# SAR TEST REPORT

| | |
|---|---|
| **Applicant** | Mobiwire SAS |
| **FCC ID** | QPN-WANETAPLUS |
| **Product** | 4G Smartphone |
| **Brand** | MobiWire, ALTICE |
| **Model** | MobiWire Waneta+, ALTICE S70 |
| **Report No.** | RXA1707-0218SAR02R2 |
| **Issue Date** | August 1, 2017 |

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **IEEE 1528- 2013, ANSI/ IEEE C95.1-1992.** The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Jiangpeng Lan  Kai Xu

*Performed by: Jiangpeng Lan*  *Approved by: Kai Xu*


**TA Technology (Shanghai) Co., Ltd.**

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# Table of Contents

# 1 Test Laboratory

## 1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.**The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above. This report must not be used by the client to claim product certification, approval, or endorsement by any government agencies.

## 1.2 Test facility

**CNAS (accreditation number:L2264)**

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

**FCC (recognition number is 428261)**

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

**IC (recognition number is 8510A)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

**VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

**A2LA (Certificate Number: 3857.01)**

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

## 1.3 Testing Location


| | |
|---|---|
| Company: | TA Technology (Shanghai) Co., Ltd. |
| Address: | No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China |
| City: | Shanghai |
| Post code: | 201201 |
| Country: | P. R. China |
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| Website: | http://www.ta-shanghai.com |
| E-mail: | xukai@ta-shanghai.com |


## 1.4 Laboratory Environment

| | |
|---|---|
| Temperature | Min. = 18°C, Max. = 25 °C |
| Relative humidity | Min. = 30%, Max. = 70% |
| Ground system resistance | < 0.5 Ω |
| Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards. | |

# 2 Statement of Compliance

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

Table 2.1: Highest Reported SAR

| Mode | Highest Reported SAR (W/kg) | |
|---|---|---|
| | 1g SAR Head | 1g SAR Hotspot (Separation 10mm) |
| Wi-Fi 5G U-NII-1/2A | 0.429 | 0.265 |
| Wi-Fi 5G U-NII-3 | 0.074 | 0.053 |
| Date of Testing: | July 13, 2017 ~ July 27, 2017 | |
| Note: The device is in compliance with SAR for Uncontrolled Environment exposure limits (1.6 W/kg) specified in ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013. | | |

# 3 Description of Equipment under Test

**Client Information**

| | |
|---|---|
| **Applicant** | Mobiwire SAS |
| **Applicant address** | 79 AVENUE FRANCOIS ARAGO 92017 NANTERRE CEDEX France. |
| **Manufacturer** | Mobiwire SAS |
| **Manufacturer address** | 79 AVENUE FRANCOIS ARAGO 92017 NANTERRE CEDEX France. |

**General Technologies**

| | |
|---|---|
| Application Purpose: | Original Grant |
| EUT Stage | Identical Prototype |
| Model: | MobiWire Waneta+, ALTICE S70 |
| IMEI: | 357581080005489 |
| Hardware Version: | V01 |
| Software Version: | WE552_ALTICE_S70 |
| Antenna Type: | Internal Antenna |
| Device Class: | B |
| EUT Accessory | |
| Adapter | Manufacture: AoHai<br>Model : A88-502000 |
| Battery | Manufacturer: NINGBO WEKEN Battery CO,. LTD.<br>Battery Model: 178122246 |
| Earphone | Manufacturer: JuWei<br>Model: JWEP0752-M01 |
| USB cable | Manufacture: JiuJiang Juwei Electronics Co.,Ltd<br>Model : JWBU1344-M01<br>100cm Cable, Shielded |

**Wireless Technology and Frequency Range**

| Wireless Technology | | Modulation | Operating mode | Tx (MHz) |
|---|---|---|---|---|
| Wi-Fi | 5G | OFDM | 802.11a/n 20M/40M | 5150 ~ 5350<br>5725 ~ 5850 |
| | Does this device support MIMO ☐Yes ☒No | | | |
| NFC | 13.56MHz | | | |

# 4 Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE 1528- 2013, ANSI/IEEE C95.1-1992, the following FCC Published RF exposure KDB procedures:

248227 D01 802.11 Wi-Fi SAR v02r02
447498 D01 General RF Exposure Guidance v06
648474 D04 Handset SAR v01r03
865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
865664 D02 RF Exposure Reporting v01r02
941225 D06 Hotspot Mode v02r01

# 5 Operational Conditions during Test

## 5.1 Test Positions

### 5.1.1 Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

The positions used in the measurements were according to IEEE 1528 - 2013 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

### 5.1.2 Body Worn Configuration

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations.

