Class II Permissive Change

SAR Test Report on

Dual-Band Tri-mode AMPS/CDMA Cellular Phone

	FCC **Part 22 & 24**
ID:	**OVFKWC-KX9**
Original Grant Date:	**May 30, 2005**
MODEL:	**KX9A, KX9B, KX9C**

STATEMENT OF CERTIFICATION

The data, data evaluation and equipment configuration represented herein are a true and accurate representation of the measurements of the sample's radio frequency interference emissions characteristics as of the dates and at the times of the test under the conditions herein specified.

STATEMENT OF COMPLIANCE

This product has been shown to be capable of compliance with the applicable technical standards as indicted in the measurement report and was tested in accordance with the measurement procedures specified in §2.947.

Test performed by:	Kyocera Wireless Corp.	Date of Test:	May 23-24, 2005
Report Prepared by:	Fernando Calimbahin Engineer	Date of Report:	July 18, 2005
Report Reviewed by:	Lin Lu Engineer, Principal	Date of Review:	July 18, 2005

Table of Contents

1 INTRODUCTION

This test report describes an environmental evaluation measurement of specific absorption rate (SAR) distribution in simulated human muscle tissues exposed to radio frequency (RF) radiation from a wireless portable device manufactured by Kyocera Wireless Corp. (KWC). These measurements were performed for compliance with the rules and regulations of the U.S. Federal Communications Commission (FCC). The testing was performed in accordance with FCC OET Bulletin 65 Supplement C (01/01) and IEEE P1528/D1.2 issued on April 21, 2003.

2 EQUIPMENT UNDER TEST (EUT)

The wireless device is described as follows:

FCC ID:	OVFKWC-KX9			
Product:	Tri-mode Dual-Band Analog/Digital Phone			
Trade Name:	Kyocera Wireless Corp			
Model Number:	KX9A, KX9C			
EUT S/N:	92-X----18X39D, 93-X----18X41Q			
Type:	[ ] Identical Prototype, [X] Pre-production			
Device Category:	Portable			
RF Exposure Environment:	General Population / Uncontrolled			
Antenna Type:	Fixed Stubby	**Antenna Location:**	Right/Rear	
Detachable Antenna:	Yes	**Antenna Dimensions:**	24.5mm(L) x 8.4mm(W)	
External Input:	Audio/Digital Data			
Quantity:	Quantity production is planned			
FCC Rule Parts:	§22H	§22H	§22.901(d)	§24H
Modes:	800 AMPS	800 CDMA	800 CDMA1X	1900 CDMA
Multiple Access Scheme:	FDMA	CDMA	CDMA	CDMA
Duty Cycle:	1:1	1:1	1:1	1:1
TX Frequency (MHz):	824 – 849	824 – 849	824 – 849	1850 - 1910
Emission Designators:	40K0F1D,40K0F8W	1M25F9W	1M25F9W	1M25F9W
Max. Output Power (mW):	0.195 ERP	0.227 ERP		0.355 EIRP

3 PRODUCT DESCRIPTION

This report is to add an accessory (leather case) to OVFKWC-KX9. There is no change in the phone's design and features.

KWC Standard Leather Case: CV90-K0101

4 SAR TEST RESULT SUMMARY

This device has been tested for localised specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE Std. C95.1 ~ 1992 and has been tested in accordance with the measurement procedures specified in IEEE P1528_D1.2. Normal antenna operating positions were incorporated, with the device transmitting at frequencies consistent with normal usage of the device. The device has been shown capable of compliance for localised specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE std. C95.1-1992

4.1 Body Worn Configuration (with KWC Standard leather case)

Mode	Ch/f(MHz)	Conducted Power (dBm)	Device Position	Flip Position	Measured (mW/g)	Result
AMPS	383 (836.49)	25.58	Waist level	Closed	0.520	**PASSED**
CDMA-800	383 (836.49)	25.03	Waist level	Closed	0.482	**PASSED**
CDMA-1900	600 (1880.0)	23.36	Waist level	Open	0.511	**PASSED**

The highest SAR reported on the FCC Grant of Equipment Authorization for OVFKWC-KX9 body are: AMPS (Pt.22) 0.85 W/Kg; CDMA 800 (Pt. 22) 0.67 W/Kg; PCS (Pt. 24) 0.60 W/Kg.

