

|        |    |        |    |      |       |       |      |       |      |
|--------|----|--------|----|------|-------|-------|------|-------|------|
| Band66 | 5  | 132322 | 25 | #0   | 16QAM | 19.36 | -2.6 | 16.76 | PASS |
| Band66 | 5  | 132647 | 1  | #0   | QPSK  | 20.46 | -2.6 | 17.86 | PASS |
| Band66 | 5  | 132647 | 1  | #Mid | QPSK  | 20.50 | -2.6 | 17.90 | PASS |
| Band66 | 5  | 132647 | 1  | #Max | QPSK  | 20.47 | -2.6 | 17.87 | PASS |
| Band66 | 5  | 132647 | 12 | #0   | QPSK  | 20.04 | -2.6 | 17.44 | PASS |
| Band66 | 5  | 132647 | 12 | #Mid | QPSK  | 19.99 | -2.6 | 17.39 | PASS |
| Band66 | 5  | 132647 | 12 | #Max | QPSK  | 19.90 | -2.6 | 17.30 | PASS |
| Band66 | 5  | 132647 | 25 | #0   | QPSK  | 20.01 | -2.6 | 17.41 | PASS |
| Band66 | 5  | 132647 | 1  | #0   | 16QAM | 19.84 | -2.6 | 17.24 | PASS |
| Band66 | 5  | 132647 | 1  | #Mid | 16QAM | 19.85 | -2.6 | 17.25 | PASS |
| Band66 | 5  | 132647 | 1  | #Max | 16QAM | 19.83 | -2.6 | 17.23 | PASS |
| Band66 | 5  | 132647 | 12 | #0   | 16QAM | 19.03 | -2.6 | 16.43 | PASS |
| Band66 | 5  | 132647 | 12 | #Mid | 16QAM | 18.98 | -2.6 | 16.38 | PASS |
| Band66 | 5  | 132647 | 12 | #Max | 16QAM | 18.95 | -2.6 | 16.35 | PASS |
| Band66 | 5  | 132647 | 25 | #0   | 16QAM | 18.96 | -2.6 | 16.36 | PASS |
| Band66 | 10 | 132022 | 1  | #0   | QPSK  | 21.04 | -2.6 | 18.44 | PASS |
| Band66 | 10 | 132022 | 1  | #Mid | QPSK  | 21.12 | -2.6 | 18.52 | PASS |
| Band66 | 10 | 132022 | 1  | #Max | QPSK  | 21.06 | -2.6 | 18.46 | PASS |
| Band66 | 10 | 132022 | 25 | #0   | QPSK  | 20.63 | -2.6 | 18.03 | PASS |
| Band66 | 10 | 132022 | 25 | #Mid | QPSK  | 20.55 | -2.6 | 17.95 | PASS |
| Band66 | 10 | 132022 | 25 | #Max | QPSK  | 20.48 | -2.6 | 17.88 | PASS |
| Band66 | 10 | 132022 | 50 | #0   | QPSK  | 20.56 | -2.6 | 17.96 | PASS |
| Band66 | 10 | 132022 | 1  | #0   | 16QAM | 20.46 | -2.6 | 17.86 | PASS |
| Band66 | 10 | 132022 | 1  | #Mid | 16QAM | 20.51 | -2.6 | 17.91 | PASS |
| Band66 | 10 | 132022 | 1  | #Max | 16QAM | 20.41 | -2.6 | 17.81 | PASS |
| Band66 | 10 | 132022 | 25 | #0   | 16QAM | 19.63 | -2.6 | 17.03 | PASS |
| Band66 | 10 | 132022 | 25 | #Mid | 16QAM | 19.54 | -2.6 | 16.94 | PASS |
| Band66 | 10 | 132022 | 25 | #Max | 16QAM | 19.47 | -2.6 | 16.87 | PASS |
| Band66 | 10 | 132022 | 50 | #0   | 16QAM | 19.57 | -2.6 | 16.97 | PASS |
| Band66 | 10 | 132322 | 1  | #0   | QPSK  | 20.78 | -2.6 | 18.18 | PASS |
| Band66 | 10 | 132322 | 1  | #Mid | QPSK  | 20.87 | -2.6 | 18.27 | PASS |
| Band66 | 10 | 132322 | 1  | #Max | QPSK  | 20.87 | -2.6 | 18.27 | PASS |
| Band66 | 10 | 132322 | 25 | #0   | QPSK  | 20.24 | -2.6 | 17.64 | PASS |
| Band66 | 10 | 132322 | 25 | #Mid | QPSK  | 20.35 | -2.6 | 17.75 | PASS |
| Band66 | 10 | 132322 | 25 | #Max | QPSK  | 20.43 | -2.6 | 17.83 | PASS |
| Band66 | 10 | 132322 | 50 | #0   | QPSK  | 20.37 | -2.6 | 17.77 | PASS |
| Band66 | 10 | 132322 | 1  | #0   | 16QAM | 19.97 | -2.6 | 17.37 | PASS |
| Band66 | 10 | 132322 | 1  | #Mid | 16QAM | 20.09 | -2.6 | 17.49 | PASS |
| Band66 | 10 | 132322 | 1  | #Max | 16QAM | 20.10 | -2.6 | 17.50 | PASS |
| Band66 | 10 | 132322 | 25 | #0   | 16QAM | 19.27 | -2.6 | 16.67 | PASS |
| Band66 | 10 | 132322 | 25 | #Mid | 16QAM | 19.38 | -2.6 | 16.78 | PASS |
| Band66 | 10 | 132322 | 25 | #Max | 16QAM | 19.47 | -2.6 | 16.87 | PASS |
| Band66 | 10 | 132322 | 50 | #0   | 16QAM | 19.37 | -2.6 | 16.77 | PASS |
| Band66 | 10 | 132622 | 1  | #0   | QPSK  | 20.61 | -2.6 | 18.01 | PASS |
| Band66 | 10 | 132622 | 1  | #Mid | QPSK  | 20.61 | -2.6 | 18.01 | PASS |
| Band66 | 10 | 132622 | 1  | #Max | QPSK  | 20.50 | -2.6 | 17.90 | PASS |
| Band66 | 10 | 132622 | 25 | #0   | QPSK  | 20.08 | -2.6 | 17.48 | PASS |
| Band66 | 10 | 132622 | 25 | #Mid | QPSK  | 19.99 | -2.6 | 17.39 | PASS |
| Band66 | 10 | 132622 | 25 | #Max | QPSK  | 19.96 | -2.6 | 17.36 | PASS |
| Band66 | 10 | 132622 | 50 | #0   | QPSK  | 19.99 | -2.6 | 17.39 | PASS |
| Band66 | 10 | 132622 | 1  | #0   | 16QAM | 19.47 | -2.6 | 16.87 | PASS |
| Band66 | 10 | 132622 | 1  | #Mid | 16QAM | 19.45 | -2.6 | 16.85 | PASS |
| Band66 | 10 | 132622 | 1  | #Max | 16QAM | 19.35 | -2.6 | 16.75 | PASS |
| Band66 | 10 | 132622 | 25 | #0   | 16QAM | 19.14 | -2.6 | 16.54 | PASS |
| Band66 | 10 | 132622 | 25 | #Mid | 16QAM | 19.02 | -2.6 | 16.42 | PASS |
| Band66 | 10 | 132622 | 25 | #Max | 16QAM | 18.94 | -2.6 | 16.34 | PASS |
| Band66 | 10 | 132622 | 50 | #0   | 16QAM | 18.98 | -2.6 | 16.38 | PASS |

|        |    |        |     |      |       |       |      |       |      |
|--------|----|--------|-----|------|-------|-------|------|-------|------|
| Band66 | 15 | 132047 | 1   | #0   | QPSK  | 20.97 | -2.6 | 18.37 | PASS |
| Band66 | 15 | 132047 | 1   | #Mid | QPSK  | 21.05 | -2.6 | 18.45 | PASS |
| Band66 | 15 | 132047 | 1   | #Max | QPSK  | 20.88 | -2.6 | 18.28 | PASS |
| Band66 | 15 | 132047 | 36  | #0   | QPSK  | 20.55 | -2.6 | 17.95 | PASS |
| Band66 | 15 | 132047 | 36  | #Mid | QPSK  | 20.47 | -2.6 | 17.87 | PASS |
| Band66 | 15 | 132047 | 36  | #Max | QPSK  | 20.36 | -2.6 | 17.76 | PASS |
| Band66 | 15 | 132047 | 75  | #0   | QPSK  | 20.49 | -2.6 | 17.89 | PASS |
| Band66 | 15 | 132047 | 1   | #0   | 16QAM | 20.41 | -2.6 | 17.81 | PASS |
| Band66 | 15 | 132047 | 1   | #Mid | 16QAM | 20.45 | -2.6 | 17.85 | PASS |
| Band66 | 15 | 132047 | 1   | #Max | 16QAM | 20.30 | -2.6 | 17.70 | PASS |
| Band66 | 15 | 132047 | 36  | #0   | 16QAM | 19.61 | -2.6 | 17.01 | PASS |
| Band66 | 15 | 132047 | 36  | #Mid | 16QAM | 19.52 | -2.6 | 16.92 | PASS |
| Band66 | 15 | 132047 | 36  | #Max | 16QAM | 19.43 | -2.6 | 16.83 | PASS |
| Band66 | 15 | 132047 | 75  | #0   | 16QAM | 19.49 | -2.6 | 16.89 | PASS |
| Band66 | 15 | 132322 | 1   | #0   | QPSK  | 20.75 | -2.6 | 18.15 | PASS |
| Band66 | 15 | 132322 | 1   | #Mid | QPSK  | 20.81 | -2.6 | 18.21 | PASS |
| Band66 | 15 | 132322 | 1   | #Max | QPSK  | 20.77 | -2.6 | 18.17 | PASS |
| Band66 | 15 | 132322 | 36  | #0   | QPSK  | 20.22 | -2.6 | 17.62 | PASS |
| Band66 | 15 | 132322 | 36  | #Mid | QPSK  | 20.33 | -2.6 | 17.73 | PASS |
| Band66 | 15 | 132322 | 36  | #Max | QPSK  | 20.39 | -2.6 | 17.79 | PASS |
| Band66 | 15 | 132322 | 75  | #0   | QPSK  | 20.32 | -2.6 | 17.72 | PASS |
| Band66 | 15 | 132322 | 1   | #0   | 16QAM | 19.96 | -2.6 | 17.36 | PASS |
| Band66 | 15 | 132322 | 1   | #Mid | 16QAM | 20.05 | -2.6 | 17.45 | PASS |
| Band66 | 15 | 132322 | 1   | #Max | 16QAM | 20.01 | -2.6 | 17.41 | PASS |
| Band66 | 15 | 132322 | 36  | #0   | 16QAM | 19.27 | -2.6 | 16.67 | PASS |
| Band66 | 15 | 132322 | 36  | #Mid | 16QAM | 19.39 | -2.6 | 16.79 | PASS |
| Band66 | 15 | 132322 | 36  | #Max | 16QAM | 19.48 | -2.6 | 16.88 | PASS |
| Band66 | 15 | 132322 | 75  | #0   | 16QAM | 19.26 | -2.6 | 16.66 | PASS |
| Band66 | 15 | 132597 | 1   | #0   | QPSK  | 20.68 | -2.6 | 18.08 | PASS |
| Band66 | 15 | 132597 | 1   | #Mid | QPSK  | 20.61 | -2.6 | 18.01 | PASS |
| Band66 | 15 | 132597 | 1   | #Max | QPSK  | 20.44 | -2.6 | 17.84 | PASS |
| Band66 | 15 | 132597 | 36  | #0   | QPSK  | 20.10 | -2.6 | 17.50 | PASS |
| Band66 | 15 | 132597 | 36  | #Mid | QPSK  | 20.05 | -2.6 | 17.45 | PASS |
| Band66 | 15 | 132597 | 36  | #Max | QPSK  | 19.96 | -2.6 | 17.36 | PASS |
| Band66 | 15 | 132597 | 75  | #0   | QPSK  | 20.01 | -2.6 | 17.41 | PASS |
| Band66 | 15 | 132597 | 1   | #0   | 16QAM | 19.74 | -2.6 | 17.14 | PASS |
| Band66 | 15 | 132597 | 1   | #Mid | 16QAM | 19.74 | -2.6 | 17.14 | PASS |
| Band66 | 15 | 132597 | 1   | #Max | 16QAM | 19.52 | -2.6 | 16.92 | PASS |
| Band66 | 15 | 132597 | 36  | #0   | 16QAM | 19.09 | -2.6 | 16.49 | PASS |
| Band66 | 15 | 132597 | 36  | #Mid | 16QAM | 18.98 | -2.6 | 16.38 | PASS |
| Band66 | 15 | 132597 | 36  | #Max | 16QAM | 18.91 | -2.6 | 16.31 | PASS |
| Band66 | 15 | 132597 | 75  | #0   | 16QAM | 19.06 | -2.6 | 16.46 | PASS |
| Band66 | 20 | 132072 | 1   | #0   | QPSK  | 20.98 | -2.6 | 18.38 | PASS |
| Band66 | 20 | 132072 | 1   | #Mid | QPSK  | 21.05 | -2.6 | 18.45 | PASS |
| Band66 | 20 | 132072 | 1   | #Max | QPSK  | 20.81 | -2.6 | 18.21 | PASS |
| Band66 | 20 | 132072 | 50  | #0   | QPSK  | 20.71 | -2.6 | 18.11 | PASS |
| Band66 | 20 | 132072 | 50  | #Mid | QPSK  | 20.52 | -2.6 | 17.92 | PASS |
| Band66 | 20 | 132072 | 50  | #Max | QPSK  | 20.37 | -2.6 | 17.77 | PASS |
| Band66 | 20 | 132072 | 100 | #0   | QPSK  | 20.56 | -2.6 | 17.96 | PASS |
| Band66 | 20 | 132072 | 1   | #0   | 16QAM | 20.33 | -2.6 | 17.73 | PASS |
| Band66 | 20 | 132072 | 1   | #Mid | 16QAM | 20.43 | -2.6 | 17.83 | PASS |
| Band66 | 20 | 132072 | 1   | #Max | 16QAM | 20.18 | -2.6 | 17.58 | PASS |
| Band66 | 20 | 132072 | 50  | #0   | 16QAM | 19.72 | -2.6 | 17.12 | PASS |
| Band66 | 20 | 132072 | 50  | #Mid | 16QAM | 19.53 | -2.6 | 16.93 | PASS |
| Band66 | 20 | 132072 | 50  | #Max | 16QAM | 19.38 | -2.6 | 16.78 | PASS |
| Band66 | 20 | 132072 | 100 | #0   | 16QAM | 19.53 | -2.6 | 16.93 | PASS |
| Band66 | 20 | 132322 | 1   | #0   | QPSK  | 20.70 | -2.6 | 18.10 | PASS |

|        |    |        |     |      |       |       |      |       |      |
|--------|----|--------|-----|------|-------|-------|------|-------|------|
| Band66 | 20 | 132322 | 1   | #Mid | QPSK  | 20.91 | -2.6 | 18.31 | PASS |
| Band66 | 20 | 132322 | 1   | #Max | QPSK  | 20.83 | -2.6 | 18.23 | PASS |
| Band66 | 20 | 132322 | 50  | #0   | QPSK  | 20.15 | -2.6 | 17.55 | PASS |
| Band66 | 20 | 132322 | 50  | #Mid | QPSK  | 20.37 | -2.6 | 17.77 | PASS |
| Band66 | 20 | 132322 | 50  | #Max | QPSK  | 20.49 | -2.6 | 17.89 | PASS |
| Band66 | 20 | 132322 | 100 | #0   | QPSK  | 20.29 | -2.6 | 17.69 | PASS |
| Band66 | 20 | 132322 | 1   | #0   | 16QAM | 19.91 | -2.6 | 17.31 | PASS |
| Band66 | 20 | 132322 | 1   | #Mid | 16QAM | 20.10 | -2.6 | 17.50 | PASS |
| Band66 | 20 | 132322 | 1   | #Max | 16QAM | 20.06 | -2.6 | 17.46 | PASS |
| Band66 | 20 | 132322 | 50  | #0   | 16QAM | 19.10 | -2.6 | 16.50 | PASS |
| Band66 | 20 | 132322 | 50  | #Mid | 16QAM | 19.30 | -2.6 | 16.70 | PASS |
| Band66 | 20 | 132322 | 50  | #Max | 16QAM | 19.44 | -2.6 | 16.84 | PASS |
| Band66 | 20 | 132322 | 100 | #0   | 16QAM | 19.31 | -2.6 | 16.71 | PASS |
| Band66 | 20 | 132572 | 1   | #0   | QPSK  | 20.61 | -2.6 | 18.01 | PASS |
| Band66 | 20 | 132572 | 1   | #Mid | QPSK  | 20.58 | -2.6 | 17.98 | PASS |
| Band66 | 20 | 132572 | 1   | #Max | QPSK  | 20.35 | -2.6 | 17.75 | PASS |
| Band66 | 20 | 132572 | 50  | #0   | QPSK  | 20.27 | -2.6 | 17.67 | PASS |
| Band66 | 20 | 132572 | 50  | #Mid | QPSK  | 20.11 | -2.6 | 17.51 | PASS |
| Band66 | 20 | 132572 | 50  | #Max | QPSK  | 19.91 | -2.6 | 17.31 | PASS |
| Band66 | 20 | 132572 | 100 | #0   | QPSK  | 20.05 | -2.6 | 17.45 | PASS |
| Band66 | 20 | 132572 | 1   | #0   | 16QAM | 19.97 | -2.6 | 17.37 | PASS |
| Band66 | 20 | 132572 | 1   | #Mid | 16QAM | 19.84 | -2.6 | 17.24 | PASS |
| Band66 | 20 | 132572 | 1   | #Max | 16QAM | 19.60 | -2.6 | 17.00 | PASS |
| Band66 | 20 | 132572 | 50  | #0   | 16QAM | 19.28 | -2.6 | 16.68 | PASS |
| Band66 | 20 | 132572 | 50  | #Mid | 16QAM | 19.12 | -2.6 | 16.52 | PASS |
| Band66 | 20 | 132572 | 50  | #Max | 16QAM | 18.89 | -2.6 | 16.29 | PASS |
| Band66 | 20 | 132572 | 100 | #0   | 16QAM | 19.06 | -2.6 | 16.46 | PASS |

| NFC        |                 |                       |                    |                          |                         |                    |         |                                  |
|------------|-----------------|-----------------------|--------------------|--------------------------|-------------------------|--------------------|---------|----------------------------------|
| Modulation | Frequency (MHz) | Output Power (dBuV/m) | Output Power (dBm) | Max. Tune up Power (dBm) | Max. Tune up Power (mW) | Test distance (mm) | Result  | exclusion thresholds for 1-g SAR |
| ASK        | 13.56           | 51.96                 | -47.394            | -47.00                   | 0.00002                 | 5                  | 0.00001 | 3.0                              |

**Note:**

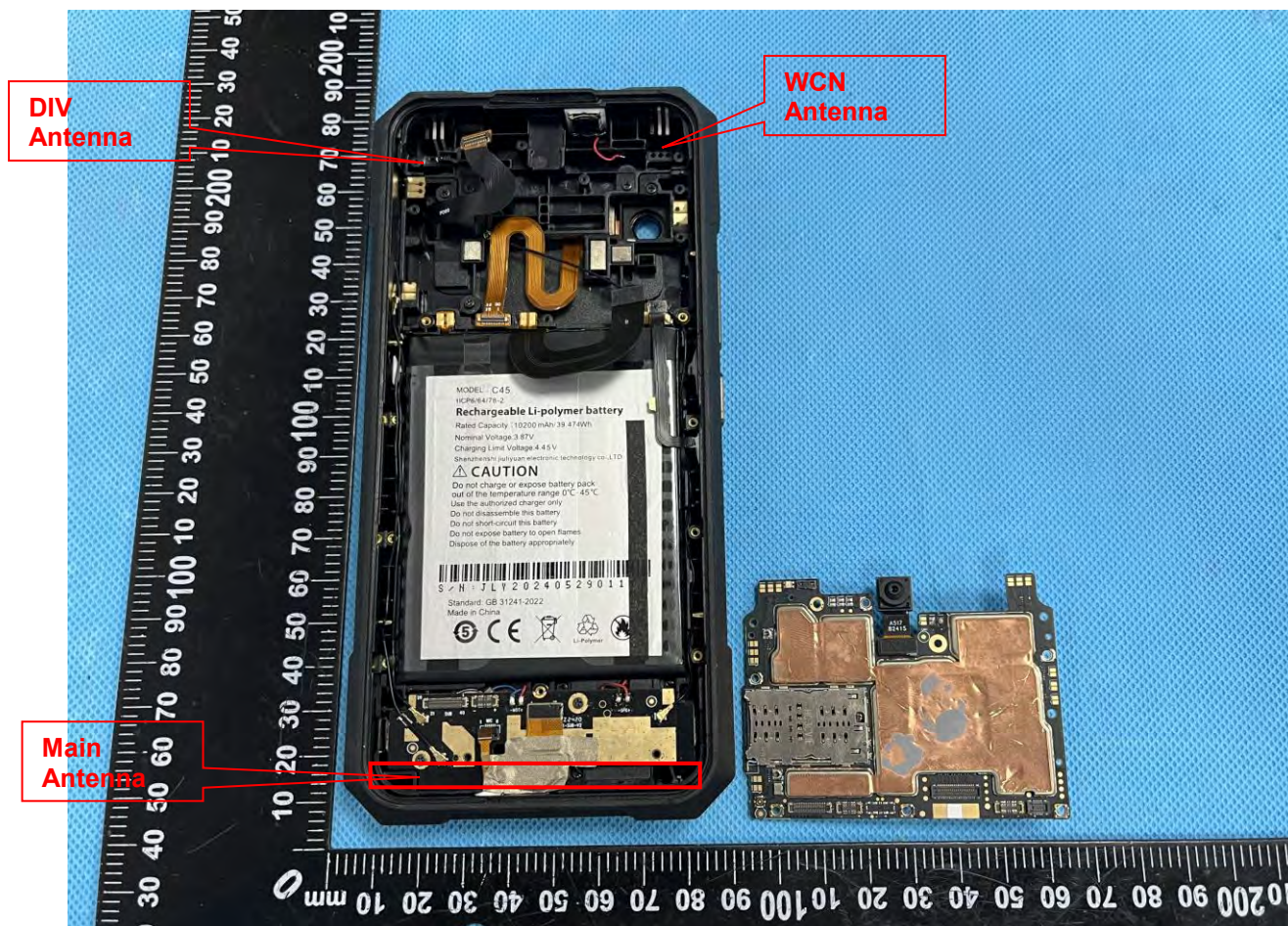
Below 1GHz: dBm=dBuV/m-95.2-4.7

Per KDB 447498 D01v06, when the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

According to the calculation results in the table above, NFC SAR does not need to be tested.

## 14.2 Transmit Antennas and SAR Measurement Position

### EUT Antenna Location:



| Antennas | Support Band                                                   |
|----------|----------------------------------------------------------------|
| Main     | GSM 850/1900 + WCDMA Band 2/4/5 + LTE Band 2/4/5/7/12/17/66 TX |
| DIV      | GSM 850/1900 + WCDMA Band 2/4/5 + LTE Band 2/4/5/7/12/17/66 RX |
| WCN      | Bluetooth + WIFI                                               |

| Distance of The Antenna to the EUT surface and edge (mm) |       |      |          |             |           |            |
|----------------------------------------------------------|-------|------|----------|-------------|-----------|------------|
| Antennas                                                 | Front | Back | Top Side | Bottom Side | Left Side | Right Side |
| Main                                                     | <25   | <25  | 145      | <25         | <25       | <25        |
| WCN                                                      | <25   | <25  | <25      | 150         | 58        | <25        |

| Positions for SAR tests; Hotspot mode |       |      |          |             |           |            |
|---------------------------------------|-------|------|----------|-------------|-----------|------------|
| Antennas                              | Front | Back | Top Side | Bottom Side | Left Side | Right Side |
| Main                                  | Yes   | Yes  | No       | Yes         | Yes       | Yes        |
| WCN                                   | Yes   | Yes  | Yes      | No          | No        | Yes        |

### 14.3 Measured and Reported (Scaled) SAR Results

The calculated SAR is obtained by the following formula:

1. Reported SAR for WWAN=Measured SAR \* Tune-up Scaling factor
2. Reported SAR for WLAN and Bluetooth=Measured SAR \* Tune-up Scaling factor \* Duty Cycle Scaling factor
3. Duty Cycle Scaling factor=1/ Duty Cycle (%)

#### KDB 447498 D01 General RF Exposure Guidance:

Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

- $\leq 0.8$  W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz
- $\leq 0.6$  W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
- $\leq 0.4$  W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  MHz

#### KDB 648474 D04 Handset SAR v01r03:

1. When the *reported* SAR for a body-worn accessory, measured without a headset connected to the handset, is  $> 1.2$  W/kg, the highest *reported* SAR configuration for that wireless mode and frequency band should be repeated for the body-worn accessory with a headset attached to the handset.
2. when the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, using the same wireless mode test configuration for voice and data, such as UMTS, LTE and Wi-Fi, and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface)
3. For Smart phones with a display diagonal dimension  $> 15.0$  cm or an overall diagonal dimension  $> 16.0$  cm, when hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR  $> 1.2$  W/kg.

#### KDB 941225 D01 3G SAR Procedures:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is  $\leq 1/4$  dB higher than the primary mode (RMC12.2kbps) or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is  $\leq 1.2$  W/kg, SAR measurement is not required for the secondary mode.

