

# SAR Test Report

Report No.: AGC10849211001FH01

**FCC ID** : VTJ-M2  
**APPLICATION PURPOSE** : Original Equipment  
**PRODUCT DESIGNATION** : Brama S-A1  
**BRAND NAME** : SoloProtect  
**MODEL NAME** : M2  
**APPLICANT** : SoloProtect Limited  
**DATE OF ISSUE** : Dec. 10, 2021  
**STANDARD(S)** : IEEE Std. 1528:2013  
FCC 47 CFR Part 2§2.1093  
IEEE Std C95.1™-2005  
IEC 62209-1: 2016  
**REPORT VERSION** : V1.0

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**Report Revise Record**

| Report Version | Revise Time | Issued Date   | Valid Version | Notes           |
|----------------|-------------|---------------|---------------|-----------------|
| V1.0           | /           | Dec. 10, 2021 | Valid         | Initial Release |

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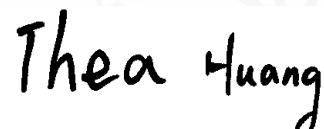
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| Test Report          |  |
|----------------------|--|
| Applicant Name       | SoloProtect Limited  |
| Applicant Address    | Suzy Lamplugh House, Vantage Drive, Sheffield, United Kingdom, S9 1RG                        |
| Manufacturer Name    | Shenzhen Unicair Communication Technology Co.,Ltd.   |
| Manufacturer Address | 8-9/F, Block1, Wutong Island, Shunchang Rd., Xixiang, Bao'an District, Shenzhen China.       |
| Factory Name         | Dongguan Unicair Communication Technology Co., Ltd.  |
| Factory Address      | 49 Yinhu Road, Qiaotou Town, Dongguan City, Guangdong Province, China                        |
| Product Designation  | Brama S-A1   |
| Brand Name           | SoloProtect  |
| Model Name           | M2   |
| EUT Voltage          | DC3.85V by battery   |
| Applicable Standard  | IEEE Std. 1528:2013<br>FCC 47 CFR Part 2§2.1093<br>IEEE Std C95.1™-2005<br>IEC 62209-1: 2016 |
| Test Date            | Nov. 01, 2021 to Nov. 27, 2021   |
| Report Template      | AGCRT-US-4G/SAR (2021-04-20)   |

Note: The results of testing in this report apply to the product/system which was tested only.

Prepared By



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Nov. 27, 2021

Reviewed By



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Dec. 10, 2021

Approved By



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Dec. 10, 2021

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## 1. SUMMARY OF MAXIMUM SAR VALUE

The maximum results of Specific Absorption Rate (SAR) found during testing for EUT are as follows:

| Frequency Band            | Highest Reported 1g-SAR(W/kg) | SAR Test Limit (W/kg) |
|---------------------------|-------------------------------|-----------------------|
|                           | Body-worn                     |                       |
| GSM 850                   | 0.789                         | 1.6                   |
| PCS 1900                  | 1.125                         |                       |
| UMTS Band II              | 0.763                         |                       |
| UMTS Band IV              | 0.791                         |                       |
| UMTS Band V               | 0.923                         |                       |
| LTE Band 2                | 0.737                         |                       |
| LTE Band 4                | 0.755                         |                       |
| LTE Band 5                | 0.526                         |                       |
| LTE Band 7                | 0.577                         |                       |
| LTE Band 12               | 0.398                         |                       |
| LTE Band 17               | 0.303                         |                       |
| WIFI 2.4G                 | 0.206                         |                       |
| 5.2GHz (U-NII-1)          | 0.410                         |                       |
| 5.8GHz U-NII-3            | 0.657                         |                       |
| Simultaneous Reported SAR | 1.459                         |                       |
| SAR Test Result           | PASS                          |                       |

This device is compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6W/kg) specified in IEEE Std. 1528:2013; FCC 47CFR § 2.1093; IEEE/ANSI C95.1:2005 and the following specific FCC Test Procedures:

- KDB 447498 D01 General RF Exposure Guidance v06
- KDB 648474 D04 Handset SAR v01r03
- KDB 865664 D01 SAR Measurement 100MHz to 6GHz v01r04
- KDB 941225 D01 3G SAR Procedures v03r01
- KDB 941225 D06 Hotspot Mode v02r01
- KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- KDB 941225 D05 SAR for LTE Devices v02r05

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## 2. GENERAL INFORMATION

### 2.1. EUT Description

| General Information     |  |
|-------------------------|--|
| Product Designation     | Brama S-A1   |
| Test Model              | M2   |
| Hardware Version        | GBE Brama S v2_main_RevA   |
| Software Version        | S-A1.D02.20211008  |
| Device Category         | Portable   |
| RF Exposure Environment | Uncontrolled   |
| Antenna Type            | Internal   |
| GSM and GPRS& EGPRS     |  |
| Support Band            | <input checked="" type="checkbox"/> GSM 850 <input checked="" type="checkbox"/> PCS 1900 (U.S. Bands)<br><input checked="" type="checkbox"/> GSM 900 <input checked="" type="checkbox"/> DCS 1800(Non-U.S. Bands)  |
| GPRS & EGPRS Type       | Class B  |
| GPRS & EGPRS Class      | Class 12(1Tx+4Rx, 2Tx+3Rx, 3Tx+2Rx, 4Tx+1Rx)   |
| TX Frequency Range      | GSM 850 : 820-850MHz;; PCS 1900: 1850-1910MHz;   |
| RX Frequency Range      | GSM 850 : 869~894MHz; PCS 1900: 1930~1990MHz   |
| Release Version         | R99  |
| Type of modulation      | GMSK for GSM/GPRS; GMSK & 8-PSK for EGPRS  |
| Antenna Gain            | GSM850: -5.7dBi; PCS1900: -0.4dBi  |
| Max. Average Power      | GSM850: 32.96dBm ;PCS1900: 29.95dBm  |
| WCDMA                   |  |
| Support Band            | <input checked="" type="checkbox"/> UMTS FDD Band II <input checked="" type="checkbox"/> UMTS FDD Band V<br><input checked="" type="checkbox"/> UMTS FDD Band IV (U.S. Bands)<br><input checked="" type="checkbox"/> UMTS FDD Band I <input checked="" type="checkbox"/> UMTS FDD Band VIII (Non-U.S. Bands) |
| HS Type                 | HSPA(HSUPA/HSDPA)  |
| TX Frequency Range      | WCDMA FDD Band II: 1850-1910MHz; WCDMA FDD Band V: 824-849MHz<br>FDD Band IV: 1710-1770MHz   |
| RX Frequency Range      | WCDMA FDD Band II: 1930-1990MHz; WCDMA FDD Band V: 869-894MHz<br>FDD Band IV: 2110-2170MHz   |
| Release Version         | Rel-6  |
| Type of modulation      | HSDPA:QPSK/16QAM; HSUPA:BPSK; WCDMA:QPSK   |
| Antenna Gain            | Band II: 0.4dBi; Band IV: -0.4dBi; Band V: -4.5dBi   |
| Max. Average Power      | Band II: 23.12dBm; Band IV: 22.80dBm; Band V: 23.76dBm   |
| Bluetooth               |  |
| Operation Frequency     | 2402~2480MHz   |
| Antenna Gain            | 2.0dBi   |
| Bluetooth Version       | V4.2   |
| Type of modulation      | <b>BR/EDR:</b> GFSK, $\pi/4$ -DQPSK, 8-DPSK; <b>BLE:</b> GFSK  |
| EIRP                    | <b>BR/EDR:</b> 2.124dBm; <b>BLE:</b> -5.508dBm   |

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**EUT Description (Continue)**

| <b>LTE</b>             |   |
|------------------------|---|
| Support Band           | <input checked="" type="checkbox"/> FDD Band 2 <input type="checkbox"/> FDD Band 4 <input type="checkbox"/> FDD Band 5 <input checked="" type="checkbox"/> FDD Band 7<br><input checked="" type="checkbox"/> FDD Band 12 <input checked="" type="checkbox"/> FDD Band 17 (U.S. Bands)<br><input checked="" type="checkbox"/> FDD Band 1 <input type="checkbox"/> FDD Band 3 <input checked="" type="checkbox"/> FDD Band 7 <input checked="" type="checkbox"/> FDD Band 8<br><input checked="" type="checkbox"/> FDD Band 20 (Non-U.S. Bands) |
| TX Frequency Range     | Band 2:1850-1910MHz; Band 4:1710-1755MHz; Band 5:824-849MHz;<br>Band 7:2500-2570MHz; Band 12:699-716MHz; Band 17: 704-716MHz;   |
| RX Frequency Range     | Band 2:1930-1990MHz; Band 4:2110-2155MHz; Band 5:869-894MHz;<br>Band 7:2620-2690MHz; Band 12: 729-746 MHz; Band 17: 734-746 MHz;  |
| Release Version        | Rel-8   |
| Type of modulation     | QPSK, 16QAM   |
| Antenna Gain           | Band 2: 0.28dBi; Band 4: -0.23dBi; Band 5: -4.59dBi; Band 7: -1.64dBi;<br>Band 12: -6.34dBi; Band 17: -6.63dBi;   |
| Diversity Antenna gain | Band 2: -2.34dBi; Band 4: -0.48dBi; Band 5: -7.12dBi; Band 7: -4.63dBi;<br>Band 12: -7.12dBi; Band 17: -7.25dBi;  |
| Max. Average Power     | Band 2: 22.17dBm; Band 4: 23.80dBm; Band 5: 23.93dBm; Band 7:23.76dBm;<br>Band 12: 24.10dBm; Band 17: 23.41dBm;   |
| <b>WIFI</b>            |   |
| WIFI Specification     | <input type="checkbox"/> 802.11a <input checked="" type="checkbox"/> 802.11b <input checked="" type="checkbox"/> 802.11g <input checked="" type="checkbox"/> 802.11n(20) <input checked="" type="checkbox"/> 802.11n(40)  |
| Operation Frequency    | 2412~2462MHz  |
| Antenna Gain           | 2.0dBi  |
| Avg. Burst Power       | 11b:14.42dBm,11g:13.05dBm,11n(20):12.08dBm,11n(40):11.79dBm   |
| <b>5 GHz WIFI</b>      |   |
| WIFI Specification     | <input checked="" type="checkbox"/> 802.11a <input checked="" type="checkbox"/> 802.11n20 <input checked="" type="checkbox"/> 802.11n40 <input checked="" type="checkbox"/> 802.11ac20 <input checked="" type="checkbox"/> 802.11ac40<br><input type="checkbox"/> 802.11ac80  |
| Operation Frequency    | U-NII-1: 5180MHz~5240MHz; U-NII-3: 5745MHz~5825MHz  |
| Max. conducted Power   | U-NII-1: 14.82dBm; U-NII-3: 16.42dBm  |
| Antenna Gain           | 2.0dBi  |
| <b>Accessories</b>     |   |
| Battery                | Brand name: N/A<br>Model No. : Brama S v2<br>Voltage and Capacitance: 3.85V & 1070mAh   |
| Earphone               | Brand name: N/A<br>Model No. : N/A  |

Note:1. CMU200 can measure the average power and Peak power at the same time

2. The sample used for testing is end product.

3. The test sample has no any deviation to the test method of standard mentioned in page 1.

| Product | Type   |
|---------|--|
|         | <input checked="" type="checkbox"/> Production unit <input type="checkbox"/> Identical Prototype |

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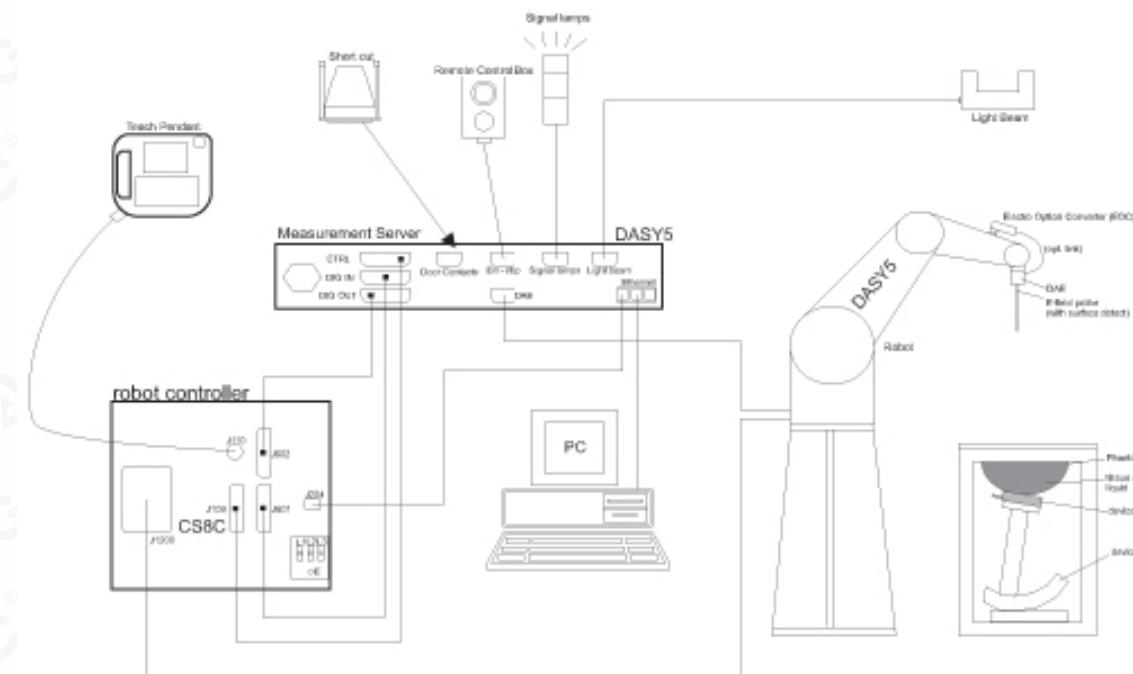
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### 3. SAR MEASUREMENT SYSTEM

#### 3.1. The DASY5 system used for performing compliance tests consists of following items



- A standard high precision 6-axis robot with controller, teach pendant and software.
- Data acquisition electronics (DAE) which attached to the robot arm extension. The DAE consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock
- A dosimetric probe equipped with an optical surface detector system.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital Communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- A Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- Phantoms, device holders and other accessories according to the targeted measurement.