4.2 Measurement Uncertainty

Combined Uncertainty (Assessment & Source)	± **10.46**
Extended Uncertainty (k=2)	± **21.22**

5 TEST CONDITIONS

5.1 Ambient Conditions

All tests were performed under the following environmental conditions:

Ambient Temperature:	22 ± 1 Degrees C
Tissue simulating liquid temperature:	22 ± 1 Degrees C
Humidity:	38 %
Pressure:	1015 mB

5.2 RF characteristics of the test site

All SAR measurements were performed inside a shielded room that provide isolation from external EM fields.

The E-field probes of the DASY 4 system are capable of detecting signals as low as 5μW/g in the liquid dielectric. External fields are minimise by the shielded room, leaving the phone as the dominant radiation source. Two 2-foot square ferrite panels are placed on the floor of the room beneath the phantom area of the DASY system to minimise reflected energy that would otherwise re-enter the phantom and combine constructively or destructively with the desired fields. These ferrite panels provide roughly 12 to 13 dB of attenuation in the frequency range of 900 MHz, and 7 to 8 dB of attenuation in the frequency range of 1.9 GHz.

5.3 Test Signal, Frequencies and Output Power

The device was controlled by using Kyocera Wireless Phone Support Toolkit, Test Code Controller.

In all operating bands, the measurements were performed on low, mid and high channels unless the SAR measured at the mid-channel is at least 3dB lower than the SAR limit. In such cases, testing at the low and high channels were no longer performed.

The phone was set to nominal maximum power level during all tests and at the beginning of the each test.

DASY4 system measures power drift during SAR testing by comparing E-field in the same location at the beginning and at the end of measurement. These records were used to monitor stability of power output.

5.4 Device Test Conditions

The EUT was tested with a fully charged battery as supplied with the handset. Conducted RF power measurements were performed before and after each SAR measurements to confirm the output power.

6 DESCRIPTION OF THE TEST EQUIPMENT

6.1 Dosimetric System

The measurements were performed with an automated near-field scanning system, DASY4, manufactured by Schmid & Partner Engineering AG (SPEAG) of Zurich, Switzerland. The system is comprised of high precision robot, robot controller, computer, near-field probe, probe alignment sensor and the SAM phantom containing brain or muscle equivalent material. The overall RSS uncertainty of the measurement system is ±10.46% with an expanded uncertainty of ±21.22% (K=2). The measurement uncertainty budget is given in section 6. Below is a list of the calibrated equipment used for the measurements:

Test Equipment	Serial Number	Cal. Due Date
DASY4 DAE3 V1	602	08-27-05
E-field Probe ET3DV6	1664	09-02-05
Dipole Validation kit, D835V2	454	04-20-06
Dipole Validation kit, D1900V2	5d005	03-17-06

The calibration records of E-field probe and dipoles are attached in Appendix C and Appendix D respectively.

6.2 Additional equipment needed in validation

Test Equipment	Serial Number	Cal. Due Date
Signal Generator, Marconi Instruments 2026	112240/036	03-14-07
Power meter, Giga-tronics 8541C	1835038	09-22-05
Power Sensor, Giga-tronics 80601A	1830422	02-13-06
ENA Serial Network Analyzer, Agilent E5062A	MY44100250	12-09-05
Thermometer	186700	03-01-06
Dielectric Probe, HP 85070E	--	no cal required

6.3 Tissue Stimulants

All dielectric parameters of tissue stimulants were measured within 24 hours of SAR measurements. The depth of the tissue stimulant in the ear reference point and flat reference point of the phantom were at least 15 cm. during all the tests. The depth of the liquid is measured by running a program that brings the probe to the bottom surface of the phantom then raise it up 15 centimeters. The operator at this point performs a visual inspection and makes sure that the liquid level is at or above the probe tip.

