Report On

Specific Absorption Rate Testing of the
Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

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REPORT ON

Specific Absorption Rate Testing of the
Sharp SHT2 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

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May 2014

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DATED 15 May 2014

This report has been up-issued to Issue 2 due to additional table in summary of results showing 1g volume averaged Stand-alone Reported SAR found during this Assessment for each supported mode, including highest simultaneous transmission results and re-naming of WLAN 5GHz bands.

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SECTION 1

REPORT SUMMARY

Specific Absorption Rate Testing of the
Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Specific Absorption Rate Testing of the SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS to the requirements of KDB 447498 – D01 v05 General RF Exposure Guidance.

Objective	To perform Specific Absorption Rate Testing to determine the Equipment Under Test's (EUT's) compliance with the requirements specified of KDB 447498 – D01 v05 General RF Exposure Guidance, for the series of tests carried out.
Applicant	Sharp Communication Compliance Ltd
Manufacturer	Sharp Corporation
Manufacturing Description	Mobile Handset
Model Number	SHL25
Serial/IMEI Number(s)	004401115170306 (SAR Test: GSM850&1900/UMTS FDDV/LTE Band 17) 004401115171536 (SAR Test: CDMA2000) 004401115170298 (SAR Test: WLAN 2.4/5GHz) 004401115170652 (Conducted: GSM850/1900) 004401115170660 (Conducted: UMTS FDDV) 004401115170678 (Conducted: LTE Band 17) 004401115170454 (Conducted: Bluetooth) 004401115170488 (Conducted: WLAN – 2.4GHz) 004401115170470 (Conducted: WLAN – 5GHz)
Number of Samples Tested	3
Hardware Version	PP1
Software Version	C2282 (GSM850&1900 / UMTS FDDV / LTE Band 17 / CDMA 2000) A2270 (WLAN 2.4/5GHz / Bluetooth)
Battery Cell Manufacturer	Sharp Corporation
Battery Model Number	Integral Battery; Non Removable
Test Specification/Issue/Date	KDB 447498 – D01 v05 General RF Exposure Guidance
Start of Test	03 April 2014
Finish of Test	16 April 2014
Related Document(s)	FCC 47CFR 2.1093: 2013 KDB 248227 - v01r02 (Rev 1.2) KDB 865664 – D01 v01 KDB 865664 – D02 v01 KDB 648474 – D04 v01 KDB 941225 - D01 v02 KDB 941225 – D06 v01 KDB 941225 – D02 v02r01 KDB 941225 - D05 v02r03 IEEE 1528-2013
Name of Engineer(s)	Peter Hill Michael Mawby

1.2 BRIEF SUMMARY OF RESULTS

The measurements shown in this report were made in accordance with the procedures specified KDB 865664 – D01 v05.

The maximum 1g volume averaged SAR found during this Assessment

Max 1g SAR (W/kg) Body	0.44 (Measured)	0.59 (Scaled)
Max 1g SAR (W/kg) Hotspot	0.44 (Measured)	0.59 (Scaled)
Max 1g SAR (W/kg) Head	0.48 (Measured)	0.64 (Scaled)
The maximum 1g volume averaged SAR level measured for all the tests performed did not exceed the limits for General Population/Uncontrolled Exposure (W/kg) Partial Body of 1.6 W/kg.		

The maximum 1g volume averaged Stand-alone Reported SAR found during this Assessment for each supported mode, including highest simultaneous transmission results;

Band	Test Configuration	Max Reported SAR (W/kg)	Highest Simultaneous Transmission SAR (W/kg)
GSM/GPRS 850	Head	0.56	1.09
	Body/Hotspot	0.54	
GSM/GPRS 1900	Head	0.38	
	Body/Hotspot	0.29	
WCDMA FDD V	Head	0.46	
	Body/Hotspot	0.55	
LTE Band 17	Body/Hotspot	0.55	
CDMA 2000 BC0	Head	0.64	
	Body/Hotspot	0.59	
WLAN 2.4GHz	Head	0.52	1.09
	Body/Hotspot	0.30	
WLAN 5.22GHz	Head	0.28	0.92
	Body/Hotspot	0.25	
WLAN 5.30GHz	Head	0.29	
	Body/Hotspot	0.26	
WLAN 5.58GHz	Head	0.19	
	Body/Hotspot	0.33	
The maximum 1g volume averaged SAR level measured for all the tests performed (including simultaneous transmission analysis results) did not exceed the limits for General Population/Uncontrolled Exposure (W/kg) Partial Body of 1.6 W/kg.			

1.3 TEST RESULTS SUMMARY

1.3.1 System Performance / Validation Check Results

Prior to formal testing being performed a System Check was performed in accordance with KDB 865664 and the results were compared against published data in Standard IEEE 1528-2003. The following results were obtained: -

System performance / Validation results

Date	Dipole Used	Frequency (MHz)	Max 1g SAR (W/kg)*	Percentage Drift on Reference
14/04/2014	700	700	7.76	1.16
04/04/2014	835	835	10.05	-4.36
07/04/2014	835	835	10.50	-0.12
07/04/2014	835	835	9.98	-3.57
11/04/2014	835	835	10.23	-2.66
11/04/2014	835	835	9.98	-3.57
03/04/2014	1900	1900	39.61	-3.37
09/04/2014	1900	1900	40.50	1.16
10/04/2014	2450	2450	52.58	-0.76
10/04/2014	2450	2450	57.10	1.64
14/04/2014	5000	5200	69.96	-1.64
15/04/2014	5000	5200	82.21	6.51
15/04/2014	5000	5500	73.39	0.53
15/04/2014	5000	5500	73.84	-8.05

*Normalised to a forward power of 1W

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1.3.2 Results Summary Tables

GSM 850MHz Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS.

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Left Cheek	128	824.2	32.82	33.5	0.39	0.46	Figure 6
Left 15°	128	824.2	32.82	33.5	0.24	0.28	Figure 7
Right Cheek	128	824.2	32.82	33.5	0.37	0.43	Figure 8
Right 15°	128	824.2	32.82	33.5	0.23	0.27	Figure 9
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz							

GSM 850MHz GPRS Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS.

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Left Cheek	251	848.8	26.65	28.1	0.40	0.56	Figure 10
Left 15°	251	848.8	26.65	28.1	0.23	0.32	Figure 11
Right Cheek	251	848.8	26.65	28.1	0.37	0.52	Figure 12
Right 15°	251	848.8	26.65	28.1	0.28	0.39	Figure 13
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz							

GSM 850MHz GPRS Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

Position		Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Spacing	Position							
10mm	Front Facing	251	848.8	26.65	28.1	0.35	0.49	Figure 14
10mm	Rear Facing	251	848.8	26.65	28.1	0.39	0.54	Figure 15
10mm	Left Edge	251	848.8	26.65	28.1	0.28	0.39	Figure 16
10mm	Right Edge	251	848.8	26.65	28.1	0.29	0.40	Figure 17
10mm	Bottom Edge	251	848.8	26.65	28.1	0.02	0.03	Figure 18

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:

≤ 0.8W/kg when the transmission band is ≤ 100MHz
≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz
≤ 0.4W/kg when the transmission band is ≥ 200MHz

Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06

KDB – 648474 D04 - When the reported SAR for body-worn accessory, measured without a headset connected to the handset, is >1.2W/kg, the highest reported SAR configuration for that wireless mode and frequency band is repeated for that body worn accessory with a headset attached to the handset.

WCDMA FDDV Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Left Cheek	4132	826.4	23.79	24.2	0.40	0.44	Figure 19
Left 15°	4132	826.4	23.79	24.2	0.29	0.32	Figure 20
Right Cheek	4132	826.4	23.79	24.2	0.42	0.46	Figure 21
Right 15°	4132	826.4	23.79	24.2	0.29	0.32	Figure 22
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz							

WCDMA FDDV Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

Position		Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Spacing	Position							
10mm	Front Face	4132	826.4	23.79	24.2	0.43	0.47	Figure 23
10mm	Rear Face	4132	826.4	23.79	24.2	0.50	0.55	Figure 24
10mm	Left Edge	4132	826.4	23.79	24.2	0.37	0.41	Figure 25
10mm	Right Edge	4132	826.4	23.79	24.2	0.27	0.30	Figure 26
10mm	Bottom Edge	4132	826.4	23.79	24.2	0.09	0.10	Figure 27
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06 KDB – 648474 D04 - When the reported SAR for body-worn accessory, measured without a headset connected to the handset, is >1.2W/kg, the highest reported SAR configuration for that wireless mode and frequency band is repeated for that body worn accessory with a headset attached to the handset.								

CDMA2000 Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Left Cheek	136	829.08	23.67	24.9	**0.48**	**0.64**	Figure 28
Left 15°	136	829.08	23.67	24.9	0.34	0.45	Figure 29
Right Cheek	136	829.08	23.67	24.9	**0.48**	**0.64**	Figure 30
Right 15°	136	829.08	23.67	24.9	0.37	0.49	Figure 31
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB 941225 D01 – Configuration RC3 S055 KDB 941225 D01 – Configuration RC3 TDSO / 032 FCH							

CDMA2000 Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Front Face	136	829.08	23.66	24.9	**0.44**	**0.59**	Figure 32
Rear Face	136	829.08	23.66	24.9	**0.44**	**0.59**	Figure 33
Left Edge	136	829.08	23.66	24.9	0.35	0.47	Figure 34
Right Edge	136	829.08	23.66	24.9	0.26	0.35	Figure 35
Bottom Edge	136	829.08	23.66	24.9	0.11	0.15	Figure 36
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB 941225 D01 – Configuration RC3 S055 KDB 941225 D01 – Configuration RC3 TDSO / 032 FCH							

LTE Band 17 Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

Position		Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Spacing	Position							
10mm	Front Face	23780	709.0	23.08	24.5	0.32	0.44	Figure 37
10mm	Rear Face	23780	709.0	23.08	24.5	0.40	0.55	Figure 38
10mm	Left Edge	23780	709.0	23.08	24.5	0.23	0.32	Figure 39
10mm	Right Edge	23780	709.0	23.08	24.5	0.24	0.33	Figure 40
10mm	Bottom Edge	23780	709.0	23.08	24.5	0.08	0.11	Figure 41

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

Configuration Used : 10MHz BW 1RB Low Offset

KDB 941225 D05:

Testing was carried out using a 1RB allocation positioned at the low offset as this was the test channel combination which gave the highest maximum output power.

Testing was not required for other RB allocations and offsets as the reported 1g SAR for the highest output combination was ≤ 0.8W/kg.

SAR was not required for 100% RB allocation as the maximum power output was less than that measured in 1RB and 50% RB allocations and the reported 1g SAR for 1RB and 50% RB allocations was ≤ 0.8W/kg.

SAR was not required for other modulations as the measured maximum output power for other modulations was not > ½dB higher than the same configuration in QPSK.

SAR measurements were not required on other channel bandwidth(s) (5MHz) as the measured maximum output power of the smaller bandwidth(s) was not > ½dB higher than the equivalent channel configurations in the largest channel bandwidth configuration.

LTE Band 17 Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

Position		Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Spacing	Position							
10mm	Front Face	23790	710.0	22.09	23.5	0.27	0.37	Figure 42
10mm	Rear Face	23790	710.0	22.09	23.5	0.33	0.46	Figure 43
10mm	Left Edge	23790	710.0	22.09	23.5	0.22	0.30	Figure 44
10mm	Right Edge	23790	710.0	22.09	23.5	0.20	0.28	Figure 45
10mm	Bottom Edge	23790	710.0	22.09	23.5	0.07	0.10	Figure 46

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

Configuration Used : 10MHz BW 25RB High Offset

KDB 941225 D05:

Testing was carried out using a 25RB allocation positioned at the high offset as this was the test channel combination which gave the highest maximum output power.

Testing was not required for other RB allocations and offsets as the reported 1g SAR for the highest output combination was ≤ 0.8W/kg.

SAR was not required for 100% RB allocation as the maximum power output was less than that measured in 1RB and 50% RB allocations and the reported 1g SAR for 1RB and 50% RB allocations was ≤ 0.8W/kg.

SAR was not required for other modulations as the measured maximum output power for other modulations was not > ½dB higher than the same configuration in QPSK.

SAR measurements were not required on other channel bandwidth(s) (5MHz) as the measured maximum output power of the smaller bandwidth(s) was not > ½dB higher than the equivalent channel configurations in the largest channel bandwidth configuration.

PCS 1900MHz Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Left Cheek	885	1909.8	30.29	30.5	0.17	0.18	Figure 47
Left 15°	885	1909.8	30.29	30.5	0.10	0.10	Figure 48
Right Cheek	885	1909.8	30.29	30.5	0.33	0.35	Figure 49
Right 15°	885	1909.8	30.29	30.5	0.13	0.14	Figure 50
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz							

PCS 1900MHz GPRS Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Left Cheek	885	1909.8	24.20	24.90	0.15	0.18	Figure 51
Left 15°	885	1909.8	24.20	24.90	0.10	0.12	Figure 52
Right Cheek	885	1909.8	24.20	24.90	0.32	0.38	Figure 53
Right 15°	885	1909.8	24.20	24.90	0.12	0.14	Figure 54
Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz							

PCS 1900MHz GPRS Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

Position		Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Spacing	Position							
10mm	Front Face	810	1909.8	24.20	24.9	0.23	0.27	Figure 55
10mm	Rear Face	810	1909.8	24.20	24.9	0.25	0.29	Figure 56
10mm	Left Edge	810	1909.8	24.20	24.9	0.20	0.23	Figure 57
10mm	Bottom Edge	810	1909.8	24.20	24.9	0.18	0.21	Figure 58

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:

≤ 0.8W/kg when the transmission band is ≤ 100MHz
≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz
≤ 0.4W/kg when the transmission band is ≥ 200MHz

Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06

KDB – 648474 D04 - When the reported SAR for body-worn accessory, measured without a headset connected to the handset, is >1.2W/kg, the highest reported SAR configuration for that wireless mode and frequency band is repeated for that body worn accessory with a headset attached to the handset.

WLAN 2450MHz Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Left Cheek	1	2412.0	16.37	17.5	0.28	0.36	Figure 59
Left 15°	1	2412.0	16.37	17.5	0.28	0.36	Figure 60
Right Cheek	1	2412.0	16.37	17.5	0.35	0.45	Figure 61
Right 15°	1	2412.0	16.37	17.5	0.40	0.52	Figure 62

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:

≤ 0.8W/kg when the transmission band is ≤ 100MHz
≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz
≤ 0.4W/kg when the transmission band is ≥ 200MHz

WLAN 2450MHz Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS

Position		Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Spacing	Position							
10mm	Front Face	1	2412	16.37	17.5	0.10	0.13	Figure 63
10mm	Rear Face	1	2412	16.37	17.5	0.23	0.30	Figure 64
10mm	Right Edge	1	2412	16.37	17.5	0.05	0.06	Figure 65
10mm	Top Edge	1	2412	16.37	17.5	0.19	0.25	Figure 66

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:

≤ 0.8W/kg when the transmission band is ≤ 100MHz
≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz
≤ 0.4W/kg when the transmission band is ≥ 200MHz

Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06

KDB – 648474 D04 - When the reported SAR for body-worn accessory, measured without a headset connected to the handset, is >1.2W/kg, the highest reported SAR configuration for that wireless mode and frequency band is repeated for that body worn accessory with a headset attached to the handset.

WLAN 5220MHz Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS (NUA)*

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Left Cheek	44	5220.0	13.57	15.5	0.05	0.08	Figure 67
Left 15°	44	5220.0	13.57	15.5	0.12	0.19	Figure 68
Right Cheek	44	5220.0	13.57	15.5	0.08	0.12	Figure 69
Right 15°	44	5220.0	13.57	15.5	0.18	0.28	Figure 70

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:

≤ 0.8W/kg when the transmission band is ≤ 100MHz
≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz
≤ 0.4W/kg when the transmission band is ≥ 200MHz

KDB 248227 - v01r02 (Rev 1.2) – Testing was carried out on Channel 44 instead of the default test channel as this was the channel with the maximum output power.

*(NUA) Not UKAS Accredited

WLAN 5220MHz Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS. (NUA)*

Position		Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Spacing	Position							
10mm	Front Face	44	5220.0	13.57	15.5	0.03	0.05	Figure 71
10mm	Rear Face	44	5220.0	13.57	15.5	0.16	0.25	Figure 72
10mm	Right Edge	44	5220.0	13.57	15.5	0.03	0.05	Figure 73
10mm	Top Edge	44	5220.0	13.57	15.5	0.12	0.19	Figure 74

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:

≤ 0.8W/kg when the transmission band is ≤ 100MHz
≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz
≤ 0.4W/kg when the transmission band is ≥ 200MHz

KDB 248227 - v01r02 (Rev 1.2) – Testing was carried out on Channel 44 instead of the default test channel as this was the channel with the maximum output power.

Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06

KDB – 648474 D04 - When the reported SAR for body-worn accessory, measured without a headset connected to the handset, is >1.2W/kg, the highest reported SAR configuration for that wireless mode and frequency band is repeated for that body worn accessory with a headset attached to the handset.

*(NUA) Not UKAS Accredited

** No data was recorded for this position due to SAR levels being below the SAR measurement system capability.

WLAN 5300MHz Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS. (NUA)*

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Left Cheek	60	5300.0	13.68	15.5	0.06	0.09	Figure 75
Left 15°	60	5300.0	13.68	15.5	0.10	0.15	Figure 76
Right Cheek	60	5300.0	13.68	15.5	0.11	0.17	Figure 77
Right 15°	60	5300.0	13.68	15.5	0.19	0.29	Figure 78

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:

≤ 0.8W/kg when the transmission band is ≤ 100MHz
≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz
≤ 0.4W/kg when the transmission band is ≥ 200MHz

KDB 248227 - v01r02 (Rev 1.2) – Testing was carried out on Channel 56 instead of the default test channel as this was the channel with the maximum output power.

*(NUA) Not UKAS Accredited

WLAN 5300MHz Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS. (NUA)*

Position		Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Spacing	Position							
10mm	Front Face	60	5300.0	13.68	15.5	0.02	0.03	Figure 79
10mm	Rear Face	60	5300.0	13.68	15.5	0.17	0.26	Figure 80
10mm	Right Edge	60	5300.0	13.68	15.5	0.03	0.05	Figure 81
10mm	Top Edge	60	5300.0	13.68	15.5	0.11	0.17	Figure 82

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:

≤ 0.8W/kg when the transmission band is ≤ 100MHz
≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz
≤ 0.4W/kg when the transmission band is ≥ 200MHz

Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06

KDB – 648474 D04 - When the reported SAR for body-worn accessory, measured without a headset connected to the handset, is >1.2W/kg, the highest reported SAR configuration for that wireless mode and frequency band is repeated for that body worn accessory with a headset attached to the handset.

KDB 248227 - v01r02 (Rev 1.2) – Testing was carried out on Channel 60 instead of the default test channel as this was the channel with the maximum output power.

*(NUA) Not UKAS Accredited

WLAN 5580MHz Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS (NUA)*

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Left Cheek	116	5580.0	13.87	15.5	0.03	0.04	Figure 83
Left 15°	116	5580.0	13.87	15.5	0.11	0.16	Figure 84
Right Cheek	116	5580.0	13.87	15.5	0.06	0.09	Figure 85
Right 15°	116	5580.0	13.87	15.5	0.13	0.19	Figure 86

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:

≤ 0.8W/kg when the transmission band is ≤ 100MHz
≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz
≤ 0.4W/kg when the transmission band is ≥ 200MHz

KDB 248227 - v01r02 (Rev 1.2) – Testing was carried out on the default Channel 116 as this was the channel with the maximum output power.

*(NUA) Not UKAS Accredited

WLAN 5580MHz Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS (NUA)*

Position		Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Area scan (Figure number)
Spacing	Position							
10mm	Front Face	116	5580.0	13.87	15.5	0.03	0.04	Figure 87
10mm	Rear Face	116	5580.0	13.87	15.5	0.23	0.33	Figure 88
10mm	Right Edge	116	5580.0	13.87	15.5	0.03	0.04	Figure 89
10mm	Top Edge	116	5580.0	13.87	15.5	0.13	0.19	Figure 90

Limit for General Population (Uncontrolled Exposure) 1.6 W/kg (1g)

KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is:

≤ 0.8W/kg when the transmission band is ≤ 100MHz
≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz
≤ 0.4W/kg when the transmission band is ≥ 200MHz

Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06

KDB 248227 - v01r02 (Rev 1.2) – Testing was carried out on the default Channel 116 as this was the channel with the maximum output power.

KDB – 648474 D04 - When the reported SAR for body-worn accessory, measured without a headset connected to the handset, is >1.2W/kg, the highest reported SAR configuration for that wireless mode and frequency band is repeated for that body worn accessory with a headset attached to the handset.

*(NUA) Not UKAS Accredited

1.3.3 Simultaneous Transmission

Position Head	GPRS 850MHz 1g SAR (W/kg) CH 128 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.56	0.36	0.92
Left 15°	0.32	0.36	0.68
Right Cheek	0.52	0.45	0.97
Right 15°	0.39	0.52	0.91
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	GPRS 850MHz 1g SAR (W/kg) CH 251 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.49	0.13	0.62
Rear Face	0.54	0.30	0.84
Top Edge	n/a	0.25	n/a
Bottom Edge	0.03	n/a	n/a
Left edge	0.39	n/a	n/a
Right Edge	0.40	0.06	0.46
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	GPRS 850MHz 1g SAR (W/kg) CH 251 (Scaled SAR values)	WLAN 5.22GHz 1g SAR (W/kg) CH 44 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.56	0.08	0.64
Left 15°	0.32	0.19	0.51
Right Cheek	0.52	0.12	0.64
Right 15°	0.39	0.28	0.67
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	GPRS 850MHz 1g SAR (W/kg) CH 251 (Scaled SAR values)	WLAN 5.22GHz 1g SAR (W/kg) CH 44 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.49	0.05	0.54
Rear Face	0.54	0.25	0.79
Top Edge	n/a	0.19	n/a
Bottom Edge	0.03	n/a	n/a
Left Edge	0.39	n/a	n/a
Right Edge	0.40	0.05	0.45
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	GPRS 850MHz 1g SAR (W/kg) CH 251 (Scaled SAR values)	WLAN 5.30GHz 1g SAR (W/kg) CH 60 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.56	0.09	0.65
Left 15°	0.32	0.15	0.47
Right Cheek	0.52	0.17	0.69
Right 15°	0.39	0.29	0.68
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	GPRS 850MHz 1g SAR (W/kg) CH 251 (Scaled SAR values)	WLAN 5.30GHz 1g SAR (W/kg) CH 60 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.49	0.03	0.52
Rear Face	0.54	0.26	0.80
Top Edge	n/a	0.17	n/a
Bottom Edge	0.03	n/a	n/a
Left edge	0.39	n/a	n/a
Right Edge	0.40	0.05	0.45
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	GPRS 850MHz 1g SAR (W/kg) CH 251 (Scaled SAR values)	WLAN 5.58GHz 1g SAR (W/kg) CH 116 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.56	0.04	0.60
Left 15°	0.32	0.16	0.48
Right Cheek	0.52	0.09	0.61
Right 15°	0.39	0.19	0.58
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	GPRS 850MHz 1g SAR (W/kg) CH 251 (Scaled SAR values)	WLAN 5.58GHz 1g SAR (W/kg) CH 116 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.49	0.04	0.53
Rear Face	0.54	0.23	0.77
Top Edge	n/a	0.13	0.13
Bottom Edge	0.03	n/a	0.03
Left edge	0.39	n/a	0.39
Right Edge	0.40	0.03	0.43
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	WCDMA FDDV 1g SAR (W/kg) CH 4132 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.44	0.36	0.80
Left 15°	0.32	0.36	0.68
Right Cheek	0.46	0.45	0.91
Right 15°	0.32	0.52	0.84
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	WCDMA FDDV 1g SAR (W/kg) CH 4132 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.43	0.13	0.56
Rear Face	0.55	0.30	0.85
Top Edge	n/a	0.25	n/a
Bottom Edge	0.10	n/a	n/a
Left edge	0.41	n/a	n/a
Right Edge	0.30	0.06	0.36
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	WCDMA FDDV 1g SAR (W/kg) CH 4132 (Scaled SAR values)	WLAN 5.22GHz 1g SAR (W/kg) CH 44 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.44	0.08	0.52
Left 15°	0.32	0.19	0.51
Right Cheek	0.46	0.12	0.58
Right 15°	0.32	0.28	0.60
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	WCDMA FDDV 1g SAR (W/kg) CH 4132 (Scaled SAR values)	WLAN 5.22GHz 1g SAR (W/kg) CH 44 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.47	0.05	0.52
Rear Face	0.55	0.25	0.8
Top Edge	n/a	0.19	n/a
Bottom Edge	0.10	n/a	n/a
Left edge	0.41	n/a	n/a
Right Edge	0.30	0.05	0.35
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	WCDMA FDDV 1g SAR (W/kg) CH 4132 (Scaled SAR values)	WLAN 5.30GHz 1g SAR (W/kg) CH 60 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.44	0.09	0.53
Left 15°	0.32	0.15	0.47
Right Cheek	0.46	0.17	0.63
Right 15°	0.32	0.29	0.61
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	WCDMA FDDV 1g SAR (W/kg) CH 4132 (Scaled SAR values)	WLAN 5.30GHz 1g SAR (W/kg) CH 60 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.47	0.03	0.03
Rear Face	0.55	0.26	0.81
Top Edge	n/a	0.17	0.17
Bottom Edge	0.10	n/a	0.1
Left edge	0.41	n/a	0.41
Right Edge	0.30	0.05	0.35
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	WCDMA FDDV 1g SAR (W/kg) CH 4132 (Scaled SAR values)	WLAN 5.58GHz 1g SAR (W/kg) CH 116 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.44	0.04	0.48
Left 15°	0.32	0.16	0.48
Right Cheek	0.46	0.09	0.55
Right 15°	0.32	0.19	0.51
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	WCDMA FDDV 1g SAR (W/kg) CH 4132 (Scaled SAR values)	WLAN 5.58GHz 1g SAR (W/kg) CH 116 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.47	0.04	0.51
Rear Face	0.55	0.33	0.88
Top Edge	n/a	0.19	n/a
Bottom Edge	0.10	n/a	n/a
Left edge	0.41	n/a	n/a
Right Edge	0.30	0.04	0.34
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	CDMA2000 1g SAR (W/kg) CH 136 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.64	0.36	1.00
Left 15°	0.45	0.36	0.81
Right Cheek	0.64	0.45	1.09
Right 15°	0.49	0.52	1.01
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	CDMA2000 1g SAR (W/kg) CH 136 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.59	0.13	0.72
Rear Face	0.59	0.30	0.89
Top Edge	n/a	0.25	n/a
Bottom Edge	0.15	n/a	n/a
Left edge	0.47	n/a	n/a
Right Edge	0.35	0.06	0.41
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	CDMA2000 1g SAR (W/kg) CH 136 (Scaled SAR values)	WLAN 5.22GHz 1g SAR (W/kg) CH 44 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.64	0.08	0.72
Left 15°	0.45	0.19	0.64
Right Cheek	0.64	0.12	0.76
Right 15°	0.49	0.28	0.77
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	CDMA2000 1g SAR (W/kg) CH 136 (Scaled SAR values)	WLAN 5.22GHz 1g SAR (W/kg) CH 44 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.59	0.05	0.64
Rear Face	0.59	0.25	0.84
Top Edge	n/a	0.19	n/a
Bottom Edge	0.15	n/a	n/a
Left edge	0.47	n/a	n/a
Right Edge	0.35	0.05	0.40
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	CDMA2000 1g SAR (W/kg) CH 136 (Scaled SAR values)	WLAN 5.30GHz 1g SAR (W/kg) CH 60 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.64	0.09	0.73
Left 15°	0.45	0.15	0.60
Right Cheek	0.64	0.17	0.81
Right 15°	0.49	0.29	0.78
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	CDMA2000 1g SAR (W/kg) CH 136 (Scaled SAR values)	WLAN 5.30GHz 1g SAR (W/kg) CH 60 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.59	0.03	0.62
Rear Face	0.59	0.26	0.85
Top Edge	n/a	0.17	n/a
Bottom Edge	0.15	n/a	n/a
Left edge	0.47	n/a	n/a
Right Edge	0.35	0.05	0.40
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	CDMA2000 1g SAR (W/kg) CH 136 (Scaled SAR values)	WLAN 5.58GHz 1g SAR (W/kg) CH 116 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.64	0.04	0.68
Left 15°	0.45	0.16	0.61
Right Cheek	0.64	0.09	0.73
Right 15°	0.49	0.19	0.68
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	CDMA2000 1g SAR (W/kg) CH 136 (Scaled SAR values)	WLAN 5.58GHz 1g SAR (W/kg) CH 116 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.59	0.04	0.63
Rear Face	0.59	0.33	0.92
Top Edge	n/a	0.19	n/a
Bottom Edge	0.15	n/a	n/a
Left edge	0.47	n/a	n/a
Right Edge	0.35	0.04	0.39
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	LTE Band 17 1g SAR (W/kg) CH 23780 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.44	0.13	0.57
Rear Face	0.55	0.30	0.85
Top Edge	n/a	0.25	n/a
Bottom Edge	0.11	n/a	n/a
Left edge	0.32	n/a	n/a
Right Edge	0.33	0.06	0.39
Simultaneous Transmission KDB 447498 D01 Configuration Used: 10MHz BW 1RB Low Offset Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	LTE Band 17 1g SAR (W/kg) CH 23780 (Scaled SAR values)	WLAN 5.22GHz 1g SAR (W/kg) CH 44 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.44	0.05	0.49
Rear Face	0.55	0.25	0.80
Top Edge	n/a	0.19	n/a
Bottom Edge	0.11	n/a	n/a
Left edge	0.32	n/a	n/a
Right Edge	0.33	0.05	0.38
Simultaneous Transmission KDB 447498 D01 Configuration Used: 10MHz BW 1RB Low Offset Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	LTE Band 17 1g SAR (W/kg) CH 23780 (Scaled SAR values)	WLAN 5.30GHz 1g SAR (W/kg) CH 60 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.44	0.03	0.47
Rear Face	0.55	0.26	0.81
Top Edge	n/a	0.17	n/a
Bottom Edge	0.11	n/a	n/a
Left edge	0.32	n/a	n/a
Right Edge	0.33	0.05	0.38
Simultaneous Transmission KDB 447498 D01 Configuration Used: 10MHz BW 1RB Low Offset Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	LTE Band 17 1g SAR (W/kg) CH 23780 (Scaled SAR values)	WLAN 5.58GHz 1g SAR (W/kg) CH 116 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.44	0.04	0.48
Rear Face	0.55	0.33	0.88
Top Edge	n/a	0.19	n/a
Bottom Edge	0.11	n/a	n/a
Left edge	0.32	n/a	n/a
Right Edge	0.33	0.04	0.37
Simultaneous Transmission KDB 447498 D01 Configuration Used: 10MHz BW 1RB Low Offset Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	LTE Band 17 1g SAR (W/kg) CH23790 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.37	0.13	0.50
Rear Face	0.46	0.30	0.76
Top Edge	n/a	0.25	n/a
Bottom Edge	0.10	n/a	n/a
Left edge	0.30	n/a	n/a
Right Edge	0.28	0.06	0.34
Simultaneous Transmission KDB 447498 D01 Configuration Used: 10MHz BW 25RB High Offset Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	LTE Band 17 1g SAR (W/kg) CH23790 (Scaled SAR values)	WLAN 5.22GHz 1g SAR (W/kg) CH 44 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.37	0.05	0.42
Rear Face	0.46	0.25	0.71
Top Edge	n/a	0.19	n/a
Bottom Edge	0.10	n/a	n/a
Left edge	0.30	n/a	n/a
Right Edge	0.28	0.05	0.33
Simultaneous Transmission KDB 447498 D01 Configuration Used: 10MHz BW 25RB High Offset Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	LTE Band 17 1g SAR (W/kg) CH23790 (Scaled SAR values)	WLAN 5.30GHz 1g SAR (W/kg) CH 60 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.37	0.03	0.40
Rear Face	0.46	0.26	0.72
Top Edge	n/a	0.17	n/a
Bottom Edge	0.10	n/a	n/a
Left edge	0.30	n/a	n/a
Right Edge	0.28	0.05	0.33
Simultaneous Transmission KDB 447498 D01 Configuration Used: 10MHz BW 25RB High Offset Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	LTE Band 17 1g SAR (W/kg) CH23790 (Scaled SAR values)	WLAN 5.58GHz 1g SAR (W/kg) CH 116 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.37	0.04	0.04
Rear Face	0.46	0.33	0.79
Top Edge	n/a	0.19	0.19
Bottom Edge	0.10	n/a	0.10
Left edge	0.30	n/a	0.30
Right Edge	0.28	0.04	0.32
Simultaneous Transmission KDB 447498 D01 Configuration Used: 10MHz BW 25RB High Offset Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	GPRS 1900MHz 1g SAR (W/kg) CH 885 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.18	0.36	0.54
Left 15°	0.12	0.36	0.48
Right Cheek	0.38	0.45	0.83
Right 15°	0.14	0.52	0.66
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	GPRS 1900MHz 1g SAR (W/kg) CH 810 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.27	0.13	0.40
Rear Face	0.29	0.30	0.59
Top Edge	n/a	0.25	n/a
Bottom Edge	0.21	n/a	n/a
Left edge	0.23	n/a	n/a
Right Edge	n/a	0.06	0.06
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	GPRS 1900MHz 1g SAR (W/kg) CH 885 (Scaled SAR values)	WLAN 5.22GHz 1g SAR (W/kg) CH 44 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.18	0.08	0.26
Left 15°	0.12	0.19	0.31
Right Cheek	0.38	0.12	0.50
Right 15°	0.14	0.28	0.42
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	GPRS 1900MHz 1g SAR (W/kg) CH 810 (Scaled SAR values)	WLAN 5.22GHz 1g SAR (W/kg) CH 44 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.27	0.05	0.32
Rear Face	0.29	0.25	0.54
Top Edge	n/a	0.19	n/a
Bottom Edge	0.21	n/a	n/a
Left edge	0.23	n/a	n/a
Right Edge	n/a	0.05	n/a
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	GPRS 1900MHz 1g SAR (W/kg) CH 885 (Scaled SAR values)	WLAN 5.30GHz 1g SAR (W/kg) CH 60 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.18	0.09	0.27
Left 15°	0.12	0.15	0.27
Right Cheek	0.38	0.17	0.55
Right 15°	0.14	0.29	0.43
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	GPRS 1900MHz 1g SAR (W/kg) CH 885 (Scaled SAR values)	WLAN 5.30GHz 1g SAR (W/kg) CH 60 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.27	0.03	0.30
Rear Face	0.29	0.26	0.55
Top Edge	n/a	0.17	n/a
Bottom Edge	0.21	n/a	n/a
Left edge	0.23	n/a	n/a
Right Edge	n/a	0.05	n/a
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Head	GPRS 1900MHz 1g SAR (W/kg) CH 885 (Scaled SAR values)	WLAN 5.58GHz 1g SAR (W/kg) CH 116 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.18	0.04	0.22
Left 15°	0.12	0.16	0.28
Right Cheek	0.38	0.09	0.47
Right 15°	0.14	0.19	0.33
Simultaneous Transmission KDB 447498 D01			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

Position Body	GPRS 1900MHz 1g SAR (W/kg) CH 885 (Scaled SAR values)	WLAN 5.58GHz 1g SAR (W/kg) CH 116 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Face	0.27	0.04	0.31
Rear Face	0.29	0.33	0.62
Top Edge	n/a	0.19	n/a
Bottom Edge	0.21	n/a	n/a
Left edge	0.23	n/a	n/a
Right Edge	n/a	0.04	n/a
Simultaneous Transmission KDB 447498 D01 Testing was carried out with a 10mm separation distance to meet the requirements of KDB 941225 D06			

Simultaneous SAR measurements were not required as the sum of the 1g SAR measurements did not exceed 1.6 W/kg.

1.3.4 Standalone SAR Estimation

When the standalone SAR test exclusion of section 4.3.1 is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to the following to determine simultaneous transmission SAR test exclusion. The estimated SAR is only used to determine simultaneous transmission SAR test exclusion; When SAR is estimated, it must be applied to determine the sum of 1-g SAR test exclusion. When SAR to peak location separation ratio test exclusion is applied, the highest reported SAR for simultaneous transmission can be an estimated standalone SAR if the estimated SAR is the highest among the simultaneously transmitting antennas (see KDB 690783).

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/7.5] W/kg for test separation distances ≤ 50 mm;

where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR

when the minimum test separation distance is <5mm, a distance of 5mm is applied.

Bluetooth Head SAR Estimation

Frequency (MHz)	Maximum Power (mW)	Distance (mm)	Estimated SAR (W/kg)
2441	5.01	5	0.21

Bluetooth Body SAR Estimation

Frequency (MHz)	Maximum Power (mW)	Distance (mm)	Estimated SAR (W/kg)
2441	5.01	10	0.10

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The equipment under test (EUT) was a Sharp SHL25 Dual-band CDMA (BC0, BC6) & Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900) & Dualband UMTS (FDD I, FDD V) & Quad-band LTE (B1, B3, B17, B18) & AXGP (TDD 41) multi mode cellular phone with Bluetooth, ANT+, WLAN, SRD (NFC, FeliCa) and GPS. A full technical description can be found in the manufacturer's documentation.

1.4.2 Test Configuration and Modes of Operation

The testing was performed with an integral battery supplied and manufactured by Sharp Corporation. The battery was fully charged before each measurement and there were no external connections.

For head SAR assessment, testing was performed with the device in the declared normal position of operation for GSM 850MHz, PCS 1900MHz, WCDMA FDDV, LTE FDD Band 17, CDMA 2000 1xRTT BC0, WLAN 2.4GHz and WLAN 5GHz frequency bands at maximum power. The device was placed against a Specific Anthropomorphic Mannequin (SAM) phantom. The phantom was filled with simulant liquid appropriate to the frequency band. The dielectric properties were measured and found to be in accordance with the requirements for the dielectric properties specified KDB 865665. Testing was performed at both the left and right ear of the phantom at both handset positions stated in the applied specification.

For body SAR assessment, testing was performed for GSM 850MHz, PCS 1900MHz, WCDMA FDDV, LTE FDD Band 17, CDMA 2000 1xRTT BC0, WLAN 2.4GHz and WLAN 5GHz frequency bands at maximum power. The device was placed at a distance of 10 mm from the bottom of the flat phantom for all body testing. The Flat Phantom dimensions were 245mm x 195mm x 200mm with a sidewall thickness of 2.00mm. The phantom was filled to a minimum depth of 150mm with the appropriate Body simulant liquid. The dielectric properties were in accordance with the requirements specified in KDB 865665. As the device is capable of hotspot configuration a 10mm separation distance was used to meet the requirements of KDB 941225 D06 Hotspot.

Test procedures for LTE SAR assessment were as described in KDB 941225 D05. From analysis of conducted RF output power measurements it was determined that SAR was only required on the largest channel bandwidth (10MHz) using QPSK modulation with 1 RB and 50% RB allocations with the RB offset configured to that which resulted in the highest conducted RF output power. The RB configuration determined by TUV was 1 RB Low Offset and 25 RB high offset on the relevant test channel. All SAR levels were found to be <0.8 W/kg therefore no additional testing was required at the relevant frequencies / RB configurations. All SAR results were found to be less than 1.45 W/kg there SAR was not required for other channel bandwidths or higher order modulation schemes.

Test procedures for CDMA 2000 1xRTT SAR assessment were as described in KDB 941225 D01. From analysis of conducted output power measurements it was determined that head SAR was only required using Loopback Service Option SO55 in RC3 and body SAR was only required in Test Data Service Option SO32 in RC3 with FCH at full rate and all other code channels disabled.

Testing was performed in each position at the frequency that gave the highest output power for each band. All SAR levels were found to be <0.80 W/kg (KDB 447498 D01) therefore no additional testing was required at the relevant frequencies / channels of the bands. WLAN testing was achieved using the devices internal software, customer supplied software and settings supplied by the customer. The worst case data rate for WLAN testing was obtained from data provided by TUV. The worst case was deemed as the data rate which produced the highest level of conducted average power. For 2.4GHz WLAN this was 11Mbps for 802.11b. For 5GHz WLAN this was 18Mbps for 802.11a.

Included in this report are descriptions of the test method; the equipment used and an analysis of the test uncertainties applicable and diagrams indicating the locations of maximum SAR for each test position along with photographs indicating the positioning of the handset against the body as appropriate.

1.5 FCC POWER MEASUREMENTS

1.5.1 Method

Conducted power measurements were made using a power meter.

1.5.2 Conducted Power Measurements

GSM 850

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)	
		Peak	Average
GMSK - Voice	824.2	33.06	**32.82**
	836.4	32.73	32.49
	848.8	32.91	32.68
GMSK - GPRS	824.2	26.70	26.55
	836.4	26.76	26.56
	848.8	27.02	**26.65**

PCS 1900

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)	
		Peak	Average
GMSK - Voice	1850.2	30.28	30.04
	1880.0	30.44	30.20
	1909.8	30.55	**30.29**
GMSK - GPRS	1850.2	24.29	23.94
	1880.0	24.05	23.90
	1909.8	24.50	**24.20**

WCDMA FDD V

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)	
		Peak	Average
WCDMA - 12.2kbps RMC	826.4	26.37	**23.79**
	835.0	26.03	23.68
	846.6	27.45	23.67
WCDMA - 12.2kbps AMR with 3.4kbps SRB	826.4	26.39	23.80*
	835.0	26.04	23.69
	846.6	27.57	23.66
WCDMA - HSDPA (Subtest #1)	826.4	26.30	22.73
	835.0	26.03	22.66
	846.6	26.53	22.66
WCDMA - HSDPA (Subtest #2)	826.4	26.42	22.33
	835.0	26.12	22.14
	846.6	27.85	22.11
WCDMA - HSDPA (Subtest #3)	826.4	27.62	21.60
	835.0	26.10	21.50
	846.6	27.66	21.47
WCDMA - HSDPA (Subtest #4)	826.4	27.65	21.47
	835.0	26.23	21.36
	846.6	27.61	21.45
WCDMA - HSUPA (Subtest #1)	826.4	26.46	22.32
	835.0	26.17	22.25
	846.6	28.00	22.26
WCDMA - HSUPA (Subtest #2)	826.4	26.44	22.54
	835.0	26.16	22.46
	846.6	27.93	22.48
* The measured Conducted power for 12.2kbps AMR is <0.25dB higher than 12.2kbps RMC, therefore, testing was carried out using 12.2kbps RMC.			
Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)	
		Peak	Average
WCDMA - 12.2kbps RMC WCDMA - HSUPA (Subtest #3)	826.4	26.24	22.12
	835.0	26.06	22.07
	846.6	27.98	22.35
WCDMA - HSUPA (Subtest #4)	826.4	26.35	22.75
	835.0	26.08	22.73
	846.6	27.40	22.85
WCDMA - HSUPA (Subtest #5)	826.4	26.44	22.34
	835.0	26.12	22.22
	846.6	28.15	22.26

CDMA2000

Band Class	Test Mode	Forward/Reverse Traffic Channel Radio Configuration	Service Option	Bottom Channel 26 825.78MHz		Middle Channel 81 827.43MHz		Top Channel 136 829.08MHz	
				Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)	Peak (dBm)	Average (dBm)
BC0	1	1/1	SO2 (Loopback)	28.59	23.59	28.83	23.66	28.88	23.70
		1/1	SO55 (Loopback)	28.58	23.57	28.82	23.68	28.87	23.68
	3	3/3	SO2 (Loopback)	28.52	23.58	28.67	23.66	28.68	23.66
		3/3	SO55 (Loopback)	28.57	23.54	28.75	23.66	28.69	23.67
		3/3	SO32(FCH)	28.54	23.56	28.75	23.66	28.69	23.66
		3/3	SO32 (FCH+SCH)	28.53	23.58	28.72	23.66	28.91	23.67
	4	4/3	SO2 (Loopback)	28.52	23.55	28.67	23.67	28.59	23.68
		4/3	SO32 (FCH)	28.51	23.55	28.72	23.68	28.66	23.68
		4/3	SO32 (FCH+SCH)	28.49	23.58	28.64	23.64	28.71	23.67
	5	5/4	SO9 (Loopback)	28.52	23.55	28.72	23.66	28.79	23.68
		5/4	SO55 (Loopback)	28.51	23.58	28.74	23.67	28.77	23.70

LTE

Channel Bandwidth (MHz)	Modulation	Resource Block Allocation	Resource Block Offset	Measured Average Output Power dBm)		
				Bottom 706.5MHz	Middle 710.0MHz	Top 713.5MHz
5	QPSK	1	Low	22.81	23.02	23.00
		1	Mid	22.89	22.99	23.04
		1	High	22.89	23.01	**23.05**
		12	Low	22.08	22.07	22.09
		12	Mid	22.02	22.00	22.03
		12	High	22.04	22.02	22.11
		25	N/A	22.07	22.01	22.06
	16QAM	1	Low	21.94	22.05	22.04
		1	Mid	21.98	22.05	22.07
		1	High	21.99	22.05	22.11
		12	Low	21.06	21.03	21.13
		12	Mid	21.02	21.01	21.13
		12	High	21.02	21.02	21.13
		25	N/A	21.07	21.04	21.09

Channel Bandwidth (MHz)	Modulation	Resource Block Allocation	Resource Block Offset	Measured Average Output Power dBm)		
				Bottom 706.5MHz	Middle 710.0MHz	Top 713.5MHz
10	QPSK	1	Low	**23.08**	22.80	22.99
		1	Mid	23.00	22.89	23.00
		1	High	23.06	22.95	23.05
		25	Low	21.99	22.01	22.00
		25	Mid	22.02	22.07	22.04
		25	High	22.05	22.09	22.06
		50	N/A	22.04	22.03	22.03
	16QAM	1	Low	22.06	21.97	21.97
		1	Mid	21.97	22.00	21.97
		1	High	22.02	22.07	22.04
		25	Low	21.02	21.01	21.00
		25	Mid	21.01	20.99	21.04
		25	High	21.03	21.01	21.03
		50	N/A	21.01	21.01	21.01

WLAN

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)	
		Peak	Average
802.11(b) - 2.4 GHz – 11Mbps	2412	18.70	**15.59**
	2437	18.07	14.80
	2462	17.86	14.58
802.11(g) - 2.4 GHz - 6Mbps	2412	21.87	**12.74**
	2437	22.02	12.24
	2462	21.90	11.98
802.11 (n) - 2.4 GHz – MCS0	2412	21.65	12.48
	2437	22.19	**12.51**
	2462	21.53	11.72
802.11a - 5GHz - 18Mbps	5180	23.31	13.44
	5200	23.39	13.55
	5220	23.19	**13.57**
	5240	23.47	13.42
	5260	23.49	13.61
	5280	23.69	13.61
	5300	23.38	**13.68**
	5320	23.14	13.58

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)	
		Peak	Average
802.11a - 5GHz - 18Mbps	5500	22.53	13.68
	5520	23.10	13.50
	5540	23.29	13.77
	5560	23.13	13.76
	5580	22.72	**13.87**
	5600	*	*
	5620	*	*
	5640	*	*
	5660	22.38	13.50
	5680	23.13	13.76
	5700	23.07	13.75
* Channel not available			

802.11n20 - 5GHz – MCS2	5180	22.82	11.70
	5200	22.57	**11.75**
	5220	22.29	11.30
	5240	22.26	11.42
	5260	22.44	11.48
	5280	22.49	**11.50**
	5300	22.08	11.30
	5320	22.02	11.47
	5500	21.51	11.68
	5520	21.20	11.25
	5540	22.01	11.80
	5560	21.81	11.64
	5580	21.90	**12.11**
	5600	*	*
	5620	*	*
	5640	*	*
	5660	21.82	12.11
	5680	21.7	12.07
	5700	21.57	11.82

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)	
		Peak	Average
802.11n40 - 5GHz – MCS1	5190	21.88	10.86
	5230	21.66	11.29
	5270	22.26	11.14
	5310	21.94	11.55
	5510	21.21	11.19
	5550	21.76	**11.63**
	5590	*	*
	5630	*	*
	5670	21.42	11.23
* Channel not available			

802.11ac20 - 5GHz – MCS3	5180	21.03	11.23
	5200	21.10	11.15
	5220	20.97	11.14
	5240	20.82	11.05
	5260	21.65	11.40
	5280	20.89	11.08
	5300	21.08	11.30
	5320	21.27	**11.63**
	5500	20.96	11.53
	5520	20.87	11.55
	5540	20.93	11.53
	5560	21.02	11.58
	5580	21.26	**11.89**
	5600	*	*
	5620	*	*
	5640	*	*
	5660	21.21	11.88
	5680	21.08	11.76
	5700	21.06	11.63

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)	
		Peak	Average
802.11ac40 - 5GHz – MCS0	5190	21.41	11.30
	5230	21.20	11.02
	5270	21.87	**11.72**
	5310	21.21	11.25
	5510	20.88	11.25
	5550	21.58	**11.72**
	5590	*	*
	5630	*	*
	5670	21.02	11.20
* Channel not available			

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)	
		Peak	Average
802.11ac80 – 5GHz – MCS1	5210	22.12	**11.67**
	5290	21.14	11.17
	5530	20.88	10.75
	5610	*	*
* Channel not available			

Bluetooth

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)	
		Peak	Average
DH5	2402	3.75	1.53
	2441	5.04	**3.09**
	2480	4.77	2.60

1.5.3 Standalone SAR Test Exclusion Considerations (KDB 447498 D01)

The 1g SAR Test exclusion thresholds for 100 MHz to 6 GHz *test separation distances* ≤ 50 mm are determined by:

[(*max power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] [√f ($_{GHz}$)]* ≤ 3.0, where

- f ($_{GHz}$) is the RF channel transmit frequency in GHz.
- Power and distance are rounded to the nearest mW and mm before calculation.
- The result is rounded to one decimal place for comparison.
- When the maximum test separation distance is < 5 mm, a distance of 5 mm is applied.

Band	Frequency (MHz)	Max Power		Test Position	Distance (mm)	Threshold	Test Exclusion
		(dBm)	(mW)				
GSM 850MHz	824.2	33.5	2238.72	Head	< 5	406.5	No
GPRS 850MHz	848.8	28.1	645.65	Head	< 5	119.0	No
GPRS 850MHz	848.8	28.1	645.65	Body	10	59.5	No
FDD V	826.4	24.2	263.03	Head	< 5	47.8	No
				Body	10	23.9	No
CDMA2000	829.08	24.9	309.03	Head	<5	56.3	No
		24.9		Body	10	28.1	No
LTE Band 17 – 5MHz	713.5	24.5	281.84	Body	10	23.8	No
LTE Band 17 – 10MHz	706.5	24.5	281.84	Body	10	23.7	No
GSM 1900	1909.8	30.5	1122.02	Head	< 5	310.1	No
GPRS 1900MHz		24.9	309.03	Head	< 5	85.4	No
GPRS 1900MHz		24.9	309.03	Body	10	42.7	No
WLAN 2.4 GHz	2412	17.5	56.23	Head	< 5	17.5	No
				Body	10	8.7	No
WLAN 5GHz	5220.0	15.5	35.48	Head	< 5	16.2	No
				Body	10	8.1	No
WLAN 5GHz	5300.0	15.5	35.48	Head	< 5	16.3	No
				Body	10	8.2	No
WLAN 5GHz	5580.0	15.5	35.48	Head	< 5	16.8	No
				Body	10	8.4	No
Bluetooth	2441	7.0	5.01	Head	< 5	1.6	Yes
				Body	10	0.8	Yes

Product Service

SECTION 2

TEST DETAILS

Specific Absorption Rate Testing of the
Sharp SHL25 Dual-band CDMA (800MHz_BC0, 1900MHz_BC6), Quad-band GSM (GSM850/GSM900/DCS1800/PCS1900), Dual-band UMTS (2100MHz_FDDI, 850MHz_FDDV), Quadband LTE (1.9G_B1, 1.7G_B3, 1.5G_B11, 800M_B18),Multi mode cellular phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS

2.1 SARA-C SAR MEASUREMENT SYSTEM

2.1.1 Robot System Specification

The SAR measurement system being used is the IndexSAR SARA-C system, which consists of a cartestian 6-axis robot jig, a dedicated robot controller, a straight IndexSAR probe, an L-shaped Indexsar probe, a fast amplifier, and two phantoms: an upside-down SAM phantom, and a rectangular box phantom,

Figure 1. The L-probe is used in connection with measurements on DUTs held against the SAM phantom, while the straight probe is used exclusively in the box phantom. The robot is used to articulate the probe to programmed positions inside the phantom head to obtain SAR readings from the DUT.

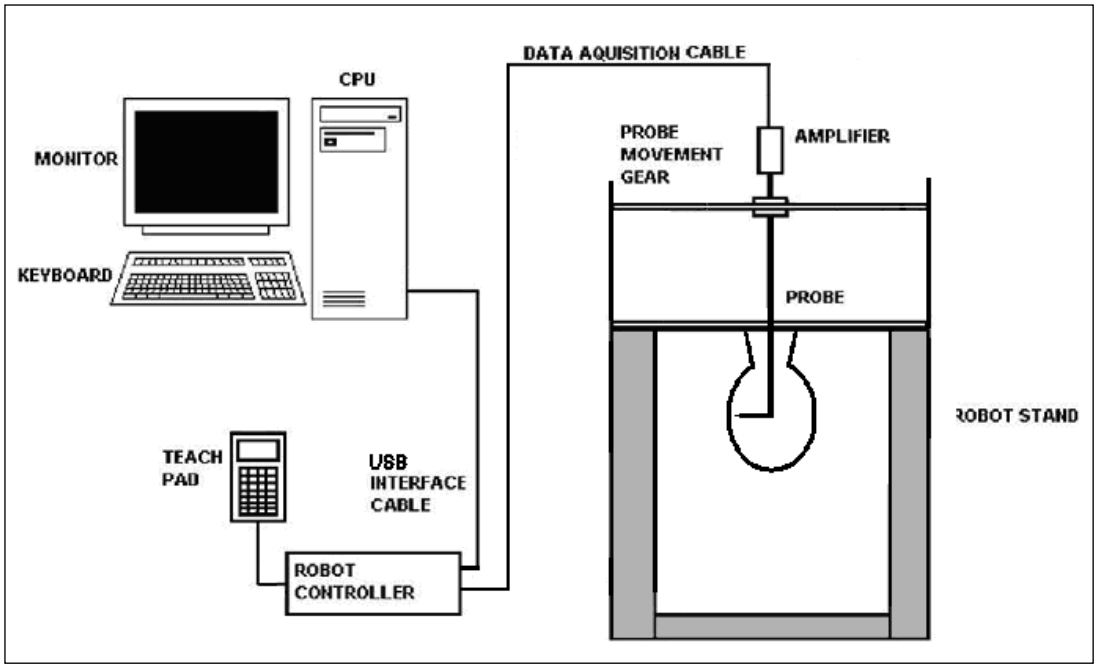

Figure 1 Schematic diagram of the SARA-C measurement system showing the L-probe and upside-down SAM phantom

The system is controlled remotely from a PC, which contains the software to drive the robot and data acquisition equipment. The software also displays the data obtained from test scans.

The position and digitised shape of the phantom heads are made available to the software for accurate positioning of the probe and reduction of set-up time. The SAM phantom heads are individually digitised using a Mitutoyo CMM machine to a precision of 0.001mm. The data is then converted into a shape format for the software, providing an accurate description of the phantom shell. Even with this accuracy, registration errors and deformation of the phantom when filled with 7 litres of fluid, can lead to probe placement errors of 1mm or more. For this reason, the L-probes house a 2-axis strain gauge unit, which allow the actual phantom wall position to be sensed to an accuracy of 0.3mm during probe movements.

In operation, the system first does an area (2D) scan within the liquid following the curve of the phantom wall at a fixed distance. When the maximum SAR point has been found, the system will then carry out a 3D scan centred at that point to determine volume averaged SAR level.

2.1.2 Probe and Amplifier Specification

IndexSAR isotropic immersible straight SAR probes

Straight probes are constructed using three orthogonal dipole sensors arranged on an interlocking, triangular prism core. The probes have built-in shielding against static charges and are contained within a PEEK cylindrical enclosure material at the tip. The tips come in either 5mm (typically for use up to 3GHz) or 2.5mm (above 3GHz) versions, model types IXP-050 and IXP-025 respectively.

Straight probes are calibrated by NPL in the UK.

Straight probes are used exclusively in the box phantom, to measure SAR from DUTs placed against the phantom base. In SARA2, straight probes were also used in the SAM phantom, but this is forbidden in SARA-C, where L-probes are demanded. NB the reverse is not true: L-probes can be used in the box phantom.

IndexSAR L-probes

The L-shaped probe is so designed to ensure the probe tip can remain perpendicular to the SAM phantom wall during scans. To allow for greater probe articulation freedom, the SAM phantom head has been turned upside down and the probe is inserted through the throat aperture, rather than through a small hole at the top of the head in the old SARA2 SAR measurement system.

Like the straight probes, L-probes also come in the same two tip sizes: IXP-020 (5mm) and IXP-021 (2.5mm).

L-probes are calibrated to national standards in-house by IndexSAR.

L-probes can be used either in the SAM head, or against the side wall of the box phantom.

IFA-020 Fast Amplifier

A block diagram of the fast probe amplifier electronics is shown below.

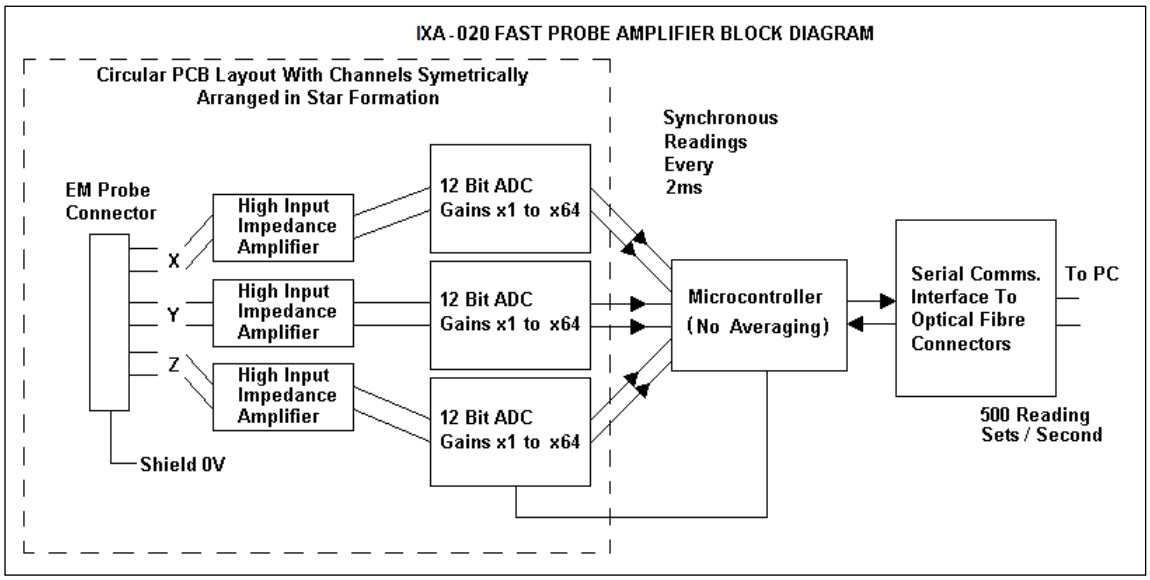

Figure 2 Schematic diagram of the fast amplifier

This amplifier has a time constant of approx. 50µs, which is much faster than the SAR probe response time. The overall system time constant is therefore that of the probe (<1ms) and a reading containing data for all three channels is returned to the PC every 2ms. The conversion period is approx. 1 µs at the start of each 2ms period. This enables the probe to follow pulse modulated signals of periods >>2ms. The PC software applies the linearisation procedure separately to each reading, so no linearisation corrections for the averaging of modulated signals are needed in this case.

The fast amplifier sampling rate can be adjusted via the SARA-C user interface from 1.7ms to 2.3ms. When not measuring CW signals, it is important to ensure that this probe reading rate and the modulated signal's pulse repetition rate are not unintentionally synchronised since this can lead to aliasing and a gross reduction in accuracy. For GSM signals, the default amplifier sampling rate of 2ms is entirely satisfactory, whereas changing it to 2.3ms (almost exactly half the GSM frame rate) could mean GSM bursts are always missed.

