



# TEST REPORT

No. 24T04N002718-003-SAR

For

**Ademco Inc**

**Quicksilver wireless tablet**

**Model Name: PROWLTOUCH/PROWLTOUCHC/VISTAHTCHWLC**

With

**Hardware Version: Q1982\_MB\_V2**

**Software Version: GMTS700\_Wireless\_01.03.424.00025**

**FCC ID: CFS8DLPROWLTOUCH**

**Issued Date: 2024-12-11**

**Designation Number: CN1210**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

**Test Laboratory:**

**SAICT, Shenzhen Academy of Information and Communications Technology**

Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 518000.

Tel:+86(0)755-33322000, Fax:+86(0)755-33322001

Email: yewu@saict.ac.cn. www.saict.ac.cn



## **REPORT HISTORY**

| <b>Report Number</b> | <b>Revision</b> | <b>Description</b> | <b>Issue Date</b> |
|----------------------|-----------------|--------------------|-------------------|
| 24T04N002718-003-SAR | Rev.0           | 1st edition        | 2024-12-11        |

## CONTENTS

|                                                                        |           |
|------------------------------------------------------------------------|-----------|
| <b>1. Summary of Test Report.....</b>                                  | <b>5</b>  |
| 1.1. Test Items.....                                                   | 5         |
| 1.2. Test Standards.....                                               | 5         |
| 1.3. Test Result.....                                                  | 5         |
| 1.4. Testing Location.....                                             | 5         |
| 1.5. Project Data.....                                                 | 5         |
| 1.6. Signature.....                                                    | 5         |
| <b>2. Statement of Compliance .....</b>                                | <b>6</b>  |
| <b>3. Client Information .....</b>                                     | <b>7</b>  |
| 3.1. Applicant Information .....                                       | 7         |
| 3.2. Manufacturer Information.....                                     | 7         |
| <b>4. Equipment under Test (EUT) and Ancillary Equipment (AE).....</b> | <b>8</b>  |
| 4.1. About EUT .....                                                   | 8         |
| 4.2. Internal Identification of EUT used during the test .....         | 8         |
| 4.3. Internal Identification of AE used during the test.....           | 8         |
| 4.4. General Description .....                                         | 9         |
| <b>5. Test Methodology.....</b>                                        | <b>10</b> |
| 5.1. Applicable Limit Regulations .....                                | 10        |
| 5.2. Applicable Measurement Standards.....                             | 10        |
| <b>6. Specific Absorption Rate (SAR) .....</b>                         | <b>11</b> |
| 6.1. Introduction .....                                                | 11        |
| 6.2. SAR Definition .....                                              | 11        |
| <b>7. Tissue Simulating Liquids.....</b>                               | <b>12</b> |
| 7.1. Targets for tissue simulating liquid.....                         | 12        |
| 7.2. Dielectric Performance.....                                       | 12        |
| <b>8. System verification .....</b>                                    | <b>13</b> |
| 8.1. System Setup .....                                                | 13        |
| 8.2. System Verification .....                                         | 14        |
| <b>9. Measurement Procedures .....</b>                                 | <b>15</b> |
| 9.1. Tests to be performed .....                                       | 15        |
| 9.2. General Measurement Procedure .....                               | 17        |
| 9.3. Bluetooth & WLAN Measurement Procedures for SAR.....              | 18        |
| 9.4. Power Drift .....                                                 | 18        |
| <b>10. Conducted Output Power.....</b>                                 | <b>19</b> |
| <b>11. Transmit Antenna .....</b>                                      | <b>20</b> |

|                                                                                  |           |
|----------------------------------------------------------------------------------|-----------|
| 11.2. Transmit Antenna Position and Size .....                                   | 20        |
| 11.2. SAR Measurement Positions.....                                             | 21        |
| <b>12. Summary of Test Results .....</b>                                         | <b>22</b> |
| 12.1. Testing Environment .....                                                  | 22        |
| 12.2. Test Results.....                                                          | 23        |
| <b>13. SAR Measurement Variability .....</b>                                     | <b>24</b> |
| <b>14. Measurement Uncertainty .....</b>                                         | <b>25</b> |
| 14.1. Measurement Uncertainty for Normal SAR Tests (300MHz~3GHz).....            | 25        |
| <b>15. Main Test Instruments .....</b>                                           | <b>26</b> |
| <b>ANNEX A: Graph Results .....</b>                                              | <b>27</b> |
| <b>ANNEX B: SystemVerification Results .....</b>                                 | <b>29</b> |
| <b>ANNEX C: SAR Measurement Setup.....</b>                                       | <b>31</b> |
| C.1. Measurement Set-up.....                                                     | 31        |
| C.2. DASY E-field Probe System .....                                             | 32        |
| C.3. E-field Probe Calibration .....                                             | 33        |
| C.4. Other Test Equipment.....                                                   | 34        |
| <b>ANNEX D: Position of the wireless device in relation to the phantom .....</b> | <b>37</b> |
| D.1. General considerations .....                                                | 37        |
| D.2. Body-worn device .....                                                      | 38        |
| D.3. Desktop device .....                                                        | 38        |
| D.4. DUT Setup Photos .....                                                      | 39        |
| <b>ANNEX E: Equivalent Media Recipes.....</b>                                    | <b>40</b> |
| <b>ANNEX F: System Validation .....</b>                                          | <b>41</b> |
| <b>ANNEX G: DAE Calibration Certificate .....</b>                                | <b>42</b> |
| <b>ANNEX H: Probe Calibration Certificate.....</b>                               | <b>45</b> |
| <b>ANNEX I: Dipole Calibration Certificate.....</b>                              | <b>67</b> |
| <b>ANNEX J: Spot Check Test .....</b>                                            | <b>73</b> |
| J.1. Internal Identification of EUT used during the spot check test .....        | 73        |
| J.2. Measurement results .....                                                   | 73        |
| J.3. Graph Results for Spot Check.....                                           | 74        |
| J.4. System Verification Results for Spot Check.....                             | 75        |

## 1. Summary of Test Report

### 1.1. Test Items

|                      |                                      |
|----------------------|--------------------------------------|
| Description:         | Quicksilver wireless tablet          |
| Model Name:          | PROWLTOUCH/PROWLTOUCHC/VISTAHTCHWLC  |
| Applicant's Name:    | Ademco Inc                           |
| Manufacturer's Name: | Huaqin Telecom Techonology Co., Ltd. |

### 1.2. Test Standards

ANSI C95.1:1992, IEEE 1528:2013

### 1.3. Test Result

Pass. Please refer to “12. Summary of Test Results” and “ANNEX J: Spot Check Test”

### 1.4. Testing Location

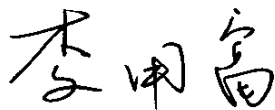
Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China

### 1.5. Project Data

Testing Start Date: 2024-12-10

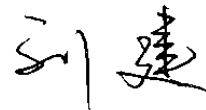
Testing End Date: 2024-12-10

### 1.6. Signature



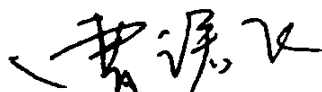
---

Li Yongfu  
(Prepared this test report)



---

Liu Jian  
(Reviewed this test report)



---

Cao Junfei  
(Approved this test report)

## 2. Statement of Compliance

This EUT is a variant product and the report of original sample is No. I19N01349-SAR. According to “Product Equality Declaration” provided by applicant, we quote the test results of original sample and spot check the worst case in annex J and added Bluetooth SAR test results in section 12.2.

The maximum results of Specific Absorption Rate (SAR) found during testing for Ademco Inc Quicksilver wireless tablet PROWLTOUCH/PROWLTOUCHC/VISTAHTCHWLC are as follows:

**Table 2.1: Highest Reported SAR (1g)**

| Equipment Class | Frequency Bands | 1g SAR (W/kg) |
|-----------------|-----------------|---------------|
|                 |                 | Body          |
| DSS             | Bluetooth       | 0.17          |
| DTS             | WLAN 2.4GHz     | <b>0.24</b>   |

This device is in compliance with Specific Absorption Rate (SAR) for general population/ uncontrolled exposure limits (1.6 W/kg for Body 1g SAR) specified in ANSI C95.1:1992.

The measurement together with the test system set-up is described in annex C of this test report. A detailed description of the equipment under test can be found in chapter 4 of this test report.

The highest reported SAR value is obtained at the case of (**Table 2.1**), Body value is **0.24 W/kg (1g)**.

### 3. Client Information

#### 3.1. Applicant Information

|               |                                                                                |
|---------------|--------------------------------------------------------------------------------|
| Company Name: | Ademco Inc                                                                     |
| Address:      | 2 Corporate Center Drive Suite - 100 PO Box 9040 Melville, New York 11747, USA |
| Contact:      | Christian Fouth                                                                |
| Email:        | Christian.fouth@resideo.com                                                    |
| Telephone:    | 516-577-2000                                                                   |

#### 3.2. Manufacturer Information

|               |                                                                                                   |
|---------------|---------------------------------------------------------------------------------------------------|
| Company Name: | Huaqin Telecom Techonology Co., Ltd.                                                              |
| Address:      | No.1 Building, No.9 Building, No. 399, Keyuan Road, Zhangjiang Hi-tech Park, Shanghai, P.R. China |
| Contact:      | Stephanie Yin                                                                                     |
| Email:        | yinxuan@huaqin.com                                                                                |
| Telephone:    | +86 19974076309                                                                                   |

## 4. Equipment under Test (EUT) and Ancillary Equipment (AE)

### 4.1. About EUT

|                                     |                                     |
|-------------------------------------|-------------------------------------|
| Description:                        | Quicksilver wireless tablet         |
| Model Name:                         | PROWLTOUCH/PROWLTOUCHC/VISTAHTCHWLC |
| Brand Name:                         | Honeywell home / Resideo            |
| Condition of EUT as received:       | No obvious damage in appearance     |
| Frequency Bands:                    | Bluetooth, WLAN 2.4GHz              |
| Tested Tx Frequency:                | 2402 – 2480MHz (Bluetooth)          |
|                                     | 2412 – 2462MHz (WLAN 2.4GHz)        |
| Test device Production information: | Production unit                     |
| Device type:                        | Portable device                     |
| Antenna type:                       | Integrated antenna                  |

\*Since the information of samples in this report is provided by the client, the laboratory is not responsible for the authenticity of sample information.

### 4.2. Internal Identification of EUT used during the test

| EUT ID* | SN          | HW Version  | SW Version                           | Receipt Date |
|---------|-------------|-------------|--------------------------------------|--------------|
| UT02aa  | HB8SAS00027 | Q1982_MB_V2 | GMTS700_Wireless_<br>01.03.424.00025 | 2024-11-12   |

\*EUT ID: is used to identify the test sample in the lab internally.

### 4.3. Internal Identification of AE used during the test

| AE ID* | Description | Model    | Manufacturer                        |
|--------|-------------|----------|-------------------------------------|
| AE1    | Battery     | P-504478 | Dongguan Amperex Technology Limited |

\*AE ID: is used to identify the test sample in the lab internally.

#### 4.4. General Description

1. According to “Product Equality Declaration” provided by applicant, the table below shows the difference between Original and Variant:

| Original                                                                          |           | Variant                                                                           |            |
|-----------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------|------------|
| Specifications                                                                    | Supplier  | Specifications                                                                    | Supplier   |
| PTVS5V0Z1USKN                                                                     | NXP       | PTVS5V0Z1USK                                                                      | NXP        |
| 08EMCP08-NL3DT227-A01                                                             | Kingston  | 08EM08-N3GMV36-GA02                                                               | Kingston   |
| ATECC508A-MAHDA-S                                                                 | Microchip | cancellation of the encryption chip (NA)                                          | /          |
| WSB5819WA-2/TR                                                                    | Will      | PSBD3D40V1H                                                                       | Prisemi    |
| Shielding_ Without insulation<br>_ stamping _ electric<br>connection              | ECT       | Shielding_ Without insulation _ stamping<br>_ electric connection                 | Jinglitong |
| BB shield cover _Cover_<br>without insulation _ stamping<br>_ electric connection | ECT       | BB shield cover _Cover_ without<br>insulation _ stamping _ electric<br>connection | Jinglitong |

2. New model name VISTAHTCHWLC added, the differences between PROWLTOUCH, PROWLTOUCHC and VISTAHTCHWLC are the model names in Instruction Manual QIG, Color box sleeve, Machine body label, Instruction Manual QUG. All components, RF parameters, software and hardware versions of VISTAHTCHWLC are the same as PROWLTOUCH/PROWLTOUCHC.

## 5. Test Methodology

### 5.1. Applicable Limit Regulations

**ANSI C95.1:1992** IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

### 5.2. Applicable Measurement Standards

**IEEE 1528:2013** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Experimental Techniques.

**KDB 447498 D01 General RF Exposure Guidance v06** Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies

**KDB 616217 D04 SAR for laptop and tablets v01r02** SAR Evaluation Considerations for Laptop, Notebook, Notebook and Tablet Computers

**KDB 248227 D01 802.11 Wi-Fi SAR v02r02** SAR Guidance for IEEE 802.11 (Wi-Fi) Transmitters

**KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04** SAR Measurement Requirements for 100 MHz to 6 GHz

**KDB 865664 D02 RF Exposure Reporting v01r02** RF Exposure Compliance Reporting and Documentation Considerations

**TCB workshop April 2019; RF Exposure Procedures (Tissue Simulating Liquids)**

## 6. Specific Absorption Rate (SAR)

### 6.1. Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an 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 general population/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.

### 6.2. SAR Definition

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 a given density (  $\rho$  ). The equation description is as below:

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

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

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = c \left( \frac{\delta T}{\delta t} \right)$$

Where:  $C$  is the specific heat capacity,  $\delta T$  is the temperature rise and  $\delta t$  is the exposure duration, or related to the electrical field in the tissue by

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

Where:  $\sigma$  is the conductivity of the tissue,  $\rho$  is the mass density of tissue and  $E$  is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

## 7. Tissue Simulating Liquids

### 7.1. Targets for tissue simulating liquid

**Table 7.1: Targets for tissue simulating liquid**

| Frequency (MHz) | Liquid Type | Conductivity ( $\sigma$ ) | $\pm 5\%$ Range | Permittivity ( $\epsilon$ ) | $\pm 5\%$ Range |
|-----------------|-------------|---------------------------|-----------------|-----------------------------|-----------------|
| 2450            | Head        | 1.80                      | 1.71~1.89       | 39.2                        | 37.2~41.2       |

### 7.2. Dielectric Performance

**Table 7.2: Dielectric Performance of Tissue Simulating Liquid**

| Measurement Date (yyyy-mm-dd) | Frequency (MHz) | Conductivity $\sigma$ (S/m) | Drift (%) | Permittivity $\epsilon$ | Drift (%) |
|-------------------------------|-----------------|-----------------------------|-----------|-------------------------|-----------|
| 2024-12-10                    | 2450            | 1.824                       | 1.33      | 38.28                   | -2.35     |

Note: The liquid temperature is 22.0°C.

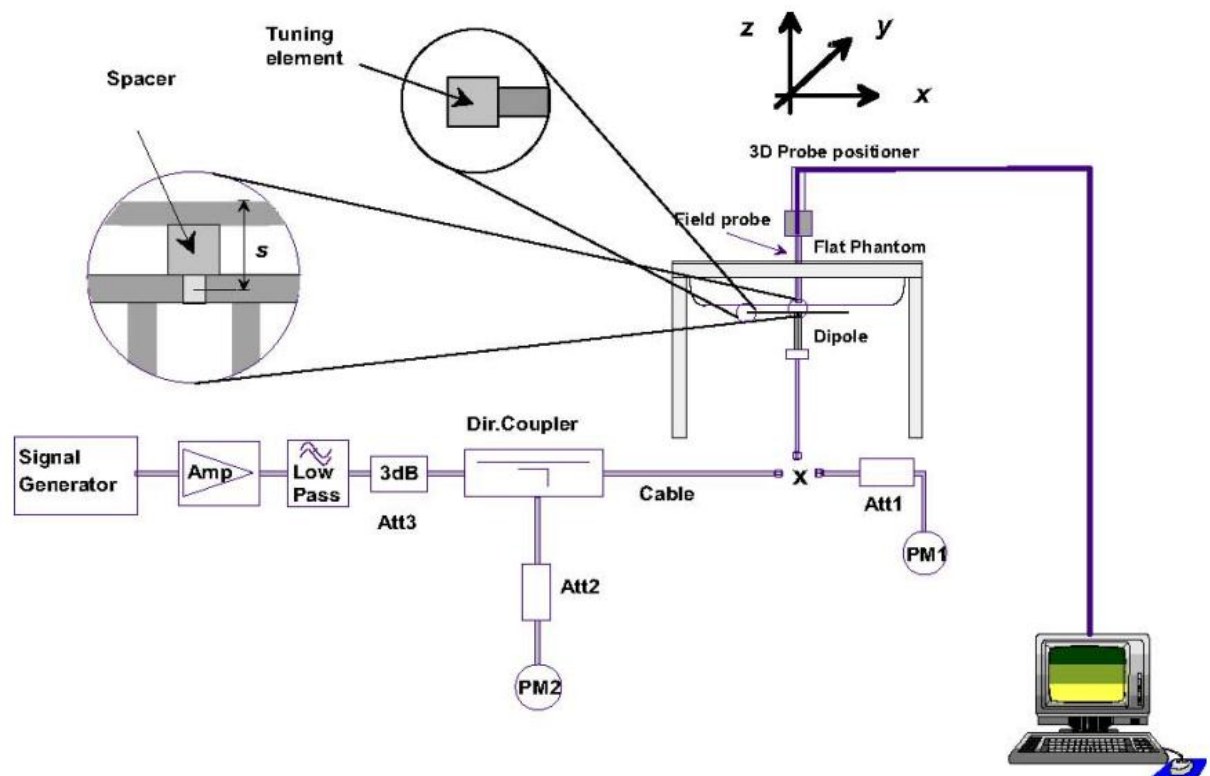


**Picture 7.1 Liquid depth in the Flat Phantom (0.7GHz - 6.5GHz)**

## 8. System verification

### 8.1. System Setup

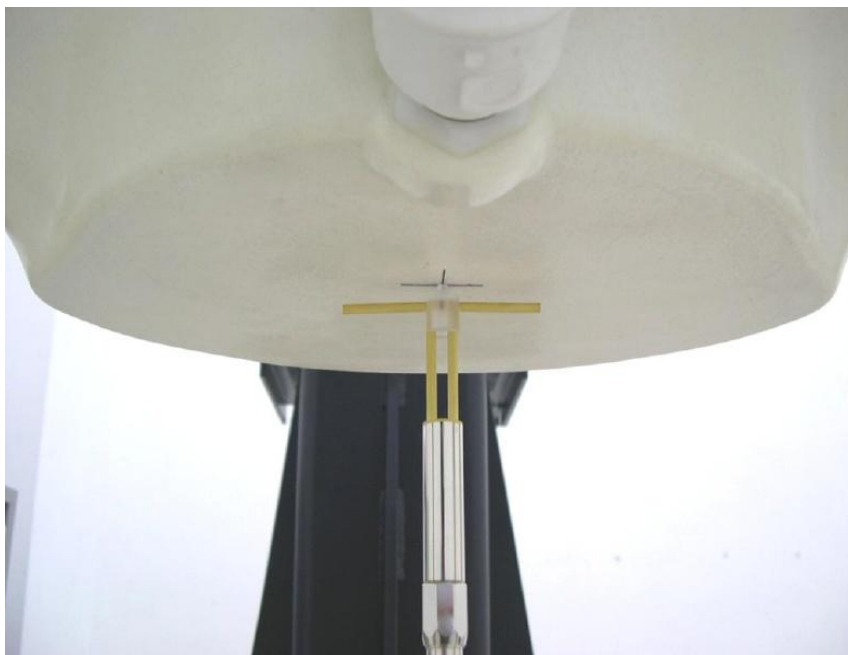
In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



Picture 8.1 System Setup for System Evaluation

For the dipole below 3GHz, the output power on dipole port must be calibrated to 24 dBm (250mW) before dipole is connected.

For the dipole above 3GHz, the output power on dipole port must be calibrated to 20 dBm (100mW) before dipole is connected.



Picture 8.2 Photo of Dipole Setup

## 8.2. System Verification

SAR system verification 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.

Table 8.1: System Verification of Head

| Measurement Date | Frequency (MHz) | Target value (W/kg) |       | Measured value (W/kg) |      |                 |       | Deviation (%) |      |
|------------------|-----------------|---------------------|-------|-----------------------|------|-----------------|-------|---------------|------|
|                  |                 |                     |       | /                     |      | Normalize to 1W |       |               |      |
|                  |                 | 1 g                 | 10 g  | 1 g                   | 10 g | 1 g             | 10 g  | 1 g           | 10 g |
| 2024-12-10       | 2450            | 52.70               | 24.80 | 13.4                  | 6.26 | 53.60           | 25.04 | 1.71          | 0.97 |

## 9. Measurement Procedures

### 9.1. Tests to be performed

In order to determine the highest value of the peak spatial-average SAR of a handset, all device positions, configurations and operational modes shall be tested for each frequency band according to steps 1 to 3 below. A flowchart of the test process is shown in picture 9.1.

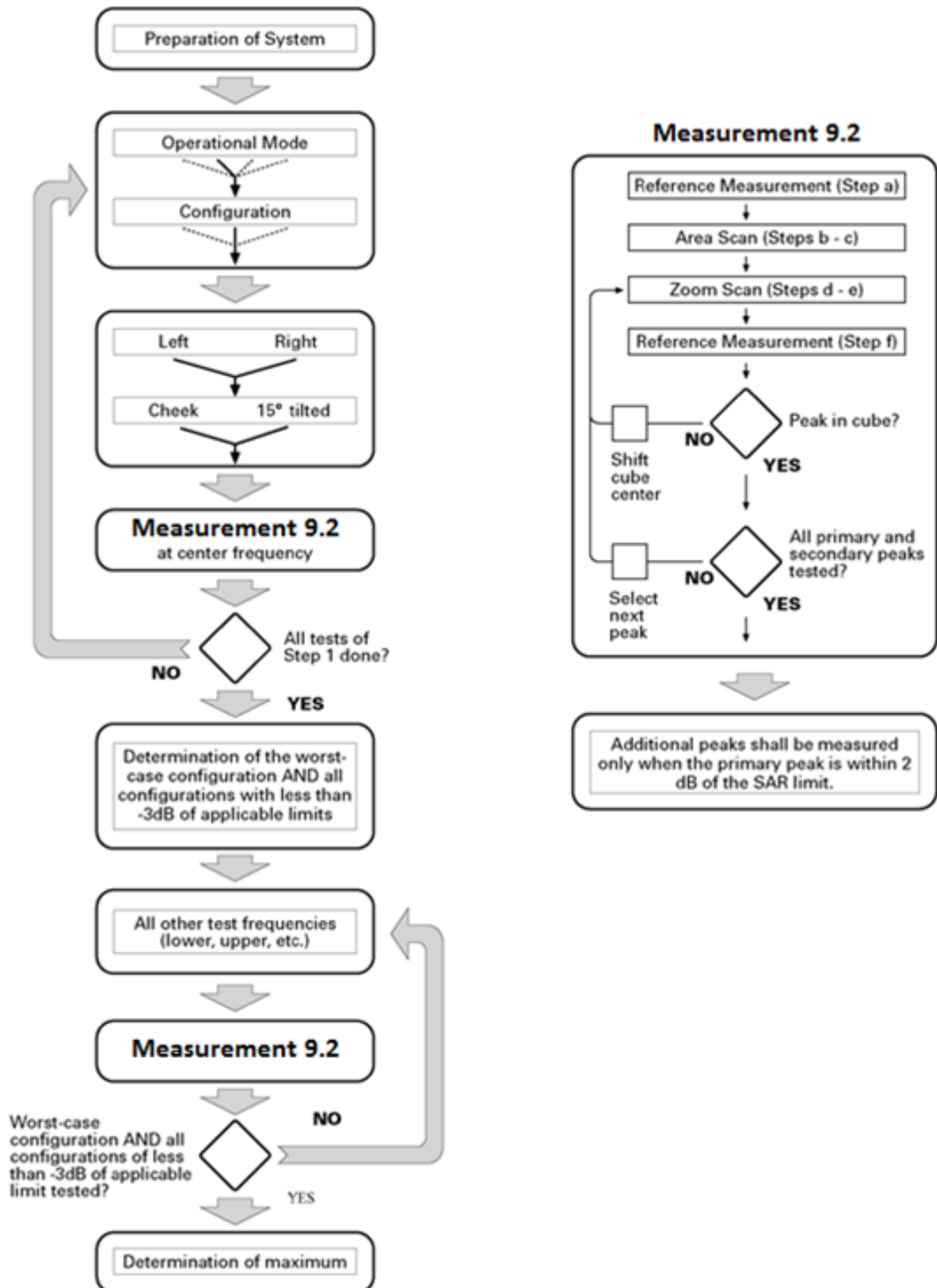
**Step 1:** The tests described in 9.2 shall be performed at the channel that is closest to the center of the transmit frequency band ( $f_c$ ) for:

- a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom, as described in annex D),
- b) all configurations for each device position in a), e.g., antenna extended and retracted, and
- c) all operational modes, e.g., analogue and digital, for each device position in a) and configuration in b) in each frequency band.

If more than three frequencies need to be tested according to 11.1 (i.e.,  $N_C > 3$ ), then all frequencies, configurations and modes shall be tested for all of the above test conditions.

**Step 2:** For the condition providing highest peak spatial-average SAR determined in Step 1, perform all tests described in 9.2 at all other test frequencies, i.e., lowest and highest frequencies. In addition, for all other conditions (device position, configuration and operational mode) where the peak spatial-average SAR value determined in Step 1 is within 3 dB of the applicable SAR limit, it is recommended that all other test frequencies shall be tested as well.