The list of ingredients and the percent composition used for the Head and Muscle tissue simulates are listed in the table below:

	835 MHz		1900 MHz	
Ingredient	***HEAD***	***MUSCLE***	***HEAD***	***MUSCLE***
Water	51.07%	65.45%	54%	69.91%
Cellulose	0.23%	--	--	--
Glycol monobutyl	--	--	44.91%	29.96%
Sugar	47.31%	34.31%	--	--
Preventol	0.24%	0.1%	--	--
Salt	1.15%	0.62%	0.21%	0.13%

The ingredients above are adopted from Application Note: Recipes for Head/Muscle Tissue Simulating Liquid by SPEAG.

6.4 Phantoms Description

SAM v4.0 phantom, manufactured by SPEAG, was used during the measurement. It has fiberglass shell integrated in a wooden table. The shape of the shell corresponds to the phantom defined in IEEE 1528/D1.2. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. Reference markings on the phantom allow the complete set-up of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

The thickness of phantom shell is 2mm except for the ear, where an integrated ear spacer provides 6mm spacing from the tissue boundary. Manufacturer reports tolerance in shell thickness to be ± 0.1mm**.**

6.5 Isotropic E-Field Probe

Model:	• ET3DV6 
Construction:	• Symmetrical design with triangular core • Built-in optical fiber for surface detection system • Built-in shielding against static charges • PEEK enclosure material (resistant to organic solvents, e.g., glycol)
Calibration:	• Calibration certificate in Appendix C
Frequency:	• 10MHz to 3GHz (dosimetry); Linearity: ± 0.2dB (30MHz to 3GHz)
Optical Surface:	• ± 0.2mm repeatability in air and clear liquid over diffuse reflecting
Detection:	• Surface
Directivity:	• ± 0.2dB in HSL (rotation around probe axis) • ± 0.4dB in HSL (rotation normal to probe axis)
Dynamic Range:	• 5 uW/g to > 100 mW/g; Linearity: ± 0.2dB
Dimensions:	• Overall length: 330mm • Tip length: 16mm • Body diameter: 12mm • Tip diameter: 6.8mm • Distance from probe tip to dipole centers: 2.7mm
Application:	• General dosimetry up to 3GHz • Compliance tests of mobile phones • Fast automatic scanning in arbitrary phantoms.

7 SYSTEM VALIDATION

The probes are calibrated annually by the manufacturer. Dielectric parameters of the stimulating liquids are measured with an automated Hewlett Packard 85070E dielectric probe in conjunction with an Agilent E5062A ENA serial network analyser.

The SAR measurements of the device were done within 24 hours of system accuracy verification, which was done using the dipole validation kit. Power level of 20dBm was supplied to a dipole antenna placed under the flat section of SAM phantom. The validation results are in the table below and printouts of the validation test are attached in Appendix A. All the measured parameters are within the specification.

The system validation with head tissues was used for the device testing in muscle. Based on OET 65 Supplement C EAB Part 22/24 SAR review Reminder Sheet 01/2002, this is a valid test.

Tissue	Freq. (MHz)	Description	Validation SAR (mW/g), 1g	Dielectric Parameters		Temp. (°C)	Test date	Comments
				ε_r	σ (S/m)			Validation testing -
Head	835	Measured	1.01	40.8	0.91	22±1	05-23-05	For device testing in muscle
		SPEAG Reference	**1.02**	**42.8**	**0.94**	**--**	**04-20-04**	
		FCC Reference*	**--**	**41.5**	**0.90**	**20-26**	**--**	
	1900	Measured	4.24	40.6	1.36	22±1	05-24-05	For device testing in muscle
		SPEAG Reference	**4.28**	**38.8**	**1.47**	**--**	**03-17-04**	
		FCC Reference*	**--**	**40.0**	**1.40**	**20-26**	**--**	
Muscle	835	Measured	--	55.7	0.92	22±1	04-20-05	For device testing in muscle
		FCC Reference*	**--**	**55.2**	**0.97**	**--**	**--**	
	1900	Measured	--	55.0	1.45	22±1	04-21-05	For device testing in muscle
		FCC Reference*	**--**	**53.3**	**1.52**	**20-26**	**--**	

FCC reference values are adopted from OET Bulletin 65 (97-01) Supplement C (01-01).

