



7.3 Description of interpolation/extrapolation scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1mm step.

The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1 gram requires a very fine resolution in the three dimensional scanned data array.



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8. MEASUREMENT OF CONDUCTED OUTPUT POWER

1. 2.4G Conducted Output Power

Band	Channel	Frequency (MHz)	Output Power(dBm)
			GFSK
2.4G	Low	2405.375	17.73
	Middle	2440.191	18.22
	High	2477.055	18.04



9. TEST RESULTS LIST

Summary of Measurement Results (2.4G)

Temperature: 21.0~23.8°C, humidity: 54~60%.					
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g
Body (10mm Separation)	Face Upward	Middle	0.018	1.067	0.019
	Edge A		0.089		0.095
	Edge B		0.054		0.058
	Edge C		0.072		0.077

Temperature: 21.0~23.8°C, humidity: 54~60%.					
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 10g Peak	Scaling Factor	Scaled SAR (W/Kg), 10g
Body (0mm Separation)	Face Upward	Middle	0.013	1.067	0.014
	Edge A		0.107		0.114
	Edge B		0.064		0.068
	Edge C		0.072		0.077

Note:

- When the 1-g SAR for the mid-band channel or the channel with the highest output power satisfy the following conditions, testing of the other channels in the band is not required. (Per KDB 447498 D01 General RF Exposure Guidance v05r02)
 - ≤ 0.8 W/kg and transmission band ≤ 100 MHz
 - ≤ 0.6 W/kg and, 100 MHz $<$ transmission bandwidth ≤ 200 MHz
 - ≤ 0.4 W/kg and transmission band > 200 MHz
- IEEE Std 1528-2013 requires the middle channel to be tested first. This generally applies to wireless devices that are designed to operate in technologies with tight tolerances for maximum output power variations across channels in the band. When the maximum output power variation across the required test channels is $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel must be used.



3. Per KDB 447498, when the SAR procedures require multiple channels to be tested and the 1-g SAR for the highest output channel is less than 0.8 W/kg and peak SAR is less than 1.6W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required.

4. Scaling Factor calculation

Band	Tune-up power tolerance(dBm)	SAR test channel Power (dBm)	Scaling Factor
2.4G	PCL = 5, PWR =18+-0.5	18.22	1.067

**ANNEX A GRAPH TEST RESULTS**

BAND	PARAMETERS
<u>2.4G</u>	<u>Measurement 1:</u> Flat Plane with Body device position on Middle Channel in GFSK mode <u>Measurement 2:</u> Flat Plane with Body device position on Middle Channel in GFSK mode <u>Measurement 3:</u> Flat Plane with Body device position on Middle Channel in GFSK mode <u>Measurement 4:</u> Flat Plane with Body device position on Middle Channel in GFSK mode <u>Measurement 5:</u> Flat Plane with Body device position on Middle Channel in GFSK mode <u>Measurement 6:</u> Flat Plane with Body device position on Middle Channel in GFSK mode <u>Measurement 7:</u> Flat Plane with Body device position on Middle Channel in GFSK mode <u>Measurement 8:</u> Flat Plane with Body device position on Middle Channel in GFSK mode



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MEASUREMENT 1

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm

Date of measurement: 2014.10.10

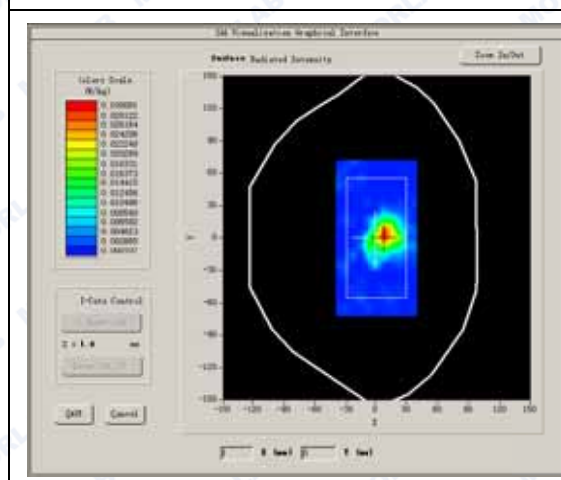
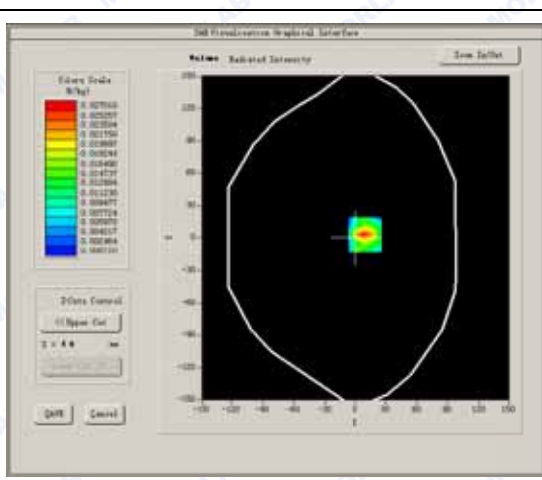
Measurement duration: 9 minutes 32seconds

