



MOTOROLA

Portable Cellular Phone SAR Test Report

Tests Requested By: Motorola Mobility, LLC
600 N. US Highway 45
Libertyville, IL 60048

Test Report #: 25408-1F, 25441-1F Rev. A
Date of Report: 10-Jun-2013
Date of Test: 22-Apr-2013 to 06-Jun-2013
FCC ID #: IHDT56PE2
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Test Laboratory: Motorola Mobility, LLC - ADR Test Services Laboratory
600 N. US Highway 45
Libertyville, IL 60048

Report Author: Ketal Patel
RF Engineer

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

Accreditation:



<p><u>Tests:</u> Electromagnetic Specific Absorption Rate</p>	<p><u>Procedures:</u> IEC 62209-1 RSS-102 IEEE 1528 - 2003 FCC OET Bulletin 65 (<i>including Supplement C</i>) Australian Communications Authority Radio Communications (Electromagnetic Radiation – Human Exposure) Standard 2003 CENELEC EN 50360 ARIB Std. T-56 (2002)</p>
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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), along with other published guidance indicated in the references at the end of this report, as well as other appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(none)

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This test report shall not be reproduced except in full, without written approval of the laboratory. The results and statements contained herein relate only to the items tested. The names of individuals involved may be mentioned only in connection with the statements or results from this report. Motorola encourages all feedback, both positive and negative, on this test report.

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Revision History

Revision Version	Date	Notes
Rev. 0	10-Jun-2013	Initial report release
Rev. A	21-Jun-2013	Updates for TCB inquiry
Rev. B	02-Jul-2013	Sections 2.5, 3.4, 3.5, 4.4, 4.5, 4.6 and Appendices 1 & 4: updated WCDMA1900 SAR measurement for Mobile Hotspot

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], [5], [9], and per FCC KDB 941225 D06 for mobile hotspot operation. 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. These measurements were performed using a DASY52™ system manufactured by Schmid & Partner Engineering AG (SPEAG), of Zurich Switzerland.

Transmit Band	Head SAR (1 g ^w /kg)	Body-Worn Accessory SAR (1 g ^w /kg)	Mobile Hotspot SAR (1 g ^w /kg)
LTE Band 13	0.29	0.24	0.42
LTE Band 4	0.47	0.26	1.20
CDMA 800	0.35	0.25	0.55
CDMA 1900	1.30	0.32	1.00
GSM 850	0.30	0.17	0.32
GSM 1900	0.48	0.14	1.23
WCDMA 850	0.32	0.21	0.28
WCDMA 1900	1.02	0.24	0.57
Wi-Fi 2.45 GHz	1.54	0.20	0.80
Wi-Fi 5.2 GHz	0.19	0.05	N/A
Wi-Fi 5.8 GHz	0.11	0.11	0.23
Bluetooth	No Testing Required		
Simultaneous SAR	1.56		

2 Details of the Device Under Test

2.1 Sample Information

Serial Number(s) (Functional Use)	LUWV260017 (LTE Band 4/13 conducted power measurements, LTE Band 4/13 SAR testing) LUWV260019 (CDMA conducted power measurements, CDMA SAR testing) LUWV260008 (GSM conducted power measurements, GSM/WiFi SAR testing) LUWV260001 (WCDMA conducted power measurements, WCDMA/WiFi SAR testing) 990002025631613 (CDMA 1900 conducted power measurements, CDMA 1900/WiFi SAR testing) LUWV220004 (Wi-Fi 2.4 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

2.2 Antenna Description

Main (835/1880 MHz) Antenna

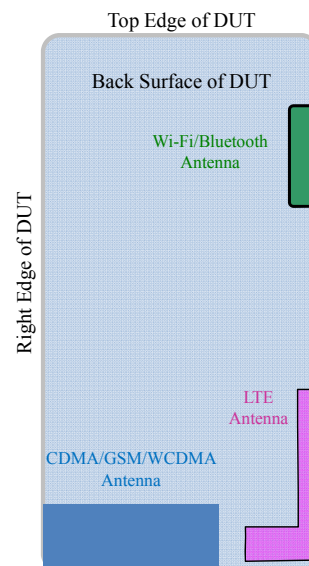
Type	Internal	
Location	Bottom of Transceiver	
Dimensions	Width	5 mm
	Length	38.6 mm

LTE (780/1730 MHz) Antenna

Type	Internal	
Location	Bottom-Left Edge of Transceiver	
Dimensions	Width	16.3 mm
	Length	21.7 mm

Wi-Fi/Bluetooth Antenna

Type	Internal	
Location	Left Edge of Transceiver	
Dimensions	Width	15.9 mm
	Length	7 mm



2.3 Transmission Band Summary

Mode(s) of Operation	Modulation Mode(s)	Target Output Power Setting	Maximum Output Power Setting	Duty Cycle	Transmitting Frequency Range(s)
LTE Band 4	QPSK, 16QAM	23.0 dBm	24.0 dBm	1:1	1710.0 - 1755.0 MHz
LTE Band 13	QPSK, 16QAM	23.0 dBm	24.0 dBm	1:1	777.0 - 787.0 MHz
CDMA 800	QPSK	24.0 dBm	25.0 dBm	1:1	824.70 - 848.31 MHz
CDMA 1900	QPSK	24.0 dBm	25.0 dBm	1:1	1851.20 - 1908.75 MHz
GSM 850	GMSK	32.5 dBm	33.5 dBm	1:8.3	824.2 - 848.8 MHz
GPRS/EDGE 850	GMSK	32.5 dBm	33.5 dBm	1:8.3, 2:8.3, 3:8.3, 4:8.3	824.2 - 848.8 MHz
EDGE 850	8PSK	26.5 dBm	28.0 dBm	1:8.3, 2:8.3, 3:8.3, 4:8.3	824.2 - 848.8 MHz
GSM 900	GMSK	32.5 dBm	33.5 dBm	1:8.3	880.2 - 914.8 MHz
GPRS/EDGE 900	GMSK	32.5 dBm	33.5 dBm	1:8.3, 2:8.3, 3:8.3, 4:8.3	880.2 - 914.8 MHz
EDGE 900	8PSK	26.5 dBm	28.0 dBm	1:8.3, 2:8.3, 3:8.3, 4:8.3	880.2 - 914.8 MHz
GSM 1800	GMSK	29.5 dBm	30.5 dBm	1:8.3	1710.2 - 1784.8 MHz
GPRS/EDGE 1800	GMSK	29.5 dBm	30.5 dBm	1:8.3, 2:8.3, 3:8.3, 4:8.3	1710.2 - 1784.8 MHz
EDGE 1800	8PSK	25.5 dBm	27.0 dBm	1:8.3, 2:8.3, 3:8.3, 4:8.3	1710.2 - 1784.8 MHz
GSM 1900	GMSK	29.5 dBm	30.5 dBm	1:8.3	1850.2 - 1909.8 MHz
GPRS/EDGE 1900	GMSK	29.5 dBm	30.5 dBm	1:8.3, 2:8.3, 3:8.3, 4:8.3	1850.2 - 1909.8 MHz
EDGE 1900	8PSK	25.5 dBm	27.0 dBm	1:8.3, 2:8.3, 3:8.3, 4:8.3	1850.2 - 1909.8 MHz
WCDMA 850	QPSK	23.0 dBm	24.0 dBm	1:1	826.4 - 846.6 MHz
WCDMA 900	QPSK	23.0 dBm	24.0 dBm	1:1	882.4 - 912.6 MHz
WCDMA 1900	QPSK	23.0 dBm	24.0 dBm	1:1	1852.4 - 1907.6 MHz
WCDMA 2100	QPSK	23.0 dBm	24.0 dBm	1:1	1922.4 - 1977.6 MHz
Wi-Fi 802.11b/g/n	BPSK	18.20 dBm		1:1	2412.0 - 2462.0 MHz
Wi-Fi 802.11a/n/ac	BPSK	14.39 dBm		1:1	5180.0 - 5240.0 MHz
Wi-Fi 802.11a/n/ac	BPSK	13.34 dBm		1:1	5745.0 - 5825.0 MHz
Bluetooth	GFSK	8.13 dBm		1:1	2402.0 - 2480.0 MHz

2.4 Device Test Setup, Operating Configurations, and Conducted Power Measurements

2.4.1 LTE

Technical Description

LTE Summary Information

FCC ID			IHDT56PA1
Form Factor			Portable Handset
Frequency Range(s)			See Section 2.3
Channel Bandwidth(s)			Band 4: 20, 15, 10, 5, 3, 1.4 MHz Band 13: 10, 5 MHz
Low, Middle, High Channel Numbers and Frequencies			
Low	Mid	High	Band: Channel Bandwidth
--	20175 (1732.5 MHz)	--	Band 4: 20 MHz
20025 (1717.5 MHz)	20175 (1732.5 MHz)	20325 (1747.5 MHz)	Band 4: 15 MHz
20000 (1715.0 MHz)	20175 (1732.5 MHz)	20350 (1750.0 MHz)	Band 4: 10 MHz
19975 (1712.5 MHz)	20175 (1732.5 MHz)	20375 (1752.5 MHz)	Band 4: 5 MHz
19965 (1711.5 MHz)	20175 (1732.5 MHz)	20385 (1753.5 MHz)	Band 4: 3 MHz
19956 (1710.6 MHz)	20175 (1732.5 MHz)	20394 (1754.4 MHz)	Band 4: 1.4 MHz
--	23230 (782.0 MHz)	--	Band 13: 10 MHz
--	23230 (782.0 MHz)	--	Band 13: 5 MHz
UE Category			3
Modulations Supported			QPSK, 16QAM
Description of LTE Tx and Antenna Implementation			Band 4: 1 TX/RX Antenna, 1 RX Antenna Band 17: 1 TX/RX Antenna, 1 RX Antenna
LTE Voice Available?			Yes (VOIP clients Only)
Hotspot with LTE + Wi-Fi?			Yes
Hotspot with LTE + Wi-Fi active with Voice sessions?			Yes (SVLTE with CDMA only)
LTE MPR Permanently Implemented per 3GPP TS 36.101?			Yes
A-MPR disabled for SAR Testing?			Yes
Conducted power table providing measurements across 1 RB, 50% RB and 100% RB allocations?			Yes
Table provided specifying other US wireless operating modes?			Yes
Table provided specifying maximum average conducted power for these other wireless modes?			Yes
Table provided identifying simultaneous transmission conditions?			Yes
Power Reduction used for SAR compliance?			Yes
Power Reduction used for GSM/WCDMA?			Yes
Power Reduction used for LTE?			Yes
Power Reduction used for SVLTE?			Yes
Test Equipment used			CMW500 SW version 2.1.28.9

LTE Maximum Power Reduction (MPR) conditions are defined in 3GPP 36-521, section 6.2.3.3:

6.2.3.3 Minimum conformance requirements

For UE Power Class 3, the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2.2.3-1 due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3.3-1.

Table 6.2.3.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

For the UE maximum output power modified by MPR, the power limits specified in subclause 6.2.5.3 apply. The normative reference for this requirement is TS 36.101 clause 6.2.3.

For the device’s architecture, MPR is permanently implemented. Per the chart above, the following MPR is used:

Modulation	1.4 MHz		3 MHz		5 MHz		10 MHz		15 MHz		20 MHz	
	# of RBs	MPR (dB)	# of RBs	MPR (dB)	# of RBs	MPR (dB)	# of RBs	MPR (dB)	# of RBs	MPR (dB)	# of RBs	MPR (dB)
QPSK	> 5	1	> 4	1	> 8	1	> 12	1	> 16	1	> 18	1
16 QAM	≤ 5	1	≤ 4	1	≤ 8	1	≤ 12	1	≤ 16	1	≤ 18	1
16 QAM	> 5	2	> 4	2	> 8	2	> 12	2	> 16	2	> 18	2

The table applies for any RB start value. RBs are assigned contiguously. Thus, given the maximum power limits stated in 2.2 and the MPR described above, the maximum power for the SAR test cases in channel bandwidths greater than 1.4 MHz is as follows:

Test Case	Band 4	Band 13
	Max Power (dBm)	Max Power (dBm)
QPSK, 1 RB Allocation	24.0	24.0
QPSK, 50% RB Allocation	23.0	23.0
QPSK, 100% RB Allocation	23.0	23.0
16QAM, 1 RB Allocation	23.0	23.0
16QAM, 50% RB Allocation	22.0	22.0
16QAM, 100% RB Allocation	22.0	22.0

The maximum power for the SAR test cases in a 1.4 MHz channel bandwidth is as follows:

Test Case	Band 4
	Max Power (dBm)
QPSK, 1 RB Allocation	24.0
QPSK, 50% RB Allocation	24.0
QPSK, 100% RB Allocation	23.0
16QAM, 1 RB Allocation	23.0
16QAM, 50% RB Allocation	23.0
16QAM, 100% RB Allocation	22.0

Exposure Conditions and Test Exclusions

Mode	Type	Head-Adjacent	Body-Worn Accessory	Mobile Hotspot
All Modes, QPSK modulation	Data	Tested (1)	Tested (1)	Tested
All Modes, 16QAM modulation	Data	Excluded (2)	Excluded (2)	Excluded (2)

Notes:

- (1) QPSK modulation, as a data-only mode, was tested against the Head and in Body-Worn Accessory exposure conditions to support evaluation for SVLTE and VOIP applications potentially installed and used by the end-user.
- (2) 16QAM modulation was excluded from testing per FCC KDB 941225 D05, as the maximum output power in this mode is not more than ½ dB higher than each comparable mode in QPSK and the *reported* SAR results for QPSK mode testing were less than 1.45 ^W/kg.

Device Test Setup

For LTE modes, the test sample was operated using transmission to a base station simulator. The base station simulator was configured per the guidance provided in FCC KDB 941225 D05, with closed-loop power control enforced to ensure the phone transmits at maximum output power.

Conducted Power Measurements

LTE Band 4

LTE Band 4 (20 MHz Channel Bandwidth) - Measured Conducted Power (dBm)																
Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	16QAM	16QAM	16QAM	16QAM	16QAM	16QAM		
Start RB	0	50	99	0	25	50	0	0	50	99	0	25	50	0		
RB Allocation	1	1	1	50	50	50	100	1	1	1	50	50	50	100		
Max Limit (dBm)	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00		
MPR Target (dB)	0	0	0	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2		
Max Limit with MPR (dBm)	24.00	24.00	24.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	22.00	22.00	22.00	22.00		
Channel BW	Frequency (MHz)	Channel														
20 MHz	1732.5	20175	23.10	22.65	22.62	21.79	21.63	21.61	21.66	21.97	21.60	21.49	20.84	20.71	20.63	20.67

LTE Band 4 (15 MHz Channel Bandwidth) - Measured Conducted Power (dBm)																
Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	16QAM	16QAM	16QAM	16QAM	16QAM	16QAM		
Start RB	0	37	74	0	19	39	0	0	37	74	0	19	39	0		
RB Allocation	1	1	1	36	36	36	75	1	1	1	36	36	36	75		
Max Limit (dBm)	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00		
MPR Target (dB)	0	0	0	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2		
Max Limit with MPR (dBm)	24.00	24.00	24.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	22.00	22.00	22.00	22.00		
Channel BW	Frequency (MHz)	Channel														
15 MHz	1717.5	20025	23.18	23.28	23.18	22.14	22.08	22.11	21.94	22.36	22.23	22.20	21.08	21.03	21.03	21.02
15 MHz	1732.5	20175	22.91	22.67	22.66	21.80	21.60	21.70	21.56	21.54	21.27	21.28	20.90	20.76	20.76	20.55
15 MHz	1747.5	20325	22.69	22.80	22.77	21.49	21.60	21.52	21.45	21.82	21.83	21.82	20.77	20.64	20.60	20.46

LTE Band 4 (10 MHz Channel Bandwidth) - Measured Conducted Power (dBm)																
Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	16QAM	16QAM	16QAM	16QAM	16QAM	16QAM		
Start RB	0	25	49	0	12	25	0	0	25	49	0	12	25	0		
RB Allocation	1	1	1	25	25	25	50	1	1	1	25	25	25	50		
Max Limit (dBm)	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00		
MPR Target (dB)	0	0	0	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2		
Max Limit with MPR (dBm)	24.00	24.00	24.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	22.00	22.00	22.00	22.00		
Channel BW	Frequency (MHz)	Channel														
10 MHz	1715.0	20000	23.17	23.23	23.23	22.08	22.19	22.13	22.02	21.66	21.68	21.74	21.17	21.28	21.21	21.06
10 MHz	1732.5	20175	22.83	22.62	22.62	21.81	21.76	21.61	21.60	21.48	21.30	21.34	20.80	20.73	20.65	20.62
10 MHz	1750.0	20350	22.81	22.77	22.73	21.69	21.65	21.60	21.57	21.82	21.88	21.78	20.69	20.77	20.69	20.60

LTE Band 4 (5 MHz Channel Bandwidth) - Measured Conducted Power (dBm)																
Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	16QAM	16QAM	16QAM	16QAM	16QAM	16QAM		
Start RB	0	12	24	0	6	13	0	0	12	24	0	6	13	0		
RB Allocation	1	1	1	12	12	12	25	1	1	1	12	12	12	25		
Max Limit (dBm)	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00		
MPR Target (dB)	0	0	0	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2		
Max Limit with MPR (dBm)	24.00	24.00	24.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	22.00	22.00	22.00	22.00		
Channel BW	Frequency (MHz)	Channel														
5 MHz	1712.5	19975	23.25	23.19	23.21	22.23	22.20	22.25	22.10	22.37	22.25	22.38	21.32	21.26	21.33	21.14
5 MHz	1732.5	20175	22.87	22.75	22.74	21.91	21.81	21.77	21.83	22.25	22.11	22.11	20.88	20.77	20.78	20.66
5 MHz	1752.5	20375	22.75	22.53	22.69	21.71	21.71	21.77	21.74	21.33	21.15	21.28	20.65	20.68	20.69	20.74

LTE Band 4 (3 MHz Channel Bandwidth) - Measured Conducted Power (dBm)																
Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	16QAM	16QAM	16QAM	16QAM	16QAM	16QAM	16QAM		
Start RB	0	7	14	0	3	7	0	0	7	14	0	3	7	0		
RB Allocation	1	1	1	8	8	8	15	1	1	1	8	8	8	15		
Max Limit (dBm)	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00		
MPR Target (dB)	0	0	0	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2		
Max Limit with MPR (dBm)	24.00	24.00	24.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	22.00	22.00	22.00	22.00		
Channel BW	Frequency (MHz)	Channel														
3 MHz	1711.5	19965	23.22	23.15	23.25	22.15	22.15	22.13	22.09	22.28	22.28	22.45	21.15	21.17	21.14	21.14
3 MHz	1732.5	20175	22.75	22.67	22.68	21.86	21.82	21.78	21.82	21.46	21.32	21.25	20.85	20.80	20.81	20.71
3 MHz	1753.5	20385	22.54	22.59	22.67	21.69	21.72	21.69	21.65	21.16	21.27	21.25	20.62	20.66	20.72	20.60

LTE Band 4 (1.4 MHz Channel Bandwidth) - Measured Conducted Power (dBm)																
Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	16QAM	16QAM	16QAM	16QAM	16QAM	16QAM	16QAM		
Start RB	0	3	5	0	1	3	0	0	3	5	0	1	3	0		
RB Allocation	1	1	1	3	3	3	6	1	1	1	3	3	3	6		
Max Limit (dBm)	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00		
MPR Target (dB)	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-2		
Max Limit with MPR (dBm)	24.00	24.00	24.00	24.00	24.00	24.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	22.00		
Channel BW	Frequency (MHz)	Channel														
1.4 MHz	1710.6	19956	23.20	23.11	23.10	23.12	23.13	23.14	22.11	21.61	21.64	21.68	22.31	22.32	22.30	21.30
1.4 MHz	1732.5	20175	22.77	22.64	22.66	22.75	22.74	22.72	21.80	21.59	21.59	21.59	21.78	21.75	21.77	20.85
1.4 MHz	1754.4	20394	22.76	22.74	22.77	22.70	22.72	22.70	21.76	21.91	21.90	21.95	21.71	21.58	21.54	20.61

LTE Band 13

LTE Band 13 (10 MHz Channel Bandwidth) - Measured Conducted Power (dBm)																
Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	16QAM	16QAM	16QAM	16QAM	16QAM	16QAM	16QAM		
Start RB	0	25	49	0	12	25	0	0	25	49	0	12	25	0		
RB Allocation	1	1	1	25	25	25	50	1	1	1	25	25	25	50		
Max Limit (dBm)	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00		
MPR Target (dB)	0	0	0	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2		
Max Limit with MPR (dBm)	24.00	24.00	24.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	22.00	22.00	22.00	22.00		
Channel BW	Frequency (MHz)	Channel														
10 MHz	782.0	23230	23.11	23.03	23.16	22.06	21.95	22.00	21.89	22.30	22.23	22.33	21.05	20.99	21.02	20.80

LTE Band 13 (5 MHz Channel Bandwidth) - Measured Conducted Power (dBm)																
Modulation	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	QPSK	16QAM	16QAM	16QAM	16QAM	16QAM	16QAM	16QAM		
Start RB	0	12	24	0	6	13	0	0	12	24	0	6	13	0		
RB Allocation	1	1	1	12	12	12	25	1	1	1	12	12	12	25		
Max Limit (dBm)	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00		
MPR Target (dB)	0	0	0	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2		
Max Limit with MPR (dBm)	24.00	24.00	24.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	22.00	22.00	22.00	22.00		
Channel BW	Frequency (MHz)	Channel														
5 MHz	782.0	23230	22.97	23.01	22.90	22.09	22.03	21.99	21.93	22.37	22.41	22.32	21.10	21.05	20.99	20.83

2.4.2 CDMA

Technical Description

The phone under test contains CDMA2000 1x and CDMA2000 1xEV-DO (Rel. A) transmitters that support both voice (circuit-switched) and data (packet-switched) capabilities.

Exposure Conditions and Test Exclusions

Mode	Type	Head-Adjacent	Body-Worn Accessory	Mobile Hotspot
RC3 SO55 Loopback	Voice	Tested (1)	Excluded (2)	N/A
RC1 SO55 Loopback	Voice	Excluded (2)	Excluded (2)	N/A
TDSO SO32 FCH	Data	Tested (3)	Tested (1)	Excluded (2)
TDSO SO32 FCH+SCH	Data	Excluded (2)	Excluded (2)	Excluded (2)
EVDO Rel. 0 (RTAP)	Data	Excluded (2)	Excluded (2)	Tested (1)
EVDO Rel. A (RETAP)	Data	Excluded (2)	Excluded (2)	Excluded (2)

Notes:

- (1) Per FCC KDB 941225 D01, RC3 SO55 is tested as the default mode for Head SAR measurements, TDSO SO32 on FCH with other code channels disabled is tested as the default mode for Body SAR measurements, and EVDO Rel. 0 (RTAP) is tested as the default mode in the Mobile Hotspot SAR exposure condition as a EVDO Data Device.
- (2) Per FCC KDB 941225 D01, the noted modes were excluded from testing as each exhibited measured output power not higher than that found in the default modes for each exposure condition.
- (3) TDSO SO32 FCH, as a data-only mode, was tested against the Head to support evaluation for 3rd Party VOIP applications potentially installed and used by the end-user.

