# SAR Compliance Test Report

| | | | |
|---|---|---|---|
| **Date of Report** | 20/04/2017 | **Client's Contact person:** | Jyrki Juvani |
| **Number of pages:** | 37 | **Responsible Test engineer:** | Kirsi Kyllönen |
| **Testing laboratory:** | Verkotan Oy<br>Elektroniikkatie 17<br>90590 Oulu<br>Finland | **Client:** | Bittium Wireless Ltd<br>Tutkijantie 8<br>90590 Oulu<br>Finland |

| | |
|---|---|
| **Tested device** | **MX Rugged B** |
| **Related reports:** | - |
| **Testing has been carried out in accordance with:** | **47CFR §2.1093**<br>Radiofrequency Radiation Exposure Evaluation: Portable Devices<br>**FCC published RF exposure KDB procedures**<br><br>**IEEE 1528 - 2013**<br>IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Technique |
| **Documentation:** | The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory |
| **Test Results:** | **The EUT complies with the requirements in respect of all parameters subject to the test.**<br>The test results relate only to devices specified in this document |

**Date and signatures:** 20.04.2017

For the contents:

Miia Nurkkala Digitally signed by Miia Nurkkala
Date: 2017.04.20 10:51:52 +03'00'

**Laboratory Manager**

**TABLE OF CONTENTS**

# 1. SUMMARY OF SAR TEST REPORT

## 1.1 Test Details

### Equipment under Test (EUT):

| | |
|---|---|
| **Product:** | Mx Rugged B |
| **Manufacturer:** | Bittium Wireless Ltd |
| **Type:** | SSD-52 |
| **Serial Number:** | 356244060507997, 356244060506840 |
| **FCC ID Number:** | V27SSD-52 |
| **Hardware Version:** | 2201 |
| **DUT Number:** | 23103, 23099 |
| **Battery Type used in testing:** | Li-Ion Polymer 9304569A01 |
| **Portable/ Mobile device** | Portable |
| **State of the Sample** | Prototype |

### Testing information:

| | |
|---|---|
| **Testing performed:** | 11.1.2017 – 30.1.2017 |
| **Notes:** | Verkotan ref ID451 |
| **Document name:** | FCC_SAR_Report_MX Rugged B_20042017.docx |
| **Temperature °C** | 22±2 / Controlled |
| **Humidity RH%** | 30±20 / Controlled |
| **Measurement performed by:** | Ilpo Joensuu/ Kirsi Kyllönen |

## 1.2 Maximum Results

The maximum reported* SAR values for Head Exposure Condition and Body-worn configurations are reported below. The device conforms to the requirements of the standards when the maximum reported SAR value is less than or equal to the limit. The SAR limit specified in FCC 47 CFR part 2 (2.1093) for Head & Body is SAR1g 1.6 W/kg,

| Equipment Class | System | Highest Reported* $SAR_{1g}$(W/kg) in Head Exposure Condition | Highest Reported* $SAR_{1g}$(W/kg) in Body-Worn Condition | Result |
|---|---|---|---|---|
| **TNE** | **Satellite** | 1.51 | 0.38 | **PASS** |
| **DSS** | **Bluetooth** | 0.012 | 0.029 | **PASS** |

* Reported SAR Values are scaled to upper limit of power tuning tolerance.

### 1.2.1 Simultaneous Transmission SAR

| Highest Simultaneous Transmission SAR | $SAR_{1g}$(W/kg) in Head Exposure Condition* | $SAR_{1g}$(W/kg) in Body-Worn Condition* | Result |
|---|---|---|---|
| **TNE + DSS** | 1.52 | 0.41 | **PASS** |

* Reported SAR Values are scaled to upper limit of power tuning tolerance.

### 1.2.2 Maximum Drift

| Maximum Drift During Measurements | -0.272 ≤ dB |
|---|---|

*Larger than 5% drifts included to scaling factors

### 1.2.3 Measurement Uncertainty

| Expanded Uncertainty (k=2) 95 % | ±24.5 % |
|---|---|

## 2. DESCRIPTION OF THE DEVICE UNDER TEST (DUT)

The Mexsat Rugged Basic is a mobile phone supporting satellite radio access technology. Satellite connection can be used as a Push-to-talk radio or against head.

| | |
|---|---|
| **Device Category** | Portable |
| **Exposure Environment** | Uncontrolled |

### 2.1 Supported Frequency Bands and Operational Modes

| TX Frequency bands | Modes of Operation | Modulation Mode | Transmitter Frequency Range (MHz) |
|---|---|---|---|
| | Bluetooth | GFSK, π/4-DQPSK, 8-DPSK | 2402 - 2480 |
| | Satellite GMR-1 3G | PI/2 BPSK / PI/4 QPSK | 1626.5-1660.5 |

### 2.2 Simultaneous Transmission

The DUT is utilizing 2 different antennas for tested frequencies.

| Possible Simultaneous TX combinations |
|---|
| Satellite + Bluetooth |

### 2.3 SAR Test Exclusion

Bluetooth and Bluetooth Low Energy use the same frequency and antenna. Since Bluetooth tuning power is higher, Bluetooth SAR is a conservative estimation of Bluetooth Low Energy SAR. Thus, Bluetooth Low Energy SAR can be deemed to comply without further analysis or measurements. The maximum and tested conducted powers for BT and BLE are shown in chapter 3 of this report.

# 3. CONDUCTED POWERS

## 3.1 Tested conducted power

| | Bluetooth | | |
|---|---|---|---|
| | CH 0 2402 MHz | CH 38 2440 MHz | CH 78 2480 MHz |
| Conducted Power [dBm] | 9.3 | 8.01 | 10.59 |

| | Bluetooth Low Energy | | |
|---|---|---|---|
| | CH 0 2402 MHz | CH 19 2440 MHz | CH 39 2480 MHz |
| Conducted Power [dBm] | 0.65 | -0.44 | 1.49 |

| | Satellite | | |
|---|---|---|---|
| | CH 1 1626.5 MHz | CH 220 1643.5 MHz | CH 43F 1660.5 MHz |
| Conducted Power [dBm] | 29.63 | 29.68 | 29.7 |

## 3.2 Maximum conducted power

| | Bluetooth | | | |
|---|---|---|---|---|
| | CH 0 2402 MHz | CH 38 2440 MHz | CH 78 2480 MHz | Max Tolerance* [dB] |
| Conducted Power [dBm] | 9.3 | 8.01 | 10.59 | +2.5 |
| *the maximum power according to the manufacturer can be 2.5dB above nominal i.e. measured conducted power | | | | |

| | Bluetooth Low Energy | | | |
|---|---|---|---|---|
| | CH 0 2402 MHz | CH 19 2442 MHz | CH 39 2480 MHz | Tolerance* [dB] |
| Conducted Power [dBm] | 0.65 | -0.44 | 1.49 | +1 |
| *the maximum power according to the manufacturer can be 1 dB above nominal i.e. measured conducted power | | | | |

| Satellite | Target [dBm] | Tolerance [dB] |
|---|---|---|
| Waveform 0x29 – 31.25KHz PI/2 BPSK | 29.5 | +0.5/-1.5 |
| Waveform 0x31 – 31.25KHz PI/4 QPSK | 29.5 | +0.5/-1.5 |
| Waveform 0x39 – 62.5KHz PI/4 QPSK | 29.5 | +0.5/-1.5 |
| Waveform 0x41 – 156.25KHz PI/4 QPSK | 29.5 | +0.5/-1.5 |

## 4. TEST EQUIPMENT

Dasy4 near field scanning system, manufactured by SPEAG was used for SAR testing. The test system consists of high precision robotics system (Staubli), robot controller, computer, near-field probe, probe alignment sensor, and a phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location of maximum electromagnetic field.

