



MOTOROLA

Portable Cellular Phone SAR Test Report

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

Test Report #: 25430-1F Supplemental
Date of Report: Jun-28-2013
Date of Test: May-08-2013 to Jun-20, 2013
FCC ID #: IHDT56PE1
IC ID #: N/A
Generic Name: M0D95

Test Laboratory: Motorola Mobility, LLC - ADR Test Services Laboratory
600 N. US Highway 45
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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	Jun-28-2013	Initial report release

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].

Per direction of the FCC, the following SAR test data is being provided to demonstrate the device's effective utilization of power reduction conditions specified in Exhibit 12 - Operational Description. The values in the tables in Section 6.0 are provided solely for the purpose of confirming compliant power reduction operation and do not represent maximum SAR values of the product. For maximum reported SAR compliance values, refer to the Exhibit 11 SAR test report.

2 Details of the Device Under Test

2.1 Sample Information

Serial Number(s) (Functional Use)	LUME290020	(CDMA conducted power measurements, CDMA/Wi-Fi SAR testing)
	LUME290014	(GSM conducted power measurements, GSM/CDMA SAR testing)
	LUME290017	(WCDMA conducted power measurements, WCDMA/LTE Band 4/13 SAR testing)
	LUME290016	(LTE Band 4 conducted power measurements, LTE Band 4 SAR testing)
	LUME290023	(LTE Band 13 conducted power measurements, LTE Band 4/13 SAR testing)
Production Unit or Identical Prototype (47 CFR §2.908)	Identical Prototype	
Device Category	Portable (Mobile Station Class B)	
RF Exposure Limits	General Population / Uncontrolled	

For a complete description of the device under test, see the Exhibit 11 SAR test report 25430-1F and the Exhibit 12 Operational Description for this device.

2.2 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 configurations, reduced power limits are enforced on the LTE Band 4 transmitter. Tables of the reduced limits used for testing are given below.

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)	23.0	23.0	23.0	23.0	23.0	23.0

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, *if the power on the 1x CDMA transmitter for voice is operating above 18 dBm*, a reduced maximum LTE transmit power limit is enforced to ensure SAR exposure compliance is maintained. When the power of the 1x CDMA transmitter is operating at or below 18 dBm or this combination of transmitters is not in use, the LTE transmitter operates up to its maximum power limit. Note that both conditions (1x CDMA above 18 dBm and LTE at reduced power, or 1x CDMA at or below 18 dBm with LTE at full power) are demonstrated for SAR compliance in section 6. A table of the reduced limits used for testing is given below.

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 Operation	LTE Band 13					
Test Channel	Applicable to all channels/channel bandwidths					
Modulation	QPSK			16QAM		
RB Allocation	1 RB	50%	100%	1 RB	50%	100%
Maximum Output Power (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 (dBm)	21.5	21.5	21.5	21.5	21.5	21.5

The LTE transmitter may also operate as the data transport to the network during a mobile hotspot session. For operation in this state, the noted reduced power limit is strictly enforced regardless of other transmit conditions.

While operating in a mobile hotspot session, either as data transport to the network or voice transport for SVLTE during a mobile hotspot session, a reduced maximum power limit is enforced on the CDMA transmitter to ensure SAR exposure compliance is maintained. A table of the reduced limits used for testing is 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)	24.0

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). Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4 W/kg to 10 W/kg.

For a complete tabulation of equipment used, system validation measurements, system verification measurements, and simulated tissue dielectric properties, see the Exhibit 11 SAR test report 25430-1F.

4 Test Setup Information, SAR Measurement Results, and Analysis

4.1 Overview of Test Setup and Results

Per direction of the FCC, the following SAR test data is being provided to demonstrate the device's effective utilization of power reduction conditions specified in Exhibit 12 - Operational Description. The values in the table(s) are provided solely for purposes of confirming compliant power reduction operation and do not represent maximum SAR values of the product. For maximum reported SAR compliance values, refer to the Exhibit 11 SAR test report 25430-1F.