Device Test Setup

For CDMA modes, the test sample was operated using transmission to a base station simulator. The base station simulator was set up for the proper channel and transmit mode of operation on the phone's uplink. The transmitter power level and power control were set to "All Up Bits" for RC3 operation, and "Alternating Bits" for TDSO SO32 operation.

Conducted Power Measurements

Power measurements were executed per FCC KDB 941225 D01:

Measured Conducted Power (dBm) for CDMA modes							
Band	Channel	Loopback		Data		EVDO Rel. 0	EVDO Rel. A
		RC3 SO55	RC1 SO55	TDSO SO32 FCH	TDSO SO32 FCH+SCH	RTAP 153.6k	Subtype 2 RETAP
CDMA 800	1013	24.77	24.66	24.69	24.19	24.53	24.51
	384	24.74	24.62	24.70	24.47	24.52	24.52
	777	24.76	24.63	24.68	24.65	24.50	24.49
CDMA 1900	25	24.58	24.50	24.59	24.47	24.29	24.28
	600	24.54	24.47	24.50	24.44	24.22	24.19
	1175	24.21	24.14	24.16	24.12	23.87	23.88

Note that the device's system architecture does not support simultaneous voice and data during a single CDMA session to the cellular network. Operation in TDSO and EVDO modes is for data transmission only.

2.4.3 GSM

Technical Description

The phone under test contains a GSM transmitter that supports voice (circuit-switched) capability, and data (packet-switched) capabilities over GPRS/EDGE (GMSK) or EDGE (8PSK).

Exposure Conditions and Test Exclusions

Mode	Type	Head-Adjacent	Body-Worn Accessory	Mobile Hotspot
GSM (GMSK 1-Slot)	Voice	Tested	Tested	N/A
GPRS/EDGE (GMSK Multi-Slot)	Data	Tested (1) (3)	Tested (1) (3)	Tested (3)
EDGE (8PSK Multi-Slot)	Data	Excluded (2) (3)	Excluded (2) (3)	Excluded (2) (3)

Notes:

- (1) GPRS/EDGE (GMSK Multi-Slot), as a data-only mode, was tested against the Head and in Body-Worn Accessory exposure conditions to support evaluation for 3rd Party VOIP applications potentially installed and used by the end-user.
- (2) EDGE (8PSK Multi-Slot) was excluded from testing per FCC KDB 941225 D03, as the source-based time-averaged output power in this mode is lower than that measured in normal GSM voice mode and GPRS/EDGE (GMSK Multi-Slot) data modes.
- (3) GPRS/EDGE (GMSK Multi-Slot) and EDGE (8PSK Multi-Slot) utilize reduced output power as additional time slots are transmitted in the uplink frame, as demonstrated in the following table. The values noted are maximum limits, and conform to the same power tune-up tolerances noted in section 2.3 above. The multi-slot configuration that results in the highest source-based time-averaged output power from the device was chosen for testing when testing of these modes is required.

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 1900			
Modulation	GMSK				GMSK			
Maximum TX Burst Output Power Setting (dBm)	33.5	31.0	28.75	28.0	30.5	28.0	25.75	25.0
Maximum Time Average Output Power Setting (dBm)	24.3	24.8	24.3	24.8	21.3	21.8	21.3	21.8
Duty Cycle	1:8.3	2:8.3	3:8.3	4:8.3	1:8.3	2:8.3	3:8.3	4:8.3
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				1850.2 - 1909.8 MHz			
Mode(s) of Operation	EDGE 850				EDGE 1900			
Modulation	8PSK				8PSK			
Maximum TX Burst Output Power Setting (dBm)	28.0	25.5	24.0	22.5	27.0	24.5	22.75	21.5
Maximum Time Average Output Power Setting (dBm)	18.8	19.3	19.6	19.3	17.8	18.3	18.3	18.3
Duty Cycle	1:8.3	2:8.3	3:8.3	4:8.3	1:8.3	2:8.3	3:8.3	4:8.3
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				1850.2 - 1909.8 MHz			

Device Test Setup

For GSM modes, the test sample was operated using transmission to a base station simulator. The base station simulator was set up for the proper channel and transmit mode of operation on the phone's uplink. The transmitter power level and power control were set to maximum at power step 5 for GSM 850 band, and power step 0 for GSM 1900 band.

Conducted Power Measurements

Band	Channel	Conducted power (dBm) for GSM modes (Burst Average Power)								
		GSM CS Voice (1 Slot)	GPRS PS Data (1 Slot)	GPRS PS Data (2 Slots)	GPRS PS Data (3 Slots)	GPRS PS Data (4 Slots)	EDGE PS Data (1 Slot)	EDGE PS Data (2 Slots)	EDGE PS Data (3 Slots)	EDGE PS Data (4 Slots)
GSM 850	128	32.94	32.79	29.20	27.62	26.39	26.47	23.74	22.00	20.50
	190	32.84	32.66	29.22	27.62	26.34	26.48	23.83	22.00	20.71
	251	33.31	33.13	29.21	28.08	26.35	26.52	23.83	22.00	20.50
GSM 1900	512	30.18	30.17	26.69	25.03	23.62	25.95	23.32	21.53	20.54
	661	30.36	30.35	26.97	25.04	23.70	26.06	23.45	21.61	20.66
	810	30.13	30.11	26.65	25.03	23.67	25.93	23.32	21.63	20.25

Band	Channel	Conducted power (dBm) for GSM modes (Source-Based Time-Averaged Power)								
		GSM CS Voice (1 Slot)	GPRS PS Data (1 Slot)	GPRS PS Data (2 Slots)	GPRS PS Data (3 Slots)	GPRS PS Data (4 Slots)	EDGE PS Data (1 Slot)	EDGE PS Data (2 Slots)	EDGE PS Data (3 Slots)	EDGE PS Data (4 Slots)
GSM 850	128	23.75	23.60	23.02	23.20	23.22	17.28	17.56	17.58	17.33
	190	23.65	23.47	23.04	23.20	23.17	17.29	17.65	17.58	17.54
	251	24.12	23.94	23.03	23.66	23.18	17.33	17.65	17.58	17.33
GSM 1900	512	20.99	20.98	20.51	20.61	20.45	16.76	17.14	17.11	17.37
	661	21.17	21.16	20.79	20.62	20.53	16.87	17.27	17.19	17.49
	810	20.94	20.92	20.47	20.61	20.50	16.74	17.14	17.21	17.08

Burst Average Power was measured using a power meter set to the appropriate profile to capture average power in the transmitting timeslot(s). Source-Based Time-Averaged Power, being related to the Burst Average Power by a fixed factor dependent on the number of time slots active in the frame, was calculated as follows (in dB), where x is the number of time slots active:

$$P_{Source} = P_{Burst} - 10 * \log \left(\frac{x}{8.3} \right)$$

CS Voice denotes circuit-switched transmission for voice call operation, and PS Data denotes packet-switched transmission for data sessions.

2.4.4 WCDMA

Technical Description

The phone under test contains a WCDMA transmitter designed per 3GPP TS 25.101, that supports both voice and data capabilities.

Exposure Conditions and Test Exclusions

Mode	Type	Head-Adjacent	Body-Worn Accessory	Mobile Hotspot
RMC	Voice/ Data	Tested	Tested	Tested
AMR	Voice/ Data	Excluded (1)	Excluded (1)	Excluded (1)
HSDPA (Rel 5) Modes	Data	Excluded (1)	Excluded (1)	Excluded (1)
HSPA (Rel 6) Modes	Data	Excluded (1)	Excluded (1)	Excluded (1)

Notes:

(1) AMR, HSDPA (Rel. 5), and HSPA (Rel. 6) were excluded from testing per FCC KDB 941225 D01, as the measured output power in these modes is not more than ¼ dB higher than that measured in RMC.

Device Test Setup

For WCDMA modes, the test sample was operated using transmission to a base station simulator. The base station simulator was set up for the proper channel and transmit mode of operation on the phone's uplink. The transmitter power level and transmit power control were set to "All 1's" for RMC and AMR modes in WCDMA or HSDPA, or inner loop power control procedures were applied to maintain maximum output power while HSUPA was active.

Conducted Power Measurements

Power measurements were executed per FCC KDB 941225 D01:

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	22.81	22.74	22.93	22.87	22.86	22.83	20.96	20.82	21.42	21.13	21.44
	4180	22.84	22.75	22.94	22.86	22.87	22.82	20.94	20.87	21.51	21.34	21.42
	4233	22.86	22.82	23	22.89	22.91	22.89	21	20.86	21.41	21.37	21.42
WCDMA 1900	9262	22.88	22.87	22.85	22.78	22.81	22.83	21.06	21.03	21.63	21.5	21.59
	9400	22.85	22.87	22.8	22.79	22.79	22.81	21.13	21.1	21.71	21.34	21.65
	9538	22.72	22.71	22.67	22.7	22.64	22.67	20.97	20.96	21.5	21.32	21.51

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 $\beta_c/\beta_d=12/15$, $\beta_{hs}/\beta_c=24/15$. 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 device's output power is identical to the case where there is no MPR in the device.

2.4.5 Wi-Fi 802.11

Technical Description

The phone under test contains a Wi-Fi 802.11b/g/n transmitter capable of data transmission in the 2.45 GHz ISM band, and contains a Wi-Fi 802.11a/n/ac transmitter capable of data transmission in the 5 GHz U-NII bands.

Exposure Conditions and Test Exclusions

Mode	Type	Head-Adjacent	Body-Worn Accessory	Mobile Hotspot
802.11b / 802.11a	Data	Tested (1)	Tested (1)	Tested (1)
802.11g / 802.11n / 802.11ac	Data	Excluded (1)	Excluded (1)	Excluded (1)

Notes:

(1) Per FCC KDB 248227 D01 and the April 2010 FCC/TCB Meeting Notes, the highest average output power channel for the lowest data rate for 802.11b or 802.11a was selected for SAR evaluation. Other 802.11 modes (including 802.11g and 802.11n) were not investigated when the average output powers over all channels and data rates were not more than ¼ dB higher than the tested channel in the lowest data rate of the 802.11b or 802.11a mode. The **bolded** data rates and channels in the following conducted power tables were used for SAR testing. For cases where alternate channels, higher data rates, or 802.11 modes resulted in output power more than ¼ dB higher than the tested configuration, additional SAR tests were conducted. Alternate configurations selected for additional testing are marked in **highlighted bold**, and were tested in all applicable exposure conditions.

Device Test Setup

For Wi-Fi 802.11 modes, the test sample was operated using manufacturer test mode software per guidance provided in FCC KDB 248227. The test software was set up for the proper channel, transmitter power level and transmit modes of operation on the phone’s uplink.

Conducted Power Measurements

Band	Channel	Average Conducted Power (dBm) for 802.11b Mode Data Rates			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
2450 MHz	1	15.08	15.09	15.26	15.35
	6	17.94	17.97	18.2	18.1
	11	15.87	15.87	16.09	16.04

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
2450 MHz	1	9.06	9.04	9.2	9.06	8.98	9	8.96	8.94
	6	16.12	16.15	16.21	16.11	16.07	16.13	16.08	16.05
	11	8.91	8.95	8.89	8.91	8.94	8.89	8.82	8.89

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
2450 MHz	1	6.27	6.46	6.51	6.18	6.17	6.13	6.2	6.16
	6	14.01	14.18	14.06	14.04	14.08	14.04	14.07	14.1
	11	6.19	6.28	6.17	6.06	6.15	5.82	6.13	6.13

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
2450 MHz	1	6.25	6.26	6.23	6.19	6.14	6.17	6.14	6.25
	6	14.04	14.21	14.06	13.97	14.03	13.95	14	14.08
	11	6.23	6.22	6.22	6.07	6.07	6.07	6.04	6.04

Band	Channel	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	14.31	14.39	13.24	13.25	13.22	13.21	12.25	11.24
	40	14.18	14.18	13.16	13.15	13.12	13.09	12.19	11.33
	44	14.17	14.23	13.21	13.25	13.22	13.19	12.28	11.19
	48	14.22	14.28	13.18	13.14	13.11	13.12	12.18	11.23
Wi-Fi 5775 MHz	149	13.32	13.34	12.24	12.19	12.22	12.21	11.2	10.26
	153	13.27	13.3	12.04	12.01	12.02	12	11.01	10.08
	157	13.08	13.06	11.97	11.96	11.84	11.81	10.99	9.85
	161	12.87	12.87	11.95	11.91	11.96	11.91	10.96	10
	165	12.73	12.72	11.74	11.76	11.75	11.77	10.76	9.76

Band	Channel	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	13.2	13.25	12.31	12.3	10.28	10.43	9.55	8.54
	40	13.35	13.35	12.3	12.31	10.36	10.32	9.38	8.42
	44	13.23	13.22	12.33	12.3	10.26	10.25	9.19	8.47
	48	13.29	13.1	12.24	12.23	10.27	10.23	9.31	8.41
Wi-Fi 5775 MHz	149	12.35	12.39	11.43	11.39	9.16	9.16	8.43	7.11
	153	12.18	12.17	11.25	11.21	9.15	9.19	8.35	7.36
	157	12.16	12.19	11.24	11.06	8.92	8.91	8.1	7.18
	161	12.04	12.06	11.11	11.08	8.92	9	8.06	6.78
	165	11.82	11.82	11.01	10.99	8.86	8.92	7.89	6.96

Band	Channel	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	13.35	13.29	12.27	12.23	10.46	10.4	9.46	8.43
	40	13.27	13.26	12.38	12.36	10.34	10.23	9.46	8.54
	44	13.14	13.13	12.23	12.22	10.42	10.34	9.35	8.38
	48	13.19	13.2	12.23	12.43	10.35	10.33	9.41	8.37
Wi-Fi 5775 MHz	149	12.35	12.34	11.39	11.38	9.16	9.21	8.48	7.17
	153	12.12	12.15	11.29	11.23	9.11	9.18	8.3	7.23
	157	12.24	12.24	11.33	11.3	8.95	9.04	8.1	7.07
	161	12.03	12.06	11.08	11.06	8.87	8.91	8.09	6.85
	165	11.9	11.92	11.08	10.83	8.84	8.84	7.96	6.96

Band	Channel	Conducted Power (dBm) for 802.11n Mode Data Rates (40 MHz Channel, 800 ns Guard Interval)							
		13.5 Mbps	27 Mbps	40.5 Mbps	54 Mbps	81 Mbps	108 Mbps	121.5 Mbps	135 Mbps
Wi-Fi 5210 MHz	36	6.09	6.01	6.02	5.9	5.93	5.82	5.94	5.9
	40	12.24	12.2	11.28	11.21	9.12	9.09	8.26	7.42
	48	12.26	12.19	11.25	11.24	9.13	9.12	8.23	7.41
Wi-Fi 5775 MHz	149	10.87	10.86	9.99	9.97	7.87	7.83	7.01	5.92
	153	10.83	10.82	10.01	9.95	7.87	7.87	7.04	6
	161	10.88	10.88	10.03	10.01	7.88	7.82	7.04	6.03
	165	10.83	10.85	9.97	10.03	7.85	7.85	7.06	6.01

Band	Channel	Conducted Power (dBm) for 802.11n Mode Data Rates (40 MHz Channel, 400 ns Guard Interval)							
		15 Mbps	30 Mbps	45 Mbps	65 Mbps	90 Mbps	120 Mbps	135 Mbps	150 Mbps
Wi-Fi 5210 MHz	38	5.94	5.97	5.94	5.89	5.91	5.79	5.92	5.84
	42	11.99	11.97	11.11	10.82	9.04	8.9	7.97	6.89
	46	11.94	12.05	11.12	11.05	8.92	8.88	7.86	6.95
Wi-Fi 5775 MHz	151	10.47	10.48	9.62	9.61	7.51	7.46	6.62	5.56
	155	10.48	10.42	9.62	9.56	7.48	7.5	6.67	5.61
	159	10.52	10.53	9.66	9.62	7.51	7.52	6.68	5.67
	163	10.48	10.48	9.6	9.65	7.47	7.48	6.69	5.63

2.4.6 Bluetooth

Technical Description

The phone under test contains a Bluetooth transmitter capable of data transmission in the 2.45 GHz ISM band.

Exposure Conditions and Test Exclusions

Mode	Type	Head-Adjacent	Dispatch/Push-to-Talk	Body-Worn Accessory	Mobile Hotspot
All Modes	Data	Excluded (1)	Excluded (1)	Excluded (1)	Excluded (1)

Notes:

(1) Per FCC KDB 447498 D01, standalone SAR measurements of the Bluetooth transmitter in this phone were not required based on the maximum conducted power and the Bluetooth antenna-to-user separation distance. As detailed by the KDB publication, the SAR exclusion threshold for distances < 50 mm is defined by the following equation:

$$\frac{[maximum\ power\ of\ channel,\ including\ tune\ -\ up\ tolerance]_{(mW)}}{[minimum\ test\ separation\ distance]_{(mm)}} \times \sqrt{f_{(GHz)}} \leq 3.0$$

Based on the maximum conducted power of Bluetooth and the most conservative antenna-to-user separation distance used in testing, standalone SAR measurements for Bluetooth were not required.

$$\frac{[6.501]_{(mW)}}{[10]_{(mm)}} \times \sqrt{2.44_{(GHz)}} = 1.0 \leq 3.0$$

Note that simultaneous SAR evaluations include estimations for Bluetooth SAR, as detailed in section 4.6 below.

Conducted Power Measurements

Frequency [MHz]	Data Rate [Mbps]	Channel Number	Average Conducted Power [mW]
2402	1.0	0	2.675
2441	1.0	39	3.419
2480	1.0	78	4.871
2402	2.0	0	3.403
2441	2.0	39	4.345
2480	2.0	78	6.102
2402	3.0	0	3.597
2441	3.0	39	4.611
2480	3.0	78	6.501

Frequency [MHz]	Mode	Channel Number	Average Conducted Power [mW]
2402	LE	0	5.558
2441	LE	39	6.058
2480	LE	78	6.342

2.4.7 Near-Field Communications

Technical Description

This device contains an integrated Near Field Communications (NFC) module.

Test Exclusion Evaluation

Evaluation of SAR test requirements for the NFC transmitter was performed per the guidance in FCC KDB 447498, FCC KDB 865664 and FCC KDB 648474. FCC KDB 865664 specifies that the FCC SAR test requirements are applicable to 100 MHz - 6 GHz only, but states that numerical SAR simulation may be appropriate for transmit frequencies below 100 MHz. Additionally, KDB 447498 provides guidance on test exclusion based on maximum transmit power capabilities, which this NFC transmitter falls into. Finally, KDB 648474 states that "phones with built-in NFC, wireless charging or similar functions that do not require separate SAR testing for these specific capabilities can generally be tested according to the normally required SAR measurement procedures. The SAR influence of the additional accessory hardware and functionality to the transmitters and antennas that require SAR Testing are considered during the required SAR testing; therefore, it is transparent to the testing process." Therefore, no SAR measurements of the NFC transmitter are required.

2.5 Transmitter power reduction conditions and modes

The phone utilizes reduced limits for the maximum transmit power for its transmitters when operating under the following noted conditions to ensure SAR exposure compliance is maintained. Tables of the reduced limits used for testing are given below. A complete description of this functionality is provided in the “Operational Description” contained within Exhibit 12. 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.

While operating in head-adjacent exposure reduced power limits are enforced on the CDMA 1900 transmitter. Tables of the reduced limits used for testing are given below.

Mode(s) of Operation	CDMA 1900
Channel Ranges	25-1175
Maximum Output Power (dBm)	25.0
Reduced Maximum Output Power Target (dBm)	24.5

While operating in body-adjacent exposure configurations during a mobile hotspot session, reduced power limits are enforced on the CDMA 1900, WCDMA 1900, GSM 1900 and LTE Band 4 transmitters. Tables of the reduced limits used for testing are given below.

Mode(s) of Operation	CDMA 1900
Channel Ranges	25-1175
Maximum Output Power Setting (dBm)	25.0
Reduced Maximum Output Power Setting (dBm)	19.0

Mode(s) of Operation	WCDMA 1900
Channel Ranges	9262-9538
Maximum Output Power Setting (dBm)	24
Reduced Maximum Output Power Setting (dBm)	18

Mode(s) of Operation	GPRS 1900			
Channel Range	512-810			
Modulation	GMSK			
Duty Cycle	1:8.3	2:8.3	3:8.3	4:8.3
Maximum Output Power Setting (dBm)	30.5	28.0	25.75	25.0
Time Average Output Power Setting (dBm)	21.3	21.8	21.3	21.8
Reduced Maximum Output Power Setting (dBm)	29.1	26.6	24.35	23.6
Reduced Time Average Output Power Setting (dBm)	19.9	20.4	19.9	20.4

Mode(s) of Operation	LTE Band 4					
Test Channel	Applicable to all channels/channel bandwidths					
Modulation	QPSK			16QAM		
RB Allocation	1 RB	50%	100%	1 RB	50%	100%
Maximum Output Power Setting (dBm)	24.0	24.0	24.0	24.0	24.0	24.0
Output Power with MPR (dBm)	24.0	23.0	23.0	23.0	22.0	22.0
Reduced Maximum Output Power Setting (dBm)	22.0	22.0	22.0	22.0	22.0	22.0

The DUT supports Simultaneous Voice and LTE (SVLTE), allowing a 1x CDMA voice call while simultaneously providing an LTE link for data transport on the cellular network.

While operating in SVLTE concurrent with mobile hotspot session, in head-adjacent exposure configurations, reduced power limits are enforced on the LTE Band 4 transmitter to ensure SAR exposure compliance is maintained. A table of the reduced limits used for testing is given below.

Mode(s) of Voice Operation	CDMA 1900					
Mode(s) of Operation	LTE Band 4					
Test Channel	Applicable to all channels/channel bandwidths					
Modulation	QPSK			16QAM		
RB Allocation	1 RB	50%	100%	1 RB	50%	100%
Maximum Output Power Setting (dBm)	24.0	24.0	24.0	24.0	24.0	24.0
Output Power with MPR (dBm)	24.0	23.0	23.0	23.0	22.0	22.0
Reduced Maximum Output Power Setting (dBm)	20.0	20.0	20.0	20.0	20.0	20.0

While operating in SVLTE concurrent with mobile hotspot session, in body-adjacent exposure configurations, reduced power limits are enforced on the LTE Band 4 transmitter to ensure SAR exposure compliance is maintained. A table of the reduced limits used for testing is given below.

Mode(s) of Voice Operation	CDMA 800					
Mode(s) of Operation	LTE Band 4					
Test Channel	Applicable to all channels/channel bandwidths					
Modulation	QPSK			16QAM		
RB Allocation	1 RB	50%	100%	1 RB	50%	100%
Maximum Output Power Setting (dBm)	24.0	24.0	24.0	24.0	24.0	24.0
Output Power with MPR (dBm)	24.0	23.0	23.0	23.0	22.0	22.0
Reduced Maximum Output Power Setting (dBm)	20.0	20.0	20.0	20.0	20.0	20.0

Mode(s) of Voice Operation	CDMA 1900					
Mode(s) of Operation	LTE Band 4					
Test Channel	Applicable to all channels/channel bandwidths					
Modulation	QPSK			16QAM		
RB Allocation	1 RB	50%	100%	1 RB	50%	100%
Maximum Output Power Setting (dBm)	24.0	24.0	24.0	24.0	24.0	24.0
Output Power with MPR (dBm)	24.0	23.0	23.0	23.0	22.0	22.0
Reduced Maximum Output Power Setting (dBm)	19.0	19.0	19.0	19.0	19.0	19.0

While operating simultaneously with any other transmitters active, a reduced maximum power limit is enforced on the Wi-Fi 2.4 GHz transmitter. A table of the reduced limits used for testing is given below.