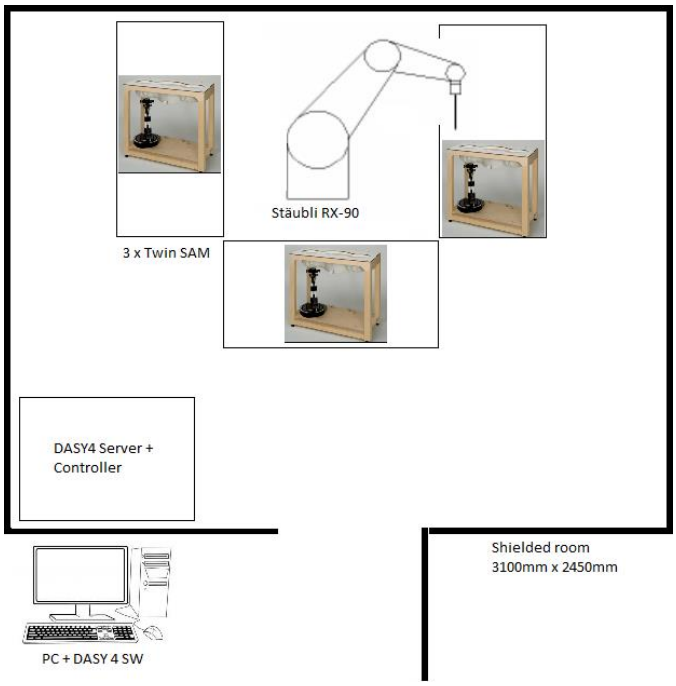



**Figure 1 Schematic Laboratory Picture**

### 4.1 Test Equipment List

Main used test system components are listed below. For full equipment list and calibration intervals, please contact the testing laboratory.

| Test Equipment | Model | Serial Number | Calibration Date | Calibration Expiry |
|---|---|---|---|---|
| DAE | DAE3 | 371 | 04/2016 | 04/2017 |
| Probe | ET3DV6 | 1381 | 09/2016 | 09/2017 |
| Dipole | SID1640 | 37/16DIP1G640-433 | 09/2016 | 09/2019 |
| DASY Software | v4.7 | na | na | na |
| Signal Generator | SMIQ06B | 834968/023 | na | na |
| Amplifier | AR 5S1G4 | 27573 | na | na |
| Power Sensor | NRT Z-11 | 100265 | 01/2016 | 01/2018 |

### 4.1.1 Isotropic E-field Probe Type ET3DV6

| | |
|---|---|
| **Construction** | Symmetric design with triangular core<br>Built-in optical fiber for surface detection system (ET3DV6 only)<br>Built-in shielding against static charges<br>PEEK enclosure material (resistant to organic solvents, e.g., DGBE) |
| **Calibration** | Calibration certificate in Appendix D |
| **Frequency** | 10 MHz – 2.3 GHz<br>Linearity: ±0.2 dB (30 MHz – 2.3 GHz) |
| **Directivity** | ±0.2 dB in TSL (rotation around probe axis)<br>±0.4 dB in TSL (rotation normal to probe axis) |
| **Dynamic Range** | 5 µW/g – >100 mW/g; Linearity: ±0.2 dB |
| **Dimensions** | Overall length: 337 mm (tip: 16 mm)<br>Tip diameter: 6.8 mm (body: 12 mm)<br>Distance from probe tip to dipole centers: 2.7 mm |
| **Application** | General dosimetric measurements up to 2.3 GHz<br>Compliance tests of mobile phones<br>Fast automatic scanning in arbitrary phantoms |

## 4.2 Phantoms

The phantom used in SAR tests was the twin-headed "SAM Phantom", manufactured by SPEAG. The phantom conforms to the requirements of IEEE 1528 and FCC published RF Exposure KDB Procedures.

## 4.3 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528 and FCC published RF Exposure KDB Procedures. The dielectric parameters of the used tissue simulants were within ±5% of the recommended values in all frequencies used. SAR testing was carried out within 24 hours of measuring the dielectric parameters. Depth of the tissue simulant was at least 15.0 cm from the inner surface of the flat phantom.

### 4.3.1 Recipes

1700 – 2000 MHZ:

| Ingredient (% by weight) | **HEAD 1700 – 2000** | **BODY 1700 – 2000** |
|---|---|---|
| Deionized Water | 54.5 | 70.25 |
| Tween 20 | 45.23 | 29.41 |
| Salt | 0.27 | 0.34 |

## 4.4 System Validation Status

| **Frequency [MHz]** | **Dipole Type / SN** | **Probe Type / SN** | **Calibrated Signal Type** | **DAE Unit / SN** | **Validation Done** | |
|---|---|---|---|---|---|---|
| | | | | | **Head tissue simulant** | **Body tissue simulant** |
| 1640 | SID1640/37/16DIP1G640-433 | ET3DV6 / 1381 | CW | DAE3 / 371 | 10/2016 | 10/2016 |

## 4.5 System Check

| Date | Tissue Type | Tissue Temp. [°C] | Frequency [MHz] | Input Power | Measured $SAR_{1g}$ [W/kg] | 1 W Target $SAR_{1g}$ [W/kg] | 1 W Normalized $SAR_{1g}$ [W/kg] | Deviation$_{1g}$ (%) | Plot # |
|---|---|---|---|---|---|---|---|---|---|
| 23.01.2017 | **H1900** | 21.7 | 1640 | 250mW | 8.53 | 35.78 | 34.12 | -4.6 | 10 |
| 24.01.2017 | **M1900** | 21.4 | 1640 | 250mW | 8.3 | 35.66 | 33.2 | -6.9 | 11 |

### 4.5.1 Tissue Simulant Verification

| | | | | Target | | Measured | | Deviation | |
|---|---|---|---|---|---|---|---|---|---|
| Date | Tissue Type | Tissue Temp. [°C] | Frequency [MHz] | Conductivity, σ [S/m] | Dielectric Constant [ε] | Conductivity, σ [S/m] | Dielectric Constant [ε] | σ (%) | ε (%) |
| 23.01.2017 | **H1900** | **22** | 1640 | 1.31 | 40.2 | 1.26 | 39.7 | -3.8 | -1.2 |
| | | | 1626.5 | 1.3 | 40.2 | 1.25 | 39.9 | -3.8 | -0.7 |
| | | | 1643.5 | 1.31 | 40.2 | 1.26 | 39.7 | -3.8 | -1.2 |
| | | | 1660.5 | 1.32 | 40.2 | 1.28 | 39.5 | -3.0 | -1.7 |
| 24.01.2017 | **M1900** | **22** | 1640 | 1.42 | 53.7 | 1.36 | 53.6 | -4.2 | -0.2 |
| | | | 1643.5 | 1.42 | 53.7 | 1.36 | 53.6 | -4.2 | -0.2 |

## 5. TEST PROCEDURE

The device output power was set to maximum power level for all tests. A fully charged battery was used for every test sequence.

### 5.1 Device Holder

The device was placed in the device holder that is supplied by SPEAG.

A custom-made spacer on the right, was used to position the device within the SPEAG holder. The spacer positions the device so that the holder has minimal effect on the test results but still holds the device securely. The spacer was removed before the tests.

### 5.2 Test Positions

See Appendix A for photos of the test positions.

#### 5.2.1 Against Head Configuration

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom as defined in IEEE 1528 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

#### 5.2.2 In Front of Face Configuration, 25mm separation distance

The device was placed in the SPEAG device holder below the flat phantom, front of the device facing the phantom. The distance between the device and the flat phantom was 25mm as required in KDB 447498 D01 General RF Exposure Guidance, section 6.1.

#### 5.2.3 Body-worn Configuration, 10 mm separation distance

The device was placed in the SPEAG device holder below the flat phantom. The distance between the device and the phantom was kept at the defined separation distance using a separate flat spacer that was removed before the start of the measurements. The device was oriented back and front side facing the phantom to find the highest results.

### 5.3 Scan Procedures

Area scans were firts measured for the determination of the field distribution. Next, a zoom scan with minimum of 5x5x7 points covering a volume of at least 30x30x30mm, was performed around the highest E-field value to determine the averaged SAR value. Power drift was determined by measuring the same point at the start of the area scan and again at the end of the zoom scan.

### 5.4 SAR Averaging Methods

The maximum SAR value is averaged over a cube of tissue using interpolation and extrapolation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at diffrent distances are necessary for the extrapolation.

The interpolation, extrapolation and maximum search routines within Dasy47 are all based on the modified Quadratic Shepard's method (Robert J. Renka,"Multivariate Interpolation of Large Sets of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148).

