

## SAR TEST REPORT

**Applicant Name:**

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**Date of Issue: 03. 13, 2018**

**Test Report No: HCT-SR-1803-FC001-R1**

**Test Site: HCT CO., LTD.**

**FCC ID:**

**A3LSMJ250N**

**Equipment Type:**

**Mobile Phone**

**Application Type:**

**Certification**

**FCC Rule Part(s):**

**FCC 47 CFR §2.1093**

**Model Name:**

**SM-J250N**

**Date of Test:**

**02/14/2018 ~ 02/21/2018**

This device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in FCC KDB procedures and had been tested in accordance with the measurement procedures specified in FCC KDB procedures.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

**Tested By**



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## **DOCUMENT REVISION HISTORY**

| Rev.                 | DATE         | DESCRIPTION                                                      |
|----------------------|--------------|------------------------------------------------------------------|
| HCT-SR-1803-FC001    | 03. 07, 2018 | First Approval Report                                            |
| HCT-SR-1803-FC001-R1 | 03. 13, 2018 | Mode of operation, Sec. 2.3 ,Sec 11.4 Attachment 3 were revised. |

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## 1. ATTESTATION OF TEST RESULT OF DEVICE UNDER TEST

| Test Laboratory |                                                                                          |
|-----------------|------------------------------------------------------------------------------------------|
| Company Name:   | HCT Co., LTD                                                                             |
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| Attestation of SAR test result            |                               |                 |            |           |                     |
|-------------------------------------------|-------------------------------|-----------------|------------|-----------|---------------------|
| Applicant Name:                           | SAMSUNG Electronics Co., Ltd. |                 |            |           |                     |
| FCC ID:                                   | A3LSMJ250N                    |                 |            |           |                     |
| Model:                                    | SM-J250N                      |                 |            |           |                     |
| EUT Type:                                 | Mobile Phone                  |                 |            |           |                     |
| Application Type:                         | Certification                 |                 |            |           |                     |
| The Highest Reported SAR                  |                               |                 |            |           |                     |
| Band                                      | Tx. Frequency                 | Equipment Class | SAR (W/kg) |           |                     |
|                                           |                               |                 | Head       | Body-Worn | Bluetooth Tethering |
|                                           | (MHz)                         |                 | (W/Kg)     | (W/Kg)    | (W/Kg)              |
| UMTS 850                                  | 826.4 ~ 846.6                 | TNE             | 0.21       | 0.41      | 0.42                |
| Bluetooth                                 | 2 402 ~ 2 480                 | DSS/DTS         | 0.24       | < 0.1     | < 0.1               |
| Simultaneous SAR per KDB 690783 D01v01r03 |                               |                 | 0.45       | 0.44      | 0.49                |
| Date(s) of Tests:                         | 02/14/2018 ~ 02/21/2018       |                 |            |           |                     |

## 2. DEVICE UNDER TEST DESCRIPTION

### 2.1 DUT specification

| Device Wireless specification overview |                                                                                                                                           |                   |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Band & Mode                            | Operating Mode                                                                                                                            | Tx Frequency      |
| UMTS 850                               | Voice / Data                                                                                                                              | 826.4 – 846.6 MHz |
| Bluetooth /LE 4.2                      | Data                                                                                                                                      | 2 402 – 2 480 MHz |
| Device Description                     |                                                                                                                                           |                   |
| Device Dimension:                      | Overall (Length x Width): 143.8 mm x 72.3 mm<br>Overall Diagonal: 152.31 mm<br>Display Diagonal: 127 mm                                   |                   |
| Hardware Version:                      | Rev 0.1                                                                                                                                   |                   |
| Software Version :                     | J250N.001                                                                                                                                 |                   |
| Device Serial Numbers                  | Mode                                                                                                                                      | Serial Number     |
|                                        | UMTS 850, Bluetooth                                                                                                                       | EUT-003           |
| Note                                   | This product does not support the HSDPA / HSUPA Features of UMTS850 in the US<br>2.4GHz WLAN operation is disabled by software in default |                   |

### 2.2 Nominal and Maximum Output Power Specifications

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

| Mode / Band              |         | 3GPP<br>WCDMA |
|--------------------------|---------|---------------|
|                          |         | (dBm)         |
| UMTS Band 5<br>(850 MHz) | Maximum | 23.0          |
|                          | Nominal | 22.5          |

Tolerance: (Nominal Power -1.5dB ~ Nominal Power +0.5dB)

| Mode / Band  |       |         | Modulated Average (dBm) |
|--------------|-------|---------|-------------------------|
| Bluetooth    | DH-5  | Maximum | 11.5                    |
|              |       | Nominal | 11.0                    |
|              | 2-DH5 | Maximum | 10.0                    |
|              |       | Nominal | 9.5                     |
|              | 3-DH5 | Maximum | 10.0                    |
|              |       | Nominal | 9.5                     |
| Bluetooth LE |       | Maximum | 2.5                     |
|              |       | Nominal | 2                       |

(Upper tolerance: Nominal Power +0.5dB)

## 2.3 DUT Antenna Locations

The overall dimensions of this device are > 9 X 5 cm. The overall diagonal dimension of the device is < 160 mm and the diagonal display is < 150 mm.

This model allows users to exchange data or media files with other Bluetooth enabled devices using Bluetooth, which means they can connect to other Bluetooth enabled devices via Bluetooth tethering. Therefore, SAR test was performed for additional simultaneous transmissions.

Head and Bluetooth Tethering SAR were evaluated for BT BR tethering applications.

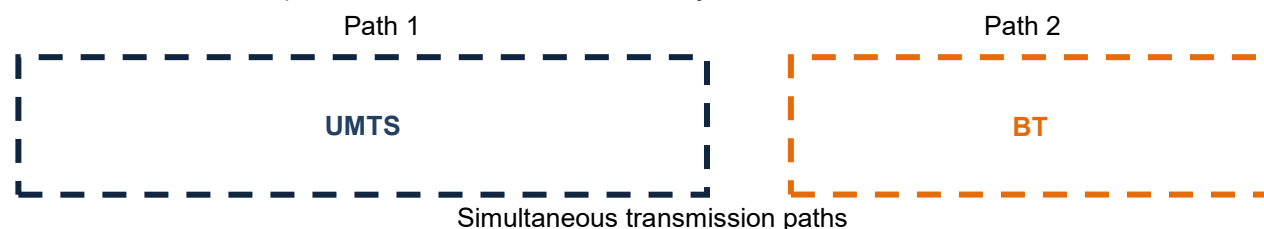
| Mode      | Rear | Front | Left | Right | Bottom | Top |
|-----------|------|-------|------|-------|--------|-----|
| UMTS 850  | Yes  | Yes   | Yes  | Yes   | Yes    | No  |
| Bluetooth | Yes  | Yes   | No   | Yes   | No     | Yes |

Particular EUT edges were not required to be evaluated for Bluetooth Tethering SAR if the edges were > 25 mm from the transmitting antenna according to FCC KDB 941225 D06v02r01 on page 2. The distance between the transmit antennas and the edges of the device are included in the filing.

\* Note: All test configurations are based on front view position.

## 2.4 SAR Summation Scenario

According to FCC KDB 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. Possible transmission paths for the EUT are shown below paths and are mode in same rectangle to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.



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

| Simultaneous Transmission Scenarios |      |           |                     |
|-------------------------------------|------|-----------|---------------------|
| Applicable Combination              | Head | Body-Worn | Bluetooth tethering |
| UMTS + Bluetooth                    | Yes* | Yes       | Yes*                |

1. The highest reported SAR for each exposure condition is used for SAR summation purpose.
2. \* Bluetooth tethering is supported.

## 2.5 SAR Test Considerations

### A) Bluetooth LE

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

$$\frac{MaxPowerofChannel(mW)}{TestSeparationDistance(mm)} * \sqrt{Frequency(GHz)} \leq 3.0(1g \text{ SAR})$$

| Mode         | Configuration | Frequency | Maximum Allowed Power | Separation Distance | ≤ 3.0 |
|--------------|---------------|-----------|-----------------------|---------------------|-------|
|              |               | [MHz]     | [mW]                  | [mm]                |       |
| Bluetooth LE | Head SAR      | 2 480     | 2.0                   | 5                   | 0.6   |
|              | Body worn SAR |           |                       | 15                  | 0.2   |
|              | Tethering SAR |           |                       | 10                  | 0.3   |

Based on the maximum conducted power of Bluetooth LE and antenna to use separation distance, Bluetooth LE SAR was not required.

### B) Licensed Transmitter(s)

This product does not support the HSDPA / HSUPA Features of UMTS850 in the US

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## 2.6 Test Methodology and Procedures

The tests documented in this report were performed in accordance with IEEE Standard 1528-2013 and the following published KDB procedures.

- FCC KDB Publication 941225 D01 3G SAR Procedures v03r01
- FCC KDB Publication 941225 D06 Hot Spot SAR v02r01
- FCC KDB Publication 447498 D01 General SAR Guidance v06
- FCC KDB Publication 648474 D04 Handset SAR v01r03
- FCC KDB Publication 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- FCC KDB Publication 865664 D02 SAR Reporting v01r02

### 3. INTRODUCTION

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. 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York 10017. The measurement procedure described in IEEE/ANSI C95.3-1992 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 of the incremental electromagnetic energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body.

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

Figure 1. SAR Mathematical Equation

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

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

Where:

σ = conductivity of the tissue-simulant material (S/m)

ρ = mass density of the tissue-simulant material (kg/m³)

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.

## 4. DESCRIPTION OF TEST EQUIPMENT

### 4.1 SAR MEASUREMENT SETUP

These measurements are performed using the DASY4 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Staubli), robot controller, Pentium III computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Figure.2).

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The PC with Windows XP or Windows 7 is working with SAR Measurement system DASY4 & DASY5, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

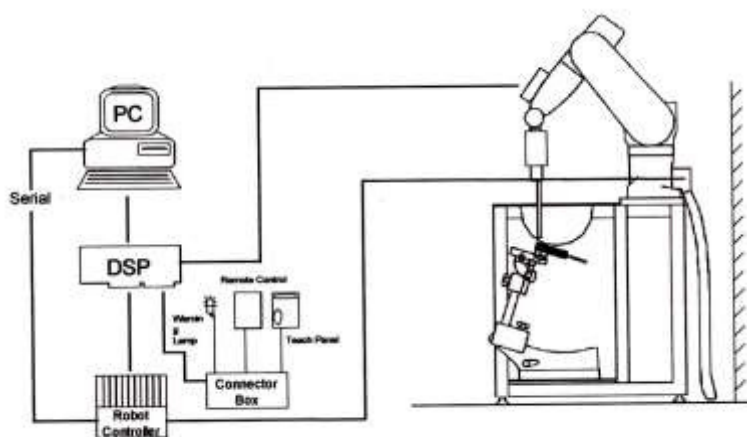


Figure 2. HCT SAR Lab. Test Measurement Set-up

The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in.

## 5. SAR MEASUREMENT PROCEDURE

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

1. The SAR distribution at the exposed side of the head or body was measured at a distance no more than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the DUT's head and body area and the horizontal grid resolution was depending on the FCC KDB 865664 D01v01r04 table 4-1 & IEEE 1528-2013.
2. Based on step, the area of the maximum absorption was determined by sophisticated interpolations routines implemented in DASY software. When an Area Scan has measured all reachable point. DASY system computes the field maximal found in the scanned are, within a range of the maximum. SAR at this fixed point was measured and used as a reference value.
3. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB 865664 D01v01r04 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 (reference from the DASY manual.)
  - a. The data at the surface were extrapolated, since the center of the dipoles is no more than 2.7 mm away from the tip of the probe (it is different from the probe type) and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.
  - b. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed using the 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 integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.
  - 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. If the value changed by more than 5 %, the SAR evaluation and drift measurements were repeated.

Area scan and zoom scan resolution setting follow KDB 865664 D01v01r04 quoted below.

|                                                                                                                                                                                                                                                                                               |                                    |                                                                                      |                                                                                                                                                                                                                                                                        |                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                               |                                    |                                                                                      | $\leq 3$ GHz                                                                                                                                                                                                                                                           | $> 3$ GHz                                                               |
| Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface                                                                                                                                                                                        |                                    |                                                                                      | $5\pm 1$ mm                                                                                                                                                                                                                                                            | $\frac{1}{2}\cdot\delta\cdot\ln(2)\pm 0.5$ mm                           |
| Maximum probe angle from probe axis to phantom surface normal at the measurement location                                                                                                                                                                                                     |                                    |                                                                                      | $30^{\circ}\pm 1^{\circ}$                                                                                                                                                                                                                                              | $20^{\circ}\pm 1^{\circ}$                                               |
| Maximum area scan Spatial resolution: $\Delta x_{Area}, \Delta y_{Area}$                                                                                                                                                                                                                      |                                    |                                                                                      | $\leq 2$ GHz: $\leq 15$ mm<br>2-3 GHz: $\leq 12$ mm                                                                                                                                                                                                                    | 3-4 GHz: $\leq 12$ mm<br>4-6 GHz: $\leq 10$ mm                          |
|                                                                                                                                                                                                                                                                                               |                                    |                                                                                      | When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device. |                                                                         |
| Maximum zoom scan Spatial resolution: $\Delta x_{zoom}, \Delta y_{zoom}$                                                                                                                                                                                                                      |                                    |                                                                                      | $\leq 2$ GHz: $\leq 8$ mm<br>2-3 GHz: $\leq 5$ mm*                                                                                                                                                                                                                     | 3-4 GHz: $\leq 5$ mm*<br>4-6 GHz: $\leq 4$ mm*                          |
| Maximum zoom scan Spatial resolution normal to phantom surface                                                                                                                                                                                                                                | uniform grid: $\Delta z_{zoom}(n)$ |                                                                                      | $\leq 5$ mm                                                                                                                                                                                                                                                            | 3-4 GHz: $\leq 4$ mm<br>4-5 GHz: $\leq 3$ mm<br>5-6 GHz: $\leq 2$ mm    |
|                                                                                                                                                                                                                                                                                               | graded grid                        | $\Delta z_{zoom}(1)$ : between 1 <sup>st</sup> two Points closest to phantom surface | $\leq 4$ mm                                                                                                                                                                                                                                                            | 3-4 GHz: $\leq 3$ mm<br>4-5 GHz: $\leq 2.5$ mm<br>5-6 GHz: $\leq 2$ mm  |
|                                                                                                                                                                                                                                                                                               |                                    | $\Delta z_{zoom}(n>1)$ : between subsequent Points                                   | $\leq 1.5\cdot\Delta z_{zoom}(n-1)$                                                                                                                                                                                                                                    |                                                                         |
| Minimum zoom scan volume                                                                                                                                                                                                                                                                      | x, y, z                            |                                                                                      | $\geq 30$ mm                                                                                                                                                                                                                                                           | 3-4 GHz: $\geq 28$ mm<br>4-5 GHz: $\geq 25$ mm<br>5-6 GHz: $\geq 22$ mm |
| Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.                                                                                                                                             |                                    |                                                                                      |                                                                                                                                                                                                                                                                        |                                                                         |
| * When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz. |                                    |                                                                                      |                                                                                                                                                                                                                                                                        |                                                                         |

## 6. DESCRIPTION OF TEST POSITION

### 6.1 EAR REFERENCE POINT

Figure 6-2 shows the front, back and side views of the SAM phantom. The center-of-mouth reference point is labeled “M”, the left ear reference point (ERP) is marked “LE”, and the right ERP is marked “RE.” Each ERP is on the B-M (back-mouth) line located 15 mm behind the entrance-to-ear-canal (EEC) point, as shown in Figure 6-1. The Reference Plane is defined as passing through the two ear reference point and point M. The line N-F (Neck-Front), also called the Reference Pivoting Line, is not perpendicular to the reference plane (See Figure 5-1), 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.

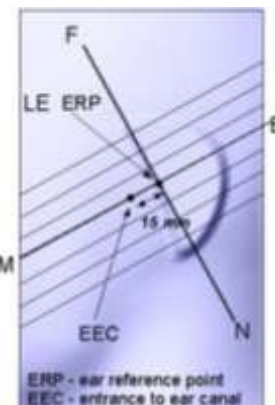


Figure 6-1  
Close-up side view of ERP

### 6.2 HANDSET REFERENCE POINTS

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The device under test was placed in a normal operating position with the acoustic output located along the “vertical centerline” on the front of the device aligned to the “ear reference point”(see Figure 6-3). The acoustic output was then located at the same level as the center of the ear reference point. The device under test was positioned so that the “vertical centerline” was bisecting the front surface of the handset at its 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 6-2  
Front, back and side views of SAM Twin Phantom

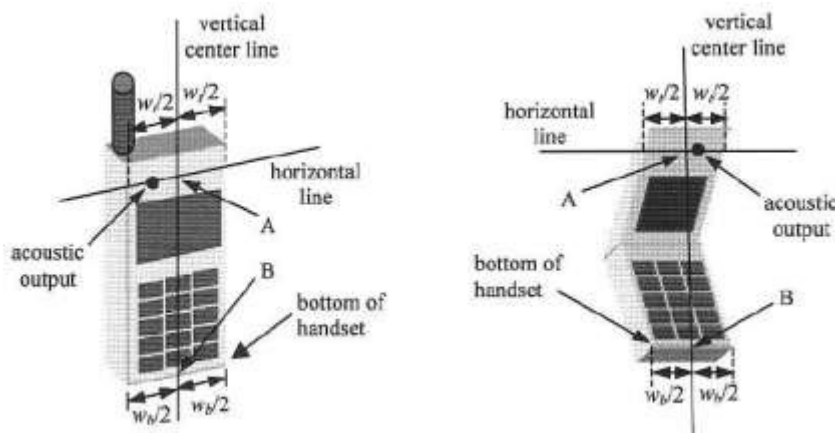


Figure 6-3. Handset vertical and horizontal reference lines

## 6.3 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameter; relative permittivity  $\epsilon=3$  and loss tangent  $\sigma=0.02$

## 6.4 Position for cheek

Figure 6.4. shows cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

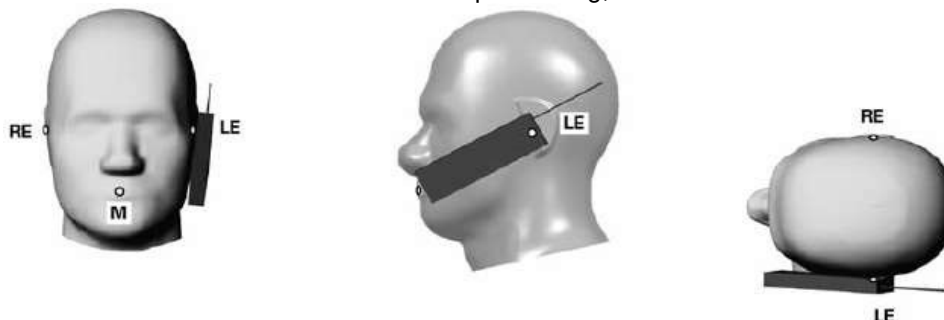


Figure 6.4 Cheek/ Touch position of the wireless device

## 6.5 Definition of the “tilted” position

Figure 6.5. shows tilted position. Place the device in the cheek position. Then while maintaining the orientation of the device, retract the device parallel to the reference plane far enough away from the phantom to enable a rotation of the device by  $15^\circ$



Figure 6.5. Tilt  $15^\circ$  position of the wireless device

## 6.6 Body-Worn Accessory Configurations

Body-worn operating configurations are tested with the belt-dips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 6-6). 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.. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is  $> 1.2 \text{ W/kg}$ , 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.



Figure 6-6  
Sample Body-Worn Diagram

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-dip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

## 6.7 Bluetooth tethering Configurations

Per May 2017 TCBC Workshop documents

When Bluetooth tethering applies ,simultaneous transmission SAR needs consideration

This model allows users to exchange data or media files with other Bluetooth enabled devices using Bluetooth, which means they can connect to other Bluetooth enabled devices via Bluetooth tethering.

Therefore, SAR test was performed for additional simultaneous transmissions.

Head and Bluetooth tethering SAR were evaluated for BT BR tethering applications

## 7. ANSI/ IEEE C95.1 - 1992 RF EXPOSURE LIMITS

| HUMAN EXPOSURE                                         | UNCONTROLLED ENVIRONMENT<br>General Population | CONTROLLED ENVIRONMENT<br>Occupational |
|--------------------------------------------------------|------------------------------------------------|----------------------------------------|
|                                                        | (W/kg) or (mW/g)                               | (W/kg) or (mW/g)                       |
| SPATIAL PEAK SAR *<br>(Head)                           | 1.60                                           | 8.00                                   |
| SPATIAL AVERAGE SAR **<br>(Whole Body)                 | 0.08                                           | 0.40                                   |
| SPATIAL PEAK SAR ***<br>(Hands / Feet / Ankle / Wrist) | 4.00                                           | 20.00                                  |

### NOTES:

\* The Spatial Peak value of the SAR averaged over any 1 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

\*\* The Spatial Average value of the SAR averaged over the whole-body.

\*\*\* The Spatial Peak value of the SAR averaged over any 10 g 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. 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 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 applicable to situations in which persons are exposed as a consequence of their 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.

## 8. FCC SAR GENERAL MEASUREMENT PROCEDURES

Power Measurements for licensed transmitters are performed using a base simulator under digital average power

### 8.1 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.

### 8.2 SAR Measurement Conditions for UMTS

#### 8.2.1 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in sec. 5.2 of 3GPP TS 34.121, using the appropriate RMC with TPC (transmit power control) set to all "1s". Results for all applicable physical channel configurations are tabulated in this test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations are identified.

#### 8.2.2 Head SAR Measurements

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all "1s". The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR in 3.4 kbps SRB (signaling radio bearer) using the highest reported SAR configuration in 12.2 kbps RMC for head exposure.

#### 8.2.3 Body SAR measurements

SAR for body exposure configurations is measured using the 12.2kbps RMC with the TPC bits all "1s".

## 9. OUTPUT POWER SPECIFICATIONS

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

### 9.1 UMTS

| 3GPP Release Version | Mode  | 3GPP 34.121   | WCDMA Band 5 [dBm] |                    |                    | 3GPP MPR |
|----------------------|-------|---------------|--------------------|--------------------|--------------------|----------|
|                      |       | Subtest       | UL 4132<br>DL 4357 | UL 4183<br>DL 4408 | UL 4233<br>DL 4458 |          |
| 99                   | WCDMA | 12.2 kbps RMC | 22.90              | 22.91              | 22.75              | -        |
| 99                   | WCDMA | 12.2 kbps AMR | 22.90              | 22.91              | 22.75              | -        |

WCDMA Maximum Conductd power

### 9.2 BT

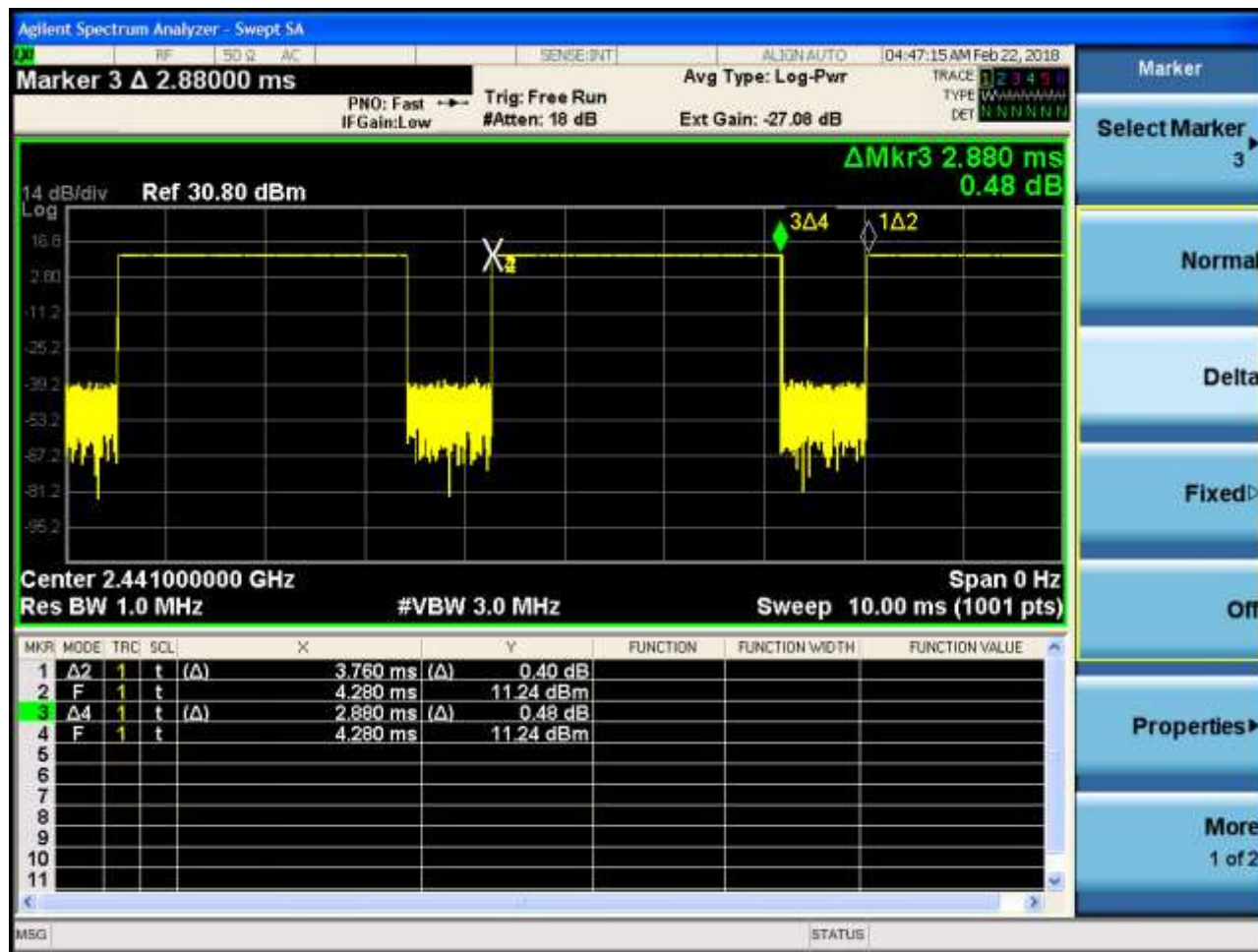
#### The Burst averaged-conducted Power

| Mode  | Channel | BT Power |
|-------|---------|----------|
|       |         | [dBm]    |
| DH5   | 0       | 10.74    |
|       | 39      | 11.43    |
|       | 78      | 9.79     |
| 2-DH5 | 0       | 9.21     |
|       | 39      | 9.91     |
|       | 78      | 8.26     |
| 3-DH5 | 0       | 9.21     |
|       | 39      | 9.91     |
|       | 78      | 8.26     |

Per October 2016 TCB Workshop Notes:

When call box and Bluetooth protocol are used for BT SAR measurement, time-domain plot is required to identify duty factor for supporting the test setup and result.

Bluetooth duty cycle was measured using Bluetooth tester equipment (CBT / R&S) with Bluetooth protocol. DH5 mode is the highest duty cycle and conducted power. SAR test were performed at DH5 mode.



Duty Cycle

$$= (\text{BT-On time} / \text{BT-Full time}) * 100 = (2.880 / 3.760) * 100 = 76.6 \% (\text{DH5})$$

Duty factor= 1/Duty cycle : 1.31

## 10. SYSTEM VERIFICATION

### 10.1 Tissue Verification

The Head /body simulating material is calibrated by HCT using the DAKS 3.5 to determine the conductivity and permittivity.

