In accordance with the requirements of
FCC 47 CFR Part 2(2.1093), ANSI/IEEE C95.1-1992 and
IEEE Std 1528-2013

FCC SAR EVALUATION REPORT

Product Name： Pc smart

Trademark： N/A

Model Name： Touch Smart Pro GP Series

Serial Model： N/A

Report No.： NTEK-2016NT03084611HF

FCC ID： 2ABFV-LTE27

Prepared for

PC Smart S.A.

Carrera 116 no.15-25, Bogota, Colombia.

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name	PC Smart S.A.
Address	Carrera 116 no.15-25, Bogota, Colombia.
Manufacture's Name	Locopo Technolgy Co.,Ltd.
Address	Rm./Flat 1501(056), 15/F, Spa Centre,53-55 Lockhart Road, Wan Chai, Kong Kong

Product description

Product name	Pc smart
Trademark	N/A
Model and/or type reference	Touch Smart Pro GP Series
Serial Model	N/A
Standards	FCC 47 CFR Part 2(2.1093) ANSI/IEEE C95.1-1992 IEEE Std 1528-2013 Published RF exposure KDB procedures

This device described above has been tested by Shenzhen NTEK. In accordance with the measurement methods and procedures specified in IEEE Std 1528-2013 and KDB 865664 D01. Testing has shown that this device is capable of compliance with localized specific absorption rate (SAR) specified in FCC 47 CFR Part 2(2.1093) and ANSI/IEEE C95.1-1992. The test results in this report apply only to the tested sample of the stated device/equipment. Other similar device/equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

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Date of Test

Date (s) of performance of tests ..... Apr. 21, 2016 ~ Apr. 24, 2016

Date of Issue ..... May 03, 2016

Test Result ..... **Pass**

Prepared By (Test Engineer) : Jerry

(Jerry)

Approved By (Lab Manager) : Sam . Chen

(Sam Chen)

※ ※ Revision History ※ ※

REV.	DESCRIPTION	ISSUED DATE	REMARK
Rev.1.0	Initial Test Report Release	May 03, 2016	Jerry

TABLE OF CONTENTS

1. General Information

1.1. RF exposure limits

(A).Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

(B).Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

NOTE: ***Whole-Body SAR*** is averaged over the entire body, ***partial-body SAR*** is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. ***SAR for hands, wrists, feet and ankles*** is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

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

General Population/Uncontrolled Environments:
Are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

NOTE
HEAD AND TRUNK LIMIT
1.6 W/kg
APPLIED TO THIS EUT

1.2. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Touch Smart Pro GP Series are as follows.

Band	Max Reported SAR(W/kg)		
	1-g Head	1-g Body(0mm)	Max. SAR Summation
GSM 850	0.282	1.196	1.544
GSM 1900	0.151	1.194	
UMTS Band V	0.170	1.154	
UMTS Band II	0.221	1.027	
LTE Band IV	0.127	1.000	
LTE Band VII	0.235	1.190	
WiFi 2.4G	0.221	0.348	

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR Part 2(2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE Std 1528-2013 & KDB 865664 D01.

1.3. EUT Description

Device Information			
Product Name	Pc smart		
Trade Name	N/A		
Model Name	Touch Smart Pro GP Series		
Serial Model	N/A		
FCC ID	2ABFV-LTE27		
Device Phase	Identical Prototype		
Exposure Category	General population / Uncontrolled environment		
Antenna	FPCB Antenna		
Device Operating Configurations			
Supporting Mode(s)	GSM 850/1900, UMTS Band V/II, LTE Band IV/VII, WiFi 2.4G, BT		
Test Modulation	GSM(GMSK/8PSK), UMTS(QPSK), LTE(QPSK/16QAM), WiFi(DSSS/OFDM)		
Device Class	B		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM 850	824-849	869-894
	GSM 1900	1850-1910	1930-1990
	UMTS Band V	824-849	869-894
	UMTS Band II	1850-1910	1930-1990
	LTE Band IV	1710-1755	2110-2155
	LTE Band VII	2500-2570	2620-2690
	WiFi 2.4G	2412-2462	
	BT	2402-2480	
GPRS Multislot Class(12)	Max Number of Timeslots in Uplink	4	
	Max Number of Timeslots in Downlink	4	
	Max Total Timeslot	5	
EDGE Multislot Class(12)	Max Number of Timeslots in Uplink	4	
	Max Number of Timeslots in Downlink	4	
	Max Total Timeslot	5	
HSDPA UE Category	14		
HSUPA UE Category	6		
Power Class	4, tested with power level 5(GSM 850)		
	1, tested with power level 0(GSM 1900)		
	3, tested with power control “all 1”(UMTS Band V)		
	3, tested with power control “all 1”(UMTS Band II)		
	3, tested with power control all Max.(LTE Band IV)		
	3, tested with power control all Max.(LTE Band VII)		
Test Channels (low-mid-high)	128-189-251(GSM 850)		

	512-661-810(GSM 1900)
	4132-4182-4233(UMTS Band V)
	9262-9400-9538(UMTS Band II)
	19957-20175-20393(LTE Band IV BW=1.4MHz)
	19965-20175-20385(LTE Band IV BW=3MHz)
	19975-20175-20375(LTE Band IV BW=5MHz)
	20000-20175-20350(LTE Band IV BW=10MHz)
	20025-20175-20325(LTE Band IV BW=15MHz)
	20050-20175-20300(LTE Band IV BW=20MHz)
	20775-21100-21425(LTE Band VII BW=5MHz)
	20800-21100-21400(LTE Band VII BW=10MHz)
	20825-21100-21375(LTE Band VII BW=15MHz)
	20850-21100-21350(LTE Band VII BW=20MHz)
	802.11 b/g/n:1-6-11(WiFi 2.4G)

1.4. Test specification(s)

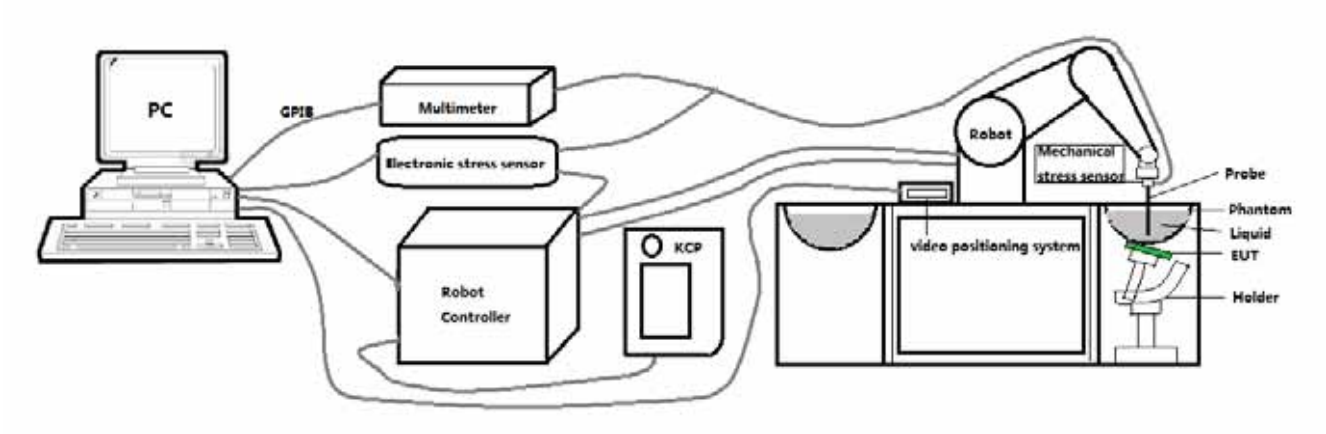
FCC 47 CFR Part 2(2.1093)
ANSI/IEEE C95.1-1992
IEEE Std 1528-2013
KDB 865664 D01 SAR measurement 100 MHz to 6 GHz
KDB 865664 D02 RF Exposure Reporting
KDB 447498 D01 General RF Exposure Guidance
KDB 248227 D01 802.11 Wi-Fi SAR
KDB 941225 D01 3G SAR Procedures
KDB 941225 D05 SAR for LTE Devices
KDB 616217 D04 SAR for laptop and tablets
KDB 648474 D04 Handset SAR

1.5. Ambient Condition

Ambient temperature	20°C – 24°C
Relative Humidity	30% – 70%

2. SAR Measurement System

2.1. SATIMO SAR Measurement Set-up Diagram



These measurements were performed with the automated near-field scanning system OPENSAR from SATIMO. The system is based on a high precision robot (working range: 901 mm), which positions the probes with a positional repeatability of better than ±0.03 mm. The SAR measurements were conducted with dosimetric probe (manufactured by SATIMO), designed in the classical triangular configuration and optimized for dosimetric evaluation.

The first step of the field measurement is the evaluation of the voltages induced on the probe by the device under test. Probe diode detectors are nonlinear. Below the diode compression point, the output voltage is proportional to the square of the applied E-field; above the diode compression point, it is linear to the applied E-field. The compression point depends on the diode, and a calibration procedure is necessary for each sensor of the probe.

The Keithley multimeter reads the voltage of each sensor and send these three values to the PC. The corresponding E field value is calculated using the probe calibration factors, which are stored in the working directory. This evaluation includes linearization of the diode characteristics. The field calculation is done separately for each sensor. Each component of the E field is displayed on the "Dipole Area Scan Interface" and the total E field is displayed on the "3D Interface"

2.2. Robot

The SATIMO SAR system uses the high precision robots from KUKA. For the 6-axis controller system, the robot controller version (KUKA) from KUKA is used. The KUKA robot series have many features that are important for our application:

- High precision (repeatability ±0.03 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

2.3. E-Field Probe

This E-field detection probe is composed of three orthogonal dipoles linked to special Schottky diodes with low detection thresholds. The probe allows the measurement of electric fields in liquids such as the one defined in the IEEE and CENELEC standards.

For the measurements the Specific Dosimetric E-Field Probe SN 34/15 EPGO 267 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter : 2.5 mm
- Distance between probe tip and sensor center: 1 mm
- Distance between sensor center and the inner phantom surface: 4 mm (repeatability better than ±1 mm).
- Probe linearity: ±0.06 dB
- Axial isotropy: <0.25 dB
- Hemispherical Isotropy: <0.50 dB
- Calibration range: 450MHz to 6000MHz for head & body simulating liquid.
- Lower detection limit: 9mW/kg

Angle between probe axis (evaluation axis) and surface normal line: less than 30°.

For the measurements the Specific Dosimetric E-Field Probe SN 27/15 EPGO 262 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter : 2.5 mm
- Distance between probe tip and sensor center: 1 mm
- Distance between sensor center and the inner phantom surface: 4 mm (repeatability better than ±1 mm).
- Probe linearity: ±0.08 dB
- Axial isotropy: <0.25 dB
- Hemispherical Isotropy: <0.50 dB
- Calibration range: 450MHz to 6000MHz for head & body simulating liquid.
- Lower detection limit: 8mW/kg

Angle between probe axis (evaluation axis) and surface normal line: less than 30°.