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### 3.2. DASY5 E-Field Probe

The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE-1528 etc.) Under ISO17025. The calibration data are in Appendix D.

#### Isotropic E-Field Probe Specification

|                      |  |
|----------------------|--|
| <b>Model</b>         | EX3DV4-SN:3953   |
| <b>Manufacture</b>   | SPEAG  |
| <b>frequency</b>     | 0.7GHz-6GHz<br>Linearity:±0.9%(k=2)  |
| <b>Dynamic Range</b> | 0.01W/kg-100W/kg<br>Linearity: ±0.9%(k=2)  |
| <b>Dimensions</b>    | Overall length:337mm<br>Tip diameter:2.5mm<br>Typical distance from probe tip to dipole centers:1mm  |
| <b>Application</b>   | High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%. |



### 3.3. Data Acquisition Electronics description

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

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

#### DAE4

|                              |                          |
|------------------------------|--------------------------|
| <b>Input Impedance</b>       | 200MOhm                  |
| <b>The Inputs</b>            | Symmetrical and floating |
| <b>Common mode rejection</b> | above 80 dB              |



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### 3.4. Robot

The DASY system uses the high precision robots (DASY5:TX60) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from is used.

The XL robot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller



### 3.5. Light Beam Unit

The light beam switch allows automatic “tooling” of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.

The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned prob.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position. e, the same position will be reached with another aligned probe within 0



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### 3.6. Device Holder

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR).

Thus the device needs no repositioning when changing the angles. The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity  $\epsilon=3$  and loss tangent  $\delta = 0.02$ . The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.



### 3.7. Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY5: 400 MHz, Intel Celeron), chip-disk (DASY5: 128MB), RAM (DASY5: 128MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DAYS I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.



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### 3.8. PHANTOM

#### SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas:

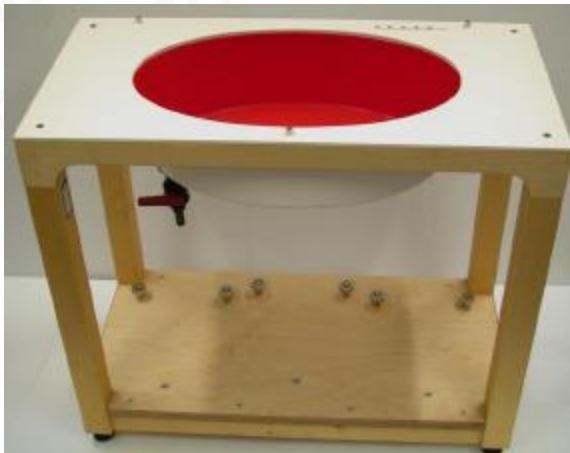
- Left head
- Right head
- Flat phantom



The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

#### ELI4 Phantom

- Flat phantom a fiberglass shell flat phantom with 2mm+/- 0.2 mm shell thickness. It has only one measurement area for Flat phantom



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## 4. SAR MEASUREMENT PROCEDURE

### 4.1. Specific Absorption Rate (SAR)

SAR is related to the rate at which energy is absorbed per unit mass in object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and occupational/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element(dv) of given mass density (ρ). The equation description is as below:

$$\text{SAR} = \frac{d}{dt} \left( \frac{dW}{dm} \right) = \frac{d}{dt} \left( \frac{dW}{\rho dV} \right)$$

SAR is expressed in units of Watts per kilogram (W/kg)

SAR can be obtained using either of the following equations:

$$\text{SAR} = \frac{\sigma E^2}{\rho}$$

$$\text{SAR} = c_h \frac{dT}{dt} \Big|_{t=0}$$

Where

SAR      is the specific absorption rate in watts per kilogram;  
E          is the r.m.s. value of the electric field strength in the tissue in volts per meter;  
σ          is the conductivity of the tissue in siemens per metre;  
ρ          is the density of the tissue in kilograms per cubic metre;  
c<sub>h</sub>       is the heat capacity of the tissue in joules per kilogram and Kelvin;

$\frac{dT}{dt} \Big|_{t=0}$  is the initial time derivative of temperature in the tissue in kelvins per second

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## 4.2. SAR Measurement Procedure

### Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurement are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface is 2.7mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties,

### Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in db) is specified in the standards for compliance testing. For example, a 2db range is required in IEEE Standard 1528, whereby 3db is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximum are detected, the number of Zoom Scan has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100MHz to 6GHz

|  | $\leq 3$ GHz   | $> 3$ GHz  |
|--|--|--|
| Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface | $5 \pm 1$ mm   | $\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm     |
| Maximum probe angle from probe axis to phantom surface normal at the measurement location              | $30^\circ \pm 1^\circ$   | $20^\circ \pm 1^\circ$                                 |
|  | $\leq 2$ GHz: $\leq 15$ mm<br>$2 - 3$ GHz: $\leq 12$ mm  | $3 - 4$ GHz: $\leq 12$ mm<br>$4 - 6$ GHz: $\leq 10$ mm |
| Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$                 | When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device. |  |

### Step 3: Zoom Scan

Zoom Scan are used to assess the peak spatial SAR value within a cubic average volume containing 1g and 10g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1g and 10g and displays these values next to the job's label.

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## Zoom Scan Parameters extracted from KDB865664 d01 SAR Measurement 100MHz to 6GHz

|  |   |  |   |
|--|---|--|---|
| Maximum zoom scan spatial resolution: $\Delta x_{Zoom}$ , $\Delta y_{Zoom}$  |   | $\leq 2$ GHz: $\leq 8$ mm<br>$2 - 3$ GHz: $\leq 5$ mm* | $3 - 4$ GHz: $\leq 5$ mm*<br>$4 - 6$ GHz: $\leq 4$ mm*                              |
| Maximum zoom scan spatial resolution, normal to phantom surface  | uniform grid: $\Delta z_{Zoom}(n)$<br><br>graded grid | $\leq 5$ mm  | $3 - 4$ GHz: $\leq 4$ mm<br>$4 - 5$ GHz: $\leq 3$ mm<br>$5 - 6$ GHz: $\leq 2$ mm    |
|  |   | $\leq 4$ mm  | $3 - 4$ GHz: $\leq 3$ mm<br>$4 - 5$ GHz: $\leq 2.5$ mm<br>$5 - 6$ GHz: $\leq 2$ mm  |
| Minimum zoom scan volume   | x, y, z   | $\geq 30$ mm   | $3 - 4$ GHz: $\geq 28$ mm<br>$4 - 5$ GHz: $\geq 25$ mm<br>$5 - 6$ GHz: $\geq 22$ mm |
| Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.<br>* When zoom scan is required and the <u>reported</u> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz. |   |  |   |

## Step 4: Power Drift Measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the same settings. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

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### 4.3. RF Exposure Conditions

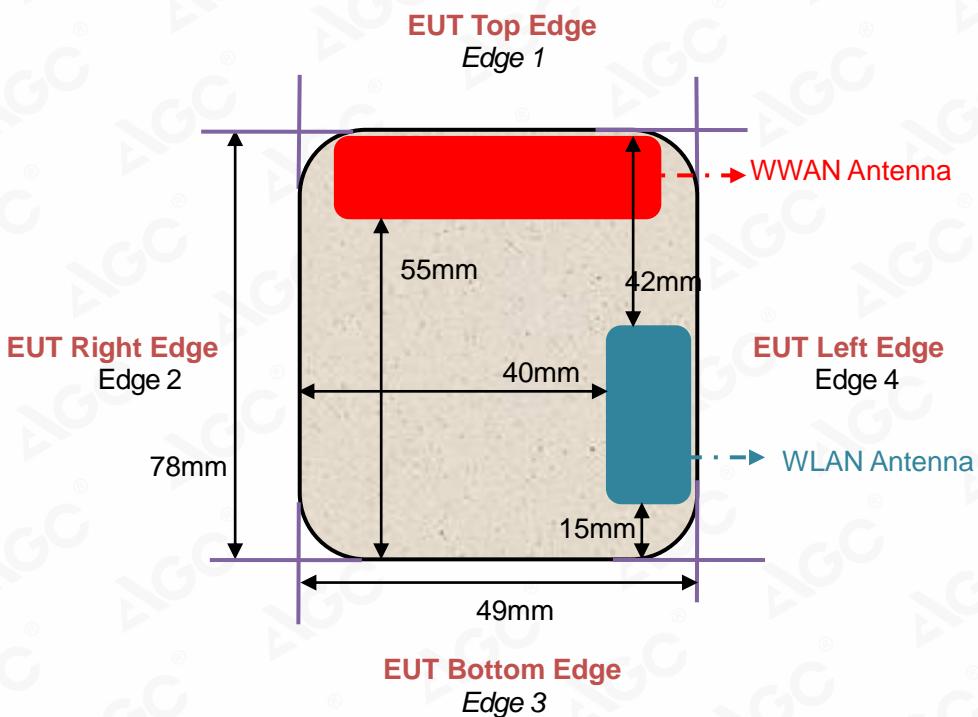
Test Configuration and setting:

The EUT is a model of GSM/WCDMA Portable Mobile Station (MS). It supports GSM/GPRS/EGPRS, WCDMA/HSPA, BT, WIFI, and support hot spot mode.

For WWAN SAR testing, the device was controlled by using a base station emulator. Communication between the device and the emulator were established by air link. The distance between the EUT and the antenna is larger than 50cm, and the output power radiated from the emulator antenna is at least 30db smaller than the output power of EUT.

For WLAN testing, the EUT is configured with the WLAN continuous TX tool through engineering command.

#### Antenna Location: (the back view)



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## For WWAN mode:

| Test Configurations | Antenna to edges/surface | SAR required | Note   |
|---------------------|--------------------------|--------------|--|
| Body                |                          |              |  |
| Back                | <25mm                    | Yes          | --   |
| Front               | <25mm                    | Yes          | --   |
| Hotspot             |                          |              |  |
| Back                | <25mm                    | Yes          | --   |
| Front               | <25mm                    | Yes          | --   |
| Edge 1 (Top)        | 9mm                      | Yes          | --   |
| Edge 2 (Right)      | 4mm                      | Yes          | --   |
| Edge 3 (Bottom)     | 55mm                     | No           | SAR is not required for the distance between the antenna and the edge is >25mm as per KDB 941225 D06 Hotspot SAR |
| Edge 4 (Left)       | 8mm                      | Yes          | --   |

## For WLAN mode:

| Test Configurations | Antenna to edges/surface | SAR required | Note   |
|---------------------|--------------------------|--------------|--|
| Body                |                          |              |  |
| Back                | <25mm                    | Yes          | --   |
| Front               | <25mm                    | Yes          | --   |
| Hotspot             |                          |              |  |
| Back                | <25mm                    | Yes          | --   |
| Front               | <25mm                    | Yes          | --   |
| Edge 1 (Top)        | 42mm                     | No           | SAR is not required for the distance between the antenna and the edge is >25mm as per KDB 941225 D06 Hotspot SAR |
| Edge 2 (Right)      | 40mm                     | No           | SAR is not required for the distance between the antenna and the edge is >25mm as per KDB 941225 D06 Hotspot SAR |
| Edge 3 (Bottom)     | 15mm                     | Yes          | --   |
| Edge 4 (Left)       | 2mm                      | Yes          | --   |

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## 5. TISSUE SIMULATING LIQUID

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15cm. For head SAR testing the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15cm For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 10% are listed in 6.2