When aggregating 2ms samples to reduce the stochastic noise, it is equally important to match the number of samples with the longer-term timing structure of the modulation scheme. Taking GSM as an example again, since 120ms is the precise length of a GSM traffic channel multiframe, best practice would dictate that aggregated samples should cover exact multiples of this timescale. In this case, setting the number of samples to be aggregated to 120 (2 multiframes), or 240 samples (4 multiframes) should be ideal. Other signalling protocols would require changing these numbers as appropriate.

Phantoms

The Flat phantom used is a rectangular Perspex Box IndexSAR item IXB-2HF, dimensions 240 x 190 x 195mm (w x d x h). The base and one side wall are made of FR4 material which has specific dielectric properties and a tightly-controlled thickness. The base is used in tandem with straight probes, measuring either a DUT or a validation dipole, while the side wall is for performing validations with the L-probe. It is also feasible to perform measurements on body-worn devices with the L-probe against the side window, but only if the L-probe is suitably calibrated (ie if the measurement standard demands body and head fluids have the same dielectric properties).

The Specific Anthropomorphic Mannequin (SAM) Upright Phantom is fabricated using moulds generated from the CAD files as specified by CENELEC EN 62209-1: 2006.

2.1.3 SAR Measurement Procedure

Detailed measurement procedures for SARA-C are set out in a separate IndexSAR technical document ("SARA-C Operational Procedures"

A test set and dipole antenna control the handset via an air link and a low-mass phone holder can position the phone at either ear. Graduated scales are provided to set the phone in the 15 degree position. The upright phantom head holds approx. 7 litres of simulant liquid. The phantom is filled and emptied through the 110mm diameter penetration hole in the neck.

An area scan is performed inside the head at a fixed distance of 5mm from the curved surface on the source side. An algorithm presents the user with the location of any local hotspots and allows one to be selected for a follow-up 3D scan, looking at how the signal absorption varies with depth. A comparison between the start and end readings at a fixed distance from the DUT also enables the power drift during measurement to be assessed.

SARA-C Interpolation and Extrapolation schemes

SARA-C software contains support for both 2D cubic B-spline interpolation as well as 3D cubic B-spline interpolation. In addition, for extrapolation purposes, a proprietary curve-fitting routine is implemented as a weighted average of 3 different polynomial fits. The polynomial fitting procedures have been extensively tested by comparing the fitting coefficients generated by the SARA-C procedures with those obtained using the polynomial fit functions of Microsoft Excel when applied to the same test input data.

Interpolation of 2D area scan

The 2D cubic B-spline interpolation is used after the initial area scan at fixed distance from the phantom shell wall. The initial scan data are collected with approx. 115mm spatial resolution and spline interpolation is used to find the location of the local maximum to within a 1mm resolution for positioning the subsequent 3D scanning.

Extrapolation of 3D scan

For the 3D scan, data are collected on a spatially regular, but conformal, 3D grid having (by default) 6.4 mm steps in the lateral dimensions and 3.5 mm steps in the depth direction (away from the source). SARA-C enables full control over the selection of alternative step sizes in all directions.

The overall accuracy of the 1g and 10g SAR volume average depends largely on the accuracy with which the probe can be re-positioned in the head. Although the digitised shape of the head is available to the SARA-C software, a better positioning solution is to use strain gauges attached to the L-probe to feel for the actual surface and to base all movements relative to this positive detection. An even more precise, but time-consuming, method is to place the probe tip in positive contact against the phantom wall, then step backwards 0.01mm at a time while monitoring the recorded SAR reading. At the exact moment that the probe detaches from contact, the SAR reading will suddenly fall.

After the data collection, the data are extrapolated up to the shell wall in the depth direction to assign values to points in the 3D array which cannot be measured in practice because of the finite size of the sensor tip. For automated measurements inside the head, the distance of the closest plane from the wall cannot be less than 2.7mm (for 5mm probes) and 1.39mm (for 2.5mm probes), this being the distance of the probe sensors behind the front edge of the probe tip.

Interpolation of 3D scan and volume averaging

The procedure used in SARA-C for defining the volumes used in SAR averaging follow the method of adapting the surface of the 'cube' to conform with the curved inner surface of the phantom (see Appendix C.2.2.1 in EN 62209-1: 2006). This is called, here, the conformal scheme.

For each row of data in the depth direction, the data are extrapolated to the phantom wall, and interpolated to less than 1mm spacing and average values are calculated from the phantom surface for the row of data over distances corresponding to the requisite depth for 10g and 1g cubes. This results in two 2D arrays of data, one for 1g and the other for 10g masses, which are then cubic B-spline interpolated to sub mm lateral resolution. A search routine then moves an averaging square around through the 2D array and records the maximum value of the corresponding 1g and 10g volume averages.

The default step size is 3.5mm, but this is under user-control. The compromise is with time of scan, so it is not practical to make it much smaller or scan times become long and power-drop influences become larger.
The robot positioning system specification for the repeatability of the positioning (**dss** in EN 62209-1: 2006) is +/- 0.04mm.

2.1.4 Head Test Positions

This recommended practice specifies exactly two test positions for the handset against the head phantom, the “Cheek” position and the “tilted” position. The handset should be tested in both positions on the left and right sides of the SAM phantom. In each test position the centre of the earpiece of the device is placed directly at the entrance of the auditory canal. The angles mentioned in the test positions used are referenced to the line connecting both auditory canal openings. The plane this line is on is known as the reference plane. Testing is performed on the right and left-hand sides of the generic phantom head.

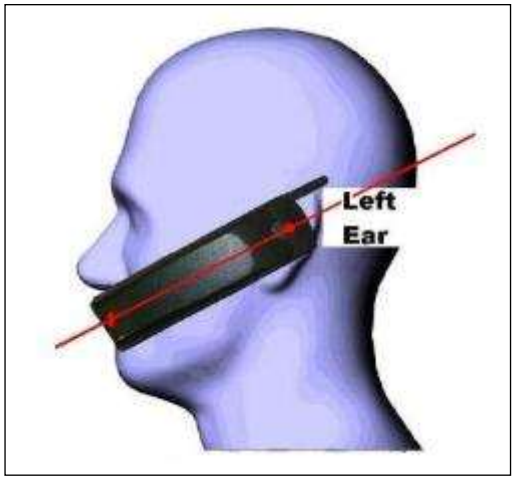

Figure 3 Side view of mobile next to head showing alignment

The Cheek Position

The Cheek Position is where the mobile is in the reference plane and the line between the mobile and the line connecting both auditory canal openings is reduced until any part of the mobile touches any part of the generic twin phantom head.

The 15° Position

The 15° Position is where the mobile is in the reference Cheek position and the phone is kept in contact with the auditory canal at the earpiece; the bottom of the phone is then tilted away from the phantom mouth by 15°.

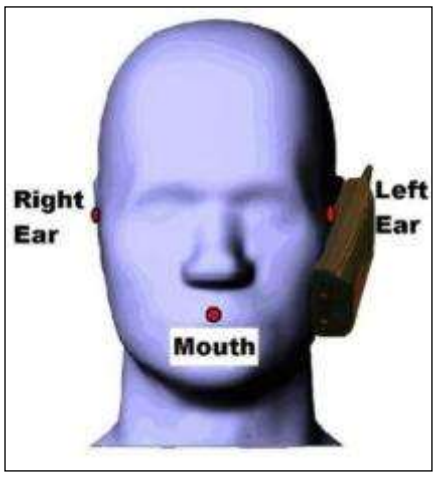

Figure 4 Cheek position

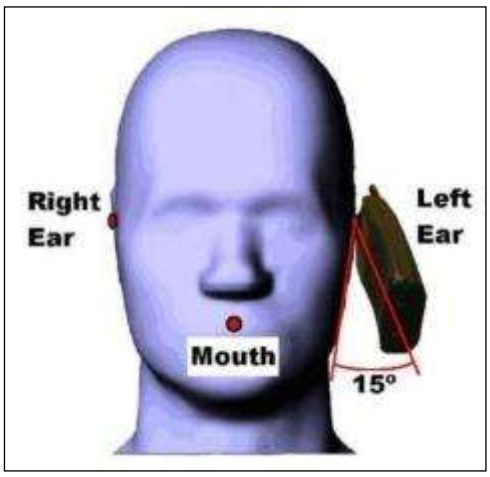

Figure 5 15º Tilt Position

2.2 GSM 850MHz HEAD SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	04/04/2014-14:06:18	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.90°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	37.40%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	58.30mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-111.70mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	19.631
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.393 W/kg
TYPE OF MODULATION:	GMSK (Voice Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	12.5%	**SAR START:**	0.344 W/kg
INPUT POWER LEVEL:	33.5dBm	**SAR END:**	0.334 W/kg
PROBE BATTERY LAST CHANGED:	04/04/2014	**SAR DRIFT DURING SCAN:**	-2.900 %

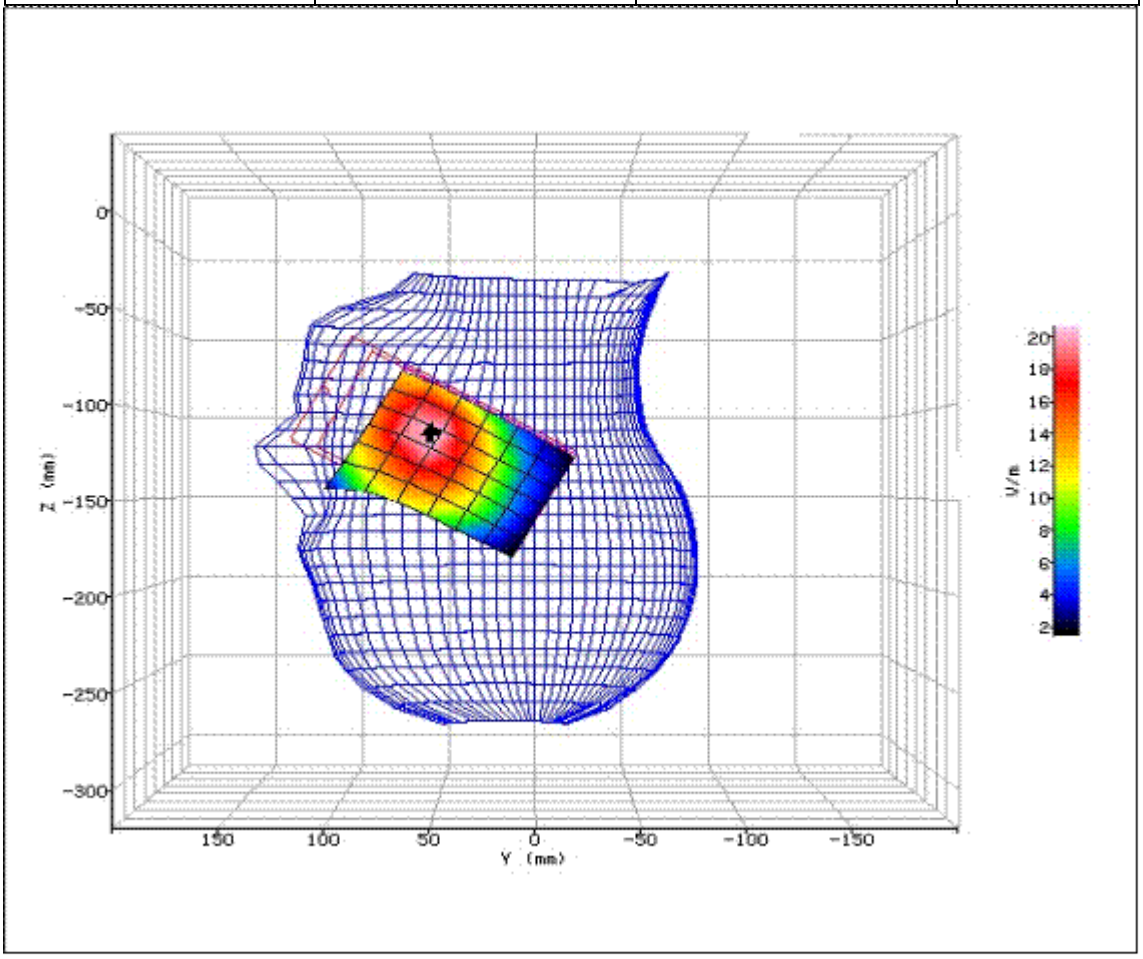

Figure 6: SAR Head Testing Results for the SHL25 Mobile Handset at 824.2MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	04/04/2014-14:25:57	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.90°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	37.40%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	43.70mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-127.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	14.264
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.241 W/kg
TYPE OF MODULATION:	GMSK (Voice Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	12.5%	**SAR START:**	0.171 W/kg
INPUT POWER LEVEL:	33.5dBm	**SAR END:**	0.174 W/kg
PROBE BATTERY LAST CHANGED:	04/04/2014	**SAR DRIFT DURING SCAN:**	1.800 %

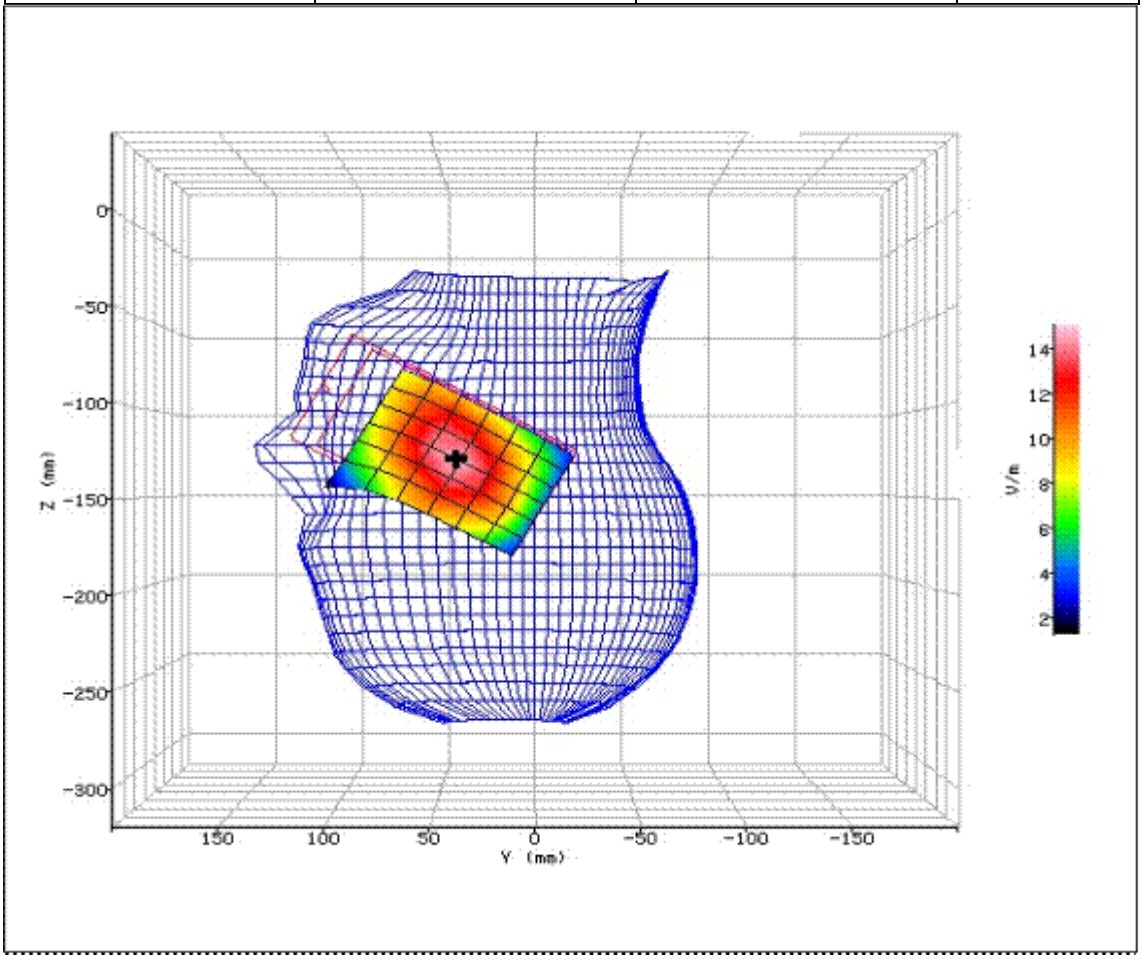

Figure 7: SAR Head Testing Results for the SHL25 Mobile Handset at 824.2MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	04/04/2014-15:10:47	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.90°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	37.40%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	58.80mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-120.90mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	20.795
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.373 W/kg
TYPE OF MODULATION:	GMSK (Voice Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	12.5%	**SAR START:**	0.363 W/kg
INPUT POWER LEVEL:	33.5dBm	**SAR END:**	0.386 W/kg
PROBE BATTERY LAST CHANGED:	04/04/2014	**SAR DRIFT DURING SCAN:**	6.300 %

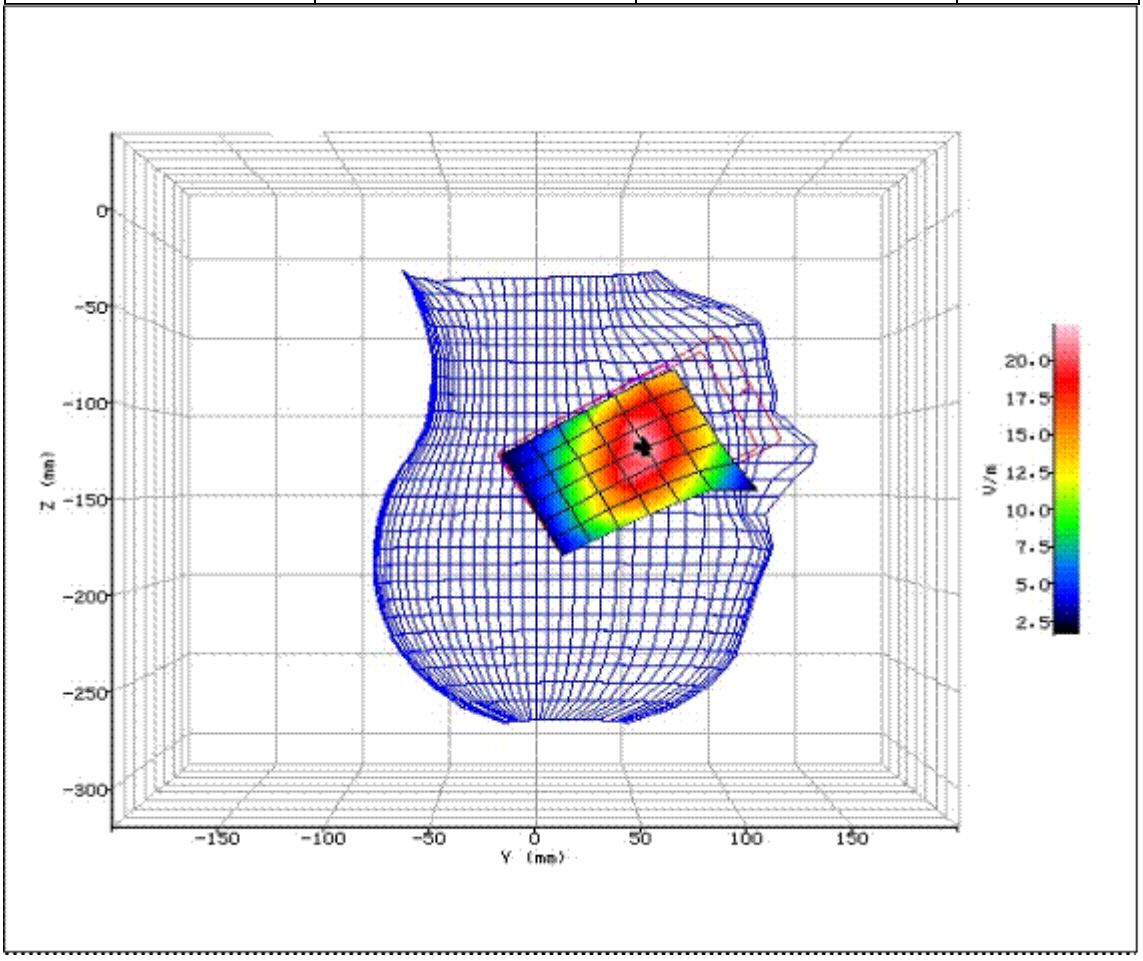

Figure 8: SAR Head Testing Results for the SHL25 Mobile Handset at 824.2MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	04/04/2014-15:56:05	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.90°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	37.40%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	49.20mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-134.60mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	16.270
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.229 W/kg
TYPE OF MODULATION:	GMSK (Voice Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	12.5%	**SAR START:**	0.221 W/kg
INPUT POWER LEVEL:	33.5dBm	**SAR END:**	0.214 W/kg
PROBE BATTERY LAST CHANGED:	04/04/2014	**SAR DRIFT DURING SCAN:**	-3.200 %

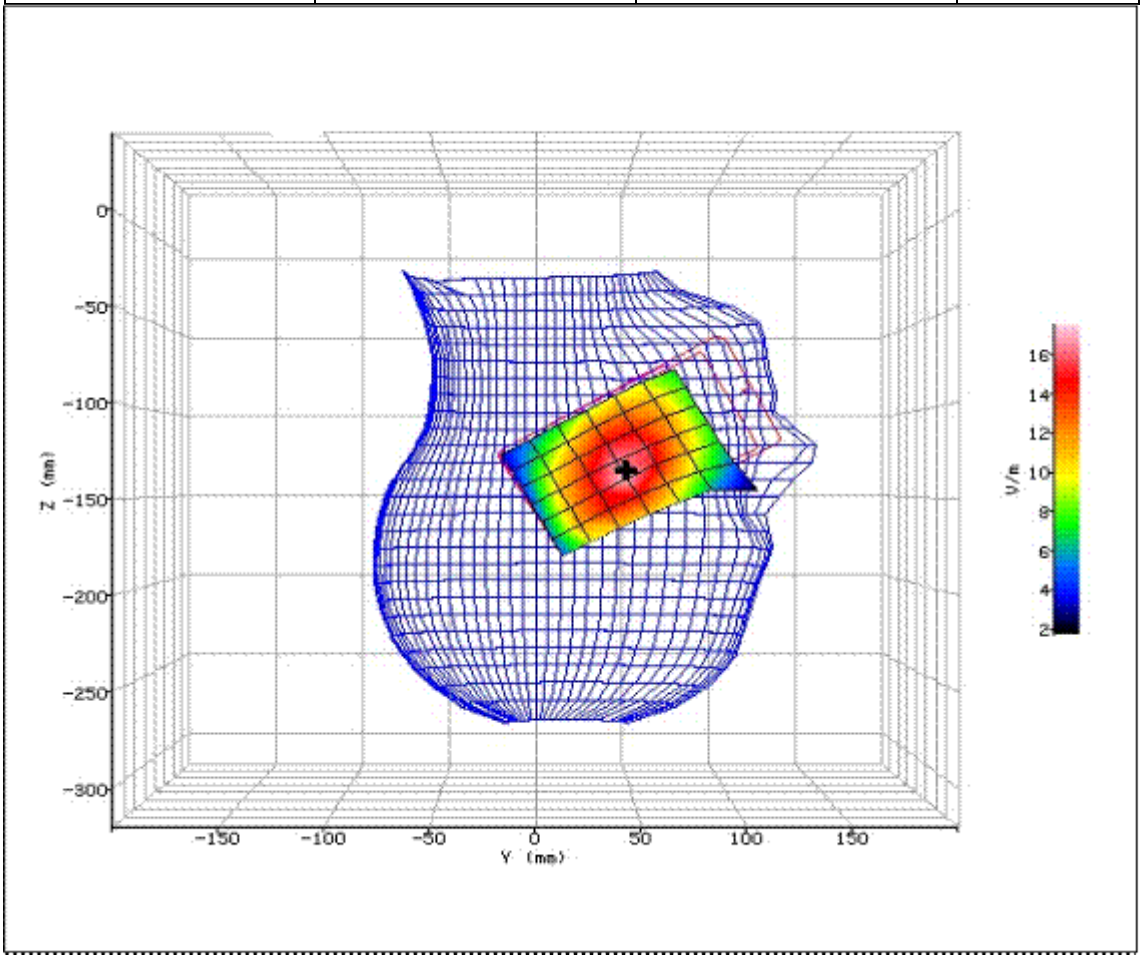

Figure 9: SAR Head Testing Results for the SHL25 Mobile Handset at 824.2MHz.

2.3 GSM 850MHz HEAD SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	07/04/2014-07:59:27	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	50.50%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	56.00mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-110.50mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	19.990
TEST FREQUENCY:	848.8MHz	**SAR 1g:**	0.398 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.363 W/kg
INPUT POWER LEVEL:	28.1dBm	**SAR END:**	0.376 W/kg
PROBE BATTERY LAST CHANGED:	07/04/2014	**SAR DRIFT DURING SCAN:**	3.600 %

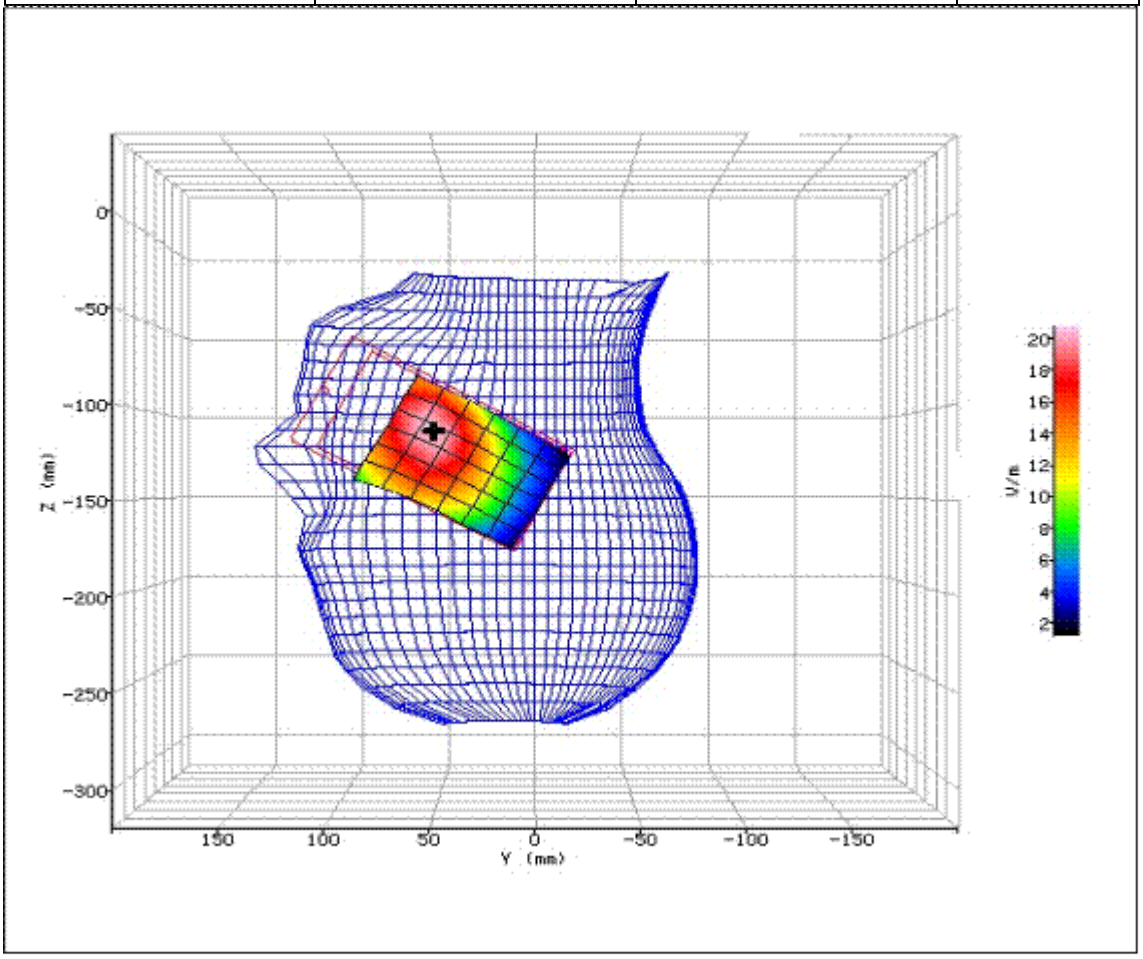

Figure 10: SAR Head Testing Results for the SHL25 Mobile Handset at 848.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	07/04/2014-08:19:50	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	50.50%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	41.50mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-125.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	14.626
TEST FREQUENCY:	848.8MHz	**SAR 1g:**	0.225 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.191 W/kg
INPUT POWER LEVEL:	28.1dBm	**SAR END:**	0.191 W/kg
PROBE BATTERY LAST CHANGED:	07/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

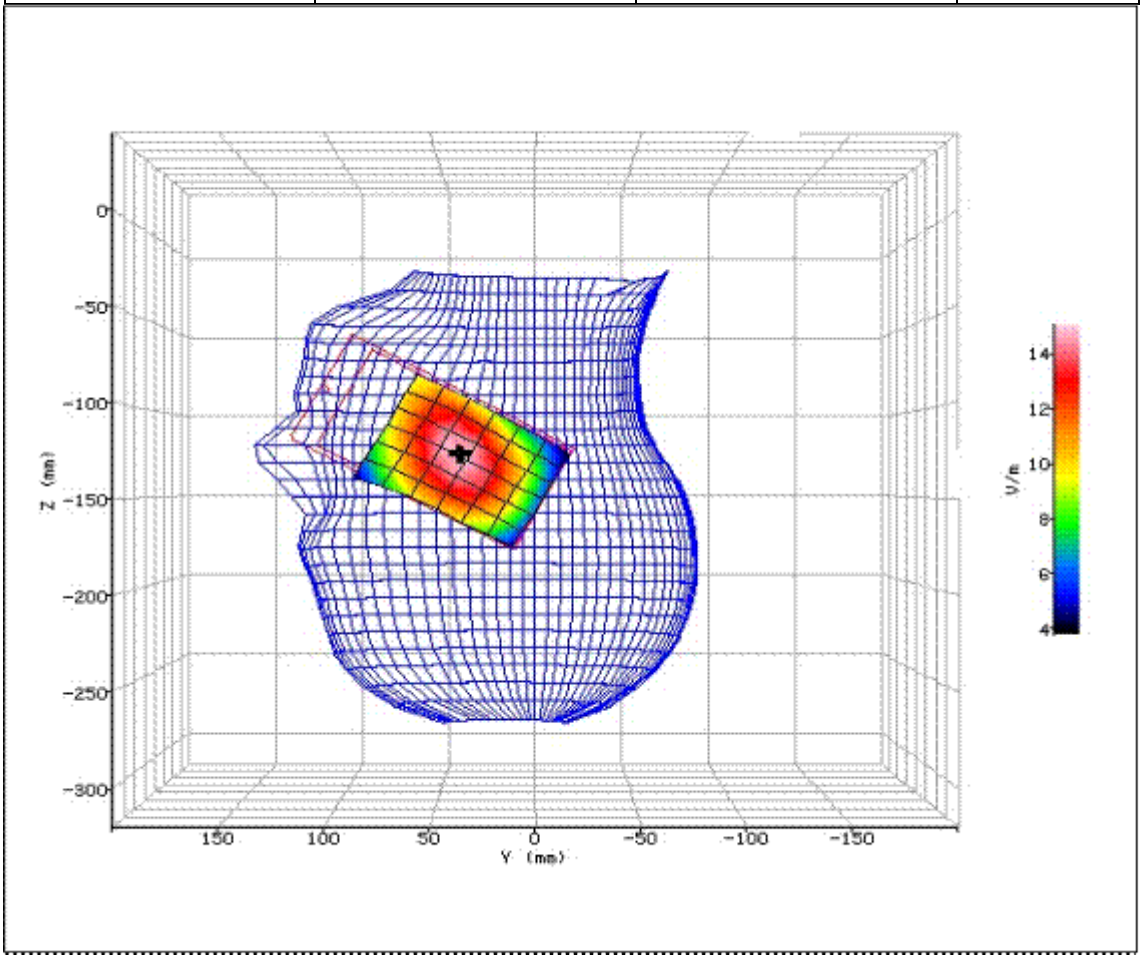

Figure 11: SAR Head Testing Results for the SHL25 Mobile Handset at 848.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	07/04/2014-08:56:57	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	50.50%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	58.50mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-124.00mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	21.297
TEST FREQUENCY:	848.8MHz	**SAR 1g:**	0.371 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.379 W/kg
INPUT POWER LEVEL:	28.1dBm	**SAR END:**	0.388 W/kg
PROBE BATTERY LAST CHANGED:	07/04/2014	**SAR DRIFT DURING SCAN:**	2.400 %

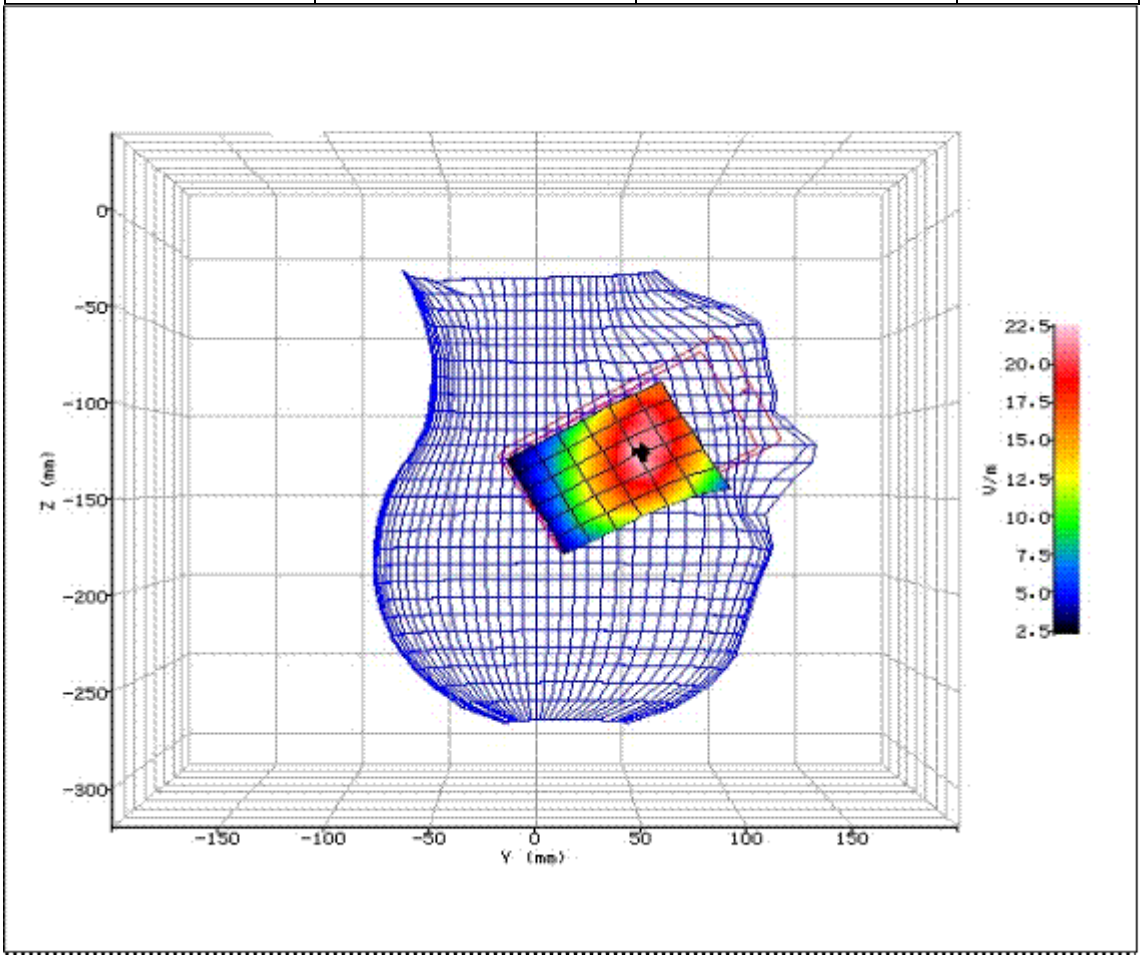

Figure 12: SAR Head Testing Results for the SHL25 Mobile Handset at 848.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	07/04/2014-09:16:23	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	50.50%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	47.70mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-134.00mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	16.672
TEST FREQUENCY:	848.8MHz	**SAR 1g:**	0.283 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.232 W/kg
INPUT POWER LEVEL:	28.1dBm	**SAR END:**	0.226 W/kg
PROBE BATTERY LAST CHANGED:	07/04/2014	**SAR DRIFT DURING SCAN:**	-2.600 %

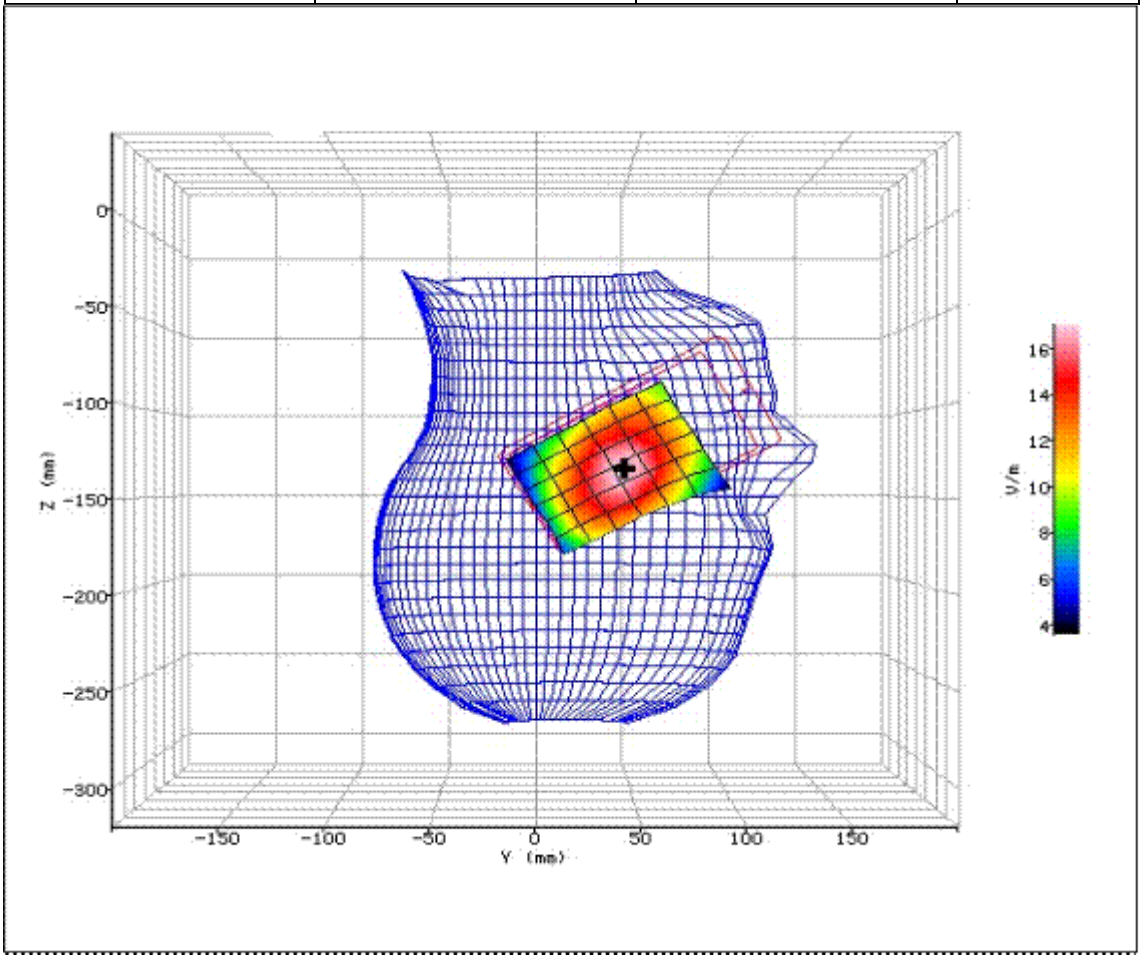

Figure 13: SAR Head Testing Results for the SHL25 Mobile Handset at 848.8MHz.

2.4 GSM 850MHz BODY SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	08/04/2014-09:43:00	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.30°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	31.20%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IBX-2HF	**LIQUID TEMPERATURE:**	22.30°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	3.80mm
DUT POSITION:	10mm-Front Facing	**MAX SAR Y-AXIS LOCATION:**	-6.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	19.295
TEST FREQUENCY:	848.8MHz	**SAR 1g:**	0.352 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.372 W/kg
INPUT POWER LEVEL:	28.1dBm	**SAR END:**	0.370 W/kg
PROBE BATTERY LAST CHANGED:	08/04/2014	**SAR DRIFT DURING SCAN:**	-0.600 %

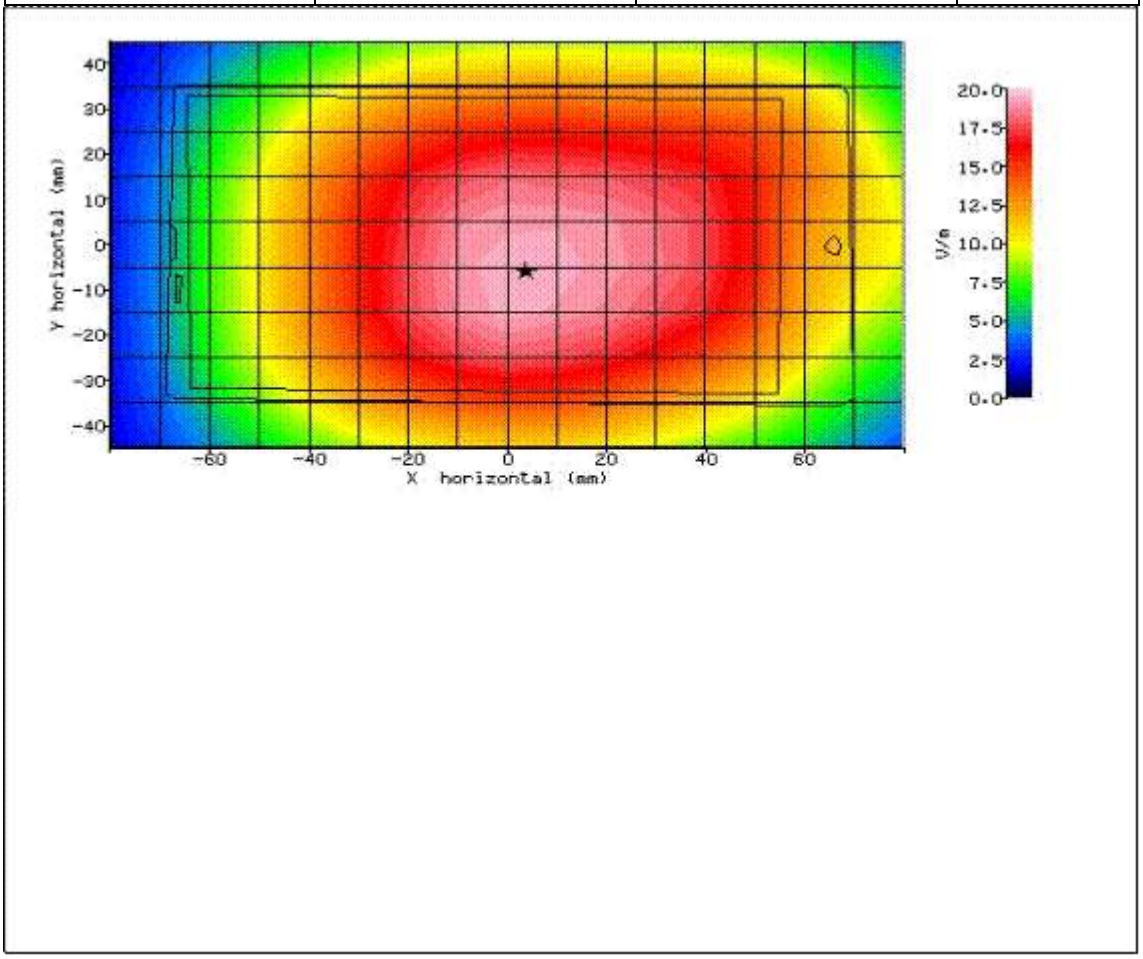

Figure 14: SAR Body Testing Results for the SHL25 Mobile Handset at 848.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	08/04/2014-10:31:21	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.30°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	31.20%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IBX-2HF	**LIQUID TEMPERATURE:**	22.30°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	11.40mm
DUT POSITION:	10mm-Rear Facing	**MAX SAR Y-AXIS LOCATION:**	0.70mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	20.630
TEST FREQUENCY:	848.8MHz	**SAR 1g:**	0.392 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.415 W/kg
INPUT POWER LEVEL:	28.1dBm	**SAR END:**	0.406 W/kg
PROBE BATTERY LAST CHANGED:	08/04/2014	**SAR DRIFT DURING SCAN:**	-2.300 %

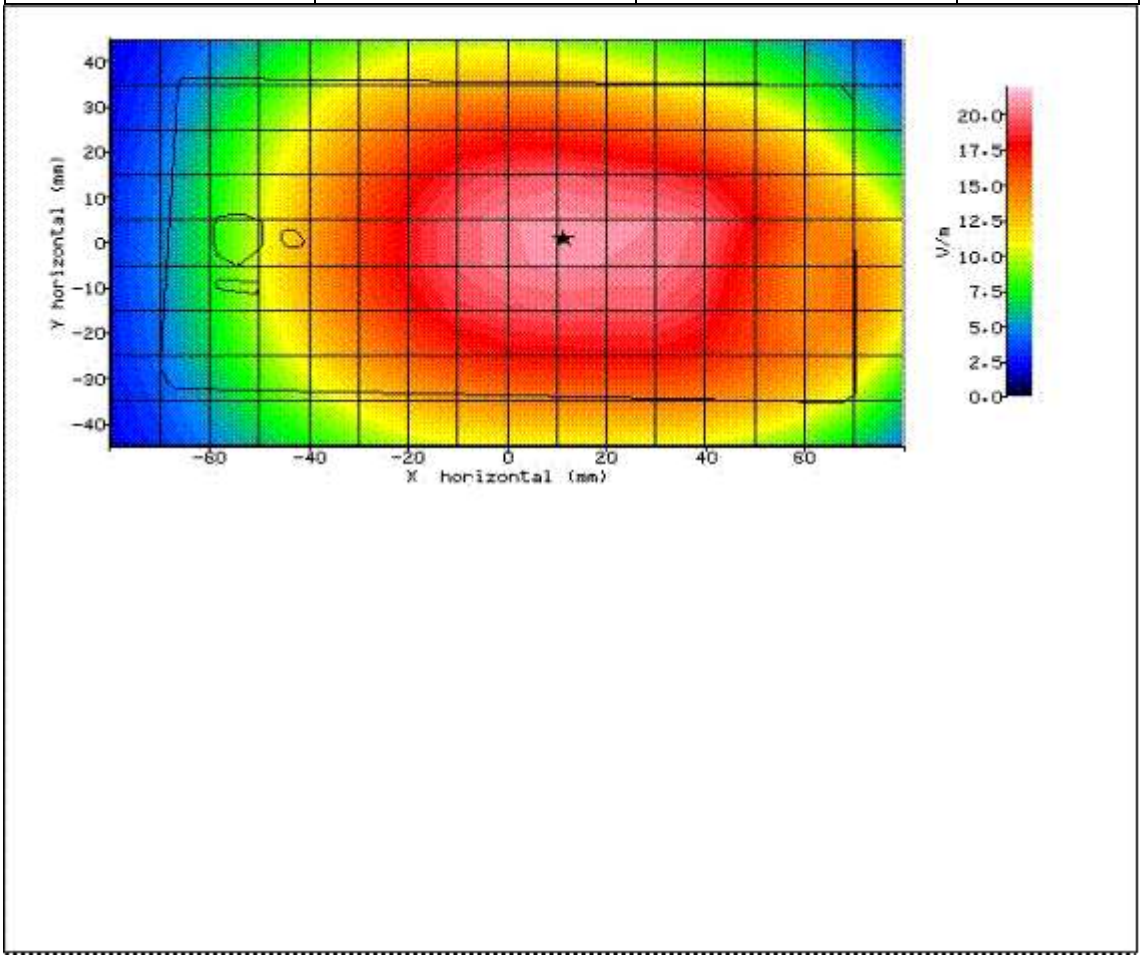

Figure 15: SAR Body Testing Results for the SHL25 Mobile Handset at 848.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	08/04/2014-10:50:49	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.30°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	31.20%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IBX-2HF	**LIQUID TEMPERATURE:**	22.30°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-6.40mm
DUT POSITION:	10mm-Left Edge	**MAX SAR Y-AXIS LOCATION:**	-4.70mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	16.682
TEST FREQUENCY:	848.8MHz	**SAR 1g:**	0.282 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.299 W/kg
INPUT POWER LEVEL:	28.1dBm	**SAR END:**	0.312 W/kg
PROBE BATTERY LAST CHANGED:	08/04/2014	**SAR DRIFT DURING SCAN:**	4.700 %

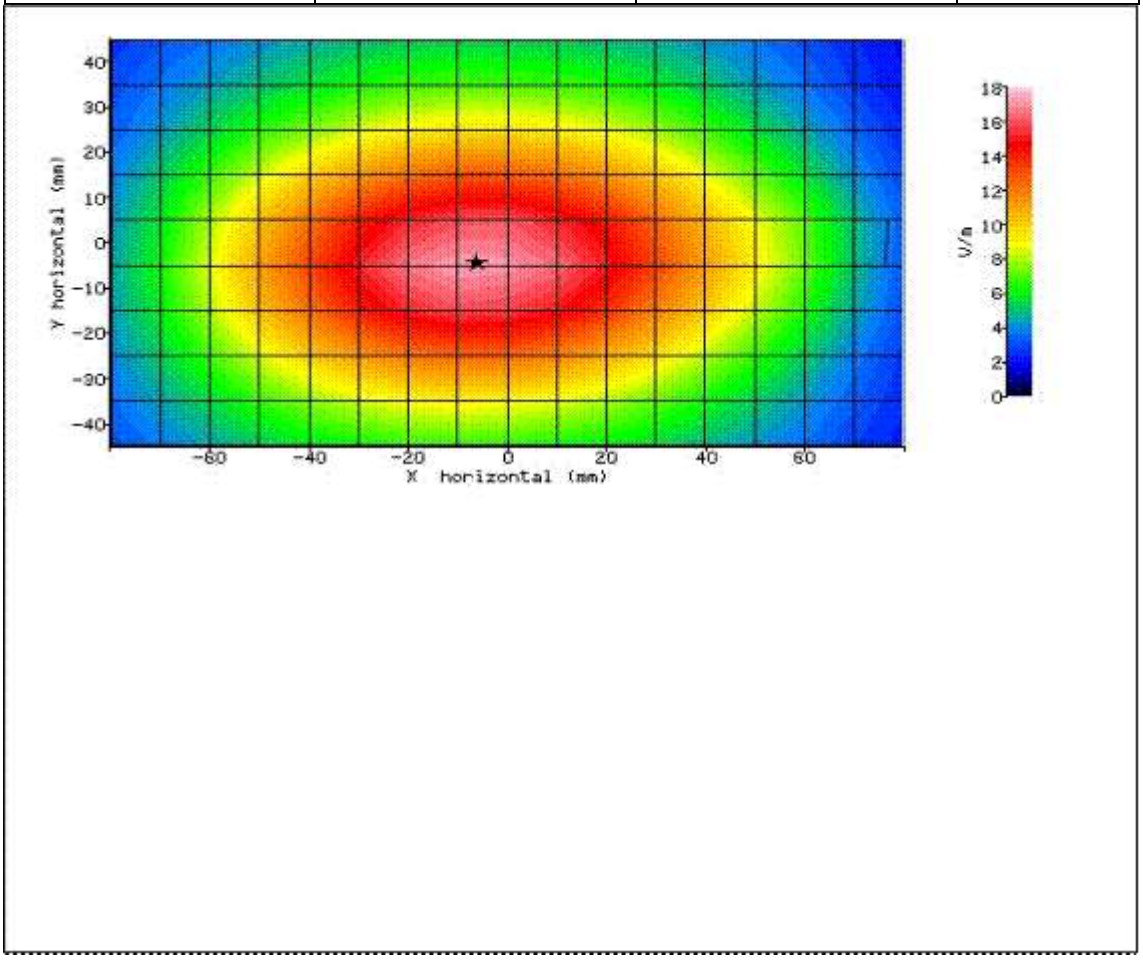

Figure 16: SAR Body Testing Results for the SHL25 Mobile Handset at 848.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	08/04/2014-11:48:34	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.30°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	31.20%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IBX-2HF	**LIQUID TEMPERATURE:**	22.30°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-2.00mm
DUT POSITION:	10mm-Right Edge	**MAX SAR Y-AXIS LOCATION:**	-5.00mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	17.146
TEST FREQUENCY:	848.8MHz	**SAR 1g:**	0.293 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.308 W/kg
INPUT POWER LEVEL:	28.1dBm	**SAR END:**	0.316 W/kg
PROBE BATTERY LAST CHANGED:	08/04/2014	**SAR DRIFT DURING SCAN:**	2.500 %

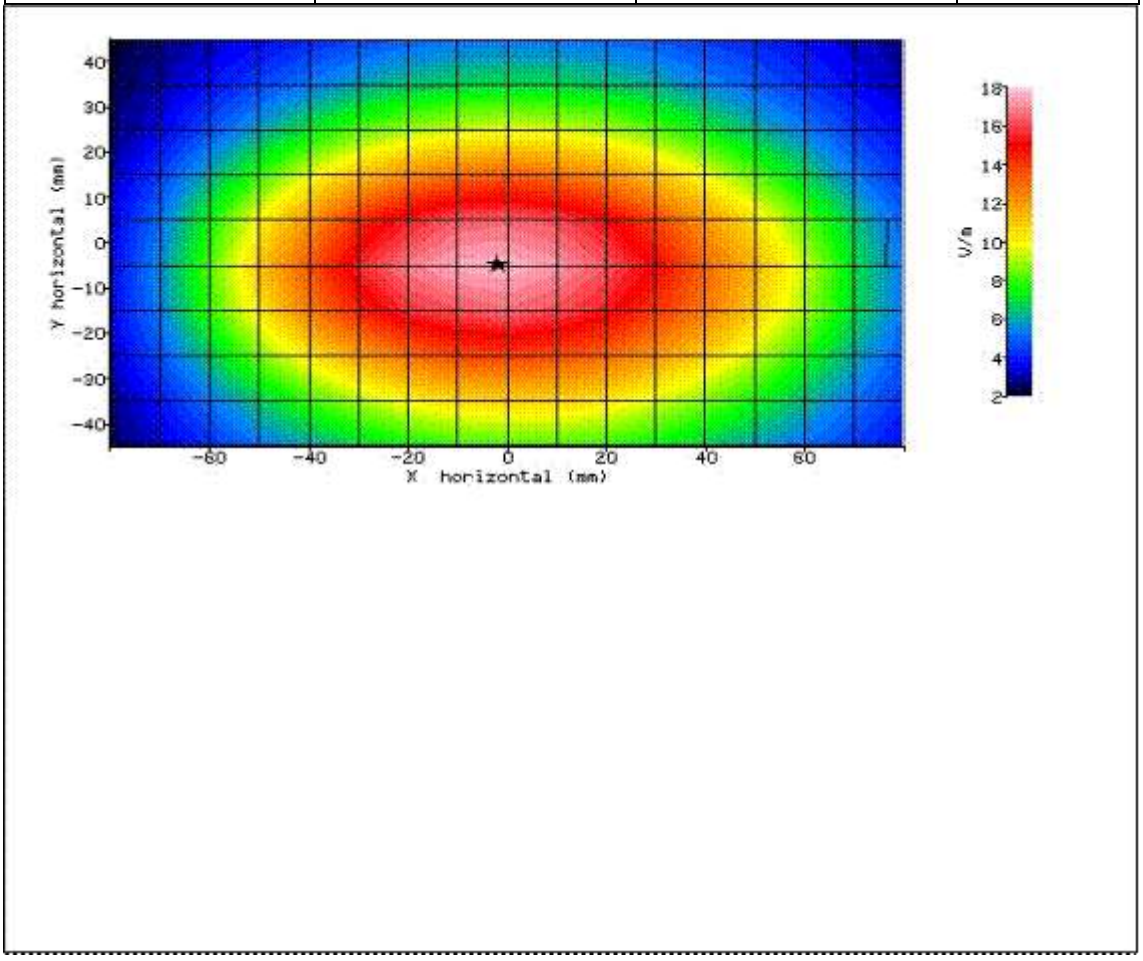

Figure 17: SAR Body Testing Results for the SHL25 Mobile Handset at 848.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	08/04/2014-13:53:35	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.30°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	31.20%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IBX-2HF	**LIQUID TEMPERATURE:**	22.30°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-35.60mm
DUT POSITION:	10mm-Bottom Edge	**MAX SAR Y-AXIS LOCATION:**	-3.80mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	4.030
TEST FREQUENCY:	848.8MHz	**SAR 1g:**	0.016 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.017 W/kg
INPUT POWER LEVEL:	28.1dBm	**SAR END:**	0.017 W/kg
PROBE BATTERY LAST CHANGED:	08/04/2014	**SAR DRIFT DURING SCAN:**	-0.400 %

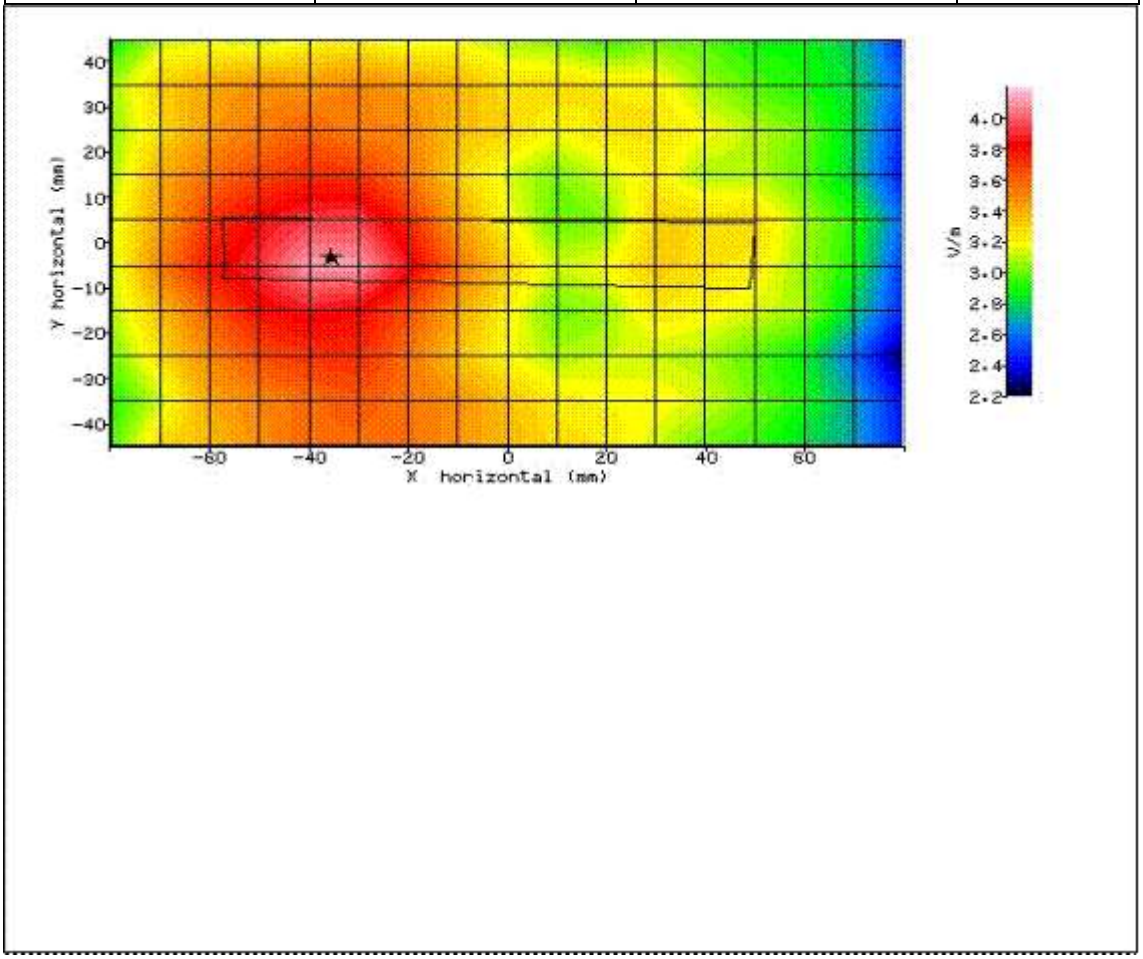

Figure 18: SAR Body Testing Results for the SHL25 Mobile Handset at 848.8MHz.