2.3.1. E-Field Probe Calibration

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

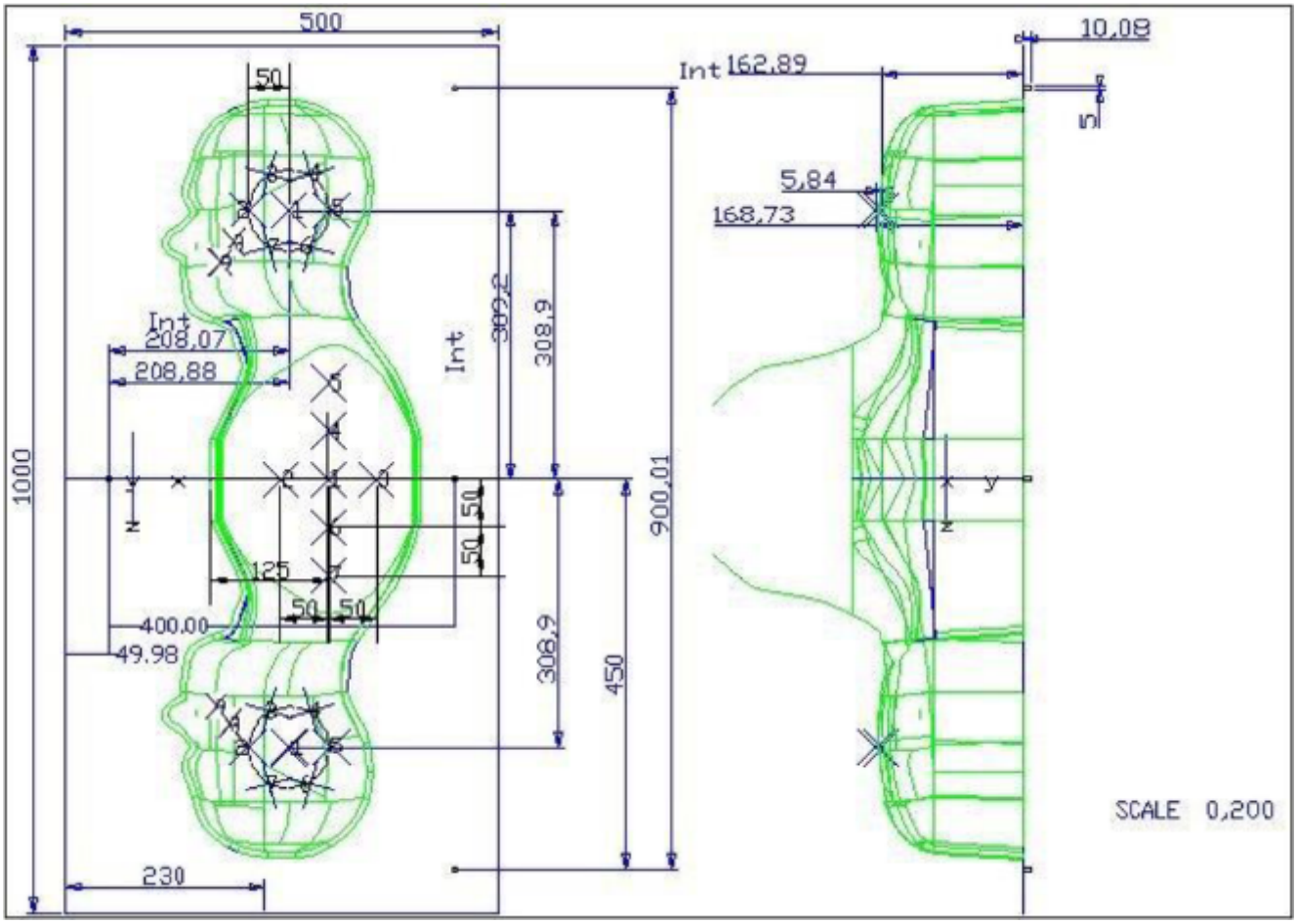
2.4. SAM phantoms

Photo of SAM phantom SN 16/15 SAM119

The SAM phantom is used to measure the SAR relative to people exposed to electro-magnetic field radiated by mobile phones.

2.4.1. Technical Data

Serial Number	Shell thickness	Filling volume	Dimensions	Positionner Material	Permittivity	Loss Tangent
SN 16/15 SAM119	2 mm ±0.2 mm	27 liters	Length:1000 mm Width:500 mm Height:200 mm	Gelcoat with fiberglass	3.4	0.02

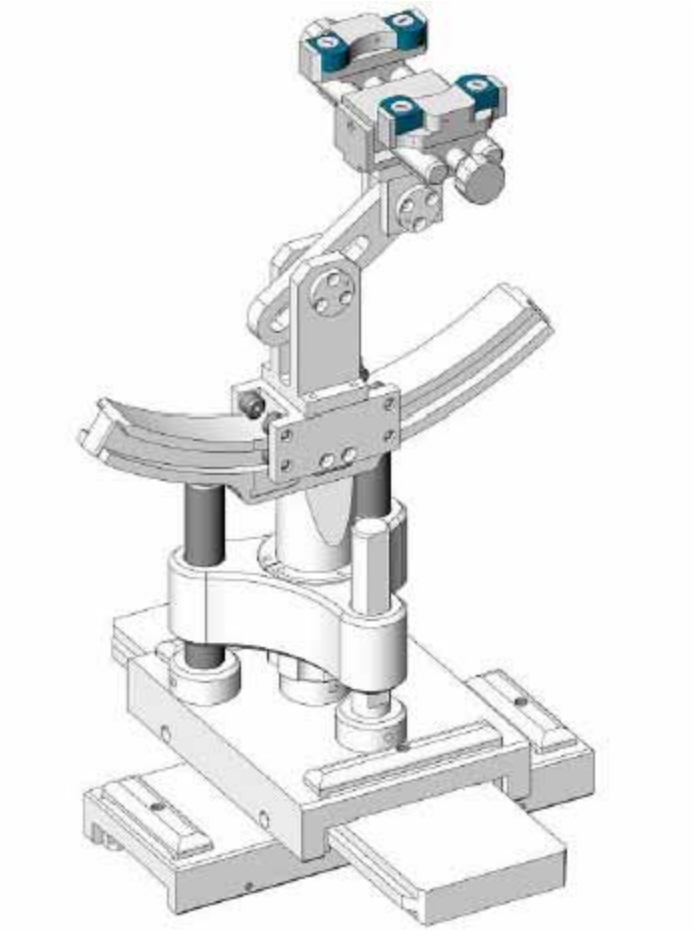


Serial Number	Left Head		Right Head		Flat Part	
SN 16/15 SAM119	2	2.02	2	2.08	1	2.09
	3	2.05	3	2.06	2	2.06
	4	2.07	4	2.07	3	2.08
	5	2.08	5	2.08	4	2.10
	6	2.05	6	2.07	5	2.10
	7	2.05	7	2.05	6	2.07
	8	2.07	8	2.06	7	2.07
	9	2.08	9	2.06	-	-

The test, based on ultrasonic system, allows measuring the thickness with an accuracy of 10 µm.

2.5. Device Holder

The positioning system allows obtaining cheek and tilting position with a very good accuracy. In compliance with CENELEC, the tilt angle uncertainty is lower than 1 degree.



Serial Number	Holder Material	Permittivity	Loss Tangent
SN 16/15 MSH100	Delrin	3.7	0.005

2.6. Test Equipment List

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

	Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
					Last Cal.	Due Date
☒	MVG	E FIELD PROBE	SSE2	SN 34/15 EPGO267	Aug. 24, 2015	Aug. 23, 2016
☒	MVG	E FIELD PROBE	SSE2	SN 27/15 EPGO262	Jul. 09, 2015	Jul. 08, 2016
☐	MVG	450 MHz Dipole	SID450	SN 03/15 DIP 0G450-345	Apr. 06, 2015	Apr. 05, 2018
☐	MVG	750 MHz Dipole	SID750	SN 03/15 DIP 0G750-355	Apr. 06, 2015	Apr. 05, 2018
☒	MVG	835 MHz Dipole	SID835	SN 03/15 DIP 0G835-347	Apr. 06, 2015	Apr. 05, 2018
☐	MVG	900 MHz Dipole	SID900	SN 03/15 DIP 0G900-348	Apr. 06, 2015	Apr. 05, 2018
☒	MVG	1750 MHz Dipole	SID1750	SN 03/15 DIP 1G750-357	Jul. 09, 2015	Jul. 08, 2018
☐	MVG	1800 MHz Dipole	SID1800	SN 03/15 DIP 1G800-349	Apr. 06, 2015	Apr. 05, 2018
☒	MVG	1900 MHz Dipole	SID1900	SN 03/15 DIP 1G900-350	Apr. 06, 2015	Apr. 05, 2018
☐	MVG	2000 MHz Dipole	SID2000	SN 03/15 DIP 2G000-351	Apr. 06, 2015	Apr. 05, 2018
☒	MVG	2450 MHz Dipole	SID2450	SN 03/15 DIP 2G450-352	Apr. 06, 2015	Apr. 05, 2018
☒	MVG	2600 MHz Dipole	SID2600	SN 03/15 DIP 2G600-356	Apr. 06, 2015	Apr. 05, 2018
☐	MVG	5000 MHz Dipole	SWG5500	SN 13/14 WGA 33	Apr. 06, 2015	Apr. 05, 2018
☒	MVG	Liquid measurement Kit	SCLMP	SN 21/15 OCPG 72	NCR	NCR
☒	MVG	Power Amplifier	N.A	AMPLISAR_28/14_003	NCR	NCR
☒	KEITHLEY	Millivoltmeter	2000	4072790	NCR	NCR
☒	R&S	Universal radio communication tester	CMU200	117858	Aug. 08, 2015	Aug. 07, 2016

☒	R&S	Wideband radio communication tester	CMW500	148500	Jun 28, 2015	Jun 27, 2016
☒	Agilent	Network Analyzer	8753D	3410J01136	Aug. 08, 2015	Aug. 07, 2016
☒	Agilent	PSG Analog Signal Generator	E8257D	MY51110112	Aug. 08, 2015	Aug. 07, 2016
☒	Agilent	Power meter	E4419B	MY45102538	Jul. 31, 2015	Jul. 30, 2016
☒	Agilent	Power sensor	E9301A	MY41495644	Jul. 31, 2015	Jul. 30, 2016
☒	Agilent	Power sensor	E9301A	US39212148	Jul. 31, 2015	Jul. 30, 2016
☒	MCLI/USA	Directional Coupler	CB11-20	0D2L51502	Aug. 13, 2015	Aug. 12, 2016

3. SAR Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>
(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
(b) Read the WWAN RF power level from the base station simulator.
(c) For WiFi/BT power measurement, use engineering software to configure EUT WiFi/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band.
(d) Connect EUT RF port through RF cable to the power meter, and measure WiFi/BT output power.

<SAR measurement>
(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WiFi/BT continuously transmission, at maximum RF power, in the highest power channel.
(b) Place the EUT in the positions as Appendix A demonstrates.
(c) Set scan area, grid size and other setting on the OPENSAR software.
(d) Measure SAR results for the highest power channel on each testing position.
(e) Find out the largest SAR result on these testing positions of each band.
(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg.

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:
(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

3.1. Power Reference

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

3.2. Area scan & Zoom scan

The area scan is a 2D scan to find the hot spot location on the DUT. The zoom scan is a 3D scan above the hot spot to calculate the 1g and 10g SAR value.
Measurement of the SAR distribution with a grid of 8 to 16 mm * 8 to 16 mm and a constant distance to

the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme. Around this point, a cube of 30 * 30 *30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8 * 4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

From the scanned SAR distribution, identify the position of the maximum SAR value, in addition identify the positions of any local maxima with SAR values within 2 dB of the maximum value that will not be within the zoom scan of other peaks; additional peaks shall be measured only when the primary peak is within 2 dB of the SAR compliance limit (e.g., 1 W/kg for 1,6 W/kg 1 g limit, or 1,26 W/kg for 2 W/kg, 10 g limit).

Area scan & Zoom scan scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

3.3. Description of interpolation/extrapolation scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimise measurements errors, but the highest local SAR will occur at the surface of the phantom.
An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1 mm step.
The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1 gram requires a very fine resolution in the three dimensional scanned data array.

3.4. Volumetric Scan

The volumetric scan consists to a full 3D scan over a specific area. This 3D scan is useful form multi Tx SAR measurement. Indeed, it is possible with OpenSAR to add, point by point, several volumetric scan to calculate the SAR value of the combined measurement as it is define in the standard IEEE1528 and IEC62209.

3.5. Power Drift

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

4. System Verification Procedure

4.1. Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% of weight)	Head Tissue							
Frequency Band (MHz)	750	835	900	1800	1900	2000	2450	2600
Water	34.40	34.40	34.40	55.36	55.36	57.87	57.87	57.87
NaCl	0.79	0.79	0.79	0.35	0.35	0.16	0.16	0.16
1,2-Propanediol	64.81	64.81	64.81	0.00	0.00	0.00	0.00	0.00
Triton X-100	0.00	0.00	0.00	30.45	30.45	19.97	19.97	19.97
DGBE	0.00	0.00	0.00	13.84	13.84	22.00	22.00	22.00
Ingredients (% of weight)	Body Tissue							
Frequency Band (MHz)	750	835	900	1800	1900	2000	2450	2600
Water	50.30	50.30	50.30	69.91	69.91	71.88	71.88	71.88
NaCl	0.60	0.60	0.60	0.13	0.13	0.16	0.16	0.16
1,2-Propanediol	49.10	49.10	49.10	0.00	0.00	0.00	0.00	0.00
Triton X-100	0.00	0.00	0.00	9.99	9.99	19.97	19.97	19.97
DGBE	0.00	0.00	0.00	19.97	19.97	7.99	7.99	7.99

4.1.1. Tissue Dielectric Parameter Check Results

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.

