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Report On

Specific Absorption Rate Testing of the
Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS

COMMERCIAL-IN-CONFIDENCE

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REPORT ON

Specific Absorption Rate Testing of the
Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS

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May 2016

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05 May 2016

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SECTION 1

REPORT SUMMARY

Specific Absorption Rate Testing of the
Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, 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 Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS to the requirements of KDB 447498 – D01 v06 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 Telecommunications of Europe Ltd
Manufacturer	Sharp Corporation
Manufacturing Description	Mobile Handset
Serial/IMEI Number(s)	004401115723591 (SAR Test: GSM/WCDMA/LTE) 004401115723625 (SAR Test: GSM/WCDMA/LTE) 004401115723641 (SAR Test: WLAN) 004401115723286 (Conducted: GSM) 004401115723385 (Conducted: WCDMA) 004401115723393 (Conducted: LTE FDD5) 004401115723252 (Conducted: LTE FDD13/17 & TDD38) 004401115723419 (Conducted: Bluetooth) 004401115723443 (Conducted: WLAN)
Number of Samples Tested	9
Hardware Version	PP1
Software Version	C2090 - GSM/WCDMA/LTE A2090 - WLAN
Battery Cell Manufacturer	Sharp Corporation
Battery Model Number	Integral
Test Specification/Issue/Date	KDB 447498 – D01 v06 General RF Exposure Guidance
Start of Test	24 March 2016
Finish of Test	21 April 2016
Related Document(s)	FCC 47CFR 2.1093: 2015 KDB 248227 – D01 v02r02 KDB 865664 – D01 v01r04 KDB 865664 – D02 v01r02 KDB 648474 – D04 v01r03 KDB 941225 – D01 v03r01 KDB 941225 – D06 v02r01 KDB 941225 – D05 v02r05 IEEE 1528-2013
Name of Engineer(s)	Nigel Grigsby Michael Mawby

1.2 BRIEF SUMMARY OF RESULTS

The measurements shown in this report were made in accordance with the procedures specified KDB 447498 – D01 v06.

The maximum 1g volume averaged SAR found during this Assessment

Max 1g SAR (W/kg) Head	0.57 (Measured)	0.63 (Scaled)
Max 1g SAR (W/kg) Body / Hotspot	0.56 (Measured)	0.70 (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 Scaled SAR (W/kg)	Highest Simultaneous Transmission Scaled SAR (W/kg)
GSM/GPRS 850	Head	0.59	0.89
	Body/Hotspot	**0.70**	
WCDMA FDD V	Head	0.54	
	Body/Hotspot	0.58	
LTE Band 5	Head	0.56	
	Body/Hotspot	0.64	
LTE Band 13	Head	0.55	
	Body/Hotspot	0.54	
LTE Band 17	Head	0.27	
	Body/Hotspot	0.34	
PCS/GPRS 1900	Head	0.46	
	Body/Hotspot	0.43	
LTE Band 38	Head	**0.63**	
	Body/Hotspot	0.51	
WLAN 2.4GHz	Head	0.30	
	Body/Hotspot	0.10	
WLAN 5GHz	Head	0.11	
	Body/Hotspot	0.09	
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 PRODUCT TECHNICAL DESCRIPTION

Refer to Model Description APYHRO00234 Rev 4.0 document.

1.4 TEST RESULTS SUMMARY

1.4.1 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
24/03/2016	835	835	10.52	0.27%
29/03/2016	835	835	10.40	-0.84%
30/03/2016	835	835	9.79	-6.72%
01/04/2016	835	835	9.89	-5.73%
13/04/2016	835	835	9.60	0.95%
14/04/2016	835	835	9.40	-1.16%
24/03/2016	1900	1900	39.17	7.74%
31/03/2016	1900	1900	39.34	8.20%
15/04/2016	1900	1900	39.55	-1.21%
01/04/2016	700	700	8.36	6.68%
04/04/2016	700	700	8.40	7.19%
14/04/2016	700	700	7.60	1.52%
15/04/2016	700	700	7.73	3.17%
19/04/2016	2450	2450	52.40	-4.24%
19/04/2016	2450	2450	53.74	4.71%
12/04/2016	2600	2600	54.09	-5.56%
15/04/2016	2600	2600	57.67	2.55%
20/04/2016	5000	5200	75.40	-1.43%
20/04/2016	5000	5200	71.37	-6.71%

*Normalised to a forward power of 1W

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1.4.2 Results Summary Tables

GSM 850MHz Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, 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	824.2	128	32.25	33.5	0.43	0.57	Figure 6
Left 15°	824.2	128	32.25	33.5	0.14	0.19	Figure 7
Right Cheek	824.2	128	32.25	33.5	0.34	0.45	Figure 8
Right 15°	824.2	128	32.25	33.5	0.14	0.19	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 Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, 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	824.2	128	30.33	31.3	0.47	0.59	Figure 10
Left 15°	824.2	128	30.33	31.3	0.18	0.23	Figure 11
Right Cheek	824.2	128	30.33	31.3	0.42	0.53	Figure 12
Right 15°	824.2	128	30.33	31.3	0.15	0.19	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 The time slot configuration with the highest source-based time-averaged maximum output power was used for testing, this was 2x time slots.							

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GSM 850MHz GPRS Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, 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	824.2	128	30.33	31.3	0.44	0.55	Figure 14
10mm	Rear Facing	824.2	128	30.33	31.3	0.56	0.70	Figure 15
10mm	Right Edge	824.2	128	30.33	31.3	0.48	0.60	Figure 16
10mm	Bottom Edge	824.2	128	30.33	31.3	0.26	0.33	Figure 17

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

The time slot configuration with the highest source-based time-averaged maximum output power was used for testing, this was 2x time slots.

WCDMA FDDV Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, 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	23.38	24.2	0.45	0.54	Figure 18
Left 15°	4132	826.4	23.38	24.2	0.17	0.21	Figure 19
Right Cheek	4132	826.4	23.38	24.2	0.36	0.43	Figure 20
Right 15°	4132	826.4	23.38	24.2	0.13	0.16	Figure 21

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 – Testing of the secondary mode was not required - When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

WCDMA FDDV Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, 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	4132	826.4	23.38	24.2	0.45	0.54	Figure 22
10mm	Rear Facing	4132	826.4	23.38	24.2	0.48	0.58	Figure 23
10mm	Right Edge	4132	826.4	23.38	24.2	0.47	0.57	Figure 24
10mm	Bottom Edge	4132	826.4	23.38	24.2	0.24	0.29	Figure 25

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 941225 D01 – Testing of the secondary mode was not required - When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

LTE Band 5 Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

10MHz Bandwidth, 1 Resource Blocks, Low Offset.

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	20450	829.0	23.07	24.2	0.43	0.56	Figure 26
Left 15°	20450	829.0	23.07	24.2	0.13	0.17	Figure 27
Right Cheek	20450	829.0	23.07	24.2	0.36	0.47	Figure 28
Right 15°	20450	829.0	23.07	24.2	0.12	0.16	Figure 29

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

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LTE Band 5 Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

10MHz Bandwidth, 1 Resource Blocks, Low Offset.

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	20450	829.0	23.07	24.2	0.46	0.60	Figure 30
10mm	Rear Facing	20450	829.0	23.07	24.2	0.45	0.58	Figure 31
10mm	Right Edge	20450	829.0	23.07	24.2	0.49	0.64	Figure 32
10mm	Bottom Edge	20450	829.0	23.07	24.2	0.28	0.36	Figure 33
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 941225 D05 - Largest channel bandwidth standalone SAR test requirements – 4.2.2. The requirements to test other resource block allocations and higher order modulations were not met.								

LTE Band 5 Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

10MHz Bandwidth, 25 Resource Blocks, High Offset.

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	20450	829.0	21.08	23.2	0.34	0.55	Figure 34
Left 15°	20450	829.0	21.08	23.2	0.14	0.23	Figure 35
Right Cheek	20450	829.0	21.08	23.2	0.30	0.49	Figure 36
Right 15°	20450	829.0	21.08	23.2	0.14	0.23	Figure 37
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							

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LTE Band 5 Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

10MHz Bandwidth, 25 Resource Blocks, High Offset.

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	20450	829.0	21.08	23.2	0.34	0.55	Figure 38
10mm	Rear Facing	20450	829.0	21.08	23.2	0.35	0.57	Figure 39
10mm	Right Edge	20450	829.0	21.08	23.2	0.36	0.59	Figure 40
10mm	Bottom Edge	20450	829.0	21.08	23.2	0.21	0.34	Figure 41
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 941225 D05 - Largest channel bandwidth standalone SAR test requirements – 4.2.2. The requirements to test other resource block allocations and higher order modulations were not met.								

LTE Band 13 Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

10MHz Bandwidth, 1 Resource Blocks, High Offset.

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	23230	782.0	23.53	24.2	0.47	0.55	Figure 42
Left 15°	23230	782.0	23.53	24.2	0.19	0.22	Figure 43
Right Cheek	23230	782.0	23.53	24.2	0.39	0.46	Figure 44
Right 15°	23230	782.0	23.53	24.2	0.21	0.25	Figure 45
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							

LTE Band 13 Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

10MHz Bandwidth, 1 Resource Blocks, High Offset.

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	23230	782.0	23.53	24.2	0.41	0.48	Figure 46
10mm	Rear Facing	23230	782.0	23.53	24.2	0.40	0.47	Figure 47
10mm	Right Edge	23230	782.0	23.53	24.2	0.46	0.54	Figure 48
10mm	Bottom Edge	23230	782.0	23.53	24.2	0.19	0.22	Figure 49
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 941225 D05 - Largest channel bandwidth standalone SAR test requirements – 4.2.2. The requirements to test other resource block allocations and higher order modulations were not met.								

LTE Band 13 Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

10MHz Bandwidth, 25 Resource Blocks, Mid Offset.

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	23230	782.0	22.11	23.2	0.34	0.44	Figure 50
Left 15°	23230	782.0	22.11	23.2	0.14	0.18	Figure 51
Right Cheek	23230	782.0	22.11	23.2	0.29	0.37	Figure 52
Right 15°	23230	782.0	22.11	23.2	0.13	0.17	Figure 53
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							

LTE Band 13 Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

10MHz Bandwidth, 25 Resource Blocks, Mid Offset.

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	23230	782.0	22.11	23.2	0.30	0.39	Figure 54
10mm	Rear Facing	23230	782.0	22.11	23.2	0.29	0.37	Figure 55
10mm	Right Edge	23230	782.0	22.11	23.2	0.33	0.42	Figure 56
10mm	Bottom Edge	23230	782.0	22.11	23.2	0.14	0.18	Figure 57
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 941225 D05 - Largest channel bandwidth standalone SAR test requirements – 4.2.2. The requirements to test other resource block allocations and higher order modulations were not met.								

LTE Band 17 Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

10MHz Bandwidth, 1 Resource Blocks, Low Offset.

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	23790	710.0	23.47	24.2	0.23	0.27	Figure 58
Left 15°	23790	710.0	23.47	24.2	0.10	0.12	Figure 59
Right Cheek	23790	710.0	23.47	24.2	0.20	0.24	Figure 60
Right 15°	23790	710.0	23.47	24.2	0.10	0.12	Figure 61
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							

Product Service

LTE Band 17 Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

10MHz Bandwidth, 1 Resource Blocks, Low Offset.

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	23790	710.0	23.47	24.2	0.29	0.34	Figure 62
10mm	Rear Facing	23790	710.0	23.47	24.2	0.29	0.34	Figure 63
10mm	Right Edge	23790	710.0	23.47	24.2	0.19	0.22	Figure 64
10mm	Bottom Edge	23790	710.0	23.47	24.2	0.06	0.07	Figure 65

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 941225 D05 - Largest channel bandwidth standalone SAR test requirements – 4.2.2. The requirements to test other resource block allocations and higher order modulations were not met.

LTE Band 17 Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

10MHz Bandwidth, 25 Resource Blocks, Mid Offset.

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	23800	711.0	22.12	23.2	0.21	0.27	Figure 66
Left 15°	23800	711.0	22.12	23.2	0.10	0.13	Figure 67
Right Cheek	23800	711.0	22.12	23.2	0.19	0.24	Figure 68
Right 15°	23800	711.0	22.12	23.2	0.10	0.13	Figure 69

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

Product Service

LTE Band 17 Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

10MHz Bandwidth, 25 Resource Blocks, Mid Offset.

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	23800	711.0	22.12	23.2	0.25	0.32	Figure 70
10mm	Rear Facing	23800	711.0	22.12	23.2	0.24	0.31	Figure 71
10mm	Right Edge	23800	711.0	22.12	23.2	0.14	0.18	Figure 72
10mm	Bottom Edge	23800	711.0	22.12	23.2	0.05	0.06	Figure 73

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 941225 D05 - Largest channel bandwidth standalone SAR test requirements – 4.2.2. The requirements to test other resource block allocations and higher order modulations were not met.

PCS 1900MHz Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, 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	1850.2	512	29.80	30.5	0.14	0.16	Figure 74
Left 15°	1850.2	512	29.80	30.5	0.16	0.19	Figure 75
Right Cheek	1850.2	512	29.80	30.5	0.29	0.34	Figure 76
Right 15°	1850.2	512	29.80	30.5	0.14	0.16	Figure 77

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

Product Service

PCS 1900MHz GPRS Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, 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	1909.8	810	27.63	28.3	0.20	0.23	Figure 78
Left 15°	1909.8	810	27.63	28.3	0.20	0.23	Figure 79
Right Cheek	1909.8	810	27.63	28.3	0.39	0.46	Figure 80
Right 15°	1909.8	810	27.63	28.3	0.17	0.20	Figure 81
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 The time slot configuration with the highest source-based time-averaged maximum output power was used for testing, this was 2x time slots.							

PCS 1900MHz GPRS Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, 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	1909.8	810	27.63	28.3	0.37	0.43	Figure 82
10mm	Rear Facing	1909.8	810	27.63	28.3	0.33	0.39	Figure 83
10mm	Left Edge	1909.8	810	27.63	28.3	0.29	0.34	Figure 84
10mm	Bottom Edge	1909.8	810	27.63	28.3	0.24	0.28	Figure 85
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 The time slot configuration with the highest source-based time-averaged maximum output power was used for testing, this was 2x time slots.								

LTE Band 38 Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

20MHz Bandwidth, 1 Resource Blocks, Low Offset.

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	38000	2595.0	24.64	24.7	0.03	0.05	Figure 86
Left 15°	38000	2595.0	24.64	24.7	0.03	0.05	Figure 87
Right Cheek	38000	2595.0	24.64	24.7	0.03	0.05	Figure 88
Right 15°	38000	2595.0	24.64	24.7	0.01	0.02	Figure 89
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 D05 - Largest channel bandwidth standalone SAR test requirements – 4.2.2. The requirements to test other resource block allocations and higher order modulations were not met.							

LTE Band 38 Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

20MHz Bandwidth, 1 Resource Blocks, Low Offset.

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	38000	2595.0	24.64	24.7	0.02	0.03	Figure 90
10mm	Rear Facing	38000	2595.0	24.64	24.7	0.03	0.05	Figure 91
10mm	Left Edge	38000	2595.0	24.64	24.7	0.02	0.03	Figure 92
10mm	Bottom Edge	38000	2595.0	24.64	24.7	0.02	0.03	Figure 93
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 941225 D05 - Largest channel bandwidth standalone SAR test requirements – 4.2.2. The requirements to test other resou KDB 941225 D05 - Largest channel bandwidth standalone SAR test requirements – 4.2.2. The requirements to test other resource block allocations and higher order modulations were not met.rce block allocations and higher order modulations were not met.								

LTE Band 38 Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

20MHz Bandwidth, 50 Resource Blocks, Low Offset.

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	38000	2595.0	23.24	23.7	0.15	0.17	Figure 94
Left 15°	38000	2595.0	23.24	23.7	0.15	0.17	Figure 95
Right Cheek	38000	2595.0	23.24	23.7	0.57	0.63	Figure 96
Right 15°	38000	2595.0	23.24	23.7	0.01	0.01	Figure 97
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 D05 - Largest channel bandwidth standalone SAR test requirements – 4.2.2. The requirements to test other resource block allocations and higher order modulations were not met.							

LTE Band 38 Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

20MHz Bandwidth, 50 Resource Blocks, Low Offset.

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	38000	2595.0	23.24	23.7	0.45	0.50	Figure 98
10mm	Rear Facing	38000	2595.0	23.24	23.7	0.46	0.51	Figure 99
10mm	Left Edge	38000	2595.0	23.24	23.7	0.45	0.50	Figure 100
10mm	Bottom Edge	38000	2595.0	23.24	23.7	0.35	0.39	Figure 101
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 941225 D05 - Largest channel bandwidth standalone SAR test requirements – 4.2.2. The requirements to test other resource block allocations and higher order modulations were not met.								

WLAN 2412MHz Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

802.11b, 1 Mbps, DSSS – Antenna 0

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scaled Duty Cycle 1g SAR (W/kg)	Area scan (Figure number)
Left Cheek	1	2412.0	9.48	11	0.21	0.30	0.30	Figure 102
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 KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2 KDB248227 D01 v02 - Only one position was tested as per Section 5.1.1 KDB248227 D01 v02 – A duty factor scaling was applied to the scaled SAR as per section 2.2								

WLAN 2412MHz Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

802.11b, 1 Mbps, DSSS – Antenna 0

Position		Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scaled Duty Cycle 1g SAR (W/kg)	Area scan (Figure number)
Spacing	Position								
10mm	Top Edge	1	2412.0	9.48	11	0.07	0.10	0.10	Figure 103
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 KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2 KDB248227 D01 v02 - Only one position was tested as per Section 5.1.1 KDB248227 D01 v02 – A duty factor scaling was applied to the scaled SAR as per section 2.2									

WLAN 2437MHz Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

802.11b, 1 Mbps, DSSS – Antenna 1

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scaled Duty Cycle 1g SAR (W/kg)	Area scan (Figure number)
Right Cheek	6	2437.0	9.24	11	0.08	0.12	0.12	Figure 104
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 KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2 KDB248227 D01 v02 - Only one position was tested as per Section 5.1.1 KDB248227 D01 v02 – A duty factor scaling was applied to the scaled SAR as per section 2.2								

WLAN 2437MHz Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS.

