MOTOROLA

Portable Cellular Phone SAR Test Report

Tests Requested By:	Motorola Mobility, Inc. 600 N. US Highway 45 Libertyville, IL 60048
Test Report #:	24400-1F Rev. G
Date of Report:	May-19-2011
Date of Test:	Feb-25-2011 to Mar-11-2011, May-04-2011 to May-09-2011
FCC ID #:	IHDP56LS2
Generic Name:	MVRQ6-33334411A11
Test Laboratory:	Motorola Mobility, Inc. - ADR Test Services Laboratory 600 N. US Highway 45 Libertyville, IL 60048
Report Author:	Thomas Knipple Senior RF Engineer

This laboratory is accredited to ISO/IEC 17025-2005 to perform the following tests:

UKAS TESTING
2404

Tests:	Procedures:
Electromagnetic Specific Absorption Rate	IEC 62209-1 RSS-102 IEEE 1528 - 2003 FCC OET Bulletin 65 (*including Supplement C*) Australian Communications Authority Radio Communications (Electromagnetic Radiation – Human Exposure) Standard 2003 CENELEC EN 50360 ARIB Std. T-56 (2002)

On the following products or types of products:
Wireless Communications Devices (Examples): Two Way Radios; Portable Phones (including Cellular, Licensed Non-Broadcast and PCS); Low Frequency Readers; and Pagers

Statement of Compliance:

Motorola declares under its sole responsibility that the portable cellular telephone model to which this declaration relates, is in conformity with the appropriate General Population/Uncontrolled RF exposure standards, recommendations and guidelines (FCC 47 CFR §2.1093) as well as with CENELEC en50360:2001 and ANSI / IEEE C95.1. It also declares that the product was tested in accordance with IEEE 1528 / CENELEC EN62209-1 (2006), as well as other appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

Motorola's ISO 17025 accreditation scope does not currently include SAR testing in the 5 GHz band. Therefore, SAR testing performed in this band was performed outside of our ISO 17025 accreditation. The general procedures and guidelines provided within; FCC KDB 248227 D01, FCC KDB 648474 D01, FCC KDB 865664 D01 and IEC 62209-2 were utilized for testing.

Table of Contents

1. Introduction

The Motorola Mobility ADR Test Services Laboratory has performed measurements of the maximum potential exposure to the user of the portable cellular phone covered by this test report. The Specific Absorption Rate (SAR) of this product was measured. The portable cellular phone was tested in accordance with [1], [4] and [5]. The SAR values measured for the portable cellular phone are below the maximum recommended levels of 1.6 W/kg in a 1 g average set in [3] and 2.0 W/kg in a 10 g average set in [2].

For ANSI / IEEE C95.1 (1 g), the final stand-alone SAR readings for this phone are given in the table below. The final simultaneous-transmission SAR readings for this phone are 1.12 W/kg for head-adjacent use and 1.45 W/kg for mobile hotspot use. These measurements were performed using a Dasy4™ v4.7 system manufactured by Schmid & Partner Engineering AG (SPEAG), of Zurich Switzerland.

Transmit Band	Head SAR (1 g $^{W}/_{kg}$)	Body SAR (1 g $^{W}/_{kg}$)	Mobile Hotspot SAR (1 g $^{W}/_{kg}$)
GSM 850	**0.60**	**0.44**	**1.14**
WCDMA 850	**0.65**	**0.32**	**1.30**
GSM 1900	**0.28**	**0.16**	**1.27**
WCDMA 1900	**1.13**	**0.31**	**1.45**
Wi-Fi 2.45 GHz	**0.93**	**0.06**	**0.34**
Wi-Fi 5.2 GHz	**0.12**	**0.03**	**0.05**
Wi-Fi 5.8 GHz	**0.14**	**0.05**	**0.08**

2. Description of the Device Under Test

2.1 Antenna description

850/1900 MHz Antenna

Type	Internal	
Location	Bottom of Transceiver	
Dimensions	Width	14.3 mm
	Length	52.4 mm

Bluetooth/Wi-Fi 2 GHz Antenna

Type	Internal	
Location	Right-Side Rear of Transceiver	
Dimensions	Width	1 mm
	Length	18.4 mm

Wi-Fi 5 GHz Antenna

Type	Internal	
Location	Right-Side Rear of Transceiver	
Dimensions	Width	2 mm
	Length	7.3 mm

2.2 Device Signaling[1]

Serial Number(s) (Functional Use)	TA014000R5	(GSM/WCDMA conducted power measurements, GSM/WCDMA/Wi-Fi 2.4 Ghz SAR testing)
	TA0140008Z	(Wi-Fi 5 GHz SAR testing)
	356381040017539	(GSM/WCDMA mobile hotspot SAR testing)
	356381040014643	(WCDMA 2100 SAR testing)
	TA0140012S	(Wi-Fi 2.4 GHz/Bluetooth conducted power measurements)
	TA014000RN	(Wi-Fi 5 GHz conducted power measurements)
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype	
Device Category	Portable (Mobile Station Class B)	
RF Exposure Limits	General Population / Uncontrolled	

Mode(s) of Operation	GSM 850	GSM 900	GSM 1800	GSM 1900	WCDMA 850	WCDMA 900	WCDMA 1900	WCDMA 2100	Wi-Fi 802.11b/g/n	Wi-Fi 802.11a/n	Bluetooth
Modulation Mode(s)	GMSK	GMSK	GMSK	GMSK	QPSK	QPSK	QPSK	QPSK	BPSK	BPSK	GFSK
Maximum Output Power Setting	33.5 dBm	33.5 dBm	30.5 dBm	30.5 dBm	24.0 dBm	24.0 dBm	24.0 dBm	24.0 dBm	18.3 dBm	11.0 dBm	10.3 dBm
Duty Cycle	1:8	1:8	1:8	1:8	1:1	1:1	1:1	1:1	1:1	1:1	1:1
Transmitting Frequency Range(s)	824.2 - 848.8 MHz	880.2 - 914.8 MHz	1710.2 - 1784.8 MHz	1850.2 - 1909.8 MHz	826.4 - 846.6 MHz	882.4 - 912.6 MHz	1852.4 - 1907.6 MHz	1922.4 - 1977.6 MHz	2412.0 - 2462.5 MHz	5180 - 5240, 5745 - 5805, MHz	2402.0 - 2483.5 MHz

GSM Data Functionality	GPRS/EDGE Class 12 (4 uplink timeslots; 4 downlink timeslots; 5 total timeslots per frame)
	Class B (DTM not supported)

Mode(s) of Operation	GPRS/EDGE 850				GPRS/EDGE 900				GPRS/EDGE 1800				GPRS/EDGE 1900			
Modulation	GMSK				GMSK				GMSK				GMSK			
Maximum Output Power Setting (dBm)	33.5	**31.5**	29.5	27.5	33.5	**31.5**	29.5	27.5	30.5	**30.0**	28.0	26.0	30.5	**30.0**	28.0	26.0
Duty Cycle	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				880.2 - 914.8 MHz				1710.2 - 1784.8 MHz				1850.2 - 1909.8 MHz			

Mode(s) of Operation	EDGE 850				EDGE 900				EDGE 1800				EDGE 1900			
Modulation	8PSK				8PSK				8PSK				8PSK			
Maximum Output Power Setting (dBm)	28.1	**26.0**	24.0	22.0	28.1	**26.0**	24.0	22.0	27.3	**26.0**	24.0	22.0	27.3	**26.0**	24.0	22.0
Duty Cycle	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				880.2 - 914.8 MHz				1710.2 - 1784.8 MHz				1850.2 - 1909.8 MHz			

[1] **Bolded** entries indicate data mode configurations of highest time-average power output per band and data mode type, and thus were utilized for SAR testing in this report.

The DUT utilizes a reduced limit for the maximum transmit power when the mobile hotspot functionality is enabled. A table of the reduced limits used for testing is given below. A complete description of this functionality is provided in the "Operational Description" contained within Exhibit 12, and is discussed within KDB inquiry 631391. The implementation to trigger the reduction in power requires the device to be radiating, which prevents conducted power measurements of this functionality without modification to the unit.

Mode(s) of Operation	WCDMA 1900		
Test Channel	9262	9400	9538
Channel Ranges	9262-9367	9368-9455	9456-9538
Reduced Maximum Output Power Setting (dBm)	21.2	22.1	24.0
Duty Cycle	1:1	1:1	1:1

Mode(s) of Operation	GPRS/EDGE 850				GPRS/EDGE 1900			
Modulation	GMSK				GMSK			
Duty Cycle	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8
Maximum Output Power Setting (dBm)	33.5	**31.5**	29.5	27.5	30.5	**30.0**	28.0	26.0
Time Average Output Power Setting (dBm)	24.5	**25.5**	25.2	24.5	21.5	**24.0**	23.7	23.0
Reduced Maximum Output Power Setting (dBm)	33.0	**30.0**	28.3	27.0	30.4	**27.4**	25.7	24.4
Reduced Time Average Output Power Setting (dBm)	24.0	**24.0**	24.0	24.0	21.4	**21.4**	21.4	21.4

Mode(s) of Operation	EDGE 850				EDGE 1900			
Modulation	8PSK				8PSK			
Duty Cycle	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8
Maximum Output Power Setting (dBm)	28.1	**26.0**	24.0	22.0	27.3	**26.0**	24.0	22.0
Time Average Output Power Setting (dBm)	19.1	**20.0**	19.7	19.0	18.3	**20.0**	19.7	19.0
Reduced Maximum Output Power Setting (dBm)	27.6	**24.6**	22.9	21.6	27.2	**24.2**	22.5	21.2
Reduced Time Average Output Power Setting (dBm)	18.6	**18.6**	18.6	18.6	18.2	**18.2**	18.2	18.2