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474 D04, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person’s face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

## 5.2 Measurement Variability

Per FCC KDB Publication 865664 D01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:
1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

## 5.3 Test Configuration

### 5.3.1 Wi-Fi Test Configuration

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.
The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the *initial test position(s)* by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The *initial test position(s)* is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the *reported* SAR for the *initial test position* is:

- ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- 0.4 W/kg, SAR is repeated using the same wireless mode test configuration tested in the *initial test position* to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the *reported* SAR is ≤ 0.8 W/kg or all required test positions are tested.
    - ✧ For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
    - ✧ When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the *initial test position* and subsequent test positions, when the *reported* SAR is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the *reported* SAR is ≤ 1.2 W/kg or all required test channels are considered.
    - ✧ The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.

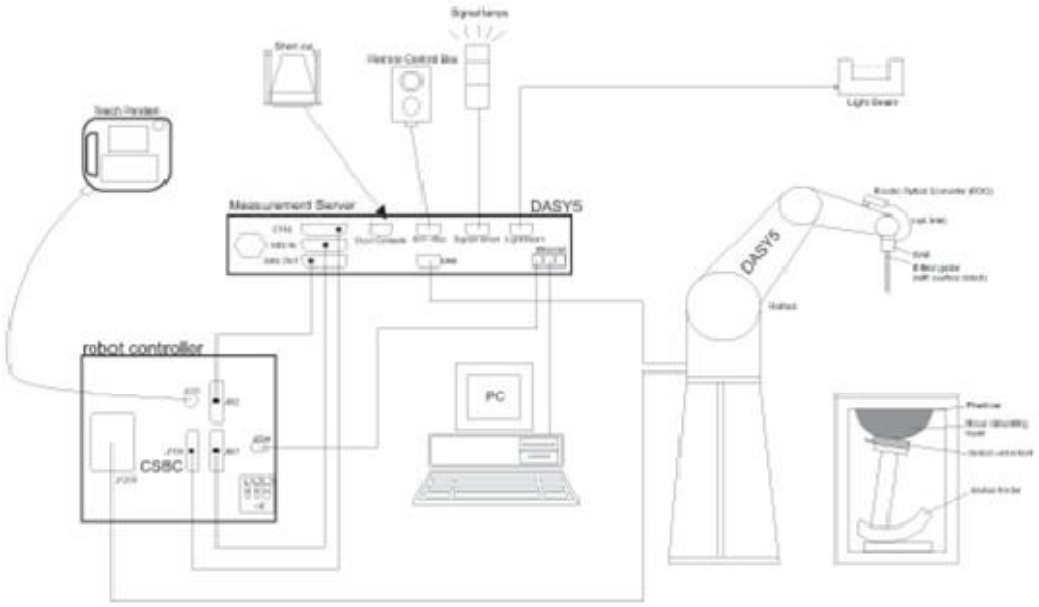
To determine the initial test position, Area Scans were performed to determine the position with the Maximum Value of SAR (measured). The position that produced the highest Maximum Value of SAR is considered the worst case position; thus used as the initial test position.

A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement. This RF signal utilized in SAR measurement has almost 100% duty cycle and its crest factor is 1.

# 6 SAR Measurements System Configuration

## 6.1 SAR Measurement Set-up

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




- A standard high precision 6-axis robot 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 or Win7 and the DASY 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.

