# TEST REPORT

Dt&C

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Tel : 031-321-2664, Fax : 031-321-1664

1. Report No : DRRFCC2001-0006

2. Customer

   • Name : LG Electronics USA, Inc.

   • Address : 1000 Sylvan Ave. Englewood Cliffs, New Jersey, United States 07632

3. Use of Report : FCC Original Grant

4. Product Name / Model Name : Mobile Phone / LM-V601V

   FCC ID : ZNFV601V

5. Test Method Used : IEEE 1528-2013, FCC SAR KDB Publications (Details in test report)

   Test Specification : CFR 47 Part 2 subpart 2.1093

6. Date of Test : 2020.01.15 ~ 2020.01.31

7. Testing Environment : Refer to appended test report.

8. Test Result : Refer to attached test report.

| Affirmation | Tested by<br>Name : BumJun Park (Signature) | Reviewed by<br>Name : HakMin Kim (Signature) |
|---|---|---|



**2020 . 02 . 03 .**

**DT&C Co., Ltd.**

**If this report is required to confirmation of authenticity, please contact to report@dtnc.net**

# Test Report Version

| Test Report No. | Date | Description | Tested By | Reviewed by |
|---|---|---|---|---|
| DRRFCC2001-0006 | Feb. 3, 2020 | Initial issue | BumJun Park | HakMin Kim |
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# 1. DESCRIPTION OF DEVICE

## 1.1 General Information

| | |
|---|---|
| EUT type | Mobile Phone |
| FCC ID | ZNFV601V |
| Equipment model name | LM-V601V |
| Equipment add model name | N/A |
| Equipment serial no. | Identical prototype |
| Mode(s) of Operation | 2.4 G W-LAN (802.11b/g/n/ac), 5 G W-LAN (802.11a/n/ac), Bluetooth |

| | Band | Mode | Operating Modes | Bandwidth | Frequency |
|---|---|---|---|---|---|
| TX Frequency Range | 2.4 GHz W-LAN | 802.11b/g/n/ac | Voice/Data | 20MHz | 2412 ~ 2462 MHz |
| | 5.2 GHz W-LAN | 802.11a/n/ac | Voice/Data | 20MHz | 5180 ~ 5240 MHz |
| | | 802.11n/ac | Voice/Data | 40MHz | 5190 ~ 5230 MHz |
| | | 802.11ac | Voice/Data | 80MHz | 5210 MHz |
| | 5.3 GHz W-LAN | 802.11a/n/ac | Voice/Data | 20MHz | 5260 ~ 5320 MHz |
| | | 802.11n/ac | Voice/Data | 40MHz | 5270 ~ 5310 MHz |
| | | 802.11ac | Voice/Data | 80MHz | 5290 MHz |
| | 5.6 GHz W-LAN | 802.11a/n/ac | Voice/Data | 20MHz | 5500 ~ 5720 MHz |
| | | 802.11n/ac | Voice/Data | 40MHz | 5510 ~ 5710 MHz |
| | | 802.11ac | Voice/Data | 80MHz | 5530 ~ 5690 MHz |
| | 5.8 GHz W-LAN | 802.11a/n/ac | Voice/Data | 20MHz | 5745 ~ 5825 MHz |
| | | 802.11n/ac | Voice/Data | 40MHz | 5755 ~ 5795 MHz |
| | | 802.11ac | Voice/Data | 80MHz | 5775 MHz |
| | Bluetooth | - | Data | - | 2402 ~ 2480 MHz |
| RX Frequency Range | 2.4 GHz W-LAN | 802.11b/g/n/ac | Voice/Data | 20MHz | 2412 ~ 2462 MHz |
| | 5.2 GHz W-LAN | 802.11a/n/ac | Voice/Data | 20MHz | 5180 ~ 5240 MHz |
| | | 802.11n/ac | Voice/Data | 40MHz | 5190 ~ 5230 MHz |
| | | 802.11ac | Voice/Data | 80MHz | 5210 MHz |
| | 5.3 GHz W-LAN | 802.11a/n/ac | Voice/Data | 20MHz | 5260 ~ 5320 MHz |
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| | | 802.11ac | Voice/Data | 80MHz | 5530 ~ 5690 MHz |
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| | | 802.11n/ac | Voice/Data | 40MHz | 5755 ~ 5795 MHz |
| | | 802.11ac | Voice/Data | 80MHz | 5775 MHz |
| | Bluetooth | - | Data | - | 2402 ~ 2480 MHz |

| Equipment Class | Band | Reported SAR | | |
|---|---|---|---|---|
| | | 1g SAR (W/kg) | | 10g SAR (W/kg) |
| | | Head | Body-Worn | Phablet |
| DTS | 2.4 GHz W-LAN | **0.79** | 0.13 | 0.53 |
| U-NII-1 | 5.2 GHz W-LAN | - | - | - |
| U-NII-2A | 5.3 GHz W-LAN | 0.29 | 0.23 | 0.75 |
| U-NII-2C | 5.6 GHz W-LAN | 0.21 | **0.23** | **0.83** |
| U-NII-3 | 5.8 GHz W-LAN | 0.23 | 0.14 | 0.44 |
| DSS | Bluetooth | 0.27 | < 0.1 | 0.25 |
| Simultaneous SAR per KDB 690783 D01v01r03 | | **0.56** | **0.26** | **0.93** |

| | |
|---|---|
| FCC Equipment Class | Part 15 Spread Spectrum Transmitter(DSS)<br>Digital Transmission System(DTS)<br>Unlicensed National Information Infrastructure (UNII) |
| Date(s) of Tests | 2020.01.15 ~ 2020.01.31 |
| Antenna Type | Internal Antenna |
| Functions | ● VoIP is supported. |

## 1.2 Power Reduction for SAR

There is no power reduction used for any band/mode implemented in this device for SAR purposes.

## 1.3 Nominal and Maximum Output Power Specifications

The Nominal and Maximum Output Power Specifications are in section 8 of this test report.

## 1.4 DUT Antenna Locations

The overall dimensions of this device are > 9 x 5 cm. A diagram showing the location of the device of the device antenna can be found in ZNFV601V_Antenna Location. Since the diagonal dimension of this device is > 160 mm and < 200 mm. it is considered a "phablet".

| Mode | Device Sides for SAR Testing | | | | | |
|---|---|---|---|---|---|---|
| | Top | Bottom | Front | Rear | Right | Left |
| 2.4G W-LAN | O | X | O | O | X | O |
| 5G W-LAN | O | X | O | O | X | O |
| Bluetooth | O | X | O | O | X | O |

Note(s):

1. Particular DUT edges were not required to be evaluated for Phablet SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 648474 D04v01r03.The antenna document shows the distances between the transmit antennas and the edges of the device.
2. O - Test / X - Not test.

## 1.5 Simultaneous Transmission Capabilities

The Simultaneous Transmission Capabilities are in section 11 of this test report.

## 1.6 Miscellaneous SAR Test Considerations

**BT**

Per FCC KDB 447498 D01v06, the 1g SAR exclusion threshold for distances < 50 mm is defined by the following equation:

$$\frac{Max\ Power\ of\ Channel\ (mW)}{Test\ Separation\ Dist\ (mm)} * \sqrt{Frequency(GHz)} \leq 3.0$$

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, body-worn **Bluetooth SAR was not required; [(14/10)*√2.480] = 2.1 (< 3.0)**. Per KDB Publication 447498 D01 v06, the maximum power of the channel was rounded to the nearest mW before calculation.

Per FCC KDB 447498 D01v06, the 10g SAR exclusion threshold for distance < 50 mm is defined by the following equation:

$$\frac{Max\ Power\ of\ Channel\ (mW)}{Test\ Separation\ Dist\ (mm)} * \sqrt{Frequency(GHz)} \leq 7.5$$

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, phablet **Bluetooth SAR was not required; [(14/5)*√2.480] = 4.3 (< 7.5)**. Per KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.

## 1.7 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 248227 D01v02r02 (802.11 Wi-Fi SAR)
- FCC KDB Publication 447498 D01v06 (General RF Exposure Guidance)
- FCC KDB Publication 648474 D04v01r03 (Handset SAR)
- FCC KDB Publication 690783 D01v01r03 (SAR Listings on Grants)
- FCC KDB Publication 865664 D01v01r04 (SAR Measurement 100 MHz to 6 GHz)
- FCC KDB Publication 865664 D02v01r02 (RF Exposure Reporting)
- April 2015 TCB Workshop Notes (Simultaneous transmission summation clarified)
- October 2016 TCB Workshop Notes (Bluetooth Duty Factor)
- FCC KDB Inquiry (Tracking No. 372568)

## 1.8 Device Serial Numbers

The serial numbers used for each test are indicated alongside the results in Section 10.

# 2. INTROCUCTION

The FCC and Industry Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices.

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring SAR due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields," NCRP Report No. 86 NCRP, 1986, Bethesda, MD 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

## SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density ($\rho$) It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Fig. 3.1)

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

Fig. 2.1 SAR Mathematical Equation

**SAR is expressed in units of Watts per Kilogram (W/kg).**

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

where:

$\sigma$ = conductivity of the tissue-simulating material (S/m)

$\rho$ = mass density of the tissue-simulating material ($kg/m^3$)

E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

# 3. DOSIMETRIC ASSESSMENT

## 3.1 Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013:

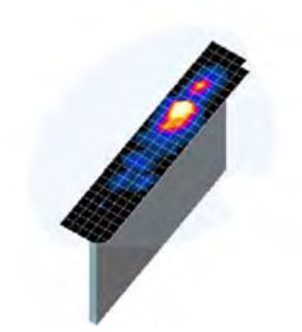

**Figure 3.1**
**Sample SAR Area Scan**

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 3.1) and IEEE1528-2013.

2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.

3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4.1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):

   a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4.1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).

   b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.

   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 mm ± 1 mm</td><td>$\frac{1}{2} \cdot \delta \cdot \ln(2)$ mm ± 0.5 mm</td></tr>
<tr><td colspan="3">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 colspan="3" rowspan="2">Maximum area scan spatial resolution: $\Delta x_{Area}$, $\Delta y_{Area}$</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>
<tr><td colspan="3">Maximum zoom scan spatial resolution: $\Delta x_{Zoom}$, $\Delta y_{Zoom}$</td><td>≤ 2 GHz: ≤ 8 mm<br>2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*<br>4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm<br>4 – 5 GHz: ≤ 3 mm<br>5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm<br>4 – 5 GHz: ≤ 2.5 mm<br>5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ $1.5 \cdot \Delta z_{Zoom}(n-1)$ mm</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm<br>4 – 5 GHz: ≥ 25 mm<br>5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.<br>* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB Publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

**Table 3.1 Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04***

# 4. DEFINITION OF REFERENCE POINTS

## 4.1 Ear Reference Point

Figure 5.1 shows the front, back and side views of the SAM Twin Phantom. The point"M" is the reference point for the center of the mouth, "LE" is the left ear reference point(ERP), and "RE" is the right ERP. The ERPs are 15 mm posterior to the entrance to the Ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 4.1. The plane Passing, through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck- Front) is perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Figure 4.1). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning.

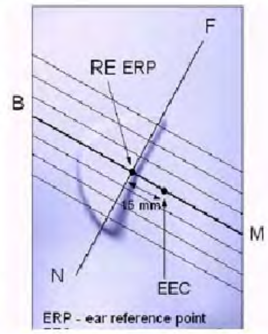


**Figure 4.1 Close-up side view of ERP**

## 4.2 Handset Reference Points

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point" (See Fig. 4.3). The "test device reference point" was than located at the same level as the center of the ear reference point. The test device was positioned so that the "vertical centerline" was bisecting the front surface of the handset at it's top and bottom edges, positioning the "ear reference point" on the outer surface of the both the left and right head phantoms on the ear reference point.


**Figure 4.2 Front, back and side view SAM Twin Phantom**

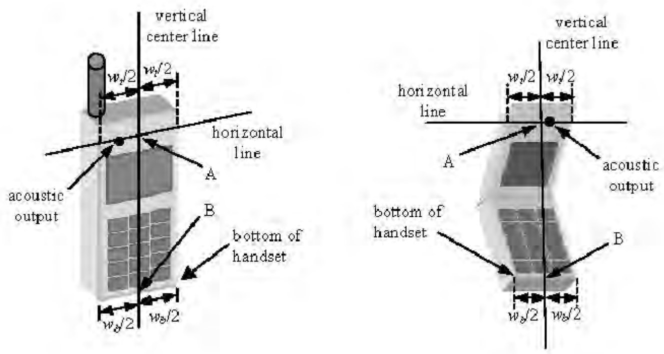


**Figure 4.3 Handset Vertical Center & Horizontal Line Reference Points**

# 5. TEST CONFIGURATION POSITIONS FOR HANDSETS

## 5.1 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02.

## 5.2 Positioning for Cheek/Touch

1. The test device was positioned with the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 5.1), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom.


**Figure 5.1 Front, Side and Top View of Cheek/Touch Position**

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the ear.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the plane normal to MB-NF including the line MB (reference plane).
4. The phone was hen rotated around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, the handset was rotated about the line NF until any point on the handset made contact with a phantom point below the ear (cheek). (See Figure 5.2)

## 5.3 Positioning for Ear / 15 ° Tilt

With the test device aligned in the “Cheek/Touch Position”:

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15 degree.
2. The phone was then rotated around the horizontal line by 15 degree.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the phone touches the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. The tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 5.3).

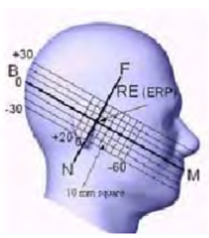


**Figure 5.2 Side view w/relevant markings**


**Figure 5.3 Front, Side and Top View of Ear/15° Position**

## 5.4 Body-Worn Accessory Configurations

**Figure 5.4 Sample Body-Worn Diagram**

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 (see Figure 5.4). Per FCC KDB Publication 648474 D04v01r03, 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 D01v06 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.

## 5.5 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user’s body, SAR compliance for the body is also required. The 1-g body and 10-g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D01v06 should be applied to determine SAR test requirements.

Per KDB Publication 447498 D01v06, Cell phones (handsets) are not normally designed to be used on extremities or operated in extremity only exposure conditions. The maximum output power levels of handsets generally do not require extremity SAR testing to show compliance. Therefore, extremity SAR was not evaluated for this device.

## 5.6 Phablet Configurations

For smart phones with a display diagonal > 150 mm or an overall diagonal dimension > 160 mm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the phablets procedures outlined in KDB Publication 648474 D04v01r03 should be applied to evaluate SAR compliance. A device marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. In addition to the normally required head and body-worn accessory SAR test procedures required for handsets, the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna ≤ 25mm from that surface or edge, in direct contact with the phantom, for 10g SAR. The UMPC mini-tablet 1g SAR at 5 mm is not required. When hotspot mode applies, 10g SAR is required only for the surfaces and edges with hotspot mode 1g SAR > 1.2 W/kg.

# 6. RF EXPOSURE LIMITS

**Uncontrolled Environment:**

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

**Controlled Environment:**

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

**Table 6.1.SAR Human Exposure Specified in ANSI/IEEE C95.1-1992**

| | HUMAN EXPOSURE LIMITS | |
|---|---|---|
| | General Public Exposure (W/kg) or (mW/g) | Occupational Exposure (W/kg) or (mW/g) |
| SPATIAL PEAK SAR * (Brain) | 1.60 | 8.00 |
| SPATIAL AVERAGE SAR ** (Whole Body) | 0.08 | 0.40 |
| SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist) | 4.00 | 20.0 |

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e.as a result of employment or occupation).

# 7. FCC MEASUREMENT PROCEDURES

Power measurements were performed using a base station simulator under digital average power.

## 7.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v06, When SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as reported SAR. The highest reported SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

## 7.2 SAR Testing with 802.11 Transmitters

The normal network operating configurations are not suitable for measuring the SAR of 802.11 b/g/n transmitters. 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 the results are consistent and reliable. See KDB Publication 248227D01v02r02 for more details.

### 7.2.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in 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.

A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the in the transmission, a maximum transmission duty factor of 92-96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

### 7.2.2 U-NII and U-NII-2A

For devices that operate in only one of the U-NII-1 and U-NII-2A bands, the normally required SAR procedures for OFDM configurations are applied. For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following, with respect to the highest reported SAR and maximum output power specified for production units. The procedures are applied independently to each exposure configuration; for example, head, body, hotspot mode etc.

1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.
2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

### 7.2.3 U-NII-2C and U-NII-3

The frequency range covered by U-NII-2C and U-NII-3 is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements.
When Terminal Doppler Weather Rader (TDWR) restriction applies, the channels at 5.60 – 5.65 GHz in U-NII-2C band must be disabled with acceptable mechanisms and documented in the equipment certification.
Unless band gap channels are permanently disabled, SAR must be considered for these channels. When band gap channels are disabled, each band is tested independently according to the normally required OFDM SAR measurements and probe calibration frequency points requirements.

### 7.2.4 Initial Test Position Procedure

For exposure conditions with multiple test positions, such as handset operating next to the ear, devices with hotspot mode or UMPC mini-tablet, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all position in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR position until the reported SAR result is ≤ 0.8 W/kg or all test position are measured.

### 7.2.5 2.4 GHz SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
2) When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed.

### 7.2.6 OFDM Transmission Mode and SAR Test Channel Selection

For the 2.4 GHz and 5 GHz bands, when the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n and 802.11 ac or 802.11g, 802.11n and 802.11ac with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11a then 802.11n and 802.11ac or 802.11g then 802.11n and 802.11ac is used for SAR measurement. When the maximum output power ware the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

### 7.2.7 Initial Test Configuration Procedure

For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, and lowest data rate. The channel of the transmission mode with the highest average RF output conducted power will be the initial test configuration.

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required.
Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2 W/kg or all channels are measured.

### 7.2.8 Subsequent Test Configuration Procedures

For OFDM configurations, in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure, when applicable. When the highest reported SAR for the initial test configuration, adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power is ≤ 1.2 W/kg, no additional SAR testing for the subsequent test configurations is required.

# 8. RF CONDUCTED POWERS

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v06.