## 6. MEASUREMENT UNCERTAINTY

**Uncertainty Budget**
**According to IEEE 1528-2013 and IEC 62209-1/201x (3 - 6 GHz range)**

| Error Description | Uncert. value | Prob. Dist. | Div. | ($c_i$) 1g | ($c_i$) 10g | Std. Unc. (1g) | Std. Unc. (10g) | ($v_i$) $v_{eff}$ |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe Calibration | ±6.55 % | N | 1 | 1 | 1 | ±6.55 % | ±6.55 % | ∞ |
| Axial Isotropy | ±4.7 % | R | $\sqrt{3}$ | 0.7 | 0.7 | ±1.9 % | ±1.9 % | ∞ |
| Hemispherical Isotropy | ±9.6 % | R | $\sqrt{3}$ | 0.7 | 0.7 | ±3.9 % | ±3.9 % | ∞ |
| Boundary Effects | ±2.0 % | R | $\sqrt{3}$ | 1 | 1 | ±1.2 % | ±1.2 % | ∞ |
| Linearity | ±4.7 % | R | $\sqrt{3}$ | 1 | 1 | ±2.7 % | ±2.7 % | ∞ |
| System Detection Limits | ±1.0 % | R | $\sqrt{3}$ | 1 | 1 | ±0.6 % | ±0.6 % | ∞ |
| Modulation Response$^{m}$ | ±2.4 % | R | $\sqrt{3}$ | 1 | 1 | ±1.4 % | ±1.4 % | ∞ |
| Readout Electronics | ±0.3 % | N | 1 | 1 | 1 | ±0.3 % | ±0.3 % | ∞ |
| Response Time | ±0.8 % | R | $\sqrt{3}$ | 1 | 1 | ±0.5 % | ±0.5 % | ∞ |
| Integration Time | ±2.6 % | R | $\sqrt{3}$ | 1 | 1 | ±1.5 % | ±1.5 % | ∞ |
| RF Ambient Noise | ±3.0 % | R | $\sqrt{3}$ | 1 | 1 | ±1.7 % | ±1.7 % | ∞ |
| RF Ambient Reflections | ±3.0 % | R | $\sqrt{3}$ | 1 | 1 | ±1.7 % | ±1.7 % | ∞ |
| Probe Positioner | ±0.8 % | R | $\sqrt{3}$ | 1 | 1 | ±0.5 % | ±0.5 % | ∞ |
| Probe Positioning | ±6.7 % | R | $\sqrt{3}$ | 1 | 1 | ±3.9 % | ±3.9 % | ∞ |
| Max. SAR Eval. | ±4.0 % | R | $\sqrt{3}$ | 1 | 1 | ±2.3 % | ±2.3 % | ∞ |
| **Test Sample Related** | | | | | | | | |
| Device Positioning | ±2.9 % | N | 1 | 1 | 1 | ±2.9 % | ±2.9 % | 145 |
| Device Holder | ±3.6 % | N | 1 | 1 | 1 | ±3.6 % | ±3.6 % | 5 |
| Power Drift | ±5.0 % | R | $\sqrt{3}$ | 1 | 1 | ±2.9 % | ±2.9 % | ∞ |
| Power Scaling$^{p}$ | ±0 % | R | $\sqrt{3}$ | 1 | 1 | ±0.0 % | ±0.0 % | ∞ |
| **Phantom and Setup** | | | | | | | | |
| Phantom Uncertainty | ±6.6 % | R | $\sqrt{3}$ | 1 | 1 | ±3.8 % | ±3.8 % | ∞ |
| SAR correction | ±1.9 % | R | $\sqrt{3}$ | 1 | 0.84 | ±1.1 % | ±0.9 % | ∞ |
| Liquid Conductivity (mea.)$^{DAK}$ | ±2.5 % | R | $\sqrt{3}$ | 0.78 | 0.71 | ±1.1 % | ±1.0 % | ∞ |
| Liquid Permittivity (mea.) $^{DAK}$ | ±2.5 % | R | $\sqrt{3}$ | 0.26 | 0.26 | ±0.3 % | ±0.4 % | ∞ |
| Temp. unc. - Conductivity $^{BB}$ | ±3.4 % | R | $\sqrt{3}$ | 0.78 | 0.71 | ±1.5 % | ±1.4 % | ∞ |
| Temp. unc. - Permittivity $^{BB}$ | ±0.4 % | R | $\sqrt{3}$ | 0.23 | 0.26 | ±0.1 % | ±0.1 % | ∞ |
| Combined Std. Uncertainty | | | | | | ±12.3 % | ±12.2 % | 748 |
| **Expanded STD Uncertainty** | | | | | | **±24.6 %** | **±24.5 %** | |

# 7. TEST RESULTS

## 7.1 SAR Results for Head Exposure Condition

| Band | Channel | Maximun Power [dBm] | Conducted Power [dBm] | Power Drift [dB] | Test Position | Antenna | Duty Cycle | Measured SAR 1g [mW/g] | Scaling Factor | Reported SAR 1g [mW/g] | Plot # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAT L | 1 | 30 | 29.63 | 0.169 | Right Cheek | EXT | 1:6.64 | 0.46 | 1.09 | 0.50 | |
| SAT L | 1 | 30 | 29.63 | -0.11 | Right Tilted | EXT | 1:6.64 | 1.33 | 1.09 | 1.45 | |
| SAT L | 1 | 30 | 29.63 | -0.07 | Left Cheek | EXT | 1:6.64 | 0.23 | 1.09 | 0.25 | |
| SAT L | 1 | 30 | 29.63 | -0.15 | Left Tilted | EXT | 1:6.64 | 0.613 | 1.09 | 0.67 | |
| SAT L | 220 | 30 | 29.68 | -0.102 | Right Cheek | EXT | 1:6.64 | 0.464 | 1.08 | 0.50 | |
| SAT L | 220 | 30 | 29.68 | -0.01 | Right Tilted | EXT | 1:6.64 | 1.37 | 1.08 | 1.47 | |
| SAT L | 220 | 30 | 29.68 | -0.18 | Left Cheek | EXT | 1:6.64 | 0.24 | 1.08 | 0.26 | |
| SAT L | 220 | 30 | 29.68 | -0.12 | Left Tilted | EXT | 1:6.64 | 0.72 | 1.08 | 0.78 | |
| SAT L | 43F | 30 | 29.7 | 0.15 | Right Cheek | EXT | 1:6.64 | 0.597 | 1.07 | 0.64 | |
| SAT L | 43F | 30 | 29.7 | 0.17 | Right Tilted | EXT | 1:6.64 | 1.41 | 1.07 | 1.51 | 3 |
| SAT L | 43F | 30 | 29.7 | 0.15 | Left Cheek | EXT | 1:6.64 | 0.283 | 1.07 | 0.30 | |
| SAT L | 43F | 30 | 29.7 | -0.12 | Left Tilted | EXT | 1:6.64 | 0.791 | 1.07 | 0.85 | |

| Repeated measurements | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Band | Channel | Maximun Power [dBm] | Conducted Power [dBm] | Power Drift [dB] | Test Position | Antenna | Duty Cycle | Measured SAR 1g [mW/g] | Scaling Factor | Reported SAR 1g [mW/g] | Plot # |
| SAT L | 1 | 30 | 29.63 | -0.08 | Right Tilted | EXT | 1:6.64 | 1.18 | 1.09 | 1.28 | |
| SAT L | 220 | 30 | 29.68 | -0.21 | Right Tilted | EXT | 1:6.64 | 1.37 | 1.08 | 1.47 | |
| SAT L | 43F | 30 | 29.7 | 0.03 | Right Tilted | EXT | 1:6.64 | 1.37 | 1.07 | 1.47 | |

| Band | Channel | Maximun Power [dBm] | Conducted Power [dBm] | Power Drift [dB] | Test Position | Duty Cycle | Measured SAR 1g [mW/g] | Scaling Factor | Reported SAR 1g [mW/g] | Plot # |
|---|---|---|---|---|---|---|---|---|---|---|
| BT | 38 | 10.51 | 8.01 | 0.18 | Right Cheek | 1:1.3 | 0.00133 | 1.78 | 0.002 | |
| BT | 38 | 10.51 | 8.01 | -0.245* | Right Tilted | 1:1.3 | 0.00296 | 1.88 | 0.006 | |
| BT | 38 | 10.51 | 8.01 | 0 | Left Cheek | 1:1.3 | 0.0053 | 1.78 | **0.012** | 4 |
| BT | 38 | 10.51 | 8.01 | -0.272* | Left Tilted | 1:1.3 | 0.00187 | 1.89 | 0.003 | |

