



No. 23T04Z80937-13



# HAC RF TEST REPORT

No. 23T04Z80937-13

For

**TCL Communication Ltd.**

**GSM/UMTS/LTE/NR Mobile phone**

**Model Name: T702W**

**with**

**Hardware Version: 03**

**Software Version: 5ES6**

**FCC ID: 2ACCJH181**

**HAC-2019 Compliance: PASS**

**Issued Date: 2024-2-7**

**Note:**

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

**Test Laboratory:**

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## **REPORT HISTORY**

| <b>Report Number</b> | <b>Revision</b> | <b>Issue Date</b> | <b>Description</b>              |
|----------------------|-----------------|-------------------|---------------------------------|
| 23T04Z80937-13       | Rev.0           | 2024-2-7          | Initial creation of test report |

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## 1 Test Laboratory

### 1.1 Introduction & Accreditation

**Telecommunication Technology Labs, CAICT** is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

### 1.2 Testing Location

|              |                                                                            |
|--------------|----------------------------------------------------------------------------|
| CompanyName: | CTTL                                                                       |
| Address:     | No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191. |

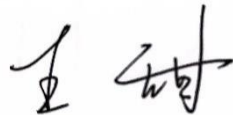
### 1.3 Testing Environment

|                                                                                                |                |
|------------------------------------------------------------------------------------------------|----------------|
| Temperature:                                                                                   | 18°C~25°C,     |
| Relative humidity:                                                                             | 30%~ 70%       |
| Ground system resistance:                                                                      | < 0.5 $\Omega$ |
| Ambient noise is checked and found very low and in compliance with requirement of standards    |                |
| Reflection of surrounding objects is minimized and in compliance with requirement of standards |                |

### 1.4 Project Data

|                     |                  |
|---------------------|------------------|
| Project Leader:     | Qi Dianyuan      |
| Test Engineer:      | Wang Tian        |
| Testing Start Date: | February 1, 2024 |
| Testing End Date:   | February 4, 2024 |

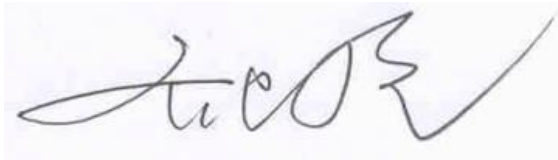
### 1.5 Signature



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Wang Tian

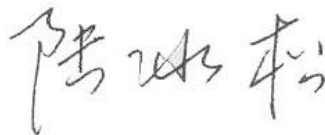
(Prepared this test report)



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Qi Dianyuan

(Reviewed this test report)



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Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

## 2 Client Information

### 2.1 Applicant Information

|                 |                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------|
| Company Name:   | TCL Communication Ltd.                                                                        |
| Address/Post:   | 5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong |
| Contact Person: | Annie Jiang                                                                                   |
| Contact Email:  | nianxiang.jiang@tcl.com                                                                       |
| Telephone:      | +86 755 3661 1621                                                                             |
| Fax             | +86 755 3661 2000-81722                                                                       |

### 2.2 Manufacturer Information

|                 |                                                                                               |
|-----------------|-----------------------------------------------------------------------------------------------|
| Company Name:   | TCL Communication Ltd.                                                                        |
| Address/Post:   | 5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong |
| Contact Person: | Annie Jiang                                                                                   |
| Contact Email:  | nianxiang.jiang@tcl.com                                                                       |
| Telephone:      | +86 755 3661 1621                                                                             |
| Fax             | +86 755 3661 2000-81722                                                                       |

### 3 Equipment Under Test (EUT) and Ancillary Equipment (AE)

#### 3.1 About EUT

|                    |                                                                                                                                                        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description:       | GSM/UMTS/LTE/NR Mobile phone                                                                                                                           |
| Model name:        | T702W                                                                                                                                                  |
| Operating mode(s): | GSM850/900/18001900,<br>WCDMA B1/2/4/5<br>LTE Band 1/2/3/4/5/7/8/12/13/20/25/26/28/38/39/40/41/66/71<br>5G NR N25/41/66/71/77<br>BT, Wi-Fi 2.4G/5G,NFC |

#### 3.2 Internal Identification of EUT used during the test

| EUT ID* | IMEI            | HW Version | SW Version |
|---------|-----------------|------------|------------|
| EUT1    | 016519000205014 | 03         | 5ES6       |

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

#### 3.3 Internal Identification of AE used during the test

| AE ID* | Description | Model    | SN | Manufacturer |
|--------|-------------|----------|----|--------------|
| AE1    | Battery     | TLp049D7 | /  | VEKEN        |
| AE2    | Battery     | TLp049DA | /  | TMB          |

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

### 3.4 Air Interfaces / Bands Indicating Operating Modes

| Air-interface | Band(MHz)                     | Type | C63.19/test ed | Simultaneous Transmissions Not Tested <sup>(1)</sup> | Name of Voice Service |
|---------------|-------------------------------|------|----------------|------------------------------------------------------|-----------------------|
| GSM           | 850                           | VO   | Yes            | BT, WLAN                                             | CMRS Voice            |
|               | 1900                          |      |                |                                                      |                       |
| GPRS/EDGE     | 850                           | DT   | Yes            |                                                      | MEET                  |
|               | 1900                          |      |                |                                                      |                       |
| WCDMA (UMTS)  | 850                           | VO   | Yes            | BT, WLAN                                             | CMRS Voice            |
|               | 1700                          |      |                |                                                      |                       |
|               | 1900                          |      |                |                                                      |                       |
|               | HSPA                          | DT   | Yes            |                                                      | MEET                  |
| LTE TDD       | Band38/41                     | V/D  | Yes            | BT, WLAN                                             | VoLTE, MEET           |
| LTE FDD       | Band2/4/5/7/12/13/25/26/66/71 | V/D  | Yes            | BT, WLAN                                             | VoLTE, MEET           |
| NR            | n25/n41/n66/n71/n77           | DT   | Yes            | BT, WLAN                                             | VoNR, MEET            |
| BT            | 2450                          | DT   | NA             | WWAN                                                 | NA                    |
| WLAN          | 2450                          | V/D  | Yes            | WWAN                                                 | VoWiFi, MEET          |
| WLAN          | 5G                            | V/D  | Yes            | WWAN                                                 | VoWiFi, MEET          |

NA: Not Applicable VO: Voice Only V/D: CMRS and IP Voice Service over Digital Transport

DT: Digital Transport

Note1: According to KDB285076 D01, clause 2 d), for the Interference Level, the single transmission scenario of each frequency band is higher than or equal to the simultaneous transmission scenario, so the frequency band that has evaluated the single will not evaluate the simultaneous.

#### 4 Maximum Output Power

| Bands          | Conducted Power (dBm) |
|----------------|-----------------------|
| GSM 850        | 32.5                  |
| GSM 1900       | 30                    |
| WCDMA 850      | 23.5                  |
| WCDMA 1700     | 24.5                  |
| WCDMA 1900     | 24                    |
| LTE Band2      | 24.5                  |
| LTE Band4      | 24.5                  |
| LTE Band5      | 25                    |
| LTE Band7      | 23.5                  |
| LTE Band12     | 25                    |
| LTE Band13     | 25                    |
| LTE Band25     | 24.5                  |
| LTE Band26     | 25                    |
| LTE Band38     | 24                    |
| LTE Band41 PC2 | 27                    |
| LTE Band41 PC3 | 25                    |
| LTE Band66     | 24.5                  |
| LTE Band71     | 24                    |
| NR n25         | 25                    |
| NR n66         | 25                    |
| NR n71         | 24.5                  |
| NR n41         | 27                    |
| NR n77         | 27                    |
| WLAN 2.4GHz    | 20.5                  |
| WLAN 5GHz      | 18.5                  |

## 5 Reference Documents

### 5.1 Reference Documents for testing

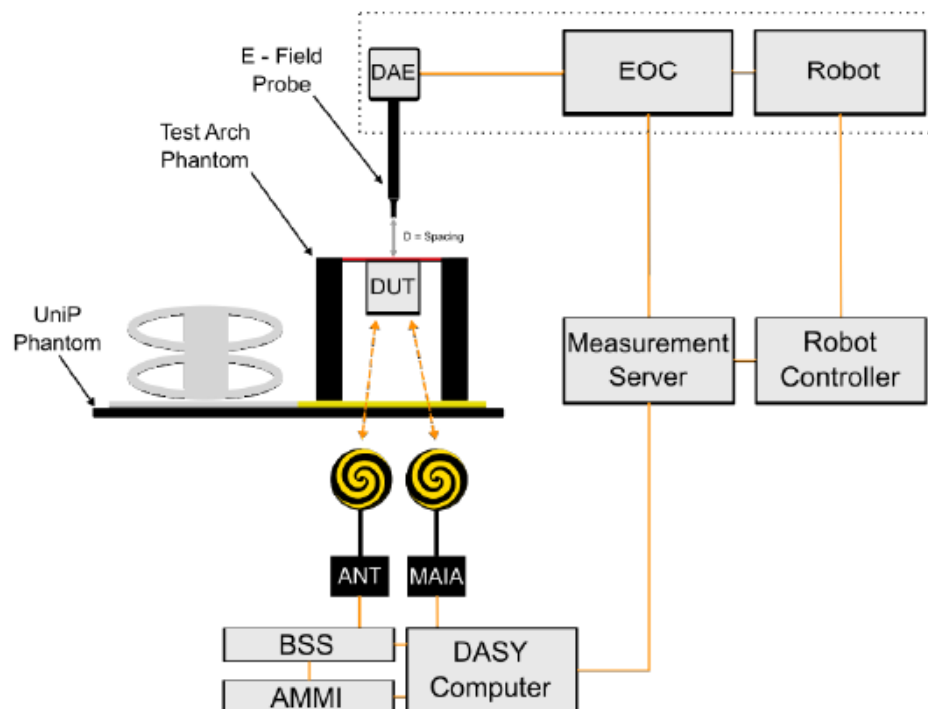
The following document listed in this section is referred for testing.

| Reference                | Title                                                                                                                          | Version      |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------|
| ANSI C63.19-2019         | American National Standard for Methods of Measurement of Compatibility Between Wireless Communication Devices and Hearing Aids | 2019 Edition |
| FCC 47 CFR §20.19        | Hearing Aid Compatible Mobile Headsets                                                                                         | 2024 Edition |
| KDB285076<br>D01 v06r04. | Equipment Authorization Guidance for Hearing Aid Compatibility                                                                 | 2023 Edition |

## 6 Operational Conditions During Test

### 6.1 HAC MEASUREMENT SET-UP

These measurements are performed using the DASY6/8 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Stäubli), robot controller, Intel Core2 computer, near-field probe, probe alignment sensor. The robot is a six-axis industrial robot performing precise movements. 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 consists of the HP Intel Core2 1.86 GHz computer with Windows 10 system and HAC Measurement Software DASY6/8, A/D interface card, monitor, mouse, and keyboard. The Stäubli 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.



**Fig. 1 HAC Test Measurement Set-up**

The DAE4 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.

## 6.2 Probe Specification

### E-Field Probe Description

|               |                                                                                                                              |
|---------------|------------------------------------------------------------------------------------------------------------------------------|
| Construction  | One dipole parallel, two dipoles normal to probe axis<br>Built-in shielding against static charges                           |
| Calibration   | In air from 30 MHz to 6.0 GHz (absolute accuracy $\pm 6.0\%$ , $k=2$ )                                                       |
| Frequency     | 30 MHz to 6 GHz<br>Linearity: $\pm 0.2$ dB (100 MHz to 3 GHz)                                                                |
| Directivity   | $\pm 0.2$ dB in air (rotation around probe axis)<br>$\pm 0.4$ dB in air (rotation normal to probe axis)                      |
| Dynamic Range | 2 V/m to 1000 V/m; Linearity: $\pm 0.2$ dB                                                                                   |
| Dimensions    | Overall length: 337 mm (Tip: 20 mm)<br>Tip diameter: 4 mm (Body: 12 mm)<br>Distance from probe tip to dipole centers: 1.5 mm |
| Application   | General near-field measurements up to 6 GHz<br>Field component measurements<br>Fast automatic scanning in phantoms           |



[EF3DV3]

### 6.3 Test Arch Phantom & Phone Positioner

The TestArch phantom should be positioned horizontally on a stable surface. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. It enables easy and well defined positioning of the phone and validation dipoles as well as simple teaching of the robot (Dimensions: 370 x 370 x 370 mm).