2.3 Device Conducted Power Measurements

2.3.1 GSM modes

Band	Channel	Conducted power (dBm) for GSM modes[2]						
		GSM *CS Voice* (1 Slot)	GPRS *PS Data* (2 Slots)	EDGE *PS Data* (2 Slots)	GPRS *PS Data* (3 Slots)	EDGE *PS Data* (3 Slots)	GPRS *PS Data* (4 Slots)	EDGE *PS Data* (4 Slots)
GSM 850	128	33.83	31.63	26.14	29.58	24.15	27.59	22.11
	190	33.46	31.39	25.83	29.49	24.30	27.63	22.09
	251	33.39	31.28	25.80	29.63	23.95	27.48	22.39
GSM 900	975	33.45	31.43	25.84	29.47	24.18	27.48	21.86
	1	33.47	31.54	26.00	29.61	24.22	27.45	21.98
	62	33.52	31.58	26.19	29.65	24.06	27.64	22.04
	124	33.63	31.40	26.09	29.47	23.96	27.71	22.16
GSM 1800	512	30.36	29.88	25.76	28.11	24.11	26.09	22.05
	700	30.40	29.88	25.86	28.03	23.98	26.13	22.15
	885	30.45	30.01	25.99	29.30	23.87	25.91	21.89
GSM 1900	512	30.40	30.06	25.92	28.12	24.23	26.15	22.17
	661	30.46	30.07	25.81	28.25	24.17	25.93	22.05
	810	30.38	30.28	25.76	27.84	24.11	25.99	21.89

[2] *CS Voice* denotes circuit-switched transmission for voice calling, and *PS Data* denotes packet-switched transmission for data sessions.

2.3.2 WCDMA modes

Per the "SAR Measurement Procedures for 3G Devices" (FCC KDB pub 941225) released in October, 2007, 12.2 kbps RMC, 12.2 kbps AMR, HS-DPCCH Sub-test 1-4, and E-DCH Sub-test 1-5 modes were considered. The conducted power measurements (per section 5.2 of 3GPP TS 34.121) for each mode are shown in the table below.

Band	Channel	Conducted power (dBm) for WCDMA modes		Conducted Power (dBm) for WCDMA – HSDPA (Rel 5) Modes				Conducted Power (dBm) for WCDMA – HSPA (HSUPA/HSDPA-Rel 6) Modes				
		RMC	AMR	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 5
WCDMA 850	4132	23.98	23.99	24.06	24.06	24.12	24.10	24.01	24.16	24.23	24.10	24.22
	4180	23.98	23.96	23.97	23.97	24.02	24.00	24.01	24.05	24.11	23.97	24.05
	4233	23.88	23.88	23.84	23.92	23.91	23.9	23.90	23.92	23.93	23.92	23.91
WCDMA 900	2712	23.95	23.99	23.93	24.03	24.03	24.04	24.01	24.04	24.01	24.03	24.04
	2787	24.11	24.11	24.12	24.04	24.16	24.10	24.12	24.07	24.16	24.06	24.16
	2863	23.99	24.00	23.97	23.85	23.95	23.88	24.02	23.90	24.03	23.93	24.04
WCDMA 1900	9262	23.86	24.06	24.10	24.03	24.08	24.09	24.11	24.07	24.16	24.10	**24.16**
	9400	24.02	24.03	24.10	24.01	24.12	24.07	24.13	24.07	24.18	24.07	24.18
	9538	23.85	23.82	23.83	23.82	23.91	23.85	23.94	23.84	23.97	23.90	23.95
WCDMA 2100	9612	23.80	23.99	23.95	23.97	23.96	23.99	23.95	24.02	24.04	24.04	**24.06**
	9750	24.00	24.12	24.16	24.14	24.13	24.07	24.14	24.13	24.18	24.21	24.25
	9888	24.12	24.00	24.08	24.13	24.15	24.00	24.16	24.16	24.22	24.17	24.23

Maximum Power Reduction (MPR)

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

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

UE transmit channel configuration	CM (dB)	MPR (dB)
For all combinations of; DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH	$0 \leq CM \leq 3.5$	MAX (CM-1, 0)
Note 1: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.		

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

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

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

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

2.3.3 Wi-Fi 802.11 modes

Per "SAR Measurement Procedures for 802.11 a/b/g Transmitters" (FCC KDB pub. 248227), power measurements were performed for 802.11 operational modes. The average conducted power measurements for each mode are shown in the tables below. SAR testing for 802.11 was performed within each transmit band (2.5 GHz, 5.2 GHz, 5.8 GHz) with the transmitter set to the lowest data rate on the default test channels **highlighted in bold** in the tables below. The head and body positions that resulted in the highest SAR values were further tested on the additional channels and higher data rates **highlighted in blue** in the tables below. Due to the relatively large number of data rates with measured conducted power exceeding the lowest data rate conducted power by more than 0.25 dB, there will be a large number of tests performed on the configuration that results in the highest measured SAR for the lowest data rate.

Band	Channel	Average Conducted Power (dBm) for 802.11b Mode Data Rates			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
Wi-Fi 2450 MHz	1	**16.48**	**18.00**	**17.85**	**18.31**
	6	**15.97**	**17.60**	**17.89**	**18.33**
	11	**15.61**	**17.01**	**17.44**	**18.02**

Band	Channel	Average Conducted Power (dBm) for 802.11g Mode Data Rates							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
Wi-Fi 2450 MHz	1	**17.32**	**17.28**	**17.36**	**17.07**	14.66	14.47	14.25	14.32
	6	**17.20**	**17.23**	**17.21**	**16.98**	14.45	14.43	14.22	14.14
	11	**16.74**	**16.71**	**16.81**	**16.64**	13.95	13.90	13.81	13.69

Band	Channel	Average Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 800 ns Guard Interval)							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
Wi-Fi 2450 MHz	1	13.25	12.95	12.97	11.72	11.69	11.45	11.42	9.88
	6	13.41	13.50	13.27	11.93	11.98	11.90	11.78	10.66
	11	12.88	12.96	12.79	11.43	11.62	11.48	11.35	10.05

Band	Channel	Average Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 400 ns Guard Interval)							
		7.2 Mbps	14.4 Mbps	21.6 Mbps	28.8 Mbps	43.3 Mbps	57.7 Mbps	65 Mbps	72.2 Mbps
Wi-Fi 2450 MHz	1	15.00	14.02	13.62	12.47	12.56	12.41	12.68	10.27
	6	14.50	14.42	14.07	12.92	13.01	12.98	13.06	10.78
	11	13.90	13.84	13.41	12.37	12.54	12.39	12.31	10.13

Band	Channel	Average Conducted Power (dBm) for 802.11a Mode Data Rates							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
Wi-Fi 5210 MHz	36	**10.96**	10.93	11.14	11.14	11.13	11.03	11.12	10.73
	40	10.87	10.99	10.93	10.71	11.06	11.05	11.04	10.9
	44	**10.9**	11.07	11.06	10.74	11.13	11.13	11.03	10.98
	48	10.88	11.04	10.85	10.64	10.89	11.06	10.85	10.91
Wi-Fi 5775 MHz	149	**10.59**	10.7	**11.05**	10.82	10.78	10.69	10.81	10.61
	153	10.68	10.59	10.56	10.7	10.78	10.75	10.75	10.73
	157	10.89	10.83	10.77	10.74	10.69	10.95	10.93	10.93
	161	**10.63**	10.84	10.78	10.72	10.69	10.66	**10.91**	**10.89**

Band	Channel	Average Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 800 ns Guard Interval)							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
Wi-Fi 5210 MHz	36	9.95	9.06	9.2	9.54	9.6	9.68	9.65	7.08
	40	9.04	9.14	9.3	9.5	9.49	9.53	9.61	7.18
	44	9.14	9.07	9.19	9.55	9.54	9.64	9.66	7.09
	48	9.05	9.2	9.26	9.56	9.57	9.6	9.63	7.3
Wi-Fi 5775 MHz	149	9.64	8.93	8.92	9.03	9.29	9.25	9.35	7.02
	153	8.9	8.44	8.68	8.8	8.83	9.05	8.86	6.81
	157	8.59	8.57	8.64	8.97	9.07	8.92	9.14	6.9
	161	8.58	8.66	8.67	8.9	8.99	8.95	8.91	6.87

Band	Channel	Average Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 400 ns Guard Interval)							
		7.2 Mbps	14.4 Mbps	21.6 Mbps	28.8 Mbps	43.3 Mbps	57.7 Mbps	65 Mbps	72.2 Mbps
Wi-Fi 5210 MHz	36	9.22	9.47	9.48	9.79	10.58	10.6	10.66	8.36
	40	9.25	9.38	9.55	9.83	10.75	10.77	10.34	8.52
	44	9.23	9.59	9.68	9.82	10.96	10.8	10.95	8.45
	48	9.13	9.39	9.57	9.72	10.9	10.95	10.94	8.41
Wi-Fi 5775 MHz	149	9.12	8.81	8.88	9.32	9.25	9.39	9.36	7.11
	153	8.45	8.56	8.81	9.04	9.04	9.15	9.04	6.86
	157	8.97	8.69	8.8	9.06	9.03	9.1	9	7.01
	161	9.09	8.79	8.84	9.02	8.98	9.1	9.12	6.84

2.4 Evaluation of Simultaneous Transmitters

Per "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas" (FCC KDB pub. 648474), the necessity of stand-alone and simultaneous SAR testing was evaluated for the licensed and unlicensed transmitters of the device under test.

By device design the GSM/WCDMA transmitter may operate simultaneously with either the Wi-Fi 802.11 transmitter or the Bluetooth transmitter. The separation distance between the Wi-Fi 802.11/Bluetooth antennas and the GSM/WCDMA antenna is 4.13 cm. Pictorial representation of the antenna locations and separation distances are given in Exhibit 7d.

