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HAC RF Emission TEST REPORT

KYOCERA CORPORATION
1-34, Sanyo-cho, Daito-Shi, Osaka, 574-8501, JAPAN

Date of Issue: Aug. 22, 2013
Test Report No.: HCTA1307FM02
Test Site: HCT CO., LTD.

FCC ID: V65C6522

APPLICANT: KYOCERA CORPORATION

Application Type	:	Certification
EUT Type	:	GSM/ WCDMA/ LTE Phone with Bluetooth/ WLAN
Tx Frequency	:	824.20 – 848.80 MHz (GSM850)
	:	1 850.20 – 1 909.80 MHz (GSM1900)
		826.4 – 846.6 MHz (WCDMA850)
		1 712.4 – 1 752.6 (WCDMA1700)
		1 852.4 – 1 907.6 MHz (WCDMA1900)
		706.5 – 713.5 MHz (LTE Band 17)
		1 710.7 – 1 754.3 MHz (LTE Band 4)
		2412.0 – 2462.0 MHz (2.4GHz WLAN)
Trade Name/Model(s)	:	KYOCERA CORPORATION / C6522N
FCC Classification	:	Licensed Portable Transmitter Held to Ear (PCE)
FCC Rule Part(s)	:	§20.19
HAC Standard	:	ANSI C63.19-2011

Hearing Aid Near-Field Category: M3

This wireless portable device has been shown to be hearing-aid compatible under the above rated category, specified in ANSI/IEEE Std. C63.19-2011 and had been tested in accordance with the specified measurement procedures. Hearing-Aid Compatibility is based on the assumption that all production units will be designed electrically identical to the device tested in this report.

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

HCT Co., Ltd. Certifies that no party to this application has been denied FCC benefits pursuant to section 5301 of the Anti- Drug Abuse Act of 1998, 21 U.S. C. 862.

Report prepared by	Approved by
: Young-Seok Yoo	: Jae-Sang So
Test Engineer of SAR Part	Manager of SAR Part

Version

Rev	DATE	DESCRIPTION
	Jul. 12, 2013	First Approval Report
1	Aug. 06, 2013	Page 5 and 12 was revised
2	Aug. 14, 2013	Page 5 was revised.
3	Aug. 22, 2013	Page 5 was revised.

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HAC MEASUREMENT REPORT

1. APPLICANT / EUT DESCRIPTION

1.1 Applicant

- Company Name: KYOCERA CORPORATION
- Address: 1-34, Sanyo-cho, Daito-Shi, Osaka, 574-8501, JAPAN
- Tel. / Fax : +82-2-368-8972

1.2 EUT Description

- EUT Type: GSM/WCDMA/LTE Phone with Bluetooth/WLAN
- Trade Name: KYOCERA CORPORATION
- Model(s): C6522N
- FCC ID: V65C6522
- Serial Number(s): #1
- Tx Frequency: 824.20 - 848.80 MHz (GSM850),1 850.20 -1 909.80 MHz (GSM1900)
  826.4 - 846.6 MHz (WCDMA850),
  1 712.4 - 1 752.6 MHz (WCDMA1700)
  1 852.4 - 1 907.6 MHz (WCDMA1900)
  2 412.0 - 2 462.0 MHz (2.4GHz WLAN)
- FCC Classification: Licensed Portable Transmitter Held to Ear (PCE)
- FCC Rule Part(s): § 20.19(b); §6.3(v), §7.3(v)
- Modulation(s): GSM850, GSM1900, WCDMA850, WCDMA1700, WCDMA1900
  LTE Band 4, LTE Band 17
- Antenna Type: Integral Antenna
- Date(s) of Tests: Jul. 4, 2013
- Place of Tests: HCT CO., LTD.
  Icheon, Kyoung ki-Do, KOREA
- Report Serial No.: HCTA1307FM02
- Max E-Field Emission: GSM1900 661ch, 1880 MHz = 32.63 dBV/m (M3)

Air-Interface	Band (MHz)	Type	HAC Tested	Simultaneous Transmissions Note: Not to be tested	concurrent HAC Tested or not Tested	Reduced Power 20.19(C)(1)	Voice over Digital Transport OTT Capability	WiFi Low Power
GSM	850	VO	Yes	Yes: BT	Not tested[1]	N/A	N/A	N/A
	1900							
	GPRS	DT	N/A	Yes: BT	N/A	N/A	Yes	N/A
	EDGE	DT	N/A	Yes: BT	N/A	N/A	Yes	N/A
WCDMA	850	VO	Yes	Yes: BT	Not tested[1]	N/A	N/A	N/A
	1700	VO						
	1900	VO						
	HSPA	DT	N/A	Yes: BT	N/A	N/A	Yes	N/A
LTE	700	VD	No[2]	Yes: WLAN or BT	Not tested[2]	N/A	Yes	N/A
	1700	VD						
WLAN	2450	DT	No	Yes: GSM, WCDMA or LTE	N/A	N/A	Yes	N/A
BT	2450	DT	NO	Yes: GSM or WCDMA	N/A	N/A	N/A	N/A

Type Transport
VO=Voice Only
DT= Digital Data-Not intended for CMRS Service

1. Non-concurrent mode was found to be the Worst Case mode
2. In accordance to KDB Guidance285076 D02 T-Coil testing for CMRS IP v01, CMRS VoLTE testing for M and T rating was not performed because instrumentation for testing VoLTE was not available for T-Coil testing at the time of testing. Operational test instrumentation is expected to be available by the 1st Quarter of 2014.

2. 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 (Staubli), robot controller, Pentium IV computer, near-field probe, probe alignment sensor. The robot is a six-axis industrial robot performing precise movements.

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The PC consists of the HP Pentium IV 3.0 GHz computer with Windows XP system and HAC Measurement Software DASY5, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

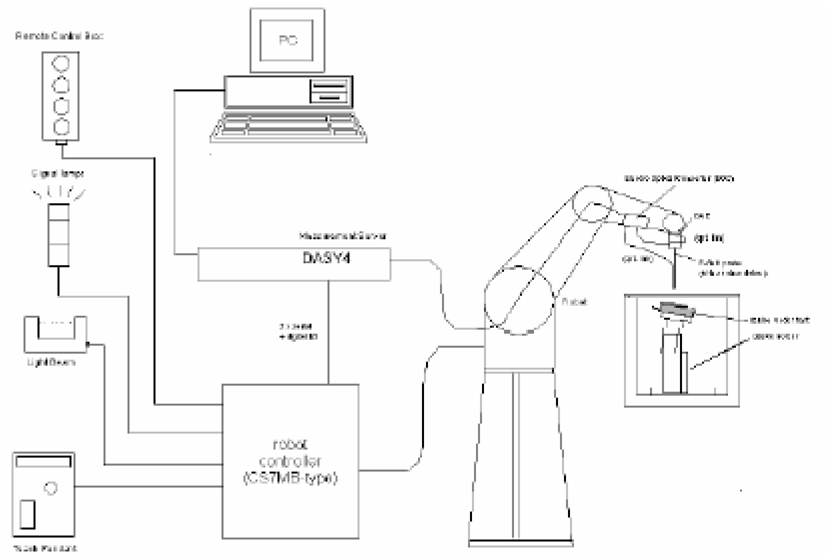


Figure 1. HAC Test Measurement Set-up

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.

3. SYSTEM SPECIFICATIONS

3.1 Probe

3.1.1 E-Field Probe Description

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

[E-Field Probe]

3.2 Phantom & Device Holder

Figure 2. HAC Phantom & Device Holder

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.
The devices can be easily, accurately, and repeatable positioned according to the FCC specifications.

3.3 Robotic System Specifications

Specifications		
	POSITIONER:	Stäubli Unimation Corp. Robot Model: RX90LB
	Repeatability:	0.02 mm
	No. of axis:	6
Data Acquisition Electronic (DAE) System		
	Cell Controller	
	Processor:	Core i7
	Clock Speed:	3.0 GHz
	Operating System:	Windows 7
	Data Card:	DASY5 PC-Board
	Data Converter	
	Features:	Signal Amplifier, multiplexer, A/D converter, and control logic
	Software:	DASY5 software
	Connecting Lines:	Optical downlink for data and status info. Optical uplink for commands and clock
PC Interface Card		
	Function:	24 bit (64 MHz) DSP for real time processing Link to DAE 16 bit A/D converter for surface detection system serial link to robot direct emergency stop output for robot

4. EUT ARRANGEMENT

4.1 WD RF Emission Measurements Reference and Plane

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

- The grid is 5 cm by 5 cm area that is divided into 9 evenly sized blocks or sub-grids.
- The grid is centered on the audio frequency output transducer of the WD (speaker or T-coil).
- The grid is in a reference plane, which is defined as the planar area that contains the highest point in the area of the phone that normally rests against the user's ear. It is parallel to the centerline of the receiver area of the phone and is defined by the points of the receiver-end of the WD handset, which, in normal handset use, rest against the ear.
- The measurement plane is parallel to, and 1.5 cm in front of, the reference plane.

Figure 3. WD reference and plane for RF emission measurements

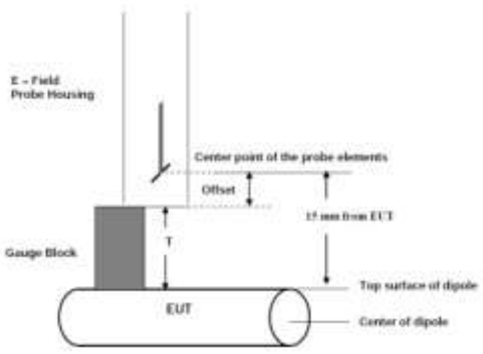


Figure 4. Gauge Block with E-Field Probe

5. SYSTEM VALIDATION

The test setup was validated when configured and verified periodically thereafter to ensure proper function. The procedure is a validation procedure using dipole antennas for which the field levels were computed by FDTD modeling.

5.1 Validation Procedure

Place a dipole antenna meeting the requirements given in ANSI-C63.19 in the position normally occupied by the WD. The dipole antenna serves as a known source for an electrical and magnetic output. Position the E-field probe 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; and
- the probes are 15 mm from the surface of the dipole elements.

Scan the length of the dipole with E-field probe and record the maximum values for each.
Compare the readings to expected values.