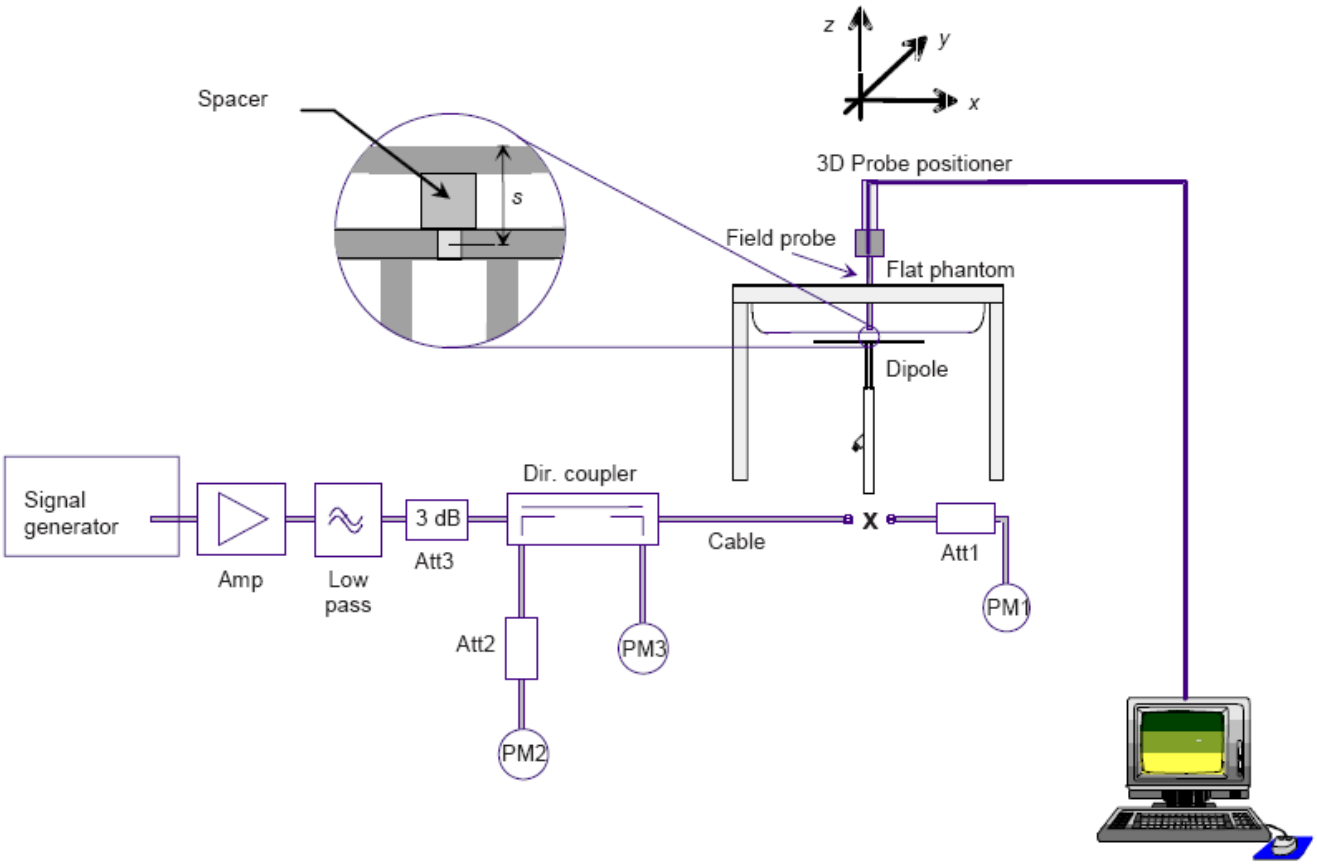
Tissue Type	Measured Frequency (MHz)	Target Tissue		Measured Tissue		Liquid Temp.	Test Date
		εr (±5%)	σ (S/m) (±5%)	εr	σ (S/m)		
Head 850	835	41.50 (39.43~43.57)	0.90 (0.86~0.94)	41.76	0.90	21.3 °C	Apr. 21, 2016
Body 850	835	55.20 (52.44~57.96)	0.97 (0.92~1.01)	55.08	1.00	21.3 °C	Apr. 21, 2016
Head 1750	1750	40.10 (38.10~42.11)	1.37 (1.30~1.44)	40.60	1.34	21.4 °C	Apr. 23, 2016
Body 1750	1750	53.40 (50.73~56.07)	1.49 (1.42~1.56)	52.11	1.55	21.3 °C	Apr. 23, 2016
Head 1900	1900	40.00 (38.00~42.00)	1.40 (1.33~1.47)	39.12	1.43	21.5 °C	Apr. 22, 2016
Body 1900	1900	53.30 (50.64~55.96)	1.52 (1.44~1.59)	53.04	1.52	21.4 °C	Apr. 22, 2016
Head 2450	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	40.39	1.79	21.4 °C	Apr. 24, 2016
Body 2450	2450	52.70 (50.07~55.33)	1.95 (1.85~2.04)	51.91	1.90	21.6 °C	Apr. 24, 2016
Head 2600	2600	39.00 (37.05~40.95)	1.96 (1.86~2.05)	39.29	1.93	21.5 °C	Apr. 23, 2016
Body 2600	2600	52.50 (49.88~55.13)	2.16 (2.05~2.27)	52.08	2.22	21.6 °C	Apr. 23, 2016

NOTE: 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.

4.2. System Verification Procedure

The system verification is performed for verifying the accuracy of the complete measurement system and performance of the software. 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 100mW (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 verification 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 verification to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test (result on plot).

The system verification is shown as below picture:



4.2.1. System Verification Results

Comparing to the original SAR value provided by SATIMO, the verification data should be within its specification of ±10%. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance verification can meet the variation criterion and the plots can be referred to Appendix B of this report.

System Verification	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)		
835MHz Head	9.56 (8.60~10.51)	6.22 (5.60~6.84)	9.46	6.09	21.3 °C	Apr. 21, 2016
835MHz Body	9.48 (8.53~10.42)	6.29 (5.66~6.91)	9.65	6.17	21.3 °C	Apr. 21, 2016
1750MHz Head	36.40 (32.76~40.04)	19.30 (17.37~21.23)	39.62	18.50	21.4 °C	Apr. 23, 2016
1750MHz Body	36.91 (33.22~40.60)	20.18 (18.16~22.20)	39.86	19.26	21.3 °C	Apr. 23, 2016
1900MHz Head	39.70 (35.73~43.67)	20.50 (18.45~22.55)	40.60	18.97	21.5 °C	Apr. 22, 2016
1900MHz Body	38.43 (34.59~42.27)	20.34 (18.31~22.37)	40.12	19.02	21.4 °C	Apr. 22, 2016
2450MHz Head	52.40 (47.16~57.64)	24.00 (21.60~26.40)	55.84	23.49	21.4 °C	Apr. 24, 2016
2450MHz Body	49.32 (44.39~54.25)	22.89 (20.60~25.17)	53.79	22.86	21.6 °C	Apr. 24, 2016
2600MHz Head	55.30 (49.77~60.83)	24.60 (22.14~27.06)	55.24	25.27	21.5 °C	Apr. 23, 2016
2600MHz Body	52.95 (47.66~58.25)	23.64 (21.28~26.00)	53.24	24.06	21.6 °C	Apr. 23, 2016

5. SAR Measurement variability and uncertainty

5.1. SAR measurement variability

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

5.2. SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

6. RF Exposure Positions

6.1. Ear and handset reference point

Figure 6.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M”, the left ear reference point (ERP) is marked “LE”, and the right ERP is marked “RE”.

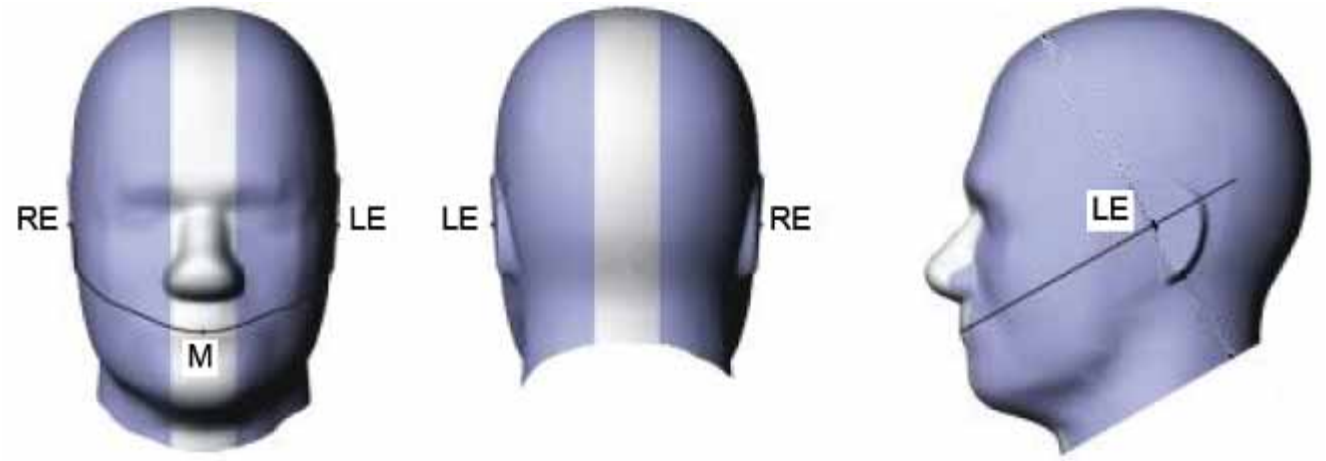


Fig 6.1.1 Front, back, and side views of SAM phantom

6.2. Definition of the cheek position

1. Define two imaginary lines on the handset, the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset: the midpoint of the width w_t of the handset at the level of the acoustic output (point A in Figure 6.2.1 and Figure 6.2.2), and the midpoint of the width w_b of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 6.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 6.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
2. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 6.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
3. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP
4. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
5. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.

6. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 6.2.3. The actual rotation angles should be documented in the test report.

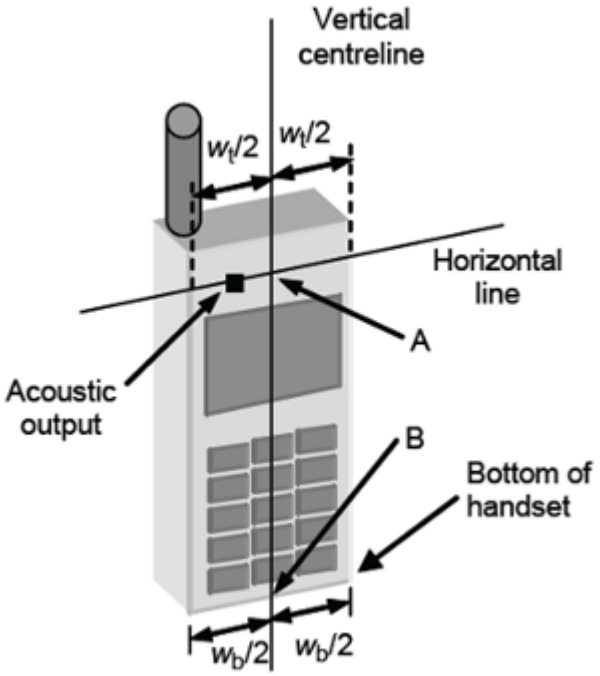


Fig 6.2.1 Handset vertical and horizontal reference lines—"fixed case

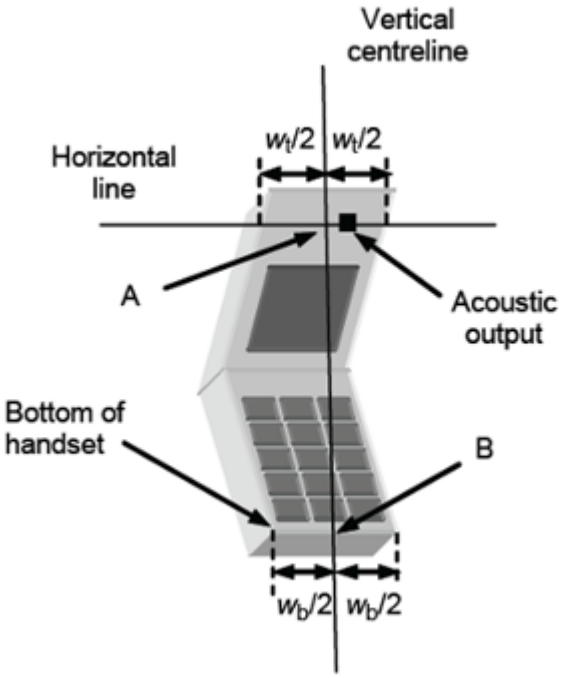


Fig 6.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

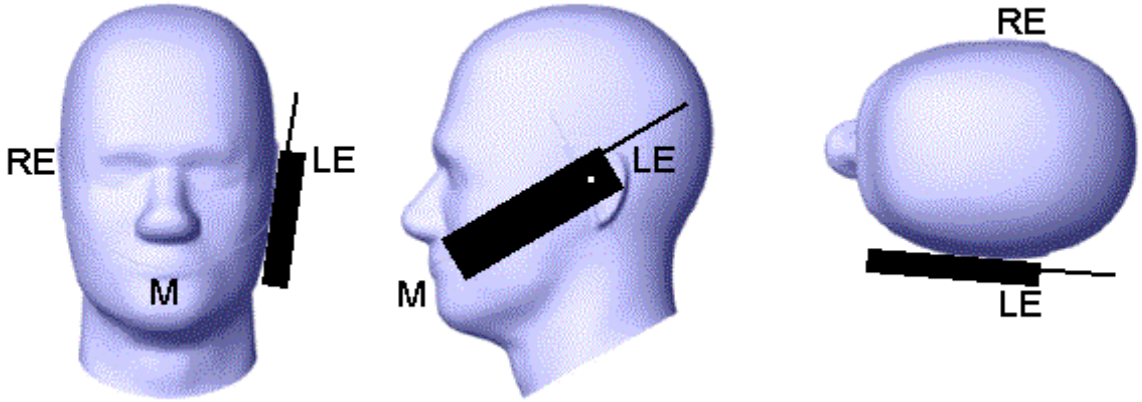


Fig 6.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

6.3. Definition of the tilt position

1. While maintaining the orientation of the handset, retract the handset parallel to the reference plane far enough away from the phantom to enable a rotation of the device by 15 degree.
2. Rotate the Handset around the horizontal line by 15 degree (see Figure 6.3.1).
3. While maintaining the orientation of the handset, move the handset towards the phantom on a line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact is on the pinna. If the contact is at any location other than the pinna, e.g., the antenna with the back of the phantom head, the angle of the handset shall be reduced. In this case, the tilt position is obtained if any part of the handset is in contact with the pinna as well as a second part of the handset is in contact with the phantom, e.g., the antenna with the back of the head.