Note this report does not include conditions and test results where both the maximum and reduced power SAR values are demonstrated in the Exhibit 11 SAR test report.

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 Appendix 1 of this report.

LTE Band 4 against head-adjacent exposure									
Configuration	Channel	f (MHz)	1 g SAR value without Power Reduction			1 g SAR value with Power Reduction			Measured SAR Reduction (dB)
			Maximum Power Limit (dBm)	Measured (W/kg)	Corrected (W/kg)	Reduced Power Limit (dBm)	Measured (W/kg)	Corrected (W/kg)	
Left Head Cheek-Touch	20175	1732.5	24.0	1.48	1.54	23.0	0.915	0.95	-2.1

CDMA 1900 during a mobile hotspot session									
Configuration	Channel	f (MHz)	1 g SAR value without Power Reduction			1 g SAR value with Power Reduction			Measured SAR Reduction (dB)
			Maximum Power Limit (dBm)	Measured (W/kg)	Corrected (W/kg)	Reduced Power Limit (dBm)	Measured (W/kg)	Corrected (W/kg)	
Bottom Edge of Phone 10 mm from Phantom	1175	1908.8	25.0	1.25	1.36	24.0	0.995	1.13	-0.8

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 v05r01 “Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies”
- [12] FCC KDB Publication 648474 D04r01 v01 “SAR Evaluation Considerations for Wireless Handsets”
- [13] FCC KDB Publication 865664 D01 v01r01 “SAR Measurement Requirements for 100 MHz to 6 GHz”
- [14] FCC KDB Publication 865664 D02 v01r01 “RF Exposure Compliance Reporting and Documentation Considerations”
- [15] FCC KDB Publication 941225 D01 v02r02 “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 v02r02 “SAR Evaluation Considerations for LTE Devices”
- [18] FCC KDB Publication 941225 D06 v01r01 “SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities”

Appendix 1

SAR Distribution Plots

Date/Time: 6/17/2013 9:04:42 PM

Test Lab: Motorola Mobility - Measurement at Full Power (Without Power Reduction)**DUT Serial: LUME290023; FCC ID: IHDT56PE1;**

Antenna: Internal; Battery: SNN5916B;

Test Configuration: Cheek

DASY Configuration:

- Probe: ES3DV3 - SN3124; ConvF(5.07,5.07,5.07); Calibrated: 8/20/2012;
- Sensor-Surface: 4 mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 9/3/2012
- Phantom: R#2 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1136
- DASY52 52.8.5(1059); SEMCAD X Version 14.6.10 (7164)

Communication System: _LTE Band 04; Communication System Band: Band 4: 20 MHz BW;
Frequency: 1733 MHz; Duty Cycle: 1:1.000

Medium Parameters used: $f=1732.5$ MHz; $\sigma = 1.348$; $\epsilon_r = 36.44$ mho/m; $\rho = 1.000$ kg/m³

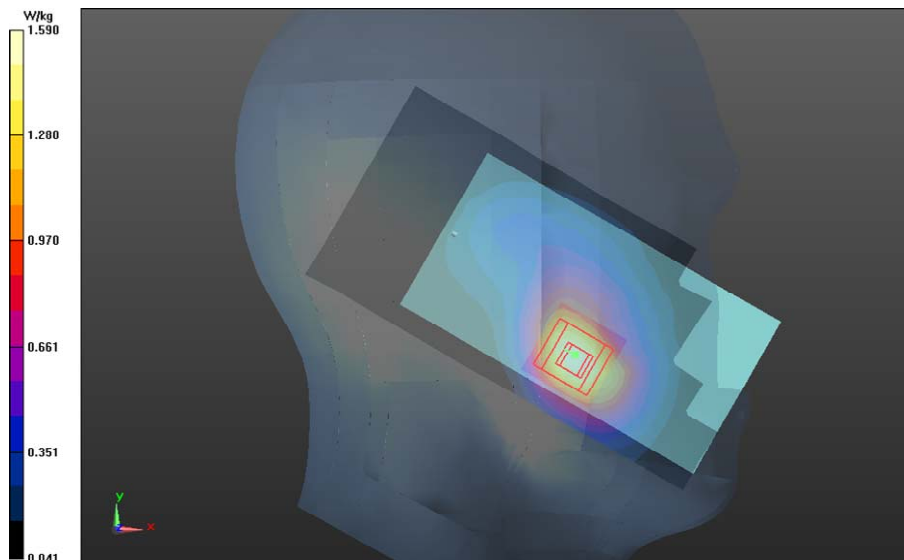
0.6-2GHz, Left Head Template/15mm, Area Scan (61x161x1):**Interpolated grid: dx=1.500 mm, dy=1.500 mm**