## 8.1 WLAN Nominal and Maximum Output Power Spec and Conducted Powers

| Band (GHz) | Mode | Ch | Modulated Average[dBm] | |
|---|---|---|---|---|
| | | | Maximum | Nominal |
| 2.4 | 802.11b | 1~2 | 15.0 | 14.0 |
| | | 3~9 | 15.0 | 14.0 |
| | | 10~11 | 15.0 | 14.0 |
| | 802.11g | 1~2 | 15.0 | 14.0 |
| | | 3~9 | 15.0 | 14.0 |
| | | 10~11 | 15.0 | 14.0 |
| | 802.11n | 1~2 | 14.0 | 13.0 |
| | | 3~9 | 14.0 | 13.0 |
| | | 10~11 | 14.0 | 13.0 |
| | 802.11ac | 1~2 | 14.0 | 13.0 |
| | | 3~9 | 14.0 | 13.0 |
| | | 10~11 | 14.0 | 13.0 |

Table 8.1.1 Nominal and Maximum Output Power Spec

| Mode | Freq. (MHz) | Channel | IEEE 802.11 (2.4 GHz) Conducted Power[dBm] |
|---|---|---|---|
| 802.11b | 2412 | 1 | 14.12 |
| | **2437** | **6** | 14.33 |
| | 2462 | 11 | 14.29 |
| 802.11g | 2412 | 1 | 13.86 |
| | 2437 | 6 | 14.21 |
| | 2462 | 11 | 13.98 |
| 802.11n (HT-20) | 2412 | 1 | 12.64 |
| | 2437 | 6 | 12.91 |
| | 2462 | 11 | 12.84 |
| 802.11ac (VHT-20) | 2412 | 1 | 12.63 |
| | 2437 | 6 | 12.90 |
| | 2462 | 11 | 12.84 |

Table 8.1.2 IEEE 802.11 Average RF Power

| Band (GHz) | Mode | Ch | Modulated Average[dBm] | |
|---|---|---|---|---|
| | | | Maximum | Nominal |
| 5 (UNII) | 802.11a | 36-165 | 15.0 | 14.0 |
| | 802.11n/ac (20MHz) | 36-165 | 15.0 | 14.0 |
| | 802.11n/ac (40MHz) | 38, 62, 102 | 11.5 | 10.5 |
| | | 46-54, 110-159 | 13.0 | 12.0 |
| | 802.11ac (80MHz) | 42-58 | 11.5 | 10.5 |
| | | 106-155 | 13.0 | 12.0 |

Table 8.1.3 Nominal and Maximum Output Power Spec

| Mode | Freq. (MHz) | Channel | IEEE 802.11a (5 GHz) Conducted Power[dBm] |
|---|---|---|---|
| 802.11a | 5180 | 36 | 14.97 |
| | 5200 | 40 | 14.87 |
| | 5220 | 44 | 14.79 |
| | 5240 | 48 | 14.83 |
| | 5260 | 52 | 14.83 |
| | 5280 | 56 | 14.73 |
| | 5300 | 60 | 14.93 |
| | **5320** | **64** | 14.94 |
| | **5500** | **100** | 14.91 |
| | 5600 | 120 | 14.81 |
| | 5660 | 132 | 14.58 |
| | 5720 | 144 | 14.53 |
| | 5745 | 149 | 14.47 |
| | **5785** | **157** | 14.49 |
| | 5825 | 165 | 14.31 |

Table 8.1.4 IEEE 802.11a Average RF Power

| Mode | Freq. (MHz) | Channel | IEEE 802.11n HT20 (5 GHz) Conducted Power[dBm] |
|---|---|---|---|
| 802.11n (HT-20) | 5180 | 36 | 14.67 |
| | 5200 | 40 | 14.62 |
| | 5220 | 44 | 14.46 |
| | 5240 | 48 | 14.50 |
| | 5260 | 52 | 14.50 |
| | 5280 | 56 | 14.44 |
| | 5300 | 60 | 14.60 |
| | 5320 | 64 | 14.70 |
| | 5500 | 100 | 14.70 |
| | 5600 | 120 | 14.51 |
| | 5660 | 132 | 14.27 |
| | 5720 | 144 | 14.24 |
| | 5745 | 149 | 14.19 |
| | 5785 | 157 | 14.17 |
| | 5825 | 165 | 13.97 |

Table 8.1.5 IEEE 802.11n HT20 Average RF Power

| Mode | Freq. (MHz) | Channel | IEEE 802.11ac VHT20 (5 GHz) Conducted Power[dBm] |
|---|---|---|---|
| 802.11ac (VHT-20) | 5180 | 36 | 14.63 |
| | 5200 | 40 | 14.58 |
| | 5220 | 44 | 14.47 |
| | 5240 | 48 | 14.53 |
| | 5260 | 52 | 14.47 |
| | 5280 | 56 | 14.43 |
| | 5300 | 60 | 14.62 |
| | 5320 | 64 | 14.73 |
| | 5500 | 100 | 14.70 |
| | 5600 | 120 | 14.53 |
| | 5660 | 132 | 14.26 |
| | 5720 | 144 | 14.22 |
| | 5745 | 149 | 14.17 |
| | 5785 | 157 | 14.14 |
| | 5825 | 165 | 14.01 |

**Table 8.1.6 IEEE 802.11ac VHT20 Average RF Power**

| Mode | Freq. (MHz) | Channel | IEEE 802.11n HT40 (5 GHz) Conducted Power[dBm] |
|---|---|---|---|
| 802.11n (HT-40) | 5190 | 38 | 10.97 |
| | 5230 | 46 | 12.49 |
| | 5270 | 54 | 12.20 |
| | 5310 | 62 | 10.91 |
| | 5510 | 102 | 11.14 |
| | 5590 | 118 | 12.77 |
| | 5670 | 134 | 12.27 |
| | 5710 | 142 | 12.09 |
| | 5755 | 151 | 12.20 |
| | 5795 | 159 | 12.01 |

**Table 8.1.7 IEEE 802.11n HT40 Average RF Power**

| Mode | Freq. (MHz) | Channel | IEEE 802.11ac VHT40 (5 GHz) Conducted Power[dBm] |
|---|---|---|---|
| 802.11ac (VHT-40) | 5190 | 38 | 10.92 |
| | 5230 | 46 | 12.52 |
| | 5270 | 54 | 12.25 |
| | 5310 | 62 | 10.93 |
| | 5510 | 102 | 11.15 |
| | 5590 | 118 | 12.81 |
| | 5670 | 134 | 12.29 |
| | 5710 | 142 | 12.11 |
| | 5755 | 151 | 12.21 |
| | 5795 | 159 | 12.04 |

**Table 8.1.8 IEEE 802.11ac VHT40 Average RF Power**

| Mode | Freq. (MHz) | Channel | IEEE 802.11ac VHT80 (5 GHz) Conducted Power[dBm] |
|---|---|---|---|
| 802.11ac (VHT-80) | 5210 | 42 | 10.64 |
| | 5290 | 58 | 10.43 |
| | 5530 | 106 | 12.34 |
| | 5610 | 122 | 11.88 |
| | 5690 | 138 | 11.83 |
| | 5775 | 155 | 11.52 |

**Table 8.1.10 IEEE 802.11ac VHT80 Average RF Power**

Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission modes with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, duo to an even number of channels, both channels were measured.
- Output Power and SAR is not required for 802.11 g/n HT20/ac VHT20 channels when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjust SAR is ≤ 1.2 W/kg.
- The underlined data rate and channel above were tested for SAR.

The average output powers of this device were tested by below configuration.

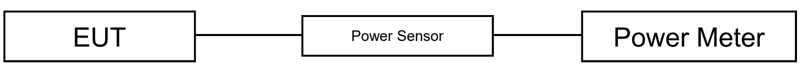


**Figure 8.1 Power Measurement Setup**

## 8.2 Bluetooth Conducted Powers

| Burst Modulated Average[dBm] | | |
|---|---|---|
| Bluetooth 1 Mbps | Maximum | 12.5 |
| | Nominal | 11.5 |
| Bluetooth 2 Mbps | Maximum | 12.5 |
| | Nominal | 11.5 |
| Bluetooth 3 Mbps | Maximum | 12.5 |
| | Nominal | 11.5 |
| Bluetooth LE | Maximum | 6.0 |
| | Nominal | 5.0 |

**Table 8.2.1 Nominal and Maximum Output Power Spec (Burst)**

| Frame Modulated Average[dBm] | | |
|---|---|---|
| Bluetooth 1 Mbps | Maximum | 11.35 |
| | Nominal | 10.35 |
| Bluetooth 2 Mbps | Maximum | 11.35 |
| | Nominal | 10.35 |
| Bluetooth 3 Mbps | Maximum | 11.35 |
| | Nominal | 10.35 |
| Bluetooth (LE / 1Mbps) | Maximum | 5.30 |
| | Nominal | 4.30 |
| Bluetooth (LE / 2Mbps) | Maximum | 3.59 |
| | Nominal | 2.59 |

**Table 8.2.2 Nominal and Maximum Output Power Spec (Frame)**

| Channel | Frequency | Burst AVG Output Power (1Mbps) | Frame AVG Output Power (1Mbps) | Burst AVG Output Power (2Mbps) | Frame AVG Output Power (2Mbps) | Burst AVG Output Power (3Mbps) | Frame AVG Output Power (3Mbps) |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) |
| Low | 2402 | 10.41 | 9.26 | 10.06 | 8.91 | 10.03 | 8.88 |
| Mid | 2441 | 10.71 | 9.56 | 10.58 | 9.43 | 10.55 | 9.40 |
| High | 2480 | 8.20 | 7.05 | 7.85 | 6.70 | 7.81 | 6.66 |

**Table 8.2.3 Bluetooth Burst and Frame Average RF Power**

| Channel | Frequency | Burst AVG Output Power(LE / 1Mbps) | Frame AVG Output Power(LE / 1Mbps) | Burst AVG Output Power(LE / 2Mbps) | Frame AVG Output Power(LE / 2Mbps) |
|---|---|---|---|---|---|
| | (MHz) | (dBm) | (dBm) | (dBm) | (dBm) |
| Low | 2402 | 3.59 | 2.89 | 3.55 | 1.14 |
| Mid | 2440 | 3.69 | 2.99 | 3.65 | 1.24 |
| High | 2480 | 2.21 | 1.51 | 2.18 | -0.23 |

**Table 8.2.4 Bluetooth LE Burst and Frame Average RF Power**

- **Bluetooth Conducted Powers procedures**

1. Bluetooth (BDR, EDR)
   1) Enter DUT mode in EUT and operate it.
   When it operating, The EUT is transmitting at maximum power level and duty cycle fixed.
   2) Instruments and EUT were connected like Figure 8.2.1(A).
   3) The maximum output powers of BDR(1 Mbps), EDR(2, 3 Mbps) and each frequency were set by a Bluetooth Tester.
   4) Power levels were measured by a Power Meter.

2. Bluetooth (LE)
   1) Enter LE mode in EUT and operate it.
   When it operating, The EUT is transmitting at maximum power level and duty cycle fixed.
   2) Instruments and EUT were connected like Figure 8.2.1(B).
   3) The average conducted output powers of LE and each frequency can measurement according to setting program in EUT.
   4) Power levels were measured by a Power Meter.

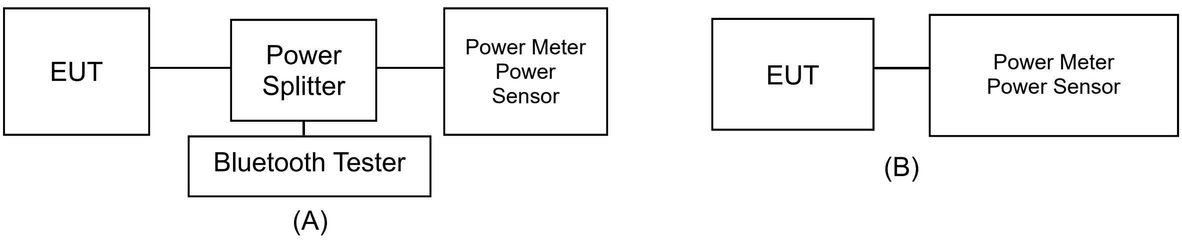


**Figure 8.2.1 Average Power Measurement Setup**

- **Bluetooth Transmission Plot**

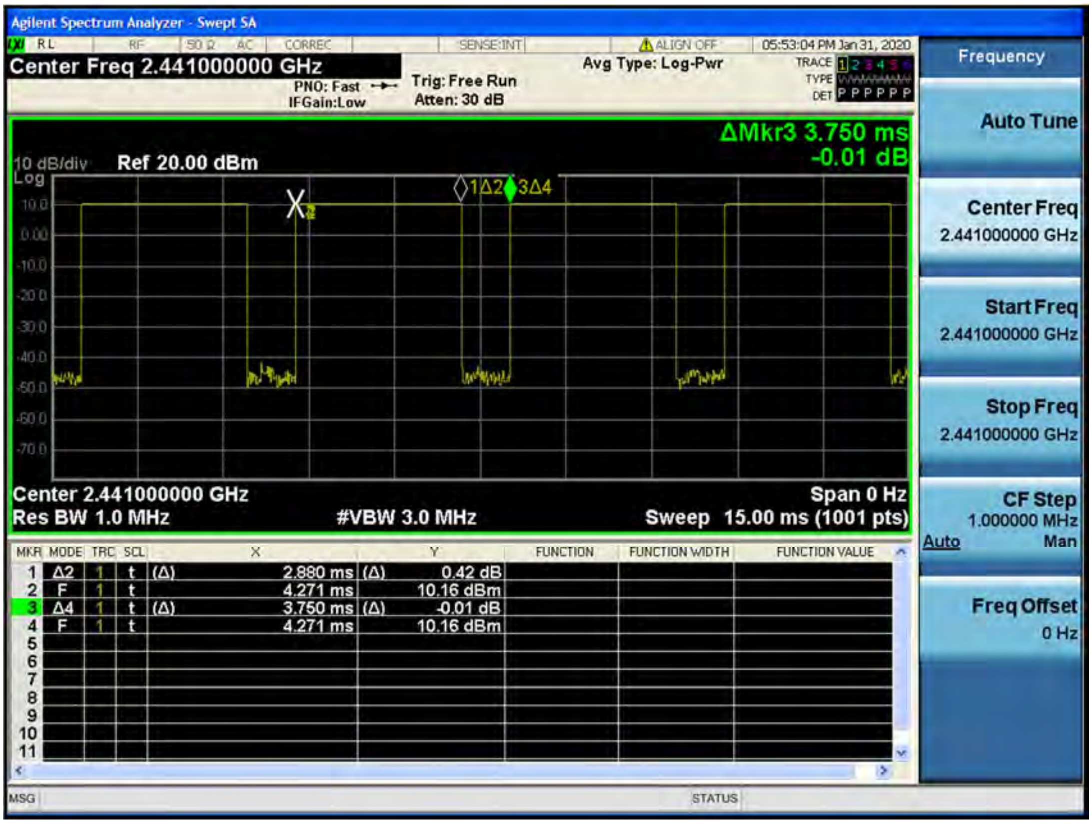

**Figure 8.2.2 Bluetooth Transmission Plot**

- **Bluetooth Duty Cycle Calculation**

**Duty Cycle = Pulse/Period * 100% = (2.880/3.750) * 100 = 76.8%**

# 9. SYSTEM VERIFICATION

## 9.1 Tissue Verification

| MEASURED TISSUE PARAMETERS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Date(s) | Tissue Type | Ambient Temp.[°C] | Liquid Temp.[°C] | Measured Frequency [MHz] | Target Dielectric Constant, εr | Target Conductivity, σ (S/m) | Measured Dielectric Constant, εr | Measured Conductivity, σ (S/m) | Er Deviation [%] | σ Deviation [%] |
| Jan. 15. 2020 | 2450 Head | 22.0 | 22.1 | 2402.0 | 39.282 | 1.757 | 39.018 | 1.763 | -0.67 | 0.34 |
| | | | | 2412.0 | 39.265 | 1.766 | 38.979 | 1.774 | -0.73 | 0.45 |
| | | | | 2437.0 | 39.222 | 1.788 | 38.889 | 1.803 | -0.85 | 0.84 |
| | | | | 2441.0 | 39.215 | 1.792 | 38.875 | 1.808 | -0.87 | 0.89 |
| | | | | 2450.0 | 39.200 | 1.800 | 38.846 | 1.818 | -0.90 | 1.00 |
| | | | | 2462.0 | 39.184 | 1.813 | 38.810 | 1.831 | -0.95 | 0.99 |
| | | | | 2467.0 | 39.177 | 1.818 | 38.797 | 1.836 | -0.97 | 0.99 |
| | | | | 2472.0 | 39.171 | 1.823 | 38.781 | 1.842 | -1.00 | 1.04 |
| | | | | 2480.0 | 39.160 | 1.832 | 38.748 | 1.851 | -1.05 | 1.04 |
| Jan. 16. 2020 | 2450 Body | 22.3 | 22.6 | 2402.0 | 52.764 | 1.904 | 51.225 | 1.855 | -2.92 | -2.57 |
| | | | | 2412.0 | 52.751 | 1.914 | 51.196 | 1.868 | -2.95 | -2.40 |
| | | | | 2437.0 | 52.717 | 1.938 | 51.138 | 1.898 | -3.00 | -2.06 |
| | | | | 2441.0 | 52.712 | 1.941 | 51.130 | 1.903 | -3.00 | -1.96 |
| | | | | 2450.0 | 52.700 | 1.950 | 51.113 | 1.913 | -3.01 | -1.90 |
| | | | | 2462.0 | 52.685 | 1.967 | 51.087 | 1.926 | -3.03 | -2.08 |
| | | | | 2467.0 | 52.678 | 1.974 | 51.073 | 1.931 | -3.05 | -2.18 |
| | | | | 2472.0 | 52.672 | 1.981 | 51.058 | 1.937 | -3.06 | -2.22 |
| | | | | 2480.0 | 52.662 | 1.993 | 51.032 | 1.946 | -3.10 | -2.36 |
| Jan. 15. 2020 | 5300 Head | 20.5 | 20.5 | 5260.0 | 35.940 | 4.720 | 35.320 | 4.630 | -1.73 | -1.91 |
| | | | | 5270.0 | 35.930 | 4.730 | 35.299 | 4.644 | -1.76 | -1.82 |
| | | | | 5280.0 | 35.920 | 4.740 | 35.292 | 4.656 | -1.75 | -1.77 |
| | | | | 5290.0 | 35.910 | 4.750 | 35.288 | 4.665 | -1.73 | -1.79 |
| | | | | 5300.0 | 35.900 | 4.760 | 35.268 | 4.672 | -1.76 | -1.85 |
| | | | | 5310.0 | 35.890 | 4.770 | 35.240 | 4.683 | -1.81 | -1.82 |
| | | | | 5320.0 | 35.880 | 4.780 | 35.219 | 4.696 | -1.84 | -1.76 |
| Jan. 17. 2020 | 5300 Body | 21.3 | 21.7 | 5260.0 | 48.933 | 5.369 | 50.669 | 5.309 | 3.55 | -1.12 |
| | | | | 5270.0 | 48.919 | 5.381 | 50.637 | 5.321 | 3.51 | -1.12 |
| | | | | 5280.0 | 48.906 | 5.393 | 50.610 | 5.333 | 3.48 | -1.11 |
| | | | | 5290.0 | 48.892 | 5.404 | 50.572 | 5.343 | 3.44 | -1.13 |
| | | | | 5300.0 | 48.879 | 5.416 | 50.535 | 5.356 | 3.39 | -1.11 |
| | | | | 5310.0 | 48.865 | 5.428 | 50.501 | 5.373 | 3.35 | -1.01 |
| | | | | 5320.0 | 48.851 | 5.439 | 50.478 | 5.387 | 3.33 | -0.96 |

