Assessment of Compliance

for

Hearing Aid Compatibility

Mobile phone, CDMA
TREO XXX

Palm Inc.

May 2005

APREL Project No.: PALB Treo XXX-CDMA- 5158

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Engineering Report

Subject: **Assessment of Compliance with respect to ANSI PC63.19-2005 D3.6 Hearing Aid Compatibility, RF Emissions**

FCC ID: **O8FJIMI**

Product: **Mobile Phone, CDMA**

Model: **TREO XXX**

Client: **Palm Inc**
950 West Maude Ave
Sunnyvale, CA 94085 USA

Project #: PALB-Treo XXX-CDMA-5158

Prepared by: **APREL Laboratories**
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Approved by: Jay Sarkar Date: July 29, 2005
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HAC Report Contents

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ENGINEERING SUMMARY

This report contains the results of the engineering evaluation performed on the PALM CDMA mobile phone model TREO 650. The analysis was carried out in accordance with the requirements of ANSI/IEEE C63.19-2005, Rev 3.6, "American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids"

PALM provided APREL laboratories with one prototype model of the Mobile Phone. The TREO 650 Mobile Phone is hereby referred to as the DUT (Device Under Test).

The TREO 650 Mobile Phone was evaluated for RF emissions and in both CDMA and PCS bands. Three channels for each band, CDMA and PCS, were tested. See the summary of the results.

In the **CDMA band**, the category for RF E-field emissions is M3 and for H-field Emissions is M3. The overall M category for the audio coupling is **M3**.

In the **PCS band**, the category for RF E-field emissions is M4 and for H-field Emissions is M3. The overall M category for the audio coupling mode is **M3**.

As such, the overall M category for the TREO 650 is **M3**.

Evaluation data and graphs are presented in this report.

This wireless portable device has been shown to be compatible with hearing aids under the category shown below. In accordance with FCC rule 47 CFR 2.033(d) these test results demonstrate compliance with FCC 47CFR section 20.19 and with PC63.19 – 2005 rd3.6.

ANSI/IEEE C63.19 – 2005 HAC Rated Category: M 3 (RF Emission)

The results presented in this report relate only to the sample evaluated.

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INTRODUCTION

General

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HAC (Hearing Aid Compatibility) is an industry term introduced in the late 1970's to describe an audio frequency magnetic output of a wireline telephone for the purpose of making it possible to couple a telephone with a hearing aid. In the mid 1990's it was found that the required audio frequency magnetic field may not be usable if excessive RF interference is masking this audio signal. Therefore, new standards for wireless devices HAC, such as IEEE C63.19, which in addition to specification of the audio magnetic field for T-coil coupling also specify the allowable RF interference level for E-field and H-field as a function of hearing aid and RF susceptibility.

The purpose of the categorization (M1, M2 etc.) is to establish categories for hearing aids and for telephones that can indicate to health care practitioners and hearing aid users which hearing aids are compatible with which telephone. Tests are performed to assess the electromagnetic characteristics of hearing aids and telephones and assign them to these categories. In this case, the telephone is tested for the E-field and H-field emissions while the hearing aid is tested for E-field and H-field immunity and based on the results they are categorized. For telephone, Category M4 has lower emission levels than the M1 which means less interference to the hearing aid. For hearing aid, Category M4 has higher immunity level than the M1 which means it can endure higher interference signal level. When this category number of telephone is summed up with the category number of the hearing aid, it provides a total system performance classification. A "M" category sum greater than or equal to 6 provides an excellent performance.

Measurement Facility

The evaluation for compliance was performed for Palm**.** by APREL Laboratories at APREL's EMI facility located in Nepean, Ontario, Canada. The laboratory operates an (3m and 10m) Open Area Test Site (OATS). The measurement facility is calibrated in accordance with ANSI C63.4-1992.

A description of the measurement facility in accordance with the radiated and AC line conducted test site criteria per ANSI C63.4-1992 is on file with the Federal Communications Commission and is in compliance with the requirements of Section 2.948 of the Commissions rules and regulations. *APREL's registration number is: 90416*

APREL is accredited by Standard Council of Canada ISO 17025..

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Standard

The evaluation and analysis were conducted in accordance with **Hearing Aid Standard ANSI PC63.19 2005 D3.6**

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Report: This report was written by Jay Sarkar, Technical Director, Standards and Certification. Tests were performed by J. Lokaj.

Test Equipment

The test equipment used during the evaluation is listed in Appendix with calibration due dates.

Environmental Conditions

- Temperature:	25 °C ± 2
- Relative Humidity:	30 - 50 %
- Air Pressure:	101 kPa ± 3

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Product Information

FCC ID:	O8FJIMI
EUT type:	Dual Band CDMA phone
Serial Number;	Prototype, no S/N
Prototype or Production:	Prototype
Mode of Operation:	CDMA, PCS
Tx Frequencies:	824.70-848.31 MKz (CDMA) 1851.25-1909.08 MHz (PCS)
Maximum Conducted RF Power (Nominal):	24dBm
Tolerance of Power Calibration::	
FCC Classification:	Licensed Transmitter Held to Ear (PCE)

Battery

Type:	LiOn
Part No./Model No.:	157-10014-00
Rated Capacity:	1800maH

Antenna

Type:	Integral
Location:	Top of Unit
Configuration:	

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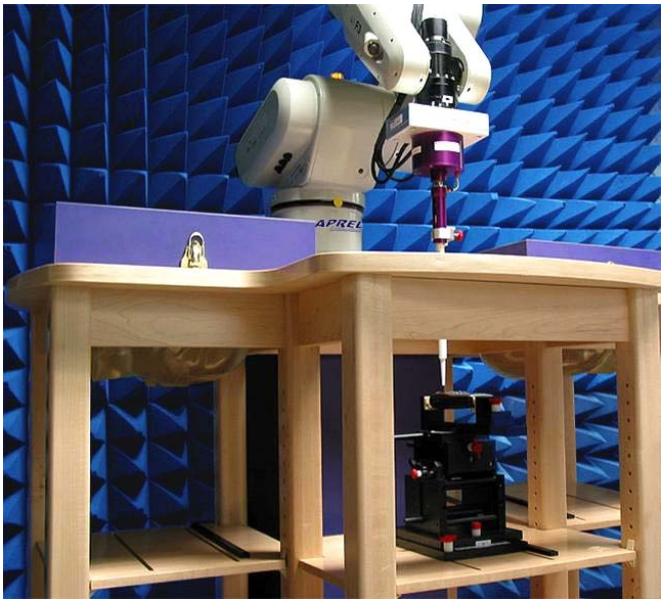
Test System: Hearing Aid Compatibility (HAC)

The scanning and positioning requirements of HAC measurement performed by the ALSAS 10-U HAC system, the use of HAC specific hardware and software allows APREL to meet the existing ANSI C63.19 and its anticipated revision. HAC testing utilizes E and H field probes as they meet the requirements of a diameter less than 10mm and are fully isotropic. These probes are calibrated “in air” for scanning in air.



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Axis Articulated Robot

ALSAS-10U utilizes a six axis articulated robot, which is controlled using a Pentium based real-time movement controller. The movement kinematics engine utilizes proprietary (Thermo CRS) interpolation and extrapolation aPalmorithms, which allow full freedom of movement for each of the six joints within the working envelope. Utilization of joint 6 allows for full probe rotation with a tolerance better than 0.05mm around the central axis.

Robot/Controller Manufacturer	Thermo CRS
Number of Axis	Six independently controlled axis
Positioning Repeatability	0.05mm
Controller Type	Single phase Pentium based C500C
Robot Reach	710mm
Communication	RS232 and LAN compatible

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Universal Device Positioner

The APREL Laboratories universal device positioner has been developed so as to allow complete freedom of movement of the DUT. Developed to hold a DUT in a free-space scenario any additional loading attributable to the material used in the construction of the positioner has been eliminated. Repeatability has been enhanced through the linear scales which form the design used to indicate positioning for any given test scenario in all major axes. A tilt indicator has been included for accurate positioning. Overall uncertainty for measurements have been reduced due to the design of the Universal device positioner, which allows positioning of a device in as near to a free-space scenario as possible, and by providing the means for complete repeatability.

Length	201mm
Width	140mm
Height	222mm
Weight	1.95kg
Number of Axis	6 axis freedom of movement
Translation Along MB Line	+/- 76.2mm
Translation Along NF Line	+/- 38.1mm
Translation Along Z Axis	+/- 25.4mm (expandable to 500mm)
Rotation Around MB Line (yaw)	+/- 10°
Rotation Around NF Line (pitch)	+/- 30°
Rotation Around Z Axis (roll)	360° full circle
Minimum Grip Range	0mm
Maximum Grip	152mm
Maximum Distance from Device to Positioner Material	40mm
Tilt Movement	Full movement with predefined 15° guide

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Performance Criteria ANSI C63.19

The following Tables show the M-rating categories providing the requirements that will allow classification of the wireless devices for RF emissions: Tables 2 and 3 provide telephone near-field categories in linear units and Articulation weighting factor (AWF) which provides the standard transmission protocols. Table 1 provides telephone near field categories in logarithmic units.

Table 1

Category	Telephone RF Parameters				
Near Field	AWF	E-Field Emissions (Peak)		H-Field Emissions (Peak)	
Category M1	0	46 – 51	dB (V/m)	-4.4 – 0.6	dB (A/m)
	-5	43.5 – 48.5	dB (V/m)	-6.9 – -1.9	dB (A/m)
Category M2	0	41 – 46	dB (V/m)	-9.4 – -4.4	dB (A/m)
	-5	38.5 – 43.5	dB (V/m)	-11.9 – -6.9	dB (A/m)
Category M3	0	36 – 41	dB (V/m)	-14.4 – -9.4	dB (A/m)
	-5	33.5 – 38.5	dB (V/m)	-16.9 – -11.9	dB (A/m)
Category M4	0	<36	dB (V/m)	<-14.4	dB (A/m)
	-5	<33.5	dB (V/m)	<-16.9	dB (A/m)

Telephone near-field categories in logarithmic units

Table 2

Category	Telephone RF Parameters				
Near Field	AWF	E-Field Emissions (Peak)		H-Field Emissions (Peak)	
Category M1	0	199.5 – 354.8	V/m	0.60 – 1.07	A/m
	-5	149.6 – 266.1	V/m	0.45 – 0.80	A/m
Category M2	0	112.2 – 199.5	V/m	0.34 – 0.60	A/m
	-5	84.1 – 149.6	V/m	0.25 – 0.45	A/m
Category M3	0	63.1 – 112.2	V/m	0.19 – 0.34	A/m
	-5	47.3 – 84.1	V/m	0.14 – 0.25	A/m
Category M4	0	<63.1	V/m	<0.19	A/m
	-5	<47.3	V/m	<0.14	A/m

Telephone near-field categories in linear units

Table 3

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

Articulation Weighting Factor (AWF)

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Test Methodology

Dipole Validation Procedure

1. Dipole antenna was placed in the position that would be occupied by the WD.
2. The dipole was energized with a 20 dBM un-modulated continuous-wave signal.
3. The length of the dipole was scanned with both E-field and H-field probes and the maximum value for each scan was recorded.
4. The readings were compared to the target values (FDTD simulated values) and were found to be within the allowed tolerance of 10%

Note: System validation data for all three signal types (CW, WD & 80% AM) are provided. The target values for CW signal had been derived by APREL using FDTD numerical method which is now part of the C63.19. The CW validation data are within 10% of the target value.. The measured values for the WD and 80% modulation could not be compared against any theoretical target values as there are none defined. The source for the WD signal was the WD itself. The substitution signal for probe modulation response measurement was generated by a WD with the real time power loop activated and controlled by the Mobile Service Tester.