## 6.2 DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

**EX3DV4 Probe Specification**

| | |
|---|---|
| Construction | Symmetrical design with triangular core<br>Built-in shielding against static charges<br>PEEK enclosure material (resistant to organic solvents, e.g., DGBE) |
| Calibration | ISO/IEC 17025 calibration service available |
| Frequency | 10 MHz to > 6 GHz<br>Linearity: ± 0.2 dB<br>(30 MHz to 6 GHz) |
| Directivity | ± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis) |
| Dynamic Range | 10 μW/g to > 100 mW/g Linearity: ± 0.2dB (noise: typically < 1 μW/g) |
| Dimensions | Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm)<br>Typical distance from probe tip to dipole centers: 1 mm |
| Application | High precision dosimetric measurements in any exposure Scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%. |

**E-field Probe Calibration**

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a wave guide 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.

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

temperature probe is used in conjunction with the E-field probe.

$$SAR=C\Delta T/\Delta t$$

Where: $\Delta t$ = Exposure time (30 seconds),
$C$ = Heat capacity of tissue (brain or muscle),
$\Delta T$ = Temperature increase due to RF exposure.

Or

$$SAR=|E|^2\sigma/\rho$$

Where: $\sigma$ = Simulated tissue conductivity,
$\rho$ = Tissue density (kg/m$^3$).

## 6.3 SAR Measurement Procedure

**Power Reference Measurement**

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

**Area Scan**

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.
Area scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

<table>
<tr><td></td><td>≤3 GHz</td><td>> 3 GHz</td></tr>
<tr><td>Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td>Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td rowspan="2">Maximum area scan spatial resolution: ΔxArea, ΔyArea</td><td>≤ 2 GHz: ≤ 15 mm<br>2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm<br>4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">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 ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
</table>

**Zoom Scan**

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

Zoom scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

| | | | ≤3GHz | > 3 GHz |
|---|---|---|---|---|
| Maximum zoom scan spatial resolution: $\triangle x_{zoom}$ $\triangle y_{zoom}$ | | | ≤2GHz: ≤8mm<br>2 – 3GHz: ≤5mm* | 3 – 4GHz: ≤5mm*<br>4 – 6GHz: ≤4mm* |
| Maximum zoom scan spatial resolution, normal to phantom surface | Uniform grid: $\triangle z_{zoom}(n)$ | | ≤5mm | 3 – 4GHz: ≤4mm<br>4 – 5GHz: ≤3mm<br>5 – 6GHz: ≤2mm |
| | Graded grid | $\triangle z_{zoom}(1)$: between 1st two points closest to phantom surface | ≤4mm | 3 – 4GHz: ≤3mm<br>4 – 5GHz: ≤2.5mm<br>5 – 6GHz: ≤2mm |
| | | $\triangle z_{zoom}(n>1)$: between subsequent points | ≤1.5•$\triangle z_{zoom}(n-1)$ | |
| Minimum zoom scan volume | X, y, z | | ≥30mm | 3 – 4GHz: ≥28mm<br>4 – 5GHz: ≥25mm<br>5 – 6GHz: ≥22mm |
| Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.<br>* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4W/kg, ≤8mm, ≤7mm and ≤5mm zoom scan resolution may be applied, respectively, for 2GHz to 3GHz, 3GHz to 4GHz and 4GHz to 6GHz. | | | | |

**Volume Scan Procedures**

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

**Power Drift Monitoring**

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

# 7 Main Test Equipment

| Name of Equipment | Manufacturer | Type/Model | Serial Number | Last Cal. | Cal. Due Date |
|---|---|---|---|---|---|
| Network analyzer | Agilent | E5071B | MY42404014 | 2017-05-20 | 2018-05-19 |
| Dielectric Probe Kit | HP | 85070E | US44020115 | 2017-05-20 | 2018-05-19 |
| Power meter | Agilent | E4417A | GB41291714 | 2017-05-21 | 2018-05-20 |
| Power sensor | Agilent | N8481H | MY50350004 | 2017-05-21 | 2018-05-20 |
| Power sensor | Agilent | E9327A | US40441622 | 2017-05-20 | 2018-05-19 |
| Dual directional coupler | Agilent | 778D-012 | 50519 | 2017-05-21 | 2018-05-20 |
| Dual directional coupler | Agilent | 777D | 50146 | 2017-05-20 | 2018-05-19 |
| Amplifier | INDEXSAR | IXA-020 | 0401 | 2017-05-20 | 2018-05-19 |
| Wideband radio communication tester | R&S | CMW 500 | 113645 | 2017-05-20 | 2018-05-19 |
| BT Base Station Simulator | R&S | CBT | 100271 | 2017-05-14 | 2018-05-13 |
| E-field Probe | SPEAG | EX3DV4 | 3677 | 2017-01-23 | 2018-01-22 |
| DAE | SPEAG | DAE4 | 1317 | 2016-08-02 | 2017-08-01 |
| Validation Kit 5GHz | SPEAG | D5GHzV2 | 1151 | 2017-01-05 | 2020-01-04 |
| Temperature Probe | Tianjin jinming | JM222 | AA1009129 | 2017-05-20 | 2018-05-19 |
| Hygrothermograph | Anymetr | NT-311 | 20150731 | 2017-05-17 | 2018-05-16 |

