

SAR TEST REPORT

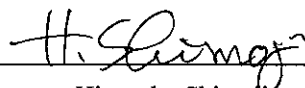
Test Report No. : 26KE0199-HO-E

Applicant : KYOCERA Corporation
Type of Equipment : iBurst User Terminal
Model No. : UTC1900D-US-B
FCC ID : JOYIUC19AB
Test standard : FCC47CFR 2.1093
FCC OET Bulletin 65, Supplement C
Test Result : Complied
Max. SAR Measured : 0.507W/kg (Body, 1909.6875MHz)

1. This test report shall not be reproduced except full or partial, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with the above standard. We hereby certify that the data contain a true representation of the SAR profile.
4. The test results in this test report are traceable to the national or international standards.

Date of test : August 10-11, 2006

Tested by : 
Miyo Ikuta
EMC Services

Approved by : 
Hironobu Shimoji
Group Leader of EMC Services



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address, <http://ulapex.jp/emc/nvlap.htm>

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SECTION 1 : Client information

Company Name	KYOCERA Corporation
Brand name	KYOCERA
Address	Yokohama Office 2-1-1 Kagahara, Tsuzuki-ku, Yokohama-shi, Kanagawa 224-8502, Japan
Telephone Number	+81-45-943-6189
Facsimile Number	+81-45-943-6123
Contact Person	Toshihiko Kawata

SECTION 2 : Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	iBurst User Terminal
Model No.	UTC1900D-US-B
Serial No.	01
Country of Manufacture	JAPAN
DC Supply	DC2.97~3.63V
Battery	N/A
Accessories	N/A
Size of EUT	(W×D×H): About 55.5×12.7×125mm
Condition of EUT	Production model
Receipt Date of Sample	July 28, 2006
Modification of EUT	No modification by the test lab.
Category Identified	Portable device

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2.3 Identification of Wireless LAN Module

2.3.1 Product Description

Equipment Type	Transceiver
Frequency of Operation	1.900GHz~1.910GHz
Meen power tested	21.99dBm (158.12mW)
Type of Modulation	BPSK,QPSK,8PSK,12QAM,16QAM
Bandwidth	500kHz
Channel spacing	625kHz
Channel number	16
Antenna type	Chip antenna
Antenna connector Type	MMCX
Antenna Gain	0dBi
Other Clock Frequency	72MHz, 24MHz, 20MHz, 18MHz, 9MHz, 6MHz, 32.768kHz
Temperature of operation	0 deg. C. to + 40 deg. C

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SECTION 3 : Test standard information

3.1 Requirements for compliance testing defined by the FCC

The US Federal Communications Commission has released the report and order "Guidelines for Evaluating the Environmental Effects of RF Radiation", ET Docket No. 93-62 in August 1996. The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g for an uncontrolled environment and 8.0 mW/g for an occupational/controlled environment as recommended by the ANSI/IEEE standard C95.1-1992. According to the Supplement C of OET Bulletin 65 "Evaluating Compliance with FCC Guide-lines for Human Exposure to Radio frequency Electromagnetic Fields", released on Jun 29, 2001 by the FCC, the device should be evaluated at maximum output power (radiated from the antenna) under "worst-case" conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

1 Specific Absorption Rate (SAR) is a measure of the rate of energy absorption due to exposure to an RF transmitting source (wireless portable device).

2 IEEE/ANSI Std. C95.1-1992 limits are used to determine compliance with FCC ET Docket 93-62.

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3.2 Exposure limit

(A) Limits for Occupational/Controlled Exposure (W/kg)

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.4	8.0	20.0

(B) Limits for General population/Uncontrolled Exposure (W/kg)

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.08	1.6	4.0

Occupational/Controlled Environments: are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

General Population/Uncontrolled Environments: are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

**NOTE:GENERAL POPULATION/UNCONTROLLED EXPOSURE
SPATIAL PEAK(averaged over any 1g of tissue) LIMIT
1.6 W/kg**

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SECTION 4 : Outline and result of test

4.1 Outline of test

3-host tests are requested for devices operating part 24E.
Therefore, this EUT was tested with typical three laptop PCs.