Validation measurement have been performed for two modulated signals as well: 80% AM modulated with 1 kHz tone and CDMA signal. Only measurement results are presented as no target values exist for modulated signals,

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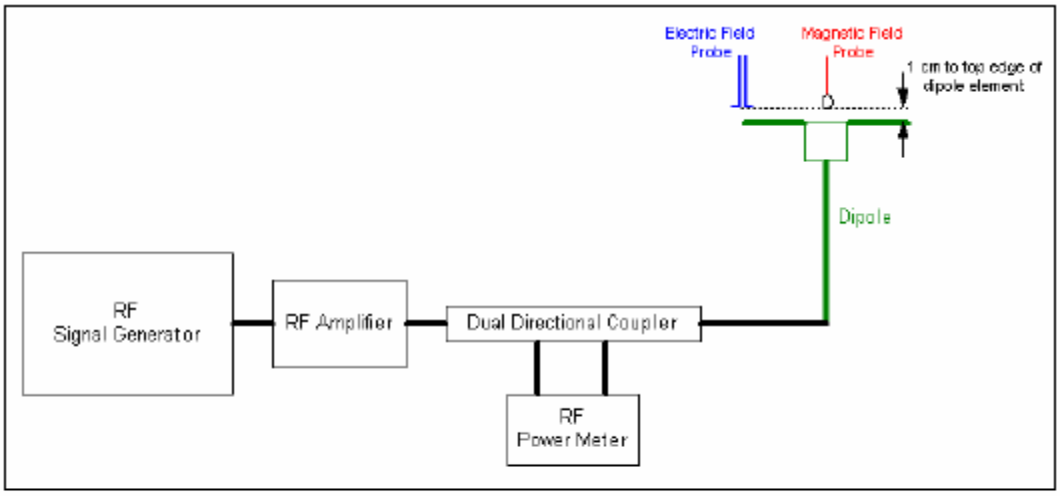
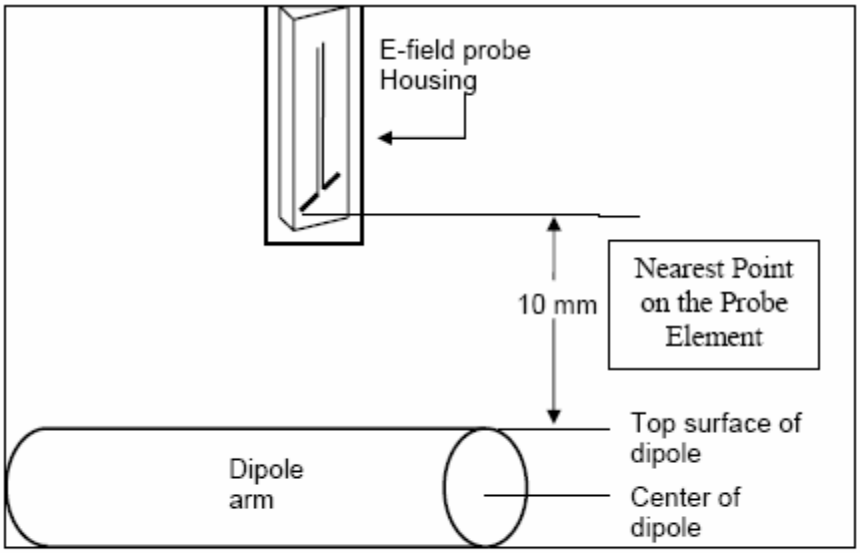
Figure 1, Setup



WD dipole calibration procedure



Probe location for WD dipole calibration

The center is aligned with the main axis of the probe. For constructional reasons it is located a small distance, specified as the vertical offset, above the tip of the probe. The actual offset is specified in the probe's calibration certificate to allow for proper referencing to the probe's calibrated center when the probe's vertical position relative to the tested object is set by touching it with the probe's tip.

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System Validation Results

Dipole target Values

Frequency (MHz)	E-Field Calculated (Target)Values Peak v/m	H-Field Calculated (Target) Values Peak A/m
835	265	0.673
1880	211	0.645

Dipole FDTD Simulated values
Thick Dipoles

Dipole Validation Results

Signal Type	Frequency (MHz)	Input Power	Measured E-Field Peak (v/m)	E-Field Target Value Peak (v/m)	Deviation
CW	835	100 mW	244	265	-7.9%
CW	1880	100 mW	196	211	-7.1%
80%AM	835	31mW	148	-	-
80%AM	1880	31mW	119	-	-
CDMA	835	31mW	246	-	-
CDMA	1880	31mW	194	-	-

Signal Type	Frequency (MHz)	Input Power	Measured H-Field Peak (A/m)	H-Field Target Value Peak (A/m)	Deviation
CW	835	100 mW	0.707	0.673	5.1%
CW	1880	100 mW	0.687	0.645	6.5%
80%AM	835	31mW	0.430	-	-
80%AM	1880	31mW	0.418	-	-
CDMA	835	31mW	0.672	-	-
CDMA	1880	31mW	0.642	-	-

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RF Field Probe Modulation Response

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

1. Fixing the probe in a set location relative to a field generating device, such as a reference dipole antenna or WB TEM, as illustrated in Figure 1.
2. Illuminate the probe with a CW signal at the intended measurement frequency.
3. Record the reading of the probe measurement system of the CW signal.
4. Determine the level of the CW signal being used to drive the field generating device.
5. Substitute a signal using the same modulation as that used by the intended WD for the CW signal.
6. Set the peak amplitude during transmission of the modulated signal to equal the amplitude of the CW signal.
7. Record the reading of the probe measurement system of the modulated signal.
8. The ratio of the CW to modulated signal reading is the modulation factor.

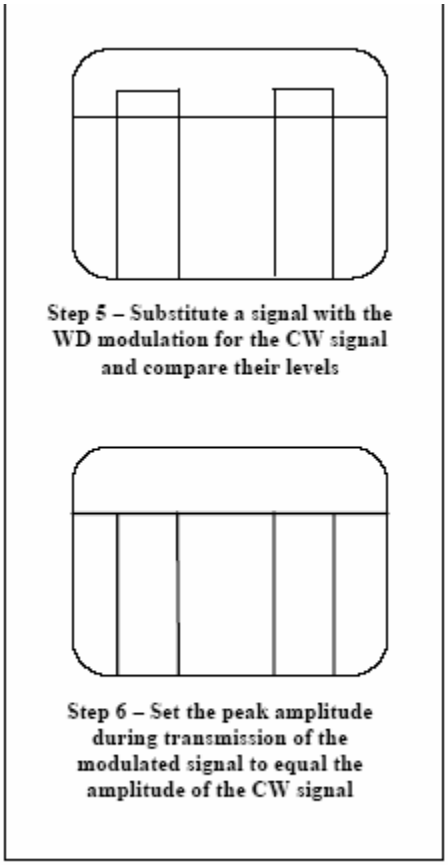

Figure C-1 – Setting the RF levels for the probe modulation response procedure. Adjusting the peak amplitude to match a WD modulation to a CW signal.

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Modulation Factors

Frequency (MHz)	Protocol	E-Field Modulation Factor	H-Field Modulation Factor
835	CDMA	5.1	5.1
835	CW		
1880	CDMA	5.1	5.1
1880	CW		

Note: Modulation factor was derived as ratio of scan result of reference CW signal to scan result of CDMA signal.

Both, reference CW and CDMA (IS-95) signals were fed to a dipole antenna with its feed point monitored with a directional coupler and a spectrum analyzer.

Both, RBW and VBW of the spectrum analyzer were set to full 3MHz as needed to cover the 20dB bandwidth of the IS-95 signal.

Zero-span peak amplitude CDMA signal was adjusted to match the reference CW signal level and it was monitored during measurement.

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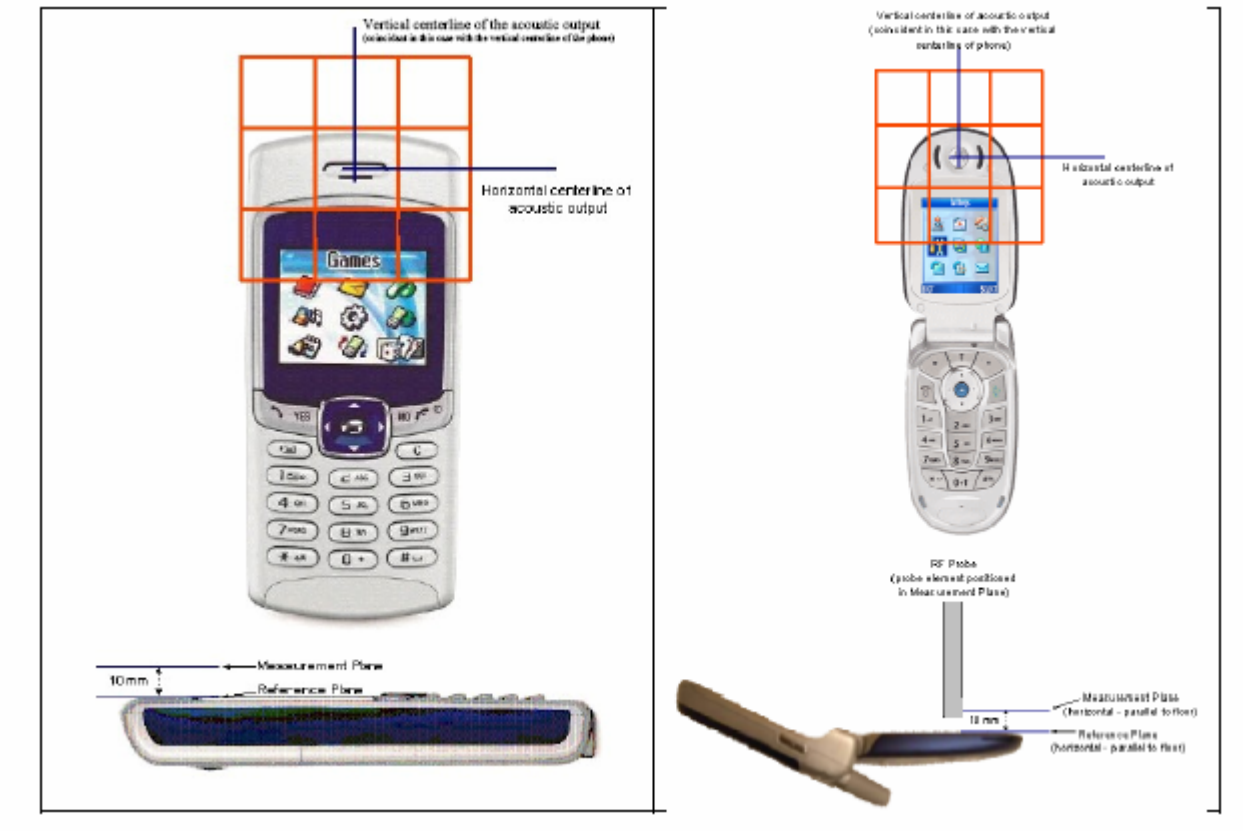
RF Emissions Test Procedure

This section describes the procedures used to measure the near field RF emissions performance of the WD. Both E-field and H-field emissions levels have to be measured.

The following summarizes the basic test flow:

1. Confirm proper operation of the field probe, probe measurement system, other instrumentation, and the positioning system.

2. Position the WD in its intended test position.



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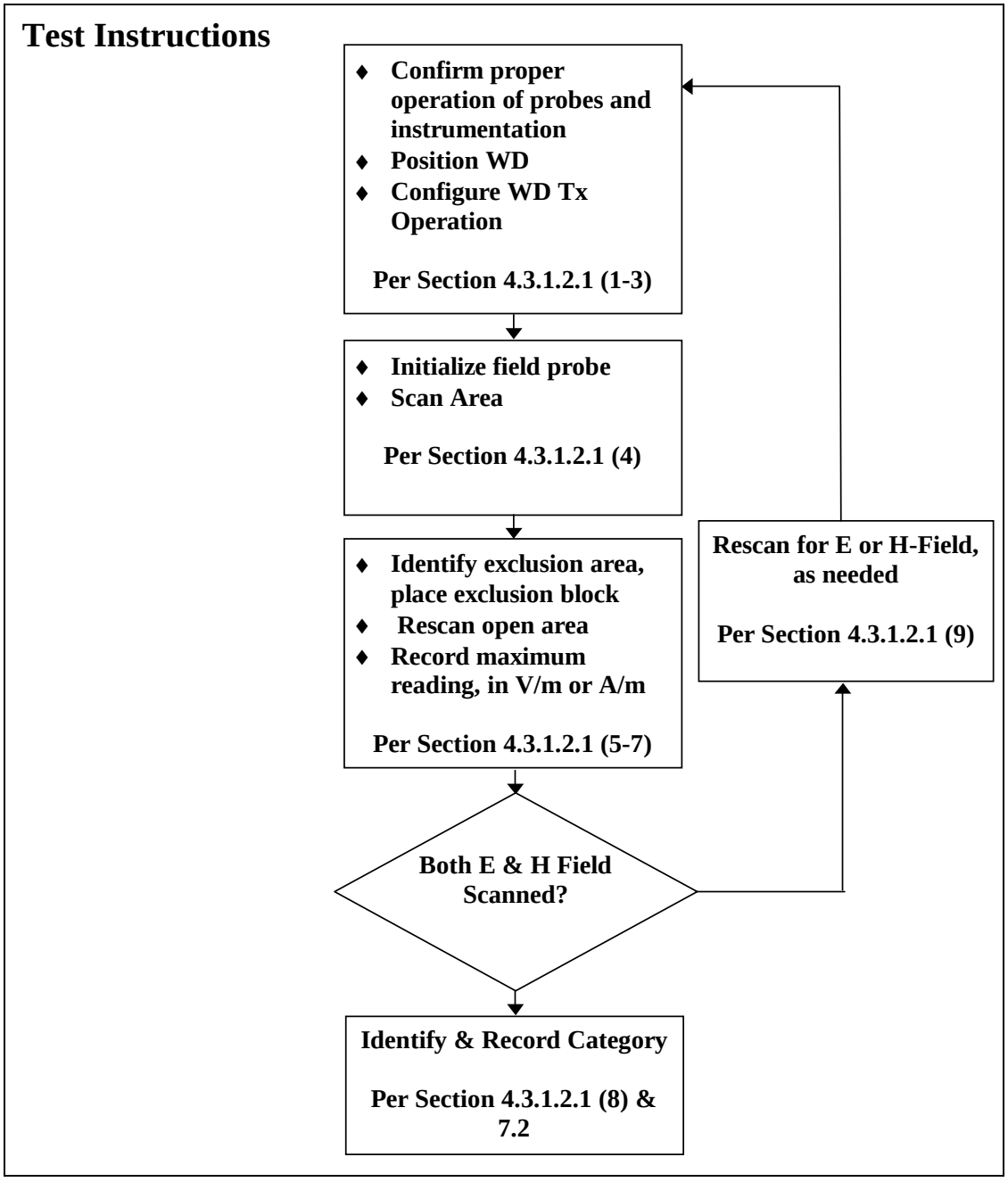

