



CERTIFICATE 2518.05

## DECLARATION OF COMPLIANCE SAR ASSESSMENT PCII Report Part 1 of 2

**Motorola Solutions Inc.****EME Test Laboratory**

Motorola Solutions Malaysia Sdn Bhd

Plot 2A, Medan Bayan Lepas,

Mukim 12 SWD 11900 Bayan Lepas Penang, Malaysia.

**Date of Report:** 01/17/2022**Report Revision:** A**Responsible Engineer:**

Puteri Alifah Liyana Bin Nor Rahim (EME Engineer)

**Report Author:**

Muhammad Zakwan Bin Zaidi (EME Senior Technician)

**Date/s Tested:**

10/23/21-10/24/2021, 12/30/2021-12/31/2021, 1/1/2022, 1/3/2022

**Manufacturer:**

Motorola Solutions Inc.

**DUT Description:**Handheld Portable PMUE4541B, XCVR 403-470 MHz, Display &  
Handheld Portable PMUE4542B, XCVR 403-470 MHz, Non-Display**Test TX mode(s):**

FM/TDMA (PTT)

**Max. Power output:**

2.4W (Analog), 3.3W (Digital)

**Tx Frequency Bands:**

LMR 403-470 MHz

**Signaling type:**

FM/TDMA (LMR)

**Model(s) Tested:**

PMUE4541B

**Model(s) Certified:**

PMUE4542B, AAH88QCC9JA2AN, AAH88QCP9JA2AN, AAH88QCP9JG2AN

**Serial Number(s):**

546TXV0351 &amp; 546TQM0138

**Classification:**

Occupational/Controlled

**Applicant Name:**

Motorola Solutions Inc.

**Applicant Address:**

8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322

**FCC ID:**

AZ489FT4922 ; LMR 406.1-470MHz

This report contains results that are immaterial for FCC equipment approval, which are clearly identified.

**IC:**

109U-89FT4922 ; LMR 406.1-430 MHz and 450-470 MHz

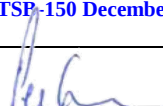
This report contains results that are immaterial for ISED equipment approval, which are clearly identified.

**ISED Test Site registration:** 24843**FCC Test Firm Registration Number:** 823256

The test results clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits of 8 W/kg averaged over 1 gram per the requirements of FCC 47 CFR § 2.1093 and RSS-102 (Issue 5).

Based on the information and the testing results provided herein, the undersigned certifies that when used as stated in the operating instructions supplied, said product complies with the national and international reference standards and guidelines listed in section 4.0 of this report (no deviation from standard methods). This report shall not be reproduced without written approval from an officially designated representative of the Motorola Solutions Inc EME Laboratory.

I attest to the accuracy of the data and assume full responsibility for the completeness of these measurements. This reporting format is consistent with the suggested guidelines of the TIA TSP-150 December 2004. The results and statements contained in this report pertain only to the device(s) evaluated.

  
**Pei Loo Tey**  
**Approved Signatory**  
**Approval Date: 1/17/2022**

## **Appendix C**

### **Dipole Calibration Certificates**

**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
Zeughausstrasse 43, 8004 Zurich, Switzerland



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Client **Motorola Solutions MY**

Certificate No: **D450V3-1054\_Mar19**

## CALIBRATION CERTIFICATE

Object **D450V3 - SN:1054**

Calibration procedure(s) **QA CAL-15.v9  
Calibration Procedure for SAR Validation Sources below 700 MHz**

Calibration date: **March 11, 2019**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature ( $22 \pm 3$ )°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards           | ID #               | Cal Date (Certificate No.)      | Scheduled Calibration |
|-----------------------------|--------------------|---------------------------------|-----------------------|
| Power meter NRP             | SN: 104778         | 04-Apr-18 (No. 217-02672/02673) | Apr-19                |
| Power sensor NRP-Z91        | SN: 103244         | 04-Apr-18 (No. 217-02672)       | Apr-19                |
| Power sensor NRP-Z91        | SN: 103245         | 04-Apr-18 (No. 217-02673)       | Apr-19                |
| Reference 20 dB Attenuator  | SN: 5277 (20x)     | 04-Apr-18 (No. 217-02682)       | Apr-19                |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 04-Apr-18 (No. 217-02683)       | Apr-19                |
| Reference Probe EX30V4      | SN: 3877           | 31-Dec-18 (No. EX3-3877_Dec18)  | Dec-19                |
| DAE4                        | SN: 654            | 05-Jul-18 (No. DAE4-654_Jul18)  | Jul-19                |

| Secondary Standards             | ID #             | Check Date (in house)             | Scheduled Check        |
|---------------------------------|------------------|-----------------------------------|------------------------|
| Power meter E4419B              | SN: GB41293874   | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| Power sensor E4412A             | SN: MY41498087   | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| Power sensor E4412A             | SN: 000110210    | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| RF generator HP 8648C           | SN: US3642U01700 | 04-Aug-99 (in house check Jun-18) | In house check: Jun-20 |
| Network Analyzer Agilent E8358A | SN: US41080477   | 31-Mar-14 (in house check Oct-18) | In house check: Oct-19 |

Calibrated by: **Claudio Leubler** **Laboratory Technician**

Approved by: **Katja Pokovic** **Technical Manager**

Signature

Issued: March 11, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D450V3-1054\_Mar19

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**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
Zeughausstrasse 43, 8004 Zurich, Switzerland



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

#### Glossary:

|       |                                 |
|-------|---------------------------------|
| TSL   | tissue simulating liquid        |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A   | not applicable or not measured  |

#### Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "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)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Additional Documentation:

- DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%.

**Measurement Conditions**

DASY system configuration, as far as not given on page 1.

|                              |                        |                                 |
|------------------------------|------------------------|---------------------------------|
| DASY Version                 | DASY5                  | V52.10.2                        |
| Extrapolation                | Advanced Extrapolation |                                 |
| Phantom                      | ELI4 Flat Phantom      | Shell thickness: $2 \pm 0.2$ mm |
| Distance Dipole Center - TSL | 15 mm                  | with Spacer                     |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm      |                                 |
| Frequency                    | 450 MHz $\pm$ 1 MHz    |                                 |

**Head TSL parameters**

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters             | 22.0 °C             | 43.5           | 0.87 mho/m           |
| Measured Head TSL parameters            | (22.0 $\pm$ 0.2) °C | 44.1 $\pm$ 6 % | 0.87 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | < 0.5 °C            | ----           | ----                 |

**SAR result with Head TSL**

|                                                       |                    |                              |
|-------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                              |
| SAR measured                                          | 250 mW input power | 1.14 W/kg                    |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 4.57 W/kg $\pm$ 18.1 % (k=2) |

|                                                         |                    |                              |
|---------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                              |
| SAR measured                                            | 250 mW input power | 0.763 W/kg                   |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 3.06 W/kg $\pm$ 17.6 % (k=2) |

**Body TSL parameters**

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Body TSL parameters             | 22.0 °C             | 56.7           | 0.94 mho/m           |
| Measured Body TSL parameters            | (22.0 $\pm$ 0.2) °C | 55.7 $\pm$ 6 % | 0.93 mho/m $\pm$ 6 % |
| Body TSL temperature change during test | < 0.5 °C            | ----           | ----                 |

**SAR result with Body TSL**

|                                                       |                    |                              |
|-------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                              |
| SAR measured                                          | 250 mW input power | 1.13 W/kg                    |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 4.54 W/kg $\pm$ 18.1 % (k=2) |

|                                                         |                    |                              |
|---------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                              |
| SAR measured                                            | 250 mW input power | 0.762 W/kg                   |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 3.06 W/kg $\pm$ 17.6 % (k=2) |

**Appendix (Additional assessments outside the scope of SCS 0108)****Antenna Parameters with Head TSL**

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 60.2 $\Omega$ - 0.4 j $\Omega$ |
| Return Loss                          | - 20.7 dB                      |

**Antenna Parameters with Body TSL**

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 57.7 $\Omega$ - 3.6 j $\Omega$ |
| Return Loss                          | - 22.1 dB                      |

**General Antenna Parameters and Design**

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.346 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

**Additional EUT Data**

|                 |       |
|-----------------|-------|
| Manufactured by | SPEAG |
|-----------------|-------|

**DASY5 Validation Report for Head TSL**

Date: 11.03.2019

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 450 MHz; Type: D450V3; Serial: D450V3 - SN:1054**

Communication System: UID 0 - CW; Frequency: 450 MHz

Medium parameters used:  $f = 450$  MHz;  $\sigma = 0.87$  S/m;  $\epsilon_r = 44.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

**DASY52 Configuration:**

- Probe: EX3DV4 - SN3877; ConvF(10.5, 10.5, 10.5) @ 450 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 05.07.2018
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1003
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

**Dipole Calibration for Head Tissue/d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:**

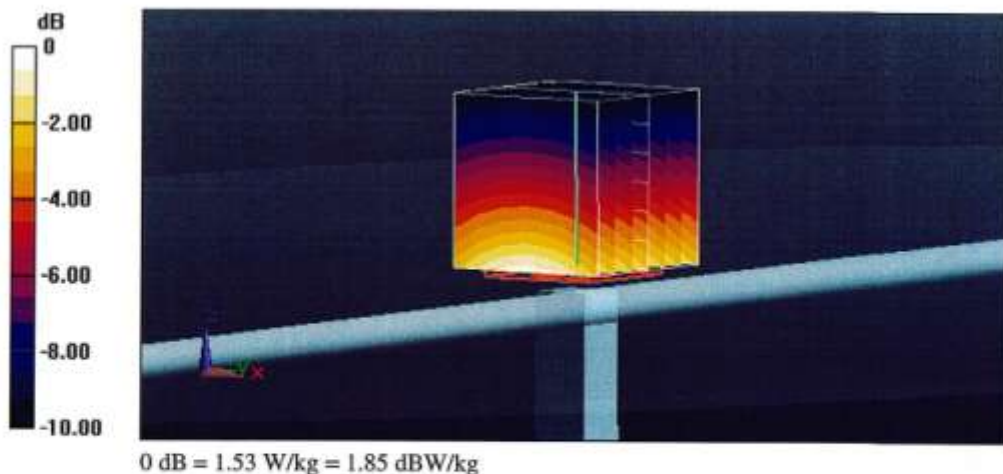
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 38.90 V/m; Power Drift = -0.01 dB