The Bluetooth transmitter of the device under test can be excluded from stand-alone and simultaneous SAR evaluation, per the highlighted requirements from FCC KDB pub. 648474, as follows:

1. The highest output conducted power measured for Bluetooth on the device under test is 10.8 mW [≤ 12 mW]
2. The separation distance between the Bluetooth antenna and the main antenna is 4.13 cm [≥ 2.5 cm]

For the transmitters requiring stand-alone SAR testing (GSM/WCDMA and Wi-Fi 802.11), the KDB guidelines direct that if the sum of the 1 g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR measurement for simultaneous transmission is not required. Further, if the SAR-to-peak-location separation ratio for two simultaneously transmitting antennas is less than 0.3 then SAR measurement for simultaneous transmission is likewise not required. Evaluations of the worst-case configurations for the head (Left head), body (Back of DUT), and mobile hotspot (Back of DUT @ 10mm) for simultaneous SAR summations and separation ratios are presented in the table below.

Evaluations for Simultaneous SAR

Cellular Mode	Wi-Fi Mode	Configuration	Cellular Mode 1 g SAR Value (W/kg)	Wi-Fi Mode 1 g SAR Value (W/kg)	Summation 1 g SAR Value (W/kg)	SAR-to-peak-location Separation Ratio[3]	*Simultaneous Measurements Required?*
GSM 850, CS Voice	Wi-Fi 2450 802.11b, 1 Mbps	Left Cheek with Battery **SNN5893A**	0.60	0.93	1.53		No
WCDMA 850, 12.2 kbps RMC	Wi-Fi 2450 802.11b, 1 Mbps	Left Cheek with Battery **SNN5893A**	0.63	0.93	1.56		No
GSM 1900, CS Voice	Wi-Fi 2450 802.11b, 1 Mbps	Left Cheek with Battery **SNN5893A**	0.25	0.93	1.18		No
WCDMA 1900, 12.2 kbps RMC	Wi-Fi 2450 802.11b, 1 Mbps	Left Cheek with Battery **SNN5893A**	1.08	0.93	> 1.60	0.35	**YES**
GSM 850, CS Voice	Wi-Fi 5210 802.11a, 6 Mbps	Left Cheek with Battery **SNN5893A**	0.60	0.12	0.72		No
WCDMA 850, 12.2 kbps RMC	Wi-Fi 5210 802.11a, 6 Mbps	Left Cheek with Battery **SNN5893A**	0.63	0.12	0.75		No
GSM 1900, CS Voice	Wi-Fi 5210 802.11a, 6 Mbps	Left Cheek with Battery **SNN5893A**	0.25	0.12	0.37		No
WCDMA 1900, 12.2 kbps RMC	Wi-Fi 5210 802.11a, 6 Mbps	Left Cheek with Battery **SNN5893A**	1.08	0.12	1.20		No
GSM 850, CS Voice	Wi-Fi 5785 802.11a, 6 Mbps	Left Cheek with Battery **SNN5893A**	0.60	0.14	0.74		No
WCDMA 850, 12.2 kbps RMC	Wi-Fi 5785 802.11a, 6 Mbps	Left Cheek with Battery **SNN5893A**	0.63	0.14	0.77		No
GSM 1900, CS Voice	Wi-Fi 5785 802.11a, 6 Mbps	Left Cheek with Battery **SNN5893A**	0.25	0.14	0.39		No
WCDMA 1900, 12.2 kbps RMC	Wi-Fi 5785 802.11a, 6 Mbps	Left Cheek with Battery **SNN5893A**	1.08	0.14	1.22		No

[3] Calculated per SPEAG technical note "CALCULATION OF THE DISTANCE BETWEEN TWO HOTSPOTS", *TN_110209_DASY_Calculate_HotSpot_Distance.pdf*

Evaluations for Simultaneous SAR							
Cellular Mode	**Wi-Fi Mode**	**Configuration**	**Cellular Mode 1 g SAR Value (W/kg)**	**Wi-Fi Mode 1 g SAR Value (W/kg)**	**Summation 1 g SAR Value (W/kg)**	**SAR-to-peak-location Separation Ratio[4]**	***Simultaneous Measurements Required?***
GPRS 850, Class 10	Wi-Fi 2450 802.11b, 5.5 Mbps	Body Worn, Back of Phone 25 mm from Phantom with Battery **SNN5865A**	0.44	0.05	0.49		No
WCDMA 850, 12.2 kbps RMC	Wi-Fi 2450 802.11b, 5.5 Mbps	Body Worn, Back of Phone 25 mm from Phantom with Battery **SNN5893A**	0.32	0.06	0.38		No
GPRS 1900, Class 10	Wi-Fi 2450 802.11b, 5.5 Mbps	Body Worn, Back of Phone 25 mm from Phantom with Battery **SNN5893A**	0.16	0.06	0.22		No
WCDMA 1900, 12.2 kbps RMC	Wi-Fi 2450 802.11b, 5.5 Mbps	Body Worn, Back of Phone 25 mm from Phantom with Battery **SNN5865A**	0.31	0.05	0.36		No
GPRS 850, Class 10	Wi-Fi 5210 802.11a, 6 Mbps	Body Worn, Back of Phone 25 mm from Phantom with Battery **SNN5893A**	0.41	0.03	0.44		No
WCDMA 850, 12.2 kbps RMC	Wi-Fi 5210 802.11a, 6 Mbps		0.32	0.03	0.35		No
GPRS 1900, Class 10	Wi-Fi 5210 802.11a, 6 Mbps		0.16	0.03	0.19		No
WCDMA 1900, 12.2 kbps RMC	Wi-Fi 5210 802.11a, 6 Mbps		0.28	0.03	0.31		No
GPRS 850, Class 10	Wi-Fi 5785 802.11a, 12 Mbps	Body Worn, Back of Phone 25 mm from Phantom with Battery **SNN5893A**	0.41	0.05	0.46		No
WCDMA 850, 12.2 kbps RMC	Wi-Fi 5785 802.11a, 12 Mbps		0.32	0.05	0.37		No
GPRS 1900, Class 10	Wi-Fi 5785 802.11a, 12 Mbps		0.16	0.05	0.21		No
WCDMA 1900, 12.2 kbps RMC	Wi-Fi 5785 802.11a, 12 Mbps		0.28	0.05	0.33		No

Evaluations for Simultaneous SAR							
Cellular Mode	**Wi-Fi Mode**	**Configuration**	**Cellular Mode 1 g SAR Value (W/kg)**	**Wi-Fi Mode 1 g SAR Value (W/kg)**	**Summation 1 g SAR Value (W/kg)**	**SAR-to-peak-location Separation Ratio[4]**	***Simultaneous Measurements Required?***
GPRS 850, Class 10	Wi-Fi 2450 802.11b, 5.5 Mbps	Mobile Hotspot Mode, Back of Phone 10 mm from Phantom with Battery **SNN5893A**	1.14	0.29	1.43		No
WCDMA 850, 12.2 kbps RMC	Wi-Fi 2450 802.11b, 5.5 Mbps	Mobile Hotspot Mode, Back of Phone 10 mm from Phantom with Battery **SNN5865A**	1.30	0.32	> 1.60	0.36	**YES**
GPRS 1900, Class 10	Wi-Fi 2450 802.11b, 5.5 Mbps	Mobile Hotspot Mode, Back of Phone 10 mm from Phantom with Battery **SNN5893A**	1.27	0.29	1.56		No
WCDMA 1900, 12.2 kbps RMC	Wi-Fi 2450 802.11b, 5.5 Mbps	Mobile Hotspot Mode, Back of Phone 10 mm from Phantom with Battery **SNN5865A**	1.45	0.32	> 1.60	0.43	**YES**
GPRS 850, Class 10	Wi-Fi 5210 802.11a, 54 Mbps	Mobile Hotspot Mode, Back of Phone 10 mm from Phantom with Battery **SNN5893A**	1.14	0.05	1.19		No
WCDMA 850, 12.2 kbps RMC	Wi-Fi 5210 802.11a, 54 Mbps	Mobile Hotspot Mode, Back of Phone 10 mm from Phantom with Battery **SNN5865A**	1.30	0.04	1.34		No
GPRS 1900, Class 10	Wi-Fi 5210 802.11a, 54 Mbps	Mobile Hotspot Mode, Back of Phone 10 mm from Phantom with Battery **SNN5893A**	1.27	0.05	1.32		No
WCDMA 1900, 12.2 kbps RMC	Wi-Fi 5210 802.11a, 54 Mbps	Mobile Hotspot Mode, Back of Phone 10 mm from Phantom with Battery **SNN5865A**	1.45	0.04	1.49		No
GPRS 850, Class 10	Wi-Fi 5785 802.11a, 6 Mbps	Mobile Hotspot Mode, Back of Phone 10 mm from Phantom with Battery **SNN5893A**	1.14	0.08	1.22		No
WCDMA 850, 12.2 kbps RMC	Wi-Fi 5785 802.11a, 6 Mbps	Mobile Hotspot Mode, Back of Phone 10 mm from Phantom with Battery **SNN5865A**	1.30	0.07	1.37		No
GPRS 1900, Class 10	Wi-Fi 5785 802.11a, 6 Mbps	Mobile Hotspot Mode, Back of Phone 10 mm from Phantom with Battery **SNN5893A**	1.27	0.08	1.35		No
WCDMA 1900, 12.2 kbps RMC	Wi-Fi 5785 802.11a, 6 Mbps	Mobile Hotspot Mode, Back of Phone 10 mm from Phantom with Battery **SNN5865A**	1.45	0.07	1.52		No

For the configurations noted as requiring simultaneous SAR evaluation, combined SAR measurements were required to determine the aggregate 1 g SAR. The results of these measurements are given in the table below, with additional SAR plots of the combined measurements provided in Appendix 5.

