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Report On

Specific Absorption Rate Testing of the Sepura Ltd, SC2128 Tetra Radio (2.4GHz WLAN Transmitter)

Covering FCC 47CFR 2.1093, RSS 102 Issue 5 and related documents.

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REPORT ON	Specific Absorption Rate Testing of the Sepura Ltd, SC2128 Tetra Radio (2.4GHz WLAN Transmitter) Document 75950098 Report 5 Issue 1 June 2021
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DATED	29 June 2021

CONTENTS

SECTION 1

REPORT SUMMARY

Specific Absorption Rate Testing of the
Sepura SC2128 Tetra Radio (2.4GHz WLAN Transmitter)

1.1 REPORT MODIFICATION RECORD

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	29 June 2021

1.2 INTRODUCTION

The information contained in this report is intended to show verification of the Specific Absorption Rate Testing of the Sepura Ltd, SC2128 Tetra Radio (2.4GHz WLAN Transmitter) to the requirements of of KDB 447498 D01 v06 General RF Exposure Guidance.

Objective	To perform Specific Absorption Rate Testing to determine the Equipment Under Test's (EUT's) compliance with the requirements specified of KDB 447498 D01 v06 General RF Exposure Guidance, for the series of tests carried out.
Applicant	Sepura Ltd
Manufacturer	Sepura Ltd
Manufacturing Description	Tetra Radio
Model Number	SC2128
Serial Number(s)	1PR002013GMJ3UC (SC2128) 1PR001909GM18RZ (WLAN conducted sample SC2124)
Number of Samples Tested	2
Hardware Version	Production Unit
Software Version	2001 797 07367
Battery Model Number	300-01852 (1160mAh) 300-01853 (1880mAh)
Test Specification/Issue/Date	KDB 447498 D01 v06 General RF Exposure Guidance
Start of Test	27 December 2020
Finish of Test	07 April 2021
Related Document(s)	FCC 47CFR 2.1093: 2015 KDB 865664 – D01 v01r04 KDB 648474 – D01 v01r03 KDB 447498 – D01 v06 KDB 248227 – D01 v02r02 IEEE 1528 – 2013 RSS-102 Issue 5
Name of Engineer(s)	Mohamud Mohamud Stephen Dodd

1.3 BRIEF SUMMARY OF RESULTS

The measurements shown in this report were made in accordance with the procedures specified KDB 447498 D01 v06 General RF Exposure Guidance.

The maximum 1g volume averaged stand-alone SAR found during this Assessment:

Max 1g SAR (W/kg) Body	0.17 (Measured)	0.21 (Scaled)
Max 1g SAR (W/kg) Head	0.15 (Measured)	0.18 (Scaled)
Max 1g SAR (W/kg) Front of Face	0.02 (Measured)	0.02 (Scaled)
The maximum 1 g volume averaged SAR level measured for all the tests performed did not exceed the limits for Occupational Use/ Controlled Exposure (W/kg) Partial Body of 8.0 W/kg which is the relevant limit for testing according to the KDB 447498 D01 v06 General RF Exposure Guidance.		

1.4 TEST RESULTS SUMMARY

1.4.1 System Performance / Validation Check Results

Prior to formal testing being performed a System Check was performed in accordance with KDB 447498 D01 v06 General RF Exposure Guidance and the results were compared against published data in Standard IEEE 1528-2013. The following results were obtained:

System performance / Validation results

Date	Frequency (MHz)	Fluid Type	Measured Max 1g SAR (W/kg) *	Max 1g SAR (W/kg) Target	Percentage Drift on Reference
27/12/2020	2450	MBBL	50.56	51.20	-1.25
06/04/2021	2450	HBBL	54.14	52.40	3.32
07/04/2021	2450	HBBL	54.14	52.40	3.32

*Normalised to a forward power of 1W

1.4.2 Results Summary Tables

WLAN 2450 MHz - 802.11b - 20MHz – 1Mbps - Nylon Holster (300-01916) - 1160mAh battery (300-01852): Body Specific Absorbtion Rate (Maximum SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear Facing	11	2462.0	15.62	16.5	0.09	0.11	2
Limit for Occupation (Controlled Exposure) 8.0 W/kg (1 g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2							

WLAN 2450 MHz - 802.11b - 20MHz – 1Mbps - Nylon Holster (300-01916) - 1880mAh battery (300-01853): Body Specific Absorbtion Rate (Maximum SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear Facing	11	2462.0	15.52	16.5	0.06	0.08	3
Limit for Occupation (Controlled Exposure) 8.0 W/kg (1 g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2							

WLAN 2450 MHz - 802.11b - 20MHz – 1Mbps - No Holster - 1880mAh battery (300-01853): Body Specific Absorbtion Rate (Maximum SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear Facing	11	2462.0	15.52	16.5	0.17	**0.21**	4
Limit for Occupation (Controlled Exposure) 8.0 W/kg (1 g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2							

WLAN 2450 MHz - 802.11b - 20MHz – 1Mbps - No Holster (300-01916) - 1160mAh battery (300-01852): Body Specific Absorbtion Rate (Maximum SAR) 1g Results

Test Position	Channel Number	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
0mm Rear Facing	11	2462.0	15.52	16.5	0.16	0.19	5
Limit for Occupation (Controlled Exposure) 8.0 W/kg (1 g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2							

WLAN 2450MHz - 802.11b 20 MHz 1Mbps - 1880mAh Battery
Head Specific Absorbtion Rate (Maximum SAR) 1g Results

Test Position	Channel	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
Left Cheek	11	2462	15.62	16.50	0.15	0.18	Figure 6
Left Tilt	11	2462	15.62	16.50	0.02	0.02	Figure 7
Right Cheek	11	2462	15.62	16.50	0.09	0.11	Figure 8
Right Tilt	11	2462	15.62	16.50	0.01	0.01	Figure 9
Limit for Occupation (Controlled Exposure) 8.0 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2							

WLAN 2450MHz - 802.11b 20 MHz 1Mbps - 1160mAh Battery
Head Specific Absorbtion Rate (Maximum SAR) 1g Results

Test Position	Channel	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
Left Cheek	11	2462	15.62	16.50	0.14	0.18	Figure 10
Limit for Occupation (Controlled Exposure) 8.0 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2 This position was retested using the low capacity battery as it was the worst case configuration using the high capacity battery (Before rounding of results to 2 decimal places).							