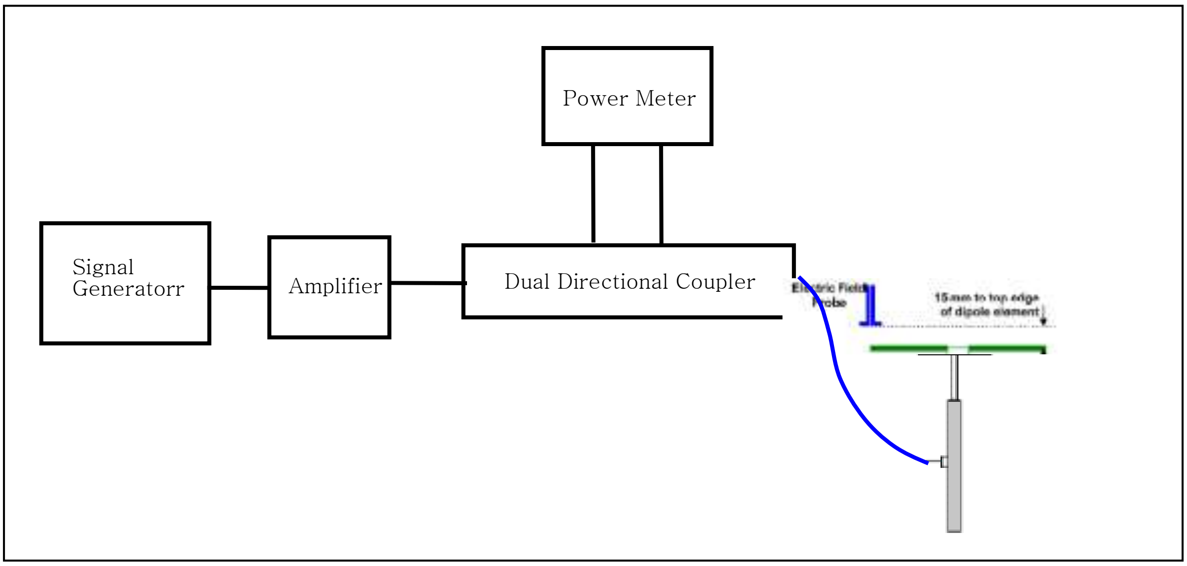


Figure 6. Dipole Validation SET-UP

5.2 Validation Result

5.2.1 E-Field Scan

Mode	Freq. [MHz]	Input Power [dBm]	Measured Value [V/m]	Target Value [V/m] SPEAG	Deviation [%]
CW	835	20	104.65	105.75	- 1.04
CW	1 880	20	92.63	91.25	+ 1.51

Notes:

1) Deviation (%) = 100 * (Measured value minus Target value) divided by Target value. ANSI-C63.19 requires values to be within 25 % of their targets. 12 % is deviation and 13 % is measurement uncertainty.
2) The maximum E-field was evaluated and compared to the target values provided by SPEAG in the calibration certificate of specific dipoles.
3) Please refer to the attachment for detailed measurement data and plot.

6. Modulation interference factor

For any specific fixed and repeatable modulated signal, a modulation interference factor (MIF, expressed in dB) may be developed that relates its interference potential to its steady-state rms signal level or average power level. This factor is a function only of the audio-frequency amplitude modulation characteristics of the signal and is the same for field-strength and conducted power measurements. It is important to emphasize that the MIF is valid only for a specific repeatable audio-frequency amplitude modulation characteristic. Any change in modulation characteristic requires determination and application of a new MIF.

6.1 Modulation Interference Factor

6.1.1 E-Field

Mode	Freq. [MHz]	Channel	MIF
GSM850	835	128	3.630
		190	3.630
		251	3.630
GSM1900	1 880	512	3.630
		661	3.630
		810	3.630

Mode	Freq. [MHz]	Channel	MIF
WCDMA850	835	4132	- 27.23
		4183	- 27.23
		4233	- 27.23
WCDMA1900	1 880	9262	- 27.23
		9400	- 27.23
		9538	- 27.23

Note : MIF values are provided by the manufacturer(SPEAG).
We used the MIF file with UID number(10021-CAA, 10011-CAA).

6.2.1.Analysis of RF Air interface Technologies

1. An analysis was performed, following the guidance of 4.3 and 4.4 of the ANSI standard, of the RF air interface technologies being evaluated. The factors that will affect the RF interference Potential were evaluated, and the worst case operating modes were identified and used in the evaluation. A WD's interference potential is a function both of the WD's average near-field field strength and of the signal's audio-frequency amplitude modulation characteristics. Per 4.4, RF air interface technologies that have low power have been found to produce sufficiently low RF interference potential, so it is possible to exempt them from the product testing specified in Clause 5 of the ANSI standard. An RF air interface technology of a device is exempt from testing When its average antenna input power plus its MIF is ≤ 17dBm for all of its operating modes.

The worst case MIF plus the worst case average antenna input power for all modes are investigated below to determine the testing requirements for this device.

6.2.2.Analysis of RF Air interface Technologies

Air Interface	Maximum Average Power (dBm)	Worst Case MIF (dB)	Total (Power + MIF, dB)	C63.19 Testing Required
GSM	33.26	3.630	36.89	Yes
UMTS-RMC	23.32	- 27.23	- 3.91	No
UMTS-AMR	23.56	- 27.23	- 3.67	No

Table 1. Max. Power + MIF calculations for Low Power Exemptions

6.2.3.Low-Power Exemption Conclusions

Per ANSI C63.19-2011, RF Emissions testing for this device is required only for GSM voice modes. All other applicable air interfaces are exempt.

7. RF Conducted Power Measurements

Sample pre-testing of the various modes were performed at the worst case probe location as part of subset testing justification. See below for measured conducted power for applicable device modes:

7.1 Handset Measured Conducted Powers

Maximum Average Output Power Measurement for FCC ID: V65C6522

Band	Channel	Voice	GPRS Data				EDGE Data			
		GSM (dBm)	GPRS 1 TX Slot (dBm)	GPRS 2 TX Slot (dBm)	GPRS 3 TX Slot (dBm)	GPRS 4 TX Slot (dBm)	EDGE 1 TX Slot (dBm)	EDGE 2 TX Slot (dBm)	EDGE 3 TX Slot (dBm)	EDGE 4 TX Slot (dBm)
GSM 850	128	31.80	31.85	31.53	29.70	29.34	25.15	25.20	24.10	23.99
	190	32.10	32.12	31.19	29.83	29.47	25.13	25.18	24.06	24.00
	251	31.71	31.70	31.40	30.02	29.70	25.13	25.11	24.05	23.95
GSM 1900	512	30.53	30.60	30.44	30.26	29.95	25.20	25.27	25.10	24.90
	661	30.61	30.67	30.52	30.31	30.00	25.23	25.30	25.07	24.92
	810	30.29	30.24	30.05	29.90	29.60	25.50	25.40	25.10	24.91

Table 2. Maximum average GSM Conducted output powers **(Burst-Average)**

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			MPR Target
			UL 4132 DL 4357	UL 4183 DL 4408	UL 4233 DL 4458	
99	WCDMA	12.2 kbps RMC	24.07	24.05	23.90	-
99	WCDMA	12.2 kbps AMR	24.00	24.03	23.85	-
3GPP Release Version	Mode	3GPP 34.121 Subtest	AWS Band [dBm]			MPR Target
			UL 1312 DL 1537	UL 1412 DL 1637	UL 1512 DL 1737	
99	WCDMA	12.2 kbps RMC	23.62	23.79	23.70	-
99	WCDMA	12.2 kbps AMR	23.61	23.68	23.65	-
3GPP Release Version	Mode	3GPP 34.121 Subtest	PCS Band [dBm]			MPR Target
			UL 9262 DL 9662	UL 9400 DL 9800	UL 9538 DL 9938	
99	WCDMA	12.2 kbps RMC	23.04	23.30	23.03	-
99	WCDMA	12.2 kbps AMR	22.95	22.98	23.00	-

Table 3. Maximum average WCDMA Conducted output powers

8. TEST PROCEDURE

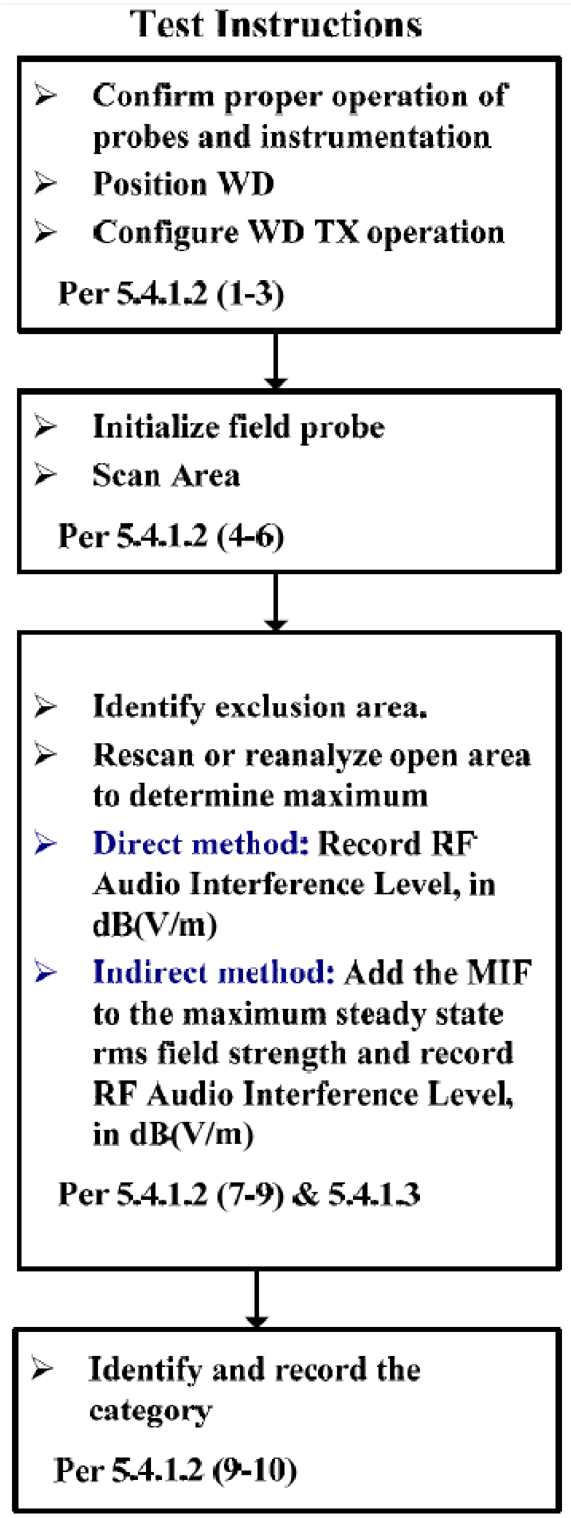


Figure 9. WD near-field emission automated test flowchart

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 measurement should be performed at a distance 1.5 cm
   from the probe elements so the gauge block can simplify this positioning.
3. Configure the WD normal operation for maximum rated RF output power, at the desired channel and other operating parameters, 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.
5. A Surface calibration was performed before each setup change to ensure repeatable spacing and proper maintenance of the measurement plane using the HAC Phantom.
6. Locate the field probe at reference location and measure the field strength.
7. Scan the entire 5 cm by 5 cm region at 5 mm increments and record the reading at each measurement point.
8. Identify the maximum field reading within the non-excluded sub-grids identified in Step 7.
9. Move the probe to the location of maximum scan measurement and then 360° rotating the probe to align it for the maximum reading at that position.
10. Locate the field probe at the reference location and measure the field strength for drift evaluation.
    If conducted power deviations of more than 5 % occurred, the tests were repeated.
11. 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.
12. Repeat Step 1 through Step 11 for both the E field measurements.