2.5 WCDMA FDDV HEAD SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	07/04/2014-12:20:39	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	50.50%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	57.10mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-112.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	20.363
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.401 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.385 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.400 W/kg
PROBE BATTERY LAST CHANGED:	07/04/2014	**SAR DRIFT DURING SCAN:**	3.900 %

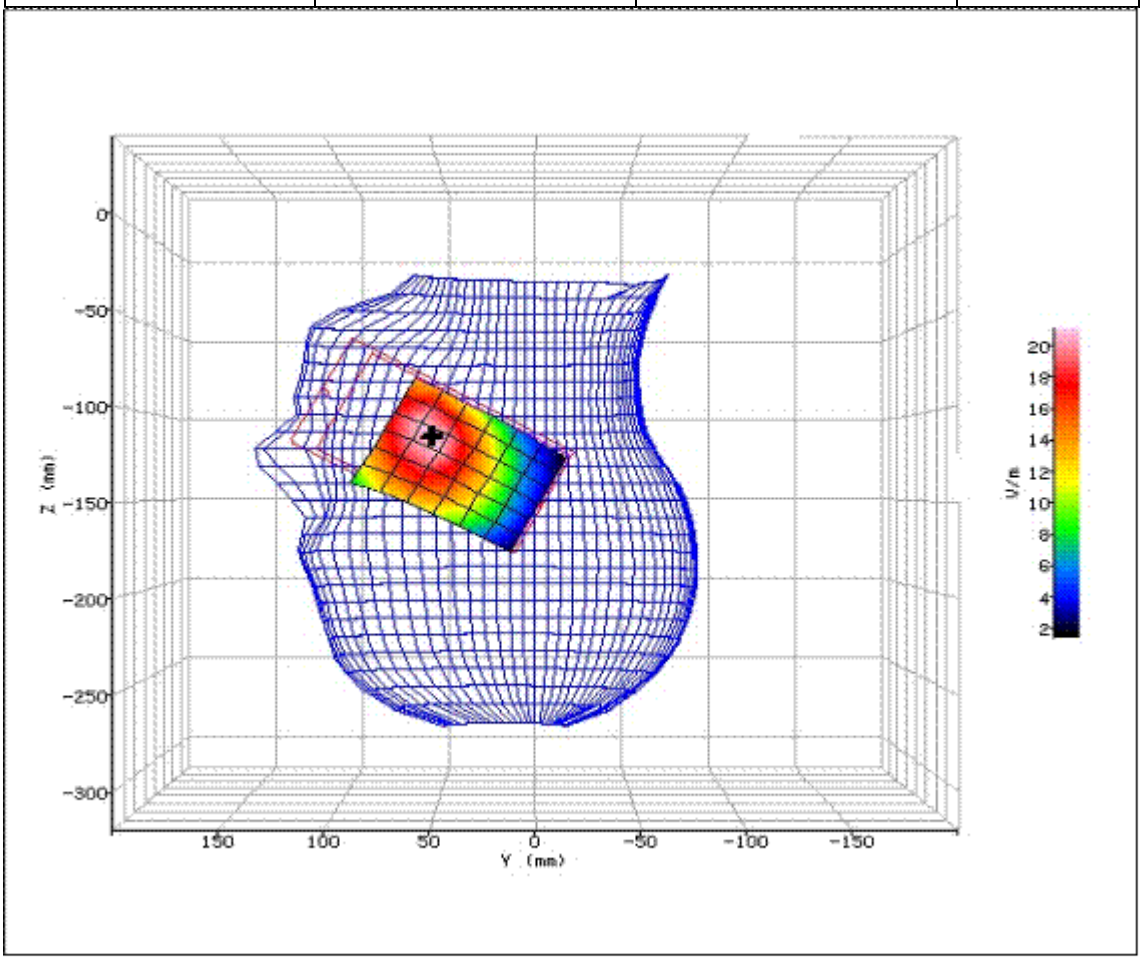

Figure 19: SAR Head Testing Results for the SHL25 Mobile Handset at 826.4MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	07/04/2014-12:42:17	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	50.50%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	45.00mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-126.20mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	16.546
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.293 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.250 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.251 W/kg
PROBE BATTERY LAST CHANGED:	07/04/2014	**SAR DRIFT DURING SCAN:**	0.400 %

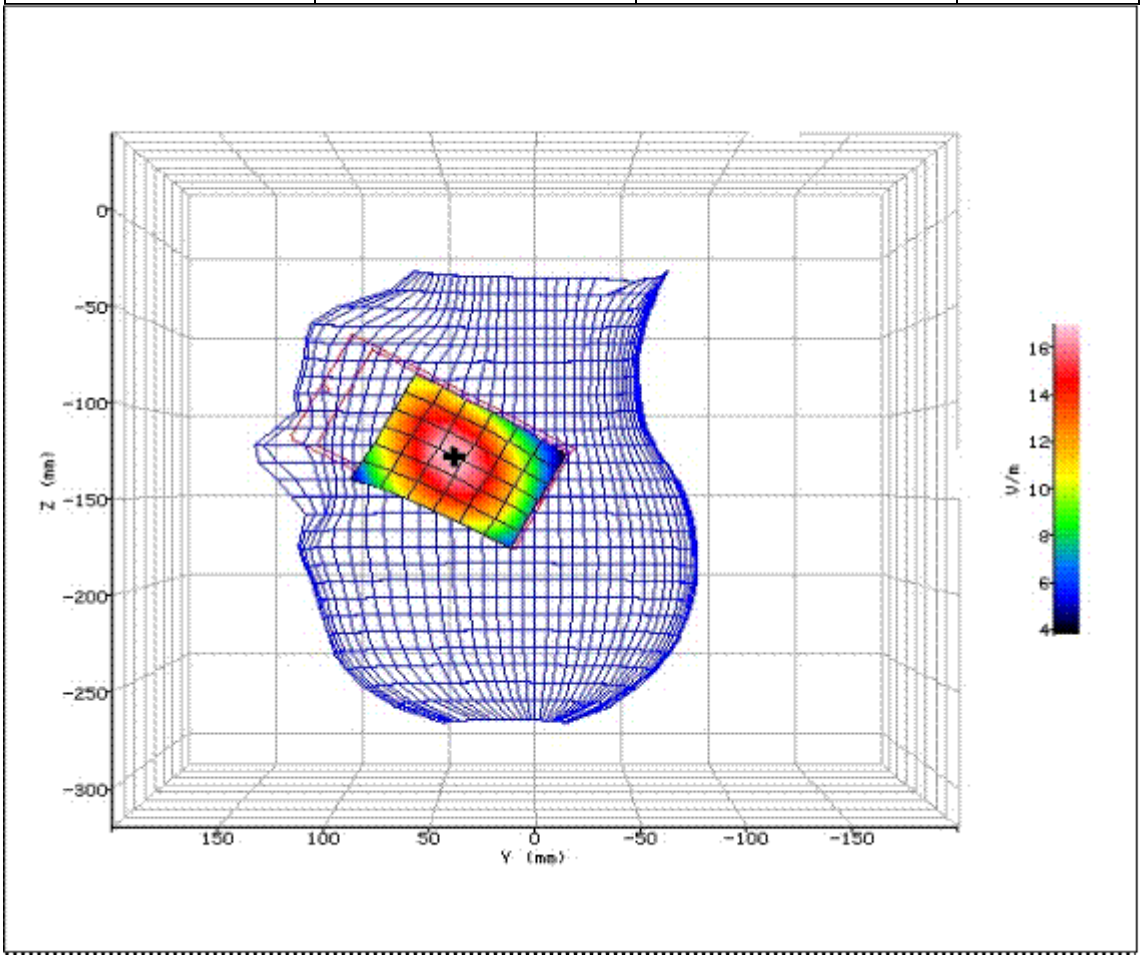

Figure 20: SAR Head Testing Results for the SHL25 Mobile Handset at 826.4MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	07/04/2014-10:56:59	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	50.50%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	58.80mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-121.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	21.820
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.416 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.417 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.415 W/kg
PROBE BATTERY LAST CHANGED:	07/04/2014	**SAR DRIFT DURING SCAN:**	-0.500 %

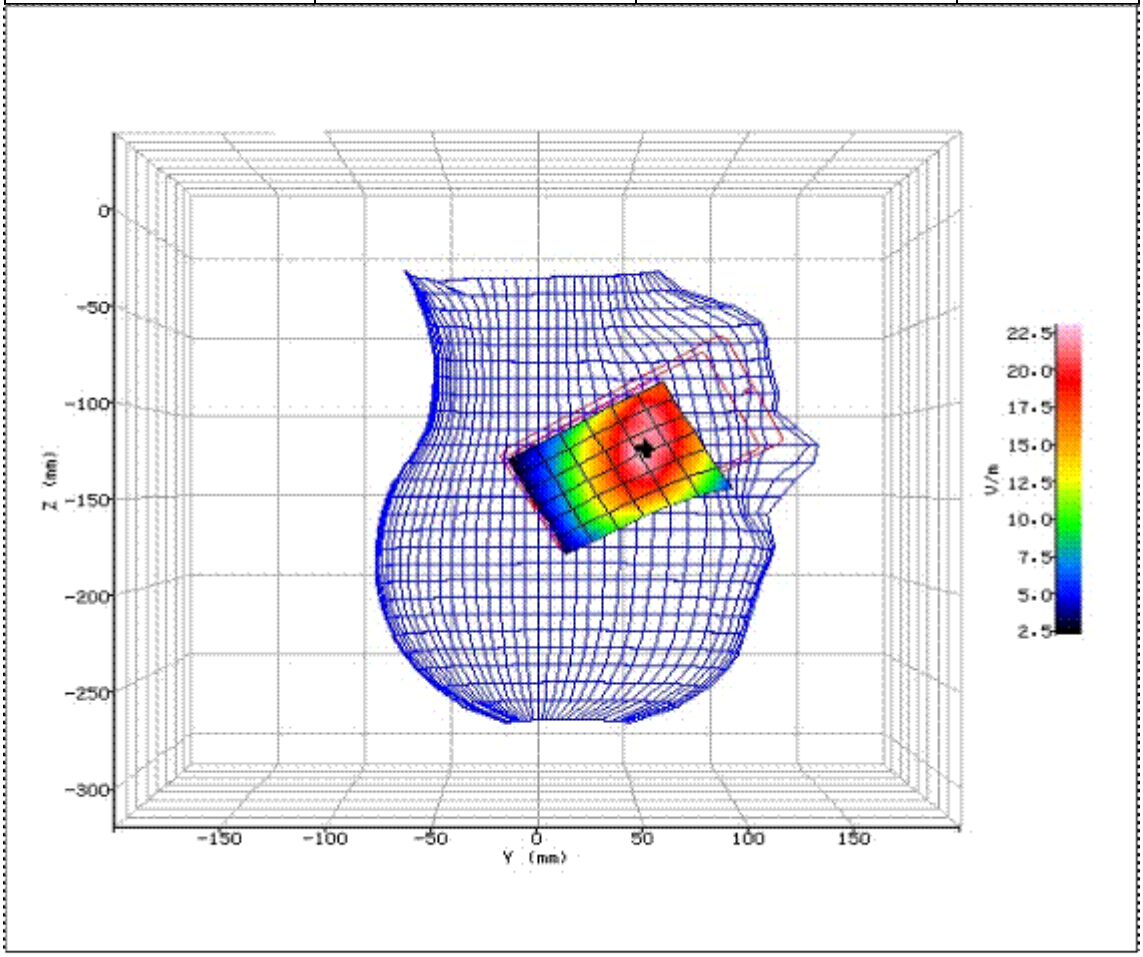

Figure 21: SAR Head Testing Results for the SHL25 Mobile Handset at 826.4MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	07/04/2014-11:14:44	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	50.50%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	49.90mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-131.50mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	17.094
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.292 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.252 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.253 W/kg
PROBE BATTERY LAST CHANGED:	07/04/2014	**SAR DRIFT DURING SCAN:**	0.400 %

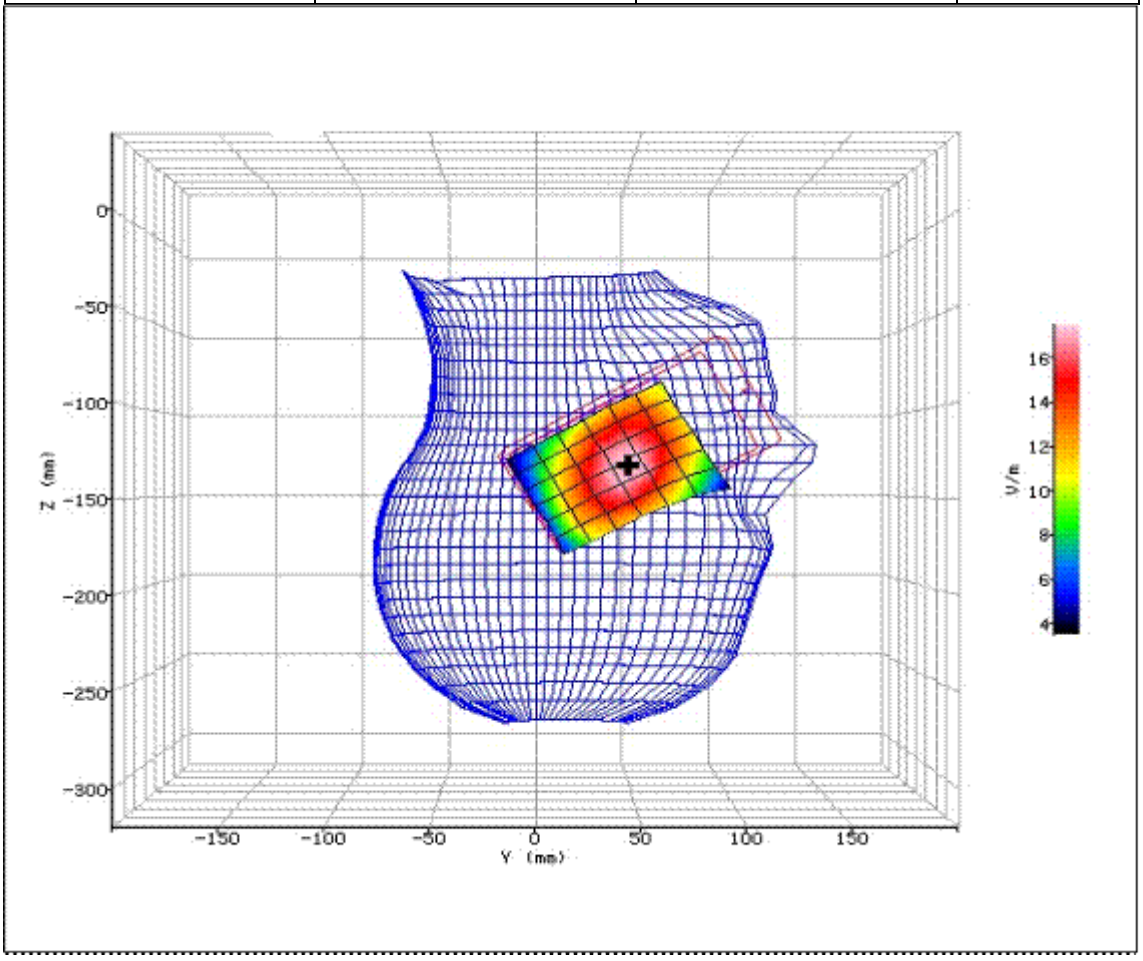

Figure 22: SAR Head Testing Results for the SHL25 Mobile Handset at 826.4MHz.

2.6 WCDMA FDD V BODY SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	08/04/2014-07:22:13	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.30°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	56.44
RELATIVE HUMIDITY:	31.20%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.30°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	9.80mm
DUT POSITION:	10mm-Front Facing	**MAX SAR Y-AXIS LOCATION:**	-3.40mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	21.020
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.428 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.457 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.459 W/kg
PROBE BATTERY LAST CHANGED:	08/04/2014	**SAR DRIFT DURING SCAN:**	0.400 %

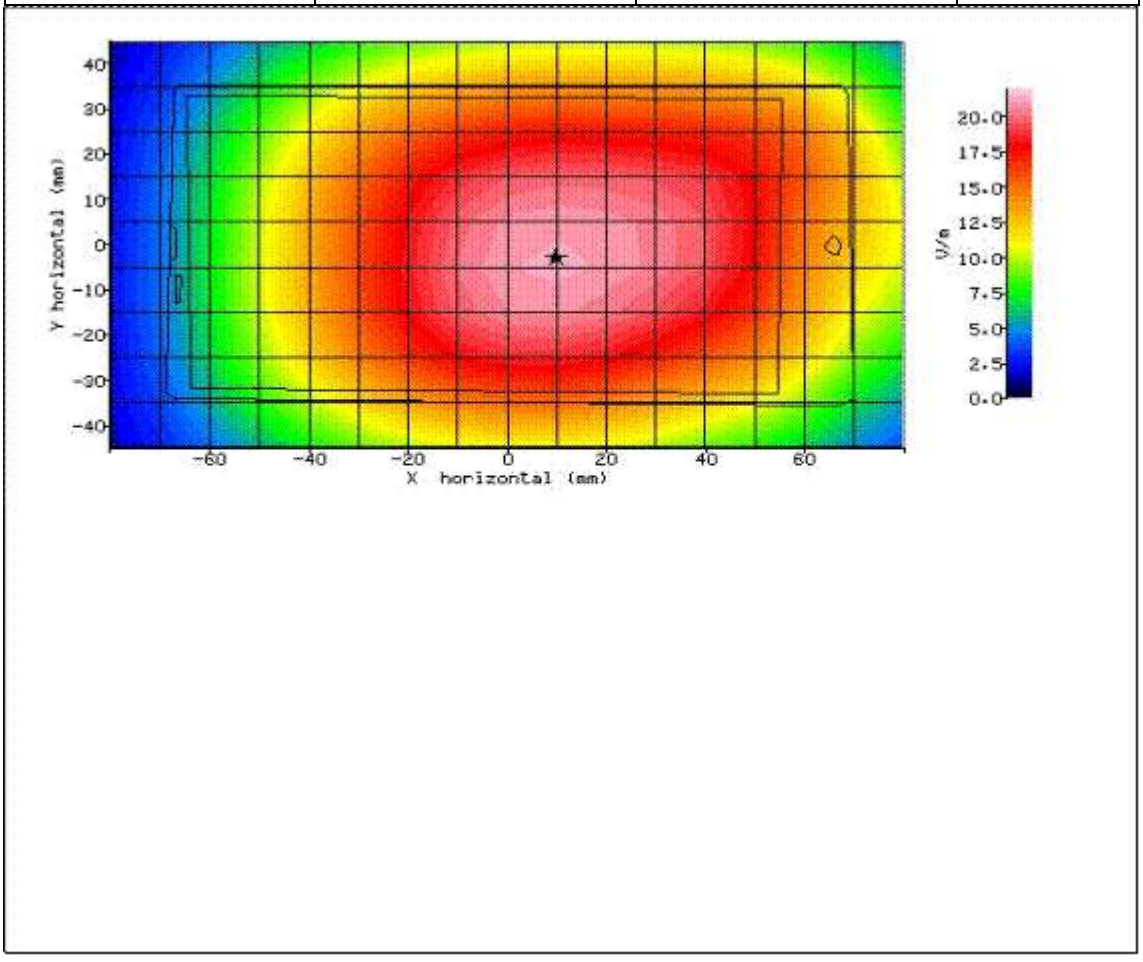

Figure 23: SAR Body Testing Results for the SHL25 Mobile Handset at 826.4MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	08/04/2014-07:46:46	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.30°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	56.44
RELATIVE HUMIDITY:	31.20%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.30°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	14.40mm
DUT POSITION:	10mm-Rear Facing	**MAX SAR Y-AXIS LOCATION:**	-1.20mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	22.698
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.497 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.533 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.532 W/kg
PROBE BATTERY LAST CHANGED:	08/04/2014	**SAR DRIFT DURING SCAN:**	-0.200 %

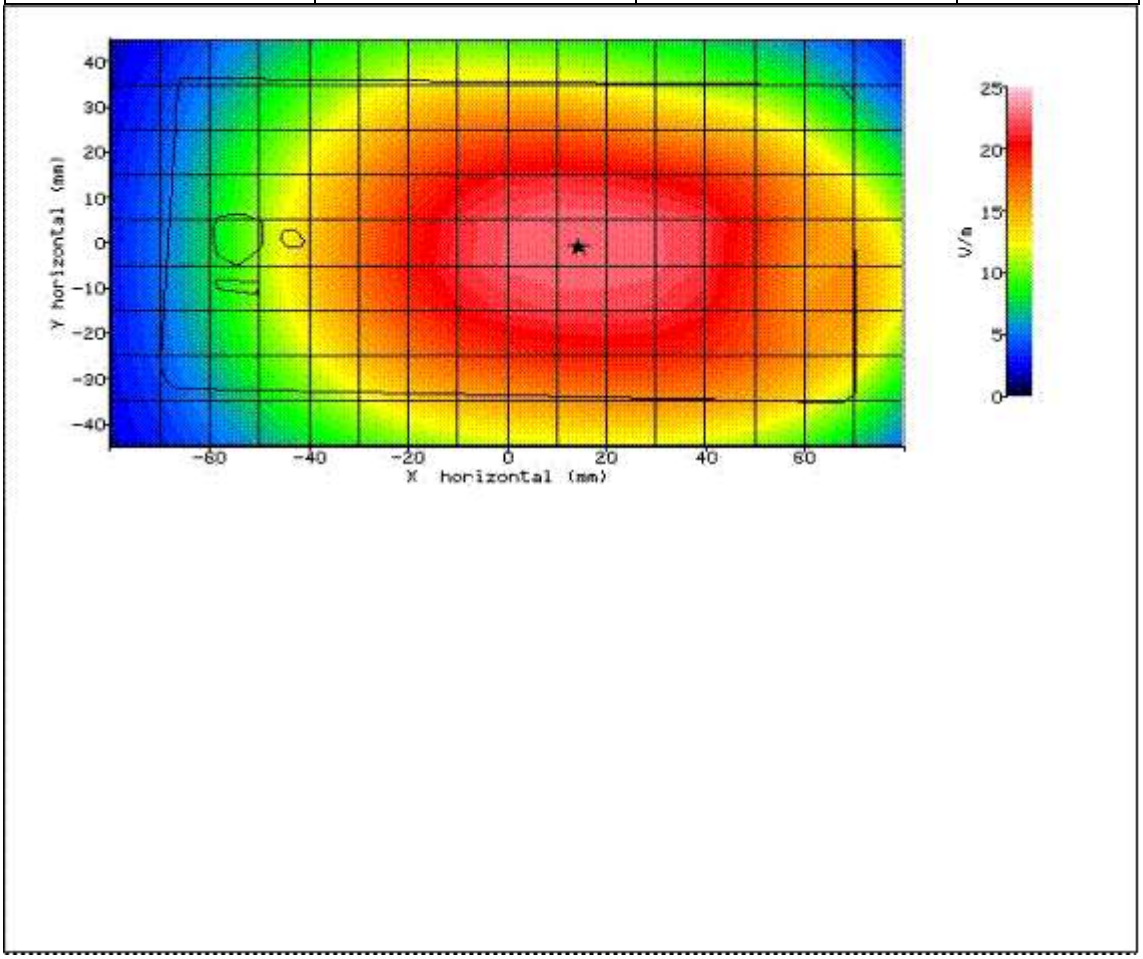

Figure 24: SAR Body Testing Results for the SHL25 Mobile Handset at 826.4MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	08/04/2014-08:29:34	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.30°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	56.44
RELATIVE HUMIDITY:	31.20%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.30°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-0.20mm
DUT POSITION:	10mm-Left Edge	**MAX SAR Y-AXIS LOCATION:**	4.00mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	19.067
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.366 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.391 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.391 W/kg
PROBE BATTERY LAST CHANGED:	08/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

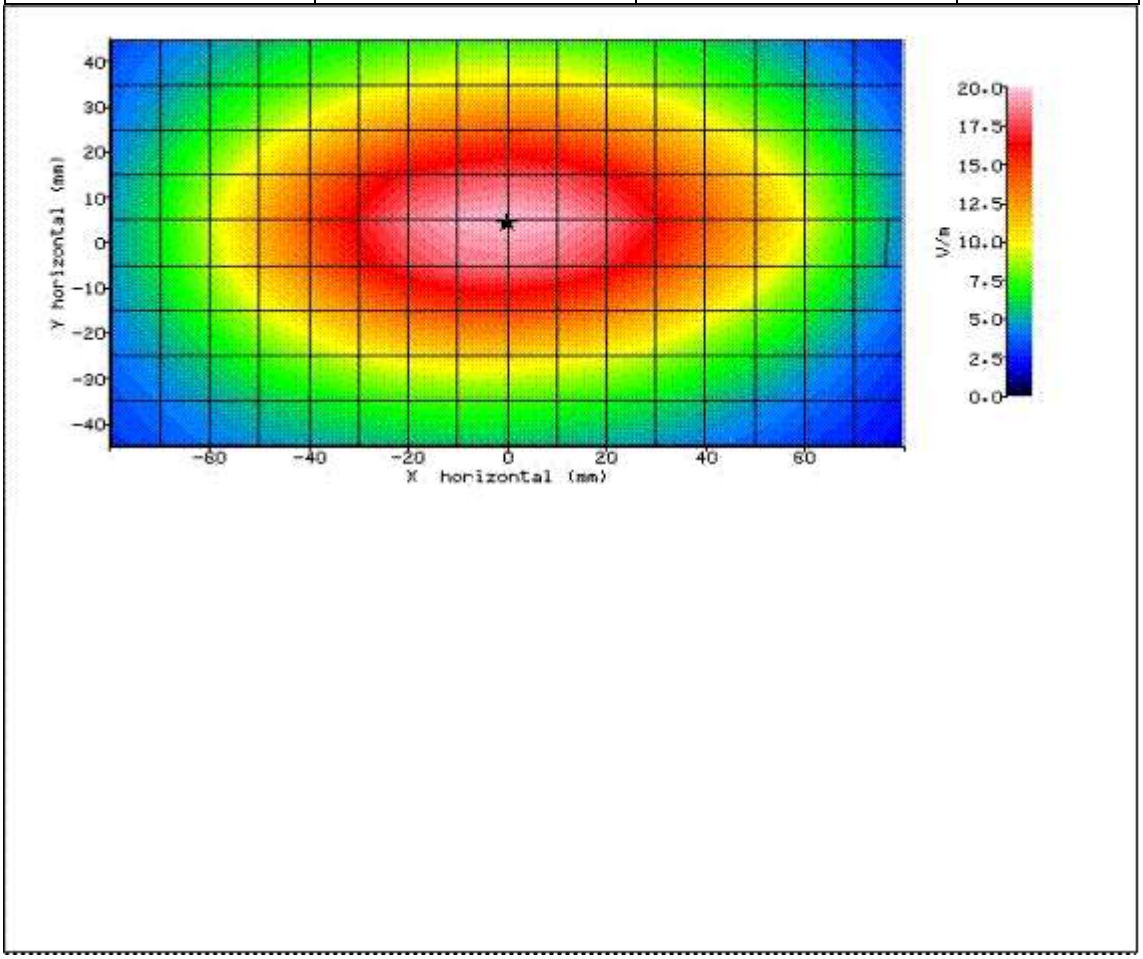

Figure 25: SAR Body Testing Results for the SHL25 Mobile Handset at 826.4MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	08/04/2014-08:45:27	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.30°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	56.44
RELATIVE HUMIDITY:	31.20%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.30°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-4.10mm
DUT POSITION:	10mm-Right Edge	**MAX SAR Y-AXIS LOCATION:**	1.70mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	16.570
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.273 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.291 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.294 W/kg
PROBE BATTERY LAST CHANGED:	08/04/2014	**SAR DRIFT DURING SCAN:**	1.200 %

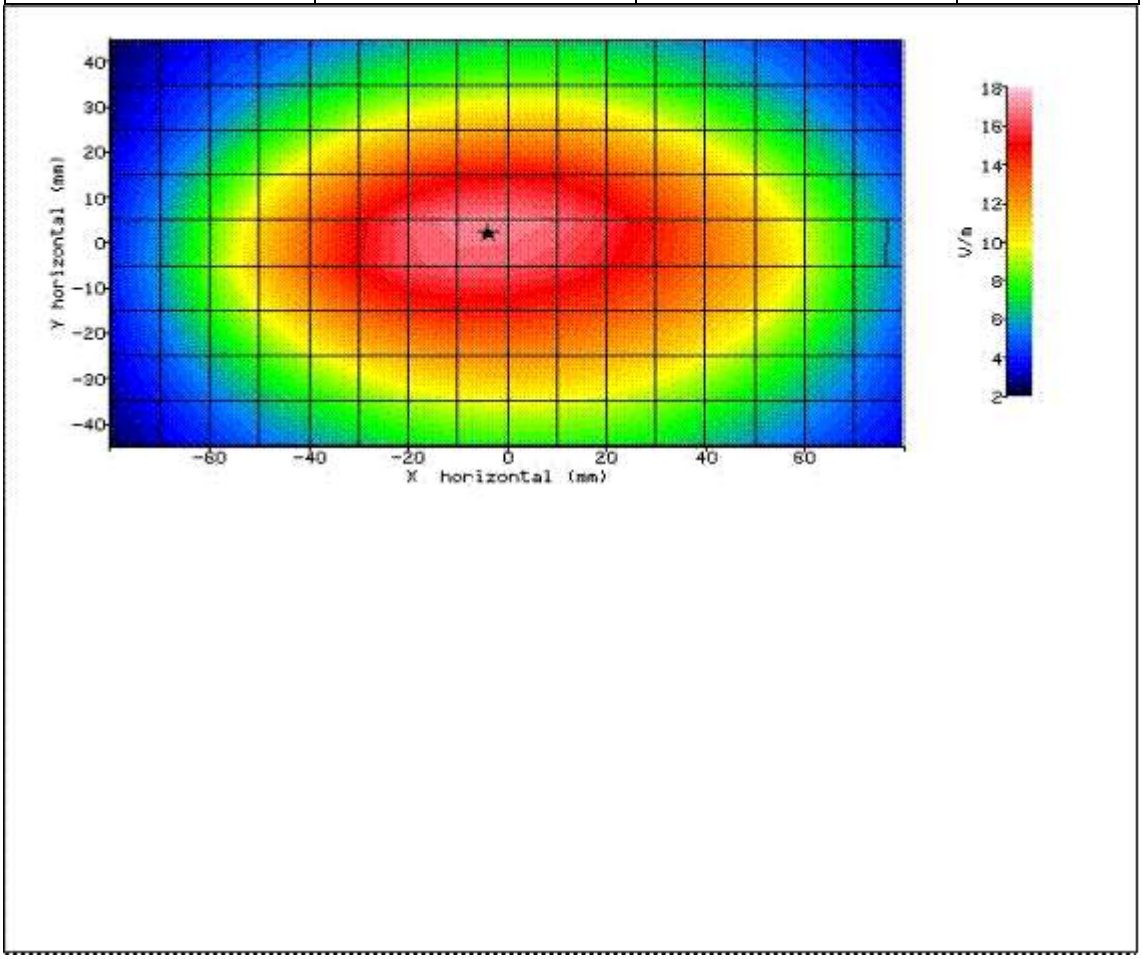

Figure 26: SAR Body Testing Results for the SHL25 Mobile Handset at 826.4MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	08/04/2014-14:45:32	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.30°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	56.44
RELATIVE HUMIDITY:	31.20%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.30°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-1.20mm
DUT POSITION:	10mm-Bottom Edge	**MAX SAR Y-AXIS LOCATION:**	-0.50mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	8.488
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.085 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.092 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.094 W/kg
PROBE BATTERY LAST CHANGED:	08/04/2014	**SAR DRIFT DURING SCAN:**	2.300 %

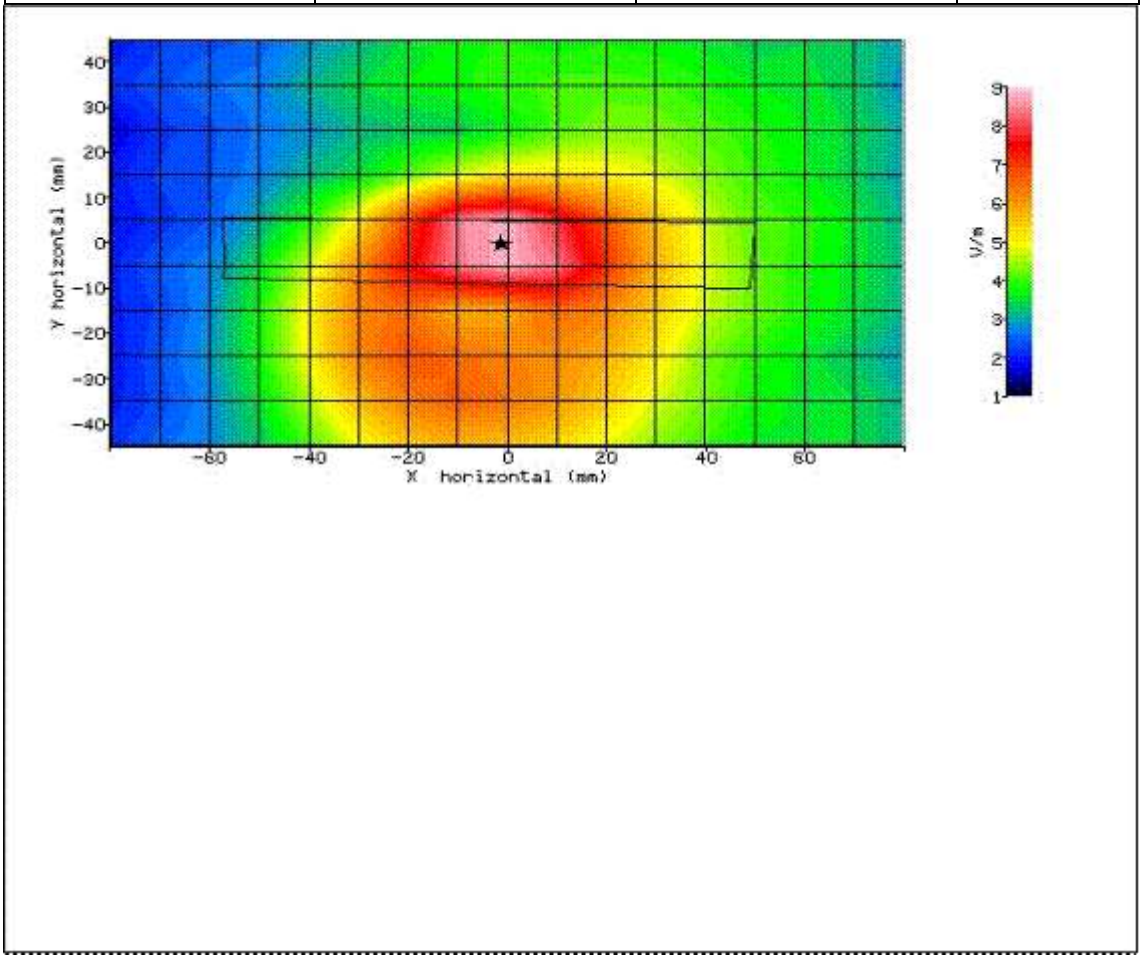

Figure 27: SAR Body Testing Results for the SHL25 Mobile Handset at 826.4MHz.

2.7 CDMA2000 HEAD SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	11/04/2014-09:06:52	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.60°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	32.10%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.60°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	57.50mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-111.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	21.818
TEST FREQUENCY:	829.08MHz	**SAR 1g:**	0.476 W/kg
TYPE OF MODULATION:	HPSK (CDMA 2000)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100	**SAR START:**	0.445 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.440 W/kg
PROBE BATTERY LAST CHANGED:	11/04/2014	**SAR DRIFT DURING SCAN:**	-1.100 %

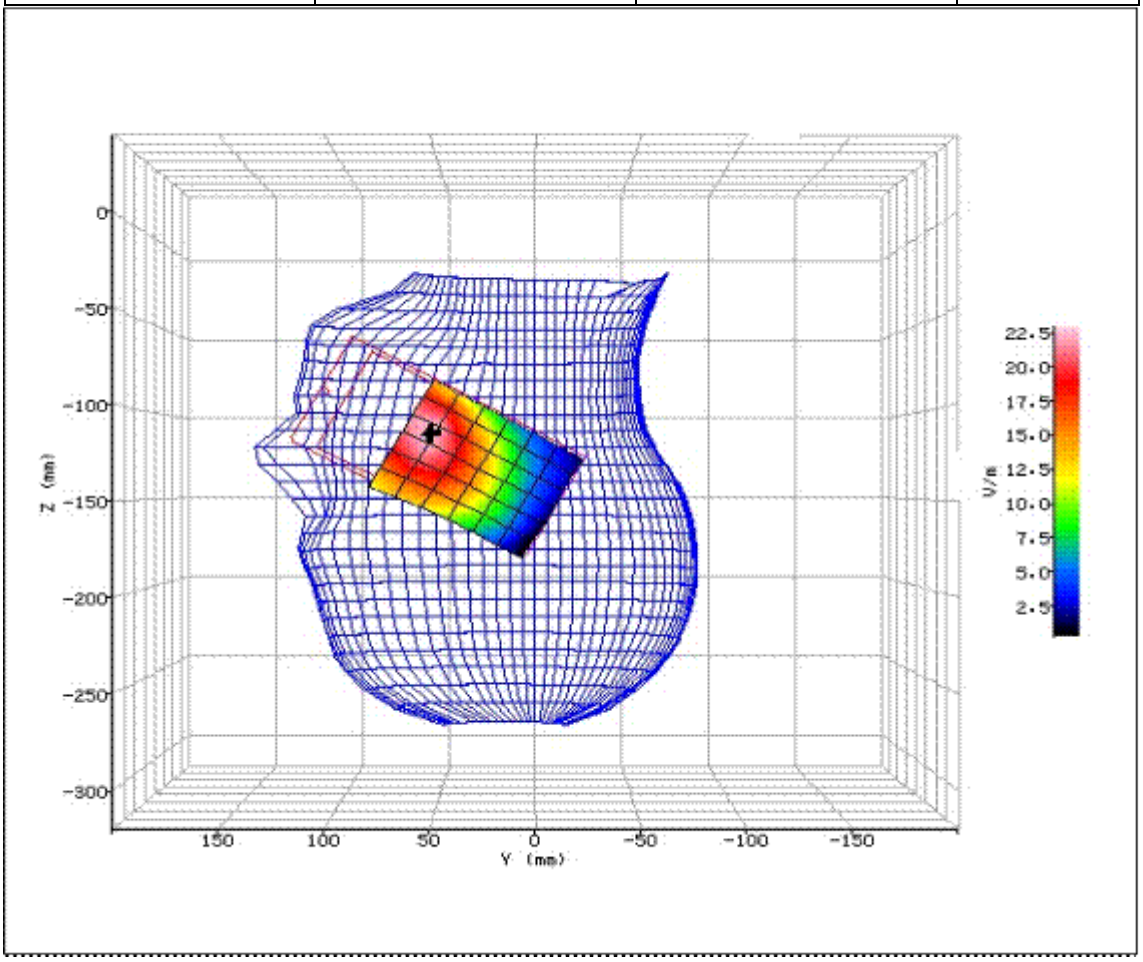

Figure 28: SAR Head Testing Results for the SHL25 Mobile Handset at 829.08MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	11/04/2014-10:00:48	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.60°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	32.10%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.60°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	44.90mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-127.00mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	17.480
TEST FREQUENCY:	829.08MHz	**SAR 1g:**	0.335 W/kg
TYPE OF MODULATION:	HPSK (CDMA 2000)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100	**SAR START:**	0.275 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.276 W/kg
PROBE BATTERY LAST CHANGED:	11/04/2014	**SAR DRIFT DURING SCAN:**	0.400 %

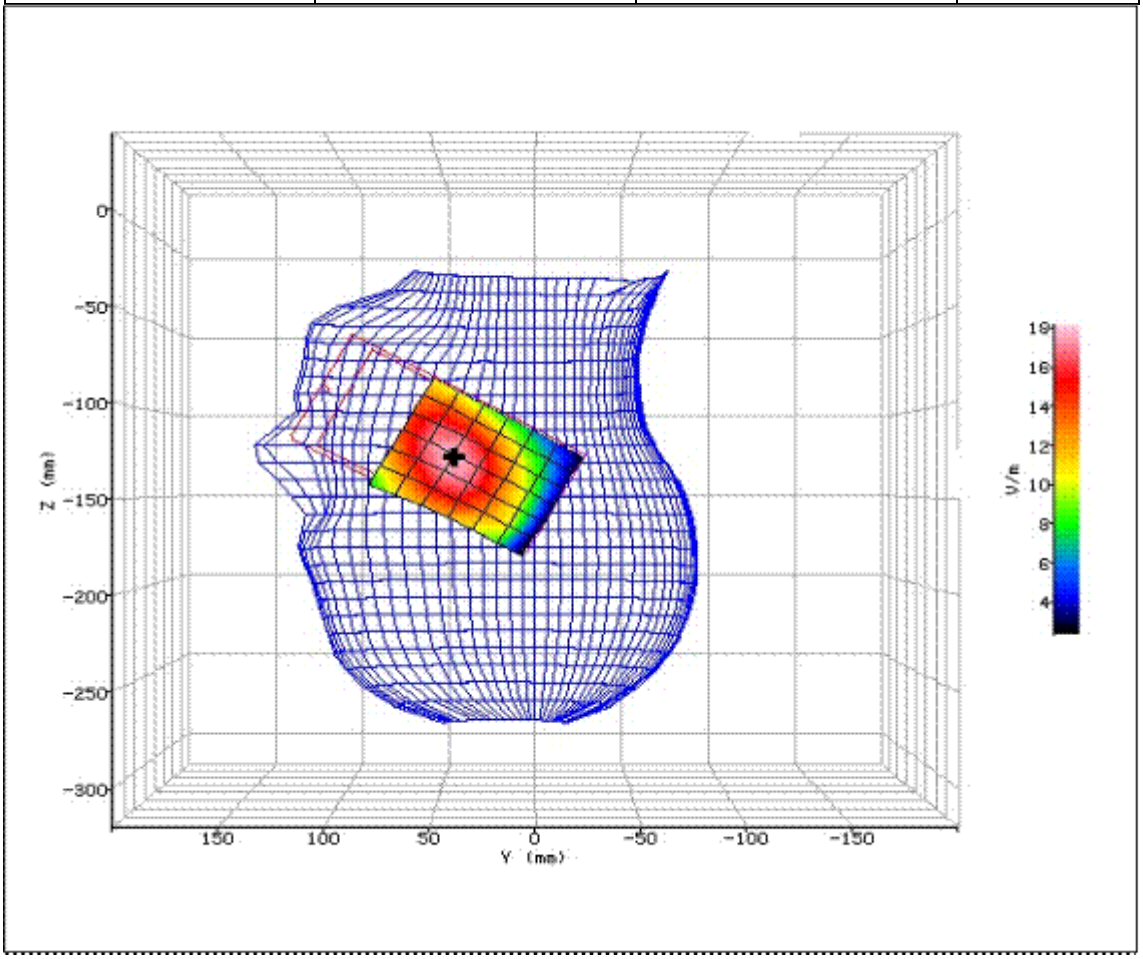

Figure 29: SAR Head Testing Results for the SHL25 Mobile Handset at 829.08MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	11/04/2014-10:30:18	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.60°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	32.10%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.60°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	58.40mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-120.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	22.822
TEST FREQUENCY:	829.08MHz	**SAR 1g:**	0.484 W/kg
TYPE OF MODULATION:	HPSK (CDMA 2000)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100	**SAR START:**	0.463 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.462 W/kg
PROBE BATTERY LAST CHANGED:	11/04/2014	**SAR DRIFT DURING SCAN:**	-0.200 %

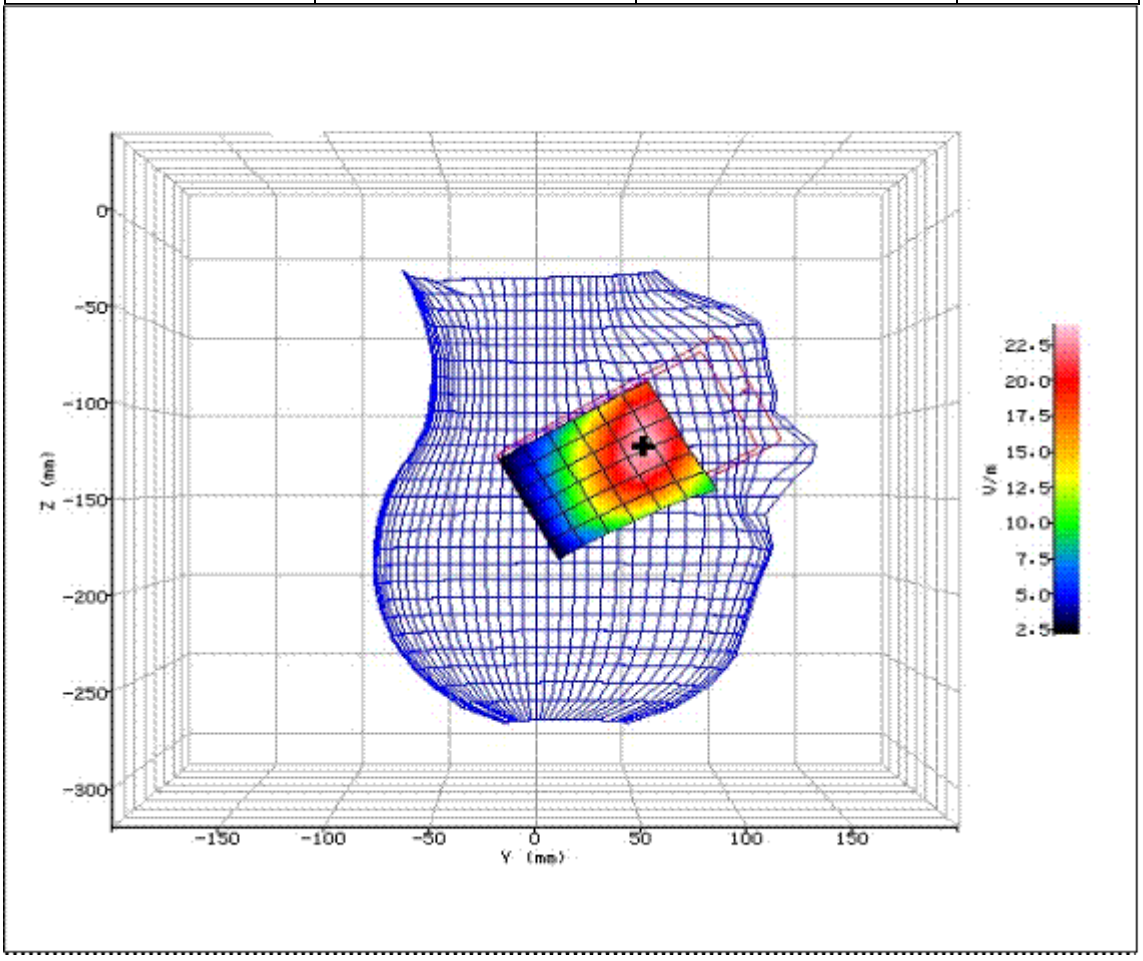

Figure 30: SAR Head Testing Results for the SHL25 Mobile Handset at 829.08MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	11/04/2014-10:48:33	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.60°C	**LIQUID SIMULANT:**	850Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	41.06
RELATIVE HUMIDITY:	32.10%	**CONDUCTIVITY:**	0.883
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.60°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	46.70mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-131.60mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	18.474
TEST FREQUENCY:	829.08MHz	**SAR 1g:**	0.367 W/kg
TYPE OF MODULATION:	HPSK (CDMA 2000)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100	**SAR START:**	0.301 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.303 W/kg
PROBE BATTERY LAST CHANGED:	11/04/2014	**SAR DRIFT DURING SCAN:**	0.700 %

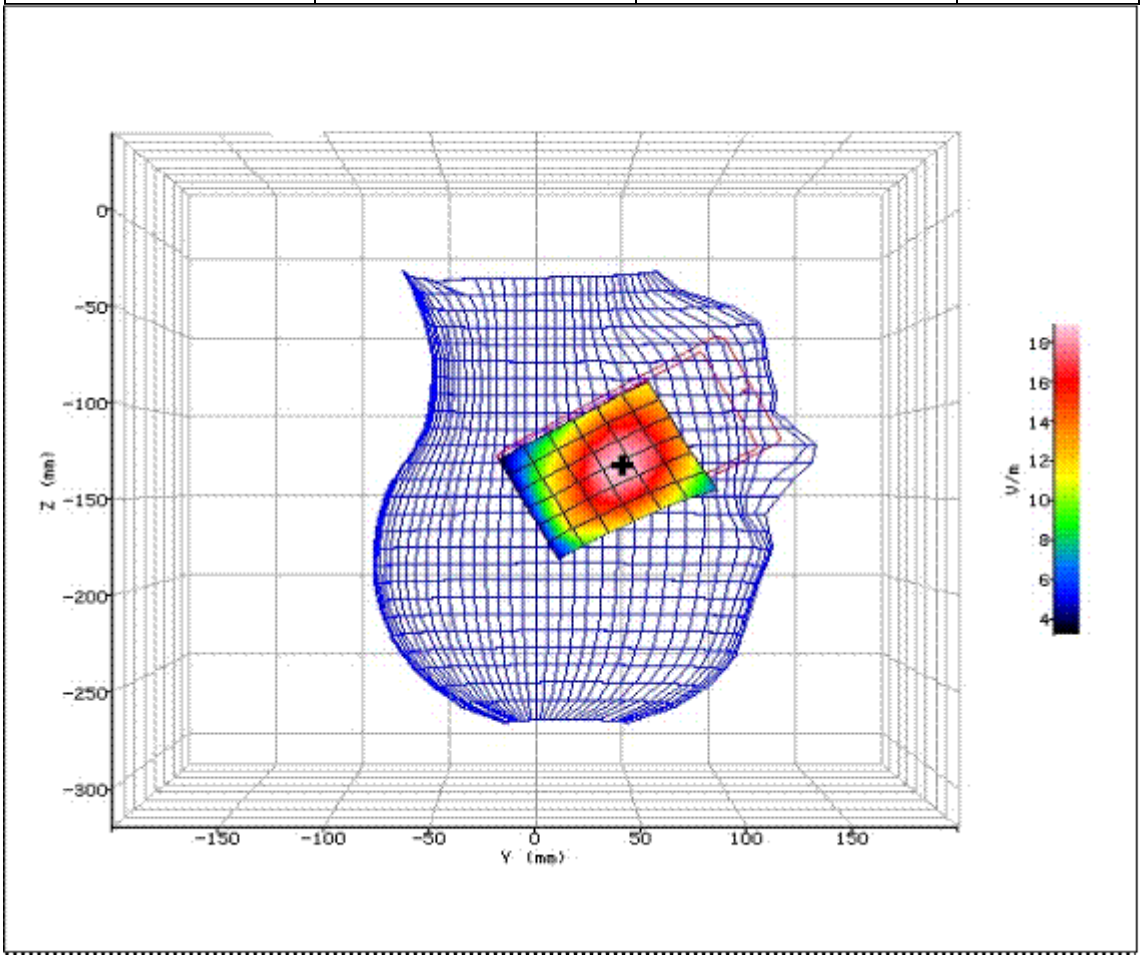

Figure 31: SAR Head Testing Results for the SHL25 Mobile Handset at 829.08MHz.