802.11b, 1 Mbps, DSSS – Antenna 1

Position		Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scaled Duty Cycle 1g SAR (W/kg)	Area scan (Figure number)
Spacing	Position								
10mm	Front Facing	6	2437.0	9.24	11	0.01	0.01	0.02	Figure 105
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 KDB248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2 KDB248227 D01 v02 - Only one position was tested as per Section 5.1.1 KDB248227 D01 v02 – A duty factor scaling was applied to the scaled SAR as per section 2.2									

Product Service

WLAN 5260MHz U-NII-2 Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS. (NUA)

802.11a, 20MHz, 6 Mbps, OFDM – Antenna 0

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scaled Duty Cycle 1g SAR (W/kg)	Area scan (Figure number)
Left 15°	52	5260.0	10.46	12.0	0.05	0.07	0.08	Figure 106
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 KDB248227 D01 v02 - Testing was not required for U-NII-1 band as per Section 5.3.1 (a) KDB248227 D01 v02 - Only one position was tested as per Section 5.1.1 KDB248227 D01 v02 – A duty factor scaling was applied to the scaled SAR as per section 2.2 KDB248227 D01 v02 - For OFDM transmission configurations where the same maximum output power is specified, testing was performed using the lowest order modulation, lowest order data rate and lowest order 802.11a/g/n/ac mode Section 2.1 (b)								

WLAN 5260MHz U-NII-2 Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS. (NUA)

802.11a, 20MHz, 6 Mbps, OFDM – Antenna 0

Position		Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scaled Duty Cycle 1g SAR (W/kg)	Area scan (Figure number)
Spacing	Position								
10mm	Rear Facing	52	5260.0	10.46	12.00	0.06	0.09	0.09	Figure 107
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 KDB248227 D01 v02 - Testing was not required for U-NII-1 band as per Section 5.3.1 (a) KDB248227 D01 v02 - Only one position was tested as per Section 5.1.1 KDB248227 D01 v02 – A duty factor scaling was applied to the scaled SAR as per section 2.2 KDB248227 D01 v02 - For OFDM transmission configurations where the same maximum output power is specified, testing was performed using the lowest order modulation, lowest order data rate and lowest order 802.11a/g/n/ac mode Section 2.1 (b)									

Product Service

WLAN 5280MHz U-NII-2 Head Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS. (NUA)

802.11a, 20MHz, 6 Mbps, OFDM – Antenna 1

Test Position	Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scaled Duty Cycle 1g SAR (W/kg)	Area scan (Figure number)
Right Cheek	56	5280.0	11.5	12.0	0.09	0.10	0.11	Figure 108
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 KDB248227 D01 v02 - Testing was not required for U-NII-1 band as per Section 5.3.1 (a) KDB248227 D01 v02 - Only one position was tested as per Section 5.1.1 KDB248227 D01 v02 – A duty factor scaling was applied to the scaled SAR as per section 2.2 KDB248227 D01 v02 - For OFDM transmission configurations where the same maximum output power is specified, testing was performed using the lowest order modulation, lowest order data rate and lowest order 802.11a/g/n/ac mode Section 2.1 (b)								

WLAN 5280MHz U-NII-2 Body & Hotspot Configuration Specific Absorption Rate (Maximum SAR) 1g Results for the Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS. (NUA)

802.11a, 20MHz, 6 Mbps, OFDM – Antenna 1

Position		Channel Number	Frequency (MHz)	Measured Conducted Power (dBm)	Tune Up limit (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scaled Duty Cycle 1g SAR (W/kg)	Area scan (Figure number)
Spacing	Position								
10mm	Rear Facing	56	5280.0	11.5	12.0	0.01	0.01	0.01	Figure 109
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 KDB248227 D01 v02 - Testing was not required for U-NII-1 band as per Section 5.3.1 (a) KDB248227 D01 v02 - Only one position was tested as per Section 5.1.1 KDB248227 D01 v02 – A duty factor scaling was applied to the scaled SAR as per section 2.2 KDB248227 D01 v02 - For OFDM transmission configurations where the same maximum output power is specified, testing was performed using the lowest order modulation, lowest order data rate and lowest order 802.11a/g/n/ac mode Section 2.1 (b)									

Product Service

1.4.3 Simultaneous Transmission

Position Head	GPRS 850MHz 1g SAR (W/kg) CH 128 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.59	0.30	0.89
Left 15°	0.23	-	-
Right Cheek	0.53	-	-
Right 15°	0.19	-	-
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 128 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.55	-	-
Rear Facing	0.70	-	-
Left Edge	-	-	-
Right Edge	0.60	-	-
Top Edge	-	0.10	-
Bottom Edge	0.33	-	-
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 128 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.59	-	-
Left 15°	0.23	-	-
Right Cheek	0.53	0.12	0.65
Right 15°	0.19	-	-
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 128 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.55	0.02	0.57
Rear Facing	0.70	-	-
Left Edge	-	-	-
Right Edge	0.60	-	-
Top Edge	-	-	-
Bottom Edge	0.33	-	-
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 128 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.59	-	-
Left 15°	0.23	0.08	0.31
Right Cheek	0.53	-	-
Right 15°	0.19	-	-
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 128 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.55	-	-
Rear Facing	0.70	0.09	0.79
Left Edge	-	-	-
Right Edge	0.60	-	-
Top Edge	-	-	-
Bottom Edge	0.33	-	-
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 128 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.59	-	-
Left 15°	0.23	-	-
Right Cheek	0.53	0.11	0.64
Right 15°	0.19	-	-
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 128 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.55	-	-
Rear Facing	0.70	0.01	0.71
Left Edge	-	-	-
Right Edge	0.60	-	-
Top Edge	-	-	-
Bottom Edge	0.33	-	-
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 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.54	0.30	0.84
Left 15°	0.21	-	-
Right Cheek	0.43	-	-
Right 15°	0.16	-	-
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 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.54	-	-
Rear Facing	0.58	-	-
Left Edge	-	-	-
Right Edge	0.57	-	-
Top Edge	-	0.10	-
Bottom Edge	0.29	-	-
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 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.54	-	-
Left 15°	0.21	-	-
Right Cheek	0.43	0.12	0.55
Right 15°	0.16	-	-
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 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.54	0.02	0.56
Rear Facing	0.58	-	-
Left Edge	-	-	-
Right Edge	0.57	-	-
Top Edge	-	-	-
Bottom Edge	0.29	-	-
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)	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.54	-	-
Left 15°	0.21	0.08	0.29
Right Cheek	0.43	-	-
Right 15°	0.16	-	-
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)	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.54	-	-
Rear Facing	0.58	0.09	0.67
Left Edge	-	-	-
Right Edge	0.57	-	-
Top Edge	-	-	-
Bottom Edge	0.29	-	-
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)	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.54	-	-
Left 15°	0.21	-	-
Right Cheek	0.43	0.10	0.53
Right 15°	0.16	-	-
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)	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.54	-	-
Rear Facing	0.58	0.01	0.59
Left Edge	-	-	-
Right Edge	0.57	-	-
Top Edge	-	-	-
Bottom Edge	0.29	-	-
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	LTE Band 5, 1RB 1g SAR (W/kg) CH 20450 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.56	0.30	0.86
Left 15°	0.17	-	-
Right Cheek	0.47	-	-
Right 15°	0.16	-	-
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	LTE Band 5, 1RB 1g SAR (W/kg) CH 20450 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.60	-	-
Rear Facing	0.58	-	-
Left Edge	-	-	-
Right Edge	0.64	-	-
Top Edge	-	0.10	-
Bottom Edge	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	LTE Band 5, 1RB 1g SAR (W/kg) CH 20450 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.56	-	-
Left 15°	0.17	-	-
Right Cheek	0.47	0.12	0.59
Right 15°	0.16	-	-
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	LTE Band 5, 1RB 1g SAR (W/kg) CH 20450 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.60	0.02	0.62
Rear Facing	0.58	-	-
Left Edge	-	-	-
Right Edge	0.64	-	-
Top Edge	-	-	-
Bottom Edge	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	LTE Band 5, 1RB 1g SAR (W/kg) CH 20450 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.56	-	-
Left 15°	0.17	0.08	0.25
Right Cheek	0.47	-	-
Right 15°	0.16	-	-
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	LTE Band 5, 1RB 1g SAR (W/kg) CH 20450 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.60	-	-
Rear Facing	0.58	0.09	0.67
Left Edge	-	-	-
Right Edge	0.64		-
Top Edge	-	-	-
Bottom Edge	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	LTE Band 5, 1RB 1g SAR (W/kg) CH 20450 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.56	-	-
Left 15°	0.17	-	-
Right Cheek	0.47	0.11	0.58
Right 15°	0.16	-	-
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	LTE Band 5, 1RB 1g SAR (W/kg) CH 20450 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.60	-	-
Rear Facing	0.58	0.01	0.59
Left Edge	-	-	-
Right Edge	0.64	-	-
Top Edge	-	-	-
Bottom Edge	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	LTE Band 13, 1RB 1g SAR (W/kg) CH 23230 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.55	0.30	0.85
Left 15°	0.22	-	-
Right Cheek	0.46	-	-
Right 15°	0.25	-	-
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	LTE Band 13, 1RB 1g SAR (W/kg) CH 23230 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.48	-	-
Rear Facing	0.47	-	-
Left Edge	-	-	-
Right Edge	0.54	-	-
Top Edge	-	0.10	-
Bottom Edge	0.22	-	-
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	LTE Band 13, 1RB 1g SAR (W/kg) CH 23230 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.55	-	-
Left 15°	0.22	-	-
Right Cheek	0.46	0.12	0.58
Right 15°	0.25	-	-
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	LTE Band 13, 1RB 1g SAR (W/kg) CH 23230 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.48	0.02	0.50
Rear Facing	0.47	-	-
Left Edge	-	-	-
Right Edge	0.54	-	-
Top Edge	-	-	-
Bottom Edge	0.22	-	-
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	LTE Band 13, 1RB 1g SAR (W/kg) CH 23230 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.55	-	-
Left 15°	0.22	0.08	0.30
Right Cheek	0.46	-	-
Right 15°	0.25	-	-
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	LTE Band 13, 1RB 1g SAR (W/kg) CH 23230 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.48	-	-
Rear Facing	0.47	0.09	0.56
Left Edge	-	-	-
Right Edge	0.54	-	-
Top Edge	-	-	-
Bottom Edge	0.22		-
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	LTE Band 13, 1RB 1g SAR (W/kg) CH 23230 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.55	-	-
Left 15°	0.22	-	-
Right Cheek	0.46	0.11	0.57
Right 15°	0.25	-	-
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	LTE Band 13, 1RB 1g SAR (W/kg) CH 23230 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.48	-	-
Rear Facing	0.47	0.01	0.48
Left Edge	-	-	-
Right Edge	0.54	-	-
Top Edge		-	-
Bottom Edge	0.22	-	-
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	LTE Band 17, 1RB 1g SAR (W/kg) CH 23790 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.27	0.30	0.57
Left 15°	0.12	-	-
Right Cheek	0.24	-	-
Right 15°	0.12	-	-
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	LTE Band 17, 1RB 1g SAR (W/kg) CH 23790 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.34	-	-
Rear Facing	0.34	-	-
Left Edge		-	-
Right Edge	0.22	-	-
Top Edge	-	0.10	-
Bottom Edge	0.07	-	-
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	LTE Band 17, 1RB 1g SAR (W/kg) CH 23790 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.27	-	-
Left 15°	0.12	-	-
Right Cheek	0.24	0.12	0.36
Right 15°	0.12	-	-
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	LTE Band 17, 1RB 1g SAR (W/kg) CH 23790 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.34	0.02	0.36
Rear Facing	0.34	-	-
Left Edge	-	-	-
Right Edge	0.22	-	-
Top Edge		-	-
Bottom Edge	0.07	-	-
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	LTE Band 17, 1RB 1g SAR (W/kg) CH 23790 (Scaled SAR values))	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.27	-	-
Left 15°	0.12	0.08	0.20
Right Cheek	0.24	-	-
Right 15°	0.12	-	-
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	LTE Band 17, 1RB 1g SAR (W/kg) CH 23790 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.34	-	-
Rear Facing	0.34	0.09	0.43
Left Edge	-	-	-
Right Edge	0.22	-	-
Top Edge	-	-	-
Bottom Edge	0.07	-	-
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	LTE Band 17, 1RB 1g SAR (W/kg) CH 23790 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.27	-	-
Left 15°	0.12	-	-
Right Cheek	0.24	0.11	0.35
Right 15°	0.12	-	-
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	LTE Band 17, 1RB 1g SAR (W/kg) CH 23790 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.34	-	-
Rear Facing	0.34	0.01	0.35
Left Edge	-	-	-
Right Edge	0.22	-	-
Top Edge	-	-	-
Bottom Edge	0.07	-	-
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 1900 1g SAR (W/kg) CH 512 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.23	0.30	0.53
Left 15°	0.23	-	-
Right Cheek	0.46	-	-
Right 15°	0.20	-	-
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 1900 1g SAR (W/kg) CH 810 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.43	-	-
Rear Facing	0.39	-	-
Left Edge	0.34	-	-
Right Edge	-	-	-
Top Edge	-	0.10	-
Bottom Edge	0.28	-	-
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 1900 1g SAR (W/kg) CH 512 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.23	-	-
Left 15°	0.23	-	-
Right Cheek	0.46	0.12	0.58
Right 15°	0.20	-	-
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 1900 1g SAR (W/kg) CH 810 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.43	0.02	0.45
Rear Facing	0.39	-	-
Left Edge	0.34	-	-
Right Edge	-	-	-
Top Edge	-	-	-
Bottom Edge	0.28	-	-
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 1900 1g SAR (W/kg) CH 512 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.23	-	-
Left 15°	0.23	0.08	31
Right Cheek	0.46	-	-
Right 15°	0.20	-	-
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 1900 1g SAR (W/kg) CH 810 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.43	-	-
Rear Facing	0.39	0.09	0.48
Left Edge	0.34	-	-
Right Edge	-	-	-
Top Edge	-	-	-
Bottom Edge	0.28	-	-
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 1900 1g SAR (W/kg) CH 512 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.23	-	-
Left 15°	0.23	-	-
Right Cheek	0.46	0.11	0.57
Right 15°	0.20	-	-
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 1900 1g SAR (W/kg) CH 810 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.43	-	-
Rear Facing	0.39	0.01	0.40
Left Edge	0.34	-	-
Right Edge	-	-	-
Top Edge	-	-	-
Bottom Edge	0.28	-	-
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	LTE Band 38, 50RB 1g SAR (W/kg) CH 38000 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.17	0.30	0.47
Left 15°	0.17	-	-
Right Cheek	0.63	-	-
Right 15°	0.01	-	-
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	LTE Band 38, 50RB 1g SAR (W/kg) CH 38000 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.50	-	-
Rear Facing	0.51	-	-
Left Edge	0.50	-	-
Right Edge	-	-	-
Top Edge	-	0.10	-
Bottom Edge	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 Head	LTE Band 38, 50RB 1g SAR (W/kg) CH 38000 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.17	-	-
Left 15°	0.17	-	-
Right Cheek	0.63	0.12	0.75
Right 15°	0.01	-	-
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	LTE Band 38, 50RB 1g SAR (W/kg) CH 38000 (Scaled SAR values)	WLAN 2.4GHz 1g SAR (W/kg) CH 1 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.50	0.02	0.52
Rear Facing	0.51	-	-
Left Edge	0.50	-	-
Right Edge	-	-	-
Top Edge	-	-	-
Bottom Edge	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 Head	LTE Band 38, 50RB 1g SAR (W/kg) CH 38000 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.17	-	-
Left 15°	0.17	0.08	0.25
Right Cheek	0.63	-	-
Right 15°	0.01	-	-
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	LTE Band 38, 50RB 1g SAR (W/kg) CH 38000 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 52 Antenna 0 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.50	-	-
Rear Facing	0.51	0.09	0.60
Left Edge	0.50	-	-
Right Edge	-	-	-
Top Edge	-	-	-
Bottom Edge	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 Head	LTE Band 38, 50RB 1g SAR (W/kg) CH 38000 (Scaled SAR values))	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Left Cheek	0.17	-	-
Left 15°	0.17	-	-
Right Cheek	0.63	0.11	0.74
Right 15°	0.01	-	-
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	LTE Band 38, 50RB 1g SAR (W/kg) CH 38000 (Scaled SAR values)	U-NII-2 1g SAR (W/kg) CH 56 Antenna 1 (Scaled SAR values)	∑ 1g SAR (W/kg)
Front Facing	0.50	-	-
Rear Facing	0.51	0.01	0.52
Left Edge	0.50	-	-
Right Edge	-	-	-
Top Edge	-	-	-
Bottom Edge	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.

1.4.4 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)
2450.0	5.01	5	0.209

Bluetooth Body SAR Estimation

Frequency (MHz)	Maximum Power (mW)	Distance (mm)	Estimated SAR (W/kg)
2450.0	5.01	10	0.105

1.5 PRODUCT INFORMATION

1.5.1 Technical Description

The equipment under test (EUT) was a Sharp Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS. A full technical description can be found in the manufacturer's documentation.

1.5.2 Test Configuration and Modes of Operation

The testing was performed with an integral battery manufactured by Sharp Corporation.

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 Band 5, 13, 17, 38, 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 in 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 Band 5, 13, 17, 38, 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.

Testing was performed in each position at the frequency that gave the highest output power for each band. For all bands all scaled 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 802.11b 1Mbps.
Testing was not required for OFDM transmission configurations as the requirements of KDB 248227 D01v02r02 Section 5.2.2 were met.
For 5GHz WLAN this was 802.11a 6Mbps.
For OFDM transmission configurations where the same maximum output power is specified, testing was performed using the lowest order modulation, lowest order data rate and lowest order 802.11a/g/n/ac mode as per KDB 248227 D01 v02r02 clause 2.1(b).
SAR was not required for U-NII-1 band as he highest reported SAR is ≤ 1.2 W/kg in the U-NII-2A band as per KDB 248227 D01v02r02 Section 5.3.1(a).

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.

VoLTE Power Measurements

Standalone LTE SAR evaluation against the head was performed using the same RMC data mode to that used against the head. The justification for this being that the results shown in the following tables demonstrate that the power is no higher in a VoLTE call when compared to the same configuration using an RMC data connection. Measurements giving the highest conducted power result for each frequency band, bandwidth, modulation and resource block configurations were repeated with EUT in a VoLTE call.

VoLTE Comparison Measurements

Band 5 – 10 MHz – QPSK

Resource Block Allocation	Resource Block Offset	Channel	Resource Block Offset	Carrier Power (dBm)		
				RMC	VoLTE	Difference (dB)
1	Low	Bottom	Low	23.07	22.85	-0.22
25	Mid	Bottom	Mid	21.80	21.76	-0.04

Band 13 – 10 MHz – QPSK

Resource Block Allocation	Resource Block Offset	Channel	Resource Block Offset	Carrier Power (dBm)		
				RMC	VoLTE	Difference (dB)
1	Low	Bottom	High	23.53	23.25	-0.28
25	Mid	Middle	Mid	22.11	21.86	-0.25

Band 17 – 10 MHz – QPSK

Resource Block Allocation	Resource Block Offset	Channel	Resource Block Offset	Carrier Power (dBm)		
				RMC	VoLTE	Difference (dB)
1	Low	Middle	Low	23.47	22.91	-0.56
25	Mid	Middle	Mid	22.12	21.86	-0.26

Band 38 – 10 MHz – QPSK

Resource Block Allocation	Resource Block Offset	Channel	Resource Block Offset	Carrier Power (dBm)		
				RMC	VoLTE	Difference (dB)
1	Low	Middle	Low	24.64	23.38	-1.26

VoLTE Configuration: AMR NB 5.99 kbps – Mode 2
Temperature: 24.9 ˚C Humidity: 24.2 %

Instrument Description	Manufacturer	Model Type	TE Number	Cal Period (months)	Calibration Due Date
Power Splitter	Weinschel	1506A	607	12	31-Mar-2017
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	02-Sep-2016
P-Series Power Meter	Agilent Technologies	N1911A	3980	12	25-Sep-2016
50 MHz-18 GHz Wideband Power Sensor	Agilent Technologies	N1921A	3982	12	25-Sep-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	07-Sep-2016
PayPass Mobile Sample	Samsung	Galaxy S4	4536	-	TU

TU – Traceability Unscheduled
O/P Mon – Output monitored using calibrated equipment.

1.6 FCC POWER MEASUREMENTS

1.6.1 Method

Conducted power measurements were made using a power meter.

1.6.2 Conducted Power Measurements

GSM 850

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)
		Average
GMSK - Voice	824.20	22.97
	836.40	22.87
	848.80	22.92
GMSK - GPRS	824.20	23.79
	836.40	23.71
	848.80	23.76

PCS 1900

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)
		Average
GMSK - Voice	1850.20	20.44
	1880.00	20.21
	1909.80	19.97
GMSK - GPRS	1850.20	21.01
	1880.00	20.90
	1909.80	21.14

Product Service

WCDMA FDD V

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)
		Average
WCDMA - 12.2kbps RMC	826.4	23.38
	835.0	23.30
	846.6	23.07
WCDMA - 12.2kbps AMR with 3.4kbps SRB*	826.4	23.36
	835.0	23.27
	846.6	23.07
WCDMA - HSDPA (Subtest #1)	826.4	22.26
	835.0	22.20
	846.6	22.22
WCDMA - HSDPA (Subtest #2)	826.4	21.94
	835.0	21.55
	846.6	21.41
WCDMA - HSDPA (Subtest #3)	826.4	21.07
	835.0	21.01
	846.6	21.00
WCDMA - HSDPA (Subtest #4)	826.4	21.22
	835.0	20.95
	846.6	20.85
WCDMA - HSUPA (Subtest #1)	826.4	22.38
	835.0	22.29
	846.6	22.18
WCDMA - HSUPA (Subtest #2)	826.4	21.89
	835.0	21.90
	846.6	21.68
WCDMA - 12.2kbps RMC WCDMA - HSUPA (Subtest #3)	826.4	22.36
	835.0	22.27
	846.6	22.08
WCDMA - HSUPA (Subtest #4)	826.4	22.35
	835.0	22.26
	846.6	22.04
WCDMA - HSUPA (Subtest #5)	826.4	22.35
	835.0	22.27
	846.6	22.14
* 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.		