A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	2.4G
Channels	Middle
Signal	GFSK

B. SAR Measurement Results**Middle Band SAR**

Frequency (MHz)	2440.191000
Relative permittivity (real part)	52.457208
Conductivity (S/m)	1.958372
Power drift (%)	-2.020000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	4.96
Crest factor:	1:1

SURFACE SAR**VOLUME SAR**



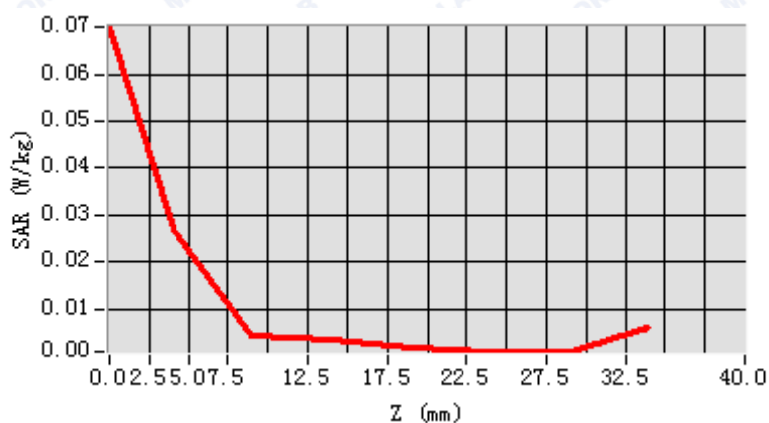
REPORT No. : SZ14080041S01

Maximum location: X=9.00, Y=3.00

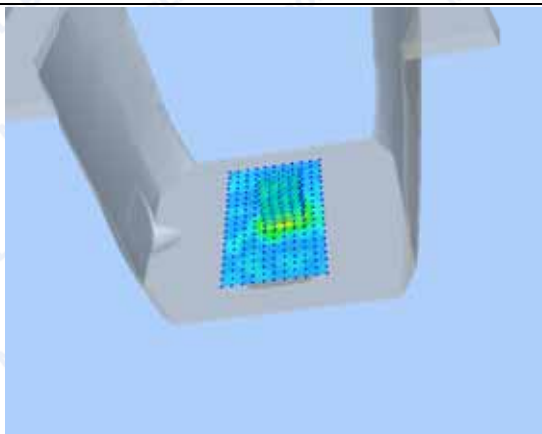
SAR Peak: 0.07 W/kg

SAR 10g (W/Kg)	0.008568
SAR 1g (W/Kg)	0.017602

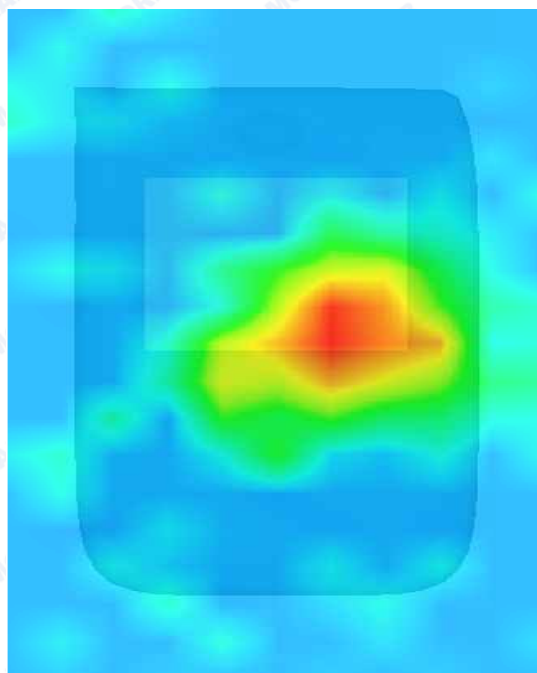