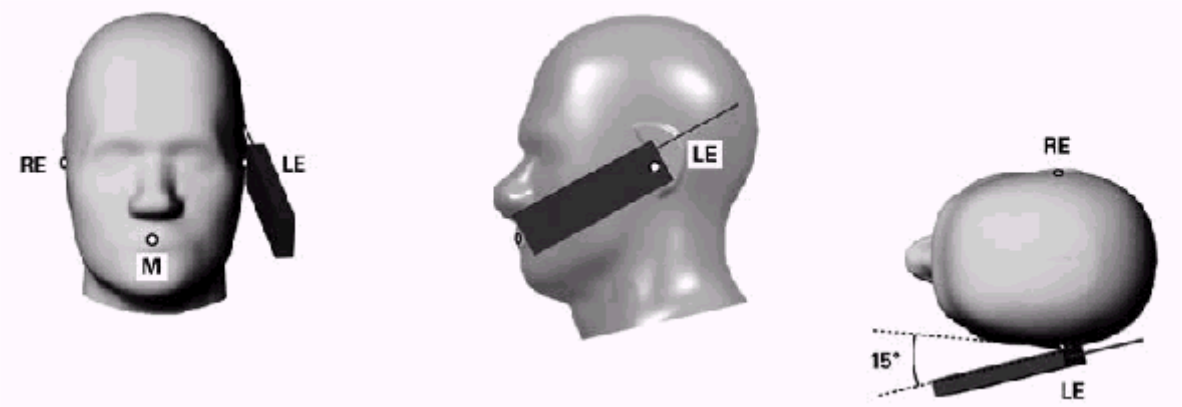


Figure 6.3.1 – Tilt position of the wireless device on the left side of SAM

6.4. Tablet SAR test considerations

Most recent tablets are designed with an interactive display that may not require a physical keyboard. Both configurations are used in similar manners and require SAR evaluation for the back surface and edges of the tablet.

a) ≤ 5 mm between the antenna and user for both back surface and edge exposure conditions

b) the antennas used by the host must have been tested for equipment approval or qualify for SAR test exclusion

c) the antenna polarization, physical orientation, rotation and installation configurations used by the host must have been tested for compliance or qualify for test exclusion

7. RF Output Power

7.1. Maximum Tune-up Limit

Band	Mode	The Tune-up Maximum Power (Customer Declared)(dBm)	Range	Measured Maximum Output Power(dBm)
GSM 850	GSM (GMSK)	32±1	31~33	32.56
	GPRS(GMSK, 1 Tx slot)	32±1	31~33	32.68
	GPRS(GMSK, 2 Tx slot)	32±1	31~33	32.51
	GPRS(GMSK, 3 Tx slot)	32±1	31~33	32.25
	GPRS(GMSK, 4 Tx slot)	32±1	31~33	32.31
	EDGE(8PSK, 1 Tx slot)	27±1	26~28	27.58
	EDGE(8PSK, 2 Tx slot)	27±1	26~28	27.48
	EDGE(8PSK, 3 Tx slot)	27±1	26~28	27.38
	EDGE(8PSK, 4 Tx slot)	27±1	26~28	27.16
GSM 1900	GSM (GMSK)	29±1	28~30	29.85
	GPRS(GMSK, 1 Tx slot)	29±1	28~30	29.13
	GPRS(GMSK, 2 Tx slot)	29±1	28~30	29.03
	GPRS(GMSK, 3 Tx slot)	29±1	28~30	28.77
	GPRS(GMSK, 4 Tx slot)	29±1	28~30	28.62
	EDGE(8PSK, 1 Tx slot)	25±1	24~26	25.24
	EDGE(8PSK, 2 Tx slot)	25±1	24~26	25.03
	EDGE(8PSK, 3 Tx slot)	25±1	24~26	25.73
	EDGE(8PSK, 4 Tx slot)	25±1	24~26	25.65
UMTS Band V	RMC 12.2Kbps	22±1	21~23	22.36
	HSDPA Subtest-1	20±1	19~21	20.54
	HSDPA Subtest-2	20±1	19~21	19.87
	HSDPA Subtest-3	20±1	19~21	19.88
	HSDPA Subtest-4	20±1	19~21	19.99
	HSUPA Subtest-1	20±1	19~21	20.51
	HSUPA Subtest-2	20±1	19~21	19.97
	HSUPA Subtest-3	20±1	19~21	19.87
	HSUPA Subtest-4	20±1	19~21	19.89
	HSUPA Subtest-5	20±1	19~21	19.76
UMTS Band II	RMC 12.2Kbps	22±1	21~23	22.45
	HSDPA Subtest-1	21±1	20~22	20.86
	HSDPA Subtest-2	21±1	20~22	21.36
	HSDPA Subtest-3	21±1	20~22	21.76
	HSDPA Subtest-4	21±1	20~22	21.53

	HSUPA Subtest-1	20±1	19~21	20.46
	HSUPA Subtest-2	20±1	19~21	19.81
	HSUPA Subtest-3	20±1	19~21	19.88
	HSUPA Subtest-4	20±1	19~21	19.88
	HSUPA Subtest-5	20±1	19~21	19.97
LTE Band IV	1.4M QPSK 1RB	23±1	22~24	23.69
	1.4M QPSK 3RB	23±1	22~24	23.48
	1.4M QPSK 6RB	22±1	21~23	22.50
	1.4M 16QAM 1RB	23±1	22~24	23.43
	1.4M 16QAM 3RB	23±1	22~24	23.36
	1.4M 16QAM 6RB	22±1	21~23	22.41
	3M QPSK 1RB	23±1	22~24	23.48
	3M QPSK 8RB	23±1	22~24	23.29
	3M QPSK 15RB	22±1	21~23	22.39
	3M 16QAM 1RB	23±1	22~24	23.40
	3M 16QAM 8RB	23±1	22~24	23.26
	3M 16QAM 15RB	22±1	21~23	22.53
	5M QPSK 1RB	23±1	22~24	23.17
	5M QPSK 12RB	21±1	20~22	21.84
	5M QPSK 25RB	21±1	20~22	21.80
	5M 16QAM 1RB	23±1	22~24	23.12
	5M 16QAM 12RB	21±1	20~22	21.81
	5M 16QAM 25RB	21±1	20~22	21.77
	10M QPSK 1RB	22±1	21~23	22.53
	10M QPSK 25RB	21±1	20~22	21.72
	10M QPSK 50RB	21±1	20~22	21.71
	10M 16QAM 1RB	22±1	21~23	22.49
	10M 16QAM 25RB	21±1	20~22	21.69
	10M 16QAM 50RB	21±1	20~22	21.68
	15M QPSK 1RB	22±1	21~23	22.91
	15M QPSK 36RB	21±1	20~22	21.85
	15M QPSK 75RB	21±1	20~22	21.79
	15M 16QAM 1RB	22±1	21~23	22.93
	15M 16QAM 36RB	21±1	20~22	21.90
	15M 16QAM 75RB	21±1	20~22	21.84
	20M QPSK 1RB	23±1	22~24	23.32
	20M QPSK 50RB	21±1	20~22	21.90
	20M QPSK 100RB	21±1	20~22	21.85
	20M 16QAM 1RB	23±1	22~24	23.01
	20M 16QAM 50RB	21±1	20~22	21.88

	20M 16QAM 100RB	21±1	20~22	21.82
LTE Band VII	5M QPSK 1RB	22±1	21~23	22.85
	5M QPSK 12RB	21±1	20~22	21.40
	5M QPSK 25RB	21±1	20~22	21.11
	5M 16QAM 1RB	22±1	21~23	22.65
	5M 16QAM 12RB	21±1	20~22	21.24
	5M 16QAM 25RB	21±1	20~22	21.09
	10M QPSK 1RB	22±1	21~23	22.54
	10M QPSK 25RB	21±1	20~22	21.59
	10M QPSK 50RB	21±1	20~22	21.19
	10M 16QAM 1RB	22±1	21~23	22.49
	10M 16QAM 25RB	21±1	20~22	21.55
	10M 16QAM 50RB	21±1	20~22	21.17
	15M QPSK 1RB	22±1	21~23	22.58
	15M QPSK 36RB	21±1	20~22	21.71
	15M QPSK 75RB	21±1	20~22	21.33
	15M 16QAM 1RB	22±1	21~23	22.49
	15M 16QAM 36RB	21±1	20~22	21.69
	15M 16QAM 75RB	21±1	20~22	21.27
	20M QPSK 1RB	22±1	21~23	22.53
	20M QPSK 50RB	21±1	20~22	21.50
	20M QPSK 100RB	21±1	20~22	21.32
	20M 16QAM 1RB	22±1	21~23	22.49
	20M 16QAM 50RB	21±1	20~22	21.50
	20M 16QAM 100RB	21±1	20~22	21.32
WiFi 2.4G	802.11b	11±1	10~12	11.75
	802.11g	9±1	8~10	9.27
	802.11n-HT20	9±1	8~10	9.70
	802.11n-HT40	5±1	4~6	5.88
BT	3.0	2±1	1~3	2.64
	4.0	-4±1	-5~-3	-3.66

7.2. GSM Conducted Power

Per KDB 447498 D01, the maximum output power channel is used for SAR testing and for further SAR test reduction. Therefore, the EUT was set in GPRS (4Tx slots) for GSM850/GSM1900.

Band GSM850	Burst-Averaged output Power (dBm)				Frame-Averaged output Power (dBm)			
Tx Channel	Tune-up	128	189	251	Tune-up	128	189	251
Frequency (MHz)	(dBm)	824.2	836.4	848.8	(dBm)	824.2	836.4	848.8
GSM (GMSK)	33.00	32.56	32.44	32.38	23.97	23.53	23.41	23.35
GPRS(GMSK, 1 TS)	33.00	32.68	32.39	32.31	23.97	23.65	23.36	23.28
GPRS(GMSK, 2 TS)	33.00	32.51	32.34	32.29	26.98	26.49	26.32	26.27
GPRS(GMSK, 3 TS)	33.00	32.21	32.25	32.15	28.74	27.95	27.99	27.89
GPRS(GMSK, 4 TS)	33.00	32.31	32.02	31.43	29.99	29.30	29.01	28.42
EDGE(8PSK, 1 TS)	28.00	27.58	27.42	27.52	18.97	18.55	18.39	18.49
EDGE(8PSK, 2 TS)	28.00	27.48	27.37	27.27	21.98	21.46	21.35	21.25
EDGE(8PSK, 3 TS)	28.00	27.04	27.22	27.38	23.74	22.78	22.96	23.12
EDGE(8PSK, 4 TS)	28.00	27.16	27.03	27.05	24.99	24.15	24.02	24.04
Band GSM1900	Burst-Averaged output Power (dBm)				Frame-Averaged output Power (dBm)			
Tx Channel	Tune-up	512	661	810	Tune-up	512	661	810
Frequency (MHz)	(dBm)	1850.2	1880.0	1909.8	(dBm)	1850.2	1880.0	1909.8
GSM (GMSK)	30.00	29.85	29.21	28.99	20.97	20.82	20.18	19.96
GPRS(GMSK, 1 TS)	30.00	28.79	29.13	28.57	20.97	19.76	20.10	19.54
GPRS(GMSK, 2 TS)	30.00	29.03	29.01	28.79	23.98	23.01	22.99	22.77
GPRS(GMSK, 3 TS)	30.00	28.25	28.77	28.47	25.74	23.99	24.51	24.21
GPRS(GMSK, 4 TS)	30.00	28.35	28.47	28.62	26.99	25.34	25.46	25.61
EDGE(8PSK, 1 TS)	26.00	25.24	25.23	25.24	16.97	16.21	16.20	16.21
EDGE(8PSK, 2 TS)	26.00	24.68	25.03	24.89	19.98	18.66	19.01	18.87
EDGE(8PSK, 3 TS)	26.00	25.28	25.67	25.73	21.74	21.02	21.41	21.47
EDGE(8PSK, 4 TS)	26.00	25.35	25.65	24.97	22.99	22.34	22.64	21.96

Note: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots. The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 TS) – 9.03 dB

Frame-averaged power = Maximum burst averaged power (2 TS) – 6.02 dB

Frame-averaged power = Maximum burst averaged power (3 TS) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 TS) – 3.01 dB

7.3. UMTS Conducted Power

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

1. Release99 Setup Configuration

Mode	Subtest	Rel99
UMTS General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

2. HSDPA Setup Configuration

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
UMTS General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs =βhs/βc	30/15			

3. HSUPA Setup Configuration

	Mode	HSUPA	HSUPA	HSUPA	HSUPA	HSUPA
	Subtest	1	2	3	4	5
UMTS General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	15/15
	βec	209/225	12/15	30/15	2/15	24/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	βhs	22/15	12/15	30/15	4/15	30/15
	βed	1309/225	94/75	47/15 47/15	56/75	134/15
	CM (dB)	1.0	3.0	2.0	3.0	1.0
HSDPA Specific Settings	D_{ACK}	8				
	D_{NAK}	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				

	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9

4. UMTS Conducted Power Results

1) Per KDB 941225 D01, SAR for Head / Hotspot / Body-worn exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”.

