



SAR TEST REPORT

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

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 :
IEEE802.11a/n(5180-5320MHz) : 0.512W/kg (Body, 5180MHz)
IEEE802.11a/n(5745-5785MHz) : 0.307W/kg (Body, 5745MHz)

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3. This sample tested is in compliance with the limits of the above regulation.
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Date of test: October 19 to November 6, 2009

Tested by: 
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NVLAP LAB CODE: 200572-0

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SECTION 1: Customer information

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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. : 244
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

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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.			

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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 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 = 0.512W/kg

Note: UL Japan, Inc.'s SAR Work Procedures QPM46 and QPM47

Result of Max. SAR value

Max. SAR Value:

IEEE802.11a/n(5180-5320MHz) : 0.512W/kg (Body, 5180MHz)
IEEE802.11a/n(5745-5785MHz) : 0.307W/kg (Body, 5745MHz)

The 1-g SAR was <0.8W/kg for all configurations.

Therefore according to the KDB447498 D01, the EUT was approved for used in a multiple platform.

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**

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3.5 Test Location

*Shielded room for SAR testings

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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: 244).

-11a/n(5180-5320) mode was measured the average output power as a reference data for SAR power.

-11a/n(5745-5825) 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: 244).

-11a/n(5180-5320) mode was measured the average output power.

-11a/n(5745-5825) mode was measured the peak output power.

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3.6.2 Power check for SAR testing

Step.1 Data rate check

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

Reference of modulation table

11a	
Modulation	Data rate [Mbps]
BPSK	6
BPSK	9
QPSK	12
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

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Step.2 Decision of SAR test channel

The average output power for 802.11a was measured on all channels in each frequency band.

Mode	GHz	Channel	Turbo Channel	"Default Test Channel"				
				FCC 15.247		UNII		
				802.11b	802.11g			
802.11 b/g	2.412	1		√	Δ			
	2.437	6	6	√	Δ			
	2.462	11		√	Δ			
802.11a	5.18	36				√		
	5.20	40	42(5.21 GHz)				*	
	5.22	44					*	
	5.24	48	50(5.25 GHz)			√		
	5.26	52				√		
	5.28	56	58(5.29 GHz)				*	
	5.30	60					*	
	5.32	64				√		
	5.50	100	Unknown					*
	5.52	104				√		
	5.54	108						*
	5.56	112						*
	5.58	116				√		
	5.60	120						*
	5.62	124				√		
	5.64	128						*
	5.66	132						*
	5.68	136				√		
	5.70	140						*
	UNII or FCC 15.247	5.745	149		√		√	
		5.765	153	152(5.76 GHz)		*		*
5.785		157		√			*	
5.805		161	160(5.80GHz)		*	√		
FCC 15.247	5.825	165		√				

√ = "default test channels"

* = Possible 802.11a channels with maximum average output > the "default test channels"

Δ = Possible 802.11g channels with maximum average output ¼ dB ≥ the "default test channels"

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3.7 Confirmation after SAR testing

It was checked that the power drift [W] is within $\pm 5\%$. The verification of power drift during the SAR test is that DASY4 system calculates the power drift by measuring the E-field at the same location at beginning and the end of the scan measurement for each test position.

DASY4 system calculation Power drift value[dB] = $20\log(E_a)/(E_b)$
Before SAR testing : E_b [V/m]
After SAR testing : E_a [V/m]

Limit of power drift[W] = $\pm 5\%$
 $X[\text{dB}] = 10\log[P] = 10\log(1.05/1) = 10\log(1.05) - 10\log(1) = 0.212\text{dB}$

from E-field relations with power.

$S = E \cdot H = E^2 / \eta = P / 4 \pi r^2$ (η : Space impedance)

$P = E^2 \cdot 4 \pi r^2 / \eta$

Therefore, The correlation of power and the E-field

$X[\text{dB}] = 10\log(P) = 10\log(E)^2 = 20\log(E)$

From the above mentioned,

The calculated power drift of DASY4 System must be the less than $\pm 0.212\text{dB}$.

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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.

And, because this EUT was used to the single platform, only the worst condition was tested with Laptop computer.

As a result, EUT was proved to the satisfaction enough SAR value with 0.8W/kg or less in compared with the connection to Laptop PC.

Radiated power is always monitored by Spectrum Analyzer.

1. IEEE 802.11a/n mode

The 11a/n mode test was performed on the BPSK modulation, because it was the maximum average power*.

As for the SAR measurement of each band in the 11a/n mode, it was repeated from Step1 to Step4.

Step1. The searching for the worst position and worst radiated pattern.

This test was performed at the 11a mode.

Step2. Change the mode (11n MISO 20M band mode)

This test was performed at the worst condition of Step 1.

Step3. Change the mode (11n MISO 40M band mode)

This test was performed at the worst condition of Step 1.

Step4. Change the channel

This test was performed at the worst condition of Step 1 to Step3.

Step5. Without USB cable

This test was performed at the worst condition in all measurements.

* Refer to the average power data to Section 6

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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.

(5): Horizontal-Front without USB cable:

The test was performed in separated distance of 5 mm between front surface 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 transmit 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:

It radiates strongly on the interface side.

(4): Front + Rear:

It is radiated strongly on the both side.

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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.802.11a/n are shown as a following.

1. IEEE 802.11a Low/Middle band mode
Tx frequency band : 5180-5320MHz
Channel : 48ch(5240MHz)
Modulation : OFDM (BPSK)
Crest factor : 1

Mode	On time	1cycle	Duty	Crest factor
BPSK	1.736	1.820	95%	1.05

Duty[%]=On time / 1cycle *100
Crest factor=100 / Duty[%]
Crest factor=1.05

2. IEEE 802.11n(5G) MISO 20Mband mode Low/Middle band mode
Tx frequency band : 5180-5320MHz
Channel : 36ch(5180MHz),48ch(5240MHz),56ch(5280MHz),64ch(5320MHz)
Modulation : OFDM (BPSK)
Crest factor : 1

Mode	On time	1cycle	Duty	Crest factor
BPSK	1.342	1.431	94%	1.06

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

3. IEEE 802.11n(5G) MISO 40Mband mode Low/Middle band mode
Tx frequency band : 5190-5310MHz
Channel : 46ch(5230MHz)
Modulation : OFDM (BPSK)
Crest factor : 1