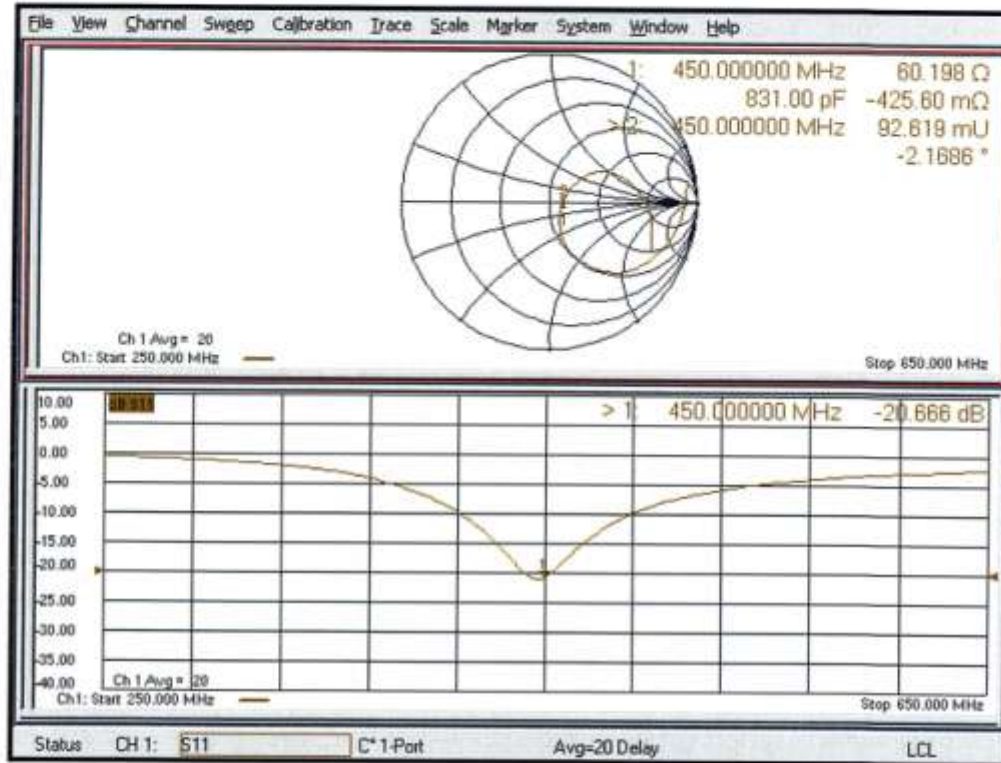
Peak SAR (extrapolated) = 1.75 W/kg

**SAR(1 g) = 1.14 W/kg; SAR(10 g) = 0.763 W/kg**

Maximum value of SAR (measured) = 1.53 W/kg



## Impedance Measurement Plot for Head TSL



**DASY5 Validation Report for Body TSL**

Date: 11.03.2019

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 450 MHz; Type: D450V3; Serial: D450V3 - SN:1054**

Communication System: UID 0 - CW; Frequency: 450 MHz

Medium parameters used:  $f = 450 \text{ MHz}$ ;  $\sigma = 0.93 \text{ S/m}$ ;  $\epsilon_r = 55.7$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3877; ConvF(10.7, 10.7, 10.7) @ 450 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 05.07.2018
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1003
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

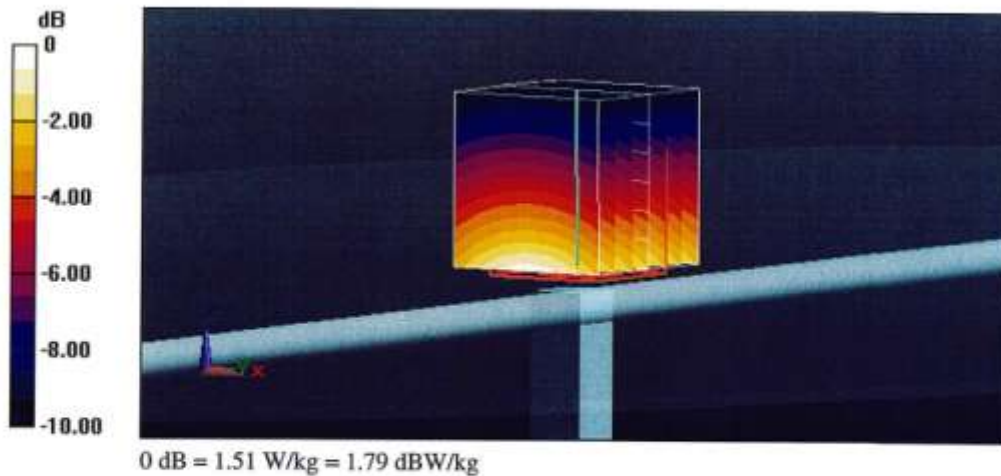
**Dipole Calibration for Body Tissue/d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:**Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$ 

Reference Value = 41.61 V/m; Power Drift = -0.03 dB

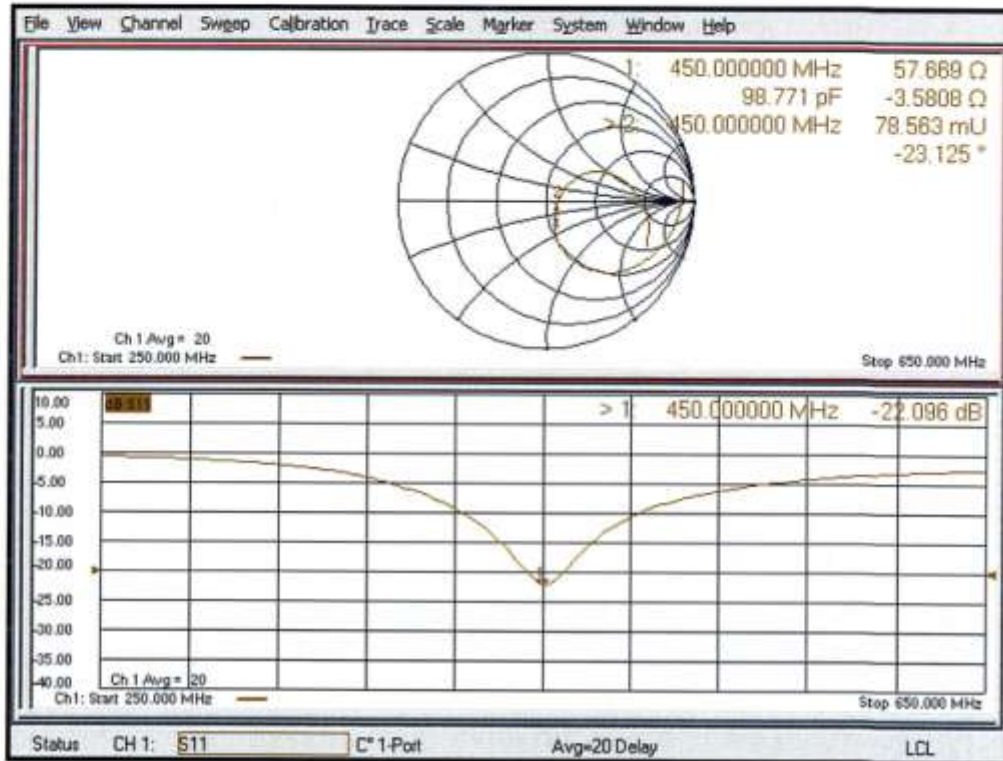
Peak SAR (extrapolated) = 1.73 W/kg

**SAR(1 g) = 1.13 W/kg; SAR(10 g) = 0.762 W/kg**

Maximum value of SAR (measured) = 1.51 W/kg



## Impedance Measurement Plot for Body TSL



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **Motorola Solutions MY**

Certificate No: **D450V3-1077\_Jul21**

## CALIBRATION CERTIFICATE

Object **D450V3 - SN:1077**

Calibration procedure(s) **QA CAL-15.v9  
Calibration Procedure for SAR Validation Sources below 700 MHz**

Calibration date: **July 09, 2021**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature ( $22 \pm 3$ )°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards               | ID #               | Cal Date (Certificate No.)        | Scheduled Calibration  |
|---------------------------------|--------------------|-----------------------------------|------------------------|
| Power meter NRP                 | SN: 104778         | 09-Apr-21 (No. 217-03291/03292)   | Apr-22                 |
| Power sensor NRP-Z91            | SN: 103244         | 09-Apr-21 (No. 217-03291)         | Apr-22                 |
| Power sensor NRP-Z91            | SN: 103245         | 09-Apr-21 (No. 217-03292)         | Apr-22                 |
| Reference 20 dB Attenuator      | SN: CC2552 (20x)   | 09-Apr-21 (No. 217-03343)         | Apr-22                 |
| Type-N mismatch combination     | SN: 310982 / 06327 | 09-Apr-21 (No. 217-03344)         | Apr-22                 |
| Reference Probe EX3DV4          | SN: 3877           | 30-Dec-20 (No. EX3-3877_Dec20)    | Dec-21                 |
| DAE4                            | SN: 654            | 28-Jun-21 (No. DAE4-654_Jun21)    | Jun-22                 |
| Secondary Standards             | ID #               | Check Date (in house)             | Scheduled Check        |
| Power meter E4419B              | SN: GB41293874     | 06-Apr-16 (in house check Jun-20) | In house check: Jun-22 |
| Power sensor E4412A             | SN: MY41498087     | 06-Apr-16 (in house check Jun-20) | In house check: Jun-22 |
| Power sensor E4412A             | SN: 000110210      | 06-Apr-16 (in house check Jun-20) | In house check: Jun-22 |
| RF generator HP 8648C           | SN: US3642U01700   | 04-Aug-99 (in house check Jun-20) | In house check: Jun-22 |
| Network Analyzer Agilent E8358A | SN: US41080477     | 31-Mar-14 (in house check Oct-20) | In house check: Oct-21 |

|                |                 |                       |           |
|----------------|-----------------|-----------------------|-----------|
|                | Name            | Function              | Signature |
| Calibrated by: | Jeffrey Katzman | Laboratory Technician |           |
| Approved by:   | Katja Pokovic   | Technical Manager     |           |

Issued: July 9, 2021

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D450V3-1077\_Jul21

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**Calibration Laboratory of  
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Accreditation No.: **SCS 0108**

**Glossary:**

|       |                                 |
|-------|---------------------------------|
| TSL   | tissue simulating liquid        |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A   | not applicable or not measured  |

**Calibration is Performed According to the Following Standards:**

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- DASY System Handbook

**Methods Applied and Interpretation of Parameters:**

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:** This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%.