*Drift considered in scaling factor

### In Front of Face, 25mm separation distance

| Band | Channel | Maximun Power [dBm] | Conducted Power [dBm] | Power Drift [dB] | Test Position | Antenna | Duty Cycle | Measured SAR 1g [mW/g] | Scaling Factor | Reported SAR 1g [mW/g] | Plot # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAT L | 220 | 30 | 29.68 | -0.0324 | In front of Face | EXT | 1:6.64 | 0.104 | 1.08 | 0.11 | 5 |

## 7.2 SAR Results for Body-Worn Configuration, 10 mm separation distance

| Band | Channel | Maximun Power [dBm] | Conducted Power [dBm] | Power Drift [dB] | Test Position | Duty Cycle | Measured SAR 1g [mW/g] | Scaling Factor | Reported SAR 1g [mW/g] | Plot # |
|---|---|---|---|---|---|---|---|---|---|---|
| BT | 38 | 10.51 | 8.01 | -0.08 | Front | 1:1.3 | 0.00187 | 1.78 | 0.003 | |
| BT | 38 | 10.51 | 8.01 | 0.17 | Back | 1:1.3 | 0.0161 | 1.78 | 0.029 | 6 |

| Band | Channel | Maximun Power [dBm] | Conducted Power [dBm] | Power Drift [dB] | Test Position | Antenna | Duty Cycle | Measured SAR 1g [mW/g] | Scaling Factor | Reported SAR 1g [mW/g] | Plot # |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAT L | 220 | 30 | 29.68 | -0.08 | Front | EXT | 1:6.64 | 0.323 | 1.08 | 0.35 | |
| SAT L | 220 | 30 | 29.68 | -0.02 | Back | EXT | 1:6.64 | 0.354 | 1.08 | 0.38 | 7 |

## 7.3 SAR Results for simultaneous transmission

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna.

When the sum of $SAR_{1g}$ of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit ($SAR_{1g}$ 1.6 W/kg), the simultaneous transmission SAR is not required.

When the sum of $SAR_{1g}$ is greater than the SAR limit ($SAR_{1g}$ 1.6 W/kg), SAR test exclusion is determined by the SPLSR.

| | Explosure Condition | Head | | | | Body | |
|---|---|---|---|---|---|---|---|
| | Test Position | Right Cheek | Right Tilt | Left Cheek | Left Tilt | Front | Back |
| Satellite | | 0.64 | 1.51 | 0.30 | 0.85 | 0.35 | 0.38 |
| Bluetooth | | 0.002 | 0.006 | 0.012 | 0.003 | 0.003 | 0.029 |
| SAR Summation | | 0.642 | 1.516 | 0.312 | 0.853 | 0.353 | 0.409 |
| SPLSR Analysis | | Σ SAR < 1.6, Analysis Not Required | | | | | |

**APPENDIX A: PHOTOS OF THE DUT**

Dimension of the DUT are 152mm x 47mm x 24.5mm

Front of the DUT:

Back of the DUT:

Head Explosure Condition:

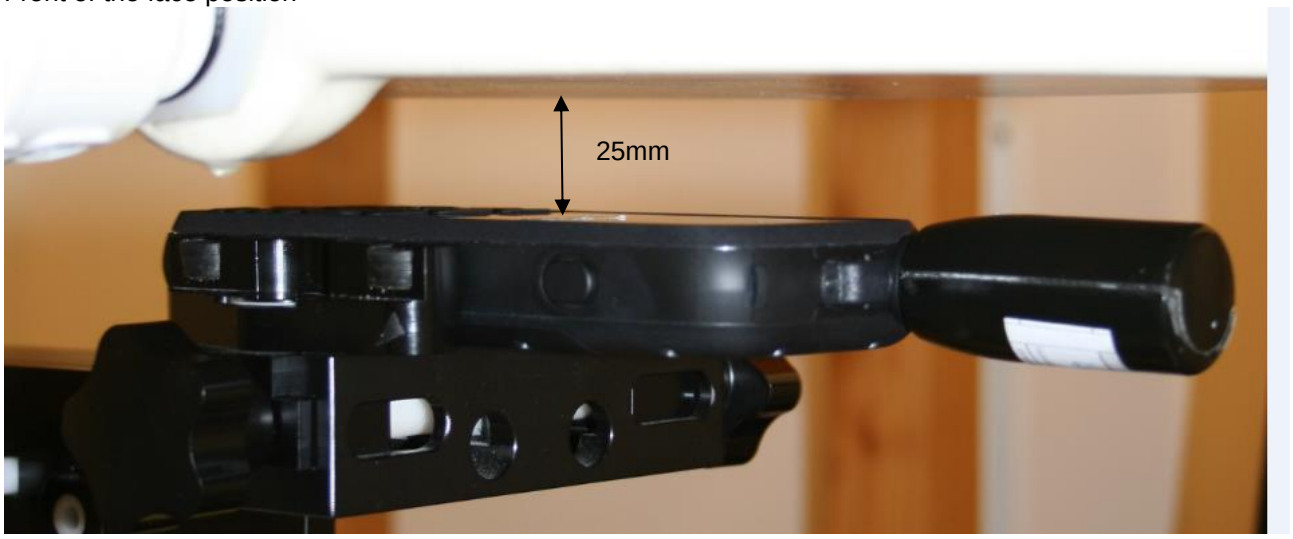
Right cheek position


Right tilt position

Left cheek position

Left tilt position

Front of the face position




Body-worn Explosure Condition:

Backside toward phantom


Frontside toward phantom


10mm
10mm

## APPENDIX B: SYSTEM CHECK SCANS

Date/Time: 23.01.2017 12:14:48

Test Laboratory: Verkotan Oy

Plot 1

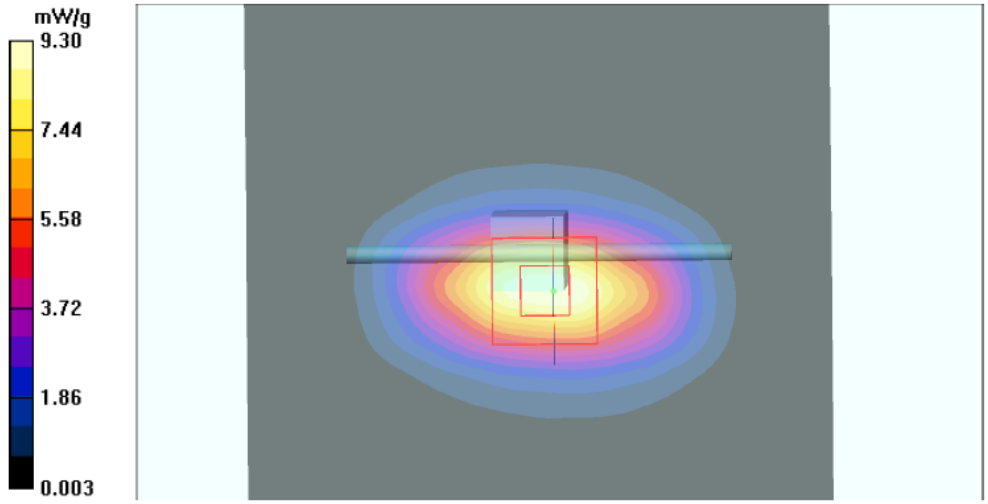
**DUT: Dipole 1640 MHz; Type: DIP1G640-433; Serial: SN 37/16 DIP 1G640-433**
**Program Name: System Performance Check at 1640 MHz**

Communication System: CW; Frequency: 1640 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1640 MHz; $\sigma$ = 1.26 mho/m; $\varepsilon_r$ = 39.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1381; ConvF(5.56, 5.56, 5.56); Calibrated: 15.09.2016
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 22.04.2016
- Phantom: SAM_2; Type: SAM Twin; Serial: TP-1142
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**d=10mm, Pin=250mW/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 9.30 mW/g

**d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 79.3 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 13.7 W/kg
**SAR(1 g) = 8.53 mW/g; SAR(10 g) = 4.77 mW/g**
Maximum value of SAR (measured) = 9.61 mW/g