| MEASURED TISSUE PARAMETERS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Date(s) | Tissue Type | Ambient Temp.[°C] | Liquid Temp.[°C] | Measured Frequency [MHz] | Target Dielectric Constant, εr | Target Conductivity, σ (S/m) | Measured Dielectric Constant, εr | Measured Conductivity, σ (S/m) | Er Deviation [%] | σ Deviation [%] |
| Jan. 16. 2020 | 5600 Head | 20.7 | 20.5 | 5500.0 | 35.650 | 4.965 | 35.759 | 4.887 | 0.31 | -1.57 |
| | | | | 5510.0 | 35.635 | 4.976 | 35.750 | 4.895 | 0.32 | -1.63 |
| | | | | 5530.0 | 35.605 | 4.997 | 35.703 | 4.917 | 0.28 | -1.60 |
| | | | | 5550.0 | 35.575 | 5.018 | 35.673 | 4.943 | 0.28 | -1.49 |
| | | | | 5580.0 | 35.530 | 5.049 | 35.619 | 4.976 | 0.25 | -1.45 |
| | | | | 5600.0 | 35.500 | 5.070 | 35.582 | 5.005 | 0.23 | -1.28 |
| | | | | 5660.0 | 35.440 | 5.130 | 35.494 | 5.070 | 0.15 | -1.17 |
| | | | | 5670.0 | 35.430 | 5.140 | 35.481 | 5.080 | 0.14 | -1.17 |
| | | | | 5690.0 | 35.410 | 5.160 | 35.439 | 5.103 | 0.08 | -1.10 |
| | | | | 5710.0 | 35.390 | 5.180 | 35.404 | 5.131 | 0.04 | -0.95 |
| | | | | 5720.0 | 35.380 | 5.190 | 35.401 | 5.142 | 0.06 | -0.92 |
| | | | | 5800.0 | 35.300 | 5.270 | 35.257 | 5.230 | -0.12 | -0.76 |
| Jan. 20. 2020 | 5600 Body | 21.8 | 22.1 | 5500.0 | 48.607 | 5.650 | 49.141 | 5.516 | 1.10 | -2.37 |
| | | | | 5510.0 | 48.594 | 5.661 | 49.089 | 5.525 | 1.02 | -2.40 |
| | | | | 5530.0 | 48.566 | 5.685 | 48.991 | 5.553 | 0.88 | -2.32 |
| | | | | 5550.0 | 48.539 | 5.708 | 48.905 | 5.583 | 0.75 | -2.19 |
| | | | | 5580.0 | 48.499 | 5.743 | 48.788 | 5.640 | 0.60 | -1.79 |
| | | | | 5600.0 | 48.471 | 5.766 | 48.751 | 5.670 | 0.58 | -1.66 |
| | | | | 5660.0 | 48.390 | 5.836 | 48.491 | 5.739 | 0.21 | -1.66 |
| | | | | 5670.0 | 48.376 | 5.848 | 48.442 | 5.758 | 0.14 | -1.54 |
| | | | | 5690.0 | 48.349 | 5.872 | 48.384 | 5.800 | 0.07 | -1.23 |
| | | | | 5710.0 | 48.322 | 5.895 | 48.354 | 5.828 | 0.07 | -1.14 |
| | | | | 5720.0 | 48.309 | 5.907 | 48.324 | 5.833 | 0.03 | -1.25 |
| | | | | 5800.0 | 48.200 | 6.000 | 47.988 | 5.956 | -0.44 | -0.73 |
| Jan. 17. 2020 | 5800 Head | 20.4 | 20.5 | 5745.0 | 35.355 | 5.215 | 35.000 | 5.247 | -1.00 | 0.61 |
| | | | | 5755.0 | 35.345 | 5.225 | 34.978 | 5.261 | -1.04 | 0.69 |
| | | | | 5775.0 | 35.325 | 5.245 | 34.954 | 5.283 | -1.05 | 0.72 |
| | | | | 5785.0 | 35.315 | 5.255 | 34.934 | 5.293 | -1.08 | 0.72 |
| | | | | 5795.0 | 35.305 | 5.265 | 34.910 | 5.305 | -1.12 | 0.76 |
| | | | | 5800.0 | 35.300 | 5.270 | 35.257 | 5.230 | -0.12 | -0.76 |
| | | | | 5825.0 | 35.275 | 5.296 | 34.865 | 5.346 | -1.16 | 0.94 |
| Jan. 21. 2020 | 5800 Body | 21.4 | 21.1 | 5745.0 | 48.275 | 5.936 | 49.185 | 5.842 | 1.89 | -1.58 |
| | | | | 5755.0 | 48.261 | 5.947 | 49.087 | 5.849 | 1.71 | -1.65 |
| | | | | 5775.0 | 48.234 | 5.971 | 48.886 | 5.893 | 1.35 | -1.31 |
| | | | | 5785.0 | 48.220 | 5.982 | 48.826 | 5.933 | 1.26 | -0.82 |
| | | | | 5795.0 | 48.207 | 5.994 | 48.815 | 5.977 | 1.26 | -0.28 |
| | | | | 5800.0 | 48.200 | 6.000 | 48.825 | 5.996 | 1.30 | -0.07 |
| | | | | 5825.0 | 48.166 | 6.029 | 48.972 | 6.037 | 1.67 | 0.13 |

The above measured tissue parameters were used in the DASY software. The DASY software was used to perform interpolation to determine the dielectric parameters at the SAR test device frequencies (per KDB 865664 and IEEE 1528-2013 6.6.1.2). The tissue parameters listed in the SAR test plots may slightly differ from the table above due to significant digit rounding in the software.

**Measurement Procedure for Tissue verification:**

1) The network analyzer and probe system was configured and calibrated.
2) The probe was immersed in the sample which was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
3) The complex admittance with respect to the probe aperture was measured
4) The complex relative permittivity , for example from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\varepsilon_r\varepsilon_0}{[\ln(b/a)]^2}\int_a^b\int_a^b\int_0^\pi \cos\phi' \frac{\exp\left[-j\omega r(\mu_0\varepsilon_r'\varepsilon_0)^{1/2}\right]}{r} d\phi' d\rho' d\rho$$

where $Y$ is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively, $r^2 = \rho^2 + \rho'^2 - 2\rho\rho'\cos\phi'$, $\omega$ is the angular frequency, and $j = \sqrt{-1}$.

## 9.2 Test System Verification

Prior to assessment, the system is verified to the ± 10 % of the specifications at using the SAR Dipole kit(s). (Graphic Plots Attached)

### Table 9.2.1 System Verification Results (1g)

| SYSTEM DIPOLE VERIFICATION TARGET & MEASURED | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAR System # | Freq. [MHz] | SAR Dipole kits | Date(s) | Tissue Type | Ambient Temp. [°C] | Liquid Temp. [°C] | Probe S/N | Input Power (mW) | 1 W Target $SAR_{1g}$ (W/kg) | Measured $SAR_{1g}$ (W/kg) | 1 W Normalized $SAR_{1g}$ (W/kg) | Deviation [%] |
| D | 2450 | D2450V2, SN: 726 | Jan. 15. 2020 | Head | 22.0 | 22.1 | 3933 | 100 | 51.2 | 5.19 | 51.90 | 1.37 |
| D | 2450 | D2450V2, SN: 726 | Jan. 16. 2020 | Body | 22.3 | 22.6 | 3933 | 100 | 52.0 | 5.17 | 51.70 | -0.58 |
| C | 5300 | D5GHzV2, SN:1103 | Jan. 15. 2020 | Head | 20.5 | 20.5 | 7337 | 100 | 82.4 | 8.43 | 84.30 | 2.31 |
| D | 5300 | D5GHzV2, SN:1103 | Jan. 17. 2020 | Body | 21.3 | 21.7 | 3933 | 100 | 74.4 | 7.63 | 76.30 | 2.55 |
| C | 5500 | D5GHzV2, SN:1103 | Jan. 16. 2020 | Head | 20.7 | 20.5 | 7337 | 100 | 84.0 | 8.09 | 80.90 | -3.69 |
| D | 5500 | D5GHzV2, SN:1103 | Jan. 20. 2020 | Body | 21.8 | 22.1 | 3933 | 100 | 79.6 | 7.81 | 78.10 | -1.88 |
| C | 5800 | D5GHzV2, SN:1103 | Jan. 17. 2020 | Head | 20.4 | 20.5 | 7337 | 100 | 81.4 | 8.03 | 80.30 | -1.35 |
| D | 5800 | D5GHzV2, SN:1103 | Jan. 21. 2020 | Body | 21.4 | 21.1 | 3933 | 100 | 74.8 | 7.73 | 77.30 | 3.34 |

### Table 9.2.2 System Verification Results (10g)

| SYSTEM DIPOLE VERIFICATION TARGET & MEASURED | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAR System # | Freq. [MHz] | SAR Dipole kits | Date(s) | Tissue Type | Ambient Temp. [°C] | Liquid Temp. [°C] | Probe S/N | Input Power (mW) | 1 W Target $SAR_{10g}$ (W/kg) | Measured $SAR_{10g}$ (W/kg) | 1 W Normalized $SAR_{10g}$ (W/kg) | Deviation [%] |
| D | 2450 | D2450V2, SN: 726 | Jan. 16. 2020 | Body | 22.3 | 22.6 | 3933 | 100 | 24.6 | 2.43 | 24.30 | -1.22 |
| D | 5300 | D5GHzV2, SN:1103 | Jan. 17. 2020 | Body | 21.3 | 21.7 | 3933 | 100 | 20.9 | 2.15 | 21.50 | 2.87 |
| D | 5500 | D5GHzV2, SN:1103 | Jan. 20. 2020 | Body | 21.8 | 22.1 | 3933 | 100 | 22.1 | 2.19 | 21.90 | -0.90 |
| D | 5800 | D5GHzV2, SN:1103 | Jan. 21. 2020 | Body | 21.4 | 21.1 | 3933 | 100 | 20.9 | 2.13 | 21.30 | 1.91 |

Note(s)
1. System Verification was measured with input 100 mW and normalized to 1W.
2. Full system validation status and results can be found in Appendix D.

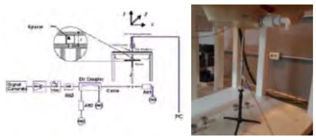

**Figure 9.1 Dipole Verification Test Setup Diagram & Photo**

# 10. SAR TEST RESULTS

## 10.1 Head SAR Results

### Table 10.1.1 DTS Head SAR

| MEASUREMENT RESULTS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Dual Display Accessory Configuration | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Phantom Position | Device Serial Number | Peak SAR of Area Scan | Data Rate [Mbps] | Duty Cycle | 1g SAR (W/kg) | Scaling Factor | Scaling Factor (Duty Cycle) | 1g Scaled SAR (W/kg) | Plots # |
| MHz | Ch | | | | | | | | | | | | | | | |
| 2437.0 | 6 | 802.11b | - | 15.00 | 14.33 | 0.000 | Left Touch | FCC #1 | 0.128 | 1 | 98.9 | 0.129 | 1.167 | 1.011 | 0.152 | |
| 2437.0 | 6 | 802.11b | - | 15.00 | 14.33 | -0.120 | Right Touch | FCC #1 | 0.581 | 1 | 98.9 | 0.668 | 1.167 | 1.011 | **0.788** | A1 |
| 2437.0 | 6 | 802.11b | - | 15.00 | 14.33 | 0.100 | Left Tilt | FCC #1 | 0.089 | 1 | 98.9 | 0.086 | 1.167 | 1.011 | 0.101 | |
| 2437.0 | 6 | 802.11b | - | 15.00 | 14.33 | -0.030 | Right Tilt | FCC #1 | 0.337 | 1 | 98.9 | 0.321 | 1.167 | 1.011 | 0.379 | |
| 2437.0 | 6 | 802.11b | #1 | 15.00 | 14.33 | 0.190 | Right Touch | FCC #1 | 0.198 | 1 | 98.9 | 0.202 | 1.167 | 1.011 | 0.238 | |
| 2437.0 | 6 | 802.11b | #2 | 15.00 | 14.33 | 0.020 | Right Touch | FCC #1 | 0.427 | 1 | 98.9 | 0.418 | 1.167 | 1.011 | 0.493 | |
| 2437.0 | 6 | 802.11b | #3 | 15.00 | 14.33 | 0.120 | Right Touch | FCC #1 | 0.426 | 1 | 98.9 | 0.556 | 1.167 | 1.011 | 0.656 | |
| ANSI / IEEE C95.1-1992– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure | | | | | | | | | Head<br>1.6 W/kg (mW/g)<br>averaged over 1 gram | | | | | | | |

Note(s):
1. Blue entries represent additional Head SAR Test Position (#1: DD angle: 0 degree) with the worst case position.
2. Green entries represent additional Head SAR Test Position (#2: DD angle: 180 degree) with the worst case position.
3. Orange entries represent additional Head SAR Test Position (#3: DD angle: 360 degree) with the worst case position.

| Adjusted SAR results for OFDM SAR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Service | Maximum Allowed Power [dBm] | 1g Scaled SAR (W/kg) | FREQUENCY [MHz] | Mode | Service | Maximum Allowed Power [dBm | Ratio of OFDM to DSSS | 1g Adjusted SAR (W/kg) | Determine OFDM SAR |
| MHz | Ch | | | | | | | | | | | |
| 2437.0 | 6 | 802.11b | DSSS | 15.0 | 0.788 | 2437 | 802.11g | OFDM | 15.0 | 1.000 | **0.788** | X |
| 2437.0 | 6 | 802.11b | DSSS | 15.0 | 0.788 | 2437 | 802.11n | OFDM | 14.0 | 0.794 | **0.626** | X |
| 2437.0 | 6 | 802.11b | DSSS | 15.0 | 0.788 | 2437 | 802.11ac | OFDM | 14.0 | 0.794 | **0.626** | X |
| ANSI / IEEE C95.1-1992– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure | | | | | | Head<br>1.6 W/kg (mW/g)<br>averaged over 1 gram | | | | | | |

Note(s):
1. SAR is not required for the following 2.4 GHz OFDM conditions. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

### Table 10.1.2 UNII Head SAR

| MEASUREMENT RESULTS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Phantom Position | Device Serial Number | Peak SAR of Area Scan | Data Rate [Mbps] | Duty Cycle | 1g SAR (W/kg) | Scaling Factor | Scaling Factor (Duty Cycle) | 1g Scaled SAR (W/kg) | Plots # |
| MHz | Ch | | | | | | | | | | | | | | |
| 5320.0 | 64 | 802.11a | 15.00 | 14.94 | 0.170 | Left Touch | FCC #1 | 0.056 | 6 | 99.0 | 0.042 | 1.014 | 1.010 | 0.043 | |
| 5320.0 | 64 | 802.11a | 15.00 | 14.94 | 0.120 | Right Touch | FCC #1 | 0.271 | 6 | 99.0 | 0.279 | 1.014 | 1.010 | **0.286** | A2 |
| 5320.0 | 64 | 802.11a | 15.00 | 14.94 | 0.010 | Left Tilt | FCC #1 | 0.049 | 6 | 99.0 | 0.040 | 1.014 | 1.010 | 0.041 | |
| 5320.0 | 64 | 802.11a | 15.00 | 14.94 | 0.060 | Right Tilt | FCC #1 | 0.132 | 6 | 99.0 | 0.142 | 1.014 | 1.010 | 0.145 | |
| ANSI / IEEE C95.1-1992– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure | | | | | | | | Head<br>1.6 W/kg (mW/g)<br>averaged over 1 gram | | | | | | | |

| Adjusted SAR results for UNII-1 and UNII-2A SAR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Service | Maximum Allowed Power [dBm] | 1g Scaled SAR (W/kg) | FREQUENCY [MHz] | Mode | Service | Maximum Allowed Power [dBm | Adjusted Factor | 1g Adjusted SAR (W/kg) | SAR for the band with lower maximum output power |
| MHz | Ch | | | | | | | | | | | |
| 5320.0 | 64 | 802.11a | OFDM | 15.0 | 0.286 | 5180 | 802.11a | OFDM | 15.0 | 1.000 | **0.286** | X |
| ANSI / IEEE C95.1-1992– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure | | | | | | Head<br>1.6 W/kg (mW/g)<br>averaged over 1 gram | | | | | | |

Note: U-NII-1 and U-NII-2A Bands: When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration.

### Table 10.1.3 UNII Head SAR

| MEASUREMENT RESULTS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Phantom Position | Device Serial Number | Peak SAR of Area Scan | Data Rate [Mbps] | Duty Cycle | 1g SAR (W/kg) | Scaling Factor | Scaling Factor (Duty Cycle) | 1g Scaled SAR (W/kg) | Plots # |
| MHz | Ch | | | | | | | | | | | | | | |
| 5500.0 | 100 | 802.11a | 15.00 | 14.91 | -0.120 | Left Touch | FCC #1 | 0.065 | 6 | 99.0 | 0.043 | 1.021 | 1.010 | 0.044 | |
| 5500.0 | 100 | 802.11a | 15.00 | 14.91 | 0.130 | Right Touch | FCC #1 | 0.200 | 6 | 99.0 | 0.205 | 1.021 | 1.010 | **0.211** | A3 |
| 5500.0 | 100 | 802.11a | 15.00 | 14.91 | 0.110 | Left Tilt | FCC #1 | 0.065 | 6 | 99.0 | 0.052 | 1.021 | 1.010 | 0.054 | |
| 5500.0 | 100 | 802.11a | 15.00 | 14.91 | -0.010 | Right Tilt | FCC #1 | 0.095 | 6 | 99.0 | 0.106 | 1.021 | 1.010 | 0.109 | |
| 5785.0 | 157 | 802.11a | 15.00 | 14.49 | 0.000 | Left Touch | FCC #1 | 0.045 | 6 | 99.0 | 0.031 | 1.125 | 1.010 | 0.035 | |
| 5785.0 | 157 | 802.11a | 15.00 | 14.49 | -0.120 | Right Touch | FCC #1 | 0.173 | 6 | 99.0 | 0.198 | 1.125 | 1.010 | **0.225** | A4 |
| 5785.0 | 157 | 802.11a | 15.00 | 14.49 | 0.000 | Left Tilt | FCC #1 | 0.038 | 6 | 99.0 | 0.027 | 1.125 | 1.010 | 0.031 | |
| 5785.0 | 157 | 802.11a | 15.00 | 14.49 | 0.140 | Right Tilt | FCC #1 | 0.081 | 6 | 99.0 | 0.072 | 1.125 | 1.010 | 0.082 | |
| ANSI / IEEE C95.1-1992– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure | | | | | | | | Head<br>1.6 W/kg (mW/g)<br>averaged over 1 gram | | | | | | | |

### Table 10.1.4 Bluetooth Head SAR

| MEASUREMENT RESULTS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Phantom Position | Device Serial Number | Rate [Mbps] | Duty Cycle (%) | 1g SAR (W/kg) | Scaling Factor | Scaling Factor (Duty Cycle) | 1g Scaled SAR (W/kg) | Plots # |
| MHz | Ch | | | | | | | | | | | | | |
| 2441.0 | 39 | Bluetooth | 11.35 | 9.56 | 0.000 | Left Touch | FCC #1 | 1 | 76.8 | 0.030 | 1.510 | 1.302 | 0.059 | |
| 2441.0 | 39 | Bluetooth | 11.35 | 9.56 | -0.010 | Right Touch | FCC #1 | 1 | 76.8 | 0.139 | 1.510 | 1.302 | **0.273** | A5 |
| 2441.0 | 39 | Bluetooth | 11.35 | 9.56 | 0.000 | Left Tilt | FCC #1 | 1 | 76.8 | 0.015 | 1.510 | 1.302 | 0.029 | |
| 2441.0 | 39 | Bluetooth | 11.35 | 9.56 | 0.000 | Right Tilt | FCC #1 | 1 | 76.8 | 0.050 | 1.510 | 1.302 | 0.098 | |
| ANSI / IEEE C95.1-1992– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure | | | | | | | | Head<br>1.6 W/kg (mW/g)<br>averaged over 1 gram | | | | | | |