9. ANSI/IEEE C63.19 PERFORMANCE CATEGORIES

The EUT must meet the following M3 or M4 category:

Category	Telephone RF Parameters
Near Field Category	E-Field Emissions CW dB [V/m]
Frequency < 960 MHz	
M1	50 to 55
M2	45 to 50
M3	40 to 45
M4	< 40
Frequency > 960 MHz	
M1	40 to 45
M2	35 to 40
M3	30 to 35
M4	< 30

Table 4. Telephone near-field categories in linear units

10. MEASUREMENT UNCERTAINTIES

10.1 E-Field

	HAC (E-Field) Uncertainty Budget [According to ANSI C63.19]									Note/ Comment
	Error Description	Uncertainty [%]	Probability Distribution	Divisor	ci [E]	Standard Uncertainty [E]	Stand Uncert^2	(Stand Uncert^2) X (ci^2)	Vi & Veff	
	Measurement system									
1	Probe Calibration	5.1 %	Normal	1.00	1	5.1 %	26.01	26.01	∞	
2	Axial Isotropy	4.7 %	Rectangular	1.73	1	2.7 %	7.36	7.36	∞	
3	Sensor Displacement	16.5 %	Rectangular	1.73	1	9.5 %	90.75	90.75	∞	
4	Boundary effect	2.4 %	Rectangular	1.73	1	1.4 %	1.92	1.92	∞	
5	Linearity	4.7 %	Rectangular	1.73	1	2.7 %	7.36	7.36	∞	
6	Scaling to peak Envelope Power	2.0 %	Rectangular	1.73	1	1.2 %	1.33	1.33	∞	
7	System Detection limits	1.0 %	Rectangular	1.73	1	0.6 %	0.33	0.33	∞	
8	Readout Electronics	0.3 %	Normal	1.00	1	0.3 %	0.09	0.09	∞	
9	Response time	0.8 %	Rectangular	1.73	1	0.5 %	0.21	0.21	∞	
10	Integration time	2.6 %	Rectangular	1.73	1	1.5 %	2.25	2.25	∞	
11	RF Ambient Conditions	3.0 %	Rectangular	1.73	1	1.7 %	3.00	3.00	∞	
12	RF Reflections	1.2 %	Rectangular	1.73	1	0.7 %	0.50	0.50	∞	
13	Probe positioner	1.2 %	Rectangular	1.73	1	0.7 %	0.48	0.48	∞	
14	Probe positionering	4.7 %	Rectangular	1.73	1	2.7 %	7.36	7.36	∞	
15	Extrap. And Interpolation	1.0 %	Rectangular	1.73	1	0.6 %	0.33	0.33	∞	
	Test Sample Related									
16	Device Positioning Vertical	4.7 %	Rectangular	1.73	1	2.7 %	7.36	7.36	∞	
17	Device Positioning Lateral	1.0 %	Rectangular	1.73	1	0.6 %	0.33	0.33	∞	
18	Device Holder and Phantom	2.4 %	Rectangular	1.73	1	1.4 %	1.92	1.92	∞	
19	Test Sample	0.4 %	Normal	1.00	1	0.4 %	0.16	0.16	9	0.17 dB
20	Power drift	3.0 %	Rectangular	1.73	1	1.7 %	3.00	3.00	∞	
	PMF Calculations									
21	Power Sensor	1.0 %	Rectangular	1.73	1	0.6 %	0.32	0.32	∞	
22	Dual Directional Coupler	1.0 %	Rectangular	1.73	1	0.6 %	0.32	0.32	∞	
	Phantom and Setup Related									
23	Phantom Thickness	2.4 %	Rectangular	1.73	1	1.4 %	1.92	1.92	∞	
	Combined standard Uncertainty [%]					12.8 %		164.64		0.523 dB
	Expanded standard Uncertainty [k = 2 , Confidence 95 %]					**25.7 %**				0.993 dB

Table 5. Uncertainties (E-Field)

Notes:

1. Worst-Case uncertainty budget for HAC free field assessment according to ANSI-C 63.19[1].The budget is valid for the frequency range 800 MHz-3 GHz and represents a worst-Case analysis. For specific test sand configurations, the uncertainty could be considerably smaller. Some of the parameters are dependent on the user situations and need adjustment according to the actual laboratory conditions.

2. * Uncertainty specifications from Schmidt & Partner Engineering AG (not site specific)

11. HAC TEST DATA SUMMARY

11. 1 E-Field Measurement Results (GSM850 / GSM1900)

Ambient TEMPERATURE (°C): **21.6**

S/N: **#1**

Mode	Ch.	Back light	Battery	Antenna	Conducted Power [dBm]	Time Avg. Field [V/m]	Peak Field [dBV/m]	FCC Limit [dBV/m]	FCC MARGIN [dB]	MIF	RESULT	Exclusion Block
GSM850	128	off	Standard	Intenna	31.80	49.21	37.47	45	-7.53	3.630	M4	none
GSM850	190	off	Standard	Intenna	32.10	44.95	36.68	45	-8.32	3.630	M4	none
GSM850	251	off	Standard	Intenna	31.71	37.77	35.17	45	-9.83	3.630	M4	none
GSM1900	512	off	Standard	Intenna	30.53	26.64	32.14	35	-2.86	3.630	M3	none
GSM1900	661	off	Standard	Intenna	30.61	28.19	32.63	35	-2.37	3.630	M3	none
GSM1900	810	off	Standard	Intenna	30.29	27.67	32.47	35	-2.53	3.630	M3	none

NOTES:

1. All modes of operation were investigated and the worst-case are reported.
2. Battery Type ☒ Standard ☐ Extended ☐ Fixed
3. Power Measured ☒ Conducted ☐ EIRP ☐ ERP
4. Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator
5. SAR Measurement System ☒ SPEAG

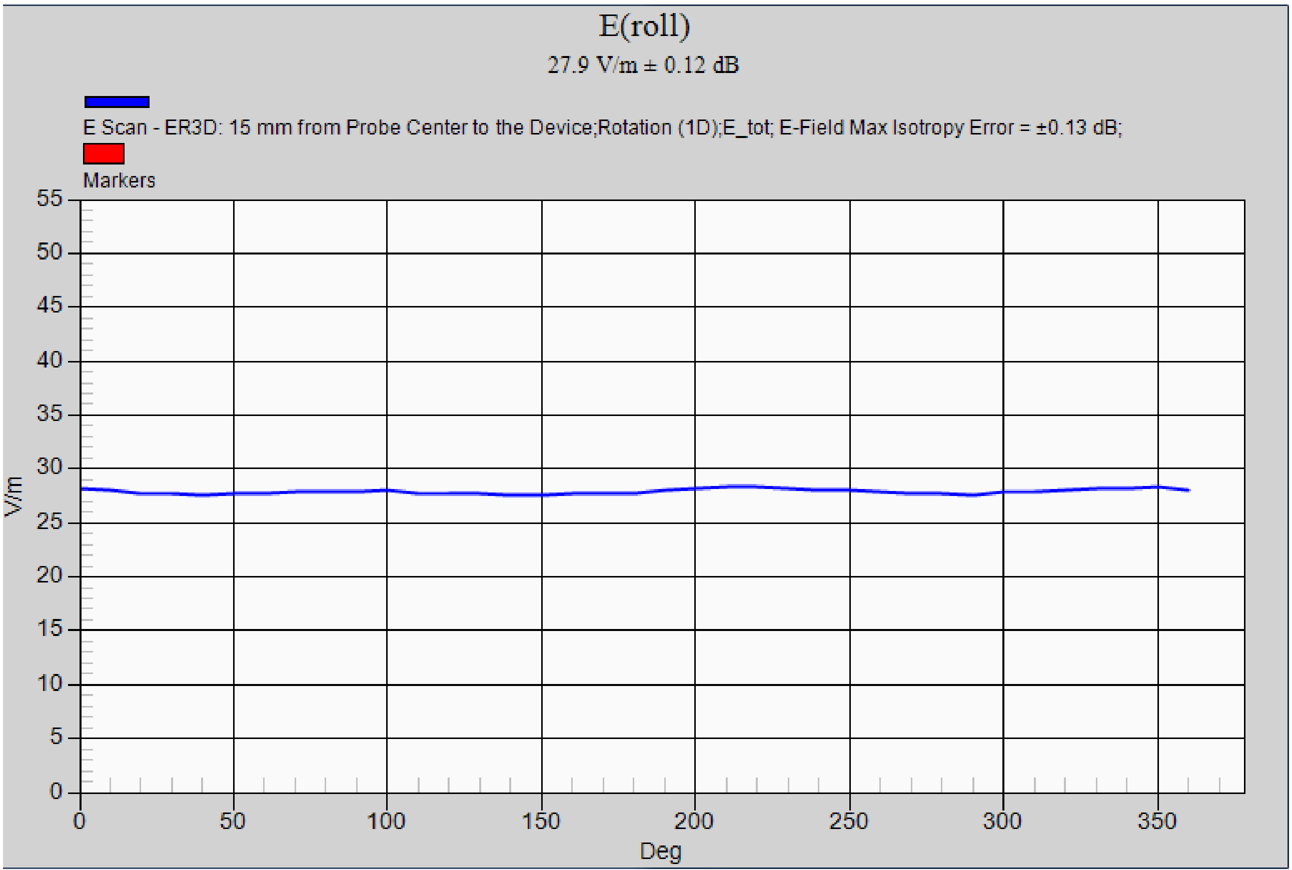
11.2 Worst-case Configuration Evaluation

Ambient TEMPERATURE (°C): 21.6

S/N: #1

Peak Reading 360° Probe Rotation at Azimuth axis

Mode	Ch.	Back light	Battery	Antenna	Conducted Power [dBm]	Time Avg. Field [V/m]	Peak Field [dBV/m]	FCC Limit [dBV/m]	FCC MARGIN [dB]	MIF	RESULT	Exclusion Block
GSM1900	661	off	Standard	Intenna	30.61	28.34	32.68	35	- 2.32	3.63	M3	none



Worst-Case Probe Rotation about Azimuth axis

12. HAC TEST EQUIPMENT LIST

Manufacturer	Type / Model	S/N	Calib. Date	Calib. Interval	Calib. Due
Staubli	Robot TX90 XLspeag	F11/5K3RA1/A/01	N/A	N/A	N/A
Staubli	Robot Controller	F11/5K3RA1/C/01	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	S-1203 0309	N/A	N/A	N/A
HP	Pavilion t000_puffer	KRJ51201TV	N/A	N/A	N/A
SPEAG	SPEAG HAC Phantom	-	N/A	N/A	N/A
SPEAG	Light Alignment Sensor	265	N/A	N/A	N/A
SPEAG	DAE4	869	Sep. 18, 2012	Annual	Sep. 18, 2013
SPEAG	E-Field Probe	2343	Mar. 15, 2013	Annual	Mar. 15, 2014
SPEAG	Validation Dipole CD835V2	1024	Apr. 04, 2013	Annual	Mar. 15, 2014
SPEAG	Validation Dipole CD1880V2	1019	Apr. 04, 2013	Annual	Mar. 15, 2014
Agilent	Power Meter(F) E4419B	MY41291386	Nov. 02, 2012	Annual	Nov. 02, 2013
Agilent	Power Sensor(G) 8481	MY41090870	Nov. 02, 2012	Annual	Nov. 02, 2013
HP	Signal Generator 8664A	3744A02069	Nov. 02, 2012	Annual	Nov. 02, 2013
Agilent	Base Station CMU200	110740	Jul. 23, 2012	Annual	Jul. 23, 2013
Agilent	Base Station E5515C	GB44400269	Feb. 14, 2013	Annual	Feb. 14, 2014

NOTE:
The probe was calibrated by SPEAG, by the waveguide technique procedure. Dipole Validation measurement is performed by HCT Lab. before each test.

13. CONCLUSION

The HAC measurement indicates that the EUT complies with the HAC limits of the ANSI-C63.19-2011.