2) Per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA.

Band	UMTS Band V			
Tx Channel	Tune-up	4132	4182	4233
Frequency (MHz)		826.4	836.4	846.6
RMC 12.2Kbps	23.00	22.25	22.36	21.97
HSDPA Subtest-1	21.00	20.54	19.78	19.88
HSDPA Subtest-2	21.00	19.87	19.85	19.73
HSDPA Subtest-3	21.00	19.43	19.88	19.86
HSDPA Subtest-4	21.00	19.94	19.68	19.99
HSUPA Subtest-1	21.00	20.51	19.72	19.82
HSUPA Subtest-2	21.00	19.93	19.94	19.97
HSUPA Subtest-3	21.00	19.83	19.87	19.80
HSUPA Subtest-4	21.00	19.89	19.79	19.77
HSUPA Subtest-5	21.00	19.73	19.75	19.76
Band	UMTS Band II			
Tx Channel	Tune-up	9262	9400	9538
Frequency (MHz)		1852.4	1880	1907.6
RMC 12.2Kbps	23.00	22.13	22.45	22.36
HSDPA Subtest-1	22.00	20.76	20.86	20.79
HSDPA Subtest-2	22.00	21.14	20.84	21.36
HSDPA Subtest-3	22.00	21.76	21.36	21.48
HSDPA Subtest-4	22.00	21.53	20.97	20.89
HSUPA Subtest-1	21.00	20.46	19.62	19.57

HSUPA Subtest-2	21.00	19.68	19.78	19.81
HSUPA Subtest-3	21.00	19.88	19.81	19.76
HSUPA Subtest-4	21.00	19.88	19.73	19.72
HSUPA Subtest-5	21.00	19.58	19.88	19.97

7.4. LTE Conducted Power

R&S CMW500 base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.

<LTE Band IV>

Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		19957/1710.7	20175/1732.5	20393/1754.3
LTE Band IV	1.4MHz	QPSK	1	0	24.00	23.69	23.54	23.07
			1	2	24.00	23.51	23.30	22.85
			1	5	24.00	23.51	23.47	22.96
			3	0	24.00	23.48	23.39	22.94
			3	2	24.00	23.35	23.34	22.88
			6	0	23.00	22.50	22.43	21.98
		16QAM	1	0	24.00	23.43	23.42	22.96
			1	2	24.00	23.20	23.23	22.77
			1	5	24.00	23.25	23.41	22.89
			3	0	24.00	23.26	23.36	22.89
			3	2	24.00	23.17	23.31	22.84
			6	0	23.00	22.41	22.40	21.95
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		19965/1711.5	20175/1732.5	20385/1753.5
LTE Band IV	3MHz	QPSK	1	0	24.00	23.18	23.48	23.05
			1	7	24.00	22.82	23.24	22.80
			1	14	24.00	22.76	23.30	22.85
			8	0	24.00	22.76	23.29	22.82
			8	7	24.00	22.76	23.28	22.80
			15	0	23.00	22.05	22.39	21.89
		16QAM	1	0	24.00	23.17	23.40	22.91
			1	7	24.00	22.85	23.20	22.71

			1	14	24.00	22.79	23.26	22.77
			8	0	24.00	22.79	23.26	22.76
			8	7	24.00	22.79	23.23	22.76
			15	0	23.00	22.06	22.35	21.86
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		19975/1712.5	20175/1732.5	20375/1752.5
LTE Band IV	5MHz	QPSK	1	0	24.00	22.84	23.12	22.81
			1	12	24.00	22.06	22.65	22.29
			1	24	24.00	22.45	23.17	22.65
			12	0	22.00	21.40	21.81	21.46
			12	11	22.00	21.26	21.84	21.40
			25	0	22.00	21.31	21.80	21.39
		16QAM	1	0	24.00	22.77	23.04	22.76
			1	12	24.00	22.09	22.60	22.26
			1	24	24.00	22.48	23.12	22.61
			12	0	22.00	21.42	21.79	21.44
			12	11	22.00	21.29	21.81	21.39
			25	0	22.00	21.34	21.77	21.37
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20000/1715	20175/1732.5	20350/1750
LTE Band IV	10MHz	QPSK	1	0	23.00	22.14	22.41	22.32
			1	24	23.00	21.97	22.53	22.22
			1	49	23.00	21.83	22.46	21.98
			25	0	22.00	21.16	21.64	21.39
			25	24	22.00	21.09	21.72	21.27
			50	0	22.00	21.14	21.71	21.37
		16QAM	1	0	23.00	22.10	22.36	22.28
			1	24	23.00	21.97	22.49	22.19
			1	49	23.00	21.84	22.41	21.96
			25	0	22.00	21.17	21.61	21.39
			25	24	22.00	21.10	21.69	21.27
			50	0	22.00	21.15	21.68	21.37
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20025/1717.5	20175/1732.5	20325/1747.5

LTE Band IV	15MHz	QPSK	1	0	23.00	22.40	22.41	22.91
			1	37	23.00	21.94	22.54	22.52
			1	74	23.00	22.30	22.78	22.46
			36	0	22.00	21.12	21.69	21.77
			36	37	22.00	21.19	21.85	21.58
			75	0	22.00	21.14	21.79	21.71
		16QAM	1	0	23.00	22.24	22.50	22.93
			1	37	23.00	21.87	22.62	22.56
			1	74	23.00	22.25	22.86	22.49
			36	0	22.00	21.09	21.75	21.80
			36	37	22.00	21.16	21.90	21.60
			75	0	22.00	21.12	21.84	21.71

Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20050/1720	20175/1732.5	20300/1745
LTE Band IV	20MHz	QPSK	1	0	24.00	22.71	22.60	23.32
			1	49	24.00	22.30	22.67	22.59
			1	99	24.00	22.83	22.81	22.43
			50	0	22.00	21.34	21.76	21.87
			50	49	22.00	21.59	21.90	21.64
			100	0	22.00	21.44	21.85	21.81
		16QAM	1	0	24.00	22.51	22.56	23.01
			1	49	24.00	22.23	22.65	22.58
			1	99	24.00	22.79	22.77	22.43
			50	0	22.00	21.31	21.70	21.86
			50	49	22.00	21.56	21.88	21.64
			100	0	22.00	21.43	21.82	21.81

<LTE Band VII>

Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20775/2502.5	21100/2535	21425/2567.5
LTE Band VII	5MHz	QPSK	1	0	23.00	22.22	21.20	22.45
			1	12	23.00	22.14	21.75	22.02
			1	24	23.00	22.85	21.34	22.46
			12	0	22.00	20.91	20.09	21.09
			12	11	22.00	21.40	20.07	21.18
			25	0	22.00	21.11	20.01	21.08

		16QAM	1	0	23.00	21.91	21.11	22.39
			1	12	23.00	21.89	21.07	21.97
			1	24	23.00	22.65	21.26	22.44
			12	0	22.00	20.72	20.12	21.09
			12	11	22.00	21.24	20.02	21.19
			25	0	22.00	20.96	20.16	21.09
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20800/2505	21100/2535	21400/2565
LTE Band VII	10MHz	QPSK	1	0	23.00	22.22	21.37	21.50
			1	24	23.00	22.11	21.60	21.81
			1	49	23.00	22.54	21.87	21.88
			25	0	22.00	20.79	20.60	20.72
			25	24	22.00	21.59	20.03	21.04
			50	0	22.00	21.19	20.81	20.93
		16QAM	1	0	23.00	21.07	21.36	21.45
			1	24	23.00	22.06	21.60	21.79
			1	49	23.00	22.49	21.87	21.87
			25	0	22.00	20.75	20.61	20.72
			25	24	22.00	21.55	20.04	21.04
			50	0	22.00	21.17	20.83	20.93
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		
			RB Size	RB Offset		20825/2507.5	21100/2535	21375/2562.5
LTE Band VII	15MHz	QPSK	1	0	23.00	21.37	21.65	21.48
			1	37	23.00	22.40	21.54	21.50
			1	74	23.00	22.58	21.00	22.06
			36	0	22.00	20.90	20.59	20.58
			36	37	22.00	21.71	20.05	20.97
			75	0	22.00	21.33	20.78	20.81
		16QAM	1	0	23.00	21.21	21.61	21.44
			1	37	23.00	22.34	21.52	21.48
			1	74	23.00	22.49	21.03	22.04
			36	0	22.00	20.83	20.55	20.55
			36	37	22.00	21.69	20.07	20.95
			75	0	22.00	21.27	20.79	20.78
Band	Band Width	Modulation	RB Configuration		Tune-up	Channel/Frequency(MHz)		

			RB Size	RB Offset		20850/2510	21100/2535	21350/2560
LTE Band VII	20MHz	QPSK	1	0	23.00	21.47	21.93	21.45
			1	49	23.00	22.53	21.56	21.39
			1	99	23.00	22.03	21.16	21.86
			50	0	22.00	21.05	20.52	20.49
			50	49	22.00	21.50	20.03	20.79
			100	0	22.00	21.32	20.77	20.67
		16QAM	1	0	23.00	21.36	21.87	21.37
			1	49	23.00	22.49	21.52	21.36
			1	99	23.00	21.99	21.14	21.83
			50	0	22.00	21.05	20.52	20.48
			50	49	22.00	21.50	20.04	20.79
			100	0	22.00	21.32	20.77	20.67

7.5. WiFi & BT Output Power

7.5.1. Output Power Results Of WiFi

The output power of WiFi is as following:

Mode	Channel	Frequence (MHz)	Tune-up	Output Power (dBm)
802.11b	1	2412	12.00	11.74
	6	2437	12.00	**11.75**
	11	2462	12.00	11.32
802.11g	1	2412	10.00	8.61
	6	2437	10.00	9.27
	11	2462	10.00	8.22
802.11n (HT20)	1	2412	10.00	8.08
	6	2437	10.00	9.70
	11	2462	10.00	8.21
802.11n (HT40)	3	2422	6.00	5.73
	6	2437	6.00	5.88
	9	2452	6.00	5.36

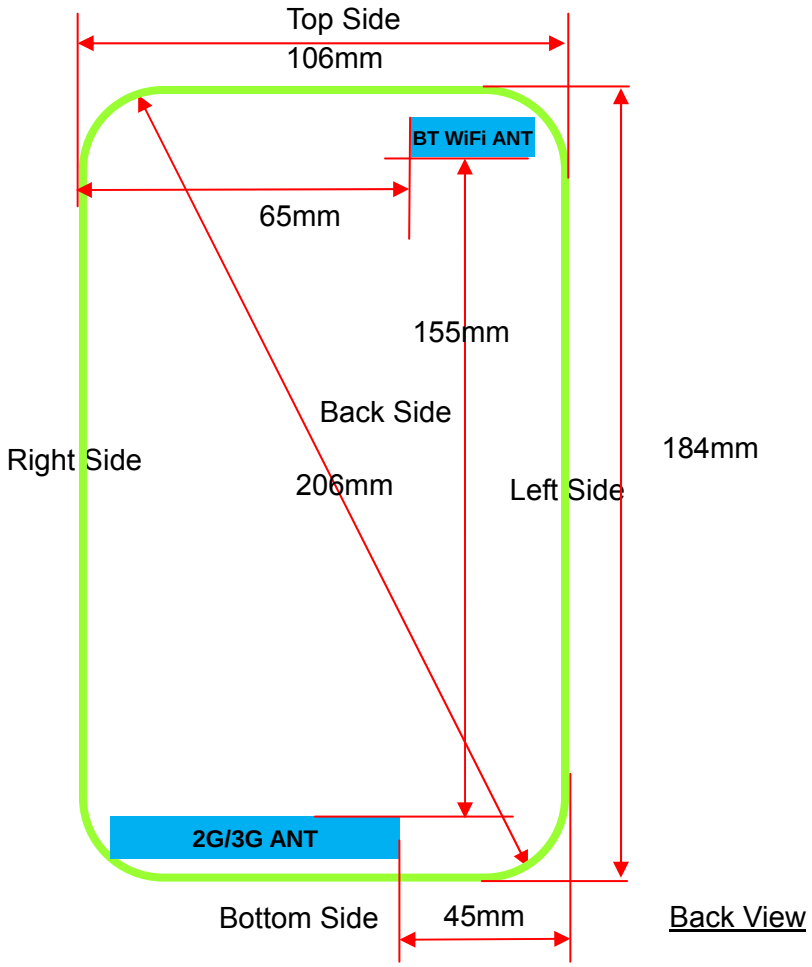
7.5.2. Output Power Results Of BT

The output power of BT is as following:

	Output Power (dBm)				
BT(3.0)	Channel	Tune-up	Data Rates		
			1M	2M	3M
	0CH	3.00	2.64	1.98	2.28
	39CH	3.00	2.58	2.00	2.26
	78CH	3.00	2.14	1.50	1.77

	Channel	Tune-up	Output Power (dBm)
BT(4.0)	0CH	-3.00	-3.86
	19CH	-3.00	-3.66
	39CH	-3.00	-4.35

8. Antenna Location



Distance of the Antenna to the EUT surface/edge						
Antennas	Front Side	Back Side	Left Side	Right Side	Top Side	Bottom Side
WWAN Main	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	>25mm	≤ 25mm
WLAN & BT	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	>25mm

Positions for SAR tests						
Antennas	Front Side	Back Side	Left Side	Right Side	Top Side	Bottom Side
WWAN Main	Yes	Yes	NO	Yes	NO	Yes
WLAN & BT	Yes	Yes	Yes	NO	Yes	NO

9. Stand-alone SAR test exclusion

Per FCC KDB 447498D01, the 1-g SAR and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[$\sqrt{f_{(GHZ)}}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where:

- $f_{(GHZ)}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

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

Mode	P_{max} (dBm)	P_{max} (mW)	Distance (mm)	f (GHz)	Calculation Result	SAR Exclusion threshold	SAR test exclusion
BT	3	2	<5	2.480	0.63	3.0	Yes

NOTE: Standalone SAR test exclusion for BT

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

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] * [$\sqrt{f_{(GHZ)}}$/x] W/kg for test separation distances ≤ 50mm, where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.

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

Mode	Position	P_{max} (dBm)	P_{max} (mW)	Distance (mm)	f (GHz)	x	Estimated SAR (W/Kg)
BT	Head	3	2	<5	2.480	7.5	0.084
BT	Body	3	2	<5	2.480	7.5	0.084

NOTE: Estimated SAR calculation for BT

10. SAR Measurement Results

10.1. SAR measurement results

General Notes:

1) Per KDB447498 D01, all measurement SAR results are scaled to the maximum tune-up tolerance limit to demonstrate compliant.

2) Per KDB447498 D01, 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 D01, 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 KDB648474 D04, SAR is evaluated without a headset connected to the device. When the standalone reported Body-Worn SAR is ≤1.2 W/kg, no additional SAR evaluations using a headset are required.

5) Per KDB865664 D02, SAR plot is only required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination; Plots are also required when the measured SAR is > 1.5 W/kg, or > 7.0 W/kg for occupational exposure. The published RF exposure KDB procedures may require additional plots; for example, to support SAR to peak location separation ratio test exclusion and/or volume scan post-processing(Refer to appendix C for details).

6) Per KDB 941225 D05, 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.

7) Per KDB 941225 D05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.

8) Per KDB 941225 D05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 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.

9) Per KDB 941225 D05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05, 16QAM SAR testing is not required.

10) Per KDB 941225 D05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05, smaller bandwidth SAR testing is not required.

10.1.1. SAR measurement Result of GSM850

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Left Cheek	128/824.2	GPRS(GMSK 4TS)	0.241	0.179	0.81	32.31	33.00	**0.282**
Left Tilt 15 Degree	128/824.2	GPRS(GMSK 4TS)	0.106	0.063	1.26	32.31	33.00	0.124
Right Cheek	128/824.2	GPRS(GMSK 4TS)	0.190	0.145	2.21	32.31	33.00	0.223
Right Tilt 15 Degree	128/824.2	GPRS(GMSK 4TS)	0.098	0.043	-2.64	32.31	33.00	0.115

NOTE: Head SAR test results of GSM850.

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	128/824.2	GPRS(GMSK 4TS)	0.352	0.216	-0.57	32.31	33.00	0.413
Back Side	128/824.2	GPRS(GMSK 4TS)	1.020	0.719	1.91	32.31	33.00	**1.196**
Back Side-Repeated	128/824.2	GPRS(GMSK 4TS)	0.919	0.711	0.13	32.31	33.00	1.077
Right Side	128/824.2	GPRS(GMSK 4TS)	0.104	0.065	2.01	32.31	33.00	0.122
Bottom Side	128/824.2	GPRS(GMSK 4TS)	0.670	0.415	-0.89	32.31	33.00	0.785
Back Side	189/836.4	GPRS(GMSK 4TS)	0.829	0.682	2.09	32.02	33.00	1.039
Back Side	251/848.8	GPRS(GMSK 4TS)	0.826	0.679	1.39	31.43	33.00	1.186

NOTE: Body SAR test results of GSM850

10.1.2. SAR measurement Result of GSM1900

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Left Cheek	810/1909.8	GPRS(GMSK 4TS)	0.084	0.052	2.73	28.62	30.00	0.115
Left Tilt 15 Degree	810/1909.8	GPRS(GMSK 4TS)	0.036	0.011	3.67	28.62	30.00	0.049
Right Cheek	810/1909.8	GPRS(GMSK 4TS)	0.110	0.070	0.10	28.62	30.00	**0.151**
Right Tilt 15 Degree	810/1909.8	GPRS(GMSK 4TS)	0.043	0.014	1.26	28.62	30.00	0.059

NOTE: Head SAR test results of GSM1900

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	810/1909.8	GPRS(GMSK 4TS)	0.783	0.331	-1.06	28.62	30.00	1.076
Back Side	810/1909.8	GPRS(GMSK 4TS)	0.869	0.450	-2.52	28.62	30.00	**1.194**
Back Side-Repeated	810/1909.8	GPRS(GMSK 4TS)	0.864	0.439	-0.01	28.62	30.00	1.187
Right Side	810/1909.8	GPRS(GMSK 4TS)	0.030	0.015	1.28	28.62	30.00	0.041
Bottom Side	810/1909.8	GPRS(GMSK 4TS)	0.185	0.086	3.62	28.62	30.00	0.254
Front Side	512/1850.2	GPRS(GMSK 4TS)	0.538	0.227	0.13	28.35	30.00	0.787
Front Side	661/1880	GPRS(GMSK 4TS)	0.586	0.254	3.06	28.47	30.00	0.833
Back Side	512/1850.2	GPRS(GMSK 4TS)	0.739	0.308	1.97	28.35	30.00	1.081
Back Side	661/1880	GPRS(GMSK 4TS)	0.805	0.345	-0.43	28.47	30.00	1.145

NOTE: Body SAR test results of GSM1900

10.1.3. SAR measurement Result of UMTS Band V

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Left Cheek	4182/836.4	RMC12.2K	0.147	0.112	1.29	22.36	23.00	**0.170**
Left Tilt 15 Degree	4182/836.4	RMC12.2K	0.034	0.009	1.28	22.36	23.00	0.039
Right Cheek	4182/836.4	RMC12.2K	0.109	0.087	0.31	22.36	23.00	0.126
Right Tilt 15 Degree	4182/836.4	RMC12.2K	0.028	0.005	4.06	22.36	23.00	0.032

NOTE: Head SAR test results of UMTS Band V

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	4182/836.4	RMC12.2K	0.685	0.434	1.29	22.36	23.00	0.794
Back Side	4182/836.4	RMC12.2K	0.961	0.724	-0.07	22.36	23.00	1.114
Back Side-Repeated	4182/836.4	RMC12.2K	0.909	0.711	0.11	22.36	23.00	1.053
Right Side	4182/836.4	RMC12.2K	0.198	0.120	-0.87	22.36	23.00	0.229
Bottom Side	4182/836.4	RMC12.2K	0.428	0.260	2.08	22.36	23.00	0.496
Back Side	4132/826.4	RMC12.2K	0.937	0.716	0.07	22.25	23.00	1.114
Back Side	4233/846.6	RMC12.2K	0.910	0.691	0.06	21.97	23.00	**1.154**

NOTE: Body SAR test results of UMTS Band V

10.1.4. SAR measurement Result of UMTS Band II

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Left Cheek	9400/1880	RMC12.2K	0.129	0.080	0.93	22.45	23.00	0.146
Left Tilt 15 Degree	9400/1880	RMC12.2K	0.035	0.011	2.67	22.45	23.00	0.040
Right Cheek	9400/1880	RMC12.2K	0.195	0.122	-0.40	22.45	23.00	**0.221**
Right Tilt 15 Degree	9400/1880	RMC12.2K	0.043	0.018	2.97	22.45	23.00	0.049

NOTE: Head SAR test results of UMTS Band II

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	9400/1880	RMC12.2K	0.356	0.208	1.33	22.45	23.00	0.404
Back Side	9400/1880	RMC12.2K	0.905	0.370	-4.53	22.45	23.00	**1.027**
Back Side-Repeated	9400/1880	RMC12.2K	0.889	0.361	0.13	22.45	23.00	1.009
Right Side	9400/1880	RMC12.2K	0.109	0.086	1.89	22.45	23.00	0.124
Bottom Side	9400/1880	RMC12.2K	0.521	0.213	2.06	22.45	23.00	0.591
Back Side	9262/1852.4	RMC12.2K	0.721	0.372	3.06	22.13	23.00	0.881
Back Side	9538/1907.6	RMC12.2K	0.744	0.305	-2.69	22.36	23.00	0.862

NOTE: Body SAR test results of UMTS Band II

10.1.5. SAR measurement Result of LTE Band IV

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
1RB								
Left Cheek	20300/1745	20M QPSK(1,0)	0.087	0.051	0.06	23.32	24.00	0.102
Left Tilt 15 Degree	20300/1745	20M QPSK(1,0)	0.021	0.010	2.01	23.32	24.00	0.025
Right Cheek	20300/1745	20M QPSK(1,0)	0.109	0.066	-0.17	23.32	24.00	**0.127**
Right Tilt 15 Degree	20300/1745	20M QPSK(1,0)	0.028	0.013	-1.36	23.32	24.00	0.033
50%RB								
Left Cheek	20175/1732.5	20M QPSK(50,49)	0.063	0.033	-0.26	21.90	22.00	0.064
Left Tilt 15 Degree	20175/1732.5	20M QPSK(50,49)	0.012	0.006	-0.42	21.90	22.00	0.012
Right Cheek	20175/1732.5	20M QPSK(50,49)	0.091	0.051	2.01	21.90	22.00	**0.093**
Right Tilt 15 Degree	20175/1732.5	20M QPSK(50,49)	0.019	0.009	-0.17	21.90	22.00	0.019

NOTE: Head SAR test results of LTE Band IV

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
1RB								
Front Side	20300/1745	20M QPSK(1,0)	0.386	0.218	-1.06	23.32	24.00	0.451
Back Side	20300/1745	20M QPSK(1,0)	0.855	0.349	-0.20	23.32	24.00	**1.000**
Back Side-Repeated	20300/1745	20M QPSK(1,0)	0.833	0.331	0.12	23.32	24.00	0.974
Right Side	20300/1745	20M QPSK(1,0)	0.164	0.078	1.12	23.32	24.00	0.192
Bottom Side	20300/1745	20M QPSK(1,0)	0.486	0.267	2.07	23.32	24.00	0.568
Back Side	20050/1720	20M QPSK(1,99)	0.664	0.272	-3.06	22.83	24.00	0.869
Back Side	20175/1732.5	20M QPSK(1,99)	0.685	0.326	4.06	22.81	24.00	0.901
50%RB								
Front Side	20175/1732.5	20M QPSK (50,49)	0.299	0.117	-1.86	21.90	22.00	0.306
Back Side	20175/1732.5	20M QPSK (50,49)	0.729	0.273	-0.18	21.90	22.00	**0.746**
Right Side	20175/1732.5	20M QPSK (50,49)	0.099	0.013	-1.21	21.90	22.00	0.101
Bottom Side	20175/1732.5	20M QPSK (50,49)	0.377	0.159	-0.26	21.90	22.00	0.386
100%RB								
Back Side	20175/1732.5	20M QPSK (100,0)	0.711	0.269	0.08	21.85	22.00	**0.736**