Date/Time: 24.01.2017 13:36:28

Test Laboratory: Verkotan Oy

Plot 2

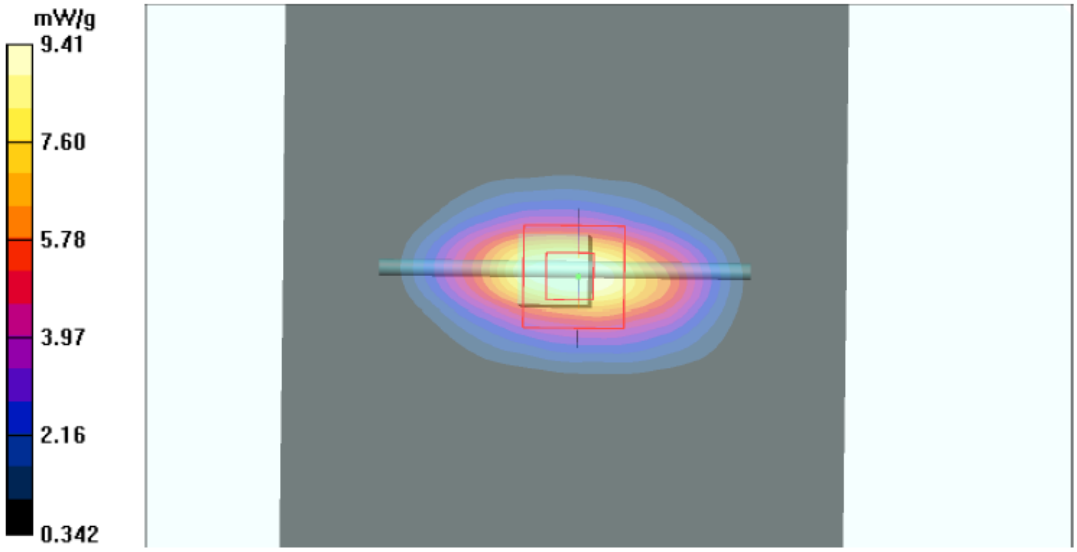
**DUT: Dipole 1640 MHz; Type: DIP1G640-433; Serial: SN 37/16 DIP 1G640-433**
**Program Name: System Performance Check at 1640 MHz**

Communication System: CW; Frequency: 1640 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1640 MHz; $\sigma$ = 1.36 mho/m; $\varepsilon_r$ = 53.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1381; ConvF(5.19, 5.19, 5.19); Calibrated: 15.09.2016
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 22.04.2016
- Phantom: SAM_1; Type: SAM Twin; Serial: TP-1128
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**d=10mm, Pin=250mW/Area Scan (81x81x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 9.62 mW/g

**d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.1 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 12.6 W/kg
**SAR(1 g) = 8.3 mW/g; SAR(10 g) = 4.67 mW/g**
Maximum value of SAR (measured) = 9.41 mW/g



## APPENDIX C: MEASUREMENT SCAN

Date/Time: 23.01.2017 19:52:37

Test Laboratory: Verkotan Oy

Plot 3

**DUT: Mexsat Rugged; Type: Phone; Serial: 356244060507997**
**Program Name: Head Exposure Condition**

Communication System: Satellite; Frequency: 1660.5 MHz;Duty Cycle: 1:6.64
Medium parameters used (interpolated): f = 1660.5 MHz; $\sigma$ = 1.28 mho/m; $\varepsilon_r$ = 39.5; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

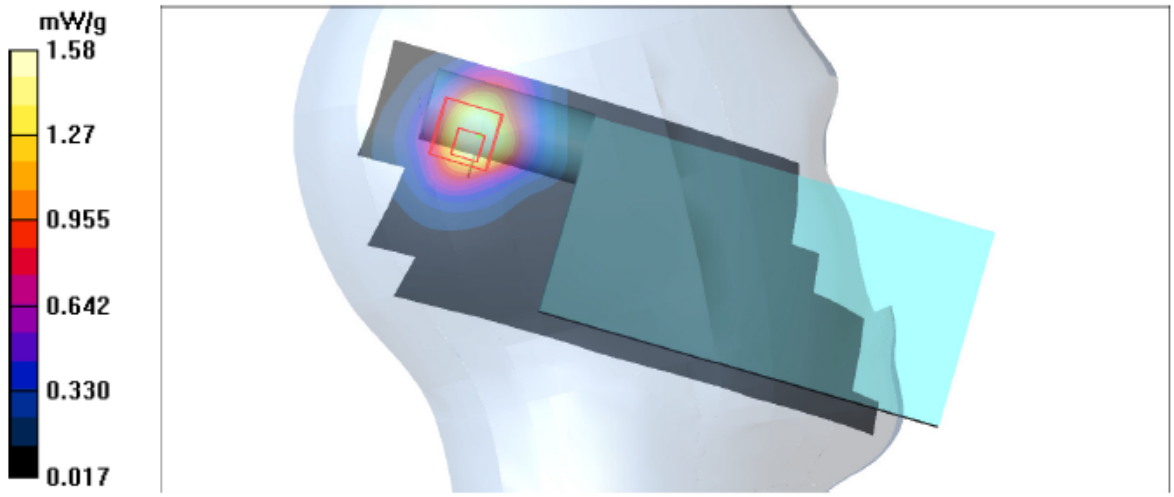
DASY4 Configuration:
- Probe: ET3DV6 - SN1381; ConvF(5.56, 5.56, 5.56); Calibrated: 15.09.2016
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 22.04.2016
- Phantom: SAM_2; Type: SAM Twin; Serial: TP-1142
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Right Tilted 5/Area Scan (61x151x1):** Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.74 mW/g

**Right Tilted 5/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.20 V/m; Power Drift = 0.170 dB
Peak SAR (extrapolated) = 2.68 W/kg
**SAR(1 g) = 1.41 mW/g; SAR(10 g) = 0.788 mW/g**

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.58 mW/g



Date/Time: 17.01.2017 10:35:08

Test Laboratory: Verkotan Oy

Plot 4

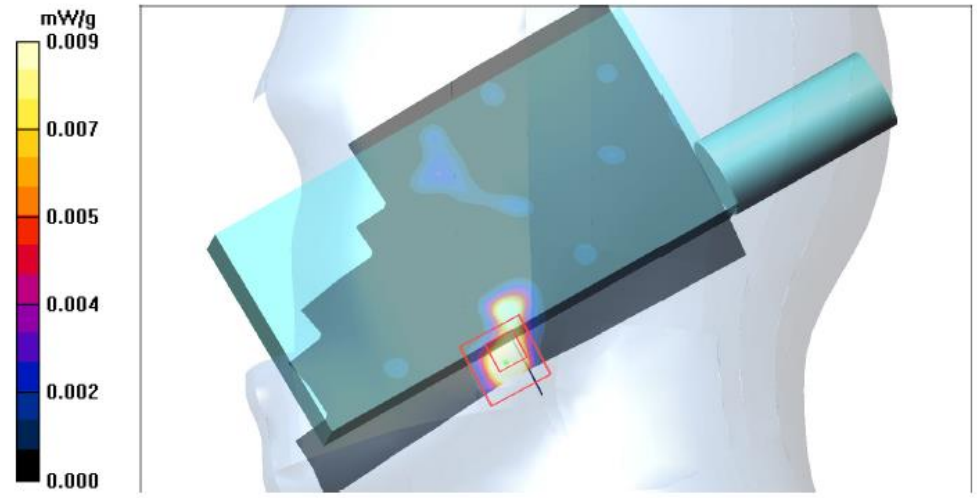
**DUT: Mexsat Rugged; Type: Phone; Serial: 356244060507997**
**Program Name: Head Explosure Condition**

Communication System: Bluetooth; Frequency: 2440 MHz;Duty Cycle: 1:1.3
Medium parameters used: f = 2440 MHz; $\sigma$ = 1.82 mho/m; $\varepsilon_r$ = 39.4; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3892; ConvF(7.22, 7.22, 7.22); Calibrated: 11.03.2016
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 22.04.2016
- Phantom: SAM_2; Type: SAM Twin; Serial: TP-1142
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Left Cheek/Area Scan (81x131x1):** Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.020 mW/g

**Left Cheek/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.755 V/m; Power Drift = 0.028 dB
Peak SAR (extrapolated) = 0.018 W/kg
**SAR(1 g) = 0.0053 mW/g; SAR(10 g) = 0.00197 mW/g**
Maximum value of SAR (measured) = 0.009 mW/g