Fast SAR: SAR(1g) = 1.46 W/kg; SAR(10g) = 0.867 W/kg

0.6-2GHz, Left Head Template/5x5x7 Zoom Scan (0.6-2GHz) (21x21x36)/Cube 0:**Interpolated grid: dx=1.600 mm, dy=1.600 mm, dz=1.000 mm**

Reference Value = 32.189 V/m, Power Drift = -0.055 dB

Averaged SAR: SAR(1g) = 1.48 W/kg; SAR(10g) = 0.923 W/kg

**0.6-2GHz, Left Head Template**

Date/Time: 5/15/2013 12:55:44 AM

Test Lab: Motorola Mobility - Measurement at Reduced Power

DUT Serial: LUME290016; FCC ID: IHDT56PE1;

Antenna: Internal; Battery: SNN5916B;

Test Configuration: Cheek

DASY Configuration:

- Probe: ES3DV3 - SN3124; ConvF(5.07,5.07,5.07); Calibrated: 8/20/2012;
- Sensor-Surface: 4 mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 9/3/2012
- Phantom: R#2 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1136
- DASY52 52.8.5(1059); SEMCAD X Version 14.6.10 (7164)

Communication System: _LTE Band 04; Communication System Band: Band 4: 20 MHz BW;
Frequency: 1733 MHz; Duty Cycle: 1:1.000

Medium Parameters used: $f=1732.5$ MHz; $\sigma = 1.332$; $\epsilon_r = 37.26$ mho/m; $\rho = 1.000$ kg/m³

0.6-2GHz, Left Head Template/15mm, Area Scan (61x161x1):

Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

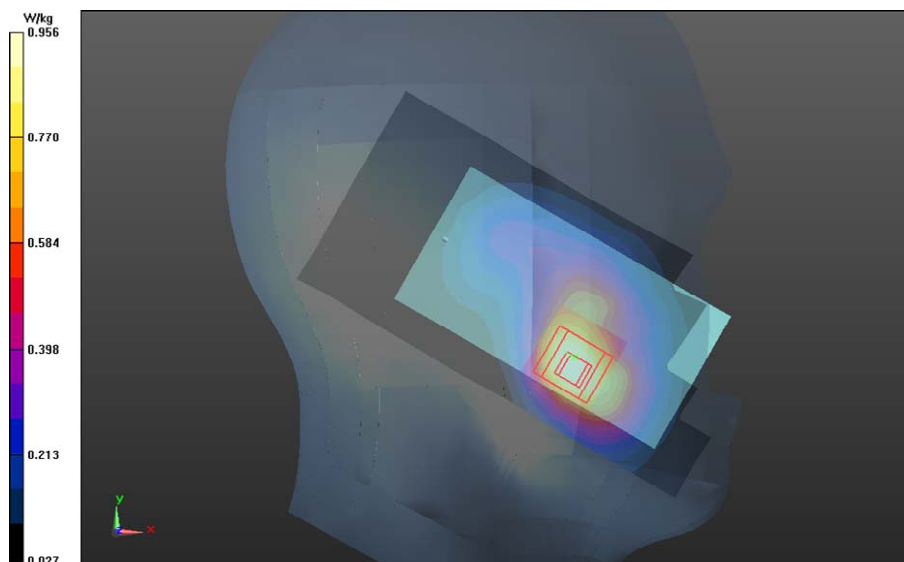
Fast SAR: SAR(1g) = 0.903 W/kg; SAR(10g) = 0.546 W/kg