WLAN

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)	
		Average Port 0	Average Port 1
802.11(b) - 2.4 GHz – 1Mbps	2412	9.48	9.18
	2437	9.39	9.24
	2462	9.34	9.16
802.11(g) - 2.4 GHz - 6Mbps	2412	9.29	8.97
	2437	9.18	9.03
	2462	9.13	8.95
802.11 (n) - 2.4 GHz – MCS0	2412	9.09	8.77
	2437	8.99	8.83
	2462	8.94	8.76
802.11a 20MHz 9Mbps	5180	10.47	11.34
	5200	10.55	11.27
	5220	10.67	11.14
	5240	10.73	11.00
	5260	10.64	10.98
	5280	10.61	11.15
	5300	10.51	11.13
	5320	10.52	11.04
	5500	10.30	11.05
	5520	10.27	11.08
	5540	10.48	10.85
	5560	10.47	10.79
	5580	10.42	10.82
	5600	10.27	10.80
	5620	10.20	10.96
	5640	10.12	10.83
	5660	10.16	10.73
	5680	10.12	10.67
	5700	9.94	10.80

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)	
		Average Port 0	Average Port 1
802.11n 20MHz MCS0	5180	10.29	11.01
	5200	10.24	11.03
	5220	10.44	10.90
	5240	10.48	10.76
	5260	10.38	10.74
	5280	10.35	10.92
	5300	10.23	10.90
	5320	10.34	10.79
	5500	10.03	10.82
	5520	10.04	10.83
	5540	10.24	10.63
	5560	10.34	10.56
	5580	10.18	10.59
	5600	9.98	10.65
	5620	9.93	10.73
	5640	9.88	10.60
	5660	10.01	10.54
	5680	9.88	10.45
	5700	9.71	10.58
802.11n 40MHz MCS0	5190	10.91	11.65
	5230	11.11	11.44
	5270	10.96	11.39
	5310	10.93	11.47
	5510	10.69	11.48
	5550	10.95	11.27
	5590	10.73	11.24
	5630	10.71	11.35
	5670	10.61	11.13

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)	
		Average Port 0	Average Port 1
802.11ac 20MHz MCS0	5180	9.35	10.18
	5200	9.32	10.19
	5220	9.50	10.06
	5240	9.53	9.90
	5260	9.45	9.84
	5280	9.41	10.00
	5300	9.30	9.97
	5320	9.40	9.88
	5500	9.11	9.90
	5520	9.12	9.90
	5540	9.30	9.70
	5560	9.39	9.65
	5580	9.23	9.66
	5600	9.08	9.73
	5620	9.02	9.79
	5640	8.94	9.67
	5660	9.06	9.56
	5680	8.95	9.52
	5700	8.76	9.62
802.11ac 40MHz MCS0	5190	10.33	11.12
	5230	10.53	10.90
	5270	10.37	10.82
	5310	10.34	10.87
	5510	10.14	10.86
	5550	10.40	10.70
	5590	10.18	10.66
	5630	10.14	10.76
	5670	10.02	10.53
802.11ac 80MHz MCS0	5210	9.90	10.47
	5290	9.82	10.32
	5530	9.64	10.25
	5610	9.57	10.17

Product Service

LTE Band 17

Channel Bandwidth (MHz)	Modulation	Resource Block Allocation	Resource Block Offset	Measured Average Output Power (dBm)		
				Low Test Channel (709.0MHz)	Middle Test Channel (710.0 MHz)	High Test Channel (711.0 MHz)
10	QPSK	1	Low	23.34	23.47	23..39
		1	Mid	23.12	22.93	23.01
		1	High	22.56	22.64	22.19
		25	Low	22.12	22.10	22.06
		25	Mid	21.96	21.97	22.12
		25	High	22.02	22.04	22.05
		50	N/A	22.16	22.22	22.19
	16 QAM	1	Low	22.62	22.49	22.52
		1	Mid	22.24	22.36	22.08
		1	High	21.90	21.29	21.13
		25	Low	21.09	21.15	21.13
		25	Mid	21.04	21.07	21.20
		25	High	20.96	20.94	21.05
		50	N/A	21.16	21.18	21.08

LTE Band 5

Channel Bandwidth (MHz)	Modulation	Resource Block Allocation	Resource Block Offset	Measured Average Output Power (dBm)		
				Low Test Channel (829.0MHz)	Middle Test Channel (836.5 MHz)	High Test Channel (844.0 MHz)
10	QPSK	1	Low	23.07	22.77	22.73
		1	Mid	22.78	22.87	22.53
		1	High	22.97	22.77	22.75
		25	Low	21.74	21.62	21.50
		25	Mid	21.77	21.68	21.61
		25	High	21.80	21.65	21.54
		50	N/A	21.75	21.64	21.59
	16 QAM	1	Low	22.24	21.95	21.95
		1	Mid	22.21	21.85	21.77
		1	High	22.14	21.86	22.17
		25	Low	20.75	20.66	20.60
		25	Mid	20.82	20.64	20.60
		25	High	20.80	20.53	20.63
		50	N/A	20.71	20.67	20.59

Product Service

LTE Band 13

Channel Bandwidth (MHz)	Modulation	Resource Block Allocation	Resource Block Offset	Measured Average Output Power (dBm)		
				Low Test Channel	Middle Test Channel (782.0MHz)	High Test Channel
10	QPSK	1	Low	-	23.11	-
		1	Mid	-	23.03	-
		1	High	-	23.53	-
		25	Low	-	22.02	-
		25	Mid	-	22.11	-
		25	High	-	22.06	-
		50	-	-	22.16	-
	16 QAM	1	Low	-	22.65	-
		1	Mid	-	22.20	-
		1	High	-	22.43	-
		36	Low	-	21.05	-
		36	Mid	-	21.08	-
		36	High	-	21.11	-
		75	N/A	-	21.12	-

LTE Band 38

Channel Bandwidth (MHz)	Modulation	Resource Block Allocation	Resource Block Offset	Measured Average Output Power (dBm)		
				Low Test Channel (258.0MHz)	Middle Test Channel (2595.0MHz)	High Test Channel (2610.0MHz)
20	QPSK	1	Low	24.48	24.64	24.34
		1	Mid	24.11	24.17	23.94
		1	High	24.02	24.05	23.92
		50	Low	23.16	23.24	23.11
		50	Mid	23.05	23.05	23.03
		50	High	23.03	22.93	23.02
		100	N/A	23.09	23.18	23.02
	16 QAM	1	Low	23.48	23.07	23.46
		1	Mid	23.21	22.94	22.84
		1	High	23.23	22.81	22.83
		50	Low	22.23	22.11	22.14
		50	Mid	22.06	21.95	21.97
		50	High	22.03	21.87	22.01
		100	N/A	22.02	22.15	22.01

Bluetooth

Modulation	Frequency (MHz)	Conducted Carrier Power (dBm)
		Average
GFSK/DH5	2402	2.06
	2441	2.33
	2480	1.23

Product Service

1.6.3 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	824.2	31.3	1348.96	Head	< 5	244.9	No
GPRS 850MHz	824.2	31.3	1348.96	Body	10	122.5	No
WCDMA FDD V	826.4	24.2	263.03	Head	< 5	47.8	No
				Body	10	23.9	No
LTE Band 17	710.0	24.2	263.03	Head	< 5	44.3	No
				Body	10	22.2	No
LTE Band 5	829.0	24.2	263.03	Head	< 5	47.9	No
				Body	10	23.9	No
LTE Band 13	782.0	24.2	263.03	Head	< 5	46.5	No
				Body	10	23.3	No
LTE Band 38	2595.0	24.7	295.12	Head	< 5	95.1	No
				Body	10	47.5	No
GSM 1900MHz	1850.2	30.5	1122.02	Head	< 5	305.2	No
GPRS 1900MHz	1909.8	28.3	676.03	Head	< 5	186.9	No
GPRS 1900MHz	1909.8	28.3	676.03	Body	10	93.4	No
WLAN 2.4 GHz Antenna 0	2412.0	11	12.59	Head	< 5	3.9	No
				Body	10	2.0	Yes
WLAN 2.4 GHz Antenna 1	2437.0	11	12.59	Head	< 5	3.9	No
				Body	10	2.0	Yes
WLAN 5 GHz Antenna 0	5260.0	12	15.085	Head	< 5	7.3	No
				Body	10	3.6	No
WLAN 5 GHz Antenna 1	5280.0	12	15.085	Head	< 5	7.3	No
				Body	10	3.6	No
Bluetooth	2450	7	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 Hep-band LTE (B1 / B3 / B5 / B13 / B17 / B26 / B38), Dual-band WCDMA (FDD I / V), Quad-band GSM (850 / 900 / 1800 / 1900) & WiMAX2+ (TDD41) multi mode Smart phone with Bluetooth, WLAN, SRD(NFC,FeliCa) and GPS

Product Service

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.

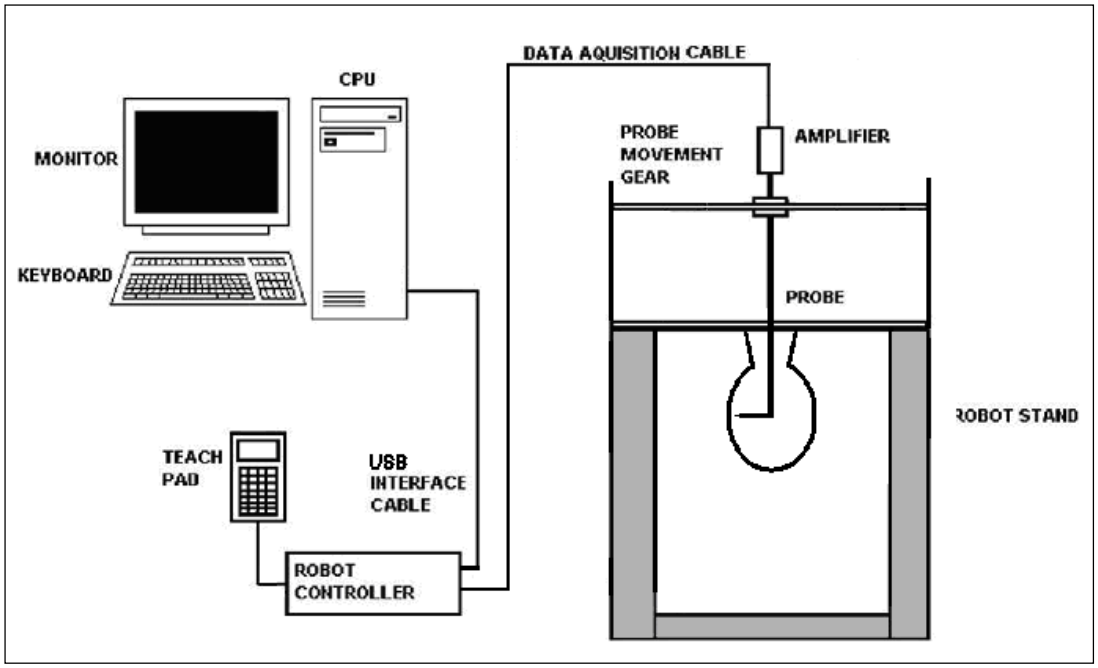

Figure 1 Schematic diagram of the SARA-C measurement system showing the L-probe and upside-down SAM phantom

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.

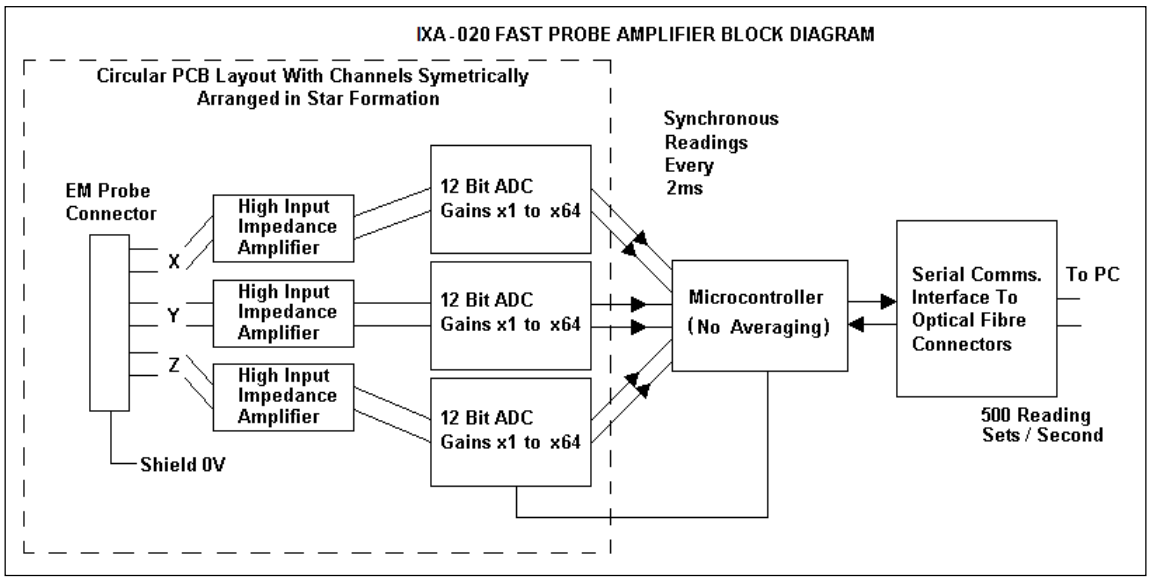

Figure 2 Schematic diagram of the fast amplifier

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.

Product Service

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.

Product Service

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.

Product Service

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.

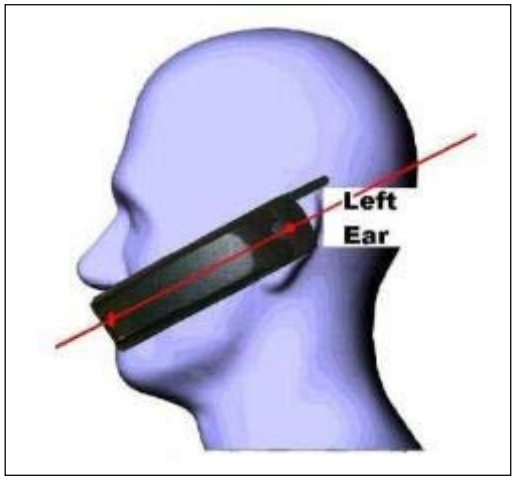

Figure 3 Side view of mobile next to head showing alignment

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°.

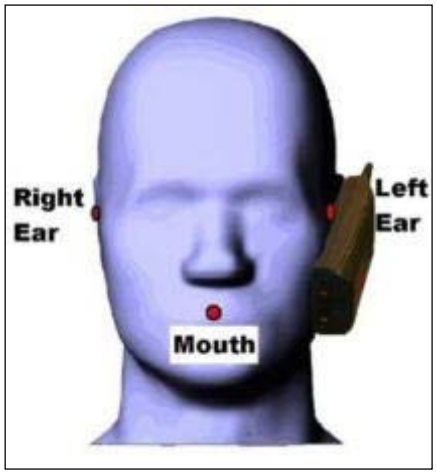

Figure 4 Cheek position

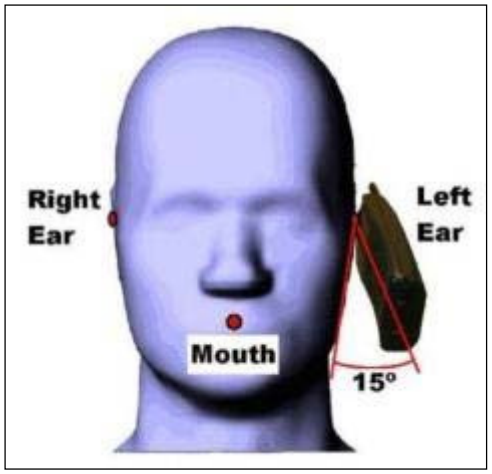

Figure 5 15º Tilt Position

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

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	24/03/2016-11:31:10	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	22.20°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	34.00%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	62.10mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-105.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	19.978
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.429 W/kg
TYPE OF MODULATION:	GMSK (Voice Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	12.5%	**SAR START:**	0.410 W/kg
INPUT POWER LEVEL:	33.5dBm	**SAR END:**	0.411 W/kg
PROBE BATTERY LAST CHANGED:	24/03/2016	**SAR DRIFT DURING SCAN:**	0.300 %

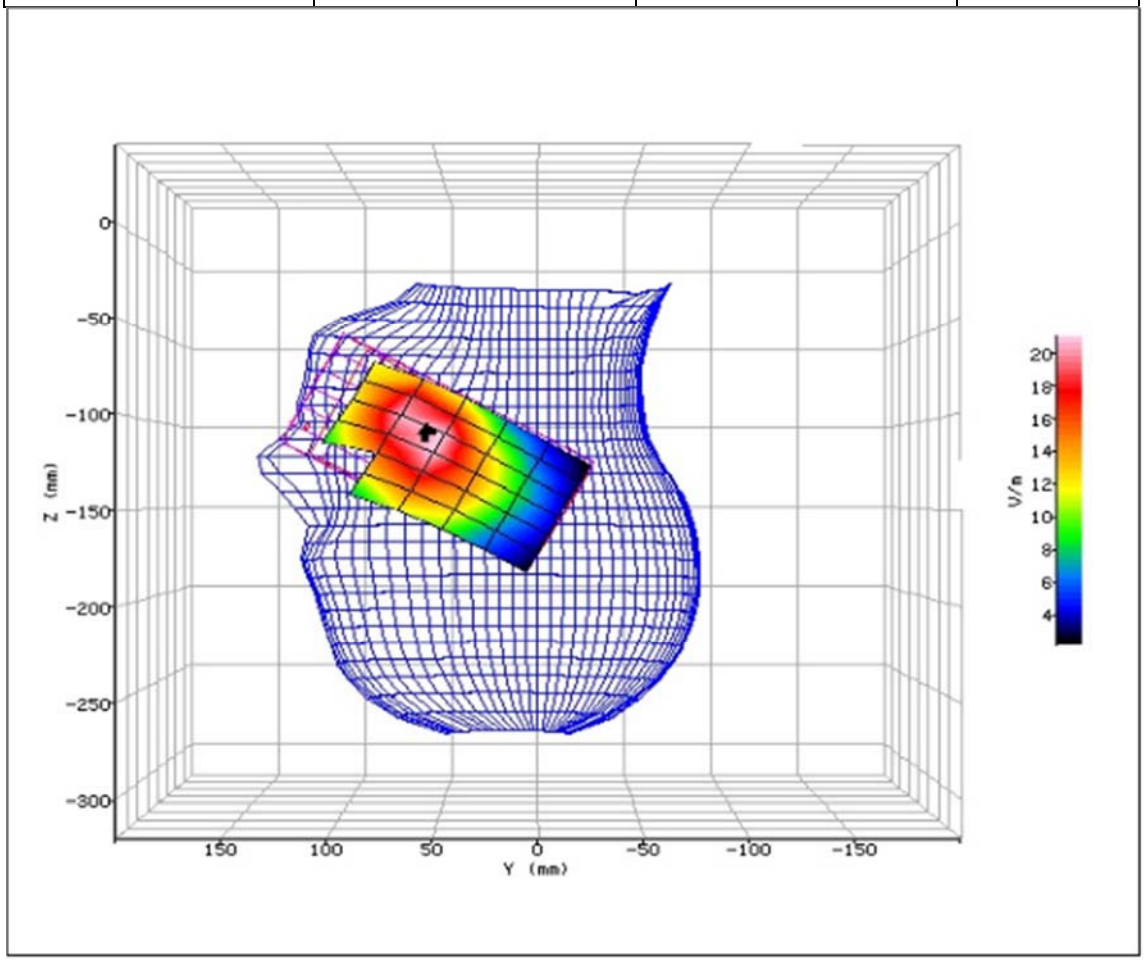

Figure 6: SAR Head Testing Results for the Sharp Smart phone at 824.2MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	24/03/2016-11:56:15	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	22.20°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	34.00%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	48.20mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-117.70mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	11.787
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.144 W/kg
TYPE OF MODULATION:	GMSK (Voice Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	12.5%	**SAR START:**	0.136 W/kg
INPUT POWER LEVEL:	33.5dBm	**SAR END:**	0.136 W/kg
PROBE BATTERY LAST CHANGED:	24/03/2016	**SAR DRIFT DURING SCAN:**	0.100 %

