SAR Test Report

Report No.: AGC03576180501FH01

FCC ID	:	2APJY-TT201
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Travis Touch
BRAND NAME	:	Travis
MODEL NAME	:	TT201
CLIENT	:	Travis GT b.v.
DATE OF ISSUE	:	July 10,2018
STANDARD(S)	:	IEEE Std. 1528:2013 FCC 47CFR § 2.1093 IEEE/ANSI C95.1:2005
REPORT VERSION	:	V1.0

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	July 10,2018	Valid	Initial Release

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Test Report Certification

Applicant Name	Travis GT b.v.
Applicant Address	Stationsplein 45, 3013 AK Rotterdam, The Netherlands, Rotterdam, Netherlands
Manufacturer Name	Huano International Technology Limited
Manufacturer Address	29th Floor, Yinglong Building, # 6025 ShenNan Road, FuTian District, Shenzhen, China
Product Designation	Travis Touch
Brand Name	Travis
Model Name	TT201
Different Description	N/A
EUT Voltage	DC3.8V by battery
Applicable Standard	IEEE Std. 1528:2013 FCC 47CFR § 2.1093 IEEE/ANSI C95.1:2005
Test Date	June 14,2018 to July 04,2018
Report Template	AGCRT-US-4G/SAR (2018-01-01)

Note: The results of testing in this report apply to the product/system which was tested only.

Tested By

Eric Zhou(Zhou Yongkang) July 04,2018

Checked By

Angela Li(Li Jiao) July 10,2018

Authorized By

Forrest Lei(Lei Yonggang) July 10,2018
Authorized Officer

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TABLE OF CONTENTS

1. SUMMARY OF MAXIMUM SAR VALUE 5

2. GENERAL INFORMATION 6

2.1. EUT DESCRIPTION 6

3. SAR MEASUREMENT SYSTEM 8

3.1. THE SATIMO SYSTEM USED FOR PERFORMING COMPLIANCE TESTS CONSISTS OF FOLLOWING ITEMS 8
3.2. COMOSAR E-FIELD PROBE 9
3.3. ROBOT 9
3.4. VIDEO POSITIONING SYSTEM 10
3.5. DEVICE HOLDER 10
3.6. SAM TWIN PHANTOM 11

4. SAR MEASUREMENT PROCEDURE 12

4.1. SPECIFIC ABSORPTION RATE (SAR) 12
4.2. SAR MEASUREMENT PROCEDURE 13
4.3. RF EXPOSURE CONDITIONS 15

5. TISSUE SIMULATING LIQUID 17

5.1. THE COMPOSITION OF THE TISSUE SIMULATING LIQUID 17
5.2. TISSUE DIELECTRIC PARAMETERS FOR HEAD AND BODY PHANTOMS 17
5.3. TISSUE CALIBRATION RESULT 18

6. SAR SYSTEM CHECK PROCEDURE 20

6.1. SAR SYSTEM CHECK PROCEDURES 20
6.2. SAR SYSTEM CHECK 21

7. EUT TEST POSITION 22

7.1. BODY WORN POSITION 22

8. SAR EXPOSURE LIMITS 23

9. TEST FACILITY 24

10. TEST EQUIPMENT LIST 25

11. MEASUREMENT UNCERTAINTY 26

12. CONDUCTED POWER MEASUREMENT 29

13. TEST RESULTS 50

13.1. SAR TEST RESULTS SUMMARY 50

APPENDIX A. SAR SYSTEM CHECK DATA 65

APPENDIX B. SAR MEASUREMENT DATA 79

APPENDIX C. TEST SETUP PHOTOGRAPHS 115

APPENDIX D. CALIBRATION DATA 119

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1. SUMMARY OF MAXIMUM SAR VALUE

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

Frequency Band	Highest Reported 1g-SAR(W/Kg)	SAR Test Limit (W/Kg)
	Body-worn	
GSM 850	0.939	1.6
PCS 1900	0.676	
UMTS Band II	1.290	
UMTS Band V	0.126	
LTE Band 7	1.275	
LTE Band 17	0.281	
LTE Band 38	0.525	
LTE Band 40	1.366	
LTE Band 41	0.312	
WIFI 2.4G	0.125	
Simultaneous Reported SAR	1.491	
SAR Test Result	PASS	

This device is compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6W/Kg) specified in IEEE Std. 1528:2013; FCC 47CFR § 2.1093; IEEE/ANSI C95.1:2005 and the following specific FCC Test Procedures:

- KDB 447498 D01 General RF Exposure Guidance v06
- KDB 648474 D04 Handset SAR v01r03
- KDB 865664 D01 SAR Measurement 100MHz to 6GHz v01r04
- KDB 941225 D01 3G SAR Procedures v03r01
- KDB 941225 D06 Hotspot Mode v02r01
- KDB 248227 D01 802 11 Wi-Fi SAR v02r02
- KDB 941225 D05 SAR for LTE Devices v02r05

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2. GENERAL INFORMATION

2.1. EUT Description

General Information	
Product Designation	Travis Touch
Test Model	TT201
Hardware Version	F01_MB_V1.11
Software Version	V2.0.0
Device Category	Portable
RF Exposure Environment	Uncontrolled
Antenna Type	Internal
GSM and GPRS& EGPRS	
Support Band	☒GSM 850 ☒PCS 1900 (U.S. Bands) ☒GSM 900 ☒DCS 1800 (Non-U.S. Bands)
GPRS & EGPRS Type	Class B
GPRS & EGPRS Class	Class 12(1Tx+4Rx, 2Tx+3Rx, 3Tx+2Rx, 4Tx+1Rx)
TX Frequency Range	GSM 850 : 820-850MHz; PCS 1900: 1850-1910MHz;
RX Frequency Range	GSM 850 : 869~894MHz; PCS 1900: 1930~1990MHz
Release Version	R99
Type of modulation	GMSK for GSM/GPRS; GMSK & 8-PSK for EGPRS
Antenna Gain	GSM850:0.7dBi; PCS1900: 0.9dBi;
Max. Average Power	GSM850: 31.59dBm; PCS1900: 28.74dBm
WCDMA	
Support Band	☒UMTS FDD Band II ☒UMTS FDD Band V (U.S. Bands) ☒UMTS FDD Band I ☒UMTS FDD Band VIII (Non-U.S. Bands)
HS Type	HSPA(HSUPA/HSDPA)
TX Frequency Range	FDD Band II: 1850-1910MHz; FDD Band V: 820-850MHz
RX Frequency Range	FDD Band II: 1930-1990MHz; FDD Band V: 869-894MHz
Release Version	Rel-6
Type of modulation	HSDPA:QPSK/16QAM; HSUPA:BPSK; WCDMA:QPSK
Antenna Gain	Band II: 0.9dBii; Band V: 0.7dBi
Max. Average Power	Band II: 22.73dBm; Band V: 21.89dBm

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EUT Description(Continue)

LTE	
Support Band	☒FDD Band 7☒FDD Band 17☒TDD Band 38☒TDD Band 40 ☒TDD Band 41 (U.S. Bands) ☒FDD Band 1☒FDD Band 3☒FDD Band 7☐FDD Band 8☒FDD Band 20 ☒TDD Band 28 ☐TDD Band 34 ☒TDD Band 38 ☒TDD Band 39 ☒TDD Band 40 ☐TDD Band 41 ☐TDD Band 43 (Non-U.S. Bands)
TX Frequency Range	Band 7:2500-2570MHz Band 17: 704-716 MHz; Band 38:2570-2620 MHz; Band 40:2300-2400MHz; Band 41: 2496-2690 MHz;
RX Frequency Range	Band 7:2620-2690MHz Band 17 734-746 MHz; Band 38:2570-2620 MHz; Band 40 2300-2400MHz; Band 41: 2496-2690 MHz;
Release Version	Rel-8
Type of modulation	QPSK, 16QAM
Antenna Gain	Band 7:0.45dBi; Band 17:0.63dBi; Band 38:0.66dBi; Band 40:0.37dBi; Band 41:0.39dBi
Diversity Antenna Gain	Band 7:0.42dBi; Band 17:0.55dBi; Band 38:0.60dBi; Band 40:0.23dBi; Band 41:0.23dBi
Max. Average Power	Band 7: 22.21dBm; Band 17: 23.11dBm; Band 38: 23.71dBm; Band 40: 23.17dBm; Band 41: 21.83dBm
Bluetooth	
Bluetooth Version	☐V2.0 ☐V2.1 ☐V2.1+EDR ☐V3.0 ☐V3.0+HS ☒V4.0 ☐V4.1
Operation Frequency	2402~2480MHz
Type of modulation	☒GFSK ☒Π/4-DQPSK ☒8-DPSK
Peak Power	-2.782dBm
Antenna Gain	1.0dBi
WIFI	
WIFI Specification	☐802.11a ☒802.11b ☒802.11g ☒802.11n(20) ☒802.11n(40)
Operation Frequency	2412~2472MHz
Avg. Burst Power	11b: 10.23dBm,11g:7.09dBm,11n(20):8.15dBm,11n(40):8.06dBm
Antenna Gain	1.0dBi
Accessories	
Battery	Brand name: N/A Model No. : FHP K664060P Voltage and Capacitance: 3.8V & 2500mAh
Earphone	Brand name: N/A Model No. : N/A

Note:1.CMU200 can measure the average power and Peak power at the same time
2.The sample used for testing is end product.

Product	Type ☒ Production unit ☐ Identical Prototype

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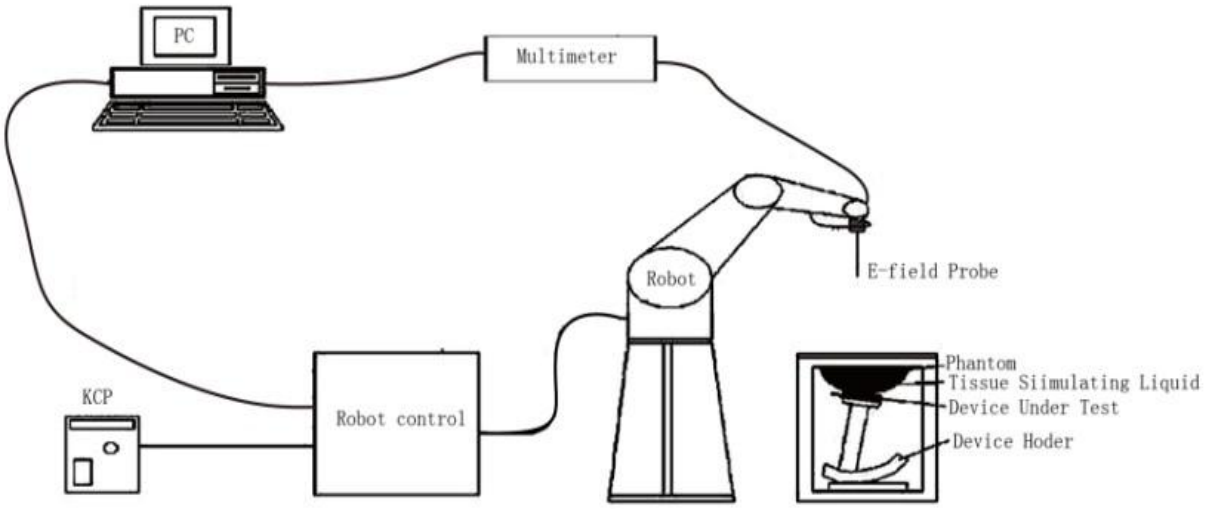
3. SAR MEASUREMENT SYSTEM

3.1. The SATIMO system used for performing compliance tests consists of following items



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

- The PC. It controls most of the bench devices and stores measurement data.A computer running WinXP and the Opensar software.
- The E-Field probe. The probe is a 3-axis system made of 3 distinct dipoles. Each dipole returns a voltage in function of the ambient electric field.
- The Keithley multimeter measures each probe dipole voltages.
- The SAM phantom simulates a human head. The measurement of the electric field is made inside the phantom.
- The liquids simulate the dielectric properties of the human head tissues.
- The network emulator controls the mobile phone under test.
- The validation dipoles are used to measure a reference SAR. They are used to periodically check the bench to make sure that there is no drift of the system characteristics over time.
- The phantom, the device holder and other accessories according to the targeted measurement.

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3.2. COMOSAR E-Field Probe

The SAR measurement is conducted with the dosimetric probe manufactured by SATIMO. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. SATIMO conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528 and relevant KDB files.) The calibration data are in Appendix D.

Isotropic E-Field Probe Specification

Model	SSE2	
Manufacture	MVG	
Identification No.	SN 08/16 EPGO282	
Frequency	0.7GHz-6GHz Linearity:±0.06dB(700MHz-6GHz)	
Dynamic Range	0.01W/Kg-100W/Kg Linearity:±0.06dB	
Dimensions	Overall length:330mm Length of individual dipoles:2mm Maximum external diameter:8mm Probe Tip external diameter:2.5mm Distance between dipoles/ probe extremity: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. Robot

The COMOSAR system uses the KUKA robot from SATIMO SA (France).For the 6-axis controller COMOSAR system, the KUKA robot controller version from SATIMO is used.
The XL robot series have many features that are important for our application:
- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller

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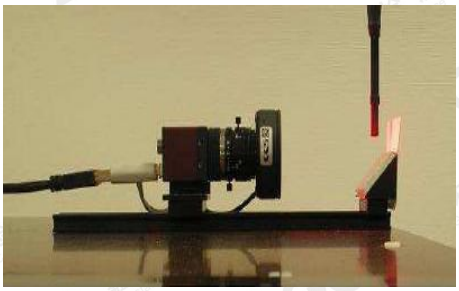
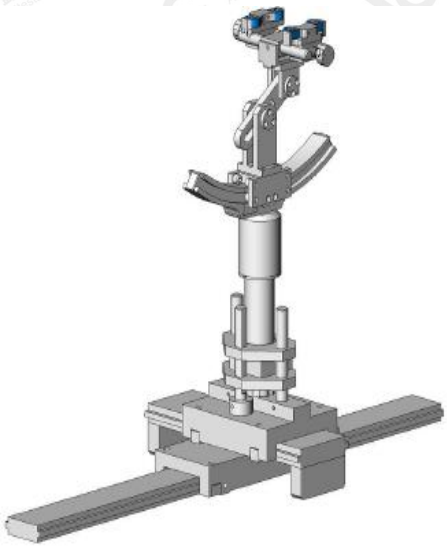
3.4. Video Positioning System

The video positioning system is used in OpenSAR to check the probe. Which is composed of a camera, LED, mirror and mechanical parts.The camera is piloted by the main computer with firewire link. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip. The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.	

3.5. Device Holder

The COMOSAR device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR). Thus the device needs no repositioning when changing the angles. The COMOSAR device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity εr =3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.	

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3.6. SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas: □ Left head □ Right head □ Flat phantom	

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

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4. SAR MEASUREMENT PROCEDURE

4.1. Specific Absorption Rate (SAR)

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

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

$$\mathrm{SAR} = \frac{\mathrm{d}}{\mathrm{d}t}\left(\frac{\mathrm{d}W}{\mathrm{d}m}\right) = \frac{\mathrm{d}}{\mathrm{d}t}\left(\frac{\mathrm{d}W}{\rho \mathrm{d}V}\right)$$

SAR is expressed in units of Watts per kilogram (W/Kg)
SAR can be obtained using either of the following equations:

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

$$\mathrm{SAR} = c_h \left.\frac{\mathrm{d}T}{\mathrm{d}t}\right|_{t=0}$$

Where

SAR	is the specific absorption rate in watts per kilogram;
E	is the r.m.s. value of the electric field strength in the tissue in volts per meter;
σ	is the conductivity of the tissue in siemens per metre;
ρ	is the density of the tissue in kilograms per cubic metre;
c_h	is the heat capacity of the tissue in joules per kilogram and Kelvin;
$\frac{dT}{dt} \mid t = 0$	is the initial time derivative of temperature in the tissue in kelvins per second

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4.2. SAR Measurement Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurement are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface is 2.7mm This distance cannot be smaller than the distance os sensor calibration points to probe tip as `defined in the probe properties,

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in SATIMO software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in db) is specified in the standards for compliance testing. For example, a 2db range is required in IEEE Standard 1528 and IEC62209 standards, whereby 3db is a requirement when compliance is assessed in accordance with the ARIB standard (Japan) If one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximum are detected, the number of Zoom Scan has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100MHz to 6GHz

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

Zoom Scan are used to assess the peak spatial SAR value within a cubic average volume containing 1g abd 10g of simulated tissue. The Zoom Scan measures points(refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1g and 10g and displays these values next to the job's label.

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Zoom Scan Parameters extracted from KDB865664 d01 SAR Measurement 100MHz to 6GHz

Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

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

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 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.

Step 4: Power Drift Measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the same settings. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

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4.3. RF Exposure Conditions

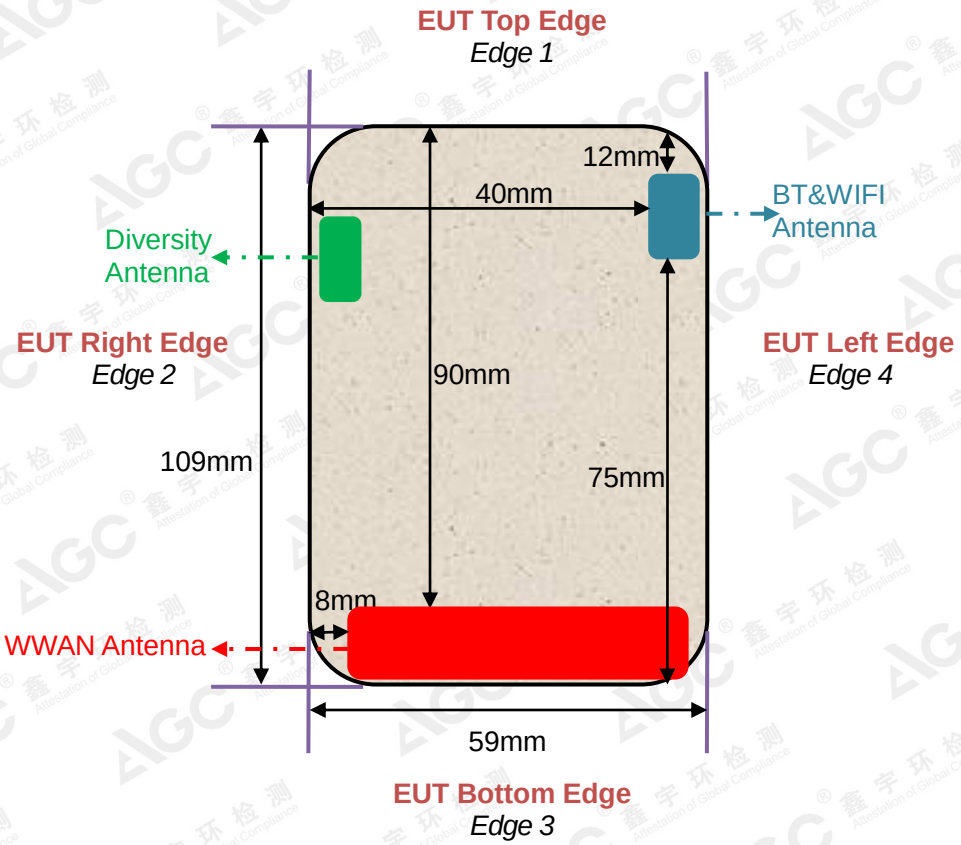
Test Configuration and setting:

The EUT is a model of GSM Portable Mobile Station (MS). It supports GSM/GPRS/EGPRS, WCDMA/HSPA, LTE, BT, WIFI, and support hot spot mode.

For WWAN SAR testing, the device was controlled by using a base station emulator. Communication between the device and the emulator were established by air link. The distance between the EUT and the antenna is larger than 50cm, and the output power radiated from the emulator antenna is at least 30db smaller than the output power of EUT.

For WLAN testing, the EUT is configured with the WLAN continuous TX tool through engineering command.

Antenna Location: (the back view)



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For WWAN mode:

Test Configurations	Antenna to edges/surface	SAR required	Note
Body			
Back	<25mm	Yes	--
Front	<25mm	Yes	--
Hotspot			
Back	<25mm	Yes	--
Front	<25mm	Yes	--
Edge 1 (Top)	90mm	No	SAR is not required for the distance between the antenna and the edge is >25mm as per KDB 941225 D06 Hotspot SAR
Edge 2 (Right)	8mm	Yes	--
Edge 3 (Bottom)	1mm	Yes	--
Edge 4 (Left)	2mm	Yes	--

For WLAN mode:

Test Configurations	Antenna to edges/surface	SAR required	Note
Body			
Back	<25mm	Yes	--
Front	<25mm	Yes	--
Hotspot			
Back	<25mm	Yes	--
Front	<25mm	Yes	--
Edge 1 (Top)	12mm	Yes	--
Edge 2 (Right)	10mm	Yes	--
Edge 3 (Bottom)	75mm	No	SAR is not required for the distance between the antenna and the edge is >25mm as per KDB 941225 D06 Hotspot SAR
Edge 4 (Left)	1mm	Yes	--

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5. TISSUE SIMULATING LIQUID

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15cm. For head SAR testing the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15cm For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15cm.The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in 5.2

5.1. The composition of the tissue simulating liquid

Ingredient (% Weight) / Frequency (MHz)	Water	Nacl	Polysorbate 20	DGBE	1,2 Propanediol	Triton X-100
750 Body	55	1	0.0	0.0	44	0.0
835 Body	54.00	1	0.0	15	0.0	30
1900 Body	70	1	0.0	9	0.0	20
2300 Body	70	1	0.0	9	0.0	20
2450 Body	70	1	0.0	9	0.0	20
2600 body	70	1	0.0	9	0.0	20

5.2. Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in IEEE 1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in IEEE 1528.

Target Frequency (MHz)	head		body	
	εr	σ (S/m)	εr	σ (S/m)
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
750	41.9	0.89	**55.5**	**0.96**
835	41.5	0.90	**55.2**	**0.97**
900	41.5	0.97	55.0	1.05
915	41.5	1.01	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1750	40.1	1.37	53.4	1.49
1800 – 2000	40.0	1.40	**53.3**	**1.52**
2300	39.5	1.67	**52.9**	**1.81**
2450	39.2	1.80	**52.7**	**1.95**
2600	39.0	1.96	**52.5**	**2.16**
3000	38.5	2.40	52.0	2.73

(εr = relative permittivity, σ = conductivity and ρ = 1000 kg/m3

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5.3. Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using SATIMO Dielectric Probe Kit and R&S Network Analyzer ZVL6.

Tissue Stimulant Measurement for 750MHz					
	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr 55.5(52.725-58.275)	δ[s/m]0.96(0.912-1.008)		
Body	709	56.26	0.93	21.5	July 02,2018
	710	55.75	0.95		
	711	55.04	0.97		
	750	54.56	0.98		

Tissue Stimulant Measurement for 835MHz					
	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr 55.20(52.44-57-96)	δ[s/m]0.97(0.9215-1.0185)		
Body	824.2	56.71	0.93	22.8	June 19,2018
	826.4	56.22	0.94		
	835	55.89	0.95		
	836.6	55.43	0.96		
	846.6	54.97	0.97		
	848.8	54.52	0.98		

Tissue Stimulant Measurement for 1900MHz					
	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr53.30(50.635-55.965)	δ[s/m]1.52(1.444-1.596)		
Body	1850.2	55.13	1.46	22.0	June 14,2018
	1852.4	54.71	1.48		
	1880	54.22	1.50		
	1900	53.65	1.52		
	1907.6	53.07	1.53		
	1909.8	52.59	1.55		

Tissue Stimulant Measurement for 2300MHz					
	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr52.9(50.26-55.55)	δ[s/m]1.81(1.72-1.90)		
Body	2300	54.16	1.75	21.3	July 03,2018
	2310	53.75	1.77		
	2350	53.22	1.80		
	2390	52.64	1.82		

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Tissue Stimulant Measurement for 2450MHz					
	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr52.7(50.065-55.335)	δ[s/m]1.95(1.8525-2.0475)		
Body	2412	54.63	1.88	21.5	June 29,2018
	2437	54.17	1.90		
	2450	53.59	1.92		
	2462	52.86	1.95		

Tissue Stimulant Measurement for 2600MHz					
	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr52.5(49.875-55.125)	δ[s/m]2.16(2.052-2.268)		
Body	2506	54.62	2.09	21.7	June 28,2018
	2510	54.06	2.12		
	2535	53.75	2.14		
	2560	53.34	2.15		
	2593	52.99	2.17		
	2600	52.48	2.18		
	2680	51.85	2.20		

Tissue Stimulant Measurement for 2600MHz					
	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr52.5(49.875-55.125)	δ[s/m]2.16(2.052-2.268)		
Body	2580	54.22	2.09	21.3	July 04,2018
	2595	53.78	2.11		
	2600	52.65	2.15		
	2610	52.02	2.19		

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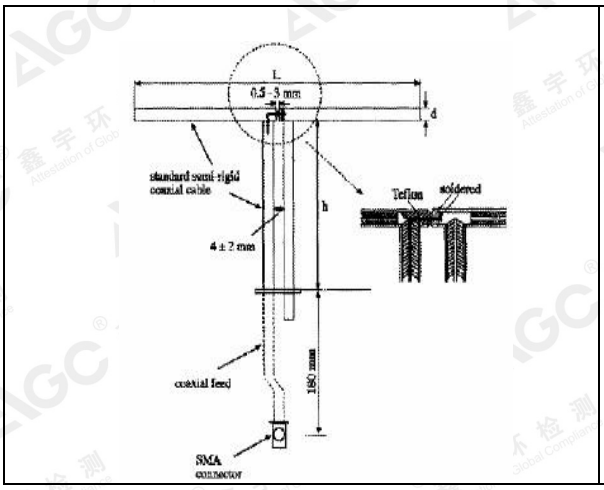
6. SAR SYSTEM CHECK PROCEDURE

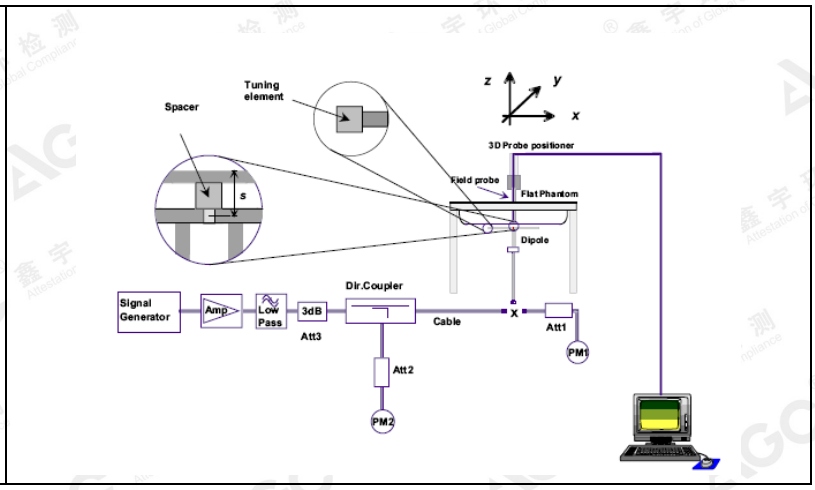
6.1. SAR System Check Procedures

SAR system check is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are remeasured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

Each SATIMO system is equipped with one or more system check kits. These units, together with the predefined measurement procedures within the SATIMO software, enable the user to conduct the system check and system validation. System kit includes a dipole, and dipole device holder.

The system check verifies that the system operates within its specifications. It's performed daily or before every SAR measurement. The system check uses normal SAR measurement in the flat section of the phantom with a matched dipole at a specified distance. The system check setup is shown as below.





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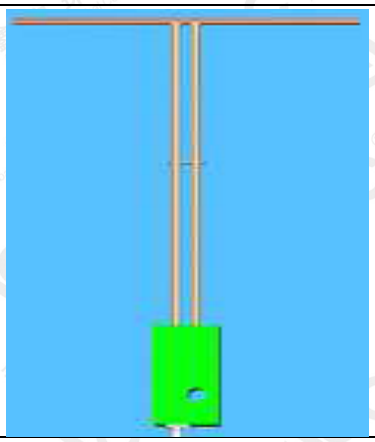
6.2. SAR System Check

6.2.1. Dipoles



The dipoles used is based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of IEEE. the table below provides details for the mechanical and electrical Specifications for the dipoles.

Frequency	L (mm)	h (mm)	d (mm)
750MHz	176	100	6.35
835MHz	161.0	89.8	3.6
1900MHz	68	39.5	3.6
2300MHz	55.5	32.6	3.6
2450MHz	51.5	30.4	3.6
2600MHz	48.5	28.8	3.6

6.2.2. System Check Result

System Performance Check at 750MHz & 835MHz &1900MHz &2300MHz&2450MHz&2600MHz for Body Validation Kit: SN22/16 DIP 0G750-417& SN29/15 DIP 0G835-383&SN 29/15 DIP 1G900-389& SN 22/16 DIP 2G300-412& SN 29/15DIP 2G450-393& SN22/16 DIP 2G600-407								
Frequency [MHz]	Target Value(W/Kg)		Reference Result (± 10%)		Tested Value(W/Kg)		Tissue Temp. [°C]	Test time
	1g	10g	1g	10g	1g	10g		
750	8.95	5.97	8.055-9.845	5.373-6.567	9.65	6.00	21.5	July 02,2018
835	9.85	6.45	8.865-10.835	5.805-7.095	9.35	5.98	22.8	June 19,2018
1900	39.38	20.86	35.442-43.318	18.774-22.946	37.17	18.82	22.0	June 14,2018
2300	47.28	22.78	42.552-52.008	20.502-25.058	45.79	22.62	21.3	July 03,2018
2450	49.92	23.16	44.928-54.912	20.844-25.476	49.41	22.75	21.5	June 29,2018
2600	51.69	23.33	46.521-56.859	20.997-25.663	49.60	22.48	21.7	June 28,2018
2600	51.69	23.33	46.521-56.859	20.997-25.663	49.56	22.82	21.3	July 04,2018

Note:
(1) We use a CW signal of 18dBm for system check, and then all SAR value are normalized to 1W forward power. The result must be within ±10% of target value.