**Measurement Conditions**

DASY system configuration, as far as not given on page 1.

|                              |                        |                                 |
|------------------------------|------------------------|---------------------------------|
| DASY Version                 | DASY52                 | V52.10.4                        |
| Extrapolation                | Advanced Extrapolation |                                 |
| Phantom                      | ELI4 Flat Phantom      | Shell thickness: $2 \pm 0.2$ mm |
| Distance Dipole Center - TSL | 15 mm                  | with Spacer                     |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm      |                                 |
| Frequency                    | 450 MHz $\pm$ 1 MHz    |                                 |

**Head TSL parameters**

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Head TSL parameters             | 22.0 °C             | 43.5           | 0.87 mho/m           |
| Measured Head TSL parameters            | (22.0 $\pm$ 0.2) °C | 43.2 $\pm$ 6 % | 0.87 mho/m $\pm$ 6 % |
| Head TSL temperature change during test | < 0.5 °C            | ----           | ----                 |

**SAR result with Head TSL**

|                                                       |                    |                              |
|-------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                              |
| SAR measured                                          | 250 mW input power | 1.16 W/kg                    |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | 4.63 W/kg $\pm$ 18.1 % (k=2) |

|                                                         |                    |                              |
|---------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                              |
| SAR measured                                            | 250 mW input power | 0.772 W/kg                   |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | 3.08 W/kg $\pm$ 17.6 % (k=2) |

**Body TSL parameters**

The following parameters and calculations were applied.

|                                         | Temperature         | Permittivity   | Conductivity         |
|-----------------------------------------|---------------------|----------------|----------------------|
| Nominal Body TSL parameters             | 22.0 °C             | 56.7           | 0.94 mho/m           |
| Measured Body TSL parameters            | (22.0 $\pm$ 0.2) °C | 56.7 $\pm$ 6 % | 0.93 mho/m $\pm$ 6 % |
| Body TSL temperature change during test | < 0.5 °C            | ----           | ----                 |

**SAR result with Body TSL**

|                                                       |                    |                              |
|-------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                              |
| SAR measured                                          | 250 mW input power | 1.15 W/kg                    |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | 4.64 W/kg $\pm$ 18.1 % (k=2) |

|                                                         |                    |                              |
|---------------------------------------------------------|--------------------|------------------------------|
| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                              |
| SAR measured                                            | 250 mW input power | 0.774 W/kg                   |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | 3.12 W/kg $\pm$ 17.6 % (k=2) |

**Appendix (Additional assessments outside the scope of SCS 0108)****Antenna Parameters with Head TSL**

|                                      |                               |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 55.1 $\Omega$ - 6.3 $j\Omega$ |
| Return Loss                          | - 22.2 dB                     |

**Antenna Parameters with Body TSL**

|                                      |                               |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 52.4 $\Omega$ - 9.8 $j\Omega$ |
| Return Loss                          | - 20.2 dB                     |

**General Antenna Parameters and Design**

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.351 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

**Additional EUT Data**

|                 |       |
|-----------------|-------|
| Manufactured by | SPEAG |
|-----------------|-------|

**DASY5 Validation Report for Head TSL**

Date: 07.07.2021

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 450 MHz; Type: D450V3; Serial: D450V3 - SN:1077**

Communication System: UID 0 - CW; Frequency: 450 MHz

Medium parameters used:  $f = 450$  MHz;  $\sigma = 0.87$  S/m;  $\epsilon_r = 43.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

**DASY52 Configuration:**

- Probe: EX3DV4 - SN3877; ConvF(10.64, 10.64, 10.64) @ 450 MHz; Calibrated: 30.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 28.06.2021
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1003
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**Dipole Calibration for Head Tissue/d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:**

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 39.23 V/m; Power Drift = -0.01 dB

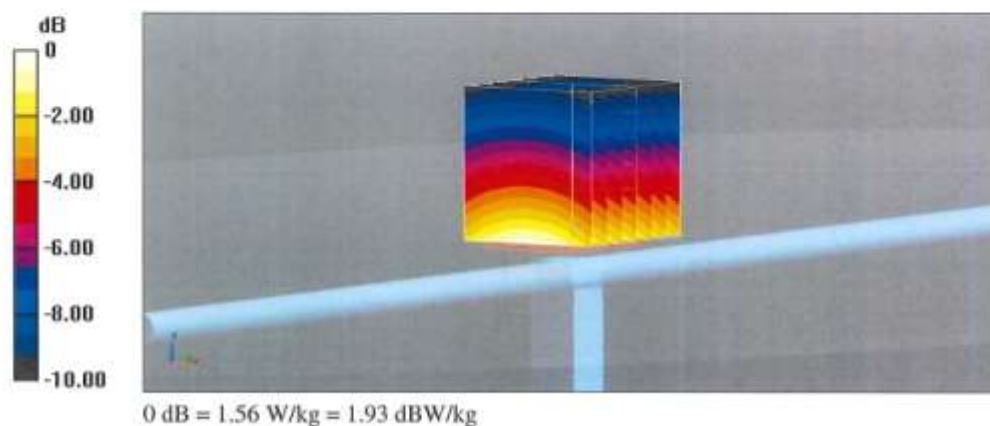
Peak SAR (extrapolated) = 1.79 W/kg

**SAR(1 g) = 1.16 W/kg; SAR(10 g) = 0.772 W/kg**

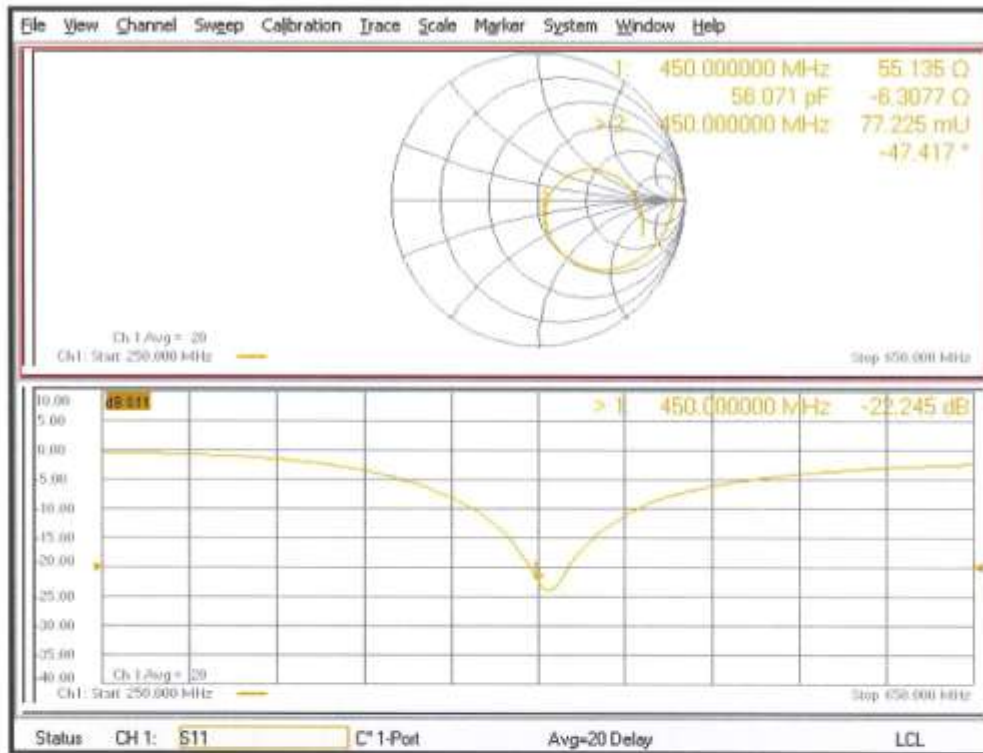
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid (&gt; 30 mm)

Ratio of SAR at M2 to SAR at M1 = 64.4%

Maximum value of SAR (measured) = 1.56 W/kg



## Impedance Measurement Plot for Head TSL



**DASY5 Validation Report for Body TSL**

Date: 09.07.2021

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 450 MHz; Type: D450V3; Serial: D450V3 - SN:1077**

Communication System: UID 0 - CW; Frequency: 450 MHz

Medium parameters used:  $f = 450$  MHz;  $\sigma = 0.93$  S/m;  $\epsilon_r = 56.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

**DASY52 Configuration:**

- Probe: EX3DV4 - SN3877; ConvF(10.64, 10.64, 10.64) @ 450 MHz; Calibrated: 30.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 28.06.2021
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1003
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**Dipole Calibration for Body Tissue/d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:**

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 42.26 V/m; Power Drift = -0.03 dB

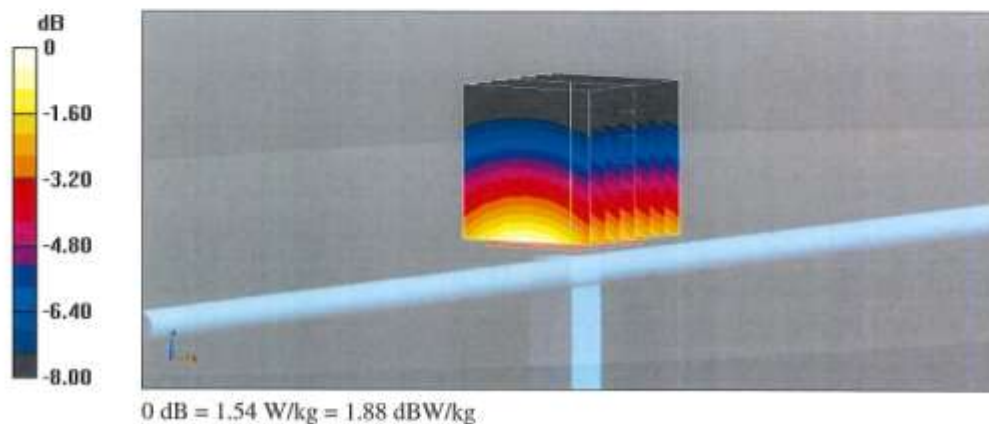
Peak SAR (extrapolated) = 1.76 W/kg

**SAR(1 g) = 1.15 W/kg; SAR(10 g) = 0.774 W/kg**

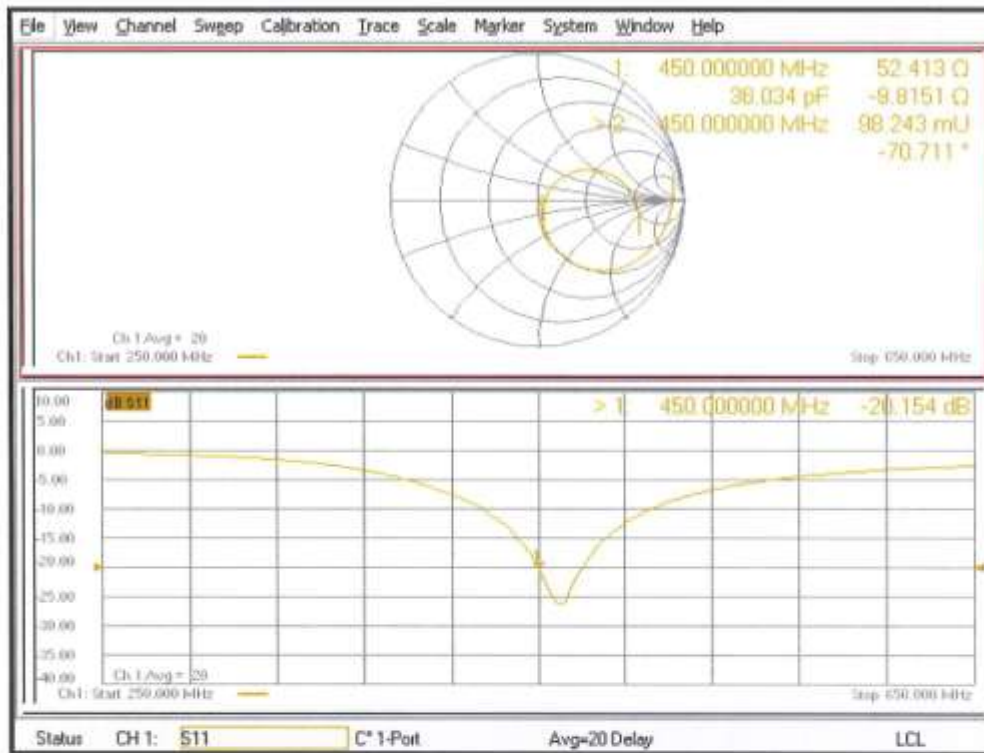
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid (&gt; 30 mm)