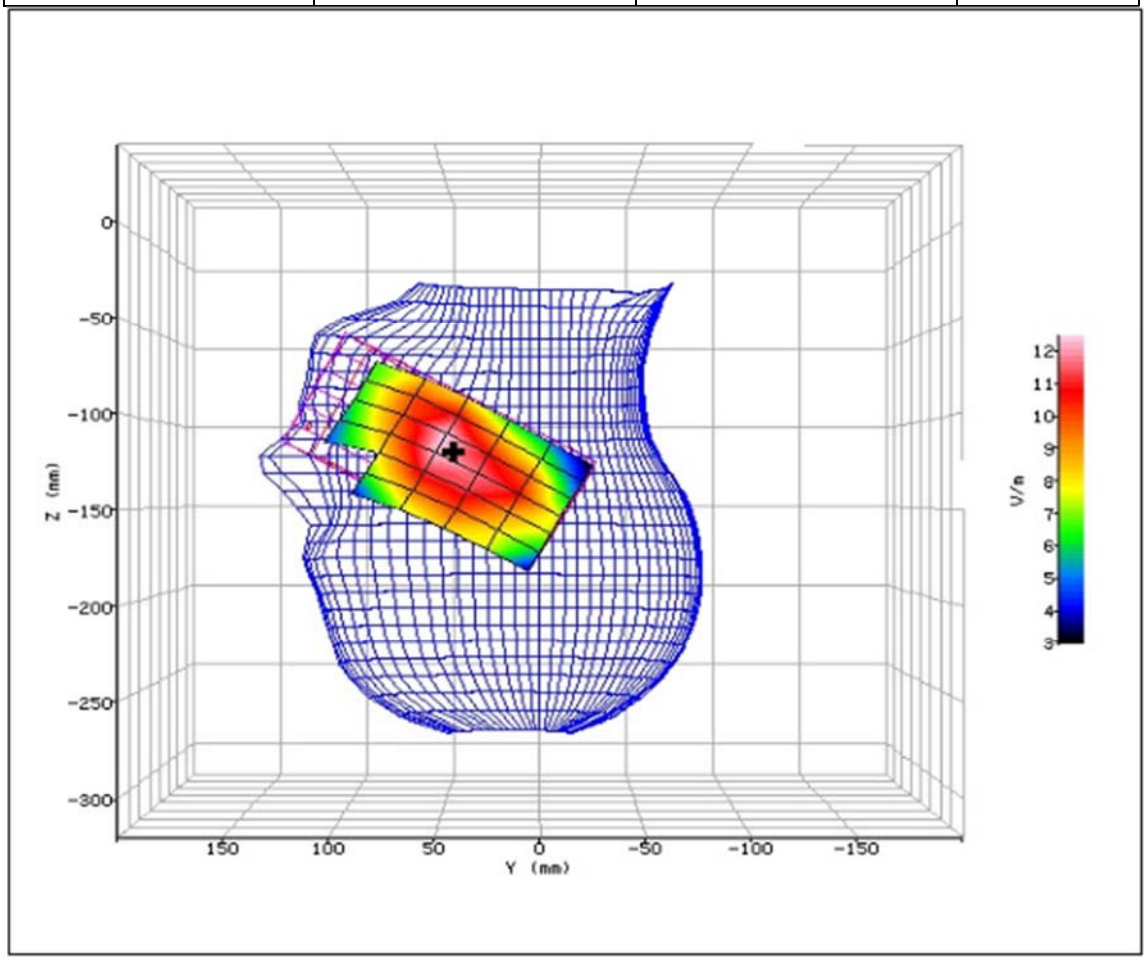

Figure 7: SAR Head Testing Results for the Sharp Smart phone at 824.2MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	24/03/2016-13:40:21	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	22.20°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	34.00%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	64.70mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-117.80mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	18.375
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.344 W/kg
TYPE OF MODULATION:	GMSK (Voice Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	12.5%	**SAR START:**	0.341 W/kg
INPUT POWER LEVEL:	33.5dBm	**SAR END:**	0.330 W/kg
PROBE BATTERY LAST CHANGED:	24/03/2016	**SAR DRIFT DURING SCAN:**	-3.100 %

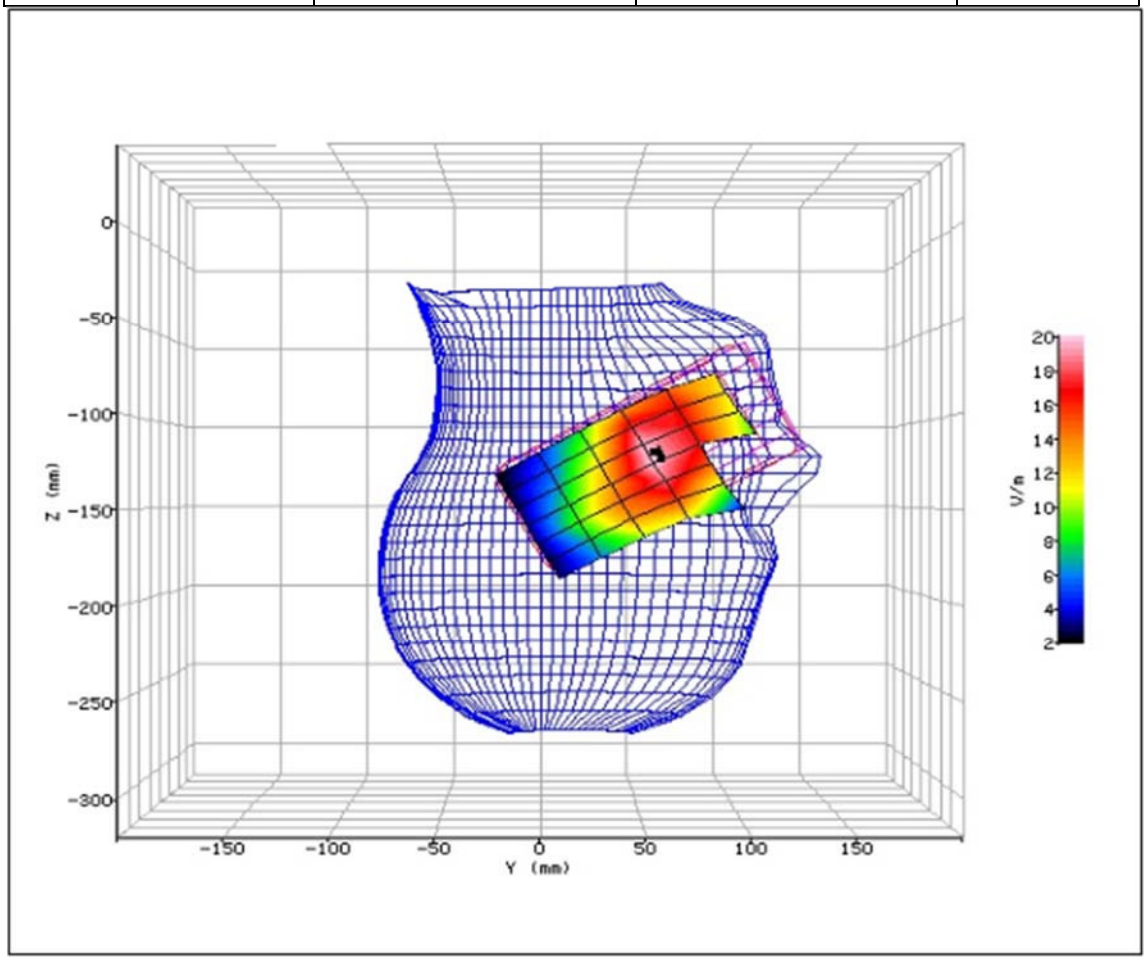

Figure 8: SAR Head Testing Results for the Sharp Smart phone at 824.2MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	24/03/2016-14:06:31	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	22.20°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	34.00%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	54.90mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-127.40mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	11.561
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.135 W/kg
TYPE OF MODULATION:	GMSK (Voice Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	12.5%	**SAR START:**	0.130 W/kg
INPUT POWER LEVEL:	33.5dBm	**SAR END:**	0.125 W/kg
PROBE BATTERY LAST CHANGED:	24/03/2016	**SAR DRIFT DURING SCAN:**	-3.700 %

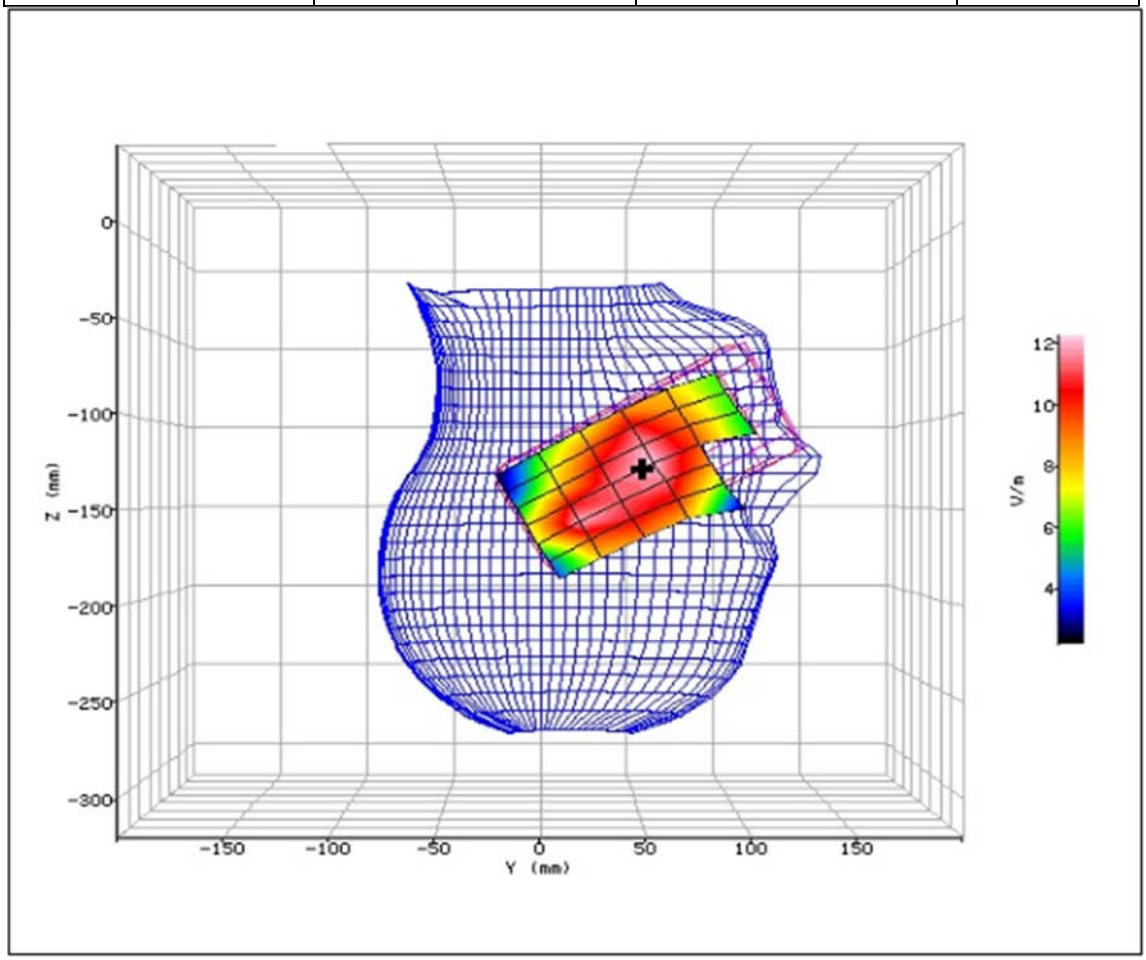

Figure 9: SAR Head Testing Results for the Mobile Handset at 824.2MHz.

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

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	24/03/2016-16:12:14	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	22.20°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	34.00%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	61.30mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-105.60mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	20.801
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.473 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	25%	**SAR START:**	0.447 W/kg
INPUT POWER LEVEL:	31.3dBm	**SAR END:**	0.439 W/kg
PROBE BATTERY LAST CHANGED:	24/03/2016	**SAR DRIFT DURING SCAN:**	-1.800 %

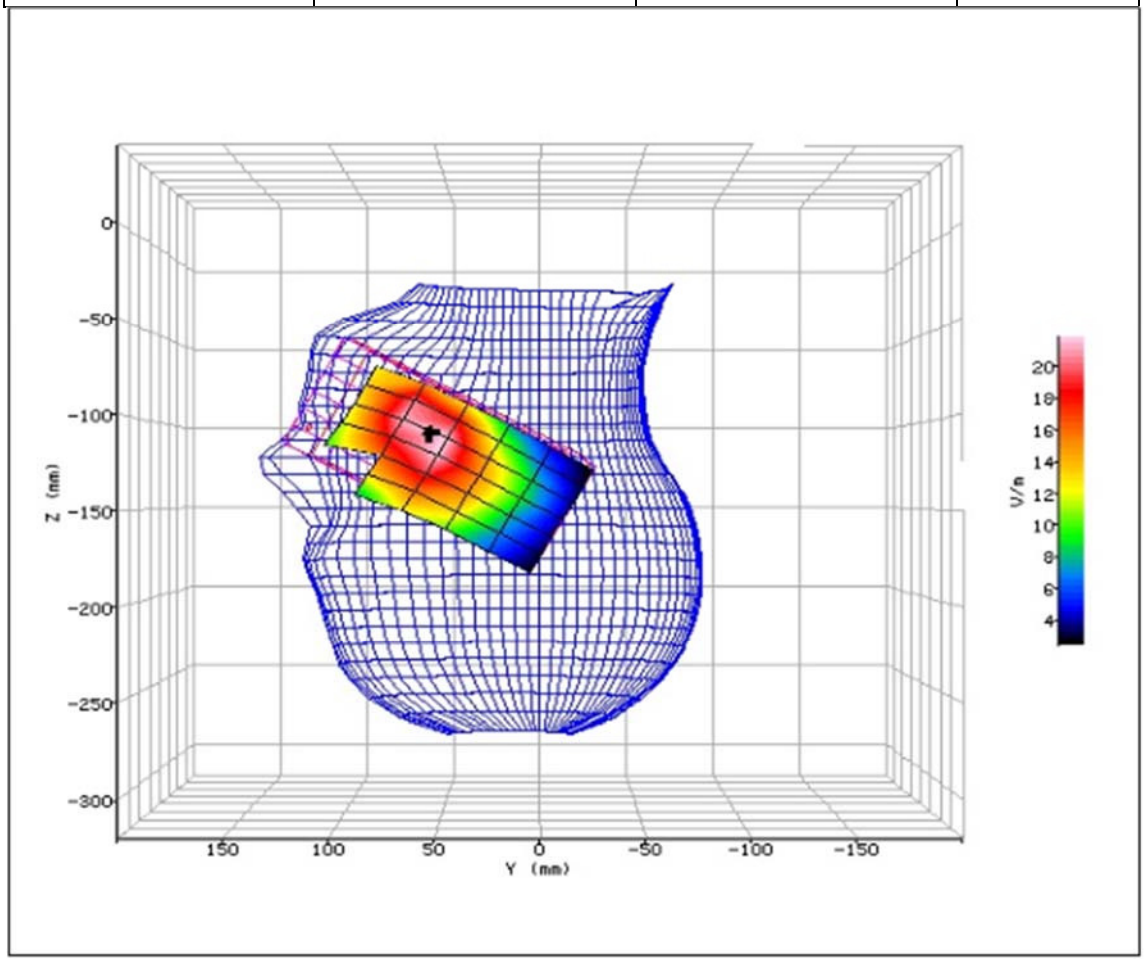

Figure 10: SAR Head Testing Results for the Sharp Smart phone at 824.2MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	29/03/2016-11:47:39	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	27.30%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	47.80mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-118.80mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	13.037
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.176 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	25%	**SAR START:**	0.167 W/kg
INPUT POWER LEVEL:	31.3dBm	**SAR END:**	0.169 W/kg
PROBE BATTERY LAST CHANGED:	29/03/2016	**SAR DRIFT DURING SCAN:**	0.800 %

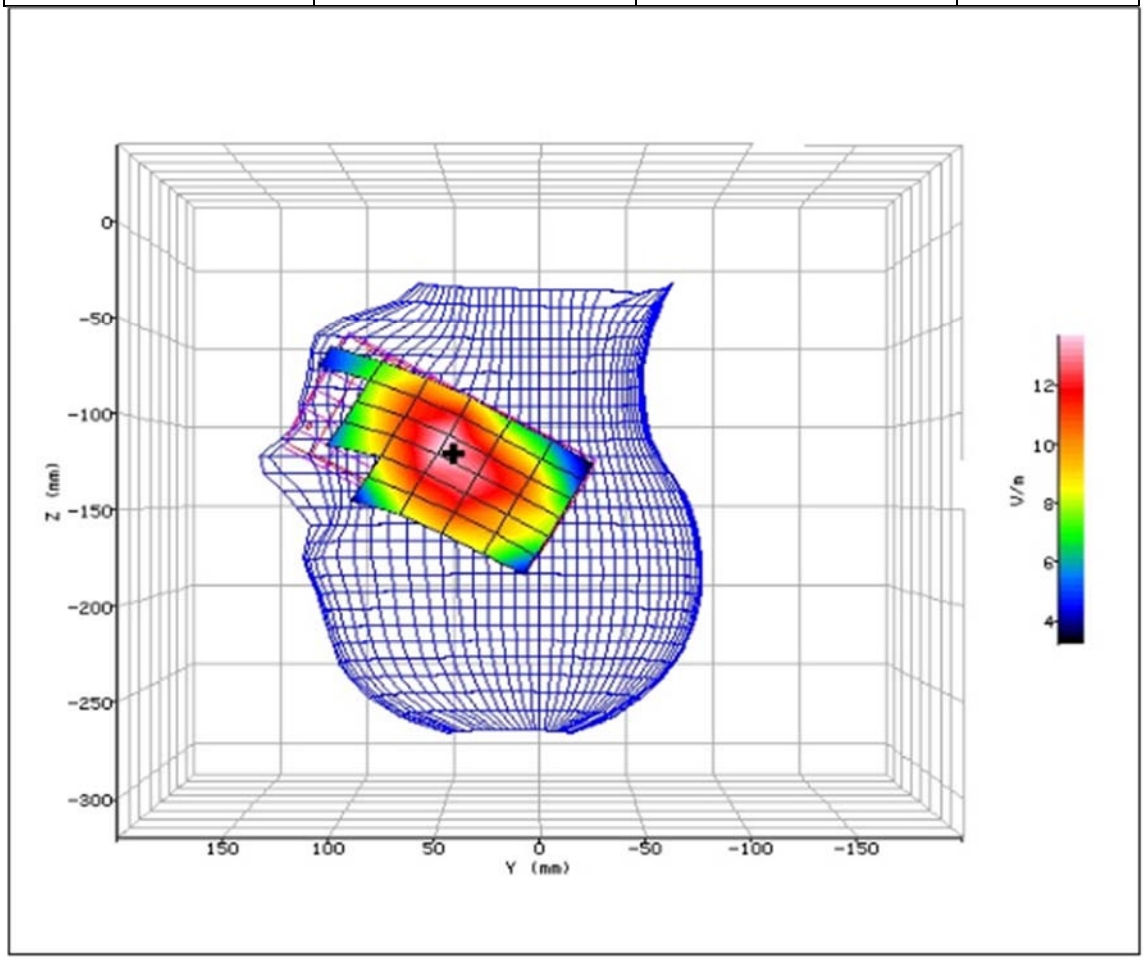

Figure 11: SAR Head Testing Results for the Sharp Smart phone at 824.2MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	29/03/2016-13:04:23	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	27.30%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	62.40mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-120.40mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	20.198
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.417 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	25%	**SAR START:**	0.418 W/kg
INPUT POWER LEVEL:	31.3dBm	**SAR END:**	0.397 W/kg
PROBE BATTERY LAST CHANGED:	29/03/2016	**SAR DRIFT DURING SCAN:**	-5.000 %

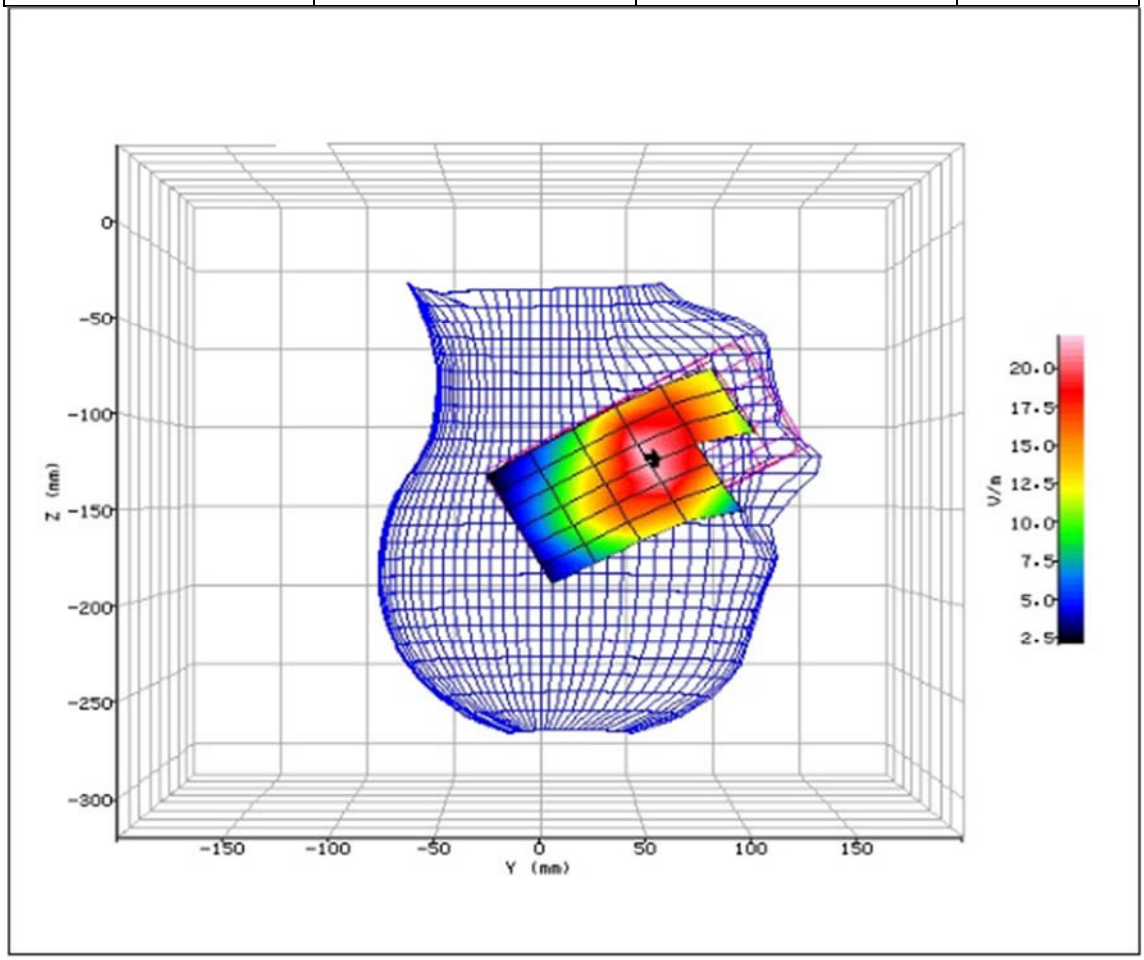

Figure 12: SAR Head Testing Results for the Sharp Smart phone at 824.2MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	29/03/2016-13:31:24	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	27.30%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	54.60mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-131.60mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	12.349
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.146 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	25%	**SAR START:**	0.151 W/kg
INPUT POWER LEVEL:	31.3dBm	**SAR END:**	0.151 W/kg
PROBE BATTERY LAST CHANGED:	29/03/2016	**SAR DRIFT DURING SCAN:**	0.200 %