Mode	On time	1cycle	Duty	Crest factor
BPSK	0.6726	0.7582	89%	1.12

Duty[%]=On time / 1cycle *100
Crest factor=100 / Duty[%]
Crest factor=1.12

4. IEEE 802.11a Upper band mode

Tx frequency band : 5745-5825MHz
Channel : 149ch(5745MHz),157ch(5785MHz),165ch(5825MHz)
Modulation : OFDM (BPSK)
Crest factor : 1

Mode	On time	1cycle	Duty	Crest factor
BPSK	1.738	1.822	95%	1.05

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

Crest factor=100 / Duty[%]

Crest factor=1.05 \doteq 1.0

5. IEEE 802.11n(5G) MISO 20Mband mode Upper band mode

Tx frequency band : 5745-5825MHz
Channel : 149ch(5745MHz),157ch(5785MHz),165ch(5825MHz)
Modulation : OFDM (BPSK)
Crest factor : 1

Mode	On time	1cycle	Duty	Crest factor
BPSK	1.332	1.421	94%	1.06

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

Crest factor=100 / Duty[%]

Crest factor=1.06 \doteq 1

6. IEEE 802.11n(5G) MISO 40Mband mode Upper band mode

Tx frequency band : 5755-5795MHz
Channel : 159ch(5795MHz)
Modulation : OFDM (BPSK)
Crest factor : 1

Mode	On time	1cycle	Duty	Crest factor
BPSK	0.6711	0.7573	89%	1.12

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

Crest factor=100 / Duty[%]

Crest factor=1.12 \doteq 1

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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	$\sqrt{3}$	$(1-cp)^{1/2}$	±1.9	∞
Spherical isotropy of the probe	±9.6	Rectangular	$\sqrt{3}$	$(cp)^{1/2}$	±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	58
Device holder uncertainty	±3.6	Normal	1	1	±3.6	16
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)	±10.0	Rectangular	$\sqrt{3}$	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.

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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 & C).
Date of test: October 13 to 29, 2009

[IEEE 802.11a ant.0, 6Mbps]

Ch	Freq. [MHz]	P/M AVG Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
36	5180.0	1.89	1.00	10.14	13.03	20.1
44	5220.0	1.72	1.00	10.14	12.86	19.3
48	5240.0	1.83	1.00	10.14	12.97	19.8
52	5260.0	1.30	1.00	10.14	12.44	17.5
60	5300.0	1.00	1.00	10.14	12.14	16.4
64	5320.0	1.05	1.00	10.14	12.19	16.6

[IEEE 802.11a ant.1, 6Mbps]

Ch	Freq. [MHz]	P/M AVG Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
36	5180.0	1.02	1.00	10.14	12.16	16.4
44	5220.0	1.04	1.00	10.14	12.18	16.5
48	5240.0	1.36	1.00	10.14	12.50	17.8
52	5260.0	0.71	1.00	10.14	11.85	15.3
60	5300.0	0.80	1.00	10.14	11.94	15.6
64	5320.0	0.82	1.00	10.14	11.96	15.7

[IEEE 802.11a ant.0, 6Mbps]

Ch	Freq. [MHz]	P/M PK Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
149	5745.0	10.93	1.00	10.14	22.07	161.1
157	5785.0	10.97	1.00	10.13	22.10	162.2
165	5825.0	11.10	1.00	10.13	22.23	167.1

[IEEE 802.11a ant.1, 6Mbps]

Ch	Freq. [MHz]	P/M PK Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
149	5745.0	10.95	1.00	10.14	22.09	161.8
157	5785.0	10.93	1.00	10.13	22.06	160.7
165	5825.0	10.92	1.00	10.13	22.05	160.3

Sample Calculation:

Result = Reading + Cable Loss (Including customer's cable loss)+ Atten.Loss

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[IEEE 802.11n-20 ant.0, MCS 0]

Ch	Freq. [MHz]	P/M AVG Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
36	5180.0	1.84	1.00	10.14	12.98	19.9
44	5220.0	1.69	1.00	10.14	12.83	19.2
48	5240.0	1.74	1.00	10.14	12.88	19.4
52	5260.0	0.96	1.00	10.14	12.10	16.2
60	5300.0	0.94	1.00	10.14	12.08	16.1
64	5320.0	1.01	1.00	10.14	12.15	16.4

[IEEE 802.11n-20 ant.1, MCS 0]

Ch	Freq. [MHz]	P/M AVG Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
36	5180.0	1.00	1.00	10.14	12.14	16.4
44	5220.0	0.94	1.00	10.14	12.08	16.1
48	5240.0	1.24	1.00	10.14	12.38	17.3
52	5260.0	0.77	1.00	10.14	11.91	15.5
60	5300.0	0.72	1.00	10.14	11.86	15.3
64	5320.0	0.79	1.00	10.14	11.93	15.6

[IEEE 802.11n-20 ant.0, MCS 0]

Ch	Freq. [MHz]	P/M PK Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
149	5745.0	10.83	1.00	10.14	21.97	157.4
157	5785.0	11.22	1.00	10.13	22.35	171.8
165	5825.0	11.04	1.00	10.13	22.17	164.8

[IEEE 802.11n-20 ant.1, MCS 0]

Ch	Freq. [MHz]	P/M PK Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
149	5745.0	10.72	1.00	10.14	21.86	153.5
157	5785.0	11.20	1.00	10.13	22.33	171.0
165	5825.0	10.78	1.00	10.13	21.91	155.2

Sample Calculation:

$$\text{Result} = \text{Reading} + \text{Cable Loss (Including customer's cable loss)} + \text{Atten. Loss}$$

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[IEEE 802.11n-40 ant.0, MCS 0]

Ch	Freq. [MHz]	P/M AVG Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
38	5190.0	0.78	1.00	10.14	11.92	15.6
46	5230.0	0.65	1.00	10.14	11.79	15.1
54	5270.0	0.42	1.00	10.14	11.56	14.3
62	5310.0	0.46	1.00	10.14	11.60	14.5

[IEEE 802.11n-40 ant.1, MCS 0]

