**General Note:** According with FCC KDB 447498 D01, appendix A, <SAR test exclusion thresholds for 100MHz~6GHz and≤50mm＞table, this device SAR test configurations considerations are shown in the table above.

Per KDB 447498 D01, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.

# 12.SAR Test Results Summary

General Note:

1.Per KDB 447498 D01v05r01, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.

*Scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.*

*Reported SAR(W/kg)= Measured SAR(W/kg)* Scaling Factor*

2.Per KDB 447498 D01v05r01, for each exposure position, if the highest output channel reported SAR≤0.8W/kg, other channels SAR testing are not necessary

3.Per KDB 941225 D05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.

4.Per KDB 941225 D05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.

5.Per KDB 941225 D05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

6.Per KDB 941225 D05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05, 16QAM SAR testing is not required.

7.Per KDB 941225 D05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05, smaller bandwidth SAR testing is not required.

8.Per KDB865664 D01, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/Kg; if the deviation among the repeated measurement is ≤20%,and the measured SAR <1.45W/Kg, only one repeated measurement is required.

9.When the user enables the personal Wireless router functions for the handsets, actual operationsinclude simultane ous transmission of both the Wi-Fi transmitting frequency and thus cannot beevaluated for SAR under actual use co nditions. The “Portable Hotspot” feature on the handset was
NOT activated, to ensure the SAR measurements were evaluated for a single transmissionfrequency RF signal.

## 12.1. Body–worn and Hotspot SAR Results

<LTE>

| Plot No. | Band | Mode | Test Position | Gap (mm) | Freq. (MHz) | Average Power (dBm) | Tune-Up Limit (dBm) | Scaling Factor | Power Drift (dB) | Measured $SAR_{1g}$ (W/kg) | Reported $SAR_{1g}$ (W/kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LTE Band 41 | 20MHz/1RB | Front | 5 | 2600 | 21.39 | 21.5 | 1.005 | 0.04 | 0.441 | 0.443 |
| | LTE Band 41 | 20MHz/50RB | Front | 5 | 2600 | 21.39 | 21.5 | 1.005 | -0.06 | 0.336 | 0.338 |
| #1 | LTE Band 41 | 20MHz/1RB | Back | 5 | 2600 | 21.39 | 21.5 | 1.005 | 0.10 | **0.747** | **0.751** |
| | LTE Band 41 | 20MHz/50RB | Back | 5 | 2600 | 21.39 | 21.5 | 1.005 | 0.12 | 0.684 | 0.688 |
| | LTE Band 41 | 20MHz/1RB | Right side | 5 | 2600 | 21.39 | 21.5 | 1.005 | -0.05 | 0.265 | 0.266 |
| | LTE Band 41 | 20MHz/50RB | Right side | 5 | 2600 | 21.39 | 21.5 | 1.005 | 0.06 | 0.201 | 0.202 |
| | LTE Band 41 | 20MHz/1RB | Left Side | 5 | 2600 | 21.39 | 21.5 | 1.005 | 0.08 | 0.226 | 0.227 |
| | LTE Band 41 | 20MHz/50RB | Left Side | 5 | 2600 | 21.39 | 21.5 | 1.005 | 0.12 | 0.197 | 0.198 |
| | LTE Band 41 | 20MHz/1RB | Top Side | 5 | 2600 | 21.39 | 21.5 | 1.005 | 0.15 | 0.179 | 0.180 |
| | LTE Band 41 | 20MHz/50RB | Top Side | 5 | 2600 | 21.39 | 21.5 | 1.005 | 0.03 | 0.156 | 0.157 |

SAR variability requirement

According to KDB 865664 D01v01 section 2.8.1, repeated measurements are required following the procedures as below:

1.Repeated measurement is not required when the original highest measured SAR is < 0.80W/kg; steps 2).through 4) do not apply.

2. When the original highest measured SAR is> 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 > 1.45 W/kg (~10% from the 1-g SAR limit).