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

APPENDIX A. HAC TEST PLOTS

Test Laboratory:	HCT CO., LTD.
Ambient Temperature / Channel	21.4 °C /128
Test Date	Jun. 29, 2013

DUT: C6522N; Type: Bar; Serial: #1
Procedure Name: E Scan - ER3D: 15 mm from Probe Center to the Device

Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 824.2 MHz;Duty Cycle: 1:8.6896
Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Phantom section: RF Section

DASY5 Configuration:

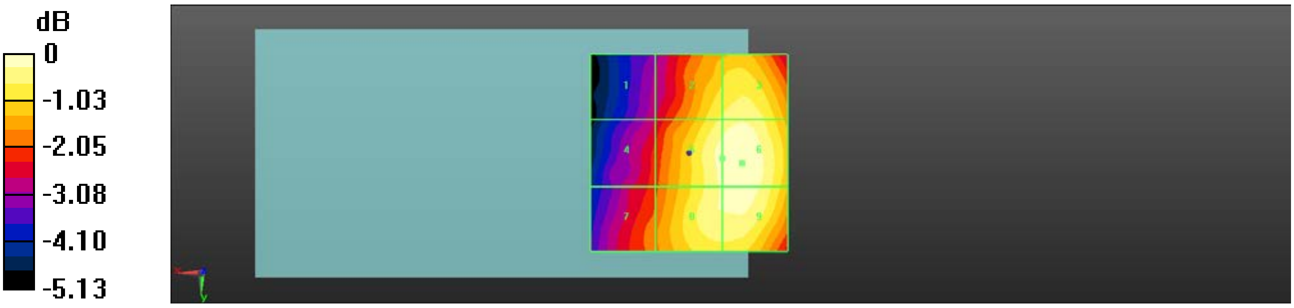
- Probe: ER3DV6 - SN2343; ConvF(1, 1, 1); Calibrated: 15/03/2013;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn869; Calibrated: 18/09/2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Device E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - ER3D: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 53.43 V/m; Power Drift = 0.04 dB
Applied MIF = 3.63 dB
RF audio interference level = 37.47 dBV/m
Emission category: M4

MIF scaled E-field

Grid 1 M4 34.75 dBV/m	Grid 2 M4 36.88 dBV/m	Grid 3 M4 37.08 dBV/m
Grid 4 M4 35.34 dBV/m	Grid 5 M4 37.29 dBV/m	Grid 6 M4 37.47 dBV/m
Grid 7 M4 35.73 dBV/m	Grid 8 M4 37.2 dBV/m	Grid 9 M4 37.36 dBV/m

Cursor:
Total = 37.47 dBV/m
E Category: M4
Location: -13.5, 2.5, 8.7 mm



0 dB = 74.74 V/m = 37.47 dBV/m

Test Laboratory:	HCT CO., LTD.
Ambient Temperature / Channel	21.4 °C /190
Test Date	Jun. 29, 2013

DUT: C6522N; Type: Bar; Serial: #1
Procedure Name: E Scan - ER3D: 15 mm from Probe Center to the Device

Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 836.6 MHz;Duty Cycle: 1:8.6896
Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Phantom section: RF Section

DASY5 Configuration:

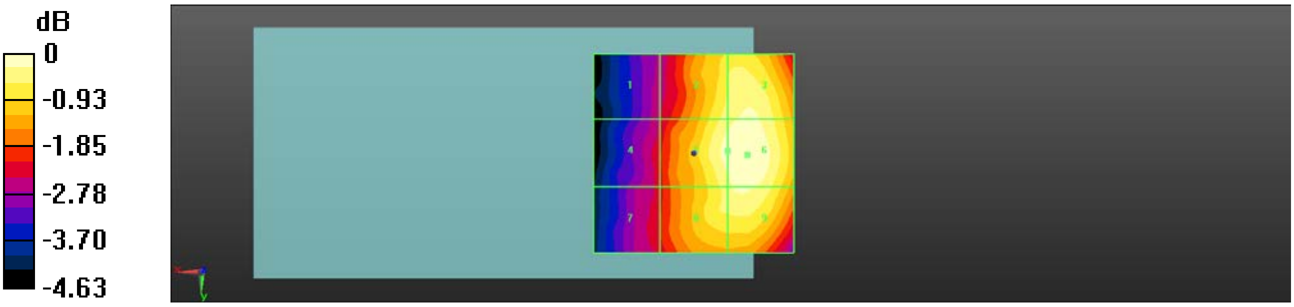
- Probe: ER3DV6 - SN2343; ConvF(1, 1, 1); Calibrated: 15/03/2013;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn869; Calibrated: 18/09/2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Device E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - ER3D: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 48.95 V/m; Power Drift = 0.03 dB
Applied MIF = 3.63 dB
RF audio interference level = 36.68 dBV/m
Emission category: M4

MIF scaled E-field

Grid 1 M4 34.22 dBV/m	Grid 2 M4 36.25 dBV/m	Grid 3 M4 36.47 dBV/m
Grid 4 M4 34.49 dBV/m	Grid 5 M4 36.51 dBV/m	Grid 6 M4 36.68 dBV/m
Grid 7 M4 34.55 dBV/m	Grid 8 M4 36.29 dBV/m	Grid 9 M4 36.45 dBV/m

Cursor:
Total = 36.68 dBV/m
E Category: M4
Location: -13.5, 0.5, 8.7 mm



0 dB = 68.27 V/m = 36.68 dBV/m

Test Laboratory: HCT CO., LTD.

Ambient Temperature / Channel 21.4 °C /251

Test Date Jun. 29, 2013

DUT: C6522N; Type: Bar; Serial: #1
Procedure Name: E Scan - ER3D: 15 mm from Probe Center to the Device

Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 848.6 MHz;Duty Cycle: 1:8.6896
Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 0 kg/m^3
Phantom section: RF Section

DASY5 Configuration:

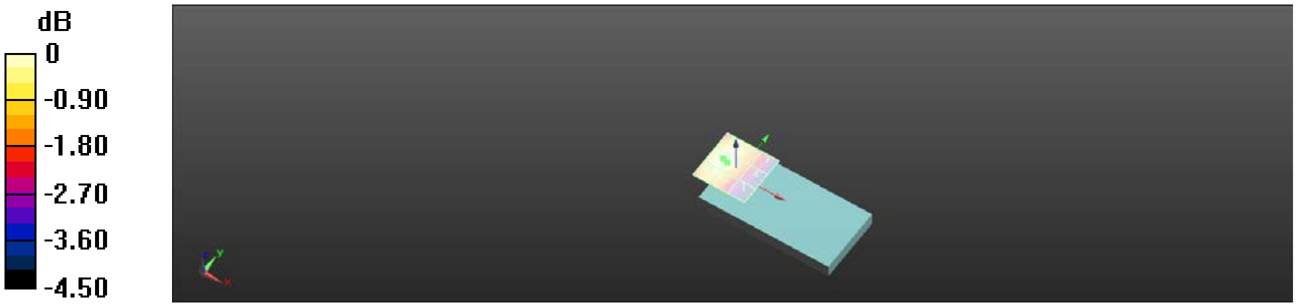
- Probe: ER3DV6 - SN2343; ConvF(1, 1, 1); Calibrated: 15/03/2013;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn869; Calibrated: 18/09/2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Device E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - ER3D: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 40.53 V/m; Power Drift = 0.16 dB
Applied MIF = 3.63 dB
RF audio interference level = 35.17 dBV/m
Emission category: M4

MIF scaled E-field

Grid 1 **M4** 32.77 dBV/m	Grid 2 **M4** 34.66 dBV/m	Grid 3 **M4** 34.86 dBV/m
Grid 4 **M4** 33.12 dBV/m	Grid 5 **M4** 34.99 dBV/m	Grid 6 **M4** 35.17 dBV/m
Grid 7 **M4** 33.31 dBV/m	Grid 8 **M4** 34.79 dBV/m	Grid 9 **M4** 34.97 dBV/m

Cursor:
Total = 35.17 dBV/m
E Category: M4
Location: -13.5, 2, 8.7 mm



0 dB = 57.36 V/m = 35.17 dBV/m

Test Laboratory:	HCT CO., LTD.
Ambient Temperature / Channel	21.4 °C /512
Test Date	Jun. 29, 2013

DUT: C6522N; Type: Bar; Serial: #1
Procedure Name: E Scan - ER3D: 15 mm from Probe Center to the Device

Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 1850.2 MHz;Duty Cycle: 1:8.6896
Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Phantom section: RF Section

DASY5 Configuration:

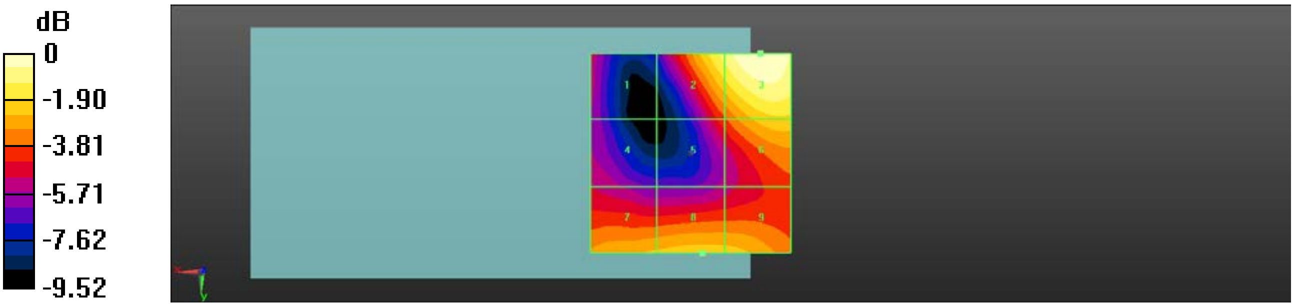
- Probe: ER3DV6 - SN2343; ConvF(1, 1, 1); Calibrated: 15/03/2013;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn869; Calibrated: 18/09/2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Device E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - ER3D: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 11.69 V/m; Power Drift = 0.06 dB
Applied MIF = 3.63 dB
RF audio interference level = 32.14 dBV/m
Emission category: M3

MIF scaled E-field

Grid 1 M4 27.28 dBV/m	Grid 2 M3 31.17 dBV/m	Grid 3 M3 32.14 dBV/m
Grid 4 M4 27.09 dBV/m	Grid 5 M4 28.22 dBV/m	Grid 6 M3 30.12 dBV/m
Grid 7 M4 29.75 dBV/m	Grid 8 M3 30.01 dBV/m	Grid 9 M4 29.96 dBV/m

Cursor:
Total = 32.14 dBV/m
E Category: M3
Location: -17.5, -25, 8.7 mm



0 dB = 40.47 V/m = 32.14 dBV/m

Test Laboratory:	HCT CO., LTD.
Ambient Temperature / Channel	21.4 °C /661
Test Date	Jun. 29, 2013

DUT: C6522N; Type: Bar; Serial: #1
Procedure Name: E Scan - ER3D: 15 mm from Probe Center to the Device

Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 1880 MHz;Duty Cycle: 1:8.6896
Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Phantom section: RF Section

DASY5 Configuration:

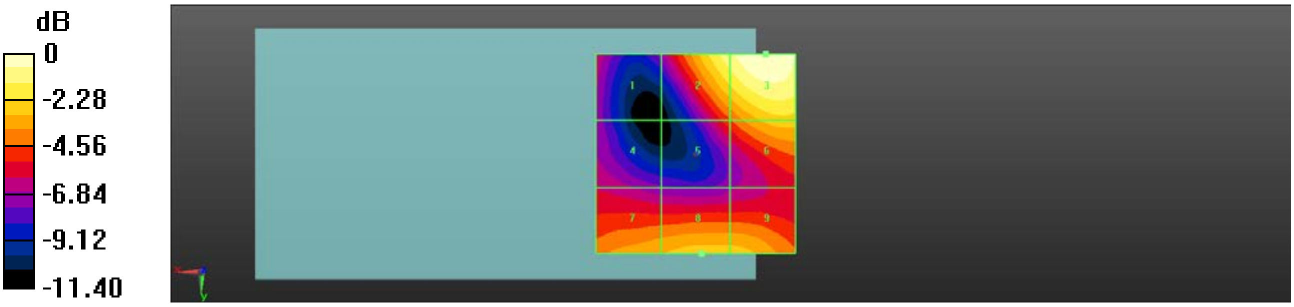
- Probe: ER3DV6 - SN2343; ConvF(1, 1, 1); Calibrated: 15/03/2013;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn869; Calibrated: 18/09/2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Device E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - ER3D: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 10.22 V/m; Power Drift = 0.01 dB
Applied MIF = 3.63 dB
RF audio interference level = 32.63 dBV/m
Emission category: M3

MIF scaled E-field

Grid 1 M4 26.81 dBV/m	Grid 2 M3 31.63 dBV/m	Grid 3 M3 32.63 dBV/m
Grid 4 M4 26.54 dBV/m	Grid 5 M4 27.97 dBV/m	Grid 6 M3 30.08 dBV/m
Grid 7 M4 29.6 dBV/m	Grid 8 M3 30.07 dBV/m	Grid 9 M3 30.02 dBV/m

Cursor:
Total = 32.63 dBV/m
E Category: M3
Location: -17.5, -25, 8.7 mm



0 dB = 42.81 V/m = 32.63 dBV/m

Test Laboratory: HCT CO., LTD.