**Step 3:** Examine all data to determine the highest value of the peak spatial-average SAR found in Steps 1 to 2.



Picture 9.1 Block diagram of the tests to be performed

## 9.2. General Measurement Procedure

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements and fully documented in SAR reports to qualify for TCB approval. Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2013. The results should be documented as part of the system validation records and may be requested to support test results when all the measurement parameters in the following table are not satisfied.

|                                                                                                                                                                                                                                                                                                                                    |                                    |                                                                                      |                                                                                                                                                                                                                                                                        |                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                    |                                    |                                                                                      | $\leq 3\text{ GHz}$                                                                                                                                                                                                                                                    | $> 3\text{ GHz}$                                                                                                        |
| Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface                                                                                                                                                                                                                             |                                    |                                                                                      | $5 \pm 1\text{ mm}$                                                                                                                                                                                                                                                    | $\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5\text{ mm}$                                                               |
| Maximum probe angle from probe axis to phantom surface normal at the measurement location                                                                                                                                                                                                                                          |                                    |                                                                                      | $30^\circ \pm 1^\circ$                                                                                                                                                                                                                                                 | $20^\circ \pm 1^\circ$                                                                                                  |
| Maximum area scan spatial resolution: $\Delta x_{Area}$ , $\Delta y_{Area}$                                                                                                                                                                                                                                                        |                                    |                                                                                      | $\leq 2\text{ GHz}: \leq 15\text{ mm}$<br>$2 - 3\text{ GHz}: \leq 12\text{ mm}$                                                                                                                                                                                        | $3 - 4\text{ GHz}: \leq 12\text{ mm}$<br>$4 - 6\text{ GHz}: \leq 10\text{ mm}$                                          |
|                                                                                                                                                                                                                                                                                                                                    |                                    |                                                                                      | 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. |                                                                                                                         |
| Maximum zoom scan spatial resolution: $\Delta x_{Zoom}$ , $\Delta y_{Zoom}$                                                                                                                                                                                                                                                        |                                    |                                                                                      | $\leq 2\text{ GHz}: \leq 8\text{ mm}$<br>$2 - 3\text{ GHz}: \leq 5\text{ mm}^*$                                                                                                                                                                                        | $3 - 4\text{ GHz}: \leq 5\text{ mm}^*$<br>$4 - 6\text{ GHz}: \leq 4\text{ mm}^*$                                        |
| Maximum zoom scan spatial resolution, normal to phantom surface                                                                                                                                                                                                                                                                    | uniform grid: $\Delta z_{Zoom}(n)$ |                                                                                      | $\leq 5\text{ mm}$                                                                                                                                                                                                                                                     | $3 - 4\text{ GHz}: \leq 4\text{ mm}$<br>$4 - 5\text{ GHz}: \leq 3\text{ mm}$<br>$5 - 6\text{ GHz}: \leq 2\text{ mm}$    |
|                                                                                                                                                                                                                                                                                                                                    | graded grid                        | $\Delta z_{Zoom}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface | $\leq 4\text{ mm}$                                                                                                                                                                                                                                                     | $3 - 4\text{ GHz}: \leq 3\text{ mm}$<br>$4 - 5\text{ GHz}: \leq 2.5\text{ mm}$<br>$5 - 6\text{ GHz}: \leq 2\text{ mm}$  |
|                                                                                                                                                                                                                                                                                                                                    |                                    | $\Delta z_{Zoom}(n>1)$ : between subsequent points                                   | $\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$                                                                                                                                                                                                                                  |                                                                                                                         |
| Minimum zoom scan volume                                                                                                                                                                                                                                                                                                           | x, y, z                            |                                                                                      | $\geq 30\text{ mm}$                                                                                                                                                                                                                                                    | $3 - 4\text{ GHz}: \geq 28\text{ mm}$<br>$4 - 5\text{ GHz}: \geq 25\text{ mm}$<br>$5 - 6\text{ GHz}: \geq 22\text{ mm}$ |
| 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.                                                                                                                                                                                  |                                    |                                                                                      |                                                                                                                                                                                                                                                                        |                                                                                                                         |
| * When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is $\leq 1.4\text{ W/kg}$ , $\leq 8\text{ mm}$ , $\leq 7\text{ mm}$ and $\leq 5\text{ mm}$ zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz. |                                    |                                                                                      |                                                                                                                                                                                                                                                                        |                                                                                                                         |

### **9.3. Bluetooth & WLAN Measurement Procedures for SAR**

Normal network operating configurations are not suitable for measuring the SAR of 802.11 transmitters in general. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure that the results are consistent and reliable.

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

### **9.4. Power Drift**

To control the output power stability during the SAR test, DASY5 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Section 14 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

## 10. Conducted Output Power

**Table 10.1: The conducted Power measurement results for Bluetooth**

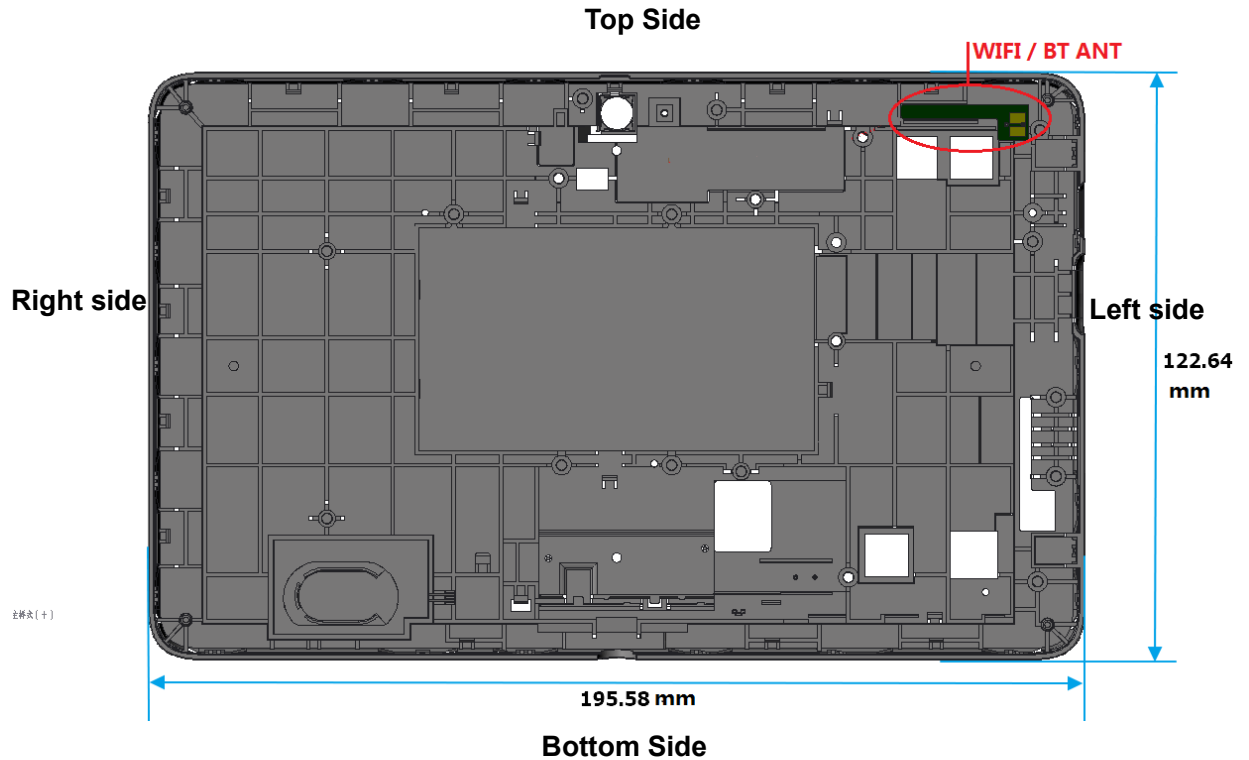
| Averaged Power (dBm)_ Duty Cycle: <b>76.84%</b> |                |                |                 |                 |
|-------------------------------------------------|----------------|----------------|-----------------|-----------------|
| Mode                                            | <b>Tune up</b> | Ch.0 (2402MHz) | Ch.39 (2441MHz) | Ch.78 (2480MHz) |
| GFSK                                            | <b>9.0</b>     | 7.85           | 8.16            | <b>8.18</b>     |
| EDR2M-4_DQPSK                                   | <b>7.0</b>     | 5.85           | 5.68            | 5.91            |
| EDR3M-8DPSK                                     | <b>7.0</b>     | 5.83           | 5.86            | 5.90            |
| /                                               | /              | Ch.0 (2402MHz) | Ch.19 (2440MHz) | Ch.39 (2480MHz) |
| BLE(1M)                                         | <b>3.0</b>     | 2.17           | 2.10            | 2.05            |

**Table 10.2: The conducted Power measurement results for WLAN 2.4GHz**

| Averaged Power (dBm) _Duty Cycle: <b>100.00%</b> |                |                |                |                 |
|--------------------------------------------------|----------------|----------------|----------------|-----------------|
| Mode                                             | <b>Tune up</b> | Ch.1 (2412MHz) | Ch.6 (2437MHz) | Ch.11 (2462MHz) |
| 802.11b                                          | <b>17.0</b>    | <b>15.71</b>   | 15.52          | 15.35           |
| 802.11g                                          | <b>15.0</b>    | 13.87          | 13.74          | 13.51           |
| 802.11n(20MHz)                                   | <b>13.5</b>    | 12.01          | 11.85          | 11.63           |

## 11. Transmit Antenna

### 11.2. Transmit Antenna Position and Size



Picture 11.1 Antenna Locations (Back View)

## 11.2. SAR Measurement Positions

| SAR measurement positions |       |      |           |            |          |             |
|---------------------------|-------|------|-----------|------------|----------|-------------|
| Antenna                   | Front | Rear | Left edge | Right edge | Top edge | Bottom edge |
| WIFI / BT                 | Yes   | Yes  | Yes       | No         | Yes      | No          |

Note:

1. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances*  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR, where

$f(\text{GHz})$  is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation

2. Per KDB 447498 D01v06, for 100 MHz to 6 GHz and *test separation distances*  $> 50$  mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following

1)  $\{[\text{Power allowed at numeric threshold for 50 mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot (f(\text{MHz})/150)]\}$  mW, for 100 MHz to 1500 MHz

2)  $\{[\text{Power allowed at numeric threshold for 50 mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\}$  mW, for  $> 1500$  MHz and  $\leq 6$  GHz

## 12. Summary of Test Results

According to the client's decision rule in the test registration form, which is "based on the measurement results as the basis of the conformity statement", the test conclusion of this report meets the limit requirements.

The calculated SAR is obtained by the following formula:

$$\text{Calculated SAR} = \text{Measured SAR} \times 10^{(P_{\text{Target}} - P_{\text{Measured}})/10}$$

Where  $P_{\text{Target}}$  is the power of manufacturing upper limit;

$P_{\text{Measured}}$  is the measured power in chapter 10.

### 12.1. Testing Environment

|                             |              |
|-----------------------------|--------------|
| Temperature:                | 18°C~25°C    |
| Relative humidity:          | 30%~70%      |
| Ambient noise & Reflection: | < 0.012 W/kg |

## 12.2. Test Results

**Table 12.1: Bluetooth SAR Values**

| RF Exposure Conditions | Frequency Band | Channel Number | Frequency (MHz) | Mode/RB | Test Position | Distance | Note | Figure No. | EUT Measured Power (dBm) | Tune up (dBm) | Duty Cycle % | Duty Cycle Scaling Factor | Measured SAR 1g (W/kg) | Calculated SAR 1g (W/kg) | Measured SAR 10g (W/kg) | Calculated SAR 10g (W/kg) | Power Drift |
|------------------------|----------------|----------------|-----------------|---------|---------------|----------|------|------------|--------------------------|---------------|--------------|---------------------------|------------------------|--------------------------|-------------------------|---------------------------|-------------|
| Body                   | Bluetooth      | 78             | 2480.0          | GFSK    | Front         | 0mm      | \    | 1          | 8.18                     | 9.00          | 76.84        | 1.30                      | 0.106                  | 0.17                     | 0.049                   | 0.08                      | 0.09        |
| Body                   | Bluetooth      | 78             | 2480.0          | GFSK    | Rear          | 0mm      | \    | \          | 8.18                     | 9.00          | 76.84        | 1.30                      | 0.026                  | 0.04                     | 0.011                   | 0.02                      | -0.02       |
| Body                   | Bluetooth      | 78             | 2480.0          | GFSK    | Left          | 0mm      | \    | \          | 8.18                     | 9.00          | 76.84        | 1.30                      | 0.025                  | 0.04                     | 0.009                   | 0.01                      | -0.17       |
| Body                   | Bluetooth      | 78             | 2480.0          | GFSK    | Top           | 0mm      | \    | \          | 8.18                     | 9.00          | 76.84        | 1.30                      | <0.01                  | <0.01                    | <0.01                   | <0.01                     | \           |

**Table 12.2: WLAN 2.4GHz SAR Values**

| RF Exposure Conditions | Frequency Band | Channel Number | Frequency (MHz) | Mode/RB | Test Position | Distance | Note | Figure No. | EUT Measured Power (dBm) | Tune up (dBm) | Duty Cycle % | Duty Cycle Scaling Factor | Measured SAR 1g (W/kg) | Calculated SAR 1g (W/kg) | Measured SAR 10g (W/kg) | Calculated SAR 10g (W/kg) | Power Drift |
|------------------------|----------------|----------------|-----------------|---------|---------------|----------|------|------------|--------------------------|---------------|--------------|---------------------------|------------------------|--------------------------|-------------------------|---------------------------|-------------|
| Body                   | WLAN 2.4GHz    | 1              | 2412.0          | 802.11b | Front         | 0mm      | \    | 2          | 15.71                    | 17.00         | 100.00       | 1.00                      | 0.182                  | 0.24                     | 0.080                   | 0.11                      | 0.02        |
| Body                   | WLAN 2.4GHz    | 1              | 2412.0          | 802.11b | Rear          | 0mm      | \    | \          | 15.71                    | 17.00         | 100.00       | 1.00                      | 0.055                  | 0.07                     | 0.034                   | 0.05                      | 0.06        |
| Body                   | WLAN 2.4GHz    | 1              | 2412.0          | 802.11b | Left          | 0mm      | \    | \          | 15.71                    | 17.00         | 100.00       | 1.00                      | 0.040                  | 0.05                     | 0.019                   | 0.03                      | 0.05        |
| Body                   | WLAN 2.4GHz    | 1              | 2412.0          | 802.11b | Top           | 0mm      | \    | \          | 15.71                    | 17.00         | 100.00       | 1.00                      | 0.081                  | 0.11                     | 0.053                   | 0.07                      | 0.11        |

**Note:**

1. According to the KDB 248227 D01, SAR is measured for 2.4GHz 802.11b DSSS using the initial test position procedure.
2. For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
3. According to the KDB 248227 D01, the reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.
4. SAR is not required for OFDM because the 802.11b adjusted SAR ≤ 1.2 W/kg.

### 13. SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

- 1) Repeated measurement is not required when the original highest measured SAR is  $< 0.80$  W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is  $\geq 0.80$  W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is  $> 1.20$  or when the original or repeated measurement is  $\geq 1.45$  W/kg ( $\sim 10\%$  from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .

## 14. Measurement Uncertainty

### 14.1. Measurement Uncertainty for Normal SAR Tests (300MHz~3GHz)

| No.                                                                       | Error Description                                                            | Type | Uncertainty value | Probably Distribution | Div.       | (Ci) 1g      | (Ci) 10g     | Std. Unc. (1g) | Std. Unc. (10g) | Degree of freedom |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------|------|-------------------|-----------------------|------------|--------------|--------------|----------------|-----------------|-------------------|
| <b>Measurement system</b>                                                 |                                                                              |      |                   |                       |            |              |              |                |                 |                   |
| 1                                                                         | Probe calibration                                                            | B    | 11.0              | N                     | 2          | 1            | 1            | 5.5            | 5.5             | $\infty$          |
| 2                                                                         | Axial isotropy                                                               | B    | 4.7               | R                     | $\sqrt{3}$ | $\sqrt{0.5}$ | $\sqrt{0.5}$ | 4.3            | 4.3             | $\infty$          |
| 3                                                                         | Hemispherical isotropy                                                       | B    | 9.6               | R                     | $\sqrt{3}$ | 1            | 1            | 4.8            | 4.8             | $\infty$          |
| 4                                                                         | Boundary effect                                                              | B    | 1.1               | R                     | $\sqrt{3}$ | 1            | 1            | 0.6            | 0.6             | $\infty$          |
| 5                                                                         | Linearity                                                                    | B    | 4.7               | R                     | $\sqrt{3}$ | 1            | 1            | 2.7            | 2.7             | $\infty$          |
| 6                                                                         | Detection limit                                                              | B    | 1.0               | R                     | $\sqrt{3}$ | 1            | 1            | 0.6            | 0.6             | $\infty$          |
| 7                                                                         | Modulation response                                                          | B    | 4.0               | R                     | $\sqrt{3}$ | 1            | 1            | 2.3            | 2.3             | $\infty$          |
| 8                                                                         | Readout electronics                                                          | B    | 1.0               | N                     | 1          | 1            | 1            | 1.0            | 1.0             | $\infty$          |
| 9                                                                         | Response time                                                                | B    | 0.8               | R                     | $\sqrt{3}$ | 1            | 1            | 0.5            | 0.5             | $\infty$          |
| 10                                                                        | Integration time                                                             | B    | 1.7               | R                     | $\sqrt{3}$ | 1            | 1            | 1.0            | 1.0             | $\infty$          |
| 11                                                                        | RF ambient conditions-noise                                                  | B    | 3.0               | R                     | $\sqrt{3}$ | 1            | 1            | 1.7            | 1.7             | $\infty$          |
| 12                                                                        | RF ambient conditions-reflection                                             | B    | 3.0               | R                     | $\sqrt{3}$ | 1            | 1            | 1.7            | 1.7             | $\infty$          |
| 13                                                                        | Probe positioned mech. restrictions                                          | B    | 0.35              | R                     | $\sqrt{3}$ | 1            | 1            | 0.2            | 0.2             | $\infty$          |
| 14                                                                        | Probe positioning with respect to phantom shell                              | B    | 2.9               | R                     | $\sqrt{3}$ | 1            | 1            | 1.7            | 1.7             | $\infty$          |
| 15                                                                        | Post-processing                                                              | B    | 1.0               | R                     | $\sqrt{3}$ | 1            | 1            | 0.6            | 0.6             | $\infty$          |
| <b>Test sample related</b>                                                |                                                                              |      |                   |                       |            |              |              |                |                 |                   |
| 16                                                                        | Test sample positioning                                                      | A    | 3.3               | N                     | 1          | 1            | 1            | 3.3            | 3.3             | 5                 |
| 17                                                                        | Device holder uncertainty                                                    | A    | 3.4               | N                     | 1          | 1            | 1            | 3.4            | 3.4             | 5                 |
| 18                                                                        | Power scaling                                                                | B    | 0                 | R                     | $\sqrt{3}$ | 1            | 1            | 0              | 0               | $\infty$          |
| 19                                                                        | Drift of output power                                                        | B    | 5.0               | R                     | $\sqrt{3}$ | 1            | 1            | 2.9            | 2.9             | $\infty$          |
| <b>Phantom and set-up</b>                                                 |                                                                              |      |                   |                       |            |              |              |                |                 |                   |
| 20                                                                        | Phantom uncertainty                                                          | B    | 1.0               | R                     | $\sqrt{3}$ | 1            | 1            | 0.6            | 0.6             | $\infty$          |
| 21                                                                        | Algorithm for correcting SAR for deviations in permittivity and conductivity | B    | 1.9               | N                     | 1          | 1            | 0.84         | 1.9            | 1.6             | $\infty$          |
| 22                                                                        | Liquid conductivity (target)                                                 | B    | 5.0               | R                     | $\sqrt{3}$ | 0.64         | 0.43         | 1.8            | 1.2             | $\infty$          |
| 23                                                                        | Liquid conductivity (meas.)                                                  | A    | 1.3               | N                     | 1          | 0.64         | 0.43         | 0.83           | 0.56            | 9                 |
| 24                                                                        | Liquid permittivity (target)                                                 | B    | 5.0               | R                     | $\sqrt{3}$ | 0.6          | 0.49         | 1.7            | 1.4             | $\infty$          |
| 25                                                                        | Liquid permittivity (meas.)                                                  | A    | 1.6               | N                     | 1          | 0.6          | 0.49         | 0.96           | 0.78            | 9                 |
| Combined standard uncertainty, $u_c = \sqrt{\sum_{i=1}^{25} c_i^2 u_i^2}$ |                                                                              |      |                   |                       |            |              |              | 11.2           | 11.0            | 95.5              |
| Expanded uncertainty (Confidence interval of 95 %), $u_e = 2u_c$          |                                                                              |      |                   |                       |            |              |              | 22.4           | 22.0            |                   |

## 15. Main Test Instruments

**Table 15.1: List of Main Instruments**

| No. | Name                  | Type    | Serial Number | Calibration Date | Valid Period |
|-----|-----------------------|---------|---------------|------------------|--------------|
| 01  | Network analyzer      | E5071C  | MY46103759    | 2024-11-12       | One year     |
| 02  | Dielectric probe      | 85070E  | MY44300317    | /                | /            |
| 03  | Power meter           | E4418B  | MY50000366    | 2024-12-09       | One year     |
| 04  | Power sensor          | E9304A  | MY50000188    | 2024-12-09       | One year     |
| 05  | Power meter           | NRP     | 102603        | 2023-12-28       | One year     |
| 06  | Power sensor          | NRP-Z51 | 102211        | 2023-12-28       | One year     |
| 07  | Signal Generator      | E8257D  | MY47461211    | 2024-01-12       | One year     |
| 08  | Amplifier             | VTL5400 | 0404          | /                | /            |
| 09  | DAE                   | DAE4    | 1790          | 2024-06-06       | One year     |
| 10  | E-field Probe         | EX3DV4  | 7683          | 2024-07-03       | One year     |
| 11  | Dipole Validation Kit | D2450V2 | 873           | 2024-09-26       | Three years  |
| 12  | Thermometer           | 51II    | 99250045      | 2024-11-21       | One year     |
| 13  | Software              | DASY5   | /             | /                | /            |

## ANNEX A: Graph Results

### Bluetooth Body

Date: 2024-12-10

Electronics: DAE4 Sn1790

Medium: Head 2450MHz

Medium parameters used:  $f = 2480$  MHz;  $\sigma = 1.859$  S/m;  $\epsilon_r = 38.183$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Communication System: UID 0, BT (0) Frequency: 2480 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (7.87, 7.49, 7.34)

**Front Side Ch.78/Area Scan (71x111x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.168 W/kg

**Front Side Ch.78/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.2960 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.246 W/kg

**SAR(1 g) = 0.106 W/kg; SAR(10 g) = 0.049 W/kg**

Maximum value of SAR (measured) = 0.131 W/kg

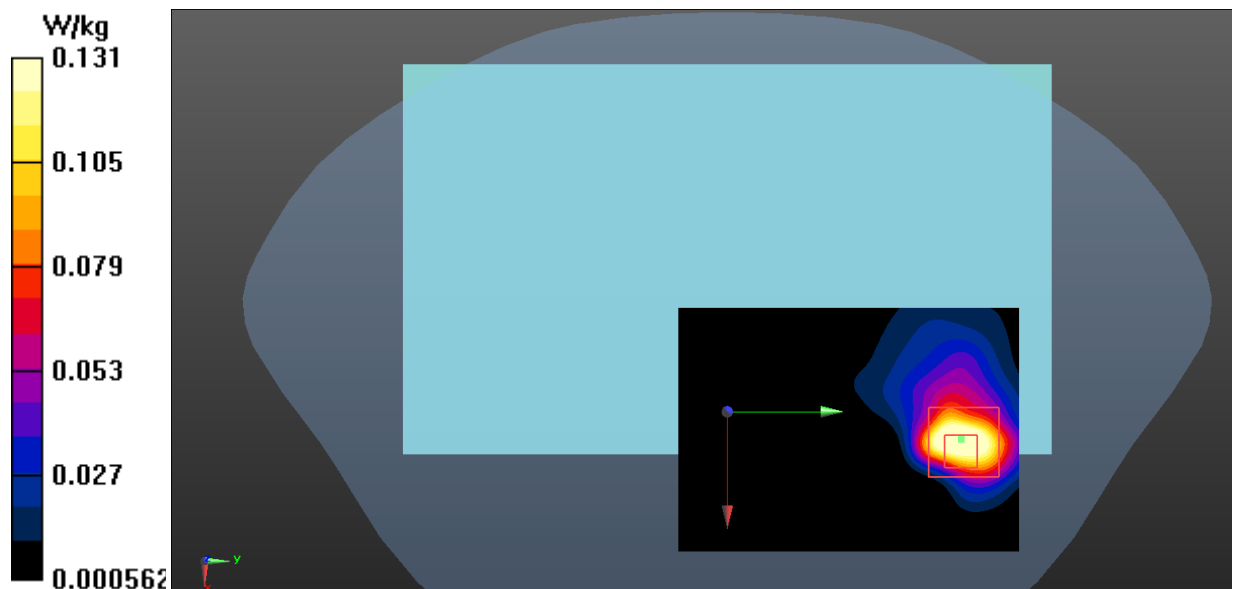


Fig.1 Bluetooth Body

### WLAN 2.4GHz Body

Date: 2019-7-22

Electronics: DAE4 Sn786

Medium: Head 2450MHz

Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.783$  S/m;  $\epsilon_r = 38.588$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Communication System: UID 0, WLAN (0) Frequency: 2412 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (7.33, 7.33, 7.33);

**Front Side Ch.1/Area Scan (131x201x1):** Interpolated grid:  $dx=1.000$  mm,  $dy=1.000$  mm

Maximum value of SAR (interpolated) = 0.244 W/kg

**Front Side Ch.1/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 0.226 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.418 W/kg

**SAR(1 g) = 0.182 W/kg; SAR(10 g) = 0.080 W/kg**

Maximum value of SAR (measured) = 0.296 W/kg

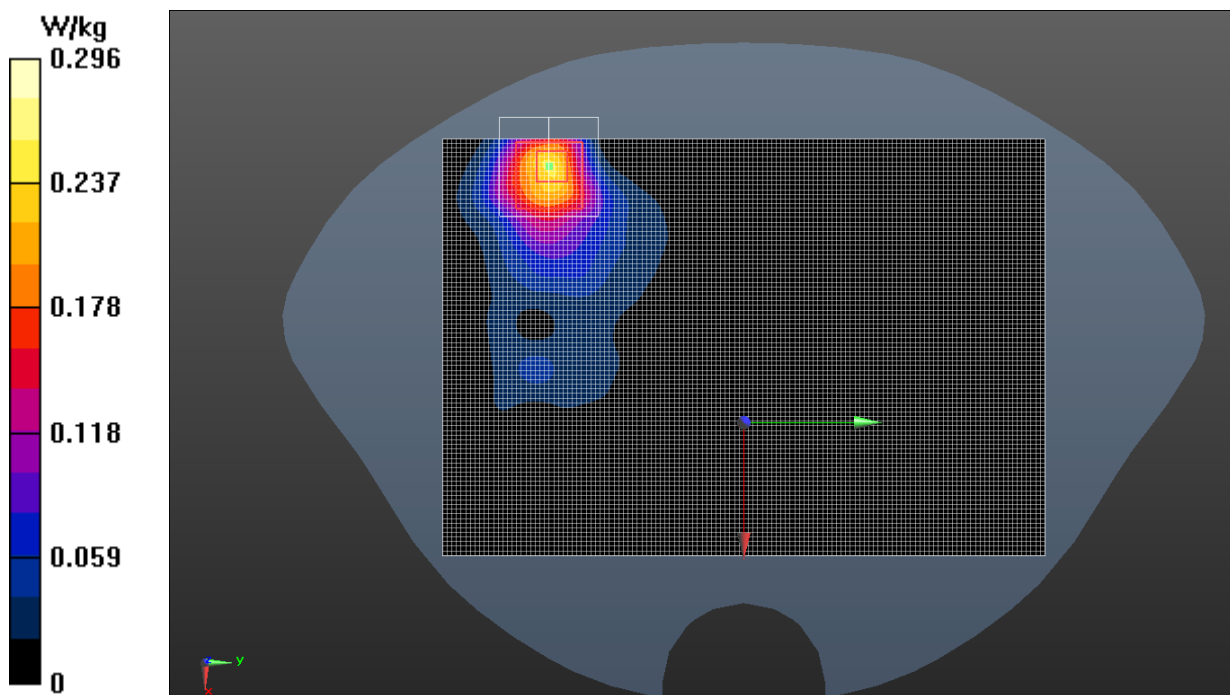


Fig.2 WLAN 2.4GHz Body

## ANNEX B: System Verification Results

### 2450MHz

Date: 2019-7-22

Electronics: DAE4 Sn786

Medium: Head 2450MHz

Medium parameters used:  $f = 2450 \text{ MHz}$ ;  $\sigma = 1.828 \text{ S/m}$ ;  $\epsilon_r = 38.462$ ;  $\rho = 1000 \text{ kg/m}^3$