From Hearing Aid Compatibility Standard ANSI PC63.19 2005 D3.6

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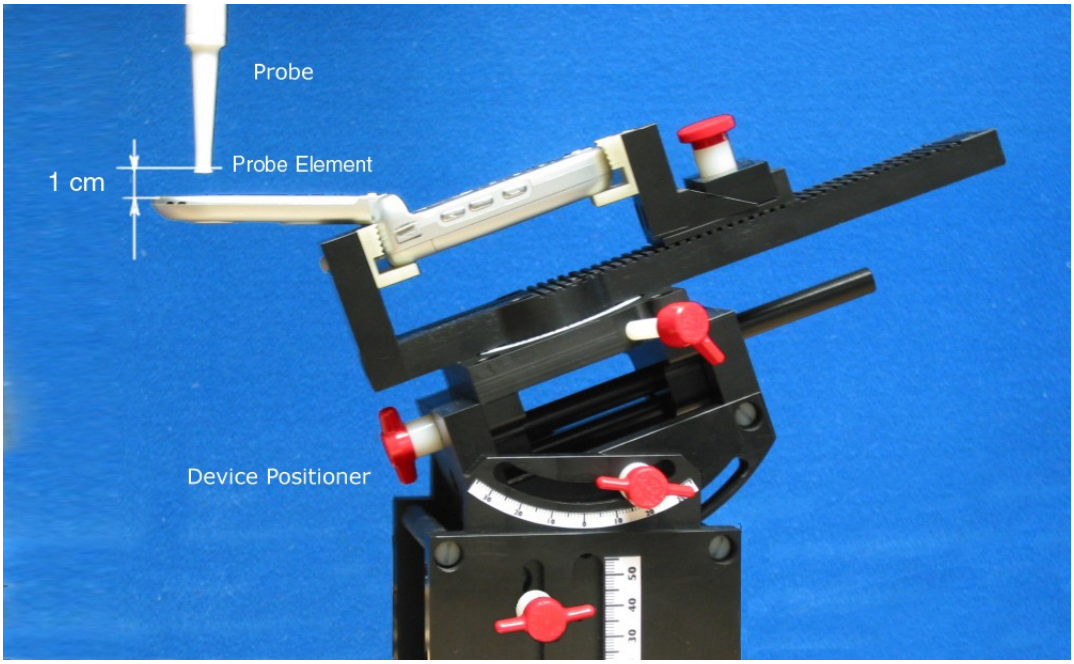

Figure 2 WD test Fixture

3. Configure the WD operation for maximum rated RF output power, at the desired channel and other normal operating parameters, (e.g. – test mode) as intended for the test.

4. The center sub-grid shall be centered on the center of the WD output (acoustic or T-Coil output), as appropriate. Locate the field probe at the initial test position in the 5 x 5 cm measurement plane.

5. Record the reading.

6. Scan the entire 5 x 5 cm region in equally spaced increments and record the reading at each measurement point. The distance between measurement locations shall be sufficient to assure the identification of the peak reading.

7. Identify the five contiguous sub-grids around the center sub-grid with the lowest maximum field strength readings. Please note that a maximum of five sub-grids can be excluded for E-field and H-field.

8. Identify the highest field reading within the six sub-grids identified in step 7.

9. Convert the highest field strength reading identified in step 8 to peak V/m or A/m, as appropriate.

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10. Repeat steps 1-10 for both the E and H-Field measurements. The highest field strength reading identified was converted to peak V/m or A/m as appropriate. This conversion was done using the appropriate factors derived from the probe modulation factor.

11. Compare this reading to the categories in Section 7 of ANSI/IEEE C63.19 and record the resulting category. The lowest category number 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.

Probe Rotation

The highest reading reported includes the probe rotation performed at the peak after exclusion.

Applicable Documents

The following documents are applicable to the evaluation performed:

1) ANSI/IEEE C63.19, American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

2) AISP.4-HACTS v 8.2, Test Plan & Technical Specification for Wireless Phone Compliance Baseline.

3) IEEE 1309-2005, IEEE Standard for Calibration Electromagnetic Field Sensors and Probes, Excluding Antennas, form 9kHz to 40GHz.

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Test Results – E-field

Mode	Channel	Freq.	Cond. Pwr	Peak E-field	Peak E-field	Reference position	Battery	Cat.
		[MHz]	[dBm]	[V/m]	[dB(V/m)]			
CDMA	384	836.5	24	106.8	40.6	speaker	1	M3
CDMA	799	849	24	109.8	40.8	speaker	1	M3
CDMA	991	824	24	87.54	38.8	speaker	1	M3
CDMA	001	850	24	66.5	36.5	speaker	1	M3
CDMA	600	1880	24	64.78	36.2	speaker	1	M3
CDMA	1199	1910	24	64.45	36.2	speaker	1	M3

Test Results – H-field

Mode	Channel	Freq.	Cond. Pwr	Peak H-field	Peak H-field	Reference position	Battery	Cat.
		[MHz]	[dBm]	[A/m]	[dB(A/m)]			
CDMA	1199	1910	24	0.296	-10.6	speaker	1	M3
CDMA	384	836.5	24	0.236	-12.5	speaker	1	M3
CDMA	799	849	24	0.252	-12.0	speaker	1	M3
CDMA	991	824	24	0.198	-14.1	speaker	1	M3
CDMA	001	1850	24	0.291	-10.7	speaker	1	M3
CDMA	600	1880	24	0.292	-10.7	speaker	1	M3

Power Drift: The drift was monitored using two methods:

- via air-interface using a combination of horn antenna and a spectrum analyzer. Drift was measured before the start of the test, when the WD started transmitting (for reference purpose), during the test and after the test. There was no drift observed on the spectrum analyzer. The horn antenna was used as a receiver permanently placed aiming towards the WD under test at a safe distance of 3 feet where no reflection is created. The antenna was placed in such a manner such that no obstruction was present in its receiving path. The spectrum analyzer was situated outside the test chamber. It was ensured that during the drift measurement there was no moving object as well as the test engineer was absent inside the test chamber. No object inside the chamber was moved from their original position during the complete test process of the WD.

and the second method: Immediately before the scan the sensor is positioned 10mm above the ERP. E-field level is recorded as “BEFORE”. When the sensor is stopped at the same spot after completing the scan E-field level is again recorded as “AFTER”. The difference is then calculated in terms of radiated power drift.

Note: The substitution signal for probe modulation response measurement was generated by a WD with the real time power loop activated and controlled by the Mobile Service Tester. The peak level at the dipole antenna feed point was adjusted to match the CW signal level and then in was monitored continuously with a spectrum analyzer. No drift was detected.

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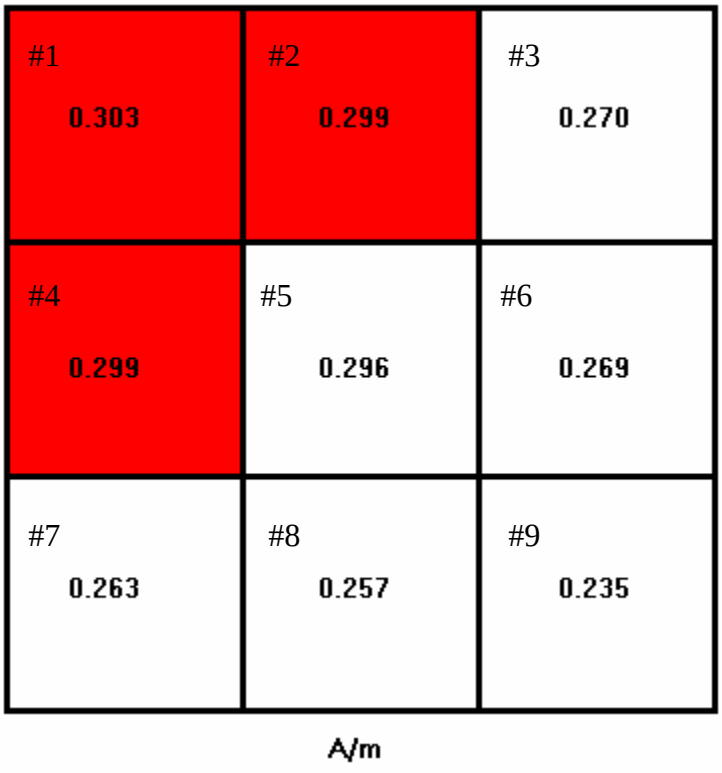
HAC Test Report

Device Type	: CDMA
Device Name	: Treo XXX
Device S/N	: E5225
Probe Serial No.	: 101
Probe Name	: H-field probe
Probe Type	: H-Field Sensor
Probe Model	: ALS-H-020
Date Calibrated	: 02-Oct-2004
Test Frequency	: 1910 MHz
Channel number	: 1199
Probe Mod. Factor	: 5.1 dB
Probe Sensitivity	: 452 mV/(A/m)
Compression Point	: 95 mV
Offset	: 3 mm
H-Field	0.296 A/m Peak
dB	: -10.575 db(A/m) Peak
Category	: M3

contiguous sub-grids shaded red are excluded



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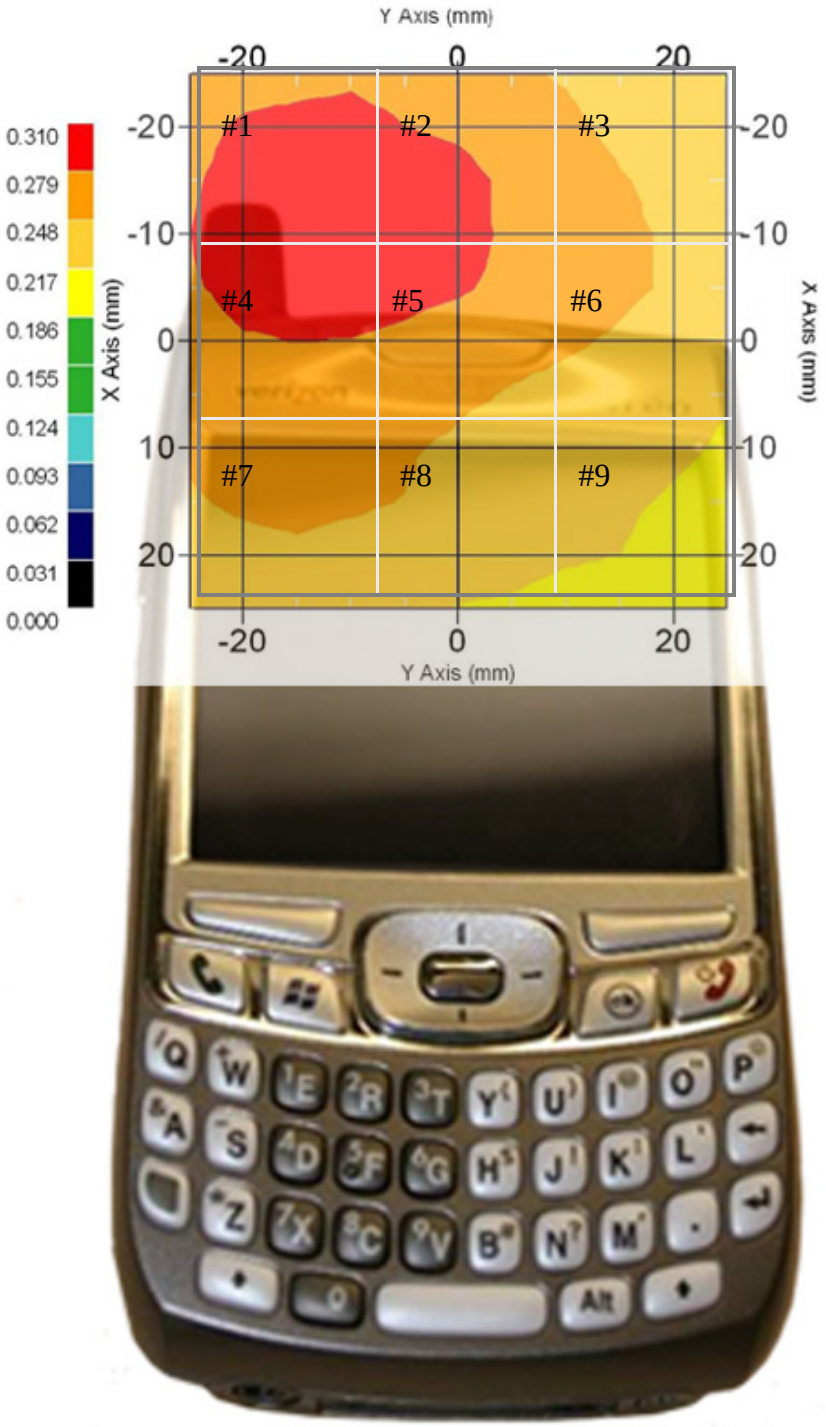