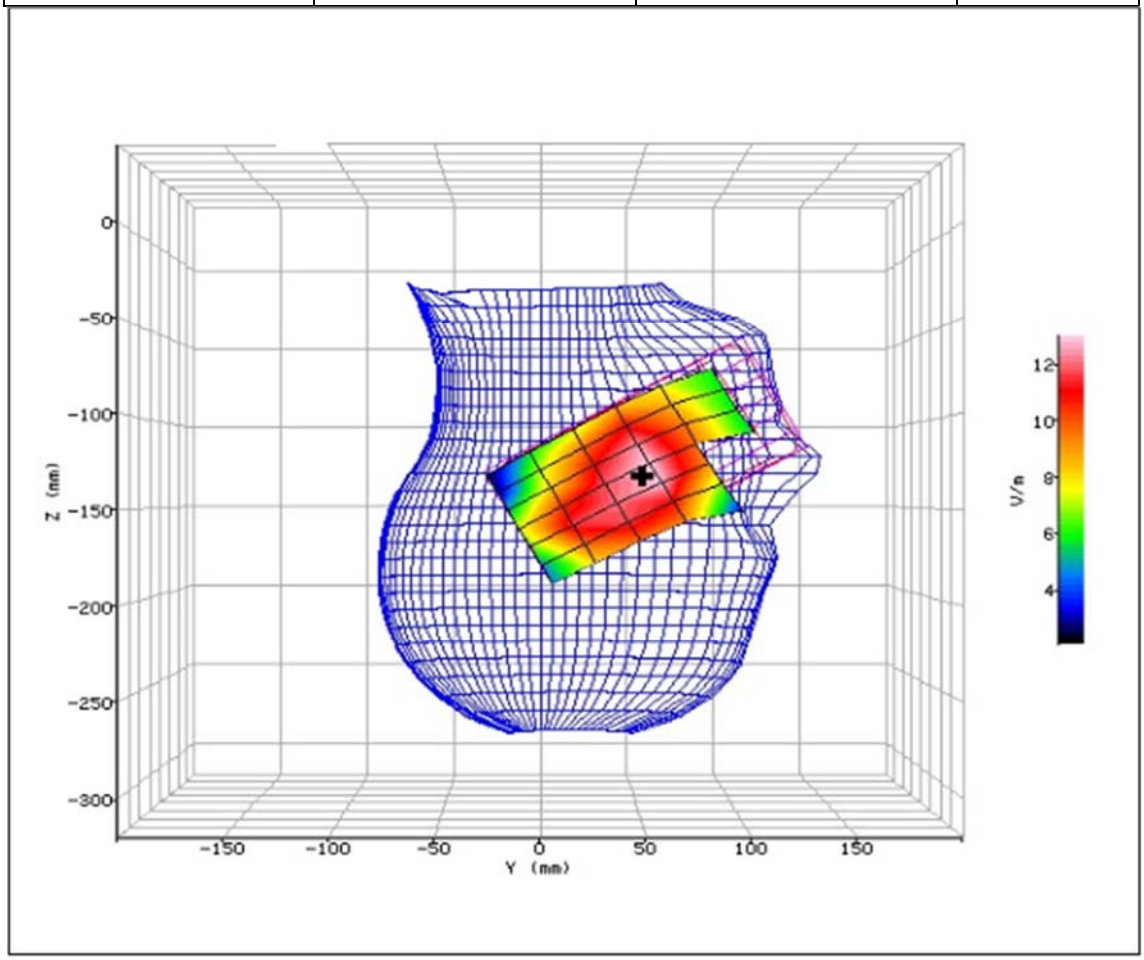

Figure 13: SAR Head Testing Results for the Sharp Smart phone at 824.2MHz.

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

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	13/04/2016-11:09:31	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Body
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	54.18
RELATIVE HUMIDITY:	42.30%	**CONDUCTIVITY:**	0.987
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	23.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	39.50mm
DUT POSITION:	10mm-Front Facing	**MAX SAR Y-AXIS LOCATION:**	-5.70mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	21.048
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.441 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	25%	**SAR START:**	0.447 W/kg
INPUT POWER LEVEL:	31.3dBm	**SAR END:**	0.423 W/kg
PROBE BATTERY LAST CHANGED:	13/04/2016	**SAR DRIFT DURING SCAN:**	-5.400 %

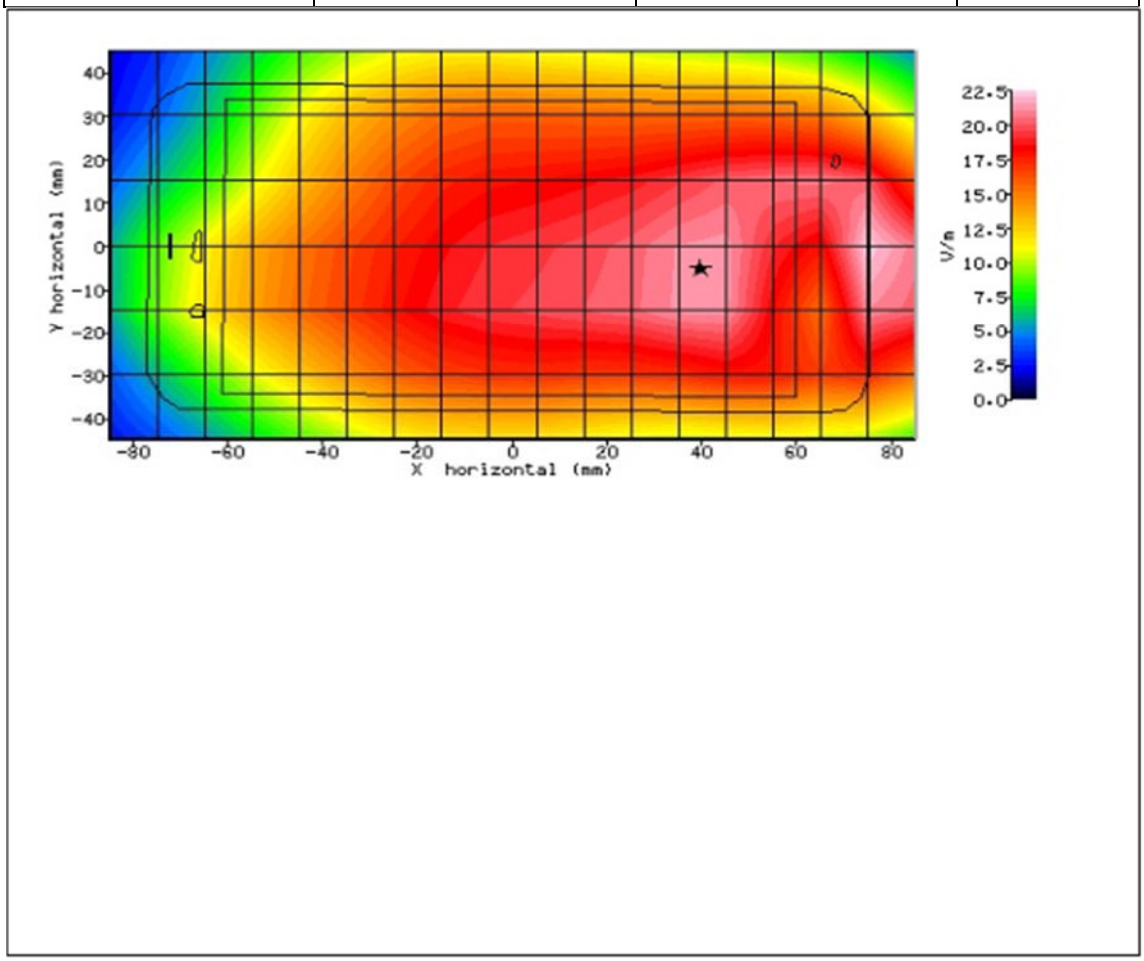

Figure 14: SAR Body Testing Results for the Sharp Smart phone at 824.2MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	13/04/2016-12:16:00	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Body
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	54.18
RELATIVE HUMIDITY:	42.30%	**CONDUCTIVITY:**	0.987
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	23.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	79.30mm
DUT POSITION:	10mm-Rear Facing	**MAX SAR Y-AXIS LOCATION:**	-1.20mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	21.997
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.558 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	25%	**SAR START:**	0.545 W/kg
INPUT POWER LEVEL:	31.3dBm	**SAR END:**	0.558 W/kg
PROBE BATTERY LAST CHANGED:	13/04/2016	**SAR DRIFT DURING SCAN:**	2.400 %

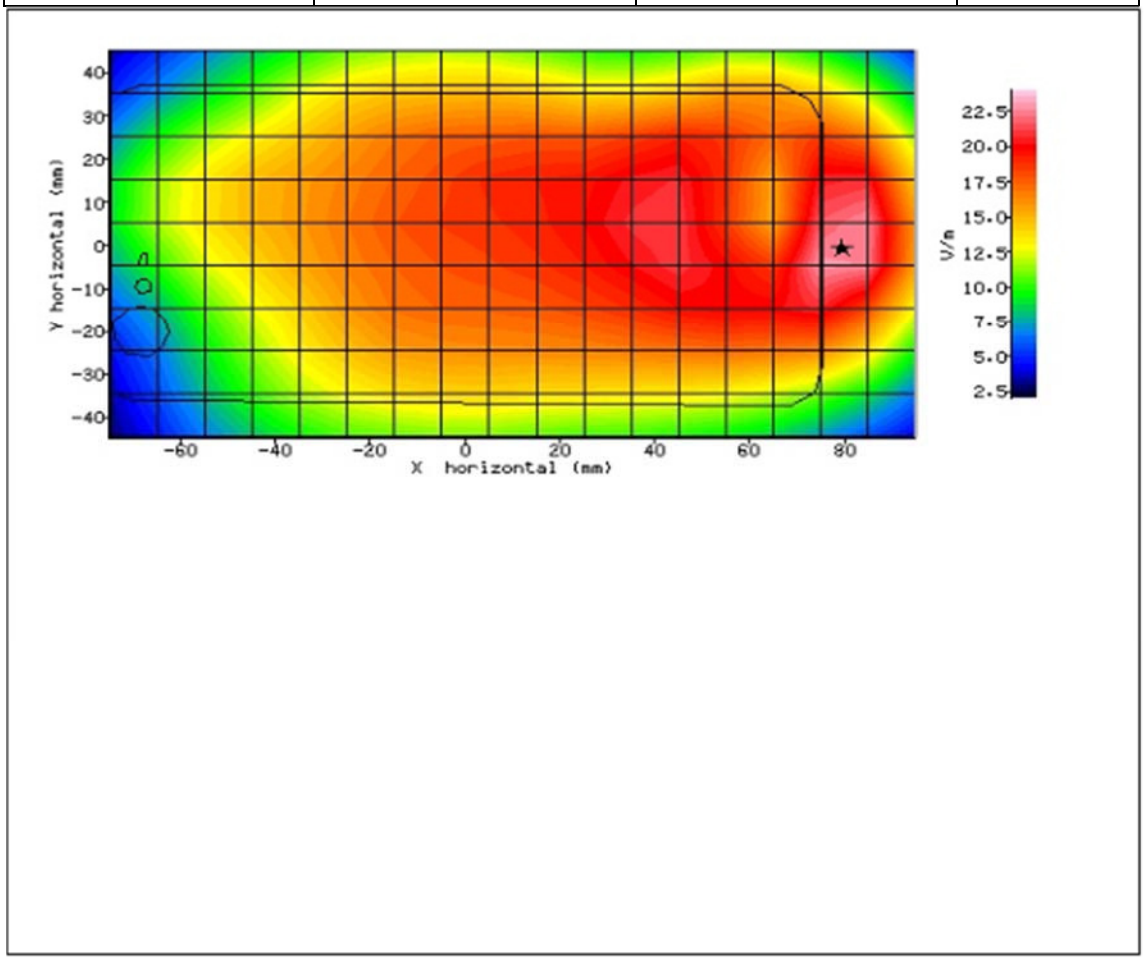

Figure 15: SAR Body Testing Results for the Sharp Smart phone at 824.2MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	13/04/2016-13:39:09	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Body
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	54.18
RELATIVE HUMIDITY:	42.30%	**CONDUCTIVITY:**	0.987
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	23.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-7.40mm
DUT POSITION:	10mm-Right Edge	**MAX SAR Y-AXIS LOCATION:**	1.90mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	23.630
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.483 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	25%	**SAR START:**	0.582 W/kg
INPUT POWER LEVEL:	31.3dBm	**SAR END:**	0.569 W/kg
PROBE BATTERY LAST CHANGED:	13/04/2016	**SAR DRIFT DURING SCAN:**	-2.200 %

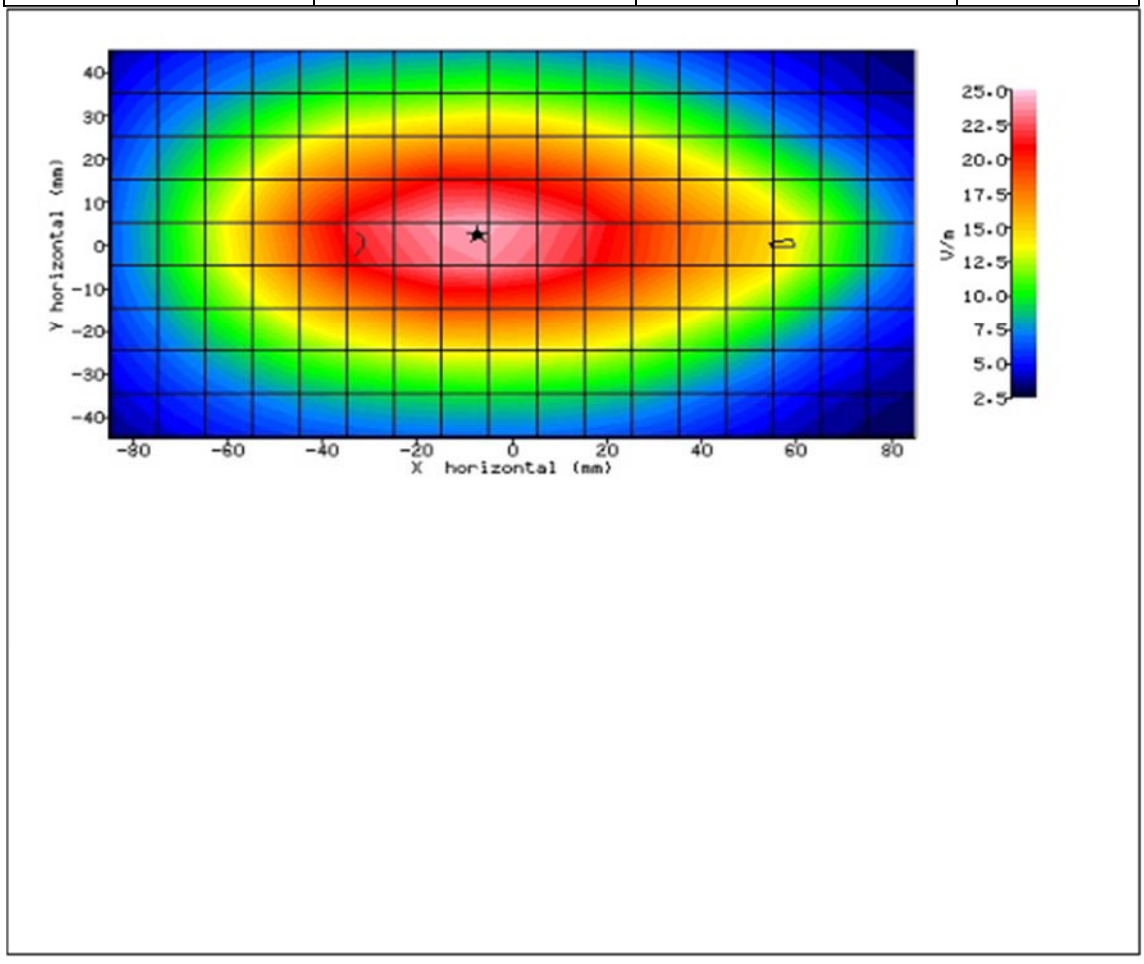

Figure 16: SAR Body Testing Results for the Sharp Smart phone at 824.2MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	13/04/2016-13:58:37	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Body
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	54.18
RELATIVE HUMIDITY:	42.30%	**CONDUCTIVITY:**	0.987
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	23.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	8.30mm
DUT POSITION:	10mm-Bottom Edge	**MAX SAR Y-AXIS LOCATION:**	1.90mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	16.034
TEST FREQUENCY:	824.2MHz	**SAR 1g:**	0.264 W/kg
TYPE OF MODULATION:	GMSK (GPRS Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	25%	**SAR START:**	0.326 W/kg
INPUT POWER LEVEL:	31.3dBm	**SAR END:**	0.321 W/kg
PROBE BATTERY LAST CHANGED:	13/04/2016	**SAR DRIFT DURING SCAN:**	-1.500 %

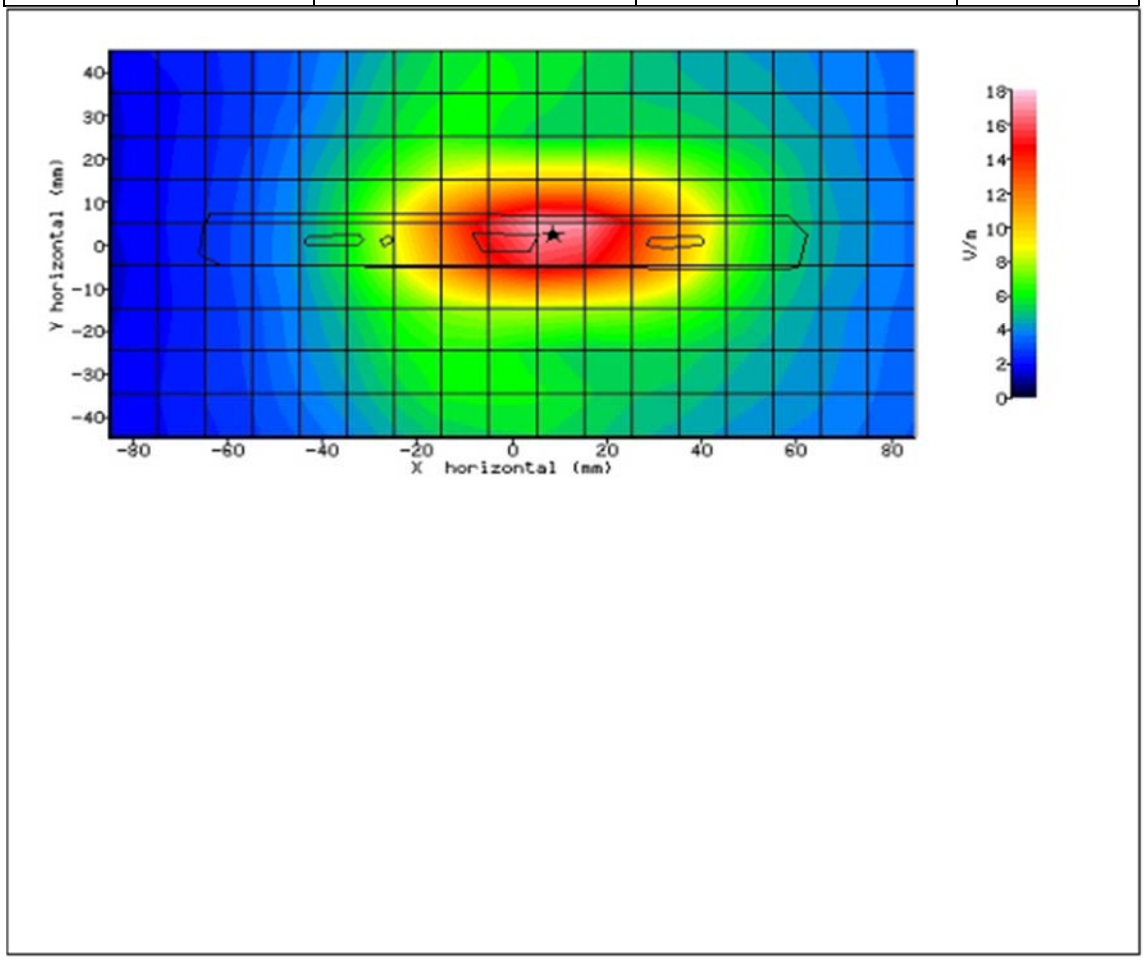

Figure 17: SAR Body Testing Results for the Sharp Smart phone at 824.2MHz.

