SAR TEST REPORT

Test Report No. : 29LE0211-HO-02-H

Applicant	:	**Panasonic Corporation of North America**
Type of Equipment	:	**WIRELESS LAN ADAPTOR**
Model No.	:	**DY-WL10**
FCC ID	:	**ACJ-DY-WL10**
Test regulation	:	**FCC47CFR 2.1093** **FCC OET BULLETIN 65, SUPPLEMENT C**
Test Result	:	**Complied**
Max. SAR Value	:	
IEEE802.11b/g/n(2412-2462MHz)	:	**0.156W/kg (Body, 2412MHz)**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Date of test: October 14 to November 13, 2009

Tested by:

Miyo Kishimoto
EMC Services

Hisayoshi Sato
EMC Services

Approved by :

Mitsuru Fujimura
Site Manager of EMC Services

NVLAP LAB CODE: 200572-0

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UL Japan, Inc.
Head Office EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124

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UL Japan, Inc.
Head Office EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124

SECTION 1: Customer information

Company Name	:	Panasonic Corporation of North America
Address	:	One Panasonic Way, 4B-8 Secaucus, NJ 0709
Telephone Number	:	+1-201-348-7758
Facsimile Number	:	+1-201-392-4564
Contact Person	:	Richard Mullen

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

2.1 Identification of E.U.T.

Type of Equipment	:	WIRELESS LAN ADAPTOR
Model No.	:	DY-WL10
Serial No.	:	245
Rating	:	DC5.0V / 0.5A
Receipt Date of Sample	:	October 9, 2009
Country of Mass-production	:	Japan
Condition of EUT	:	Production model
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

WIRELESS LAN ADAPTOR for several Audio/ Visual Devices.

General Specification

Clock frequency in the system : CRYSTAL: 20MHz

Specification of WLAN (IEEE802.11a/b/g)

Type of radio	Wireless LAN (IEEE802.11a)	Wireless LAN (IEEE802.11b/g)
Equipment Type	Transceiver	
Frequency of Operation	5180MHz - 5320MHz 5745MHz - 5825MHz	2412MHz - 2462MHz
Bandwidth & Channel spacing	Bandwidth : 20MHz Ch spacing : 20MHz	Bandwidth : 20MHz Ch spacing : 5MHz
Type of Modulation	OFDM	11b: DSSS 11g: OFDM
Antenna Type	PWB pattern antenna	
Antenna Connector Type	U.FL connector (Hirose)	
Antenna Gain	5.15GHz: 1.5dBi (Including Cableloss) 5.20GHz: 1.5dBi (Including Cableloss) 5.30GHz: 1.4dBi (Including Cableloss) 5.50GHz: 1.4dBi (Including Cableloss) 5.60GHz: 1.3dBi (Including Cableloss) 5.80GHz: 1.0dBi (Including Cableloss)	2.4GHz: 1.5dBi (Including Cableloss)
Power Supply	DC 1.2 & 3.3V	
Operating temperature range	0 to +40 deg. C.	

Specification of WLAN (IEEE802.11n)

Type of radio	Wireless LAN (IEEE802.11n)			
	2.4G Band MISO (20M Band)	2.4G Band MISO (40M Band)	5G Band MISO (20M Band)	5G Band MISO (40M Band)
Equipment Type	Transceiver			
Frequency of Operation	2412MHz - 2462MHz	2422MHz - 2452MHz	5180MHz - 5320MHz 5745MHz - 5825MHz	5190MHz - 5310MHz 5755MHz - 5795MHz
Bandwidth & Channel spacing	Bandwidth : 20MHz Ch spacing : 5MHz	Bandwidth : 40MHz Ch spacing : 5MHz	Bandwidth : 20MHz Ch spacing : 20MHz	Bandwidth : 40MHz Ch spacing : 40MHz
Type of Modulation	OFDM			
Antenna Type	PWB pattern antenna			
Antenna Connector Type	U.FL connector (Hirose)			
Antenna Gain	2.4GHz: 1.5dBi (Including Cableloss)		5.15GHz: 1.5dBi (Including Cableloss) 5.20GHz: 1.5dBi (Including Cableloss) 5.30GHz: 1.4dBi (Including Cableloss) 5.50GHz: 1.4dBi (Including Cableloss) 5.60GHz: 1.3dBi (Including Cableloss) 5.80GHz: 1.0dBi (Including Cableloss)	
Power Supply	DC 1.2 & 3.3V			
Operating temperature range	0 to +40 deg. C.			