Ch	Freq. [MHz]	P/M AVG Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
38	5190.0	0.64	1.00	10.14	11.78	15.1
46	5230.0	0.47	1.00	10.14	11.61	14.5
54	5270.0	0.26	1.00	10.14	11.40	13.8
62	5310.0	0.36	1.00	10.14	11.50	14.1

[IEEE 802.11n-40 ant.0, MCS 0]

Ch	Freq. [MHz]	P/M PK Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
151	5755.0	10.16	1.00	10.14	21.30	134.9
159	5795.0	10.22	1.00	10.13	21.35	136.5

[IEEE 802.11n-40 ant.1, MCS 0]

Ch	Freq. [MHz]	P/M PK Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
151	5755.0	10.14	1.00	10.13	21.27	134.0
159	5795.0	10.18	1.00	10.13	21.31	135.2

Sample Calculation:

Result = Reading + Cable Loss (Including customer's cable loss)+ Atten.Loss

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6.1.2 SAR power

Date of test: October 19, 2009

[IEEE 802.11a ant.0, 6Mbps]

Ch	Freq. [MHz]	P/M AVG Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
36	5180.0	1.91	1.00	10.14	13.05	20.2
44	5220.0	1.75	1.00	10.14	12.89	19.5
48	5240.0	1.86	1.00	10.14	13.00	20.0
52	5260.0	1.09	1.00	10.14	12.23	16.7
60	5300.0	1.02	1.00	10.14	12.16	16.4
64	5320.0	1.08	1.00	10.14	12.22	16.7

[IEEE 802.11a ant.1, 6Mbps]

Ch	Freq. [MHz]	P/M AVG Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
36	5180.0	1.05	1.00	10.14	12.19	16.6
44	5220.0	1.07	1.00	10.14	12.21	16.6
48	5240.0	1.40	1.00	10.14	12.54	17.9
52	5260.0	0.75	1.00	10.14	11.89	15.5
60	5300.0	0.83	1.00	10.14	11.97	15.7
64	5320.0	0.86	1.00	10.14	12.00	15.8

[IEEE 802.11a ant.0, 6Mbps]

Ch	Freq. [MHz]	P/M PK Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
149	5745.0	10.95	1.00	10.14	22.09	161.8
157	5785.0	11.02	1.00	10.13	22.15	164.1
165	5825.0	11.21	1.00	10.13	22.34	171.4

[IEEE 802.11a ant.1, 6Mbps]

Ch	Freq. [MHz]	P/M PK Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
149	5745.0	11.00	1.00	10.14	22.14	163.7
157	5785.0	10.98	1.00	10.13	22.11	162.6
165	5825.0	10.95	1.00	10.13	22.08	161.4

Sample Calculation:

Result = Reading + Cable Loss (Including customer's cable loss)+ Atten.Loss

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[IEEE 802.11n-20 ant.0, MCS 0]

Ch	Freq. [MHz]	P/M AVG Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
36	5180.0	1.87	1.00	10.14	13.01	20.0
44	5220.0	1.71	1.00	10.14	12.85	19.3
48	5240.0	1.78	1.00	10.14	12.92	19.6
52	5260.0	0.99	1.00	10.14	12.13	16.3
60	5300.0	0.98	1.00	10.14	12.12	16.3
64	5320.0	1.05	1.00	10.14	12.19	16.6

[IEEE 802.11n-20 ant.1, MCS 0]

Ch	Freq. [MHz]	P/M AVG Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
36	5180.0	1.02	1.00	10.14	12.16	16.4
44	5220.0	0.96	1.00	10.14	12.10	16.2
48	5240.0	1.32	1.00	10.14	12.46	17.6
52	5260.0	0.82	1.00	10.14	11.96	15.7
60	5300.0	0.79	1.00	10.14	11.93	15.6
64	5320.0	0.82	1.00	10.14	11.96	15.7

[IEEE 802.11n-20 ant.0, MCS 0]

Ch	Freq. [MHz]	P/M PK Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
149	5745.0	10.92	1.00	10.14	22.06	160.7
157	5785.0	11.34	1.00	10.13	22.47	176.6
165	5825.0	11.10	1.00	10.13	22.23	167.1

[IEEE 802.11n-20 ant.1, MCS 0]

Ch	Freq. [MHz]	P/M PK Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result	
					[dBm]	[mW]
149	5745.0	10.76	1.00	10.14	21.90	154.9
157	5785.0	11.26	1.00	10.13	22.39	173.4
165	5825.0	10.89	1.00	10.13	22.02	159.2

Sample Calculation:

$$\text{Result} = \text{Reading} + \text{Cable Loss (Including customer's cable loss)} + \text{Atten. Loss}$$

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[IEEE 802.11n-40 ant.0, MCS 0]

Ch	Freq. [MHz]	P/M	Cable Loss [dB]	Atten. Loss [dB]	Result	
		AVG Reading [dBm]			[dBm]	[mW]
38	5190.0	0.82	1.00	10.14	11.96	15.7
46	5230.0	0.71	1.00	10.14	11.85	15.3
54	5270.0	0.48	1.00	10.14	11.62	14.5
62	5310.0	0.51	1.00	10.14	11.65	14.6

[IEEE 802.11n-40 ant.1, MCS 0]

Ch	Freq. [MHz]	P/M	Cable Loss [dB]	Atten. Loss [dB]	Result	
		AVG Reading [dBm]			[dBm]	[mW]
38	5190.0	0.69	1.00	10.14	11.83	15.2
46	5230.0	0.52	1.00	10.14	11.66	14.7
54	5270.0	0.31	1.00	10.14	11.45	14.0
62	5310.0	0.42	1.00	10.14	11.56	14.3

[IEEE 802.11n-40 ant.0, MCS 0]

Ch	Freq. [MHz]	P/M	Cable Loss [dB]	Atten. Loss [dB]	Result	
		PK Reading [dBm]			[dBm]	[mW]
151	5755.0	10.21	1.00	10.14	21.35	136.5
159	5795.0	10.27	1.00	10.13	21.40	138.0

[IEEE 802.11n-40 ant.1, MCS 0]

Ch	Freq. [MHz]	P/M	Cable Loss [dB]	Atten. Loss [dB]	Result	
		PK Reading [dBm]			[dBm]	[mW]
151	5755.0	10.18	1.00	10.13	21.31	135.2
159	5795.0	10.22	1.00	10.13	21.35	136.5

