SAR Evaluation Report

IN ACCORDANCE WITH THE REQUIREMENTS OF
FCC OET BULLETIN 65 SUPPLEMENT C

FOR

EMBEDDED WIRELESS RADIO MODEM INSTALLED IN A CN3 HANDHELD COMPUTER

MODEL: CN3

FCC ID: EHA-07CN3

REPORT NUMBER: 07U11266-3

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Prepared for

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issued date	Revisions	Revised By
--	September 10, 2007	Initial issue	Hsin Fu Shih

CERTIFICATE OF COMPLIANCE (SAR EVALUATION)

DATES OF TEST: August 21, 31, and September 4, 7, and 10 2007

APPLICANT: ADDRESS:	Intermec Technologies Corporation 550 Second Street SE, Cedar Rapids, Iowa 52401, USA
FCC ID: MODEL:	EHA-07CN3 CN3
DEVICE CATEGORY: EXPOSURE CATEGORY:	Portable Device General Population/Uncontrolled Exposure

Embedded wireless radio modem installed in a CN3 handheld computer includes EM5626 CDMA radio FCC ID: EHA-07CN3, along with 802.11b/g and Bluetooth Combo Radio DHIB Module FCC ID: EHA-06CN3 DHIB

Test Sample is a:	Production unit		
Rule Parts	Frequency Range [MHz]	The Highest SAR Values [1g_mW/g]	Collocation SAR Values [1g_mW/g]
FCC 22H	824 - 849	Body: 0.287 Head: 1.162	Body: 0.280 Head: 1.265
FCC 24E	1850 - 1910	Body: 0.937 Head: 1.297	Body:1.094 Head: 1.460

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for General Population/Uncontrolled Exposure limits specified in ANSI/IEEE Std. C95.1-1992 and had been tested in accordance with the measurement procedures specified in FCC OET 65 Supplement C (Edition 01-01).

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 Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Hsin Fu Shih
Engineering Supervisor
Compliance Certification Services

Tested By:

Jonathan King
EMC Engineer
Compliance Certification Services

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1 DEVICE UNDER TEST (DUT) DESCRIPTION

Embedded wireless radio modem installed in a CN 3 handheld computer includes EM5626 CDMA radio along with 802.11bg and Bluetooth Combo Radio DHIB Module	
Normal operation:	Head and body position with holster
Accessories:	Holster: Koszegi Asia Limited PN# 815-061-001 Standard Holster: Koszegi Asia Limited PN# 815-062-001 with Scan Handle Scan Handle: PN# 203-839-001
Duty cycle:	100% for CDMA200 1xEV-DO and 1xRTT mode
Power supply:	3.7V Nominal Lithium-Ion PN# 318-016-002 – High Capacity

2 FACILITIES AND ACCREDITATION

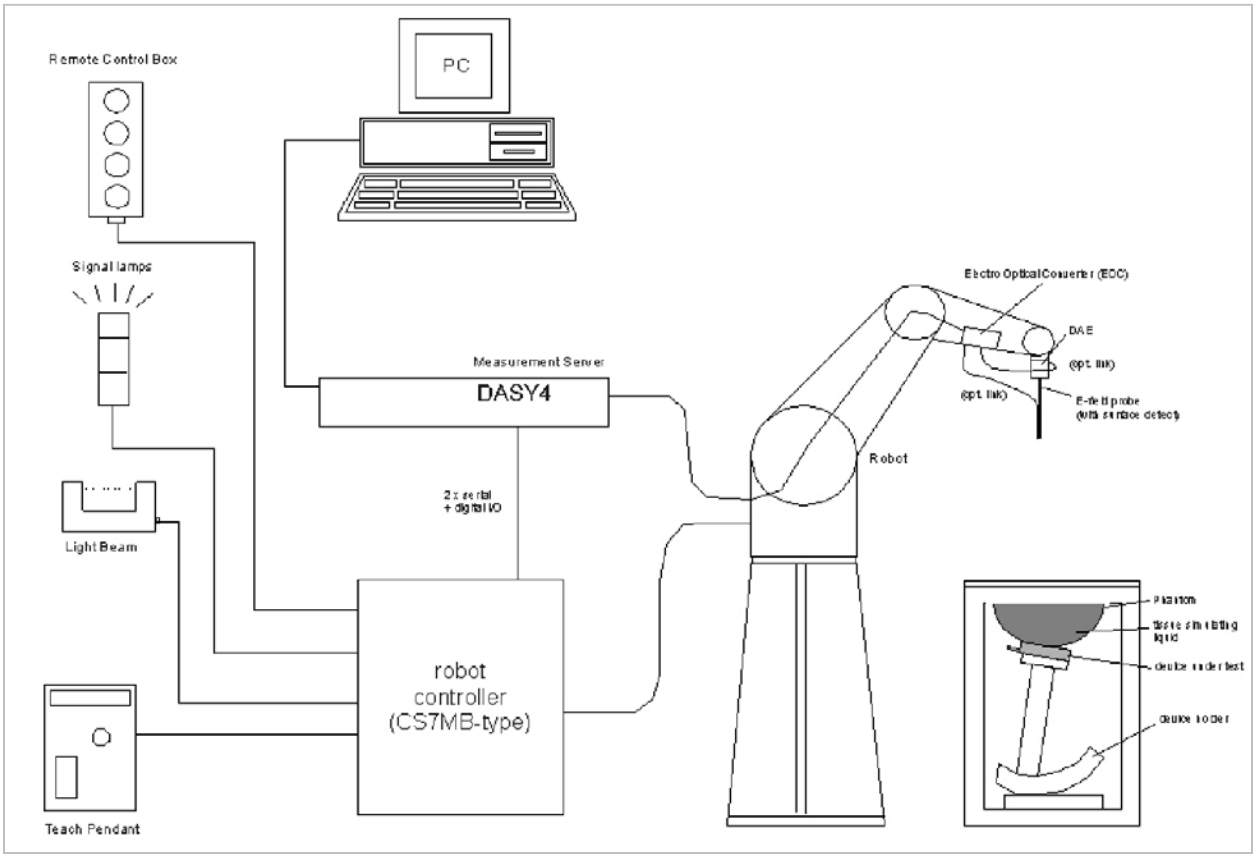
The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, CA 94538 USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

NVLAP LAB CODE 200065-0

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

No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

3 SYSTEM DESCRIPTION



The DASY4 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000 or Windows XP.
- DASY4 software.
- Remote controls with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

3.1 COMPOSITION OF INGREDIENTS FOR TISSUE SIMULATING LIQUIDS

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

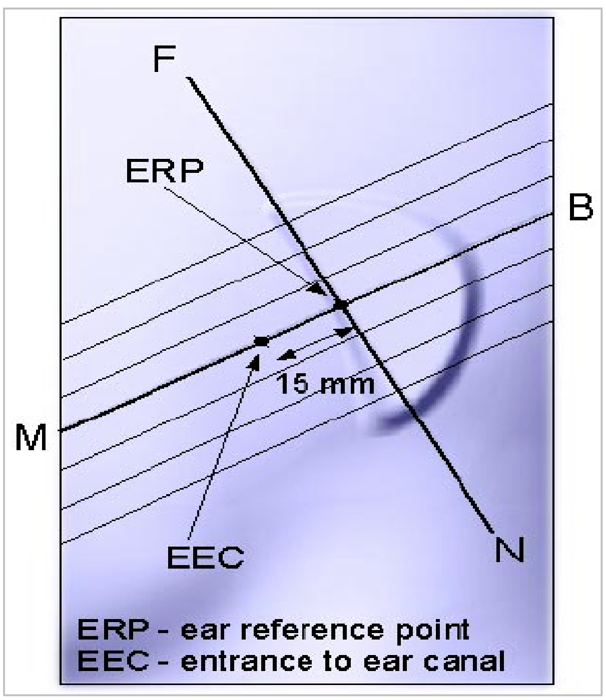
Ingredients (% by weight)	Frequency (MHz) 450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