2.8 CDMA2000 BODY SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	11/04/2014-13:12:53	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.00°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	56.44
RELATIVE HUMIDITY:	31.40%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.80°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	4.10mm
DUT POSITION:	10mm-Front Facing	**MAX SAR Y-AXIS LOCATION:**	-4.40mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	21.463
TEST FREQUENCY:	829.08MHz	**SAR 1g:**	0.442 W/kg
TYPE OF MODULATION:	HPSK (CDMA 2000)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100	**SAR START:**	0.472 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.470 W/kg
PROBE BATTERY LAST CHANGED:	11/04/2014	**SAR DRIFT DURING SCAN:**	-0.400 %

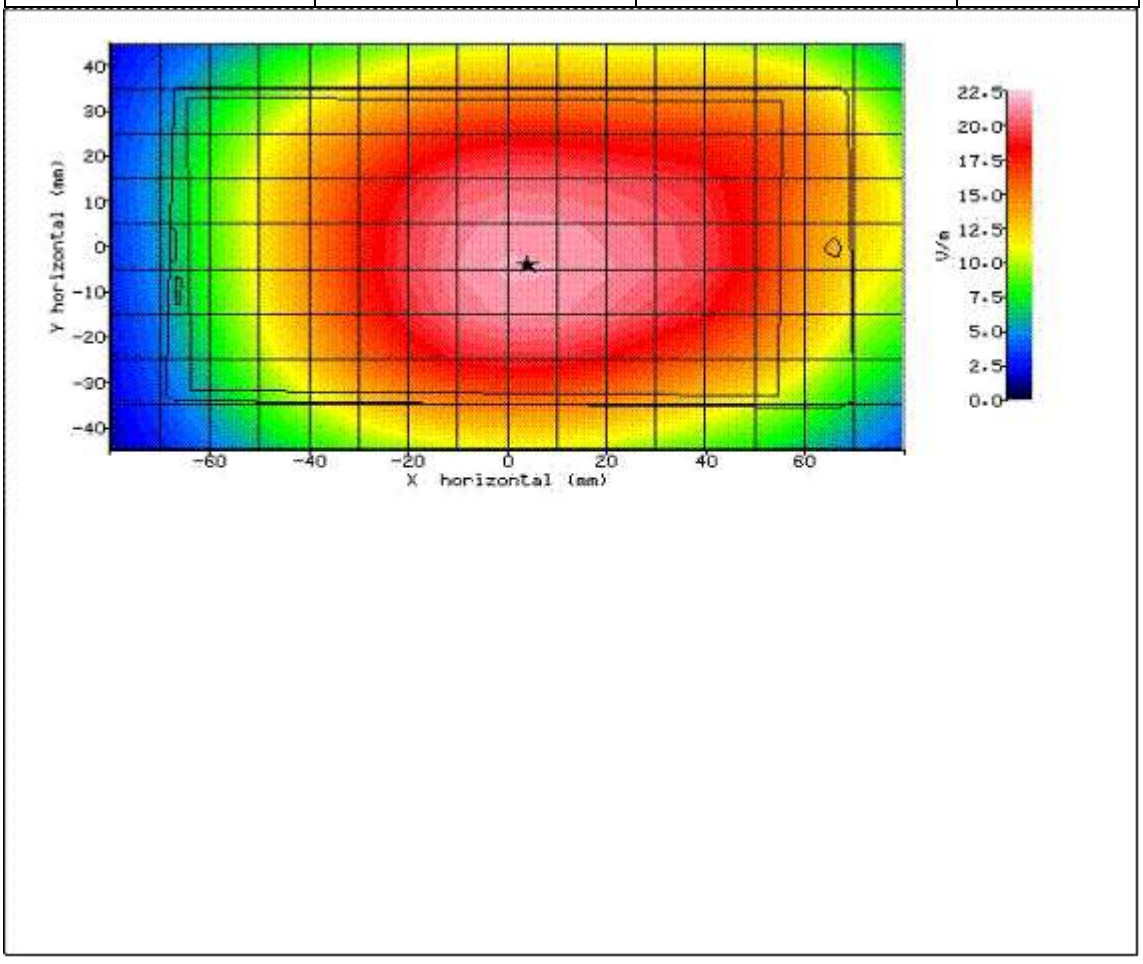

Figure 32: SAR Body Testing Results for the SHL25 Mobile Handset at 829.08MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	11/04/2014-13:27:24	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.00°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	56.44
RELATIVE HUMIDITY:	31.40%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.80°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	25.60mm
DUT POSITION:	10mm-Rear Facing	**MAX SAR Y-AXIS LOCATION:**	-0.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	21.132
TEST FREQUENCY:	829.08MHz	**SAR 1g:**	0.437 W/kg
TYPE OF MODULATION:	HPSK (CDMA 2000)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100	**SAR START:**	0.465 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.467 W/kg
PROBE BATTERY LAST CHANGED:	11/04/2014	**SAR DRIFT DURING SCAN:**	0.300 %

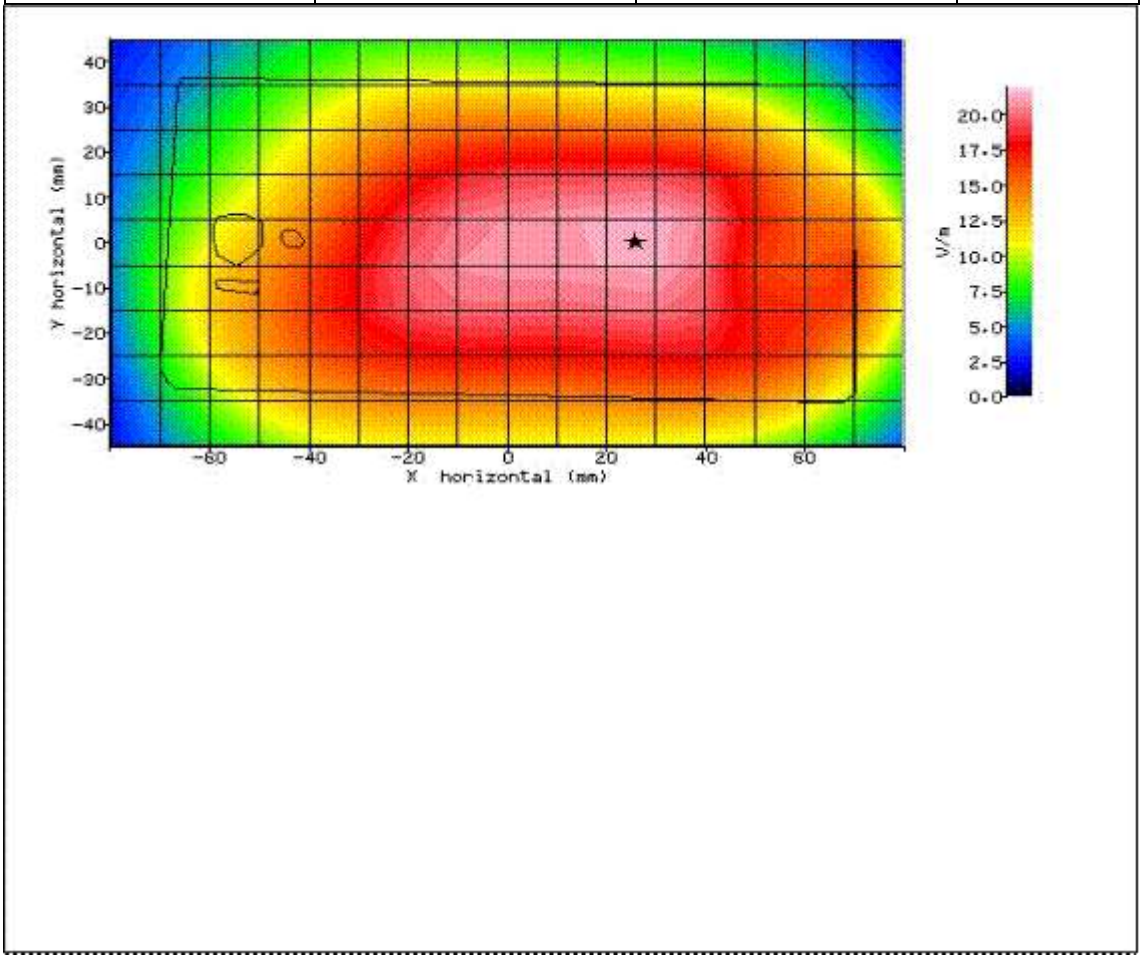

Figure 33: SAR Body Testing Results for the SHL25 Mobile Handset at 829.08MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	11/04/2014-13:44:34	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.00°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	56.44
RELATIVE HUMIDITY:	31.40%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.80°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-10.80mm
DUT POSITION:	10mm-Left Edge	**MAX SAR Y-AXIS LOCATION:**	-0.40mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	18.636
TEST FREQUENCY:	829.08MHz	**SAR 1g:**	0.348 W/kg
TYPE OF MODULATION:	HPSK (CDMA 2000)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100	**SAR START:**	0.375 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.377 W/kg
PROBE BATTERY LAST CHANGED:	11/04/2014	**SAR DRIFT DURING SCAN:**	0.400 %

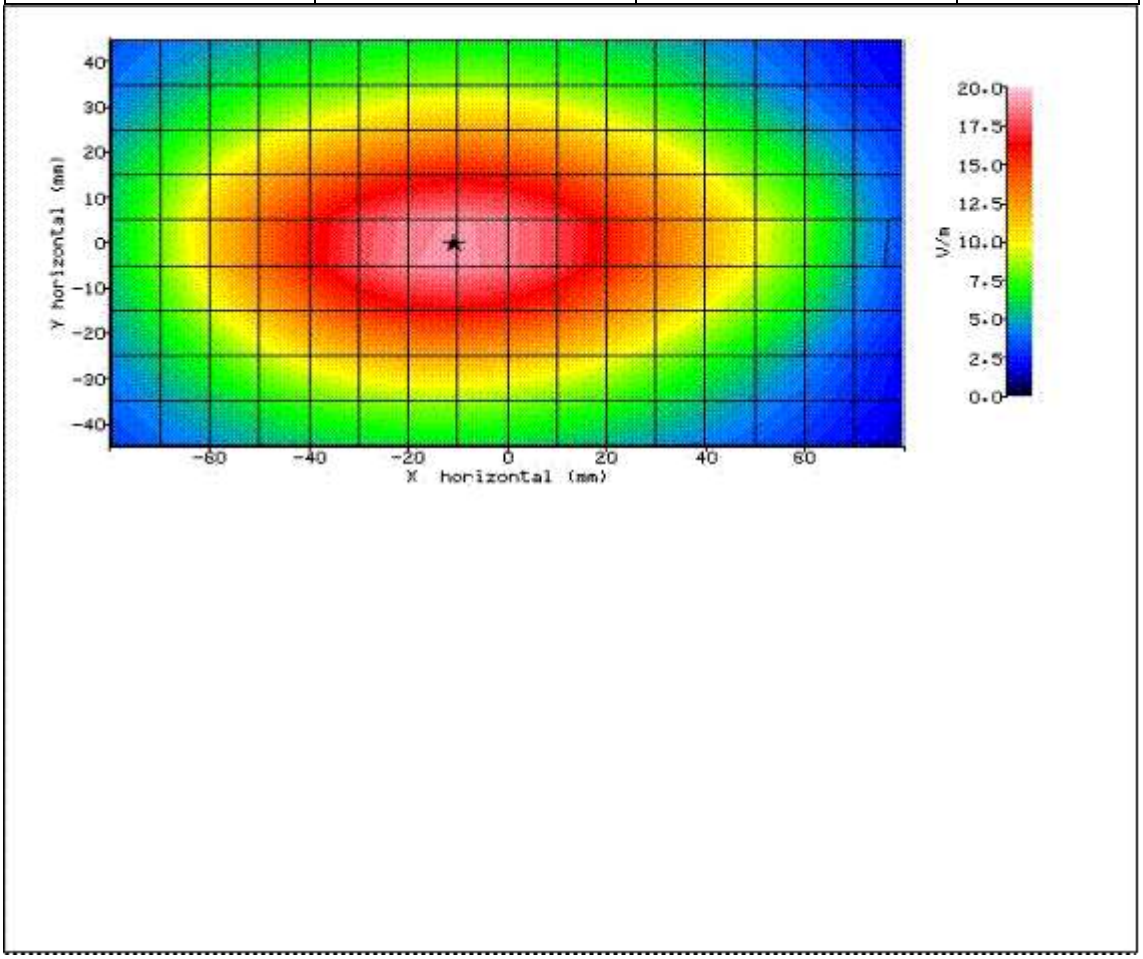

Figure 34: SAR Body Testing Results for the SHL25 Mobile Handset at 829.08MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	11/04/2014-14:55:27	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.00°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	56.44
RELATIVE HUMIDITY:	31.40%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.80°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-5.60mm
DUT POSITION:	10mm-Right Edge	**MAX SAR Y-AXIS LOCATION:**	5.80mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	16.135
TEST FREQUENCY:	829.08MHz	**SAR 1g:**	0.260 W/kg
TYPE OF MODULATION:	HPSK (CDMA 2000)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100	**SAR START:**	0.277 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.278 W/kg
PROBE BATTERY LAST CHANGED:	11/04/2014	**SAR DRIFT DURING SCAN:**	0.300 %

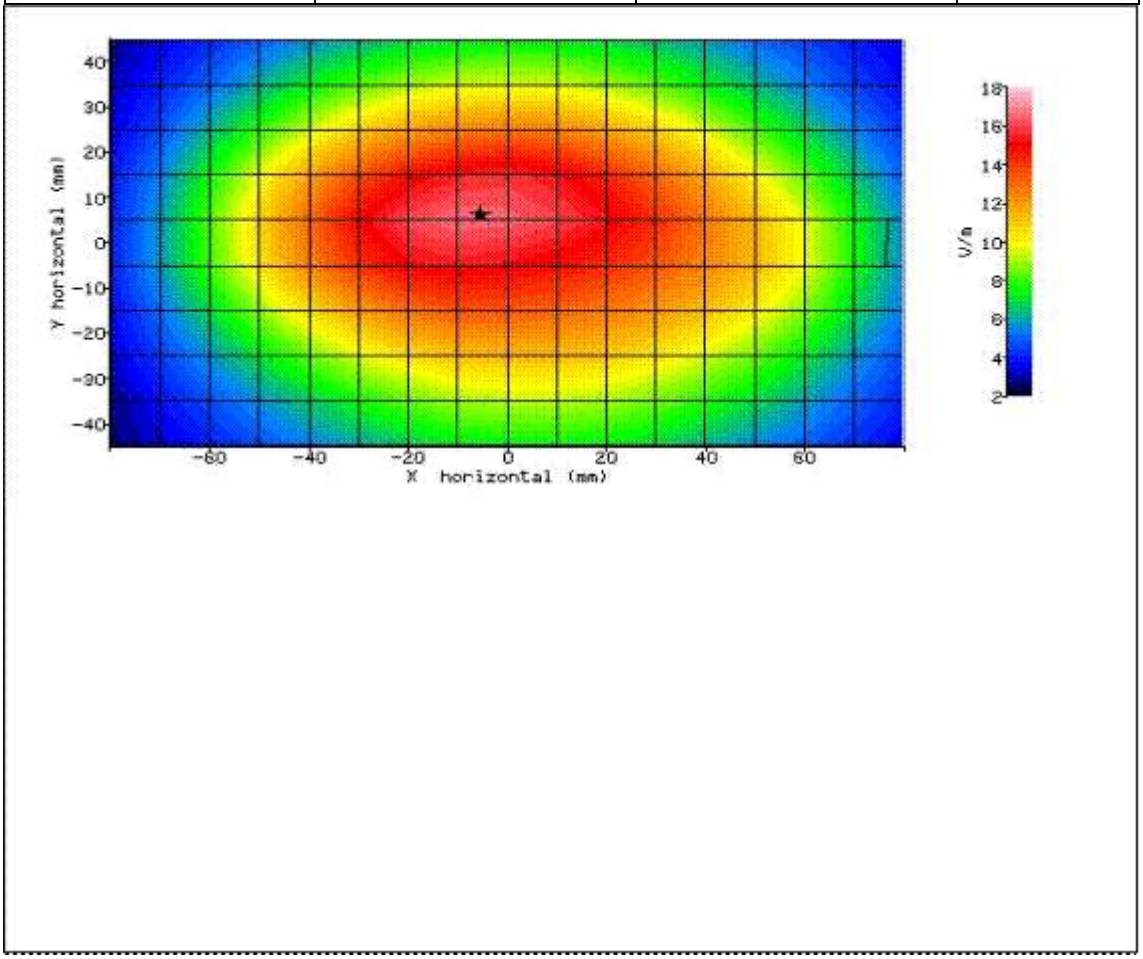

Figure 35: SAR Body Testing Results for the SHL25 Mobile Handset at 829.08MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	11/04/2014-15:11:47	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.00°C	**LIQUID SIMULANT:**	850Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	56.44
RELATIVE HUMIDITY:	31.40%	**CONDUCTIVITY:**	1.008
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.80°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-1.60mm
DUT POSITION:	10mm-Bottom Edge	**MAX SAR Y-AXIS LOCATION:**	3.50mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	9.447
TEST FREQUENCY:	829.08MHz	**SAR 1g:**	0.105 W/kg
TYPE OF MODULATION:	HPSK (CDMA 2000)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100	**SAR START:**	0.115 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.114 W/kg
PROBE BATTERY LAST CHANGED:	11/04/2014	**SAR DRIFT DURING SCAN:**	-1.000 %

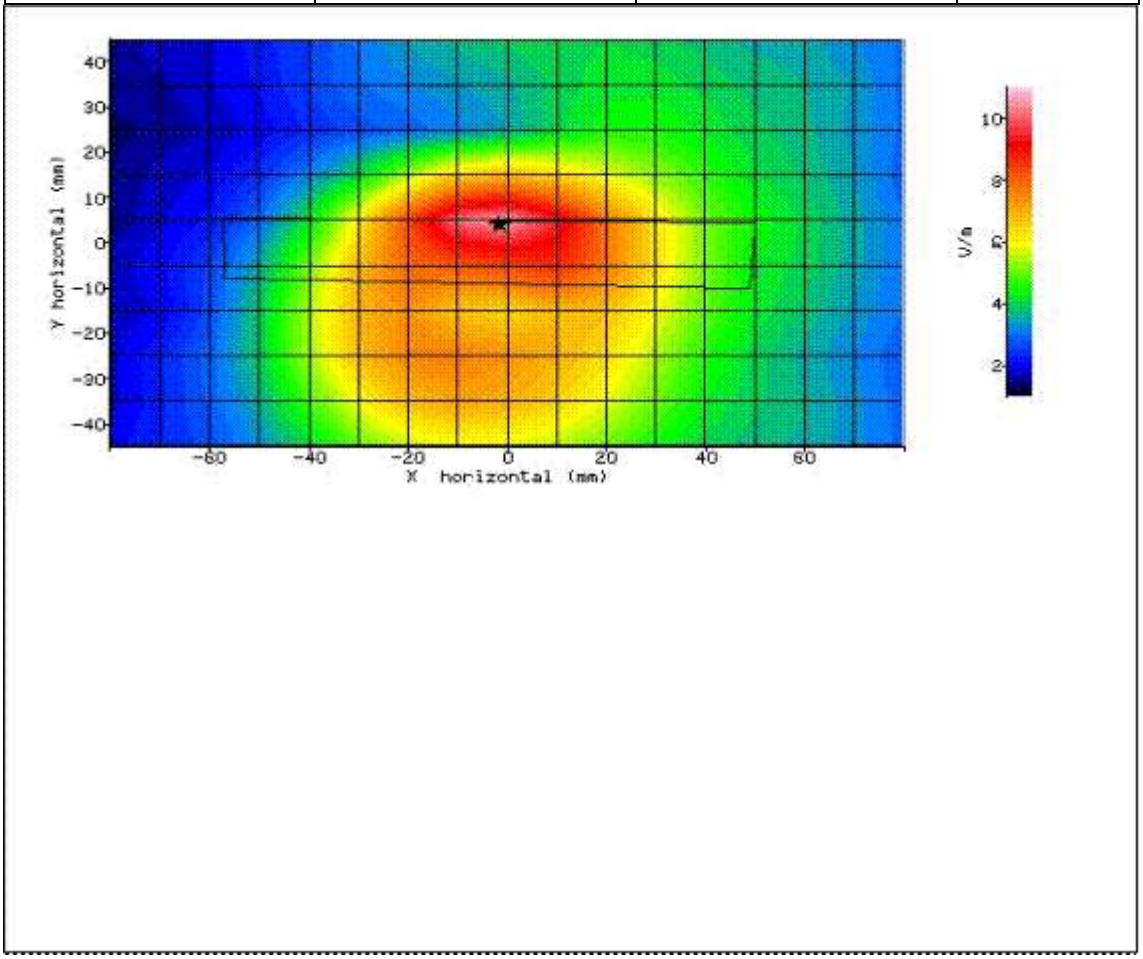

Figure 36: SAR Body Testing Results for the SHL25 Mobile Handset at 829.08MHz.

2.9 LTE BAND 17 BODY SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-09:14:27	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.60°C	**LIQUID SIMULANT:**	700Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	32.10%	**CONDUCTIVITY:**	0.985
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	18.40mm
DUT POSITION:	10mm-Front Facing	**MAX SAR Y-AXIS LOCATION:**	8.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	18.464
TEST FREQUENCY:	709.0MHz	**SAR 1g:**	0.317 W/kg
TYPE OF MODULATION:	QPSK (LTE)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.338 W/kg
INPUT POWER LEVEL:	25dBm	**SAR END:**	0.343 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	1.500 %

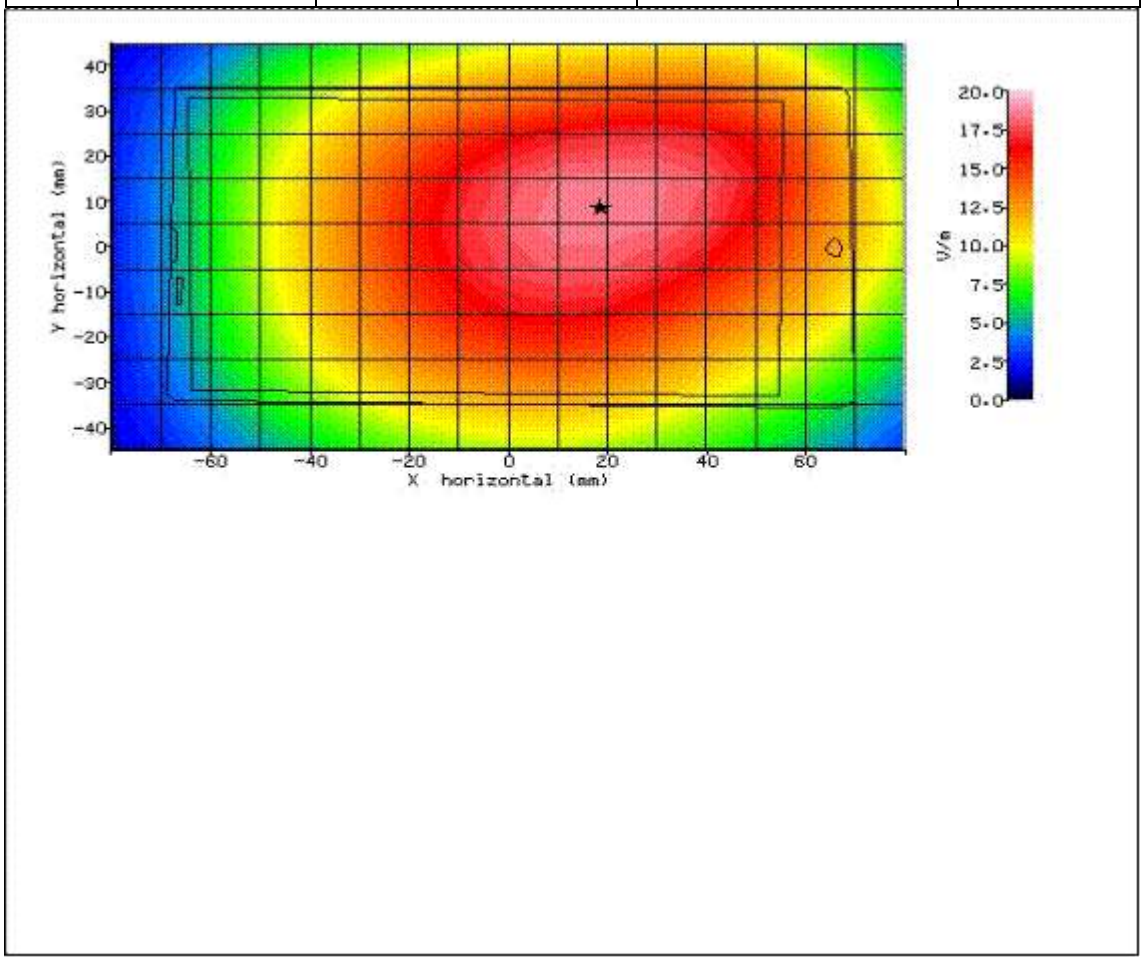

Figure 37: SAR Body Testing Results for the SHL25 Mobile Handset at 709.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-09:46:34	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.60°C	**LIQUID SIMULANT:**	700Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	32.10%	**CONDUCTIVITY:**	0.985
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	23.70mm
DUT POSITION:	10mm-Rear Facing	**MAX SAR Y-AXIS LOCATION:**	-10.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	20.525
TEST FREQUENCY:	709.0MHz	**SAR 1g:**	0.400 W/kg
TYPE OF MODULATION:	QPSK (LTE)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.433 W/kg
INPUT POWER LEVEL:	25dBm	**SAR END:**	0.433 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

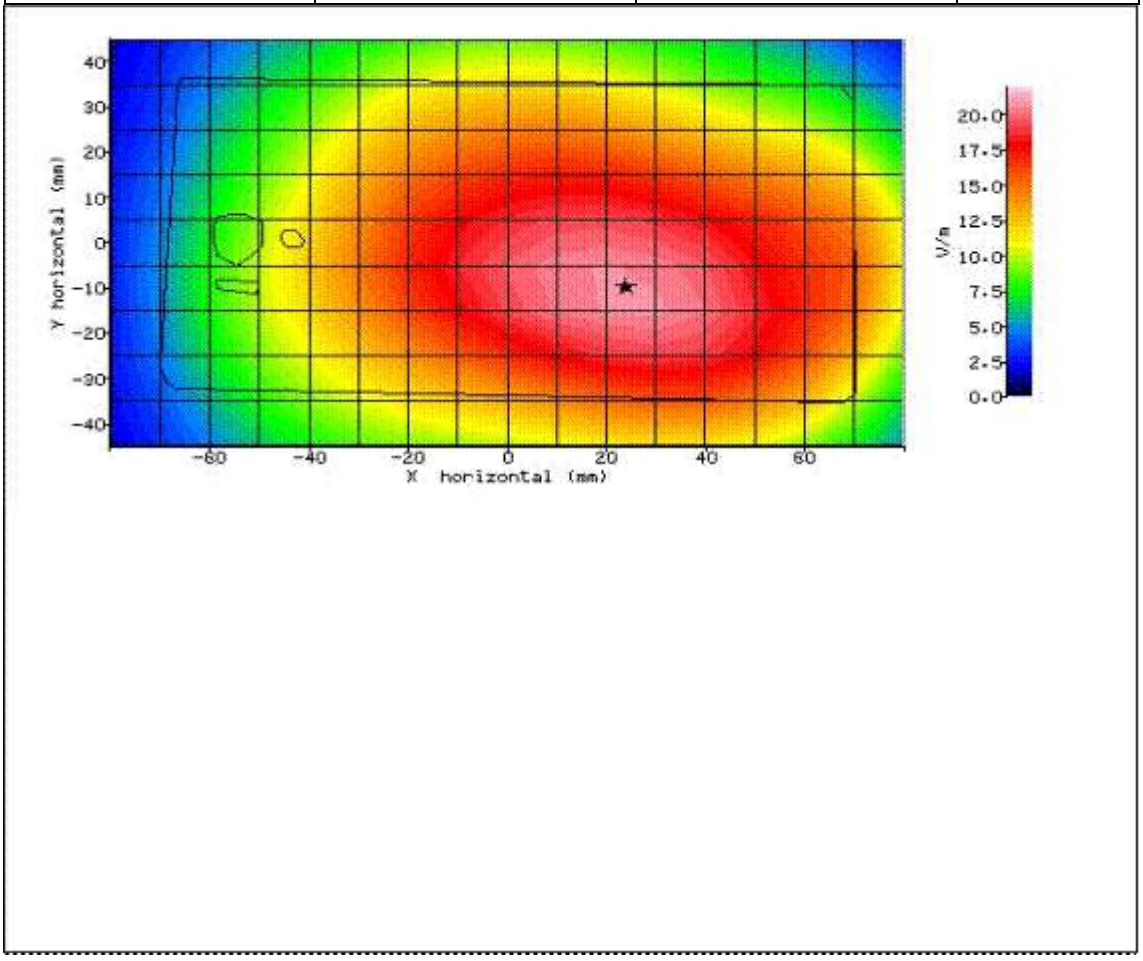

Figure 38: SAR Body Testing Results for the SHL25 Mobile Handset at 709.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-10:31:00	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.60°C	**LIQUID SIMULANT:**	700Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	32.10%	**CONDUCTIVITY:**	0.985
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	13.90mm
DUT POSITION:	10mm-Left Edge	**MAX SAR Y-AXIS LOCATION:**	-3.40mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	15.416
TEST FREQUENCY:	709.0MHz	**SAR 1g:**	0.230 W/kg
TYPE OF MODULATION:	QPSK (LTE)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.248 W/kg
INPUT POWER LEVEL:	25dBm	**SAR END:**	0.247 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	-0.300 %

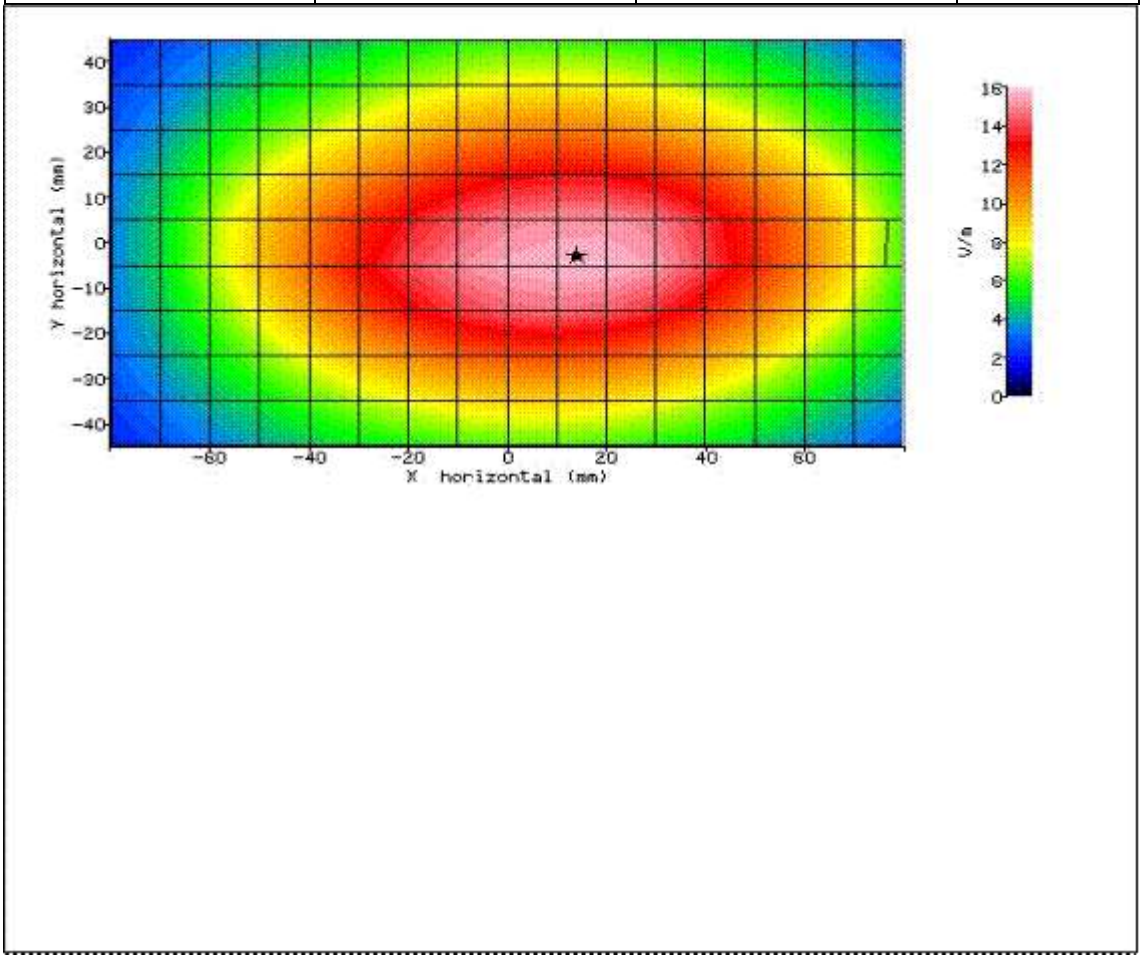

Figure 39: SAR Body Testing Results for the SHL25 Mobile Handset at 709.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-10:45:28	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.60°C	**LIQUID SIMULANT:**	700Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	32.10%	**CONDUCTIVITY:**	0.985
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	4.20mm
DUT POSITION:	10mm-Right Edge	**MAX SAR Y-AXIS LOCATION:**	-2.00mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	15.785
TEST FREQUENCY:	709.0MHz	**SAR 1g:**	0.239 W/kg
TYPE OF MODULATION:	QPSK (LTE)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.259 W/kg
INPUT POWER LEVEL:	25dBm	**SAR END:**	0.259 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	-0.100 %

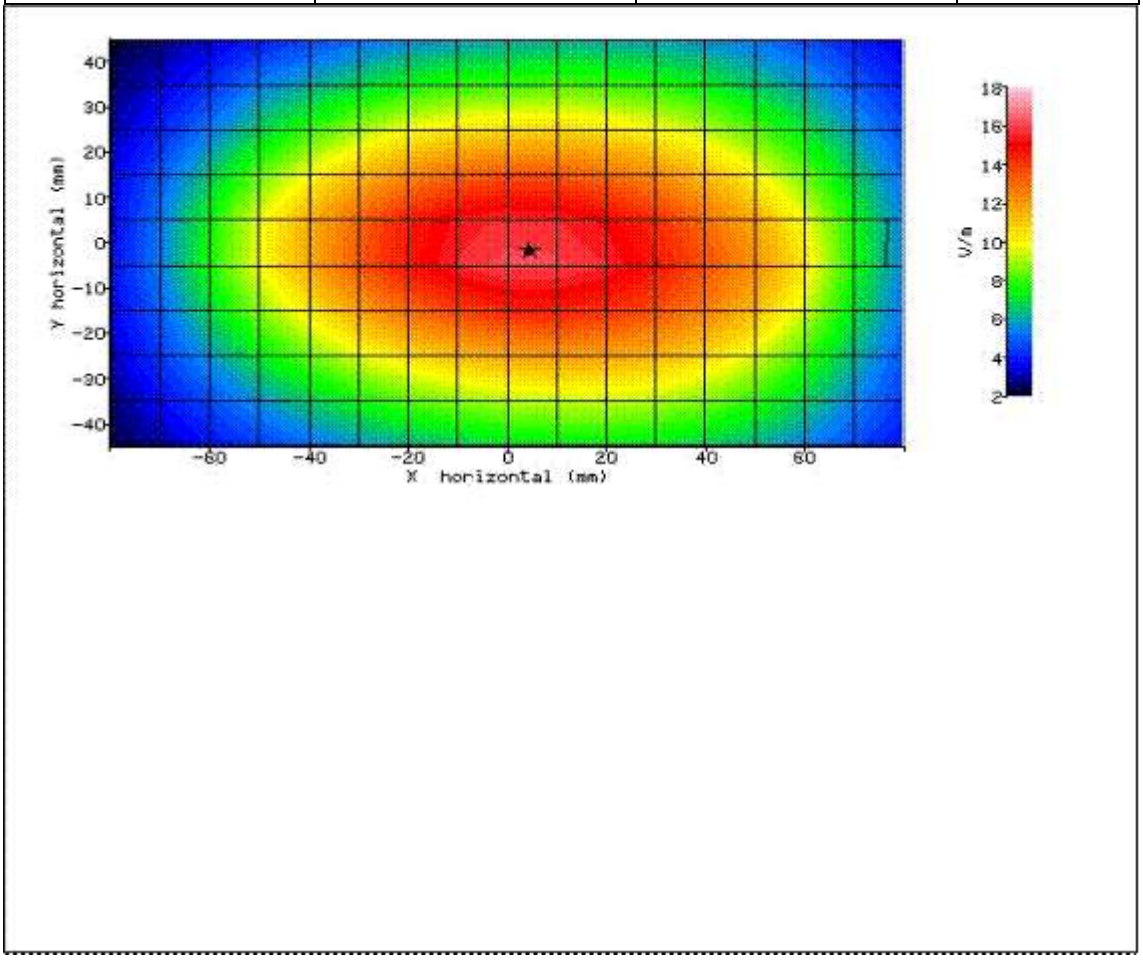

Figure 40: SAR Body Testing Results for the SHL25 Mobile Handset at 709.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-11:26:31	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.40°C	**LIQUID SIMULANT:**	700Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	26.60%	**CONDUCTIVITY:**	0.985
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	1.00mm
DUT POSITION:	10mm-Bottom Edge	**MAX SAR Y-AXIS LOCATION:**	7.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	8.318
TEST FREQUENCY:	709.0MHz	**SAR 1g:**	0.075 W/kg
TYPE OF MODULATION:	QPSK (LTE)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.081 W/kg
INPUT POWER LEVEL:	25dBm	**SAR END:**	0.081 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	0.100 %

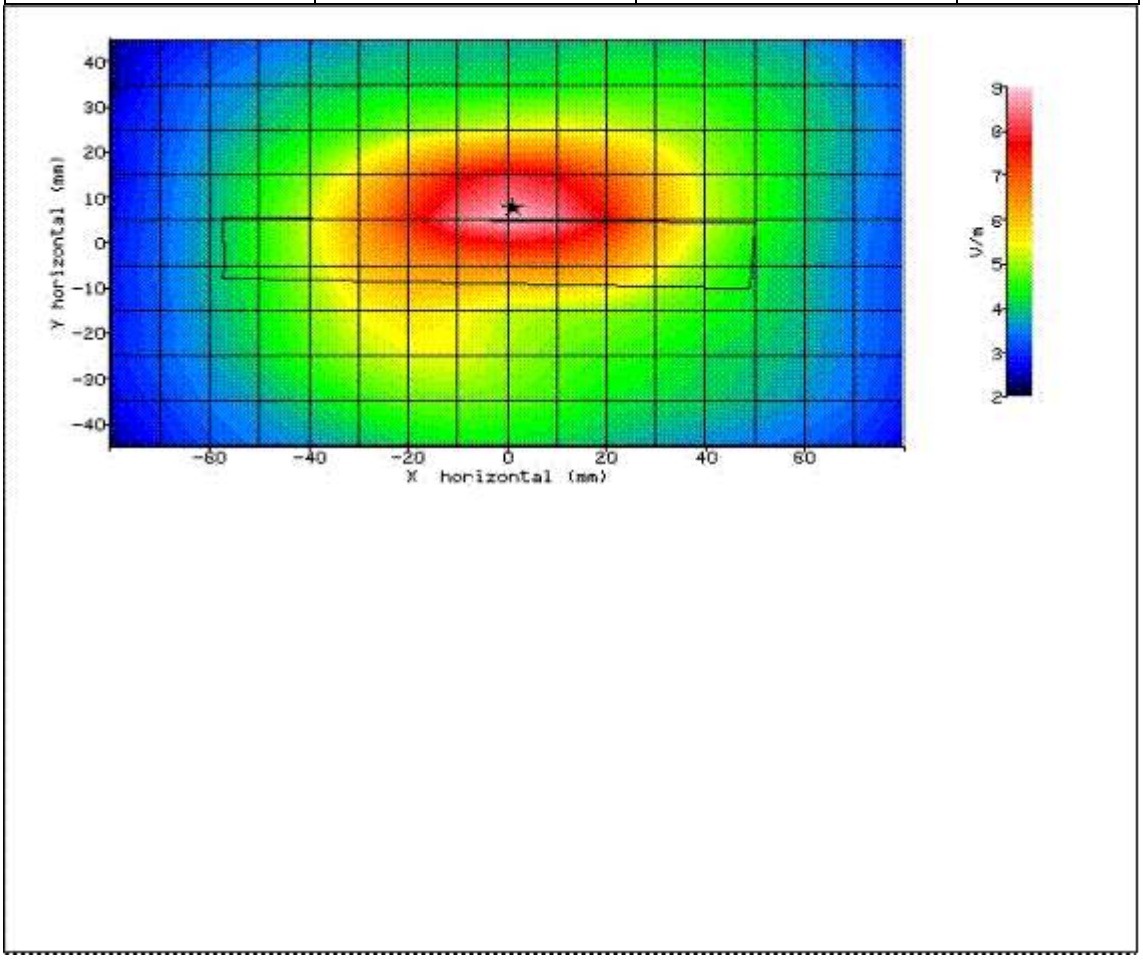

Figure 41: SAR Body Testing Results for the SHL25 Mobile Handset at 709.0MHz.

2.10 LTE BAND 17 BODY SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-12:53:34	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.80°C	**LIQUID SIMULANT:**	700Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	24.80%	**CONDUCTIVITY:**	0.985
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.00°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	18.90mm
DUT POSITION:	10mm-Front Facing	**MAX SAR Y-AXIS LOCATION:**	6.60mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	17.024
TEST FREQUENCY:	710.0MHz	**SAR 1g:**	0.273 W/kg
TYPE OF MODULATION:	QPSK (LTE)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.295 W/kg
INPUT POWER LEVEL:	25dBm	**SAR END:**	0.292 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	-1.100 %

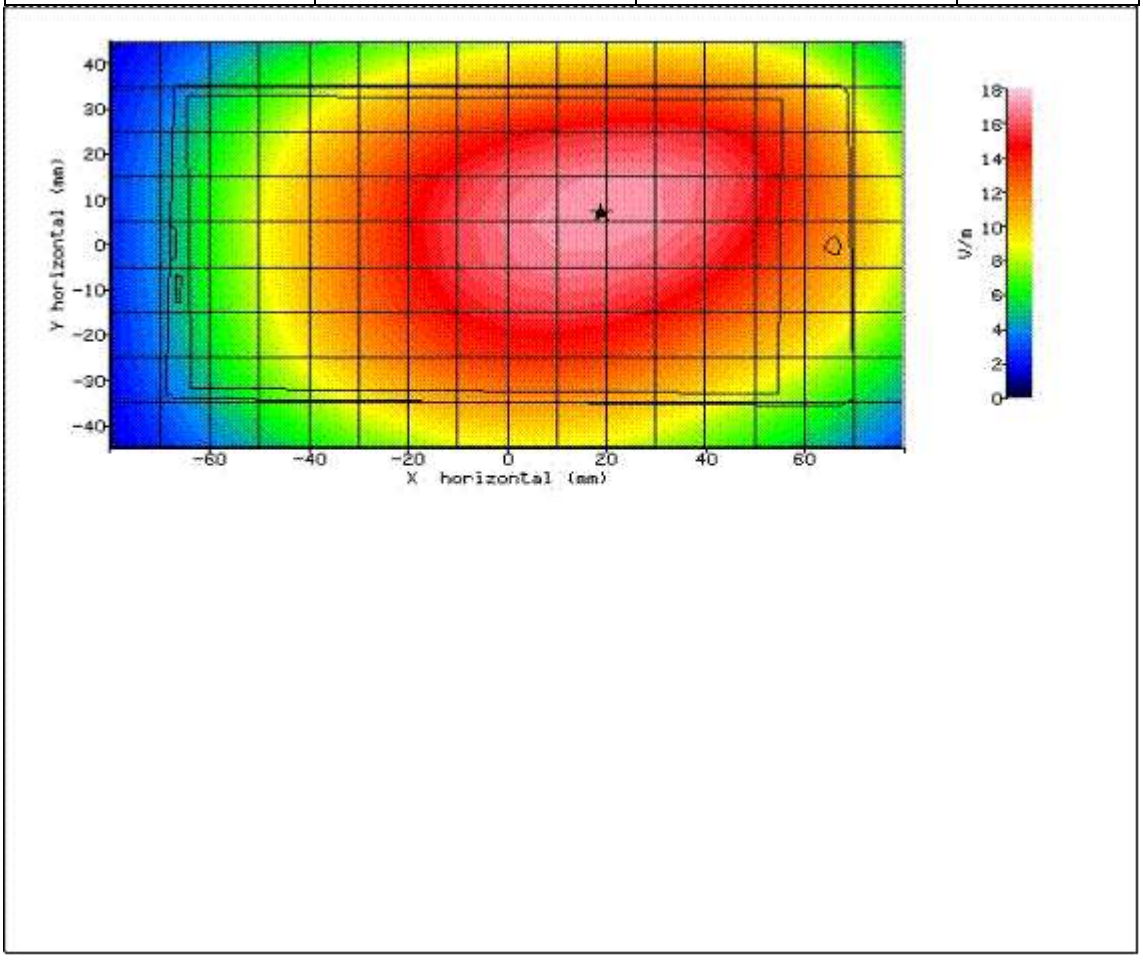

Figure 42: SAR Body Testing Results for the SHL25 Mobile Handset at 710.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-13:27:17	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.80°C	**LIQUID SIMULANT:**	700Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	24.80%	**CONDUCTIVITY:**	0.985
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.00°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	22.90mm
DUT POSITION:	10mm-Rear Facing	**MAX SAR Y-AXIS LOCATION:**	-10.80mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	18.879
TEST FREQUENCY:	710.0MHz	**SAR 1g:**	0.331 W/kg
TYPE OF MODULATION:	QPSK (LTE)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.356 W/kg
INPUT POWER LEVEL:	25dBm	**SAR END:**	0.364 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	2.100 %

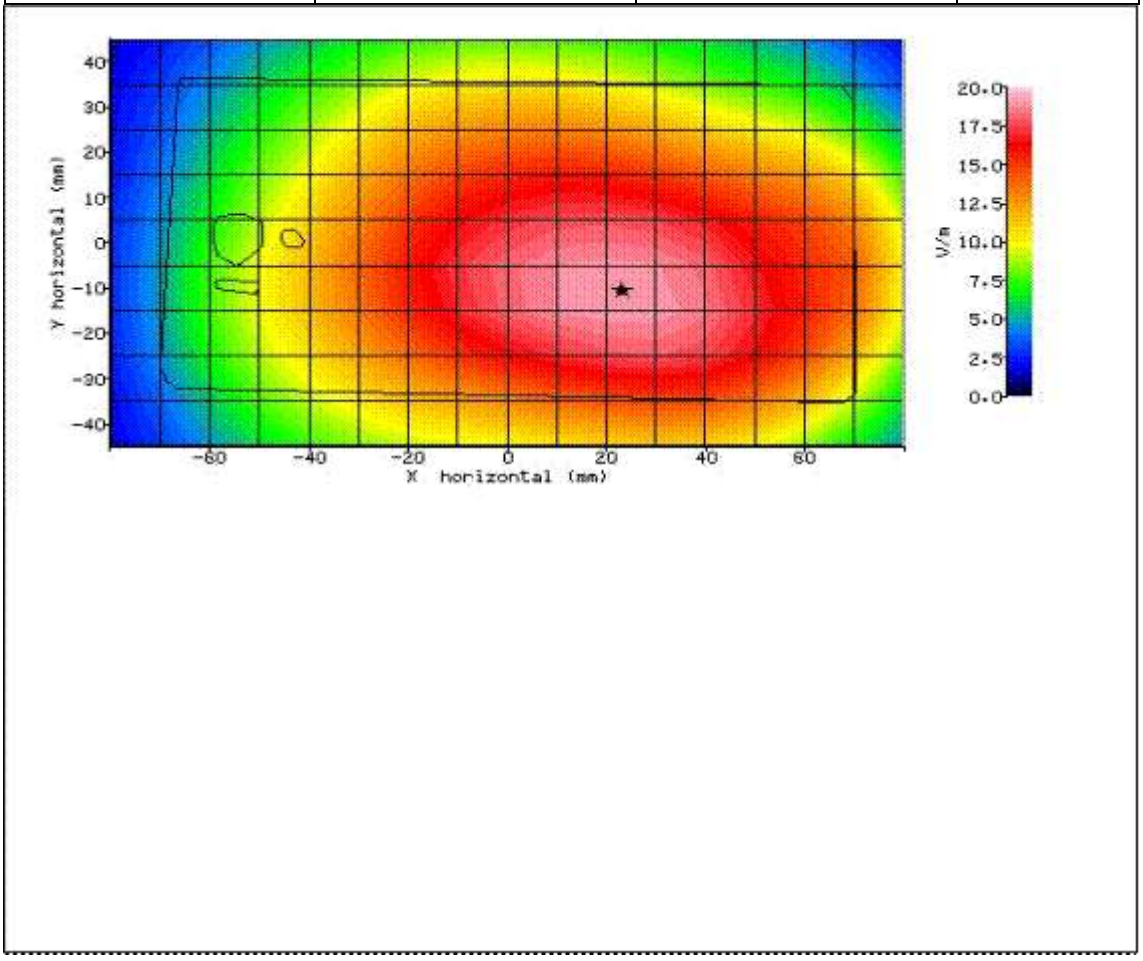

Figure 43: SAR Body Testing Results for the SHL25 Mobile Handset at 710.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-13:45:41	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.80°C	**LIQUID SIMULANT:**	700Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	25.80%	**CONDUCTIVITY:**	0.985
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	11.70mm
DUT POSITION:	10mm-Left Edge	**MAX SAR Y-AXIS LOCATION:**	-1.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	15.219
TEST FREQUENCY:	710.0MHz	**SAR 1g:**	0.224 W/kg
TYPE OF MODULATION:	QPSK (LTE)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.242 W/kg
INPUT POWER LEVEL:	25dBm	**SAR END:**	0.242 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	0.100 %

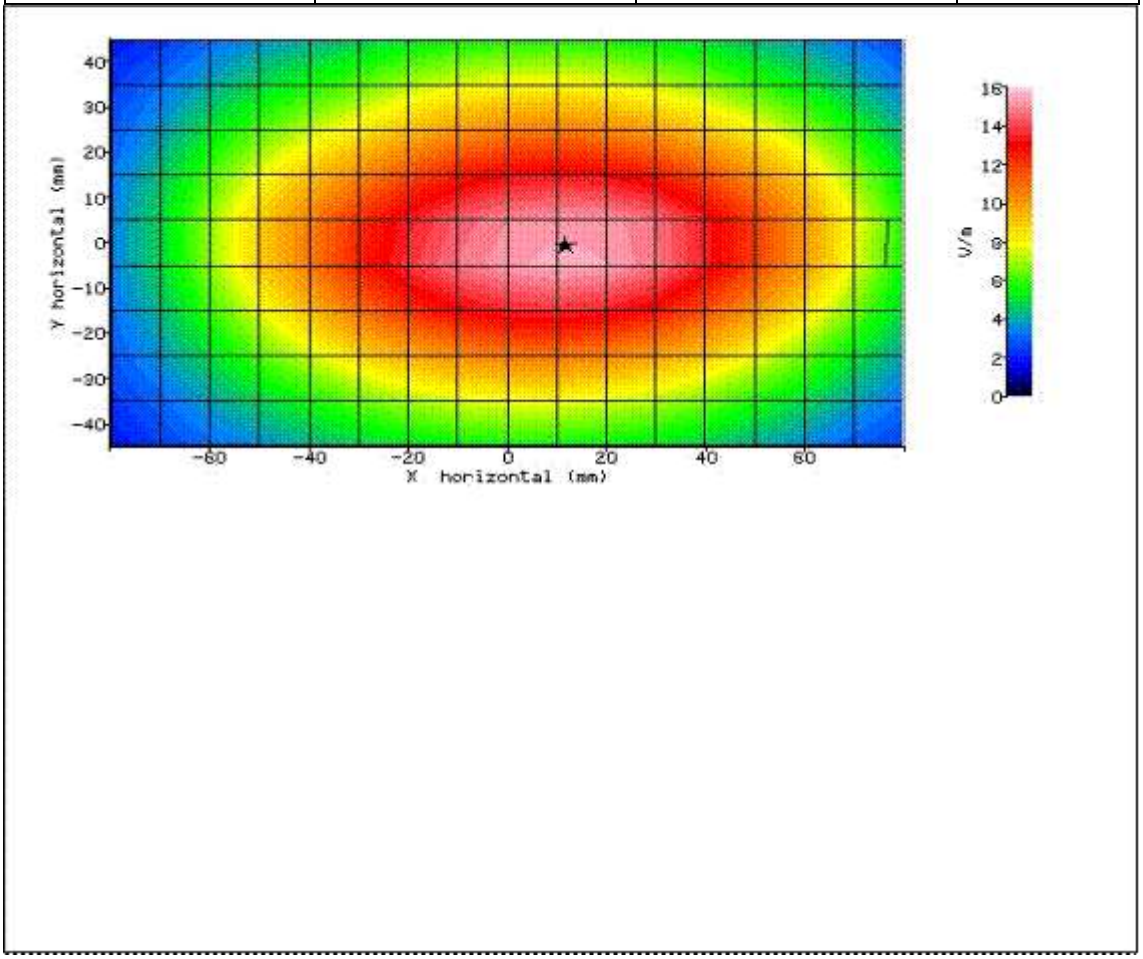

Figure 44: SAR Body Testing Results for the SHL25 Mobile Handset at 710.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-14:11:06	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.80°C	**LIQUID SIMULANT:**	700Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	25.80%	**CONDUCTIVITY:**	0.985
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	5.00mm
DUT POSITION:	10mm-Right Edge	**MAX SAR Y-AXIS LOCATION:**	-2.00mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	14.261
TEST FREQUENCY:	710.0MHz	**SAR 1g:**	0.196 W/kg
TYPE OF MODULATION:	QPSK (LTE)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.212 W/kg
INPUT POWER LEVEL:	25dBm	**SAR END:**	0.211 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	-0.400 %

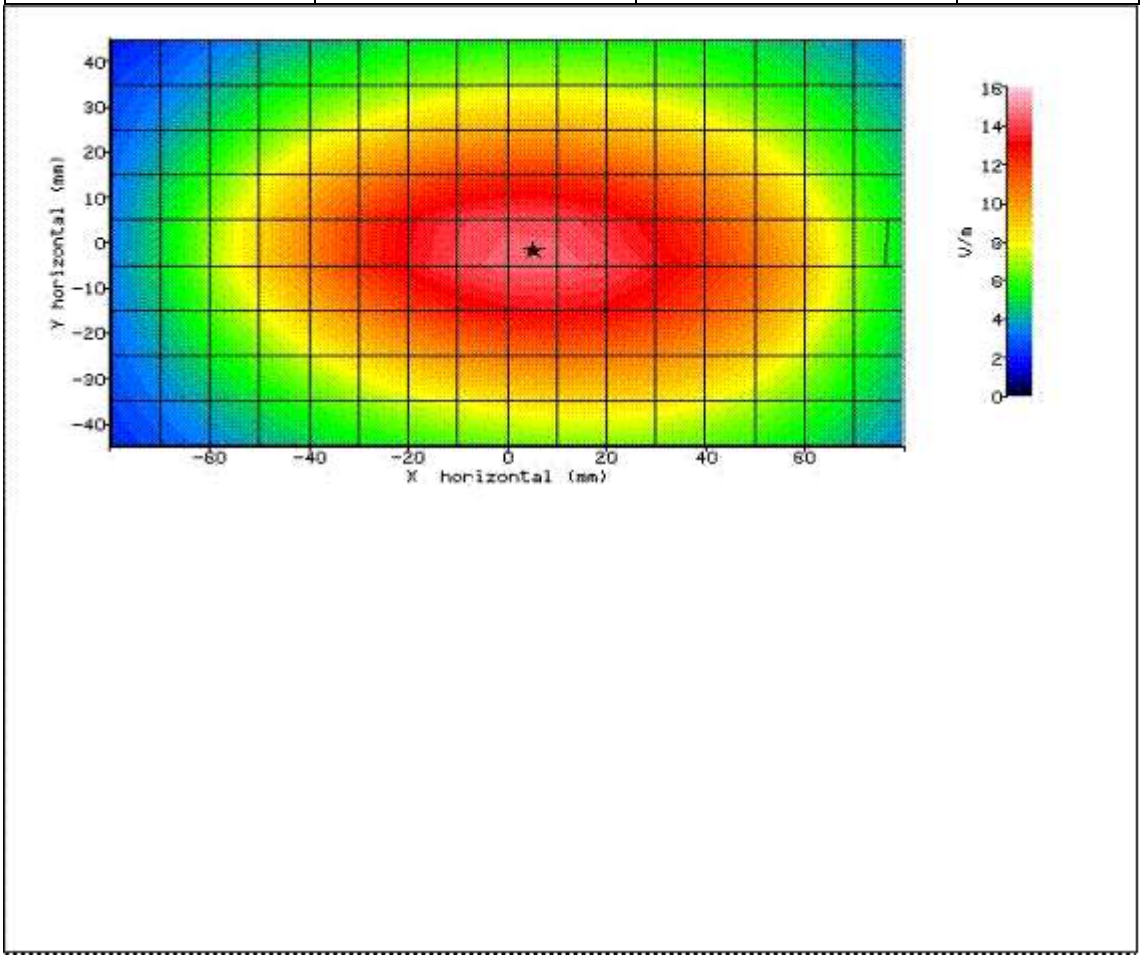

Figure 45: SAR Body Testing Results for the SHL25 Mobile Handset at 710.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-14:26:23	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.80°C	**LIQUID SIMULANT:**	700Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	55.59
RELATIVE HUMIDITY:	25.80%	**CONDUCTIVITY:**	0.985
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	3.80mm
DUT POSITION:	10mm-Bottom Edge	**MAX SAR Y-AXIS LOCATION:**	2.70mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	7.855
TEST FREQUENCY:	710.0MHz	**SAR 1g:**	0.066 W/kg
TYPE OF MODULATION:	QPSK (LTE)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.071 W/kg
INPUT POWER LEVEL:	25dBm	**SAR END:**	0.071 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	0.100 %

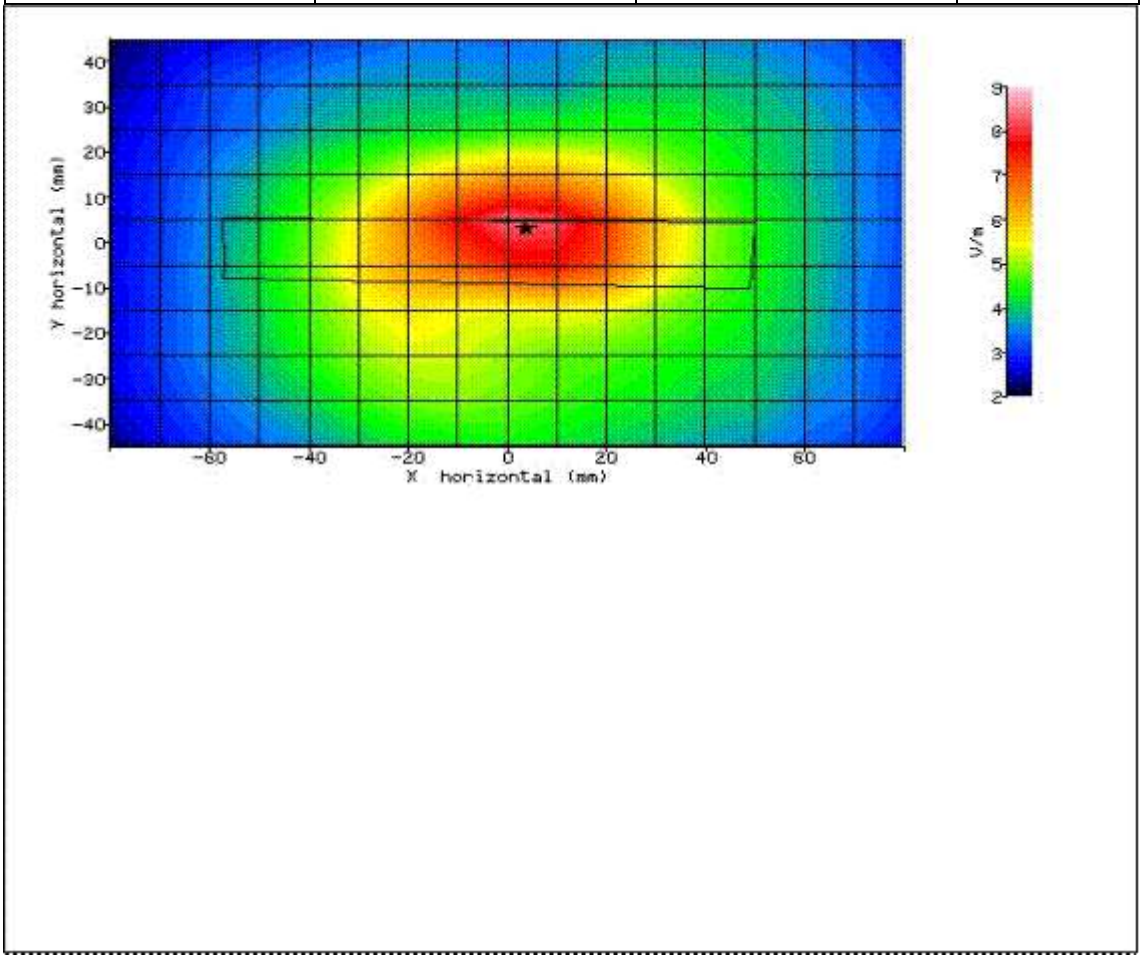

Figure 46: SAR Body Testing Results for the SHL25 Mobile Handset at 710.0MHz.

