

Hearing Aid Compatibility (HAC) RF Emissions Test Report

APPLICANT : HTC Corporation
EQUIPMENT : Smartphone
MODEL NAME : PL08120
FCC ID : NM8PL80120
STANDARD : FCC 47 CFR §20.19
ANSI C63.19-2007
M CATEGORY : M4

The product was completely tested on Sep. 22, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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Revision History

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|------------|---------|-------------------------|---------------|
| HA281609A | Rev. 01 | Initial issue of report | Oct. 31, 2012 |
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1. Statement of Compliance

The maximum results of RF Emission of Hearing Aid Compliance (HAC) found during testing for the **HTC Corporation Smartphone PL08120** are follows (with expanded uncertainty $\pm 30.5\%$ for E-field and $\pm 21.7\%$ for H-field):

| Band | HAC RF Emission Test Result | | M Rating |
|---------------|-----------------------------|-------|----------|
| CDMA2000 BC0 | E-Field (V/m) | 55 | M4 |
| | H-Field (A/m) | 0.096 | M4 |
| CDMA2000 BC1 | E-Field (V/m) | 30.8 | M4 |
| | H-Field (A/m) | 0.076 | M4 |
| CDMA2000 BC15 | E-Field (V/m) | 32.7 | M4 |
| | H-Field (A/m) | 0.076 | M4 |

They are in compliance with HAC limits (HAC Rated category M3) specified in guidelines FCC 47 CFR §20.19 and ANSI Standard ANSI C63.19-2007.

Results Summary : M Category = M4 (ANSI C63.19-2007)



2. Administration Data

2.1 Testing Laboratory

| | |
|--------------------|---|
| Test Site | SPORTON INTERNATIONAL INC. |
| Test Site Location | No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978 |
| Test Site No. | Sporton Site No. : SAR01-HY |

2.2 Applicant

| | |
|--------------|--|
| Company Name | HTC Corporation |
| Address | No.23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan |

2.3 Manufacturer

| | |
|--------------|--|
| Company Name | HTC Corporation |
| Address | No.23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan |

2.4 Application Details

| | |
|-------------------------------|---------------|
| Date of Start during the Test | Sep. 10, 2012 |
| Date of End during the Test | Sep. 22, 2012 |

3. General Information

3.1 Description of Device Under Test (DUT)

| Product Feature & Specification | |
|---------------------------------|---|
| DUT Type | Smartphone |
| Model Name | PL08120 |
| FCC ID | NM8PL80120 |
| Sample 1 | EUT with LCM 1 and Main camera 1 |
| Sample 2 | EUT with LCM 2 and Main camera 2 |
| Tx Frequency | CDMA2000 BC0 : 824.70 MHz ~ 848.31 MHz CDMA2000 BC1 : 1851.25 MHz ~ 1908.75 MHz CDMA2000 BC15 : 1711.25 MHz ~ 1753.75 MHz |
| Rx Frequency | CDMA2000 BC0 : 869.70 MHz ~ 893.31 MHz CDMA2000 BC1 : 1931.25 MHz ~ 1988.75 MHz CDMA2000 BC15 : 2111.25 MHz ~ 2153.75 MHz |
| Maximum Output Power to Antenna | CDMA2000 BC0 : 24.05 dBm CDMA2000 BC1 : 24.23 dBm CDMA2000 BC15 : 23.99 dBm |
| Antenna Type | PIFA Antenna |
| Type of Modulation | QPSK |
| DUT Stage | Production Unit |

List of air interfaces / frequency bands

| Air Interface | Band (MHz) | Voice/Data | C 63.19-2007 Tested | Concurrent connections | Reduced Power 20.19 (c)(1) |
|---------------|---------------|------------|---------------------|------------------------|----------------------------|
| CDMA2000 | 850,1700,1900 | Voice | Yes | WLAN, BT | No |
| WLAN | 2450 | Data (*) | No | CDMA2000 | No |
| BT | 2450 | Data (*) | No | CDMA2000 | No |

Note:

- (*): The voice function maybe be activated via 3rd party software application.
- Per KDB 285076 D01 7)a), during RF test, concurrent transmission is disabled.



3.2 Applied Standards

The ANSI Standard ANSI C63.19-2007 represents performance requirements for acceptable interoperability of hearing aids with wireless communications devices. When these parameters are met, a hearing aid operates acceptably in close proximity to a wireless communications device.

The following AWF factors shall be used for the standard transmission protocols:

| Standard | Technology | AWF (dB) |
|-----------------|---------------------|----------|
| TIA/EIA/IS-2000 | CDMA | 0 |
| TIA/EIA-136 | TDMA (50 Hz) | 0 |
| J-STD-007 | GSM (217) | -5 |
| T1/T1P1/3GPP | UMTS (WCDMA) | 0 |
| iDENTM | TDMA (22 and 11 Hz) | 0 |

Table 3.1 Articulation Weighting Factor (AWF)

| Category | Telephone RF Parameters | | | |
|---------------------|-------------------------|-----|--------------------|-------------------|
| | Near Field | AWF | E-Field Emissions | H-Field Emissions |
| < 960 MHz | | | | |
| Category M1 | | 0 | 631.0 – 1122.0 V/m | 1.91 – 3.39 A/m |
| | | -5 | 473.2 – 841.4 V/m | 1.43 – 2.54 A/m |
| Category M2 | | 0 | 354.8 – 631.0 V/m | 1.07 – 1.91 A/m |
| | | -5 | 266.1 – 473.2 V/m | 0.80 – 1.43 A/m |
| Category M3 | | 0 | 199.5 – 354.8 V/m | 0.6 – 1.07 A/m |
| | | -5 | 149.6 – 266.1 V/m | 0.45 – 0.80 A/m |
| Category M4 | | 0 | < 199.5 V/m | < 0.60 A/m |
| | | -5 | < 149.6 V/m | < 0.45 A/m |
| > 960 MHz | | | | |
| Category M1 | | 0 | 199.5 – 354.8 V/m | 0.60 – 1.07 A/m |
| | | -5 | 149.6 – 266.1 V/m | 0.45 – 0.80 A/m |
| Category M2 | | 0 | 112.2 – 199.5 V/m | 0.34 – 0.60 A/m |
| | | -5 | 84.1 – 149.6 V/m | 0.25 – 0.45 A/m |
| Category M3 | | 0 | 63.1 – 112.2 V/m | 0.19 – 0.34 A/m |
| | | -5 | 47.3 – 84.1 V/m | 0.14 – 0.25 A/m |
| Category M4 | | 0 | < 63.1 V/m | < 0.19 A/m |
| | | -5 | < 47.3 V/m | < 0.14 A/m |

Table 3.2 Telephone near-field categories in linear units



3.3 Test Conditions

3.3.1 Ambient Condition

| | |
|---------------------|-------------|
| Ambient Temperature | 20 to 24 °C |
| Humidity | < 60 % |

3.3.2 Test Configuration

The device was controlled by using a base station emulator Agilent 8960. Communication between the device and the emulator was established by air link. The power control bits was set to "Always Up" from the emulator to radiate maximum output power during all testing.

Measurements were performed on the low, middle and high channels of both bands.



4. Hearing Aid Compliance (HAC)

4.1 Introduction

The federal communication commission (FCC) adopted ANSI C63.19 as HAC test standard.

5. HAC RF Emission Measurement Setup

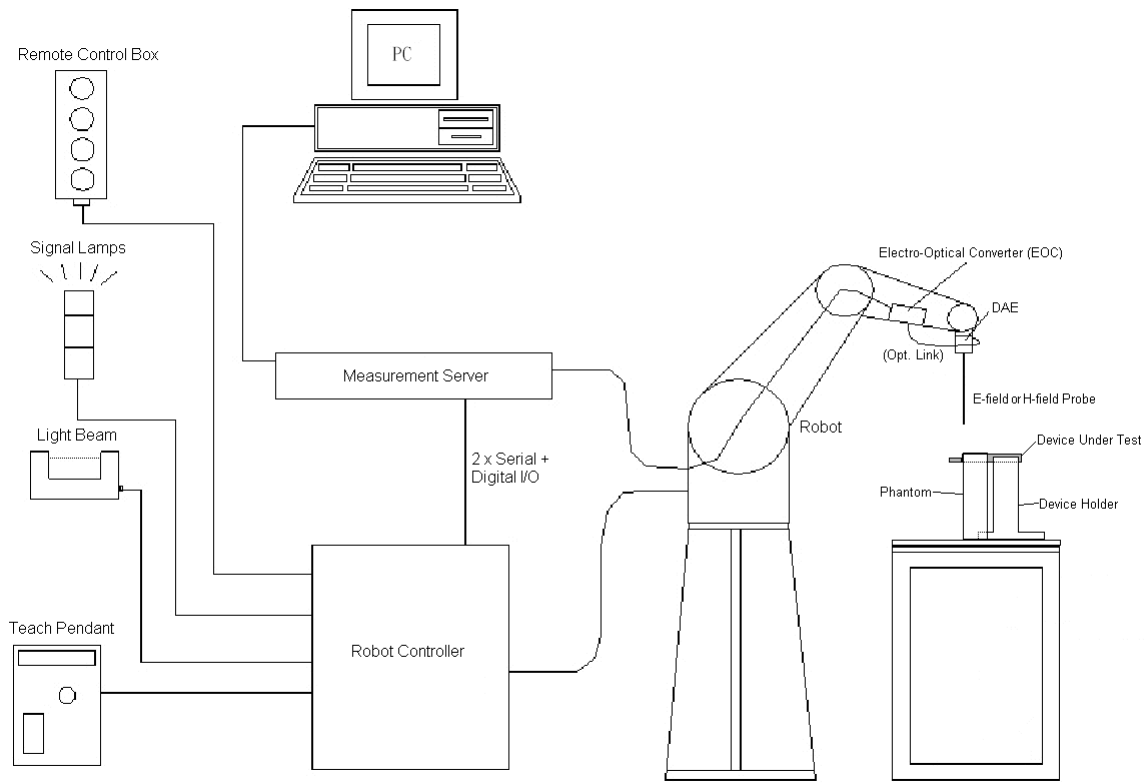


Fig 5.1 SPEAG DASY4 or DASY5 System Configurations

The DASY4 or DASY5 system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic (DAE) attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter (EOC) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows XP
- DASY4 or DASY5 software
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

Some of the components are described in details in the following sub-sections.

5.1 E-Field and H-Field Probe System

The HAC measurement is conducted with the dosimetric probe ER3DV6 and H3DV6 (manufactured by SPEAG). The probe is specially designed and calibrated. This probe has a built in optical surface detection system to prevent from collision with DUT.

5.1.1 E-Field Probe Specification

<ER3DV6>

| | |
|----------------------|--|
| Construction | One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges |
| Calibration | In air from 100 MHz to 3.0 GHz (absolute accuracy $\pm 6.0\%$, $k=2$) |
| Frequency | 100 MHz to 6 GHz; Linearity: ± 2.0 dB (100 MHz to 3 GHz) |
| Directivity | ± 0.2 dB in air (rotation around probe axis) ± 0.4 dB in air (rotation normal to probe axis) |
| Dynamic Range | 2 V/m to 1000 V/m (M3 or better device readings fall well below diode compression point) |
| Linearity | ± 0.2 dB |
| Dimensions | Overall length: 330 mm (Tip: 16 mm) Tip diameter: 8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.5 mm |



Fig 5.2 Photo of E-field Probe

5.1.2 H-Field Probe Description

<H3DV6>

| | |
|-----------------------------|---|
| Construction | Three concentric loop sensors with 3.8 mm loop diameters Resistively loaded detector diodes for linear response Built-in shielding against static charges |
| Frequency | 200 MHz to 3 GHz (absolute accuracy $\pm 6.0\%$, $k=2$); Output linearized |
| Directivity | ± 0.25 dB (spherical isotropy error) |
| Dynamic Range | 10 m A/m to 2 A/m at 1 GHz (M3 or better device readings fall well below diode compression point) |
| Dimensions | Overall length: 330 mm (Tip: 40 mm) Tip diameter: 6 mm (Body: 12 mm) Distance from probe tip to dipole centers: 3 mm |
| E-Field Interference | < 10% at 3 GHz (for plane wave) |



Fig 5.3 Photo of H-field Probe

5.1.3 Probe Tip Description

HAC field measurements take place in the close near field with high gradients. Increasing the measuring distance from the source will generally decrease the measured field values (in case of the validation dipole approx. 10%/per mm).

Magnetic field sensors are measuring the integral of the H-field across their sensor area surrounded by the loop. They are calibrated in a precise, homogeneous field. When measuring a gradient field, the result will be very close to the field in the center of the loop which is equivalent to the value of a homogeneous field equivalent to the center value. But it will be different from the field at the field at the border of the loop.

Consequently, two sensors with different loop diameters – both calibrated ideally – would give different results when measuring from the edge of the probe sensor elements. The behavior for electrically small E-field sensors is equivalent. See below for distance plots from a WD which show the conservative nature of field readings at the probe element center vs. measurements at the sensor end:

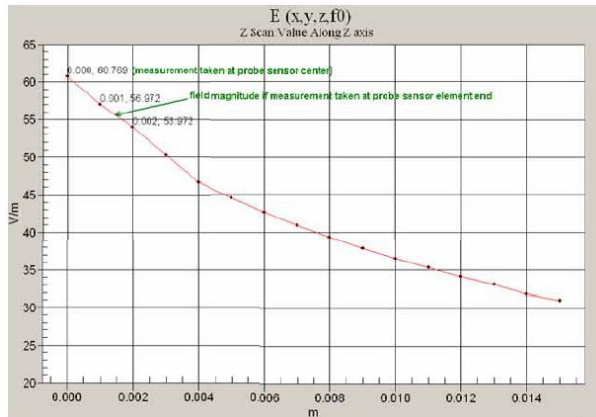


Fig 5.4 Z-Axis Scan at maximum point above a typical wireless device for E-field

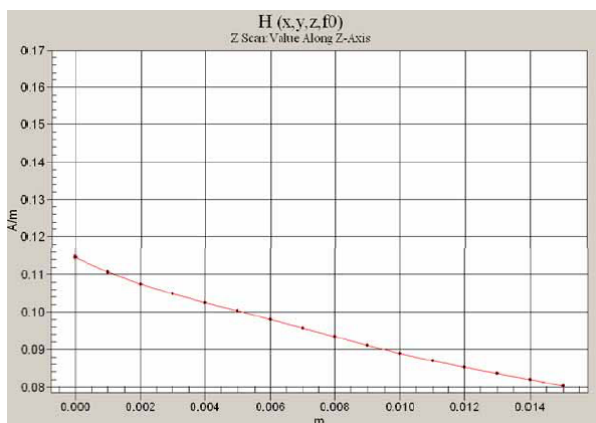


Fig 5.5 Z-Axis Scan at maximum point above a typical wireless device for H-field

The magnetic field loops of the H3D probes are concentric, with the center 3mm from the tip for H3DV6. Their radius is 1.9 mm.

The electric field probes have a more irregular internal geometry because it is physically not possible to have the 3 orthogonal sensors situated with the same center. The effect of the different sensor centers is accounted for in the HAC uncertainty budget ("sensor displacement"). Their geometric center is at 2.5 mm from the tip, and the element ends are 1.1 mm closer to the tip.

Where:

Peak Field = Peak field (in dB V/m or dB A/m)

Raw = Raw field measurement from the measurement system (in V/m or A/m).

PMF = Probe Modulation Factor (in Linear units). See Chapter 8 of test report.

5.2 DATA Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



Fig 5.6 Photo of DAE

5.3 Robot

The SPEAG DASY system uses the high precision robots (DASY4: RX90BL; DASY5: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY4: CS7MB; DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ± 0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller

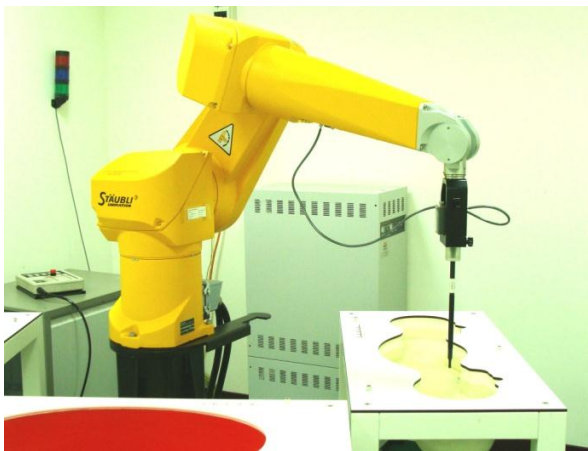


Fig 5.7 Photo of DASY4



Fig 5.8 Photo of DASY5

5.4 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY4: 166 MHz, Intel Pentium; DASY5: 400 MHz, Intel Celeron), chipdisk (DASY4: 32 MB; DASY5: 128 MB), RAM (DASY4: 64 MB, DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.



Fig 5.9 Photo of Server for DASY4



Fig 5.10 Photo of Server for DASY5

5.5 Phone Positioner

The phone positioner shown in Fig. 5.11 is used to adjust DUT to the suitable position.



Fig 5.11 Phone Positioner

5.6 Test Arch Phantom

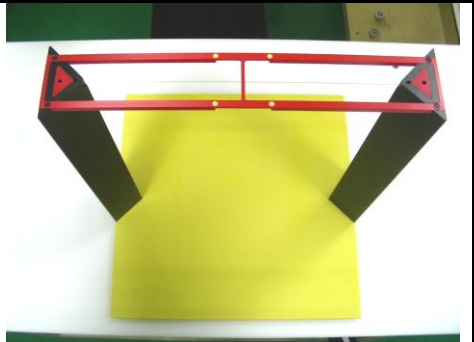
| | | |
|------------------------------|---|--|
| <p>Construction :</p> | <p>Enables easy and well defined positioning of the phone and validation dipoles as well as simple teaching of the robot.</p> |  |
| <p>Dimensions :</p> | <p>370 x 370 x 370 mm</p> | |

Fig 5.12 Photo of Arch Phantom



5.7 Data Storage and Evaluation

5.7.1 Data Storage

The DASYS software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, and device frequency and modulation data) in measurement files. The post-processing software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of erroneous parameter settings.

5.7.2 Data Evaluation

The DASYS post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software :

| | | |
|----------------------------|---------------------------|---|
| Probe parameters : | - Sensitivity | Norm _i , a _{i0} , a _{i1} , a _{i2} |
| | - Conversion factor | ConvF _i |
| | - Diode compression point | dcp _i |
| Device parameters : | - Frequency | f |
| | - Crest factor | cf |
| Media parameters : | - Conductivity | σ |
| | - Density | ρ |

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASYS components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as :

V_i = U_i + U_i^2 * (cf / dcp_i)

- with V_i = compensated signal of channel i, (i = x, y, z)
- U_i = input signal of channel i, (i = x, y, z)
- cf = crest factor of exciting field (DASY parameter)
- dcp_i = diode compression point (DASY parameter)

From the compensated input signals, the primary field data for each channel can be evaluated :

$$\text{E-field Probes : } \mathbf{E}_i = \sqrt{\frac{V_i}{\text{Norm}_i \cdot \text{ConvF}}}$$

$$\text{H-field Probes : } \mathbf{H}_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1}f + a_{i2}f^2}{f}$$

- with V_i = compensated signal of channel i , ($i = x, y, z$)
- Norm_i = sensor sensitivity of channel i , ($i = x, y, z$), $\mu\text{V}/(\text{V/m})^2$ for E-field Probes
- ConvF = sensitivity enhancement in solution
- a_{ij} = sensor sensitivity factors for H-field probes
- f = carrier frequency [GHz]
- E_i = electric field strength of channel i in V/m
- H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude) :

$$\mathbf{E}_{\text{tot}} = \sqrt{\mathbf{E}_x^2 + \mathbf{E}_y^2 + \mathbf{E}_z^2}$$

The primary field data are used to calculate the derived field units.

The measurement/integration time per point, as specified by the system manufacturer is > 500 ms. The signal response time is evaluated as the time required by the system to reach 90% of the expected final value after an on/off switch of the power source with an integration time of 500 ms and a probe response time of < 5 ms. In the current implementation, DASYS waits longer than 100 ms after having reached the grid point before starting a measurement, i.e., the response time uncertainty is negligible.

If the device under test does not emit a CW signal, the integration time applied to measure the electric field at a specific point may introduce additional uncertainties due to the discretization. The tolerances for the different systems had the worst-case of 2.6%.



5.8 Test Equipment List

| Manufacturer | Name of Equipment | Type/Model | Serial Number | Calibration | |
|--------------|---|------------|---------------|---------------|---------------|
| | | | | Last Cal. | Due Date |
| SPEAG | Isotropic E-Field Probe | ER3DV6 | 2358 | Jun. 21, 2012 | Jun. 20, 2013 |
| SPEAG | Isotropic H-Field Probe | H3DV6 | 6184 | Jan. 26, 2012 | Jan. 25, 2013 |
| SPEAG | 835MHz Calibration Dipole | CD835V3 | 1045 | Jun. 14, 2012 | Jun. 13, 2013 |
| SPEAG | 1880MHz Calibration Dipole | CD1880V3 | 1038 | Jun. 14, 2012 | Jun. 13, 2013 |
| SPEAG | Data Acquisition Electronics | DAE4 | 1338 | Jun. 12, 2012 | Jun. 11, 2013 |
| SPEAG | Test Arch Phantom | N/A | N/A | NCR | NCR |
| SPEAG | Phone Positoiner | N/A | N/A | NCR | NCR |
| Agilent | Network Analyzer | E5071C | MY46101588 | May 11, 2012 | May 10, 2013 |
| Agilent | ESG Vector Series Signal Generator | E4438C | MY49070755 | Oct. 17, 2011 | Oct. 16, 2012 |
| Anritsu | Power Meter | ML2495A | 0932001 | Sep. 21, 2011 | Sep. 20, 2012 |
| Anritsu | Radio Communication Analyzer | MT8820C | 6201074414 | Dec. 21, 2011 | Dec. 20, 2012 |
| Agilent | Wireless Communication Test Set | E5515C | MY48360820 | Jan. 05, 2012 | Jan. 04, 2014 |
| Agilent | Wireless Communication Test Set | E5515C | GB46311322 | Mar. 23, 2011 | Mar. 22, 2013 |
| Agilent | Wireless Communication Test Set | E5515C | MY50264370 | Apr. 19, 2011 | Apr. 18, 2013 |
| Agilent | Wireless Communication Test Set | E5515C | MY50266977 | Nov. 13, 2011 | Nov. 12, 2013 |
| R&S | Universal Digital Radiocommunication Tester | CMU200 | 106656 | Jun. 28, 2012 | Jun. 27, 2013 |
| R&S | Spectrum Analyzer | FSP7 | 101131 | Jul. 23, 2012 | Jul. 22, 2013 |

Table 5.1 Test Equipment List

6. Uncertainty Assessment

The component of uncertainty may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainty by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience and knowledge of the behavior and properties of relevant materials and instruments, manufacture’s specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in Table 6.1.

| Uncertainty Distributions | Normal | Rectangular | Triangular | U-Shape |
|------------------------------------|--------------------|--------------------|-------------------|----------------|
| Multi-plying Factor ^(a) | 1/k ^(b) | 1/√3 | 1/√6 | 1/√2 |

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) κ is the coverage factor

Table 6.1 Multiplying Factors for Various Distributions

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual “root-sum-squares” (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is showed in Table 6.2.



| Error Description | Uncertainty Value (±%) | Probability Distribution | Divisor | Ci (E) | Ci (H) | Standard Uncertainty (E) | Standard Uncertainty (H) |
|--------------------------------------|------------------------|--------------------------|---------|--------|--------|--------------------------|--------------------------|
| Measurement System | | | | | | | |
| Probe Calibration | 5.1 | Normal | 1 | 1 | 1 | ± 5.1 % | ± 5.1 % |
| Axial Isotropy | 4.7 | Rectangular | √3 | 1 | 1 | ± 2.7 % | ± 2.7 % |
| Sensor Displacement | 16.5 | Rectangular | √3 | 1 | 0.145 | ± 9.5 % | ± 1.4 % |
| Test Arch | 7.2 | Rectangular | √3 | 1 | 0 | ± 4.1 % | ± 0.0 % |
| Linearity | 4.7 | Rectangular | √3 | 1 | 1 | ± 2.7 % | ± 2.7 % |
| Scaling to Peak Envelope Power | 2.0 | Rectangular | √3 | 1 | 1 | ± 1.2 % | ± 1.2 % |
| System Detection Limit | 1.0 | Rectangular | √3 | 1 | 1 | ± 0.6 % | ± 0.6 % |
| Readout Electronics | 0.3 | Normal | 1 | 1 | 1 | ± 0.3 % | ± 0.3 % |
| Response Time | 0.8 | Rectangular | √3 | 1 | 1 | ± 0.5 % | ± 0.5 % |
| Integration Time | 2.6 | Rectangular | √3 | 1 | 1 | ± 1.5 % | ± 1.5 % |
| RF Ambient Conditions | 3.0 | Rectangular | √3 | 1 | 1 | ± 1.7 % | ± 1.7 % |
| RF Reflections | 12.0 | Rectangular | √3 | 1 | 1 | ± 6.9 % | ± 6.9 % |
| Probe Positioner | 1.2 | Rectangular | √3 | 1 | 0.67 | ± 0.7 % | ± 0.5 % |
| Probe Positioning | 4.7 | Rectangular | √3 | 1 | 0.67 | ± 2.7 % | ± 1.8 % |
| Extrap. and Interpolation | 1.0 | Rectangular | √3 | 1 | 1 | ± 0.6 % | ± 0.6 % |
| Test Sample Related | | | | | | | |
| Device Positioning Vertical | 4.7 | Rectangular | √3 | 1 | 0.67 | ± 2.7 % | ± 1.8 % |
| Device Positioning Lateral | 1.0 | Rectangular | √3 | 1 | 1 | ± 0.6 % | ± 0.6 % |
| Device Holder and Phantom | 2.4 | Rectangular | √3 | 1 | 1 | ± 1.4 % | ± 1.4 % |
| Power Drift | 5.0 | Rectangular | √3 | 1 | 1 | ± 2.9 % | ± 2.9 % |
| Phantom and Setup Related | | | | | | | |
| Phantom Thickness | 2.4 | Rectangular | √3 | 1 | 0.67 | ± 1.4 % | ± 0.9 % |
| Combined Standard Uncertainty | | | | | | ± 15.2 % | ± 10.8 % |
| Coverage Factor for 95 % | | | | | | K = 2 | |
| Expanded Uncertainty | | | | | | ± 30.5 % | ± 21.7 % |

Table 6.2 Uncertainty Budget of DASYS

7. HAC RF Emission Measurement Evaluation

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the test Arch and a corresponding distance holder.

7.1 Purpose of System Performance Check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal HAC measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

7.2 System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator. The calibrated dipole must be placed beneath the arch phantom. The equipment setup is shown below:

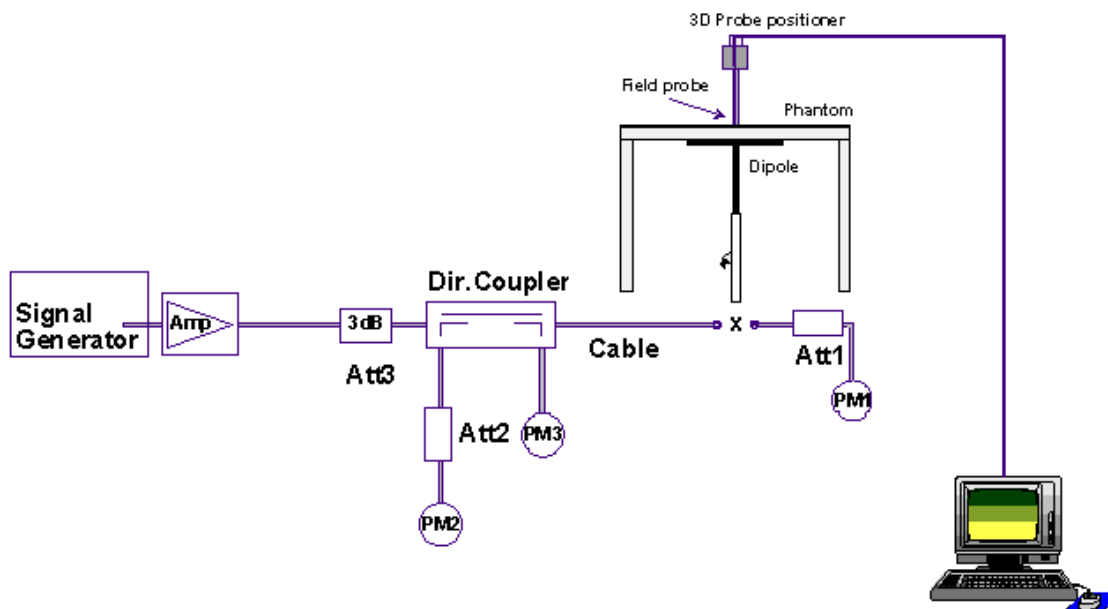


Fig. 7.1 System Setup of System Evaluation

1. Signal Generator
2. Amplifier
3. Directional Coupler
4. Power Meter
5. Calibrated Dipole

The output power on dipole port must be calibrated to 20dBm (100mW) before dipole is connected.

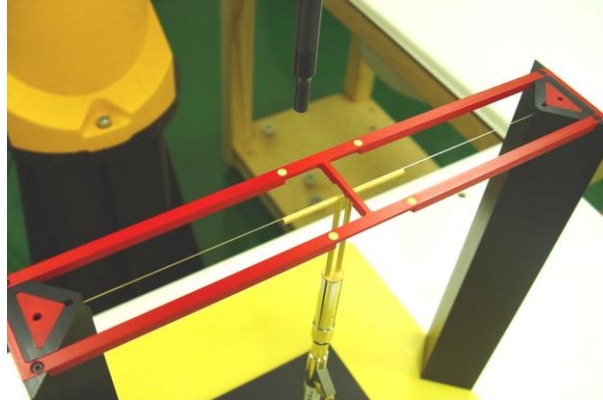


Fig 7.2 Dipole Setup



7.3 Validation Results

Comparing to the original E-field or H-field value provided by SPEAG, the validation data should be within its specification of 25 %. Table 7.1 shows the target value and measured value. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Table with 8 columns: Frequency (MHz), Input Power (dBm), Target Value (V/m), E-Field 1 (V/m), E-Field 2 (V/m), Average Value (V/m), Deviation (%), Date. It contains two sections of data for E-field and H-field measurements at 835 MHz and 1880 MHz.

Table 7.1 Test Results of System Validation

Note: Deviation = ((E or H-field Result) - (Target field)) / (Target field) * 100%

8. RF Field Probe Modulation Factor

A calibration shall be made of the modulation response of the probe and its instrumentation chain. This calibration shall be performed with the field probe, attached to the instrumentation that is to be used with it during the measurement. The response of the probe system to a CW field at the frequency(s) of interest is compared to its response to a modulated signal with equal peak amplitude. The field level of the test signals shall be more than 10 dB above the ambient level and the noise floor of the instrumentation being used. The ratio of the CW reading to that taken with a modulated field shall be applied to the readings taken of modulated fields of the specified type.

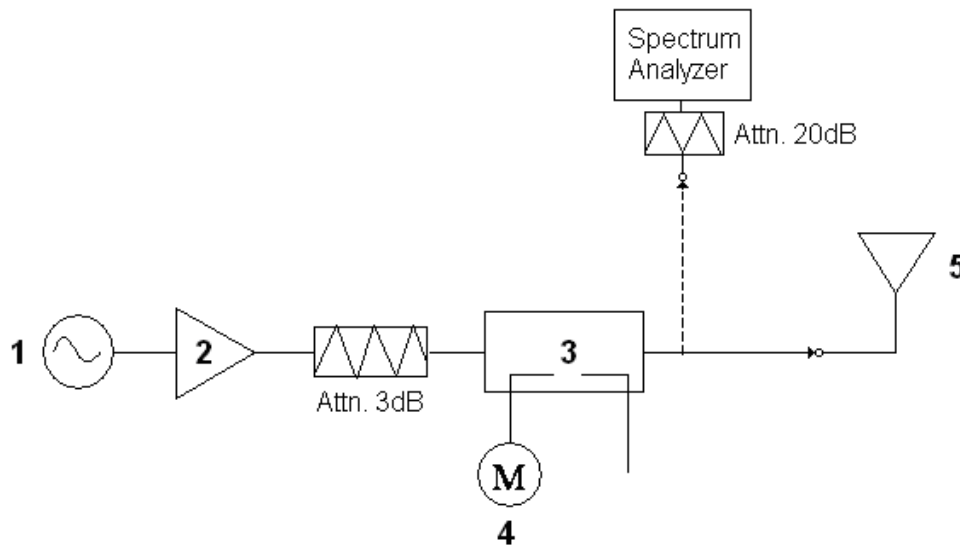


Fig. 8.1 System Calibration

This was done using the following procedure:

1. Fixing the probe in a set location relative to a field generating device.
2. Illuminate the probe with a CW signal at the intended measurement frequency.
3. Record the reading of the probe measurement system of the CW signal.
4. Determine the level of the CW signal being used to drive the field generating device.
5. Substitute a signal using the same modulation as that used by the intended WD for the CW signal.
6. Set the peak amplitude during transmission of the modulated signal to equal the amplitude of the CW signal.
7. Record the reading of the probe measurement system of the modulated signal.
8. The ratio of the CW to modulated signal reading is the modulation factor.
9. Repeat 2~8 steps at intended measurement frequency for both E and H field probe.

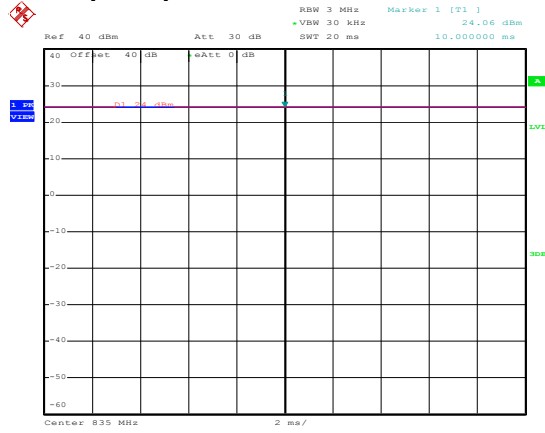


PMF Measurement Summary:

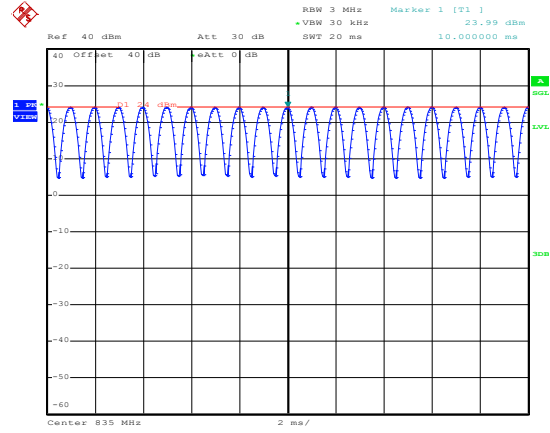
| Frequency | Functions | E-field | H-field | PMF | |
|-----------|-----------|---------|---------|---------|---------|
| | | V/m | A/m | E-field | H-field |
| 835MHz | CW | 265.4 | 0.755 | - | - |
| 835MHz | AM | 162.2 | 0.492 | 1.64 | 1.53 |
| 835MHz | CDMA | 271.1 | 0.804 | 0.98 | 0.94 |
| 835MHz | CDMA 1/8 | 89.2 | 0.274 | 2.98 | 2.76 |
| 1880MHz | CW | 301.4 | 0.999 | - | - |
| 1880MHz | AM | 187.9 | 0.770 | 1.60 | 1.30 |
| 1880MHz | CDMA | 308.5 | 1.231 | 0.98 | 0.81 |
| 1880MHz | CDMA 1/8 | 96.7 | 0.374 | 3.12 | 2.67 |



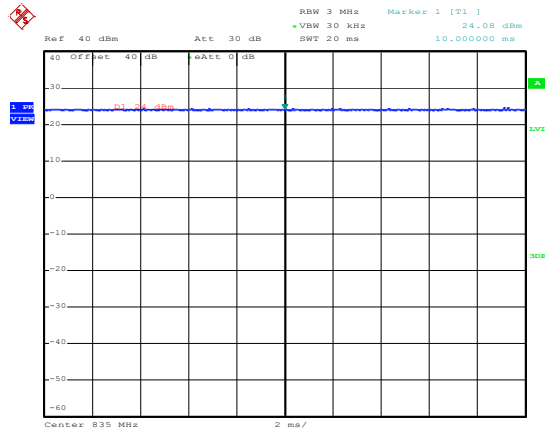
Zero span Spectrum Plots for RF Field Probe Modulation Factor



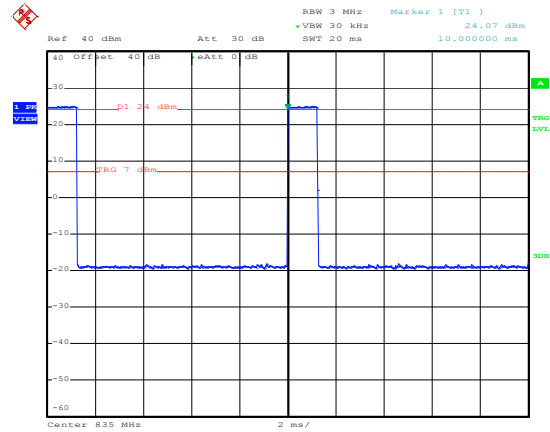
835MHz - CW



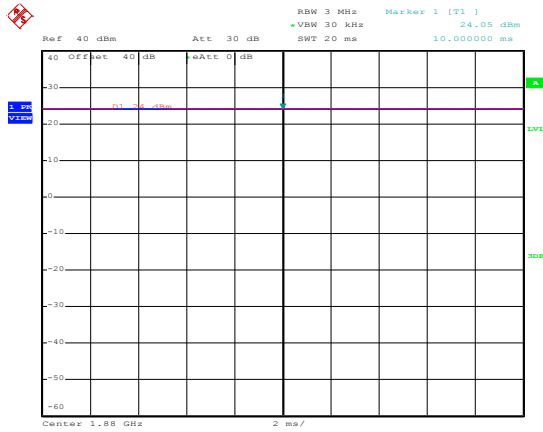
835MHz - 80% AM



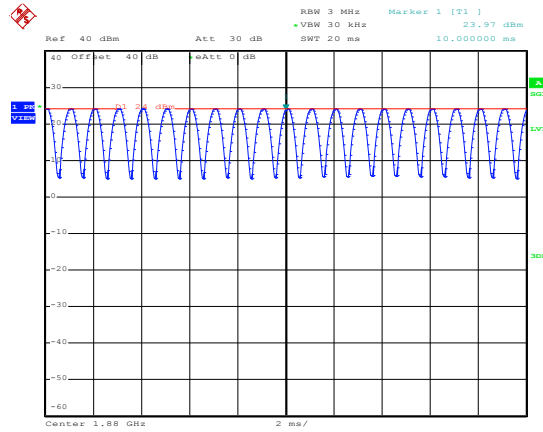
835MHz - CDMA (Full Rate)



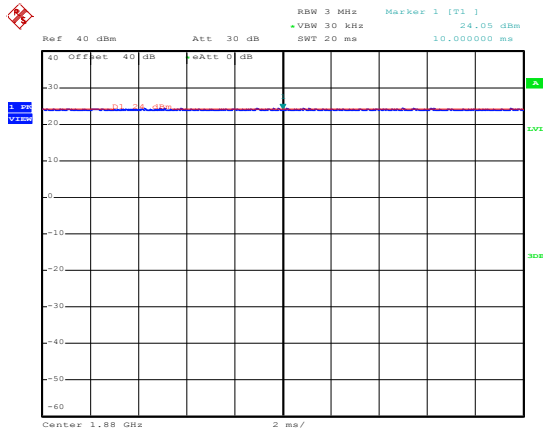
835MHz - CDMA (1/8 Rate)



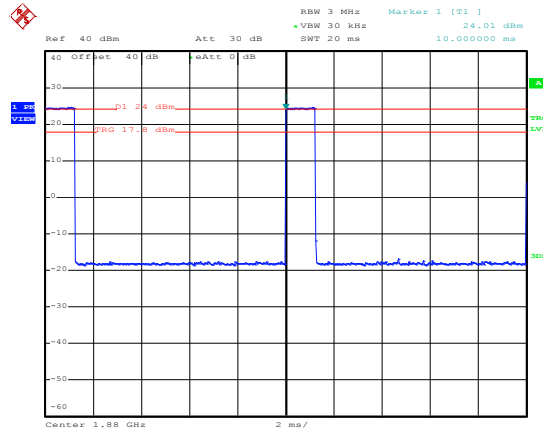
1900MHz - CW



1900MHz - 80% AM



1900MHz - CDMA (Full Rate)



1900MHz - CDMA (1/8 Rate)

9. Description for DUT Testing Position

The DUT was put on device holder and adjusted to the accurate and reliable position. Please refer to Appendix E for the Setup photographs.

Fig. 9.1 illustrate the references and reference plane that shall be used in a typical DUT emissions measurement. The principle of this section is applied to DUT with similar geometry.

- The grid is 5 cm by 5 cm area that is divided into 9 evenly sized blocks or sub-grids.
- The grid is centered on the audio frequency output transducer of the DUT.
- The grid is in a reference plane, which is defined as the planar area that contains 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 DUT handset, which, in normal handset use, rest against the ear.
- The measurement plane is parallel to, and 15 mm in front of, the reference plane.



Fig 9.1 A typical DUT reference and plane for HAC measurements

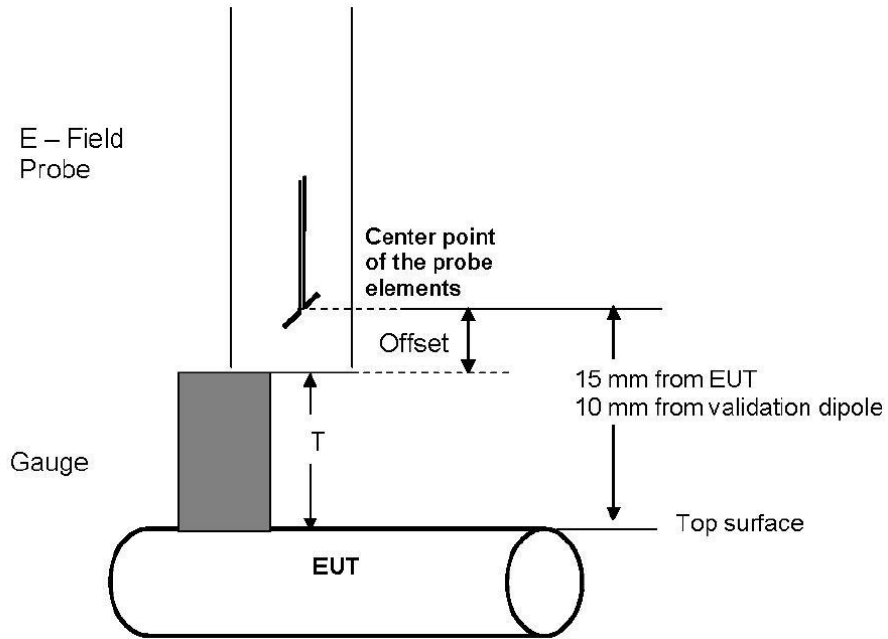


Fig. 9.2 Gauge block with E-field probe

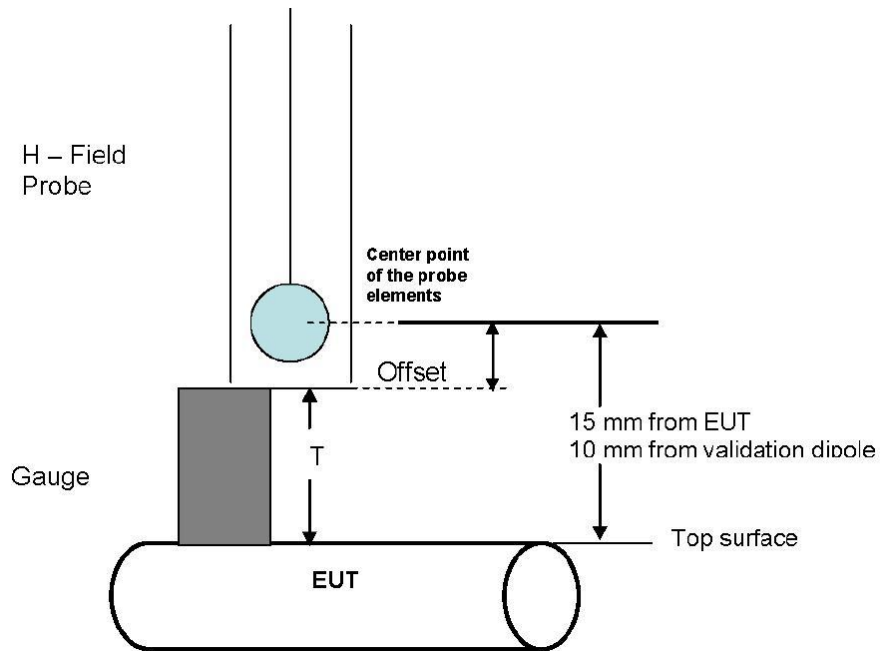


Fig. 9.3 Gauge block with H-field probe



10. RF Emissions Test Procedure

The following illustrate a typical RF emissions test scan over a wireless communications device:

1. Proper operation of the field probe, probe measurement system, other instrumentation, and the positioning system was confirmed.
2. DUT is positioned in its intended test position, acoustic output point of the device perpendicular to the field probe.
3. The DUT operation for maximum rated RF output power was configured and confirmed with the base station simulator, at the test channel and other normal operating parameters as intended for the test. The battery was ensured to be fully charged before each test.
4. The center sub-grid was centered over the center of the acoustic output (also audio band magnetic output, if applicable). The DUT audio output was positioned tangent (as physically possible) to the measurement plane.
5. A surface calibration was performed before each setup change to ensure repeatable spacing and proper maintenance of the measurement plane using the test Arch.
6. The measurement system measured the field strength at the reference location.
7. Measurements at 5 mm increments in the 5 x 5 cm region in equally spaced increments and record the reading at each measurement point. The distance between measurement points shall be sufficient to assure the identification of the peak reading.
8. The system performed a drift evaluation by measuring the field at the reference location.
9. Steps 1 ~ 8 were done for both the E and H-Field measurements.



11. HAC RF Emission Test Results

11.1 Conducted Power (Unit: dBm)

| Band | CDMA2000 BC0 | | | CDMA2000 BC1 | | |
|----------------|--------------|--------|--------|--------------|-------|---------|
| | Channel | 1013 | 384 | 777 | 25 | 600 |
| Frequency | 824.7 | 836.52 | 848.31 | 1851.25 | 1880 | 1908.75 |
| 1xRTT RC1+SO55 | 23.83 | 23.97 | 23.89 | 24.17 | 24.22 | 23.92 |
| 1xRTT RC3+SO55 | 23.92 | 24.05 | 23.92 | 24.18 | 24.23 | 23.93 |

| Band | CDMA2000 BC15 | | |
|----------------|---------------|---------|---------|
| | Channel | 25 | 425 |
| Frequency | 1711.25 | 1731.25 | 1753.75 |
| 1xRTT RC1+SO55 | 23.98 | 23.86 | 23.90 |
| 1xRTT RC3+SO55 | 23.99 | 23.92 | 23.91 |

11.2 E-Field Emission

| Plot No. | Band | Mode | Ch. | PMF | Sample | Battery | Peak E-Field (V/m) | M-Rating |
|----------|----------------------|-----------------|------------|-------------|----------|----------|--------------------|-----------|
| 1 | CDMA2000 BC0 | RC3+SO55 | 1013 | 0.98 | 1 | 1 | 51.1 | M4 |
| 2 | CDMA2000 BC0 | RC3+SO55 | 384 | 0.98 | 1 | 1 | 55 | M4 |
| 3 | CDMA2000 BC0 | RC3+SO55 | 777 | 0.98 | 1 | 1 | 52.3 | M4 |
| 19 | CDMA2000 BC0 | RC3+SO55 | 384 | 0.98 | 2 | 2 | 52.3 | M4 |
| 4 | CDMA2000 BC1 | RC3+SO55 | 25 | 0.98 | 1 | 1 | 30.8 | M4 |
| 5 | CDMA2000 BC1 | RC3+SO55 | 600 | 0.98 | 1 | 1 | 28.5 | M4 |
| 6 | CDMA2000 BC1 | RC3+SO55 | 1175 | 0.98 | 1 | 1 | 27.3 | M4 |
| 20 | CDMA2000 BC1 | RC3+SO55 | 25 | 0.98 | 2 | 2 | 28.5 | M4 |
| 7 | CDMA2000 BC15 | RC3+SO55 | 25 | 0.98 | 1 | 1 | 31 | M4 |
| 8 | CDMA2000 BC15 | RC3+SO55 | 425 | 0.98 | 1 | 1 | 31.9 | M4 |
| 9 | CDMA2000 BC15 | RC3+SO55 | 875 | 0.98 | 1 | 1 | 32.7 | M4 |
| 21 | CDMA2000 BC15 | RC3+SO55 | 875 | 0.98 | 2 | 2 | 31.5 | M4 |



11.3H-Field Emission

| Plot No. | Band | Mode | Ch. | PMF | Sample | Battery | Peak H-Field (A/m) | M-Rating |
|-----------|----------------------|-----------------|------------|-------------|----------|----------|--------------------|-----------|
| 10 | CDMA2000 BC0 | RC3+SO55 | 1013 | 0.94 | 1 | 1 | 0.091 | M4 |
| 11 | CDMA2000 BC0 | RC3+SO55 | 384 | 0.94 | 1 | 1 | 0.094 | M4 |
| 12 | CDMA2000 BC0 | RC3+SO55 | 777 | 0.94 | 1 | 1 | 0.091 | M4 |
| 22 | CDMA2000 BC0 | RC3+SO55 | 384 | 0.94 | 2 | 2 | 0.096 | M4 |
| 13 | CDMA2000 BC1 | RC3+SO55 | 25 | 0.81 | 1 | 1 | 0.076 | M4 |
| 14 | CDMA2000 BC1 | RC3+SO55 | 600 | 0.81 | 1 | 1 | 0.072 | M4 |
| 15 | CDMA2000 BC1 | RC3+SO55 | 1175 | 0.81 | 1 | 1 | 0.069 | M4 |
| 23 | CDMA2000 BC1 | RC3+SO55 | 25 | 0.81 | 2 | 2 | 0.069 | M4 |
| 16 | CDMA2000 BC15 | RC3+SO55 | 25 | 0.81 | 1 | 1 | 0.076 | M4 |
| 17 | CDMA2000 BC15 | RC3+SO55 | 425 | 0.81 | 1 | 1 | 0.072 | M4 |
| 18 | CDMA2000 BC15 | RC3+SO55 | 875 | 0.81 | 1 | 1 | 0.073 | M4 |
| 24 | CDMA2000 BC15 | RC3+SO55 | 25 | 0.81 | 2 | 2 | 0.067 | M4 |

Remark:

- 1. The volume was adjusted to maximum level and the backlight turned on during RF Emission testing.
- 2. There is no special HAC mode software on this DUT.

Test Engineer : Nick Yu and Jack Wu



12. References

- [1] ANSI C63.19-2007, "American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids", 8 June 2007
- [2] SPEAG DASY System Handbook



Appendix A. Plots of System Performance Check

The plots are shown as follows.

HAC_E_Dipole_835_120910

DUT: Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

E Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 166.0 V/m

Probe Modulation Factor = 1

Reference Value = 121.4 V/m; Power Drift = 0.00779 dB

Average value of Total=(165.7+166) / 2 = 165.85 V/m

Peak E-field in V/m

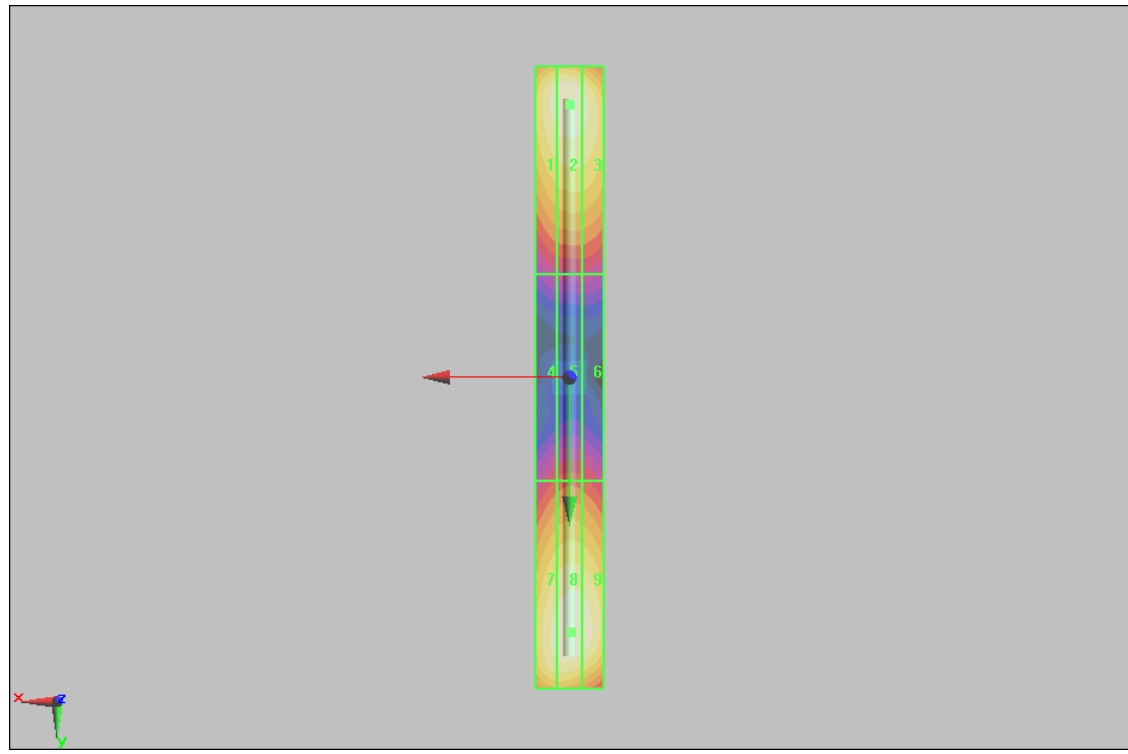
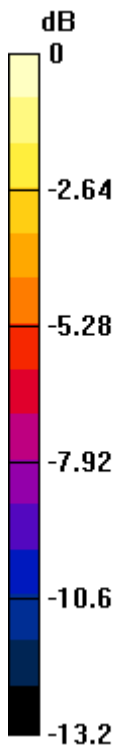
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 160.4 M4 | Grid 2 165.7 M4 | Grid 3 158.8 M4 |
| Grid 4 84 M4 | Grid 5 87.6 M4 | Grid 6 85.4 M4 |
| Grid 7 158.7 M4 | Grid 8 166.0 M4 | Grid 9 162.9 M4 |

Cursor:

Total = 166.0 V/m

E Category: M4

Location: -0.5, 73.5, 4.7 mm



0 dB = 166.0V/m

HAC_E_Dipole_835_120922

DUT: Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.5 °C; Liquid Temperature : 21.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

E Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 172.4 V/m

Probe Modulation Factor = 1

Reference Value = 126.5 V/m; Power Drift = -0.018 dB

Average value of Total=(172.4+172.1) / 2 = 172.25 V/m

Peak E-field in V/m

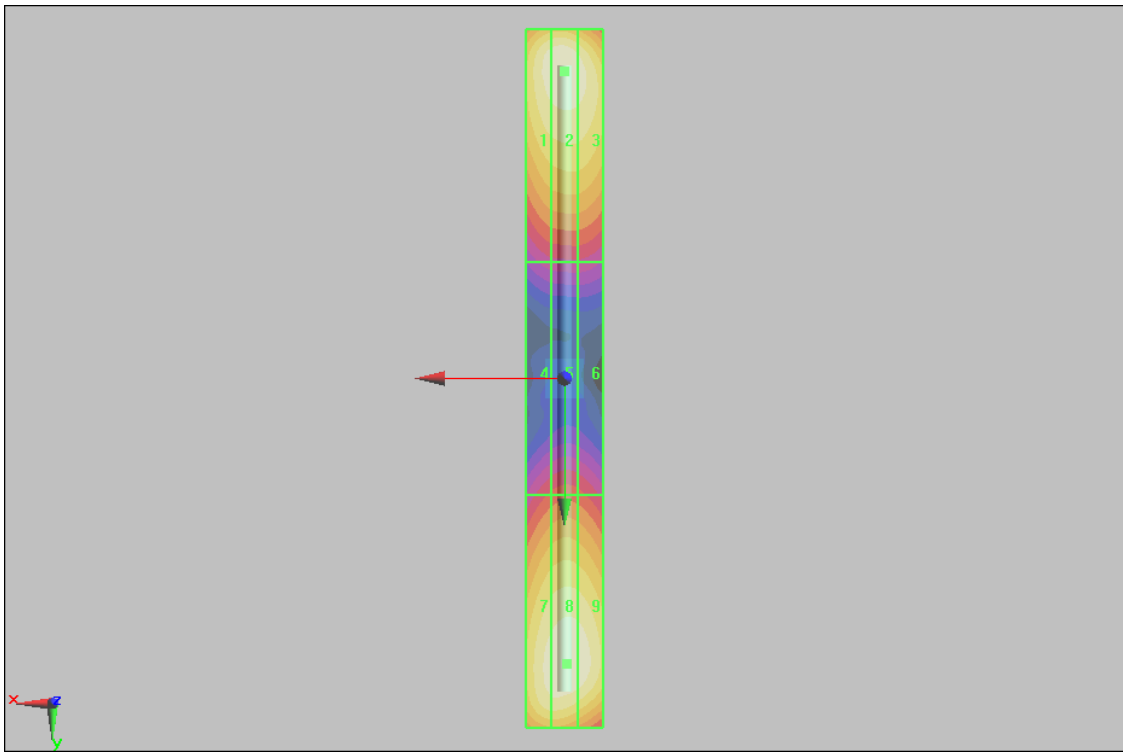
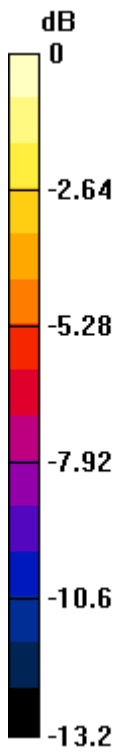
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 167.2 M4 | Grid 2 172.4 M4 | Grid 3 165.3 M4 |
| Grid 4 87.2 M4 | Grid 5 91 M4 | Grid 6 88.8 M4 |
| Grid 7 164.8 M4 | Grid 8 172.1 M4 | Grid 9 168.9 M4 |

Cursor:

Total = 172.4 V/m

E Category: M4

Location: 0, -79, 4.7 mm



0 dB = 172.4V/m

HAC_E_Dipole_1880_120910

DUT: HAC Dipole 1880 MHz

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

E Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 130.4 V/m

Probe Modulation Factor = 1

Reference Value = 132.5 V/m; Power Drift = 0.00473 dB

Average value of Total=(130.4+130.4) / 2 = 130.4 V/m

Peak E-field in V/m

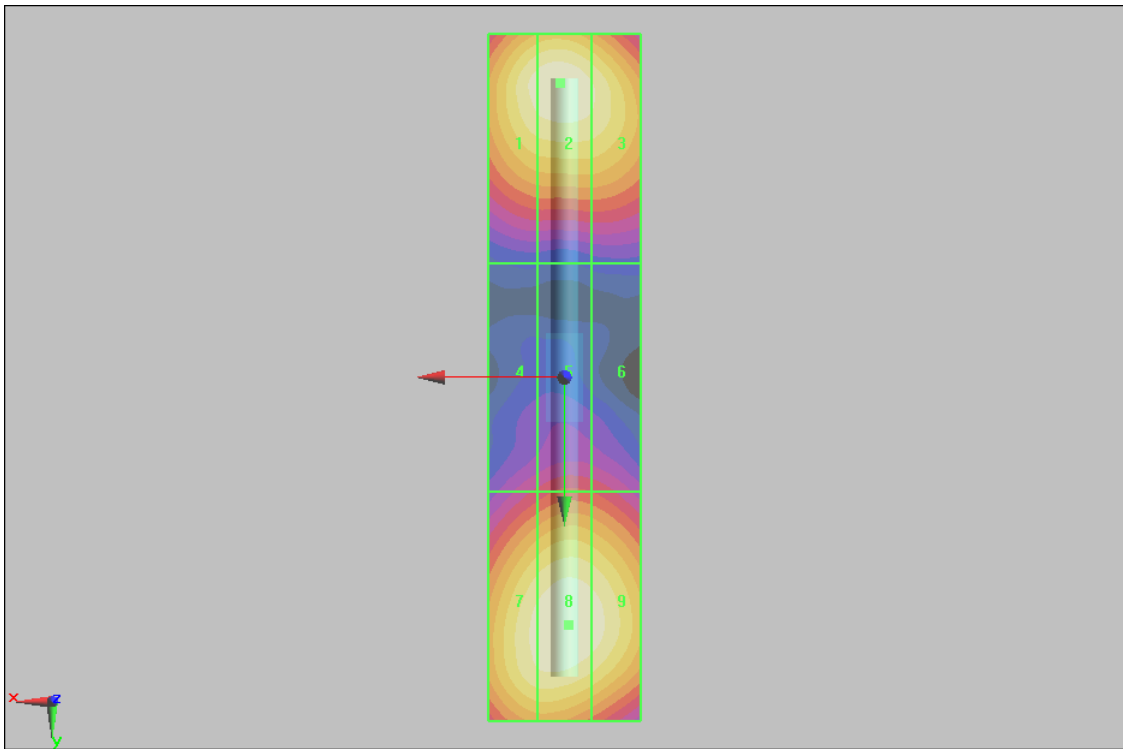
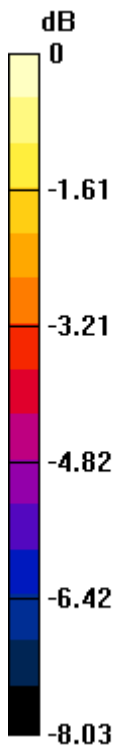
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 126.8 M2 | Grid 2 130.4 M2 | Grid 3 124.2 M2 |
| Grid 4 81.5 M3 | Grid 5 86.7 M3 | Grid 6 85 M3 |
| Grid 7 126.1 M2 | Grid 8 130.4 M2 | Grid 9 127.3 M2 |

Cursor:

Total = 130.4 V/m

E Category: M2

Location: 0.5, -38.5, 4.7 mm



0 dB = 130.4V/m

HAC_E_Dipole_1880_120922

DUT: HAC Dipole 1880 MHz

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

E Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 142.7 V/m

Probe Modulation Factor = 1

Reference Value = 145.2 V/m; Power Drift = -0.027 dB

Average value of Total=(142.7+142.7) / 2 = 142.7 V/m

Peak E-field in V/m

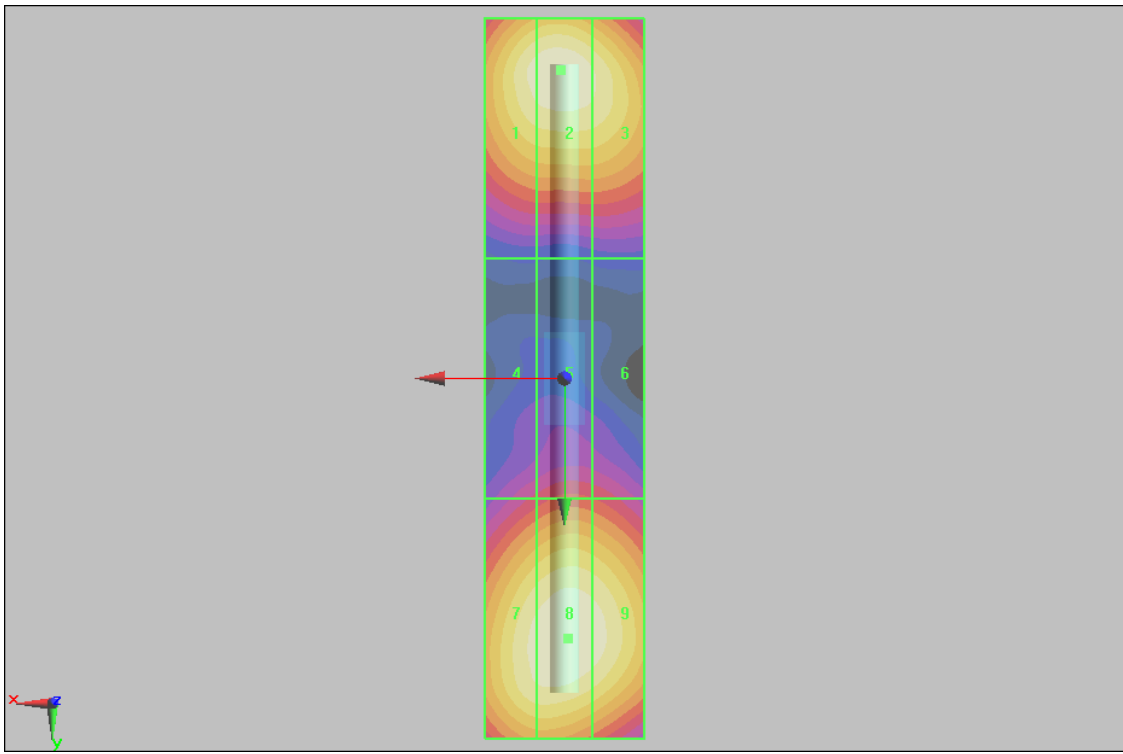
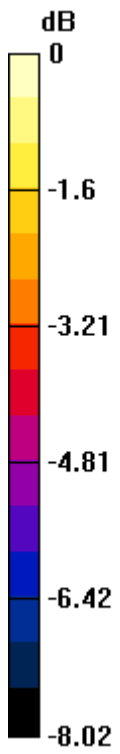
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 138.6 M2 | Grid 2 142.7 M2 | Grid 3 135.8 M2 |
| Grid 4 89.3 M3 | Grid 5 95 M3 | Grid 6 93.1 M3 |
| Grid 7 138.0 M2 | Grid 8 142.7 M2 | Grid 9 139.3 M2 |

Cursor:

Total = 142.7 V/m

E Category: M2

Location: 0.5, -38.5, 4.7 mm



0 dB = 142.7V/m

HAC_H_Dipole_835_120910

DUT: HAC-Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
 Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

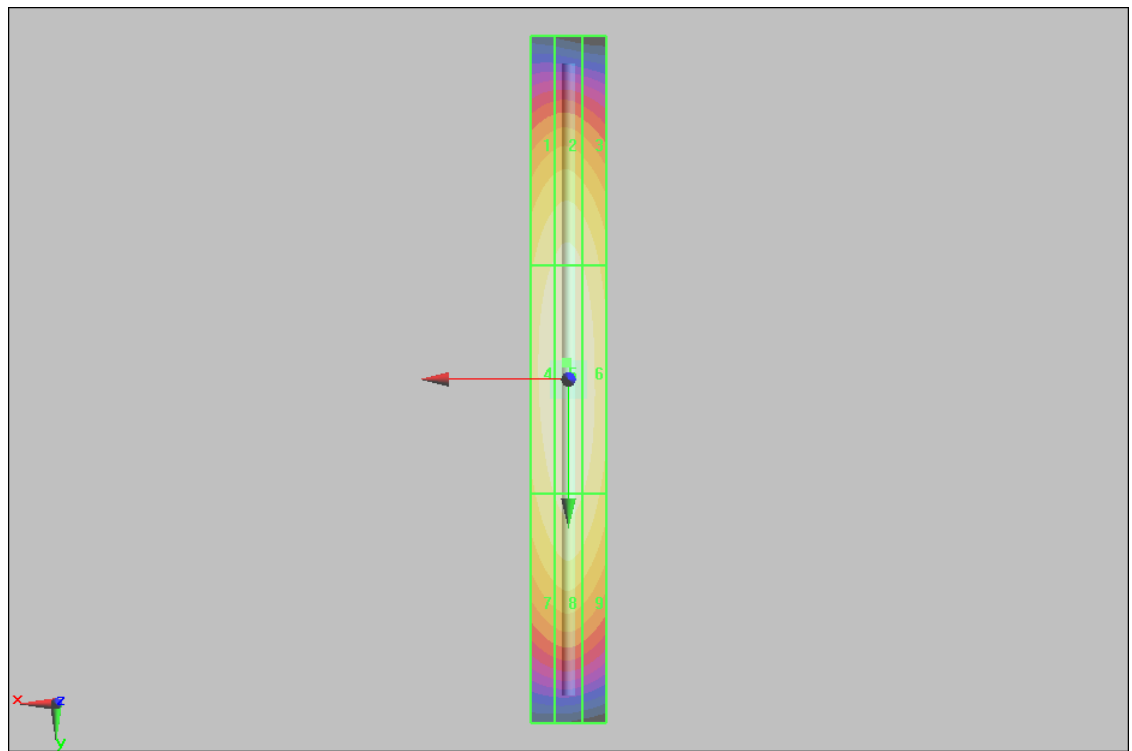
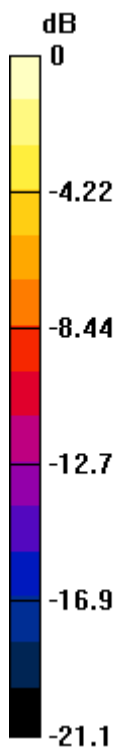
H Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm
 Probe Modulation Factor = 1
 Reference Value = 0.521 A/m; Power Drift = -0.052 dB
 Maximum value of peak Total field = 0.468 A/m

Peak H-field in A/m

| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.407 M4 | Grid 2 0.425 M4 | Grid 3 0.400 M4 |
| Grid 4 0.450 M4 | Grid 5 0.468 M4 | Grid 6 0.444 M4 |
| Grid 7 0.401 M4 | Grid 8 0.422 M4 | Grid 9 0.401 M4 |

Cursor:

Total = 0.468 A/m
 H Category: M4
 Location: 0.5, -4.5, 5.2 mm



0 dB = 0.468A/m

HAC_H_Dipole_835_120922

DUT: HAC-Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
 Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

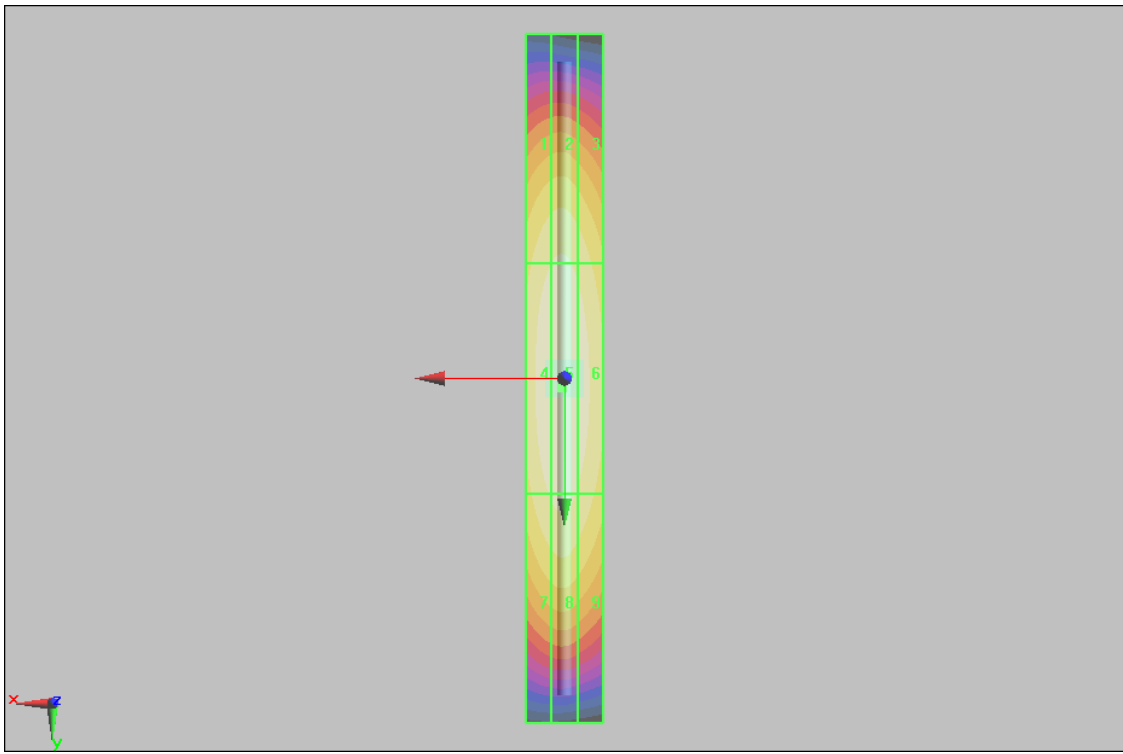
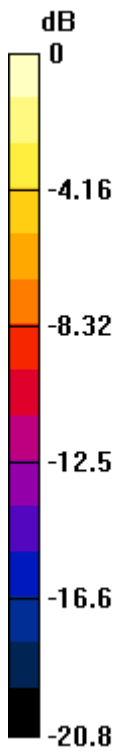
H Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm
 Probe Modulation Factor = 1
 Reference Value = 0.491 A/m; Power Drift = -0.00559 dB
 Maximum value of peak Total field = 0.443 A/m

Peak H-field in A/m

| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.377 M4 | Grid 2 0.388 M4 | Grid 3 0.363 M4 |
| Grid 4 0.429 M4 | Grid 5 0.443 M4 | Grid 6 0.415 M4 |
| Grid 7 0.384 M4 | Grid 8 0.398 M4 | Grid 9 0.371 M4 |

Cursor:

Total = 0.443 A/m
 H Category: M4
 Location: 0.5, 2.5, 5.2 mm



0 dB = 0.443A/m

HAC_H_Dipole_1880_120910

DUT: HAC Dipole 1880 MHz

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
 Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

H Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm
 Probe Modulation Factor = 1
 Reference Value = 0.542 A/m; Power Drift = 0.00106 dB
 Maximum value of peak Total field = 0.491 A/m

Peak H-field in A/m

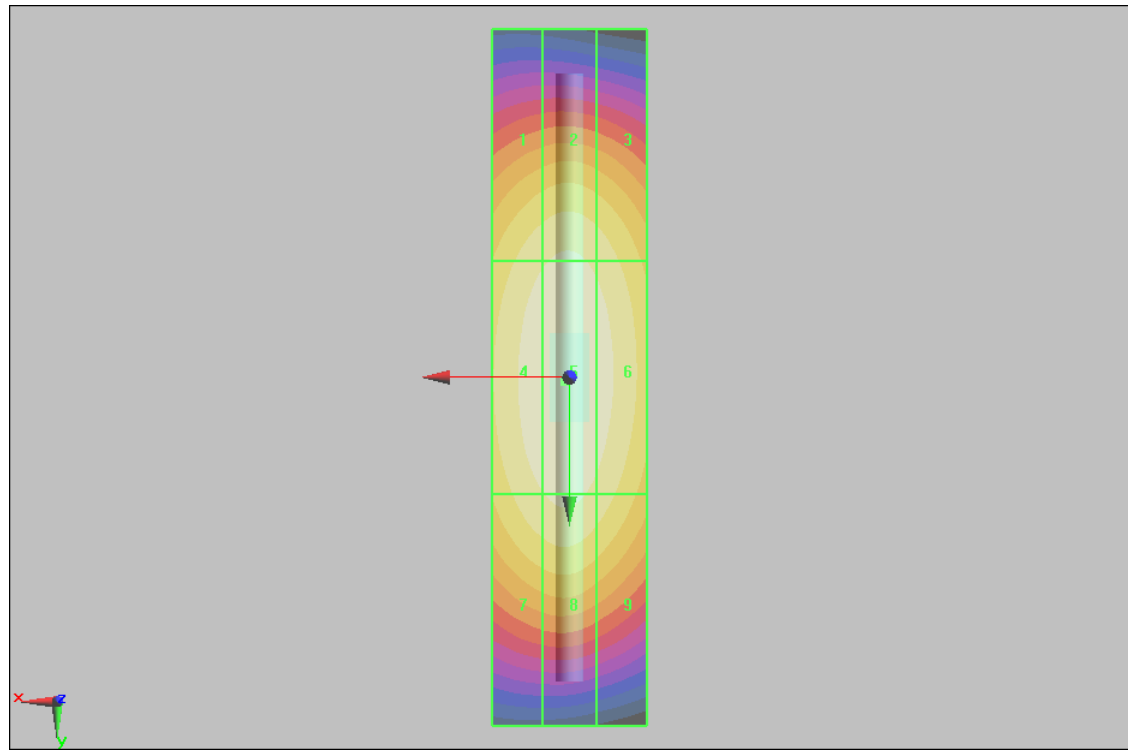
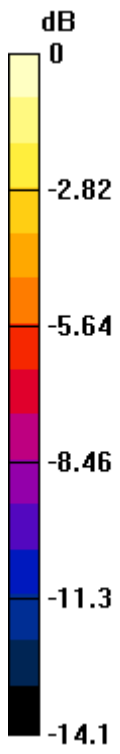
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.435 M2 | Grid 2 0.451 M2 | Grid 3 0.429 M2 |
| Grid 4 0.475 M2 | Grid 5 0.491 M2 | Grid 6 0.468 M2 |
| Grid 7 0.439 M2 | Grid 8 0.453 M2 | Grid 9 0.426 M2 |

Cursor:

Total = 0.491 A/m

H Category: M2

Location: 0.5, 0.5, 5.2 mm



0 dB = 0.491A/m

HAC_H_Dipole_1880_120922

DUT: HAC Dipole 1880 MHz

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
 Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

H Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm
 Probe Modulation Factor = 1
 Reference Value = 0.542 A/m; Power Drift = 0.00107 dB
 Maximum value of peak Total field = 0.492 A/m

Peak H-field in A/m

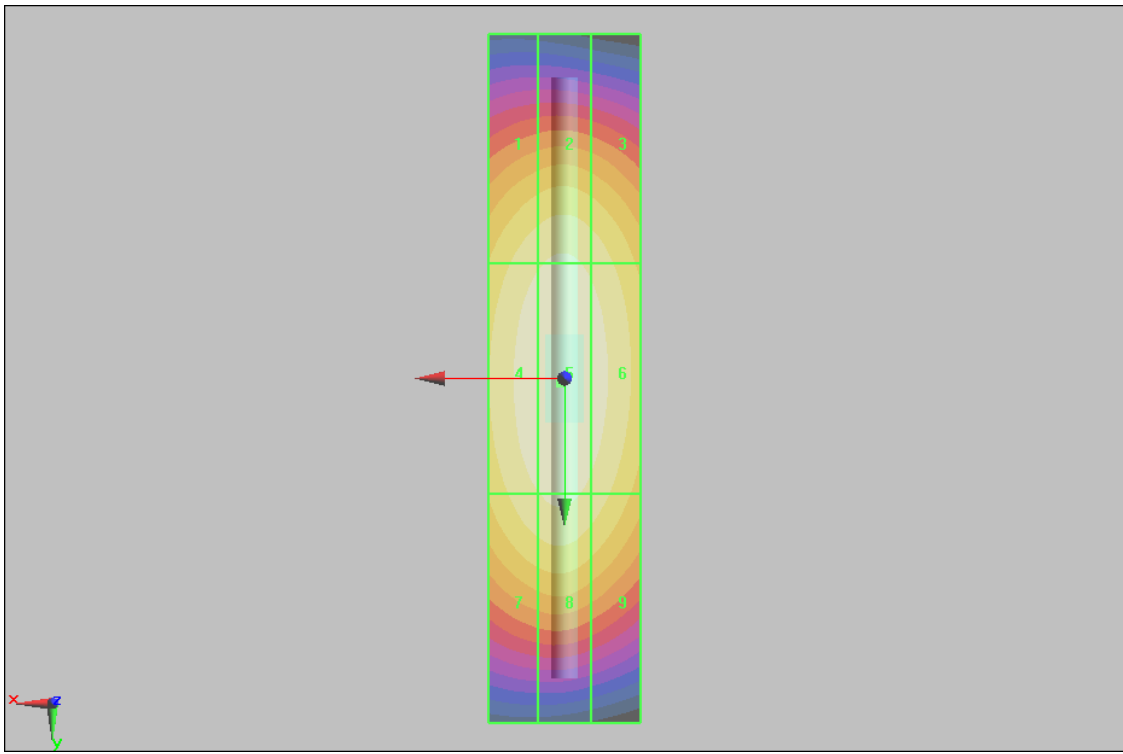
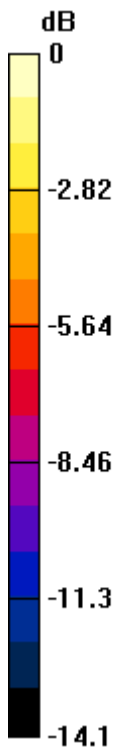
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.436 M2 | Grid 2 0.452 M2 | Grid 3 0.43 M2 |
| Grid 4 0.476 M2 | Grid 5 0.492 M2 | Grid 6 0.469 M2 |
| Grid 7 0.44 M2 | Grid 8 0.454 M2 | Grid 9 0.427 M2 |

Cursor:

Total = 0.492 A/m

H Category: M2

Location: 0.5, 0.5, 5.2 mm



0 dB = 0.491A/m



Appendix B. Plots of RF Emission Measurement

The plots are shown as follows.

#01 HAC_E_CDMA2000 BC0_RC3+SO55_Ch1013_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 824.7 MHz;Duty Cycle: 1:1
 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
 Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch1013/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 51.1 V/m

Probe Modulation Factor = 0.980

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 68.8 V/m; Power Drift = -0.135 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

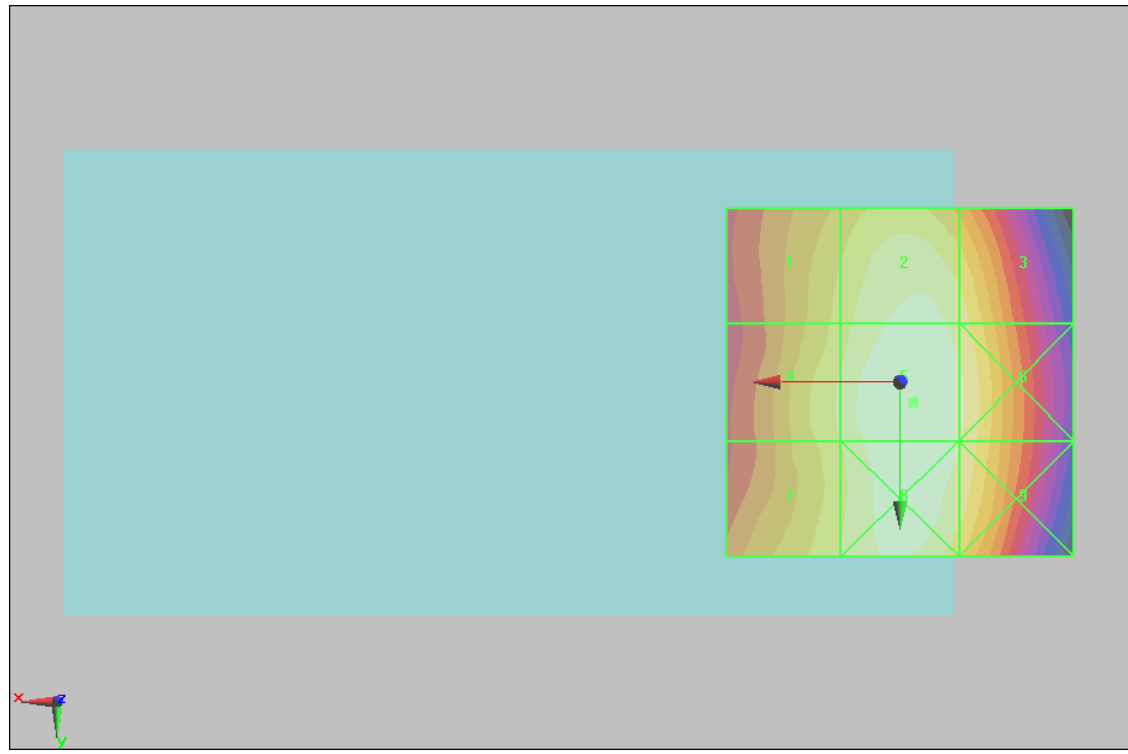
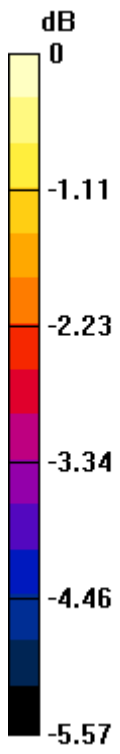
| | | |
|----------------|----------------|----------------|
| Grid 1 | Grid 2 | Grid 3 |
| 45.9 M4 | 49.7 M4 | 48.1 M4 |
| Grid 4 | Grid 5 | Grid 6 |
| 47.5 M4 | 51.1 M4 | 49.6 M4 |
| Grid 7 | Grid 8 | Grid 9 |
| 47.1 M4 | 50.6 M4 | 49.1 M4 |

Cursor:

Total = 51.1 V/m

E Category: M4

Location: -2, 3, 8.7 mm



0 dB = 51.1V/m

#02 HAC_E_CDMA2000 BC0_RC3+SO55_Ch384_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch384/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 55 V/m

Probe Modulation Factor = 0.980

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 73.2 V/m; Power Drift = -0.060 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

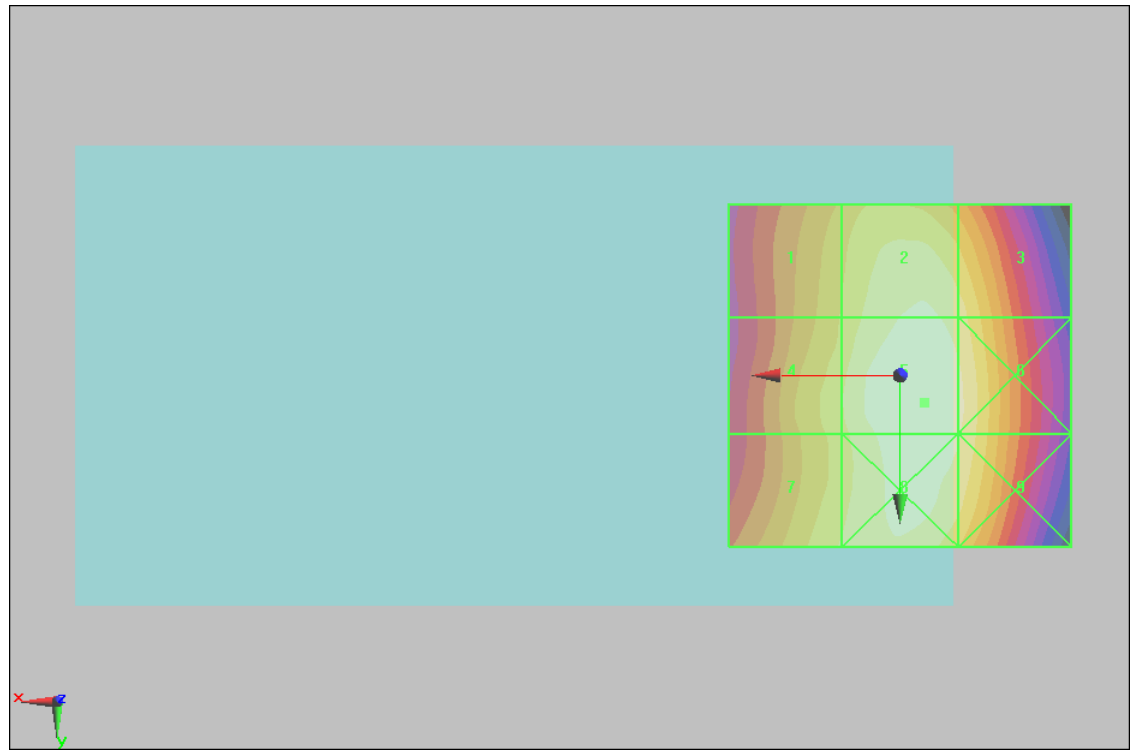
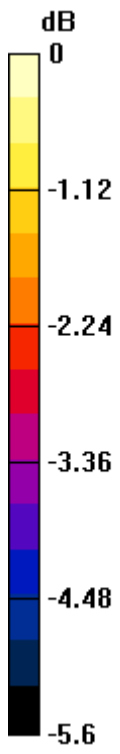
| | | |
|----------------|----------------|----------------|
| Grid 1 | Grid 2 | Grid 3 |
| 48.6 M4 | 53.2 M4 | 51.6 M4 |
| Grid 4 | Grid 5 | Grid 6 |
| 50.3 M4 | 55 M4 | 53.3 M4 |
| Grid 7 | Grid 8 | Grid 9 |
| 50.7 M4 | 54.5 M4 | 52.9 M4 |

Cursor:

Total = 55 V/m

E Category: M4

Location: -3.5, 4, 8.7 mm



0 dB = 55V/m

#03 HAC_E_CDMA2000 BC0_RC3+SO55_Ch777_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 848.31 MHz; Duty Cycle: 1:1
 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
 Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch777/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 52.3 V/m

Probe Modulation Factor = 0.980

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 69.8 V/m; Power Drift = -0.082 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

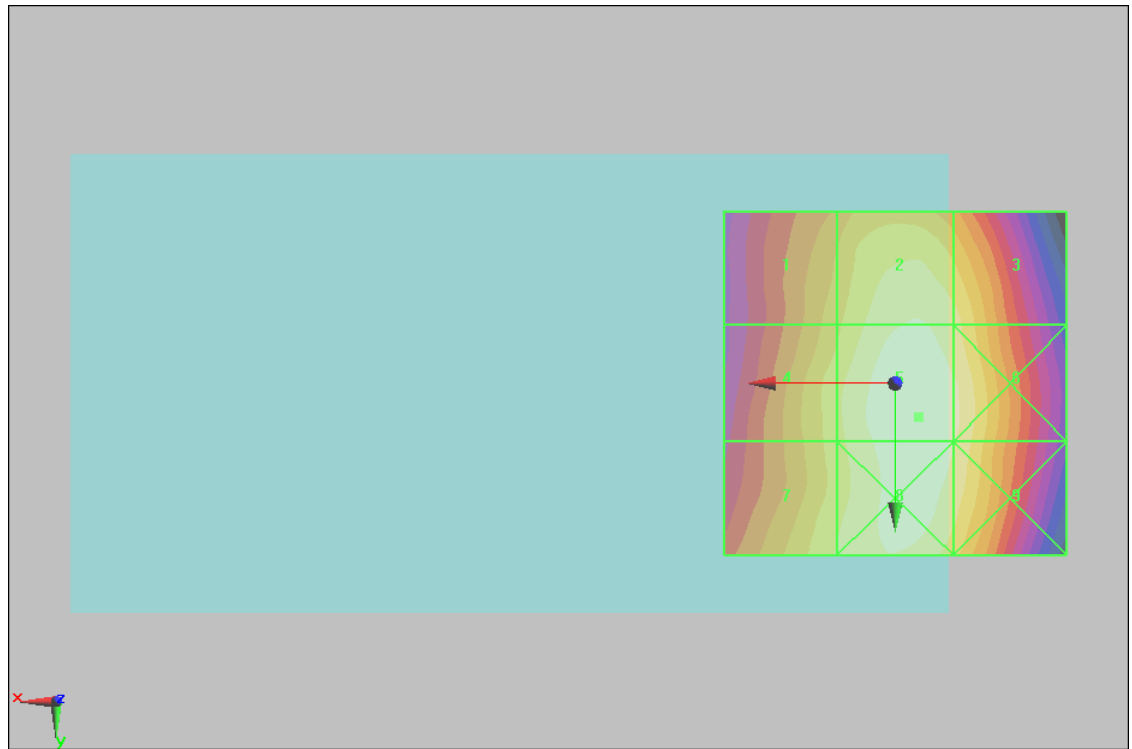
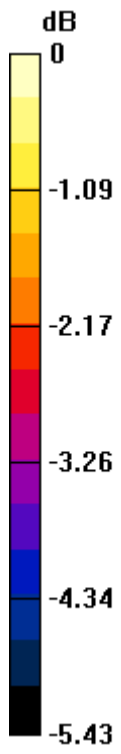
| | | |
|----------------|----------------|----------------|
| Grid 1 | Grid 2 | Grid 3 |
| 45.8 M4 | 50.4 M4 | 48.9 M4 |
| Grid 4 | Grid 5 | Grid 6 |
| 47.7 M4 | 52.3 M4 | 50.8 M4 |
| Grid 7 | Grid 8 | Grid 9 |
| 48.3 M4 | 52 M4 | 50.3 M4 |

Cursor:

Total = 52.3 V/m

E Category: M4

Location: -3.5, 5, 8.7 mm



0 dB = 52.3V/m

#19 HAC_E_CDMA2000 BC0_RC3+SO55_Ch384_Sample2_Battery2

DUT: 281609

Communication System: CDMA ; Frequency: 836.52 MHz;Duty Cycle: 1:1
 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
 Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch384/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 52.3 V/m

Probe Modulation Factor = 0.980

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 68 V/m; Power Drift = 0.014 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

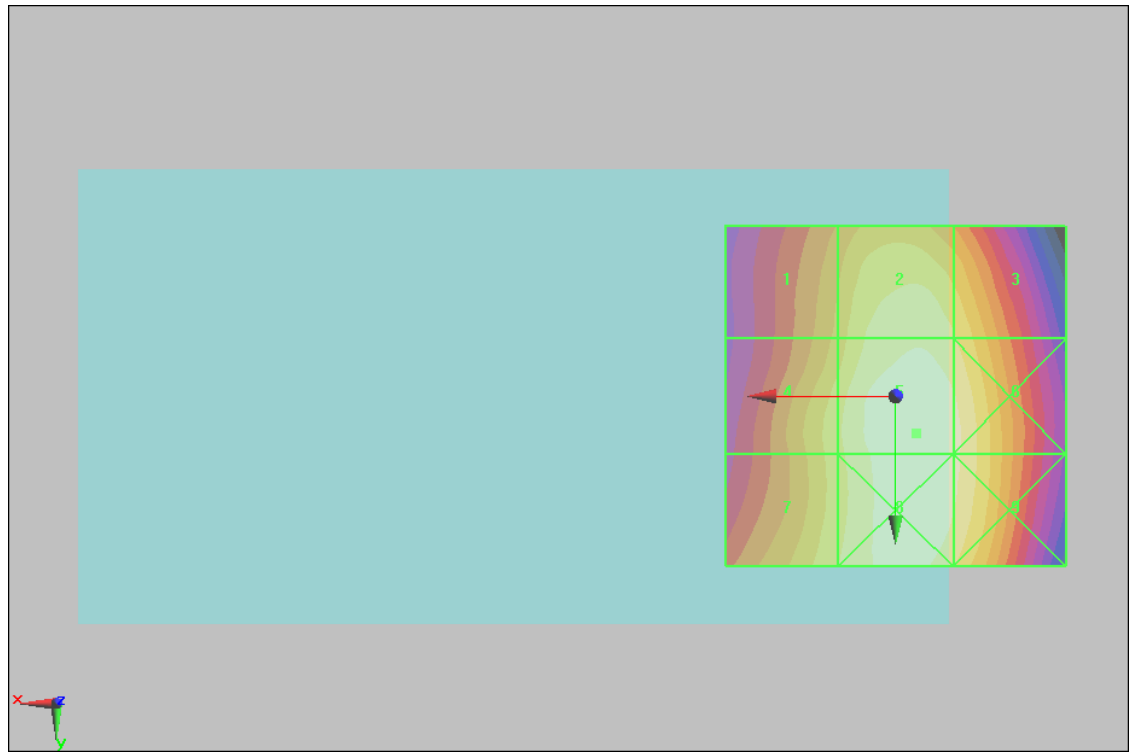
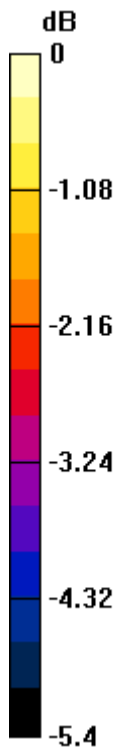
| | | |
|----------------|----------------|----------------|
| Grid 1 | Grid 2 | Grid 3 |
| 45.1 M4 | 49.9 M4 | 48.4 M4 |
| Grid 4 | Grid 5 | Grid 6 |
| 47.7 M4 | 52.3 M4 | 50.9 M4 |
| Grid 7 | Grid 8 | Grid 9 |
| 48.1 M4 | 52.1 M4 | 50.8 M4 |

Cursor:

Total = 52.3 V/m

E Category: M4

Location: -3, 5.5, 8.7 mm



0 dB = 52.3V/m

#04 HAC_E_CDMA2000 BC1_RC3+SO55_Ch25_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 1851.25 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26

- Sensor-Surface: (Fix Surface)

- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12

- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch25/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 30.8 V/m

Probe Modulation Factor = 0.980

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 26.8 V/m; Power Drift = 0.057 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

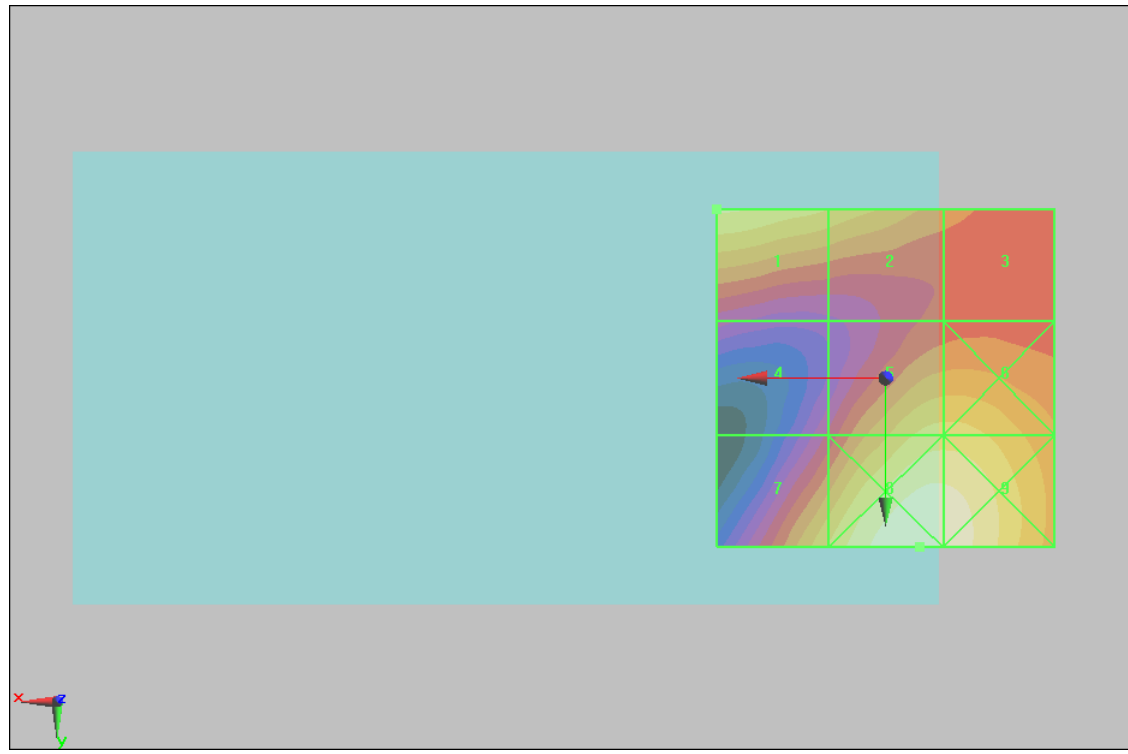
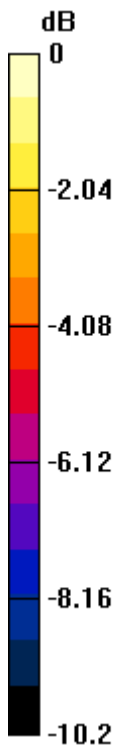
| | | |
|--------------------------|--------------------------|--------------------------|
| Grid 1 30.8 M4 | Grid 2 28.1 M4 | Grid 3 23.3 M4 |
| Grid 4 19.5 M4 | Grid 5 29.2 M4 | Grid 6 29.2 M4 |
| Grid 7 28.3 M4 | Grid 8 35.5 M4 | Grid 9 34.9 M4 |

Cursor:

Total = 35.5 V/m

E Category: M4

Location: -5, 25, 8.7 mm



0 dB = 35.5V/m

#05 HAC_E_CDMA2000 BC1_RC3+SO55_Ch600_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 1880 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch600/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 28.5 V/m

Probe Modulation Factor = 0.980

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 24.5 V/m; Power Drift = 0.075 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

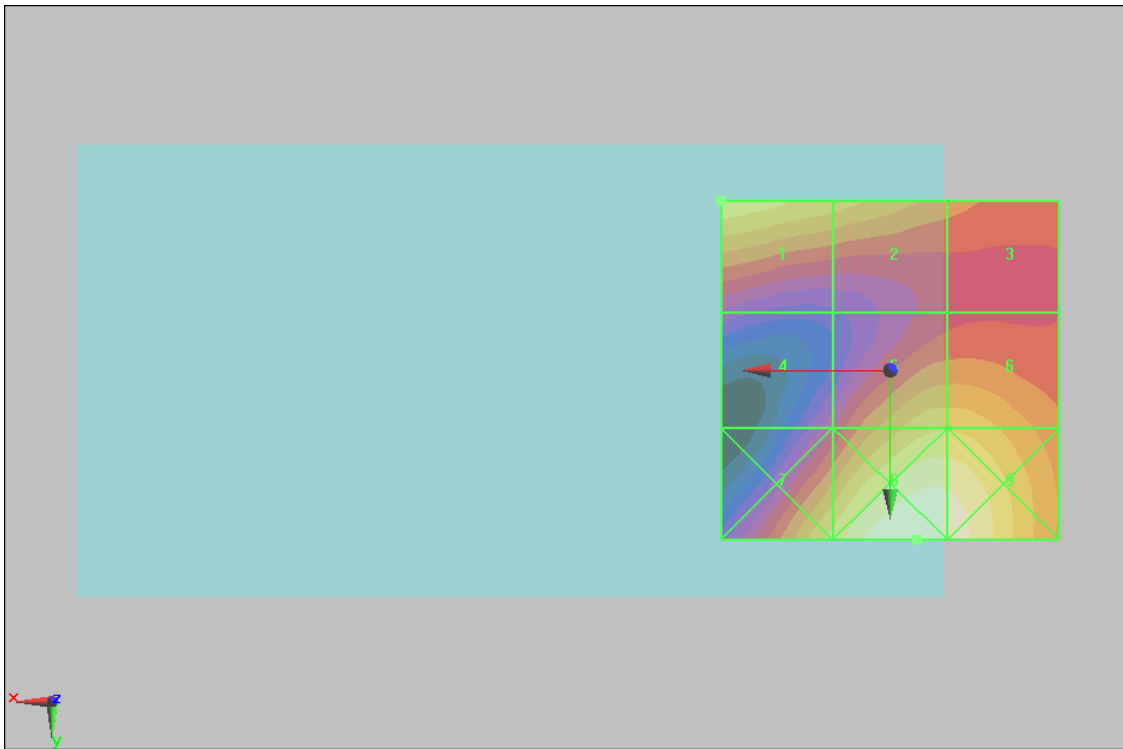
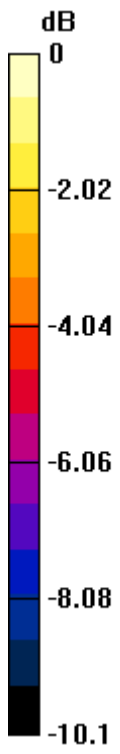
| | | |
|----------------|----------------|----------------|
| Grid 1 | Grid 2 | Grid 3 |
| 28.5 M4 | 25.9 M4 | 22.1 M4 |
| Grid 4 | Grid 5 | Grid 6 |
| 18.1 M4 | 26.4 M4 | 26.4 M4 |
| Grid 7 | Grid 8 | Grid 9 |
| 27.7 M4 | 33.6 M4 | 32.8 M4 |

Cursor:

Total = 33.6 V/m

E Category: M4

Location: -4, 25, 8.7 mm



0 dB = 33.6V/m

#06 HAC_E_CDMA2000 BC1_RC3+SO55_Ch1175_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 1908.75 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26

- Sensor-Surface: (Fix Surface)

- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12

- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch1175/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 27.3 V/m

Probe Modulation Factor = 0.980

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 19.8 V/m; Power Drift = 0.059 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

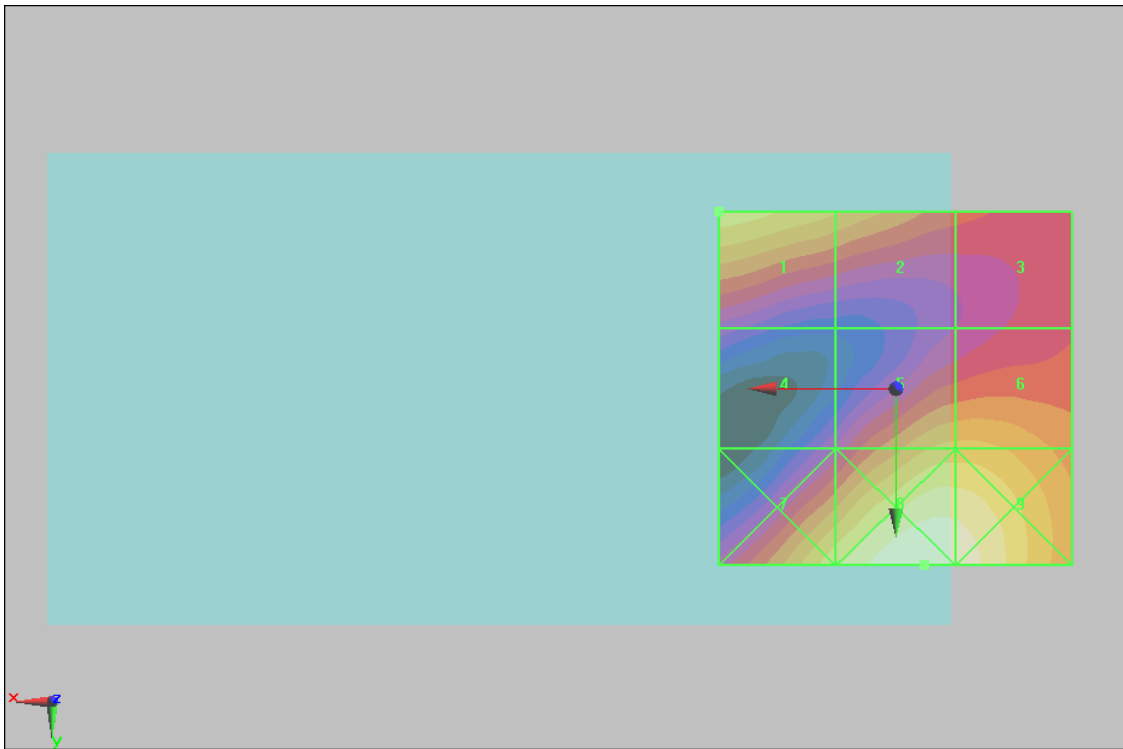
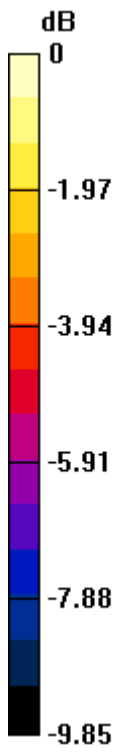
| | | |
|----------------|----------------|----------------|
| Grid 1 | Grid 2 | Grid 3 |
| 27.3 M4 | 24.2 M4 | 19.9 M4 |
| Grid 4 | Grid 5 | Grid 6 |
| 16.8 M4 | 24.8 M4 | 24.8 M4 |
| Grid 7 | Grid 8 | Grid 9 |
| 27.7 M4 | 32.5 M4 | 31.8 M4 |

Cursor:

Total = 32.5 V/m

E Category: M4

Location: -4, 25, 8.7 mm



0 dB = 32.5V/m

#20 HAC_E_CDMA2000 BC1_RC3+SO55_Ch25_Sample2_Battery2

DUT: 281609

Communication System: CDMA ; Frequency: 1851.25 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26

- Sensor-Surface: (Fix Surface)

- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12

- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch25/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 28.5 V/m

Probe Modulation Factor = 0.980

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 24.9 V/m; Power Drift = 0.140 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

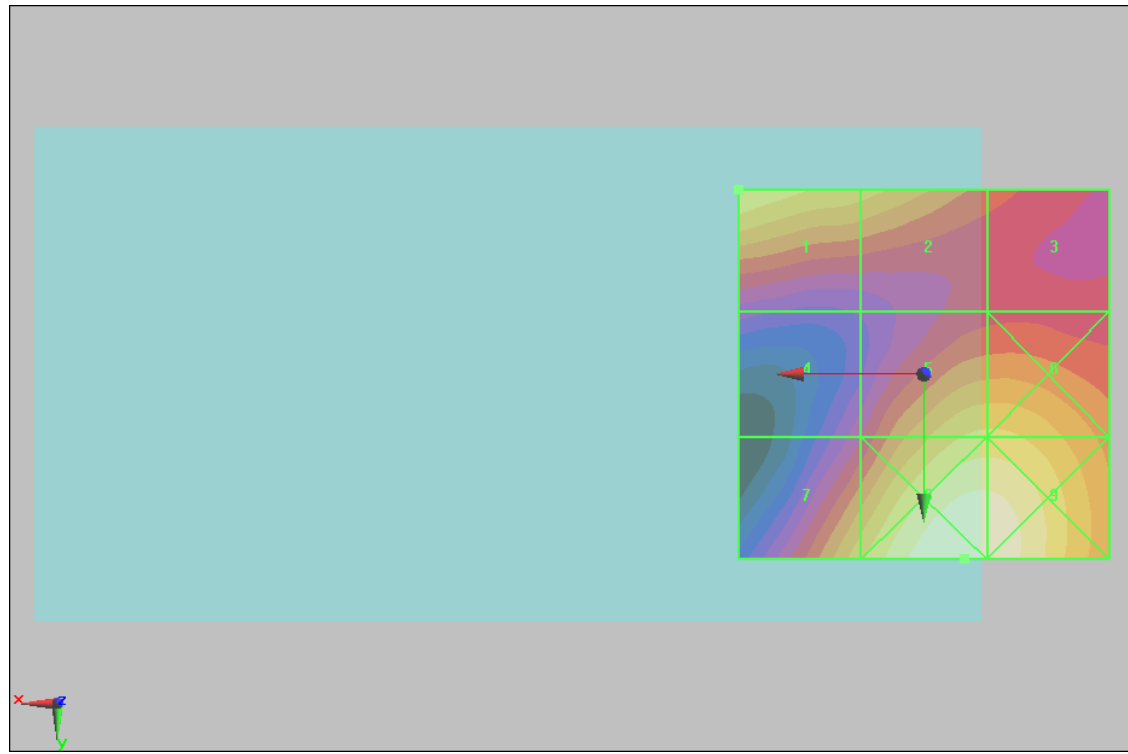
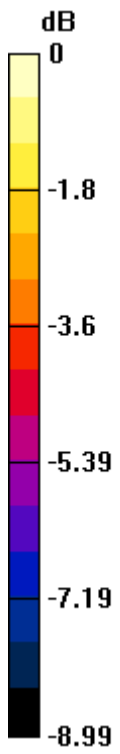
| | | |
|--------------------------|--------------------------|--------------------------|
| Grid 1 28.5 M4 | Grid 2 25.9 M4 | Grid 3 21.3 M4 |
| Grid 4 18.9 M4 | Grid 5 27.2 M4 | Grid 6 27.2 M4 |
| Grid 7 26.3 M4 | Grid 8 32.8 M4 | Grid 9 32.4 M4 |

Cursor:

Total = 32.8 V/m

E Category: M4

Location: -5.5, 25, 8.7 mm



0 dB = 32.8V/m

#07 HAC_E_CDMA2000 BC15_RC3+SO55_Ch25_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 1711.25 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26

- Sensor-Surface: (Fix Surface)

- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12

- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch25/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 31 V/m

Probe Modulation Factor = 0.980

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 27 V/m; Power Drift = 0.00794 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

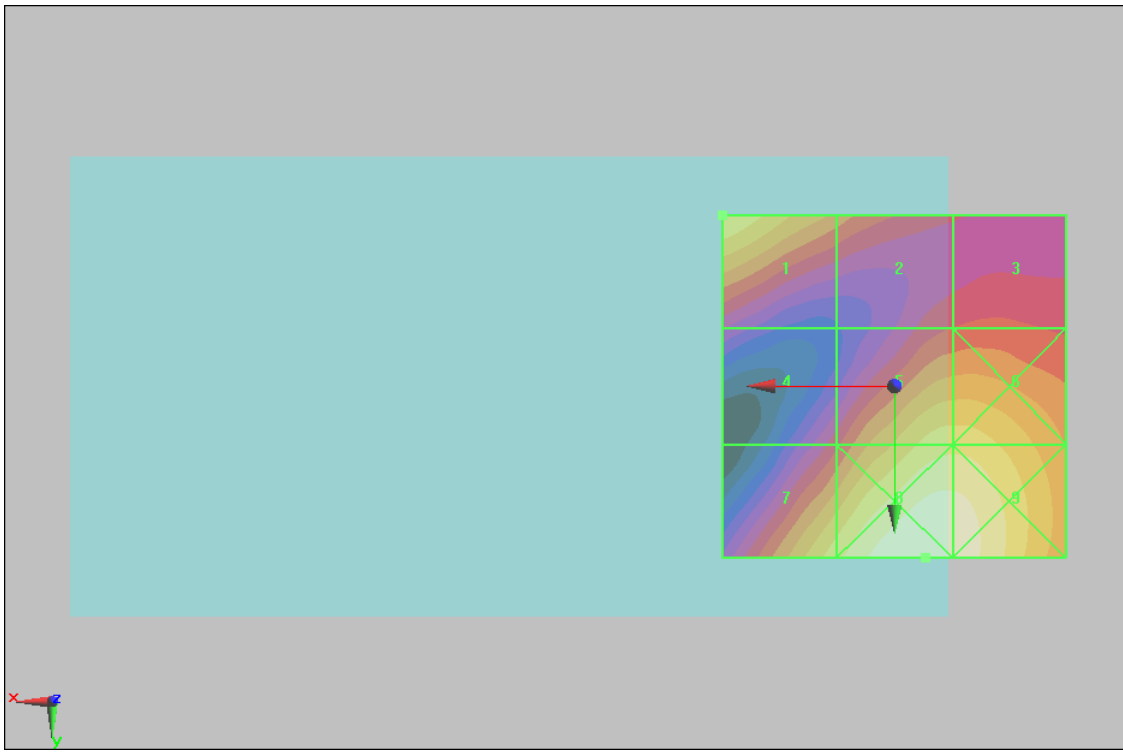
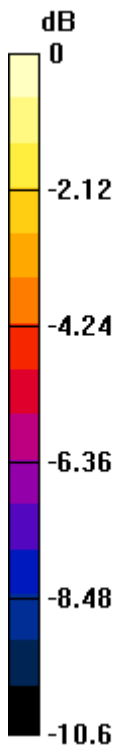
| | | |
|--------------------------|--------------------------|--------------------------|
| Grid 1 31 M4 | Grid 2 23.5 M4 | Grid 3 20.8 M4 |
| Grid 4 19.9 M4 | Grid 5 29.8 M4 | Grid 6 29.8 M4 |
| Grid 7 29.7 M4 | Grid 8 35.9 M4 | Grid 9 35.1 M4 |

Cursor:

Total = 35.9 V/m

E Category: M4

Location: -4.5, 25, 8.7 mm



0 dB = 35.9V/m

#08 HAC_E_CDMA2000 BC15_RC3+SO55_Ch425_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 1731.25 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch425/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 31.9 V/m

Probe Modulation Factor = 0.980

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 27.1 V/m; Power Drift = 0.021 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

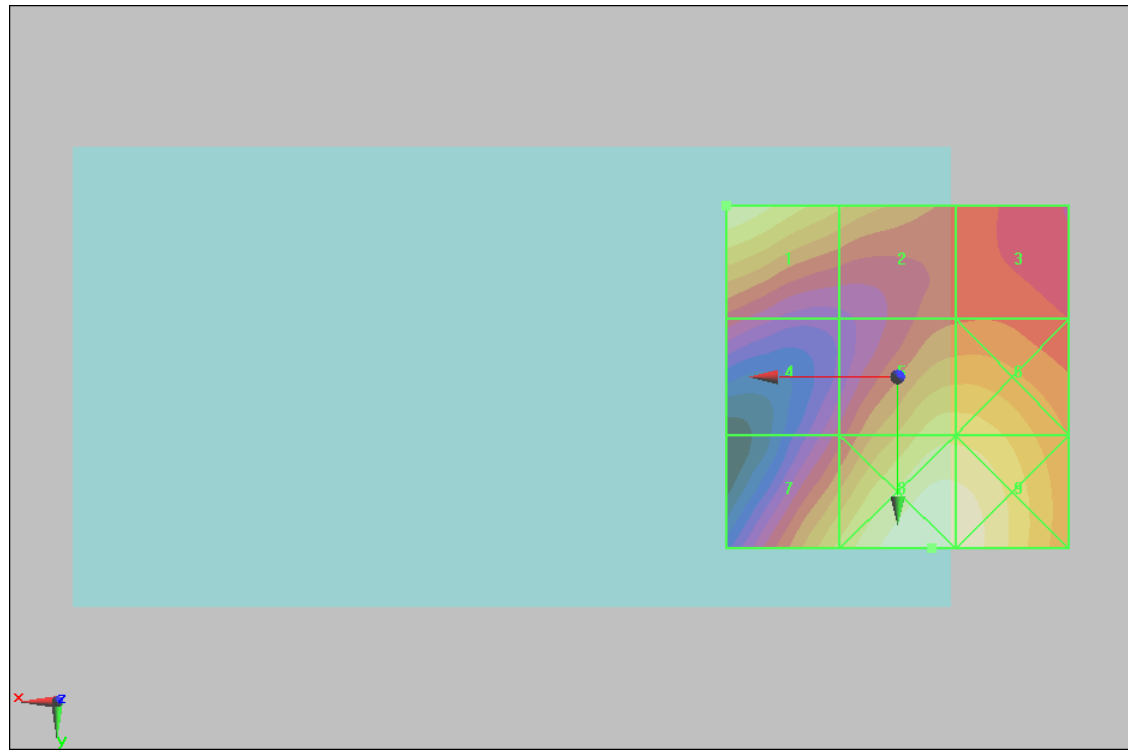
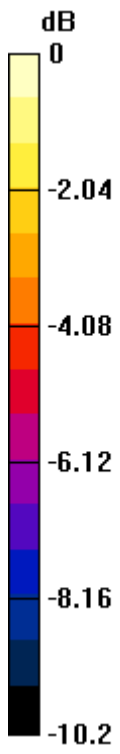
| | | |
|----------------|----------------|----------------|
| Grid 1 | Grid 2 | Grid 3 |
| 31.9 M4 | 25.6 M4 | 21.4 M4 |
| Grid 4 | Grid 5 | Grid 6 |
| 19.4 M4 | 28.8 M4 | 28.7 M4 |
| Grid 7 | Grid 8 | Grid 9 |
| 27.8 M4 | 34.3 M4 | 33.7 M4 |

Cursor:

Total = 34.3 V/m

E Category: M4

Location: -5, 25, 8.7 mm



0 dB = 34.3V/m

#09 HAC_E_CDMA2000 BC15_RC3+SO55_Ch875_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 1753.75 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch875/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 32.7 V/m

Probe Modulation Factor = 0.980

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 27.6 V/m; Power Drift = -0.053 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

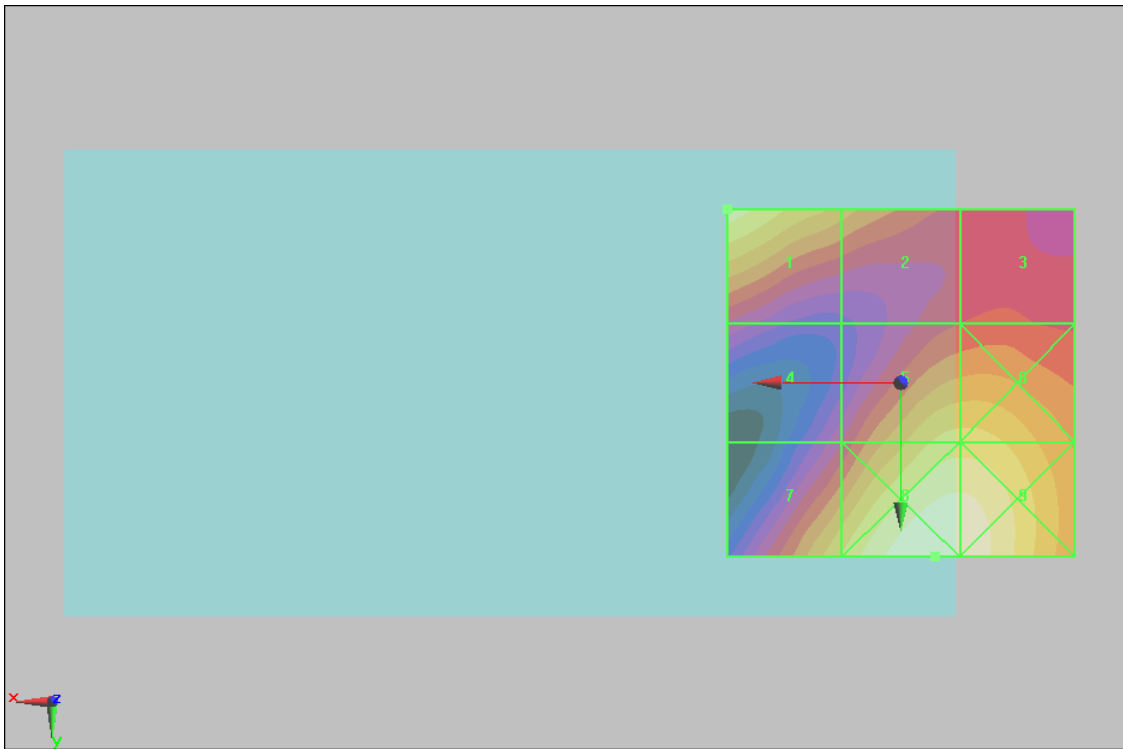
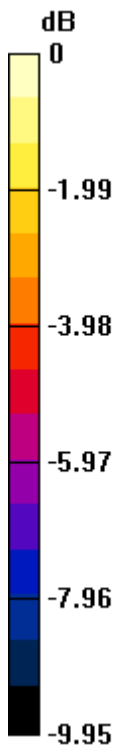
| | | |
|----------------|----------------|----------------|
| Grid 1 | Grid 2 | Grid 3 |
| 32.7 M4 | 26 M4 | 21.9 M4 |
| Grid 4 | Grid 5 | Grid 6 |
| 19.7 M4 | 29.9 M4 | 29.9 M4 |
| Grid 7 | Grid 8 | Grid 9 |
| 29.1 M4 | 36.2 M4 | 35.6 M4 |

Cursor:

Total = 36.2 V/m

E Category: M4

Location: -5, 25, 8.7 mm



0 dB = 36.2V/m

#21 HAC_E_CDMA2000 BC15_RC3+SO55_Ch875_Sample2_Battery2

DUT: 281609

Communication System: CDMA ; Frequency: 1753.75 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: ER3DV6 - SN2358; ConvF(1, 1, 1); Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch875/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 31.5 V/m

Probe Modulation Factor = 0.980

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 26.2 V/m; Power Drift = -0.162 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

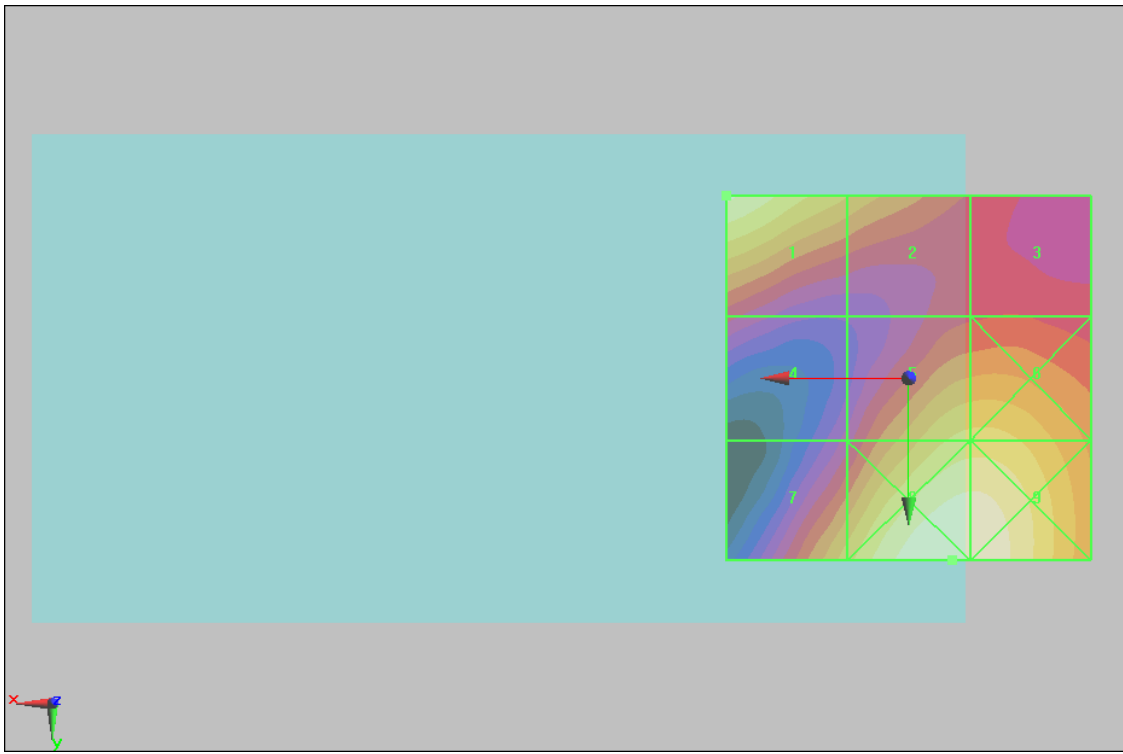
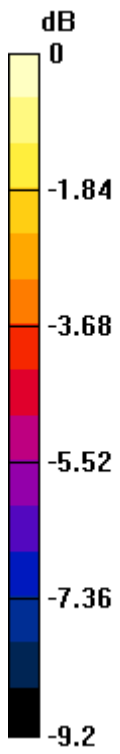
| | | |
|----------------|----------------|----------------|
| Grid 1 | Grid 2 | Grid 3 |
| 31.5 M4 | 25.2 M4 | 20.4 M4 |
| Grid 4 | Grid 5 | Grid 6 |
| 19.5 M4 | 27.7 M4 | 27.7 M4 |
| Grid 7 | Grid 8 | Grid 9 |
| 26.2 M4 | 33.2 M4 | 33 M4 |

Cursor:

Total = 33.2 V/m

E Category: M4

Location: -6, 25, 8.7 mm



0 dB = 33.2V/m

#10 HAC_H_CDMA2000 BC0_RC3_SO55_Ch1013_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 824.7 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch1013/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.091 A/m

Probe Modulation Factor = 0.940

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.050 A/m; Power Drift = 0.068 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

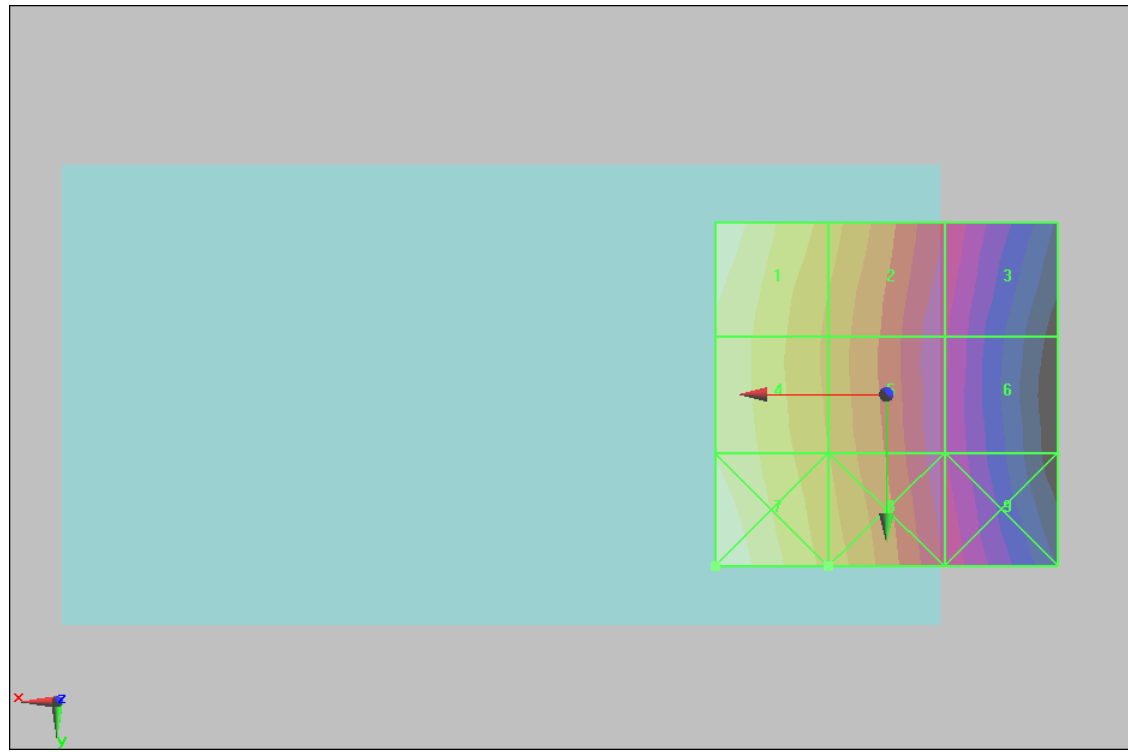
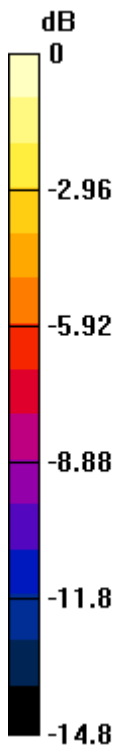
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.091 M4 | Grid 2 0.063 M4 | Grid 3 0.038 M4 |
| Grid 4 0.083 M4 | Grid 5 0.059 M4 | Grid 6 0.034 M4 |
| Grid 7 0.093 M4 | Grid 8 0.064 M4 | Grid 9 0.037 M4 |

Cursor:

Total = 0.093 A/m

H Category: M4

Location: 25, 25, 8.7 mm



0 dB = 0.093A/m

#11 HAC_H_CDMA2000 BC0_RC3_SO55_Ch384_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 836.52 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch384/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.094 A/m

Probe Modulation Factor = 0.940

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.052 A/m; Power Drift = 0.083 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

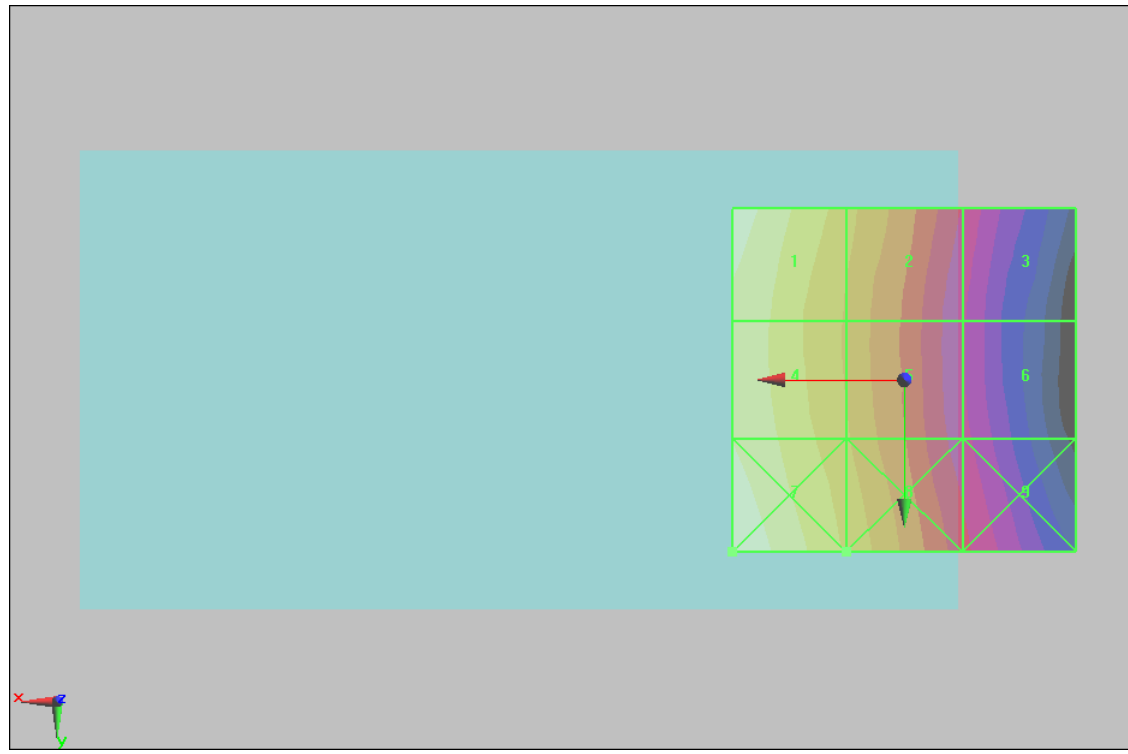
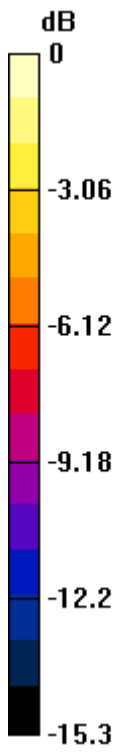
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.094 M4 | Grid 2 0.065 M4 | Grid 3 0.038 M4 |
| Grid 4 0.087 M4 | Grid 5 0.062 M4 | Grid 6 0.036 M4 |
| Grid 7 0.098 M4 | Grid 8 0.068 M4 | Grid 9 0.040 M4 |

Cursor:

Total = 0.098 A/m

H Category: M4

Location: 25, 25, 8.7 mm



0 dB = 0.098A/m

#12 HAC_H_CDMA2000 BC0_RC3_SO55_Ch777_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 848.31 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch777/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.091 A/m

Probe Modulation Factor = 0.940

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.050 A/m; Power Drift = -0.040 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

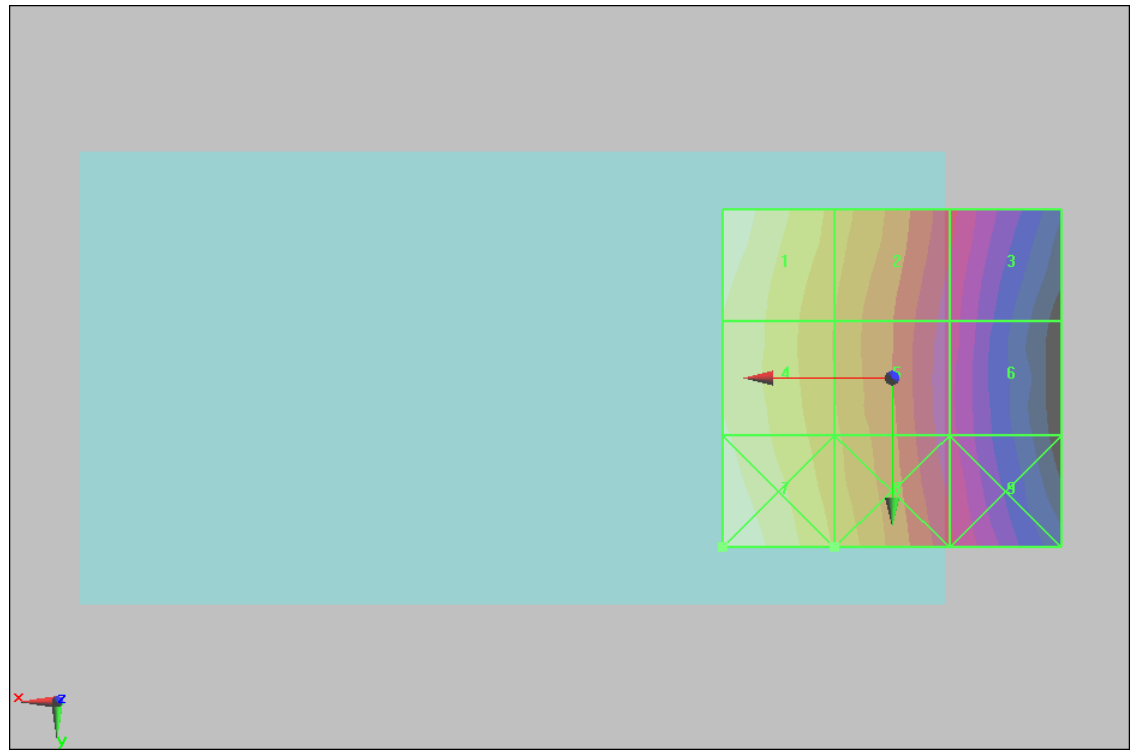
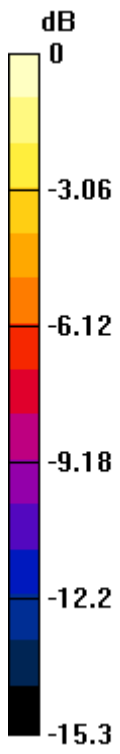
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.091 M4 | Grid 2 0.063 M4 | Grid 3 0.038 M4 |
| Grid 4 0.084 M4 | Grid 5 0.060 M4 | Grid 6 0.034 M4 |
| Grid 7 0.093 M4 | Grid 8 0.065 M4 | Grid 9 0.038 M4 |

Cursor:

Total = 0.093 A/m

H Category: M4

Location: 25, 25, 8.7 mm



0 dB = 0.093A/m

#22 HAC_H_CDMA2000 BC0_RC3_SO55_Ch384_Sample2_Battery2

DUT: 281609

Communication System: CDMA ; Frequency: 836.52 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch384/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.096 A/m

Probe Modulation Factor = 0.940

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.059 A/m; Power Drift = -0.012 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

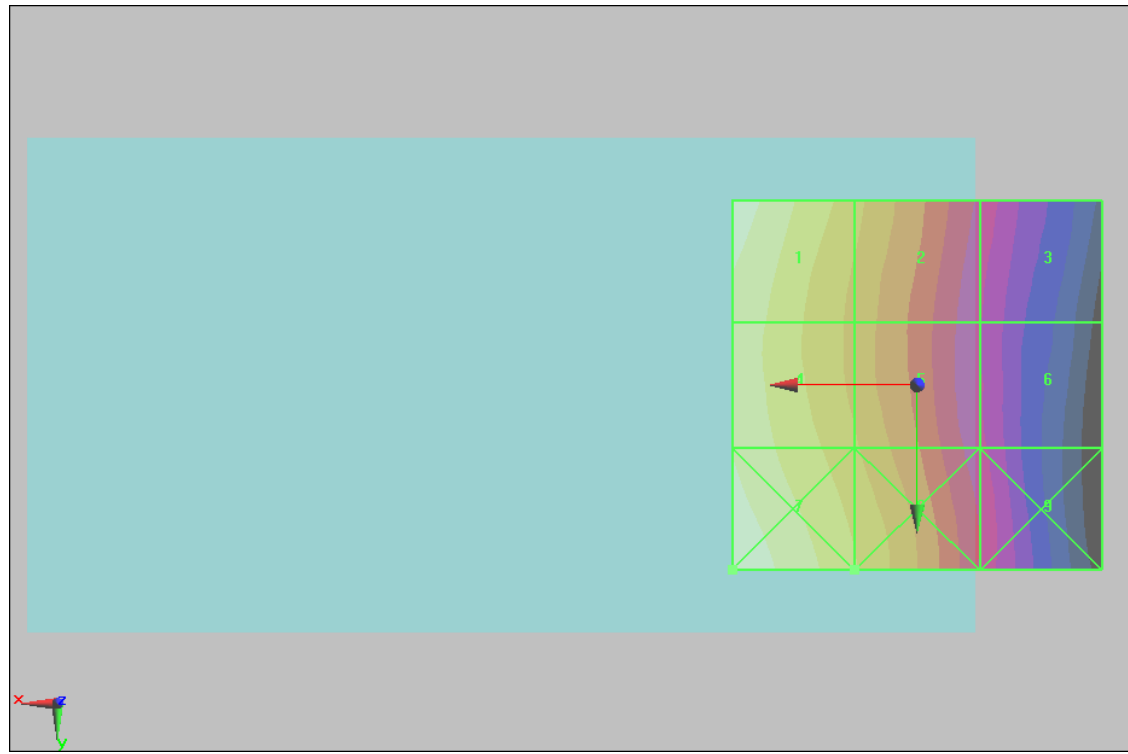
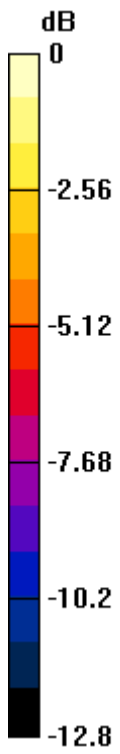
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.096 M4 | Grid 2 0.069 M4 | Grid 3 0.044 M4 |
| Grid 4 0.089 M4 | Grid 5 0.068 M4 | Grid 6 0.042 M4 |
| Grid 7 0.099 M4 | Grid 8 0.075 M4 | Grid 9 0.045 M4 |

Cursor:

Total = 0.099 A/m

H Category: M4

Location: 25, 25, 8.7 mm



0 dB = 0.099A/m

#13 HAC_H_CDMA2000 BC1_RC3_SO55_Ch25_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 1851.25 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch25/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.076 A/m

Probe Modulation Factor = 0.810

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.100 A/m; Power Drift = 0.018 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

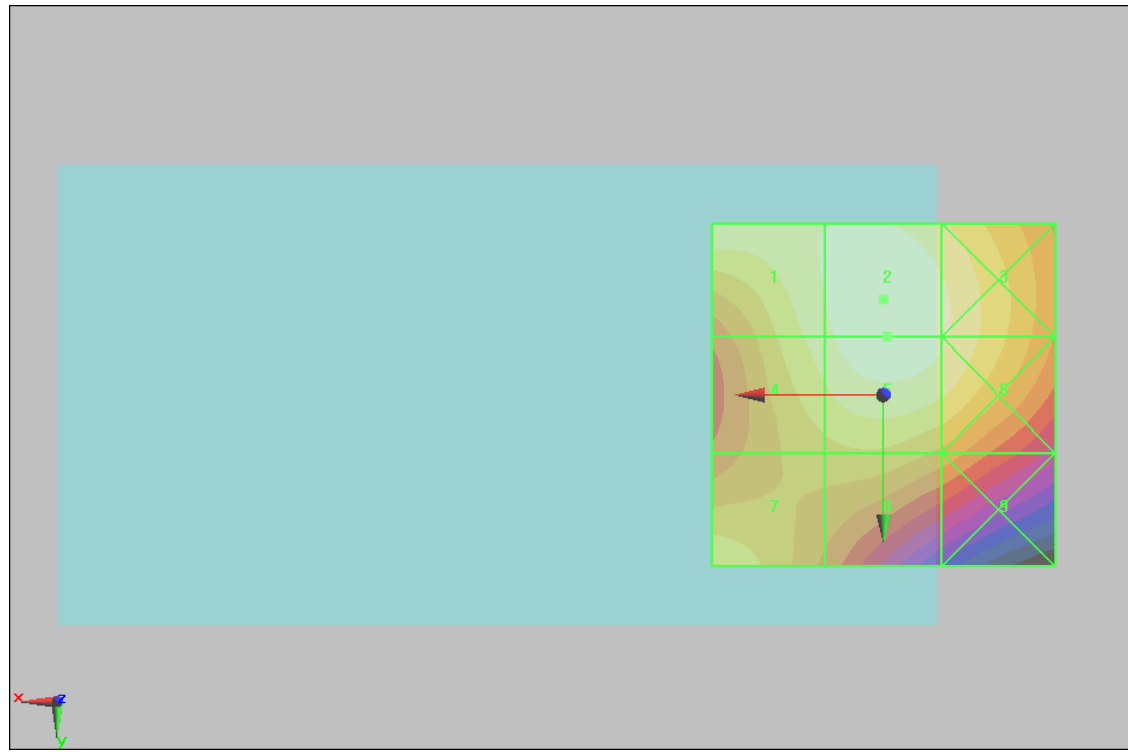
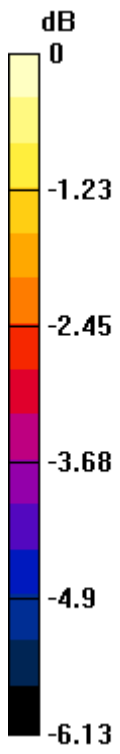
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.073 M4 | Grid 2 0.076 M4 | Grid 3 0.073 M4 |
| Grid 4 0.071 M4 | Grid 5 0.075 M4 | Grid 6 0.073 M4 |
| Grid 7 0.070 M4 | Grid 8 0.066 M4 | Grid 9 0.062 M4 |

Cursor:

Total = 0.076 A/m

H Category: M4

Location: 0, -14, 8.7 mm



0 dB = 0.076A/m

#14 HAC_H_CDMA2000 BC1_RC3_SO55_Ch600_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 1880 MHz;Duty Cycle: 1:1
 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
 Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch25/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.072 A/m

Probe Modulation Factor = 0.810

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.090 A/m; Power Drift = -0.035 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

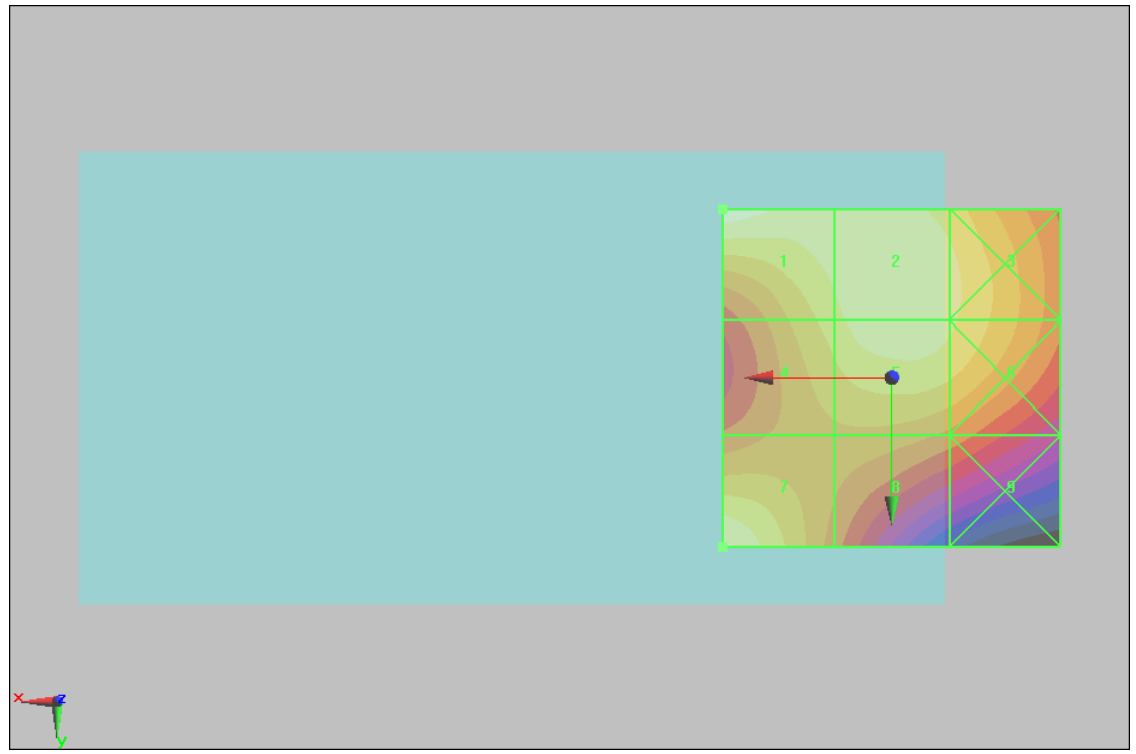
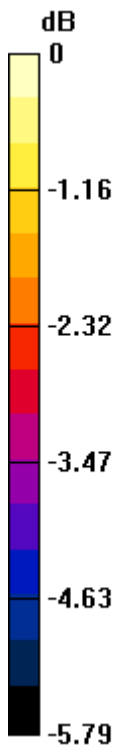
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.072 M4 | Grid 2 0.069 M4 | Grid 3 0.067 M4 |
| Grid 4 0.065 M4 | Grid 5 0.068 M4 | Grid 6 0.066 M4 |
| Grid 7 0.070 M4 | Grid 8 0.060 M4 | Grid 9 0.057 M4 |

Cursor:

Total = 0.072 A/m

H Category: M4

Location: 25, -25, 8.7 mm



0 dB = 0.072A/m

#15 HAC_H_CDMA2000 BC1_RC3_SO55_Ch1175_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 1908.75 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Ambient Temperature : 22.5 °C ; Liquid Temperature : 21.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch1175/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.069 A/m

Probe Modulation Factor = 0.810

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.092 A/m; Power Drift = 0.046 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

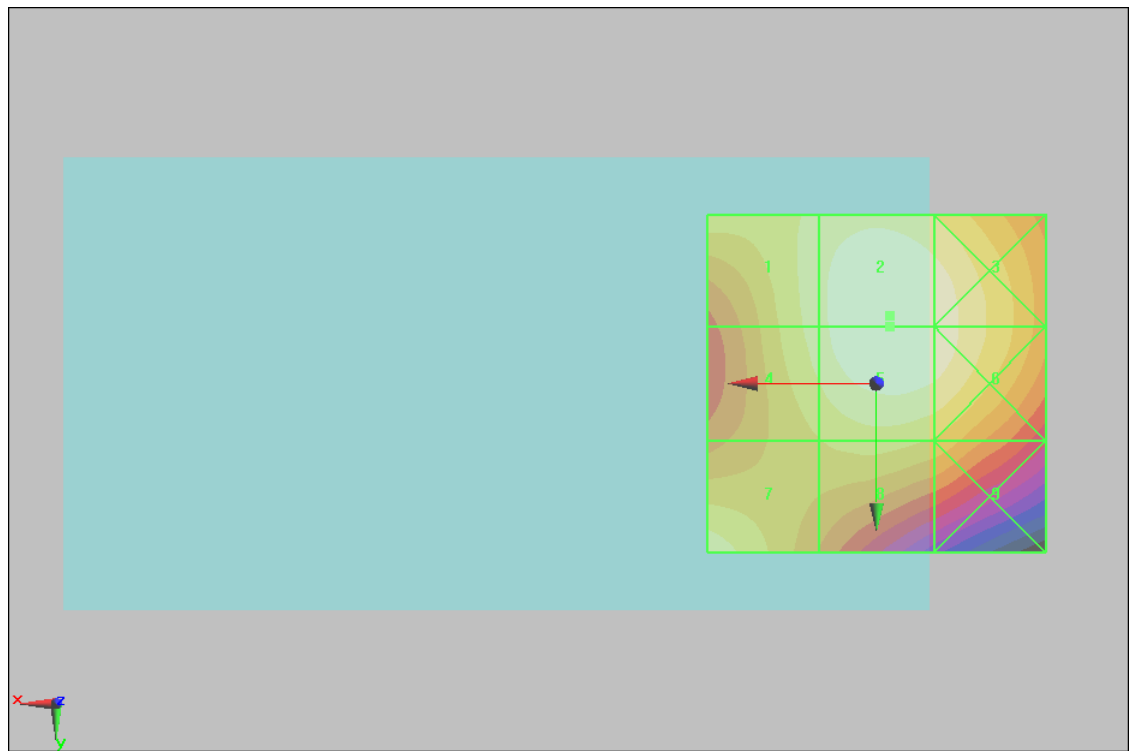
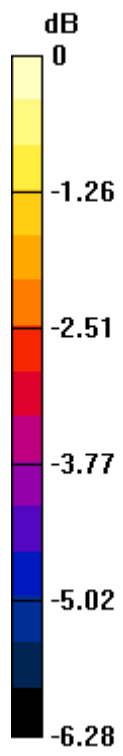
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.065 M4 | Grid 2 0.069 M4 | Grid 3 0.068 M4 |
| Grid 4 0.065 M4 | Grid 5 0.069 M4 | Grid 6 0.068 M4 |
| Grid 7 0.065 M4 | Grid 8 0.061 M4 | Grid 9 0.059 M4 |

Cursor:

Total = 0.069 A/m

H Category: M4

Location: -2, -10, 8.7 mm



0 dB = 0.069A/m

#23 HAC_H_CDMA2000 BC1_RC3_SO55_Ch25_Sample2_Battery2

DUT: 281609

Communication System: CDMA ; Frequency: 1851.25 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch25/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.069 A/m

Probe Modulation Factor = 0.810

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.089 A/m; Power Drift = 0.196 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

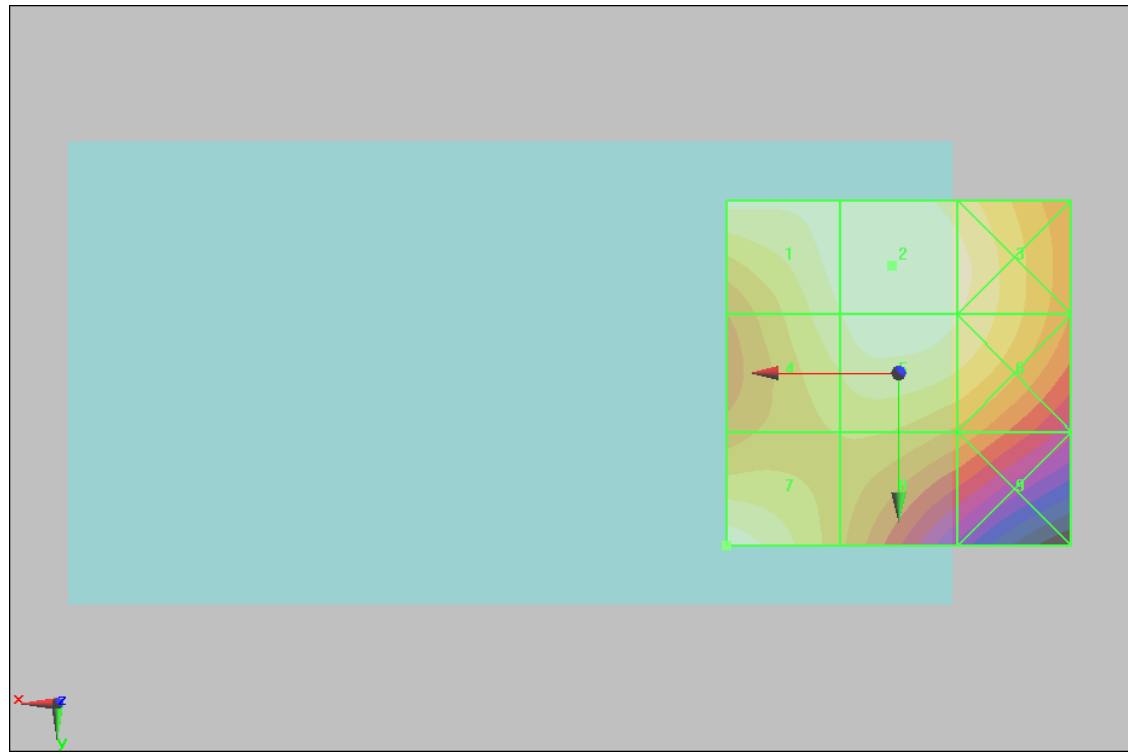
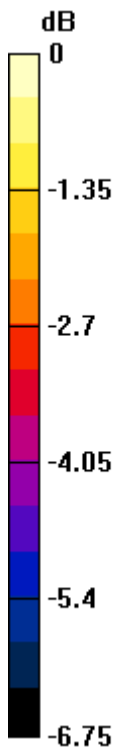
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.067 M4 | Grid 2 0.069 M4 | Grid 3 0.067 M4 |
| Grid 4 0.065 M4 | Grid 5 0.068 M4 | Grid 6 0.066 M4 |
| Grid 7 0.068 M4 | Grid 8 0.060 M4 | Grid 9 0.055 M4 |

Cursor:

Total = 0.069 A/m

H Category: M4

Location: 1, -15.5, 8.7 mm



0 dB = 0.069A/m

#16 HAC_H_CDMA2000 BC15_RC3_SO55_Ch25_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 1711.25 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch25/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.076 A/m

Probe Modulation Factor = 0.810

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.095 A/m; Power Drift = -0.070 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

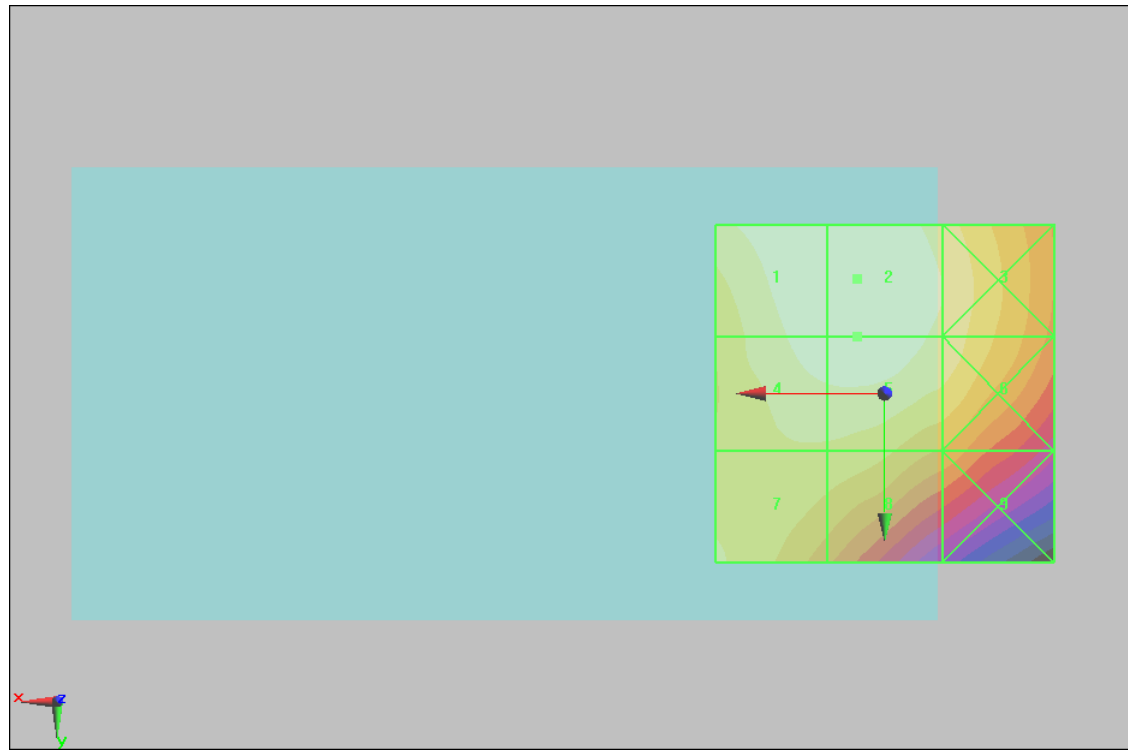
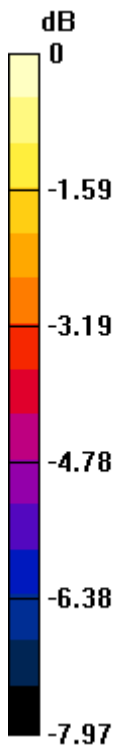
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.076 M4 | Grid 2 0.076 M4 | Grid 3 0.072 M4 |
| Grid 4 0.074 M4 | Grid 5 0.075 M4 | Grid 6 0.070 M4 |
| Grid 7 0.068 M4 | Grid 8 0.067 M4 | Grid 9 0.059 M4 |

Cursor:

Total = 0.076 A/m

H Category: M4

Location: 4, -17, 8.7 mm



0 dB = 0.076A/m

#17 HAC_H_CDMA2000 BC15_RC3_SO55_Ch425_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 1731.25 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch425/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.072 A/m

Probe Modulation Factor = 0.810

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.090 A/m; Power Drift = 0.043 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

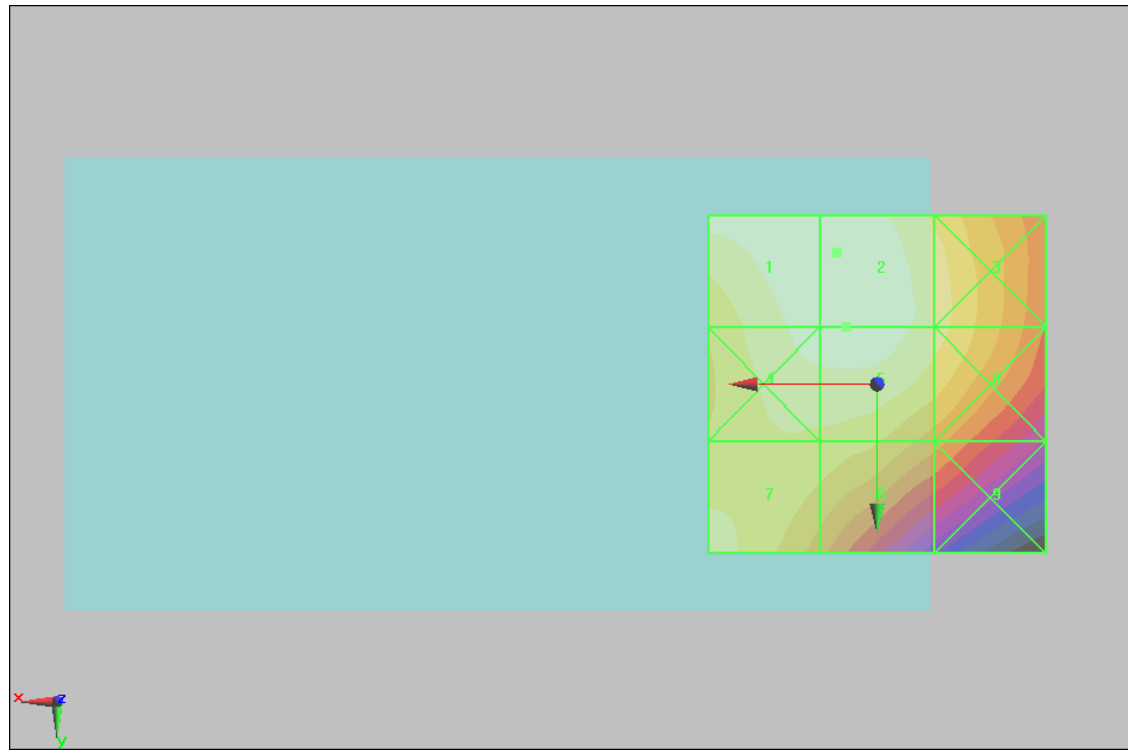
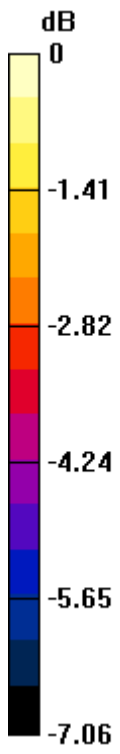
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.072 M4 | Grid 2 0.072 M4 | Grid 3 0.067 M4 |
| Grid 4 0.070 M4 | Grid 5 0.071 M4 | Grid 6 0.066 M4 |
| Grid 7 0.067 M4 | Grid 8 0.064 M4 | Grid 9 0.056 M4 |

Cursor:

Total = 0.072 A/m

H Category: M4

Location: 6, -19.5, 8.7 mm



0 dB = 0.072A/m

#18 HAC_H_CDMA2000 BC15_RC3_SO55_Ch875_Sample1_Battery1

DUT: 281609

Communication System: CDMA ; Frequency: 1753.75 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch875/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.073 A/m

Probe Modulation Factor = 0.810

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.094 A/m; Power Drift = -0.050 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

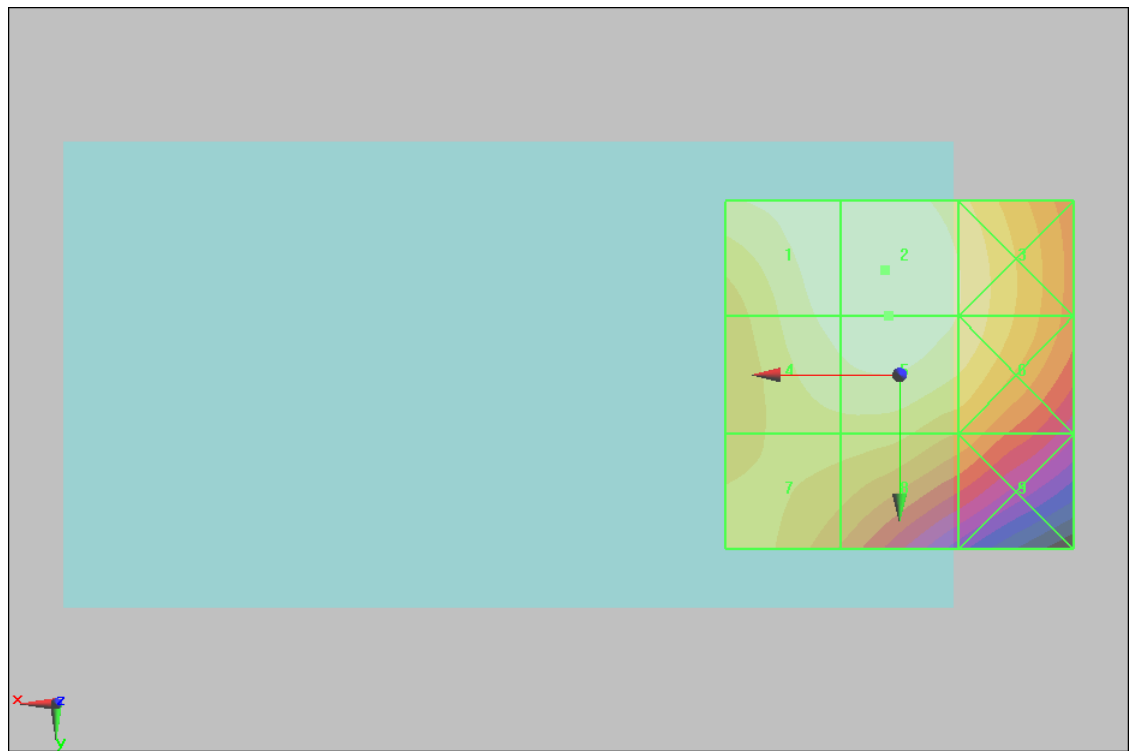
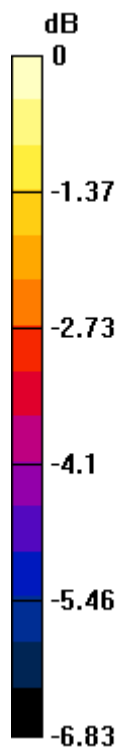
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.072 M4 | Grid 2 0.073 M4 | Grid 3 0.070 M4 |
| Grid 4 0.071 M4 | Grid 5 0.073 M4 | Grid 6 0.069 M4 |
| Grid 7 0.066 M4 | Grid 8 0.064 M4 | Grid 9 0.059 M4 |

Cursor:

Total = 0.073 A/m

H Category: M4

Location: 2, -15, 8.7 mm



0 dB = 0.073A/m

#24 HAC_H_CDMA2000 BC15_RC3_SO55_Ch25_Sample2_Battery2

DUT: 281609

Communication System: CDMA ; Frequency: 1711.25 MHz;Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Ambient Temperature : 22.5 °C

DASY5 Configuration:

- Probe: H3DV6 - SN6184; ; Calibrated: 2012/1/26
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1338; Calibrated: 2012/6/12
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch25/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.067 A/m

Probe Modulation Factor = 0.810

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.081 A/m; Power Drift = 0.165 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

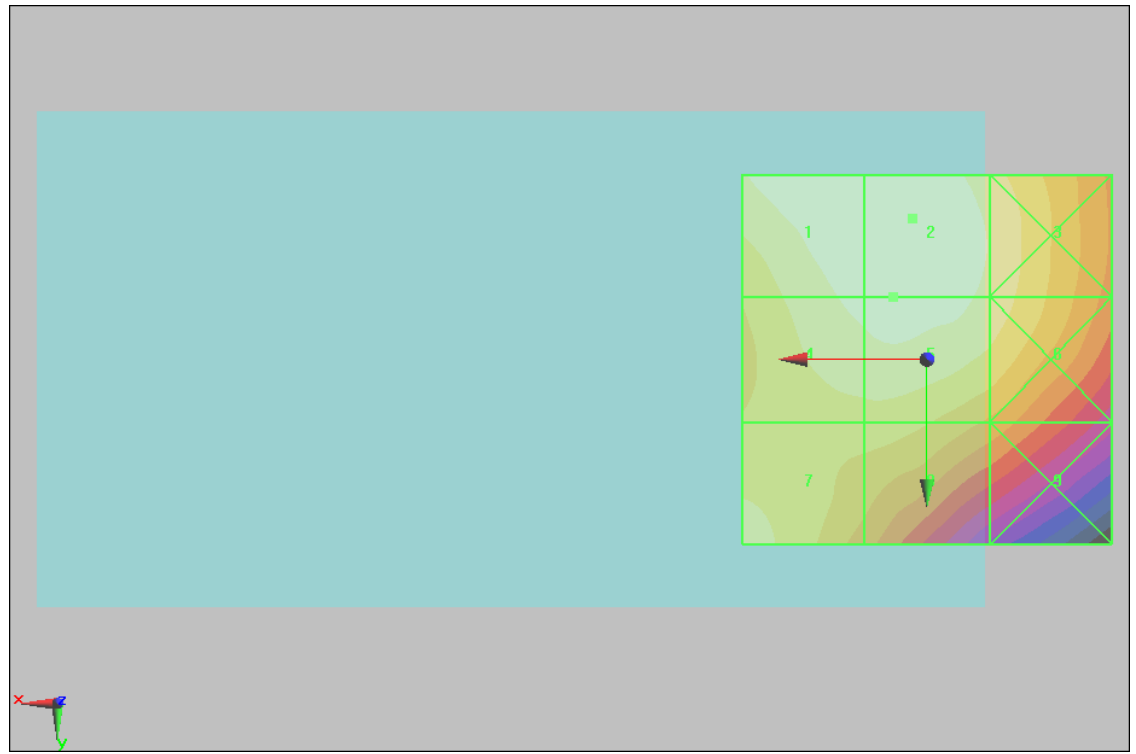
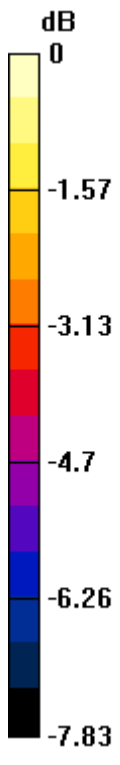
| | | |
|---------------------------|---------------------------|---------------------------|
| Grid 1 0.066 M4 | Grid 2 0.067 M4 | Grid 3 0.063 M4 |
| Grid 4 0.064 M4 | Grid 5 0.065 M4 | Grid 6 0.062 M4 |
| Grid 7 0.061 M4 | Grid 8 0.058 M4 | Grid 9 0.052 M4 |

Cursor:

Total = 0.067 A/m

H Category: M4

Location: 2, -19, 8.7 mm



0 dB = 0.067A/m



Appendix C. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.