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.

3.2 SAR Test online

SAR evaluation was measured all USB orientations (see Appendix 1 – (1) Horizontal-Front, (2) Horizontal-Rear, (3) Vertical-Right side, and (4) Vertical-Left side) with a device to phantom separation distance of 5 mm, according to KDB 447498 requirements.

3.3 Procedure and result

No.	Item	Test Procedure	Limit	Remarks	Exclusion	Result
1	Human Exposure	FCC OET BULLETIN 65, SUPPLEMENT C	FCC47CFR 2.1093	SAR Measurement	N/A	Complied Max.SAR = 0.156W/kg
Note: UL Japan, Inc. 's SAR Work Procedures QPM46 and QPM47						

Result of Max. SAR value

Max. SAR Value:

IEEE802.11b/g/n(2412-2462MHz) : 0.156W/kg (Body, 2412MHz)

The 1-g SAR was <0.4W/kg for all configurations.
Therefore according to the KDB447498 D01, the EUT was incorporated in or operated as a portable device with no restrictions on host platforms.

3.4 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

3.5 Test Location

*Shielded room for SAR testings
UL Japan, Inc. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

3.6 Confirmation before SAR testing

3.6.1 Correlation of Output Power between EMC and SAR tests

It was checked that the antenna port power was correlated within 0~+5% (FCC requirements)
The result is shown in Section 6.1.

- **Output power at EMC test**
  EMC power was measured during EMC testing (S/N: 245).
  -11b/g/n mode was measured the peak output power in the FCC 15.247.

- **Output power at SAR test**
  SAR power was measured before SAR testing (S/N: 245).
  -11b/g/n mode was measured the peak output power in the FCC 15.247.

3.6.2 Power check for SAR testing

- Data rate check

The data rate check was measurement all data rate in the middle frequency of each frequency band.

Reference of modulation table

11b		11g	
Modulation	**Data rate [Mbps]**	**Modulation**	**Data rate [Mbps]**
DBPSK	1	BPSK	6
DQPSK	2	BPSK	9
CCK	5.5	QPSK	12
CCK	11	QPSK	18
-	-	16QAM	24
-	-	16QAM	36
-	-	64QAM	48
-	-	64QAM	54

Reference of MCS index

11n	
Modulation	**MCS Number**
BPSK	MCS 0
QPSK	MCS 1
QPSK	MCS 2
16QAM	MCS 3
16QAM	MCS 4
64QAM	MCS 5
64QAM	MCS 6
64QAM	MCS 7

3.7 Confirmation after SAR testing

It was checked that the power drift [W] is within ±5%.The verification of power drift during the SAR test is that DASY4 system calculates the power drift by measureing the e-filed at the same location at beginning and the end of the scan measurement for each test position.

DASY4 system calucation Power drift value[dB] =20log(Ea)/(Eb)
Before SAR testing : Eb[V/m]
After SAR testing : Ea[V/m]

Limit of power drift[W] =+/-5%
X[dB]=10log[P]=10log(1.05/1)=10log(1.05)-10log(1)=0.212dB

from E-filed relations with power.
S=E*H=E^2/ η =P/4 π r^2 (η : Space impedance)
P=E^2*4 π r^2/η
Therefore, The correlation of power and the E-filed
XdB=10log(P)=10log(E)^2=20log(E)

From the above mentioned,
The calculated power drift of DASY4 System must be the less than +/-0.212dB.

3.8 Measurement procedure

This EUT has two antennas but was transmitted with single antenna and cannot be transmitted simultaneously with multi antennas.
The each antenna has four radiated patterns and the test was measured by each pattern.

This EUT is USB dongle with internal antennas.
Therefore, it was tested with all USB orientations(four orientations) had been connected with the host device through the USB cable.
The USB cable used is a short (less than 12 inches), high quality and did not affect emission characteristics of device and output power from dongle.
As a result, EUT was proved to the satisfaction enough SAR value with 0.4W/kg or less.

Radiated power is always monitored by Spectrum Analyzer.