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7. EUT TEST POSITION

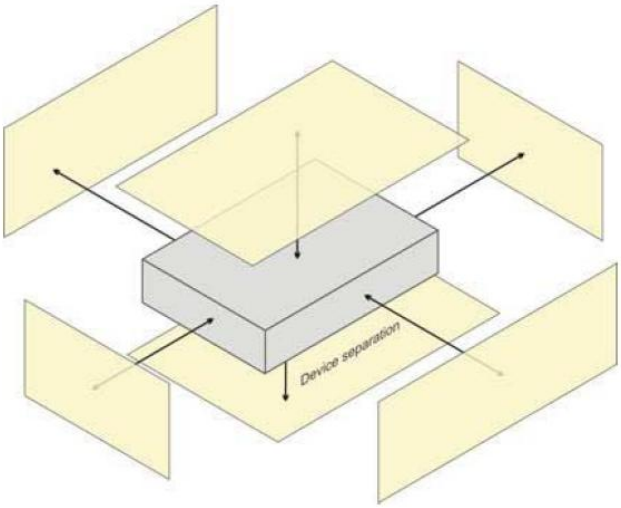
This EUT was tested in **Body back, Body front and 4 edges.**

7.1. Body Worn Position

(1) To position the EUT parallel to the phantom surface.

(2) To adjust the EUT parallel to the flat phantom.

(3) To adjust the distance between the EUT surface and the flat phantom to **5mm.**



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8. SAR EXPOSURE LIMITS

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

Type Exposure	Uncontrolled Environment Limit (W/kg)
Spatial Peak SAR (1g cube tissue for brain or body)	1.60
Spatial Average SAR (Whole body)	0.08
Spatial Peak SAR (Limbs)	4.0

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9. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2F., Bldg.2, No.1-4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District B112-B113, Shenzhen 518012
NVLAP Lab Code	600153-0
Designation Number	CN5028
Test Firm Registration Number	682566
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by National Voluntary Laboratory Accreditation program, NVLAP Code 600153-0

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10. TEST EQUIPMENT LIST

Equipment description	Manufacturer/ Model	Identification No.	Current calibration date	Next calibration date
SAR Probe	MVG	SN 08/16 EPGO282	Aug. 08,2017	Aug. 07,2018
Phantom	SATIMO	SN_4511_SAM90	Validated. No cal required.	Validated. No cal required.
Liquid	SATIMO	-	Validated. No cal required.	Validated. No cal required.
Comm Tester	Agilent-8960	GB46310822	Mar. 01,2018	Feb. 28,2019
Comm Tester	R&S- CMW500	S/N121209	Jul. 13,2017	Jul. 12,2018
Multimeter	Keithley 2000	1188656	Mar. 01,2018	Feb. 28,2019
Dipole	SATIMO SID750	SN22/16 DIP 0G750-417	Jul. 05,2016	Jul. 04,2019
Dipole	SATIMO SID835	SN29/15 DIP 0G835-383	Jul. 05,2016	Jul. 04,2019
Dipole	SATIMO SID1900	SN 29/15 DIP 1G900-389	Jul. 05,2016	Jul. 04,2019
Dipole	SATIMO SID2300	SN 22/16 DIP 2G300-412	Jul. 05,2016	Jul. 04,2019
Dipole	SATIMO SID2450	SN29/15 DIP 2G450-393	Jul. 05,2016	Jul. 04,2019
Dipole	SATIMO SID2600	SN22/16 DIP 2G600-407	Jul. 05,2016	Jul. 04,2019
Signal Generator	Agilent-E4438C	US41461365	Mar. 01,2018	Feb. 28,2019
Vector Analyzer	Agilent / E4440A	US41421290	Mar. 01,2018	Feb. 28,2019
Network Analyzer	Rhode & Schwarz ZVL6	SN100132	Mar. 01,2018	Feb. 28,2019
Attenuator	Warison /WATT-6SR1211	N/A	N/A	N/A
Attenuator	Mini-circuits / VAT-10+	N/A	N/A	N/A
Amplifier	EM30180	SN060552	Mar. 01,2018	Feb. 28,2019
Directional Couple	Werlatone/ C5571-10	SN99463	Jun. 12,2018	Jun. 11,2019
Directional Couple	Werlatone/ C6026-10	SN99482	Jun. 12,2018	Jun. 11,2019
Power Sensor	NRP-Z21	1137.6000.02	Oct. 12,2017	Oct. 11,2018
Power Sensor	NRP-Z23	US38261498	Mar. 01,2018	Feb. 28,2019
Power Viewer	R&S	V2.3.1.0	N/A	N/A

Note: Per KDB 865664 Dipole SAR Validation, AGC Lab has adopted 3 years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:
1. There is no physical damage on the dipole;
2. System validation with specific dipole is within 10% of calibrated value;
3. Return-loss is within 20% of calibrated measurement;
4. Impedance is within 5Ω of calibrated measurement.

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11. MEASUREMENT UNCERTAINTY

Measurement uncertainty for Dipole averaged over 1 gram / 10 gram.									
a	b	c	d	e f(d,k)	f	g	h c×f/e	i c×g/e	k
Uncertainty Component	Sec.	Tol (± %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (±%)	10g Ui (±%)	vi
Measurement System									
Probe calibration	E.2.1	5.831	N	1	1	1	5.83	5.83	∞
Axial Isotropy	E.2.2	0.695	R	$\sqrt{3}$	√0.5	√0.5	0.28	0.28	∞
Hemispherical Isotropy	E.2.2	1.045	R	$\sqrt{3}$	√0.5	√0.5	0.43	0.43	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	0.685	R	$\sqrt{3}$	1	1	0.40	0.40	∞
System detection limits	E.2.4	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation response	E2.5	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Readout Electronics	E.2.6	0.021	N	1	1	1	0.021	0.021	∞
Response Time	E.2.7	0	R	$\sqrt{3}$	1	1	0	0	∞
Integration Time	E.2.8	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF ambient conditions-Noise	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient conditions-reflections	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner mechanical tolerance	E.6.2	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to phantom shell	E.6.3	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation, interpolation, and integrations algorithms for max. SAR evaluation	E.5	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
Test sample Related									
Test sample positioning	E.4.2	2.6	N	1	1	1	2.6	2.6	∞
Device holder uncertainty	E.4.1	3	N	1	1	1	3	3	∞
Output power variation—SAR drift measurement	E.2.9	5	R	$\sqrt{3}$	1	1	2.89	2.89	∞
SAR scaling	E.6.5	5	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Phantom and tissue parameters									
Phantom shell uncertainty—shape, thickness, and permittivity	E.3.1	4	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	E.3.2	1.9	N	1	1	0.84	1.90	1.60	∞
Liquid conductivity measurement	E.3.3	4	N	1	0.78	0.71	3.12	2.84	M
Liquid permittivity measurement	E.3.3	5	N	1	0.23	0.26	1.15	1.30	M
Liquid conductivity—temperature uncertainty	E.3.4	2.5	R	$\sqrt{3}$	0.78	0.71	1.13	1.02	∞
Liquid permittivity—temperature uncertainty	E.3.4	2.5	R	$\sqrt{3}$	0.23	0.26	0.33	0.38	∞
Combined Standard Uncertainty			RSS				9.79	9.59	
Expanded Uncertainty (95% Confidence interval)			K=2				19.58	19.18	

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System check uncertainty for Dipole averaged over 1 gram / 10 gram.									
a	b	c	d	e f(d,k)	f	g	h c×f/e	i c×g/e	k
Uncertainty Component	Sec.	Tol (± %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (±%)	10g Ui (±%)	vi
Measurement System									
Probe calibration drift	E.2.1.3	0.5	N	1	1	1	0.50	0.50	∞
Axial Isotropy	E.2.2	0.695	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Hemispherical Isotropy	E.2.2	1.045	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Linearity	E.2.4	0.685	R	$\sqrt{3}$	0	0	0.00	0.00	∞
System detection limits	E.2.4	1.0	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Modulation response	E2.5	3.0	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Readout Electronics	E.2.6	0.021	N	1	0	0	0.00	0.00	∞
Response Time	E.2.7	0	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Integration Time	E.2.8	1.4	R	$\sqrt{3}$	0	0	0.00	0.00	∞
RF ambient conditions-Noise	E.6.1	3.0	R	$\sqrt{3}$	0	0	0.00	0.00	∞
RF ambient conditions-reflections	E.6.1	3.0	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Probe positioner mechanical tolerance	E.6.2	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to phantom shell	E.6.3	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation, interpolation, and integrations algorithms for max. SAR evaluation	E.5	2.3	R	$\sqrt{3}$	0	0	0.00	0.00	∞
System check source (dipole)									
Deviation of experimental dipoles	E.6.4	2	N	1	1	1	2	2	∞
Input power and SAR drift measurement	8,6.6.4	5	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Dipole axis to liquid distance	8,E.6.6	2	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Phantom and tissue parameters									
Phantom shell uncertainty—shape, thickness, and permittivity	E.3.1	4	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	E.3.2	1.9	N	1	1	0.84	1.90	1.60	∞
Liquid conductivity measurement	E.3.3	4	N	1	0.78	0.71	3.12	2.84	M
Liquid permittivity measurement	E.3.3	5	N	1	0.23	0.26	1.15	1.30	M
Liquid conductivity—temperature uncertainty	E.3.4	2.5	R	$\sqrt{3}$	0.78	0.71	1.13	1.02	∞
Liquid permittivity—temperature uncertainty	E.3.4	2.5	R	$\sqrt{3}$	0.23	0.26	0.33	0.38	∞
Combined Standard Uncertainty			RSS				5.564	5.205	
Expanded Uncertainty (95% Confidence interval)			K=2				11.128	10.410	

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System Validation uncertainty for Dipole averaged over 1 gram / 10 gram.									
a	b	c	d	e f(d,k)	f	g	h c×f/e	i c×g/e	k
Uncertainty Component	Sec.	Tol (±%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (±%)	10g Ui (±%)	vi
Measurement System									
Probe calibration	E.2.1	5.831	N	1	1	1	5.83	5.83	∞
Axial Isotropy	E.2.2	0.695	R	$\sqrt{3}$	1	1	0.40	0.40	∞
Hemispherical Isotropy	E.2.2	1.045	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	0.685	R	$\sqrt{3}$	1	1	0.40	0.40	∞
System detection limits	E.2.4	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation response	E2.5	3.0	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Readout Electronics	E.2.6	0.021	N	1	1	1	0.021	0.021	∞
Response Time	E.2.7	0.0	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Integration Time	E.2.8	1.4	R	$\sqrt{3}$	0	0	0.00	0.00	∞
RF ambient conditions-Noise	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF ambient conditions-reflections	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner mechanical tolerance	E.6.2	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to phantom shell	E.6.3	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation, interpolation, and integrations algorithms for max. SAR evaluation	E.5	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
System check source (dipole)									
Deviation of experimental dipole from numerical dipole	E.6.4	5.0	N	1	1	1	5.00	5.00	∞
Input power and SAR drift measurement	8,6.6.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Dipole axis to liquid distance	8,E.6.6	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Phantom and tissue parameters									
Phantom shell uncertainty—shape, thickness, and permittivity	E.3.1	4.0	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	E.3.2	1.9	N	1	1	0.84	1.90	1.60	∞
Liquid conductivity measurement	E.3.3	4.0	N	1	0.78	0.71	3.12	2.84	M
Liquid permittivity measurement	E.3.3	5.0	N	1	0.23	0.26	1.15	1.30	M
Liquid conductivity—temperature uncertainty	E.3.4	2.5	R	$\sqrt{3}$	0.78	0.71	1.13	1.02	∞
Liquid permittivity—temperature uncertainty	E.3.4	2.5	R	$\sqrt{3}$	0.23	0.26	0.33	0.38	∞
Combined Standard Uncertainty			RSS				9.718	9.517	
Expanded Uncertainty (95% Confidence interval)			K=2				19.437	19.035	

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12. CONDUCTED POWER MEASUREMENT

GSM BAND

Mode	Frequency(MHz)	Avg. Burst Power(dBm)	Duty cycle Factor(dBm)	Frame Power(dBm)
GSM 850	824.2	**31.59**	-9	22.59
	836.6	31.32	-9	22.32
	848.8	31.44	-9	22.44
GPRS 850 （1 Slot）	824.2	31.36	-9	22.36
	836.6	31.25	-9	22.25
	848.8	31.28	-9	22.28
GPRS 850 （2 Slot）	824.2	28.77	-6	**22.77**
	836.6	28.52	-6	22.52
	848.8	28.49	-6	22.49
GPRS 850 （3 Slot）	824.2	26.33	-4.26	22.07
	836.6	26.45	-4.26	22.19
	848.8	26.29	-4.26	22.03
GPRS 850 （4 Slot）	824.2	25.33	-3	22.33
	836.6	25.38	-3	22.38
	848.8	25.52	-3	22.52
EGPRS 850 （1 Slot）	824.2	25.62	-9	16.62
	836.6	25.35	-9	16.35
	848.8	25.44	-9	16.44
EGPRS 850 （2 Slot）	824.2	22.16	-6	16.16
	836.6	22.18	-6	16.18
	848.8	22.23	-6	16.23
EGPRS 850 （3 Slot）	824.2	21.44	-4.26	17.18
	836.6	21.53	-4.26	17.27
	848.8	21.57	-4.26	17.31
EGPRS 850 （4 Slot）	824.2	19.44	-3	16.44
	836.6	19.56	-3	16.56
	848.8	19.38	-3	16.38

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GSM BAND CONTINUE

Mode	Frequency(MHz)	Avg. Burst Power(dBm)	Duty cycle Factor(dBm)	Frame Power(dBm)
PCS1900	1850.2	**28.74**	-9	19.74
	1880	28.25	-9	19.25
	1909.8	28.23	-9	19.23
GPRS1900 (1 Slot)	1850.2	27.55	-9	18.55
	1880	27.59	-9	18.59
	1909.8	27.66	-9	18.66
GPRS1900 (2 Slot)	1850.2	24.15	-6	18.15
	1880	24.12	-6	18.12
	1909.8	24.29	-6	18.29
GPRS1900 (3 Slot)	1850.2	23.33	-4.26	19.07
	1880	23.42	-4.26	19.16
	1909.8	23.36	-4.26	19.10
GPRS1900 (4 Slot)	1850.2	22.22	-3	19.22
	1880	22.42	-3	**19.42**
	1909.8	22.29	-3	19.29
EGPRS1900 (1 Slot)	1850.2	24.10	-9	15.10
	1880	24.11	-9	15.11
	1909.8	24.26	-9	15.26
EGPRS1900 (2 Slot)	1850.2	21.18	-6	15.18
	1880	21.21	-6	15.21
	1909.8	21.13	-6	15.13
EGPRS1900 (3 Slot)	1850.2	21.44	-4.26	17.18
	1880	21.32	-4.26	17.06
	1909.8	21.45	-4.26	17.19
EGPRS1900 (4 Slot)	1850.2	20.28	-3	17.28
	1880	20.33	-3	17.33
	1909.8	20.42	-3	17.42

Note 1:
The Frame Power (Source-based time-averaged Power) is scaled the maximum burst average power based on time slots. The calculated methods are show as following:
Frame Power = Max burst power (1 Up Slot) – 9 dB
Frame Power = Max burst power (2 Up Slot) – 6 dB
Frame Power = Max burst power (3 Up Slot) – 4.26 dB
Frame Power = Max burst power (4 Up Slot) – 3 dB

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UMTS BAND
HSDPA Setup Configuration:

·The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.

·The RF path losses were compensated into the measurements.

·A call was established between EUT and Based Station with following setting:

(1) Set Gain Factors(βc and βd) parameters set according to each

(2) Set RMC 12.2Kbps+HSDPA mode.

(3) Set Cell Power=-86dBm

(4) Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)

(5) Select HSDPA Uplink Parameters

(6) Set Delta ACK, Delta NACK and Delta CQI=8

(7) Set Ack - Nack Repetition Factor to 3

(8) Set CQI Feedback Cycle (k) to 4ms

(9) Set CQI Repetition Factor to 2

(10) Power Ctrl Mode=All Up bits

·The transmitted maximum output power was recorded.

Table C.10.2.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	βc (Note5)	βd	βd (SF)	βc/βd	βHS (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15(Note 4)	15/15(Note 4)	64	12/15(Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: ΔACK, ΔNACK and ΔCQI = 30/15 with β_{hs} = 30/15 * β_c .
Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, ΔACK and ΔNACK = 30/15 with β_{hs} = 30/15 * β_c , and ΔCQI = 24/15 with β_{hs} = 24/15 * β_c .
Note 3: CM = 1 for βc/βd =12/15, hs/ c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.
Note 4: For subtest 2 the c/ d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to c = 11/15 and d = 15/15.

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HSUPA Setup Configuration:

· The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.

· The RF path losses were compensated into the measurements.

· A call was established between EUT and Base Station with following setting * :

(1) Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK

(2) Set the Gain Factors (βc and βd) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121

(3) Set Cell Power = -86 dBm

(4) Set Channel Type = 12.2k + HSPA

(5) Set UE Target Power

(6) Power Ctrl Mode= Alternating bits

(7) Set and observe the E-TFCI

(8) Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI

· The transmitted maximum output power was recorded.

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	βc	βd	βd (SF)	βc/βd	βHS (Note 1)	βec	βed (Note 4) (Note 5)	βed (SF)	βed (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	βed1: 47/15 βed2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, ΔACK, ΔNACK and ΔCQI = 30/15 with β_{hs} = 30/15 * β_c. For sub-test 5, ΔACK, ΔNACK and ΔCQI = 5/15 with β_{hs} = 5/15 * β_c.
Note 2: CM = 1 for βc/βd =12/15, hs/ c=24/15. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the c/ d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to c = 10/15 and d = 15/15.
Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.
Note 5: βed cannot be set directly; it is set by Absolute Grant Value.
Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

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UMTS BAND II

Mode	Frequency (MHz)	Avg. Burst Power (dBm)
WCDMA 1900 RMC	1852.4	22.42
	1880	22.38
	1907.6	22.35
WCDMA 1900 AMR	1852.4	**22.73**
	1880	22.41
	1907.6	22.43
HSDPA Subtest 1	1852.4	21.36
	1880	21.02
	1907.6	21.55
HSDPA Subtest 2	1852.4	20.40
	1880	20.47
	1907.6	20.36
HSDPA Subtest 3	1852.4	20.01
	1880	20.53
	1907.6	20.66
HSDPA Subtest 4	1852.4	20.29
	1880	20.33
	1907.6	20.42
HSUPA Subtest 1	1852.4	20.59
	1880	20.75
	1907.6	20.64
HSUPA Subtest 2	1852.4	21.55
	1880	21.46
	1907.6	21.69
HSUPA Subtest 3	1852.4	21.11
	1880	21.28
	1907.6	21.53
HSUPA Subtest 4	1852.4	21.19
	1880	22.23
	1907.6	22.28
HSUPA Subtest 5	1852.4	21.45
	1880	21.39
	1907.6	21.44

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UMTS BAND V

Mode	Frequency (MHz)	Avg. Burst Power (dBm)
WCDMA 850 RMC	826.4	21.81
	836.6	**21.89**
	846.6	21.45
WCDMA 850 AMR	826.4	21.14
	836.6	21.00
	846.6	21.07
HSDPA Subtest 1	826.4	19.95
	836.6	19.60
	846.6	20.07
HSDPA Subtest 2	826.4	19.36
	836.6	20.97
	846.6	20.87
HSDPA Subtest 3	826.4	20.48
	836.6	20.74
	846.6	20.65
HSDPA Subtest 4	826.4	20.84
	836.6	20.39
	846.6	20.52
HSUPA Subtest 1	826.4	20.46
	836.6	20.99
	846.6	21.02
HSUPA Subtest 2	826.4	20.79
	836.6	20.93
	846.6	20.85
HSUPA Subtest 3	826.4	20.44
	836.6	20.36
	846.6	20.55
HSUPA Subtest 4	826.4	20.44
	836.6	20.46
	846.6	20.33
HSUPA Subtest 5	826.4	20.28
	836.6	20.42
	846.6	20.26

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According to 3GPP 25.101 sub-clause 6.2.2 , the maximum output power is allowed to be reduced by following the table.

Table 6.1aA: UE maximum output power with HS-DPCCH and E-DCH

UE Transmit Channel Configuration	CM(db)	MPR(db)
For all combinations of ,DPDCH,DPCCH HS-DPDCH,E-DPDCH and E-DPCCH	0≤ CM≤3.5	MAX(CM-1,0)
Note: CM=1 for β_c/β_d=12/15, β_{hs}/β_c=24/15.For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.		

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done .However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a compensation for the power back-off by increasing the gain of TX_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

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LTE Band

LTE (TDD) Considerations

For Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7.

LTE TDD Band 40 and Band 41 supports 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

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

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

Table 4.2-2: Uplink-downlink configurations

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

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Calculated Duty Cycle

Uplink-Downlink Configuration	Downlink-to-Uplink Switch-point Periodicity	Subframe Number										Calculated Duty Cycle(%)
		0	1	2	3	4	5	6	7	8	9	
0	5ms	D	S	U	U	U	D	S	U	U	U	63.33
1	5ms	D	S	U	U	D	D	S	U	U	D	43.33
2	5ms	D	S	U	D	D	D	S	U	D	D	23.33
3	10ms	D	S	U	U	U	D	D	D	D	D	31.67
4	10ms	D	S	U	U	D	D	D	D	D	D	21.67
5	10ms	D	S	U	D	D	D	D	D	D	D	11.67
6	5ms	D	S	U	U	U	D	S	U	U	D	53.33

Note: 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

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LTE Band

Avg. Output Power of LTE Band 7 (dBm)							
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 20775	Channel 21100	Channel 21425
5MHz	QPSK	1	0	0	22.07	21.96	21.75
			12	0	21.89	21.94	21.74
			24	0	21.96	21.91	21.96
		12	0	1	21.11	20.86	20.88
			6	1	21.09	20.89	20.79
			13	1	21.01	20.90	20.88
		25	0	1	21.09	20.95	20.93
	16QAM	1	0	1	21.31	20.92	20.86
			12	1	21.34	20.96	20.94
			24	1	21.26	20.94	21.01
		12	0	2	20.12	19.95	19.88
			6	2	20.09	19.87	19.78
			13	2	20.15	19.94	19.98
		25	0	2	20.12	19.93	19.97
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 20800	Channel 21100	Channel 21400
10MHz	QPSK	1	0	0	22.15	21.95	21.85
			24	0	**22.21**	20.88	22.00
			49	0	22.01	21.91	22.02
		25	0	1	21.16	20.87	20.58
			12	1	21.09	20.79	20.79
			25	1	21.10	20.97	20.93
		50	0	1	21.09	20.95	20.92
	16QAM	1	0	1	21.32	21.19	21.11
			24	1	21.54	21.25	20.22
			49	1	21.19	21.12	21.30
		25	0	2	20.03	19.57	20.02
			12	2	20.10	19.89	19.99
			25	2	20.07	19.94	19.92
		50	0	2	20.04	19.90	19.96

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Avg. Output Power of LTE Band 7 (dBm)							
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 20825	Channel 21100	Channel 21375
15MHz	QPSK	1	0	0	22.08	21.92	21.39
			37	0	21.86	21.87	21.57
			74	0	21.97	21.83	21.43
		37	0	1	21.26	20.56	20.52
			19	1	21.20	20.83	20.46
			38	1	21.22	20.77	20.43
		75	0	1	21.17	20.87	20.48
	16QAM	1	0	1	21.27	20.88	20.54
			37	1	21.35	20.46	20.44
			74	1	21.22	20.67	20.64
		37	0	2	20.09	19.56	19.53
			19	2	20.16	19.42	19.52
			38	2	20.17	19.65	19.46
		75	0	2	20.09	19.70	19.44
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 20850	Channel 21100	Channel 21350
20MHz	QPSK	1	0	0	21.49	21.39	21.32
			49	0	21.52	21.54	21.57
			99	0	21.57	21.38	21.28
		50	0	1	20.22	20.46	20.20
			25	1	20.64	20.38	20.28
			50	1	20.71	20.50	20.26
		100	0	1	20.61	20.51	20.35
	16QAM	1	0	1	20.61	20.56	20.65
			49	1	20.55	20.53	20.47
			99	1	20.70	20.54	20.56
		50	0	2	19.88	19.77	19.52
			25	2	19.46	19.43	19.43
			50	2	19.72	19.51	19.36
		100	0	2	19.60	19.52	19.37

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Conducted Power of LTE Band 17(dBm)							
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 23755	Channel 23790	Channel 23825
5MHz	QPSK	1	0	0	22.52	22.71	22.21
			13	0	22.43	22.56	22.36
			24	0	22.53	22.24	22.13
		12	0	1	21.53	22.15	22.25
			6	1	21.43	22.19	22.33
			13	1	21.76	21.35	21.13
		25	0	1	22.06	21.56	21.22
	16QAM	1	0	1	22.61	21.72	21.32
			13	1	22.56	21.56	21.25
			24	1	22.34	21.18	21.31
		12	0	2	21.02	21.55	20.36
			6	2	21.33	21.36	20.43
			13	2	21.06	21.23	20.26
		25	0	2	22.26	20.64	20.47
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 23780	Channel 23790	Channel 23800
10MHz	QPSK	1	0	0	22.45	21.11	23.03
			25	0	22.32	21.33	23.09
			49	0	22.44	21.09	**23.11**
		25	0	1	21.20	22.16	22.55
			13	1	21.16	22.20	22.42
			25	1	21.33	22.03	22.58
		50	0	1	21.10	22.36	22.56
	16QAM	1	0	1	21.43	21.12	22.09
			25	1	21.31	21.11	22.12
			49	1	20.56	21.34	22.31
		25	0	2	20.46	21.00	22.35
			13	2	20.72	21.31	20.16
			25	2	20.66	21.15	20.15
		50	0	2	20.34	21.19	20.19

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Conducted Power of LTE Band 38(dBm)							
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 37775	Channel 38000	Channel 38225
5MHz	QPSK	1	0	0	**23.71**	23.67	23.68
			12	0	23.42	23.54	23.57
			24	0	23.20	23.17	23.16
		12	0	1	23.22	23.15	23.64
			6	1	22.33	23.43	23.55
			13	1	23.25	23.21	23.25
		25	0	1	22.46	22.43	22.45
	16QAM	1	0	1	22.89	22.22	22.88
			12	1	22.45	22.15	22.48
			24	1	22.42	22.39	22.43
		12	0	2	22.47	22.25	22.45
			6	2	22.34	22.43	22.36
			13	2	22.36	22.24	22.22
		25	0	2	21.54	21.55	21.53
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 37800	Channel 38000	Channel 38200
10MHz	QPSK	0	0	0	22.69	23.69	23.69
			24	0	22.67	23.27	23.55
			49	0	22.99	23.01	23.02
		25	0	1	22.12	21.25	22.11
			12	1	22.16	21.56	22.15
			25	1	22.00	21.99	22.01
		50	0	1	22.90	22.20	22.21
	16QAM	0	0	1	22.49	22.89	22.90
			24	1	22.18	22.56	22.59
			49	1	22.57	22.15	22.15
		25	0	2	21.03	21.08	21.25
			12	2	21.05	21.10	21.68
			25	2	21.27	21.05	21.02
		50	0	2	22.90	21.29	21.29

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Conducted Power of LTE Band 38(dBm)							
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 37825	Channel 38000	Channel 38175
15MHz	QPSK	1	0	0	23.68	23.67	23.69
			37	0	23.48	23.42	23.57
			74	0	23.67	23.68	23.68
		37	0	1	21.42	21.52	21.25
			19	1	21.20	21.22	21.40
			38	1	21.33	21.35	21.33
		75	0	1	21.40	21.36	21.38
	16QAM	1	0	1	22.83	22.88	22.90
			37	1	22.88	22.54	22.85
			74	1	22.90	22.90	22.88
		37	0	2	21.40	21.51	21.40
			19	2	21.41	21.56	21.53
			38	2	21.37	21.39	21.33
		75	0	2	21.38	21.37	21.36
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 37850	Channel 38000	Channel 38150
20MHz	QPSK	1	0	0	23.55	23.42	23.36
			49	0	23.49	23.52	23.53
			99	0	23.66	23.69	23.69
		50	0	1	21.52	21.42	21.12
			25	1	21.37	21.53	21.28
			50	1	21.43	21.28	21.26
		100	0	1	21.29	21.28	21.26
	16QAM	1	0	1	22.91	22.90	22.88
			49	1	22.56	22.87	22.74
			99	1	22.89	22.89	22.87
		50	0	2	21.33	21.31	21.12
			25	2	21.43	23.42	21.23
			50	2	21.23	21.22	21.25
		100	0	2	21.28	21.27	21.27