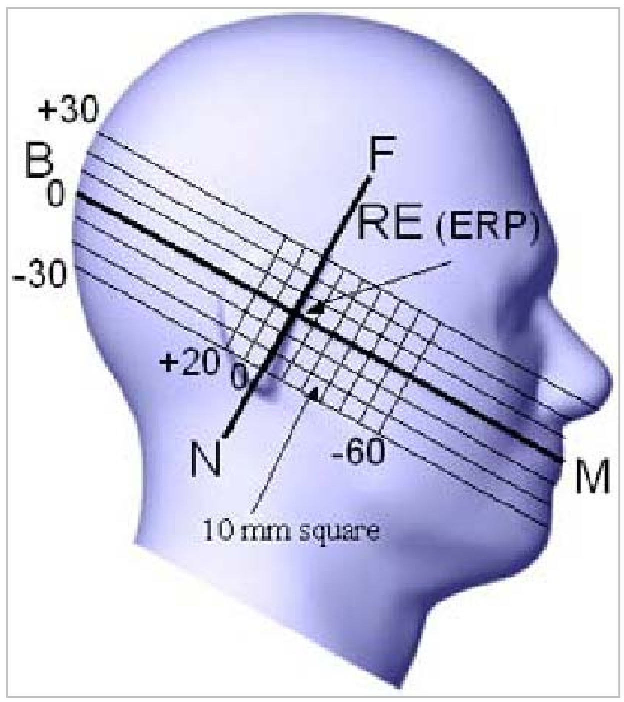
Salt: 99+% Pure Sodium Chloride
Sugar: 98+% Pure Sucrose
Water: De-ionized, 16 MΩ+ resistivity
HEC: Hydroxyethyl Cellulose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

4 TEST POSITIONS FOR DEVICES OPERATING NEXT TO A PERSON'S EAR

This category includes most wireless handsets with fixed, retractable or internal antennas located toward the top half of the device, with or without a foldout, sliding or similar keypad cover. The handset should have its earpiece located within the upper ¼ of the device, either along the centerline or off-centered, as perceived by its users. This type of handset should be positioned in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point". The "test device reference point" should be located at the same level as the center of the earpiece region. The "vertical centerline" should bisect the front surface of the handset at its top and bottom edges. A "ear reference point" is located on the outer surface of the head phantom on each ear spacer. It is located 1.5 cm above the center of the ear canal entrance in the "phantom reference plane" defined by the three lines joining the center of each "ear reference point" (left and right) and the tip of the mouth.

A handset should be initially positioned with the earpiece region pressed against the ear spacer of a head phantom. For the SCC-34/SC-2 head phantom, the device should be positioned parallel to the "N-F" line defined along the base of the ear spacer that contains the "ear reference point". For interim head phantoms, the device should be positioned parallel to the cheek for maximum RF energy coupling. The "test device reference point" is aligned to the "ear reference point" on the head phantom and the "vertical centerline" is aligned to the "phantom reference plane". This is called the "initial ear position". While maintaining these three alignments, the body of the handset is gradually adjusted to each of the following positions for evaluating SAR:





4.1 CHEEK/TOUCH POSITION

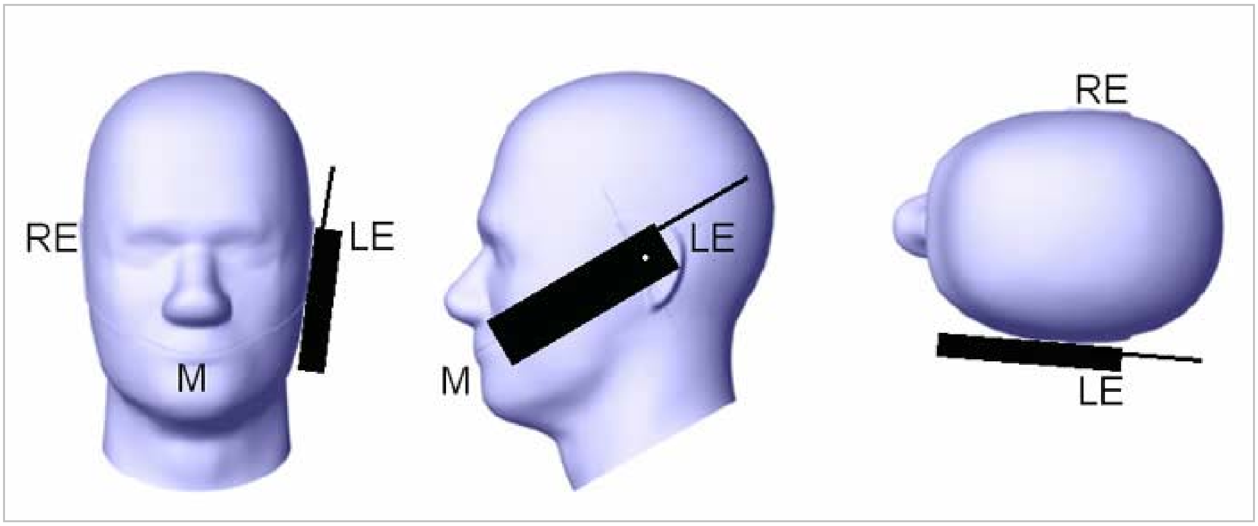
The device is brought toward the mouth of the head phantom by pivoting against the “ear reference point” or along the “N-F” line for the SCC-34/SC-2 head phantom.

This test position is established:

i. When any point on the display, keypad or mouthpiece portions of the handset is in contact with the phantom.
ii. (or) When any portion of a foldout, sliding or similar keypad cover opened to its intended self-adjusting normal use position is in contact with the cheek or mouth of the phantom.

For existing head phantoms – when the handset loses contact with the phantom at the pivoting point, rotation should continue until the device touches the cheek of the phantom or breaks its last contact from the ear spacer.

Cheek / Touch Position



4.2 EAR/TILT POSITION

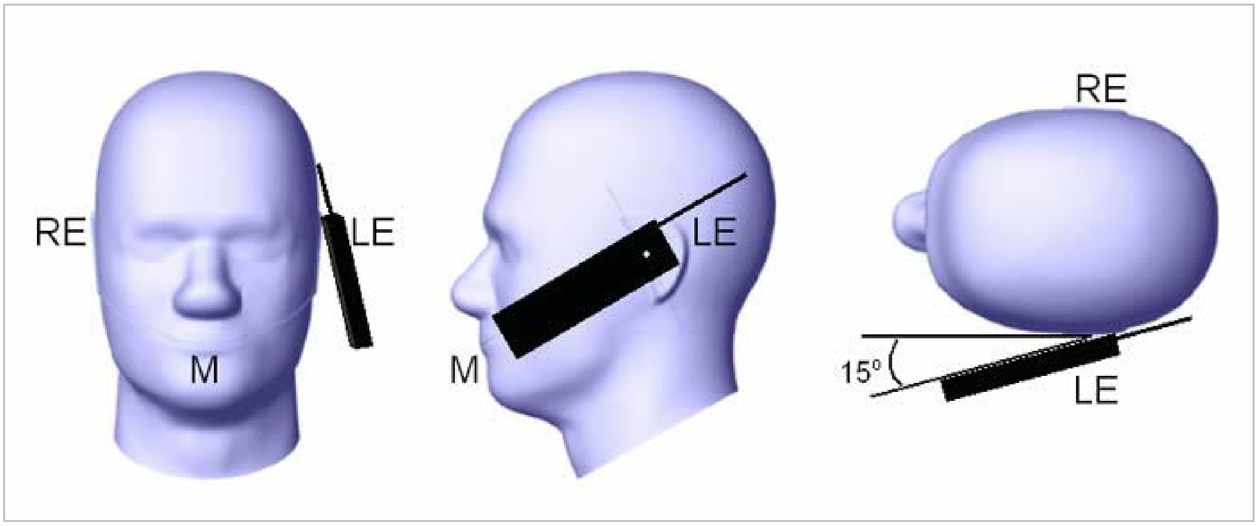
With the handset aligned in the “Cheek/Touch Position”:

i. If the earpiece of the handset is not in full contact with the phantom’s ear spacer (in the “Cheek/Touch position”) and the peak SAR location for the “Cheek/Touch” position is located at the ear spacer region or corresponds to the earpiece region of the handset, the device should be returned to the “initial ear position” by rotating it away from the mouth until the earpiece is in full contact with the ear spacer.