0.6-2GHz, Left Head Template/5x5x7 Zoom Scan (0.6-2GHz) (21x21x36)/Cube 0:

Interpolated grid: $dx=1.600$ mm, $dy=1.600$ mm, $dz=1.000$ mm

Reference Value = 25.024 V/m, Power Drift = 0.068 dB

Averaged SAR: SAR(1g) = 0.915 W/kg; SAR(10g) = 0.580 W/kg



0.6-2GHz, Left Head Template

Date/Time: 5/9/2013 3:07:25 PM

Test Lab: Motorola Mobility - Measurement at Full Power (Without Power Reduction)**DUT Serial: LUME290020; FCC ID: IHDT56PE1;**

Antenna: Internal; Battery: SNN5916B;

Test Configuration: Bottom Edge of Phone 10 mm from Phantom

DASY Configuration:

- Probe: ES3DV3 - SN3037; ConvF(4.83,4.83,4.83); Calibrated: 9/13/2012;
- Sensor-Surface: 4 mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/11/2012
- Phantom: R#4 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a
- DASY52 52.8.5(1059); SEMCAD X Version 14.6.10 (7164)

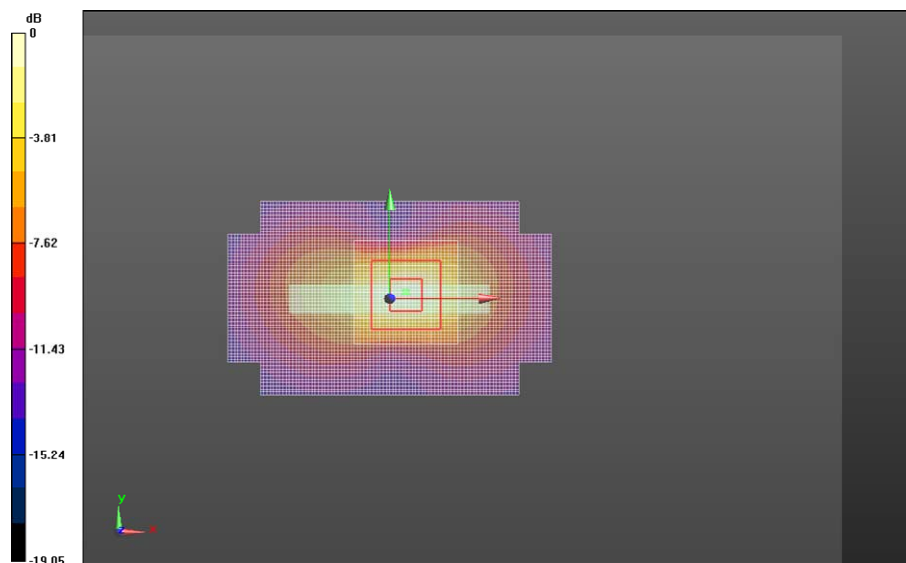
Communication System: _CDMA; Communication System Band: CDMA 1900; Frequency: 1909 MHz;
Duty Cycle: 1:1.000Medium Parameters used: $f=1908.75$ MHz; $\sigma = 1.570$; $\epsilon_r = 50.15$ mho/m; $\rho = 1.000$ kg/m³**0.6-2GHz Triple Flat Phone Template/Area Scan (10mm) (261x141x1):****Interpolated grid: dx=1.000 mm, dy=1.000 mm**

