

FCC CFR47 PART 20.19 ANSI C63.19-2007

HAC RF EMISSIONS TEST REPORT

For GSM AND WCDMA PHONE WITH BLUETOOTH, NFC AND WLAN

> Model: E960, LGE960, LG-E960 FCC ID: ZNFE960

REPORT NUMBER: 12U14580-6 ISSUE DATE: 8/28/2012

Prepared for LG ELECTRONICS MOBILECOMM U.S.A., INC. 1000 SYLVAN AVE. ENGLEWOOD CLIFFS, NJ 07632

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Revision History

Rev.	Issue Date	Revisions	Revised By
	8/28/2012	Initial Issue	

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1. Attestation of Test Results

Applicant name	LG ELECTRONICS MOBILECOMM U.S.A., INC.						
DUT description	GSM AND WCDMA PHO	GSM AND WCDMA PHONE WITH BLUETOOTH, NFC AND WLAN					
Model name	E960, LGE960, LG-E960						
Test device is	An identical prototype						
Device category	Portable						
Exposure category	General Population/Uncont	trolled Exposure					
Date of tested	8/19/2012 – 8/20/2012						
Maximum E/H-Field Emiss	ions						
Max. E-Field Emissions	Part 22 - Cellular band	162.4 V/m (M3)_0	SSM850				
	Part 27 - AWS Band	36.479 V/m (M4)_	W-CDMA Band IV				
	Part 24 - PCS band	58.991 V/m (M3)_	_GSM1900				
Max. H-Field Emissions	Part 22 - Cellular band	0.233 A/m (M4)_0	GSM850				
	Part 27 - AWS Band	0.098 A/m (M4)_V	V-CDMA Band IV				
	Part 24 - PCS band	0.206 A/m (M3)_0	GSM1900				
Hearing Aid Near-Field Category: M3							
Applicable Standards			Test Results				
ANSI C63.19-2007			Pass				

UL CCS tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released For UL CCS By:

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Down Charg

Devin Chang SAR Engineer UL CCS

2. Test Methodology

The tests documented in this report were performed in accordance with ANSI C63.19-2007 Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids and FCC KDB 285076 D01 HAC Guidance v02r01

3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <u>http://www.ccsemc.com.</u>

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4. Calibration and Uncertainty

4.1. Measuring Instrument Calibration

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

Name of Equipment	Manufacturer	Type/Model	Serial No	Cal. Due date		
	Manufacturer	i ype/iviodei	Senai No.	MM	DD	Year
Robot - Six Axes	Stäubli	TX90 XL	N/A		N/A	Ň
Robot Remote Control	Stäubli	CS8C	N/A		N/A	١
DASY5 Measurement Server	SPEAG	SEUMS001BA	1041		N/A	١
Probe Alignment Unit	SPEAG	LB (V2)	261	N/A		١
Data Acquisition Electronics	SPEAG	DAE4	1239	6	6	2013
Radio Communication Tester	R &S	CMU 200	106301	6 6 20'		2013
E-Field Probe	SPEAG	ER3DV6 2339		1	20	2013
H-Field Probe	SPEAG	H3DV6 6157		1	30	2013
Calibration Dipole	SPEAG	CD835V3 1014		3	8	2013
Calibration Dipole	SPEAG	CD1880V3 1122		3	8	2013
Amplifier	MITEQ	4D00400600-50-30P 1620606		N/A		
Directional coupler	Werlatone	C8060-102	2141		N/A	1

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4.2. Measurement Uncertainty