Mode(s) of Operation	Wi-Fi 2.4 GHz
Channel Ranges	1-11
Maximum Output Power (dBm)	18.2
Reduced Maximum Output Power Target (dBm)	17

The DUT supports Simultaneous Voice and LTE (SVLTE), allowing a 1x CDMA voice call while simultaneously providing an LTE link for data transport on the cellular network. While operating in SVLTE concurrent with a mobile hotspot session, a further reduced maximum power limit is enforced on the Wi-Fi 2.4 GHz transmitter. A table of the reduced limits used for testing is given below.

Mode(s) of Operation	Wi-Fi 2.4 GHz
Channel Ranges	149-165
Maximum Output Power (dBm)	18.2
Reduced Maximum Output Power Target (dBm)	12

See section 6.4 for tables detailing the complete interoperation of this power limit reduction schema.

2.6 Accessories for the Device Under Test

2.6.1 Batteries

The phone tested in this report has the following battery options:

Model SNN5924A - 2130 mAH battery

Model SNN5925A - 3500 mAH battery

Battery SNN5924A and SNN5925A were used to do the SAR testing. The data below provides the worst case results for the two batteries. The phone was placed in the SAR measurement system with a fully charged battery.

2.6.2 Optional Inductive Charging Accessories

This device has an inductive charging accessory integrated within battery model SNN5925A. The inductive charging serves as the Wireless Power Receiver in an Inductive Charging System. The receiver is a Wireless Power Consortium (WPC) compliant receiver and requires a WPC compliant transmitter to create the appropriate magnetic field in order to function. The receiver is designed to apply power to the phone when placed in the appropriate magnetic field. Please see a more detailed description in Exhibit 12: Operational Description. Please see Exhibit 3 for external photos of the inductive charging door.

The device configurations and exposure conditions that resulted in the highest SAR values were also tested using the inductive charging battery.

3 Test Equipment Used

3.1 Dosimetric Measurement System

The Motorola Mobility ADR Test Services Laboratory utilizes a DASY52™ Dosimetric Assessment System manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. All SAR measurements are taken within a shielded enclosure. The overall 10 g RSS uncertainty of the measurement system is $\pm 11\%$ ($K=1$) with an expanded uncertainty of $\pm 22\%$ ($K=2$). The overall 1 g RSS uncertainty of the measurement system is $\pm 11\%$ ($K=1$) with an expanded uncertainty of $\pm 22\%$ ($K=2$). The measurement uncertainty budget is given in Appendix 5. 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. All equipment was brought into service and used only during its noted calibration period, except where indicated. Equipment without a calibration period was in service for the entirety of the test period.

Description	Serial Number	Cal Date	Cal Due Date	Service Notes
DASY™ DAE V1	656	07-Feb-2013	07-Feb-2014	Measurement System 1 Removed from service 13-May-2013
DASY™ DAE V1	715	28-Jan-2013	28-Jan-2014	Measurement System 1 Placed into service 13-May-2013
E-Field Probe ES3DV3	3180	11-Feb-2013	11-Feb-2014	Measurement System 1
Twin SAM Phantom V4.0	TP-1156			Measurement System 1
Twin SAM Phantom V4.0	TP-1319			Measurement System 1
MFP V5.1 C Triple Modular Flat Phantom	1101			Measurement System 1
DASY™ DAE V1	376	3-Sep-2012	3-Sep-2013	Measurement System 2
E-Field Probe ES3DV3	3124	20-Aug-2012	20-Aug-2013	Measurement System 2
Twin SAM Phantom V4.0	TP-1235			Measurement System 2
Twin SAM Phantom V4.0	TP-1136			Measurement System 2
MFP V5.1 C Triple Modular Flat Phantom	1102			Measurement System 2
DASY™ DAE V1	784	6-Mar-2013	6-Mar-2014	Measurement System 3
E-Field Probe EX3DV4	3730	24-Aug-2012	24-Aug-2013	Measurement System 3
Twin SAM Phantom V4.0	TP-1106			Measurement System 3
Twin SAM Phantom V4.0	TP-1153			Measurement System 3
MFP V5.1 C Triple Modular Flat Phantom	1103			Measurement System 3
DASY™ DAE V1	703	11-Sep-2012	11-Sep-2013	Measurement System 4
E-Field Probe ES3DV3	3037	13-Sep-2012	13-Sep-2013	Measurement System 4
Twin SAM Phantom V4.0	TP-1132			Measurement System 4
Twin SAM Phantom V4.0	TP-1162			Measurement System 4
MFP V5.1 C Triple Modular Flat Phantom	1104			Measurement System 4
Dipole Validation Kit, D835V2	422tr	18-Mar-2011	18-Mar-2012	Calibration extension, see note.
Dipole Validation Kit, D835V2	423tr	12-Sep-2012	12-Sep-2013	
Dipole Validation Kit, D835V2	436tr	18-Mar-2011	18-Mar-2012	Calibration extension, see note.
Dipole Validation Kit, D1800V2	2d190	5-Jan-2012	5-Jan-2013	Calibration extension, see note.
Dipole Validation Kit, D1800V2	2d191	5-Jan-2012	5-Jan-2013	Calibration extension, see note.
Dipole Validation Kit, D1800V2	259tr	20-Oct-2011	20-Oct-2012	Calibration extension, see note.
Dipole Validation Kit, D2450V2	740	7-Feb-2012	7-Feb-2013	Calibration extension, see note.
Dipole Validation Kit, DV2450V2	877	10-Jan-2012	10-Jan-2013	Calibration extension, see note.
Dipole Validation Kit, D5GHzV2	1088	20-May-2011	20-May-2012	Calibration extension, see note.
Dipole Validation Kit, D5GHzV2	1098	17-Jan-2012	17-Jan-2013	Calibration extension, see note.

Note: Per FCC KDB 450824 D02, evaluation for the extension of the dipole calibration was carried out. Results are provided in Appendix 7 in addition to the original calibration certificate.

3.2 Additional Equipment

Description	Serial Number	Cal Date	Cal Due Date	Service Notes
Power Meter 437B	3125U08032	28-Aug-2012	28-Aug-2013	
Power Sensor 8481A	US37296470	2-Nov-2012	2-Nov-2013	
10 dB Attenuator 8491A	62165	24-Sep-2011	27-Sep-2013	
Signal Generator HP8648C	3847A04810	26-Sep-2011	26-Sep-2013	
Power Meter E4419B	GB39511090	12-Aug-2011	12-Aug-2013	
Power Sensor #1 - E9301A	US39211009	28-Aug-2012	28-Aug-2013	
Power Sensor #2 - E9301A	US39211013	2-Nov-2012	2-Nov-2013	
3 dB Attenuator 8491A	50577	15-Aug-2011	15-Aug-2013	
Dual Directional Coupler 778D	50790	2-Nov-2012	2-Nov-2014	
Amplifier ZHL-42-SMA	N120299-25			
Power Meter 437B	3125U08939	12-Aug-2011	12-Aug-2013	
Power Sensor 8481A	US37296475	2-Nov-2012	2-Nov-2013	
10 dB Attenuator 8491A	3929M50702	12-Sep-2011	12-Sep-2013	
Signal Generator HP8648C	3847M01245	23-Aug-2011	23-Aug-2013	
Power Meter E4419B	GB39511087	28-Aug-2012	28-Aug-2014	
Power Sensor #1 - E9301A	US39210915	14-Jan-2013	14-Jan-2014	
Power Sensor #2 - E9301A	US39210916	14-Jan-2013	14-Jan-2014	
3 dB Attenuator 8491A	MY39267604	13-Oct-2011	13-Oct-2013	
Dual Directional Coupler 778D	18376	29-Aug-2012	29-Aug-2014	
Amplifier ZHL-42-SMA	N120299-23			
Signal Generator HP8648C	3847A04632	13-Aug-2011	13-Aug-2013	
Power Meter E4419B	GB39511086	4-Nov-2011	4-Nov-2013	
Power Sensor #1 - E9301A	US39211007	28-Aug-2012	28-Aug-2013	
Power Sensor #2 - E9301A	US39211008	28-Aug-2012	28-Aug-2013	
3 dB Attenuator 8491A	50555	13-Sep-2011	13-Sep-2013	
Dual Directional Coupler 778D	18621	18-Aug-2011	18-Aug-2013	
Amplifier ZHL-42-SMA	N120299-26			
Power Meter E4416A	GB41293246	5-Nov-2011	5-Nov-2013	
Power Sensor #3 - E9323A	MY444420676	29-Aug-2012	29-Aug-2013	
10 dB Attenuator 8491A	MY39267982	31-Jul-2012	31-Jul-2013	
Signal Generator N5181A	MY50143026	27-Oct-2011	27-Oct-2014	
Power Meter E4419B	GB39511088	11-Aug-2011	11-Aug-2013	
Power Sensor #1 - E9301A	US39210929	27-Jul-2012	27-Jul-2013	
Power Sensor #2 - E9301A	US39210930	27-Jun-2012	27-Jun-2013	
3 dB Attenuator 8491A	36902	13-Sep-2011	13-Sep-2013	
Dual Directional Coupler 772D	MY46151266	1-Aug-2012	1-Aug-2013	
Amplifier ZVA-183-S+	988901030 A			
Network Analyzer E5071C	MY46212851	10-May-2012	10-May-2013	
Dielectric Probe Kit DAK-3.5	1072			

3.3 Test System Validations

Per [5] and FCC KDB 865664 D01, each SAR system (including probes, system components, and software) used for device testing was validated against its performance specifications prior to deployment. These validation measurements are taken to ensure the accuracy of device test results. Validation measurements utilize reference dipoles and the required tissue-equivalent media, and include assessments of system sensitivity, probe linearity, and probe isotropy. Per FCC KDB 865664 D02, a tabulated summary of the validation results for each SAR system used in testing is given below.

DASY52™ Measurement System 1											
System Validation Measurements											
Probe	Tissue Type	f (MHz)	CW Validations				Modulated Validations				
			Date	Dielectric Parameters			Date	Mod. Type	Dielectric Parameters		Result
				Measured σ (S/m)	Measured ϵ_r	Result			Measured σ (S/m)	Measured ϵ_r	
3180	Head	750	21-Feb-13	0.8599	41.52	pass					
3180	Head	835	21-Feb-13	0.941	41.98	pass	3/7/2013	GMSK	0.912	39.6	pass
3180	Head	1800	21-Feb-13	1.37	39.23	pass	3/7/2013	GMSK	1.384	38.24	pass
3180	Head	1900	21-Feb-13	1.476	38.79	pass					
3180	Head	2450	25-Feb-13	1.75	36.59	pass	3/14/2013	OFDM	1.807	37.8	pass
3180	Head	2600	25-Feb-13	1.897	36.17	pass					
3180	Body	750	21-Feb-13	0.9525	54.36	pass					
3180	Body	835	21-Feb-13	1	55.04	pass	3/7/2013	GMSK	0.996	54.068	pass
3180	Body	1800	21-Feb-13	1.445	49.43	pass	3/7/2013	GMSK	1.582	49.18	pass
3180	Body	1900	21-Feb-13	1.561	49.05	pass					
3180	Body	2450	25-Feb-13	1.926	49.22	pass	3/12/2013	OFDM	1.999	50.5	pass
3180	Body	2600	25-Feb-13	2.097	48.83	pass					

DASY52™ Measurement System 2											
System Validation Measurements											
Probe	Tissue Type	f (MHz)	CW Validations				Modulated Validations				
			Date	Dielectric Parameters			Date	Mod. Type	Dielectric Parameters		Result
				Measured σ (S/m)	Measured ϵ_r	Result			Measured σ (S/m)	Measured ϵ_r	
3124	Head	750	1/16/2013	0.876	42.29	PASS					
3124	Head	835	1/16/2013	0.895	39.11	PASS	1/14/2013	GMSK	0.914	40.63	PASS
3124	Head	1800	1/15/2013	1.365	38.34	PASS	1/14/2013	GMSK	1.373	39.61	PASS
3124	Head	1900	1/15/2013	1.457	38.20	PASS					
3124	Head	2450	1/16/2013	1.812	39.28	PASS	3/12/2013	OFDM	1.795	37.65	PASS
3124	Head	2600	1/16/2013	1.971	38.77	PASS					
3124	Body	750	1/16/2013	0.967	54.55	PASS					
3124	Body	835	1/15/2013	0.989	53.55	PASS	1/15/2013	GMSK	0.99	53.547	PASS
3124	Body	1800	1/15/2013	1.448	51.40	PASS	1/14/2013	GMSK	1.45	52.38	PASS
3124	Body	1900	1/15/2013	1.568	51.03	PASS					
3124	Body	2450	1/16/2013	1.992	50.89	PASS	3/12/2013	OFDM	1.999	50.5	PASS
3124	Body	2600	1/16/2013	2.179	50.40	PASS					

DASY52™ Measurement System 3											
System Validation Measurements											
Probe	Tissue Type	f (MHz)	CW Validations				Modulated Validations				
			Date	Dielectric Parameters			Date	Mod. Type	Dielectric Parameters		Result
				Measured σ (S/m)	Measured ϵ_r	Result			Measured σ (S/m)	Measured ϵ_r	
3730	Head	2450	1/16/2013	1.812	39.28	PASS	3/12/2013	OFDM	1.795	37.65	PASS
3730	Head	2600	1/16/2013	1.972	38.77	PASS					
3730	Head	5200	1/15/2013	4.547	35.00	PASS	3/18/2013	OFDM	4.562	35.362	PASS
3730	Head	5300	1/15/2013	4.663	34.79	PASS	3/18/2013	OFDM	4.679	35.123	PASS
3730	Head	5600	1/15/2013	4.981	34.10	PASS	3/18/2013	OFDM	5.014	34.448	PASS
3730	Head	5800	1/14/2013	5.204	33.67	PASS	3/19/2013	OFDM	5.243	34.016	PASS
3730	Body	2450	1/16/2013	1.992	50.89	PASS	3/12/2013	OFDM	1.999	50.5	PASS
3730	Body	2600	1/16/2013	2.179	50.40	PASS					
3730	Body	5200	1/14/2013	5.204	46.23	PASS	3/18/2013	OFDM	5.233	47.237	PASS
3730	Body	5300	1/14/2013	5.353	46.00	PASS	3/18/2013	OFDM	5.386	46.995	PASS
3730	Body	5600	1/14/2013	5.766	45.24	PASS	3/18/2013	OFDM	5.815	46.248	PASS
3730	Body	5800	1/14/2013	6.061	44.77	PASS	3/19/2013	OFDM	6.114	45.753	PASS

DASY52™ Measurement System 4											
System Validation Measurements											
Probe	Tissue Type	f (MHz)	CW Validations				Modulated Validations				
			Date	Dielectric Parameters			Date	Mod. Type	Dielectric Parameters		Result
				Measured σ (S/m)	Measured ϵ_r	Result			Measured σ (S/m)	Measured ϵ_r	
3037	Head	750	1/8/2013	0.861	43.20	PASS					
3037	Head	835	1/7/2013	0.936	42.10	PASS	1/10/2013	GMSK	0.936	41.632	PASS
3037	Head	1800	1/7/2013	1.352	38.58	PASS	1/8/2013	GMSK	1.345	38.568	PASS
3037	Head	1900	1/7/2013	1.459	38.05	PASS					
3037	Head	2450	1/8/2013	1.822	37.87	PASS	3/12/2013	OFDM	1.795	37.65	PASS
3037	Head	2600	1/8/2013	1.974	37.32	PASS					
3037	Body	750	1/8/2013	0.911	54.83	PASS					
3037	Body	835	1/7/2013	0.997	53.94	PASS	1/8/2013	GMSK	1.00	54.83	PASS
3037	Body	1800	1/7/2013	1.443	52.70	PASS	1/8/2013	GMSK	1.43	52.459	PASS
3037	Body	1900	1/7/2013	1.567	52.25	PASS					
3037	Body	2450	1/8/2013	1.999	51.31	PASS	3/12/2013	OFDM	1.999	50.5	PASS
3037	Body	2600	1/8/2013	2.177	50.77	PASS					

3.4 Test System Verifications (System Performance Checks)

System accuracy verifications of the DASY52™ were performed using the measurement equipment listed in Section 3.1. The daily system performance check 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 7. These frequencies are within ±10% of the compliance test mid-band frequency as required in [1] and [5]. The test was conducted within 24 hours prior to the measurement of the phone. 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.

DASY52™ Measurement System 1											
System Verification Measurements for Head SAR Measurements											
f (MHz)	Description	Probe	Dipole	Measured SAR (W/kg), 1 gram	Normalized SAR (W/kg), 1 gram	Dielectric Parameters				Ambient Temp (°C)	Tissue Temp (°C)
						Measured σ (S/m)	Deviation σ (S/m)	Measured ε _r	Deviation ε _r		
835	Measured, 22-Apr-2013	3180	422tr	1.86	9.3	0.91	1.2%	39.3	-5.5%	22.0	19.7
	Recommended Limits	3180	422tr		9.33	0.90	±10%	41.5	±10%	18-25	18-25
1800	Measured, 23-Apr-2013	3180	259tr	7.57	37.85	1.37	-2.2%	38.2	-4.5%	22.1	19.1
	Measured, 30-May-2013	3180	529tr	7.37	36.85	1.34	-4.3%	38.4	-4.0%	22.0	20.2
	Measured, 06-Jun-2013	3180	259tr	7.56	37.8	1.36	-2.9%	37.9	-5.3%	22.0	20.6
	Recommended Limits	3180	259tr		38.1	1.40	±10%	40.0	±10%	18-25	18-25

DASY52™ Measurement System 2											
System Verification Measurements for Head SAR Measurements											
f (MHz)	Description	Probe	Dipole	Measured SAR (W/kg), 1 gram	Normalized SAR (W/kg), 1 gram	Dielectric Parameters				Ambient Temp (°C)	Tissue Temp (°C)
						Measured σ (S/m)	Deviation σ (S/m)	Measured ε _r	Deviation ε _r		
835	Measured, 24-Apr-2013	3124	436tr	1.97	9.85	0.91	1.2%	39.9	4.0%	22.2	21.2
	Recommended Limits	3124	436tr		9.73	0.90	±10%	41.5	±10%	18-25	18-25
1800	Measured, 24-Apr-2013	3124	2d190	7.56	37.8	1.38	-1.5%	37.8	-5.6%	22.1	20.0
	Measured, 03-Jun-2013	3124	2d190	7.50	37.5	1.33	-5.0%	38.4	-4.0%	22.3	20.9
	Measured, 04-Jun-2013	3124	2d190	7.44	37.2	1.32	-5.8%	38	-5.0%	22.0	20.6
	Recommended Limits	3124	2d190		39.3	1.40	±10%	40.0	±10%	18-25	18-25

DASY52™ Measurement System 3											
System Verification Measurements for Head SAR Measurements											
f (MHz)	Description	Probe	Dipole	Measured SAR (W/kg), 1 gram	Normalized SAR (W/kg), 1 gram	Dielectric Parameters				Ambient Temp (°C)	Tissue Temp (°C)
						Measured σ (S/m)	Deviation σ (S/m)	Measured ε _r	Deviation ε _r		
2450	Measured, 20-May-2013	3730	877	5.28	26.4	1.76	-2.3%	35.7	-8.9%	20.5	18.9
	Recommended Limits	3730	877		52.1	1.80	±10%	39.2	±10%	18-25	18-25
5200	Measured, 26-May-2013	3730	1098	7.99	79.9	4.56	-2.2%	34.0	-5.6%	22.6	20.0
	Recommended Limits	3730	1098		79.2	4.66	-5%/+10%	36.0	-10%/+5%	18-25	18-25
5800	Measured, 26-May-2013	3730	1098	7.91	79.1	5.25	-0.4%	32.6	-7.7%	22.7	20.0
	Recommended Limits	3730	1098		78.2	5.27	-5%/+10%	35.3	-10%/+5%	18-25	18-25

DASY52™ Measurement System 4											
System Verification Measurements for Head SAR Measurements											
f (MHz)	Description	Probe	Dipole	Measured SAR (W/kg), 1 gram	Normalized SAR (W/kg), 1 gram	Dielectric Parameters				Ambient Temp (°C)	Tissue Temp (°C)
						Measured σ (S/m)	Deviation σ (S/m)	Measured ε _r	Deviation ε _r		
835	Measured, 22-Apr-2013	3037	423tr	1.90	9.5	0.93	0.93	3.4%	41.0	-1.2%	20.1
	Recommended Limits	3037	423tr		9.22	0.90	±10%	41.5	±10%	18-25	18-25
1800	Measured, 22-Apr-2013	3037	2d191	7.66	38.3	1.34	-4.3%	37.44	-6.5%	22.0	19.5
	Recommended Limits	3037	2d191		39.2	1.40	±10%	40.0	±10%	18-25	18-25

DASY52™ Measurement System 1												
System Verification Measurements for Body SAR Measurements												
<i>f</i> (MHz)	Description	Probe	Dipole	Measured SAR (W/kg), 1 gram	Normalized SAR (W/kg), 1 gram	Dielectric Parameters				Ambient Temp (°C)	Tissue Temp (°C)	
						Measured σ (S/m)	Deviation σ (S/m)	Measured ϵ_r	Deviation ϵ_r			
835	Measured, 24-Apr-2013	3180	422tr	1.92	9.6	0.99	2.1%	51.8	-6.2%	22.1	21.0	
	Measured, 25-Apr-2013	3180	422tr	1.89	9.45	1.01	4.2%	52.7	-4.5%	22.3	20.2	
	Recommended Limits	3180	422tr		9.77	0.97	±10%	55.2	±10%	18-25	18-25	
1800	Measured, 22-Apr-2013	3180	259tr	7.67	38.35	1.42	-6.6%	49.5	-7.2%	22.0	19.2	
	Measured, 25-Apr-2013	3180	259tr	7.76	38.8	1.46	-4.0%	48.7	-8.7%	22.4	19.8	
	Measured, 01-May-2013	3180	259tr	7.83	39.15	1.46	-4.0%	50.7	-4.9%	21.7	20.3	
	Measured, 02-May-2013	3180	259tr	7.70	38.5	1.44	-5.3%	50.3	-5.7%	21.5	20.5	
	Measured, 14-May-2013	3180	259tr	7.82	39.1	1.43	-6.0%	50.3	-5.7%	22.2	20.7	
	Measured, 16-May-2013	3180	259tr	7.78	38.9	1.59	4.7%	49.5	-7.2%	22.0	20.4	
	Measured, 30-May-2013	3180	259tr	7.52	37.6	1.44	-5.3%	49.4	-7.4%	22.2	20.5	
	Measured, 28-Jun-2013	3180	259tr	7.54	37.7	1.39	-8.6%	48.6	-8.8%	22.2	20.5	
	Recommended Limits	3180	259tr		39.1	1.52	±10%	53.3	±10%	18-25	18-25	