# 8 Tissue Dielectric Parameter Measurements & System Verification

## 8.1 Tissue Verification

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance.

**Target values**

| Frequency (MHz) | | Water (%) | Diethylenglycol monohexylether | Triton X-100 | $\varepsilon_r$ | σ(s/m) |
|---|---|---|---|---|---|---|
| Head | 5250 | 65.53 | 17.24 | 17.23 | 35.9 | 4.71 |
| | 5750 | 65.53 | 17.24 | 17.23 | 35.4 | 5.22 |
| Body | 5250 | 72.52 | 13.74 | 13.74 | 48.9 | 5.36 |
| | 5750 | 72.52 | 13.74 | 13.74 | 48.3 | 5.94 |

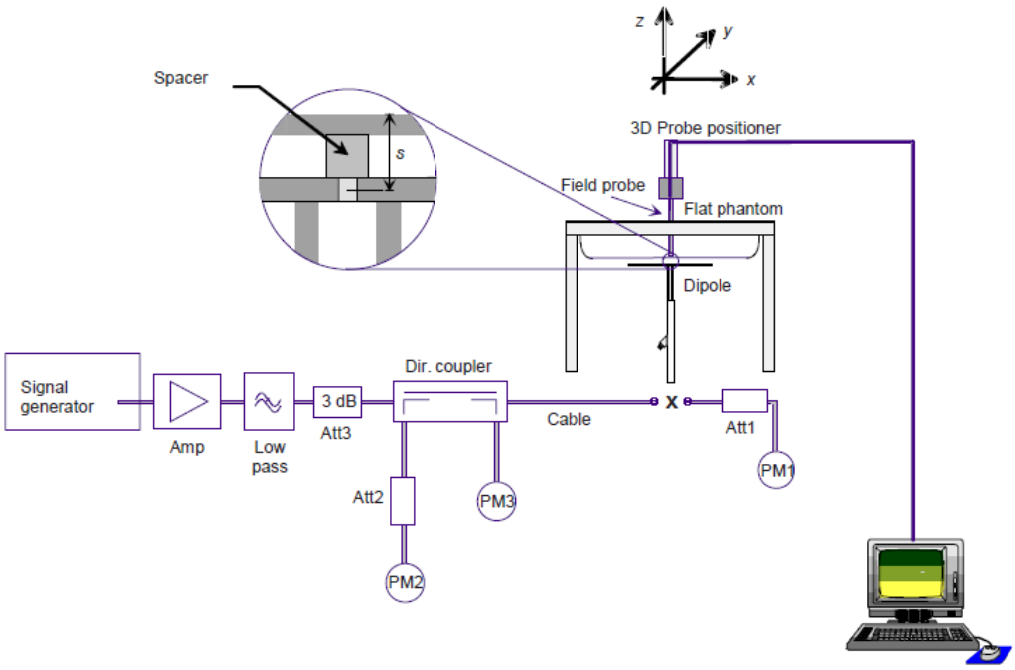
**Measurements results**

| Frequency (MHz) | | Test Date | Temp ℃ | Measured Dielectric Parameters | | Target Dielectric Parameters | | Limit (Within ±5%) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | $\varepsilon_r$ | σ(s/m) | $\varepsilon_r$ | σ(s/m) | Dev $\varepsilon_r$(%) | Dev σ(%) |
| 5250 | Head | 7/13/2017 | 21.5 | 35.96 | 4.75 | 35.9 | 4.71 | 0.17 | 0.85 |
| | Body | 7/13/2017 | 21.5 | 46.71 | 5.42 | 48.9 | 5.36 | -4.48 | 1.12 |
| 5750 | Head | 7/27/2017 | 21.5 | 34.68 | 5.39 | 35.4 | 5.22 | -2.03 | 3.26 |
| | Body | 7/27/2017 | 21.5 | 47.73 | 6.07 | 48.3 | 5.94 | -1.18 | 2.19 |
| Note: The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm for measurements > 3 GHz. | | | | | | | | | |

## 8.2 System Performance Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulates were measured using the dielectric probe kit and the network analyzer. A system check measurement for every day was made following the determination of the dielectric parameters of the Tissue simulates, using the dipole validation kit. The dipole antenna was placed under the flat section of the twin SAM phantom.

System check is performed regularly on all frequency bands where tests are performed with the DASY system.




**Picture 1 System Performance Check setup**

**Picture 2 Setup Photo**

**System Check results**

| Frequency (MHz) | | Test Date | Temp ℃ | 100mW Measured $SAR_{1g}$ (W/kg) | 1W Normalized $SAR_{1g}$ (W/kg) | 1W Target $SAR_{1g}$ (W/kg) | Δ % (Limit ±10%) | Plot No. |
|---|---|---|---|---|---|---|---|---|
| 5250 | Head | 7/13/2017 | 21.5 | 7.87 | 78.7 | 78.40 | 0.38 | 1 |
| | Body | 7/13/2017 | 21.5 | 7.46 | 74.6 | 75.60 | -1.32 | 2 |
| 5750 | Head | 7/27/2017 | 21.5 | 7.65 | 76.5 | 80.5 | -4.97 | 3 |
| | Body | 7/27/2017 | 21.5 | 7.17 | 71.7 | 74.6 | -3.89 | 4 |
| Note：Target Values used derive from the calibration certificate Data Storage and Evaluation. | | | | | | | | |

# 9 Normal and Maximum Output Power

KDB 447498 D01 at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit.