ii. (otherwise) The handset should be moved (translated) away from the cheek perpendicular to the line passes through both “ear reference points” (note: one of these ear reference points may not physically exist on a split head model) for approximate 2-3 cm. While it is in this position, the device handset is tilted away from the mouth with respect to the “test device reference point” until the inside angle between the vertical centerline on the front surface of the phone and the horizontal line passing through the ear reference point is by 15°. After the tilt, it is then moved (translated) back toward the head perpendicular to the line passes through both “ear reference points” until the device touches the phantom or the ear spacer. If the antenna touches the head first, the positioning process should be repeated with a tilt angle less than 15° so that the device and its antenna would touch the phantom simultaneously. This test position may require a device holder or positioner to achieve the translation and tilting with acceptable positioning repeatability.

If a device is also designed to transmit with its keypad cover closed for operating in the head position, such positions should also be considered in the SAR evaluation. The device should be tested on the left and right side of the head phantom in the “Cheek/Touch” and “Ear/Tilt” positions. When applicable, each configuration should be tested with the antenna in its fully extended and fully retracted positions. These test configurations should be tested at the high, middle and low frequency channels of each operating mode; for example, AMPS, CDMA, and TDMA. If the SAR measured at the middle channel for each test configuration (left, right, Cheek/Touch, Tilt/Ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s). If the transmission band of the test device is less than 10 MHz, testing at the high and low frequency channels is optional.

Ear/Tilt 15° Position



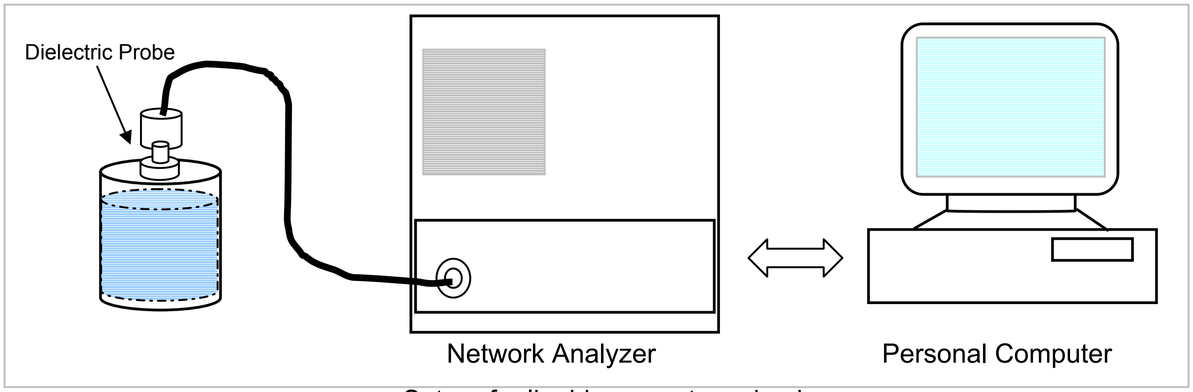
4.3 TEST POSITIONS FOR BODY-WORN AND OTHER SIMILAR CONFIGURATIONS

Without the belt-clips or holsters

Body-worn accessories may not always be supplied or available as options for some devices that are intended to be authorized for body-worn use. A separation distance of 1.5 cm between the back of the device and a flat phantom is recommended for testing body-worn SAR compliance under such circumstances. Other separation distances may be used, but they should not exceed 2.5 cm. In these cases, the device may use body-worn accessories that provide a separation distance greater than that tested for the device provided however that the accessory contains no metallic components.

5 SIMULATING LIQUID PARAMETERS CHECK

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine of the dielectric parameters are within the tolerances of the specified target values. The relative permittivity and conductivity of the tissue material should be within ± 5% of the values given in the table below.



Set-up for liquid parameters check

Reference Values of Tissue Dielectric Parameters for Head and Body Phantom (for 150 – 3000 MHz and 5800 MHz)

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in IEEE Standard 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations and extrapolated according to the head parameters specified in IEEE Standard 1528.

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

5.1 SIMULATING LIQUID PARAMETER CHECK RESULT

Simulating Liquid Dielectric Parameters Check Result @ Head 835 MHz

Room Ambient Temperature = 23°C; Relative humidity = 55% Measured by: Jonathan King

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
835	22	15	e'	43.4153	Relative Permittivity (ϵ_r):	43.4153	41.5	4.62	± 5
			e''	19.3490	Conductivity (σ):	0.89880	0.90	-0.13	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
August 21, 2007 09:26 AM

Frequency	e'	e''
800000000.	43.7320	19.3056
805000000.	43.7024	19.3120
810000000.	43.6586	19.3224
815000000.	43.6086	19.3453
820000000.	43.5703	19.3861
825000000.	43.5412	19.3812
830000000.	43.4708	19.3777
835000000.	**43.4153**	**19.3490**
840000000.	43.3402	19.3580
845000000.	43.2760	19.3640
850000000.	43.2177	19.3162
855000000.	43.1670	19.2563
860000000.	43.0631	19.2234
865000000.	43.0322	19.1898
870000000.	42.9624	19.1274
875000000.	42.8956	19.1055
880000000.	42.8277	19.0439
885000000.	42.7904	19.0140
890000000.	42.7375	19.0294
895000000.	42.7171	18.9847
900000000.	42.6825	18.9896
905000000.	42.6250	18.9818
910000000.	42.5827	19.0039
915000000.	42.5264	19.0255
920000000.	42.4360	19.0284
925000000.	42.3460	19.0753
930000000.	42.2858	19.0740
935000000.	42.2121	19.0578
940000000.	42.1771	19.0392
945000000.	42.1313	19.0147
950000000.	42.0889	18.9990

The conductivity (σ) can be given as:

$$\sigma = \omega\varepsilon_0 e'' = 2\pi f \varepsilon_0 e''$$

where $f = \text{target } f * 10^6$
$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Dielectric Parameters Check Result @ Head 1900 MHz

Room Ambient Temperature = 23°C; Relative humidity = 55% Measured by: Jonathan King

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
1900	22	15	e'	38.4262	Relative Permittivity (ε_r):	38.4262	40.0	-3.93	± 5
			e"	13.5320	Conductivity (σ):	1.43032	1.40	2.17	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
September 04, 2007 09:18 AM