Date/Time: 24.01.2017 09:28:38

**DUT: Mexsat Rugged; Type: Phone; Serial: 356244060507997**
**Program Name: In-Front of Face**

Plot 5

Communication System: Satellite; Frequency: 1643.5 MHz;Duty Cycle: 1:6.64
Medium parameters used (interpolated): f = 1643.5 MHz; $\sigma$ = 1.26 mho/m; $\varepsilon_r$ = 39.7; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

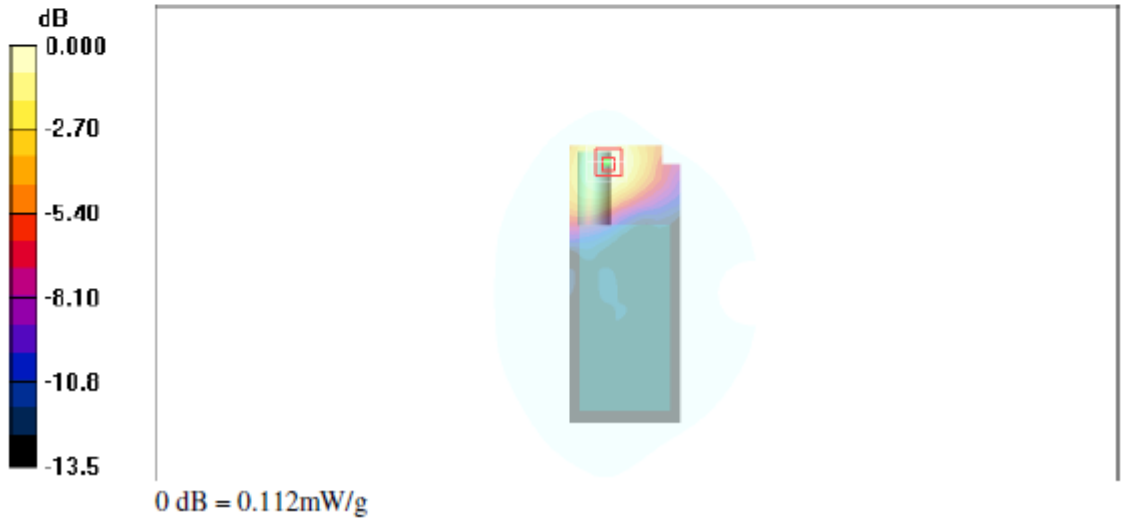
DASY4 Configuration:
- Probe: ET3DV6 - SN1381; ConvF(5.56, 5.56, 5.56); Calibrated: 15.09.2016
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 22.04.2016
- Phantom: SAM_2; Type: SAM Twin; Serial: TP-1142
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Front Face 25mm/Area Scan (61x151x1):** Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.111 mW/g

**Front Face 25mm/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.1 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 0.149 W/kg
**SAR(1 g) = 0.104 mW/g; SAR(10 g) = 0.069 mW/g**

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.112 mW/g




0 dB = 0.112mW/g

Date/Time: 17.01.2017 10:07:03

Test Laboratory: Verkotan Oy

Plot 6

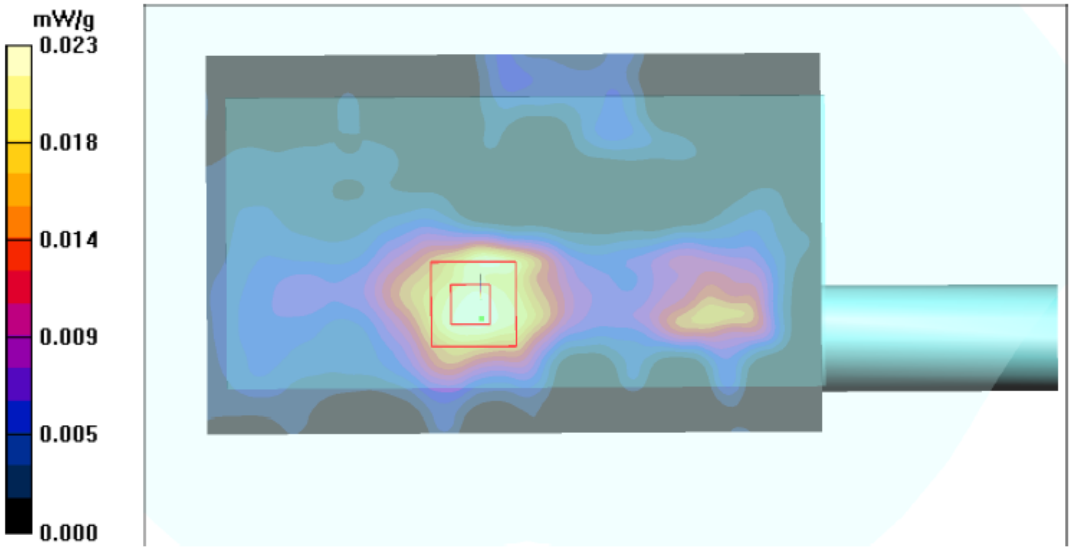
**DUT: Mexsat Rugged; Type: Phone; Serial: 356244060507997**
**Program Name: Body-Worn Condition**

Communication System: Bluetooth; Frequency: 2440 MHz;Duty Cycle: 1:1.3
Medium parameters used: f = 2440 MHz; $\sigma$ = 1.92 mho/m; $\varepsilon_r$ = 52.2; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3892; ConvF(7.35, 7.35, 7.35); Calibrated: 11.03.2016
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 22.04.2016
- Phantom: SAM_1; Type: SAM Twin; Serial: TP-1128
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Back 10mm 2/Area Scan (81x131x1):** Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.022 mW/g

**Back 10mm 2/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.97 V/m; Power Drift = 0.172 dB
Peak SAR (extrapolated) = 0.052 W/kg
**SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.00798 mW/g**
Maximum value of SAR (measured) = 0.023 mW/g



Date/Time: 24.01.2017 14:35:47

Test Laboratory: Verkotan Oy

Plot 7

**DUT: Mexsat Rugged; Type: Phone; Serial: 356244060507997**
**Program Name: Body-Worn Condition**

Communication System: Satellite; Frequency: 1643.5 MHz;Duty Cycle: 1:6.64
Medium parameters used (interpolated): f = 1643.5 MHz; $\sigma$ = 1.36 mho/m; $\varepsilon_r$ = 53.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

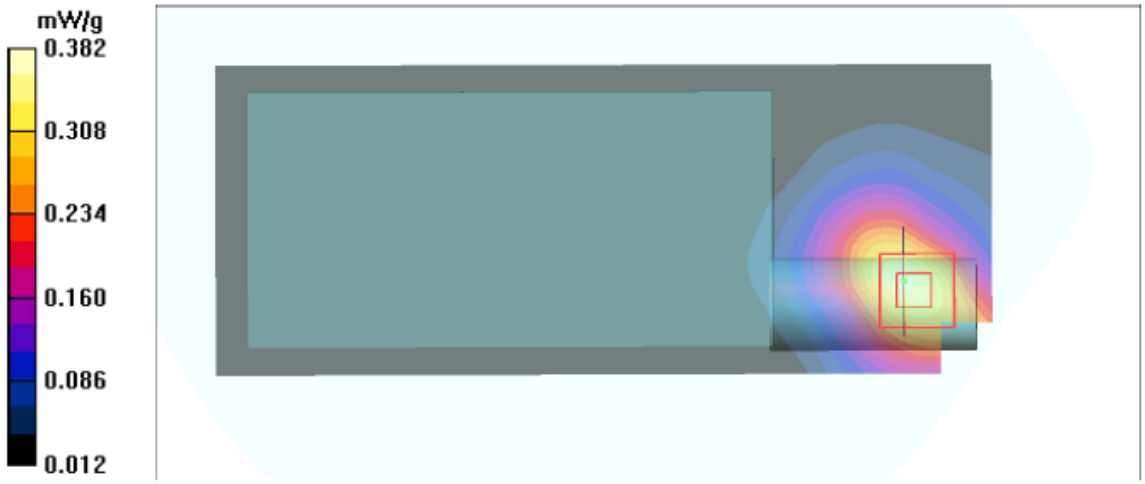
DASY4 Configuration:
- Probe: ET3DV6 - SN1381; ConvF(5.19, 5.19, 5.19); Calibrated: 15.09.2016
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn371; Calibrated: 22.04.2016
- Phantom: SAM_1; Type: SAM Twin; Serial: TP-1128
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Back 10mm/Area Scan (61x151x1):** Measurement grid: dx=15mm, dy=15mm