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Avg. Output Power of LTE Band 40(dBm)							
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 38675	Channel 39150	Channel 39625
5MHz	QPSK	1	0	0	22.84	22.54	23.15
			12	0	22.56	22.58	23.12
			24	0	22.69	22.69	23.09
		12	0	1	22.45	22.56	22.36
			6	1	22.64	22.48	22.33
			13	1	22.71	22.70	22.69
		25	0	1	21.87	21.89	21.89
	16QAM	1	0	1	21.82	21.39	22.38
			12	1	21.98	21.45	22.44
			24	1	21.95	21.54	22.28
		12	0	2	21.59	21.44	21.44
			6	2	21.97	21.69	21.37
			13	2	21.79	21.80	21.56
		25	0	2	21.02	21.03	20.98
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 38700	Channel 39150	Channel 39600
10MHz	QPSK	1	0	0	22.15	22.16	22.15
			24	0	22.63	22.59	22.45
			49	0	22.40	22.42	22.41
		25	0	1	21.42	21.65	21.59
			12	1	21.66	21.29	21.34
			25	1	21.46	21.45	21.43
		50	0	1	21.69	21.72	21.69
	16QAM	1	0	1	21.41	21.41	21.43
			24	1	21.56	21.61	21.56
			49	1	21.67	21.62	21.65
		25	0	2	20.53	21.52	20.53
			12	2	20.36	21.39	20.43
			25	2	20.57	20.57	20.57
		50	0	2	20.83	20.82	20.81

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Avg. Output Power of LTE Band 40(dBm)							
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 38725	Channel 39150	Channel 39575
15MHz	QPSK	1	0	0	23.10	23.11	23.13
			37	0	20.14	23.17	23.10
			74	0	23.15	23.12	23.11
		37	0	1	20.88	20.67	20.44
			19	1	20.75	20.46	20.66
			38	1	20.86	20.83	20.82
		75	0	1	20.90	20.91	20.89
	16QAM	1	0	1	22.39	22.39	22.41
			37	1	22.42	22.25	22.25
			74	1	22.36	22.40	22.44
		37	0	2	20.42	20.85	20.49
			19	2	20.53	20.76	20.66
			38	2	20.81	20.82	20.86
		75	0	2	20.84	20.86	20.87
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 38750	Channel 39150	Channel 39550
20MHz	QPSK	1	0	0	23.11	23.15	23.15
			49	0	23.16	23.13	23.16
			99	0	**23.17**	23.12	23.11
		50	0	1	20.56	20.79	20.85
			25	1	20.78	20.98	20.77
			50	1	20.79	20.77	20.73
		100	0	1	20.84	20.83	20.81
	16QAM	1	0	1	22.42	22.38	22.40
			49	1	20.25	22.42	20.41
			99	1	22.39	22.39	22.43
		50	0	2	20.78	20.79	20.49
			25	2	20.59	20.64	20.79
			50	2	20.79	20.80	20.81
		100	0	2	20.83	20.82	20.83

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Conducted Power of LTE Band 41(dBm)							
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 39675	Channel 40620	Channel 41565
5MHz	QPSK	1	0	0	21.66	21.61	21.59
			12	0	21.54	20.53	21.46
			24	0	21.55	21.62	21.78
		12	0	1	20.33	20.45	21.55
			6	1	20.49	20.43	21.64
			13	1	20.53	20.55	20.65
		25	0	1	20.57	20.55	20.69
	16QAM	1	0	1	20.91	20.63	20.73
			12	1	20.76	20.69	20.74
			24	1	20.81	20.64	20.88
		12	0	2	19.62	19.55	19.31
			6	2	19.46	19.74	19.58
			13	2	19.62	19.58	19.75
		25	0	2	19.57	19.58	19.73
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 39700	Channel 40620	Channel 41540
10MHz	QPSK	1	0	0	21.72	21.76	21.61
			24	0	**21.83**	21.53	21.55
			49	0	21.62	21.63	21.72
		25	0	1	20.55	20.67	20.59
			12	1	20.54	20.55	20.75
			25	1	20.67	20.66	20.73
		50	0	1	20.67	20.64	20.68
	16QAM	1	0	1	20.93	20.85	21.00
			24	1	20.76	20.69	21.11
			49	1	20.80	20.87	21.07
		25	0	2	19.45	19.53	19.56
			12	2	19.31	19.57	19.44
			25	2	19.66	19.63	19.74
		50	0	2	19.66	19.67	19.67

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Conducted Power of LTE Band 41(dBm)							
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 39725	Channel 40620	Channel 41515
15MHz	QPSK	1	0	0	21.69	21.69	21.65
			37	0	21.45	21.56	21.54
			74	0	21.60	21.60	21.74
		37	0	1	20.66	20.58	20.78
			19	1	20.43	20.47	20.81
			38	1	20.69	20.66	20.76
		75	0	1	20.73	20.73	20.77
	16QAM	1	0	1	20.89	20.85	20.82
			37	1	20.77	20.46	20.69
			74	1	20.81	20.82	20.97
		37	0	2	19.59	19.52	19.82
			19	2	19.61	19.53	19.55
			38	2	19.65	19.69	19.77
		75	0	2	19.70	19.68	19.69
Bandwidth	Modulation	RB size	RB offset	Target MPR	Channel 39750	Channel 40620	Channel 41490
20MHz	QPSK	1	0	0	21.51	21.57	21.59
			49	0	21.45	21.54	21.54
			99	0	21.51	21.52	21.63
		50	0	1	20.66	20.49	20.53
			25	1	20.58	20.67	20.34
			50	1	20.75	20.71	20.66
		100	0	1	20.71	20.73	20.71
	16QAM	1	0	1	20.72	20.78	20.88
			49	1	20.74	20.69	20.58
			99	1	20.75	20.73	20.90
		50	0	2	19.52	19.55	19.58
			25	2	19.44	19.88	19.77
			50	2	19.68	19.71	19.73
		100	0	2	19.68	19.65	19.69

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The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.
UE Power Class: 3 (23 +/- 2dBm). 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 6.2.3.3-1 of the 3GPP TS36.101.

Table 6.2.3.3-1 Maximum Power Reduction (MPR) for Power class3

Modulation	Maximum Power Reduction (MPR) for Power[RB]						MPR(dB)
	1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz	
QPSK	＞5	＞4	＞8	＞12	＞16	＞18	≤1
16QAM	≤5	≤4	≤8	≤12	≤16	≤18	≤1
16QAM	＞5	＞4	＞8	＞12	＞16	＞18	≤2

The allowed A-MPR values specified below in Table 6.2.4.3-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of “NS_01”.3

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Table 6.2.4.3-1: Additional Maximum Power Reduction (A-MPR) / Spectrum Emission requirements

Network Signaling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.2-1	1.4,3,5,10,15,20	Table 5.4.2-1	N/A
NS_03	6.6.2.2.3.1	2,4,10, 23, 25,35,36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.3.2	41	5	>6	≤1
			10, 15, 20	Table 6.2.4.3-4	
NS_05	6.6.3.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.4.2-1	N/A
NS_07	6.6.2.2.3.3 6.6.3.3.3.2	13	10	Table 6.2.4.3-2	Table 6.2.4.3-2
NS_08	6.6.3.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4.3-3	Table 6.2.4.3-3
NS_11	6.6.2.2.1 6.6.3.3.13	231	1.4, 3, 5, 10,15,20	Table 6.2.4.3-5	Table 6.2.4.3-5
NS_12	6.6.3.3.5	26	1.4, 3, 5	Table 6.2.4.3-6	Table 6.2.4.3-6
NS_13	6.6.3.3.6	26	5	Table 6.2.4.3-7	Table 6.2.4.3-7
NS_14	6.6.3.3.7	26	10, 15	Table 6.2.4.3-8	Table 6.2.4.3-8
NS_15	6.6.3.3.8	26	1.4, 3, 5, 10, 15	Table 6.2.4.3-9 Table 6.2.4.3-10	Table 6.2.4.3-9, Table 6.2.4.3-10
NS_16	6.6.3.3.9	27	3, 5, 10	Table 6.2.4.3-11, Table 6.2.4.3-12, Table 6.2.4.3-13	
NS_17	6.6.3.3.10 6.6.3.3.11	28 28	5, 10	Table 5.4.2-1	N/A
			5	≥ 2	≤ 1
NS_18			10, 15, 20	≥ 1	≤ 4
NS_19			10, 15, 20	Table 6.2.4.3-15	Table 6.2.4.3-15
NS_20			5, 10, 15, 20	Table 6.2.4.3-14	Table 6.2.4.3-14
…					
NS_20	-	-	-	-	-

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WIFI

Mode	Data Rate (Mbps)	Channel	Frequency(MHz)	Avg. Burst Power(dBm)
802.11b	1	01	2412	9.34
		06	2437	8.31
		11	2462	**10.23**
802.11g	6	01	2412	5.65
		06	2437	6.84
		11	2462	7.09
802.11n(20)	6.5	01	2412	6.45
		06	2437	7.30
		11	2462	8.15
802.11n(40)	13.5	03	2422	6.62
		06	2437	6.30
		09	2452	8.06

Bluetooth_V4.0(BR/EDR)

Modulation	Channel	Frequency(MHz)	Avg. Burst Power (dBm)
GFSK	0	2402	-3.245
	39	2441	-4.180
	78	2480	**-2.782**
π /4-DQPSK	0	2402	-4.002
	39	2441	-5.172
	78	2480	-4.304
8-DPSK	0	2402	-4.145
	39	2441	-5.261
	78	2480	-4.528

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13. TEST RESULTS

13.1. SAR Test Results Summary

13.1.1. Test position and configuration

Body-worn SAR was performed with the device 5mm from the phantom, and 4 Edges SAR was performed with the device 5mm from the phantom.

13.1.2. Operation Mode

1. Per KDB 447498 D01 v06 ,for each exposure position, if the highest 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional.
2. Per KDB 865664 D01 v01r04,for each frequency band, if the measured SAR is ≥0.8W/Kg, testing for repeated SAR measurement is required , that the highest measured SAR is only to be tested. When the SAR results are near the limit, the following procedures are required for each device to verify these types of SAR measurement related variation concerns by repeating the highest measured SAR configuration in each frequency band.
   (1) When the original highest measured SAR is ≥0.8W/Kg, repeat that measurement once.
   (2) 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.
   (3) Perform a third repeated measurement only if the original, first and second repeated measurement is ≥1.5 W/Kg and ratio of largest to smallest SAR for the original, first and second measurement is ≥ 1.20.
3. Body-worn exposure conditions are intended to voice call operations, therefore GSM voice call mode is selected to be test.
4. Per KDB 648474 D04 v01r03,when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤1.2W/Kg, SAR testing with a headset connected is not required.
5. Per KDB 248227 D01v02r02,for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤1.2W/kg.
6. Per KDB 941225 D06 V02r01, When the same wireless mode transmission configurations for voice and data are required for SAR measurements, the more conservative configuration with a smaller separation distance should be tested for the overlapping SAR configurations.
7. Maximum Scaling SAR in order to calculate the Maximum SAR values to test under the standard Peak Power, Calculation method is as follows:
   Maximum Scaling SAR =tested SAR (Max.) ×[maximum turn-up power (mw)/ maximum measurement output power(mw)]
8. Proximity sensor, just for avoiding the wrong operation in the phone screen when call, and has no influence on output power or SAR result
9. Per KDB 941225 D05v02r03, start with the largest channel bandwidth and measure SAR for QPSK with 1RB allocation using the RB offset and required test channel combination with highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
10. Per KDB 941125 D05v02r03, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
11. Per KDB 941125 D05v02r03. 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

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1RB allocation and the highest reported SAR is >1.45 W/Kg, the remaining required test channels must also be tested.

12. Per KDB 941125 D05v02r03. 16QAM output power for each RB allocation configuration is not 1/2 dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤1.45W/Kg, Per KDB 941225 D05v02r02, 16QAM SAR testing is not required.
13. Per KDB 941125 D05v02r03. Smaller bandwidth output power for each RB allocation configuration is >not 1/2 dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤1.45W/Kg. Per KDB 941125 D05v02r03, smaller bandwidth SAR testing is not required.

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13.1.3. Test Result

SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 64.9					
Product: Travis Touch									
Test Mode: GSM850 with GMSK modulation									
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tune-up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
Body back	voice	128	824.2	-0.12	**0.937**	31.60	31.59	**0.939**	1.6
Body back	voice	190	836.6	0.06	0.784	31.60	31.32	0.836	1.6
Body back	voice	251	848.8	-0.25	0.645	31.60	31.44	0.669	1.6
Body front	voice	190	836.6	0.18	0.546	31.60	31.32	0.582	1.6
Body back	GPRS-2 slot	190	836.6	-0.11	0.565	28.80	28.52	0.603	1.6
Body front	GPRS-2 slot	190	836.6	0.09	**0.696**	28.80	28.52	**0.742**	1.6
Edge 2(Right)	GPRS-2 slot	190	836.6	-0.23	0.691	28.80	28.52	0.737	1.6
Edge 3(Bottom)	GPRS-2 slot	190	836.6	-0.17	0.187	28.80	28.52	0.199	1.6
Edge 4(Left)	GPRS-2 slot	190	836.6	0.02	0.686	28.80	28.52	0.732	1.6

Note:
· When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
·The test separation for body back and body front is 5mm of all above table.
·The test separation for 4 Edges is 5mm of all above table.

SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 40.1					
Product: Travis Touch									
Test Mode: PCS1900 with GMSK modulation									
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tune-up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
Body back	voice	661	1880.0	-0.12	**0.571**	28.80	28.25	**0.648**	1.6
Body front	voice	661	1880.0	0.16	0.087	28.80	28.25	0.099	1.6
Body back	GPRS-4 slot	661	1880.0	-0.22	**0.664**	22.50	22.42	**0.676**	1.6
Body front	GPRS-4 slot	661	1880.0	0.18	0.115	22.50	22.42	0.117	1.6
Edge 2(Right)	GPRS-4 slot	661	1880.0	-0.03	0.026	22.50	22.42	0.026	1.6
Edge 3(Bottom)	GPRS-4 slot	661	1880.0	0.09	0.169	22.50	22.42	0.172	1.6
Edge 4(Left)	GPRS-4 slot	661	1880.0	-0.17	0.153	22.50	22.42	0.156	1.6

Note:
· When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
·The test separation for body back and body front is 5mm of all above table.
·The test separation for 4 Edges is 5mm of all above table.

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SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 40.1					
Product: Travis Touch									
Test Mode: WCDMA Band II with QPSK modulation									
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tune-up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
Body back	RMC 12.2kbps	9262	1852.4	-0.11	1.222	22.50	22.42	1.245	1.6
Body back	RMC 12.2kbps	9400	1880	0.29	1.058	22.50	22.38	1.088	1.6
Body back	RMC 12.2kbps	9538	1907.6	-0.35	0.912	22.50	22.35	0.944	1.6
Body front	RMC 12.2kbps	9400	1880	-0.28	0.149	22.50	22.38	0.153	1.6
Body back+Ear.	RMC 12.2kbps	9262	1852.4	-1.17	**1.266**	22.50	22.42	**1.290**	1.6
Body back+Ear.	RMC 12.2kbps	9400	1880	-1.04	1.152	22.50	22.38	1.184	1.6
Body back+Ear.	RMC 12.2kbps	9538	1907.6	-1.16	0.981	22.50	22.35	1.015	1.6
Edge 2(Right)	RMC 12.2kbps	9400	1880	-0.22	0.029	22.50	22.38	0.030	1.6
Edge 3(Bottom)	RMC 12.2kbps	9400	1880	0.05	0.195	22.50	22.38	0.200	1.6
Edge 4(Left)	RMC 12.2kbps	9400	1880	-0.17	0.214	22.50	22.38	0.220	1.6

Note:
· When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
·The test separation for body back and body front is 5mm of all above table.
·The test separation for 4 Edges is 5mm of all above table.

SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 64.9					
Product: Travis Touch									
Test Mode: WCDMA Band V with QPSK modulation									
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tune-up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
Body back	RMC 12.2kbps	4183	836.6	0.26	**0.123**	22.00	21.89	**0.126**	1.6
Body front	RMC 12.2kbps	4183	836.6	-0.25	0.050	22.00	21.89	0.051	1.6
Edge 2(Right)	RMC 12.2kbps	4183	836.6	-0.18	0.044	22.00	21.89	0.045	1.6
Edge 3(Bottom)	RMC 12.2kbps	4183	836.6	0.09	0.029	22.00	21.89	0.030	1.6
Edge 4(Left)	RMC 12.2kbps	4183	836.6	-0.21	0.078	22.00	21.89	0.080	1.6

Note:
· When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
·The test separation for body back and body front is 5mm of all above table.
·The test separation for 4 Edges is 5mm of all above table.

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SAR MEASUREMENT													
Depth of Liquid (cm):>15						Relative Humidity (%): 49.3							
Product: Travis Touch													
Test Mode: LTE Band 7													
BM MHz	MOD	Position	Test Mode		Ch.	Freq. (MHz)	Power Drift (<±5%)	SAR (1g) (W/kg)	Max. Tune up Power (dBm)	Meas. output Power (dBm)	Scaled SAR (W/Kg)	Limit (W/kg)
			UL RB Allocation	UL RB START								
20	QPSK	Body back	1	0	20850	2510	-0.14	**1.080**	22.21	21.49	**1.275**	1.6
		Body back	1	0	21100	2535	0.22	0.972	22.21	21.39	1.174	1.6
		Body back	1	0	21350	2560	-0.06	0.873	22.21	21.32	1.072	1.6
		Body front	1	0	21100	2535	-0.15	0.086	22.21	21.39	0.104	1.6
		Edge 2(Right)	1	0	21100	2535	-0.08	0.112	22.21	21.39	0.135	1.6
		Edge 3(Bottom)	1	0	21100	2535	0.19	0.375	22.21	21.39	0.453	1.6
		Edge 4(Left)	1	0	21100	2535	-0.23	0.066	22.21	21.39	0.080	1.6

Note:
· When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
·The test separation for body back and body front is 5mm of all above table.
·The test separation for 4 Edges is 5mm of all above table.

SAR MEASUREMENT													
Depth of Liquid (cm):>15						Relative Humidity (%): 48.8							
Product: Travis Touch													
Test Mode: LTE Band 17													
BM MHz	MOD	Position	Test Mode		Ch.	Freq. (MHz)	Power Drift (<±5%)	SAR (1g) (W/kg)	Max. Tuneup Power (dBm)	Meas. output Power (dBm)	Scaled SAR (W/Kg)	Limit (W/kg)
			UL RB Allocation	UL RB START								
10	QPSK	Body back	1	0	23790	710	-0.18	**0.177**	23.11	21.11	**0.281**	1.6
		Body front	1	0	23790	710	0.05	0.005	23.11	21.11	0.008	1.6
		Edge 2(Right)	1	0	23790	710	-0.26	0.006	23.11	21.11	0.010	1.6
		Edge 3(Bottom)	1	0	23790	710	-0.17	0.008	23.11	21.11	0.013	1.6
		Edge 4(Left)	1	0	23790	710	0.13	0.010	23.11	21.11	0.016	1.6

Note:
· When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
·The test separation for body back and body front is 5mm of all above table.
·The test separation for 4 Edges is 5mm of all above table.

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SAR MEASUREMENT												
Depth of Liquid (cm):>15						Relative Humidity (%): 49.9						
Product: Travis Touch												
Test Mode: LTE Band 38												
BW MHz	MOD	Position	Test Mode		Ch.	Freq. (MHz)	Power Drift (<±5%)	SAR (1g) (W/kg)	Max. Tune up Power (dBm)	Meas. output Power (dBm)	Scaled SAR (W/Kg)	Limit (W/kg)
			UL RB Allocation	UL RB START								
20	QPSK	Body back	1	0	38000	2595	-0.12	**0.491**	23.71	23.42	**0.525**	1.6
		Body front	1	0	38000	2595	0.52	0.041	23.71	23.42	0.044	1.6
		Edge 2(Right)	1	0	38000	2595	-0.13	0.038	23.71	23.42	0.041	1.6
		Edge 3(Bottom)	1	0	38000	2595	-0.05	0.118	23.71	23.42	0.126	1.6
		Edge 4(Left)	1	0	38000	2595	-0.28	0.026	23.71	23.42	0.028	1.6

Note:
· When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
·The test separation for body back and body front is 5mm of all above table.
·The test separation for 4 Edges is 5mm of all above table.

SAR MEASUREMENT												
Depth of Liquid (cm):>15						Relative Humidity (%): 53.4						
Product: Travis Touch												
Test Mode: LTE Band 40												
BM MHz	MOD	Position	Test Mode		Ch.	Freq. (MHz)	Power Drift (<±5%)	SAR (1g) (W/kg)	Max. Tuneup Power (dBm)	Meas. output Power (dBm)	Scaled SAR (W/Kg)	Limit (W/kg)
			UL RB Allocation	UL RB START								
20	QPSK	Body back	1	0	38750	2310	-0.11	1.272	23.17	23.11	1.290	1.6
		Body back	1	0	39150	2350	0.13	**1.360**	23.17	23.15	**1.366**	1.6
		Body back	1	0	39550	2390	-0.05	1.317	23.17	23.15	1.323	1.6
		Body front	1	0	39150	2350	-0.12	0.086	23.17	23.15	0.086	1.6
		Body back+Ear.	1	0	38750	2310	-0.65	1.251	23.17	23.11	1.268	1.6
		Body back+Ear.	1	0	39150	2350	-1.26	1.262	23.17	23.15	1.268	1.6
		Body back+Ear.	1	0	39550	2390	-1.08	1.288	23.17	23.15	1.294	1.6
		Edge 2(Right)	1	0	39150	2350	0.17	0.036	23.17	23.15	0.036	1.6
		Edge 3(Bottom)	1	0	39150	2350	-0.23	0.157	23.17	23.15	0.158	1.6
		Edge 4(Left)	1	0	39150	2350	0.36	0.089	23.17	23.15	0.089	1.6

Note:
· When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
·The test separation for body back and body front is 5mm of all above table.
·The test separation for 4 Edges is 5mm of all above table.

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SAR MEASUREMENT												
Depth of Liquid (cm):>15					Relative Humidity (%): 49.3							
Product: Travis Touch												
Test Mode: LTE Band 41												
BM MHz	MOD	Position	Test Mode		Ch.	Freq. (MHz)	Power Drift (<±5%)	SAR (1g) (W/kg)	Max. Tuneup Power (dBm)	Meas. output Power (dBm)	Scaled SAR (W/Kg)	Limit (W/kg)
			UL RB Allocation	UL RB START								
10	QPSK	Body back	1	0	40620	2593	-0.23	**0.294**	21.83	21.57	**0.312**	1.6
		Body front	1	0	40620	2593	-0.16	0.033	21.83	21.57	0.035	1.6
		Edge 2(Right)	1	0	40620	2593	0.05	0.040	21.83	21.57	0.042	1.6
		Edge 3(Bottom)	1	0	40620	2593	-0.18	0.143	21.83	21.57	0.152	1.6
		Edge 4(Left)	1	0	40620	2593	0.29	0.024	21.83	21.57	0.025	1.6

Note:
· When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
·The test separation for body back and body front is 5mm of all above table.
·The test separation for 4 Edges is 5mm of all above table.

SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 50.7					
Product: Travis Touch									
Test Mode:802.11b									
Position	Mode	Ch.	Fr. (MHz)	Power Drift (<±5%)	SAR (1g) (W/kg)	Max. Tune-up Power (dBm)	Meas. output Power (dBm)	Scaled SAR (W/Kg)	Limit (W/kg)
Body back	DTS	11	2462	-0.12	**0.125**	10.23	10.23	**0.125**	1.6
Body front	DTS	11	2462	0.06	0.026	10.23	10.23	0.026	1.6
Edge 1 (Top)	DTS	11	2462	-0.15	0.012	10.23	10.23	0.012	1.6
Edge 2(Right)	DTS	11	2462	0.28	0.009	10.23	10.23	0.009	1.6
Edge 4(Left)	DTS	11	2462	-0.03	0.015	10.23	10.23	0.015	1.6

Note:
· According to KDB 248227 D01v02r02,for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤1.2W/kg
· All of above "DTS" means data transmitters.
·The test separation for body back and body front is 5mm of all above table.
·The test separation for 4 Edges is 5mm of all above table.

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Repeated SAR										
Product: Travis Touch										
Test Mode: GSM850 with GMSK modulation and WCDMA Band II with QPSK modulation										
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±5%)**	**Once SAR (1g) (W/kg)**	**Power Drift (<±5%)**	**Twice SAR (1g) (W/kg)**	**Power Drift (<±5%)**	**Third SAR (1g) (W/kg)**	**Limit W/kg**
Body back	voice	128	824.2	-0.22	0.913	--	--	--	--	1.6
Body back+Ear.	RMC 12.2kbps	9262	1852.4	0.13	1.215	0.12	1.206	--	--	1.6

Repeated SAR														
Product: Travis Touch														
Test Mode: LTE Band 7& LTE Band 40														
BM MHz	**MOD**	**Position**	**Test Mode**		**Ch.**	**Freq. (MHz)**	**Power Drift (<±5%)**	**Once SAR (1g) (W/kg)**	**Power Drift (<±5%)**	**Twice SAR (1g) (W/kg)**	**Power Drift (<±5%)**	**Third SAR (1g) (W/kg)**	**Limit (W/kg)**
			UL RB Allocation	**UL RB START**									
20	**QPSK**	Body back	1	0	20850	2510	-0.12	0.922	--	--	--	--	1.6
		Body back	1	0	39150	2350	0.06	1.327	0.03	1.305	--	--	1.6

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Simultaneous Multi-band Transmission Evaluation:

Application Simultaneous Transmission information:

NO	Simultaneous state	Portable Handset	
		Body-worn	Hotspot
1	GSM(voice)+WLAN 2.4GHz (data)	Yes	-
2	WCDMA(voice)+WLAN 2.4GHz (data)	Yes	-
3	GSM(voice)+Bluetooth(data)	Yes	-
4	WCDMA(voice)+Bluetooth(data)	Yes	-
5	GSM (Data) + Bluetooth(data)	Yes	
6	GSM (Data) + WLAN 2.4GHz (data)	Yes	Yes
7	WCDMA (Data) + Bluetooth(data)	Yes	
8	WCDMA (Data) + WLAN 2.4GHz (data)	Yes	Yes
9	LTE + Bluetooth(data)	Yes	
10	LTE + WLAN 2.4GHz (data)	Yes	Yes

NOTE:

1. WIFI and BT share the same antenna, and cannot transmit simultaneously.
2. Simultaneous with every transmitter must be the same test position.
3. KDB 447498 D01, BT SAR is excluded as below table.
4. KDB 447498 D01, for handsets the test separation distance is determined by the smallest distance between the outer surface of the device and the user; which is 5mm for body-worn SAR.
5. According to KDB 447498 D01 4.3.1, Standalone SAR test exclusion is as follow:
   For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:
   [(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] • [√f(GHz)] ≤ 3.0 for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR[30], where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation[31]
   - The result is rounded to one decimal place for comparison
   - The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

   The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.
6. If the test separation distance is <5mm, 5mm is used for excluded SAR calculation.
7. According to KDB 447498 D01 4.3.2, simultaneous transmission SAR test exclusion is as follow:
   (1) Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna.
   (2) Any transmitters and antennas should be considered when calculating simultaneous mode.
   (3) For mobile phone and PC, it's the sum of all transmitters and antennas at the same mode with same position in each applicable exposure condition
   (4)When the standalone SAR test exclusion of section 4.3.2 is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to the following to det
   (max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm;
   where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.

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8. When the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR to peak location separation ratio. The simultaneous transmitting antennas in each operating mode and exposure condition combination must be considered one pair at a time to determine the SAR to peak location separation ratio to qualify for test exclusion. The ratio is determined by (SAR1 + SAR2)1.5/Ri, rounded to two decimal digits, and must be ≤ 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion.

Estimated SAR		Max Power including Tune-up Tolerance		Separation Distance (mm)	Estimated SAR (W/kg)
		dBm	mW		
BT	Body	-2	0.631	5	0.026

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Sum of the SAR for GSM 850 &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		GSM 850	WI-Fi DTS Band	Bluetooth		
Body-worn (voice)	Rear	0.939	0.125		1.064	No
		0.939		0.026	0.965	No
	Front	0.582	0.026		0.608	No
		0.582		0.026	0.608	No
Body-worn (Data)	Rear	0.603		0.026	0.629	No
		0.603	0.125		0.728	No
	Front	0.742		0.026	0.768	No
		0.742	0.026		0.768	No
Body-worn (Hotspot)	Edge 2	0.737	0.009		0.746	No
	Edge 4	0.732	0.015		0.747	No
	Edge 2	0.737	0.009		0.746	No
	Edge 4	0.732	0.015		0.747	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.

·SPLSR mean is "The SAR to Peak Location Separation Ratio "

Sum of the SAR for GSM 1900 &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		PCS 1900	WI-Fi DTS Band	Bluetooth		
Body-worn (voice)	Rear	0.648	0.125		0.773	No
		0.648		0.026	0.674	No
	Front	0.099	0.026		0.125	No
		0.099		0.026	0.125	No
Body-worn (Data)	Rear	0.676		0.026	0.702	No
		0.676	0.125		0.801	No
	Front	0.117		0.026	0.143	No
		0.117	0.026		0.143	No
Body-worn (Hotspot)	Edge 2	0.026	0.009		0.035	No
	Edge 4	0.156	0.015		0.171	No
	Edge 2	0.026	0.009		0.035	No
	Edge 4	0.156	0.015		0.171	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.