HAC Uncertainty Budget According to ANSI PC63.19

Error Description	Uncertainty	Probe Dist	Div	(Ci) E	(Ci) H	Std. Unc.(±%)		
	value (±%)	TTODE DISt.	DIV.	(0) L		E	Н	
Measurement System								
Probe Calibration	5.10	N	1	1	1	5.1	5.1	
Axial Isotropy	4.70	R	1.732	1	1	2.7	2.7	
Sensor Displacement	16.50	R	1.732	1	0.145	9.5	1.4	
Boundary Effects	2.40	R	1.732	1	1	1.4	1.4	
Linearity	4.70	R	1.732	1	1	2.7	2.7	
Scaling to Peak Envelope Power	2.00	R	1.732	1	1	1.2	1.2	
System Detection Limit	1.00	R	1.732	1	1	0.6	0.6	
Readout Electronics	0.30	N	1	1	1	0.3	0.3	
Response Time	0.80	R	1.732	1	1	0.5	0.5	
Integration Time	2.60	R	1.732	1	1	1.5	1.5	
RF Ambient Conditions	3.00	R	1.732	1	1	1.7	1.7	
RF Reflections	12.00	R	1.732	1	1	6.9	6.9	
Probe Positioner	1.20	R	1.732	1	0.67	0.7	0.5	
Probe Positioning	4.70	R	1.732	1	0.67	2.7	1.8	
Extrapolation and Interpolation	1.00	R	1.732	1	1	0.6	0.6	
Test sample Related								
Test Positioning Vertical	4.70	R	1.732	1	0.67	2.7	1.8	
Test Positioning Lateral	1.00	R	1.732	1	1	0.6	0.6	
Device Holder and Phantom	2.40	R	1.732	1	1	1.4	1.4	
Power Drift	5.00	R	1.732	1	1	2.9	2.9	
Phantom and Setup Related								
Phantom Thickness	2.40	R	1.732	1	0.67	1.4	0.9	
Combined Std. Uncertainty						14.7	10.9	
Expanded Std. Uncertainty on Power						29.4	21.8	
Expanded Std. Uncertainty on Field						14.7	10.9	
Notesfor table								
1. N - Nomal								
2. R - Rectangular								
3. Div Divisor used to obtain standard uncertainty								

4. Ci - is te sensitivity coefficient

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5. Equipment Under Test

GSM AND WCDMA PHONE WITH BLUETOOTH, NFC AND WLAN

Model: E960, LGE960, LG-E960

Normal operation	Held to head					
Accessory	Wireless Charging Battery Cover with NFC					

5.1. List of Air Interfaces/Bands & Operating Modes

Air- Interface	Bands (MHz)	Туре	C63.19/ Tested	Simultaneous Transmissions Note: Not to be tested	Concurrent single transmission	Reduced power 20.19 (c) (1)	Voice Over Digital Transport (Data)
	850	VO	Yes	Yes:	Yes: GPRS/EDGE,	Ν/Δ	Ν/Δ
GSM	1900	0	Yes	with WiFi/Bluetooth	WiFi and Bluetooth	N/A	IN/A
	GPRS/EDGE	DT	N/A	N/A	Yes: * see note	N/A	N/A
W-CDMA	Bands V, IV & II R 99	VO	Yes	Yes: with WiFi/Bluetooth	Yes: HSPA+, WiFi and Bluetooth	N/A	N/A
	HSPA+	DT	N/A	N/A	Yes: * see note	N/A	Yes
WiFi	2450	DT	N/A	Yes with GSMW-CDMA	Yes with GSMW-CDMA	N/A	Vac
	5000	DT	N/A	Yes with GSMW-CDMA	Yes with GSMW-CDMA	N/A	Yes
Bluetooth	2400	DT	N/A	Yes with GSMW-CDMA	N/A	N/A	N/A
VO Voice CMRS/PTSN Service OnlyNote: * HAC Rating was not base on concurrent voice and dataV/D Voice CMRS/PSTN and Data Servicemodes, Noncurrent mode was found to represent worst caseDT Digital Transportrating.							

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6. System Specifications

E-field and H-field measurements are performed using the DASY5 automated dosimetric assessment system. The DASY5 is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland.

The DASY5 HAC Extension consists of the following parts:

Test Arch Phantom

The specially designed Test Arch allows high precision positioning of both the device and any of the validation dipoles.

ER3DV6 Isotropic E-Field Probe

Construction:	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)
Calibration:	In air from 100 MHz to 3.0 GHz (absolute accuracy ±6.0%, k=2)
Frequency:	100 MHz to > 6 GHz; Linearity: \pm 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; 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 The closest part of the sensor element is 1.1 mm closer to the tip
Application:	General near-field measurements up to 6 GHz Field component measurements
H3DV6 3-Dimensional	H-Field Probe
Construction:	Three concentric loop sensors with 3.8 mm loop diameters resistively loaded detector diodes for linear response Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)
Frequency:	200 MHz to 3 GHz (absolute accuracy \pm 6.0%, k=2); Output linearized
Directivity:	± 0.25 dB (spherical isotropy error)
Dynamic Range:	10 mA/m to 2 A/m at 1 GHz
E-Field Interference:	< 10% at 3 GHz (for plane wave)
Dimensions:	Overall length: 330 mm (Tip: 40 mm) Tip diameter: 6 mm (Body: 12 mm) Distance from probe tip to dipole centers: 3 mm The closest part of the sensor element is 1.9 mm closer to the tip
Application:	General magnetic near-field measurements up to 3 GHz Field component measurements Surface current measurements Measurements in air or liquids

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Low interaction with the measured field

7. System Validation

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

Procedure

Place a dipole antenna meeting the requirements given in ANSI-PC63.19 2007 in the normally occupied by the WD.