## 10.2 Standalone Body-Worn SAR Worn SAR Results

### Table 10.2.1 DTS Body-Worn SAR

| MEASUREMENT RESULTS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Phantom Position | Device Serial Number | Peak SAR of Area Scan | Data Rate [Mbps] | Duty Cycle | 1g SAR (W/kg) | Scaling Factor | Scaling Factor (Duty Cycle) | SAR (W/kg) | Plots # |
| MHz | Ch | | | | | | | | | | | | | | |
| 2437.0 | 6 | 802.11b | 15.00 | 14.33 | -0.120 | 10 mm [Front] | FCC #1 | 0.121 | 1 | 98.9 | 0.109 | 1.167 | 1.011 | **0.129** | A6 |
| 2437.0 | 6 | 802.11b | 15.00 | 14.33 | -0.090 | 10 mm [Rear] | FCC #1 | 0.069 | 1 | 98.9 | 0.069 | 1.167 | 1.011 | 0.081 | |
| **ANSI / IEEE C95.1-1992– SAFETY LIMIT**<br>**Spatial Peak**<br>**Uncontrolled Exposure/General Population Exposure** | | | | | | | | **Body**<br>**1.6 W/kg (mW/g)**<br>averaged over 1 gram | | | | | | | |

| Adjusted SAR results for OFDM SAR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Service | Maximum Allowed Power [dBm] | 1g Scaled SAR (W/kg) | FREQUENCY [MHz] | Mode | Service | Maximum Allowed Power [dBm] | Ratio of OFDM to DSSS | 1g Adjusted SAR (W/kg) | Determine OFDM SAR |
| MHz | Ch | | | | | | | | | | | |
| 2437.0 | 6 | 802.11b | DSSS | 15.0 | 0.129 | 2437 | 802.11g | OFDM | 15.0 | 1.000 | **0.129** | X |
| 2437.0 | 6 | 802.11b | DSSS | 15.0 | 0.129 | 2437 | 802.11n | OFDM | 14.0 | 0.794 | **0.102** | X |
| 2437.0 | 6 | 802.11b | DSSS | 15.0 | 0.129 | 2437 | 802.11ac | OFDM | 14.0 | 0.794 | **0.102** | X |
| **ANSI / IEEE C95.1-1992– SAFETY LIMIT**<br>**Spatial Peak**<br>**Uncontrolled Exposure/General Population Exposure** | | | | | | **Head**<br>**1.6 W/kg (mW/g)**<br>averaged over 1 gram | | | | | | |

Note(s):
1. SAR is not required for the following 2.4 GHz OFDM conditions. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

### Table 10.2.2 UNII Body-Worn SAR

| MEASUREMENT RESULTS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Phantom Position | Device Serial Number | Peak SAR of Area Scan | Data Rate [Mbps] | Duty Cycle | 1g SAR (W/kg) | Scaling Factor | Scaling Factor (Duty Cycle) | 1g Scaled SAR (W/kg) | Plots # |
| MHz | Ch | | | | | | | | | | | | | | |
| 5320.0 | 64 | 802.11a | 15.00 | 14.94 | -0.160 | 10 mm [Front] | FCC #1 | 0.031 | 6 | 99.0 | 0.026 | 1.014 | 1.010 | 0.027 | |
| 5320.0 | 64 | 802.11a | 15.00 | 14.94 | -0.160 | 10 mm [Rear] | FCC #1 | 0.237 | 6 | 99.0 | 0.224 | 1.014 | 1.010 | **0.229** | A7 |
| **ANSI / IEEE C95.1-2005– SAFETY LIMIT**<br>**Spatial Peak**<br>**Uncontrolled Exposure/General Population Exposure** | | | | | | | | **Body**<br>**1.6 W/kg (mW/g)**<br>averaged over 1 gram | | | | | | | |

| Adjusted SAR results for UNII-1 and UNII-2A SAR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Service | Maximum Allowed Power [dBm] | 1g Scaled SAR (W/kg) | FREQUENCY [MHz] | Mode | Service | Maximum Allowed Power [dBm | Adjusted Factor | 1g Adjusted SAR (W/kg) | SAR for the band with lower maximum output power |
| MHz | Ch | | | | | | | | | | | |
| 5320.0 | 64 | 802.11a | OFDM | 15.0 | 0.229 | 5180 | 802.11a | OFDM | 15.0 | 1.000 | **0.229** | X |
| **ANSI / IEEE C95.1-1992– SAFETY LIMIT**<br>**Spatial Peak**<br>**Uncontrolled Exposure/General Population Exposure** | | | | | | **Body**<br>**1.6 W/kg (mW/g)**<br>averaged over 1 gram | | | | | | |

Note: U-NII-1 and U-NII-2A Bands: When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration.

### Table 10.2.3 UNII Body-Worn SAR

| MEASUREMENT RESULTS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Dual Display Accessory Configuration | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Phantom Position | Device Serial Number | Peak SAR of Area Scan | Data Rate [Mbps] | Duty Cycle | 1g SAR (W/kg) | Scaling Factor | Scaling Factor (Duty Cycle) | 1g Scaled SAR (W/kg) | Plots # |
| MHz | Ch | | | | | | | | | | | | | | | |
| 5500.0 | 100 | 802.11a | - | 15.00 | 14.91 | 0.150 | 10 mm [Front] | FCC #1 | 0.031 | 6 | 99.0 | 0.021 | 1.021 | 1.010 | 0.022 | |
| 5500.0 | 100 | 802.11a | - | 15.00 | 14.91 | -0.150 | 10 mm [Rear] | FCC #1 | 0.228 | 6 | 99.0 | 0.226 | 1.021 | 1.010 | **0.233** | A8 |
| 5500.0 | 100 | 802.11a | #1 | 15.00 | 14.91 | -0.120 | 10 mm [Rear] | FCC #1 | 0.213 | 6 | 99.0 | 0.197 | 1.021 | 1.010 | 0.203 | |
| 5500.0 | 100 | 802.11a | #2 | 15.00 | 14.91 | -0.090 | 10 mm [Rear] | FCC #1 | 0.184 | 6 | 99.0 | 0.178 | 1.021 | 1.010 | 0.184 | |
| 5500.0 | 100 | 802.11a | #3 | 15.00 | 14.91 | -0.060 | 10 mm [Rear] | FCC #1 | 0.183 | 6 | 99.0 | 0.166 | 1.021 | 1.010 | 0.171 | |
| 5785.0 | 157 | 802.11a | - | 15.00 | 14.49 | 0.150 | 10 mm [Front] | FCC #1 | 0.033 | 6 | 99.0 | 0.023 | 1.125 | 1.010 | 0.026 | |
| 5785.0 | 157 | 802.11a | - | 15.00 | 14.49 | 0.130 | 10 mm [Rear] | FCC #1 | 0.139 | 6 | 99.0 | 0.123 | 1.125 | 1.010 | **0.140** | A9 |
| **ANSI / IEEE C95.1-1992– SAFETY LIMIT**<br>**Spatial Peak**<br>**Uncontrolled Exposure/General Population Exposure** | | | | | | | | | **Body**<br>**1.6 W/kg (mW/g)**<br>averaged over 1 gram | | | | | | | |

Note(s):
1. Blue entries represent additional Body-Worn SAR Test Position (#1: DD angle: 0 degree) with the worst case position.
2. Green entries represent additional Body-Worn SAR Test Position (#2: DD angle: 180 degree) with the worst case position.
3. Orange entries represent additional Body-Worn SAR Test Position (#3: DD angle: 360 degree) with the worst case position.

### Table 10.2.4 Bluetooth Body-Worn SAR

| MEASUREMENT RESULTS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Phantom Position | Device Serial Number | Rate [Mbps] | Duty Cycle (%) | 1g SAR (W/kg) | Scaling Factor | Scaling Factor (Duty Cycle) | 1g Scaled SAR (W/kg) | Plots # |
| MHz | Ch | | | | | | | | | | | | | |
| 2441.0 | 39 | Bluetooth | 11.35 | 9.56 | -0.030 | 10 mm [Front] | FCC #1 | 1 | 76.8 | 0.022 | 1.510 | 1.302 | **0.043** | A10 |
| 2441.0 | 39 | Bluetooth | 11.35 | 9.56 | -0.160 | 10 mm [Rear] | FCC #1 | 1 | 76.8 | 0.013 | 1.510 | 1.302 | 0.026 | |
| **ANSI / IEEE C95.1-1992– SAFETY LIMIT**<br>**Spatial Peak**<br>**Uncontrolled Exposure/General Population Exposure** | | | | | | | | **Body**<br>**1.6 W/kg (mW/g)**<br>averaged over 1 gram | | | | | | |

## 10.3 Standalone Phablet SAR Results

### Table 10.3.1 DTS Phablet SAR

| MEASUREMENT RESULTS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Phantom Position | Device Serial Number | Peak SAR of Area Scan | Data Rate [Mbps] | Duty Cycle | 10g SAR (W/kg) | Scaling Factor | Scaling Factor (Duty Cycle) | SAR (W/kg) | Plots # |
| MHz | Ch | | | | | | | | | | | | | | |
| 2437.0 | 6 | 802.11b | 15.00 | 14.33 | -0.080 | 0 mm [Top] | FCC #1 | 0.192 | 1 | 98.9 | 0.206 | 1.167 | 1.011 | 0.243 | |
| 2437.0 | 6 | 802.11b | 15.00 | 14.33 | 0.120 | 0 mm [Front] | FCC #1 | 0.507 | 1 | 98.9 | 0.445 | 1.167 | 1.011 | **0.525** | A11 |
| 2437.0 | 6 | 802.11b | 15.00 | 14.33 | -0.000 | 0 mm [Rear] | FCC #1 | 0.192 | 1 | 98.9 | 0.187 | 1.167 | 1.011 | 0.221 | |
| 2437.0 | 6 | 802.11b | 15.00 | 14.33 | -0.010 | 0 mm [Left] | FCC #1 | 0.421 | 1 | 98.9 | 0.429 | 1.167 | 1.011 | 0.506 | |
| ANSI / IEEE C95.1-1992– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure | | | | | | | | Phablet<br>4.0 W/kg (mW/g)<br>averaged over 10 gram | | | | | | | |

| Adjusted SAR results for OFDM SAR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Service | Maximum Allowed Power [dBm] | 10g Scaled SAR (W/kg) | FREQUENCY [MHz] | Mode | Service | Maximum Allowed Power [dBm] | Ratio of OFDM to DSSS | 10g Adjusted SAR (W/kg) | Determine OFDM SAR |
| MHz | Ch | | | | | | | | | | | |
| 2437.0 | 6 | 802.11b | DSSS | 15.0 | 0.525 | 2437 | 802.11g | OFDM | 15.0 | 1.000 | **0.525** | X |
| 2437.0 | 6 | 802.11b | DSSS | 15.0 | 0.525 | 2437 | 802.11n | OFDM | 14.0 | 0.794 | **0.417** | X |
| 2437.0 | 6 | 802.11b | DSSS | 15.0 | 0.525 | 2437 | 802.11ac | OFDM | 14.0 | 0.794 | **0.417** | X |
| ANSI / IEEE C95.1-1992– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure | | | | | | Phablet<br>4.0 W/kg (mW/g)<br>averaged over 10 gram | | | | | | |

Note(s):
1. SAR is not required for the following 2.4 GHz OFDM conditions. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 3.0 W/kg.

### Table 10.3.1 UNII Phablet SAR

| MEASUREMENT RESULTS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Phantom Position | Device Serial Number | Peak SAR of Area Scan | Data Rate [Mbps] | Duty Cycle | 10g SAR (W/kg) | Scaling Factor | Scaling Factor (Duty Cycle) | 10g Scaled SAR (W/kg) | Plots # |
| MHz | Ch | | | | | | | | | | | | | | |
| 5320.0 | 64 | 802.11a | 15.00 | 14.94 | -0.120 | 0 mm [Top] | FCC #1 | 0.087 | 6 | 99.0 | 0.083 | 1.014 | 1.010 | 0.085 | |
| 5320.0 | 64 | 802.11a | 15.00 | 14.94 | -0.170 | 0 mm [Front] | FCC #1 | 0.271 | 6 | 99.0 | 0.257 | 1.014 | 1.010 | 0.263 | |
| 5320.0 | 64 | 802.11a | 15.00 | 14.94 | 0.130 | 0 mm [Rear] | FCC #1 | 0.761 | 6 | 99.0 | 0.728 | 1.014 | 1.010 | **0.746** | A12 |
| 5320.0 | 64 | 802.11a | 15.00 | 14.94 | 0.080 | 0 mm [Left] | FCC #1 | 0.160 | 6 | 99.0 | 0.130 | 1.014 | 1.010 | 0.133 | |
| ANSI / IEEE C95.1-1992– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure | | | | | | | | Phablet<br>4.0 W/kg (mW/g)<br>averaged over 10 gram | | | | | | | |

| Adjusted SAR results for UNII-1 and UNII-2A SAR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Service | Maximum Allowed Power [dBm] | 10g Scaled SAR (W/kg) | FREQUENCY [MHz] | Mode | Service | Maximum Allowed Power [dBm] | Adjusted Factor | 10g Adjusted SAR (W/kg) | SAR for the band with lower maximum output power |
| MHz | Ch | | | | | | | | | | | |
| 5320.0 | 64 | 802.11a | OFDM | 15.0 | 0.746 | 5180 | 802.11a | OFDM | 15.0 | 1.000 | **0.746** | X |
| ANSI / IEEE C95.1-1992– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure | | | | | | Phablet<br>4.0 W/kg (mW/g)<br>averaged over 10 gram | | | | | | |

Note: U-NII-1 and U-NII-2A Bands: When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 3.0 W/kg, SAR is not required for the band with lower maximum output power in that test configuration.

### Table 10.3.2 UNII Phablet SAR

| MEASUREMENT RESULTS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Dual Display Accessory Configuration | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Phantom Position | Device Serial Number | Peak SAR of Area Scan | Data Rate [Mbps] | Duty Cycle | 10g SAR (W/kg) | Scaling Factor | Scaling Factor (Duty Cycle) | 10g Scaled SAR (W/kg) | Plots # |
| MHz | Ch | | | | | | | | | | | | | | | |
| 5500.0 | 100 | 802.11a | - | 15.00 | 14.91 | 0.090 | 0 mm [Top] | FCC #1 | 0.028 | 6 | 99.0 | 0.020 | 1.021 | 1.019 | 0.021 | |
| 5500.0 | 100 | 802.11a | - | 15.00 | 14.91 | -0.110 | 0 mm [Front] | FCC #1 | 0.155 | 6 | 99.0 | 0.147 | 1.021 | 1.019 | 0.153 | |
| 5500.0 | 100 | 802.11a | - | 15.00 | 14.91 | -0.170 | 0 mm [Rear] | FCC #1 | 0.683 | 6 | 99.0 | 0.797 | 1.021 | 1.019 | **0.829** | A13 |
| 5500.0 | 100 | 802.11a | - | 15.00 | 14.91 | -0.110 | 0 mm [Left] | FCC #1 | 0.091 | 6 | 99.0 | 0.077 | 1.021 | 1.019 | 0.080 | |
| 5500.0 | 100 | 802.11a | #1 | 15.00 | 14.91 | -0.030 | 0 mm [Rear] | FCC #1 | 0.527 | 6 | 98.8 | 0.579 | 1.021 | 1.019 | 0.602 | |
| 5500.0 | 100 | 802.11a | #2 | 15.00 | 14.91 | -0.110 | 0 mm [Rear] | FCC #1 | 0.549 | 6 | 98.8 | 0.531 | 1.021 | 1.019 | 0.552 | |
| 5500.0 | 100 | 802.11a | #3 | 15.00 | 14.91 | 0.020 | 0 mm [Rear] | FCC #1 | 0.461 | 6 | 98.8 | 0.484 | 1.021 | 1.019 | 0.504 | |
| ANSI / IEEE C95.1-1992– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure | | | | | | | | | Phablet<br>4.0 W/kg (mW/g)<br>averaged over 10 gram | | | | | | | |

Note(s):
1. Blue entries represent additional Phablet SAR Test Position (#1: DD angle: 0 degree) with the worst case position.
2. Green entries represent additional Phablet SAR Test Position (#2: DD angle: 180 degree) with the worst case position.
3. Orange entries represent additional Phablet SAR Test Position (#3: DD angle: 360 degree) with the worst case position.

### Table 10.3.3 UNII Phablet SAR

| MEASUREMENT RESULTS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Phantom Position | Device Serial Number | Peak SAR of Area Scan | Data Rate [Mbps] | Duty Cycle | 10g SAR (W/kg) | Scaling Factor | Scaling Factor (Duty Cycle) | 10g Scaled SAR (W/kg) | Plots # |
| MHz | Ch | | | | | | | | | | | | | | |
| 5785.0 | 157 | 802.11a | 15.00 | 14.49 | 0.090 | 0 mm [Top] | FCC #2 | 0.029 | 6 | 99.0 | 0.022 | 1.125 | 1.010 | 0.025 | |
| 5785.0 | 157 | 802.11a | 15.00 | 14.49 | -0.110 | 0 mm [Front] | FCC #2 | 0.161 | 6 | 99.0 | 0.160 | 1.125 | 1.010 | 0.182 | |
| 5785.0 | 157 | 802.11a | 15.00 | 14.49 | 0.040 | 0 mm [Rear] | FCC #2 | 0.415 | 6 | 99.0 | 0.389 | 1.125 | 1.010 | **0.442** | A14 |
| 5785.0 | 157 | 802.11a | 15.00 | 14.49 | -0.110 | 0 mm [Left] | FCC #2 | 0.095 | 6 | 99.0 | 0.084 | 1.125 | 1.010 | 0.095 | |
| ANSI / IEEE C95.1-1992– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure | | | | | | | | Phablet<br>4.0 W/kg (mW/g)<br>averaged over 10 gram | | | | | | | |

### Table 10.3.4 Bluetooth Phablet SAR

| MEASUREMENT RESULTS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FREQUENCY | | Mode | Maximum Allowed Power [dBm] | Conducted Power [dBm] | Drift Power [dB] | Phantom Position | Device Serial Number | Rate [Mbps] | Duty Cycle (%) | 10g SAR (W/kg) | Scaling Factor | Scaling Factor (Duty Cycle) | 10g Scaled SAR (W/kg) | Plots # |
| MHz | Ch | | | | | | | | | | | | | |
| 2441.0 | 39 | Bluetooth | 11.35 | 9.56 | 0.100 | 0 mm [Top] | FCC #1 | 1 | 76.8 | 0.045 | 1.510 | 1.302 | 0.088 | |
| 2441.0 | 39 | Bluetooth | 11.35 | 9.56 | 0.020 | 0 mm [Front] | FCC #1 | 1 | 76.8 | 0.108 | 1.510 | 1.302 | 0.212 | |
| 2441.0 | 39 | Bluetooth | 11.35 | 9.56 | 0.090 | 0 mm [Rear] | FCC #1 | 1 | 76.8 | 0.053 | 1.510 | 1.302 | 0.104 | |
| 2441.0 | 39 | Bluetooth | 11.35 | 9.56 | -0.010 | 0 mm [Left] | FCC #1 | 1 | 76.8 | 0.127 | 1.510 | 1.302 | **0.250** | A15 |
| ANSI / IEEE C95.1-1992– SAFETY LIMIT<br>Spatial Peak<br>Uncontrolled Exposure/General Population Exposure | | | | | | | | Phablet<br>4.0 W/kg (mW/g)<br>averaged over 10 gram | | | | | | |

## 10.4 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01r03, body-worn SAR was evaluated without a headset connected to the device. Since the standalone reported boy-worn SAR was not > 1.2 W/kg, no additional body-worn SAR evaluations using a headset cable were performed.
8. SAR measurements were performed using the DASY5 automated system. The procedure for spatial peak SAR evaluation has been implemented according to the IEEE 1528 standard. During a maximum search, global and local maxima searches are automatically performed in 2-D after each area scan measurement. The algorithm will find the global maximum and all local maxima within 2 dB of the global maxima for all SAR distributions. All local maxima within 2 dB of the global maximum were searched and passed for the Zoom Scan measurement.

WLAN Notes:

1. The initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required duo to the maximum allowed powers and the highest reported DSSS SAR when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output and the adjust SAR is ≤ 1.2 W/kg.
3. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg.
4. When the maximum reported 1g averaged SAR ≤ 0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg or all test channels were measured.
5. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor to determine compliance.

Bluetooth Notes:

1. Bluetooth SAR was measured with the device connected to a call with hopping disabled with DH5 operation and Tx test mode type. Per October 2016 TCB Workshop Notes, the reported SAR was scaled to the 100% transmission duty factor to determine compliance. Refer to section 8.2 for the time-domain plot and calculation for the duty factor of the device.