#### KDB 941225 D05 SAR for LTE Devices:

1. Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
2. When the reported SAR is  $> 0.8$  W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
3. Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are  $> 0.8$  W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation  $< 1.45$  W/kg.
4. SAR measurement is not required for the 16QAM and 64QAM. When the highest maximum output power for 16QAM and 64QAM is  $\leq \frac{1}{2}$  dB higher than the QPSK or when the reported SAR for the QPSK configuration is  $\leq 1.45$  W/kg.
5. Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is  $< 1.45$  W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

| WIFI 2.4G              |      |               |             |                    |         |                |              |              |          |
|------------------------|------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions | Mode | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                        |      |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)             | b    | Left Cheek    | 2462        | 12.49              | 12.5    | 1.002          | 0.177        | 0.177        |          |
|                        |      | Left Tilt     | 2462        | 12.49              | 12.5    | 1.002          | 0.101        | 0.101        |          |
|                        |      | Right Cheek   | 2462        | 12.49              | 12.5    | 1.002          | 0.142        | 0.142        |          |
|                        |      | Right Tilt    | 2462        | 12.49              | 12.5    | 1.002          | 0.150        | 0.150        |          |
| Body (10mm)            | b    | Front Face    | 2462        | 12.49              | 12.5    | 1.002          | 0.180        | <b>0.180</b> | 1        |
|                        |      | Back Face     | 2462        | 12.49              | 12.5    | 1.002          | 0.175        | 0.175        |          |
| Hotspot (10mm)         | b    | Right Side    | 2462        | 12.49              | 12.5    | 1.002          | 0.123        | 0.123        |          |
|                        |      | Top Side      | 2462        | 12.49              | 12.5    | 1.002          | 0.161        | 0.161        |          |

| WIFI 5.1G              |      |               |             |                    |         |                |              |              |          |
|------------------------|------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions | Mode | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                        |      |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)             | a    | Left Cheek    | 5200        | 10.92              | 11.0    | 1.019          | 0.405        | 0.413        |          |
|                        |      | Left Tilt     | 5200        | 10.92              | 11.0    | 1.019          | 1.021        | <b>1.040</b> | 2        |
|                        |      | Right Cheek   | 5200        | 10.92              | 11.0    | 1.019          | 0.591        | 0.602        |          |
|                        |      | Right Tilt    | 5200        | 10.92              | 11.0    | 1.019          | 0.351        | 0.358        |          |
|                        |      | Left Tilt     | 5180        | 10.66              | 11.0    | 1.081          | 0.889        | 0.961        |          |
|                        |      | Left Tilt     | 5240        | 10.68              | 11.0    | 1.076          | 0.749        | 0.806        |          |
| Body (10mm)            | a    | Front Face    | 5200        | 10.92              | 11.0    | 1.019          | 0.335        | 0.341        |          |
|                        |      | Back Face     | 5200        | 10.92              | 11.0    | 1.019          | 0.217        | 0.221        |          |
| Hotspot (10mm)         | a    | Right Side    | 5200        | 10.92              | 11.0    | 1.019          | 0.387        | 0.394        |          |
|                        |      | Top Side      | 5200        | 10.92              | 11.0    | 1.019          | 0.654        | 0.666        |          |

| WIFI 5.8G              |      |               |             |                    |         |                |              |              |          |
|------------------------|------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions | Mode | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                        |      |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)             | a    | Left Cheek    | 5745        | 10.12              | 10.5    | 1.091          | 0.609        | 0.665        |          |
|                        |      | Left Tilt     | 5745        | 10.12              | 10.5    | 1.091          | 0.425        | 0.464        |          |
|                        |      | Right Cheek   | 5745        | 10.12              | 10.5    | 1.091          | 0.787        | <b>0.859</b> | 3        |
|                        |      | Right Tilt    | 5745        | 10.12              | 10.5    | 1.091          | 0.436        | 0.476        |          |
| Body (10mm)            | a    | Front Face    | 5745        | 10.12              | 10.5    | 1.091          | 0.586        | 0.640        |          |
|                        |      | Back Face     | 5745        | 10.12              | 10.5    | 1.091          | 0.478        | 0.522        |          |
| Hotspot (10mm)         | a    | Right Side    | 5745        | 10.12              | 10.5    | 1.091          | 0.397        | 0.433        |          |
|                        |      | Top Side      | 5745        | 10.12              | 10.5    | 1.091          | 0.491        | 0.536        |          |

Remark:

1. The value with the bold is the maximum SAR Value of each test band.
2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is  $\leq 0.8$  W/kg then testing at the other channels SAR tests are not necessary.

| GSM 850                |             |               |             |                    |         |                |              |              |          |
|------------------------|-------------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions | Mode        | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                        |             |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)             | GSM         | Left Cheek    | 824.2       | 32.79              | 33.0    | 1.050          | 0.104        | 0.109        |          |
|                        |             | Left Tilt     | 824.2       | 32.79              | 33.0    | 1.050          | 0.177        | 0.186        |          |
|                        |             | Right Cheek   | 824.2       | 32.79              | 33.0    | 1.050          | 0.106        | 0.111        |          |
|                        |             | Right Tilt    | 824.2       | 32.79              | 33.0    | 1.050          | 0.135        | 0.142        |          |
| Body (10mm)            | GSM         | Front Face    | 824.2       | 32.79              | 33.0    | 1.050          | 0.255        | 0.268        |          |
|                        |             | Back Face     | 824.2       | 32.79              | 33.0    | 1.050          | 0.586        | 0.615        |          |
|                        | GPRS Slot-4 | Front Face    | 836.6       | 28.87              | 29.0    | 1.030          | 0.443        | 0.456        |          |
|                        |             | Back Face     | 836.6       | 28.87              | 29.0    | 1.030          | 0.697        | <b>0.718</b> | 4        |
| Hotspot (10mm)         | GPRS Slot-4 | Left Side     | 836.6       | 28.87              | 29.0    | 1.030          | 0.151        | 0.156        |          |
|                        |             | Right Side    | 836.6       | 28.87              | 29.0    | 1.030          | 0.432        | 0.445        |          |
|                        |             | Bottom Side   | 836.6       | 28.87              | 29.0    | 1.030          | 0.473        | 0.487        |          |

| GSM 1900               |             |               |             |                    |         |                |              |              |          |
|------------------------|-------------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions | Mode        | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                        |             |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)             | GSM         | Left Cheek    | 1880        | 29.80              | 30.0    | 1.047          | 0.129        | 0.135        |          |
|                        |             | Left Tilt     | 1880        | 29.80              | 30.0    | 1.047          | 0.116        | 0.121        |          |
|                        |             | Right Cheek   | 1880        | 29.80              | 30.0    | 1.047          | 0.081        | 0.085        |          |
|                        |             | Right Tilt    | 1880        | 29.80              | 30.0    | 1.047          | 0.098        | 0.103        |          |
| Body (10mm)            | GSM         | Front Face    | 1880        | 29.80              | 30.0    | 1.047          | 0.244        | 0.255        |          |
|                        |             | Back Face     | 1880        | 29.80              | 30.0    | 1.047          | 0.285        | 0.298        |          |
|                        | GPRS Slot-4 | Front Face    | 1880        | 26.26              | 26.5    | 1.057          | 0.549        | 0.580        |          |
|                        |             | Back Face     | 1880        | 26.26              | 26.5    | 1.057          | 0.535        | 0.565        |          |
| Hotspot (10mm)         | GPRS Slot-4 | Left Side     | 1880        | 26.26              | 26.5    | 1.057          | 0.577        | <b>0.610</b> | 5        |
|                        |             | Right Side    | 1880        | 26.26              | 26.5    | 1.057          | 0.178        | 0.188        |          |
|                        |             | Bottom Side   | 1880        | 26.26              | 26.5    | 1.057          | 0.560        | 0.592        |          |

#### Remark:

1. The value with the bold is the maximum SAR Value of each test band.
2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is  $\leq 0.8$  W/kg then testing at the other channels SAR tests are not necessary.

| WCDMA Band II          |      |               |             |                    |         |                |              |              |          |
|------------------------|------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions | Mode | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                        |      |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)             | RMC  | Left Cheek    | 1907.6      | 20.50              | 21.0    | 1.122          | 0.120        | 0.135        |          |
|                        |      | Left Tilt     | 1907.6      | 20.50              | 21.0    | 1.122          | 0.123        | 0.138        |          |
|                        |      | Right Cheek   | 1907.6      | 20.50              | 21.0    | 1.122          | 0.143        | 0.160        |          |
|                        |      | Right Tilt    | 1907.6      | 20.50              | 21.0    | 1.122          | 0.121        | 0.136        |          |
| Body (10mm)            | RMC  | Front Face    | 1907.6      | 20.50              | 21.0    | 1.122          | 0.247        | 0.277        |          |
|                        |      | Back Face     | 1907.6      | 20.50              | 21.0    | 1.122          | 0.710        | <b>0.797</b> | 6        |
| Hotspot (10mm)         | RMC  | Left Side     | 1907.6      | 20.50              | 21.0    | 1.122          | 0.206        | 0.231        |          |
|                        |      | Right Side    | 1907.6      | 20.50              | 21.0    | 1.122          | 0.137        | 0.154        |          |
|                        |      | Bottom Side   | 1907.6      | 20.50              | 21.0    | 1.122          | 0.478        | 0.536        |          |

| WCDMA Band IV          |      |               |             |                    |         |                |              |              |          |
|------------------------|------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions | Mode | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                        |      |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)             | RMC  | Left Cheek    | 1712.4      | 21.46              | 21.5    | 1.009          | 0.085        | 0.086        |          |
|                        |      | Left Tilt     | 1712.4      | 21.46              | 21.5    | 1.009          | 0.153        | 0.154        |          |
|                        |      | Right Cheek   | 1712.4      | 21.46              | 21.5    | 1.009          | 0.146        | 0.147        |          |
|                        |      | Right Tilt    | 1712.4      | 21.46              | 21.5    | 1.009          | 0.093        | 0.094        |          |
| Body (10mm)            | RMC  | Front Face    | 1712.4      | 21.46              | 21.5    | 1.009          | 0.100        | 0.101        |          |
|                        |      | Back Face     | 1712.4      | 21.46              | 21.5    | 1.009          | 0.656        | <b>0.662</b> | 7        |
| Hotspot (10mm)         | RMC  | Left Side     | 1712.4      | 21.46              | 21.5    | 1.009          | 0.099        | 0.100        |          |
|                        |      | Right Side    | 1712.4      | 21.46              | 21.5    | 1.009          | 0.037        | 0.037        |          |
|                        |      | Bottom Side   | 1712.4      | 21.46              | 21.5    | 1.009          | 0.250        | 0.252        |          |

| WCDMA Band IV          |      |               |             |                    |         |                |              |              |          |
|------------------------|------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions | Mode | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                        |      |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)             | RMC  | Left Cheek    | 826.4       | 23.05              | 23.5    | 1.109          | 0.265        | 0.294        |          |
|                        |      | Left Tilt     | 826.4       | 23.05              | 23.5    | 1.109          | 0.161        | 0.179        |          |
|                        |      | Right Cheek   | 826.4       | 23.05              | 23.5    | 1.109          | 0.121        | 0.134        |          |
|                        |      | Right Tilt    | 826.4       | 23.05              | 23.5    | 1.109          | 0.103        | 0.114        |          |
| Body (10mm)            | RMC  | Front Face    | 826.4       | 23.05              | 23.5    | 1.109          | 0.155        | 0.172        |          |
|                        |      | Back Face     | 826.4       | 23.05              | 23.5    | 1.109          | 0.715        | <b>0.793</b> | 8        |
| Hotspot (10mm)         | RMC  | Left Side     | 826.4       | 23.05              | 23.5    | 1.109          | 0.185        | 0.205        |          |
|                        |      | Right Side    | 826.4       | 23.05              | 23.5    | 1.109          | 0.385        | 0.427        |          |
|                        |      | Bottom Side   | 826.4       | 23.05              | 23.5    | 1.109          | 0.703        | 0.780        |          |

Remark:

1. The value with the bold is the maximum SAR Value of each test band.
2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is  $\leq 0.8$  W/kg then testing at the other channel SAR tests are not necessary.

| LTE Band 2 (20MHz Bandwidth) |       |               |             |                    |         |                |              |              |          |
|------------------------------|-------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions       | Mode  | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                              |       |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)                   | 1RB   | Left Cheek    | 1900        | 20.36              | 20.5    | 1.033          | 0.096        | 0.099        |          |
|                              |       | Left Tilt     | 1900        | 20.36              | 20.5    | 1.033          | 0.125        | 0.129        |          |
|                              |       | Right Cheek   | 1900        | 20.36              | 20.5    | 1.033          | 0.116        | 0.120        |          |
|                              |       | Right Tilt    | 1900        | 20.36              | 20.5    | 1.033          | 0.231        | 0.239        |          |
|                              | 50%RB | Left Cheek    | 1900        | 19.82              | 20.0    | 1.042          | 0.133        | 0.139        |          |
|                              |       | Left Tilt     | 1900        | 19.82              | 20.0    | 1.042          | 0.122        | 0.127        |          |
|                              |       | Right Cheek   | 1900        | 19.82              | 20.0    | 1.042          | 0.105        | 0.109        |          |
|                              |       | Right Tilt    | 1900        | 19.82              | 20.0    | 1.042          | 0.176        | 0.183        |          |
| Body (10mm)                  | 1RB   | Front Face    | 1900        | 20.36              | 20.5    | 1.033          | 0.219        | 0.226        |          |
|                              |       | Back Face     | 1900        | 20.36              | 20.5    | 1.033          | 0.424        | 0.438        |          |
|                              | 50%RB | Front Face    | 1900        | 19.82              | 20.0    | 1.042          | 0.207        | 0.216        |          |
|                              |       | Back Face     | 1900        | 19.82              | 20.0    | 1.042          | 0.339        | 0.353        |          |
| Hotspot (10mm)               | 1RB   | Left Side     | 1900        | 20.36              | 20.5    | 1.033          | 0.493        | <b>0.509</b> | 9        |
|                              |       | Right Side    | 1900        | 20.36              | 20.5    | 1.033          | 0.114        | 0.118        |          |
|                              |       | Bottom Side   | 1900        | 20.36              | 20.5    | 1.033          | 0.467        | 0.482        |          |
|                              | 50%RB | Left Side     | 1900        | 19.82              | 20.0    | 1.042          | 0.304        | 0.317        |          |
|                              |       | Right Side    | 1900        | 19.82              | 20.0    | 1.042          | 0.083        | 0.087        |          |
|                              |       | Bottom Side   | 1900        | 19.82              | 20.0    | 1.042          | 0.440        | 0.459        |          |

| LTE Band 4 (20MHz Bandwidth) |       |               |             |                    |         |                |              |              |          |
|------------------------------|-------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions       | Mode  | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                              |       |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)                   | 1RB   | Left Cheek    | 1720        | 20.97              | 21.0    | 1.007          | 0.126        | 0.127        |          |
|                              |       | Left Tilt     | 1720        | 20.97              | 21.0    | 1.007          | 0.105        | 0.106        |          |
|                              |       | Right Cheek   | 1720        | 20.97              | 21.0    | 1.007          | 0.094        | 0.095        |          |
|                              |       | Right Tilt    | 1720        | 20.97              | 21.0    | 1.007          | 0.107        | 0.108        |          |
|                              | 50%RB | Left Cheek    | 1720        | 20.63              | 21.0    | 1.089          | 0.099        | 0.108        |          |
|                              |       | Left Tilt     | 1720        | 20.63              | 21.0    | 1.089          | 0.115        | 0.125        |          |
|                              |       | Right Cheek   | 1720        | 20.63              | 21.0    | 1.089          | 0.088        | 0.096        |          |
|                              |       | Right Tilt    | 1720        | 20.63              | 21.0    | 1.089          | 0.109        | 0.119        |          |
| Body (10mm)                  | 1RB   | Front Face    | 1720        | 20.97              | 21.0    | 1.007          | 0.126        | 0.127        |          |
|                              |       | Back Face     | 1720        | 20.97              | 21.0    | 1.007          | 0.282        | 0.284        |          |
|                              | 50%RB | Front Face    | 1720        | 20.63              | 21.0    | 1.089          | 0.092        | 0.100        |          |
|                              |       | Back Face     | 1720        | 20.63              | 21.0    | 1.089          | 0.208        | 0.226        |          |
| Hotspot (10mm)               | 1RB   | Left Side     | 1720        | 20.97              | 21.0    | 1.007          | 0.130        | 0.131        |          |
|                              |       | Right Side    | 1720        | 20.97              | 21.0    | 1.007          | 0.088        | 0.089        |          |
|                              |       | Bottom Side   | 1720        | 20.97              | 21.0    | 1.007          | 0.296        | 0.298        |          |
|                              | 50%RB | Left Side     | 1720        | 20.63              | 21.0    | 1.089          | 0.112        | 0.122        |          |
|                              |       | Right Side    | 1720        | 20.63              | 21.0    | 1.089          | 0.067        | 0.073        |          |
|                              |       | Bottom Side   | 1720        | 20.63              | 21.0    | 1.089          | 0.279        | <b>0.304</b> | 10       |

| LTE Band 5 (10MHz Bandwidth) |       |               |             |                    |         |                |              |              |          |
|------------------------------|-------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions       | Mode  | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                              |       |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)                   | 1RB   | Left Cheek    | 829         | 23.02              | 23.5    | 1.117          | 0.197        | 0.220        |          |
|                              |       | Left Tilt     | 829         | 23.02              | 23.5    | 1.117          | 0.141        | 0.157        |          |
|                              |       | Right Cheek   | 829         | 23.02              | 23.5    | 1.117          | 0.106        | 0.118        |          |
|                              |       | Right Tilt    | 829         | 23.02              | 23.5    | 1.117          | 0.134        | 0.150        |          |
|                              | 50%RB | Left Cheek    | 844         | 22.00              | 22.5    | 1.122          | 0.103        | 0.116        |          |
|                              |       | Left Tilt     | 844         | 22.00              | 22.5    | 1.122          | 0.125        | 0.140        |          |
|                              |       | Right Cheek   | 844         | 22.00              | 22.5    | 1.122          | 0.166        | 0.186        |          |
|                              |       | Right Tilt    | 844         | 22.00              | 22.5    | 1.122          | 0.111        | 0.125        |          |
| Body (10mm)                  | 1RB   | Front Face    | 829         | 23.02              | 23.5    | 1.117          | 0.346        | 0.386        |          |
|                              |       | Back Face     | 829         | 23.02              | 23.5    | 1.117          | 0.772        | <b>0.862</b> | 11       |
|                              | 50%RB | Front Face    | 844         | 22.00              | 22.5    | 1.122          | 0.193        | 0.217        |          |
|                              |       | Back Face     | 844         | 22.00              | 22.5    | 1.122          | 0.593        | 0.665        |          |
| Hotspot (10mm)               | 1RB   | Left Side     | 829         | 23.02              | 23.5    | 1.117          | 0.150        | 0.168        |          |
|                              |       | Right Side    | 829         | 23.02              | 23.5    | 1.117          | 0.437        | 0.488        |          |
|                              |       | Bottom Side   | 829         | 23.02              | 23.5    | 1.117          | 0.409        | 0.457        |          |
|                              | 50%RB | Left Side     | 844         | 22.00              | 22.5    | 1.122          | 0.145        | 0.163        |          |
|                              |       | Right Side    | 844         | 22.00              | 22.5    | 1.122          | 0.368        | 0.413        |          |
|                              |       | Bottom Side   | 844         | 22.00              | 22.5    | 1.122          | 0.222        | 0.249        |          |

| LTE Band 7 (20MHz Bandwidth) |       |               |             |                    |         |                |              |              |          |
|------------------------------|-------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions       | Mode  | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                              |       |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)                   | 1RB   | Left Cheek    | 2510        | 20.71              | 21.0    | 1.069          | 0.121        | 0.129        |          |
|                              |       | Left Tilt     | 2510        | 20.71              | 21.0    | 1.069          | 0.172        | 0.184        |          |
|                              |       | Right Cheek   | 2510        | 20.71              | 21.0    | 1.069          | 0.138        | 0.148        |          |
|                              |       | Right Tilt    | 2510        | 20.71              | 21.0    | 1.069          | 0.203        | 0.217        |          |
|                              | 50%RB | Left Cheek    | 2510        | 20.21              | 20.5    | 1.069          | 0.181        | 0.193        |          |
|                              |       | Left Tilt     | 2510        | 20.21              | 20.5    | 1.069          | 0.180        | 0.192        |          |
|                              |       | Right Cheek   | 2510        | 20.21              | 20.5    | 1.069          | 0.205        | 0.219        |          |
|                              |       | Right Tilt    | 2510        | 20.21              | 20.5    | 1.069          | 0.183        | 0.196        |          |
| Body (10mm)                  | 1RB   | Front Face    | 2510        | 20.71              | 21.0    | 1.069          | 0.293        | 0.313        |          |
|                              |       | Back Face     | 2510        | 20.71              | 21.0    | 1.069          | 0.545        | 0.583        |          |
|                              | 50%RB | Front Face    | 2510        | 20.21              | 20.5    | 1.069          | 0.267        | 0.285        |          |
|                              |       | Back Face     | 2510        | 20.21              | 20.5    | 1.069          | 0.308        | 0.329        |          |
| Hotspot (10mm)               | 1RB   | Left Side     | 2510        | 20.71              | 21.0    | 1.069          | 0.751        | <b>0.803</b> | 12       |
|                              |       | Right Side    | 2510        | 20.71              | 21.0    | 1.069          | 0.530        | 0.567        |          |
|                              |       | Bottom Side   | 2510        | 20.71              | 21.0    | 1.069          | 0.550        | 0.588        |          |
|                              | 50%RB | Left Side     | 2510        | 20.21              | 20.5    | 1.069          | 0.571        | 0.610        |          |
|                              |       | Right Side    | 2510        | 20.21              | 20.5    | 1.069          | 0.288        | 0.308        |          |
|                              |       | Bottom Side   | 2510        | 20.21              | 20.5    | 1.069          | 0.483        | 0.516        |          |

| LTE Band 12 (10MHz Bandwidth) |       |               |             |                    |         |                |              |              |          |
|-------------------------------|-------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions        | Mode  | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                               |       |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)                    | 1RB   | Left Cheek    | 711         | 22.67              | 23.0    | 1.079          | 0.221        | 0.238        |          |
|                               |       | Left Tilt     | 711         | 22.67              | 23.0    | 1.079          | 0.135        | 0.624        |          |
|                               |       | Right Cheek   | 711         | 22.67              | 23.0    | 1.079          | 0.119        | 0.166        |          |
|                               |       | Right Tilt    | 711         | 22.67              | 23.0    | 1.079          | 0.115        | 0.242        |          |
|                               | 50%RB | Left Cheek    | 704         | 22.15              | 22.5    | 1.084          | 0.147        | 0.159        |          |
|                               |       | Left Tilt     | 704         | 22.15              | 22.5    | 1.084          | 0.106        | 0.115        |          |
|                               |       | Right Cheek   | 704         | 22.15              | 22.5    | 1.084          | 0.120        | 0.130        |          |
|                               |       | Right Tilt    | 704         | 22.15              | 22.5    | 1.084          | 0.098        | 0.106        |          |
| Body (10mm)                   | 1RB   | Front Face    | 711         | 22.67              | 23.0    | 1.079          | 0.241        | 0.260        |          |
|                               |       | Back Face     | 711         | 22.67              | 23.0    | 1.079          | 0.578        | <b>0.624</b> | 13       |
|                               | 50%RB | Front Face    | 704         | 22.15              | 22.5    | 1.084          | 0.215        | 0.233        |          |
|                               |       | Back Face     | 704         | 22.15              | 22.5    | 1.084          | 0.504        | 0.546        |          |
| Hotspot (10mm)                | 1RB   | Left Side     | 711         | 22.67              | 23.0    | 1.079          | 0.154        | 0.166        |          |
|                               |       | Right Side    | 711         | 22.67              | 23.0    | 1.079          | 0.224        | 0.242        |          |
|                               |       | Bottom Side   | 711         | 22.67              | 23.0    | 1.079          | 0.219        | 0.236        |          |
|                               | 50%RB | Left Side     | 704         | 22.15              | 22.5    | 1.084          | 0.137        | 0.148        |          |
|                               |       | Right Side    | 704         | 22.15              | 22.5    | 1.084          | 0.137        | 0.148        |          |
|                               |       | Bottom Side   | 704         | 22.15              | 22.5    | 1.084          | 0.194        | 0.210        |          |

| LTE Band 17 (10MHz Bandwidth) |       |               |             |                    |         |                |              |              |          |
|-------------------------------|-------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions        | Mode  | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                               |       |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)                    | 1RB   | Left Cheek    | 709         | 22.67              | 23.0    | 1.079          | 0.127        | 0.137        |          |
|                               |       | Left Tilt     | 709         | 22.67              | 23.0    | 1.079          | 0.153        | 0.165        |          |
|                               |       | Right Cheek   | 709         | 22.67              | 23.0    | 1.079          | 0.105        | 0.113        |          |
|                               |       | Right Tilt    | 709         | 22.67              | 23.0    | 1.079          | 0.129        | 0.139        |          |
|                               | 50%RB | Left Cheek    | 709         | 21.99              | 22.0    | 1.002          | 0.081        | 0.081        |          |
|                               |       | Left Tilt     | 709         | 21.99              | 22.0    | 1.002          | 0.129        | 0.129        |          |
|                               |       | Right Cheek   | 709         | 21.99              | 22.0    | 1.002          | 0.157        | 0.157        |          |
|                               |       | Right Tilt    | 709         | 21.99              | 22.0    | 1.002          | 0.127        | 0.127        |          |
| Body (10mm)                   | 1RB   | Front Face    | 709         | 22.67              | 23.0    | 1.079          | 0.261        | 0.282        |          |
|                               |       | Back Face     | 709         | 22.67              | 23.0    | 1.079          | 0.285        | <b>0.307</b> | 14       |
|                               | 50%RB | Front Face    | 709         | 21.99              | 22.0    | 1.002          | 0.250        | 0.251        |          |
|                               |       | Back Face     | 709         | 21.99              | 22.0    | 1.002          | 0.279        | 0.280        |          |
| Hotspot (10mm)                | 1RB   | Left Side     | 709         | 22.67              | 23.0    | 1.079          | 0.176        | 0.190        |          |
|                               |       | Right Side    | 709         | 22.67              | 23.0    | 1.079          | 0.249        | 0.269        |          |
|                               |       | Bottom Side   | 709         | 22.67              | 23.0    | 1.079          | 0.219        | 0.236        |          |
|                               | 50%RB | Left Side     | 709         | 21.99              | 22.0    | 1.002          | 0.167        | 0.167        |          |
|                               |       | Right Side    | 709         | 21.99              | 22.0    | 1.002          | 0.223        | 0.224        |          |
|                               |       | Bottom Side   | 709         | 21.99              | 22.0    | 1.002          | 0.161        | 0.161        |          |

| LTE Band 66 (20MHz Bandwidth) |       |               |             |                    |         |                |              |              |          |
|-------------------------------|-------|---------------|-------------|--------------------|---------|----------------|--------------|--------------|----------|
| RF Exposure Conditions        | Mode  | Test Position | Freq. (MHz) | Output Power (dBm) |         |                | SAR1g (W/kg) |              | Plot No. |
|                               |       |               |             | Meas.              | Turn-up | Scaling Factor | Meas.        | Scaled       |          |
| Head (0mm)                    | 1RB   | Left Cheek    | 1720        | 21.05              | 21.5    | 1.109          | 0.123        | 0.136        |          |
|                               |       | Left Tilt     | 1720        | 21.05              | 21.5    | 1.109          | 0.104        | 0.115        |          |
|                               |       | Right Cheek   | 1720        | 21.05              | 21.5    | 1.109          | 0.121        | 0.134        |          |
|                               |       | Right Tilt    | 1720        | 21.05              | 21.5    | 1.109          | 0.180        | 0.200        |          |
|                               | 50%RB | Left Cheek    | 1720        | 20.71              | 21.0    | 1.069          | 0.113        | 0.121        |          |
|                               |       | Left Tilt     | 1720        | 20.71              | 21.0    | 1.069          | 0.117        | 0.125        |          |
|                               |       | Right Cheek   | 1720        | 20.71              | 21.0    | 1.069          | 0.081        | 0.087        |          |
|                               |       | Right Tilt    | 1720        | 20.71              | 21.0    | 1.069          | 0.147        | 0.157        |          |
| Body (10mm)                   | 1RB   | Front Face    | 1720        | 21.05              | 21.5    | 1.109          | 0.144        | 0.160        |          |
|                               |       | Back Face     | 1720        | 21.05              | 21.5    | 1.109          | 0.303        | 0.336        |          |
|                               | 50%RB | Front Face    | 1720        | 20.71              | 21.0    | 1.069          | 0.089        | 0.095        |          |
|                               |       | Back Face     | 1720        | 20.71              | 21.0    | 1.069          | 0.221        | 0.236        |          |
| Hotspot (10mm)                | 1RB   | Left Side     | 1720        | 21.05              | 21.5    | 1.109          | 0.146        | 0.162        |          |
|                               |       | Right Side    | 1720        | 21.05              | 21.5    | 1.109          | 0.118        | 0.131        |          |
|                               |       | Bottom Side   | 1720        | 21.05              | 21.5    | 1.109          | 0.317        | <b>0.352</b> | 15       |
|                               | 50%RB | Left Side     | 1720        | 20.71              | 21.0    | 1.069          | 0.143        | 0.153        |          |
|                               |       | Right Side    | 1720        | 20.71              | 21.0    | 1.069          | 0.107        | 0.114        |          |
|                               |       | Bottom Side   | 1720        | 20.71              | 21.0    | 1.069          | 0.213        | 0.228        |          |

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#### 14.4 SAR Measurement Variability

According to KDB865664, Repeated measurements are required only when the measured SAR is  $\geq 0.80$  W/kg. If the measured SAR value of the initial repeated measurement is  $< 1.45$  W/kg with  $\leq 20\%$  variation, only one repeated measurement is required to reaffirm that the results are not expected to have substantial variations, which may introduce significant compliance concerns. A second repeated measurement is required only if the measured result for the initial repeated measurement is within 10% of the SAR limit and vary by more than 20%, which are often related to device and measurement setup difficulties. The following procedures are applied to determine if repeated measurements are required. The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.<sup>19</sup> The repeated measurement results must be clearly identified in the SAR report. All measured SAR, including the repeated results, must be considered to determine compliance and for reporting according to KDB 690783. Repeated measurement is not required when the original highest measured SAR is  $< 0.80$  W/kg; steps 2) through 4) do not apply.

- 1) When the original highest measured SAR is  $\geq 0.80$  W/kg, repeat that measurement once.
- 2) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is  $> 1.20$  or when the original or repeated measurement is  $\geq 1.45$  W/kg ( $\sim 10\%$  from the 1-g SAR limit).
- 3) Perform a third repeated measurement only if the original, first or second repeated measurement is  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .

| Test Mode | Frequency Band (MHz) | RF Exposure Configuration | Test Position | Repeated SAR (yes/no) | Highest Measured SAR1-g (W/Kg) | First Repeated         |                               |
|-----------|----------------------|---------------------------|---------------|-----------------------|--------------------------------|------------------------|-------------------------------|
|           |                      |                           |               |                       |                                | Measured SAR1-g (W/Kg) | Largest to Smallest SAR Ratio |
| WIFI 5.1G | 5200                 | Head                      | Left Tilt     | yes                   | 1.021                          | 0.987                  | 1.034                         |
| WIFI 5.1G | 5180                 | Head                      | Left Tilt     | yes                   | 0.889                          | 0.817                  | 1.088                         |

## 14.5 Simultaneous Transmission Evaluation

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.