### 5.1. The composition of the tissue simulating liquid

| Ingredient<br>(% Weight) | Water  | NaCl  | Polysorbate 20 | DGBE   | 1,2<br>Propanediol | Triton<br>X-100 |
|--------------------------|--------|-------|----------------|--------|--------------------|-----------------|
| Frequency<br>(MHz)       |        |       |                |        |                    |                 |
| 750 Head                 | 35     | 2     | 0.0            | 0.0    | 63                 | 0.0             |
| 835 Head                 | 50.36  | 1.25  | 48.39          | 0.0    | 0.0                | 0.0             |
| 1750 Head                | 52.64  | 0.36  | 0.0            | 47     | 0.0                | 0.0             |
| 1900 Head                | 54.9   | 0.18  | 0.0            | 44.92  | 0.0                | 0.0             |
| 2450 Head                | 71.88  | 0.16  | 0.0            | 7.99   | 0.0                | 19.97           |
| 2600 Head                | 55.242 | 0.306 | 0              | 44.452 | 0                  | 0               |

| Ingredient<br>(% Weight) | Water | NaCl | Polysorbate<br>20 | DGBE | 1,2-<br>Propanediol | Triton<br>X-100 | Diethylen<br>glycol<br>monohex<br>ylether |
|--------------------------|-------|------|-------------------|------|---------------------|-----------------|---|
| Frequency<br>(MHz)       |       |      |                   |      |                     |                 |   |
| 5000 Head                | 65.52 | 0.0  | 0.0               | 0.0  | 0.0                 | 17.24           | 17.24                                     |

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## 5.2. Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEC 62209-1 have been incorporated in the following table. The body tissue dielectric parameters recommended by the IEC 62209-2 have been incorporated in the following table.

| Target Frequency<br>(MHz) | head         |                | body         |                |
|---------------------------|--------------|----------------|--------------|----------------|
|                           | $\epsilon_r$ | $\sigma$ (S/m) | $\epsilon_r$ | $\sigma$ (S/m) |
| 300                       | 45.3         | 0.87           | 45.3         | 0.87           |
| 450                       | 43.5         | 0.87           | 43.5         | 0.87           |
| <b>750</b>                | <b>41.9</b>  | <b>0.89</b>    | <b>41.9</b>  | <b>0.89</b>    |
| <b>835</b>                | <b>41.5</b>  | <b>0.90</b>    | <b>41.5</b>  | <b>0.90</b>    |
| 900                       | 41.5         | 0.97           | 41.5         | 0.97           |
| 915                       | 41.5         | 1.01           | 41.5         | 1.01           |
| 1450                      | 40.5         | 1.20           | 40.5         | 1.20           |
| 1610                      | 40.3         | 1.29           | 40.3         | 1.29           |
| <b>1750</b>               | <b>40.1</b>  | <b>1.37</b>    | <b>40.1</b>  | <b>1.37</b>    |
| <b>1800 – 2000</b>        | <b>40.0</b>  | <b>1.40</b>    | <b>40.0</b>  | <b>1.40</b>    |
| 2300                      | 39.5         | 1.67           | 39.5         | 1.67           |
| <b>2450</b>               | <b>39.2</b>  | <b>1.80</b>    | <b>39.2</b>  | <b>1.80</b>    |
| <b>2600</b>               | <b>39.0</b>  | <b>1.96</b>    | <b>39.0</b>  | <b>1.96</b>    |
| 3000                      | 38.5         | 2.40           | 38.5         | 2.40           |
| <b>5200</b>               | <b>36.0</b>  | <b>4.66</b>    | <b>36.0</b>  | <b>4.66</b>    |
| <b>5300</b>               | <b>35.9</b>  | <b>4.76</b>    | <b>35.9</b>  | <b>4.76</b>    |
| <b>5600</b>               | <b>35.5</b>  | <b>5.07</b>    | <b>35.5</b>  | <b>5.07</b>    |
| <b>5800</b>               | <b>35.3</b>  | <b>5.27</b>    | <b>35.3</b>  | <b>5.27</b>    |

( $\epsilon_r$  = relative permittivity,  $\sigma$  = conductivity and  $\rho = 1000$  kg/m<sup>3</sup>)

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### 5.3. Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using DASY 5 Dielectric Probe Kit and R&S Network Analyzer ZVL6.

| Tissue Stimulant Measurement for 750MHz |              |                                      |                                  |                        |               |
|---|--------------|--------------------------------------|----------------------------------|------------------------|---------------|
| Head                                    | Fr.<br>(MHz) | Dielectric Parameters ( $\pm 10\%$ ) |                                  | Tissue<br>Temp<br>[°C] | Test time     |
|   |              | $\epsilon_r$ 41.9 (37.71-46.09)      | $\delta$ [s/m] 0.89(0.801-0.979) |                        |               |
|   | 707.5        | 42.95                                | 0.88                             | 21.6                   | Nov. 08, 2021 |
|   | 710          | 42.74                                | 0.89                             |                        |               |
|   | 750          | 42.61                                | 0.90                             |                        |               |

| Tissue Stimulant Measurement for 835MHz |              |                                      |                                |                        |               |
|---|--------------|--------------------------------------|--------------------------------|------------------------|---------------|
| Head                                    | Fr.<br>(MHz) | Dielectric Parameters ( $\pm 10\%$ ) |                                | Tissue<br>Temp<br>[°C] | Test time     |
|   |              | $\epsilon_r$ 41.5 (37.35-45.65)      | $\delta$ [s/m] 0.90(0.81-0.99) |                        |               |
|   | 835          | 42.72                                | 0.88                           | 21.3                   | Nov. 24, 2021 |
|   | 836.6        | 42.57                                | 0.89                           |                        |               |

| Tissue Stimulant Measurement for 835MHz |              |                                      |                                |                        |               |
|---|--------------|--------------------------------------|--------------------------------|------------------------|---------------|
| Head                                    | Fr.<br>(MHz) | Dielectric Parameters ( $\pm 10\%$ ) |                                | Tissue<br>Temp<br>[°C] | Test time     |
|   |              | $\epsilon_r$ 41.5 (37.35-45.65)      | $\delta$ [s/m] 0.90(0.81-0.99) |                        |               |
|   | 835          | 41.07                                | 0.91                           | 21.1                   | Nov. 30, 2021 |
|   | 836.5        | 40.89                                | 0.92                           |                        |               |

| Tissue Stimulant Measurement for 1750MHz |              |                                      |                                  |                        |               |
|--|--------------|--------------------------------------|----------------------------------|------------------------|---------------|
| Head                                     | Fr.<br>(MHz) | Dielectric Parameters ( $\pm 10\%$ ) |                                  | Tissue<br>Temp<br>[°C] | Test time     |
|  |              | $\epsilon_r$ 40.1 (36.09-44.11)      | $\delta$ [s/m] 1.37(1.233-1.507) |                        |               |
|  | 1712.4       | 40.54                                | 1.34                             | 21.8                   | Nov. 03, 2021 |
|  | 1732.4       | 40.12                                | 1.35                             |                        |               |
|  | 1732.5       | 40.12                                | 1.35                             |                        |               |
|  | 1750         | 39.87                                | 1.36                             |                        |               |
|  | 1752.6       | 39.63                                | 1.37                             |                        |               |

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| Tissue Stimulant Measurement for 1900MHz |              |                                      |                               |                        |               |
|--|--------------|--------------------------------------|-------------------------------|------------------------|---------------|
| Head                                     | Fr.<br>(MHz) | Dielectric Parameters ( $\pm 10\%$ ) |                               | Tissue<br>Temp<br>[°C] | Test time     |
|  |              | $\epsilon_r$ 40.00(36.00-44.00)      | $\delta$ [s/m]1.40(1.26-1.54) |                        |               |
|  | 1850.2       | 39.95                                | 1.35                          | 21.2                   | Nov. 25, 2021 |
|  | 1880         | 39.69                                | 1.36                          |                        |               |
|  | 1900         | 39.57                                | 1.37                          |                        |               |
|  | 1909.8       | 39.32                                | 1.38                          |                        |               |

| Tissue Stimulant Measurement for 1900MHz |              |                                      |                               |                        |               |
|--|--------------|--------------------------------------|-------------------------------|------------------------|---------------|
| Head                                     | Fr.<br>(MHz) | Dielectric Parameters ( $\pm 10\%$ ) |                               | Tissue<br>Temp<br>[°C] | Test time     |
|  |              | $\epsilon_r$ 40.00(36.00-44.00)      | $\delta$ [s/m]1.40(1.26-1.54) |                        |               |
|  | 1880         | 39.76                                | 1.36                          | 21.3                   | Nov. 02, 2021 |
|  | 1900         | 39.56                                | 1.37                          |                        |               |

| Tissue Stimulant Measurement for 2450MHz |              |                                      |                               |                        |               |
|--|--------------|--------------------------------------|-------------------------------|------------------------|---------------|
| Head                                     | Fr.<br>(MHz) | Dielectric Parameters ( $\pm 10\%$ ) |                               | Tissue<br>Temp<br>[°C] | Test time     |
|  |              | $\epsilon_r$ 39.2(35.28-43.12)       | $\delta$ [s/m]1.80(1.62-1.98) |                        |               |
|  | 2437         | 38.99                                | 1.77                          | 21.4                   | Nov. 04, 2021 |
|  | 2450         | 38.71                                | 1.78                          |                        |               |

| Tissue Stimulant Measurement for 2600MHz |              |                                      |                                 |                        |               |
|--|--------------|--------------------------------------|---------------------------------|------------------------|---------------|
| Head                                     | Fr.<br>(MHz) | Dielectric Parameters ( $\pm 10\%$ ) |                                 | Tissue<br>Temp<br>[°C] | Test time     |
|  |              | $\epsilon_r$ 39(35.1-42.9)           | $\delta$ [s/m]1.96(1.764-2.156) |                        |               |
|  | 2535         | 38.75                                | 1.90                            | 21.6                   | Nov. 01, 2021 |
|  | 2600         | 38.64                                | 1.91                            |                        |               |

| Tissue Stimulant Measurement for 5200MHz |              |                                      |                    |                        |               |
|--|--------------|--------------------------------------|--------------------|------------------------|---------------|
| Head                                     | Fr.<br>(MHz) | Dielectric Parameters ( $\pm 10\%$ ) |                    | Tissue<br>Temp<br>[°C] | Test time     |
|  |              | $\epsilon_r$                         | $\delta$ [s/m]     |                        |               |
|  | 5200         | 36.0(32.4-39.6)                      | 4.66(4.194 -5.126) | 21.7                   | Nov. 28, 2021 |
|  | 5220         | 36.63                                | 4.80               |                        |               |

| Tissue Stimulant Measurement for 5800MHz |              |                                      |                    |                        |               |
|--|--------------|--------------------------------------|--------------------|------------------------|---------------|
| Head                                     | Fr.<br>(MHz) | Dielectric Parameters ( $\pm 10\%$ ) |                    | Tissue<br>Temp<br>[°C] | Test time     |
|  |              | $\epsilon_r$                         | $\delta$ [s/m]     |                        |               |
|  | 5785         | 35.3 (31.77-38.83)                   | 5.27 (4.743-5.797) | 21.3                   | Nov. 29, 2021 |
|  | 5800         | 35.87                                | 5.24               |                        |               |

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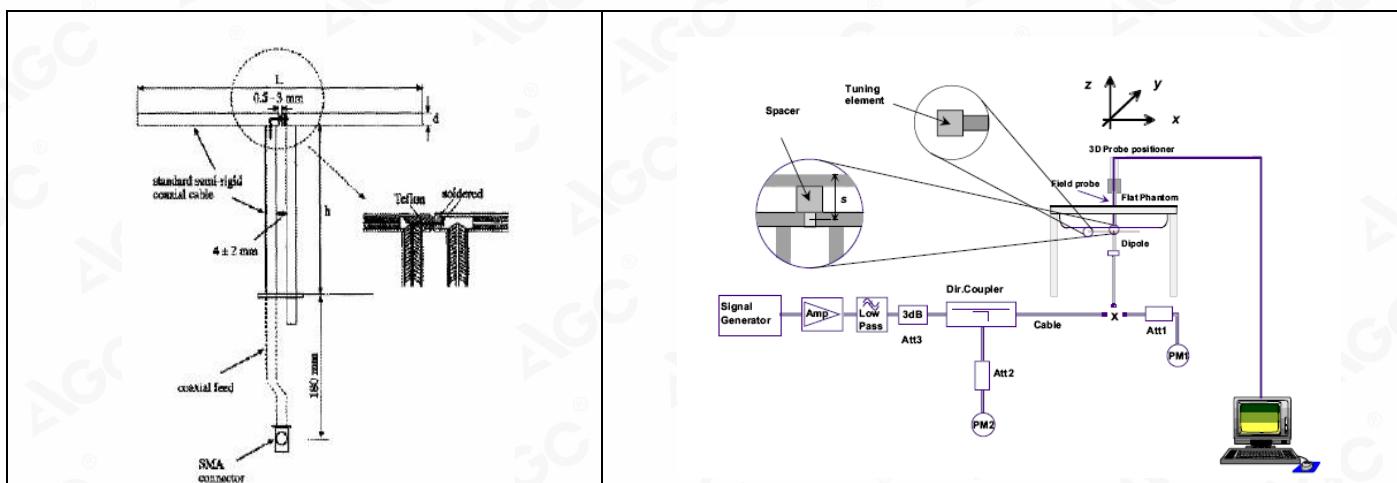
## 6. SAR SYSTEM CHECK PROCEDURE

### 6.1. SAR System Check Procedures

SAR system check is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are remeasured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

Each DASY system is equipped with one or more system check kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system check and system validation. System kit includes a dipole, and dipole device holder.

The system check verifies that the system operates within its specifications. It's performed daily or before every SAR measurement. The system check uses normal SAR measurement in the flat section of the phantom with a matched dipole at a specified distance. The system check setup is shown as below.