2.11 GSM 1900MHz HEAD SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	03/04/2014-13:37:37	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.50°C	**LIQUID SIMULANT:**	1900Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	39.00
RELATIVE HUMIDITY:	45.80%	**CONDUCTIVITY:**	1.435
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	57.10mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-101.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	10.219
TEST FREQUENCY:	1909.8MHz	**SAR 1g:**	0.165 W/kg
TYPE OF MODULATION:	GMSK (Voice Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	12.5%	**SAR START:**	0.152 W/kg
INPUT POWER LEVEL:	30.5dBm	**SAR END:**	0.161 W/kg
PROBE BATTERY LAST CHANGED:	03/04/2014	**SAR DRIFT DURING SCAN:**	5.900 %

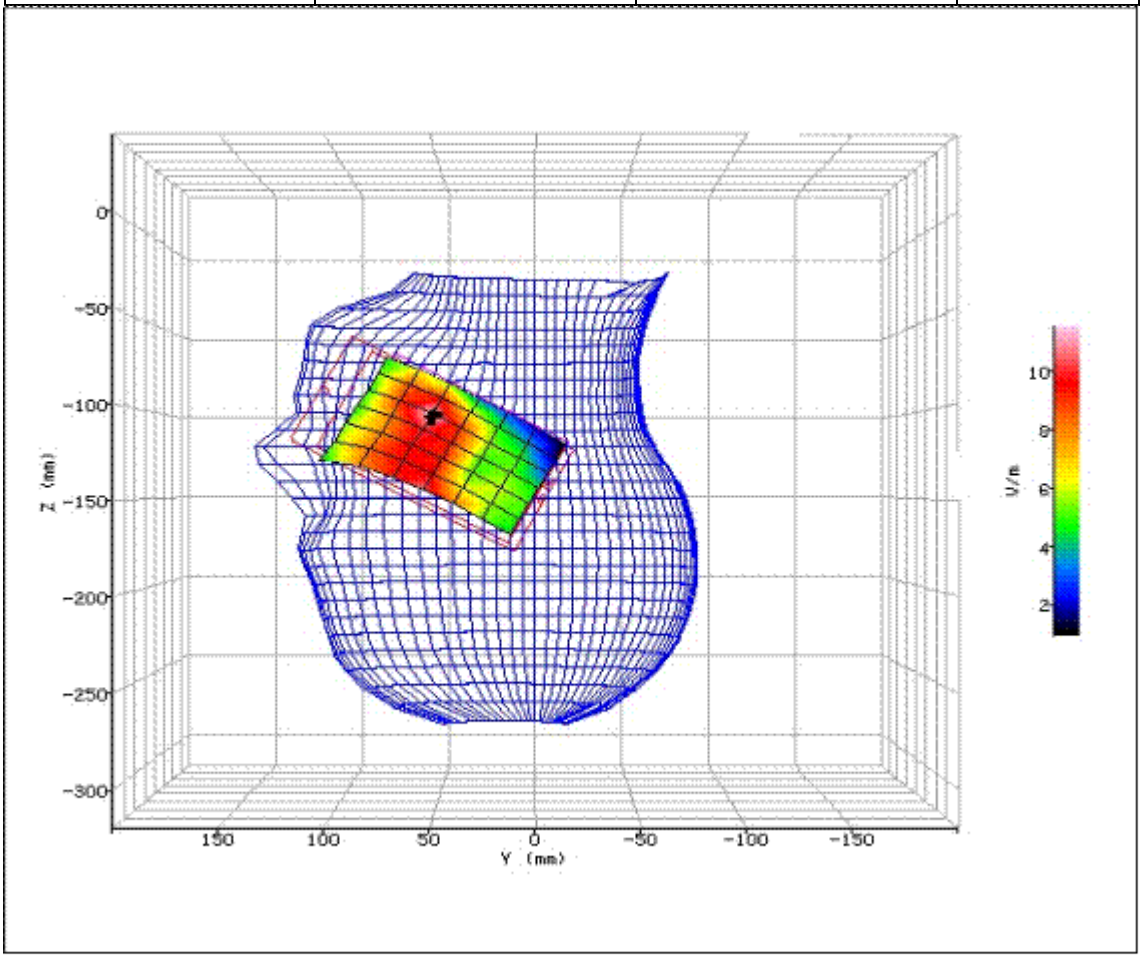

Figure 47: SAR Head Testing Results for the SHL25 Mobile Handset at 1909.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	03/04/2014-14:11:11	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.50°C	**LIQUID SIMULANT:**	1900Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	39.00
RELATIVE HUMIDITY:	45.80%	**CONDUCTIVITY:**	1.435
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	12.40mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-141.20mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	7.240
TEST FREQUENCY:	1909.8MHz	**SAR 1g:**	0.103 W/kg
TYPE OF MODULATION:	GMSK (Voice Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	12.5%	**SAR START:**	0.094 W/kg
INPUT POWER LEVEL:	30.5dBm	**SAR END:**	0.085 W/kg
PROBE BATTERY LAST CHANGED:	03/04/2014	**SAR DRIFT DURING SCAN:**	-9.600 %

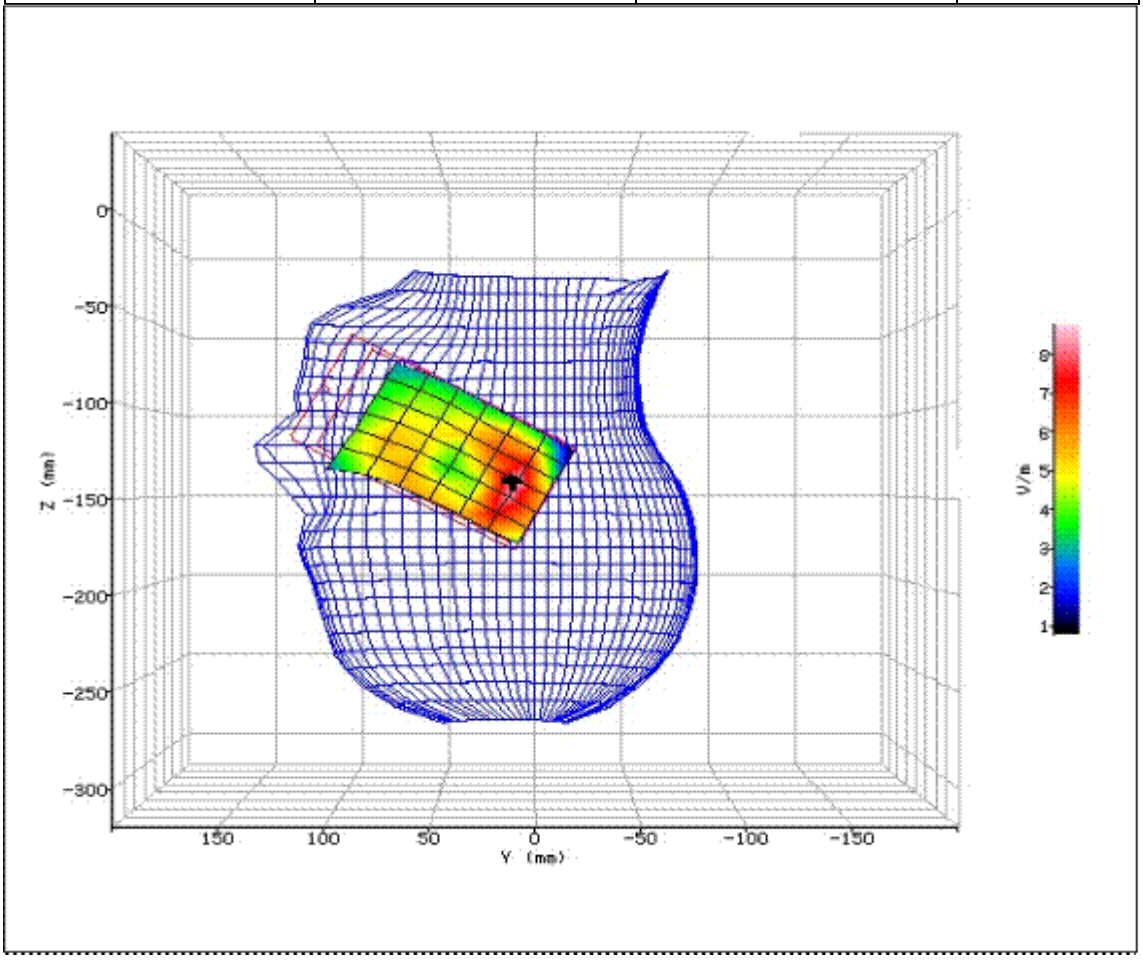

Figure 48: SAR Head Testing Results for the SHL25 Mobile Handset at 1909.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	03/04/2014-14:56:46	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.50°C	**LIQUID SIMULANT:**	1900Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	39.00
RELATIVE HUMIDITY:	45.80%	**CONDUCTIVITY:**	1.435
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	59.70mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-98.40mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	15.501
TEST FREQUENCY:	1909.8MHz	**SAR 1g:**	0.325 W/kg
TYPE OF MODULATION:	GMSK (Voice Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	12.5%	**SAR START:**	0.393 W/kg
INPUT POWER LEVEL:	30.5dBm	**SAR END:**	0.368 W/kg
PROBE BATTERY LAST CHANGED:	03/04/2014	**SAR DRIFT DURING SCAN:**	-6.400 %

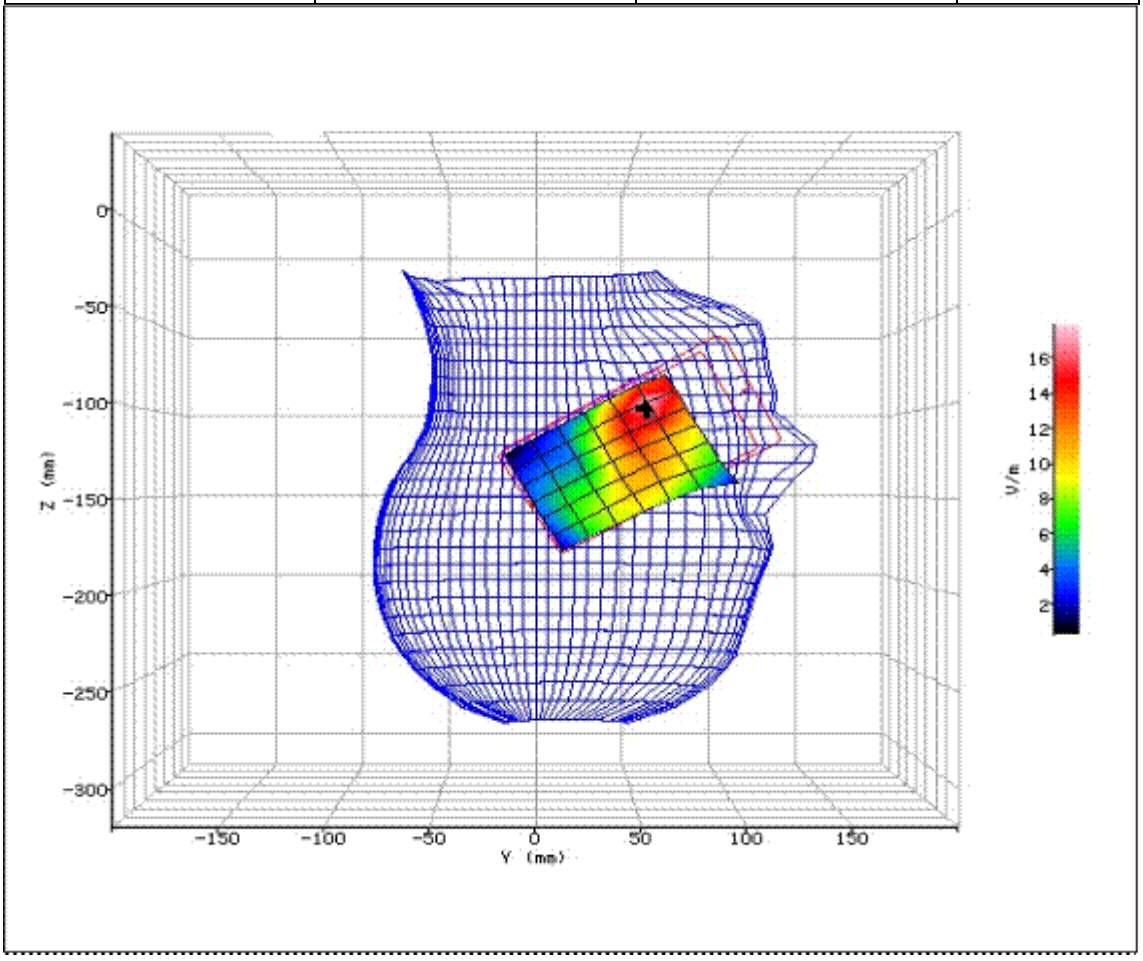

Figure 49: SAR Head Testing Results for the SHL25 Mobile Handset at 1909.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	03/04/2014-15:26:36	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.50°C	**LIQUID SIMULANT:**	1900Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	39.00
RELATIVE HUMIDITY:	45.80%	**CONDUCTIVITY:**	1.435
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	30.50mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-159.50mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	8.685
TEST FREQUENCY:	1909.8MHz	**SAR 1g:**	0.126 W/kg
TYPE OF MODULATION:	GMSK (Voice Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	12.5%	**SAR START:**	0.124 W/kg
INPUT POWER LEVEL:	30.5dBm	**SAR END:**	0.116 W/kg
PROBE BATTERY LAST CHANGED:	03/04/2014	**SAR DRIFT DURING SCAN:**	-6.500 %

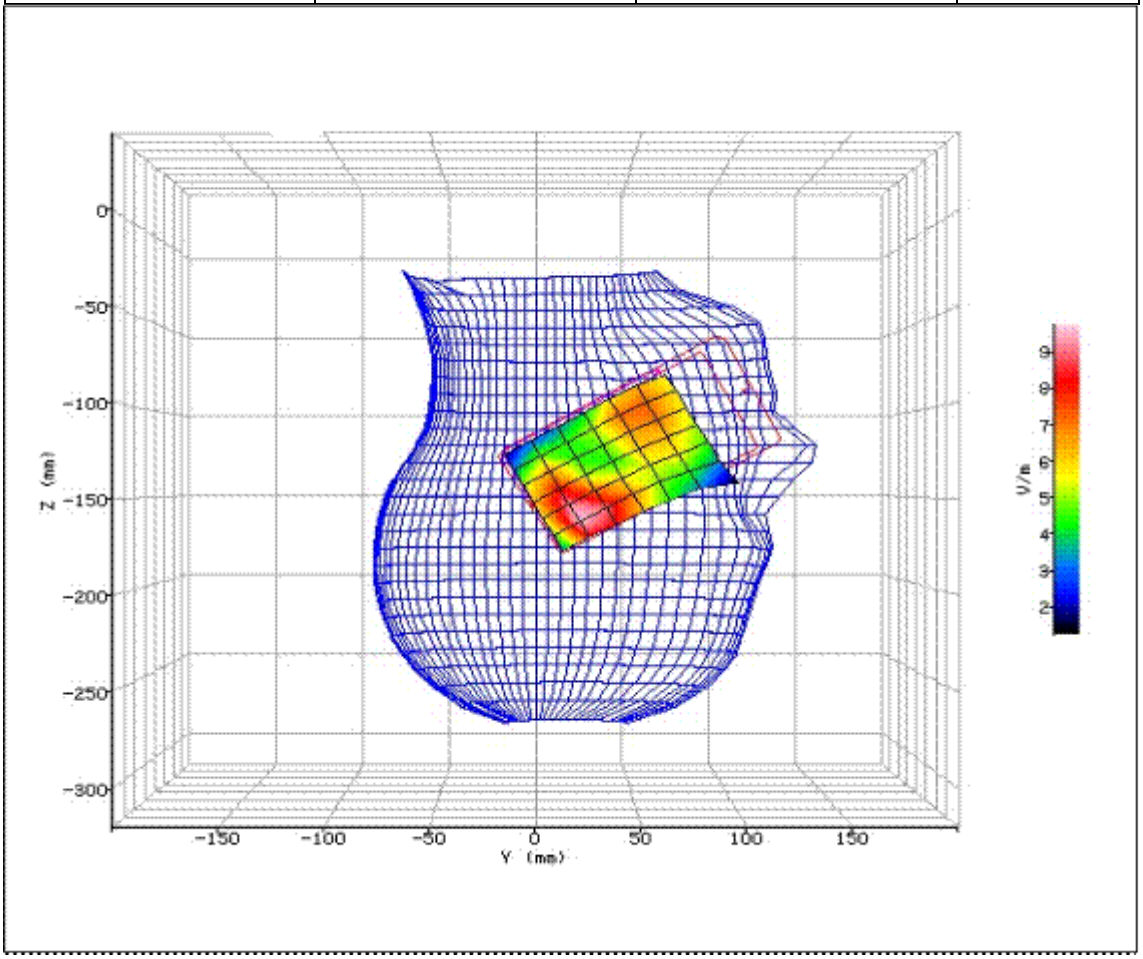

Figure 50: SAR Head Testing Results for the SHL25 Mobile Handset at 1909.8MHz.

2.12 GSM 1900MHz HEAD SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	04/04/2014-09:26:28	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.00°C	**LIQUID SIMULANT:**	1900Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	39.00
RELATIVE HUMIDITY:	38.40%	**CONDUCTIVITY:**	1.435
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	56.30mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-102.90mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	10.296
TEST FREQUENCY:	1909.8MHz	**SAR 1g:**	0.150 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.156 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.160 W/kg
PROBE BATTERY LAST CHANGED:	04/04/2014	**SAR DRIFT DURING SCAN:**	2.600 %

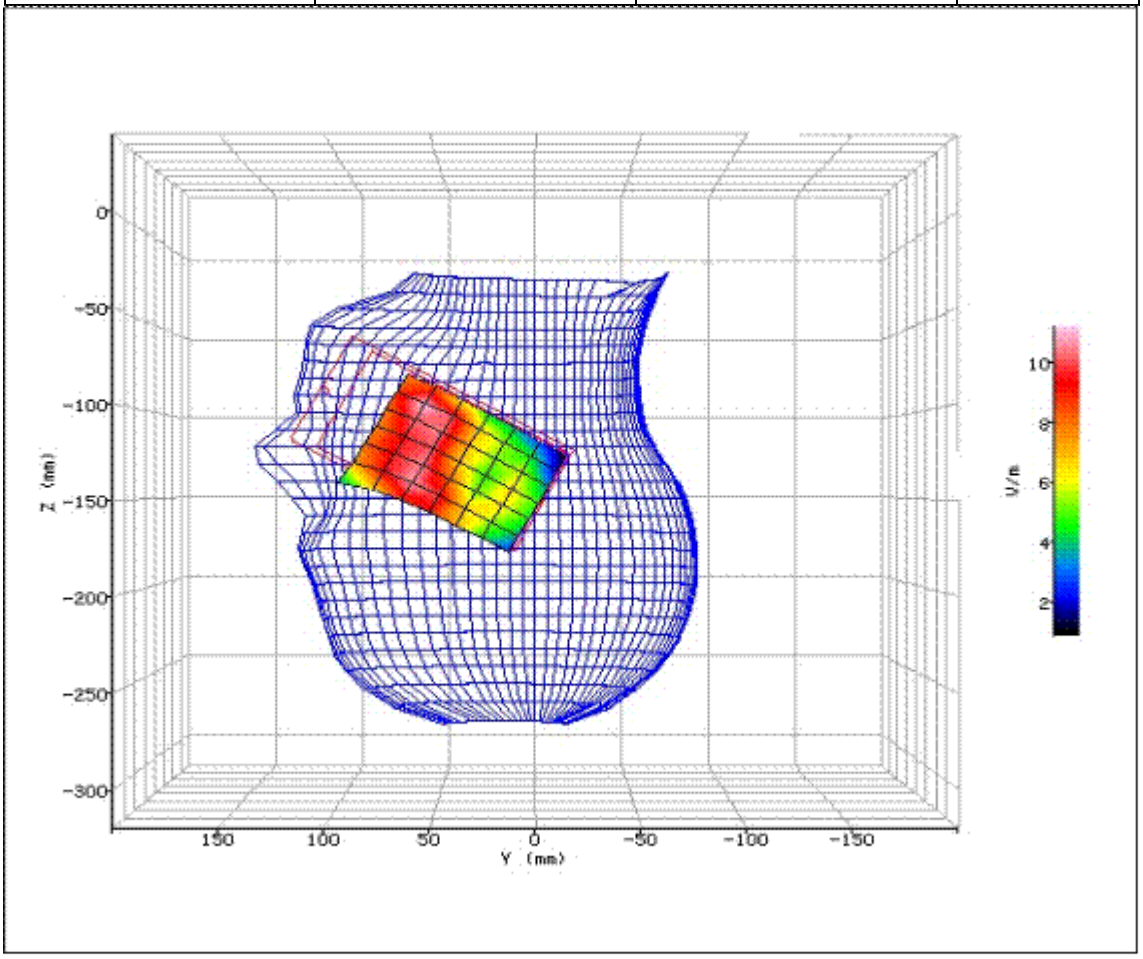

Figure 51: SAR Head Testing Results for the SHL25 Mobile Handset at 1909.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	04/04/2014-09:53:01	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.00°C	**LIQUID SIMULANT:**	1900Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	39.00
RELATIVE HUMIDITY:	38.40%	**CONDUCTIVITY:**	1.435
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	12.90mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-143.40mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	7.563
TEST FREQUENCY:	1909.8MHz	**SAR 1g:**	0.104 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.094 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.097 W/kg
PROBE BATTERY LAST CHANGED:	04/04/2014	**SAR DRIFT DURING SCAN:**	3.200 %

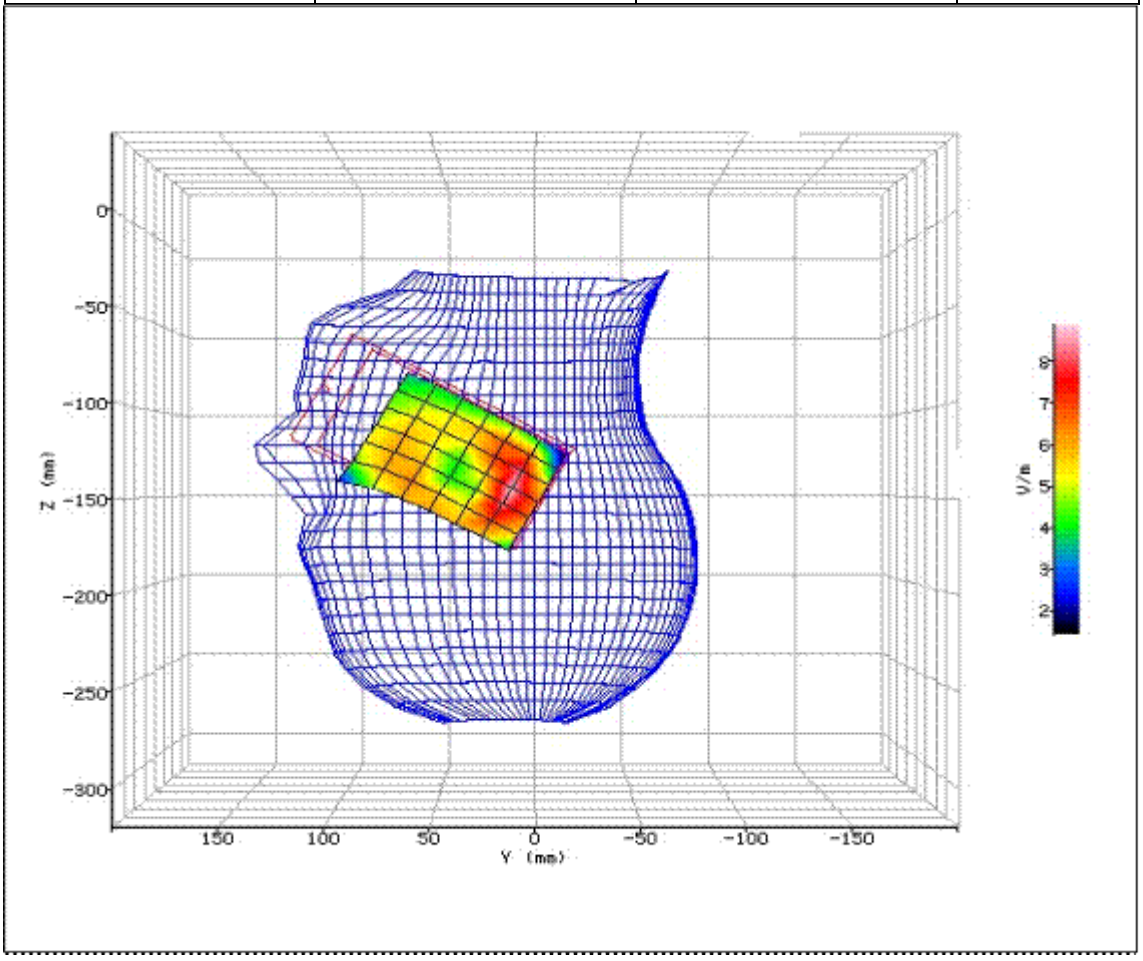

Figure 52: SAR Head Testing Results for the SHL25 Mobile Handset at 1909.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	03/04/2014-16:18:04	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.50°C	**LIQUID SIMULANT:**	1900Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	39.00
RELATIVE HUMIDITY:	45.80%	**CONDUCTIVITY:**	1.435
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	59.50mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-99.80mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	15.506
TEST FREQUENCY:	1909.8MHz	**SAR 1g:**	0.321 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.374 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.366 W/kg
PROBE BATTERY LAST CHANGED:	03/04/2014	**SAR DRIFT DURING SCAN:**	-2.100 %

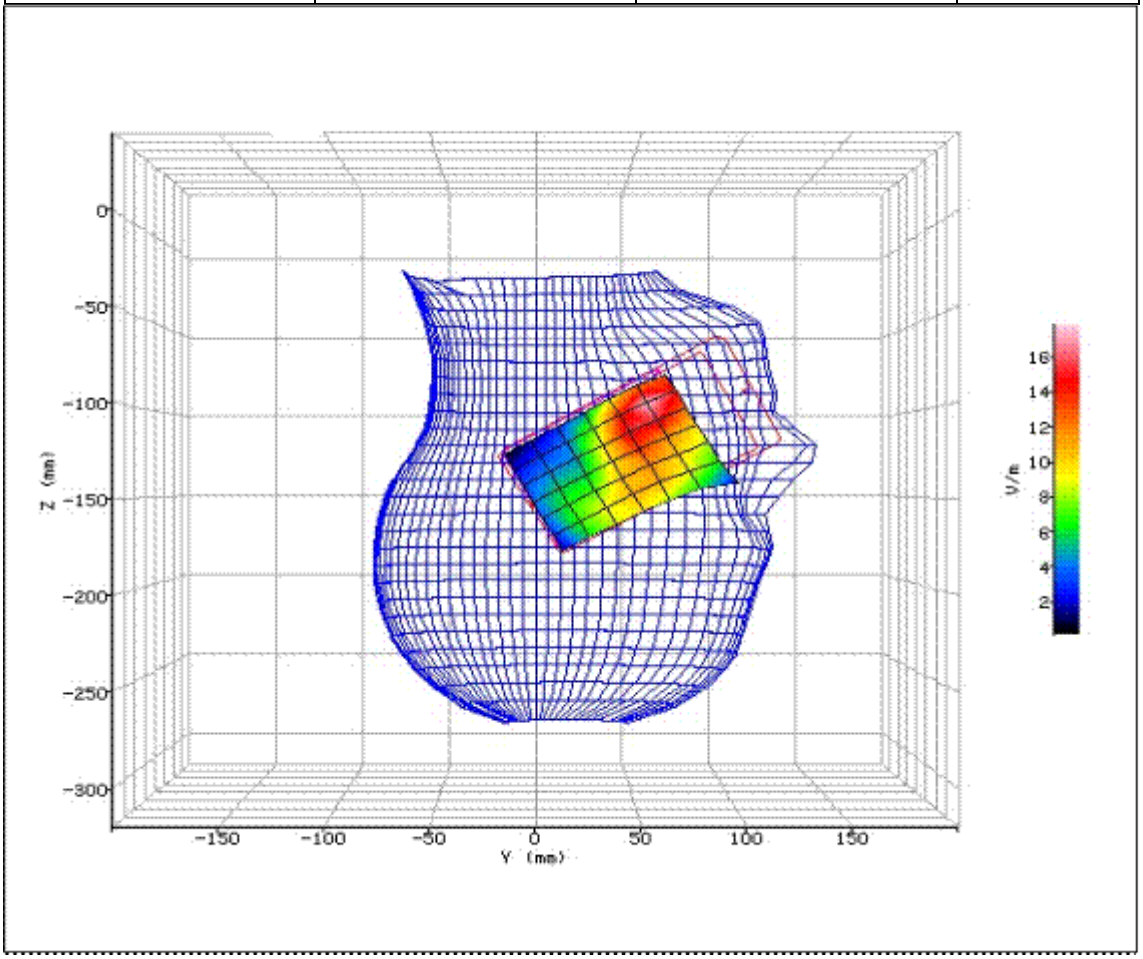

Figure 53: SAR Head Testing Results for the SHL25 Mobile Handset at 1909.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	03/04/2014-16:41:27	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.50°C	**LIQUID SIMULANT:**	1900Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	39.00
RELATIVE HUMIDITY:	45.80%	**CONDUCTIVITY:**	1.435
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	31.70mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-160.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	8.807
TEST FREQUENCY:	1909.8MHz	**SAR 1g:**	0.124 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.127 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.124 W/kg
PROBE BATTERY LAST CHANGED:	03/04/2014	**SAR DRIFT DURING SCAN:**	-2.400 %

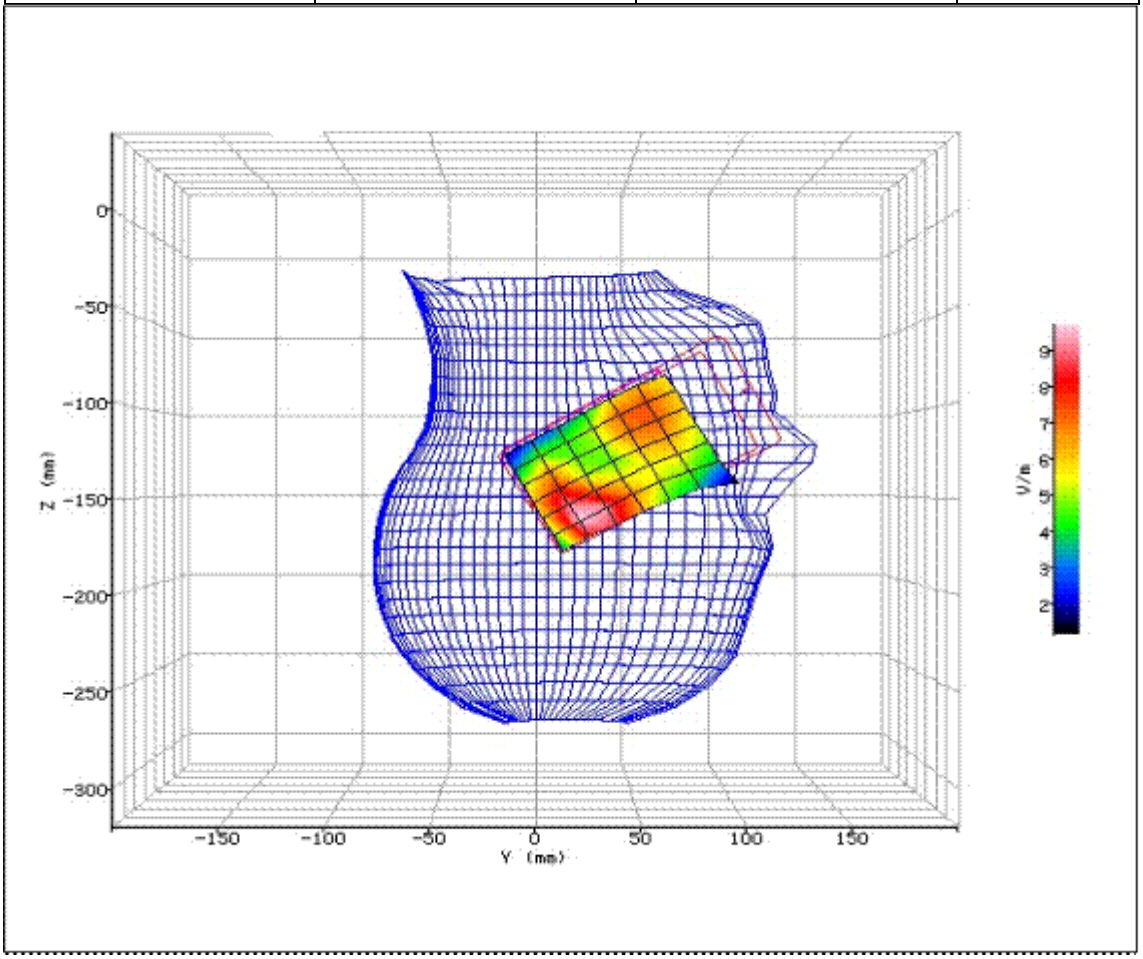

Figure 54: SAR Head Testing Results for the SHL25 Mobile Handset at 1909.8MHz.

2.13 GSM 1900MHz BODY SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	09/04/2014-07:27:25	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.20°C	**LIQUID SIMULANT:**	1900Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	53.05
RELATIVE HUMIDITY:	30.10%	**CONDUCTIVITY:**	1.594
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	40.20mm
DUT POSITION:	10mm-Front Facing	**MAX SAR Y-AXIS LOCATION:**	-1.20mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	12.442
TEST FREQUENCY:	1909.8MHz	**SAR 1g:**	0.234 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.253 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.245 W/kg
PROBE BATTERY LAST CHANGED:	09/04/2014	**SAR DRIFT DURING SCAN:**	-3.200 %

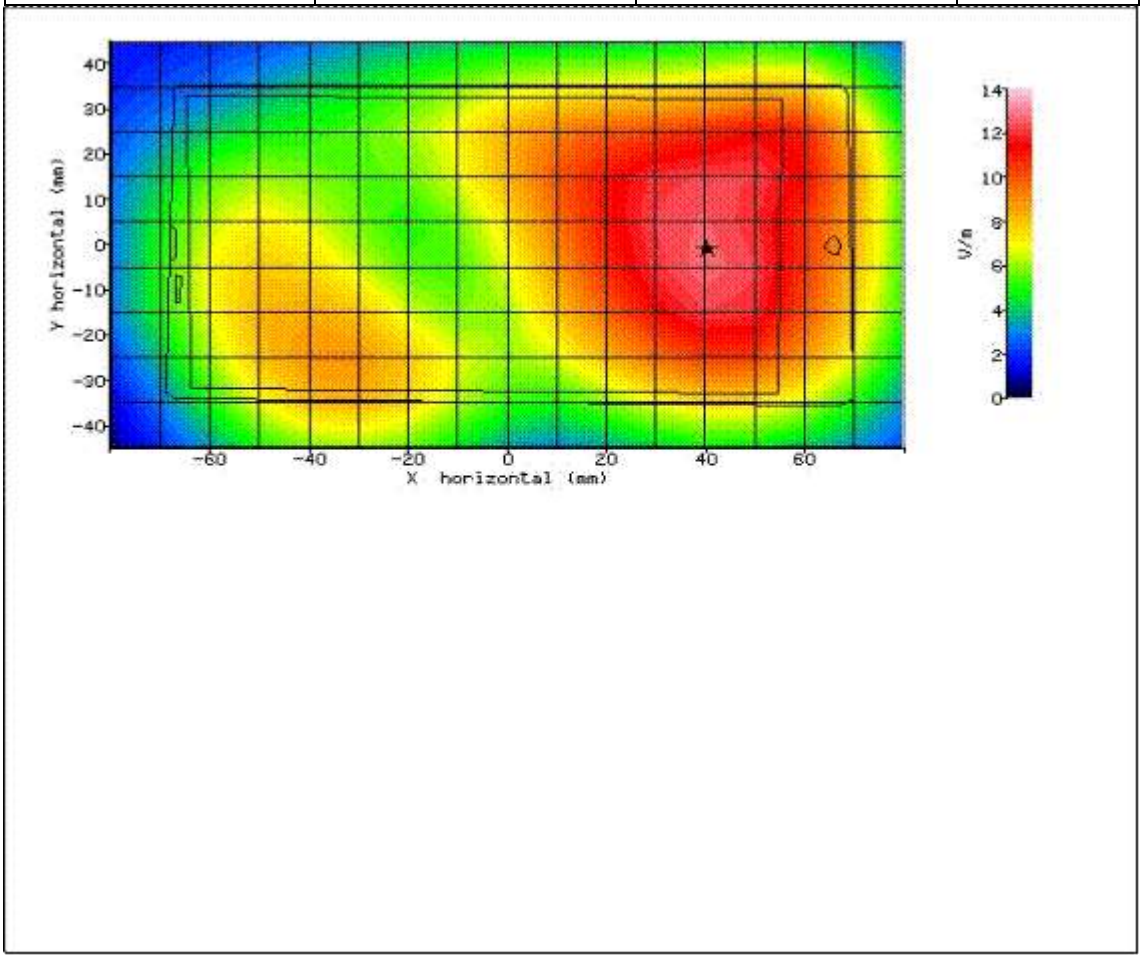

Figure 55: SAR Body Testing Results for the SHL25 Mobile Handset at 1909.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	09/04/2014-07:49:29	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.20°C	**LIQUID SIMULANT:**	1900Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	53.05
RELATIVE HUMIDITY:	30.10%	**CONDUCTIVITY:**	1.594
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	31.00mm
DUT POSITION:	10mm-Rear Facing	**MAX SAR Y-AXIS LOCATION:**	-9.60mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	12.619
TEST FREQUENCY:	1909.8MHz	**SAR 1g:**	0.245 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.266 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.259 W/kg
PROBE BATTERY LAST CHANGED:	09/04/2014	**SAR DRIFT DURING SCAN:**	-2.500 %

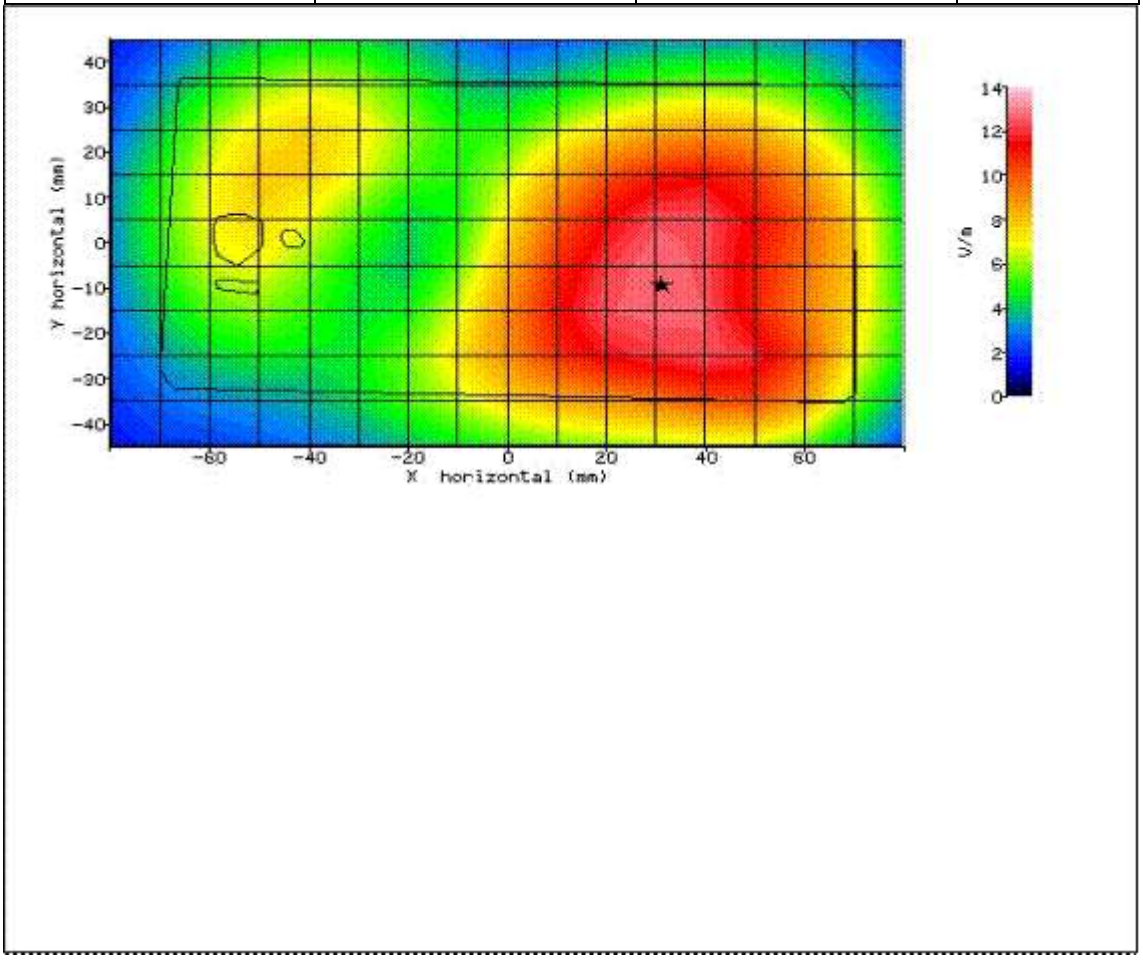

Figure 56: SAR Body Testing Results for the SHL25 Mobile Handset at 1909.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	09/04/2014-08:34:33	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.20°C	**LIQUID SIMULANT:**	1900Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	53.05
RELATIVE HUMIDITY:	30.10%	**CONDUCTIVITY:**	1.594
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	45.20mm
DUT POSITION:	10mm-Left Edge	**MAX SAR Y-AXIS LOCATION:**	1.80mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	10.947
TEST FREQUENCY:	1909.8MHz	**SAR 1g:**	0.200 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.222 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.221 W/kg
PROBE BATTERY LAST CHANGED:	09/04/2014	**SAR DRIFT DURING SCAN:**	-0.300 %

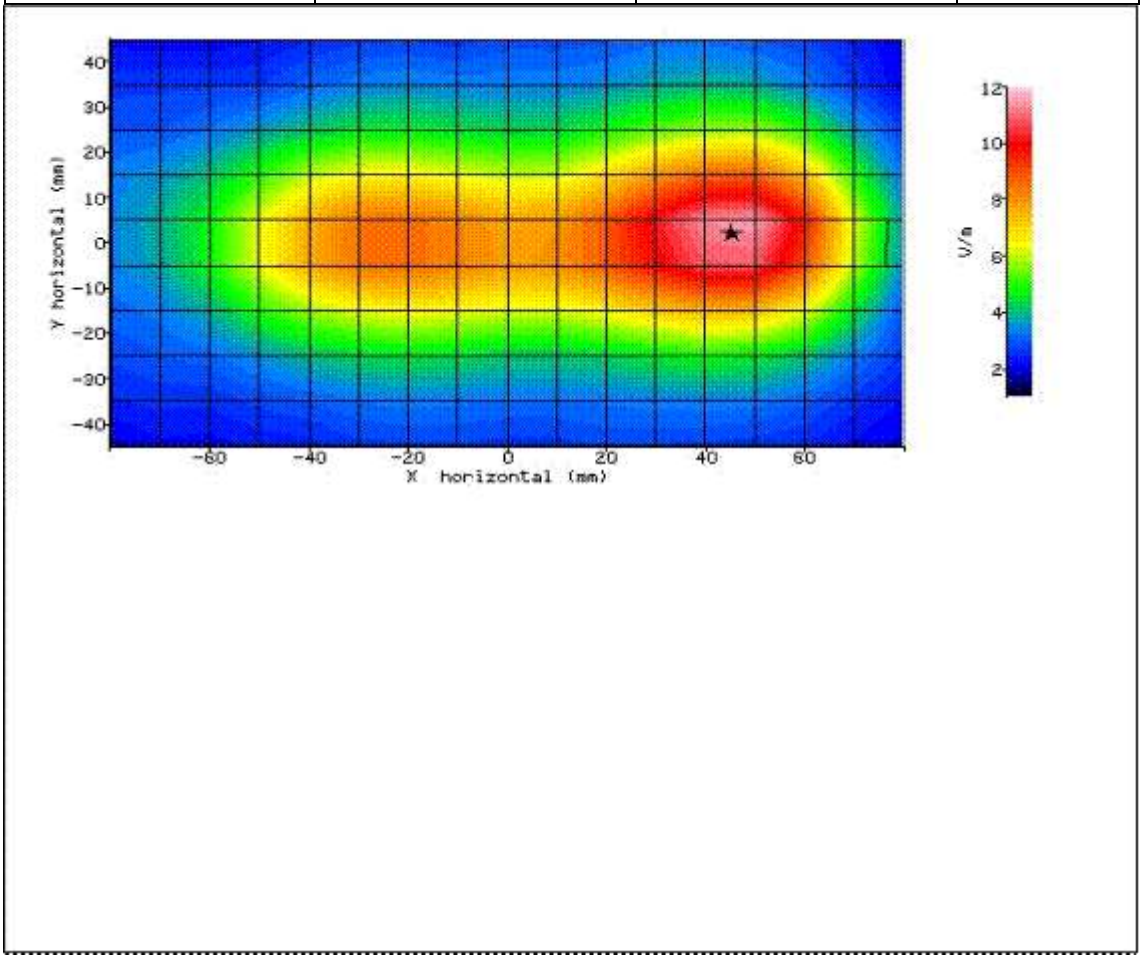

Figure 57: SAR Body Testing Results for the SHL25 Mobile Handset at 1909.8MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	09/04/2014-08:52:20	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.20°C	**LIQUID SIMULANT:**	1900Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	53.05
RELATIVE HUMIDITY:	30.10%	**CONDUCTIVITY:**	1.594
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	8.00mm
DUT POSITION:	10mm-Bottom Edge	**MAX SAR Y-AXIS LOCATION:**	1.90mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	10.429
TEST FREQUENCY:	1909.8MHz	**SAR 1g:**	0.184 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	50%	**SAR START:**	0.208 W/kg
INPUT POWER LEVEL:	24.9dBm	**SAR END:**	0.212 W/kg
PROBE BATTERY LAST CHANGED:	09/04/2014	**SAR DRIFT DURING SCAN:**	2.000 %

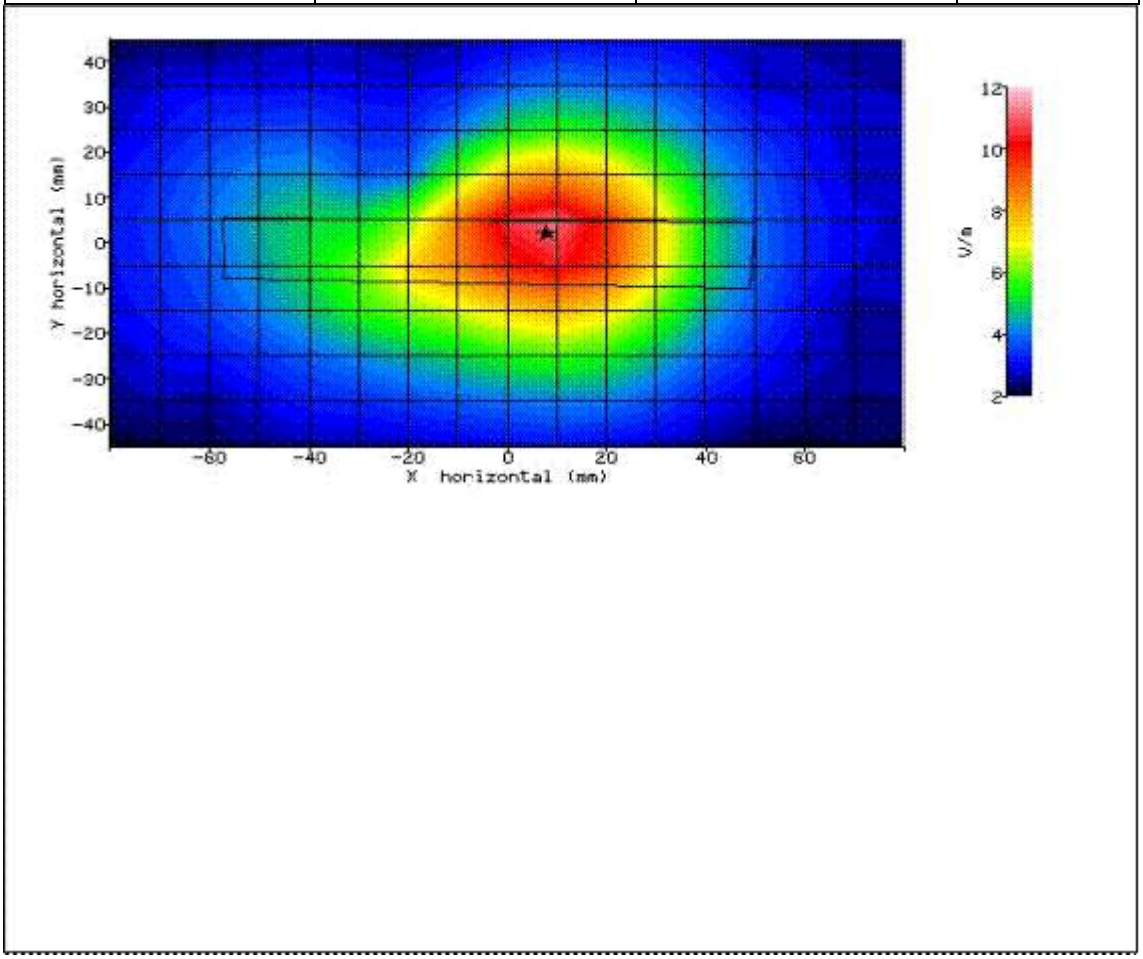

Figure 58: SAR Body Testing Results for the SHL25 Mobile Handset at 1909.8MHz.

2.14 WLAN 2450MHz HEAD SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	10/04/2014-11:53:42	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.30°C	**LIQUID SIMULANT:**	2450Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	39.00
RELATIVE HUMIDITY:	29.00%	**CONDUCTIVITY:**	1.435
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.20°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	9.50mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-150.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	10.133
TEST FREQUENCY:	2412.0MHz	**SAR 1g:**	0.284 W/kg
TYPE OF MODULATION:	WLAN (DSSS)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.225 W/kg
INPUT POWER LEVEL:	17.5dBm	**SAR END:**	0.231 W/kg
PROBE BATTERY LAST CHANGED:	10/04/2014	**SAR DRIFT DURING SCAN:**	2.700 %

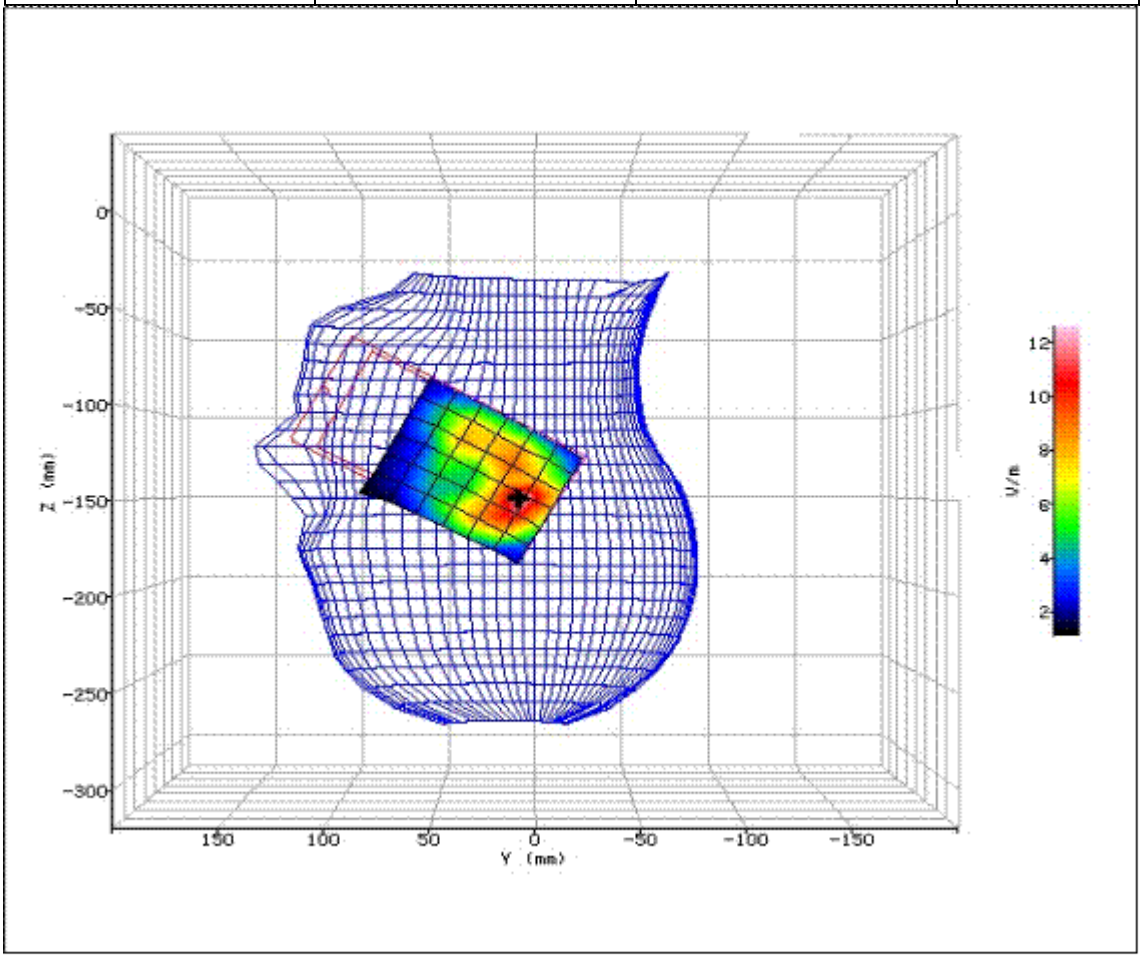

Figure 59: SAR Head Testing Results for the SHL25 Mobile Handset at 2412.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	10/04/2014-12:14:52	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.30°C	**LIQUID SIMULANT:**	2450Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	39.00
RELATIVE HUMIDITY:	29.00%	**CONDUCTIVITY:**	1.435
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.20°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	7.20mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-150.80mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	9.973
TEST FREQUENCY:	2412.0MHz	**SAR 1g:**	0.284 W/kg
TYPE OF MODULATION:	WLAN (DSSS)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.236 W/kg
INPUT POWER LEVEL:	17.5dBm	**SAR END:**	0.232 W/kg
PROBE BATTERY LAST CHANGED:	10/04/2014	**SAR DRIFT DURING SCAN:**	-1.700 %

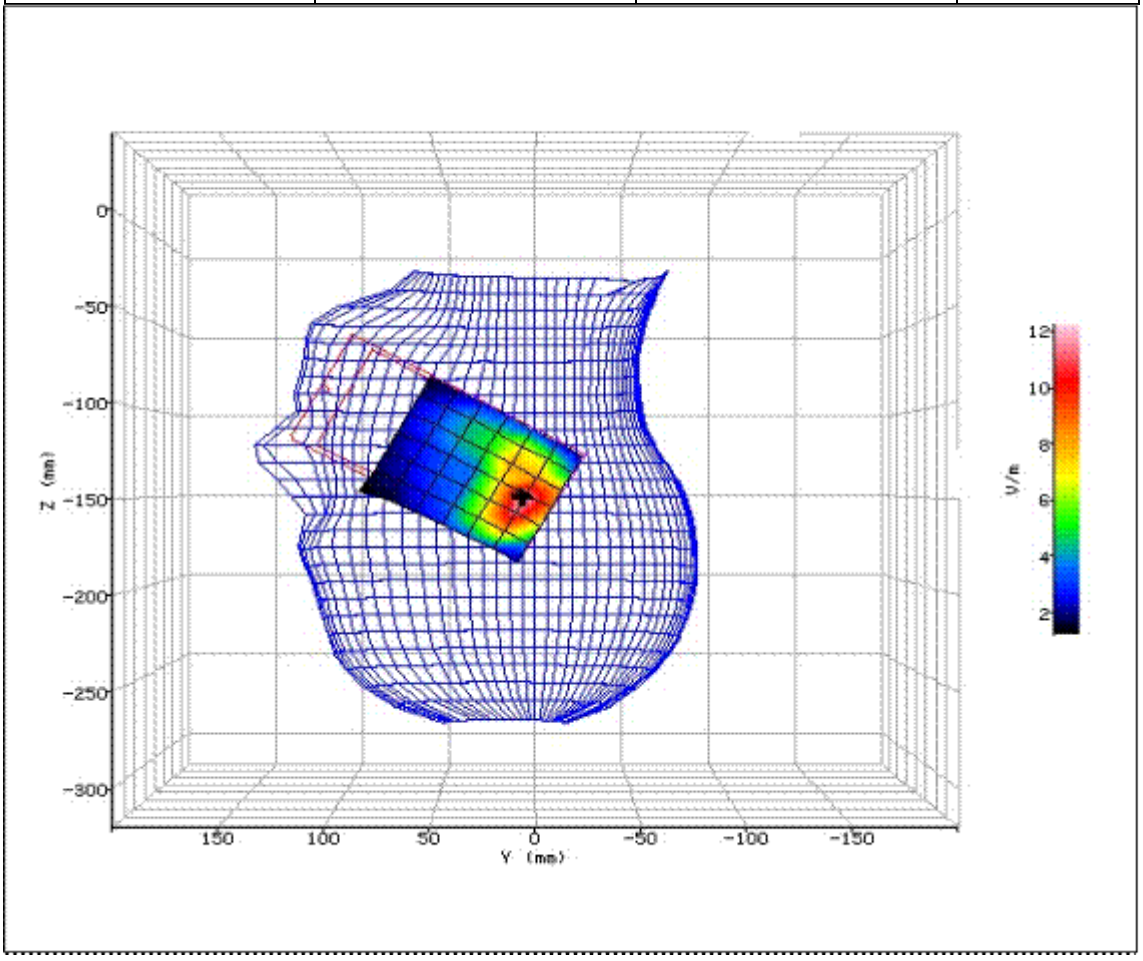

Figure 60: SAR Head Testing Results for the SHL25 Mobile Handset at 2412.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	10/04/2014-12:58:09	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.30°C	**LIQUID SIMULANT:**	2450Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	39.00
RELATIVE HUMIDITY:	29.00%	**CONDUCTIVITY:**	1.435
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.20°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	20.10mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-163.60mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	12.167
TEST FREQUENCY:	2412.0MHz	**SAR 1g:**	0.346 W/kg
TYPE OF MODULATION:	WLAN (DSSS)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.297 W/kg
INPUT POWER LEVEL:	17.5dBm	**SAR END:**	0.280 W/kg
PROBE BATTERY LAST CHANGED:	10/04/2014	**SAR DRIFT DURING SCAN:**	-5.700 %

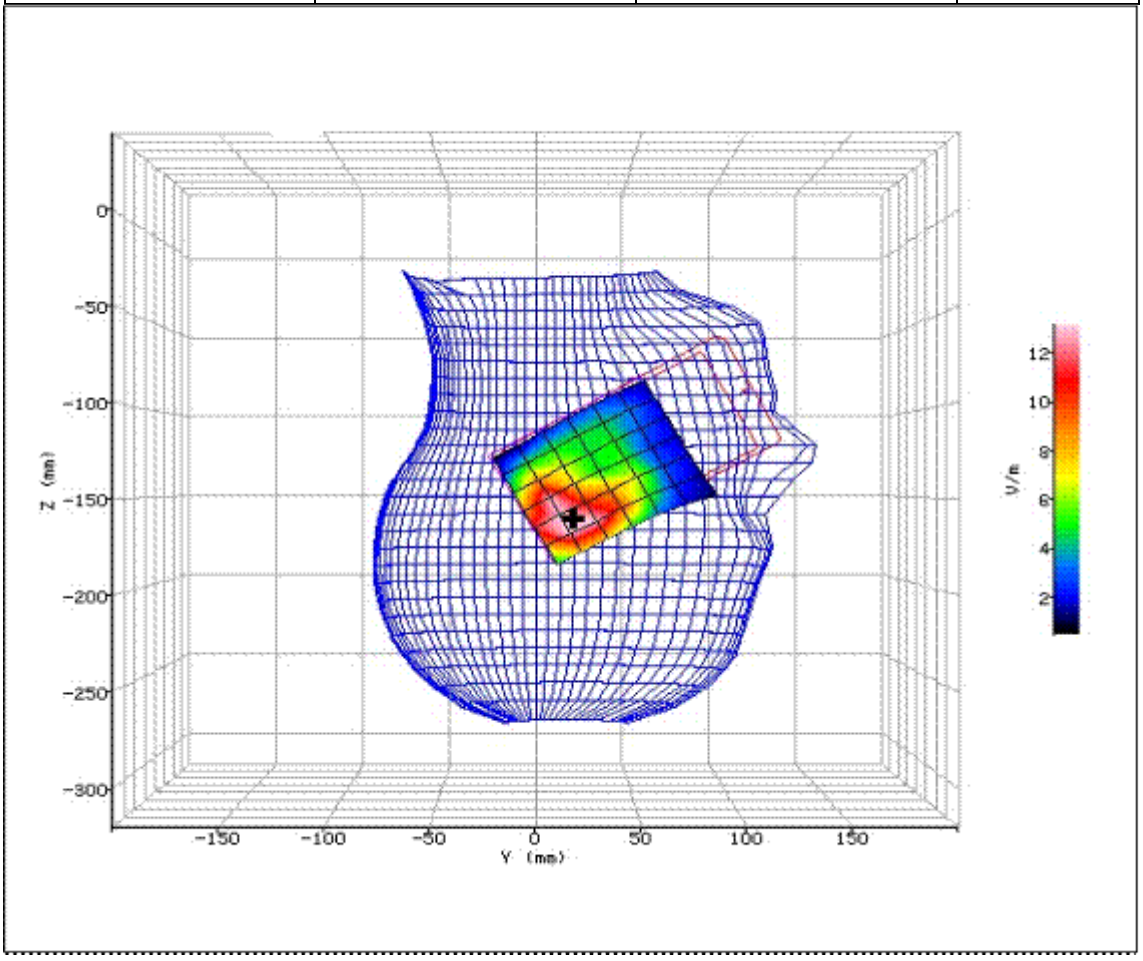

Figure 61: SAR Head Testing Results for the SHL25 Mobile Handset at 2412.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	10/04/2014-14:12:05	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.30°C	**LIQUID SIMULANT:**	2450Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	39.00
RELATIVE HUMIDITY:	29.00%	**CONDUCTIVITY:**	1.435
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.20°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	14.20mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-161.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	11.857
TEST FREQUENCY:	2412.0MHz	**SAR 1g:**	0.395 W/kg
TYPE OF MODULATION:	WLAN (DSSS)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.265 W/kg
INPUT POWER LEVEL:	17.5dBm	**SAR END:**	0.274 W/kg
PROBE BATTERY LAST CHANGED:	10/04/2014	**SAR DRIFT DURING SCAN:**	3.400 %

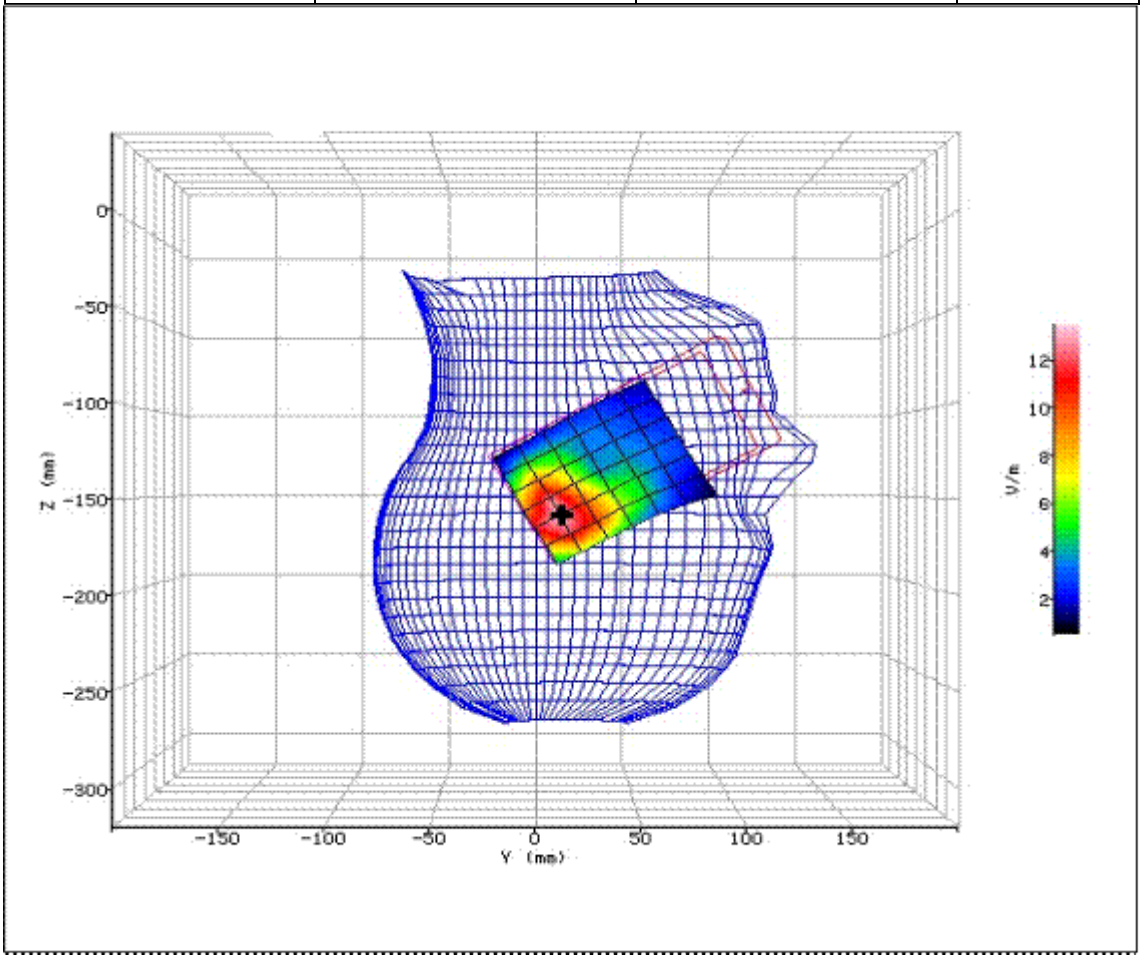

Figure 62: SAR Head Testing Results for the SHL25 Mobile Handset at 2412.0MHz.