·SPLSR mean is "The SAR to Peak Location Separation Ratio "

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Sum of the SAR for WCDMA Band II &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		WCDMA Band II	Wi-Fi DTS Band	Bluetooth		
Body-worn	Rear	1.245	0.125		1.370	No
	Front	0.153	0.026		0.179	No
	Edge 2	0.030	0.009		0.039	No
	Edge 4	0.220	0.015		0.235	No
	Rear	1.245		0.026	1.271	No
	Front	0.153		0.026	0.179	No
	Edge 2	0.030		0.026	0.056	No
	Edge 4	0.220		0.026	0.246	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.
·SPLSR mean is "The SAR to Peak Location Separation Ratio "

Sum of the SAR for WCDMA Band V &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		WCDMA Band V	Wi-Fi DTS Band	Bluetooth		
Body-worn	Rear	0.126	0.125		0.251	No
	Front	0.051	0.026		0.077	No
	Edge 2	0.045	0.009		0.054	No
	Edge 4	0.080	0.015		0.095	No
	Rear	0.126		0.026	0.152	No
	Front	0.051		0.026	0.077	No
	Edge 2	0.045		0.026	0.071	No
	Edge 4	0.080		0.026	0.106	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.
·SPLSR mean is "The SAR to Peak Location Separation Ratio "

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Sum of the SAR for LTE Band 7 &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		LTE Band 7	Wi-Fi DTS Band	Bluetooth		
Body-worn	Rear	1.275	0.125		1.400	No
	Front	0.104	0.026		0.130	No
	Edge 2	0.135	0.009		0.144	No
	Edge 4	0.080	0.015		0.095	No
	Rear	1.275		0.026	1.301	No
	Front	0.104		0.026	0.130	No
	Edge 2	0.135		0.026	0.161	No
	Edge 4	0.080		0.026	0.106	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.
·SPLSR mean is “The SAR to Peak Location Separation Ratio “

Sum of the SAR for LTE Band 17 &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		LTE Band 17	Wi-Fi DTS Band	Bluetooth		
Body-worn	Rear	0.281	0.125		0.406	No
	Front	0.008	0.026		0.034	No
	Edge 2	0.010	0.009		0.019	No
	Edge 4	0.016	0.015		0.031	No
	Rear	0.281		0.026	0.307	No
	Front	0.008		0.026	0.034	No
	Edge 2	0.010		0.026	0.036	No
	Edge 4	0.016		0.026	0.042	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.
·SPLSR mean is “The SAR to Peak Location Separation Ratio “

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Sum of the SAR for LTE Band 38 &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		LTE Band 38	Wi-Fi DTS Band	Bluetooth		
Body-worn	Rear	0.525	0.125		0.650	No
	Front	0.044	0.026		0.070	No
	Edge 2	0.041	0.009		0.050	No
	Edge 4	0.028	0.015		0.043	No
	Rear	0.525		0.026	0.551	No
	Front	0.044		0.026	0.070	No
	Edge 2	0.041		0.026	0.067	No
	Edge 4	0.028		0.026	0.054	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.
·SPLSR mean is "The SAR to Peak Location Separation Ratio "

Sum of the SAR for LTE Band 40 &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		LTE Band 40	Wi-Fi DTS Band	Bluetooth		
Body-worn	Rear	1.366	0.125		**1.491**	No
	Front	0.086	0.026		0.112	No
	Edge 2	0.036	0.009		0.045	No
	Edge 4	0.089	0.015		0.104	No
	Rear	1.366		0.026	1.392	No
	Front	0.086		0.026	0.112	No
	Edge 2	0.036		0.026	0.062	No
	Edge 4	0.089		0.026	0.115	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.
·SPLSR mean is "The SAR to Peak Location Separation Ratio "

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Sum of the SAR for LTE Band 41 &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		LTE Band 41	Wi-Fi DTS Band	Bluetooth		
Body-worn	Rear	0.312	0.125		0.437	No
	Front	0.035	0.026		0.061	No
	Edge 2	0.042	0.009		0.051	No
	Edge 4	0.025	0.015		0.040	No
	Rear	0.312		0.026	0.338	No
	Front	0.035		0.026	0.061	No
	Edge 2	0.042		0.026	0.068	No
	Edge 4	0.025		0.026	0.051	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.

·SPLSR mean is “The SAR to Peak Location Separation Ratio “

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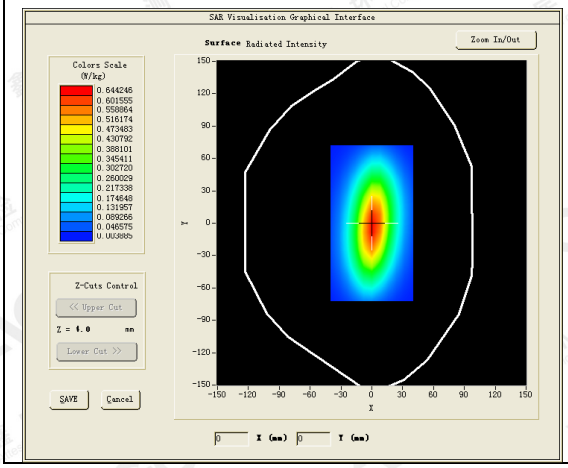
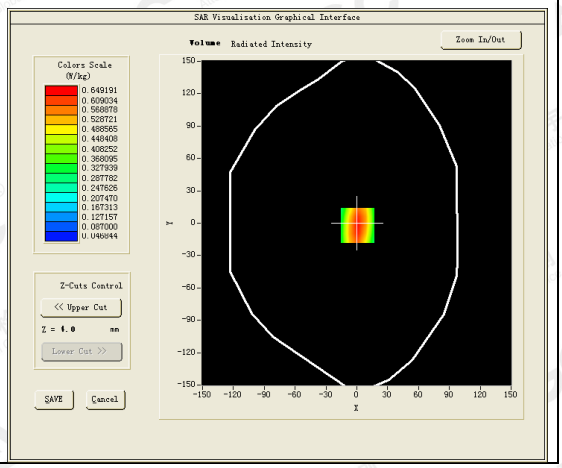
APPENDIX A. SAR SYSTEM CHECK DATA

Test Laboratory: AGC Lab **Date: July 02,2018**
System Check Body 750 MHz
DUT: Dipole 750 MHz Type: SID 750
Communication System CW; Communication System Band: D750 (750.0 MHz); Duty Cycle: 1:1; Conv.F=1.66
Frequency: 750 MHz; Medium parameters used: f = 750 MHz; σ=0.98 mho/m; εr =54.56; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃):22.0, Liquid temperature (℃): 21.5

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/System Check 750MHz Body/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/System Check 750MHz Body/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm

SURFACE SAR	VOLUME SAR
	

Maximum location: X=2.00, Y=-2.00
SAR Peak: 0.90 W/kg

SAR 10g (W/Kg)	0.378543
SAR 1g (W/Kg)	0.608906

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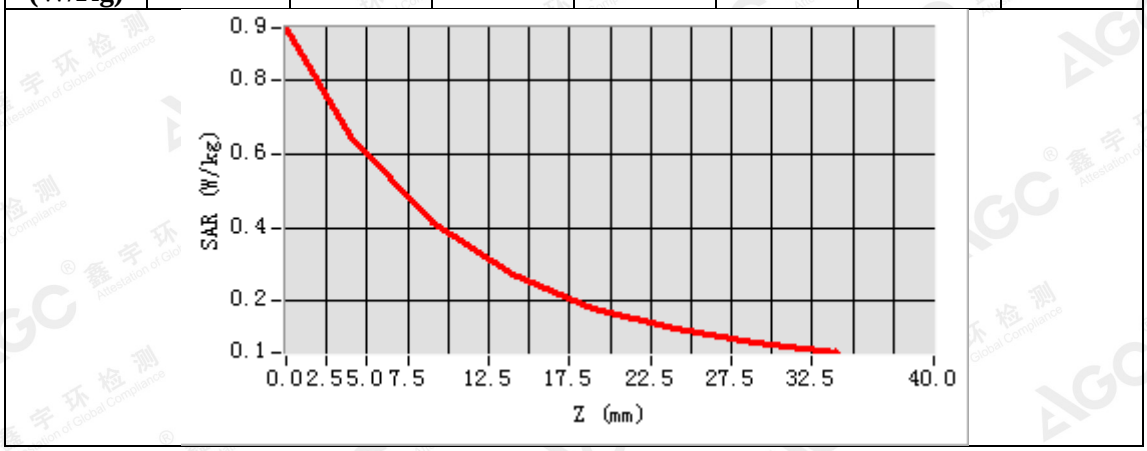
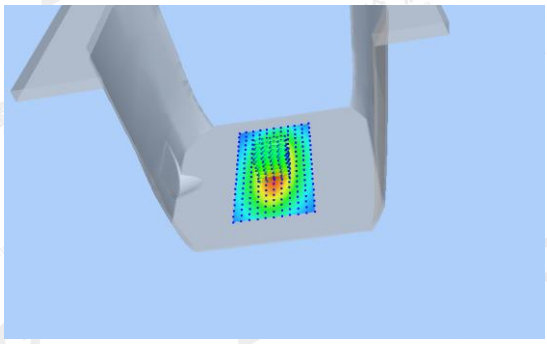
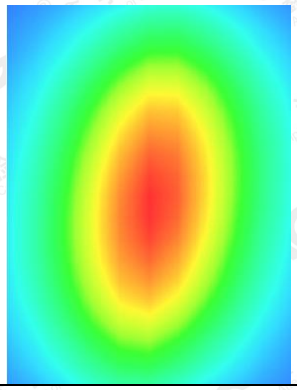
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.9022	0.6419	0.4056	0.2663	0.1775	0.1206	0.0813



3D screen shot	Hot spot position
	

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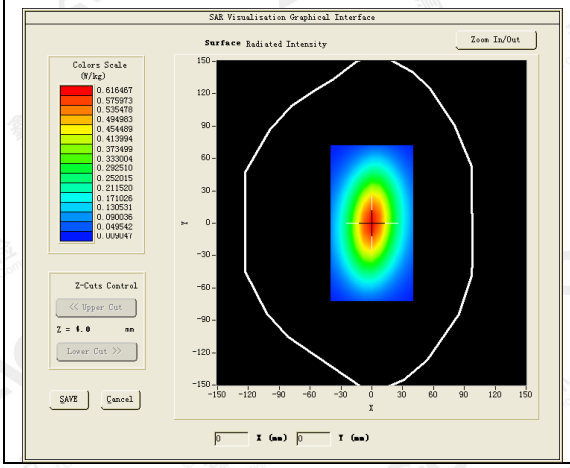
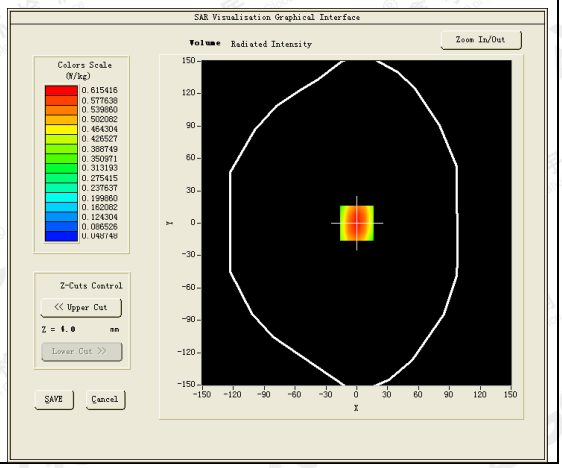
Test Laboratory: AGC Lab **Date: June 19,2018**
System Check Body 835 MHz
DUT: Dipole 835 MHz Type: SID 835
Communication System CW; Communication System Band: D835 (835.0 MHz); Duty Cycle: 1:1; Conv.F=1.81
Frequency: 835 MHz; Medium parameters used: f = 835 MHz; σ=0.95 mho/m; εr =55.89; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃):23.3, Liquid temperature (℃): 22.8

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/System Check 835MHz Body/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/System Check 835MHz Body/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm

SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=0.00
SAR Peak: 0.86 W/kg

SAR 10g (W/Kg)	0.377520
SAR 1g (W/Kg)	0.590207

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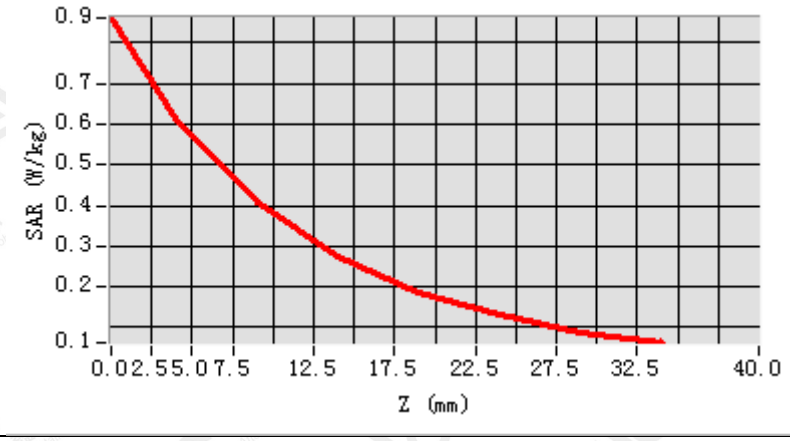
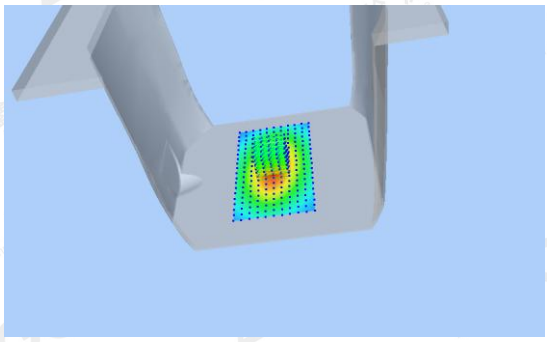
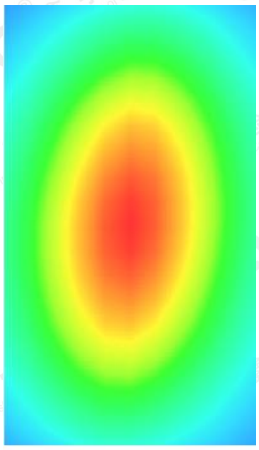
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.8614	0.6154	0.4056	0.2740	0.1873	0.1294	0.0898



3D screen shot	Hot spot position
	

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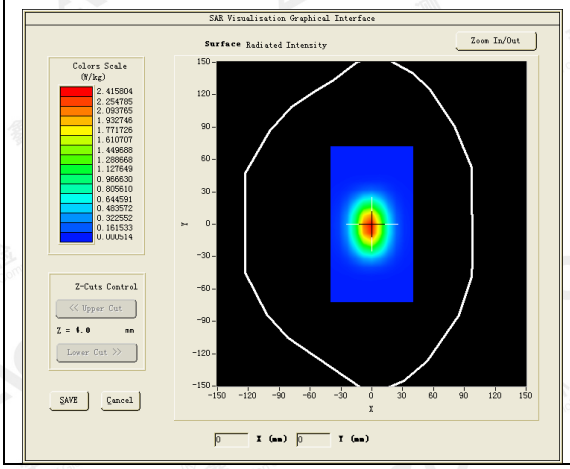
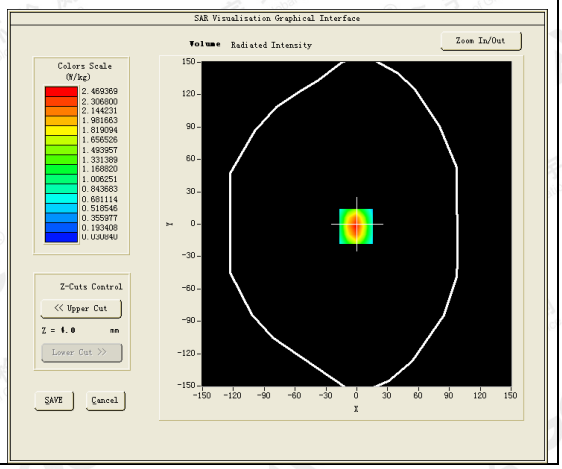
Test Laboratory: AGC Lab **Date: June 14,2018**
System Check Body 1900MHz
DUT: Dipole 1900 MHz; Type: SID 1900
Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Duty Cycle:1:1; Conv.F=2.39
Frequency: 1900 MHz; Medium parameters used: f = 1900 MHz; σ=1.52 mho/m; εr =53.65; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃):22.5, Liquid temperature (℃): 22.0

SATIMO Configuration:
Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_35

Configuration/System Check 1900MHz Body/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/System Check 1900MHz Body/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm

SURFACE SAR	VOLUME SAR
	

Maximum location: X=-2.00, Y=-2.00
SAR Peak: 3.99 W/kg

SAR 10g (W/Kg)	1.187209
SAR 1g (W/Kg)	2.345375

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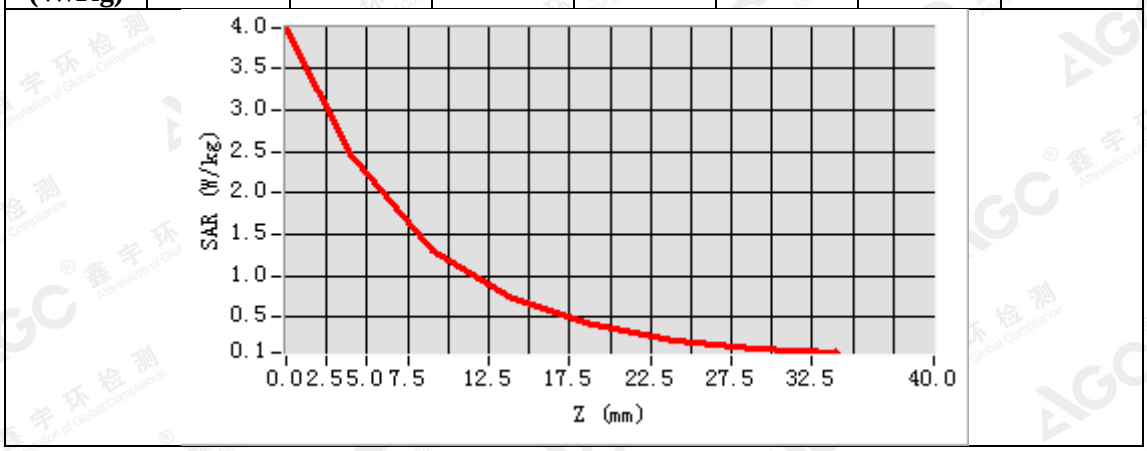
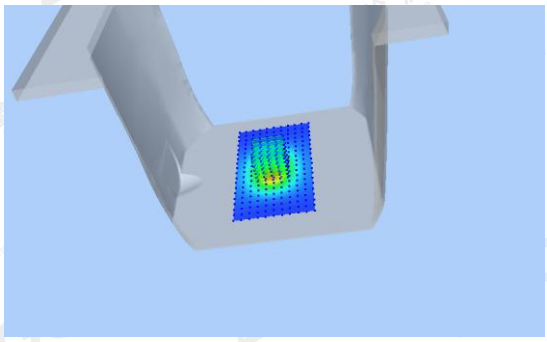
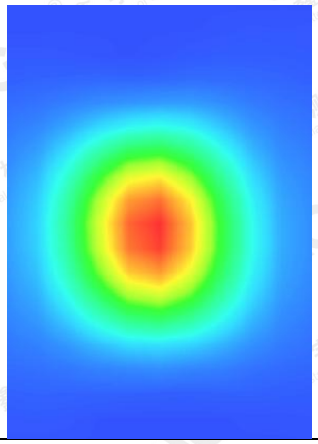
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	4.0035	2.4851	1.3309	0.7428	0.4153	0.2395	0.1417



3D screen shot	Hot spot position
	

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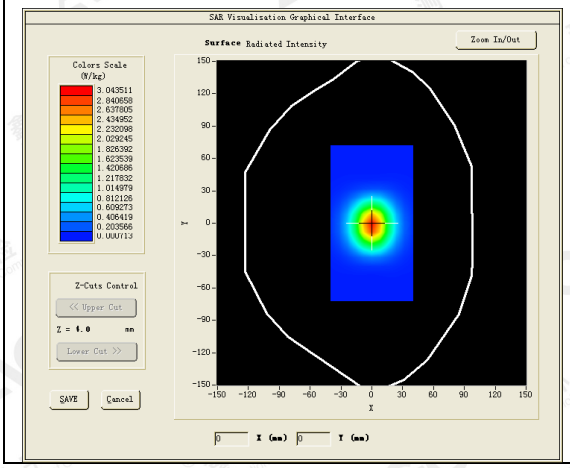
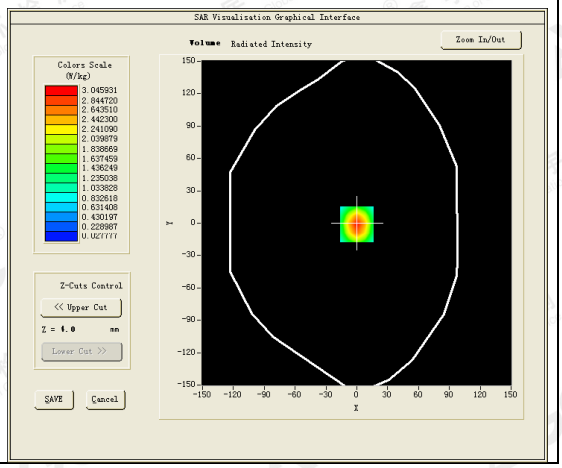
Test Laboratory: AGC Lab **Date: July 03,2018**
System Check Body 2300 MHz
DUT: Dipole 2300 MHz Type: SID 2300
Communication System CW; Communication System Band: D2300 (2300.0 MHz); Duty Cycle: 1:1; Conv.F=2.59
Frequency: 2300 MHz; Medium parameters used: f = 2300 MHz; σ=1.75 mho/m; εr =54.16; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃):21.8, Liquid temperature (℃): 21.3

SATIMO Configuration
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/System Check 2300MHz Body/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/System Check 2300MHz Body/Zoom Scan: Measurement grid: dx=5mm,dy=5mm, dz=5mm

SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=-1.00
SAR Peak: 5.02 W/kg

SAR 10g (W/Kg)	1.427365
SAR 1g (W/Kg)	2.889044

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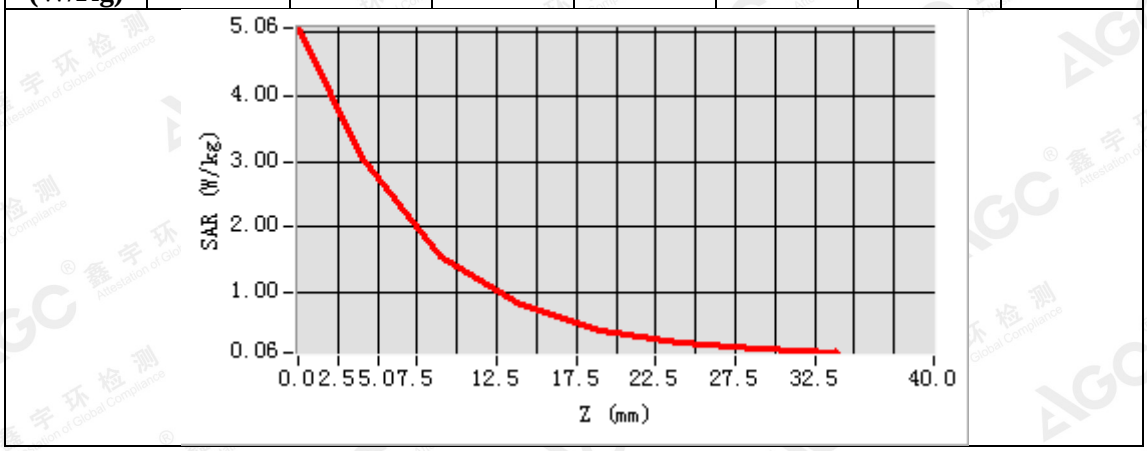
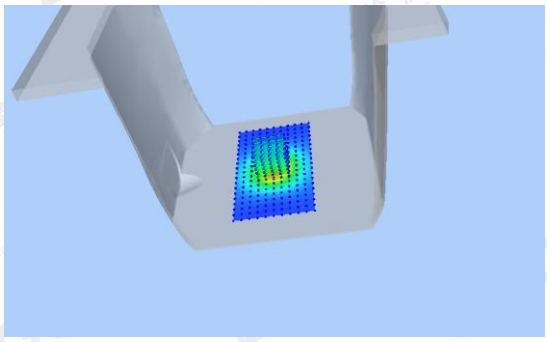
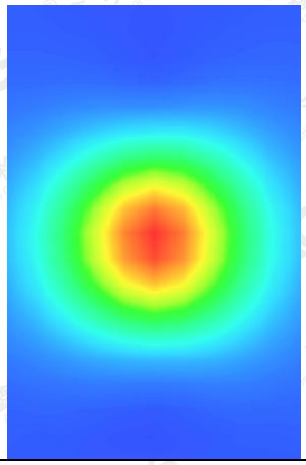
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	5.0649	3.0459	1.5372	0.7964	0.4134	0.2188	0.1156



3D screen shot	Hot spot position
	

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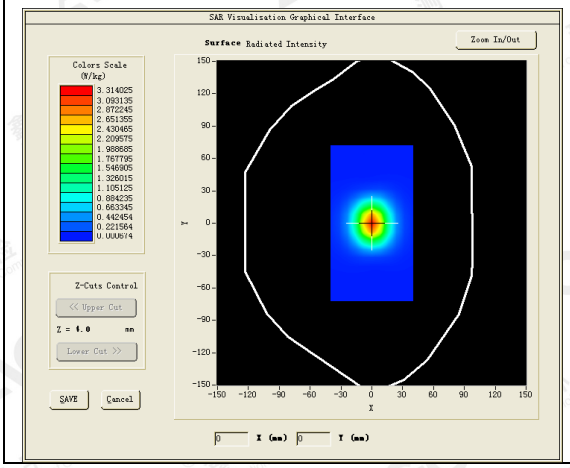
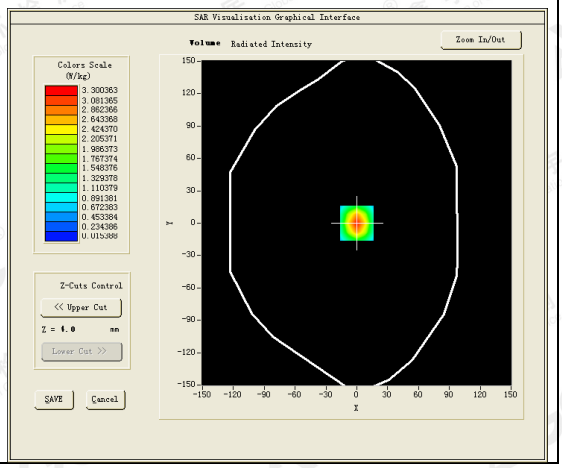
Test Laboratory: AGC Lab **Date: June 29,2018**
System Check Body 2450 MHz
DUT: Dipole 2450 MHz Type: SID 2450
Communication System CW; Communication System Band: D2450 (2450.0 MHz); Duty Cycle: 1:1; Conv.F=2.58
Frequency: 2450 MHz; Medium parameters used: f = 2450 MHz; σ=1.92 mho/m; εr =53.59; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃):21.9, Liquid temperature (℃): 21.5

SATIMO Configuration
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/System Check 2450MHz Body/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/System Check 2450MHz Body/Zoom Scan: Measurement grid: dx=5mm,dy=5mm, dz=5mm

SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=0.00
SAR Peak: 5.70 W/kg

SAR 10g (W/Kg)	1.435126
SAR 1g (W/Kg)	3.117495

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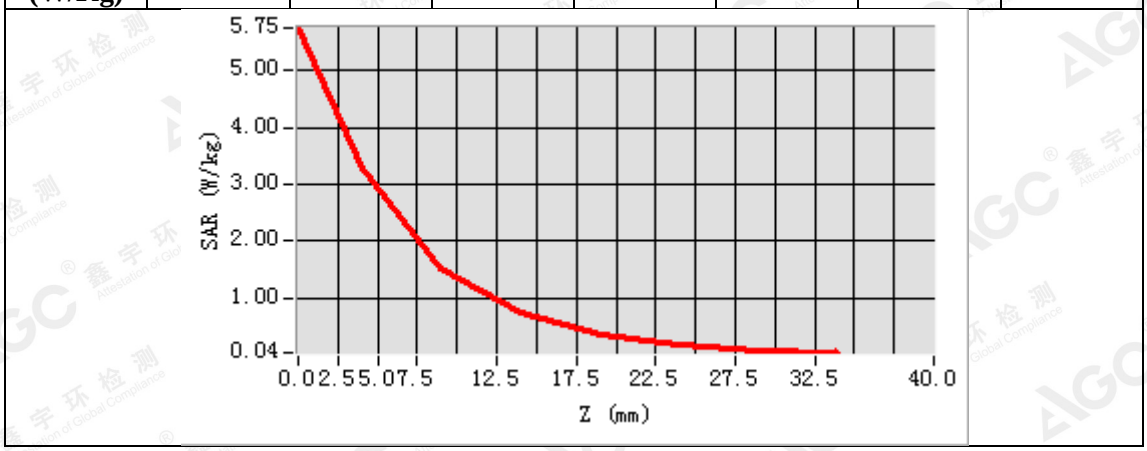
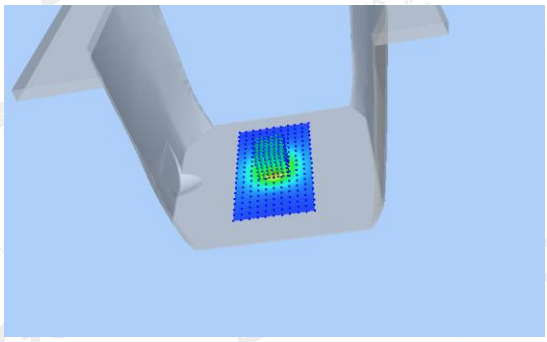
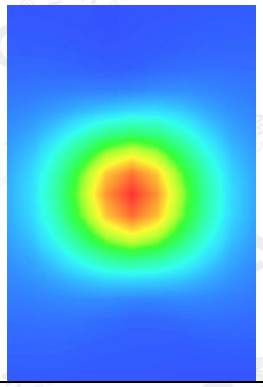
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	5.7463	3.3052	1.5395	0.7366	0.3522	0.1719	0.0880