Additional SAR measurements for simultaneous transmission evaluation were performed for each of the single transmitters using an extended zoom scan. This extended zoom scan was created to encompass the zoom scan volumes that were found previously in each of the stand-alone transmit SAR tests. For the head position, the outer dimensions of the extended zoom scan were X = 80 mm, Y = 64 mm, Z = 30 mm with a step size of X = 8 mm, Y = 8 mm, and Z = 5 mm. For the body position, the outer dimensions of the extended zoom scan were X = 80 mm, Y = 56 mm, Z = 30 mm with a step size of X = 8 mm, Y = 8 mm, and Z = 5 mm.

The location of these extended zoom scans was established by using X, Y grid offsets from the "Grid Reference Point" in DASY4.7. The results were then combined via the DASY4.7 Multi-Band Combiner feature. A comparison can be performed between the stand-alone measurements for each noted transmitter and the measurements provided for simultaneous transmission. The measurements were not performed sequentially and thus may show slightly different results due to a number of reasons includi1ng, but not limited to, measurement system performance, slight differences in DUT positioning, or variations in simulated tissue parameters.

Measurements for Simultaneous SAR							
Cellular Mode	**Wi-Fi Mode**	**Configuration**	**Cellular Mode 1 g SAR Value (W/kg)**	**Wi-Fi Mode 1 g SAR Value (W/kg)**	**Simultaneous 1 g SAR Value (W/kg)**	***Test Plots***	
						Grid	**Plot Page**
WCDMA 1900, 12.2 kbps RMC	Wi-Fi 2450 802.11b, 1 Mbps	Left Cheek with Battery SNN5893A	1.08	0.847	1.12	**11x8x7**	**A90-A92**
WCDMA 850, 12.2 kbps RMC	Wi-Fi 2450 802.11b, 5.5 Mbps	Mobile Hotspot Mode, Back of Phone 10 mm from Phantom with Battery SNN5865A	1.14	0.211	1.20	**11x8x7**	**A93-A95**
WCDMA 1900, 12.2 kbps RMC	Wi-Fi 2450 802.11b, 5.5 Mbps		1.30	0.211	1.35	**11x8x7**	**A96-A98**

3. Test Equipment Used

3.1 Dosimetric System

The Motorola Mobility ADR Test Services Laboratory utilizes a Dosimetric Assessment System (Dasy4™ v4.7) manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. All the SAR measurements are taken within a shielded enclosure. The overall 10 g RSS uncertainty of the measurement system is ±10.8% (K=1) with an expanded uncertainty of ±21.6% (K=2). The overall 1 g RSS uncertainty of the measurement system is ±11.1% (K=1) with an expanded uncertainty of ±22.2% (K=2). The measurement uncertainty budget is given in Appendix 7. Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4 W/kg to 10 W/kg.

The list of calibrated equipment used for the measurements is shown in the following table.

Description	Serial Number	Cal Date	Cal Due Date
DASY4™ DAE V1	434	Jan-13-2011	Jan-13-2012
E-Field Probe ES3DV3	3124	Aug-11-2010	Aug-11-2011
DASY4™ DAE V1	702	May-18-2010	May-18-2011
E-Field Probe ES3DV3	3183	Jul-14-2010	Jul-14-2011
DASY4™ DAE V1	440	Nov-11-2010	Nov-11-2011
E-Field Probe EX3DV4	3730	Jul-16-2010	Jul-16-2011
S.A.M. Phantom used for 800/900 MHz	TP-1131		
S.A.M. Phantom used for 800/900 MHz	TP-1156		
S.A.M. Phantom used for 1800/1900/2450 MHz	TP-1250		
S.A.M. Phantom used for 5210/5775 MHz	TP-1106		
S.A.M. Phantom used for 5210/5775 MHz	TP-1153		
Dipole Validation Kit, DV835V2	424TR	Oct-14-2010	Oct-14-2011
	425TR	Oct-14-2010	Oct-14-2011
	434TR	Mar-09-2011	Mar-09-2013
Dipole Validation Kit, DV1800V2	279TR	Oct-13-2010	Oct-13-2011
	281TR	Jan-13-2011	Jan-13-2012
	271TR	Mar-08-2011	Mar-08-2013
	250TR	Mar-17-2011	Mar-17-2013
Dipole Validation Kit, DV1900V2	524TR	Oct-13-2010	Oct-13-2011
Dipole Validation Kit, DV2450V2	766	Oct-13-2010	Oct-13-2011
Dipole Validation Kit, D5GHzV2	1088	Jul-14-2010	Jul-14-2011

3.2 Additional Equipment

Description	Serial Number	Cal Date	Cal Due Date
Signal Generator HP8648C	3847A04982	Nov-18-2009	Nov-18-2011
Power Meter E4419B	GB39511082	Apr-24-2009	Apr-24-2011
Power Sensor #1 - E9301A	US39210918	Oct-25-2010	Oct-25-2011
Power Sensor #2 - E9301A	US39210917	Oct-25-2010	Oct-25-2011
Signal Generator HP8648C	3847A04810	Oct-30-2009	Oct-30-2011
Power Meter E4419B	GB39511087	Dec-22-2009	Dec-22-2011
Power Sensor #1 - E9301A	US39211006	Oct-25-2010	Oct-25-2011
Power Sensor #2 - E9301A	US39210934	Oct-25-2010	Oct-25-2011
Signal Generator HP8648C	3429A00286	Nov-23-2009	Nov-23-2011
Power Meter E4419B	US39250622	Dec-22-2009	Dec-22-2011
Power Sensor #1 - E9301A	US39210931	Oct-25-2010	Oct-25-2011
Power Sensor #2 - E9301A	US39210932	Oct-25-2010	Oct-25-2011
Network Analyzer HP8753ES	US39172529	Jun-04-2010	Jun-04-2011
Dielectric Probe Kit HP85070C	US99360070		

4. Electrical parameters of the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity, ε_r, and the conductivity, σ, of the tissue simulating liquids were measured with a HP85070 Dielectric Probe Kit These values, along with the temperature of the simulated tissue are shown in the table below. The recommended limits for permittivity and conductivity are also shown. A mass density of $\rho = 1\ ^{g}/_{cm^3}$ was entered into the system in all the cases. It can be seen that the measured parameters are within tolerance of the recommended limits specified in [1] and [5].

E-field probes calibrated at 1810 MHz were used for "1900 MHz" band (1850 MHz - 1910 MHz) SAR measurements. FCC KDB pub. 450824 provides additional requirements on page 3 of 6 for SAR testing that is performed with probe calibration points that are more than 50 MHz removed from the measured bands. The KDB requires; "(2) When nominal tissue dielectric parameters are specified in the probe calibration data, the tissue dielectric parameters measured for routine measurements should be less than the target Er and higher than the target Sigma values to minimize SAR underestimations". The 1900 MHz simulated tissues listed below meet these criteria.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (°C)
835	Head	**Measured,** Feb-27-2011	40.7	0.91	20.5
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** Feb-25-2011	53.7	0.99	19.5
		Measured, Mar-04-2011	53.3	0.99	19.1
		Measured, Mar-11-2011	53.7	0.99	20.0
		Measured, May-04-2011	53.5	0.99	19.7
		Measured, May-06-2011	53.2	0.99	20.1
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1880	Head	**Measured,** Feb-25-2011	39.3	1.42	18.7
		Measured, Feb-26-2011	38.9	1.40	20.0
		Measured, Mar-11-2011	38.1	1.45	20.0
		Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
	Body	**Measured,** Feb-25-2011	51.6	1.59	19.1
		Measured, Feb-27-2011	51.5	1.57	20.0
		Measured, Mar-04-2011	52.4	1.57	19.1
		Measured, Mar-11-2011	51.9	1.58	19.7
		Measured, May-03-2011	51.3	1.58	18.9
		Measured, May-04-2011	51.2	1.59	18.6
		Measured, May-06-2011	50.7	1.59	19.1
		Measured, May-09-2011	51.2	1.59	19.1
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25
2450	Head	**Measured,** Mar-01-2011	35.8	1.86	20.2
		Measured, Mar-11-2011	36.3	1.89	19.2
		Recommended Limits	39.2 ±10%	1.80 ±5%	18-25
	Body	**Measured,** Mar-02-2011	48.2	2.02	20.3
		Measured, Mar-04-2011	47.8	2.02	19.8
		Measured, Mar-11-2011	48.6	1.97	20.1
		Recommended Limits	52.7 ±10%	1.95 ±5%	18-25
5210	Head	**Measured,** Mar-02-2011	34.4	4.95	19.5
		Measured, Mar-03-2011	34.0	4.81	19.9
		Recommended Limits	36.0 ±10%	4.66 ±5%	18-25
	Body	**Measured,** Mar-08-2011	45.9	5.71	19.2
		Measured, Mar-10-2011	47.1	5.90	19.1
		Recommended Limits	49.0 ±10%	5.31 ±5%	18-25
5785	Head	**Measured,** Mar-05-2011	33.1	5.43	20.5
		Recommended Limits	35.4 ±10%	5.25 ±5%	18-25
	Body	**Measured,** Mar-07-2011	44.2	6.50	20.5
		Measured, Mar-10-2011	45.9	6.76	19.3
		Recommended Limits	48.2 ±10%	5.98 ±5%	18-25

The list of ingredients and the percent composition used for the simulated tissues are indicated in the table below.