4.2 Result of Max. SAR value

Max SAR Measured : 0.507W/kg (Body Hch 1909.6875MHz)

4.3 Test location

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SECTION 5 : Operation of E.U.T. during testing

5.1 Confirmation before SAR testing

(i)Correlation of EMC power and SAR power

SAR power is equal to DATA of EMC test (August 9, 2006) based on the following reason.

- EMC and SAR tests are performed with the same test sample under the same condition.
- EMC and SAR tests are performed at the same laboratory.
- The test mode setting is simple, and there is no possibility that the power (value) is changed by the wrong setting.

The result is shown in Section 7.1.

(ii)Duty factor verifications

Crest factor determing

Crest factor was calculated by the duty factor measured at each data rate.

The duty factor was calculated according to the following equation:

Duty factor = on time / 1 cycle (on+off time)

The result of duty factor is shown in Section 7.3.

5.2 Confirmation after SAR testing

It was checked that the powerdrift is within $\pm 5\%$ in the evaluation procedure of SARtesting.

The result is shown in APPENDIX 2.

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5.3 Operating modes for SAR testing

5.3.1 Setting of EUT

The mode is used : Transmitting mode
Tx frequency band : 1900.3125 – 1909.6875MHz
Channel : 1ch(1900.3125MHz),8ch(1904.6875MHz),16ch(1909.6875MHz)
Modulation : BPSK,QPSK+,8PSK,12QAM,16QAM
Crest factor* : 3.1

Remark* : The result of crest factor is shown in Section 7.3.

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5.3.2 SAR Measurement (Radiated power is always monitored by Spectrum Analyzer.)

1. PC type #1

Step1. The searching for the modulation.

The data rate in the higher peak power*¹ of each modulation was decided, then the worst modulation was searched in the SAR testing.

Step2. The searching for the worst position

This test was performed at the worst modulation of Step1.

Step3. The changing to the Low and High channels

This test was performed at the worst conditions of Step 2.

2. PC type #2

Step4. The searching for the worst position

This test was performed at the worst modulation of Step1.

Step5. The changing to the Low and High channels

This test was performed at the worst conditions of Step 4.

3. PC type #3

Step6. The searching for the worst position

This test was performed at the worst modulation of Step1.

Step7. The changing to the Low and High channels

This test was performed at the worst conditions of Step 6.

*¹ Refer to the peak power data to Section 7.2.

5.4 Test setup of EUT

In order to assume this situation, we performed the test at the following positions. Please refer to "APPENDIX 1" for more details.

1. Bottom (Back) : The test was performed in touch with bottom of the PC to the flat section of SAM Twin Phantom.
The separation between the back of EUT and phantom was 9mm(PC #1), 10mm(PC #2), and 8mm(PC #3).
2. Side (Top) : The test was performed in the separation of 15mm between top of the EUT and flat sections of the SAM Twin Phantom.

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SECTION 6 : Test surrounding

6.1 Measurement uncertainty

The uncertainty budget has been determined for the DASY4 measurement system according to the SPEAG documents[6][7] and is given in the following Table.

Error Description	Uncertainty value \pm %	Probability distribution	divisor	(ci) 1g	Standard Uncertainty (1g)	vi or v _{eff}
Measurement System						
Probe calibration	± 6.8	Normal	1	1	± 6.8	∞
Axial isotropy of the probe	± 4.7	Rectangular	$\sqrt{3}$	$(1-c_p)^{1/2}$	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	$\sqrt{3}$	$(c_p)^{1/2}$	± 3.9	∞
Boundary effects	± 2.0	Rectangular	$\sqrt{3}$	1	± 1.2	∞
Probe linearity	± 4.7	Rectangular	$\sqrt{3}$	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	$\sqrt{3}$	1	± 0.6	∞
Readout electronics	± 0.3	Normal	1	1	± 0.3	∞
Response time	± 0.8	Rectangular	$\sqrt{3}$	1	± 0.5	∞
Integration time	± 2.6	Rectangular	$\sqrt{3}$	1	± 1.5	∞
RF ambient Noise	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
RF ambient Reflections	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
Probe Positioner	± 0.8	Rectangular	$\sqrt{3}$	1	± 0.5	∞
Probe positioning	± 9.9	Rectangular	$\sqrt{3}$	1	± 5.7	∞
Max.SAR Eval.	± 4.0	Rectangular	$\sqrt{3}$	1	± 2.3	∞
Test Sample Related						
Device positioning	± 2.9	Normal	1	1	± 2.9	16
Device holder uncertainty	± 3.6	Normal	1	1	± 3.6	5
Power drift	± 5.0	Rectangular	$\sqrt{3}$	1	± 2.9	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	$\sqrt{3}$	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	$\sqrt{3}$	0.64	± 1.8	∞
Liquid conductivity (meas.)	± 5.0	Rectangular	1	0.64	± 3.2	∞
Liquid permittivity (target)	± 5.0	Rectangular	$\sqrt{3}$	0.6	± 1.7	∞
Liquid permittivity (meas.)	± 5.0	Rectangular	1	0.6	± 3.0	∞
Combined Standard Uncertainty						
					± 13.45	
Expanded Uncertainty (k=2)						
					± 26.91	