Z axis scan



3D screen shot



Hot spot position



**MEASUREMENT 2**

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm

Date of measurement: 2014.10.10

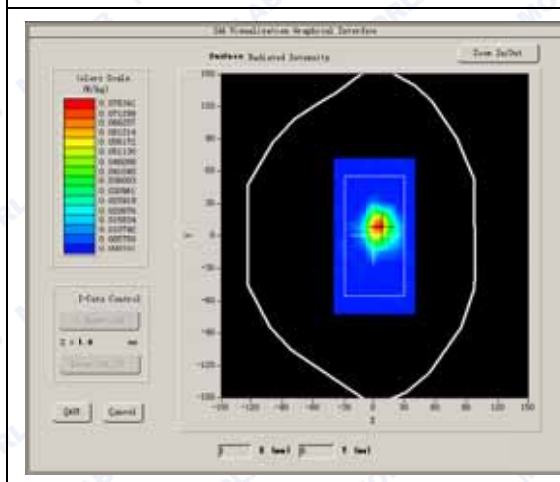
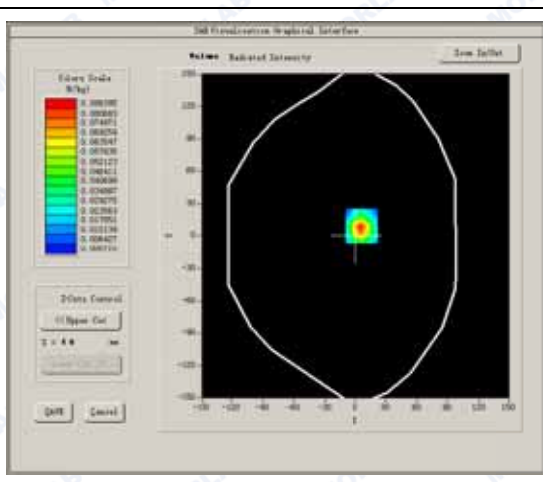
Measurement duration: 9 minutes 34 seconds

A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	2.4G
Channels	Middle
Signal	GFSK

B. SAR Measurement Results**Middle Band SAR**

Frequency (MHz)	2440.191000
Relative permittivity (real part)	52.457208
Conductivity (S/m)	1.958372
Power drift (%)	-1.460000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	4.96
Crest factor:	1:1