Application Simultaneous Transmission information:

| No. | Configurations | Head SAR | Body SAR | Hotspot SAR |
|-----|----------------|----------|----------|-------------|
| 1   | WWAN+WIFI      | Yes      | Yes      | Yes         |
| 2   | WWAN+Bluetooth | Yes      | Yes      | Yes         |
| 3   | WIFI+Bluetooth | No       | No       | No          |

**Remark:**

1. WWAN cannot transmit simultaneously.
2. Bluetooth and WIFI share the same antenna and cannot transmit data at the same time.
3. According to the KDB 447498 D01 v06, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
  - $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})} / x] \text{ W/kg}$  for test separation distances  $\leq 50 \text{ mm}$ ; where  $x = 7.5$  for 1-g SAR, and  $x = 18.75$  for 10-g SAR.
  - $0.4 \text{ W/kg}$  for 1-g SAR and  $1.0 \text{ W/kg}$  for 10-g SAR, when the test separation distances is  $> 50 \text{ mm}$

| Estimated stand alone SAR |                 |                     |                    |                          |     |                         |
|---------------------------|-----------------|---------------------|--------------------|--------------------------|-----|-------------------------|
| Mode                      | Frequency (MHz) | Maximum Power (dBm) | Maximum Power (mW) | Separation Distance (mm) | X   | Estimated SAR1-g (W/kg) |
| Bluetooth                 | 2480            | 5.0                 | 3.16               | 5                        | 3   | 0.133                   |
| Bluetooth                 | 2480            | 5.0                 | 3.16               | 10                       | 7.5 | 0.053                   |

Note:

1. Bluetooth\*- Including Lower power Bluetooth
2. Maximum average power including tune-up tolerance;
3. When the minimum test separation distance is  $< 5 \text{ mm}$ , a distance of  $5 \text{ mm}$  is applied to determine SAR test exclusion

4. Per FCC KD B447498 D01, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the transmitting antenna in a specific a physical test configuration is  $\leq 1.6 \text{ W/Kg}$ . When the sum is greater than the SAR limit, SAR test exclusion is determined by the SAR to peak location separation ratio.

$$\text{Ratio} = \frac{(\text{SAR}_1 + \text{SAR}_2)^{1.5}}{(\text{peak location separation, mm})} < 0.04$$

## 5. Simultaneous transmission of maximum SAR sum calculation.

| RF Exposure Conditions | Test Position | WWAN              | WCN               | Summed SAR (W/kg) | SAR1-g Limit (W/kg) |
|------------------------|---------------|-------------------|-------------------|-------------------|---------------------|
|                        |               | Scaled SAR (W/kg) | Scaled SAR (W/kg) |                   |                     |
| Head                   | Left Cheek    | 0.294             | 0.665             | 0.959             | 1.6                 |
|                        | Left Tilt     | 0.186             | 1.040             | <b>1.226</b>      | 1.6                 |
|                        | Right Cheek   | 0.219             | 0.859             | 1.078             | 1.6                 |
|                        | Right Tilt    | 0.239             | 0.476             | 0.715             | 1.6                 |
| Body                   | Front Face    | 0.580             | 0.640             | 1.220             | 1.6                 |
|                        | Back Face     | 0.862             | 0.522             | <b>1.384</b>      | 1.6                 |
| Hotspot                | Left Side     | 0.803             | /                 | 0.803             | 1.6                 |
|                        | Right Side    | 0.567             | 0.433             | <b>1.000</b>      | 1.6                 |
|                        | Top Side      | /                 | 0.666             | 0.666             | 1.6                 |
|                        | Bottom Side   | 0.780             | /                 | 0.780             | 1.6                 |

## 15. Test Plots

### 15.1 System Performance Check

#### System check at 750 MHz

Date of measurement: 11/10/2024

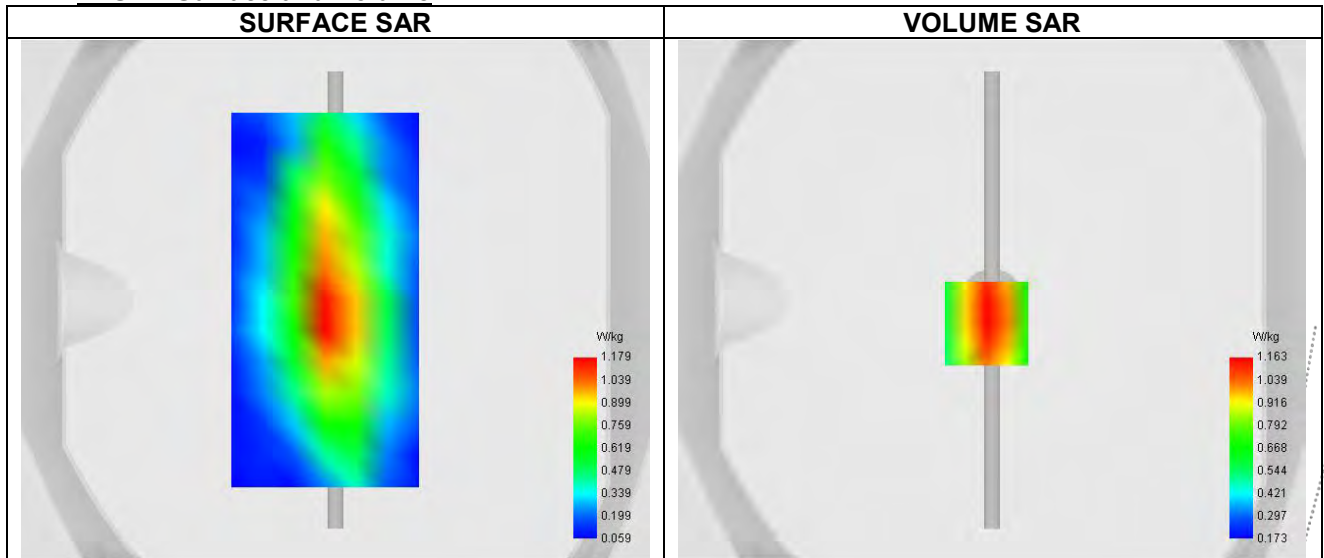
##### A. Experimental conditions.

|                 |                            |
|-----------------|----------------------------|
| Probe           | SN 26/23 EPGO420           |
| ConvF           | 0.87                       |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Dipole                     |
| Band            | CW750                      |
| Signal          | CW                         |

##### B. Permittivity

|                                        |         |
|----------------------------------------|---------|
| Frequency (MHz)                        | 750.000 |
| Relative permittivity (real part)      | 42.787  |
| Relative permittivity (imaginary part) | 24.595  |
| Conductivity (S/m)                     | 0.921   |

##### C. SAR Surface and Volume



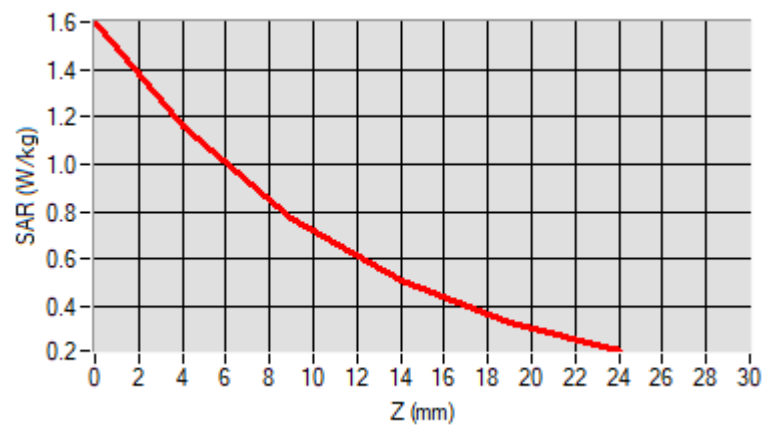
Maximum location: X=-2.00, Y=-9.00 ; SAR Peak: 1.61 W/kg

##### D. SAR 1g & 10g

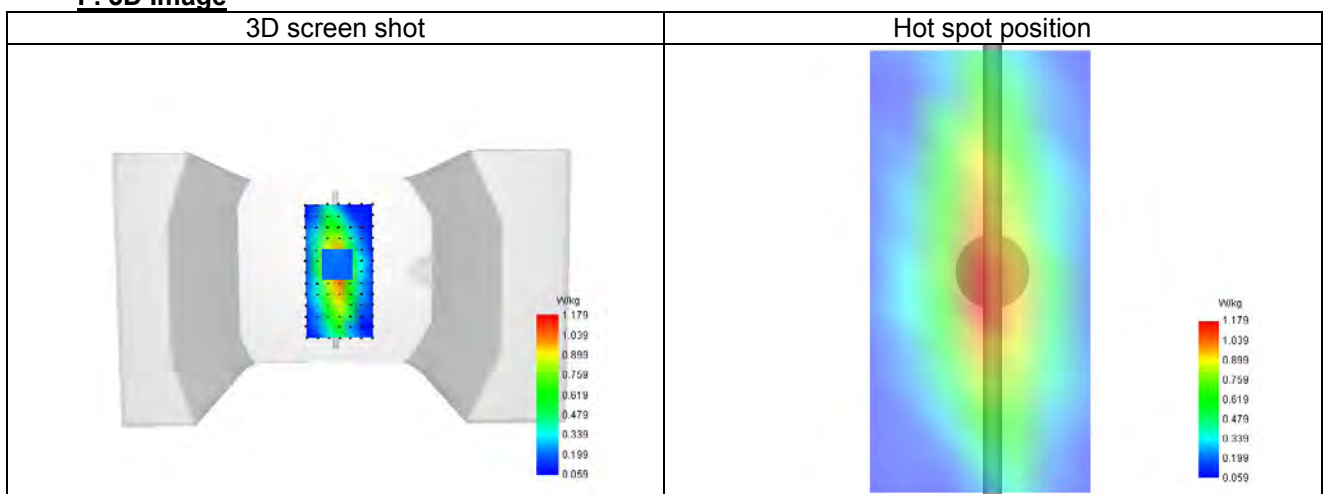
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.962    |
| SAR 1g (W/Kg)                                         | 2.039    |
| Variation (%)                                         | -1.534   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

##### E. Z Axis Scan

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 1.603 | 1.163 | 0.769 | 0.506 | 0.333 |



### F. 3D Image



**System check at 835 MHz**

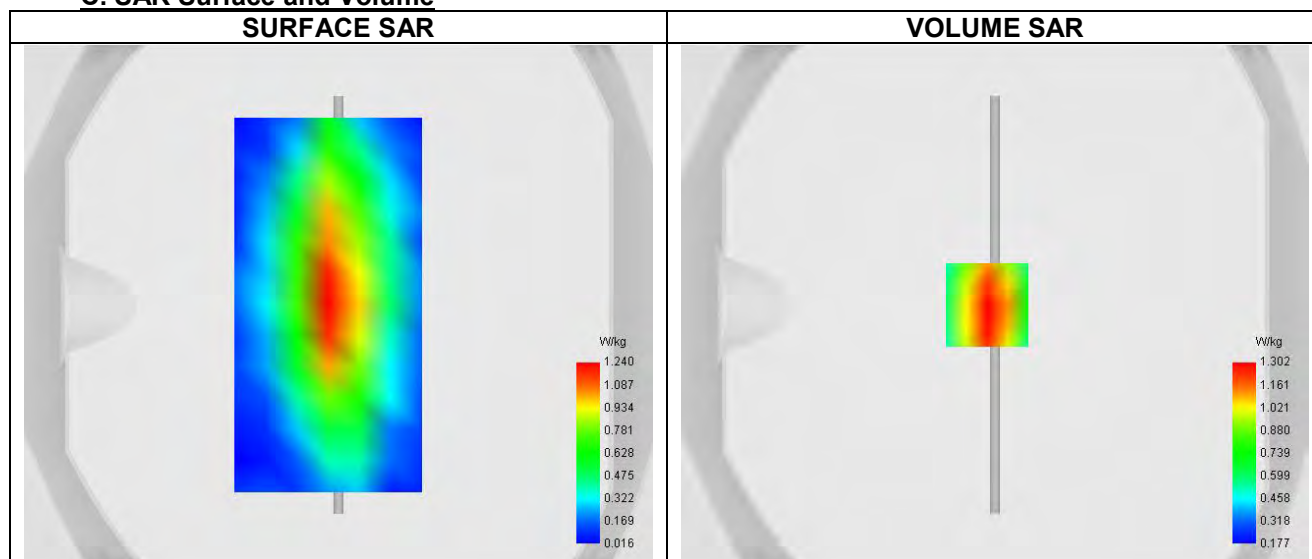
Date of measurement: 12/10/2024

**A. Experimental conditions.**

|                 |                            |
|-----------------|----------------------------|
| Probe           | SN 26/23 EPGO420           |
| ConvF           | 0.80                       |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Dipole                     |
| Band            | CW835                      |
| Signal          | CW                         |

**B. Permittivity**

|                                        |         |
|----------------------------------------|---------|
| Frequency (MHz)                        | 835.000 |
| Relative permittivity (real part)      | 42.101  |
| Relative permittivity (imaginary part) | 20.910  |
| Conductivity (S/m)                     | 0.870   |

**C. SAR Surface and Volume**


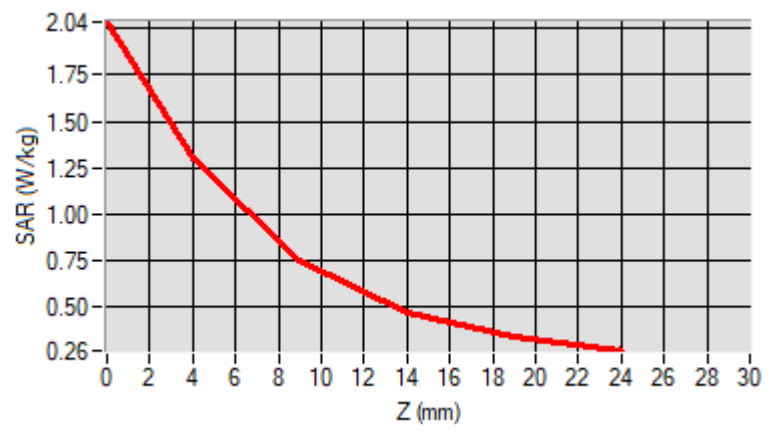
Maximum location: X=-3.00, Y=0.00 ; SAR Peak: 2.06 W/kg

**D. SAR 1g & 10g**

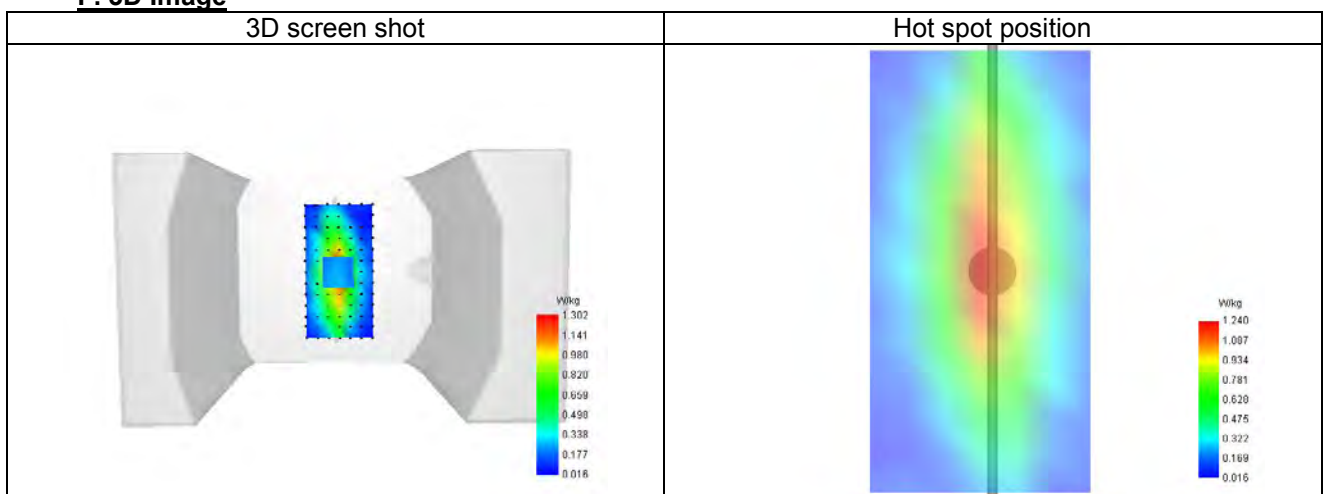
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.564    |
| SAR 1g (W/Kg)                                         | 2.394    |
| Variation (%)                                         | -1.989   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 2.036 | 1.302 | 0.747 | 0.462 | 0.331 |



### F. 3D Image



**System check at 1800 MHz**

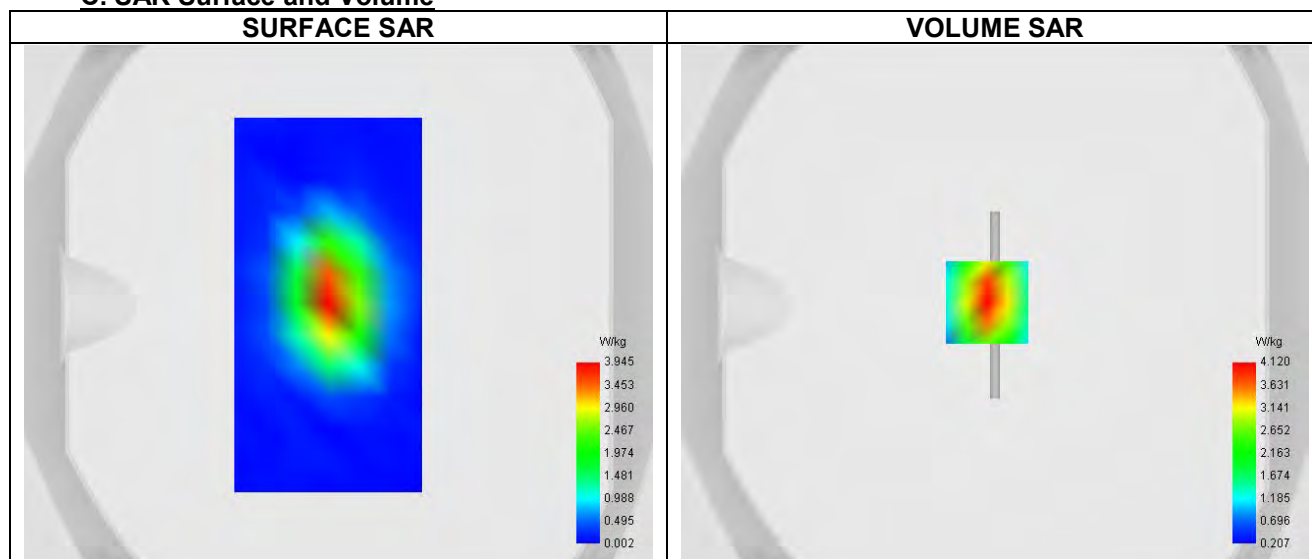
Date of measurement: 18/10/2024

**A. Experimental conditions.**

|                 |                            |
|-----------------|----------------------------|
| Probe           | SN 26/23 EPGO420           |
| ConvF           | 1.01                       |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Dipole                     |
| Band            | CW1800                     |
| Signal          | CW                         |

**B. Permittivity**

|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 1800.000 |
| Relative permittivity (real part)      | 39.598   |
| Relative permittivity (imaginary part) | 15.200   |
| Conductivity (S/m)                     | 1.366    |

**C. SAR Surface and Volume**


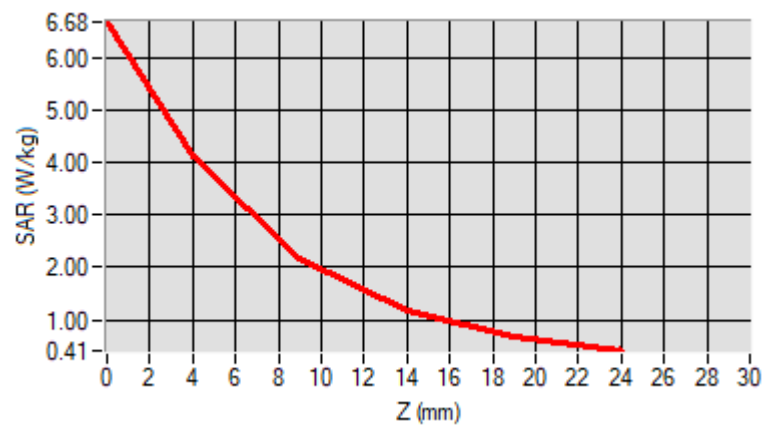
Maximum location: X=-3.00, Y=1.00 ; SAR Peak: 6.69 W/kg

**D. SAR 1g & 10g**

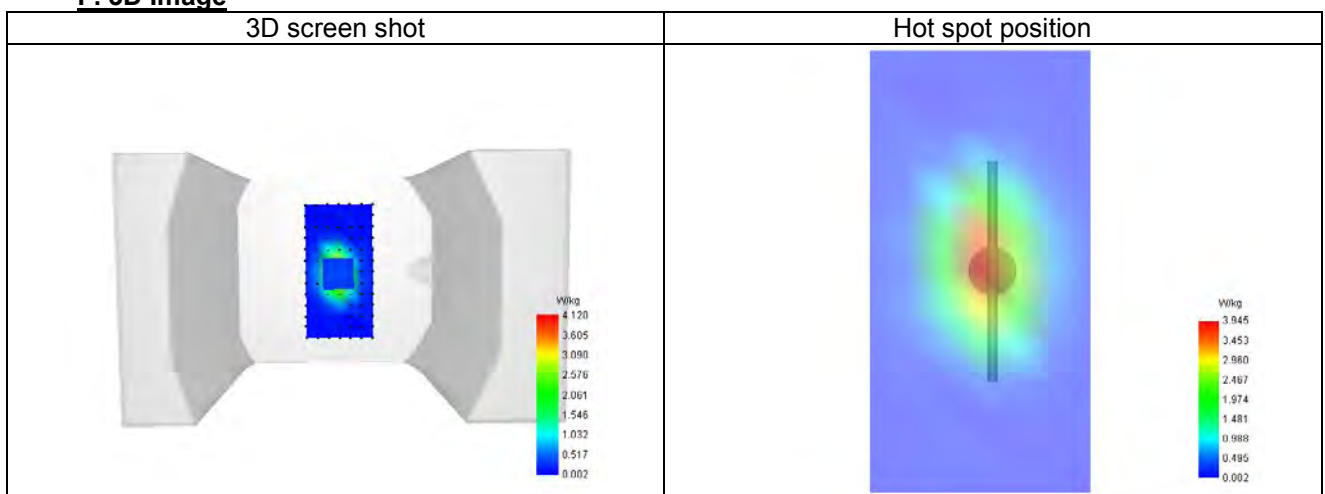
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 4.017    |
| SAR 1g (W/Kg)                                         | 9.985    |
| Variation (%)                                         | -0.830   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 6.684 | 4.120 | 2.184 | 1.177 | 0.685 |



### F. 3D Image



**System check at 1900 MHz**

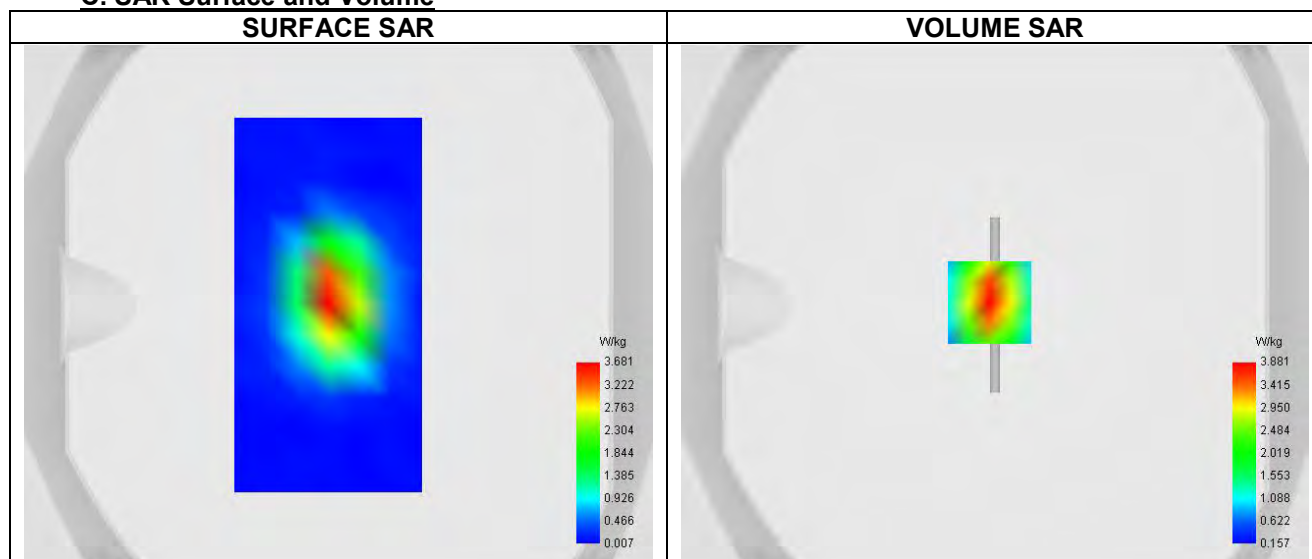
Date of measurement: 19/10/2024

**A. Experimental conditions.**

|                 |                            |
|-----------------|----------------------------|
| Probe           | SN 26/23 EPGO420           |
| ConvF           | 1.11                       |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Dipole                     |
| Band            | CW1900                     |
| Signal          | CW                         |

**B. Permittivity**

|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 1900.000 |
| Relative permittivity (real part)      | 38.663   |
| Relative permittivity (imaginary part) | 14.400   |
| Conductivity (S/m)                     | 1.400    |

**C. SAR Surface and Volume**


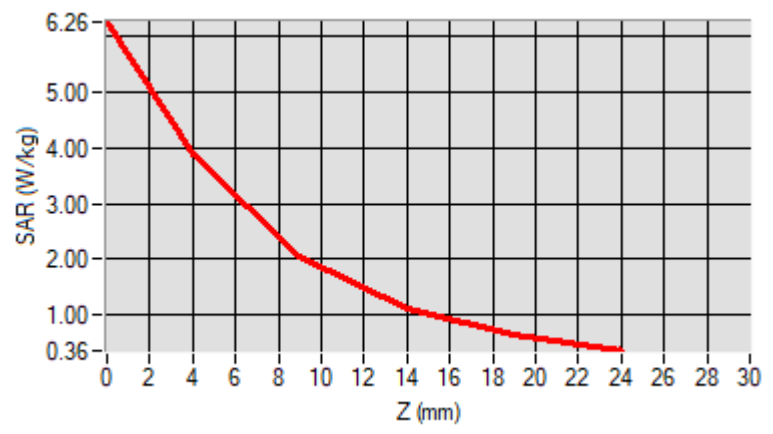
Maximum location: X=-2.00, Y=1.00 ; SAR Peak: 6.27 W/kg

**D. SAR 1g & 10g**

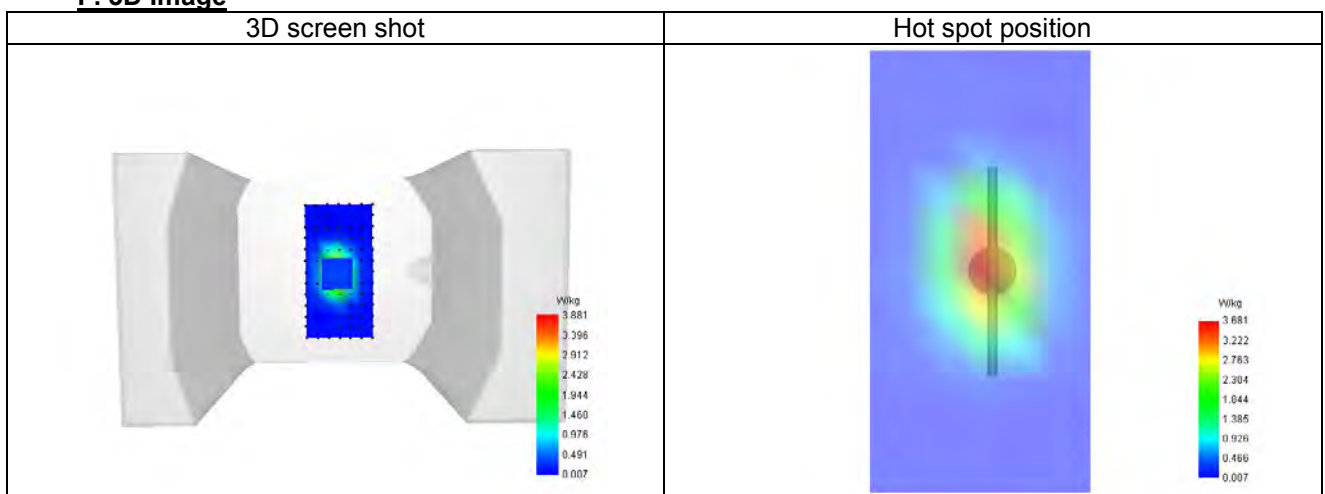
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 5.074    |
| SAR 1g (W/Kg)                                         | 10.253   |
| Variation (%)                                         | 2.003    |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 6.259 | 3.881 | 2.069 | 1.111 | 0.634 |



### F. 3D Image



**System check at 2450 MHz**

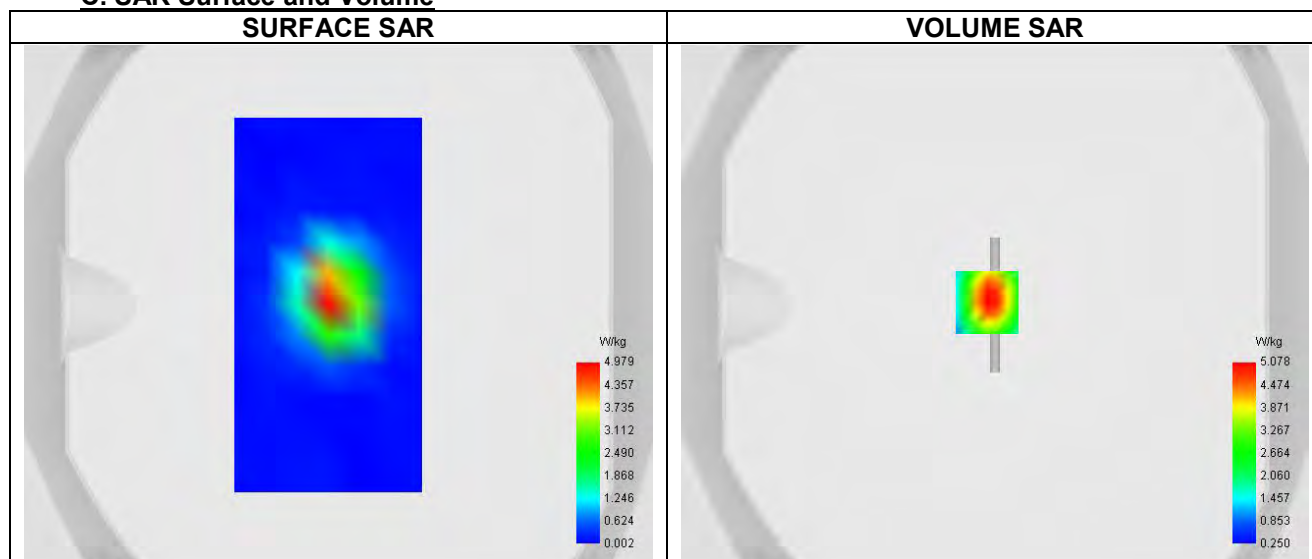
Date of measurement: 21/10/2024

**A. Experimental conditions.**

|                 |                             |
|-----------------|-----------------------------|
| Probe           | SN 26/23 EPGO420            |
| ConvF           | 1.32                        |
| Area Scan       | surf_sam_plan.txt           |
| Zoom Scan       | 7x7x12,dx=4mm dy=4mm dz=5mm |
| Phantom         | Validation plane            |
| Device Position | Dipole                      |
| Band            | CW2450                      |
| Signal          | CW                          |