Communication System: CW Frequency: 2450 MHz Duty Cycle: 1:1

Probe: EX3DV4 – SN3633 ConvF (7.33, 7.33, 7.33);

**System Validation/Area Scan (61x81x1):** Interpolated grid:  $dx=1.000 \text{ mm}$ ,  $dy=1.000 \text{ mm}$

Reference Value =  $91.822 \text{ V/m}$ ; Power Drift =  $0.05 \text{ dB}$

**SAR(1 g) =  $13.2 \text{ W/kg}$ ; SAR(10 g) =  $6.10 \text{ W/kg}$**

Maximum value of SAR (interpolated) =  $14.9 \text{ W/kg}$

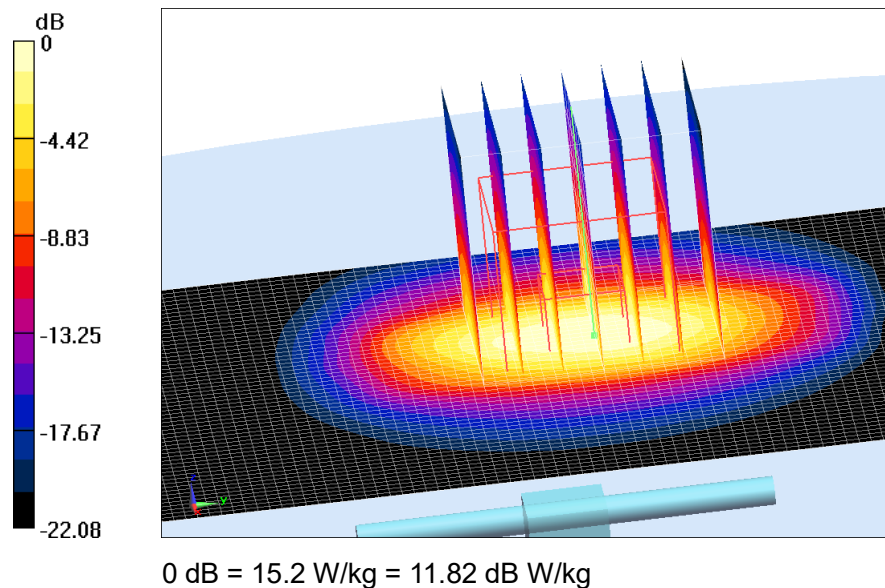
**System Validation/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $91.822 \text{ V/m}$ ; Power Drift =  $0.05 \text{ dB}$

Peak SAR (extrapolated) =  $26.2 \text{ W/kg}$

**SAR(1 g) =  $13.4 \text{ W/kg}$ ; SAR(10 g) =  $6.16 \text{ W/kg}$**

Maximum value of SAR (measured) =  $15.2 \text{ W/kg}$



**Fig.B.1. Validation 2450MHz 250mW**

## 2450MHz

Date: 2024-12-10

Electronics: DAE4 Sn1790

Medium: Head 2450MHz

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.824$  S/m;  $\epsilon_r = 38.282$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Communication System: CW Frequency: 2450 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (7.87, 7.49, 7.34)

**System Validation/Area Scan (81x121x1):** Interpolated grid:  $dx=1.000$  mm,  $dy=1.000$  mm

Reference Value = 95.356 V/m; Power Drift = 0.05 dB

**SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.13 W/kg**

Maximum value of SAR (interpolated) = 21.6 W/kg

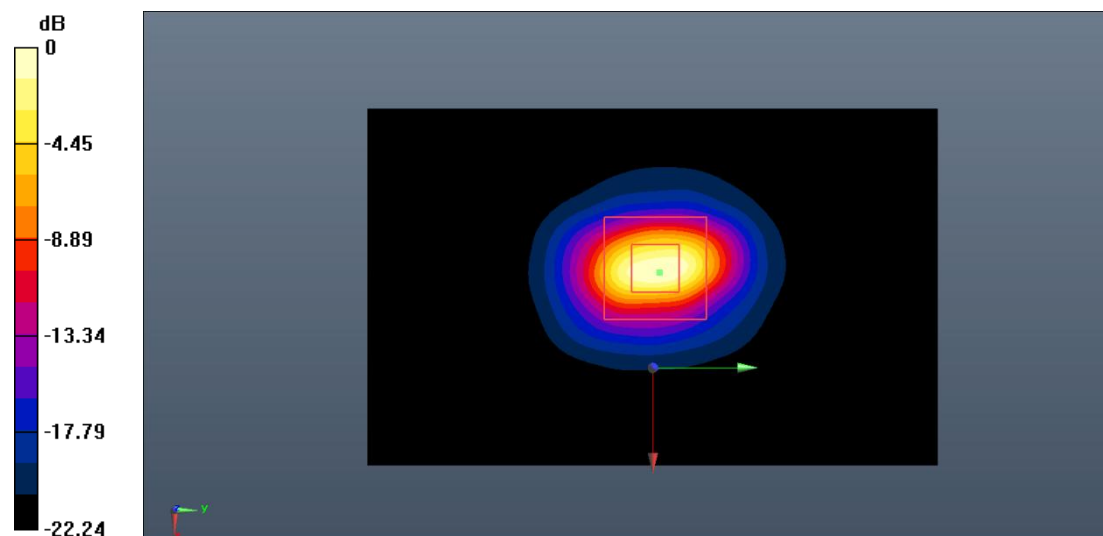
**System Validation/Zoom Scan (7x7x7)/Cube0:** Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 95.356 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 29.8 W/kg

**SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.26 W/kg**

Maximum value of SAR (measured) = 21.8 W/kg



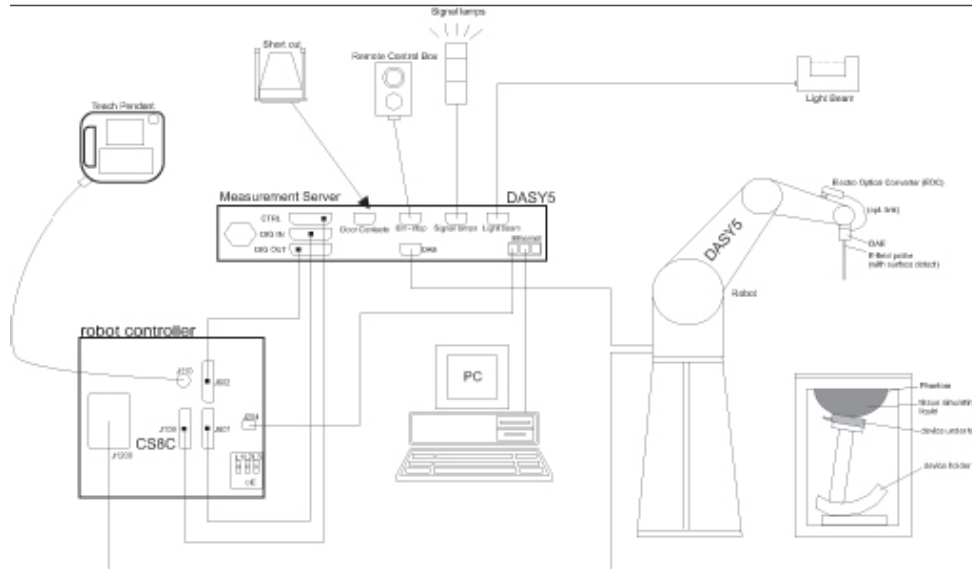
0 dB = 21.8 W/kg = 13.38 dB W/kg

**Fig.B.2. Validation 2450MHz 250mW**

## ANNEX C: SAR Measurement Setup

### C.1. Measurement Set-up

DASY5 system for performing compliance tests is illustrated above graphically. This system consists of the following items:



**Picture C.1 SAR Lab Test Measurement Set-up**

- A standard high precision 6-axis robot (Stäubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- 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.
- The phantom, the device holder and other accessories according to the targeted measurement.

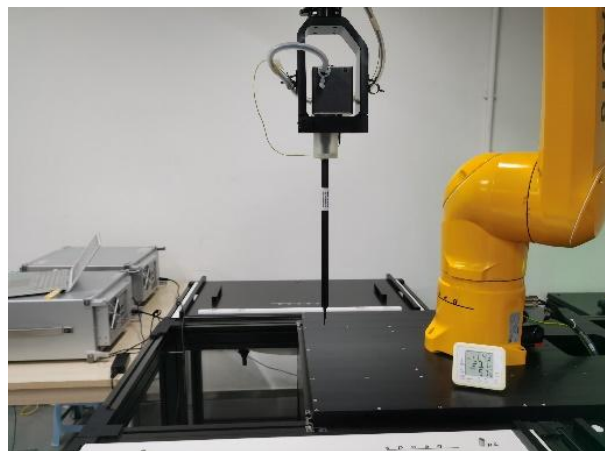
## C.2. DASY E-field Probe System

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY5 OR DASY8 software reads the reflection during a software approach and looks for the maximum using 2<sup>nd</sup> order curve fitting. The approach is stopped at reaching the maximum.

| Probe Specifications: |                                                                                                    |
|-----------------------|----------------------------------------------------------------------------------------------------|
| Model:                | EX3DV4                                                                                             |
| Frequency Range:      | 10 MHz - 6.0 GHz                                                                                   |
| Calibration:          | In head simulating tissue at Frequencies from 750 up to 5750 MHz                                   |
| Linearity:            | $\pm 0.2$ dB (30 MHz to 6 GHz)                                                                     |
| Dynamic Range:        | 10 mW/kg - 100 W/kg                                                                                |
| Probe Length:         | 337 mm                                                                                             |
| Probe Tip Length:     | 20 mm                                                                                              |
| Body Diameter:        | 12 mm                                                                                              |
| Tip Diameter:         | 2.5 mm                                                                                             |
| Tip-Center:           | 1 mm                                                                                               |
| Application:          | SAR Dosimetry Testing / Compliance tests of mobile phones /<br>Dosimetry in strong gradient fields |



Picture C.2: Near-field Probe



Picture C.3: E-field Probe

### C.3. E-field Probe Calibration

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm<sup>2</sup>) using an RF Signal generator, TEM cell, and RF Power Meter.

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equate to 1 mW/cm<sup>2</sup>.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C \frac{\Delta T}{\Delta t}$$

Where:

$\Delta t$  = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

$\Delta T$  = Temperature increase due to RF exposure.

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

Where:

$\sigma$  = Simulated tissue conductivity,

$\rho$  = Tissue density (kg/m<sup>3</sup>).

## C.4. Other Test Equipment

### C.4.1. Data Acquisition Electronics (DAE)

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

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

The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



Picture C.4: DAE

### C.4.2. Robot

The SPEAG DASY system uses the high precision robots (DASY5: RX90L) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchron motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)



Picture C.5: DASY 5



Picture C.6: DASY 8

### C.4.3. Measurement Server

The Measurement server is based on a PC/104 CPU board with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (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 DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.



Picture C.7: Server for DASY 5



Picture C.8: Server for DASY 8

### C.4.4. Device Holder for Phantom

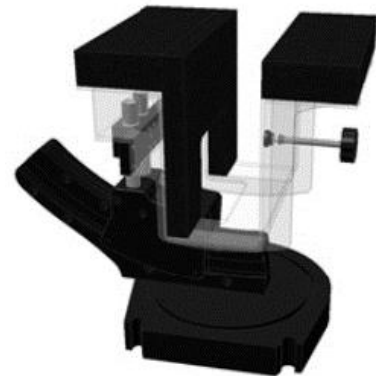
The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5mm distance, a positioning uncertainty of  $\pm 0.5\text{mm}$  would produce a SAR uncertainty of  $\pm 20\%$ . Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed 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.

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin-SAM and ELI phantoms.

**Picture C.9: Device Holder****Picture C.10: Laptop Extension Kit**

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to represent the 90<sup>th</sup> percentile of the population. The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

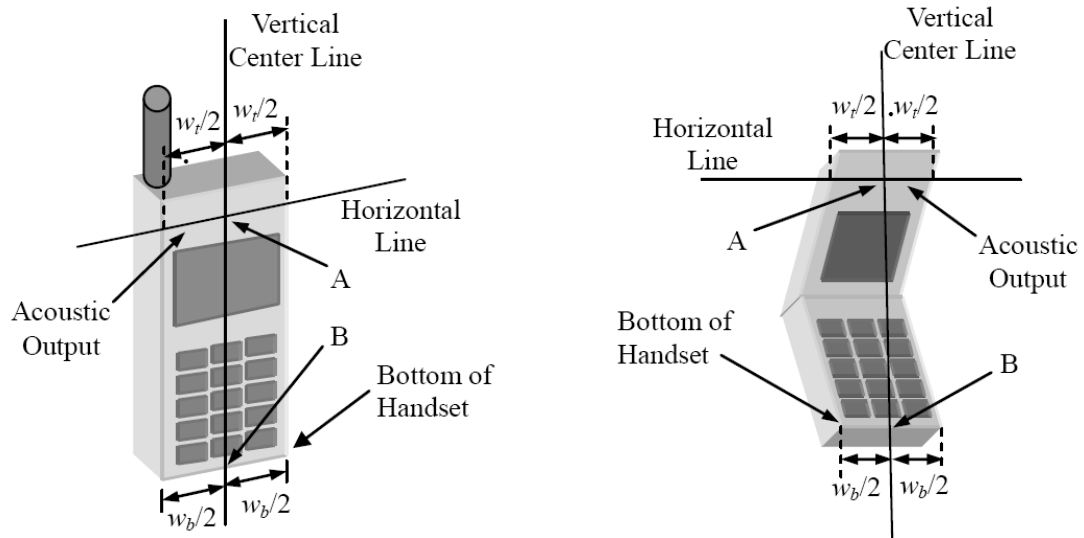
Shell Thickness:  $2 \pm 0.2$  mm  
Filling Volume: Approx. 25 liters  
Dimensions: 810 x 1000 x 500 mm (H x L x W)  
Available: Special

**Picture C.11: SAM Twin Phantom**

## ANNEX D: Position of the wireless device in relation to the phantom

### D.1. General considerations

This standard specifies two handset test positions against the head phantom – the “cheek” position and the “tilt” position.



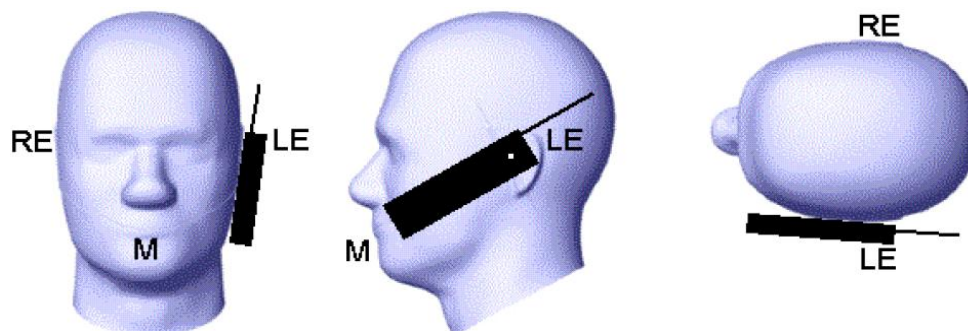
$w_t$  Width of the handset at the level of the acoustic

$w_b$  Width of the bottom of the handset

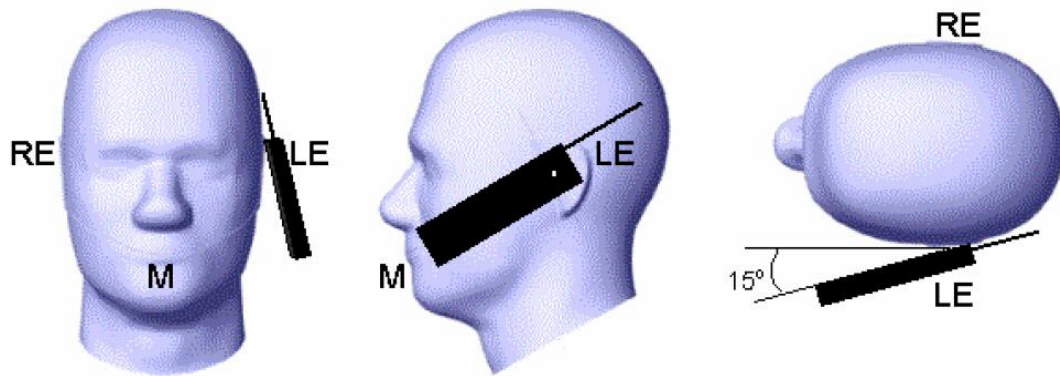
A Midpoint of the width  $w_t$  of the handset at the level of the acoustic output

B Midpoint of the width  $w_b$  of the bottom of the handset

Picture D.1-a Typical “fixed” case handset      Picture D.1-b Typical “clam-shell” case handset



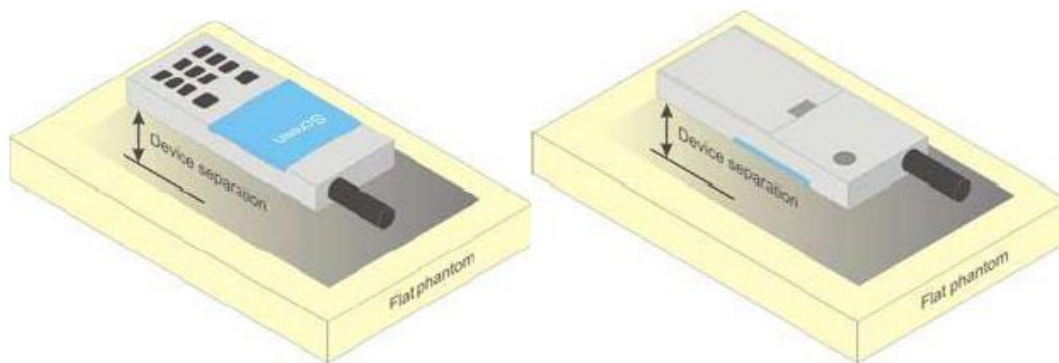
Picture D.2 Cheek position of the wireless device on the left side of SAM



Picture D.3 Tilt position of the wireless device on the left side of SAM

## D.2. Body-worn device

A typical example of a body-worn device is a mobile phone, wireless enabled PDA or other battery operated wireless device with the ability to transmit while mounted on a person's body using a carry accessory approved by the wireless device manufacturer.

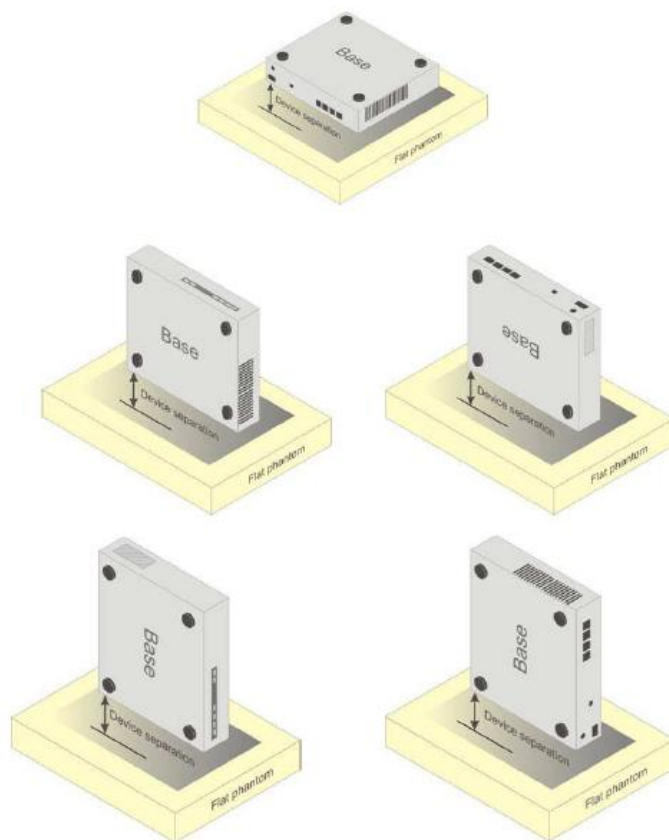


Picture D.4 Test positions for body-worn devices

## D.3. Desktop device

A typical example of a desktop device is a wireless enabled desktop computer placed on a table or desk when used.

The DUT shall be positioned at the distance and in the orientation to the phantom that corresponds to the intended use as specified by the manufacturer in the user instructions. For devices that employ an external antenna with variable positions, tests shall be performed for all antenna positions specified. Picture 8.5 show positions for desktop device SAR tests. If the intended use is not specified, the device shall be tested directly against the flat phantom.



Picture D.5 Test positions for desktop devices

#### D.4. DUT Setup Photos



Picture D.6 Specific Absorption Rate Test Layout

## ANNEX E: Equivalent Media Recipes

The liquid used for the frequency range of 700-6000 MHz consisted of water, sugar, salt, preventol, glycol monobutyl and Cellulose. The liquid has been previously proven to be suited for worst-case. The Table E.1 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528 and IEC 62209.

**Table E.1: Composition of the Tissue Equivalent Matter**

| Frequency (MHz)                    | 835                              | 1750                              | 1900                             | 2450                              | 2600                              | 5200                              | 5800                              |
|------------------------------------|----------------------------------|-----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Water                              | 41.45                            | 55.242                            | 55.242                           | 58.79                             | 58.79                             | 65.53                             | 66.10                             |
| Sugar                              | 56.0                             | /                                 | /                                | /                                 | /                                 | /                                 | /                                 |
| Salt                               | 1.45                             | 0.306                             | 0.306                            | 0.06                              | 0.06                              |                                   |                                   |
| Preventol                          | 0.1                              | /                                 | /                                | /                                 | /                                 | 17.24                             | 16.95                             |
| Cellulose                          | 1.0                              | /                                 | /                                | /                                 | /                                 | 17.24                             | 16.95                             |
| Glycol Monobutyl                   | /                                | 44.452                            | 44.452                           | 41.15                             | 41.15                             | /                                 | /                                 |
| Diethylenglycol monohexylether     | /                                | /                                 | /                                | /                                 | /                                 | /                                 | /                                 |
| Triton X-100                       | /                                | /                                 | /                                | /                                 | /                                 | /                                 | /                                 |
| Dielectric Parameters Target Value | $\epsilon=41.5$<br>$\sigma=0.90$ | $\epsilon=40.08$<br>$\sigma=1.37$ | $\epsilon=40.0$<br>$\sigma=1.40$ | $\epsilon=39.20$<br>$\sigma=1.80$ | $\epsilon=39.01$<br>$\sigma=1.96$ | $\epsilon=35.99$<br>$\sigma=4.66$ | $\epsilon=35.30$<br>$\sigma=5.27$ |

**Note:** There is a little adjustment respectively for 750, 5300 and 5600, based on the recipe of closest frequency in table E.1

## ANNEX F: System Validation

The SAR system must be validated against its performance specifications before it is deployed. When SAR probes, system components or software are changed, upgraded or recalibrated, these must be validated with the SAR system(s) that operates with such components.

**Table F.1: System Validation**

| Probe SN. | Liquid name (MHz) | Validation date | Frequency point | CW Validation | Modulation Signal Validation |             |      |
|-----------|-------------------|-----------------|-----------------|---------------|------------------------------|-------------|------|
|           |                   |                 |                 |               | Modulation Type              | Duty Factor | PAR  |
| 7683      | Head 750          | 2024-08-08      | 750MHz          | Pass          | N/A                          | N/A         | N/A  |
| 7683      | Head 835          | 2024-08-08      | 835MHz          | Pass          | GMSK                         | Pass        | N/A  |
| 7683      | Head 1750         | 2024-08-08      | 1750MHz         | Pass          | N/A                          | N/A         | N/A  |
| 7683      | Head 1900         | 2024-08-08      | 1900MHz         | Pass          | GMSK                         | Pass        | N/A  |
| 7683      | Head 2450         | 2024-08-20      | 2450MHz         | Pass          | OFDM/TDD                     | Pass        | Pass |
| 7683      | Head 2550         | 2024-08-20      | 2550MHz         | Pass          | TDD                          | Pass        | N/A  |
| 7683      | Head 3500         | 2024-08-19      | 3500MHz         | Pass          | TDD                          | Pass        | N/A  |
| 7683      | Head 3700         | 2024-08-19      | 3700MHz         | Pass          | TDD                          | Pass        | N/A  |
| 7683      | Head 3900         | 2024-08-19      | 3900MHz         | Pass          | TDD                          | Pass        | N/A  |
| 7683      | Head 5250         | 2024-08-21      | 5250MHz         | Pass          | OFDM                         | N/A         | Pass |
| 7683      | Head 5600         | 2024-08-21      | 5600MHz         | Pass          | OFDM                         | N/A         | Pass |
| 7683      | Head 5750         | 2024-08-21      | 5750MHz         | Pass          | OFDM                         | N/A         | Pass |

**ANNEX G: DAE Calibration Certificate****DAE4 - SN:1790 (2024-06-06)**

Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China  
Tel: +86-10-62304633-2117  
E-mail: emf@caict.ac.cn <http://www.caict.ac.cn>



中国认可  
国际互认  
校准  
CALIBRATION  
CNAS L0570

Client : **SAICT**Certificate No: **24J02Z000295****CALIBRATION CERTIFICATE**Object **DAE4 - SN: 1790**Calibration Procedure(s) **FF-Z11-002-01  
Calibration Procedure for the Data Acquisition Electronics  
(DAEx)**Calibration date: **June 06, 2024**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&amp;TE critical for calibration)

| Primary Standards | ID # | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
|-------------------|------|------------------------------------------|-----------------------|
|-------------------|------|------------------------------------------|-----------------------|

|                        |         |                                |        |
|------------------------|---------|--------------------------------|--------|
| Process Calibrator 753 | 1971018 | 12-Jun-23 (CTTL, No.J23X05436) | Jun-24 |
|------------------------|---------|--------------------------------|--------|

|                | Name        | Function           | Signature |
|----------------|-------------|--------------------|-----------|
| Calibrated by: | Yu Zongying | SAR Test Engineer  |           |
| Reviewed by:   | Lin Jun     | SAR Test Engineer  |           |
| Approved by:   | Qi Dianyuan | SAR Project Leader |           |

Issued: June 09, 2024

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



Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China  
Tel: +86-10-62304633-2117  
E-mail: [cmf@caict.ac.cn](mailto:cmf@caict.ac.cn) <http://www.caict.ac.cn>

**Glossary:**

DAE data acquisition electronics  
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

**Methods Applied and Interpretation of Parameters:**

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle:* The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The report provide only calibration results for DAE, it does not contain other performance test results.



Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China  
Tel: +86-10-62304633-2117  
E-mail: [emf@caict.ac.cn](mailto:emf@caict.ac.cn) <http://www.caict.ac.cn>

#### DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB =  $6.1\mu\text{V}$ , full range =  $-100\dots+300\text{ mV}$

Low Range: 1LSB =  $61\text{nV}$ , full range =  $-1\dots\dots+3\text{mV}$

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

| Calibration Factors | X                          | Y                          | Z                          |
|---------------------|----------------------------|----------------------------|----------------------------|
| High Range          | $404.649 \pm 0.15\% (k=2)$ | $404.367 \pm 0.15\% (k=2)$ | $404.501 \pm 0.15\% (k=2)$ |
| Low Range           | $4.00172 \pm 0.7\% (k=2)$  | $3.99527 \pm 0.7\% (k=2)$  | $3.98609 \pm 0.7\% (k=2)$  |

#### Connector Angle

|                                           |                           |
|-------------------------------------------|---------------------------|
| Connector Angle to be used in DASY system | $305.5^\circ \pm 1^\circ$ |
|-------------------------------------------|---------------------------|

## ANNEX H: Probe Calibration Certificate

EX3DV4 - SN:7683 (2024-07-03)

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



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

Accredited by the Swiss Accreditation Service (SAS)  
The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **SAICT**  
Shenzhen

Certificate No. **EX-7683\_Jul24**

### CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:7683**

Calibration procedure(s) **QA CAL-01.v10, QA CAL-12.v10, QA CAL-14.v7, QA CAL-23.v6,  
QA CAL-25.v8  
Calibration procedure for dosimetric E-field probes**

Calibration date **July 03, 2024**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.  
All calibrations have been conducted in the closed laboratory facility: environment temperature ( $22 \pm 3$ ) °C and humidity < 70%.  
Calibration Equipment used (M&TE critical for calibration)

| Primary Standards          | ID               | Cal Date (Certificate No.)        | Scheduled Calibration |
|----------------------------|------------------|-----------------------------------|-----------------------|
| Power meter NRP2           | SN: 104778       | 26-Mar-24 (No. 217-04036/04037)   | Mar-25                |
| Power sensor NRP-Z91       | SN: 103244       | 26-Mar-24 (No. 217-04036)         | Mar-25                |
| OCP DAK-3.5 (weighted)     | SN: 1249         | 05-Oct-23 (OCP-DAK3.5-1249_Oct23) | Oct-24                |
| OCP DAK-12                 | SN: 1016         | 05-Oct-23 (OCP-DAK12-1016_Oct23)  | Oct-24                |
| Reference 20 dB Attenuator | SN: CC2552 (20x) | 26-Mar-24 (No. 217-04046)         | Mar-25                |
| DAE4                       | SN: 660          | 23-Feb-24 (No. DAE4-660_Feb24)    | Feb-25                |
| Reference Probe EX3DV4     | SN: 7349         | 03-Jun-24 (No. EX3-7349_Jun24)    | Jun-25                |

| Secondary Standards     | ID               | Check Date (in house)             | Scheduled Check        |
|-------------------------|------------------|-----------------------------------|------------------------|
| Power meter E4419B      | SN: GB41293874   | 06-Apr-16 (in house check Jun-24) | In house check: Jun-26 |
| Power sensor E4412A     | SN: MY41498087   | 06-Apr-16 (in house check Jun-24) | In house check: Jun-26 |
| Power sensor E4412A     | SN: 000110210    | 06-Apr-16 (in house check Jun-24) | In house check: Jun-26 |
| RF generator HP 8648C   | SN: US3642U01700 | 04-Aug-99 (in house check Jun-24) | In house check: Jun-26 |
| Network Analyzer E8358A | SN: US41080477   | 31-Mar-14 (in house check Oct-22) | In house check: Oct-24 |

|                                                                                                                 | Name           | Function              | Signature                                                                             |
|-----------------------------------------------------------------------------------------------------------------|----------------|-----------------------|---------------------------------------------------------------------------------------|
| Calibrated by                                                                                                   | Joanna Lieshaj | Laboratory Technician |  |
| Approved by                                                                                                     | Sven Kühn      | Technical Manager     |  |
| This calibration certificate shall not be reproduced except in full without written approval of the laboratory. |                |                       |                                                                                       |

Issued: July 03, 2024

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



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

Accredited by the Swiss Accreditation Service (SAS)  
 The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

## Glossary

|                        |                                                                                                                                                |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| TSL                    | tissue simulating liquid                                                                                                                       |
| NORM <sub>x,y,z</sub>  | sensitivity in free space                                                                                                                      |
| ConvF                  | sensitivity in TSL / NORM <sub>x,y,z</sub>                                                                                                     |
| DCP                    | diode compression point                                                                                                                        |
| CF                     | crest factor (1/duty_cycle) of the RF signal                                                                                                   |
| A, B, C, D             | modulation dependent linearization parameters                                                                                                  |
| Polarization $\varphi$ | $\varphi$ rotation around probe axis                                                                                                           |
| Polarization $\theta$  | $\theta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\theta = 0$ is normal to probe axis |
| Connector Angle        | information used in DASY system to align probe sensor X to the robot coordinate system                                                         |

## Calibration is Performed According to the Following Standards:

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

## Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\theta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub> = NORM<sub>x,y,z</sub> \* frequency\_response** (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; D<sub>x,y,z</sub>; V<sub>Rx,y,z</sub>**: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM<sub>x</sub> (no uncertainty required).

EX3DV4 - SN:7683

July 03, 2024

### Parameters of Probe: EX3DV4 - SN:7683

#### Basic Calibration Parameters

|                                                           | Sensor X | Sensor Y | Sensor Z | Unc (k = 2)  |
|-----------------------------------------------------------|----------|----------|----------|--------------|
| Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup> | 0.62     | 0.63     | 0.63     | $\pm 10.1\%$ |
| DCP (mV) <sup>B</sup>                                     | 103.2    | 103.9    | 103.2    | $\pm 4.7\%$  |

#### Calibration Results for Modulation Response

| UID   | Communication System Name   |   | A<br>dB | B<br>$\text{dB}\sqrt{\mu\text{V}}$ | C     | D<br>dB | VR<br>mV | Max<br>dev. | Max<br>Unc <sup>E</sup><br>k = 2 |
|-------|-----------------------------|---|---------|------------------------------------|-------|---------|----------|-------------|----------------------------------|
| 0     | CW                          | X | 0.00    | 0.00                               | 1.00  | 0.00    | 120.4    | $\pm 1.4\%$ | $\pm 4.7\%$                      |
|       |                             | Y | 0.00    | 0.00                               | 1.00  |         | 140.6    |             |                                  |
|       |                             | Z | 0.00    | 0.00                               | 1.00  |         | 119.4    |             |                                  |
| 10352 | Pulse Waveform (200Hz, 10%) | X | 1.52    | 60.67                              | 6.55  | 10.00   | 60.0     | $\pm 2.6\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 1.53    | 60.79                              | 6.54  |         | 60.0     |             |                                  |
|       |                             | Z | 2.00    | 62.00                              | 7.00  |         | 60.0     |             |                                  |
| 10353 | Pulse Waveform (200Hz, 20%) | X | 0.80    | 60.00                              | 5.10  | 6.99    | 80.0     | $\pm 2.3\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 10.00   | 72.00                              | 9.00  |         | 80.0     |             |                                  |
|       |                             | Z | 0.80    | 60.00                              | 4.99  |         | 80.0     |             |                                  |
| 10354 | Pulse Waveform (200Hz, 40%) | X | 0.26    | 143.64                             | 0.03  | 3.98    | 95.0     | $\pm 2.6\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 52.00   | 78.00                              | 9.00  |         | 95.0     |             |                                  |
|       |                             | Z | 0.19    | 137.24                             | 0.48  |         | 95.0     |             |                                  |
| 10355 | Pulse Waveform (200Hz, 60%) | X | 10.14   | 157.74                             | 16.87 | 2.22    | 120.0    | $\pm 1.6\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 12.08   | 151.82                             | 9.48  |         | 120.0    |             |                                  |
|       |                             | Z | 10.53   | 156.21                             | 19.40 |         | 120.0    |             |                                  |
| 10387 | QPSK Waveform, 1 MHz        | X | 0.62    | 63.82                              | 12.61 | 1.00    | 150.0    | $\pm 4.5\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 0.70    | 63.58                              | 11.65 |         | 150.0    |             |                                  |
|       |                             | Z | 0.58    | 62.17                              | 11.23 |         | 150.0    |             |                                  |
| 10388 | QPSK Waveform, 10 MHz       | X | 1.39    | 65.66                              | 14.01 | 0.00    | 150.0    | $\pm 1.4\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 1.40    | 64.71                              | 13.34 |         | 150.0    |             |                                  |
|       |                             | Z | 1.31    | 64.28                              | 13.14 |         | 150.0    |             |                                  |
| 10396 | 64-QAM Waveform, 100 kHz    | X | 1.61    | 63.63                              | 15.52 | 3.01    | 150.0    | $\pm 1.1\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 1.73    | 64.50                              | 15.77 |         | 150.0    |             |                                  |
|       |                             | Z | 1.59    | 63.24                              | 15.16 |         | 150.0    |             |                                  |
| 10399 | 64-QAM Waveform, 40 MHz     | X | 2.86    | 66.09                              | 15.03 | 0.00    | 150.0    | $\pm 1.9\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 2.90    | 65.80                              | 14.74 |         | 150.0    |             |                                  |
|       |                             | Z | 2.80    | 65.50                              | 14.61 |         | 150.0    |             |                                  |
| 10414 | WLAN CCDF, 64-QAM, 40 MHz   | X | 3.85    | 65.69                              | 15.17 | 0.00    | 150.0    | $\pm 3.5\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 4.00    | 65.56                              | 15.06 |         | 150.0    |             |                                  |
|       |                             | Z | 4.03    | 66.09                              | 15.30 |         | 150.0    |             |                                  |

Note: For details on UID parameters see Appendix

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

<sup>A</sup> The uncertainties of Norm X,Y,Z do not affect the  $E^2$ -field uncertainty inside TSL (see Pages 5 and 6).

<sup>B</sup> Linearization parameter uncertainty for maximum specified field strength.

<sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

EX3DV4 - SN:7683

July 03, 2024

### Parameters of Probe: EX3DV4 - SN:7683

#### Sensor Model Parameters

|   | C1<br>fF | C2<br>fF | $\alpha$<br>$V^{-1}$ | T1<br>$msV^{-2}$ | T2<br>$msV^{-1}$ | T3<br>ms | T4<br>$V^{-2}$ | T5<br>$V^{-1}$ | T6   |
|---|----------|----------|----------------------|------------------|------------------|----------|----------------|----------------|------|
| x | 10.8     | 77.56    | 33.12                | 2.58             | 0.00             | 4.90     | 0.27           | 0.00           | 1.00 |
| y | 13.0     | 94.75    | 33.73                | 3.67             | 0.00             | 4.92     | 0.51           | 0.00           | 1.00 |
| z | 11.7     | 84.47    | 33.28                | 2.66             | 0.00             | 4.90     | 0.28           | 0.00           | 1.00 |

#### Other Probe Parameters

|                                               |            |
|-----------------------------------------------|------------|
| Sensor Arrangement                            | Triangular |
| Connector Angle                               | 70.6°      |
| Mechanical Surface Detection Mode             | enabled    |
| Optical Surface Detection Mode                | disabled   |
| Probe Overall Length                          | 337 mm     |
| Probe Body Diameter                           | 10 mm      |
| Tip Length                                    | 9 mm       |
| Tip Diameter                                  | 2.5 mm     |
| Probe Tip to Sensor X Calibration Point       | 1 mm       |
| Probe Tip to Sensor Y Calibration Point       | 1 mm       |
| Probe Tip to Sensor Z Calibration Point       | 1 mm       |
| Recommended Measurement Distance from Surface | 1.4 mm     |

**Note:** Measurement distance from surface can be increased to 3–4 mm for an Area Scan job.

EX3DV4 - SN:7683

July 03, 2024

### Parameters of Probe: EX3DV4 - SN:7683

#### Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity <sup>F</sup> (S/m) | ConvF X | ConvF Y | ConvF Z | Alpha <sup>G</sup> | Depth <sup>G</sup> (mm) | Unc <sup>H</sup> (k = 2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|--------------------------|
| 13                   | 55.0                               | 0.75                            | 18.80   | 15.39   | 15.39   | 0.00               | 1.25                    | ±13.3%                   |
| 750                  | 41.9                               | 0.89                            | 10.40   | 9.90    | 9.70    | 0.34               | 1.27                    | ±11.0%                   |
| 900                  | 41.5                               | 0.97                            | 9.93    | 9.45    | 9.26    | 0.34               | 1.27                    | ±11.0%                   |
| 1640                 | 40.2                               | 1.31                            | 8.55    | 8.13    | 7.97    | 0.35               | 1.27                    | ±11.0%                   |
| 1750                 | 40.1                               | 1.37                            | 8.60    | 8.19    | 8.02    | 0.35               | 1.27                    | ±11.0%                   |
| 1900                 | 40.0                               | 1.40                            | 8.37    | 7.96    | 7.80    | 0.35               | 1.27                    | ±11.0%                   |
| 2100                 | 39.8                               | 1.49                            | 8.41    | 8.01    | 7.84    | 0.36               | 1.27                    | ±11.0%                   |
| 2300                 | 39.5                               | 1.67                            | 8.14    | 7.75    | 7.59    | 0.36               | 1.27                    | ±11.0%                   |
| 2450                 | 39.2                               | 1.80                            | 7.87    | 7.49    | 7.34    | 0.36               | 1.27                    | ±11.0%                   |
| 2600                 | 39.0                               | 1.96                            | 7.93    | 7.55    | 7.39    | 0.36               | 1.27                    | ±11.0%                   |
| 3300                 | 38.2                               | 2.71                            | 7.14    | 6.80    | 6.66    | 0.37               | 1.27                    | ±13.1%                   |
| 3500                 | 37.9                               | 2.91                            | 7.20    | 6.85    | 6.71    | 0.37               | 1.27                    | ±13.1%                   |
| 3700                 | 37.7                               | 3.12                            | 7.08    | 6.74    | 6.60    | 0.37               | 1.27                    | ±13.1%                   |
| 3900                 | 37.5                               | 3.32                            | 6.96    | 6.62    | 6.49    | 0.38               | 1.27                    | ±13.1%                   |
| 4100                 | 37.2                               | 3.53                            | 6.87    | 6.54    | 6.40    | 0.38               | 1.27                    | ±13.1%                   |
| 4400                 | 36.9                               | 3.84                            | 6.68    | 6.35    | 6.22    | 0.38               | 1.27                    | ±13.1%                   |
| 4600                 | 36.7                               | 4.04                            | 6.74    | 6.41    | 6.28    | 0.38               | 1.27                    | ±13.1%                   |
| 4800                 | 36.4                               | 4.25                            | 6.61    | 6.29    | 6.16    | 0.39               | 1.27                    | ±13.1%                   |
| 4950                 | 36.3                               | 4.40                            | 6.59    | 6.27    | 6.14    | 0.37               | 1.27                    | ±13.1%                   |
| 5250                 | 35.9                               | 4.71                            | 6.03    | 5.73    | 5.62    | 0.34               | 1.27                    | ±13.1%                   |
| 5600                 | 35.5                               | 5.07                            | 5.46    | 5.19    | 5.09    | 0.30               | 1.27                    | ±13.1%                   |
| 5800                 | 35.3                               | 5.27                            | 5.53    | 5.26    | 5.15    | 0.28               | 1.27                    | ±13.1%                   |

<sup>C</sup> Frequency validity above 300 MHz of ±100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ±50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ±10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4–9 MHz, and ConvF assessed at 13 MHz is 9–19 MHz. Above 5 GHz frequency validity can be extended to ±110 MHz.

<sup>F</sup> The probes are calibrated using tissue simulating liquids (TSL) that deviate for  $\epsilon$  and  $\sigma$  by less than ±5% from the target values (typically better than ±3%) and are valid for TSL with deviations of up to ±10% if SAR correction is applied.

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

<sup>H</sup> The stated uncertainty is the total calibration uncertainty (k = 2) of Norm-ConvF. Therefore, the uncertainty stated is equivalent to the uncertainty component with the symbol CF in Table 9 of IEC/IEEE 62209-1528:2020.

EX3DV4 - SN:7683

July 03, 2024

### Parameters of Probe: EX3DV4 - SN:7683

#### Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity <sup>F</sup> (S/m) | ConvF X | ConvF Y | ConvF Z | Alpha <sup>G</sup> | Depth <sup>G</sup> (mm) | Unc <sup>H</sup> (k = 2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|--------------------------|
| 6500                 | 34.5                               | 6.07                            | 5.99    | 5.70    | 5.58    | 0.20               | 1.27                    | ±18.6%                   |

<sup>C</sup> Frequency validity at 6.5 GHz is -600/+700 MHz, and ±700 MHz at or above 7 GHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

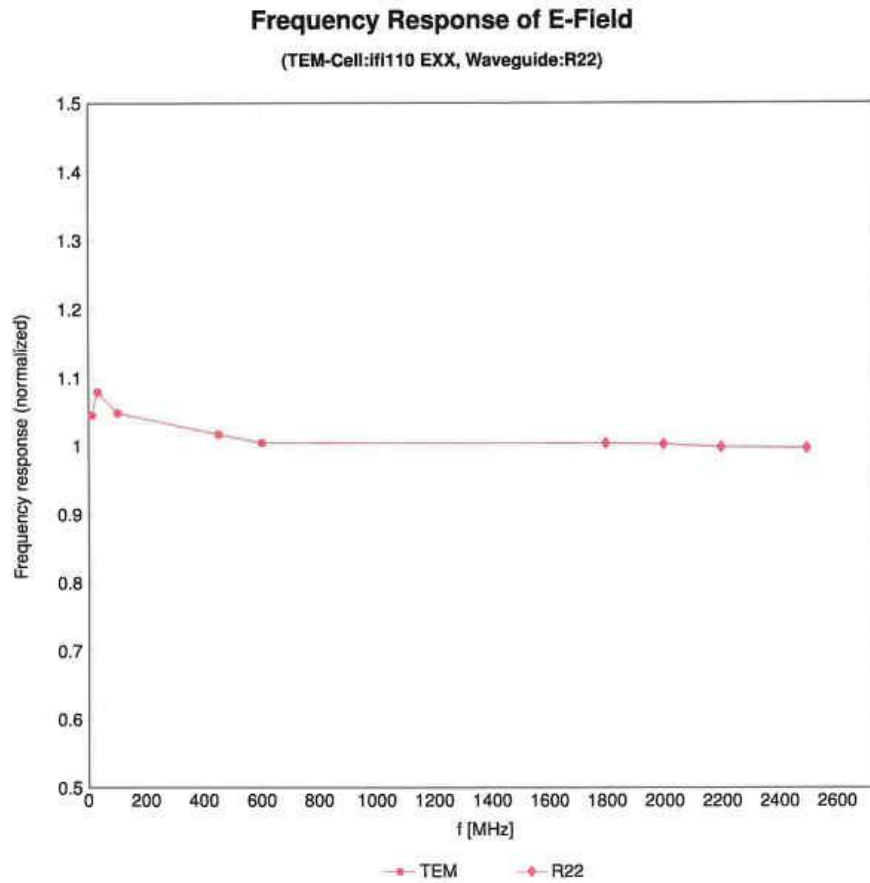
<sup>F</sup> The probes are calibrated using tissue simulating liquids (TSL) that deviate for  $\epsilon$  and  $\sigma$  by less than ±10% from the target values (typically better than ±6%) and are valid for TSL with deviations of up to ±10%.

<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz; below ±2% for frequencies between 3–6 GHz; and below ±4% for frequencies between 6–10 GHz at any distance larger than half the probe tip diameter from the boundary.

<sup>H</sup> The stated uncertainty is the total calibration uncertainty (k = 2) of Norm-ConvF. Therefore, the uncertainty stated is equivalent to the uncertainty component with the symbol CF in Table 9 of IEC/IEEE 62209-1528:2020.

EX3DV4 - SN:7683

July 03, 2024

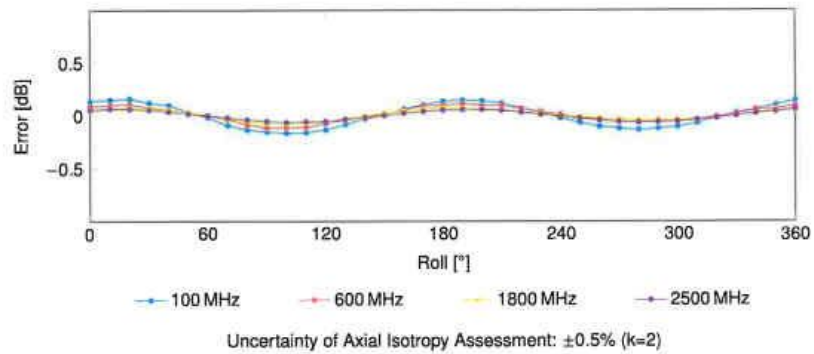
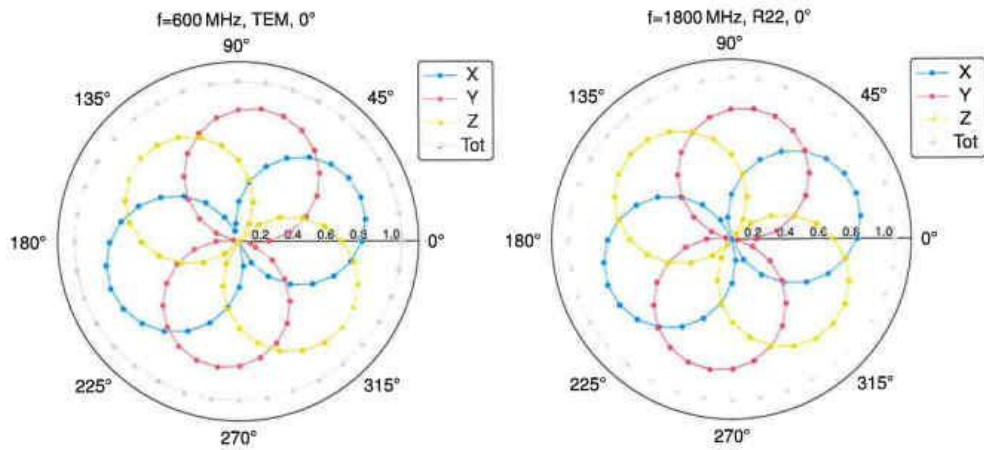