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

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	29/03/2016-16:16:54	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	27.30%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	61.60mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-108.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	20.638
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.453 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.445 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.443 W/kg
PROBE BATTERY LAST CHANGED:	29/03/2016	**SAR DRIFT DURING SCAN:**	-0.500 %

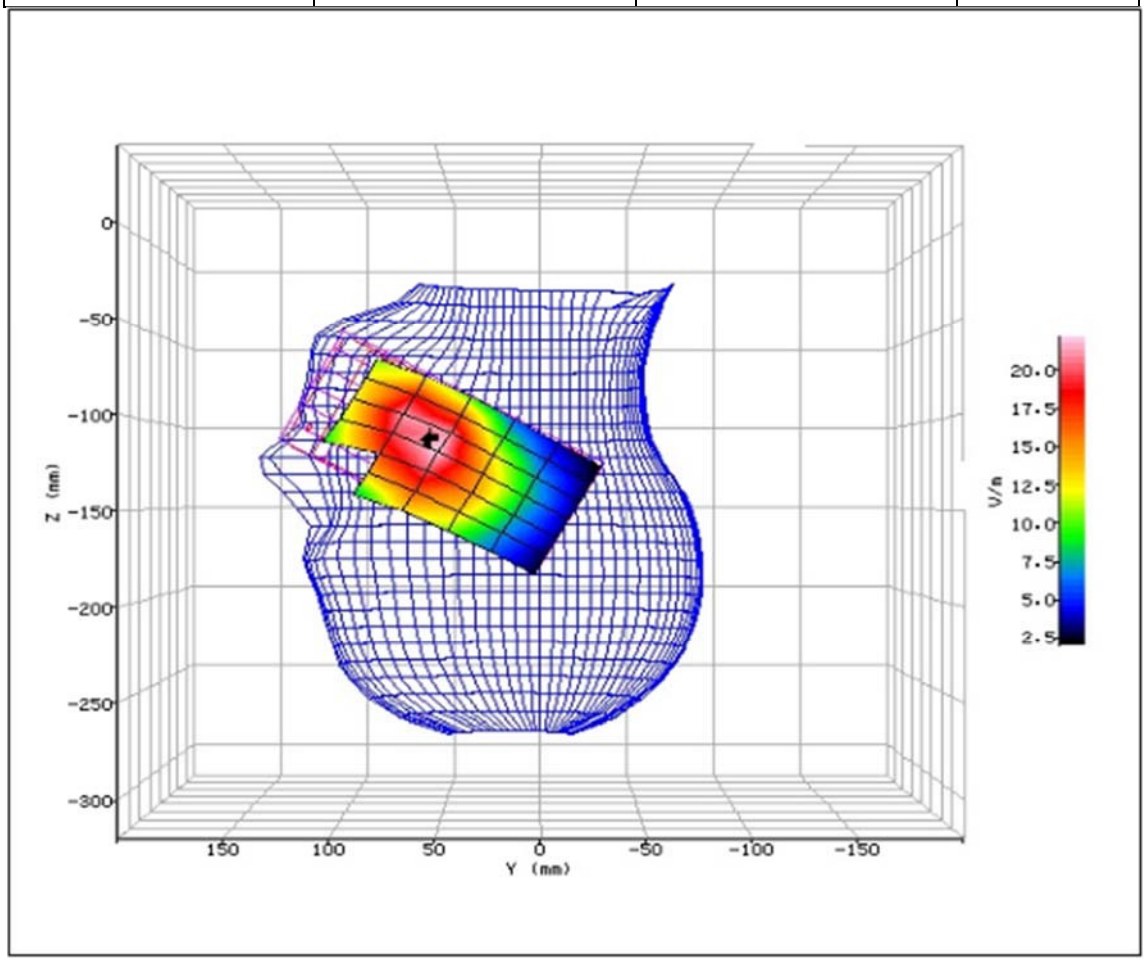

Figure 18: SAR Head Testing Results for the Sharp Smart phone at 826.4MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	29/03/2016-16:42:27	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	27.30%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	48.90mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-118.90mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	12.865
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.168 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.167 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.168 W/kg
PROBE BATTERY LAST CHANGED:	29/03/2016	**SAR DRIFT DURING SCAN:**	0.600 %

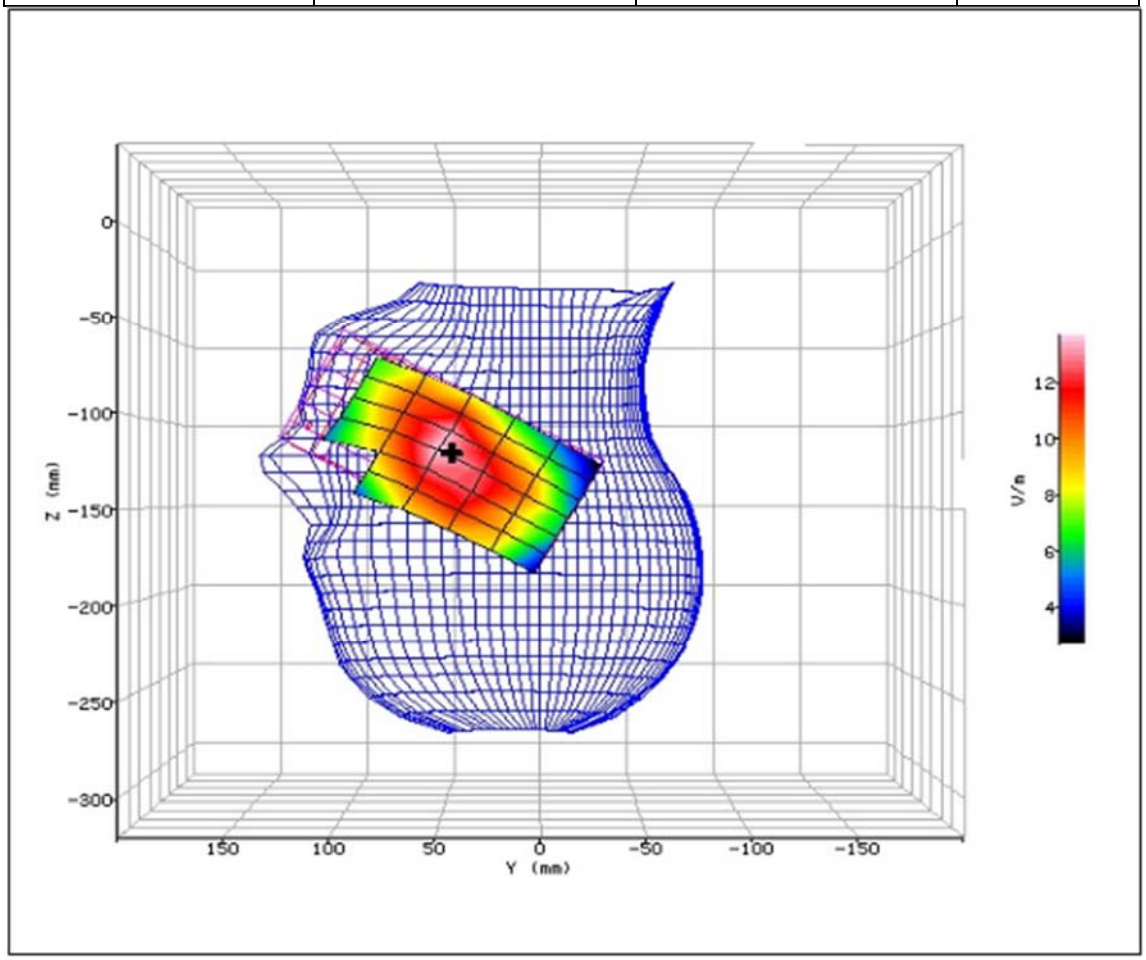

Figure 19: SAR Head Testing Results for the Sharp Smart phone at 826.4MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	29/03/2016-14:51:04	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	27.30%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	61.10mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-118.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	19.128
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.359 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.383 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.375 W/kg
PROBE BATTERY LAST CHANGED:	29/03/2016	**SAR DRIFT DURING SCAN:**	-2.100 %

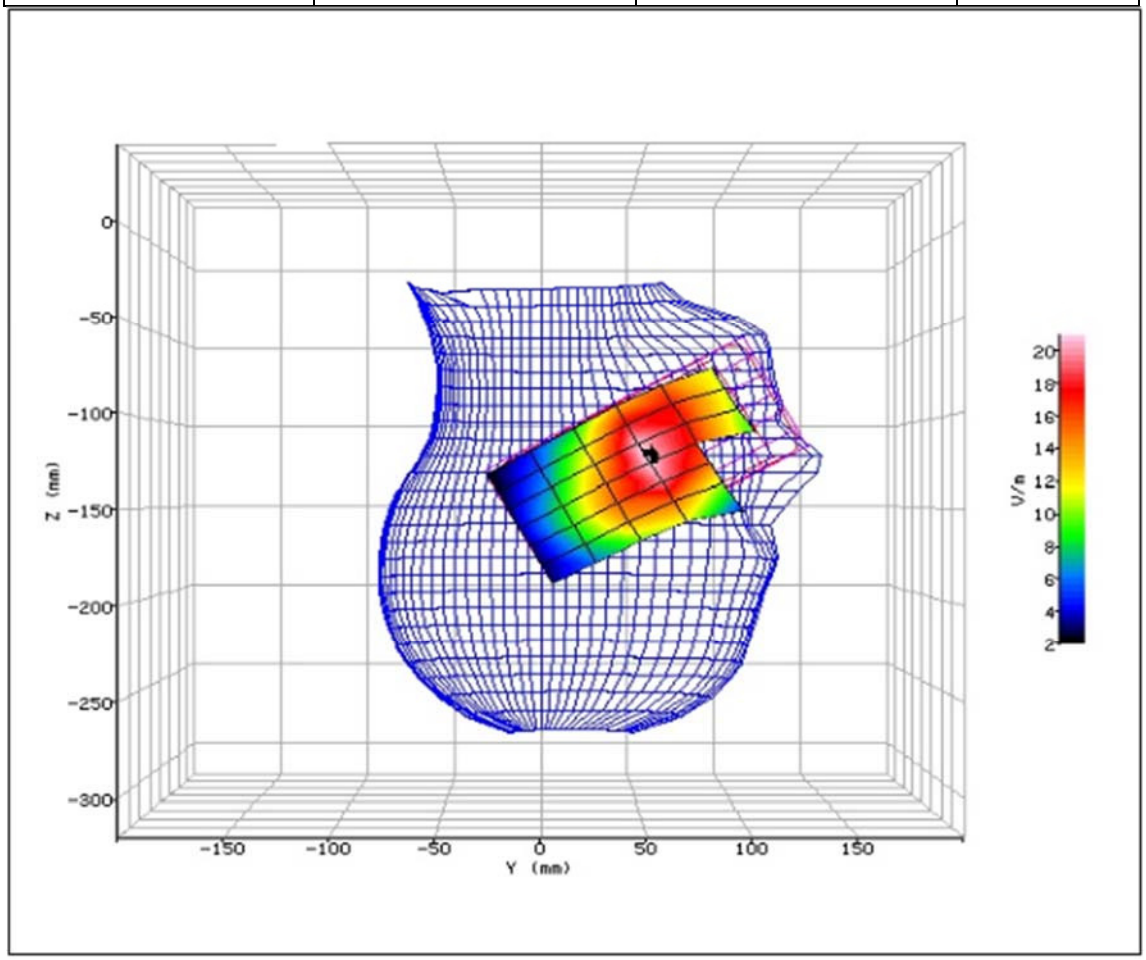

Figure 20: SAR Head Testing Results for the Sharp Smart phone at 826.4MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	29/03/2016-15:18:51	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	27.30%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	55.50mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-130.40mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	11.497
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.126 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.133 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.132 W/kg
PROBE BATTERY LAST CHANGED:	29/03/2016	**SAR DRIFT DURING SCAN:**	-0.900 %

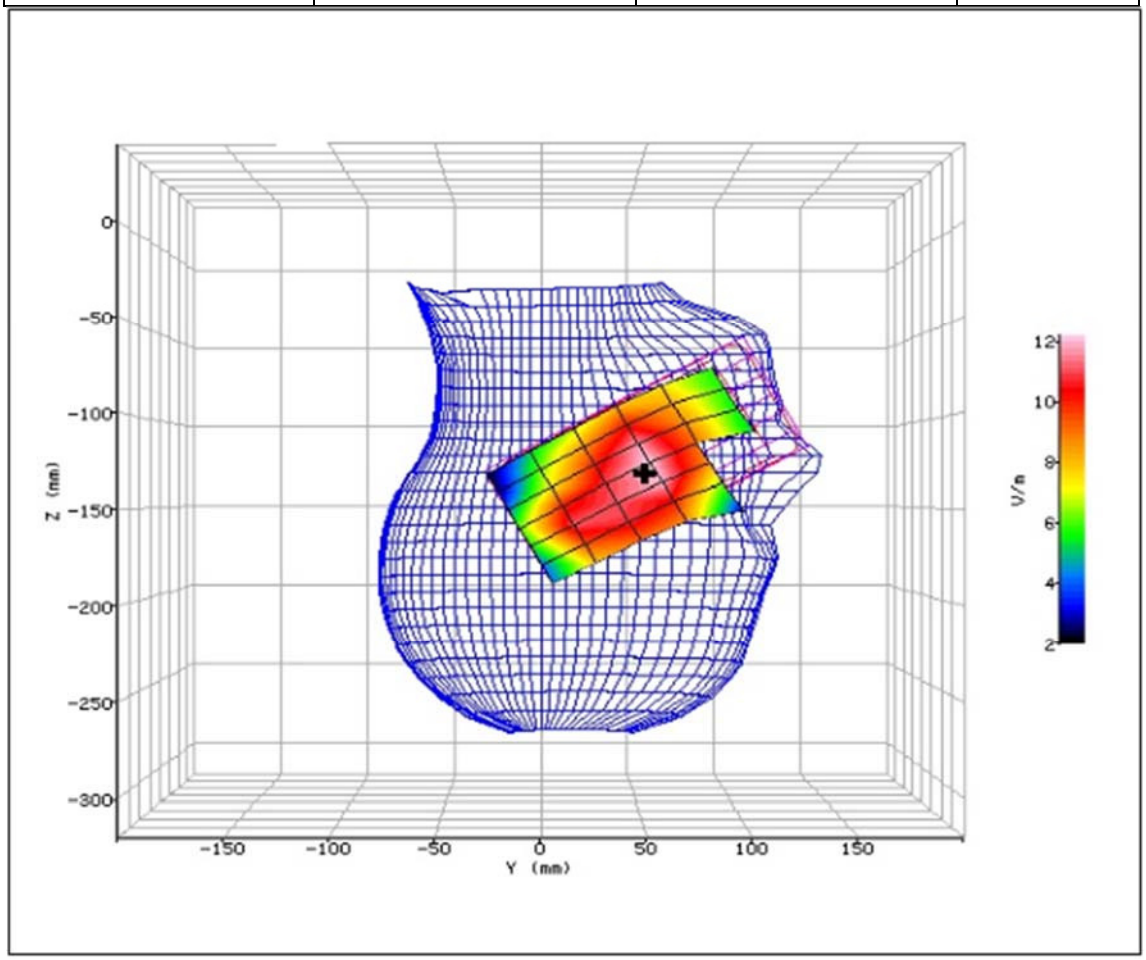

Figure 21: SAR Head Testing Results for the Sharp Smart phone at 826.4MHz.

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

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	13/04/2016-16:03:44	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Body
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	54.18
RELATIVE HUMIDITY:	42.30%	**CONDUCTIVITY:**	0.987
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	23.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	78.40mm
DUT POSITION:	10mm-Front Facing	**MAX SAR Y-AXIS LOCATION:**	0.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	20.052
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.447 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.458 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.455 W/kg
PROBE BATTERY LAST CHANGED:	13/04/2016	**SAR DRIFT DURING SCAN:**	-0.800 %

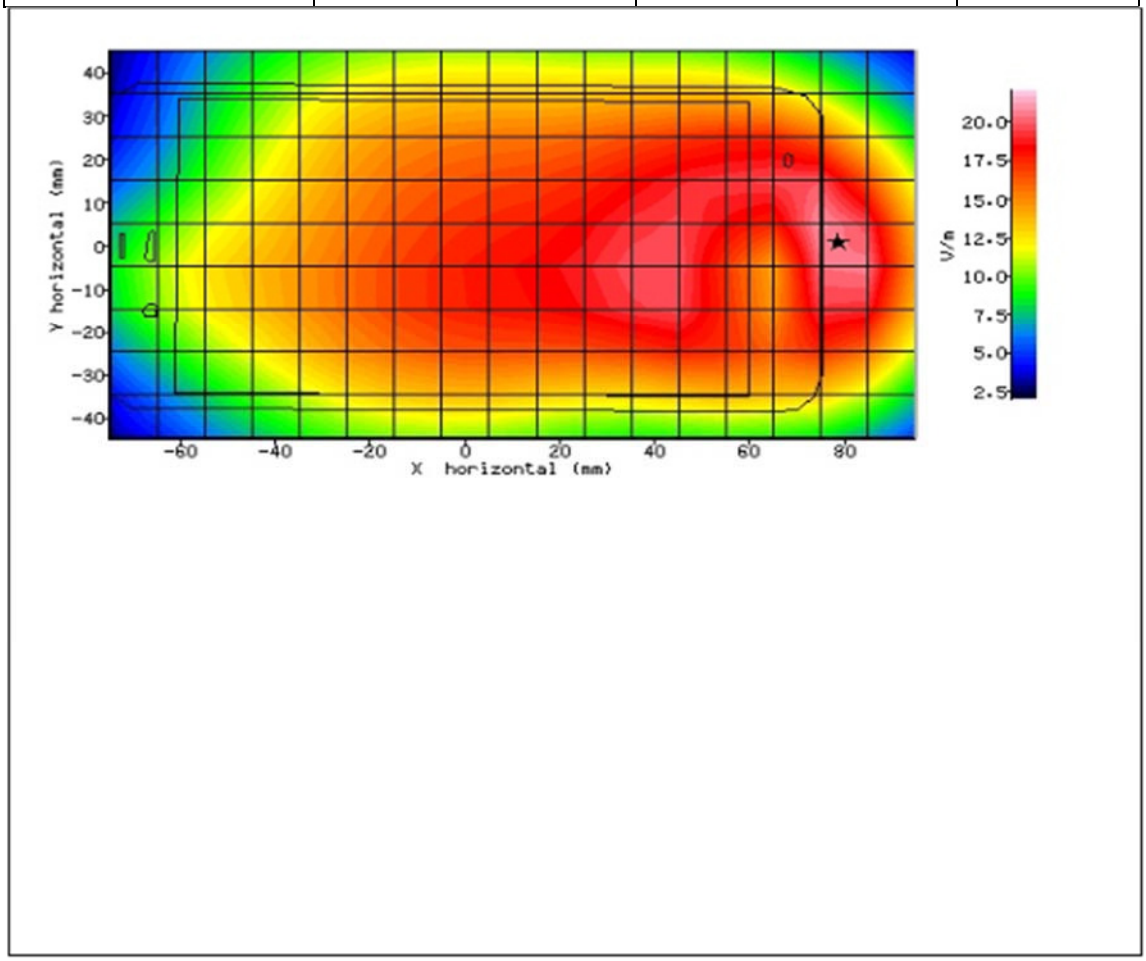

Figure 22: SAR Body Testing Results for the Sharp Smart phone at 826.4MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	13/04/2016-16:25:49	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Body
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	54.18
RELATIVE HUMIDITY:	42.30%	**CONDUCTIVITY:**	0.987
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	23.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	80.10mm
DUT POSITION:	10mm-Rear Facing	**MAX SAR Y-AXIS LOCATION:**	2.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	20.618
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.483 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.499 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.496 W/kg
PROBE BATTERY LAST CHANGED:	13/04/2016	**SAR DRIFT DURING SCAN:**	-0.600 %