**Table for Head Tissue Verification**

| Date of Tests | Tissue Temp | Tissue Type | Freq. (MHz) | Measured Conductivity $\sigma$ (S/m) | Measured Dielectric Constant, $\epsilon$ | Target Conductivity $\sigma$ (S/m) | Target Dielectric Constant, $\epsilon$ | % dev $\sigma$ | % dev $\epsilon$ |
|---------------|-------------|-------------|-------------|--------------------------------------|------------------------------------------|------------------------------------|----------------------------------------|----------------|------------------|
| 02/14/2018    | 21.1        | 835H        | 820         | 0.895                                | 41.761                                   | 0.899                              | 41.578                                 | -0.44%         | 0.44%            |
|               |             |             | 835         | 0.910                                | 41.495                                   | 0.900                              | 41.500                                 | 1.11%          | -0.01%           |
|               |             |             | 850         | 0.925                                | 41.272                                   | 0.916                              | 41.500                                 | 0.98%          | -0.55%           |
| 02/21/2018    | 19.2        | 2450H       | 2 400       | 1.779                                | 39.122                                   | 1.756                              | 39.290                                 | 1.31%          | -0.43%           |
|               |             |             | 2 450       | 1.837                                | 38.925                                   | 1.800                              | 39.200                                 | 2.06%          | -0.70%           |
|               |             |             | 2 500       | 1.894                                | 38.759                                   | 1.855                              | 39.140                                 | 2.10%          | -0.97%           |

**Table for Body Tissue Verification**

| Date of Tests | Tissue Temp | Tissue Type | Freq. (MHz) | Measured Conductivity $\sigma$ (S/m) | Measured Dielectric Constant, $\epsilon$ | Target Conductivity $\sigma$ (S/m) | Target Dielectric Constant, $\epsilon$ | % dev $\sigma$ | % dev $\epsilon$ |
|---------------|-------------|-------------|-------------|--------------------------------------|------------------------------------------|------------------------------------|----------------------------------------|----------------|------------------|
| 02/19/2018    | 20.5        | 835B        | 820         | 0.964                                | 55.516                                   | 0.969                              | 55.258                                 | -0.52%         | 0.47%            |
|               |             |             | 835         | 0.976                                | 55.334                                   | 0.970                              | 55.200                                 | 0.62%          | 0.24%            |
|               |             |             | 850         | 0.987                                | 55.114                                   | 0.988                              | 55.154                                 | -0.10%         | -0.07%           |
| 02/21/2018    | 19.2        | 2450B       | 2 400       | 1.852                                | 52.552                                   | 1.902                              | 52.770                                 | -2.63%         | -0.41%           |
|               |             |             | 2 450       | 1.915                                | 52.360                                   | 1.950                              | 52.700                                 | -1.79%         | -0.65%           |
|               |             |             | 2 500       | 1.984                                | 52.240                                   | 2.021                              | 52.640                                 | -1.83%         | -0.76%           |

## 10.2 System Verification

Prior to assessment, the system is verified to the  $\pm 10\%$  of the specifications at 835 MHz/ 2 450 MHz by using the system Verification kit. (Graphic Plots Attached)

### System Verification Results

| Freq. | Date       | Probe (S/N) | Dipole (S/N) | Liquid | Amb. Temp. | Liquid Temp. | 1 W Target SAR <sub>1g</sub> (SPEAG) | InPut Power | Measured SAR <sub>1g</sub> | 1 W Normalized SAR <sub>1g</sub> | Deviation | Limit [%] |
|-------|------------|-------------|--------------|--------|------------|--------------|--------------------------------------|-------------|----------------------------|----------------------------------|-----------|-----------|
| [MHz] |            |             |              |        | [°C]       | [°C]         | [W/kg]                               | [W]         | [W/kg]                     | [W/kg]                           | [%]       | [%]       |
| 835   | 02/14/2018 | 3968        | 441          | Head   | 21.4       | 21.1         | 9.38                                 | 0.05        | 0.470                      | 9.40                             | + 0.21    | $\pm 10$  |
| 835   | 02/19/2018 | 3968        |              | Body   | 20.7       | 20.5         | 9.41                                 | 0.05        | 0.483                      | 9.66                             | + 2.66    | $\pm 10$  |
| 2 450 | 02/21/2018 | 3967        | 743          | Head   | 19.6       | 19.2         | 53.0                                 | 0.05        | 2.61                       | 52.2                             | - 1.51    | $\pm 10$  |
| 2 450 | 02/21/2018 | 3967        |              | Body   | 19.6       | 19.2         | 50.6                                 | 0.05        | 2.49                       | 49.8                             | - 1.58    | $\pm 10$  |

## 10.3 System Verification Procedure

SAR measurement was prior to assessment, the system is verified to the  $\pm 10\%$  of the specifications at each frequency band by using the system Verification kit. (Graphic Plots Attached)

- Cabling the system, using the Verification kit equipments.
- Generate about 50 mW Input Level from the Signal generator to the Dipole Antenna.
- Dipole Antenna was placed below the Flat phantom.
- The measured one-gram SAR at the surface of the phantom above the dipole feed-point should be within 10 % of the target reference value.
- The results are normalized to 1 W input power.

NOTE;

SAR Verification was performed according to the FCC KDB 865664 D01v01r04.

## 11. SAR TEST DATA SUMMARY

### 11.1 HEAD SAR Measurement Results

| UMTS 850 Head SAR                                                                                  |      |      |               |             |             |                                                 |            |           |                |              |          |
|----------------------------------------------------------------------------------------------------|------|------|---------------|-------------|-------------|-------------------------------------------------|------------|-----------|----------------|--------------|----------|
| Frequency                                                                                          |      | Mode | Tune-Up Limit | Meas. Power | Power Drift | Test Position                                   | Duty Cycle | Meas. SAR | Scaling Factor | Scaled SAR   | Plot No. |
| MHz                                                                                                | Ch.  |      | (dB)          | (dB)        | (dB)        |                                                 |            | (W/kg)    |                | (W/kg)       |          |
| 836.6                                                                                              | 4183 | RMC  | 23.0          | 22.91       | -0.19       | Left Cheek                                      | 1:1        | 0.193     | 1.021          | 0.197        | -        |
| 836.6                                                                                              | 4183 | RMC  | 23.0          | 22.91       | -0.13       | Left Tilt                                       | 1:1        | 0.117     | 1.021          | 0.119        | -        |
| 836.6                                                                                              | 4183 | RMC  | 23.0          | 22.91       | -0.15       | Right Cheek                                     | 1:1        | 0.201     | 1.021          | <b>0.205</b> | 1        |
| 836.6                                                                                              | 4183 | RMC  | 23.0          | 22.91       | -0.13       | Right Tilt                                      | 1:1        | 0.117     | 1.021          | 0.119        | -        |
| ANSI/ IEEE C95.1 - 1992– Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population |      |      |               |             |             | Head<br>1.6 W/kg (mW/g)<br>Averaged over 1 gram |            |           |                |              |          |

| DSS Head SAR                                                                                       |     |               |               |             |             |                                                 |           |                |                |              |          |
|----------------------------------------------------------------------------------------------------|-----|---------------|---------------|-------------|-------------|-------------------------------------------------|-----------|----------------|----------------|--------------|----------|
| Frequency                                                                                          |     | Mode          | Tune-Up Limit | Meas. Power | Power Drift | Test Position                                   | Meas. SAR | Scaling Factor | Scaling Factor | Scaled SAR   | Plot No. |
| MHz                                                                                                | Ch. |               | (dBm)         | (dBm)       | (dB)        |                                                 |           |                | (Duty)         | (W/kg)       |          |
| 2 441                                                                                              | 39  | Bluetooth DH5 | 11.5          | 11.43       | -0.17       | Left Cheek                                      | 0.182     | 1.016          | 1.310          | <b>0.242</b> | 2        |
| 2 441                                                                                              | 39  | Bluetooth DH5 | 11.5          | 11.43       | -0.04       | Left Tilt                                       | 0.135     | 1.016          | 1.310          | 0.180        | -        |
| 2 441                                                                                              | 39  | Bluetooth DH5 | 11.5          | 11.43       | 0.01        | Right Cheek                                     | 0.130     | 1.016          | 1.310          | 0.173        | -        |
| 2 441                                                                                              | 39  | Bluetooth DH5 | 11.5          | 11.43       | 0.05        | Right Tilt                                      | 0.139     | 1.016          | 1.310          | 0.185        | -        |
| ANSI/ IEEE C95.1 - 1992– Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population |     |               |               |             |             | Head<br>1.6 W/kg (mW/g)<br>Averaged over 1 gram |           |                |                |              |          |

## 11.2 Body-worn SAR Measurement Results

### UMTS Body-Worn SAR

| Frequency                                                                                          |      | Mode | Tune-Up Limit | Meas. Power | Power Drift | Test Position                                   | Duty Cycle | Distance | Meas. SAR | Scaling Factor | Scaled SAR   | Plot No. |
|----------------------------------------------------------------------------------------------------|------|------|---------------|-------------|-------------|-------------------------------------------------|------------|----------|-----------|----------------|--------------|----------|
| MHz                                                                                                | Ch.  |      | (dB)          | (dB)        | (dB)        |                                                 |            | (mm)     | (W/kg)    |                | (W/kg)       |          |
| 836.6                                                                                              | 4183 | RMC  | 23.0          | 22.91       | -0.13       | Rear                                            | 1:1        | 15       | 0.398     | 1.021          | <b>0.406</b> | 3        |
| ANSI/ IEEE C95.1 - 1992– Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population |      |      |               |             |             | Body<br>1.6 W/kg (mW/g)<br>Averaged over 1 gram |            |          |           |                |              |          |

### DSS Body-Worn SAR

| Frequency                                                                                          |     | Mode          | Tune-Up Limit | Meas. Power | Power Drift | Test Position                                   | Distance | Meas. SAR | Scaling Factor | Scaling Factor | Scaled SAR   | Plot No. |
|----------------------------------------------------------------------------------------------------|-----|---------------|---------------|-------------|-------------|-------------------------------------------------|----------|-----------|----------------|----------------|--------------|----------|
| MHz                                                                                                | Ch. |               | (dBm)         | (dBm)       | (dB)        |                                                 | (mm)     | (W/kg)    |                | (Duty)         | (W/kg)       |          |
| 2 441                                                                                              | 39  | Bluetooth DH5 | 11.5          | 11.43       | -0.14       | Rear                                            | 15       | 0.024     | 1.016          | 1.310          | <b>0.032</b> | 4        |
| ANSI/ IEEE C95.1 - 1992– Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population |     |               |               |             |             | Body<br>1.6 W/kg (mW/g)<br>Averaged over 1 gram |          |           |                |                |              |          |

### 11.3 Bluetooth tethering SAR Measurement Results

| UMTS 850 SAR                                                                                       |      |      |               |             |             |                                                 |            |          |           |                |              |          |
|----------------------------------------------------------------------------------------------------|------|------|---------------|-------------|-------------|-------------------------------------------------|------------|----------|-----------|----------------|--------------|----------|
| Frequency                                                                                          |      | Mode | Tune-Up Limit | Meas. Power | Power Drift | Test Position                                   | Duty Cycle | Distance | Meas. SAR | Scaling Factor | Scaled SAR   | Plot No. |
| MHz                                                                                                | Ch.  |      | (dB)          | (dB)        | (dB)        |                                                 |            | (mm)     | (W/kg)    |                | (W/kg)       |          |
| 836.6                                                                                              | 4183 | RMC  | 23.0          | 22.91       | 0.05        | Rear                                            | 1:1        | 10       | 0.410     | 1.021          | <b>0.419</b> | 5        |
| 836.6                                                                                              | 4183 | RMC  | 23.0          | 22.91       | -0.01       | Front                                           | 1:1        | 10       | 0.298     | 1.021          | 0.304        | -        |
| 836.6                                                                                              | 4183 | RMC  | 23.0          | 22.91       | 0.08        | Left                                            | 1:1        | 10       | 0.174     | 1.021          | 0.178        | -        |
| 836.6                                                                                              | 4183 | RMC  | 23.0          | 22.91       | -0.11       | Right                                           | 1:1        | 10       | 0.193     | 1.021          | 0.197        | -        |
| 836.6                                                                                              | 4183 | RMC  | 23.0          | 22.91       | -0.10       | Bottom                                          | 1:1        | 10       | 0.018     | 1.021          | 0.018        | -        |
| ANSI/ IEEE C95.1 - 1992– Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population |      |      |               |             |             | Body<br>1.6 W/kg (mW/g)<br>Averaged over 1 gram |            |          |           |                |              |          |

| DSS Tethering SAR                                                                                  |     |               |               |             |             |                                                 |          |           |                |                |              |          |
|----------------------------------------------------------------------------------------------------|-----|---------------|---------------|-------------|-------------|-------------------------------------------------|----------|-----------|----------------|----------------|--------------|----------|
| Frequency                                                                                          |     | Mode          | Tune-Up Limit | Meas. Power | Power Drift | Test Position                                   | Distance | Meas. SAR | Scaling Factor | Scaling Factor | Scaled SAR   | Plot No. |
| MHz                                                                                                | Ch. |               | (dBm)         | (dBm)       | (dB)        |                                                 |          | (W/kg)    |                | (Duty)         | (W/kg)       |          |
| 2 441                                                                                              | 39  | Bluetooth DH5 | 11.5          | 11.43       | -0.10       | Rear                                            | 10       | 0.041     | 1.016          | 1.310          | 0.055        | -        |
| 2 441                                                                                              | 39  | Bluetooth DH5 | 11.5          | 11.43       | -0.07       | Front                                           | 10       | 0.051     | 1.016          | 1.310          | <b>0.068</b> | 6        |
| 2 441                                                                                              | 39  | Bluetooth DH5 | 11.5          | 11.43       | 0.07        | Right                                           | 10       | 0.019     | 1.016          | 1.310          | 0.025        | -        |
| 2 441                                                                                              | 39  | Bluetooth DH5 | 11.5          | 11.43       | 0.10        | Top                                             | 10       | 0.028     | 1.016          | 1.310          | 0.037        | -        |
| ANSI/ IEEE C95.1 - 1992– Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population |     |               |               |             |             | Body<br>1.6 W/kg (mW/g)<br>Averaged over 1 gram |          |           |                |                |              |          |

## 11.4 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, FCC KDB Procedure.
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 447498 D01v06.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 15 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 648474 D04v01r03, SAR was evaluated without a headset connected to the device. Since the standalone reported SAR was  $\leq 1.2$  W/kg, no additional SAR evaluation using a headset cable were required.
8. Per FCC KDB 865664 D01v01r04, variability SAR tests were not performed since the measured SAR results for all frequency bands were less than 0.8 W/kg. Please see Section 13 for variability analysis information.

### UMTS Notes:

1. The 12.2 kbps RMC mode is the primary mode per KDB 941225 D01v03r01.
2. UMTS mode in Body SAR was tested under RMC 12.2 kbps
3. Per FCC KDB 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is  $\leq 0.8$  W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the channel highest output power channel was used.

### Bluetooth Notes:

1. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation and Tx Tests mode type. Per October 2016 TCBC Workshop Notes, the reported SAR was scaled to 100% transmission duty factor to determine compliance. Please see sec.9.2 for the time-domain plot and calculation for duty factor of the device.
2. Head and Bluetooth tethering SAR were evaluated for BT BR tethering applications.

## 12. SIMULTANEOUS SAR ANALYSIS

### 12.1 Simultaneous Transmission Summation for Head

| Simultaneous Transmission Summation Scenario with Bluetooth |          |          |               |                  |
|-------------------------------------------------------------|----------|----------|---------------|------------------|
| Exposure condition                                          | Band     | WWAN SAR | Bluetooth SAR | $\Sigma$ 1-g SAR |
|                                                             |          | (W/kg)   | (W/kg)        | (W/kg)           |
| Head                                                        | UMTS 850 | 0.205    | 0.242         | 0.447            |

### 12.2 Simultaneous Transmission Summation for Body-Worn

| Simultaneous Transmission Summation Scenario with Bluetooth |          |          |          |               |                  |
|-------------------------------------------------------------|----------|----------|----------|---------------|------------------|
| Exposure condition                                          | Distance | Band     | WWAN SAR | Bluetooth SAR | $\Sigma$ 1-g SAR |
|                                                             | (mm)     |          | (W/kg)   | (W/kg)        | (W/kg)           |
| Body-worn                                                   | 15       | UMTS 850 | 0.406    | 0.032         | 0.438            |

### 12.3 Simultaneous Transmission Summation for Tethering

| Simultaneous Transmission Summation Scenario with Bluetooth |          |          |          |               |                  |
|-------------------------------------------------------------|----------|----------|----------|---------------|------------------|
| Exposure condition                                          | Distance | Band     | WWAN SAR | Bluetooth SAR | $\Sigma$ 1-g SAR |
|                                                             | (mm)     |          | (W/kg)   | (W/kg)        | (W/kg)           |
| Bluetooth Tethering                                         | 10       | UMTS 850 | 0.419    | 0.068         | 0.487            |

### 12.4 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.

## 13. SAR MEASUREMENT VARIABILITY AND UNCERTAINTY

In accordance with KDB procedure 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz, SAR additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is 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) Repeated measurement is not required when the original highest measured SAR is  $< 0.80$  W/kg for 1g SAR or  $< 2.0$  W/kg for 10g SAR; steps 2) through 4) do not apply.
- 2) When the original highest measured 1g SAR is  $\geq 0.80$  W/kg or 10g SAR  $\geq 2.0$  W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is  $> 1.20$  or when the original or repeated measurement is  $\geq 1.45$  W/kg for 1g SAR or  $\geq 3.625$  W/kg for 10g SAR (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is  $\geq 1.5$  W/kg for 1g SAR or  $\geq 3.75$  W/kg for 10g SAR and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .

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## 14. MEASUREMENT UNCERTAINTY

The measured SAR was <1.5 W/Kg for all frequency bands. Therefore,per KDB Publication 865664 D01v01r04,the extended measurement uncertainty analysis per IEEE1528-2013 was not required.

## 15. SAR TEST EQUIPMENT

| Manufacturer | Type / Model                          | S/N                | Calib. Date | Calib.Interval | Calib.Due  |
|--------------|---------------------------------------|--------------------|-------------|----------------|------------|
| SPEAG        | SAM Phantom                           | -                  | N/A         | N/A            | N/A        |
| SPEAG        | Triple Modular Phantom                | -                  | N/A         | N/A            | N/A        |
| HP           | SAR System Control PC                 | -                  | N/A         | N/A            | N/A        |
| Staubli      | TX90 XLSpeag                          | F13/ 5R4XF1/ A/ 01 | N/A         | N/A            | N/A        |
| Staubli      | CS8Cspeag-TX90                        | F13/ 5R4XF1/ C/ 01 | N/A         | N/A            | N/A        |
| Staubli      | Teach Pendant (Joystick)              | D21142605          | N/A         | N/A            | N/A        |
| SPEAG        | DAE3                                  | 466                | 08/29/2017  | Annual         | 08/29/2018 |
| SPEAG        | DAE4                                  | 1417               | 01/16/2018  | Annual         | 01/16/2019 |
| SPEAG        | E-Field Probe EX3DV4                  | 3968               | 05/31/2017  | Annual         | 05/31/2018 |
| SPEAG        | E-Field Probe EX3DV4                  | 3967               | 01/24/2018  | Annual         | 01/24/2019 |
| SPEAG        | Dipole D835V2                         | 441                | 09/21/2017  | Annual         | 09/21/2018 |
| SPEAG        | Dipole D2450V2                        | 743                | 03/15/2017  | Annual         | 03/15/2018 |
| Agilent      | Power Meter N1911A                    | MY45101406         | 09/15/2017  | Annual         | 09/15/2018 |
| HP           | Power Sensor N1921A                   | MY55220026         | 09/01/2017  | Annual         | 09/01/2018 |
| SPEAG        | DAKS 3.5                              | 1038               | 05/23/2017  | Annual         | 05/23/2018 |
| SPEAG        | VNA-R140                              | 0141013            | 06/12/2017  | Annual         | 06/12/2018 |
| Agilent      | Directional Bridge 86205A             | 3140A02249         | 06/09/2017  | Annual         | 06/09/2018 |
| Agilent      | Base Station E5515C                   | GB44400269         | 02/02/2018  | Annual         | 02/02/2019 |
| HP           | Signal Generator E4433B               | US40052109         | 03/10/2017  | Annual         | 03/10/2018 |
| HP           | 11636B/Power Divider                  | 58698              | 03/05/2017  | Annual         | 03/05/2018 |
| TESTO        | 175-H1/Thermometer                    | 40332651310        | 02/06/2017  | Annual         | 02/06/2019 |
| EMPOWER      | RF Power amplifier                    | 1011               | 10/12/2017  | Annual         | 10/12/2018 |
| Agilent      | Attenuator (3dB) 8491B                | MY39270622         | 06/29/2017  | Annual         | 06/29/2018 |
| Agilent      | Attenuator (20dB) 33340C              | 13311              | 05/10/2017  | Annual         | 05/10/2018 |
| HP           | Dielectric Probe Kit 85070C           | 00721521           | N/A         | N/A            | N/A        |
| HP           | Dual Directional Coupler              | 16072              | 10/12/2017  | Annual         | 10/12/2018 |
| Anritsu      | Radio Communication Analyzer/ MT8820C | 6200628628         | 07/04/2017  | Annual         | 07/04/2018 |
| R&S          | Bluetooth CBT                         | 100272             | 03/05/2017  | Annual         | 03/05/2018 |

NOTE:

1. The E-field probe was calibrated by SPEAG, by the waveguide technique procedure. Dipole Verification measurement is performed by HCT Lab. before each test. The brain/body simulating material is calibrated by HCT using the DAKS 3.5 to determine the conductivity and permittivity (dielectric constant) of the brain/body-equivalent material.

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## 16. CONCLUSION

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the ANSI/IEEE C95.1 - 1992.

These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests.

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

## 17. REFERENCES

- [1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radio frequency Radiation, Aug. 1996.
- [2] ANSI/IEEE C95.1 - 1992, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300 kHz to 300 GHz, New York: IEEE, Sept. 1992
- [3] ANSI/IEEE C 95.1 - 2005, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz, New York: IEEE, 2006
- [4] ANSI/IEEE C95.3 - 2002, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave, New York: December 2002.
- [5] IEEE Standards Coordinating Committee 34 – IEEE Std. 1528-2013, IEEE Recommended Practice or Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body from Wireless Communications Devices
- [6] NCRP, National Council on Radiation Protection and Measurements, Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields, NCRP Report No. 86, 1986. Reprinted Feb. 1995.
- [7] T. Schmid, O. Egger, N. Kuster, Automated E-field scanning system for dosimetric assessments, IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.
- [8] K. Pokovic, T. Schmid, N. Kuster, Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies, ICECOM97, Oct. 1997, pp. 120-124.
- [9] K. Pokovic, T. Schmid, and N. Kuster, E-field Probe with improved isotropy in brain simulating liquids, Proceedings of the ELMAR, Zadar, Croatia, June 23-25, 1996, pp. 172-175.
- [10] Schmid & Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.
- [11] V. Hombach, K. Meier, M. Burkhardt, E. Kuhn, N. Kuster, The Dependence of EM Energy Absorption upon Human Head Modeling at 900 MHz, IEEE Transaction on Microwave Theory and Techniques, vol. 44 no. 10, Oct. 1996, pp. 1865-1873.
- [12] N. Kuster and Q. Balzano, Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300 MHz, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.
- [13] G. Hartsgrove, A. Kraszewski, A. Surowiec, Simulated Biological Materials for Electromagnetic Radiation Absorption Studies, University of Ottawa, Bioelectro magnetics, Canada: 1987, pp. 29-36.
- [14] Q. Balzano, O. Garay, T. Manning Jr., Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.
- [15] W. Gander, Computer mathematick, Birkhaeuser, Basel, 1992.
- [16] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, Numerical Recepies in C, The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.
- [17] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.
- [18] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), Human Exposure to Electromagnetic Fields High-frequency: 10 kHz-300 GHz, Jan. 1995.
- [19] Prof. Dr. Niels Kuster, ETH, EidgenØssische Technische Hoschschule ZØrich, Dosimetric Evaluation of the Cellular Phone.
- [20] IEC 62209-1, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation and procedures – Part 1:Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz), July. 2016..

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- [21] IEC 62209-2, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures – Part 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) Mar. 2010.
- [22] Industry Canada RSS-102 Radio Frequency Exposure Compliance of Radio Communication Apparatus (All Frequency Band) Issue 5, March 2015.
- [23] Health Canada Safety Code 6 Limits of Human Exposure to Radio Frequency Electromagnetic Fields in the Frequency Range from 3 kHz – 300 GHz, 2009
- [24] FCC SAR Test procedures for 2G-3G Devices, Mobile Hotspot and UMPC Device KDB 941225 D01.
- [25] SAR Measurement Guidance for IEEE 802.11 transmitters, KDB 248227 D01v02r02
- [26] SAR Evaluation of Handsets with Multiple Transmitters and Antennas KDB 648474 D03, D04.
- [27] SAR Evaluation for Laptop, Notebook, Netbook and Tablet computers KDB 616217 D04.
- [28] SAR Measurement and Reporting Requirements for 100 MHz – 6 GHz, KDB 865664 D01, D02.
- [29] FCC General RF Exposure Guidance and SAR procedures for Dongles, KDB 447498 D01,D02.