**B. Permittivity**

|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 2450.000 |
| Relative permittivity (real part)      | 39.847   |
| Relative permittivity (imaginary part) | 14.330   |
| Conductivity (S/m)                     | 1.783    |

**C. SAR Surface and Volume**


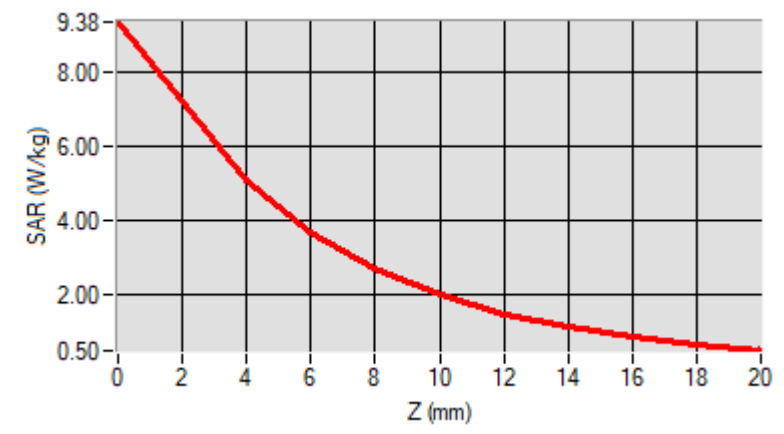
Maximum location: X=-3.00, Y=1.00 ; SAR Peak: 9.50 W/kg

**D. SAR 1g & 10g**

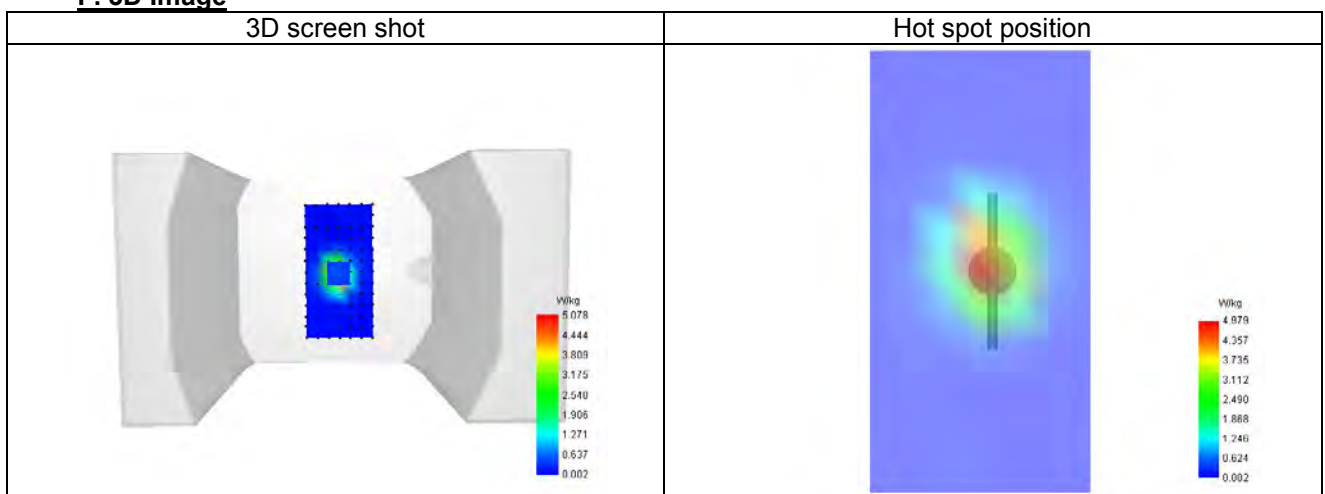
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 6.584    |
| SAR 1g (W/Kg)                                         | 13.799   |
| Variation (%)                                         | 1.347    |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 6.00  | 8.00  | 10.00 | 12.00 | 14.00 | 16.00 | 18.00 |
| SAR (W/Kg) | 9.380 | 5.078 | 3.712 | 2.709 | 2.001 | 1.499 | 1.138 | 0.871 | 0.667 |



### F. 3D Image



**System check at 2600 MHz**

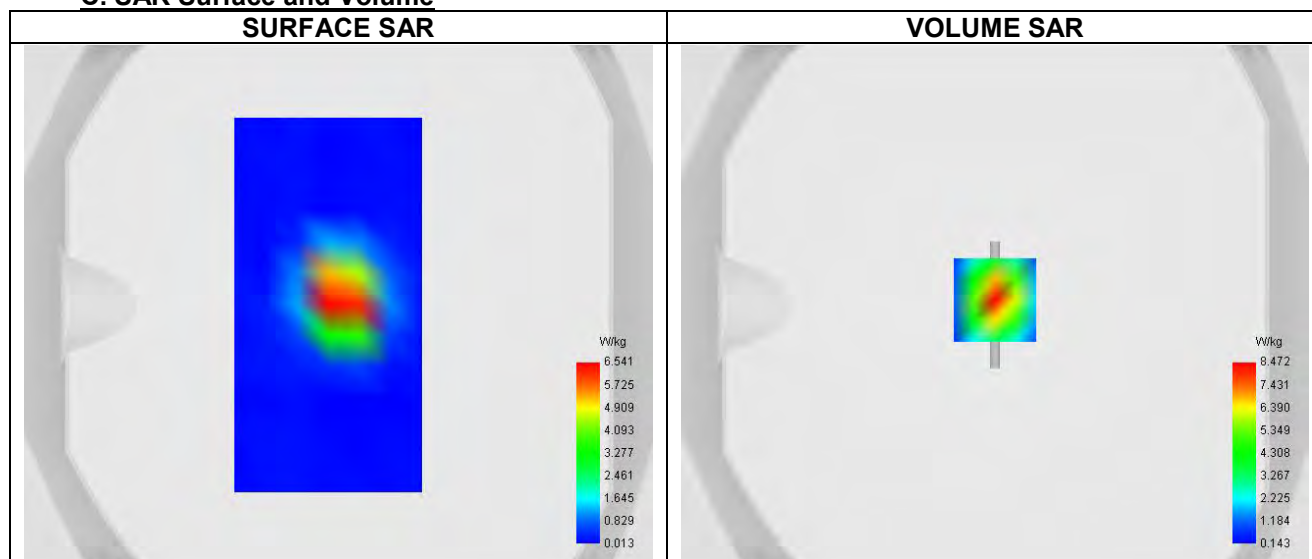
Date of measurement: 11/10/2024

**A. Experimental conditions.**

|                 |                            |
|-----------------|----------------------------|
| Probe           | SN 26/23 EPGO420           |
| ConvF           | 1.19                       |
| Area Scan       | surf_sam_plan.txt          |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Phantom         | Validation plane           |
| Device Position | Dipole                     |
| Band            | CW2600                     |
| Signal          | CW                         |

**B. Permittivity**

|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 2600.000 |
| Relative permittivity (real part)      | 39.706   |
| Relative permittivity (imaginary part) | 14.889   |
| Conductivity (S/m)                     | 1.974    |

**C. SAR Surface and Volume**


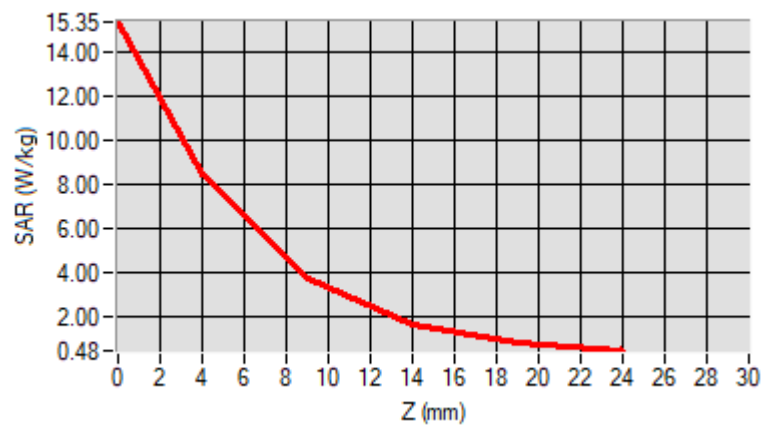
Maximum location: X=0.00, Y=2.00 ; SAR Peak: 15.35 W/kg

**D. SAR 1g & 10g**

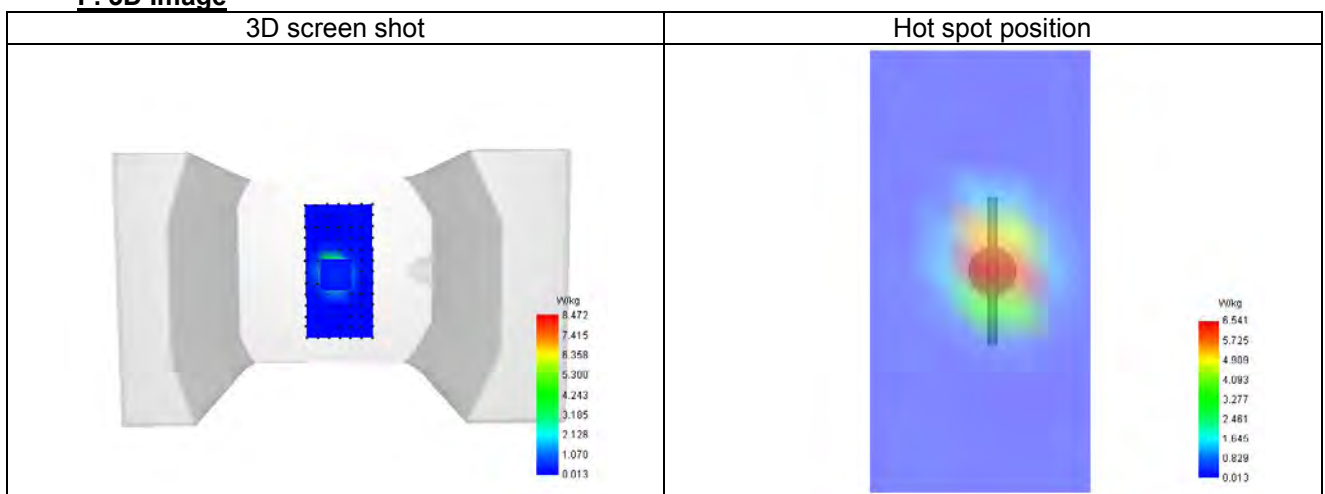
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 6.100    |
| SAR 1g (W/Kg)                                         | 14.660   |
| Variation (%)                                         | 1.525    |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |        |       |       |       |       |
|------------|--------|-------|-------|-------|-------|
| Z (mm)     | 0.00   | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 15.347 | 8.472 | 3.768 | 1.677 | 0.856 |



### F. 3D Image



**System check at 5200 MHz**

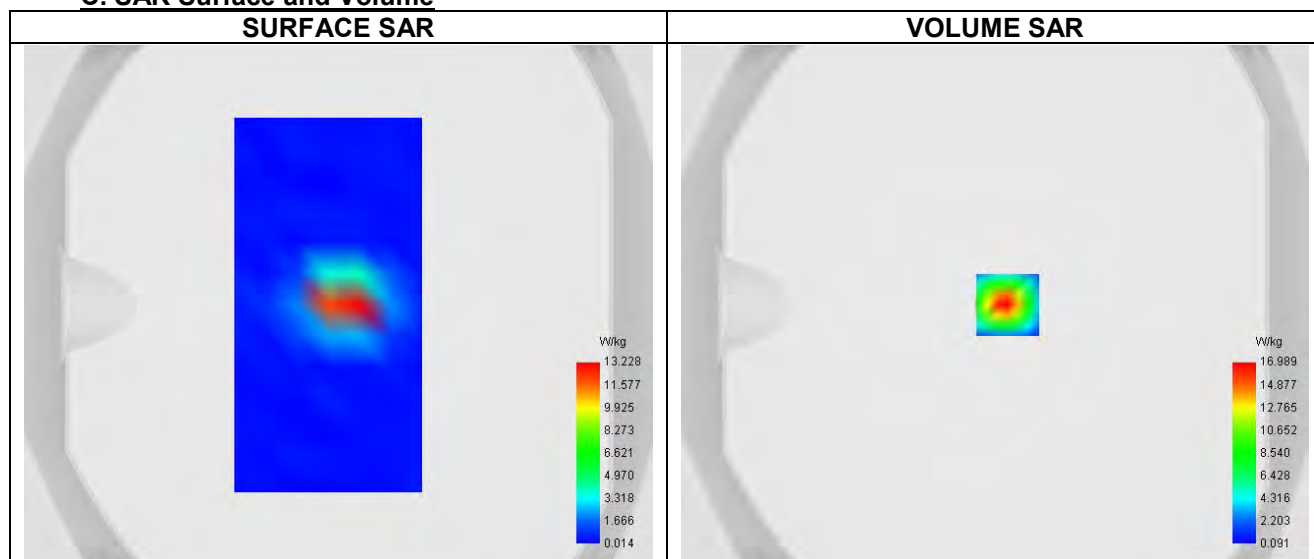
Date of measurement: 21/10/2024

**A. Experimental conditions.**

|                 |                             |
|-----------------|-----------------------------|
| Probe           | SN 26/23 EPG0420            |
| ConvF           | 0.97                        |
| Area Scan       | surf_sam_plan.txt           |
| Zoom Scan       | 7x7x12,dx=4mm dy=4mm dz=2mm |
| Phantom         | Validation plane            |
| Device Position | Dipole                      |
| Band            | CW5200                      |
| Signal          | CW                          |

**B. Permittivity**

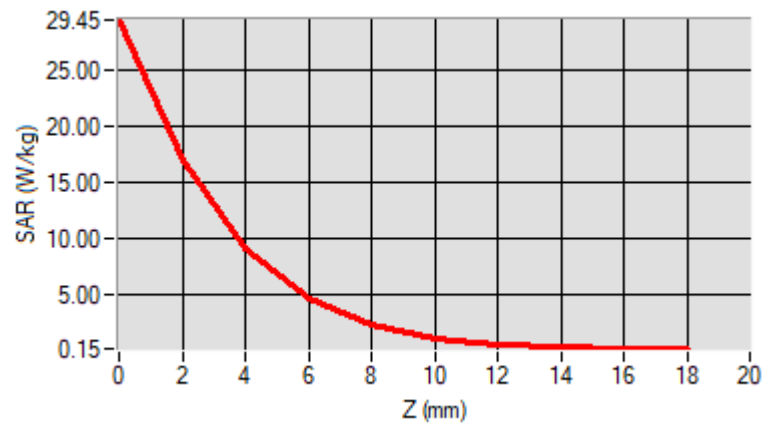
|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 5200.000 |
| Relative permittivity (real part)      | 36.781   |
| Relative permittivity (imaginary part) | 18.140   |
| Conductivity (S/m)                     | 4.744    |

**C. SAR Surface and Volume**

**D. SAR 1g & 10g**

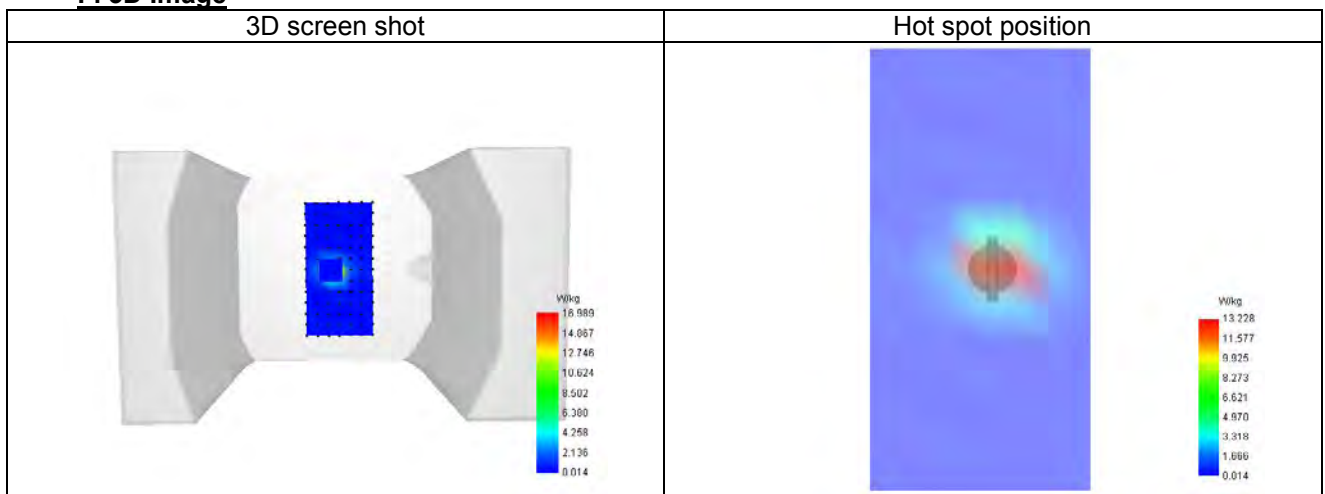
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 8.460    |
| SAR 1g (W/Kg)                                         | 18.207   |
| Variation (%)                                         | -1.302   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |        |        |       |       |       |       |       |       |       |
|------------|--------|--------|-------|-------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00   | 2.00   | 4.00  | 6.00  | 8.00  | 10.00 | 12.00 | 14.00 | 16.00 |
| SAR (W/Kg) | 29.452 | 16.989 | 9.130 | 4.585 | 2.232 | 1.083 | 0.552 | 0.315 | 0.209 |



### F. 3D Image



**System check at 5800 MHz**

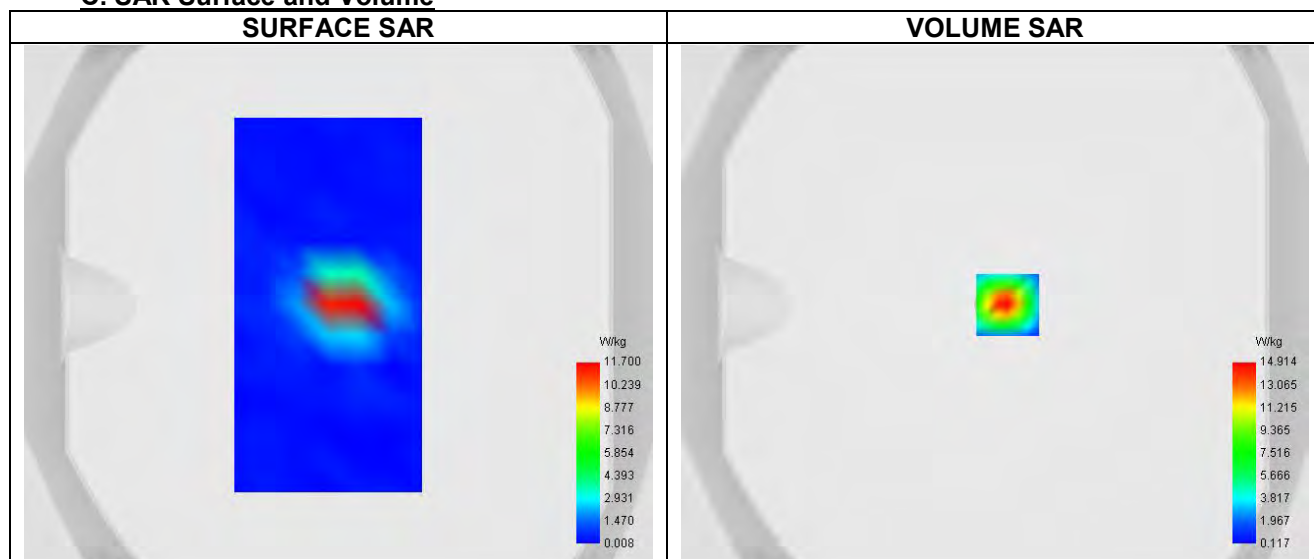
Date of measurement: 21/10/2024

**A. Experimental conditions.**

|                 |                             |
|-----------------|-----------------------------|
| Probe           | SN 26/23 EPG0420            |
| ConvF           | 1.05                        |
| Area Scan       | surf_sam_plan.txt           |
| Zoom Scan       | 7x7x12,dx=4mm dy=4mm dz=2mm |
| Phantom         | Validation plane            |
| Device Position | Dipole                      |
| Band            | CW5800                      |
| Signal          | CW                          |

**B. Permittivity**

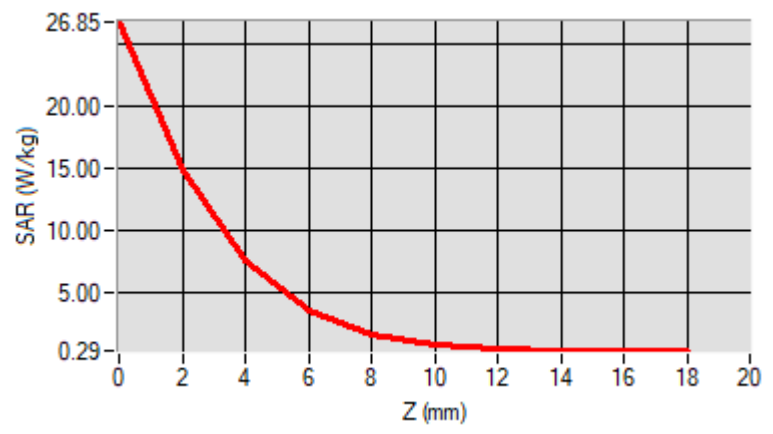
|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 5800.000 |
| Relative permittivity (real part)      | 36.608   |
| Relative permittivity (imaginary part) | 18.620   |
| Conductivity (S/m)                     | 5.362    |

**C. SAR Surface and Volume**

**D. SAR 1g & 10g**

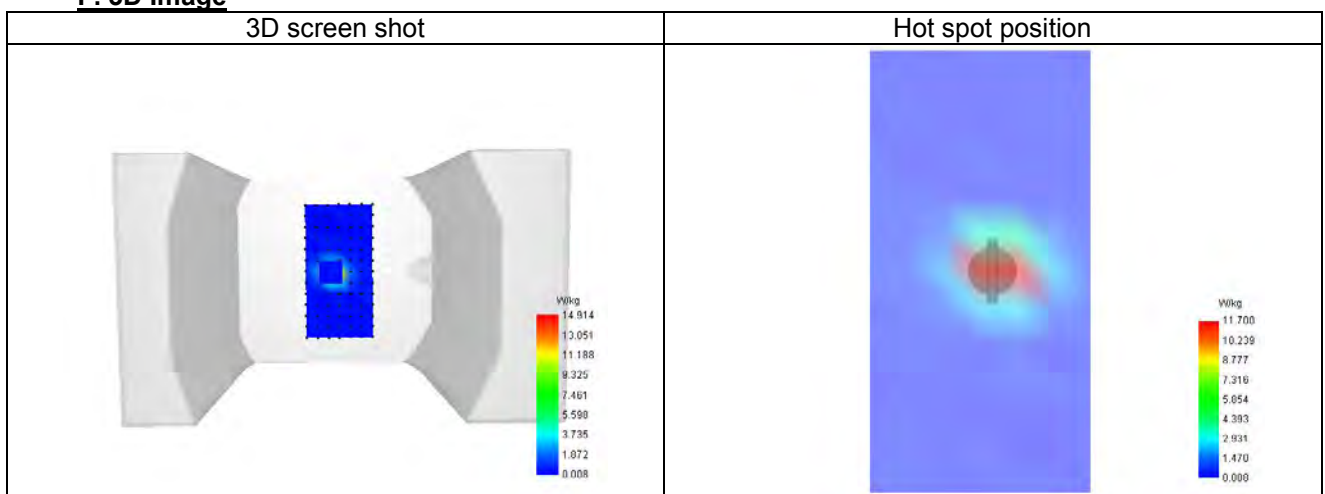
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 8.245    |
| SAR 1g (W/Kg)                                         | 18.871   |
| Variation (%)                                         | -0.220   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |        |        |       |       |       |       |       |       |       |
|------------|--------|--------|-------|-------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00   | 2.00   | 4.00  | 6.00  | 8.00  | 10.00 | 12.00 | 14.00 | 16.00 |
| SAR (W/Kg) | 26.852 | 14.914 | 7.581 | 3.559 | 1.627 | 0.770 | 0.423 | 0.303 | 0.288 |



### F. 3D Image



## 15.2 SAR Test Graph Results

### Plot 1

Date of measurement: 21/10/2024

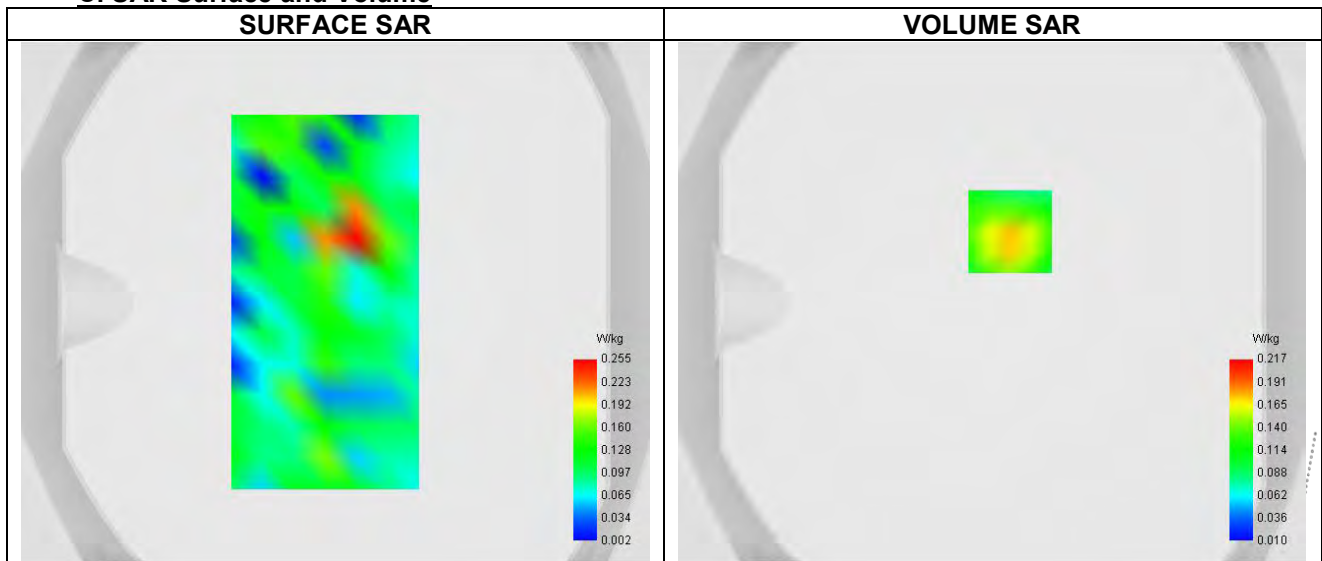
#### A. Experimental conditions.

|                 |                              |
|-----------------|------------------------------|
| Probe           | SN 26/23 EPG0420             |
| ConvF           | 1.11                         |
| Area Scan       | surf_sam_plan.txt            |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5.0mm |
| Phantom         | Validation plane             |
| Device Position | Body                         |
| Band            | ISM                          |
| Signal          | IEEE 802.11 b                |

#### B. Permittivity

|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 2462.000 |
| Relative permittivity (real part)      | 39.847   |
| Relative permittivity (imaginary part) | 13.207   |
| Conductivity (S/m)                     | 1.783    |