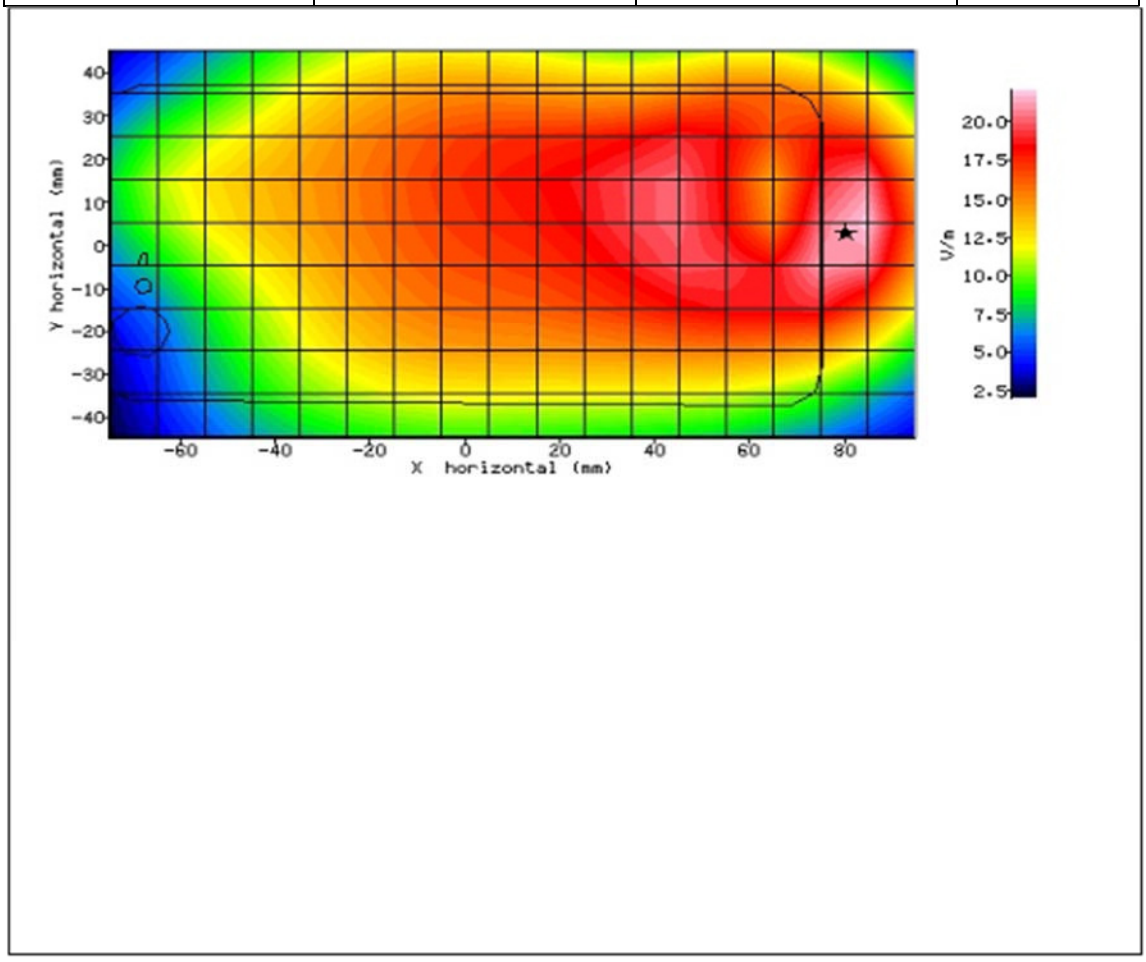

Figure 23: SAR Body Testing Results for the Sharp Smart phone at 826.4MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	13/04/2016-15:19:15	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Body
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	54.18
RELATIVE HUMIDITY:	42.30%	**CONDUCTIVITY:**	0.987
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	23.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	-7.60mm
DUT POSITION:	10mm-Right Edge	**MAX SAR Y-AXIS LOCATION:**	2.00mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	21.345
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.468 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.482 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.479 W/kg
PROBE BATTERY LAST CHANGED:	13/04/2016	**SAR DRIFT DURING SCAN:**	-0.700 %

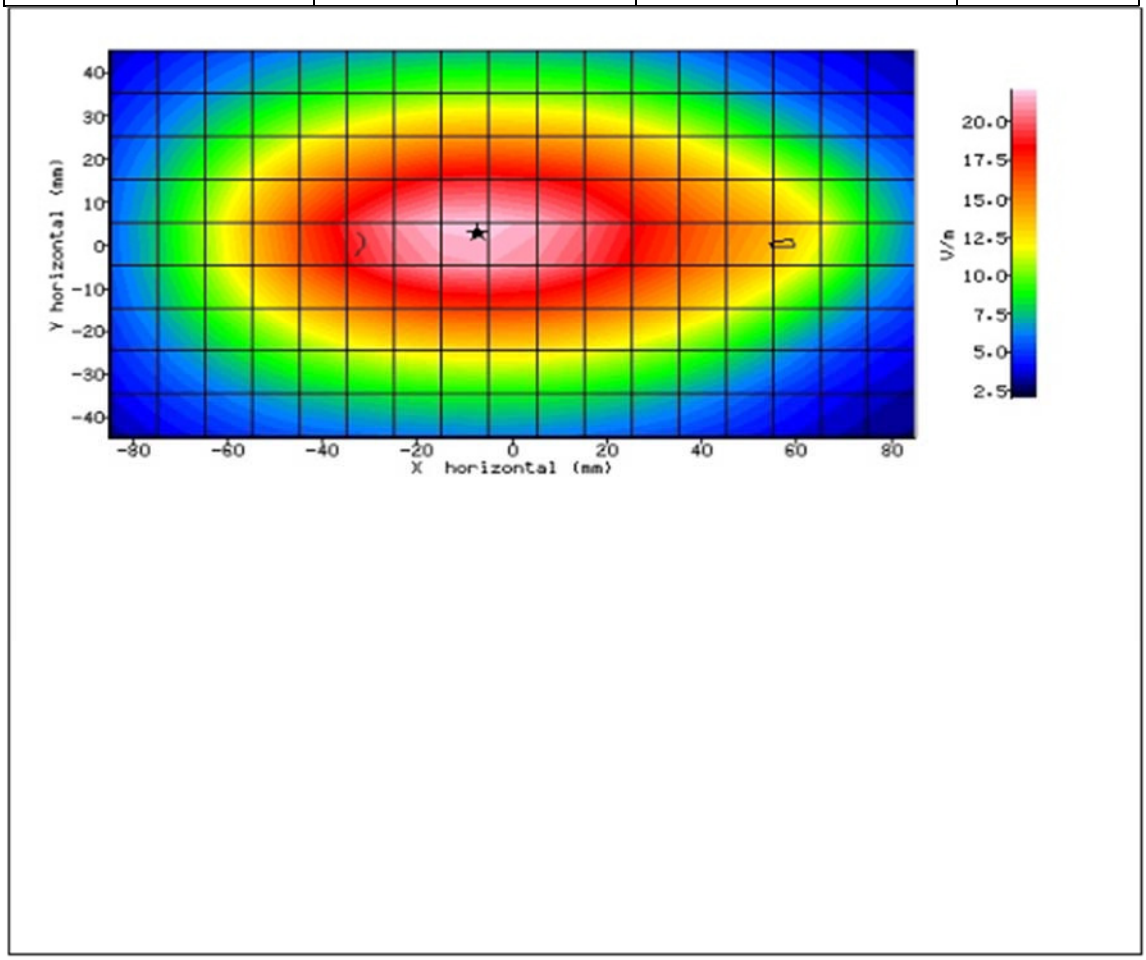

Figure 24: SAR Body Testing Results for the Sharp Smart phone at 826.4MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	13/04/2016-14:50:27	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Body
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	54.18
RELATIVE HUMIDITY:	42.30%	**CONDUCTIVITY:**	0.987
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	23.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	9.10mm
DUT POSITION:	10mm-Bottom Edge	**MAX SAR Y-AXIS LOCATION:**	0.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	15.114
TEST FREQUENCY:	826.4MHz	**SAR 1g:**	0.235 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.289 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.288 W/kg
PROBE BATTERY LAST CHANGED:	13/04/2016	**SAR DRIFT DURING SCAN:**	-0.300 %

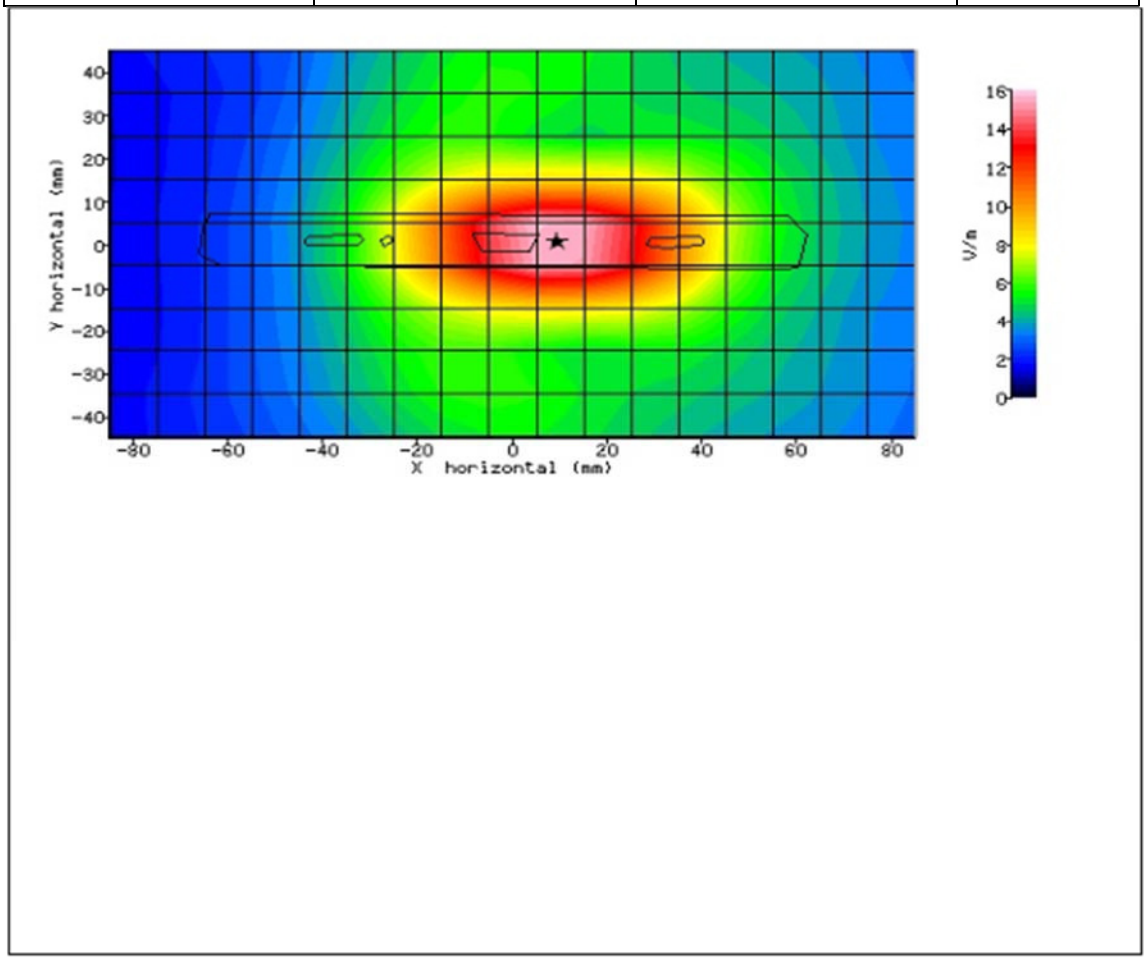

Figure 25: SAR Body Testing Results for the Sharp Smart phone at 826.4MHz.

2.7 LTE BAND 5 HEAD SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	31/03/2016-13:28:29	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	22.80°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	26.10%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	61.20mm
DUT POSITION:	Left-Cheek	**MAX SAR Z-AXIS LOCATION:**	-104.20mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	20.389
TEST FREQUENCY:	829.0MHz	**SAR 1g:**	0.431 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.431 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.433 W/kg
PROBE BATTERY LAST CHANGED:	31/03/2016	**SAR DRIFT DURING SCAN:**	0.400 %

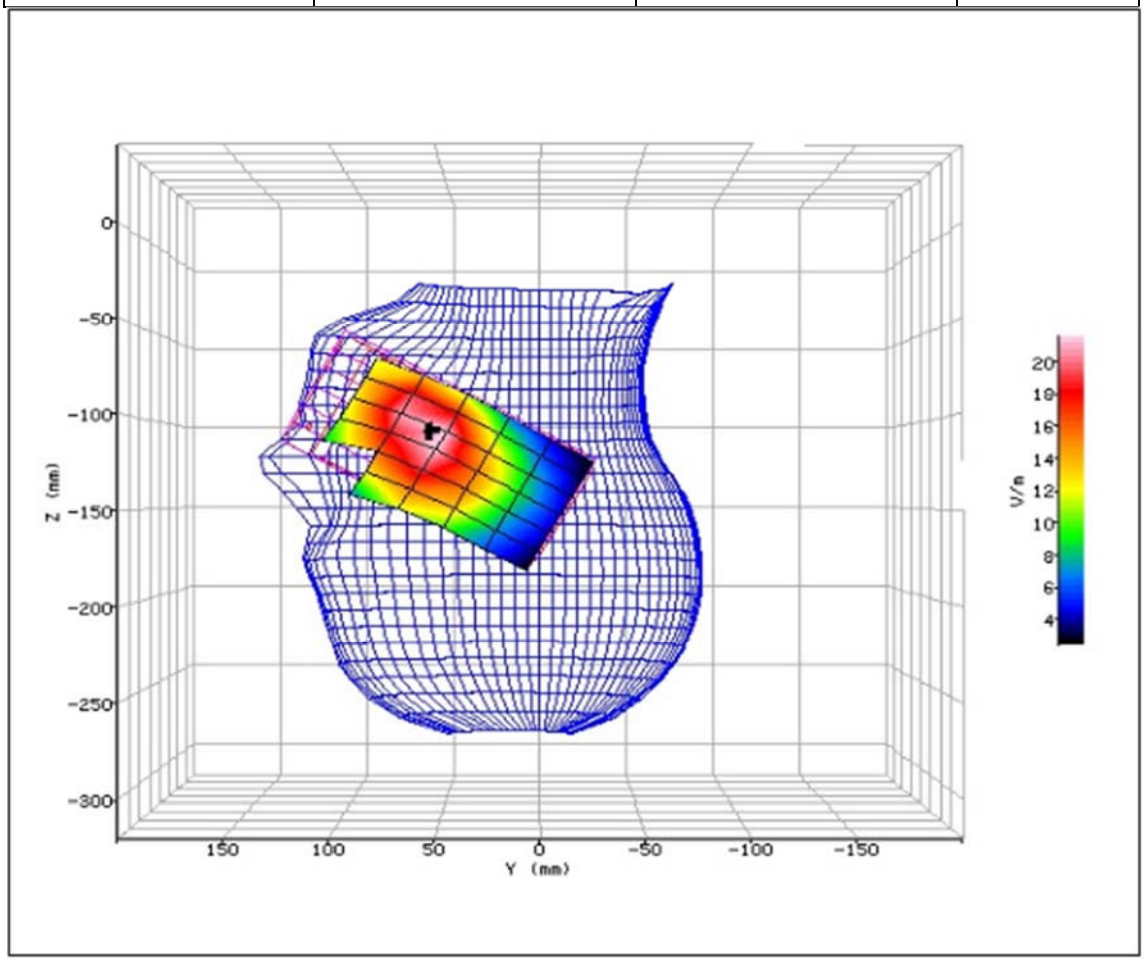

Figure 26: SAR Head Testing Results for the Sharp Smart phone at 829.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	31/03/2016-14:47:39	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	22.80°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	26.10%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	47.70mm
DUT POSITION:	Left-15°	**MAX SAR Z-AXIS LOCATION:**	-117.40mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	11.312
TEST FREQUENCY:	829.0MHz	**SAR 1g:**	0.134 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.128 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.128 W/kg
PROBE BATTERY LAST CHANGED:	31/03/2016	**SAR DRIFT DURING SCAN:**	0.100 %

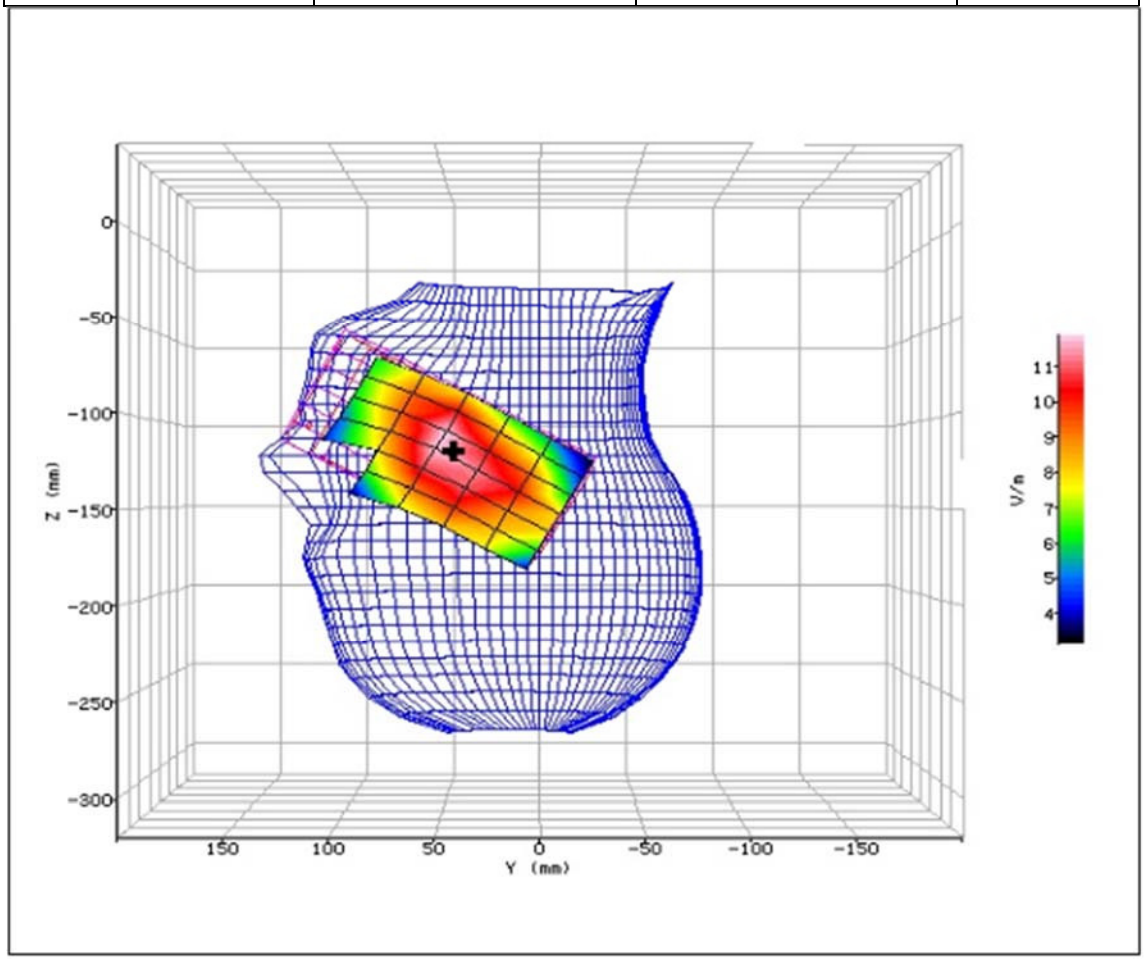

Figure 27: SAR Head Testing Results for the Sharp Smart phone at 829.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	31/03/2016-16:12:12	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	22.80°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	26.10%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.50°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	61.40mm
DUT POSITION:	Right-Cheek	**MAX SAR Z-AXIS LOCATION:**	-118.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	19.100
TEST FREQUENCY:	829.0MHz	**SAR 1g:**	0.363 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.369 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.362 W/kg
PROBE BATTERY LAST CHANGED:	31/03/2016	**SAR DRIFT DURING SCAN:**	-1.800 %