DASY52™ Measurement System 2												
System Verification Measurements for Body SAR Measurements												
<i>f</i> (MHz)	Description	Probe	Dipole	Measured SAR (W/kg), 1 gram	Normalized SAR (W/kg), 1 gram	Dielectric Parameters				Ambient Temp (°C)	Tissue Temp (°C)	
						Measured σ (S/m)	Deviation σ (S/m)	Measured ϵ_r	Deviation ϵ_r			
835	Measured, 22-Apr-2013	3124	436tr	2.00	10	1.00	3.1%	53.3	-3.5%	22.1	19.3	
	Measured, 24-Apr-2013	3124	436tr	1.96	9.8	1.00	3.1%	53.1	-3.9%	22.1	20.5	
	Recommended Limits	3124	436tr		10.1	0.97	±10%	55.2	±10%	18-25	18-25	
1800	Measured, 24-Apr-2013	3124	2d190	7.53	37.65	1.46	-4.0%	48.9	-8.3%	22.1	20.3	
	Measured, 23-May-2013	3124	2d190	7.72	38.6	1.45	-4.7%	49.9	-6.4%	22.1	20.2	
	Recommended Limits	3124	2d190		37.8	1.52	±10%	53.3	±10%	18-25	18-25	

DASY52™ Measurement System 3												
System Verification Measurements for Body SAR Measurements												
<i>f</i> (MHz)	Description	Probe	Dipole	Measured SAR (W/kg), 1 gram	Normalized SAR (W/kg), 1 gram	Dielectric Parameters				Ambient Temp (°C)	Tissue Temp (°C)	
						Measured σ (S/m)	Deviation σ (S/m)	Measured ϵ_r	Deviation ϵ_r			
5200	Measured, 13-May-2013	3730	1088	7.60	76.0	5.16	-2.7%	45.4	-7.4%	21.9	20.6	
	Recommended Limits	3730	1088		75.5	5.30	-5%/+10%	49.0	-10%/+5%	18-25	18-25	
5800	Measured, 10-May-2013	3730	1088	7.40	74.0	6.23	3.9%	44	-8.8%	21.6	21.0	
	Recommended Limits	3730	1088		75.4	6.00	-5%/+10%	48.2	-10%/+5%	18-25	18-25	

DASY52™ Measurement System 4												
System Verification Measurements for Body SAR Measurements												
<i>f</i> (MHz)	Description	Probe	Dipole	Measured SAR (W/kg), 1 gram	Normalized SAR (W/kg), 1 gram	Dielectric Parameters				Ambient Temp (°C)	Tissue Temp (°C)	
						Measured σ (S/m)	Deviation σ (S/m)	Measured ϵ_r	Deviation ϵ_r			
835	Measured, 22-Apr-2013	3037	423tr	1.94	9.7	1.00	3.1%	54.0	-2.2%	21.8	20.0	
	Measured, 23-Apr-2013	3037	423tr	1.94	9.7	1.00	3.1%	54.1	-2.0%	22.1	19.8	
	Measured, 25-Apr-2013	3037	423tr	1.96	9.8	1.02	5.2%	54.5	-1.4%	21.3	19.9	
	Recommended Limits	3037	423tr		9.31	0.97	±10%	55.2	±10%	18-25	18-25	
1800	Measured, 22-Apr-2013	3037	2d191	7.91	39.55	1.42	-6.6%	49.5	-7.2%	22.3	18.6	
	Measured, 23-Apr-2013	3037	2d191	8.04	40.2	1.44	-5.3%	49.3	-7.6%	22.1	19.1	
	Recommended Limits	3124	2d190		37.8	1.52	±10%	53.3	±10%	18-25	18-25	
2450	Measured, 17-May-2013	3037	740	5.19	25.95	2	2.6%	50.4	-4.4%	22.1	20.2	
	Recommended Limits	3037	740		49.5	1.95	±10%	52.7	±10%	18-25	18-25	
	Measured, 18-May-2013	3037	877	5.37	26.85	2	2.6%	49.4	-6.3%	21.7	19.5	
	Recommended Limits	3037	877		52.3	1.95	±10%	52.7	±10%	18-25	18-25	

3.5 Simulated Tissue Dielectric Properties

Validation, System Performance Check, and device SAR measurements are performed using the DASY52™ system along with liquids specified to simulate head and body tissues subjected to electromagnetic exposure. The list of ingredients and the percent composition of the tissue-simulating liquids used for testing are indicated in the following table.

Ingredient	782 / 835 / 900 MHz Head	782 / 835 / 900 MHz Body	1800 MHz / 1900 MHz Head	1800 MHz / 1900 MHz Body	2450 MHz Head	2450 MHz Body	5 GHz Head	5 GHz Body
Sugar	57.0	44.9	--	--	--	--	--	--
DGBE	--	--	47.0	30.8	6.89	8.0	--	--
Water	40.45	53.06	52.62	68.8	57.95	71.8	65.52	78.66
Salt	1.45	0.94	0.38	0.4	0.15	0.2	--	--
HEC	1.0	1.0	--	--	--	--	--	--
Bact.	0.1	0.1	--	--	--	--	--	--
Triton X-100	--	--	--	--	35.02	20.0	17.24	10.67
Di(ethylene glycol) Hexyl Ether	--	--	--	--	--	--	17.24	10.67

Prior to conducting SAR measurements, the relative permittivity, ϵ_r , and conductivity, σ , of the tissue-simulating liquids were measured with a SPEAG™ DAK-3.5 Dielectric Assessment Kit across the frequency ranges of interest. These values, along with recommended targets, percent deviation from the targets, and the temperature of the simulated tissue are shown in the tables below.

For SAR measurements, the dielectric measurements from the DAK-3.5 are imported into the DASY software which performs interpolation to determine the dielectric parameters at the specific frequencies used for device testing. The DASY software also implements SAR error compensation algorithms to automatically correct the measured SAR results for deviations between the measured and target dielectric parameters. This error compensation has been verified by the lab to meet the requirements in FCC KDB 865664 D01. Therefore, where frequencies of test fall within ± 50 MHz of a calibration point of the probe used for test, the acceptable range of tissue variation is $\pm 10\%$ per FCC KDB 865664 D01 section 2.4. For test frequencies outside of ± 50 MHz of a probe calibration point, the range of tissue variation is reduced per section 2.6 part 2 of the same KDB, to ensure that tissues used in testing are within the required specification regardless of device performance. A mass density of $\rho = 1 \text{ g/cm}^3$ was entered into the system for all cases. It can be seen that the measured parameters are within tolerance of the recommended targets specified in [1] and [5].

Head Simulated-Tissue Dielectric Parameters										
Index	Date Measured	f (MHz)	Target σ (S/m)	Target ϵ_r	Measured σ (S/m)	Deviation σ (%)	Measured ϵ_r	Deviation ϵ_r (%)	Temp (°C)	
782	22-Apr-2013	777.0	0.90 ±10%	41.80 ±10%	0.85	-5.1%	40.0	-4.4%	19.8	
		782.0	0.90 ±10%	41.78 ±10%	0.86	-4.1%	39.9	-4.5%		
		787.0	0.90 ±10%	41.75 ±10%	0.86	-4.1%	39.9	-4.6%		
835	22-Apr-2013	820.0	0.90 ±10%	41.58 ±10%	0.92	2.4%	41.2	-1.0%	20.8	
		835.0	0.90 ±10%	41.50 ±10%	0.93	3.4%	41.0	-1.2%		
		849.0	0.92 ±10%	41.50 ±10%	0.95	3.9%	40.8	-1.7%		
	24-Apr-2013	820.0	0.90 ±10%	41.58 ±10%	0.90	0.2%	40.1	-3.7%	21.1	
		835.0	0.90 ±10%	41.50 ±10%	0.91	1.2%	39.9	-4.0%		
		849.0	0.92 ±10%	41.50 ±10%	0.93	1.7%	39.7	-4.4%		
1730	23-Apr-2013	1709.0	1.35 -5%/+10%	40.13 -10%/+5%	1.33	-1.4%	37.5	-6.6%	19.3	
		1730.0	1.36 -5%/+10%	40.10 -10%/+5%	1.35	-0.8%	37.4	-6.8%		
		1755.0	1.37 -5%/+10%	40.06 -10%/+5%	1.38	0.5%	37.3	-7.0%		
1880	22-Apr-2013	1850.0	1.40 ±10%	40.00 ±10%	1.39	-0.8%	37.2	-7.0%	20.0	
		1880.0	1.40 -5%/+10%	40.00 -10%/+5%	1.42	1.5%	37.1	-7.3%		
		1915.0	1.40 -5%/+10%	40.00 -10%/+5%	1.47	5.0%	36.9	-7.8%		
	24-Apr-2013	1850.0	1.40 ±10%	40.00 ±10%	1.44	2.9%	37.5	-6.4%	20.0	
		1880.0	1.40 -5%/+10%	40.00 -10%/+5%	1.47	5.0%	37.3	-6.8%		
		1915.0	1.40 -5%/+10%	40.00 -10%/+5%	1.51	7.9%	37.1	-7.3%		
	30-May-2013	1850.0	1.40 ±10%	40.00 ±10%	1.39	-0.8%	38.2	-4.6%	20.4	
		1880.0	1.40 -5%/+10%	40.00 -10%/+5%	1.43	2.2%	38.0	-5.0%		
		1915.0	1.40 -5%/+10%	40.00 -10%/+5%	1.47	5.0%	37.9	-5.4%		
	03-Jun-2013	1850.0	1.40 ±10%	40.00 ±10%	1.39	-0.8%	38.2	-4.7%	20.9	
		1880.0	1.40 -5%/+10%	40.00 -10%/+5%	1.42	1.5%	38.0	-5.0%		
		1915.0	1.40 -5%/+10%	40.00 -10%/+5%	1.45	3.6%	37.9	-5.4%		
	04-Jun-2013	1850.0	1.40 ±10%	40.00 ±10%	1.37	-2.2%	37.8	-5.6%	20.6	
		1880.0	1.40 -5%/+10%	40.00 -10%/+5%	1.41	0.8%	37.6	-6.0%		
		1915.0	1.40 -5%/+10%	40.00 -10%/+5%	1.44	2.9%	37.5	-6.4%		
	06-Jun-2013	1850.0	1.40 ±10%	40.00 ±10%	1.40	0.0%	37.7	-5.7%	20.6	
		1880.0	1.40 -5%/+10%	40.00 -10%/+5%	1.43	2.2%	37.5	-6.2%		
		1915.0	1.40 -5%/+10%	40.00 -10%/+5%	1.47	5.0%	37.4	-6.6%		
	28-Jun-2013	1850.0	1.40 ±10%	40.00 ±10%	1.48	-2.7%	48.8	-8.4%	21.0	
		1880.0	1.40 -5%/+10%	40.00 -10%/+5%	1.50	-1.4%	48.7	-8.6%		
		1915.0	1.40 -5%/+10%	40.00 -10%/+5%	1.53	0.7%	48.3	-9.4%		
	2450	20-May-2013	2412.0	1.77 ±10%	39.27 ±10%	1.74	-1.5%	35.9	-8.6%	20.5
			2450.0	1.80 ±10%	39.20 ±10%	1.76	-2.3%	35.7	-8.9%	
			2462.0	1.81 ±10%	39.18 ±10%	1.78	-1.9%	35.7	-9.0%	
5500	26-May-2013	5180.0	4.63 -5%/+10%	36.02 -10%/+5%	4.54	-2.0%	34.0	-5.5%	20.0	
		5500.0	4.96 -5%/+10%	35.65 -10%/+5%	4.90	-1.3%	33.3	-6.6%		
		5825.0	5.30 -5%/+10%	35.36 -10%/+5%	5.29	-0.2%	32.6	-7.9%		

Body Simulated-Tissue Dielectric Parameters										
Index	Date Measured	f (MHz)	Target σ (S/m)	Target ϵ_r	Measured σ (S/m)	Deviation σ (%)	Measured ϵ_r	Deviation ϵ_r (%)	Temp (°C)	
782	24-Apr-2013	777.0	0.97 ±10%	55.43 ±10%	0.93	-3.7%	52.4	-5.5%	21.0	
		782.0	0.97 ±10%	55.41 ±10%	0.94	-2.7%	52.4	-5.6%		
		787.0	0.97 ±10%	55.39 ±10%	0.94	-2.8%	52.3	-5.6%		
	26-Apr-2013	777.0	0.97 ±10%	55.43 ±10%	0.93	-3.7%	54.8	-1.2%	20.9	
		782.0	0.97 ±10%	55.41 ±10%	0.94	-2.7%	54.8	-1.2%		
		787.0	0.97 ±10%	55.39 ±10%	0.94	-2.8%	54.7	-1.3%		
835	22-Apr-2013	820.0	0.97 ±10%	55.26 ±10%	0.98	1.2%	53.5	-3.3%	19.5	
		835.0	0.97 ±10%	55.20 ±10%	1.00	3.1%	53.3	-3.5%		
		849.0	0.99 ±10%	55.16 ±10%	1.01	2.4%	53.2	-3.7%		
	22-Apr-2013	820.0	0.97 ±10%	55.26 ±10%	0.99	2.2%	54.2	-1.9%	19.9	
		835.0	0.97 ±10%	55.20 ±10%	1.00	3.1%	54.0	-2.2%		
		849.0	0.99 ±10%	55.16 ±10%	1.02	3.4%	53.9	-2.3%		
	23-Apr-2013	820.0	0.97 ±10%	55.26 ±10%	0.98	1.2%	54.3	-1.9%	19.9	
		835.0	0.97 ±10%	55.20 ±10%	1.00	3.1%	54.1	-2.0%		
		849.0	0.99 ±10%	55.16 ±10%	1.01	2.4%	54.0	-2.2%		
	24-Apr-2013	820.0	0.97 ±10%	55.26 ±10%	0.98	1.2%	53.2	-3.7%	20.5	
		835.0	0.97 ±10%	55.20 ±10%	1.00	3.1%	53.1	-3.9%		
		849.0	0.99 ±10%	55.16 ±10%	1.01	2.4%	52.9	-4.1%		
	25-Apr-2013	820.0	0.97 ±10%	55.26 ±10%	0.99	2.2%	52.9	-4.3%	20.5	
		835.0	0.97 ±10%	55.20 ±10%	1.01	4.2%	52.7	-4.5%		
		849.0	0.99 ±10%	55.16 ±10%	1.02	3.4%	52.6	-4.8%		
	1730	22-Apr-2013	1709.0	1.47 -5%/+10%	53.55 -10%/+5%	1.47	0.3%	50.0	-6.7%	19.3
			1730.0	1.48 -5%/+10%	53.50 -10%/+5%	1.49	0.7%	49.9	-6.8%	
			1755.0	1.49 -5%/+10%	53.39 -10%/+5%	1.52	1.9%	49.8	-6.8%	
16-May-2013		1709.0	1.47 -5%/+10%	53.55 -10%/+5%	1.51	3.1%	49.5	-7.6%	20.3	
		1730.0	1.48 -5%/+10%	53.50 -10%/+5%	1.57	6.1%	49.4	-7.8%		
		1755.0	1.49 -5%/+10%	53.39 -10%/+5%	1.59	6.5%	49.5	-7.3%		
23-May-2013		1709.0	1.47 -5%/+10%	53.55 -10%/+5%	1.47	0.3%	49.3	-8.0%	20.6	
		1730.0	1.48 -5%/+10%	53.50 -10%/+5%	1.51	2.1%	49.0	-8.5%		
		1755.0	1.49 -5%/+10%	53.39 -10%/+5%	1.54	3.2%	49.1	-8.1%		
1880	22-Apr-2013	1850.0	1.52 ±10%	53.30 ±10%	1.48	-2.7%	49.3	-7.6%	19.4	
		1880.0	1.52 -5%/+10%	53.30 -10%/+5%	1.51	-0.7%	49.2	-7.8%		
		1915.0	1.52 -5%/+10%	53.30 -10%/+5%	1.56	2.7%	49.0	-8.1%		
	23-Apr-2013	1850.0	1.52 ±10%	53.30 ±10%	1.50	-1.4%	49.1	-7.9%	19.0	
		1880.0	1.52 -5%/+10%	53.30 -10%/+5%	1.53	0.7%	49.0	-8.2%		
		1915.0	1.52 -5%/+10%	53.30 -10%/+5%	1.58	4.0%	48.8	-8.5%		
	24-Apr-2013	1850.0	1.52 ±10%	53.30 ±10%	1.52	0.0%	48.6	-8.8%	20.3	
		1880.0	1.52 -5%/+10%	53.30 -10%/+5%	1.55	2.0%	48.4	-9.2%		
		1915.0	1.52 -5%/+10%	53.30 -10%/+5%	1.60	5.3%	48.3	-9.5%		
	25-Apr-2013	1850.0	1.52 ±10%	53.30 ±10%	1.52	0.0%	48.5	-9.1%	20.3	
		1880.0	1.52 -5%/+10%	53.30 -10%/+5%	1.55	2.0%	48.4	-9.3%		
		1915.0	1.52 -5%/+10%	53.30 -10%/+5%	1.60	5.3%	48.2	-9.6%		
	01-May-2013	1850.0	1.52 ±10%	53.30 ±10%	1.52	0.0%	50.5	-5.3%	20.3	
		1880.0	1.52 -5%/+10%	53.30 -10%/+5%	1.56	2.7%	50.4	-5.5%		
		1915.0	1.52 -5%/+10%	53.30 -10%/+5%	1.60	5.3%	50.2	-5.8%		
	02-May-2013	1850.0	1.52 ±10%	53.30 ±10%	1.50	-1.4%	50.1	-6.0%	20.5	
		1880.0	1.52 -5%/+10%	53.30 -10%/+5%	1.53	0.7%	50.0	-6.2%		
		1915.0	1.52 -5%/+10%	53.30 -10%/+5%	1.58	4.0%	49.9	-6.4%		
	14-May-2013	1850.0	1.52 ±10%	53.30 ±10%	1.49	-2.0%	50.1	-6.1%	20.6	
		1880.0	1.52 -5%/+10%	53.30 -10%/+5%	1.52	0.0%	49.9	-6.4%		
		1915.0	1.52 -5%/+10%	53.30 -10%/+5%	1.57	3.3%	49.8	-6.6%		
	30-May-2013	1850.0	1.52 ±10%	53.30 ±10%	1.49	-2.0%	49.3	-7.6%	20.5	
		1880.0	1.52 -5%/+10%	53.30 -10%/+5%	1.53	0.7%	49.1	-7.9%		
		1915.0	1.52 -5%/+10%	53.30 -10%/+5%	1.57	3.3%	49.0	-8.1%		
28-Jun-2013	1850.0	1.40 ±10%	40.00 ±10%	1.48	-2.7%	48.8	-8.4%	21.0		
	1880.0	1.40 -5%/+10%	40.00 -10%/+5%	1.50	-1.4%	48.7	-8.6%			
	1915.0	1.40 -5%/+10%	40.00 -10%/+5%	1.53	0.7%	48.3	-9.4%			
2450	17-May-2013	2412.0	1.91 ±10%	52.75 ±10%	1.96	2.4%	50.3	-4.7%	20.5	
		2450.0	1.95 ±10%	52.70 ±10%	2.00	2.6%	50.4	-4.4%		
		2462.0	1.97 ±10%	52.68 ±10%	2.01	2.2%	50.4	-4.5%		
	18-May-2013	2412.0	1.91 ±10%	52.75 ±10%	1.95	1.9%	49.5	-6.2%	19.5	
		2450.0	1.95 ±10%	52.70 ±10%	2.00	2.6%	49.4	-6.3%		
5500	10-May-2013	5180.0	5.28 -5%/+10%	49.05 -10%/+5%	5.30	0.4%	45.6	-7.1%	21.0	
		5500.0	5.65 -5%/+10%	48.61 -10%/+5%	5.76	2.0%	44.8	-8.0%		
		5825.0	6.03 -5%/+10%	48.17 -10%/+5%	6.27	4.0%	44.0	-8.8%		

13-May-2013	5180.0	5.28 -5%/+10%	49.05 -10%/+5%	5.07	-4.0%	44.9	-8.5%	20.7
	5500.0	5.65 -5%/+10%	48.61 -10%/+5%	5.50	-2.7%	44.2	-9.2%	
	5825.0	6.03 -5%/+10%	48.17 -10%/+5%	5.98	-0.9%	43.4	-10.0%	

4 Test Setup Information, SAR Measurement Results, and Analysis

4.1 Overview of Test Setup and Results

The phone was tested in the exposure configurations stipulated in [1], [4], [5], [9], and per FCC KDB 941225 D06 for mobile hotspot operation. The phone was positioned into these configurations using the device holder supplied with the DASY52™ SAR measurement system. The default settings for the SAR scans are set in accordance with FCC KDB 865664 D01 for all area scan resolutions, zoom scan resolutions and volumes, and probe positioning. Please refer to the DASY52™ manual for additional information on SAR scanning procedures and algorithms used.

The SAR measurements were performed using the SAM and Flat phantoms listed in section 3.1. The same phantoms and simulated tissues were used for the system performance checks and the device SAR measurements. Consequently the Z-axis scans included in Appendix 1 are applicable for verification of the required simulated tissue depths of 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 SAR results shown in following tables 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 maximum device power, measured device power, temperature of the simulated tissue after the test, the measured drift and the scaled SAR. The exact method of scaling is:

$$\text{Scaled SAR} = (\text{Measured SAR}) * 10^{\left(\frac{(\text{Maximum Power}) - (\text{Measured Power})}{10}\right)} * 10^{\left(\frac{(-\text{Drift})}{10}\right)}$$

The SAR reported at the end of the measurement process by the DASY52™ 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. Note that measured SAR is scaled only in the manner which results in a more conservative scaled value, i.e. to a higher SAR value as a consequence of measured power being below the maximum allowed power, or for negative drift values.

Per FCC KDB 447498 D01, area-scan based 1 g SAR estimation was used for initial testing in all combinations of device modes and exposure conditions. The highest SAR measurements for each combination of device mode and exposure condition, and all conditions where the area scan estimation reported values greater than 1.2 W/kg, were further evaluated with a zoom scan. When operating conditions for the SAR system verifications did not demonstrate that the verification area scan 1 g SAR estimation resulted in values within 3% of zoom scan 1 g SAR, zoom scans were executed for all SAR tests.

The test conditions that produced the highest SAR values for each combination of DUT mode and exposure condition are indicated as **bold** numbers in the following tables. Plots of these tests are included in Appendices 2 through 4.