Ingredient	835 MHz / 900 MHz Head	835 MHz / 900 MHz Body	1800 MHz / 1900 MHz Head	1800 MHz / 1900 MHz Body	2450 MHz Head	2450 MHz Body
Sugar	57	44.9	--	--	--	--
DGBE	--	--	47	30.8	--	30
Diacetin	--	--	--	--	51	--
Water	40.45	53.06	52.62	68.8	48.75	70
Salt	1.45	0.94	0.38	0.4	0.15	--
HEC	1	1	--	--	--	--
Bact.	0.1	0.1	--	--	0.1	--

All 5.2 GHz and 5.8 GHz SAR testing was performed using HSL 3500/5800 and MSL 3500/5800 tissue simulating liquids from Schmid & Partner Engineering AG. Prior to conducting SAR measurements, the relative permittivity, ε_r, and the conductivity, σ, of the liquids were measured. The conductivity of the purchased liquids was determined to be at the high end of the window from the target parameter. This resulted in the 5.2 GHz and 5.8 GHz System Accuracy Verifications measuring slightly above the 19.9% (k=2) window from the dipole validation target. When conductivity is normalized to the target value, the system accuracy verification is within the 19.9% (k=2) window. Because the system accuracy verifications were measured on the conservative side of the target window, all subsequent 5.2 GHz and 5.8 GHz SAR tests were also on the conservative side of their uncertainty window.

5. System Accuracy Verification

A system accuracy verification of the DASY4™ was performed using the measurement equipment listed in Section 3.1. The daily system accuracy verification occurs within the flat section of the SAM phantom.

A SAR measurement was performed to verify the measured SAR was within ±10% from the target SAR indicated in Appendix 8. These frequencies are within ±10% of the compliance test mid-band frequency as required in [1] and [5]. The test was conducted on the same days as the measurement of the DUT. Recommended limits for permittivity and conductivity, specified in [5], are shown in the table below. The obtained results from the system accuracy verification are also displayed in the table below. SAR values are normalized to 1 W forward power delivered to the dipole. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The distributions of SAR compare well with those of the reference measurements (see Appendix 1). For frequencies below 3 GHz, the simulated tissue depth was verified to be 15.0 cm ± 0.5 cm. For frequencies above 3 GHz, the simulated tissue depth was verified to be 10 cm ± 0.5 cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

f (MHz)	Description	SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ε_r	σ (S/m)		
835	**Measured,** Feb-25-2011	9.75	41.6	0.91	20..2	20.3
	Measured, Feb-27-2011	9.85	40.7	0.91	20.3	20.5
	Measured, Feb-28-2011	9.80	41.5	0.92	20.5	21.3
	Measured, Mar-01-2011	9.65	41.1	0.91	20.6	20.5
	Recommended Limits	9.57	41.5 ±5%	0.90 ±5%	18-25	18-25
	Measured, Mar-04-2011	9.50	41.5	0.91	20.5	19.5
	Measured, Mar-11-2011	9.35	40.6	0.90	20.5	20.1
	Recommended Limits	9.49	41.5 ±5%	0.90 ±5%	18-25	18-25
	Measured, May-04-2011	9.85	53.5	0.99	20.3	19.0
	Measured, May-06-2011	9.65	53.7	0.98	20.4	19.0
	Recommended Limits	10.00	55.2 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** Feb-25-2011	40.15	39.3	1.39	20.5	19.0
	Measured, Feb-28-2011	39.00	39.2	1.37	20.5	20.0
	Recommended Limits	37.8	40.0 ±5%	1.40 ±5%	18-25	18-25
	Measured, Feb-27-2011	37.90	39.3	1.37	20.5	20.0
	Measured, Mar-04-2011	37.35	39.1	1.36	20.8	19.9
	Measured, Mar-11-2011	36.35	38.5	1.36	20.4	20.0
	Recommended Limits	38.9	40.0 ±5%	1.40 ±5%	18-25	18-25
	Measured, May-03-2011	40.65	51.5	1.47	20.2	19.1
	Recommended Limits	37.20	53.3 ±5%	1.52 ±5%	18-25	18-25
	Measured, May-04-2011	38.00	51.5	1.49	20.3	18.8
	Measured, May-06-2011	39.55	51.1	1.51	20.4	19.0
	Measured, May-09-2011	37.70	51.5	1.49	20.3	19.3
	Recommended Limits	37.90	53.3 ±5%	1.52 ±5%	18-25	18-25
1900	**Measured,** Feb-25-2011	41.75	39.1	1.43	20.2	19.1
	Recommended Limits	39.0	40.0 ±5%	1.40 ±5%	18-25	18-25
2450	**Measured,** Mar-01-2011	56.5	35.8	1.86	20.2	19.5
	Measured, Mar-02-2011	56.5	35.4	1.87	20.5	20.3
	Measured, Mar-04-2011	56.0	35.6	1.85	20.3	19.8
	Measured, Mar-11-2011	57.0	36.3	1.89	20.1	20.2
	Recommended Limits	52.2	39.2 ±10%	1.80 ±5%	18-25	18-25
5200	**Measured,** Mar-02-2011	93.1	34.4	4.94	20.8	20.5
	Measured, Mar-03-2011	91.2	34.0	4.80	20.5	20.1
	Measured, Mar-04-2011	93.0	34.2	4.75	20.5	19.0
	Measured, Mar-07-2011	92.8	33.5	4.77	20.5	19.7
	Measured, Mar-08-2011	92.0	33.5	4.77	20.6	19.6
	Measured, Mar-09-2011	92.5	33.5	4.79	20.7	19.7
	Measured, Mar-10-2011	92.6	34.3	4.86	20.6	19.7
	Measured, Mar-11-2011	90.9	34.2	4.82	20.3	19.3
	Recommended Limits	82.4	36.0 ±10%	4.65 ±5%	18-25	18-25
5800	**Measured,** Mar-05-2011	88.7	33.1	5.44	20.7	19.2
	Measured, Mar-06-2011	92.3	32.6	5.35	20.7	20.5
	Measured, Mar-07-2011	94.2	32.4	5.43	20.4	19.7
	Measured, Mar-10-2011	96.8	33.2	5.54	20.6	19.7
	Recommended Limits	82.1	35.4 ±10%	5.27 ±5%	18-25	18-25

The following probe conversion factors were used on the E-Field probe(s) used for the system accuracy verification measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3124	835	5.89	5 of 11
		1810	4.89	5 of 11
		1810 (body)	4.76	6 of 11
		2450	4.35	5 of 11
E-Field Probe ES3DV3	3183	835	6.11	5 of 11
		835 (body)	6.15	6 of 11
		1810	5.05	5 of 11
		1810 (body)	4,84	6 of 11
		2450	4.49	5 of 11
		835	6.15	6 of 11
		1810	4.84	6 of 11
E-Field Probe EX3DV4	3730	5200	4.67	5 of 11
		5800	4.06	5 of 11

6. Test Results

For GSM and WCDMA modes, the test sample was operated using an actual transmission through a base station simulator. Wi-Fi testing was conducted using manufacturer test mode software, per guidance given in FCC KDB pub. 248227. The base station simulator or test software was set up for the proper channels, transmitter power levels and transmit modes of operation.

The phone was tested in the configurations stipulated in [1], [4] and [5]. The phone was positioned into these configurations using the device holder supplied with the DASY4™ SAR measurement system The default settings for the "coarse" and "cube" scans were chosen and used for measurements. The grid spacing of the coarse scan was set to 15 mm or less as shown in the SAR plots included in Appendices 2 through 5. Please refer to the DASY4™ manual for additional information on SAR scanning procedures and algorithms used.

The Cellular Phone model covered by this report has the following battery options:
Model SNN5893A - 1930 mAH Battery
Model SNN5865A - 1540 mAH Battery

The battery with the highest capacity is the SNN5893A. This battery was used to test all configurations for SAR evaluation. The phone was placed in the SAR measurement system with a fully charged battery. The configurations that resulted in the highest SAR values were tested using the other battery listed above.

6.1 Head Adjacent Test Results

The SAR results shown in tables 1 through 4 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to the [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is Extrapolated SAR = Measured SAR * $10^{(-drift/10)}$. The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

The left head and right head SAR contour distributions are similar. Because of this similarity, the cheek/touch and 15° tilt test conditions with the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 2. All other test conditions measured lower SAR values than those included in Appendix 2.

The head adjacent configuration that resulted in the highest measured SAR when the DUT is operating in the lowest data rate of each WiFi mode was utilized to measure SAR for the other data rates that require testing per section "2.3.3 Evaluation of Wi-Fi 802.11 modes".

The SAR measurements were performed using the SAM phantoms listed in section 3.1. Since the same phantoms and simulated tissue were used for the system accuracy verification and the device SAR measurements, the Z-axis scans included in Appendix 1 are applicable for verification of simulated tissue depth.