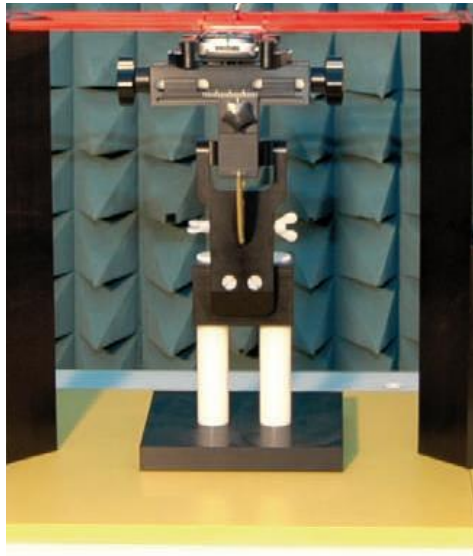


Fig. 2 HAC Phantom & Device Holder

### 6.4 Robotic System Specifications

#### Specifications

**Positioner:** Stäubli Unimation Corp. Robot Model: RX160L

**Repeatability:**  $\pm 0.02$  mm

**No. of Axis:** 6

#### Data Acquisition Electronic (DAE) System

**Cell Controller**

**Processor:** Intel Core2

**Clock Speed:** 1.86GHz

**Operating System:** Windows 10

**Data Converter**

**Features:** Signal Amplifier, multiplexer, A/D converter, and control logic

**Software:** DASY6/8 cD6 HAC

**Connecting Lines:** Optical downlink for data and status info.

Optical uplink for commands and clock

## 7 EUT Arrangement

### 7.1 WD RF Emission Measurements Reference and Plane

Figure 3 illustrates the references and reference plane that shall be used in the WD emissions measurement.

- The measurement area is 50.0 mm by 50.0 mm.
- The measurement area is centered on the audio frequency output transducer of the WD (speaker or T-Coil signal).
- The measurement area is in a reference plane, which is defined as the planar area tangent to the highest point in the area of the phone that normally rests against the user's ear. It is parallel to the centerline of the receiver area of the phone and is defined by the points of the receiver-end of the WD handset, which, in normal handset use, rest against the ear.
- The measurement plane is parallel to, and 15.0 mm in front of, the reference plane.

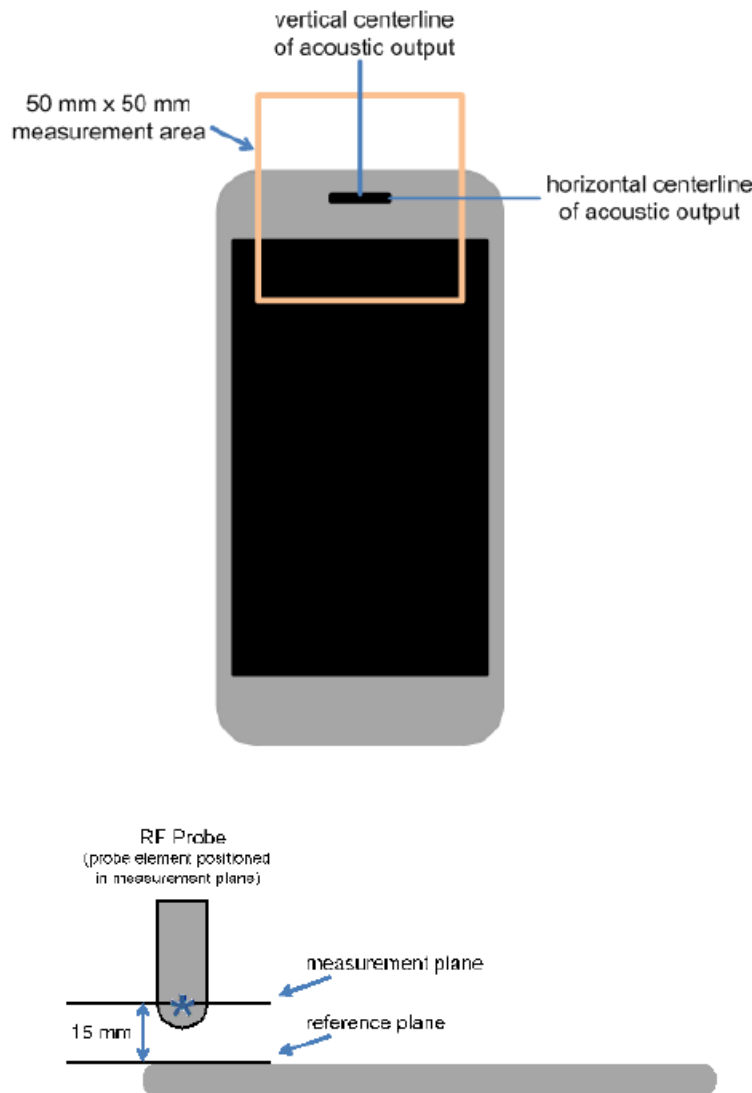


Fig. 3 WD measurement and reference planes for RF emission measurements

## 8 System Validation

### 8.1 Validation Procedure

Place a dipole antenna meeting the requirements given in ANSI C63.19 in the position normally occupied by the WD. The dipole antenna serves as a known source for an electrical output. Position the E-field probes so that:

- The probes and their cables are parallel to the coaxial feed of the dipole antenna
- The probe cables and the coaxial feed of the dipole antenna approach the measurement area from opposite directions
- The center point of the probe element(s) are 15 mm from the closest surface of the dipole elements.

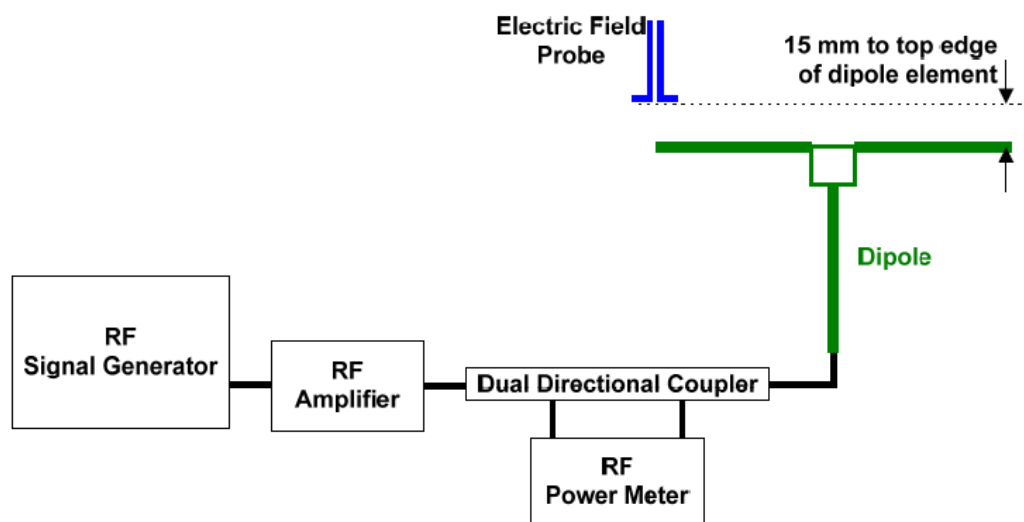


Fig. 4 Dipole Validation Setup

### 8.2 Validation Result

| E-Field Scan |                 |                  |                                  |                                |                            |                        |
|--------------|-----------------|------------------|----------------------------------|--------------------------------|----------------------------|------------------------|
| Mode         | Frequency (MHz) | Input Power (mW) | Measured <sup>1</sup> Value(V/m) | Target <sup>2</sup> Value(V/m) | Deviation <sup>3</sup> (%) | Limit <sup>4</sup> (%) |
| CW           | 835             | 100              | 107.00                           | 113.40                         | -5.64                      | ± 18                   |
| CW           | 1880            | 100              | 90.90                            | 87.20                          | 4.24                       | ± 18                   |
| CW           | 2600            | 100              | 84.00                            | 86.30                          | -2.67                      | ± 18                   |
| CW           | 3500            | 100              | 80.60                            | 84.10                          | -4.16                      | ± 18                   |

Notes:

1. Please refer to the attachment for detailed measurement data and plot.
2. Target value is provided by SPEAG in the calibration certificate of specific dipoles.
3. Deviation (%) = 100 \* (Measured value minus Target value) divided by Target value.
4. ANSI C63.19 requires values within ± 18% are acceptable, of which 12% is deviation and 13% is measurement uncertainty. Values independently validated for the dipole actually used in the measurements should be used, when available.

## 9 Evaluation of MIF

### 9.1 Introduction

The HAC Standard ANSI C63.19-2019 defines the MIF as a scaling factor to evaluate the Radio Frequency Audio Interference Level (RFail). It is applicable to any modulation scheme. The MIF (in dB) is added to the measured averaged E-field (in dBV /m) to obtain the RFail (also in dBV/m) which defines the audible amplitude of the measured RF signal strength. The RFail is then compared to the associated qualification level.

The MIF is defined in section D.7 of the ANSI C63.19-2019 as the interference potential of a signal to its steady state RMS signal level or average power level. This factor is a function only of the audio frequency amplitude modulation characteristics of the signal and is the same for field strength or conducted power measurements. The modulated signal is processed as described below:

- The full signal bandwidth is presented to a wideband square law detector which demodulates the signal.
- The baseband signal (after demodulation) is presented to a spectral weighting filter which is normalized to 1 kHz. The filter frequency response is shown in Section D.4 of the ANSI C63.19-2019 standard.
- The spectral weighted signal is presented to a temporal weighting filter consisting of rapid Root Mean Square (RMS) level detection followed by peak detection with a 550 ms decay time.

- The MIF is calculated as 
$$\frac{10 \cdot \log_{10}(\text{filtered signal})}{1.154 \cdot \text{RMS of demodulated signal}}$$

Measurements of the MIF value are conducted using the MAIA designed by SPEAG. The resulting deviations from the simulated values are within the requirements of the HAC standard.

MAIA is a hardware interface for evaluating the modulation and audio interference characteristics of RF signals in the frequency range 698–6000 MHz. It uses USB-powered active electronics to identify the modulation of the DUT. It can be operated with the over-the-air interface using the built-in ultra-broadband planar log spiral antenna (698–6000 MHz) or in the conducted mode using the coaxial SMA 50W connector (300–6000 MHz).



Fig. 5 MAIA View

## 9.2 DUT MIF results

Based on the KDB285076D01v06r02, the handset can also use the MIF values predetermined by the test equipment manufacturer. MIF values applied in this test report were provided by the HAC equipment provider of SPEAG, and the worst values for all air interface are listed below.

| Typical MIF levels in ANSI C63.19-2019                      |                                |
|-------------------------------------------------------------|--------------------------------|
| Transmission protocol                                       | Modulation interference factor |
| GSM-FDD (TDMA, GMSK)                                        | +3.63 dB                       |
| EDGE-FDD (TDMA, 8PSK, TN 0-1)                               | +1.23dB                        |
| EDGE-FDD (TDMA, 8PSK, TN 0-1-2)                             | -0.52dB                        |
| EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)                           | -1.82dB                        |
| UMTS-FDD(WCDMA, AMR)                                        | -25.43dB                       |
| UMTS-FDD (HSPA+)                                            | -20.39dB                       |
| LTE-FDD (SC-FDMA, 1RB, 20MHz, QPSK)                         | -15.63 dB                      |
| LTE-FDD (SC-FDMA, 1RB, 20MHz, 16QAM)                        | -9.76 dB                       |
| LTE-FDD (SC-FDMA, 1RB, 20MHz, 64QAM)                        | -9.93 dB                       |
| LTE-TDD (SC-FDMA, 1RB, 20MHz, QPSK)                         | -1.62 dB                       |
| LTE-TDD (SC-FDMA, 1RB, 20MHz, 16QAM)                        | -1.44 dB                       |
| LTE-TDD (SC-FDMA, 1RB, 20MHz, 64QAM)                        | -1.54 dB                       |
| LTE-TDD(SC-FDMA,1RB,20MHz,QPSK,UL<br>Subframe=2,3,4,7,8,9)  | -3.41 dB                       |
| LTE-TDD(SC-FDMA,1RB,20MHz,16QAM,UL<br>Subframe=2,3,4,7,8,9) | -3.17 dB                       |
| LTE-TDD(SC-FDMA,1RB,20MHz,64QAM,UL<br>Subframe=2,3,4,7,8,9) | -3.31 dB                       |

|                                                   |           |
|---------------------------------------------------|-----------|
| IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)          | -5.90 dB  |
| IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)          | -5.17 dB  |
| IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)        | -3.37 dB  |
| IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)         | -2.02 dB  |
| IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)     | -0.36dB   |
| IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)      | -15.80 dB |
| IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)          | -5.82 dB  |
| IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle) | -12.23dB  |
| 5G NR (DFT-s-OFDM, 1RB, 100 MHz, QPSK, 30 kHz)    | -1.64dB   |
| 5G NR (CP-OFDM, 1RB, 20 MHz, QPSK, 15 kHz)        | -1.65dB   |
| 5G NR (DFT-s-OFDM, 1RB, 20 MHz, QPSK, 15 kHz)     | -15.06dB  |
| 5G NR (CP-OFDM, 1RB, 5 MHz, QPSK, 15 kHz)         | -12.18dB  |
| 5G NR (CP-OFDM, 1RB, 10 MHz, QPSK, 15 kHz)        | -12.26dB  |
| 5G NR (CP-OFDM, 1RB, 15 MHz, QPSK, 15 kHz)        | -12.08dB  |
| 5G NR (CP-OFDM, 1RB, 20 MHz, QPSK, 15 kHz)        | -12.20dB  |
| 5G NR (CP-OFDM, 1RB, 5 MHz, QPSK, 30 kHz)         | -14.39dB  |
| 5G NR (CP-OFDM, 1RB, 10 MHz, QPSK, 30 kHz)        | -14.47dB  |
| 5G NR (CP-OFDM, 1RB, 15 MHz, QPSK, 30 kHz)        | -14.33dB  |
| 5G NR (CP-OFDM, 1RB, 20 MHz, QPSK, 30 kHz)        | -14.46dB  |
| 5G NR (CP-OFDM, 1RB, 25 MHz, QPSK, 30 kHz)        | -14.35dB  |
| 5G NR (CP-OFDM, 1RB, 30 MHz, QPSK, 30 kHz)        | -14.32dB  |
| 5G NR (CP-OFDM, 1RB, 40 MHz, QPSK, 30 kHz)        | -14.32dB  |
| 5G NR (CP-OFDM, 1RB, 50 MHz, QPSK, 30 kHz)        | -14.55dB  |
| 5G NR (CP-OFDM, 1RB, 60 MHz, QPSK, 30 kHz)        | -14.45dB  |
| 5G NR (CP-OFDM, 1RB, 80 MHz, QPSK, 30 kHz)        | -14.47dB  |
| 5G NR (CP-OFDM, 1RB, 90 MHz, QPSK, 30 kHz)        | -14.43dB  |
| 5G NR (CP-OFDM, 1RB, 100 MHz, QPSK, 30 kHz)       | -14.38dB  |
| 5G NR (DFT-s-OFDM, 1RB, 5 MHz, QPSK, 15 kHz)      | -15.06dB  |
| 5G NR (DFT-s-OFDM, 1RB, 10 MHz, QPSK, 15 kHz)     | -15.06dB  |
| 5G NR (DFT-s-OFDM, 1RB, 15 MHz, QPSK, 15 kHz)     | -15.06dB  |
| 5G NR (DFT-s-OFDM, 1RB, 20 MHz, QPSK, 15 kHz)     | -15.06dB  |