4.2 Head-Adjacent Exposure Results

Left Cheek-Touch Position												
Mode	Battery/ Accessory	Channel	f (MHz)	DUT Power		Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Plot Page
				Maximum (dBm)	Measured (dBm)			Measured (W/kg)	Corrected (W/kg)	Measured (W/kg)	Corrected (W/kg)	
LTE B13, 10 MHz BW QPSK (1 RB @ High)	SNN5924A	23230	782	24.0	23.16	20.1	0.151	0.181	0.22	0.237	0.29	A40
LTE B13, 10 MHz BW QPSK (50% RB @ Low)	SNN5924A	23230	782	23.0	22.06	20.1	0.120	0.165	0.21	0.215	0.27	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	24.0	23.10	19.2	-0.080	0.183	0.23	0.291	0.36	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	23.0	21.79	19.2	0.020	0.091	0.12	0.147	0.19	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	20		20.5	-0.120	0.064	0.08	0.101	0.13	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	20		20.5	0.060	0.059	0.08	0.094	0.12	
CDMA 800, RC3 SO55	SNN5924A	1013	824.7	25.0	24.77	19.5	-0.02	0.221	0.23	0.291	0.31	
EV-DO 800 Rev. 0	SNN5924A	1013	824.7	25.0	24.53	20.3	0.09	0.18	0.20	0.235	0.26	
CDMA 1900, RC3 SO55	SNN5925A	384	836.52	24.5		20.2	-0.02	0.273	0.32	0.434	0.51	
EV-DO 1900 Rev. 0	SNN5925A	25	1851.3	24.5		20.2	0.03	0.445	0.53	0.675	0.80	
EV-DO 1900 Rev. 0	SNN5925A	600	1880	24.5		20.2	0.01	0.343	0.42	0.528	0.64	
EV-DO 1900 Rev. 0	SNN5925A	1175	1908.8	24.5		20.2	0.01	0.21	0.27	0.328	0.42	
GSM 850, CS Voice	SNN5924A	251	848.8	33.5	33.31	20	-0.03	0.163	0.17	0.214	0.23	
GSM 1900, CS Voice	SNN5924A	661	1880	30.5	30.36	18.8	0.23	0.116	0.12	0.183	0.19	
WCDMA 850, RMC	SNN5924A	4233	846.6	24.0	22.86	20.6	0.08	0.134	0.17	0.177	0.23	
WCDMA 1900, RMC	SNN5924A	9262	1852.4	24.0	22.99	19.1	0.06	0.172	0.22	0.277	0.35	
802.11b, 1 Mbps	SNN5924A	6	2437		17.94	20	-0.08	0.225	0.23	0.429	0.44	
802.11b, 5.5 Mbps	SNN5924A	6	2437		18.20	20.5	0.06	0.312	0.31	0.597	0.60	
802.11b, 1 Mbps	SNN5924A	6	2437	17.0		19.7	0.11	0.221	0.22	0.422	0.42	
802.11b, 5.5 Mbps	SNN5924A	6	2437	17.0		19.7	0.27	0.249	0.25	0.478	0.48	
802.11b, 1 Mbps	SNN5924A	6	2437	12.0		19.6	-0.04	0.059	0.06	0.114	0.12	
802.11b, 5.5 Mbps	SNN5924A	6	2437	12.0		19.6	-0.35	0.0567	0.06	0.11	0.12	
802.11a, 6 Mbps	SNN5924A	36	5180		14.31	20.4	0.05	0.00973	0.01	0.0262	0.03	
802.11a, 6 Mbps	SNN5924A	149	5745		13.32	19	-0.31	0.0215	0.02	0.0278	0.03	

Table 4-1: SAR measurement results in a head-adjacent position against the ICNIRP and ANSI SAR Limit.

Right Cheek-Touch Position												
Mode	Battery/ Accessory	Channel	f (MHz)	DUT Power		Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Plot Page
				Maximum (dBm)	Measured (dBm)			Measured (W/kg)	Corrected (W/kg)	Measured (W/kg)	Corrected (W/kg)	
LTE B13, 10 MHz BW QPSK (1 RB @ High)	SNN5924A	23230	782	24.0	23.16	20.1	-0.020	0.169	0.21	0.217	0.26	
LTE B13, 10 MHz BW QPSK (50% RB @ Low)	SNN5924A	23230	782	23.0	22.06	20.1	0.140	0.148	0.18	0.192	0.24	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	24.0	23.10	20	0.105	0.247	0.30	0.383	0.47	A41
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	23.0	21.79	20	0.110	0.125	0.17	0.193	0.26	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	20		20.3	-0.030	0.099	0.12	0.152	0.19	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	20		20.4	-0.180	0.081	0.11	0.125	0.17	
CDMA 800, RC3 SO55	SNN5924A	1013	824.7	25.0	24.77	19.5	-0.052	0.25	0.27	0.327	0.35	A42
EV-DO 800 Rev. 0	SNN5924A	1013	824.7	25.0	24.53	20.3	0.04	0.225	0.25	0.296	0.33	
CDMA 1900, RC3 SO55	SNN5925A	25	1851.3	24.5		20.2	0.00	0.529	0.62	0.849	0.99	
CDMA 1900, RC3 SO55	SNN5925A	600	1880	24.5		20.2	0.16	0.387	0.46	0.624	0.74	
CDMA 1900, RC3 SO55	SNN5925A	1175	1908.8	24.5		20.2	0.08	0.252	0.32	0.407	0.51	
EV-DO 1900 Rev. 0	SNN5925A	25	1851.3	24.5		20.1	-0.12	0.669	0.82	1.07	1.30	A43
EV-DO 1900 Rev. 0	SNN5925A	25	1851.3	24.5		20.1	0.05	0.671	0.80	1.07	1.27	
EV-DO 1900 Rev. 0	SNN5925A	600	1880	24.5		20.1	0.10	0.509	0.62	0.816	0.99	
EV-DO 1900 Rev. 0	SNN5925A	1175	1908.8	24.5		20.1	0.03	0.319	0.41	0.514	0.66	
EV-DO 1900 Rev. 0	SNN5924A	25	1851.3	24.5		20.1	0.07	0.389	0.46	0.616	0.73	
GSM 850, CS Voice	SNN5924A	251	848.8	33.5	33.31	20	-0.04	0.191	0.20	0.253	0.27	
GSM 850, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	251	848.8	28.0	26.35	20	-0.04	0.154	0.23	0.206	0.30	A44
GSM 1900, CS Voice	SNN5924A	661	1880	30.5	30.36	18.8	-0.14	0.226	0.24	0.373	0.40	
GSM 1900, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	661	1880	25.0	23.70	18.8	-0.15	0.209	0.29	0.342	0.48	A45
WCDMA 850, RMC	SNN5924A	4233	846.6	24.0	22.86	20.6	0.00	0.186	0.24	0.247	0.32	A46
WCDMA 1900, RMC	SNN5924A	9262	1852.4	24.0	22.99	19.1	0.16	0.499	0.63	0.805	1.02	A47
WCDMA 1900, RMC	SNN5924A	9400	1880	24.0	22.84	19.2	0.02	0.41	0.54	0.666	0.87	
WCDMA 1900, RMC	SNN5924A	9538	1907.6	24.0	22.72	19.2	-0.05	0.298	0.40	0.487	0.66	
802.11b, 1 Mbps	SNN5924A	6	2437		17.94	19.9	-0.21	0.529	0.56	1.07	1.12	
802.11b, 5.5 Mbps	SNN5924A	6	2437		18.20	20.2	-0.02	0.731	0.73	1.5	1.51	
802.11b, 5.5 Mbps	SNN5924A	6	2437		18.20	19.7	-0.31	0.707	0.76	1.43	1.54	
802.11b, 5.5 Mbps	SNN5924A	6	2437		18.20	19.7	-0.255	0.712	0.75	1.45	1.54	A48
802.11b, 1 Mbps	SNN5924A	6	2437	17.0		19.3	-0.29	0.431	0.46	0.874	0.93	
802.11b, 5.5 Mbps	SNN5924A	6	2437	17.0		20.2	-0.42	0.536	0.59	1.1	1.21	
802.11b, 5.5 Mbps	SNN5925A	6	2437	17.0		20.2	-0.09	0.244	0.25	0.502	0.51	
802.11b, 1 Mbps	SNN5924A	6	2437	12.0		19.4	-0.07	0.136	0.14	0.283	0.29	
802.11b, 5.5 Mbps	SNN5924A	6	2437	12.0		19.5	0.03	0.137	0.14	0.284	0.28	
802.11a, 6 Mbps	SNN5924A	36	5180		14.31	19.5	-0.04	0.00987	0.01	0.0478	0.05	
802.11a, 6 Mbps	SNN5925A	36	5180		14.31	20	-0.48	0.0532	0.06	0.174	0.19	A49
802.11a, 6 Mbps	SNN5924A	149	5745		13.32	19	-0.09	0.0185	0.02	0.0657	0.07	
802.11a, 6 Mbps	SNN5925A	149	5745		13.32	20	-0.31	0.0296	0.03	0.107	0.11	A50

Table 4-2: SAR measurement results in a head-adjacent position against the ICNIRP and ANSI SAR Limit.

Left 15° Tilt Position												
Mode	Battery/ Accessory	Channel	f (MHz)	DUT Power		Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Plot Page
				Maximum (dBm)	Measured (dBm)			Measured (W/kg)	Corrected (W/kg)	Measured (W/kg)	Corrected (W/kg)	
LTE B13, 10 MHz BW QPSK (1 RB @ High)	SNN5924A	23230	782	24.0	23.16	20.1	-0.050	0.115	0.14	0.145	0.18	
LTE B13, 10 MHz BW QPSK (50% RB @ Low)	SNN5924A	23230	782	23.0	22.06	20.1	0.020	0.108	0.13	0.135	0.17	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	24.0	23.10	20.1	-0.160	0.077	0.10	0.129	0.16	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	23.0	21.79	20.1	-0.010	0.037	0.05	0.062	0.08	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	20		20.5	-0.200	0.022	0.03	0.038	0.05	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	20		20.5	0.550	0.020	0.03	0.035	0.05	
CDMA 800, RC3 SO55	SNN5924A	1013	824.7	25.0	24.77	19.5	0.00	0.168	0.18	0.212	0.22	
EV-DO 800 Rev. 0	SNN5924A	1013	824.7	25.0	24.53	20.3	0	0.135	0.15	0.174	0.19	
CDMA 1900, RC3 SO55	SNN5925A	25	1851.3	24.5		20.2	-0.02	0.263	0.31	0.412	0.48	
EV-DO 1900 Rev. 0	SNN5925A	25	1851.3	24.5		20.2	-0.09	0.318	0.38	0.51	0.62	
GSM 850, CS Voice	SNN5924A	251	848.8	33.5	33.31	20	-0.09	0.0988	0.11	0.128	0.14	
GSM 1900, CS Voice	SNN5924A	661	1880	30.5	30.36	18.8	-0.04	0.0692	0.07	0.112	0.12	
WCDMA 850, RMC	SNN5924A	4233	846.6	24.0	22.86	20.6	0.07	0.103	0.13	0.133	0.17	
WCDMA 1900, RMC	SNN5924A	9262	1852.4	24.0	22.99	19.1	0.05	0.225	0.28	0.355	0.45	
802.11b, 1 Mbps	SNN5924A	6	2437		17.94	20	20	-0.21	0.193	0.20	0.374	
802.11b, 5.5 Mbps	SNN5924A	6	2437		18.20	20.5	20.3	-0.03	0.192	0.19	0.361	
802.11b, 1 Mbps	SNN5924A	6	2437	17.0		19.7	19.7	0.32	0.135	0.14	0.26	
802.11b, 5.5 Mbps	SNN5924A	6	2437	17.0		19.7	19.7	0.04	0.172	0.17	0.33	
802.11b, 1 Mbps	SNN5924A	6	2437	12.0		19.6	-0.03	0.0367	0.04	0.0734	0.07	
802.11b, 5.5 Mbps	SNN5924A	6	2437	12.0		19.6	0.01	0.0335	0.03	0.0667	0.07	
802.11a, 6 Mbps	SNN5924A	36	5180		14.31	19.9	0.32	0.0162	0.02	0.0286	0.03	
802.11a, 6 Mbps	SNN5924A	149	5745		13.32	19	-0.29	0.0221	0.02	0.0354	0.04	

Table 4-3: SAR measurement results in a head-adjacent position against the ICNIRP and ANSI SAR Limit.

Right 15° Tilt Position												
Mode	Battery/ Accessory	Channel	f (MHz)	DUT Power		Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Plot Page
				Maximum (dBm)	Measured (dBm)			Measured (W/kg)	Corrected (W/kg)	Measured (W/kg)	Corrected (W/kg)	
LTE B13, 10 MHz BW QPSK (1 RB @ High)	SNN5924A	23230	782	24.0	23.16	20.1	-0.040	0.105	0.13	0.133	0.16	
LTE B13, 10 MHz BW QPSK (50% RB @ Low)	SNN5924A	23230	782	23.0	22.06	20.1	0.020	0.093	0.12	0.116	0.14	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	24.0	23.10	20	0.150	0.074	0.09	0.120	0.15	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	23.0	21.79	20	0.100	0.039	0.05	0.065	0.09	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	20		20.4	-0.010	0.026	0.03	0.042	0.05	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	20		20.4	0.160	0.024	0.03	0.038	0.05	
CDMA 800, RC3 SO55	SNN5924A	1013	824.7	25.0	24.77	19.5	-0.02	0.184	0.19	0.233	0.25	
EV-DO 800 Rev. 0	SNN5923A	1013	824.7	25.0	24.53	20.3	0.04	0.172	0.19	0.221	0.25	
CDMA 1900, RC3 SO55	SNN5925A	25	1851.3	24.5		20.2	-0.11	0.243	0.29	0.374	0.45	
EV-DO 1900 Rev. 0	SNN5925A	25	1851.3	24.5		20.1	-0.02	0.271	0.32	0.414	0.49	
GSM 850, CS Voice	SNN5924A	251	848.8	33.5	33.31	20	-0.02	0.102	0.11	0.133	0.14	
GSM 1900, CS Voice	SNN5924A	661	1880	30.5	30.36	18.8	-0.05	0.105	0.11	0.165	0.17	
WCDMA 850, RMC	SNN5924A	4233	846.6	24.0	22.86	20.6	0.03	0.132	0.17	0.17	0.22	
WCDMA 1900, RMC	SNN5924A	9262	1852.4	24.0	22.99	19.1	0.03	0.213	0.27	0.331	0.42	
802.11b, 1 Mbps	SNN5924A	6	2437		17.94	20	-0.15	0.237	0.25	0.489	0.51	
802.11b, 5.5 Mbps	SNN5924A	6	2437		18.20	20.2	-0.02	0.391	0.39	0.821	0.82	
802.11b, 1 Mbps	SNN5924A	6	2437	17.0		19.3	-0.41	0.19	0.21	0.396	0.44	
802.11b, 5.5 Mbps	SNN5924A	6	2437	17.0		19.7	0.11	0.309	0.31	0.638	0.64	
802.11b, 1 Mbps	SNN5924A	6	2437	12.0		19.3	-0.20	0.0755	0.08	0.159	0.17	
802.11b, 5.5 Mbps	SNN5924A	6	2437	12.0		19.6	-0.14	0.0823	0.08	0.177	0.18	
802.11a, 6 Mbps	SNN5924A	36	5180		14.31	19.2	0.05	0.00792	0.01	0.0338	0.03	
802.11a, 6 Mbps	SNN5924A	149	5745		13.32	19	-0.24	0.0218	0.02	0.0372	0.04	

Table 4-4: SAR measurement results in a head-adjacent position against the ICNIRP and ANSI SAR Limit.

4.3 Body-Worn Accessory Exposure Results

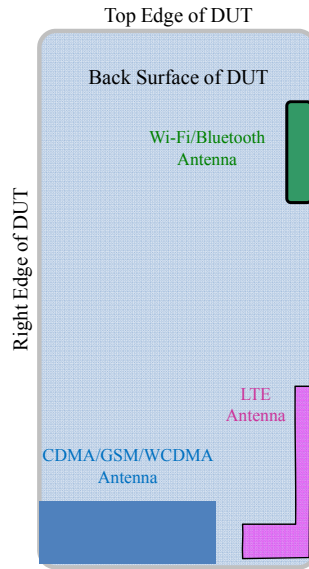
Body-Worn Accessory Position, Front of Phone 25 mm from Phantom												
Mode	Battery/ Accessory	Channel	f (MHz)	DUT Power		Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Plot Page
				Maximum (dBm)	Measured (dBm)			Measured (W/kg)	Corrected (W/kg)	Measured (W/kg)	Corrected (W/kg)	
LTE B13, 10 MHz BW QPSK (1 RB @ High)	SNN5924A	23230	782	24.0	23.16	19.6	-0.050	0.140	0.17	0.182	0.22	
LTE B13, 10 MHz BW QPSK (50% RB @ Low)	SNN5924A	23230	782	23.0	22.06	19.6	-0.160	0.118	0.15	0.154	0.20	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	24.0	23.10	19.1	0.020	0.139	0.17	0.214	0.26	A53
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	23.0	21.79	19.1	0.010	0.069	0.09	0.107	0.14	
CDMA 800, TDSO SO32 (+FCH-SCH)	SNN5924A	777	848.3	25.0	24.65	19.2	-0.08	0.172	0.19	0.227	0.25	A54
CDMA 1900, TDSO SO32 (+FCH-SCH)	SNN5925A	25	1851.3	25.0	24.33	20.3	-0.08	0.166	0.20	0.27	0.32	A55
GSM 850, CS Voice	SNN5924A	251	848.8	33.5	33.31	20	-0.13	0.11	0.12	0.146	0.16	
GSM 1900, CS Voice	SNN5924A	661	1880	30.5	30.36	18.6	-0.02	0.0891	0.09	0.138	0.14	A57
WCDMA 850, RMC	SNN5924A	4233	846.6	24.0	22.86	20.1	-0.02	0.121	0.16	0.16	0.21	A58
WCDMA 1900, RMC	SNN5924A	9262	1852.4	24.0	22.99	20.1	-0.08	0.121	0.16	0.183	0.24	A59
802.11b, 1 Mbps	SNN5924A	6	2437		17.94	19.9	-0.03	0.0409	0.04	0.0702	0.07	
802.11b, 5.5 Mbps	SNN5924A	6	2437		18.20	20.2	0.04	0.0598	0.06	0.104	0.10	
802.11b, 1 Mbps	SNN5924A	6	2437	17.0		20.6	0.05	0.0343	0.03	0.0598	0.06	
802.11b, 5.5 Mbps	SNN5924A	6	2437	17.0		19.5	-0.02	0.046	0.05	0.0802	0.08	
802.11a, 6 Mbps	SNN5924A	36	5180		14.31	20.6	0.23	0.00316	0.00	0.0118	0.01	
802.11a, 6 Mbps	SNN5924A	149	5745		13.32	21	0.24	0.000	0.00	0.000	0.00	

Table 4-5: SAR measurement results in a body-adjacent position against the ICNIRP and ANSI SAR Limit.

Body-Worn Accessory Position, Back of Phone 25 mm from Phantom												
Mode	Battery/ Accessory	Channel	f (MHz)	DUT Power		Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Plot Page
				Maximum (dBm)	Measured (dBm)			Measured (W/kg)	Corrected (W/kg)	Measured (W/kg)	Corrected (W/kg)	
LTE B13, 10 MHz BW QPSK (1 RB @ High)	SNN5924A	23230	782	24.0	23.16	20.3	-0.170	0.146	0.18	0.190	0.24	A52
LTE B13, 10 MHz BW QPSK (50% RB @ Low)	SNN5924A	23230	782	23.0	22.06	19.6	0.040	0.118	0.15	0.155	0.19	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	24.0	23.10	19.1	0.050	0.127	0.16	0.193	0.24	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	23.0	21.79	19.1	0.070	0.067	0.09	0.103	0.14	
CDMA 800, TDSO SO32 (+FCH-SCH)	SNN5924A	777	848.3	25.0	24.65	19.2	-0.13	0.152	0.17	0.2	0.22	
CDMA 1900, TDSO SO32 (+FCH-SCH)	SNN5925A	25	1851.3	25.0	24.33	20.3	-0.01	0.14	0.16	0.226	0.26	
GSM 850, CS Voice	SNN5924A	251	848.8	33.5	33.31	20	-0.07	0.119	0.13	0.157	0.17	A56
GSM 1900, CS Voice	SNN5924A	661	1880	30.5	30.36	18.6	-0.02	0.0768	0.08	0.129	0.13	
WCDMA 850, RMC	SNN5924A	4233	846.6	24.0	22.86	20.1	0.03	0.118	0.15	0.157	0.20	
WCDMA 1900, RMC	SNN5924A	9262	1852.4	24.0	22.99	20.1	-0.01	0.0981	0.12	0.146	0.18	
802.11b, 1 Mbps	SNN5924A	6	2437		17.94	19.9	-0.04	0.0668	0.07	0.115	0.12	
802.11b, 5.5 Mbps	SNN5924A	6	2437		18.20	20.3	0.09	0.113	0.11	0.196	0.20	A60
802.11b, 1 Mbps	SNN5924A	6	2437	17.0		20.6	-0.02	0.0675	0.07	0.117	0.12	
802.11b, 5.5 Mbps	SNN5924A	6	2437	17.0		19.5	0.00	0.0738	0.07	0.127	0.13	
802.11a, 6 Mbps	SNN5924A	36	5180		14.31	20.6	0.125	0.023	0.02	0.0535	0.05	A61
802.11a, 6 Mbps	SNN5924A	149	5745		13.32	19.9	-0.23	0.0454	0.05	0.108	0.11	A62

Table 4-6: SAR measurement results in a body-adjacent position against the ICNIRP and ANSI SAR Limit.