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Category	Telephone RF Parameters					
Near Field	AWF	E-Field Emissions (Peak)		H-Field Emissions (Peak)		
Category M1	0	199.5 – 354.8	V/m	0.60 – 1.07	A/m	
	-5	149.6 – 266.1	V/m	0.45 – 0.80	A/m	
Category M2	0	112.2 – 199.5	V/m	0.34 – 0.60	A/m	
	-5	84.1 – 149.6	V/m	0.25 – 0.45	A/m	
Category M3	0	63.1 – 112.2	V/m	0.19 – 0.34	A/m	
	-5	47.3 – 84.1	V/m	0.14 – 0.25	A/m	
Category M4	0	<63.1	V/m	<0.19	A/m	
	-5	<47.3	V/m	<0.14	A/m	

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HAC Test Report

Device Type	:	CDMA
Device Name	:	Treo XXX
Device S/N	:	E5225
Probe Serial No.	:	212
Probe Name	:	E probe
Probe Type	:	E-Field Triangle
Probe Model	:	ALS-E020
Date Calibrated	:	21-May-2005
Test Frequency	:	836.5 MHz
Channel number	:	384
Probe Mod. Factor	:	5.1 dB
Probe Sensitivity	:	1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point	:	95 mV
Offset	:	1.56 mm
E-Field	:	106.783 V/m Peak
dB	:	40.570 db(V/m) Peak
Category	:	M3

contiguous sub-grids shaded red are excluded

#1 226.173	#2 144.465	#3 69.282
#4 156.144	#5 106.783	#6 63.816
#7 67.589	#8 62.557	#9 54.597

V/m

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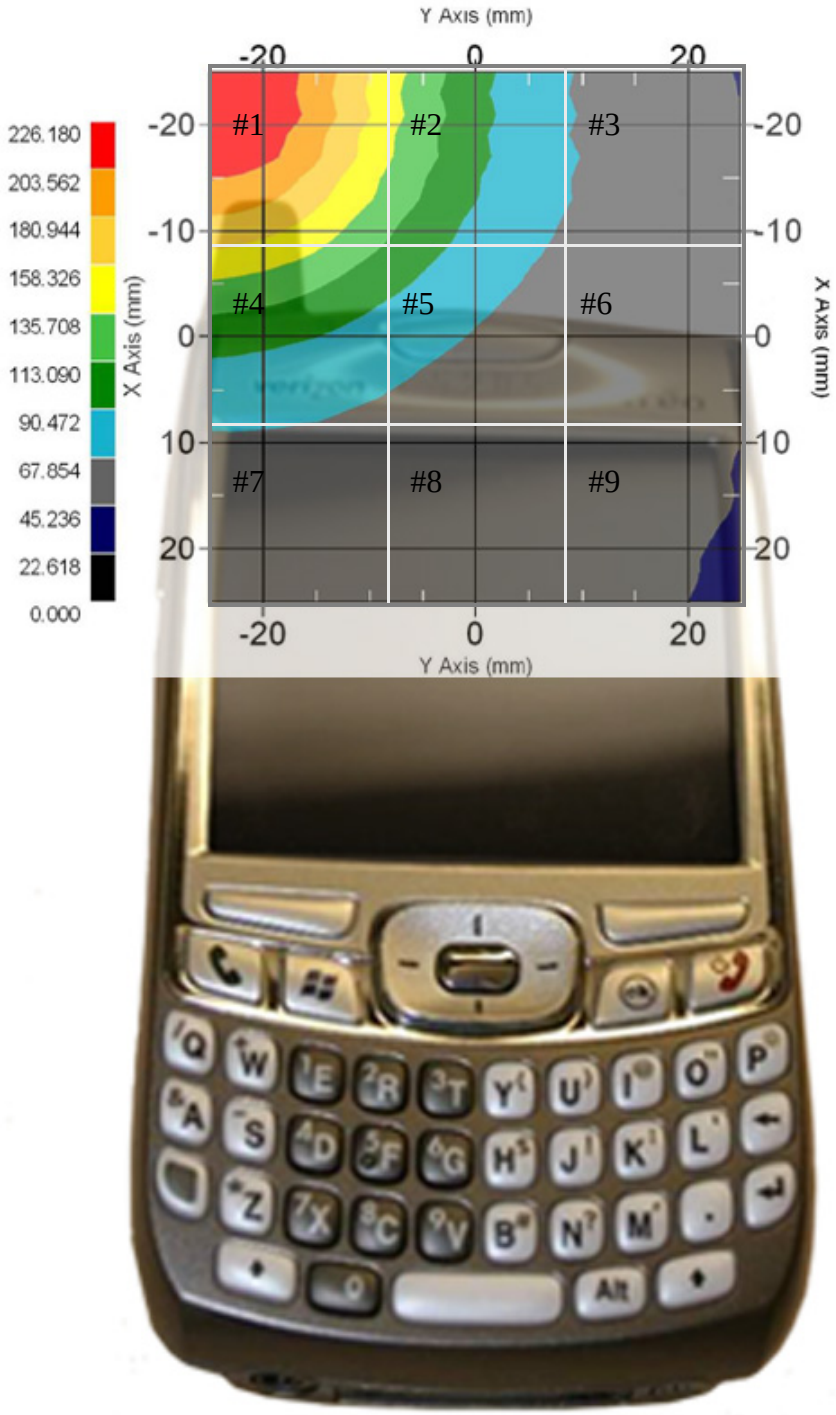

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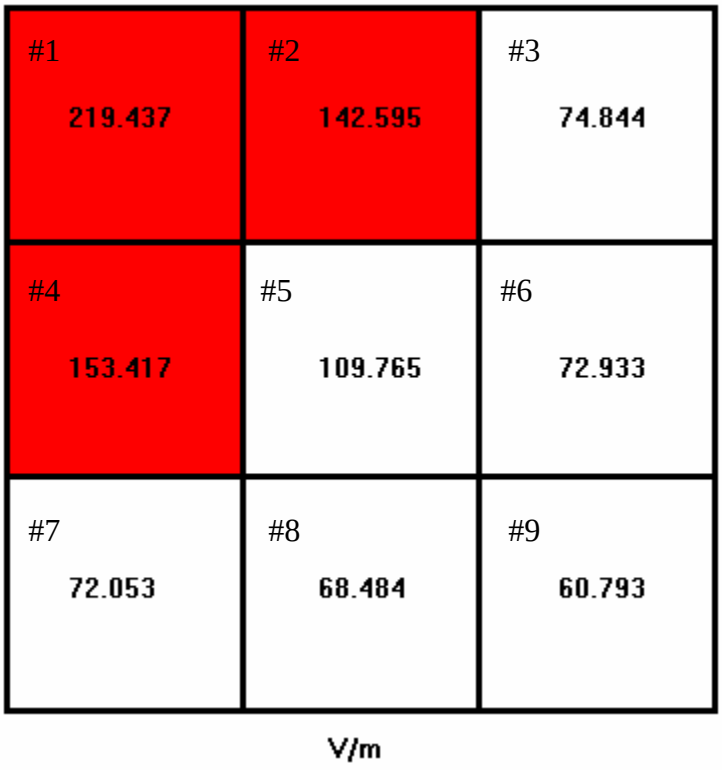
HAC Test Report

Device Type	:	CDMA
Device Name	:	Treo XXX
Device S/N	:	E5225
Probe Serial No.	:	212
Probe Name	:	E probe
Probe Type	:	E-Field Triangle
Probe Model	:	ALS-E020
Date Calibrated	:	21-May-2005
Test Frequency	:	849 MHz
Channel number	:	799
Probe Mod. Factor	:	5.1 dB
Probe Sensitivity	:	1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point	:	95 mV
Offset	:	1.56 mm
E-Field	:	109.765 V/m Peak
dB	:	40.809 db(V/m) Peak
Category	:	M3

Contiguous sub-grids shaded red are excluded



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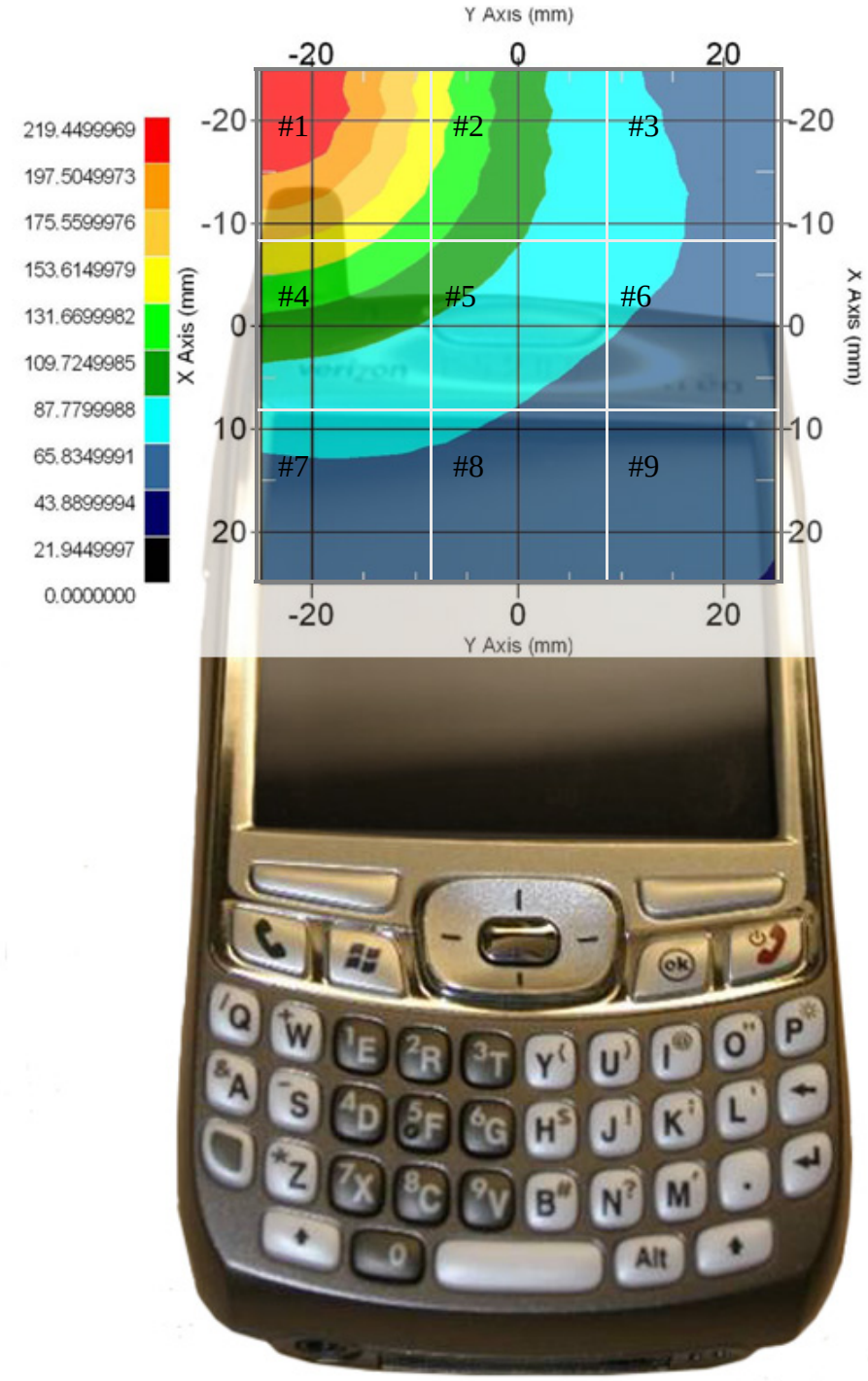