Sample Calculation:

Result = Reading + Cable Loss (Including customer's cable loss)+ Atten.Loss

6.2 Power check for SAR testing

Date of test: October 19, 2009

Step. 1 Data rate check

IEEE802.11a 5180-5320band, ant 0] Rate Check

Rate [Mbps]	Freq. [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
6.0	5240	12.09	1.86	1.00	10.14	23.23	13.00	210.38	19.95
9.0	5240	11.40	1.84	1.00	10.14	22.54	12.98	179.47	19.86
12.0	5240	11.47	1.63	1.00	10.14	22.61	12.77	182.39	18.92
18.0	5240	11.35	1.58	1.00	10.14	22.49	12.72	177.42	18.71
24.0	5240	12.09	1.13	1.00	10.14	23.23	12.27	210.38	16.87
36.0	5240	11.68	0.76	1.00	10.14	22.82	11.90	191.43	15.49
48.0	5240	11.60	0.26	1.00	10.14	22.74	11.40	187.93	13.80
54.0	5240	11.74	0.17	1.00	10.14	22.88	11.31	194.09	13.52

IEEE802.11a 5180-5320band, ant 1] Rate Check

Rate [Mbps]	Freq. [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
6.0	5240	11.46	1.40	1.00	10.14	22.60	12.54	181.97	17.95
9.0	5240	11.39	1.21	1.00	10.14	22.53	12.35	179.06	17.18
12.0	5240	11.30	1.05	1.00	10.14	22.44	12.19	175.39	16.56
18.0	5240	10.85	0.84	1.00	10.14	21.99	11.98	158.12	15.78
24.0	5240	11.78	0.53	1.00	10.14	22.92	11.67	195.88	14.69
36.0	5240	11.26	0.09	1.00	10.14	22.40	11.23	173.78	13.27
48.0	5240	11.37	-0.21	1.00	10.14	22.51	10.93	178.24	12.39
54.0	5240	11.28	-0.28	1.00	10.14	22.42	10.86	174.58	12.19

Step. 2 Decision of SAR test channel

IEEE802.11a5180-5320band 6Mbps ant 0

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
36	5180	12.10	1.91	1.00	10.14	23.24	13.05	210.86	20.18
40	5200	12.01	1.85	1.00	10.14	23.15	12.99	206.54	19.91
44	5220	12.03	1.75	1.00	10.14	23.17	12.89	207.49	19.45
48	5240	12.09	1.86	1.00	10.14	23.23	13.00	210.38	19.95
52	5260	11.38	1.09	1.00	10.14	22.52	12.23	178.65	16.71
56	5280*	11.48	1.12	1.00	10.14	22.62	12.26	182.81	16.83
60	5300	11.41	1.02	1.00	10.14	22.55	12.16	179.89	16.44
64	5320	11.42	1.08	1.00	10.15	22.57	12.23	180.72	16.71

IEEE802.11a5180-5320band 6Mbps ant 1

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
36	5180	11.36	1.05	1.00	10.14	22.50	12.19	177.83	16.56
40	5200	11.28	1.04	1.00	10.14	22.42	12.18	174.58	16.52
44	5220	11.32	1.07	1.00	10.14	22.46	12.21	176.20	16.63
48	5240	11.46	1.40	1.00	10.14	22.60	12.54	181.97	17.95
52	5260	11.20	0.75	1.00	10.14	22.34	11.89	171.40	15.45
56	5280*	11.22	0.84	1.00	10.14	22.36	11.98	172.19	15.78
60	5300	11.17	0.83	1.00	10.14	22.31	11.97	170.22	15.74
64	5320	11.21	0.86	1.00	10.15	22.36	12.01	172.19	15.89

Sample Calculation: Result = Reading + Cable Loss + Attenuator

: Channel of SAR testing

* : This channel was tested instead of an adjacent" default test channel".

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Step. 1 Data rate check

[IEEE802.11a 5745-5825band, ant 0] Rate Check

Rate [Mbps]	Freq. [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
6.0	5785	11.02	1.37	1.00	10.13	22.15	12.50	164.06	17.78
9.0	5785	10.93	1.20	1.00	10.13	22.06	12.33	160.69	17.10
12.0	5785	10.86	1.07	1.00	10.13	21.99	12.20	158.12	16.60
18.0	5785	10.82	0.71	1.00	10.13	21.95	11.84	156.68	15.28
24.0	5785	10.93	0.46	1.00	10.13	22.06	11.59	160.69	14.42
36.0	5785	10.83	0.06	1.00	10.13	21.96	11.19	157.04	13.15
48.0	5785	10.82	-0.28	1.00	10.13	21.95	10.85	156.68	12.16
54.0	5785	10.73	-0.37	1.00	10.13	21.86	10.76	153.46	11.91

[IEEE802.11a 5745-5825band, ant 1] Rate Check

Rate [Mbps]	Freq. [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
6.0	5785	10.98	1.38	1.00	10.13	22.11	12.51	162.55	17.82
9.0	5785	10.67	0.90	1.00	10.13	21.80	12.03	151.36	15.96
12.0	5785	10.76	0.72	1.00	10.13	21.89	11.85	154.53	15.31
18.0	5785	10.44	0.55	1.00	10.13	21.57	11.68	143.55	14.72
24.0	5785	11.00	0.15	1.00	10.13	22.13	11.28	163.31	13.43
36.0	5785	10.60	-0.27	1.00	10.13	21.73	10.86	148.94	12.19
48.0	5785	10.74	-0.47	1.00	10.13	21.87	10.66	153.82	11.64
54.0	5785	10.58	-0.67	1.00	10.13	21.71	10.46	148.25	11.12

Step. 2 Decision of SAR test channel

IEEE802.11a5745-5825band 6Mbps, ant 0

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
149	5745	10.95	1.31	1.00	10.14	22.09	12.45	161.81	17.58
153	5765	10.77	1.18	1.00	10.13	21.90	12.31	154.88	17.02
157	5785	11.02	1.37	1.00	10.13	22.15	12.50	164.06	17.78
161	5805	10.92	1.33	1.00	10.13	22.05	12.46	160.32	17.63
165	5825	11.21	1.61	1.00	10.13	22.34	12.74	171.40	18.79