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## Attachment 1. – SAR Test Plots

Test Laboratory: HCT CO., LTD  
EUT Type: Mobile Phone  
Liquid Temperature: 21.1 °C  
Ambient Temperature: 21.4 °C  
Test Date: 02/14/2018  
Plot No.: 1

#### DUT: SM-J250N;

Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1  
Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.912$  S/m;  $\epsilon_r = 41.473$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Right Section

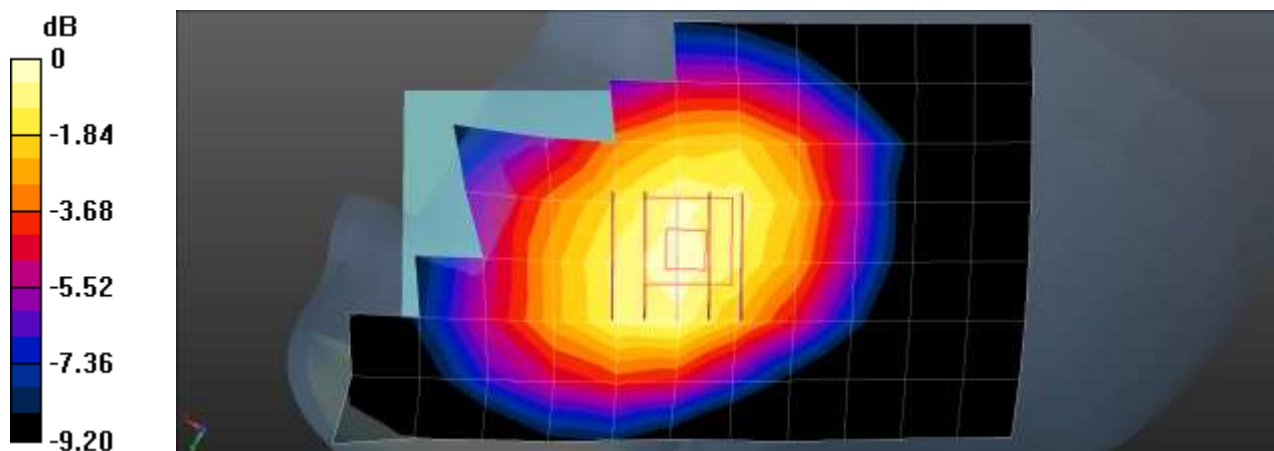
#### DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(10.55, 10.55, 10.55); Calibrated: 2017-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2017-08-29
- Phantom: SAM
- Measurement SW: DASY52, Version 52.8 (8);

**WCDMA band 5 Head Right touch 4183ch/Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 0.240 W/kg

**WCDMA band 5 Head Right touch 4183ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 5.240 V/m; Power Drift = -0.15 dB  
Peak SAR (extrapolated) = 0.261 W/kg

**SAR(1 g) = 0.201 W/kg; SAR(10 g) = 0.153 W/kg**  
Maximum value of SAR (measured) = 0.242 W/kg



0 dB = 0.242 W/kg = -6.16 dBW/kg

Test Laboratory: HCT CO., LTD  
EUT Type: Mobile Phone  
Liquid Temperature: 19.2 °C  
Ambient Temperature: 19.6 °C  
Test Date: 02/21/2018  
Plot No.: 2

### DUT: SM-J250N;

Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz; Duty Cycle: 1:31  
Medium parameters used (interpolated):  $f = 2441$  MHz;  $\sigma = 1.825$  S/m;  $\epsilon_r = 38.962$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Left Section

### DASY Configuration:

- Probe: EX3DV4 - SN3967; ConvF(7.35, 7.35, 7.35); Calibrated: 2018-01-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2018-01-16
- Phantom: SAM
- Measurement SW: DASY52, Version 52.8 (8);

**BT Head Left Touch DH5 39ch/Area Scan (9x15x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.286 W/kg

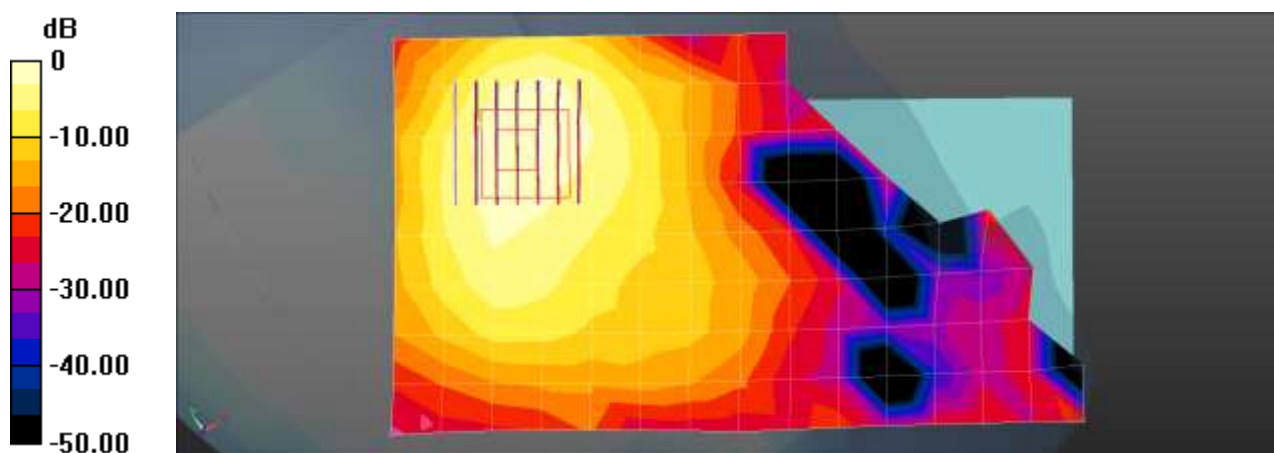
**BT Head Left Touch DH5 39ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.932 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.395 W/kg

**SAR(1 g) = 0.182 W/kg; SAR(10 g) = 0.094 W/kg**

Maximum value of SAR (measured) = 0.307 W/kg



$$0 \text{ dB} = 0.286 \text{ W/kg} = -5.43 \text{ dBW/kg}$$

Test Laboratory: HCT CO., LTD  
EUT Type: Mobile Phone  
Liquid Temperature: 20.5 °C  
Ambient Temperature: 20.7 °C  
Test Date: 02/19/2018  
Plot No.: 3

**DUT: SM-J250N;**

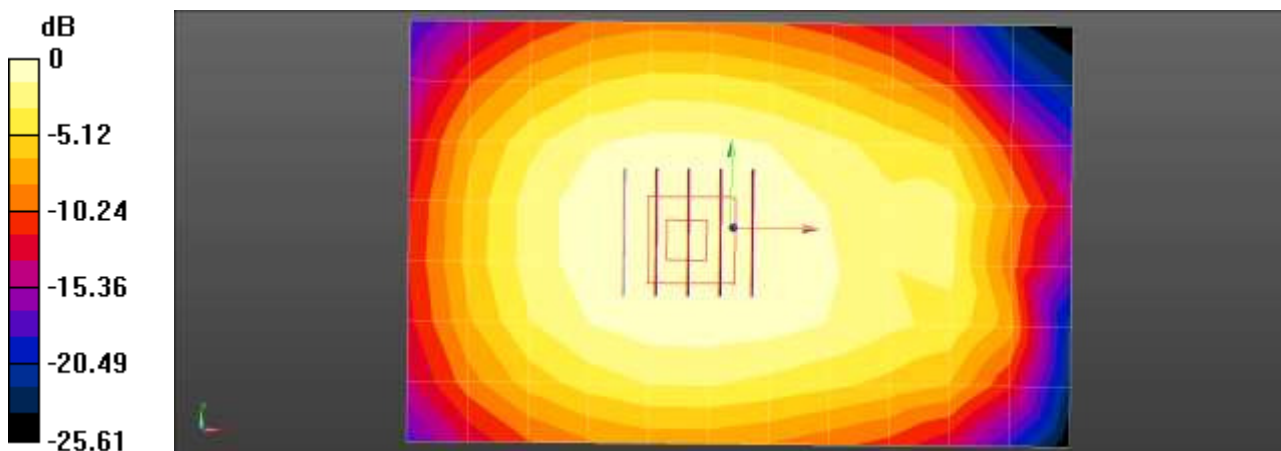
Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1  
Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.977$  S/m;  $\epsilon_r = 55.313$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Center Section

**DASY Configuration:**

- Probe: EX3DV4 - SN3968; ConvF(10.15, 10.15, 10.15); Calibrated: 2017-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2017-08-29
- Phantom: MFP
- Measurement SW: DASY52, Version 52.8 (8);

**WCDMA band 5 Body worn Rear 4183ch/Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 0.463 W/kg  
**WCDMA band 5 Body worn Rear 4183ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 22.73 V/m; Power Drift = -0.13 dB  
Peak SAR (extrapolated) = 0.501 W/kg

**SAR(1 g) = 0.398 W/kg; SAR(10 g) = 0.313 W/kg**  
Maximum value of SAR (measured) = 0.466 W/kg



$$0 \text{ dB} = 0.463 \text{ W/kg} = -3.35 \text{ dBW/kg}$$

Test Laboratory: HCT CO., LTD  
EUT Type: Mobile Phone  
Liquid Temperature: 19.2 °C  
Ambient Temperature: 19.6 °C  
Test Date: 02/21/2018  
Plot No.: 4

**DUT: SM-J250N;**

Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz; Duty Cycle: 1:1.31  
Medium parameters used (interpolated):  $f = 2441$  MHz;  $\sigma = 1.904$  S/m;  $\epsilon_r = 52.384$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3967; ConvF(7.37, 7.37, 7.37); Calibrated: 2018-01-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2018-01-16
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

**BT Body worn Rear DH5 39ch/Area Scan (9x15x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.0319 W/kg

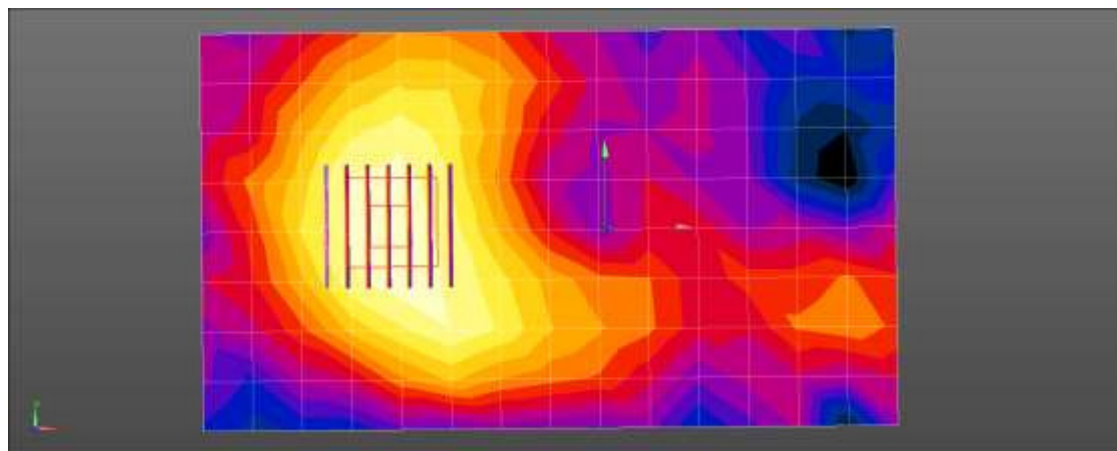
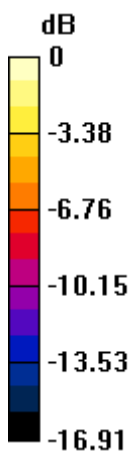
**BT Body worn Rear DH5 39ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.593 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 0.0390 W/kg

**SAR(1 g) = 0.024 W/kg; SAR(10 g) = 0.014 W/kg**

**Maximum value of SAR (measured) = 0.0330 W/kg**



$$0 \text{ dB} = 0.0319 \text{ W/kg} = -14.96 \text{ dBW/kg}$$

Test Laboratory: HCT CO., LTD  
EUT Type: Mobile Phone  
Liquid Temperature: 20.5 °C  
Ambient Temperature: 20.7 °C  
Test Date: 02/19/2018  
Plot No.: 5

**DUT: SM-J250N;**

Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1  
Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.977$  S/m;  $\epsilon_r = 55.313$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Center Section

## DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(10.15, 10.15, 10.15); Calibrated: 2017-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2017-08-29
- Phantom: MFP
- Measurement SW: DASY52, Version 52.8 (8);

**WCDMA band 5 Body Rear 10mm 4183ch/Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 0.485 W/kg

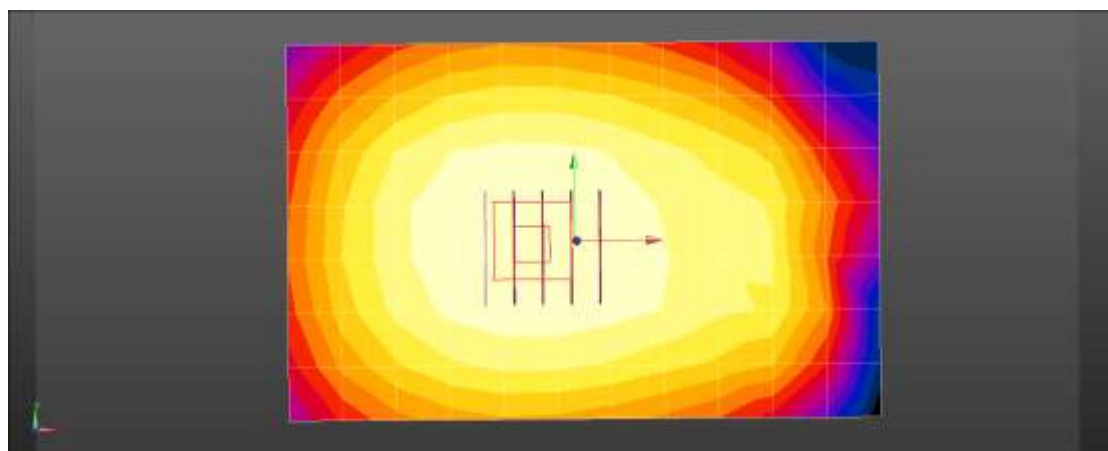
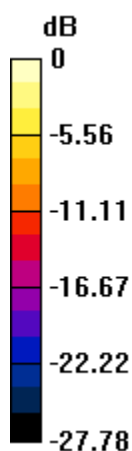
**WCDMA band 5 Body Rear 10mm 4183ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.02 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.524 W/kg

**SAR(1 g) = 0.410 W/kg; SAR(10 g) = 0.320 W/kg**

Maximum value of SAR (measured) = 0.484 W/kg



$$0 \text{ dB} = 0.485 \text{ W/kg} = -3.14 \text{ dBW/kg}$$

Test Laboratory: HCT CO., LTD  
EUT Type: Mobile Phone  
Liquid Temperature: 19.2 °C  
Ambient Temperature: 19.6 °C  
Test Date: 02/21/2018  
Plot No.: 6

### DUT: SM-J250N;

Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz; Duty Cycle: 1:31  
Medium parameters used (interpolated):  $f = 2441$  MHz;  $\sigma = 1.904$  S/m;  $\epsilon_r = 52.384$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Center Section

### DASY Configuration:

- Probe: EX3DV4 - SN3967; ConvF(7.37, 7.37, 7.37); Calibrated: 2018-01-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2018-01-16
- Phantom: Triple Flat Phantom
- Measurement SW: DASY52, Version 52.8 (8);

**BT Body Front DH5 39ch/Area Scan (9x15x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.0701 W/kg

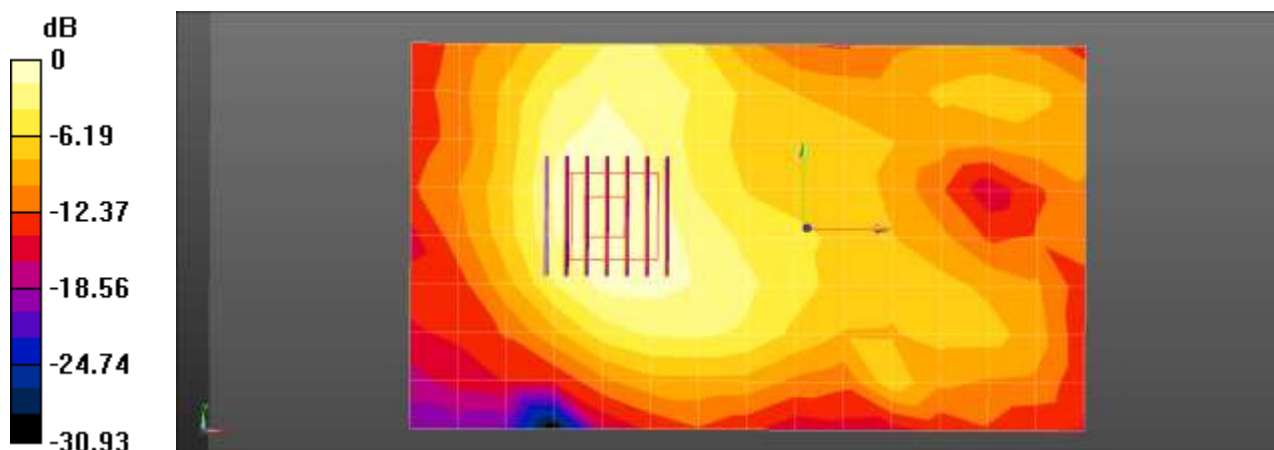
**BT Body Front DH5 39ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.441 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.0870 W/kg

**SAR(1 g) = 0.051 W/kg; SAR(10 g) = 0.029 W/kg**

Maximum value of SAR (measured) = 0.0728 W/kg



$$0 \text{ dB} = 0.0701 \text{ W/kg} = -11.54 \text{ dBW/kg}$$

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## Attachment 2. – Dipole Verification Plots

## ■ Verification Data (835 MHz Head)

Test Laboratory: HCT CO., LTD  
Input Power: 0.05 W  
Liquid Temp: 21.1 °C  
Test Date: 02/14/2018

### DUT: Dipole 835 MHz D835V2; Type: D835V2

Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1  
Medium parameters used (interpolated):  $f = 835$  MHz;  $\sigma = 0.91$  S/m;  $\epsilon_r = 41.495$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

#### DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(10.55, 10.55, 10.55); Calibrated: 2017-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2017-08-29
- Phantom: SAM
- Measurement SW: DASY52, Version 52.8 (8);

**Dipole/835 MHz Head Verification/Area Scan (13x7x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 0.618 W/kg

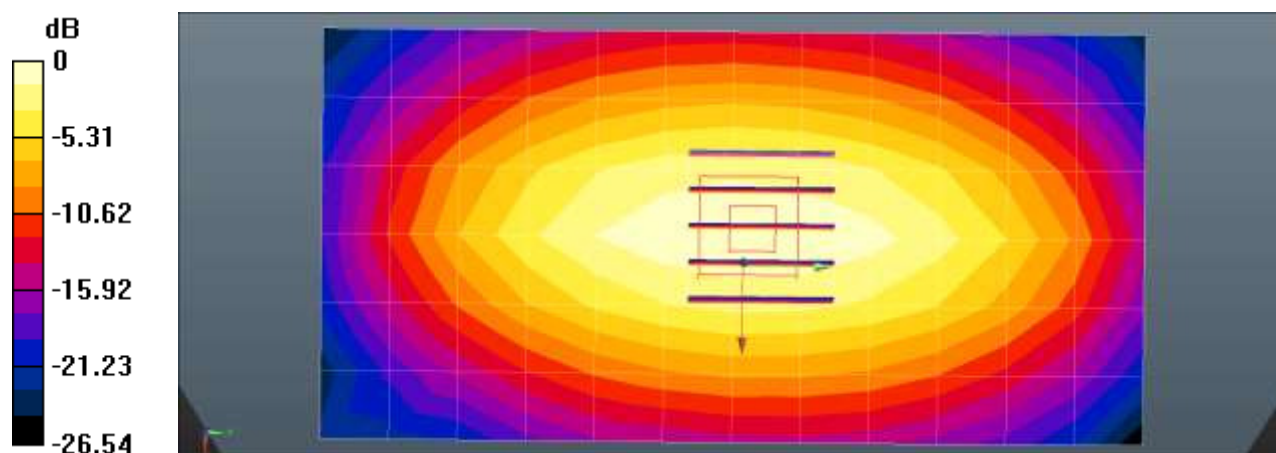
**Dipole/835 MHz Head Verification/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 27.20 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.729 W/kg

**SAR(1 g) = 0.470 W/kg; SAR(10 g) = 0.308 W/kg**

Maximum value of SAR (measured) = 0.639 W/kg



0 dB = 0.618 W/kg = -2.09 dBW/kg

## ■ Verification Data (835 MHz Body)

Test Laboratory: HCT CO., LTD  
Input Power: 0.05 W  
Liquid Temp: 20.5 °C  
Test Date: 02/19/2018

### DUT: Dipole 835 MHz D835V2; Type: D835V2

Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1  
Medium parameters used (interpolated):  $f = 835$  MHz;  $\sigma = 0.976$  S/m;  $\epsilon_r = 55.334$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Center Section

#### DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(10.15, 10.15, 10.15); Calibrated: 2017-05-31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2017-08-29
- Phantom: MFP
- Measurement SW: DASY52, Version 52.8 (8);

**Dipole/835 MHz Body Verification/Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 0.643 W/kg

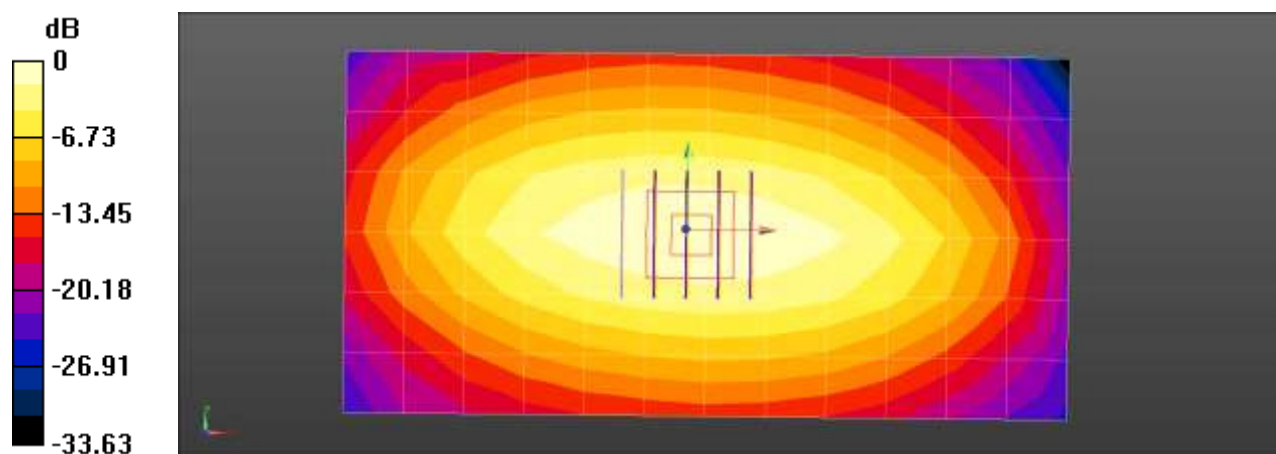
**Dipole/835 MHz Body Verification/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 26.88 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.723 W/kg

**SAR(1 g) = 0.483 W/kg; SAR(10 g) = 0.325 W/kg**

Maximum value of SAR (measured) = 0.639 W/kg



0 dB = 0.643 W/kg = -1.92 dBW/kg

## ■ Verification Data (2 450 MHz Head)

Test Laboratory: HCT CO., LTD  
Input Power: 0.05 W  
Liquid Temp: 19.2 °C  
Test Date: 02/21/2018

### DUT: Dipole 2450 MHz D2450V2; Type: D2450V2

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.837$  S/m;  $\epsilon_r = 38.925$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

#### DASY Configuration:

- Probe: EX3DV4 - SN3967; ConvF(7.35, 7.35, 7.35); Calibrated: 2018-01-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2018-01-16
- Phantom: SAM
- Measurement SW: DASY52, Version 52.8 (8);

**Dipole/2450MHz Head Verification/Area Scan (8x8x1):** Measurement grid: dx=12mm, dy=12mm  
Maximum value of SAR (measured) = 2.63 W/kg

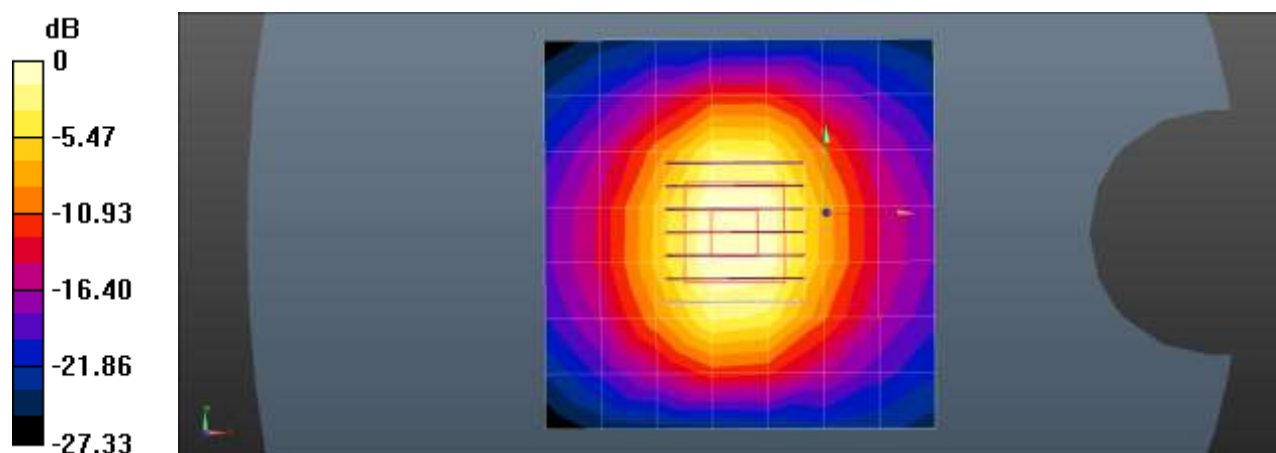
**Dipole/2450MHz Head Verification/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 43.68 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 5.74 W/kg

**SAR(1 g) = 2.61 W/kg; SAR(10 g) = 1.19 W/kg**

Maximum value of SAR (measured) = 3.49 W/kg



0 dB = 2.63 W/kg = 4.20 dBW/kg

## ■ Verification Data (2 450 MHz Body)

Test Laboratory: HCT CO., LTD  
Input Power 0.05 W  
Liquid Temp: 19.2 °C  
Test Date: 02/21/2018

### DUT: Dipole 2450 MHz D2450V2; Type: D2450V2

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.915$  S/m;  $\epsilon_r = 52.36$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Center Section

#### DASY Configuration:

- Probe: EX3DV4 - SN3967; ConvF(7.37, 7.37, 7.37); Calibrated: 2018-01-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2018-01-16
- Phantom: Triple Flat Phantom
- Measurement SW: DASY52, Version 52.8 (8);

**Dipole/2450 MHz Body Verification/Area Scan (8x8x1):** Measurement grid: dx=12mm, dy=12mm  
Maximum value of SAR (measured) = 3.24 W/kg

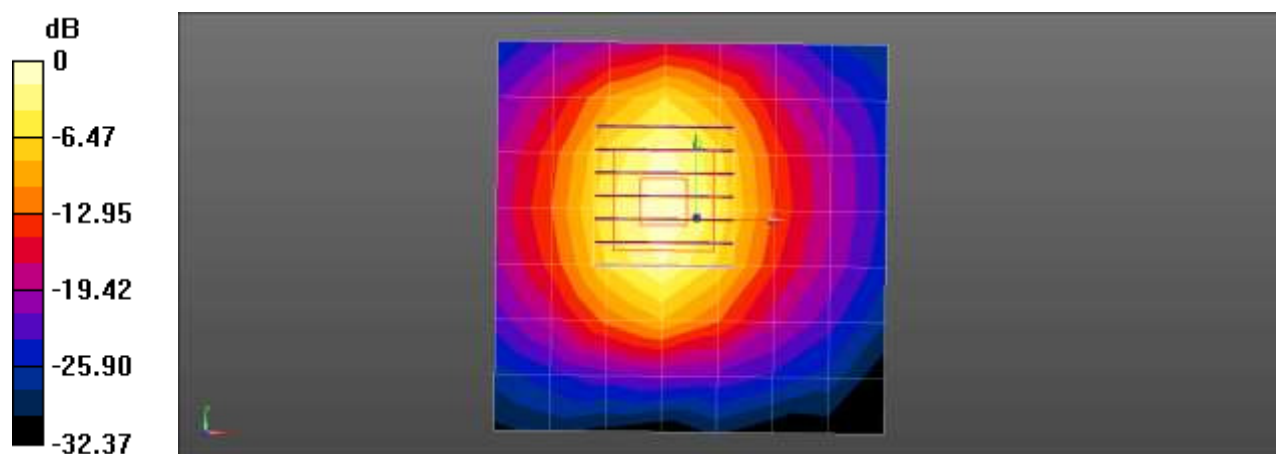
**Dipole/2450 MHz Body Verification/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 32.09 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 5.02 W/kg

**SAR(1 g) = 2.49 W/kg; SAR(10 g) = 1.16 W/kg**

Maximum value of SAR (measured) = 3.25 W/kg



0 dB = 3.24 W/kg = 5.11 dBW/kg

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## Attachment 3. – 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  
**S** Swiss Calibration Service

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

Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **EX3-3968\_May17**

## CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3968**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v4, QA CAL-23.v5,  
QA CAL-25.v6  
Calibration procedure for dosimetric E-field probes**

Calibration date: **May 31, 2017**

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

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

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards          | ID               | Cal Date (Certificate No.)        | Scheduled Calibration  |
|----------------------------|------------------|-----------------------------------|------------------------|
| Power meter NRP            | SN: 104778       | 04-Apr-17 (No. 217-02521/02522)   | Apr-18                 |
| Power sensor NRP-Z91       | SN: 103244       | 04-Apr-17 (No. 217-02521)         | Apr-18                 |
| Power sensor NRP-Z91       | SN: 103245       | 04-Apr-17 (No. 217-02525)         | Apr-18                 |
| Reference 20 dB Attenuator | SN: S5277 (20x)  | 07-Apr-17 (No. 217-02528)         | Apr-18                 |
| Reference Probe ES3DV2     | SN: 3013         | 31-Dec-16 (No. ES3-3013_Dec16)    | Dec-17                 |
| DAE4                       | SN: 660          | 7-Dec-16 (No. DAE4-660_Dec16)     | Dec-17                 |
| Secondary Standards        | ID               | Check Date (in house)             | Scheduled Check        |
| Power meter E4419B         | SN: GB41293874   | 06-Apr-16 (in house check Jun-16) | In house check: Jun-18 |
| Power sensor E4412A        | SN: MY41498087   | 06-Apr-16 (in house check Jun-16) | In house check: Jun-18 |
| Power sensor E4412A        | SN: 000110210    | 06-Apr-16 (in house check Jun-16) | In house check: Jun-18 |
| RF generator HP 8648C      | SN: US3642U01700 | 04-Aug-09 (in house check Jun-16) | In house check: Jun-18 |
| Network Analyzer HP 8753E  | SN: US37390585   | 18-Oct-01 (in house check Oct-16) | In house check: Oct-17 |

|                | Name          | Function              | Signature                                                                             |
|----------------|---------------|-----------------------|---------------------------------------------------------------------------------------|
| Calibrated by: | Michael Weber | Laboratory Technician |  |
| Approved by:   | Katja Pokovic | Technical Manager     |   |
|                |               |                       | Issued: May 31, 2017                                                                  |

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

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#### Glossary:

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

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

- 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Methods Applied and Interpretation of Parameters:

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

EX3DV4 – SN:3968

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# Probe EX3DV4

## SN:3968

Manufactured: September 30, 2013  
Calibrated: May 31, 2017

Calibrated for DASY/EASY Systems  
(Note: non-compatible with DASY2 system!)