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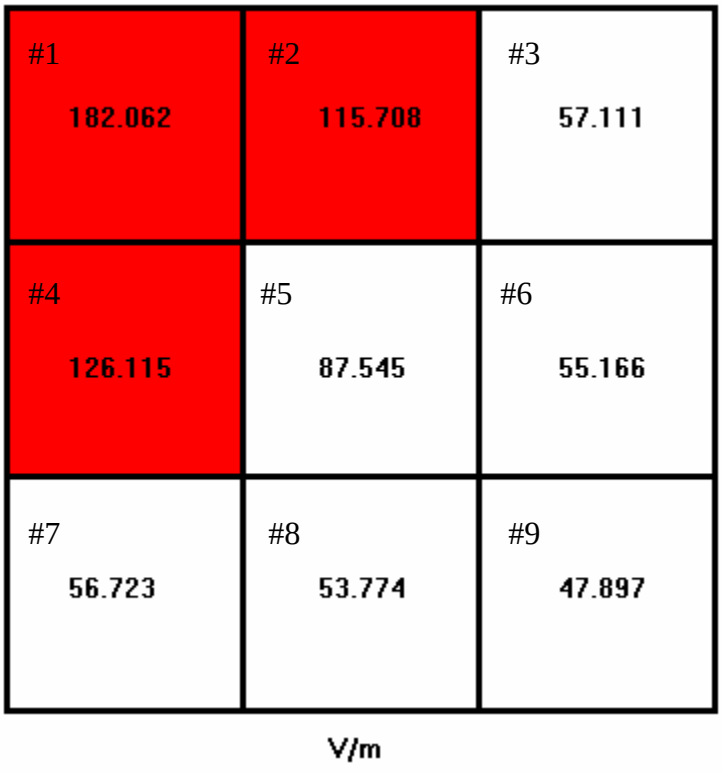
HAC Test Report

Device Type	:	CDMA
Device Name	:	Treo XXX
Device S/N	:	E5225
Probe Serial No.	:	212
Probe Name	:	E probe
Probe Type	:	E-Field Triangle
Probe Model	:	ALS-E020
Date Calibrated	:	21-May-2005
Test Frequency	:	824 MHz
Channel number	:	991
Probe Mod. Factor	:	5.1 dB
Probe Sensitivity	:	1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point	:	95 mV
Offset	:	1.56 mm
E-Field	:	87.545 V/m Peak
dB	:	38.845 db(V/m) Peak
Category	:	M3

contiguous sub-grids shaded red are excluded



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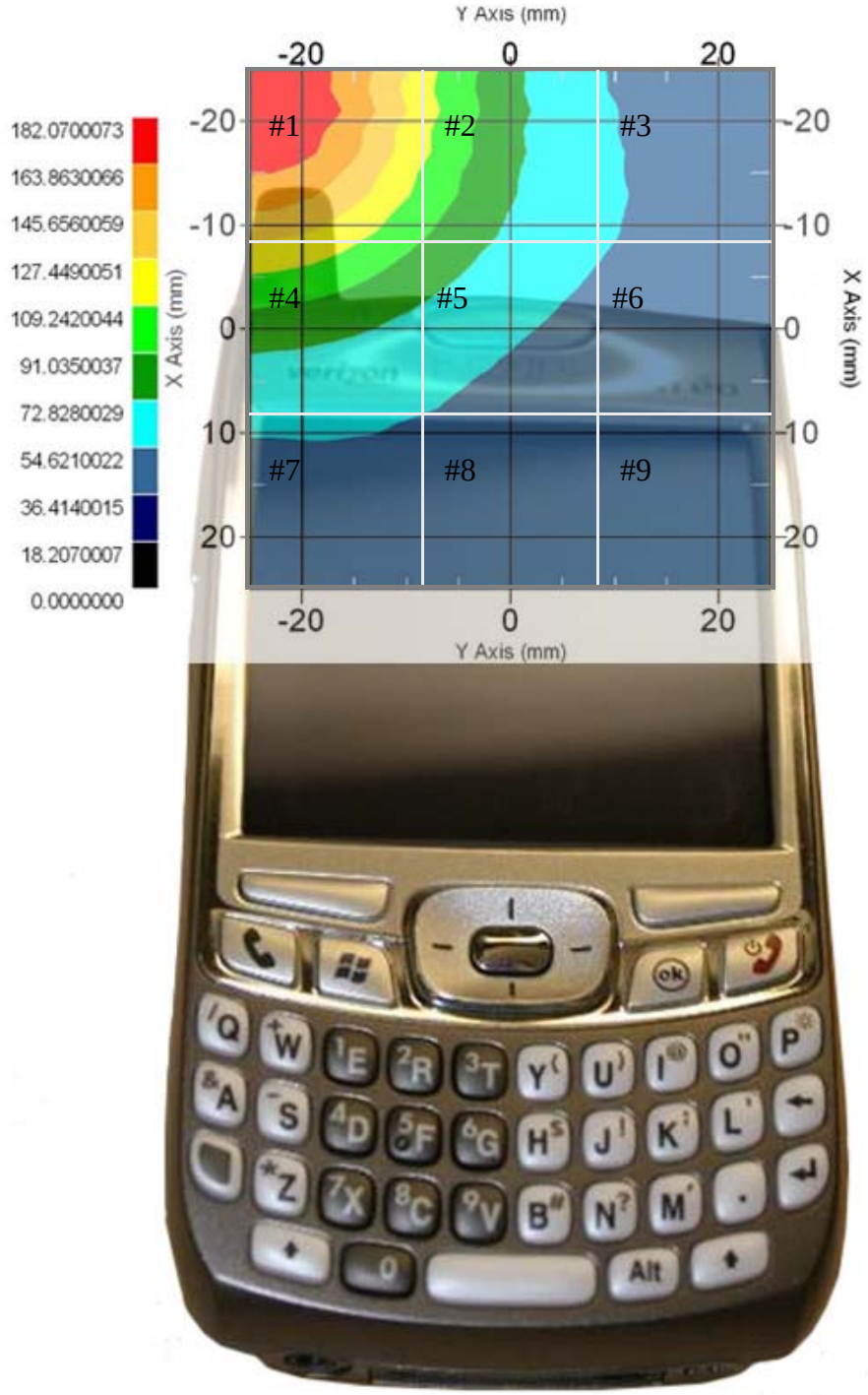

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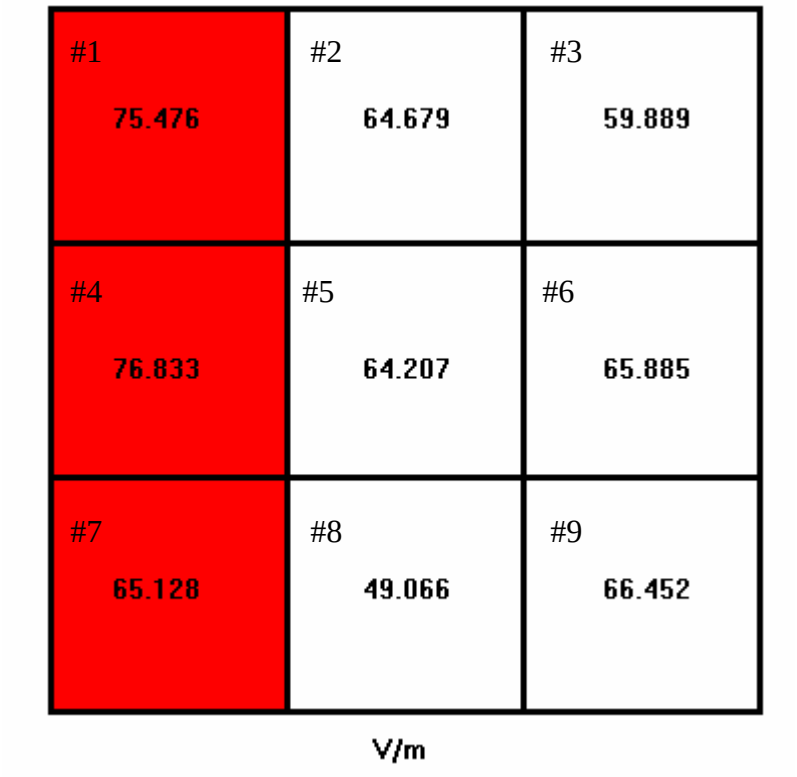
HAC Test Report

Device Type : CDMA
Device Name : Treo XXX
Device S/N : E5225
Probe Serial No. : 212
Probe Name : E probe
Probe Type : E-Field Triangle
Probe Model : ALS-E020
Date Calibrated : 21-May-2005
Test Frequency : 1850 MHz
Channel number : 001
Probe Mod. Factor : 5.1 dB
Probe Sensitivity : 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point : 95 mV
Offset : 1.56 mm
E-Field : 66.452 V/m Peak
dB : 36.450 db(V/m) Peak
Category : M3
contiguous sub-grids shaded red are excluded



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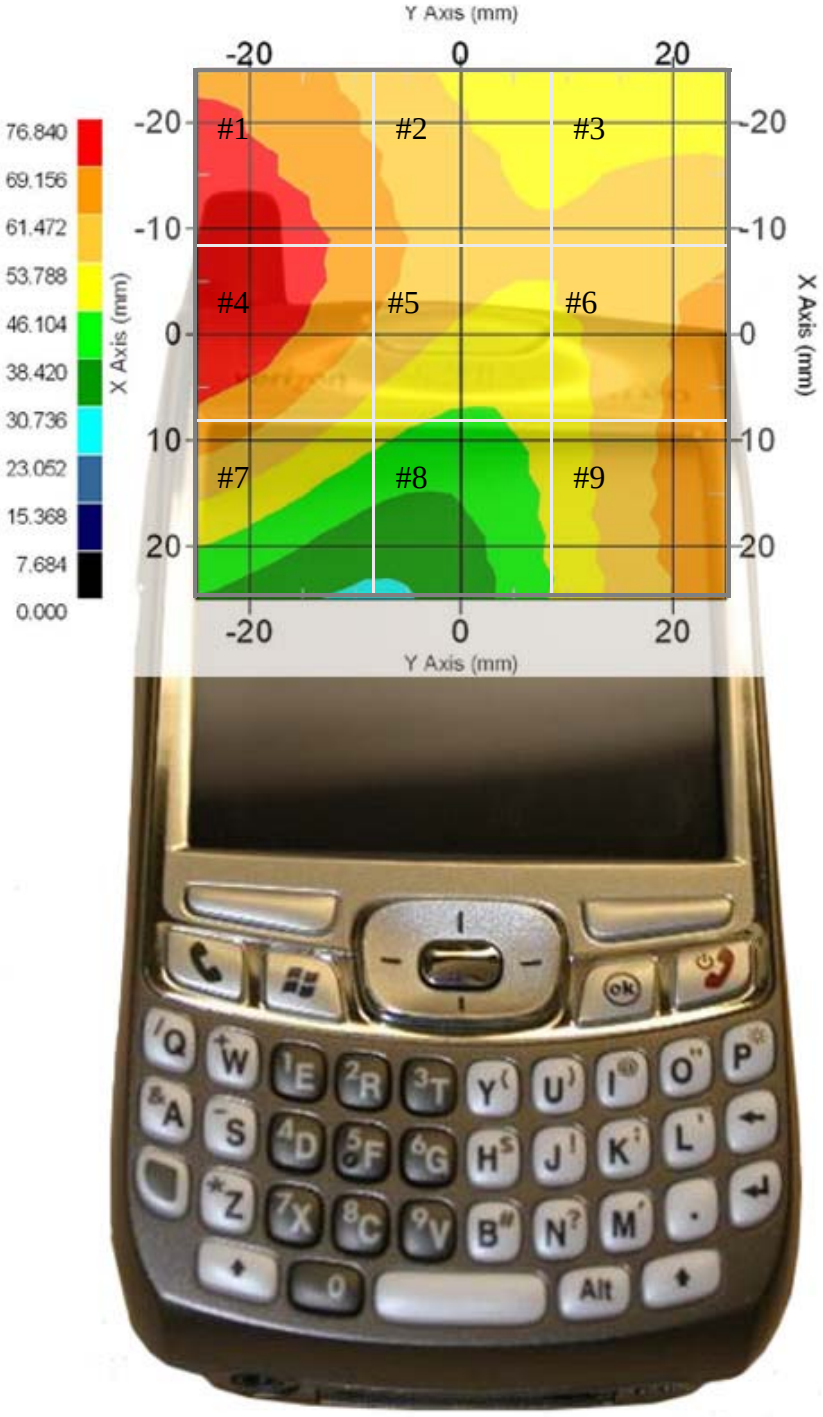