Frequency	e'	e"
1710000000.	39.2027	13.0314
1720000000.	39.1685	13.0766
1730000000.	39.1348	13.1091
1740000000.	39.0740	13.1509
1750000000.	39.0295	13.1652
1760000000.	38.9957	13.1856
1770000000.	38.9684	13.1992
1780000000.	38.9345	13.2257
1790000000.	38.8865	13.2516
1800000000.	38.8411	13.2849
1810000000.	38.7892	13.3252
1820000000.	38.7485	13.3619
1830000000.	38.6618	13.3994
1840000000.	38.6067	13.4271
1850000000.	38.5656	13.4466
1860000000.	38.5471	13.4377
1870000000.	38.5382	13.4675
1880000000.	38.5066	13.4874
1890000000.	38.4697	13.5017
1900000000.	**38.4262**	**13.5320**
1910000000.	38.3924	13.5857

The conductivity (σ) can be given as:

$$\sigma = \omega\varepsilon_0\, e'' = 2\,\pi\, f\, \varepsilon_0\, e''$$

where $f = \text{target } f * 10^6$
$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Dielectric Parameters Check Result @ Muscle 835 MHz

Room Ambient Temperature = 23°C; Relative humidity = 50% Measured by: Jonathan King

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
835	22	15	e'	53.4552	Relative Permittivity (ε_r):	53.4552	55.2	-3.16	± 5
			e''	21.3124	Conductivity (σ):	0.99001	0.97	2.06	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
August 31, 2007 03:30 PM

Frequency	e'	e''
800000000.	54.9253	20.9970
805000000.	54.7448	21.0006
810000000.	54.5251	21.0134
815000000.	54.2669	21.1140
820000000.	54.0521	21.1545
825000000.	53.8357	21.2130
830000000.	53.6190	21.2776
835000000.	**53.4552**	**21.3124**
840000000.	53.4075	21.3276
845000000.	53.3563	21.3002
850000000.	53.3612	21.2743
855000000.	53.4805	21.2926
860000000.	53.5876	21.2494
865000000.	53.7318	21.1914
870000000.	53.8655	21.1364
875000000.	54.0247	21.0385
880000000.	54.1876	20.9809
885000000.	54.3181	20.9242
890000000.	54.4404	20.8486
895000000.	54.5318	20.7635
900000000.	54.5169	20.7415
905000000.	54.4342	20.7572
910000000.	54.2893	20.8084
915000000.	54.0561	20.8023
920000000.	53.7715	20.8541
925000000.	53.4316	20.8367
930000000.	53.0943	20.8046
935000000.	52.7938	20.7797
940000000.	52.5313	20.7413
945000000.	52.3617	20.6771
950000000.	52.2028	20.6601

The conductivity (σ) can be given as:

$$\sigma = \omega\varepsilon_0 e'' = 2\pi f \varepsilon_0 e''$$

where $f = \text{target } f * 10^6$
$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Dielectric Parameters Check Result @ Muscle 1900 MHz

Room Ambient Temperature = 23°C; Relative humidity = 55% Measured by: Jonathan King

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
1900	22	15	e'	51.3033	Relative Permittivity (ε_r):	51.3033	53.3	-3.75	± 5
			e"	14.1109	Conductivity (σ):	1.49151	1.52	-1.87	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
August 31, 2007 09:27 AM

Frequency	e'	e"
1710000000.	51.8807	13.6154
1720000000.	51.8471	13.6589
1730000000.	51.8341	13.7255
1740000000.	51.7904	13.7377
1750000000.	51.7346	13.7457
1760000000.	51.7268	13.7579
1770000000.	51.6973	13.7806
1780000000.	51.6574	13.8014
1790000000.	51.6064	13.8281
1800000000.	51.5529	13.8750
1810000000.	51.5273	13.9059
1820000000.	51.4640	13.9616
1830000000.	51.4179	14.0139
1840000000.	51.3687	14.0266
1850000000.	51.3434	14.0405
1860000000.	51.3686	14.0288
1870000000.	51.3832	14.0401
1880000000.	51.3725	14.0732
1890000000.	51.3326	14.0789
1900000000.	**51.3033**	**14.1109**
1910000000.	51.2746	14.1532

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where $f = \text{target } f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Dielectric Parameters Check Result @ Muscle 1900 MHz

Room Ambient Temperature = 23°C; Relative humidity = 50% Measured by: Jonathan King

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
1900	22	15	e'	51.9431	Relative Permittivity (ϵ_r):	51.9431	53.3	-2.55	± 5
			e''	14.2634	Conductivity (σ):	1.50763	1.52	-0.81	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
September 07, 2007 01:22 PM

Frequency	e'	e''
1710000000.	52.6434	13.6076
1720000000.	52.6182	13.6582
1730000000.	52.5622	13.6903
1740000000.	52.5179	13.7385
1750000000.	52.4805	13.7704
1760000000.	52.4452	13.7935
1770000000.	52.4119	13.8296
1780000000.	52.3824	13.8807
1790000000.	52.3401	13.9139
1800000000.	52.3247	13.9426
1810000000.	52.2778	13.9909
1820000000.	52.2426	14.0295
1830000000.	52.1884	14.0560
1840000000.	52.1303	14.1006
1850000000.	52.0890	14.1455
1860000000.	52.0636	14.1696
1870000000.	52.0188	14.1896
1880000000.	51.9973	14.2178
1890000000.	51.9645	14.2312
1900000000.	**51.9431**	**14.2634**
1910000000.	51.9073	14.3051

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where $f = \text{target } f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Dielectric Parameters Check Result @ Muscle 835 MHz

Room Ambient Temperature = 23°C; Relative humidity = 55% Measured by: Jonathan King

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
835	22	15	e'	54.3599	Relative Permittivity (ε_r):	54.3599	55.2	-1.52	± 5
			e''	21.0704	Conductivity (σ):	0.97876	0.97	0.90	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
September 10, 2007 09:13 AM

Frequency	e'	e''
800000000.	54.5645	20.9431
805000000.	54.5215	20.9782
810000000.	54.5179	20.9934
815000000.	54.5236	21.0160
820000000.	54.4810	21.0108
825000000.	54.4475	21.0581
830000000.	54.4279	21.0942
835000000.	**54.3599**	**21.0704**
840000000.	54.3027	21.0431
845000000.	54.2466	21.0156
850000000.	54.2095	20.9488
855000000.	54.1185	20.8811
860000000.	54.0453	20.8292
865000000.	53.9602	20.7718
870000000.	53.9021	20.7263
875000000.	53.8215	20.6474
880000000.	53.7583	20.5839
885000000.	53.6954	20.5738
890000000.	53.6377	20.5200
895000000.	53.6485	20.4922
900000000.	53.5991	20.5089
905000000.	53.5693	20.5594
910000000.	53.5326	20.5501
915000000.	53.4620	20.6214
920000000.	53.4112	20.6485
925000000.	53.3501	20.6849
930000000.	53.2926	20.6635
935000000.	53.2431	20.6596
940000000.	53.2014	20.6223
945000000.	53.2090	20.6055
950000000.	53.2171	20.5884

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where $f = \text{target } f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

6 SYSTEM PERFORMANCE CHECK

The system performance check is performed prior to any usage of the system in order to guarantee reproducible results. The system performance check verifies that the system operates within its specifications of ±10%.

System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the SAM twin phantom filled with Body simulating liquid of the following parameters.
- The DASY4 system with an Isotropic E-Field Probe EX3DV3-SN: 3554 was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 5 x 5 x 7 fine cube was chosen for cube integration(dx=dy=7.5mm; dz=5mm).
  For 5 GHz band - Special 8x8x8 fine cube was chosen for cube integration(dx=dy=4.3mm; dz=3mm)
- Distance between probe sensors and phantom surface was set to 4 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.0mm
- The dipole input power (forward power) was 250 mW±3%.
- The results are normalized to 1 W input power.