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## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3968

### Basic Calibration Parameters

|                                                               | Sensor X | Sensor Y | Sensor Z | Unc (k=2)    |
|---------------------------------------------------------------|----------|----------|----------|--------------|
| Norm ( $\mu\text{V}/(\text{V}/\text{m})^{2.5}$ ) <sup>A</sup> | 0.34     | 0.33     | 0.41     | $\pm 10.1\%$ |
| DCP (mV) <sup>B</sup>                                         | 105.3    | 103.7    | 101.6    |              |

### Modulation Calibration Parameters

| UID | Communication System Name |   | A<br>dB | B<br>dB $\sqrt{\mu\text{V}}$ | C   | D<br>dB | VR<br>mV | Unc <sup>E</sup><br>(k=2) |
|-----|---------------------------|---|---------|------------------------------|-----|---------|----------|---------------------------|
| 0   | CW                        | X | 0.0     | 0.0                          | 1.0 | 0.00    | 166.8    | $\pm 2.7\%$               |
|     |                           | Y | 0.0     | 0.0                          | 1.0 |         | 167.0    |                           |
|     |                           | Z | 0.0     | 0.0                          | 1.0 |         | 162.8    |                           |

Note: For details on UID parameters see Appendix.

### Sensor Model Parameters

|   | C1<br>fF | C2<br>fF | $\alpha$<br>$\text{V}^{-1}$ | T1<br>$\text{ms}\cdot\text{V}^{-2}$ | T2<br>$\text{ms}\cdot\text{V}^{-1}$ | T3<br>ms | T4<br>$\text{V}^{-2}$ | T5<br>$\text{V}^{-1}$ | T6    |
|---|----------|----------|-----------------------------|-------------------------------------|-------------------------------------|----------|-----------------------|-----------------------|-------|
| X | 38.91    | 285.0    | 34.75                       | 14.00                               | 1.299                               | 4.917    | 0.303                 | 0.332                 | 1.002 |
| Y | 38.40    | 282.5    | 34.90                       | 12.77                               | 1.162                               | 4.935    | 0.244                 | 0.361                 | 1.003 |
| Z | 27.87    | 209.3    | 36.27                       | 12.33                               | 1.412                               | 4.946    | 0.00                  | 0.285                 | 1.004 |

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

<sup>A</sup> The uncertainties of Norm X,Y,Z do not affect the E<sup>1</sup>-field uncertainty inside TSL (see Pages 5 and 6).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

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

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## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3968

### Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) <sup>C</sup> | Relative Permittivity <sup>E</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha <sup>G</sup> | Depth <sup>H</sup> (mm) | Unc (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|-----------|
| 600                  | 42.7                               | 0.88                            | 10.91   | 10.91   | 10.91   | 0.10               | 1.10                    | ± 13.3 %  |
| 750                  | 41.9                               | 0.89                            | 10.78   | 10.78   | 10.78   | 0.58               | 0.80                    | ± 12.0 %  |
| 835                  | 41.5                               | 0.90                            | 10.55   | 10.55   | 10.55   | 0.51               | 0.80                    | ± 12.0 %  |
| 900                  | 41.5                               | 0.97                            | 10.23   | 10.23   | 10.23   | 0.50               | 0.80                    | ± 12.0 %  |
| 1450                 | 40.5                               | 1.20                            | 9.14    | 9.14    | 9.14    | 0.39               | 0.80                    | ± 12.0 %  |
| 1750                 | 40.1                               | 1.37                            | 9.06    | 9.06    | 9.06    | 0.43               | 0.85                    | ± 12.0 %  |
| 1900                 | 40.0                               | 1.40                            | 8.66    | 8.66    | 8.66    | 0.43               | 0.80                    | ± 12.0 %  |
| 2450                 | 39.2                               | 1.80                            | 7.95    | 7.95    | 7.95    | 0.37               | 0.91                    | ± 12.0 %  |
| 2600                 | 39.0                               | 1.96                            | 7.72    | 7.72    | 7.72    | 0.42               | 0.93                    | ± 12.0 %  |
| 5250                 | 35.9                               | 4.71                            | 5.49    | 5.49    | 5.49    | 0.35               | 1.80                    | ± 13.1 %  |
| 5600                 | 35.5                               | 5.07                            | 4.90    | 4.90    | 4.90    | 0.40               | 1.80                    | ± 13.1 %  |
| 5750                 | 35.4                               | 5.22                            | 5.07    | 5.07    | 5.07    | 0.40               | 1.80                    | ± 13.1 %  |

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

<sup>E</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

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## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3968

### Calibration Parameter Determined in Body Tissue Simulating Media

| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha <sup>G</sup> | Depth <sup>G</sup> (mm) | Unc (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|-----------|
| 600                  | 56.1                               | 0.95                            | 10.81   | 10.81   | 10.81   | 0.09               | 1.10                    | ± 13.3 %  |
| 750                  | 55.5                               | 0.96                            | 10.57   | 10.57   | 10.57   | 0.46               | 0.80                    | ± 12.0 %  |
| 835                  | 55.2                               | 0.97                            | 10.15   | 10.15   | 10.15   | 0.45               | 0.88                    | ± 12.0 %  |
| 1750                 | 53.4                               | 1.49                            | 8.54    | 8.54    | 8.54    | 0.44               | 0.84                    | ± 12.0 %  |
| 1900                 | 53.3                               | 1.52                            | 8.19    | 8.19    | 8.19    | 0.40               | 0.80                    | ± 12.0 %  |
| 2450                 | 52.7                               | 1.95                            | 8.05    | 8.05    | 8.05    | 0.43               | 0.90                    | ± 12.0 %  |
| 2600                 | 52.5                               | 2.16                            | 7.87    | 7.87    | 7.87    | 0.32               | 0.98                    | ± 12.0 %  |
| 5250                 | 48.9                               | 5.36                            | 4.90    | 4.90    | 4.90    | 0.40               | 1.90                    | ± 13.1 %  |
| 5600                 | 48.5                               | 5.77                            | 4.18    | 4.18    | 4.18    | 0.45               | 1.90                    | ± 13.1 %  |
| 5750                 | 48.3                               | 5.94                            | 4.28    | 4.28    | 4.28    | 0.50               | 1.90                    | ± 13.1 %  |

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

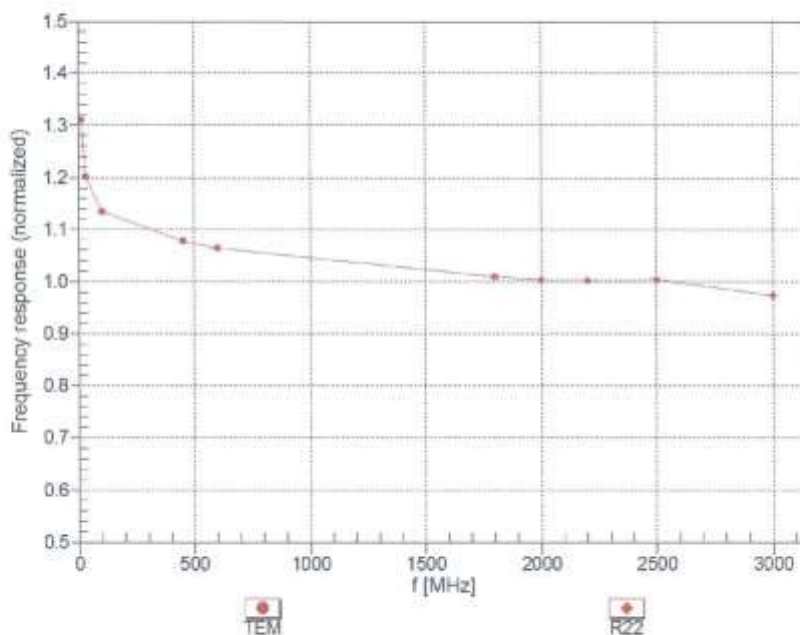
<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty in the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

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

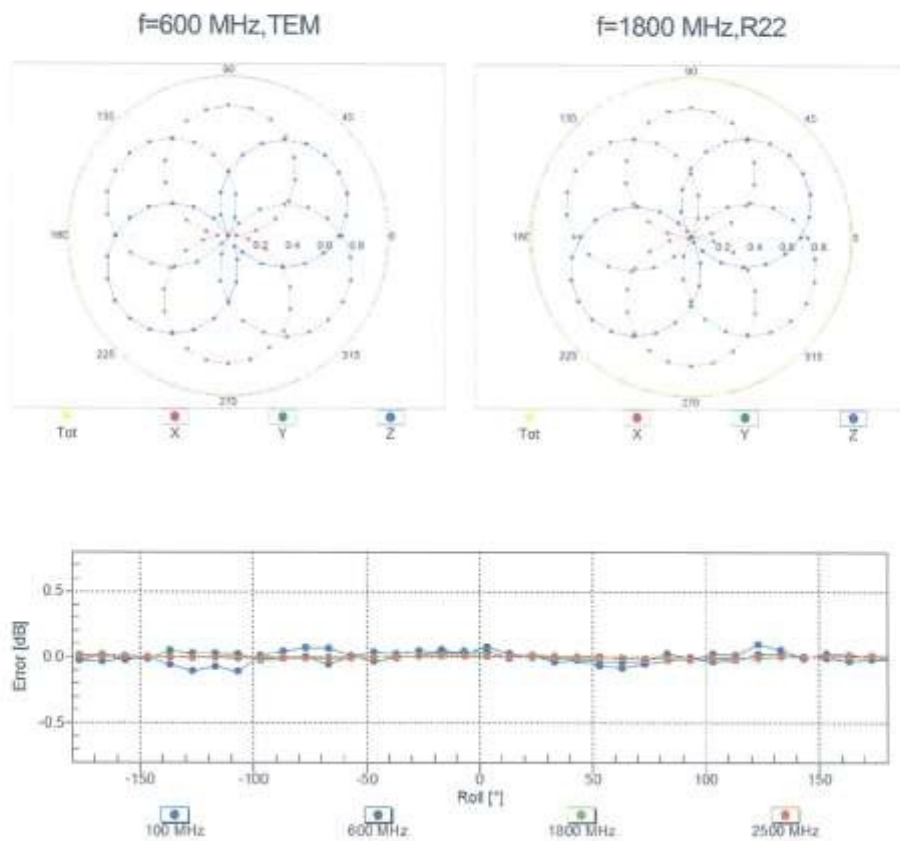


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

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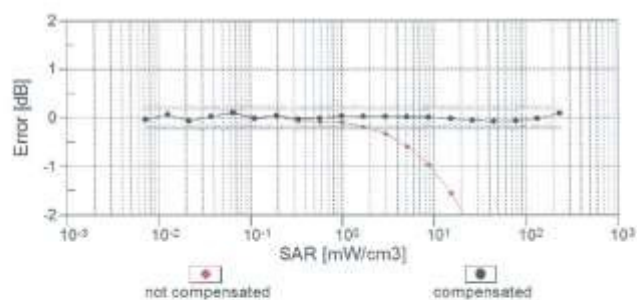
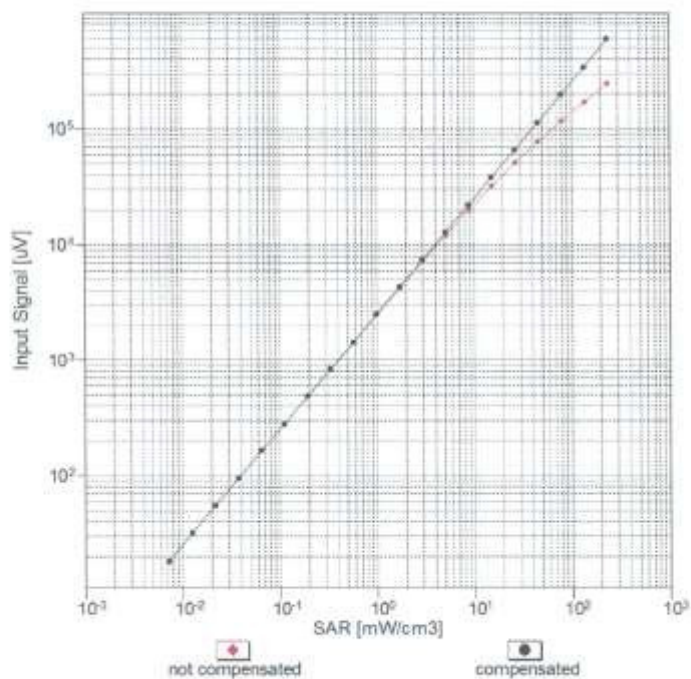
### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$



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### Dynamic Range f(SAR<sub>head</sub>) (TEM cell, f<sub>eval</sub>=1900 MHz)

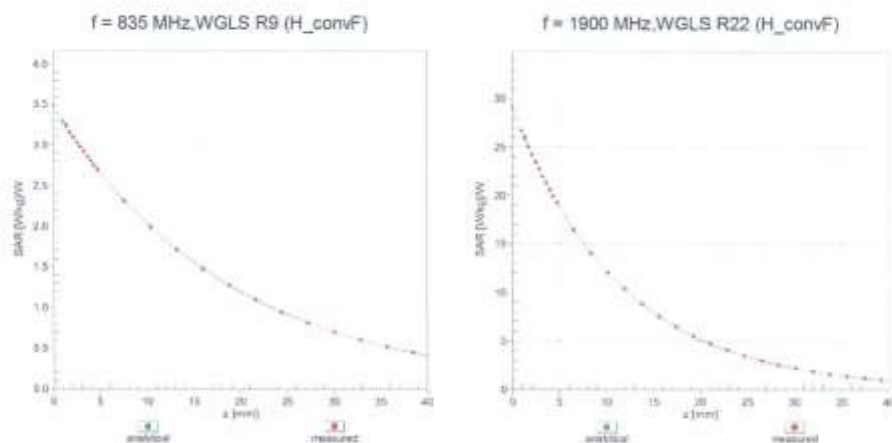


Uncertainty of Linearity Assessment:  $\pm 0.6\%$  (k=2)

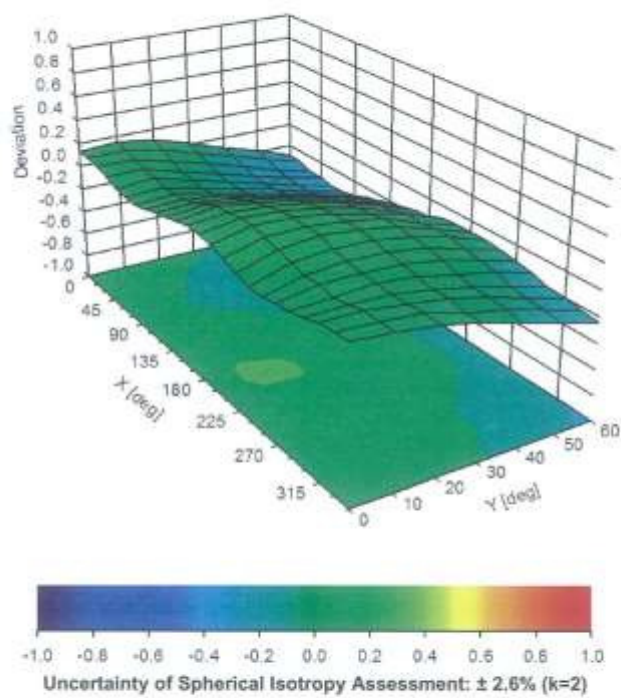
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## Conversion Factor Assessment



## Deviation from Isotropy in Liquid Error ( $\phi$ , $\theta$ ), $f = 900$ MHz



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## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3968

### Other Probe Parameters

|                                               |            |
|-----------------------------------------------|------------|
| Sensor Arrangement                            | Triangular |
| Connector Angle (°)                           | 63.1       |
| 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     |

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**Appendix: Modulation Calibration Parameters**

| UID           | Communication System Name                     |   | A<br>dB | B<br>dB $\sqrt{\mu}$ V | C     | D<br>dB | VR<br>mV | Max<br>Unc <sup>c</sup><br>(k=2) |
|---------------|-----------------------------------------------|---|---------|------------------------|-------|---------|----------|----------------------------------|
| 0             | CW                                            | X | 0.00    | 0.00                   | 1.00  | 0.00    | 166.8    | $\pm 2.7\%$                      |
|               |                                               | Y | 0.00    | 0.00                   | 1.00  |         | 167.0    |                                  |
|               |                                               | Z | 0.00    | 0.00                   | 1.00  |         | 162.8    |                                  |
| 10010-<br>CAA | SAR Validation (Square, 100ms, 10ms)          | X | 2.67    | 65.27                  | 10.31 | 10.00   | 20.0     | $\pm 9.6\%$                      |
|               |                                               | Y | 2.64    | 65.46                  | 10.40 |         | 20.0     |                                  |
|               |                                               | Z | 3.46    | 68.69                  | 12.53 |         | 20.0     |                                  |
| 10011-<br>CAB | UMTS-FDD (WCDMA)                              | X | 2.04    | 81.42                  | 22.42 | 0.00    | 150.0    | $\pm 9.6\%$                      |
|               |                                               | Y | 1.40    | 74.05                  | 19.02 |         | 150.0    |                                  |
|               |                                               | Z | 2.07    | 81.87                  | 22.38 |         | 150.0    |                                  |
| 10012-<br>CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)      | X | 1.29    | 66.65                  | 17.30 | 0.41    | 150.0    | $\pm 9.6\%$                      |
|               |                                               | Y | 1.23    | 65.47                  | 16.42 |         | 150.0    |                                  |
|               |                                               | Z | 1.30    | 66.68                  | 17.29 |         | 150.0    |                                  |
| 10013-<br>CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps) | X | 4.76    | 66.97                  | 17.12 | 1.46    | 150.0    | $\pm 9.6\%$                      |
|               |                                               | Y | 4.74    | 66.83                  | 17.01 |         | 150.0    |                                  |
|               |                                               | Z | 4.66    | 67.38                  | 17.36 |         | 150.0    |                                  |
| 10021-<br>DAC | GSM-FDD (TDMA, GMSK)                          | X | 5.21    | 73.16                  | 14.87 | 9.39    | 50.0     | $\pm 9.6\%$                      |
|               |                                               | Y | 6.15    | 75.66                  | 15.87 |         | 50.0     |                                  |
|               |                                               | Z | 13.17   | 86.61                  | 20.51 |         | 50.0     |                                  |
| 10023-<br>DAC | GPRS-FDD (TDMA, GMSK, TN 0)                   | X | 4.93    | 72.26                  | 14.53 | 9.57    | 50.0     | $\pm 9.6\%$                      |
|               |                                               | Y | 5.58    | 74.24                  | 15.34 |         | 50.0     |                                  |
|               |                                               | Z | 9.65    | 82.17                  | 19.03 |         | 50.0     |                                  |
| 10024-<br>DAC | GPRS-FDD (TDMA, GMSK, TN 0-1)                 | X | 4.50    | 73.46                  | 13.82 | 6.56    | 60.0     | $\pm 9.6\%$                      |
|               |                                               | Y | 6.18    | 77.37                  | 15.27 |         | 60.0     |                                  |
|               |                                               | Z | 100.00  | 110.63                 | 25.27 |         | 60.0     |                                  |
| 10025-<br>DAC | EDGE-FDD (TDMA, 8PSK, TN 0)                   | X | 5.90    | 76.91                  | 27.81 | 12.57   | 50.0     | $\pm 9.6\%$                      |
|               |                                               | Y | 3.94    | 66.02                  | 22.20 |         | 50.0     |                                  |
|               |                                               | Z | 8.17    | 86.75                  | 33.07 |         | 50.0     |                                  |
| 10026-<br>DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1)                 | X | 8.94    | 90.70                  | 30.72 | 9.56    | 60.0     | $\pm 9.6\%$                      |
|               |                                               | Y | 8.23    | 86.52                  | 29.19 |         | 60.0     |                                  |
|               |                                               | Z | 9.07    | 90.03                  | 31.36 |         | 60.0     |                                  |
| 10027-<br>DAC | GPRS-FDD (TDMA, GMSK, TN 0-1-2)               | X | 8.90    | 81.45                  | 15.73 | 4.80    | 80.0     | $\pm 9.6\%$                      |
|               |                                               | Y | 26.42   | 92.49                  | 18.83 |         | 80.0     |                                  |
|               |                                               | Z | 100.00  | 110.93                 | 24.58 |         | 80.0     |                                  |
| 10028-<br>DAC | GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)             | X | 100.00  | 104.11                 | 20.79 | 3.55    | 100.0    | $\pm 9.6\%$                      |
|               |                                               | Y | 100.00  | 105.45                 | 21.29 |         | 100.0    |                                  |
|               |                                               | Z | 100.00  | 113.44                 | 24.98 |         | 100.0    |                                  |
| 10029-<br>DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1-2)               | X | 6.40    | 81.85                  | 26.45 | 7.80    | 80.0     | $\pm 9.6\%$                      |
|               |                                               | Y | 5.60    | 79.03                  | 25.33 |         | 80.0     |                                  |
|               |                                               | Z | 5.92    | 81.05                  | 26.87 |         | 80.0     |                                  |
| 10030-<br>CAA | IEEE 802.15.1 Bluetooth (GFSK, DH1)           | X | 3.52    | 71.63                  | 12.55 | 5.30    | 70.0     | $\pm 9.6\%$                      |
|               |                                               | Y | 4.51    | 74.62                  | 13.71 |         | 70.0     |                                  |
|               |                                               | Z | 83.47   | 106.60                 | 23.34 |         | 70.0     |                                  |
| 10031-<br>CAA | IEEE 802.15.1 Bluetooth (GFSK, DH3)           | X | 100.00  | 104.21                 | 19.69 | 1.88    | 100.0    | $\pm 9.6\%$                      |
|               |                                               | Y | 100.00  | 105.19                 | 20.02 |         | 100.0    |                                  |
|               |                                               | Z | 100.00  | 116.94                 | 25.06 |         | 100.0    |                                  |

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|           |                                                     |   |        |        |          |       |       |         |
|-----------|-----------------------------------------------------|---|--------|--------|----------|-------|-------|---------|
| 10032-CAA | IEEE 802.15.1 Bluetooth (GFSK, DH5)                 | X | 100.00 | 116.57 | 23.84    | 1.17  | 100.0 | ± 9.6 % |
|           |                                                     | Y | 100.00 | 115.60 | 23.40    |       | 100.0 |         |
|           |                                                     | Z | 100.00 | 139.46 | 33.13    |       | 100.0 |         |
| 10033-CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)           | X | 4.53   | 75.57  | 16.99    | 5.30  | 70.0  | ± 9.6 % |
|           |                                                     | Y | 4.36   | 75.57  | 17.12    |       | 70.0  |         |
|           |                                                     | Z | 4.63   | 75.58  | 16.67    |       | 70.0  |         |
| 10034-CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)           | X | 3.55   | 77.24  | 16.84    | 1.86  | 100.0 | ± 9.6 % |
|           |                                                     | Y | 2.72   | 74.13  | 15.70    |       | 100.0 |         |
|           |                                                     | Z | 2.99   | 74.09  | 14.52    |       | 100.0 |         |
| 10035-CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)           | X | 3.85   | 80.24  | 17.96    | 1.17  | 100.0 | ± 9.6 % |
|           |                                                     | Y | 2.43   | 74.53  | 15.87    |       | 100.0 |         |
|           |                                                     | Z | 3.13   | 76.10  | 15.07    |       | 100.0 |         |
| 10036-CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH1)               | X | 5.07   | 77.22  | 17.66    | 5.30  | 70.0  | ± 9.6 % |
|           |                                                     | Y | 4.89   | 77.31  | 17.83    |       | 70.0  |         |
|           |                                                     | Z | 5.15   | 77.15  | 17.32    |       | 70.0  |         |
| 10037-CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH3)               | X | 3.16   | 75.93  | 16.35    | 1.88  | 100.0 | ± 9.6 % |
|           |                                                     | Y | 2.48   | 73.10  | 15.28    |       | 100.0 |         |
|           |                                                     | Z | 2.53   | 72.37  | 13.88    |       | 100.0 |         |
| 10038-CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH5)               | X | 4.08   | 81.32  | 18.49    | 1.17  | 100.0 | ± 9.6 % |
|           |                                                     | Y | 2.50   | 75.14  | 16.23    |       | 100.0 |         |
|           |                                                     | Z | 3.35   | 77.15  | 15.58    |       | 100.0 |         |
| 10039-CAB | CDMA2000 (1xRTT, RC1)                               | X | 100.00 | 127.95 | 31.45    | 0.00  | 150.0 | ± 9.6 % |
|           |                                                     | Y | 26.45  | 108.25 | 26.43    |       | 150.0 |         |
|           |                                                     | Z | 100.00 | 116.70 | 25.69    |       | 150.0 |         |
| 10042-CAB | IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate) | X | 3.92   | 70.88  | 12.92    | 7.78  | 50.0  | ± 9.6 % |
|           |                                                     | Y | 4.53   | 72.92  | 13.76    |       | 50.0  |         |
|           |                                                     | Z | 15.64  | 88.11  | 19.60    |       | 50.0  |         |
| 10044-CAA | IS-91/EIA/TIA-553 FDD (FDMA, FM)                    | X | 0.00   | 116.31 | 1.84     | 0.00  | 150.0 | ± 9.6 % |
|           |                                                     | Y | 0.00   | 105.81 | 1.81     |       | 150.0 |         |
|           |                                                     | Z | 0.03   | 60.00  | 41766.38 |       | 150.0 |         |
| 10048-CAA | DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)           | X | 4.84   | 68.58  | 14.54    | 13.80 | 25.0  | ± 9.6 % |
|           |                                                     | Y | 5.18   | 69.74  | 15.02    |       | 25.0  |         |
|           |                                                     | Z | 6.81   | 73.79  | 17.39    |       | 25.0  |         |
| 10049-CAA | DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)         | X | 4.93   | 71.14  | 14.34    | 10.79 | 40.0  | ± 9.6 % |
|           |                                                     | Y | 5.27   | 72.36  | 14.86    |       | 40.0  |         |
|           |                                                     | Z | 7.31   | 77.25  | 17.52    |       | 40.0  |         |
| 10056-CAA | UMTS-TDD (TD-SCDMA, 1.28 Mcps)                      | X | 6.42   | 75.87  | 17.61    | 9.03  | 50.0  | ± 9.6 % |
|           |                                                     | Y | 6.65   | 76.85  | 18.08    |       | 50.0  |         |
|           |                                                     | Z | 7.13   | 77.76  | 18.49    |       | 50.0  |         |
| 10058-DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)                   | X | 4.93   | 77.31  | 24.05    | 6.55  | 100.0 | ± 9.6 % |
|           |                                                     | Y | 4.44   | 75.18  | 23.16    |       | 100.0 |         |
|           |                                                     | Z | 4.62   | 76.59  | 24.40    |       | 100.0 |         |
| 10059-CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)            | X | 1.36   | 68.02  | 17.83    | 0.61  | 110.0 | ± 9.6 % |
|           |                                                     | Y | 1.28   | 66.56  | 16.85    |       | 110.0 |         |
|           |                                                     | Z | 1.38   | 68.08  | 17.88    |       | 110.0 |         |
| 10060-CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)          | X | 100.00 | 135.52 | 34.61    | 1.30  | 110.0 | ± 9.6 % |
|           |                                                     | Y | 37.24  | 120.78 | 31.25    |       | 110.0 |         |
|           |                                                     | Z | 100.00 | 139.93 | 36.67    |       | 110.0 |         |