The following probe conversion factors were used on the E-Field probe(s) used for head-adjacent measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3124	835	5.89	5 of 11
		1810	4.89	5 of 11
		2450	4.35	5 of 11
E-Field Probe ES3DV3	3183	835	6.11	5 of 11
		1810	5.05	5 of 11
		2450	4.49	5 of 11
E-Field Probe EX3DV4	3730	5200	4.67	5 of 11
		5800	4.06	5 of 11

Left Head Cheek Position											
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
						Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5893A	128								
			190	**20.7**	**-0.059**	**0.434**	**0.44**	**0.596**	**0.60**	**5x5x7**	**A59**
			251								
		SNN5865A	190	20.6	-0.107	0.421	0.43	0.580	0.59		
	WCDMA 850, 12.2 kbps RMC	SNN5893A	4132								
			4180	20.6	-0.055	0.456	0.46	0.620	0.63		
			4233								
		SNN5865A	4180	**20.6**	**0.124**	**0.472**	**0.47**	**0.649**	**0.65**	**5x5x7**	**A60**
1880	GSM 1900, CS Voice	SNN5893A	512								
			661	19.1	0.004	0.158	0.16	0.249	0.25		
			810								
		SNN5865A	661	**19.1**	**-0.408**	**0.164**	**0.18**	**0.257**	**0.28**	**5x5x7**	**A61**
	WCDMA 1900, 12.2 kbps RMC	SNN5893A	9262	19.7	-0.002	0.414	0.41	0.621	0.62		
			9400	19.5	0.031	0.542	0.54	0.852	0.85		
			9538	19.6	-0.025	0.662	0.67	1.07	1.08		
		SNN5865A	9538	**19.6**	**-0.044**	**0.704**	**0.71**	**1.12**	**1.13**	**5x5x7**	**A62**
2450	802.11b, 1 Mbps	SNN5893A	1	19.5	-0.042	0.356	0.36	0.750	0.76		
			6	**19.5**	**-0.200**	**0.416**	**0.44**	**0.890**	**0.93**	**5x5x7**	**A63**
			11	19.5	-0.066	0.397	0.40	0.840	0.85		
	802.11b, 2 Mbps	SNN5893A	1	19.5	-0.101	0.348	0.36	0.723	0.74		
			6	19.3	-0.116	0.383	0.39	0.802	0.82		
			11	19.4	-0.176	0.396	0.41	0.844	0.88		
	802.11b, 5.5 Mbps	SNN5893A	1	19.3	-0.136	0.308	0.32	0.637	0.66		
			6	19.5	-0.075	0.382	0.39	0.803	0.82		
			11	19.6	-0.240	0.379	0.40	0.797	0.84		
	802.11b, 11 Mbps	SNN5893A	1	19.3	-0.188	0.326	0.34	0.667	0.70		
			6	19.5	0.062	0.384	0.38	0.798	0.80		
			11	19.2	-0.255	0.362	0.38	0.761	0.81		
	802.11g, 6 Mbps	SNN5893A	1	19.4	-0.042	0.299	0.30	0.618	0.62		
			6	19.5	-0.116	0.309	0.32	0.645	0.66		
			11	19.5	-0.030	0.343	0.35	0.720	0.73		
	802.11g, 9 Mbps	SNN5893A	1	19.4	-0.058	0.302	0.31	0.623	0.63		
			6	19.5	-0.130	0.290	0.30	0.602	0.62		
			11	19.6	-0.104	0.342	0.35	0.725	0.74		
	802.11g, 12 Mbps	SNN5893A	1	19.5	-0.060	0.297	0.30	0.616	0.62		
			6	19.5	-0.076	0.303	0.31	0.633	0.64		
			11	19.5	-0.096	0.348	0.36	0.735	0.75		
	802.11g, 18 Mbps	SNN5893A	1	19.3	-0.052	0.286	0.29	0.588	0.60		
			6	19.5	-0.122	0.289	0.30	0.599	0.62		
			11	19.6	0.043	0.340	0.34	0.721	0.72		
	802.11b, 1 Mbps	SNN5865A	6	20.0	-0.444	0.355	0.39	0.735	0.81		
5210	802.11a, 6 Mbps	SNN5893A	**36**	**20.1**	**-0.580**	**0.036**	**0.04**	**0.109**	**0.12**	**7x7x12**	**A64**
			44	20.1	-0.066	0.032	0.03	0.104	0.11		
5785	802.11a, 6 Mbps	SNN5893A	**149**	**19.5**	**-0.474**	**0.044**	**0.05**	**0.128**	**0.14**	**7x7x12**	**A65**
			161	19.6	0.124	0.45	0.05	0.127	0.13		
		SNN5865A	149	19.5	0.0532	0.0483	0.05	0.132	0.13		
	802.11a, 12 Mbps	SNN5893A	149	19.8	0.161	0.039	0.04	0.111	0.11		
	802.11a, 48 Mbps	SNN5893A	161	19.6	-0.105	0.0414	0.04	0.133	0.14		
	802.11a, 54 Mbps	SNN5893A	161	19.5	-0.181	0.0379	0.04	0.0985	0.10		

Table 1: SAR measurement results at the highest possible output power, measured in a head cheek position against the ICNIRP and ANSI SAR Limit.

Right Head Cheek Position											
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
						Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5893A	128								
			190	20.7	-0.004	0.383	0.38	0.514	0.51		
			251								
	WCDMA 850, 12.2 kbps RMC	SNN5893A	4132								
			4180	20.6	-0.050	0.419	0.42	0.565	0.57		
			4233								
1880	GSM 1900, CS Voice	SNN5893A	512								
			661	19.1	0.036	0.130	0.13	0.205	0.21		
			810								
	WCDMA 1900, 12.2 kbps RMC	SNN5893A	9262	19.6	0.006	0.497	0.50	0.786	0.79		
			9400	19.6	0.018	0.521	0.52	0.816	0.82		
			9538	19.6	0.013	0.577	0.58	0.899	0.90		
2450	802.11b, 1 Mbps	SNN5893A	1	19.5	0.163	0.263	0.26	0.550	0.55		
			6								
			11								
5210	802.11a, 6 Mbps	SNN5893A	36	18.2	-0.266	0.021	0.02	0.060	0.06		
			44	18.2	0.202	0.023	0.02	0.062	0.06		
5785	802.11a, 6 Mbps	SNN5893A	149	19.5	-0.063	0.016	0.02	0.077	0.08		
			161	19.8	-0.827	0.024	0.03	0.062	0.08		

Table 2: SAR measurement results at the highest possible output power, measured in a head cheek position against the ICNIRP and ANSI SAR Limit.

Left Head 15° Tilt Position											
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
						Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5893A	128								
			190	**20.7**	**0.004**	**0.272**	**0.27**	**0.366**	**0.37**	**5x5x7**	**A66**
			251								
	WCDMA 850, 12.2 kbps RMC	SNN5893A	4132								
			4180	**20.7**	**0.098**	**0.286**	**0.29**	**0.381**	**0.38**	**5x5x7**	**A67**
			4233								
1880	GSM 1900, CS Voice	SNN5893A	512								
			661	**19.1**	**-0.030**	**0.078**	**0.08**	**0.125**	**0.13**	**5x5x7**	**A68**
			810								
	WCDMA 1900, 12.2 kbps RMC	SNN5893A	9262								
			9400	**19.6**	**0.024**	**0.278**	**0.28**	**0.450**	**0.45**	**5x5x7**	**A69**
			9538								
2450	802.11b, 1 Mbps	SNN5893A	1	**19.5**	**0.229**	**0.100**	**0.10**	**0.189**	**0.19**	**5x5x7**	**A70**
			6								
			11								
5210	802.11a, 6 Mbps	SNN5893A	36	**18.8**	**-0.055**	**0.019**	**0.02**	**0.041**	**0.04**	**7x7x12**	**A71**
			44	20.1	-0.311	0.011	0.01	0.032	0.03		
5785	802.11a, 6 Mbps	SNN5893A	149	**19.6**	**-0.321**	**0.025**	**0.03**	**0.082**	**0.09**	**7x7x12**	**A72**
			161	19.8	0.091	0.031	0.03	0.084	0.08		

Table 3: SAR measurement results at the highest possible output power, measured in a head tilt position against the ICNIRP and ANSI SAR Limit.

Right Head 15° Tilt Position											
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
						Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5893A	128								
			190	20.7	0.035	0.254	0.25	0.338	0.34		
			251								
	WCDMA 850, 12.2 kbps RMC	SNN5893A	4132								
			4180	20.6	0.207	0.271	0.27	0.360	0.36		
			4233								
1880	GSM 1900, CS Voice	SNN5893A	512								
			661	19.1	-0.112	0.065	0.07	0.102	0.10		
			810								
	WCDMA 1900, 12.2 kbps RMC	SNN5893A	9262								
			9400	19.6	-0.001	0.246	0.25	0.381	0.38		
			9538								
2450	802.11b, 1 Mbps	SNN5893A	1	19.5	-0.067	0.071	0.07	0.133	0.14		
			6								
			11								
5210	802.11a, 6 Mbps	SNN5893A	36	18.2	-0.133	0.006	0.01	0.008	0.01		
			44	18.1	-0.108	0.007	0.01	0.026	0.03		
5785	802.11a, 6 Mbps	SNN5893A	149	19.6	0.195	0.009	0.01	0.042	0.04		
			161	19.5	-0.142	0.012	0.01	0.045	0.05		

Table 4: SAR measurement results at the highest possible output power, measured in a head tilt position against the ICNIRP and ANSI SAR Limit.

6.2 Body Worn Test Results

The SAR results shown in tables 5 and 6 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is Extrapolated SAR = Measured SAR * $10^{(-drift/10)}$. The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

The test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 3. All other test conditions measured lower SAR values than those included in Appendix 3.

A "flat" phantom was for the body-worn tests. This "flat" phantom is made out of 1" thick natural High Density Polyethylene with a thickness at the bottom equal to 2.0 mm. It measures 52.7 cm(long) x 26.7 cm(wide) x 21.2 cm(tall).

The simulated tissue depth was verified to be 15.0 cm ± 0.5 cm for frequencies less than 3 GHz, or 10.0 cm ± 0.5 cm for frequencies greater than 3 GHz. The same device holder described in section 6 was used for positioning the phone. Functional accessories were divided into two categories, the ones with metal components and the ones with non-metal components. For non-metallic component accessories, testing was performed on the accessory that displayed the closest proximity to the flat phantom. Each metallic component accessory, if any, was checked for uniqueness of metal component so that each is tested with the device. If multiple accessories shared an identical metal component, only the accessory that dictates the closest spacing to the body was tested. The cellular phone was tested with a headset connected to the device for all body-worn SAR measurements.