In the table below, the numerical reference SAR values of a SPEAG validation dipoles placed below the flat phantom filled with body-tissue simulating liquid are given. The reference SAR values were calculated using the finite-difference time-domain method and the geometry parameters.

Dipole Type	Distance (mm)	Frequency (MHz)	SAR (1g) [W/kg]	SAR (10g) [W/kg]	SAR (peak) [W/kg]
D450V2	15	450	5.01	3.36	7.22
D835V2	15	835	9.71	6.38	14.1
D900V2	15	900	11.1	7.17	16.3
D1450V2	10	1450	29.6	16.6	49.8
D1800V2	10	1800	38.5	20.3	67.5
D1900V2	10	1900	39.8	20.8	69.6
D2000V2	10	2000	40.9	21.2	71.5
D2450V2	10	2450	51.2	23.7	97.6

Note: All SAR values normalized to 1 W forward power.

7 SYSTEM PERFORMANCE CHECK

The system performance check is performed prior to any usage of the system in order to guarantee reproducible results. The system performance check verifies that the system operates within its specifications of ±10%.

System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the SAM twin phantom filled with Head simulating liquid of the following parameters.
- The DASY4 system with an Isotropic E-Field Probe EX3DV3-SN: 3554 was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 5 x 5 x 7 fine cube was chosen for cube integration(dx=dy=7.5mm; dz=5mm).
  For 5 GHz band - Special 8x8x8 fine cube was chosen for cube integration(dx=dy=4.3mm; dz=3mm)
- Distance between probe sensors and phantom surface was set to 4 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.0mm
- The dipole input power (forward power) was 250 mW±3%.
- The results are normalized to 1 W input power.

IEEE Standard 1528-2003 Recommended Reference Value.

Frequency (MHz)	Distance (mm)	1g SAR [W/kg]	10g SAR [W/kg]
300	15	3.0	2.0
450	15	4.9	3.3
835	15	9.5	6.2
900	15	10.8	6.9
1450	10	29.0	16.0
1800	10	38.1	19.8
1900	10	39.7	20.5
2000	10	41.1	21.1
2450	10	52.4	24.0
3000	10	63.8	25.7

Note: All SAR values normalized to 1 W forward power.

7.1 SYSTEM PERFORMANCE CHECK RESULTS

System Validation Dipole: D835V2 SN:4d002

Date: August 21, 2007

Ambient Temperature = 23°C; Relative humidity = 55% Measured by: Jonathan King

Head Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
835	22	15	1g	2.57	10.28	9.5	8.21	± 10
			10g	1.68	6.72	6.2	8.39	± 10

System Validation Dipole: D835V2 SN:4d002

Date: August 31, 2007

Ambient Temperature = 23°C; Relative humidity = 50% Measured by: Jonathan King

Body Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
835	22	15	1g	2.54	10.16	9.71	4.63	± 10
			10g	1.67	6.68	6.38	4.70	± 10

System Validation Dipole: D1900V2 SN:5d043

Date: August 31, 2007

Ambient Temperature = 23°C; Relative humidity = 55% Measured by: Jonathan King

Body Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1900	22	15	1g	9.86	39.44	39.8	-0.90	± 10
			10g	5.16	20.64	20.8	-0.77	± 10

System Validation Dipole: D1900V2 SN:5d043

Date: September 4, 2007

Ambient Temperature = 23°C; Relative humidity = 55% Measured by: Jonathan King

Head Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1900	22	15	1g	10.70	42.8	39.7	7.81	± 10
			10g	5.47	21.88	20.5	6.73	± 10

System Validation Dipole: D1900V2 SN:5d043

Date: September 7, 2007

Ambient Temperature = 23°C; Relative humidity = 50% Measured by: Jonathan King

Body Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1900	22	15	1g	10.00	40	39.8	0.50	± 10
			10g	5.26	21.04	20.8	1.15	± 10

System Validation Dipole: D835V2 SN:4d002

Date: September 10, 2007

Ambient Temperature = 23°C; Relative humidity = 55% Measured by: Jonathan King

Body Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
835	22	15	1g	2.44	9.76	9.71	0.51	± 10
			10g	1.61	6.44	6.38	0.94	± 10

8 SAR MEASURMENT PROCEDURE

A summary of the procedure follows:

a) A measurement of the SAR value at a fixed location is used as a reference value for assessing the power drop of the EUT. The SAR at this point is measured at the start of the test, and then again at the end of the test.

b) The SAR distribution at the exposed flat section of the flat phantom is measured at a distance of 4 mm from the inner surface of the shell. The area covers the entire dimension of the EUT and the horizontal grid spacing is 15 mm x 15 mm. Based on this data, the area of the maximum absorption is determined by Spline interpolation. The first Area Scan covers the entire dimension of the EUT to ensure that the hotspot was correctly identified.

For 5 GHz band - The SAR distribution at the exposed flat section of the flat phantom is measured at a distance of 2.0 mm from the inner surface of the shell. The area covers the entire dimension of the EUT and the horizontal grid spacing is 10 mm x 10 mm. Based on this data, the area of the maximum absorption is determined by Spline interpolation. The first Area Scan covers the entire dimension of the EUT to ensure that the hotspot was correctly identified.

c) Around this point, a volume of X=Y= 30 and Z=21 mm is assessed by measuring 5 x 5 x 7 mm points. On the basis of this data set, the spatial peak SAR value is evaluated with the following procedure:

For 5 GHz band - Around this point, a volume of X=Y=24 and Z=20 mm is assessed by measuring 7 x 7 x 9 mm points. On the basis of this data set, the spatial peak SAR value is evaluated with the following procedure:

(i) The data at the surface are extrapolated, since the centre of the dipoles is 1.2 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm. The extrapolation is based on a least square algorithm. A polynomial of the fourth order is calculated through the points in z-axes. This polynomial is then used to evaluate the points between the surface and the probe tip.

(ii) The maximum interpolated value is searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g and 10 g) are computed using the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one-dimensional splines with the “Not a knot”- condition (in x, y and z-direction). The volume is integrated with the trapezoidal – algorithm. One thousand points (10 x 10 x 10) are interpolated to calculate the averages.

(iii) All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.

(iv) The SAR value at the same location as in Step (a) is again measured to evaluate the actual power drift.

8.1 DASY4 SAR MEASURMENT PROCEDURE

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties (for example, 1.2 mm for an EX3DV3 probe type).

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY4 software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528, EN 50361 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures 5 x 5 x 7 points within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

For 5 GHz band – Same as above except the Zoom Scan measures 7 x 7 x 9 points.

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

Step 5: Z-Scan

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation, the extrapolated distance should not be larger than the step size in Z-direction.

9 PROCEDURE USED TO ESTABLISH TEST SIGNAL

The following procedures had been used to prepare the EUT for the SAR test.

CDMA2000 1xRTT

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

<u>Application</u>	<u>Rev, License</u>
CDMA2000 Mobil Test	B.10.11, L

<u>1xRTT</u>

- Call Setup > Shift & Preset
- Protocol Rev > 6 (IS-2000-0)
- Radio Config (RC) > RC3 (Fwd3, Rvs3)
- FCH Service Option (SO) Setup > 32 (+ F-SCH)
- Traffic Data Rate > Full
- TDSO SCH Info > F-SCH Parameters > F-SCH Data Rate > 153.6 kbps
  > R-SCH Parameters > R-SCH Data Rate > 153.6 kbps
- Cell Info > Cell Parameters > System ID (SID) > 8
  > Network ID (NID) > 65535

Once “Active Cell” show “Connected ” then change “Rvs Power Ctrl” from “Active bits” to “**All Up bits**” to get the maximum power.