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

EX3DV4 - SN:7683

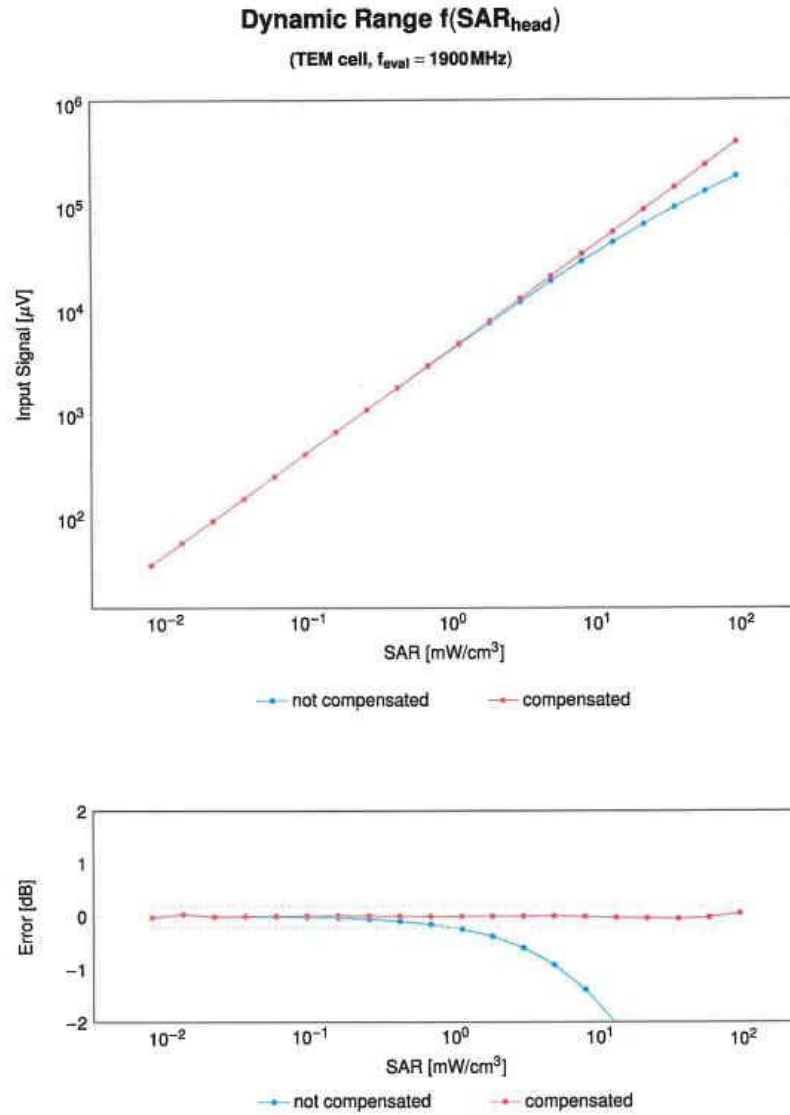
July 03, 2024

### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$



EX3DV4 - SN:7683

July 03, 2024

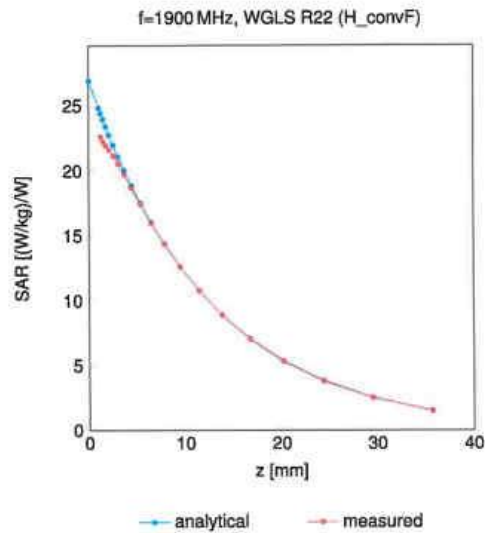


Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

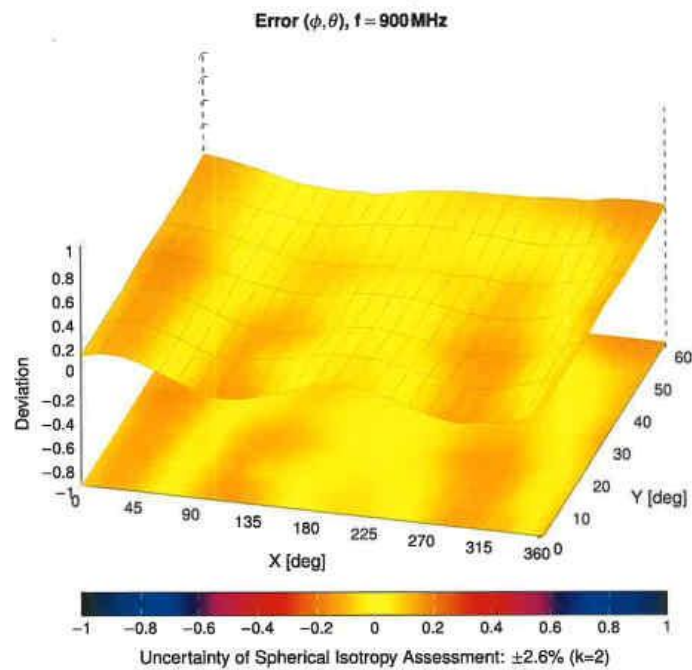
EX3DV4 - SN:7683

July 03, 2024

### Conversion Factor Assessment



### Deviation from Isotropy in Liquid



EX3DV4 - SN:7683

July 03, 2024

### Appendix: Modulation Calibration Parameters

| UID   | Rev | Communication System Name                           | Group     | PAR (dB) | Unc <sup>k</sup> k = 2 |
|-------|-----|-----------------------------------------------------|-----------|----------|------------------------|
| 0     |     | CW                                                  | CW        | 0.00     | ±4.7                   |
| 10010 | CAB | SAR Validation (Square, 100 ms, 10 ms)              | Test      | 10.00    | ±9.6                   |
| 10011 | CAC | UMTS-FDD (WCDMA)                                    | WCDMA     | 2.91     | ±9.6                   |
| 10012 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)            | WLAN      | 1.87     | ±9.6                   |
| 10013 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)       | WLAN      | 9.48     | ±9.6                   |
| 10021 | DAC | GSM-FDD (TDMA, GMSK)                                | GSM       | 9.39     | ±9.6                   |
| 10023 | DAC | GPRS-FDD (TDMA, GMSK, TN 0)                         | GSM       | 9.57     | ±9.6                   |
| 10024 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-1)                       | GSM       | 6.56     | ±9.6                   |
| 10025 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0)                         | GSM       | 12.62    | ±9.6                   |
| 10026 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1)                       | GSM       | 9.55     | ±9.6                   |
| 10027 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-1-2)                     | GSM       | 4.80     | ±9.6                   |
| 10028 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)                   | GSM       | 3.55     | ±9.6                   |
| 10029 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1-2)                     | GSM       | 7.76     | ±9.6                   |
| 10030 | CAA | IEEE 802.15.1 Bluetooth (GFSK, DH1)                 | Bluetooth | 5.30     | ±9.6                   |
| 10031 | CAA | IEEE 802.15.1 Bluetooth (GFSK, DH3)                 | Bluetooth | 1.87     | ±9.6                   |
| 10032 | CAA | IEEE 802.15.1 Bluetooth (GFSK, DH5)                 | Bluetooth | 1.16     | ±9.6                   |
| 10033 | CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)           | Bluetooth | 7.74     | ±9.6                   |
| 10034 | CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)           | Bluetooth | 4.53     | ±9.6                   |
| 10035 | CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)           | Bluetooth | 3.83     | ±9.6                   |
| 10036 | CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH1)               | Bluetooth | 8.01     | ±9.6                   |
| 10037 | CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH3)               | Bluetooth | 4.77     | ±9.6                   |
| 10038 | CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH5)               | Bluetooth | 4.10     | ±9.6                   |
| 10039 | CAB | CDMA2000 (1xRTT, RC1)                               | CDMA2000  | 4.57     | ±9.6                   |
| 10042 | CAB | IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate) | AMPS      | 7.78     | ±9.6                   |
| 10044 | CAA | IS-91/EIA/TIA-553 FDD (FDMA, FM)                    | AMPS      | 0.00     | ±9.6                   |
| 10048 | CAA | DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)           | DECT      | 13.80    | ±9.6                   |
| 10049 | CAA | DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)         | DECT      | 10.79    | ±9.6                   |
| 10056 | CAA | UMTS-TDD (TD-SCDMA, 1.28 Mcps)                      | TD-SCDMA  | 11.01    | ±9.6                   |
| 10058 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)                   | GSM       | 6.52     | ±9.6                   |
| 10059 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)            | WLAN      | 2.12     | ±9.6                   |
| 10060 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)          | WLAN      | 2.83     | ±9.6                   |
| 10061 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)           | WLAN      | 3.60     | ±9.6                   |
| 10062 | CAE | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)            | WLAN      | 8.68     | ±9.6                   |
| 10063 | CAE | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)            | WLAN      | 8.63     | ±9.6                   |
| 10064 | CAE | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)           | WLAN      | 9.09     | ±9.6                   |
| 10065 | CAE | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)           | WLAN      | 9.00     | ±9.6                   |
| 10066 | CAE | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)           | WLAN      | 9.38     | ±9.6                   |
| 10067 | CAE | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)           | WLAN      | 10.12    | ±9.6                   |
| 10068 | CAE | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)           | WLAN      | 10.24    | ±9.6                   |
| 10069 | CAE | IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)           | WLAN      | 10.56    | ±9.6                   |
| 10071 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)       | WLAN      | 9.83     | ±9.6                   |
| 10072 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)      | WLAN      | 9.62     | ±9.6                   |
| 10073 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)      | WLAN      | 9.94     | ±9.6                   |
| 10074 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)      | WLAN      | 10.30    | ±9.6                   |
| 10075 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)      | WLAN      | 10.77    | ±9.6                   |
| 10076 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)      | WLAN      | 10.94    | ±9.6                   |
| 10077 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)      | WLAN      | 11.00    | ±9.6                   |
| 10081 | CAB | CDMA2000 (1xRTT, RC3)                               | CDMA2000  | 3.97     | ±9.6                   |
| 10082 | CAB | IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate) | AMPS      | 4.77     | ±9.6                   |
| 10090 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-4)                       | GSM       | 6.56     | ±9.6                   |
| 10097 | CAC | UMTS-FDD (HSDPA)                                    | WCDMA     | 3.98     | ±9.6                   |
| 10098 | CAC | UMTS-FDD (HSUPA, Subtest 2)                         | WCDMA     | 3.98     | ±9.6                   |
| 10099 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-4)                       | GSM       | 9.55     | ±9.6                   |
| 10100 | CAF | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)            | LTE-FDD   | 5.67     | ±9.6                   |
| 10101 | CAF | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)          | LTE-FDD   | 6.42     | ±9.6                   |
| 10102 | CAF | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)          | LTE-FDD   | 6.60     | ±9.6                   |
| 10103 | CAH | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)            | LTE-TDD   | 9.29     | ±9.6                   |
| 10104 | CAH | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)          | LTE-TDD   | 9.97     | ±9.6                   |
| 10105 | CAH | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)          | LTE-TDD   | 10.01    | ±9.6                   |
| 10108 | CAH | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)            | LTE-FDD   | 5.80     | ±9.6                   |
| 10109 | CAH | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)          | LTE-FDD   | 6.43     | ±9.6                   |
| 10110 | CAH | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)             | LTE-FDD   | 5.75     | ±9.6                   |
| 10111 | CAH | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)           | LTE-FDD   | 6.44     | ±9.6                   |

Certificate No: EX-7683\_Jul24

Page 11 of 22

EX3DV4 - SN:7683

July 03, 2024

| UID   | Rev | Communication System Name                      | Group   | PAR (dB) | Unc <sup>E</sup> k = 2 |
|-------|-----|------------------------------------------------|---------|----------|------------------------|
| 10112 | CAH | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)     | LTE-FDD | 6.59     | ±9.6                   |
| 10113 | CAH | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)      | LTE-FDD | 6.62     | ±9.6                   |
| 10114 | CAE | IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)  | WLAN    | 8.10     | ±9.6                   |
| 10115 | CAE | IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)  | WLAN    | 8.46     | ±9.6                   |
| 10116 | CAE | IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM) | WLAN    | 8.15     | ±9.6                   |
| 10117 | CAE | IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)       | WLAN    | 8.07     | ±9.6                   |
| 10118 | CAE | IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)       | WLAN    | 8.59     | ±9.6                   |
| 10119 | CAE | IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)      | WLAN    | 8.13     | ±9.6                   |
| 10140 | CAF | LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)     | LTE-FDD | 6.49     | ±9.6                   |
| 10141 | CAF | LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)     | LTE-FDD | 6.53     | ±9.6                   |
| 10142 | CAF | LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)        | LTE-FDD | 5.73     | ±9.6                   |
| 10143 | CAF | LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)      | LTE-FDD | 6.35     | ±9.6                   |
| 10144 | CAF | LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)      | LTE-FDD | 6.65     | ±9.6                   |
| 10145 | CAG | LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)      | LTE-FDD | 5.76     | ±9.6                   |
| 10146 | CAG | LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)    | LTE-FDD | 6.41     | ±9.6                   |
| 10147 | CAG | LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)    | LTE-FDD | 6.72     | ±9.6                   |
| 10149 | CAF | LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)      | LTE-FDD | 6.42     | ±9.6                   |
| 10150 | CAF | LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)      | LTE-FDD | 6.60     | ±9.6                   |
| 10151 | CAH | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)        | LTE-TDD | 9.28     | ±9.6                   |
| 10152 | CAH | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)      | LTE-TDD | 9.92     | ±9.6                   |
| 10153 | CAH | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)      | LTE-TDD | 10.05    | ±9.6                   |
| 10154 | CAH | LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)        | LTE-FDD | 5.75     | ±9.6                   |
| 10155 | CAH | LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)      | LTE-FDD | 6.43     | ±9.6                   |
| 10156 | CAH | LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)         | LTE-FDD | 5.79     | ±9.6                   |
| 10157 | CAH | LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)       | LTE-FDD | 6.49     | ±9.6                   |
| 10158 | CAH | LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)      | LTE-FDD | 6.62     | ±9.6                   |
| 10159 | CAH | LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)       | LTE-FDD | 6.56     | ±9.6                   |
| 10160 | CAF | LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)        | LTE-FDD | 5.82     | ±9.6                   |
| 10161 | CAF | LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)      | LTE-FDD | 6.43     | ±9.6                   |
| 10162 | CAF | LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)      | LTE-FDD | 6.58     | ±9.6                   |
| 10166 | CAG | LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)       | LTE-FDD | 5.46     | ±9.6                   |
| 10167 | CAG | LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)     | LTE-FDD | 6.21     | ±9.6                   |
| 10168 | CAG | LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)     | LTE-FDD | 6.79     | ±9.6                   |
| 10169 | CAF | LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)          | LTE-FDD | 5.73     | ±9.6                   |
| 10170 | CAF | LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)        | LTE-FDD | 6.52     | ±9.6                   |
| 10171 | AAF | LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)        | LTE-FDD | 6.49     | ±9.6                   |
| 10172 | CAH | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)          | LTE-TDD | 9.21     | ±9.6                   |
| 10173 | CAH | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)        | LTE-TDD | 9.48     | ±9.6                   |
| 10174 | CAH | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)        | LTE-TDD | 10.25    | ±9.6                   |
| 10175 | CAH | LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)          | LTE-FDD | 5.72     | ±9.6                   |
| 10176 | CAH | LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)        | LTE-FDD | 6.52     | ±9.6                   |
| 10177 | CAJ | LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)           | LTE-FDD | 5.73     | ±9.6                   |
| 10178 | CAH | LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)         | LTE-FDD | 6.52     | ±9.6                   |
| 10179 | CAH | LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)        | LTE-FDD | 6.50     | ±9.6                   |
| 10180 | CAH | LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)         | LTE-FDD | 6.50     | ±9.6                   |
| 10181 | CAF | LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)          | LTE-FDD | 5.72     | ±9.6                   |
| 10182 | CAF | LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)        | LTE-FDD | 6.52     | ±9.6                   |
| 10183 | AAE | LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)        | LTE-FDD | 6.50     | ±9.6                   |
| 10184 | CAF | LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)           | LTE-FDD | 5.73     | ±9.6                   |
| 10185 | CAF | LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)         | LTE-FDD | 6.51     | ±9.6                   |
| 10186 | AAF | LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)         | LTE-FDD | 6.50     | ±9.6                   |
| 10187 | CAG | LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)         | LTE-FDD | 5.73     | ±9.6                   |
| 10188 | CAG | LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)       | LTE-FDD | 6.52     | ±9.6                   |
| 10189 | AAG | LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)       | LTE-FDD | 6.50     | ±9.6                   |
| 10193 | CAE | IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)   | WLAN    | 8.09     | ±9.6                   |
| 10194 | CAE | IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)  | WLAN    | 8.12     | ±9.6                   |
| 10195 | CAE | IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)  | WLAN    | 8.21     | ±9.6                   |
| 10196 | CAE | IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)        | WLAN    | 8.10     | ±9.6                   |
| 10197 | CAE | IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)       | WLAN    | 8.13     | ±9.6                   |
| 10198 | CAE | IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)       | WLAN    | 8.27     | ±9.6                   |
| 10219 | CAE | IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)        | WLAN    | 8.03     | ±9.6                   |
| 10220 | CAE | IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)     | WLAN    | 8.13     | ±9.6                   |
| 10221 | CAE | IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)     | WLAN    | 8.27     | ±9.6                   |
| 10222 | CAE | IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)         | WLAN    | 8.06     | ±9.6                   |
| 10223 | CAE | IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)       | WLAN    | 8.48     | ±9.6                   |
| 10224 | CAE | IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)      | WLAN    | 8.08     | ±9.6                   |

Certificate No: EX-7683\_Jul24

Page 12 of 22

EX3DV4 - SN:7683

July 03, 2024

| UID   | Rev | Communication System Name                                            | Group    | PAR (dB) | Unc <sup>k</sup> k = 2 |
|-------|-----|----------------------------------------------------------------------|----------|----------|------------------------|
| 10225 | CAC | UMTS-FDD (HSPA+)                                                     | WCDMA    | 5.97     | ±9.6                   |
| 10226 | CAC | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)                             | LTE-TDD  | 9.49     | ±9.6                   |
| 10227 | CAC | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)                             | LTE-TDD  | 10.26    | ±9.6                   |
| 10228 | CAC | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)                               | LTE-TDD  | 9.22     | ±9.6                   |
| 10229 | CAE | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)                               | LTE-TDD  | 9.48     | ±9.6                   |
| 10230 | CAE | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)                               | LTE-TDD  | 10.25    | ±9.6                   |
| 10231 | CAE | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)                                 | LTE-TDD  | 9.19     | ±9.6                   |
| 10232 | CAH | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)                               | LTE-TDD  | 9.48     | ±9.6                   |
| 10233 | CAH | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)                               | LTE-TDD  | 10.25    | ±9.6                   |
| 10234 | CAH | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)                                 | LTE-TDD  | 9.21     | ±9.6                   |
| 10235 | CAH | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)                              | LTE-TDD  | 9.48     | ±9.6                   |
| 10236 | CAH | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)                              | LTE-TDD  | 10.25    | ±9.6                   |
| 10237 | CAH | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)                                | LTE-TDD  | 9.21     | ±9.6                   |
| 10238 | CAG | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)                              | LTE-TDD  | 9.48     | ±9.6                   |
| 10239 | CAG | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)                              | LTE-TDD  | 10.25    | ±9.6                   |
| 10240 | CAG | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)                                | LTE-TDD  | 9.21     | ±9.6                   |
| 10241 | CAC | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)                           | LTE-TDD  | 9.82     | ±9.6                   |
| 10242 | CAC | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)                           | LTE-TDD  | 9.86     | ±9.6                   |
| 10243 | CAC | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)                             | LTE-TDD  | 9.46     | ±9.6                   |
| 10244 | CAE | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)                             | LTE-TDD  | 10.06    | ±9.6                   |
| 10245 | CAE | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)                             | LTE-TDD  | 10.06    | ±9.6                   |
| 10246 | CAE | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)                               | LTE-TDD  | 9.30     | ±9.6                   |
| 10247 | CAH | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)                             | LTE-TDD  | 9.91     | ±9.6                   |
| 10248 | CAH | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)                             | LTE-TDD  | 10.09    | ±9.6                   |
| 10249 | CAH | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)                               | LTE-TDD  | 9.29     | ±9.6                   |
| 10250 | CAH | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)                            | LTE-TDD  | 9.81     | ±9.6                   |
| 10251 | CAH | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)                            | LTE-TDD  | 10.17    | ±9.6                   |
| 10252 | CAH | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)                              | LTE-TDD  | 9.24     | ±9.6                   |
| 10253 | CAG | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)                            | LTE-TDD  | 9.90     | ±9.6                   |
| 10254 | CAG | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)                            | LTE-TDD  | 10.14    | ±9.6                   |
| 10255 | CAG | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)                              | LTE-TDD  | 9.20     | ±9.6                   |
| 10256 | CAC | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)                          | LTE-TDD  | 9.96     | ±9.6                   |
| 10257 | CAC | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)                          | LTE-TDD  | 10.08    | ±9.6                   |
| 10258 | CAC | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)                            | LTE-TDD  | 9.34     | ±9.6                   |
| 10259 | CAE | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)                            | LTE-TDD  | 9.98     | ±9.6                   |
| 10260 | CAE | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)                            | LTE-TDD  | 9.97     | ±9.6                   |
| 10261 | CAE | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)                              | LTE-TDD  | 9.24     | ±9.6                   |
| 10262 | CAH | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)                            | LTE-TDD  | 9.83     | ±9.6                   |
| 10263 | CAH | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)                            | LTE-TDD  | 10.16    | ±9.6                   |
| 10264 | CAH | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)                              | LTE-TDD  | 9.23     | ±9.6                   |
| 10265 | CAH | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)                           | LTE-TDD  | 9.92     | ±9.6                   |
| 10266 | CAH | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)                           | LTE-TDD  | 10.07    | ±9.6                   |
| 10267 | CAH | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)                             | LTE-TDD  | 9.30     | ±9.6                   |
| 10268 | CAG | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)                           | LTE-TDD  | 10.06    | ±9.6                   |
| 10269 | CAG | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)                           | LTE-TDD  | 10.13    | ±9.6                   |
| 10270 | CAG | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)                             | LTE-TDD  | 9.58     | ±9.6                   |
| 10274 | CAC | UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)                            | WCDMA    | 4.87     | ±9.6                   |
| 10275 | CAC | UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)                             | WCDMA    | 3.96     | ±9.6                   |
| 10277 | CAA | PHS (QPSK)                                                           | PHS      | 11.81    | ±9.6                   |
| 10278 | CAA | PHS (QPSK, BW 884 MHz, Roll-off 0.5)                                 | PHS      | 11.81    | ±9.6                   |
| 10279 | CAA | PHS (QPSK, BW 884 MHz, Roll-off 0.38)                                | PHS      | 12.18    | ±9.6                   |
| 10290 | AAB | CDMA2000, RC1, SO55, Full Rate                                       | CDMA2000 | 3.91     | ±9.6                   |
| 10291 | AAB | CDMA2000, RC3, SO55, Full Rate                                       | CDMA2000 | 3.46     | ±9.6                   |
| 10292 | AAB | CDMA2000, RC3, SO32, Full Rate                                       | CDMA2000 | 3.39     | ±9.6                   |
| 10293 | AAB | CDMA2000, RC3, SO3, Full Rate                                        | CDMA2000 | 3.50     | ±9.6                   |
| 10295 | AAB | CDMA2000, RC1, SO3, 1/8th Rate 25 fr.                                | CDMA2000 | 12.49    | ±9.6                   |
| 10297 | AAE | LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)                              | LTE-FDD  | 5.81     | ±9.6                   |
| 10298 | AAE | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)                               | LTE-FDD  | 5.72     | ±9.6                   |
| 10299 | AAE | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)                             | LTE-FDD  | 6.39     | ±9.6                   |
| 10300 | AAE | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)                             | LTE-FDD  | 6.60     | ±9.6                   |
| 10301 | AAA | IEEE 802.16e WiMAX (29:18, 5 ms, 10 MHz, QPSK, PUSC)                 | WiMAX    | 12.03    | ±9.6                   |
| 10302 | AAA | IEEE 802.16e WiMAX (29:18, 5 ms, 10 MHz, QPSK, PUSC, 3 CTRL symbols) | WiMAX    | 12.57    | ±9.6                   |
| 10303 | AAA | IEEE 802.16e WiMAX (31:15, 5 ms, 10 MHz, 64QAM, PUSC)                | WiMAX    | 12.52    | ±9.6                   |
| 10304 | AAA | IEEE 802.16e WiMAX (29:18, 5 ms, 10 MHz, 64QAM, PUSC)                | WiMAX    | 11.86    | ±9.6                   |
| 10305 | AAA | IEEE 802.16e WiMAX (31:15, 10 ms, 10 MHz, 64QAM, PUSC, 15 symbols)   | WiMAX    | 15.24    | ±9.6                   |
| 10306 | AAA | IEEE 802.16e WiMAX (29:18, 10 ms, 10 MHz, 64QAM, PUSC, 18 symbols)   | WiMAX    | 14.67    | ±9.6                   |

Certificate No: EX-7683\_Jul24

Page 13 of 22

EX3DV4 - SN:7683

July 03, 2024

| UID   | Rev | Communication System Name                                                       | Group    | PAR (dB) | Unc <sup>k</sup> k = 2 |
|-------|-----|---------------------------------------------------------------------------------|----------|----------|------------------------|
| 10307 | AAA | IEEE 802.16e WiMAX (29:18, 10 ms, 10 MHz, QPSK, PUSC, 18 symbols)               | WiMAX    | 14.49    | ±9.6                   |
| 10308 | AAA | IEEE 802.16e WiMAX (29:18, 10 ms, 10 MHz, 16QAM, PUSC)                          | WiMAX    | 14.46    | ±9.6                   |
| 10309 | AAA | IEEE 802.16e WiMAX (29:18, 10 ms, 10 MHz, 16QAM, AMC 2x3, 18 symbols)           | WiMAX    | 14.58    | ±9.6                   |
| 10310 | AAA | IEEE 802.16e WiMAX (29:18, 10 ms, 10 MHz, QPSK, AMC 2x3, 18 symbols)            | WiMAX    | 14.57    | ±9.6                   |
| 10311 | AAE | LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)                                        | LTE-FDD  | 6.06     | ±9.6                   |
| 10313 | AAA | IDEN 1.3                                                                        | IDEN     | 10.61    | ±9.6                   |
| 10314 | AAA | IDEN 1.6                                                                        | IDEN     | 13.48    | ±9.6                   |
| 10315 | AAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)                       | WLAN     | 1.71     | ±9.6                   |
| 10316 | AAB | IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)                   | WLAN     | 8.36     | ±9.6                   |
| 10317 | AAE | IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)                         | WLAN     | 8.36     | ±9.6                   |
| 10352 | AAA | Pulse Waveform (200Hz, 10%)                                                     | Generic  | 10.00    | ±9.6                   |
| 10353 | AAA | Pulse Waveform (200Hz, 20%)                                                     | Generic  | 8.99     | ±9.6                   |
| 10354 | AAA | Pulse Waveform (200Hz, 40%)                                                     | Generic  | 3.98     | ±9.6                   |
| 10355 | AAA | Pulse Waveform (200Hz, 60%)                                                     | Generic  | 2.22     | ±9.6                   |
| 10356 | AAA | Pulse Waveform (200Hz, 80%)                                                     | Generic  | 0.97     | ±9.6                   |
| 10387 | AAA | QPSK Waveform, 1 MHz                                                            | Generic  | 5.10     | ±9.6                   |
| 10388 | AAA | QPSK Waveform, 10 MHz                                                           | Generic  | 5.22     | ±9.6                   |
| 10396 | AAA | 64-QAM Waveform, 100 kHz                                                        | Generic  | 6.27     | ±9.6                   |
| 10399 | AAA | 64-QAM Waveform, 40 MHz                                                         | Generic  | 6.27     | ±9.6                   |
| 10400 | AAF | IEEE 802.11ac WiFi (20 MHz, 64-QAM, 99pc duty cycle)                            | WLAN     | 8.37     | ±9.6                   |
| 10401 | AAF | IEEE 802.11ac WiFi (40 MHz, 64-QAM, 99pc duty cycle)                            | WLAN     | 8.60     | ±9.6                   |
| 10402 | AAF | IEEE 802.11ac WiFi (80 MHz, 64-QAM, 99pc duty cycle)                            | WLAN     | 8.53     | ±9.6                   |
| 10403 | AAB | CDMA2000 (1xEV-DO, Rev. 0)                                                      | CDMA2000 | 3.76     | ±9.6                   |
| 10404 | AAB | CDMA2000 (1xEV-DO, Rev. A)                                                      | CDMA2000 | 3.77     | ±9.6                   |
| 10406 | AAB | CDMA2000, RC3, SO32, SCH0, Full Rate                                            | CDMA2000 | 5.22     | ±9.6                   |
| 10410 | AAH | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9, Subframe Conf=4) | LTE-TDD  | 7.82     | ±9.6                   |
| 10414 | AAA | WLAN CCDF, 64-QAM, 40 MHz                                                       | Generic  | 8.54     | ±9.6                   |
| 10415 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)                       | WLAN     | 1.54     | ±9.6                   |
| 10416 | AAA | IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)                   | WLAN     | 8.23     | ±9.6                   |
| 10417 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)                       | WLAN     | 8.23     | ±9.6                   |
| 10418 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preamble)   | WLAN     | 8.14     | ±9.6                   |
| 10419 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preamble)  | WLAN     | 8.19     | ±9.6                   |
| 10422 | AAD | IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)                                    | WLAN     | 8.32     | ±9.6                   |
| 10423 | AAD | IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)                                 | WLAN     | 8.47     | ±9.6                   |
| 10424 | AAD | IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)                                 | WLAN     | 8.40     | ±9.6                   |
| 10425 | AAD | IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)                                     | WLAN     | 8.41     | ±9.6                   |
| 10426 | AAD | IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)                                   | WLAN     | 8.45     | ±9.6                   |
| 10427 | AAD | IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)                                  | WLAN     | 8.41     | ±9.6                   |
| 10430 | AAE | LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)                                                | LTE-FDD  | 8.28     | ±9.6                   |
| 10431 | AAE | LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)                                               | LTE-FDD  | 8.38     | ±9.6                   |
| 10432 | AAD | LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)                                               | LTE-FDD  | 8.34     | ±9.6                   |
| 10433 | AAD | LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)                                               | LTE-FDD  | 8.34     | ±9.6                   |
| 10434 | AAB | W-CDMA (BS Test Model 1, 64 DPCH)                                               | WCDMA    | 8.60     | ±9.6                   |
| 10435 | AAG | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)                  | LTE-TDD  | 7.82     | ±9.6                   |
| 10447 | AAE | LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)                                  | LTE-FDD  | 7.56     | ±9.6                   |
| 10448 | AAE | LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)                                 | LTE-FDD  | 7.53     | ±9.6                   |
| 10449 | AAD | LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)                                 | LTE-FDD  | 7.51     | ±9.6                   |
| 10450 | AAD | LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)                                 | LTE-FDD  | 7.48     | ±9.6                   |
| 10451 | AAB | W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)                                 | WCDMA    | 7.59     | ±9.6                   |
| 10453 | AAE | Validation (Square, 10 ms, 1 ms)                                                | Test     | 10.00    | ±9.6                   |
| 10456 | AAD | IEEE 802.11ac WiFi (160 MHz, 64-QAM, 99pc duty cycle)                           | WLAN     | 8.63     | ±9.6                   |
| 10457 | AAB | UMTS-FDD (DC-HSDPA)                                                             | WCDMA    | 6.62     | ±9.6                   |
| 10458 | AAA | CDMA2000 (1xEV-DO, Rev. B, 2 carriers)                                          | CDMA2000 | 6.55     | ±9.6                   |
| 10459 | AAA | CDMA2000 (1xEV-DO, Rev. B, 3 carriers)                                          | CDMA2000 | 8.25     | ±9.6                   |
| 10460 | AAB | UMTS-FDD (WCDMA, AMR)                                                           | WCDMA    | 2.39     | ±9.6                   |
| 10461 | AAC | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)                 | LTE-TDD  | 7.82     | ±9.6                   |
| 10462 | AAC | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)               | LTE-TDD  | 8.30     | ±9.6                   |
| 10463 | AAC | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)               | LTE-TDD  | 8.56     | ±9.6                   |
| 10464 | AAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)                   | LTE-TDD  | 7.82     | ±9.6                   |
| 10465 | AAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)                 | LTE-TDD  | 8.32     | ±9.6                   |
| 10466 | AAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)                 | LTE-TDD  | 8.57     | ±9.6                   |
| 10467 | AAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)                   | LTE-TDD  | 7.82     | ±9.6                   |
| 10468 | AAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)                 | LTE-TDD  | 8.32     | ±9.6                   |
| 10469 | AAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)                 | LTE-TDD  | 8.56     | ±9.6                   |
| 10470 | AAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)                  | LTE-TDD  | 7.82     | ±9.6                   |
| 10471 | AAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)                | LTE-TDD  | 8.32     | ±9.6                   |