3D screen shot	Hot spot position
	

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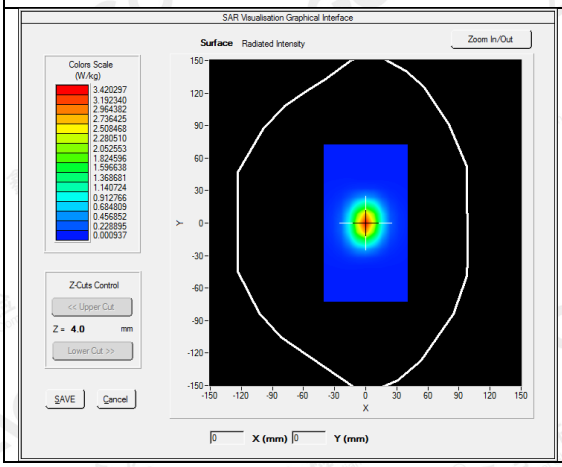
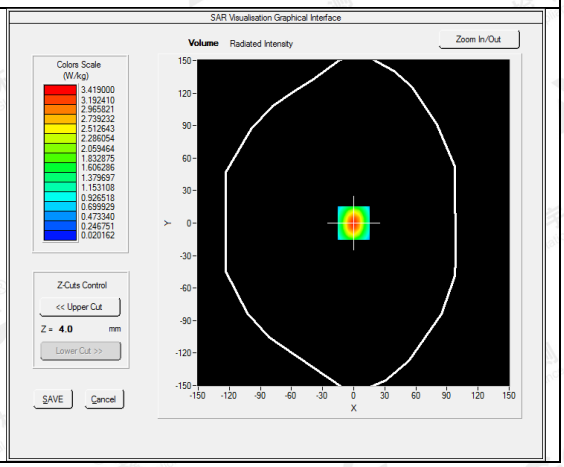
Test Laboratory: AGC Lab **Date: July 04,2018**
System Check Body 2600 MHz
DUT: Dipole 2600 MHz Type: SID 2600
Communication System CW; Communication System Band: D2600 (2600.0 MHz); Duty Cycle: 1:1; Conv.F=2.46
Frequency: 2600 MHz; Medium parameters used: f = 2600 MHz; σ=2.15 mho/m; εr =52.65; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃): 21.8, Liquid temperature (℃): 21.3

SATIMO Configuration
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_35

Configuration/System Check 2600MHz Body/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/System Check 2600MHz Body/Zoom Scan: Measurement grid: dx=5mm,dy=5mm, dz=5mm

SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=0.00
SAR Peak: 5.74 W/kg

SAR 10g (W/Kg)	1.440153
SAR 1g (W/Kg)	3.126885

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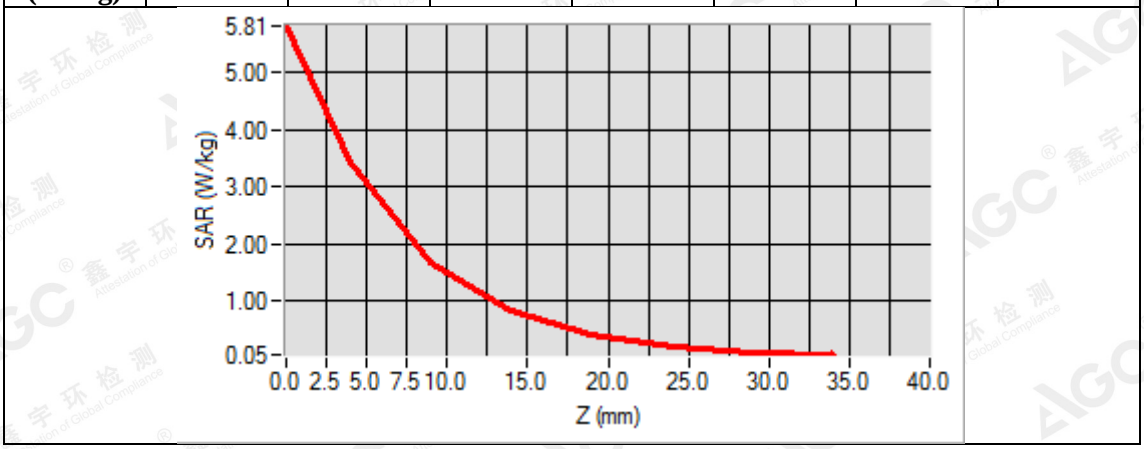
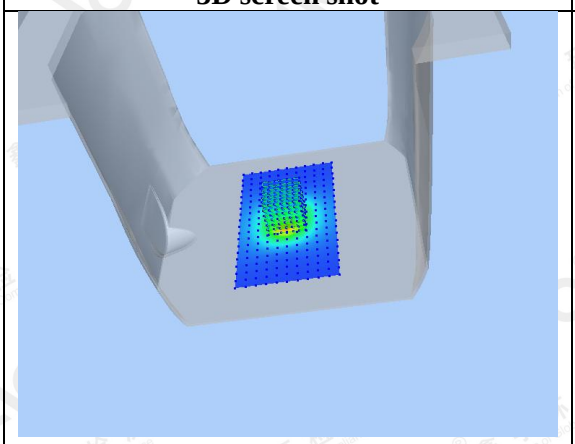
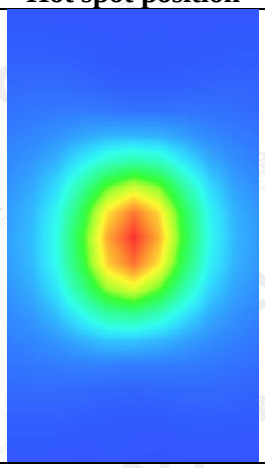
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	5.8141	3.4190	1.6613	0.8221	0.4133	0.2090	0.1062



3D screen shot	Hot spot position
	

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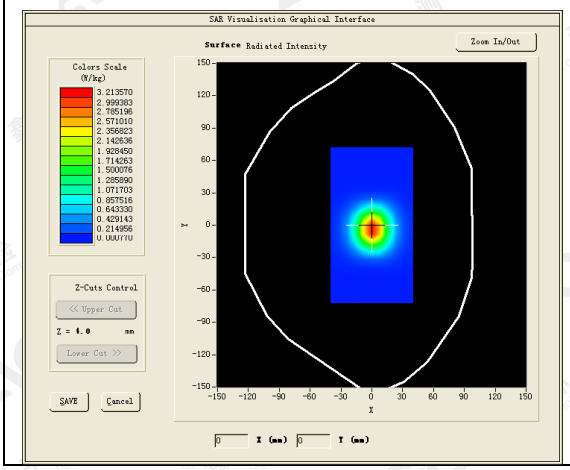
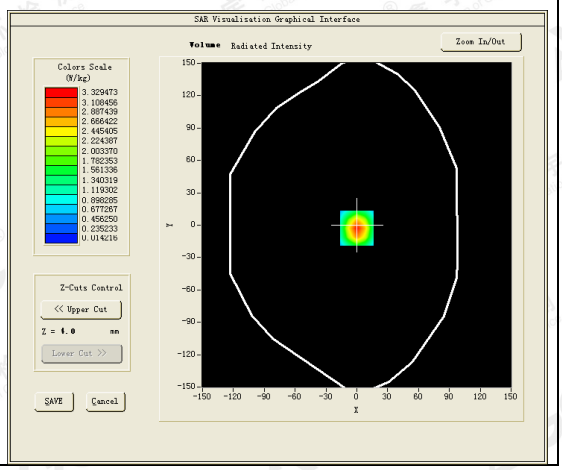
Test Laboratory: AGC Lab **Date: June 28,2018**
System Check Body 2600 MHz
DUT: Dipole 2600 MHz Type: SID 2600
Communication System CW; Communication System Band: D2600 (2600.0 MHz); Duty Cycle: 1:1; Conv.F=2.46
Frequency: 2600 MHz; Medium parameters used: f = 2600 MHz; σ=2.18 mho/m; εr =52.48; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃):22.1, Liquid temperature (℃): 21.7

SATIMO Configuration
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/System Check 2600MHz Body/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/System Check 2600MHz Body/Zoom Scan: Measurement grid: dx=5mm,dy=5mm, dz=5mm

SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=-2.00
SAR Peak: 5.83 W/kg

SAR 10g (W/Kg)	1.418543
SAR 1g (W/Kg)	3.129477

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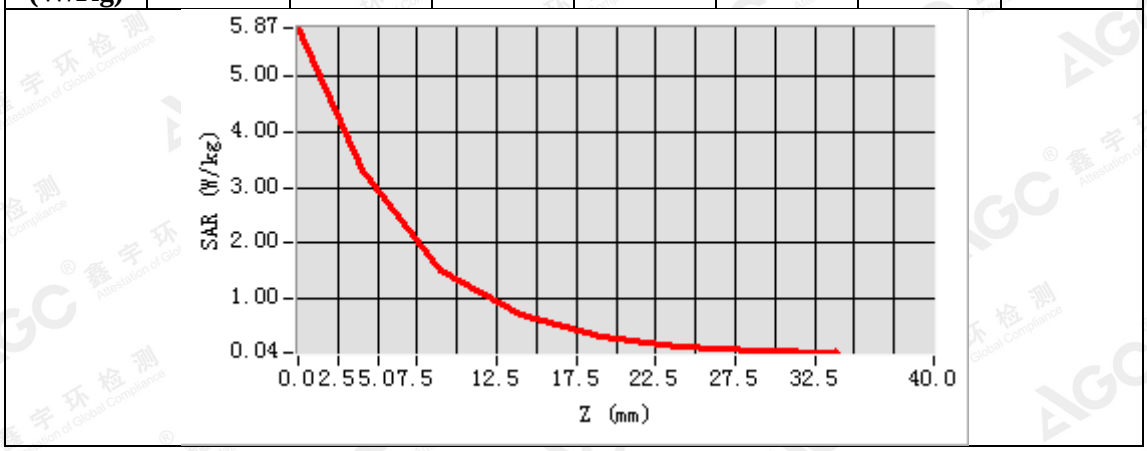
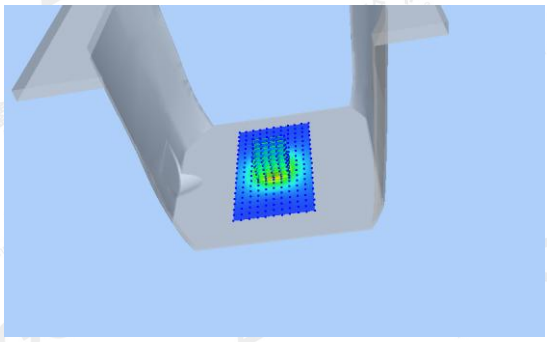
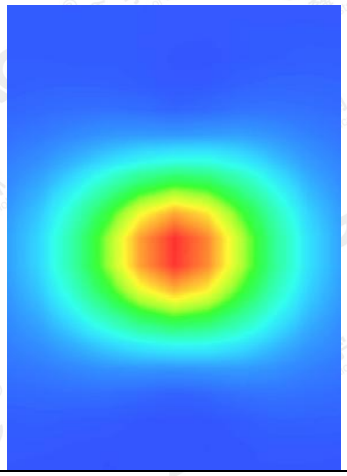
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	5.8702	3.3338	1.5224	0.7186	0.3415	0.1687	0.0831



3D screen shot	Hot spot position
	

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APPENDIX B. SAR MEASUREMENT DATA

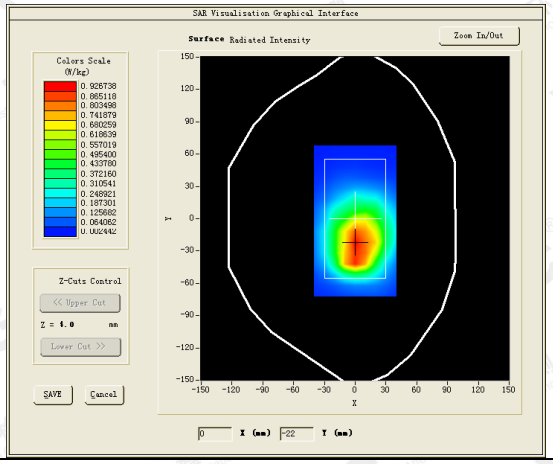
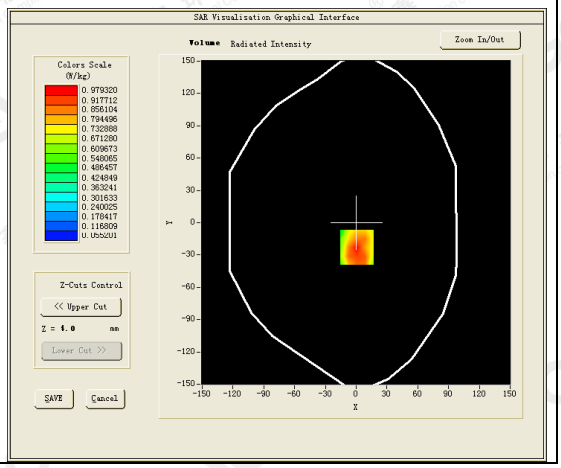
Test Laboratory: AGC Lab **Date: June 19,2018**
GSM 850 Low- Body- Back (MS)
DUT: Travis Touch; Type: TT201

Communication System: Generic GSM; Communication System Band: GSM 850; Duty Cycle: 1:8.3; Conv.F=1.81; Frequency: 824.2 MHz; Medium parameters used: f = 835 MHz; σ= 0.93 mho/m; εr = 56.71; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 23.3, Liquid temperature (℃): 22.8

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/GSM 850 Low-Body-Back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/GSM 850 Low-Body-Back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body Back
Band	GSM 850
Channels	Low
Signal	TDMA (Crest factor: 8.0)

SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=-23.00
SAR Peak: 1.42 W/kg

SAR 10g (W/Kg)	0.593368
SAR 1g (W/Kg)	0.936902

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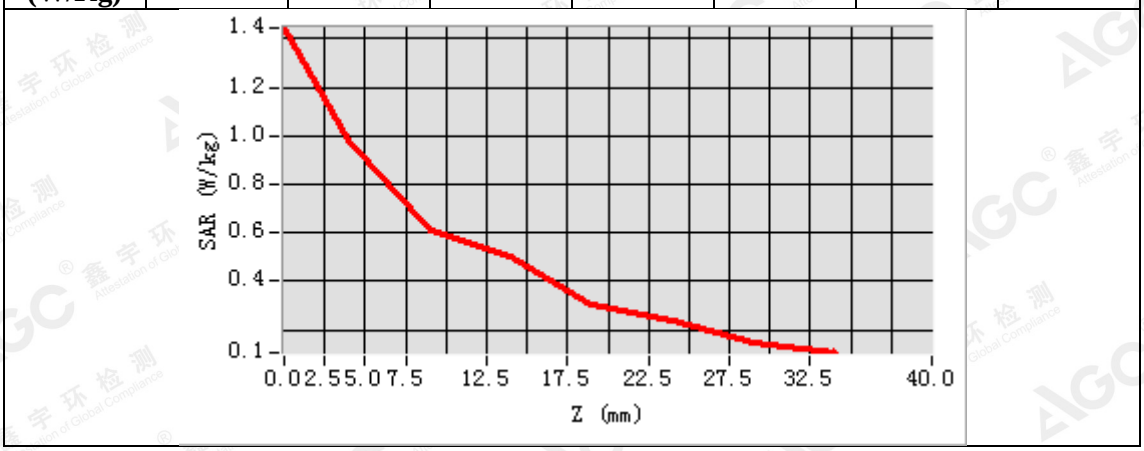
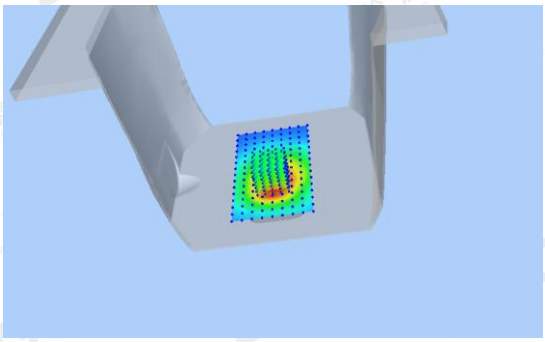
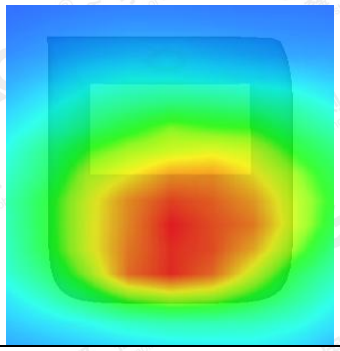
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.4443	0.9793	0.6088	0.5024	0.3010	0.2383	0.1502



3D screen shot	Hot spot position
	

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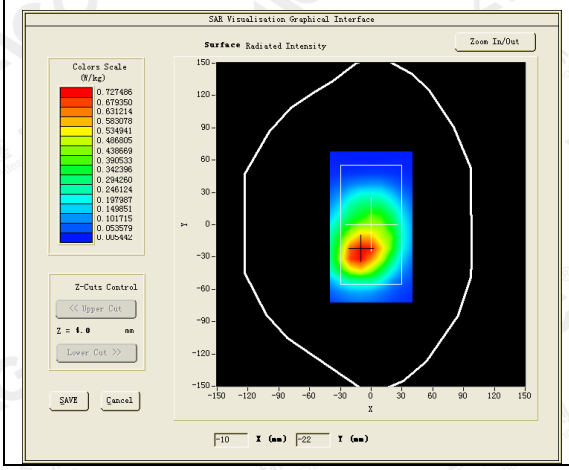
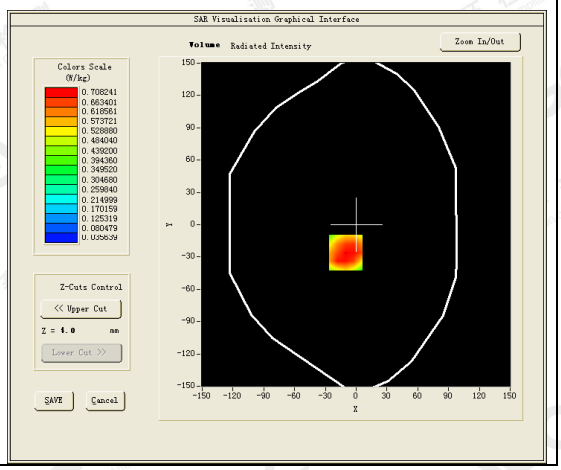
Test Laboratory: AGC Lab **Date: June 19,2018**
GPRS 850 Mid- Body- Front (2up))
DUT: Travis Touch; Type: TT201

Communication System: GPRS-2 Slot; Communication System Band: GSM 850; Duty Cycle: 1:4.2; Conv.F=1.81; Frequency: 836.6 MHz; Medium parameters used: f = 835 MHz; σ= 0.96 mho/m; εr = 55.43; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 23.3, Liquid temperature (℃): 22.8

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/GPRS 850 Mid- Body- Front /Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/GPRS 850 Mid- Body- Front /Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body Front
Band	GSM 850
Channels	Middle
Signal	TDMA (Crest factor: 4.0)

SURFACE SAR	VOLUME SAR
	

Maximum location: X=-10.00, Y=-26.00
SAR Peak: 1.07 W/kg

SAR 10g (W/Kg)	0.451337
SAR 1g (W/Kg)	0.695674

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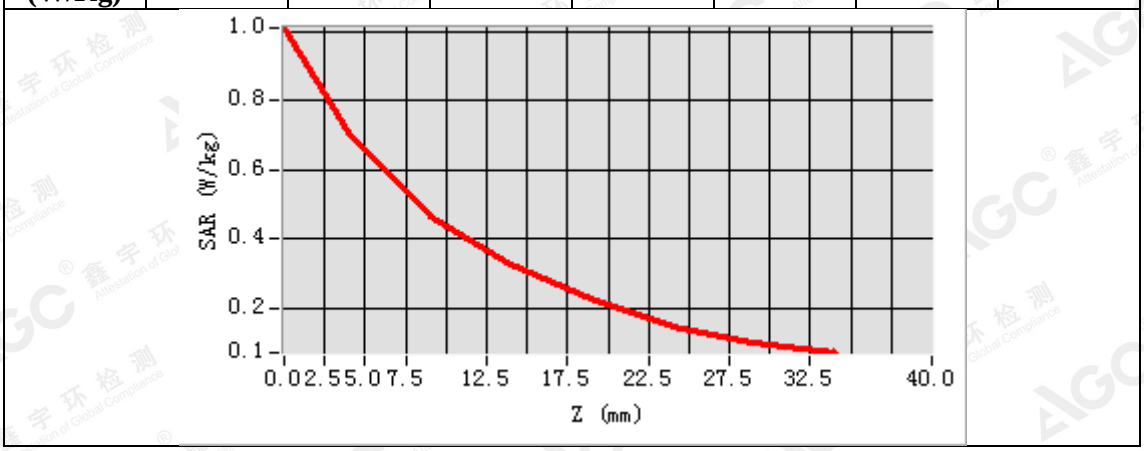
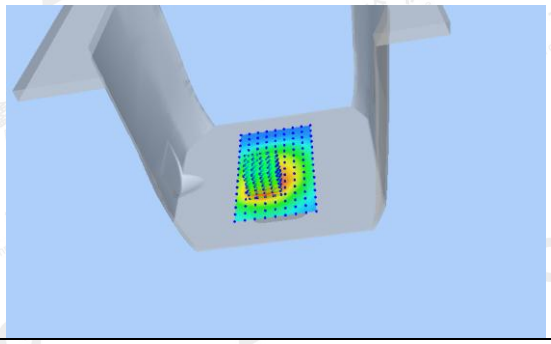
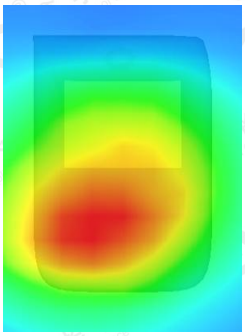
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.0123	0.7082	0.4663	0.3232	0.2291	0.1457	0.0980



3D screen shot	Hot spot position
	

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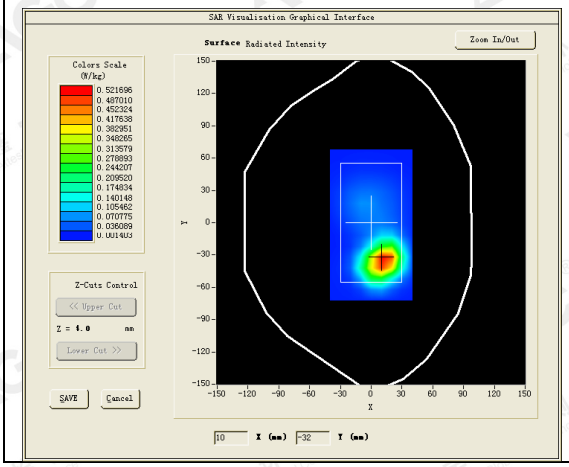
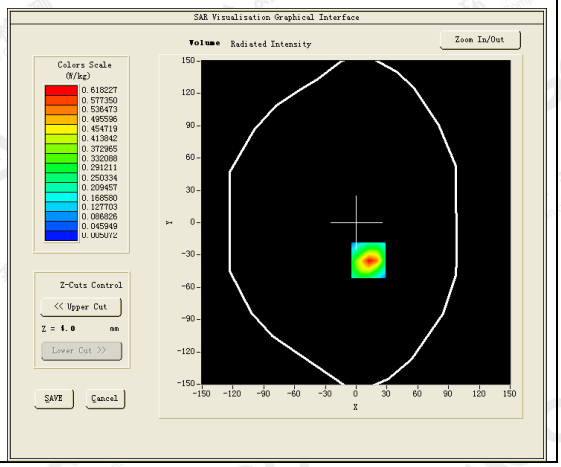
Test Laboratory: AGC Lab **Date: June 14,2018**
PCS 1900 Mid-Body-Back (MS)
DUT: Travis Touch; Type: TT201

Communication System: Generic GSM; Communication System Band: PCS 1900; Duty Cycle: 1:8.3; Conv.F=2.39;
Frequency: 1880 MHz; Medium parameters used: f = 1900 MHz; σ= 1.50 mho/m; εr =54.22; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.5, Liquid temperature (℃): 22.0

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_35

Configuration/PCS1900 Mid-Body-Back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/PCS1900 Mid-Body-Back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body Back
Band	PCS 1900
Channels	Middle
Signal	TDMA (Crest factor: 8.0)

SURFACE SAR	VOLUME SAR
	

Maximum location: X=12.00, Y=-35.00
SAR Peak: 1.09 W/kg

SAR 10g (W/Kg)	0.257308
SAR 1g (W/Kg)	0.571158

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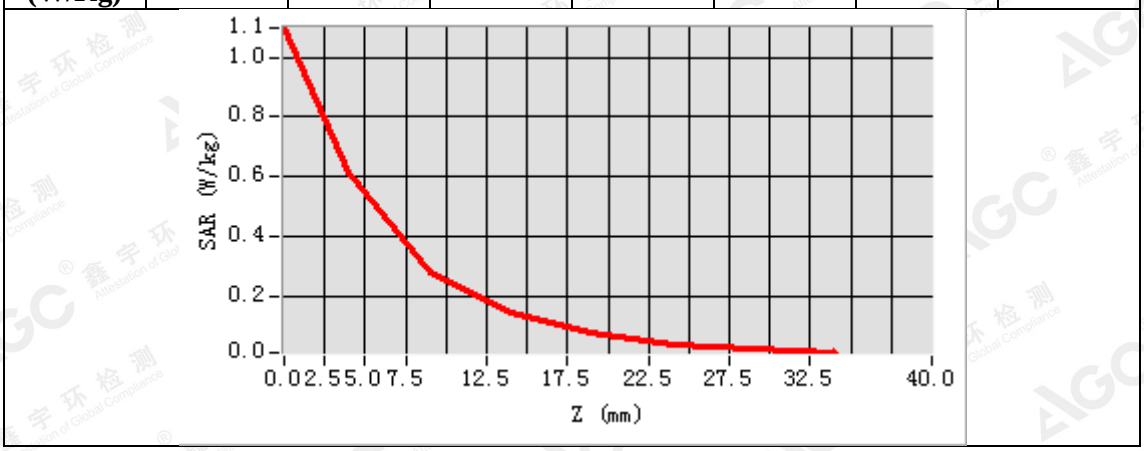
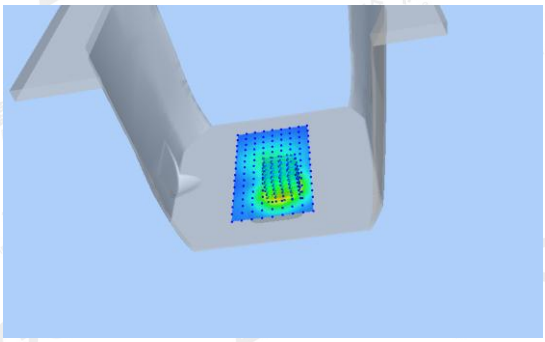
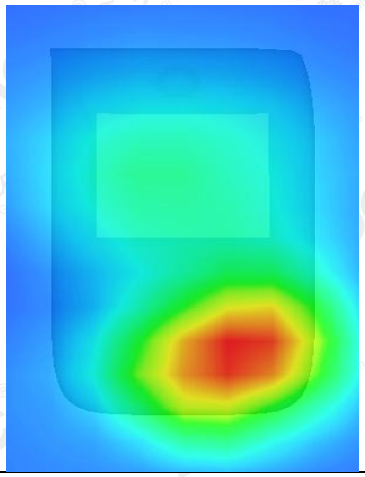
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.0982	0.6182	0.2831	0.1463	0.0770	0.0414	0.0227