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|           |                                                |   |      |       |       |      |       |         |
|-----------|------------------------------------------------|---|------|-------|-------|------|-------|---------|
| 10061-CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)      | X | 4.03 | 84.42 | 22.84 | 2.04 | 110.0 | ± 9.6 % |
|           |                                                | Y | 2.88 | 79.06 | 20.91 |      | 110.0 |         |
|           |                                                | Z | 4.10 | 85.58 | 23.75 |      | 110.0 |         |
| 10062-CAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)       | X | 4.60 | 67.19 | 16.81 | 0.49 | 100.0 | ± 9.6 % |
|           |                                                | Y | 4.58 | 67.01 | 16.66 |      | 100.0 |         |
|           |                                                | Z | 4.46 | 67.43 | 16.92 |      | 100.0 |         |
| 10063-CAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)       | X | 4.60 | 67.23 | 16.85 | 0.72 | 100.0 | ± 9.6 % |
|           |                                                | Y | 4.58 | 67.05 | 16.70 |      | 100.0 |         |
|           |                                                | Z | 4.47 | 67.53 | 17.00 |      | 100.0 |         |
| 10064-CAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)      | X | 4.85 | 67.38 | 16.99 | 0.86 | 100.0 | ± 9.6 % |
|           |                                                | Y | 4.83 | 67.21 | 16.85 |      | 100.0 |         |
|           |                                                | Z | 4.68 | 67.63 | 17.12 |      | 100.0 |         |
| 10065-CAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)      | X | 4.71 | 67.19 | 17.00 | 1.21 | 100.0 | ± 9.6 % |
|           |                                                | Y | 4.69 | 67.03 | 16.87 |      | 100.0 |         |
|           |                                                | Z | 4.56 | 67.43 | 17.15 |      | 100.0 |         |
| 10066-CAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)      | X | 4.72 | 67.14 | 17.09 | 1.46 | 100.0 | ± 9.6 % |
|           |                                                | Y | 4.69 | 66.98 | 16.96 |      | 100.0 |         |
|           |                                                | Z | 4.56 | 67.38 | 17.23 |      | 100.0 |         |
| 10067-CAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)      | X | 4.99 | 67.29 | 17.45 | 2.04 | 100.0 | ± 9.6 % |
|           |                                                | Y | 4.97 | 67.15 | 17.34 |      | 100.0 |         |
|           |                                                | Z | 4.83 | 67.60 | 17.63 |      | 100.0 |         |
| 10068-CAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)      | X | 5.02 | 67.19 | 17.54 | 2.55 | 100.0 | ± 9.6 % |
|           |                                                | Y | 5.00 | 67.04 | 17.43 |      | 100.0 |         |
|           |                                                | Z | 4.90 | 67.61 | 17.81 |      | 100.0 |         |
| 10069-CAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)      | X | 5.09 | 67.20 | 17.71 | 2.67 | 100.0 | ± 9.6 % |
|           |                                                | Y | 5.07 | 67.05 | 17.60 |      | 100.0 |         |
|           |                                                | Z | 4.94 | 67.57 | 17.94 |      | 100.0 |         |
| 10071-CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)  | X | 4.84 | 66.98 | 17.32 | 1.99 | 100.0 | ± 9.6 % |
|           |                                                | Y | 4.83 | 66.84 | 17.21 |      | 100.0 |         |
|           |                                                | Z | 4.76 | 67.44 | 17.60 |      | 100.0 |         |
| 10072-CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps) | X | 4.81 | 67.24 | 17.47 | 2.30 | 100.0 | ± 9.6 % |
|           |                                                | Y | 4.79 | 67.08 | 17.36 |      | 100.0 |         |
|           |                                                | Z | 4.72 | 67.65 | 17.75 |      | 100.0 |         |
| 10073-CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps) | X | 4.87 | 67.38 | 17.72 | 2.83 | 100.0 | ± 9.6 % |
|           |                                                | Y | 4.85 | 67.21 | 17.60 |      | 100.0 |         |
|           |                                                | Z | 4.82 | 67.94 | 18.09 |      | 100.0 |         |
| 10074-CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps) | X | 4.88 | 67.30 | 17.82 | 3.30 | 100.0 | ± 9.6 % |
|           |                                                | Y | 4.86 | 67.13 | 17.71 |      | 100.0 |         |
|           |                                                | Z | 4.87 | 68.01 | 18.27 |      | 100.0 |         |
| 10075-CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps) | X | 4.92 | 67.37 | 18.05 | 3.82 | 90.0  | ± 9.6 % |
|           |                                                | Y | 4.89 | 67.17 | 17.93 |      | 90.0  |         |
|           |                                                | Z | 4.93 | 68.08 | 18.51 |      | 90.0  |         |
| 10076-CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps) | X | 4.96 | 67.24 | 18.19 | 4.15 | 90.0  | ± 9.6 % |
|           |                                                | Y | 4.93 | 67.04 | 18.07 |      | 90.0  |         |
|           |                                                | Z | 4.98 | 68.00 | 18.69 |      | 90.0  |         |
| 10077-CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps) | X | 4.99 | 67.33 | 18.28 | 4.30 | 90.0  | ± 9.6 % |
|           |                                                | Y | 4.96 | 67.12 | 18.17 |      | 90.0  |         |
|           |                                                | Z | 5.03 | 68.14 | 18.82 |      | 90.0  |         |

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|           |                                                     |   |        |        |       |      |       |         |
|-----------|-----------------------------------------------------|---|--------|--------|-------|------|-------|---------|
| 10081-CAB | CDMA2000 (1xRTT, RC3)                               | X | 68.67  | 125.16 | 30.28 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 1.87   | 77.82  | 17.29 |      | 150.0 |         |
|           |                                                     | Z | 28.98  | 104.13 | 22.27 |      | 150.0 |         |
| 10082-CAB | IS-54 / IS-136 FDD (TDMA/FDM, P1/4-DQPSK, Fullrate) | X | 0.89   | 60.00  | 4.78  | 4.77 | 80.0  | ± 9.6 % |
|           |                                                     | Y | 0.66   | 57.32  | 2.78  |      | 80.0  |         |
|           |                                                     | Z | 0.87   | 60.00  | 5.11  |      | 80.0  |         |
| 10090-DAC | GPRS-FDD (TDMA, GMSK, TN 0-4)                       | X | 4.44   | 73.28  | 13.76 | 6.56 | 60.0  | ± 9.6 % |
|           |                                                     | Y | 6.04   | 77.10  | 15.19 |      | 60.0  |         |
|           |                                                     | Z | 100.00 | 110.63 | 25.29 |      | 60.0  |         |
| 10097-CAB | UMTS-FDD (HSDPA)                                    | X | 2.55   | 74.94  | 19.44 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 2.23   | 72.22  | 18.02 |      | 150.0 |         |
|           |                                                     | Z | 2.84   | 77.31  | 19.86 |      | 150.0 |         |
| 10098-CAB | UMTS-FDD (HSUPA, Subtest 2)                         | X | 2.51   | 74.99  | 19.48 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 2.18   | 72.20  | 18.01 |      | 150.0 |         |
|           |                                                     | Z | 2.80   | 77.36  | 19.91 |      | 150.0 |         |
| 10099-DAC | EDGE-FDD (TDMA, 8PSK, TN 0-4)                       | X | 9.97   | 90.71  | 30.71 | 9.56 | 60.0  | ± 9.6 % |
|           |                                                     | Y | 8.26   | 86.55  | 29.18 |      | 60.0  |         |
|           |                                                     | Z | 9.10   | 90.06  | 31.36 |      | 60.0  |         |
| 10100-CAC | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)            | X | 3.76   | 74.65  | 19.15 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 3.44   | 72.90  | 18.25 |      | 150.0 |         |
|           |                                                     | Z | 3.41   | 73.56  | 18.91 |      | 150.0 |         |
| 10101-CAC | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)          | X | 3.40   | 69.35  | 17.20 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 3.30   | 68.65  | 16.74 |      | 150.0 |         |
|           |                                                     | Z | 3.24   | 69.00  | 17.13 |      | 150.0 |         |
| 10102-CAC | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)          | X | 3.49   | 69.24  | 17.24 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 3.41   | 68.62  | 16.82 |      | 150.0 |         |
|           |                                                     | Z | 3.33   | 68.95  | 17.17 |      | 150.0 |         |
| 10103-CAC | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)            | X | 6.09   | 74.44  | 19.37 | 3.98 | 65.0  | ± 9.6 % |
|           |                                                     | Y | 5.86   | 73.97  | 19.23 |      | 65.0  |         |
|           |                                                     | Z | 6.05   | 75.35  | 20.19 |      | 65.0  |         |
| 10104-CAC | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)          | X | 6.32   | 73.41  | 19.75 | 3.98 | 65.0  | ± 9.6 % |
|           |                                                     | Y | 6.08   | 72.80  | 19.51 |      | 65.0  |         |
|           |                                                     | Z | 6.09   | 73.52  | 20.07 |      | 65.0  |         |
| 10105-CAC | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)          | X | 5.87   | 71.91  | 19.40 | 3.98 | 65.0  | ± 9.6 % |
|           |                                                     | Y | 5.72   | 71.55  | 19.26 |      | 65.0  |         |
|           |                                                     | Z | 5.72   | 72.17  | 19.76 |      | 65.0  |         |
| 10108-CAD | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)            | X | 3.27   | 74.13  | 19.15 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 2.99   | 72.32  | 18.18 |      | 150.0 |         |
|           |                                                     | Z | 2.99   | 73.55  | 19.04 |      | 150.0 |         |
| 10109-CAD | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)          | X | 3.09   | 69.75  | 17.36 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 2.98   | 68.90  | 16.81 |      | 150.0 |         |
|           |                                                     | Z | 2.94   | 69.71  | 17.28 |      | 150.0 |         |
| 10110-CAD | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)             | X | 2.75   | 74.22  | 19.20 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 2.46   | 71.96  | 18.00 |      | 150.0 |         |
|           |                                                     | Z | 2.59   | 74.44  | 19.15 |      | 150.0 |         |
| 10111-CAD | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)           | X | 3.10   | 72.77  | 18.57 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 2.90   | 71.37  | 17.76 |      | 150.0 |         |
|           |                                                     | Z | 3.06   | 73.60  | 18.47 |      | 150.0 |         |

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|           |                                                |   |      |       |       |      |       |         |
|-----------|------------------------------------------------|---|------|-------|-------|------|-------|---------|
| 10112-CAD | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)     | X | 3.21 | 69.66 | 17.35 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 3.10 | 68.88 | 16.84 |      | 150.0 |         |
|           |                                                | Z | 3.06 | 69.73 | 17.30 |      | 150.0 |         |
| 10113-CAD | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)      | X | 3.24 | 72.71 | 18.58 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 3.05 | 71.45 | 17.84 |      | 150.0 |         |
|           |                                                | Z | 3.18 | 73.49 | 18.44 |      | 150.0 |         |
| 10114-CAB | IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)  | X | 5.10 | 67.80 | 16.95 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 5.07 | 67.60 | 16.78 |      | 150.0 |         |
|           |                                                | Z | 4.95 | 67.75 | 17.03 |      | 150.0 |         |
| 10115-CAB | IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)  | X | 5.34 | 67.80 | 16.94 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 5.31 | 67.63 | 16.79 |      | 150.0 |         |
|           |                                                | Z | 5.18 | 67.81 | 17.03 |      | 150.0 |         |
| 10116-CAB | IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM) | X | 5.19 | 68.00 | 16.97 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 5.16 | 67.80 | 16.80 |      | 150.0 |         |
|           |                                                | Z | 5.02 | 67.94 | 17.05 |      | 150.0 |         |
| 10117-CAB | IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)       | X | 5.08 | 67.72 | 16.93 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 5.05 | 67.54 | 16.76 |      | 150.0 |         |
|           |                                                | Z | 4.92 | 67.62 | 16.99 |      | 150.0 |         |
| 10118-CAB | IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)       | X | 5.41 | 67.97 | 17.03 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 5.38 | 67.80 | 16.87 |      | 150.0 |         |
|           |                                                | Z | 5.24 | 67.98 | 17.12 |      | 150.0 |         |
| 10119-CAB | IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)      | X | 5.18 | 67.97 | 16.97 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 5.15 | 67.78 | 16.80 |      | 150.0 |         |
|           |                                                | Z | 5.03 | 67.97 | 17.07 |      | 150.0 |         |
| 10140-CAC | LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)     | X | 3.52 | 69.25 | 17.15 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 3.43 | 68.61 | 16.72 |      | 150.0 |         |
|           |                                                | Z | 3.35 | 69.02 | 17.10 |      | 150.0 |         |
| 10141-CAC | LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)     | X | 3.64 | 69.34 | 17.30 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 3.56 | 68.75 | 16.90 |      | 150.0 |         |
|           |                                                | Z | 3.48 | 69.20 | 17.28 |      | 150.0 |         |
| 10142-CAD | LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)        | X | 2.87 | 76.71 | 19.74 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 2.39 | 73.30 | 18.07 |      | 150.0 |         |
|           |                                                | Z | 2.84 | 77.56 | 19.40 |      | 150.0 |         |
| 10143-CAD | LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)      | X | 3.59 | 76.68 | 19.32 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 3.09 | 73.98 | 18.00 |      | 150.0 |         |
|           |                                                | Z | 3.47 | 76.63 | 18.17 |      | 150.0 |         |
| 10144-CAD | LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)      | X | 2.58 | 70.43 | 18.00 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 2.34 | 68.71 | 15.02 |      | 150.0 |         |
|           |                                                | Z | 2.11 | 68.46 | 13.98 |      | 150.0 |         |
| 10145-CAD | LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)      | X | 1.80 | 71.43 | 14.14 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 1.22 | 66.46 | 11.71 |      | 150.0 |         |
|           |                                                | Z | 0.59 | 60.37 | 6.54  |      | 150.0 |         |
| 10146-CAD | LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)    | X | 1.30 | 63.14 | 9.02  | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 1.23 | 62.47 | 8.58  |      | 150.0 |         |
|           |                                                | Z | 0.74 | 60.00 | 5.47  |      | 150.0 |         |
| 10147-CAD | LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)    | X | 1.47 | 64.42 | 9.80  | 0.00 | 150.0 | ± 9.6 % |
|           |                                                | Y | 1.35 | 63.41 | 9.19  |      | 150.0 |         |
|           |                                                | Z | 0.75 | 60.00 | 5.53  |      | 150.0 |         |

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|-----------|--------------------------------------------|---|------|-------|-------|------|-------|---------|
| 10149-CAC | LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)  | X | 3.10 | 69.85 | 17.43 | 0.00 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.99 | 68.99 | 16.87 |      | 150.0 |         |
|           |                                            | Z | 2.95 | 69.81 | 17.34 |      | 150.0 |         |
| 10150-CAC | LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)  | X | 3.22 | 69.74 | 17.41 | 0.00 | 150.0 | ± 9.6 % |
|           |                                            | Y | 3.12 | 68.97 | 16.90 |      | 150.0 |         |
|           |                                            | Z | 3.07 | 69.82 | 17.36 |      | 150.0 |         |
| 10151-CAC | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)    | X | 6.61 | 77.26 | 20.48 | 3.98 | 65.0  | ± 9.6 % |
|           |                                            | Y | 6.23 | 76.49 | 20.24 |      | 65.0  |         |
|           |                                            | Z | 6.65 | 78.63 | 21.37 |      | 65.0  |         |
| 10152-CAC | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)  | X | 5.81 | 73.18 | 19.23 | 3.98 | 65.0  | ± 9.6 % |
|           |                                            | Y | 5.56 | 72.52 | 18.96 |      | 65.0  |         |
|           |                                            | Z | 5.58 | 73.31 | 19.36 |      | 65.0  |         |
| 10153-CAC | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)  | X | 6.26 | 74.38 | 20.12 | 3.98 | 65.0  | ± 9.6 % |
|           |                                            | Y | 6.00 | 73.76 | 19.89 |      | 65.0  |         |
|           |                                            | Z | 6.04 | 74.64 | 20.30 |      | 65.0  |         |
| 10154-CAD | LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)    | X | 2.88 | 75.05 | 19.63 | 0.00 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.56 | 72.71 | 18.40 |      | 150.0 |         |
|           |                                            | Z | 2.69 | 75.11 | 19.49 |      | 150.0 |         |
| 10155-CAD | LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)  | X | 3.10 | 72.81 | 18.60 | 0.00 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.90 | 71.40 | 17.79 |      | 150.0 |         |
|           |                                            | Z | 3.08 | 73.70 | 18.53 |      | 150.0 |         |
| 10156-CAD | LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)     | X | 3.13 | 79.40 | 20.43 | 0.00 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.38 | 74.57 | 18.24 |      | 150.0 |         |
|           |                                            | Z | 3.10 | 79.69 | 19.48 |      | 150.0 |         |
| 10157-CAD | LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)   | X | 2.76 | 73.09 | 16.84 | 0.00 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.33 | 70.29 | 15.42 |      | 150.0 |         |
|           |                                            | Z | 1.97 | 69.03 | 13.65 |      | 150.0 |         |
| 10158-CAD | LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)  | X | 3.26 | 72.85 | 18.66 | 0.00 | 150.0 | ± 9.6 % |
|           |                                            | Y | 3.07 | 71.58 | 17.92 |      | 150.0 |         |
|           |                                            | Z | 3.21 | 73.68 | 18.54 |      | 150.0 |         |
| 10159-CAD | LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)   | X | 3.01 | 74.12 | 17.33 | 0.00 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.51 | 71.14 | 15.85 |      | 150.0 |         |
|           |                                            | Z | 2.07 | 69.37 | 13.82 |      | 150.0 |         |
| 10160-CAC | LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)    | X | 3.13 | 72.38 | 18.51 | 0.00 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.93 | 71.01 | 17.72 |      | 150.0 |         |
|           |                                            | Z | 2.96 | 72.46 | 18.52 |      | 150.0 |         |
| 10161-CAC | LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)  | X | 3.13 | 69.90 | 17.42 | 0.00 | 150.0 | ± 9.6 % |
|           |                                            | Y | 3.02 | 69.07 | 16.87 |      | 150.0 |         |
|           |                                            | Z | 2.98 | 70.05 | 17.29 |      | 150.0 |         |
| 10162-CAC | LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)  | X | 3.25 | 70.07 | 17.52 | 0.00 | 150.0 | ± 9.6 % |
|           |                                            | Y | 3.14 | 69.26 | 16.99 |      | 150.0 |         |
|           |                                            | Z | 3.10 | 70.32 | 17.43 |      | 150.0 |         |
| 10166-CAD | LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)   | X | 3.33 | 69.90 | 19.53 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 3.29 | 69.40 | 19.18 |      | 150.0 |         |
|           |                                            | Z | 2.92 | 68.78 | 19.45 |      | 150.0 |         |
| 10167-CAD | LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM) | X | 4.00 | 72.90 | 20.01 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 3.89 | 72.10 | 19.55 |      | 150.0 |         |
|           |                                            | Z | 3.29 | 71.42 | 19.88 |      | 150.0 |         |

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|-----------|--------------------------------------------|---|------|-------|-------|------|-------|---------|
| 10168-CAD | LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM) | X | 4.63 | 76.13 | 21.82 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 4.52 | 75.41 | 21.43 |      | 150.0 |         |
|           |                                            | Z | 3.72 | 74.32 | 21.63 |      | 150.0 |         |
| 10169-CAC | LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)      | X | 2.65 | 68.33 | 18.90 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.63 | 67.83 | 18.51 |      | 150.0 |         |
|           |                                            | Z | 2.39 | 66.76 | 18.51 |      | 150.0 |         |
| 10170-CAC | LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)    | X | 3.56 | 74.73 | 21.63 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 3.49 | 73.90 | 21.15 |      | 150.0 |         |
|           |                                            | Z | 2.83 | 71.38 | 20.67 |      | 150.0 |         |
| 10171-AAC | LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)    | X | 2.85 | 69.97 | 18.42 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.78 | 69.08 | 17.86 |      | 150.0 |         |
|           |                                            | Z | 2.41 | 67.99 | 18.00 |      | 150.0 |         |
| 10172-CAC | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)      | X | 5.00 | 80.18 | 23.19 | 6.02 | 65.0  | ± 9.6 % |
|           |                                            | Y | 4.48 | 78.21 | 22.53 |      | 65.0  |         |
|           |                                            | Z | 4.20 | 78.93 | 23.75 |      | 65.0  |         |
| 10173-CAC | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)    | X | 7.13 | 83.28 | 22.36 | 6.02 | 65.0  | ± 9.6 % |
|           |                                            | Y | 6.38 | 81.79 | 22.03 |      | 65.0  |         |
|           |                                            | Z | 5.93 | 83.17 | 23.46 |      | 65.0  |         |
| 10174-CAC | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)    | X | 5.18 | 77.63 | 19.84 | 6.02 | 65.0  | ± 9.6 % |
|           |                                            | Y | 3.87 | 73.57 | 18.53 |      | 65.0  |         |
|           |                                            | Z | 4.51 | 78.07 | 21.06 |      | 65.0  |         |
| 10175-CAD | LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)      | X | 2.61 | 68.01 | 18.63 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.60 | 67.49 | 18.23 |      | 150.0 |         |
|           |                                            | Z | 2.37 | 66.53 | 18.29 |      | 150.0 |         |
| 10176-CAD | LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)    | X | 3.56 | 74.76 | 21.64 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 3.49 | 73.93 | 21.16 |      | 150.0 |         |
|           |                                            | Z | 2.83 | 71.40 | 20.68 |      | 150.0 |         |
| 10177-CAF | LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)       | X | 2.63 | 68.16 | 18.72 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.62 | 67.64 | 18.33 |      | 150.0 |         |
|           |                                            | Z | 2.38 | 66.62 | 18.35 |      | 150.0 |         |
| 10178-CAD | LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)     | X | 3.53 | 74.54 | 21.53 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 3.46 | 73.70 | 21.03 |      | 150.0 |         |
|           |                                            | Z | 2.82 | 71.31 | 20.62 |      | 150.0 |         |
| 10179-CAD | LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)    | X | 3.17 | 72.23 | 19.90 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 3.09 | 71.29 | 19.33 |      | 150.0 |         |
|           |                                            | Z | 2.80 | 69.67 | 19.26 |      | 150.0 |         |
| 10180-CAD | LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)     | X | 2.84 | 69.91 | 18.37 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.78 | 69.02 | 17.81 |      | 150.0 |         |
|           |                                            | Z | 2.41 | 67.97 | 17.96 |      | 150.0 |         |
| 10181-CAC | LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)      | X | 2.63 | 68.14 | 18.72 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.61 | 67.62 | 18.32 |      | 150.0 |         |
|           |                                            | Z | 2.38 | 66.61 | 18.35 |      | 150.0 |         |
| 10182-CAC | LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)    | X | 3.52 | 74.52 | 21.51 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 3.45 | 73.67 | 21.01 |      | 150.0 |         |
|           |                                            | Z | 2.82 | 71.28 | 20.60 |      | 150.0 |         |
| 10183-AAB | LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)    | X | 2.84 | 69.89 | 18.36 | 3.01 | 150.0 | ± 9.6 % |
|           |                                            | Y | 2.77 | 68.99 | 17.80 |      | 150.0 |         |
|           |                                            | Z | 2.41 | 67.95 | 17.97 |      | 150.0 |         |

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|-----------|-----------------------------------------------|---|------|-------|-------|------|-------|---------|
| 10184-CAD | LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)          | X | 2.64 | 68.18 | 18.74 | 3.01 | 150.0 | ± 9.6 % |
|           |                                               | Y | 2.62 | 67.67 | 18.35 |      | 150.0 |         |
|           |                                               | Z | 2.39 | 66.64 | 18.36 |      | 150.0 |         |
| 10185-CAD | LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)        | X | 3.54 | 74.60 | 21.56 | 3.01 | 150.0 | ± 9.6 % |
|           |                                               | Y | 3.47 | 73.75 | 21.06 |      | 150.0 |         |
|           |                                               | Z | 2.83 | 71.35 | 20.64 |      | 150.0 |         |
| 10186-AAD | LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)        | X | 2.85 | 69.96 | 18.40 | 3.01 | 150.0 | ± 9.6 % |
|           |                                               | Y | 2.78 | 69.06 | 17.83 |      | 150.0 |         |
|           |                                               | Z | 2.42 | 68.00 | 18.00 |      | 150.0 |         |
| 10187-CAD | LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)        | X | 2.65 | 68.25 | 18.82 | 3.01 | 150.0 | ± 9.6 % |
|           |                                               | Y | 2.63 | 67.74 | 18.42 |      | 150.0 |         |
|           |                                               | Z | 2.40 | 66.72 | 18.45 |      | 150.0 |         |
| 10188-CAD | LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)      | X | 3.66 | 75.34 | 21.98 | 3.01 | 150.0 | ± 9.6 % |
|           |                                               | Y | 3.60 | 74.54 | 21.51 |      | 150.0 |         |
|           |                                               | Z | 2.89 | 71.81 | 20.95 |      | 150.0 |         |
| 10189-AAD | LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)      | X | 2.92 | 70.41 | 18.71 | 3.01 | 150.0 | ± 9.6 % |
|           |                                               | Y | 2.85 | 69.50 | 18.14 |      | 150.0 |         |
|           |                                               | Z | 2.45 | 68.32 | 18.25 |      | 150.0 |         |
| 10193-CAB | IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)  | X | 4.52 | 67.52 | 16.76 | 0.00 | 150.0 | ± 9.6 % |
|           |                                               | Y | 4.48 | 67.29 | 16.56 |      | 150.0 |         |
|           |                                               | Z | 4.37 | 67.78 | 16.83 |      | 150.0 |         |
| 10194-CAB | IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM) | X | 4.67 | 67.77 | 16.88 | 0.00 | 150.0 | ± 9.6 % |
|           |                                               | Y | 4.64 | 67.54 | 16.68 |      | 150.0 |         |
|           |                                               | Z | 4.49 | 67.92 | 16.94 |      | 150.0 |         |
| 10195-CAB | IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM) | X | 4.71 | 67.79 | 16.89 | 0.00 | 150.0 | ± 9.6 % |
|           |                                               | Y | 4.67 | 67.56 | 16.69 |      | 150.0 |         |
|           |                                               | Z | 4.51 | 67.88 | 16.93 |      | 150.0 |         |
| 10196-CAB | IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)       | X | 4.51 | 67.54 | 16.76 | 0.00 | 150.0 | ± 9.6 % |
|           |                                               | Y | 4.48 | 67.31 | 16.56 |      | 150.0 |         |
|           |                                               | Z | 4.35 | 67.73 | 16.79 |      | 150.0 |         |
| 10197-CAB | IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)      | X | 4.68 | 67.78 | 16.88 | 0.00 | 150.0 | ± 9.6 % |
|           |                                               | Y | 4.65 | 67.55 | 16.69 |      | 150.0 |         |
|           |                                               | Z | 4.49 | 67.91 | 16.94 |      | 150.0 |         |
| 10198-CAB | IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)      | X | 4.70 | 67.79 | 16.89 | 0.00 | 150.0 | ± 9.6 % |
|           |                                               | Y | 4.67 | 67.57 | 16.70 |      | 150.0 |         |
|           |                                               | Z | 4.50 | 67.87 | 16.93 |      | 150.0 |         |
| 10219-CAB | IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)       | X | 4.47 | 67.60 | 16.75 | 0.00 | 150.0 | ± 9.6 % |
|           |                                               | Y | 4.43 | 67.36 | 16.54 |      | 150.0 |         |
|           |                                               | Z | 4.31 | 67.63 | 16.81 |      | 150.0 |         |
| 10220-CAB | IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)    | X | 4.67 | 67.74 | 16.87 | 0.00 | 150.0 | ± 9.6 % |
|           |                                               | Y | 4.64 | 67.51 | 16.67 |      | 150.0 |         |
|           |                                               | Z | 4.48 | 67.86 | 16.92 |      | 150.0 |         |
| 10221-CAB | IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)    | X | 4.71 | 67.71 | 16.87 | 0.00 | 150.0 | ± 9.6 % |
|           |                                               | Y | 4.68 | 67.49 | 16.68 |      | 150.0 |         |
|           |                                               | Z | 4.52 | 67.82 | 16.91 |      | 150.0 |         |
| 10222-CAB | IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)        | X | 5.05 | 67.71 | 16.91 | 0.00 | 150.0 | ± 9.6 % |
|           |                                               | Y | 5.03 | 67.52 | 16.75 |      | 150.0 |         |
|           |                                               | Z | 4.90 | 67.64 | 16.98 |      | 150.0 |         |