## 9.1 WLAN Mode

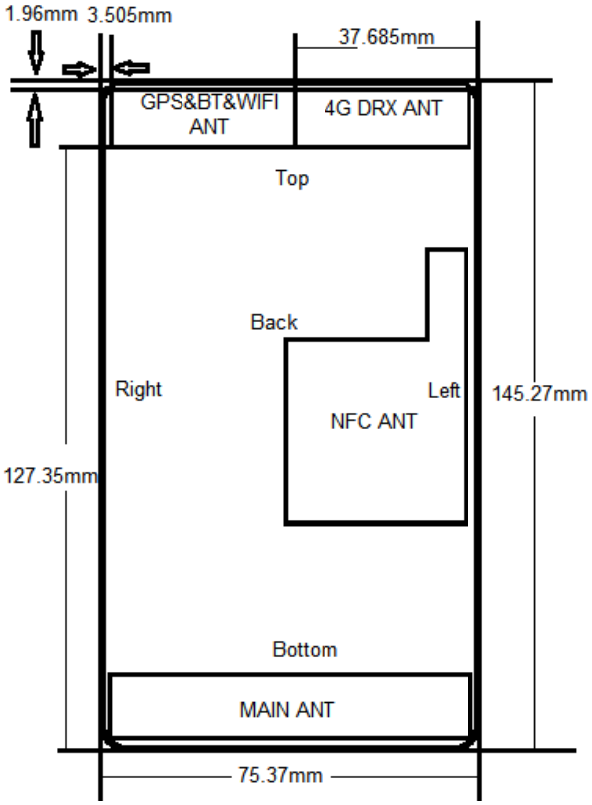
| Mode | Channel | Frequency (MHz) | Average Conducted Power (dBm) | Tune-up Limit (dBm) | TX Power |
|---|---|---|---|---|---|
| | | | Data Rate (bps) | | |
| | | | 6M | | |
| 802.11a (5GHz) | 36 | 5180 | 15.85 | 16.50 | 17 |
| | 40 | 5200 | 15.60 | 16.50 | 17 |
| | 44 | 5220 | 15.60 | 16.50 | 17 |
| | 48 | 5240 | 15.70 | 16.50 | 17 |
| | 52 | 5260 | 15.45 | 16.50 | 17 |
| | 56 | 5280 | 15.47 | 16.50 | 17 |
| | 60 | 5300 | 15.34 | 16.50 | 17 |
| | 64 | 5320 | 15.54 | 16.50 | 17 |
| | 149 | 5745 | 12.98 | 13.50 | 15 |
| | 157 | 5785 | 12.03 | 13.50 | 15 |
| | 165 | 5825 | 9.60 | 11.50 | 13 |
| Mode | Channel | Frequency (MHz) | Data Rate (bps) | Tune-up Limit (dBm) | |
| | | | MCS0 | | |
| 802.11n HT20 (5GHz) | 36 | 5180 | 16.27 | 16.50 | 17 |
| | 40 | 5200 | 15.58 | 16.50 | 17 |
| | 44 | 5220 | 15.76 | 16.50 | 17 |
| | 48 | 5240 | 15.98 | 16.50 | 17 |
| | 52 | 5260 | 15.39 | 16.50 | 17 |
| | 56 | 5280 | 15.52 | 16.50 | 17 |
| | 60 | 5300 | 15.63 | 16.50 | 17 |
| | 64 | 5320 | 15.59 | 16.50 | 17 |
| | 149 | 5745 | 10.83 | 12.50 | 14 |
| | 157 | 5785 | 11.74 | 12.50 | 15 |
| | 165 | 5825 | 10.64 | 12.50 | 14 |
| Mode | Channel | Frequency (MHz) | Data Rate (bps) | Tune-up Limit (dBm) | |
| | | | MCS0 | | |
| 802.11n HT40 (5GHz) | 38 | 5190 | 16.48 | 17.00 | 17 |