Ambient Temperature / Channel 21.4 °C /810

Test Date Jun. 29, 2013

DUT: C6522N; Type: Bar; Serial: #1
Procedure Name: E Scan - ER3D: 15 mm from Probe Center to the Device

Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 1909.8 MHz;Duty Cycle: 1:8.6896
Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Phantom section: RF Section

DASY5 Configuration:

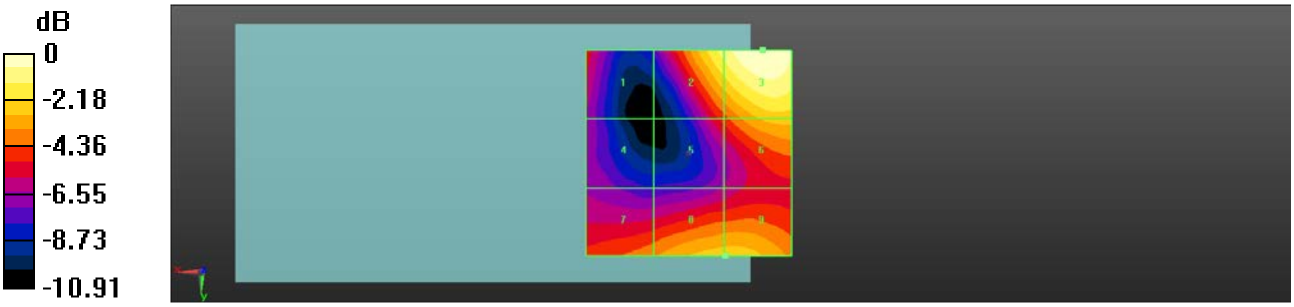
- Probe: ER3DV6 - SN2343; ConvF(1, 1, 1); Calibrated: 15/03/2013;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn869; Calibrated: 18/09/2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Device E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - ER3D: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 10.69 V/m; Power Drift = 0.07 dB
Applied MIF = 3.63 dB
RF audio interference level = 32.47 dBV/m
Emission category: M3

MIF scaled E-field

Grid 1 M4 27.5 dBV/m	Grid 2 M3 31.32 dBV/m	Grid 3 M3 32.47 dBV/m
Grid 4 M4 25.84 dBV/m	Grid 5 M4 27.8 dBV/m	Grid 6 M4 29.95 dBV/m
Grid 7 M4 28.74 dBV/m	Grid 8 M4 29.97 dBV/m	Grid 9 M4 29.97 dBV/m

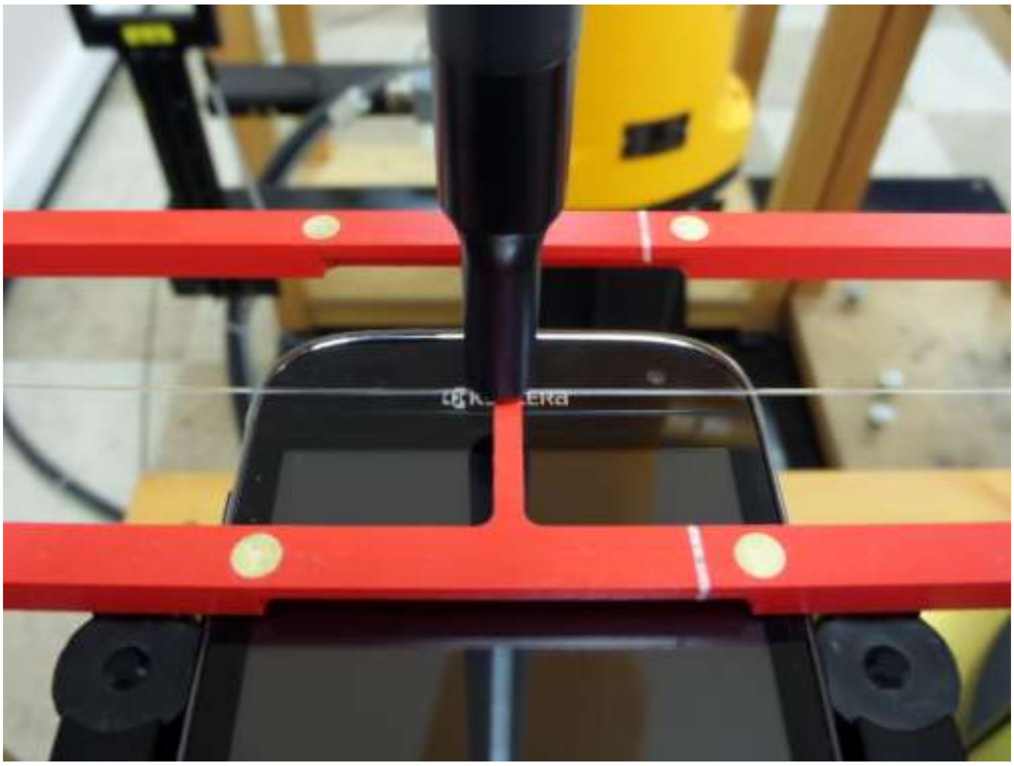
Cursor:
Total = 32.47 dBV/m
E Category: M3
Location: -18, -25, 8.7 mm

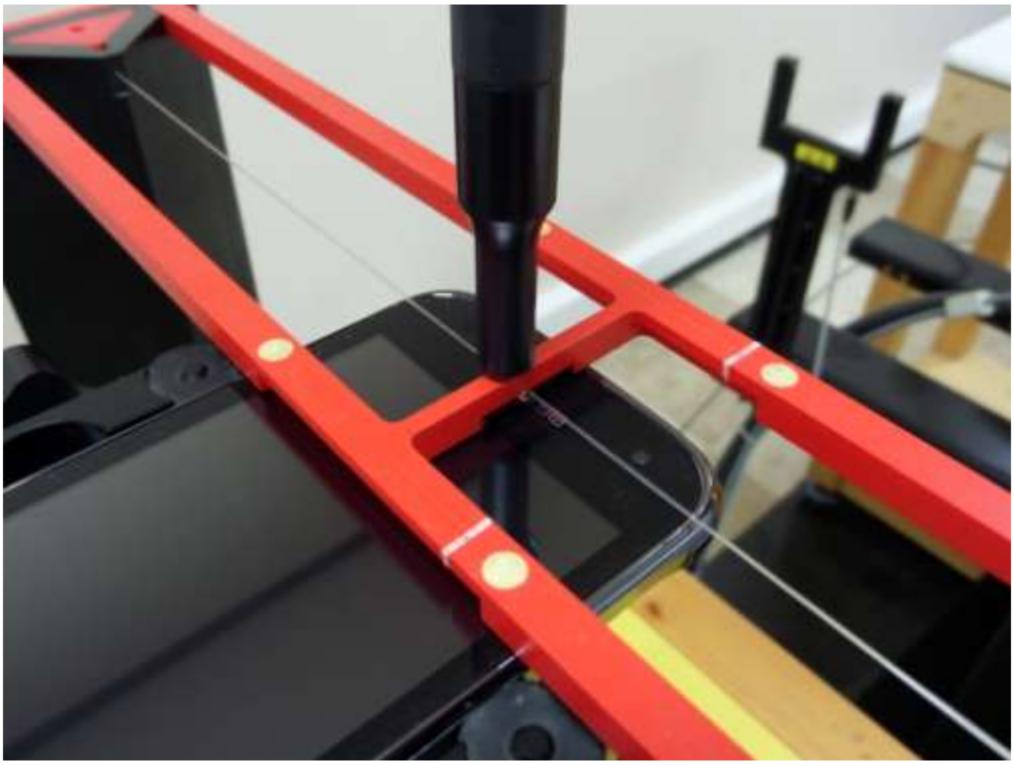


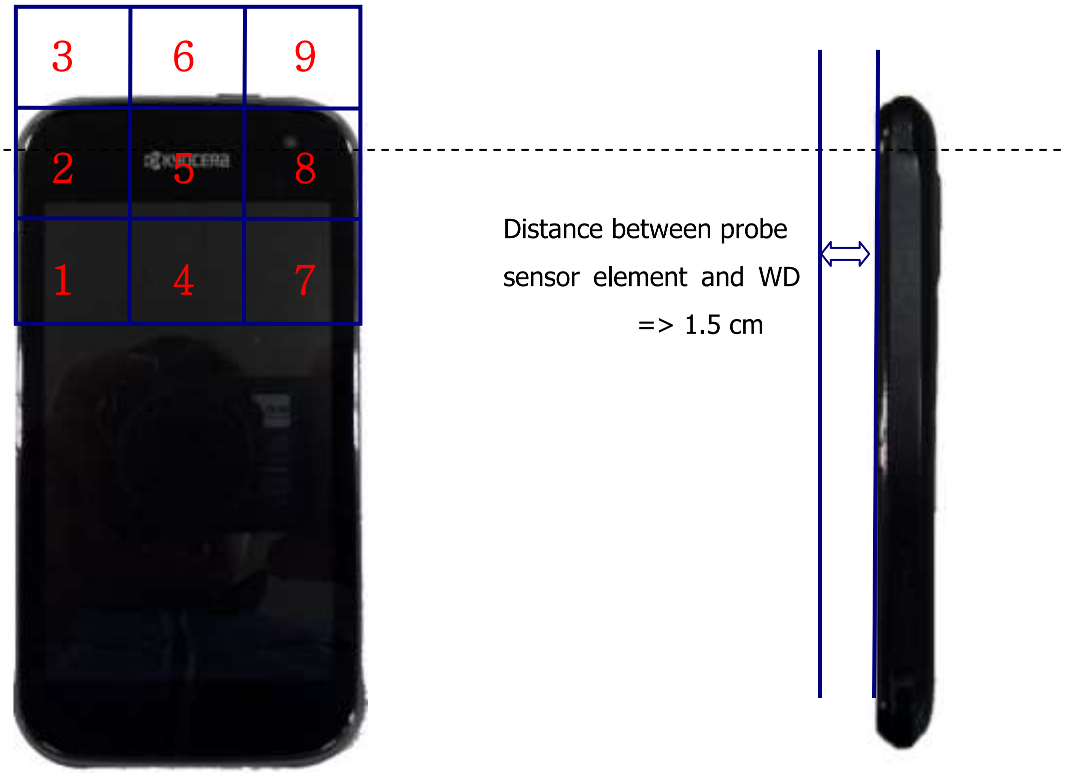
0 dB = 42.03 V/m = 32.47 dBV/m

APPENDIX B (HAC TEST SET-UP PHOTO)

■ Test Setup Photo







5 X 5 Scan grid above WD

GSM

E-Field WD Scan overlay

APPENDIX C (DIPOLE VALIDATION)

HCT CO., LTD.
105-1, Jangam-ri, Majang-myeon, Icheon-si,Gyeonggi-do,Korea 467-811
TEL: +82 31 645 6300 FAX: +82 31 645 6401 www.hct.co.kr

Test Laboratory: HCT CO., LTD.