Certificate No: EX-7683\_Jul24

Page 14 of 22



EX3DV4 - SN:7683

July 03, 2024

| UID   | Rev | Communication System Name                                            | Group   | PAR (dB) | Unc <sup>k</sup> k = 2 |
|-------|-----|----------------------------------------------------------------------|---------|----------|------------------------|
| 10472 | AAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)     | LTE-TDD | 8.57     | ±9.6                   |
| 10473 | AAF | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)       | LTE-TDD | 7.82     | ±9.6                   |
| 10474 | AAF | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)     | LTE-TDD | 8.32     | ±9.6                   |
| 10475 | AAF | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)     | LTE-TDD | 8.57     | ±9.6                   |
| 10477 | AAG | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)     | LTE-TDD | 8.32     | ±9.6                   |
| 10478 | AAG | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)     | LTE-TDD | 8.57     | ±9.6                   |
| 10479 | AAC | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)    | LTE-TDD | 7.74     | ±9.6                   |
| 10480 | AAC | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)  | LTE-TDD | 8.18     | ±9.6                   |
| 10481 | AAC | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)  | LTE-TDD | 8.45     | ±9.6                   |
| 10482 | AAD | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)      | LTE-TDD | 7.71     | ±9.6                   |
| 10483 | AAD | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)    | LTE-TDD | 8.39     | ±9.6                   |
| 10484 | AAD | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)    | LTE-TDD | 8.47     | ±9.6                   |
| 10485 | AAG | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)      | LTE-TDD | 7.59     | ±9.6                   |
| 10486 | AAG | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)    | LTE-TDD | 8.38     | ±9.6                   |
| 10487 | AAG | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)    | LTE-TDD | 8.60     | ±9.6                   |
| 10488 | AAG | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)     | LTE-TDD | 7.70     | ±9.6                   |
| 10489 | AAG | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   | LTE-TDD | 8.31     | ±9.6                   |
| 10490 | AAG | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   | LTE-TDD | 8.54     | ±9.6                   |
| 10491 | AAF | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)     | LTE-TDD | 7.74     | ±9.6                   |
| 10492 | AAF | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   | LTE-TDD | 8.41     | ±9.6                   |
| 10493 | AAF | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   | LTE-TDD | 8.55     | ±9.6                   |
| 10494 | AAG | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)     | LTE-TDD | 7.74     | ±9.6                   |
| 10495 | AAG | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   | LTE-TDD | 8.37     | ±9.6                   |
| 10496 | AAG | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   | LTE-TDD | 8.54     | ±9.6                   |
| 10497 | AAC | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)   | LTE-TDD | 7.67     | ±9.6                   |
| 10498 | AAC | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9) | LTE-TDD | 8.40     | ±9.6                   |
| 10499 | AAC | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9) | LTE-TDD | 8.68     | ±9.6                   |
| 10500 | AAD | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)     | LTE-TDD | 7.67     | ±9.6                   |
| 10501 | AAD | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   | LTE-TDD | 8.44     | ±9.6                   |
| 10502 | AAD | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   | LTE-TDD | 8.52     | ±9.6                   |
| 10503 | AAG | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)     | LTE-TDD | 7.72     | ±9.6                   |
| 10504 | AAG | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   | LTE-TDD | 8.31     | ±9.6                   |
| 10505 | AAG | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   | LTE-TDD | 8.54     | ±9.6                   |
| 10506 | AAG | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)    | LTE-TDD | 7.74     | ±9.6                   |
| 10507 | AAG | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)  | LTE-TDD | 8.36     | ±9.6                   |
| 10508 | AAG | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)  | LTE-TDD | 8.55     | ±9.6                   |
| 10509 | AAF | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)    | LTE-TDD | 7.99     | ±9.6                   |
| 10510 | AAF | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)  | LTE-TDD | 8.49     | ±9.6                   |
| 10511 | AAF | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)  | LTE-TDD | 8.51     | ±9.6                   |
| 10512 | AAG | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)    | LTE-TDD | 7.74     | ±9.6                   |
| 10513 | AAG | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)  | LTE-TDD | 8.42     | ±9.6                   |
| 10514 | AAG | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)  | LTE-TDD | 8.45     | ±9.6                   |
| 10515 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)            | WLAN    | 1.58     | ±9.6                   |
| 10516 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)          | WLAN    | 1.57     | ±9.6                   |
| 10517 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)           | WLAN    | 1.58     | ±9.6                   |
| 10518 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)            | WLAN    | 8.23     | ±9.6                   |
| 10519 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)           | WLAN    | 8.39     | ±9.6                   |
| 10520 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)           | WLAN    | 8.12     | ±9.6                   |
| 10521 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)           | WLAN    | 7.97     | ±9.6                   |
| 10522 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)           | WLAN    | 8.45     | ±9.6                   |
| 10523 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)           | WLAN    | 8.08     | ±9.6                   |
| 10524 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)           | WLAN    | 8.27     | ±9.6                   |
| 10525 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS0, 99pc duty cycle)                   | WLAN    | 8.36     | ±9.6                   |
| 10526 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS1, 99pc duty cycle)                   | WLAN    | 8.42     | ±9.6                   |
| 10527 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS2, 99pc duty cycle)                   | WLAN    | 8.21     | ±9.6                   |
| 10528 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS3, 99pc duty cycle)                   | WLAN    | 8.36     | ±9.6                   |
| 10529 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS4, 99pc duty cycle)                   | WLAN    | 8.36     | ±9.6                   |
| 10531 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS6, 99pc duty cycle)                   | WLAN    | 8.43     | ±9.6                   |
| 10532 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS7, 99pc duty cycle)                   | WLAN    | 8.29     | ±9.6                   |
| 10533 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS8, 99pc duty cycle)                   | WLAN    | 8.38     | ±9.6                   |
| 10534 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS0, 99pc duty cycle)                   | WLAN    | 8.45     | ±9.6                   |
| 10535 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS1, 99pc duty cycle)                   | WLAN    | 8.45     | ±9.6                   |
| 10536 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS2, 99pc duty cycle)                   | WLAN    | 8.32     | ±9.6                   |
| 10537 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS3, 99pc duty cycle)                   | WLAN    | 8.44     | ±9.6                   |
| 10538 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS4, 99pc duty cycle)                   | WLAN    | 8.54     | ±9.6                   |
| 10540 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS6, 99pc duty cycle)                   | WLAN    | 8.39     | ±9.6                   |



EX3DV4 - SN:7683

July 03, 2024

| UID   | Rev | Communication System Name                                       | Group | PAR (dB) | Unc <sup>k</sup> k = 2 |
|-------|-----|-----------------------------------------------------------------|-------|----------|------------------------|
| 10541 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS7, 99pc duty cycle)              | WLAN  | 8.46     | ±9.6                   |
| 10542 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS8, 99pc duty cycle)              | WLAN  | 8.65     | ±9.6                   |
| 10543 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS9, 99pc duty cycle)              | WLAN  | 8.65     | ±9.6                   |
| 10544 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS0, 99pc duty cycle)              | WLAN  | 8.47     | ±9.6                   |
| 10545 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS1, 99pc duty cycle)              | WLAN  | 8.55     | ±9.6                   |
| 10546 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS2, 99pc duty cycle)              | WLAN  | 8.35     | ±9.6                   |
| 10547 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS3, 99pc duty cycle)              | WLAN  | 8.49     | ±9.6                   |
| 10548 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS4, 99pc duty cycle)              | WLAN  | 8.37     | ±9.6                   |
| 10550 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS6, 99pc duty cycle)              | WLAN  | 8.38     | ±9.6                   |
| 10551 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS7, 99pc duty cycle)              | WLAN  | 8.50     | ±9.6                   |
| 10552 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS8, 99pc duty cycle)              | WLAN  | 8.42     | ±9.6                   |
| 10553 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS9, 99pc duty cycle)              | WLAN  | 8.45     | ±9.6                   |
| 10554 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS0, 99pc duty cycle)             | WLAN  | 8.48     | ±9.6                   |
| 10555 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS1, 99pc duty cycle)             | WLAN  | 8.47     | ±9.6                   |
| 10556 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS2, 99pc duty cycle)             | WLAN  | 8.50     | ±9.6                   |
| 10557 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS3, 99pc duty cycle)             | WLAN  | 8.52     | ±9.6                   |
| 10558 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS4, 99pc duty cycle)             | WLAN  | 8.61     | ±9.6                   |
| 10560 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS6, 99pc duty cycle)             | WLAN  | 8.73     | ±9.6                   |
| 10561 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS7, 99pc duty cycle)             | WLAN  | 8.56     | ±9.6                   |
| 10562 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS8, 99pc duty cycle)             | WLAN  | 8.69     | ±9.6                   |
| 10563 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS9, 99pc duty cycle)             | WLAN  | 8.77     | ±9.6                   |
| 10564 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)  | WLAN  | 8.25     | ±9.6                   |
| 10565 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle) | WLAN  | 8.45     | ±9.6                   |
| 10566 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle) | WLAN  | 8.13     | ±9.6                   |
| 10567 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle) | WLAN  | 8.00     | ±9.6                   |
| 10568 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle) | WLAN  | 8.37     | ±9.6                   |
| 10569 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle) | WLAN  | 8.10     | ±9.6                   |
| 10570 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle) | WLAN  | 8.30     | ±9.6                   |
| 10571 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)       | WLAN  | 1.99     | ±9.6                   |
| 10572 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)       | WLAN  | 1.99     | ±9.6                   |
| 10573 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)     | WLAN  | 1.98     | ±9.6                   |
| 10574 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)      | WLAN  | 1.98     | ±9.6                   |
| 10575 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)  | WLAN  | 8.59     | ±9.6                   |
| 10576 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)  | WLAN  | 8.60     | ±9.6                   |
| 10577 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle) | WLAN  | 8.70     | ±9.6                   |
| 10578 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle) | WLAN  | 8.49     | ±9.6                   |
| 10579 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle) | WLAN  | 8.36     | ±9.6                   |
| 10580 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle) | WLAN  | 8.76     | ±9.6                   |
| 10581 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle) | WLAN  | 8.35     | ±9.6                   |
| 10582 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle) | WLAN  | 8.67     | ±9.6                   |
| 10583 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)       | WLAN  | 8.59     | ±9.6                   |
| 10584 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)       | WLAN  | 8.60     | ±9.6                   |
| 10585 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)      | WLAN  | 8.70     | ±9.6                   |
| 10586 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)      | WLAN  | 8.49     | ±9.6                   |
| 10587 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)      | WLAN  | 8.36     | ±9.6                   |
| 10588 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)      | WLAN  | 8.76     | ±9.6                   |
| 10589 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)      | WLAN  | 8.35     | ±9.6                   |
| 10590 | AAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)      | WLAN  | 8.67     | ±9.6                   |
| 10591 | AAD | IEEE 802.11n (HT Mixed, 20 MHz, MCS0, 90pc duty cycle)          | WLAN  | 8.63     | ±9.6                   |
| 10592 | AAD | IEEE 802.11n (HT Mixed, 20 MHz, MCS1, 90pc duty cycle)          | WLAN  | 8.79     | ±9.6                   |
| 10593 | AAD | IEEE 802.11n (HT Mixed, 20 MHz, MCS2, 90pc duty cycle)          | WLAN  | 8.64     | ±9.6                   |
| 10594 | AAD | IEEE 802.11n (HT Mixed, 20 MHz, MCS3, 90pc duty cycle)          | WLAN  | 8.74     | ±9.6                   |
| 10595 | AAD | IEEE 802.11n (HT Mixed, 20 MHz, MCS4, 90pc duty cycle)          | WLAN  | 8.74     | ±9.6                   |
| 10596 | AAD | IEEE 802.11n (HT Mixed, 20 MHz, MCS5, 90pc duty cycle)          | WLAN  | 8.71     | ±9.6                   |
| 10597 | AAD | IEEE 802.11n (HT Mixed, 20 MHz, MCS6, 90pc duty cycle)          | WLAN  | 8.72     | ±9.6                   |
| 10598 | AAD | IEEE 802.11n (HT Mixed, 20 MHz, MCS7, 90pc duty cycle)          | WLAN  | 8.50     | ±9.6                   |
| 10599 | AAD | IEEE 802.11n (HT Mixed, 40 MHz, MCS0, 90pc duty cycle)          | WLAN  | 8.79     | ±9.6                   |
| 10600 | AAD | IEEE 802.11n (HT Mixed, 40 MHz, MCS1, 90pc duty cycle)          | WLAN  | 8.88     | ±9.6                   |
| 10601 | AAD | IEEE 802.11n (HT Mixed, 40 MHz, MCS2, 90pc duty cycle)          | WLAN  | 8.82     | ±9.6                   |
| 10602 | AAD | IEEE 802.11n (HT Mixed, 40 MHz, MCS3, 90pc duty cycle)          | WLAN  | 8.94     | ±9.6                   |
| 10603 | AAD | IEEE 802.11n (HT Mixed, 40 MHz, MCS4, 90pc duty cycle)          | WLAN  | 9.03     | ±9.6                   |
| 10604 | AAD | IEEE 802.11n (HT Mixed, 40 MHz, MCS5, 90pc duty cycle)          | WLAN  | 8.76     | ±9.6                   |
| 10605 | AAD | IEEE 802.11n (HT Mixed, 40 MHz, MCS6, 90pc duty cycle)          | WLAN  | 8.97     | ±9.6                   |
| 10606 | AAD | IEEE 802.11n (HT Mixed, 40 MHz, MCS7, 90pc duty cycle)          | WLAN  | 8.82     | ±9.6                   |
| 10607 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS0, 90pc duty cycle)              | WLAN  | 8.64     | ±9.6                   |
| 10608 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS1, 90pc duty cycle)              | WLAN  | 8.77     | ±9.6                   |



EX3DV4 - SN:7683

July 03, 2024

| UID   | Rev | Communication System Name                              | Group     | PAR (dB) | Unc <sup>k</sup> k = 2 |
|-------|-----|--------------------------------------------------------|-----------|----------|------------------------|
| 10609 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS2, 90pc duty cycle)     | WLAN      | 8.57     | ±9.6                   |
| 10610 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS3, 90pc duty cycle)     | WLAN      | 8.78     | ±9.6                   |
| 10611 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS4, 90pc duty cycle)     | WLAN      | 8.70     | ±9.6                   |
| 10612 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS5, 90pc duty cycle)     | WLAN      | 8.77     | ±9.6                   |
| 10613 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS6, 90pc duty cycle)     | WLAN      | 8.94     | ±9.6                   |
| 10614 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS7, 90pc duty cycle)     | WLAN      | 8.59     | ±9.6                   |
| 10615 | AAD | IEEE 802.11ac WiFi (20 MHz, MCS8, 90pc duty cycle)     | WLAN      | 8.82     | ±9.6                   |
| 10616 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS0, 90pc duty cycle)     | WLAN      | 8.82     | ±9.6                   |
| 10617 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS1, 90pc duty cycle)     | WLAN      | 8.81     | ±9.6                   |
| 10618 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS2, 90pc duty cycle)     | WLAN      | 8.58     | ±9.6                   |
| 10619 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS3, 90pc duty cycle)     | WLAN      | 8.86     | ±9.6                   |
| 10620 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS4, 90pc duty cycle)     | WLAN      | 8.87     | ±9.6                   |
| 10621 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS5, 90pc duty cycle)     | WLAN      | 8.77     | ±9.6                   |
| 10622 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS6, 90pc duty cycle)     | WLAN      | 8.68     | ±9.6                   |
| 10623 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS7, 90pc duty cycle)     | WLAN      | 8.82     | ±9.6                   |
| 10624 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS8, 90pc duty cycle)     | WLAN      | 8.96     | ±9.6                   |
| 10625 | AAD | IEEE 802.11ac WiFi (40 MHz, MCS9, 90pc duty cycle)     | WLAN      | 8.96     | ±9.6                   |
| 10626 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS0, 90pc duty cycle)     | WLAN      | 8.83     | ±9.6                   |
| 10627 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS1, 90pc duty cycle)     | WLAN      | 8.88     | ±9.6                   |
| 10628 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS2, 90pc duty cycle)     | WLAN      | 8.71     | ±9.6                   |
| 10629 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS3, 90pc duty cycle)     | WLAN      | 8.85     | ±9.6                   |
| 10630 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS4, 90pc duty cycle)     | WLAN      | 8.72     | ±9.6                   |
| 10631 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS5, 90pc duty cycle)     | WLAN      | 8.81     | ±9.6                   |
| 10632 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS6, 90pc duty cycle)     | WLAN      | 8.74     | ±9.6                   |
| 10633 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS7, 90pc duty cycle)     | WLAN      | 8.83     | ±9.6                   |
| 10634 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS8, 90pc duty cycle)     | WLAN      | 8.80     | ±9.6                   |
| 10635 | AAD | IEEE 802.11ac WiFi (80 MHz, MCS9, 90pc duty cycle)     | WLAN      | 8.81     | ±9.6                   |
| 10636 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS0, 90pc duty cycle)    | WLAN      | 8.83     | ±9.6                   |
| 10637 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS1, 90pc duty cycle)    | WLAN      | 8.79     | ±9.6                   |
| 10638 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS2, 90pc duty cycle)    | WLAN      | 8.86     | ±9.6                   |
| 10639 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS3, 90pc duty cycle)    | WLAN      | 8.85     | ±9.6                   |
| 10640 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS4, 90pc duty cycle)    | WLAN      | 8.98     | ±9.6                   |
| 10641 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS5, 90pc duty cycle)    | WLAN      | 9.06     | ±9.6                   |
| 10642 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS6, 90pc duty cycle)    | WLAN      | 9.06     | ±9.6                   |
| 10643 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS7, 90pc duty cycle)    | WLAN      | 8.89     | ±9.6                   |
| 10644 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS8, 90pc duty cycle)    | WLAN      | 9.05     | ±9.6                   |
| 10645 | AAE | IEEE 802.11ac WiFi (160 MHz, MCS9, 90pc duty cycle)    | WLAN      | 9.11     | ±9.6                   |
| 10646 | AAH | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)  | LTE-TDD   | 11.96    | ±9.6                   |
| 10647 | AAG | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7) | LTE-TDD   | 11.96    | ±9.6                   |
| 10648 | AAA | CDMA2000 (1x Advanced)                                 | CDMA2000  | 3.45     | ±9.6                   |
| 10652 | AAF | LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)         | LTE-TDD   | 6.91     | ±9.6                   |
| 10653 | AAF | LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)        | LTE-TDD   | 7.42     | ±9.6                   |
| 10654 | AAE | LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)        | LTE-TDD   | 6.96     | ±9.6                   |
| 10655 | AAF | LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)        | LTE-TDD   | 7.21     | ±9.6                   |
| 10658 | AAB | Pulse Waveform (200Hz, 10%)                            | Test      | 10.00    | ±9.6                   |
| 10659 | AAB | Pulse Waveform (200Hz, 20%)                            | Test      | 8.99     | ±9.6                   |
| 10660 | AAB | Pulse Waveform (200Hz, 40%)                            | Test      | 3.98     | ±9.6                   |
| 10661 | AAB | Pulse Waveform (200Hz, 60%)                            | Test      | 2.22     | ±9.6                   |
| 10662 | AAB | Pulse Waveform (200Hz, 80%)                            | Test      | 0.97     | ±9.6                   |
| 10670 | AAA | Bluetooth Low Energy                                   | Bluetooth | 2.19     | ±9.6                   |
| 10671 | AAC | IEEE 802.11ax (20 MHz, MCS0, 90pc duty cycle)          | WLAN      | 9.09     | ±9.6                   |
| 10672 | AAC | IEEE 802.11ax (20 MHz, MCS1, 90pc duty cycle)          | WLAN      | 8.57     | ±9.6                   |
| 10673 | AAC | IEEE 802.11ax (20 MHz, MCS2, 90pc duty cycle)          | WLAN      | 8.78     | ±9.6                   |
| 10674 | AAC | IEEE 802.11ax (20 MHz, MCS3, 90pc duty cycle)          | WLAN      | 8.74     | ±9.6                   |
| 10675 | AAC | IEEE 802.11ax (20 MHz, MCS4, 90pc duty cycle)          | WLAN      | 8.90     | ±9.6                   |
| 10676 | AAC | IEEE 802.11ax (20 MHz, MCS5, 90pc duty cycle)          | WLAN      | 8.77     | ±9.6                   |
| 10677 | AAC | IEEE 802.11ax (20 MHz, MCS6, 90pc duty cycle)          | WLAN      | 8.73     | ±9.6                   |
| 10678 | AAC | IEEE 802.11ax (20 MHz, MCS7, 90pc duty cycle)          | WLAN      | 8.78     | ±9.6                   |
| 10679 | AAC | IEEE 802.11ax (20 MHz, MCS8, 90pc duty cycle)          | WLAN      | 8.89     | ±9.6                   |
| 10680 | AAC | IEEE 802.11ax (20 MHz, MCS9, 90pc duty cycle)          | WLAN      | 8.80     | ±9.6                   |
| 10681 | AAC | IEEE 802.11ax (20 MHz, MCS10, 90pc duty cycle)         | WLAN      | 8.62     | ±9.6                   |
| 10682 | AAC | IEEE 802.11ax (20 MHz, MCS11, 90pc duty cycle)         | WLAN      | 8.83     | ±9.6                   |
| 10683 | AAC | IEEE 802.11ax (20 MHz, MCS0, 99pc duty cycle)          | WLAN      | 8.42     | ±9.6                   |
| 10684 | AAC | IEEE 802.11ax (20 MHz, MCS1, 99pc duty cycle)          | WLAN      | 8.26     | ±9.6                   |
| 10685 | AAC | IEEE 802.11ax (20 MHz, MCS2, 99pc duty cycle)          | WLAN      | 8.33     | ±9.6                   |
| 10686 | AAC | IEEE 802.11ax (20 MHz, MCS3, 99pc duty cycle)          | WLAN      | 8.28     | ±9.6                   |