| | 46 | 5230 | 15.97 | 17.00 | 17 |
| | 54 | 5270 | 15.63 | 17.00 | 17 |
| | 62 | 5310 | 16.39 | 17.00 | 17 |

| | | | | | |
|---|---|---|---|---|---|
| | 151 | 5755 | 12.98 | 13.50 | 15 |
| | 159 | 5795 | 11.78 | 13.50 | 15 |

Note. 1. Per KDB 248227 D01 802 11 Wi-Fi SAR v02r02, for OFDM transmission configurations in the 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/n mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
2. When the adjusted SAR is $\leqslant$ 1.2 W/kg, SAR is not required for the other band/ configuration; Otherwise, each band/ configuration is tested independently for SAR.

# 10 Measured and Reported (Scaled) SAR Results

## 10.1 EUT Antenna Locations




| Overall (Length x Width): 145.27 mm x 75.37 mm<br>Overall Diagonal: 165.5 mm/Display Diagonal: 140mm | | | | | | |
|---|---|---|---|---|---|---|
| Distance of the Antenna to the EUT surface/edge | | | | | | |
| Antenna | Back Side | Front side | Left Edge | Right Edge | Top Edge | Bottom Edge |
| Wi-Fi Antenna | 0 | 0 | 37.685 | 3.505 | 1.96 | 127.35 |
| Hotspot mode, Positions for SAR tests | | | | | | |
| Mode | Back Side | Front side | Left Edge | Right Edge | Top Edge | Bottom Edge |
| Wi-Fi Antenna | Yes | Yes | N/A | Yes | Yes | N/A |
| Note: 1. Per KDB 941225 D06, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge. | | | | | | |