Ambient Temperature 21.4 °C

Test Date Jun. 29, 2013

DUT: HAC-Dipole 835 MHz; Type: CD835V3
Procedure Name: E Scan - measurement distance from the probe sensor center to CD835 = 15mm

Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Phantom section: RF Section

DASY5 Configuration:

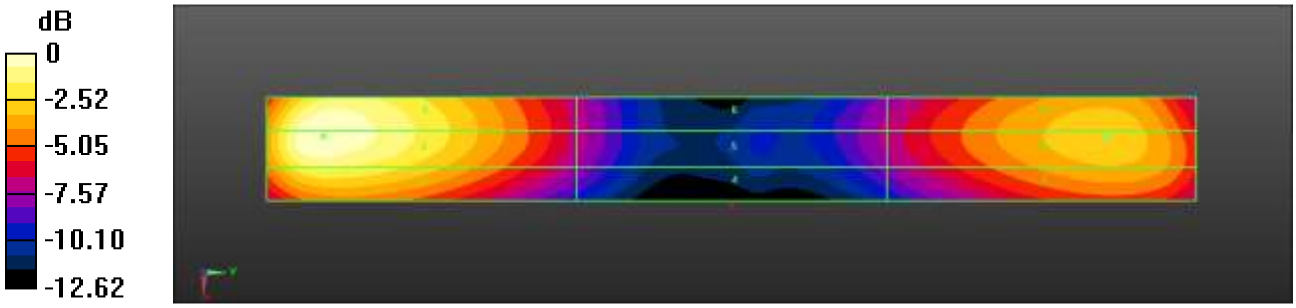
- Probe: ER3DV6 - SN2343; ConvF(1, 1, 1); Calibrated: 15/03/2013;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn869; Calibrated: 18/09/2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Dipole E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - measurement distance from the probe sensor center to CD835 = 15mm/Hearing Aid Compatibility Test at 10mm distance (41x361x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 69.64 V/m; Power Drift = -0.01 dB
Applied MIF = 0.00 dB
RF audio interference level = 41.80 dBV/m
Emission category: M3

MIF scaled E-field

Grid 1 **M3** 40.33 dBV/m	Grid 2 **M3** 41.8 dBV/m	Grid 3 **M3** 41.77 dBV/m
Grid 4 **M4** 34.04 dBV/m	Grid 5 **M4** 34.74 dBV/m	Grid 6 **M4** 34.74 dBV/m
Grid 7 **M4** 38.4 dBV/m	Grid 8 **M4** 38.99 dBV/m	Grid 9 **M4** 38.98 dBV/m

Cursor:
Total = 41.80 dBV/m
E Category: M3
Location: -2.5, -79, 4.7 mm



0 dB = 123.0 V/m = 41.80 dBV/m

HCT CO., LTD.
105-1, Jangam-ri, Majang-myeon, Icheon-si,Gyeonggi-do,Korea 467-811
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Test Laboratory: HCT CO., LTD.

Ambient Temperature 21.4 °C

Test Date Jun. 29, 2013

DUT: HAC Dipole 1880 MHz; Type: CD1880V3
Procedure Name: E Scan - measurement distance from the probe sensor center to CD1880 = 15mm

Communication System: UID 0, CW (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Phantom section: RF Section

DASY5 Configuration:

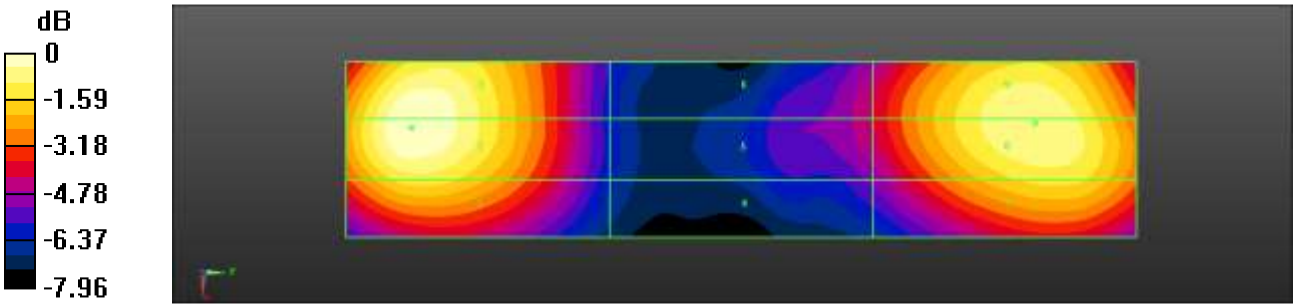
- Probe: ER3DV6 - SN2343; ConvF(1, 1, 1); Calibrated: 15/03/2013;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn869; Calibrated: 18/09/2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Dipole E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - measurement distance from the probe sensor center to CD1880 = 15mm/Hearing Aid Compatibility Test at 10mm distance (41x181x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 93.70 V/m; Power Drift = 0.04 dB
Applied MIF = 0.00 dB
RF audio interference level = 39.61 dBV/m
Emission category: M2

MIF scaled E-field

Grid 1 **M2** 38.29 dBV/m	Grid 2 **M2** 39.61 dBV/m	Grid 3 **M2** 39.58 dBV/m
Grid 4 **M3** 34.51 dBV/m	Grid 5 **M2** 35.46 dBV/m	Grid 6 **M2** 35.47 dBV/m
Grid 7 **M2** 38.22 dBV/m	Grid 8 **M2** 39.06 dBV/m	Grid 9 **M2** 39.05 dBV/m

Cursor:
Total = 39.61 dBV/m
E Category: M2
Location: -2.5, -37.5, 4.7 mm



0 dB = 95.60 V/m = 39.61 dBV/m

HCT CO., LTD.
105-1, Jangam-ri, Majang-myeon, Icheon-si,Gyeonggi-do,Korea 467-811
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APPENDIX D (PROBE CALIBRATION DATA)

HCT CO., LTD.
105-1, Jangam-ri, Majang-myeon, Icheon-si,Gyeonggi-do,Korea 467-811
TEL: +82 31 645 6300 FAX: +82 31 645 6401 www.hct.co.kr

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 **HCT (Dymstec)**

Certificate No: **ER3-2343_Mar13**

CALIBRATION CERTIFICATE

Object: ER3DV6 - SN:2343

Calibration procedure(s): QA CAL-02.v6, QA CAL-25.v4
Calibration procedure for E-field probes optimized for close near field evaluations in air

Calibration date: March 15, 2013

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	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ER3DV6	SN: 2328	12-Oct-12 (No. ER3-2328_Oct12)	Oct-13
DAE4	SN: 789	18-Sep-12 (No. DAE4-789_Sep12)	Sep-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	D Iliev
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 18, 2013

HCT CO., LTD.
105-1, Jangam-ri, Majang-myeon, Icheon-si,Gyeonggi-do,Korea 467-811
TEL: +82 31 645 6300 FAX: +82 31 645 6401 www.hct.co.kr

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

Glossary:

NORMx,y,z	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 φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 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:

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

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 for XY sensors and ϑ = 90 for Z sensor (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart).
- *DCPx,y,z:* 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
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: 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 *NORMx* (no uncertainty required).

Probe ER3DV6

SN:2343

Manufactured: December 14, 2004
Calibrated: March 15, 2013

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

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ER3DV6– SN:2343 March 15, 2013

DASY/EASY - Parameters of Probe: ER3DV6 - SN:2343

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m)^2)	1.67	1.60	1.60	± 10.1 %
DCP (mV)[B]	97.7	99.5	99.6	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√µV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	165.2	±2.5 %
		Y	0.0	0.0	1.0		196.2	
		Z	0.0	0.0	1.0		178.7	
10011-CAA	UMTS-FDD (WCDMA)	X	3.23	66.3	18.4	2.91	133.0	±0.7 %
		Y	3.15	66.1	18.3		116.1	
		Z	3.30	67.0	18.6		143.5	
10012-CAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	2.71	66.7	18.0	1.87	135.8	±0.7 %
		Y	3.04	69.4	19.4		117.6	
		Z	2.97	68.2	18.4		147.1	
10021-CAA	GSM-FDD (TDMA, GMSK)	X	19.99	99.9	29.4	9.39	100.3	±1.2 %
		Y	18.04	99.3	28.9		116.6	
		Z	23.17	99.8	29.0		118.9	
10039-CAA	CDMA2000 (1xRTT, RC1)	X	4.84	66.7	19.3	4.57	131.3	±0.9 %
		Y	4.68	66.1	18.9		116.2	
		Z	4.80	66.9	19.1		144.3	
10061-CAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	X	6.72	80.8	24.3	3.60	120.9	±1.4 %
		Y	9.32	88.4	27.3		149.3	
		Z	8.57	83.9	24.8		137.9	
10077-CAA	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	X	13.23	77.3	29.2	11.00	112.5	±5.2 %
		Y	13.56	78.7	30.0		145.3	
		Z	13.24	76.8	28.2		139.2	
10081-CAA	CDMA2000 (1xRTT, RC3)	X	3.94	65.8	18.6	3.97	126.4	±0.7 %
		Y	3.78	65.1	18.3		113.4	
		Z	3.98	66.3	18.7		141.8	
10100-CAA	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.81	69.0	21.0	5.67	143.9	±2.5 %
		Y	6.57	68.1	20.4		128.6	
		Z	6.18	66.5	19.3		115.4	
10108-CAA	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.66	68.5	20.8	5.80	142.4	±2.5 %
		Y	6.46	67.7	20.3		126.8	
		Z	6.07	66.2	19.2		114.3	
10110-CAA	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	X	6.31	67.8	20.5	5.75	139.1	±2.2 %
		Y	6.15	67.2	20.1		124.0	
		Z	5.78	65.8	19.1		112.0	

ER3DV6– SN:2343 March 15, 2013

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%.