8 DESCRIPTION OF THE TEST PROCEDURE

The device was position against phantom according to OET Bulletin 65 (97-01) Supplement C (01-01).

8.1 Test Positions

The device was placed in the holder. The bottom of the device aligns with the bottom of the holder clamp to provide a standard positioning and ensure enough free space for antenna.

Device holder was provided by SPEAG together with DASY4.

8.1.1 Body Worn Configuration

KWC body worn accessories were tested for the FCC RF exposure compliance. The device was positioned into the carrying case and placed below the flat phantom. Hands-free headset was connected during measurements.

8.2 Scan Procedures

First, coarse scans are used for a quick determination of the field distribution. Then an area scan measures all reachable points, it computes all of the field maxima found in the scanned area, within a range of 2dB as specified in IEEE P1528, (see the configuration below). For cases where multiple maxima were detected, the number of zoom scans could be increased accordingly.

Next a cube scan, 7x7x7 points (spacing between each point is 5x5x5mm), is performed around the highest E-field value to determine the averaged SAR-distribution over 1g. If two peaks are within 2dB of the highest one, two zoom scans are performed to provide the evaluations. A fine resolution volume scan determines the one-gram average SAR for both peaks.

8.3 SAR Averaging Methods

The maximum SAR value is average over its volume using interpolation and extrapolation.

The interpolation of the points is done with a 3d-Spline. The 3d-Spline is composed of three one-dimensional splines with the “Not a knot” –condition [W. Gander, Computermathematatik, p. 141-150] (x, y and z – directions) [numerical Recipes in C, Second Edition, p 123].

The extrapolation is based on least square algorithm [W. Gander, Computermathematik, p. 168-180]. Through the points in the first 30mm in all z-axis, polynomials of order four are calculated. This polynomial is then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1mm from one another.

9 MEASUREMENT UNCERTAINTY

Description of individual measurement uncertainty

Uncertainty Description	Uncert. Value (± %)	Prob. Dist.	Div	C_i^1 1g	Stand. Uncert (1g) (±%)	V_i^2 or V_{eff}
Measurement system						
Probe calibration	4.8	N	1	1	4.8	∞
Axial isotropy	4.7	R	√3	0.7	1.9	∞
Hemispherical Isotropy	9.6	R	√3	0.7	3.9	∞
Boundary effects	1.0	R	√3	1	0.6	∞
Linearity	4.7	R	√3	1	1.0	∞
System Detection limit	1.0	R	√3	1	0.5	∞
Readout Electronics	1.0	N	1	1	1.0	∞
Response Time	0.8	R	√3	1	0.5	∞
Integration Time	2.6	R	√3	1	1.5	∞
RF ambient conditions	3.0	R	√3	1	1.7	∞
Mech. Constrains of robot	0.4	R	√3	1	0.2	∞
Probe positioning	2.9	R	√3	1	1.7	∞
Extrapolation, integration and Integration Algorithms for Max. SAR Evaluation	1.0	R	√3	1	0.6	∞
Test Sample Related						
Device positioning	3.0	N	1	1	3.0	∞
Device Holder	3.0	N	1	1	3.0	∞
Power drift	7.0	N	√3	1	4.0	∞
Phantom and setup						
Phantom uncertainty	4.0	R	√3	1	2.3	∞
Liquid conductivity (target)	5.0	R	√3	0.6	1.7	∞
Liquid conductivity (meas.)	5.0	N	1	0.6	3.0	∞
Liquid permittivity (target)	5.0	R	√3	0.6	1.7	∞
Liquid permittivity (meas.)	5.0	N	1	0.6	1.5	∞
Combined Standard Uncertainty:					**10.46**	
Extended Standard Uncertainty (k=2):					**21.22**	

N: Normal
R: Rectangular

10 TEST DATA

10.1 Body Worn SAR Test Result

The device was tested with the KWC standard leather case. The maximum SAR results between the phone configurations (in bold **blue** color) in each mode are shown in Appendix B as SAR distribution printouts. The rest of the SAR distributions are substantially similar or equivalent to the plots submitted, regardless of what phone configuration was used.