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HAC Test Report

Device Type	:	CDMA
Device Name	:	Treo XXX
Device S/N	:	E5225
Probe Serial No.	:	212
Probe Name	:	E probe
Probe Type	:	E-Field Triangle
Probe Model	:	ALS-E020
Date Calibrated	:	21-May-2005
Test Frequency	:	1880 MHz
Channel number	:	600
Probe Mod. Factor	:	5.1 dB
Probe Sensitivity	:	1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point	:	95 mV
Offset	:	1.56 mm
E-Field	:	64.788 V/m Peak
dB	:	36.230 db(V/m) Peak
Category	:	M3

contiguous sub-grids shaded red are excluded

#1 70.987	#2 58.864	#3 54.337
#4 71.874	#5 58.424	#6 61.813
#7 62.109	#8 46.878	#9 64.788

V/m

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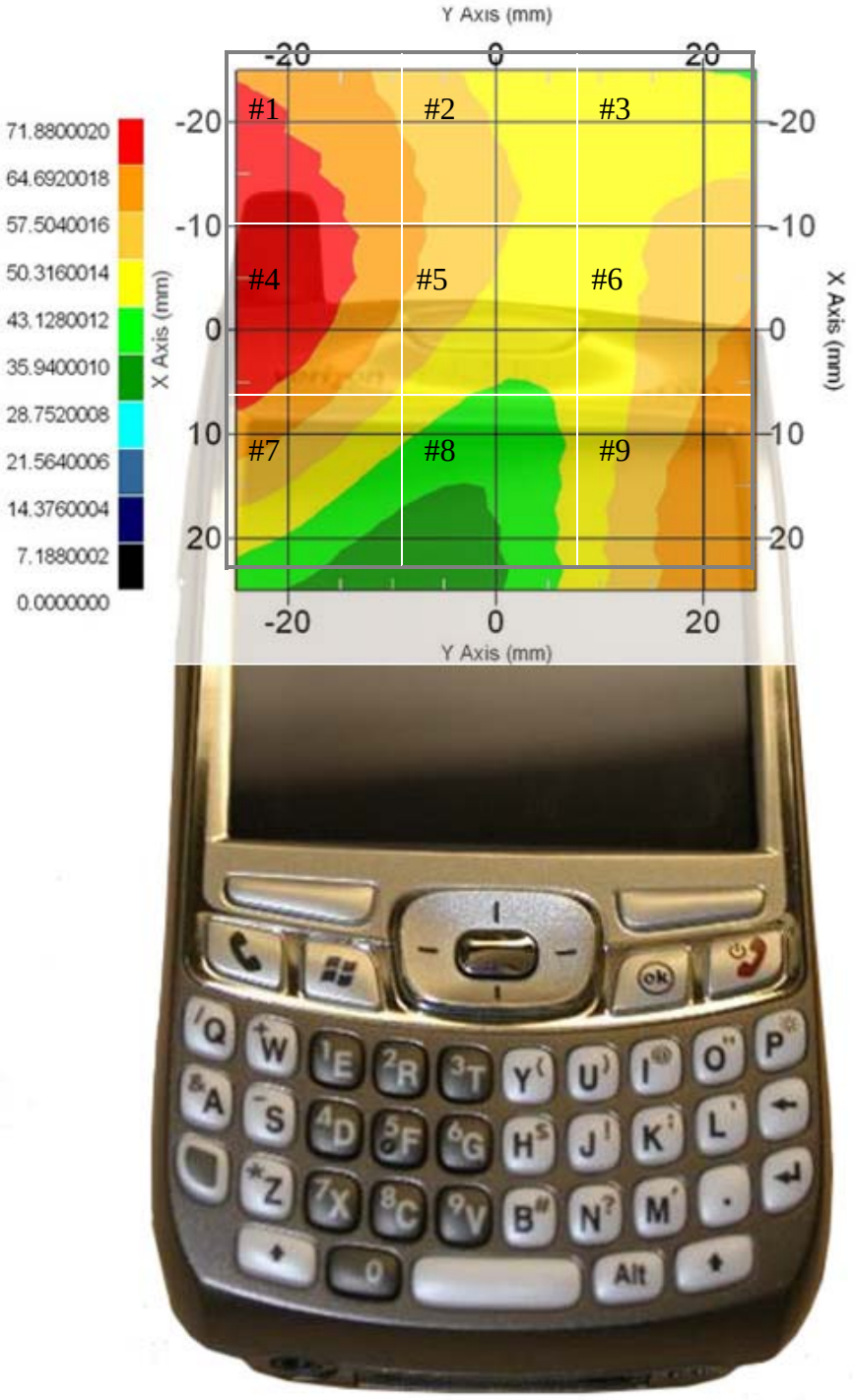

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HAC Test Report

Device Type	:	CDMA
Device Name	:	Treo XXX
Device S/N	:	E5225
Probe Serial No.	:	212
Probe Name	:	E probe
Probe Type	:	E-Field Triangle
Probe Model	:	ALS-E020
Date Calibrated	:	21-May-2005
Test Frequency	:	1910 MHz
Channel number	:	1199
Probe Mod. Factor	:	5.1 dB
Probe Sensitivity	:	1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point	:	95 mV
Offset	:	1.56 mm
E-Field	:	64.453 V/m Peak
dB	:	36.185 db(V/m) Peak
Category	:	M3

contiguous sub-grids shaded red are excluded

#1 71.104	#2 59.435	#3 53.991
#4 73.881	#5 59.589	#6 62.995
#7 66.427	#8 48.494	#9 64.453

V/m

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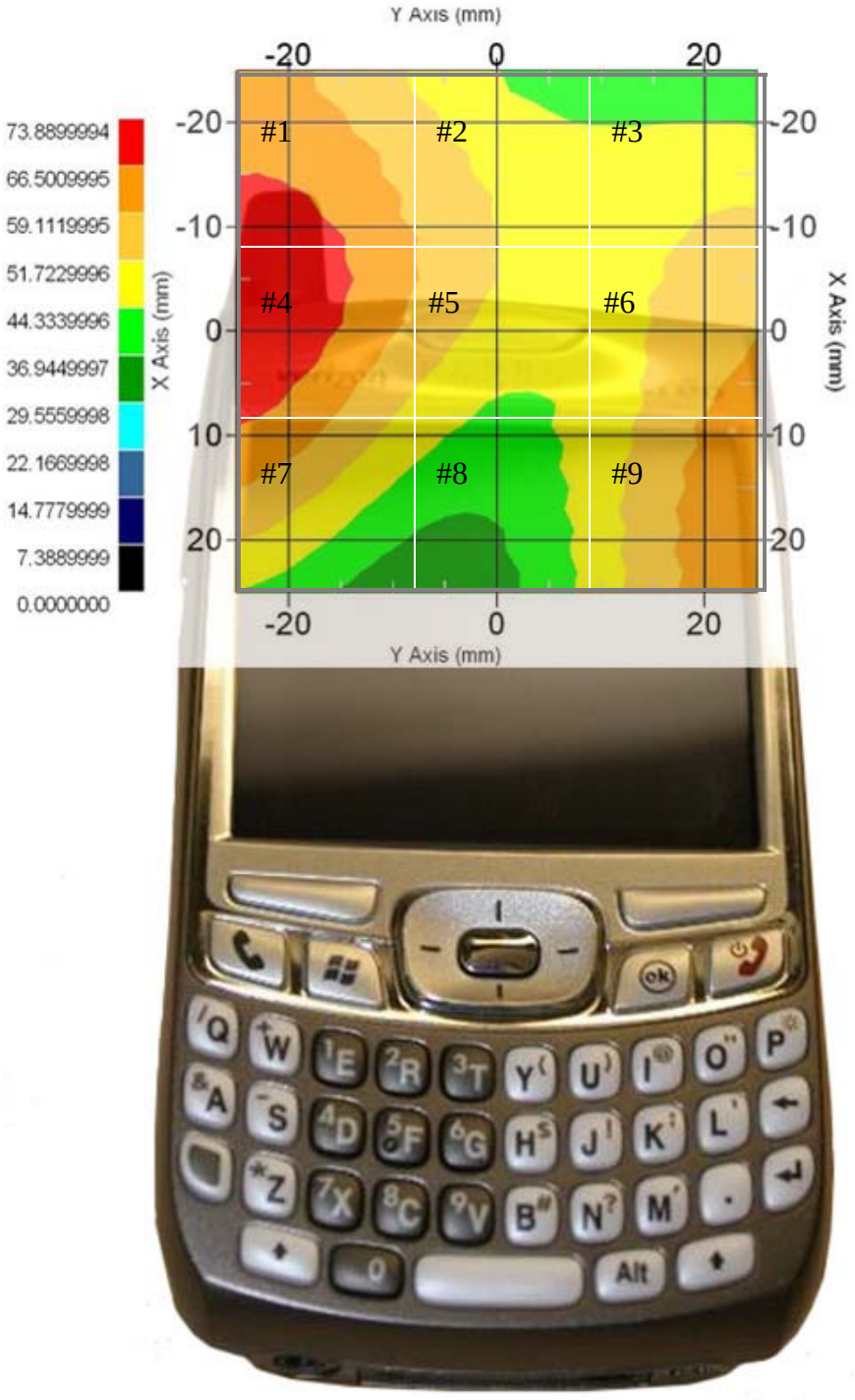

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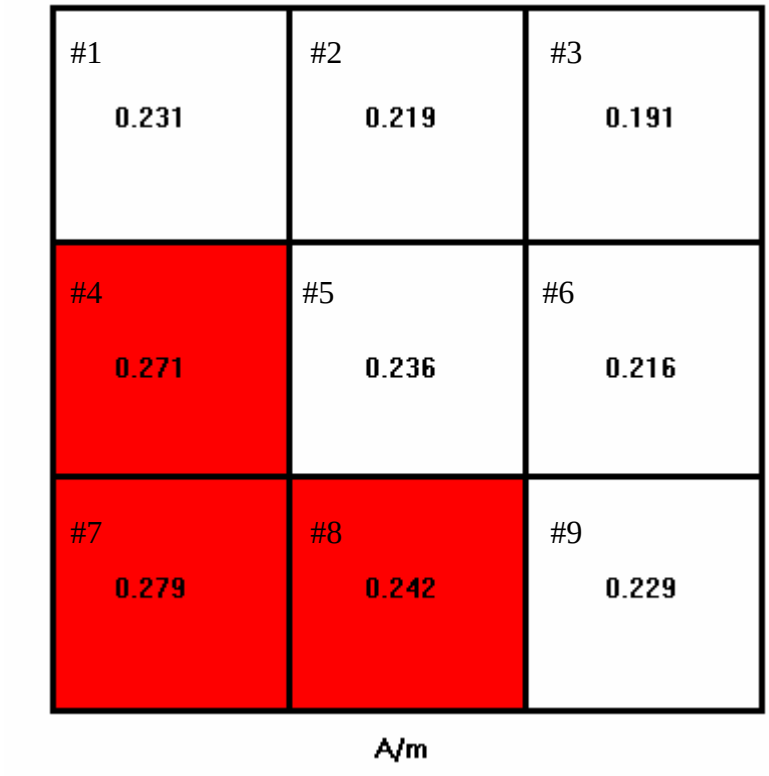
HAC Test Report

Device Type	: CDMA
Device Name	: Treo XXX
Device S/N	: E5225
Probe Serial No.	: 101
Probe Name	: H-field probe
Probe Type	: H-Field Sensor
Probe Model	: ALS-H-020
Date Calibrated	: 02-Oct-2004
Test Frequency	: 836.5 MHz
Channel number	: 384
Probe Mod. Factor	: 5.1 dB
Probe Sensitivity	: 86.7 mV/(A/m)
Compression Point	: 95 mV
Offset	: 3 mm
H-Field	: 0.236 A/m Peak
dB	: -12.527 db(A/m) Peak
Category	: M3