#### C. SAR Surface and Volume

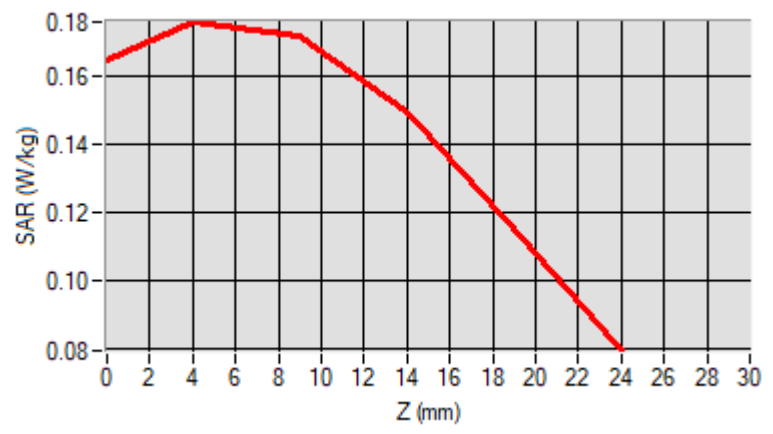


#### D. SAR 1g & 10g

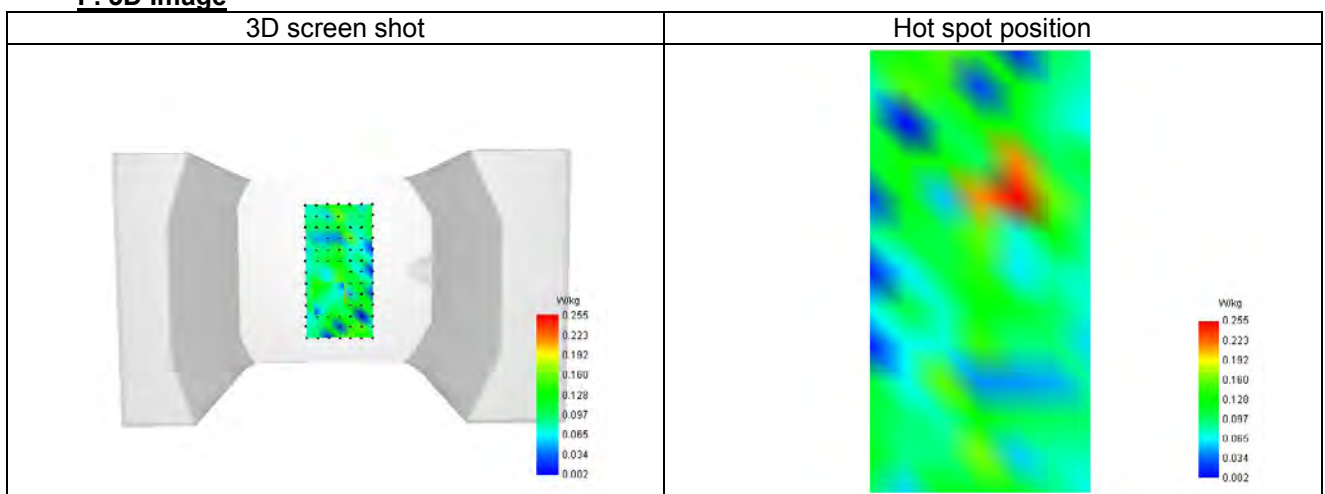
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.124    |
| SAR 1g (W/Kg)                                         | 0.180    |
| Variation (%)                                         | -1.530   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

#### E. Z Axis Scan

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 0.165 | 0.176 | 0.172 | 0.150 | 0.115 |



### F. 3D Image



**Plot 2**

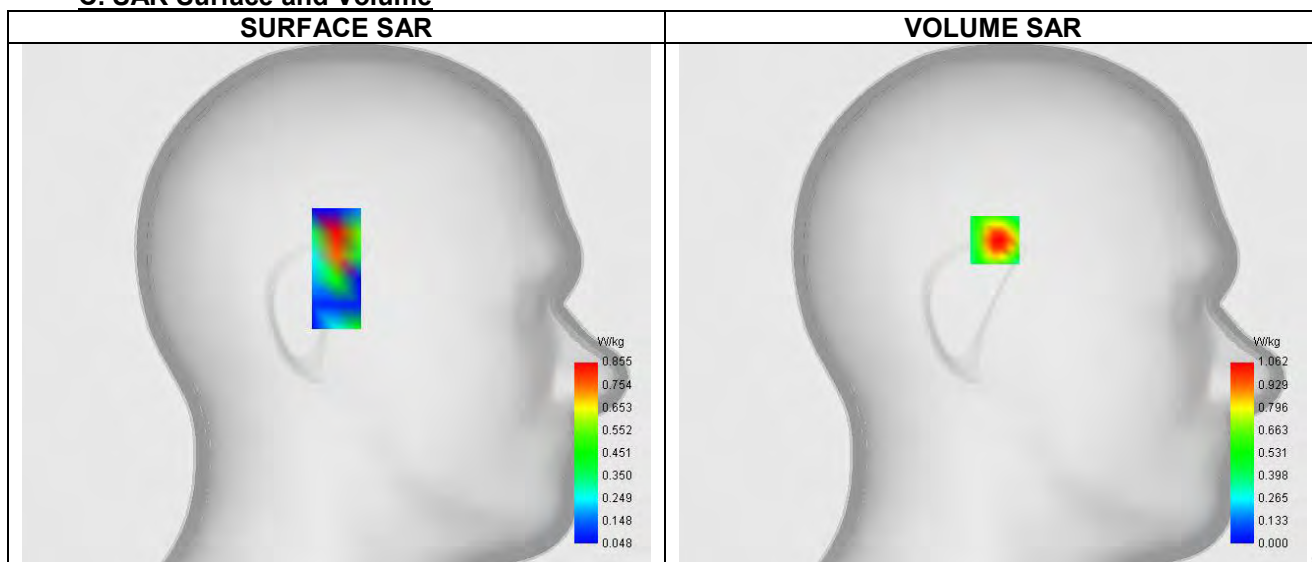
Date of measurement: 21/10/2024

**A. Experimental conditions.**

|                 |                                   |
|-----------------|-----------------------------------|
| Probe           | SN 26/23 EPG0420                  |
| ConvF           | 1.18                              |
| Area Scan       | dx=12mm dy=12mm, Adaptative 1 max |
| Zoom Scan       | 7x7x12,dx=4mm dy=4mm dz=2mm       |
| Phantom         | Left head                         |
| Device Position | Tilt                              |
| Band            | 5200                              |
| Signal          | --                                |

**B. Permittivity**

|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 5180.000 |
| Relative permittivity (real part)      | 36.781   |
| Relative permittivity (imaginary part) | 16.130   |
| Conductivity (S/m)                     | 4.744    |

**C. SAR Surface and Volume**


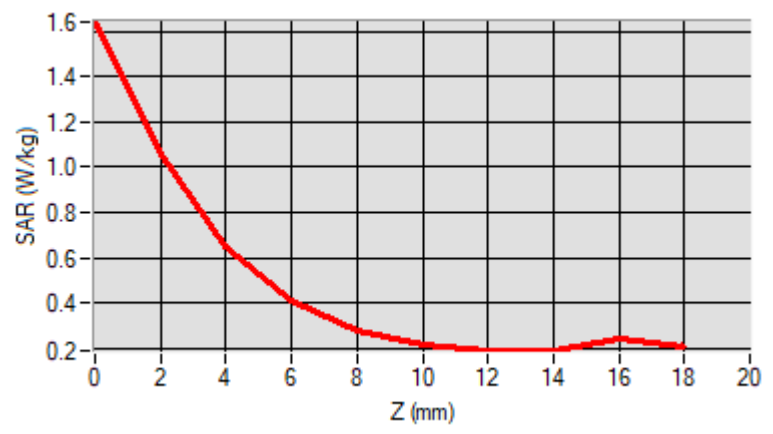
Maximum location: X=-1.00, Y=32.00 ; SAR Peak: 2.51 W/kg

**D. SAR 1g & 10g**

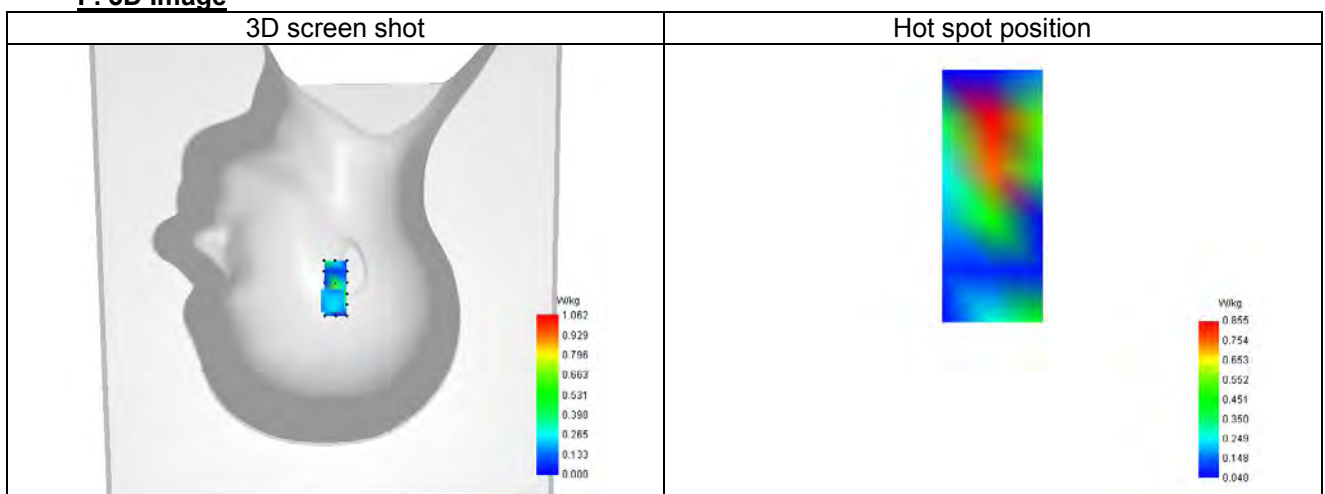
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.430    |
| SAR 1g (W/Kg)                                         | 1.021    |
| Variation (%)                                         | -1.380   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 2.00  | 4.00  | 6.00  | 8.00  | 10.00 | 12.00 | 14.00 | 16.00 |
| SAR (W/Kg) | 1.643 | 1.062 | 0.651 | 0.407 | 0.276 | 0.212 | 0.187 | 0.188 | 0.237 |



### F. 3D Image



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**Plot 3**

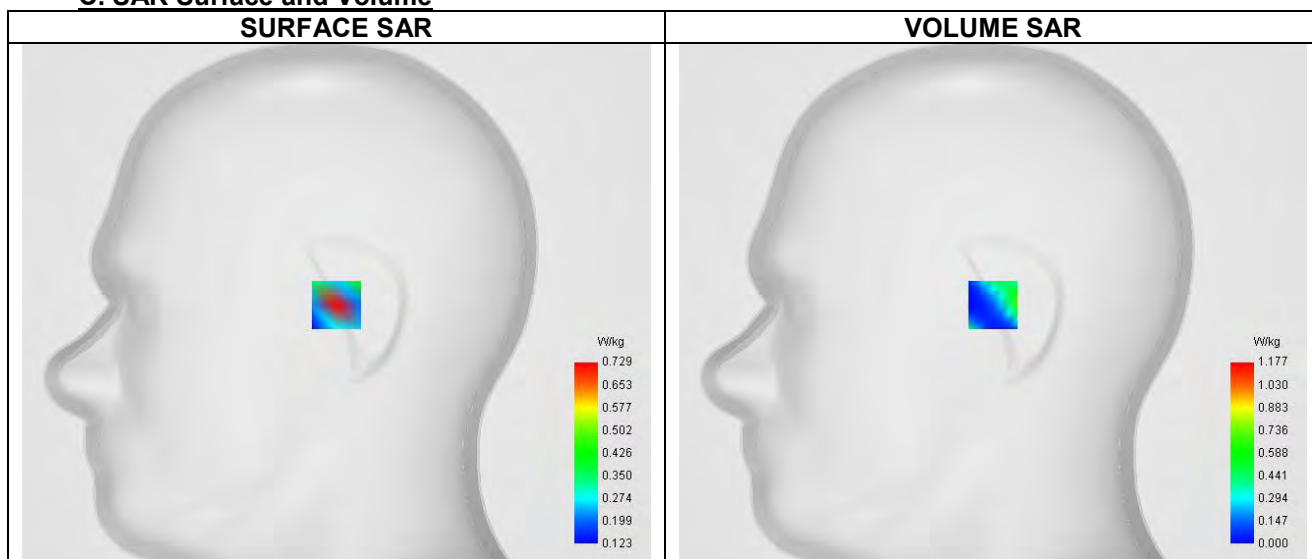
Date of measurement: 21/10/2024

**A. Experimental conditions.**

|                 |                                   |
|-----------------|-----------------------------------|
| Probe           | SN 26/23 EPGO420                  |
| ConvF           | 1.15                              |
| Area Scan       | dx=12mm dy=12mm, Adaptative 1 max |
| Zoom Scan       | 7x7x12,dx=4mm dy=4mm dz=2mm       |
| Phantom         | Right head                        |
| Device Position | Cheek                             |
| Band            | 5800                              |
| Signal          | --                                |

**B. Permittivity**

|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 5745.000 |
| Relative permittivity (real part)      | 36.608   |
| Relative permittivity (imaginary part) | 16.355   |
| Conductivity (S/m)                     | 5.362    |

**C. SAR Surface and Volume**


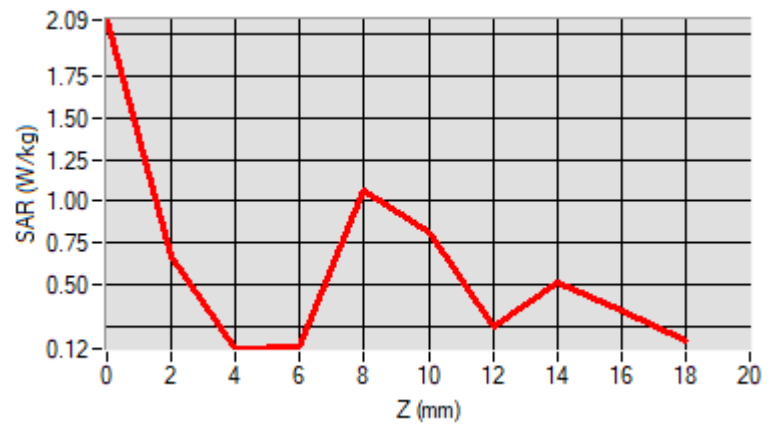
Maximum location: X=0.00, Y=0.00 ; SAR Peak: 3.97 W/kg

**D. SAR 1g & 10g**

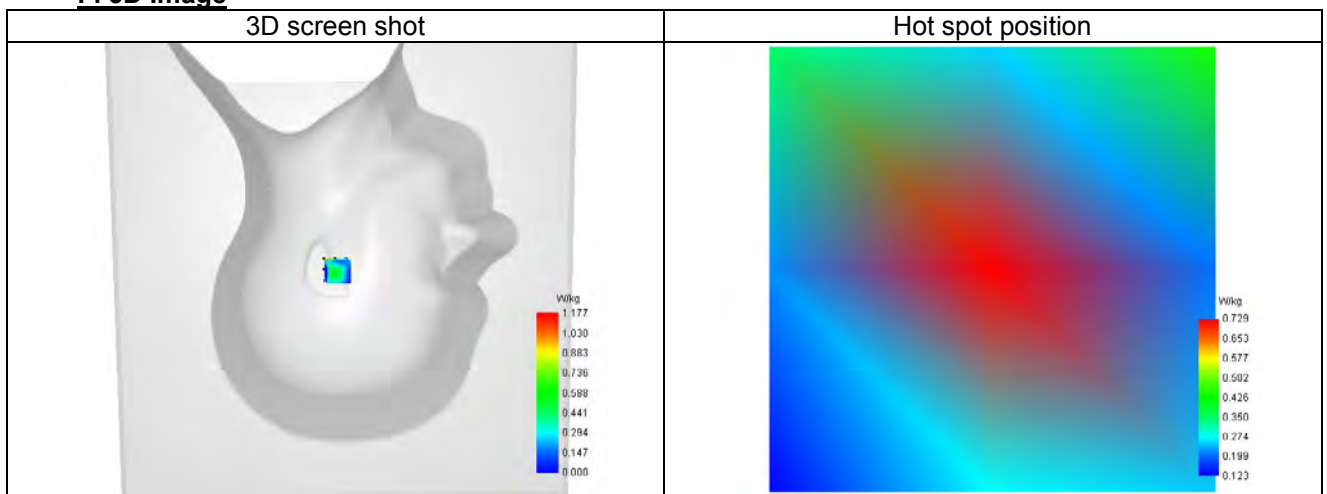
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.446    |
| SAR 1g (W/Kg)                                         | 0.787    |
| Variation (%)                                         | -3.460   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 2.00  | 4.00  | 6.00  | 8.00  | 10.00 | 12.00 | 14.00 | 16.00 |
| SAR (W/Kg) | 2.086 | 0.664 | 0.118 | 0.125 | 1.067 | 0.813 | 0.246 | 0.509 | 0.348 |



### F. 3D Image



**Plot 4**

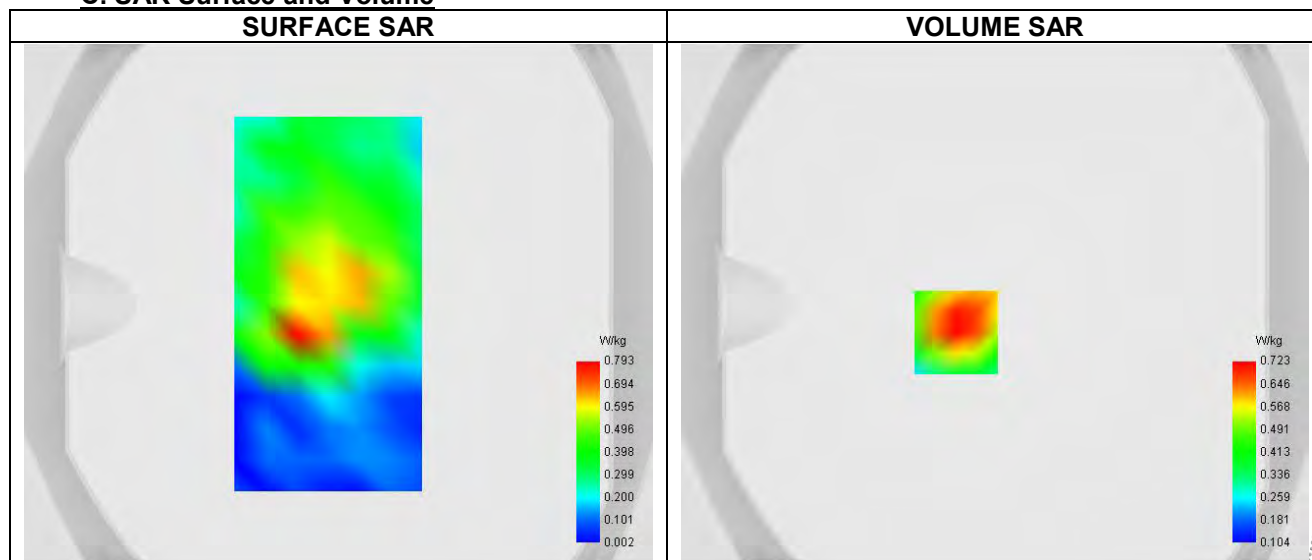
Date of measurement: 12/10/2024

**A. Experimental conditions.**

|                 |                              |
|-----------------|------------------------------|
| Probe           | SN 26/23 EPGO420             |
| ConvF           | 0.81                         |
| Area Scan       | surf_sam_plan.txt            |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5.0mm |
| Phantom         | Validation plane             |
| Device Position | Body                         |
| Band            | GPRS850                      |
| Signal          | TDMA (GPRS)                  |
| Modulation      | GMSK (CS-1)                  |

**B. Permittivity**

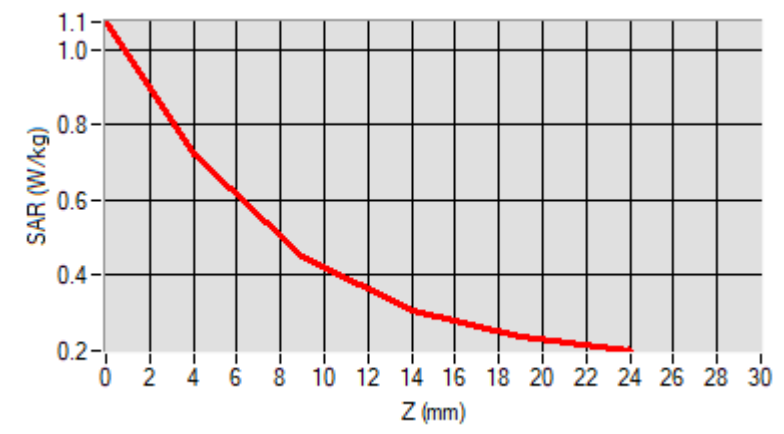
|                                        |         |
|----------------------------------------|---------|
| Frequency (MHz)                        | 836.600 |
| Relative permittivity (real part)      | 42.101  |
| Relative permittivity (imaginary part) | 19.400  |
| Conductivity (S/m)                     | 0.870   |

**C. SAR Surface and Volume**

**D. SAR 1g & 10g**

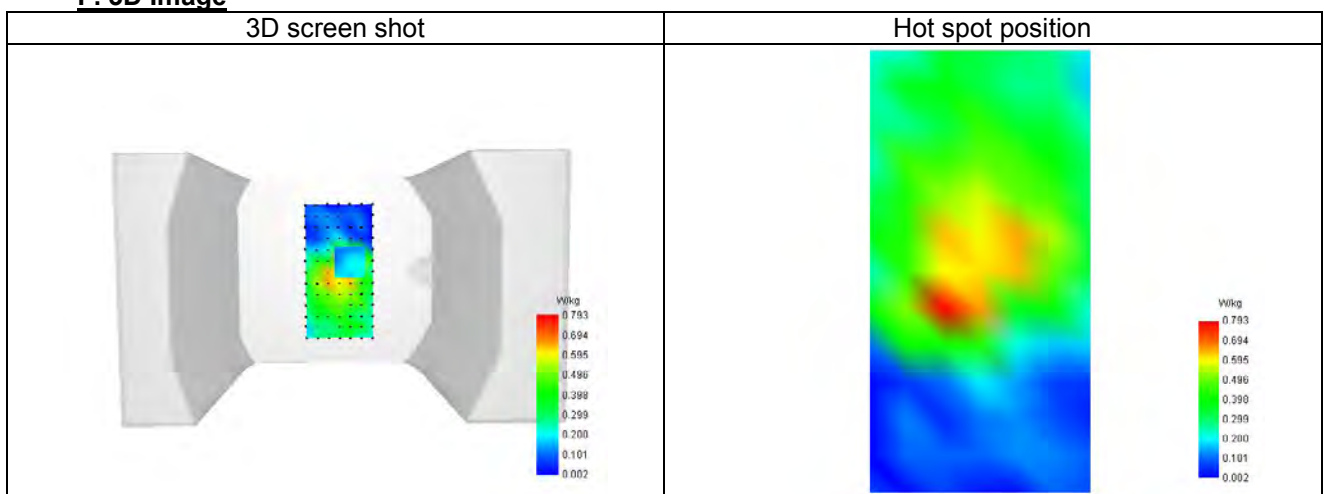
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.404    |
| SAR 1g (W/Kg)                                         | 0.697    |
| Variation (%)                                         | 1.120    |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 1.074 | 0.723 | 0.450 | 0.304 | 0.235 |



### F. 3D Image



**Plot 5**

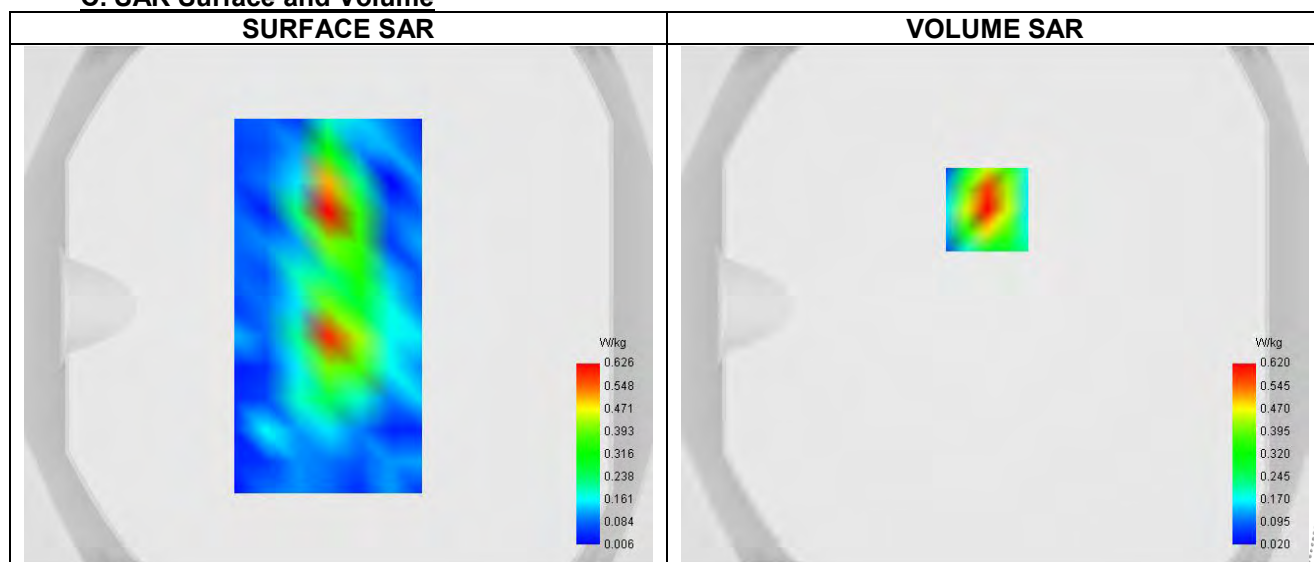
Date of measurement: 19/10/2024

**A. Experimental conditions.**

|                 |                              |
|-----------------|------------------------------|
| Probe           | SN 26/23 EPG0420             |
| ConvF           | 1.04                         |
| Area Scan       | surf_sam_plan.txt            |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5.0mm |
| Phantom         | Validation plane             |
| Device Position | Body                         |
| Band            | GPRS1900                     |
| Signal          | TDMA (GPRS)                  |
| Modulation      | GMSK (CS-1)                  |

**B. Permittivity**

|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 1880.000 |
| Relative permittivity (real part)      | 38.663   |
| Relative permittivity (imaginary part) | 13.408   |
| Conductivity (S/m)                     | 1.400    |

**C. SAR Surface and Volume**


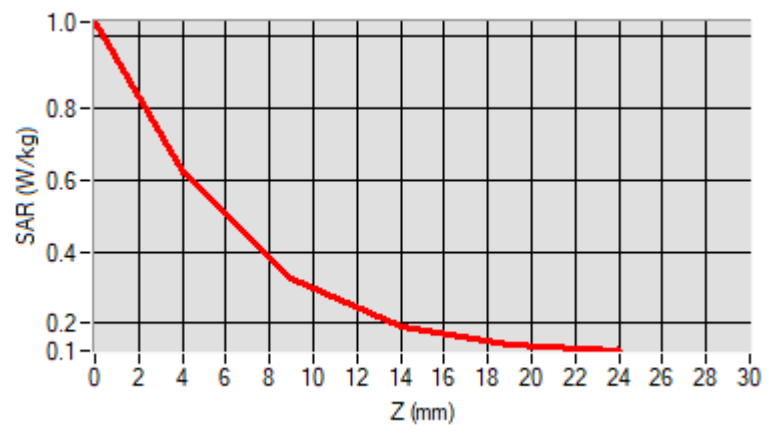
Maximum location: X=-3.00, Y=37.00 ; SAR Peak: 1.06 W/kg

**D. SAR 1g & 10g**

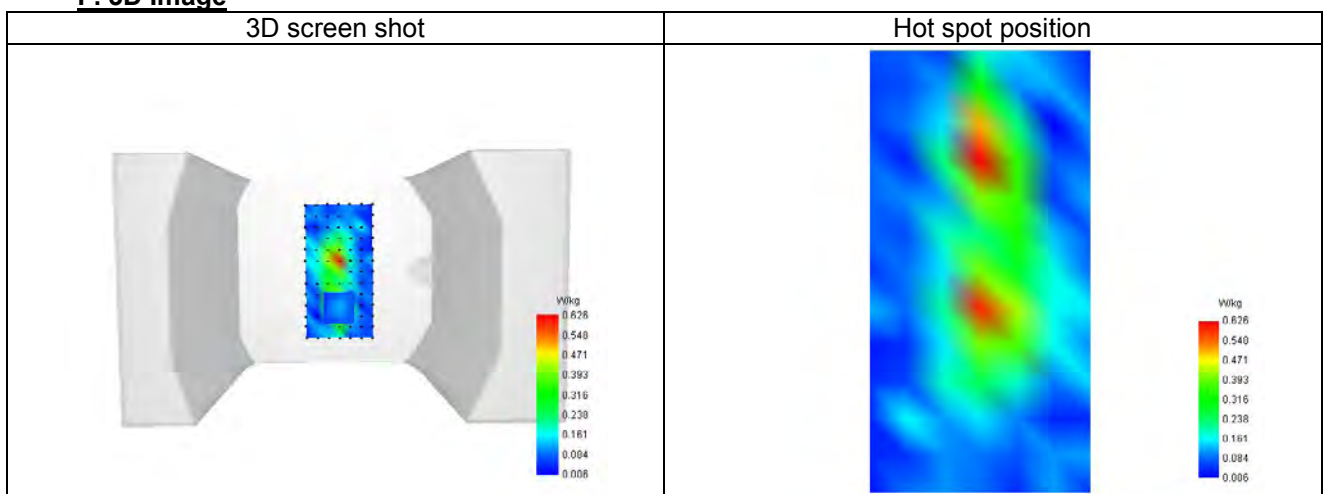
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.301    |
| SAR 1g (W/Kg)                                         | 0.577    |
| Variation (%)                                         | -3.400   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 1.042 | 0.620 | 0.324 | 0.190 | 0.141 |