WLAN 2450MHz - 802.11b 20 MHz 1Mbps - 1880mAh Battery
Front of Face Specific Absorbtion Rate (Maximum SAR) 1g Results

Test Position	Channel	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
25mm Front face	11	2462	15.62	16.50	0.02	0.02	Figure 11
Limit for Occupation (Controlled Exposure) 8.0 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2							

WLAN 2450MHz - 802.11b 20 MHz 1Mbps - 1160mAh Battery
Front of Face Specific Absorbtion Rate (Maximum SAR) 1g Results

Test Position	Channel	Frequency (MHz)	Measured Average Power (dBm)	Tune Up (dBm)	Measured 1g SAR (W/kg)	Scaled 1g SAR (W/kg)	Scan Figure Number
25mm Front face	11	2462	15.62	16.50	0.02	0.02	Figure 12
Limit for Occupation (Controlled Exposure) 8.0 W/kg (1g) KDB 447498 D01 - Testing of other required channels within the operation mode of a frequency band is not required when the reported 1g SAR for mid-band or highest output power channel is: ≤ 0.8W/kg when the transmission band is ≤ 100MHz ≤ 0.6W/kg when the transmission band is between 100MHz and 200MHz ≤ 0.4W/kg when the transmission band is ≥ 200MHz KDB 248227 D01 v02 - Testing was not required for OFDM as per Section 5.2.2							

1.4.3 Standalone SAR Estimation

When the standalone SAR test exclusion of section 4.3.1 is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to the following to determine simultaneous transmission SAR test exclusion. The estimated SAR is only used to determine simultaneous transmission SAR test exclusion; When SAR is estimated, it must be applied to determine the sum of 1-g SAR test exclusion. When SAR to peak location separation ratio test exclusion is applied, the highest reported SAR for simultaneous transmission can be an estimated standalone SAR if the estimated SAR is the highest among the simultaneously transmitting antennas (see KDB 690783).

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[$\sqrt{f(\text{GHz})}$/7.5] W/kg for test separation distances ≤ 50 mm;

where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR

when the minimum test separation distance is <5mm, a distance of 5mm is applied.

Bluetooth SAR Estimation

Test Configuration	Frequency (MHz)	Maximum Power (mW)	Distance (mm)	Estimated SAR (W/kg)
Body	2480	5.47	5	0.23
Head	2480	5.47	5	0.23
Front of face	2480	5.47	25	0.05

1.4.4 Standalone SAR Test Exclusion Considerations (KDB 447498 D01)

The 1g SAR Test exclusion thresholds for 100 MHz to 6 GHz *test separation distances* ≤ 50 mm are determined by:

[(*max power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] [√f (GHz)]* ≤ 3.0, where

- f (GHz) is the RF channel transmit frequency in GHz.
- Power and distance are rounded to the nearest mW and mm before calculation.
- The result is rounded to one decimal place for comparison.
- When the maximum test separation distance is < 5 mm, a distance of 5 mm is applied.

RAT & Band	Frequency (MHz)	Power (dBm)	Power (mW)	Test Position	Distance (mm)	Threshold	Test Exclusion
Bluetooth 2450 MHz	2480	7.38	5.47	Head	5	1.7	Yes
Bluetooth 2450 MHz	2480	7.38	5.47	Body	5	1.7	Yes
Bluetooth 2450 MHz	2480	7.38	5.47	Front of Face	25	0.3	Yes
WLAN 2450 MHz	2462	16.5	44.67	Head	5	14.0	No
WLAN 2450 MHz	2462	16.5	44.67	Body	5	14.0	No
WLAN 2450 MHz	2462	16.5	44.67	Front of Face	25	2.9	Yes

1.4.5 Technical Description

The equipment under test (EUT) was a Sepura SC2128 A full technical description can be found in the manufacturer's documentation.

1.4.6 Test Configuration and Modes of Operation

The testing was performed with two battery variants (1160 mAh and 1880 mAh) which were supplied and manufactured by Sepura Limited. The batteries were fully charged before each measurement and there were no external connections.

For body SAR assessment, testing was performed for the WLAN 2.4GHz frequency bands at maximum power, using Nylon Holster (Model Number 300-01916) which contains metal components. Body SAR testing was carried out with the device inside the holster using two battery variants. (Part Numbers: 300-01852 (1160 mAh) and 300-01853 (1880 mAh)
Various body worn accesories are compatible with the radio, Nylon Holster (Model Number 300-01916) provides the smallest separtion distance betwwen the body and the radio.
Additional testing was performed without any body worn accessories attached at 0 mm separation distance between the device under test and the Elliptical Flat Phantom.

WLAN Head SAR assessment was performed with no body worn accessories using the 1880 mAh battery, the worst-case position was retested using 1160 mAh battery.

WLAN Front of Face SAR assessment was not required as this meets the exclusion criteria specified in KDB 447498 D01, however testing was applied and performed with no body worn accessories using the 1880 mAh and 1160 mAh battery.

The Elliptical Flat Phantom dimensions are 600 mm major axis and 400 mm minor axis with a shell thickness of 2.00 mm. The phantom was filled to a minimum depth of 150 mm with the appropriate Body simulant liquid. The dielectric properties were measured and found to be in accordance with the requirements specified in KDB 865664 D01

WLAN testing was achieved using the devices internal software, customer supplied software and settings supplied by the customer. For each scan, the EUT was configured into a continuous transmission test mode

802.11g/n OFDM configurations met the test exclusion requirements of KDB 248227 D01 section 5.2.2. The highest reported SAR for DSSS was adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR was ≤ 1.2 W/kg.