Waist Level SAR with KWC Standard Leather Case

AMPS BODY		**Channel:**		991	383	799
		Frequency (MHz):		824.04	836.49	848.97
		Conducted Power (dBm):		25.55	25.50	25.58
Configuration	**Test Position**	**Flip Position**	**Phone Position**	**SAR, 1g (W/kg)**		
KX9A	Flat	Closed	Face Down		**0.520**	
KX9C	Flat	Closed	Face Down		0.517	
KX9A	Flat	Open	Face Down		0.423	
KX9C	Flat	Open	Face Down		**0.482**	

Note: If the SAR measured at the mid-channel is at least 3dB lower than the SAR limit, testing at the low and high channels were no longer performed.

CDMA 800 BODY			**Channel:**	1013	383	777
			Frequency (MHz):	824.70	836.49	848.31
			Conducted Power (dBm):	25.06	24.98	25.03
Configuration	**Test Position**	**Flip Position**	**Phone Position**	**SAR, 1g (W/kg)**		
KX9A	Flat	Closed	Face Down		0.462	
KX9C	Flat	Closed	Face Down		**0.482**	
KX9A	Flat	Open	Face Down		0.389	
KX9C	Flat	Open	Face Down		**0.426**	

Note: If the SAR measured at the mid-channel is at least 3dB lower than the SAR limit, testing at the low and high channels were no longer performed.

CDMA 1900 BODY		**Channel:**		25	600	1175
		Frequency (MHz):		1851.25	1880	1908.75
		Conducted Power (dBm):		23.30	23.36	23.25
Configuration	**Test Position**	**Flip Position**	**Phone Position**	**SAR, 1g (W/kg)**		
KX9A	Flat	Closed	Face Down		**0.318**	
KX9C	Flat	Closed	Face Down		0.273	
KX9A	Flat	Open	Face Down		**0.511**	
KX9C	Flat	Open	Face Down		0.364	

Note: If the SAR measured at the mid-channel is at least 3dB lower than the SAR limit, testing at the low and high channels were no longer performed.

.

11 TEST SETUP PHOTOS

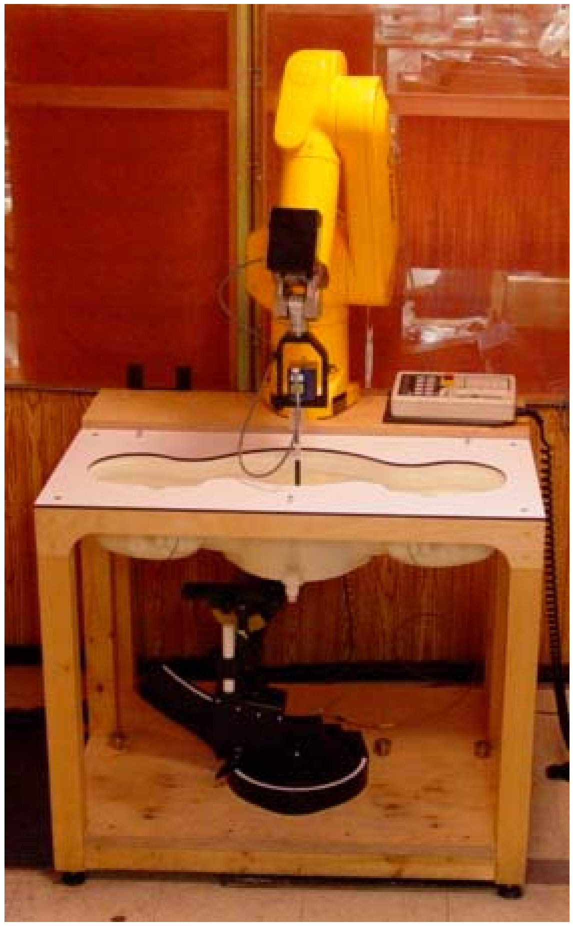

Figure 11.1 DASY 4 System

Figure 11.2 body SAR closed position

Figure 11.3 body SAR open position

Appendix A: Validation Test Plots

Please see separate attachment

Appendix B: SAR Distribution Plots

Please see separate attachment

Appendix C: Probe Calibration Parameters

Please see separate attachment

Appendix D: Dipole Calibration Parameters

Please see separate attachment