### F. 3D Image



**Plot 6**

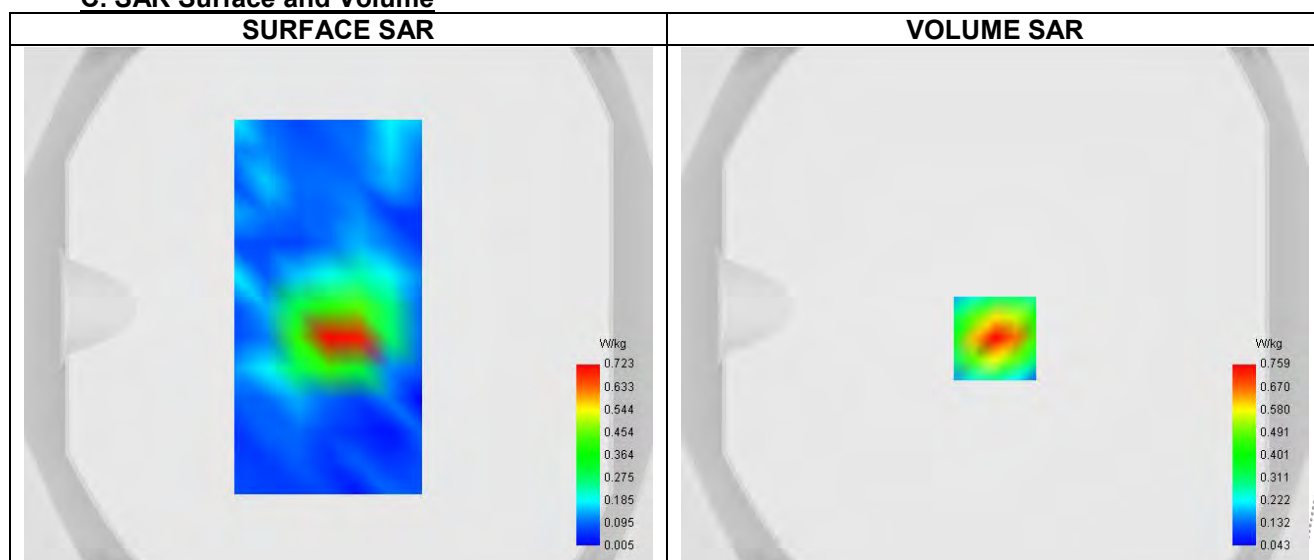
Date of measurement: 19/10/2024

**A. Experimental conditions.**

|                 |                              |
|-----------------|------------------------------|
| Probe           | SN 26/23 EPGO420             |
| ConvF           | 1.04                         |
| Area Scan       | surf_sam_plan.txt            |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5.0mm |
| Phantom         | Validation plane             |
| Device Position | Body                         |
| Band            | Band 2 (1900)                |
| Signal          | WCDMA                        |
| Mode            | Release 99                   |
| Connection Type | RMC, 12.2 kbps               |

**B. Permittivity**

|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 1907.600 |
| Relative permittivity (real part)      | 38.663   |
| Relative permittivity (imaginary part) | 13.408   |
| Conductivity (S/m)                     | 1.400    |

**C. SAR Surface and Volume**


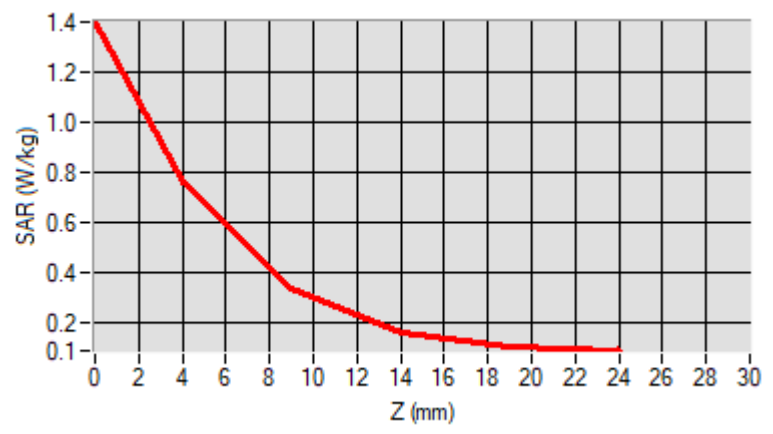
Maximum location: X=0.00, Y=-12.00 ; SAR Peak: 1.40 W/kg

**D. SAR 1g & 10g**

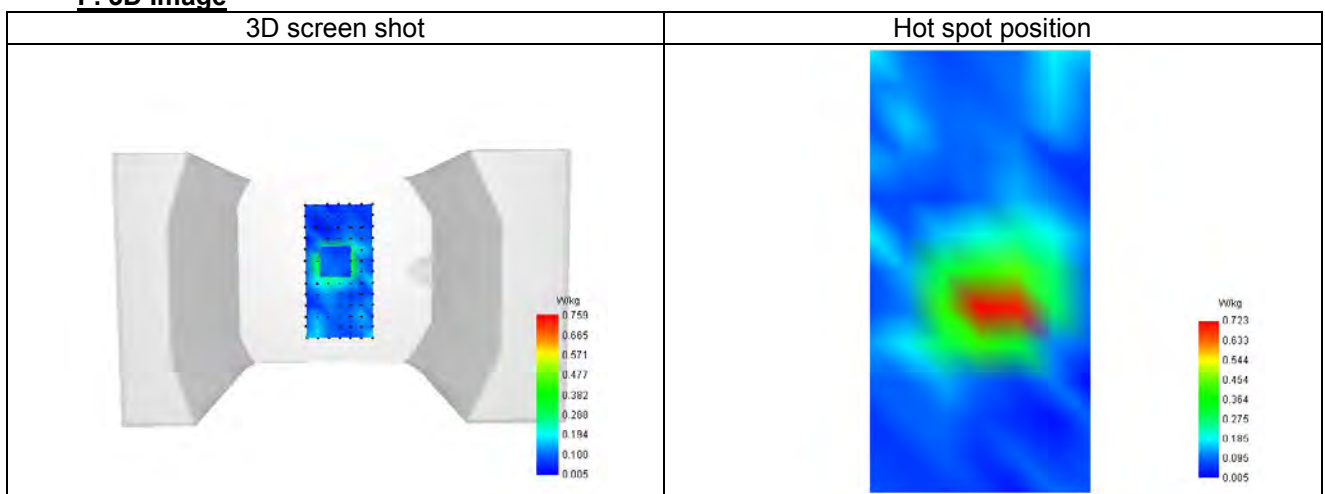
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.331    |
| SAR 1g (W/Kg)                                         | 0.710    |
| Variation (%)                                         | -1.020   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 1.399 | 0.759 | 0.338 | 0.164 | 0.108 |



### F. 3D Image



**Plot 7**

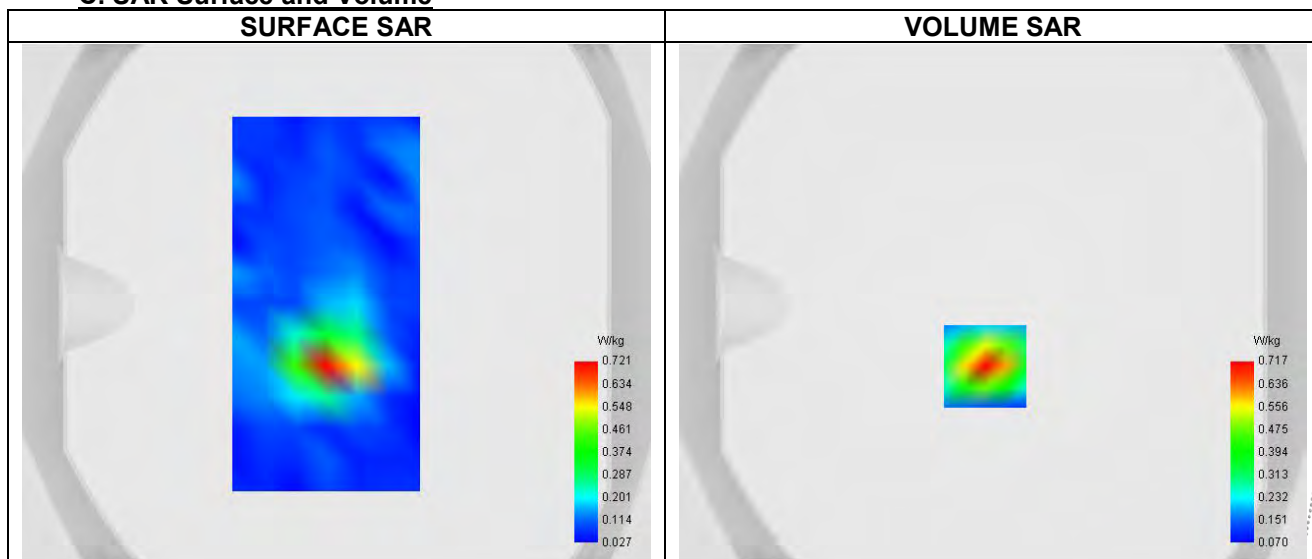
Date of measurement: 18/10/2024

**A. Experimental conditions.**

|                 |                              |
|-----------------|------------------------------|
| Probe           | SN 26/23 EPGO420             |
| ConvF           | 0.96                         |
| Area Scan       | surf_sam_plan.txt            |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5.0mm |
| Phantom         | Validation plane             |
| Device Position | Body                         |
| Band            | Band 4 (1700)                |
| Signal          | WCDMA                        |
| Mode            | Release 99                   |
| Connection Type | RMC, 12.2 kbps               |

**B. Permittivity**

|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 1712.400 |
| Relative permittivity (real part)      | 39.598   |
| Relative permittivity (imaginary part) | 14.136   |
| Conductivity (S/m)                     | 1.366    |

**C. SAR Surface and Volume**


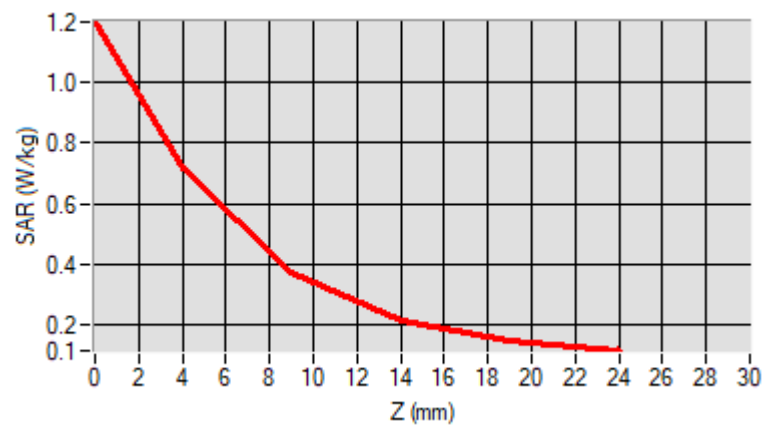
Maximum location: X=-3.00, Y=-24.00 ; SAR Peak: 1.20 W/kg

**D. SAR 1g & 10g**

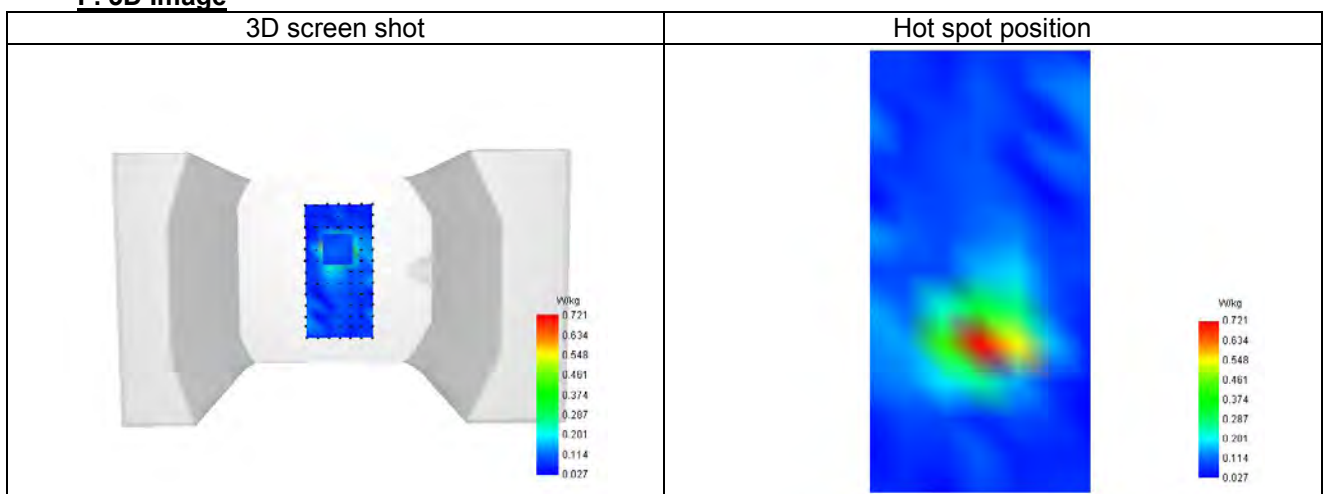
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.332    |
| SAR 1g (W/Kg)                                         | 0.656    |
| Variation (%)                                         | 3.040    |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 1.196 | 0.717 | 0.374 | 0.213 | 0.147 |



### F. 3D Image



**Plot 8**

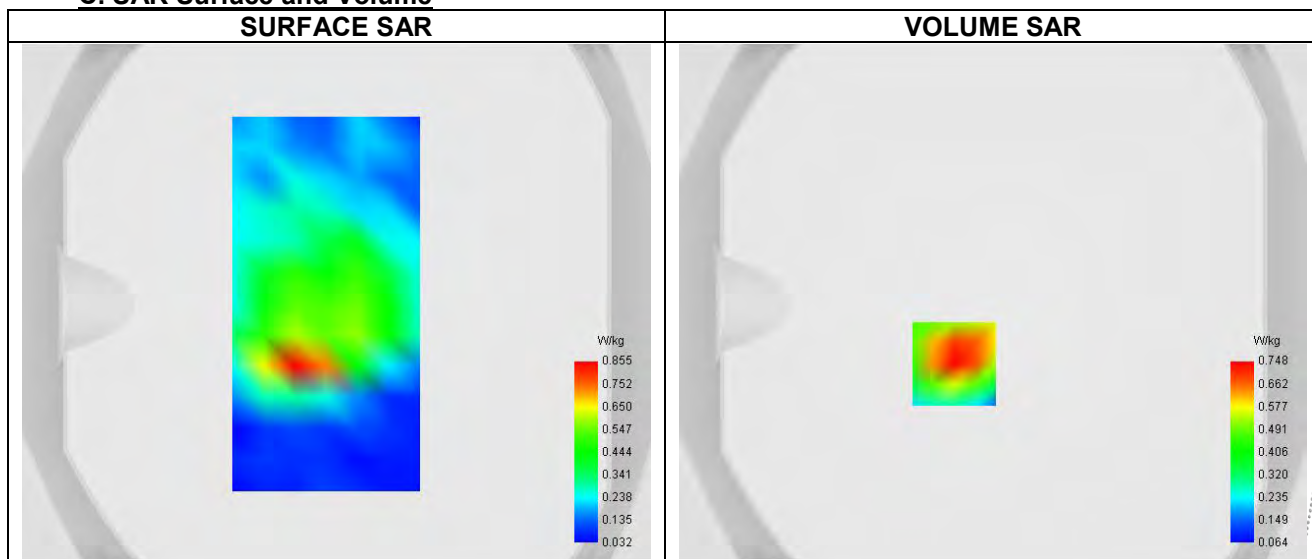
Date of measurement: 12/10/2024

**A. Experimental conditions.**

|                 |                              |
|-----------------|------------------------------|
| Probe           | SN 26/23 EPGO420             |
| ConvF           | 0.81                         |
| Area Scan       | surf_sam_plan.txt            |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5.0mm |
| Phantom         | Validation plane             |
| Device Position | Body                         |
| Band            | Band 5 (850)                 |
| Signal          | WCDMA                        |
| Mode            | Release 99                   |
| Connection Type | RMC, 12.2 kbps               |

**B. Permittivity**

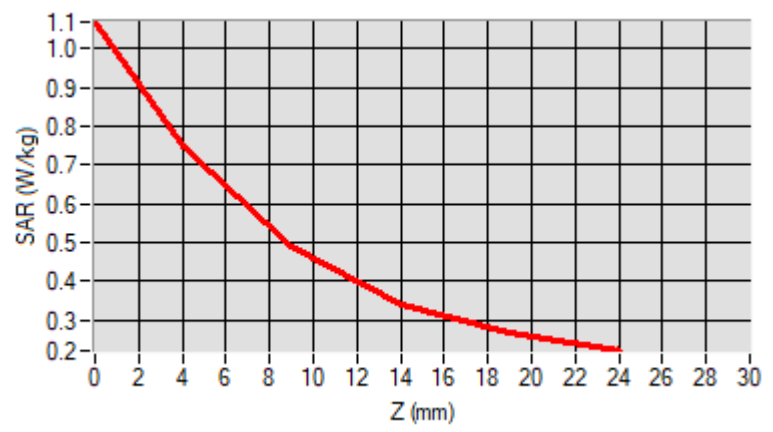
|                                        |         |
|----------------------------------------|---------|
| Frequency (MHz)                        | 826.400 |
| Relative permittivity (real part)      | 42.101  |
| Relative permittivity (imaginary part) | 19.400  |
| Conductivity (S/m)                     | 0.870   |

**C. SAR Surface and Volume**

**D. SAR 1g & 10g**

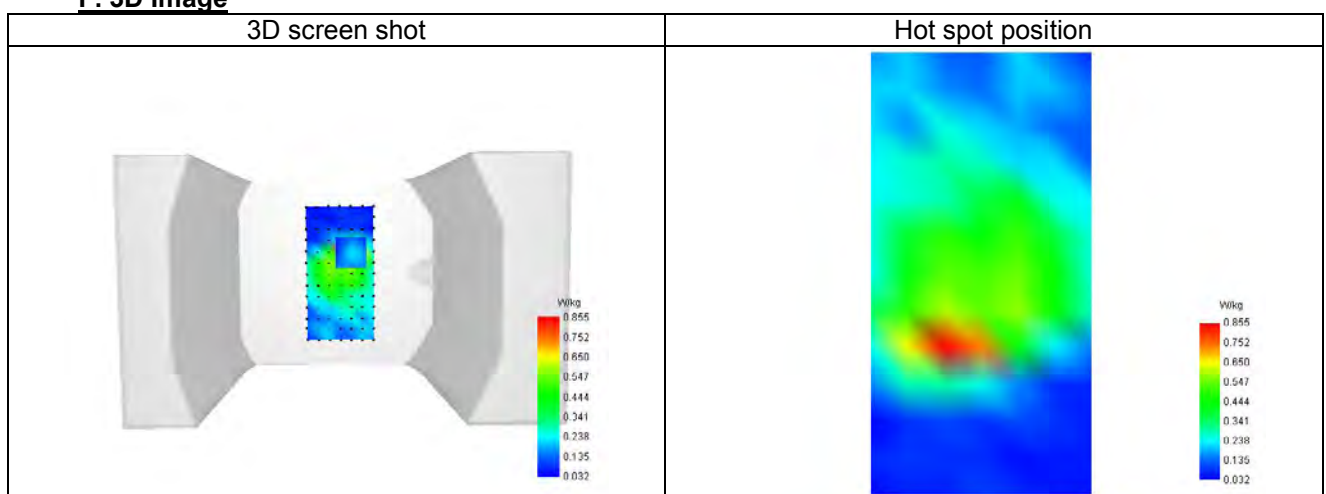
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.448    |
| SAR 1g (W/Kg)                                         | 0.715    |
| Variation (%)                                         | -3.090   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 1.069 | 0.748 | 0.488 | 0.342 | 0.267 |



### F. 3D Image



**Plot 9**

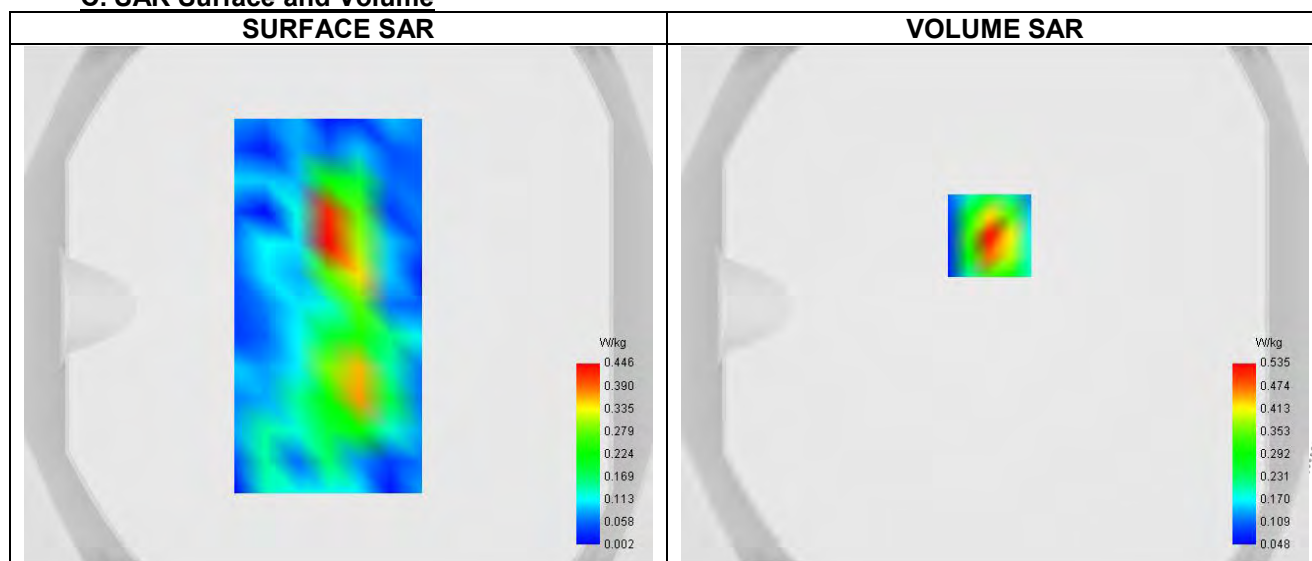
Date of measurement: 19/10/2024

**A. Experimental conditions.**

|                 |                              |
|-----------------|------------------------------|
| Probe           | SN 26/23 EPGO420             |
| ConvF           | 1.04                         |
| Area Scan       | surf_sam_plan.txt            |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5.0mm |
| Phantom         | Validation plane             |
| Device Position | Body                         |
| Band            | LTE band 2                   |
| Signal          | LTE FDD                      |
| Cell Bandwidth  | 20 Mhz                       |
| Modulation      | SC-OFDM - QPSK               |
| RB offset       | 5                            |
| RB size         | 20                           |

**B. Permittivity**

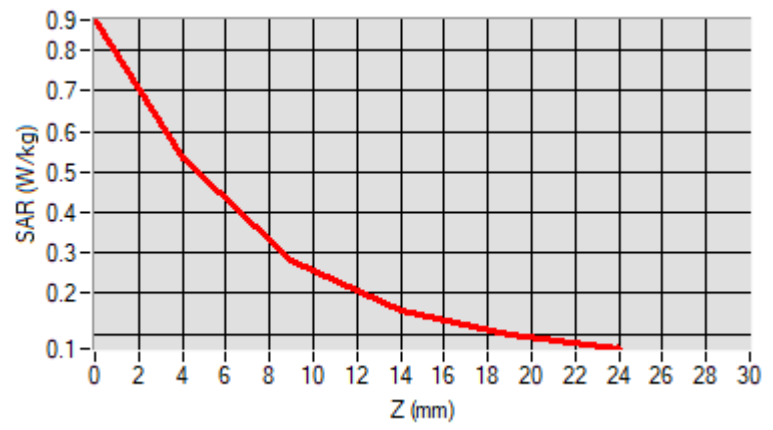
|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 1900.000 |
| Relative permittivity (real part)      | 38.663   |
| Relative permittivity (imaginary part) | 13.455   |
| Conductivity (S/m)                     | 1.400    |

**C. SAR Surface and Volume**

**D. SAR 1g & 10g**

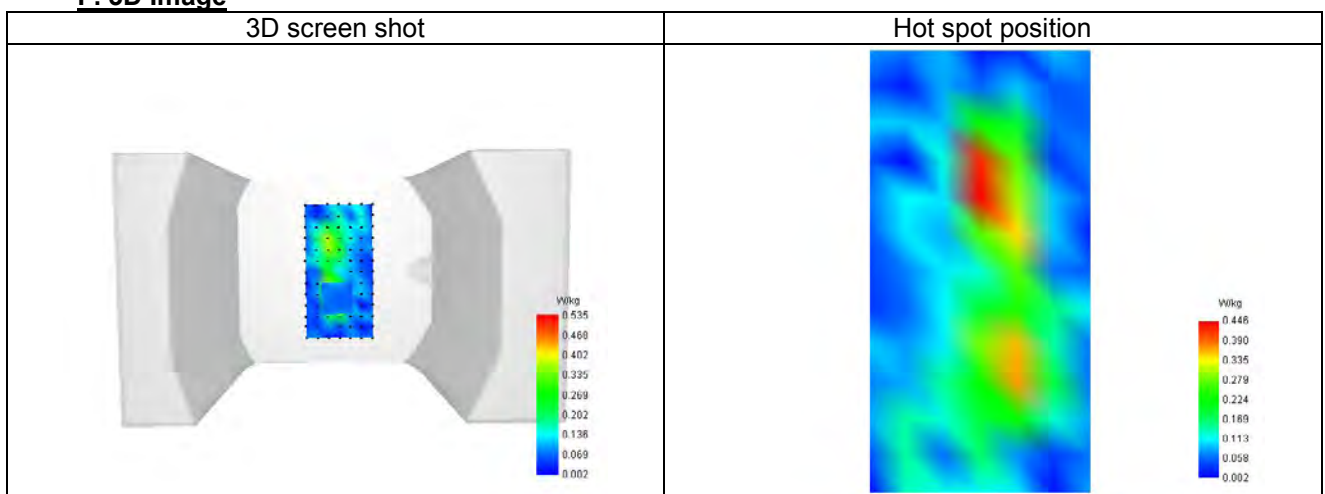
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.246    |
| SAR 1g (W/Kg)                                         | 0.493    |
| Variation (%)                                         | -4.040   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 0.875 | 0.535 | 0.283 | 0.155 | 0.096 |



### F. 3D Image



**Plot 10**

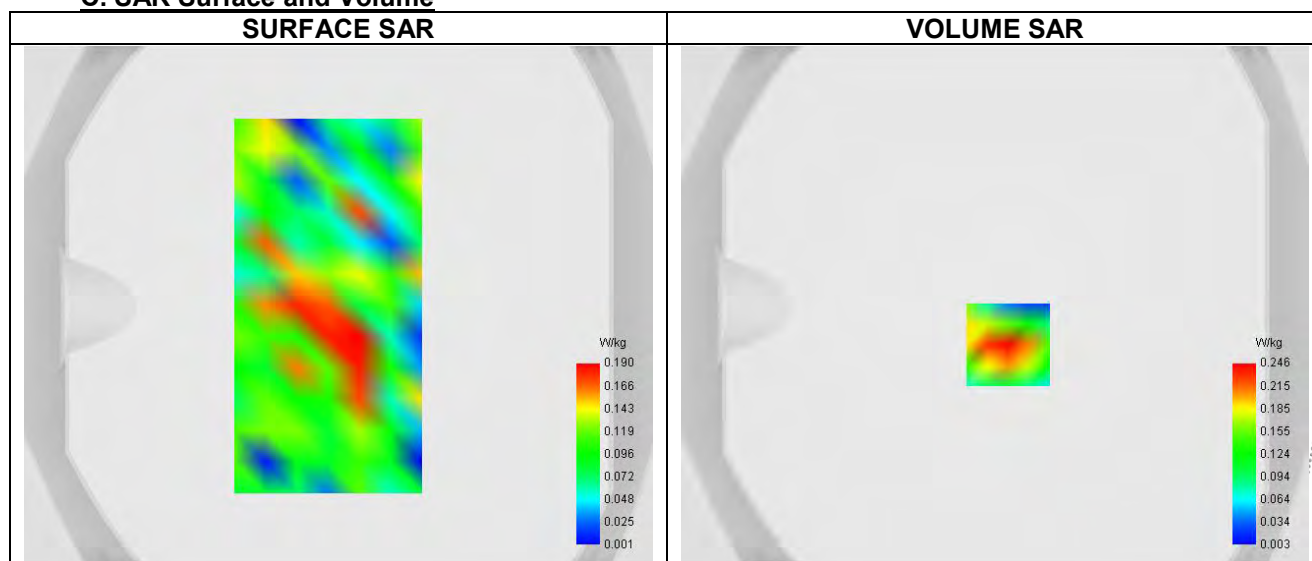
Date of measurement: 18/10/2024

**A. Experimental conditions.**

|                 |                              |
|-----------------|------------------------------|
| Probe           | SN 26/23 EPGO420             |
| ConvF           | 0.96                         |
| Area Scan       | surf_sam_plan.txt            |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5.0mm |
| Phantom         | Validation plane             |
| Device Position | Body                         |
| Band            | LTE band 4                   |
| Signal          | LTE FDD                      |
| Cell Bandwidth  | 20 Mhz                       |
| Modulation      | SC-OFDM - QPSK               |
| RB offset       | 5                            |
| RB size         | 20                           |