NOTE: Body SAR test results of LTE Band IV

10.1.6. SAR measurement Result of LTE Band VII

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
1RB								
Left Cheek	20850/2510	20M QPSK(1,49)	0.211	0.152	0.33	22.53	23.00	**0.235**
Left Tilt 15 Degree	20850/2510	20M QPSK(1,49)	0.026	0.016	0.26	22.53	23.00	0.029
Right Cheek	20850/2510	20M QPSK(1,49)	0.153	0.113	2.44	22.53	23.00	0.170
Right Tilt 15 Degree	20850/2510	20M QPSK(1,49)	0.025	0.013	3.06	22.53	23.00	0.028
50%RB								
Left Cheek	20850/2510	20M QPSK(50,49)	0.175	0.134	1.29	21.50	22.00	**0.196**
Left Tilt 15 Degree	20850/2510	20M QPSK(50,49)	0.017	0.006	-0.07	21.50	22.00	0.019
Right Cheek	20850/2510	20M QPSK(50,49)	0.114	0.009	0.11	21.50	22.00	0.128
Right Tilt 15 Degree	20850/2510	20M QPSK(50,49)	0.012	0.004	0.07	21.50	22.00	0.013

NOTE: Head SAR test results of LTE Band VII

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
1RB								
Front Side	20850/2510	20M QPSK(1,49)	0.590	0.306	-4.81	22.53	23.00	0.657
Back Side	20850/2510	20M QPSK(1,49)	1.068	0.477	-1.27	22.53	23.00	**1.190**
Back Side-Repeated	20850/2510	20M QPSK(1,49)	1.004	0.458	0.17	22.53	23.00	1.119
Right Side	20850/2510	20M QPSK(1,49)	0.020	0.010	-1.26	22.53	23.00	0.022
Bottom Side	20850/2510	20M QPSK(1,49)	0.244	0.114	0.82	22.53	23.00	0.272
Back Side	21100/2535	20M QPSK(1,0)	0.919	0.386	1.38	21.93	23.00	1.176
Back Side	21350/2560	20M QPSK(1,99)	0.906	0.483	2.15	21.86	23.00	1.178
50%RB								
Front Side	20850/2510	20M QPSK (50,49)	0.381	0.213	0.13	21.50	22.00	0.427
Back Side	20850/2510	20M QPSK (50,49)	0.711	0.403	0.72	21.50	22.00	**0.798**
Right Side	20850/2510	20M QPSK (50,49)	0.009	0.002	-0.01	21.50	22.00	0.010
Bottom Side	20850/2510	20M QPSK (50,49)	0.183	0.094	-0.32	21.50	22.00	0.205
100%RB								
Back Side	20850/2510	20M QPSK (100,0)	0.680	0.397	0.11	21.32	22.00	**0.795**

NOTE: Body SAR test results of LTE Band VII

10.1.7. SAR measurement Result of WiFi 2.4G

Test Position of Head	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Left Cheek	6/2437	802.11 b	0.096	0.051	0.09	11.75	12.00	0.102
Left Tilt 15 Degree	6/2437	802.11 b	0.093	0.050	2.16	11.75	12.00	0.099
Right Cheek	6/2437	802.11 b	0.209	0.097	-0.08	11.75	12.00	**0.221**
Right Tilt 15 Degree	6/2437	802.11 b	0.204	0.097	1.02	11.75	12.00	0.216

NOTE: Head SAR test results of WiFi 2.4G

Test Position of Body with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (±5%)	Conducted power (dBm)	Tune-up power (dBm)	Scaled SAR 1g (W/Kg)
			1g	10g				
Front Side	6/2437	802.11 b	0.303	0.160	-1.86	11.75	12.00	0.321
Back Side	6/2437	802.11 b	0.329	0.180	-0.18	11.75	12.00	**0.348**
Left Side	6/2437	802.11 b	0.172	0.077	-1.21	11.75	12.00	0.182
Top Side	6/2437	802.11 b	0.240	0.091	-0.26	11.75	12.00	0.254

NOTE: Body SAR test results of WiFi 2.4G

10.2. Simultaneous Transmission Possibilities

The Simultaneous Transmission Possibilities of this device are as below:

No.	Configuration	Head	Body	Hotspot	Note
1	GSM(Voice) + WiFi 2.4GHz(data)	Yes	Yes	N/A	
2	UMTS(Voice) + WiFi 2.4GHz(data)	Yes	Yes	N/A	
3	GSM(Voice) + BT(data)	Yes	Yes	N/A	
4	UMTS(Voice) + BT(data)	Yes	Yes	N/A	
5	GPRS/EDGE(data) + WiFi 2.4GHz(data)	Yes	Yes	Yes	2.4GHz Hotspot
6	UMTS(data) + WiFi 2.4GHz(data)	Yes	Yes	Yes	2.4GHz Hotspot
7	LTE(data) + WiFi 2.4GHz(data)	Yes	Yes	Yes	2.4GHz Hotspot
7	GPRS/EDGE(data) + BT(data)	Yes	Yes	Yes	BT Tethering
8	UMTS(data) + BT(data)	Yes	Yes	Yes	BT Tethering
	LTE(data) + BT(data)	Yes	Yes	Yes	BT Tethering

NOTE:

1) This device supported VoIP in GPRS/EDGE, UMTS and LTE(e.g. 3rd party VoIP).

2) This device WiFi 2.4GHz supports Hotspot operation.

3) WiFi 2.4GHz and BT share the same antenna, and cannot transmit simultaneously.

4) EUT will choose each GSM, UMTS and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.

5) The Scaled SAR summation is calculated based on the same configuration and test position.

10.3. SAR Summation Scenario

Per KDB 447498 D01, simultaneous transmission SAR is compliant if,

1) Scalar SAR summation < 1.6W/kg.

2) SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (min. separation distance, mm), and the peak separation distance is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan. If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		GSM 850	WiFi 2.4G			
Head	Left Cheek	0.282	0.102	0.384	N/A	N/A
	Left Tilt 15 Degree	0.124	0.099	0.223	N/A	N/A
	Right Cheek	0.223	0.221	0.444	N/A	N/A
	Right Tilt 15 Degree	0.115	0.216	0.331	N/A	N/A
Body	Front Side	0.413	0.321	0.734	N/A	N/A
	Back Side	1.196	0.348	**1.544**	N/A	N/A
	Left Side	N/A	0.182	0.182	N/A	N/A
	Right Side	0.122	N/A	0.122	N/A	N/A
	Top Side	N/A	0.254	0.254	N/A	N/A
	Bottom Side	0.785	N/A	0.785	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of GSM850 and WiFi 2.4G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		GSM 1900	WiFi 2.4G			
Head	Left Cheek	0.115	0.102	0.217	N/A	N/A
	Left Tilt 15 Degree	0.049	0.099	0.148	N/A	N/A
	Right Cheek	0.151	0.221	0.373	N/A	N/A
	Right Tilt 15 Degree	0.059	0.216	0.275	N/A	N/A
Body	Front Side	1.076	0.321	1.397	N/A	N/A
	Back Side	1.194	0.348	1.542	N/A	N/A
	Left Side	N/A	0.182	0.182	N/A	N/A
	Right Side	0.041	N/A	0.041	N/A	N/A
	Top Side	N/A	0.254	0.254	N/A	N/A
	Bottom Side	0.254	N/A	0.254	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of GSM1900 and WiFi 2.4G.

Test Position	Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
	UMTS Band V	WiFi 2.4G			

Head	Left Cheek	0.170	0.102	0.272	N/A	N/A
	Left Tilt 15 Degree	0.039	0.099	0.138	N/A	N/A
	Right Cheek	0.126	0.221	0.348	N/A	N/A
	Right Tilt 15 Degree	0.032	0.216	0.249	N/A	N/A
Body	Front Side	0.794	0.321	1.115	N/A	N/A
	Back Side	1.154	0.348	1.502	N/A	N/A
	Left Side	N/A	0.182	0.182	N/A	N/A
	Right Side	0.229	N/A	0.229	N/A	N/A
	Top Side	N/A	0.254	0.254	N/A	N/A
	Bottom Side	0.496	N/A	0.496	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of UMTS Band V and WiFi 2.4G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		UMTS Band II	WiFi 2.4G			
Head	Left Cheek	0.146	0.102	0.248	N/A	N/A
	Left Tilt 15 Degree	0.040	0.099	0.138	N/A	N/A
	Right Cheek	0.221	0.221	0.443	N/A	N/A
	Right Tilt 15 Degree	0.049	0.216	0.265	N/A	N/A
Body	Front Side	0.404	0.321	0.725	N/A	N/A
	Back Side	1.027	0.348	1.375	N/A	N/A
	Left Side	N/A	0.182	0.182	N/A	N/A
	Right Side	0.124	N/A	0.124	N/A	N/A
	Top Side	N/A	0.254	0.254	N/A	N/A
	Bottom Side	0.591	N/A	0.591	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of UMTS Band II and WiFi 2.4G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band IV	WiFi 2.4G			
Head	Left Cheek	0.102	0.102	0.203	N/A	N/A
	Left Tilt 15 Degree	0.025	0.099	0.123	N/A	N/A
	Right Cheek	0.127	0.221	0.349	N/A	N/A
	Right Tilt 15 Degree	0.033	0.216	0.249	N/A	N/A
Body	Front Side	0.451	0.321	0.772	N/A	N/A
	Back Side	1.000	0.348	1.348	N/A	N/A
	Left Side	N/A	0.182	0.182	N/A	N/A
	Right Side	0.192	N/A	0.192	N/A	N/A
	Top Side	N/A	0.254	0.254	N/A	N/A

	Bottom Side	0.568	N/A	0.568	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of LTE Band IV and WiFi 2.4G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band VII	WiFi 2.4G			
Head	Left Cheek	0.235	0.102	0.337	N/A	N/A
	Left Tilt 15 Degree	0.029	0.099	0.127	N/A	N/A
	Right Cheek	0.170	0.221	0.392	N/A	N/A
	Right Tilt 15 Degree	0.028	0.216	0.244	N/A	N/A
Body	Front Side	0.657	0.321	0.978	N/A	N/A
	Back Side	1.190	0.348	1.538	N/A	N/A
	Left Side	N/A	0.182	0.182	N/A	N/A
	Right Side	0.022	N/A	0.022	N/A	N/A
	Top Side	N/A	0.254	0.254	N/A	N/A
	Bottom Side	0.272	N/A	0.272	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of LTE Band VII and WiFi 2.4G.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		GSM 850	BT			
Head	Left Cheek	0.282	0.084	0.366	N/A	N/A
	Left Tilt 15 Degree	0.124	0.084	0.208	N/A	N/A
	Right Cheek	0.223	0.084	0.307	N/A	N/A
	Right Tilt 15 Degree	0.115	0.084	0.199	N/A	N/A
Body	Front Side	0.413	0.084	0.497	N/A	N/A
	Back Side	1.196	0.084	1.280	N/A	N/A
	Left Side	N/A	0.084	0.084	N/A	N/A
	Right Side	0.122	N/A	0.122	N/A	N/A
	Top Side	N/A	0.084	0.084	N/A	N/A
	Bottom Side	0.785	N/A	0.785	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of GSM850 and BT.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		GSM 1900	BT			
Head	Left Cheek	0.115	0.084	0.199	N/A	N/A
	Left Tilt 15 Degree	0.049	0.084	0.133	N/A	N/A
	Right Cheek	0.151	0.084	0.235	N/A	N/A
	Right Tilt 15 Degree	0.059	0.084	0.143	N/A	N/A
Body	Front Side	1.076	0.084	1.160	N/A	N/A

	Back Side	1.194	0.084	1.278	N/A	N/A
	Left Side	N/A	0.084	0.084	N/A	N/A
	Right Side	0.041	N/A	0.041	N/A	N/A
	Top Side	N/A	0.084	0.084	N/A	N/A
	Bottom Side	0.254	N/A	0.254	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of GSM1900 and BT.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		UMTS Band V	BT			
Head	Left Cheek	0.170	0.084	0.254	N/A	N/A
	Left Tilt 15 Degree	0.039	0.084	0.123	N/A	N/A
	Right Cheek	0.126	0.084	0.210	N/A	N/A
	Right Tilt 15 Degree	0.032	0.084	0.116	N/A	N/A
Body	Front Side	0.794	0.084	0.878	N/A	N/A
	Back Side	1.154	0.084	1.238	N/A	N/A
	Left Side	N/A	0.084	0.084	N/A	N/A
	Right Side	0.229	N/A	0.229	N/A	N/A
	Top Side	N/A	0.084	0.084	N/A	N/A
	Bottom Side	0.496	N/A	0.496	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of UMTS Band V and BT.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		UMTS Band II	BT			
Head	Left Cheek	0.146	0.084	0.230	N/A	N/A
	Left Tilt 15 Degree	0.040	0.084	0.124	N/A	N/A
	Right Cheek	0.221	0.084	0.305	N/A	N/A
	Right Tilt 15 Degree	0.049	0.084	0.133	N/A	N/A
Body	Front Side	0.404	0.084	0.488	N/A	N/A
	Back Side	1.027	0.084	1.111	N/A	N/A
	Left Side	N/A	0.084	0.084	N/A	N/A
	Right Side	0.124	N/A	0.124	N/A	N/A
	Top Side	N/A	0.084	0.084	N/A	N/A
	Bottom Side	0.591	N/A	0.591	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of UMTS Band II and BT.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band IV	BT			
Head	Left Cheek	0.102	0.084	0.186	N/A	N/A
	Left Tilt 15 Degree	0.025	0.084	0.109	N/A	N/A
	Right Cheek	0.127	0.084	0.211	N/A	N/A
	Right Tilt 15 Degree	0.033	0.084	0.117	N/A	N/A
Body	Front Side	0.451	0.084	0.535	N/A	N/A
	Back Side	1.000	0.084	1.084	N/A	N/A
	Left Side	N/A	0.084	0.084	N/A	N/A
	Right Side	0.192	N/A	0.192	N/A	N/A
	Top Side	N/A	0.084	0.084	N/A	N/A
	Bottom Side	0.568	N/A	0.568	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of LTE Band IV and BT.