contiguous sub-grids shaded red are excluded



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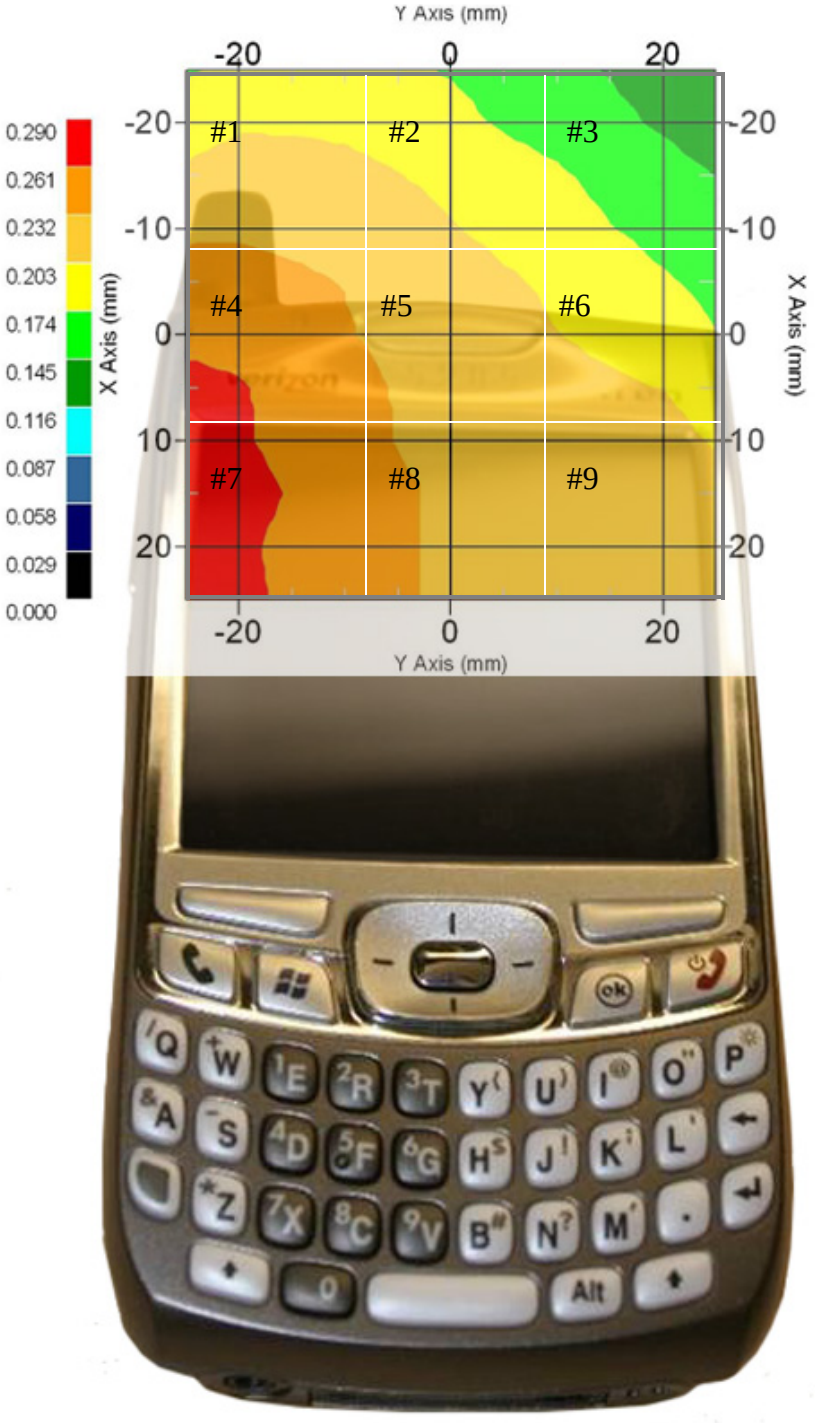

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HAC Test Report

Device Type : CDMA
Device Name : Treo XXX
Device S/N : E5225
Probe Serial No. : 101
Probe Name : H-field probe
Probe Type : H-Field Sensor
Probe Model : ALS-H-020
Date Calibrated : 02-Oct-2004
Test Frequency : 849 MHz
Channel number : 799
Probe Mod. Factor : 5.1 dB
Probe Sensitivity : 89.3 mV/(A/m)
Compression Point : 95 mV
Offset : 3 mm
H-Field : 0.252 A/m Peak
dB : -11.986 db(A/m) Peak
Category : M3
contiguous sub-grids shaded red are excluded

#1 0.233	#2 0.221	#3 0.199
#4 0.284	#5 0.247	#6 0.230
#7 0.302	#8 0.261	#9 0.252

A/m

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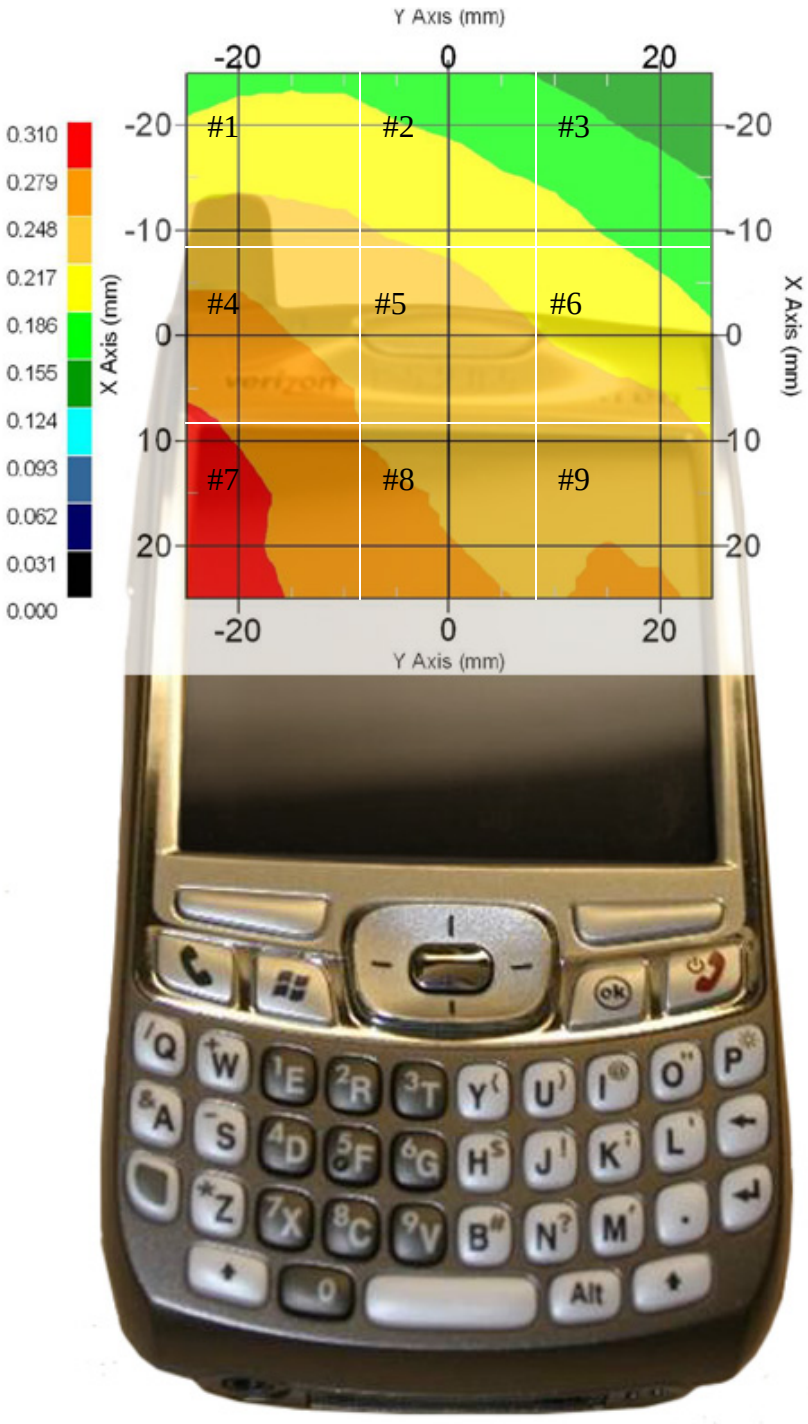

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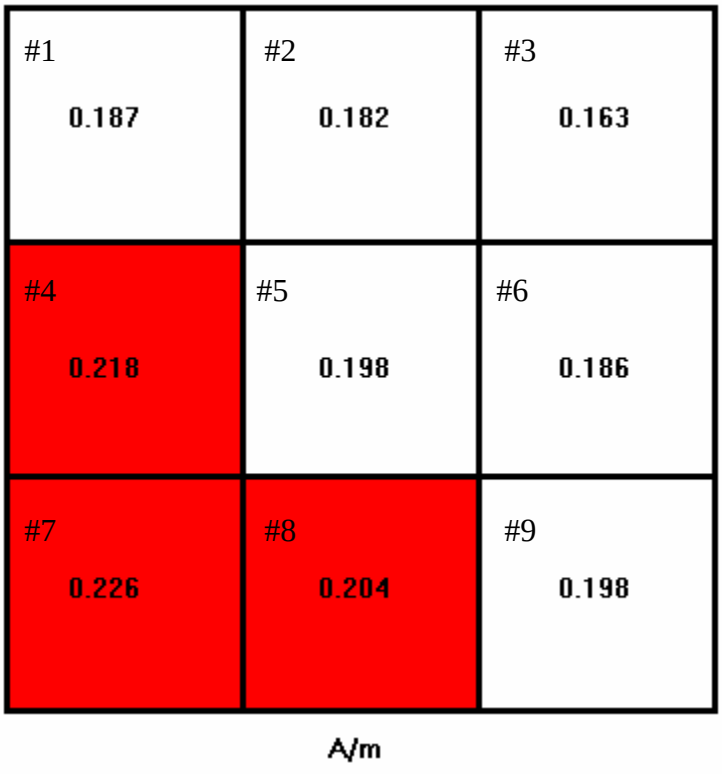
HAC Test Report

Device Type	: CDMA
Device Name	: Treo XXX
Device S/N	: E5225
Probe Serial No.	: 101
Probe Name	: H-field probe
Probe Type	: H-Field Sensor
Probe Model	: ALS-H-020
Date Calibrated	: 02-Oct-2004
Test Frequency	: 824 MHz
Channel number	: 991
Probe Mod. Factor	: 5.1 dB
Probe Sensitivity	: 84.1 mV/(A/m)
Compression Point	: 95 mV
Offset	: 3 mm
H-Field	: 0.198 A/m Peak
dB	: -14.060 db(A/m) Peak
Category	: M3

contiguous sub-grids shaded red are excluded



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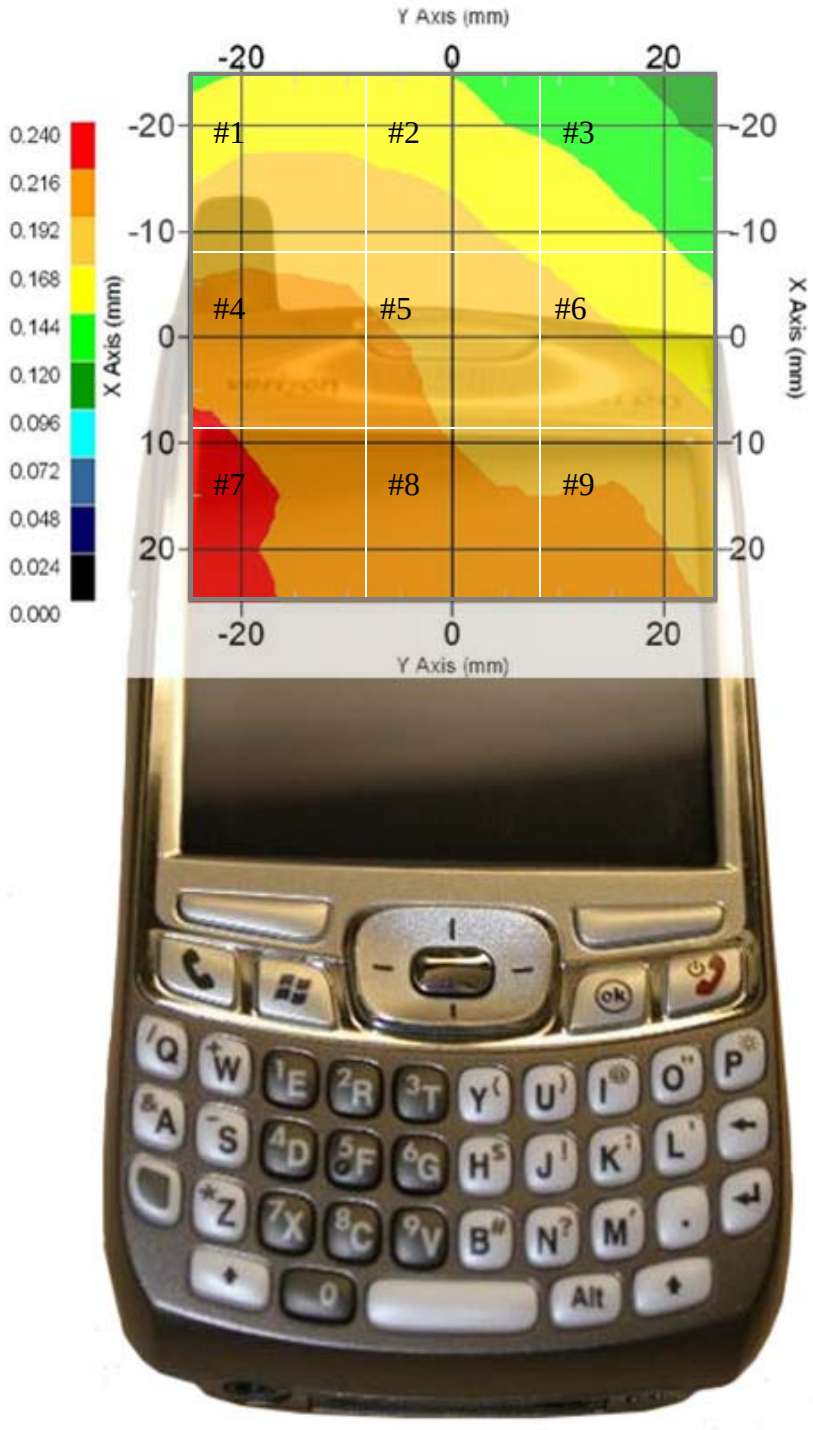