# 11. FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

## 11.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v06 are applicable to handsets with built-in unlicensed transmitters such as 802.11b/g/n and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

## 11.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v06 4.3.2 and IEEE 1528-2013 Section 6.3.4.1.2,simultaneous transmission SAR test exclusion may be applied when the sum of the sum 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤ 1.6 W/kg. The different test positon in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1-g or 10-g SAR.

## 11.3 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds.

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v06.

**Table 11.3.1 Simultaneous SAR Cases**

| No. | Capable Transmit Configuration | Head SAR | Body-Worn SAR | Phablet SAR | Note |
|---|---|---|---|---|---|
| 1 | Bluetooth 2.4 GHz + Wi-Fi 5GHz | Yes | Yes | Yes | |

Notes:
1. Bluetooth and WiFi can not transmit simultaneously at 2.4G band.
2. VoIP is supported.

## 11.4 Head SAR Simultaneous Transmission Analysis

Table 11.4.1 Simultaneous Transmission Scenario : Bluetooth + 5 GHz W-LAN (Held to Ear)

| Exposure Condition | Mode | Configuration | Bluetooth SAR (W/kg) | 5G W-LAN SAR (W/kg) | ΣSAR (W/kg) |
|---|---|---|---|---|---|
| | | | 1 | 2 | 1+2 |
| Head SAR | 5.3G W-LAN | Left Touch | 0.059 | 0.043 | 0.102 |
| | | **Right Touch** | **0.273** | **0.286** | **0.559** |
| | | Left Tilt | 0.029 | 0.041 | 0.070 |
| | | Right Tilt | 0.098 | 0.145 | 0.243 |
| | 5.6G W-LAN | Left Touch | 0.059 | 0.044 | 0.103 |
| | | Right Touch | 0.273 | 0.211 | **0.484** |
| | | Left Tilt | 0.029 | 0.054 | 0.083 |
| | | Right Tilt | 0.098 | 0.109 | 0.207 |
| | 5.8G W-LAN | Left Touch | 0.059 | 0.035 | 0.094 |
| | | Right Touch | 0.273 | 0.225 | **0.498** |
| | | Left Tilt | 0.029 | 0.031 | 0.060 |
| | | Right Tilt | 0.098 | 0.082 | 0.180 |

## 11.5 Body-Worn Simultaneous Transmission Analysis

Table 11.5.1 Simultaneous Transmission Scenario : Bluetooth + 5 GHz W-LAN (Body-Worn at 10 mm)

| Exposure Condition | Mode | Configuration | Bluetooth SAR (W/kg) | 5G W-LAN SAR (W/kg) | ΣSAR (W/kg) |
|---|---|---|---|---|---|
| | | | 1 | 2 | 1+2 |
| Body-Worn SAR | 5.3G W-LAN | Front | 0.043 | 0.027 | 0.070 |
| | | Rear | 0.026 | 0.229 | **0.255** |
| | 5.6G W-LAN | Front | 0.043 | 0.022 | 0.065 |
| | | **Rear** | **0.026** | **0.233** | **0.259** |
| | 5.8G W-LAN | Front | 0.043 | 0.026 | 0.069 |
| | | Rear | 0.026 | 0.140 | **0.166** |

## 11.6 Phablet SAR Simultaneous Transmission Analysis

Per FCC KDB Publication 648474 D04v01r03, the device edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR ("-").

Table 11.6.1 Simultaneous Transmission Scenario : Bluetooth + 5 GHz W-LAN (Phablet at 0 mm)

| Exposure Condition | Mode | Configuration | Bluetooth SAR (W/kg) | 5G W-LAN SAR (W/kg) | ΣSAR (W/kg) |
|---|---|---|---|---|---|
| | | | 1 | 2 | 1+2 |
| Phablet SAR | 5.3G W-LAN | Top | 0.088 | 0.085 | 0.173 |
| | | Bottom | - | - | - |
| | | Front | 0.212 | 0.263 | 0.475 |
| | | Rear | 0.104 | 0.746 | **0.850** |
| | | Right | - | - | - |
| | | Left | 0.250 | 0.133 | 0.383 |
| | 5.6G W-LAN | Top | 0.088 | 0.021 | 0.109 |
| | | Bottom | - | - | - |
| | | Front | 0.212 | 0.153 | 0.365 |
| | | **Rear** | **0.104** | **0.829** | **0.933** |
| | | Right | - | - | - |
| | | Left | 0.250 | 0.080 | 0.330 |
| | 5.8G W-LAN | Top | 0.088 | 0.025 | 0.113 |
| | | Bottom | - | - | - |
| | | Front | 0.212 | 0.182 | 0.394 |
| | | Rear | 0.104 | 0.442 | **0.546** |
| | | Right | - | - | - |
| | | Left | 0.250 | 0.095 | 0.345 |

## 11.7 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013 Section 6.3.4.1.2.

# 12. SAR MEASUREMENT VARIABILITY

## 12.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, 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 performed 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. The same procedures should be adapted for measurements according to extremity exposure limits by applying a factor of 2.5 for extremity exposure to the corresponding SAR thresholds.

## 12.2 Measurement Uncertainty

The measured SAR was < 1.5 W/kg for 1g and < 3.75 W/kg for 10g for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE 1528-2013 was not required.

# 13. EQUIPMENT LIST

Table 13.1.1 Test Equipment Calibration

| | Type | Manufacturer | Model | Cal.Date | Next.Cal.Date | S/N |
|---|---|---|---|---|---|---|
| ☒ | SEMITEC Engineering | SEMITEC | N/A | N/A | N/A | Shield Room |
| ☒ | SEMITEC Engineering | SEMITEC | N/A | N/A | N/A | Shield Room |
| ☒ | Robot | SPEAG | TX90XL | N/A | N/A | F13/5RR2A1/A/01 |
| ☒ | Robot | SPEAG | TX90XL | N/A | N/A | F13/5P9GA1/A/01 |
| ☒ | Robot Controller | SPEAG | CS8C | N/A | N/A | F13/5RR2A1/C/01 |
| ☒ | Robot Controller | SPEAG | CS8C | N/A | N/A | F13/5P9GA1/C/01 |
| ☒ | Joystick | SPEAG | N/A | N/A | N/A | S-13200990 |
| ☒ | Joystick | SPEAG | N/A | N/A | N/A | S-12450905 |
| ☒ | Intel Core i7-3770 3.40 GHz Windows 7 Professional | N/A | N/A | N/A | N/A | N/A |
| ☒ | Intel Core i7-3770 3.40 GHz Windows 7 Professional | N/A | N/A | N/A | N/A | N/A |
| ☒ | Probe Alignment Unit LB | N/A | N/A | N/A | N/A | SE UKS 030 AA |
| ☒ | Probe Alignment Unit LB | N/A | N/A | N/A | N/A | SE UKS 030 AA |
| ☒ | Device Holder | SPEAG | SD000H01HA | N/A | N/A | N/A |
| ☒ | Device Holder | SPEAG | SD000H01HA | N/A | N/A | N/A |
| ☒ | Twin SAM Phantom | SPEAG | QD000P40CD | N/A | N/A | 1782 |
| ☒ | Twin SAM Phantom | SPEAG | QD000P40CD | N/A | N/A | 1785 |
| ☒ | Twin SAM Phantom | SPEAG | QD000P40CD | N/A | N/A | 1786 |
| ☒ | Data Acquisition Electronics | SPEAG | DAE4V1 | 2019-04-18 | 2020-04-18 | 1391 |
| ☒ | Data Acquisition Electronics | SPEAG | DAE4V1 | 2019-03-20 | 2020-03-20 | 1394 |
| ☒ | Dosimetric E-Field Probe | SPEAG | EX3DV4 | 2019-09-27 | 2020-09-27 | 3933 |
| ☒ | Dosimetric E-Field Probe | SPEAG | EX3DV4 | 2019-11-27 | 2020-11-27 | 7337 |
| ☒ | 2450MHz SAR Dipole | SPEAG | D2450V2 | 2019-09-19 | 2021-09-19 | 726 |
| ☒ | 5GHz SAR Dipole | SPEAG | D5GHzV2 | 2019-02-28 | 2021-02-28 | 1103 |
| ☒ | Network Analyzer | Agilent | E5071C | 2019-06-24 | 2020-06-24 | MY46106970 |
| ☒ | Signal Generator | Agilent | E4438C | 2019-06-24 | 2020-06-24 | US41461520 |
| ☒ | Amplifier | EMPOWER | BBS3Q7ELU | 2019-06-24 | 2020-06-24 | 1020 |
| ☒ | High Power RF Amplifier | EMPOWER | BBS3Q8CCJ | 2019-06-24 | 2020-06-24 | 1005 |
| ☒ | Power Meter | HP | EPM-442A | 2019-12-18 | 2020-12-18 | GB37170267 |
| ☒ | Power Meter | HP | EPM-442A | 2019-12-16 | 2020-12-16 | GB37170413 |
| ☒ | Power Sensor | HP | 8481A | 2019-12-16 | 2020-12-16 | US37294267 |
| ☒ | Power Sensor | HP | 8481A | 2019-12-18 | 2020-12-18 | 3318A96566 |
| ☒ | Power Sensor | HP | 8481A | 2019-12-18 | 2020-12-18 | 2702A65976 |
| ☒ | Dual Directional Coupler | Agilent | 778D-012 | 2019-12-17 | 2020-12-17 | 50228 |
| ☒ | Directional Coupler | HP | 772D | 2019-06-24 | 2020-06-24 | 2889A01064 |
| ☒ | Low Pass Filter 3.0GHz | Micro LAB | LA-30N | 2019-06-24 | 2020-06-24 | 2 |
| ☒ | Low Pass Filter 6.0GHz | Micro LAB | LA-60N | 2019-12-17 | 2020-12-17 | 03942 |
| ☒ | Attenuators(10 dB) | WEINSCHEL | 23-10-34 | 2019-12-17 | 2020-12-17 | BP4387 |
| ☒ | Attenuators | Cernexwave | CFADC2603U5 | 2019-06-27 | 2020-06-27 | C11740 |
| ☒ | Dielectric Probe kit | SPEAG | DAK-3.5 | 2019-11-19 | 2020-11-19 | 1092 |
| ☒ | Power Splitter | Anritsu | K241B | 2019-12-16 | 2020-12-16 | 1301183 |
| ☒ | Bluetooth Tester | TESCOM | TC-3000C | 2019-06-24 | 2020-06-24 | 3000C000563 |

**NOTE(S):**
1. The E-field probe was calibrated by SPEAG, by temperature measurement procedure. Dipole Verification measurement is performed by DT&C before each test. The brain and muscle simulating material are calibrated by DT&C using the dielectric probe system and network analyzer to determine the conductivity and permittivity (dielectric constant) of the brain and muscle-equivalent material. Each equipment item was used solely within its respective calibration period.
2. CBT(Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

# 14. MEASUREMENT UNCERTAINTIES

## 2450 MHz Head (SN: 3933)

| Error Description | Uncertainty value ±% | Probability Distribution | Divisor | (Ci) 1g | (Ci) 10g | Standard (1g) | Standard (10g) | vi 2 or Veff |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe calibration | ± 6.0 | Normal | 1 | 1 | 1 | ± 6.0 % | ± 6.0 % | ∞ |
| Isotropy | ± 1.3 | Normal | 1 | 1 | 1 | ± 1.3 % | ± 1.3 % | ∞ |
| Boundary Effects | ± 2.0 | Rectangular | √3 | 1 | 1 | ± 1.2 % | ± 1.2 % | ∞ |
| Probe Linearity | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Probe modulation response | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| Detection limits | ± 0.25 | Rectangular | √3 | 1 | 1 | ± 0.14 % | ± 0.14 % | ∞ |
| Readout Electronics | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Response time | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Integration time | ± 2.6 | Rectangular | √3 | 1 | 1 | ± 1.5 % | ± 1.5 % | ∞ |
| RF Ambient Conditions – Noise | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| RF Ambient Conditions – Reflections | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| Probe Positioner | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Probe Positioning | ± 6.7 | Rectangular | √3 | 1 | 1 | ± 3.9 % | ± 3.9 % | ∞ |
| Algorithms for Max. SAR Eval. | ± 4.0 | Rectangular | √3 | 1 | 1 | ± 2.3 % | ± 2.3 % | ∞ |
| **Test Sample Related** | | | | | | | | |
| Device Positioning | ± 2.9 | Normal | 1 | 1 | 1 | ± 2.9 % | ± 2.9 % | 145 |
| Device Holder | ± 3.6 | Normal | 1 | 1 | 1 | ± 3.6 % | ± 3.6 % | 5 |
| Power Drift | ± 5.0 | Rectangular | √3 | 1 | 1 | ± 2.9 % | ± 2.9 % | ∞ |
| SAR Scaling | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| **Physical Parameters** | | | | | | | | |
| Phantom Shell | ± 7.6 | Rectangular | √3 | 1 | 1 | ± 4.4 % | ± 4.4 % | ∞ |
| SAR correction | ± 0.0 | Normal | 1 | 1 | 0.84 | ± 0.0 % | ± 0.0 % | ∞ |
| Liquid conductivity (Target) | ± 5.0 | Rectangular | √3 | 0.64 | 0.43 | ± 1.8 % | ± 1.2 % | ∞ |
| Liquid conductivity (Meas.) | ± 4.2 | Normal | 1 | 0.78 | 0.71 | ± 3.3 % | ± 3.0 % | 10 |
| Liquid permittivity (Target) | ± 5.0 | Rectangular | √3 | 0.60 | 0.49 | ± 1.7 % | ± 1.4 % | ∞ |
| Liquid permittivity (Meas.) | ± 4.3 | Normal | 1 | 0.23 | 0.26 | ± 1.0 % | ± 1.1 % | 10 |
| Temp. unc. - Conductivity | ± 1.8 | Rectangular | √3 | 0.78 | 0.71 | ± 0.8 % | ± 0.7 % | ∞ |
| Temp. unc. - Permittivity | ± 1.7 | Rectangular | √3 | 0.23 | 0.26 | ± 0.2 % | ± 0.3 % | ∞ |
| **Combined Standard Uncertainty** | | | | | | **± 11.7 %** | **± 11.5 %** | 330 |
| **Expanded Uncertainty (k=2)** | | | | | | **± 23.4 %** | **± 23.0 %** | |

The above measurement uncertainties are according to IEEE Std 1528

**2450 MHz Body (SN: 3933)**

| Error Description | Uncertainty value ±% | Probability Distribution | Divisor | (Ci) 1g | (Ci) 10g | Standard (1g) | Standard (10g) | vi 2 or Veff |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe calibration | ± 6.0 | Normal | 1 | 1 | 1 | ± 6.0 % | ± 6.0 % | ∞ |
| Isotropy | ± 1.3 | Normal | 1 | 1 | 1 | ± 1.3 % | ± 1.3 % | ∞ |
| Boundary Effects | ± 2.0 | Rectangular | √3 | 1 | 1 | ± 1.2 % | ± 1.2 % | ∞ |
| Probe Linearity | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Probe modulation response | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| Detection limits | ± 0.25 | Rectangular | √3 | 1 | 1 | ± 0.14 % | ± 0.14 % | ∞ |
| Readout Electronics | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Response time | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Integration time | ± 2.6 | Rectangular | √3 | 1 | 1 | ± 1.5 % | ± 1.5 % | ∞ |
| RF Ambient Conditions – Noise | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| RF Ambient Conditions – Reflections | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| Probe Positioner | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Probe Positioning | ± 6.7 | Rectangular | √3 | 1 | 1 | ± 3.9 % | ± 3.9 % | ∞ |
| Algorithms for Max. SAR Eval. | ± 4.0 | Rectangular | √3 | 1 | 1 | ± 2.3 % | ± 2.3 % | ∞ |
| **Test Sample Related** | | | | | | | | |
| Device Positioning | ± 2.9 | Normal | 1 | 1 | 1 | ± 2.9 % | ± 2.9 % | 145 |
| Device Holder | ± 3.6 | Normal | 1 | 1 | 1 | ± 3.6 % | ± 3.6 % | 5 |
| Power Drift | ± 5.0 | Rectangular | √3 | 1 | 1 | ± 2.9 % | ± 2.9 % | ∞ |
| SAR Scaling | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| **Physical Parameters** | | | | | | | | |
| Phantom Shell | ± 7.6 | Rectangular | √3 | 1 | 1 | ± 4.4 % | ± 4.4 % | ∞ |
| SAR correction | ± 0.0 | Normal | 1 | 1 | 0.84 | ± 0.0 % | ± 0.0 % | ∞ |
| Liquid conductivity (Target) | ± 5.0 | Rectangular | √3 | 0.64 | 0.43 | ± 1.8 % | ± 1.2 % | ∞ |
| Liquid conductivity (Meas.) | ± 4.0 | Normal | 1 | 0.78 | 0.71 | ± 3.1 % | ± 2.8 % | 10 |
| Liquid permittivity (Target) | ± 5.0 | Rectangular | √3 | 0.60 | 0.49 | ± 1.7 % | ± 1.4 % | ∞ |
| Liquid permittivity (Meas.) | ± 4.3 | Normal | 1 | 0.23 | 0.26 | ± 1.0 % | ± 1.1 % | 10 |
| Temp. unc. - Conductivity | ± 1.8 | Rectangular | √3 | 0.78 | 0.71 | ± 0.8 % | ± 0.7 % | ∞ |
| Temp. unc. - Permittivity | ± 1.9 | Rectangular | √3 | 0.23 | 0.26 | ± 0.3 % | ± 0.3 % | ∞ |
| **Combined Standard Uncertainty** | | | | | | **± 11.6 %** | **± 11.4 %** | 330 |
| **Expanded Uncertainty (k=2)** | | | | | | **± 23.2 %** | **± 22.8 %** | |

The above measurement uncertainties are according to IEEE Std 1528

## 5300 MHz Head (SN: 7337)

| Error Description | Uncertainty value ±% | Probability Distribution | Divisor | (Ci) 1g | (Ci) 10g | Standard (1g) | Standard (10g) | vi 2 or Veff |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe calibration | ± 6.55 | Normal | 1 | 1 | 1 | ± 6.6 % | ± 6.6 % | ∞ |
| Isotropy | ± 1.3 | Normal | 1 | 1 | 1 | ± 1.3 % | ± 1.3 % | ∞ |
| Boundary Effects | ± 2.0 | Rectangular | √3 | 1 | 1 | ± 1.2 % | ± 1.2 % | ∞ |
| Probe Linearity | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Probe modulation response | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| Detection limits | ± 0.25 | Rectangular | √3 | 1 | 1 | ± 0.14 % | ± 0.14 % | ∞ |
| Readout Electronics | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Response time | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Integration time | ± 2.6 | Rectangular | √3 | 1 | 1 | ± 1.5 % | ± 1.5 % | ∞ |
| RF Ambient Conditions – Noise | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| RF Ambient Conditions – Reflections | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| Probe Positioner | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Probe Positioning | ± 6.7 | Rectangular | √3 | 1 | 1 | ± 3.9 % | ± 3.9 % | ∞ |
| Algorithms for Max. SAR Eval. | ± 4.0 | Rectangular | √3 | 1 | 1 | ± 2.3 % | ± 2.3 % | ∞ |
| **Test Sample Related** | | | | | | | | |
| Device Positioning | ± 2.9 | Normal | 1 | 1 | 1 | ± 2.9 % | ± 2.9 % | 145 |
| Device Holder | ± 3.6 | Normal | 1 | 1 | 1 | ± 3.6 % | ± 3.6 % | 5 |
| Power Drift | ± 5.0 | Rectangular | √3 | 1 | 1 | ± 2.9 % | ± 2.9 % | ∞ |
| SAR Scaling | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| **Physical Parameters** | | | | | | | | |
| Phantom Shell | ± 7.6 | Rectangular | √3 | 1 | 1 | ± 4.4 % | ± 4.4 % | ∞ |
| SAR correction | ± 0.0 | Normal | 1 | 1 | 0.84 | ± 0.0 % | ± 0.0 % | ∞ |
| Liquid conductivity (Target) | ± 5.0 | Rectangular | √3 | 0.64 | 0.43 | ± 1.8 % | ± 1.2 % | ∞ |
| Liquid conductivity (Meas.) | ± 3.8 | Normal | 1 | 0.78 | 0.71 | ± 3.0 % | ± 2.7 % | 10 |
| Liquid permittivity (Target) | ± 5.0 | Rectangular | √3 | 0.60 | 0.49 | ± 1.7 % | ± 1.4 % | ∞ |
| Liquid permittivity (Meas.) | ± 4.0 | Normal | 1 | 0.23 | 0.26 | ± 0.9 % | ± 1.0 % | 10 |
| Temp. unc. - Conductivity | ± 1.8 | Rectangular | √3 | 0.78 | 0.71 | ± 0.8 % | ± 0.7 % | ∞ |
| Temp. unc. - Permittivity | ± 1.9 | Rectangular | √3 | 0.23 | 0.26 | ± 0.3 % | ± 0.3 % | ∞ |
| **Combined Standard Uncertainty** | | | | | | **± 11.9 %** | **± 11.7 %** | 330 |
| **Expanded Uncertainty (k=2)** | | | | | | **± 23.8 %** | **± 23.4 %** | |