There are no body-worn accessories available for this phone at the time of testing thus the device was tested per the Supplement C testing guidelines for devices that do not have body-worn accessories. A separation distance of 25 mm between the device and the flat phantom was used for testing body-worn SAR. The chosen separation distance of 25 mm is utilized in order to support any case or holder accessories offered or to be offered by Motorola for this product. The device was tested with the front and back of the device facing the phantom. Both sides of the device were tested for Body SAR for the purpose of including the SAR evaluation for body-worn accessories that support the device with the front side facing the user.

The following probe conversion factors were used on the E-Field probe(s) used for the body-worn measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3124	835	5.86	6 of 11
		1810	4.76	6 of 11
		2450	4.19	6 of 11
E-Field Probe ES3DV3	3183	835	6.15	6 of 11
		1810	4.84	6 of 11
		2450	4.36	6 of 11
E-Field Probe EX3DV4	3730	5200	4.07	6 of 11
		5800	3.53	6 of 11

Body-Worn, Front of Phone 25 mm from Phantom											
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
						Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5893A	128								
			190	19.7	-0.045	0.163	0.16	0.221	0.22		
			251								
	WCDMA 850, 12.2 kbps RMC	SNN5893A	4132								
			4180	19.7	-0.103	0.145	0.15	0.197	0.20		
			4233								
1880	GSM 1900, CS Voice	SNN5893A	512								
			661	19.1	-0.034	0.042	0.04	0.065	0.07		
			810								
	WCDMA 1900, 12.2 kbps RMC	SNN5893A	9262								
			9400	19.0	0.027	0.110	0.11	0.170	0.17		
			9538								
2450	802.11b, 1 Mbps	SNN5893A	1	19.3	-0.085	0.015	0.02	0.026	0.03		
			6								
			11								
5210	802.11a, 6 Mbps	SNN5893A	36	19.7	-0.046	0.002	0.00	0.006	0.01		
			44	19.5	0.086	0.000	0.000	0.001	0.00		
5785	802.11a, 6 Mbps	SNN5893A	149	20.8	-0.445	0.002	0.00	0.008	0.01		
			161	20.8	0.196	0.001	0.00	0.004	0.00		

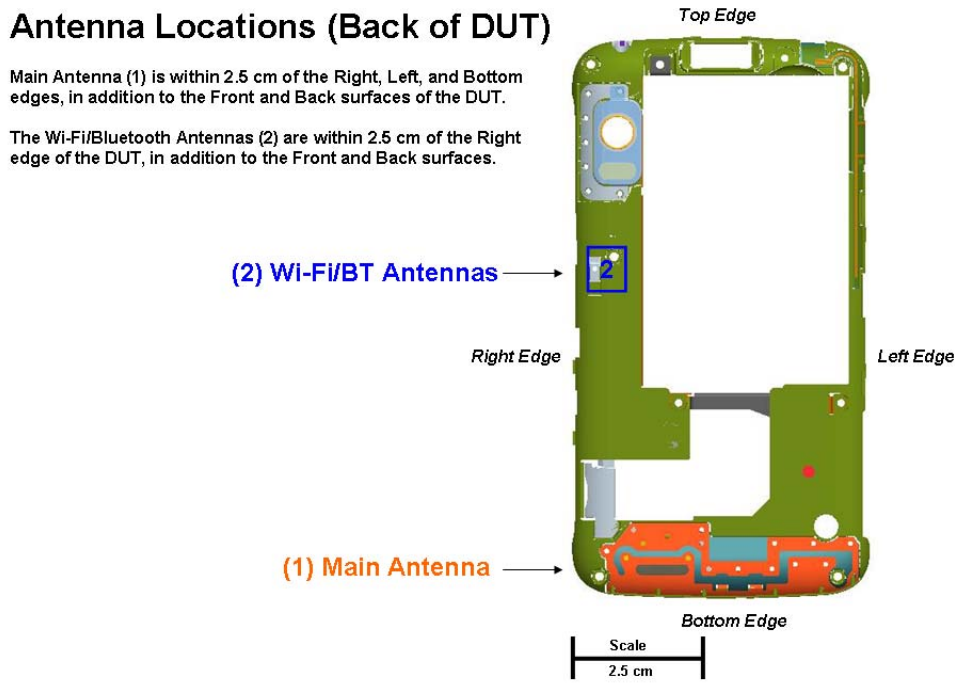
Table 5: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn, Back of Phone 25 mm from Phantom											
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
						Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5893A	128								
			190	19.6	-0.019	0.234	0.23	0.318	0.32		
			251								
	GPRS 850, Class 10	SNN5893A	190	19.0	-0.176	0.291	0.30	0.395	0.41		
	EDGE 850, Class 10	SNN5893A	190	19.5	0.018	0.084	0.08	0.113	0.11		
	GPRS 850, Class 10	**SNN5865A**	**190**	**19.3**	**-0.231**	**0.308**	**0.32**	**0.415**	**0.44**	**5x5x7**	**A74**
	WCDMA 850, 12.2 kbps RMC	SNN5893A	4132								
			4180	**19.8**	**-0.002**	**0.233**	**0.23**	**0.315**	**0.32**	**5x5x7**	**A75**
			4233								
		SNN5865A	4180	19.5	0.004	0.225	0.23	0.303	0.30		
1880	GSM 1900, CS Voice	SNN5893A	512								
			661	19.1	-0.024	0.051	0.05	0.083	0.08		
			810								
	GPRS 1900, Class 10	SNN5893A	661	**19.1**	**-0.058**	**0.097**	**0.10**	**0.157**	**0.16**	**5x5x7**	**A76**
	EDGE 1900, Class 10	SNN5893A	661	19.0	0.078	0.039	0.04	0.063	0.06		
	GPRS 1900, Class 10	SNN5865A	661	19.1	-0.051	0.094	0.10	0.151	0.15		
	WCDMA 1900, 12.2 kbps RMC	SNN5893A	9262								
			9400	19.0	-0.002	0.174	0.17	0.282	0.28		
			9538								
	WCDMA 1900, HSUPA Subtest 5	SNN5893A	9262	19.3	0.021	0.140	0.14	0.226	0.23		
	WCDMA 1900, 12.2 kbps RMC	SNN5865A	9400	**18.9**	**-0.036**	**0.189**	**0.19**	**0.303**	**0.31**	**5x5x7**	**A77**
2450	802.11b, 1 Mbps	SNN5893A	1	19.2	-0.018	0.027	0.03	0.047	0.05		
			6	19.2	0.180	0.032	0.03	0.055	0.06		
			11	19.2	-0.084	0.030	0.03	0.052	0.05		
	802.11b, 2 Mbps	SNN5893A	1	19.2	0.121	0.026	0.03	0.044	0.04		
			6	19.1	0.053	0.031	0.03	0.053	0.05		
			11	19.1	-0.123	0.029	0.03	0.050	0.05		
	802.11b, 5.5 Mbps	SNN5893A	1	19.1	0.122	0.024	0.02	0.042	0.04		
			6	19.1	-0.023	0.030	0.03	0.052	0.05		
			11	**19.1**	**-0.155**	**0.033**	**0.03**	**0.059**	**0.06**	**5x5x7**	**A78**
	802.11b, 11 Mbps	SNN5893A	1	19.0	-0.020	0.025	0.02	0.043	0.04		
			6	19.0	-0.032	0.032	0.03	0.057	0.06		
			11	19.2	-0.057	0.032	0.03	0.055	0.06		
	802.11g, 6 Mbps	SNN5893A	1	19.0	0.039	0.023	0.02	0.040	0.04		
			6	18.8	-0.016	0.027	0.03	0.048	0.05		
			11	19.0	-0.000	0.031	0.03	0.054	0.05		
	802.11g, 9 Mbps	SNN5893A	1	19.0	-0.009	0.024	0.02	0.041	0.04		
			6	18.8	0.006	0.025	0.03	0.044	0.04		
			11	19.1	-0.027	0.030	0.03	0.053	0.05		
	802.11g, 12 Mbps	SNN5893A	1	18.8	-0.020	0.023	0.02	0.041	0.04		
			6	18.9	-0.019	0.026	0.03	0.045	0.05		
			11	18.9	-0.130	0.028	0.03	0.049	0.05		
	802.11g, 18 Mbps	SNN5893A	1	19.1	0.043	0.023	0.02	0.039	0.04		
			6	18.8	-0.059	0.026	0.03	0.046	0.05		
			11	19.1	-0.039	0.027	0.03	0.048	0.05		
	802.11b, 5.5 Mbps	SNN5865A	11	20.2	0.008	0.027	0.03	0.047	0.05		
5210	802.11a, 6 Mbps	SNN5893A	36	19.2	0.089	0.000	0.00	0.001	0.00		
			48	**18.8**	**0.187**	**0.012**	**0.01**	**0.028**	**0.03**	**7x7x12**	**A79**
5785	802.11a, 6 Mbps	SNN5893A	149	20.8	0.141	0.014	0.01	0.034	0.03		
			161	19.5	0.218	0.011	0.01	0.034	0.03		
	802.11a, 12 Mbps	SNN5893A	**149**	**19.3**	**-0.114**	**0.019**	**0.02**	**0.047**	**0.05**	**7x7x12**	**A80**
	802.11a, 48 Mbps	SNN5893A	161	19.4	-0.0159	0.0113	0.01	0.0315	0.03		
	802.11a, 54 Mbps	SNN5893A	161	19.4	-0.147	0.0162	0.02	0.0516	0.05		

Table 6: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

6.3 Mobile Hotspot Test Results

The DUT is capable of functioning as a Wi-Fi to Cellular mobile hotspot. Additional SAR testing was performed according to the interim test guidelines provided at the October 2010 TCB Workshop. Testing was performed with a separation of 1 cm between the DUT and the "flat" phantom. The DUT was positioned for SAR tests with the front and back surfaces facing the phantom, and also with the edges facing the phantom in which the transmitting antenna is < 2.5 cm from the edge. Each transmit band was utilized for SAR testing, but only the "mode" within each band that exhibited the highest SAR results from section 6.2 was used.