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|-----------|-------------------------------------------|---|------|-------|-------|------|-------|---------|
| 10223-CAB | IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)  | X | 5.32 | 67.86 | 16.99 | 0.00 | 150.0 | ± 9.6 % |
|           |                                           | Y | 5.30 | 67.68 | 16.83 |      | 150.0 |         |
|           |                                           | Z | 5.10 | 67.66 | 16.98 |      | 150.0 |         |
| 10224-CAB | IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM) | X | 5.10 | 67.84 | 16.91 | 0.00 | 150.0 | ± 9.6 % |
|           |                                           | Y | 5.07 | 67.64 | 16.74 |      | 150.0 |         |
|           |                                           | Z | 4.95 | 67.80 | 16.99 |      | 150.0 |         |
| 10225-CAB | UMTS-FDD (HSPA+)                          | X | 2.93 | 68.25 | 16.51 | 0.00 | 150.0 | ± 9.6 % |
|           |                                           | Y | 2.84 | 67.58 | 16.02 |      | 150.0 |         |
|           |                                           | Z | 2.78 | 68.41 | 15.93 |      | 150.0 |         |
| 10226-CAA | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)  | X | 7.54 | 84.28 | 22.80 | 6.02 | 65.0  | ± 9.6 % |
|           |                                           | Y | 6.75 | 82.79 | 22.48 |      | 65.0  |         |
|           |                                           | Z | 6.25 | 84.16 | 23.89 |      | 65.0  |         |
| 10227-CAA | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)  | X | 6.92 | 81.86 | 21.35 | 6.02 | 65.0  | ± 9.6 % |
|           |                                           | Y | 6.37 | 80.91 | 21.22 |      | 65.0  |         |
|           |                                           | Z | 5.81 | 82.09 | 22.53 |      | 65.0  |         |
| 10228-CAA | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)    | X | 6.62 | 85.29 | 25.06 | 6.02 | 65.0  | ± 9.6 % |
|           |                                           | Y | 5.62 | 82.48 | 24.18 |      | 65.0  |         |
|           |                                           | Z | 5.19 | 83.13 | 25.38 |      | 65.0  |         |
| 10229-CAB | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)    | X | 7.18 | 83.37 | 22.40 | 6.02 | 65.0  | ± 9.6 % |
|           |                                           | Y | 6.43 | 81.89 | 22.07 |      | 65.0  |         |
|           |                                           | Z | 5.96 | 83.24 | 23.49 |      | 65.0  |         |
| 10230-CAB | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)    | X | 6.58 | 81.03 | 20.98 | 6.02 | 65.0  | ± 9.6 % |
|           |                                           | Y | 6.06 | 80.07 | 20.84 |      | 65.0  |         |
|           |                                           | Z | 5.52 | 81.20 | 22.15 |      | 65.0  |         |
| 10231-CAB | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)      | X | 6.33 | 84.43 | 24.68 | 6.02 | 65.0  | ± 9.6 % |
|           |                                           | Y | 5.39 | 81.67 | 23.80 |      | 65.0  |         |
|           |                                           | Z | 5.00 | 82.33 | 25.01 |      | 65.0  |         |
| 10232-CAC | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)    | X | 7.17 | 83.35 | 22.40 | 6.02 | 65.0  | ± 9.6 % |
|           |                                           | Y | 6.42 | 81.87 | 22.07 |      | 65.0  |         |
|           |                                           | Z | 5.95 | 83.23 | 23.49 |      | 65.0  |         |
| 10233-CAC | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)    | X | 6.56 | 81.01 | 20.98 | 6.02 | 65.0  | ± 9.6 % |
|           |                                           | Y | 6.04 | 80.05 | 20.84 |      | 65.0  |         |
|           |                                           | Z | 5.51 | 81.18 | 22.15 |      | 65.0  |         |
| 10234-CAC | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)      | X | 6.09 | 83.61 | 24.26 | 6.02 | 65.0  | ± 9.6 % |
|           |                                           | Y | 5.21 | 80.93 | 23.40 |      | 65.0  |         |
|           |                                           | Z | 4.86 | 81.70 | 24.66 |      | 65.0  |         |
| 10235-CAC | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)   | X | 7.17 | 83.38 | 22.40 | 6.02 | 65.0  | ± 9.6 % |
|           |                                           | Y | 6.42 | 81.89 | 22.07 |      | 65.0  |         |
|           |                                           | Z | 5.96 | 83.26 | 23.50 |      | 65.0  |         |
| 10236-CAC | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)   | X | 6.61 | 81.10 | 21.01 | 6.02 | 65.0  | ± 9.6 % |
|           |                                           | Y | 6.09 | 80.13 | 20.86 |      | 65.0  |         |
|           |                                           | Z | 5.55 | 81.29 | 22.18 |      | 65.0  |         |
| 10237-CAC | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)     | X | 6.34 | 84.47 | 24.69 | 6.02 | 65.0  | ± 9.6 % |
|           |                                           | Y | 5.39 | 81.70 | 23.81 |      | 65.0  |         |
|           |                                           | Z | 5.00 | 82.36 | 25.03 |      | 65.0  |         |
| 10238-CAC | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)   | X | 7.15 | 83.33 | 22.39 | 6.02 | 65.0  | ± 9.6 % |
|           |                                           | Y | 6.40 | 81.85 | 22.06 |      | 65.0  |         |
|           |                                           | Z | 5.94 | 83.21 | 23.48 |      | 65.0  |         |

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|---------------|-----------------------------------------------|---|------|-------|-------|------|------|---------|
| 10239-<br>CAC | LTE-TDD (SC-FDMA, 1 RB, 15 MHz,<br>64-QAM)    | X | 6.55 | 80.98 | 20.97 | 6.02 | 65.0 | ± 9.6 % |
|               |                                               | Y | 6.03 | 80.02 | 20.83 |      | 65.0 |         |
|               |                                               | Z | 5.49 | 81.16 | 22.14 |      | 65.0 |         |
| 10240-<br>CAC | LTE-TDD (SC-FDMA, 1 RB, 15 MHz,<br>QPSK)      | X | 6.32 | 84.44 | 24.68 | 6.02 | 65.0 | ± 9.6 % |
|               |                                               | Y | 5.38 | 81.67 | 23.80 |      | 65.0 |         |
|               |                                               | Z | 4.99 | 82.36 | 25.02 |      | 65.0 |         |
| 10241-<br>CAA | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz,<br>16-QAM) | X | 7.54 | 79.78 | 23.89 | 6.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 7.12 | 78.68 | 23.50 |      | 65.0 |         |
|               |                                               | Z | 7.29 | 81.76 | 25.37 |      | 65.0 |         |
| 10242-<br>CAA | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz,<br>64-QAM) | X | 6.65 | 77.35 | 22.83 | 6.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 6.39 | 76.59 | 22.56 |      | 65.0 |         |
|               |                                               | Z | 6.46 | 79.39 | 24.36 |      | 65.0 |         |
| 10243-<br>CAA | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz,<br>QPSK)   | X | 5.60 | 74.76 | 22.64 | 6.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 5.39 | 73.91 | 22.28 |      | 65.0 |         |
|               |                                               | Z | 5.48 | 76.41 | 24.04 |      | 65.0 |         |
| 10244-<br>CAB | LTE-TDD (SC-FDMA, 50% RB, 3 MHz,<br>16-QAM)   | X | 3.97 | 68.56 | 13.68 | 3.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 3.88 | 68.47 | 13.69 |      | 65.0 |         |
|               |                                               | Z | 2.96 | 65.44 | 11.23 |      | 65.0 |         |
| 10245-<br>CAB | LTE-TDD (SC-FDMA, 50% RB, 3 MHz,<br>64-QAM)   | X | 3.92 | 68.19 | 13.46 | 3.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 3.83 | 68.09 | 13.47 |      | 65.0 |         |
|               |                                               | Z | 2.93 | 65.12 | 11.02 |      | 65.0 |         |
| 10246-<br>CAB | LTE-TDD (SC-FDMA, 50% RB, 3 MHz,<br>QPSK)     | X | 4.09 | 72.00 | 15.70 | 3.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 3.87 | 71.55 | 15.57 |      | 65.0 |         |
|               |                                               | Z | 3.03 | 68.36 | 13.27 |      | 65.0 |         |
| 10247-<br>CAC | LTE-TDD (SC-FDMA, 50% RB, 5 MHz,<br>16-QAM)   | X | 4.48 | 70.89 | 16.01 | 3.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 4.29 | 70.48 | 15.86 |      | 65.0 |         |
|               |                                               | Z | 3.71 | 68.56 | 14.08 |      | 65.0 |         |
| 10248-<br>CAC | LTE-TDD (SC-FDMA, 50% RB, 5 MHz,<br>64-QAM)   | X | 4.46 | 70.46 | 15.82 | 3.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 4.28 | 70.04 | 15.66 |      | 65.0 |         |
|               |                                               | Z | 3.64 | 67.99 | 13.80 |      | 65.0 |         |
| 10249-<br>CAC | LTE-TDD (SC-FDMA, 50% RB, 5 MHz,<br>QPSK)     | X | 5.68 | 77.13 | 18.91 | 3.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 5.27 | 76.33 | 18.67 |      | 65.0 |         |
|               |                                               | Z | 4.90 | 75.49 | 17.78 |      | 65.0 |         |
| 10250-<br>CAC | LTE-TDD (SC-FDMA, 50% RB, 10 MHz,<br>16-QAM)  | X | 5.88 | 75.29 | 19.89 | 3.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 5.60 | 74.67 | 19.68 |      | 65.0 |         |
|               |                                               | Z | 5.60 | 75.21 | 19.60 |      | 65.0 |         |
| 10251-<br>CAC | LTE-TDD (SC-FDMA, 50% RB, 10 MHz,<br>64-QAM)  | X | 5.51 | 73.06 | 18.59 | 3.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 5.25 | 72.42 | 18.34 |      | 65.0 |         |
|               |                                               | Z | 5.09 | 72.51 | 18.03 |      | 65.0 |         |
| 10252-<br>CAC | LTE-TDD (SC-FDMA, 50% RB, 10 MHz,<br>QPSK)    | X | 6.68 | 79.38 | 21.06 | 3.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 6.19 | 78.37 | 20.75 |      | 65.0 |         |
|               |                                               | Z | 6.73 | 80.63 | 21.61 |      | 65.0 |         |
| 10253-<br>CAC | LTE-TDD (SC-FDMA, 50% RB, 15 MHz,<br>16-QAM)  | X | 5.72 | 72.77 | 18.98 | 3.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 5.48 | 72.14 | 18.73 |      | 65.0 |         |
|               |                                               | Z | 5.49 | 72.91 | 18.99 |      | 65.0 |         |
| 10254-<br>CAC | LTE-TDD (SC-FDMA, 50% RB, 15 MHz,<br>64-QAM)  | X | 6.11 | 73.81 | 19.75 | 3.98 | 65.0 | ± 9.6 % |
|               |                                               | Y | 5.86 | 73.21 | 19.52 |      | 65.0 |         |
|               |                                               | Z | 5.86 | 73.96 | 19.75 |      | 65.0 |         |

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|-----------|---------------------------------------------|---|------|-------|-------|------|------|---------|
| 10255-CAC | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)     | X | 6.37 | 76.83 | 20.48 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 6.01 | 76.03 | 20.21 |      | 65.0 |         |
|           |                                             | Z | 6.39 | 78.07 | 21.20 |      | 65.0 |         |
| 10256-CAA | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM) | X | 2.99 | 84.96 | 10.83 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 2.92 | 84.89 | 10.83 |      | 65.0 |         |
|           |                                             | Z | 2.22 | 82.40 | 8.44  |      | 65.0 |         |
| 10257-CAA | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM) | X | 2.97 | 84.63 | 10.57 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 2.90 | 84.54 | 10.57 |      | 65.0 |         |
|           |                                             | Z | 2.21 | 82.15 | 8.20  |      | 65.0 |         |
| 10258-CAA | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)   | X | 2.91 | 87.08 | 12.50 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 2.79 | 86.85 | 12.43 |      | 65.0 |         |
|           |                                             | Z | 2.13 | 83.74 | 9.80  |      | 65.0 |         |
| 10259-CAB | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)   | X | 5.01 | 72.58 | 17.44 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 4.79 | 72.08 | 17.26 |      | 65.0 |         |
|           |                                             | Z | 4.39 | 71.02 | 16.07 |      | 65.0 |         |
| 10260-CAB | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)   | X | 5.04 | 72.34 | 17.34 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 4.82 | 71.86 | 17.17 |      | 65.0 |         |
|           |                                             | Z | 4.39 | 70.72 | 15.92 |      | 65.0 |         |
| 10261-CAB | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)     | X | 5.86 | 77.47 | 19.56 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 5.44 | 76.58 | 19.28 |      | 65.0 |         |
|           |                                             | Z | 5.45 | 77.05 | 19.07 |      | 65.0 |         |
| 10262-CAC | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)   | X | 5.86 | 75.21 | 19.83 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 5.58 | 74.59 | 19.62 |      | 65.0 |         |
|           |                                             | Z | 5.57 | 75.10 | 19.53 |      | 65.0 |         |
| 10263-CAC | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)   | X | 5.50 | 73.03 | 18.58 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 5.24 | 72.40 | 18.33 |      | 65.0 |         |
|           |                                             | Z | 5.08 | 72.49 | 18.02 |      | 65.0 |         |
| 10264-CAC | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)     | X | 6.61 | 79.16 | 20.96 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 6.12 | 78.16 | 20.64 |      | 65.0 |         |
|           |                                             | Z | 6.64 | 80.39 | 21.49 |      | 65.0 |         |
| 10265-CAC | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)  | X | 5.81 | 73.19 | 19.23 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 5.56 | 72.52 | 18.97 |      | 65.0 |         |
|           |                                             | Z | 5.58 | 73.32 | 19.37 |      | 65.0 |         |
| 10266-CAC | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)  | X | 6.25 | 74.36 | 20.11 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 5.99 | 73.74 | 19.87 |      | 65.0 |         |
|           |                                             | Z | 6.03 | 74.63 | 20.29 |      | 65.0 |         |
| 10267-CAC | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)    | X | 6.59 | 77.22 | 20.46 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 6.22 | 76.45 | 20.22 |      | 65.0 |         |
|           |                                             | Z | 6.64 | 78.58 | 21.35 |      | 65.0 |         |
| 10268-CAC | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)  | X | 6.49 | 73.39 | 19.85 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 6.26 | 72.83 | 19.63 |      | 65.0 |         |
|           |                                             | Z | 6.27 | 73.63 | 20.18 |      | 65.0 |         |
| 10269-CAC | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)  | X | 6.49 | 73.06 | 19.76 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 6.26 | 72.51 | 19.54 |      | 65.0 |         |
|           |                                             | Z | 6.29 | 73.33 | 20.07 |      | 65.0 |         |
| 10270-CAC | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)    | X | 6.52 | 75.03 | 19.84 | 3.98 | 65.0 | ± 9.6 % |
|           |                                             | Y | 6.26 | 74.48 | 19.66 |      | 65.0 |         |
|           |                                             | Z | 6.50 | 76.04 | 20.64 |      | 65.0 |         |

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|-----------|--------------------------------------------------------------------|---|--------|--------|-------|------|-------|---------|
| 10274-CAB | UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)                          | X | 2.83   | 69.40  | 16.84 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                    | Y | 2.72   | 68.44  | 16.21 |      | 150.0 |         |
|           |                                                                    | Z | 2.77   | 69.99  | 16.52 |      | 150.0 |         |
| 10275-CAB | UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)                           | X | 2.37   | 76.27  | 19.94 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                    | Y | 1.96   | 72.56  | 18.08 |      | 150.0 |         |
|           |                                                                    | Z | 2.42   | 77.27  | 20.03 |      | 150.0 |         |
| 10277-CAA | PHS (QPSK)                                                         | X | 2.52   | 61.59  | 7.17  | 9.03 | 50.0  | ± 9.6 % |
|           |                                                                    | Y | 2.39   | 61.33  | 6.95  |      | 50.0  |         |
|           |                                                                    | Z | 2.48   | 61.77  | 7.29  |      | 50.0  |         |
| 10278-CAA | PHS (QPSK, BW 884MHz, Rolloff 0.5)                                 | X | 3.57   | 65.95  | 11.54 | 9.03 | 50.0  | ± 9.6 % |
|           |                                                                    | Y | 3.51   | 66.04  | 11.58 |      | 50.0  |         |
|           |                                                                    | Z | 3.35   | 64.91  | 10.65 |      | 50.0  |         |
| 10279-CAA | PHS (QPSK, BW 884MHz, Rolloff 0.38)                                | X | 3.64   | 66.13  | 11.67 | 9.03 | 50.0  | ± 9.6 % |
|           |                                                                    | Y | 3.57   | 66.21  | 11.72 |      | 50.0  |         |
|           |                                                                    | Z | 3.38   | 64.97  | 10.72 |      | 50.0  |         |
| 10290-AAB | CDMA2000, RC1, SO55, Full Rate                                     | X | 28.93  | 109.20 | 26.52 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                    | Y | 3.08   | 79.96  | 17.95 |      | 150.0 |         |
|           |                                                                    | Z | 2.21   | 75.33  | 14.40 |      | 150.0 |         |
| 10291-AAB | CDMA2000, RC3, SO55, Full Rate                                     | X | 37.67  | 117.33 | 28.53 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                    | Y | 1.72   | 76.79  | 16.85 |      | 150.0 |         |
|           |                                                                    | Z | 12.13  | 95.30  | 20.16 |      | 150.0 |         |
| 10292-AAB | CDMA2000, RC3, SO32, Full Rate                                     | X | 100.00 | 137.32 | 34.35 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                    | Y | 100.00 | 132.22 | 32.19 |      | 150.0 |         |
|           |                                                                    | Z | 100.00 | 124.89 | 28.34 |      | 150.0 |         |
| 10293-AAB | CDMA2000, RC3, SO3, Full Rate                                      | X | 100.00 | 143.15 | 37.02 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                    | Y | 100.00 | 137.89 | 34.78 |      | 150.0 |         |
|           |                                                                    | Z | 100.00 | 132.56 | 31.71 |      | 150.0 |         |
| 10295-AAB | CDMA2000, RC1, SO3, 1/8th Rate 25 fr.                              | X | 7.26   | 76.93  | 18.86 | 9.03 | 50.0  | ± 9.6 % |
|           |                                                                    | Y | 7.41   | 77.59  | 19.20 |      | 50.0  |         |
|           |                                                                    | Z | 12.74  | 84.07  | 20.73 |      | 50.0  |         |
| 10297-AAB | LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)                            | X | 3.30   | 74.32  | 19.25 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                    | Y | 3.02   | 72.49  | 18.28 |      | 150.0 |         |
|           |                                                                    | Z | 3.01   | 73.73  | 19.14 |      | 150.0 |         |
| 10298-AAC | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)                             | X | 3.48   | 80.92  | 19.41 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                    | Y | 2.06   | 73.13  | 16.18 |      | 150.0 |         |
|           |                                                                    | Z | 1.48   | 69.53  | 13.10 |      | 150.0 |         |
| 10299-AAC | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)                           | X | 2.32   | 69.41  | 13.38 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                    | Y | 2.01   | 67.41  | 12.36 |      | 150.0 |         |
|           |                                                                    | Z | 1.09   | 62.15  | 8.23  |      | 150.0 |         |
| 10300-AAC | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)                           | X | 1.48   | 63.38  | 9.67  | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                    | Y | 1.43   | 62.86  | 9.30  |      | 150.0 |         |
|           |                                                                    | Z | 0.87   | 59.93  | 6.20  |      | 150.0 |         |
| 10301-AAA | IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)                 | X | 4.58   | 66.01  | 17.79 | 4.17 | 50.0  | ± 9.6 % |
|           |                                                                    | Y | 4.57   | 65.86  | 17.62 |      | 50.0  |         |
|           |                                                                    | Z | 4.84   | 67.36  | 18.12 |      | 50.0  |         |
| 10302-AAA | IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols) | X | 5.06   | 66.60  | 18.47 | 4.96 | 50.0  | ± 9.6 % |
|           |                                                                    | Y | 5.01   | 66.28  | 18.21 |      | 50.0  |         |
|           |                                                                    | Z | 5.06   | 67.60  | 18.66 |      | 50.0  |         |

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|           |                                                                     |   |      |       |       |       |       |         |
|-----------|---------------------------------------------------------------------|---|------|-------|-------|-------|-------|---------|
| 10303-AAA | IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)                 | X | 4.83 | 66.30 | 18.31 | 4.96  | 50.0  | ± 9.6 % |
|           |                                                                     | Y | 4.78 | 65.96 | 18.04 |       | 50.0  |         |
|           |                                                                     | Z | 4.88 | 67.53 | 18.55 |       | 50.0  |         |
| 10304-AAA | IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)                 | X | 4.65 | 66.26 | 17.89 | 4.17  | 50.0  | ± 9.6 % |
|           |                                                                     | Y | 4.60 | 65.95 | 17.63 |       | 50.0  |         |
|           |                                                                     | Z | 4.67 | 67.39 | 18.08 |       | 50.0  |         |
| 10305-AAA | IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)    | X | 4.64 | 69.67 | 20.36 | 6.02  | 35.0  | ± 9.6 % |
|           |                                                                     | Y | 4.49 | 68.76 | 19.76 |       | 35.0  |         |
|           |                                                                     | Z | 5.52 | 73.70 | 21.11 |       | 35.0  |         |
| 10306-AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)    | X | 4.74 | 67.70 | 19.59 | 6.02  | 35.0  | ± 9.6 % |
|           |                                                                     | Y | 4.65 | 67.17 | 19.19 |       | 35.0  |         |
|           |                                                                     | Z | 5.13 | 70.44 | 20.25 |       | 35.0  |         |
| 10307-AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)     | X | 4.67 | 67.99 | 19.62 | 6.02  | 35.0  | ± 9.6 % |
|           |                                                                     | Y | 4.57 | 67.39 | 19.18 |       | 35.0  |         |
|           |                                                                     | Z | 5.10 | 70.79 | 20.28 |       | 35.0  |         |
| 10308-AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)                | X | 4.67 | 68.31 | 19.82 | 6.02  | 35.0  | ± 9.6 % |
|           |                                                                     | Y | 4.56 | 67.65 | 19.36 |       | 35.0  |         |
|           |                                                                     | Z | 5.15 | 71.28 | 20.56 |       | 35.0  |         |
| 10309-AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols) | X | 4.77 | 67.81 | 19.69 | 6.02  | 35.0  | ± 9.6 % |
|           |                                                                     | Y | 4.68 | 67.26 | 19.28 |       | 35.0  |         |
|           |                                                                     | Z | 5.12 | 70.46 | 20.33 |       | 35.0  |         |
| 10310-AAA | IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)  | X | 4.71 | 67.86 | 19.62 | 6.02  | 35.0  | ± 9.6 % |
|           |                                                                     | Y | 4.62 | 67.30 | 19.21 |       | 35.0  |         |
|           |                                                                     | Z | 5.14 | 70.74 | 20.36 |       | 35.0  |         |
| 10311-AAB | LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)                            | X | 3.69 | 73.06 | 18.59 | 0.00  | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 3.41 | 71.48 | 17.76 |       | 150.0 |         |
|           |                                                                     | Z | 3.35 | 72.16 | 18.40 |       | 150.0 |         |
| 10313-AAA | IDEN 1:3                                                            | X | 3.19 | 69.59 | 14.03 | 6.99  | 70.0  | ± 9.6 % |
|           |                                                                     | Y | 3.06 | 69.62 | 14.17 |       | 70.0  |         |
|           |                                                                     | Z | 3.95 | 73.55 | 16.44 |       | 70.0  |         |
| 10314-AAA | IDEN 1:6                                                            | X | 4.34 | 74.73 | 18.66 | 10.00 | 30.0  | ± 9.6 % |
|           |                                                                     | Y | 4.44 | 75.75 | 19.25 |       | 30.0  |         |
|           |                                                                     | Z | 5.90 | 80.62 | 21.70 |       | 30.0  |         |
| 10315-AAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)           | X | 1.21 | 67.12 | 17.72 | 0.17  | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 1.16 | 65.82 | 16.72 |       | 150.0 |         |
|           |                                                                     | Z | 1.23 | 67.09 | 17.63 |       | 150.0 |         |
| 10316-AAB | IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)       | X | 4.51 | 67.28 | 16.67 | 0.17  | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 4.49 | 67.07 | 16.49 |       | 150.0 |         |
|           |                                                                     | Z | 4.36 | 67.48 | 16.75 |       | 150.0 |         |
| 10317-AAB | IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)             | X | 4.51 | 67.28 | 16.67 | 0.17  | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 4.49 | 67.07 | 16.49 |       | 150.0 |         |
|           |                                                                     | Z | 4.36 | 67.48 | 16.75 |       | 150.0 |         |
| 10400-AAC | IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)                 | X | 4.64 | 67.79 | 16.86 | 0.00  | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 4.60 | 67.54 | 16.65 |       | 150.0 |         |
|           |                                                                     | Z | 4.41 | 67.81 | 16.87 |       | 150.0 |         |
| 10401-AAC | IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)                 | X | 5.28 | 67.49 | 16.76 | 0.00  | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 5.25 | 67.30 | 16.59 |       | 150.0 |         |
|           |                                                                     | Z | 5.12 | 67.47 | 16.84 |       | 150.0 |         |

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|           |                                                                                |   |        |        |       |      |       |         |
|-----------|--------------------------------------------------------------------------------|---|--------|--------|-------|------|-------|---------|
| 10402-AAC | IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)                            | X | 5.60   | 67.98  | 16.88 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                                | Y | 5.58   | 67.81  | 16.73 |      | 150.0 |         |
|           |                                                                                | Z | 5.46   | 67.90  | 16.96 |      | 150.0 |         |
| 10403-AAB | CDMA2000 (1xEV-DO, Rev. 0)                                                     | X | 28.93  | 109.20 | 26.52 | 0.00 | 115.0 | ± 9.6 % |
|           |                                                                                | Y | 3.08   | 79.96  | 17.95 |      | 115.0 |         |
|           |                                                                                | Z | 2.21   | 75.33  | 14.40 |      | 115.0 |         |
| 10404-AAB | CDMA2000 (1xEV-DO, Rev. A)                                                     | X | 28.93  | 109.20 | 26.52 | 0.00 | 115.0 | ± 9.6 % |
|           |                                                                                | Y | 3.08   | 79.96  | 17.95 |      | 115.0 |         |
|           |                                                                                | Z | 2.21   | 75.33  | 14.40 |      | 115.0 |         |
| 10406-AAB | CDMA2000, RC3, S032, SCH0, Full Rate                                           | X | 100.00 | 125.52 | 31.37 | 0.00 | 100.0 | ± 9.6 % |
|           |                                                                                | Y | 100.00 | 124.20 | 30.84 |      | 100.0 |         |
|           |                                                                                | Z | 100.00 | 128.01 | 31.68 |      | 100.0 |         |
| 10410-AAB | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)                 | X | 5.07   | 80.58  | 17.88 | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                                | Y | 4.32   | 79.23  | 17.48 |      | 80.0  |         |
|           |                                                                                | Z | 10.97  | 94.77  | 23.32 |      | 80.0  |         |
| 10415-AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)                      | X | 1.12   | 66.35  | 17.40 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                                | Y | 1.08   | 65.14  | 16.40 |      | 150.0 |         |
|           |                                                                                | Z | 1.14   | 66.31  | 17.26 |      | 150.0 |         |
| 10416-AAA | IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)                  | X | 4.51   | 67.52  | 16.83 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                                | Y | 4.48   | 67.29  | 16.83 |      | 150.0 |         |
|           |                                                                                | Z | 4.35   | 67.67  | 16.87 |      | 150.0 |         |
| 10417-AAA | IEEE 802.11a/n WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)                      | X | 4.51   | 67.52  | 16.83 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                                | Y | 4.48   | 67.29  | 16.63 |      | 150.0 |         |
|           |                                                                                | Z | 4.35   | 67.67  | 16.87 |      | 150.0 |         |
| 10418-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preamble)  | X | 4.52   | 67.76  | 16.90 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                                | Y | 4.48   | 67.51  | 16.69 |      | 150.0 |         |
|           |                                                                                | Z | 4.35   | 67.95  | 16.98 |      | 150.0 |         |
| 10419-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preamble) | X | 4.53   | 67.67  | 16.87 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                                | Y | 4.50   | 67.43  | 16.67 |      | 150.0 |         |
|           |                                                                                | Z | 4.36   | 67.85  | 16.94 |      | 150.0 |         |
| 10422-AAA | IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)                                   | X | 4.63   | 67.60  | 16.85 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                                | Y | 4.60   | 67.38  | 16.66 |      | 150.0 |         |
|           |                                                                                | Z | 4.45   | 67.76  | 16.92 |      | 150.0 |         |
| 10423-AAA | IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)                                | X | 4.77   | 67.88  | 16.94 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                                | Y | 4.74   | 67.65  | 16.75 |      | 150.0 |         |
|           |                                                                                | Z | 4.56   | 67.99  | 16.99 |      | 150.0 |         |
| 10424-AAA | IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)                                | X | 4.70   | 67.85  | 16.94 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                                | Y | 4.67   | 67.62  | 16.74 |      | 150.0 |         |
|           |                                                                                | Z | 4.50   | 67.93  | 16.97 |      | 150.0 |         |
| 10425-AAA | IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)                                    | X | 5.29   | 67.89  | 16.98 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                                | Y | 5.27   | 67.71  | 16.82 |      | 150.0 |         |
|           |                                                                                | Z | 5.11   | 67.80  | 17.03 |      | 150.0 |         |
| 10426-AAA | IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)                                  | X | 5.30   | 67.95  | 17.01 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                                | Y | 5.28   | 67.77  | 16.85 |      | 150.0 |         |
|           |                                                                                | Z | 5.16   | 68.01  | 17.13 |      | 150.0 |         |