Included in this report are descriptions of the test method; the equipment used and an analysis of the test uncertainties applicable and diagrams indicating the locations of maximum SAR for each test position along with photographs indicating the positioning of the handset against the body as appropriate.

1.5 FCC POWER MEASUREMENTS

1.5.1 Method

Conducted power measurements were made using a power meter.

1.5.2 Conducted Power Measurements

WLAN 2450 MHz

Technology	Frequency (MHz)	Rate (Mbps)	Channel Bandwidth (MHz)	Measured Power (dBm)
802.11b	2412	1	20	15.19
802.11b	2437	1	20	15.60
802.11b	2462	1	20	15.62

Conducted power measurements were made using a power meter.
Maximum Declared output power for WLAN is 16.5 dBm

WLAN Conducted power measurements were performed on a modified Sepura SC2124 from document 06 under project number 75947270. The SC2124 and SC2128 use the same plug in Bluetooth/Wi-Fi module.

SECTION 2

TEST DETAILS

Specific Absorption Rate Testing of the
Sepura SC2128 Tetra Radio (2.4GHz WLAN Transmitter)

2.1 DASY5 MEASUREMENT SYSTEM

2.1.1 System Description

The DASY5 system for performing compliance tests consists of the following items:

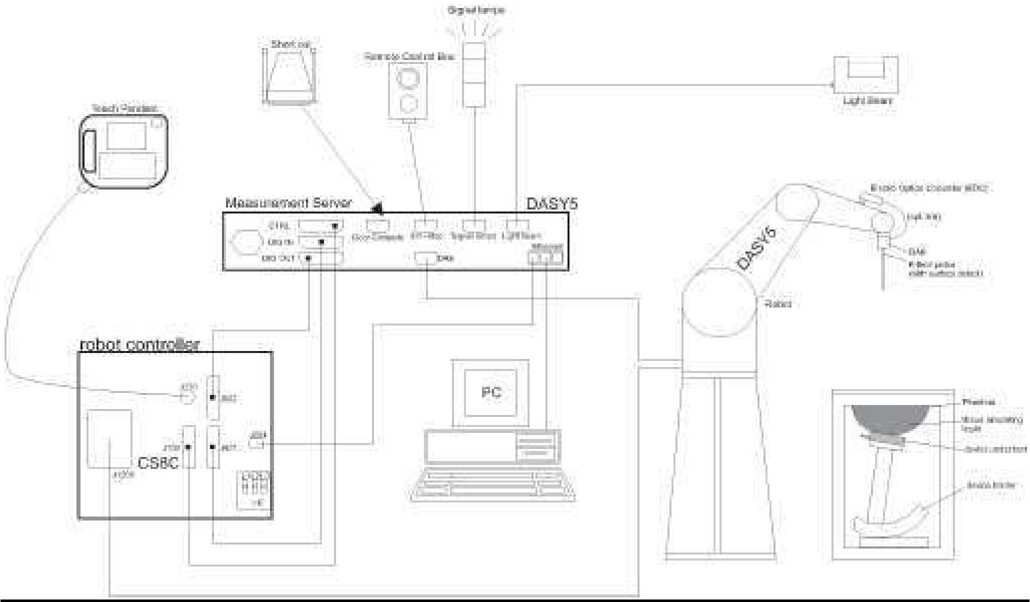

Figure 1 System Description Diagram

A standard high precision 6-axis robot (Stäubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).

An isotropic field probe optimized and calibrated for the targeted measurement.

A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.

The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.

The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.

Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.

The phantom, the device holder and other accessories according to the targeted measurement.

2.1.2 Probe Specification

The probes used by the DASY system are isotropic E-field probes, constructed with a symmetric design and a triangular core. The probes have built-in shielding against static charges and are contained within a PEEK enclosure material. These probes are specially designed and calibrated for use in liquids with high permittivities. The frequency range of the probes are from 6 MHz to 6 GHz.

2.1.3 Data Acquisition Electronics

The data acquisition electronics (DAE4 or DAE3) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection. The input impedance of both the DAE4 as well as of the DAE3 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

2.1.4 SAR Evaluation Description

The DASY5 software includes all numerical procedures necessary to evaluate the spatial peak SAR values.

Based on the IEEE 1528 standard, a new algorithm has been implemented. The spatial-peak SAR can be computed over any required mass.

The base for the evaluation is a "cube" measurement in a volume of 30mm3 (7x7x7 points). The measured volume must include the 1 g and 10 g cubes with the highest averaged SAR values. For that purpose, the centre of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan. If the 10g cube or both cubes are not entirely inside the measured volumes, the system issues a warning regarding the evaluated spatial peak values within the Post processing engine (SEMCAD X). This means that if the measured volume is shifted, higher values might be possible. To get the correct values you can use a finer measurement grid for the area scan. In complicated field distributions, a large grid spacing for the area scan might miss some details and give an incorrectly interpolated peak location.

The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD X). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. extraction of the measured data (grid and values) from the Zoom Scan
2. calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. generation of a high-resolution mesh within the measured volume
4. interpolation of all measured values from the measurement grid to the high-resolution grid
5. extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. calculation of the averaged SAR within masses of 1 g and 10 g

2.1.5 Interpolation, Extrapolation and Detection of Maxima

The probe is calibrated at the centre of the dipole sensors which is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated.

In DASY5, the choice of the coordinate system defining the location of the measurement points has no influence on the uncertainty of the interpolation, Maxima Search and extrapolation routines. The interpolation, extrapolation and maximum search routines are all based on the modified Quadratic Shepard's method. Thereby, the interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation. The DASY5 routines construct a once-continuously differentiable function that interpolates the measurement values as follows:

For each measurement point a trivariate (3-D) / bivariate (2-D) quadratic is computed.
It interpolates the measurement values at the data point and forms a least-square fit to neighbouring measurement values. The spatial location of the quadratic with respect to the measurement values is attenuated by an inverse distance weighting. This is performed since the calculated quadratic will fit measurement values at nearby points more accurate than at points located further away.