1. IEEE 802.11b/n mode

Step1. The searching for the worst modulation
The 11b (DSSS) mode test was performed on the DQPSK[2Mbps] modulation and the DBPSK[1Mbps] modulation, because it was the maximum average power* and the minimum data rate.

Step2. The searching for the worst position and worst radiated pattern.
This test was performed at the worst modulation of Step 1.

Step3. Change the mode (11n MISO 20M band mode)
This test was performed at the worst condition of Step 1 to Step 2.

Step4. Change the mode (11n MISO 40M band mode)
This test was performed at the worst condition of Step 1 to Step 2.

Step5. Change the channel
This test was performed at the worst condition of Step 1to Step4.

2. IEEE 802.11g

According to the KDB 248227 (Rev1.2) SAR Measurement Procedures for 802 11 a/b/g Transmitters, SAR is not required for 802.11g channels when the maximum average output power* is less than $^{1}/_{4}$dB higher than that measured on the corresponding 802.11b channels. Refer to the Section 6.

* Refer to the average power data to Section 6

3.9 Test setup of EUT

SAR evaluation was measured all USB orientations (see Appendix 1 – (1) Horizontal-Front, (2) Horizontal-Rear, (3) Vertical-Right side, and (4) Vertical-Left side) with a device to phantom separation distance of 5 mm, according to KDB 447498 requirements.

(1): Horizontal-Front:
The test was performed in separated distance of 5 mm between front surface of the EUT and the flat phantom.

(2): Horizontal-Rear:
The test was performed in separated distance of 5 mm between rear surface of the EUT and the flat phantom.

(3): Vertical-Right side:
The test was performed in separated distance of 5 mm between right side of the EUT and the flat phantom.

(4): Vertical-Left side:
The test was performed in separated distance of 5 mm between left side of the EUT and the flat phantom.

3.10 Radiated pattern

This EUT has two antennas, but it transmits with single antenna and does not trasmit with multi antennas.
Each antenna has four radiated patterns and the test was performed by each pattern.

(1): Default:
It is radiated in the large range.

(2): Front:
It radiates strongly on head side(the other side of the interface).

(3): Rear:
I It radiates strongly on the interface side.

(4): Front + Rear:
It is radiated strongly on the both side.

SECTION 4 : Operation of E.U.T. during testing

4.1 Operating modes for SAR testing

4.1.1 Setting of EUT

The frequency band and the modulation used in the testing of IEEE.802.11b/n are shown as a following.

1. IEEE 802.11b mode
Tx frequency band : 2412-2462MHz
Channel : 1ch(2412MHz),6ch(2437MHz),11ch(2462MHz)
Modulation : DSSS(DBPSK, DQPSK)
Crest factor : 1

Mode	On time	1cycle	Duty	Crest factor
DBPSK	8.622	8.702	99%	1.01

Duty[%]=On time / 1cycle *100
Crest factor=100 / Duty[%]
Crest factor=1.01 1

Mode	On time	1cycle	Duty	Crest factor
DQPSK	4.427	4.501	98%	1.02

Duty[%]=On time / 1cycle *100
Crest factor=100 / Duty[%]
Crest factor=1.02≒1

2. IEEE 802.11n MISO 20Mband mode
Tx frequency band : 2412-2462MHz
Channel : 6ch(2437MHz)
Modulation : OFDM(BPSK)
Crest factor : 1

Mode	On time	1cycle	Duty	Crest factor
BPSK	1.344	1.432	94%	1.06

Duty[%]=On time / 1cycle *100
Crest factor=100 / Duty[%]
Crest factor=1.06≒1

3. IEEE 802.11n MISO 40Mband mode
Tx frequency band : 2422-2452MHz
Channel : 6ch(2437MHz)
Modulation : OFDM(BPSK)
Crest factor : 1