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|-----------|----------------------------------------------------------------|---|------|-------|-------|------|-------|---------|
| 10427-AAA | IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)                 | X | 5.29 | 67.81 | 16.94 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 5.26 | 67.63 | 16.77 |      | 150.0 |         |
|           |                                                                | Z | 5.11 | 67.74 | 17.00 |      | 150.0 |         |
| 10430-AAA | LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)                               | X | 5.05 | 75.77 | 20.50 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 5.01 | 75.52 | 20.30 |      | 150.0 |         |
|           |                                                                | Z | 5.26 | 77.59 | 20.50 |      | 150.0 |         |
| 10431-AAA | LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)                              | X | 4.21 | 68.46 | 16.96 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 4.15 | 68.11 | 16.69 |      | 150.0 |         |
|           |                                                                | Z | 3.98 | 68.69 | 16.84 |      | 150.0 |         |
| 10432-AAA | LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)                              | X | 4.49 | 68.06 | 16.95 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 4.44 | 67.79 | 16.72 |      | 150.0 |         |
|           |                                                                | Z | 4.28 | 68.23 | 16.96 |      | 150.0 |         |
| 10433-AAA | LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)                              | X | 4.72 | 67.89 | 16.96 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 4.68 | 67.66 | 16.76 |      | 150.0 |         |
|           |                                                                | Z | 4.52 | 67.98 | 17.00 |      | 150.0 |         |
| 10434-AAA | W-CDMA (BS Test Model 1, 64 DPCH)                              | X | 5.66 | 78.13 | 20.93 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 5.55 | 77.68 | 20.64 |      | 150.0 |         |
|           |                                                                | Z | 5.82 | 79.40 | 20.42 |      | 150.0 |         |
| 10435-AAB | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9) | X | 4.77 | 79.73 | 17.34 | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                | Y | 4.12 | 78.53 | 17.19 |      | 80.0  |         |
|           |                                                                | Z | 9.86 | 93.17 | 22.80 |      | 80.0  |         |
| 10447-AAA | LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)                 | X | 3.59 | 69.14 | 16.44 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 3.48 | 68.49 | 15.99 |      | 150.0 |         |
|           |                                                                | Z | 3.25 | 68.82 | 15.52 |      | 150.0 |         |
| 10448-AAA | LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)                | X | 4.07 | 68.28 | 16.85 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 4.01 | 67.91 | 16.57 |      | 150.0 |         |
|           |                                                                | Z | 3.87 | 68.53 | 16.75 |      | 150.0 |         |
| 10449-AAA | LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)                | X | 4.32 | 67.94 | 16.88 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 4.28 | 67.65 | 16.65 |      | 150.0 |         |
|           |                                                                | Z | 4.14 | 68.10 | 16.89 |      | 150.0 |         |
| 10450-AAA | LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)                | X | 4.51 | 67.71 | 16.85 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 4.46 | 67.46 | 16.64 |      | 150.0 |         |
|           |                                                                | Z | 4.34 | 67.79 | 16.88 |      | 150.0 |         |
| 10451-AAA | W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)                | X | 3.49 | 69.42 | 16.00 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 3.35 | 68.60 | 15.46 |      | 150.0 |         |
|           |                                                                | Z | 2.95 | 68.04 | 14.36 |      | 150.0 |         |
| 10456-AAA | IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)           | X | 6.21 | 68.40 | 17.09 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 6.19 | 68.25 | 16.96 |      | 150.0 |         |
|           |                                                                | Z | 6.42 | 69.29 | 17.68 |      | 150.0 |         |
| 10457-AAA | UMTS-FDD (DC-HSDPA)                                            | X | 3.81 | 66.18 | 16.56 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 3.79 | 65.98 | 16.36 |      | 150.0 |         |
|           |                                                                | Z | 3.76 | 66.54 | 16.65 |      | 150.0 |         |
| 10458-AAA | CDMA2000 (1xEV-DO, Rev. B, 2 carriers)                         | X | 3.17 | 68.04 | 14.87 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 3.04 | 67.24 | 14.33 |      | 150.0 |         |
|           |                                                                | Z | 2.32 | 64.70 | 11.78 |      | 150.0 |         |
| 10459-AAA | CDMA2000 (1xEV-DO, Rev. B, 3 carriers)                         | X | 4.29 | 66.38 | 15.98 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                | Y | 4.06 | 65.37 | 15.37 |      | 150.0 |         |
|           |                                                                | Z | 3.61 | 64.80 | 14.10 |      | 150.0 |         |

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|-----------|-------------------------------------------------------------------|---|-------|-------|-------|------|-------|---------|
| 10460-AAA | UMTS-FDD (WCDMA, AMR)                                             | X | 2.58  | 90.05 | 26.41 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                   | Y | 1.45  | 78.32 | 21.49 |      | 150.0 |         |
|           |                                                                   | Z | 2.79  | 91.24 | 26.54 |      | 150.0 |         |
| 10461-AAA | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)   | X | 3.12  | 76.58 | 17.21 | 3.29 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 2.41  | 73.61 | 16.46 |      | 80.0  |         |
|           |                                                                   | Z | 10.41 | 96.12 | 24.53 |      | 80.0  |         |
| 10462-AAA | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9) | X | 0.87  | 60.00 | 7.19  | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 0.86  | 60.00 | 7.41  |      | 80.0  |         |
|           |                                                                   | Z | 0.75  | 60.00 | 7.65  |      | 80.0  |         |
| 10463-AAA | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9) | X | 0.89  | 60.00 | 6.68  | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 0.88  | 60.00 | 6.89  |      | 80.0  |         |
|           |                                                                   | Z | 0.76  | 60.00 | 7.01  |      | 80.0  |         |
| 10464-AAA | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)     | X | 2.08  | 71.38 | 14.72 | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 1.78  | 69.87 | 14.37 |      | 80.0  |         |
|           |                                                                   | Z | 6.21  | 88.00 | 21.46 |      | 80.0  |         |
| 10465-AAA | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   | X | 0.87  | 60.00 | 7.13  | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 0.86  | 60.00 | 7.35  |      | 80.0  |         |
|           |                                                                   | Z | 0.75  | 60.00 | 7.60  |      | 80.0  |         |
| 10466-AAA | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   | X | 0.90  | 60.00 | 6.64  | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 0.88  | 60.00 | 6.85  |      | 80.0  |         |
|           |                                                                   | Z | 0.76  | 60.00 | 6.97  |      | 80.0  |         |
| 10467-AAB | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)     | X | 2.21  | 72.14 | 15.04 | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 1.86  | 70.47 | 14.64 |      | 80.0  |         |
|           |                                                                   | Z | 7.28  | 90.21 | 22.16 |      | 80.0  |         |
| 10468-AAB | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   | X | 0.87  | 60.00 | 7.15  | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 0.86  | 60.00 | 7.36  |      | 80.0  |         |
|           |                                                                   | Z | 0.75  | 60.00 | 7.62  |      | 80.0  |         |
| 10469-AAB | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   | X | 0.89  | 60.00 | 6.64  | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 0.88  | 60.00 | 6.85  |      | 80.0  |         |
|           |                                                                   | Z | 0.76  | 60.00 | 6.98  |      | 80.0  |         |
| 10470-AAB | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)    | X | 2.20  | 72.13 | 15.02 | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 1.86  | 70.46 | 14.63 |      | 80.0  |         |
|           |                                                                   | Z | 7.38  | 90.41 | 22.21 |      | 80.0  |         |
| 10471-AAB | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)  | X | 0.87  | 60.00 | 7.13  | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 0.86  | 60.00 | 7.35  |      | 80.0  |         |
|           |                                                                   | Z | 0.75  | 60.00 | 7.61  |      | 80.0  |         |
| 10472-AAB | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)  | X | 0.89  | 60.00 | 6.62  | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 0.88  | 60.00 | 6.83  |      | 80.0  |         |
|           |                                                                   | Z | 0.76  | 60.00 | 6.96  |      | 80.0  |         |
| 10473-AAB | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)    | X | 2.20  | 72.08 | 15.00 | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 1.85  | 70.42 | 14.61 |      | 80.0  |         |
|           |                                                                   | Z | 7.31  | 90.27 | 22.17 |      | 80.0  |         |
| 10474-AAB | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)  | X | 0.87  | 60.00 | 7.13  | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 0.86  | 60.00 | 7.35  |      | 80.0  |         |
|           |                                                                   | Z | 0.75  | 60.00 | 7.61  |      | 80.0  |         |
| 10475-AAB | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)  | X | 0.89  | 60.00 | 6.62  | 3.23 | 80.0  | ± 9.6 % |
|           |                                                                   | Y | 0.88  | 60.00 | 6.83  |      | 80.0  |         |
|           |                                                                   | Z | 0.76  | 60.00 | 6.96  |      | 80.0  |         |

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| 10477-AAB | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)    | X | 0.87  | 60.00  | 7.11  | 3.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 0.86  | 60.00  | 7.33  |      | 80.0 |         |
|           |                                                                     | Z | 0.75  | 60.00  | 7.58  |      | 80.0 |         |
| 10478-AAB | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)    | X | 0.89  | 60.00  | 6.61  | 3.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 0.88  | 60.00  | 6.82  |      | 80.0 |         |
|           |                                                                     | Z | 0.76  | 60.00  | 6.95  |      | 80.0 |         |
| 10479-AAA | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)   | X | 5.13  | 79.55  | 19.37 | 3.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 4.22  | 77.09  | 18.60 |      | 80.0 |         |
|           |                                                                     | Z | 21.65 | 102.19 | 26.38 |      | 80.0 |         |
| 10480-AAA | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9) | X | 2.66  | 67.78  | 13.04 | 3.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 2.55  | 67.43  | 12.98 |      | 80.0 |         |
|           |                                                                     | Z | 2.99  | 70.98  | 14.03 |      | 80.0 |         |
| 10481-AAA | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9) | X | 2.13  | 64.99  | 11.45 | 3.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 2.09  | 64.87  | 11.48 |      | 80.0 |         |
|           |                                                                     | Z | 1.84  | 65.40  | 11.31 |      | 80.0 |         |
| 10482-AAA | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)     | X | 2.32  | 68.30  | 14.02 | 2.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 2.01  | 66.66  | 13.30 |      | 80.0 |         |
|           |                                                                     | Z | 1.48  | 63.65  | 10.80 |      | 80.0 |         |
| 10483-AAA | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   | X | 2.07  | 63.78  | 11.13 | 2.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 1.98  | 63.36  | 10.95 |      | 80.0 |         |
|           |                                                                     | Z | 1.30  | 60.00  | 8.01  |      | 80.0 |         |
| 10484-AAA | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   | X | 2.03  | 63.37  | 10.93 | 2.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 1.95  | 63.00  | 10.76 |      | 80.0 |         |
|           |                                                                     | Z | 1.32  | 60.00  | 7.99  |      | 80.0 |         |
| 10485-AAB | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)     | X | 3.25  | 72.90  | 17.20 | 2.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 2.75  | 70.63  | 16.28 |      | 80.0 |         |
|           |                                                                     | Z | 3.15  | 72.97  | 16.56 |      | 80.0 |         |
| 10486-AAB | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   | X | 2.82  | 67.74  | 14.41 | 2.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 2.59  | 66.65  | 13.89 |      | 80.0 |         |
|           |                                                                     | Z | 2.10  | 64.72  | 12.00 |      | 80.0 |         |
| 10487-AAB | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   | X | 2.80  | 67.30  | 14.19 | 2.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 2.58  | 66.29  | 13.71 |      | 80.0 |         |
|           |                                                                     | Z | 2.07  | 64.20  | 11.71 |      | 80.0 |         |
| 10488-AAB | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)    | X | 3.62  | 72.90  | 18.33 | 2.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 3.22  | 71.10  | 17.57 |      | 80.0 |         |
|           |                                                                     | Z | 3.69  | 74.34  | 18.95 |      | 80.0 |         |
| 10489-AAB | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)  | X | 3.46  | 69.30  | 16.80 | 2.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 3.24  | 68.32  | 16.33 |      | 80.0 |         |
|           |                                                                     | Z | 3.42  | 70.03  | 16.82 |      | 80.0 |         |
| 10490-AAB | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)  | X | 3.53  | 69.11  | 16.73 | 2.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 3.33  | 68.19  | 16.29 |      | 80.0 |         |
|           |                                                                     | Z | 3.45  | 69.69  | 16.65 |      | 80.0 |         |
| 10491-AAB | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)    | X | 3.79  | 71.27  | 17.94 | 2.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 3.50  | 70.00  | 17.38 |      | 80.0 |         |
|           |                                                                     | Z | 3.72  | 72.09  | 18.48 |      | 80.0 |         |
| 10492-AAB | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)  | X | 3.79  | 68.57  | 16.95 | 2.23 | 80.0 | ± 9.6 % |
|           |                                                                     | Y | 3.61  | 67.82  | 16.59 |      | 80.0 |         |
|           |                                                                     | Z | 3.70  | 69.13  | 17.15 |      | 80.0 |         |

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|           |                                                                      |   |      |       |       |      |      |        |
|-----------|----------------------------------------------------------------------|---|------|-------|-------|------|------|--------|
| 10493-AAB | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   | X | 3.84 | 68.43 | 16.90 | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 3.68 | 67.71 | 16.55 |      | 80.0 |        |
|           |                                                                      | Z | 3.73 | 68.93 | 17.04 |      | 80.0 |        |
| 10494-AAB | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)     | X | 4.11 | 72.66 | 18.38 | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 3.74 | 71.19 | 17.76 |      | 80.0 |        |
|           |                                                                      | Z | 4.03 | 73.42 | 19.00 |      | 80.0 |        |
| 10495-AAB | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   | X | 3.82 | 68.90 | 17.17 | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 3.64 | 68.12 | 16.79 |      | 80.0 |        |
|           |                                                                      | Z | 3.74 | 69.38 | 17.45 |      | 80.0 |        |
| 10496-AAB | LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   | X | 3.90 | 68.65 | 17.10 | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 3.73 | 67.93 | 16.75 |      | 80.0 |        |
|           |                                                                      | Z | 3.80 | 69.14 | 17.36 |      | 80.0 |        |
| 10497-AAA | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)   | X | 1.35 | 62.07 | 9.89  | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 1.26 | 61.45 | 9.55  |      | 80.0 |        |
|           |                                                                      | Z | 1.00 | 60.00 | 7.36  |      | 80.0 |        |
| 10498-AAA | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9) | X | 1.29 | 60.00 | 7.73  | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 1.28 | 60.00 | 7.70  |      | 80.0 |        |
|           |                                                                      | Z | 1.19 | 60.00 | 6.08  |      | 80.0 |        |
| 10499-AAA | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9) | X | 1.31 | 60.00 | 7.59  | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 1.30 | 60.00 | 7.56  |      | 80.0 |        |
|           |                                                                      | Z | 1.22 | 60.00 | 5.90  |      | 80.0 |        |
| 10500-AAA | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)     | X | 3.38 | 72.81 | 17.64 | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 2.93 | 70.77 | 16.79 |      | 80.0 |        |
|           |                                                                      | Z | 3.45 | 73.92 | 17.65 |      | 80.0 |        |
| 10501-AAA | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   | X | 3.15 | 68.71 | 15.47 | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 2.91 | 67.62 | 14.97 |      | 80.0 |        |
|           |                                                                      | Z | 2.74 | 67.51 | 14.14 |      | 80.0 |        |
| 10502-AAA | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   | X | 3.18 | 68.47 | 15.30 | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 2.94 | 67.44 | 14.82 |      | 80.0 |        |
|           |                                                                      | Z | 2.71 | 67.08 | 13.86 |      | 80.0 |        |
| 10503-AAB | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)     | X | 3.57 | 72.66 | 18.22 | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 3.17 | 70.88 | 17.47 |      | 80.0 |        |
|           |                                                                      | Z | 3.63 | 74.08 | 18.82 |      | 80.0 |        |
| 10504-AAB | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   | X | 3.44 | 69.18 | 16.73 | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 3.22 | 68.21 | 16.26 |      | 80.0 |        |
|           |                                                                      | Z | 3.39 | 69.89 | 16.74 |      | 80.0 |        |
| 10505-AAB | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   | X | 3.51 | 69.00 | 16.66 | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 3.30 | 68.08 | 16.22 |      | 80.0 |        |
|           |                                                                      | Z | 3.42 | 69.56 | 16.58 |      | 80.0 |        |
| 10506-AAB | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)    | X | 4.07 | 72.49 | 18.29 | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 3.70 | 71.04 | 17.68 |      | 80.0 |        |
|           |                                                                      | Z | 3.99 | 73.25 | 18.92 |      | 80.0 |        |
| 10507-AAB | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)  | X | 3.80 | 68.83 | 17.12 | 2.23 | 80.0 | ±9.6 % |
|           |                                                                      | Y | 3.63 | 68.04 | 16.75 |      | 80.0 |        |
|           |                                                                      | Z | 3.72 | 69.31 | 17.41 |      | 80.0 |        |

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|-----------|---------------------------------------------------------------------|---|-------|--------|-------|------|-------|---------|
| 10508-AAB | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9) | X | 3.88  | 68.57  | 17.05 | 2.23 | 80.0  | ± 9.6 % |
|           |                                                                     | Y | 3.71  | 67.85  | 16.70 |      | 80.0  |         |
|           |                                                                     | Z | 3.78  | 69.05  | 17.31 |      | 80.0  |         |
| 10509-AAB | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)   | X | 4.38  | 71.20  | 17.84 | 2.23 | 80.0  | ± 9.6 % |
|           |                                                                     | Y | 4.10  | 70.16  | 17.39 |      | 80.0  |         |
|           |                                                                     | Z | 4.26  | 71.62  | 18.37 |      | 80.0  |         |
| 10510-AAB | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9) | X | 4.27  | 68.48  | 17.16 | 2.23 | 80.0  | ± 9.6 % |
|           |                                                                     | Y | 4.11  | 67.85  | 16.86 |      | 80.0  |         |
|           |                                                                     | Z | 4.13  | 68.66  | 17.43 |      | 80.0  |         |
| 10511-AAB | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9) | X | 4.33  | 68.26  | 17.11 | 2.23 | 80.0  | ± 9.6 % |
|           |                                                                     | Y | 4.18  | 67.68  | 16.82 |      | 80.0  |         |
|           |                                                                     | Z | 4.20  | 68.49  | 17.38 |      | 80.0  |         |
| 10512-AAB | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)   | X | 4.57  | 72.57  | 18.24 | 2.23 | 80.0  | ± 9.6 % |
|           |                                                                     | Y | 4.21  | 71.30  | 17.71 |      | 80.0  |         |
|           |                                                                     | Z | 4.41  | 72.82  | 18.74 |      | 80.0  |         |
| 10513-AAB | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9) | X | 4.16  | 68.68  | 17.24 | 2.23 | 80.0  | ± 9.6 % |
|           |                                                                     | Y | 4.00  | 68.00  | 16.92 |      | 80.0  |         |
|           |                                                                     | Z | 4.03  | 68.78  | 17.51 |      | 80.0  |         |
| 10514-AAB | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9) | X | 4.19  | 68.31  | 17.14 | 2.23 | 80.0  | ± 9.6 % |
|           |                                                                     | Y | 4.04  | 67.69  | 16.84 |      | 80.0  |         |
|           |                                                                     | Z | 4.07  | 68.43  | 17.40 |      | 80.0  |         |
| 10515-AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)           | X | 1.10  | 66.90  | 17.70 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 1.05  | 65.52  | 16.60 |      | 150.0 |         |
|           |                                                                     | Z | 1.11  | 66.83  | 17.54 |      | 150.0 |         |
| 10516-AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)         | X | 99.99 | 177.80 | 50.50 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 1.87  | 94.13  | 28.28 |      | 150.0 |         |
|           |                                                                     | Z | 15.95 | 138.93 | 41.89 |      | 150.0 |         |
| 10517-AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)          | X | 1.12  | 73.13  | 20.66 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 0.98  | 69.56  | 18.47 |      | 150.0 |         |
|           |                                                                     | Z | 1.11  | 72.41  | 20.24 |      | 150.0 |         |
| 10518-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)           | X | 4.51  | 67.64  | 16.83 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 4.48  | 67.40  | 16.62 |      | 150.0 |         |
|           |                                                                     | Z | 4.35  | 67.84  | 16.89 |      | 150.0 |         |
| 10519-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)          | X | 4.66  | 67.79  | 16.90 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 4.63  | 67.56  | 16.70 |      | 150.0 |         |
|           |                                                                     | Z | 4.47  | 67.95  | 16.95 |      | 150.0 |         |
| 10520-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)          | X | 4.53  | 67.79  | 16.85 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 4.49  | 67.54  | 16.64 |      | 150.0 |         |
|           |                                                                     | Z | 4.34  | 67.91  | 16.89 |      | 150.0 |         |
| 10521-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)          | X | 4.46  | 67.79  | 16.86 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 4.42  | 67.53  | 16.64 |      | 150.0 |         |
|           |                                                                     | Z | 4.27  | 67.84  | 16.86 |      | 150.0 |         |
| 10522-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)          | X | 4.52  | 67.91  | 16.95 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                     | Y | 4.48  | 67.65  | 16.73 |      | 150.0 |         |
|           |                                                                     | Z | 4.29  | 67.87  | 16.90 |      | 150.0 |         |

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|           |                                                            |   |      |       |       |      |       |         |
|-----------|------------------------------------------------------------|---|------|-------|-------|------|-------|---------|
| 10523-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle) | X | 4.44 | 67.91 | 16.87 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 4.40 | 67.64 | 16.65 |      | 150.0 |         |
|           |                                                            | Z | 4.28 | 68.14 | 16.98 |      | 150.0 |         |
| 10524-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle) | X | 4.47 | 67.86 | 16.93 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 4.43 | 67.60 | 16.72 |      | 150.0 |         |
|           |                                                            | Z | 4.26 | 67.97 | 16.98 |      | 150.0 |         |
| 10525-AAA | IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)          | X | 4.50 | 66.97 | 16.56 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 4.46 | 66.72 | 16.34 |      | 150.0 |         |
|           |                                                            | Z | 4.34 | 67.16 | 16.63 |      | 150.0 |         |
| 10526-AAA | IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)          | X | 4.64 | 67.28 | 16.68 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 4.59 | 67.02 | 16.46 |      | 150.0 |         |
|           |                                                            | Z | 4.43 | 67.37 | 16.72 |      | 150.0 |         |
| 10527-AAA | IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)          | X | 4.57 | 67.28 | 16.64 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 4.53 | 67.01 | 16.42 |      | 150.0 |         |
|           |                                                            | Z | 4.38 | 67.39 | 16.69 |      | 150.0 |         |
| 10528-AAA | IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)          | X | 4.58 | 67.29 | 16.66 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 4.54 | 67.02 | 16.44 |      | 150.0 |         |
|           |                                                            | Z | 4.39 | 67.38 | 16.71 |      | 150.0 |         |
| 10529-AAA | IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)          | X | 4.58 | 67.29 | 16.66 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 4.54 | 67.02 | 16.44 |      | 150.0 |         |
|           |                                                            | Z | 4.39 | 67.38 | 16.71 |      | 150.0 |         |
| 10531-AAA | IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)          | X | 4.56 | 67.36 | 16.67 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 4.51 | 67.07 | 16.44 |      | 150.0 |         |
|           |                                                            | Z | 4.34 | 67.37 | 16.67 |      | 150.0 |         |
| 10532-AAA | IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)          | X | 4.44 | 67.24 | 16.62 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 4.39 | 66.95 | 16.39 |      | 150.0 |         |
|           |                                                            | Z | 4.24 | 67.27 | 16.63 |      | 150.0 |         |
| 10533-AAA | IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)          | X | 4.60 | 67.38 | 16.68 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 4.55 | 67.11 | 16.45 |      | 150.0 |         |
|           |                                                            | Z | 4.40 | 67.52 | 16.74 |      | 150.0 |         |
| 10534-AAA | IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)          | X | 5.10 | 67.10 | 16.56 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 5.07 | 66.89 | 16.41 |      | 150.0 |         |
|           |                                                            | Z | 4.94 | 67.03 | 16.64 |      | 150.0 |         |
| 10535-AAA | IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)          | X | 5.16 | 67.26 | 16.66 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 5.12 | 67.04 | 16.48 |      | 150.0 |         |
|           |                                                            | Z | 4.97 | 67.13 | 16.69 |      | 150.0 |         |
| 10536-AAA | IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)          | X | 5.05 | 67.29 | 16.66 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 5.02 | 67.07 | 16.47 |      | 150.0 |         |
|           |                                                            | Z | 4.87 | 67.16 | 16.69 |      | 150.0 |         |
| 10537-AAA | IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)          | X | 5.10 | 67.23 | 16.63 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 5.07 | 67.02 | 16.45 |      | 150.0 |         |
|           |                                                            | Z | 4.96 | 67.24 | 16.73 |      | 150.0 |         |
| 10538-AAA | IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)          | X | 5.17 | 67.18 | 16.64 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 5.14 | 66.97 | 16.46 |      | 150.0 |         |
|           |                                                            | Z | 4.98 | 67.06 | 16.67 |      | 150.0 |         |
| 10540-AAA | IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)          | X | 5.10 | 67.17 | 16.65 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                            | Y | 5.07 | 66.96 | 16.48 |      | 150.0 |         |
|           |                                                            | Z | 4.92 | 67.03 | 16.68 |      | 150.0 |         |