The dipole antenna serves as a known source for an electrical and magnetic output. Position the E-field and H-field probes so that:

- The probes and their cables are parallel to the coaxial feed of the dipole antenna
- The probe cables and the coaxial feed of the dipole antenna approach the measurement area from opposite directions; and
- The center point of the probe element(s) are 10 mm from the closest surface of the dipole elements.

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



Setup diagram

7.1. System Validation Results

E-field

			Max. measured from		Average max.	E-field Target	
Calibration Dipole	f (MHz)	Input Power (mW)	above high end (V/m)	above low end (V/m)	above arm (V/m)	Values (V/m) (From SPEAG)	Deviation ¹⁾ (%)
CD835V3 SN 1014	835	100	164.5	163.0	163.75	161.8	1.21
CD1880V3 SN 1122	1880	100	146.3	144.5	145.40	140.9	3.19
CD1880V3 SN 1122	1730	100	147.4	143.9	145.65	153.6	-5.18

H-field

Calibration Dipole	f (MHz)	Input Power (mW)	Measured H-field (A/m)	H-field Target Values (A/m) (From SPEAG)	Deviation ¹⁾ (%)
CD835V3 SN 1014	835	100	0.457	0.460	-0.65
CD1880V3 SN 1122	1880	100	0.453	0.459	-1.31
CD1880V3 SN 1122	1730	100	0.499	0.487	2.46

Notes:

1) Delta (Deviation) % = 100 * (Measured value minus Target value) divided by the Target value. Deltas within ±25% are acceptable, of which 12% is deviation and 13% is measurement uncertainty.

2) The maximum E-field or H-field were 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 plots.

8. Probe Modulation Factor (PMF)

Purpose

The HAC Standard requires measurement of the peak envelope E- and H-fields of the wireless device (WD). Para. 4.2.2.1, and C.3.1 of the standard describes the Probe Modulation Response Factor that shall be applied to convert the probe reading to Peak Envelope Field.

Definitions

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

Evaluation Procedure for Unknown PMF (DASY4 Application note, Section 28.8)

The proposed measurement setup corresponds to the procedure as required in the Standard, Chapter C.3.1.

- 1. Install a calibration dipole for the appropriate frequency band under the Test Arch Phantom and select the proper phantom section according to the probe type installed (E- or H-field). Move the probe to the field reference point. (Do not move the probe between the subsequent CW and modulated measurements.)
- 2. Install the field probe in the setup.
- 3. The modulated signal to the dipole must be monitored to record peak amplitude and compared to a CW signal with the same peak envelope level (e.g., with a directional coupler and a spectrum analyzer in zero span mode set to the operating frequency). To determine the peak envelope level of the modulated signal properly, the settings of a spectrum analyzer shall be as follows:
 - Resolution bandwidth >= emission bandwidth (4 MHz for UMTS bands, 300 kHz)
 - Video bandwidth >= 20 kHz
 - Span: zero
 - Center Frequency: nominal center frequency of channel
 - Detection: RMS detection with averaging turned on
 - Trigger: Video or IF trigger, adjusted to give a stable display of the transmission
 - Sweep rate: Sufficiently rapid to permit the transmit pulse to be resolved accurately. The sweep shall be long enough to show a complete transmission. The sweep time may be set to allow a full transmission cycle, displaying the on and off time.
- 4. Define a DASY4 document and set the procedure properties (frequency, modulation frequency and crest factor) according to the measured signal. Define a multimeter job for the field reading.
- 5. Define a second procedure for the evaluation of the CW signal (frequency set as above, modulation frequency = 0, crest factor = 1) and a multimeter job.