The above measurement uncertainties are according to IEEE Std 1528

**5300 MHz Body (SN: 3933)**

| Error Description | Uncertainty value ±% | Probability Distribution | Divisor | (Ci) 1g | (Ci) 10g | Standard (1g) | Standard (10g) | vi 2 or Veff |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe calibration | ± 6.55 | Normal | 1 | 1 | 1 | ± 6.6 % | ± 6.6 % | ∞ |
| Isotropy | ± 1.3 | Normal | 1 | 1 | 1 | ± 1.3 % | ± 1.3 % | ∞ |
| Boundary Effects | ± 2.0 | Rectangular | √3 | 1 | 1 | ± 1.2 % | ± 1.2 % | ∞ |
| Probe Linearity | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Probe modulation response | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| Detection limits | ± 0.25 | Rectangular | √3 | 1 | 1 | ± 0.14 % | ± 0.14 % | ∞ |
| Readout Electronics | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Response time | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Integration time | ± 2.6 | Rectangular | √3 | 1 | 1 | ± 1.5 % | ± 1.5 % | ∞ |
| RF Ambient Conditions – Noise | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| RF Ambient Conditions – Reflections | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| Probe Positioner | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Probe Positioning | ± 6.7 | Rectangular | √3 | 1 | 1 | ± 3.9 % | ± 3.9 % | ∞ |
| Algorithms for Max. SAR Eval. | ± 4.0 | Rectangular | √3 | 1 | 1 | ± 2.3 % | ± 2.3 % | ∞ |
| **Test Sample Related** | | | | | | | | |
| Device Positioning | ± 2.9 | Normal | 1 | 1 | 1 | ± 2.9 % | ± 2.9 % | 145 |
| Device Holder | ± 3.6 | Normal | 1 | 1 | 1 | ± 3.6 % | ± 3.6 % | 5 |
| Power Drift | ± 5.0 | Rectangular | √3 | 1 | 1 | ± 2.9 % | ± 2.9 % | ∞ |
| SAR Scaling | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| **Physical Parameters** | | | | | | | | |
| Phantom Shell | ± 7.6 | Rectangular | √3 | 1 | 1 | ± 4.4 % | ± 4.4 % | ∞ |
| SAR correction | ± 0.0 | Normal | 1 | 1 | 0.84 | ± 0.0 % | ± 0.0 % | ∞ |
| Liquid conductivity (Target) | ± 5.0 | Rectangular | √3 | 0.64 | 0.43 | ± 1.8 % | ± 1.2 % | ∞ |
| Liquid conductivity (Meas.) | ± 3.9 | Normal | 1 | 0.78 | 0.71 | ± 3.0 % | ± 2.8 % | 10 |
| Liquid permittivity (Target) | ± 5.0 | Rectangular | √3 | 0.60 | 0.49 | ± 1.7 % | ± 1.4 % | ∞ |
| Liquid permittivity (Meas.) | ± 4.2 | Normal | 1 | 0.23 | 0.26 | ± 1.0 % | ± 1.1 % | 10 |
| Temp. unc. - Conductivity | ± 1.7 | Rectangular | √3 | 0.78 | 0.71 | ± 0.8 % | ± 0.7 % | ∞ |
| Temp. unc. - Permittivity | ± 1.7 | Rectangular | √3 | 0.23 | 0.26 | ± 0.2 % | ± 0.3 % | ∞ |
| **Combined Standard Uncertainty** | | | | | | **± 11.9 %** | **± 11.7 %** | 330 |
| **Expanded Uncertainty (k=2)** | | | | | | **± 23.8 %** | **± 23.4 %** | |

The above measurement uncertainties are according to IEEE Std 1528

**5500 MHz Head (SN: 7337)**

| Error Description | Uncertainty value ±% | Probability Distribution | Divisor | (Ci) 1g | (Ci) 10g | Standard (1g) | Standard (10g) | vi 2 or Veff |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe calibration | ± 6.55 | Normal | 1 | 1 | 1 | ± 6.6 % | ± 6.6 % | ∞ |
| Isotropy | ± 1.3 | Normal | 1 | 1 | 1 | ± 1.3 % | ± 1.3 % | ∞ |
| Boundary Effects | ± 2.0 | Rectangular | √3 | 1 | 1 | ± 1.2 % | ± 1.2 % | ∞ |
| Probe Linearity | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Probe modulation response | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| Detection limits | ± 0.25 | Rectangular | √3 | 1 | 1 | ± 0.14 % | ± 0.14 % | ∞ |
| Readout Electronics | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Response time | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Integration time | ± 2.6 | Rectangular | √3 | 1 | 1 | ± 1.5 % | ± 1.5 % | ∞ |
| RF Ambient Conditions – Noise | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| RF Ambient Conditions – Reflections | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| Probe Positioner | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Probe Positioning | ± 6.7 | Rectangular | √3 | 1 | 1 | ± 3.9 % | ± 3.9 % | ∞ |
| Algorithms for Max. SAR Eval. | ± 4.0 | Rectangular | √3 | 1 | 1 | ± 2.3 % | ± 2.3 % | ∞ |
| **Test Sample Related** | | | | | | | | |
| Device Positioning | ± 2.9 | Normal | 1 | 1 | 1 | ± 2.9 % | ± 2.9 % | 145 |
| Device Holder | ± 3.6 | Normal | 1 | 1 | 1 | ± 3.6 % | ± 3.6 % | 5 |
| Power Drift | ± 5.0 | Rectangular | √3 | 1 | 1 | ± 2.9 % | ± 2.9 % | ∞ |
| SAR Scaling | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| **Physical Parameters** | | | | | | | | |
| Phantom Shell | ± 7.6 | Rectangular | √3 | 1 | 1 | ± 4.4 % | ± 4.4 % | ∞ |
| SAR correction | ± 0.0 | Normal | 1 | 1 | 0.84 | ± 0.0 % | ± 0.0 % | ∞ |
| Liquid conductivity (Target) | ± 5.0 | Rectangular | √3 | 0.64 | 0.43 | ± 1.8 % | ± 1.2 % | ∞ |
| Liquid conductivity (Meas.) | ± 4.1 | Normal | 1 | 0.78 | 0.71 | ± 3.2 % | ± 2.9 % | 10 |
| Liquid permittivity (Target) | ± 5.0 | Rectangular | √3 | 0.60 | 0.49 | ± 1.7 % | ± 1.4 % | ∞ |
| Liquid permittivity (Meas.) | ± 4.2 | Normal | 1 | 0.23 | 0.26 | ± 1.0 % | ± 1.1 % | 10 |
| Temp. unc. - Conductivity | ± 2.0 | Rectangular | √3 | 0.78 | 0.71 | ± 0.9 % | ± 0.8 % | ∞ |
| Temp. unc. - Permittivity | ± 1.9 | Rectangular | √3 | 0.23 | 0.26 | ± 0.3 % | ± 0.3 % | ∞ |
| **Combined Standard Uncertainty** | | | | | | **± 11.9 %** | **± 11.7 %** | 330 |
| **Expanded Uncertainty (k=2)** | | | | | | **± 23.8 %** | **± 23.4 %** | |

The above measurement uncertainties are according to IEEE Std 1528

**5500 MHz Body (SN: 3933)**

| Error Description | Uncertainty value ±% | Probability Distribution | Divisor | (Ci) 1g | (Ci) 10g | Standard (1g) | Standard (10g) | vi 2 or Veff |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe calibration | ± 6.55 | Normal | 1 | 1 | 1 | ± 6.6 % | ± 6.6 % | ∞ |
| Isotropy | ± 1.3 | Normal | 1 | 1 | 1 | ± 1.3 % | ± 1.3 % | ∞ |
| Boundary Effects | ± 2.0 | Rectangular | √3 | 1 | 1 | ± 1.2 % | ± 1.2 % | ∞ |
| Probe Linearity | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Probe modulation response | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| Detection limits | ± 0.25 | Rectangular | √3 | 1 | 1 | ± 0.14 % | ± 0.14 % | ∞ |
| Readout Electronics | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Response time | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Integration time | ± 2.6 | Rectangular | √3 | 1 | 1 | ± 1.5 % | ± 1.5 % | ∞ |
| RF Ambient Conditions – Noise | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| RF Ambient Conditions – Reflections | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| Probe Positioner | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Probe Positioning | ± 6.7 | Rectangular | √3 | 1 | 1 | ± 3.9 % | ± 3.9 % | ∞ |
| Algorithms for Max. SAR Eval. | ± 4.0 | Rectangular | √3 | 1 | 1 | ± 2.3 % | ± 2.3 % | ∞ |
| **Test Sample Related** | | | | | | | | |
| Device Positioning | ± 2.9 | Normal | 1 | 1 | 1 | ± 2.9 % | ± 2.9 % | 145 |
| Device Holder | ± 3.6 | Normal | 1 | 1 | 1 | ± 3.6 % | ± 3.6 % | 5 |
| Power Drift | ± 5.0 | Rectangular | √3 | 1 | 1 | ± 2.9 % | ± 2.9 % | ∞ |
| SAR Scaling | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| **Physical Parameters** | | | | | | | | |
| Phantom Shell | ± 7.6 | Rectangular | √3 | 1 | 1 | ± 4.4 % | ± 4.4 % | ∞ |
| SAR correction | ± 0.0 | Normal | 1 | 1 | 0.84 | ± 0.0 % | ± 0.0 % | ∞ |
| Liquid conductivity (Target) | ± 5.0 | Rectangular | √3 | 0.64 | 0.43 | ± 1.8 % | ± 1.2 % | ∞ |
| Liquid conductivity (Meas.) | ± 4.0 | Normal | 1 | 0.78 | 0.71 | ± 3.1 % | ± 2.8 % | 10 |
| Liquid permittivity (Target) | ± 5.0 | Rectangular | √3 | 0.60 | 0.49 | ± 1.7 % | ± 1.4 % | ∞ |
| Liquid permittivity (Meas.) | ± 3.8 | Normal | 1 | 0.23 | 0.26 | ± 0.9 % | ± 1.0 % | 10 |
| Temp. unc. - Conductivity | ± 2.0 | Rectangular | √3 | 0.78 | 0.71 | ± 0.9 % | ± 0.8 % | ∞ |
| Temp. unc. - Permittivity | ± 2.0 | Rectangular | √3 | 0.23 | 0.26 | ± 0.3 % | ± 0.3 % | ∞ |
| **Combined Standard Uncertainty** | | | | | | **± 11.9 %** | **± 11.7 %** | 330 |
| **Expanded Uncertainty (k=2)** | | | | | | **± 23.8 %** | **± 23.4 %** | |

The above measurement uncertainties are according to IEEE Std 1528

**5800 MHz Head (SN: 7337)**

| Error Description | Uncertainty value ±% | Probability Distribution | Divisor | (Ci) 1g | (Ci) 10g | Standard (1g) | Standard (10g) | vi 2 or Veff |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe calibration | ± 6.55 | Normal | 1 | 1 | 1 | ± 6.6 % | ± 6.6 % | ∞ |
| Isotropy | ± 1.3 | Normal | 1 | 1 | 1 | ± 1.3 % | ± 1.3 % | ∞ |
| Boundary Effects | ± 2.0 | Rectangular | √3 | 1 | 1 | ± 1.2 % | ± 1.2 % | ∞ |
| Probe Linearity | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Probe modulation response | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| Detection limits | ± 0.25 | Rectangular | √3 | 1 | 1 | ± 0.14 % | ± 0.14 % | ∞ |
| Readout Electronics | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Response time | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Integration time | ± 2.6 | Rectangular | √3 | 1 | 1 | ± 1.5 % | ± 1.5 % | ∞ |
| RF Ambient Conditions – Noise | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| RF Ambient Conditions – Reflections | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| Probe Positioner | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Probe Positioning | ± 6.7 | Rectangular | √3 | 1 | 1 | ± 3.9 % | ± 3.9 % | ∞ |
| Algorithms for Max. SAR Eval. | ± 4.0 | Rectangular | √3 | 1 | 1 | ± 2.3 % | ± 2.3 % | ∞ |
| **Test Sample Related** | | | | | | | | |
| Device Positioning | ± 2.9 | Normal | 1 | 1 | 1 | ± 2.9 % | ± 2.9 % | 145 |
| Device Holder | ± 3.6 | Normal | 1 | 1 | 1 | ± 3.6 % | ± 3.6 % | 5 |
| Power Drift | ± 5.0 | Rectangular | √3 | 1 | 1 | ± 2.9 % | ± 2.9 % | ∞ |
| SAR Scaling | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| **Physical Parameters** | | | | | | | | |
| Phantom Shell | ± 7.6 | Rectangular | √3 | 1 | 1 | ± 4.4 % | ± 4.4 % | ∞ |
| SAR correction | ± 0.0 | Normal | 1 | 1 | 0.84 | ± 0.0 % | ± 0.0 % | ∞ |
| Liquid conductivity (Target) | ± 5.0 | Rectangular | √3 | 0.64 | 0.43 | ± 1.8 % | ± 1.2 % | ∞ |
| Liquid conductivity (Meas.) | ± 3.8 | Normal | 1 | 0.78 | 0.71 | ± 3.0 % | ± 2.7 % | 10 |
| Liquid permittivity (Target) | ± 5.0 | Rectangular | √3 | 0.60 | 0.49 | ± 1.7 % | ± 1.4 % | ∞ |
| Liquid permittivity (Meas.) | ± 4.1 | Normal | 1 | 0.23 | 0.26 | ± 0.9 % | ± 1.1 % | 10 |
| Temp. unc. - Conductivity | ± 1.9 | Rectangular | √3 | 0.78 | 0.71 | ± 0.9 % | ± 0.8 % | ∞ |
| Temp. unc. - Permittivity | ± 2.0 | Rectangular | √3 | 0.23 | 0.26 | ± 0.3 % | ± 0.3 % | ∞ |
| **Combined Standard Uncertainty** | | | | | | **± 11.9 %** | **± 11.7 %** | 330 |
| **Expanded Uncertainty (k=2)** | | | | | | **± 23.8 %** | **± 23.4 %** | |

The above measurement uncertainties are according to IEEE Std 1528

**5800 MHz Body (SN: 3933)**

| Error Description | Uncertainty value ±% | Probability Distribution | Divisor | (Ci) 1g | (Ci) 10g | Standard (1g) | Standard (10g) | vi 2 or Veff |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe calibration | ± 6.55 | Normal | 1 | 1 | 1 | ± 6.6 % | ± 6.6 % | ∞ |
| Isotropy | ± 1.3 | Normal | 1 | 1 | 1 | ± 1.3 % | ± 1.3 % | ∞ |
| Boundary Effects | ± 2.0 | Rectangular | √3 | 1 | 1 | ± 1.2 % | ± 1.2 % | ∞ |
| Probe Linearity | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Probe modulation response | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| Detection limits | ± 0.25 | Rectangular | √3 | 1 | 1 | ± 0.14 % | ± 0.14 % | ∞ |
| Readout Electronics | ± 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % | ∞ |
| Response time | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Integration time | ± 2.6 | Rectangular | √3 | 1 | 1 | ± 1.5 % | ± 1.5 % | ∞ |
| RF Ambient Conditions – Noise | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| RF Ambient Conditions – Reflections | ± 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % | ∞ |
| Probe Positioner | ± 0.8 | Rectangular | √3 | 1 | 1 | ± 0.46 % | ± 0.46 % | ∞ |
| Probe Positioning | ± 6.7 | Rectangular | √3 | 1 | 1 | ± 3.9 % | ± 3.9 % | ∞ |
| Algorithms for Max. SAR Eval. | ± 4.0 | Rectangular | √3 | 1 | 1 | ± 2.3 % | ± 2.3 % | ∞ |
| **Test Sample Related** | | | | | | | | |
| Device Positioning | ± 2.9 | Normal | 1 | 1 | 1 | ± 2.9 % | ± 2.9 % | 145 |
| Device Holder | ± 3.6 | Normal | 1 | 1 | 1 | ± 3.6 % | ± 3.6 % | 5 |
| Power Drift | ± 5.0 | Rectangular | √3 | 1 | 1 | ± 2.9 % | ± 2.9 % | ∞ |
| SAR Scaling | ± 0.0 | Rectangular | √3 | 1 | 1 | ± 0.0 % | ± 0.0 % | ∞ |
| **Physical Parameters** | | | | | | | | |
| Phantom Shell | ± 7.6 | Rectangular | √3 | 1 | 1 | ± 4.4 % | ± 4.4 % | ∞ |
| SAR correction | ± 0.0 | Normal | 1 | 1 | 0.84 | ± 0.0 % | ± 0.0 % | ∞ |
| Liquid conductivity (Target) | ± 5.0 | Rectangular | √3 | 0.64 | 0.43 | ± 1.8 % | ± 1.2 % | ∞ |
| Liquid conductivity (Meas.) | ± 4.0 | Normal | 1 | 0.78 | 0.71 | ± 3.1 % | ± 2.8 % | 10 |
| Liquid permittivity (Target) | ± 5.0 | Rectangular | √3 | 0.60 | 0.49 | ± 1.7 % | ± 1.4 % | ∞ |
| Liquid permittivity (Meas.) | ± 4.1 | Normal | 1 | 0.23 | 0.26 | ± 0.9 % | ± 1.1 % | 10 |
| Temp. unc. - Conductivity | ± 2.0 | Rectangular | √3 | 0.78 | 0.71 | ± 0.9 % | ± 0.8 % | ∞ |
| Temp. unc. - Permittivity | ± 1.9 | Rectangular | √3 | 0.23 | 0.26 | ± 0.3 % | ± 0.3 % | ∞ |
| **Combined Standard Uncertainty** | | | | | | **± 11.9 %** | **± 11.7 %** | 330 |
| **Expanded Uncertainty (k=2)** | | | | | | **± 23.8 %** | **± 23.4 %** | |

The above measurement uncertainties are according to IEEE Std 1528

# 15. CONCLUSION

**Measurement Conclusion**

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements are taken to simulate the RF effects exposure under the worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The tested device complies with the requirements in respect to all parameters subject to the test. The test results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are every complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role impossible biological effect are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease).