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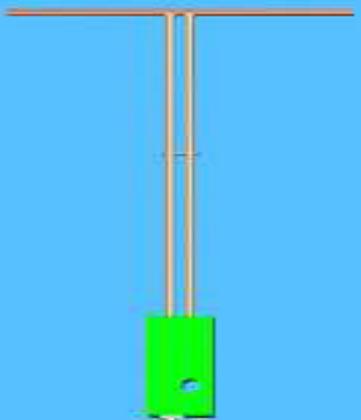
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## 6.2. SAR System Check

### 6.2.1. Dipoles

|  |  |
|--|--|
|   | <p>The dipoles used are based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of IEEE. the table below provides details for the mechanical and electrical specifications for the dipoles.</p> |
|  | <p>The wave guide is based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of IEEE. The table below provides details for the mechanical and electrical specifications for the wave guide.</p> |

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| Frequency | L (mm) | h (mm) | d (mm) |
|-----------|--------|--------|--------|
| 750MHz    | 176    | 100    | 6.35   |
| 835MHz    | 161.0  | 89.8   | 3.6    |
| 1800MHz   | 71.6   | 41.7   | 3.6    |
| 1900MHz   | 68     | 39.5   | 3.6    |
| 2300MHz   | 55.5   | 32.6   | 3.6    |
| 2450MHz   | 51.5   | 30.4   | 3.6    |
| 2600MHz   | 48.5   | 28.8   | 3.6    |

| Frequency | L (mm) | W (mm) | L <sub>f</sub> (mm) | W <sub>f</sub> (mm) |
|-----------|--------|--------|---------------------|---------------------|
| 5000MHz   | 40.39  | 20.19  | 81.03               | 61.98               |

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### 6.2.2. System Check Result

| System Performance Check at 750MHz&835MHz &1800MHz &1900MHz &2300MHz &2450MHz &2600MHz& 5000-6000MHz   |                    |       |                                 |               |                    |       |                   |               |
|--|--------------------|-------|---------------------------------|---------------|--------------------|-------|-------------------|---------------|
| Validation Kit: SN47/14 DIP 0G750-340& SN29/15 DIP 0G835-383& SN46/11 DIP 1G800-186& SN 46/11 DIP 1G900-187& SN 47/14 DIP 2G300-341& SN46/11 DIP 2G450-189&& SN 47/14 DIP 2G600-342& SN 15/15 WGA 36 |                    |       |                                 |               |                    |       |                   |               |
| Frequency [MHz]  | Target Value(W/kg) |       | Reference Result ( $\pm 10\%$ ) |               | Tested Value(W/kg) |       | Tissue Temp. [°C] | Test time     |
|  | 1g                 | 10g   | 1g                              | 10g           | 1g                 | 10g   |                   |               |
| 750  | 8.31               | 5.45  | 7.479-9.141                     | 4.905-5.995   | 8.35               | 5.61  | 21.6              | Nov. 08, 2021 |
| 835  | 9.85               | 6.27  | 8.865-10.835                    | 5.643-6.897   | 9.64               | 6.17  | 21.3              | Nov. 24, 2021 |
| 835  | 9.85               | 6.27  | 8.865-10.835                    | 5.643-6.897   | 9.78               | 6.13  | 21.1              | Nov. 30, 2021 |
| 1800   | 39.07              | 20.29 | 35.163-42.977                   | 18.261-22.319 | 37.24              | 19.49 | 21.8              | Nov. 03, 2021 |
| 1900   | 40.25              | 20.50 | 36.225-44.275                   | 18.45-22.55   | 39.31              | 20.45 | 21.2              | Nov. 25, 2021 |
| 1900   | 40.25              | 20.50 | 36.225-44.275                   | 18.45-22.55   | 39.31              | 20.13 | 21.3              | Nov. 02, 2021 |
| 2450   | 53.97              | 24.01 | 48.573-59.367                   | 21.609-26.411 | 54.36              | 24.72 | 21.4              | Nov. 04, 2021 |
| 2600   | 56.86              | 24.84 | 51.174-62.546                   | 22.356-27.324 | 55.31              | 23.30 | 21.6              | Nov. 01, 2021 |
| 5200   | 161.18             | 55.04 | 145.062-177.298                 | 49.536-60.544 | 169.0              | 58.7  | 21.7              | Nov. 28, 2021 |
| 5800   | 181.69             | 60.11 | 163.521-199.859                 | 54.099-66.121 | 171.0              | 57.4  | 21.3              | Nov. 29, 2021 |

Note:

(1) We use a CW signal of 18dBm&10dBm for system check, and then all SAR values are normalized to 1W forward power. The result must be within  $\pm 10\%$  of target value.

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## 7. EUT TEST POSITION

This EUT was tested in **Body back, Body front and 4 edges**.

### 7.1. Body Worn Position

- (1) To position the EUT parallel to the phantom surface.
- (2) To adjust the EUT parallel to the flat phantom.
- (3) To adjust the distance between the EUT surface and the flat phantom to **5mm**.

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## 8. SAR EXPOSURE LIMITS

### Limits for General Population/Uncontrolled Exposure (W/kg)

| Type Exposure                                       | Uncontrolled Environment Limit (W/kg) |
|---|---------------------------------------|
| Spatial Peak SAR (1g cube tissue for brain or body) | 1.60                                  |
| Spatial Average SAR (Whole body)                    | 0.08                                  |
| Spatial Peak SAR (Limbs)                            | 4.0                                   |

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## 9. TEST FACILITY

|  |  |
|--|--|
| <b>Test Site</b>                         | Attestation of Global Compliance (Shenzhen) Co., Ltd   |
| <b>Location</b>                          | 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |
| <b>Designation Number</b>                | CN1259   |
| <b>FCC Test Firm Registration Number</b> | 975832   |
| <b>A2LA Cert. No.</b>                    | 5054.02  |
| <b>Description</b>                       | Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA  |

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## 10. TEST EQUIPMENT LIST

| Equipment description      | Manufacturer/ Model     | Identification No.     | Current calibration date | Next calibration date |
|----------------------------|-------------------------|------------------------|--------------------------|-----------------------|
| Stäubli Robot              | Stäubli-TX60            | F13/5Q2UD1/A/01        | N/A                      | N/A                   |
| Robot Controller           | Stäubli-CS8             | 139522                 | N/A                      | N/A                   |
| E-Field Probe              | Speag- EX3DV4           | SN:3953                | Aug. 27,2021             | Aug. 26,2022          |
| SAM Twin Phantom           | Speag-SAM               | 1790                   | N/A                      | N/A                   |
| Device Holder              | Speag-SD 000 H01 KA     | SD 000 H01 KA          | N/A                      | N/A                   |
| DAE4                       | Speag-SD 000 D04 BM     | 1398                   | May 17,2021              | May 16,2022           |
| SAR Software               | Speag-DASY5             | DASY52.8.7.1137        | N/A                      | N/A                   |
| Liquid                     | SATIMO                  | -                      | N/A                      | N/A                   |
| Radio Communication Tester | R&S-CMU200              | 115532                 | Apr. 14,2021             | Apr. 13,2022          |
| Dipole                     | SATIMO SID750           | SN47/14 DIP 0G750-340  | Apr. 26,2019             | Apr. 25,2022          |
| Dipole                     | SATIMO SID835           | SN 29/15 DIP 0G850-383 | Apr. 26,2019             | Apr. 25,2022          |
| Dipole                     | SATIMO SID1800          | SN46/11 DIP 1G800-186  | Apr. 26,2019             | Apr. 25,2022          |
| Dipole                     | SATIMO SID1900          | SN 46/11 DIP 1G900-187 | Apr. 26,2019             | Apr. 25,2022          |
| Dipole                     | SATIMO SID2450          | SN 46/11 DIP 2G450-189 | Apr. 26,2019             | Apr. 25,2022          |
| Dipole                     | SATIMO SID2600          | SN 47/14 DIP 2G600-342 | Apr. 26,2019             | Apr. 25,2022          |
| Wave guide                 | SWG5500                 | SN 15/15 WGA 36        | Apr. 26,2019             | Apr. 25,2022          |
| Signal Generator           | Agilent-E4438C          | US41461365             | Aug. 18,2021             | Aug. 17,2022          |
| Vector Analyzer            | Agilent / E4440A        | MY44303916             | Mar. 21,2021             | Mar. 20,2022          |
| Network Analyzer           | Rhode & Schwarz ZVL6    | SN101443               | Oct. 28,2021             | Oct. 27,2022          |
| Attenuator                 | Warison WATT-6SR1211    | S/N:WRJ34AYM2F1        | June 09,2021             | June 08,2022          |
| Attenuator                 | Mini-circuits / VAT-10+ | 31405                  | June 09,2021             | June 08,2022          |
| Amplifier                  | AS0104-55_55            | 1004793                | June 10,2021             | June 09,2022          |
| Directional Couple         | Werlatone/ C5571-10     | SN99463                | May 15,2020              | May 14,2022           |
| Directional Couple         | Werlatone/ C6026-10     | SN99482                | May 15,2020              | May 14,2022           |
| Power Sensor               | NRP-Z21                 | 1137.6000.02           | Sep. 07,2021             | Sep. 06,2022          |
| Power Sensor               | NRP-Z23                 | 100323                 | Feb. 17,2021             | Feb. 16,2022          |
| Power Viewer               | R&S                     | V2.3.1.0               | N/A                      | N/A                   |

Note: Per KDB 865664 Dipole SAR Validation, AGC Lab has adopted 3 years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole;
2. System validation with specific dipole is within 10% of calibrated value;

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3. Return-loss is within 20% of calibrated measurement;
4. Impedance is within 5Ω of calibrated measurement.

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## 11. MEASUREMENT UNCERTAINTY

| DASY Uncertainty- EX3DV4<br>Measurement uncertainty for Dipole averaged over 1 gram / 10 gram. |       |                   |                |             |              |              |                         |                         |          |
|--|-------|-------------------|----------------|-------------|--------------|--------------|-------------------------|-------------------------|----------|
| a  | b     | c                 | d              | e<br>f(d,k) | f            | g            | h<br>cx <sup>2</sup> /e | i<br>cx <sup>2</sup> /e | k        |
| Uncertainty Component  | Sec.  | Tol<br>( $\pm$ %) | Prob.<br>Dist. | Div.        | Ci (1g)      | Ci (10g)     | 1g Ui<br>( $\pm$ %)     | 10g Ui<br>( $\pm$ %)    | vi       |
| <b>Measurement System</b>  |       |                   |                |             |              |              |                         |                         |          |
| Probe calibration  | E.2.1 | 6.65              | N              | 1           | 1            | 1            | 6.65                    | 6.65                    | $\infty$ |
| Axial Isotropy   | E.2.2 | 0.6               | R              | $\sqrt{3}$  | $\sqrt{0.5}$ | $\sqrt{0.5}$ | 0.24                    | 0.24                    | $\infty$ |
| Hemispherical Isotropy   | E.2.2 | 1.6               | R              | $\sqrt{3}$  | $\sqrt{0.5}$ | $\sqrt{0.5}$ | 0.65                    | 0.65                    | $\infty$ |
| Boundary effect  | E.2.3 | 1                 | R              | $\sqrt{3}$  | 1            | 1            | 0.58                    | 0.58                    | $\infty$ |
| Linearity  | E.2.4 | 0.45              | R              | $\sqrt{3}$  | 1            | 1            | 0.26                    | 0.26                    | $\infty$ |
| System detection limits  | E.2.4 | 1                 | R              | $\sqrt{3}$  | 1            | 1            | 0.58                    | 0.58                    | $\infty$ |
| Modulation response  | E.2.5 | 3.3               | R              | $\sqrt{3}$  | 1            | 1            | 1.91                    | 1.91                    | $\infty$ |
| Readout Electronics  | E.2.6 | 0.15              | N              | 1           | 1            | 1            | 0.15                    | 0.15                    | $\infty$ |
| Response Time  | E.2.7 | 0                 | R              | $\sqrt{3}$  | 1            | 1            | 0.00                    | 0.00                    | $\infty$ |
| Integration Time   | E.2.8 | 1.7               | R              | $\sqrt{3}$  | 1            | 1            | 0.98                    | 0.98                    | $\infty$ |
| RF ambient conditions-Noise  | E.6.1 | 3                 | R              | $\sqrt{3}$  | 1            | 1            | 1.73                    | 1.73                    | $\infty$ |
| RF ambient conditions-reflections  | E.6.1 | 3                 | R              | $\sqrt{3}$  | 1            | 1            | 1.73                    | 1.73                    | $\infty$ |
| Probe positioner mechanical tolerance  | E.6.2 | 0.4               | R              | $\sqrt{3}$  | 1            | 1            | 0.23                    | 0.23                    | $\infty$ |
| Probe positioning with respect to phantom shell  | E.6.3 | 6.7               | R              | $\sqrt{3}$  | 1            | 1            | 3.87                    | 3.87                    | $\infty$ |
| Extrapolation, interpolation, and integrations algorithms for max. SAR evaluation              | E.5   | 4                 | R              | $\sqrt{3}$  | 1            | 1            | 2.31                    | 2.31                    | $\infty$ |
| <b>Test sample Related</b>   |       |                   |                |             |              |              |                         |                         |          |
| Test sample positioning  | E.4.2 | 2.9               | N              | 1           | 1            | 1            | 2.90                    | 2.90                    | $\infty$ |
| Device holder uncertainty  | E.4.1 | 3.6               | N              | 1           | 1            | 1            | 3.60                    | 3.60                    | $\infty$ |
| Output power variation—SAR drift measurement   | E.2.9 | 5                 | R              | $\sqrt{3}$  | 1            | 1            | 2.89                    | 2.89                    | $\infty$ |
| SAR scaling  | E.6.5 | 5                 | R              | $\sqrt{3}$  | 1            | 1            | 2.89                    | 2.89                    | $\infty$ |
| <b>Phantom and tissue parameters</b>   |       |                   |                |             |              |              |                         |                         |          |
| Phantom shell uncertainty—shape, thickness, and permittivity                                   | E.3.1 | 6.6               | R              | $\sqrt{3}$  | 1            | 1            | 3.81                    | 3.81                    | $\infty$ |
| Uncertainty in SAR correction for deviations in permittivity and conductivity                  | E.3.2 | 1.9               | N              | 1           | 1            | 0.84         | 1.90                    | 1.60                    | $\infty$ |
| Liquid conductivity measurement  | E.3.3 | 4                 | N              | 1           | 0.78         | 0.71         | 3.12                    | 2.84                    | M        |
| Liquid permittivity measurement  | E.3.3 | 5                 | N              | 1           | 0.23         | 0.26         | 1.15                    | 1.30                    | M        |
| Liquid conductivity—temperature uncertainty  | E.3.4 | 2.5               | R              | $\sqrt{3}$  | 0.78         | 0.71         | 1.13                    | 1.02                    | $\infty$ |
| Liquid permittivity—temperature uncertainty  | E.3.4 | 2.5               | R              | $\sqrt{3}$  | 0.23         | 0.26         | 0.33                    | 0.38                    | $\infty$ |
| Combined Standard Uncertainty  |       |                   | RSS            |             |              |              | 11.79                   | 11.63                   |          |
| Expanded Uncertainty (95% Confidence interval)   |       |                   | K=2            |             |              |              | 23.59                   | 23.26                   |          |