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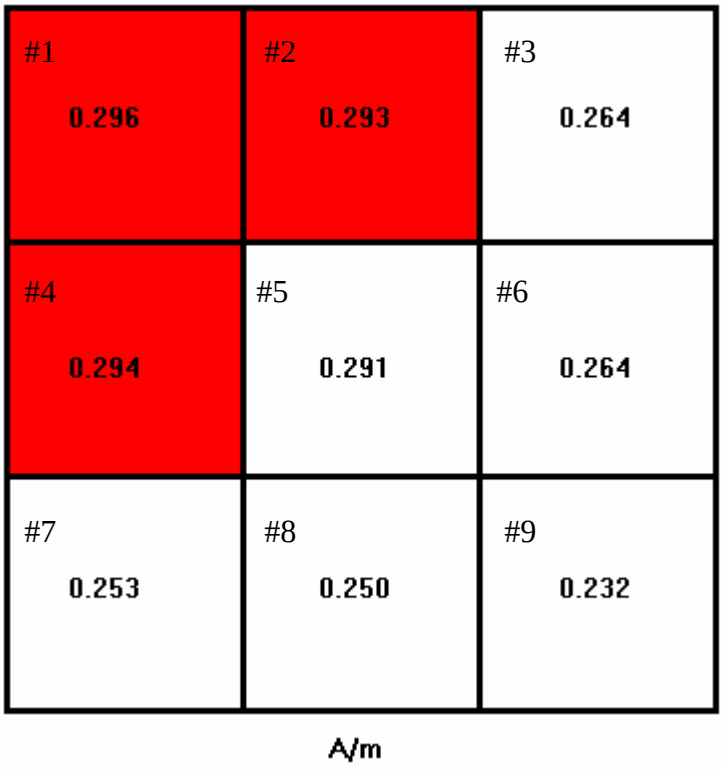
HAC Test Report

Device Type : CDMA
Device Name : Treo XXX
Device S/N : E5225
Probe Serial No. : 101
Probe Name : H-field probe
Probe Type : H-Field Sensor
Probe Model : ALS-H-020
Date Calibrated : 02-Oct-2004
Test Frequency : 1850 MHz
Channel number : 001
Probe Mod. Factor : 5.1 dB
Probe Sensitivity : 424 mV/(A/m)
Compression Point : 95 mV
Offset : 3 mm
H-Field : 0.291 A/m Peak
dB : -10.721 db(A/m) Peak
Category : M3
contiguous sub-grids shaded red are excluded



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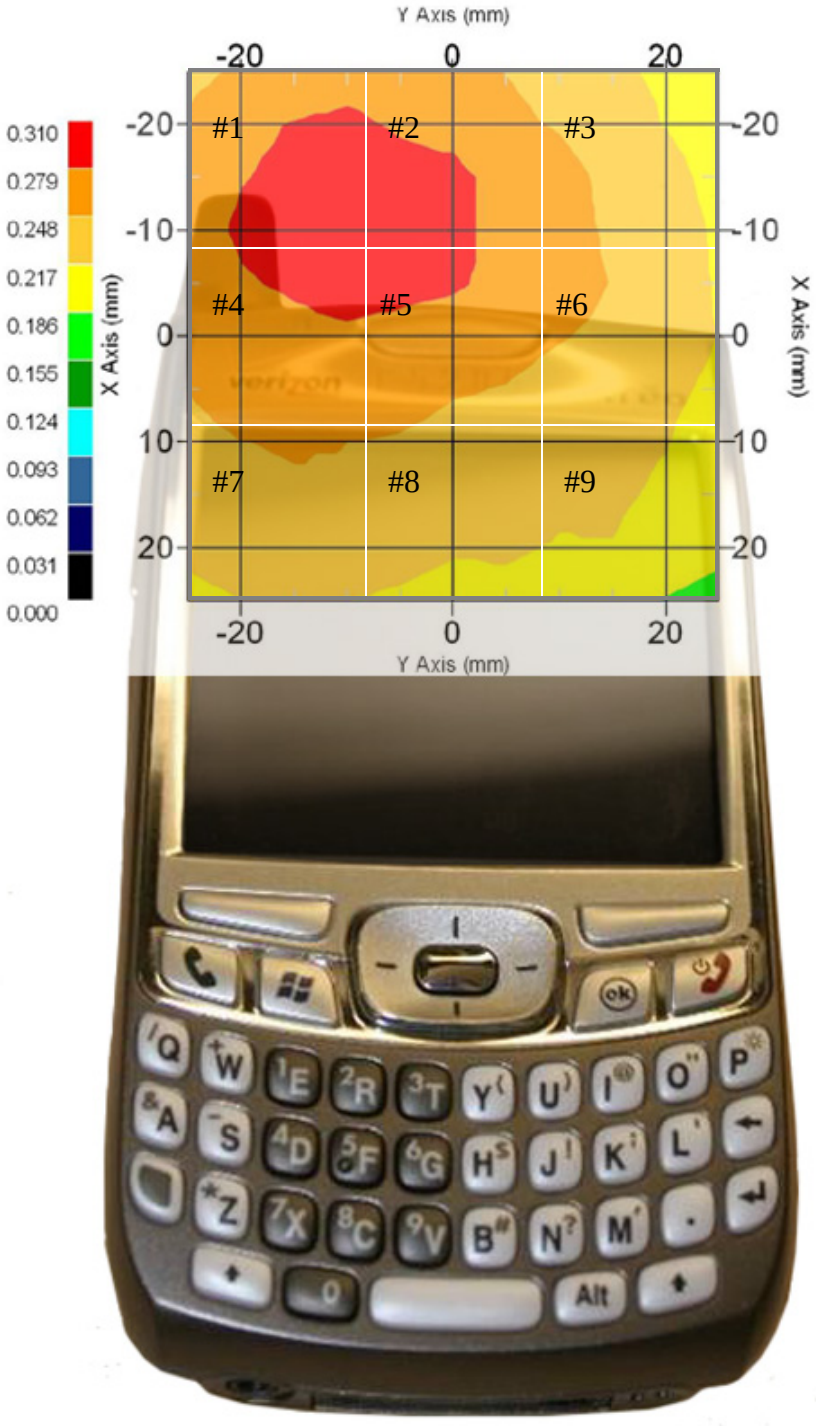

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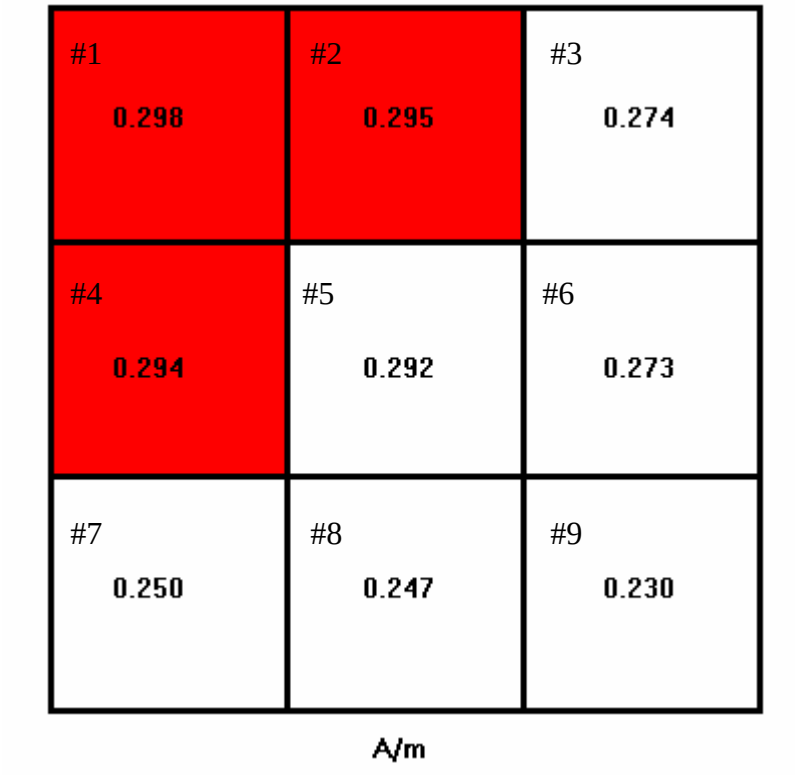
HAC Test Report

Device Type : CDMA
Device Name : Treo XXX
Device S/N : E5225
Probe Serial No. : 101
Probe Name : H-field probe
Probe Type : H-Field Sensor
Probe Model : ALS-H-020
Date Calibrated : 02-Oct-2004
Test Frequency : 1880 MHz
Channel number : 600
Probe Mod. Factor : 5.1 dB
Probe Sensitivity : 438 mV/(A/m)
Compression Point : 95 mV
Offset : 3 mm
H-Field : 0.292 A/m Peak
dB : -10.686 db(A/m) Peak
Category : M3
contiguous sub-grids shaded red are excluded



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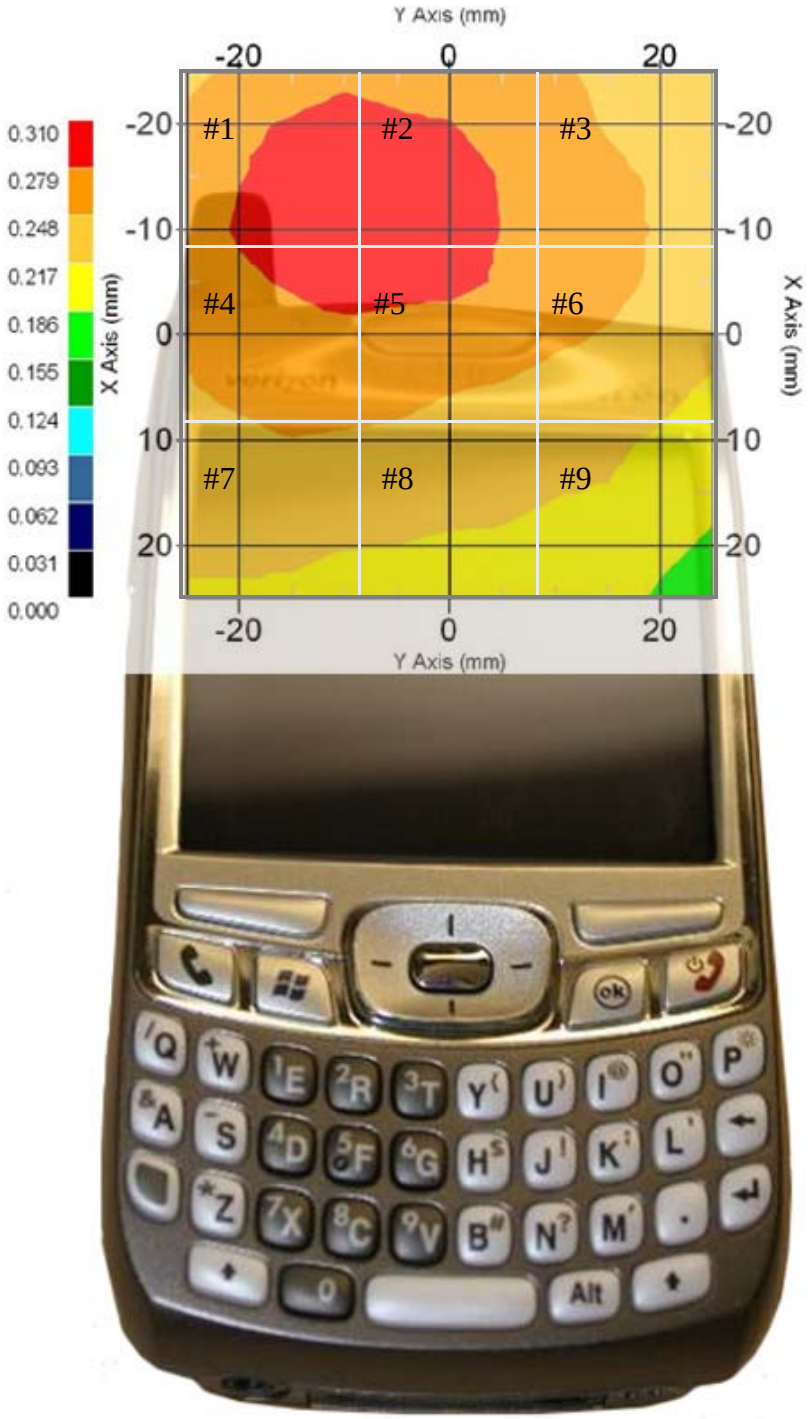

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