4.Perform a third repeated measurement only if the original, first or second repeated measurement is > 1.5 W/kg and the ratio of largest to smallest SAR for the original. first and second repeated measurements is > 1.20.Measured SAR (W/Kg)

Repeated SAR: N/A

Note: 1g-SAR scalar summation<1.6W/kg, so no simultaneous SAR is required.

# 13.Simultaneous Transmission Analysis

## Simultaneous Multi-band Transmission Evaluation:

| Position | Simultaneous state |
|---|---|
| Body | 1. LTE+NFC |

NOTE:

1. For simultaneous transmission at head and body exposure position, 2 transmitters simultaneous transmission was the worst state.
2. Based upon KDB 447498 D01, NFC SAR is excluded as below table.
3. If the test separation distance is <5mm, 5mm is used for excluded SAR calculation.
4. For minimum test separation distance≦50mm,NFC standalone SAR is excluded according to [(max. power of channel, including tune-up tolerance, mW)/ (min. test separation distance, mm) ·[√f (GHz) /x] ≦ 3.0 for 1-g SAR and ≦7.5 for 10-g extremity SAR
5. The reported SAR summation is calculated based on the same configuration and test position.
6. KDB 447498 / 4.3.2 (2) when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion: a) [ (max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f (GHz) /x] W/kg for test separation distances≤ 50 mm; Where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR. b) 0.4W/Kg for 1-g SAR and 1.0W/Kg for 10-g SAR, when the separation distance is >50mm.

| Estimated SAR | | Maximum Power | | Antenna to user(mm) | Frequency(MHz) | Stand alone SAR(1g) [W/kg] |
|---|---|---|---|---|---|---|
| | | dBm | mW | | | |
| NFC | Body | -5 | 0.316 | 5 | 13.56 | 0.001 |

| Simultaneous Mode | Position | Mode | Max. 1-g SAR (W/kg) | 1-g Sum SAR (W/kg) |
|---|---|---|---|---|
| LTE+NFC | Body | LTE | **0.751** | 0.752 |
| | | NFC | 0.001 | |

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

When the sum of SAR 1g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR-1g 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR 1g is greater than the SAR limit (SAR-1g 1.6 W/kg), SAR test exclusion is determined by the SPLSR.

# 14. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a fr equency band is< 1.5 W/Kg, the extensive SAR measurement uncertainty analysis is not required in SAR reports s ubmitted for equipment approval.

# Appendix A. EUT Photos and Test Setup Photos

Front with Phantom 5 mm

Back with Phantom 5 mm

Top with Phantom (5mm)

Left with Phantom (5mm)

Right with Phantom (5mm)

# Appendix B. Plots of SAR System Check

2600MHz Head System Check at Body

**DUT: Dipole 2600 MHz; Type: D2600V2;**

Date:12/06/2021

Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 2600 MHz; σ = 2.19S/m; εr = 53.12; ρ = 1000 kg/m3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 – SN7396; ConvF(7.38, 7.38, 7.38); Calibrated: May,06.2021;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: Sep.06.2021
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.10 (7164)