4.4 Mobile Hotspot Exposure Results



Mobile Hotspot Surfaces/Edges for SAR testing						
Mode	Front	Back	Left	Right	Top	Bottom
LTE	Yes	Yes	Yes	No	No	Yes
CDMA	Yes	Yes	No	Yes	No	Yes
GSM	Yes	Yes	No	Yes	No	Yes
WCDMA	Yes	Yes	No	Yes	No	Yes
Wi-Fi	Yes	Yes	Yes	No	Yes	No

Mobile Hotspot Position, Front of Phone 10 mm from Phantom												
Mode	Battery/ Accessory	Channel	f (MHz)	DUT Power		Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Plot Page
				Maximum (dBm)	Measured (dBm)			Measured (W/kg)	Corrected (W/kg)	Measured (W/kg)	Corrected (W/kg)	
LTE B13, 10 MHz BW QPSK (1 RB @ High)	SNN5924A	23230	782	24.0	23.16	19.8	-0.360	0.240	0.32	0.309	0.41	
LTE B13, 10 MHz BW QPSK (50% RB @ Low)	SNN5924A	23230	782	23.0	22.06	19.8	-0.020	0.202	0.25	0.260	0.32	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	22.0		19.6	-0.180	0.451	0.58	0.860	1.10	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	22.0		19.6	-0.170	0.362	0.50	0.691	0.95	
LTE B4, 20 MHz BW QPSK (100% RB)	SNN5924A	20175	1732.5	22.0		19.6	-0.110	0.348	0.49	0.662	0.92	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	20.0		19.7	-0.070	0.304	0.38	0.568	0.71	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	20.0		19.8	-0.090	0.250	0.34	0.471	0.64	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	19.0		20.5	-0.110	0.241	0.30	0.473	0.60	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	19.0		20.5	-0.070	0.223	0.30	0.437	0.59	
CDMA 800, EVDO Rel. 0 (RTAP)	SNN5924A	1013	824.7	25.0	24.53	19.4	0.02	0.353	0.39	0.454	0.51	
CDMA 1900, EVDO REL. 0 (RTAP)	SNN5924A	1175	1908.8	19.0		20.1	-0.03	0.259	0.34	0.517	0.68	
GSM 850, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	128	824.2	28.0	26.39	20	-0.11	0.129	0.19	0.167	0.25	
GSM 1900, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	661	1880	23.6		20.1	0.02	0.258	0.35	0.508	0.69	
WCDMA 850, RMC	SNN5924A	4233	846.6	24.0	22.86	19.2	-0.01	0.166	0.22	0.214	0.28	
WCDMA 1900, RMC	SNN5924A	9400	1880	18.0		21.0	-0.07	0.0855	0.11	0.155	0.21	
802.11b, 1 Mbps	SNN5924A	6	2437	17.0		20.6	0.04	0.11	0.11	0.206	0.21	
802.11b, 5.5 Mbps	SNN5924A	6	2437	17.0		19.5	-0.06	0.169	0.17	0.315	0.32	
802.11b, 1 Mbps	SNN5924A	6	2437	12.0		20.1	0.06	0.0258	0.03	0.0595	0.06	
802.11b, 5.5 Mbps	SNN5924A	6	2437	12.0		20.1	0.16	0.0306	0.03	0.0567	0.06	
802.11a, 6 Mbps	SNN5924A	149	5745		13.32	19.8	0.14	0.0041	0.00	0.0177	0.02	

Table 4-7: SAR measurement results in a body-adjacent position against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot Position, Back of Phone 10 mm from Phantom												
Mode	Battery/ Accessory	Channel	f (MHz)	DUT Power		Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Plot Page
				Maximum (dBm)	Measured (dBm)			Measured (W/kg)	Corrected (W/kg)	Measured (W/kg)	Corrected (W/kg)	
LTE B13, 10 MHz BW QPSK (1 RB @ High)	SNN5924A	23230	782	24.0	23.16	19.7	-0.040	0.255	0.31	0.343	0.42	A64
LTE B13, 10 MHz BW QPSK (50% RB @ Low)	SNN5924A	23230	782	23.0	22.06	19.8	0.060	0.213	0.26	0.283	0.35	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	22.0		19.5	-0.090	0.497	0.62	0.953	1.20	A65
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	22.0		20.4	-0.140	0.314	0.40	0.564	0.72	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	22.0		19.8	-0.180	0.348	0.45	0.641	0.82	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	22.0		19.5	-0.030	0.405	0.54	0.781	1.04	
LTE B4, 20 MHz BW QPSK (100% RB)	SNN5924A	20175	1732.5	22.0		19.5	-0.150	0.383	0.54	0.738	1.04	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	20.0		19.7	-0.070	0.256	0.32	0.472	0.59	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	20.0		19.7	-0.010	0.231	0.31	0.426	0.56	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	19.0		20.5	-0.070	0.226	0.28	0.424	0.53	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	19.0		20.5	-0.030	0.208	0.28	0.390	0.52	
CDMA 800, EVDO Rel. 0 (RTAP)	SNN5924A	1013	824.7	25.0	24.53	19.4	-0.01	0.363	0.41	0.47	0.52	
CDMA 1900, EVDO REL. 0 (RTAP)	SNN5924A	1175	1908.8	19.0		20.1	-0.07	0.214	0.28	0.42	0.55	
GSM 850, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	128	824.2	28.0	26.39	19.9	-0.17	0.137	0.21	0.18	0.27	
GSM 1900, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	512	1850.2	23.6		19.8	-0.09	0.213	0.30	0.421	0.59	
GSM 1900, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	661	1880	23.6		19.6	0.06	0.361	0.49	0.756	1.02	
GSM 1900, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	810	1909.8	23.6		19.8	-0.06	0.34	0.47	0.705	0.97	
WCDMA 850, RMC	SNN5924A	4233	846.6	24.0	22.86	19.2	0.13	0.169	0.22	0.219	0.28	A70
WCDMA 1900, RMC	SNN5924A	9400	1880	18.0		21.0	-0.11	0.211	0.28	0.431	0.58	
802.11b, 1 Mbps	SNN5924A	6	2437	17.0		20.6	0.00	0.268	0.27	0.506	0.51	
802.11b, 5.5 Mbps	SNN5924A	6	2437	17.0		19.5	0.17	0.325	0.33	0.635	0.64	
802.11b, 1 Mbps	SNN5924A	6	2437	12.0		20.2	-0.04	0.0739	0.07	0.145	0.15	
802.11b, 5.5 Mbps	SNN5924A	6	2437	12.0		20	0.03	0.0689	0.07	0.131	0.13	
802.11a, 6 Mbps	SNN5924A	149	5745		13.32	19.8	-0.03	0.0786	0.08	0.23	0.23	A73

Table 4-8: SAR measurement results in a body-adjacent position against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot Position, Left Edge of Phone 10 mm from Phantom												
Mode	Battery/ Accessory	Channel	f (MHz)	DUT Power		Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Plot Page
				Maximum (dBm)	Measured (dBm)			Measured (W/kg)	Corrected (W/kg)	Measured (W/kg)	Corrected (W/kg)	
LTE B13, 10 MHz BW QPSK (1 RB @ High)	SNN5924A	23230	782	24.0	23.16	19.8	-0.070	0.223	0.28	0.320	0.39	
LTE B13, 10 MHz BW QPSK (50% RB @ Low)	SNN5924A	23230	782	23.0	22.06	19.8	0.040	0.168	0.21	0.244	0.30	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	22.0		19.5	0.070	0.207	0.25	0.390	0.48	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	22.0		20.5	-0.070	0.184	0.25	0.348	0.47	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	20.0		19.6	-0.040	0.139	0.17	0.262	0.33	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	20.0		19.6	-0.050	0.126	0.17	0.238	0.32	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	19.0		20.5	-0.070	0.087	0.11	0.159	0.20	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	19.0		20.5	-0.020	0.081	0.11	0.148	0.20	
802.11b, 1 Mbps	SNN5924A	6	2437	17.0		20.6	0.09	0.345	0.35	0.741	0.74	
802.11b, 5.5 Mbps	SNN5924A	6	2437	17.0		19.5	0.07	0.374	0.37	0.802	0.80	A72
802.11b, 1 Mbps	SNN5924A	6	2437	12.0		20.2	0.09	0.0724	0.07	0.151	0.15	
802.11b, 5.5 Mbps	SNN5924A	6	2437	12.0		20	0.05	0.079	0.08	0.166	0.17	
802.11a, 6 Mbps	SNN5924A	149	5745		13.32	19.7	-0.21	0.0583	0.06	0.172	0.18	

Table 4-9: SAR measurement results in a body-adjacent position against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot Position, Right Edge of Phone 10 mm from Phantom												
Mode	Battery/Accessory	Channel	f (MHz)	DUT Power		Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Plot Page
				Maximum (dBm)	Measured (dBm)			Measured (W/kg)	Corrected (W/kg)	Measured (W/kg)	Corrected (W/kg)	
CDMA 800, EVDO Rel. 0 (RTAP)	SNN5924A	1013	824.7	25.0	24.53	19.3	0.11	0.344	0.38	0.497	0.55	A66
CDMA 1900, EVDO REL. 0 (RTAP)	SNN5924A	1175	1908.8	19.0		20.2	-0.02	0.0748	0.10	0.123	0.16	
GSM 850, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	128	824.2	28.0	26.39	19.9	-0.05	0.149	0.22	0.217	0.32	A68
GSM 1900, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	661	1880	23.6		19.6	-0.02	0.0992	0.13	0.164	0.22	
WCDMA 850, RMC	SNN5924A	4233	846.6	24.0	22.86	19.2	0.02	0.139	0.18	0.202	0.26	
WCDMA 1900, RMC	SNN5924A	9400	1880	18.0		21.0	0.07	0.0591	0.08	0.0966	0.13	

Table 4-10: SAR measurement results in a body-adjacent position against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot Position, Top Edge of Phone 10 mm from Phantom												
Mode	Battery/Accessory	Channel	f (MHz)	DUT Power		Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Plot Page
				Maximum (dBm)	Measured (dBm)			Measured (W/kg)	Corrected (W/kg)	Measured (W/kg)	Corrected (W/kg)	
802.11b, 1 Mbps	SNN5924A	6	2437	17.0		20.6	-0.04	0.068	0.07	0.125	0.13	
802.11b, 5.5 Mbps	SNN5924A	6	2437	17.0		19.5	0.06	0.095	0.10	0.17	0.17	
802.11b, 1 Mbps	SNN5924A	6	2437	12.0		20.2	0.11	0.0175	0.02	0.0315	0.03	
802.11b, 5.5 Mbps	SNN5924A	6	2437	12.0		20.1	0.01	0.0169	0.02	0.0293	0.03	
802.11a, 6 Mbps	SNN5924A	149	5745		13.32	19.7	0.27	0.0113	0.01	0.0375	0.04	

Table 4-11: SAR measurement results in a body-adjacent position against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot Position, Bottom Edge of Phone 10 mm from Phantom												
Mode	Battery/Accessory	Channel	f (MHz)	DUT Power		Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Plot Page
				Maximum (dBm)	Measured (dBm)			Measured (W/kg)	Corrected (W/kg)	Measured (W/kg)	Corrected (W/kg)	
LTE B13, 10 MHz BW QPSK (1 RB @ High)	SNN5924A	23230	782	24.0	23.16	19.8	-0.090	0.160	0.20	0.249	0.31	
LTE B13, 10 MHz BW QPSK (50% RB @ Low)	SNN5924A	23230	782	23.0	22.06	19.7	-0.030	0.117	0.15	0.183	0.23	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	22.0		19.7	-0.060	0.416	0.52	0.853	1.06	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	22.0		19.7	-0.010	0.343	0.45	0.706	0.94	
LTE B4, 20 MHz BW QPSK (100% RB)	SNN5924A	20175	1732.5	22.0		19.7	0.110	0.336	0.46	0.690	0.94	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	20.0		19.7	0.020	0.263	0.32	0.534	0.66	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	20.0		19.7	-0.110	0.242	0.33	0.492	0.67	
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	SNN5924A	20175	1732.5	19.0		20.5	-0.100	0.179	0.23	0.361	0.45	
LTE B4, 20 MHz BW QPSK (50% RB @ Low)	SNN5924A	20175	1732.5	19.0		20.5	-0.010	0.169	0.22	0.339	0.45	
CDMA 800, EVDO Rel. 0 (RTAP)	SNN5924A	1013	824.7	25.0	24.53	19.3	-0.05	0.0517	0.06	0.0858	0.10	
CDMA 1900, EVDO REL. 0 (RTAP)	SNN5924A	25	1851.3	19.0		19.9	-0.08	0.131	0.16	0.274	0.33	
CDMA 1900, EVDO REL. 0 (RTAP)	SNN5924A	600	1880	19.0		20.3	-0.01	0.283	0.34	0.589	0.71	
CDMA 1900, EVDO REL. 0 (RTAP)	SNN5924A	1175	1908.8	19.0		20.2	-0.04	0.365	0.48	0.762	1.00	A67
GSM 850, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	128	824.2	28.0	26.39	19.9	-0.04	0.0198	0.03	0.0307	0.04	
GSM 1900, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	512	1850.2	23.6		19.6	-0.08	0.236	0.33	0.486	0.68	
GSM 1900, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	661	1880	23.6		19.5	-0.07	0.353	0.48	0.738	1.01	
GSM 1900, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	810	1909.8	23.6		19.6	-0.16	0.412	0.58	0.873	1.23	A69
GSM 1900, GPRS Class 12 (4 Uplink Timeslots)	SNN5924A	810	1909.8	23.6		19.5	-0.06	0.419	0.58	0.889	1.22	
WCDMA 850, RMC	SNN5924A	4233	846.6	24.0	22.86	19.2	0.09	0.0404	0.05	0.0641	0.08	
WCDMA 1900, RMC	SNN5924A	9262	1852.4	18.0		21.0	-0.04	0.175	0.22	0.362	0.46	
WCDMA 1900, RMC	SNN5924A	9400	1880	18.0		21.0	-0.01	0.236	0.31	0.49	0.64	
WCDMA 1900, RMC	SNN5924A	9538	1907.6	18.0		21.0	-0.08	0.269	0.37	0.563	0.77	A71

Table 4-12: SAR measurement results in a body-adjacent position against the ICNIRP and ANSI SAR Limit.

4.5 Measurement Variability Analysis

Per FCC KDB 865664 D01, SAR measurement variability was assessed for each frequency band as determined by the SAR probe calibration points and tissue-equivalent mediums used for the device measurements. These additional measurements are executed after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The phone was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for these measurements, to minimize any unexpected variations in the repeated results.

SAR measurement variability was assessed using the following procedures for each frequency band:

1. If the original highest measured SAR is $< 0.8 \text{ W/kg}$, the following steps do not apply and no repeat measurements were executed.
2. If the original highest measured SAR is $\geq 0.8 \text{ W/kg}$, that measurement was repeated once.
3. If the ratio of the largest to smallest SAR for the original and first repeated measurement was > 1.2 , or if the original or first repeated measurement was $\geq 1.45 \text{ W/kg}$, the measurement was repeated a second time.
4. If the ratio of the largest to smallest SAR for the original, first repeated, or second repeated measurement was > 1.2 , and one of those measurements was $\geq 1.5 \text{ W/kg}$, the measurement was repeated a third time.

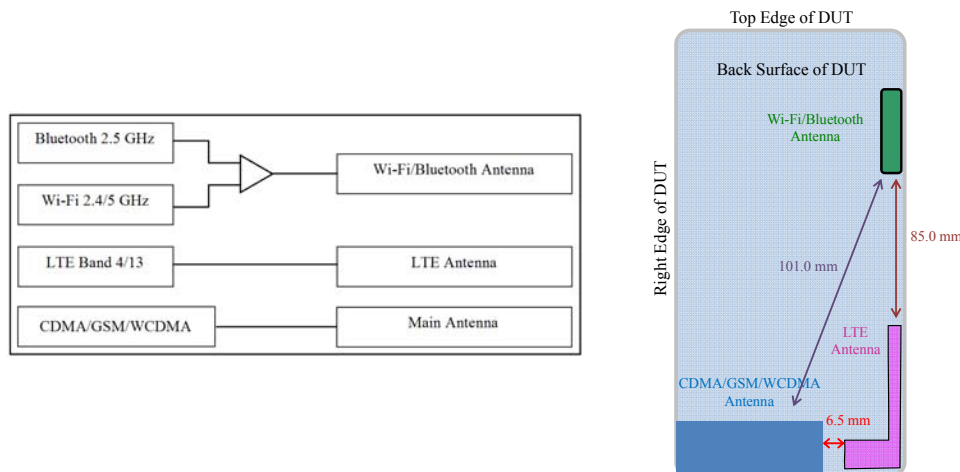
SAR Measurement Variability Results										
Mode	Exposure Condition	Channel	f (MHz)	Original Measured SAR (W/kg)	1st Repeated SAR (W/kg)	Ratio	2nd Repeated SAR (W/kg)	Ratio	3rd Repeated SAR (W/kg)	Ratio
LTE B4, 20 MHz BW QPSK (1 RB @ Low)	Mobile Hotspot Position, Back of Phone 10 mm from Phantom	20175	1732.5	0.953	0.564	1.69	0.641			
CDMA 1900, TDSO SO32 (+FCH-SCH)	Right Cheek-Touch Position	25	1851.3	1.01	1.01	1.00				
GPRS 1900, Class 12 (4 Uplink Timeslots)	Mobile Hotspot Position, Bottom Edge of Phone 10 mm from Phantom	810	1909.8	0.873	0.889	1.02				
802.11b, 5.5 Mbps	Right Cheek-Touch Position	6	2437	1.5	1.43	1.05	1.45			

Table 4-13 SAR measurement results for Variability Analysis

4.6 Description and Evaluation of Simultaneous Transmitters

Per FCC KDB 447498 D01, the necessity of simultaneous SAR testing was evaluated for the licensed and unlicensed transmitters of the phone under test.

By design some or all of the transmitters built into the phone may operate simultaneously, as described in the tables on the following pages. A simplified model of the transmit paths and a diagram of the separation distances between the transmitting antennas are provided below.



When standalone SAR test exclusion applies to a mode and antenna that transmits simultaneously with other modes and antennas, the KDB directs that the standalone SAR of that mode must be estimated for evaluation in the SAR summations.

For simultaneous SAR evaluation, Bluetooth SAR was estimated and included in all applicable SAR summations. For Body-Worn Accessory simultaneous SAR evaluation, the value used for inclusion in these summations was found to be:

$$\frac{[6.501]_{(mW)}}{[25]_{(mm)}} \times \frac{\sqrt{2.44_{(GHz)}}}{7.5} = 0.1 W/kg_{(estimated)}$$

Note that Head-Adjacent exposure configurations are not applicable to Bluetooth operation, and therefore were not considered for simultaneous evaluation. Further, Bluetooth and Wi-Fi share the same transmit path, and cannot transmit simultaneously.

A description of the power conditions or reduced limits for simultaneous transmit modes is provided in section 2.5 and in expanded detail in Exhibit 12. The notation used in the “Exposure Condition” tables is as follows for the PWR column:

- N/A indicates the transmitter in this case has no reduced power limit enforced and may operate up to its maximum power, and no conditions are contingent on this transmitter’s operation.
- 12, 13, 17, 19, 20, 22, 24.5, and 29.1 indicate an enforced power limit, at the value stated in dBm, on the noted transmitter for this simultaneous transmit case.

Per FCC KDB 447498 D01 section 4.3.2, when the sum of the 1 g SAR values of all simultaneously transmitting antennas and device modes in an exposure condition is within the SAR limit, that simultaneous transmission configuration may be excluded from SAR measurements. Simultaneous SAR summations for the head-adjacent, dispatch/push-to-talk, body-worn accessory, and mobile hotspot exposure conditions with the worst-case SAR transmitter configurations are presented in the following tables.

Head Exposure Conditions; Simultaneous Transmit Configurations, including Power Conditions or Reduced Limits							
Case	Transmitter #1		Transmitter #2		Transmitter #3		Notes
	Transmitter Configuration	PWR	Transmitter Configuration	PWR	Transmitter Configuration	PWR	
H1	GSM 850	MAX	Wi-Fi 2.4 GHz	17			Voice + Background Data
H2	GSM 1900	MAX	Wi-Fi 2.4 GHz	17			Voice + Background Data
H3	GSM 850	MAX	Wi-Fi 5 GHz	13			Voice + Background Data
H4	GSM 1900	MAX	Wi-Fi 5 GHz	13			Voice + Background Data
H5	WCDMA 850	MAX	Wi-Fi 2.4 GHz	17			Voice + Background Data
H6	WCDMA 1900	MAX	Wi-Fi 2.4 GHz	17			Voice + Background Data
H7	WCDMA 850	MAX	Wi-Fi 5 GHz	13			Voice + Background Data
H8	WCDMA 1900	MAX	Wi-Fi 5 GHz	13			Voice + Background Data
H9	CDMA 800	MAX	Wi-Fi 2.4 GHz	17			Voice + Background Data
H10	CDMA 1900	24.5	Wi-Fi 2.4 GHz	17			Voice + Background Data
H11	CDMA 800	MAX	Wi-Fi 5 GHz	13			Voice + Background Data
H12	CDMA 1900	24.5	Wi-Fi 5 GHz	13			Voice + Background Data
H13	CDMA 800	MAX	LTE B4	MAX			SVLTE
H14	CDMA 1900	24.5	LTE B4	MAX			SVLTE
H15	CDMA 800	MAX	LTE B13	MAX			SVLTE
H16	CDMA 1900	24.5	LTE B13	MAX			SVLTE
H17	CDMA 800	MAX	LTE B4	MAX	Wi-Fi 2.4 GHz	12	SVLTE during Mobile Hotspot
H18	CDMA 800	MAX	LTE B4	MAX	Wi-Fi 5.785 GHz	13	SVLTE during Mobile Hotspot
H19	CDMA 800	MAX	LTE B13	MAX	Wi-Fi 2.4 GHz	12	SVLTE during Mobile Hotspot
H20	CDMA 800	MAX	LTE B13	MAX	Wi-Fi 5.785 GHz	13	SVLTE during Mobile Hotspot
H21	CDMA 1900	24.5	LTE B4	20	Wi-Fi 2.4 GHz	12	SVLTE during Mobile Hotspot
H22	CDMA 1900	24.5	LTE B4	20	Wi-Fi 5.785 GHz	13	SVLTE during Mobile Hotspot
H23	CDMA 1900	24.5	LTE B13	MAX	Wi-Fi 2.4 GHz	12	SVLTE during Mobile Hotspot
H24	CDMA 1900	24.5	LTE B13	MAX	Wi-Fi 5.785 GHz	13	SVLTE during Mobile Hotspot
H25	LTE B13	MAX	Wi-Fi 2.4 GHz	17			VoIP while in mobile hotspot
H26	LTE B4	MAX	Wi-Fi 2.4 GHz	17			VoIP while in mobile hotspot
H27	LTE B13	MAX	Wi-Fi 5 GHz	13			VoIP while in mobile hotspot
H28	LTE B4	MAX	Wi-Fi 5 GHz	13			VoIP while in mobile hotspot
H29	1x/EVDO 800	MAX	Wi-Fi 2.4 GHz	17			VoIP while in mobile hotspot
H30	1x/EVDO 800	MAX	Wi-Fi 2.4 GHz	17			VoIP while in mobile hotspot
H31	1x/EVDO 1900	MAX	Wi-Fi 5 GHz	13			VoIP while in mobile hotspot
H32	1x/EVDO 1900	MAX	Wi-Fi 5 GHz	13			VoIP while in mobile hotspot

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)			
						H1	H2	H3	H4
Band		GSM 850	GSM 1900	Wi-Fi 2.4 GHz	Wi-Fi 5 GHz	GSM 850 + Wi-Fi 2.4 GHz	GSM 1900 + Wi-Fi 2.4 GHz	GSM 850 + Wi-Fi 5 GHz	GSM 1900 + Wi-Fi 5 GHz
Power Condition or Reduced Limit		N/A	N/A	17	13				
Position	Left Head Cheek	0.23	0.19	0.48	0.03	0.71	0.67	0.26	0.22
	Left Head 15° Tilt	0.14	0.12	0.33	0.04	0.47	0.45	0.18	0.16
	Right Head Cheek	0.3	0.48	1.21	0.19	1.51	> 1.6	0.49	0.67
	Right Head 15° Tilt	0.14	0.17	0.64	0.04	0.78	0.81	0.18	0.21

