



PCTEST Hearing-Aid Compatibility Facility

DUT: HAC Dipole 1900 MHz

Type: CD1880V3
Serial: 1002

Communication System: CW; Frequency: 1880 MHz;

Measurement Standard: DAS4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ER3DV6 - SN2332; Calibrated: 1/31/2005
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn637; Calibrated: 9/22/2004
- Phantom: HAC Phantom; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19;

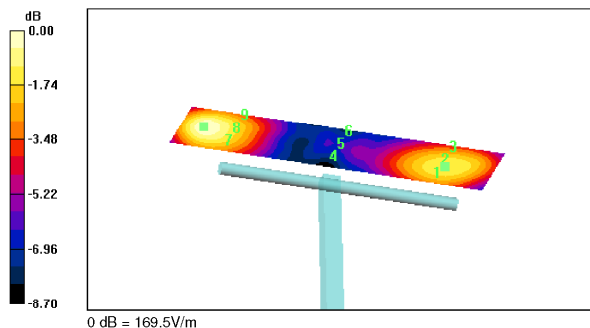
4-11-05/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of Total field (slot averaged) = 169.5 V/m

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

E in V/m (Time averaged)			E in V/m (Slot averaged)		
Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
145.4	148.3	140.7	145.4	148.3	140.7
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
101.8	102.9	97.2	101.8	102.9	97.2
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
156.3	169.5	163.5	156.3	169.5	163.5

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJYX4700	Page 31 of 66

Date: 4/12/2005

PCTEST
w i r e l e s s
PCTEST Hearing-Aid Compatability Facility

DUT: HAC Dipole 1900 MHz
Type: CD1880V3
Serial: 1002

Communication System: 80% AM; Frequency: 1880 MHz;

Measurement Standard: DASY4 (High Precision Assessment)

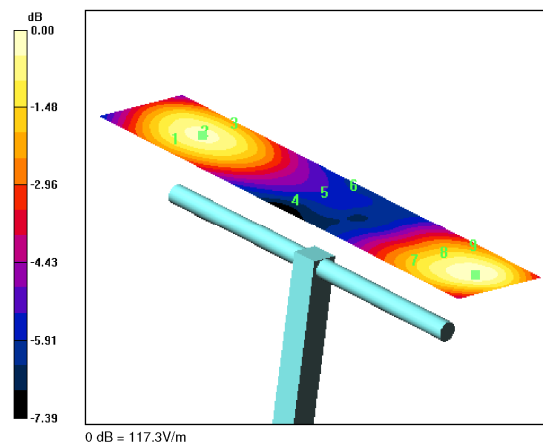
DASY4 Configuration:

- Probe: ER3DV6 - SN2332; Calibrated: 1/31/2005
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn637; Calibrated: 9/22/2004
- Phantom: HAC Main; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19;

1880MHz, 100mW/20dBm 80%AM/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of Total field (slot averaged) = 166.7 V/m
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

E in V/m (Time averaged)			E in V/m (Slot averaged)		
Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
107.9	113.7	110.9	153.4	161.6	157.6
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
79.9	82.6	81.0	113.6	117.4	115.1
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
110.7	117.3	114.8	157.3	166.7	163.2

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



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PCTEST™ HAC REPORT	PCTEST w i r e l e s s	FCC MEASUREMENT REPORT	LG	Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVX4700	Page 32 of 66

PCTEST Hearing-Aid Compatibility Facility

DUT: HAC Dipole 1900 MHz

Type: CD1880V3
Serial: 1002

Communication System: CDMA; Frequency: 1880 MHz;

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ER3DV6 - SN2332; Calibrated: 1/31/2005
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn637; Calibrated: 9/22/2004
- Phantom: HAC Phantom; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19;

CDMA/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

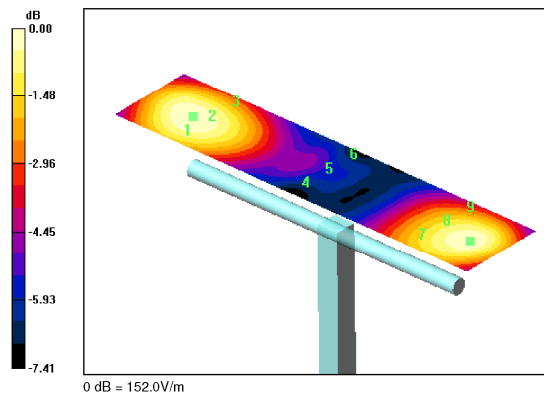
Maximum value of Total field (slot averaged) = 152.0 V/m

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

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
148.9	151.7	141.8	148.9	151.7	141.8
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
100.6	101.4	94.5	100.6	101.4	94.5
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
147.0	152.0	140.3	147.0	152.0	140.3

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJWX4700	Page 33 of 66



PCTEST Hearing-Aid Compatibility Facility

DUT: HAC Dipole 835 MHz

Type: CD835V3
Serial: 1003

Communication System: CW; Frequency: 835 MHz;

Measurement Standard: DASy4 (High Precision Assessment)

DASy4 Configuration:

- Probe: H3DV6 - SN6180; Calibrated: 10/6/2004
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn637; Calibrated: 9/22/2004
- Phantom: HAC Phantom; Type: SD HAC P01 BA;
- Measurement SW: DASy4, V4.5 Build 19;

4-12/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm

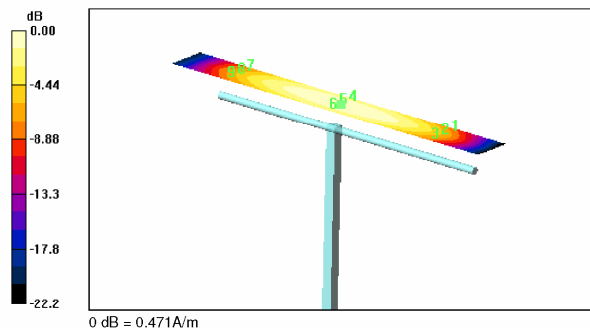
Maximum value of Total field (slot averaged) = 0.471 A/m

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

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.387	0.417	0.393	0.387	0.417	0.393
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
0.447	0.471	0.441	0.447	0.471	0.441
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.395	0.412	0.381	0.395	0.412	0.381