Ratio of SAR at M2 to SAR at M1 = 65.5%

Maximum value of SAR (measured) = 1.54 W/kg



## Impedance Measurement Plot for Body TSL



## Dipole Data

The table below includes dipole impedance and return loss measurement data measured by Motorola Solutions' EME lab. The results meet the requirements stated in KDB 865664.

| Dipole 450-1054 | Head             |                   |             | Body             |                   |             |
|-----------------|------------------|-------------------|-------------|------------------|-------------------|-------------|
|                 | Impedance        |                   | Return Loss | Impedance        |                   | Return Loss |
| Date Measured   | real<br>$\Omega$ | imag<br>$j\Omega$ | dB          | real<br>$\Omega$ | imag<br>$j\Omega$ | dB          |
| 04/08/19        | 59.46            | -4.57             | -20.36      | 56.02            | -6.09             | -21.87      |
| 04/13/20        | 57.08            | -6.58             | -20.38      | 56.08            | -3.56             | -24.43      |
| 04/26/21        | 54.62            | -6.32             | -22.56      | 52.47            | -6.56             | -21.36      |
| Dipole 450-1077 | Head             |                   |             | Body             |                   |             |
|                 | Impedance        |                   | Return Loss | Impedance        |                   | Return Loss |
| Date Measured   | real<br>$\Omega$ | imag<br>$j\Omega$ | dB          | real<br>$\Omega$ | imag<br>$j\Omega$ | dB          |
| 08/06/21        | 48.59            | -6.47             | -23.86      | 48.12            | -6.21             | -21.70      |

## **Appendix D**

### **System Verification Check Scans**

**Motorola Solutions, Inc. EME Laboratory**

Date/Time: 10/23/2021 9:42:28 AM

Robot#: DASY5-PG-1 | Run#: MHI-SYSP-450H-211023-09  
 Dipole Model# D450V3  
 Phantom#: ELI4 1103  
 Tissue Temp: 20.8 (C)  
 Serial#: 1077  
 Test Freq: 450.0000 (MHz)  
 Start Power: 250 (mW)  
 Rotation (1D): 0.049 dB  
 Adjusted SAR (1W): 4.92 mW/g (1g)

## Comments:

Communication System Band: D450, Communication System UID: 0, Duty Cycle: 1:1,  
 Medium parameters used:  $f = 450$  MHz;  $\sigma = 0.86$  S/m;  $\epsilon_r = 42.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Probe: EX3DV4 - SN7486, Calibrated: 6/18/2021, Frequency: 450 MHz, ConvF(11.24, 11.24, 11.24) @ 450 MHz  
 Electronics: DAE4 Sn1488, Calibrated: 4/7/2021

**Below 2 GHz-Rev.3/System Performance Check/Dipole Area Scan 2 (41x221x1):**

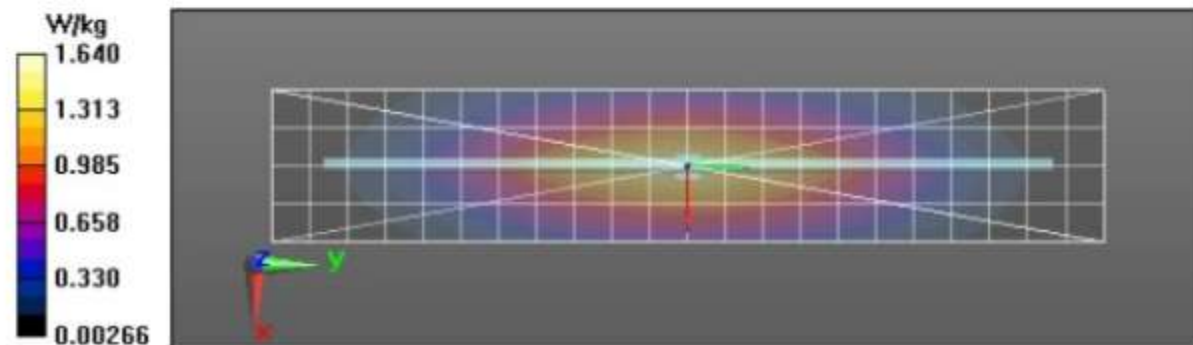
Interpolated grid: dx=1.500 mm, dy=1.500 mm  
 Reference Value = 45.34 V/m; Power Drift = -0.09 dB  
**Fast SAR: SAR(1 g) = 1.32 W/kg; SAR(10 g) = 0.909 W/kg** (SAR corrected for target medium)  
 Maximum value of SAR (interpolated) = 1.64 W/kg

**Below 2 GHz-Rev.3/System Performance Check/0-Degree Cube (5x5x7)/Cube 0:**

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm  
 Reference Value = 45.34 V/m; Power Drift = -0.09 dB  
 Peak SAR (extrapolated) = 1.90 W/kg  
**SAR(1 g) = 1.23 W/kg; SAR(10 g) = 0.823 W/kg** (SAR corrected for target medium)  
 Smallest distance from peaks to all points 3 dB below: Larger than measurement grid  
 Ratio of SAR at M2 to SAR at M1 = 64.3%  
 Maximum value of SAR (measured) = 1.65 W/kg

**Below 2 GHz-Rev.3/System Performance Check/Z-Axis Retraction (1x1x17): Measurement**

grid: dx=20mm, dy=20mm, dz=10mm  
 Maximum value of SAR (measured) = 1.67 W/kg



**Motorola Solutions, Inc. EME Laboratory**

Date/Time: 10/24/2021 9:55:10 AM

Robot#: DASY5-PG-1 | Run#: MHI-SYSP-450B-211024-12  
 Dipole Model#: D450V3  
 Phantom#: ELI4 1028  
 Tissue Temp: 21.1 (C)  
 Serial#: 1077  
 Test Freq: 450.0000 (MHz)  
 Start Power: 250 (mW)  
 Rotation (1D): 0.055 dB  
 Adjusted SAR (1W): 4.84 mW/g (1g)

## Comments:

Communication System Band: D450, Communication System UID: 0, Duty Cycle: 1:1,

Medium parameters used:  $f = 450$  MHz;  $\sigma = 0.96$  S/m;  $\epsilon_r = 54.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Probe: EX3DV4 - SN7486, Calibrated: 6/18/2021, Frequency: 450 MHz, ConvF(11.4, 11.4, 11.4) @ 450 MHz

Electronics: DAE4 Sn1488, Calibrated: 4/7/2021

**Below 2 GHz-Rev.3/System Performance Check/Dipole Area Scan 2 (41x221x1):**

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

Reference Value = 43.04 V/m; Power Drift = -0.09 dB

**Fast SAR: SAR(1 g) = 1.31 W/kg; SAR(10 g) = 0.905 W/kg** (SAR corrected for target medium)

Maximum value of SAR (interpolated) = 1.69 W/kg

**Below 2 GHz-Rev.3/System Performance Check/0-Degree Cube (5x5x7)/Cube 0:**

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 43.04 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 1.98 W/kg

**SAR(1 g) = 1.21 W/kg; SAR(10 g) = 0.808 W/kg** (SAR corrected for target medium)

Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

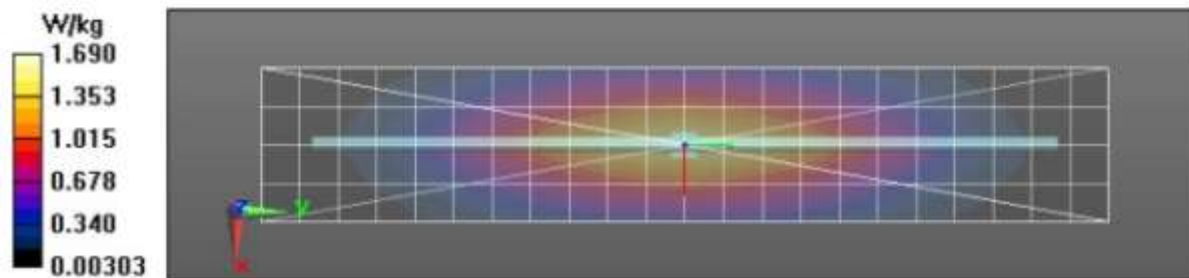
Ratio of SAR at M2 to SAR at M1 = 62.9%

Maximum value of SAR (measured) = 1.70 W/kg

**Below 2 GHz-Rev.3/System Performance Check/Z-Axis Retraction (1x1x17): Measurement**

grid: dx=20mm, dy=20mm, dz=10mm

Maximum value of SAR (measured) = 1.69 W/kg



**Motorola Solutions, Inc. EME Laboratory**

Date/Time: 12/30/2021 9:31:22 PM

Robot#: DASY5-PG-3 | Run#: BAD(DAN)-SYSP-450H-211230-09  
 Dipole Model# D450V3  
 Phantom#: EL14 1022  
 Tissue Temp: 19.3 C)  
 Serial#: 1054  
 Test Freq: 450.0000 (MHz)  
 Start Power: 250 (mW)  
 Rotation (1D): 0.095 dB  
 Adjusted SAR (1W): 4.88 mW/g (1g)

## Comments:

Duty Cycle: 1:1, Medium parameters used:  $f = 450$  MHz;  $\sigma = 0.89$  S/m;  $\epsilon_r = 41.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Probe: EX3DV4 - SN7533, Calibrated: 4/19/2021, Frequency: 450 MHz, ConvF(11.86, 11.86, 11.86) @ 450 MHz  
 Electronics: DAE3 Sn374, Calibrated: 4/8/2021