Because innumerable factors may interact to determine the specific biological outcome of an exposure to electromagnetic fields, any protection guide shall consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

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# APPENDIX A. – Probe Calibration Data

**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
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 **DT&C (Dymstec)**

Certificate No: **EX3-3933_Sep19**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | EX3DV4 - SN:3933 |
| Calibration procedure(s) | QA CAL-01.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7<br>Calibration procedure for dosimetric E-field probes |
| Calibration date: | September 27, 2019 |

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&TE critical for calibration)

| Primary Standards | ID | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter NRP | SN: 104778 | 03-Apr-19 (No. 217-02892/02893) | Apr-20 |
| Power sensor NRP-Z91 | SN: 103244 | 03-Apr-19 (No. 217-02892) | Apr-20 |
| Power sensor NRP-Z91 | SN: 103245 | 03-Apr-19 (No. 217-02893) | Apr-20 |
| Reference 20 dB Attenuator | SN: S5277 (20x) | 04-Apr-19 (No. 217-02894) | Apr-20 |
| DAE4 | SN: 660 | 19-Dec-18 (No. DAE4-660_Dec18) | Dec-19 |
| Reference Probe ES3DV2 | SN: 3013 | 31-Dec-18 (No. ES3-3013_Dec18) | Dec-19 |
| | | | |
| Secondary Standards | ID | Check Date (in house) | Scheduled Check |
| Power meter E4419B | SN: GB41293874 | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| Power sensor E4412A | SN: MY41498087 | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| Power sensor E4412A | SN: 000110210 | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| RF generator HP 8648C | SN: US3642U01700 | 04-Aug-99 (in house check Jun-18) | In house check: Jun-20 |
| Network Analyzer E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-18) | In house check: Oct-19 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Claudio Leubler | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: September 30, 2019

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

S Schweizerischer Kalibrierdienst
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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 |
| 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.e., 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, ", "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
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 ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect 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 with CW signal (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; Dx,y,z; VRx,y,z: 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 ≤ 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 *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 ± 50 MHz to ± 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 *NORMx* (no uncertainty required).

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3933

## Basic Calibration Parameters

| | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|---|---|---|---|
| Norm ($\mu V/(V/m)^2$)[A] | 0.49 | 0.52 | 0.19 | ± 10.1 % |
| DCP (mV)[B] | 105.1 | 100.3 | 95.6 | |

## Calibration Results for Modulation Response

| UID | Communication System Name | | A dB | B dB√μV | C | D dB | VR mV | Max dev. | Max Unc[E] (k=2) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | CW | X | 0.00 | 0.00 | 1.00 | 0.00 | 163.3 | ± 2.2 % | ± 4.7 % |
| | | Y | 0.00 | 0.00 | 1.00 | | 166.6 | | |
| | | Z | 0.00 | 0.00 | 1.00 | | 158.8 | | |
| 10352-AAA | Pulse Waveform (200Hz, 10%) | X | 15.00 | 90.30 | 22.21 | 10.00 | 60.0 | ± 3.2 % | ± 9.6 % |
| | | Y | 15.00 | 89.45 | 22.16 | | 60.0 | | |
| | | Z | 15.00 | 90.07 | 22.52 | | 60.0 | | |
| 10353-AAA | Pulse Waveform (200Hz, 20%) | X | 15.00 | 93.23 | 22.50 | 6.99 | 80.0 | ± 2.1 % | ± 9.6 % |
| | | Y | 15.00 | 90.02 | 21.08 | | 80.0 | | |
| | | Z | 15.00 | 92.33 | 21.94 | | 80.0 | | |
| 10354-AAA | Pulse Waveform (200Hz, 40%) | X | 15.00 | 102.11 | 25.43 | 3.98 | 95.0 | ± 2.4 % | ± 9.6 % |
| | | Y | 15.00 | 91.85 | 20.31 | | 95.0 | | |
| | | Z | 15.00 | 161.21 | 54.32 | | 95.0 | | |
| 10355-AAA | Pulse Waveform (200Hz, 60%) | X | 15.00 | 127.83 | 36.23 | 2.22 | 120.0 | ± 3.0 % | ± 9.6 % |
| | | Y | 15.00 | 100.88 | 23.08 | | 120.0 | | |
| | | Z | 0.11 | 60.00 | 30.00 | | 120.0 | | |
| 10387-AAA | QPSK Waveform, 1 MHz | X | 15.00 | 94.61 | 19.88 | 0.00 | 150.0 | ± 4.9 % | ± 9.6 % |
| | | Y | 0.98 | 66.33 | 11.74 | | 150.0 | | |
| | | Z | 0.03 | 60.00 | 30.00 | | 150.0 | | |
| 10388-AAA | QPSK Waveform, 10 MHz | X | 4.47 | 82.57 | 22.97 | 0.00 | 150.0 | ± 4.7 % | ± 9.6 % |
| | | Y | 2.77 | 72.49 | 18.16 | | 150.0 | | |
| | | Z | 15.00 | 116.88 | 37.35 | | 150.0 | | |
| 10396-AAA | 64-QAM Waveform, 100 kHz | X | 3.14 | 73.89 | 21.30 | 3.01 | 150.0 | ± 3.7 % | ± 9.6 % |
| | | Y | 3.97 | 75.80 | 21.70 | | 150.0 | | |
| | | Z | 15.00 | 121.14 | 42.19 | | 150.0 | | |
| 10399-AAA | 64-QAM Waveform, 40 MHz | X | 4.01 | 70.75 | 18.20 | 0.00 | 150.0 | ± 3.5 % | ± 9.6 % |
| | | Y | 3.70 | 68.48 | 16.76 | | 150.0 | | |
| | | Z | 6.59 | 83.14 | 25.05 | | 150.0 | | |
| 10414-AAA | WLAN CCDF, 64-QAM, 40MHz | X | 4.96 | 67.04 | 16.71 | 0.00 | 150.0 | ± 4.5 % | ± 9.6 % |
| | | Y | 4.95 | 66.11 | 16.05 | | 150.0 | | |
| | | Z | 5.53 | 71.03 | 19.84 | | 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%.

[A] The uncertainties of Norm X,Y,Z do not affect the $E^2$-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3933

## Sensor Model Parameters

| | C1 fF | C2 fF | α $V^{-1}$ | T1 $ms.V^{-2}$ | T2 $ms.V^{-1}$ | T3 ms | T4 $V^{-2}$ | T5 $V^{-1}$ | T6 |
|---|---|---|---|---|---|---|---|---|---|
| X | 37.1 | 274.02 | 35.44 | 16.09 | 0.81 | 5.10 | 0.05 | 0.40 | 1.01 |
| Y | 48.6 | 371.39 | 37.26 | 21.32 | 1.16 | 5.10 | 0.67 | 0.53 | 1.01 |
| Z | 27.0 | 217.61 | 42.23 | 8.67 | 1.66 | 5.07 | 0.00 | 0.24 | 1.01 |

## Other Probe Parameters

| | |
|---|---|
| Sensor Arrangement | Triangular |
| Connector Angle (°) | 76.2 |
| 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 |

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3933

## Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) [C] | Relative Permittivity [F] | Conductivity (S/m) [F] | ConvF X | ConvF Y | ConvF Z | Alpha [G] | Depth [G] (mm) | Unc (k=2) |
|---|---|---|---|---|---|---|---|---|
| 750 | 41.9 | 0.89 | 10.68 | 10.68 | 10.68 | 0.45 | 0.86 | ± 12.0 % |
| 835 | 41.5 | 0.90 | 10.32 | 10.32 | 10.32 | 0.41 | 0.90 | ± 12.0 % |
| 900 | 41.5 | 0.97 | 10.01 | 10.01 | 10.01 | 0.52 | 0.80 | ± 12.0 % |
| 1750 | 40.1 | 1.37 | 8.87 | 8.87 | 8.87 | 0.34 | 0.87 | ± 12.0 % |
| 1900 | 40.0 | 1.40 | 8.57 | 8.57 | 8.57 | 0.30 | 0.87 | ± 12.0 % |
| 2300 | 39.5 | 1.67 | 8.19 | 8.19 | 8.19 | 0.29 | 0.90 | ± 12.0 % |
| 2450 | 39.2 | 1.80 | 7.84 | 7.84 | 7.84 | 0.33 | 0.90 | ± 12.0 % |
| 2600 | 39.0 | 1.96 | 7.62 | 7.62 | 7.62 | 0.25 | 0.90 | ± 12.0 % |
| 3500 | 37.9 | 2.91 | 7.27 | 7.27 | 7.27 | 0.30 | 1.35 | ± 13.1 % |
| 3700 | 37.7 | 3.12 | 6.99 | 6.99 | 6.99 | 0.30 | 1.35 | ± 13.1 % |
| 5200 | 36.0 | 4.66 | 5.29 | 5.29 | 5.29 | 0.40 | 1.80 | ± 13.1 % |
| 5300 | 35.9 | 4.76 | 5.10 | 5.10 | 5.10 | 0.40 | 1.80 | ± 13.1 % |
| 5500 | 35.6 | 4.96 | 4.95 | 4.95 | 4.95 | 0.40 | 1.80 | ± 13.1 % |
| 5600 | 35.5 | 5.07 | 4.80 | 4.80 | 4.80 | 0.40 | 1.80 | ± 13.1 % |
| 5800 | 35.3 | 5.27 | 4.75 | 4.75 | 4.75 | 0.40 | 1.80 | ± 13.1 % |

[C] 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.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] 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.

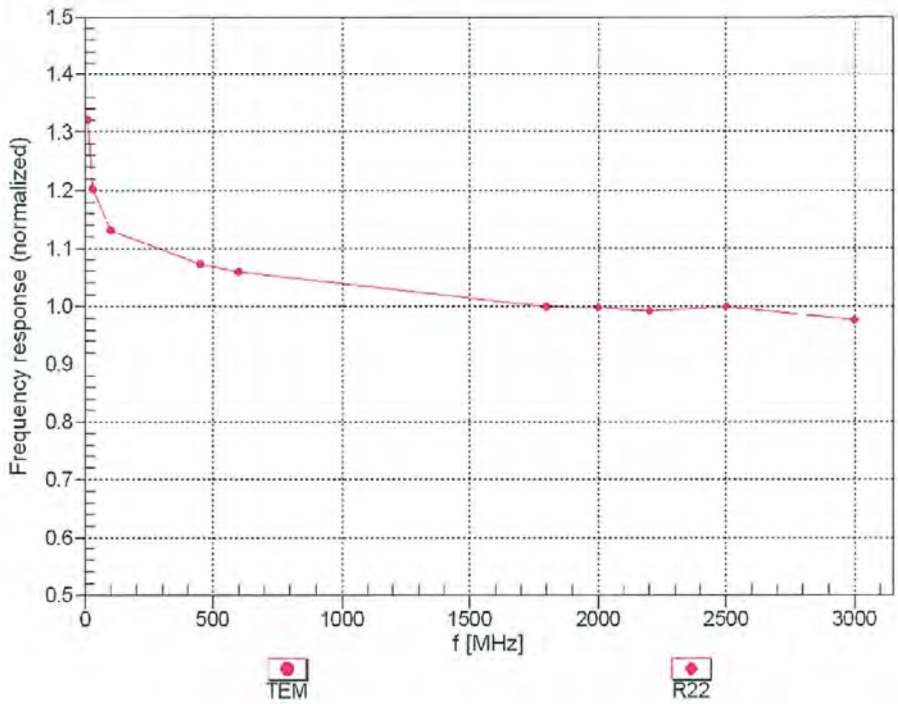
# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3933

## Calibration Parameter Determined in Body Tissue Simulating Media

| f (MHz) [C] | Relative Permittivity [F] | Conductivity (S/m) [F] | ConvF X | ConvF Y | ConvF Z | Alpha [G] | Depth [G] (mm) | Unc (k=2) |
|---|---|---|---|---|---|---|---|---|
| 750 | 55.5 | 0.96 | 10.44 | 10.44 | 10.44 | 0.45 | 0.80 | ± 12.0 % |
| 835 | 55.2 | 0.97 | 10.24 | 10.24 | 10.24 | 0.40 | 0.80 | ± 12.0 % |
| 900 | 55.0 | 1.05 | 10.14 | 10.14 | 10.14 | 0.47 | 0.80 | ± 12.0 % |
| 1750 | 53.4 | 1.49 | 8.64 | 8.64 | 8.64 | 0.40 | 0.87 | ± 12.0 % |
| 1900 | 53.3 | 1.52 | 8.15 | 8.15 | 8.15 | 0.40 | 0.87 | ± 12.0 % |
| 2300 | 52.9 | 1.81 | 7.94 | 7.94 | 7.94 | 0.39 | 0.90 | ± 12.0 % |
| 2450 | 52.7 | 1.95 | 7.75 | 7.75 | 7.75 | 0.38 | 0.90 | ± 12.0 % |
| 2600 | 52.5 | 2.16 | 7.57 | 7.57 | 7.57 | 0.31 | 0.90 | ± 12.0 % |
| 3500 | 51.3 | 3.31 | 6.88 | 6.88 | 6.88 | 0.40 | 1.35 | ± 13.1 % |
| 3700 | 51.0 | 3.55 | 6.82 | 6.82 | 6.82 | 0.40 | 1.35 | ± 13.1 % |
| 5200 | 49.0 | 5.30 | 4.66 | 4.66 | 4.66 | 0.50 | 1.90 | ± 13.1 % |
| 5300 | 48.9 | 5.42 | 4.56 | 4.56 | 4.56 | 0.50 | 1.90 | ± 13.1 % |
| 5500 | 48.6 | 5.65 | 4.20 | 4.20 | 4.20 | 0.50 | 1.90 | ± 13.1 % |
| 5600 | 48.5 | 5.77 | 4.05 | 4.05 | 4.05 | 0.50 | 1.90 | ± 13.1 % |
| 5800 | 48.2 | 6.00 | 4.13 | 4.13 | 4.13 | 0.50 | 1.90 | ± 13.1 % |

[C] 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.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] 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.

# Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)




**Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)**

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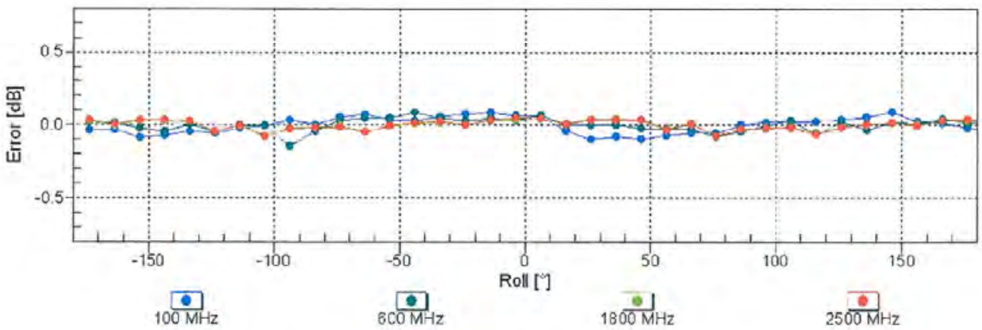
# Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM

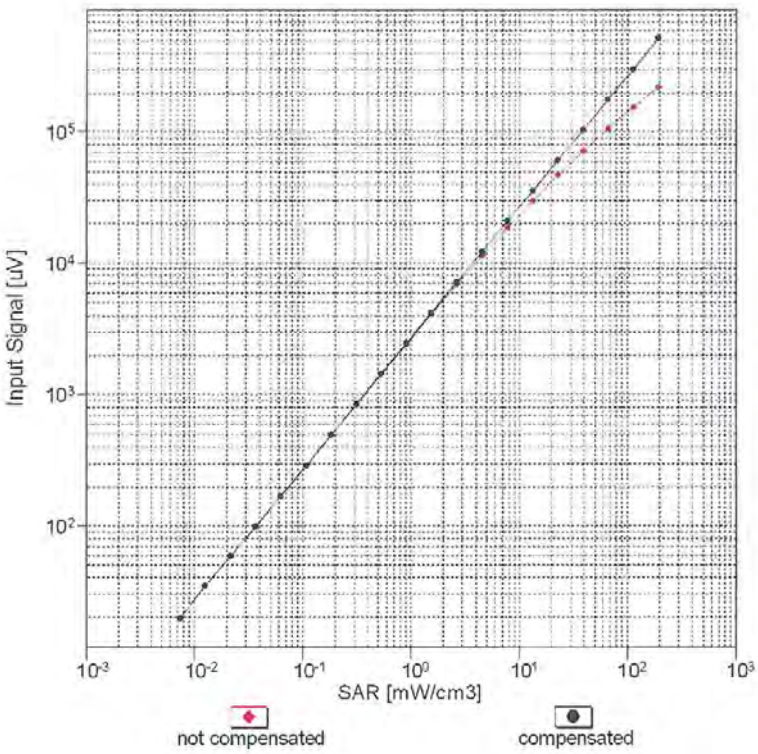
f=1800 MHz,R22

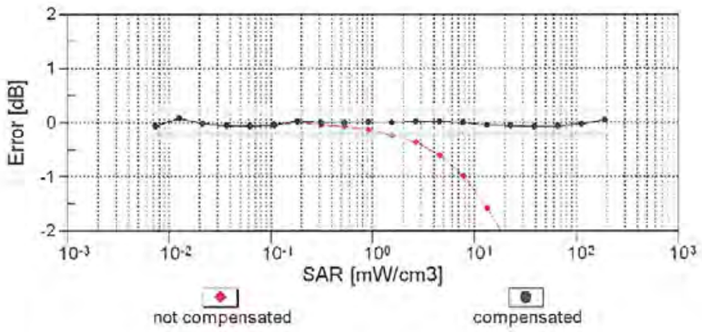




**Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)**

## Dynamic Range f($SAR_{head}$)

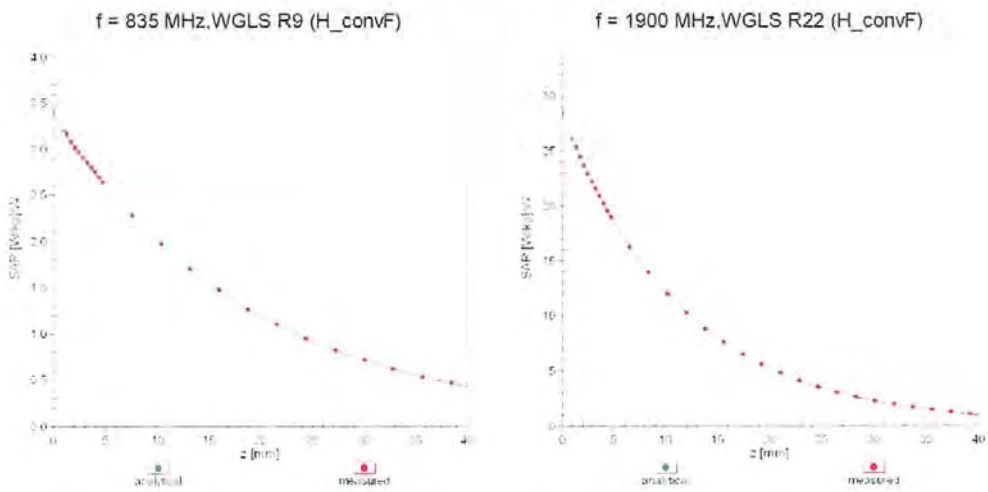
**(TEM cell , $f_{eval}$= 1900 MHz)**



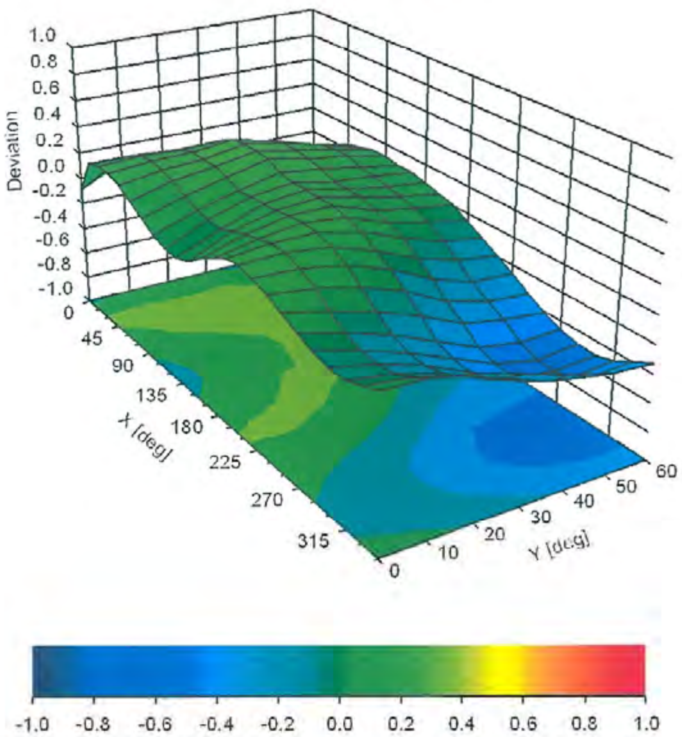

**Uncertainty of Linearity Assessment: ± 0.6% (k=2)**

# Conversion Factor Assessment




# Deviation from Isotropy in Liquid

**Error (ϕ, ϑ), f = 900 MHz**




**Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)**

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## Appendix: Modulation Calibration Parameters