DATE: 8/28/2012

PMF Measurement Setup Diagram



The HAC measurement procedure is as follows:

- Modulated signals (WD and 80% AM) measurement: a)
 - 1) Connect the modulated signal using the appropriate frequency via the cable to the dipole.
 - 2) The signal to the dipole must be monitored to record peak amplitude with a directional coupler and a spectrum analyzer.
 - 3) Run the multimeter job in the procedure with the corresponding modulation setting in continuous mode.
 - 4) Read the envelope peak on the monitor in order to adjust the CW signal later to the same level.
- b) CW signal measurement:
 - 1) Change the signal to CW at the same center frequency, without touching or moving the dipole and probe in the setup.
 - Adjust the CW signal amplitude to the same peak level on the spectrum analyzer (keep the same 2) bandwidth and attenuation for CW and modulated signals).
 - 3) Run the multimeter job in the CW procedure in continuous mode.
 - 4) Read the multimeter total field display and note it together with modulation type and frequency.
 - Calculate the Probe Modulation Factor as the ratio between the CW multimeter field reading and the 5)

reading for the applicable modulation. I.e., $PMF = \frac{E_{cw}}{E_{mod}}$ and similar for H.

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8.1. PMF Measurement Results

GSM

Probe	Frequency (MHz)	Type of signal	E-field V/m	PMF	
	835	GSM	54.4	2 70	
E-Field Probe	000	CW	152.0	2.19	
	1880	GSM	29.8	2 82	
	1000	CW	83.9	2.02	
Probe	Frequency (MHz)	Type of signal	H-field A/m	PMF	
	835	GSM	0.144	2 70	
H-Field Probe	000	CW	0.402	2.19	
	1880	GSM	0.132	2.84	
	1000	CW	0.375	∠.04	

W-CDMA

Probe	Frequency (MHz)	Type of signal	E-field V/m	PMF	
	925	UMTS	49.66	0.80	
	000	CW	44.30	0.89	
E-Field Probe	1730	UMTS	37.29	0.06	
	1750	CW	35.79	0.90	
	1990	UMTS	36.90	0.06	
	1000	CW	35.30	0.90	
Probe	Frequency (MHz)	Type of signal	H-field A/m	PMF	
	835	UMTS	0.144	0.00	
	000	CW	0.129	0.90	
H-Field Probe	1720	UMTS	0.132	0.05	
	1730	CW	0.126	0.95	
	1990	UMTS	0.128	0.05	
	1000	CW	0.122	0.95	

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9. HAC RF Emissions Test Procedure

The following are step-by-step test procedures.

- 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.
- 3. Configure the WD normal operation for maximum rated RF output power, at the desired channel and other operating parameters, (e.g. test mode) as intended for the test.
- 4. The center sub-grid shall be centered on the center of the WD output (acoustic or T-coil output), as appropriate. Locate the field probe at the initial test position in the 5 x 5 cm grid, which is contained in the measurement plane, see illustrated in Figure 5.
- 5. Record the reading.
- 6. Scan the entire 5 x 5 cm region in equally spaced increments and record the reading at each measurement point. The distance between measurement points shall be sufficient to assure the identification of the peak reading.
- 7. Identify the five contiguous sub-grids around the center sub-grid with the lowest maximum strength readings. Thus the 6 areas to be used to determine the WD's peak emissions are identified and outlined for the final manual scan. Please note that a maximum of five blocks can be excluded for both E- and H-field measurements for the WD output being measured. State another way, the center sub-grid and 3 other must be common to both the E- and H-field measurements.
- 8. Identify the highest field reading within the non-excluded sub-grids identified in step 7.
- 9. Convert the highest field reading within identified in step 8 to peak V/m or A/m, as appropriate.
- 10. Repeat steps 1-10 for both the E- and H-field measurements.
- 11. Compare this reading to the categories in ANSI-PC63.19 and record the resulting category. The lowest category number listed in ANSI-PC63.19 obtained in step 10 for either E or H field determines the M category for the audio coupling mode assessment. Record the WD category rating.

Test flowchart Per ANSI-PC63.19 2007



10. RF Emissions Measurement Criteria

Telephone near-field Categories in linear units

		Telephone RF Parameters			
		< 960 MHz		> 960 MHz	
		E-Field	H-Field	E-Field	H-Field
Category	AWF	Emissions (V/m)	Emissions (A/m)	Emissions (V/m)	Emissions (A/m)
Ma	0	199.5 to 354.8	0.60 to 1.07	63.1 to 112.2	0.19 to 0.34
IVIS	-5	149.6 to 266.1	0.45 to 0.80	47.3 to 84.1	0.14 to 0.25
MA	0	< 199.5	< 0.60	< 63.1	< 0.19
1014	-5	< 149.6	< 0.45	< 47.3	< 0.14