**Below 2 GHz-Rev.3/System Performance Check/Dipole Area Scan 2 (41x221x1):**

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

Reference Value = 45.20 V/m; Power Drift = -0.12 dB

**Fast SAR: SAR(1 g) = 1.33 W/kg; SAR(10 g) = 0.920 W/kg** (SAR corrected for target medium)

Maximum value of SAR (interpolated) = 1.71 W/kg

**Below 2 GHz-Rev.3/System Performance Check/0-Degree Cube (5x5x7)/Cube 0:**

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 45.20 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 1.97 W/kg

**SAR(1 g) = 1.22 W/kg; SAR(10 g) = 0.817 W/kg** (SAR corrected for target medium)

Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

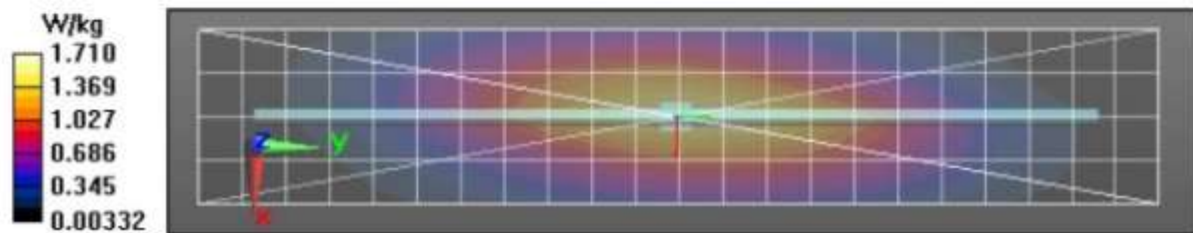
Ratio of SAR at M2 to SAR at M1 = 63.7%

Maximum value of SAR (measured) = 1.71 W/kg

**Below 2 GHz-Rev.3/System Performance Check/Z-Axis Retraction (1x1x17): Measurement**

grid: dx=20mm, dy=20mm, dz=10mm

Maximum value of SAR (measured) = 1.72 W/kg



**Motorola Solutions, Inc. EME Laboratory**

Date/Time: 12/31/2021 9:28:03 PM

Robot#: DASY5-PG-3 | Run#: BAD-SYSP-450H-211231-17  
 Dipole Model#: D450V3  
 Phantom#: EL14 1022  
 Tissue Temp: 19.2 (C)  
 Serial#: 1054  
 Test Freq: 450.0000 (MHz)  
 Start Power: 250 (mW)  
 Rotation (1D): 0.13 dB  
 Adjusted SAR (1W): 4.76 mW/g (1g)

**Comments:**

Communication System Band: Dipole 450, Communication System UID: 0, Duty Cycle: 1:1,

Medium parameters used:  $f = 450$  MHz;  $\sigma = 0.89$  S/m;  $\epsilon_r = 42.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Probe: EX3DV4 - SN7533, Calibrated: 4/19/2021, Frequency: 450 MHz, ConvF(11.86, 11.86, 11.86) @ 450 MHz

Electronics: DAE3 Sn374, Calibrated: 4/8/2021

**Below 2 GHz-Rev.3/System Performance Check/Dipole Area Scan 2 (41x221x1):**

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

Reference Value = 44.29 V/m; Power Drift = -0.03 dB

**Fast SAR: SAR(1 g) = 1.29 W/kg; SAR(10 g) = 0.894 W/kg** (SAR corrected for target medium)

Maximum value of SAR (interpolated) = 1.65 W/kg

**Below 2 GHz-Rev.3/System Performance Check/0-Degree Cube (5x5x7)/Cube 0:**

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 44.29 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.90 W/kg

**SAR(1 g) = 1.19 W/kg; SAR(10 g) = 0.797 W/kg** (SAR corrected for target medium)

Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

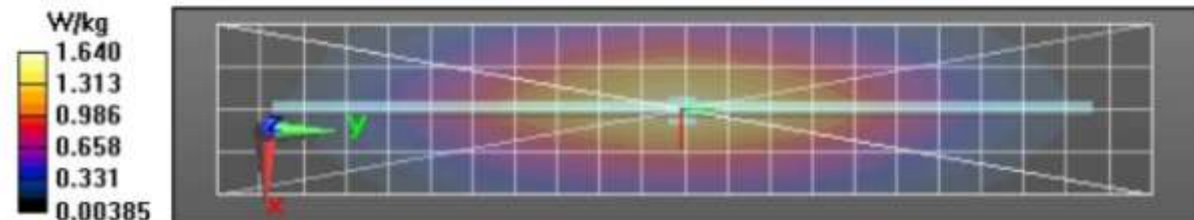
Ratio of SAR at M2 to SAR at M1 = 64%

Maximum value of SAR (measured) = 1.65 W/kg

**Below 2 GHz-Rev.3/System Performance Check/Z-Axis Retraction (1x1x17): Measurement**

grid: dx=20mm, dy=20mm, dz=10mm

Maximum value of SAR (measured) = 1.67 W/kg



**Motorola Solutions, Inc. EME Laboratory**

Date/Time: 1/3/2022 9:40:38 AM

Robot#: DASY5-PG-3 | Run#: BAD-SYSP-450H-220103-01  
Dipole Model# D450V3  
Phantom#: ELI4 1022  
Tissue Temp: 18.7 (C)  
Serial#: 1054  
Test Freq: 450.0000 (MHz)  
Start Power: 250 (mW)  
Rotation (1D): 0.11 dB  
Adjusted SAR (1W): 4.80 mW/g (1g)

**Comments:**

Communication System Band: Dipole 450, Communication System UID: 0, Duty Cycle: 1:1,

Medium parameters used:  $f = 450$  MHz;  $\sigma = 0.88$  S/m;  $\epsilon_r = 42.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Probe: EX3DV4 - SN7533, Calibrated: 4/19/2021, Frequency: 450 MHz, ConvF(11.86, 11.86, 11.86) @ 450 MHz

Electronics: DAE3 Sn374, Calibrated: 4/8/2021

**Below 2 GHz-Rev.3/System Performance Check/Dipole Area Scan 2 (41x221x1):**

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

Reference Value = 44.44 V/m; Power Drift = -0.14 dB

**Fast SAR: SAR(1 g) = 1.29 W/kg; SAR(10 g) = 0.891 W/kg** (SAR corrected for target medium)

Maximum value of SAR (interpolated) = 1.65 W/kg

**Below 2 GHz-Rev.3/System Performance Check/0-Degree Cube (5x5x7)/Cube 0:**

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 44.44 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 1.89 W/kg

**SAR(1 g) = 1.2 W/kg; SAR(10 g) = 0.799 W/kg** (SAR corrected for target medium)

Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

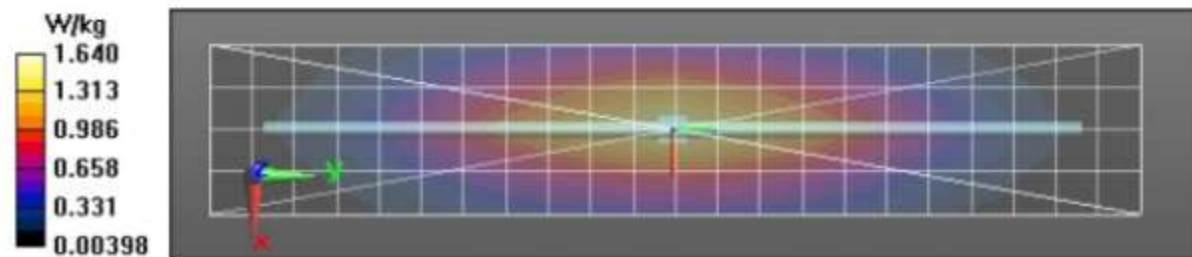
Ratio of SAR at M2 to SAR at M1 = 64.2%

Maximum value of SAR (measured) = 1.65 W/kg

**Below 2 GHz-Rev.3/System Performance Check/Z-Axis Retraction (1x1x17): Measurement**

grid: dx=20mm, dy=20mm, dz=10mm

Maximum value of SAR (measured) = 1.62 W/kg



## **Appendix E**

### **DUT Scans**

## TDMA Digital Mode – Assessment at the Body

### Table 17

#### Motorola Solutions, Inc. EME Laboratory

Date/Time: 10/24/2021 11:12:59 AM

Robot#: DASY5-PG-1 | Run#: MHI-AB-211024-14  
 Model#: AAH88QCP9JA2AN (PMUE4541B)  
 Phantom#: EL14 1028  
 Tissue Temp: 21.1 (C)  
 Serial#: 546TXV0351  
 Antenna: PMAE4095B  
 Test Freq: 458.3000 (MHz)  
 Battery: PMNN4468B  
 Carry Acc: PMLN7190A  
 Audio Acc: PMLN7156A  
 Start Power: 3.22 (W)

#### Comments:

Communication System Band: Tonga UHF, Communication System UID: 0, Duty Cycle: 1:1.99986,  
 Medium parameters used:  $f = 458 \text{ MHz}$ ;  $\sigma = 0.97 \text{ S/m}$ ;  $\epsilon_r = 54.7$ ;  $\rho = 1000 \text{ kg/m}^3$   
 Probe: EX3DV4 - SN7486, Calibrated: 6/18/2021, Frequency: 458.3 MHz, ConvF(11.4, 11.4, 11.4) @ 458.3 MHz  
 Electronics: DAE4 Sn1488, Calibrated: 4/7/2021

#### **Below 2 GHz-Rev.3/Ab Scan/1-Area Scan (61x141x1):** Interpolated grid: $dx=1.500 \text{ mm}$ , $dy=1.500 \text{ mm}$

Reference Value = 45.22 V/m; Power Drift = -0.40 dB

**Fast SAR: SAR(1 g) = 2.06 W/kg; SAR(10 g) = 1.47 W/kg** (SAR corrected for target medium)

Maximum value of SAR (interpolated) = 2.56 W/kg

#### **Below 2 GHz-Rev.3/Ab Scan/3-Zoom Scan (5x5x7)/Cube 0:** Measurement grid: $dx=7.5\text{mm}$ , $dy=7.5\text{mm}$ , $dz=5\text{mm}$