2.15 WLAN 2450MHz BODY SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	10/04/2014-07:22:52	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	2450Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	50.93
RELATIVE HUMIDITY:	32.10%	**CONDUCTIVITY:**	1.973
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-66.60mm
DUT POSITION:	10mm-Front Facing	**MAX SAR Y-AXIS LOCATION:**	-2.70mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	6.602
TEST FREQUENCY:	2412.0MHz	**SAR 1g:**	0.102 W/kg
TYPE OF MODULATION:	WLAN (DSSS)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.103 W/kg
INPUT POWER LEVEL:	17.5dBm	**SAR END:**	0.103 W/kg
PROBE BATTERY LAST CHANGED:	10/04/2014	**SAR DRIFT DURING SCAN:**	0.900 %

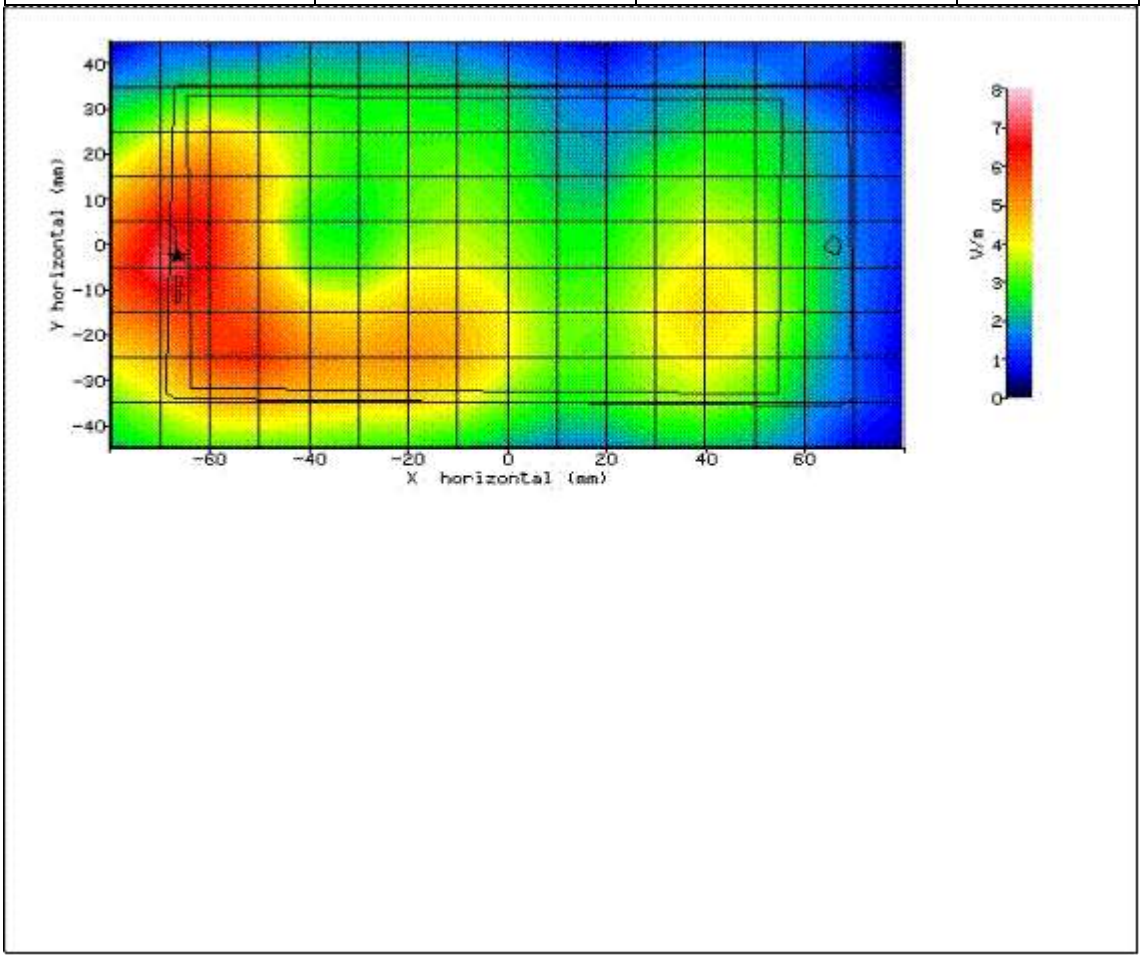

Figure 63: SAR Body Testing Results for the SHL25 Mobile Handset at 2412.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	10/04/2014-07:39:59	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	2450Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	50.93
RELATIVE HUMIDITY:	32.10%	**CONDUCTIVITY:**	1.973
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-58.70mm
DUT POSITION:	10mm-Rear Facing	**MAX SAR Y-AXIS LOCATION:**	8.60mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	9.895
TEST FREQUENCY:	2412.0MHz	**SAR 1g:**	0.226 W/kg
TYPE OF MODULATION:	WLAN (DSSS)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.243 W/kg
INPUT POWER LEVEL:	17.5dBm	**SAR END:**	0.235 W/kg
PROBE BATTERY LAST CHANGED:	10/04/2014	**SAR DRIFT DURING SCAN:**	-3.200 %

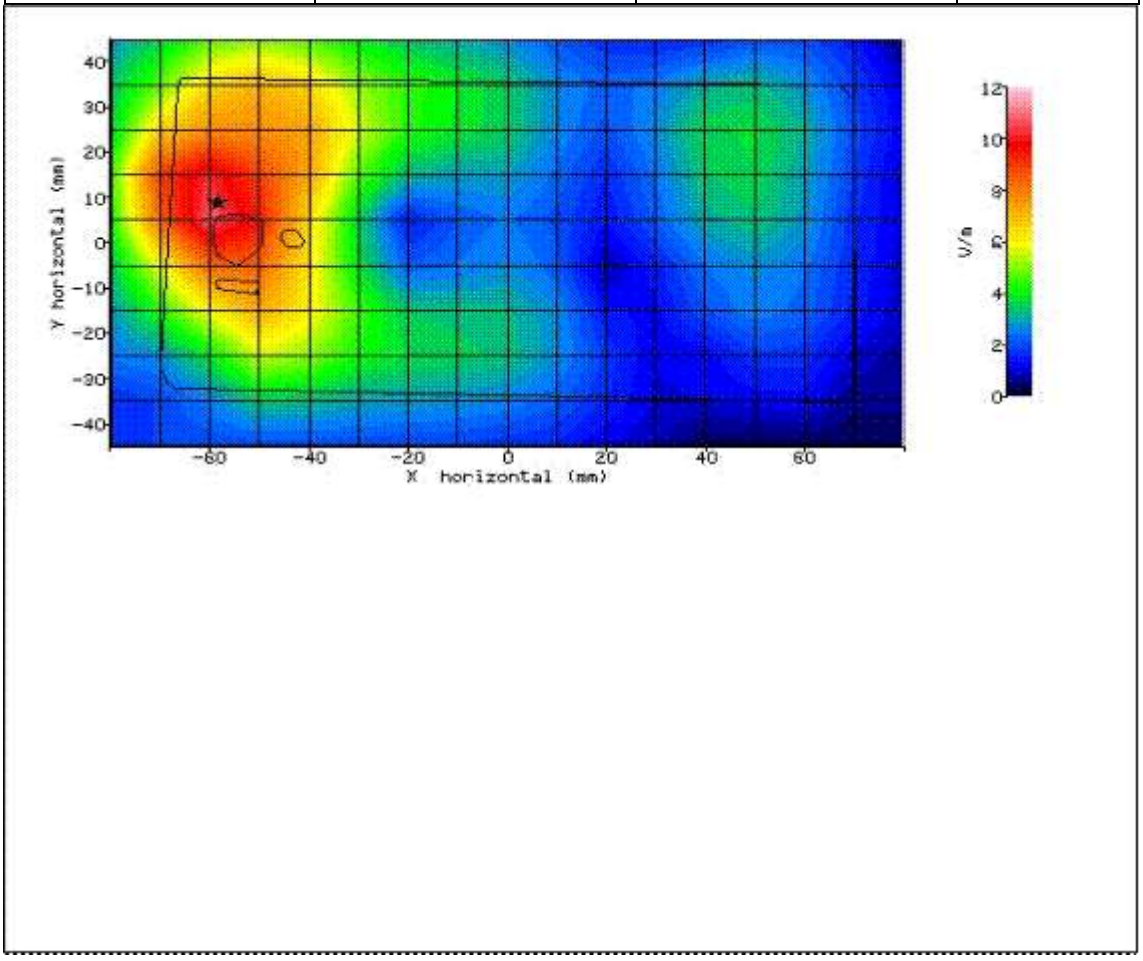

Figure 64: SAR Body Testing Results for the SHL25 Mobile Handset at 2412.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	10/04/2014-08:19:11	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	2450Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	50.93
RELATIVE HUMIDITY:	32.10%	**CONDUCTIVITY:**	1.973
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-57.90mm
DUT POSITION:	10mm-Right Edge	**MAX SAR Y-AXIS LOCATION:**	-1.70mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	5.049
TEST FREQUENCY:	2412.0MHz	**SAR 1g:**	0.054 W/kg
TYPE OF MODULATION:	WLAN (DSSS)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.061 W/kg
INPUT POWER LEVEL:	17.5dBm	**SAR END:**	0.056 W/kg
PROBE BATTERY LAST CHANGED:	10/04/2014	**SAR DRIFT DURING SCAN:**	-8.200 %

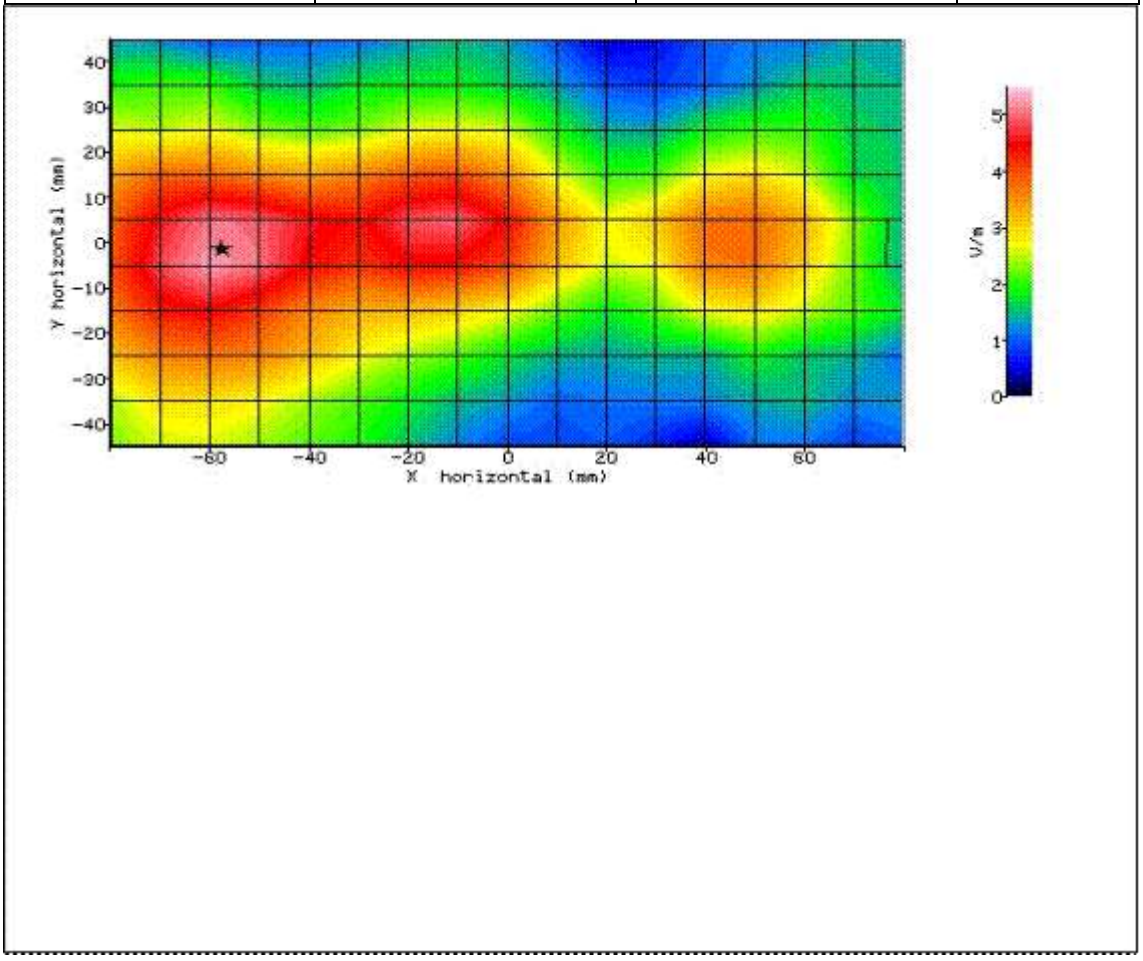

Figure 65: SAR Body Testing Results for the SHL25 Mobile Handset at 2412.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	10/04/2014-08:49:00	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	2450Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	50.93
RELATIVE HUMIDITY:	32.10%	**CONDUCTIVITY:**	1.973
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-11.20mm
DUT POSITION:	10mm-Top Edge	**MAX SAR Y-AXIS LOCATION:**	3.40mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	8.974
TEST FREQUENCY:	2412.0MHz	**SAR 1g:**	0.188 W/kg
TYPE OF MODULATION:	WLAN (DSSS)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.202 W/kg
INPUT POWER LEVEL:	17.5dBm	**SAR END:**	0.203 W/kg
PROBE BATTERY LAST CHANGED:	10/04/2014	**SAR DRIFT DURING SCAN:**	0.600 %

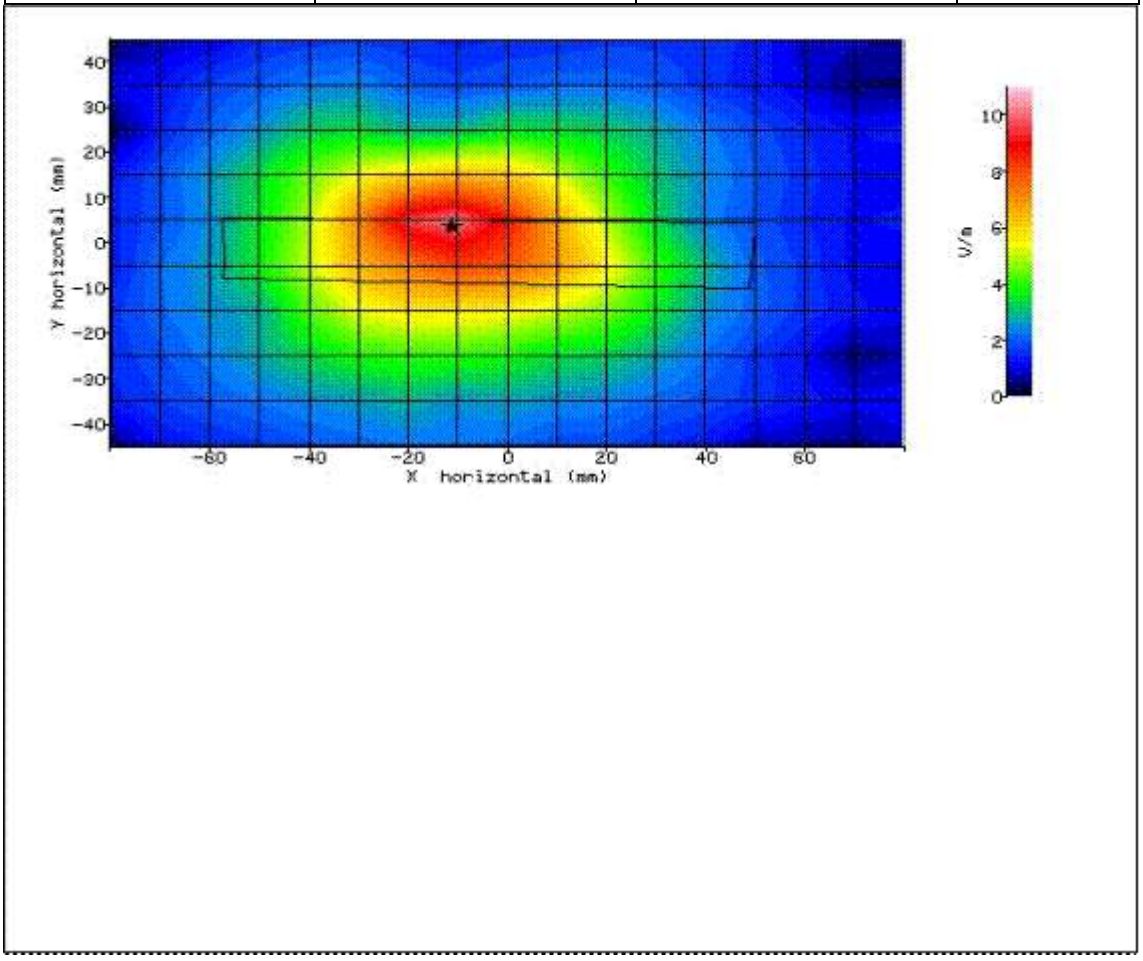

Figure 66: SAR Body Testing Results for the SHL25 Mobile Handset at 2412.0MHz.

2.16 WLAN 5220MHz HEAD SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	15/04/2014-14:22:04	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.50°C	**LIQUID SIMULANT:**	5000Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	37.35
RELATIVE HUMIDITY:	27.60%	**CONDUCTIVITY:**	4.610
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.60°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	-11.00mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-141.70mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	3.970
TEST FREQUENCY:	5220.0MHz	**SAR 1g:**	0.053 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.104 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.103 W/kg
PROBE BATTERY LAST CHANGED:	15/04/2014	**SAR DRIFT DURING SCAN:**	-1.000 %

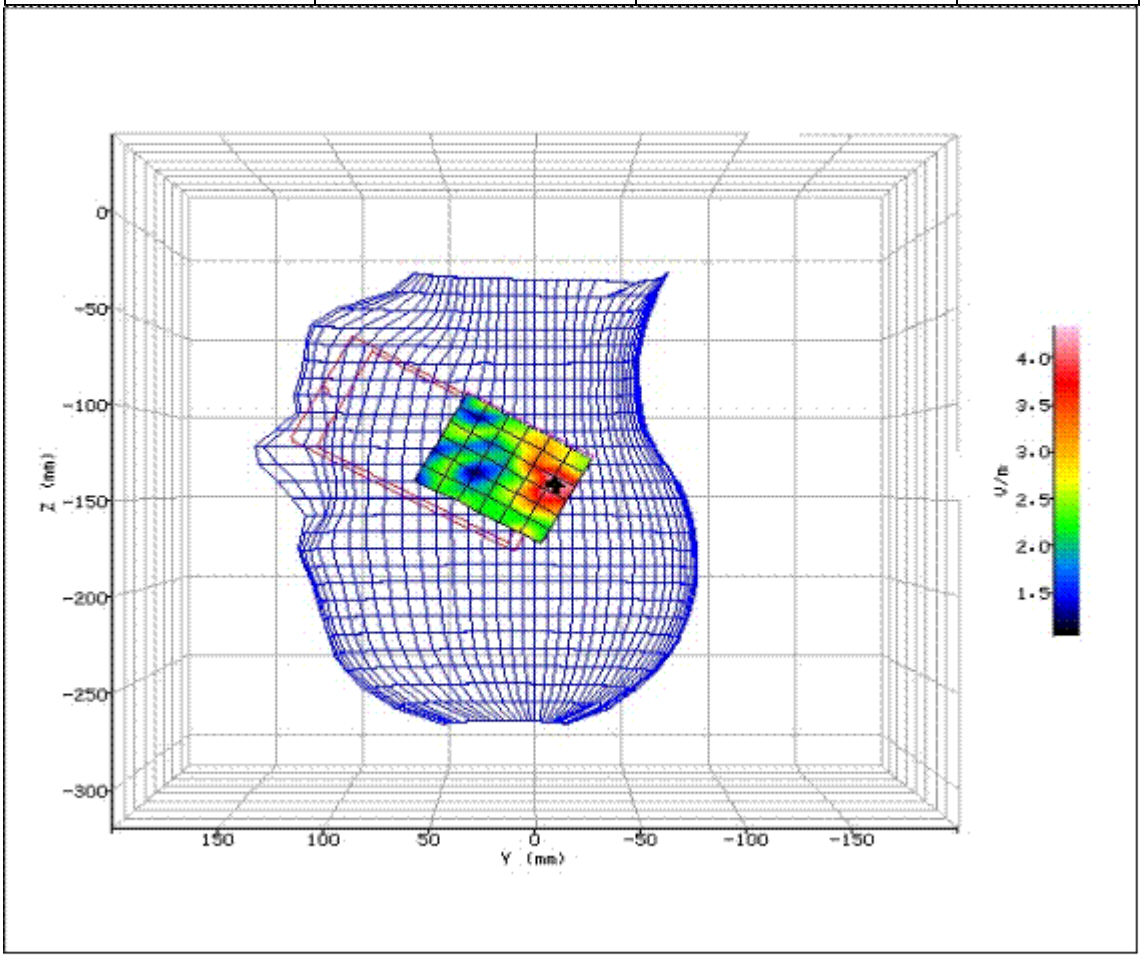

Figure 67: SAR Head Testing Results for the SHL25 Mobile Handset at 5220.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	15/04/2014-14:33:21	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.50°C	**LIQUID SIMULANT:**	5000Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	37.35
RELATIVE HUMIDITY:	27.60%	**CONDUCTIVITY:**	4.610
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.60°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	-12.20mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-149.00mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	4.154
TEST FREQUENCY:	5220.0MHz	**SAR 1g:**	0.122 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.115 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.108 W/kg
PROBE BATTERY LAST CHANGED:	15/04/2014	**SAR DRIFT DURING SCAN:**	-6.100 %

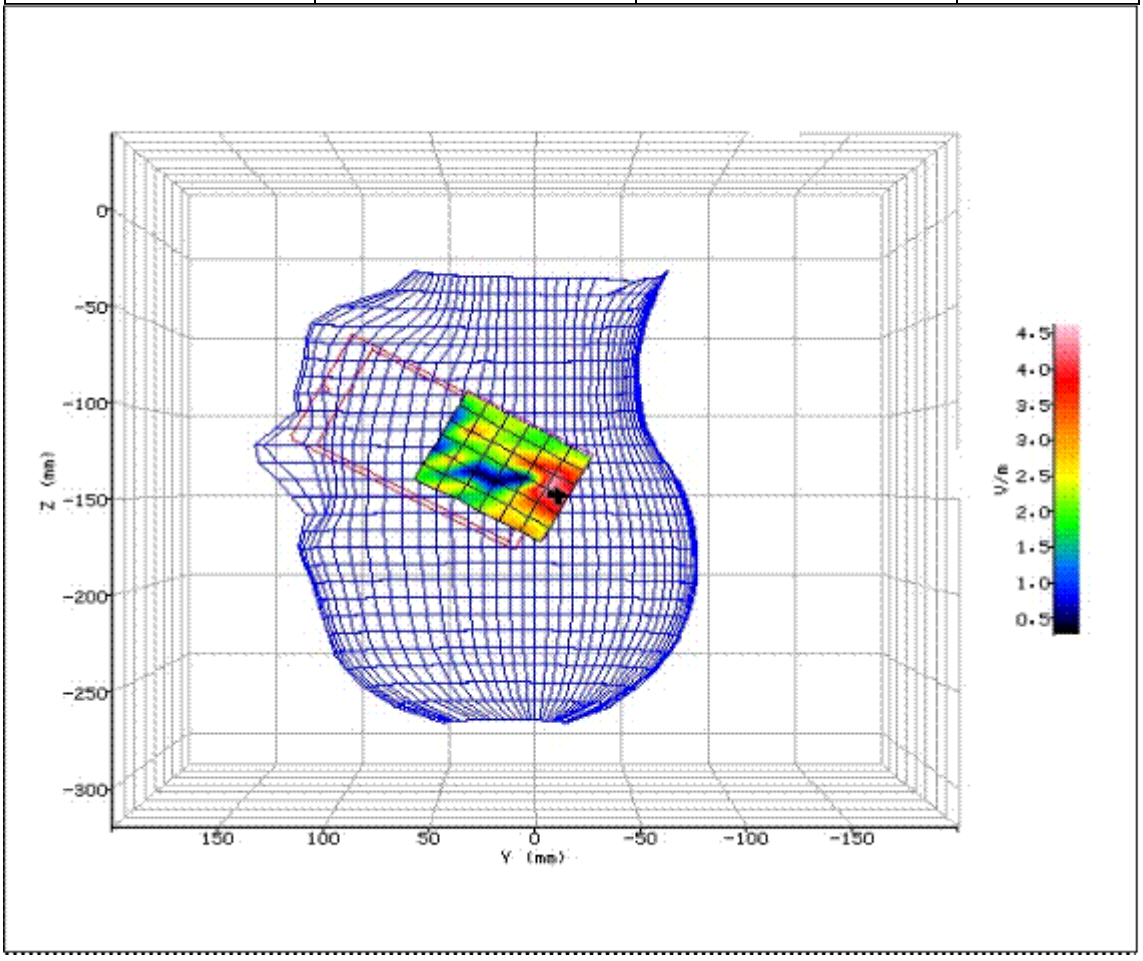

Figure 68: SAR Head Testing Results for the SHL25 Mobile Handset at 5220.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	15/04/2014-15:03:37	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.50°C	**LIQUID SIMULANT:**	5000Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	37.35
RELATIVE HUMIDITY:	27.60%	**CONDUCTIVITY:**	4.610
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.60°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	12.30mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-174.20mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	4.861
TEST FREQUENCY:	5220.0MHz	**SAR 1g:**	0.077 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.117 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.113 W/kg
PROBE BATTERY LAST CHANGED:	15/04/2014	**SAR DRIFT DURING SCAN:**	-3.400 %

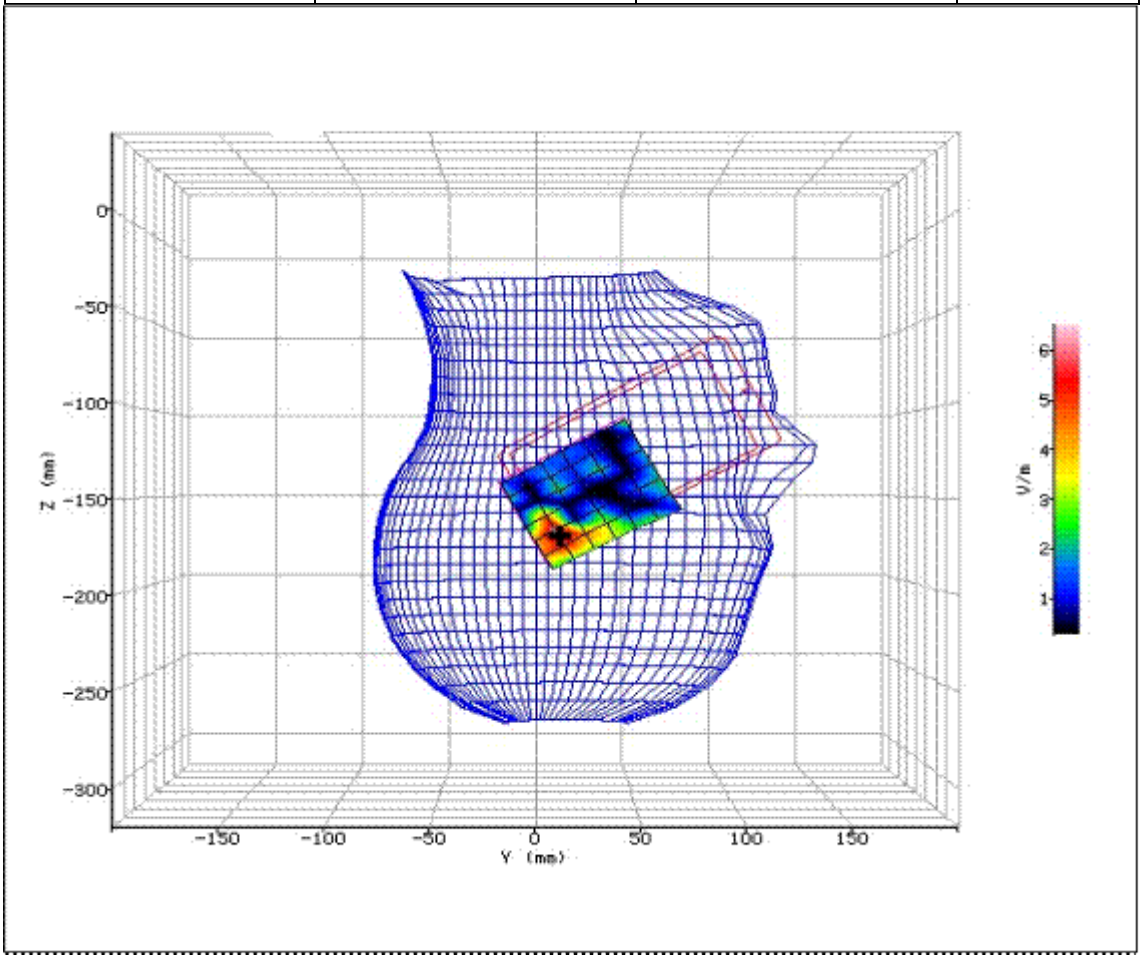

Figure 69: SAR Head Testing Results for the SHL25 Mobile Handset at 5220.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	15/04/2014-15:31:12	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.50°C	**LIQUID SIMULANT:**	5000Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	37.35
RELATIVE HUMIDITY:	27.60%	**CONDUCTIVITY:**	4.610
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.60°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	10.50mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-173.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	5.377
TEST FREQUENCY:	5220.0MHz	**SAR 1g:**	0.176 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.191 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.191 W/kg
PROBE BATTERY LAST CHANGED:	15/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

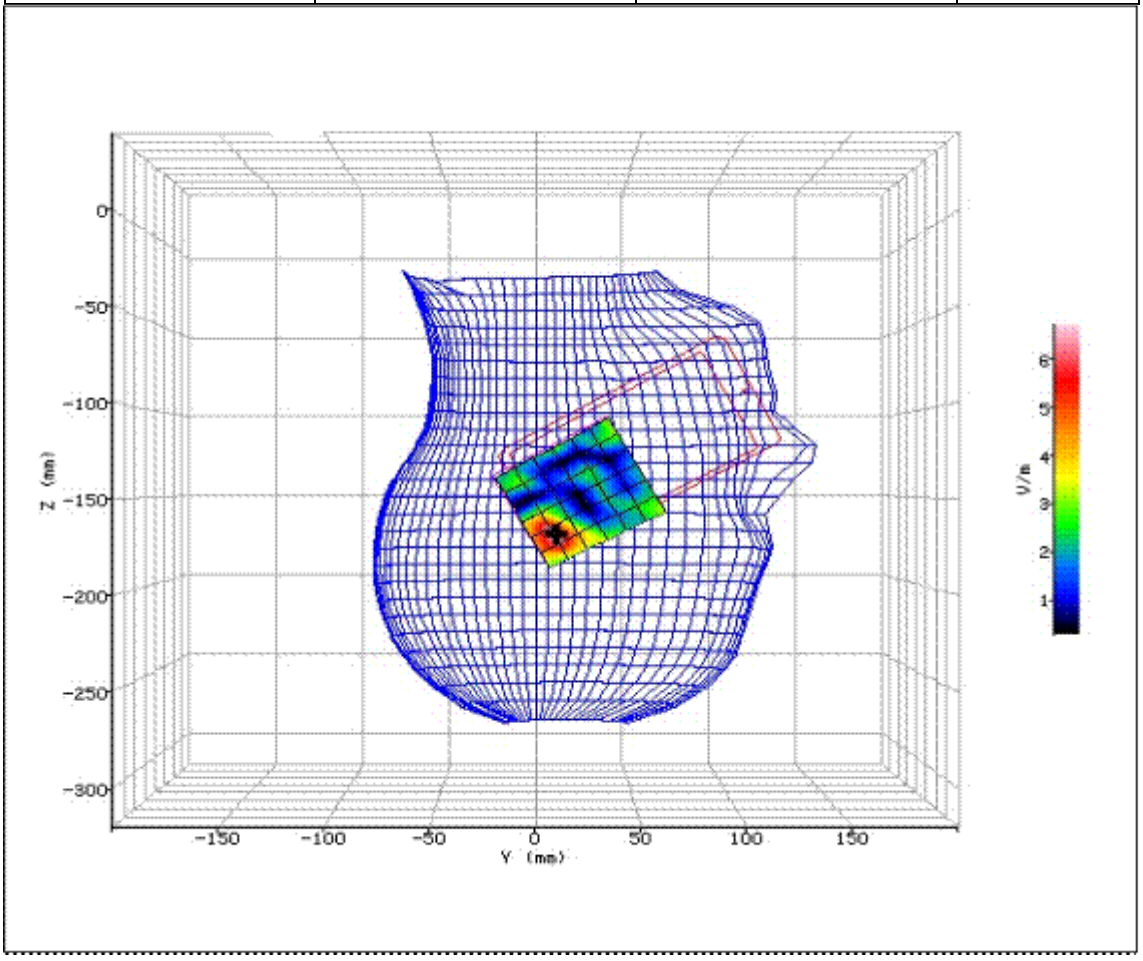

Figure 70: SAR Head Testing Results for the SHL25 Mobile Handset at 5220.0MHz.

2.17 WLAN 5220MHz BODY SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-13:44:45	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	23.20°C	**LIQUID SIMULANT:**	5000Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	48.86
RELATIVE HUMIDITY:	31.00%	**CONDUCTIVITY:**	5.068
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.80°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-77.00mm
DUT POSITION:	10mm-Front Facing	**MAX SAR Y-AXIS LOCATION:**	-16.20mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	2.191
TEST FREQUENCY:	5220.0MHz	**SAR 1g:**	0.027 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.035 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.035 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

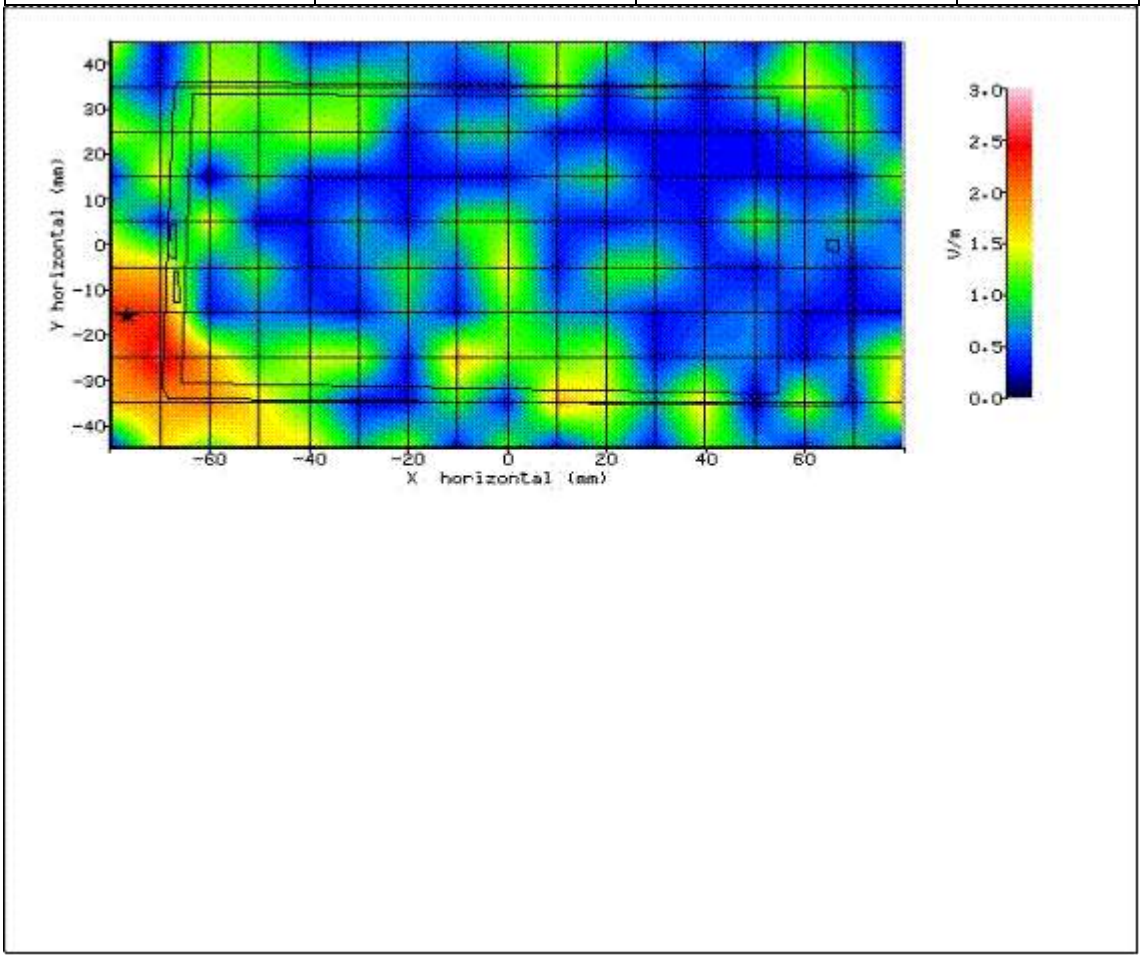

Figure 71: SAR Body Testing Results for the SHL25 Mobile Handset at 5220.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-14:00:56	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	23.20°C	**LIQUID SIMULANT:**	5000Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	48.86
RELATIVE HUMIDITY:	31.00%	**CONDUCTIVITY:**	5.068
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.80°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-62.90mm
DUT POSITION:	10mm-Rear Facing	**MAX SAR Y-AXIS LOCATION:**	14.90mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	5.228
TEST FREQUENCY:	5220.0MHz	**SAR 1g:**	0.156 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.236 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.235 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	-0.700 %

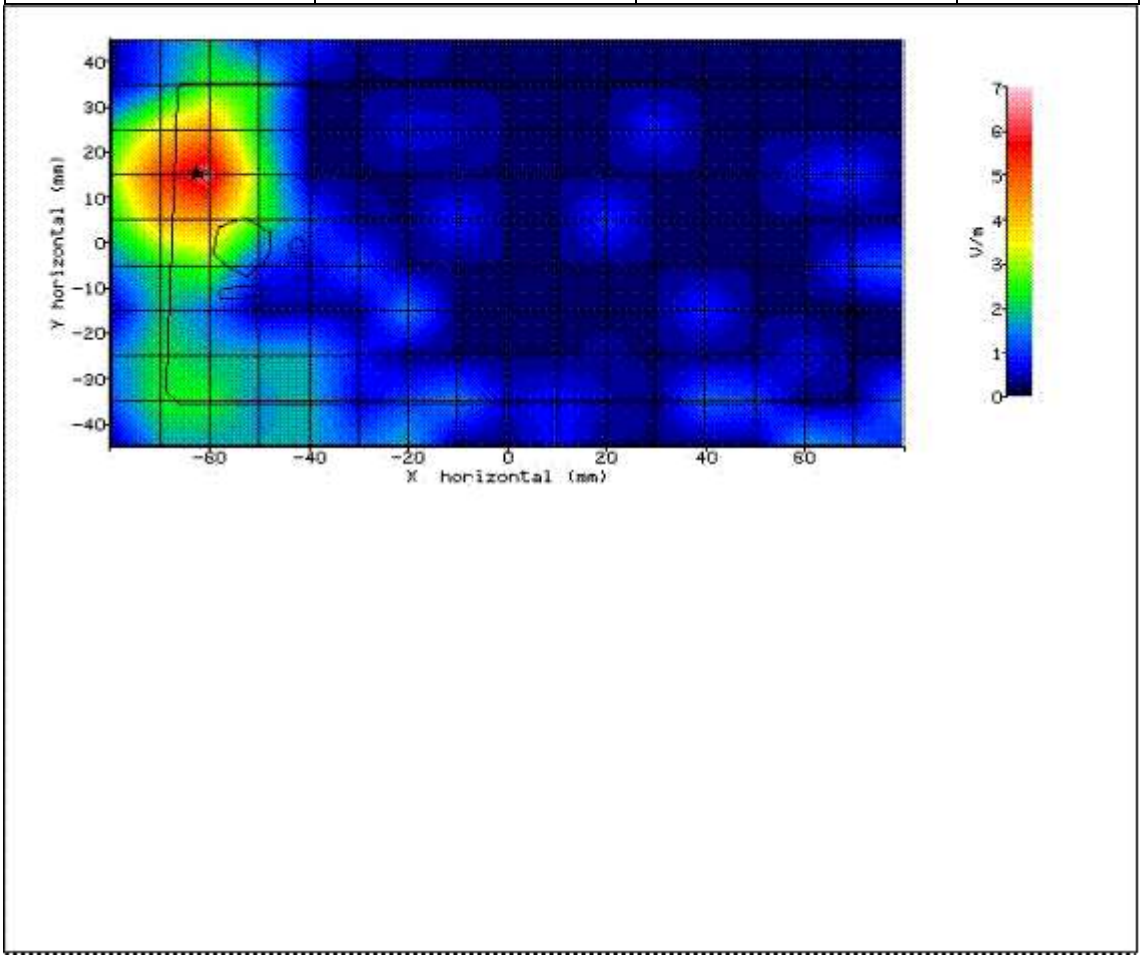

Figure 72: SAR Body Testing Results for the SHL25 Mobile Handset at 5220.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-14:46:10	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	23.20°C	**LIQUID SIMULANT:**	5000Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	48.86
RELATIVE HUMIDITY:	31.00%	**CONDUCTIVITY:**	5.068
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.80°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-61.00mm
DUT POSITION:	10mm-Right Edge	**MAX SAR Y-AXIS LOCATION:**	-13.80mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	2.251
TEST FREQUENCY:	5220.0MHz	**SAR 1g:**	0.026 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.031 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.031 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

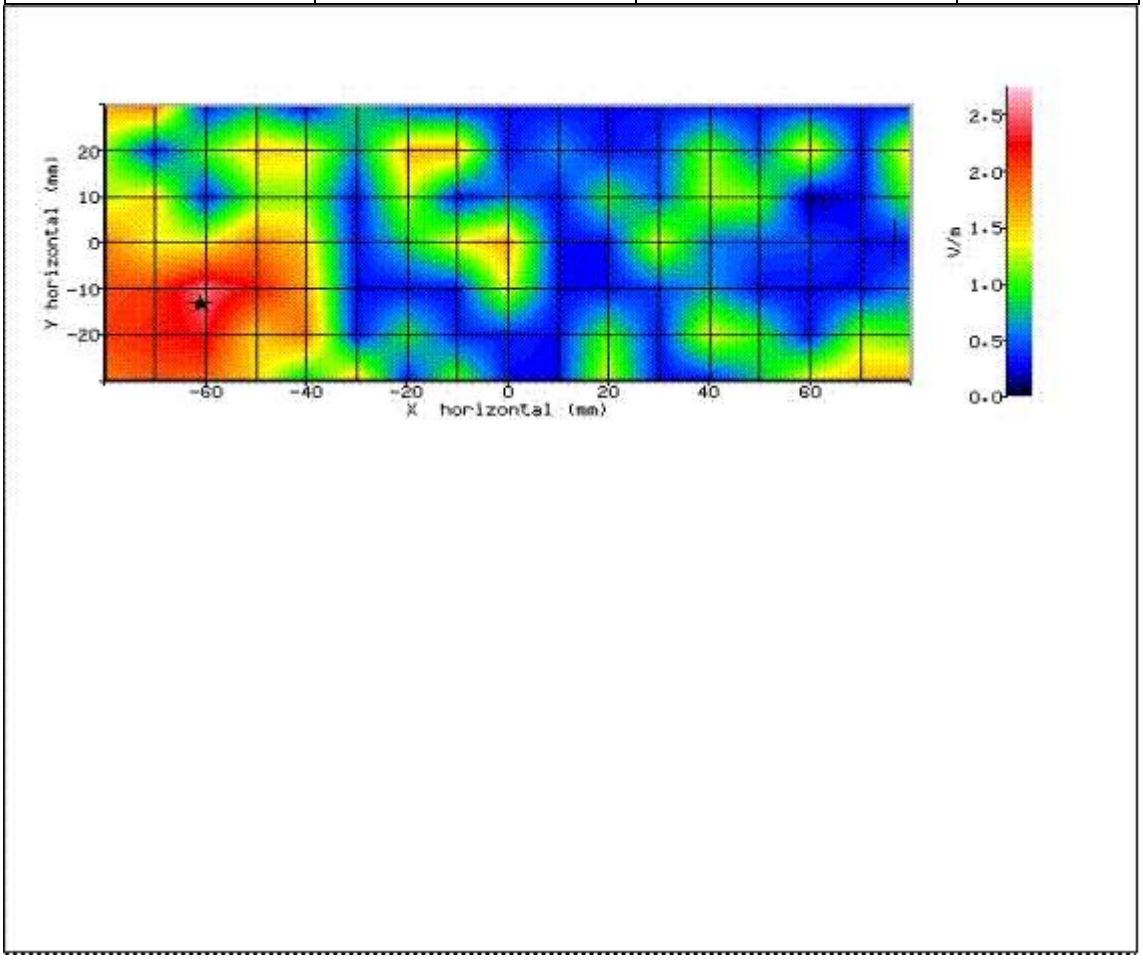

Figure 73: SAR Body Testing Results for the SHL25 Mobile Handset at 5220.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2014-15:00:36	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	23.20°C	**LIQUID SIMULANT:**	5000Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	48.86
RELATIVE HUMIDITY:	31.00%	**CONDUCTIVITY:**	5.068
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.80°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-14.00mm
DUT POSITION:	10mm-Top Edge	**MAX SAR Y-AXIS LOCATION:**	4.20mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	4.396
TEST FREQUENCY:	5220.0MHz	**SAR 1g:**	0.116 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.163 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.174 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2014	**SAR DRIFT DURING SCAN:**	6.400 %

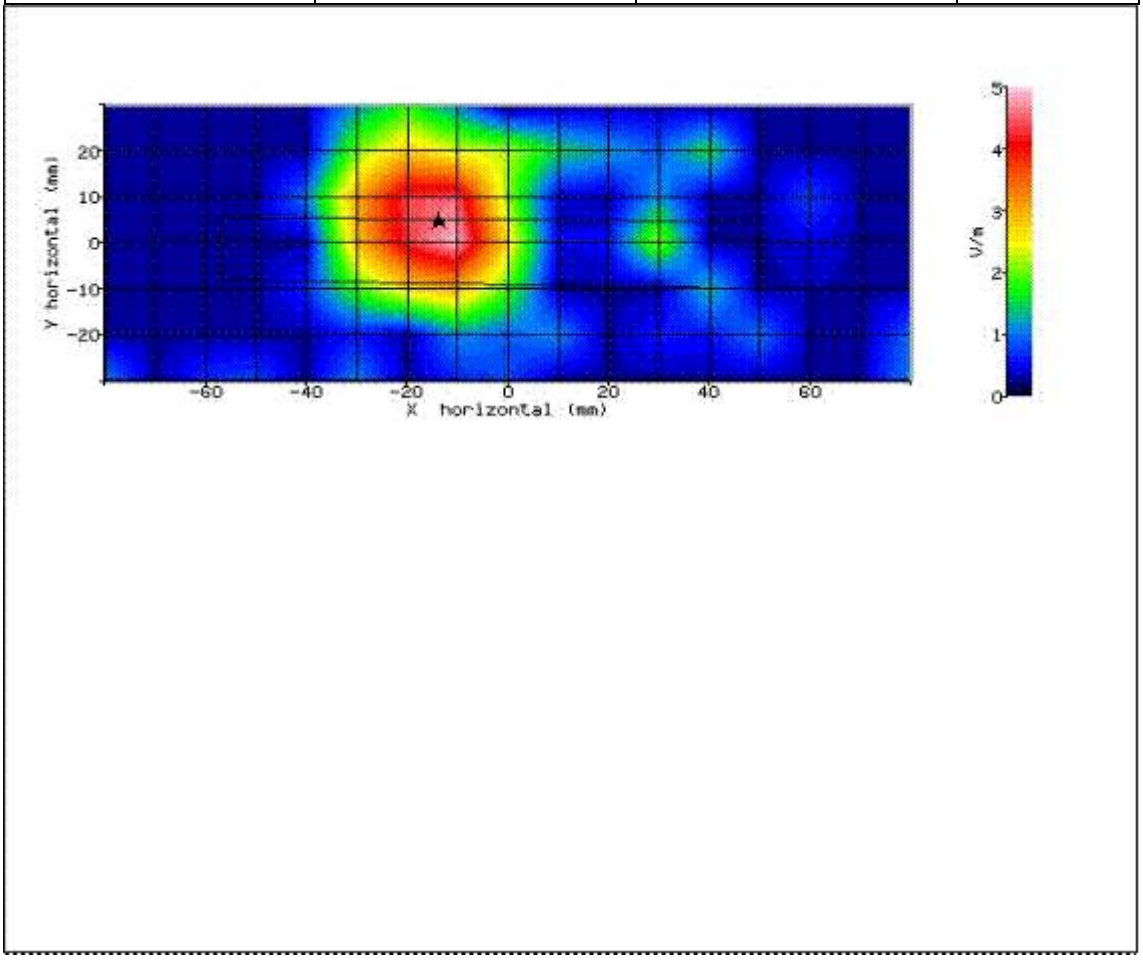

Figure 74: SAR Body Testing Results for the SHL25 Mobile Handset at 5220.0MHz.

2.18 WLAN 5300MHz HEAD SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	16/04/2014-06:49:02	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	5000Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	37.35
RELATIVE HUMIDITY:	28.90%	**CONDUCTIVITY:**	4.610
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	23.00°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	-12.70mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-144.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	3.633
TEST FREQUENCY:	5300.0MHz	**SAR 1g:**	0.061 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.068 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.068 W/kg
PROBE BATTERY LAST CHANGED:	16/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

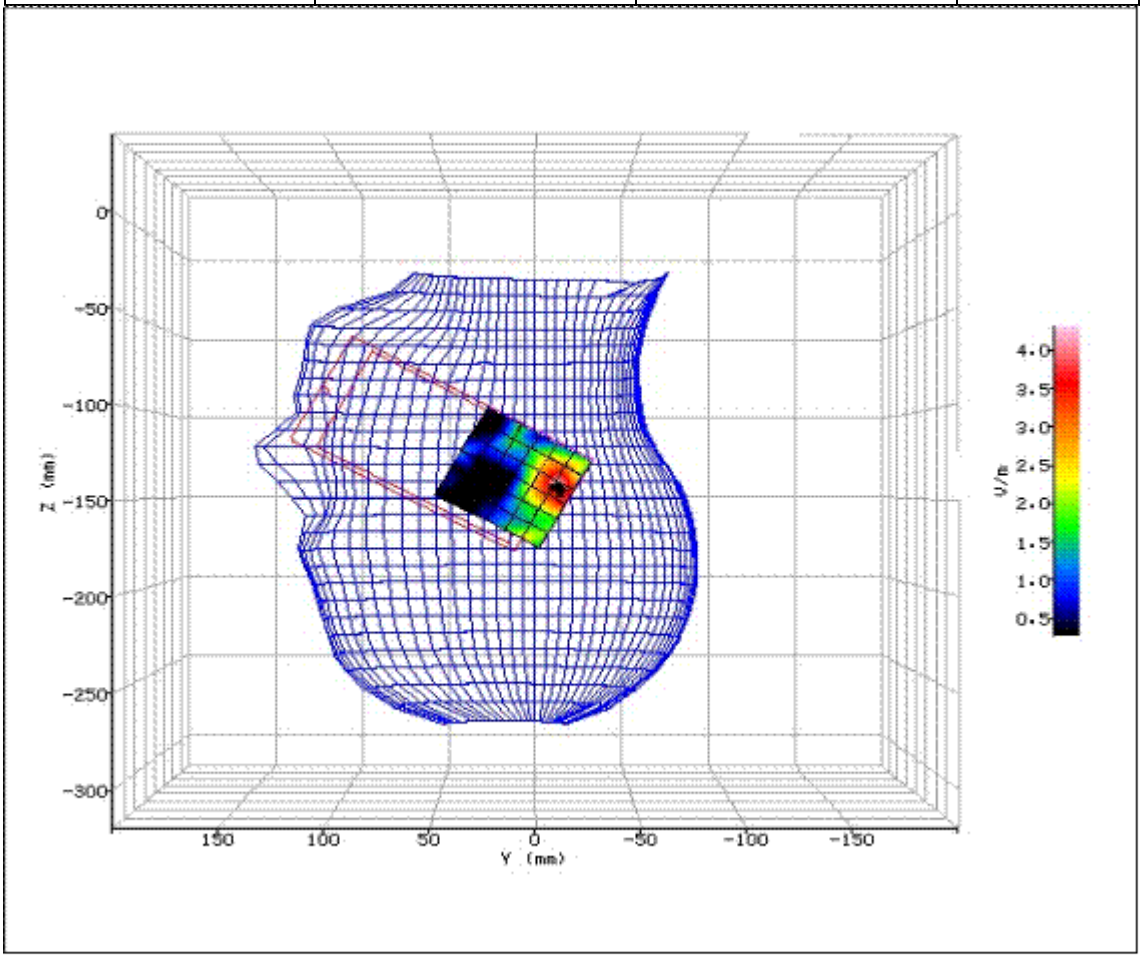

Figure 75: SAR Head Testing Results for the SHL25 Mobile Handset at 5300.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	16/04/2014-07:22:06	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	5000Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	37.35
RELATIVE HUMIDITY:	28.90%	**CONDUCTIVITY:**	4.610
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	23.00°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	-13.40mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-144.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	4.078
TEST FREQUENCY:	5300.0MHz	**SAR 1g:**	0.101 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.092 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.092 W/kg
PROBE BATTERY LAST CHANGED:	16/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

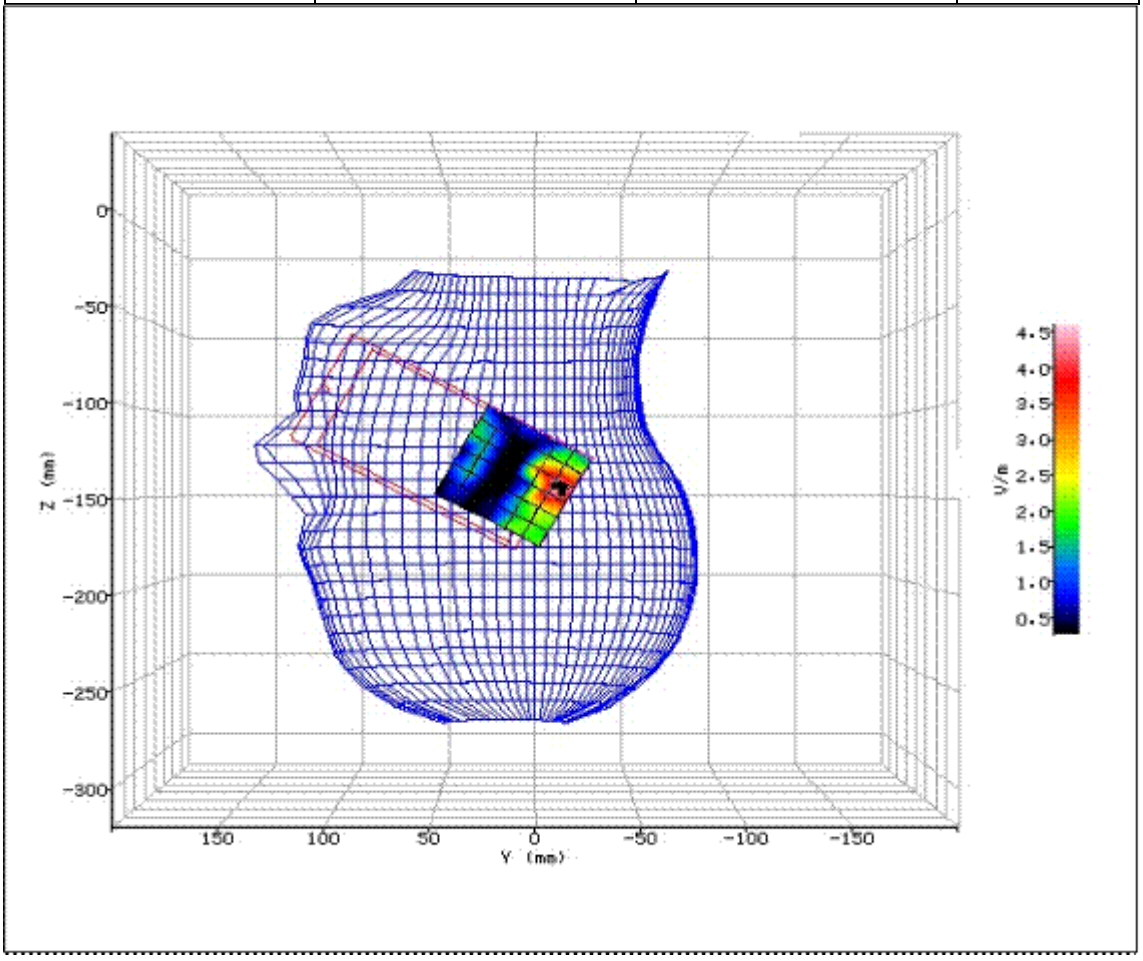

Figure 76: SAR Head Testing Results for the SHL25 Mobile Handset at 5300.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	16/04/2014-08:36:49	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	5000Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	37.35
RELATIVE HUMIDITY:	28.90%	**CONDUCTIVITY:**	4.610
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	23.00°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	10.80mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-171.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	4.701
TEST FREQUENCY:	5300.0MHz	**SAR 1g:**	0.110 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.129 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.129 W/kg
PROBE BATTERY LAST CHANGED:	16/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

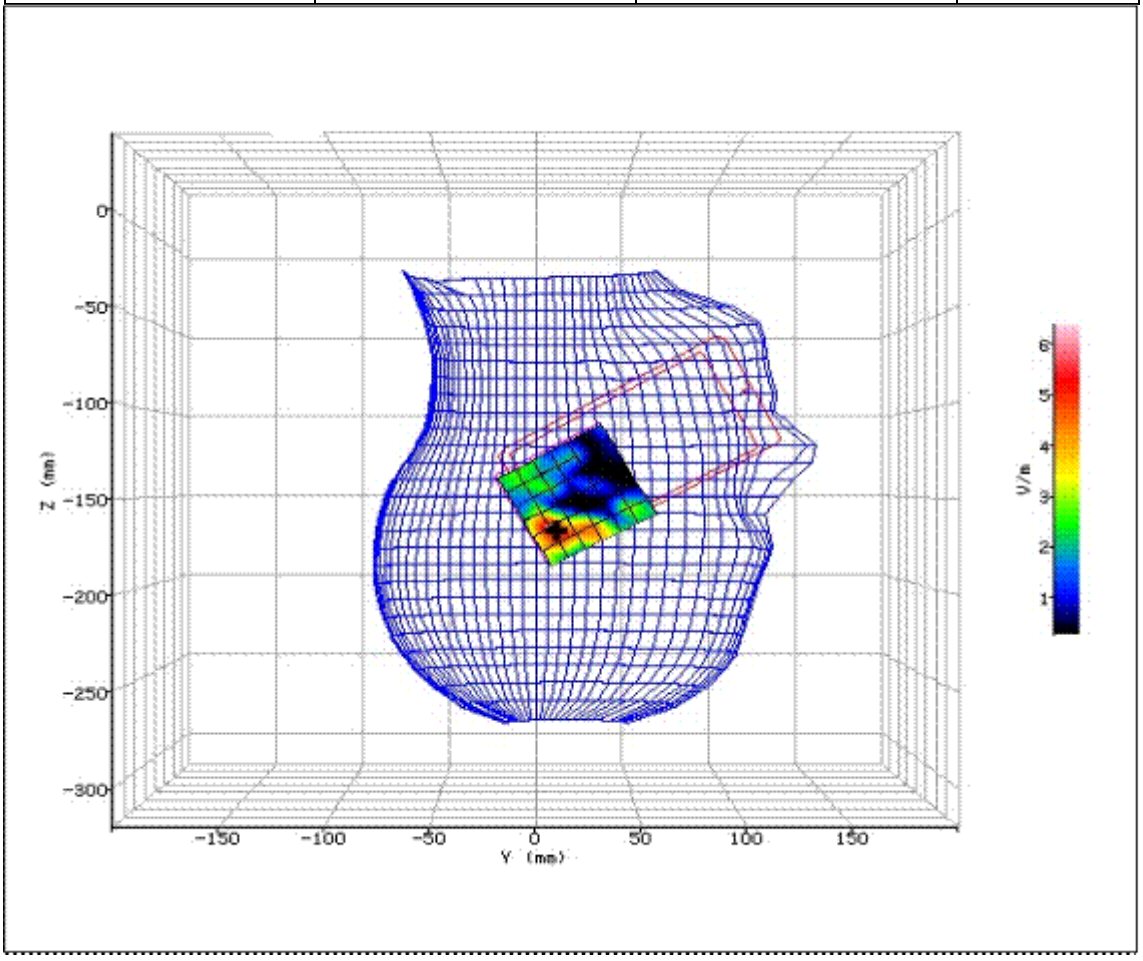

Figure 77: SAR Head Testing Results for the SHL25 Mobile Handset at 5300.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	16/04/2014-09:32:28	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.80°C	**LIQUID SIMULANT:**	5000Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	37.35
RELATIVE HUMIDITY:	28.90%	**CONDUCTIVITY:**	4.610
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	23.00°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	10.10mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-172.20mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	5.568
TEST FREQUENCY:	5300.0MHz	**SAR 1g:**	0.192 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.136 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.148 W/kg
PROBE BATTERY LAST CHANGED:	16/04/2014	**SAR DRIFT DURING SCAN:**	8.800 %

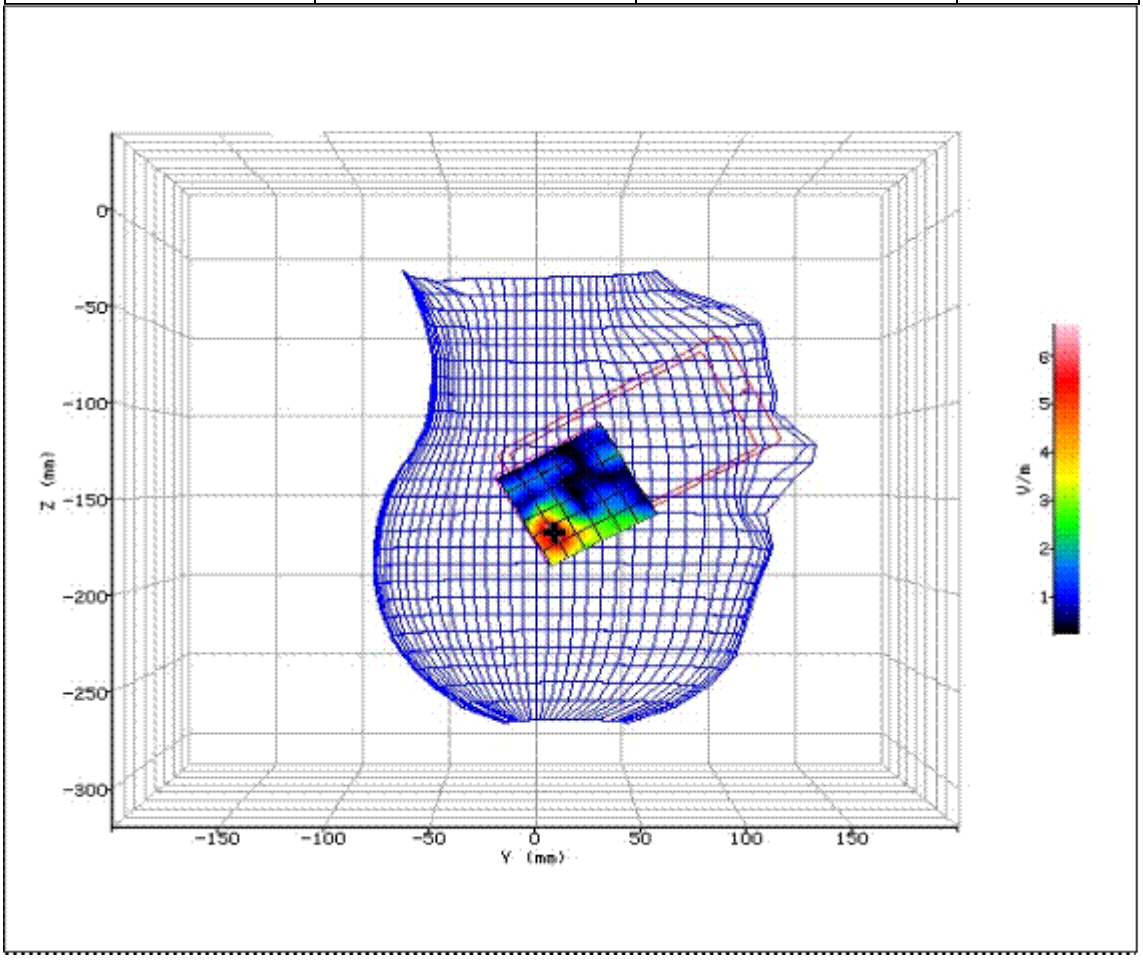

Figure 78: SAR Head Testing Results for the SHL25 Mobile Handset at 5300.0MHz.