EX3DV4 - SN:7683

July 03, 2024

| UID   | Rev | Communication System Name                      | Group | PAR (dB) | Unc <sup>±</sup> k = 2 |
|-------|-----|------------------------------------------------|-------|----------|------------------------|
| 10687 | AAC | IEEE 802.11ax (20 MHz, MCS4, 99pc duty cycle)  | WLAN  | 8.45     | ±9.6                   |
| 10688 | AAC | IEEE 802.11ax (20 MHz, MCS5, 99pc duty cycle)  | WLAN  | 8.29     | ±9.6                   |
| 10689 | AAC | IEEE 802.11ax (20 MHz, MCS6, 99pc duty cycle)  | WLAN  | 8.55     | ±9.6                   |
| 10690 | AAC | IEEE 802.11ax (20 MHz, MCS7, 99pc duty cycle)  | WLAN  | 8.29     | ±9.6                   |
| 10691 | AAC | IEEE 802.11ax (20 MHz, MCS8, 99pc duty cycle)  | WLAN  | 8.25     | ±9.6                   |
| 10692 | AAC | IEEE 802.11ax (20 MHz, MCS9, 99pc duty cycle)  | WLAN  | 8.29     | ±9.6                   |
| 10693 | AAC | IEEE 802.11ax (20 MHz, MCS10, 99pc duty cycle) | WLAN  | 8.25     | ±9.6                   |
| 10694 | AAC | IEEE 802.11ax (20 MHz, MCS11, 99pc duty cycle) | WLAN  | 8.57     | ±9.6                   |
| 10695 | AAC | IEEE 802.11ax (40 MHz, MCS0, 90pc duty cycle)  | WLAN  | 8.78     | ±9.6                   |
| 10696 | AAC | IEEE 802.11ax (40 MHz, MCS1, 90pc duty cycle)  | WLAN  | 8.91     | ±9.6                   |
| 10697 | AAC | IEEE 802.11ax (40 MHz, MCS2, 90pc duty cycle)  | WLAN  | 8.81     | ±9.6                   |
| 10698 | AAC | IEEE 802.11ax (40 MHz, MCS3, 90pc duty cycle)  | WLAN  | 8.89     | ±9.6                   |
| 10699 | AAC | IEEE 802.11ax (40 MHz, MCS4, 90pc duty cycle)  | WLAN  | 8.82     | ±9.6                   |
| 10700 | AAC | IEEE 802.11ax (40 MHz, MCS5, 90pc duty cycle)  | WLAN  | 8.73     | ±9.6                   |
| 10701 | AAC | IEEE 802.11ax (40 MHz, MCS6, 90pc duty cycle)  | WLAN  | 8.86     | ±9.6                   |
| 10702 | AAC | IEEE 802.11ax (40 MHz, MCS7, 90pc duty cycle)  | WLAN  | 8.70     | ±9.6                   |
| 10703 | AAC | IEEE 802.11ax (40 MHz, MCS8, 90pc duty cycle)  | WLAN  | 8.82     | ±9.6                   |
| 10704 | AAC | IEEE 802.11ax (40 MHz, MCS9, 90pc duty cycle)  | WLAN  | 8.56     | ±9.6                   |
| 10705 | AAC | IEEE 802.11ax (40 MHz, MCS10, 90pc duty cycle) | WLAN  | 8.69     | ±9.6                   |
| 10706 | AAC | IEEE 802.11ax (40 MHz, MCS11, 90pc duty cycle) | WLAN  | 8.66     | ±9.6                   |
| 10707 | AAC | IEEE 802.11ax (40 MHz, MCS0, 99pc duty cycle)  | WLAN  | 8.32     | ±9.6                   |
| 10708 | AAC | IEEE 802.11ax (40 MHz, MCS1, 99pc duty cycle)  | WLAN  | 8.55     | ±9.6                   |
| 10709 | AAC | IEEE 802.11ax (40 MHz, MCS2, 99pc duty cycle)  | WLAN  | 8.33     | ±9.6                   |
| 10710 | AAC | IEEE 802.11ax (40 MHz, MCS3, 99pc duty cycle)  | WLAN  | 8.29     | ±9.6                   |
| 10711 | AAC | IEEE 802.11ax (40 MHz, MCS4, 99pc duty cycle)  | WLAN  | 8.39     | ±9.6                   |
| 10712 | AAC | IEEE 802.11ax (40 MHz, MCS5, 99pc duty cycle)  | WLAN  | 8.67     | ±9.6                   |
| 10713 | AAC | IEEE 802.11ax (40 MHz, MCS6, 99pc duty cycle)  | WLAN  | 8.33     | ±9.6                   |
| 10714 | AAC | IEEE 802.11ax (40 MHz, MCS7, 99pc duty cycle)  | WLAN  | 8.26     | ±9.6                   |
| 10715 | AAC | IEEE 802.11ax (40 MHz, MCS8, 99pc duty cycle)  | WLAN  | 8.45     | ±9.6                   |
| 10716 | AAC | IEEE 802.11ax (40 MHz, MCS9, 99pc duty cycle)  | WLAN  | 8.30     | ±9.6                   |
| 10717 | AAC | IEEE 802.11ax (40 MHz, MCS10, 99pc duty cycle) | WLAN  | 8.48     | ±9.6                   |
| 10718 | AAC | IEEE 802.11ax (40 MHz, MCS11, 99pc duty cycle) | WLAN  | 8.24     | ±9.6                   |
| 10719 | AAC | IEEE 802.11ax (80 MHz, MCS0, 90pc duty cycle)  | WLAN  | 8.81     | ±9.6                   |
| 10720 | AAC | IEEE 802.11ax (80 MHz, MCS1, 90pc duty cycle)  | WLAN  | 8.87     | ±9.6                   |
| 10721 | AAC | IEEE 802.11ax (80 MHz, MCS2, 90pc duty cycle)  | WLAN  | 8.76     | ±9.6                   |
| 10722 | AAC | IEEE 802.11ax (80 MHz, MCS3, 90pc duty cycle)  | WLAN  | 8.55     | ±9.6                   |
| 10723 | AAC | IEEE 802.11ax (80 MHz, MCS4, 90pc duty cycle)  | WLAN  | 8.70     | ±9.6                   |
| 10724 | AAC | IEEE 802.11ax (80 MHz, MCS5, 90pc duty cycle)  | WLAN  | 8.90     | ±9.6                   |
| 10725 | AAC | IEEE 802.11ax (80 MHz, MCS6, 90pc duty cycle)  | WLAN  | 8.74     | ±9.6                   |
| 10726 | AAC | IEEE 802.11ax (80 MHz, MCS7, 90pc duty cycle)  | WLAN  | 8.72     | ±9.6                   |
| 10727 | AAC | IEEE 802.11ax (80 MHz, MCS8, 90pc duty cycle)  | WLAN  | 8.66     | ±9.6                   |
| 10728 | AAC | IEEE 802.11ax (80 MHz, MCS9, 90pc duty cycle)  | WLAN  | 8.65     | ±9.6                   |
| 10729 | AAC | IEEE 802.11ax (80 MHz, MCS10, 90pc duty cycle) | WLAN  | 8.64     | ±9.6                   |
| 10730 | AAC | IEEE 802.11ax (80 MHz, MCS11, 90pc duty cycle) | WLAN  | 8.67     | ±9.6                   |
| 10731 | AAC | IEEE 802.11ax (80 MHz, MCS0, 99pc duty cycle)  | WLAN  | 8.42     | ±9.6                   |
| 10732 | AAC | IEEE 802.11ax (80 MHz, MCS1, 99pc duty cycle)  | WLAN  | 8.46     | ±9.6                   |
| 10733 | AAC | IEEE 802.11ax (80 MHz, MCS2, 99pc duty cycle)  | WLAN  | 8.40     | ±9.6                   |
| 10734 | AAC | IEEE 802.11ax (80 MHz, MCS3, 99pc duty cycle)  | WLAN  | 8.25     | ±9.6                   |
| 10735 | AAC | IEEE 802.11ax (80 MHz, MCS4, 99pc duty cycle)  | WLAN  | 8.33     | ±9.6                   |
| 10736 | AAC | IEEE 802.11ax (80 MHz, MCS5, 99pc duty cycle)  | WLAN  | 8.27     | ±9.6                   |
| 10737 | AAC | IEEE 802.11ax (80 MHz, MCS6, 99pc duty cycle)  | WLAN  | 8.36     | ±9.6                   |
| 10738 | AAC | IEEE 802.11ax (80 MHz, MCS7, 99pc duty cycle)  | WLAN  | 8.42     | ±9.6                   |
| 10739 | AAC | IEEE 802.11ax (80 MHz, MCS8, 99pc duty cycle)  | WLAN  | 8.29     | ±9.6                   |
| 10740 | AAC | IEEE 802.11ax (80 MHz, MCS9, 99pc duty cycle)  | WLAN  | 8.48     | ±9.6                   |
| 10741 | AAC | IEEE 802.11ax (80 MHz, MCS10, 99pc duty cycle) | WLAN  | 8.40     | ±9.6                   |
| 10742 | AAC | IEEE 802.11ax (80 MHz, MCS11, 99pc duty cycle) | WLAN  | 8.43     | ±9.6                   |
| 10743 | AAC | IEEE 802.11ax (160 MHz, MCS0, 90pc duty cycle) | WLAN  | 8.94     | ±9.6                   |
| 10744 | AAC | IEEE 802.11ax (160 MHz, MCS1, 90pc duty cycle) | WLAN  | 9.16     | ±9.6                   |
| 10745 | AAC | IEEE 802.11ax (160 MHz, MCS2, 90pc duty cycle) | WLAN  | 8.93     | ±9.6                   |
| 10746 | AAC | IEEE 802.11ax (160 MHz, MCS3, 90pc duty cycle) | WLAN  | 9.11     | ±9.6                   |
| 10747 | AAC | IEEE 802.11ax (160 MHz, MCS4, 90pc duty cycle) | WLAN  | 9.04     | ±9.6                   |
| 10748 | AAC | IEEE 802.11ax (160 MHz, MCS5, 90pc duty cycle) | WLAN  | 8.93     | ±9.6                   |
| 10749 | AAC | IEEE 802.11ax (160 MHz, MCS6, 90pc duty cycle) | WLAN  | 8.90     | ±9.6                   |
| 10750 | AAC | IEEE 802.11ax (160 MHz, MCS7, 90pc duty cycle) | WLAN  | 8.79     | ±9.6                   |
| 10751 | AAC | IEEE 802.11ax (160 MHz, MCS8, 90pc duty cycle) | WLAN  | 8.82     | ±9.6                   |
| 10752 | AAC | IEEE 802.11ax (160 MHz, MCS9, 90pc duty cycle) | WLAN  | 8.81     | ±9.6                   |

EX3DV4 - SN:7683

July 03, 2024

| UID   | Rev | Communication System Name                       | Group         | PAR (dB) | Unc <sup>k</sup> k = 2 |
|-------|-----|-------------------------------------------------|---------------|----------|------------------------|
| 10753 | AAC | IEEE 802.11ax (160 MHz, MCS10, 90pc duty cycle) | WLAN          | 9.00     | ±9.6                   |
| 10754 | AAC | IEEE 802.11ax (160 MHz, MCS11, 90pc duty cycle) | WLAN          | 8.94     | ±9.6                   |
| 10755 | AAC | IEEE 802.11ax (160 MHz, MCS0, 99pc duty cycle)  | WLAN          | 8.64     | ±9.6                   |
| 10756 | AAC | IEEE 802.11ax (160 MHz, MCS1, 99pc duty cycle)  | WLAN          | 8.77     | ±9.6                   |
| 10757 | AAC | IEEE 802.11ax (160 MHz, MCS2, 99pc duty cycle)  | WLAN          | 8.77     | ±9.6                   |
| 10758 | AAC | IEEE 802.11ax (160 MHz, MCS3, 99pc duty cycle)  | WLAN          | 8.69     | ±9.6                   |
| 10759 | AAC | IEEE 802.11ax (160 MHz, MCS4, 99pc duty cycle)  | WLAN          | 8.58     | ±9.6                   |
| 10760 | AAC | IEEE 802.11ax (160 MHz, MCS5, 99pc duty cycle)  | WLAN          | 8.49     | ±9.6                   |
| 10761 | AAC | IEEE 802.11ax (160 MHz, MCS6, 99pc duty cycle)  | WLAN          | 8.58     | ±9.6                   |
| 10762 | AAC | IEEE 802.11ax (160 MHz, MCS7, 99pc duty cycle)  | WLAN          | 8.49     | ±9.6                   |
| 10763 | AAC | IEEE 802.11ax (160 MHz, MCS8, 99pc duty cycle)  | WLAN          | 8.53     | ±9.6                   |
| 10764 | AAC | IEEE 802.11ax (160 MHz, MCS9, 99pc duty cycle)  | WLAN          | 8.54     | ±9.6                   |
| 10765 | AAC | IEEE 802.11ax (160 MHz, MCS10, 99pc duty cycle) | WLAN          | 8.54     | ±9.6                   |
| 10766 | AAC | IEEE 802.11ax (160 MHz, MCS11, 99pc duty cycle) | WLAN          | 8.51     | ±9.6                   |
| 10767 | AAG | 5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)      | 5G NR FR1 TDD | 7.99     | ±9.6                   |
| 10768 | AAE | 5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)     | 5G NR FR1 TDD | 8.01     | ±9.6                   |
| 10769 | AAD | 5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)     | 5G NR FR1 TDD | 8.01     | ±9.6                   |
| 10770 | AAE | 5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)     | 5G NR FR1 TDD | 8.02     | ±9.6                   |
| 10771 | AAD | 5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)     | 5G NR FR1 TDD | 8.02     | ±9.6                   |
| 10772 | AAE | 5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)     | 5G NR FR1 TDD | 8.23     | ±9.6                   |
| 10773 | AAF | 5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)     | 5G NR FR1 TDD | 8.03     | ±9.6                   |
| 10774 | AAE | 5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)     | 5G NR FR1 TDD | 8.02     | ±9.6                   |
| 10775 | AAF | 5G NR (CP-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)    | 5G NR FR1 TDD | 8.31     | ±9.6                   |
| 10776 | AAE | 5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)   | 5G NR FR1 TDD | 8.30     | ±9.6                   |
| 10777 | AAC | 5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)   | 5G NR FR1 TDD | 8.30     | ±9.6                   |
| 10778 | AAE | 5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)   | 5G NR FR1 TDD | 8.34     | ±9.6                   |
| 10779 | AAC | 5G NR (CP-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)   | 5G NR FR1 TDD | 8.42     | ±9.6                   |
| 10780 | AAE | 5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)   | 5G NR FR1 TDD | 8.38     | ±9.6                   |
| 10781 | AAF | 5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)   | 5G NR FR1 TDD | 8.38     | ±9.6                   |
| 10782 | AAE | 5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)   | 5G NR FR1 TDD | 8.43     | ±9.6                   |
| 10783 | AAG | 5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)   | 5G NR FR1 TDD | 8.31     | ±9.6                   |
| 10784 | AAE | 5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)  | 5G NR FR1 TDD | 8.29     | ±9.6                   |
| 10785 | AAD | 5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)  | 5G NR FR1 TDD | 8.40     | ±9.6                   |
| 10786 | AAE | 5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)  | 5G NR FR1 TDD | 8.35     | ±9.6                   |
| 10787 | AAD | 5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)  | 5G NR FR1 TDD | 8.44     | ±9.6                   |
| 10788 | AAE | 5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)  | 5G NR FR1 TDD | 8.39     | ±9.6                   |
| 10789 | AAF | 5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)  | 5G NR FR1 TDD | 8.37     | ±9.6                   |
| 10790 | AAE | 5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)  | 5G NR FR1 TDD | 8.39     | ±9.6                   |
| 10791 | AAG | 5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)      | 5G NR FR1 TDD | 7.83     | ±9.6                   |
| 10792 | AAE | 5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 7.92     | ±9.6                   |
| 10793 | AAD | 5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 7.95     | ±9.6                   |
| 10794 | AAE | 5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 7.82     | ±9.6                   |
| 10795 | AAD | 5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 7.84     | ±9.6                   |
| 10796 | AAE | 5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 7.82     | ±9.6                   |
| 10797 | AAF | 5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 8.01     | ±9.6                   |
| 10798 | AAE | 5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 7.89     | ±9.6                   |
| 10799 | AAF | 5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 7.93     | ±9.6                   |
| 10801 | AAF | 5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 7.89     | ±9.6                   |
| 10802 | AAE | 5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 7.87     | ±9.6                   |
| 10803 | AAF | 5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 7.93     | ±9.6                   |
| 10805 | AAE | 5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 8.34     | ±9.6                   |
| 10806 | AAD | 5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 8.37     | ±9.6                   |
| 10809 | AAE | 5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 8.34     | ±9.6                   |
| 10810 | AAF | 5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 8.34     | ±9.6                   |
| 10812 | AAF | 5G NR (CP-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 8.35     | ±9.6                   |
| 10817 | AAG | 5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 8.35     | ±9.6                   |
| 10818 | AAE | 5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.34     | ±9.6                   |
| 10819 | AAD | 5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.33     | ±9.6                   |
| 10820 | AAE | 5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.30     | ±9.6                   |
| 10821 | AAD | 5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.41     | ±9.6                   |
| 10822 | AAE | 5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.41     | ±9.6                   |
| 10823 | AAF | 5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.36     | ±9.6                   |
| 10824 | AAE | 5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.39     | ±9.6                   |
| 10825 | AAF | 5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.41     | ±9.6                   |
| 10827 | AAF | 5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.42     | ±9.6                   |
| 10828 | AAE | 5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.43     | ±9.6                   |

EX3DV4 - SN:7683

July 03, 2024

| UID   | Rev | Communication System Name                            | Group         | PAR (dB) | Unc <sup>o</sup> k = 2 |
|-------|-----|------------------------------------------------------|---------------|----------|------------------------|
| 10829 | AAF | 5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)      | 5G NR FR1 TDD | 8.40     | ±9.6                   |
| 10830 | AAE | 5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 60 kHz)          | 5G NR FR1 TDD | 7.63     | ±9.6                   |
| 10831 | AAD | 5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 60 kHz)          | 5G NR FR1 TDD | 7.73     | ±9.6                   |
| 10832 | AAE | 5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 60 kHz)          | 5G NR FR1 TDD | 7.74     | ±9.6                   |
| 10833 | AAD | 5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 60 kHz)          | 5G NR FR1 TDD | 7.70     | ±9.6                   |
| 10834 | AAE | 5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 60 kHz)          | 5G NR FR1 TDD | 7.75     | ±9.6                   |
| 10835 | AAF | 5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 60 kHz)          | 5G NR FR1 TDD | 7.70     | ±9.6                   |
| 10836 | AAE | 5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 60 kHz)          | 5G NR FR1 TDD | 7.66     | ±9.6                   |
| 10837 | AAF | 5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 60 kHz)          | 5G NR FR1 TDD | 7.68     | ±9.6                   |
| 10839 | AAF | 5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 60 kHz)          | 5G NR FR1 TDD | 7.70     | ±9.6                   |
| 10840 | AAE | 5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 60 kHz)          | 5G NR FR1 TDD | 7.67     | ±9.6                   |
| 10841 | AAF | 5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 60 kHz)         | 5G NR FR1 TDD | 7.71     | ±9.6                   |
| 10843 | AAD | 5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 60 kHz)        | 5G NR FR1 TDD | 8.49     | ±9.6                   |
| 10844 | AAE | 5G NR (CP-OFDM, 50% RB, 20 MHz, QPSK, 60 kHz)        | 5G NR FR1 TDD | 8.34     | ±9.6                   |
| 10846 | AAE | 5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 60 kHz)        | 5G NR FR1 TDD | 8.41     | ±9.6                   |
| 10854 | AAE | 5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 60 kHz)       | 5G NR FR1 TDD | 8.34     | ±9.6                   |
| 10855 | AAD | 5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 60 kHz)       | 5G NR FR1 TDD | 8.36     | ±9.6                   |
| 10856 | AAE | 5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 60 kHz)       | 5G NR FR1 TDD | 8.37     | ±9.6                   |
| 10857 | AAD | 5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 60 kHz)       | 5G NR FR1 TDD | 8.35     | ±9.6                   |
| 10858 | AAE | 5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 60 kHz)       | 5G NR FR1 TDD | 8.36     | ±9.6                   |
| 10859 | AAF | 5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 60 kHz)       | 5G NR FR1 TDD | 8.34     | ±9.6                   |
| 10860 | AAE | 5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 60 kHz)       | 5G NR FR1 TDD | 8.41     | ±9.6                   |
| 10861 | AAF | 5G NR (CP-OFDM, 100% RB, 60 MHz, QPSK, 60 kHz)       | 5G NR FR1 TDD | 8.40     | ±9.6                   |
| 10863 | AAF | 5G NR (CP-OFDM, 100% RB, 80 MHz, QPSK, 60 kHz)       | 5G NR FR1 TDD | 8.41     | ±9.6                   |
| 10864 | AAE | 5G NR (CP-OFDM, 100% RB, 90 MHz, QPSK, 60 kHz)       | 5G NR FR1 TDD | 8.37     | ±9.6                   |
| 10865 | AAF | 5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 60 kHz)      | 5G NR FR1 TDD | 8.41     | ±9.6                   |
| 10866 | AAF | 5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)      | 5G NR FR1 TDD | 5.68     | ±9.6                   |
| 10868 | AAF | 5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 5.89     | ±9.6                   |
| 10869 | AAE | 5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)     | 5G NR FR2 TDD | 5.75     | ±9.6                   |
| 10870 | AAE | 5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)  | 5G NR FR2 TDD | 5.86     | ±9.6                   |
| 10871 | AAE | 5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)    | 5G NR FR2 TDD | 5.75     | ±9.6                   |
| 10872 | AAE | 5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz) | 5G NR FR2 TDD | 6.52     | ±9.6                   |
| 10873 | AAE | 5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)    | 5G NR FR2 TDD | 6.61     | ±9.6                   |
| 10874 | AAE | 5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz) | 5G NR FR2 TDD | 6.65     | ±9.6                   |
| 10875 | AAE | 5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)        | 5G NR FR2 TDD | 7.78     | ±9.6                   |
| 10876 | AAE | 5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)     | 5G NR FR2 TDD | 8.39     | ±9.6                   |
| 10877 | AAE | 5G NR (CP-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)       | 5G NR FR2 TDD | 7.95     | ±9.6                   |
| 10878 | AAE | 5G NR (CP-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)    | 5G NR FR2 TDD | 8.41     | ±9.6                   |
| 10879 | AAE | 5G NR (CP-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)       | 5G NR FR2 TDD | 8.12     | ±9.6                   |
| 10880 | AAE | 5G NR (CP-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)    | 5G NR FR2 TDD | 8.38     | ±9.6                   |
| 10881 | AAE | 5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)      | 5G NR FR2 TDD | 5.75     | ±9.6                   |
| 10882 | AAE | 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)   | 5G NR FR2 TDD | 5.96     | ±9.6                   |
| 10883 | AAE | 5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)     | 5G NR FR2 TDD | 6.57     | ±9.6                   |
| 10884 | AAE | 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)  | 5G NR FR2 TDD | 6.53     | ±9.6                   |
| 10885 | AAE | 5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)     | 5G NR FR2 TDD | 6.61     | ±9.6                   |
| 10886 | AAE | 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)  | 5G NR FR2 TDD | 6.65     | ±9.6                   |
| 10887 | AAE | 5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)         | 5G NR FR2 TDD | 7.78     | ±9.6                   |
| 10888 | AAE | 5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)      | 5G NR FR2 TDD | 8.35     | ±9.6                   |
| 10889 | AAE | 5G NR (CP-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)        | 5G NR FR2 TDD | 8.02     | ±9.6                   |
| 10890 | AAE | 5G NR (CP-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)     | 5G NR FR2 TDD | 8.40     | ±9.6                   |
| 10891 | AAE | 5G NR (CP-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)        | 5G NR FR2 TDD | 8.13     | ±9.6                   |
| 10892 | AAE | 5G NR (CP-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)     | 5G NR FR2 TDD | 8.41     | ±9.6                   |
| 10897 | AAE | 5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)        | 5G NR FR1 TDD | 5.66     | ±9.6                   |
| 10898 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)       | 5G NR FR1 TDD | 5.67     | ±9.6                   |
| 10899 | AAB | 5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)       | 5G NR FR1 TDD | 5.67     | ±9.6                   |
| 10900 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)       | 5G NR FR1 TDD | 5.68     | ±9.6                   |
| 10901 | AAB | 5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)       | 5G NR FR1 TDD | 5.68     | ±9.6                   |
| 10902 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)       | 5G NR FR1 TDD | 5.68     | ±9.6                   |
| 10903 | AAD | 5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)       | 5G NR FR1 TDD | 5.68     | ±9.6                   |
| 10904 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)       | 5G NR FR1 TDD | 5.68     | ±9.6                   |
| 10905 | AAD | 5G NR (DFT-s-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)       | 5G NR FR1 TDD | 5.68     | ±9.6                   |
| 10906 | AAD | 5G NR (DFT-s-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)       | 5G NR FR1 TDD | 5.68     | ±9.6                   |
| 10907 | AAE | 5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 30 kHz)      | 5G NR FR1 TDD | 5.78     | ±9.6                   |
| 10908 | AAC | 5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 5.93     | ±9.6                   |
| 10909 | AAB | 5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 5.96     | ±9.6                   |
| 10910 | AAC | 5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 5.83     | ±9.6                   |