Reference Value = 45.22 V/m; Power Drift = -0.49 dB

Peak SAR (extrapolated) = 2.66 W/kg

**SAR(1 g) = 1.88 W/kg; SAR(10 g) = 1.37 W/kg** (SAR corrected for target medium)

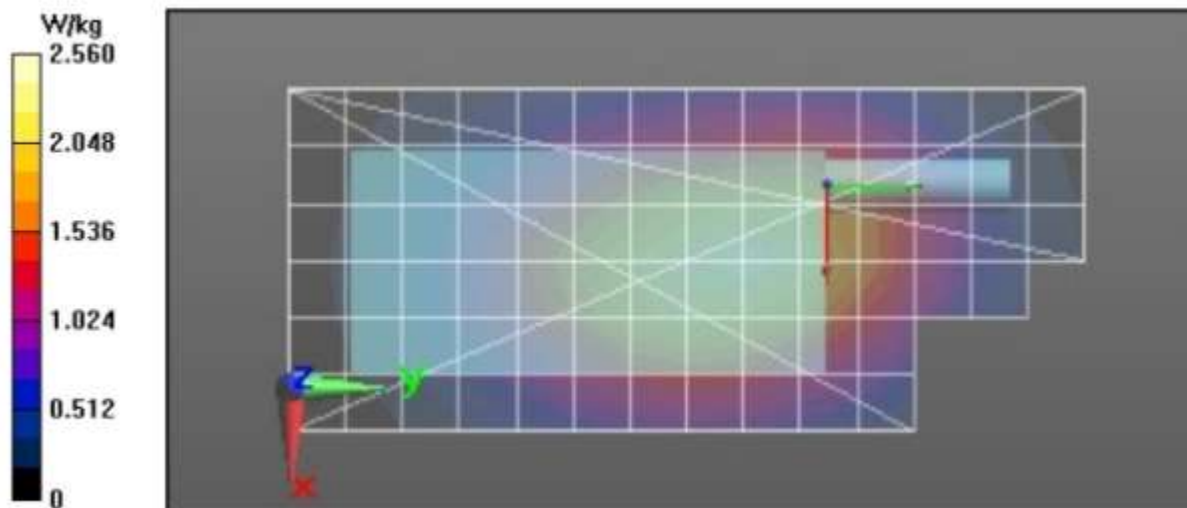
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

Ratio of SAR at M2 to SAR at M1 = 70.8%

Maximum value of SAR (measured) = 2.39 W/kg

#### **Below 2 GHz-Rev.3/Ab Scan/4-Z-Axis Scan (1x1x17):** Measurement grid: $dx=20\text{mm}$ , $dy=20\text{mm}$ , $dz=10\text{mm}$

Maximum value of SAR (measured) = 2.28 W/kg



## TDMA Digital Mode – Assessment at the Face

### Table 17

#### Motorola Solutions, Inc. EME Laboratory

Date/Time: 10/24/2021 1:52:36 AM

Robot#: DASY5-PG-1 | Run#: AF-FACE-211024-04#  
 Model#: AAH88QCP9JA2AN (PMUE4541B)  
 Phantom#: ELI4 1103  
 Tissue Temp: 21.4 (C)  
 Serial#: 546TXV0351  
 Antenna: PMAE4093B  
 Test Freq: 425.0000 (MHz)  
 Battery: PMNN4468B  
 Carry Acc: NONE  
 Audio Acc: NONE  
 Start Power: 3.15 (W)

#### Comments:

Communication System Band: Tonga UHF, Communication System UID: 0, Duty Cycle: 1:1.99986,

Medium parameters used:  $f = 425$  MHz;  $\sigma = 0.84$  S/m;  $\epsilon_r = 43.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Probe: EX3DV4 - SN7486, Calibrated: 6/18/2021, Frequency: 425 MHz, ConvF(11.24, 11.24) @ 425 MHz

Electronics: DAE4 Sn1488, Calibrated: 4/7/2021

**Below 2 GHz-Rev.3/Face Scan/1-Area Scan (61x141x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 63.02 V/m; Power Drift = -0.29 dB

**Fast SAR: SAR(1 g) = 2.73 W/kg; SAR(10 g) = 1.98 W/kg** (SAR corrected for target medium)

Maximum value of SAR (interpolated) = 3.27 W/kg

**Below 2 GHz-Rev.3/Face Scan/3-Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 63.02 V/m; Power Drift = -0.49 dB

Peak SAR (extrapolated) = 3.62 W/kg

**SAR(1 g) = 2.59 W/kg; SAR(10 g) = 1.9 W/kg** (SAR corrected for target medium)

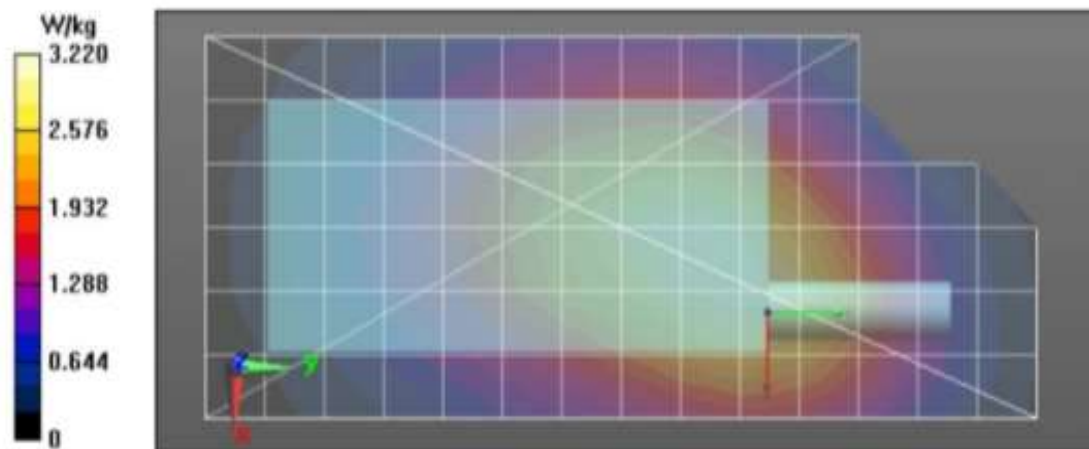
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

Ratio of SAR at M2 to SAR at M1 = 69%

Maximum value of SAR (measured) = 3.20 W/kg

**Below 2 GHz-Rev.3/Face Scan/4-Z-Axis Scan (1x1x17):** Measurement grid: dx=20mm, dy=20mm, dz=10mm

Maximum value of SAR (measured) = 3.04 W/kg



**FM Analog Mode**  
**Assessments at the Body with Body-worn PMLN7190A**  
**Table 19**

**Motorola Solutions, Inc. EME Laboratory**

Date/Time: 12/30/2021 11:34:17 AM

Robot#: DASY5-PG-3 | Run#: AR-AB-211230-05#  
 Model#: PMUE4541A  
 Phantom#: ELI4 1022  
 Tissue Temp: 19.0 (C)  
 Serial#: 546TQM0138  
 Antenna: PMAE4094B  
 Test Freq: 435.0000 (MHz)  
 Battery: PMNN4468B  
 Carry Acc: PMLN7190A  
 Audio Acc: PMLN7156A  
 Start Power: 2.40 (W)

**Comments:**

Communication System Band: Tonga UHF Plus1, Communication System UID: 0, Duty Cycle: 1:1,  
 Medium parameters used:  $f = 435$  MHz;  $\sigma = 0.88$  S/m;  $\epsilon_r = 42.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Probe: EX3DV4 - SN7533, Calibrated: 4/19/2021, Frequency: 435 MHz, ConvF(11.86, 11.86, 11.86) @ 435 MHz  
 Electronics: DAE3 Sn374, Calibrated: 4/8/2021

**Below 2 GHz-Rev.3/Ab Scan/1-Area Scan (71x161x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 77.10 V/m; Power Drift = -0.53 dB

**Fast SAR: SAR(1 g) = 5.08 W/kg; SAR(10 g) = 3.67 W/kg** (SAR corrected for target medium)

Maximum value of SAR (interpolated) = 6.29 W/kg

**Below 2 GHz-Rev.3/Ab Scan/3-Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm,

dy=7.5mm, dz=5mm

Reference Value = 77.10 V/m; Power Drift = -0.62 dB

Peak SAR (extrapolated) = 6.64 W/kg

**SAR(1 g) = 4.84 W/kg; SAR(10 g) = 3.55 W/kg** (SAR corrected for target medium)

Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

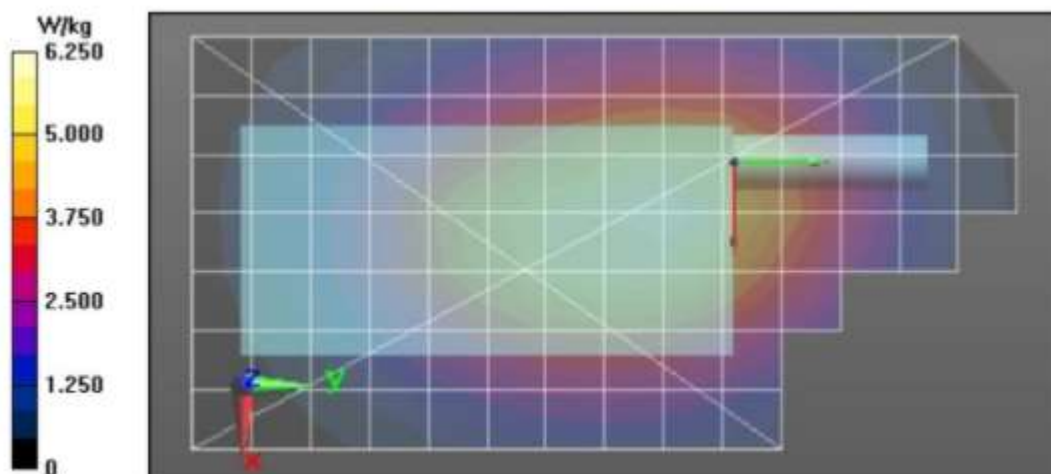
Ratio of SAR at M2 to SAR at M1 = 72.6%

Maximum value of SAR (measured) = 6.07 W/kg

**Below 2 GHz-Rev.3/Ab Scan/4-Z-Axis Scan (1x1x17):** Measurement grid: dx=20mm, dy=20mm,

dz=10mm

Maximum value of SAR (measured) = 6.01 W/kg



# **FM Analog Mode** **Assessments at the Body with Body-worn PMLN7128A** **Table 20**

## **Motorola Solutions, Inc. EME Laboratory**

Date/Time: 12/30/2021 8:37:19 PM

Robot#: DASY5-PG-3 | Run#: BAD(DAN)-AB-211230-08#  
 Model#: PMUE4541A  
 Phantom#: ELI4 1022  
 Tissue Temp: 19.2 (C)  
 Serial#: 546TQM0138  
 Antenna: PMAE4094B  
 Test Freq: 435.0000 (MHz)  
 Battery: PMNN4468B  
 Carry Acc: PMLN7128A  
 Audio Acc: PMLN7156A  
 Start Power: 2.40 (W)

### Comments:

Duty Cycle: 1:1, Medium parameters used:  $f = 435$  MHz;  $\sigma = 0.88$  S/m;  $\epsilon_r = 42.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Probe: EX3DV4 - SN7533, Calibrated: 4/19/2021, Frequency: 435 MHz, ConvF(11.86, 11.86, 11.86) @ 435 MHz  
 Electronics: DAE3 Sn374, Calibrated: 4/8/2021