## 10.2 Measured SAR Results

**Table1: Wi-Fi (5G, U-NII-2A, 802.11n (40M))**

| Test Position | Cover Type | Channel/ Frequency (MHz) | Mode | Duty Cycle | Area Scan Max.SAR (W/Kg) | Tune-up limit (dBm) | Conducted Power (dBm) | Drift (dB) | Measured $SAR_{1g}$ (W/kg) | Scaling Factor | Reported $SAR_{1g}$ (W/kg) | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Head SAR** | | | | | | | | | | | | |
| Left Cheek | standard | 62/5310 | OFDM | 1:1 | 0.293 | 17.00 | 16.39 | 0.040 | 0.315 | 1.15 | 0.363 | / |
| Left Tilt | standard | 62/5310 | OFDM | 1:1 | 0.271 | 17.00 | 16.39 | 0.161 | 0.373 | 1.15 | 0.429 | 5 |
| Right Cheek | standard | 62/5310 | OFDM | 1:1 | 0.232 | 17.00 | 16.39 | 0.168 | 0.223 | 1.15 | 0.257 | / |
| Right Tilt | standard | 62/5310 | OFDM | 1:1 | 0.182 | 17.00 | 16.39 | 0.095 | 0.225 | 1.15 | 0.259 | / |
| **Body-worn (Distance 10mm)** | | | | | | | | | | | | |
| Back Side | standard | 62/5310 | OFDM | 1:1 | 0.224 | 17.00 | 16.39 | 0.026 | 0.230 | 1.15 | 0.265 | 6 |
| Front Side | standard | 62/5310 | OFDM | 1:1 | 0.0748 | 17.00 | 16.39 | 0.127 | 0.071 | 1.15 | 0.081 | / |
| Left Edge | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | / |
| Right Edge | standard | 62/5310 | OFDM | 1:1 | 0.183 | 17.00 | 16.39 | 0.039 | 0.145 | 1.15 | 0.167 | / |
| Top Edge | standard | 62/5310 | OFDM | 1:1 | 0.194 | 17.00 | 16.39 | 0.027 | 0.165 | 1.15 | 0.190 | / |
| Bottom Edge | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | / |

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. According to 648474 D04 Handset SAR v01r03，For Phablet, Since hotspot mode 1-g *reported* SAR < 1.2 W/kg, 10-g extremity SAR is no required.

3. Per KDB 248227 D01v02r02, U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band.

**Table 2: Wi-Fi (5G, U-NII-3, 802.11n (40M))**

| Test Position | Cover Type | Channel/ Frequency (MHz) | Mode | Duty Cycle | Area Scan Max.SAR (W/Kg) | Tune-up limit (dBm) | Conducted Power (dBm) | Drift (dB) | Measured $SAR_{1g}$ (W/kg) | Scaling Factor | Reported $SAR_{1g}$ (W/kg) | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Head SAR** | | | | | | | | | | | | |
| Left Cheek | standard | 151/5755 | OFDM | 1:1 | 0.0512 | 13.50 | 12.98 | 0.100 | 0.065 | 1.13 | 0.074 | 7 |
| Left Tilt | standard | 151/5755 | OFDM | 1:1 | 0.0443 | 13.50 | 12.98 | 0.090 | 0.060 | 1.13 | 0.068 | / |
| Right Cheek | standard | 151/5755 | OFDM | 1:1 | 0.0149 | 13.50 | 12.98 | 0.064 | 0.052 | 1.13 | 0.059 | / |
| Right Tilt | standard | 151/5755 | OFDM | 1:1 | 0.0287 | 13.50 | 12.98 | 0.121 | 0.044 | 1.13 | 0.050 | / |
| **Hotspot (Distance 10mm)** | | | | | | | | | | | | |
| Back Side | standard | 151/5755 | OFDM | 1:1 | 0.0312 | 13.50 | 12.98 | -0.093 | 0.040 | 1.13 | 0.045 | / |
| Front Side | standard | 151/5755 | OFDM | 1:1 | 0.0199 | 13.50 | 12.98 | -0.090 | 0.017 | 1.13 | 0.019 | / |
| Left Edge | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Right Edge | standard | 151/5755 | OFDM | 1:1 | 0.0312 | 13.50 | 12.98 | 0.100 | 0.043 | 1.13 | 0.048 | / |
| Top Edge | standard | 151/5755 | OFDM | 1:1 | 0.0861 | 13.50 | 12.98 | -0.131 | 0.047 | 1.13 | 0.053 | 8 |
| Bottom Edge | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. According to 648474 D04 Handset SAR v01r03，For Phablet, Since hotspot mode 1-g *reported* SAR < 1.2 W/kg, 10-g extremity SAR is no required.