[A] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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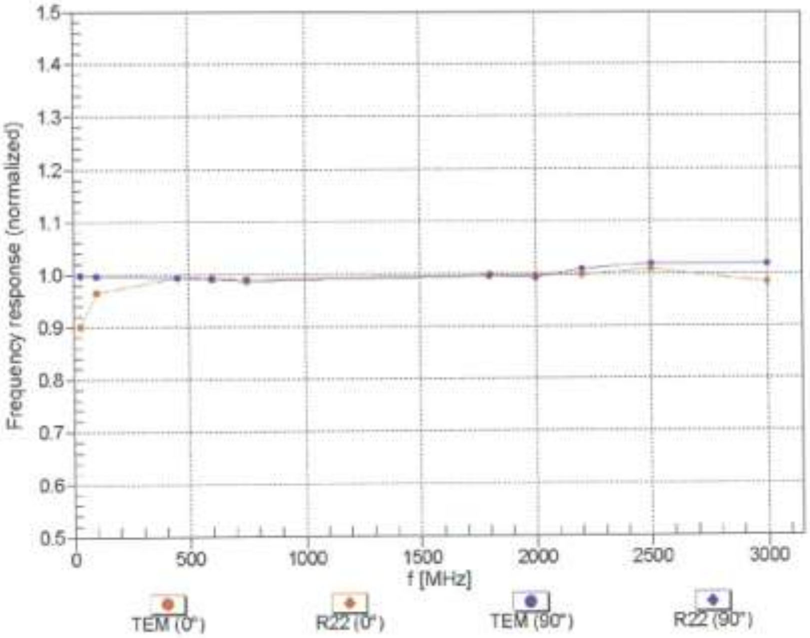
ER3DV6– SN:2343 March 15, 2013

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Certificate No: ER3-2343_Mar13 Page 6 of 11

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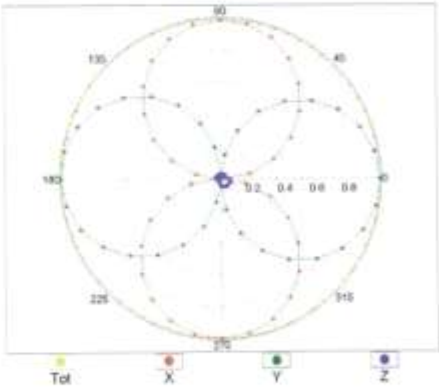
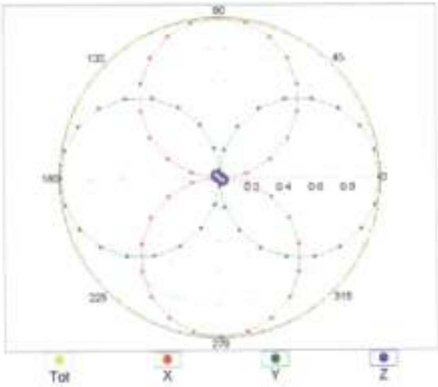
ER3DV6– SN:2343 March 15, 2013

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM,0°

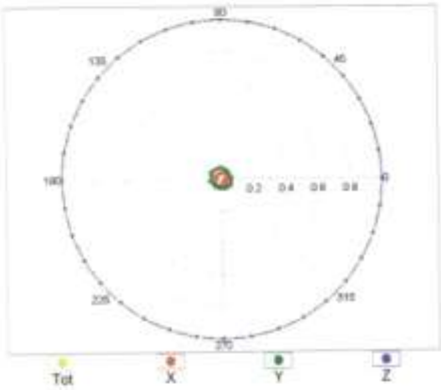


f=2500 MHz,R22,0°

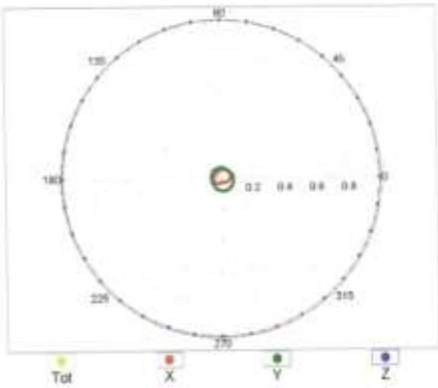


Receiving Pattern (ϕ), ϑ = 90°

f=600 MHz,TEM,90°



f=2500 MHz,R22,90°



Certificate No: ER3-2343_Mar13 Page 7 of 11

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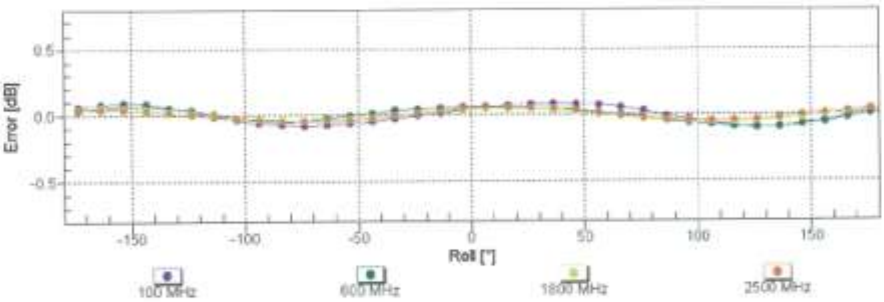
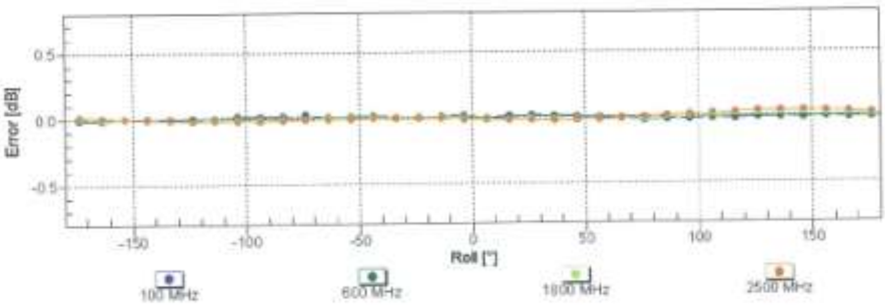
Receiving Pattern (ϕ), ϑ = 0°



Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Receiving Pattern (ϕ), ϑ = 90°



Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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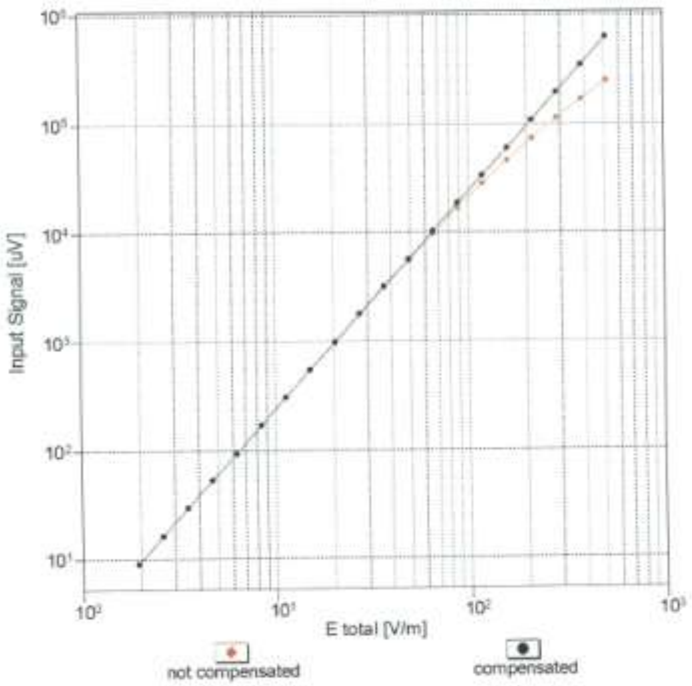
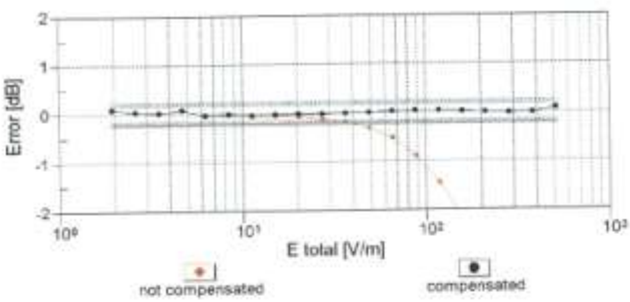
ER3DV6– SN:2343

March 15, 2013

Dynamic Range f(E-field)

(TEM cell , f = 900 MHz)





Uncertainty of Linearity Assessment: ± 0.6% (k=2)

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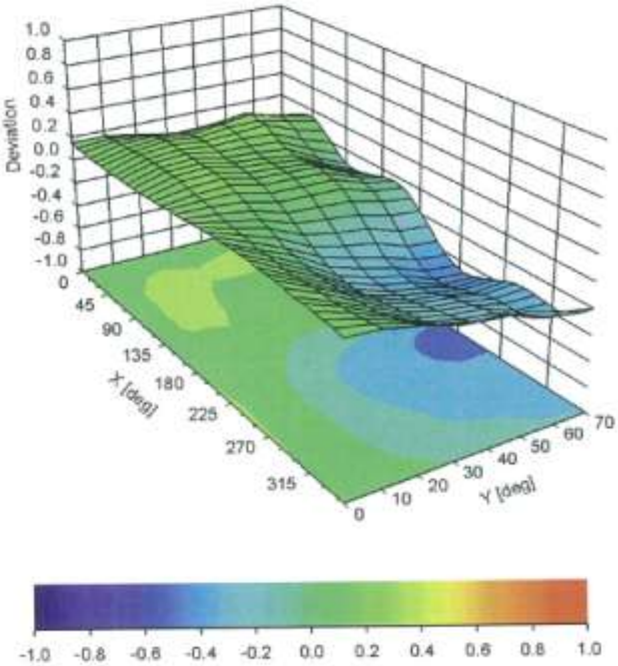
ER3DV6– SN:2343 March 15, 2013

Deviation from Isotropy in Air

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: ER3-2343_Mar13 Page 10 of 11

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DASY/EASY - Parameters of Probe: ER3DV6 - SN:2343

Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	56.4
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

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APPENDIX E (DIPOLE CALIBRATION DATA)

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Accreditation No.: **SCS 108**

Client **HCT (Dymstec)**

Certificate No: **CD835V3-1024_Mar13**

CALIBRATION CERTIFICATE

Object	CD835V3 - SN: 1024
Calibration procedure(s)	QA CAL-20.v6 Calibration procedure for dipoles in air
Calibration date:	March 15, 2013

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 EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 10 dB Attenuator	SN: 5047.2 (10q)	27-Mar-12 (No. 217-01527)	Apr-13
Probe ER3DV6	SN: 2336	28-Dec-12 (No. ER3-2336_Dec12)	Dec-13
Probe H3DV6	SN: 6065	28-Dec-12 (No. H3-6065_Dec12)	Dec-13
DAE4	SN: 781	29-May-12 (No. DAE4-781_May12)	May-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter Agilent 4419B	SN: GB42420191	09-Oct-09 (in house check Oct-12)	In house check: Oct-13
Power sensor HP E4412A	SN: MY41495277	01-Apr-08 (in house check Oct-12)	In house check: Oct-13
Power sensor HP 8482A	SN: US37295597	09-Oct-09 (in house check Oct-12)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13
RF generator R&S SMT-06	SN: 832283/011	27-Aug-12 (in house check Oct-12)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	Leif Klysner
Approved by:	Fin Bomholt	Deputy Technical Manager	F. Bomholt

Issued: March 19, 2013

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

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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.