3D screen shot	Hot spot position
	

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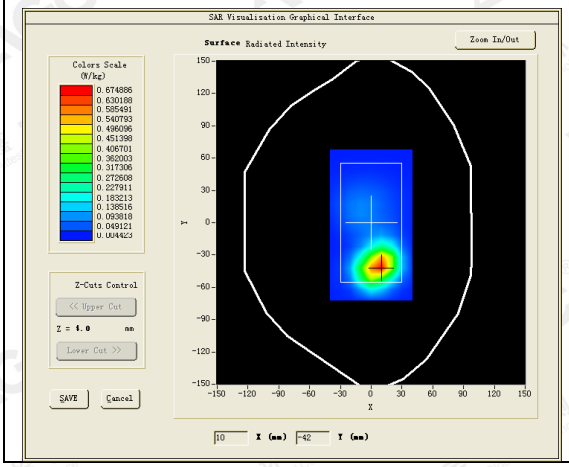
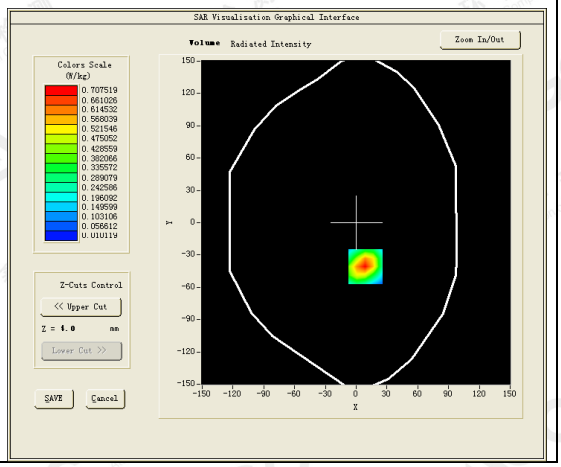
Test Laboratory: AGC Lab **Date: June 14,2018**
GPRS 1900 Mid-Body-Back (4up)
DUT: Travis Touch; Type: TT201

Communication System: GPRS-4Slot; Communication System Band: PCS 1900; Duty Cycle: 1:2.1; Conv.F=2.39; Frequency: 1880 MHz; Medium parameters used: f = 1900 MHz; σ= 1.50 mho/m; εr =54.22; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.5, Liquid temperature (℃): 22.0

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_35

Configuration/GPRS1900 Mid-Body-Back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/GPRS1900 Mid-Body-Back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body Back
Band	PCS 1900
Channels	Middle
Signal	TDMA (Crest factor: 2.0)

SURFACE SAR	VOLUME SAR
	

Maximum location: X=9.00, Y=-41.00
SAR Peak: 1.19 W/kg

SAR 10g (W/Kg)	0.317539
SAR 1g (W/Kg)	0.664193

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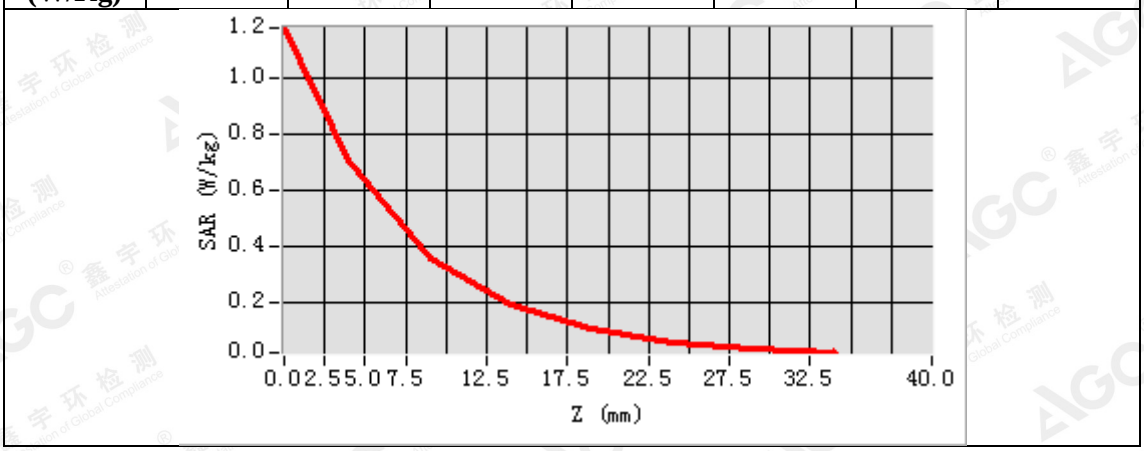
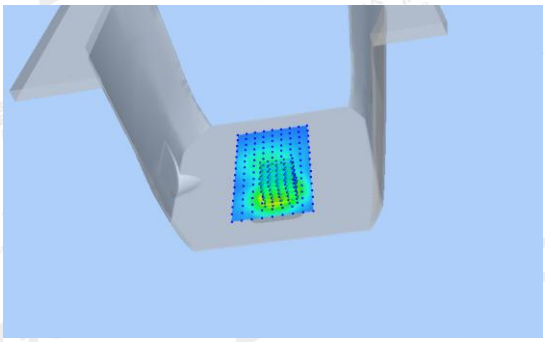
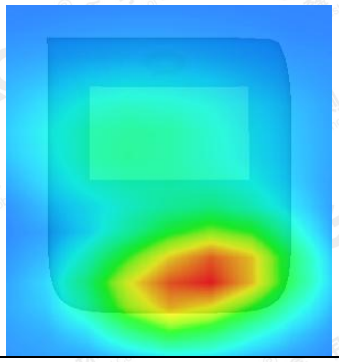
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.1830	0.7075	0.3567	0.1928	0.1041	0.0574	0.0332



3D screen shot	Hot spot position
	

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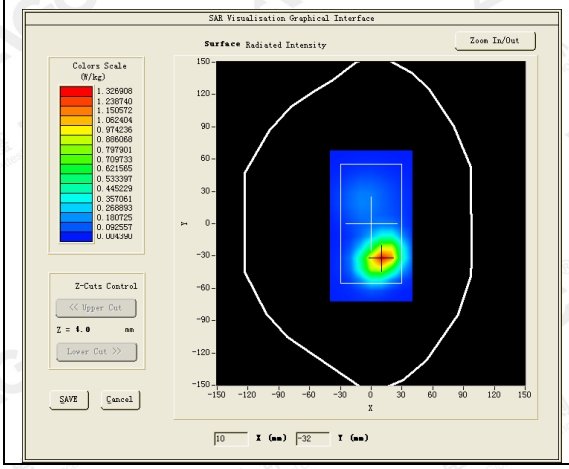
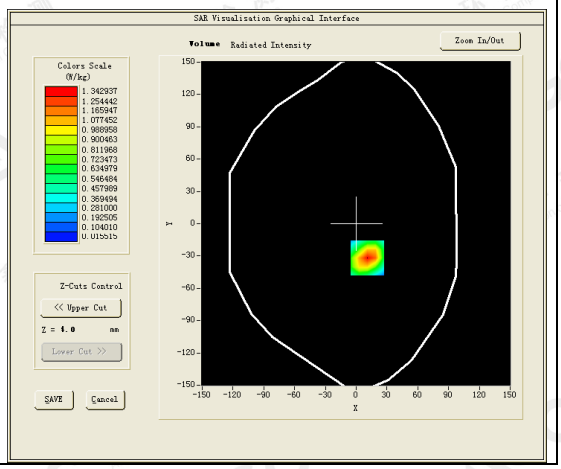
Test Laboratory: AGC Lab **Date: June 14,2018**
WCDMA Band II Low-Body-Towards Ground (RMC12.2kbps)- with earphone
DUT: Travis Touch; Type: TT201

Communication System: UMTS; Communication System Band: Band II UTRA/FDD ;Duty Cycle:1:1; Conv.F=2.39;
Frequency: 1852.4 MHz; Medium parameters used: f = 1900 MHz; σ=1.48 mho/m; εr =54.71; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.5, Liquid temperature (℃): 22.0

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_35

Configuration/ WCDMA band II Low-Body-back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/ WCDMA band II Low-Body-back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5m;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body Back
Band	WCDMA band II
Channels	Low
Signal	CDMA (Crest factor: 1.0)

SURFACE SAR	VOLUME SAR
	

Maximum location: X=11.00, Y=-32.00
SAR Peak: 2.26 W/kg

SAR 10g (W/Kg)	0.610286
SAR 1g (W/Kg)	1.266234

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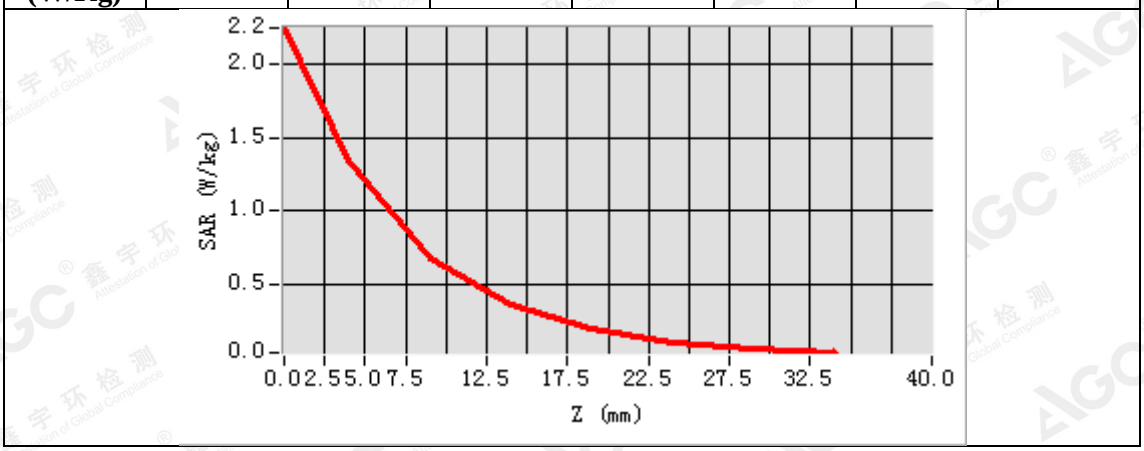
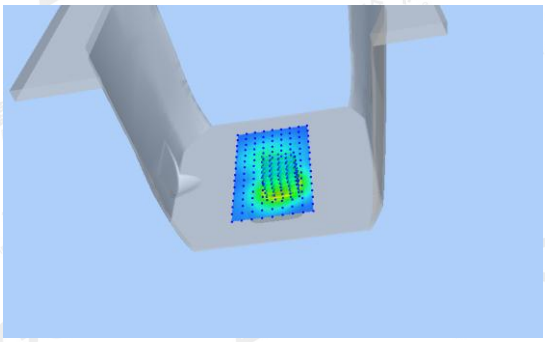
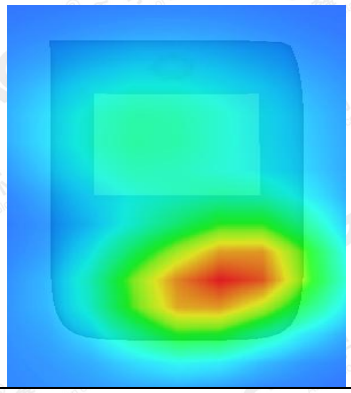
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.2450	1.3429	0.6791	0.3602	0.1982	0.1098	0.0624



3D screen shot	Hot spot position
	

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Test Laboratory: AGC Lab **Date: June 19,2018**

WCDMA Band Ⅴ Mid-Body-Towards Grounds (RMC)

DUT: Travis Touch; Type: TT201

Communication System: UMTS; Communication System Band: BAND V UTRA/FDD; Duty Cycle:1: 1; Conv.F=1.81; Frequency: 836.6 MHz; Medium parameters used: f = 835MHz; σ=0.96 mho/m; εr =55.43; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 23.3, Liquid temperature (℃): 22.8

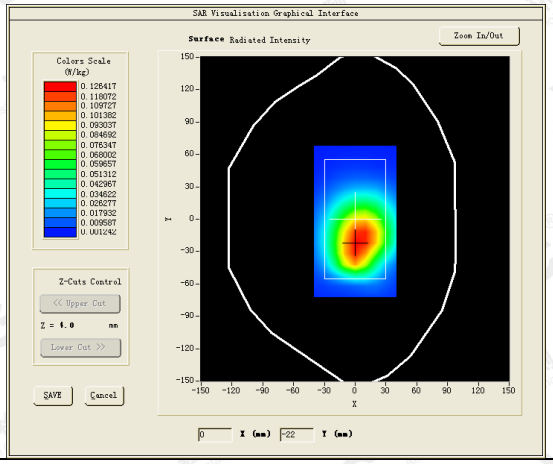
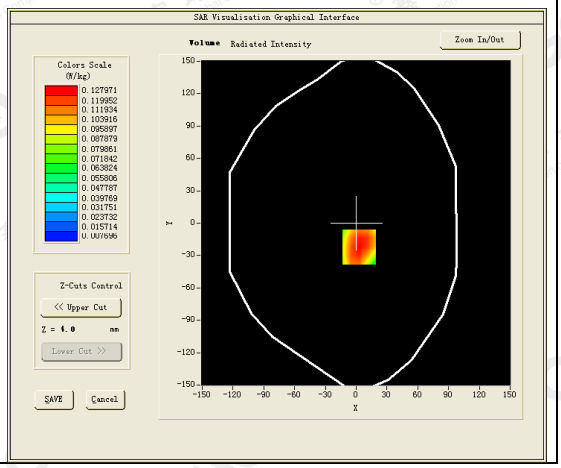
SATIMO Configuration:

- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/ WCDMA BandⅤMid-Body-Back/Area Scan: Measurement grid: dx=8mm, dy=8mm

Configuration/ WCDMA BandⅤMid-Body-Back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body Back
Band	WCDMA Band V
Channels	Middle
Signal	CDMA (Crest factor: 1.0)

SURFACE SAR	VOLUME SAR
	

Maximum location: X=3.00, Y=-22.00

SAR Peak: 0.17 W/kg

SAR 10g (W/Kg)	0.082156
SAR 1g (W/Kg)	0.122979

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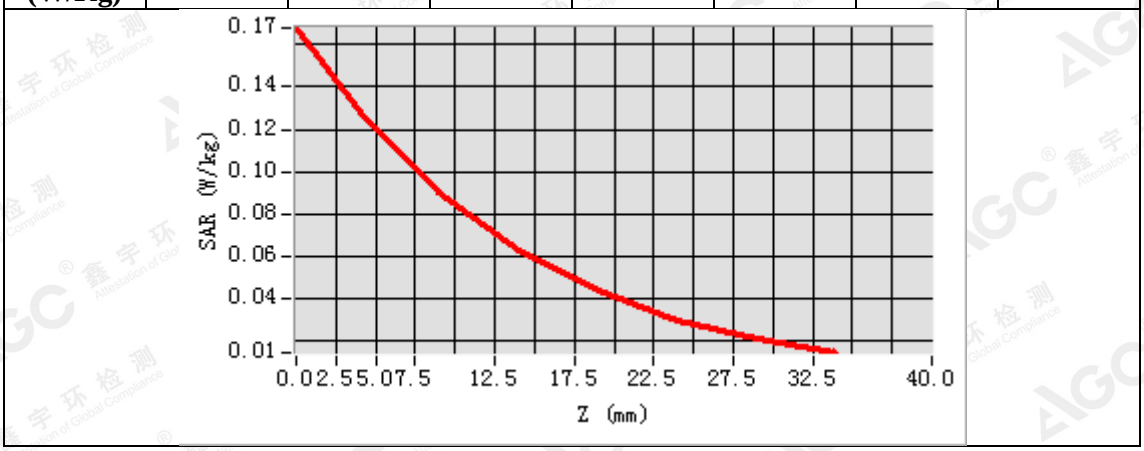
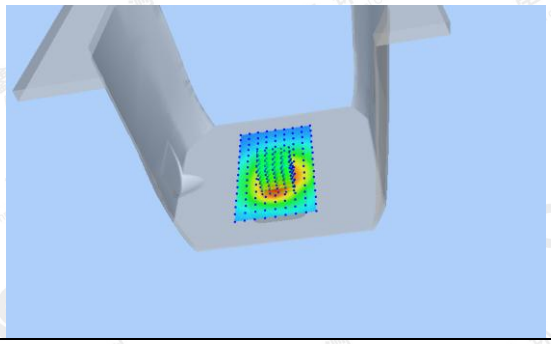
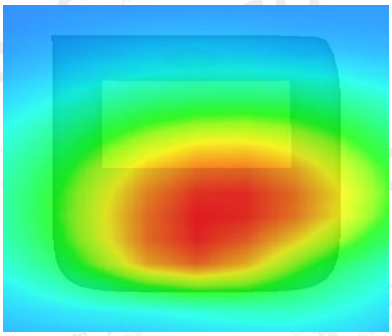
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.1678	0.1280	0.0902	0.0631	0.0439	0.0304	0.0212



3D screen shot	Hot spot position
	

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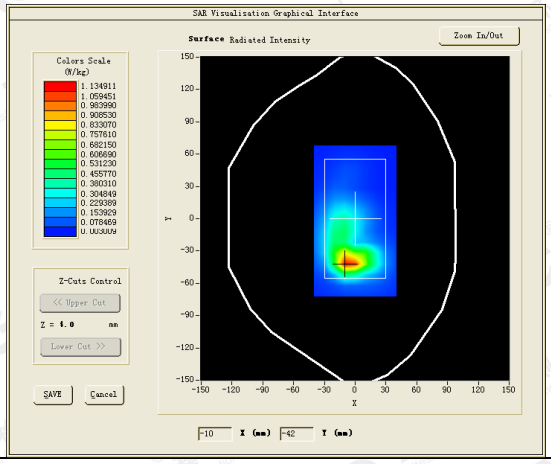
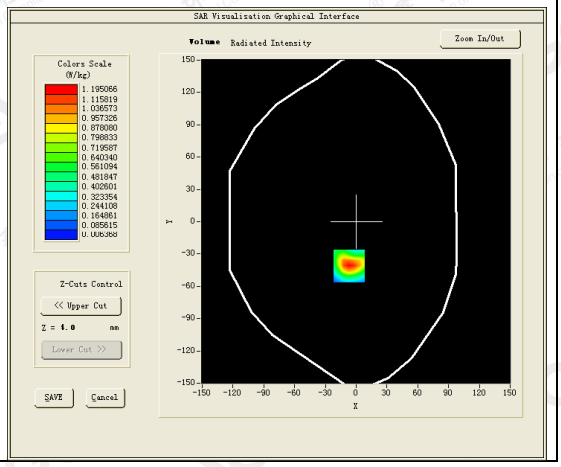
Test Laboratory: AGC Lab **Date: June 28,2018**
LTE Band 7 Low-Body-Back (1 RB#0)
DUT: Travis Touch; Type: TT201

Communication System: LTE; Communication System Band: LTE Band 7; Duty Cycle:1:1; Conv.F=2.46;
Frequency: 2510 MHz; Medium parameters used: f = 2600 MHz; σ=2.12 mho/m; εr =54.06; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.7

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/ LTE Band 7 Low-Body-back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/ LTE Band 7 Low-Body-back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5m;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Body Back
Band	LTE Band 7
Channels	Low
Signal	OFDM (Crest factor: 1.0)

SURFACE SAR	VOLUME SAR
	

Maximum location: X=-7.00, Y=-41.00
SAR Peak: 1.93 W/kg

SAR 10g (W/Kg)	0.502080
SAR 1g (W/Kg)	1.079844

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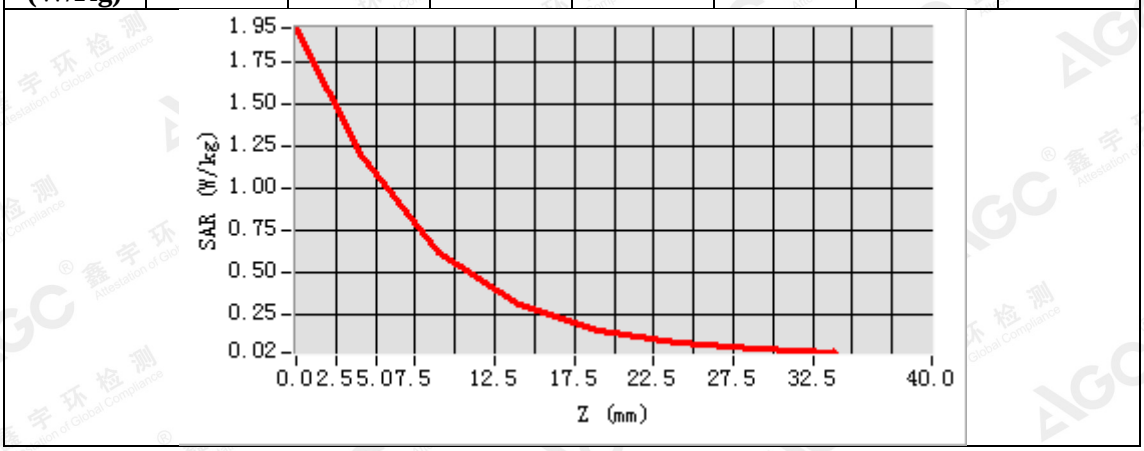
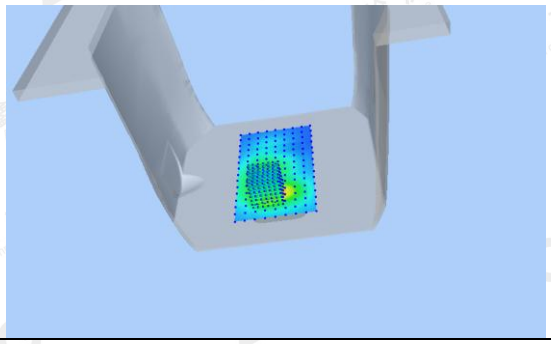
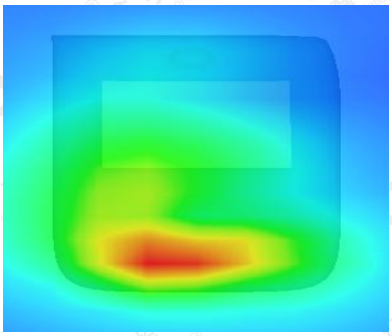
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.9483	1.1951	0.6155	0.3103	0.1556	0.0786	0.0405



3D screen shot	Hot spot position
	

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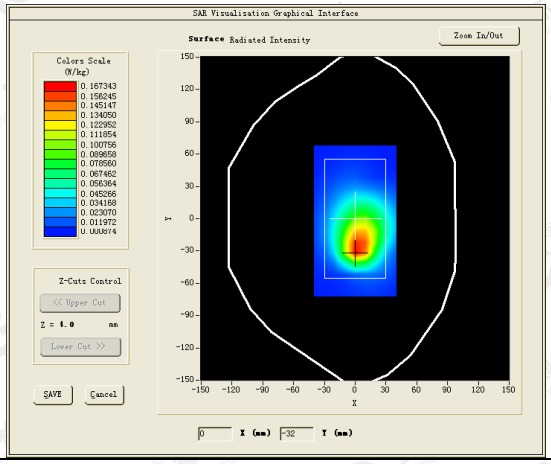
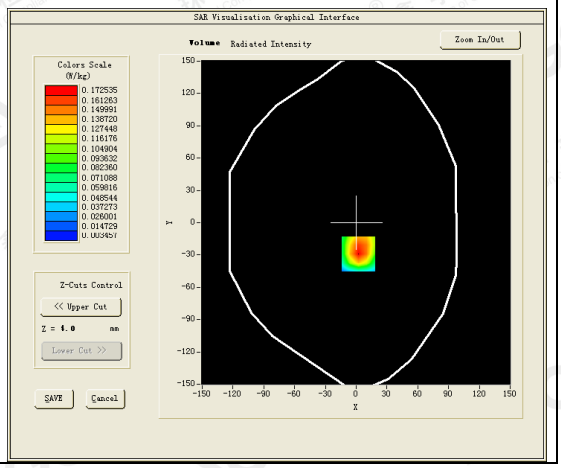
Test Laboratory: AGC Lab **Date: July 02,2018**
LTE Band 17 Mid-Body-Back (1 RB#0)
DUT: Travis Touch; Type: TT201

Communication System: LTE; Communication System Band: LTE Band 17; Duty Cycle:1:1; Conv.F=1.66;
Frequency: 710 MHz; Medium parameters used: f = 750 MHz; σ=0.95 mho/m; εr =55.75; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.0, Liquid temperature (℃): 21.5

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/ LTE Band 17 Mid-Body-back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/ LTE Band 17 Mid-Body-back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5m;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
Zoom Scan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body Back
Band	LTE Band 17
Channels	Middle
Signal	OFDM (Crest factor: 1.0)

SURFACE SAR	VOLUME SAR
	

Maximum location: X=2.00, Y=-29.00
SAR Peak: 0.27 W/kg

SAR 10g (W/Kg)	0.102184
SAR 1g (W/Kg)	0.176798

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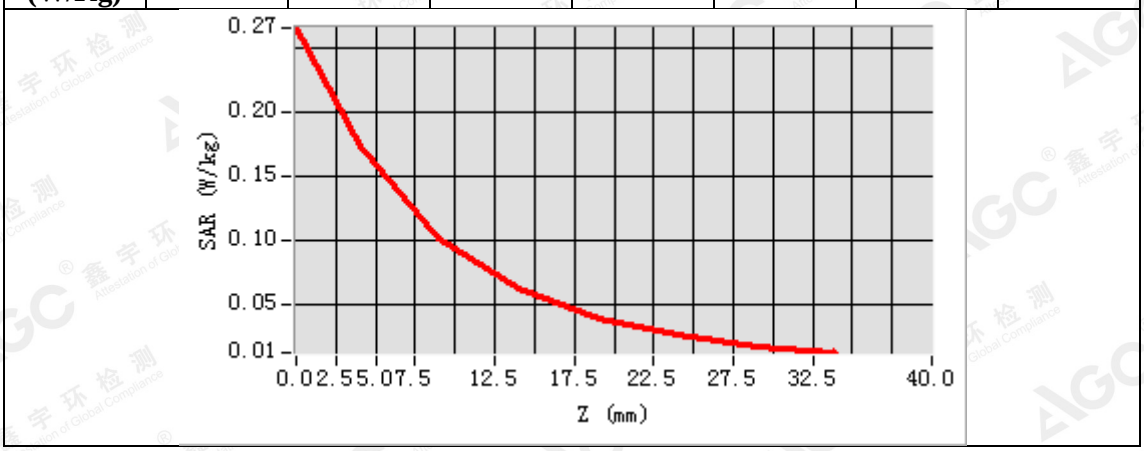
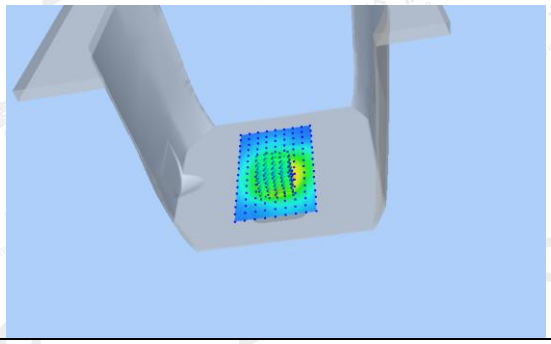
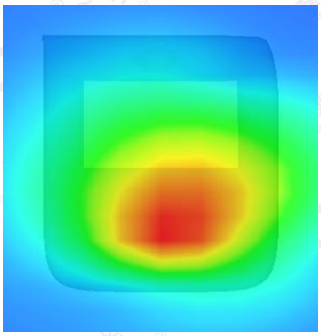
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.2651	0.1725	0.1007	0.0622	0.0398	0.0264	0.0178



3D screen shot	Hot spot position
	

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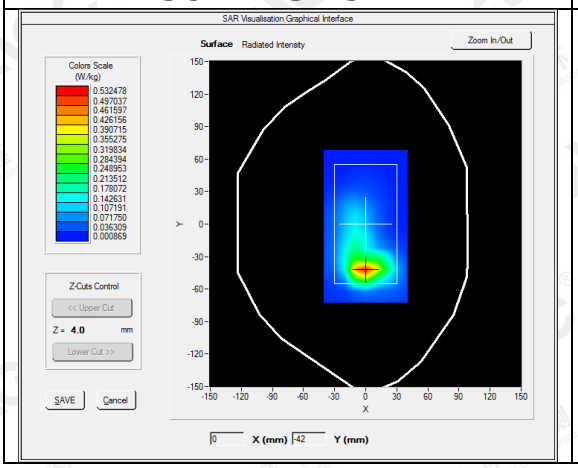
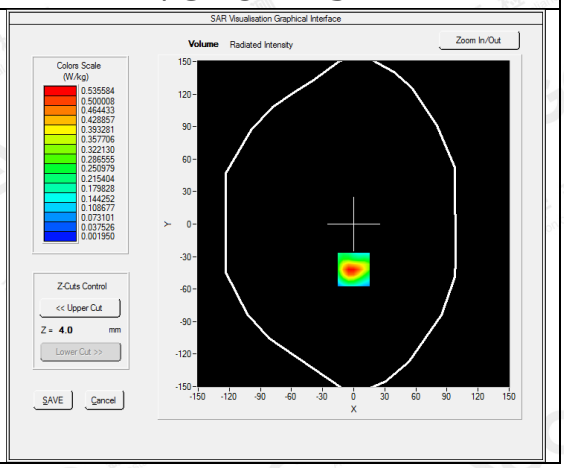
Test Laboratory: AGC Lab **Date: July 04,2018**
LTE Band 38 Mid-Body-Back (1 RB#0)
DUT: Travis Touch; Type: TT201

Communication System: LTE; Communication System Band: LTE Band 38; Duty Cycle:1:1.58; Conv.F=2.46;
Frequency: 2595 MHz; Medium parameters used: f = 2600 MHz; σ=2.11 mho/m; εr =53.78; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 21.8, Liquid temperature (℃): 21.3