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJvX4700	Page 34 of 66

PCTEST Hearing-Aid Compatibility Facility

DUT: HAC Dipole 835 MHz

Type: CD835V3
Serial: 1003

Communication System: 80% AM; Frequency: 835 MHz;

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: H3DV6 - SN6180; Calibrated: 10/6/2004
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn637; Calibrated: 9/22/2004
- Phantom: HAC Main; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19;

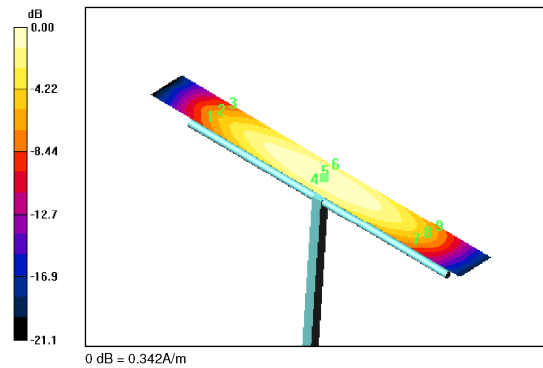
835MHz, 100mW/20dBm 80%AM/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of Total field (slot averaged) = 0.486 A/m

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

H in A/m (Time averaged)			H in A/m (Slot averaged)		
Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.276	0.299	0.277	0.392	0.425	0.394
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
0.318	0.342	0.330	0.452	0.486	0.469
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.276	0.304	0.295	0.392	0.432	0.419

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
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PCTEST Hearing-Aid Compatibility Facility
DUT: HAC Dipole 835 MHz

Type: CD835V3

Serial: 1003

Duty Cycle: 1:1

Communication System: CDMA; Frequency: 835 MHz;

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: H3DV6 - SN6190; Calibrated: 10/6/2004
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn637; Calibrated: 9/22/2004
- Phantom: HAC Phantom; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19;

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

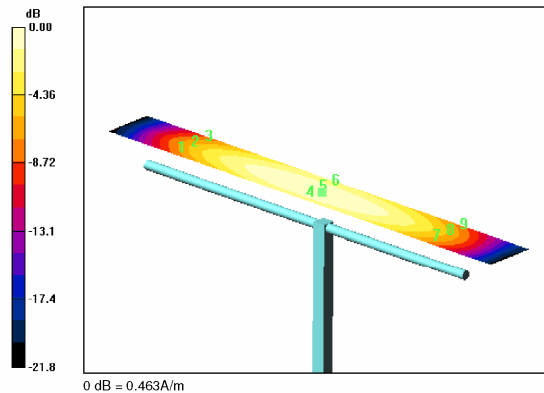
Maximum value of Total field (slot averaged) = 0.463 A/m

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

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.386	0.409	0.383	0.386	0.409	0.383
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
0.444	0.463	0.433	0.444	0.463	0.433
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.389	0.405	0.375	0.389	0.405	0.375

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
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PCTEST Hearing-Aid Compatibility Facility

DUT: HAC Dipole 1900 MHz

Type: CD1880V3
Serial: 1002

Communication System: CW; Frequency: 1880 MHz;

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: H3DV6 - SN6180; Calibrated: 10/6/2004
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn637; Calibrated: 9/22/2004
- Phantom: HAC Phantom; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19;

4-12/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

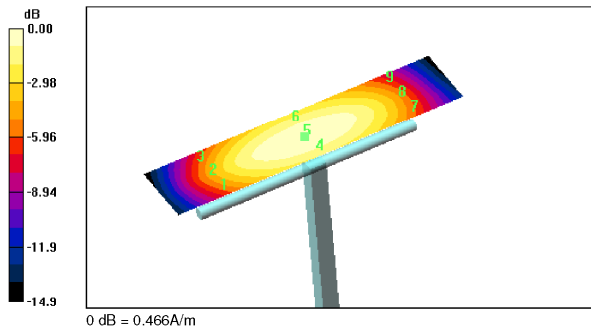
Maximum value of Total field (slot averaged) = 0.466 A/m

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

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.402	0.422	0.391	0.402	0.422	0.391
Grid 4	0.447	0.466	Grid 4	0.447	0.466
0.447	0.466	0.436	0.447	0.466	0.436
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.407	0.424	0.395	0.407	0.424	0.395

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVB4700	Page 37 of 66



PCTEST Hearing-Aid Compatability Facility

DUT: HAC Dipole 1900 MHz

Type: CD1880V3
Serial: 1002

Communication System: 80% AM; Frequency: 1880 MHz;

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: H3DV6 - SN6180; Calibrated: 10/6/2004
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn637; Calibrated: 9/22/2005
- Phantom: HAC Main; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19;

1880MHz, 100mW/20dBm 80%AM/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

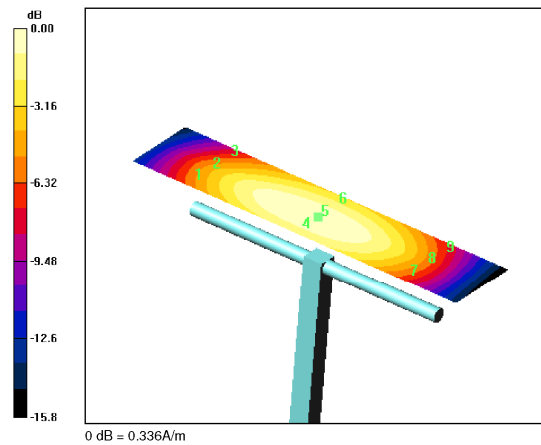
Maximum value of Total field (slot averaged) = 0.477 A/m

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

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.299	0.308	0.272	0.424	0.438	0.387
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
0.324	0.336	0.305	0.460	0.477	0.434
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.288	0.295	0.269	0.409	0.420	0.382

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVB4700	Page 38 of 66



PCTEST Hearing-Aid Compatibility Facility

DUT: HAC Dipole 1900 MHz

Type: CD1880V3

Serial: 1002

Duty Cycle: 1:1

Communication System: CDMA; Frequency: 1880 MHz;

Measurement Standard: DASy4 (High Precision Assessment)

DASy4 Configuration:

- Probe: H3DV6 - SN6180; Calibrated: 10/6/2004
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn637; Calibrated: 9/22/2004
- Phantom: HAC Phantom; Type: SD HAC P01 BA;
- Measurement SW: DASy4, V4.5 Build 19;

CDMA/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

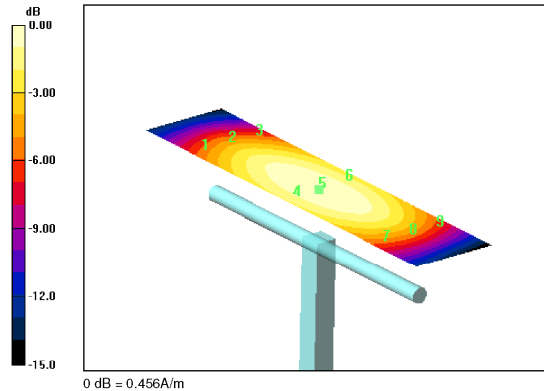
Maximum value of Total field (slot averaged) = 0.456 A/m

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

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.388	0.411	0.388	0.388	0.411	0.388
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
0.434	0.456	0.433	0.434	0.456	0.433
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.396	0.417	0.394	0.396	0.417	0.394

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVX4700	Page 39 of 66

PCTEST
WIRELESS
PCTEST Hearing-Aid Compatibility Facility

DUT: LG-VX4700

Type: Tri Mode
Serial: 238D0372
Backlight off
Duty Cycle: 1:1

Communication System: Cellular CDMA; Frequency: 824.7 MHz;

Measurement Standard: DASy4 (High Precision Assessment)

DASy4 Configuration:

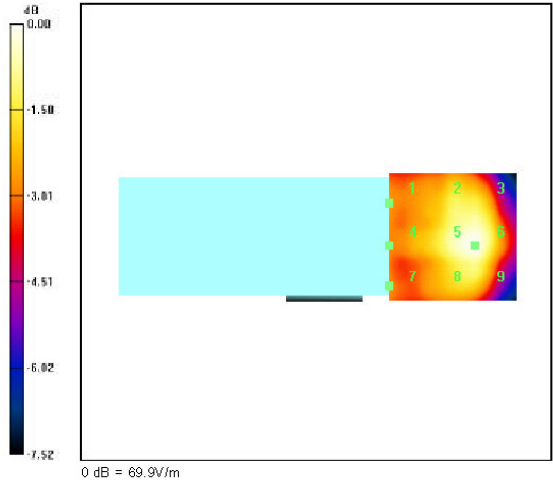
- Probe: ER3DV6 - SN2332; Calibrated: 1/31/2005
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn637; Calibrated: 9/22/2004
- Phantom: HAC Phantom; Type: SD HAC P01 BA;
- Measurement SW: DASy4, V4.5 Build 19;

1013/Hearing Aid Compatibility Test (261x261x1); Measurement grid: dx=2mm, dy=2mm
Maximum value of Total field (slot averaged) = 69.9 V/m
Hearing Aid Near-Field Category: M3 (AWF 0 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
54.2	62.8	62.8	54.2	62.8	62.8
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
56.5	69.8	69.9	56.5	69.8	69.9
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
52.3	65.1	65.1	52.3	65.1	65.1

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



PCTEST™ HAC REPORT	PCTEST WIRELESS	FCC MEASUREMENT REPORT	LG	Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVB4700	Page 40 of 66

PCTEST
WIRELESS
PCTEST Hearing-Aid Compatibility Facility

DUT: LG-VX4700

Type: Tri Mode
Serial: 238D0372
Backlight off
Duty Cycle: 1:1

Communication System: PCS CDMA; Frequency: 1880 MHz;

Measurement Standard: DASy4 (High Precision Assessment)

DASy4 Configuration:

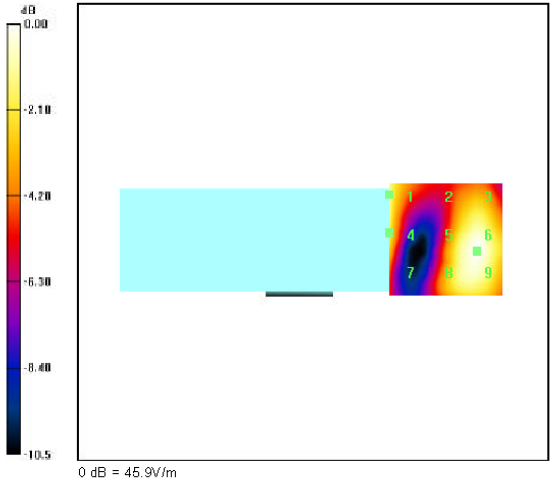
- Probe: ER3DV6 - SN2332; Calibrated: 1/31/2005
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn637; Calibrated: 9/22/2004
- Phantom: HAC Phantom; Type: SD HAC P01 BA;
- Measurement SW: DASy4, V4.5 Build 19;

Mid Channel/Hearing Aid Compatibility Test (261x261x1): Measurement grid: dx=2mm, dy=2mm
Maximum value of Total field (slot averaged) = 45.9 V/m
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
40.7	34.4	38.9	40.7	34.4	38.9
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
38.6	41.7	45.9	38.6	41.7	45.9
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
31.0	41.8	45.0	31.0	41.8	45.0

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



PCTEST™ HAC REPORT	PCTEST WIRELESS	FCC MEASUREMENT REPORT	LG	Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVX4700	Page 41 of 66

PCTEST
WIRELESS
PCTEST Hearing-Aid Compatibility Facility

DUT: LG-VX4700

Type: Tri Mode
Serial: 238D0372
Backlight off
Duty Cycle: 1:1

Communication System: Cellular CDMA; Frequency: 824.7 MHz;

Measurement Standard: DASy4 (High Precision Assessment)

DASy4 Configuration:

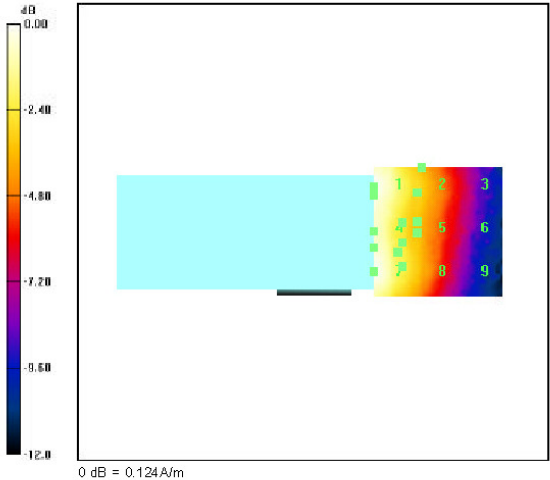
- Probe: HSDV6 - SN6180; Calibrated: 10/6/2004
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn637; Calibrated: 9/22/2004
- Phantom: HAC Phantom; Type: SD HAC P01 BA;
- Measurement SW: DASy4, V4.5 Build 19;

Low Channel/Hearing Aid Compatibility Test (261x261x1): Measurement grid: dx=2mm, dy=2mm
Maximum value of Total field (slot averaged) = 0.124 A/m
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.124	0.090	0.061	0.124	0.090	0.061
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
0.118	0.086	0.058	0.118	0.086	0.058
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.123	0.086	0.054	0.123	0.086	0.054

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVX4700	Page 42 of 66

PCTEST
WIRELESS
PCTEST Hearing-Aid Compatibility Facility

DUT: LG-VX4700

Type: Tri Mode
Serial: 238D0372
Backlight off
Duty Cycle: 1:1

Communication System: PCS CDMA; Frequency: 1880 MHz;

Measurement Standard: DASy4 (High Precision Assessment)

DASy4 Configuration:

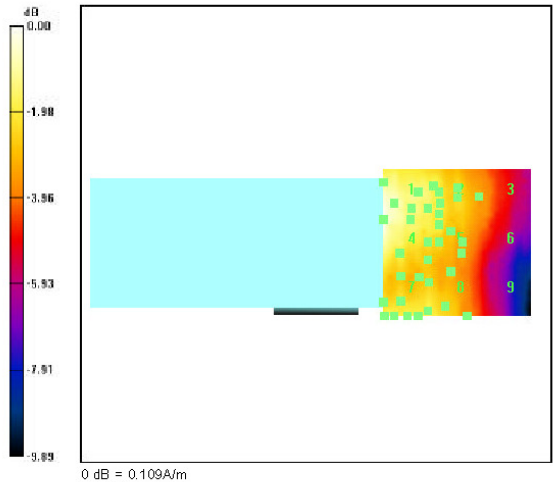
- Probe: HSDV6 - SN6180; Calibrated: 10/6/2004
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn637; Calibrated: 9/22/2004
- Phantom: HAC Phantom; Type: SD HAC P01 BA;
- Measurement SW: DASy4, V4.5 Build 19;

Mid Channel/Hearing Aid Compatibility Test (261x261x1): Measurement grid: dx=2mm, dy=2mm
Maximum value of Total field (slot averaged) = 0.109 A/m
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.109	0.090	0.074	0.109	0.090	0.074
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
0.109	0.089	0.071	0.109	0.089	0.071
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.090	0.087	0.064	0.090	0.087	0.064

Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.6 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.6	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.15



PCTEST™ HAC REPORT	PCTEST WIRELESS	FCC MEASUREMENT REPORT	LG	Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVB4700	Page 43 of 66

13. PROBE CALIBRATION

The following pages include the probe calibration used to evaluate HAC for the DUT.

PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVB4700	Page 44 of 66

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



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 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 **PC test**

Certificate No. **ER3-2332_Jan05**

CALIBRATION CERTIFICATE

Object **ER3DV6 - SN:2332**

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

Calibration date: **January 31, 2005**

Condition of the calibrated item **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ER3DV6	SN: 2328	6-Oct-04 (SPEAG, No. ER3-2328_Oct04)	Oct-05
DAE4	SN: 617	19-Jan-05 (SPEAG, No. DAE4-617_Jan05)	Jan-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: February 19, 2005

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

Certificate No: ER3-2332_Jan05

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PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJXX4700	Page 45 of 66

Calibration Laboratory of
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Engineering AG
 Zeughausstrasse 43, 8004 Zurich, Switzerland



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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

NORM_{x,y,z} sensitivity in free space
DCP diode compression point
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., $\vartheta = 0$ is normal to probe axis
Connector Angle information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1309-1996, "IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", 1996.

Methods Applied and Interpretation of Parameters:

- **NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ for XY sensors and $\vartheta = 90$ for Z sensor ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide).
- **NORM(f)_{x,y,z}** = **NORM_{x,y,z}** * *frequency_response* (see Frequency Response Chart).
- **DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency.
- **Spherical isotropy (3D deviation from isotropy)**: in a locally homogeneous field realized using an open waveguide setup.
- **Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- **Connector Angle**: The angle is assessed using the information gained by determining the **NORM_x** (no uncertainty required).

Certificate No: ER3-2332_Jan05

Page 2 of 9

PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVX4700	Page 46 of 66

Probe ER3DV6

SN:2332

Manufactured: September 9, 2003
Calibrated: January 31, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVB4700	Page 47 of 66

DASY - Parameters of Probe: ER3DV6 SN:2332Sensitivity in Free Space [$\mu\text{V}/(\text{V/m})^2$] Diode Compression^A

NormX	1.34 $\pm$ 10.1 % (k=2)	DCP X	95 mV
NormY	1.47 $\pm$ 10.1 % (k=2)	DCP Y	95 mV
NormZ	1.64 $\pm$ 10.1 % (k=2)	DCP Z	97 mV

Frequency Correction

X	0.0
Y	0.0
Z	0.0

Sensor Offset (Probe Tip to Sensor Center)