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| DASY Uncertainty- EX3DV4<br>System Check uncertainty for Dipole averaged over 1 gram / 10 gram. |         |              |                |             |         |          |                         |                |    |
|---|---------|--------------|----------------|-------------|---------|----------|-------------------------|----------------|----|
| a   | b       | c            | d              | e<br>f(d,k) | f       | g        | h<br>cx <sup>2</sup> /e | i<br>cxg/e     | k  |
| Uncertainty Component   | Sec.    | Tol<br>(± %) | Prob.<br>Dist. | Div.        | Ci (1g) | Ci (10g) | 1g Ui<br>(±%)           | 10g Ui<br>(±%) | vi |
| <b>Measurement System</b>   |         |              |                |             |         |          |                         |                |    |
| Probe calibration drift   | E.2.1   | 0.5          | N              | 1           | 1       | 1        | 0.5                     | 0.5            | ∞  |
| Axial Isotropy  | E.2.2   | 0.6          | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| Hemispherical Isotropy  | E.2.2   | 1.6          | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| Boundary effect   | E.2.3   | 1            | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| Linearity   | E.2.4   | 0.45         | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| System detection limits   | E.2.4   | 1            | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| Modulation response   | E.2.5   | 3.3          | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| Readout Electronics   | E.2.6   | 0.15         | N              | 1           | 0       | 0        | 0.00                    | 0.00           | ∞  |
| Response Time   | E.2.7   | 0            | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| Integration Time  | E.2.8   | 1.7          | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| RF ambient conditions-Noise   | E.6.1   | 3            | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| RF ambient conditions-reflections   | E.6.1   | 3            | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| Probe positioner mechanical tolerance   | E.6.2   | 0.4          | R              | $\sqrt{3}$  | 1       | 1        | 0.37                    | 0.37           | ∞  |
| Probe positioning with respect to phantom shell   | E.6.3   | 6.7          | R              | $\sqrt{3}$  | 1       | 1        | 3.87                    | 3.87           | ∞  |
| Extrapolation, interpolation, and integrations algorithms for max. SAR evaluation               | E.5     | 4            | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| <b>System check source (dipole)</b>   |         |              |                |             |         |          |                         |                |    |
| Deviation of experimental dipoles   | E.6.4   | 2.0          | N              | 1           | 1       | 1        | 2.00                    | 2.00           | ∞  |
| Input power and SAR drift measurement   | 8,E.6.4 | 5.0          | R              | $\sqrt{3}$  | 1       | 1        | 2.89                    | 2.89           | ∞  |
| Dipole axis to liquid distance  | 8,E.6.6 | 2.0          | R              | $\sqrt{3}$  | 1       | 1        | 1.15                    | 1.15           | ∞  |
| <b>Phantom and tissue parameters</b>  |         |              |                |             |         |          |                         |                |    |
| Phantom shell uncertainty—shape, thickness, and permittivity                                    | E.3.1   | 6.6          | R              | $\sqrt{3}$  | 1       | 1        | 3.81                    | 3.81           | ∞  |
| Uncertainty in SAR correction for deviations in permittivity and conductivity                   | E.3.2   | 1.9          | N              | 1           | 1       | 0.84     | 1.90                    | 1.60           | ∞  |
| Liquid conductivity measurement   | E.3.3   | 4            | N              | 1           | 0.78    | 0.71     | 3.12                    | 2.84           | M  |
| Liquid permittivity measurement   | E.3.3   | 5            | N              | 1           | 0.23    | 0.26     | 1.15                    | 1.30           | M  |
| Liquid conductivity—temperature uncertainty   | E.3.4   | 2.5          | R              | $\sqrt{3}$  | 0.78    | 0.71     | 1.13                    | 1.02           | ∞  |
| Liquid permittivity—temperature uncertainty   | E.3.4   | 2.5          | R              | $\sqrt{3}$  | 0.23    | 0.26     | 0.33                    | 0.38           | ∞  |
| Combined Standard Uncertainty   |         |              | RSS            |             |         |          | 7.34                    | 7.07           |    |
| Expanded Uncertainty (95% Confidence interval)  |         |              | K=2            |             |         |          | 14.67                   | 14.14          |    |

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| DASY Uncertainty- EX3DV4  |         |             |                |             |         |          |                         |                |    |
|---|---------|-------------|----------------|-------------|---------|----------|-------------------------|----------------|----|
| System Validation uncertainty for Dipole averaged over 1 gram / 10 gram.          |         |             |                |             |         |          |                         |                |    |
| a   | b       | c           | d              | e<br>f(d,k) | f       | g        | h<br>cx <sup>2</sup> /e | i<br>cxg/e     | k  |
| Uncertainty Component   | Sec.    | Tol<br>(±%) | Prob.<br>Dist. | Div.        | Ci (1g) | Ci (10g) | 1g Ui<br>(±%)           | 10g Ui<br>(±%) | vi |
| <b>Measurement System</b>   |         |             |                |             |         |          |                         |                |    |
| Probe calibration   | E.2.1   | 6.65        | N              | 1           | 1       | 1        | 6.65                    | 6.65           | ∞  |
| Axial Isotropy  | E.2.2   | 0.6         | R              | $\sqrt{3}$  | 1       | 1        | 0.35                    | 0.35           | ∞  |
| Hemispherical Isotropy  | E.2.2   | 1.6         | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| Boundary effect   | E.2.3   | 1           | R              | $\sqrt{3}$  | 1       | 1        | 0.58                    | 0.58           | ∞  |
| Linearity   | E.2.4   | 0.45        | R              | $\sqrt{3}$  | 1       | 1        | 0.26                    | 0.26           | ∞  |
| System detection limits   | E.2.4   | 1           | R              | $\sqrt{3}$  | 1       | 1        | 0.58                    | 0.58           | ∞  |
| Modulation response   | E.2.5   | 3.3         | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| Readout Electronics   | E.2.6   | 0.15        | N              | 1           | 1       | 1        | 0.15                    | 0.15           | ∞  |
| Response Time   | E.2.7   | 0           | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| Integration Time  | E.2.8   | 1.7         | R              | $\sqrt{3}$  | 0       | 0        | 0.00                    | 0.00           | ∞  |
| RF ambient conditions-Noise   | E.6.1   | 3           | R              | $\sqrt{3}$  | 1       | 1        | 1.73                    | 1.73           | ∞  |
| RF ambient conditions-reflections   | E.6.1   | 3           | R              | $\sqrt{3}$  | 1       | 1        | 1.73                    | 1.73           | ∞  |
| Probe positioner mechanical tolerance   | E.6.2   | 0.4         | R              | $\sqrt{3}$  | 1       | 1        | 0.23                    | 0.23           | ∞  |
| Probe positioning with respect to phantom shell                                   | E.6.3   | 6.7         | R              | $\sqrt{3}$  | 1       | 1        | 3.87                    | 3.87           | ∞  |
| Extrapolation, interpolation, and integrations algorithms for max. SAR evaluation | E.5     | 4           | R              | $\sqrt{3}$  | 1       | 1        | 2.31                    | 2.31           | ∞  |
| <b>System check source (dipole)</b>   |         |             |                |             |         |          |                         |                |    |
| Deviation of experimental dipole from numerical dipole                            | E.6.4   | 5.0         | N              | 1           | 1       | 1        | 5.00                    | 5.00           | ∞  |
| Input power and SAR drift measurement   | 8,6.6.4 | 5.0         | R              | $\sqrt{3}$  | 1       | 1        | 2.89                    | 2.89           | ∞  |
| Dipole axis to liquid distance  | 8,E.6.6 | 2.0         | R              | $\sqrt{3}$  | 1       | 1        | 1.15                    | 1.15           | ∞  |
| <b>Phantom and tissue parameters</b>  |         |             |                |             |         |          |                         |                |    |
| Phantom shell uncertainty—shape, thickness, and permittivity                      | E.3.1   | 6.6         | R              | $\sqrt{3}$  | 1       | 1        | 3.81                    | 3.81           | ∞  |
| Uncertainty in SAR correction for deviations in permittivity and conductivity     | E.3.2   | 1.9         | N              | 1           | 1       | 0.84     | 1.90                    | 1.60           | ∞  |
| Liquid conductivity measurement   | E.3.3   | 4           | N              | 1           | 0.78    | 0.71     | 3.12                    | 2.84           | M  |
| Liquid permittivity measurement   | E.3.3   | 5           | N              | 1           | 0.23    | 0.26     | 1.15                    | 1.30           | M  |
| Liquid conductivity—temperature uncertainty                                       | E.3.4   | 2.5         | R              | $\sqrt{3}$  | 0.78    | 0.71     | 1.13                    | 1.02           | ∞  |
| Liquid permittivity—temperature uncertainty                                       | E.3.4   | 2.5         | R              | $\sqrt{3}$  | 0.23    | 0.26     | 0.33                    | 0.38           | ∞  |
| Combined Standard Uncertainty   |         |             | RSS            |             |         |          | 11.45                   | 11.28          |    |
| Expanded Uncertainty (95% Confidence interval)                                    |         |             | K=2            |             |         |          | 22.89                   | 22.55          |    |

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## 12. CONDUCTED POWER MEASUREMENT

### GSM BAND

| Mode                  | Frequency(MHz) | Avg. Burst Power(dBm) | Duty cycle Factor(dBm) | Frame Power(dBm) |
|-----------------------|----------------|-----------------------|------------------------|------------------|
| Maximum Power <1>     |                |                       |                        |                  |
| GSM 850               | 824.2          | 32.87                 | -9                     | 23.87            |
|                       | 836.6          | 32.92                 | -9                     | 23.92            |
|                       | 848.8          | <b>32.96</b>          | -9                     | 23.96            |
| GPRS 850<br>(1 Slot)  | 824.2          | 32.65                 | -9                     | 23.65            |
|                       | 836.6          | 32.44                 | -9                     | 23.44            |
|                       | 848.8          | 32.41                 | -9                     | 23.41            |
| GPRS 850<br>(2 Slot)  | 824.2          | 30.12                 | -6                     | 24.12            |
|                       | 836.6          | 30.08                 | -6                     | 24.08            |
|                       | 848.8          | 31.32                 | -6                     | <b>25.32</b>     |
| GPRS 850<br>(3 Slot)  | 824.2          | 28.44                 | -4.26                  | 24.18            |
|                       | 836.6          | 28.53                 | -4.26                  | 24.27            |
|                       | 848.8          | 28.24                 | -4.26                  | 23.98            |
| GPRS 850<br>(4 Slot)  | 824.2          | 26.78                 | -3                     | 23.78            |
|                       | 836.6          | 26.71                 | -3                     | 23.71            |
|                       | 848.8          | 26.51                 | -3                     | 23.51            |
| EGPRS 850<br>(1 Slot) | 824.2          | 28.21                 | -9                     | 19.21            |
|                       | 836.6          | 27.90                 | -9                     | 18.90            |
|                       | 848.8          | 27.69                 | -9                     | 18.69            |
| EGPRS 850<br>(2 Slot) | 824.2          | 26.03                 | -6                     | 20.03            |
|                       | 836.6          | 26.12                 | -6                     | 20.12            |
|                       | 848.8          | 25.94                 | -6                     | 19.94            |
| EGPRS 850<br>(3 Slot) | 824.2          | 24.32                 | -4.26                  | 20.06            |
|                       | 836.6          | 24.28                 | -4.26                  | 20.02            |
|                       | 848.8          | 24.33                 | -4.26                  | 20.07            |
| EGPRS 850<br>(4 Slot) | 824.2          | 22.02                 | -3                     | 19.02            |
|                       | 836.6          | 22.12                 | -3                     | 19.12            |
|                       | 848.8          | 22.35                 | -3                     | 19.35            |