**Configuration/Pin=250mW/Area Scan (81x81x1):**Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 24.35 W/kg

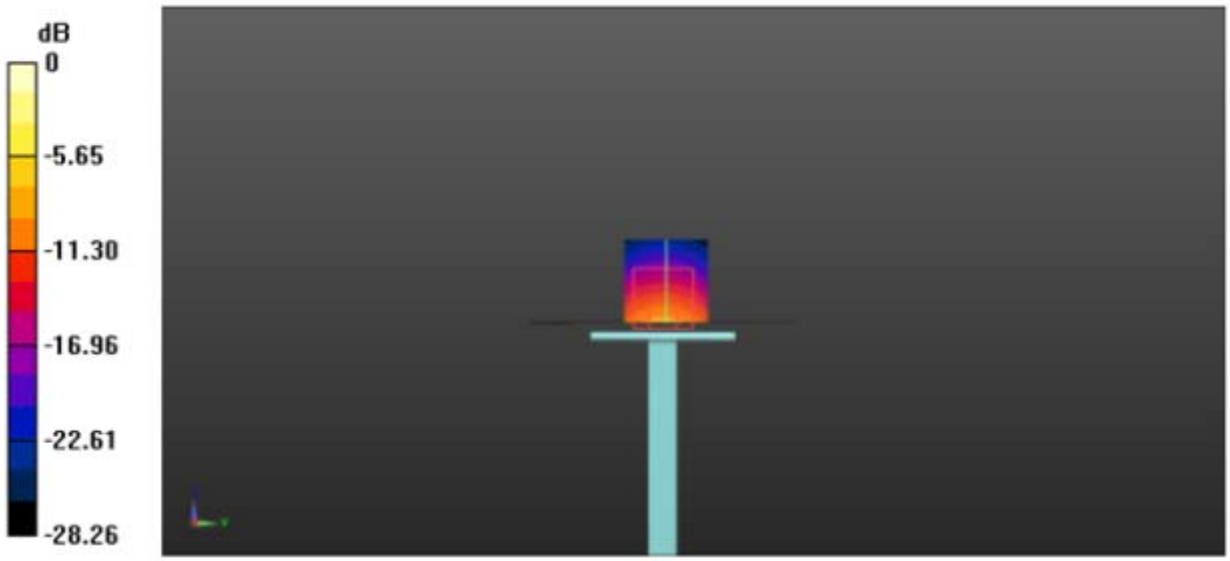
**Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0:**Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 110.741 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 34.59W/kg

**SAR(1 g) = 13.92 W/kg; SAR(10 g) = 6.58 W/kg**

Maximum value of SAR (measured) = 26.74 W/kg



# Appendix C. Plots of SAR Test Data

**#1**

#1 Date: 12/06/2021

**LTE Band41_Body Back**

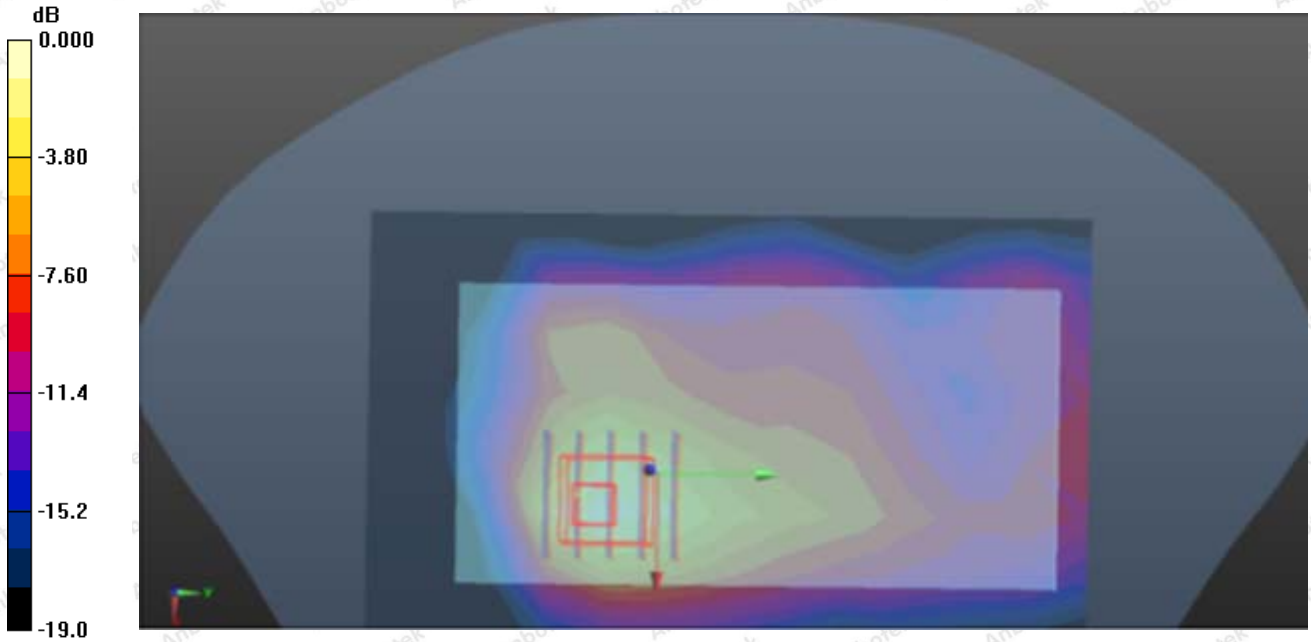
Communication System: UID 0, Generic LTE (0); Frequency: 2570 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 2.19S/m; εr = 53.12; ρ = 1000 kg/m3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 – SN7396; ConvF(9.88, 9.88, 9.88); Calibrated: May,06.2021;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: Sep.06.2021
- Phantom: SAM; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.10 (7164)