IEEE802.11a5745-5825band 6Mbps, ant 1

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
149	5745	11.00	1.08	1.00	10.14	22.14	12.22	163.68	16.67
153	5765	10.92	1.01	1.00	10.13	22.05	12.14	160.32	16.37
157	5785	10.98	1.38	1.00	10.13	22.11	12.51	162.55	17.82
161	5805	10.92	1.07	1.00	10.13	22.05	12.20	160.32	16.60
165	5825	10.95	1.07	1.00	10.13	22.08	12.20	161.44	16.60

Sample Calculation: Result = Reading + Cable Loss + Attenuator

: Channel of SAR testing

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Step. 1 Data rate check

[IEEE802.11n HT20 5180-5320band, ant 0] Rate Check

MCS Number	Freq. [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
0	5240	11.44	1.78	1.00	10.14	22.58	12.92	181.13	19.59
1	5240	11.32	1.72	1.00	10.14	22.46	12.86	176.20	19.32
2	5240	11.24	1.56	1.00	10.14	22.38	12.70	172.98	18.62
3	5240	11.23	1.46	1.00	10.14	22.37	12.60	172.58	18.20
4	5240	12.01	1.08	1.00	10.14	23.15	12.22	206.54	16.67
5	5240	11.57	0.67	1.00	10.14	22.71	11.81	186.64	15.17
6	5240	11.47	0.21	1.00	10.14	22.61	11.35	182.39	13.65
7	5240	11.64	0.13	1.00	10.14	22.78	11.27	189.67	13.40

[IEEE802.11n HT20 5180-5320band, ant 1] Rate Check

MCS Number	Freq. [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
0	5240	11.39	1.32	1.00	10.14	22.53	12.46	179.06	17.62
1	5240	11.28	1.17	1.00	10.14	22.42	12.31	174.58	17.02
2	5240	11.13	1.00	1.00	10.14	22.27	12.14	168.66	16.37
3	5240	10.76	0.72	1.00	10.14	21.90	11.86	154.88	15.35
4	5240	11.65	0.48	1.00	10.14	22.79	11.62	190.11	14.52
5	5240	11.18	0.04	1.00	10.14	22.32	11.18	170.61	13.12
6	5240	11.22	-0.32	1.00	10.14	22.36	10.82	172.19	12.08
7	5240	11.18	-0.35	1.00	10.14	22.32	10.79	170.61	11.99

Step. 2 Decision of SAR test channel

[IEEE802.11n HT20 5180-5320band MCS 0 ant 0]

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
36	5180	12.08	1.87	1.00	10.14	23.22	13.01	209.89	20.00
40	5200	11.89	1.78	1.00	10.14	23.03	12.92	200.91	19.59
44	5220	11.35	1.71	1.00	10.14	22.49	12.85	177.42	19.28
48	5240	11.44	1.78	1.00	10.14	22.58	12.92	181.13	19.59
52	5260	11.12	0.99	1.00	10.14	22.26	12.13	168.27	16.33
56	5280*	11.32	1.01	1.00	10.14	22.46	12.15	176.20	16.41
60	5300	11.28	0.98	1.00	10.14	22.42	12.12	174.58	16.29
64	5320	11.30	1.05	1.00	10.15	22.45	12.20	175.79	16.60

[IEEE802.11n HT20 5180-5320band MCS 0, ant 1]

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
36	5180	11.28	1.02	1.00	10.14	22.42	12.16	174.58	16.44
40	5200	11.14	0.99	1.00	10.14	22.28	12.13	169.04	16.33
44	5220	11.21	0.96	1.00	10.14	22.35	12.10	171.79	16.22
48	5240	11.39	1.32	1.00	10.14	22.53	12.46	179.06	17.62
52	5260	10.99	0.82	1.00	10.14	22.13	11.96	163.31	15.70
56	5280*	11.03	0.90	1.00	10.14	22.17	12.04	164.82	16.00
60	5300	10.87	0.79	1.00	10.14	22.01	11.93	158.85	15.60
64	5320	11.18	0.82	1.00	10.15	22.33	11.97	171.00	15.74

Sample Calculation: Result = Reading + Cable Loss + Attenuator

Channel of SAR testing

* : This channel was tested instead of an adjacent default test channel".

Step. 1 Data rate check

[IEEE802.11n HT20 5745-5825band, ant 0] Rate Check

MCS Number	Freq. [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
0	5785	11.34	1.58	1.00	10.13	22.47	12.71	176.60	18.66
1	5785	11.20	1.31	1.00	10.13	22.33	12.44	171.00	17.54
2	5785	11.02	1.02	1.00	10.13	22.15	12.15	164.06	16.41
3	5785	10.01	0.89	1.00	10.13	21.14	12.02	130.02	15.92
4	5785	11.10	0.56	1.00	10.13	22.23	11.69	167.11	14.76
5	5785	11.14	0.31	1.00	10.13	22.27	11.44	168.66	13.93
6	5785	11.14	0.09	1.00	10.13	22.27	11.22	168.66	13.24
7	5785	11.13	-0.18	1.00	10.13	22.26	10.95	168.27	12.45

[IEEE802.11n HT20 5745-5825band, ant 1] Rate Check

MCS Number	Freq. [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
0.0	5785	11.26	1.38	1.00	10.13	22.39	12.51	173.38	17.82
1.0	5785	10.47	0.77	1.00	10.13	21.60	11.90	144.54	15.49
2.0	5785	10.65	0.63	1.00	10.13	21.78	11.76	150.66	15.00
3.0	5785	10.33	0.49	1.00	10.13	21.46	11.62	139.96	14.52
4.0	5785	10.87	0.10	1.00	10.13	22.00	11.23	158.49	13.27
5.0	5785	10.55	-0.33	1.00	10.13	21.68	10.80	147.23	12.02
6.0	5785	10.67	-0.58	1.00	10.13	21.80	10.55	151.36	11.35
7.0	5785	10.42	-0.72	1.00	10.13	21.55	10.41	142.89	10.99