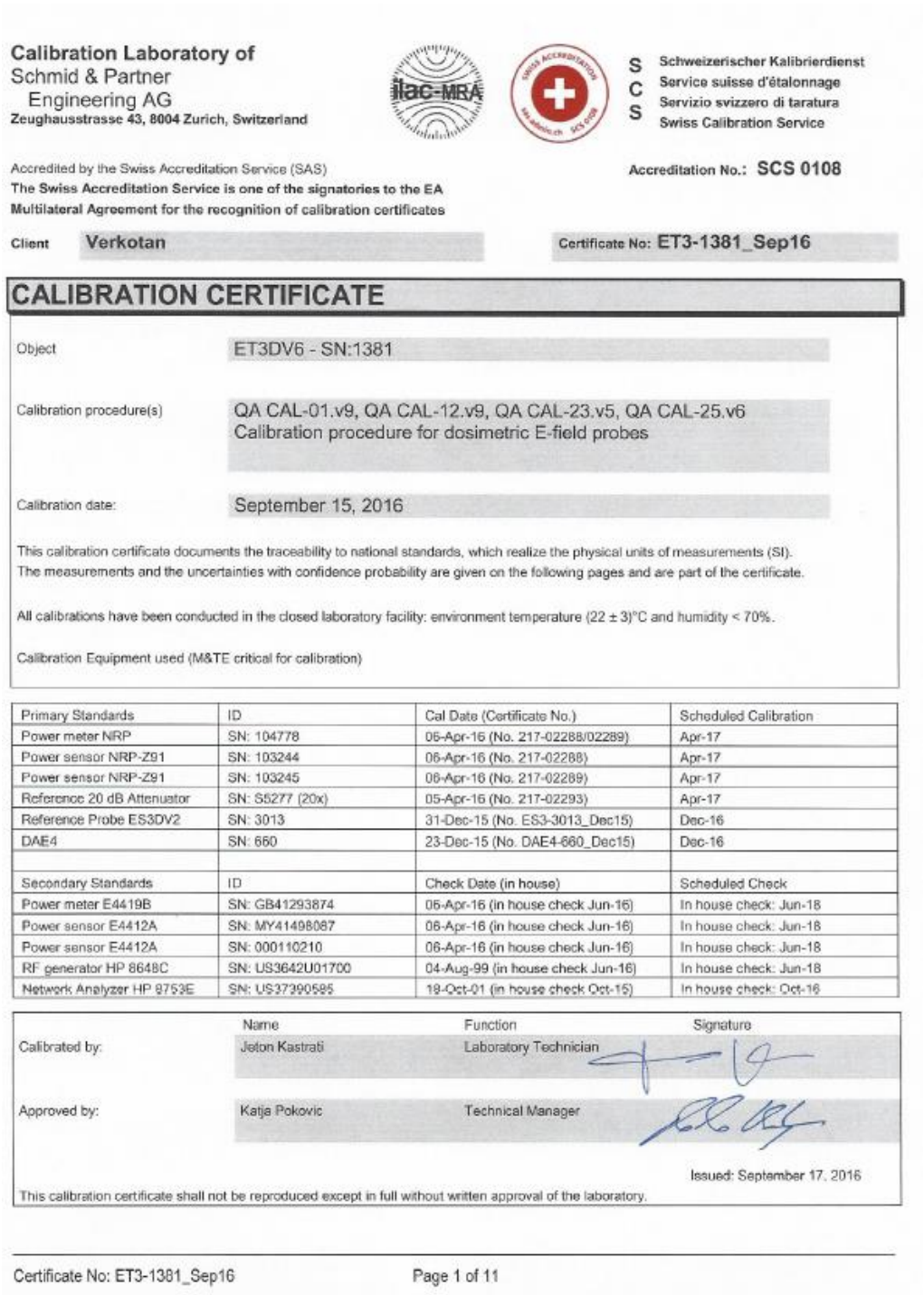
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.361 mW/g

**Back 10mm/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.57 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 0.505 W/kg
**SAR(1 g) = 0.354 mW/g; SAR(10 g) = 0.214 mW/g**

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.382 mW/g



## APPENDIX D: RELEVANT PAGES FROM PROBE CALIBRATION REPORTS



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

Accreditation No.: SCS 0108

Client: Verkotan

Certificate No: ET3-1381_Sep16

# CALIBRATION CERTIFICATE

Object: ET3DV6 - SN:1381

Calibration procedure(s): QA CAL-01.v9, QA CAL-12.v9, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: September 15, 2016

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 ± 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 | 06-Apr-16 (No. 217-02288/02289) | Apr-17 |
| Power sensor NRP-Z91 | SN: 103244 | 06-Apr-16 (No. 217-02288) | Apr-17 |
| Power sensor NRP-Z91 | SN: 103245 | 06-Apr-16 (No. 217-02289) | Apr-17 |
| Reference 20 dB Attenuator | SN: S5277 (20x) | 05-Apr-16 (No. 217-02293) | Apr-17 |
| Reference Probe ES3DV2 | SN: 3013 | 31-Dec-15 (No. ES3-3013_Dec15) | Dec-16 |
| DAE4 | SN: 660 | 23-Dec-15 (No. DAE4-660_Dec15) | Dec-16 |
| | | | |
| Secondary Standards | ID | Check Date (in house) | Scheduled Check |
| Power meter E4419B | SN: GB41293874 | 06-Apr-16 (in house check Jun-16) | In house check: Jun-18 |
| Power sensor E4412A | SN: MY41498087 | 06-Apr-16 (in house check Jun-16) | In house check: Jun-18 |
| Power sensor E4412A | SN: 000110210 | 06-Apr-16 (in house check Jun-16) | In house check: Jun-18 |
| RF generator HP 8648C | SN: US3642U01700 | 04-Aug-99 (in house check Jun-16) | In house check: Jun-18 |
| Network Analyzer HP 8753E | SN: US37390585 | 18-Oct-01 (in house check Oct-15) | In house check: Oct-16 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Jeton Kastrati | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: September 17, 2016