After the quadratics are calculated for at all measurement points, the interpolating function is calculated as a weighted average of the quadratics.

There are two control parameters that govern the behaviour of the interpolation method. One specifies the number of measurement points to be used in computing the least-square fits for the local quadratics. These measurement points are the ones nearest the input point for which the quadratic is being computed. The second parameter specifies the number of measurement points that will be used in calculating the weights for the quadratics to produce the final function. The input data points used there are the ones nearest the point at which the interpolation is desired. Appropriate defaults are chosen for each of the control parameters

The trivariate quadratics that have been previously computed for the 3-D interpolation and whose input data are at the closest distance from the phantom surface, are used in order to extrapolate the fields to the surface of the phantom.

In order to determine all the field maxima in 2-D (Area Scan) and 3-D (Zoom Scan), the measurement grid is refined by a default factor of 10 and the interpolation function is used to evaluate all field values between corresponding measurement points. Subsequently, a linear search is applied to find all the candidate maxima. In a last step, nonphysical maxima are removed and only those maxima which are within 2 dB of the global maximum value are retained.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extrema of the SAR distribution. The uncertainty on the locations of the extrema is less than 1/20 of the grid size. Only local maxima within 2 dB of the global maximum are searched and passed for the Zoom Scan measurement.

In the Zoom Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5mm.

2.1.6 Averaging and Determination of Spatial Peak SAR

The interpolated data is used to average the SAR over the 1g and 10g cubes by spatially discretising the entire measured volume. The resolution of this spatial grid used to calculate the averaged SAR is 1mm or about 42875 interpolated points. The resulting volumes are defined as cubical volumes containing the appropriate tissue parameters that are cantered at the location. The location is defined as the centre of the incremental volume (voxel).

The spatial-peak SAR must be evaluated in cubical volumes containing a mass that is within 5%of the required mass. The cubical volume centred at each location, as defined above, should be expanded in all directions until the desired value for the mass is reached, with no surface boundaries of the averaging volume extending beyond the outermost surface of the considered region. In addition, the cubical volume should not consist of more than 10% of air. If these conditions are not satisfied, then the centre of the averaging volume is moved to the next location. Otherwise, the exact size of the final sampling cube is found using an inverse polynomial approximation algorithm, leading to results with improved accuracy. If one boundary of the averaging volume reaches the boundary of the measured volume during its expansion, it will not be evaluated at all. Reference is kept of all locations used and those not used for averaging the SAR. All average SAR values are finally assigned to the centred location in each valid averaging volume.

All locations included in an averaging volume are marked to indicate that they have been used at least once. If a location has been marked as used but has never been assigned to the centre of a cube, the highest averaged SAR value of all other cubical volumes which have used this location for averaging is assigned to this location. Only those locations that are not part of any valid averaging volume should be marked as unused. For the case of an unused location, a new averaging volume must be constructed which will have the unused location centred at one surface of the cube. The remaining five surfaces are expanded evenly in all directions until the required mass is enclosed, regardless of the amount of included air. Of the six possible cubes with one surface centred on the unused location, the smallest cube is used, which still contains the required mass.

If the final cube containing the highest averaged SAR touches the surface of the measured volume, an appropriate warning is issued within the Post-processing engine.

2.2 WLAN 2450 MHz - 802.11b - 1Mbps - BODY SAR TEST RESULTS

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	21.4 °C
DATE:	28/12/2020	**RELATIVE HUMIDITY:**	35.5 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	1.972 S/m
DUT CONFIGURATION:	Nylon Holster (300-01916)-1160mAh battery (300-01852)	**RELATIVE PERMITTIVITY:**	54.515
DUT POSITION:	0mm - Rear Facing	**LIQUID TEMPERATURE:**	20.3 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2462.0 MHz	**DRIFT:**	-0.07 dB
MODULATION:	BPSK	**PEAK SAR:**	0.14 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.11 W/kg

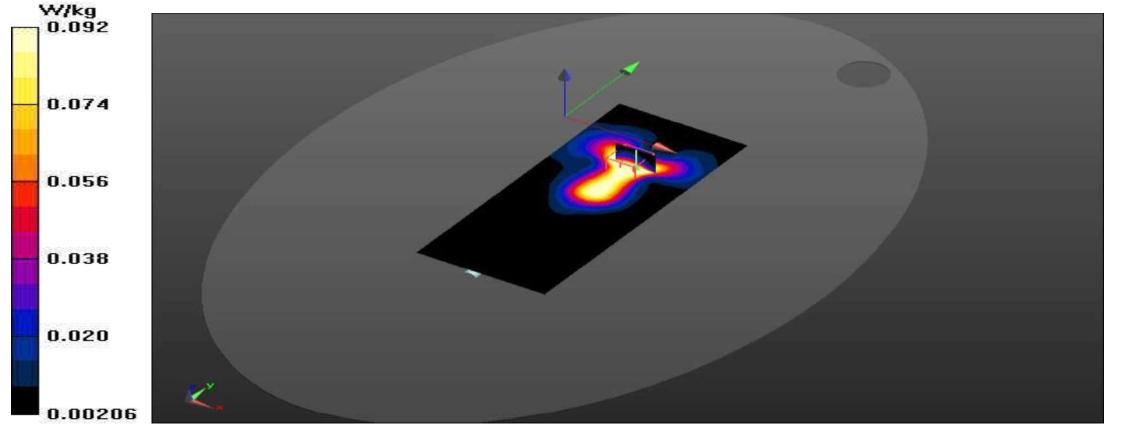

Figure 2: SAR Body Testing Results for the SC2128 at 2462.0 MHz

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	21.4 °C
DATE:	28/12/2020	**RELATIVE HUMIDITY:**	35.5 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	1.972 S/m
DUT CONFIGURATION:	Nylon Holster (300-01916)-1880mAh battery (300-01853)	**RELATIVE PERMITTIVITY:**	54.515
DUT POSITION:	0mm - Rear Facing	**LIQUID TEMPERATURE:**	20.3 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2462.0 MHz	**DRIFT:**	-0.04 dB
MODULATION:	BPSK	**PEAK SAR:**	0.10 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.08 W/kg