X	2.5 mm
Y	2.5 mm
Z	2.5 mm

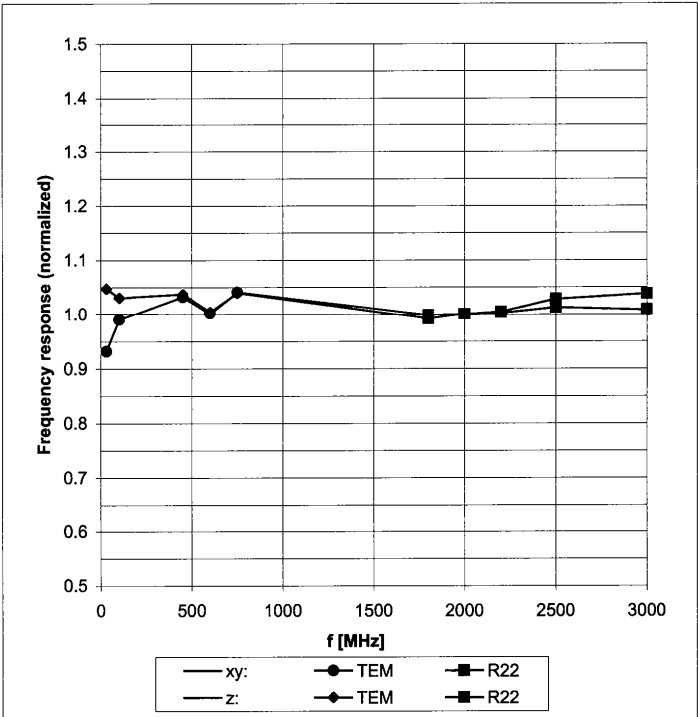
Connector Angle **139** °

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

PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJXX4700	Page 48 of 66

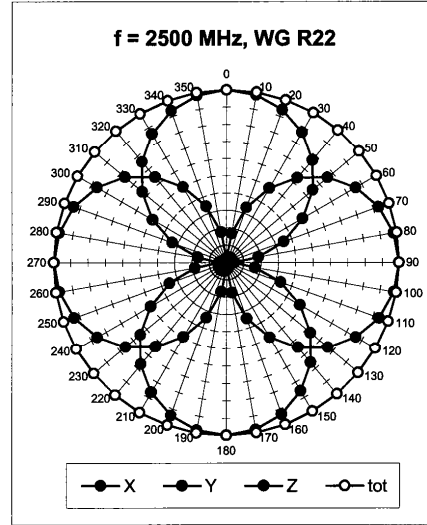
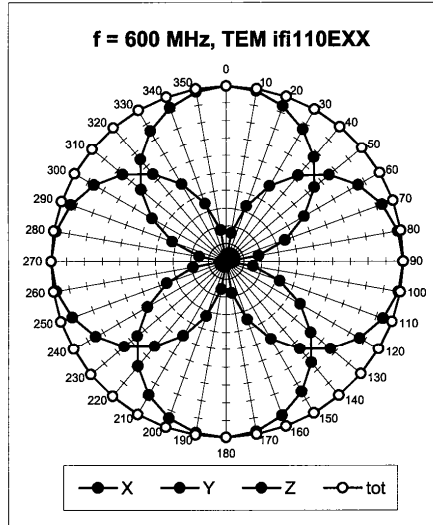
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide R22)



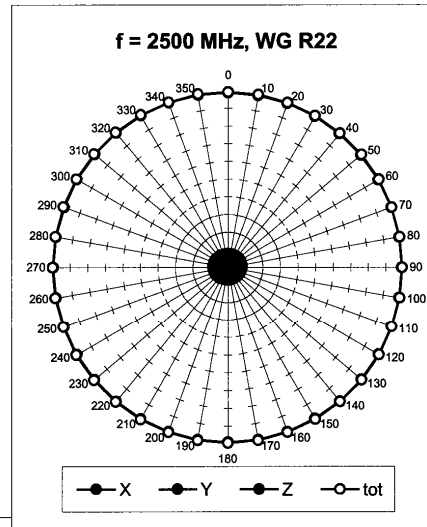
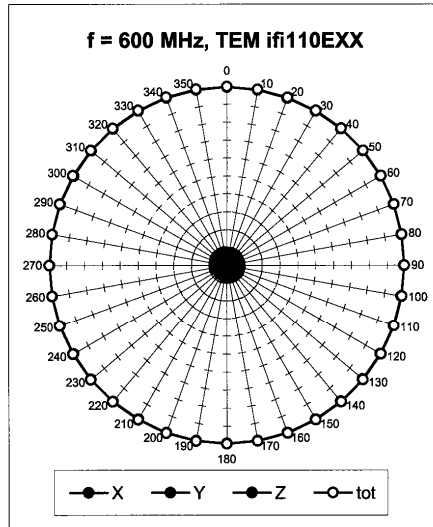
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVX4700	Page 49 of 66

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

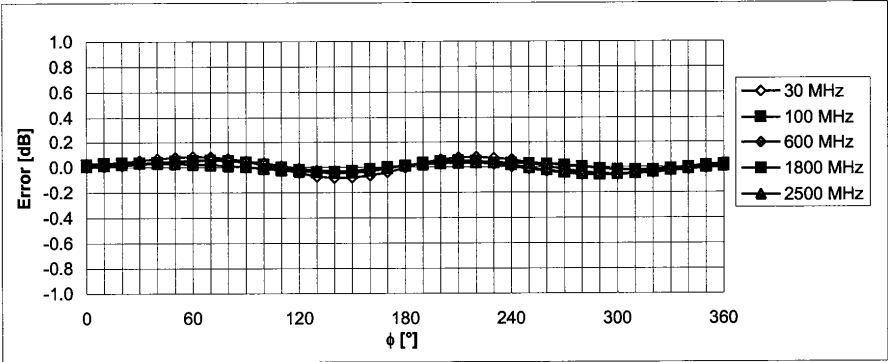


Receiving Pattern (ϕ), $\vartheta = 90^\circ$



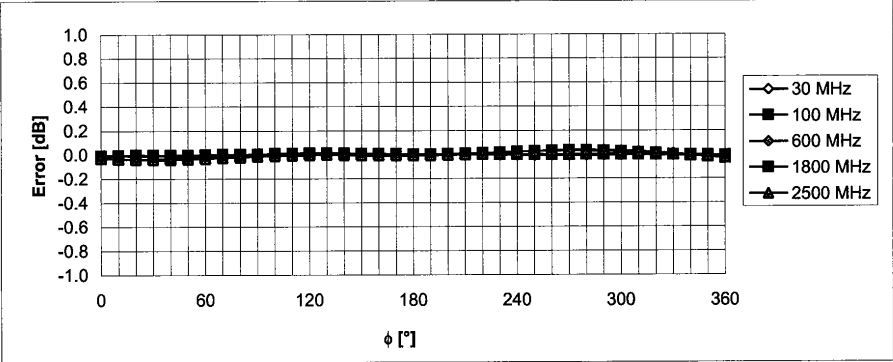
PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVB4700	Page 50 of 66