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_35

Configuration/ LTE Band 38 Mid-Body-back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/ LTE Band 38 Mid-Body-back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5m;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Body Back
Band	LTE Band 38
Channels	Middle
Signal	Crest factor: 1.58

SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=-42.00
SAR Peak: 0.88 W/kg

SAR 10g (W/Kg)	0.221625
SAR 1g (W/Kg)	0.491382

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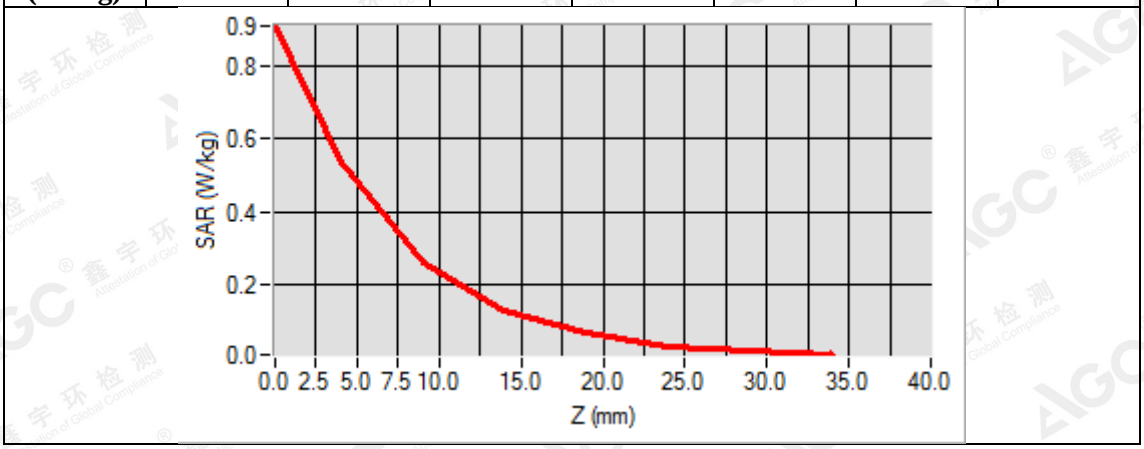
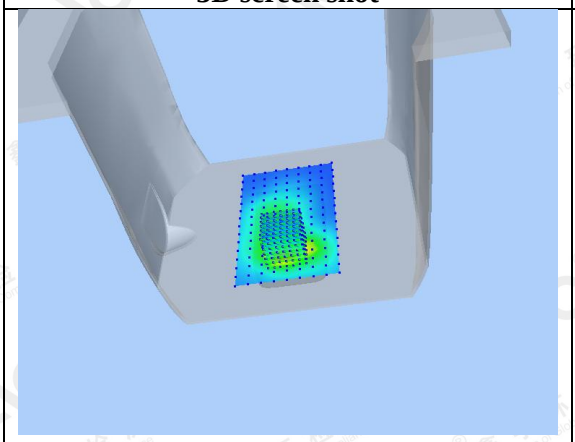
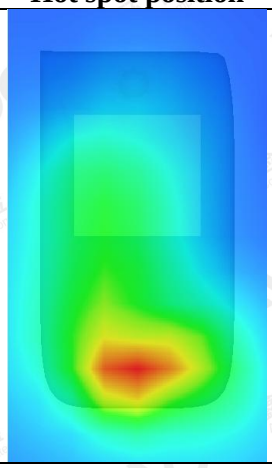
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.9085	0.5356	0.2617	0.1296	0.0675	0.0305	0.0167



3D screen shot	Hot spot position
	

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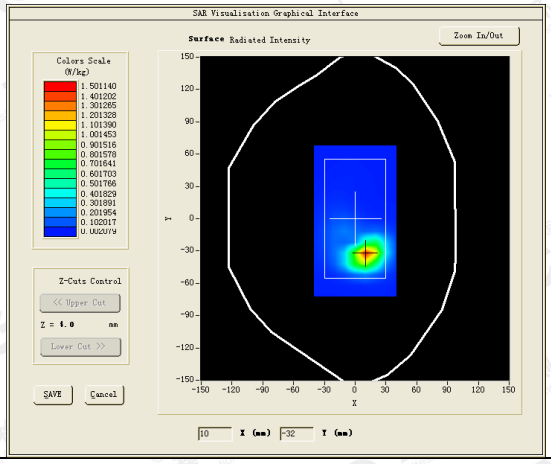
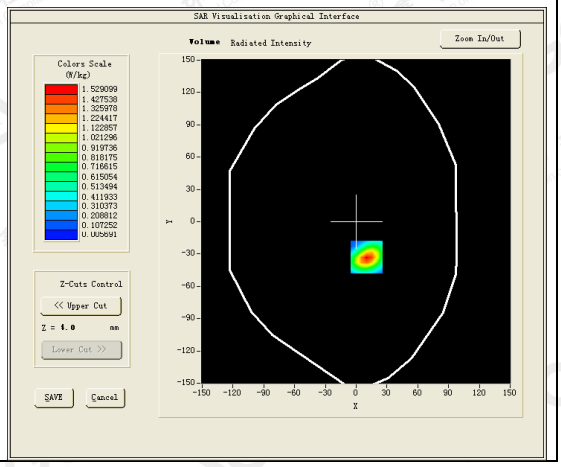
Test Laboratory: AGC Lab **Date: July 03,2018**
LTE Band 40 Mid-Body-Back (1 RB#0)
DUT: Travis Touch; Type: TT201

Communication System: LTE; Communication System Band: LTE Band 40; Duty Cycle:63.33%; Conv.F=2.59; Frequency: 2350MHz; Medium parameters used: f = 2300 MHz; σ=1.80 mho/m; εr =53.22; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 21.8, Liquid temperature (℃): 21.3

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/ LTE Band 40 Mid-Body-back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/ LTE Band 40 Mid-Body-back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5m;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Body Back
Band	LTE Band 40
Channels	Middle
Signal	Crest factor: 1.58

SURFACE SAR	VOLUME SAR
	

Maximum location: X=10.00, Y=-33.00
SAR Peak: 2.46 W/kg

SAR 10g (W/Kg)	0.613557
SAR 1g (W/Kg)	1.359804

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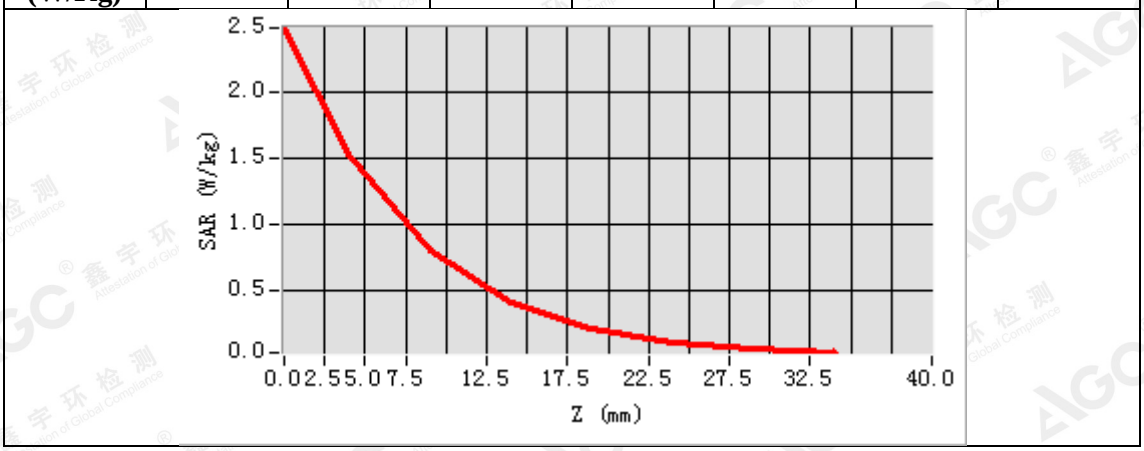
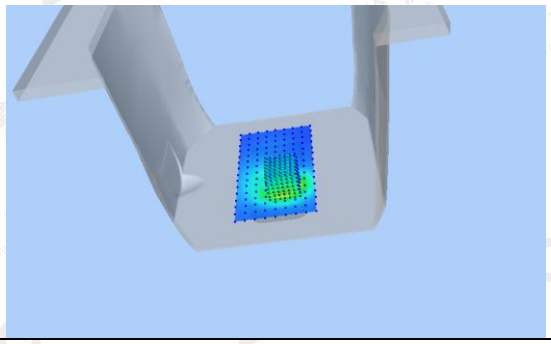
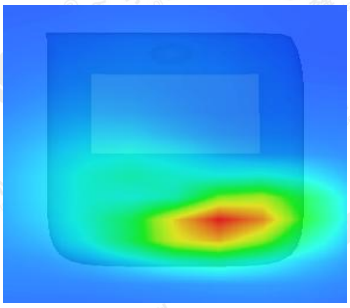
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.4755	1.5291	0.7982	0.4087	0.2102	0.1081	0.0567



3D screen shot	Hot spot position
	

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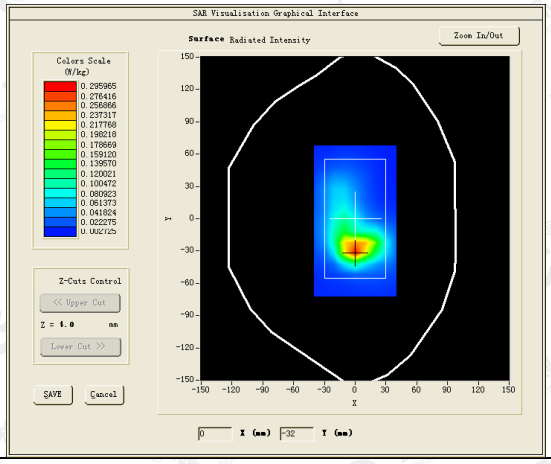
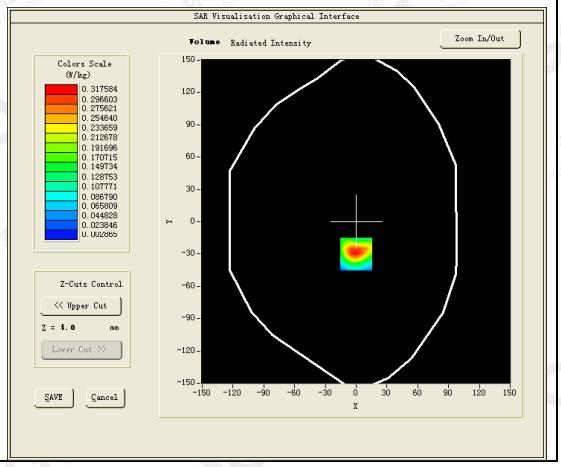
Test Laboratory: AGC Lab **Date: June 28,2018**
LTE Band 41 Mid-Body-Back (1 RB#0)
DUT: Travis Touch; Type: TT201

Communication System: LTE; Communication System Band: LTE Band 41; Duty Cycle:1:1.58; Conv.F=2.46;
Frequency: 2593 MHz; Medium parameters used: f = 2600 MHz; σ=2.17 mho/m; εr =52.99; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.7

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/ LTE Band 41 Mid-Body-back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/ LTE Band 41 Mid-Body-back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5m;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Body Back
Band	LTE Band 41
Channels	Middle
Signal	Crest factor: 1.58

SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=-30.00
SAR Peak: 0.53 W/kg

SAR 10g (W/Kg)	0.136156
SAR 1g (W/Kg)	0.293812

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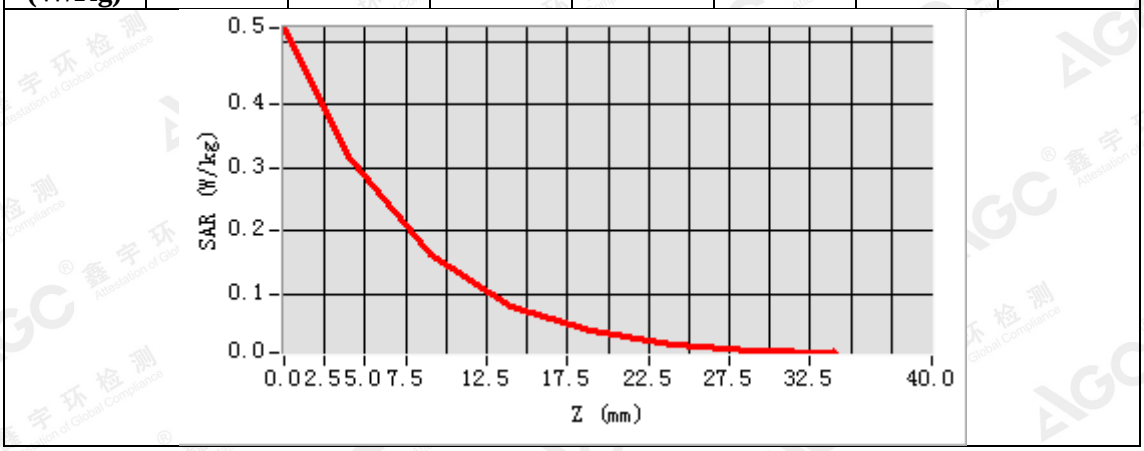
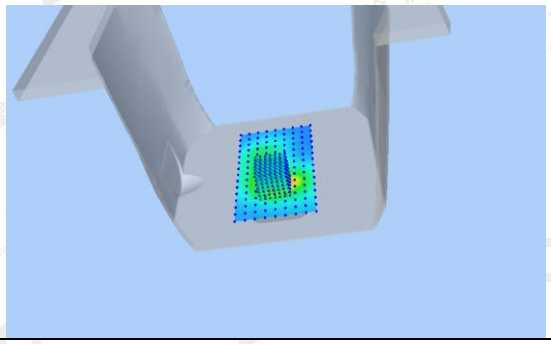
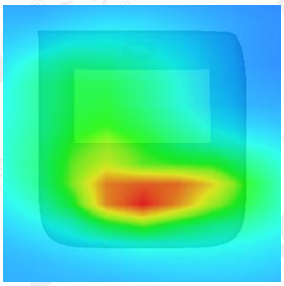
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.5215	0.3176	0.1620	0.0805	0.0402	0.0209	0.0109



3D screen shot	Hot spot position
	

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WIFI MODE

Test Laboratory: AGC Lab **Date: June 29,2018**

802.11b High-Body-Worn- Back

DUT: Travis Touch; Type: TT201

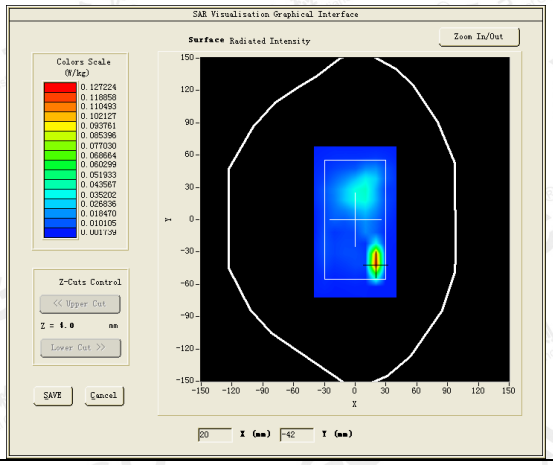
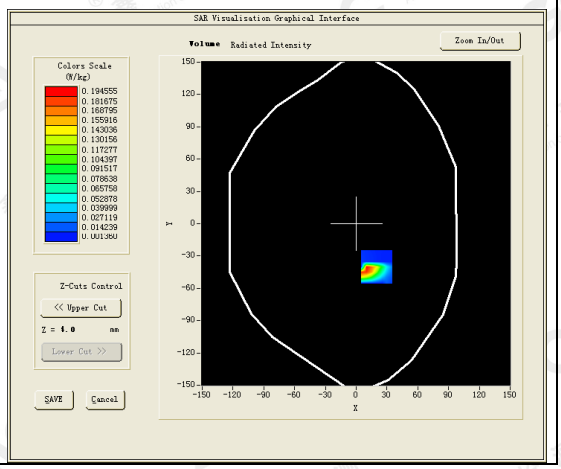
Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1; Conv.F=2.58;
Frequency: 2462 MHz; Medium parameters used: f = 2450 MHz; σ =1.90mho/m; εr =54.17; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃):21.9, Liquid temperature (℃): 21.5

SATIMO Configuration:

- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/802.11b High- Body- Back /Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/802.11b High- Body- Back /Zoom Scan: Measurement grid: dx=5mm,dy=5mm, dz=5mm;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
ZoomScan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Body Back
Band	2450MHz
Channels	High
Signal	Crest factor: 1.0

SURFACE SAR	VOLUME SAR
	

Maximum location: X=20.00, Y=-40.00

SAR Peak: 0.40 W/kg

SAR 10g (W/Kg)	0.043660
SAR 1g (W/Kg)	0.124908

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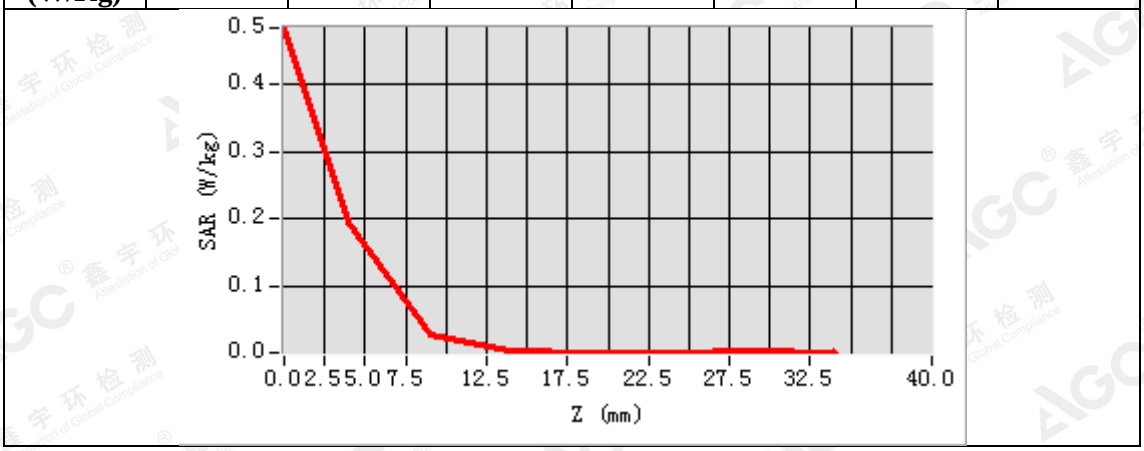
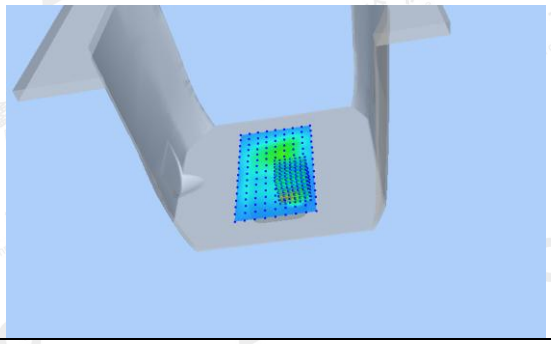
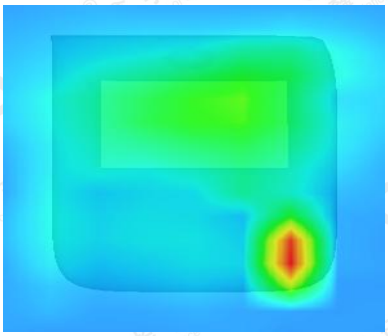
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.4831	0.1946	0.0290	0.0033	0.0018	0.0021	0.0042



3D screen shot	Hot spot position
	

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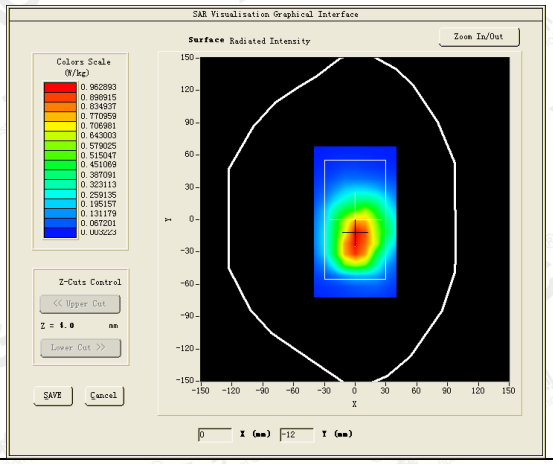
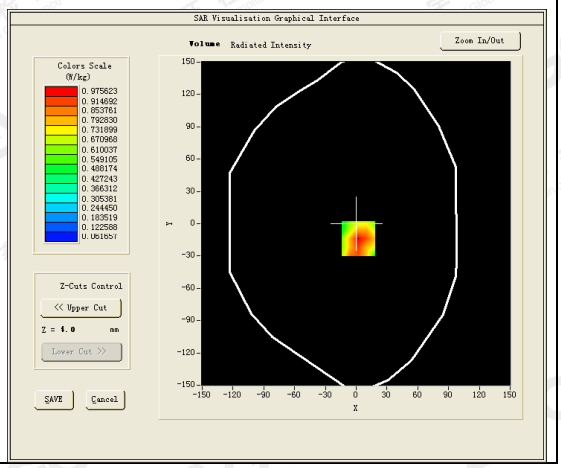
Repeated SAR Once
Test Laboratory: AGC Lab **Date: June 19,2018**
GSM 850 Low- Body- Back (MS)
DUT: Travis Touch; Type: TT201

Communication System: Generic GSM; Communication System Band: GSM 850; Duty Cycle: 1:8.3; Conv.F=1.81; Frequency: 824.2 MHz; Medium parameters used: f = 835 MHz; σ= 0.93 mho/m; εr = 56.71; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 23.3, Liquid temperature (℃): 22.8

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/GSM 850 Low-Body-Back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/GSM 850 Low-Body-Back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body Back
Band	GSM 850
Channels	Low
Signal	TDMA (Crest factor: 8.0)

SURFACE SAR	VOLUME SAR
	

Maximum location: X=2.00, Y=-14.00
SAR Peak: 1.26 W/kg

SAR 10g (W/Kg)	0.590458
SAR 1g (W/Kg)	0.913194

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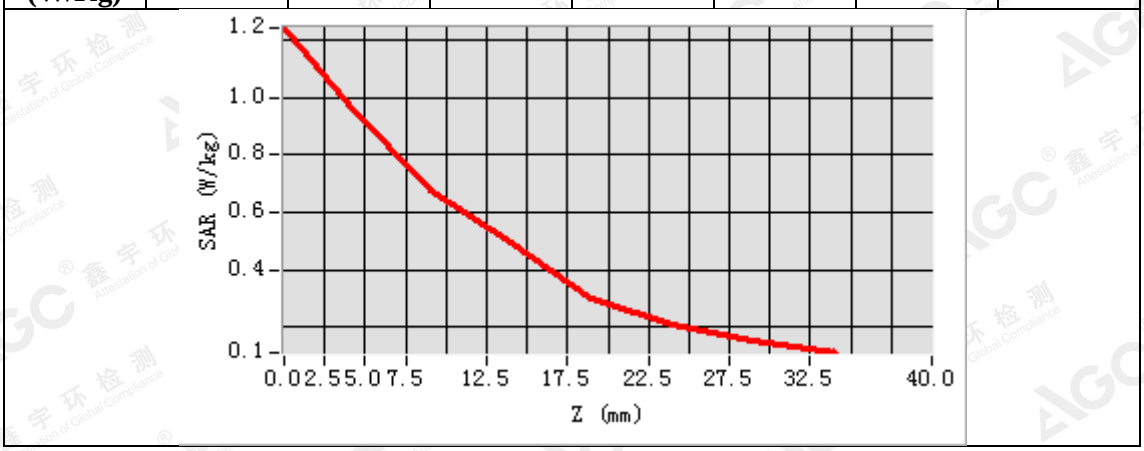
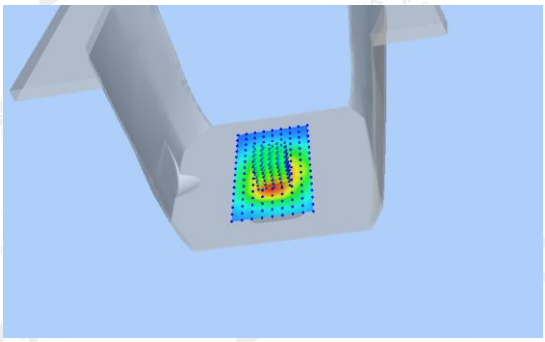
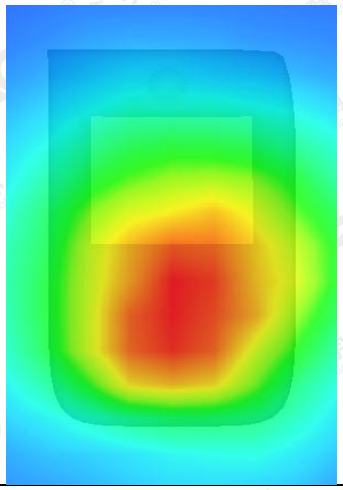
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.2434	0.9756	0.6764	0.4948	0.3013	0.2068	0.1536



3D screen shot	Hot spot position
	

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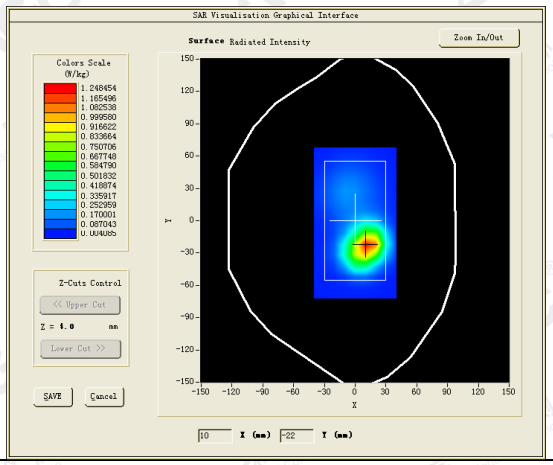
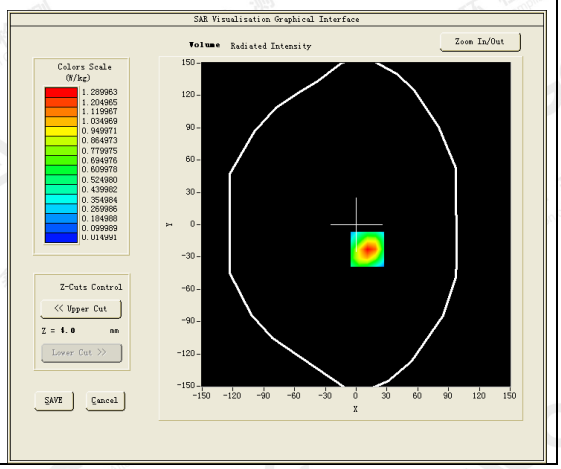
Test Laboratory: AGC Lab **Date: June 14,2018**
WCDMA Band II Low-Body-Towards Ground (RMC12.2kbps)- with earphone
DUT: Travis Touch; Type: TT201

Communication System: UMTS; Communication System Band: Band II UTRA/FDD ;Duty Cycle:1:1; Conv.F=2.39;
Frequency: 1852.4 MHz; Medium parameters used: f = 1900 MHz; σ=1.48 mho/m; εr =54.71; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.5, Liquid temperature (℃): 22.0

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_35

Configuration/ WCDMA band II Low-Body-back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/ WCDMA band II Low-Body-back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5m;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body Back
Band	WCDMA band II
Channels	Low
Signal	CDMA (Crest factor: 1.0)

SURFACE SAR	VOLUME SAR
	

Maximum location: X=11.00, Y=-23.00
SAR Peak: 2.21 W/kg

SAR 10g (W/Kg)	0.571071
SAR 1g (W/Kg)	1.215268

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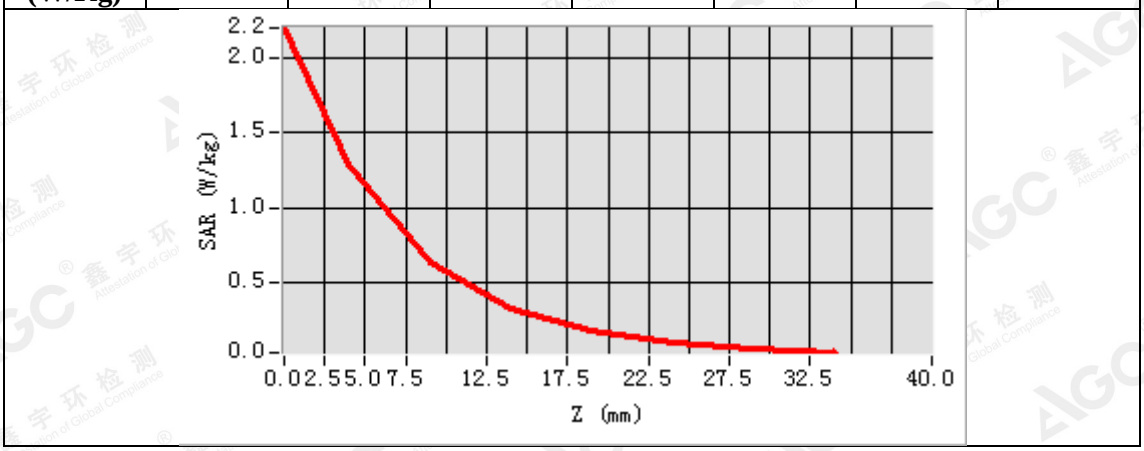
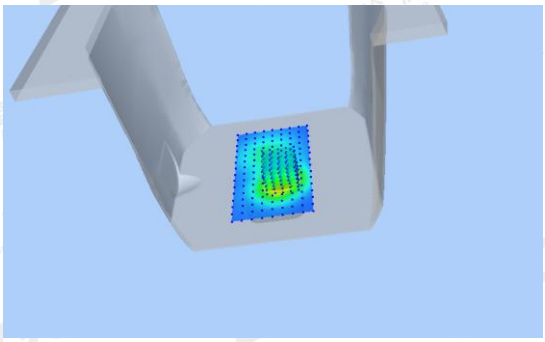
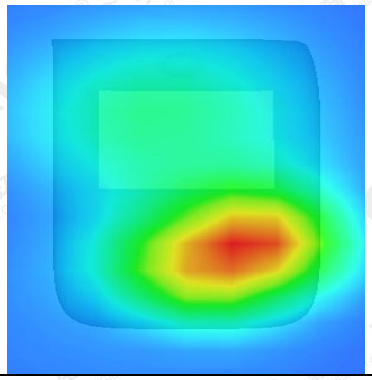
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.1993	1.2900	0.6316	0.3273	0.1761	0.0970	0.0539