Mode	On time	1cycle	Duty	Crest factor
BPSK	0.6734	0.7620	88%	1.14

Duty[%]=On time / 1cycle *100
Crest factor=100 / Duty[%]
Crest factor=1.14≒1

SECTION 5 : Test surrounding

5.1 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 ± %	Probability distribution	divisor	(ci) 1g	Standard Uncertainty (1g)	vi or veff
Measurement System						
Probe calibration	±6.8	Normal	1	1	±6.8	∞
Axial isotropy of the probe	±4.7	Rectangular	√3	$(1\text{-cp})^{1/2}$	±1.9	∞
Spherical isotropy of the probe	±9.6	Rectangular	√3	$(cp)^{1/2}$	±3.9	∞
Boundary effects	±2.0	Rectangular	√3	1	±1.2	∞
Probe linearity	±4.7	Rectangular	√3	1	±2.7	∞
Detection limit	±1.0	Rectangular	√3	1	±0.6	∞
Readout electronics	±0.3	Normal	1	1	±0.3	∞
Response time	±0.8	Rectangular	√3	1	±0.5	∞
Integration time	±2.6	Rectangular	√3	1	±1.5	∞
RF ambient Noise	±3.0	Rectangular	√3	1	±1.7	∞
RF ambient Reflections	±3.0	Rectangular	√3	1	±1.7	∞
Probe Positioner	±0.8	Rectangular	√3	1	±0.5	∞
Probe positioning	±9.9	Rectangular	√3	1	±5.7	∞
Max.SAR Eval.	±4.0	Rectangular	√3	1	±2.3	∞
Test Sample Related						
Device positioning	±2.9	Normal	1	1	±2.9	29
Device holder uncertainty	±3.6	Normal	1	1	±3.6	3
Power drift	±5.0	Rectangular	√3	1	±2.9	∞
Phantom and Setup						
Phantom uncertainty	±4.0	Rectangular	√3	1	±2.3	∞
Liquid conductivity (target)	±5.0	Rectangular	√3	0.64	±1.8	∞
Liquid conductivity (meas.)	±5.0	Rectangular	1	0.64	±3.2	∞
Liquid permittivity (target)	±10.0	Rectangular	√3	0.6	±3.4	∞
Liquid permittivity (meas.)	±10.0	Rectangular	1	0.6	±6.0	∞
Combined Standard Uncertainty					**±14.72**	
Expanded Uncertainty (k=2)					**±29.4**	

The dielectric parameters (permittivity) were expanded to variation of ±10% from the target value.

SECTION 6 : Confirmation before testing

6.1 Correlation of Output Power between EMC and SAR tests

6.1.1 EMC power

This data is reference data of EMC test(Report No. 29LE0211-HO-02-A).
Date of test: October 13, 2009

[11b ant 0, 11Mbps]

Ch	Freq.	P/M PK Reading	Cable Loss	Atten.	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
Low	2412.0	8.63	0.50	10.09	19.22	83.56
Mid	2437.0	8.89	0.50	10.09	19.48	88.72
High	2462.0	8.18	0.50	10.09	18.77	75.34

[11b ant 1, 11Mbps]

Ch	Freq.	P/M PK Reading	Cable Loss	Atten.	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
Mid	2437.0	8.21	0.50	10.09	18.80	75.86

[11n-20(2.4GHz) ant 1, MCS 0]

Ch	Freq.	P/M PK Reading	Cable Loss	Atten.	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
Low	2412.0	11.55	0.50	10.09	22.14	163.68
Mid	2437.0	11.71	0.50	10.09	22.30	169.82
High	2462.0	11.34	0.50	10.09	21.93	155.96

[11n-20(2.4GHz) ant 0, MCS 0]

Ch	Freq.	P/M PK Reading	Cable Loss	Atten.	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
Mid	2437.0	11.38	0.50	10.09	21.97	157.40

[11n-40(2.4GHz) abt 0, MCS 5]

Ch	Freq.	P/M PK Reading	Cable Loss	Atten.	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
Low	2422.0	11.60	0.50	10.09	22.19	165.58
Mid	2437.0	12.20	0.50	10.09	22.79	190.11
High	2452.0	11.70	0.50	10.09	22.29	169.43

[11n-40(2.4GHz) ant 1, MCS 5]

Ch	Freq.	P/M PK Reading	Cable Loss	Atten.	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
Mid	2437.0	12.18	0.50	10.09	22.77	189.23

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

6.1.2 SAR power

Date of test: October 14, 2009

[11b ant 0, 11Mbps]

Ch	Freq.	P/M PK Reading	Cable Loss	Atten.	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
Low	2412.0	8.72	0.50	10.09	19.31	85.31
Mid	2437.0	8.92	0.50	10.09	19.51	89.33
High	2462.0	8.24	0.50	10.09	18.83	76.38

[11b ant 1, 11Mbps]