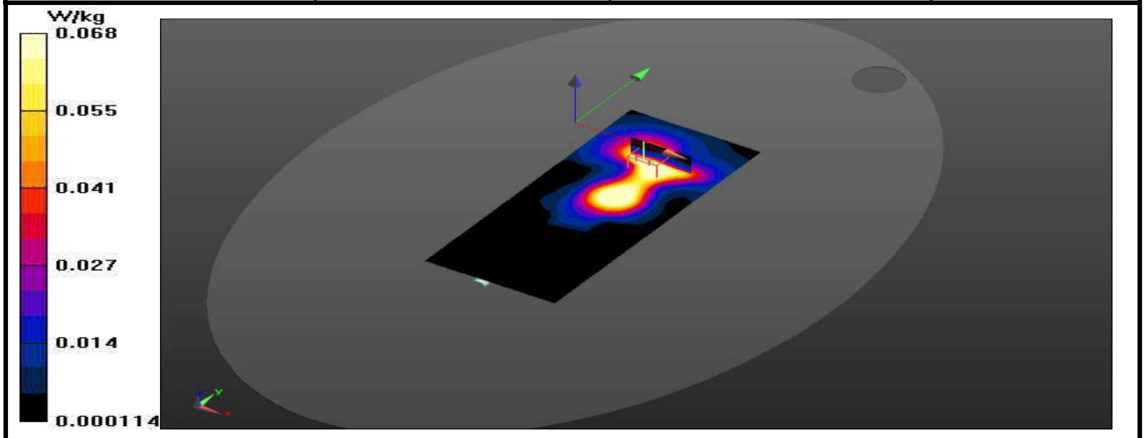

Figure 3: SAR Body Testing Results for the SC2128 at 2462.0 MHz

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	21.4 °C
DATE:	28/12/2020	**RELATIVE HUMIDITY:**	35.5 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	1.972 S/m
DUT CONFIGURATION:	No Holster 1880mAh battery (300-01853)	**RELATIVE PERMITTIVITY:**	54.515
DUT POSITION:	0mm - Rear Facing	**LIQUID TEMPERATURE:**	20.3 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2462.0 MHz	**DRIFT:**	-0.00 dB
MODULATION:	BPSK	**PEAK SAR:**	0.26 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.21 W/kg

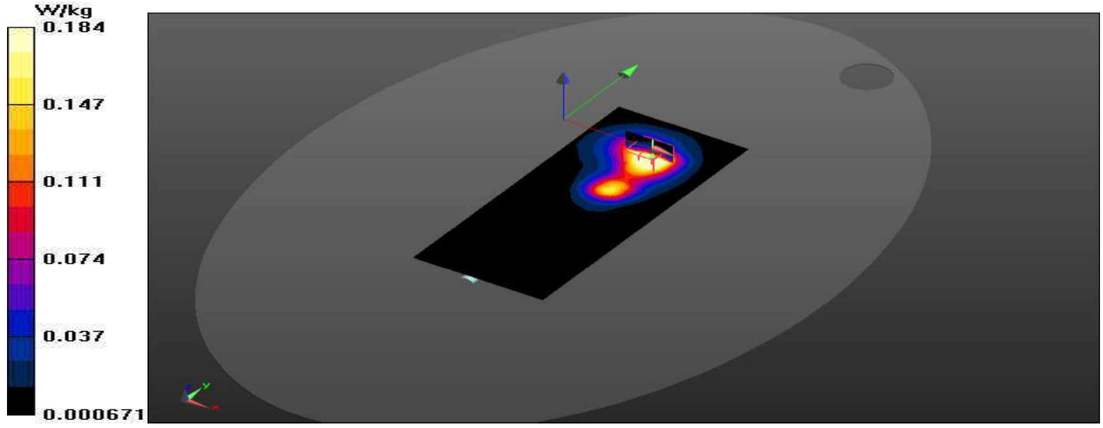

Figure 4: SAR Body Testing Results for the SC2128 at 2462.0 MHz

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	21.4 °C
DATE:	28/12/2020	**RELATIVE HUMIDITY:**	35.5 %
PHANTOM:	QD OVA 004 Ax	**CONDUCTIVITY:**	1.972 S/m
DUT CONFIGURATION:	No Holster 1160mAh battery (300-01852)	**RELATIVE PERMITTIVITY:**	54.515
DUT POSITION:	0mm - Rear Facing	**LIQUID TEMPERATURE:**	20.3 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2462.0 MHz	**DRIFT:**	-0.01 dB
MODULATION:	BPSK	**PEAK SAR:**	0.24 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.19 W/kg