Table 4-14: SAR summations for simultaneous evaluation – GSM in Head Positions

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)			
						H5	H6	H7	H8
Band		WCDMA 850	WCDMA 1900	Wi-Fi 2.4 GHz	Wi-Fi 5 GHz	WCDMA 850 + Wi-Fi 2.4 GHz	WCDMA 1900 + Wi-Fi 2.4 GHz	WCDMA 850 + Wi-Fi 5 GHz	WCDMA 1900 + Wi-Fi 5 GHz
Power Condition or Reduced Limit		N/A	N/A	17	13				
Position	Left Head Cheek	0.23	0.35	0.48	0.03	0.71	0.83	0.26	0.38
	Left Head 15° Tilt	0.17	0.45	0.33	0.04	0.5	0.78	0.21	0.49
	Right Head Cheek	0.32	1.02	1.21	0.19	1.53	> 1.6	0.51	1.21
	Right Head 15° Tilt	0.22	0.42	0.64	0.04	0.86	1.06	0.26	0.46

Table 4-15: SAR summations for simultaneous evaluation – WCDMA in Head Positions

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)			
						H9	H10	H11	H12
Band		CDMA 800	CDMA 1900	Wi-Fi 2.4 GHz	Wi-Fi 5 GHz	CDMA 800 + Wi-Fi 2.4 GHz	CDMA 1900 + Wi-Fi 2.4 GHz	CDMA 050 + Wi-Fi 5 GHz	CDMA 1900 + Wi-Fi 5 GHz
Power Condition or Reduced Limit		N/A	24.5	17	13				
Position	Left Head Cheek	0.31	0.51	0.48	0.03	0.79	0.99	0.34	0.54
	Left Head 15° Tilt	0.22	0.48	0.33	0.04	0.55	0.81	0.26	0.52
	Right Head Cheek	0.35	0.99	1.21	0.19	1.56	> 1.6	0.54	1.18
	Right Head 15° Tilt	0.25	0.45	0.64	0.04	0.89	1.09	0.29	0.49

Table 4-16: SAR summations for simultaneous evaluation – CDMA in Head Positions

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)			
						H13	H14	H15	H16
Band		CDMA 800	CDMA 1900	LTE B4	LTE B13	CDMA 050 + LTE B4	CDMA 1900 + LTE B4	CDMA 800 + LTE B13	CDMA 1900 + LTE B13
Power Condition or Reduced Limit		N/A	24.5	N/A	N/A				
Position	Left Head Cheek	0.31	0.51	0.36	0.29	0.67	0.87	0.6	0.8
	Left Head 15° Tilt	0.22	0.48	0.16	0.18	0.38	0.64	0.4	0.66
	Right Head Cheek	0.35	0.99	0.47	0.26	0.82	1.46	0.61	1.25
	Right Head 15° Tilt	0.25	0.45	0.15	0.16	0.4	0.6	0.41	0.61

Table 4-17: SAR summations for simultaneous evaluation – CDMA in Head Positions

		Transmitter Stand-Alone 1 g SAR Values (W/kg)					1 g SAR Summations (W/kg)			
							H17	H18	H19	H20
Band		CDMA 800	LTE Band 4	LTE Band 13	Wi-Fi 2.4 GHz	Wi-Fi 5.785 GHz	CDMA 800 + LTE Band 4 + Wi-Fi 2.4 GHz	CDMA 800 + LTE Band 4 + Wi-Fi 5.785 GHz	CDMA 800 + LTE Band 13 + Wi-Fi 2.4 GHz	CDMA 800 + LTE Band 13 + Wi-Fi 5.785 GHz
Power Condition or Reduced Limit		N/A	N/A	N/A	12	13				
Position	Left Head Cheek	0.31	0.36	0.29	0.12	0.03	0.79	0.7	0.72	0.63
	Left Head 15° Tilt	0.22	0.16	0.18	0.07	0.04	0.45	0.42	0.47	0.44
	Right Head Cheek	0.35	0.47	0.26	0.29	0.19	1.11	1.01	0.9	0.8
	Right Head 15° Tilt	0.25	0.15	0.16	0.18	0.04	0.58	0.44	0.59	0.45

Table 4-18: SAR summations for simultaneous evaluation – CDMA 800 in Head Positions during a Mobile Hotspot session

		Transmitter Stand-Alone 1 g SAR Values (W/kg)					1 g SAR Summations (W/kg)			
							H21	H22	H23	H24
Band		CDMA 1900	LTE Band 4	LTE Band 13	Wi-Fi 2.4 GHz	Wi-Fi 5.785 GHz	CDMA 1900 + LTE Band 4 + Wi-Fi 2.4 GHz	CDMA 1900 + LTE Band 4 + Wi-Fi 5.785 GHz	CDMA 1900 + LTE Band 13 + Wi-Fi 2.4 GHz	CDMA 1900 + LTE Band 13 + Wi-Fi 5.785 GHz
Power Condition or Reduced Limit		24.5	20	N/A	12	13				
Position	Left Head Cheek	0.51	0.13	0.29	0.12	0.03	0.76	0.67	0.92	0.83
	Left Head 15° Tilt	0.48	0.05	0.18	0.07	0.04	0.6	0.57	0.73	0.7
	Right Head Cheek	0.99	0.19	0.26	0.29	0.19	1.47	1.37	1.54	1.44
	Right Head 15° Tilt	0.45	0.05	0.16	0.18	0.04	0.68	0.54	0.79	0.65

Table 4-19: SAR summations for simultaneous evaluation – CDMA 1900 in Head Positions during a Mobile Hotspot session

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)			
						H25	H26	H27	H28
Band		LTE Band 13	LTE Band 4	Wi-Fi 2.4 GHz	Wi-Fi 5.785 GHz	LTE Band 13 + Wi-Fi 2.4 GHz	LTE Band 4 + Wi-Fi 2.4 GHz	LTE Band 13 + Wi-Fi 5 GHz	LTE Band 4 + Wi-Fi 5 GHz
Power Condition or Reduced Limit		MAX	MAX	17	13				
Position	Left Head Cheek	0.29	0.36	0.48	0.03	0.77	0.84	0.32	0.39
	Left Head 15° Tilt	0.18	0.16	0.33	0.04	0.51	0.49	0.22	0.2
	Right Head Cheek	0.26	0.47	1.21	0.19	1.47	> 1.6	0.45	0.66
	Right Head 15° Tilt	0.16	0.15	0.64	0.04	0.8	0.79	0.2	0.19

Table 4-20: SAR summations for simultaneous evaluation – LTE in Head Positions during VoIP and a Mobile Hotspot session

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)					
						H29	H30	H31	H32		
Band		EVDO 800	EVDO 1900	Wi-Fi 2.4 GHz	Wi-Fi 5 GHz	EVDO 800 + Wi-Fi 2.4 GHz	EVDO 1900 + Wi-Fi 2.4 GHz	EVDO 800 + Wi-Fi 5 GHz	EVDO 1900 + Wi-Fi 5 GHz		
Power Condition or Reduced Limit		N/A	24.5	17	13						
Position	Left Head Cheek		0.26	0.8	0.48	0.03	0.74	1.28	0.29	0.83	
	Left Head 15° Tilt		0.19	0.62	0.33	0.04	0.52	0.95	0.23	0.66	
	Right Head Cheek	SNN5924A		0.33	0.73	1.21	0.19	1.54	> 1.6	0.52	1.1
		SNN5925A			1.3	0.51	0.19		> 1.6		1.49
	Right Head 15° Tilt		0.25	0.49	0.64	0.04	0.89	1.13	0.29	0.53	

Table 4-21: SAR summations for simultaneous evaluation – 1x RTT Data in Head Positions during VoIP and a Mobile Hotspot session

Body-Worn Accessory Exposure Conditions; Simultaneous Transmit Configurations, including Power Conditions or Reduced Limits							
Case	Transmitter #1		Transmitter #2		Transmitter #3		Notes
	Transmitter Configuration	PWR	Transmitter Configuration	PWR	Transmitter Configuration	PWR	
B1	GSM 850	MAX	Wi-Fi 2.4 GHz	17			Voice + Background Data
B2	GSM 1900	MAX	Wi-Fi 2.4 GHz	17			Voice + Background Data
B3	GSM 850	MAX	Wi-Fi 5 GHz	13			Voice + Background Data
B4	GSM 1900	MAX	Wi-Fi 5 GHz	13			Voice + Background Data
B5	WCDMA 850	MAX	Wi-Fi 2.4 GHz	17			Voice + Background Data
B6	WCDMA 1900	MAX	Wi-Fi 2.4 GHz	17			Voice + Background Data
B7	WCDMA 850	MAX	Wi-Fi 5 GHz	13			Voice + Background Data
B8	WCDMA 1900	MAX	Wi-Fi 5 GHz	13			Voice + Background Data
B9	CDMA 800	MAX	Wi-Fi 2.4 GHz	17			Voice + Background Data
B10	CDMA 1900	MAX	Wi-Fi 2.4 GHz	17			Voice + Background Data
B11	CDMA 800	MAX	Wi-Fi 5 GHz	13			Voice + Background Data
B12	CDMA 1900	MAX	Wi-Fi 5 GHz	13			Voice + Background Data
B13	CDMA 800	MAX	LTE B4	MAX			SVLTE
B14	CDMA 1900	MAX	LTE B4	MAX			SVLTE
B15	CDMA 800	MAX	LTE B13	MAX			SVLTE
B16	CDMA 1900	MAX	LTE B13	MAX			SVLTE
B17	LTE B13	MAX	Wi-Fi 2.4 GHz	17			VoIP while in mobile hotspot
B18	LTE B4	MAX	Wi-Fi 2.4 GHz	17			VoIP while in mobile hotspot
B19	LTE B13	MAX	Wi-Fi 5 GHz	13			VoIP while in mobile hotspot
B20	LTE B4	MAX	Wi-Fi 5 GHz	13			VoIP while in mobile hotspot
B21	CDMA 800	MAX	Bluetooth	MAX			Voice + BT (Estimated)
B22	CDMA 1900	MAX	Bluetooth	MAX			Voice + BT (Estimated)
B23	GSM 850	MAX	Bluetooth	MAX			Voice + BT (Estimated)
B24	GSM 1900	MAX	Bluetooth	MAX			Voice + BT (Estimated)
B25	WCDMA 850	MAX	Bluetooth	MAX			Voice + BT (Estimated)
B26	WCDMA 1900	MAX	Bluetooth	MAX			Voice + BT (Estimated)
B27	LTE B4	MAX	Bluetooth	MAX			VoIP + BT (Estimated)
B28	LTE B13	MAX	Bluetooth	MAX			VoIP + BT (Estimated)

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)			
						B1	B2	B3	B4
Band		GSM 850	GSM 1900	Wi-Fi 2.4 GHz	Wi-Fi 5 GHz	GSM 850 + Wi-Fi 2.4 GHz	GSM 850 + Wi-Fi 5 GHz	GSM 1900 + Wi-Fi 2.4 GHz	GSM 1900 + Wi-Fi 5 GHz
Position	Front of Phone 25 mm from Phantom	0.16	0.14	0.08	0.01	0.24	0.22	0.17	0.15
	Back of Phone 25 mm from Phantom	0.17	0.13	0.13	0.11	0.3	0.26	0.28	0.11

Table 4-22: SAR summations for simultaneous evaluation – GSM in Body-Worn Accessory Positions

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)			
						B5	B6	B7	B8
Band		WCDMA 850	WCDMA 1900	Wi-Fi 2.4 GHz	Wi-Fi 5 GHz	WCDMA 850 + Wi-Fi 2.4 GHz	WCDMA 850 + Wi-Fi 5 GHz	WCDMA 1900 + Wi-Fi 2.4 GHz	WCDMA 1900 + Wi-Fi 5 GHz
Position	Front of Phone 25 mm from Phantom	0.21	0.24	0.08	0.01	0.29	0.32	0.22	0.25
	Back of Phone 25 mm from Phantom	0.2	0.18	0.13	0.11	0.33	0.31	0.31	0.29

Table 4-23: SAR summations for simultaneous evaluation – WCDMA in Body-Worn Accessory Positions

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)			
						H9	H10	H11	H12
Band		CDMA 800	CDMA 1900	Wi-Fi 2.4 GHz	Wi-Fi 5 GHz	CDMA 800 + Wi-Fi 2.4 GHz	CDMA 1900 + Wi-Fi 2.4 GHz	CDMA 050 + Wi-Fi 5 GHz	CDMA 1900 + Wi-Fi 5 GHz
Position	Front of Phone 25 mm from Phantom	0.25	0.32	0.08	0.01	0.33	0.4	0.26	0.33
	Back of Phone 25 mm from Phantom	0.22	0.26	0.13	0.11	0.35	0.39	0.33	0.37

Table 4-24: SAR summations for simultaneous evaluation – CDMA in Body-Worn Accessory Positions

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)			
						B13	B14	B15	B16
Band		CDMA 800	CDMA 1900	LTE B4	LTE B13	CDMA 050 + LTE B4	CDMA 1900 + LTE B4	CDMA 800 + LTE B13	CDMA 1900 + LTE B13
Position	Front of Phone 25 mm from Phantom	0.25	0.32	0.26	0.22	0.51	0.58	0.47	0.54
	Back of Phone 25 mm from Phantom	0.22	0.26	0.24	0.24	0.46	0.5	0.46	0.5

Table 4-25: SAR summations for simultaneous evaluation – CDMA in Body-Worn Accessory Positions

		Transmitter Stand-Alone 1 g SAR Values (W/kg)							1 g SAR Summations (W/kg)					
									B21	B22	B23	B24	B25	B26
Band		CDMA 800	CDMA 1900	GSM 850	GSM 1900	WCDMA 850	WCDMA 1900	Bluetooth (Estimated)	CDMA 800 + BT	CDMA 1900 + BT	GSM 850 + BT	GSM 1900 + BT	WCDMA 850 + BT	WCDMA 1900 + BT
Position	Front of Phone 25 mm from Phantom	0.25	0.32	0.16	0.14	0.21	0.24	0.1	0.35	0.42	0.26	0.24	0.31	0.34
	Back of Phone 25 mm from Phantom	0.22	0.26	0.17	0.13	0.2	0.18	0.1	0.32	0.36	0.27	0.23	0.3	0.28

Table 4-26: SAR summations for simultaneous evaluation – Bluetooth (Estimated) in Body-Worn Accessory Positions

		Transmitter Stand-Alone 1 g SAR Values (W/kg)			1 g SAR Summations (W/kg)	
					B27	B28
Band		LTE B4	LTE B13	Bluetooth (Estimated)	LTE B4 + BT	LTE B13 + BT
Position	Front of Phone 25 mm from Phantom	0.22	0.26	0.1	0.32	0.36
	Back of Phone 25 mm from Phantom	0.24	0.24	0.1	0.34	0.34

Table 4-27: SAR summations for simultaneous evaluation – LTE in VoIP and a background data session when in a Body-Worn Accessory Position

Mobile Hotspot Exposure Conditions; Simultaneous Transmit Configurations, including Power Conditions or Reduced Limits							
Case	Transmitter #1		Transmitter #2		Transmitter #3		Notes
	Transmitter Configuration	PWR	Transmitter Configuration	PWR	Transmitter Configuration	PWR	
M1	GSM 850	MAX	Wi-Fi 2.4 GHz	17			Mobile Hotspot
M2	GSM 1900	29.1	Wi-Fi 2.4 GHz	17			Mobile Hotspot
M3	GSM 850	MAX	Wi-Fi 5 GHz	13			Mobile Hotspot
M4	GSM 1900	29.1	Wi-Fi 5 GHz	13			Mobile Hotspot
M5	WCDMA 850	MAX	Wi-Fi 2.4 GHz	17			Mobile Hotspot
M6	WCDMA 1900	20	Wi-Fi 2.4 GHz	17			Mobile Hotspot
M7	WCDMA 850	MAX	Wi-Fi 5 GHz	13			Mobile Hotspot
M8	WCDMA 1900	20	Wi-Fi 5 GHz	13			Mobile Hotspot
M9	CDMA 800	MAX	Wi-Fi 2.4 GHz	17			Mobile Hotspot
M10	CDMA 1900	19	Wi-Fi 2.4 GHz	17			Mobile Hotspot
M11	CDMA 800	MAX	Wi-Fi 5 GHz	13			Mobile Hotspot
M12	CDMA 1900	19	Wi-Fi 5 GHz	13			Mobile Hotspot
M13	LTE B13	MAX	Wi-Fi 2.4 GHz	17			Mobile Hotspot
M14	LTE B4	MAX	Wi-Fi 2.4 GHz	17			Mobile Hotspot
M15	LTE B13	MAX	Wi-Fi 5 GHz	13			Mobile Hotspot
M16	LTE B4	MAX	Wi-Fi 5 GHz	13			Mobile Hotspot
M17	CDMA 800	MAX	LTE B4	20	Wi-Fi 2.4 GHz	12	SVLTE during Mobile Hotspot
M18	CDMA 800	MAX	LTE B4	20	Wi-Fi 5.785 GHz	13	SVLTE during Mobile Hotspot
M19	CDMA 800	MAX	LTE B13	MAX	Wi-Fi 2.4 GHz	12	SVLTE during Mobile Hotspot
M20	CDMA 800	MAX	LTE B13	MAX	Wi-Fi 5.785 GHz	13	SVLTE during Mobile Hotspot
M21	CDMA 1900	19	LTE B4	19	Wi-Fi 2.4 GHz	12	SVLTE during Mobile Hotspot
M22	CDMA 1900	19	LTE B4	19	Wi-Fi 5.785 GHz	13	SVLTE during Mobile Hotspot
M23	CDMA 1900	19	LTE B13	MAX	Wi-Fi 2.4 GHz	12	SVLTE during Mobile Hotspot
M24	CDMA 1900	19	LTE B13	MAX	Wi-Fi 5.785 GHz	13	SVLTE during Mobile Hotspot

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)			
		GPRS 850	GPRS 1900	Wi-Fi 2.4 GHz	Wi-Fi 5.785 GHz	M1	M2	M3	M4
Band						GPRS 850 + Wi-Fi 2.4 GHz	GPRS 1900 + Wi-Fi 2.4 GHz	GPRS 850 + Wi-Fi 5.785 GHz	GPRS 1900 + Wi-Fi 5.785 GHz
Power Condition or Reduced Limit		N/A	29.1	17	13				
Position	Front of Phone 10 mm from Phantom	0.25	0.69	0.32	0.02	0.57	1.01	0.27	0.71
	Back of Phone 10 mm from Phantom	0.27	1.02	0.64	0.23	0.91	> 1.6	0.51	0.95
	Left Edge of Phone 10 mm from Phantom	0	0	0.8	0.18	0.8	0.8	0.18	0.18
	Right Edge of Phone 10 mm from Phantom	0.32	0.22	0	0	0.32	0.22	0.32	0.22
	Top Edge of Phone 10 mm from Phantom	0	0	0.17	0.04	0.17	0.17	0.04	0.04
	Bottom Edge of Phone 10 mm from Phantom	0.04	1.23	0	0	0.04	1.23	0.04	1.23

Table 4-21: SAR summations for simultaneous evaluation – Positions during a Mobile Hotspot session

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)			
		WCDMA 850	WCDMA 1900	Wi-Fi 2.4 GHz	Wi-Fi 5 GHz	M5	M6	M7	M8
Band						WCDMA 850 + Wi-Fi 2.4 GHz	WCDMA 1900 + Wi-Fi 2.4 GHz	WCDMA 850 + Wi-Fi 5 GHz	WCDMA 1900 + Wi-Fi 5 GHz
Power Condition or Reduced Limit		N/A	20	17	13				
Position	Front of Phone 10 mm from Phantom	0.28	0.21	0.32	0.02	0.6	0.53	0.3	0.23
	Back of Phone 10 mm from Phantom	0.28	0.58	0.64	0.23	0.92	1.22	0.51	0.81
	Left Edge of Phone 10 mm from Phantom	0	0	0.8	0.18	0.8	0.8	0.18	0.18
	Right Edge of Phone 10 mm from Phantom	0.26	0.13	0	0	0.26	0.13	0.26	0.13
	Top Edge of Phone 10 mm from Phantom	0	0	0.17	0.04	0.17	0.17	0.04	0.04
	Bottom Edge of Phone 10 mm from Phantom	0.08	0.77	0	0	0.08	0.77	0.08	0.77

Table 4-28: SAR summations for simultaneous evaluation – Positions during a Mobile Hotspot session

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)			
		CDMA 800	CDMA 1900	Wi-Fi 2.4 GHz	Wi-Fi 5 GHz	M9	M10	M11	M12
Band						CDMA 800 + Wi-Fi 2.4 GHz	CDMA 1900 + Wi-Fi 2.4 GHz	CDMA 050 + Wi-Fi 5 GHz	CDMA 1900 + Wi-Fi 5 GHz
Power Condition or Reduced Limit		N/A	20	17	13				
Position	Front of Phone 10 mm from Phantom	0.51	0.68	0.32	0.02	0.83	1	0.53	0.7
	Back of Phone 10 mm from Phantom	0.52	0.55	0.64	0.23	1.16	1.19	0.75	0.78
	Left Edge of Phone 10 mm from Phantom	0	0	0.8	0.18	0.8	0.8	0.18	0.18
	Right Edge of Phone 10 mm from Phantom	0.55	0.2	0	0	0.55	0.2	0.55	0.2
	Top Edge of Phone 10 mm from Phantom	0	0	0.17	0.04	0.17	0.17	0.04	0.04
	Bottom Edge of Phone 10 mm from Phantom	0.1	1	0	0	0.1	1	0.1	1

Table 4-29: SAR summations for simultaneous evaluation – Positions during a Mobile Hotspot session

		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)			
		LTE Band 13	LTE Band 4	Wi-Fi 2.4 GHz	Wi-Fi 5.785 GHz	M13	M14	M15	M16
Band						LTE Band 13 + Wi-Fi 2.4 GHz	LTE Band 4 + Wi-Fi 2.4 GHz	LTE Band 13 + Wi-Fi 5 GHz	LTE Band 4 + Wi-Fi 5 GHz
Power Condition or Reduced Limit		N/A	22	17	13				
Position	Front of Phone 10 mm from Phantom	0.41	1.1	0.32	0.02	0.73	1.42	0.43	1.22
	Back of Phone 10 mm from Phantom	0.42	1.2	0.64	0.23	1.06	> 1.6	0.65	1.43
	Left Edge of Phone 10 mm from Phantom	0.39	0.48	0.8	0.18	1.19	1.28	0.57	0.66
	Right Edge of Phone 10 mm from Phantom	0	0	0	0	0	0	0	0
	Top Edge of Phone 10 mm from Phantom	0	0	0.17	0.04	0.17	0.17	0.04	0.04
	Bottom Edge of Phone 10 mm from Phantom	0.31	1.06	0	0	0.31	1.06	0.31	1.06

Table 4-30: SAR summations for simultaneous evaluation – Positions during a Mobile Hotspot session