Ch	Freq.	P/M PK Reading	Cable Loss	Atten.	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
Mid	2437.0	8.36	0.50	10.09	18.95	78.52

[11n-20(2.4GHz) ant 1, MCS 0]

Ch	Freq.	P/M PK Reading	Cable Loss	Atten.	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
Low	2412.0	11.62	0.50	10.09	22.21	166.34
Mid	2437.0	11.91	0.50	10.09	22.50	177.83
High	2462.0	11.52	0.50	10.09	22.11	162.55

[11n-20(2.4GHz) ant 0, MCS 0]

Ch	Freq.	P/M PK Reading	Cable Loss	Atten.	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
Mid	2437.0	11.42	0.50	10.09	22.01	158.85

[11n-40(2.4GHz) abt 0, MCS 0]

Ch	Freq.	P/M PK Reading	Cable Loss	Atten.	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
Low	2422.0	11.72	0.50	10.09	22.31	170.22
Mid	2437.0	12.31	0.50	10.09	22.90	194.98
High	2452.0	11.81	0.50	10.09	22.40	173.78

[11n-40(2.4GHz) ant 1, MCS 0]

Ch	Freq.	P/M PK Reading	Cable Loss	Atten.	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
Mid	2437.0	12.24	0.50	10.09	22.83	191.87

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

6.2 Power check for SAR testing

Date of test: October 13, 2009

[IEEE802.11b ant 0] Rate Check

Rate	Freq.	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
[Mbps]	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
1.0	2437	8.06	4.25	0.50	10.09	18.65	14.84	73.28	30.48
2.0	2437	8.86	4.72	0.50	10.09	19.45	15.31	88.10	33.96
5.5	2437	6.72	4.11	0.50	10.09	17.31	14.70	53.83	29.51
11.0	2437	8.89	4.01	0.50	10.09	19.48	14.60	88.72	28.84

[IEEE802.11b ant 1] Rate Check

Rate	Freq.	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
[Mbps]	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
1.0	2437	8.14	3.65	0.50	10.09	18.73	14.24	74.64	26.55
2.0	2437	8.16	3.67	0.50	10.09	18.75	14.26	74.99	26.67
5.5	2437	7.02	3.42	0.50	10.09	17.61	14.01	57.68	25.18
11.0	2437	8.21	3.25	0.50	10.09	18.80	13.84	75.86	24.21

IEEE802.11b 1Mbps ant 0

Ch	Frequency	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
1	2412	8.18	4.41	0.50	10.09	18.77	15.00	75.34	31.62
11	2462	8.06	4.30	0.50	10.09	18.65	14.89	73.28	30.83

IEEE802.11b 1Mbps ant 1

Ch	Frequency	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
1	2412	8.14	3.70	0.50	10.09	18.73	14.29	74.64	26.85
11	2462	8.17	3.67	0.50	10.09	18.76	14.26	75.16	26.67

IEEE802.11b 2Mbps ant 0

Ch	Frequency	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
1	2412	8.95	4.85	0.50	10.09	19.54	15.44	89.95	34.99
11	2462	8.94	4.77	0.50	10.09	19.53	15.36	89.74	34.36

IEEE802.11b 2Mbps ant 1

Ch	Frequency	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
1	2412	8.23	3.84	0.50	10.09	18.82	14.43	76.21	27.73
11	2462	8.24	3.81	0.50	10.09	18.83	14.40	76.38	27.54

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

[IEEE802.11g ant 0] Rate Check

Rate	Freq.	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
[Mbps]	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
6.0	2437	12.10	2.88	0.50	10.09	25.07	13.47	321.37	22.23
9.0	2437	11.94	2.37	0.50	10.09	24.40	12.96	275.42	19.77
12.0	2437	12.01	2.32	0.50	10.09	24.42	12.91	276.69	19.54
18.0	2437	11.50	2.20	0.50	10.09	23.79	12.79	239.33	19.01
24.0	2437	12.28	1.79	0.50	10.09	24.16	12.38	260.62	17.30
36.0	2437	11.80	1.52	0.50	10.09	23.41	12.11	219.28	16.26
48.0	2437	11.64	1.10	0.50	10.09	22.83	11.69	191.87	14.76
54.0	2437	11.64	0.94	0.50	10.09	22.67	11.53	184.93	14.22