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## GSM BAND CONTINUE

| Mode                  | Frequency(MHz) | Avg. Burst Power(dBm) | Duty cycle Factor(dBm) | Frame Power(dBm) |
|-----------------------|----------------|-----------------------|------------------------|------------------|
| Maximum Power <1>     |                |                       |                        |                  |
| PCS1900               | 1850.2         | 29.14                 | -9                     | 20.14            |
|                       | 1880           | 29.92                 | -9                     | 20.92            |
|                       | 1909.8         | 29.87                 | -9                     | 20.87            |
| GPRS1900<br>(1 Slot)  | 1850.2         | 29.18                 | -9                     | 20.18            |
|                       | 1880           | <b>29.95</b>          | -9                     | 20.95            |
|                       | 1909.8         | 29.88                 | -9                     | 20.88            |
| GPRS1900<br>(2 Slot)  | 1850.2         | 27.74                 | -6                     | 21.74            |
|                       | 1880           | 27.56                 | -6                     | 21.56            |
|                       | 1909.8         | 27.84                 | -6                     | <b>21.84</b>     |
| GPRS1900<br>(3 Slot)  | 1850.2         | 25.43                 | -4.26                  | 21.17            |
|                       | 1880           | 25.71                 | -4.26                  | 21.45            |
|                       | 1909.8         | 25.64                 | -4.26                  | 21.38            |
| GPRS1900<br>(4 Slot)  | 1850.2         | 23.22                 | -3                     | 20.22            |
|                       | 1880           | 23.58                 | -3                     | 20.58            |
|                       | 1909.8         | 23.47                 | -3                     | 20.47            |
| EGPRS1900<br>(1 Slot) | 1850.2         | 25.07                 | -9                     | 16.07            |
|                       | 1880           | 25.50                 | -9                     | 16.50            |
|                       | 1909.8         | 25.86                 | -9                     | 16.86            |
| EGPRS1900<br>(2 Slot) | 1850.2         | 23.46                 | -6                     | 17.46            |
|                       | 1880           | 23.85                 | -6                     | 17.85            |
|                       | 1909.8         | 23.44                 | -6                     | 17.44            |
| EGPRS1900<br>(3 Slot) | 1850.2         | 21.56                 | -4.26                  | 17.30            |
|                       | 1880           | 21.61                 | -4.26                  | 17.35            |
|                       | 1909.8         | 21.67                 | -4.26                  | 17.41            |
| EGPRS1900<br>(4 Slot) | 1850.2         | 20.05                 | -3                     | 17.05            |
|                       | 1880           | 19.96                 | -3                     | 16.96            |
|                       | 1909.8         | 19.86                 | -3                     | 16.86            |

## Note 1:

The Frame Power (Source-based time-averaged Power) is scaled the maximum burst average power based on time slots. The calculated methods are show as following:

Frame Power = Max burst power (1 Up Slot) - 9 dB

Frame Power = Max burst power (2 Up Slot) - 6 dB

Frame Power = Max burst power (3 Up Slot) - 4.26 dB

Frame Power = Max burst power (4 Up Slot) - 3 dB

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**UMTS BAND**
**HSDPA Setup Configuration:**

- The EUT was connected to Base Station CMU200 referred to the Setup Configuration.
- The RF path losses were compensated into the measurements.
- A call was established between EUT and Based Station with following setting:
  - (1) Set Gain Factors( $\beta_c$  and  $\beta_d$ ) parameters set according to each
  - (2) Set RMC 12.2Kbps+HSDPA mode.
  - (3) Set Cell Power=-86dBm
  - (4) Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
  - (5) Select HSDPA Uplink Parameters
  - (6) Set Delta ACK, Delta NACK and Delta CQI=8
  - (7) Set Ack - Nack Repetition Factor to 3
  - (8) Set CQI Feedback Cycle (k) to 4ms
  - (9) Set CQI Repetition Factor to 2
  - (10) Power Ctrl Mode=All Up bits
- The transmitted maximum output power was recorded.

 Table C.10.2.4:  $\beta$  values for transmitter characteristics tests with HS-DPCCH

| Sub-test | $\beta_c$ (Note5) | $\beta_d$     | $\beta_d$ (SF) | $\beta_c/\beta_d$ | $\beta_{HS}$ (Note1, Note 2) | CM (dB) (Note 3) | MPR (dB) (Note 3) |
|----------|-------------------|---------------|----------------|-------------------|------------------------------|------------------|-------------------|
| 1        | 2/15              | 15/15         | 64             | 2/15              | 4/15                         | 0.0              | 0.0               |
| 2        | 12/15(Note 4)     | 15/15(Note 4) | 64             | 12/15(Note 4)     | 24/15                        | 1.0              | 0.0               |
| 3        | 15/15             | 8/15          | 64             | 15/8              | 30/15                        | 1.5              | 0.5               |
| 4        | 15/15             | 4/15          | 64             | 15/4              | 30/15                        | 1.5              | 0.5               |

Note 1:  $\Delta$ ACK,  $\Delta$ NACK and  $\Delta$ CQI = 30/15 with  $\beta_{hs} = 30/15 * \beta_c$ .

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause

5.13.1AA,  $\Delta$ ACK and  $\Delta$ NACK = 30/15 with  $\beta_{hs} = 30/15 * \beta_c$ , and  $\Delta$ CQI = 24/15 with  $\beta_{hs} = 24/15 * \beta_c$ .

Note 3: CM = 1 for  $\beta_c/\beta_d = 12/15$ ,  $hs/c = 24/15$ . For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the  $c/d$  ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to  $c = 11/15$  and  $d = 15/15$ .

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**HSUPA Setup Configuration:**

- The EUT was connected to Base Station CMU200 referred to the Setup Configuration.
- The RF path losses were compensated into the measurements.
- A call was established between EUT and Base Station with following setting \* :

- (1) Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
- (2) Set the Gain Factors ( $\beta_c$  and  $\beta_d$ ) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
- (3) Set Cell Power = -86 dBm
- (4) Set Channel Type = 12.2k + HSPA
- (5) Set UE Target Power
- (6) Power Ctrl Mode= Alternating bits
- (7) Set and observe the E-TFCI
- (8) Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI

- The transmitted maximum output power was recorded.

 Table C.11.1.3:  $\beta$  values for transmitter characteristics tests with HS-DPCCH and E-DCH

| Sub-test | $\beta_c$         | $\beta_d$         | $\beta_d$<br>(SF ) | $\beta_c/\beta_d$ | $\beta_{HS}$<br>(Note 1) | $\beta_{EC}$ | $\beta_{ED}$<br>(Note 4)<br>(Note 5)               | $\beta_{ED}$<br>(SF ) | $\beta_{ED}$<br>(Codes) | CM<br>(dB)<br>(Note 2) | MPR<br>(dB)<br>(Note 2)<br>(Note 6) | AG<br>Index<br>(Note 5) | E-TF<br>CI |
|----------|-------------------|-------------------|--------------------|-------------------|--------------------------|--------------|--|-----------------------|-------------------------|------------------------|-------------------------------------|-------------------------|------------|
| 1        | 11/15<br>(Note 3) | 15/15<br>(Note 3) | 64                 | 11/15<br>(Note 3) | 22/15                    | 209/225      | 1309/225   | 4                     | 1                       | 1.0                    | 0.0                                 | 20                      | 75         |
| 2        | 6/15              | 15/15             | 64                 | 6/15              | 12/15                    | 12/15        | 94/75  | 4                     | 1                       | 3.0                    | 2.0                                 | 12                      | 67         |
| 3        | 15/15             | 9/15              | 64                 | 15/9              | 30/15                    | 30/15        | $\beta_{ED1}:$<br>47/15<br>$\beta_{ED2}:$<br>47/15 | 4<br>4                | 2                       | 2.0                    | 1.0                                 | 15                      | 92         |
| 4        | 2/15              | 15/15             | 64                 | 2/15              | 4/15                     | 2/15         | 56/75  | 4                     | 1                       | 3.0                    | 2.0                                 | 17                      | 71         |
| 5        | 15/15             | 0                 | -                  | -                 | 5/15                     | 5/15         | 47/15  | 4                     | 1                       | 1.0                    | 0.0                                 | 12                      | 67         |

Note 1: For sub-test 1 to 4,  $\Delta ACK$ ,  $\Delta NACK$  and  $\Delta CQI = 30/15$  with  $\beta_{hs} = 30/15 * \beta_c$ . For sub-test 5,  $\Delta ACK$ ,  $\Delta NACK$  and  $\Delta CQI = 5/15$  with  $\beta_{hs} = 5/15 * \beta_c$ .

Note 2: CM = 1 for  $\beta_c/\beta_d = 12/15$ ,  $\beta_{hs}/\beta_c = 24/15$ . For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the  $c/d$  ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to  $c = 10/15$  and  $d = 15/15$ .

Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5:  $\beta_{ED}$  cannot be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

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## UMTS BAND II

| Mode               | Frequency (MHz) | Avg. Burst Power (dBm) |
|--------------------|-----------------|------------------------|
| WCDMA 1900<br>RMC  | 1852.4          | 22.40                  |
|                    | 1880            | 22.34                  |
|                    | 1907.6          | 22.18                  |
| HSDPA<br>Subtest 1 | 1852.4          | 21.37                  |
|                    | 1880            | 21.49                  |
|                    | 1907.6          | 21.32                  |
| HSDPA<br>Subtest 2 | 1852.4          | 20.90                  |
|                    | 1880            | 20.78                  |
|                    | 1907.6          | 20.63                  |
| HSDPA<br>Subtest 3 | 1852.4          | 20.56                  |
|                    | 1880            | 20.75                  |
|                    | 1907.6          | 20.61                  |
| HSDPA<br>Subtest 4 | 1852.4          | 20.56                  |
|                    | 1880            | 20.74                  |
|                    | 1907.6          | 20.52                  |
| HSUPA<br>Subtest 1 | 1852.4          | 20.49                  |
|                    | 1880            | 19.56                  |
|                    | 1907.6          | 20.09                  |
| HSUPA<br>Subtest 2 | 1852.4          | 21.89                  |
|                    | 1880            | 20.37                  |
|                    | 1907.6          | 21.20                  |
| HSUPA<br>Subtest 3 | 1852.4          | 22.96                  |
|                    | 1880            | <b>23.12</b>           |
|                    | 1907.6          | 22.45                  |
| HSUPA<br>Subtest 4 | 1852.4          | 21.12                  |
|                    | 1880            | 22.89                  |
|                    | 1907.6          | 21.16                  |
| HSUPA<br>Subtest 5 | 1852.4          | 19.76                  |
|                    | 1880            | 20.87                  |
|                    | 1907.6          | 20.67                  |

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## UMTS BAND IV

| Mode               | Frequency (MHz) | Avg. Burst Power (dBm) |
|--------------------|-----------------|------------------------|
| WCDMA 1700<br>RMC  | 1712.4          | 22.80                  |
|                    | 1732.4          | 22.57                  |
|                    | 1752.6          | 22.69                  |
| HSDPA<br>Subtest 1 | 1712.4          | 21.76                  |
|                    | 1732.4          | 21.85                  |
|                    | 1752.6          | 21.79                  |
| HSDPA<br>Subtest 2 | 1712.4          | 21.34                  |
|                    | 1732.4          | 21.43                  |
|                    | 1752.6          | 21.30                  |
| HSDPA<br>Subtest 3 | 1712.4          | 21.68                  |
|                    | 1732.4          | 21.39                  |
|                    | 1752.6          | 21.24                  |
| HSDPA<br>Subtest 4 | 1712.4          | 21.28                  |
|                    | 1732.4          | 21.39                  |
|                    | 1752.6          | 21.28                  |
| HSUPA<br>Subtest 1 | 1712.4          | 21.78                  |
|                    | 1732.4          | 21.46                  |
|                    | 1752.6          | 21.16                  |
| HSUPA<br>Subtest 2 | 1712.4          | 20.54                  |
|                    | 1732.4          | 20.63                  |
|                    | 1752.6          | 20.59                  |
| HSUPA<br>Subtest 3 | 1712.4          | 20.70                  |
|                    | 1732.4          | 20.80                  |
|                    | 1752.6          | 20.39                  |
| HSUPA<br>Subtest 4 | 1712.4          | 20.90                  |
|                    | 1732.4          | 21.09                  |
|                    | 1752.6          | 21.00                  |
| HSUPA<br>Subtest 5 | 1712.4          | 20.52                  |
|                    | 1732.4          | 20.43                  |
|                    | 1752.6          | 20.12                  |

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## UMTS BAND V

| Mode               | Frequency (MHz) | Avg. Burst Power (dBm) |
|--------------------|-----------------|------------------------|
| WCDMA 850<br>RMC   | 826.4           | <b>23.76</b>           |
|                    | 836.6           | 23.54                  |
|                    | 846.6           | 23.50                  |
| HSDPA<br>Subtest 1 | 826.4           | 22.36                  |
|                    | 836.6           | 22.41                  |
|                    | 846.6           | 22.43                  |
| HSDPA<br>Subtest 2 | 826.4           | 21.88                  |
|                    | 836.6           | 21.63                  |
|                    | 846.6           | 21.87                  |
| HSDPA<br>Subtest 3 | 826.4           | 21.88                  |
|                    | 836.6           | 21.58                  |
|                    | 846.6           | 21.72                  |
| HSDPA<br>Subtest 4 | 826.4           | 21.48                  |
|                    | 836.6           | 21.47                  |
|                    | 846.6           | 21.62                  |
| HSUPA<br>Subtest 1 | 826.4           | 21.50                  |
|                    | 836.6           | 21.98                  |
|                    | 846.6           | 22.59                  |
| HSUPA<br>Subtest 2 | 826.4           | 20.87                  |
|                    | 836.6           | 21.31                  |
|                    | 846.6           | 21.22                  |
| HSUPA<br>Subtest 3 | 826.4           | 20.52                  |
|                    | 836.6           | 21.17                  |
|                    | 846.6           | 21.40                  |
| HSUPA<br>Subtest 4 | 826.4           | 21.45                  |
|                    | 836.6           | 21.49                  |
|                    | 846.6           | 21.60                  |
| HSUPA<br>Subtest 5 | 826.4           | 21.32                  |
|                    | 836.6           | 21.17                  |
|                    | 846.6           | 21.39                  |

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According to 3GPP 25.101 sub-clause 6.2.2 , the maximum output power is allowed to be reduced by following the table.