## 10 Evaluation of RF Audio Interference Power Level

According to ANSIC 63.19-2019, the WD's conducted power must be at or below either the stated  $RF_{AIPL}$  (Table 13-1) or the stated peak power level (Table 13-2), or the average near-field emissions over the measurement area must be at or below the stated  $RF_{AIL}$  (Table 13-3), or the stated peak field strength (Table 13-4). The WD may demonstrate compliance by meeting any of these four requirements, but it must do so in each of its operating bands at its established worst-case normal speech-mode operating condition. This chapter will evaluate the RF audio interference power level of WD.

| Bands                 | Average Power <sub>max</sub> (dBm) | MIF <sub>worst</sub> (dB) | Power + MIF | C63.19 Lowest $RF_{AIPL}$ (dBm) | Compliance   |
|-----------------------|------------------------------------|---------------------------|-------------|---------------------------------|--------------|
| <b>GSM 850</b>        | 32.5                               | 3.63                      | 36.13       | 29                              | To be tested |
| <b>GSM 1900</b>       | 30                                 | 3.63                      | 33.63       | 26                              | To be tested |
| <b>WCDMA 850</b>      | 23.5                               | -20.39                    | 3.11        | 29                              | PASS         |
| <b>WCDMA 1700</b>     | 24.5                               | -20.39                    | 4.11        | 26                              | PASS         |
| <b>WCDMA 1900</b>     | 24                                 | -20.39                    | 3.61        | 26                              | PASS         |
| <b>LTE Band2</b>      | 24.5                               | -9.76                     | 14.74       | 26                              | PASS         |
| <b>LTE Band4</b>      | 24.5                               | -9.76                     | 14.74       | 26                              | PASS         |
| <b>LTE Band5</b>      | 25                                 | -9.76                     | 15.24       | 29                              | PASS         |
| <b>LTE Band7</b>      | 23.5                               | -9.76                     | 13.74       | 25                              | PASS         |
| <b>LTE Band12</b>     | 25                                 | -9.76                     | 15.24       | 29                              | PASS         |
| <b>LTE Band13</b>     | 25                                 | -9.76                     | 15.24       | 29                              | PASS         |
| <b>LTE Band25</b>     | 24.5                               | -9.76                     | 14.74       | 26                              | PASS         |
| <b>LTE Band26</b>     | 25                                 | -9.76                     | 15.24       | 29                              | PASS         |
| <b>LTE Band38</b>     | 24                                 | -1.62                     | 22.38       | 25                              | PASS         |
| <b>LTE Band41 PC2</b> | 27                                 | -1.62                     | 25.38       | 25                              | To be tested |
| <b>LTE Band41 PC3</b> | 25                                 | -1.62                     | 23.38       | 25                              | PASS         |
| <b>LTE Band66</b>     | 24.5                               | -9.76                     | 14.74       | 26                              | PASS         |
| <b>LTE Band71</b>     | 24                                 | -9.76                     | 14.24       | 29                              | PASS         |
| <b>NR n25</b>         | 25                                 | -1.64                     | 23.36       | 26                              | PASS         |
| <b>NR n66</b>         | 25                                 | -1.64                     | 23.36       | 26                              | PASS         |
| <b>NR n71</b>         | 24.5                               | -1.64                     | 22.86       | 29                              | PASS         |
| <b>NR n41</b>         | 27                                 | -1.64                     | 25.36       | 25                              | To be tested |
| <b>NR n77</b>         | 27                                 | -1.64                     | 25.36       | 25                              | To be tested |
| <b>WLAN 2.4GHz</b>    | 20.5                               | -0.36                     | 20.14       | 25                              | PASS         |
| <b>WLAN 5GHz</b>      | 18.5                               | -5.82                     | 12.68       | 25                              | PASS         |

According to the above table, the  $RF_{AIPL}$  for WCDMA, LTE FDD, WIFI and NR FDD are less than the stated  $RF_{AIPL}$  (Table 13.1). Near field emission testing is required for the GSM, LTE TDD, NR

TDD bands.

## 11 Near-field Emission Test Procedures

**The evaluation was performed with the following procedure:**

- 1) Confirm proper operation of the field probe, probe measurement system and other instrumentation and the positioning system.
- 2) Position the WD in its intended test position. The gauge block can simplify this positioning.
- 3) Set the WD to transmit a fixed and repeatable combination of signal power and modulation characteristic that is representative of the worst case (highest interference potential) encountered in normal use. Transiently occurring start-up, changeover, or termination conditions, or other operations likely to occur less than 1% of the time during normal operation, may be excluded from consideration.
- 4) The measurement area shall be centered on the acoustic output or the T-Coil mode measurement reference point, as appropriate. Locate the field probe at the initial test position in the 50 mm by 50 mm measurement area, which is contained in the measurement plane. If the field alignment method is used, align the probe for maximum field reception
- 5) Record the reading at the output of the measurement system.
- 6) Scan the entire 50 mm by 50 mm measurement area in equally spaced step sizes and record the reading at each measurement point.
- 7) Calculate the average of the measurements taken in Step 6)
- 8) The RF audio interference level in dB(V/m) is obtained by adding the Modulation Interference Factor (in decibels) to the average steady state rms field strength reading over the measurement area, in dB(V/m)
- 9) Compare this RF audio interference level to the limits in ANSI C63.19-2019 clause 4.7 and record the result.

## 12 Near-field Emission Test Results

| Bands      | Frequency<br>(MHz) | Channel | RFail<br>(dBV/m) | Compliance        |
|------------|--------------------|---------|------------------|-------------------|
| GSM 850    | 848.8              | 251     | 37.44            | PASS              |
|            | 836.6              | 190     | 38.19            | PASS              |
|            | 824.2              | 128     | 38.39            | PASS(see Fig B.1) |
| GSM 1900   | 1909.8             | 810     | 24.89            | PASS              |
|            | 1880               | 661     | 25.4             | PASS              |
|            | 1850.2             | 512     | 25.86            | PASS(see Fig B.2) |
| LTE Band41 | 2680               | 41490   | 28.45            | PASS              |
|            | 2636.5             | 41055   | 28.81            | PASS              |
|            | 2593               | 40620   | 30.77            | PASS(see Fig B.3) |
|            | 2549.5             | 40185   | 29.57            | PASS              |
|            | 2506               | 39750   | 30.39            | PASS              |
| NR n41     | 2506.02            | 501204  | 31.63            | PASS              |
|            | 2592.99            | 518598  | 31.67            | PASS(see Fig B.4) |
|            | 2679.99            | 535998  | 30.69            | PASS              |
| NR n77     | 3350.01            | 623334  | 29.9             | PASS              |
|            | 3750               | 650000  | 33.79            | PASS(see Fig B.5) |
|            | 4149.99            | 676666  | 31.23            | PASS              |

## 13 ANSIC 63.19-2019 Limits

### 13-1 Wireless device RF audio interference power level

| Frequency range<br>(MHz) | RF <sub>AIPL</sub><br>(dBm) |
|--------------------------|-----------------------------|
| <960                     | 29                          |
| 960–2000                 | 26                          |
| >2000                    | 25                          |

### 13-2 Wireless device RF peak power level

| Frequency range<br>(MHz) | RF <sub>Peak Power</sub><br>(dBm) |
|--------------------------|-----------------------------------|
| <960                     | 35                                |
| 960–2000                 | 32                                |
| >2000                    | 31                                |

### 13-3 Wireless device RF audio interference level

| Frequency range<br>(MHz) | RF <sub>AIL</sub><br>[dB(V/m)] |
|--------------------------|--------------------------------|
| <960                     | 39                             |
| 960–2000                 | 36                             |
| >2000                    | 35                             |

### 13-4 Wireless device RF peak near-field level

| Frequency range<br>(MHz) | RF <sub>Peak</sub><br>[dB(V/m)] |
|--------------------------|---------------------------------|
| <960                     | 45                              |
| 960–2000                 | 42                              |
| >2000                    | 41                              |

## 14 Measurement Uncertainty

| Error Description                         | Uncert.<br>value | Prob.<br>Dist. | Div. | (c)<br>Eav | Std. Unc.<br>E |
|-------------------------------------------|------------------|----------------|------|------------|----------------|
| <b>Measurement System</b>                 |                  |                |      |            |                |
| Probe Calibration                         | ±5.1 %           | N              | 1    | 1          | ±5.1 %         |
| Axial Isotropy                            | ±4.7 %           | R              | √3   | 1          | ±2.7 %         |
| Sensor Displacement                       | ±7.2 %           | R              | √3   | 0.5        | ±2.1 %         |
| Boundary Effects                          | ±2.4 %           | R              | √3   | 1          | ±1.4 %         |
| Phantom Boundary Effect                   | ±7.2 %           | R              | √3   | 1          | ±4.2 %         |
| Probe Linearity                           | ±4.7 %           | R              | √3   | 1          | ±2.7 %         |
| Scaling to Peak Power with MIF            | ±10.0 %          | R              | √3   | 1          | ±5.8 %         |
| System Detection Limit                    | ±1.0 %           | R              | √3   | 1          | ±0.6 %         |
| Readout Electronics                       | ±0.3 %           | N              | 1    | 1          | ±0.3 %         |
| Response Time                             | ±0.8 %           | R              | √3   | 0          | ±0 %           |
| Integration Time                          | ±2.6 %           | R              | √3   | 0          | ±0 %           |
| RF Ambient Conditions                     | ±3.0 %           | R              | √3   | 1          | ±1.7 %         |
| RF Reflections                            | ±12.0 %          | R              | √3   | 1          | ±6.9 %         |
| Probe Positioner                          | ±1.2 %           | R              | √3   | 1          | ±0.7 %         |
| Probe Positioning                         | ±3.0 %           | R              | √3   | 1          | ±1.7 %         |
| Extrapolation and Interpolation           | ±1.0 %           | R              | √3   | 1          | ±0.6 %         |
| <b>Test Sample Related</b>                |                  |                |      |            |                |
| Device Positioning Vertical               | ±4.7 %           | R              | √3   | 1          | ±2.7 %         |
| Device Positioning Lateral                | ±1.0 %           | R              | √3   | 1          | ±0.6 %         |
| Device Holder and Phantom                 | ±2.4 %           | R              | √3   | 1          | ±1.4 %         |
| Power Drift                               | ±5.0 %           | R              | √3   | 1          | ±2.9 %         |
| <b>Phantom and Setup Related</b>          |                  |                |      |            |                |
| Phantom Thickness                         | ±2.4 %           | R              | √3   | 1          | ±1.4 %         |
| Combined Std. Uncertainty                 |                  |                |      |            | ±13.2 %        |
| <b>Expanded Std. Uncertainty on Power</b> |                  |                |      |            | ±26.4 %        |
| <b>Expanded Std. Uncertainty on Field</b> |                  |                |      |            | ±13.2 %        |

## 15 Main Test Instruments

Table 1: List of Main Instruments

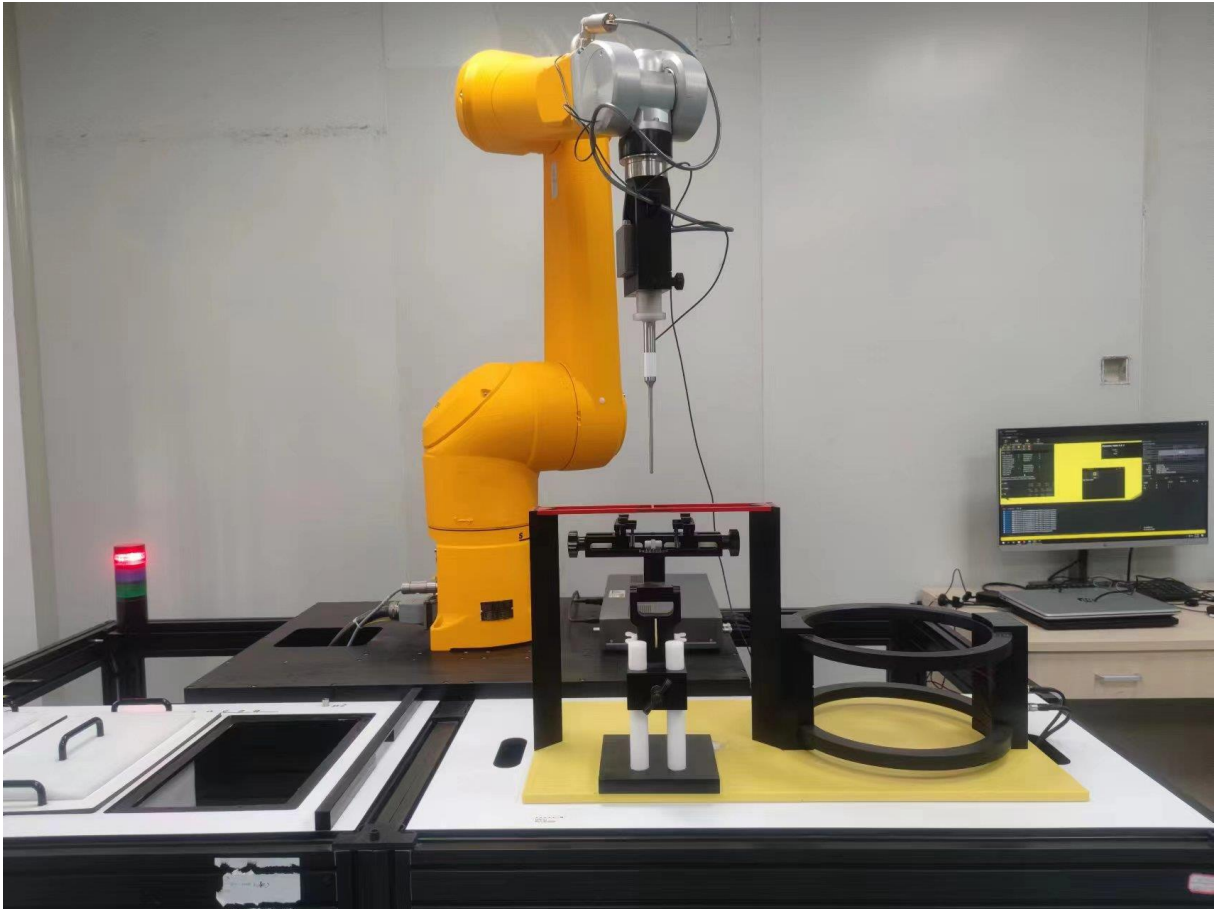
| No. | Name             | Type          | Serial Number | Calibration Date         | Valid Period |
|-----|------------------|---------------|---------------|--------------------------|--------------|
| 01  | Signal Generator | E4483C        | MY49070393    | May 15, 2023             | One Year     |
| 02  | Power meter      | NRP2          | 106276        | May 15, 2023             | One year     |
| 03  | Power sensor     | NRP6A         | 101369        |                          |              |
| 04  | Amplifier        | 60S1G4        | 0331848       | No Calibration Requested |              |
| 05  | E-Field Probe    | EF3DV3        | 4060          | May 24, 2023             | One year     |
| 06  | DAE              | SPEAG DAE4    | 1524          | October 20, 2023         | One year     |
| 07  | HAC Dipole       | CD835V3       | 1023          | August 15, 2023          | One year     |
| 08  | HAC Dipole       | CD1880V3      | 1018          | August 15, 2023          | One year     |
| 09  | HAC Dipole       | CD2600V3      | 1017          | August 15, 2023          | One year     |
| 10  | HAC Dipole       | CD3500V3      | 1008          | August 16, 2023          | One year     |
| 11  | BTS              | CMW500        | 166370        | July 4, 2023             | One year     |
| 12  | AIA              | SE UMS 170 CB | 1029          | No Calibration Requested |              |

## 16 Conclusion

The HAC measurement indicates that the EUT complies with the HAC limits of the ANSIC63.19-2019. It is comprehensively determined as **PASS**

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

## ANNEX A TEST LAYOUT



Picture A1:HAC RF System Layout

## ANNEX B TEST PLOTS

### Hardware Setup

| Probe Name      | Probe Calibration Date | DAE Name    | DAE Calibration Date |
|-----------------|------------------------|-------------|----------------------|
| EF3DV3 - SN4060 | May 24, 2023           | DAE4 Sn1524 | October 20, 2023     |

### Communication Systems

| Band Name | Communication Systems Name | Channel | Frequency [MHz] |
|-----------|----------------------------|---------|-----------------|
| GSM 850   | GSM-FDD (TDMA, GMSK)       | 128     | 824.2           |

### Grid Settings

| Extent X [mm] | Extent Y [mm] | Step X [mm] | Step Y [mm] | Distance [mm] |
|---------------|---------------|-------------|-------------|---------------|
| 50.0          | 50.0          | 10.0        | 10.0        | 15.0          |

### Results

| E <sub>max</sub> [dB(V/m)] | E <sub>avg50x50 max</sub> [dB(V/m)] | MIF [dB] | R <sub>Fail</sub> [dB(V/m)] |
|----------------------------|-------------------------------------|----------|-----------------------------|
| 39.58                      | 34.76                               | 3.63     | 38.39                       |

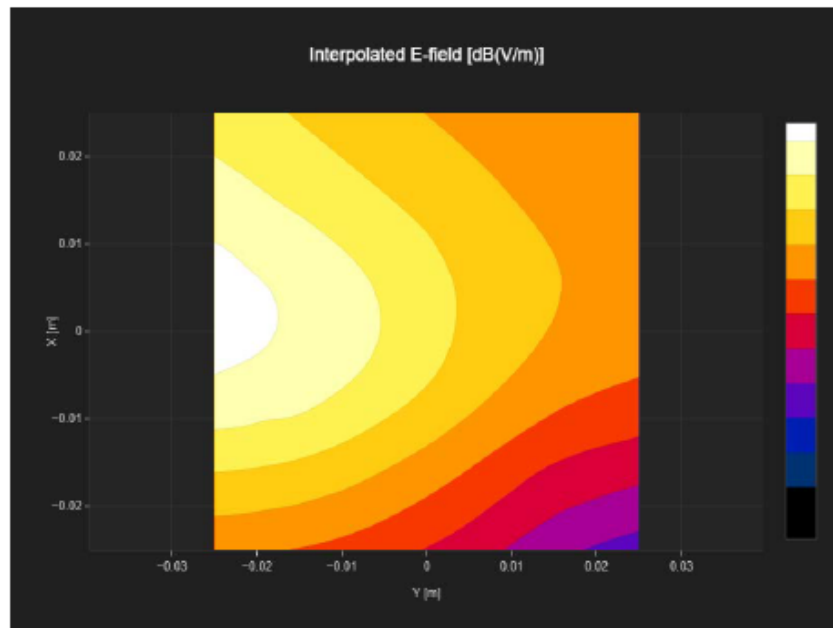


Fig B.1 GSM 850

## Hardware Setup

| Probe Name      | Probe Calibration Date | DAE Name    | DAE Calibration Date |
|-----------------|------------------------|-------------|----------------------|
| EF3DV3 - SN4080 | May 24, 2023           | DAE4 Sn1524 | October 20, 2023     |

## Communication Systems

| Band Name | Communication Systems Name | Channel | Frequency [MHz] |
|-----------|----------------------------|---------|-----------------|
| PCS 1900  | GSM-FDD (TDMA, GMSK)       | 512     | 1850.2          |

## Grid Settings

| Extent X [mm] | Extent Y [mm] | Step X [mm] | Step Y [mm] | Distance [mm] |
|---------------|---------------|-------------|-------------|---------------|
| 50.0          | 50.0          | 10.0        | 10.0        | 15.0          |

## Results

| E <sub>max</sub> [dB(V/m)] | E <sub>avg50x50 max</sub> [dB(V/m)] | MIF [dB] | RFail [dB(V/m)] |
|----------------------------|-------------------------------------|----------|-----------------|
| 29.31                      | 22.23                               | 3.63     | 25.86           |

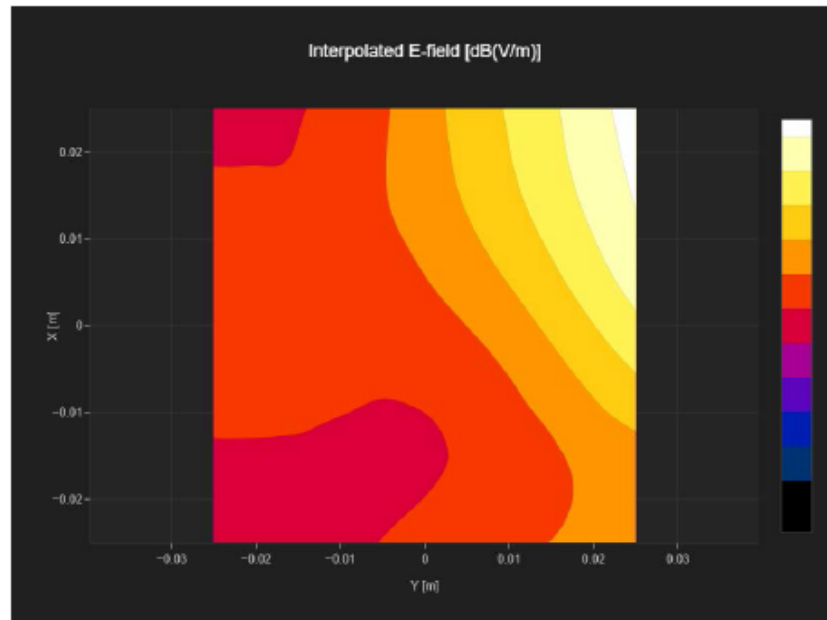


Fig B.2 GSM 1900

## Hardware Setup

| Probe Name      | Probe Calibration Date | DAE Name    | DAE Calibration Date |
|-----------------|------------------------|-------------|----------------------|
| EF3DV3 - SN4060 | May 24, 2023           | DAE4 Sn1524 | October 20, 2023     |

## Communication Systems

| Band Name           | Communication Systems Name                             | Channel | Frequency [MHz] |
|---------------------|--------------------------------------------------------|---------|-----------------|
| Band 41, E-UTRA/TDD | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7) | 40620   | 2593.0          |

## Grid Settings

| Extent X [mm] | Extent Y [mm] | Step X [mm] | Step Y [mm] | Distance [mm] |
|---------------|---------------|-------------|-------------|---------------|
| 50.0          | 50.0          | 10.0        | 10.0        | 15.0          |

## Results

| E <sub>max</sub> [dB(V/m)] | E <sub>avg50x50 max</sub> [dB(V/m)] | MIF [dB] | RFail [dB(V/m)] |
|----------------------------|-------------------------------------|----------|-----------------|
| 31.12                      | 29.27                               | -1.62    | 30.77           |

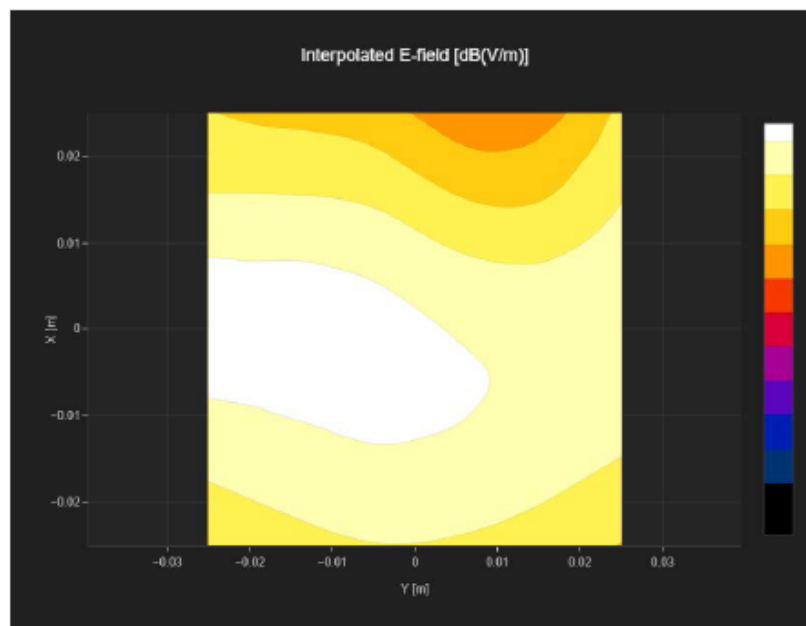


Fig B.3 LTE Band41

## Hardware Setup

| Probe Name      | Probe Calibration Date | DAE Name    | DAE Calibration Date |
|-----------------|------------------------|-------------|----------------------|
| EF3DV3 - SN4060 | May 24, 2023           | DAE4 Sn1524 | October 20, 2023     |

## Communication Systems

| Band Name | Communication Systems Name                      | Channel | Frequency [MHz] |
|-----------|-------------------------------------------------|---------|-----------------|
| Band n41  | 5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz) | 501204  | 2508.02         |

## Grid Settings

| Extent X [mm] | Extent Y [mm] | Step X [mm] | Step Y [mm] | Distance [mm] |
|---------------|---------------|-------------|-------------|---------------|
| 50.0          | 50.0          | 10.0        | 10.0        | 15.0          |

## Results

| E <sub>max</sub> [dB(V/m)] | E <sub>avg50x50 max</sub> [dB(V/m)] | MIF [dB] | RFail [dB(V/m)] |
|----------------------------|-------------------------------------|----------|-----------------|
| 36.27                      | 33.31                               | -1.64    | 31.67           |

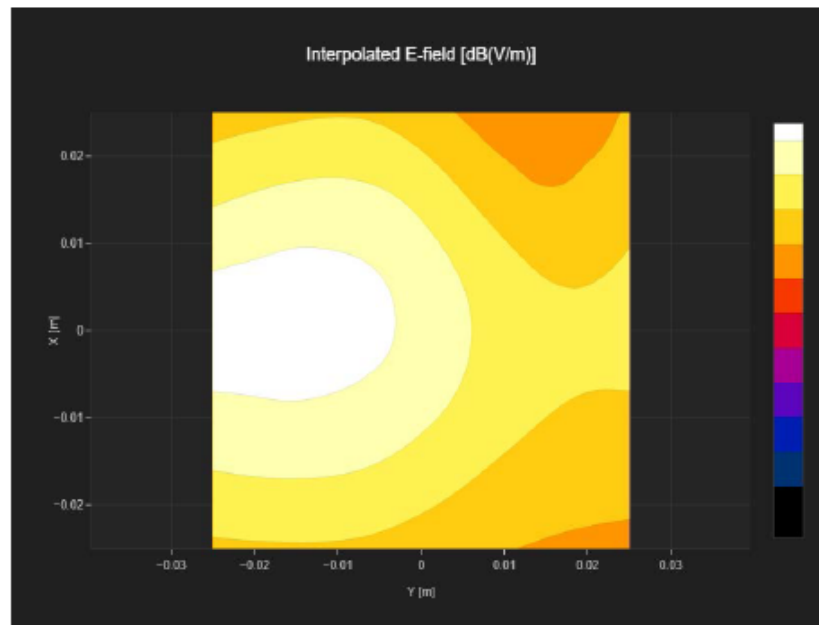


Fig B.4 NR n41

## Hardware Setup

| Probe Name      | Probe Calibration Date | DAE Name    | DAE Calibration Date |
|-----------------|------------------------|-------------|----------------------|
| EF3DV3 - SN4060 | May 24, 2023           | DAE4 Sn1524 | October 20, 2023     |

## Communication Systems

| Band Name | Communication Systems Name                      | Channel | Frequency [MHz] |
|-----------|-------------------------------------------------|---------|-----------------|
| Band n77  | 5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz) | 650000  | 3750.0          |

## Grid Settings

| Extent X [mm] | Extent Y [mm] | Step X [mm] | Step Y [mm] | Distance [mm] |
|---------------|---------------|-------------|-------------|---------------|
| 50.0          | 50.0          | 10.0        | 10.0        | 15.0          |

## Results

| E <sub>max</sub> [dB(V/m)] | E <sub>avg50x50 max</sub> [dB(V/m)] | MIF [dB] | RFail [dB(V/m)] |
|----------------------------|-------------------------------------|----------|-----------------|
| 38.02                      | 35.43                               | -1.64    | 33.79           |

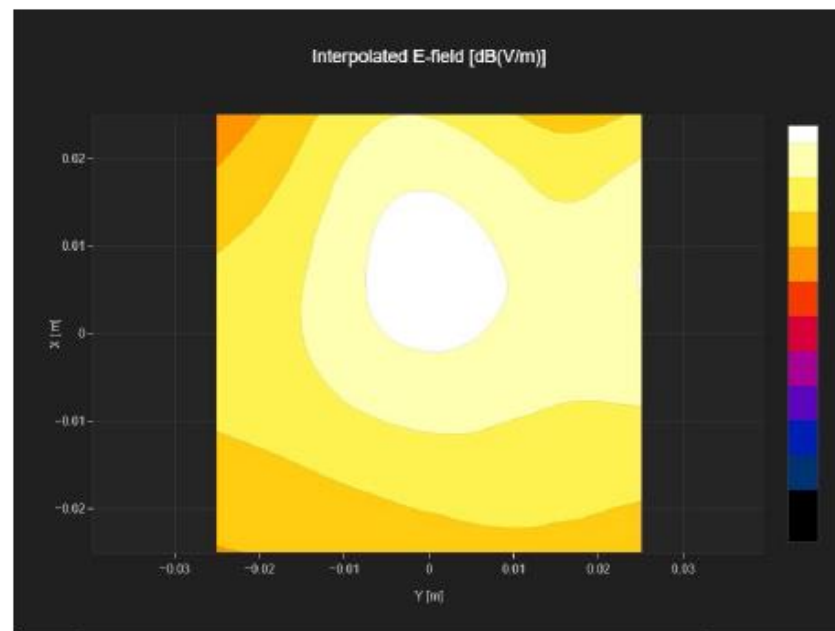


Fig B.5 NR n77

## ANNEX C SYSTEM VALIDATION RESULT

### E SCAN of Dipole 835 MHz

#### Hardware Setup

| Probe Name      | Probe Calibration Date | DAE Name    | DAE Calibration Date |
|-----------------|------------------------|-------------|----------------------|
| EF3DV3 - SN4060 | May 24, 2023           | DAE4 Sn1524 | October 20, 2023     |

#### Communication Systems

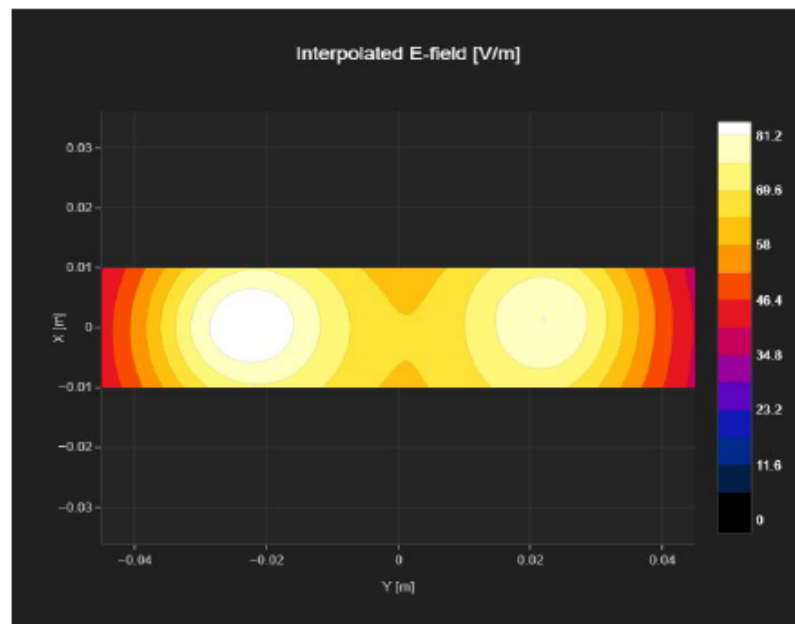
| Band Name | Communication Systems Name | Channel | Frequency [MHz] |
|-----------|----------------------------|---------|-----------------|
| CD835     | CW                         | 50      | 835.0           |

#### Grid Settings

| Extent X [mm] | Extent Y [mm] | Step X [mm] | Step Y [mm] | Distance [mm] |
|---------------|---------------|-------------|-------------|---------------|
| 20.0          | 180.0         | 5.0         | 5.0         | 15.0          |

#### Results

| Dipole Type | Dipole Serial Number | E <sub>max</sub> [V/m] | Drift [dB] |
|-------------|----------------------|------------------------|------------|
| CD835       | XXXX                 | 107                    | 0.05       |



## E SCAN of Dipole 1880 MHz

### Hardware Setup

| Probe Name      | Probe Calibration Date | DAE Name    | DAE Calibration Date |
|-----------------|------------------------|-------------|----------------------|
| EF3DV3 - SN4080 | May 24, 2023           | DAE4 Sn1524 | October 20, 2023     |

### Communication Systems

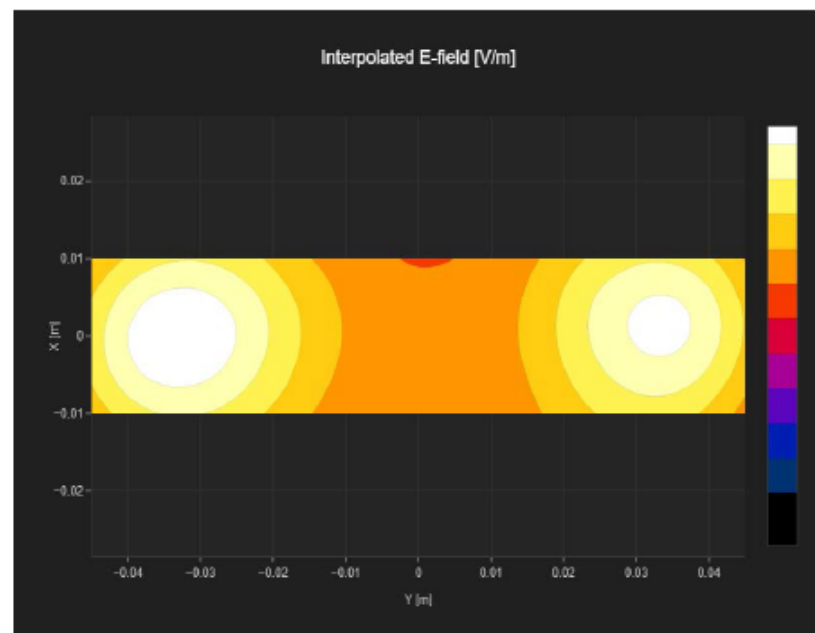
| Band Name | Communication Systems Name | Channel | Frequency [MHz] |
|-----------|----------------------------|---------|-----------------|
| CD1880    | CW                         | 0       | 1730.0          |

### Grid Settings

| Extent X [mm] | Extent Y [mm] | Step X [mm] | Step Y [mm] | Distance [mm] |
|---------------|---------------|-------------|-------------|---------------|
| 20.0          | 90.0          | 5.0         | 5.0         | 15.0          |

### Results

| Dipole Type | Dipole Serial Number | E <sub>max</sub> [V/m] | Drift [dB] |
|-------------|----------------------|------------------------|------------|
| CD1880      | XXXX                 | 90.9                   | -0.0       |



## E SCAN of Dipole 2600 MHz

### Hardware Setup

| Probe Name      | Probe Calibration Date | DAE Name    | DAE Calibration Date |
|-----------------|------------------------|-------------|----------------------|
| EF3DV3 - SN4080 | May 24, 2023           | DAE4 Sn1524 | October 20, 2023     |

### Communication Systems

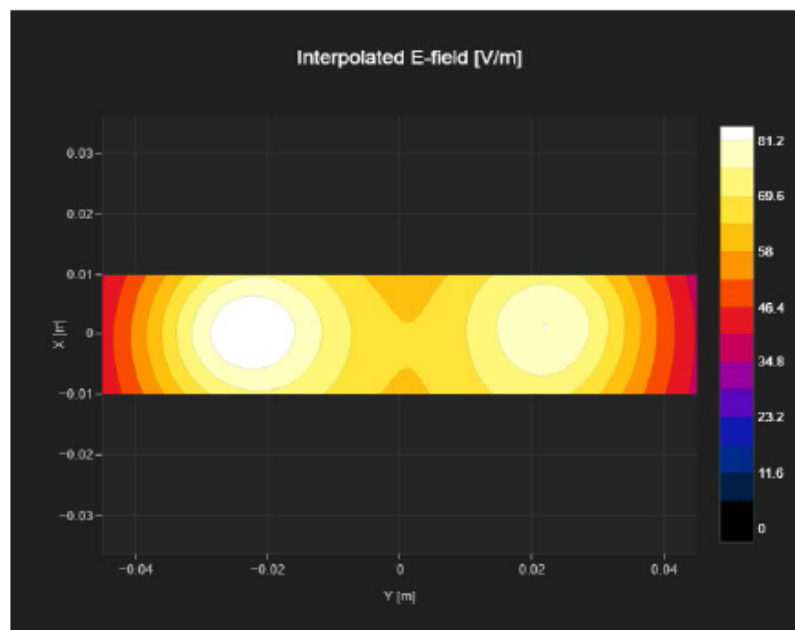
| Band Name | Communication Systems Name | Channel | Frequency [MHz] |
|-----------|----------------------------|---------|-----------------|
| CD2600V3  | CW                         | 50      | 2600.0          |

### Grid Settings

| Extent X [mm] | Extent Y [mm] | Step X [mm] | Step Y [mm] | Distance [mm] |
|---------------|---------------|-------------|-------------|---------------|
| 20.0          | 80.0          | 5.0         | 5.0         | 15.0          |

### Results

| Dipole Type | Dipole Serial Number | E <sub>max</sub> [V/m] | Drift [dB] |
|-------------|----------------------|------------------------|------------|
| CD2600      | XXXX                 | 84.0                   | -0.01      |



## E SCAN of Dipole 3500 MHz

### Hardware Setup

| Probe Name      | Probe Calibration Date | DAE Name    | DAE Calibration Date |
|-----------------|------------------------|-------------|----------------------|
| EF3DV3 - SN4080 | May 24, 2023           | DAE4 Sn1524 | October 20, 2023     |

### Communication Systems

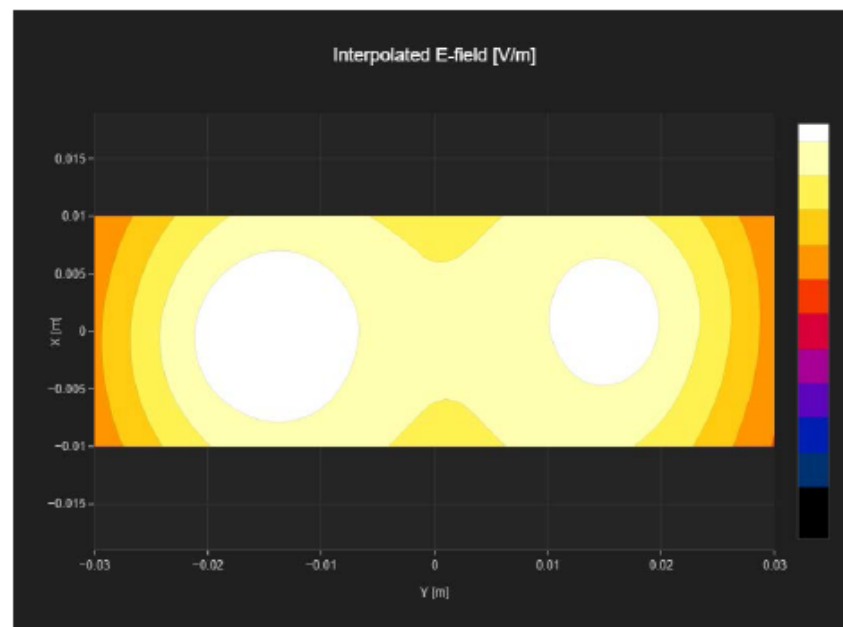
| Band Name | Communication Systems Name | Channel | Frequency [MHz] |
|-----------|----------------------------|---------|-----------------|
| CD3500V3  | CW                         | 50      | 3500.0          |

### Grid Settings

| Extent X [mm] | Extent Y [mm] | Step X [mm] | Step Y [mm] | Distance [mm] |
|---------------|---------------|-------------|-------------|---------------|
| 20.0          | 80.0          | 5.0         | 5.0         | 15.0          |

### Results

| Dipole Type | Dipole Serial Number | E <sub>max</sub> [V/m] | Drift [dB] |
|-------------|----------------------|------------------------|------------|
| CD3500      | XXXX                 | 80.6                   | -0.07      |



# ANNEX D PROBE CALIBRATION CERTIFICATE

**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

**CTTL**  
Beijing

Certificate No.

**EF-4060\_May23**

## CALIBRATION CERTIFICATE

Object

**EF3DV3 - SN:4060**

Calibration procedure(s)

**QA CAL-02.v9, QA CAL-25.v8**  
Calibration procedure for E-field probes optimized for close near field  
evaluations in air

Calibration date

**May 24, 2023**

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  $(22 \pm 3)^\circ\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards          | ID               | Cal Date (Certificate No.)      | Scheduled Calibration |
|----------------------------|------------------|---------------------------------|-----------------------|
| Power meter NRP2           | SN: 104778       | 30-Mar-23 (No. 217-03804/03805) | Mar-24                |
| Power sensor NRP-Z91       | SN: 103244       | 30-Mar-23 (No. 217-03804)       | Mar-24                |
| Power sensor NRP-Z91       | SN: 103245       | 30-Mar-23 (No. 217-03805)       | Mar-24                |
| Reference 20 dB Attenuator | SN: CC2552 (20x) | 30-Mar-23 (No. 217-03809)       | Mar-24                |
| DAE4                       | SN: 789          | 03-Jan-23 (No. DAE4-789_Jan23)  | Jan-24                |
| Reference Probe ER3DV6     | SN: 2328         | 06-Oct-22 (No. ER3-2328_Oct22)  | Oct-23                |

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

Calibrated by

Name  
**Jeffrey Katzman**

Function

**Laboratory Technician**

Signature



Approved by

**Sven Kühn**

**Technical Manager**



Issued: May 24, 2023

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

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Accreditation No.: SCS 0108

### Glossary

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

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

- IEEE Std 1309-2005, "IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005
- CTIA Test Plan for Hearing Aid Compatibility, Rev 3.1.1, May 2017

### Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\theta = 0$  for XY sensors and  $\theta = 90$  for Z sensor ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz in R22 waveguide).
- NORM(f)<sub>x,y,z</sub>** = NORM<sub>x,y,z</sub> \* frequency\_response (see Frequency Response Chart).
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; D<sub>x,y,z</sub>; 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.
- Spherical isotropy (3D deviation from isotropy)**: in a locally homogeneous field realized using an open waveguide setup
- 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).

EF3DV3 - SN:4060

May 24, 2023

## Parameters of Probe: EF3DV3 - SN:4060

### Basic Calibration Parameters

|                                              | Sensor X | Sensor Y | Sensor Z | Unc (k = 2)  |
|----------------------------------------------|----------|----------|----------|--------------|
| Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) | 0.79     | 0.74     | 1.28     | $\pm 10.1\%$ |
| DCP (mV) <sup>B</sup>                        | 96.0     | 99.0     | 96.0     | $\pm 4.7\%$  |

### Calibration Results for Frequency Response (30 MHz – 5.8 GHz)

| Frequency MHz | Target E-field (En) V/m | Measured E-field (En) V/m | Deviation E-field (En) | Target E-field (Ep) V/m | Measured E-field (Ep) V/m | Deviation E-field (Ep) | Unc (k = 2) |
|---------------|-------------------------|---------------------------|------------------------|-------------------------|---------------------------|------------------------|-------------|
| 30            | 77.1                    | 77.2                      | 0.0%                   | 77.1                    | 76.7                      | -0.5%                  | $\pm 5.1\%$ |
| 100           | 76.9                    | 78.0                      | 1.4%                   | 76.9                    | 78.1                      | 1.5%                   | $\pm 5.1\%$ |
| 450           | 77.2                    | 78.2                      | 1.3%                   | 77.1                    | 78.2                      | 1.4%                   | $\pm 5.1\%$ |
| 600           | 77.1                    | 77.7                      | 0.8%                   | 77.1                    | 77.8                      | 0.9%                   | $\pm 5.1\%$ |
| 750           | 77.1                    | 77.5                      | 0.5%                   | 77.1                    | 77.5                      | 0.4%                   | $\pm 5.1\%$ |
| 1800          | 143.1                   | 139.9                     | -2.2%                  | 143.2                   | 139.9                     | -2.3%                  | $\pm 5.1\%$ |
| 2000          | 135.0                   | 129.5                     | -4.1%                  | 135.0                   | 129.4                     | -4.2%                  | $\pm 5.1\%$ |
| 2200          | 127.6                   | 124.5                     | -2.4%                  | 127.6                   | 125.5                     | -1.6%                  | $\pm 5.1\%$ |
| 2500          | 125.5                   | 120.2                     | -4.2%                  | 125.4                   | 120.9                     | -3.6%                  | $\pm 5.1\%$ |
| 3000          | 79.4                    | 76.2                      | -4.1%                  | 79.4                    | 77.1                      | -2.9%                  | $\pm 5.1\%$ |
| 3500          | 256.1                   | 255.1                     | -0.4%                  | 256.2                   | 251.5                     | -1.8%                  | $\pm 5.1\%$ |
| 3700          | 250.4                   | 244.0                     | -2.6%                  | 250.6                   | 241.6                     | -3.6%                  | $\pm 5.1\%$ |
| 5200          | 50.8                    | 50.8                      | 0.0%                   | 50.8                    | 51.1                      | 0.7%                   | $\pm 5.1\%$ |
| 5500          | 49.6                    | 48.8                      | -1.6%                  | 49.6                    | 49.1                      | -1.0%                  | $\pm 5.1\%$ |
| 5800          | 48.8                    | 47.9                      | -1.8%                  | 48.8                    | 47.5                      | -2.7%                  | $\pm 5.1\%$ |

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

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

EF3DV3 - SN:4060

May 24, 2023

### Parameters of Probe: EF3DV3 - SN:4060

#### Calibration Results for Modulation Response

| UID   | Communication System Name   |   | A<br>dB | B<br>dB $\sqrt{\mu V}$ | C     | D<br>dB | VR<br>mV | Max<br>dev. | Max<br>Unc <sup>E</sup><br>k = 2 |
|-------|-----------------------------|---|---------|------------------------|-------|---------|----------|-------------|----------------------------------|
| 0     | CW                          | X | 0.00    | 0.00                   | 1.00  | 0.00    | 170.4    | $\pm 3.3\%$ | $\pm 4.7\%$                      |
|       |                             | Y | 0.00    | 0.00                   | 1.00  |         | 163.0    |             |                                  |
|       |                             | Z | 0.00    | 0.00                   | 1.00  |         | 171.2    |             |                                  |
| 10352 | Pulse Waveform (200Hz, 10%) | X | 2.09    | 63.68                  | 8.65  | 10.00   | 60.0     | $\pm 3.0\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 3.02    | 67.16                  | 10.44 |         | 60.0     |             |                                  |
|       |                             | Z | 2.32    | 64.82                  | 9.38  |         | 60.0     |             |                                  |
| 10353 | Pulse Waveform (200Hz, 20%) | X | 1.37    | 63.21                  | 7.37  | 6.99    | 80.0     | $\pm 1.0\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 1.65    | 64.91                  | 8.54  |         | 80.0     |             |                                  |
|       |                             | Z | 1.59    | 64.51                  | 8.20  |         | 80.0     |             |                                  |
| 10354 | Pulse Waveform (200Hz, 40%) | X | 0.59    | 61.11                  | 5.39  | 3.98    | 95.0     | $\pm 0.8\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 0.81    | 63.31                  | 6.95  |         | 95.0     |             |                                  |
|       |                             | Z | 0.72    | 62.40                  | 6.27  |         | 95.0     |             |                                  |
| 10355 | Pulse Waveform (200Hz, 60%) | X | 0.33    | 60.52                  | 4.33  | 2.22    | 120.0    | $\pm 0.8\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 0.44    | 62.39                  | 5.87  |         | 120.0    |             |                                  |
|       |                             | Z | 0.45    | 62.08                  | 5.26  |         | 120.0    |             |                                  |
| 10387 | QPSK Waveform, 1 MHz        | X | 1.82    | 70.10                  | 16.42 | 1.00    | 150.0    | $\pm 2.5\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 1.64    | 68.24                  | 15.36 |         | 150.0    |             |                                  |
|       |                             | Z | 1.85    | 70.86                  | 16.70 |         | 150.0    |             |                                  |
| 10388 | QPSK Waveform, 10 MHz       | X | 2.33    | 69.87                  | 16.90 | 0.00    | 150.0    | $\pm 1.0\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 2.16    | 68.46                  | 16.04 |         | 150.0    |             |                                  |
|       |                             | Z | 2.33    | 70.07                  | 17.03 |         | 150.0    |             |                                  |
| 10396 | 64-QAM Waveform, 100 kHz    | X | 2.27    | 69.05                  | 18.68 | 3.01    | 150.0    | $\pm 2.2\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 1.80    | 65.34                  | 17.49 |         | 150.0    |             |                                  |
|       |                             | Z | 2.20    | 68.34                  | 18.30 |         | 150.0    |             |                                  |
| 10399 | 64-QAM Waveform, 40 MHz     | X | 3.49    | 67.41                  | 16.17 | 0.00    | 150.0    | $\pm 1.8\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 3.37    | 66.77                  | 15.70 |         | 150.0    |             |                                  |
|       |                             | Z | 3.48    | 67.47                  | 16.22 |         | 150.0    |             |                                  |
| 10414 | WLAN CCDF, 64-QAM, 40 MHz   | X | 4.74    | 65.93                  | 15.90 | 0.00    | 150.0    | $\pm 3.3\%$ | $\pm 9.6\%$                      |
|       |                             | Y | 4.64    | 65.55                  | 15.57 |         | 150.0    |             |                                  |
|       |                             | Z | 4.72    | 66.00                  | 15.96 |         | 150.0    |             |                                  |

Note: For details on UID parameters see Appendix

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

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

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

EF3DV3 - SN:4060

May 24, 2023

### Parameters of Probe: EF3DV3 - SN:4060

#### Sensor Frequency Model Parameters

|                      | Sensor X | Sensor Y | Sensor Z |
|----------------------|----------|----------|----------|
| Frequency Corr. (LF) | 0.14     | 0.22     | 4.61     |
| Frequency Corr. (HF) | 2.82     | 2.82     | 2.82     |

#### Sensor Model Parameters

|   | C1<br>fF | C2<br>fF | $\alpha$<br>V <sup>-1</sup> | T1<br>msV <sup>-2</sup> | T2<br>msV <sup>-1</sup> | T3<br>ms | T4<br>V <sup>-2</sup> | T5<br>V <sup>-1</sup> | T6   |
|---|----------|----------|-----------------------------|-------------------------|-------------------------|----------|-----------------------|-----------------------|------|
| x | 35.5     | 238.24   | 37.85                       | 6.57                    | 0.07                    | 4.96     | 0.76                  | 0.05                  | 1.00 |
| y | 35.1     | 232.38   | 36.75                       | 6.91                    | 0.01                    | 4.99     | 0.00                  | 0.02                  | 1.01 |
| z | 33.6     | 225.86   | 37.95                       | 6.74                    | 0.08                    | 4.98     | 0.49                  | 0.09                  | 1.00 |

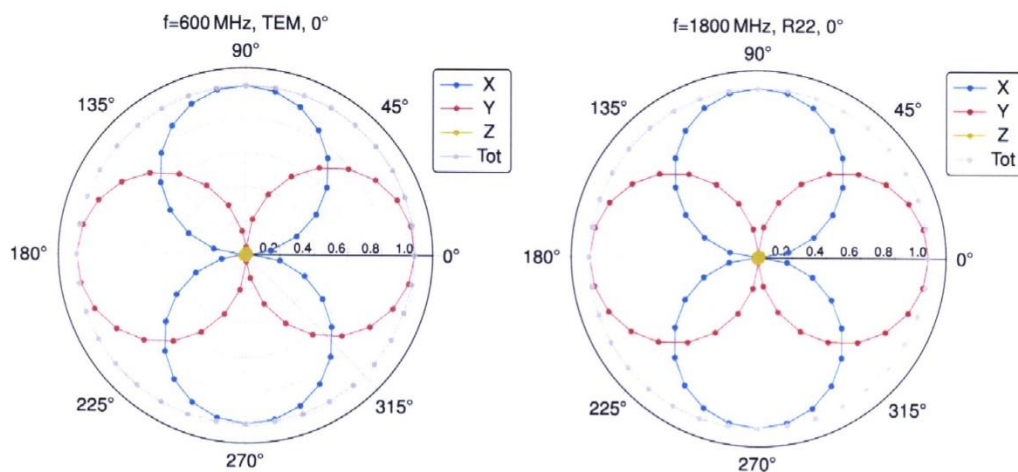
#### Other Probe Parameters

|                                         |             |
|-----------------------------------------|-------------|
| Sensor Arrangement                      | Rectangular |
| Connector Angle                         | 145.2°      |
| Mechanical Surface Detection Mode       | enabled     |
| Optical Surface Detection Mode          | disabled    |
| Probe Overall Length                    | 337 mm      |
| Probe Body Diameter                     | 12 mm       |
| Tip Length                              | 25 mm       |
| Tip Diameter                            | 4 mm        |
| Probe Tip to Sensor X Calibration Point | 1.5 mm      |
| Probe Tip to Sensor Y Calibration Point | 1.5 mm      |
| Probe Tip to Sensor Z Calibration Point | 1.5 mm      |

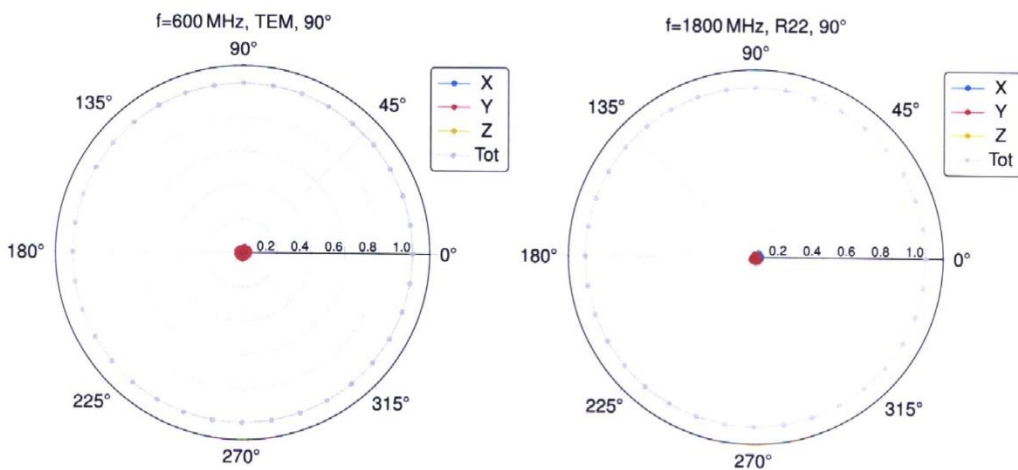
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### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$



### Receiving Pattern ( $\phi$ ), $\theta = 90^\circ$



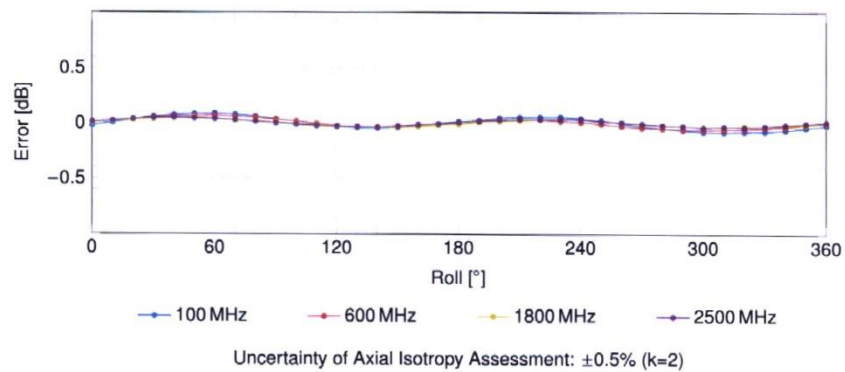
Certificate No: EF-4060\_May23

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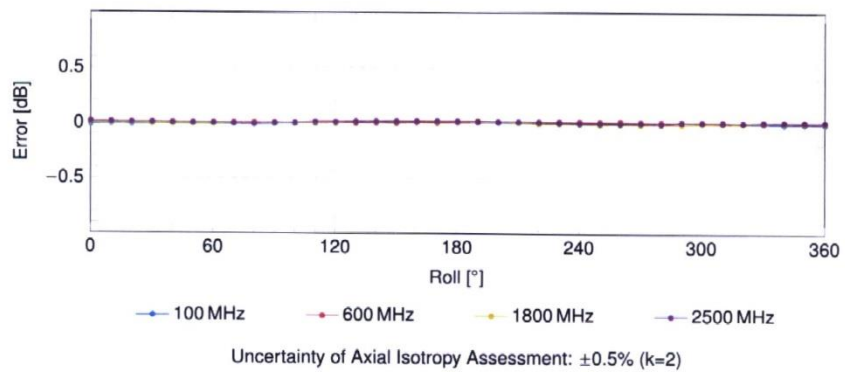
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### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$



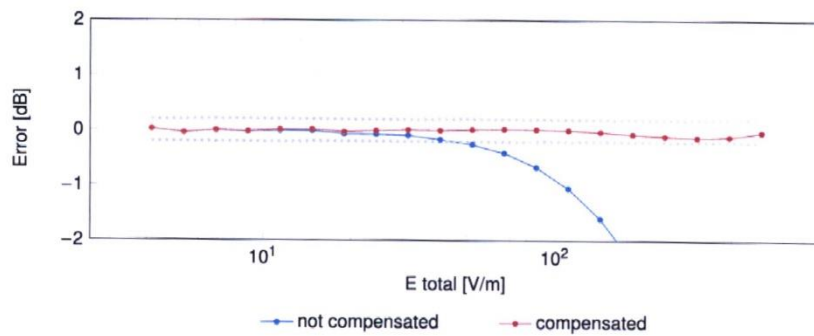
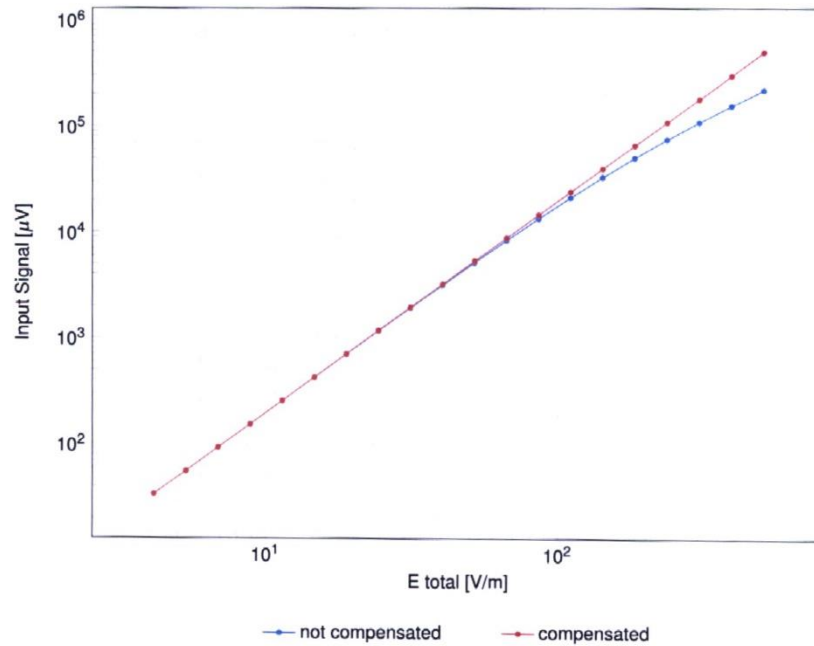
### Receiving Pattern ( $\phi$ ), $\theta = 90^\circ$



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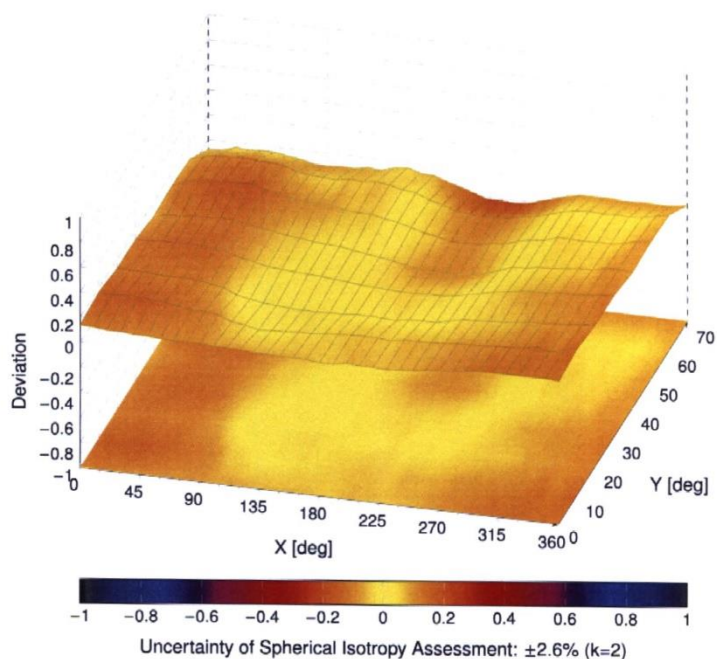
### Dynamic Range f(E-field)

(TEM cell,  $f_{\text{eval}} = 900 \text{ MHz}$ )

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

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### Deviation from Isotropy in Air

Error ( $\phi, \theta$ ),  $f = 900\text{MHz}$ 


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## Appendix: Modulation Calibration Parameters

| UID   | Rev | Communication System Name                           | Group     | PAR (dB) | Unc <sup>E</sup> k = 2 |
|-------|-----|-----------------------------------------------------|-----------|----------|------------------------|
| 0     |     | CW                                                  | CW        | 0.00     | ±4.7                   |
| 10010 | CAB | SAR Validation (Square, 100 ms, 10 ms)              | Test      | 10.00    | ±9.6                   |
| 10011 | CAC | UMTS-FDD (WCDMA)                                    | WCDMA     | 2.91     | ±9.6                   |
| 10012 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)            | WLAN      | 1.87     | ±9.6                   |
| 10013 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)       | WLAN      | 9.46     | ±9.6                   |
| 10021 | DAC | GSM-FDD (TDMA, GMSK)                                | GSM       | 9.39     | ±9.6                   |
| 10023 | DAC | GPRS-FDD (TDMA, GMSK, TN 0)                         | GSM       | 9.57     | ±9.6                   |
| 10024 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-1)                       | GSM       | 6.56     | ±9.6                   |
| 10025 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0)                         | GSM       | 12.62    | ±9.6                   |
| 10026 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1)                       | GSM       | 9.55     | ±9.6                   |
| 10027 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-1-2)                     | GSM       | 4.80     | ±9.6                   |
| 10028 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)                   | GSM       | 3.55     | ±9.6                   |
| 10029 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1-2)                     | GSM       | 7.78     | ±9.6                   |
| 10030 | CAA | IEEE 802.15.1 Bluetooth (GFSK, DH1)                 | Bluetooth | 5.30     | ±9.6                   |
| 10031 | CAA | IEEE 802.15.1 Bluetooth (GFSK, DH3)                 | Bluetooth | 1.87     | ±9.6                   |
| 10032 | CAA | IEEE 802.15.1 Bluetooth (GFSK, DH5)                 | Bluetooth | 1.16     | ±9.6                   |
| 10033 | CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)           | Bluetooth | 7.74     | ±9.6                   |
| 10034 | CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)           | Bluetooth | 4.53     | ±9.6                   |
| 10035 | CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)           | Bluetooth | 3.83     | ±9.6                   |
| 10036 | CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH1)               | Bluetooth | 8.01     | ±9.6                   |
| 10037 | CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH3)               | Bluetooth | 4.77     | ±9.6                   |
| 10038 | CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH5)               | Bluetooth | 4.10     | ±9.6                   |
| 10039 | CAB | CDMA2000 (1xRTT, RC1)                               | CDMA2000  | 4.57     | ±9.6                   |
| 10042 | CAB | IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate) | AMPS      | 7.78     | ±9.6                   |
| 10044 | CAA | IS-91/EIA/TIA-553 FDD (FDMA, FM)                    | AMPS      | 0.00     | ±9.6                   |
| 10048 | CAA | DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)           | DECT      | 13.80    | ±9.6                   |
| 10049 | CAA | DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)         | DECT      | 10.79    | ±9.6                   |
| 10056 | CAA | UMTS-TDD (TD-SCDMA, 1.28 Mcps)                      | TD-SCDMA  | 11.01    | ±9.6                   |
| 10058 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)                   | GSM       | 6.52     | ±9.6                   |
| 10059 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)            | WLAN      | 2.12     | ±9.6                   |
| 10060 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)          | WLAN      | 2.83     | ±9.6                   |
| 10061 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)           | WLAN      | 3.60     | ±9.6                   |
| 10062 | CAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)            | WLAN      | 8.68     | ±9.6                   |
| 10063 | CAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)            | WLAN      | 8.63     | ±9.6                   |
| 10064 | CAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)           | WLAN      | 9.09     | ±9.6                   |
| 10065 | CAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)           | WLAN      | 9.00     | ±9.6                   |
| 10066 | CAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)           | WLAN      | 9.38     | ±9.6                   |
| 10067 | CAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)           | WLAN      | 10.12    | ±9.6                   |
| 10068 | CAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)           | WLAN      | 10.24    | ±9.6                   |
| 10069 | CAD | IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)           | WLAN      | 10.56    | ±9.6                   |
| 10071 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)       | WLAN      | 9.83     | ±9.6                   |
| 10072 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)      | WLAN      | 9.62     | ±9.6                   |
| 10073 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)      | WLAN      | 9.94     | ±9.6                   |
| 10074 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)      | WLAN      | 10.30    | ±9.6                   |
| 10075 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)      | WLAN      | 10.77    | ±9.6                   |
| 10076 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)      | WLAN      | 10.94    | ±9.6                   |
| 10077 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)      | WLAN      | 11.00    | ±9.6                   |
| 10081 | CAB | CDMA2000 (1xRTT, RC3)                               | CDMA2000  | 3.97     | ±9.6                   |
| 10082 | CAB | IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate) | AMPS      | 4.77     | ±9.6                   |
| 10090 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-4)                       | GSM       | 6.56     | ±9.6                   |
| 10097 | CAC | UMTS-FDD (HSDPA)                                    | WCDMA     | 3.98     | ±9.6                   |
| 10098 | CAC | UMTS-FDD (HSUPA, Subtest 2)                         | WCDMA     | 3.98     | ±9.6                   |
| 10099 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-4)                       | GSM       | 9.55     | ±9.6                   |
| 10100 | CAF | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)            | LTE-FDD   | 5.67     | ±9.6                   |
| 10101 | CAF | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)          | LTE-FDD   | 6.42     | ±9.6                   |
| 10102 | CAF | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)          | LTE-FDD   | 6.60     | ±9.6                   |
| 10103 | CAH | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)            | LTE-TDD   | 9.29     | ±9.6                   |
| 10104 | CAH | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)          | LTE-TDD   | 9.97     | ±9.6                   |
| 10105 | CAH | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)          | LTE-TDD   | 10.01    | ±9.6                   |
| 10108 | CAH | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)            | LTE-FDD   | 5.80     | ±9.6                   |
| 10109 | CAH | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)          | LTE-FDD   | 6.43     | ±9.6                   |
| 10110 | CAH | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)             | LTE-FDD   | 5.75     | ±9.6                   |
| 10111 | CAH | LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)           | LTE-FDD   | 6.44     | ±9.6                   |

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

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

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| UID   | Rev | Communication System Name                                                       | Group    | PAR (dB) | Unc <sup>E</sup> k = 2 |
|-------|-----|---------------------------------------------------------------------------------|----------|----------|------------------------|
| 10307 | AAA | IEEE 802.16e WiMAX (29:18, 10 ms, 10 MHz, QPSK, PUSC, 18 symbols)               | WiMAX    | 14.49    | ±9.6                   |
| 10308 | AAA | IEEE 802.16e WiMAX (29:18, 10 ms, 10 MHz, 16QAM, PUSC)                          | WiMAX    | 14.46    | ±9.6                   |
| 10309 | AAA | IEEE 802.16e WiMAX (29:18, 10 ms, 10 MHz, 16QAM, AMC 2x3, 18 symbols)           | WiMAX    | 14.58    | ±9.6                   |
| 10310 | AAA | IEEE 802.16e WiMAX (29:18, 10 ms, 10 MHz, QPSK, AMC 2x3, 18 symbols)            | WiMAX    | 14.57    | ±9.6                   |
| 10311 | AAE | LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)                                        | LTE-FDD  | 6.06     | ±9.6                   |
| 10313 | AAA | iDEN 1:3                                                                        | iDEN     | 10.51    | ±9.6                   |
| 10314 | AAA | iDEN 1:6                                                                        | iDEN     | 13.48    | ±9.6                   |
| 10315 | AAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)                       | WLAN     | 1.71     | ±9.6                   |
| 10316 | AAB | IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)                   | WLAN     | 8.36     | ±9.6                   |
| 10317 | AAD | IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)                         | WLAN     | 8.36     | ±9.6                   |
| 10352 | AAA | Pulse Waveform (200Hz, 10%)                                                     | Generic  | 10.00    | ±9.6                   |
| 10353 | AAA | Pulse Waveform (200Hz, 20%)                                                     | Generic  | 6.99     | ±9.6                   |
| 10354 | AAA | Pulse Waveform (200Hz, 40%)                                                     | Generic  | 3.98     | ±9.6                   |
| 10355 | AAA | Pulse Waveform (200Hz, 60%)                                                     | Generic  | 2.22     | ±9.6                   |
| 10356 | AAA | Pulse Waveform (200Hz, 80%)                                                     | Generic  | 0.97     | ±9.6                   |
| 10387 | AAA | QPSK Waveform, 1 MHz                                                            | Generic  | 5.10     | ±9.6                   |
| 10388 | AAA | QPSK Waveform, 10 MHz                                                           | Generic  | 5.22     | ±9.6                   |
| 10396 | AAA | 64-QAM Waveform, 100 kHz                                                        | Generic  | 6.27     | ±9.6                   |
| 10399 | AAA | 64-QAM Waveform, 40 MHz                                                         | Generic  | 6.27     | ±9.6                   |
| 10400 | AAE | IEEE 802.11ac WiFi (20 MHz, 64-QAM, 99pc duty cycle)                            | WLAN     | 8.37     | ±9.6                   |
| 10401 | AAE | IEEE 802.11ac WiFi (40 MHz, 64-QAM, 99pc duty cycle)                            | WLAN     | 8.60     | ±9.6                   |
| 10402 | AAE | IEEE 802.11ac WiFi (80 MHz, 64-QAM, 99pc duty cycle)                            | WLAN     | 8.53     | ±9.6                   |
| 10403 | AAB | CDMA2000 (1xEV-DO, Rev. 0)                                                      | CDMA2000 | 3.76     | ±9.6                   |
| 10404 | AAB | CDMA2000 (1xEV-DO, Rev. A)                                                      | CDMA2000 | 3.77     | ±9.6                   |
| 10406 | AAB | CDMA2000, RC3, SO32, SCH0, Full Rate                                            | CDMA2000 | 5.22     | ±9.6                   |
| 10410 | AAH | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9, Subframe Conf=4) | LTE-TDD  | 7.82     | ±9.6                   |
| 10414 | AAA | WLAN CCDF, 64-QAM, 40 MHz                                                       | Generic  | 8.54     | ±9.6                   |
| 10415 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)                       | WLAN     | 1.54     | ±9.6                   |
| 10416 | AAA | IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)                   | WLAN     | 8.23     | ±9.6                   |
| 10417 | AAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)                       | WLAN     | 8.23     | ±9.6                   |
| 10418 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preamble)   | WLAN     | 8.14     | ±9.6                   |
| 10419 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preamble)  | WLAN     | 8.19     | ±9.6                   |
| 10422 | AAC | IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)                                    | WLAN     | 8.32     | ±9.6                   |
| 10423 | AAC | IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)                                 | WLAN     | 8.47     | ±9.6                   |
| 10424 | AAC | IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)                                 | WLAN     | 8.40     | ±9.6                   |
| 10425 | AAC | IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)                                     | WLAN     | 8.41     | ±9.6                   |
| 10426 | AAC | IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)                                   | WLAN     | 8.45     | ±9.6                   |
| 10427 | AAC | IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)                                  | WLAN     | 8.41     | ±9.6                   |
| 10430 | AAE | LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)                                                | LTE-FDD  | 8.28     | ±9.6                   |
| 10431 | AAE | LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)                                               | LTE-FDD  | 8.38     | ±9.6                   |
| 10432 | AAD | LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)                                               | LTE-FDD  | 8.34     | ±9.6                   |
| 10433 | AAD | LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)                                               | LTE-FDD  | 8.34     | ±9.6                   |
| 10434 | AAB | W-CDMA (BS Test Model 1, 64 DPCH)                                               | WCDMA    | 8.60     | ±9.6                   |
| 10435 | AAG | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)                  | LTE-TDD  | 7.82     | ±9.6                   |
| 10447 | AAE | LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)                                  | LTE-FDD  | 7.56     | ±9.6                   |
| 10448 | AAE | LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)                                 | LTE-FDD  | 7.53     | ±9.6                   |
| 10449 | AAD | LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)                                 | LTE-FDD  | 7.51     | ±9.6                   |
| 10450 | AAD | LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)                                 | LTE-FDD  | 7.48     | ±9.6                   |
| 10451 | AAB | W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)                                 | WCDMA    | 7.59     | ±9.6                   |
| 10453 | AAE | Validation (Square, 10 ms, 1 ms)                                                | Test     | 10.00    | ±9.6                   |
| 10456 | AAC | IEEE 802.11ac WiFi (160 MHz, 64-QAM, 99pc duty cycle)                           | WLAN     | 8.63     | ±9.6                   |
| 10457 | AAB | UMTS-FDD (DC-HSDPA)                                                             | WCDMA    | 6.62     | ±9.6                   |
| 10458 | AAA | CDMA2000 (1xEV-DO, Rev. B, 2 carriers)                                          | CDMA2000 | 6.55     | ±9.6                   |
| 10459 | AAA | CDMA2000 (1xEV-DO, Rev. B, 3 carriers)                                          | CDMA2000 | 8.25     | ±9.6                   |
| 10460 | AAB | UMTS-FDD (WCDMA, AMR)                                                           | WCDMA    | 2.39     | ±9.6                   |
| 10461 | AAC | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)                 | LTE-TDD  | 7.82     | ±9.6                   |
| 10462 | AAC | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)               | LTE-TDD  | 8.30     | ±9.6                   |
| 10463 | AAC | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)               | LTE-TDD  | 8.56     | ±9.6                   |
| 10464 | AAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)                   | LTE-TDD  | 7.82     | ±9.6                   |
| 10465 | AAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)                 | LTE-TDD  | 8.32     | ±9.6                   |
| 10466 | AAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)                 | LTE-TDD  | 8.57     | ±9.6                   |
| 10467 | AAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)                   | LTE-TDD  | 7.82     | ±9.6                   |
| 10468 | AAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)                 | LTE-TDD  | 8.32     | ±9.6                   |
| 10469 | AAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)                 | LTE-TDD  | 8.56     | ±9.6                   |
| 10470 | AAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)                  | LTE-TDD  | 7.82     | ±9.6                   |
| 10471 | AAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)                | LTE-TDD  | 8.32     | ±9.6                   |

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

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