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



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

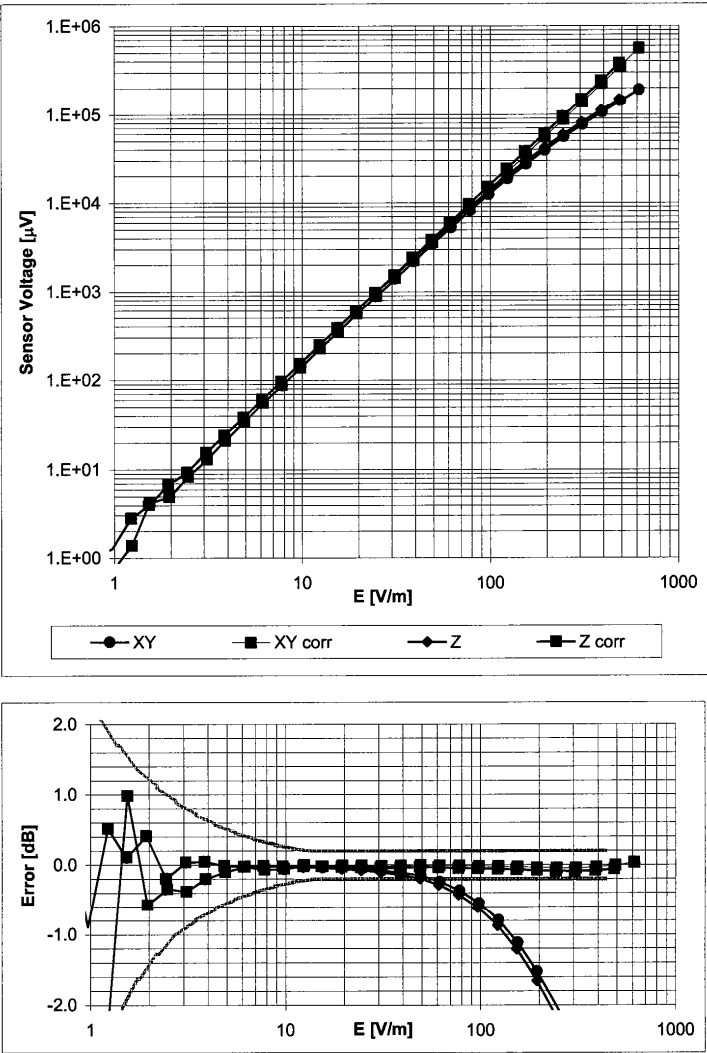
Receiving Pattern (ϕ), $\vartheta = 90^\circ$



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

PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVB4700	Page 51 of 66

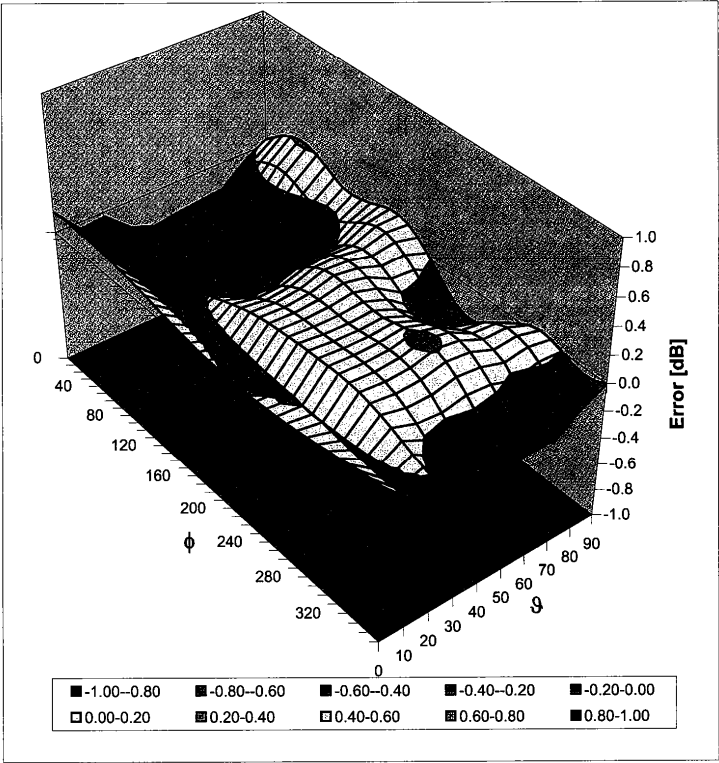
Dynamic Range f(E-field)
(Waveguide R22, f = 1800 MHz)



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

PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVB4700	Page 52 of 66

Deviation from Isotropy in Air
Error (ϕ , θ) , f = 900 MHz



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

PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVX4700	Page 53 of 66

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Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **H3-6180_Oct04**

CALIBRATION CERTIFICATE

Object **H3DV6 - SN:6180**

Calibration procedure(s) **QA CAL-03.v4
Calibration procedure for H-field probes optimized for close near field
evaluations in air**

Calibration date: **October 6, 2004**

Condition of the calibrated item **In Tolerance**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	3-Apr-03 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5066 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	3-Apr-03 (METAS, No. 251-00404)	Aug-05
Reference Probe H3DV6	SN: S0665	17-Dec-03 (SPEAG, No. H3-6065_Dec03)	Dec-04
DAE4	SN: 617	26-May-04 (SPEAG, No. DAE4-617_May04)	May-05
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-03)	In house check: Nov 04

Calibrated by:	Name Katja Pokovic	Function Technical Manager	Signature
Approved by:	Name Niels Kuster	Function Quality Manager	

Issued: October 23, 2004

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Certificate No: H3-6180_Oct04

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PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJXX4700	Page 54 of 66

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Accreditation No.: **SCS 108**

Glossary:

NORM_{x,y,z} sensitivity in free space
DCP diode compression point
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., $\vartheta = 0$ is normal to probe axis
Connector Angle information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1309-1996, "IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", 1996.