Table 6.1aA: UE maximum output power with HS-DPCCH and E-DCH

| UE Transmit Channel Configuration                                    | CM(db)    | MPR(db)     |
|--|-----------|-------------|
| For all combinations of ,DPDCH,DPCCH<br>HS-DPDCH,E-DPDCH and E-DPCCH | 0≤ CM≤3.5 | MAX(CM-1,0) |

Note: CM=1 for  $\beta_c/\beta_d=12/15$ ,  $\beta_{hs}/\beta_c=24/15$ .For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done .However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a compensation for the power back-off by increasing the gain of TX\_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

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## LTE Band

| Conducted Power of LTE Band 2(dBm) |            |         |           |            |         |         |         |
|------------------------------------|------------|---------|-----------|------------|---------|---------|---------|
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel | Channel | Channel |
|                                    |            |         |           |            | 18607   | 18900   | 19193   |
| 1.4MHz                             | QPSK       | 1       | 0         | 0          | 19.76   | 19.53   | 19.69   |
|                                    |            |         | 2         | 0          | 20.51   | 21.23   | 20.89   |
|                                    |            |         | 5         | 0          | 20.23   | 20.97   | 21.47   |
|                                    |            | 3       | 0         | 0          | 20.62   | 21.02   | 21.32   |
|                                    |            |         | 1         | 0          | 19.71   | 19.23   | 21.85   |
|                                    |            |         | 2         | 0          | 19.68   | 19.64   | 20.41   |
|                                    | 16QAM      | 6       | 0         | 1          | 19.80   | 19.73   | 20.44   |
|                                    |            | 1       | 0         | 1          | 20.62   | 19.82   | 20.71   |
|                                    |            |         | 2         | 1          | 20.45   | 19.70   | 19.73   |
|                                    |            |         | 5         | 1          | 20.69   | 21.51   | 19.96   |
| 3MHz                               | QPSK       | 1       | 0         | 1          | 20.97   | 21.41   | 19.66   |
|                                    |            |         | 3         | 1          | 20.94   | 19.74   | 20.66   |
|                                    |            |         | 2         | 1          | 19.88   | 20.63   | 20.24   |
|                                    |            | 6       | 0         | 2          | 19.48   | 20.59   | 20.85   |
|                                    | 16QAM      | 8       | 0         | 0          | 19.71   | 21.66   | 21.82   |
|                                    |            |         | 8         | 0          | 21.25   | 21.75   | 21.72   |
|                                    |            |         | 14        | 0          | 21.26   | 21.75   | 21.71   |
|                                    |            | 8       | 0         | 1          | 20.37   | 20.66   | 20.88   |
|                                    |            |         | 4         | 1          | 20.31   | 20.74   | 20.78   |
|                                    |            |         | 8         | 1          | 20.68   | 20.84   | 20.82   |
|                                    |            | 15      | 0         | 1          | 20.65   | 20.77   | 20.76   |
|                                    | 16QAM      | 1       | 0         | 1          | 20.49   | 20.66   | 21.26   |
|                                    |            |         | 8         | 1          | 20.50   | 20.24   | 20.94   |
|                                    |            |         | 14        | 1          | 20.43   | 20.62   | 21.02   |
|                                    |            | 8       | 0         | 2          | 19.70   | 19.71   | 19.71   |
|                                    |            |         | 4         | 2          | 19.56   | 19.69   | 19.71   |
|                                    |            |         | 8         | 2          | 19.21   | 19.80   | 19.72   |
|                                    |            |         | 15        | 0          | 19.66   | 19.53   | 19.69   |

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| Conducted Power of LTE Band 2(dBm) |            |         |           |            |         |         |         |
|------------------------------------|------------|---------|-----------|------------|---------|---------|---------|
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel | Channel | Channel |
|                                    |            |         |           |            | 18625   | 18900   | 19175   |
| 5MHz                               | QPSK       | 1       | 0         | 0          | 21.54   | 21.92   | 21.44   |
|                                    |            |         | 12        | 0          | 21.73   | 21.73   | 21.64   |
|                                    |            |         | 24        | 0          | 21.74   | 21.71   | 21.59   |
|                                    |            | 12      | 0         | 1          | 20.78   | 20.85   | 20.80   |
|                                    |            |         | 6         | 1          | 20.76   | 20.76   | 20.73   |
|                                    |            |         | 13        | 1          | 20.76   | 20.86   | 20.78   |
|                                    | 16QAM      | 25      | 0         | 1          | 20.67   | 20.88   | 20.85   |
|                                    |            | 1       | 0         | 1          | 20.52   | 20.78   | 20.60   |
|                                    |            |         | 12        | 1          | 20.58   | 20.65   | 20.98   |
|                                    |            |         | 24        | 1          | 20.72   | 20.77   | 21.09   |
|                                    | 16QAM      | 12      | 0         | 2          | 19.63   | 19.80   | 19.77   |
|                                    |            |         | 6         | 2          | 19.61   | 20.01   | 19.71   |
|                                    |            |         | 13        | 2          | 19.54   | 20.00   | 19.90   |
|                                    |            | 25      | 0         | 2          | 19.85   | 19.83   | 19.91   |
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel | Channel | Channel |
|                                    |            |         |           |            | 18650   | 18900   | 19150   |
| 10MHz                              | QPSK       | 1       | 0         | 0          | 18.15   | 18.41   | 17.98   |
|                                    |            |         | 24        | 0          | 18.06   | 18.23   | 18.02   |
|                                    |            |         | 49        | 0          | 18.30   | 18.12   | 18.41   |
|                                    |            | 25      | 0         | 1          | 17.15   | 17.52   | 17.25   |
|                                    |            |         | 12        | 1          | 17.16   | 17.51   | 17.22   |
|                                    |            |         | 25        | 1          | 17.42   | 17.31   | 17.24   |
|                                    |            |         | 50        | 0          | 17.27   | 17.38   | 17.35   |
|                                    | 16QAM      | 1       | 0         | 1          | 17.08   | 17.25   | 16.96   |
|                                    |            |         | 24        | 1          | 17.34   | 17.22   | 17.68   |
|                                    |            |         | 49        | 1          | 17.54   | 17.13   | 18.09   |
|                                    |            | 25      | 0         | 2          | 16.14   | 16.55   | 16.34   |
|                                    |            |         | 12        | 2          | 16.09   | 16.40   | 16.34   |
|                                    |            |         | 25        | 2          | 16.41   | 16.35   | 16.43   |
|                                    |            |         | 50        | 0          | 16.30   | 16.41   | 16.39   |

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| Conducted Power of LTE Band 2(dBm) |            |         |           |            |         |         |         |
|------------------------------------|------------|---------|-----------|------------|---------|---------|---------|
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel | Channel | Channel |
|                                    |            |         |           |            | 18675   | 18900   | 19125   |
| 15MHz                              | QPSK       | 1       | 0         | 0          | 21.49   | 22.11   | 22.07   |
|                                    |            |         | 38        | 0          | 21.29   | 21.68   | 21.46   |
|                                    |            |         | 74        | 0          | 21.97   | 21.92   | 22.14   |
|                                    |            | 38      | 0         | 1          | 20.91   | 21.27   | 20.65   |
|                                    |            |         | 18        | 1          | 20.59   | 20.78   | 20.47   |
|                                    |            |         | 37        | 1          | 21.38   | 20.84   | 21.06   |
|                                    | 16QAM      | 75      | 0         | 1          | 20.53   | 20.69   | 20.63   |
|                                    |            | 1       | 0         | 1          | 20.88   | 21.15   | 20.73   |
|                                    |            |         | 38        | 1          | 20.70   | 20.76   | 20.41   |
|                                    |            |         | 74        | 1          | 21.44   | 20.89   | 21.03   |
|                                    | 16QAM      | 38      | 0         | 2          | 20.94   | 21.26   | 20.68   |
|                                    |            |         | 18        | 2          | 20.57   | 20.80   | 20.45   |
|                                    |            |         | 37        | 2          | 21.34   | 20.96   | 21.05   |
|                                    |            | 75      | 0         | 2          | 19.56   | 19.70   | 19.51   |
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel | Channel | Channel |
|                                    |            |         |           |            | 18700   | 18900   | 19100   |
| 20MHz                              | QPSK       | 1       | 0         | 0          | 21.55   | 22.17   | 21.58   |
|                                    |            |         | 49        | 0          | 21.41   | 21.56   | 21.30   |
|                                    |            |         | 99        | 0          | 22.01   | 21.82   | 21.83   |
|                                    |            | 50      | 0         | 1          | 20.43   | 20.86   | 20.41   |
|                                    |            |         | 25        | 1          | 20.40   | 20.86   | 20.44   |
|                                    |            |         | 49        | 1          | 20.75   | 20.61   | 20.62   |
|                                    |            |         | 100       | 0          | 20.74   | 20.74   | 20.49   |
|                                    | 16QAM      | 1       | 0         | 1          | 20.32   | 21.57   | 20.54   |
|                                    |            |         | 49        | 1          | 20.32   | 21.41   | 20.27   |
|                                    |            |         | 99        | 1          | 20.92   | 21.37   | 20.77   |
|                                    |            | 50      | 0         | 2          | 19.37   | 19.86   | 19.38   |
|                                    |            |         | 25        | 2          | 19.48   | 19.84   | 19.47   |
|                                    |            |         | 49        | 2          | 19.81   | 19.64   | 19.65   |
|                                    |            |         | 100       | 0          | 19.70   | 19.65   | 19.62   |

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| Conducted Power of LTE Band 4(dBm) |            |         |           |            |         |         |         |
|------------------------------------|------------|---------|-----------|------------|---------|---------|---------|
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel | Channel | Channel |
|                                    |            |         |           |            | 19957   | 20175   | 20393   |
| 1.4MHz                             | QPSK       | 1       | 0         | 0          | 23.47   | 22.47   | 22.41   |
|                                    |            |         | 2         | 0          | 23.54   | 22.42   | 22.52   |
|                                    |            |         | 5         | 0          | 23.41   | 22.38   | 22.47   |
|                                    |            | 3       | 0         | 0          | 23.53   | 22.47   | 22.34   |
|                                    |            |         | 1         | 0          | 23.56   | 22.47   | 22.40   |
|                                    |            |         | 2         | 0          | 23.44   | 22.38   | 22.42   |
|                                    |            |         | 6         | 0          | 22.44   | 21.38   | 21.43   |
|                                    | 16QAM      | 1       | 0         | 1          | 22.44   | 21.43   | 21.26   |
|                                    |            |         | 2         | 1          | 22.33   | 21.35   | 21.29   |
|                                    |            |         | 5         | 1          | 22.35   | 21.39   | 21.32   |
|                                    |            | 3       | 0         | 1          | 22.23   | 21.27   | 21.20   |
|                                    |            |         | 1         | 1          | 22.27   | 21.26   | 21.19   |
|                                    |            |         | 2         | 1          | 22.16   | 21.18   | 21.25   |
|                                    |            |         | 6         | 0          | 21.42   | 20.46   | 20.43   |
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel | Channel | Channel |
|                                    |            |         |           |            | 19965   | 20175   | 20385   |
| 3MHz                               | QPSK       | 1       | 0         | 0          | 23.60   | 22.55   | 22.70   |
|                                    |            |         | 7         | 0          | 23.69   | 22.60   | 22.63   |
|                                    |            |         | 14        | 0          | 23.58   | 22.52   | 22.69   |
|                                    |            | 8       | 0         | 1          | 22.44   | 21.54   | 21.72   |
|                                    |            |         | 4         | 1          | 22.45   | 21.52   | 21.72   |
|                                    |            |         | 7         | 1          | 22.45   | 21.52   | 21.57   |
|                                    |            |         | 15        | 0          | 22.43   | 21.43   | 21.60   |
|                                    | 16QAM      | 1       | 0         | 1          | 22.66   | 21.51   | 21.56   |
|                                    |            |         | 7         | 1          | 22.56   | 21.59   | 21.48   |
|                                    |            |         | 14        | 1          | 22.58   | 21.53   | 21.49   |
|                                    |            | 8       | 0         | 2          | 21.45   | 20.51   | 20.68   |
|                                    |            |         | 4         | 2          | 21.47   | 20.58   | 20.68   |
|                                    |            |         | 7         | 2          | 21.48   | 20.49   | 20.54   |
|                                    |            |         | 15        | 0          | 21.46   | 20.52   | 20.39   |