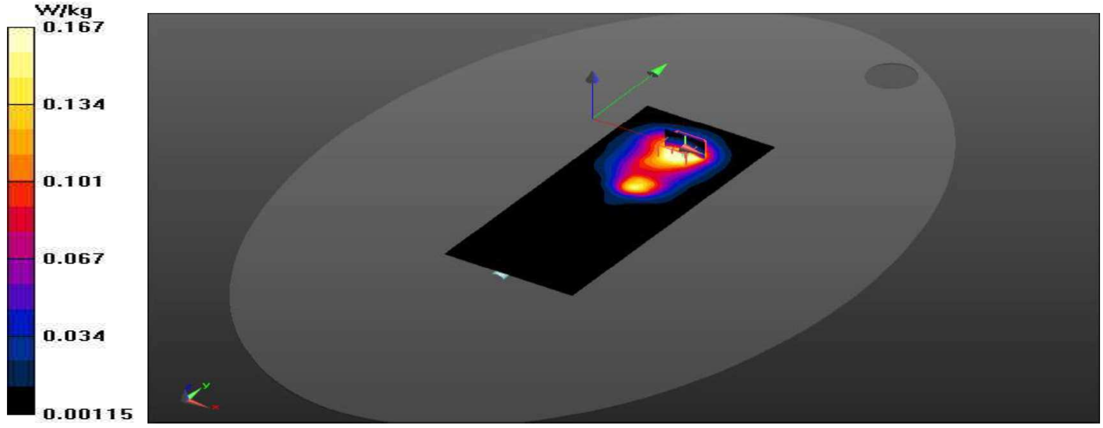

Figure 5: SAR Body Testing Results for the SC2128 at 2462.0 MHz

2.3 WLAN 2450 MHz - 802.11b - 1Mbps - HEAD SAR TEST RESULTS

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.1 °C
DATE:	06/04/2021	**RELATIVE HUMIDITY:**	23.1 %
PHANTOM:	QD 000 P40 CD	**CONDUCTIVITY:**	1.909 S/m
DUT CONFIGURATION:	1880mAh battery, No accessories	**RELATIVE PERMITTIVITY:**	40.862
DUT POSITION:	Left Cheek	**LIQUID TEMPERATURE:**	20.3 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2462 MHz	**DRIFT:**	0.00 dB
MODULATION:	BPSK	**PEAK SAR:**	0.27 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.18 W/kg

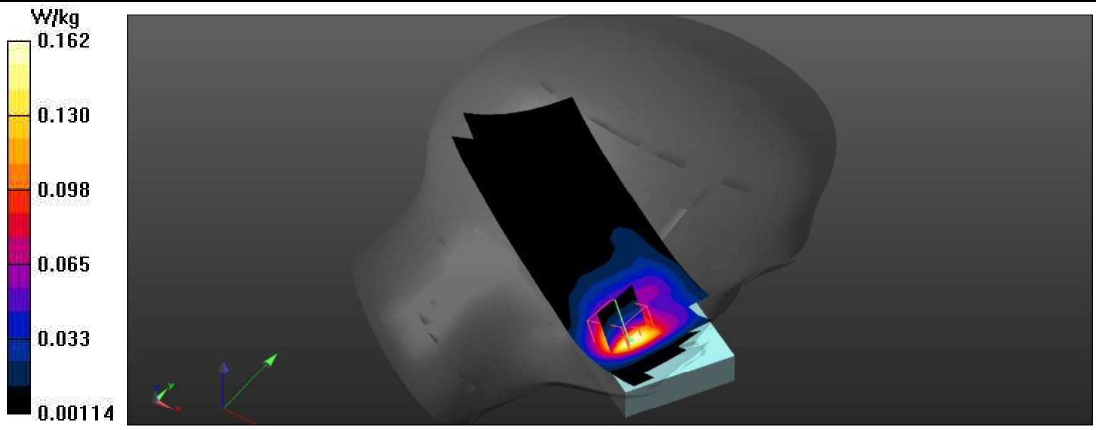

Figure 6: SAR Head Testing Results for the SC2128 at 2462 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.1 °C
DATE:	06/04/2021	**RELATIVE HUMIDITY:**	23.1 %
PHANTOM:	QD 000 P40 CD	**CONDUCTIVITY:**	1.909 S/m
DUT CONFIGURATION:	1880mAh battery, No accessories	**RELATIVE PERMITTIVITY:**	40.862
DUT POSITION:	Left Tilt	**LIQUID TEMPERATURE:**	20.3 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2462 MHz	**DRIFT:**	-0.16 dB
MODULATION:	BPSK	**PEAK SAR:**	0.03 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.02 W/kg

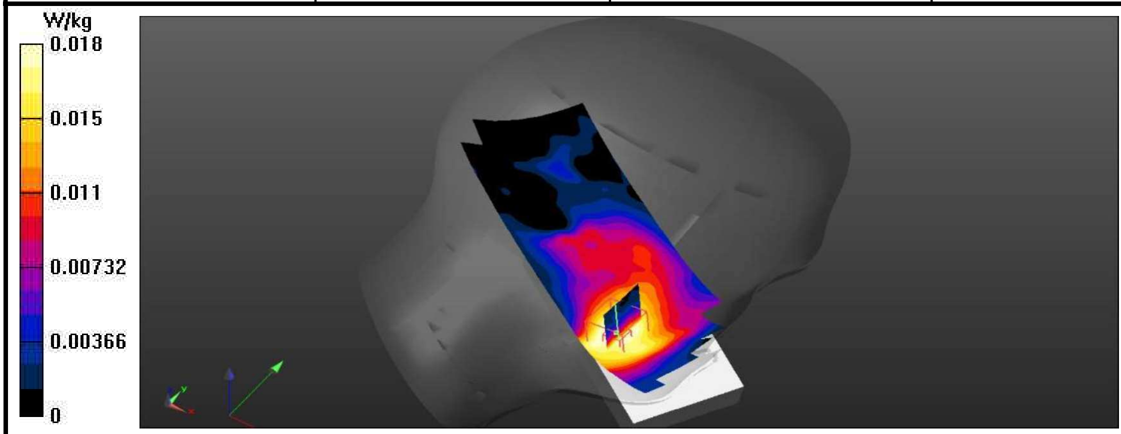

Figure 7: SAR Head Testing Results for the SC2128 at 2462 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.1 °C
DATE:	06/04/2021	**RELATIVE HUMIDITY:**	23.1 %
PHANTOM:	QD 000 P40 CD	**CONDUCTIVITY:**	1.909 S/m
DUT CONFIGURATION:	1880mAh battery, No accessories	**RELATIVE PERMITTIVITY:**	40.862
DUT POSITION:	Right Cheek	**LIQUID TEMPERATURE:**	20.3 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2462 MHz	**DRIFT:**	0.06 dB
MODULATION:	BPSK	**PEAK SAR:**	0.16 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.11 W/kg