### **Below 2 GHz-Rev.3/Ab Scan/1-Area Scan (71x161x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 80.53 V/m; Power Drift = -0.42 dB

**Fast SAR: SAR(1 g) = 5 W/kg; SAR(10 g) = 3.62 W/kg** (SAR corrected for target medium)

Maximum value of SAR (interpolated) = 6.22 W/kg

### **Below 2 GHz-Rev.3/Ab Scan/3-Zoom Scan (6x6x7)/Cube 0:** Measurement grid: dx=7.5mm,

dy=7.5mm, dz=5mm

Reference Value = 80.53 V/m; Power Drift = -0.51 dB

Peak SAR (extrapolated) = 6.70 W/kg

**SAR(1 g) = 4.75 W/kg; SAR(10 g) = 3.49 W/kg** (SAR corrected for target medium)

Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

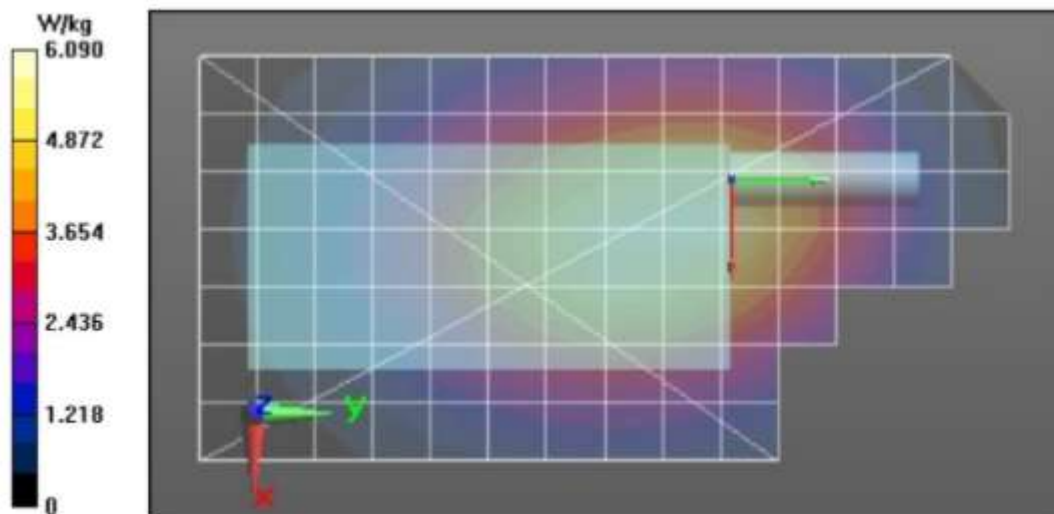
Ratio of SAR at M2 to SAR at M1 = 70.3%

Maximum value of SAR (measured) = 6.04 W/kg

### **Below 2 GHz-Rev.3/Ab Scan/4-Z-Axis Scan (1x1x17):** Measurement grid: dx=20mm, dy=20mm,

dz=10mm

Maximum value of SAR (measured) = 5.91 W/kg



**FM Analog Mode  
Assessments at the Face  
Table 22**

**Motorola Solutions, Inc. EME Laboratory  
Date/Time: 12/31/2021 12:40:04 AM**

Robot#: DASY5-PG-3 | Run#: MA(BAD)-FACE-211231-02#  
 Model#: PMUE4541A  
 Phantom#: ELI4 1022  
 Tissue Temp: 19.0 (C)  
 Serial#: 546TQM0138  
 Antenna: PMAE4093B  
 Test Freq: 425.0000 (MHz)  
 Battery: PMNN4468B  
 Carry Acc: @ front  
 Audio Acc: N/A  
 Start Power: 2.40 (W)

**Comments:**

Duty Cycle: 1:1, Medium parameters used:  $f = 425$  MHz;  $\sigma = 0.87$  S/m;  $\epsilon_r = 42.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Probe: EX3DV4 - SN7533, Calibrated: 4/19/2021, Frequency: 425 MHz, ConvF(11.86, 11.86, 11.86) @ 425 MHz  
 Electronics: DAE3 Sn374, Calibrated: 4/8/2021

**Below 2 GHz-Rev.3/Face Scan/1-Area Scan (71x151x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 83.06 V/m; Power Drift = -0.32 dB

**Fast SAR: SAR(1 g) = 5.25 W/kg; SAR(10 g) = 3.82 W/kg** (SAR corrected for target medium)

Maximum value of SAR (interpolated) = 6.46 W/kg

**Below 2 GHz-Rev.3/Face Scan/3-Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 83.06 V/m; Power Drift = -0.42 dB

Peak SAR (extrapolated) = 6.79 W/kg

**SAR(1 g) = 4.9 W/kg; SAR(10 g) = 3.59 W/kg** (SAR corrected for target medium)

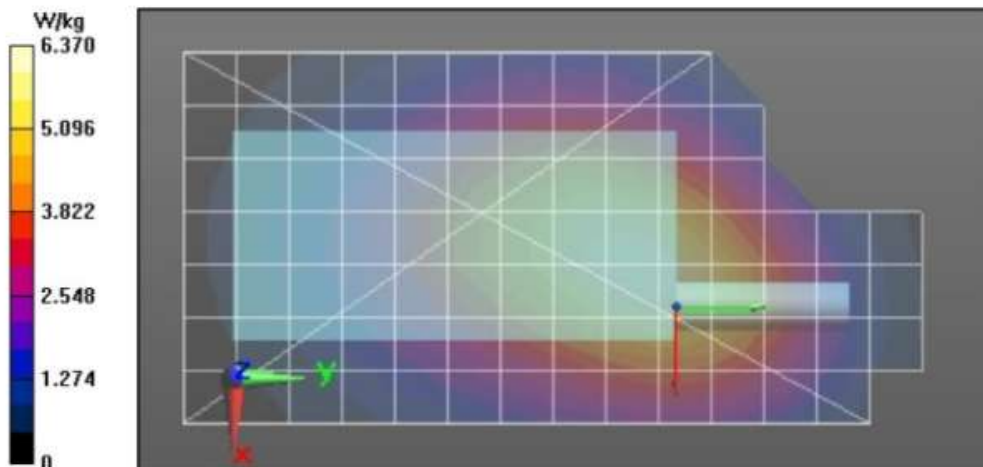
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

Ratio of SAR at M2 to SAR at M1 = 71.9%

Maximum value of SAR (measured) = 6.12 W/kg

**Below 2 GHz-Rev.3/Face Scan/4-Z-Axis Scan (1x1x17):** Measurement grid: dx=20mm, dy=20mm, dz=10mm

Maximum value of SAR (measured) = 6.08 W/kg



**FM Analog mode**  
**Assessment for ISED - Body**  
**Table 24**

**Motorola Solutions, Inc. EME Laboratory**  
**Date/Time: 12/31/2021 4:15:20 AM**

Robot#: DASY5-PG-3 | Run#: MA(BAD)-AB-211231-06#  
 Model#: PMUE4541A  
 Phantom#: ELI4 1022  
 Tissue Temp: 19.2 (C)  
 Serial#: 546TQM0138  
 Antenna: PMAE4094B  
 Test Freq: 430.0000 (MHz)  
 Battery: PMNN4468B  
 Carry Acc: PMLN7190A  
 Audio Acc: PMLN7156A  
 Start Power: 2.40 (W)

**Comments:**

Communication System Band: Tonga UHF Plus1, Communication System UID: 0, Duty Cycle: 1:1,

Medium parameters used:  $f = 430 \text{ MHz}$ ;  $\sigma = 0.87 \text{ S/m}$ ;  $\epsilon_r = 42.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Probe: EX3DV4 - SN7533, Calibrated: 4/19/2021, Frequency: 430 MHz, ConvF(11.86, 11.86, 11.86) @ 430 MHz

Electronics: DAE3 Sn374, Calibrated: 4/8/2021

**Below 2 GHz-Rev.3/Ab Scan/1-Area Scan (71x161x1):** Interpolated grid:  $dx=1.500 \text{ mm}$ ,  $dy=1.500 \text{ mm}$

Reference Value = 75.10 V/m; Power Drift = -0.51 dB

**Fast SAR: SAR(1 g) = 4.93 W/kg; SAR(10 g) = 3.58 W/kg** (SAR corrected for target medium)

Maximum value of SAR (interpolated) = 6.10 W/kg

**Below 2 GHz-Rev.3/Ab Scan/3-Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=7.5\text{mm}$ ,  $dy=7.5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 75.10 V/m; Power Drift = -0.60 dB

Peak SAR (extrapolated) = 6.56 W/kg

**SAR(1 g) = 4.65 W/kg; SAR(10 g) = 3.41 W/kg** (SAR corrected for target medium)

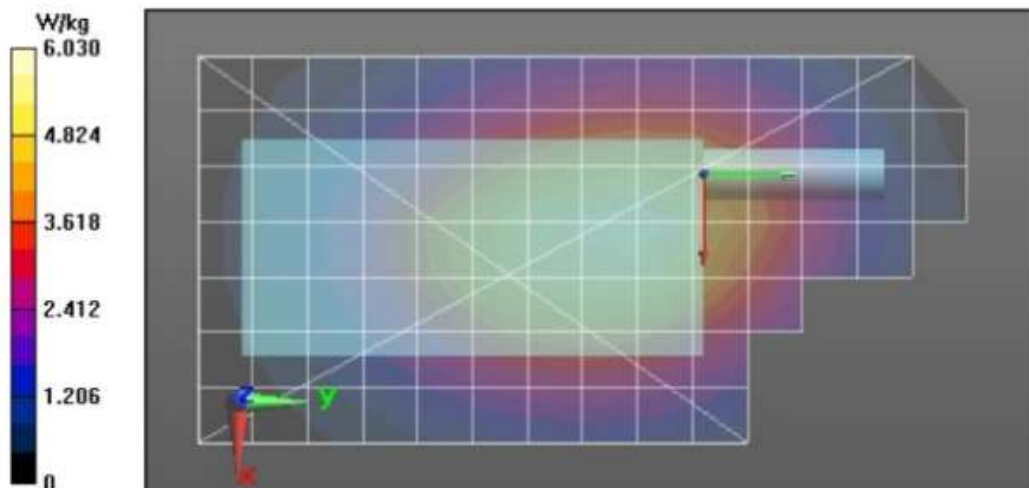
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

Ratio of SAR at M2 to SAR at M1 = 70.9%

Maximum value of SAR (measured) = 5.91 W/kg

**Below 2 GHz-Rev.3/Ab Scan/4-Z-Axis Scan (1x1x17):** Measurement grid:  $dx=20\text{mm}$ ,  $dy=20\text{mm}$ ,  $dz=10\text{mm}$