[IEEE802.11g ant 1] Rate Check

Rate	Freq.	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
[Mbps]	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
6.0	2437	12.06	2.32	0.50	10.09	24.47	12.91	279.90	19.54
9.0	2437	11.53	2.31	0.50	10.09	23.93	12.90	247.17	19.50
12.0	2437	11.76	2.16	0.50	10.09	24.01	12.75	251.77	18.84
18.0	2437	11.07	2.02	0.50	10.09	23.18	12.61	207.97	18.24
24.0	2437	12.10	1.66	0.50	10.09	23.85	12.25	242.66	16.79
36.0	2437	11.67	1.18	0.50	10.09	22.94	11.77	196.79	15.03
48.0	2437	11.10	0.82	0.50	10.09	22.01	11.41	158.85	13.84
54.0	2437	11.30	0.63	0.50	10.09	22.02	11.22	159.22	13.24

IEEE802.11g 6Mbps ant 0

Ch	Frequency	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
1	2412	12.08	2.78	0.50	10.09	22.67	13.37	184.93	21.73
11	2462	12.00	2.45	0.50	10.09	22.59	13.04	181.55	20.14

IEEE802.11g 6Mbps ant 1

Ch	Frequency	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
1	2412	11.76	2.22	0.50	10.09	22.35	12.81	171.79	19.10
11	2462	11.81	2.26	0.50	10.09	22.40	12.85	173.78	19.28

**: SAR is not required for 802.11g channels when the maximum average output power is less than 1/4dB higher than that measured on the corresponding 802.11b channels.

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

[IEEE802.11n HT20 ant 0] Rate Check

MCS Number	Freq.	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
0	2437	11.38	2.40	0.50	10.09	23.87	12.99	243.78	19.91
1	2437	10.94	2.01	0.50	10.09	23.04	12.60	201.37	18.20
2	2437	11.29	1.95	0.50	10.09	23.33	12.54	215.28	17.95
3	2437	11.16	1.63	0.50	10.09	22.88	12.22	194.09	16.67
4	2437	10.79	1.14	0.50	10.09	22.02	11.73	159.22	14.89
5	2437	11.19	1.14	0.50	10.09	22.42	11.73	174.58	14.89
6	2437	11.35	0.73	0.50	10.09	22.17	11.32	164.82	13.55
7	2437	11.35	0.61	0.50	10.09	22.05	11.20	160.32	13.18

[IEEE802.11n HT20 ant 1] Rate Check

MCS Number	Freq.	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
0	2437	11.71	2.55	0.50	10.09	24.35	13.14	272.27	20.61
1	2437	11.45	2.21	0.50	10.09	23.75	12.80	237.14	19.05
2	2437	11.45	2.15	0.50	10.09	23.69	12.74	233.88	18.79
3	2437	11.55	1.61	0.50	10.09	23.25	12.20	211.35	16.60
4	2437	11.42	1.28	0.50	10.09	22.79	11.87	190.11	15.38
5	2437	11.36	0.98	0.50	10.09	22.43	11.57	174.98	14.35
6	2437	11.56	0.82	0.50	10.09	22.47	11.41	176.60	13.84
7	2437	11.38	0.67	0.50	10.09	22.14	11.26	163.68	13.37

IEEE802.11n HT20 MCS 0 ant 0

Ch	Frequency	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
1	2412	11.49	2.41	0.50	10.09	22.08	13.00	161.44	19.95
11	2462	11.42	2.30	0.50	10.09	22.01	12.89	158.85	19.45

IEEE802.11n HT20 MCS 0 ant 1

Ch	Frequency	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
1	2412	11.55	2.72	0.50	10.09	22.14	13.31	163.68	21.43
11	2462	11.34	2.64	0.50	10.09	21.93	13.23	155.96	21.04

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

[IEEE802.11n HT40 ant 0] Rate Check

MCS Number	Freq.	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
0	2437	11.92	2.70	0.50	10.09	24.71	13.29	295.80	21.33
1	2437	11.69	1.80	0.50	10.09	23.58	12.39	228.03	17.34
2	2437	11.21	1.25	0.50	10.09	22.55	11.84	179.89	15.28
3	2437	12.04	1.07	0.50	10.09	23.20	11.66	208.93	14.66
4	2437	11.81	1.04	0.50	10.09	22.94	11.63	196.79	14.55
5	2437	12.20	0.42	0.50	10.09	22.71	11.01	186.64	12.62
6	2437	11.92	0.23	0.50	10.09	22.24	10.82	167.49	12.08
7	2437	11.33	0.07	0.50	10.09	21.49	10.66	140.93	11.64