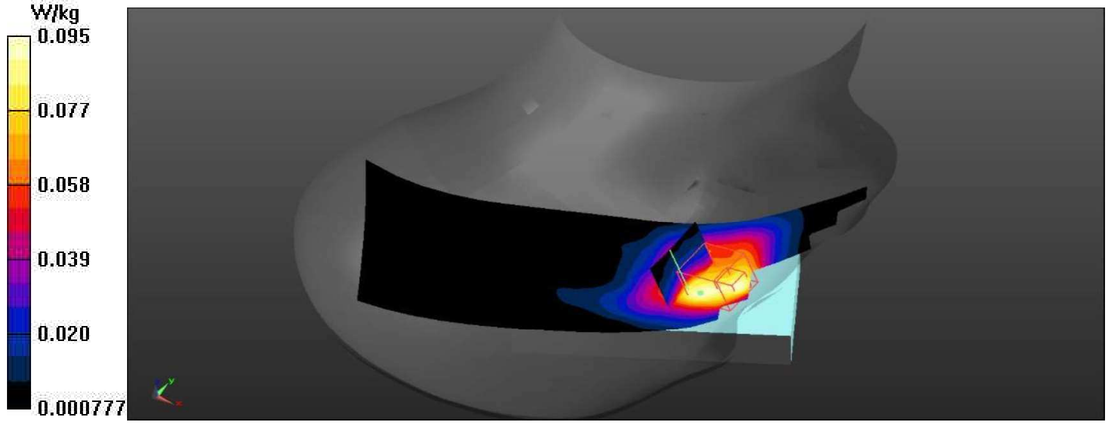

Figure 8: SAR Head Testing Results for the SC2128 at 2462 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.1 °C
DATE:	06/04/2021	**RELATIVE HUMIDITY:**	23.1 %
PHANTOM:	QD 000 P40 CD	**CONDUCTIVITY:**	1.909 S/m
DUT CONFIGURATION:	1880mAh battery, No accessories	**RELATIVE PERMITTIVITY:**	40.862
DUT POSITION:	Right Tilt	**LIQUID TEMPERATURE:**	20.3 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2462 MHz	**DRIFT:**	-0.02 dB
MODULATION:	BPSK	**PEAK SAR:**	0.02 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.01 W/kg

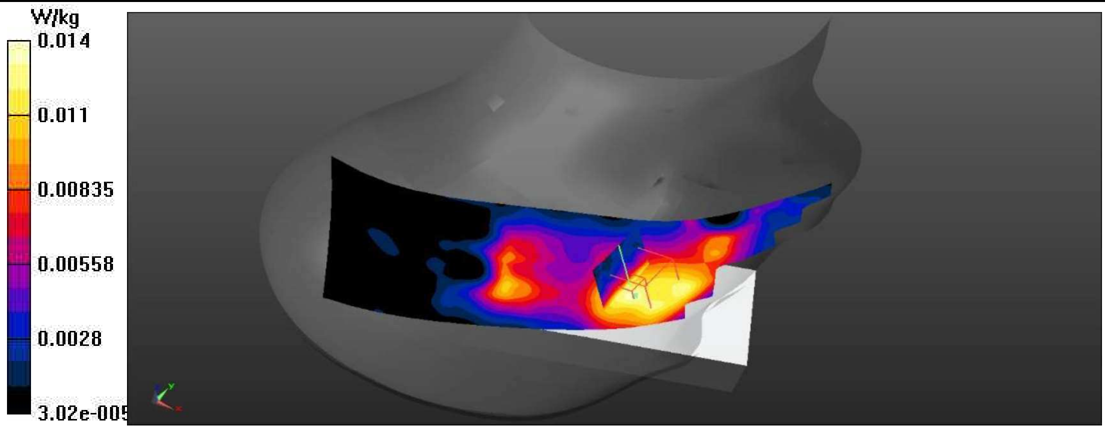

Figure 9: SAR Head Testing Results for the SC2128 at 2462 MHz.

SOFTWARE VERSION:	52.10.2(1495)	AMBIENT TEMPERATURE:	22.4 °C
DATE:	07/04/2021	RELATIVE HUMIDITY:	17.5 %
PHANTOM:	QD 000 P40 CD	CONDUCTIVITY:	1.909 S/m
DUT CONFIGURATION:	1160mAh battery, No accessories	RELATIVE PERMITTIVITY:	40.862
DUT POSITION:	Left Cheek	LIQUID TEMPERATURE:	20.1 °C
RAT:	WLAN	SCAN TYPE:	Full
FREQUENCY:	2462 MHz	DRIFT:	-0.17 dB
MODULATION:	BPSK	PEAK SAR:	0.27 W/kg
DUTY CYCLE:	100 %	SAR (1g):	0.18 W/kg

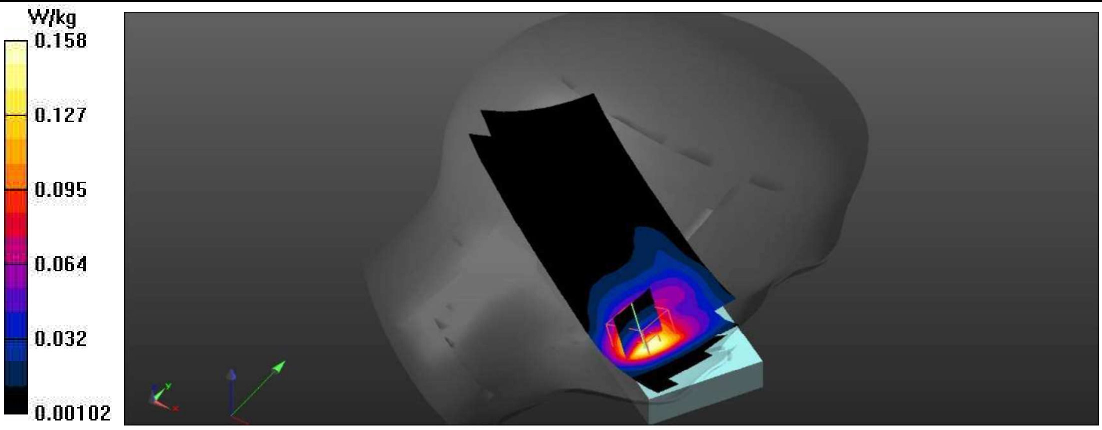

Figure 10: SAR Head Testing Results for the SC2128 at 2462 MHz.