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| Conducted Power of LTE Band 4(dBm) |            |         |           |            |              |         |         |
|------------------------------------|------------|---------|-----------|------------|--------------|---------|---------|
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel      | Channel | Channel |
|                                    |            |         |           |            | 19975        | 20175   | 20375   |
| 5MHz                               | QPSK       | 1       | 0         | 0          | 23.59        | 22.54   | 22.77   |
|                                    |            |         | 12        | 0          | 23.58        | 22.56   | 22.66   |
|                                    |            |         | 24        | 0          | 23.42        | 22.67   | 22.68   |
|                                    |            | 12      | 0         | 1          | 22.45        | 21.47   | 21.61   |
|                                    |            |         | 6         | 1          | 22.45        | 21.47   | 21.59   |
|                                    |            |         | 11        | 1          | 22.39        | 21.53   | 21.55   |
|                                    | 16QAM      | 25      | 0         | 1          | 22.50        | 21.38   | 21.65   |
|                                    |            | 1       | 0         | 1          | 22.67        | 21.40   | 22.01   |
|                                    |            |         | 12        | 1          | 22.81        | 21.36   | 21.82   |
|                                    |            |         | 24        | 1          | 22.58        | 21.46   | 21.79   |
|                                    | 16QAM      | 12      | 0         | 2          | 21.48        | 20.42   | 20.61   |
|                                    |            |         | 6         | 2          | 21.49        | 20.46   | 20.66   |
|                                    |            |         | 11        | 2          | 21.49        | 20.49   | 20.64   |
|                                    |            | 25      | 0         | 2          | 21.43        | 20.42   | 20.59   |
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel      | Channel | Channel |
|                                    |            |         |           |            | 20000        | 20175   | 20350   |
| 10MHz                              | QPSK       | 1       | 0         | 0          | <b>23.80</b> | 22.54   | 22.84   |
|                                    |            |         | 24        | 0          | 23.46        | 22.40   | 22.59   |
|                                    |            |         | 49        | 0          | 23.61        | 22.91   | 23.04   |
|                                    |            | 25      | 0         | 1          | 22.41        | 21.40   | 21.62   |
|                                    |            |         | 12        | 1          | 22.41        | 21.40   | 21.60   |
|                                    |            |         | 25        | 1          | 22.40        | 21.69   | 21.77   |
|                                    |            | 50      | 0         | 1          | 22.37        | 21.45   | 21.68   |
|                                    | 16QAM      | 1       | 0         | 1          | 22.72        | 21.54   | 21.76   |
|                                    |            |         | 24        | 1          | 22.36        | 21.38   | 21.60   |
|                                    |            |         | 49        | 1          | 22.66        | 22.07   | 21.85   |
|                                    |            | 25      | 0         | 2          | 21.39        | 20.41   | 20.66   |
|                                    |            |         | 12        | 2          | 21.45        | 20.41   | 20.60   |
|                                    |            |         | 25        | 2          | 21.55        | 20.77   | 20.85   |
|                                    |            | 50      | 0         | 2          | 21.33        | 20.45   | 20.74   |

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| Conducted Power of LTE Band 4(dBm) |            |         |           |            |         |         |         |
|------------------------------------|------------|---------|-----------|------------|---------|---------|---------|
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel | Channel | Channel |
|                                    |            |         |           |            | 20025   | 20175   | 20325   |
| 15MHz                              | QPSK       | 1       | 0         | 0          | 23.30   | 22.22   | 22.37   |
|                                    |            |         | 37        | 0          | 23.26   | 22.36   | 22.31   |
|                                    |            |         | 74        | 0          | 22.80   | 22.57   | 22.25   |
|                                    |            | 36      | 0         | 1          | 22.47   | 21.20   | 21.65   |
|                                    |            |         | 16        | 1          | 22.48   | 21.42   | 21.63   |
|                                    |            |         | 35        | 1          | 21.96   | 21.59   | 21.63   |
|                                    | 16QAM      | 75      | 0         | 1          | 22.07   | 21.33   | 21.34   |
|                                    |            | 1       | 0         | 1          | 22.49   | 21.21   | 21.76   |
|                                    |            |         | 37        | 1          | 22.47   | 21.35   | 21.66   |
|                                    |            |         | 74        | 1          | 21.92   | 21.60   | 21.57   |
|                                    | 16QAM      | 36      | 0         | 2          | 22.49   | 21.13   | 21.67   |
|                                    |            |         | 16        | 2          | 22.52   | 21.40   | 21.73   |
|                                    |            |         | 35        | 2          | 21.92   | 21.59   | 21.55   |
|                                    |            | 75      | 0         | 2          | 21.10   | 20.33   | 20.37   |
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel | Channel | Channel |
|                                    |            |         |           |            | 20050   | 20175   | 20300   |
| 20MHz                              | QPSK       | 1       | 0         | 0          | 23.20   | 22.06   | 22.40   |
|                                    |            |         | 49        | 0          | 22.75   | 22.47   | 22.33   |
|                                    |            |         | 99        | 0          | 22.69   | 22.61   | 22.52   |
|                                    |            | 50      | 0         | 1          | 22.12   | 21.17   | 21.52   |
|                                    |            |         | 25        | 1          | 22.09   | 21.18   | 21.54   |
|                                    |            |         | 49        | 1          | 21.77   | 21.47   | 21.47   |
|                                    |            |         | 100       | 0          | 21.80   | 21.42   | 21.41   |
|                                    | 16QAM      | 1       | 0         | 1          | 22.73   | 20.92   | 22.04   |
|                                    |            |         | 49        | 1          | 22.66   | 21.34   | 22.38   |
|                                    |            |         | 99        | 1          | 22.12   | 21.55   | 22.12   |
|                                    |            | 50      | 0         | 2          | 21.13   | 20.15   | 20.51   |
|                                    |            |         | 25        | 2          | 21.13   | 20.16   | 20.52   |
|                                    |            |         | 49        | 2          | 20.75   | 20.17   | 20.46   |
|                                    |            |         | 100       | 0          | 20.87   | 20.28   | 20.41   |

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| Conducted Power of LTE Band 5(dBm) |            |         |           |            |         |         |         |
|------------------------------------|------------|---------|-----------|------------|---------|---------|---------|
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel | Channel | Channel |
|                                    |            |         |           |            | 20407   | 20525   | 20643   |
| 1.4MHz                             | QPSK       | 1       | 0         | 0          | 23.58   | 22.99   | 23.32   |
|                                    |            |         | 2         | 0          | 23.52   | 23.00   | 23.29   |
|                                    |            |         | 5         | 0          | 23.43   | 22.96   | 23.21   |
|                                    |            | 3       | 0         | 0          | 23.55   | 22.99   | 23.25   |
|                                    |            |         | 1         | 0          | 23.51   | 22.96   | 23.29   |
|                                    |            |         | 2         | 0          | 23.44   | 22.89   | 23.19   |
|                                    | 16QAM      | 6       | 0         | 1          | 22.59   | 21.98   | 22.21   |
|                                    |            | 1       | 0         | 1          | 22.56   | 21.92   | 22.11   |
|                                    |            |         | 2         | 1          | 22.55   | 21.95   | 22.03   |
|                                    |            |         | 5         | 1          | 22.41   | 21.91   | 21.99   |
|                                    |            | 3       | 0         | 1          | 22.32   | 21.76   | 22.07   |
|                                    |            |         | 1         | 1          | 22.40   | 21.76   | 22.06   |
|                                    |            |         | 2         | 1          | 22.35   | 21.78   | 22.08   |
|                                    |            | 6       | 0         | 2          | 21.60   | 20.88   | 21.20   |
| Conducted Power of LTE Band 5(dBm) |            |         |           |            |         |         |         |
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel | Channel | Channel |
|                                    |            |         |           |            | 20415   | 20525   | 20635   |
| 3MHz                               | QPSK       | 1       | 0         | 0          | 23.61   | 22.77   | 23.43   |
|                                    |            |         | 7         | 0          | 23.62   | 22.91   | 23.40   |
|                                    |            |         | 14        | 0          | 23.43   | 23.00   | 23.19   |
|                                    |            | 8       | 0         | 1          | 22.52   | 21.78   | 22.31   |
|                                    |            |         | 4         | 1          | 22.51   | 21.75   | 22.30   |
|                                    |            |         | 7         | 1          | 22.47   | 21.93   | 22.26   |
|                                    | 16QAM      | 15      | 0         | 1          | 22.55   | 21.93   | 22.22   |
|                                    |            | 1       | 0         | 1          | 22.61   | 21.82   | 22.27   |
|                                    |            |         | 7         | 1          | 22.54   | 21.99   | 22.17   |
|                                    |            |         | 14        | 1          | 22.53   | 22.05   | 22.00   |
|                                    |            | 8       | 0         | 2          | 21.58   | 20.74   | 21.26   |
|                                    |            |         | 4         | 2          | 21.54   | 20.76   | 21.28   |
|                                    |            |         | 7         | 2          | 21.51   | 20.87   | 21.27   |
|                                    |            | 15      | 0         | 2          | 21.57   | 20.91   | 21.16   |

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| Conducted Power of LTE Band 5(dBm) |            |         |           |            |         |         |         |
|------------------------------------|------------|---------|-----------|------------|---------|---------|---------|
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel | Channel | Channel |
|                                    |            |         |           |            | 20425   | 20525   | 20625   |
| 5MHz                               | QPSK       | 1       | 0         | 0          | 23.66   | 22.80   | 23.48   |
|                                    |            |         | 12        | 0          | 23.58   | 22.94   | 23.43   |
|                                    |            |         | 24        | 0          | 23.46   | 23.07   | 23.22   |
|                                    |            | 12      | 0         | 1          | 22.56   | 21.73   | 22.38   |
|                                    |            |         | 6         | 1          | 22.52   | 21.73   | 22.30   |
|                                    |            |         | 11        | 1          | 22.45   | 22.05   | 22.32   |
|                                    | 16QAM      | 1       | 25        | 0          | 22.50   | 21.89   | 22.31   |
|                                    |            |         | 0         | 1          | 22.53   | 21.66   | 22.58   |
|                                    |            |         | 12        | 1          | 22.43   | 21.97   | 22.46   |
|                                    |            | 12      | 24        | 1          | 22.40   | 21.99   | 22.78   |
|                                    |            |         | 0         | 2          | 21.53   | 20.72   | 21.44   |
|                                    |            |         | 6         | 2          | 21.53   | 20.69   | 21.43   |
|                                    |            |         | 11        | 2          | 21.45   | 21.04   | 21.44   |
|                                    |            |         | 25        | 0          | 21.56   | 20.83   | 21.27   |
| Bandwidth                          | Modulation | RB size | RB offset | Target MPR | Channel | Channel | Channel |
|                                    |            |         |           |            | 20450   | 20525   | 20600   |
| 10MHz                              | QPSK       | 1       | 0         | 0          | 23.08   | 22.78   | 23.70   |
|                                    |            |         | 24        | 0          | 22.73   | 22.87   | 23.61   |
|                                    |            |         | 49        | 0          | 23.16   | 23.54   | 23.93   |
|                                    |            | 25      | 0         | 1          | 21.80   | 21.73   | 22.45   |
|                                    |            |         | 12        | 1          | 21.78   | 21.74   | 22.37   |
|                                    |            |         | 25        | 1          | 21.72   | 22.11   | 22.48   |
|                                    | 16QAM      | 1       | 50        | 0          | 21.78   | 21.95   | 22.35   |
|                                    |            |         | 0         | 1          | 22.07   | 21.69   | 22.20   |
|                                    |            |         | 24        | 1          | 21.67   | 21.68   | 22.06   |
|                                    |            | 25      | 49        | 1          | 22.05   | 22.32   | 22.36   |
|                                    |            |         | 0         | 2          | 20.82   | 20.71   | 21.46   |
|                                    |            |         | 12        | 2          | 20.77   | 20.71   | 21.47   |
|                                    |            |         | 25        | 2          | 20.82   | 21.18   | 21.47   |
|                                    |            |         | 50        | 0          | 20.81   | 20.91   | 21.45   |

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