[IEEE802.11n HT40 ant 1] Rate Check

MCS Number	Freq.	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
0	2437	11.37	2.04	0.50	10.09	23.50	12.63	223.87	18.32
1	2437	11.42	1.55	0.50	10.09	23.06	12.14	202.30	16.37
2	2437	11.44	1.24	0.50	10.09	22.77	11.83	189.23	15.24
3	2437	11.98	0.95	0.50	10.09	23.02	11.54	200.45	14.26
4	2437	11.56	0.34	0.50	10.09	21.99	10.93	158.12	12.39
5	2437	12.18	-0.25	0.50	10.09	22.02	10.34	159.22	10.81
6	2437	11.73	-0.33	0.50	10.09	21.49	10.26	140.93	10.62
7	2437	11.17	-0.51	0.50	10.09	20.75	10.08	118.85	10.19

IEEE802.11n HT40 MCS 0 ant 0

Ch	Frequency	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
3	2422	11.56	2.50	0.50	10.09	22.15	13.09	164.06	20.37
9	2452	11.90	2.12	0.50	10.09	22.49	12.71	177.42	18.66

IEEE802.11n HT40 MCS 0 ant 0

Ch	Frequency	P/M Reading [dBm]		Cable Loss	Atten.	Result [dBm]		Result [mW]	
	[MHz]	PK	AVG	[dB]	[dB]	PK	AVG	PK	AVG
3	2422	11.78	2.14	0.50	10.09	22.37	12.73	172.58	18.75
9	2452	11.71	2.04	0.50	10.09	22.30	12.63	169.82	18.32

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

SECTION 7 : Measurement results

7.1 Body SAR 2450MHz

7.1.1 ant 0

Model	:	**DY-WL10**	
Serial No.	:	**245**	
Modulation	:	**DSSS, OFDM**	
Measured By	:	**Hisayoshi Sato**	
Date	:	**October 14, 2009**	**November 12, 2009**
Liquid Depth (cm)	:	**15.0**	**15.0**
Parameters	:	**εr =50.1, σ =1.99**	**εr =50.4, σ =1.97**
Ambient temperature(deg.c.)	:	**24.5**	**24.3**
Relative Humidity (%)	:	**41**	**33**

BODY SAR MEASUREMENT RESULTS

Frequency			Modulation	Phantom Section	EUT Set-up Conditions				Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Mode	Channel	[MHz]			Antenna	Radiated pattern	Position	Separation [mm]	Before	After	Maximum value of multi-peak
	Step 1. Search for the worst modulation										
	6	2437	DBPSK(1Mbps)	Flat	ant 0	Default	Hori-Front	5	24.0	24.0	**0.109**
	6	2437	DQPSK(2Mbps)	Flat	ant 0	Default	Hori-Front	5	24.0	24.0	**0.109**
	Step 1. Search for the worst position and worst radiated pattern										
	6	2437	DBPSK(1Mbps)	Flat	ant 0	Front	Hori-Front	5	24.0	24.0	**0.106**
	6	2437	DBPSK(1Mbps)	Flat	ant 0	Rear	Hori-Front	5	23.5	23.5	**0.082**
11b	6	2437	DBPSK(1Mbps)	Flat	ant 0	Front+Rear	Hori-Front	5	23.5	23.5	**0.077**
	6	2437	DBPSK(1Mbps)	Flat	ant 0	Default	Hori-Rear*	5	24.0	24.0	**0.016**
	6	2437	DBPSK(1Mbps)	Flat	ant 0	Default	Ver-Right	5	24.0	24.0	**0.087**
	6	2437	DBPSK(1Mbps)	Flat	ant 0	Front	Ver-Right	5	24.0	24.0	**0.093**
	6	2437	DBPSK(1Mbps)	Flat	ant 0	Rear	Ver-Right	5	23.5	23.5	**0.068**
	6	2437	DBPSK(1Mbps)	Flat	ant 0	Front+Rear	Ver-Right	5	23.5	23.5	**0.064**
	6	2437	DBPSK(1Mbps)	Flat	ant 0	Default	Ver-Left*	5	24.0	24.0	**0.00991**
	Step 2. Change the mode (11n MISO 20M band mode)										
11n	6	2437	BPSK(MCS 0)	Flat	ant 0	Default	Hori-Front	5	24.0	24.0	**0.072**
	Step 3. Change the mode (11n MISO 40M band mode)										
	6	2437	BPSK(MCS 0)	Flat	ant 0	Default	Hori-Front	5	24.0	24.1	**0.064**
	Step 4. Change the channel										
11b	1	2412	DBPSK(1Mbps)	Flat	ant 0	Default	Hori-Front	5	24.1	24.3	**0.111**
	11	2462	DBPSK(1Mbps)	Flat	ant 0	Default	Hori-Front	5	24.3	24.3	**0.101**