2.4 WLAN 2450 MHz - 802.11B - 1MBPS - FRONT OF FACE SAR TEST RESULTS

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.4 °C
DATE:	07/04/2021	**RELATIVE HUMIDITY:**	17.5 %
PHANTOM:	QD 000 P40 CD	**CONDUCTIVITY:**	1.909 S/m
DUT CONFIGURATION:	1880mAh battery, No accessories	**RELATIVE PERMITTIVITY:**	40.862
DUT POSITION:	25mm Front Face	**LIQUID TEMPERATURE:**	20.1 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2462 MHz	**DRIFT:**	0.14 dB
MODULATION:	BPSK	**PEAK SAR:**	0.03 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.02 W/kg

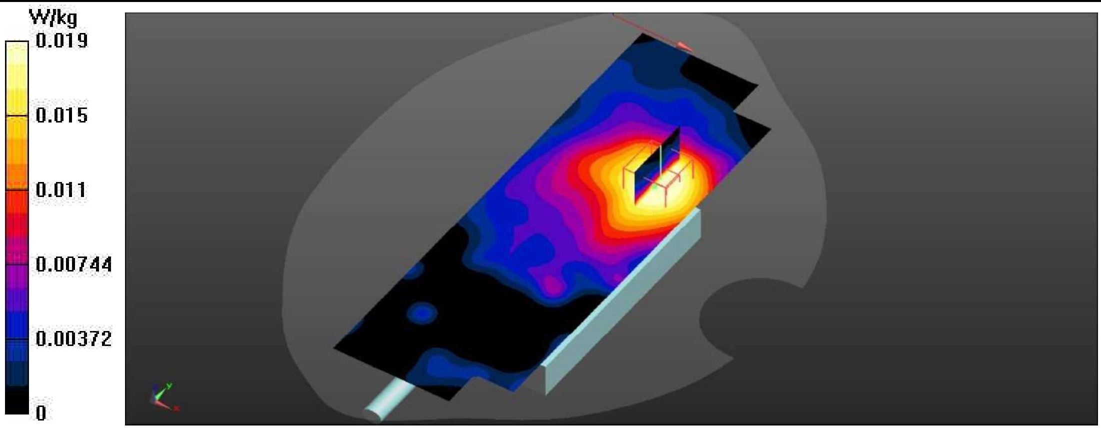

Figure 11: SAR Head Testing Results for the SC2128 at 2462 MHz.

SOFTWARE VERSION:	52.10.2(1495)	**AMBIENT TEMPERATURE:**	22.4 °C
DATE:	07/04/2021	**RELATIVE HUMIDITY:**	17.5 %
PHANTOM:	QD 000 P40 CD	**CONDUCTIVITY:**	1.909 S/m
DUT CONFIGURATION:	1160mAh battery, No accessories	**RELATIVE PERMITTIVITY:**	40.862
DUT POSITION:	25mm Front Face	**LIQUID TEMPERATURE:**	20.1 °C
RAT:	WLAN	**SCAN TYPE:**	Full
FREQUENCY:	2462 MHz	**DRIFT:**	0.14 dB
MODULATION:	BPSK	**PEAK SAR:**	0.03 W/kg
DUTY CYCLE:	100 %	**SAR (1g):**	0.02 W/kg

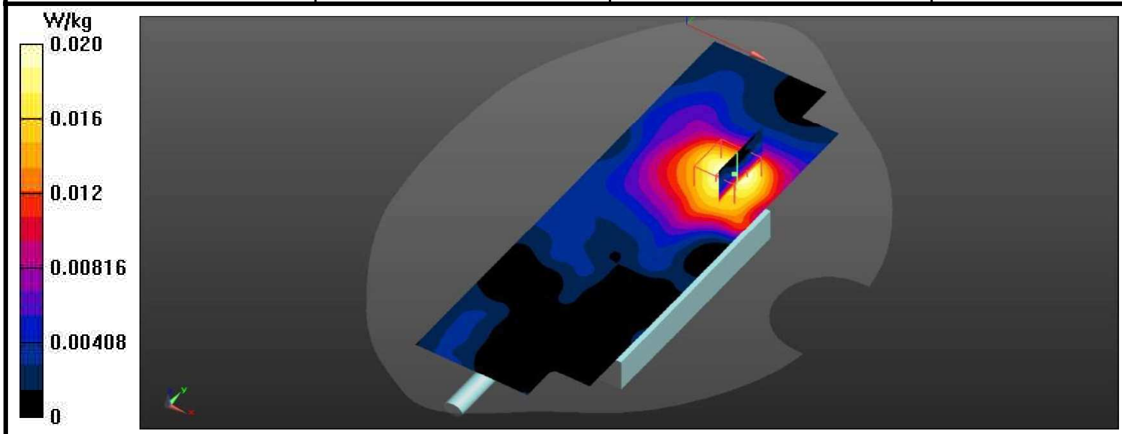

Figure 12: SAR Head Testing Results for the SC2128 at 2462 MHz.

SECTION 3

TEST EQUIPMENT USED