Step. 2 Decision of SAR test channel

IEEE802.11n HT20 5745-5825band MCS 0, ant 0

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
149	5745	10.92	1.43	1.00	10.14	22.06	12.57	160.69	18.07
153	5765	10.67	1.02	1.00	10.13	21.80	12.15	151.36	16.41
157	5785	11.34	1.58	1.00	10.13	22.47	12.71	176.60	18.66
161	5805	10.88	1.24	1.00	10.13	22.01	12.37	158.85	17.26
165	5825	11.10	1.68	1.00	10.13	22.23	12.81	167.11	19.10

IEEE802.11n HT20 5745-5825band MCS 0, ant 1

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
149	5745	10.76	0.81	1.00	10.14	21.90	11.95	154.88	15.67
153	5765	10.65	0.78	1.00	10.13	21.78	11.91	150.66	15.52
157	5785	11.26	1.38	1.00	10.13	22.39	12.51	173.38	17.82
161	5805	10.82	1.01	1.00	10.13	21.95	12.14	156.68	16.37
165	5825	10.89	1.03	1.00	10.13	22.02	12.16	159.22	16.44

Sample Calculation: Result = Reading + Cable Loss + Attenuator

: Channel of SAR testing

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Step. 1 Data rate check

[IEEE802.11n HT40 5190-5310band, ant 0] Rate Check

MCS Number	Freq. [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
0	5230	10.81	0.71	1.00	10.14	21.95	11.85	156.68	15.31
1	5230	10.67	0.42	1.00	10.14	21.81	11.56	151.71	14.32
2	5230	10.65	0.24	1.00	10.14	21.79	11.38	151.01	13.74
3	5230	10.68	0.11	1.00	10.14	21.82	11.25	152.05	13.34
4	5230	10.70	-0.12	1.00	10.14	21.84	11.02	152.76	12.65
5	5230	10.72	-0.33	1.00	10.14	21.86	10.81	153.46	12.05
6	5230	10.79	-0.63	1.00	10.14	21.93	10.51	155.96	11.25
7	5230	10.69	-0.91	1.00	10.14	21.83	10.23	152.41	10.54

[IEEE802.11n HT40 5190-5310band, ant 1] Rate Check

MCS Number	Freq. [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
0	5230	10.56	0.52	1.00	10.14	21.70	11.66	147.91	14.66
1	5230	10.52	0.33	1.00	10.14	21.66	11.47	146.55	14.03
2	5230	10.52	0.12	1.00	10.14	21.66	11.26	146.55	13.37
3	5230	10.51	-0.13	1.00	10.14	21.65	11.01	146.22	12.62
4	5230	10.48	-0.34	1.00	10.14	21.62	10.80	145.21	12.02
5	5230	10.44	-0.52	1.00	10.14	21.58	10.62	143.88	11.53
6	5230	10.48	-0.71	1.00	10.14	21.62	10.43	145.21	11.04
7	5230	10.49	-0.92	1.00	10.14	21.63	10.22	145.55	10.52

Step. 2 Decision of SAR test channel

[IEEE802.11n HT40 5190-5310band MCS 0 ant 0]

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
38	5190	10.91	0.82	1.00	10.14	22.05	11.96	160.32	15.70
46	5230	10.81	0.71	1.00	10.14	21.95	11.85	156.68	15.31
54	5270	10.48	0.48	1.00	10.14	21.62	11.62	145.21	14.52
62	5310	10.52	0.51	1.00	10.15	21.67	11.66	146.89	14.66

[IEEE802.11n HT40 5190-5310band MCS 0 ant 1]

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
38	5190	10.70	0.69	1.00	10.14	21.84	11.83	152.76	15.24
46	5230	10.56	0.52	1.00	10.14	21.70	11.66	147.91	14.66
54	5270	10.11	0.31	1.00	10.14	21.25	11.45	133.35	13.96
62	5310	10.21	0.42	1.00	10.15	21.36	11.57	136.77	14.35

Sample Calculation: Result = Reading + Cable Loss + Attenuator

Step. 1 Data rate check

[IEEE802.11n HT40 5755-5795band, ant 0] Rate Check

MCS Number	Freq. [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
0	5755	10.21	0.80	1.00	10.14	21.35	11.94	136.46	15.63
1	5755	10.02	0.27	1.00	10.14	21.16	11.41	130.62	13.84
2	5755	9.91	-0.07	1.00	10.14	21.05	11.07	127.35	12.79
3	5755	10.08	-0.49	1.00	10.14	21.22	10.65	132.43	11.61
4	5755	10.00	-0.99	1.00	10.14	21.14	10.15	130.02	10.35
5	5755	10.02	-1.50	1.00	10.14	21.16	9.64	130.62	9.20
6	5755	9.98	-1.57	1.00	10.14	21.12	9.57	129.42	9.06
7	5755	9.70	-1.72	1.00	10.14	20.84	9.42	121.34	8.75

[IEEE802.11n HT40 5755-5795band, ant 1] Rate Check

MCS Number	Freq. [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
0	5755	10.18	0.51	1.00	10.14	21.32	11.65	135.52	14.62
1	5755	9.88	-0.04	1.00	10.14	21.02	11.10	126.47	12.88
2	5755	9.85	-0.21	1.00	10.14	20.99	10.93	125.60	12.39
3	5755	10.12	-0.83	1.00	10.14	21.26	10.31	133.66	10.74
4	5755	9.91	-1.22	1.00	10.14	21.05	9.92	127.35	9.82
5	5755	10.32	-1.72	1.00	10.14	21.46	9.42	139.96	8.75
6	5755	10.16	-1.92	1.00	10.14	21.30	9.22	134.90	8.36
7	5755	9.66	-2.01	1.00	10.14	20.80	9.13	120.23	8.18

Step. 2 Decision of SAR test channel

IEEE802.11n HT40 5755-5795band MCS 0, ant 0

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
151	5755	10.21	0.80	1.00	10.14	21.35	11.94	136.46	15.63
159	5795	10.27	0.59	1.00	10.13	21.40	11.72	138.04	14.86

IEEE802.11n HT40 5755-5795band MCS 0, ant 1

Ch	Frequency [MHz]	P/M Reading [dBm]		Cable Loss [dB]	Atten. [dB]	Result			
		PK	AVG			[dBm]		[mW]	
						PK	AVG	PK	AVG
151	5755	10.18	0.51	1.00	10.14	21.32	11.65	135.52	14.62
159	5795	10.22	0.25	1.00	10.13	21.35	11.38	136.46	13.74