SURFACE SAR**VOLUME SAR**



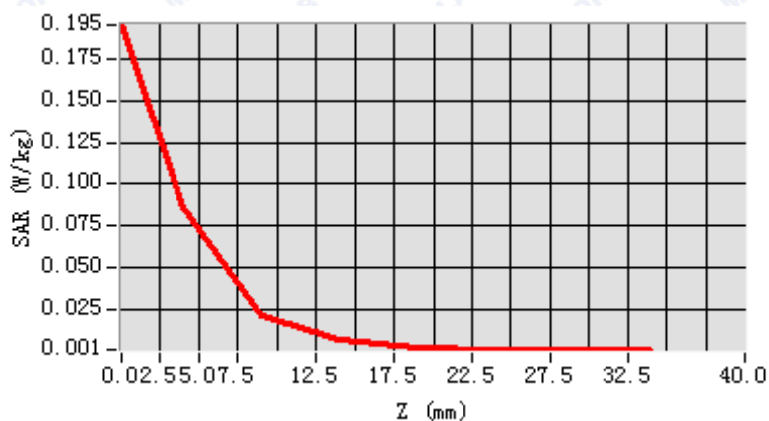
REPORT No. : SZ14080041S01

Maximum location: X=6.00, Y=9.00

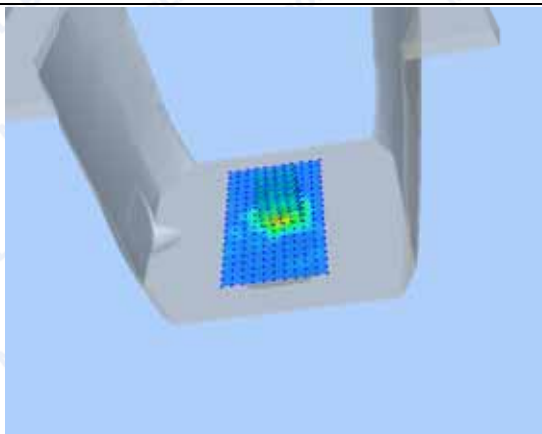
SAR Peak: 0.20 W/kg

SAR 10g (W/Kg)	0.030281
SAR 1g (W/Kg)	0.088522

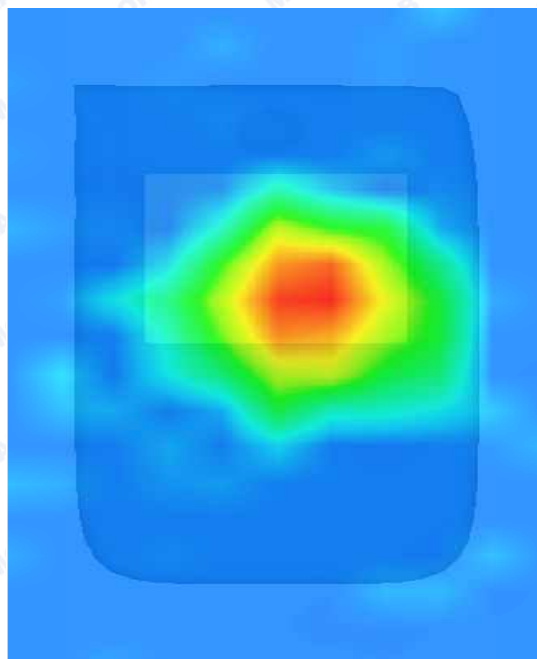
Z axis scan



3D screen shot



Hot spot position



**MEASUREMENT 3**

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm

Date of measurement: 2014.10.10

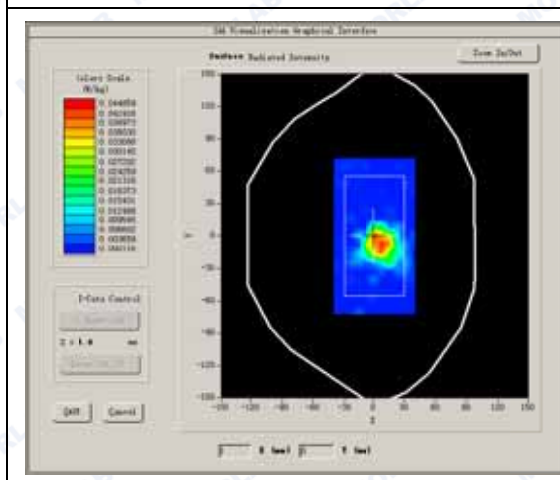
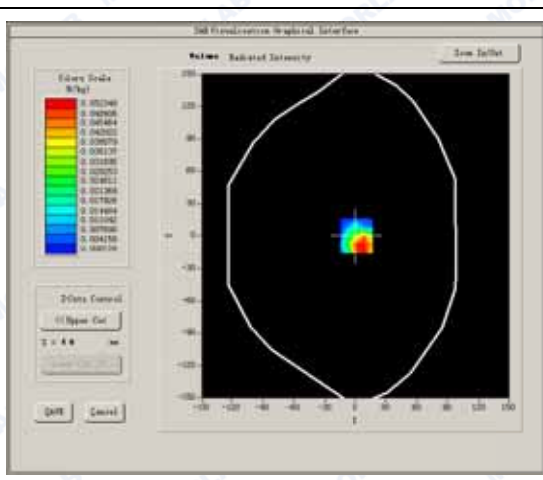
Measurement duration: 9 minutes 33 seconds

A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	2.4G
Channels	Middle
Signal	GFSK

B. SAR Measurement Results**Middle Band SAR**

Frequency (MHz)	2440.191000
Relative permittivity (real part)	52.457208
Conductivity (S/m)	1.958372
Power drift (%)	-3.260000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	4.96
Crest factor:	1:1