3D screen shot	Hot spot position
	

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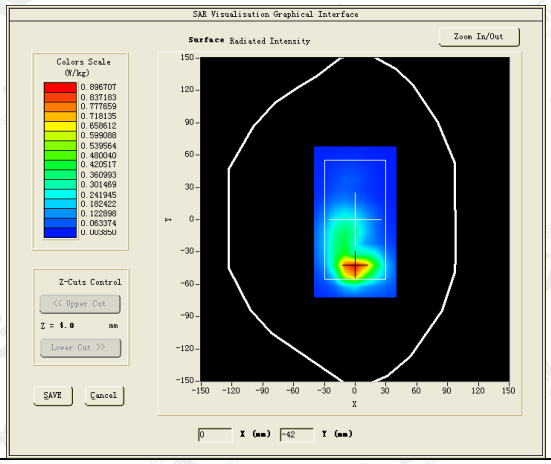
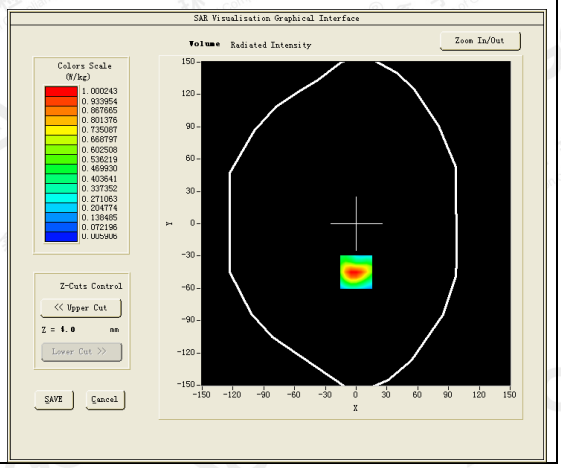
Test Laboratory: AGC Lab **Date: June 28,2018**
LTE Band 7 Low-Body-Back (1 RB#0)
DUT: Travis Touch; Type: TT201

Communication System: LTE; Communication System Band: LTE Band 7; Duty Cycle:1:1; Conv.F=2.46;
Frequency: 2510 MHz; Medium parameters used: f = 2600 MHz; σ=2.12 mho/m; εr =54.06; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.1, Liquid temperature (℃): 21.7

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/ LTE Band 7 Low-Body-back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/ LTE Band 7 Low-Body-back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5m;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Body Back
Band	LTE Band 7
Channels	Low
Signal	OFDM (Crest factor: 1.0)

SURFACE SAR	VOLUME SAR
	

Maximum location: X=0.00, Y=-45.00
SAR Peak: 1.68 W/kg

SAR 10g (W/Kg)	0.419617
SAR 1g (W/Kg)	0.921610

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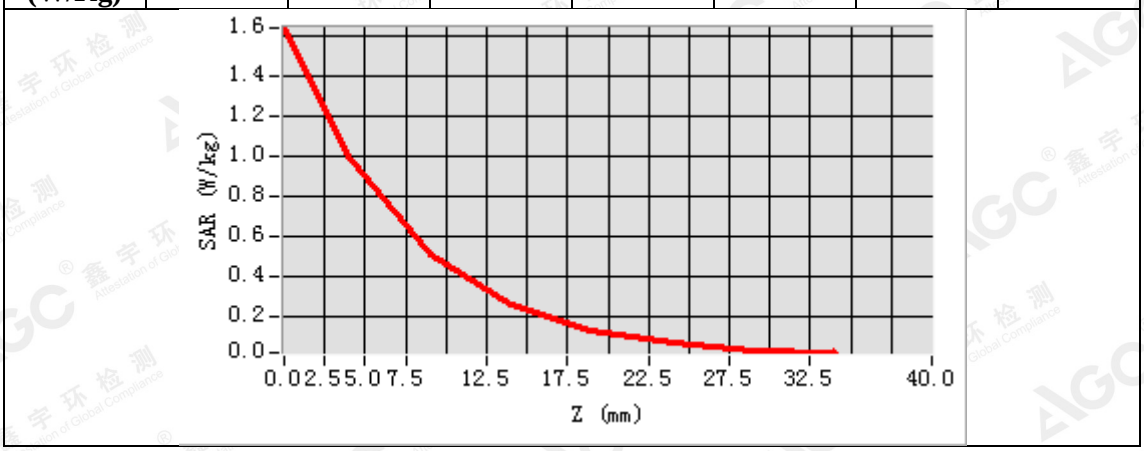
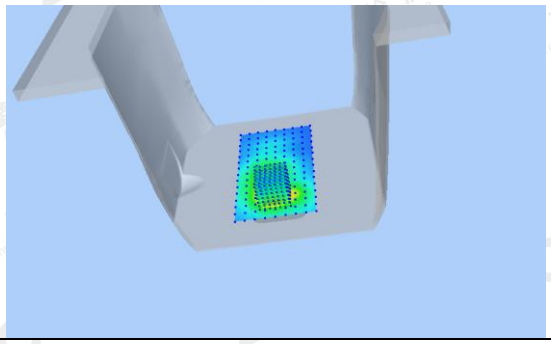
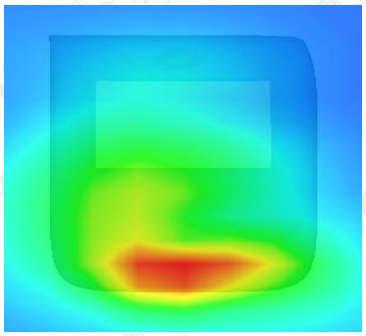
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	1.6390	1.0002	0.5111	0.2566	0.1268	0.0633	0.0315



3D screen shot	Hot spot position
	

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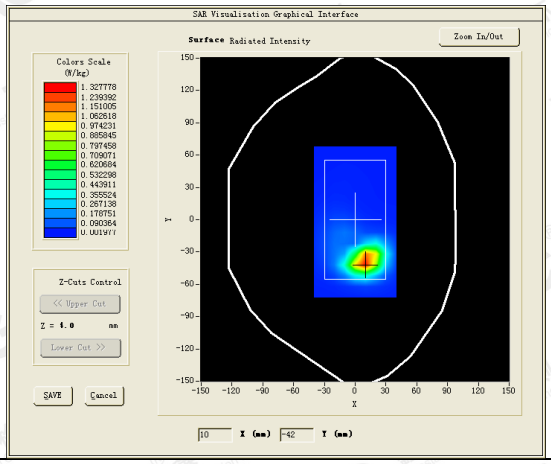
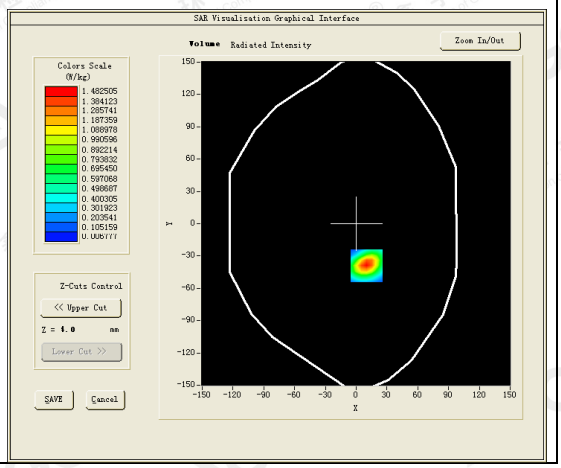
Test Laboratory: AGC Lab **Date: July 03,2018**
LTE Band 40 Mid-Body-Back (1 RB#0)
DUT: Travis Touch; Type: TT201

Communication System: LTE; Communication System Band: LTE Band 40; Duty Cycle:63.33%; Conv.F=2.59; Frequency: 2350MHz; Medium parameters used: f = 2300 MHz; σ=1.80 mho/m; εr =53.22; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 21.8, Liquid temperature (℃): 21.3

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/ LTE Band 40 Mid-Body-back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/ LTE Band 40 Mid-Body-back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5m;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Body Back
Band	LTE Band 40
Channels	Middle
Signal	Crest factor: 1.58

SURFACE SAR	VOLUME SAR
	

Maximum location: X=10.00, Y=-39.00
SAR Peak: 2.39 W/kg

SAR 10g (W/Kg)	0.602517
SAR 1g (W/Kg)	1.326869

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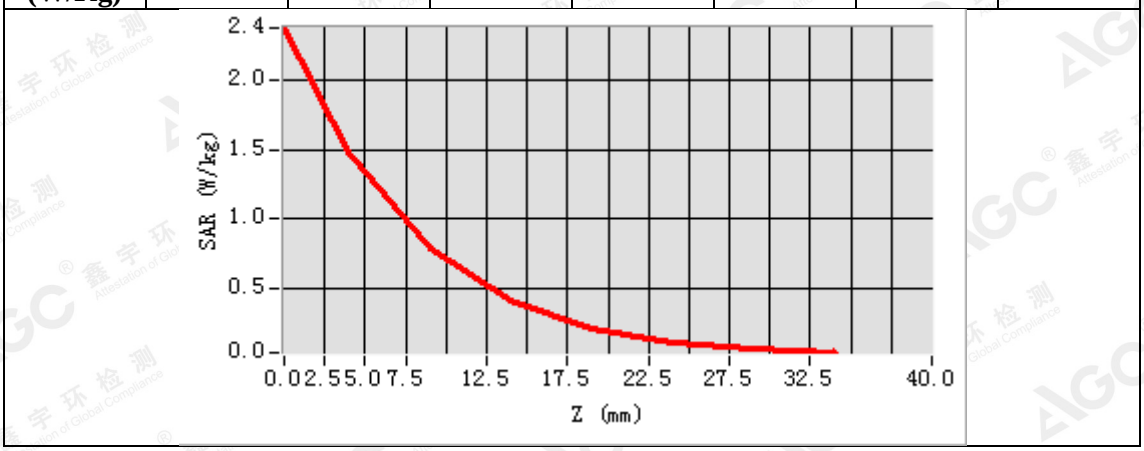
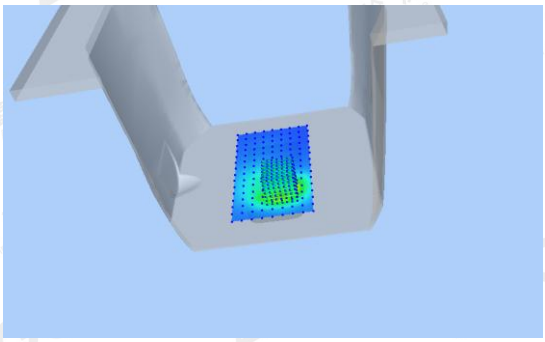
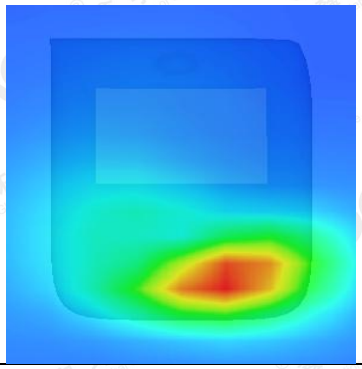
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.3795	1.4825	0.7836	0.4035	0.2091	0.1082	0.0569



3D screen shot	Hot spot position
	

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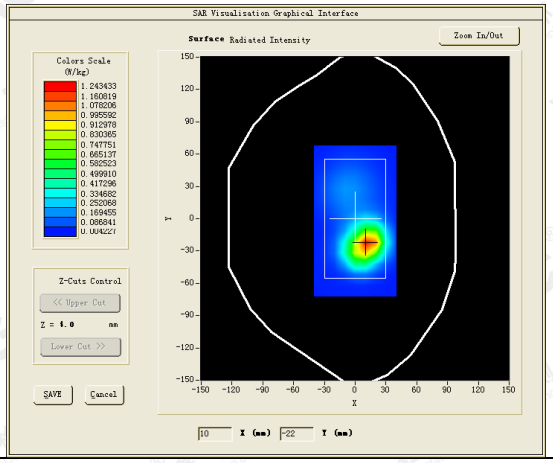
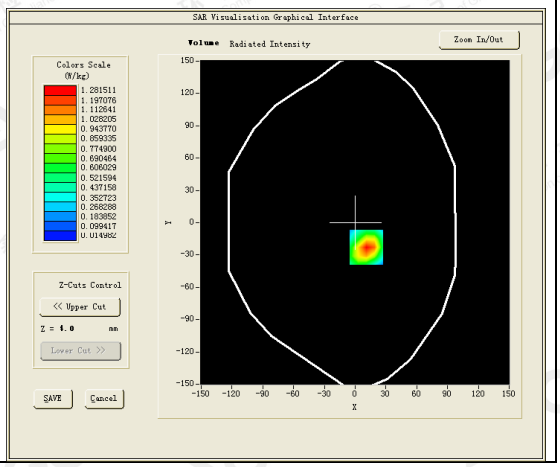
Repeated SAR Twice
Test Laboratory: AGC Lab **Date: June 14,2018**
WCDMA Band II Low-Body-Towards Ground (RMC12.2kbps)- with earphone
DUT: Travis Touch; Type: TT201

Communication System: UMTS; Communication System Band: Band II UTRA/FDD ;Duty Cycle:1:1; Conv.F=2.39;
Frequency: 1852.4 MHz; Medium parameters used: f = 1900 MHz; σ=1.48 mho/m; εr =54.71; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 22.5, Liquid temperature (℃): 22.0

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_35

Configuration/ WCDMA band II Low-Body-back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/ WCDMA band II Low-Body-back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5m;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete
Phantom	Validation plane
Device Position	Body Back
Band	WCDMA band II
Channels	Low
Signal	CDMA (Crest factor: 1.0)

SURFACE SAR	VOLUME SAR
	

Maximum location: X=11.00, Y=-23.00
SAR Peak: 2.19 W/kg

SAR 10g (W/Kg)	0.567313
SAR 1g (W/Kg)	1.206082

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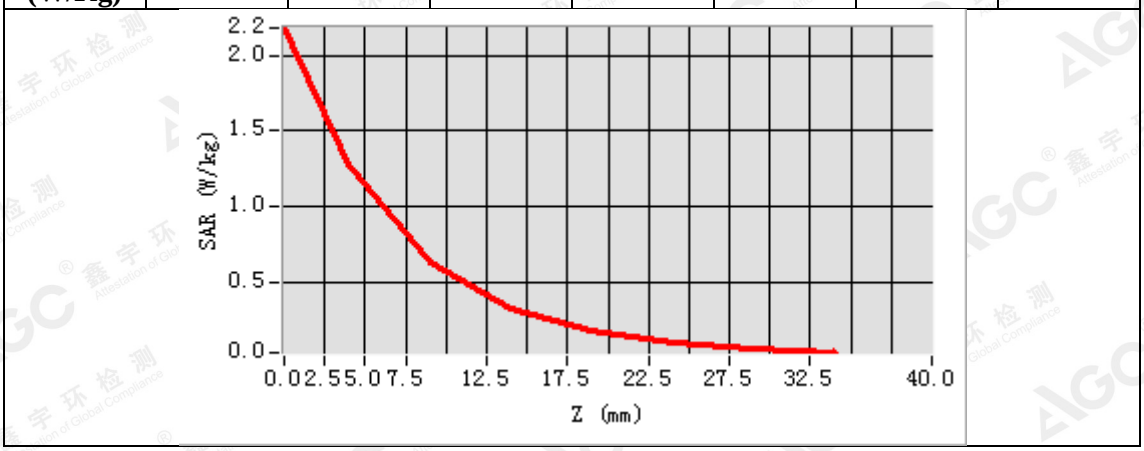
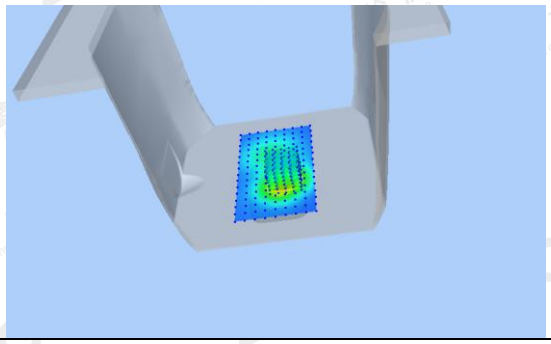
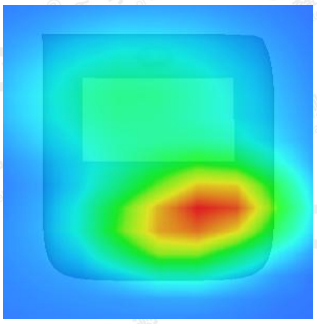
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.1840	1.2815	0.6272	0.3244	0.1737	0.0962	0.0535



3D screen shot	Hot spot position
	

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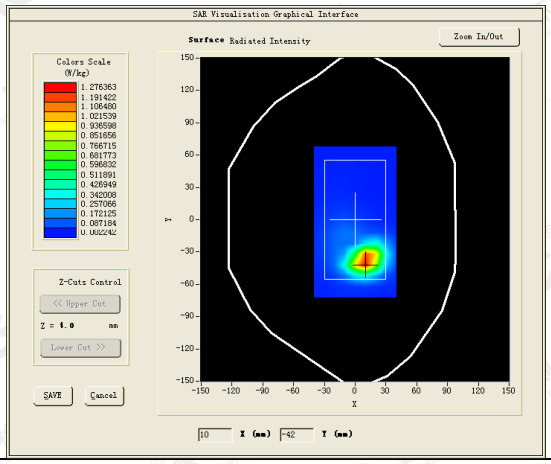
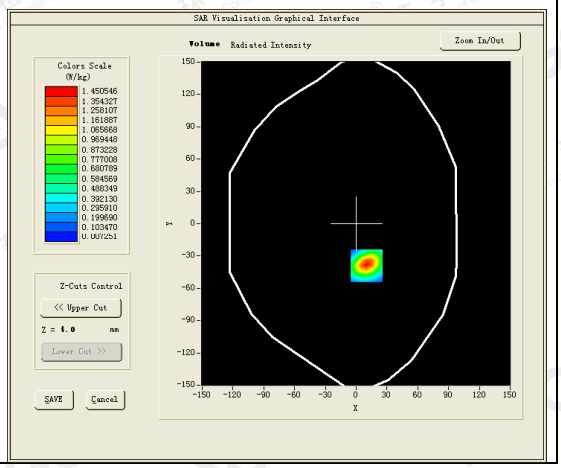
Test Laboratory: AGC Lab **Date: July 03,2018**
LTE Band 40 Mid-Body-Back (1 RB#0)
DUT: Travis Touch; Type: TT201

Communication System: LTE; Communication System Band: LTE Band 40; Duty Cycle:63.33%; Conv.F=2.59; Frequency: 2350MHz; Medium parameters used: f = 2300 MHz; σ=1.80 mho/m; εr =53.22; ρ= 1000 kg/m³ ;
Phantom section: Flat Section
Ambient temperature (℃): 21.8, Liquid temperature (℃): 21.3

SATIMO Configuration:
- Probe: SSE2; Calibrated: Aug. 08,2017; Serial No.: SN 08/16 EPGO282
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

Configuration/ LTE Band 40 Mid-Body-back/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/ LTE Band 40 Mid-Body-back/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5m;

Area Scan	surf_sam_plan.txt, h= 5.00 mm
Zoom Scan	7x7x7,dx=5mm dy=5mm dz=5mm
Phantom	Validation plane
Device Position	Body Back
Band	LTE Band 40
Channels	Middle
Signal	Crest factor: 1.58

SURFACE SAR	VOLUME SAR
	

Maximum location: X=10.00, Y=-39.00
SAR Peak: 2.34 W/kg

SAR 10g (W/Kg)	0.588734
SAR 1g (W/Kg)	1.305421

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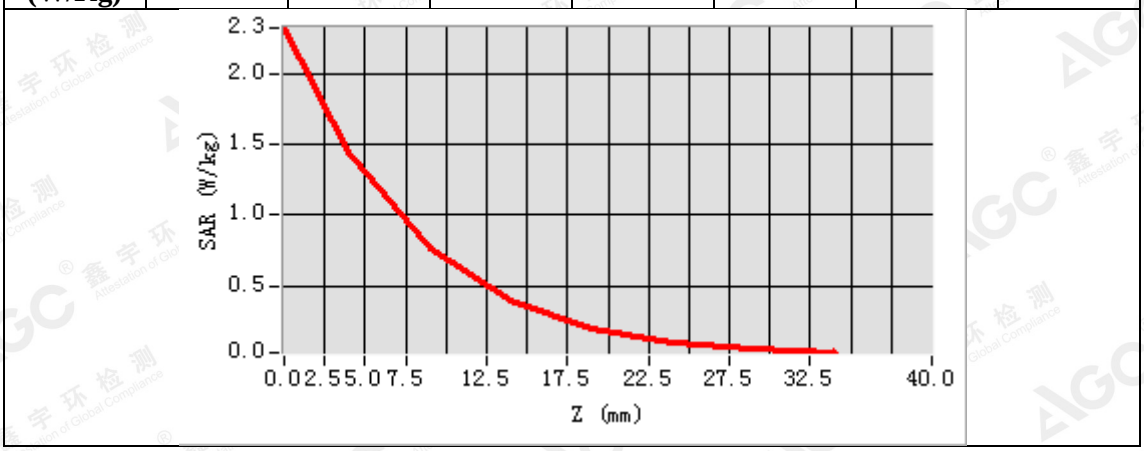
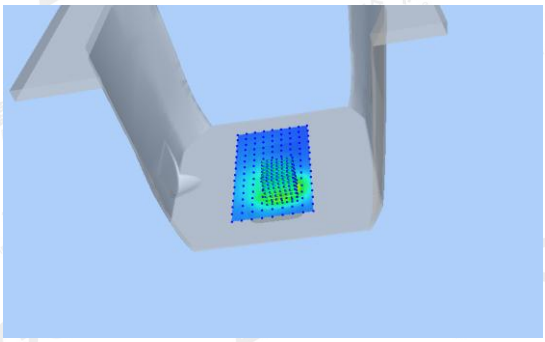
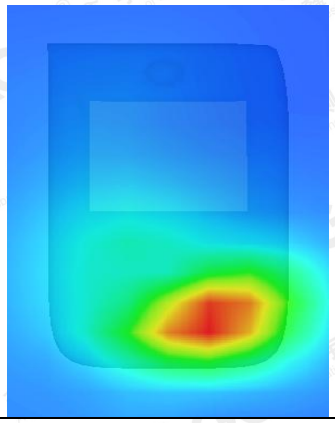
Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	2.3225	1.4505	0.7688	0.3926	0.2032	0.1043	0.0544



3D screen shot	Hot spot position
	

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APPENDIX C. TEST SETUP PHOTOGRAPHS

Body Back 5mm

Body Front 5mm

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Edge 1(Top) 5mm-Hotspot Mode

Edge 2(Right) 5mm-Hotspot Mode

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Edge 3(Bottom) 5mm-Hotspot Mode

Edge 4(Left) 5mm-Hotspot Mode

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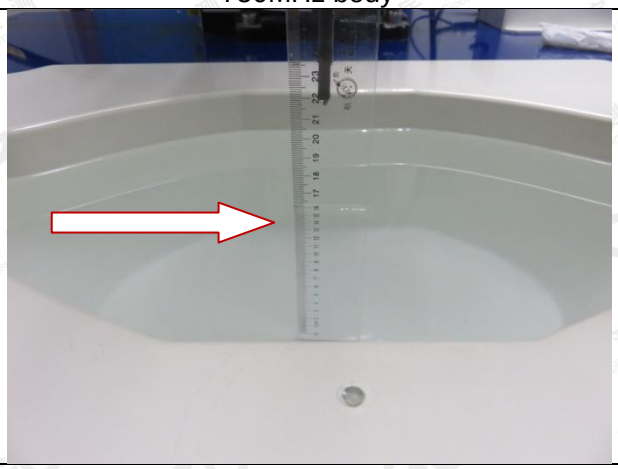
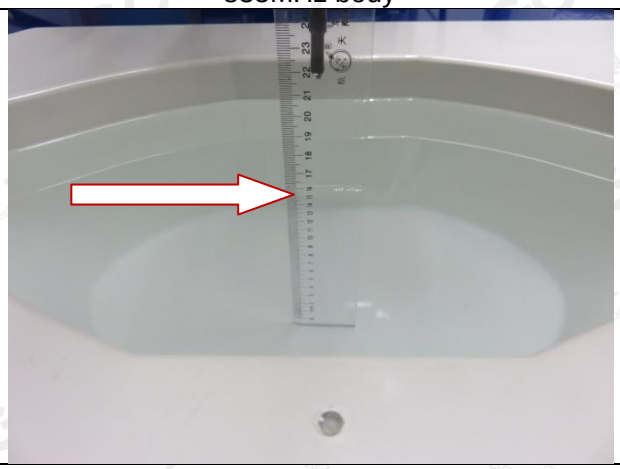
DEPTH OF THE LIQUID IN THE PHANTOM—ZOOM IN

Note：The position used in the measurement were according to IEEE 1528-2013

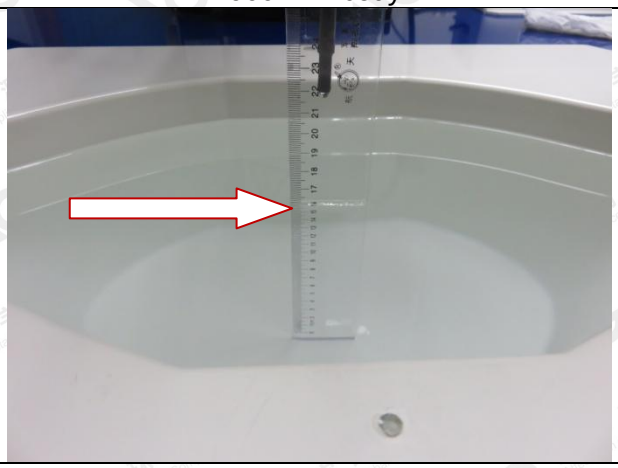
750MHz body



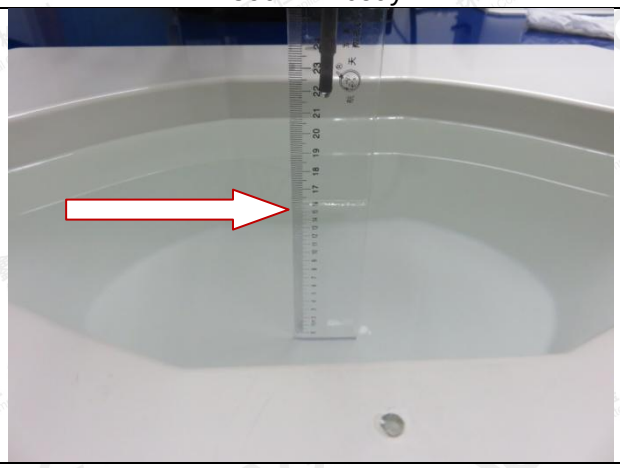
835MHz body



1900MHz body

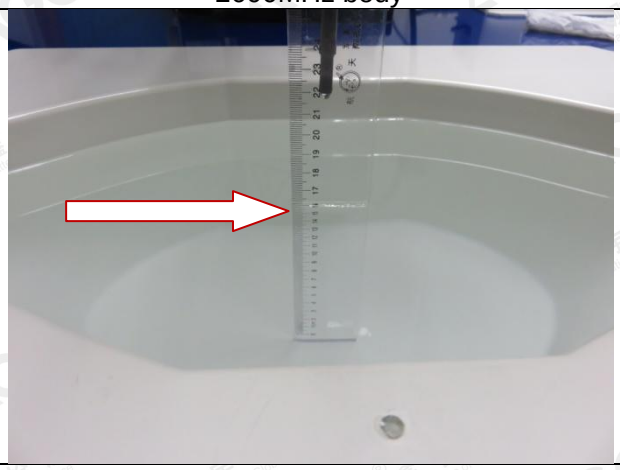


2300MHz body



2450MHz body

2600MHz body



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APPENDIX D. CALIBRATION DATA

Refer to Attached files.

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