HAC (RF Emissions) Test Results

11. Summary of Test Results

11.1. E-Field Emissions

			5145	Peak	
Operating Mode	Ch. No.	f (MHZ)	PMF	E-Field (V/m)	M-Rating
	128	824.2		132.0	M4
GSM850	190	836.6	2.79	156.1	M3
	251	848.8		162.4	M3
	512	1850.2		46.428	M4
GSM1900	661	1880.0	2.82	52.443	M3
	810	1909.8		58.991	M3
W-CDMA band V	4132	826.4	0.89	52.911	M4
	4182	836.4		50.951	M4
R99 RIVIC 12.2kbps	4233	846.6		49.316	M4
	1312	1712.4		36.479	M4
	1412	1732.4	0.96	33.074	M4
R99 RIVIC 12.2kbps	1862	1752.5		29.544	M4
W-CDMA band II	9262	1852.4	0.96	21.987	M4
POO PMC 12 2kbpc	9400	1880.0		24.709	M4
Raa Rivic 12.2kbps	9538	1907.6		25.530	M4

11.2. H- Field Emissions

				Peak	
Operating Mode	Ch. No.	f (MHz)	PMF	H-Field (A/m)	M-Rating
	128	824.2		0.190	M4
GSM850	190	836.6	2.79	0.212	M4
	251	848.8		0.233	M4
	512	1850.2		0.177	M3
GSM1900	661	1880.0	2.84	0.186	M3
	810	1909.8		0.206	M3
W-CDMA band V	4132	826.4	0.90	0.079	M4
POO PMC 12 2kbpc	4182	836.4		0.077	M4
R99 RIVIC 12.2kbps	4233	846.6		0.078	M4
W-CDMA band IV	1312	1712.4		0.098	M4
	1412	1732.4	0.95	0.088	M4
R99 RIVIC 12.2kbps	1862	1752.5		0.083	M4
W-CDMA band II	9262	1852.4	0.95	0.078	M4
POO PMC 12 2kbps	9400	1880.0		0.079	M4
Reg Rive 12.2kbps	9538	1907.6		0.087	M4

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12. Worst-case Test Plots

E-field worst-cast test plot for Part 22

Date: 8/19/2012

Test Laboratory: UL CCS SAR Lab C

GSM 850

Communication System: GPRS-FDD (TDMA, GMSK, 1 slot); Frequency: 848.8 MHz; Duty Cycle: 1:8.00018 Phantom section: RF Section

DASY5 Configuration:

- Probe: ER3DV6 SN2339; ConvF(1, 1, 1); Calibrated: 1/20/2012
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012

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

- Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.4.5 (3634)

E-Field/H ch/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 162.4 V/m Probe Modulation Factor = 2.790 Device Reference Point: 0, 0, -6.3 mm Reference Value = 72.184 V/m; Power Drift = 0.36 dB

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

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
139.0 M4	159.6 M3	151.7 M3
Grid 4	Grid 5	Grid 6
142.3 M4	162.4 M3	153.0 M3
Grid 7	Grid 8	Grid 9
140.0 M4	157.8 M3	151.0 M3



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E-field worst-cast test plot for Part 27

Date: 8/19/2012

DATE: 8/28/2012

Test Laboratory: UL CCS SAR Lab C

W-CDMA Band IV

Communication System: UMTS-FDD (WCDMA); Frequency: 1712.4 MHz; Duty Cycle: 1:1 Phantom section: RF Section

DASY5 Configuration:

- Probe: ER3DV6 - SN2339; ConvF(1, 1, 1); Calibrated: 1/20/2012

- Sensor-Surface: (Fix Surface)

- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012

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

- Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.4.5 (3634)

E-Field/L ch/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 36.479 V/m Probe Modulation Factor = 0.960 Device Reference Point: 0, 0, -6.3 mm Reference Value = 40.455 V/m; Power Drift = 0.0094 dB

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

Peak E-field in V/m				
Grid 1	Grid 2	Grid 3		
27.923 M4	28.579 M4	27.838 M4		
Grid 4	Grid 5	Grid 6		
29.864 M4	36.479 M4	36.017 M4		
Grid 7	Grid 8	Grid 9		
36.258 M4	40.450 M4	39.129 M4		



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Date: 8/19/2012

Test Laboratory: UL CCS SAR Lab C

GSM 1900

Communication System: GPRS-FDD (TDMA, GMSK, 1 slot); Frequency: 1909.8 MHz; Duty Cycle: 1:8.00018 Phantom section: RF Section

DASY5 Configuration:

- Probe: ER3DV6 - SN2339; ConvF(1, 1, 1); Calibrated: 1/20/2012

- Sensor-Surface: (Fix Surface)

- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012

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

- Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.4.5 (3634)

E-Field/H ch/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 58.991 V/m Probe Modulation Factor = 2.820 Device Reference Point: 0, 0, -6.3 mm Reference Value = 13.076 V/m; Power Drift = -0.21 dB

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

Peak E-field in V/m				
Grid 1	Grid 2	Grid 3		
68.306 M3	69.737 M3	60.697 M3		
Grid 4	Grid 5	Grid 6		
31.553 M4	40.911 M4	40.759 M4		
Grid 7	Grid 8	Grid 9		
58.129 M3	58.991 M3	53.575 M3		



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Date: 8/20/2012

Test Laboratory: UL CCS SAR Lab C

GSM 850

Communication System: GPRS-FDD (TDMA, GMSK, 1 slot); Frequency: 848.8 MHz; Duty Cycle: 1:8.00018 Phantom section: RF Section

DASY5 Configuration:

- Probe: H3DV6 - SN6157; ; Calibrated: 1/30/2012

- Sensor-Surface: (Fix Surface)

- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012

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

- Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.4.5 (3634)

H-Field/H ch/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.233 A/m Probe Modulation Factor = 2.790 Device Reference Point: 0, 0, -6.3 mm Reference Value = 0.054 A/m; Power Drift = -0.0058 dB Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak H-fiel	d in A/m
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Grid 1	Grid 2	Grid 3
0.322 M4	0.233 M4	0.129 M4
Grid 4	Grid 5	Grid 6
0.282 M4	0.202 M4	0.118 M4
Crid 7	Crid Q	Crid 0
Ullu /	Gilu o	Gilu 9



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H-field worst-cast test plot for Part 27

Date: 8/19/2012

Test Laboratory: UL CCS SAR Lab C

W-CDMA Band IV

Communication System: UMTS-FDD (WCDMA); Frequency: 1712.4 MHz; Duty Cycle: 1:1 Phantom section: RF Section DASY5 Configuration:

- Probe: H3DV6 - SN6157; ; Calibrated: 1/30/2012

- Sensor-Surface: (Fix Surface)

- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012

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

- Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.4.5 (3634)

H-Field/L ch/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.098 A/m Probe Modulation Factor = 0.950 Device Reference Point: 0, 0, -6.3 mm Reference Value = 0.105 A/m; Power Drift = -0.08 dB

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



0.098 M4	0.083 M4	0.072 M4
Grid 7	Grid 8	Grid 9
0.092 M4	0.095 M4	0.086 M4
Grid 4	Grid 5	Grid 6
0.098 M4	0.098 M4	0.086 M4
Grid 1	Grid 2	Grid 3



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H-field worst-cast test plot for Part 24

Date: 8/19/2012

Test Laboratory: UL CCS SAR Lab C

GSM 1900

Communication System: GPRS-FDD (TDMA, GMSK, 1 slot); Frequency: 1909.8 MHz; Duty Cycle: 1:8.00018 Phantom section: RF Section

DASY5 Configuration:

- Probe: H3DV6 - SN6157; ; Calibrated: 1/30/2012

- Sensor-Surface: (Fix Surface)

- Electronics: DAE4 Sn1239; Calibrated: 6/6/2012

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

- Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.4.5 (3634)

H-Field/H ch/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.206 Å/m Probe Modulation Factor = 2.840 Device Reference Point: 0, 0, -6.3 mm Reference Value = 0.089 Å/m; Power Drift = -0.02 dB

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

Peak	H-field	in	A/m

Grid 1	Grid 2	Grid 3
0.201 M3	0.200 M3	0.187 M3
Grid 4	Grid 5	Grid 6
0.191 M3	0.206 M3	0.192 M3
Grid 7	Grid 8	Grid 9
0.176 M3	0.194 M3	0.183 M3



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13. Appendixes

Refer to separated files for the following appendixes

- 13.1. System Validation Plots
- 13.2. E-Field Emissions Test Plots
- 13.3. H-Field Emissions Test Plots
- 13.4. Calibration Certificate E-Field Probe ER3DV6 SN 2339
- 13.5. Calibration Certificate H-Field Probe H3DV6 SN 6157
- 13.6. Calibration Certificate for Dipole CD835V3 SN 1014
- 13.7. Calibration Certificate for Dipole CD1880V3 SN 1122