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 above the top 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 eliminating 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], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the 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, 10mm 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%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.5
Extrapolation	Advanced Extrapolation	
Phantom	HAC Test Arch	
Distance Dipole Top - Probe Center	10mm	
Scan resolution	dx, dy = 5 mm	
Frequency	835 MHz ± 1 MHz	
Input power drift	< 0.05 dB	

Maximum Field values at 835 MHz

E-field 15 mm above dipole surface	condition	**Interpolated maximum**
Maximum measured above high end	100 mW input power	105.9 V / m
Maximum measured above low end	100 mW input power	105.6 V / m
Averaged maximum above arm	100 mW input power	**105.8 V / m ± 12.8 % (k=2)**

Appendix

Antenna Parameters

Frequency	**Return Loss**	**Impedance**
800 MHz	16.7 dB	41.4 Ω - 10.2 jΩ
835 MHz	24.1 dB	48.8 Ω + 6.1 jΩ
900 MHz	18.9 dB	57.1 Ω - 9.9 jΩ
950 MHz	14.0 dB	55.3 Ω + 20.9 jΩ
960 MHz	10.1 dB	72.6 Ω + 32.4 jΩ

3.2 Antenna Design and Handling

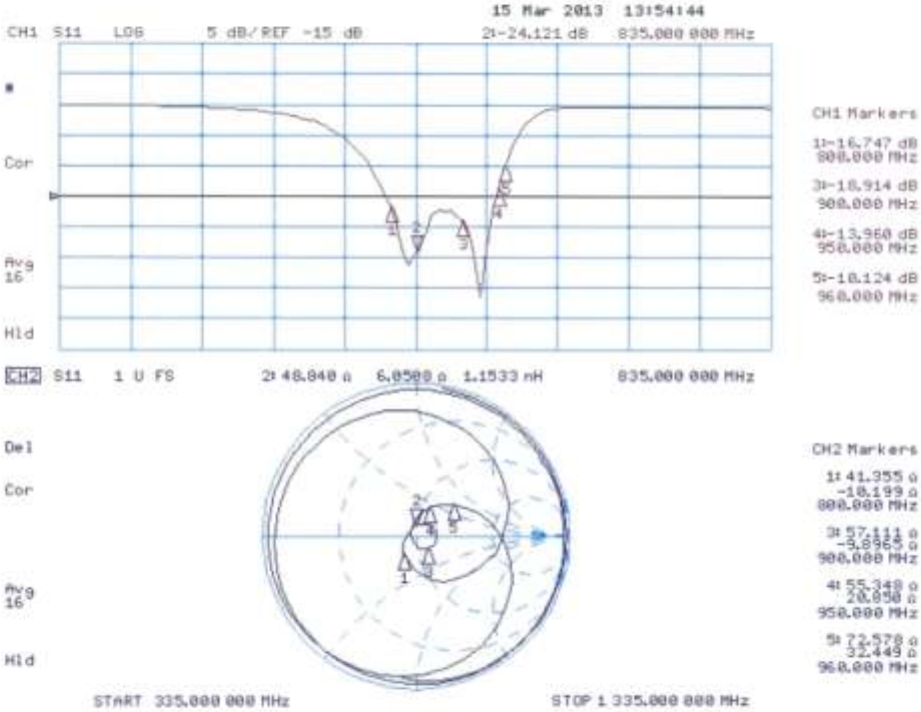
The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.
The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.
Do not apply force to dipole 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.

3.3 Dipole modification by end user

The dipole had been damaged and was re-soldered by the end user near the feed point! Gap distance is slightly larger than originally. This can influence the return loss values.
The E-field values are not affected as long as the arms are straight in a line.

Impedance Measurement Plot



DASY5 E-field Result

Date: 15.03.2013

Test Laboratory: SPEAG Lab2

DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: CD835V3 - SN: 1024

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

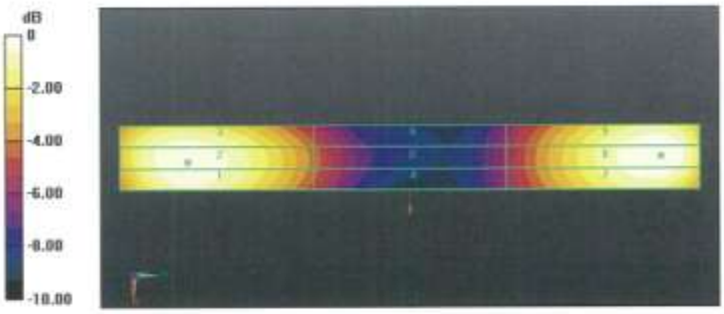
DASY52 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 28.12.2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 29.05.2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

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 = 105.1 V/m; Power Drift = -0.02 dB
PMR not calibrated. PMF = 1.000 is applied.
E-field emissions = 105.9 V/m
Near-field category: M4 (AWF 0 dB)

PMF scaled E-field

Grid 1 **M4** **105.0 V/m**	Grid 2 **M4** **105.6 V/m**	Grid 3 **M4** **102.3 V/m**
Grid 4 **M4** **64.67 V/m**	Grid 5 **M4** **65.31 V/m**	Grid 6 **M4** **63.57 V/m**
Grid 7 **M4** **103.6 V/m**	Grid 8 **M4** **105.9 V/m**	Grid 9 **M4** **104.2 V/m**



0 dB = 105.9 V/m = 40.50 dBV/m

Certificate No: CD835V3-1024_Mar13 Page 5 of 5

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Accreditation No.: **SCS 108**

Client **HCT (Dymstec)**

Certificate No: **CD1880V3-1019_Mar13**

CALIBRATION CERTIFICATE

Object	CD1880V3 - SN: 1019
Calibration procedure(s)	QA CAL-20.v6 Calibration procedure for dipoles in air
Calibration date:	March 15, 2013

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 EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 10 dB Attenuator	SN: 5047.2 (10q)	27-Mar-12 (No. 217-01527)	Apr-13
Probe ER3DV6	SN: 2336	28-Dec-12 (No. ER3-2336_Dec12)	Dec-13
Probe H3DV6	SN: 6065	28-Dec-12 (No. H3-6065_Dec12)	Dec-13
DAE4	SN: 781	29-May-12 (No. DAE4-781_May12)	May-13
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Power meter Agilent 4419B	SN: GB42420191	09-Oct-09 (in house check Oct-12)	In house check: Oct-13
Power sensor HP E4412A	SN: MY41495277	01-Apr-08 (in house check Oct-12)	In house check: Oct-13
Power sensor HP 8482A	SN: US37295597	09-Oct-09 (in house check Oct-12)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13
RF generator R&S SMT-06	SN: 832283/011	27-Aug-12 (in house check Oct-12)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	Leif Klysner
Approved by:	Fin Bomholt	Deputy Technical Manager	F. Bomholt

Issued: March 19, 2013

Certificate No: CD1880V3-1019_Mar13 Page 1 of 5

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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.

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 above the top 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 eliminating 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], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the 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, 10mm 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%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.5
Extrapolation	Advanced Extrapolation	
Phantom	HAC Test Arch	
Distance Dipole Top - Probe Center	10mm	
Scan resolution	dx, dy = 5 mm	
Frequency	1880 MHz ± 1 MHz	
Input power drift	< 0.05 dB	

Maximum Field values at 1880 MHz

E-field 15 mm above dipole surface	condition	**Interpolated maximum**
Maximum measured above high end	100 mW input power	91.9 V / m
Maximum measured above low end	100 mW input power	90.6 V / m
Averaged maximum above arm	100 mW input power	**91.3 V / m ± 12.8 % (k=2)**

Appendix

Antenna Parameters

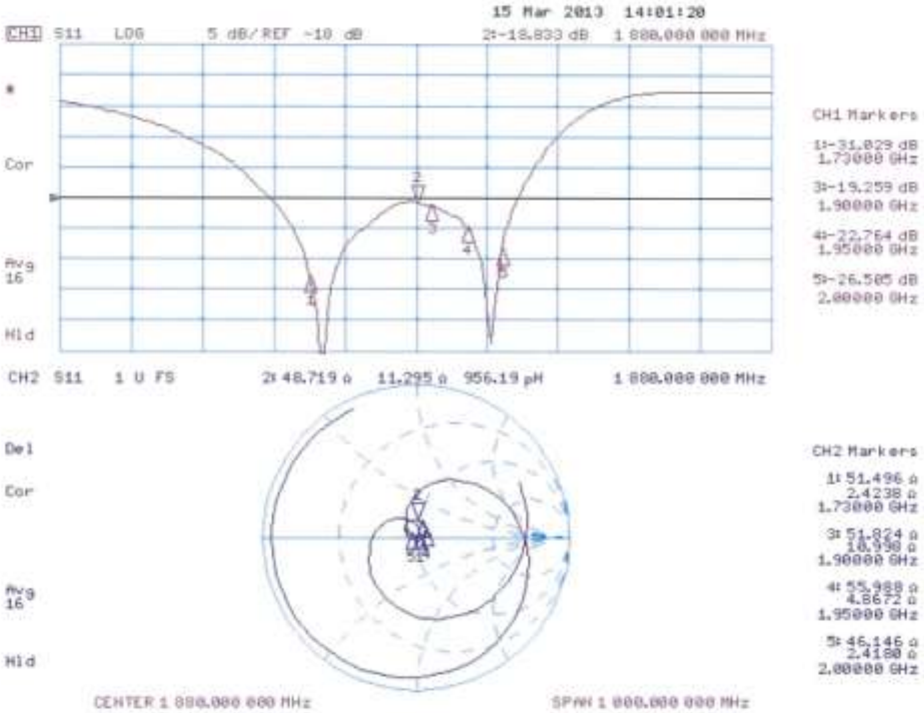
Frequency	**Return Loss**	**Impedance**
1730 MHz	31.0 dB	51.5 Ω + 2.4 jΩ
1880 MHz	18.8 dB	48.7 Ω + 11.3 jΩ
1900 MHz	19.3 dB	51.8 Ω + 11.0 jΩ
1950 MHz	22.8 dB	56.0 Ω + 4.9 jΩ
2000 MHz	26.5 dB	46.1 Ω + 2.4 jΩ

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.

Impedance Measurement Plot



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DASY5 E-field Result

Date: 15.03.2013

Test Laboratory: SPEAG Lab2

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: CD1880V3 - SN: 1019

Communication System: CW; Frequency: 1880 MHz
Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: RF Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

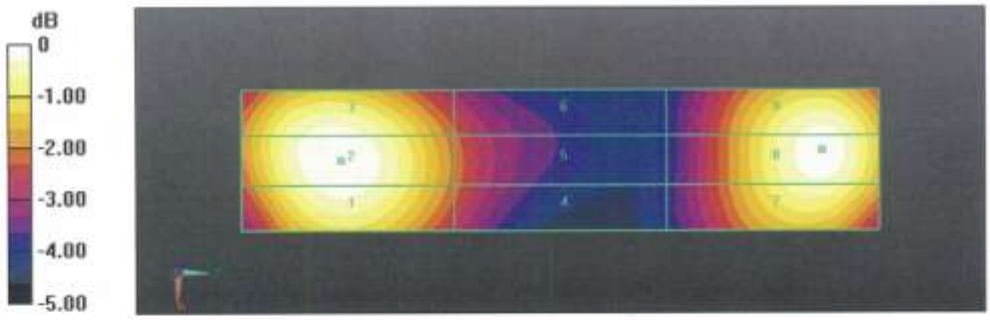
DASY52 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 28.12.2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 29.05.2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

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 = 159.8 V/m; Power Drift = 0.02 dB
PMR not calibrated. PMF = 1.000 is applied.
E-field emissions = 91.94 V/m
Near-field category: M3 (AWF 0 dB)

PMF scaled E-field

Grid 1 **M3** 90.33 V/m	Grid 2 **M3** 91.94 V/m	Grid 3 **M3** 90.35 V/m
Grid 4 **M3** 71.70 V/m	Grid 5 **M3** 72.39 V/m	Grid 6 **M3** 71.22 V/m
Grid 7 **M3** 87.65 V/m	Grid 8 **M3** 90.56 V/m	Grid 9 **M3** 89.89 V/m



0 dB = 91.94 V/m = 39.27 dBV/m