Test Position		Scaled SAR_{MAX}		∑1-g SAR (W/Kg)	SPLSR	Remark
		LTE Band VII	BT			
Head	Left Cheek	0.235	0.084	0.319	N/A	N/A
	Left Tilt 15 Degree	0.029	0.084	0.113	N/A	N/A
	Right Cheek	0.170	0.084	0.254	N/A	N/A
	Right Tilt 15 Degree	0.028	0.084	0.112	N/A	N/A
Body	Front Side	0.657	0.084	0.741	N/A	N/A
	Back Side	1.190	0.084	1.274	N/A	N/A
	Left Side	N/A	0.084	0.084	N/A	N/A
	Right Side	0.022	N/A	0.022	N/A	N/A
	Top Side	N/A	0.084	0.084	N/A	N/A
	Bottom Side	0.272	N/A	0.272	N/A	N/A

NOTE: 1-g SAR Simultaneous Tx Combination of LTE Band VII and BT.

11. Appendix A. Photo documentation

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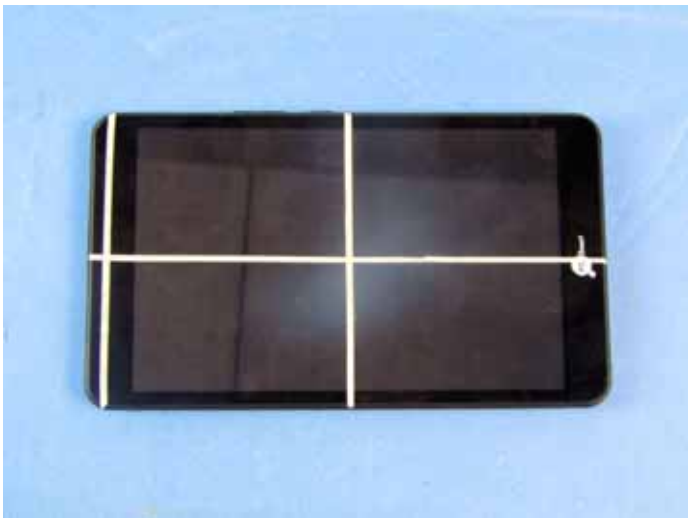
Test Facility
Product Photo
Test Positions
Liquid depth

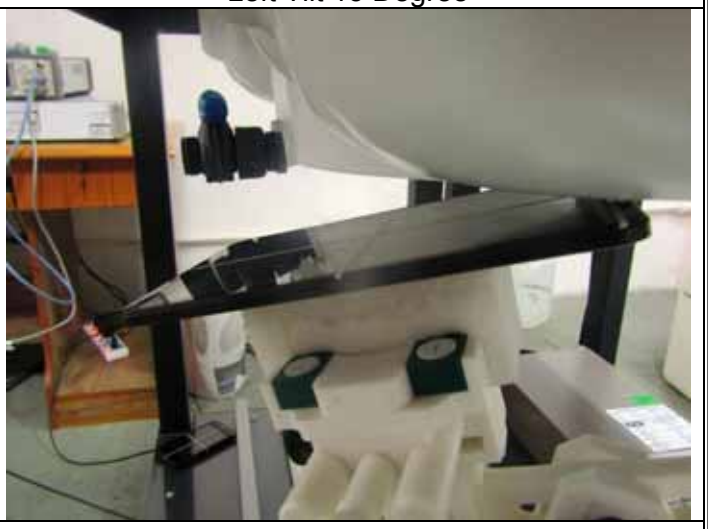
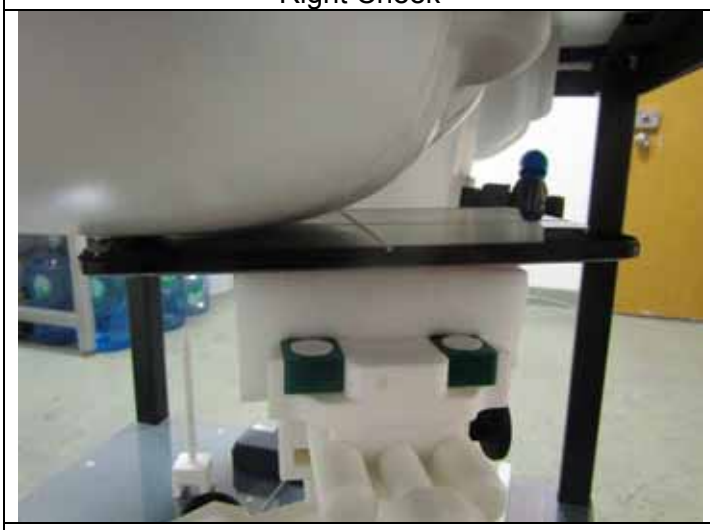
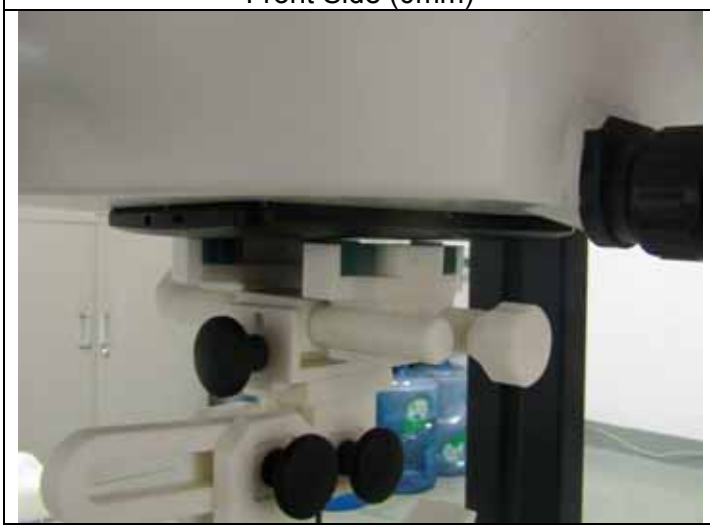
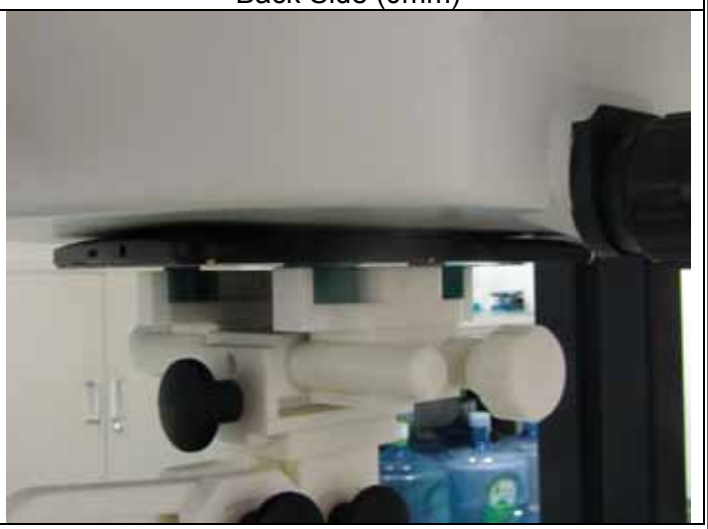
Test Facility

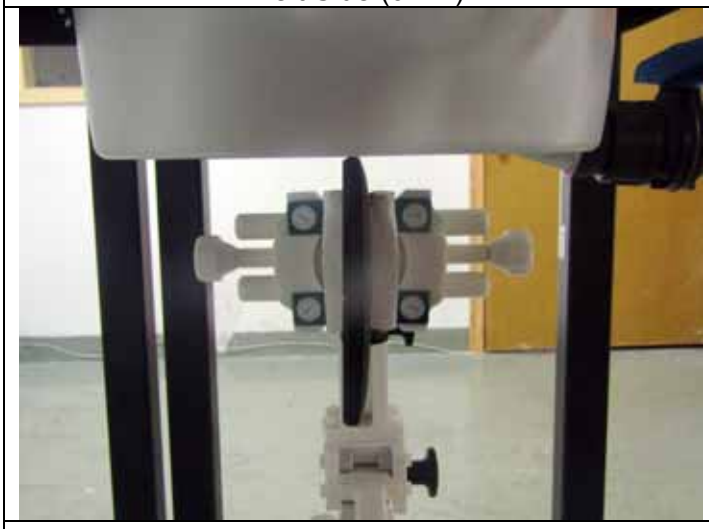
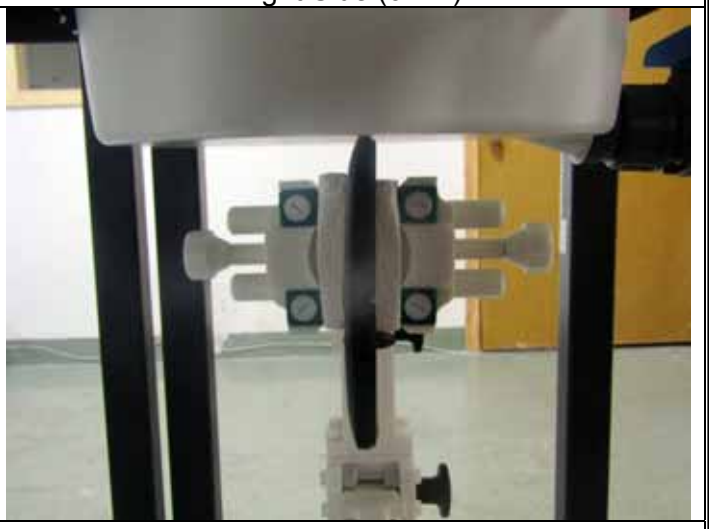
Measurement System SATIMO

Product Photo

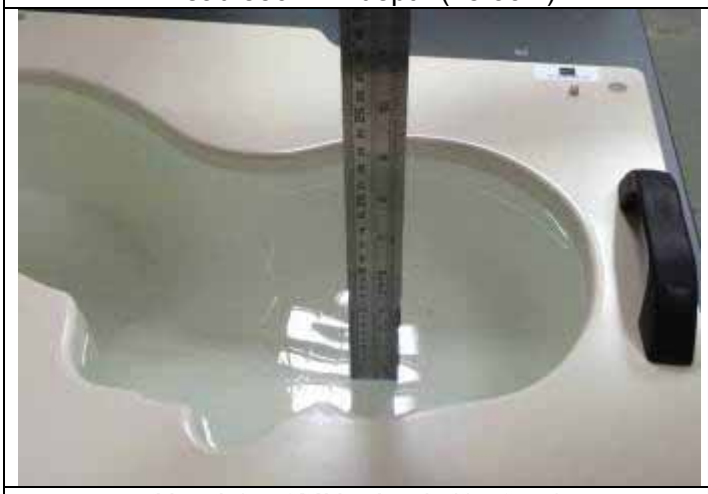
Front View	Back View
	
Reference Line	N/A
	N/A

Test Positions

Left Cheek	Left Tilt 15 Degree
	
Right Cheek	Right Tilt 15 Degree
	
Front Side (0mm)	Back Side (0mm)
	

Left Side (0mm)	Right Side (0mm)
	
Top Side (0mm)	Bottom Side (0mm)
	

Liquid depth

Head 850MHz depth (15.3cm)	Body 850MHz depth (15.2cm)
	
Head 1750MHz depth (15.3cm)	Body 1750MHz depth (15.2cm)
	
Head 1900MHz depth (15.2cm)	Body 1900MHz depth (15.1cm)
	

Head 2450MHz depth (15.2cm)	Body 2450MHz depth (15.3cm)
	
Head 2600MHz depth (15.1cm)	Body 2600MHz depth (15.2cm)