Methods Applied and Interpretation of Parameters:

- **X,Y,Z_{a0a1a2}**: Assessed for E-field polarization $\vartheta = 90$ for XY sensors and $\vartheta = 0$ for Z sensor ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide).
- **X,Y,Z(f)_{a0a1a2}** = **X,Y,Z_{a0a1a2}** * *frequency_response* (see Frequency Response Chart).
- **DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency.
- **Spherical isotropy (3D deviation from isotropy)**: in a locally homogeneous field realized using an open waveguide setup.
- **Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- **Connector Angle**: The angle is assessed using the information gained by determining the **X_{a0a1a2}** (no uncertainty required).

PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVX4700	Page 55 of 66

H3DV6 SN:6180

October 6, 2004

Probe H3DV6

SN:6180

Manufactured: July 6, 2004
Calibrated: October 6, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: H3-6180_Oct04

Page 3 of 8

PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVB4700	Page 56 of 66

DASY - Parameters of Probe: H3DV6 SN:6180Sensitivity in Free Space [A/m / $\sqrt{(\mu V)}$]

	a0	a1	a2	
X	2.490E-03	1.788E-05	-2.842E-05	± 5.0 % (k=2)
Y	2.681E-03	3.017E-05	-3.113E-05	± 5.0 % (k=2)
Z	2.912E-03	-1.610E-05	1.858E-05	± 5.0 % (k=2)

Diode Compression¹

DCP X	85 mV
DCP Y	85 mV
DCP Z	87 mV

Sensor Offset (Probe Tip to Sensor Center)

X	3.0 mm
Y	3.0 mm
Z	3.0 mm

Connector Angle 4 °

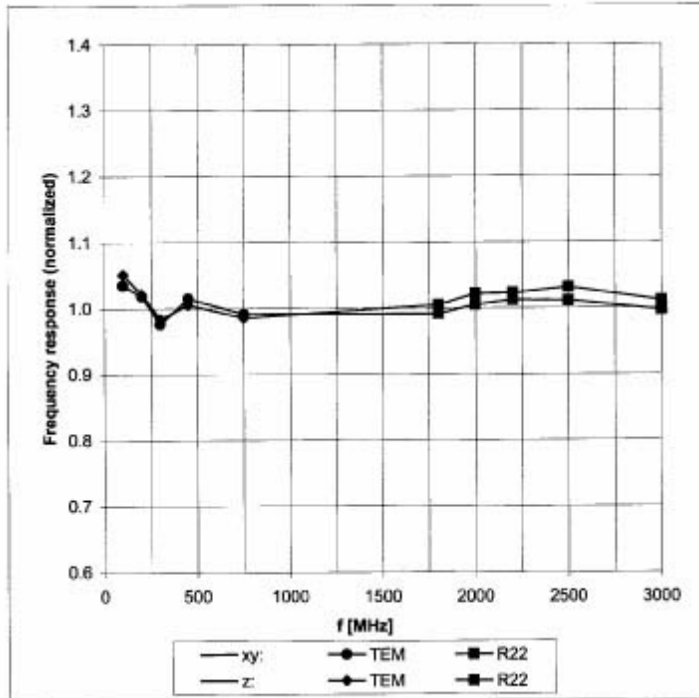
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

¹ numerical linearization parameter: uncertainty not required

PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJXX4700	Page 57 of 66

Frequency Response of H-Field

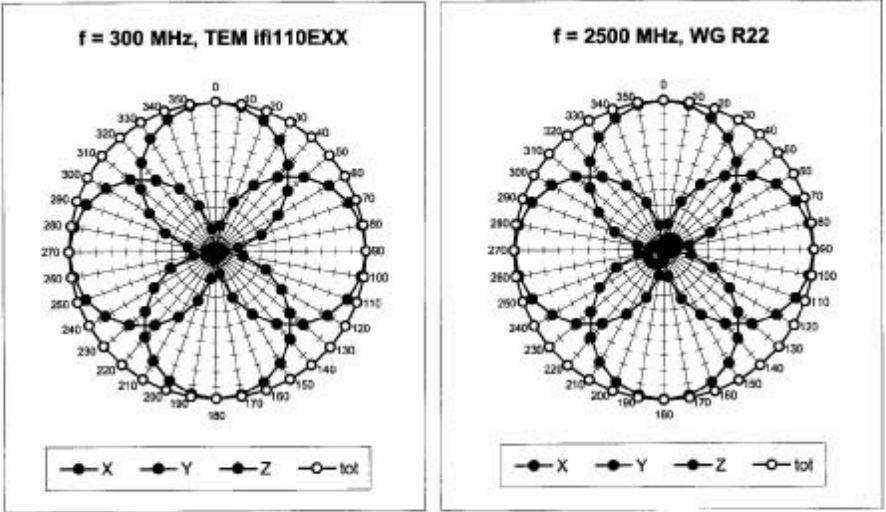
(TEM-Cell:ifi110, Waveguide R22)



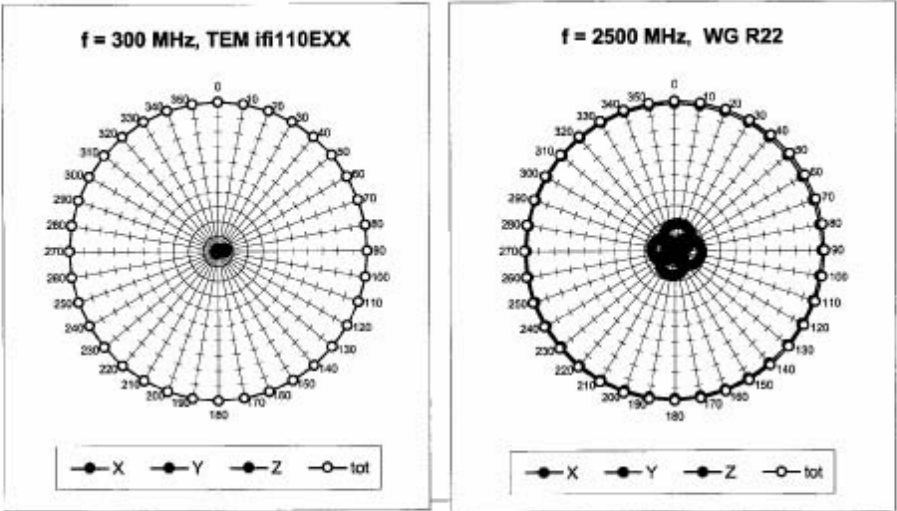
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJVX4700	Page 58 of 66