Sample Calculation: Result = Reading + Cable Loss + Attenuator
: Channel of SAR testing

7.1.2 Low/Middle band (5180-5320MHz), ant 1

Model : DY-WL10
Serial No. : 244
Modulation : OFDM
Measured By : Hisayoshi Sato
Date : October 26, 2009 November 5, 2009
Liquid Depth (cm) : 15.0 15.0
Parameters : $\epsilon_r = 46.0, \sigma = 5.58(5200\text{MHz})$ $\epsilon_r = 45.8, \sigma = 5.58(5200\text{MHz})$
: $\epsilon_r = 45.8, \sigma = 5.61(5300\text{MHz})$
Ambient temperature(deg.c.) : 24.6 24.5
Relative Humidity (%) : 40 36

BODY SAR MEASUREMENT RESULTS												
Frequency			Modulation	Phantom Section	EUT Set-up Conditions				Liquid Temp.[deg.c]		SAR(1g)	
Mode	Channel	[MHz]			Antenna	Radiated pattern	Position	Separation [mm]	Before	After	Maximum value of multi-peak [W/kg]	
Step 1. Search for the worst position and worst radiated pattern												
11a	48	5240	BPSK(6Mbps)	Flat	ant 1	Default	Hori-Front	5	23.6	23.6	0.311	
	48	5240	BPSK(6Mbps)	Flat	ant 1	Front	Hori-Front	5	23.6	23.6	0.335	
	48	5240	BPSK(6Mbps)	Flat	ant 1	Rear	Hori-Front	5	23.6	23.6	0.317	
	48	5240	BPSK(6Mbps)	Flat	ant 1	Front+Rear	Hori-Front	5	23.6	23.6	0.300	
	48	5240	BPSK(6Mbps)	Flat	ant 1	Default	Hori-Rear*	5	23.6	23.6	0.121	
	48	5240	BPSK(6Mbps)	Flat	ant 1	Default	Ver-Right*	5	23.5	23.5	0.058	
	48	5240	BPSK(6Mbps)	Flat	ant 1	Default	Ver-Left	5	23.5	23.5	0.341	
	48	5240	BPSK(6Mbps)	Flat	ant 1	Front	Ver-Left	5	23.5	23.5	0.371	
	48	5240	BPSK(6Mbps)	Flat	ant 1	Rear	Ver-Left	5	23.8	23.8	0.108	
48	5240	BPSK(6Mbps)	Flat	ant 1	Font+Rear	Ver-Left	5	23.5	23.5	0.362		
Step 2. Change the mode (11n MISO 20M band mode)												
11n	48	5240	BPSK(MCS 0)	Flat	ant 1	Front	Ver-Left	5	23.5	23.5	0.385	
	Step 3. Change the mode (11n MISO 40M band mode)											
11n	46	5230	BPSK(MCS 0)	Flat	ant 1	Front	Ver-Left	5	23.5	23.5	0.207	
	Step 4. Change the channel											
	36	5180	BPSK(MCS 0)	Flat	ant 1	Front	Ver-Left	5	23.5	23.5	0.437	
	56	5280	BPSK(MCS 0)	Flat	ant 1	Front	Ver-Left	5	23.5	23.5	0.264	
64	5320	BPSK(MCS 0)	Flat	ant 1	Front	Ver-Left	5	23.5	23.5	0.259		

* 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.

Note: Calibration frequency of probe (Conversion factor)

SAR measurement frequency [MHz]	Calibration frequency [MHz] +/- validity [MHz]	Used conversion factor +/- uncertainty
5180	5200+/-50	4.58 +/- 13.1%(k=2)
5240	5200+/-50	4.58 +/- 13.1%(k=2)
5280	5300+/-50	4.38 +/- 13.1%(k=2)
5300	5300+/-50	4.38 +/- 13.1%(k=2)

7.1.2 Upper band (5745-5825MHz), ant 0

Model : **DY-WL10**
Serial No. : **244**
Modulation : **OFDM**
Measured By : **Hisayoshi Sato**
Date : **October 19, 2009** **November 6, 2009**
Liquid Depth (cm) : **15.0** **15.0**
Parameters : **$\epsilon_r = 45.6, \sigma = 6.23$** **$\epsilon_r = 44.1, \sigma = 6.21$**
Ambient temperature(deg.c.) : **24.4** **24.5**
Relative Humidity (%) : **43** **38**

BODY SAR MEASUREMENT RESULTS											
Frequency			Modulation	Phantom Section	EUT Set-up Conditions				Liquid Temp.[deg.c]		SAR(1g)
Mode	Channel	[MHz]			Antenna	Radiated pattern	Position	Separation [mm]	Before	After	Maximum value of multi-peak [W/kg]
Step 1. Search for the worst position and worst radiated pattern											
11a	157	5785	BPSK(6Mbps)	Flat	ant 0	Default	Hori-Front	5	23.8	23.8	0.109
	157	5785	BPSK(6Mbps)	Flat	ant 0	Front	Hori-Front	5	23.8	23.8	0.175
	157	5785	BPSK(6Mbps)	Flat	ant 0	Rear	Hori-Front	5	23.8	23.8	0.177
	157	5785	BPSK(6Mbps)	Flat	ant 0	Front+Rear	Hori-Front	5	23.8	23.8	0.225
	157	5785	BPSK(6Mbps)	Flat	ant 0	Default	Hori-Rear*	5	23.8	23.8	0.045
	157	5785	BPSK(6Mbps)	Flat	ant 0	Default	Ver-Right	5	23.7	23.7	0.090
	157	5785	BPSK(6Mbps)	Flat	ant 0	Front	Ver-Right	5	23.7	23.7	0.082
	157	5785	BPSK(6Mbps)	Flat	ant 0	Rear	Ver-Right	5	23.8	23.8	0.111
	157	5785	BPSK(6Mbps)	Flat	ant 0	Front+Rear	Ver-Right	5	23.8	23.8	0.208
157	5785	BPSK(6Mbps)	Flat	ant 0	Default	Ver-Left*	5	23.8	23.8	0.032	
Step 2. Change the mode (11n MISO 20M band mode)											
11n	157	5785	BPSK(MCS 0)	Flat	ant 0	Front+Rear	Hori-Front	5	23.8	23.8	0.197
	Step 3. Change the mode (11n MISO 40M band mode)										
11n	159	5795	BPSK(MCS 0)	Flat	ant 0	Front+Rear	Hori-Front	5	23.8	23.8	0.206
Step 4. Change the channel											
11a	149	5745	BPSK(6Mbps)	Flat	ant 0	Front+Rear	Hori-Front	5	23.8	23.8	0.259
	165	5825	BPSK(6Mbps)	Flat	ant 0	Front+Rear	Hori-Front	5	23.8	23.8	0.221

* 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.