SURFACE SAR**VOLUME SAR**



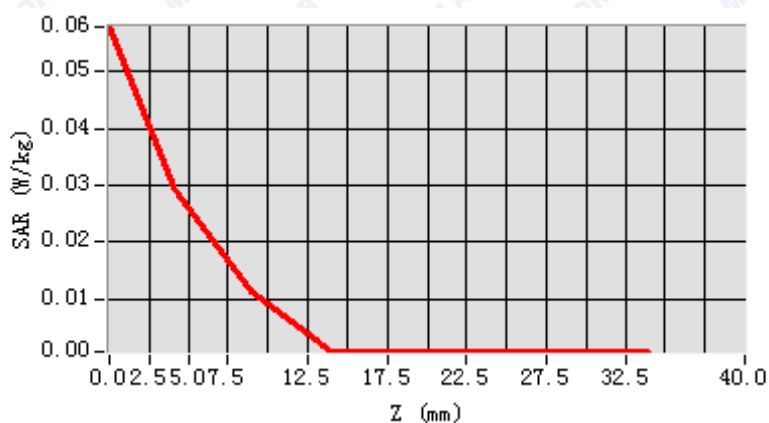
REPORT No. : SZ14080041S01

Maximum location: X=1.00, Y=0.00

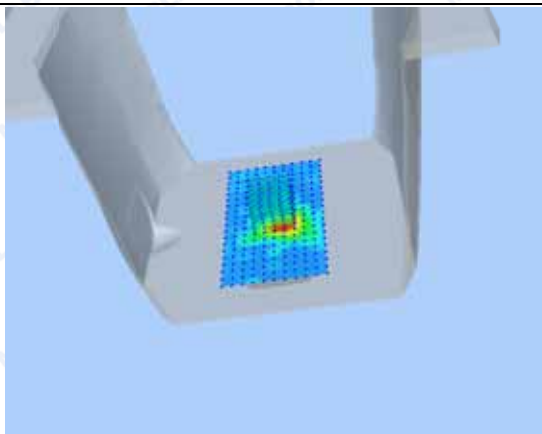
SAR Peak: 0.12 W/kg

SAR 10g (W/Kg)	0.021562
SAR 1g (W/Kg)	0.053773

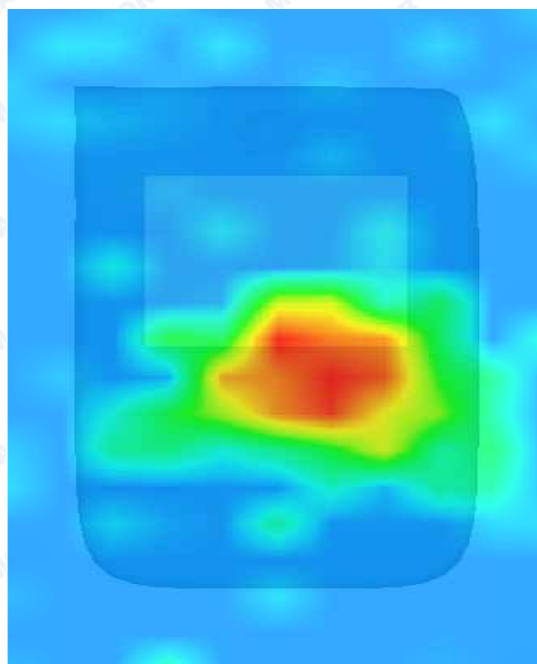
Z axis scan



3D screen shot



Hot spot position



**MEASUREMENT 4**

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm

Date of measurement: 2014.10.10

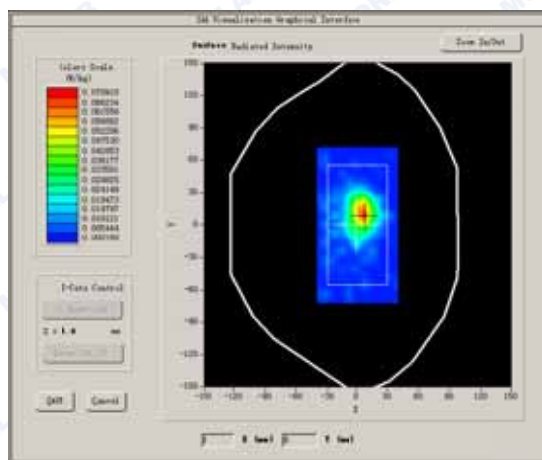
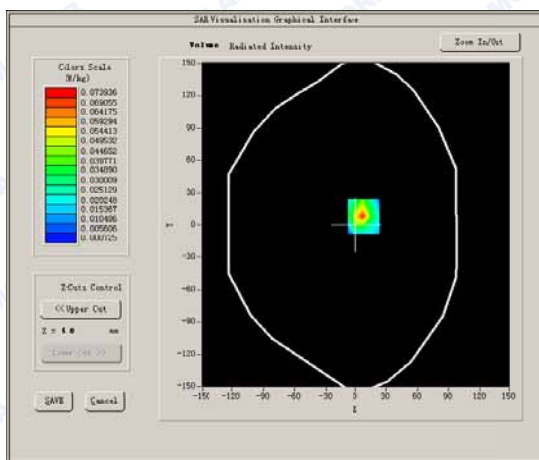
Measurement duration: 9 minutes 32 seconds

A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	2.4G
Channels	Middle
Signal	GFSK

B. SAR Measurement Results**Middle Band SAR**

Frequency (MHz)	2440.191000
Relative permittivity (real part)	52.457208
Conductivity (S/m)	1.958372
Power drift (%)	-3.190000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	4.96
Crest factor:	1:1