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

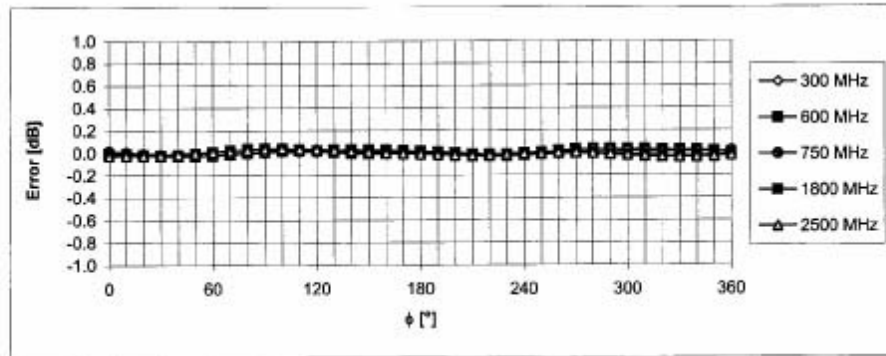


Receiving Pattern (ϕ), $\vartheta = 0^\circ$



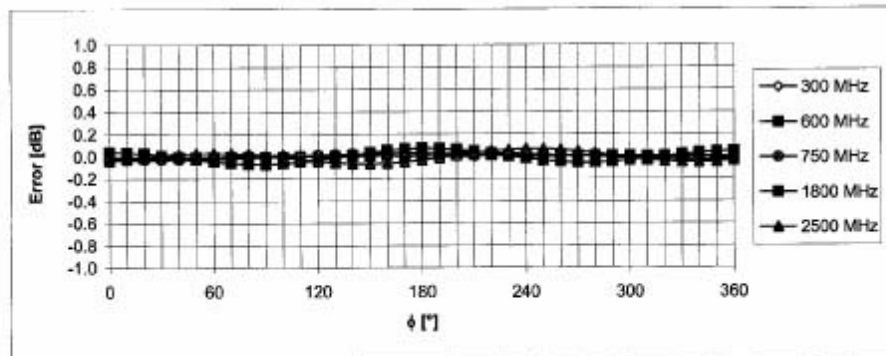
PCTEST™ HAC REPORT		FCC MEASUREMENT REPORT		Reviewed by: Quality Manager
HAC Filename: HAC.0503220222-R2.BEJ	Test Dates: April 8 - 13 & May 26, 2005	EUT Type: Tri-Mode Phone	FCC ID: BEJXX4700	Page 59 of 66

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



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

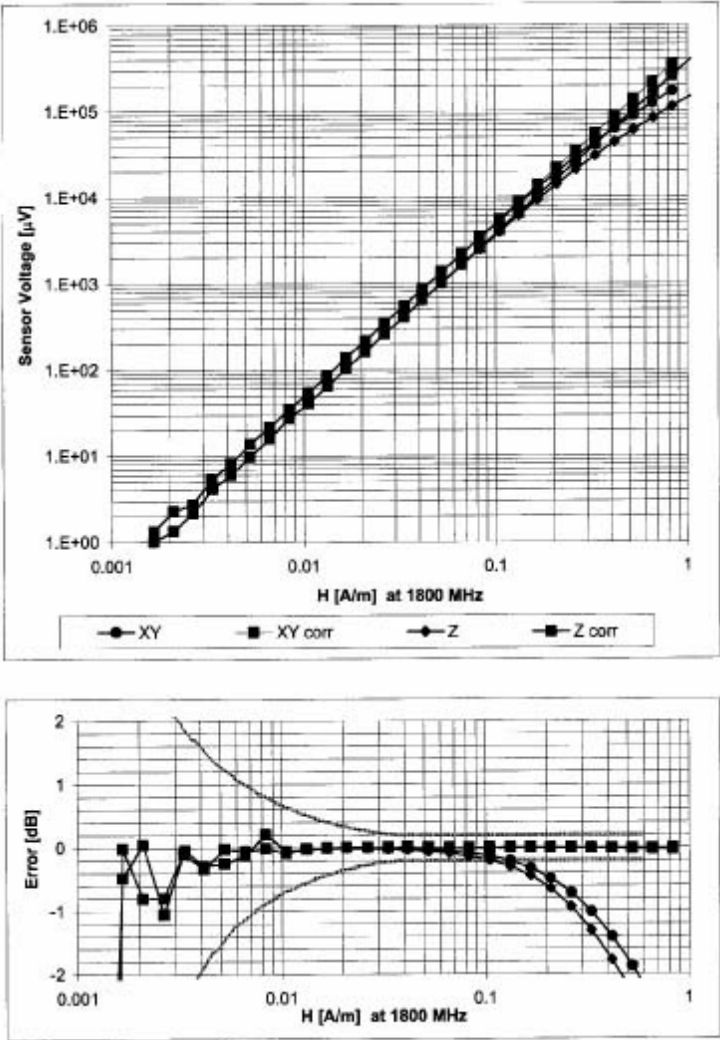
Receiving Pattern (ϕ), $\vartheta = 0^\circ$



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

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Dynamic Range f(H-field)
(Waveguide R22, f = 1800 MHz)



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

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15. CONCLUSION

The measurements indicate that the wireless communications device complies with the HAC limits specified in accordance with the ANSI PC63.19 Standard and FCC WT Docket No. 01-309 RM-8658. Precise laboratory measures were taken to assure repeatability of the tests. The tested device complies with the requirements in respect to all parameters specific to the test. The test results and statements relate only to the item(s) tested.

Please note that the M-rating for this equipment only represents the field interference possible against a hypothetical and typical hearing aid. The measurement system and techniques presented in this evaluation are proposed in the ANSI standard as a means of best approximating wireless device compatibility with a hearing-aid. The literature is under continual re-construction.

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