Note: Calibration frequency of probe (Conversion factor)

SAR measurement frequency [MHz]	Calibration frequency [MHz] +/- validity [MHz]	Used conversion factor +/- uncertainty
5745	5800 +/- 100*	3.88 +/- 13.1% (k=2)
5785	5800 +/- 50	3.88 +/- 13.1% (k=2)
5825	5800 +/- 50	3.88 +/- 13.1% (k=2)

*The validity of +/-100MHz was expanded by the calibration uncertainty (k=2) < 15% according to the KDB865664 (SAR Measurement Procedures for 3-6GHz) and by the DASy v4.4 and higher according to the manufacture's request.

7.1.3 Upper band (5745-5825MHz), ant 1

Model : **DY-WL10**
Serial No. : **244**
Modulation : **OFDM**
Measured By : **Hisayoshi Sato**
Date : **October 20, 2009** **November 6, 2009**
Liquid Depth (cm) : **15.0** **15.0**
Parameters : **$\epsilon_r = 43.8, \sigma = 6.16$** **$\epsilon_r = 44.1, \sigma = 6.21$**
Ambient temperature(deg.c.) : **24.3** **24.5**
Relative Humidity (%) : **42** **38**

BODY SAR MEASUREMENT RESULTS												
Frequency			Modulation	Phantom Section	EUT Set-up Conditions				Liquid Temp.[deg.c]		SAR(1g)	
Mode	Channel	[MHz]			Antenna	Radiated pattern	Position	Separation [mm]	Before	After	Maximum value of multi-peak [W/kg]	
Step 1. Search for the worst position and worst radiated pattern												
11a	157	5785	BPSK(6Mbps)	Flat	ant 1	Default	Hori-Front	5	23.6	23.6	0.150	
	157	5785	BPSK(6Mbps)	Flat	ant 1	Front	Hori-Front	5	23.6	23.6	0.229	
	157	5785	BPSK(6Mbps)	Flat	ant 1	Rear	Hori-Front	5	23.6	23.6	0.225	
	157	5785	BPSK(6Mbps)	Flat	ant 1	Front+Rear	Hori-Front	5	23.6	23.6	0.252	
	157	5785	BPSK(6Mbps)	Flat	ant 1	Default	Hori-Rear*1	5	23.6	23.6	0.108	
	157	5785	BPSK(6Mbps)	Flat	ant 1	Default	Ver-Right*1	5	23.7	23.7	0.051	
	157	5785	BPSK(6Mbps)	Flat	ant 1	Default	Ver-Left	5	23.6	23.6	0.090	
	157	5785	BPSK(6Mbps)	Flat	ant 1	Front	Ver-Left	5	23.6	23.6	0.085	
	157	5785	BPSK(6Mbps)	Flat	ant 1	Rear	Ver-Left	5	23.6	23.6	0.192	
157	5785	BPSK(6Mbps)	Flat	ant 1	Front+Rear	Ver-Left	5	23.6	23.6	0.250		
Step 2. Change the mode (11n MISO 20M band mode)												
11n	157	5785	BPSK(MCS 0)	Flat	ant 1	Front+Rear	Hori-Front	5	23.8	23.8	0.272	
	Step 3. Change the mode (11n MISO 40M band mode)											
11n	159	5795	BPSK(MCS 0)	Flat	ant 1	Front+Rear	Hori-Front	5	23.8	23.8	0.253	
	Step 4. Change the channel											
	149	5745	BPSK(MCS 0)	Flat	ant 1	Front+Rear	Hori-Front	5	23.7	23.7	0.307	
165	5825	BPSK(MCS 0)	Flat	ant 1	Front+Rear	Hori-Front	5	23.7	23.7	0.234		

*1 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.

Note: Calibration frequency of probe (Conversion factor)

SAR measurement frequency [MHz]	Calibration frequency [MHz] +/- validity [MHz]	Used conversion factor +/- uncertainty
5745	5800 +/- 100 * 2	3.88 +/- 13.1% (k=2)
5785	5800 +/- 50	3.88 +/- 13.1% (k=2)
5825	5800 +/- 50	3.88 +/- 13.1% (k=2)

*2 The validity of +/- 100MHz was expanded by the calibration uncertainty (k=2) < 15% according to the KDB865664 (SAR Measurement Procedures for 3-6GHz) and by the DASy v4.4 and higher according to the manufacture's request.

7.2 Body SAR 5GHz (without USB cable)

7.2.1 Low/Middle band(5180-5320MHz), ant 0

Model : DY-WL10
Serial No. : 244
Modulation : OFDM
Measured By : Hisayoshi Sato
Date : October 23, 2009
Liquid Depth (cm) : 15.0
Parameters : $\epsilon_r = 45.9, \sigma = 5.56(5200\text{MHz})$
Ambient temperature(deg.c.) : 24.5
Relative Humidity (%) : 41

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
11n	Step 5. Without USB cable										
	36	5180	BPSK(MCS 0)	Flat	ant 0	Front	Hori-Front	5	23.5	23.5	0.480*

* This result is satisfied enough SAR value with 0.8W/kg or less.

Note: Calibration frequency of probe (Conversion factor)

SAR measurement frequency [MHz]	Calibration frequency [MHz] +/- validity [MHz]	Used conversion factor +/- uncertainty
5180	5200 +/- 50	4.58 +/- 13.1% (k=2)
5240	5200 +/- 50	4.58 +/- 13.1% (k=2)
5280	5300 +/- 50	4.38 +/- 13.1% (k=2)
5300	5300 +/- 50	4.38 +/- 13.1% (k=2)