Maximum value of SAR (measured) = 5.86 W/kg



**FM Analog mode**  
**Assessment for ISED at Face**  
**Table 24**

**Motorola Solutions, Inc. EME Laboratory**  
**Date/Time: 12/31/2021 12:40:04 AM**

Robot#: DASY5-PG-3 | Run#: MA(BAD)-FACE-211231-02#  
 Model#: PMUE4541A  
 Phantom#: ELI4 1022  
 Tissue Temp: 19.0 (C)  
 Serial#: 546TQM0138  
 Antenna: PMAE4093B  
 Test Freq: 425.0000 (MHz)  
 Battery: PMNN4468B  
 Carry Acc: @ front  
 Audio Acc: N/A  
 Start Power: 2.40 (W)

**Comments:**

Duty Cycle: 1:1, Medium parameters used:  $f = 425$  MHz;  $\sigma = 0.87$  S/m;  $\epsilon_r = 42.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Probe: EX3DV4 - SN7533, Calibrated: 4/19/2021, Frequency: 425 MHz, ConvF(11.86, 11.86, 11.86) @ 425 MHz  
 Electronics: DAE3 Sn374, Calibrated: 4/8/2021

**Below 2 GHz-Rev.3/Face Scan/1-Area Scan (71x151x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 83.06 V/m; Power Drift = -0.32 dB

**Fast SAR: SAR(1 g) = 5.25 W/kg; SAR(10 g) = 3.82 W/kg** (SAR corrected for target medium)

Maximum value of SAR (interpolated) = 6.46 W/kg

**Below 2 GHz-Rev.3/Face Scan/3-Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 83.06 V/m; Power Drift = -0.42 dB

Peak SAR (extrapolated) = 6.79 W/kg

**SAR(1 g) = 4.9 W/kg; SAR(10 g) = 3.59 W/kg** (SAR corrected for target medium)

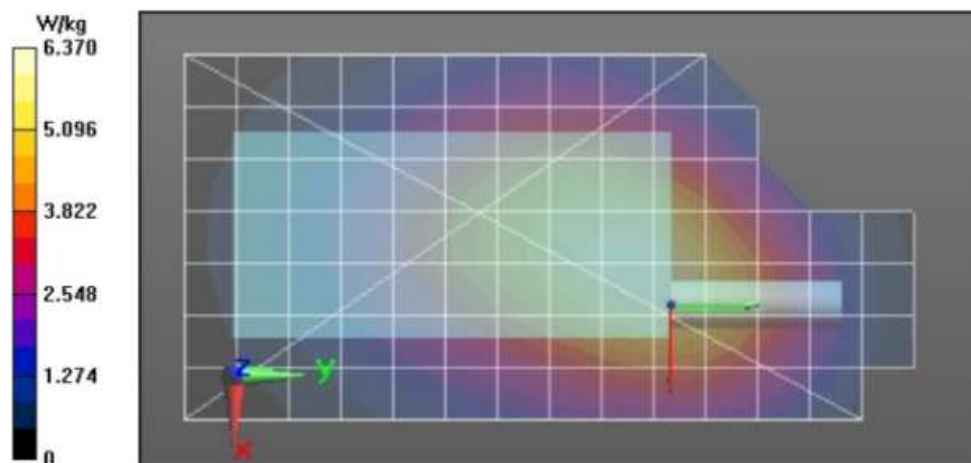
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

Ratio of SAR at M2 to SAR at M1 = 71.9%

Maximum value of SAR (measured) = 6.12 W/kg

**Below 2 GHz-Rev.3/Face Scan/4-Z-Axis Scan (1x1x17):** Measurement grid: dx=20mm, dy=20mm, dz=10mm

Maximum value of SAR (measured) = 6.08 W/kg



## **APPENDIX F**

### **Shortened Scan of Highest SAR configuration**

## Shorten Scan Assessment

### Table 25

**Motorola Solutions, Inc. EME Laboratory**  
Date/Time: 1/3/2022 4:52:45 PM

Robot#: DASY5-PG-3 | Run#: BAD-AB-220103-10  
Model#: PMUE4541A  
Phantom#: ELI4 1022  
Tissue Temp: 19.5 (C)  
Serial#: 546TQM0138  
Antenna: PMAE4094B  
Test Freq: 435.0000 (MHz)  
Battery: PMNN4468B  
Carry Acc: PMLN7190A  
Audio Acc: PMLN7156A  
Start Power: 2.40 (W)

**Comments:**

Communication System Band: Tonga UHF Plus1, Communication System UID: 0, Duty Cycle: 1:1,  
Medium parameters used:  $f = 435$  MHz;  $\sigma = 0.87$  S/m;  $\epsilon_r = 42.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Probe: EX3DV4 - SN7533, Calibrated: 4/19/2021, Frequency: 435 MHz, ConvF(11.86, 11.86, 11.86) @ 435 MHz  
Electronics: DAE3 Sn374, Calibrated: 4/8/2021

**Below 2 GHz-Rev.3/Ab Scan/1-Area Scan (71x161x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 75.05 V/m; Power Drift = -0.59 dB

**Fast SAR: SAR(1 g) = 4.88 W/kg; SAR(10 g) = 3.53 W/kg** (SAR corrected for target medium)

Maximum value of SAR (interpolated) = 6.04 W/kg

**Below 2 GHz-Rev.3/Ab Scan/2-Volume 2D Scan (41x41x1):** Interpolated grid: dx=0.7500 mm, dy=0.7500 mm, dz=1.000 mm

Reference Value = 75.05 V/m; Power Drift = -0.62 dB

**Fast SAR: SAR(1 g) = 4.79 W/kg; SAR(10 g) = 3.48 W/kg** (SAR corrected for target medium)

Maximum value of SAR (interpolated) = 5.90 W/kg

**Below 2 GHz-Rev.3/Ab Scan/3-Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 89.38 V/m; Power Drift = -0.34 dB

Peak SAR (extrapolated) = 7.01 W/kg

**SAR(1 g) = 5.04 W/kg; SAR(10 g) = 3.68 W/kg** (SAR corrected for target medium)

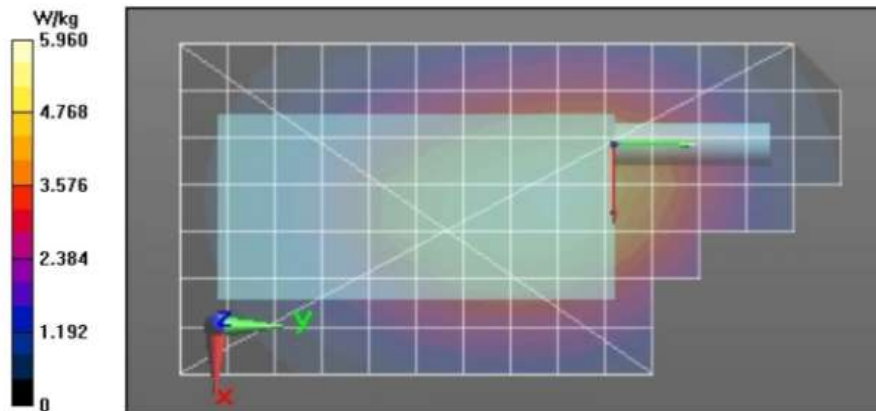
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

Ratio of SAR at M2 to SAR at M1 = 71.6%

Maximum value of SAR (measured) = 6.36 W/kg

**Below 2 GHz-Rev.3/Ab Scan/4-Z-Axis Scan (1x1x17):** Measurement grid: dx=20mm, dy=20mm, dz=10mm

Maximum value of SAR (measured) = 5.78 W/kg



**Shortened scan reflects highest SAR producing configuration and is compared to the full scan.**

| <b>Scan Description</b> | <b>Referenced Table</b> | <b>Test Time (min.)</b> | <b>SAR 1g (W/kg)</b> |
|-------------------------|-------------------------|-------------------------|----------------------|
| Shorten scan (zoom)     | 20                      | 9                       | 2.73                 |
| Full scan (area & zoom) | 17                      | 30                      | 2.79                 |

## **APPENDIX G**

### **DUT Test Position Photos**

## 1.0 Highest SAR Test Position per body location

### 1.1 Body LMR

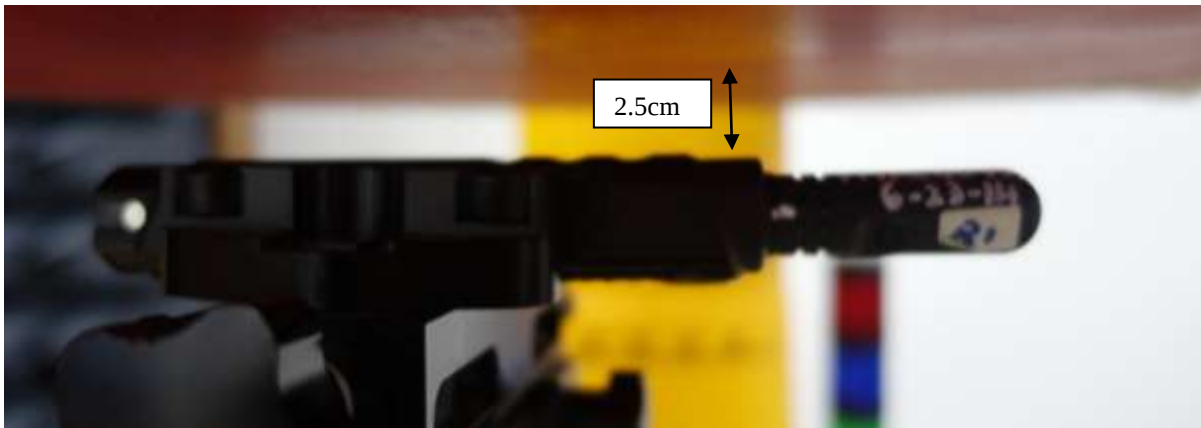
DUT with antenna PMAE4094B, battery PMNN4468B against the phantom and with bodyworn PMLN7190A and audio PMLN7156A attached.



| Antenna kit # | Separation Distances (mm) |                   |                  |
|---------------|---------------------------|-------------------|------------------|
|               | @ bottom surface of DUT   | @ base of antenna | @ tip of antenna |
| PMAE4094B     | 10                        | 28                | 31               |

### 1.2 Face LMR

DUT with antenna PMAE4093B, battery PMNN4468B and radio position at 2.5cm from the phantom and at front.



| Antenna kit # | Separation Distances (mm) |                   |                  |
|---------------|---------------------------|-------------------|------------------|
|               | @ bottom surface of DUT   | @ base of antenna | @ tip of antenna |
| PMAE4093B     | 28                        | 29                | 29               |

## **APPENDIX H**

### **DUT, Body worn and audio accessories Photos**

**Please refer to original filling report**