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SECTION 7 : Results of confirmation before SAR testing

7.1 Result of correlation of EMC power and SAR power

This data is reference data of EMC test. (Report No. 26KE0199-HO-B)

Test Date : August 9, 2006

Ch	Modulation	Frequency [MHz]	S/A AVG Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Duty Factor [dB]	Result	
							[dBm]	[mW]
Low	0 (BPSK)	1900.3125	4.90	10.09	1.85	4.95	21.79	151.01
Mid	0 (BPSK)	1904.6875	5.09	10.09	1.86	4.95	21.99	158.12
High	0 (BPSK)	1909.6875	5.07	10.09	1.86	4.95	21.97	157.40

Sample Calculation : Result = Reading + Atten. + Cable Loss +Duty Factor

* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

* Duty factor : $10\log(\text{on time } 1.6\text{ms}/1 \text{ cycle time } 5.0\text{ms}) = 10\log(1.6/5)=-4.95$

7.2 Reference data of SAR test (Data rate deterring)

This data is reference data of EMC test. (Report No. 26KE0199-HO-B)

Test Date : August 9, 2006

Modulation		Frequency [MHz]	S/A AVG Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Duty Factor [dB]	Result [dBm]
0	BPSK						
1	BPSK+	1904.6875	5.09	10.09	1.86	4.95	21.99
2	QPSK	1904.6875	4.00	10.09	1.86	4.95	20.90
3	QPSK+	1904.6875	4.04	10.09	1.86	4.95	20.94
4	8PSK	1904.6875	4.08	10.09	1.86	4.95	20.98
5	8PSK+	1904.6875	4.07	10.09	1.86	4.95	20.97
6	12QAM	1904.6875	2.49	10.09	1.86	4.95	19.39
7	16QAM	1904.6875	2.33	10.09	1.86	4.95	19.23

Sample Calculation : Result = Reading + Atten. + Cable Loss +Duty Factor

* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

* Duty factor : $10\log(\text{on time } 1.6\text{ms}/1 \text{ cycle time } 5.0\text{ms}) = 10\log(1.6/5)=-4.95$

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7.3 Result of Duty factor verifications

The maximum duty factor of test mode was checked. The results are in the table below.
The duty factor when the user uses EUT is not exceeded from the duty factor of the test mode.

Test Date : August 9, 2006

	DATA rate	1cycle[ms]	ON time[ms]	Duty[%]	Crest factor for SAR
0	BPSK	5.04	1.64	32.5	3.1*
1	BPSK+	5.04	1.64	32.5	-
2	QPSK	5.04	1.64	32.5	-
3	QPSK+	5.04	1.64	32.5	3.1*
4	8PSK	5.00	1.60	32.0	3.1*
5	8PSK+	5.00	1.60	32.0	
6	12QAM	5.00	1.60	32.0	3.1*
7	16QAM	5.00	1.60	32.0	3.1*

*Reference: SAR test was not performed at the data rate.

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SECTION 8 : Measurement results

8.1 SAR measurement results (PC type #1)

All of power drifts were within $\pm 5\%$. The measurement data is shown the "APPENDIX 2".