		Transmitter Stand-Alone 1 g SAR Values (W/kg)					1 g SAR Summations (W/kg)			
		CDMA 800	LTE Band 4	LTE Band 13	Wi-Fi 2.4 GHz	Wi-Fi 5.785 GHz	M17	M18	M19	M20
Band		CDMA 800	LTE Band 4	LTE Band 13	Wi-Fi 2.4 GHz	Wi-Fi 5.785 GHz	CDMA 800 + LTE Band 4 + Wi-Fi 2.4 GHz	CDMA 800 + LTE Band 4 + Wi-Fi 5.785 GHz	CDMA 800 + LTE Band 13 + Wi-Fi 2.4 GHz	CDMA 800 + LTE Band 13 + Wi-Fi 5.785 GHz
Power Condition or Reduced Limit		N/A	20	N/A	12	13				
Position	Front of Phone 10 mm from Phantom	0.51	0.71	0.41	0.06	0.02	1.28	1.24	0.98	0.94
	Back of Phone 10 mm from Phantom	0.52	0.59	0.42	0.15	0.23	1.26	1.34	1.09	1.17
	Left Edge of Phone 10 mm from Phantom	0	0.33	0.39	0.17	0.18	0.5	0.51	0.56	0.57
	Right Edge of Phone 10 mm from Phantom	0.55	0	0	0	0	0.55	0.55	0.55	0.55
	Top Edge of Phone 10 mm from Phantom	0	0	0	0.03	0.04	0.03	0.04	0.03	0.04
	Bottom Edge of Phone 10 mm from Phantom	0.1	0.67	0.31	0	0	0.77	0.77	0.41	0.41

Table 4-31: SAR summations for simultaneous evaluation – Positions during a Mobile Hotspot session with a concurrent Voice session

		Transmitter Stand-Alone 1 g SAR Values (W/kg)					1 g SAR Summations (W/kg)			
		CDMA 1900	LTE Band 4	LTE Band 13	Wi-Fi 2.4 GHz	Wi-Fi 5.785 GHz	M21	M22	M23	M24
Band		CDMA 1900	LTE Band 4	LTE Band 13	Wi-Fi 2.4 GHz	Wi-Fi 5.785 GHz	CDMA 1900 + LTE Band 4 + Wi-Fi 2.4 GHz	CDMA 1900 + LTE Band 4 + Wi-Fi 5.785 GHz	CDMA 1900 + LTE Band 13 + Wi-Fi 2.4 GHz	CDMA 1900 + LTE Band 13 + Wi-Fi 5.785 GHz
Power Condition or Reduced Limit		19	19	N/A	12	13				
Position	Front of Phone 10 mm from Phantom	0.68	0.6	0.41	0.06	0.02	1.34	1.3	1.15	1.11
	Back of Phone 10 mm from Phantom	0.55	0.53	0.42	0.15	0.23	1.23	1.31	1.12	1.20
	Left Edge of Phone 10 mm from Phantom	0	0.2	0.39	0.17	0.18	0.37	0.38	0.56	0.57
	Right Edge of Phone 10 mm from Phantom	0.16	0	0	0	0	0.16	0.16	0.16	0.16
	Top Edge of Phone 10 mm from Phantom	0	0	0	0.03	0.04	0.03	0.04	0.03	0.04
	Bottom Edge of Phone 10 mm from Phantom	1	0.45	0.31	0	0	1.45	1.45	1.31	1.31

Table 4-32: SAR summations for simultaneous evaluation – Positions during a Mobile Hotspot session with a concurrent Voice session

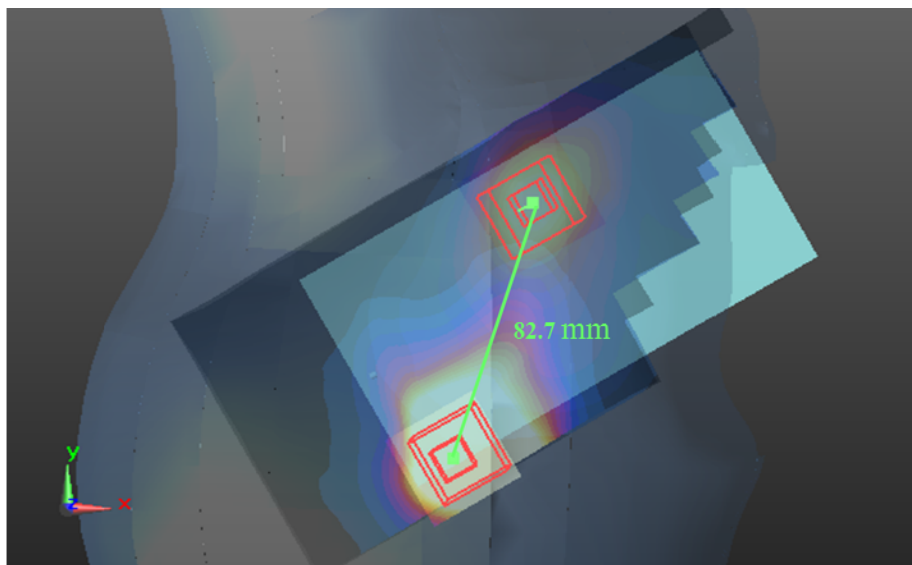
Per the preceding analysis, the following configurations and transmitter combinations required further investigation:

- H2. Right Cheek, GSM 1900 + Wi-Fi 2.4 GHz
- H6. Right Cheek, WCDMA 1900 + Wi-Fi 2.4 GHz
- H10. Right Cheek, CDMA 1900 + Wi-Fi 2.4 GHz
- H26. Right Cheek LTE Band 4 + Wi-Fi 2.4 GHz
- H30. Right Cheek, EVDO 1900 + Wi-Fi 2.4 GHz

- M2. Back of DUT 10 mm from Phantom, GSM 1900 + Wi-Fi 2450
- M14. Back of DUT 10 mm from Phantom, LTE Band 4 + Wi-Fi 2450

The guidelines provided in FCC KDB 447498 D01 were utilized for evaluation of the need for simultaneous transmission SAR measurements. These guidelines direct that if the SAR-to-peak location separation ratio (SPLSR) for a pair of antennas is ≤ 0.04 then SAR measurement for simultaneous transmission is not required. Overlaid SAR plots, separation distances between RF peaks, and demonstration of these calculations are provided below for each noted case. Calculations of peak separation distances were evaluated per SPEAG Technical Note “Calculation of the Distance between Two Hotspot”, *TN_110209_DASY_Calculate_HotSpot_Distance.pdf*.

Case H2: Right Cheek, GSM 1900 + Wi-Fi 2.4 GHz

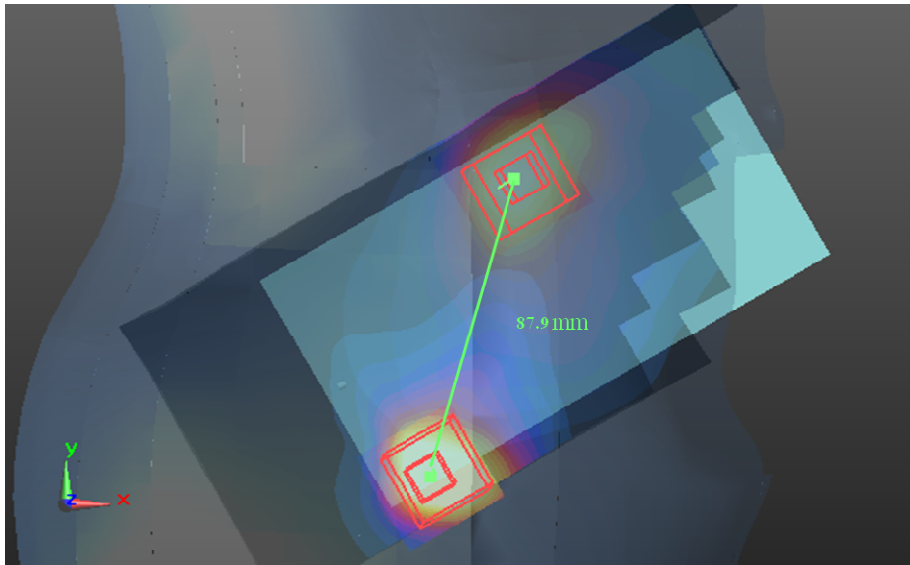


GPRS 1900 Right Head Cheek SAR overlaid with Wi-Fi 2.4 GHz Right Head Cheek SAR

Transmitter	1-g SAR
GPRS 1900	0.48
Wi-Fi 2.4 GHz	1.21
Sum ^{1.5}	2.2
Peak separation distance	82.7 mm
SPLSR	0.03

As the SPLSR is less than or equal to 0.04, no measurements to determine the aggregate 1-g SAR were required for this case.

Case H6: Right Cheek, WCDMA 1900 + Wi-Fi 2.4 GHz

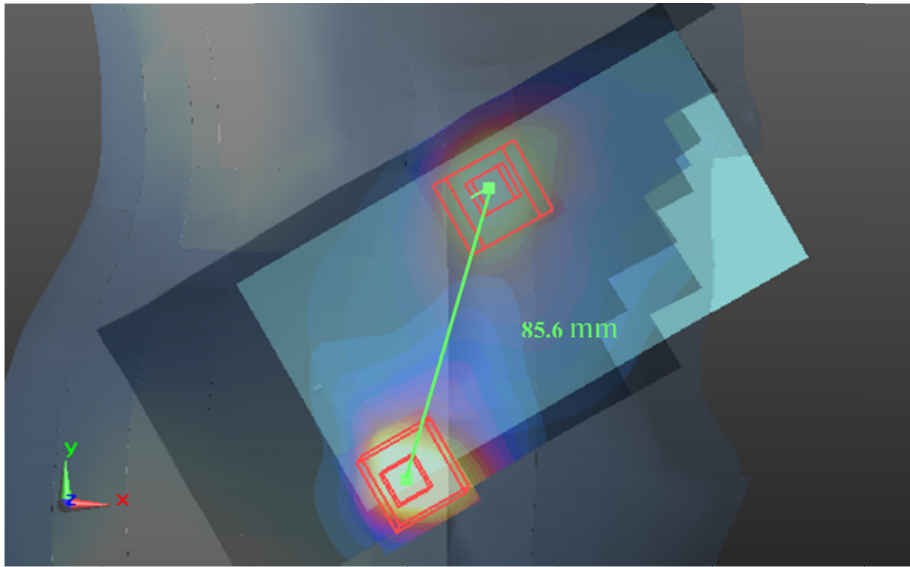


WCDMA 1900 Right Head Cheek SAR overlaid with Wi-Fi 2.4 GHz Right Head Cheek SAR

Transmitter	1-g SAR
WCDMA 1900	1.02
Wi-Fi 2.4 GHz	1.21
Sum ^{1.5}	3.33
Peak separation distance	87.9 mm
<i>SPLSR</i>	0.04

As the SPLSR is less than or equal to 0.04, no measurements to determine the aggregate 1-g SAR were required for this case.

Case H10: Right Cheek, CDMA 1900 + Wi-Fi 2.4 GHz

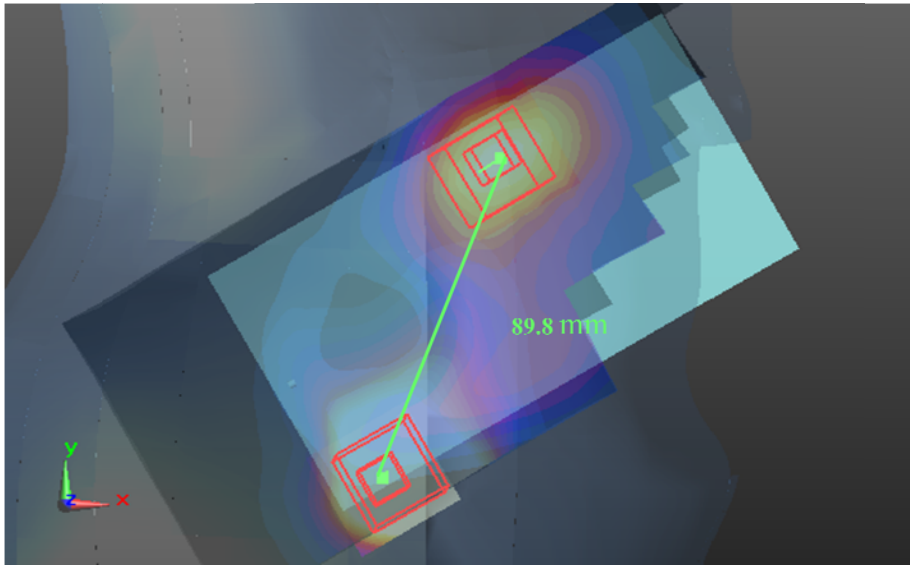


CDMA 1900 Right Head Cheek SAR overlaid with Wi-Fi 2.4 GHz Right Head Cheek SAR

Transmitter	1-g SAR
CDMA 1900	0.99
Wi-Fi 2.4 GHz	1.21
Sum ^{1.5}	3.26
Peak separation distance	85.6 mm
<i>SPLSR</i>	0.04

As the SPLSR is less than or equal to 0.04, no measurements to determine the aggregate 1-g SAR were required for this case.

Case H26: Right Cheek, LTE Band 4 + Wi-Fi 2.4 GHz

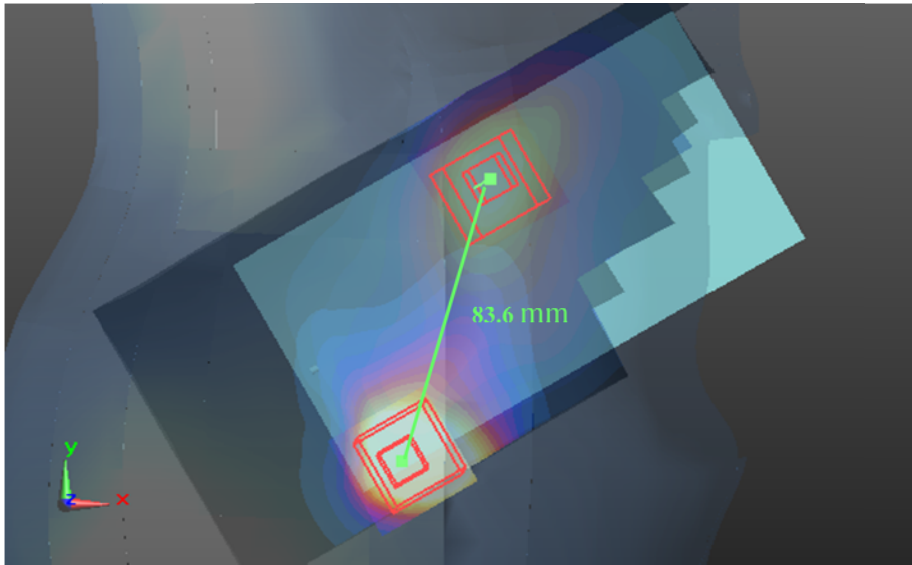


LTE Band 4 Right Head Cheek SAR overlaid with Wi-Fi 2.4 GHz Right Head Cheek SAR

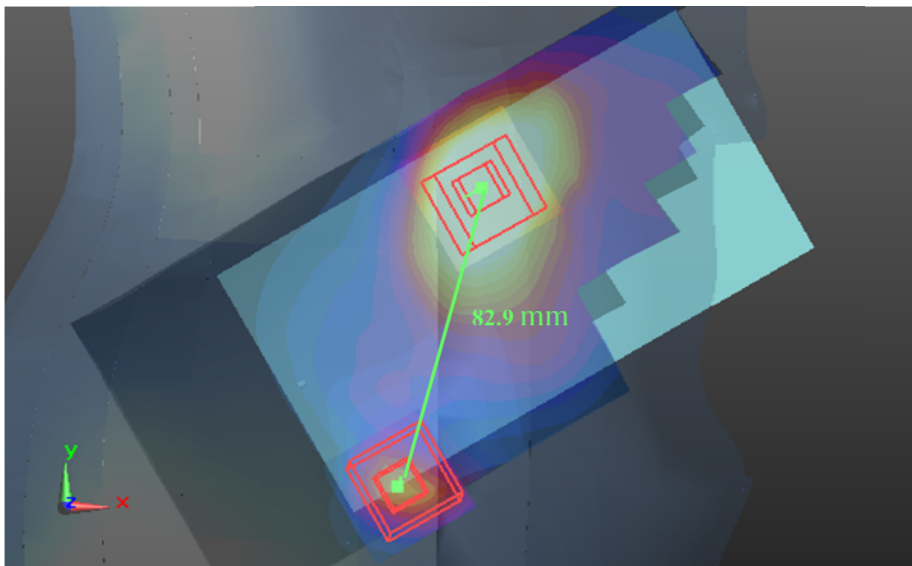
Transmitter	1-g SAR
LTE Band 4	0.47
Wi-Fi 2.4 GHz	1.21
Sum ^{1.5}	2.18
Peak separation distance	89.8 mm
<i>SPLSR</i>	0.02

As the SPLSR is less than or equal to 0.04, no measurements to determine the aggregate 1-g SAR were required for this case.

Case H30: Right Cheek, EVDO 1900 + Wi-Fi 2.4 GHz



EVDO 1900 Right Head Cheek SAR with SNN5924A Battery overlaid with Wi-Fi 2.4 GHz Right Head Cheek SAR with SNN5924A Battery

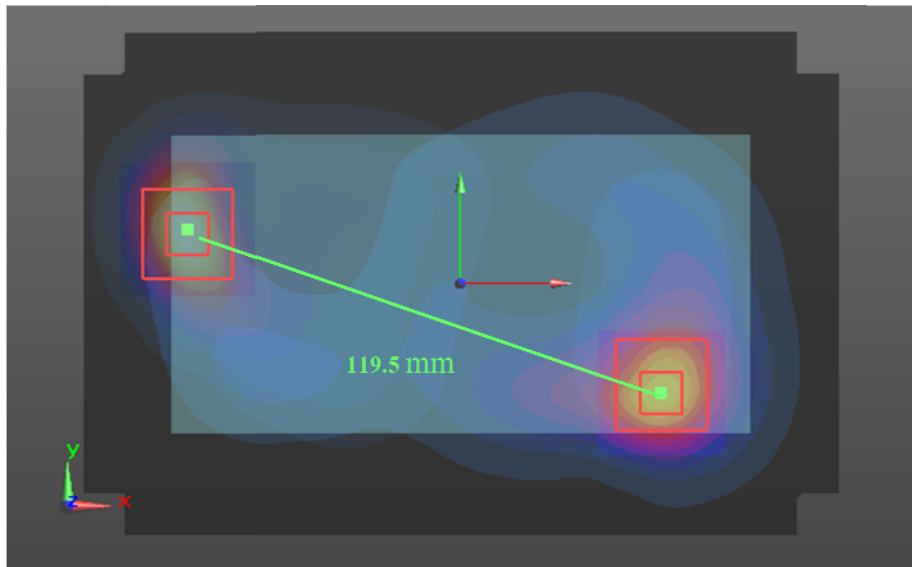


EVDO 1900 Right Head Cheek SAR with SNN5925A Battery overlaid with Wi-Fi 2.4 GHz Right Head Cheek SAR with SNN5925A Battery

Transmitter	1-g SAR	1-g SAR
Battery	SNN5924A	SNN5925A
EVDO 1900	0.73	1.3
Wi-Fi 2.4 GHz	1.21	0.51
Sum ^{1.5}	2.70	2.44
Peak separation distance	83.6 mm	82.9 mm
SPLSR	0.04	0.03

As the SPLSR is less than or equal to 0.04, no measurements to determine the aggregate 1-g SAR were required for this case.

Case M2: Back of DUT 10 mm from Phantom, GSM 1900 + Wi-Fi 2450

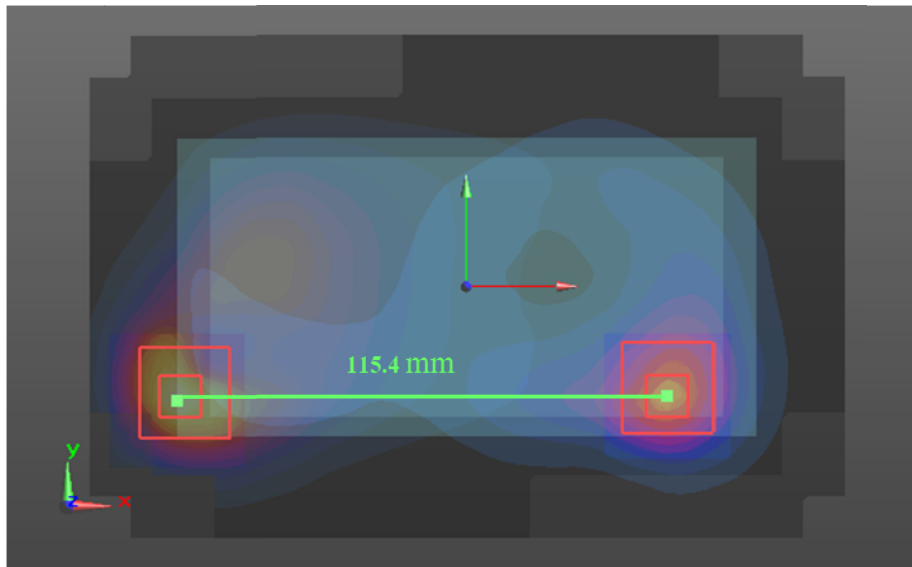


GPRS 1900 Back of DUT 10 mm from Phantom SAR overlaid with Wi-Fi 2.4 GHz Back of DUT 10 mm from Phantom SAR

Transmitter	1-g SAR
GPRS 1900	1.02
Wi-Fi 2.4 GHz	0.64
Sum ^{1.5}	2.14
Peak separation distance	119.5 mm
SPLSR	0.02

As the SPLSR is less than or equal to 0.04, no measurements to determine the aggregate 1-g SAR were required for this case.

Case M2: Back of DUT 10 mm from Phantom, LTE Band 4 + Wi-Fi 2450



LTE Band 4 Back of DUT 10 mm from Phantom SAR overlaid with Wi-Fi 2.4 GHz Back of DUT 10 mm from Phantom SAR

Transmitter	1-g SAR
LTE Band 4	1.20
Wi-Fi 2.4 GHz	0.64
Sum ^{1.5}	2.50
Peak separation distance	115.4 mm
SPLSR	0.02

As the SPLSR is less than or equal to 0.04, no measurements to determine the aggregate 1-g SAR were required for this case.

5 References to Test Standards and Guidance

- [1] CENELEC, EN 62209-1:2006 “Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures - Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)”
- [2] CENELEC, EN 50360:2001 “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)”
- [7] IC RSS-102 “Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
- [8] IC Notice 2012-DRS1203 “RE: Applicability of Latest FCC RF Exposure KDB Procedures (Publication Date: October 24, 2012) and Other Procedures”
- [9] CENELEC, EN 62209-2:2010 “Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)”
- [10] FCC KDB Publication 248227 D01 v01r02 “SAR Measurement Procedures for 802.11 a/b/g Transmitters”
- [11] FCC KDB Publication 447498 D01 v05 “Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies”
- [12] FCC KDB Publication 648474 D04 v01 “SAR Evaluation Considerations for Wireless Handsets”
- [13] FCC KDB Publication 865664 D01 v01 “SAR Measurement Requirements for 100 MHz to 6 GHz”
- [14] FCC KDB Publication 865664 D02 v01 “RF Exposure Compliance Reporting and Documentation Considerations”
- [15] FCC KDB Publication 941225 D01 v02 “SAR Measurement Procedures for 3G Devices”
- [16] FCC KDB Publication 941225 D03 v01 “Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE”
- [17] FCC KDB Publication 941225 D05 v02r01 “SAR Evaluation Considerations for LTE Devices”
- [18] FCC KDB Publication 941225 D06 v01 “SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities”