



# ANSI C63.19

# TEST REPORT

<b>Product Name</b>	HSDPA/HSUPA/HSPA+/UMTS Bi bands / GSM quad bands/LTE 2 bands mobile phone
<b>Model Name</b>	A845L
<b>Marketing Name</b>	A845L
<b>FCC ID</b>	RAD471
<b>Client</b>	TCT Mobile Limited
<b>Manufacturer</b>	TCT Mobile Limited
<b>Date of issue</b>	April 30, 2014

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

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

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**GENERAL SUMMARY**

<b>Reference Standard(s)</b>	<b>ANSI C63.19-2007:</b> American National Standard Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.
<b>Conclusion</b>	This portable wireless equipment has been measured in all cases requested by the relevant standards.  General Judgment: <b>M3 (RF Emission)</b>
<b>Comment</b>	The test result only responds to the measured sample.

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## 1. General Information

### 1.1. Notes of the Test Report

**TA Technology (Shanghai) Co., Ltd.** has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L2264.

**TA Technology (Shanghai) Co., Ltd.** guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

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If the electronic report is inconsistent with the printed one, it should be subject to the latter.

### 1.2. Testing Laboratory

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### 1.3. Applicant Information

Company: TCT Mobile Limited

Address: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area  
Shanghai, P.R. China. 201203

### 1.4. Manufacturer Information

Company: TCT Mobile Limited

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### 1.5. Information of EUT

#### General Information

Device Type:	Portable Device	
State of Sample:	Prototype Unit	
Product IMEI:	014036000002897	
Hardware Version:	PIO	
Software Version:	v1H1F	
Antenna Type:	Internal Antenna	
Device Operating Configurations :		
Tested Mode(s):	GSM 850/GSM 1900; UMTS Band II/ UMTS Band V;	
Test Modulation:	(GSM)GMSK; (UMTS)QPSK	
Operating Frequency Range(s):	Mode	Tx (MHz)
	GSM 850	824.2 ~ 848.8
	GSM 1900	1850.2 ~ 1909.8
	UMTS Band II	1852.4 ~ 1907.6
	UMTS Band V	826.4 ~ 846.6
Power Class:	GSM 850: 4	
	GSM 1900: 1	
	UMTS Band II/V: 3	
Power Level	GSM 850: level 5	
	GSM 1900: level 0	
	UMTS Band II/V: all up bits	
Test Channel: (Low - Middle - High)	128 - 190 - 251	(GSM 850)
	512 - 661 - 810	(GSM 1900)
	9262 - 9400 - 9538	(UMTS Band II)
	4132 - 4183 - 4233	(UMTS Band V)

#### Auxiliary Equipment Details

##### AE1:Battery

Model: TLp020A2

Manufacturer: SCUD

SN: C2000003C3Y005ZE

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Air-Interface	Band (MHz)	Type	C63.19/ tested	Simultaneous Transmissions Note: Not to be tested	Concurrent single transmission	Reduced power 20.19(c)(1)	Voice Over Digital Transport (Data)
GSM	850	VO	Yes	Yes WIFI or BT	Yes: WIFI, BT	NA	NA
	1900	VO				NA	NA
	GPRS/EGPRS	DT	NA	Yes WIFI or BT	Yes: * see note	NA	NA
WCDMA	Band II	VO	Yes	Yes WIFI or BT	Yes: * see note	NA	NA
	Band V	VO	Yes	Yes WIFI or BT	Yes: * see note	NA	NA
	HSDPA/HSUP A/RMC/HSPA +/DC-HSDPA	DT	NA	Yes WIFI or BT	Yes: * see note	NA	NA
LTE	Band 4,17	DT	NA	Yes WIFI or BT	NA	NA	NA
WIFI	2450	DT	NA	Yes GSM,GPRS,EGPRS, HSDPA/HSUPA/RMC/HSPA+/ DC-HSDPA	NA	NA	Yes
Bluetooth (BT)	2400	DT	NA	Yes GSM,GPRS,EGPRS, HSDPA/HSUPA/RMC/HSPA+/ DC-HSDPA	NA	NA	NA

VO Voice CMRS/PSTN Service only  
V/D Voice CMRS/PSTN and Data Service  
DT Digital Transport

\*HAC Rating was based on concurrent voice and  
data modes, Non current mode was found to  
represent worst case rating for both M and T rating

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**1.6. The Ambient Conditions during Test**

Temperature	Min. = 18°C, Max. = 28 °C
Relative humidity	Min. = 0%, Max. = 80%
Ground system resistance	< 0.5 $\Omega$
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

**1.7. The Total M-rating of each tested band**

Mode	Rating
GSM 850	<b>M3</b>
GSM 1900	<b>M3</b>
UMTS Band II	<b>M4</b>
UMTS Band V	<b>M4</b>

**1.8. Test Date**

The test performed from April 28, 2014 to April 29, 2014.



## **2. Test Information**

### **2.1. Operational Conditions during Test**

#### **2.1.1. General Description of Test Procedures**

The phone was tested in all normal configurations for the ear use. The EUT is mounted in the device holder equivalent as for classic dosimeter measurements. The acoustic output of the EUT shall coincide with the center point of the area formed by the dielectric wire and the middle bar of the arch's top frame. The EUT shall be moved vertically upwards until it touches the frame. The fine adjustment is possible by sliding the complete. The EUT holder is on the yellow base plate of the Test Arch phantom. These test configurations are tested at the high, middle and low frequency channels of each applicable operating mode; for example, GSM, WCDMA (UMTS), CDMA and TDMA.

#### **2.1.2. GSM/WCDMA Test Configuration**

A communication link is set up with a System Simulator (SS) by air link, and a call is established. The EUT is commanded to operate at maximum transmitting power. Using E5515C the power lever is set to "5" for GSM 850, set to "0" for GSM 1900. Set to all up bits for UMTS. The test in the bands of GSM 850/GSM 1900 and UMTS Band II /UMTS Band V are performed in the mode of speech transfer function.

## 2.2. HAC RF Measurements System Configuration

### 2.2.1. HAC Measurement Set-up

These measurements are performed using the DASY5 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Stäubli), robot controller, Intel Core2 computer, near-field probe, probe alignment sensor. The robot is a six-axis industrial robot performing precise movements. Cell controller systems contain the power supply, robot controller, teach pendant (Joystick) and remote control, and are used to drive the robot motors. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification; signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

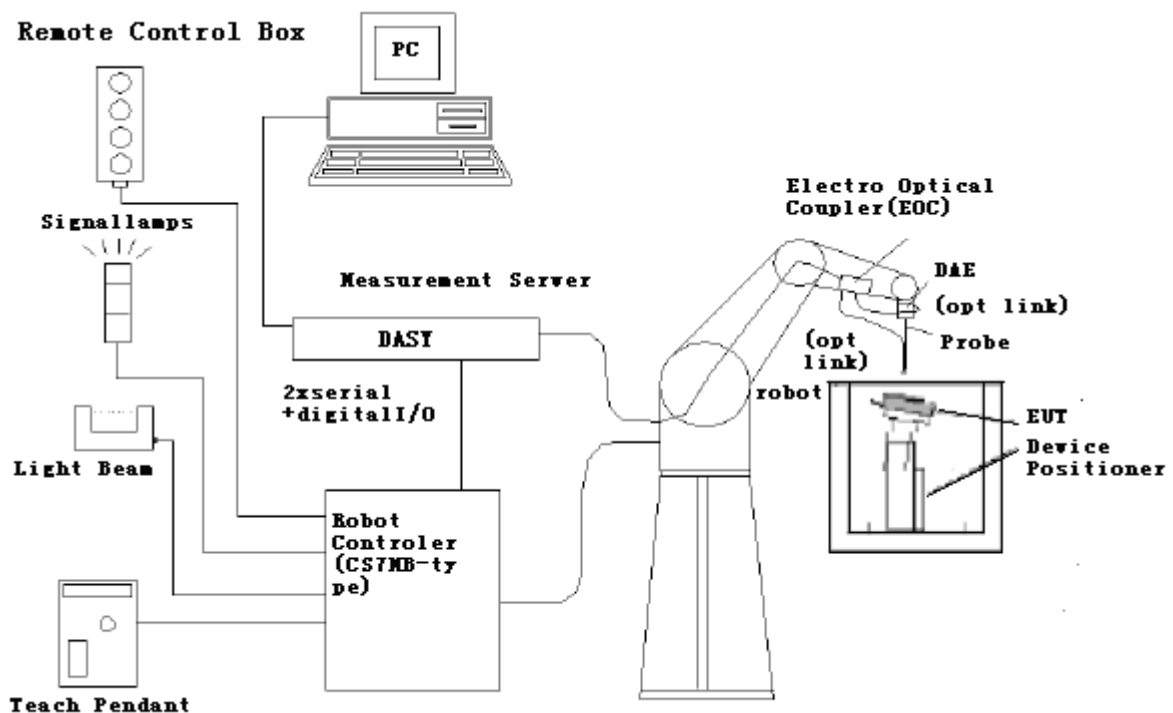


Figure 1 HAC Test Measurement Set-up

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

### 2.2.2. Probe System

The HAC measurements were conducted with the E-Field Probe ER3DV6 and the H-Field Probe H3DV6 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

#### E-Field Probe Description

Construction	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges PEEK enclosure material
Calibration	In air from 100 MHz to 3.0 GHz (absolute accuracy $\pm 6.0\%$ , $k=2$ )
Frequency	40 MHz to > 6 GHz (can be extended to < 20 MHz) Linearity: $\pm 0.2$ dB (100 MHz to 3 GHz)
Directivity	$\pm 0.2$ dB in air (rotation around probe axis) $\pm 0.4$ dB in air (rotation normal to probe axis)
Dynamic Range	2 V/m to > 1000 V/m; Linearity: $\pm 0.2$ dB
Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.5 mm
Application	General near-field measurements up to 6 GHz Field component measurements Fast automatic scanning in phantoms



**Figure 2 ER3DV6 E-field Probe**

#### H-Field Probe Description

Construction	Three concentric loop sensors with 3.8 mm loop diameters Resistively loaded detector diodes for linear response Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)
Frequency	200 MHz to 3 GHz (absolute accuracy $\pm 6.0\%$ , $k=2$ ); Output linearized
Directivity	$\pm 0.2$ dB (spherical isotropy error)
Dynamic Range	10 mA/m to 2 A/m at 1 GHz
E-Field Interference	< 10% at 3 GHz (for plane wave)
Dimensions	Overall length: 330 mm (Tip: 40 mm) Tip diameter: 6 mm (Body: 12 mm) Distance from probe tip to dipole centers: 3 mm



**Figure 3 H3DV6 H-field Probe**

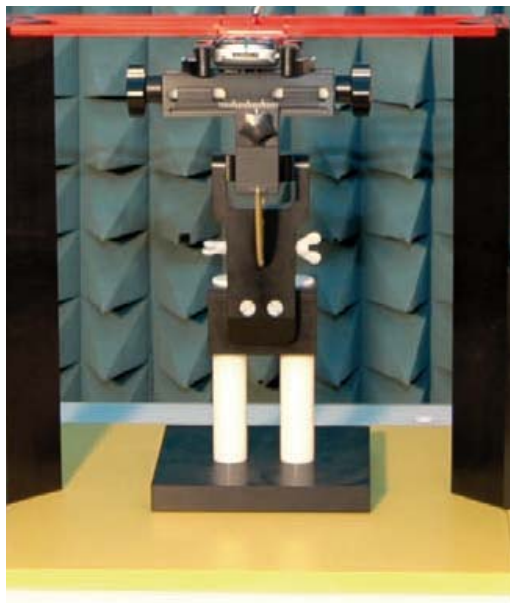
Application            General magnetic near-field measurements up to 3 GHz (in air or liquids)  
Field component measurements  
Surface current measurements  
Low interaction with the measured field

**2.2.3. Test Arch Phantom & Phone Positioner**

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

The Device reference point is set for the EUT at 6.3 mm, the Grid reference point is on the upper surface at the origin of the coordinates, and the “user point \Height Check 0.5 mm” is 0.5mm above the center, allowing verification of the gap of 0.5mm while the probe is positioned there.

The Phone Positioner supports accurate and reliable positioning of any phone with effect on near field  $<\pm 0.5$  dB.



**Figure 4 HAC Phantom & Device Holder**

### **2.3. RF Test Procedures**

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

1. Confirm proper operation of the field probe, probe measurement system and other instrumentation and the positioning system.
2. Position the WD in its intended test position. The gauge block can simplify this positioning. Note that a separate E-field and H-field gauge block will be needed if the center of the probe sensor elements is at different distances from the tip of the probe.
3. Configure the WD normal operation for maximum rated RF output power, at the desired channel and other operating parameters (e.g., test mode), as intended for the test.
4. The center sub-grid shall center on the center of the axial measurement point or the acoustic output, as appropriate. Locate the field probe at the initial test position in the 50 mm by 50 mm grid, which is contained in the measurement plane. If the field alignment method is used, align the probe for maximum field reception.
5. Record the reading.
6. Scan the entire 50 mm by 50 mm region in equally spaced increments and record the reading at each measurement point. The grid is 5 cm by 5 cm area that is divided into 9 evenly sized blocks or sub-grids. The distance between measurement points shall be sufficient to assure the identification of the maximum reading.
7. Identify the five contiguous sub-grids around the center sub-grid with the lowest maximum field strength readings. Thus the six areas to be used to determine the WD's highest emissions are identified and outlined for the final manual scan. Please note that a maximum of five blocks can be excluded for both E-field and H-field measurements for the WD output being measured. Stated another way, the center sub-grid and three others must be common to both the E-field and H-field measurements.
8. Identify the maximum field reading within the non-excluded sub-grids identified in Step 7.
9. Convert the maximum field strength reading identified in Step 8 to V/m or A/m, as appropriate. For probes which require a probe modulation factor, this conversion shall be done using the appropriate probe modulation factor and the calibration.
10. Repeat Step 1 through Step 10 for both the E-field and H-field measurements.
11. Compare this reading to the categories in ANSI C63.19 Clause 7 and record the resulting category. The lowest category number listed in 7.2, Table 7.4, or Table 7.5 obtained in Step 10 for either E- or H-field determines the M category for the audio coupling mode assessment. Record the WD category rating.



Figure 5 WD reference and plane for RF emission measurements

## 2.4. System Check

### Validation Procedure

Place a dipole antenna meeting the requirements given in ANSI C63.19 D.5 in the position normally occupied by the WD. The dipole antenna serves as a known source for an electrical and magnetic output. Position the E-field and H-field probes so that:

The probes and their cables are parallel to the coaxial feed of the dipole antenna.

The probe cables and the coaxial feed of the dipole antenna approach the measurement area from opposite directions.

The center point of the probe element(s) are 10 mm from the closest surface of the dipole elements. Validation was performed to verify that measured E-field and H-field values are within +/-25% from the target reference values provided by the manufacturer. "Values within +/-25% are acceptable. Of which 12% is deviation and 13% is measurement uncertainty."

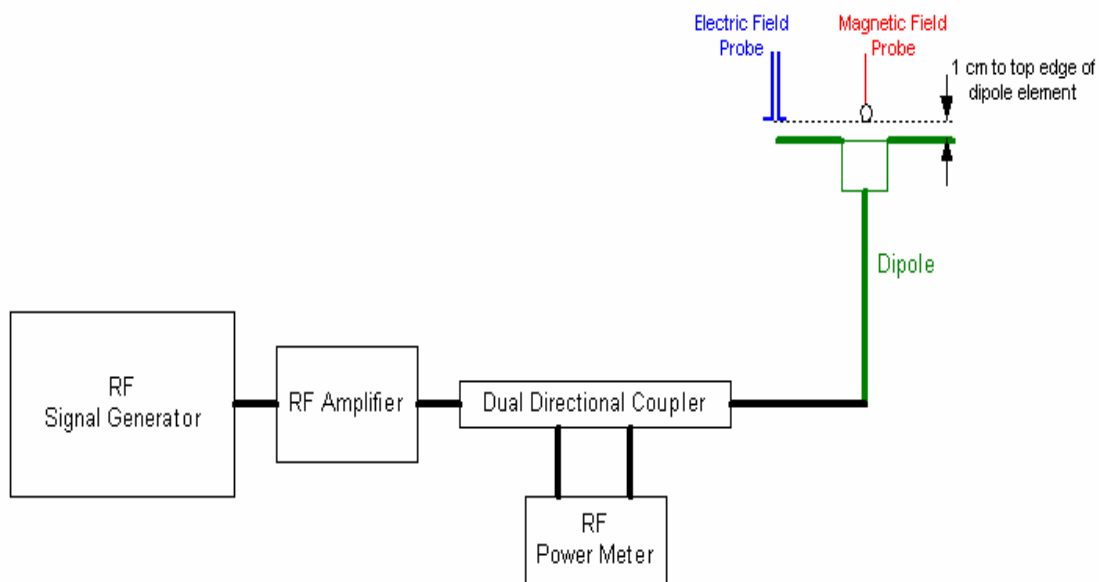


Figure 6 Dipole Validation Setup

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**Dipole Measurement Summary**

<b>E-Field Scan</b>					
<b>Mode</b>	<b>Frequency (MHz)</b>	<b>Input Power (mW)</b>	<b>Value</b>		<b>Test Date</b>
CW	835	100	Target <sup>1</sup> Value(V/m)	169.8	September 2, 2013
			Measured <sup>2</sup> Value(V/m)	170.3	April 28, 2014
			Deviation <sup>3</sup> (%)	0.29	/
CW	1880	100	Target <sup>1</sup> Value(V/m)	142.9	September 2, 2013
			Measured <sup>2</sup> Value(V/m)	148.1	April 29, 2014
			Deviation <sup>3</sup> (%)	3.64	/
<b>H-Field Scan</b>					
<b>Mode</b>	<b>Frequency (MHz)</b>	<b>Input Power (mW)</b>	<b>Value</b>		<b>Test Date</b>
CW	835	100	Target <sup>1</sup> Value(A/m)	0.461	September 2, 2013
			Measured <sup>2</sup> Value(A/m)	0.471	April 28, 2014
			Deviation <sup>3</sup> (%)	2.17	/
CW	1880	100	Target <sup>1</sup> Value(A/m)	0.470	September 2, 2013
			Measured <sup>2</sup> Value(A/m)	0.457	April 29, 2014
			Deviation <sup>3</sup> (%)	-2.77	/
<p>Notes: 1. Target value is provided by SPEAD in the calibration certificate of specific dipoles.                  2. Please refer to the attachment for detailed measurement data and plot.                  3. Deviation (%) = 100 * (Measured value minus Target value) divided by Target value.</p>					



## 2.5. Probe Modulation Factor

The Probe Modulation Factor (PMF) is defined as the ratio of the field readings for a CW and a modulated signal with the equivalent Field Envelope Peak as defined in ANSI C63.19 (Chapter C.3.1). 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 10dB 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.

### Modulation Factor Test Procedure

This may be done using the following procedure:

1. Fix the field probe in a set location relative to a field generating device, such as the reference dipole antenna.
2. Illuminate the probe using the wireless device connected to the reference dipole with a test signal at the intended measurement frequency, Ensure there is sufficient field coupling between the probe and the antenna so the resulting reading is greater than 10 dB above the probe system noise floor but within the systems operating range.
3. Record the amplitude applied to the antenna during transmission and the field strength measured by the E-field probe located near the tip of the dipole antenna
4. Replace the wireless device with an RF signal generator producing an unmodulated CW signal and set to the wireless device operating frequency.
5. Set the amplitude of the unmodulated signal to equal that recorded from the wireless device.
6. Record the reading of the probe measurement system of the unmodulated signal.
7. The ratio, in linear units, of the probe reading in Step 6 to the reading in Step 3 is the E-field modulation factor.  $PMF_E = E_{CW} / E_{mod}$  ( $PMF_H = H_{CW} / H_{mod}$ )
8. Repeat the previous steps using the H-field probe, except locate the probe at the center of the dipole.

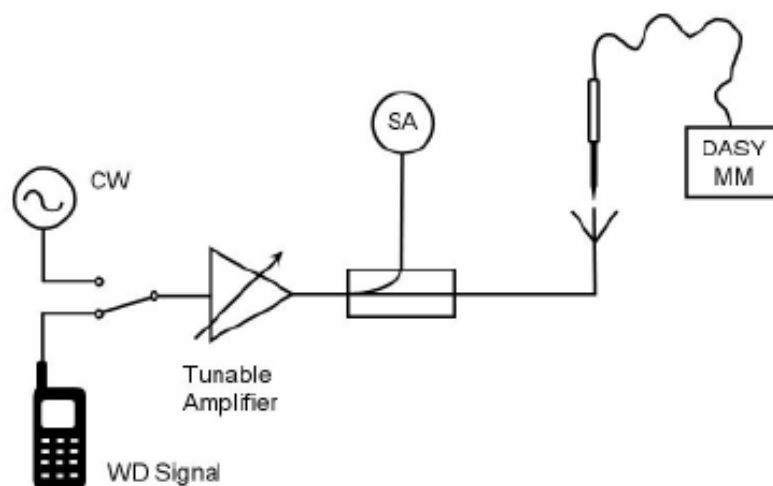


Figure 7 Probe Modulation Factor Test Setup

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**PMF**

<b>Band</b>	<b>E-Field Probe Modulation Factor</b>	<b>H-Field Probe Modulation Factor</b>
GSM 850	2.81	2.75
GSM 1900	2.84	2.84
UMTS Band II	1.03	1.01
UMTS Band V	1.03	1.01

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**2.6. Conducted Output Power Measurement**

**Summary**

The EUT is tested using an E5515C communications tester as controller unit to set test channels and maximum output power to the DUT, as well as for measuring the conducted power. Conducted output power was measured using an integrated RF connector and attached RF cable. This result contains conducted output power for the EUT.

**Conducted Power Results**

<b>GSM 850</b>	<b>Conducted Power(dBm)</b>		
	Channel 128	Channel 190	Channel 251
Test Results	32.95	32.95	33.36
<b>GSM 1900</b>	<b>Conducted Power(dBm)</b>		
	Channel 512	Channel 661	Channel 810
Test Results	30.42	30.37	30.32
<b>UMTS Band II</b>	<b>Conducted Power(dBm)</b>		
	Channel 9262	Channel 9400	Channel 9538
12.2kbps RMC	22.79	22.93	22.82
<b>UMTS Band V</b>	<b>Conducted Power(dBm)</b>		
	Channel 4132	Channel 4183	Channel 4233
12.2kbps RMC	22.85	23.17	22.88

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**3. Test Results**

**3.1. ANSI C63.19-2007 Limits**

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

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**3.2. Summary Test Results**

**GSM 850 Results**

<b>E-Field</b>				
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Peak Field (V/m)</b>	<b>Power Drift (dB)</b>	<b>Rating</b>
High/251	848.8	156.5	0.041	M3
Middle/190	836.6	165.5	-0.159	M3
Low/128	824.2	187.0	0.020	M3
<b>H-Field</b>				
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Peak Field (A/m)</b>	<b>Power Drift (dB)</b>	<b>Rating</b>
High/251	848.8	0.229	0.033	M4
Middle/190	836.6	0.241	0.138	M4
Low/128	824.2	0.271	0.030	M4

**GSM 1900 Results**

<b>E-Field</b>				
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Peak Field (V/m)</b>	<b>Power Drift (dB)</b>	<b>Rating</b>
High/810	1909.8	47.2	0.111	M4
Middle/661	1880	44.2	0.057	M4
Low/512	1850.2	51.4	0.002	M3
<b>H-Field</b>				
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Peak Field (A/m)</b>	<b>Power Drift (dB)</b>	<b>Rating</b>
High/810	1909.8	0.138	0.008	M4
Middle/661	1880	0.132	-0.037	M4
Low/512	1850.2	0.144	-0.022	M3

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**UMTS Band II Results**

<b>E-Field</b>				
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Peak Field (V/m)</b>	<b>Power Drift (dB)</b>	<b>Rating</b>
High/9538	1907.6	26.3	-0.190	M4
Middle/9400	1880	26.3	0.100	M4
Low/9262	1852.4	25.2	0.064	M4
<b>H-Field</b>				
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Peak Field (A/m)</b>	<b>Power Drift (dB)</b>	<b>Rating</b>
High/9538	1907.6	0.065	-0.004	M4
Middle/9400	1880	0.065	-0.045	M4
Low/9262	1852.4	0.067	-0.021	M4

**UMTS Band V Results**

<b>E-Field</b>				
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Peak Field (V/m)</b>	<b>Power Drift (dB)</b>	<b>Rating</b>
High/4233	846.6	55.3	0.115	M4
Middle/4183	836.6	59.4	-0.155	M4
Low/4132	826.4	61.5	0.040	M4
<b>H-Field</b>				
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Peak Field (A/m)</b>	<b>Power Drift (dB)</b>	<b>Rating</b>
High/4233	846.6	0.081	0.020	M4
Middle/4183	836.6	0.088	-0.063	M4
Low/4132	826.4	0.090	-0.075	M4

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**4. Measurement Uncertainty**

No.	Error source	Type	Uncertainty Value (%)	Prob. Dist.	k	$c_{iE}$	$c_{iH}$	Standard Uncertainty (%) $u_i$ (%) E	Standard Uncertainty (%) $u_i$ (%) H	Degree of freedom $V_{eff}$ or $v_i$
<b>Measurement System</b>										
1	Probe Calibration	B	5.1	N	1	1	1	5.1	5.1	$\infty$
2	Axial Isotropy	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	$\infty$
3	Sensor Displacement	B	16.5	R	$\sqrt{3}$	1	0.145	9.5	1.4	$\infty$
4	Boundary Effects	B	2.4	R	$\sqrt{3}$	1	1	1.4	1.4	$\infty$
5	Test Arch	B	7.2	R	$\sqrt{3}$	1	0	4.1	0	$\infty$
6	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	$\infty$
7	Scaling to Peak Envelope Power	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	$\infty$
8	System Detection Limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
9	Readout Electronics	B	0.3	N	1	1	1	0.3	0.3	$\infty$
10	Response Time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	$\infty$
11	Integration Time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	$\infty$
12	RF Ambient Conditions	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	$\infty$
13	RF Reflections	B	12.0	R	$\sqrt{3}$	1	1	6.9	6.9	$\infty$
14	Probe Positioner	B	1.2	R	$\sqrt{3}$	1	0.67	0.7	0.5	$\infty$
15	Probe Positioning	A	4.7	R	$\sqrt{3}$	1	0.67	2.7	1.8	$\infty$
16	Extra. And Interpolation	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
<b>Test Sample Related</b>										
17	Device Positioning Vertical	B	4.7	R	$\sqrt{3}$	1	0.67	2.7	1.8	$\infty$
18	Device Positioning Lateral	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$

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19	Device Holder and Phantom	B	2.4	R	$\sqrt{3}$	1	1	1.4	1.4	$\infty$
20	Power Drift	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	$\infty$
<b>Phantom and Setup related</b>										
21	Phantom Thickness	B	2.4	R	$\sqrt{3}$	1	0.67	1.4	0.9	$\infty$
Combined standard uncertainty (%)								15.19	10.82	
Expanded Std. uncertainty on power (K=2)								30.38	21.64	
Expanded Std. uncertainty on field (K=2)								15.19	10.82	



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**5. Main Test Instruments**

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Power meter	Agilent E4417A	GB41291714	March 9, 2014	One year
02	Power sensor	Agilent N8481H	MY50350004	September 23, 2013	One year
03	Signal Generator	HP 8341B	2730A00804	September 10, 2013	One year
04	Amplifier	IXA-020	0401	No Calibration Requested	
05	BTS	E5515C	MY48360988	November 30, 2013	One year
06	E-Field Probe	ER3DV6	2428	January 27, 2014	One year
07	H-Field Probe	H3DV6	6260	January 27, 2014	One year
08	DAE	DAE4	1317	January 16, 2014	One year
09	Validation Kit 835MHz	CD835V3	1156	September 2, 2013	One year
10	Validation Kit 1880MHz	CD1880V3	1140	September 2, 2013	One year
11	Hygrothermograph	WS-1	64591	September 26, 2013	One year

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

## ANNEX A: System Check Results

### HAC\_System Performance Check at 835MHz\_E

**DUT: Dipole 835 MHz; Type: CD835V3; SN:1156**

Date/Time: 4/28/2014

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

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**E Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm**

**2/Hearing Aid Compatibility Test (41x361x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 170.3 V/m

Probe Modulation Factor = 1.00

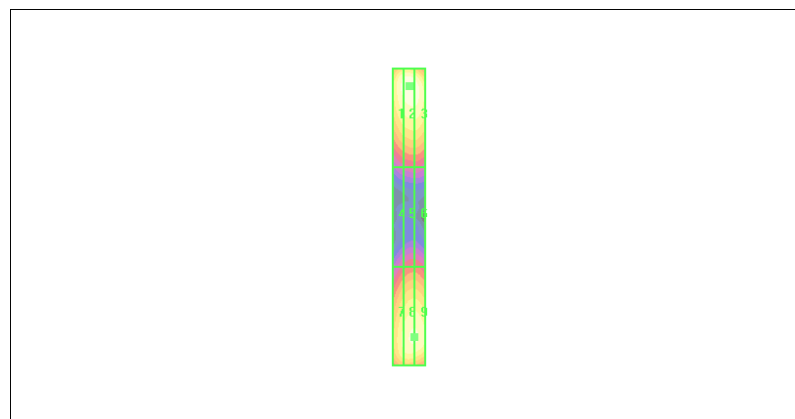
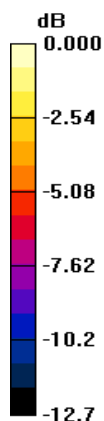
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 118.7 V/m; Power Drift = 0.003 dB

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

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>161.9 M4</b>	<b>170.3 M4</b>	<b>166.1 M4</b>
Grid 4	Grid 5	Grid 6
<b>81.2 M4</b>	<b>88.2 M4</b>	<b>87.9 M4</b>
Grid 7	Grid 8	Grid 9
<b>144.5 M4</b>	<b>157.6 M4</b>	<b>157.6 M4</b>



0 dB = 170.3V/m

**Figure 8 System Performance Check 835MHz\_E**

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## HAC\_System Performance Check at 835MHz\_H

**DUT: Dipole 835 MHz; Type: CD835V3; SN: 1156**

Date/Time: 4/28/2014

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

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**H Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x381x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.471 A/m

Probe Modulation Factor = 1.00

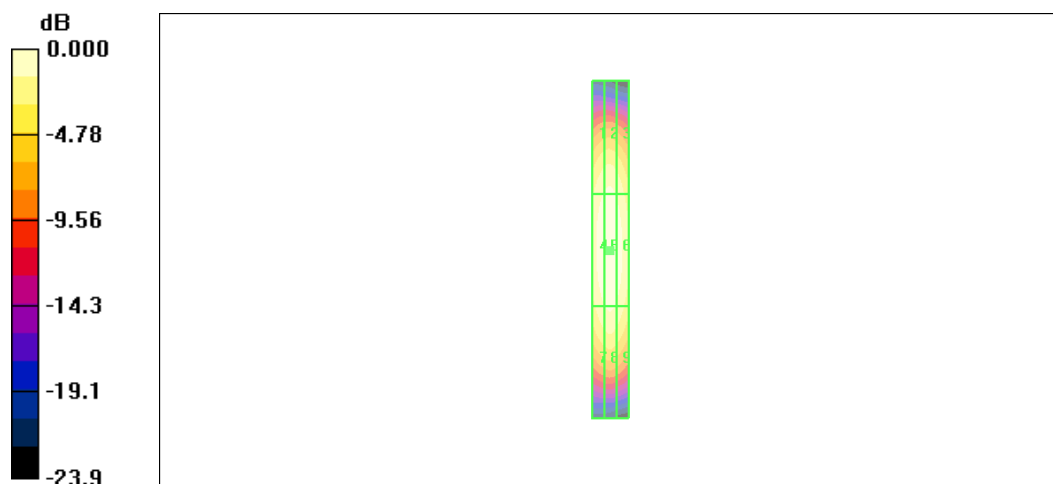
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 0.503 A/m; Power Drift = -0.012 dB

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

Peak H-field in A/m

Grid 1 <b>0.397 M4</b>	Grid 2 <b>0.411 M4</b>	Grid 3 <b>0.382 M4</b>
Grid 4 <b>0.453 M4</b>	Grid 5 <b>0.471 M4</b>	Grid 6 <b>0.440 M4</b>
Grid 7 <b>0.388 M4</b>	Grid 8 <b>0.405 M4</b>	Grid 9 <b>0.380 M4</b>



0 dB = 0.471A/m

**Figure 9 System Performance Check 835MHz\_H**

# TA Technology (Shanghai) Co., Ltd. Test Report

## HAC\_System Performance Check at 1880MHz\_E

**DUT: Dipole 1880 MHz; Type: CD1880V3; SN: 1140**

Date/Time: 4/29/2014

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

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**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 = 148.1 V/m

Probe Modulation Factor = 1.00

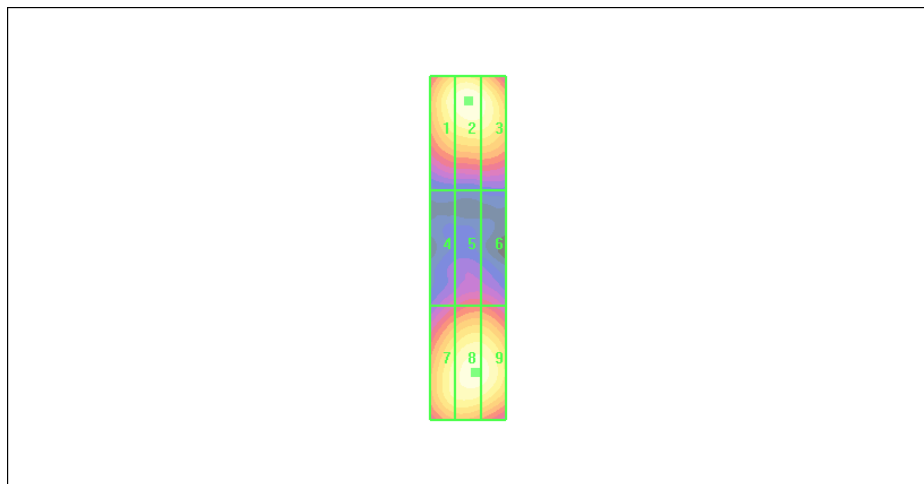
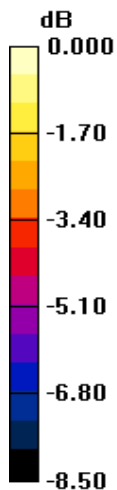
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 146.4 V/m; Power Drift = 0.002 dB

**Hearing Aid Near-Field Category: M2 (AWF 0 dB)**

Peak E-field in V/m

Grid 1 <b>140.5 M2</b>	Grid 2 <b>148.1 M2</b>	Grid 3 <b>143.0 M2</b>
Grid 4 <b>86.9 M3</b>	Grid 5 <b>93.9 M3</b>	Grid 6 <b>93.7 M3</b>
Grid 7 <b>136.0 M2</b>	Grid 8 <b>143.9 M2</b>	Grid 9 <b>143.2 M2</b>



0 dB = 148.1V/m

**Figure 10 System Performance Check 1880MHz\_E**

# TA Technology (Shanghai) Co., Ltd.

## Test Report

### HAC\_System Performance Check at 1880MHz\_H

**DUT: Dipole 1880 MHz; Type: CD1880V3; SN: 1140**

Date/Time: 4/29/2014

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

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**H Scan - measurement distance from the probe sensor center to Dipole = 10mm/Hearing Aid**

**Compatibility Test (41x181x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.457 A/m

Probe Modulation Factor = 1.00

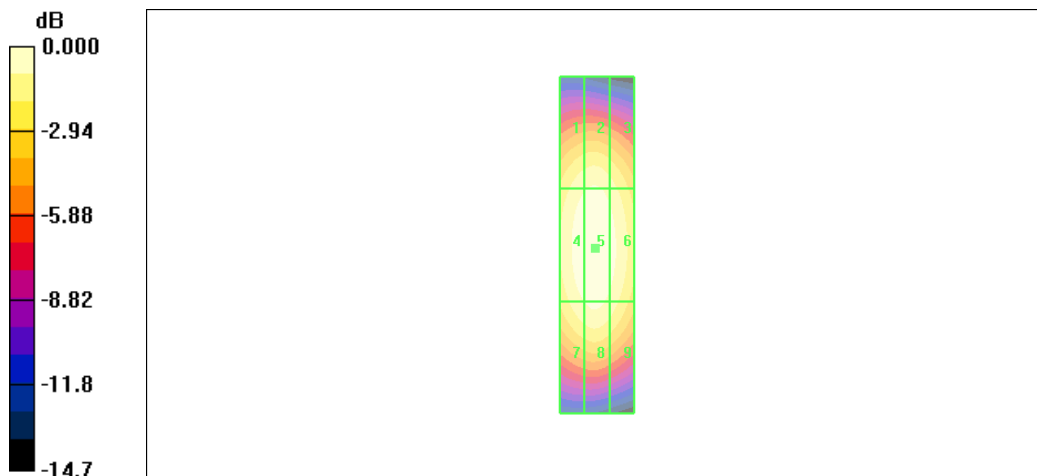
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 0.483 A/m; Power Drift = 0.003 dB

**Hearing Aid Near-Field Category: M2 (AWF 0 dB)**

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.403 M2</b>	<b>0.415 M2</b>	<b>0.387 M2</b>
Grid 4	Grid 5	Grid 6
<b>0.443 M2</b>	<b>0.457 M2</b>	<b>0.428 M2</b>
Grid 7	Grid 8	Grid 9
<b>0.408 M2</b>	<b>0.423 M2</b>	<b>0.393 M2</b>



0 dB = 0.457A/m

**Figure 11 System Performance Check 1880MHz\_H**

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### ANNEX B: Graph Results

#### HAC RF E-Field GSM 850 High

Date/Time: 4/28/2014

Communication System: GSM; Frequency: 848.8 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

#### A845L GSM 850 HAC RF E-Field/E Scan - ER3D - 2007: 15 mm from Probe Center to the Device High/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 156.5 V/m

Probe Modulation Factor = 2.81

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 64.5 V/m; Power Drift = 0.041 dB

**Hearing Aid Near-Field Category: M3 (AWF -5 dB)**

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>130.6 M4</b>	<b>155.4 M3</b>	<b>154.5 M3</b>
Grid 4	Grid 5	Grid 6
<b>128.0 M4</b>	<b>156.5 M3</b>	<b>156.1 M3</b>
Grid 7	Grid 8	Grid 9
<b>118.9 M4</b>	<b>150.2 M3</b>	<b>149.9 M3</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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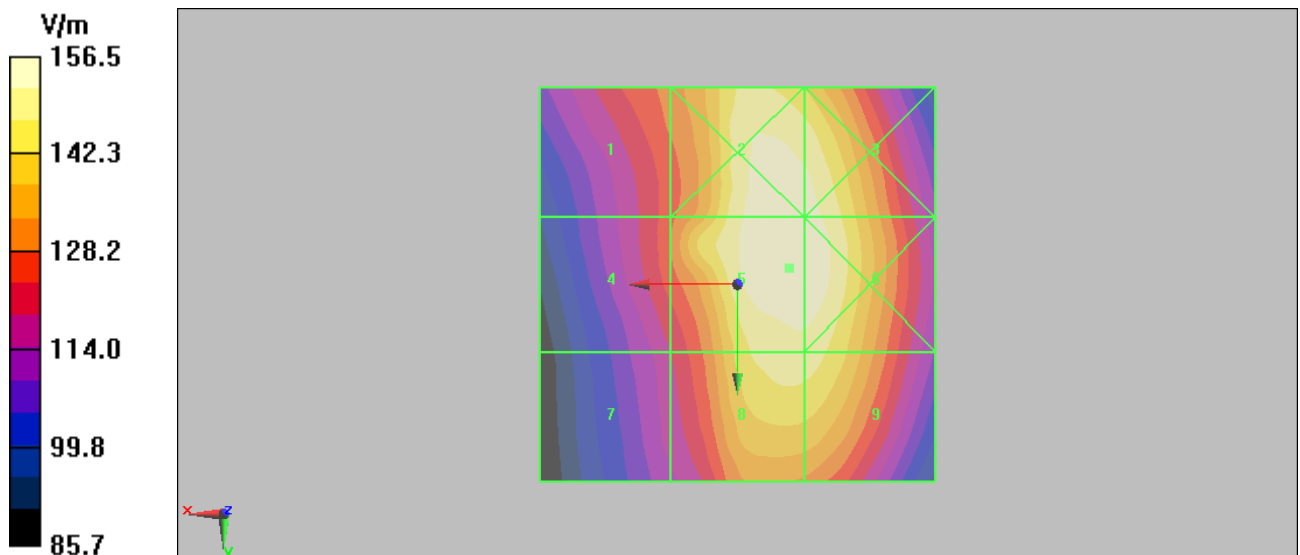
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 156.5 V/m

E Category: M3

Location: -6.5, -2, 8.7 mm



**Figure 12 HAC RF E-Field GSM 850 Channel 251**

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### HAC RF E-Field GSM 850 Middle

Date/Time: 4/28/2014

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

### A845L GSM 850 HAC RF E-Field/E Scan - ER3D - 2007: 15 mm from Probe Center to the Device Middle/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 165.5 V/m

Probe Modulation Factor = 2.81

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 72.9 V/m; Power Drift = -0.159 dB

**Hearing Aid Near-Field Category: M3 (AWF -5 dB)**

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>148.9 M4</b>	<b>164.1 M3</b>	<b>162.7 M3</b>
Grid 4	Grid 5	Grid 6
<b>144.0 M4</b>	<b>165.5 M3</b>	<b>164.4 M3</b>
Grid 7	Grid 8	Grid 9
<b>135.9 M4</b>	<b>157.9 M3</b>	<b>157.1 M3</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14



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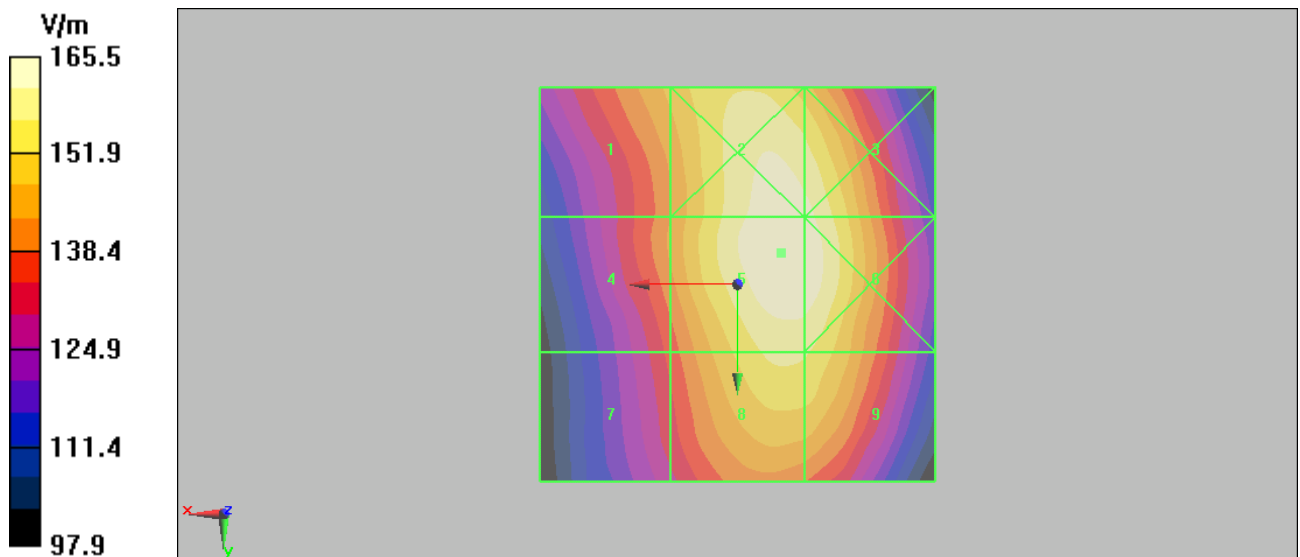
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 165.5 V/m

E Category: M3

Location: -5.5, -4, 8.7 mm



**Figure 13 HAC RF E-Field GSM 850 Channel 190**

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**HAC RF E-Field GSM 850 Low**

Date/Time: 4/28/2014

Communication System: GSM; Frequency: 824.2 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**A845L GSM 850 HAC RF E-Field/E Scan - ER3D - 2007: 15 mm from Probe Center to the Device  
Low/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 187.0 V/m

Probe Modulation Factor = 2.81

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 81.6 V/m; Power Drift = 0.020 dB

**Hearing Aid Near-Field Category: M3 (AWF -5 dB)**

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>169.5 M3</b>	<b>185.5 M3</b>	<b>184.2 M3</b>
Grid 4	Grid 5	Grid 6
<b>163.8 M3</b>	<b>187.0 M3</b>	<b>185.1 M3</b>
Grid 7	Grid 8	Grid 9
<b>153.6 M3</b>	<b>178.7 M3</b>	<b>178.3 M3</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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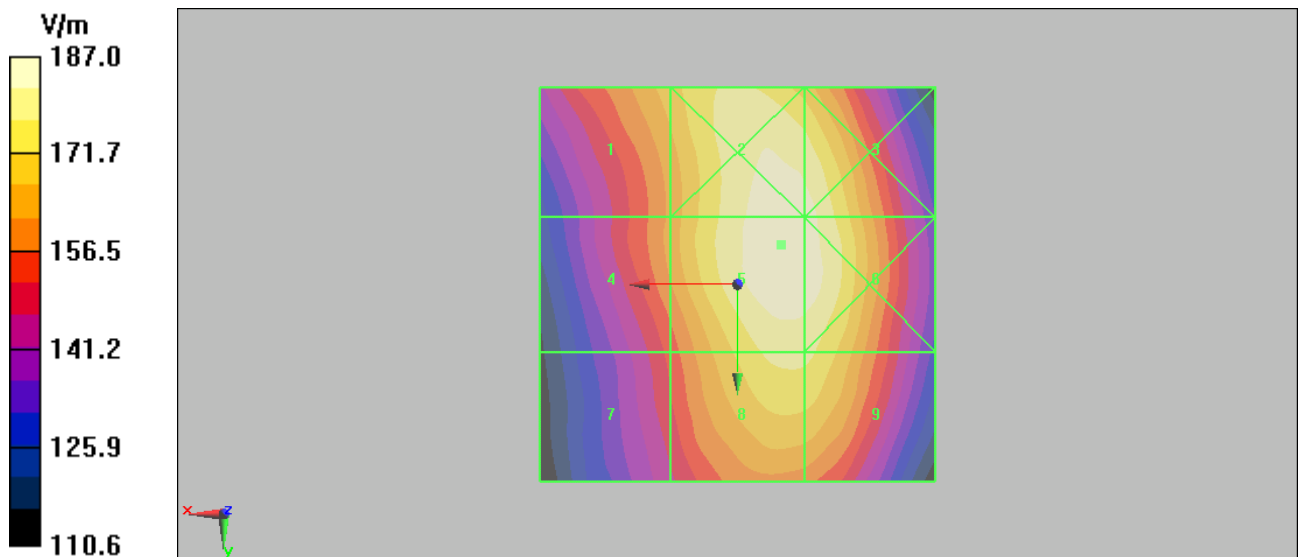
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 187.0 V/m

E Category: M3

Location: -5.5, -5, 8.7 mm



**Figure 14 HAC RF E-Field GSM 850 Channel 128**

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No. RXA1404-0079HAC01

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### HAC RF H-Field GSM 850 High

Date/Time: 4/28/2014

Communication System: GSM; Frequency: 848.8 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

### A845L GSM 850 HAC RF H-Field/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device High/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.229 A/m

Probe Modulation Factor = 2.75

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.065 A/m; Power Drift = 0.033 dB

### Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.318 M4</b>	<b>0.229 M4</b>	<b>0.143 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.289 M4</b>	<b>0.217 M4</b>	<b>0.135 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.304 M4</b>	<b>0.225 M4</b>	<b>0.143 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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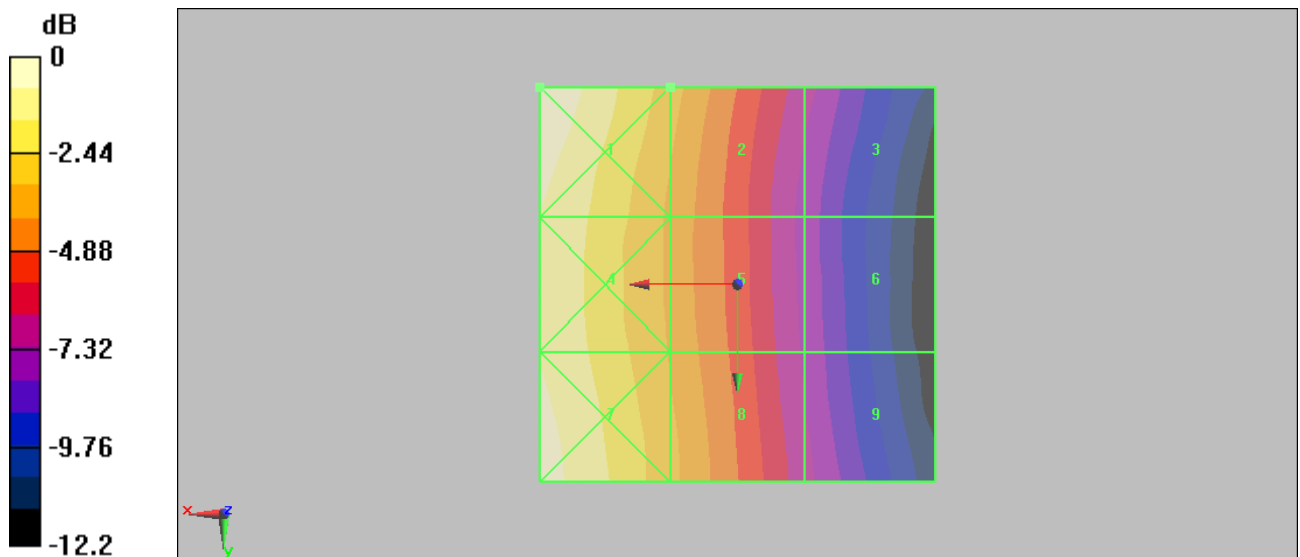
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 0.318 A/m

H Category: M4

Location: 25, -25, 8.7 mm



0 dB = 0.318A/m

**Figure 15 HAC RF H-Field GSM 850Channel 251**

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### HAC RF H-Field GSM 850 Middle

Date/Time: 4/28/2014

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**A845L GSM 850 HAC RF H-Field/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device Middle/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.241 A/m

Probe Modulation Factor = 2.75

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.068 A/m; Power Drift = 0.138 dB

**Hearing Aid Near-Field Category: M4 (AWF -5 dB)**

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.330 M4</b>	<b>0.237 M4</b>	<b>0.148 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.306 M4</b>	<b>0.230 M4</b>	<b>0.144 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.327 M4</b>	<b>0.241 M4</b>	<b>0.154 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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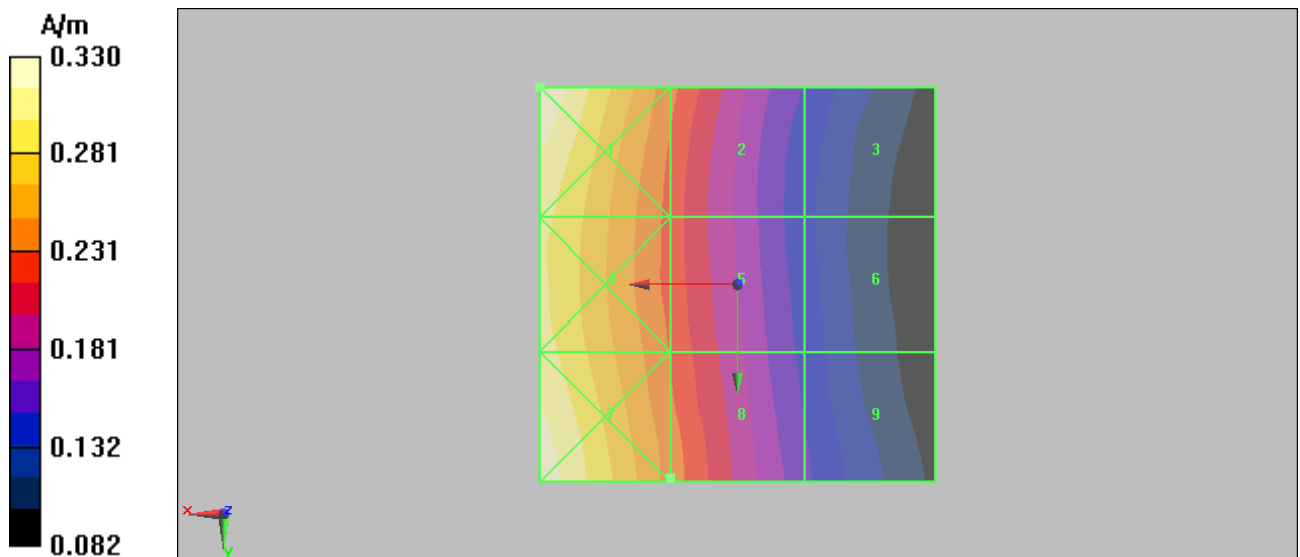
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 0.330 A/m

H Category: M4

Location: 25, -25, 8.7 mm



**Figure 16 HAC RF H-Field GSM 850 Channel 190**

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### HAC RF H-Field GSM 850 Low

Date/Time: 4/28/2014

Communication System: GSM; Frequency: 824.2 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

### A845L GSM 850 HAC RF H-Field/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device Low/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.271 A/m

Probe Modulation Factor = 2.75

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.075 A/m; Power Drift = 0.030 dB

### Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.369 M4</b>	<b>0.261 M4</b>	<b>0.158 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.345 M4</b>	<b>0.256 M4</b>	<b>0.158 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.372 M4</b>	<b>0.271 M4</b>	<b>0.170 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14



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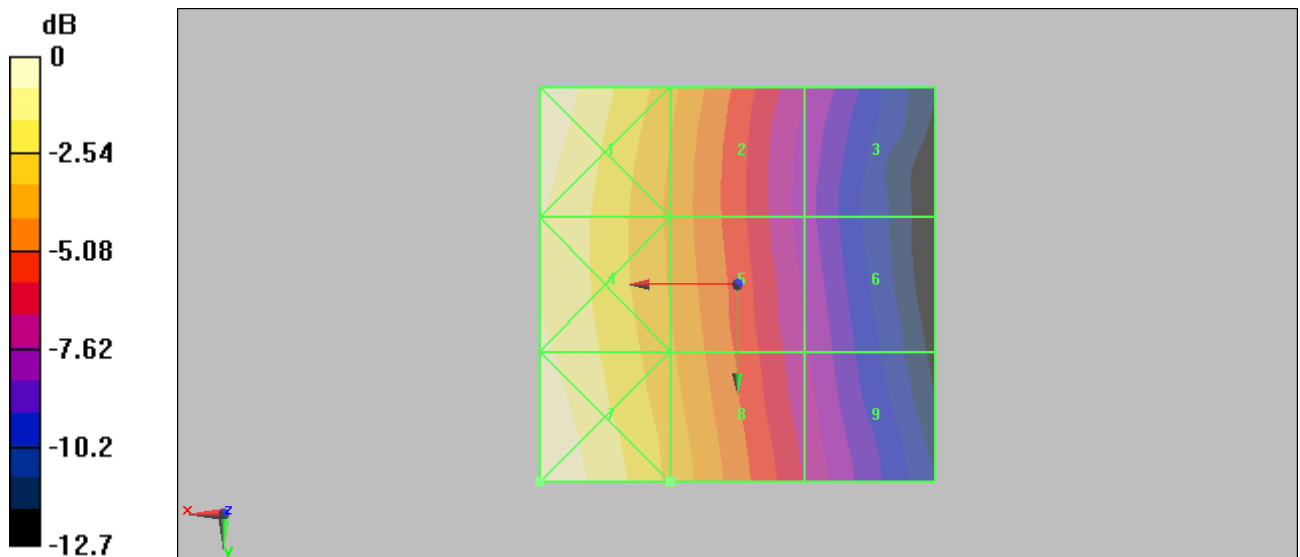
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 0.372 A/m

H Category: M4

Location: 25, 25, 8.7 mm



0 dB = 0.372A/m

**Figure 17 HAC RF H-Field GSM 850 Channel 128**

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### HAC RF E-Field GSM 1900 High

Date/Time: 4/29/2014

Communication System: GSM; Frequency: 1909.8 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

### A845L GSM 1900 HAC RF E-Field/E Scan - ER3D - 2007: 15 mm from Probe Center to the Device High/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 47.2 V/m

Probe Modulation Factor = 2.84

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 19 V/m; Power Drift = 0.111 dB

### Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>41.8 M4</b>	<b>54.4 M3</b>	<b>54.5 M3</b>
Grid 4	Grid 5	Grid 6
<b>35.7 M4</b>	<b>47.2 M4</b>	<b>47.2 M4</b>
Grid 7	Grid 8	Grid 9
<b>40.2 M4</b>	<b>43.4 M4</b>	<b>43.3 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 54.5 V/m

E Category: M3

Location: -9.5, -25, 8.7 mm

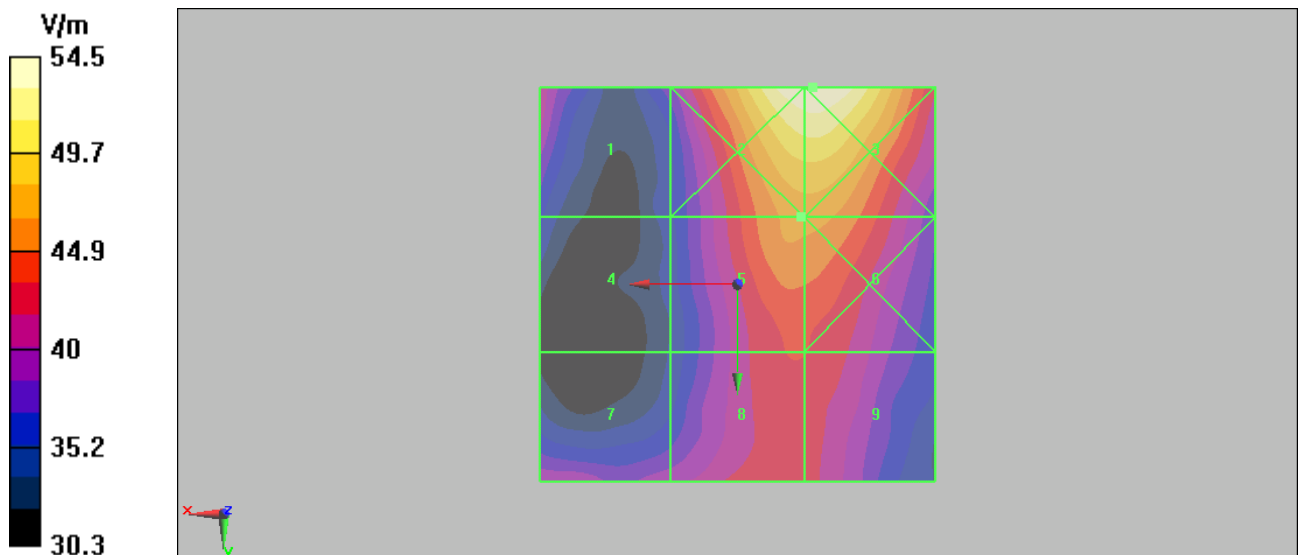


Figure 18 HAC RF E-Field GSM 1900 Channel 810

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### HAC RF E-Field GSM 1900 Middle

Date/Time: 4/29/2014

Communication System: GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**A845L GSM 1900 HAC RF E-Field/E Scan - ER3D - 2007: 15 mm from Probe Center to the Device Middle/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 44.2 V/m

Probe Modulation Factor = 2.84

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 16.1 V/m; Power Drift = 0.057 dB

**Hearing Aid Near-Field Category: M4 (AWF -5 dB)**

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>35.3 M4</b>	<b>57.8 M3</b>	<b>58.2 M3</b>
Grid 4	Grid 5	Grid 6
<b>32.6 M4</b>	<b>42.6 M4</b>	<b>43 M4</b>
Grid 7	Grid 8	Grid 9
<b>41.2 M4</b>	<b>44.2 M4</b>	<b>44.2 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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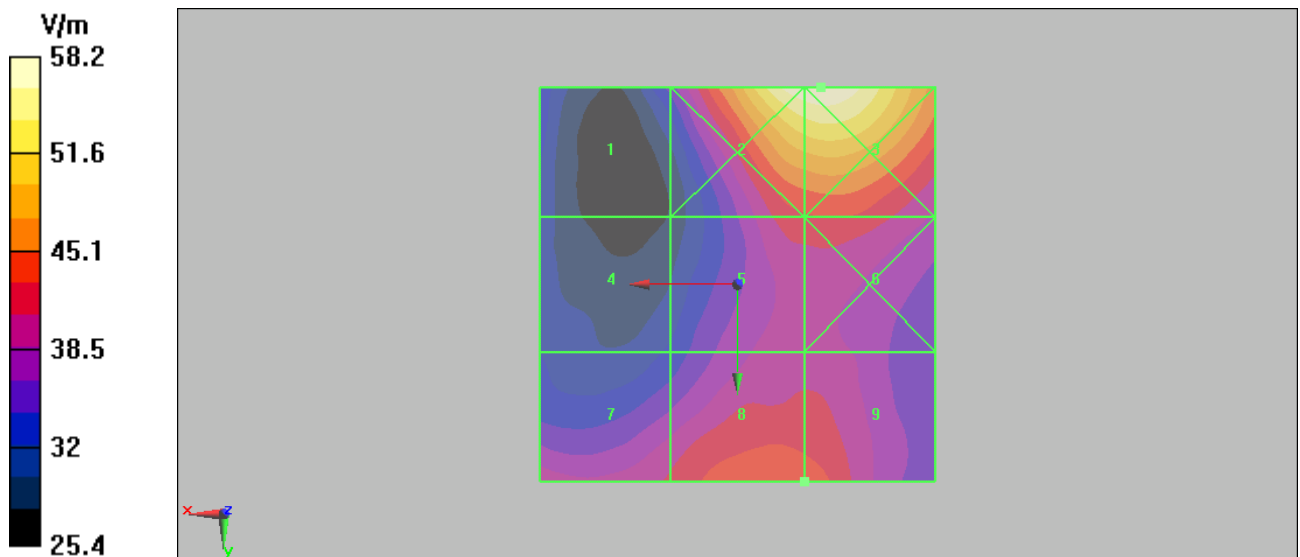
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 58.2 V/m

E Category: M3

Location: -10.5, -25, 8.7 mm



**Figure 19 HAC RF E-Field GSM 1900 Channel 661**

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### HAC RF E-Field GSM 1900 Low

Date/Time: 4/29/2014

Communication System: GSM; Frequency: 1850.2 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

### A845L GSM 1900 HAC RF E-Field/E Scan - ER3D - 2007: 15 mm from Probe Center to the Device Low/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 51.4 V/m

Probe Modulation Factor = 2.84

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 14.8 V/m; Power Drift = 0.002 dB

### Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>39.9 M4</b>	<b>62.8 M3</b>	<b>63 M3</b>
Grid 4	Grid 5	Grid 6
<b>36.2 M4</b>	<b>40.9 M4</b>	<b>41.5 M4</b>
Grid 7	Grid 8	Grid 9
<b>48.9 M3</b>	<b>51.4 M3</b>	<b>45.8 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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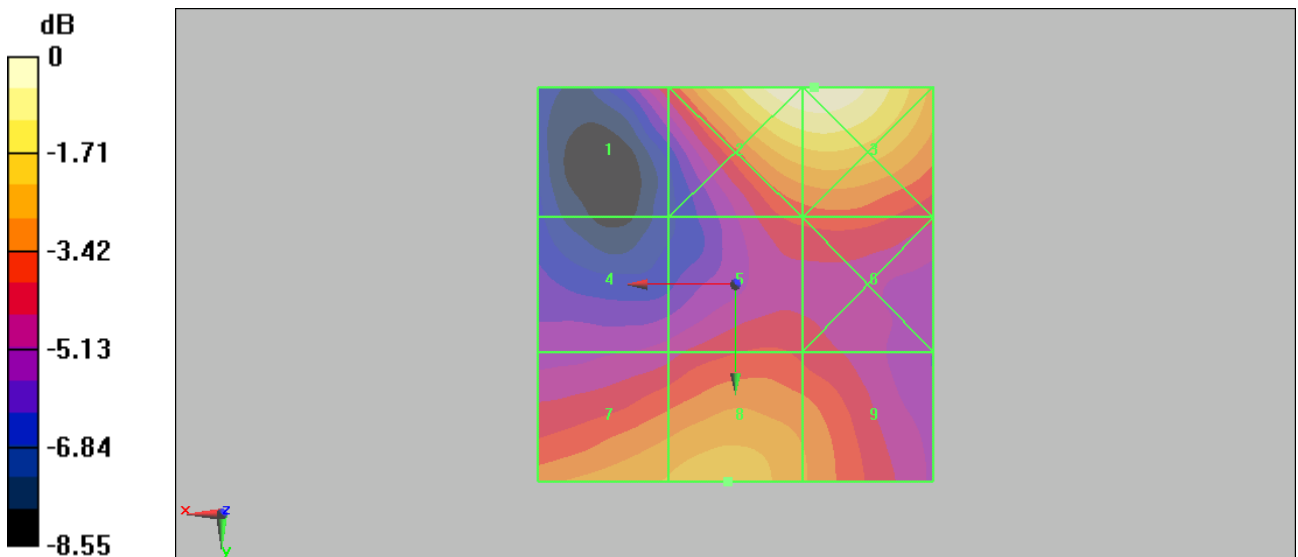
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 63 V/m

E Category: M3

Location: -10, -25, 8.7 mm



0 dB = 63V/m

**Figure 20 HAC RF E-Field GSM 1900 Channel 512**

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### HAC RF H-Field GSM 1900 High

Date/Time: 4/29/2014

Communication System: GSM; Frequency: 1909.8 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

### A845L GSM 1900 HAC RF H-Field/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device High/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.138 A/m

Probe Modulation Factor = 2.84

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.049 A/m; Power Drift = 0.008 dB

### Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.181 M3</b>	<b>0.160 M3</b>	<b>0.115 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.137 M4</b>	<b>0.133 M4</b>	<b>0.119 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.138 M4</b>	<b>0.135 M4</b>	<b>0.120 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14



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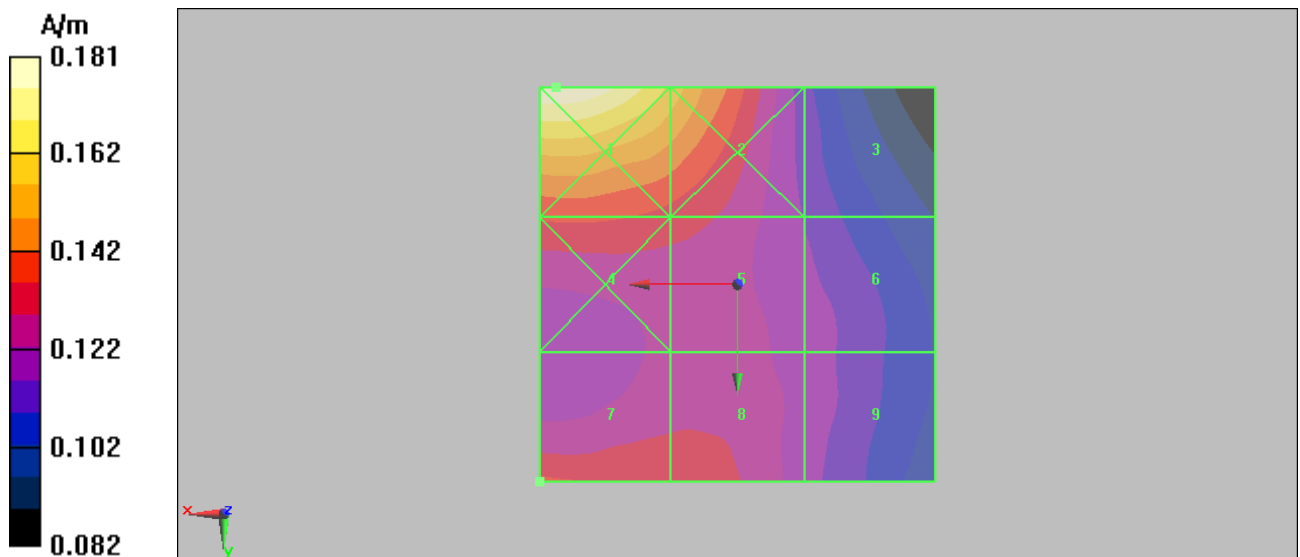
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 0.181 A/m

H Category: M3

Location: 23, -25, 8.7 mm



**Figure 21 HAC RF H-Field GSM 1900 Channel 810**

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### HAC RF H-Field GSM 1900 Middle

Date/Time: 4/29/2014

Communication System: GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**A845L GSM 1900 HAC RF H-Field/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device Middle/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.132 A/m

Probe Modulation Factor = 2.84

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.052 A/m; Power Drift = -0.037 dB

**Hearing Aid Near-Field Category: M4 (AWF -5 dB)**

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.181 M3</b>	<b>0.162 M3</b>	<b>0.125 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.131 M4</b>	<b>0.132 M4</b>	<b>0.128 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.126 M4</b>	<b>0.127 M4</b>	<b>0.126 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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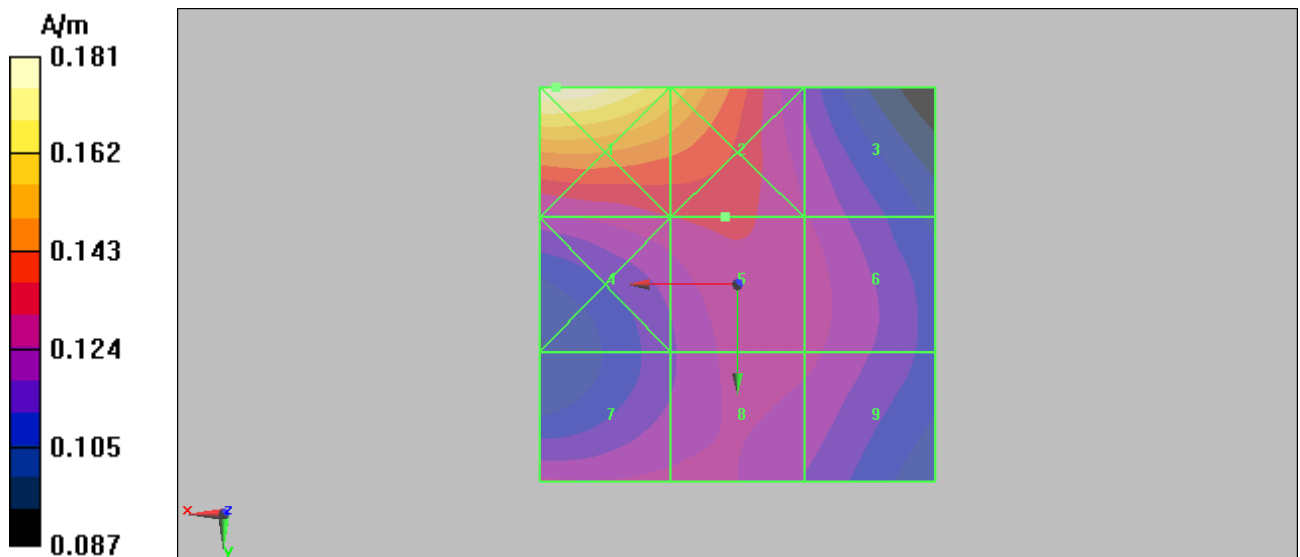
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 0.181 A/m

H Category: M3

Location: 23, -25, 8.7 mm



**Figure 22 HAC RF H-Field GSM 1900 Channel 661**

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### HAC RF H-Field GSM 1900 Low

Date/Time: 4/29/2014

Communication System: GSM; Frequency: 1850.2 MHz; Duty Cycle: 1:8.30042

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

### A845L GSM 1900 HAC RF H-Field/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device Low/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.144 A/m

Probe Modulation Factor = 2.84

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.058 A/m; Power Drift = -0.022 dB

### Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.188 M3</b>	<b>0.166 M3</b>	<b>0.140 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.136 M4</b>	<b>0.144 M3</b>	<b>0.140 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.128 M4</b>	<b>0.132 M4</b>	<b>0.132 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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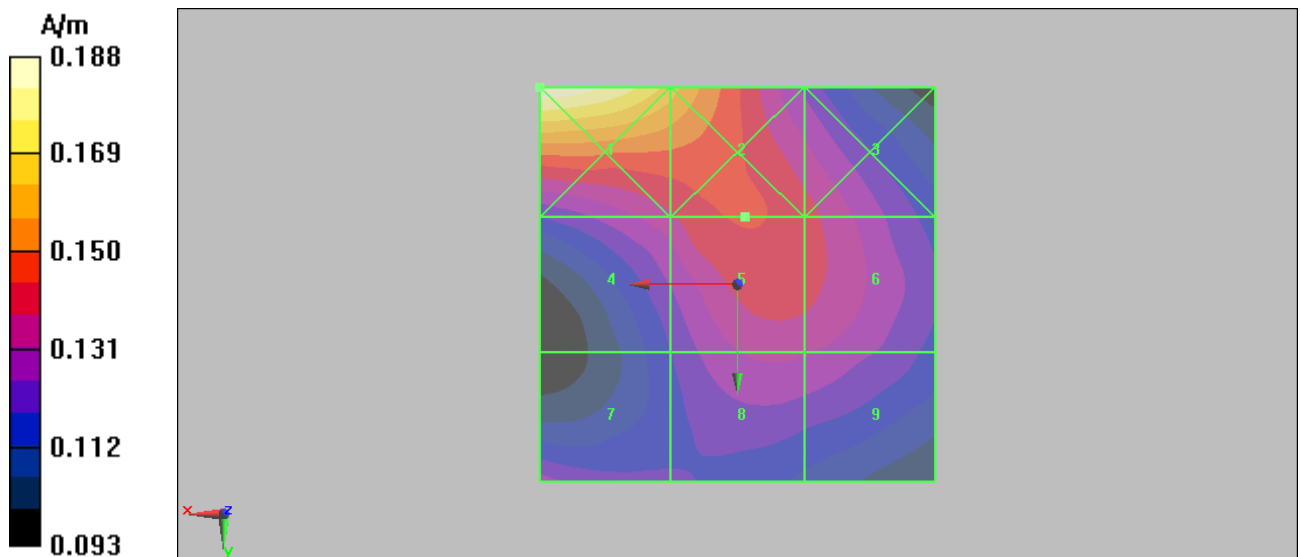
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 0.188 A/m

H Category: M3

Location: 25, -25, 8.7 mm



**Figure 23 HAC RF H-Field GSM 1900 Channel 512**

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### HAC RF E-Field UMTS Band II High

Date/Time: 4/29/2014

Communication System: WCDMA ; Frequency: 1907.6 MHz;Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature:22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

### A845L WCDMA II HAC RF E-Field/E Scan - ER3D - 2007: 15 mm from Probe Center to the Device High/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 26.3 V/m

Probe Modulation Factor = 1.03

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 26.2 V/m; Power Drift = -0.190 dB

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

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>27.2 M4</b>	<b>26.2 M4</b>	<b>26.3 M4</b>
Grid 4	Grid 5	Grid 6
<b>27.1 M4</b>	<b>22.7 M4</b>	<b>22.7 M4</b>
Grid 7	Grid 8	Grid 9
<b>25.4 M4</b>	<b>20.5 M4</b>	<b>20.5 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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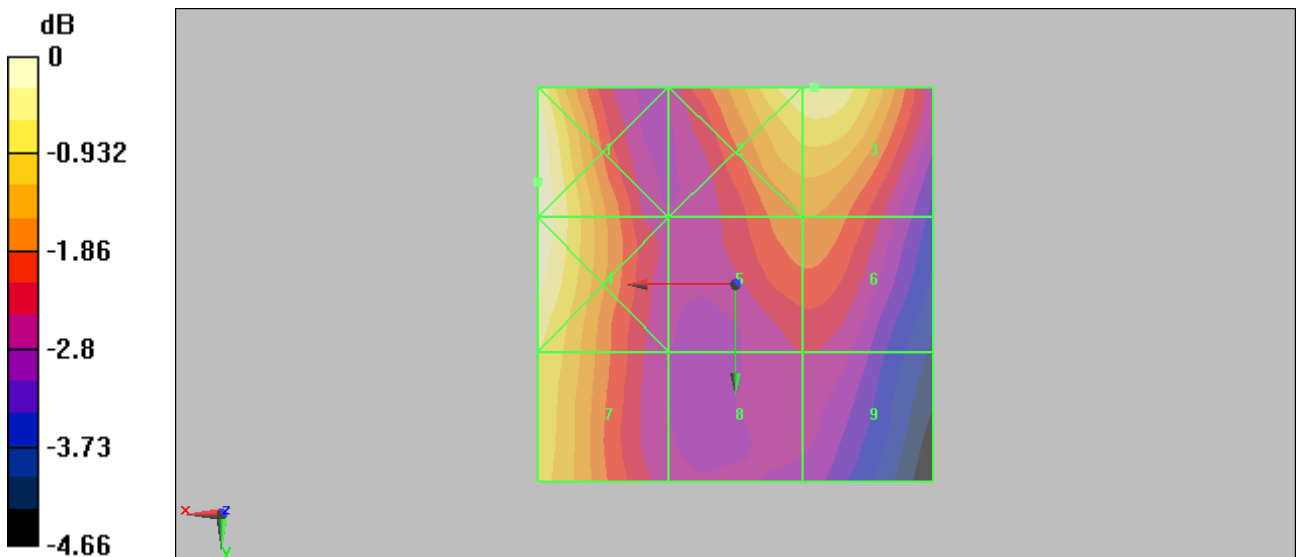
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 27.2 V/m

E Category: M4

Location: 25, -13, 8.7 mm



0 dB = 27.2V/m

**Figure 24 HAC RF E-Field UMTS Band II Channel 9538**

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### HAC RF E-Field UMTS Band II Middle

Date/Time: 4/29/2014

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

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**A845L WCDMA II HAC RF E-Field/E Scan - ER3D - 2007: 15 mm from Probe Center to the Device Middle/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 26.3 V/m

Probe Modulation Factor = 1.03

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 24 V/m; Power Drift = 0.100 dB

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

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>26.2 M4</b>	<b>29.4 M4</b>	<b>29.6 M4</b>
Grid 4	Grid 5	Grid 6
<b>26.3 M4</b>	<b>21.9 M4</b>	<b>22 M4</b>
Grid 7	Grid 8	Grid 9
<b>25.9 M4</b>	<b>22.6 M4</b>	<b>21.9 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14



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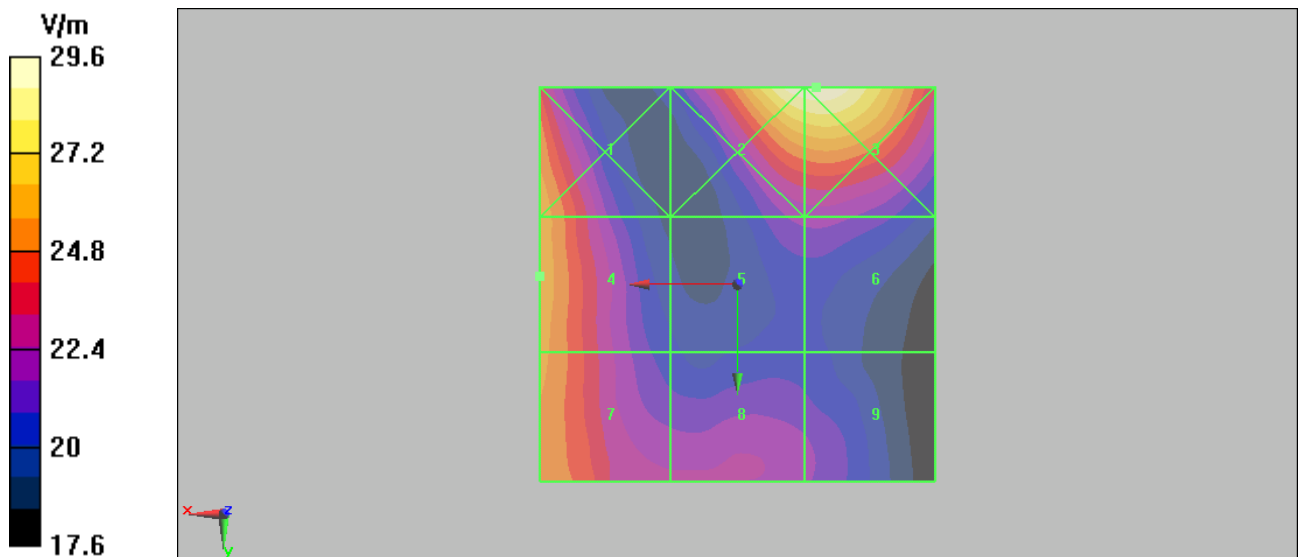
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 29.6 V/m

E Category: M4

Location: -10, -25, 8.7 mm



**Figure 25 HAC RF E-Field UMTS Band II Channel 9400**

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### HAC RF E-Field UMTS Band II Low

Date/Time: 4/29/2014

Communication System: WCDMA ; Frequency: 1852.4 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

### A845L WCDMA II HAC RF E-Field/E Scan - ER3D - 2007: 15 mm from Probe Center to the Device Low/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 25.2 V/m

Probe Modulation Factor = 1.03

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 21.8 V/m; Power Drift = 0.064 dB

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

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>23.6 M4</b>	<b>30.3 M4</b>	<b>30.5 M4</b>
Grid 4	Grid 5	Grid 6
<b>24.4 M4</b>	<b>20.5 M4</b>	<b>20.6 M4</b>
Grid 7	Grid 8	Grid 9
<b>25.2 M4</b>	<b>24.5 M4</b>	<b>22.5 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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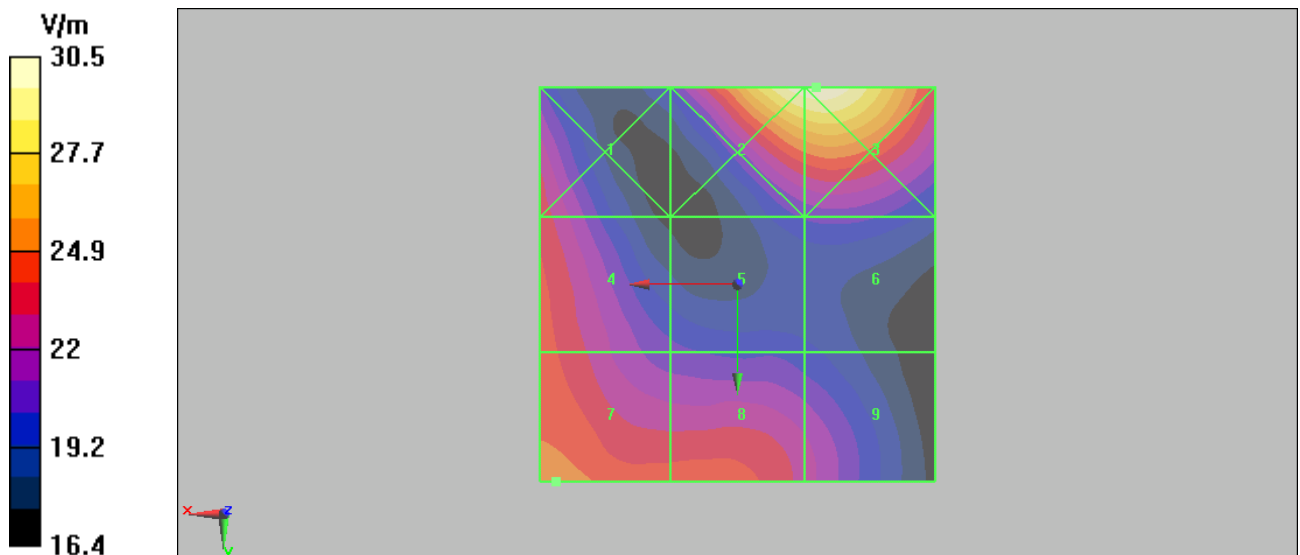
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 30.5 V/m

E Category: M4

Location: -10, -25, 8.7 mm



**Figure 26 HAC RF E-Field UMTS Band II Channel 9262**

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### HAC RF H-Field UMTS Band II High

Date/Time: 4/29/2014

Communication System: WCDMA ; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

### A845L WCDMA II HAC RF H-Field/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device High/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.065 A/m

Probe Modulation Factor = 1.01

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.066 A/m; Power Drift = -0.004 dB

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

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.084 M4</b>	<b>0.075 M4</b>	<b>0.055 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.065 M4</b>	<b>0.063 M4</b>	<b>0.058 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.065 M4</b>	<b>0.065 M4</b>	<b>0.059 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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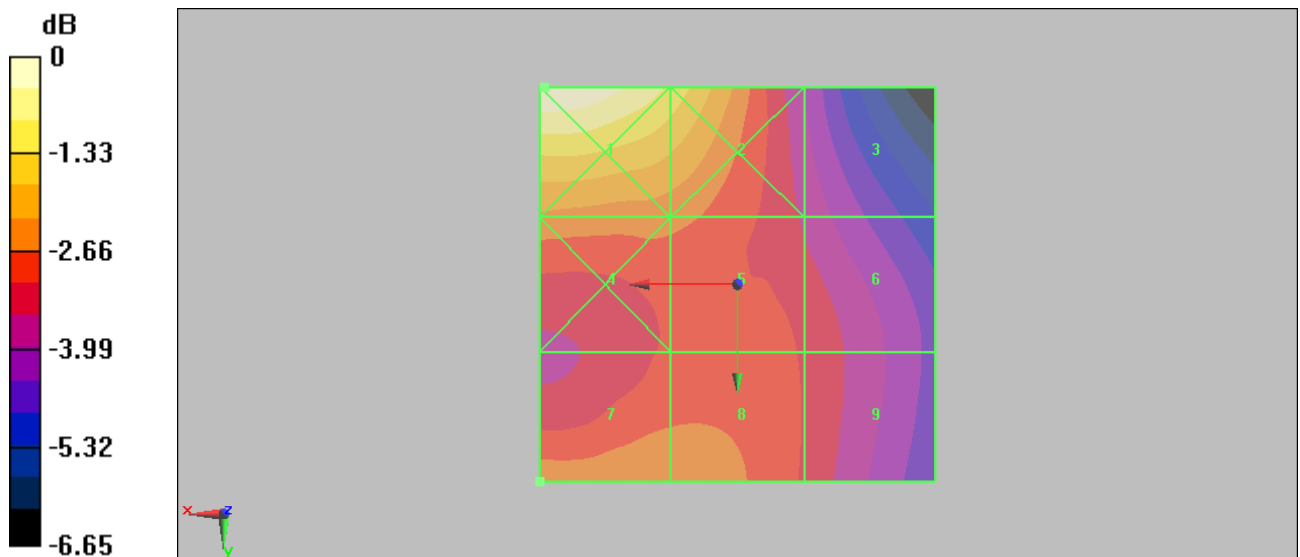
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 0.084 A/m

H Category: M4

Location: 24.5, -25, 8.7 mm



0 dB = 0.084A/m

**Figure 27 HAC RF H-Field UMTS Band II Channel 9538**

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### HAC RF H-Field UMTS Band II Middle

Date/Time: 4/29/2014

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

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**A845L WCDMA II HAC RF H-Field/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device Middle/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.065 A/m

Probe Modulation Factor = 1.01

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.072 A/m; Power Drift = -0.045 dB

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

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.088 M4</b>	<b>0.079 M4</b>	<b>0.062 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.064 M4</b>	<b>0.065 M4</b>	<b>0.063 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.063 M4</b>	<b>0.063 M4</b>	<b>0.062 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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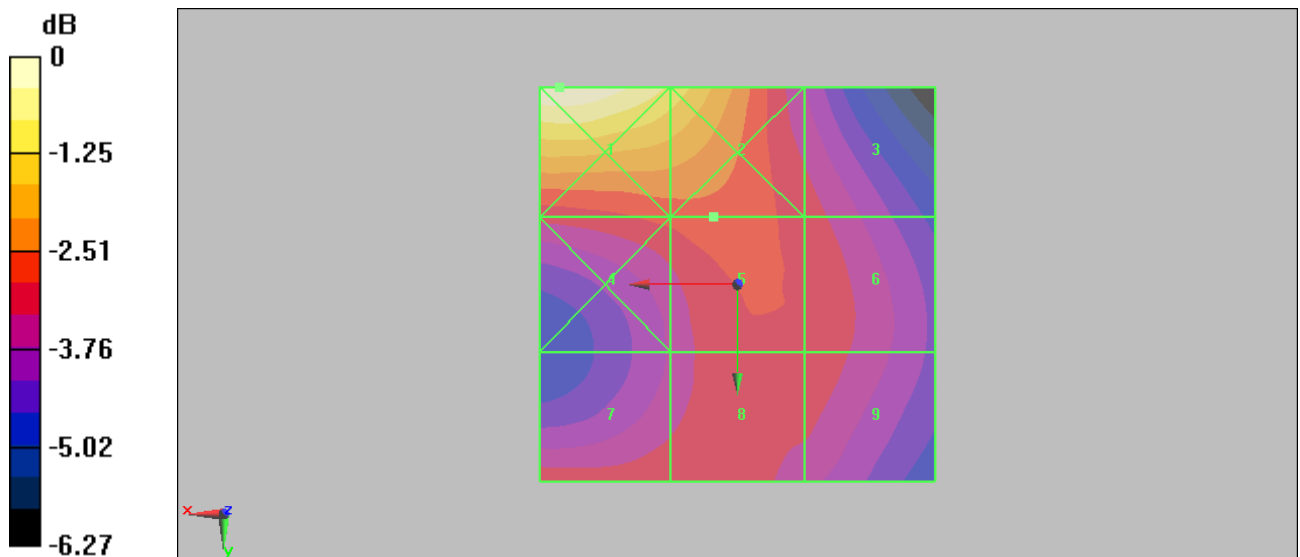
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 0.088 A/m

H Category: M4

Location: 22.5, -25, 8.7 mm



0 dB = 0.088A/m

**Figure 28 HAC RF H-Field UMTS Band II Channel 9400**

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**HAC RF H-Field UMTS Band II Low**

Date/Time: 4/29/2014

Communication System: WCDMA ; Frequency: 1852.4 MHz;Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature:22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**A845L WCDMA II HAC RF H-Field/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device Low/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.067 A/m

Probe Modulation Factor = 1.01

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.076 A/m; Power Drift = -0.021 dB

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

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.087 M4</b>	<b>0.077 M4</b>	<b>0.065 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.063 M4</b>	<b>0.067 M4</b>	<b>0.065 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.062 M4</b>	<b>0.062 M4</b>	<b>0.062 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14



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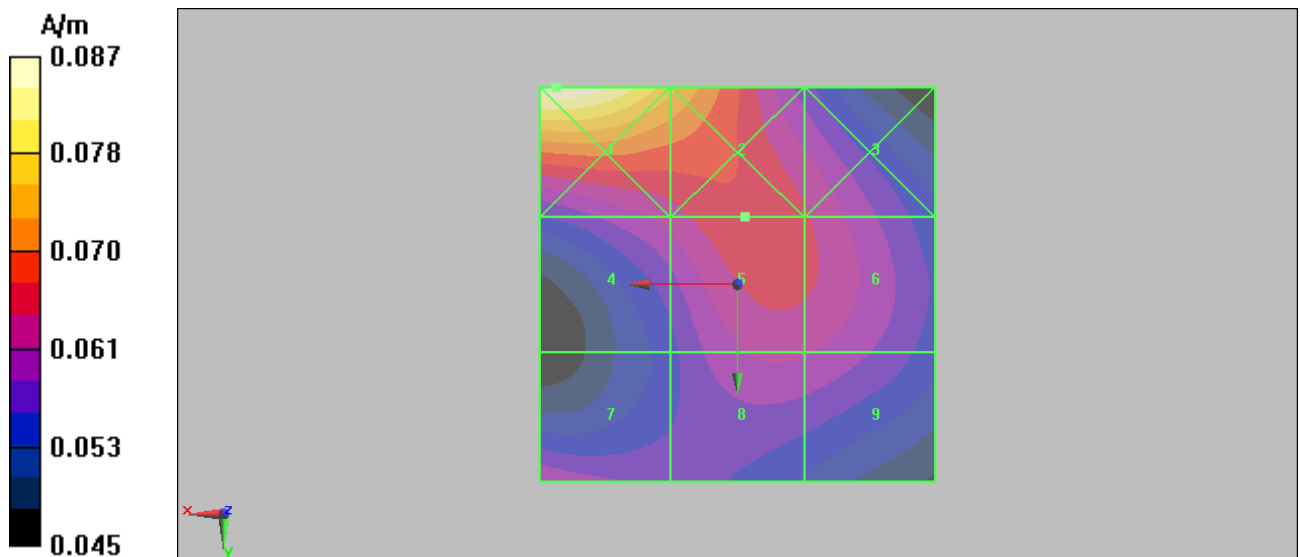
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 0.087 A/m

H Category: M4

Location: 23, -25, 8.7 mm



**Figure 29 HAC RF H-Field UMTS Band II Channel 9262**

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### HAC RF E-Field UMTS Band V High

Date/Time: 4/28/2014

Communication System: WCDMA ; Frequency: 846.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

### A845L WCDMA V HAC RF E-Field/E Scan - ER3D - 2007: 15 mm from Probe Center to the Device High/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 55.3 V/m

Probe Modulation Factor = 1.03

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 65.4 V/m; Power Drift = 0.115 dB

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

Peak E-field in V/m

Grid 1 <b>49.7 M4</b>	Grid 2 <b>54.9 M4</b>	Grid 3 <b>54.5 M4</b>
Grid 4 <b>48.1 M4</b>	Grid 5 <b>55.3 M4</b>	Grid 6 <b>55.2 M4</b>
Grid 7 <b>45.4 M4</b>	Grid 8 <b>52.6 M4</b>	Grid 9 <b>52.5 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 55.3 V/m

E Category: M4

Location: -6, -4, 8.7 mm

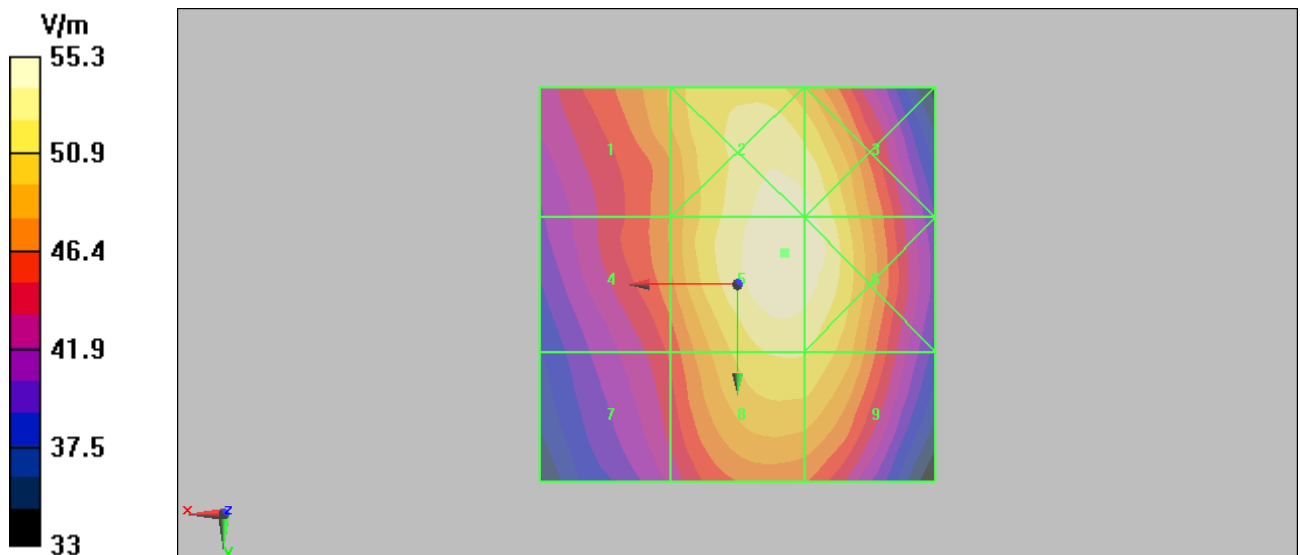


Figure 30 HAC RF E-Field UMTS Band V Channel 4233

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### HAC RF E-Field UMTS Band V Middle

Date/Time: 4/28/2014

Communication System: WCDMA ; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**A845L WCDMA V HAC RF E-Field/E Scan - ER3D - 2007: 15 mm from Probe Center to the Device Middle/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 59.4 V/m

Probe Modulation Factor = 1.03

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 72.5 V/m; Power Drift = -0.155 dB

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

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>53.5 M4</b>	<b>58.8 M4</b>	<b>58.6 M4</b>
Grid 4	Grid 5	Grid 6
<b>52.5 M4</b>	<b>59.4 M4</b>	<b>59.2 M4</b>
Grid 7	Grid 8	Grid 9
<b>49.6 M4</b>	<b>56.9 M4</b>	<b>56.8 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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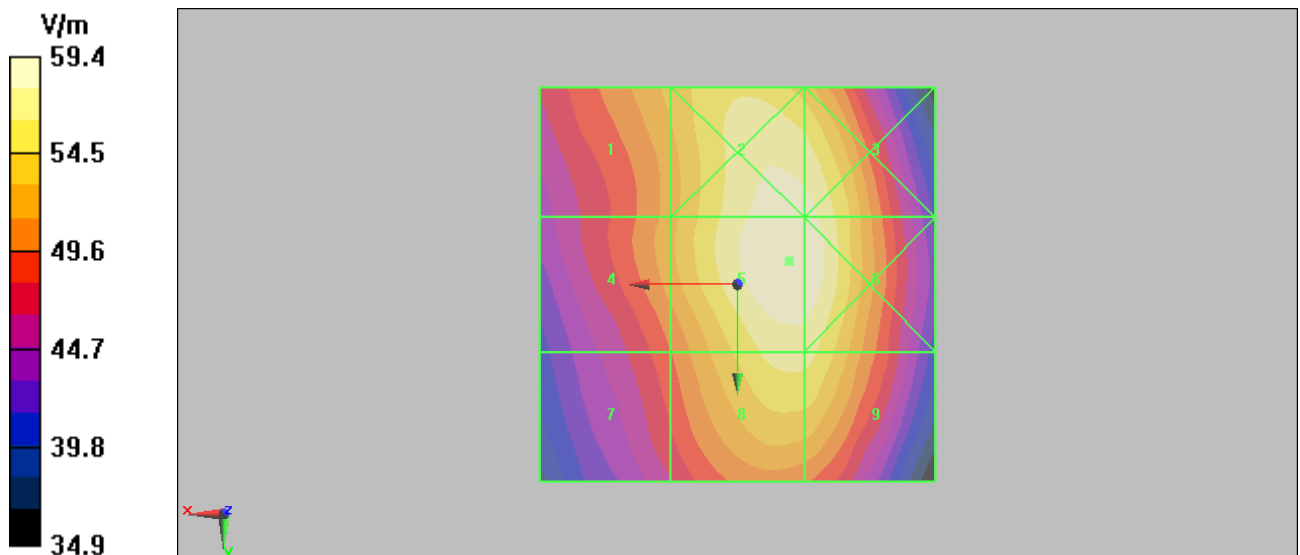
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 59.4 V/m

E Category: M4

Location: -6.5, -3, 8.7 mm



**Figure 31 HAC RF E-Field UMTS Band V Channel 4183**

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**HAC RF E-Field UMTS Band V Low**

Date/Time: 4/28/2014

Communication System: WCDMA ; Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**A845L WCDMA V HAC RF E-Field/E Scan - ER3D - 2007: 15 mm from Probe Center to the Device Low/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 61.5 V/m

Probe Modulation Factor = 1.03

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 74.3 V/m; Power Drift = 0.040 dB

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

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>56 M4</b>	<b>61 M4</b>	<b>60.6 M4</b>
Grid 4	Grid 5	Grid 6
<b>54.7 M4</b>	<b>61.5 M4</b>	<b>61.2 M4</b>
Grid 7	Grid 8	Grid 9
<b>51.4 M4</b>	<b>58.7 M4</b>	<b>58.6 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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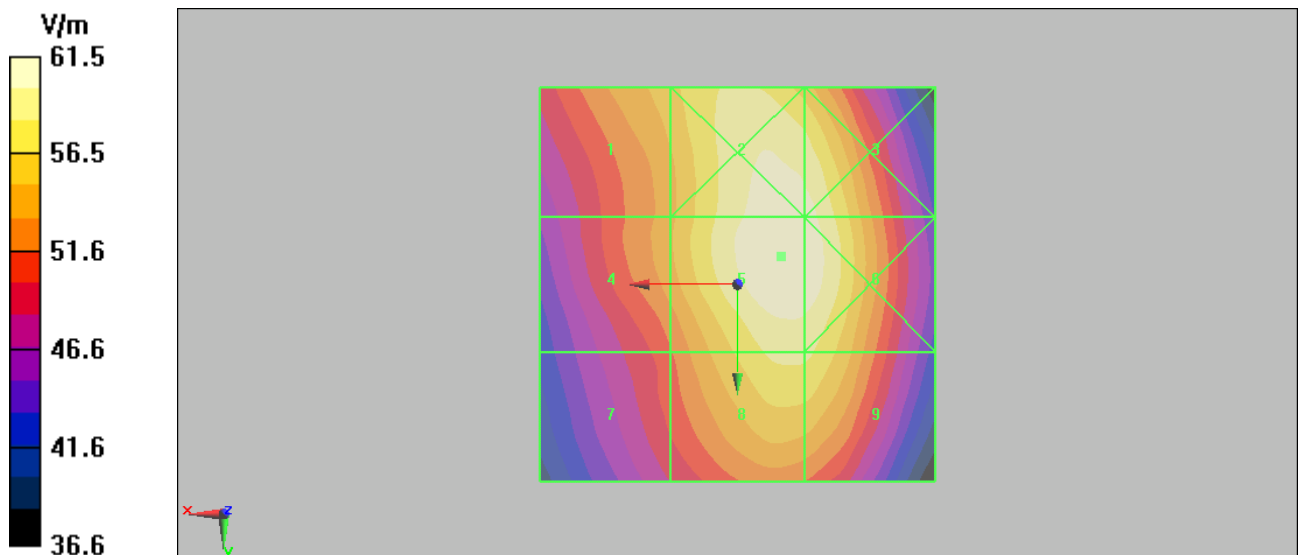
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 61.5 V/m

E Category: M4

Location: -5.5, -3.5, 8.7 mm



**Figure 32 HAC RF E-Field UMTS Band V Channel 4132**

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### HAC RF H-Field UMTS Band V High

Date/Time: 4/28/2014

Communication System: WCDMA ; Frequency: 846.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

### A845L WCDMA V HAC RF H-Field/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device High/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.081 A/m

Probe Modulation Factor = 1.01

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.062 A/m; Power Drift = 0.020 dB

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

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.111 M4</b>	<b>0.081 M4</b>	<b>0.050 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.101 M4</b>	<b>0.076 M4</b>	<b>0.048 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.108 M4</b>	<b>0.079 M4</b>	<b>0.051 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14



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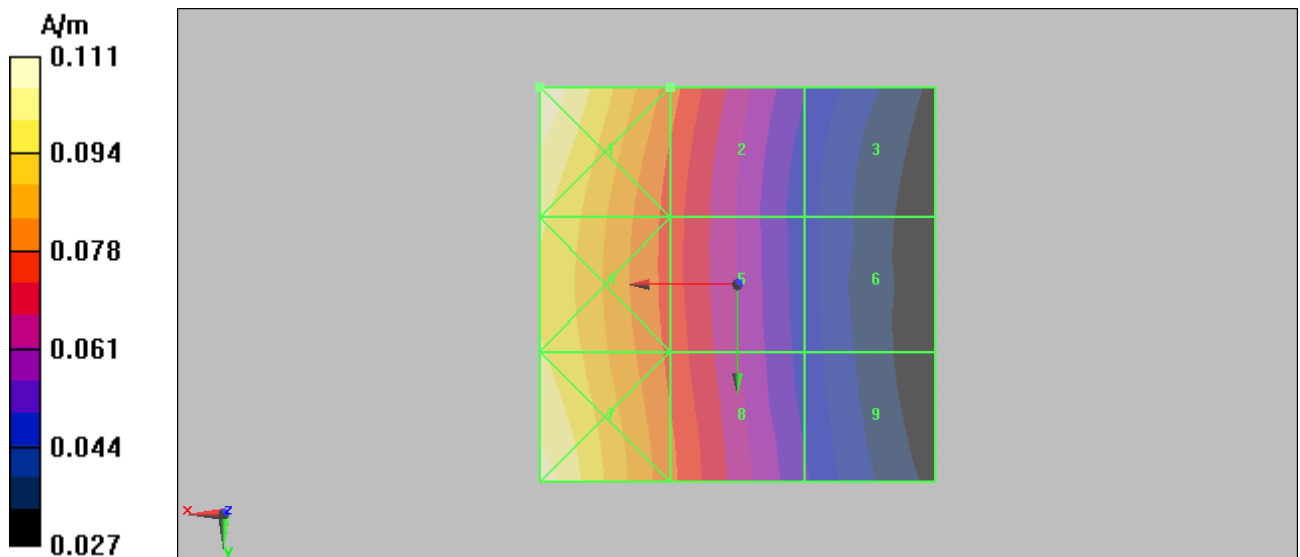
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 0.111 A/m

H Category: M4

Location: 25, -25, 8.7 mm



**Figure 33 HAC RF H-Field UMTS Band V Channel 4233**

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### HAC RF H-Field UMTS Band V Middle

Date/Time: 4/28/2014

Communication System: WCDMA ; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

**A845L WCDMA V HAC RF H-Field/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device Middle/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.088 A/m

Probe Modulation Factor = 1.01

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.068 A/m; Power Drift = -0.063 dB

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

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.121 M4</b>	<b>0.087 M4</b>	<b>0.054 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.111 M4</b>	<b>0.084 M4</b>	<b>0.052 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.119 M4</b>	<b>0.088 M4</b>	<b>0.056 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 0.121 A/m

H Category: M4

Location: 25, -25, 8.7 mm

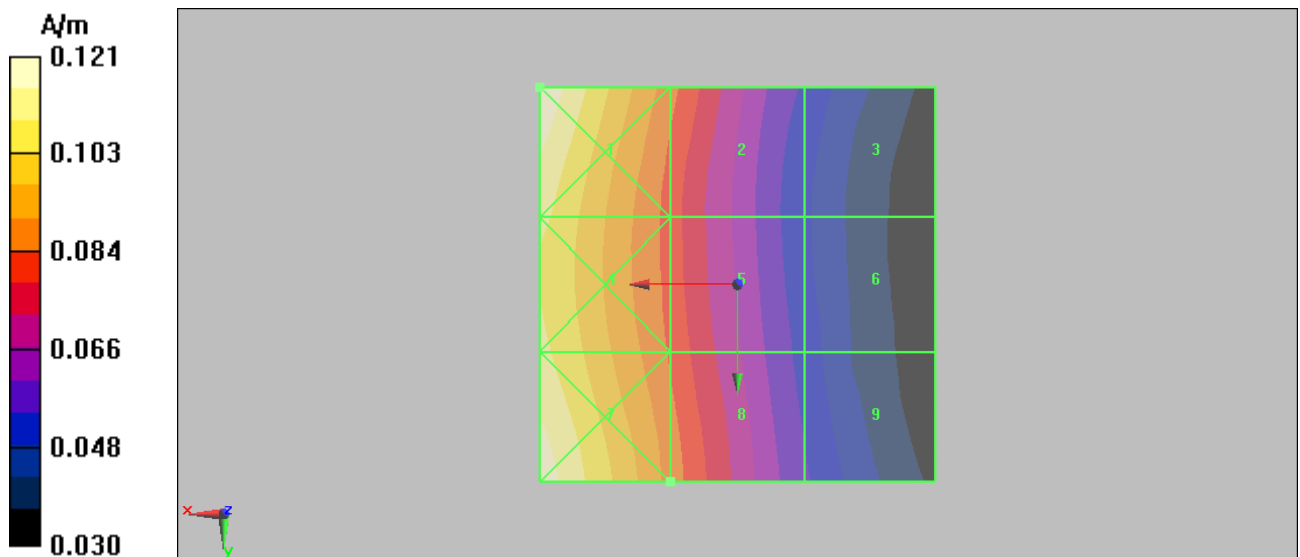


Figure 34 HAC RF H-Field UMTS Band V Channel 4183

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### HAC RF H-Field UMTS Band V Low

Date/Time: 4/28/2014

Communication System: WCDMA ; Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Phantom section: RF Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: H3DV6 - SN6260; Calibrated: 1/27/2014

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

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

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

### A845L WCDMA V HAC RF H-Field/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device Low/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.090 A/m

Probe Modulation Factor = 1.01

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.068 A/m; Power Drift = -0.075 dB

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

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.122 M4</b>	<b>0.087 M4</b>	<b>0.053 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.113 M4</b>	<b>0.085 M4</b>	<b>0.053 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.121 M4</b>	<b>0.090 M4</b>	<b>0.057 M4</b>

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

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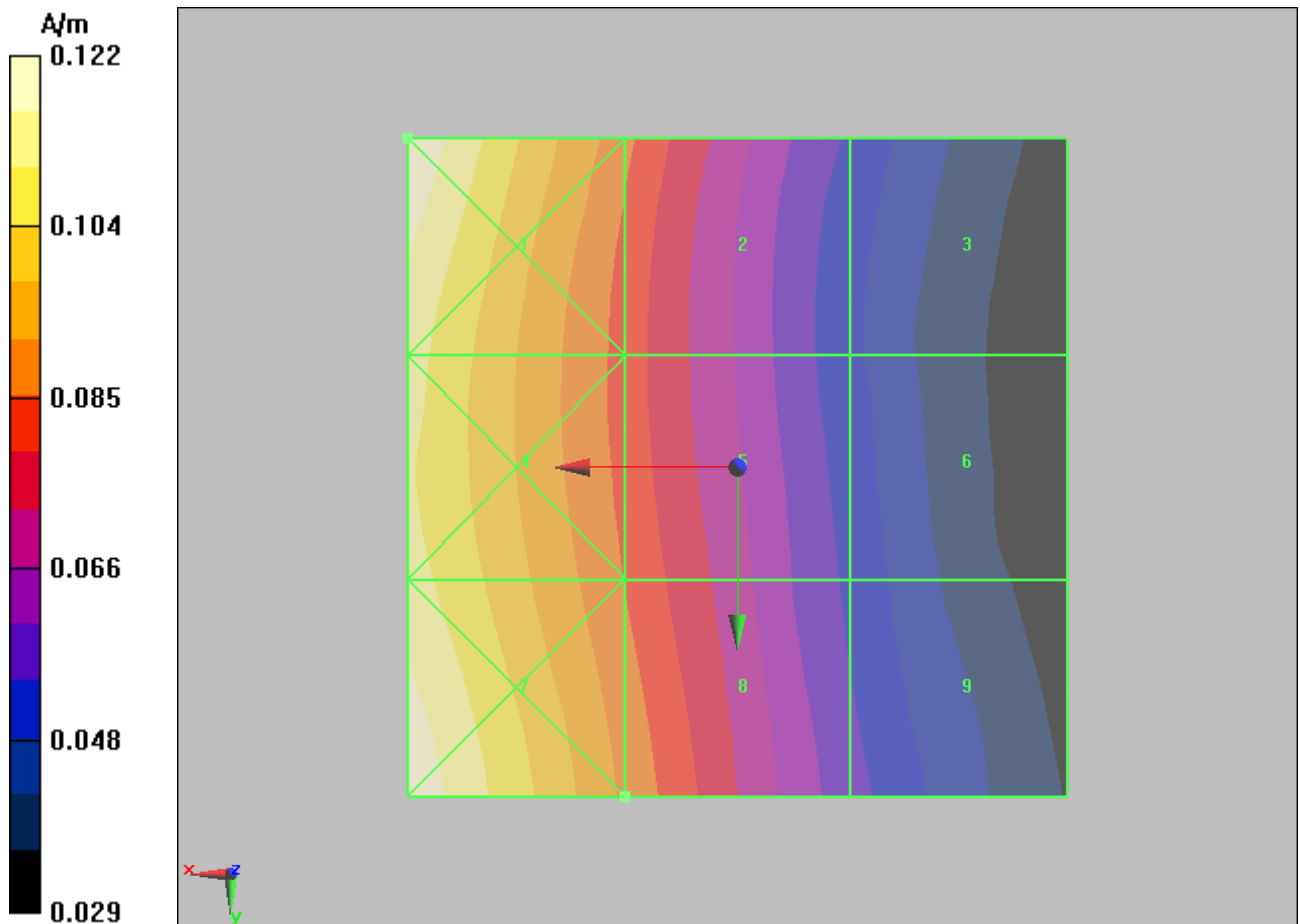
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

**Cursor:**

Total = 0.122 A/m

H Category: M4

Location: 25, -25, 8.7 mm



**Figure 35 HAC RF H-Field UMTS Band V Channel 4132**

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### ANNEX C: E-Probe Calibration Certificate

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



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

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

Accreditation No.: **SCS 108**

Client **TMC Beijing (Auden)**

Certificate No: **ER3-2428\_Jan14**

#### CALIBRATION CERTIFICATE

Object	ER3DV6 - SN:2428
Calibration procedure(s)	QA CAL-02.v8, QA CAL-25.v6 Calibration procedure for E-field probes optimized for close near field evaluations in air
Calibration date:	January 27, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	04-Apr-13 (No. 217-01733)	Apr-14
Power sensor E4412A	MY41498087	04-Apr-13 (No. 217-01733)	Apr-14
Reference 3 dB Attenuator	SN: S5054 (3c)	04-Apr-13 (No. 217-01737)	Apr-14
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-13 (No. 217-01735)	Apr-14
Reference 30 dB Attenuator	SN: S5129 (30b)	04-Apr-13 (No. 217-01738)	Apr-14
Reference Probe ER3DV6	SN: 2328	10-Oct-13 (No. ER3-2328_Oct13)	Oct-14
DAE4	SN: 789	15-May-13 (No. DAE4-789_May13)	May-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	<b>Name</b>	<b>Function</b>	<b>Signature</b>
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 28, 2014

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

# TA Technology (Shanghai) Co., Ltd.

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



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

### Glossary:

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

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

- IEEE Std 1309-2005, "IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005
- CTIA Test Plan for Hearing Aid Compatibility, April 2010.

### Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  for XY sensors and  $\vartheta = 90$  for Z sensor ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide).
- NORM(f)<sub>x,y,z</sub>** = **NORM<sub>x,y,z</sub>** \* *frequency\_response* (see Frequency Response Chart).
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; D<sub>x,y,z</sub>; VR<sub>x,y,z</sub>**: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- Spherical isotropy (3D deviation from isotropy)**: in a locally homogeneous field realized using an open waveguide setup.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle**: The angle is assessed using the information gained by determining the **NORM<sub>x</sub>** (no uncertainty required).

ER3DV6 – SN:2428

January 27, 2014

# Probe ER3DV6

## SN:2428

Manufactured: September 11, 2007

Calibrated: January 27, 2014

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)



# TA Technology (Shanghai) Co., Ltd.

## Test Report

ER3DV6- SN:2428

January 27, 2014

### DASY/EASY - Parameters of Probe: ER3DV6 - SN:2428

#### Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ )	1.51	1.59	1.83	$\pm 10.1 \%$
DCP (mV) <sup>B</sup>	98.9	97.0	101.1	

#### Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc <sup>E</sup> (k=2)
0	CW	X	0.0	0.0	1.0	0.00	190.5	$\pm 3.3 \%$
		Y	0.0	0.0	1.0		152.5	
		Z	0.0	0.0	1.0		198.6	
10021-DAA	GSM-FDD (TDMA, GMSK)	X	20.75	99.9	29.1	9.39	119.1	$\pm 1.2 \%$
		Y	19.27	99.6	28.9		125.1	
		Z	24.43	99.4	28.5		139.5	
10039-CAA	CDMA2000 (1xRTT, RC1)	X	4.62	65.6	18.5	4.57	109.6	$\pm 0.9 \%$
		Y	4.78	66.3	18.9		121.2	
		Z	4.58	66.0	18.7		114.4	

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

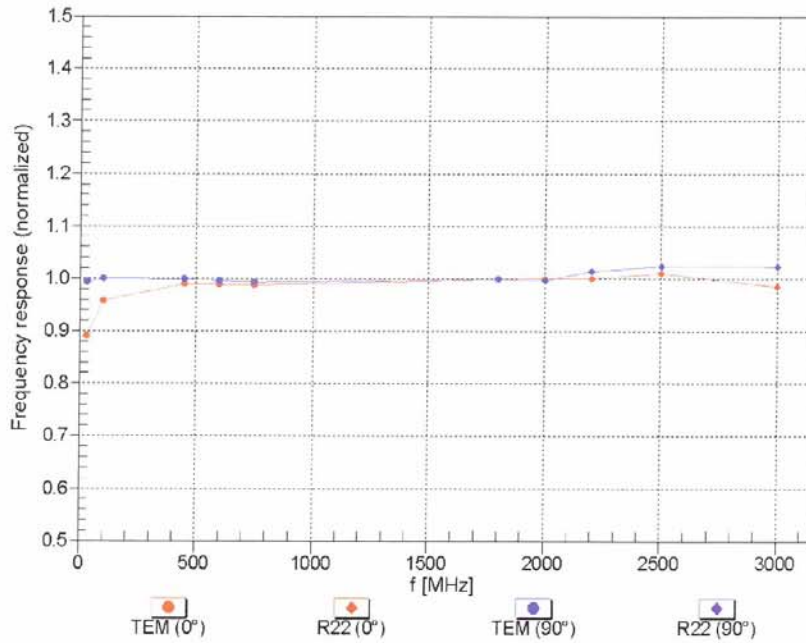
<sup>B</sup> Numerical linearization parameter: uncertainty not required.

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

ER3DV6-SN:2428

January 27, 2014

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

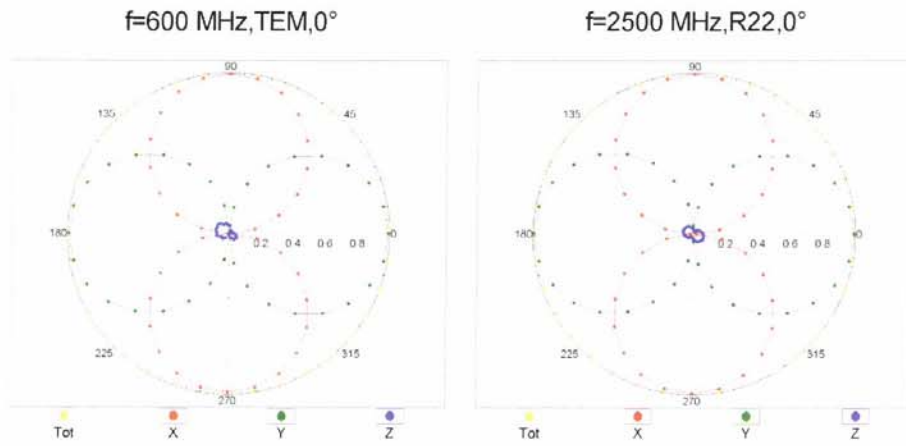


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

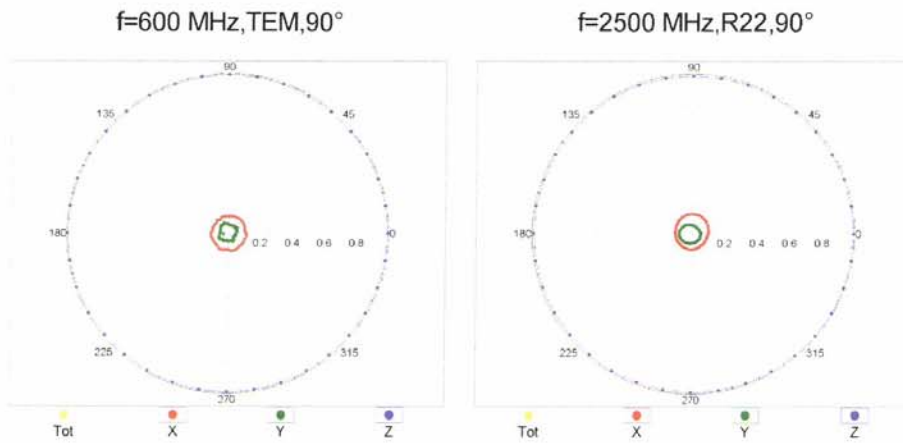
ER3DV6- SN:2428

January 27, 2014

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



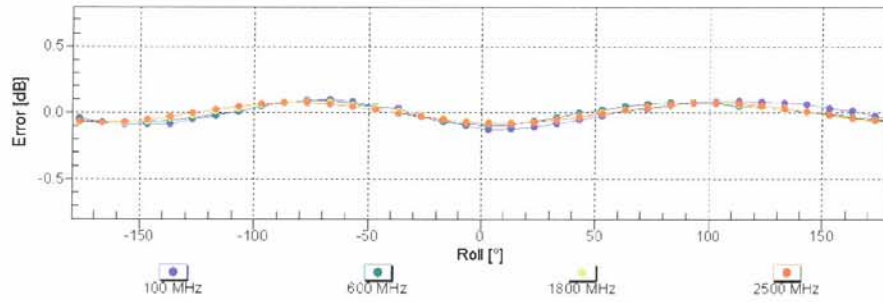
Receiving Pattern ( $\phi$ ),  $\vartheta = 90^\circ$



ER3DV6-SN:2428

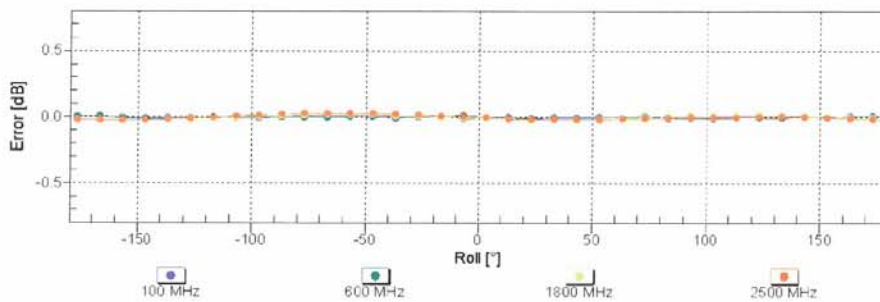
January 27, 2014

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



Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

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

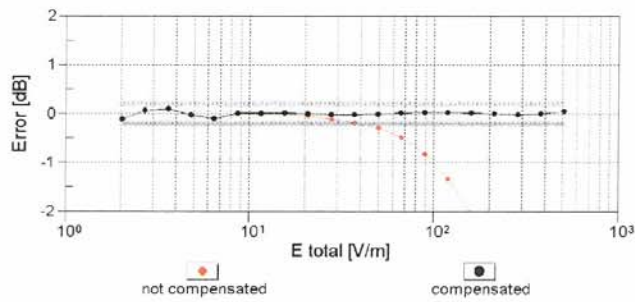
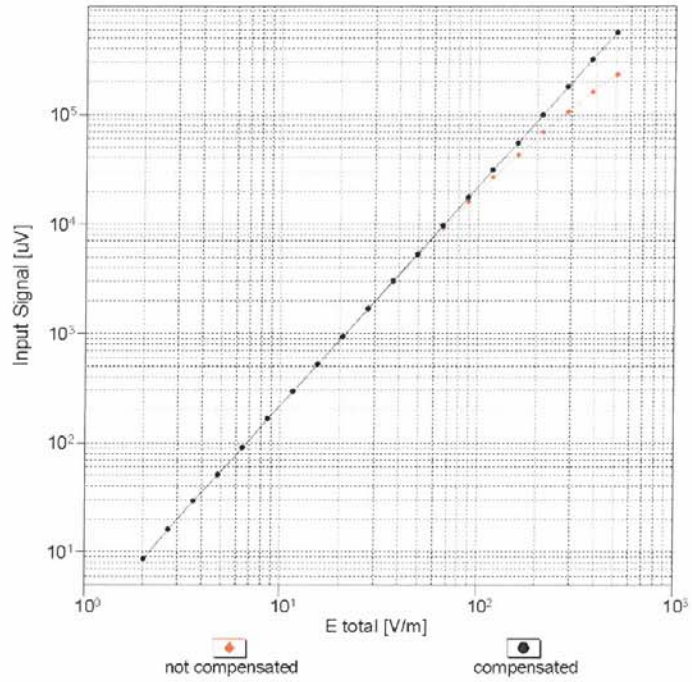


Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

ER3DV6-SN:2428

January 27, 2014

**Dynamic Range f(E-field)**  
(TEM cell , f = 900 MHz)

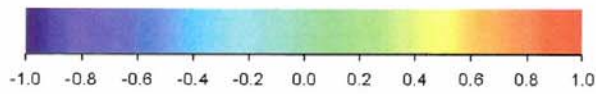
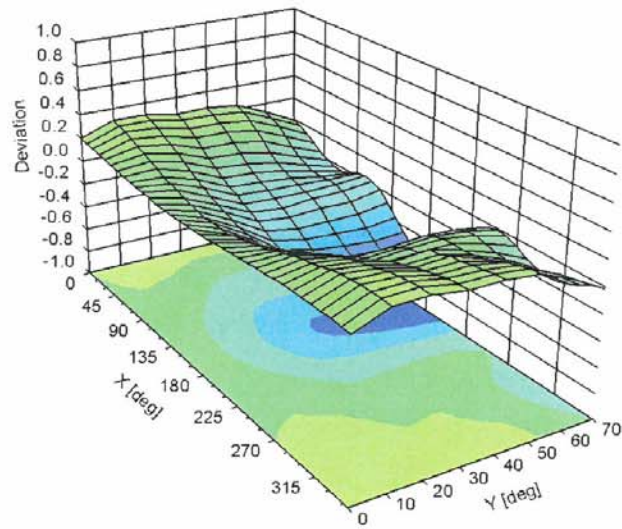


Uncertainty of Linearity Assessment:  $\pm 0.6\%$  (k=2)

ER3DV6-SN:2428

January 27, 2014

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



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )

ER3DV6- SN:2428

January 27, 2014

### DASY/EASY - Parameters of Probe: ER3DV6 - SN:2428

#### Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	-36.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	8 mm
Probe Tip to Sensor X Calibration Point	2.5 mm
Probe Tip to Sensor Y Calibration Point	2.5 mm
Probe Tip to Sensor Z Calibration Point	2.5 mm

# TA Technology (Shanghai) Co., Ltd.

## Test Report

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### ANNEX D: H-Probe Calibration Certificate

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



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
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**S** Swiss Calibration Service

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

Accreditation No.: **SCS 108**

Client **TMC Beijing (Auden)**

Certificate No: **H3-6260\_Jan14**

CALIBRATION CERTIFICATE	
Object	H3DV6 - SN:6260
Calibration procedure(s)	QA CAL-03.v8, QA CAL-25.v6 Calibration procedure for H-field probes optimized for close near field evaluations in air
Calibration date:	January 27, 2014
<p>This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (M&amp;TE critical for calibration)</p>	

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	04-Apr-13 (No. 217-01733)	Apr-14
Power sensor E4412A	MY41498087	04-Apr-13 (No. 217-01733)	Apr-14
Reference 3 dB Attenuator	SN: S5054 (3c)	04-Apr-13 (No. 217-01737)	Apr-14
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-13 (No. 217-01735)	Apr-14
Reference 30 dB Attenuator	SN: S5129 (30b)	04-Apr-13 (No. 217-01738)	Apr-14
Reference Probe H3DV6	SN: 6182	10-Oct-13 (No. H3-6182_Oct13)	Oct-14
DAE4	SN: 789	15-May-13 (No. DAE4-789_May13)	May-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	
			Issued: January 28, 2014
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# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No. RXA1404-0079HAC01

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**Calibration Laboratory of**  
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Zeughausstrasse 43, 8004 Zurich, Switzerland



**S** Schweizerischer Kalibrierdienst  
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**S** Servizio svizzero di taratura  
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

### Glossary:

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

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

- IEEE Std 1309-2005, "IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005.
- CTIA Test Plan for Hearing Aid Compatibility, April 2010.

### Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  for XY sensors and  $\vartheta = 90$  for Z sensor ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide).
- X, Y, Z(f)\_a0a1a2 = X, Y, Z\_a0a1a2 \* frequency\_response** (see Frequency Response Chart).
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; D<sub>x,y,z</sub>; VR<sub>x,y,z</sub>**: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- Spherical isotropy (3D deviation from isotropy)**: in a locally homogeneous field realized using an open waveguide setup.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle**: The angle is assessed using the information gained by determining the X\_a0a1a2 (no uncertainty required).

H3DV6 – SN:6260

January 27, 2014

# Probe H3DV6

## SN:6260

Manufactured: September 7, 2007  
Calibrated: January 27, 2014

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

# TA Technology (Shanghai) Co., Ltd.

## Test Report

H3DV6- SN:6260

January 27, 2014

### DASY/EASY - Parameters of Probe: H3DV6 - SN:6260

#### Basic Calibration Parameters

		Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (A/m / $\sqrt{(mV)}$ )	a0	2.48E-003	2.49E-003	2.92E-003	$\pm 5.1 \%$
Norm (A/m / $\sqrt{(mV)}$ )	a1	-2.51E-005	1.35E-006	2.69E-006	$\pm 5.1 \%$
Norm (A/m / $\sqrt{(mV)}$ )	a2	5.03E-005	4.10E-005	5.26E-005	$\pm 5.1 \%$
DCP (mV) <sup>b</sup>		90.9	91.8	92.6	

#### Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB $\sqrt{\mu V}$	C	D dB	VR mV	Unc <sup>e</sup> (k=2)
0	CW	X	0.0	0.0	1.0	0.00	138.5	$\pm 1.4 \%$
		Y	0.0	0.0	1.0		136.9	
		Z	0.0	0.0	1.0		134.3	

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

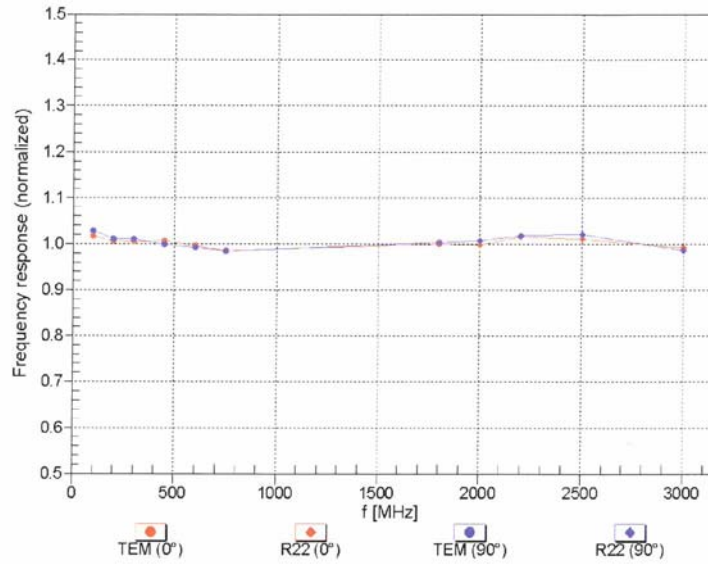
<sup>b</sup> Numerical linearization parameter; uncertainty not required.

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

H3DV6- SN:6260

January 27, 2014

**Frequency Response of H-Field**  
(TEM-Cell:ifi110 EXX, Waveguide: R22)

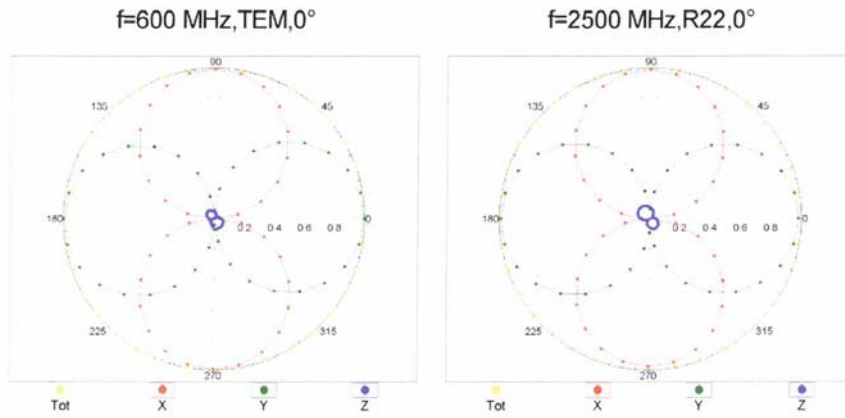


Uncertainty of Frequency Response of H-field:  $\pm 6.3\%$  (k=2)

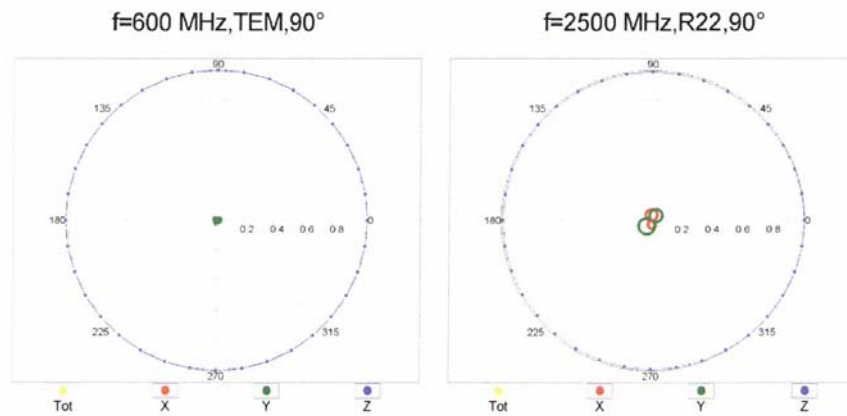
H3DV6-SN:6260

January 27, 2014

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



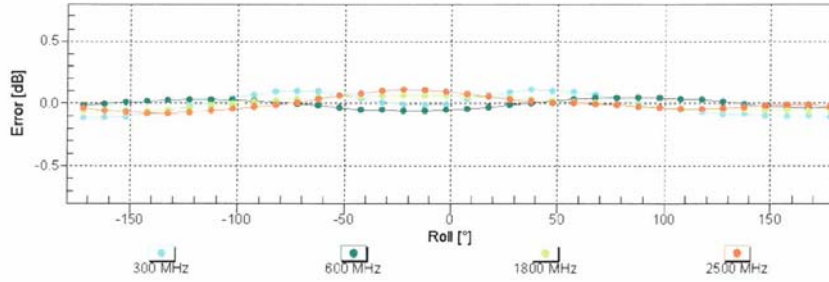
Receiving Pattern ( $\phi$ ),  $\vartheta = 90^\circ$



H3DV6-SN:6260

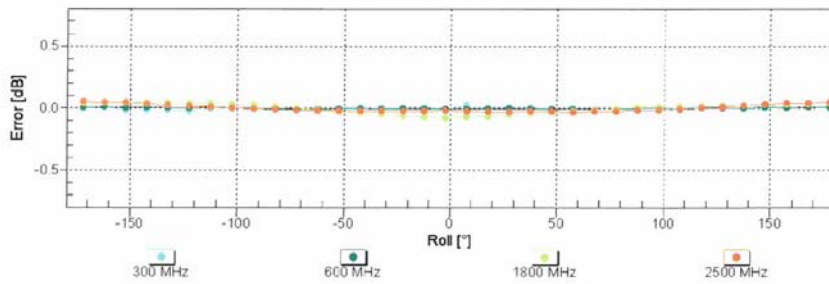
January 27, 2014

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



Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

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

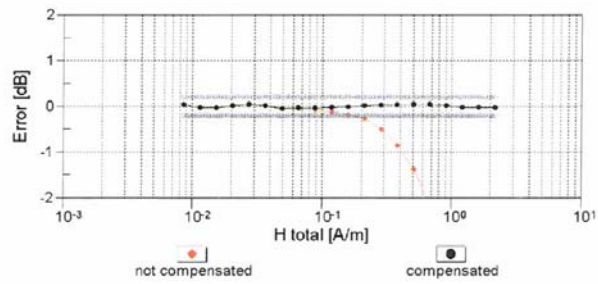
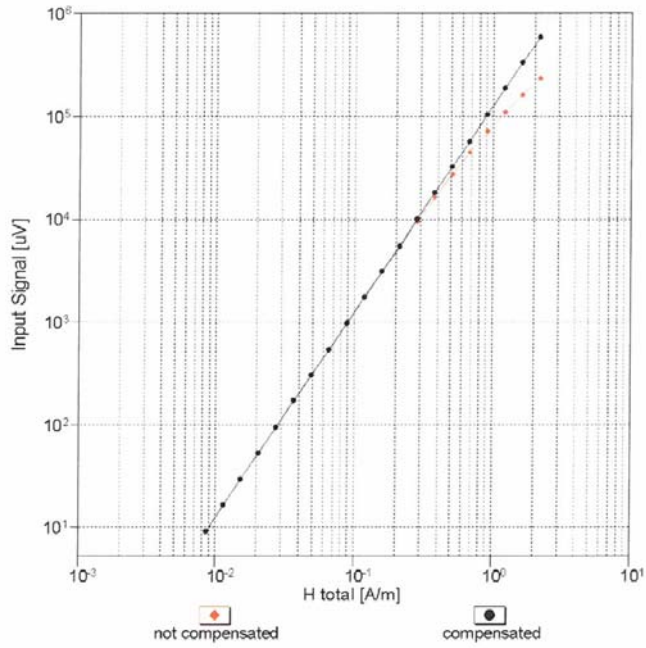


Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

H3DV6-SN:6260

January 27, 2014

**Dynamic Range f(H-field)**  
(TEM cell, f = 900 MHz)

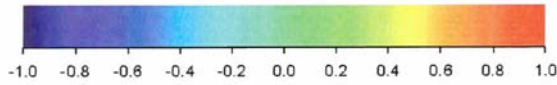
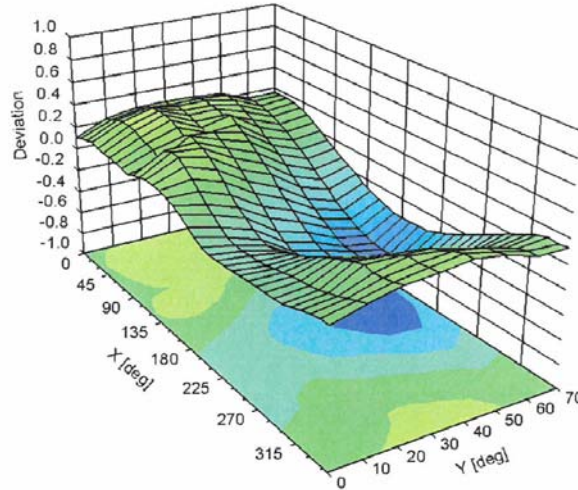


Uncertainty of Linearity Assessment:  $\pm 0.6\%$  (k=2)

H3DV6-SN:6260

January 27, 2014

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



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )



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

Report No. RXA1404-0079HAC01

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H3DV6- SN:6260

January 27, 2014

**DASY/EASY - Parameters of Probe: H3DV6 - SN:6260**

**Other Probe Parameters**

Sensor Arrangement	Rectangular
Connector Angle (°)	-152.4
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	20 mm
Tip Diameter	6 mm
Probe Tip to Sensor X Calibration Point	3 mm
Probe Tip to Sensor Y Calibration Point	3 mm
Probe Tip to Sensor Z Calibration Point	3 mm

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No. RXA1404-0079HAC01

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### ANNEX E: CD835V3 Dipole Calibration Certificate

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



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
 Swiss Calibration Service

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

Accreditation No.: **SCS 108**

Client **Tejet-SH (Auden)**

Certificate No.: **CD835V3-1156\_Sep13**

CALIBRATION CERTIFICATE																																																							
Object	CD835V3 - SN: 1156																																																						
Calibration procedure(s)	QA CAL-20.v6 Calibration procedure for dipoles in air																																																						
Calibration date:	September 02, 2013																																																						
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# TA Technology (Shanghai) Co., Ltd.

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Report No. RXA1404-0079HAC01

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



**S** Schweizerischer Kalibrierdienst  
**S** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

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

Accreditation No.: **SCS 108**

### References

- [1] ANSI-C63.19-2007  
American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.
- [2] ANSI-C63.19-2011  
American National Standard, Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

### Methods Applied and Interpretation of Parameters:

- **Coordinate System:** y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with the standards [1], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm (15 mm for [2]) above the top metal edge of the dipole arms.
- **Measurement Conditions:** Further details are available from the hardcopies at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- **Antenna Positioning:** The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY5 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- **Feed Point Impedance and Return Loss:** These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminated by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles.
- **E-field distribution:** E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward power to the antenna feed point. In accordance with [1] and [2], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (15 mm for [2]) (in z) above the metal top of the dipole arms. Two 3D maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value represents the maximum of the interpolated 3D-E-field, in the plane above the dipole surface.
- **H-field distribution:** H-field is measured with an isotropic H-field probe with 100mW forward power to the antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field scan. The maximum of the field is available at the center (subgrid 5) above the feed point. The H-field value stated as calibration value represents the maximum of the interpolated H-field, 10mm above the dipole surface at the feed point.

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

# TA Technology (Shanghai) Co., Ltd.

## Test Report

### Measurement Conditions

DASY system configuration, as far as not given on page 1.

<b>DASY Version</b>	DASY5	V52.8.7
<b>Phantom</b>	HAC Test Arch	
<b>Distance Dipole Top - Probe Center</b>	10 mm 15 mm	
<b>Scan resolution</b>	dx, dy = 5 mm	
<b>Frequency</b>	835 MHz ± 1 MHz	
<b>Input power drift</b>	< 0.05 dB	

### Maximum Field values at 835 MHz

<b>H-field 10 mm above dipole surface</b>	condition	<b>interpolated maximum</b>
Maximum measured	100 mW input power	<b>0.461 A / m ± 8.2 % (k=2)</b>

<b>E-field 10 mm above dipole surface</b>	condition	<b>Interpolated maximum</b>
Maximum measured above high end	100 mW input power	169.8 V / m
Maximum measured above low end	100 mW input power	167.7 V / m
Averaged maximum above arm	100 mW input power	<b>168.8 V / m ± 12.8 % (k=2)</b>

<b>E-field 15 mm above dipole surface</b>	condition	<b>Interpolated maximum</b>
Maximum measured above high end	100 mW input power	109.5 V / m
Maximum measured above low end	100 mW input power	108.0 V / m
Averaged maximum above arm	100 mW input power	<b>108.8 V / m ± 12.8 % (k=2)</b>

# TA Technology (Shanghai) Co., Ltd.

## Test Report

### Appendix

#### Antenna Parameters

Frequency	Return Loss	Impedance
800 MHz	17.8 dB	46.8 $\Omega$ - 12.1 j $\Omega$
835 MHz	28.0 dB	48.3 $\Omega$ + 3.5 j $\Omega$
900 MHz	15.9 dB	59.7 $\Omega$ - 14.9 j $\Omega$
950 MHz	22.0 dB	42.7 $\Omega$ - 1.0 j $\Omega$
960 MHz	21.4 dB	45.7 $\Omega$ + 7.0 j $\Omega$

#### 3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

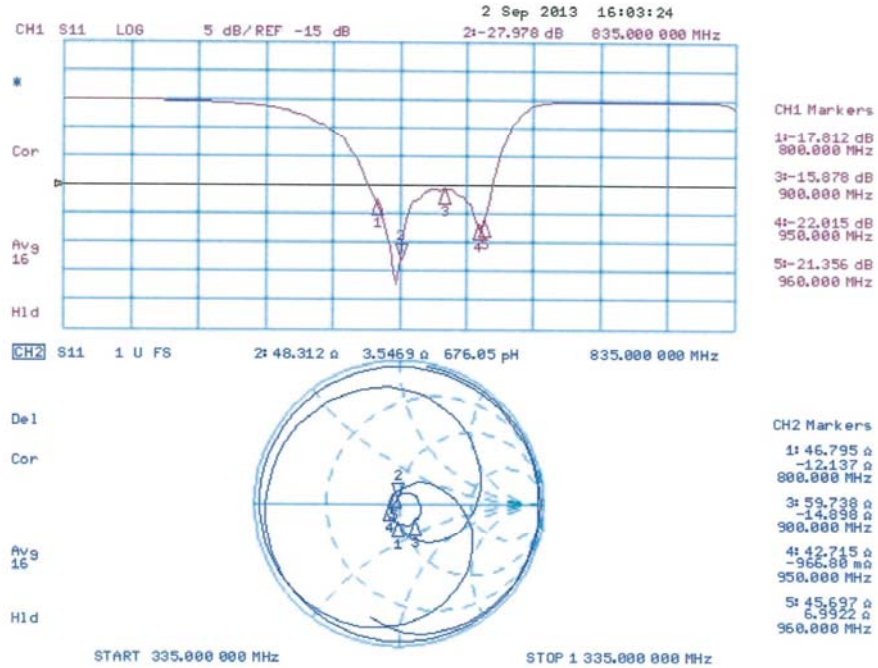
After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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## Impedance Measurement Plot



# TA Technology (Shanghai) Co., Ltd.

## Test Report

**DASY5 H-field Result**

Date: 02.09.2013

Test Laboratory: SPEAG Lab2

**DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: CD835V3 - SN: 1156**

Communication System: UID 0 - CW ; Frequency: 835 MHz  
 Medium parameters used:  $\sigma = 0$  S/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>  
 Phantom section: RF Section  
 Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

**DASY52 Configuration:**

- Probe: H3DV6 - SN6065; ; Calibrated: 28.12.2012
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 03.06.2013
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

**Dipole H-Field measurement @ 835MHz/H-Scan - 835MHz d=10mm/Hearing Aid Compatibility Test**

**(41x361x1):** Interpolated grid: dx=0.5000 mm, dy=0.5000 mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.4890 A/m; Power Drift = 0.00 dB

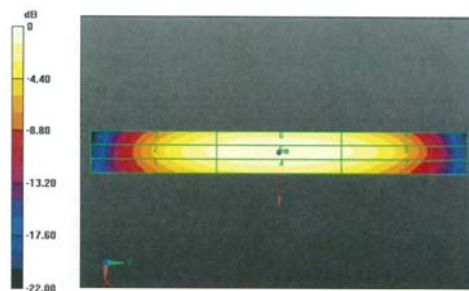
PMR not calibrated. PMF = 1.000 is applied.

H-field emissions = 0.4612 A/m

**Near-field category: M4 (AWF 0 dB)**

PMF scaled H-field

Grid 1 <b>M4</b> <b>0.380 A/m</b>	Grid 2 <b>M4</b> <b>0.409 A/m</b>	Grid 3 <b>M4</b> <b>0.394 A/m</b>
Grid 4 <b>M4</b> <b>0.426 A/m</b>	Grid 5 <b>M4</b> <b>0.461 A/m</b>	Grid 6 <b>M4</b> <b>0.446 A/m</b>
Grid 7 <b>M4</b> <b>0.377 A/m</b>	Grid 8 <b>M4</b> <b>0.413 A/m</b>	Grid 9 <b>M4</b> <b>0.400 A/m</b>



0 dB = 0.4612 A/m = -6.72 dBA/m

# TA Technology (Shanghai) Co., Ltd.

## Test Report

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### DASY5 E-field Result

Date: 02.09.2013

Test Laboratory: SPEAG Lab2

**DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: CD835V3 - SN: 1156**

Communication System: UID 0 - CW ; Frequency: 835 MHz  
Medium parameters used:  $\sigma = 0$  S/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: RF Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 28.12.2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 03.06.2013
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

**Dipole E-Field measurement @ 835MHz/E-Scan - 835MHz d=10mm/Hearing Aid Compatibility Test (41x361x1):** Interpolated grid: dx=0.5000 mm, dy=0.5000 mm  
Device Reference Point: 0, 0, -6.3 mm  
Reference Value = 107.8 V/m; Power Drift = 0.02 dB  
PMR not calibrated. PMF = 1.000 is applied.  
E-field emissions = 169.8 V/m  
**Near-field category: M4 (AWF 0 dB)**

PMF scaled E-field

Grid 1 M4 162.6 V/m	Grid 2 M4 169.8 V/m	Grid 3 M4 166.1 V/m
Grid 4 M4 86.01 V/m	Grid 5 M4 89.06 V/m	Grid 6 M4 87.46 V/m
Grid 7 M4 157.4 V/m	Grid 8 M4 167.7 V/m	Grid 9 M4 166.3 V/m

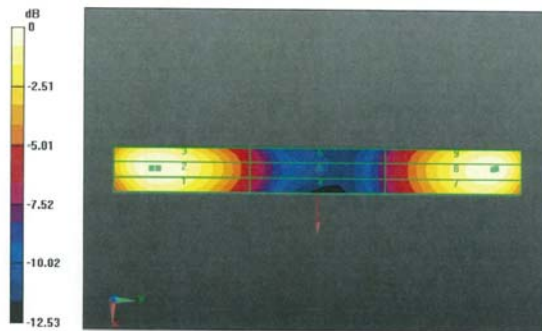


# TA Technology (Shanghai) Co., Ltd. Test Report

Dipole E-Field measurement @ 835MHz/E-Scan - 835MHz d=15mm/Hearing Aid Compatibility Test  
(41x361x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm  
Device Reference Point: 0, 0, -6.3 mm  
Reference Value = 107.9 V/m; Power Drift = -0.00 dB  
PMR not calibrated. PMF = 1.000 is applied.  
E-field emissions = 109.5 V/m  
Near-field category: M4 (AWF 0 dB)

PMF scaled E-field

Grid 1 M4 <b>106.8 V/m</b>	Grid 2 M4 <b>109.5 V/m</b>	Grid 3 M4 <b>108.4 V/m</b>
Grid 4 M4 <b>62.93 V/m</b>	Grid 5 M4 <b>63.94 V/m</b>	Grid 6 M4 <b>63.37 V/m</b>
Grid 7 M4 <b>104.9 V/m</b>	Grid 8 M4 <b>108.0 V/m</b>	Grid 9 M4 <b>107.1 V/m</b>



0 dB = 169.8 V/m = 44.60 dBV/m

# TA Technology (Shanghai) Co., Ltd.

## Test Report

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### ANNEX F: CD1880V3 Dipole Calibration Certificate

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



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
Swiss Calibration Service

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

Accreditation No.: **SCS 108**

Client **Tejet-SH (Auden)**

Certificate No: **CD1880V3-1140\_Sep13**

CALIBRATION CERTIFICATE																																																							
Object	CD1880V3 - SN: 1140																																																						
Calibration procedure(s)	QA CAL-20.v6 Calibration procedure for dipoles in air																																																						
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Approved by:	Name Fin Bomholt	Deputy Technical Manager																																																					
			Issued: September 2, 2013																																																				
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S Schweizerischer Kalibrierdienst  
S Service suisse d'étalonnage  
S Servizio svizzero di taratura  
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

#### References

- [1] ANSI-C63.19-2007  
American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.
- [2] ANSI-C63.19-2011  
American National Standard, Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

#### Methods Applied and Interpretation of Parameters:

- **Coordinate System:** y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with the standards [1], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm (15 mm for [2]) above the top metal edge of the dipole arms.
- **Measurement Conditions:** Further details are available from the hardcopies at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- **Antenna Positioning:** The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY5 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- **Feed Point Impedance and Return Loss:** These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminated by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles.
- **E-field distribution:** E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward power to the antenna feed point. In accordance with [1] and [2], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (15 mm for [2]) (in z) above the metal top of the dipole arms. Two 3D maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value represents the maximum of the interpolated 3D-E-field, in the plane above the dipole surface.
- **H-field distribution:** H-field is measured with an isotropic H-field probe with 100mW forward power to the antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field scan. The maximum of the field is available at the center (subgrid 5) above the feed point. The H-field value stated as calibration value represents the maximum of the interpolated H-field, 10mm above the dipole surface at the feed point.

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

# TA Technology (Shanghai) Co., Ltd.

## Test Report

### Measurement Conditions

DASY system configuration, as far as not given on page 1.

<b>DASY Version</b>	DASY5	V52.8.7
<b>Phantom</b>	HAC Test Arch	
<b>Distance Dipole Top - Probe Center</b>	10 mm 15 mm	
<b>Scan resolution</b>	dx, dy = 5 mm	
<b>Frequency</b>	1880 MHz ± 1 MHz	
<b>Input power drift</b>	< 0.05 dB	

### Maximum Field values at 1880 MHz

<b>H-field 10 mm above dipole surface</b>	condition	<b>interpolated maximum</b>
Maximum measured	100 mW input power	<b>0.470 A / m ± 8.2 % (k=2)</b>

<b>E-field 10 mm above dipole surface</b>	condition	<b>Interpolated maximum</b>
Maximum measured above high end	100 mW input power	142.9 V / m
Maximum measured above low end	100 mW input power	138.1 V / m
Averaged maximum above arm	100 mW input power	<b>140.5 V / m ± 12.8 % (k=2)</b>

<b>E-field 15 mm above dipole surface</b>	condition	<b>Interpolated maximum</b>
Maximum measured above high end	100 mW input power	91.7 V / m
Maximum measured above low end	100 mW input power	89.7 V / m
Averaged maximum above arm	100 mW input power	<b>90.7 V / m ± 12.8 % (k=2)</b>

# TA Technology (Shanghai) Co., Ltd.

## Test Report

### Appendix

#### Antenna Parameters

Frequency	Return Loss	Impedance
1730 MHz	24.9 dB	48.8 $\Omega$ + 5.5 j $\Omega$
1880 MHz	21.6 dB	49.7 $\Omega$ + 8.3 j $\Omega$
1900 MHz	21.8 dB	52.1 $\Omega$ + 8.1 j $\Omega$
1950 MHz	27.6 dB	54.2 $\Omega$ + 1.1 j $\Omega$
2000 MHz	23.0 dB	43.4 $\Omega$ + 0.0 j $\Omega$

#### 3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

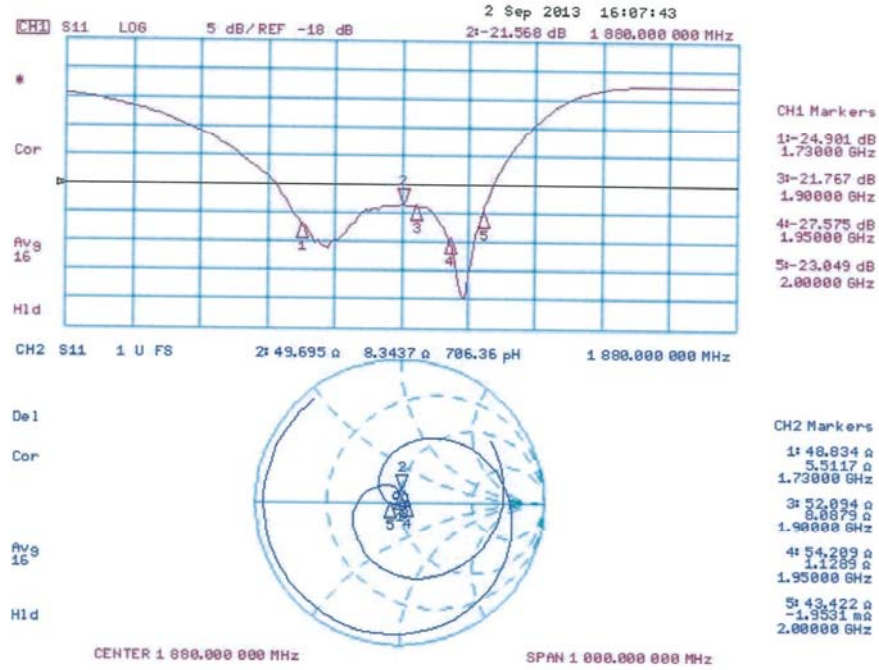
After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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## Impedance Measurement Plot



# TA Technology (Shanghai) Co., Ltd.

## Test Report

### DASY5 H-field Result

Date: 02.09.2013

Test Laboratory: SPEAG Lab2

**DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: CD1880V3 - SN: 1140**

Communication System: UID 0 - CW ; Frequency: 1880 MHz  
 Medium parameters used:  $\sigma = 0$  S/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>  
 Phantom section: RF Section  
 Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

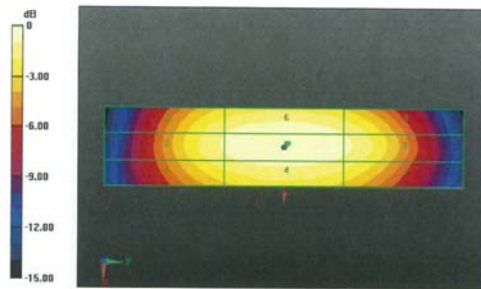
DASY52 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 28.12.2012
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 03.06.2013
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

**Dipole H-Field measurement @ 1880MHz/H-Scan - 1880MHz d=10mm/Hearing Aid Compatibility Test (41x181x1):** Interpolated grid: dx=0.5000 mm, dy=0.5000 mm  
 Device Reference Point: 0, 0, -6.3 mm  
 Reference Value = 0.4940 A/m; Power Drift = 0.00 dB  
 PMR not calibrated. PMF = 1.000 is applied.  
 H-field emissions = 0.4699 A/m  
**Near-field category: M2 (AWF 0 dB)**

PMF scaled H-field

Grid 1 M2 <b>0.397 A/m</b>	Grid 2 M2 <b>0.427 A/m</b>	Grid 3 M2 <b>0.417 A/m</b>
Grid 4 M2 <b>0.435 A/m</b>	Grid 5 M2 <b>0.470 A/m</b>	Grid 6 M2 <b>0.458 A/m</b>
Grid 7 M2 <b>0.397 A/m</b>	Grid 8 M2 <b>0.434 A/m</b>	Grid 9 M2 <b>0.421 A/m</b>



0 dB = 0.4699 A/m = -6.56 dBA/m

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## Test Report

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### DASY5 E-field Result

Date: 02.09.2013

Test Laboratory: SPEAG Lab2

**DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: CD1880V3 - SN: 1140**

Communication System: UID 0 - CW ; Frequency: 1880 MHz

Medium parameters used:  $\sigma = 0$  S/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: RF Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 28.12.2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 03.06.2013
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

### Dipole E-Field measurement @ 1880MHz/E-Scan - 1880MHz d=10mm/Hearing Aid Compatibility Test

(41x181x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 159.8 V/m; Power Drift = -0.04 dB

PMR not calibrated. PMF = 1.000 is applied.

E-field emissions = 142.9 V/m

Near-field category: M2 (AWF 0 dB)

PMF scaled E-field

Grid 1 M2 131.1 V/m	Grid 2 M2 138.1 V/m	Grid 3 M2 136.7 V/m
Grid 4 M3 88.37 V/m	Grid 5 M3 91.80 V/m	Grid 6 M3 89.30 V/m
Grid 7 M2 133.5 V/m	Grid 8 M2 142.9 V/m	Grid 9 M2 141.2 V/m

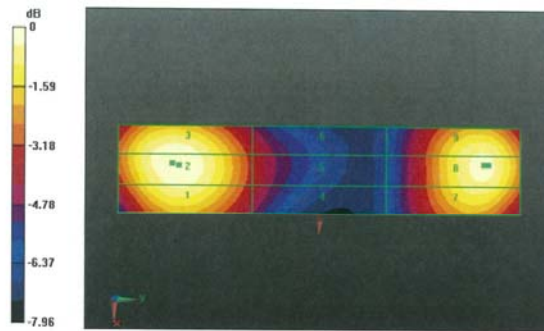


# TA Technology (Shanghai) Co., Ltd. Test Report

**Dipole E-Field measurement @ 1880MHz/E-Scan - 1880MHz d=15mm/Hearing Aid Compatibility Test**  
 (41x181x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm  
 Device Reference Point: 0, 0, -6.3 mm  
 Reference Value = 159.3 V/m; Power Drift = 0.02 dB  
 PMR not calibrated. PMF = 1.000 is applied.  
 E-field emissions = 91.75 V/m  
**Near-field category: M3 (AWF 0 dB)**

PMF scaled E-field

Grid 1 M3 <b>88.97 V/m</b>	Grid 2 M3 <b>91.75 V/m</b>	Grid 3 M3 <b>91.13 V/m</b>
Grid 4 M3 <b>70.45 V/m</b>	Grid 5 M3 <b>71.52 V/m</b>	Grid 6 M3 <b>70.85 V/m</b>
Grid 7 M3 <b>87.12 V/m</b>	Grid 8 M3 <b>89.70 V/m</b>	Grid 9 M3 <b>89.08 V/m</b>



0 dB = 142.9 V/m = 43.10 dBV/m

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## ANNEX G: DAE4 Calibration Certificate



In Collaboration with  
**s p e a g**  
CALIBRATION LABORATORY

Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China  
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504  
E-mail: [info@emcite.com](mailto:info@emcite.com) Http://www.emcite.com



Client : **TA(Shanghai)**

Certificate No: **J14-2-0052**

### CALIBRATION CERTIFICATE

Object: **DAE4 - SN: 1317**

Calibration Procedure(s): **TMC-OS-E-01-198  
Calibration Procedure for the Data Acquisition Electronics (DAEx)**

Calibration date: **January 16, 2014**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Documenting Process Calibrator 753	1971018	01-July-13 (TMC, No:JW13-049)	July-14

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: January 16, 2014

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

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

DAE data acquisition electronics  
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

**Methods Applied and Interpretation of Parameters:**

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle:* The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The report provide only calibration results for DAE, it does not contain other performance test results.



In Collaboration with  
**s p e a g**  
**CALIBRATION LABORATORY**

Add. No. 52 Huayuanbei Road, Haidian District, Beijing, 100191, China  
 Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504  
 E-mail: [info@emcite.com](mailto:info@emcite.com) [Http://www.emcite.com](http://www.emcite.com)

**DC Voltage Measurement**

A/D - Converter Resolution nominal  
 High Range: 1LSB = 6.1μV, full range = -100...+300 mV  
 Low Range: 1LSB = 61nV, full range = -1.....+3mV  
 DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.058 ± 0.15% (k=2)	404.060 ± 0.15% (k=2)	403.954 ± 0.15% (k=2)
Low Range	3.99002 ± 0.7% (k=2)	3.99910 ± 0.7% (k=2)	3.98303 ± 0.7% (k=2)

**Connector Angle**

Connector Angle to be used in DASY system	119° ± 1°
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**ANNEX H: The EUT Appearances and Test Configuration**



EUT

Picture 1: Constituents of EUT

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**Test Report**

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**Picture 2: Test Setup**