Certificate No: EX-7683\_Jul24

Page 20 of 22

EX3DV4 - SN:7683

July 03, 2024

| UID   | Rev | Communication System Name                           | Group         | PAR (dB) | Unc <sup>k</sup> k = 2 |
|-------|-----|-----------------------------------------------------|---------------|----------|------------------------|
| 10911 | AAB | 5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 5.93     | ±9.6                   |
| 10912 | AAC | 5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 5.84     | ±9.6                   |
| 10913 | AAD | 5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 5.84     | ±9.6                   |
| 10914 | AAC | 5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 5.85     | ±9.6                   |
| 10915 | AAD | 5G NR (DFT-s-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 5.83     | ±9.6                   |
| 10916 | AAD | 5G NR (DFT-s-OFDM, 50% RB, 80 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 5.87     | ±9.6                   |
| 10917 | AAD | 5G NR (DFT-s-OFDM, 50% RB, 100 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 5.94     | ±9.6                   |
| 10918 | AAE | 5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 5.86     | ±9.6                   |
| 10919 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 5.86     | ±9.6                   |
| 10920 | AAB | 5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 5.87     | ±9.6                   |
| 10921 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 5.84     | ±9.6                   |
| 10922 | AAB | 5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 5.82     | ±9.6                   |
| 10923 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 5.84     | ±9.6                   |
| 10924 | AAD | 5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 5.84     | ±9.6                   |
| 10925 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 5.95     | ±9.6                   |
| 10926 | AAD | 5G NR (DFT-s-OFDM, 100% RB, 60 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 5.84     | ±9.6                   |
| 10927 | AAD | 5G NR (DFT-s-OFDM, 100% RB, 80 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 5.94     | ±9.6                   |
| 10928 | AAD | 5G NR (DFT-s-OFDM, 1 RB, 5 MHz, QPSK, 15 kHz)       | 5G NR FR1 FDD | 5.52     | ±9.6                   |
| 10929 | AAD | 5G NR (DFT-s-OFDM, 1 RB, 10 MHz, QPSK, 15 kHz)      | 5G NR FR1 FDD | 5.52     | ±9.6                   |
| 10930 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 15 MHz, QPSK, 15 kHz)      | 5G NR FR1 FDD | 5.52     | ±9.6                   |
| 10931 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)      | 5G NR FR1 FDD | 5.51     | ±9.6                   |
| 10932 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 25 MHz, QPSK, 15 kHz)      | 5G NR FR1 FDD | 5.51     | ±9.6                   |
| 10933 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 30 MHz, QPSK, 15 kHz)      | 5G NR FR1 FDD | 5.51     | ±9.6                   |
| 10934 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 40 MHz, QPSK, 15 kHz)      | 5G NR FR1 FDD | 5.51     | ±9.6                   |
| 10935 | AAD | 5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 15 kHz)      | 5G NR FR1 FDD | 5.51     | ±9.6                   |
| 10936 | AAD | 5G NR (DFT-s-OFDM, 50% RB, 5 MHz, QPSK, 15 kHz)     | 5G NR FR1 FDD | 5.90     | ±9.6                   |
| 10937 | AAD | 5G NR (DFT-s-OFDM, 50% RB, 10 MHz, QPSK, 15 kHz)    | 5G NR FR1 FDD | 5.77     | ±9.6                   |
| 10938 | AAC | 5G NR (DFT-s-OFDM, 50% RB, 15 MHz, QPSK, 15 kHz)    | 5G NR FR1 FDD | 5.90     | ±9.6                   |
| 10939 | AAC | 5G NR (DFT-s-OFDM, 50% RB, 20 MHz, QPSK, 15 kHz)    | 5G NR FR1 FDD | 5.82     | ±9.6                   |
| 10940 | AAC | 5G NR (DFT-s-OFDM, 50% RB, 25 MHz, QPSK, 15 kHz)    | 5G NR FR1 FDD | 5.89     | ±9.6                   |
| 10941 | AAC | 5G NR (DFT-s-OFDM, 50% RB, 30 MHz, QPSK, 15 kHz)    | 5G NR FR1 FDD | 5.83     | ±9.6                   |
| 10942 | AAC | 5G NR (DFT-s-OFDM, 50% RB, 40 MHz, QPSK, 15 kHz)    | 5G NR FR1 FDD | 5.85     | ±9.6                   |
| 10943 | AAD | 5G NR (DFT-s-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)    | 5G NR FR1 FDD | 5.95     | ±9.6                   |
| 10944 | AAD | 5G NR (DFT-s-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)    | 5G NR FR1 FDD | 5.81     | ±9.6                   |
| 10945 | AAD | 5G NR (DFT-s-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz)   | 5G NR FR1 FDD | 5.85     | ±9.6                   |
| 10946 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz)   | 5G NR FR1 FDD | 5.83     | ±9.6                   |
| 10947 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz)   | 5G NR FR1 FDD | 5.87     | ±9.6                   |
| 10948 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz)   | 5G NR FR1 FDD | 5.94     | ±9.6                   |
| 10949 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz)   | 5G NR FR1 FDD | 5.87     | ±9.6                   |
| 10950 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz)   | 5G NR FR1 FDD | 5.94     | ±9.6                   |
| 10951 | AAD | 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz)   | 5G NR FR1 FDD | 5.92     | ±9.6                   |
| 10952 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)   | 5G NR FR1 FDD | 8.25     | ±9.6                   |
| 10953 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)  | 5G NR FR1 FDD | 8.15     | ±9.6                   |
| 10954 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)  | 5G NR FR1 FDD | 8.23     | ±9.6                   |
| 10955 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)  | 5G NR FR1 FDD | 8.42     | ±9.6                   |
| 10956 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)   | 5G NR FR1 FDD | 8.14     | ±9.6                   |
| 10957 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)  | 5G NR FR1 FDD | 8.31     | ±9.6                   |
| 10958 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)  | 5G NR FR1 FDD | 8.61     | ±9.6                   |
| 10959 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)  | 5G NR FR1 FDD | 8.33     | ±9.6                   |
| 10960 | AAE | 5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 15 kHz)   | 5G NR FR1 TDD | 9.32     | ±9.6                   |
| 10961 | AAC | 5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 15 kHz)  | 5G NR FR1 TDD | 9.36     | ±9.6                   |
| 10962 | AAB | 5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 15 kHz)  | 5G NR FR1 TDD | 9.40     | ±9.6                   |
| 10963 | AAC | 5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 15 kHz)  | 5G NR FR1 TDD | 9.55     | ±9.6                   |
| 10964 | AAE | 5G NR DL (CP-OFDM, TM 3.1, 5 MHz, 64-QAM, 30 kHz)   | 5G NR FR1 TDD | 9.29     | ±9.6                   |
| 10965 | AAC | 5G NR DL (CP-OFDM, TM 3.1, 10 MHz, 64-QAM, 30 kHz)  | 5G NR FR1 TDD | 9.37     | ±9.6                   |
| 10966 | AAB | 5G NR DL (CP-OFDM, TM 3.1, 15 MHz, 64-QAM, 30 kHz)  | 5G NR FR1 TDD | 9.55     | ±9.6                   |
| 10967 | AAC | 5G NR DL (CP-OFDM, TM 3.1, 20 MHz, 64-QAM, 30 kHz)  | 5G NR FR1 TDD | 9.42     | ±9.6                   |
| 10968 | AAD | 5G NR DL (CP-OFDM, TM 3.1, 100 MHz, 64-QAM, 30 kHz) | 5G NR FR1 TDD | 9.49     | ±9.6                   |
| 10972 | AAC | 5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 15 kHz)         | 5G NR FR1 TDD | 11.59    | ±9.6                   |
| 10973 | AAD | 5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 9.06     | ±9.6                   |
| 10974 | AAD | 5G NR (CP-OFDM, 100% RB, 100 MHz, 256-QAM, 30 kHz)  | 5G NR FR1 TDD | 10.28    | ±9.6                   |
| 10978 | AAA | ULLA BDR                                            | ULLA          | 1.16     | ±9.6                   |
| 10979 | AAA | ULLA HDR4                                           | ULLA          | 8.58     | ±9.6                   |
| 10980 | AAA | ULLA HDR8                                           | ULLA          | 10.32    | ±9.6                   |
| 10981 | AAA | ULLA HDRp4                                          | ULLA          | 3.19     | ±9.6                   |
| 10982 | AAA | ULLA HDRp8                                          | ULLA          | 3.43     | ±9.6                   |

Certificate No: EX-7683\_Jul24

Page 21 of 22

EX3DV4 - SN:7683

July 03, 2024

| UID   | Rev | Communication System Name                          | Group         | PAR (dB) | Unc <sup>E</sup> k = 2 |
|-------|-----|----------------------------------------------------|---------------|----------|------------------------|
| 10983 | AAC | 5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz) | 5G NR FR1 TDD | 9.31     | ±9.6                   |
| 10984 | AAB | 5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz) | 5G NR FR1 TDD | 9.42     | ±9.6                   |
| 10985 | AAC | 5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz) | 5G NR FR1 TDD | 9.54     | ±9.6                   |
| 10986 | AAB | 5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz) | 5G NR FR1 TDD | 9.50     | ±9.6                   |
| 10987 | AAC | 5G NR DL (CP-OFDM, TM 3.1, 60 MHz, 64-QAM, 30 kHz) | 5G NR FR1 TDD | 9.53     | ±9.6                   |
| 10988 | AAB | 5G NR DL (CP-OFDM, TM 3.1, 70 MHz, 64-QAM, 30 kHz) | 5G NR FR1 TDD | 9.38     | ±9.6                   |
| 10989 | AAC | 5G NR DL (CP-OFDM, TM 3.1, 80 MHz, 64-QAM, 30 kHz) | 5G NR FR1 TDD | 9.33     | ±9.6                   |
| 10990 | AAB | 5G NR DL (CP-OFDM, TM 3.1, 90 MHz, 64-QAM, 30 kHz) | 5G NR FR1 TDD | 9.52     | ±9.6                   |
| 11003 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 15 kHz) | 5G NR FR1 TDD | 10.24    | ±9.6                   |
| 11004 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 30 kHz) | 5G NR FR1 TDD | 10.73    | ±9.6                   |
| 11005 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 25 MHz, 64-QAM, 15 kHz) | 5G NR FR1 FDD | 8.70     | ±9.6                   |
| 11006 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 15 kHz) | 5G NR FR1 FDD | 8.55     | ±9.6                   |
| 11007 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 15 kHz) | 5G NR FR1 FDD | 8.46     | ±9.6                   |
| 11008 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 15 kHz) | 5G NR FR1 FDD | 8.51     | ±9.6                   |
| 11009 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 25 MHz, 64-QAM, 30 kHz) | 5G NR FR1 FDD | 8.76     | ±9.6                   |
| 11010 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 30 MHz, 64-QAM, 30 kHz) | 5G NR FR1 FDD | 8.95     | ±9.6                   |
| 11011 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 40 MHz, 64-QAM, 30 kHz) | 5G NR FR1 FDD | 8.96     | ±9.6                   |
| 11012 | AAA | 5G NR DL (CP-OFDM, TM 3.1, 50 MHz, 64-QAM, 30 kHz) | 5G NR FR1 FDD | 8.68     | ±9.6                   |
| 11013 | AAB | IEEE 802.11be (320 MHz, MCS1, 99pc duty cycle)     | WLAN          | 8.47     | ±9.6                   |
| 11014 | AAB | IEEE 802.11be (320 MHz, MCS2, 99pc duty cycle)     | WLAN          | 8.45     | ±9.6                   |
| 11015 | AAB | IEEE 802.11be (320 MHz, MCS3, 99pc duty cycle)     | WLAN          | 8.44     | ±9.6                   |
| 11016 | AAB | IEEE 802.11be (320 MHz, MCS4, 99pc duty cycle)     | WLAN          | 8.44     | ±9.6                   |
| 11017 | AAB | IEEE 802.11be (320 MHz, MCS5, 99pc duty cycle)     | WLAN          | 8.41     | ±9.6                   |
| 11018 | AAB | IEEE 802.11be (320 MHz, MCS6, 99pc duty cycle)     | WLAN          | 8.40     | ±9.6                   |
| 11019 | AAB | IEEE 802.11be (320 MHz, MCS7, 99pc duty cycle)     | WLAN          | 8.29     | ±9.6                   |
| 11020 | AAB | IEEE 802.11be (320 MHz, MCS8, 99pc duty cycle)     | WLAN          | 8.27     | ±9.6                   |
| 11021 | AAB | IEEE 802.11be (320 MHz, MCS9, 99pc duty cycle)     | WLAN          | 8.46     | ±9.6                   |
| 11022 | AAB | IEEE 802.11be (320 MHz, MCS10, 99pc duty cycle)    | WLAN          | 8.36     | ±9.6                   |
| 11023 | AAB | IEEE 802.11be (320 MHz, MCS11, 99pc duty cycle)    | WLAN          | 8.09     | ±9.6                   |
| 11024 | AAB | IEEE 802.11be (320 MHz, MCS12, 99pc duty cycle)    | WLAN          | 8.42     | ±9.6                   |
| 11025 | AAB | IEEE 802.11be (320 MHz, MCS13, 99pc duty cycle)    | WLAN          | 8.37     | ±9.6                   |
| 11026 | AAB | IEEE 802.11be (320 MHz, MCS0, 99pc duty cycle)     | WLAN          | 8.39     | ±9.6                   |

<sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

**ANNEX I: Dipole Calibration Certificate****2450MHz Dipole**

Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191  
Tel: +86-10-62304633-2117  
E-mail: cttl@chinattl.com http://www.caict.ac.cn



中国认可  
国际互认  
校准  
CALIBRATION  
CNAS L0570



Client

SAICT

Certificate No: 24J02Z000740

**CALIBRATION CERTIFICATE**

Object D2450V2 - SN: 873

Calibration Procedure(s) FF-Z11-003-01  
Calibration Procedures for dipole validation kits

Calibration date: September 26, 2024

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

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

Calibration Equipment used (M&amp;TE critical for calibration)

| Primary Standards       | ID #       | Cal Date (Calibrated by, Certificate No.)  | Scheduled Calibration |
|-------------------------|------------|--------------------------------------------|-----------------------|
| Power Meter NRP2        | 106276     | 17-May-24 (CTTL, No. J24X04107)            | May-25                |
| Power sensor NRP6A      | 101369     | 17-May-24 (CTTL, No. J24X04107)            | May-25                |
| Reference Probe EX3DV4  | SN 7464    | 22-Jan-24(SPEAG, No. EX-7464_Jan24)        | Jan-25                |
| DAE4                    | SN 1556    | 03-Jan-24(CTTL-SPEAG, No.24J02Z80002)      | Jan-25                |
| Secondary Standards     | ID #       | Cal Date (Calibrated by, Certificate No.)  | Scheduled Calibration |
| Signal Generator E4438C | MY49071430 | 25-Dec-23 (CTTL, No. J23X13426)            | Dec-24                |
| NetworkAnalyzer E5071C  | MY46110673 | 25-Dec-23 (CTTL, No. J23X13425)            | Dec-24                |
| OCP DAK-3.5(weighted)   | 1040       | 22-Jan-24(SPEAG, No.OCP-DAK3.5-1040_Jan24) | Jan-25                |

|                | Name        | Function           | Signature |
|----------------|-------------|--------------------|-----------|
| Calibrated by: | Zhao Jing   | SAR Test Engineer  |           |
| Reviewed by:   | Lin Jun     | SAR Test Engineer  |           |
| Approved by:   | Qi Dianyuan | SAR Project Leader |           |

Issued: September 30, 2024

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



Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China  
Tel: +86-10-62304633-2117  
E-mail: cttl@chinattl.com <http://www.caict.ac.cn>

**Glossary:**

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

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

- a) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices- Part 1528: Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Additional Documentation:**

- c) DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

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

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

### Measurement Conditions

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

|                                     |                          |             |
|-------------------------------------|--------------------------|-------------|
| <b>DASY Version</b>                 | DASY52                   | 52.10.4     |
| <b>Extrapolation</b>                | Advanced Extrapolation   |             |
| <b>Phantom</b>                      | Triple Flat Phantom 5.1C |             |
| <b>Distance Dipole Center - TSL</b> | 10 mm                    | with Spacer |
| <b>Zoom Scan Resolution</b>         | dx, dy, dz = 5 mm        |             |
| <b>Frequency</b>                    | 2450 MHz $\pm$ 1 MHz     |             |

### Head TSL parameters

The following parameters and calculations were applied.

|                                                | Temperature         | Permittivity   | Conductivity         |
|------------------------------------------------|---------------------|----------------|----------------------|
| <b>Nominal Head TSL parameters</b>             | 22.0 °C             | 39.2           | 1.80 mho/m           |
| <b>Measured Head TSL parameters</b>            | (22.0 $\pm$ 0.2) °C | 39.8 $\pm$ 6 % | 1.76 mho/m $\pm$ 6 % |
| <b>Head TSL temperature change during test</b> | <1.0 °C             | ---            | ---                  |

### SAR result with Head TSL

|                                                               |                    |                                                |
|---------------------------------------------------------------|--------------------|------------------------------------------------|
| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b>   | Condition          |                                                |
| SAR measured                                                  | 250 mW input power | 13.0 W/kg                                      |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>52.7 W/kg <math>\pm</math> 18.8 % (k=2)</b> |
| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b> | Condition          |                                                |
| SAR measured                                                  | 250 mW input power | 6.16 W/kg                                      |
| SAR for nominal Head TSL parameters                           | normalized to 1W   | <b>24.8 W/kg <math>\pm</math> 18.7 % (k=2)</b> |

#### Appendix (Additional assessments outside the scope of CNAS L0570)

##### Antenna Parameters with Head TSL

|                                      |               |
|--------------------------------------|---------------|
| Impedance, transformed to feed point | 53.3Ω+ 1.81jΩ |
| Return Loss                          | - 28.7dB      |

##### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.067 ns |
|----------------------------------|----------|

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

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

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

##### Additional EUT Data

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

# **DASY5 Validation Report for Head TSL**

Date: 2024-09-26

Test Laboratory: CTTL, Beijing, China

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 873**

Communication System: UID 0, CW; Frequency: 2450 MHz

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.763$  S/m;  $\epsilon_r = 39.76$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(7.63, 7.75, 7.92) @ 2450 MHz; Calibrated: 2024-01-22
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2024-01-03
- Phantom: MFP\_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

**Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.57 V/m; Power Drift = 0.02 dB

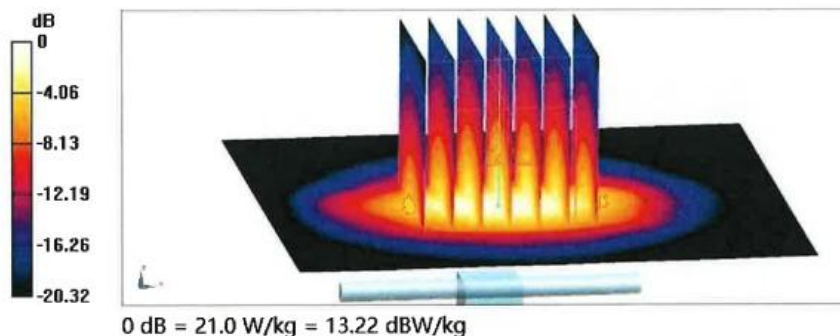
Peak SAR (extrapolated) = 25.3 W/kg

**SAR(1 g) = 13 W/kg; SAR(10 g) = 6.16 W/kg**

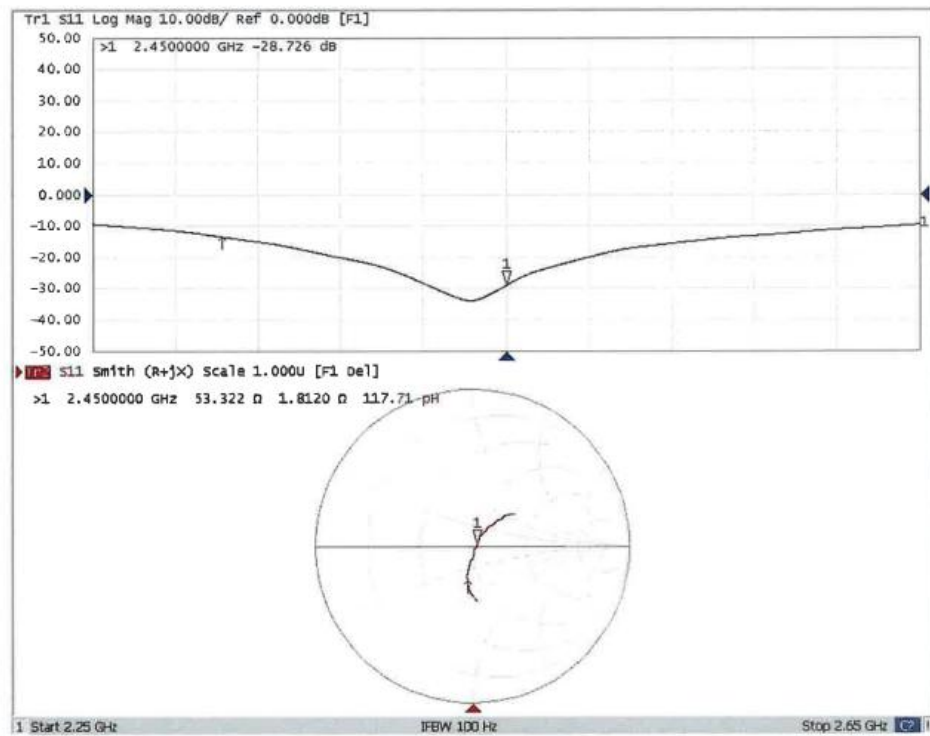
Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 52.4%

Maximum value of SAR (measured) = 21.0 W/kg



### Impedance Measurement Plot for Head TSL



## ANNEX J: Spot Check Test

As the test lab for PROWLTOUCH/PROWLTOUCHC/VISTAHTCHWLC from Ademco Inc, we, Shenzhen Academy of Information and Communications Technology, declare on our sole responsibility that, according to “Product Equality Declaration” provided by applicant, only the Spot check test should be performed. The test results are as below.

### J.1. Internal Identification of EUT used during the spot check test

| EUT ID* | SN          | HW Version  | SW Version                           | Receipt Date |
|---------|-------------|-------------|--------------------------------------|--------------|
| UT02aa  | HB8SAS00027 | Q1982_MB_V2 | GMTS700_Wireless_<br>01.03.424.00025 | 2024-11-12   |

### J.2. Measurement results

| RF Exposure Conditions | Frequency Band | Channel Number | Frequency (MHz) | Mode/RB | Test Position | Distance | Note            | Figure No. | EUT Measured Power (dBm) | Tune up (dBm) | Duty Cycle % | Duty Cycle Scaling Factor | Measured SAR 1g (W/kg) | Calculated SAR 1g (W/kg) | Measured SAR 10g (W/kg) | Calculated SAR 10g (W/kg) | Power Drift |
|------------------------|----------------|----------------|-----------------|---------|---------------|----------|-----------------|------------|--------------------------|---------------|--------------|---------------------------|------------------------|--------------------------|-------------------------|---------------------------|-------------|
| Body                   | WLAN 2.4GHz    | 1              | 2412.0          | 802.11b | Front         | 0mm      | Original Data   | \          | 15.71                    | 17.00         | 100.00       | 1.00                      | 0.182                  | 0.24                     | 0.080                   | 0.11                      | 0.02        |
| Body                   | WLAN 2.4GHz    | 1              | 2412.0          | 802.11b | Front         | 0mm      | Spot check Data | \          | 15.71                    | 17.00         | 100.00       | 1.00                      | 0.139                  | 0.19                     | 0.064                   | 0.09                      | -0.07       |

### J.3. Graph Results for Spot Check

#### WLAN 2.4GHz Body

Date: 2024-12-10

Electronics: DAE4 Sn1790

Medium: Head 2450MHz

Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.78$  S/m;  $\epsilon_r = 38.406$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Communication System: UID 0, WLAN (0) Frequency: 2412 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (7.87, 7.49, 7.34)

**Front Side Ch.1/Area Scan (71x111x1):** Interpolated grid:  $dx=1.000$  mm,  $dy=1.000$  mm

Maximum value of SAR (interpolated) = 0.261 W/kg

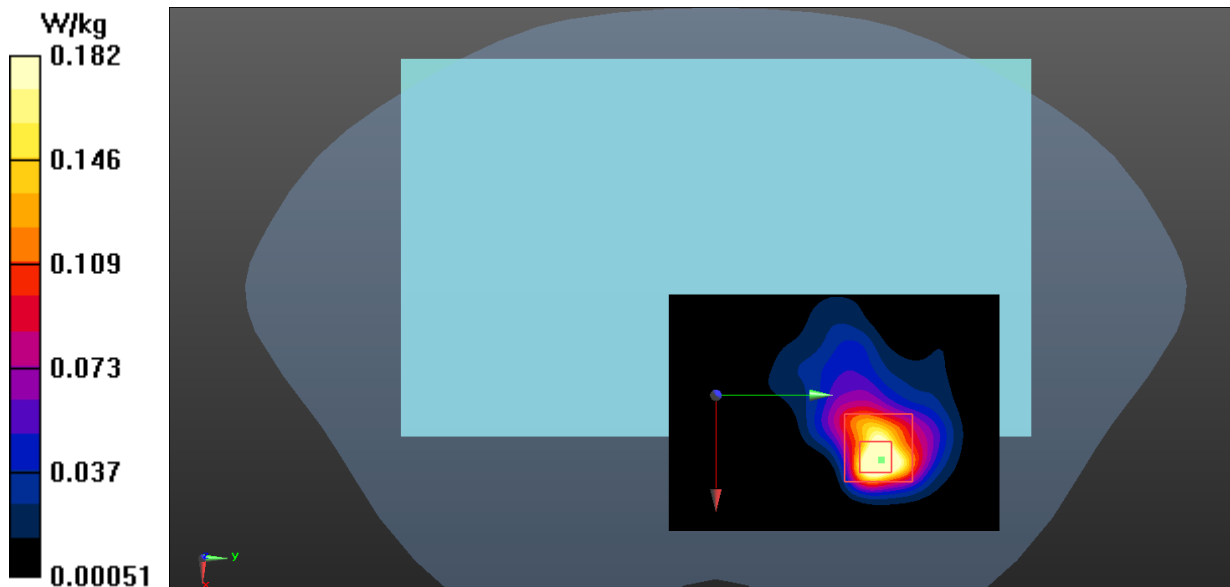
**Front Side Ch.1/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

Reference Value = 1.140 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.306 W/kg

**SAR(1 g) = 0.139 W/kg; SAR(10 g) = 0.064 W/kg**

Maximum value of SAR (measured) = 0.182 W/kg



#### J.4. System Verification Results for Spot Check

##### 2450MHz

Date: 2024-12-10

Electronics: DAE4 Sn1790

Medium: Head 2450MHz

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.824$  S/m;  $\epsilon_r = 38.282$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Communication System: CW Frequency: 2450 MHz Duty Cycle: 1:1

Probe: EX3DV4 - SN7683 ConvF (7.87, 7.49, 7.34)

**System Validation/Area Scan (81x121x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm

Reference Value = 95.356 V/m; Power Drift = 0.05 dB

**SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.13 W/kg**

Maximum value of SAR (interpolated) = 21.6 W/kg

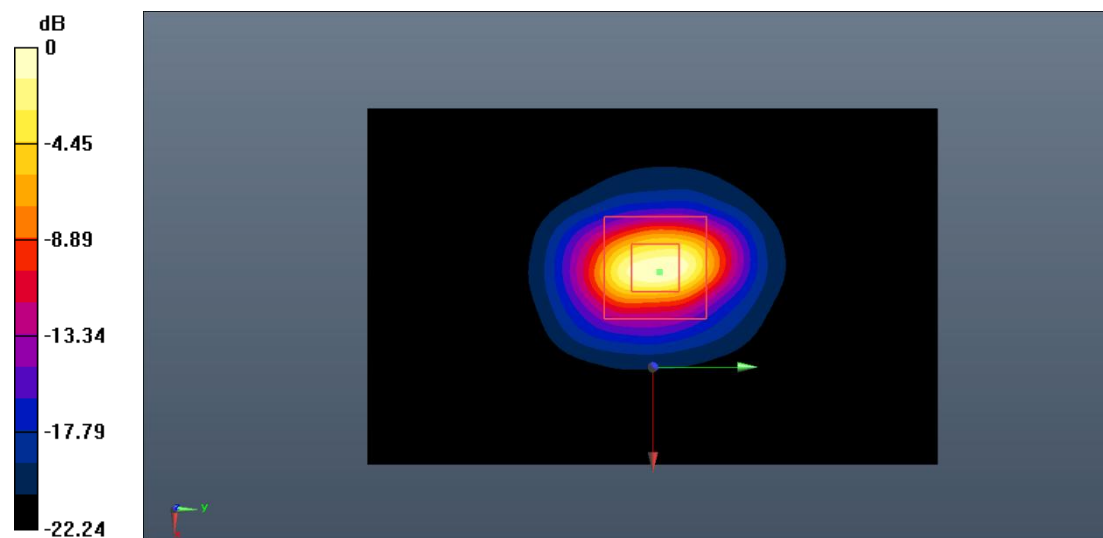
**System Validation/Zoom Scan (7x7x7)/Cube0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.356 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 29.8 W/kg

**SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.26 W/kg**

Maximum value of SAR (measured) = 21.8 W/kg



0 dB = 21.8 W/kg = 13.38 dB W/kg

\*\*\*END OF REPORT\*\*\*