**B. Permittivity**

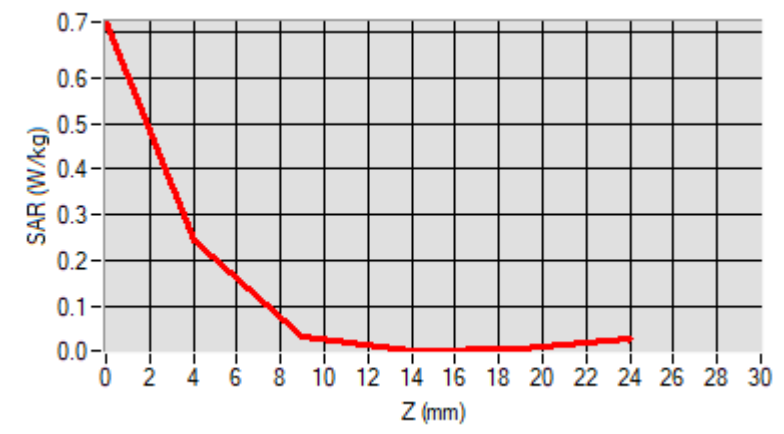
|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 1720.000 |
| Relative permittivity (real part)      | 39.598   |
| Relative permittivity (imaginary part) | 14.153   |
| Conductivity (S/m)                     | 1.366    |

**C. SAR Surface and Volume**

**D. SAR 1g & 10g**

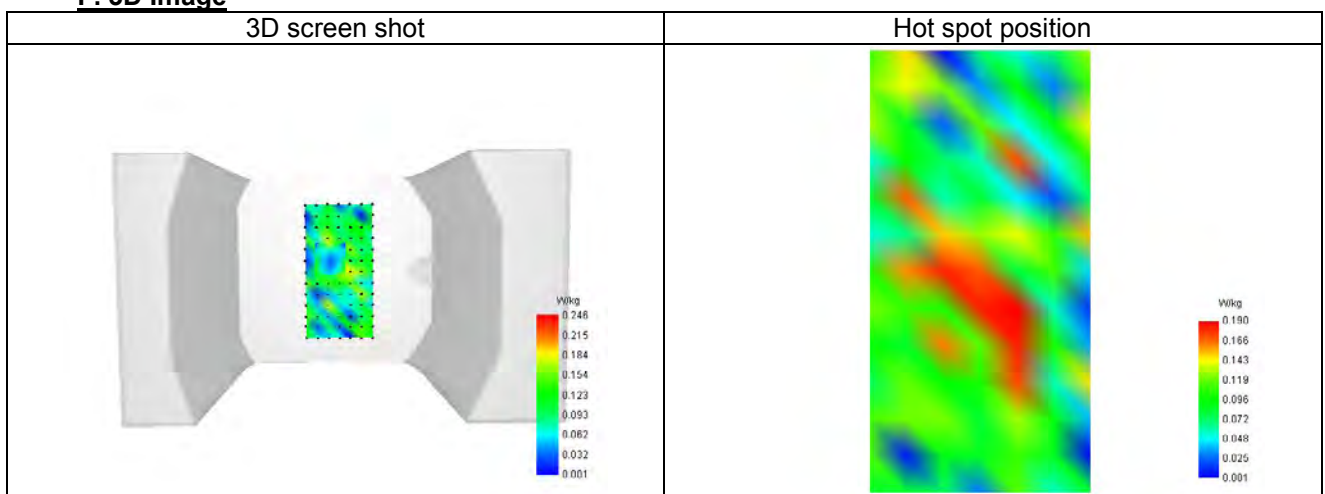
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.114    |
| SAR 1g (W/Kg)                                         | 0.279    |
| Variation (%)                                         | -0.690   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 0.722 | 0.246 | 0.035 | 0.003 | 0.006 |



### F. 3D Image



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 Report

**Plot 11**

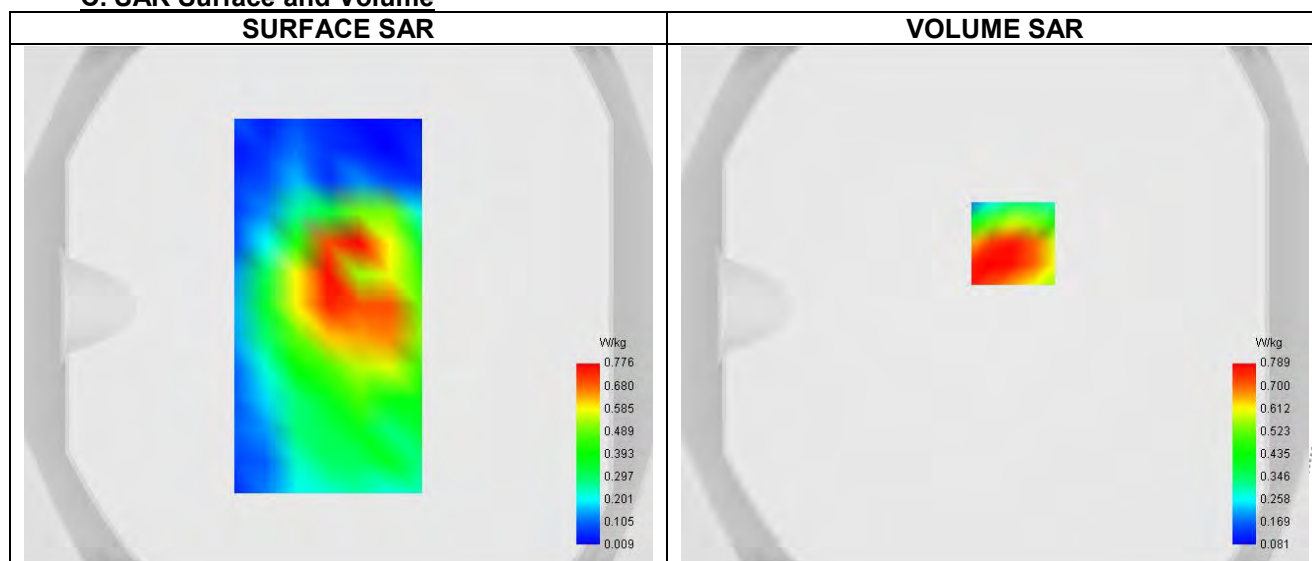
Date of measurement: 12/10/2024

**A. Experimental conditions.**

|                 |                              |
|-----------------|------------------------------|
| Probe           | SN 26/23 EPGO420             |
| ConvF           | 0.81                         |
| Area Scan       | surf_sam_plan.txt            |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5.0mm |
| Phantom         | Validation plane             |
| Device Position | Body                         |
| Band            | LTE band 5                   |
| Signal          | LTE FDD                      |
| Cell Bandwidth  | 10 Mhz                       |
| Modulation      | SC-OFDM - QPSK               |
| RB offset       | 5                            |
| RB size         | 20                           |

**B. Permittivity**

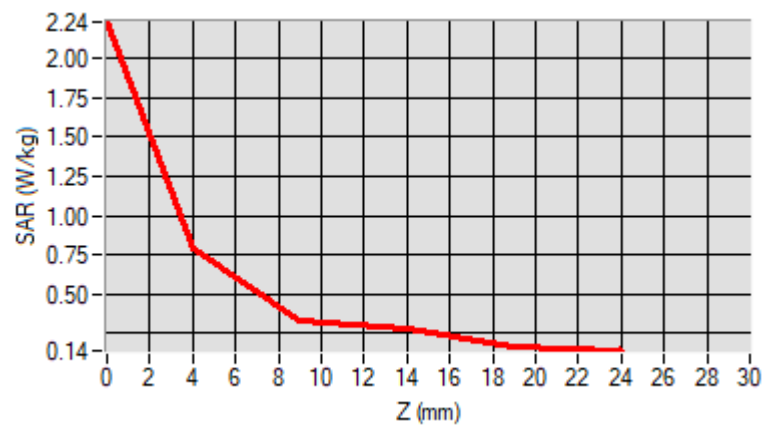
|                                        |         |
|----------------------------------------|---------|
| Frequency (MHz)                        | 829.000 |
| Relative permittivity (real part)      | 42.101  |
| Relative permittivity (imaginary part) | 19.407  |
| Conductivity (S/m)                     | 0.870   |

**C. SAR Surface and Volume**

**D. SAR 1g & 10g**

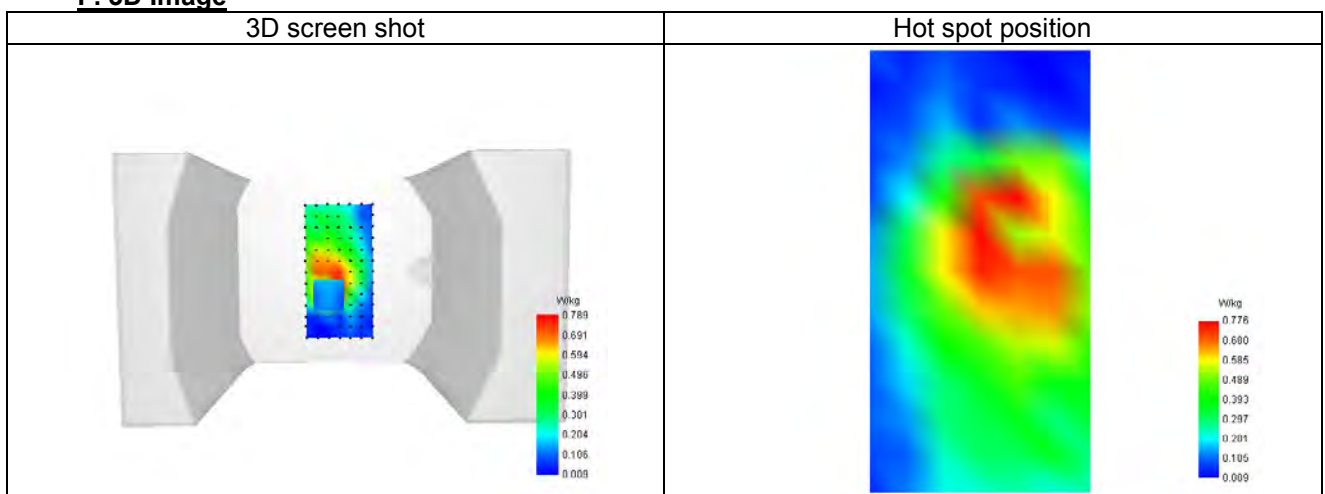
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.370    |
| SAR 1g (W/Kg)                                         | 0.772    |
| Variation (%)                                         | -1.760   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 2.235 | 0.789 | 0.322 | 0.278 | 0.157 |



### F. 3D Image



**Plot 12**

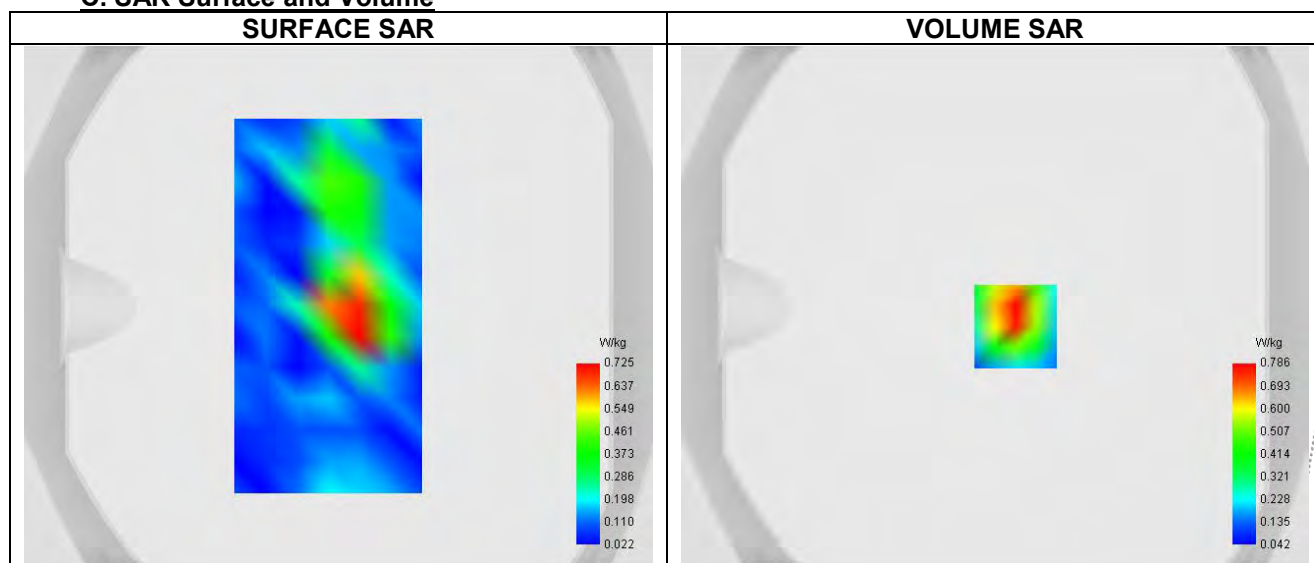
Date of measurement: 11/10/2024

**A. Experimental conditions.**

|                 |                              |
|-----------------|------------------------------|
| Probe           | SN 26/23 EPGO420             |
| ConvF           | 1.03                         |
| Area Scan       | surf_sam_plan.txt            |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5.0mm |
| Phantom         | Validation plane             |
| Device Position | Body                         |
| Band            | LTE band 7                   |
| Signal          | LTE FDD                      |
| Cell Bandwidth  | 20 Mhz                       |
| Modulation      | SC-OFDM - QPSK               |
| RB offset       | 5                            |
| RB size         | 20                           |

**B. Permittivity**

|                                        |          |
|----------------------------------------|----------|
| Frequency (MHz)                        | 2510.000 |
| Relative permittivity (real part)      | 39.706   |
| Relative permittivity (imaginary part) | 13.404   |
| Conductivity (S/m)                     | 1.974    |

**C. SAR Surface and Volume**


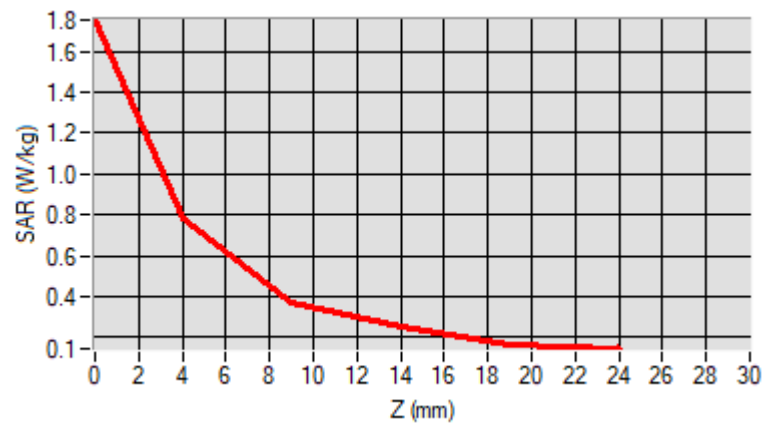
Maximum location: X=8.00, Y=-8.00 ; SAR Peak: 1.27 W/kg

**D. SAR 1g & 10g**

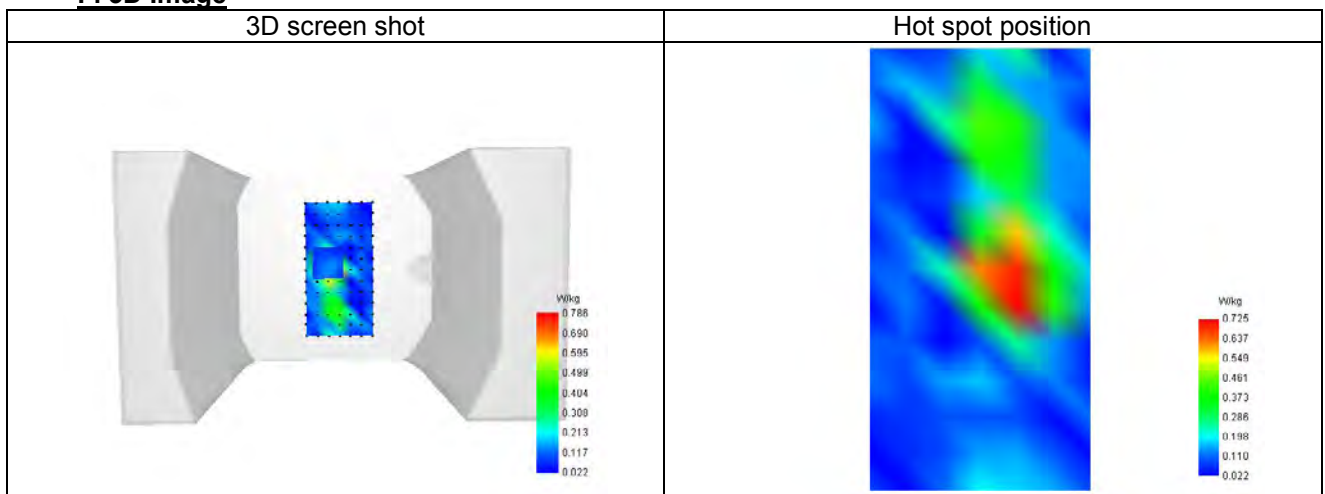
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.412    |
| SAR 1g (W/Kg)                                         | 0.751    |
| Variation (%)                                         | -0.550   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 1.754 | 0.786 | 0.366 | 0.257 | 0.168 |



### F. 3D Image



**Plot 13**

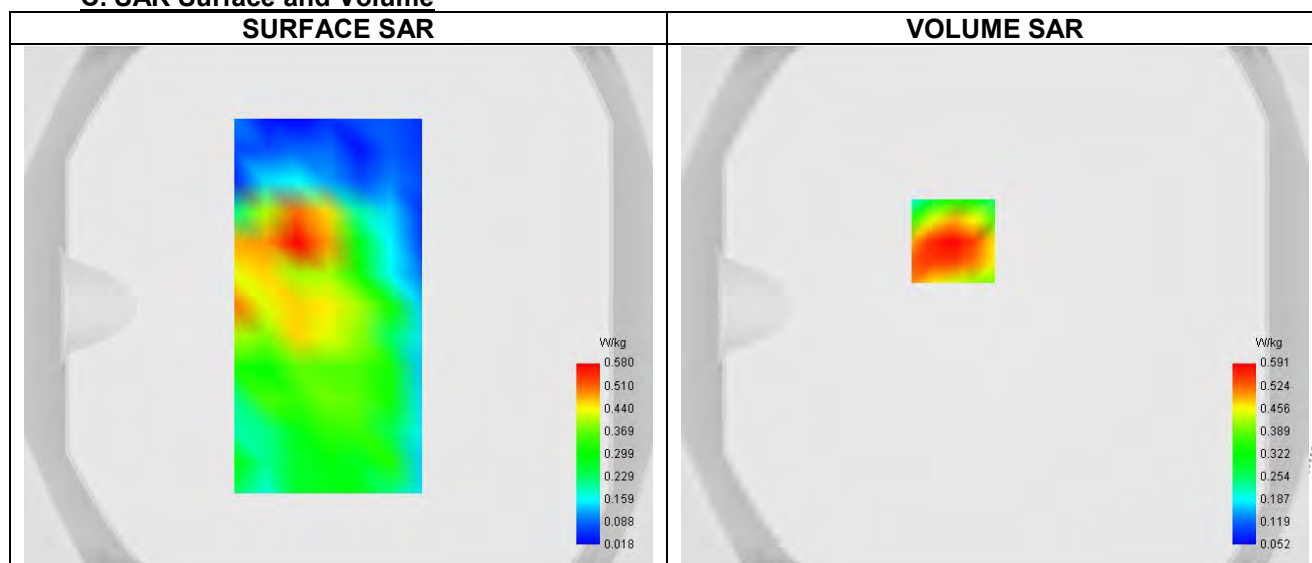
Date of measurement: 11/10/2024

**A. Experimental conditions.**

|                 |                              |
|-----------------|------------------------------|
| Probe           | SN 26/23 EPGO420             |
| ConvF           | 0.80                         |
| Area Scan       | surf_sam_plan.txt            |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5.0mm |
| Phantom         | Validation plane             |
| Device Position | Body                         |
| Band            | LTE band 12                  |
| Signal          | LTE FDD                      |
| Cell Bandwidth  | 10 Mhz                       |
| Modulation      | SC-OFDM - QPSK               |
| RB offset       | 5                            |
| RB size         | 20                           |

**B. Permittivity**

|                                        |         |
|----------------------------------------|---------|
| Frequency (MHz)                        | 711.000 |
| Relative permittivity (real part)      | 42.787  |
| Relative permittivity (imaginary part) | 23.345  |
| Conductivity (S/m)                     | 0.921   |

**C. SAR Surface and Volume**


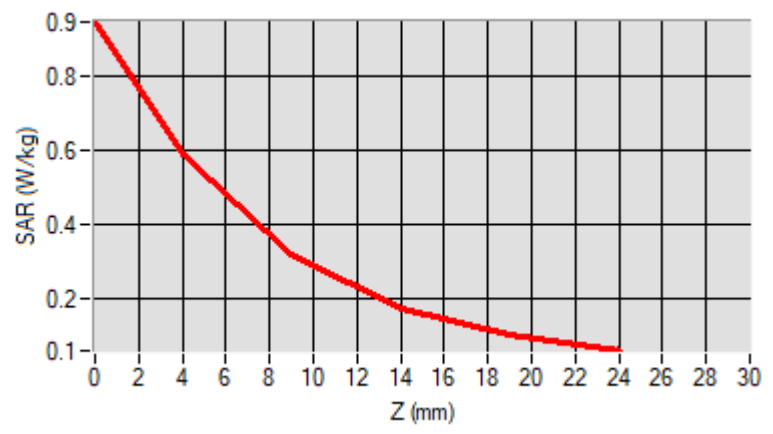
Maximum location: X=-16.00, Y=25.00 ; SAR Peak: 0.95 W/kg

**D. SAR 1g & 10g**

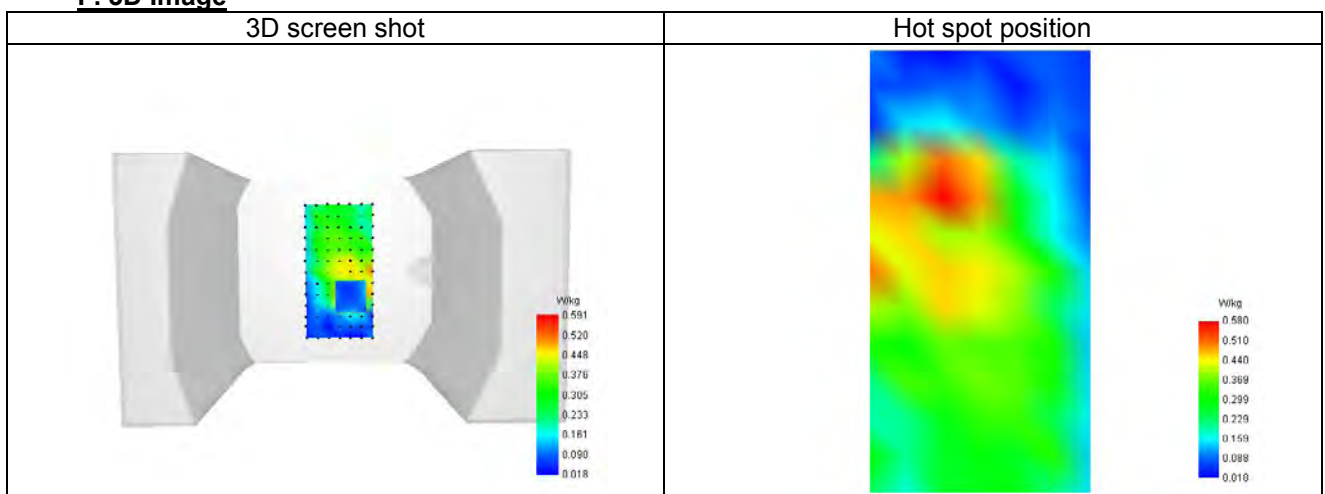
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.296    |
| SAR 1g (W/Kg)                                         | 0.578    |
| Variation (%)                                         | -3.910   |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 0.944 | 0.591 | 0.321 | 0.176 | 0.104 |



### F. 3D Image



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PPR  
Report

**Plot 14**

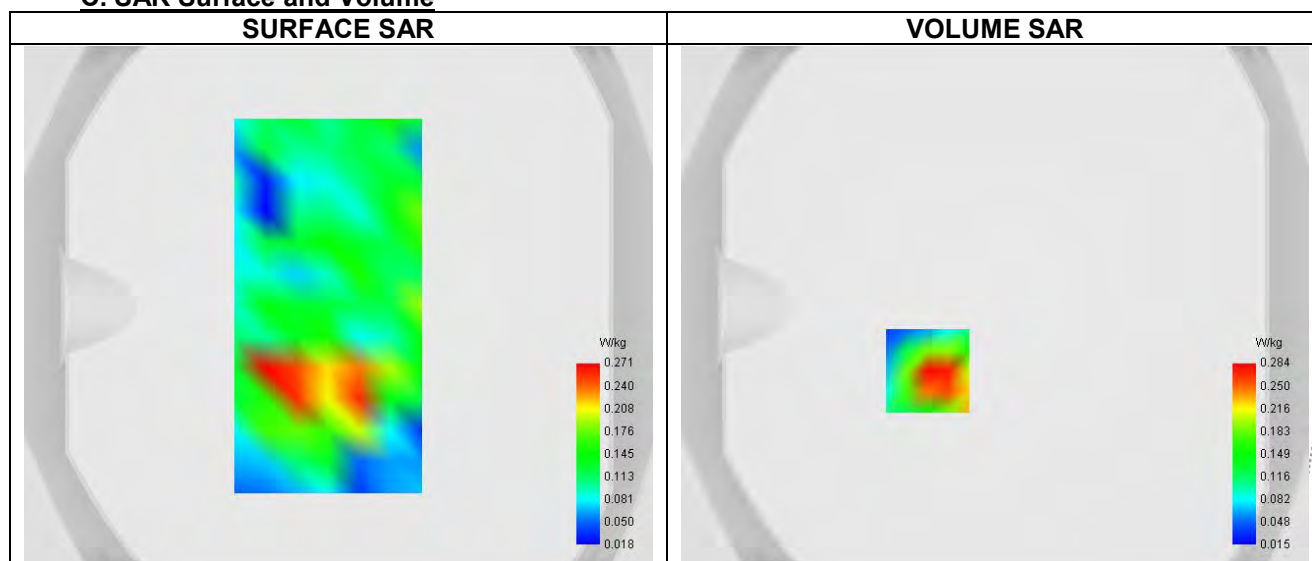
Date of measurement: 11/10/2024

**A. Experimental conditions.**

|                 |                              |
|-----------------|------------------------------|
| Probe           | SN 26/23 EPGO420             |
| ConvF           | 0.80                         |
| Area Scan       | surf_sam_plan.txt            |
| Zoom Scan       | 5x5x7,dx=8mm dy=8mm dz=5.0mm |
| Phantom         | Validation plane             |
| Device Position | Body                         |
| Band            | LTE band 17                  |
| Signal          | LTE FDD                      |
| Cell Bandwidth  | 10 Mhz                       |
| Modulation      | SC-OFDM - QPSK               |
| RB offset       | 5                            |
| RB size         | 20                           |

**B. Permittivity**

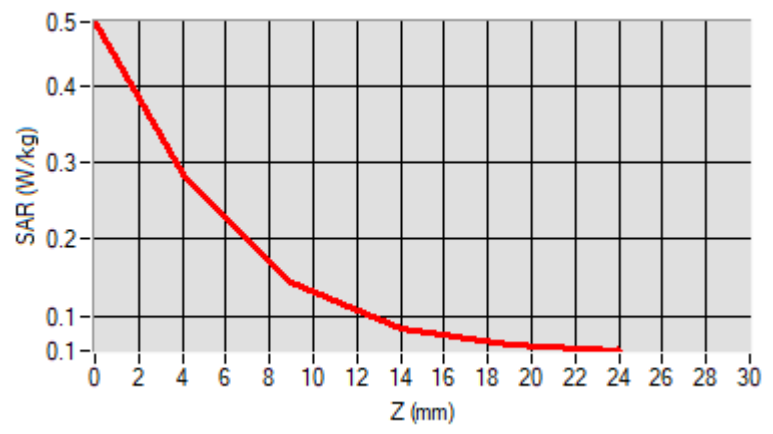
|                                        |         |
|----------------------------------------|---------|
| Frequency (MHz)                        | 708.200 |
| Relative permittivity (real part)      | 42.787  |
| Relative permittivity (imaginary part) | 23.233  |
| Conductivity (S/m)                     | 0.921   |

**C. SAR Surface and Volume**

**D. SAR 1g & 10g**

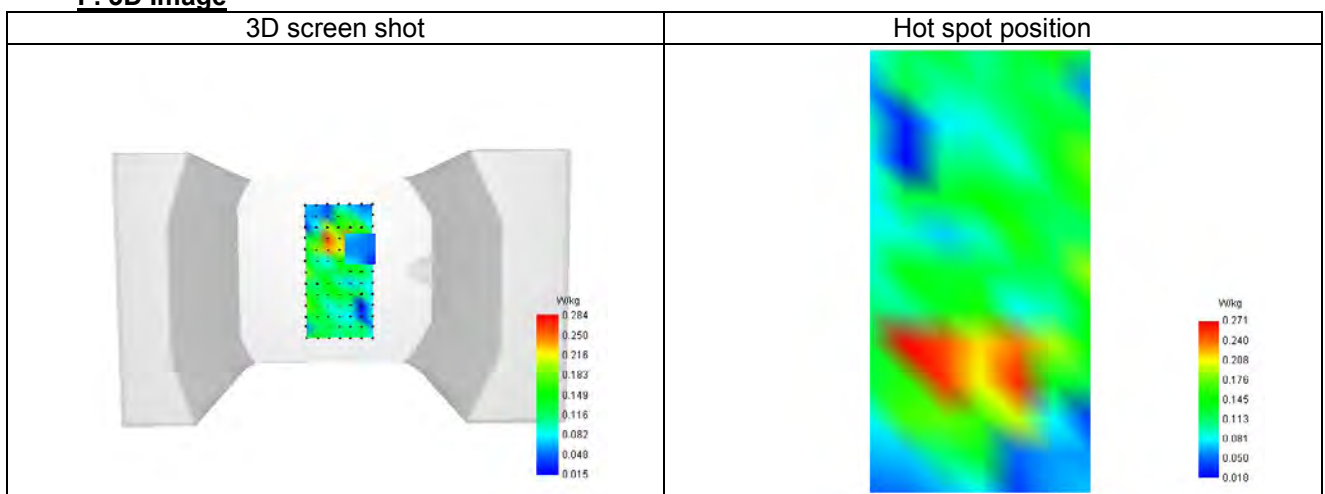
|                                                       |          |
|-------------------------------------------------------|----------|
| SAR 10g (W/Kg)                                        | 0.145    |
| SAR 1g (W/Kg)                                         | 0.285    |
| Variation (%)                                         | 2.440    |
| Horizontal validation criteria: minimum distance (mm) | 0.000000 |
| Vertical validation criteria: SAR ratio M2/M1 (%)     | 0.000000 |

**E. Z Axis Scan**

|            |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|
| Z (mm)     | 0.00  | 4.00  | 9.00  | 14.00 | 19.00 |
| SAR (W/Kg) | 0.482 | 0.284 | 0.145 | 0.084 | 0.063 |



### F. 3D Image



## 16. CALIBRATION CERTIFICATES

**Probe-EPGO420 Calibration Certificate**  
**SID750Dipole Calibration Certificate**  
**SID835Dipole Calibration Certificate**  
**SID1800Dipole Calibration Certificate**  
**SID1900Dipole Calibration Certificate**  
**SID2450Dipole Calibration Certificate**  
**SID2600Dipole Calibration Certificate**  
**SID5000Dipole Calibration Certificate**

CO., LTD.