The SAR results shown in tables 7 through 11 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is Extrapolated SAR = Measured SAR * $10^{(-drift/10)}$. The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

The DUT utilizes a reduced limit for the maximum transmit power when the mobile hotspot functionality is enabled, as described above in 2.2. A complete description of this functionality is provided in the "Operational Description" contained within Exhibit 12, and is discussed within KDB inquiry 631391.

The test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 4. All other test conditions measured lower SAR values than those included in Appendix 4.

A "flat" phantom was for the body-worn tests. This "flat" phantom is made out of 1" thick natural High Density Polyethylene with a thickness at the bottom equal to 2.0 mm. It measures 52.7 cm(long) x 26.7 cm(wide) x 21.2 cm(tall).

The simulated tissue depth was verified to be 15.0 cm ± 0.5 cm for frequencies below 3 GHz, , or 10.0 cm ± 0.5 cm for frequencies greater than 3 GHz. The same device holder described in section 6 was used for positioning the phone.

The following probe conversion factors were used on the E-Field probe(s) used for the body-worn mobile hotspot measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3124	835	5.86	6 of 11
		1810	4.76	6 of 11
		2450	4.19	6 of 11
E-Field Probe ES3DV3	3183	835	6.15	6 of 11
		1810	4.84	6 of 11
		2450	4.36	6 of 11
E-Field Probe EX3DV4	3730	5200	4.07	6 of 11
		5800	3.53	6 of 11

Mobile Hotspot, Bottom Edge of Phone 10 mm from Phantom												
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
						Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GPRS 850, Class 10	SNN5893A	128								
			190	18.1	0.333	0.0389	0.04	0.0647	0.06		
			251								
	WCDMA 850, 12.2 kbps RMC	SNN5893A	4132								
			4180	19.2	-0.090	0.055	0.06	0.091	0.09		
			4233								
1880	GPRS 1900, Class 10	SNN5893A	512								
			661	18.0	0.0072	0.15	0.15	0.265	0.27		
			810								
	WCDMA 1900, 12.2 kbps RMC	SNN5893A	9262	19.3	-0.010	0.312	0.31	0.561	0.56		
			9400	19.8	0.067	0.207	0.21	0.357	0.36		
			9538	19.3	-0.008	0.204	0.20	0.349	0.35		

Table 7: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Left Edge of Phone 10 mm from Phantom												
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
						Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GPRS 850, Class 10	SNN5893A	128								
			190	18.3	-0.0773	0.381	0.39	0.553	0.56		
			251								
	WCDMA 850, 12.2 kbps RMC	SNN5893A	4132								
			4180	19.2	-0.023	0.370	0.37	0.539	0.54		
			4233								
1880	GPRS 1900, Class 10	SNN5893A	512								
			661	18.6	0.068	0.0344	0.03	0.0568	0.06		
			810								
	WCDMA 1900, 12.2 kbps RMC	SNN5893A	9262	19.3	-0.002	0.032	0.03	0.054	0.05		
			9400	19.6	-0.022	0.067	0.07	0.112	0.11		
			9538	19.3	0.068	0.125	0.13	0.214	0.21		

Table 8: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Right Edge of Phone 10 mm from Phantom											
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
						Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GPRS 850, Class 10	SNN5893A	128								
			190	18.1	-0.0711	0.31	0.32	0.447	0.45		
			251								
	WCDMA 850, 12.2 kbps RMC	SNN5893A	4132								
			4180	19.2	-0.041	0.308	0.31	0.441	0.45		
			4233								
1880	GPRS 1900, Class 10	SNN5893A	512								
			661	18.6	-0.163	0.0611	0.06	0.105	0.11		
			810								
	WCDMA 1900, 12.2 kbps RMC	SNN5893A	9262	19.3	0.004	0.085	0.09	0.145	0.15		
			9400	19.5	0.131	0.096	0.10	0.162	0.16		
			9538	19.3	-0.033	0.169	0.17	0.293	0.30		
2450	802.11b, 5.5 Mbps	SNN5893A	1	19.2	-0.140	0.105	0.11	0.234	0.24		
			6	19.2	0.054	0.118	0.12	0.258	0.26		
			11	19.1	-0.008	0.147	0.15	0.321	0.32		
		SNN5865A	11	**19.9**	**0.029**	**0.164**	**0.16**	**0.343**	**0.34**	**5x5x7**	**A86**
5210	802.11a, 54 Mbps	SNN5893A	36	19.0	-0.073	0.012	0.01	0.044	0.04		
			48	18.4	0.501	0.017	0.02	0.045	0.05		
5785	802.11a, 6 Mbps	SNN5893A	149	18.3	0.247	0.001	0.00	0.008	0.08		
			161	18.3	-0.010	0.012	0.01	0.030	0.03		

Table 9: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Front of Phone 10 mm from Phantom											
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
						Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GPRS 850, Class 10	SNN5893A	128								
			190	18.2	0.267	0.465	0.47	0.625	0.63		
			251								
	WCDMA 850, 12.2 kbps RMC	SNN5893A	4132								
			4180	19.2	-0.085	0.472	0.48	0.638	0.65		
			4233								
1880	GPRS 1900, Class 10	SNN5893A	512								
			661	19.0	-0.117	0.176	0.18	0.276	0.28		
			810								
	WCDMA 1900, 12.2 kbps RMC	SNN5893A	9262	19.3	0.056	0.206	0.21	0.320	0.32		
			9400	19.3	0.019	0.301	0.30	0.475	0.48		
			9538	19.3	0.061	0.464	0.46	0.734	0.73		
2450	802.11b, 5.5 Mbps	SNN5893A	1	19.1	0.068	0.046	0.05	0.088	0.09		
			6	19.1	0.092	0.064	0.06	0.124	0.12		
			11	19.0	-0.184	0.061	0.06	0.118	0.12		
5210	802.11a, 54 Mbps	SNN5893A	36	19.1	0.148	0.001	0.00	0.005	0.01		
			48								
5785	802.11a, 6 Mbps	SNN5893A	149	18.3	-0.024	0.008	0.01	0.028	0.03		
			161	18.5	0.102	0.004	0.00	0.023	0.02		

Table 10: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Back of Phone 10 mm from Phantom											
F (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
						Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GPRS 850, Class 10	SNN5893A	128	18.7	-0.14	0.747	0.77	1.02	1.05		
			190	**18.7**	**-0.129**	**0.794**	**0.82**	**1.11**	**1.14**	**5x5x7**	**A82**
			251	18.7	0.311	0.749	0.75	1.07	1.07		
		SNN5865A	190	18.1	0.319	0.713	0.71	1.02	1.02		
	WCDMA 850, 12.2 kbps RMC	SNN5893A	4132	19.2	0.071	0.810	0.81	1.10	1.10		
			4180	19.2	-0.028	0.802	0.81	1.09	1.10		
			4233	19.2	-0.060	0.863	0.88	1.17	1.19		
		SNN5865A	4132	**18.9**	**0.045**	**0.923**	**0.92**	**1.30**	**1.30**	**5x5x7**	**A83**
			4180	20.0	-0.012	0.883	0.89	1.20	1.20		
			4233	19.7	0.066	0.799	0.80	1.08	1.08		
1880	GPRS 1900, Class 10	SNN5893A	512	**19.0**	**0.108**	**0.656**	**0.66**	**1.27**	**1.27**	**5x5x7**	**A84**
			661	19.3	-0.312	0.371	0.40	0.717	0.77		
			810	19.1	0.208	0.359	0.36	0.706	0.71		
		SNN5865A	661	18.4	-0.133	0.375	0.39	0.718	0.74		
	WCDMA 1900, 12.2 kbps RMC	SNN5893A	9262	19.0	-0.315	0.479	0.52	0.942	1.01		
			9400	19.1	0.160	0.516	0.52	1.02	1.02		
			9538	19.0	-0.133	0.649	0.67	1.25	1.29		
		SNN5865A	9538	**18.8**	**-0.008**	**0.751**	**0.75**	**1.45**	**1.45**	**5x5x7**	**A85**
2450	802.11b, 5.5 Mbps	SNN5893A	1	19.1	-0.176	0.113	0.12	0.225	0.23		
			6	19.2	-0.033	0.134	0.14	0.267	0.27		
			11	19.1	-0.129	0.139	0.14	0.281	0.29		
		SNN5865A	11	19.2	-0.280	0.147	0.16	0.302	0.32		
5210	802.11a, 54 Mbps	SNN5893A	36	19.1	-0.912	0.014	0.02	0.037	0.05		
			48	**18.2**	**-0.117**	**0.015**	**0.02**	**0.051**	**0.05**	**7x7x12**	**A87**
		SNN5865A	48	18.2	-0.088	0.014	0.01	0.044	0.04		
5785	802.11a, 6 Mbps	SNN5893A	149	19.0	-0.057	0.024	0.02	0.076	0.08		
			161	**18.6**	**-0.163**	**0.028**	**0.03**	**0.077**	**0.08**	**7x7x6**	**A88**
		SNN5865A	161	18.2	0.193	0.027	0.03	0.073	0.07		

Table 11: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

References

[1] CENELEC, en62209-1:2006 “Human Exposure to Radio Frequency Fields From Hand - Held and Body - Mounted Wireless Communication Devices – Human Models, Instrumentation, and Procedures”

[2] CENELEC, en50360:2001 “Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz – 3 GHz)”.

[3] ANSI / IEEE, C95.1 1992 Edition “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”

[4] FCC OET Bulletin 65 Supplement C 01-01

[5] IEEE 1528 2003 Edition “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”

[6] ICNIRP Guidelines “Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz)”