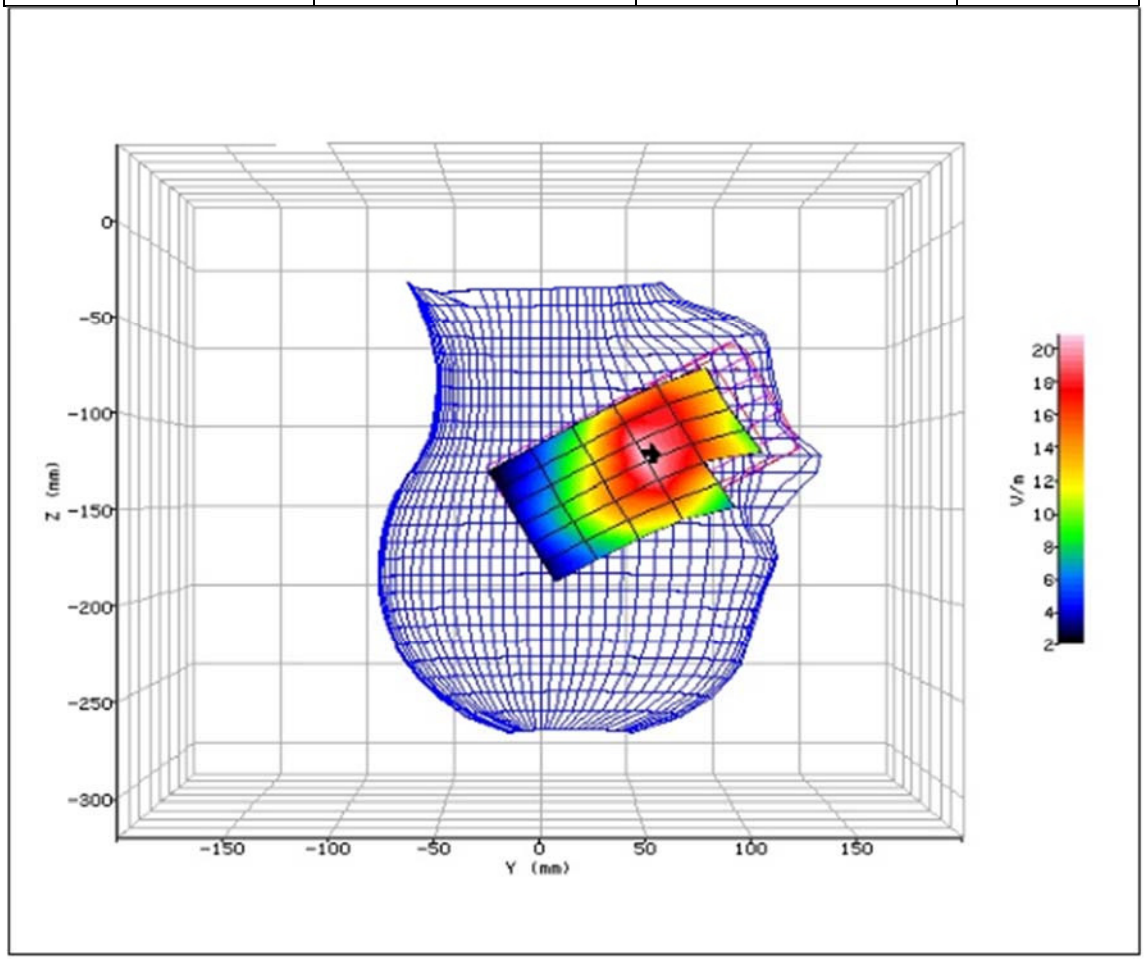

Figure 28: SAR Head Testing Results for the Sharp Smart phone at 829.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	01/04/2016-09:19:58	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	22.90°C	**LIQUID SIMULANT:**	850 Head
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	40.53
RELATIVE HUMIDITY:	29.90%	**CONDUCTIVITY:**	0.879
PHANTOM S/NO:	IXB-040	**LIQUID TEMPERATURE:**	22.40°C
PHANTOM ROTATION:	N/A	**MAX SAR Y-AXIS LOCATION:**	53.30mm
DUT POSITION:	Right-15°	**MAX SAR Z-AXIS LOCATION:**	-131.70mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	10.951
TEST FREQUENCY:	829.0MHz	**SAR 1g:**	0.122 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.118 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.116 W/kg
PROBE BATTERY LAST CHANGED:	01/04/2016	**SAR DRIFT DURING SCAN:**	-1.700 %

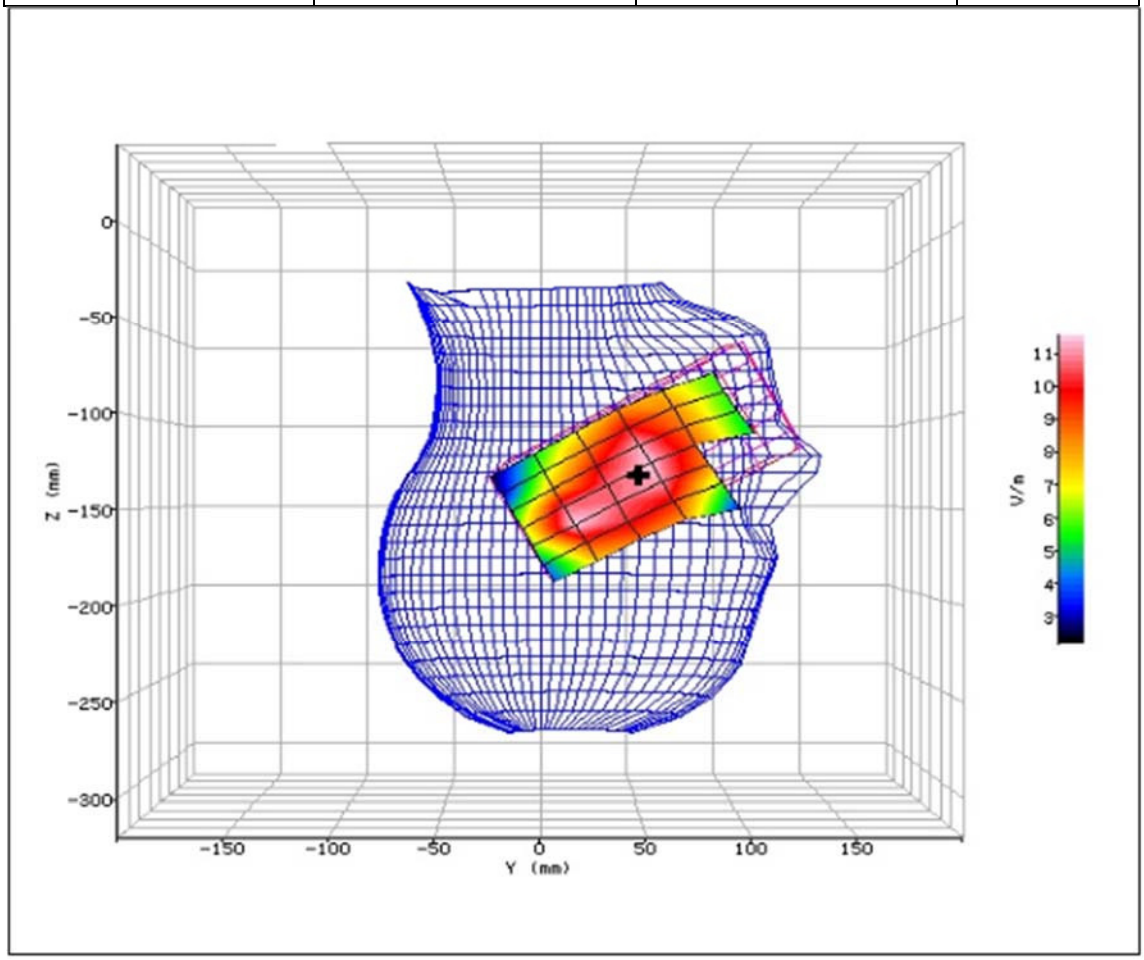

Figure 29: SAR Head Testing Results for the Sharp Smart phone at 829.0MHz.

2.8 LTE BAND 5 BODY SAR TEST RESULTS AND COURSE AREA SCANS – 2D

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	13/04/2016-17:16:13	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Body
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	54.18
RELATIVE HUMIDITY:	42.30%	**CONDUCTIVITY:**	0.987
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	23.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	78.00mm
DUT POSITION:	10mm-Front Facing	**MAX SAR Y-AXIS LOCATION:**	-0.10mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	20.187
TEST FREQUENCY:	829.0MHz	**SAR 1g:**	0.455 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.469 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.459 W/kg
PROBE BATTERY LAST CHANGED:	13/04/2016	**SAR DRIFT DURING SCAN:**	-2.200 %

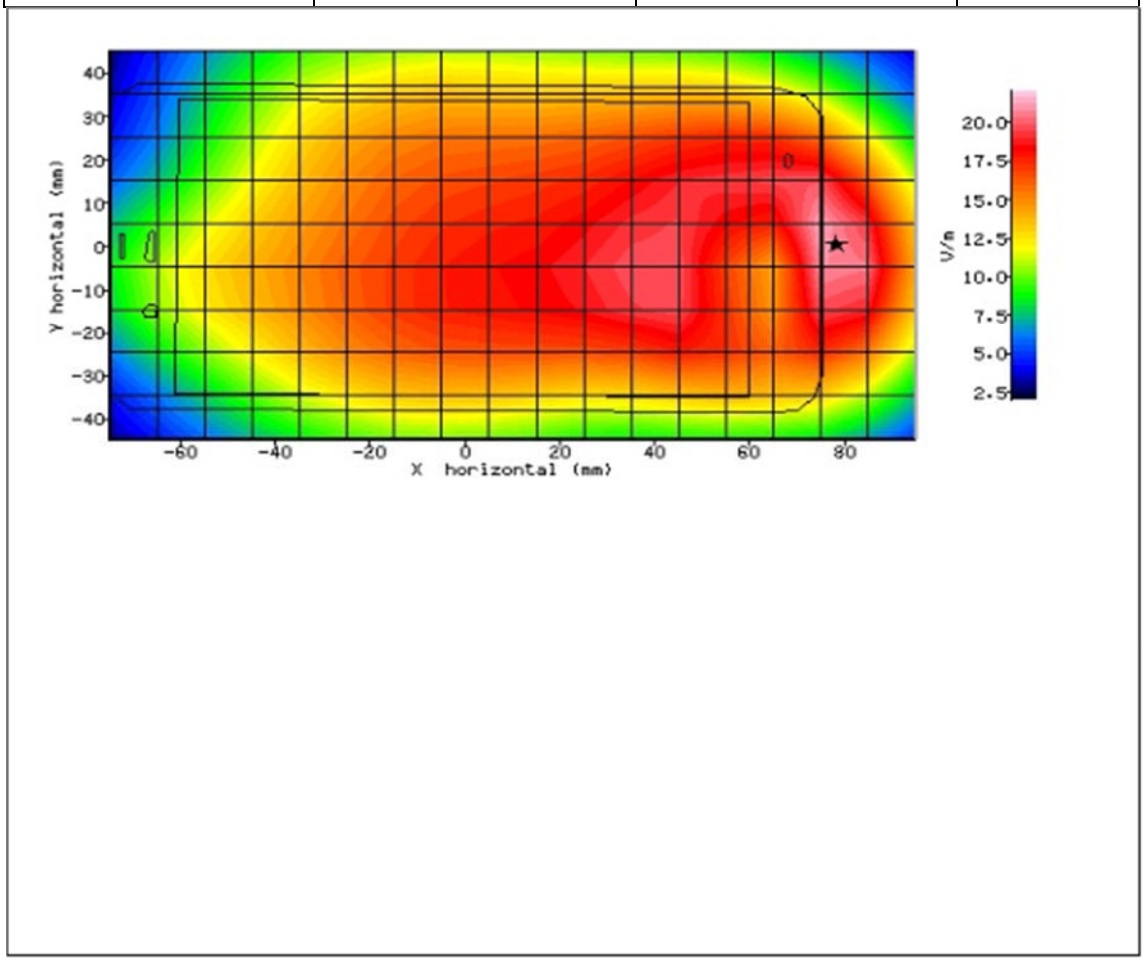

Figure 30: SAR Body Testing Results for the Sharp Smart phone at 829.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	13/04/2016-17:35:43	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.00°C	**LIQUID SIMULANT:**	850 Body
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	54.18
RELATIVE HUMIDITY:	42.30%	**CONDUCTIVITY:**	0.987
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	23.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	79.80mm
DUT POSITION:	10mm-Rear Facing	**MAX SAR Y-AXIS LOCATION:**	1.50mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	19.896
TEST FREQUENCY:	829.0MHz	**SAR 1g:**	0.450 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.466 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.459 W/kg
PROBE BATTERY LAST CHANGED:	13/04/2016	**SAR DRIFT DURING SCAN:**	-1.500 %

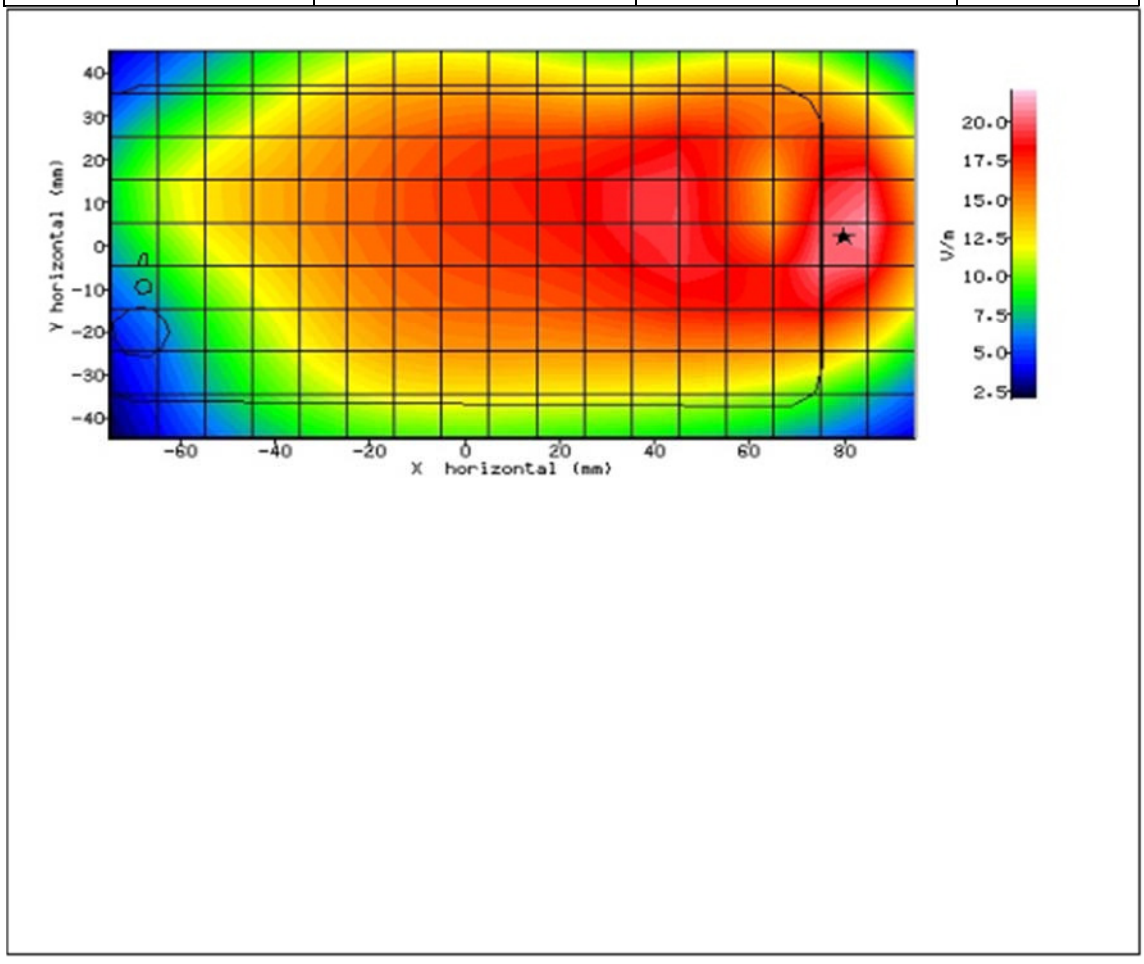

Figure 31: SAR Body Testing Results for the Sharp Smart phone at 829.0MHz.

SYSTEM / SOFTWARE:	SARA-C / v6.09.22	**INPUT POWER DRIFT:**	0 dB
DATE / TIME:	14/04/2016-08:35:25	**DUT BATTERY MODEL/NO:**	Integral
AMBIENT TEMPERATURE:	23.10°C	**LIQUID SIMULANT:**	850 Body
DEVICE UNDER TEST:	-	**RELATIVE PERMITTIVITY:**	54.18
RELATIVE HUMIDITY:	46.20%	**CONDUCTIVITY:**	0.987
PHANTOM S/NO:	IXB-2HF	**LIQUID TEMPERATURE:**	23.10°C
PHANTOM ROTATION:	N/A	**MAX SAR X-AXIS LOCATION:**	1.20mm
DUT POSITION:	10mm-Right Edge	**MAX SAR Y-AXIS LOCATION:**	2.30mm
ANTENNA CONFIGURATION:	N/A	**MAX E FIELD:**	21.697
TEST FREQUENCY:	829.0MHz	**SAR 1g:**	0.485 W/kg
TYPE OF MODULATION:	QPSK (RMC Mode)	**SAR 10g:**	-
MODN. DUTY CYCLE:	100%	**SAR START:**	0.500 W/kg
INPUT POWER LEVEL:	24.2dBm	**SAR END:**	0.191 W/kg
PROBE BATTERY LAST CHANGED:	14/04/2016	**SAR DRIFT DURING SCAN:**	-1.900 %

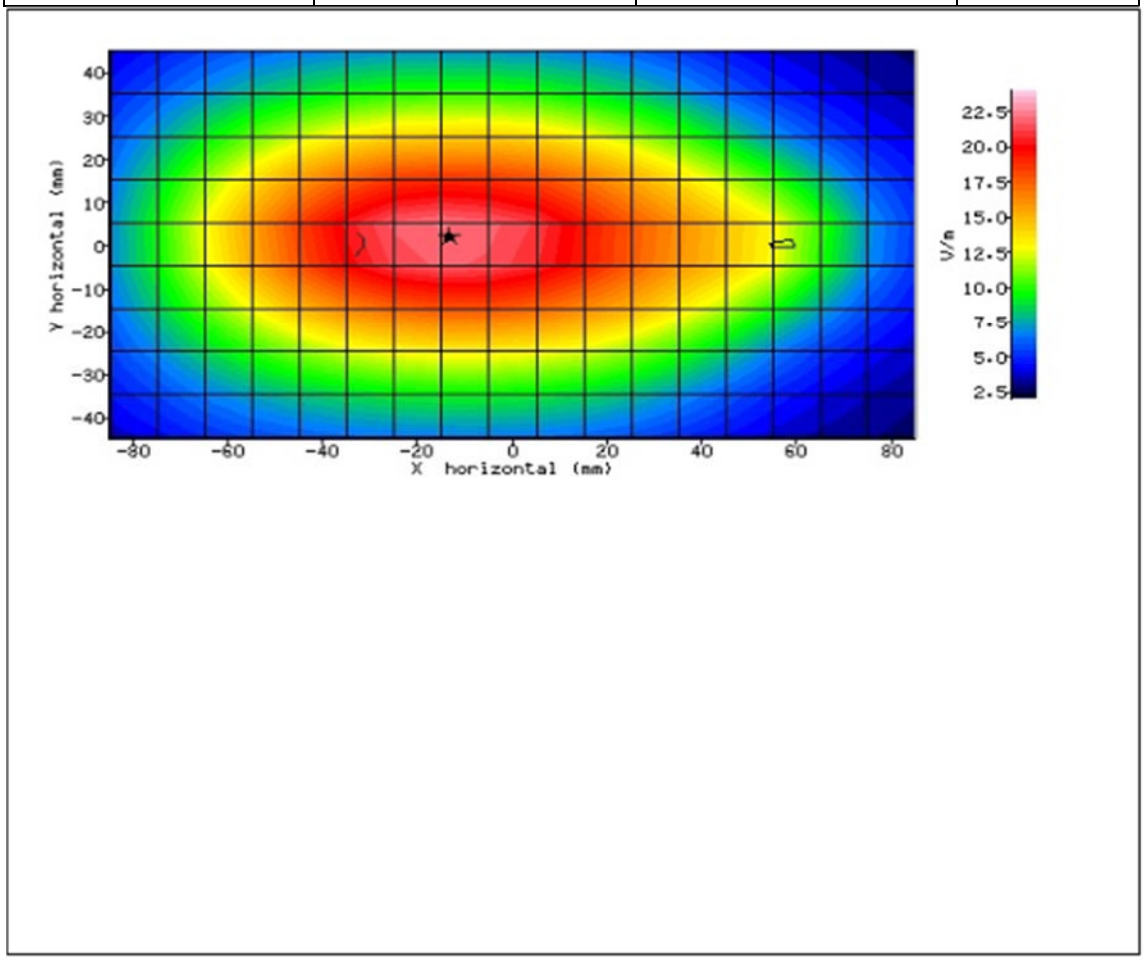

Figure 32: SAR Body Testing Results for the Sharp Smart phone at 829.0MHz.