SURFACE SAR**VOLUME SAR**



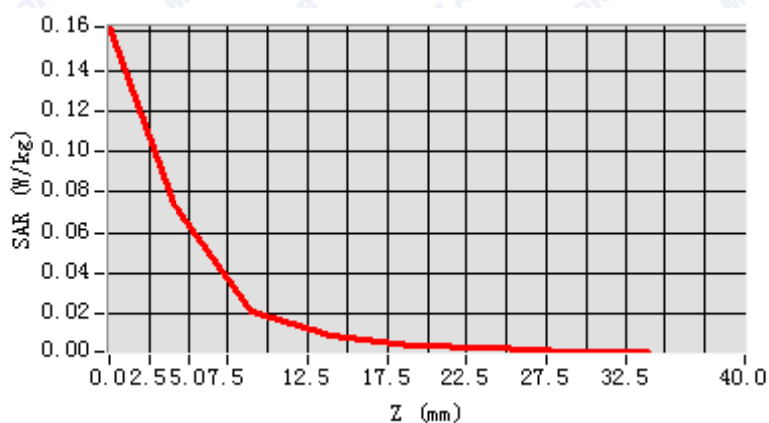
REPORT No. : SZ14080041S01

Maximum location: X=7.00, Y=8.00

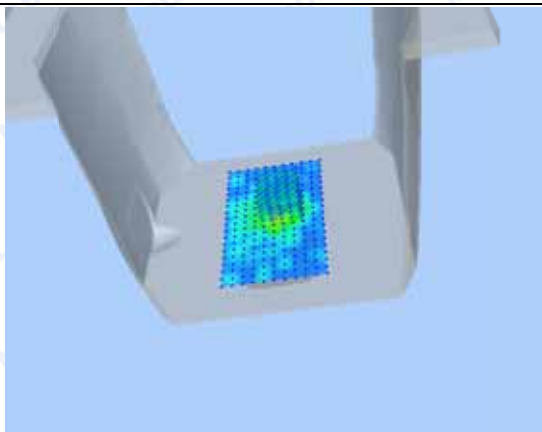
SAR Peak: 0.17 W/kg

SAR 10g (W/Kg)	0.025007
SAR 1g (W/Kg)	0.072402

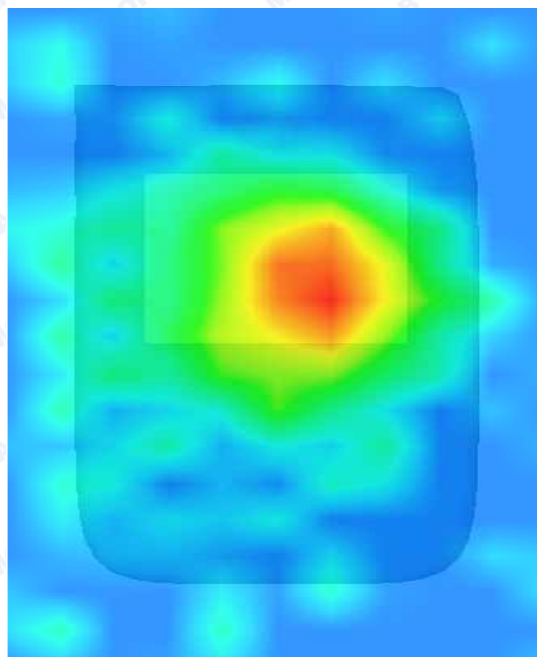
Z axis scan



3D screen shot



Hot spot position



**MEASUREMENT 5**

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm

Date of measurement: 2014.10.10

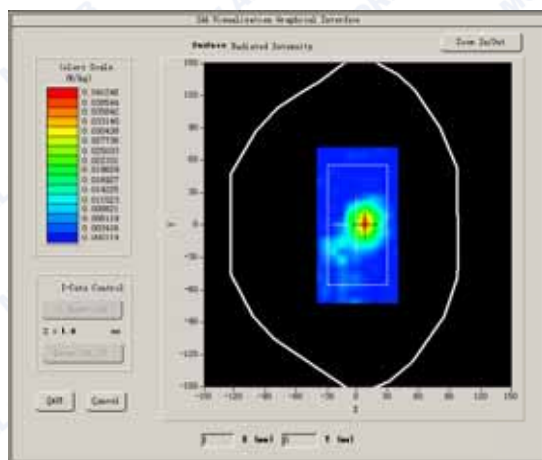
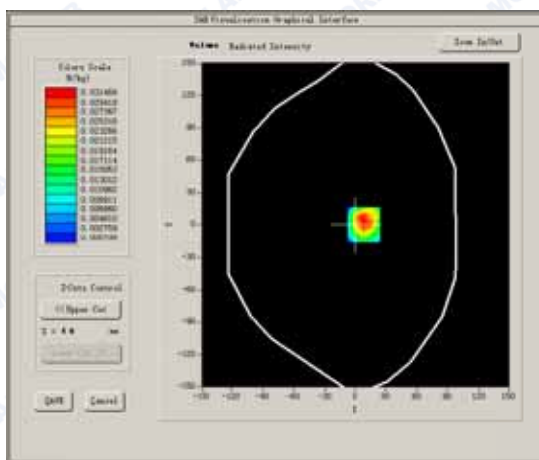
Measurement duration: 9 minutes 37 seconds

A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	2.4G
Channels	Middle
Signal	GFSK

B. SAR Measurement Results**Middle Band SAR**

Frequency (MHz)	2440.191000
Relative permittivity (real part)	52.457208
Conductivity (S/m)	1.958372
Power drift (%)	1.470000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	4.96
Crest factor:	1:1