**BODY/BACK/Area Scan (9x15x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) =1.216 W/kg

**BODY/BACK/Zoom Scan(5x5x7)/Cube 0:** Measurement grid:dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.471 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.26 W/kg
**SAR(1 g) = 0.747 W/kg; SAR(10 g) = 0.420 W/kg**
Maximum value of SAR (measured) = 0.924 W/kg



# Appendix D. DASY System Calibration Certificate

In Collaboration with
CTTL speag CALIBRATION LABORATORY
ilac-MRA CNAS 中国认可 国际互认 校准 CALIBRATION CNAS L0570
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: cttl@chinattl.com Http://www.chinattl.cn

Client **Anbotek (Auden)** **Certificate No: Z21-98671**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | EX3DV4 - SN:7396 |
| Calibration Procedure(s) | FF-Z12-006-08<br>Calibration Procedures for Dosimetric E-field Probes |
| Calibration date: | May 06 , 2021 |

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&TE critical for calibration)

| Primary Standards | ID # | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power Meter NRP2 | 101919 | 20-Jun-20 (CTTL, No.J20X07447) | Jun-21 |
| Power sensor NRP-Z91 | 101547 | 20-Jun-20 (CTTL, No.J20X07447) | Jun-21 |
| Power sensor NRP-Z91 | 101548 | 20-Jun-20 (CTTL, No.J20X07447) | Jun-21 |
| Reference10dBAttenuator | 18N50W-10dB | 13-Mar-21(CTTL,No.J21X01547) | Mar-22 |
| Reference20dBAttenuator | 18N50W-20dB | 13-Mar-21(CTTL, No.J21X01548) | Mar-22 |
| Reference Probe EX3DV4 | SN 7433 | 26-Sep-20(SPEAG,No.EX3-7433_Sep20) | Sep-21 |
| DAE4 | SN 549 | 13-Dec-20(SPEAG, No.DAE4-549_Dec20) | Dec -21 |
| **Secondary Standards** | **ID #** | **Cal Date(Calibrated by, Certificate No.)** | **Scheduled Calibration** |
| SignalGeneratorMG3700A | 6201052605 | 27-Jun-20 (CTTL, No.J20X04776) | Jun-21 |
| Network Analyzer E5071C | MY46110673 | 13-Jan-21 (CTTL, No.J21X00285) | Jan -22 |

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

Issued: May06 , 2021

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

In Collaboration with
CTTL speag CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: cttl@chinattl.com Http://www.chinattl.cn

**Glossary:**

| | |
|---|---|
| TSL | tissue simulating liquid |
| NORMx,y,z | sensitivity in free space |
| ConvF | sensitivity in TSL / NORMx,y,z |
| DCP | diode compression point |
| CF | crest factor (1/duty_cycle) of the RF signal |
| A,B,C,D | modulation dependent linearization parameters |
| Polarization Φ | Φ rotation around probe axis |
| Polarization θ | θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i θ=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:**

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005

c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010

d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Methods Applied and Interpretation of Parameters:**

- *NORMx,y,z:* Assessed for E-field polarization θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the $E^2$-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,y,z* 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.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). 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.
- *Ax,y,z; Bx,y,z; Cx,y,z;VRx,y,z:*A,B,C 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≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z* 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±50MHz to±100MHz.
- *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 *NORMx* (no uncertainty required).