Liquid Depth (cm) : **15.0** Model : **UTC1900D-US-B**
Parameters : $\epsilon_r = 50.7$ $\sigma = 1.56$ Serial No. : **No.1**
Ambient temperature (deg.c.) : **25.0** Modulation : **BPSK,QPSK+,8PSK,12QAM,16QAM**
Relative Humidity (%) : **45** Crest factor : **3.1**
Date : **August 10, 2006** Measured By : **Miyo Ikuta**

BODY SAR MEASUREMENT(PC #1)										
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Channel	[MHz]			PC		EUT		Before	After	Maximum value of multi-peak
				Position	Separation [mm]	Position	Separation [mm]			
Modulation Search										
Mid	1904.6875	1(BPSK)	Flat	PC Bottom	0	Back	9	24.3	24.3	0.455
Mid	1904.6875	3(QPSK+)	Flat	PC Bottom	0	Back	9	24.3	24.3	0.445
Mid	1904.6875	4(8PSK)	Flat	PC Bottom	0	Back	9	24.3	24.3	0.473
Mid	1904.6875	6(12QAM)	Flat	PC Bottom	0	Back	9	24.2	24.1	0.332
Mid	1904.6875	7(16QAM)	Flat	PC Bottom	0	Back	9	24.1	24.1	0.293
Position search										
Mid	1904.6875	4(8PSK)	Flat	PC Side	-	Top	15	24.1	24.1	0.156
Frequency Change										
Low	1900.3125	4(8PSK)	Flat	PC Bottom	0	Back	9	24.3	24.3	0.439
High	1909.6875	4(8PSK)	Flat	PC Bottom	0	Back	9	24.3	24.2	0.470
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body SAR : 1.6 W/kg		
Spatial Peak Uncontrolled Exposure / General Population								(averaged over 1 gram)		

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8.2 SAR measurement results (PC type #2)

Liquid Depth (cm) : 15.0 Model : UTC1900D-US-B
Parameters : $\epsilon_r = 50.7, \sigma = 1.56$ Serial No. : No.1
Ambient temperature (deg.c.) : 25.0 Modulation : 8PSK
Relative Humidity (%) : 45 Crest factor : 3.1
Date : August 10, 2006 Measured By : Miyo Ikuta

BODY SAR MEASUREMENT(PC #2)										
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Channel	[MHz]			PC		EUT		Before	After	Maximum value of multi-peak
				Position	Separation [mm]	Position	Separation [mm]			
Position search										
Mid	1904.6875	4(8PSK)	Flat	PC Side	-	Top	15	24.3	24.3	0.167
Mid	1904.6875	4(8PSK)	Flat	PC Bottom	0	Back	10	24.3	24.3	0.456
Frequency Change										
Low	1900.3125	4(8PSK)	Flat	PC Bottom	0	Back	10	24.3	24.3	0.383
High	1909.6875	4(8PSK)	Flat	PC Bottom	0	Back	10	24.3	24.2	0.409
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body SAR : 1.6 W/kg		
Spatial Peak Uncontrolled Exposure / General Population								(averaged over 1 gram)		

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8.3 SAR measurement results (PC type #3)

Parameters : $\epsilon_r = 50.7, \sigma = 1.56$ Serial No. : No.1
Ambient temperature (deg.c.) : 25.0 Modulation : 8PSK
Relative Humidity (%) : 41 Crest factor : 3.1
Date : August 11, 2006 Measured By : Miyo Ikuta

BODY SAR MEASUREMENT(PC #3)										
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Channel	[MHz]			PC		EUT		Before	After	Maximum value of multi-peak
			Position	Separation [mm]	Position	Separation [mm]				
Position search										
Mid	1904.6875	4(8PSK)	Flat	PC Side	-	Top	15	24.0	24.0	0.133
Mid	1904.6875	4(8PSK)	Flat	PC Bottom	0	Back	8	24.0	24.0	0.483
Frequency Change										
Low	1900.3125	4(8PSK)	Flat	PC Bottom	0	Back	8	24.0	24.0	0.426
High	1909.6875	4(8PSK)	Flat	PC Bottom	0	Back	8	24.0	24.0	0.507
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body SAR : 1.6 W/kg		
Spatial Peak Uncontrolled Exposure / General Population								(averaged over 1 gram)		

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