Worst-case Measurement Result @ Low, Middle and High Channel

Cellular Band

Radio Configuration (RC)	Service Option (SO)	Channel	Frequency (MHz)	Output Power (dBm)
				Average
RC3 (Fwd3, Rvs3)	SO32 (+F-SCH)	1013	824.7	23.7
		384	836.52	23.7
		777	848.31	23.7

PCS Band

Radio Configuration (RC)	Service Option (SO)	Channel	Frequency (MHz)	Output Power (dBm)
				Average
RC3 (Fwd3, Rvs3)	SO32 (+F-SCH)	25	1851.25	24.2
		600	1880	24.2
		1175	1908.75	24.2

CDMA2000 1xRTT

Preliminary Measurement Results @ Middle channel

Radio Configuration (RC)	Service Option (SO)	Output Power (dBm)	
		Cellular Band @ M-ch	PCS Band @ M-ch
		Average	Average
RC1(Fwd1, Rvs1)	1 (Voice)		
	2 (Loopback)	23.7	24.2
	3 (Voice)		
	55 (Loopback)	23.7	24.2
RC2 (Fwd2, Rvs2)	9 (Loopback)	23.7	24.2
	17 (Voice)		
	55 (Loopback)	23.7	24.2
RC3 (Fwd3, Rvs3)	1 (Voice)		
	2 (Loopback)	23.7	24.2
	3 (Voice)		
	55 (Loopback)	23.7	24.2
	32 (+ F-SCH)	23.7	24.2
	32 (+ SCH)	23.7	24.2
RC43 (Fwd4, Rvs3)	1 (Voice)		
	2 (Loopback)	23.7	24.2
	3 (Voice)		
	55 (Loopback)	23.7	24.2
	32 (+ F-SCH)	23.7	24.2
	32 (+ SCH)	23.7	24.2
RC54 (Fwd5, Rvs4)	9 (Loopback)	23.7	24.2
	17 (Voice)		
	55 (Loopback)	23.7	24.2

CDMA2000 1xEV-DO Release 0 (Rel 0)

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

Application	Rev, License
1xEV-DO Terminal Test	A.06.06, L

FTAP

- Call Setup > Shift & Preset
- Protocol Rev > 0 (1xEV-DO)
- Application Config > Enhanced Test Application Protocol > FTAP
- FTAP Rate > 307.2 kbps (2 Slot, QPSK)
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Rvs Power Ctrl > All Up bits (to get the maximum power)

RTAP

- Call Setup > Shift & Preset
- Protocol Rev > 0 (1xEV-DO)
- Application Config > Enhanced Test Application Protocol > RTAP
- RTAP Rate > 153.6 kbps
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Rvs Power Ctrl > All Up bits (to get the maximum power)

Worst-case Measurement Result @ Low, Middle and High Channel

RTAP

Cellular Band

Channel	f (MHz)	RTAP Rate	Conducted power (dBm)
			Average
1013	824.7	153.6	22.6
384	836.52		22.6
777	848.31		22.6

PCS Band

Channel	f (MHz)	RTAP Rate	Conducted power (dBm)
			Average
25	1851.3	153.6	22.6
600	1880		22.6
1175	1908.8		22.6

FTAP

Cellular Band

Channel	f (MHz)	FTAP Rate	Conducted power (dBm)
			Average
1013	824.7	307.2 kbps (2 slot, QPSK)	23.2
384	836.52		23.2
777	848.31		23.2

PCS Band - FTAP

Channel	f (MHz)	FTAP Rate	Conducted power (dBm)
			Average
25	1851.3	307.2 kbps (2 slot, QPSK)	23.2
600	1880		23.2
1175	1908.8		23.2

Cellular Band - RTAP				Cellular Band - FTAP			
		RTAP Rate	Conducted power (dBm)			FTAP Rate	Conducted power (dBm)
Channel	f (MHz)		Average	Channel	f (MHz)		Average
1013	824.70	153.6	22.6	1013	824.70	307.2 kbps (2 slot, QPSK)	23.2
384	836.52		22.6	384	836.52		23.2
777	848.31		22.6	777	848.31		23.2

PCS Band - RTAP				PCS Band - FTAP			
		RTAP Rate	Conducted power (dBm)			FTAP Rate	Conducted power (dBm)
Channel	f (MHz)		Average	Channel	f (MHz)		Average
25	1851.25	153.6	22.6	25	1851.25	307.2 kbps (2 slot, QPSK)	23.2
600	1880.00		22.6	600	1880.00		23.2
1175	1908.75		22.6	1175	1908.75		23.2

CDMA2000 1xEV-DO Release 0 (Rel 0)

Preliminary Measurement Results @ Middle channel

Cellular Band - RTAP				Cellular Band - FTAP			
		RTAP Rate	Conducted power (dBm)			FTAP Rate	Conducted power (dBm)
Channel	f (MHz)		Average	Channel	f (MHz)		Average
384	836.52	9.6	22.6	384	836.52	307.2 kbps (2 slot, QPSK)	23.2
		19.2	22.6				
		38.4	22.6				
		76.8	22.6				
		153.6	22.6				

PCS Band - RTAP				PCS Band - FTAP			
		RTAP Rate	Conducted power (dBm)			FTAP Rate	Conducted power (dBm)
Channel	f (MHz)		Average	Channel	f (MHz)		Average
600	1880.00	9.6	22.6	600	1880.00	307.2 kbps (2 slot, QPSK)	23.2
		19.2	22.6				
		38.4	22.6				
		76.8	22.6				
		153.6	22.6				

The following procedures had been used to prepare the EUT for the SAR test.

The client provided a special driver and program, FCC Test Utility, which enables a user to control the frequency and output power of the module.

The cable assembly insertion loss of 20.0 dB (including 19.8 dB attenuator and 0.2dB connectors) was entered as an offset in the power meter to allow for direct reading of power.

802.11b

Channel	Frequency (MHz)	Power (dBm)
Low	2412	19.0
Middle	2437	19.0
High	2462	19.0

802.11g

Channel	Frequency (MHz)	Power (dBm)
Low	2412	11.6
Middle	2437	11.7
High	2462	11.6

The following procedures had been used to prepare the EUT for the SAR test.

The client provided a special driver and program, Broad Test , which enables a user to control the frequency and output power of the module.

The cable assembly insertion loss of 20.0 dB (including 19.8 dB attenuator and 0.2dB connectors) was entered as an offset in the power meter to allow for direct reading of power.

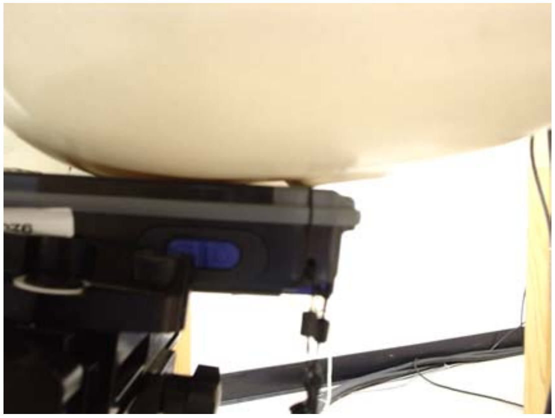
Bluetooth

Channel	Frequency (MHz)	Power (dBm)
Low	2404	2.3
Middle	2441	2.5
High	2480	2.4

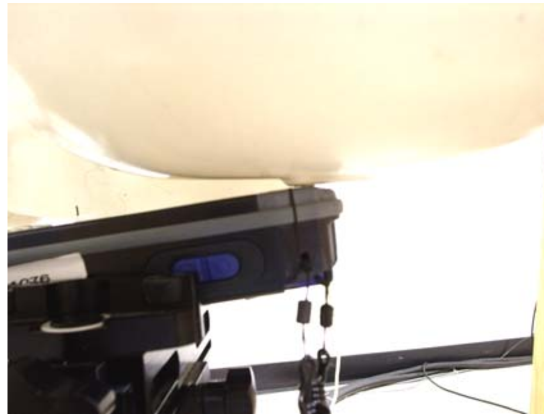
10 SAR MEASURMENT RESULTS

10.1 CELL BAND HEAD POSITIONS

10.1.1 LEFT HAND SIDE



LHS - Touch Position



LHS - Tilt Position

CDMA Cell Band - 1xRTT

Test Position	Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
LHS Touch	1013 384 777	824.70 836.52 848.31	0.659	0.000	0.659
LHS Tilt	1013 384 777	824.70 836.52 848.31	0.635	-0.046	0.642