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|-----------|-----------------------------------------------------|---|------|-------|-------|------|-------|---------|
| 10541-AAA | IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)   | X | 5.08 | 67.07 | 16.59 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.05 | 66.86 | 16.41 |      | 150.0 |         |
|           |                                                     | Z | 4.92 | 67.00 | 16.64 |      | 150.0 |         |
| 10542-AAA | IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)   | X | 5.23 | 67.13 | 16.63 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.20 | 66.94 | 16.46 |      | 150.0 |         |
|           |                                                     | Z | 5.05 | 67.04 | 16.67 |      | 150.0 |         |
| 10543-AAA | IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)   | X | 5.29 | 67.14 | 16.65 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.26 | 66.96 | 16.49 |      | 150.0 |         |
|           |                                                     | Z | 5.12 | 67.14 | 16.75 |      | 150.0 |         |
| 10544-AAA | IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)   | X | 5.43 | 67.12 | 16.52 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.40 | 66.93 | 16.36 |      | 150.0 |         |
|           |                                                     | Z | 5.30 | 66.95 | 16.56 |      | 150.0 |         |
| 10545-AAA | IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)   | X | 5.61 | 67.53 | 16.68 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.58 | 67.34 | 16.52 |      | 150.0 |         |
|           |                                                     | Z | 5.47 | 67.44 | 16.77 |      | 150.0 |         |
| 10546-AAA | IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)   | X | 5.47 | 67.27 | 16.56 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.44 | 67.07 | 16.40 |      | 150.0 |         |
|           |                                                     | Z | 5.32 | 67.06 | 16.58 |      | 150.0 |         |
| 10547-AAA | IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)   | X | 5.54 | 67.33 | 16.59 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.51 | 67.14 | 16.43 |      | 150.0 |         |
|           |                                                     | Z | 5.46 | 67.39 | 16.75 |      | 150.0 |         |
| 10548-AAA | IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)   | X | 5.71 | 68.04 | 16.91 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.68 | 67.82 | 16.74 |      | 150.0 |         |
|           |                                                     | Z | 5.50 | 67.68 | 16.87 |      | 150.0 |         |
| 10550-AAA | IEEE 802.11ac WiFi (80MHz, MCS5, 99pc duty cycle)   | X | 5.52 | 67.38 | 16.63 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.49 | 67.20 | 16.48 |      | 150.0 |         |
|           |                                                     | Z | 5.45 | 67.53 | 16.83 |      | 150.0 |         |
| 10551-AAA | IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)   | X | 5.48 | 67.26 | 16.54 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.45 | 67.06 | 16.37 |      | 150.0 |         |
|           |                                                     | Z | 5.30 | 66.98 | 16.53 |      | 150.0 |         |
| 10552-AAA | IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)   | X | 5.45 | 67.24 | 16.53 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.42 | 67.05 | 16.37 |      | 150.0 |         |
|           |                                                     | Z | 5.31 | 67.13 | 16.59 |      | 150.0 |         |
| 10553-AAA | IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)   | X | 5.50 | 67.19 | 16.53 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.47 | 67.00 | 16.37 |      | 150.0 |         |
|           |                                                     | Z | 5.34 | 67.00 | 16.55 |      | 150.0 |         |
| 10554-AAA | IEEE 1602.11ac WiFi (160MHz, MCS0, 99pc duty cycle) | X | 5.84 | 67.40 | 16.56 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.82 | 67.23 | 16.41 |      | 150.0 |         |
|           |                                                     | Z | 5.74 | 67.21 | 16.59 |      | 150.0 |         |
| 10555-AAA | IEEE 1602.11ac WiFi (160MHz, MCS1, 99pc duty cycle) | X | 5.95 | 67.66 | 16.66 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.92 | 67.47 | 16.51 |      | 150.0 |         |
|           |                                                     | Z | 5.81 | 67.40 | 16.67 |      | 150.0 |         |
| 10556-AAA | IEEE 1602.11ac WiFi (160MHz, MCS2, 99pc duty cycle) | X | 5.98 | 67.74 | 16.70 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.95 | 67.56 | 16.55 |      | 150.0 |         |
|           |                                                     | Z | 5.88 | 67.60 | 16.76 |      | 150.0 |         |
| 10557-AAA | IEEE 1602.11ac WiFi (160MHz, MCS3, 99pc duty cycle) | X | 5.94 | 67.62 | 16.66 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                     | Y | 5.91 | 67.45 | 16.51 |      | 150.0 |         |
|           |                                                     | Z | 5.81 | 67.39 | 16.67 |      | 150.0 |         |

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|           |                                                                 |   |        |        |       |      |       |         |
|-----------|-----------------------------------------------------------------|---|--------|--------|-------|------|-------|---------|
| 10558-AAA | IEEE 1602.11ac WiFi (160MHz, MCS4, 99pc duty cycle)             | X | 5.97   | 67.74  | 16.73 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                 | Y | 5.94   | 67.55  | 16.58 |      | 150.0 |         |
|           |                                                                 | Z | 5.78   | 67.33  | 16.66 |      | 150.0 |         |
| 10560-AAA | IEEE 1602.11ac WiFi (160MHz, MCS6, 99pc duty cycle)             | X | 5.97   | 67.61  | 16.71 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                 | Y | 5.94   | 67.44  | 16.56 |      | 150.0 |         |
|           |                                                                 | Z | 5.81   | 67.31  | 16.69 |      | 150.0 |         |
| 10561-AAA | IEEE 1602.11ac WiFi (160MHz, MCS7, 99pc duty cycle)             | X | 5.90   | 67.59  | 16.73 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                 | Y | 5.87   | 67.42  | 16.58 |      | 150.0 |         |
|           |                                                                 | Z | 5.75   | 67.31  | 16.72 |      | 150.0 |         |
| 10562-AAA | IEEE 1602.11ac WiFi (160MHz, MCS8, 99pc duty cycle)             | X | 5.97   | 67.83  | 16.85 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                 | Y | 5.94   | 67.63  | 16.69 |      | 150.0 |         |
|           |                                                                 | Z | 5.79   | 67.44  | 16.78 |      | 150.0 |         |
| 10563-AAA | IEEE 1602.11ac WiFi (160MHz, MCS9, 99pc duty cycle)             | X | 6.04   | 67.69  | 16.74 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                                 | Y | 6.02   | 67.52  | 16.60 |      | 150.0 |         |
|           |                                                                 | Z | 5.93   | 67.56  | 16.81 |      | 150.0 |         |
| 10564-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)  | X | 4.80   | 67.49  | 16.83 | 0.46 | 150.0 | ± 9.6 % |
|           |                                                                 | Y | 4.77   | 67.28  | 16.64 |      | 150.0 |         |
|           |                                                                 | Z | 4.63   | 67.66  | 16.91 |      | 150.0 |         |
| 10565-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle) | X | 5.01   | 67.93  | 17.15 | 0.46 | 150.0 | ± 9.6 % |
|           |                                                                 | Y | 4.98   | 67.73  | 16.98 |      | 150.0 |         |
|           |                                                                 | Z | 4.81   | 68.06  | 17.21 |      | 150.0 |         |
| 10566-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle) | X | 4.85   | 67.77  | 16.97 | 0.46 | 150.0 | ± 9.6 % |
|           |                                                                 | Y | 4.81   | 67.56  | 16.79 |      | 150.0 |         |
|           |                                                                 | Z | 4.65   | 67.87  | 17.03 |      | 150.0 |         |
| 10567-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle) | X | 4.90   | 68.26  | 17.40 | 0.46 | 150.0 | ± 9.6 % |
|           |                                                                 | Y | 4.87   | 68.07  | 17.23 |      | 150.0 |         |
|           |                                                                 | Z | 4.70   | 68.33  | 17.45 |      | 150.0 |         |
| 10568-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle) | X | 4.73   | 67.45  | 16.67 | 0.46 | 150.0 | ± 9.6 % |
|           |                                                                 | Y | 4.70   | 67.21  | 16.47 |      | 150.0 |         |
|           |                                                                 | Z | 4.51   | 67.41  | 16.65 |      | 150.0 |         |
| 10569-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle) | X | 4.88   | 68.50  | 17.53 | 0.46 | 150.0 | ± 9.6 % |
|           |                                                                 | Y | 4.86   | 68.30  | 17.37 |      | 150.0 |         |
|           |                                                                 | Z | 4.72   | 68.70  | 17.66 |      | 150.0 |         |
| 10570-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle) | X | 4.89   | 68.25  | 17.42 | 0.46 | 150.0 | ± 9.6 % |
|           |                                                                 | Y | 4.86   | 68.06  | 17.25 |      | 150.0 |         |
|           |                                                                 | Z | 4.68   | 68.36  | 17.49 |      | 150.0 |         |
| 10571-AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)       | X | 1.29   | 67.25  | 17.52 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 1.22   | 65.91  | 16.56 |      | 130.0 |         |
|           |                                                                 | Z | 1.30   | 67.30  | 17.53 |      | 130.0 |         |
| 10572-AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)       | X | 1.32   | 68.20  | 18.07 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 1.25   | 66.70  | 17.04 |      | 130.0 |         |
|           |                                                                 | Z | 1.34   | 68.20  | 18.06 |      | 130.0 |         |
| 10573-AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)     | X | 100.00 | 157.88 | 43.29 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 12.33  | 118.14 | 33.50 |      | 130.0 |         |
|           |                                                                 | Z | 100.00 | 159.43 | 44.14 |      | 130.0 |         |
| 10574-AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)      | X | 2.02   | 80.96  | 24.00 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 1.63   | 76.18  | 21.71 |      | 130.0 |         |
|           |                                                                 | Z | 1.89   | 79.55  | 23.50 |      | 130.0 |         |

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|           |                                                                 |   |      |       |       |      |       |         |
|-----------|-----------------------------------------------------------------|---|------|-------|-------|------|-------|---------|
| 10575-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)  | X | 4.55 | 67.14 | 16.73 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.53 | 66.95 | 16.56 |      | 130.0 |         |
|           |                                                                 | Z | 4.40 | 67.34 | 16.81 |      | 130.0 |         |
| 10576-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)  | X | 4.59 | 67.37 | 16.84 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.56 | 67.18 | 16.67 |      | 130.0 |         |
|           |                                                                 | Z | 4.44 | 67.63 | 16.95 |      | 130.0 |         |
| 10577-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle) | X | 4.76 | 67.60 | 16.98 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.73 | 67.42 | 16.81 |      | 130.0 |         |
|           |                                                                 | Z | 4.58 | 67.82 | 17.07 |      | 130.0 |         |
| 10578-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle) | X | 4.68 | 67.83 | 17.14 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.65 | 67.64 | 16.97 |      | 130.0 |         |
|           |                                                                 | Z | 4.50 | 68.03 | 17.23 |      | 130.0 |         |
| 10579-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle) | X | 4.41 | 66.91 | 16.31 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.38 | 66.67 | 16.11 |      | 130.0 |         |
|           |                                                                 | Z | 4.23 | 67.00 | 16.35 |      | 130.0 |         |
| 10580-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle) | X | 4.44 | 66.95 | 16.32 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.41 | 66.71 | 16.12 |      | 130.0 |         |
|           |                                                                 | Z | 4.23 | 66.96 | 16.31 |      | 130.0 |         |
| 10581-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle) | X | 4.59 | 67.94 | 17.12 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.56 | 67.73 | 16.94 |      | 130.0 |         |
|           |                                                                 | Z | 4.44 | 68.22 | 17.27 |      | 130.0 |         |
| 10582-AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle) | X | 4.33 | 66.63 | 16.06 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.30 | 66.38 | 15.85 |      | 130.0 |         |
|           |                                                                 | Z | 4.14 | 66.74 | 16.11 |      | 130.0 |         |
| 10583-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)       | X | 4.55 | 67.14 | 16.73 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.53 | 66.95 | 16.56 |      | 130.0 |         |
|           |                                                                 | Z | 4.40 | 67.34 | 16.81 |      | 130.0 |         |
| 10584-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)       | X | 4.59 | 67.37 | 16.84 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.56 | 67.18 | 16.67 |      | 130.0 |         |
|           |                                                                 | Z | 4.44 | 67.63 | 16.95 |      | 130.0 |         |
| 10585-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)      | X | 4.76 | 67.60 | 16.98 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.73 | 67.42 | 16.81 |      | 130.0 |         |
|           |                                                                 | Z | 4.58 | 67.82 | 17.07 |      | 130.0 |         |
| 10586-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)      | X | 4.68 | 67.83 | 17.14 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.65 | 67.64 | 16.97 |      | 130.0 |         |
|           |                                                                 | Z | 4.50 | 68.03 | 17.23 |      | 130.0 |         |
| 10587-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)      | X | 4.41 | 66.91 | 16.31 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.38 | 66.67 | 16.11 |      | 130.0 |         |
|           |                                                                 | Z | 4.23 | 67.00 | 16.35 |      | 130.0 |         |
| 10588-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)      | X | 4.44 | 66.95 | 16.32 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.41 | 66.71 | 16.12 |      | 130.0 |         |
|           |                                                                 | Z | 4.23 | 66.96 | 16.31 |      | 130.0 |         |
| 10589-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)      | X | 4.59 | 67.94 | 17.12 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.56 | 67.73 | 16.94 |      | 130.0 |         |
|           |                                                                 | Z | 4.44 | 68.22 | 17.27 |      | 130.0 |         |
| 10590-AAA | IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)      | X | 4.33 | 66.63 | 16.06 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                                 | Y | 4.30 | 66.38 | 15.85 |      | 130.0 |         |
|           |                                                                 | Z | 4.14 | 66.74 | 16.11 |      | 130.0 |         |

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|           |                                                       |   |      |       |       |      |       |         |
|-----------|-------------------------------------------------------|---|------|-------|-------|------|-------|---------|
| 10591-AAA | IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle) | X | 4.71 | 67.20 | 16.84 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 4.68 | 67.03 | 16.68 |      | 130.0 |         |
|           |                                                       | Z | 4.56 | 67.44 | 16.95 |      | 130.0 |         |
| 10592-AAA | IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle) | X | 4.84 | 67.52 | 16.97 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 4.81 | 67.34 | 16.81 |      | 130.0 |         |
|           |                                                       | Z | 4.65 | 67.68 | 17.06 |      | 130.0 |         |
| 10593-AAA | IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle) | X | 4.75 | 67.39 | 16.82 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 4.73 | 67.20 | 16.66 |      | 130.0 |         |
|           |                                                       | Z | 4.58 | 67.57 | 16.92 |      | 130.0 |         |
| 10594-AAA | IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle) | X | 4.81 | 67.59 | 17.00 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 4.79 | 67.41 | 16.84 |      | 130.0 |         |
|           |                                                       | Z | 4.63 | 67.76 | 17.10 |      | 130.0 |         |
| 10595-AAA | IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle) | X | 4.78 | 67.56 | 16.90 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 4.75 | 67.37 | 16.74 |      | 130.0 |         |
|           |                                                       | Z | 4.60 | 67.75 | 17.01 |      | 130.0 |         |
| 10596-AAA | IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle) | X | 4.71 | 67.53 | 16.90 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 4.68 | 67.33 | 16.72 |      | 130.0 |         |
|           |                                                       | Z | 4.52 | 67.66 | 16.98 |      | 130.0 |         |
| 10597-AAA | IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle) | X | 4.66 | 67.40 | 16.75 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 4.63 | 67.19 | 16.57 |      | 130.0 |         |
|           |                                                       | Z | 4.48 | 67.52 | 16.82 |      | 130.0 |         |
| 10598-AAA | IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle) | X | 4.66 | 67.70 | 17.06 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 4.63 | 67.50 | 16.90 |      | 130.0 |         |
|           |                                                       | Z | 4.50 | 67.86 | 17.15 |      | 130.0 |         |
| 10599-AAA | IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle) | X | 5.35 | 67.53 | 16.97 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 5.34 | 67.40 | 16.84 |      | 130.0 |         |
|           |                                                       | Z | 5.33 | 68.01 | 17.32 |      | 130.0 |         |
| 10600-AAA | IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle) | X | 5.45 | 67.87 | 17.10 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 5.44 | 67.72 | 16.97 |      | 130.0 |         |
|           |                                                       | Z | 5.33 | 68.04 | 17.31 |      | 130.0 |         |
| 10601-AAA | IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle) | X | 5.36 | 67.68 | 17.03 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 5.35 | 67.54 | 16.90 |      | 130.0 |         |
|           |                                                       | Z | 5.29 | 68.02 | 17.32 |      | 130.0 |         |
| 10602-AAA | IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle) | X | 5.48 | 67.77 | 16.99 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 5.45 | 67.61 | 16.84 |      | 130.0 |         |
|           |                                                       | Z | 5.31 | 67.79 | 17.11 |      | 130.0 |         |
| 10603-AAA | IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle) | X | 5.56 | 68.13 | 17.31 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 5.54 | 67.96 | 17.17 |      | 130.0 |         |
|           |                                                       | Z | 5.32 | 67.91 | 17.32 |      | 130.0 |         |
| 10604-AAA | IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle) | X | 5.44 | 67.76 | 17.11 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 5.42 | 67.61 | 16.98 |      | 130.0 |         |
|           |                                                       | Z | 5.22 | 67.53 | 17.10 |      | 130.0 |         |
| 10605-AAA | IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle) | X | 5.45 | 67.78 | 17.11 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 5.43 | 67.63 | 16.97 |      | 130.0 |         |
|           |                                                       | Z | 5.27 | 67.74 | 17.21 |      | 130.0 |         |
| 10606-AAA | IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle) | X | 5.21 | 67.14 | 16.64 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                       | Y | 5.20 | 66.99 | 16.50 |      | 130.0 |         |
|           |                                                       | Z | 5.15 | 67.48 | 16.93 |      | 130.0 |         |

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|           |                                                   |   |      |       |       |      |       |         |
|-----------|---------------------------------------------------|---|------|-------|-------|------|-------|---------|
| 10607-AAA | IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle) | X | 4.57 | 66.63 | 16.53 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 4.54 | 66.43 | 16.36 |      | 130.0 |         |
|           |                                                   | Z | 4.43 | 66.89 | 16.66 |      | 130.0 |         |
| 10608-AAA | IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle) | X | 4.72 | 66.99 | 16.68 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 4.69 | 66.78 | 16.51 |      | 130.0 |         |
|           |                                                   | Z | 4.54 | 67.15 | 16.78 |      | 130.0 |         |
| 10609-AAA | IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle) | X | 4.62 | 66.82 | 16.50 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 4.58 | 66.59 | 16.32 |      | 130.0 |         |
|           |                                                   | Z | 4.44 | 66.99 | 16.60 |      | 130.0 |         |
| 10610-AAA | IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle) | X | 4.67 | 67.01 | 16.68 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 4.64 | 66.79 | 16.51 |      | 130.0 |         |
|           |                                                   | Z | 4.49 | 67.19 | 16.79 |      | 130.0 |         |
| 10611-AAA | IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle) | X | 4.58 | 66.79 | 16.52 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 4.55 | 66.56 | 16.33 |      | 130.0 |         |
|           |                                                   | Z | 4.40 | 66.94 | 16.61 |      | 130.0 |         |
| 10612-AAA | IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle) | X | 4.58 | 66.92 | 16.55 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 4.54 | 66.68 | 16.36 |      | 130.0 |         |
|           |                                                   | Z | 4.37 | 67.01 | 16.62 |      | 130.0 |         |
| 10613-AAA | IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle) | X | 4.57 | 66.73 | 16.40 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 4.53 | 66.49 | 16.20 |      | 130.0 |         |
|           |                                                   | Z | 4.37 | 66.81 | 16.45 |      | 130.0 |         |
| 10614-AAA | IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle) | X | 4.55 | 67.04 | 16.71 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 4.51 | 66.82 | 16.52 |      | 130.0 |         |
|           |                                                   | Z | 4.37 | 67.15 | 16.77 |      | 130.0 |         |
| 10615-AAA | IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle) | X | 4.56 | 66.56 | 16.25 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 4.53 | 66.33 | 16.05 |      | 130.0 |         |
|           |                                                   | Z | 4.38 | 66.75 | 16.35 |      | 130.0 |         |
| 10616-AAA | IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle) | X | 5.19 | 66.85 | 16.62 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 5.17 | 66.69 | 16.48 |      | 130.0 |         |
|           |                                                   | Z | 5.04 | 66.86 | 16.74 |      | 130.0 |         |
| 10617-AAA | IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle) | X | 5.24 | 67.01 | 16.67 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 5.22 | 66.83 | 16.53 |      | 130.0 |         |
|           |                                                   | Z | 5.07 | 66.94 | 16.76 |      | 130.0 |         |
| 10618-AAA | IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle) | X | 5.16 | 67.11 | 16.75 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 5.13 | 66.93 | 16.60 |      | 130.0 |         |
|           |                                                   | Z | 4.96 | 67.03 | 16.82 |      | 130.0 |         |
| 10619-AAA | IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle) | X | 5.15 | 66.84 | 16.54 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 5.13 | 66.66 | 16.39 |      | 130.0 |         |
|           |                                                   | Z | 5.04 | 66.96 | 16.73 |      | 130.0 |         |
| 10620-AAA | IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle) | X | 5.23 | 66.84 | 16.58 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 5.20 | 66.67 | 16.44 |      | 130.0 |         |
|           |                                                   | Z | 5.05 | 66.77 | 16.66 |      | 130.0 |         |
| 10621-AAA | IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle) | X | 5.25 | 67.02 | 16.81 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 5.23 | 66.87 | 16.68 |      | 130.0 |         |
|           |                                                   | Z | 5.08 | 66.95 | 16.88 |      | 130.0 |         |
| 10622-AAA | IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle) | X | 5.25 | 67.14 | 16.86 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                   | Y | 5.22 | 66.98 | 16.72 |      | 130.0 |         |
|           |                                                   | Z | 5.07 | 67.05 | 16.93 |      | 130.0 |         |

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|           |                                                     |   |      |       |       |      |       |         |
|-----------|-----------------------------------------------------|---|------|-------|-------|------|-------|---------|
| 10623-AAA | IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)   | X | 5.12 | 66.62 | 16.46 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.09 | 66.44 | 16.31 |      | 130.0 |         |
|           |                                                     | Z | 4.98 | 66.65 | 16.57 |      | 130.0 |         |
| 10624-AAA | IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)   | X | 5.31 | 66.86 | 16.64 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.29 | 66.70 | 16.50 |      | 130.0 |         |
|           |                                                     | Z | 5.15 | 66.84 | 16.74 |      | 130.0 |         |
| 10625-AAA | IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)   | X | 5.46 | 67.18 | 16.86 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.43 | 66.99 | 16.71 |      | 130.0 |         |
|           |                                                     | Z | 5.24 | 67.04 | 16.91 |      | 130.0 |         |
| 10626-AAA | IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)   | X | 5.50 | 66.84 | 16.54 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.49 | 66.69 | 16.41 |      | 130.0 |         |
|           |                                                     | Z | 5.39 | 66.76 | 16.64 |      | 130.0 |         |
| 10627-AAA | IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)   | X | 5.73 | 67.41 | 16.79 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.71 | 67.26 | 16.66 |      | 130.0 |         |
|           |                                                     | Z | 5.61 | 67.41 | 16.94 |      | 130.0 |         |
| 10628-AAA | IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)   | X | 5.50 | 66.82 | 16.42 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.48 | 66.65 | 16.29 |      | 130.0 |         |
|           |                                                     | Z | 5.37 | 66.70 | 16.51 |      | 130.0 |         |
| 10629-AAA | IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)   | X | 5.58 | 66.92 | 16.47 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.56 | 66.77 | 16.34 |      | 130.0 |         |
|           |                                                     | Z | 5.57 | 67.23 | 16.77 |      | 130.0 |         |
| 10630-AAA | IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)   | X | 5.86 | 67.97 | 17.00 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.83 | 67.78 | 16.85 |      | 130.0 |         |
|           |                                                     | Z | 5.63 | 67.59 | 16.96 |      | 130.0 |         |
| 10631-AAA | IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)   | X | 5.85 | 68.09 | 17.26 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.83 | 67.94 | 17.14 |      | 130.0 |         |
|           |                                                     | Z | 5.64 | 67.78 | 17.25 |      | 130.0 |         |
| 10632-AAA | IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)   | X | 5.72 | 67.59 | 17.03 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.71 | 67.46 | 16.92 |      | 130.0 |         |
|           |                                                     | Z | 5.71 | 67.92 | 17.34 |      | 130.0 |         |
| 10633-AAA | IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)   | X | 5.56 | 67.02 | 16.57 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.54 | 66.85 | 16.43 |      | 130.0 |         |
|           |                                                     | Z | 5.38 | 66.77 | 16.59 |      | 130.0 |         |
| 10634-AAA | IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)   | X | 5.57 | 67.13 | 16.68 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.55 | 66.98 | 16.56 |      | 130.0 |         |
|           |                                                     | Z | 5.43 | 67.04 | 16.77 |      | 130.0 |         |
| 10635-AAA | IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)   | X | 5.40 | 66.27 | 15.95 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.38 | 66.10 | 15.80 |      | 130.0 |         |
|           |                                                     | Z | 5.26 | 66.16 | 16.04 |      | 130.0 |         |
| 10636-AAA | IEEE 1602.11ac WiFi (160MHz, MCS0, 90pc duty cycle) | X | 5.92 | 67.15 | 16.59 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 5.91 | 67.02 | 16.48 |      | 130.0 |         |
|           |                                                     | Z | 5.84 | 67.05 | 16.69 |      | 130.0 |         |
| 10637-AAA | IEEE 1602.11ac WiFi (160MHz, MCS1, 90pc duty cycle) | X | 6.05 | 67.48 | 16.74 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 6.03 | 67.33 | 16.62 |      | 130.0 |         |
|           |                                                     | Z | 5.94 | 67.32 | 16.82 |      | 130.0 |         |
| 10638-AAA | IEEE 1602.11ac WiFi (160MHz, MCS2, 90pc duty cycle) | X | 6.07 | 67.51 | 16.73 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                     | Y | 6.05 | 67.36 | 16.61 |      | 130.0 |         |
|           |                                                     | Z | 6.02 | 67.55 | 16.90 |      | 130.0 |         |

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|-----------|--------------------------------------------------------|---|-------|-------|-------|------|-------|---------|
| 10639-AAA | IEEE 1602.11ac WiFi (160MHz, MCS3, 90pc duty cycle)    | X | 6.03  | 67.41 | 16.73 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                        | Y | 6.01  | 67.27 | 16.61 |      | 130.0 |         |
|           |                                                        | Z | 5.92  | 67.26 | 16.80 |      | 130.0 |         |
| 10640-AAA | IEEE 1602.11ac WiFi (160MHz, MCS4, 90pc duty cycle)    | X | 6.01  | 67.35 | 16.64 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                        | Y | 5.99  | 67.19 | 16.50 |      | 130.0 |         |
|           |                                                        | Z | 5.84  | 67.01 | 16.62 |      | 130.0 |         |
| 10641-AAA | IEEE 1602.11ac WiFi (160MHz, MCS5, 90pc duty cycle)    | X | 6.08  | 67.33 | 16.64 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                        | Y | 6.06  | 67.19 | 16.52 |      | 130.0 |         |
|           |                                                        | Z | 5.97  | 67.23 | 16.75 |      | 130.0 |         |
| 10642-AAA | IEEE 1602.11ac WiFi (160MHz, MCS6, 90pc duty cycle)    | X | 6.12  | 67.61 | 16.97 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                        | Y | 6.11  | 67.48 | 16.86 |      | 130.0 |         |
|           |                                                        | Z | 5.98  | 67.36 | 16.99 |      | 130.0 |         |
| 10643-AAA | IEEE 1602.11ac WiFi (160MHz, MCS7, 90pc duty cycle)    | X | 5.96  | 67.26 | 16.67 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                        | Y | 5.94  | 67.11 | 16.55 |      | 130.0 |         |
|           |                                                        | Z | 5.82  | 67.03 | 16.70 |      | 130.0 |         |
| 10644-AAA | IEEE 1602.11ac WiFi (160MHz, MCS8, 90pc duty cycle)    | X | 6.04  | 67.53 | 16.83 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                        | Y | 6.02  | 67.37 | 16.70 |      | 130.0 |         |
|           |                                                        | Z | 5.87  | 67.20 | 16.81 |      | 130.0 |         |
| 10645-AAA | IEEE 1602.11ac WiFi (160MHz, MCS9, 90pc duty cycle)    | X | 6.15  | 67.50 | 16.78 | 0.46 | 130.0 | ± 9.6 % |
|           |                                                        | Y | 6.13  | 67.36 | 16.65 |      | 130.0 |         |
|           |                                                        | Z | 6.00  | 67.29 | 16.82 |      | 130.0 |         |
| 10646-AAC | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)  | X | 11.81 | 95.73 | 30.81 | 9.30 | 60.0  | ± 9.6 % |
|           |                                                        | Y | 9.29  | 91.01 | 29.34 |      | 60.0  |         |
|           |                                                        | Z | 8.85  | 92.75 | 31.14 |      | 60.0  |         |
| 10647-AAB | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7) | X | 10.77 | 94.53 | 30.54 | 9.30 | 60.0  | ± 9.6 % |
|           |                                                        | Y | 8.45  | 89.70 | 29.01 |      | 60.0  |         |
|           |                                                        | Z | 7.92  | 91.02 | 30.68 |      | 60.0  |         |
| 10648-AAA | CDMA2000 (1x Advanced)                                 | X | 1.41  | 74.35 | 15.50 | 0.00 | 150.0 | ± 9.6 % |
|           |                                                        | Y | 0.80  | 67.01 | 12.12 |      | 150.0 |         |
|           |                                                        | Z | 0.57  | 64.32 | 9.21  |      | 150.0 |         |

\* Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.