Fast SAR: SAR(1g) = 1.19 W/kg; SAR(10g) = 0.575 W/kg

0.6-2GHz Triple Flat Phone Template/5x5x7 Zoom Scan (0.6-2GHz) (21x21x36)/Cube 0:**Interpolated grid: dx=1.600 mm, dy=1.600 mm, dz=1.000 mm**

Reference Value = 26.143 V/m, Power Drift = 0.032 dB

Averaged SAR: SAR(1g) = 1.25 W/kg; SAR(10g) = 0.607 W/kg

**0.6-2GHz Triple Flat Phone Template**

Date/Time: 6/20/2013 5:18:49 PM

Test Lab: The name of your organization - Measurement at Reduced Power**DUT Serial: LUME290020; FCC ID: IHDT56PE1;**

Antenna: Internal; Battery: SNN5916B;

Test Configuration: Bottom Edge of Phone 10 mm from Phantom

DASY Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.76,4.76,4.76); Calibrated: 8/20/2012;
- Sensor-Surface: 4 mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 9/3/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a
- DASY52 52.8.7(1137); SEMCAD X Version 14.6.10 (7164)

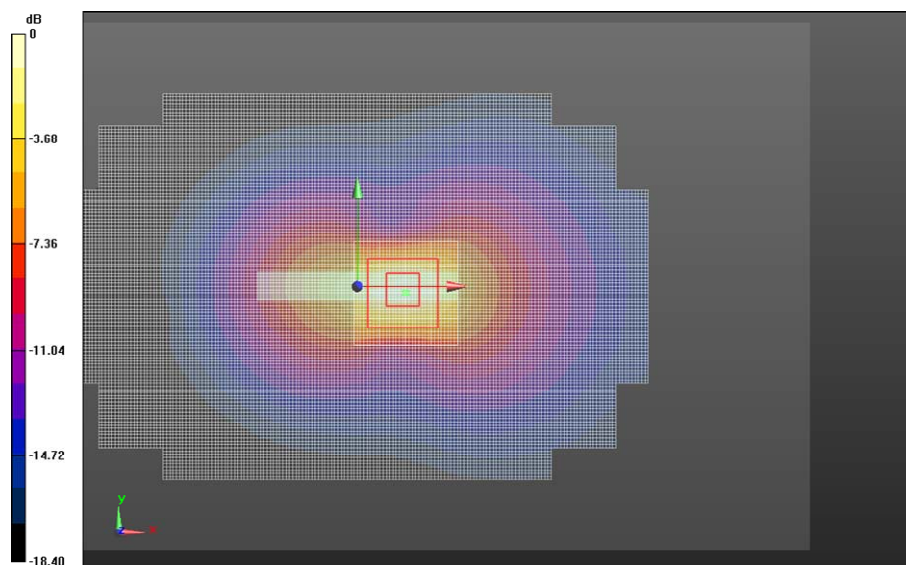
Communication System: _CDMA; Communication System Band: CDMA 1900; Frequency: 1909 MHz;
Duty Cycle: 1:1.000Medium Parameters used: $f=1908.75$ MHz; $\sigma = 1.569$; $\epsilon_r = 48.52$ mho/m; $\rho = 1.000$ kg/m³**0.6-2GHz Triple Flat Phone Template/Area Scan (10mm) (261x141x1):****Interpolated grid: dx=1.000 mm, dy=1.000 mm**

Fast SAR: SAR(1g) = 0.984 W/kg; SAR(10g) = 0.473 W/kg

0.6-2GHz Triple Flat Phone Template/5x5x7 Zoom Scan (0.6-2GHz) (21x21x36)/Cube 0:**Interpolated grid: dx=1.600 mm, dy=1.600 mm, dz=1.000 mm**

Reference Value = 28.475 V/m, Power Drift = -0.202 dB

Averaged SAR: SAR(1g) = 0.995 W/kg; SAR(10g) = 0.489 W/kg

**0.6-2GHz Triple Flat Phone Template**

END OF REPORT