## COMOSAR E-Field Probe Calibration Report

Ref : ACR.199.1.23.BES.A

**SHENZHEN BCTC TECHNOLOGY CO., LTD.**  
1 ~2/ F, NO. B FACTORY BUILDING, PENGZHOU  
INDUSTRIAL PARK, FUYUAN 1ST ROAD,  
TANGWEI COMMUNITY, FUHAI STREET, BAO'AN  
DISTRICT, SHENZHEN, GUANGDONG, CHINA  
**MVG COMOSAR DOSIMETRIC E-FIELD PROBE**  
SERIAL NO.: 2623-EPGO-420

Calibrated at MVG  
Z.I. de la pointe du diable  
Technopôle Brest Iroise – 295 avenue Alexis de Rochon  
29280 PLOUZANE - FRANCE

Calibration date: 7/18/2023



Accreditations #2-6789  
Scope available on [www.cofrac.fr](http://www.cofrac.fr)

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### Summary:

This document presents the method and results from an accredited COMOSAR Dosimetric E-Field Probe calibration performed at MVG, using the CALIPROBE test bench, for use with a MVG COMOSAR system only. The test results covered by accreditation are traceable to the International System of Units (SI).

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**COMOSAR E-FIELD PROBE CALIBRATION REPORT**

Ref: ACR.199.1.23.BES.A

|                                   | <i>Name</i>   | <i>Function</i>         | <i>Date</i> | <i>Signature</i>                                                                    |
|-----------------------------------|---------------|-------------------------|-------------|-------------------------------------------------------------------------------------|
| <i>Prepared by :</i>              | Cyrille ONNEE | Measurement Responsible | 7/18/2023   |  |
| <i>Checked &amp; approved by:</i> | Jérôme Luc    | Technical Manager       | 7/18/2023   |  |
| <i>Authorized by:</i>             | Yann Toutain  | Laboratory Director     | 7/18/2023   |  |

Yann  
Toutain ID

Signature numérique  
de Yann Toutain ID  
Date : 2023.07.18  
10:38:49 +02'00'

|                       | <i>Customer Name</i>                     |
|-----------------------|------------------------------------------|
| <i>Distribution :</i> | Shenzhen BCTC<br>Technology Co.,<br>Ltd. |

| <i>Issue</i> | <i>Name</i>   | <i>Date</i> | <i>Modifications</i> |
|--------------|---------------|-------------|----------------------|
| A            | Cyrille ONNEE | 7/18/2023   | Initial release      |
|              |               |             |                      |
|              |               |             |                      |
|              |               |             |                      |

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Template ACR.BDD.N.YY.MVGB.ISSUE COMOSAR Probe vL

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## 1 DEVICE UNDER TEST

| Device Under Test                        |                                                                         |
|------------------------------------------|-------------------------------------------------------------------------|
| Device Type                              | COMOSAR DOSIMETRIC E FIELD PROBE                                        |
| Manufacturer                             | MVG                                                                     |
| Model                                    | SSE2                                                                    |
| Serial Number                            | 2623-EPGO-420                                                           |
| Product Condition (new / used)           | New                                                                     |
| Frequency Range of Probe                 | 0.15 GHz-7.5GHz                                                         |
| Resistance of Three Dipoles at Connector | Dipole 1: R1=0.228 MΩ<br>Dipole 2: R2=0.238 MΩ<br>Dipole 3: R3=0.230 MΩ |

## 2 PRODUCT DESCRIPTION

### 2.1 GENERAL INFORMATION

MVG's COMOSAR E field Probes are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards.



**Figure 1** – *MVG COMOSAR Dosimetric E field Probe*

|                                            |         |
|--------------------------------------------|---------|
| Probe Length                               | 330 mm  |
| Length of Individual Dipoles               | 24.5 mm |
| Maximum external diameter                  | 8 mm    |
| Probe Tip External Diameter                | 2.55 mm |
| Distance between dipoles / probe extremity | 12.7 mm |

## 3 MEASUREMENT METHOD

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards provide recommended practices for the probe calibrations, including the performance characteristics of interest and methods by which to assess their effect. All calibrations / measurements performed meet the fore-mentioned standards.

### 3.1 SENSITIVITY

The sensitivity factors of the three dipoles were determined using a two step calibration method (air and tissue simulating liquid) using waveguides as outlined in the standards for frequency range 600-7500MHz and using the calorimeter cell method (transfer method) as outlined in the standards for frequency 150-450 MHz.



### 3.2 LINEARITY

The evaluation of the linearity was done in free space using the waveguide, performing a power sweep to cover the SAR range 0.01 W/kg to 100 W/kg.

### 3.3 ISOTROPY

The axial isotropy was evaluated by exposing the probe to a reference wave from a standard dipole with the dipole mounted under the flat phantom in the test configuration suggested for system validations and checks. The probe was rotated along its main axis from 0 to 360 degrees in 15-degree steps. The hemispherical isotropy is determined by inserting the probe in a thin plastic box filled with tissue-equivalent liquid, with the plastic box illuminated with the fields from a half wave dipole. The dipole is rotated about its axis (0°–180°) in 15° increments. At each step the probe is rotated about its axis (0°–360°).

### 3.4 BOUNDARY EFFECT

The boundary effect is defined as the deviation between the SAR measured data and the expected exponential decay in the liquid when the probe is oriented normal to the interface. To evaluate this effect, the liquid filled flat phantom is exposed to fields from either a reference dipole or waveguide. With the probe normal to the phantom surface, the peak spatial average SAR is measured and compared to the analytical value at the surface.

The boundary effect uncertainty can be estimated according to the following uncertainty approximation formula based on linear and exponential extrapolations between the surface and  $d_{be} + d_{step}$  along lines that are approximately normal to the surface:

$$SAR_{uncertainty}[\%] = \delta SAR_{be} \frac{(d_{be} + d_{step})^2 (e^{-d_{be}/\delta} - e^{-d_{step}/\delta})}{2d_{step} \delta/2} \quad \text{for } (d_{be} + d_{step}) < 10 \text{ mm}$$

where

$SAR_{uncertainty}$

is the uncertainty in percent of the probe boundary effect

$d_{be}$

is the distance between the surface and the closest *zoom-scan* measurement point, in millimetre

$\Delta_{step}$

is the separation distance between the first and second measurement points that are closest to the phantom surface, in millimetre, assuming the boundary effect at the second location is negligible

$\delta$

is the minimum penetration depth in millimetres of the head tissue-equivalent liquids defined in this standard, i.e.,  $\delta \approx 14$  mm at 3 GHz;

$\Delta SAR_{be}$

in percent of SAR is the deviation between the measured SAR value, at the distance  $d_{be}$  from the boundary, and the analytical SAR value.

The measured worst case boundary effect  $SAR_{uncertainty}[\%]$  for scanning distances larger than 4mm is 1.0% Limit ,2%).



#### 4 MEASUREMENT UNCERTAINTY

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty associated with a SAR probe calibration using the waveguide or calorimetric cell technique depending on the frequency.

The estimated expanded uncertainty (k=2) in calibration for SAR (W/kg) is +/-11% for the frequency range 150-450MHz.

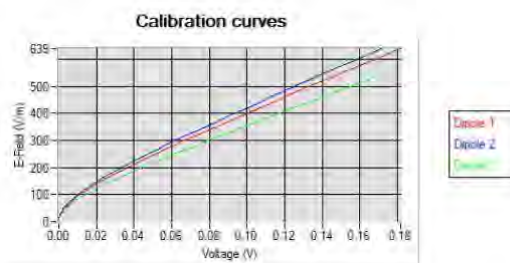
The estimated expanded uncertainty (k=2) in calibration for SAR (W/kg) is +/-14% for the frequency range 600-7500MHz.

#### 5 CALIBRATION RESULTS

| Ambient condition  |             |
|--------------------|-------------|
| Liquid Temperature | 20 +/- 1 °C |
| Lab Temperature    | 20 +/- 1 °C |
| Lab Humidity       | 30-70 %     |

##### 5.1 CALIBRATION IN AIR

The following curve represents the measurement in waveguide of the voltage picked up by the probe toward the E-field generated inside the waveguide.



From this curve, the sensitivity in air is calculated using the below formula.

$$E^2 = \sum_{i=1}^3 \frac{V_i (1 + V_i / DCP_i)}{Norm_i}$$

where

$V_i$ =voltage readings on the 3 channels of the probe

$DCP_i$ =diode compression point given below for the 3 channels of the probe

$Norm_i$ =dipole sensitivity given below for the 3 channels of the probe


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| Normx dipole<br>1 ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) | Normy dipole<br>2 ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) | Normz dipole<br>3 ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) |
|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| 1.21                                                      | 1.09                                                      | 1.56                                                      |

| DCP dipole 1<br>(mV) | DCP dipole 2<br>(mV) | DCP dipole 3<br>(mV) |
|----------------------|----------------------|----------------------|
| 106                  | 109                  | 103                  |

## 5.2 CALIBRATION IN LIQUID

The calorimeter cell or the waveguide is used to determine the calibration in liquid using the formula below.

$$ConvF = \frac{E_{liquid}^2}{E_{air}^2}$$

The E-field in the liquid is determined from the SAR measurement according to the below formula.

$$E_{liquid}^2 = \frac{\rho SAR}{\sigma}$$

where

$\sigma$ =the conductivity of the liquid

$\rho$ =the volumetric density of the liquid

SAR=the SAR measured from the formula that depends on the setup used. The SAR formulas are given below

For the calorimeter cell (150-450 MHz), the formula is:

$$SAR = c \frac{dT}{dt}$$

where

$c$ =the specific heat for the liquid

$dT/dt$ =the temperature rises over the time

For the waveguide setup (600-75000 MHz), the formula is:

$$SAR = \frac{4P_{1W}}{ab\delta} e^{-\frac{2z}{\delta}}$$

where

$a$ =the larger cross-sectional of the waveguide

$b$ =the smaller cross-sectional of the waveguide

$\delta$ =the skin depth for the liquid in the waveguide

$P_{1W}$ =the power delivered to the liquid

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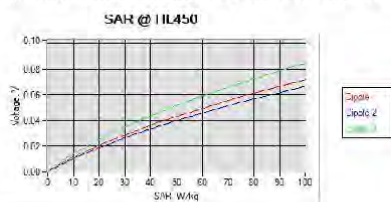

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The below table summarize the ConvF for the calibrated liquid. The curves give examples for the measured SAR depending on the voltage in some liquid.

| Liquid | Frequency (MHz*) | ConvF |
|--------|------------------|-------|
| HL450  | 450              | 0.86  |
| BL450  | 450              | 0.78  |
| HL750  | 750              | 0.80  |
| BL750  | 750              | 0.87  |
| HL850  | 835              | 0.81  |
| BL850  | 835              | 0.80  |
| HL900  | 900              | 0.76  |
| BL900  | 900              | 0.87  |
| HL1800 | 1800             | 0.96  |
| BL1800 | 1800             | 1.01  |
| HL1900 | 1900             | 1.04  |
| BL1900 | 1900             | 1.11  |
| HL2100 | 2100             | 1.00  |
| BL2100 | 2100             | 1.16  |
| HL2300 | 2300             | 1.11  |
| BL2300 | 2300             | 1.23  |
| HL2450 | 2450             | 1.11  |
| BL2450 | 2450             | 1.32  |
| HL2600 | 2600             | 1.03  |
| BL2600 | 2600             | 1.19  |
| HL5200 | 5200             | 1.18  |
| BL5200 | 5200             | 0.97  |
| HL5400 | 5400             | 1.17  |
| BL5400 | 5400             | 1.00  |
| HL5600 | 5600             | 1.20  |
| BL5600 | 5600             | 0.95  |
| HL5800 | 5800             | 1.15  |
| BL5800 | 5800             | 1.05  |

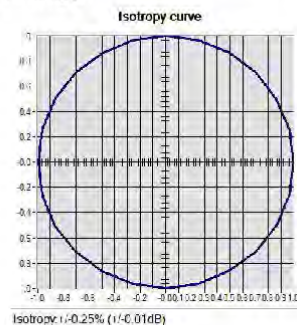
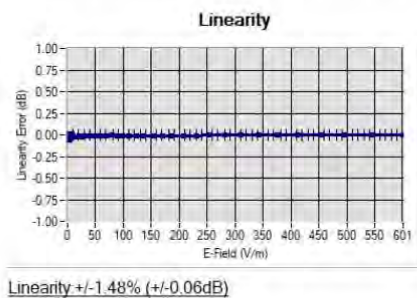
(\*) Frequency validity is +/-50MHz below 600MHz, +/-100MHz from 600MHz to 6GHz and +/-700MHz above 6GHz





## 6 VERIFICATION RESULTS

The figures below represent the measured linearity and axial isotropy for this probe. The probe specification is  $\pm 0.2$  dB for linearity and  $\pm 0.15$  dB for axial isotropy.





## 7 LIST OF EQUIPMENT

| Equipment Summary Sheet            |                         |                        |                                               |                                               |
|------------------------------------|-------------------------|------------------------|-----------------------------------------------|-----------------------------------------------|
| Equipment Description              | Manufacturer / Model    | Identification No.     | Current Calibration Date                      | Next Calibration Date                         |
| CALIPROBE Test Bench               | Version 2               | NA                     | Validated. No cal required.                   | Validated. No cal required.                   |
| Network Analyzer                   | Rohde & Schwarz ZVM     | 100203                 | 08/2021                                       | 08/2024                                       |
| Network Analyzer                   | Agilent 8753ES          | MY40003210             | 10/2019                                       | 10/2023                                       |
| Network Analyzer – Calibration kit | HP 85033D               | 3423A08186             | 06/2021                                       | 06/2027                                       |
| Network Analyzer – Calibration kit | Rohde & Schwarz ZV-Z235 | 101223                 | 07/2022                                       | 07/2025                                       |
| Multimeter                         | Keithley 2000           | 4013982                | 02/2023                                       | 02/2026                                       |
| Signal Generator                   | Rohde & Schwarz SMB     | 106589                 | 03/2022                                       | 03/2025                                       |
| Amplifier                          | MVG                     | MODU-023-C-0002        | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Power Meter                        | NI-USB 5680             | 170100013              | 06/2021                                       | 06/2024                                       |
| Power Meter                        | Keysight U2000A         | SN: MY62340002         | 10/2022                                       | 10/2025                                       |
| Directional Coupler                | Krytar 158020           | 131467                 | Characterized prior to test. No cal required. | Characterized prior to test. No cal required. |
| Fluoroptic Thermometer             | LumaSense Luxtron 812   | 94264                  | 09/2022                                       | 09/2025                                       |
| Coaxial cell                       | MVG                     | SN 32/16 COAXCELL_1    | Validated. No cal required.                   | Validated. No cal required.                   |
| Waveguide                          | MVG                     | SN 32/16 WG2_1         | Validated. No cal required.                   | Validated. No cal required.                   |
| Liquid transition                  | MVG                     | SN 32/16 WGLIQ_0G600_1 | Validated. No cal required.                   | Validated. No cal required.                   |
| Waveguide                          | MVG                     | SN 32/16 WG4_1         | Validated. No cal required.                   | Validated. No cal required.                   |
| Liquid transition                  | MVG                     | SN 32/16 WGLIQ_0G900_1 | Validated. No cal required.                   | Validated. No cal required.                   |
| Waveguide                          | MVG                     | SN 32/16 WG6_1         | Validated. No cal required.                   | Validated. No cal required.                   |
| Liquid transition                  | MVG                     | SN 32/16 WGLIQ_1G500_1 | Validated. No cal required.                   | Validated. No cal required.                   |
| Waveguide                          | MVG                     | SN 32/16 WG8_1         | Validated. No cal required.                   | Validated. No cal required.                   |

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|                                  |              |                            |                                |                                |
|----------------------------------|--------------|----------------------------|--------------------------------|--------------------------------|
| Liquid transition                | MVG          | SN 32/16<br>WGLIQ_1G800B_1 | Validated. No cal<br>required. | Validated. No cal<br>required. |
| Liquid transition                | MVG          | SN 32/16<br>WGLIQ_1G800H_1 | Validated. No cal<br>required. | Validated. No cal<br>required. |
| Waveguide                        | MVG          | SN 32/16 WG10_1            | Validated. No cal<br>required. | Validated. No cal<br>required. |
| Liquid transition                | MVG          | SN 32/16<br>WGLIQ_3G500_1  | Validated. No cal<br>required. | Validated. No cal<br>required. |
| Waveguide                        | MVG          | SN 32/16 WG12_1            | Validated. No cal<br>required. | Validated. No cal<br>required. |
| Liquid transition                | MVG          | SN 32/16<br>WGLIQ_5G000_1  | Validated. No cal<br>required. | Validated. No cal<br>required. |
| Waveguide                        | MVG          | SN 32/16 WG14_1            | Validated. No cal<br>required. | Validated. No cal<br>required. |
| Liquid transition                | MVG          | SN 32/16<br>WGLIQ_7G000_1  | Validated. No cal<br>required. | Validated. No cal<br>required. |
| Temperature / Humidity<br>Sensor | Testo 184 H1 | 44225320                   | 06/2021                        | 06/2024                        |

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## SAR Reference Dipole Calibration Report

Ref : ACR.329.8.21.BES.A

**SHENZHEN BCTC TECHNOLOGY CO., LTD.**

1 ~2/ F, NO. B FACTORY BUILDING, PENGZHOU  
INDUSTRIAL PARK, FUYUAN 1ST ROAD,  
TANGWEI COMMUNITY, FUHAI STREET, BAO'AN  
DISTRICT, SHENZHEN, GUANGDONG, CHINA  
**MVG COMOSAR REFERENCE DIPOLE**

FREQUENCY: 750 MHZ

SERIAL NO.: SN 47/21 DIP 0G750-620

Calibrated at MVG

Z.I. de la pointe du diable

Technopôle Brest Iroise – 295 avenue Alexis de Rochon  
29280 PLOUZANE - FRANCE

Calibration date: 11/25/2021



Accreditations #2-6789 and #2-6814  
Scope available on [www.cofrac.fr](http://www.cofrac.fr)

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**Summary:**

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

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**SAR REFERENCE DIPOLE CALIBRATION REPORT**

Ref: ACR.329.8.21.BES.A

|                      | <i>Name</i>  | <i>Function</i>     | <i>Date</i> | <i>Signature</i>                                      |
|----------------------|--------------|---------------------|-------------|-------------------------------------------------------|
| <i>Prepared by :</i> | Jérôme Luc   | Technical Manager   | 11/25/2021  | <i>JS</i>                                             |
| <i>Checked by :</i>  | Jérôme Luc   | Technical Manager   | 11/25/2021  | <i>JS</i>                                             |
| <i>Approved by :</i> | Yann Toutain | Laboratory Director | 11/25/2021  | <i>Yann TOUTAIN</i><br>2021.11.25<br>11:51:55 +01'00' |

|                       | <i>Customer Name</i>                     |
|-----------------------|------------------------------------------|
| <i>Distribution :</i> | Shenzhen BCTC<br>Technology Co.,<br>Ltd. |

| <i>Issue</i> | <i>Name</i> | <i>Date</i> | <i>Modifications</i> |
|--------------|-------------|-------------|----------------------|
| A            | Jérôme Luc  | 11/25/2021  | Initial release      |
|              |             |             |                      |
|              |             |             |                      |
|              |             |             |                      |

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*Templon\_ACR.DDD.N.YEMVGB.ISSUE\_SAR Reference Dipole vJ*

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## 1 INTRODUCTION

This document contains a summary of the requirements set forth by the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards for reference dipoles used for SAR measurement system validations and the measurements that were performed to verify that the product complies with the fore mentioned standards.

## 2 DEVICE UNDER TEST

| Device Under Test              |                                  |
|--------------------------------|----------------------------------|
| Device Type                    | COMOSAR 750 MHz REFERENCE DIPOLE |
| Manufacturer                   | MVG                              |
| Model                          | SID750                           |
| Serial Number                  | SN 47/21 DIP 0G750-620           |
| Product Condition (new / used) | New                              |

## 3 PRODUCT DESCRIPTION

### 3.1 GENERAL INFORMATION

MVG's COMOSAR Validation Dipoles are built in accordance to the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards. The product is designed for use with the COMOSAR test bench only.



**Figure 1 – MVG COMOSAR Validation Dipole**



#### 4 MEASUREMENT METHOD

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards provide requirements for reference dipoles used for system validation measurements. The following measurements were performed to verify that the product complies with the fore mentioned standards.

##### 4.1 RETURN LOSS REQUIREMENTS

The dipole used for SAR system validation measurements and checks must have a return loss of -20 dB or better. The return loss measurement shall be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. A direct method is used with a network analyser and its calibration kit, both with a valid ISO17025 calibration.

##### 4.2 MECHANICAL REQUIREMENTS

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards specify the mechanical components and dimensions of the validation dipoles, with the dimension's frequency and phantom shell thickness dependent. The COMOSAR test bench employs a 2 mm phantom shell thickness therefore the dipoles sold for use with the COMOSAR test bench comply with the requirements set forth for a 2 mm phantom shell thickness. A direct method is used with a ISO17025 calibrated caliper.

#### 5 MEASUREMENT UNCERTAINTY

All uncertainties listed below represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2, traceable to the Internationally Accepted Guides to Measurement Uncertainty.

##### 5.1 RETURN LOSS

The following uncertainties apply to the return loss measurement:

| Frequency band | Expanded Uncertainty on Return Loss |
|----------------|-------------------------------------|
| 400-6000MHz    | 0.08 LIN                            |

##### 5.2 DIMENSION MEASUREMENT

The following uncertainties apply to the dimension measurements:

| Length (mm) | Expanded Uncertainty on Length |
|-------------|--------------------------------|
| 0 - 300     | 0.20 mm                        |
| 300 - 450   | 0.44 mm                        |

##### 5.3 VALIDATION MEASUREMENT

The guidelines outlined in the IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards were followed to generate the measurement uncertainty for validation measurements.

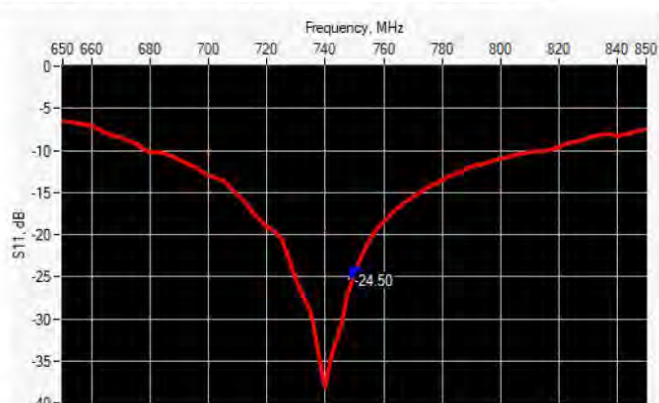

**SAR REFERENCE DIPOLE CALIBRATION REPORT**

Ref: ACR.329.8.21.BES.A

| Scan Volume | Expanded Uncertainty |
|-------------|----------------------|
| 1 g         | 19 % (SAR)           |
| 10 g        | 19 % (SAR)           |

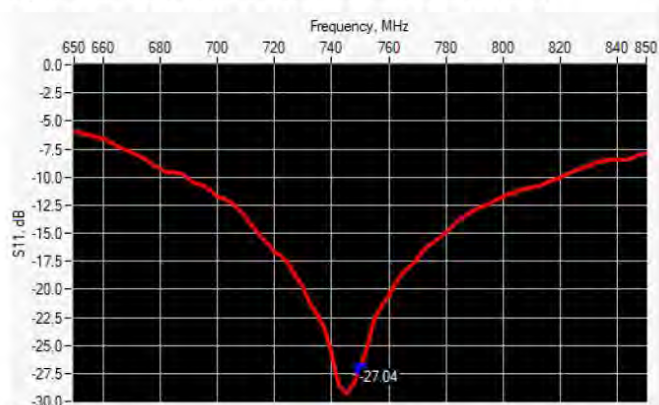
## 6 CALIBRATION MEASUREMENT RESULTS

### 6.1 RETURN LOSS AND IMPEDANCE IN HEAD LIQUID



| Frequency (MHz) | Return Loss (dB) | Requirement (dB) | Impedance                      |
|-----------------|------------------|------------------|--------------------------------|
| 750             | -24.50           | -20              | 55.7 $\Omega$ - 1.7 j $\Omega$ |

### 6.2 RETURN LOSS AND IMPEDANCE IN BODY LIQUID



| Frequency (MHz) | Return Loss (dB) | Requirement (dB) | Impedance                      |
|-----------------|------------------|------------------|--------------------------------|
| 750             | -27.04           | -20              | 53.8 $\Omega$ + 2.3 j $\Omega$ |


**SAR REFERENCE DIPOLE CALIBRATION REPORT**

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### 6.3 MECHANICAL DIMENSIONS

| Frequency MHz | L mm             |          | h mm             |          | d mm            |          |
|---------------|------------------|----------|------------------|----------|-----------------|----------|
|               | required         | measured | required         | measured | required        | measured |
| 300           | 420.0 $\pm 1$ %. |          | 250.0 $\pm 1$ %. |          | 6.35 $\pm 1$ %. |          |
| 450           | 290.0 $\pm 1$ %. |          | 166.7 $\pm 1$ %. |          | 6.35 $\pm 1$ %. |          |
| 750           | 176.0 $\pm 1$ %. | 177.28   | 100.0 $\pm 1$ %. | 99.79    | 6.35 $\pm 1$ %. | 6.35     |
| 835           | 161.0 $\pm 1$ %. |          | 89.8 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 900           | 149.0 $\pm 1$ %. |          | 83.3 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 1450          | 89.1 $\pm 1$ %.  |          | 51.7 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 1500          | 86.2 $\pm 1$ %.  |          | 50.0 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 1640          | 79.0 $\pm 1$ %.  |          | 45.7 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 1750          | 75.2 $\pm 1$ %.  |          | 42.9 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 1800          | 72.0 $\pm 1$ %.  |          | 41.7 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 1900          | 68.0 $\pm 1$ %.  |          | 39.5 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 1950          | 66.3 $\pm 1$ %.  |          | 38.5 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 2000          | 64.5 $\pm 1$ %.  |          | 37.5 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 2100          | 61.0 $\pm 1$ %.  |          | 35.7 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 2300          | 55.5 $\pm 1$ %.  |          | 32.6 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 2450          | 51.5 $\pm 1$ %.  |          | 30.4 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 2600          | 48.5 $\pm 1$ %.  |          | 28.8 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 3000          | 41.5 $\pm 1$ %.  |          | 25.0 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 3300          | -                |          | -                |          | -               |          |
| 3500          | 37.0 $\pm 1$ %.  |          | 26.4 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 3700          | 34.7 $\pm 1$ %.  |          | 26.4 $\pm 1$ %.  |          | 3.6 $\pm 1$ %.  |          |
| 3900          | -                |          | -                |          | -               |          |
| 4200          | -                |          | -                |          | -               |          |
| 4600          | -                |          | -                |          | -               |          |
| 4900          | -                |          | -                |          | -               |          |

## 7 VALIDATION MEASUREMENT

The IEC/IEEE 62209-1528 and FCC KDB865664 D01 standards state that the system validation measurements must be performed using a reference dipole meeting the fore mentioned return loss and mechanical dimension requirements. The validation measurement must be performed against a liquid filled flat phantom, with the phantom constructed as outlined in the fore mentioned standards. Per the standards, the dipole shall be positioned below the bottom of the phantom, with the dipole length centered and parallel to the longest dimension of the flat phantom, with the top surface of the dipole at the described distance from the bottom surface of the phantom.

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