2.19 WLAN 5300MHz BODY SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	15/04/2014-06:44:24	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.90°C	**LIQUID SIMULANT:**	5000Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	48.86
RELATIVE HUMIDITY:	29.30%	**CONDUCTIVITY:**	5.068
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.60°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-73.20mm
DUT POSITION:	10mm-Front Facing	**MAX SAR Y-AXIS LOCATION:**	-21.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	2.488
TEST FREQUENCY:	5300.0MHz	**SAR 1g:**	0.024 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.037 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.035 W/kg
PROBE BATTERY LAST CHANGED:	15/04/2014	**SAR DRIFT DURING SCAN:**	-5.300 %

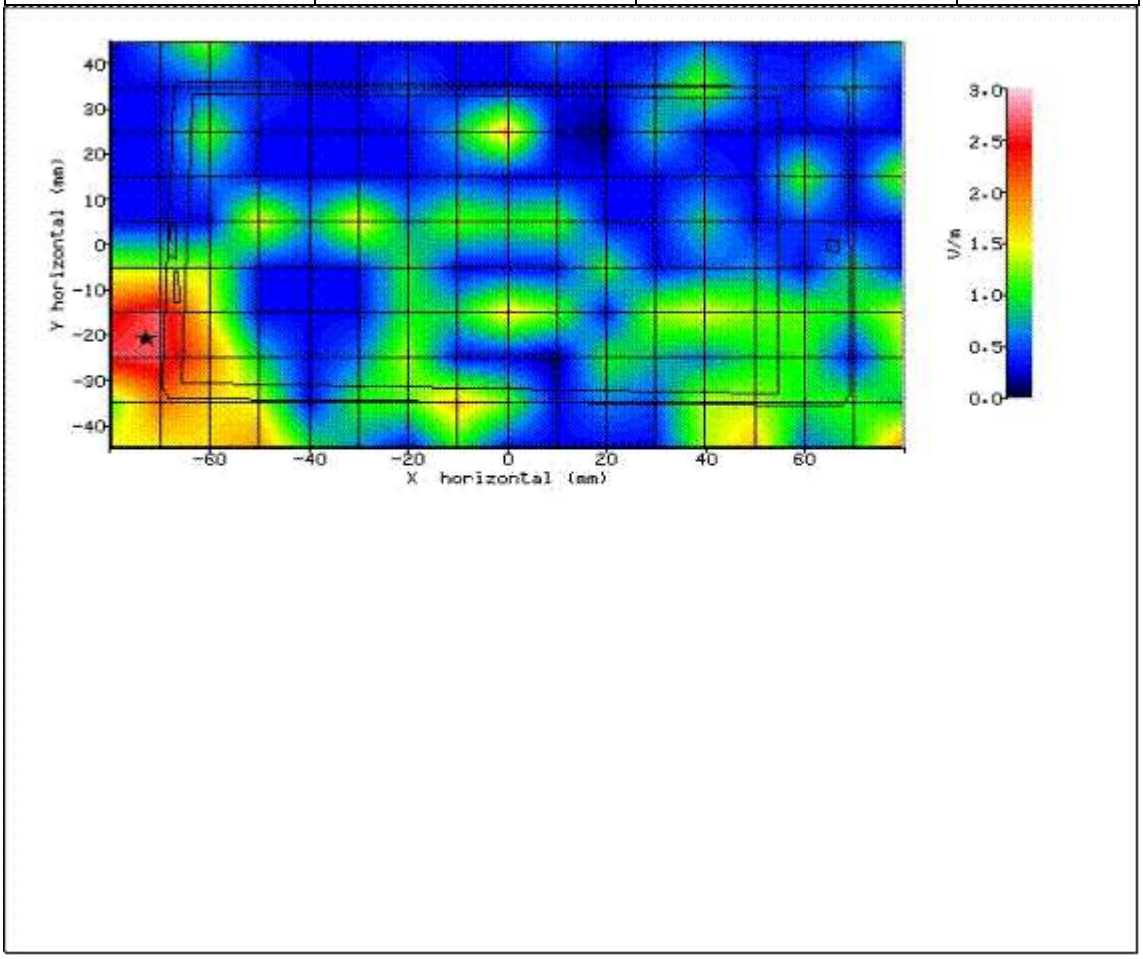

Figure 79: SAR Body Testing Results for the SHL25 Mobile Handset at 5300.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	15/04/2014-06:58:14	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.90°C	**LIQUID SIMULANT:**	5000Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	48.86
RELATIVE HUMIDITY:	29.30%	**CONDUCTIVITY:**	5.068
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.60°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-63.30mm
DUT POSITION:	10mm-Rear Facing	**MAX SAR Y-AXIS LOCATION:**	13.90mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	5.529
TEST FREQUENCY:	5300.0MHz	**SAR 1g:**	0.168 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.247 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.257 W/kg
PROBE BATTERY LAST CHANGED:	15/04/2014	**SAR DRIFT DURING SCAN:**	4.200 %

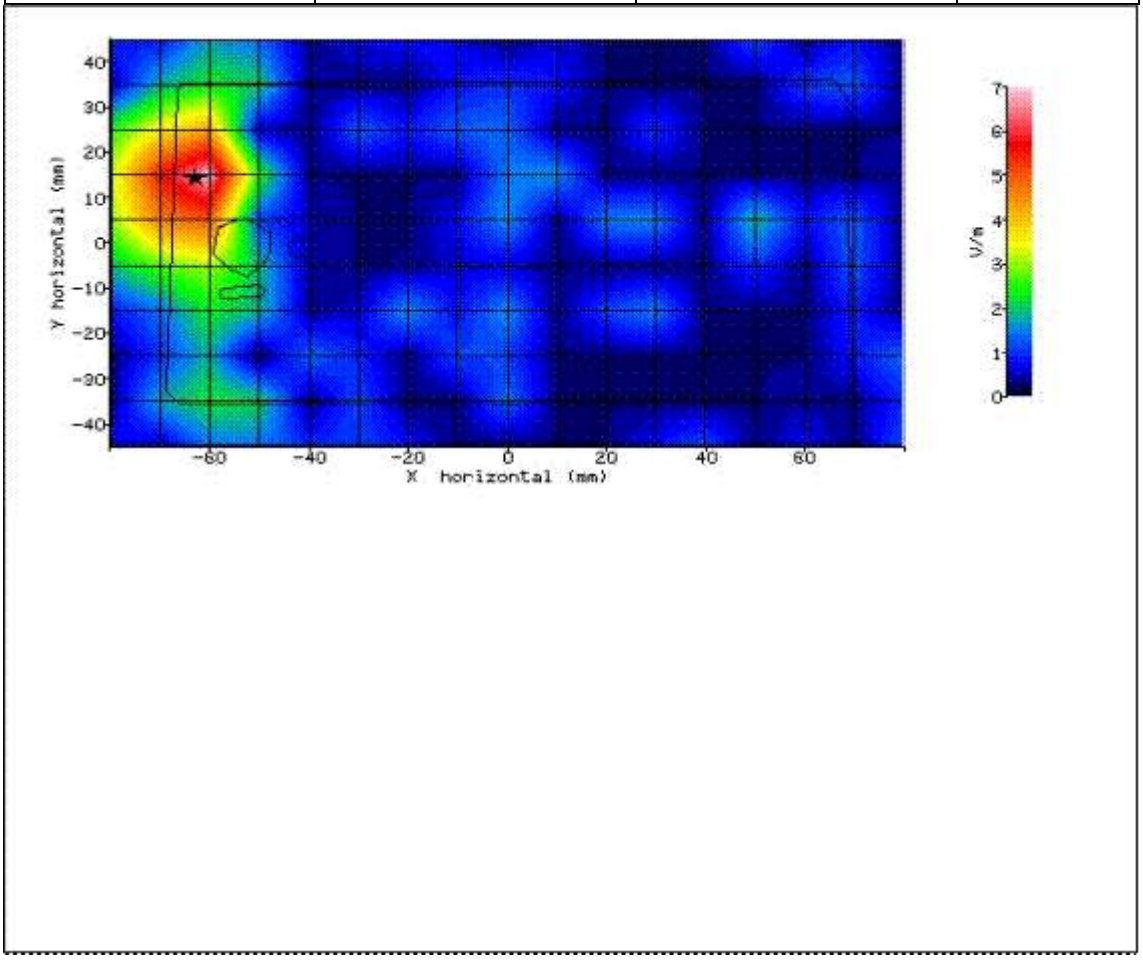

Figure 80: SAR Body Testing Results for the SHL25 Mobile Handset at 5300.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	15/04/2014-07:50:10	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.90°C	**LIQUID SIMULANT:**	5000Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	48.86
RELATIVE HUMIDITY:	29.30%	**CONDUCTIVITY:**	5.068
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.60°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-66.20mm
DUT POSITION:	10mm-Right Edge	**MAX SAR Y-AXIS LOCATION:**	-23.20mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	2.300
TEST FREQUENCY:	5300.0MHz	**SAR 1g:**	0.034 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.032 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.032 W/kg
PROBE BATTERY LAST CHANGED:	15/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

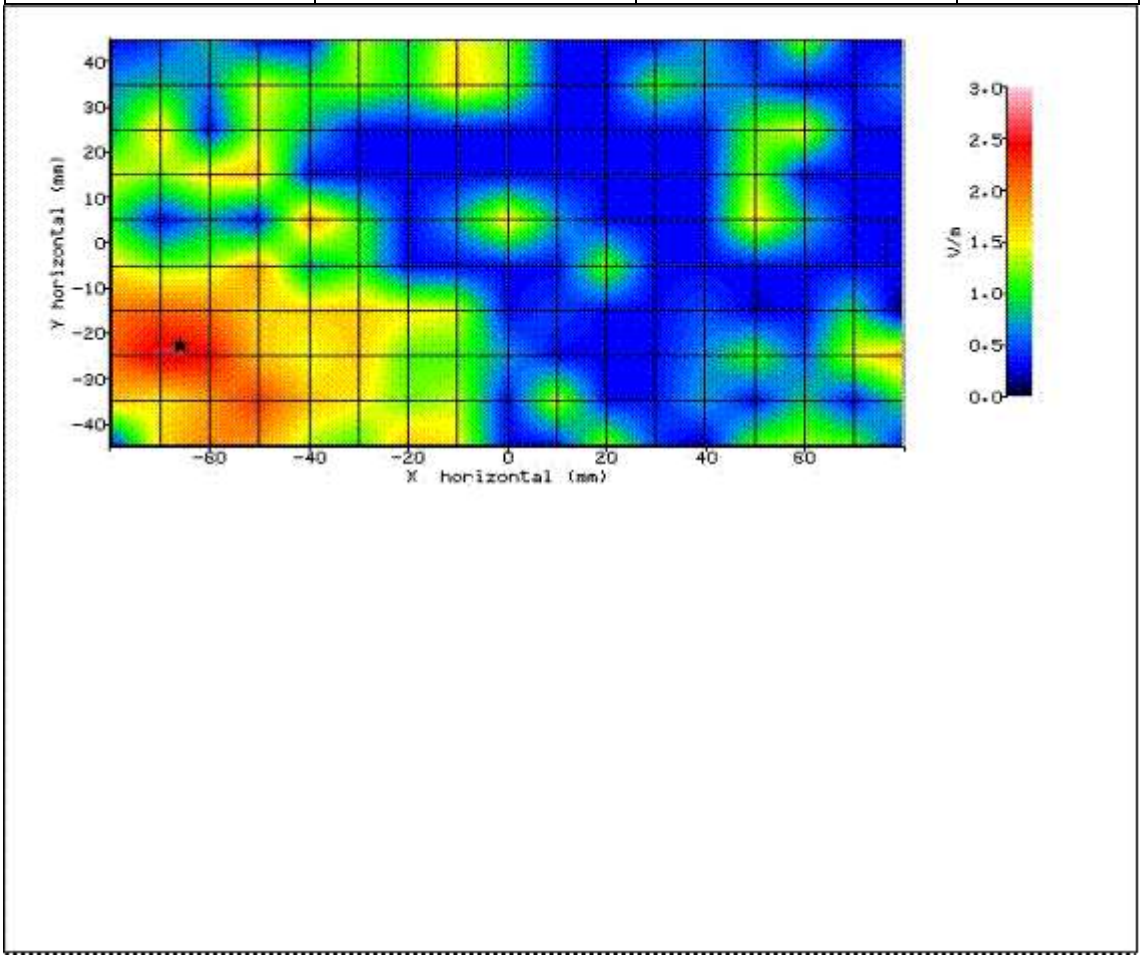

Figure 81: SAR Body Testing Results for the SHL25 Mobile Handset at 5300.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	15/04/2014-08:04:25	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.90°C	**LIQUID SIMULANT:**	5000Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	48.86
RELATIVE HUMIDITY:	29.30%	**CONDUCTIVITY:**	5.068
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.60°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-18.40mm
DUT POSITION:	10mm-Top Edge	**MAX SAR Y-AXIS LOCATION:**	7.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	4.671
TEST FREQUENCY:	5300.0MHz	**SAR 1g:**	0.108 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.164 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.168 W/kg
PROBE BATTERY LAST CHANGED:	15/04/2014	**SAR DRIFT DURING SCAN:**	2.400 %

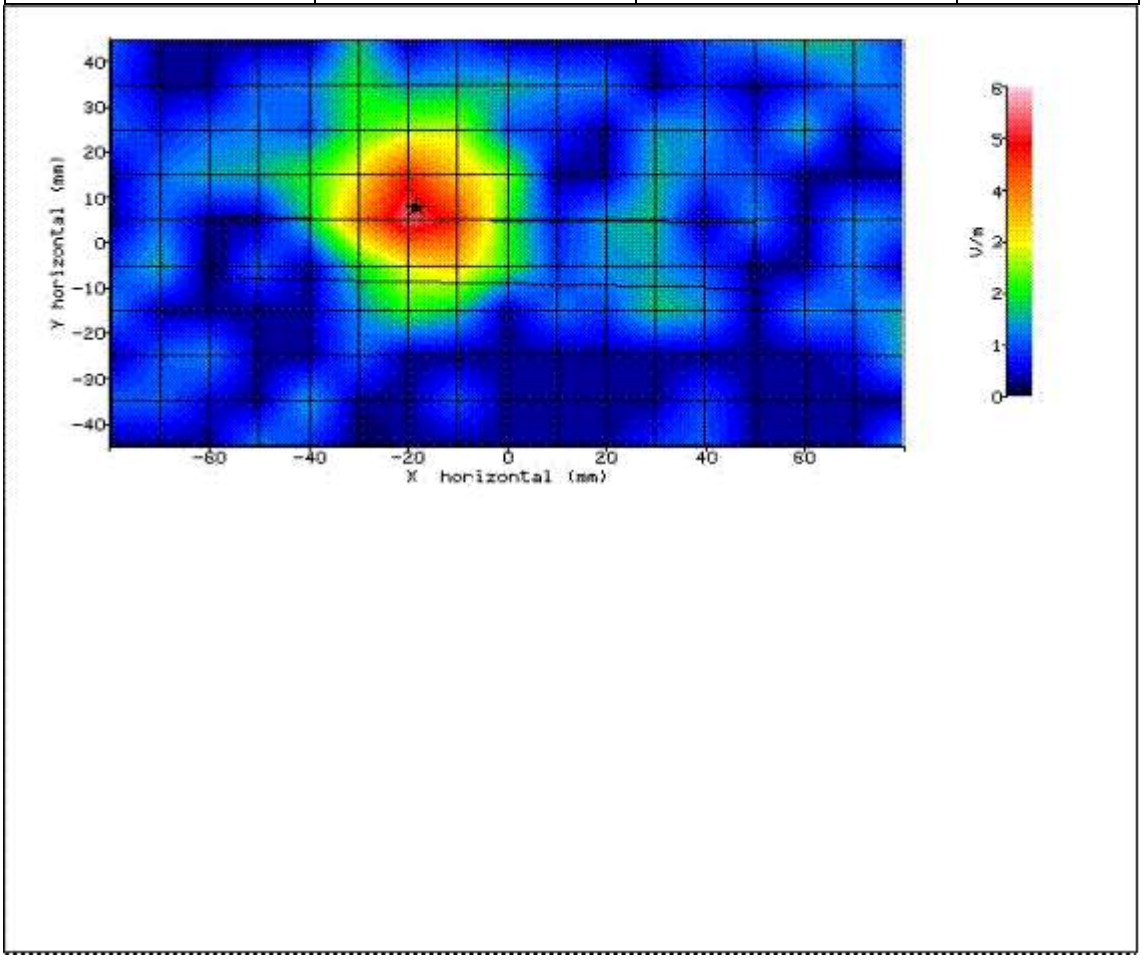

Figure 82: SAR Body Testing Results for the SHL25 Mobile Handset at 5300.0MHz.

2.20 WLAN 5580MHz HEAD SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	16/04/2014-11:08:18	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.90°C	**LIQUID SIMULANT:**	5000Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	36.44
RELATIVE HUMIDITY:	31.80%	**CONDUCTIVITY:**	4.974
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.90°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	-9.80mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-149.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	4.210
TEST FREQUENCY:	5580.0MHz	**SAR 1g:**	0.030 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.076 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.076 W/kg
PROBE BATTERY LAST CHANGED:	16/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

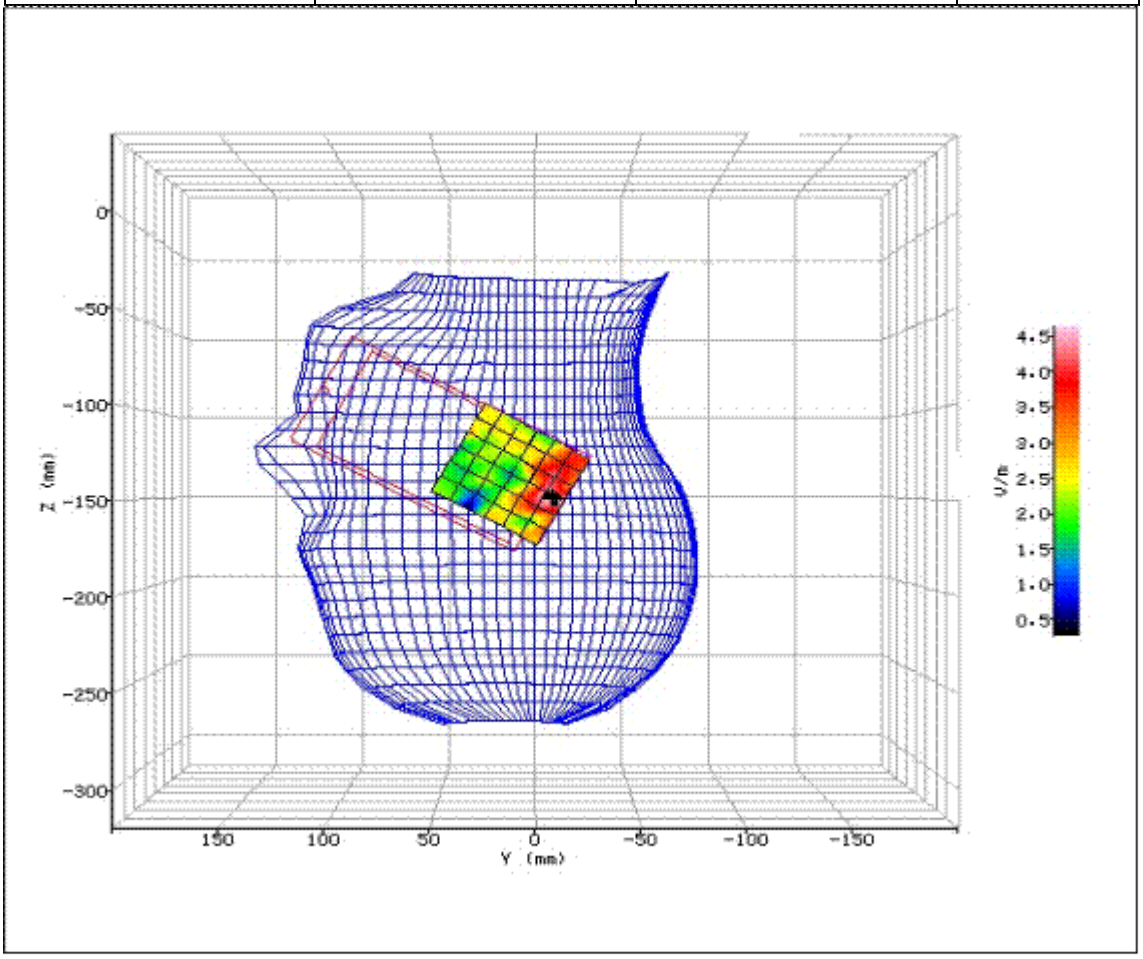

Figure 83: SAR Head Testing Results for the SHL25 Mobile Handset at 5580.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	16/04/2014-11:22:04	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.90°C	**LIQUID SIMULANT:**	5000Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	36.44
RELATIVE HUMIDITY:	31.80%	**CONDUCTIVITY:**	4.974
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.90°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	-7.30mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-144.50mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	4.159
TEST FREQUENCY:	5580.0MHz	**SAR 1g:**	0.108 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.107 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.099 W/kg
PROBE BATTERY LAST CHANGED:	16/04/2014	**SAR DRIFT DURING SCAN:**	-7.500 %

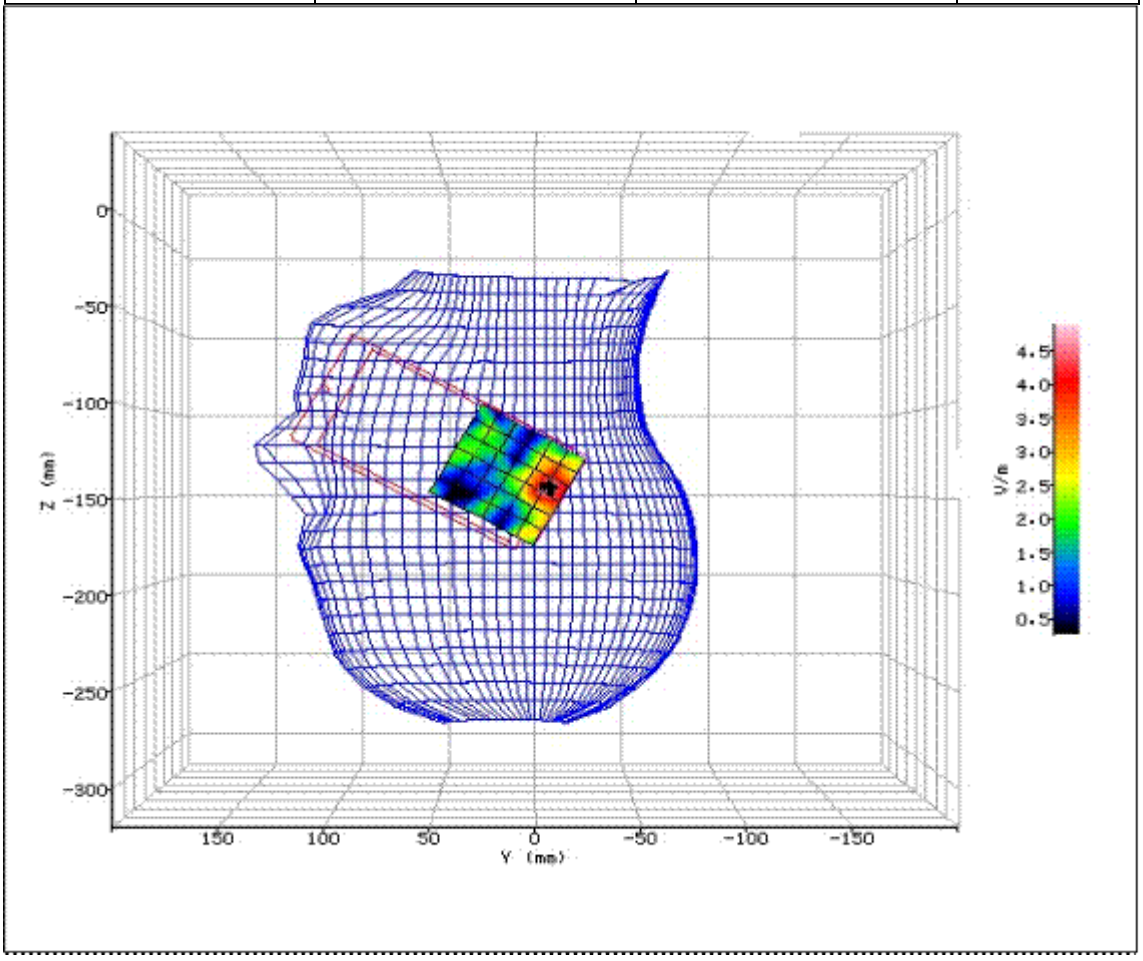

Figure 84: SAR Head Testing Results for the SHL25 Mobile Handset at 5580.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	16/04/2014-12:54:39	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.90°C	**LIQUID SIMULANT:**	5000Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	36.44
RELATIVE HUMIDITY:	31.80%	**CONDUCTIVITY:**	4.974
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.90°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	7.20mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-170.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	4.822
TEST FREQUENCY:	5580.0MHz	**SAR 1g:**	0.060 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.161 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.167 W/kg
PROBE BATTERY LAST CHANGED:	16/04/2014	**SAR DRIFT DURING SCAN:**	3.700 %

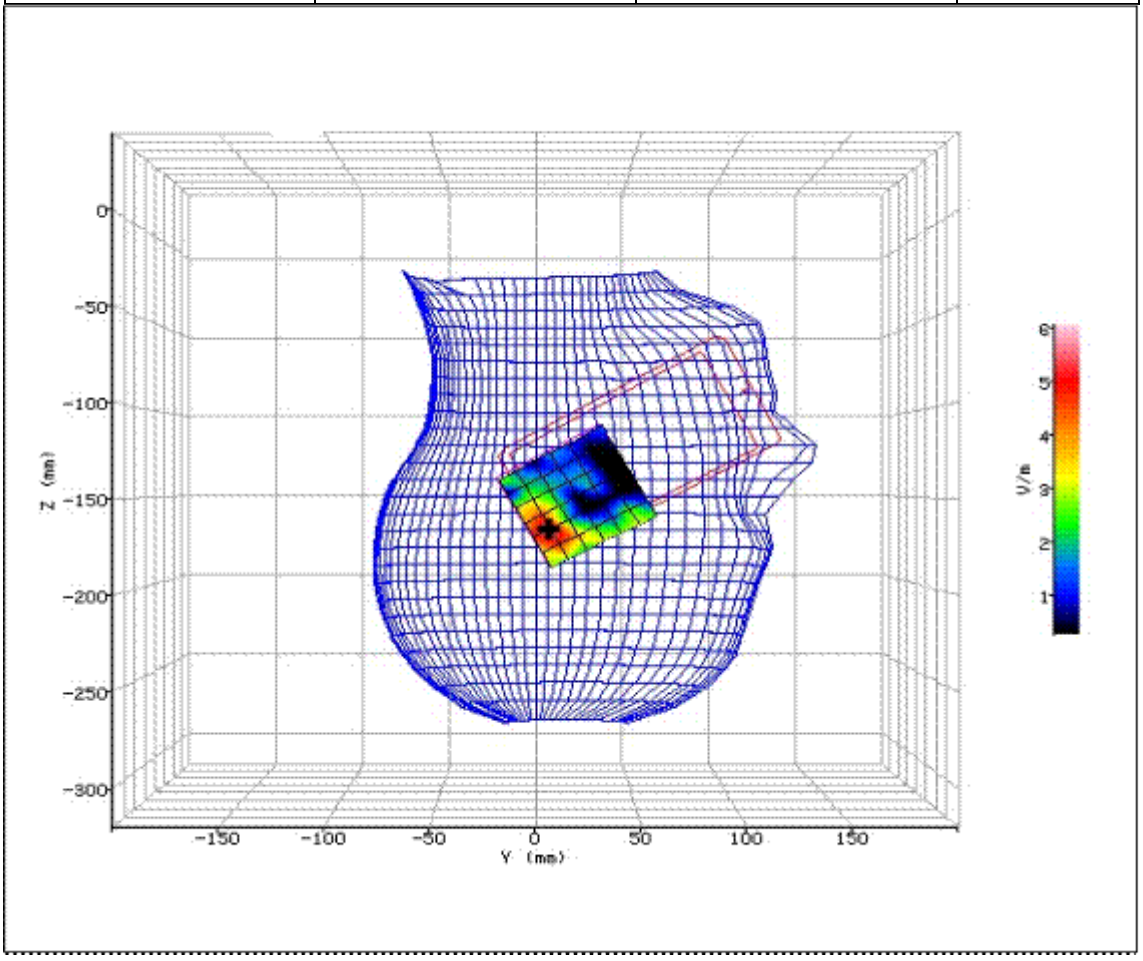

Figure 85: SAR Head Testing Results for the SHL25 Mobile Handset at 5580.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	16/04/2014-13:12:51	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	21.90°C	**LIQUID SIMULANT:**	5000Head
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	36.44
RELATIVE HUMIDITY:	31.80%	**CONDUCTIVITY:**	4.974
PHANTOM S/NO:	IBX-040	**LIQUID TEMPERATURE:**	22.90°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	8.80mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-170.00mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	5.278
TEST FREQUENCY:	5580.0MHz	**SAR 1g:**	0.125 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.152 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.152 W/kg
PROBE BATTERY LAST CHANGED:	16/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

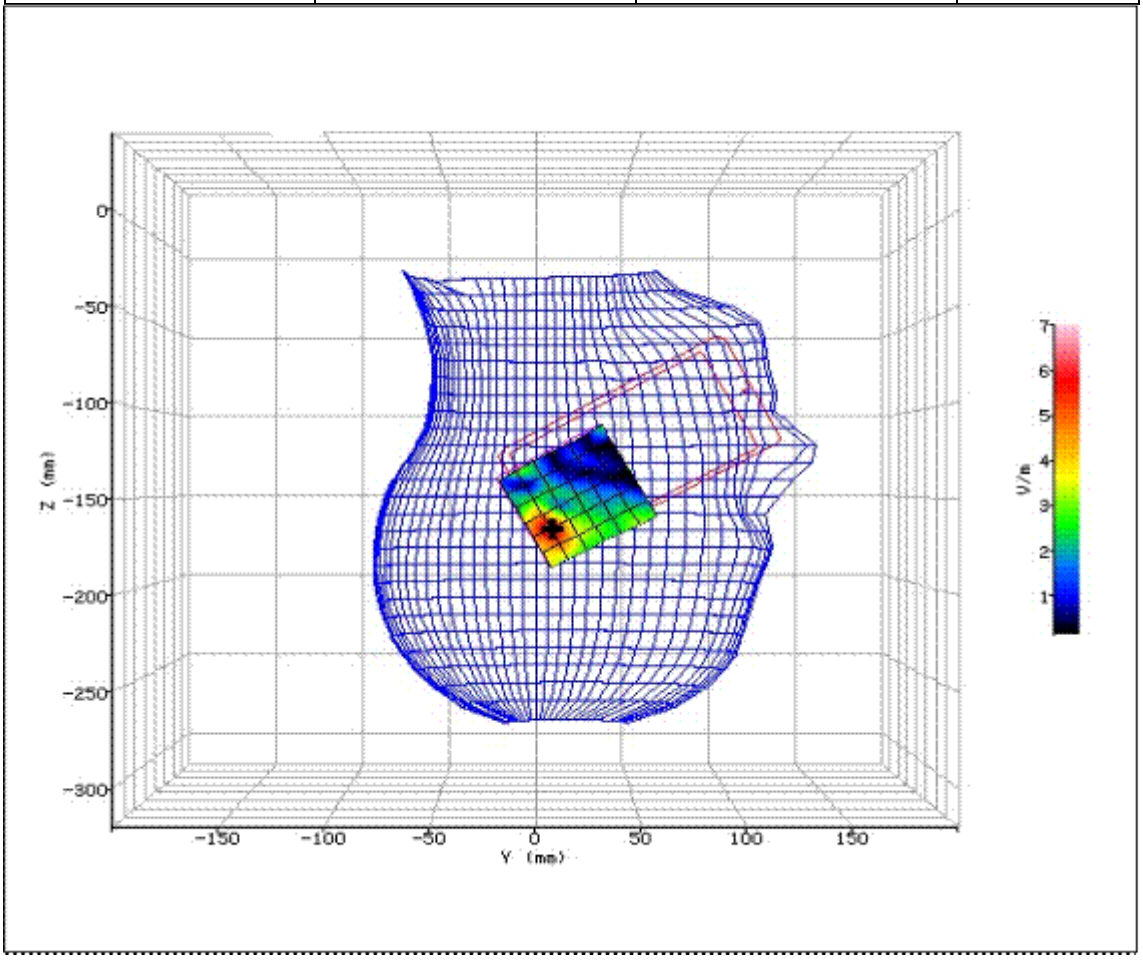

Figure 86: SAR Head Testing Results for the SHL25 Mobile Handset at 5580.0MHz.

2.21 WLAN 5580MHz BODY SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	15/04/2014-09:16:53	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.50°C	**LIQUID SIMULANT:**	5000Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	47.79
RELATIVE HUMIDITY:	22.90%	**CONDUCTIVITY:**	5.529
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.70°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-72.90mm
DUT POSITION:	10mm-Front Facing	**MAX SAR Y-AXIS LOCATION:**	-25.00mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	2.492
TEST FREQUENCY:	5580.0MHz	**SAR 1g:**	0.033 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.039 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.039 W/kg
PROBE BATTERY LAST CHANGED:	15/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

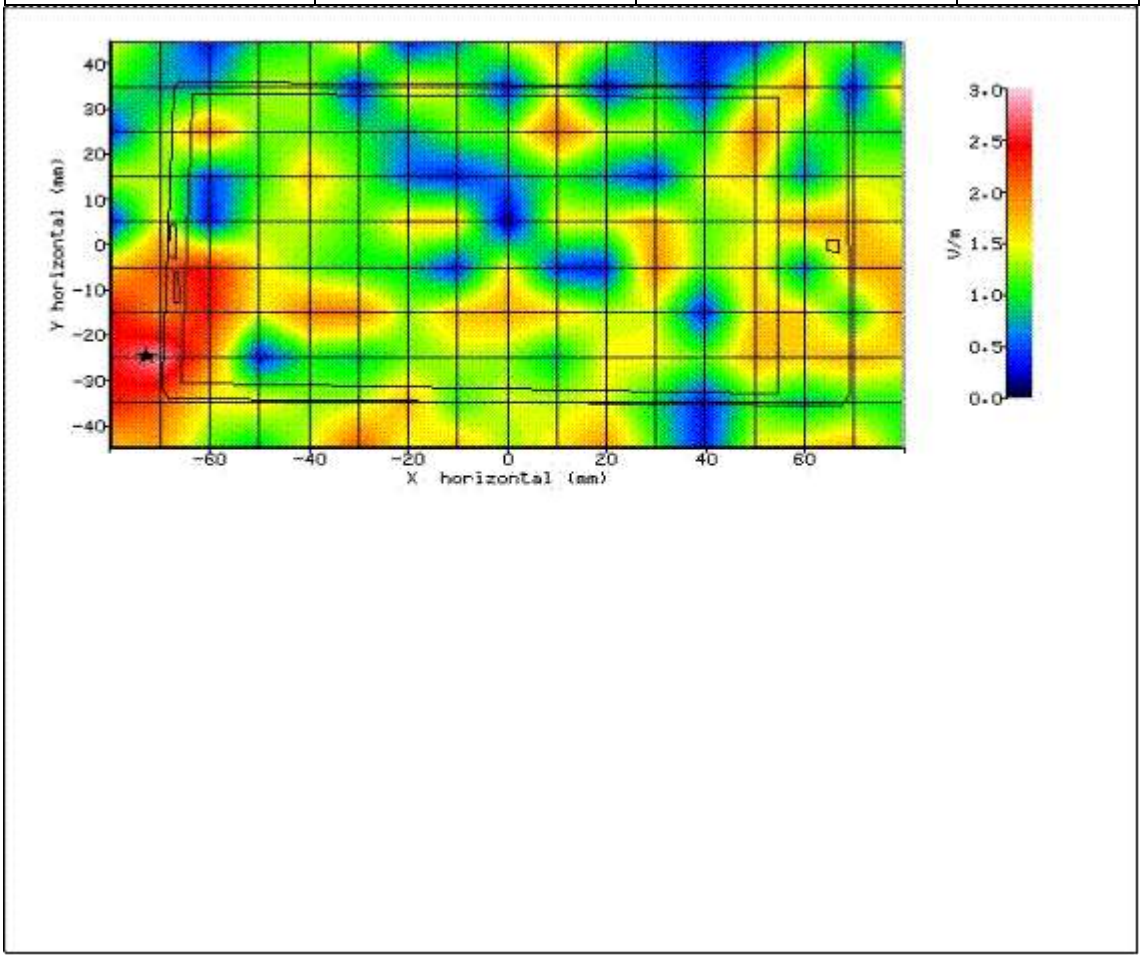

Figure 87: SAR Body Testing Results for the SHL25 Mobile Handset at 5580.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	15/04/2014-09:45:41	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.50°C	**LIQUID SIMULANT:**	5000Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	47.79
RELATIVE HUMIDITY:	22.90%	**CONDUCTIVITY:**	5.529
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.70°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-64.00mm
DUT POSITION:	10mm-Rear Facing	**MAX SAR Y-AXIS LOCATION:**	15.40mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	6.181
TEST FREQUENCY:	5580.0MHz	**SAR 1g:**	0.227 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.358 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.351 W/kg
PROBE BATTERY LAST CHANGED:	15/04/2014	**SAR DRIFT DURING SCAN:**	-1.900 %

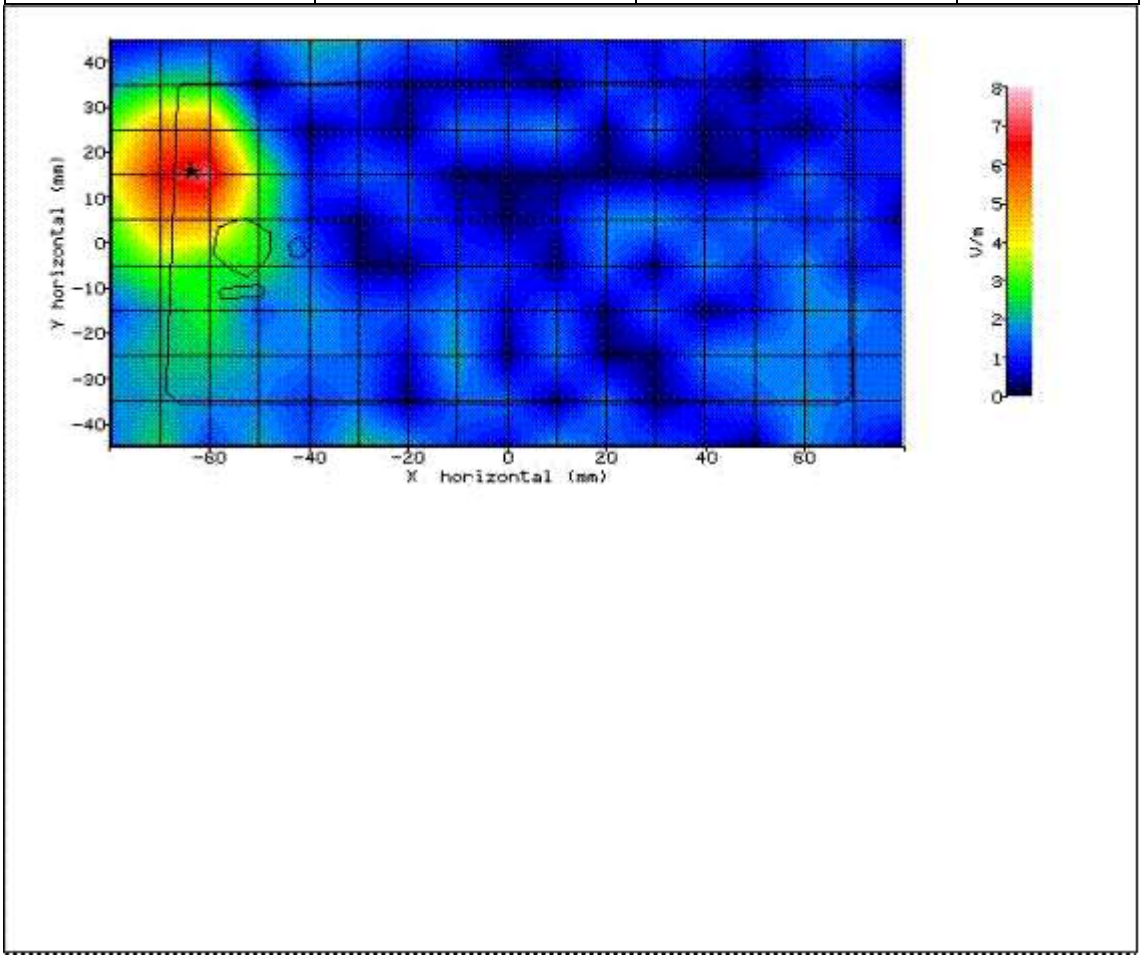

Figure 88: SAR Body Testing Results for the SHL25 Mobile Handset at 5580.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	15/04/2014-10:24:28	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.50°C	**LIQUID SIMULANT:**	5000Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	47.79
RELATIVE HUMIDITY:	22.90%	**CONDUCTIVITY:**	5.529
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.70°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-67.10mm
DUT POSITION:	10mm-Right Edge	**MAX SAR Y-AXIS LOCATION:**	-14.20mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	2.473
TEST FREQUENCY:	5580.0MHz	**SAR 1g:**	0.026 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.048 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.048 W/kg
PROBE BATTERY LAST CHANGED:	15/04/2014	**SAR DRIFT DURING SCAN:**	0.000 %

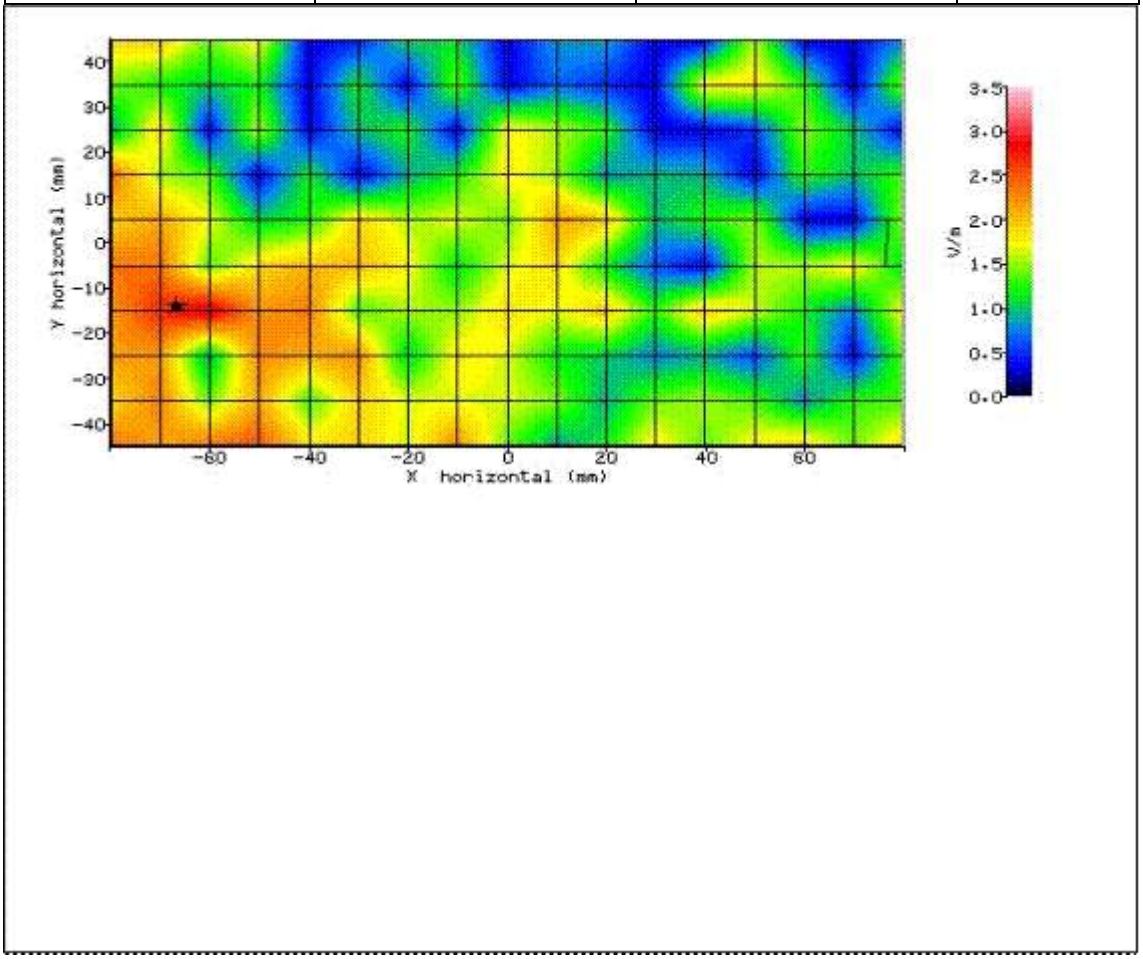

Figure 89: SAR Body Testing Results for the SHL25 Mobile Handset at 5580.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.08.11	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	15/04/2014-10:39:52	**DUT BATTERY MODEL/NO:**	N/A
AMBIENT TEMPERATURE:	22.50°C	**LIQUID SIMULANT:**	5000Body
DEVICE UNDER TEST:	SHL25	**RELATIVE PERMITTIVITY:**	47.79
RELATIVE HUMIDITY:	22.90%	**CONDUCTIVITY:**	5.529
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	22.70°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-17.10mm
DUT POSITION:	10mm-Top Edge	**MAX SAR Y-AXIS LOCATION:**	10.40mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	4.718
TEST FREQUENCY:	5580.0MHz	**SAR 1g:**	0.129 W/kg
TYPE OF MODULATION:	WLAN (OFDM)	**SAR 10g:**	N/A
MODN. DUTY CYCLE:	100%	**SAR START:**	0.188 W/kg
INPUT POWER LEVEL:	15.5dBm	**SAR END:**	0.205 W/kg
PROBE BATTERY LAST CHANGED:	15/04/2014	**SAR DRIFT DURING SCAN:**	9.300 %

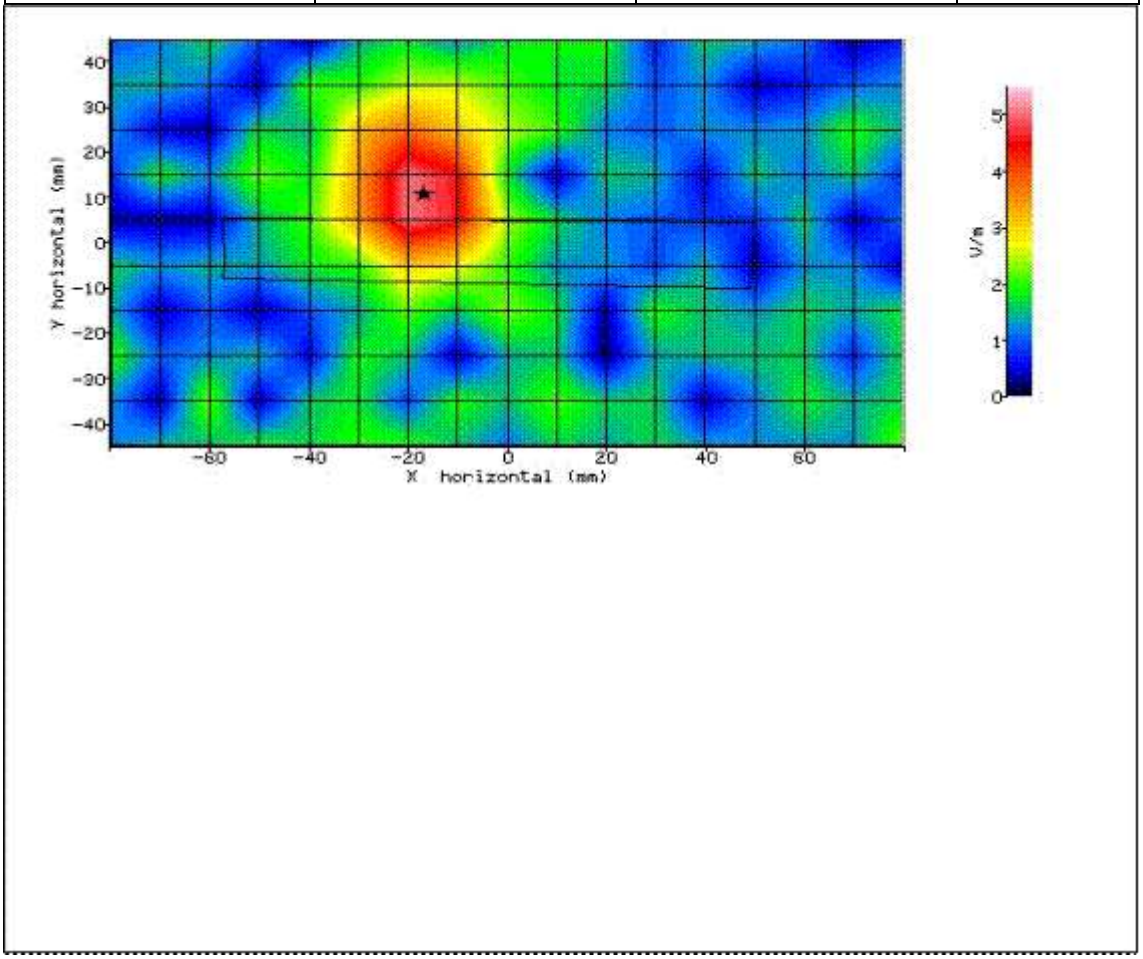

Figure 90: SAR Body Testing Results for the SHL25 Mobile Handset at 5580.0MHz.

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

The following test equipment was used at TÜV SÜD Product Service:

Instrument Description	Manufacturer	Model Type	TE Number	Cal Period (months)	Calibration Due Date
Signal Generator	Hewlett Packard	ESG4000A	38	12	23-May-2014
10MHz - 2.5GHz, 3W, Amplifier	Vectawave Technology	VTL5400	51	-	TU
Directional Coupler	Krytar	1850	58	-	TU
Power Sensor	Rohde & Schwarz	NRV-Z1	60	12	14-Jun-2014
Signal Generator	Hewlett Packard	ESG4000A	61	12	22-May-2014
Amplifier (5GHz)	IndexSar Ltd	5GHz	157	-	TU
Power Sensor	Rohde & Schwarz	NRV-Z1	178	12	23-May-2014
Communications Tester	Rohde & Schwarz	CMU 200	442	12	8-Nov-2014
Directional Coupler	Hewlett Packard	11692D	452	-	TU
Attenuator (20dB, 10W)	Weinschel	37-20-34	482	12	17-Oct-2014
Attenuator (20dB, 20W)	Narda	766F-20	483	12	13-Jun-2014
Spectrum Analyser	Agilent Technologies	E7405A	1410	12	27-Sep-2014
Dipole Positioner/Support (plastic)	IndexSar Ltd	IXH-020	1581	-	TU
Bi-directional Coupler	IndexSar Ltd	7401 (VDC0830-20)	2414	-	TU
Validation Amplifier (10MHz - 2.5GHz)	IndexSar Ltd	VBM2500-3	2415	-	TU
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	15-Nov-2014
Power Sensor	Rohde & Schwarz	NRV- Z5	2878	12	14-Jun-2014
Antenna (Omnidirectional)	Katherin Scala Division	OG-890/1990/DC	2905	-	TU
Antenna (Omnidirectional)	Katherin Scala Division	OG-890/1990/DC	2906	-	TU
Power Meter	Rohde & Schwarz	NRVD	2979	12	25-May-2014
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	25-Oct-2014
Dual Channel Power Meter	Rohde & Schwarz	NRVD	3259	12	14-Jun-2014
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	10-Feb-2015
Power Sensor	Rohde & Schwarz	NRV-Z1	3563	12	23-May-2014
Meter & T/C	R.S Components	Meter 615-8206 & Type K T/C	3612	12	8-Jul-2014
SAR 1800 MHz dipole	Speag	D1800V2	3855	36	19-Feb-2017
SAR 900 MHz dipole	Speag	D900V2	3856	36	19-Feb-2017
SAR 835 MHz dipole	Speag	D835V2	3857	36	19-Feb-2017
SAR 1900 MHz dipole	Speag	D1900V2	3876	36	19-Feb-2017
Head Phantom	IndexSar Ltd	IXB-040 Inverted SAM phantom	4075	-	TU
Part of SARAC System	IndexSar Ltd	Robot Controller	4076	-	TU
Part of SARAC System	IndexSar Ltd	Cartesian Leg Extension	4078	-	TU
Cartesian 4-axis Robot	IndexSar Ltd	SARAC	4079	-	TU
Part of SARAC System	IndexSar Ltd	Wooden Bench	4081	-	TU
Fast Probe Amplifier (3 Channels)	IndexSar Ltd	IXA-020 (5GHz)	4094	-	O/P Mon
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	4143	12	22-Jul-2014
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	4144	12	17-Jul-2014
Spacer used to raise body phantom	IndexSar Ltd	Body Phantom Spacer	4259	-	TU
Spacer used to raise body phantom	IndexSar Ltd	Body Phantom Spacer	4260	-	TU

Instrument Description	Manufacturer	Model Type	TE Number	Cal Period (months)	Calibration Due Date
Digital thermo Hygrometer	Radio Spares	1260	4300	12	22-Mar-2014
SAR 5GHz Di-pole	Speag	D5GHzV2	4309	-	TU
Immersible SAR Probe	IndexSar Ltd	IXP-025	4310	24	07-Apr-2014
Immersible SAR Probe	IndexSar Ltd	IXP-021	4311	24	24-Oct-2014
Immersible SAR Probe	IndexSar Ltd	IPX-050	4313	24	7-Mar-2015
Immersible SAR Probe	IndexSar Ltd	IPX-020	4317	24	24-Apr-2015
Immersible SAR Probe	IndexSar Ltd	IPX-020	4318	24	24-Apr-2015
835MHz Head Fluid	IndexSar Ltd	Batch 20	N/A	1	01-May-2014
835MHz Body Fluid	IndexSar Ltd	Batch 13	N/A	1	01-May-2014
1900MHz Head Fluid	IndexSar Ltd	Batch 8	N/A	1	01-May-2014
1900MHz Body Fluid	IndexSar Ltd	Batch 4	N/A	1	01-May-2014
2450MHz Head Fluid	IndexSar Ltd	Batch 11	N/A	1	01-May-2014
2450MHz Body Fluid	IndexSar Ltd	Batch 7	N/A	1	01-May-2014
5000MHz Head Fluid	IndexSar Ltd	Batch 4	N/A	1	01-May-2014
5000MHz Body Fluid	IndexSar Ltd	Batch 3	N/A	1	01-May-2014

TU – Traceability Unscheduled

3.2 TEST SOFTWARE

The following software was used to control the TÜV SÜD Product Service SARAC System.