| UID | Rev | Communication System Name | Group | PAR (dB) | Unc[E] (k=2) |
|---|---|---|---|---|---|
| 0 | | CW | CW | 0.00 | ± 4.7 % |
| 10010 | CAA | SAR Validation (Square, 100ms, 10ms) | Test | 10.00 | ± 9.6 % |
| 10011 | CAB | 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 | 9.46 | ± 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 | 7.78 | ± 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, Halfrate) | 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 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps) | WLAN | 8.68 | ± 9.6 % |
| 10063 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps) | WLAN | 8.63 | ± 9.6 % |
| 10064 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps) | WLAN | 9.09 | ± 9.6 % |
| 10065 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps) | WLAN | 9.00 | ± 9.6 % |
| 10066 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps) | WLAN | 9.38 | ± 9.6 % |
| 10067 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps) | WLAN | 10.12 | ± 9.6 % |
| 10068 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps) | WLAN | 10.24 | ± 9.6 % |
| 10069 | CAC | 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 | CAB | UMTS-FDD (HSDPA) | WCDMA | 3.98 | ± 9.6 % |
| 10098 | CAB | 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 | CAE | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK) | LTE-FDD | 5.67 | ± 9.6 % |
| 10101 | CAE | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM) | LTE-FDD | 6.42 | ± 9.6 % |
| 10102 | CAE | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM) | LTE-FDD | 6.60 | ± 9.6 % |
| 10103 | CAG | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK) | LTE-TDD | 9.29 | ± 9.6 % |
| 10104 | CAG | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM) | LTE-TDD | 9.97 | ± 9.6 % |
| 10105 | CAG | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM) | LTE-TDD | 10.01 | ± 9.6 % |
| 10108 | CAG | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK) | LTE-FDD | 5.80 | ± 9.6 % |

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| | | | | | |
|---|---|---|---|---|---|
| 10109 | CAG | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM) | LTE-FDD | 6.43 | ± 9.6 % |
| 10110 | CAG | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK) | LTE-FDD | 5.75 | ± 9.6 % |
| 10111 | CAG | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM) | LTE-FDD | 6.44 | ± 9.6 % |
| 10112 | CAG | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM) | LTE-FDD | 6.59 | ± 9.6 % |
| 10113 | CAG | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM) | LTE-FDD | 6.62 | ± 9.6 % |
| 10114 | CAC | IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK) | WLAN | 8.10 | ± 9.6 % |
| 10115 | CAC | IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM) | WLAN | 8.46 | ± 9.6 % |
| 10116 | CAC | IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM) | WLAN | 8.15 | ± 9.6 % |
| 10117 | CAC | IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK) | WLAN | 8.07 | ± 9.6 % |
| 10118 | CAC | IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM) | WLAN | 8.59 | ± 9.6 % |
| 10119 | CAC | IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM) | WLAN | 8.13 | ± 9.6 % |
| 10140 | CAE | LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM) | LTE-FDD | 6.49 | ± 9.6 % |
| 10141 | CAE | LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM) | LTE-FDD | 6.53 | ± 9.6 % |
| 10142 | CAE | LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK) | LTE-FDD | 5.73 | ± 9.6 % |
| 10143 | CAE | LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM) | LTE-FDD | 6.35 | ± 9.6 % |
| 10144 | CAE | LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM) | LTE-FDD | 6.65 | ± 9.6 % |
| 10145 | CAF | LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK) | LTE-FDD | 5.76 | ± 9.6 % |
| 10146 | CAF | LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM) | LTE-FDD | 6.41 | ± 9.6 % |
| 10147 | CAF | LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM) | LTE-FDD | 6.72 | ± 9.6 % |
| 10149 | CAE | LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM) | LTE-FDD | 6.42 | ± 9.6 % |
| 10150 | CAE | LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM) | LTE-FDD | 6.60 | ± 9.6 % |
| 10151 | CAG | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK) | LTE-TDD | 9.28 | ± 9.6 % |
| 10152 | CAG | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM) | LTE-TDD | 9.92 | ± 9.6 % |
| 10153 | CAG | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM) | LTE-TDD | 10.05 | ± 9.6 % |
| 10154 | CAG | LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK) | LTE-FDD | 5.75 | ± 9.6 % |
| 10155 | CAG | LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM) | LTE-FDD | 6.43 | ± 9.6 % |
| 10156 | CAG | LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK) | LTE-FDD | 5.79 | ± 9.6 % |
| 10157 | CAG | LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM) | LTE-FDD | 6.49 | ± 9.6 % |
| 10158 | CAG | LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM) | LTE-FDD | 6.62 | ± 9.6 % |
| 10159 | CAG | LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM) | LTE-FDD | 6.56 | ± 9.6 % |
| 10160 | CAE | LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK) | LTE-FDD | 5.82 | ± 9.6 % |
| 10161 | CAE | LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM) | LTE-FDD | 6.43 | ± 9.6 % |
| 10162 | CAE | LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM) | LTE-FDD | 6.58 | ± 9.6 % |
| 10166 | CAF | LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK) | LTE-FDD | 5.46 | ± 9.6 % |
| 10167 | CAF | LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM) | LTE-FDD | 6.21 | ± 9.6 % |
| 10168 | CAF | LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM) | LTE-FDD | 6.79 | ± 9.6 % |
| 10169 | CAE | LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK) | LTE-FDD | 5.73 | ± 9.6 % |
| 10170 | CAE | LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM) | LTE-FDD | 6.52 | ± 9.6 % |
| 10171 | AAE | LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM) | LTE-FDD | 6.49 | ± 9.6 % |
| 10172 | CAG | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK) | LTE-TDD | 9.21 | ± 9.6 % |
| 10173 | CAG | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM) | LTE-TDD | 9.48 | ± 9.6 % |
| 10174 | CAG | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM) | LTE-TDD | 10.25 | ± 9.6 % |
| 10175 | CAG | LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK) | LTE-FDD | 5.72 | ± 9.6 % |
| 10176 | CAG | LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM) | LTE-FDD | 6.52 | ± 9.6 % |
| 10177 | CAI | LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK) | LTE-FDD | 5.73 | ± 9.6 % |
| 10178 | CAG | LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM) | LTE-FDD | 6.52 | ± 9.6 % |
| 10179 | CAG | LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM) | LTE-FDD | 6.50 | ± 9.6 % |
| 10180 | CAG | LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM) | LTE-FDD | 6.50 | ± 9.6 % |
| 10181 | CAE | LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK) | LTE-FDD | 5.72 | ± 9.6 % |
| 10182 | CAE | LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM) | LTE-FDD | 6.52 | ± 9.6 % |
| 10183 | AAD | LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM) | LTE-FDD | 6.50 | ± 9.6 % |
| 10184 | CAE | LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK) | LTE-FDD | 5.73 | ± 9.6 % |
| 10185 | CAE | LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM) | LTE-FDD | 6.51 | ± 9.6 % |
| 10186 | AAE | LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM) | LTE-FDD | 6.50 | ± 9.6 % |
| 10187 | CAF | LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK) | LTE-FDD | 5.73 | ± 9.6 % |
| 10188 | CAF | LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM) | LTE-FDD | 6.52 | ± 9.6 % |
| 10189 | AAF | LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM) | LTE-FDD | 6.50 | ± 9.6 % |
| 10193 | CAC | IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK) | WLAN | 8.09 | ± 9.6 % |
| 10194 | CAC | IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM) | WLAN | 8.12 | ± 9.6 % |
| 10195 | CAC | IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM) | WLAN | 8.21 | ± 9.6 % |
| 10196 | CAC | IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK) | WLAN | 8.10 | ± 9.6 % |
| 10197 | CAC | IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM) | WLAN | 8.13 | ± 9.6 % |
| 10198 | CAC | IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM) | WLAN | 8.27 | ± 9.6 % |
| 10219 | CAC | IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK) | WLAN | 8.03 | ± 9.6 % |

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| | | | | | |
|---|---|---|---|---|---|
| 10220 | CAC | IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM) | WLAN | 8.13 | ± 9.6 % |
| 10221 | CAC | IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM) | WLAN | 8.27 | ± 9.6 % |
| 10222 | CAC | IEEE 802.11n (HT Mixed, 15 Mbps, BPSK) | WLAN | 8.06 | ± 9.6 % |
| 10223 | CAC | IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM) | WLAN | 8.48 | ± 9.6 % |
| 10224 | CAC | IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM) | WLAN | 8.08 | ± 9.6 % |
| 10225 | CAB | UMTS-FDD (HSPA+) | WCDMA | 5.97 | ± 9.6 % |
| 10226 | CAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM) | LTE-TDD | 9.49 | ± 9.6 % |
| 10227 | CAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM) | LTE-TDD | 10.26 | ± 9.6 % |
| 10228 | CAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK) | LTE-TDD | 9.22 | ± 9.6 % |
| 10229 | CAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM) | LTE-TDD | 9.48 | ± 9.6 % |
| 10230 | CAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM) | LTE-TDD | 10.25 | ± 9.6 % |
| 10231 | CAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK) | LTE-TDD | 9.19 | ± 9.6 % |
| 10232 | CAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM) | LTE-TDD | 9.48 | ± 9.6 % |
| 10233 | CAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM) | LTE-TDD | 10.25 | ± 9.6 % |
| 10234 | CAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK) | LTE-TDD | 9.21 | ± 9.6 % |
| 10235 | CAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM) | LTE-TDD | 9.48 | ± 9.6 % |
| 10236 | CAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM) | LTE-TDD | 10.25 | ± 9.6 % |
| 10237 | CAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK) | LTE-TDD | 9.21 | ± 9.6 % |
| 10238 | CAF | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM) | LTE-TDD | 9.48 | ± 9.6 % |
| 10239 | CAF | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM) | LTE-TDD | 10.25 | ± 9.6 % |
| 10240 | CAF | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK) | LTE-TDD | 9.21 | ± 9.6 % |
| 10241 | CAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM) | LTE-TDD | 9.82 | ± 9.6 % |
| 10242 | CAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM) | LTE-TDD | 9.86 | ± 9.6 % |
| 10243 | CAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK) | LTE-TDD | 9.46 | ± 9.6 % |
| 10244 | CAD | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM) | LTE-TDD | 10.06 | ± 9.6 % |
| 10245 | CAD | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM) | LTE-TDD | 10.06 | ± 9.6 % |
| 10246 | CAD | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK) | LTE-TDD | 9.30 | ± 9.6 % |
| 10247 | CAG | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM) | LTE-TDD | 9.91 | ± 9.6 % |
| 10248 | CAG | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM) | LTE-TDD | 10.09 | ± 9.6 % |
| 10249 | CAG | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK) | LTE-TDD | 9.29 | ± 9.6 % |
| 10250 | CAG | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM) | LTE-TDD | 9.81 | ± 9.6 % |
| 10251 | CAG | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM) | LTE-TDD | 10.17 | ± 9.6 % |
| 10252 | CAG | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK) | LTE-TDD | 9.24 | ± 9.6 % |
| 10253 | CAF | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM) | LTE-TDD | 9.90 | ± 9.6 % |
| 10254 | CAF | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM) | LTE-TDD | 10.14 | ± 9.6 % |
| 10255 | CAF | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK) | LTE-TDD | 9.20 | ± 9.6 % |
| 10256 | CAB | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM) | LTE-TDD | 9.96 | ± 9.6 % |
| 10257 | CAB | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM) | LTE-TDD | 10.08 | ± 9.6 % |
| 10258 | CAB | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK) | LTE-TDD | 9.34 | ± 9.6 % |
| 10259 | CAD | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM) | LTE-TDD | 9.98 | ± 9.6 % |
| 10260 | CAD | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM) | LTE-TDD | 9.97 | ± 9.6 % |
| 10261 | CAD | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK) | LTE-TDD | 9.24 | ± 9.6 % |
| 10262 | CAG | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM) | LTE-TDD | 9.83 | ± 9.6 % |
| 10263 | CAG | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM) | LTE-TDD | 10.16 | ± 9.6 % |
| 10264 | CAG | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK) | LTE-TDD | 9.23 | ± 9.6 % |
| 10265 | CAG | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM) | LTE-TDD | 9.92 | ± 9.6 % |
| 10266 | CAG | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM) | LTE-TDD | 10.07 | ± 9.6 % |
| 10267 | CAG | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK) | LTE-TDD | 9.30 | ± 9.6 % |
| 10268 | CAF | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM) | LTE-TDD | 10.06 | ± 9.6 % |
| 10269 | CAF | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM) | LTE-TDD | 10.13 | ± 9.6 % |
| 10270 | CAF | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK) | LTE-TDD | 9.58 | ± 9.6 % |
| 10274 | CAB | UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10) | WCDMA | 4.87 | ± 9.6 % |
| 10275 | CAB | 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 884MHz, Rolloff 0.5) | PHS | 11.81 | ± 9.6 % |
| 10279 | CAA | PHS (QPSK, BW 884MHz, Rolloff 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 | AAD | LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK) | LTE-FDD | 5.81 | ± 9.6 % |
| 10298 | AAD | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK) | LTE-FDD | 5.72 | ± 9.6 % |
| 10299 | AAD | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM) | LTE-FDD | 6.39 | ± 9.6 % |

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|---|---|---|---|---|---|
| 10300 | AAD | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM) | LTE-FDD | 6.60 | ± 9.6 % |
| 10301 | AAA | IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC) | WiMAX | 12.03 | ± 9.6 % |
| 10302 | AAA | IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols) | WiMAX | 12.57 | ± 9.6 % |
| 10303 | AAA | IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC) | WiMAX | 12.52 | ± 9.6 % |
| 10304 | AAA | IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC) | WiMAX | 11.86 | ± 9.6 % |
| 10305 | AAA | IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols) | WiMAX | 15.24 | ± 9.6 % |
| 10306 | AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols) | WiMAX | 14.67 | ± 9.6 % |
| 10307 | AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols) | WiMAX | 14.49 | ± 9.6 % |
| 10308 | AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC) | WiMAX | 14.46 | ± 9.6 % |
| 10309 | AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols) | WiMAX | 14.58 | ± 9.6 % |
| 10310 | AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols) | WiMAX | 14.57 | ± 9.6 % |
| 10311 | AAD | LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK) | LTE-FDD | 6.06 | ± 9.6 % |
| 10313 | AAA | iDEN 1:3 | iDEN | 10.51 | ± 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 | AAC | 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 | 6.99 | ± 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 | AAD | IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle) | WLAN | 8.37 | ± 9.6 % |
| 10401 | AAD | IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle) | WLAN | 8.60 | ± 9.6 % |
| 10402 | AAD | IEEE 802.11ac WiFi (80MHz, 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 | AAG | 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, 40MHz | 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 | AAB | 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 preambule) | WLAN | 8.14 | ± 9.6 % |
| 10419 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preambule) | WLAN | 8.19 | ± 9.6 % |
| 10422 | AAB | IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK) | WLAN | 8.32 | ± 9.6 % |
| 10423 | AAB | IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM) | WLAN | 8.47 | ± 9.6 % |
| 10424 | AAB | IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM) | WLAN | 8.40 | ± 9.6 % |
| 10425 | AAB | IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK) | WLAN | 8.41 | ± 9.6 % |
| 10426 | AAB | IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM) | WLAN | 8.45 | ± 9.6 % |
| 10427 | AAB | IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM) | WLAN | 8.41 | ± 9.6 % |
| 10430 | AAD | LTE-FDD (OFDMA, 5 MHz, E-TM 3.1) | LTE-FDD | 8.28 | ± 9.6 % |
| 10431 | AAD | LTE-FDD (OFDMA, 10 MHz, E-TM 3.1) | LTE-FDD | 8.38 | ± 9.6 % |
| 10432 | AAC | LTE-FDD (OFDMA, 15 MHz, E-TM 3.1) | LTE-FDD | 8.34 | ± 9.6 % |
| 10433 | AAC | LTE-FDD (OFDMA, 20 MHz, E-TM 3.1) | LTE-FDD | 8.34 | ± 9.6 % |
| 10434 | AAA | W-CDMA (BS Test Model 1, 64 DPCH) | WCDMA | 8.60 | ± 9.6 % |
| 10435 | AAF | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9) | LTE-TDD | 7.82 | ± 9.6 % |
| 10447 | AAD | LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%) | LTE-FDD | 7.56 | ± 9.6 % |
| 10448 | AAD | LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%) | LTE-FDD | 7.53 | ± 9.6 % |
| 10449 | AAC | LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%) | LTE-FDD | 7.51 | ± 9.6 % |
| 10450 | AAC | LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%) | LTE-FDD | 7.48 | ± 9.6 % |

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|---|---|---|---|---|---|
| 10451 | AAA | W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%) | WCDMA | 7.59 | ± 9.6 % |
| 10456 | AAB | IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle) | WLAN | 8.63 | ± 9.6 % |
| 10457 | AAA | 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 | AAA | UMTS-FDD (WCDMA, AMR) | WCDMA | 2.39 | ± 9.6 % |
| 10461 | AAB | 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 | AAB | 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 | AAB | 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 | AAC | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9) | LTE-TDD | 7.82 | ± 9.6 % |
| 10465 | AAC | 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 | AAC | 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 | AAF | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9) | LTE-TDD | 7.82 | ± 9.6 % |
| 10468 | AAF | 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 | AAF | 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 | AAF | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9) | LTE-TDD | 7.82 | ± 9.6 % |
| 10471 | AAF | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9) | LTE-TDD | 8.32 | ± 9.6 % |
| 10472 | AAF | 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 | AAE | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9) | LTE-TDD | 7.82 | ± 9.6 % |
| 10474 | AAE | 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 | AAE | 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 | AAF | 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 | AAF | 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 | AAB | 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 | AAB | 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 | AAB | 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 | AAC | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9) | LTE-TDD | 7.71 | ± 9.6 % |
| 10483 | AAC | 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 | AAC | 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 | AAF | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9) | LTE-TDD | 7.59 | ± 9.6 % |
| 10486 | AAF | 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 | AAF | 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 | AAF | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9) | LTE-TDD | 7.70 | ± 9.6 % |
| 10489 | AAF | 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 | AAF | 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 | AAE | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9) | LTE-TDD | 7.74 | ± 9.6 % |