SURFACE SAR**VOLUME SAR**



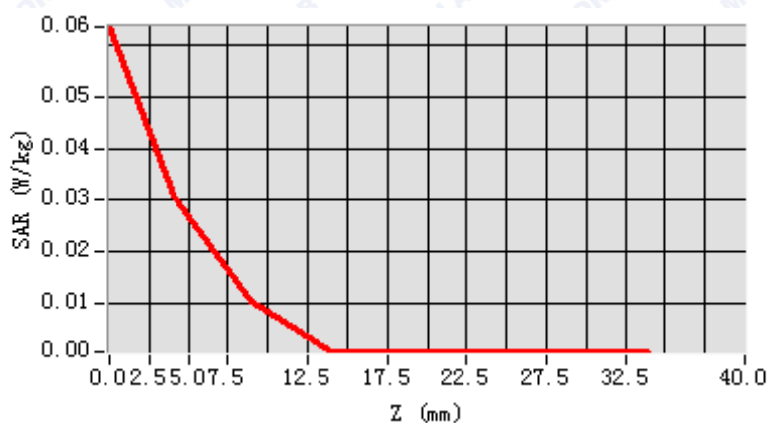
REPORT No. : SZ14080041S01

Maximum location: X=8.00, Y=0.00

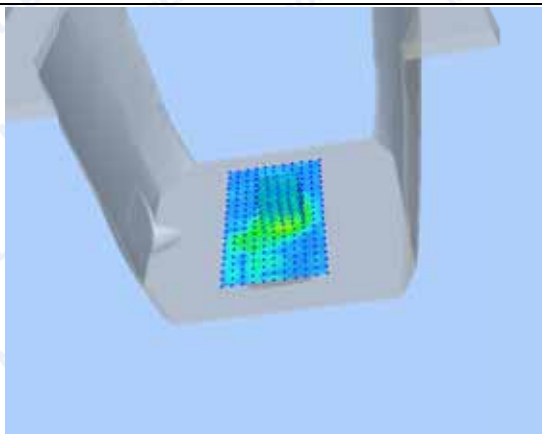
SAR Peak: 0.07 W/kg

SAR 10g (W/Kg)	0.012610
SAR 1g (W/Kg)	0.031822

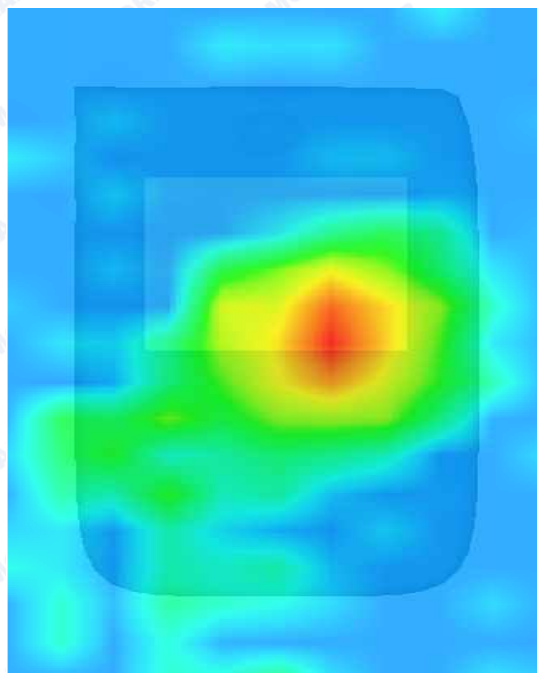
Z axis scan



3D screen shot



Hot spot position





MEASUREMENT 6

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm

Date of measurement: 2014.10.10

Measurement duration: 9 minutes 35 seconds

A. Experimental conditions.

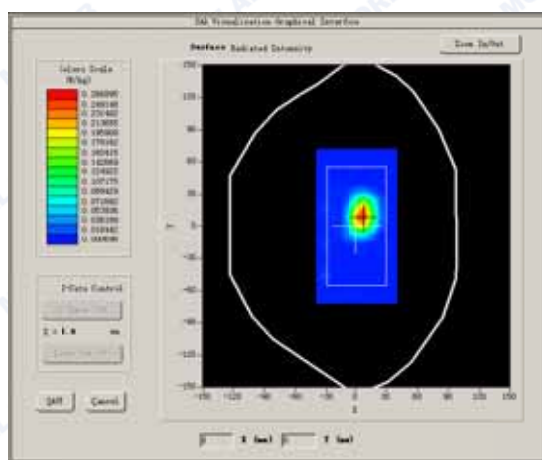
Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	2.4G
Channels	Middle
Signal	GFSK

B. SAR Measurement Results

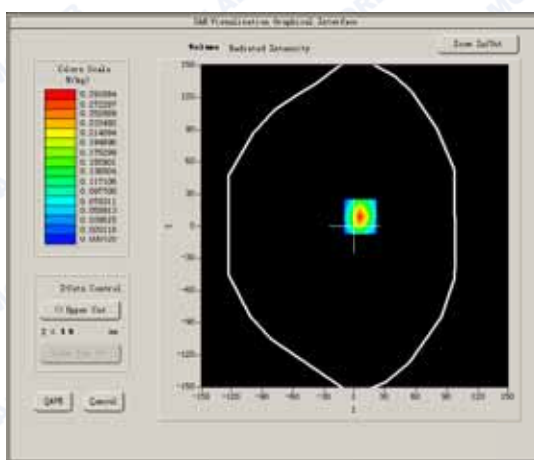
Middle Band SAR

Frequency (MHz)	2440.191000
Relative permittivity (real part)	52.457208
Conductivity (S/m)	1.958372
Power drift (%)	0.880000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	4.96
Crest factor:	1:1