Instrument	Version Number	Date
SARA-C system	v.6.08.11	06 June 2013
IFA-10 Probe amplifier	Version 2	-

3.3 DIELECTRIC PROPERTIES OF SIMULANT LIQUIDS

The fluid properties of the simulant fluids used during routine SAR evaluation meet the dielectric properties required KDB 865665.

IEEE 1528 Recipes

Frequency (MHz)	300	450		835	900			1450	1800				1900		1950	2000	2100		2450		3000
Recipe#	1	1	3	1	1	2	3	1	1	2	2	3	1	2	4	1	1	2	2	3	2
Ingredients (% by weight)																					
1, 2-Pro-panediol						64.81															
Bactericide	0.19	0.19	0.50	0.10	0.10		0.50													0.50	
Diacetin			48.90				49.20													49.45	
DGBE								45.41	47.00	13.84	44.92		44.94	13.84	45.00	50.00	50.00	7.99	7.99		7.99
HEC	0.98	0.96		1.00	1.00																
NaCl	5.95	3.95	1.70	1.45	1.48	0.79	1.10	0.67	0.36	0.35	0.18	0.64	0.18	0.35				0.16	0.16		0.16
Sucrose	55.32	56.32		57.00	56.50																
Triton X-100										30.45				30.45				19.97	19.97		19.97
Water	37.56	38.56	48.90	40.45	40.92	34.40	49.20	53.80	52.64	55.36	54.90	49.43	54.90	55.36	55.00	50.00	50.00	71.88	71.88	49.75	71.88
Measured dielectric parameters																					
ε_r'	46.00	43.40	44.30	41.60	41.20	41.80	42.70	40.9	39.3	41.00	40.40	39.20	39.90	41.00	40.10	37.00	36.80	41.10	40.30	39.20	37.90
σ (S/m)	0.86	0.85	0.90	0.90	0.98	0.97	0.99	1.21	1.39	1.38	1.40	1.40	1.42	1.38	1.41	1.40	1.51	1.55	1.88	1.82	2.46
Temp (ºC)	22	22	20	22	22	22	20	22	22	21	22	20	21	21	20	22	22	20	20	20	20
Target dielectric parameters (Table 2)																					
ε_r'	45.30	43.50		41.5	41.50			40.50	40.00								39.80		39.20		38.50
σ (S/m)	0.87	0.87		0.9	0.97			1.20	1.40								1.49		1.80		2.40

NOTE – Multiple columns for any single frequency are optional recipe #, reference: 1 (Kanda et al. [B185]), 2 (Vigneras [B143]), 3 (Peyman and Gabriel [B119]), 4 (Fukunaga et al [B50])

The dielectric properties of the tissue simulant liquids used for the SAR testing at TÜV SÜD Product Service are as follows:-

Fluid Type and Frequency	Relative Permittivity εR (ε') Target	Relative Permittivity εR (ε') Measured	Conductivity σ Target	Conductivity σ Measured
700 MHz Body	55.7	55.59	0.96	0.99
835MHz Head	41.5	41.06	0.90	0.88
835MHz Body	55.2	56.44	0.97	1.01
1900MHz Head	40.0	39.00	1.40	1.44
1900MHz Body	53.3	53.05	1.52	1.59
2450 MHz Head	39.2	39.05	1.80	1.79
2450MHz Body	52.7	50.93	1.95	1.97
5200MHz Head	36.0	37.35	4.66	4.61
5200MHz Body	49.0	48.86	5.30	5.07
5500MHz Head	35.6	36.44	4.96	4.97
5500MHz Body	48.6	47.79	5.65	5.53

3.4 TEST CONDITIONS

3.4.1 Test Laboratory Conditions

Ambient temperature: Within +15°C to +35°C.
The actual temperature during the testing ranged from 21.2°C to 23.2°C.
The actual humidity during the testing ranged from 22.9% to 50.5% RH.

3.4.2 Test Fluid Temperature Range

Frequency	Body / Head Fluid	Min Temperature °C	Max Temperature °C
700MHz	Body	22.4	22.8
835MHz	Head	21.8	22.6
835MHz	Body	21.3	22.0
1900MHz	Head	21.5	22.0
1900MHz	Body	21.2	21.2
2450MHz	Head	22.3	22.3
2450MHz	Body	21.8	21.8
5200MHz	Head	21.8	22.5
5200MHz	Body	21.9	23.2
5500MHz	Head	21.9	21.9
5500MHz	Body	22.5	22.5

3.4.3 SAR Drift

The SAR Drift was within acceptable limits during scans. The maximum SAR Drift, drift due to the handset electronics, was recorded as 9.6% (1.06 dB) for head and 8.2% (1.09 dB) for body. The measurement uncertainty budget for this assessment includes the maximum SAR Drift figures for Head and/or Body as applicable.

3.5 MEASUREMENT UNCERTAINTY

Head SAR Measurements.

Source of Uncertainty	Description	Tolerance / Uncertainty ± %	Probability distribution	Div	c_i (1g)	Standard Uncertainty ± % (1g)	v_i or v_{eff}
Measurement System							
Probe calibration	7.2.1	8.73	N	1	1	8.73	∞
Isotropy	7.2.1.2	3.18	R	1.73	1	1.84	∞
Probe angle >30deg	additional	12.00	R	1.73	1	6.93	∞
Boundary effect	7.2.1.5	0.49	R	1.73	1	0.28	∞
Linearity	7.2.1.3	1.00	R	1.73	1	0.58	∞
Detection limits	7.2.1.4	0.00	R	1.73	1	0.00	∞
Readout electronics	7.2.1.6	0.30	N	1	1	0.30	∞
Response time	7.2.1.7	0.00	R	1.73	1	0.00	∞
Integration time (equiv.)	7.2.1.8	1.38	R	1.73	1	0.80	∞
RF ambient conditions	7.2.3.6	3.00	R	1.73	1	1.73	∞
Probe positioner mech. restrictions	7.2.2.1	5.35	R	1.73	1	3.09	∞
Probe positioning with respect to phantom shell	7.2.2.3	5.00	R	1.73	1	2.89	∞
Post-processing	7.2.4	7.00	R	1.73	1	4.04	∞
Test sample related							
Test sample positioning	7.2.2.4	1.50	R	1.73	1	0.87	∞
Device holder uncertainty	7.2.2.4.2	1.73	R	1.73	1	1.00	∞
Drift of output power	7.2.3.4	9.6	R	1.73	1	5.54	∞
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	7.2.2.2	2.01	R	1.73	1	1.16	∞
Liquid conductivity (target)	7.2.3.3	5.00	R	1.73	0.64	1.85	∞
Liquid conductivity (meas.)	7.2.3.3	5.00	N	1	0.64	3.20	∞
Liquid permittivity (target)	7.2.3.4	5.00	R	1.73	0.6	1.73	∞
Liquid permittivity (meas.)	7.2.3.4	3.00	N	1	0.6	1.80	∞
Combined standard uncertainty			RSS			12.08	
Expanded uncertainty (95% confidence interval)			K=2			24.15	

Body SAR Measurements.

Source of Uncertainty	Description	Tolerance / Uncertainty ± %	Probability distribution	Div	c_i (1g)	Standard Uncertainty ± % (1g)	v_i or v_{eff}
Measurement System							
Probe calibration	7.2.1	8.73	N	1	1	8.73	∞
Isotropy	7.2.1.2	3.18	R	1.73	1	1.84	∞
Boundary effect	7.2.1.5	0.49	R	1.73	1	0.28	∞
Linearity	7.2.1.3	1.00	R	1.73	1	0.58	∞
Detection limits	7.2.1.4	0.00	R	1.73	1	0.00	∞
Readout electronics	7.2.1.6	0.30	N	1	1	0.30	∞
Response time	7.2.1.7	0.00	R	1.73	1	0.00	∞
Integration time (equiv.)	7.2.1.8	1.38	R	1.73	1	0.80	∞
RF ambient conditions	7.2.3.6	3.00	R	1.73	1	1.73	∞
Probe positioner mech. restrictions	7.2.2.1	0.60	R	1.73	1	0.35	∞
Probe positioning with respect to phantom shell	7.2.2.3	2.00	R	1.73	1	1.15	∞
Post-processing	7.2.4	7.00	R	1.73	1	4.04	∞
Test sample related							
Test sample positioning	7.2.2.4	1.50	R	1.73	1	0.87	∞
Device holder uncertainty	7.2.2.4.2	1.73	R	1.73	1	1.00	∞
Drift of output power	7.2.3.4	8.2	R	1.73	1	4.73	∞
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	7.2.2.2	2.01	R	1.73	1	1.16	∞
Liquid conductivity (target)	7.2.3.3	5.00	R	1.73	0.64	1.85	∞
Liquid conductivity (meas.)	7.2.3.3	5.00	N	1	0.64	3.20	∞
Liquid permittivity (target)	7.2.3.4	5.00	R	1.73	0.6	1.73	∞
Liquid permittivity (meas.)	7.2.3.4	3.00	N	1	0.6	1.80	∞
Combined standard uncertainty			RSS			11.51	
Expanded uncertainty (95% confidence interval)			K=2			23.03	

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SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).

ANNEX A

PROBE CALIBRATION REPORT

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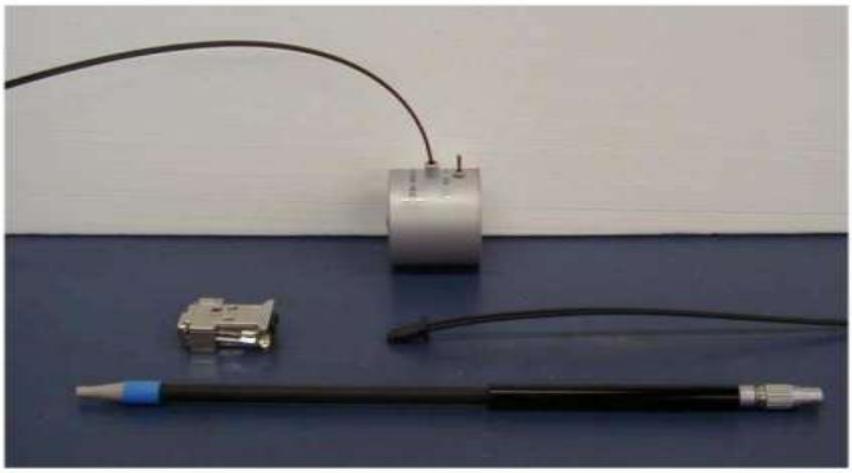
IMMERSIBLE SAR PROBE

CALIBRATION REPORT

Part Number: IXP – 050

S/N 0204

April 2013



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Calibration Certificate 1304/0204
Date of Issue: 23rd April 2013
Immersible SAR Probe

Type:	IXP-050
Manufacturer:	IndexSAR, UK
Serial Number:	0204
Place of Calibration:	IndexSAR, UK
Date of Receipt of Probe:	N/A
Calibration Dates:	14th January – 7th March 2013
Customer:	TUV Sud

IndexSAR Ltd hereby declares that the IXP-050 Probe named above has been calibrated for conformity to the current versions of IEEE 1528, IEC 62209-1, IEC 62209-2, and FCC OET65 standards using the methods described in this calibration document. Where applicable, the standards used in the calibration process are traceable to the UK's National Physical Laboratory.

Calibrated by:	A. Brinklow	**Technical Manager**
Approved by:		**Director**

Please keep this certificate with the calibration document. When the probe is sent for a calibration check, please include the calibration document.

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INTRODUCTION

Straight probes can work on either SARA-C (to measure SAR values in flat phantoms containing Body tissue simulant fluid) or on SARA2 (where they can measure either in a flat phantom with Body fluid, or in a SAM phantom containing Head fluid).

This Report presents measured calibration data for a particular Indexsar SAR probe (S/N 0204) for use on SARA-C only. **The calibration factors do not apply to, and will not give correct readings on, the IndexSAR SARA2 system.**

Indexsar probes are characterised using procedures that, where applicable, follow the recommendations of IEC 62209-1 [Ref 1], IEEE 1528 [Ref 2], IEC 62209-2 [Ref 3] and FCC OET65 [Ref 4] standards. The procedures incorporate techniques for probe linearisation, isotropy assessment and determination of liquid factors (conversion factors). Calibrations are determined by comparing probe readings with analytical computations in canonical test geometries (waveguides) using normalised power inputs.

Each step of the calibration procedure and the equipment used is described in the sections below.

CALIBRATION PROCEDURE

1. Objectives

The calibration process comprises the following stages

1) Determination of the channel sensitivity factors which optimise the probe's overall axial isotropy in 900MHz brain fluid

2) Measure the incidental spherical isotropy using these derived channel sensitivity factors.

3) Since isotropy and channel sensitivity factors are frequency independent, these channel sensitivity factors can be applied to model the exponential decay of SAR in a waveguide fluid cell at each frequency of interest, and hence derive the liquid conversion factors at that frequency.

2. Probe output

The probe channel output signals are linearised in the manner set out in Refs [1] - [4]. The following equation is utilized for each channel:

$$U_{lin} = U_{o/p} + U_{o/p}^{2} / DCP \qquad (1)$$

where U_{lin} is the linearised signal, $U_{o/p}$ is the raw output signal in mV and DCP is the diode compression potential, also in mV.

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DCP is determined from fitting equation (1) to measurements of U_{lin} versus source feed power over the full dynamic range of the probe. The DCP is a characteristic of the Schottky diodes used as the sensors. For the IXP-020 probes with CW signals the DCP values are typically 100mV.

For this value of DCP, the typical linearity response of IXP-050 probes to CW and to GSM modulation is shown in Figure 7, along with departures of this same dataset from linearity.

In turn, measurements of E-field are determined using the following equation:

$$E_{liq}^2 \text{ (V/m)} = U_{linx} * \text{Air Factor}_x * \text{Liq Factor}_x + U_{liny} * \text{Air Factor}_y * \text{Liq Factor}_y + U_{linz} * \text{Air Factor}_z * \text{Liq Factor}_z \quad (3)$$

Here, "Air Factor" represents each channel's sensitivity, while "Liq Factor" represents the enhancement in signal level when the probe is immersed in tissue-simulant liquids at each frequency of interest.

3. Selecting channel sensitivity factors to optimise isotropic response

Within SARA-C, an L-probe's predominant mode of operation is with the tip pointing directly towards the source of radiation. Consequently, optimising the probe's response to boresight signals ("axial isotropy") is far more important than optimising its spherical isotropy (where the direction, as well as the polarisation angle, of the incoming radiation must be taken into account).

The setup for measuring the probe's axial isotropy is shown in **Error! Reference source not found.**. Since isotropy is frequency-independent, measurements are normally made at a frequency of 900MHz as lower frequencies are more tolerant of positional inaccuracies.

A 900MHz waveguide containing head-fluid simulant is selected. Like all waveguides used during probe calibration, this particular waveguide contains two distinct sections: an air-filled launcher section, and a liquid cell section, separated by a dielectric matching window designed to minimise reflections at the air-liquid interface.

The waveguide stands in an upright position and the liquid cell section is filled with 900MHz brain fluid to within 10 mm of the open end. The depth of liquid ensures there is negligible radiation from the waveguide open top and that the probe calibration is not influenced by reflections from nearby objects.

During the measurement, a TE_{21} mode is launched into the waveguide by means of an N-type-to-waveguide adapter. The probe is then lowered vertically into the liquid until the tip is exactly 10mm above the centre of the dielectric window. This particular separation ensures that the probe is operating in a part of the waveguide where boundary corrections are not necessary.

Care must also be taken that the probe tip is centred while rotating.

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The exact power applied to the input of the waveguide during this stage of the probe calibration is immaterial since only relative values are of interest while the probe rotates. However, the power must be sufficiently above the noise floor and free from drift.

The dedicated Indexsar calibration software rotates the probe in 10 degree steps about its axis, and at each position, an Indexsar 'Fast' amplifier samples the probe channels 500 times per second for 0.4 s. The raw $U_{o/p}$ data from each sample are packed into 10 bytes and transmitted back to the PC controller via an optical cable. U_{linx}, U_{liny} and U_{linz} are derived from the raw $U_{o/p}$ values and written to an Excel template.

Once data have been collected from a full probe rotation, the Air Factors are adjusted using a special Excel Solver routine to equalise the output from each channel and hence minimise the axial isotropy. This automated approach to optimisation removes the effect of human bias.

Figure 2 represents the output from each diode sensor as a function of probe rotation angle.

4. Measurement of Spherical Isotropy

As mentioned earlier, in SARA-C a straight probe is always positioned so as to be end-on to the incoming signal source. The probe's axial isotropy response is therefore far more important than its spherical isotropy, which is included here for completeness only.

The setup for assessing the probe's spherical isotropy is shown in Figure 1.

A box phantom containing 900MHz head fluid is irradiated by a tuned dipole, mounted to the side of the phantom on the SARA2 robot's seventh axis. During calibration, the spherical response is generated by rotating the probe about its axis in 15 degree steps and changing the dipole polarisation in 10 degree steps.

The relative channel sensitivities are fixed by the earlier measurement of, and optimisation for, axial isotropy. The effect on spherical isotropy is shown in Figure 3.

5. Determination of Conversion ("Liquid") Factors at each frequency of interest

A lookup table of conversion factors for a probe allows a SAR value to be derived at the measured frequencies, and for either brain or body fluid-simulant.

The method by which the conversion factors are assessed is based on the comparison between measured and analytical rates of decay of SAR with height above a dielectric window. This way, not only can the conversion factors for that frequency/fluid combination be determined, but an allowance can also be made for the scale and range of boundary layer effects.

The theoretical relationship between the SAR at the cross-sectional centre of the lossy waveguide as a function of the longitudinal distance (z) from the

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dielectric separator is given by Equation 4:

$$SAR(z) = \frac{4\left(P_f - P_b\right)}{\rho ab\delta} e^{-2z/\delta} \quad (4)$$

Here, the density ρ is conventionally assumed to be 1000 kg/m^3, ab is the cross-sectional area of the waveguide, and P_f and P_b are the forward and reflected power inside the lossless section of the waveguide, respectively. The penetration depth δ (which is the reciprocal of the waveguide-mode attenuation coefficient) is a property of the lossy liquid and is given by Equation (5).

$$\delta = \left[\mathrm{Re}\left\{ \sqrt{(\pi/a)^2 + j\omega\mu_o\left(\sigma + j\omega\varepsilon_o\varepsilon_r\right)} \right\} \right]^{-1} \quad (5)$$

where σ is the conductivity of the tissue-simulant liquid in S/m, ε_r is its relative permittivity, and ω is the radial frequency (rad/s). Values for σ and ε_r are obtained prior to each waveguide test using an Indexsar DiLine measurement kit, which uses the TEM method as recommended in [2]. σ and ε_r are both temperature- and fluid-dependent, so are best measured using a sample of the tissue-simulant fluid immediately prior to the actual calibration.

Wherever possible, all DiLine and calibration measurements should be made in the open laboratory at 22 $\pm$ 2.0°C; if this is not possible, the values of σ and ε_r should reflect the actual temperature. Values employed for calibration are listed in the tables below.

By ensuring the liquid height in the waveguide is at least three penetration depths, reflections at the upper surface of the liquid are negligible. The power absorbed in the liquid is therefore determined solely from the waveguide forward and reflected power.

Different waveguides are used for 700MHz, 835/900MHz, 1450MHz, 1800/1900MHz, 2100/2450/2600MHz and 5200/5800MHz measurements. Table A.1 of [1] can be used for designing calibration waveguides with a return loss greater than 20 dB at the most important frequencies used for personal wireless communications, and better than 15dB for frequencies greater than 5GHz. Values for the penetration depth for these specific fixtures and tissue-simulating mixtures are also listed in Table A.1.

According to [1], this calibration technique provides excellent accuracy, with standard uncertainty of less than 3.6% depending on the frequency and medium. The calibration itself is reduced to power measurements traceable to a standard calibration procedure. The practical limitation to the frequency band of 800 to 5800 MHz because of the waveguide size is not severe in the context of compliance testing.

During calibration, the probe is lowered carefully until it is just touching the cross-sectional centre of the dielectric window. 200 samples are then taken and written to an Excel template file before moving the probe vertically

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upwards. This cycle is repeated 150 times. The vertical separation between readings is determined from practical considerations of the expected SAR decay rate, and range from 0.2mm steps at low frequency, through 0.1mm at 2450MHz, down to 0.05mm at 5GHz.

Once the data collection is complete, a Solver routine is run which optimises the measured-theoretical fit by varying the conversion factor, and the boundary correction size and range.

For calibrations at 450MHz, where waveguide calibrations become unfeasible, a full 3D SAR scan over a tuned dipole is performed, and the conversion factor adjusted to make the measured 1g and 10g volume-averaged SAR values agree with published targets.

CALIBRATION FACTORS MEASURED FOR PROBE S/N 0204

The probe was calibrated at 450, 835, 900, 1800, 2100, 2450 and 2600MHz in liquid samples representing brain and body liquid at these frequencies.

The calibration was for CW signals only, and the axis of the probe was parallel to the direction of propagation of the incident field i.e. end-on to the incident radiation. The axial isotropy of the probe was measured by rotating the probe about its axis in 10 degree steps through 360 degrees in this orientation.

The reference point for the calibration is in the centre of the probe's cross-section at a distance of 2.7 mm from the probe tip in the direction of the probe amplifier. A value of 2.7 mm should be used for the tip to sensor offset distance in the software. The distance of 2.7mm for assembled probes has been confirmed by taking X-ray images of the probe tips (see Figure 8).

It is important that the diode compression point and air factors used in the software are the same as those quoted in the results tables, as these are used to convert the diode output voltages to a SAR value.

CALIBRATION EQUIPMENT

The table on page 20 indicates the calibration status of all test equipment used during probe calibration.

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MEASUREMENT UNCERTAINTIES

A complete measurement uncertainty analysis for the SARA-C measurement system has been published in Reference [6]. Table 17 from that document is re-created below, and lists the uncertainty factors associated just with the calibration of probes.

Source of uncertainty	Uncertainty value ± %	Probability distribution	Divisor	c_i	Standard uncertainty ui ± %	v_i or v_{eff}
Forward power	3.92	N	1.00	1	3.92	∞
Reflected power	4.09	N	1.00	1	4.09	∞
Liquid conductivity	1.308	N	1.00	1	1.31	∞
Liquid permittivity	1.271	N	1.00	1	1.27	∞
Field homgeneity	3.0	R	1.73	1	1.73	∞
Probe positioning	0.22	R	1.73	1	0.13	∞
Field probe linearity	0.2	R	1.73	1	0.12	∞
Combined standard uncertainty		**RSS**			**6.20**	

At the 95% confidence level, therefore, the expanded uncertainty is ±12.4%

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SUMMARY OF CAL FACTORS FOR PROBE IXP-020 S/N 0204

	Relative Channel Sensitivities (to optimise Axial Isotropy)			
	X	Y	Z	
Air Factors	91.78	66.90	81.32	$(V/m)^2/mV$
DCPs	100	100	100	mV

Measured Isotropy	(+/-) dB
Axial Isotropy	0.02
Spherical Isotropy	0.66

Additional Information	
Sensor offset (mm)	2.7
Elbow – Tip dimension (mm)	0.0

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SAR Conversion Factors/ Boundary Corrections							
	Head Fluid			Body Fluid			
Frequency* (MHz)	SAR Conv Factor	Boundary Correction f(0)	Boundary Correction d(mm)	SAR Conv Factor	Boundary Correction f(0)	Boundary Correction d(mm)	Notes
450	0.317	0	1	0.317	0	1	3
700	-	-	-	-	-	-	-
835	0.310	1.69	1.08	0.327	0.59	1.91	1,2
900	0.313	0.80	1.52	0.327	1.17	1.31	1,2
1450	-	-	-	-	-	-	-
1800	0.357	0.77	1.68	0.381	0.64	2.07	1,2
1900	0.366	0.71	1.83	0.388	0.64	2.12	1,2
2100	0.397	0.70	1.96	0.413	0.78	1.86	1,2
2450	0.397	1.09	1.44	0.440	1.09	1.51	1,2
2600	0.394	1.26	1.35	0.449	1.17	1.46	1,2
Notes							
1)	Calibrations done at 22°C +/-2°C						
2)	Waveguide calibration						
3)	By validation						

The valid frequency of SARA-C probe calibrations are ±100MHz (F<300MHz) and ±200MHz (F>300MHz)

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PROBE SPECIFICATIONS

Indexsar probe 0204, along with its calibration, is compared with BSEN 62209-1 and IEEE standards recommendations (Refs [1] and [2]) in the Tables below. A listing of relevant specifications is contained in the tables below:

Dimensions	S/N 0204	BSEN [1]	IEEE [2]
Overall length (mm)	350		
Tip length (mm)	10		
Body diameter (mm)	12		
Tip diameter (mm)	5.2	8	8
Distance from probe tip to dipole centers (mm)	2.7		

Typical Dynamic range	S/N 0204	BSEN [1]	IEEE [2]
Minimum (W/kg)	0.01	<0.02	0.01
Maximum (W/kg) N.B. only measured to > 100 W/kg on representative probes	>100	>100	100

Isotropy (measured at 900MHz)	S/N 0204	BSEN [1]	IEEE [2]
Axial rotation with probe normal to source (+/- dB)	0.02	0.5	0.25
Spherical isotropy covering all orientations to source (+/- dB)	0.66	N/A	N/A

NB Isotropy is frequency independent

Construction	Each probe contains three orthogonal dipole sensors arranged on a triangular prism core, protected against static charges by built-in shielding, and covered at the tip by PEEK cylindrical enclosure material. No adhesives are used in the immersed section. Outer case materials are PEEK and heat-shrink sleeving.
Chemical resistance	Tested to be resistant to TWEEN20 and sugar/salt-based simulant liquids but probes should be removed, cleaned and dried when not in use. NOT recommended for use with glycol or soluble oil-based liquids.

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REFERENCES

References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

For a specific reference, subsequent revisions do not apply.

For a non-specific reference, the latest version applies.

[1] IEC 62209-1.
Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices — Human models, instrumentation, and procedures — Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)

[2] IEEE 1528
Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques

[3] IEC 62209-2
Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, Instrumentation, and procedures – Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)

[4] FCC OET65
Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

[5] Indexsar Report IXS-0300, October 2007.
Measurement uncertainties for the SARA2 system assessed against the recommendations of BS EN 62209-1:2006

[6] SARA-C SAR Testing System: Measurement Uncertainty, v1.0.3. October 2011.

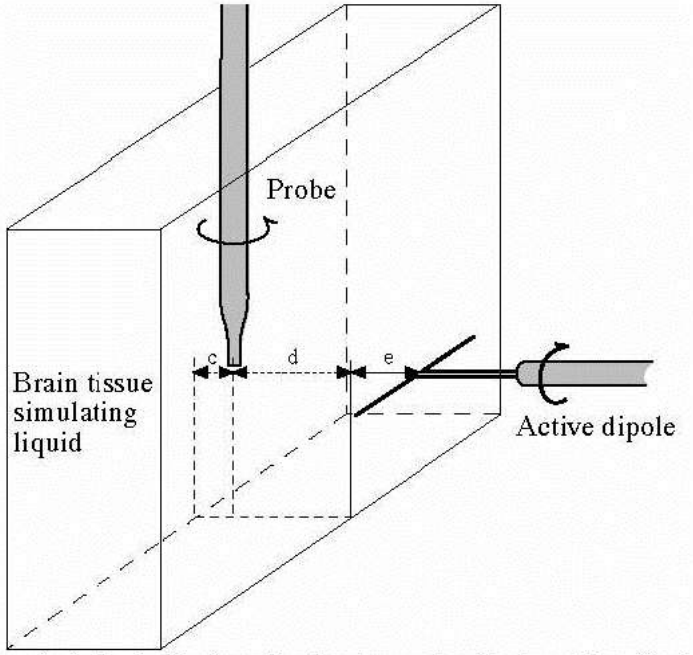

Figure 1. Spherical isotropy jig showing probe, dipole and box filled with simulated brain liquid (see Ref [2], Section A.5.2.1)

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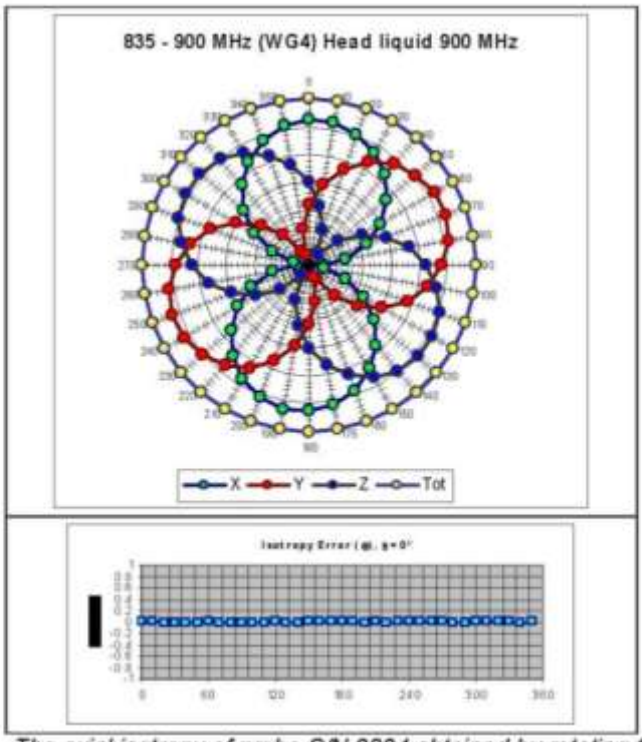

Figure 2. The axial isotropy of probe S/N 0204 obtained by rotating the probe in a liquid-filled waveguide at 900 MHz. (NB Axial Isotropy is frequency independent)

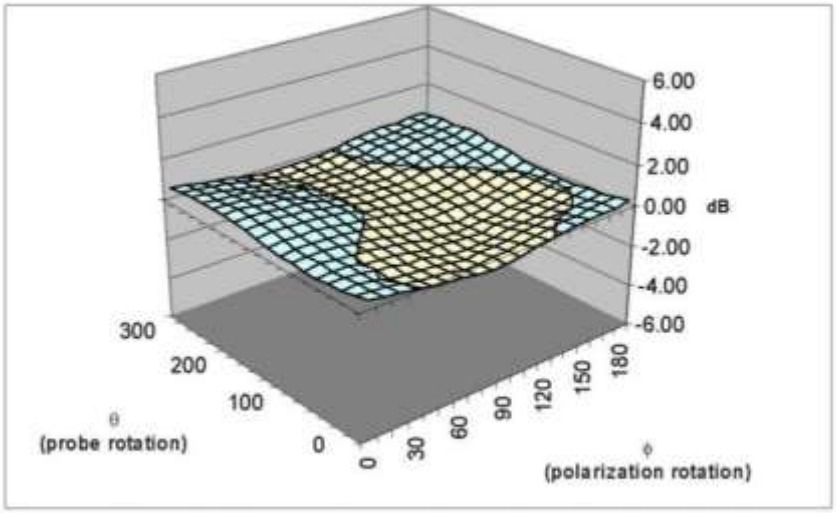

Figure 3 Spherical isotropy diagram after optimisation of relative channel sensitivities for axial isotropy

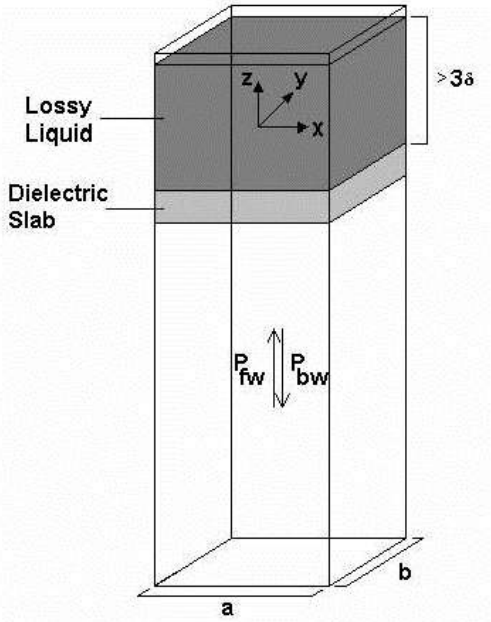

Figure 4. Geometry used for waveguide calibration (after Ref [2]. Section A.3.2.2)

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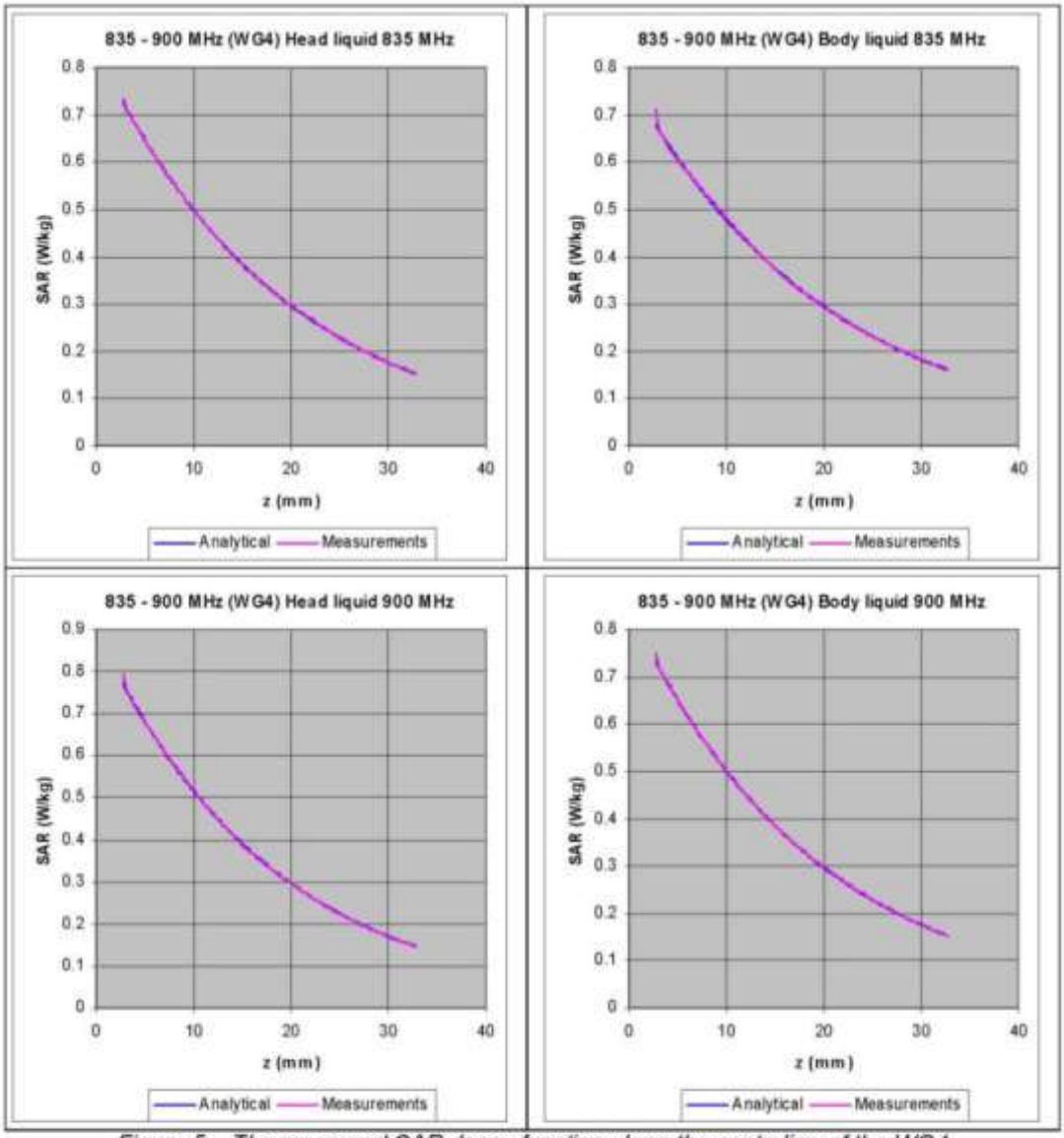

Figure 5 . The measured SAR decay function along the centreline of the WG4 waveguide with conversion factors adjusted to fit to the theoretical function for the particular dimension, frequency, power and liquid properties employed.

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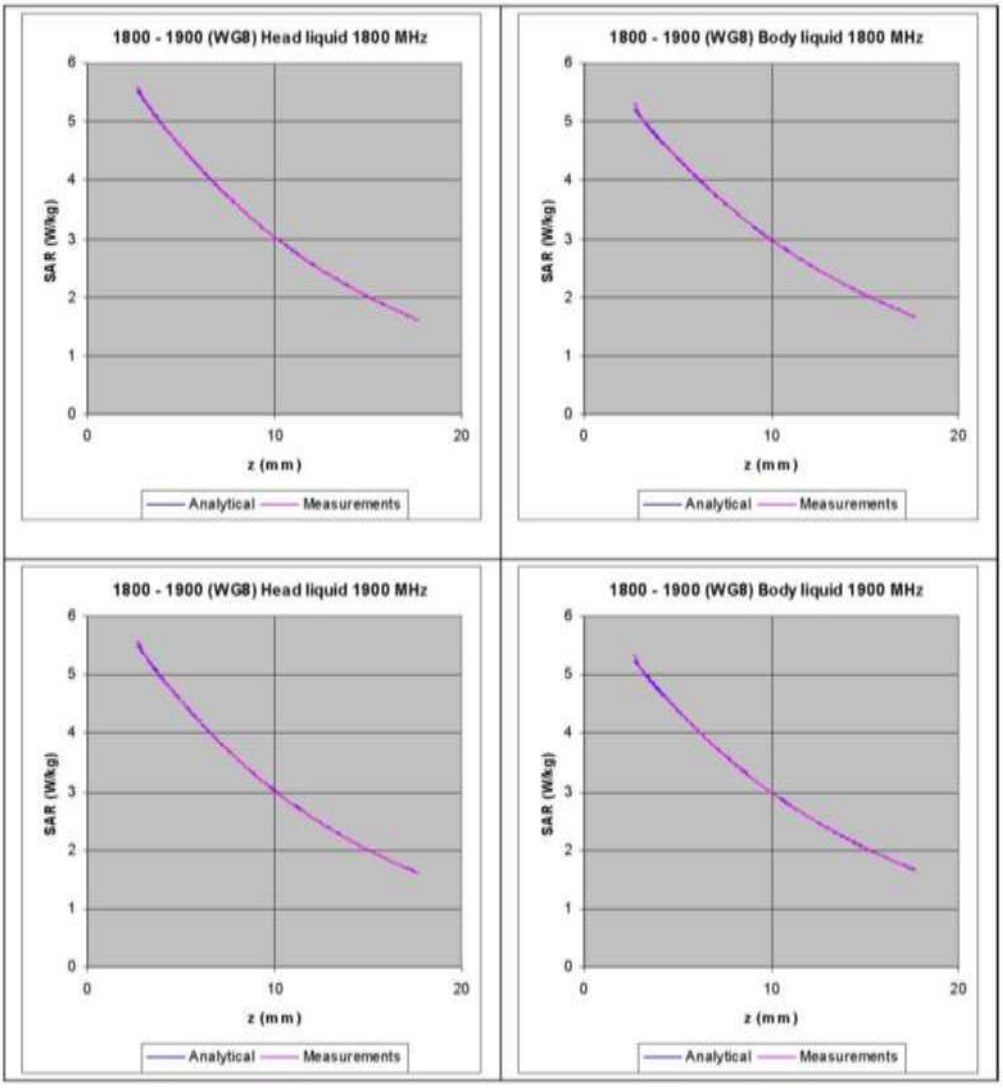
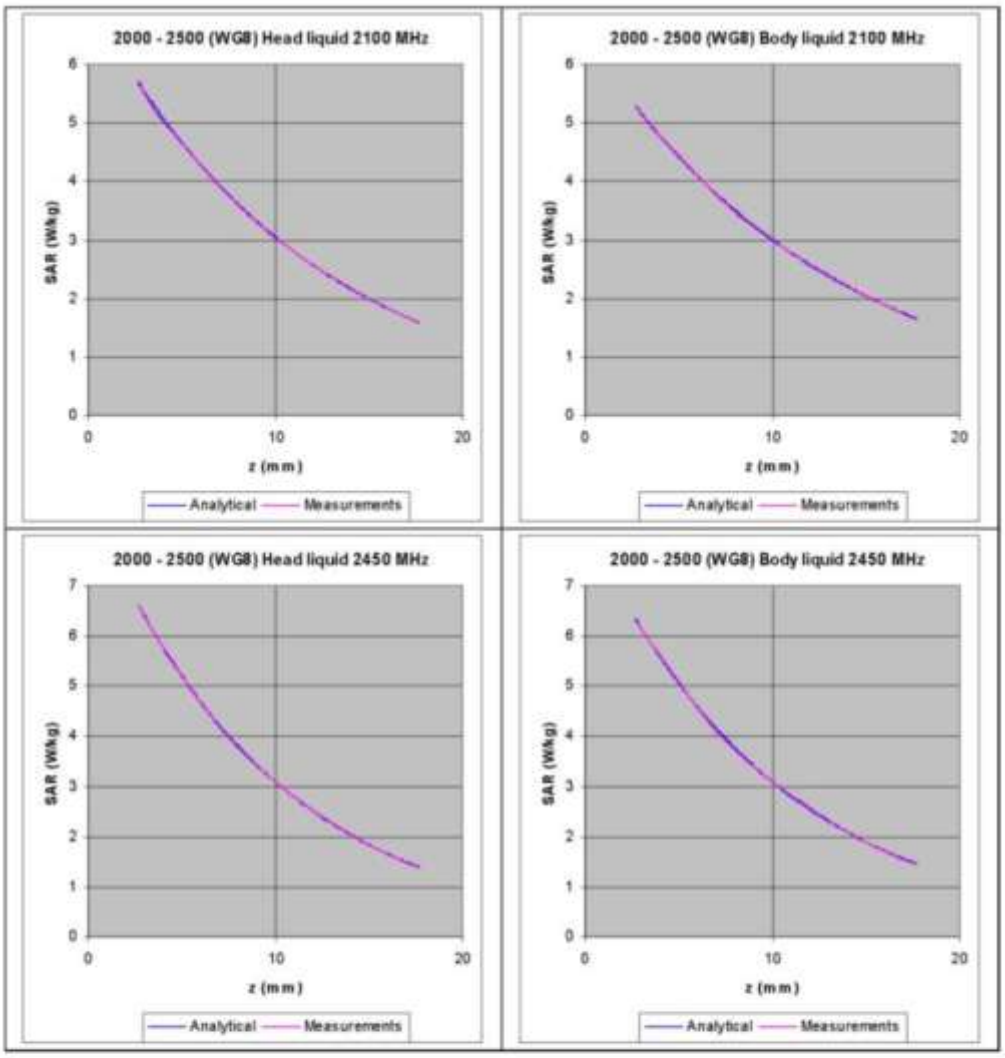


Product Service



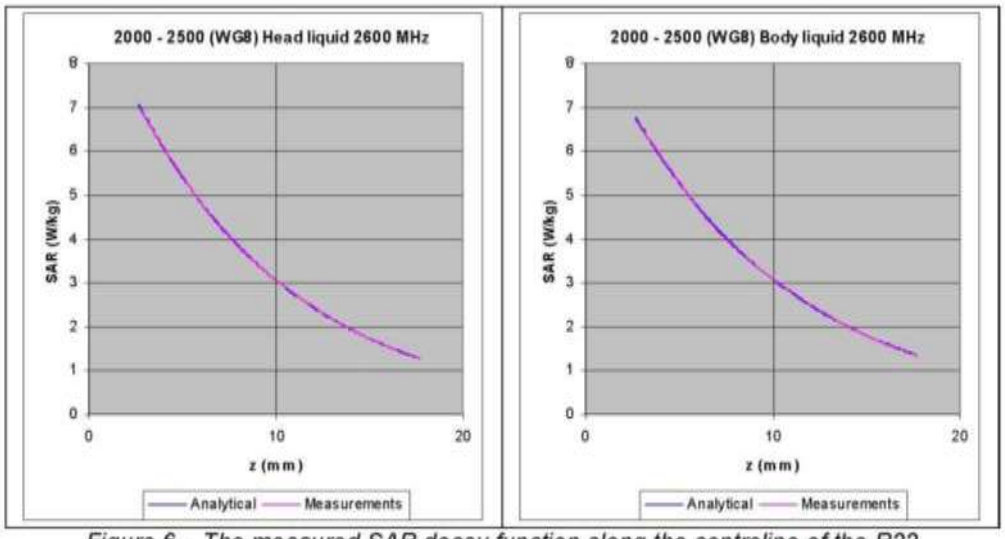


Figure 6 . The measured SAR decay function along the centreline of the R22 waveguide with conversion factors adjusted to fit to the theoretical function for the particular dimension, frequency, power and liquid properties employed.

Product Service

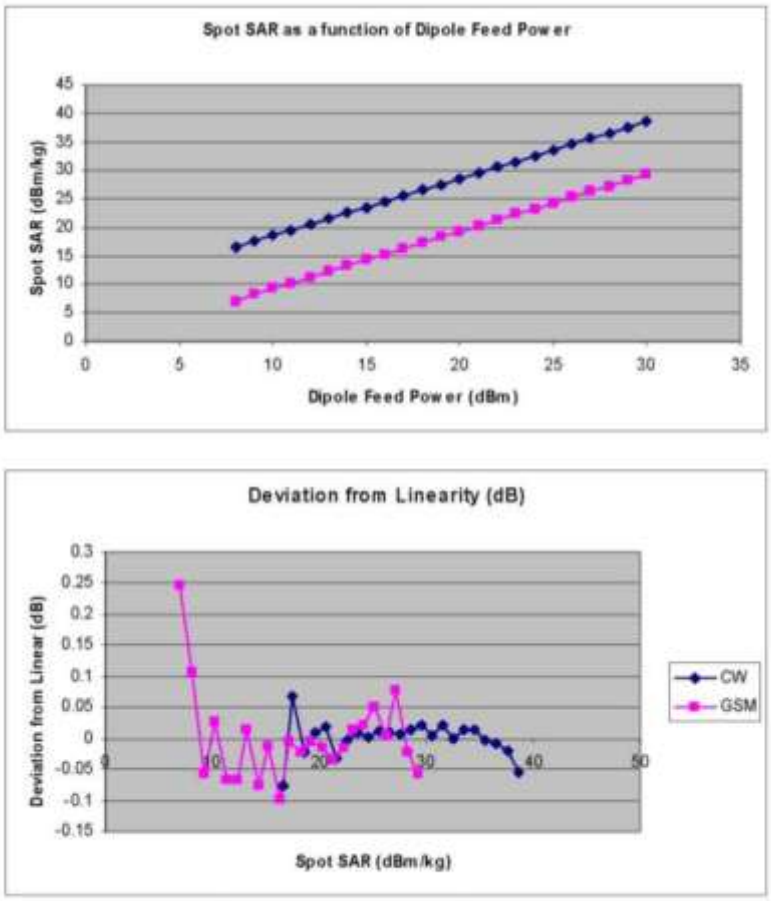


Figure 7 : The typical linearity response of IXP-050 probes to both CW (blue) and GSM (pink) modulation in close proximity to a source dipole. The top diagram shows the SAR reading as a function of dipole feed power, with GSM modulation being approx a factor of 8 (ie 9dB) lower than CW. The lower diagram shows the departure from linearity of the same two datasets.

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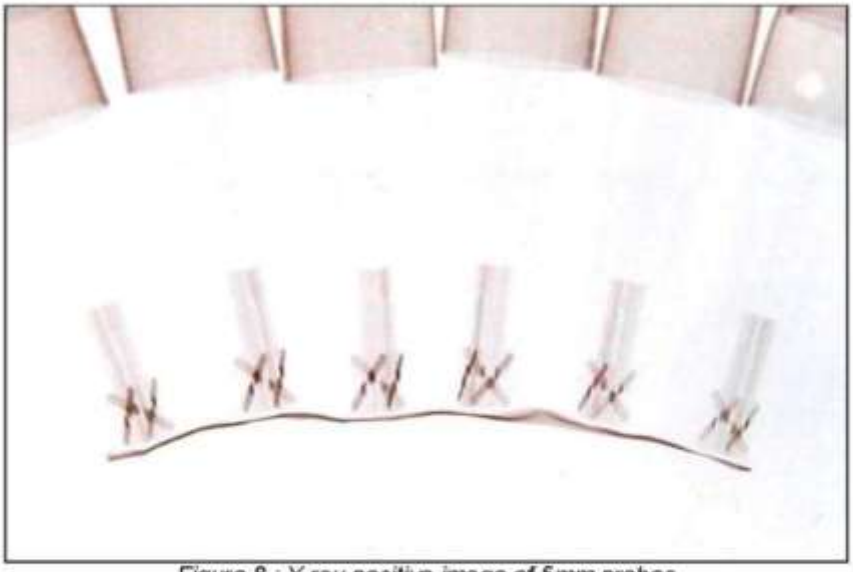

Figure 8 : X-ray positive image of 5mm probes

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Table indicating the dielectric parameters of the liquids used for calibrations at each frequency

Frequency (MHz)	Fluid Type	Relative Permittivity	Conductivity (S/m)	Relative Permittivity	Conductivity (S/m)	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
450	Head	44.33	0.835	43.5	0.87	1.9	-4.0	Pass	Pass
835		42.25	0.900	41.5	0.90	1.8	0.0	Pass	Pass
900		41.46	0.962	41.5	0.97	-0.1	-0.8	Pass	Pass
1800		39.92	1.396	40.0	1.40	-0.2	-0.4	Pass	Pass
1900		39.67	1.400	40.0	1.40	-0.8	0.0	Pass	Pass
2100		40.96	1.500	39.8	1.49	2.9	0.7	Pass	Pass
2450		39.81	1.821	39.2	1.80	1.6	1.2	Pass	Pass
2600		39.30	1.971	39.0	1.96	0.8	0.6	Pass	Pass
450	Body	57.53	0.902	56.7	0.94	1.5	-3.7	Pass	Pass
835		55.14	0.958	55.2	0.97	-0.1	-1.2	Pass	Pass
900		54.53	1.023	55	1.05	-0.9	-2.6	Pass	Pass
1800		53.07	1.521	53.3	1.52	-0.4	0.1	Pass	Pass
1900		52.85	1.533	53.3	1.52	-0.8	0.9	Pass	Pass
2100		53.92	1.568	53.2	1.62	1.4	-3.2	Pass	Pass
2450		52.90	1.957	52.7	1.95	0.4	0.4	Pass	Pass
2600		52.47	2.132	52.5	2.16	-0.1	-1.3	Pass	Pass

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IMMERSIBLE SAR PROBE

CALIBRATION REPORT

Part Number: IXP–020

S/N L0006

April 2013

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Calibration Certificate 1304/L0006
Date of Issue: 24 April 2013
Immersible SAR Probe

Type:	IXP-020
Manufacturer:	IndexSAR, UK
Serial Number:	L0006
Place of Calibration:	IndexSAR, UK
Date of Receipt of Probe:	N/A
Calibration Dates:	15 March – 23 April 2013
Customer:	TUV Sud

IndexSAR Ltd hereby declares that the IXP-050 Probe named above has been calibrated for conformity to the current versions of IEEE 1528, IEC 62209-1, IEC 62209-2, and FCC OET65 standards using the methods described in this calibration document. Where applicable, the standards used in the calibration process are traceable to the UK's National Physical Laboratory.

Calibrated by:	A. Brinklow	**Technical Manager**
Approved by:		**Director**

Please keep this certificate with the calibration document. When the probe is sent for a calibration check, please include the calibration document.

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INTRODUCTION

L-shaped probes are designed solely for use on the SARA-C SAR-measuring system. They are not designed to work on SARA2.

This Report presents measured calibration data for a particular Indexsar SAR probe (S/N L0006) only and describes the procedures used for characterisation and calibration.

Indexsar probes are characterised using procedures that, where applicable, follow the recommendations of IEC 62209-1 [Ref 1], IEEE 1528 [Ref 2], IEC 62209-2 [Ref 3] and FCC OET65 [Ref 4] standards. The procedures incorporate techniques for probe linearisation, isotropy assessment and determination of liquid factors (conversion factors). Calibrations are determined by comparing probe readings with analytical computations in canonical test geometries (waveguides) using normalised power inputs.

Each step of the calibration procedure and the equipment used is described in the sections below.

CALIBRATION PROCEDURE

1. Objectives

The calibration process comprises the following stages:-

1) Determination of the relative channel sensitivity factors which optimise the probe's overall axial isotropy in 900MHz brain fluid.

2) Measure the incidental spherical isotropy using these derived channel sensitivity factors.

3) Since isotropy and channel sensitivity factors are frequency independent, these channel sensitivity factors can be applied to model the exponential decay of SAR in a waveguide fluid cell at each frequency of interest, and hence derive the liquid conversion factors at that frequency.

2. Probe output

The probe channel output signals are linearised in the manner set out in Refs [1] - [4]. The following equation is utilized for each channel:

$$U_{lin} = U_{o/p} + U_{o/p}^{2} / DCP \qquad (1)$$

where U_{lin} is the linearised signal, $U_{o/p}$ is the raw output signal in mV and DCP is the diode compression potential, also in mV.

DCP is determined from fitting equation (1) to measurements of U_{lin} versus source feed power over the full dynamic range of the probe. The DCP is a

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characteristic of the Schottky diodes used as the sensors. For the IXP-020 probes with CW signals the DCP values are typically 100mV.

For this value of DCP, the typical linearity response of IXP-050 probes to CW and to GSM modulation is shown in Figure 7, along with departures of this same dataset from linearity.

In turn, measurements of E-field are determined using the following equation:

$$E_{liq}^2 \text{ (V/m)} = U_{linx} * \text{Air Factor}_x * \text{Liq Factor}_x + U_{liny} * \text{Air Factor}_y * \text{Liq Factor}_y + U_{linz} * \text{Air Factor}_z * \text{Liq Factor}_z \quad (3)$$

Here, "Air Factor" represents each channel's sensitivity, while "Liq Factor" represents the enhancement in signal level when the probe is immersed in tissue-simulant liquids at each frequency of interest.

3. Selecting channel sensitivity factors to optimise isotropic response

Within SARA-C, an L-probe's predominant mode of operation is with the tip pointing directly towards the source of radiation. Consequently, optimising the probe's response to boresight signals ("axial isotropy") is far more important than optimising its spherical isotropy (where the direction, as well as the polarisation angle, of the incoming radiation must be taken into account).

The setup for measuring the probe's axial isotropy is shown in Figure 1, and this allows spherical isotropy to be measured at the same time. Moreover, since isotropy is frequency-independent, measurements are normally made at a frequency of 900MHz as lower frequencies are more tolerant of positional inaccuracies.

A box phantom containing 900MHz head fluid is irradiated by a tuned dipole, mounted at the side of the phantom on the SARA2 robot's seventh axis. Note: although the probe is used on SARA-C, it is actually calibrated on SARA2. The dipole is connected to a signal generator and amplifier via a directional coupler and power meter. The absolute power level is not important as long as it is stable, with stability being monitored using the coupler and power meter.

During calibration, the spherical isotropy response is measured by changing the orientation of the probe sensors with respect to the dipole, while keeping the long shaft of the probe vertical and the probe sensors at precisely the same position in space. Correctly aligning the probe sensors in this way is essential to an accurate measurement of isotropy.

Initially, the short shaft of the probe is positioned parallel to the phantom wall with its sensors at the same vertical height as the centre of the source dipole and the line joining sensors to dipole perpendicular to the phantom wall (see Figure 1). In this position, the probe is said to be at a position angle of -90 degrees. During the scan, the probe is rotated from -90 to +90 degrees in 10 degree steps, and at each position angle, the dipole polarisation changes

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Here, the density ρ is conventionally assumed to be 1000 kg/m^3, ab is the cross-sectional area of the waveguide, and P_f and P_b are the forward and reflected power inside the lossless section of the waveguide, respectively. The penetration depth δ (which is the reciprocal of the waveguide-mode attenuation coefficient) is a property of the lossy liquid and is given by Equation (5).

$$\delta = \left[\mathrm{Re}\left\{ \sqrt{(\pi/a)^2 + j\omega\mu_o(\sigma + j\omega\varepsilon_o\varepsilon_r)} \right\} \right]^{-1} \quad (5)$$

where σ is the conductivity of the tissue-simulant liquid in S/m, ε_r is its relative permittivity, and ω is the radial frequency (rad/s). Values for σ and ε_r are obtained prior to each waveguide test using an Indexsar DiLine measurement kit, which uses the TEM method as recommended in [2]. σ and ε_r are both temperature- and fluid-dependent, so are best measured using a sample of the tissue-simulant fluid immediately prior to the actual calibration.

Wherever possible, all DiLine and calibration measurements should be made in the open laboratory at 22 $\pm$ 2.0°C; if this is not possible, the values of σ and ε_r should reflect the actual temperature. Values employed for calibration are listed in the tables below.

Dedicated waveguides have been designed to accommodate the geometry of an L-shaped probe as it traces out the decay profile. Traditional straight probes measure the decay rate of a vertical-travelling signal above a horizontal dielectric window; for the L-shaped probes, the geometry has had to be changed, and the waveguide now lies horizontally and instead of being open at the end, is capped with a metal plate (see Figure 2). A slot is cut in the top ("b") face through which tissue simulant fluid can be poured, and through which the probe can enter the guide and be offered up to the now vertical waveguide window.

During calibration, the probe tip is moved carefully towards the dielectric window until the flat face of the tip is just touching the exact centre of the face. 200 samples are then taken and written to an Excel template file before moving the probe into the liquid away from the waveguide window. This cycle is repeated 150 times at each separation. The spatial separation between readings is determined from practical considerations of the expected SAR decay rate, and range from 0.2mm steps at low frequency, through 0.1mm at 2450MHz, down to 0.05mm at 5GHz.

Once the data collection is complete, a Solver routine is run which optimises the measured-theoretical fit by varying the conversion factor, and the boundary correction size and range.

By ensuring the waveguide cap is at least three penetration depths, reflections are negligible. The power absorbed in the liquid is therefore determined solely from the waveguide forward and reflected power.

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Different waveguides are used for 700MHz, 835/900MHz, 1450MHz, 1800/1900MHz, 2100/2450/2600MHz and 5200/5800MHz measurements. Table A.1 of [1] can be used for designing calibration waveguides with a return loss greater than 20 dB at the most important frequencies used for personal wireless communications, and better than 15dB for frequencies greater than 5GHz. Values for the penetration depth for these specific fixtures and tissue-simulating mixtures are also listed in Table A.1.

According to [1], this calibration technique provides excellent accuracy, with standard uncertainty of less than 3.6% depending on the frequency and medium. The calibration itself is reduced to power measurements traceable to a standard calibration procedure. The practical limitation to the frequency band of 800 to 5800 MHz because of the waveguide size is not severe in the context of compliance testing.

For calibrations at 450MHz, where waveguide calibrations become unfeasible, a full 3D SAR scan over a tuned dipole is performed, and the conversion factor adjusted to make the measured 1g and 10g volume-averaged SAR values agree with published targets.

CALIBRATION FACTORS MEASURED FOR PROBE S/N L0006

The probe was calibrated at 450, 835, 900, 1800, 1900, 2100, 2450 and 2600 MHz in liquid samples representing brain liquid at these frequencies.

The calibration was for CW signals only, and the horizontal axis of the probe was parallel to the direction of propagation of the incident field i.e. end-on to the incident radiation.

The reference point for the calibration is in the centre of the probe's cross-section at a distance of 2.7 mm from the probe tip in the direction of the probe amplifier. A value of 2.7 mm should be used for the tip to sensor offset distance in the software. The distance of 2.7mm for assembled probes has been confirmed by taking X-ray images of the probe tips (see Figure 9).

It is important that the diode compression point and air factors used in the software are the same as those quoted in the results tables, as these are used to convert the diode output voltages to a SAR value.

CALIBRATION EQUIPMENT

The Table on page 21 indicates the calibration status of all test equipment used during probe calibration.