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

Certificate No: ET3-1381_Sep16 Page 1 of 11

# DASY/EASY - Parameters of Probe: ET3DV6 - SN:1381

## Calibration Parameter Determined in Head Tissue Simulating Media

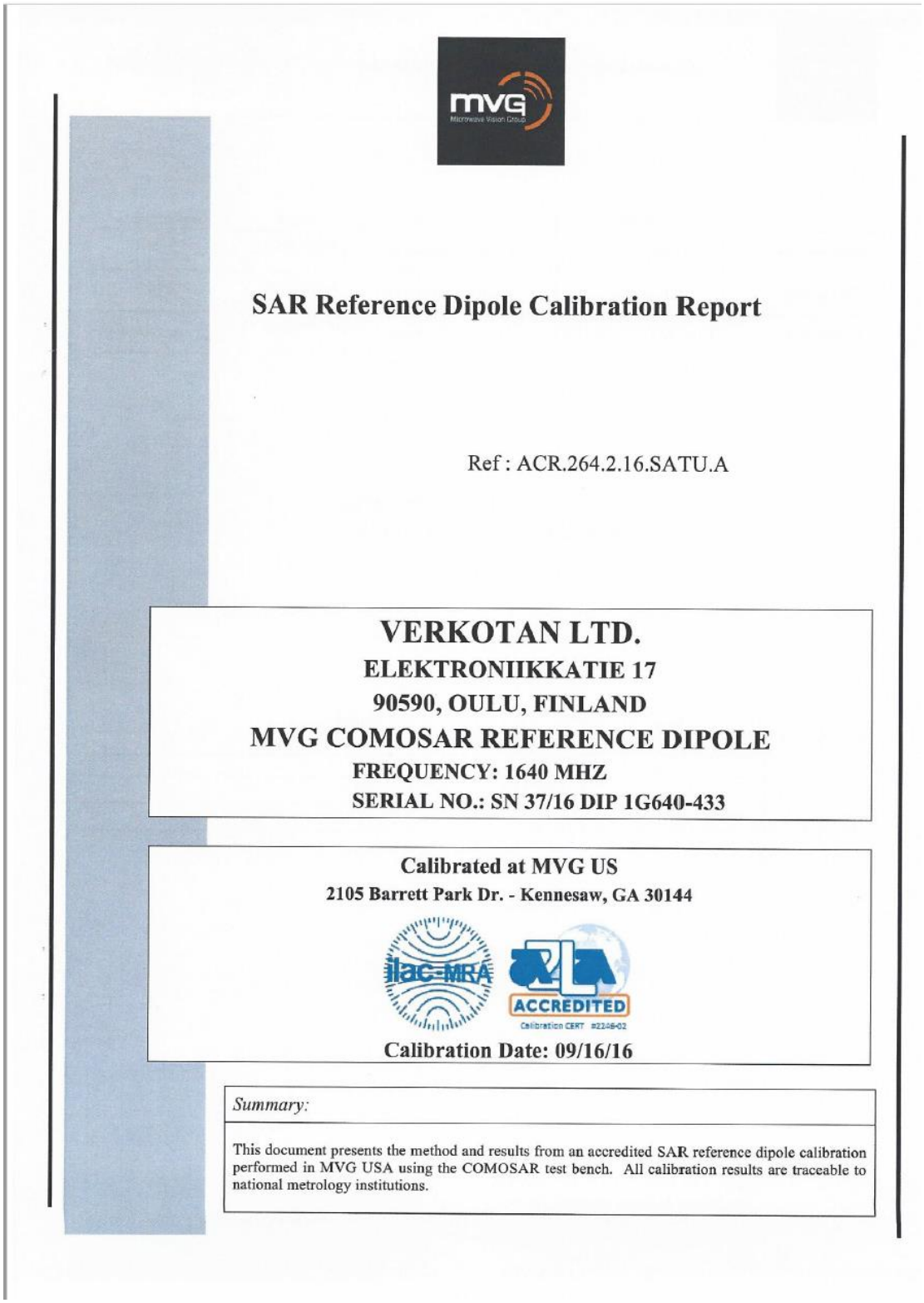
| f (MHz) [C] | Relative Permittivity [F] | Conductivity (S/m) [F] | ConvF X | ConvF Y | ConvF Z | Alpha [G] | Depth [G] (mm) | Unc (k=2) |
|---|---|---|---|---|---|---|---|---|
| 150 | 52.3 | 0.76 | 7.94 | 7.94 | 7.94 | 0.18 | 2.80 | ± 13.3 % |
| 450 | 43.5 | 0.87 | 7.29 | 7.29 | 7.29 | 0.29 | 2.87 | ± 13.3 % |
| 1640 | 40.3 | 1.29 | 5.56 | 5.56 | 5.56 | 0.75 | 2.22 | ± 12.0 % |

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

## APPENDIX E: RELEVANT PAGES FROM DIPOLE CALIBRATION REPORTS



# SAR Reference Dipole Calibration Report

Ref : ACR.264.2.16.SATU.A

**VERKOTAN LTD.**
**ELEKTRONIIKKATIE 17**
**90590, OULU, FINLAND**
**MVG COMOSAR REFERENCE DIPOLE**
**FREQUENCY: 1640 MHZ**
**SERIAL NO.: SN 37/16 DIP 1G640-433**

**Calibrated at MVG US**
**2105 Barrett Park Dr. - Kennesaw, GA 30144**

ilac-MRA
ACCREDITED
Calibration CERT #2246-02

**Calibration Date: 09/16/16**

*Summary:*

This document presents the method and results from an accredited SAR reference dipole calibration performed in MVG USA using the COMOSAR test bench. All calibration results are traceable to national metrology institutions.

SAR REFERENCE DIPOLE CALIBRATION REPORT

Ref: ACR.262.2.16.SATU.A

| | Name | Function | Date | Signature |
|---|---|---|---|---|
| *Prepared by :* | Jérôme LUC | Product Manager | 9/20/2016 | |
| *Checked by :* | Jérôme LUC | Product Manager | 9/20/2016 | |
| *Approved by :* | Kim RUTKOWSKI | Quality Manager | 9/20/2016 | |

| | Customer Name |
|---|---|
| *Distribution :* | Verkotan Ltd. |

| Issue | Date | Modifications |
|---|---|---|
| A | 9/20/2016 | Initial release |
| | | |
| | | |
| | | |

| | | | | |
|---|---|---|---|---|
| 1950 | 40.0 ±5 % | | 1.40 ±5 % | |
| 2000 | 40.0 ±5 % | | 1.40 ±5 % | |
| 2100 | 39.8 ±5 % | | 1.49 ±5 % | |
| 2300 | 39.5 ±5 % | | 1.67 ±5 % | |
| 2450 | 39.2 ±5 % | | 1.80 ±5 % | |
| 2600 | 39.0 ±5 % | | 1.96 ±5 % | |
| 3000 | 38.5 ±5 % | | 2.40 ±5 % | |
| 3500 | 37.9 ±5 % | | 2.91 ±5 % | |

## 7.2 SAR MEASUREMENT RESULT WITH HEAD LIQUID

The IEEE Std. 1528 and CEI/IEC 62209 standards state that the system validation measurements should produce the SAR values shown below (for phantom thickness of 2 mm), within the uncertainty for the system validation. All SAR values are normalized to 1 W forward power. In bracket, the measured SAR is given with the used input power.

| | |
|---|---|
| Software | OPENSAR V4 |
| Phantom | SN 20/09 SAM71 |
| Probe | SN 18/11 EPG122 |
| Liquid | Head Liquid Values: eps' : 40.1 sigma : 1.32 |
| Distance between dipole center and liquid | 10.0 mm |
| Area scan resolution | dx=8mm/dy=8mm |
| Zoon Scan Resolution | dx=8mm/dy=8mm/dz=5mm |
| Frequency | 1640 MHz |
| Input power | 20 dBm |
| Liquid Temperature | 21 °C |
| Lab Temperature | 21 °C |
| Lab Humidity | 45 % |

| Frequency MHz | 1 g SAR (W/kg/W) | | 10 g SAR (W/kg/W) | |
|---|---|---|---|---|
| | required | measured | required | measured |
| 300 | 2.85 | | 1.94 | |
| 450 | 4.58 | | 3.06 | |
| 750 | 8.49 | | 5.55 | |
| 835 | 9.56 | | 6.22 | |
| 900 | 10.9 | | 6.99 | |
| 1450 | 29 | | 16 | |
| 1500 | 30.5 | | 16.8 | |
| 1640 | 34.2 | 35.78 (3.58) | 18.4 | 19.04 (1.90) |
| 1750 | 36.4 | | 19.3 | |
| 1800 | 38.4 | | 20.1 | |
| 1900 | 39.7 | | 20.5 | |
| 1950 | 40.5 | | 20.9 | |
| 2000 | 41.1 | | 21.1 | |

| | | | | |
|---|---|---|---|---|
| 3000 | 52.0 ±5 % | | 2.73 ±5 % | |
| 3500 | 51.3 ±5 % | | 3.31 ±5 % | |
| 3700 | 51.0 ±5 % | | 3.55 ±5 % | |
| 5200 | 49.0 ±10 % | | 5.30 ±10 % | |
| 5300 | 48.9 ±10 % | | 5.42 ±10 % | |
| 5400 | 48.7 ±10 % | | 5.53 ±10 % | |
| 5500 | 48.6 ±10 % | | 5.65 ±10 % | |
| 5600 | 48.5 ±10 % | | 5.77 ±10 % | |
| 5800 | 48.2 ±10 % | | 6.00 ±10 % | |

## 7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

| | |
|---|---|
| Software | OPENSAR V4 |
| Phantom | SN 20/09 SAM71 |
| Probe | SN 18/11 EPG122 |
| Liquid | Body Liquid Values: eps' : 54.1 sigma : 1.41 |
| Distance between dipole center and liquid | 10.0 mm |
| Area scan resolution | dx=8mm/dy=8mm |
| Zoon Scan Resolution | dx=8mm/dy=8mm/dz=5mm |
| Frequency | 1640 MHz |
| Input power | 20 dBm |
| Liquid Temperature | 21 °C |
| Lab Temperature | 21 °C |
| Lab Humidity | 45 % |

| Frequency MHz | 1 g SAR (W/kg/W) | 10 g SAR (W/kg/W) |
|---|---|---|
| | measured | measured |
| 1640 | 35.66 (3.57) | 19.13 (1.91) |