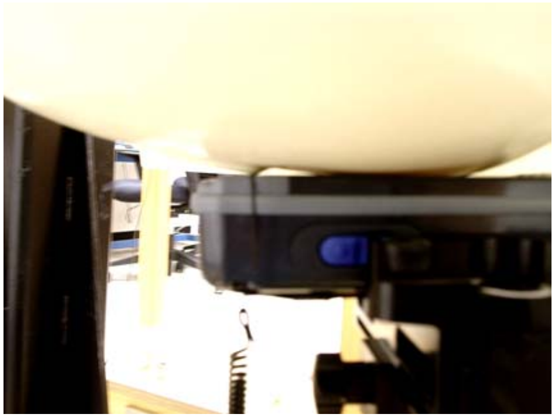
CDMA Cell Band - 1xEV-DO

Test Position	Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
LHS Touch	1013 384 777	824.70 836.52 848.31	0.747	0.000	0.747
LHS Tilt	1013 384 777	824.70 836.52 848.31	0.752	-0.042	0.759

Notes:

1) The exact method of extrapolation is Measured SAR x 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4 system can be scaled up by the Power drift to determine the SAR at the beginning of the measurement process.
2) The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.
3) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.
4) The battery was fully charged in accordance with manufacture's instructions prior to SAR measurements.

10.1.2 RIGHT HAND SIDE



RHS - Touch Position

RHS - Tilt Position

CDMA Cell Band - 1xRTT

Test Position	Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1] SAR 1g (mW/g)
RHS Touch	1013 384 777	824.70 836.52 848.31	0.703	-0.084	0.717
RHS Tilt	1013	824.70	1.140	0.000	1.140
	384	836.52	0.918	-0.141	0.948
	777	848.31	0.688	0.000	0.688

CDMA Cell Band - 1xEV-DO

Test Position	Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1] SAR 1g (mW/g)
RHS Touch	1013 384 777	824.70 836.52 848.31	0.773	0.000	0.773
RHS Tilt	**1013**	**824.70**	**1.150**	**-0.044**	**1.162**
	384	836.52	1.050	-0.057	1.064
	777	848.31	0.899	0.000	0.899
	1013[5]	**824.70**	**1.120**	**-0.054**	**1.134**
	1013[6]	**824.70**	**1.260**	**-0.016**	**1.265**

Notes:

1) The exact method of extrapolation is Measured SAR x 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4 system can be scaled up by the Power drift to determine the SAR at the beginning of the measurement process.
2) The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.
3) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.
4) The battery was fully charged in accordance with manufacture's instructions prior to SAR measurements.
5) Co-location with Bluetooth
6) Co-location with WLAN

10.1.3 CELL BAND - BODY WORN POSITION - STANDARD HOLSTER

	
LCD Up	LCD Down

CDMA Cell Band - 1xEV-DO					
Test Position	**Channel**	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1)] SAR 1g (mW/g)**
LCD Up	1013	824.70	0.243	-0.145	0.251
	384	**836.52**	**0.281**	**-0.099**	**0.287**
	777	848.31	0.219	-0.074	0.223
	384[5)]	**836.52**	**0.280**	**0.000**	**0.280**
	384[6)]	836.52	0.276	-0.089	0.282
LCD Down	1013 384 777	824.70 836.52 848.31	0.168	-0.197	0.176
CDMA Cell Band - 1xRTT					
Test Position	**Channel**	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1)] SAR 1g (mW/g)**
LCD Up	1013 384 777	824.70 836.52 848.31	0.231	0.000	0.231

Notes:

1) The exact method of extrapolation is Measured SAR x 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4 system can be scaled up by the Power drift to determine the SAR at the beginning of the measurement process.
2) The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.
3) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.
4) The battery was fully charged in accordance with manufacture's instructions prior to SAR measurements.
5) Co-location with WLAN
6) Co-location with Bluetooth

10.1.4 CELL BAND - BODY WORN POSITION – HOLSTER WITH SCAN HANDLE

Left Hand Side (LHS)

Right Hand Side (RHS)

CDMA Cell Band - 1xRTT					
Test Position	**Channel**	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1)] SAR 1g (mW/g)**
LHS	1013 384 777	824.70 836.52 848.31	0.193	-0.116	0.198
RHS	1013 384 777	824.70 836.52 848.31	0.159	0.000	0.159
CDMA Cell Band - 1xEV-DO					
Test Position	**Channel**	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1)] SAR 1g (mW/g)**
LHS	1013 384 777	824.70 836.52 848.31	0.239	0.000	0.239
RHS	1013 384 777	824.70 836.52 848.31	0.169	0.000	0.169

Notes:

1) The exact method of extrapolation is Measured SAR x 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4 system can be scaled up by the Power drift to determine the SAR at the beginning of the measurement process.
2) The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.
3) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.
4) The battery was fully charged in accordance with manufacture's instructions prior to SAR measurements.

10.2 PCS BAND HEAD POSITION

10.2.1 LEFT HAND SIDE

LHS - Touch Position

LHS - Tilt Position

CDMA PCS Band - 1xRTT					
Test Position	**Channel**	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1] SAR 1g (mW/g)**
LHS - Touch	25 600 1175	1851.25 1880 1908.75	0.526	-0.120	0.541
LHS - Tilt	25 600 1175	1851.25 1880 1908.75	0.550	-0.164	0.571
CDMA PCS Band - 1xEV-DO					
Test Position	**Channel**	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1] SAR 1g (mW/g)**
LHS - Touch	25 600 1175	1851.25 1880 1908.75	0.687	-0.158	0.712
LHS - Tilt	25 600 1175	1851.25 1880 1908.75	1.100 0.799 0.633	0.000 -0.007 -0.190	1.100 0.800 0.661

Notes:

1) The exact method of extrapolation is Measured SAR x 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4 system can be scaled up by the Power drift to determine the SAR at the beginning of the measurement process.
2) The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.
3) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.
4) The battery was fully charged in accordance with manufacture’s instructions prior to SAR measurements.

10.2.2 RIGHT HAND SIDE

	
RHS - Touch Position	RHS - Tilt Position

CDMA PCS Band - 1xRTT

Test Position	Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
RHS - Touch	25 600 1175	1851.25 1880 1908.75	0.625	0.000	0.625
RHS - Tilt	25 600 1175	1851.25 1880 1908.75	0.696	-0.129	0.717

CDMA PCS Band - 1xEV-DO

Test Position	Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
RHS - Touch	25 600 1175	1851.25 1880 1908.75	0.737	-0.190	0.770
RHS - Tilt	**25**	**1851.25**	**1.260**	**-0.127**	**1.297**
	600	1880	0.927	0.000	0.927
	1175	1908.75	0.867	0.000	0.867
	25[5)]	**1851.25**	**1.460**	**0.000**	**1.460**
	25[6)]	**1851.25**	**1.220**	**0.000**	**1.220**

Notes:

1) The exact method of extrapolation is Measured SAR x 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4 system can be scaled up by the Power drift to determine the SAR at the beginning of the measurement process.
2) The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.
3) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.
4) The battery was fully charged in accordance with manufacture's instructions prior to SAR measurements.
5) Co-location with WLAN
6) Co-location with Bluetooth

10.2.3 PCS BAND BODY WORN POSITION

	
LCD Up	LCD Down

CDMA PCS Band - 1xRTT					
Test Position	**Channel**	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1] SAR 1g (mW/g)**
LCD Down	25 600 1175	1851.25 1880 1908.75	0.726	-0.145	0.751
CDMA PCS Band - 1xEV-DO					
Test Position	**Channel**	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1] SAR 1g (mW/g)**
LCD Up	25 600 1175	1851.25 1880 1908.75	0.171	0.000	0.171
LCD Down	25 600 **1175** **1175[5]** 1175[6]	1851.25 1880 1908.75 1908.75 1908.75	0.745 0.848 **0.937** **1.090** 1.030	0.000 -0.077 **0.000** **-0.015** 0.000	0.745 0.863 **0.937** **1.094** 1.030

Notes:

1) The exact method of extrapolation is Measured SAR x 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4 system can be scaled up by the Power drift to determine the SAR at the beginning of the measurement process.
2) The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.
3) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.
4) The battery was fully charged in accordance with manufacture's instructions prior to SAR measurements.
5) Co-location with WLAN
6) Co-location with Bluetooth

10.2.4 PCS BAND BODY WORN POSITION – WITH SCAN HANDLE

Left Hand Side (LHS)

Right Hand Side (RHS)

CDMA PCS Band - 1xRTT

Test Position	Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1] SAR 1g (mW/g)
LHS	25 600 1175	1851.25 1880 1908.75	0.697	-0.059	0.707
RHS	25 600 1175	1851.25 1880 1908.75	0.041	-0.077	0.042

CDMA PCS Band - 1xEV-DO

Test Position	Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1] SAR 1g (mW/g)
LHS	25 600 1175	1851.25 1880 1908.75	0.864 0.902 0.788	-0.122 0.000 -0.072	0.889 0.902 0.801
RHS	25 600 1175	1851.25 1880 1908.75	0.077	0.000	0.077

Notes:

1) The exact method of extrapolation is Measured SAR x 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4 system can be scaled up by the Power drift to determine the SAR at the beginning of the measurement process.
2) The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.
3) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.
4) The battery was fully charged in accordance with manufacture's instructions prior to SAR measurements.

11 MEASURMENT UNCERTAINTY

11.1 MEASURMENT UNCERTAINTY FOR 300 MHz – 3000 MHz

Uncertainty component	Tol. (±%)	Probe Dist.	Div.	Ci (1g)	Ci (10g)	Std. Unc.(±%)	
						Ui (1g)	Ui(10g)
Measurement System							
Probe Calibration	4.80	N	1	1	1	4.80	4.80
Axial Isotropy	4.70	R	1.732	0.707	0.707	1.92	1.92
Hemispherical Isotropy	9.60	R	1.732	0.707	0.707	3.92	3.92
Boundary Effects	1.00	R	1.732	1	1	0.58	0.58
Linearity	4.70	R	1.732	1	1	2.71	2.71
System Detection Limits	1.00	R	1.732	1	1	0.58	0.58
Readout Electronics	1.00	N	1	1	1	1.00	1.00
Response Time	0.80	R	1.732	1	1	0.46	0.46
Integration Time	2.60	R	1.732	1	1	1.50	1.50
RF Ambient Conditions - Noise	1.59	R	1.732	1	1	0.92	0.92
RF Ambient Conditions - Reflections	0.00	R	1.732	1	1	0.00	0.00
Probe Positioner Mechnical Tolerance	0.40	R	1.732	1	1	0.23	0.23
Probe Positioning With Respect to Phantom Shell	2.90	R	1.732	1	1	1.67	1.67
Extrapolation, interpolation, and integration algorithms for max. SAR evaluation	3.90	R	1.732	1	1	2.25	2.25
Test sample Related							
Test Sample Positioning	1.10	N	1	1	1	1.10	1.10
Device Holder Uncertainty	3.60	N	1	1	1	3.60	3.60
Power and SAR Drift Measurement	5.00	R	1.732	1	1	2.89	2.89
Phantom and Tissue Parameters							
Phantom Uncertainty	4.00	R	1.732	1	1	2.31	2.31
Liquid Conductivity - Target	5.00	R	1.732	0.64	0.43	1.85	1.24
Liquid Conductivity - Meas.	8.60	N	1	0.64	0.43	5.50	3.70
Liquid Permittivity - Target	5.00	R	1.732	0.6	0.49	1.73	1.41
Liquid Permittivity - Meas.	3.30	N	1	0.6	0.49	1.98	1.62
Combined Standard Uncertainty	RSS					11.44	10.49
Expanded Uncertainty (95% Confidence Interval)	K=2					22.87	20.98

Notesfor table
1. Tol. - tolerance in influence quaitity
2. N - Nomal
3. R - Rectangular
4. Div. - Divisor used to obtain standard uncertainty
5. Ci - is te sensitivity coefficient

12 EQUIPMENT LIST AND CALIBRATION

Name of Equipment	Manufacturer	Type/Model	Serial Number	Cal. Due date		
				MM	DD	Year
Robot - Six Axes	Stäubli	RX90BL	N/A	N/A		
Robot Remote Control	Stäubli	CS7MB	3403-91535	N/A		
DASY4 Measurement Server	SPEAG	SEUMS001BA	1041	N/A		
Probe Alignment Unit	SPEAG	LB (V2)	261	N/A		
SAM Phantom (SAM1)	SPEAG	QD000P40CA	1185	N/A		
SAM Phantom (SAM2)	SPEAG	QD000P40CA	1050	N/A		
Oval Flat Phantom (ELI 4.0)	SPEAG	QD OVA001 B	1003	N/A		
Electronic Probe kit	HP	85070C	N/A	N/A		
S-Parameter Network Analyzer	Agilent	8753ES-6	US39173569	2	14	2008
E-Field Probe	SPEAG	EX3DV4	3554	4	24	2008
Thermometer	ERTCO	639-1S	1718	11	7	2007
Data Acquisition Electronics	SPEAG	DAE3 V1	427	11	16	2007
System Validation Dipole	SPEAG	D835V2	4d002	1	19	2008
System Validation Dipole	SPEAG	D1900V2	5d043	1	23	2008
System Validation Dipole	SPEAG	D2450V2	706	4	27	2008
Signal Generator	R&S	SMP 04	DE34210	10	9	2007
Power Meter	Giga-tronics	8651A	8651404	4	3	2008
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A		
Radio Communication Tester	R &S	CMU 200	656177	7	16	2008
Radio Communication Tester	Agilent	E5515C	GB46160222	6	29	2008
Simulating Liquid	CCS	H835	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	H1900	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M835	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M1900	N/A	Within 24 hrs of first test		

13 PHOTOS

EUT

CN3 with battery

CN3 with standard holster

CN3 with Scan Handle

Holster with Scan Handle

ATTACHMENTS

No.	Contents	No. Of Pages
1	System Performance Check Plots	12
2-1	SAR Test Plots – Cell Band	29
2-2	SAR Test Plots – PCS Band	31
3	Certificate of E-Field Probe - EX3DV4SN3554	10
4	Certificate of System Validation Dipole - D835V2 SN:4d002	9
5	Certificate of System Validation Dipole - D1900V2 SN:5d043	9

END OF REPORT