SURFACE SAR



VOLUME SAR





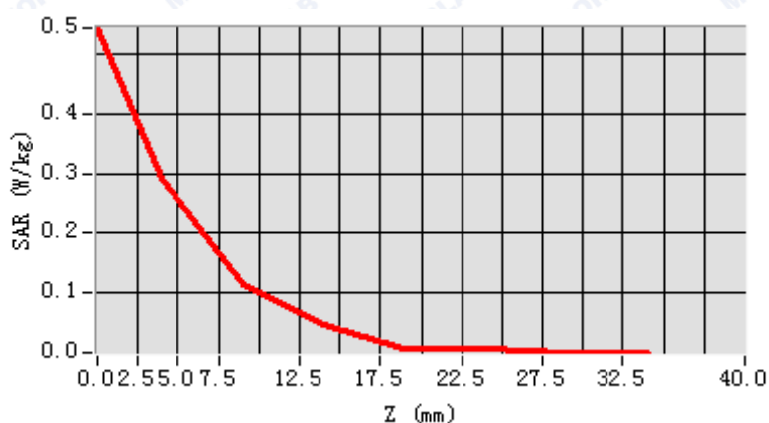
REPORT No. : SZ14080041S01

Maximum location: X=6.00, Y=9.00

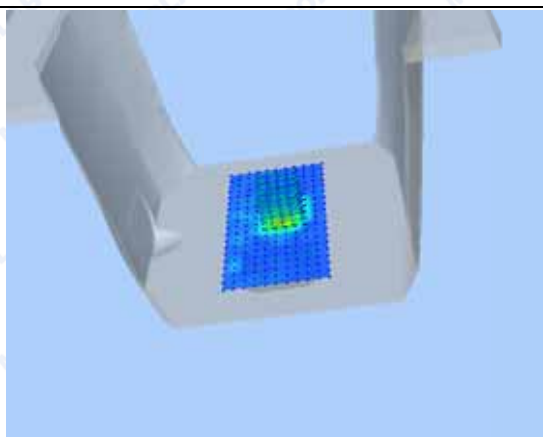
SAR Peak: 0.59 W/kg

SAR 10g (W/Kg)	0.107068
SAR 1g (W/Kg)	0.291189

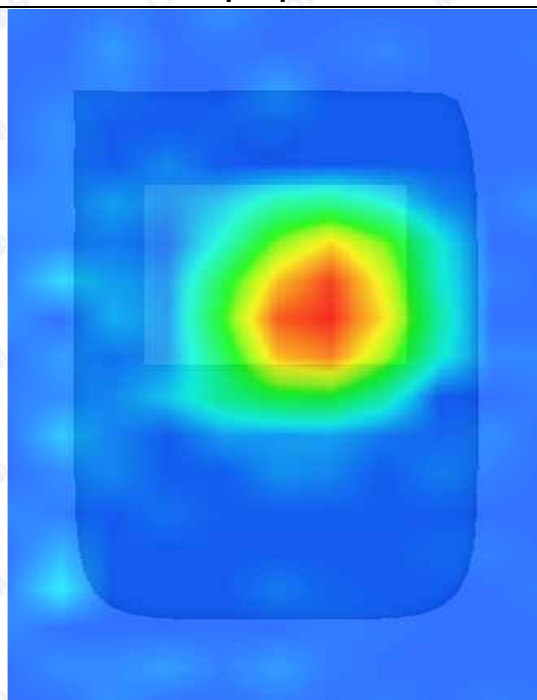
Z axis scan



3D screen shot



Hot spot position



**MEASUREMENT 7**

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

Zoom scan resolution: dx=5mm, dy=5mm, dz=5mm

Date of measurement: 2014.10.10

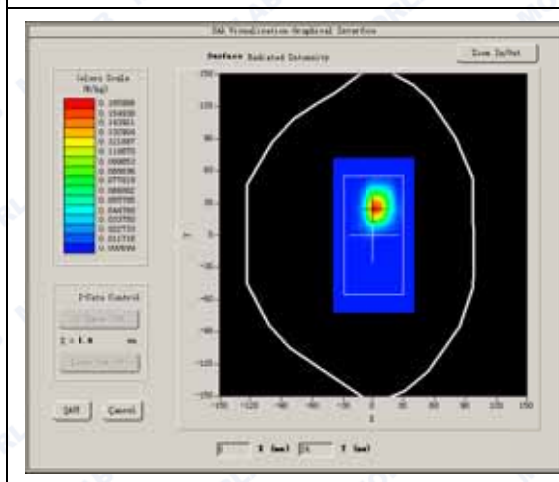
Measurement duration: 9 minutes 36 seconds

A. Experimental conditions.

Phantom File	surf_sam_plan.txt
Phantom	Validation plane
Device Position	Body
Band	2.4G
Channels	Middle
Signal	GFSK

B. SAR Measurement Results**Middle Band SAR**

Frequency (MHz)	2440.191000
Relative permittivity (real part)	52.457208
Conductivity (S/m)	1.958372
Power drift (%)	1.840000
Ambient Temperature:	22.9°C
Liquid Temperature:	22.1°C
ConvF:	4.96
Crest factor:	1:1

SURFACE SAR**VOLUME SAR**