* This position was measured by one radiated pattern. Because the position of the antenna is considerably away compared with other positions (Front, Right), and the SAR result is lower than other positions.

7.1.2 ant 1

Model	:	**DY-WL10**	
Serial No.	:	**245**	
Modulation	:	**DSSS, OFDM**	
Measured By	:	**Hisayoshi Sato**	
Date	:	**October 15, 2009**	**November 12, 2009**
Liquid Depth (cm)	:	**15.0**	**15.0**
Parameters	:	**εr =50.3, σ =1.99**	**εr =50.4, σ =1.97**
Ambient temperature(deg.c.)	:	**24.3**	**24.3**
Relative Humidity (%)	:	**39**	**33**

BODY SAR MEASUREMENT RESULTS

Frequency			Modulation	Phantom Section	EUT Set-up Conditions				Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Mode	Channel	[MHz]			Antenna	Radiated pattern	Position	Separation [mm]	Before	After	Maximum value of multi-peak
11b	**Step 1. Search for the worst modulation**										
	6	2437	DBPSK(1Mbps)	Flat	ant 1	Default	Hori-Front	5	23.5	23.5	**0.117**
	6	2437	DQPSK(2Mbps)	Flat	ant 1	Default	Hori-Front	5	23.5	23.5	**0.121**
	Step 1. Search for the worst position and worst radiated pattern										
	6	2437	DQPSK(2Mbps)	Flat	ant 1	Front	Hori-Front	5	23.5	23.5	**0.116**
	6	2437	DQPSK(2Mbps)	Flat	ant 1	Rear	Hori-Front	5	23.3	23.3	**0.097**
	6	2437	DQPSK(2Mbps)	Flat	ant 1	Front+Rear	Hori-Front	5	23.5	23.5	**0.115**
	6	2437	DQPSK(2Mbps)	Flat	ant 1	Default	Hori-Rear*	5	23.5	23.5	**0.015**
	6	2437	DQPSK(2Mbps)	Flat	ant 1	Default	Ver-Right*	5	24.0	24.0	**0.00801**
	6	2437	DQPSK(2Mbps)	Flat	ant 1	Default	Ver-Left	5	24.0	24.0	**0.109**
	6	2437	DQPSK(2Mbps)	Flat	ant 1	Front	Ver-Left	5	24.0	24.0	**0.110**
	6	2437	DQPSK(2Mbps)	Flat	ant 1	Rear	Ver-Left	5	23.3	23.3	**0.120**
	6	2437	DQPSK(2Mbps)	Flat	ant 1	Front+Rear	Ver-Left	5	24.0	24.0	**0.105**
11n	**Step 2. Change the mode (11n MISO 20M band mode)**										
	6	2437	BPSK(MCS 0)	Flat	ant 1	Default	Hori-Front	5	23.9	23.9	**0.107**
	Step 3. Change the mode (11n MISO 40M band mode)										
	6	2437	BPSK(MCS 0)	Flat	ant 1	Default	Hori-Front	5	23.9	23.9	**0.093**
11b	**Step 4. Change the channel**										
	1	2412	DQPSK(2Mbps)	Flat	ant 1	Default	Hori-Front	5	23.5	23.5	**0.156**
	11	2462	DQPSK(2Mbps)	Flat	ant 1	Default	Hori-Front	5	23.5	23.5	**0.143**

* This position was measured by one radiated pattern. Because the position of the antenna is considerably away compared with other positions (Front, Left), and the SAR result is lower than other positions.