SAR TEST REPORT

Test Report No.: 10834988S-B

Applicant : **SMK Corporation**
Type of Equipment : **WLAN Complete Module**
Model No. : **VRL4149-0601F** (*. Installed into the thermal printer)
FCC ID : **GT3FC016**
Test Standard : **FCC 47CFR §2.1093**
Test Result : **Complied**

Highest Reported SAR(1g) Value	Platform ID No.#	Platform type	Platform model	Remarks
0.31 W/kg (*1)	#2	Thermal printer	M292C	(DTS) 2437 MHz, 11b (1Mbps, DBPSK/DSSS) (*1. Measured: 0.200 W/kg, output power: 16.16 dBm).
0.37 W/kg (*2)				(UNII) 5580 MHz, 11a (6Mbps, BPSK/OFDM) (*2. Measured: 0.237 W/kg, output power: 10.11 dBm).
0.36 W/kg (*3)	#3	Thermal printer	M316A	(DTS) 2437 MHz, 11b (1Mbps, DBPSK/DSSS) (*3. Measured: 0.238 W/kg, output power: 16.16 dBm).
0.43 W/kg (*4)				(UNII) 5300 MHz, 11a (6Mbps, BPSK/OFDM) (*4. Measured: 0.338 W/kg, output power: 11.95 dBm).
0.10 W/kg (*5)	#4	Thermal printer	M316C	(DTS) 2437 MHz, 11b (1Mbps, DBPSK/DSSS) (*5. Measured: 0.066 W/kg, output power: 16.16 dBm).
n/a (*6)				(UNII) *6. Since there is enough antenna separation distance, the SAR test of 5GHz band was reduced.
*. This Wireless Module had installed into the following platforms under 0.8W/kg of reported SAR(1g) (KDB447498 (v05); multi-platform operation requirement).				
0.28 W/kg (*7)	#1	Thermal printer	M327A	(DTS) 2412 MHz, 11b (1Mbps, DBPSK/DSSS) (*7. Measured: 0.180 W/kg, output power: 16.03 dBm).
0.73 W/kg (*8)				(UNII) 5500 MHz, 11a (6Mbps, BPSK/OFDM) (*8. Measured: 0.507 W/kg, output power: 10.44 dBm).
*. The SAR tested at June 6,23 and 24, 2015. The result of platform (1) was referred to SAR test report; 10834988S-A, UL Japan, Inc. published.				

***. The highest reported SAR (1g) value across all platforms for body-worn is 0.73 W/kg (UNII).**

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Date of test: June 3, 6, 23 and 24, 2015

Test engineer: H. Naka

Hiroshi Naka
Engineer, Consumer Technology Division

Approved by: T. Imamura

Toyokazu Imamura
Leader, Consumer Technology Division

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RTL02610

REVISION HISTORY

Revision	Test report No.	Date	Page revised	Contents
Original	10834988S-B	July 23, 2015	-	-

*. By issue of new revision report, the report of an old revision becomes invalid.

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Contents of appendixes

SECTION 1: Customer information

Company Name	SMK Corporation
Address	5-6, Togoshi 6-chome, Shinagawa-ku, Tokyo 142-8511, Japan
Telephone Number	+81-3-3785-1111
Facsimile Number	+81-3-3785-1878
Contact Person	Mitsuhiko Goto

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

	EUT	Platform (*. WLAN Complete Module (EUT) was installed into these platforms.)		
		Platform ID#2	Platform ID#3	Platform ID#4
Type of Equipment	WLAN Complete Module	Thermal printer		
Model Number	VRL4149-0601F	M292C	M316A	M316C
Serial Number	B109126	TFCF000296	TTCF002078	ECCN904763
Country of Mass-production	Japan	China	China	China
Condition of EUT	Production prototype (*1)	Production model	Production model	Production prototype (*1)
	(*1. Not for sale: These samples are equivalent to mass-produced items.)			
Receipt Date of Sample	June 3, 2015 (*. EUT for SAR test.) *. No modification by the Lab. (During power measurement, the EUT that had been measured the power of SAR test reference, was installed into the SAR tested platform. After power measurement, the RF wiring was changed to the original antenna line form the antenna conducted power measurement line.)			
Category Identified	Portable device (*. Since EUT may contact and/or very close to a human body during Wi-Fi operation, the partial-body SAR (1g) shall be observed.)			
Rating	DC 1.8 V (DC 1.71 V to 1.89 V) and DC 3.3 V (DC 3.0V to 3.6 V) *. The above the DC power was supplied form the host control device.			
Feature of EUT	The EUT is a WLAN Complete Module which installs into the specified platforms.			
SAR Accessory	-	Belt clip (non-metal)	Belt clip (non-metal)	Belt clip (non-metal)
		(*. During SAR test, this belt clip was removed to make the worst SAR setup condition.)		

*. The EUT install the following platforms.

Series of mobile printer (Platform)		Minimum antenna distance	Apply SAR test?	Remarks
Model	Size			
M327A	79 (W) × 119.8 (D) × 13.6 (H)	2.5 mm	Applied	SAR test results refer to the test report: 10834988S-A, UL Japan published.
M292C	103 (W) × 159 (D) × 65 (H)	8.5 mm	Applied	M292C and M292A are the same size, and the antenna location is also same. It was different in the inner receipt cutter mechanism, but it was judged not to influence SAR and M292C was measured SAR representatively.
M292A	103 (W) × 159 (D) × 65 (H)	8.5 mm	Not applied	
M316A	110 (W) × 140 (D) × 64 (H)	13.6 mm	Applied	-
M316C	110 (W) × 140 (D) × 64.6 (H)	17.4 mm	Applied	-

2.2 Product Description

Equipment type	Transceiver
Model	VRL4149-0601F

Frequency band	2.4GHz band		5GHz band				
	Mode	2.4GHz (DTS)	Mode	W52(UNII-1)	W53(UNII-2A)	W56(UNII-2C)	W58(UNII-3)
Frequency of operation (MHz) (*.ch.: channel)	11b,g, n(20HT)	2412~2462 (*.ch.1~11)	11a, n(20HT)	5180~5240 (*.ch.36~48)	5260~5320 (*.ch.52~64)	5500~5700 (*.ch.100~140)	5745~5825 (*.ch.149~165)
Channel spacing (MHz)	5		20				
Bandwidth (MHz)	20		20				
Type of modulation	DSSS: DBPSK, DQPSK, CCK (11b), OFDM: BPSK, QPSK, 16QAM, 64QAM (11g,a,n(20HT))						
Transmit power (including manufacture variation) (dBm)	11b	18	11a:	13	13	12	12
	11g	13					
	n(20HT)	13	n(20HT)	12	12	11	11
	*. The measured Tx output power (conducted) refers to section 6 in this report.						
Antenna gain (dBi) (Maximum)	+1.47 (2412~2462 MHz)		-0.5 (5180~5260 MHz)		+1.15 (5260~5320 MHz)	-0.2 (above 5500 MHz)	
Q'ty of Antenna	1 pc						
Antenna type	Printed wire						
Antenna connector type	none						
Power supply	DC 1.8 V (DC 1.71 V to 1.89 V) and DC 3.3 V (DC 3.0V to 3.6 V)						
Operation temperature range	-20 deg.C. to +70 deg.C.						

*. The EUT do not use the special transmitting technique such as "beam-forming" and "time-space code diversity."

SECTION 3: Test specification, procedures and results

3.1 Test specification

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. 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 in accordance with the following measurement procedures..

KDB 447498 D01 (v05r02): General RF exposure guidance
KDB 248227 D01 (v02r01): SAR Guidance for IEEE 802.11 (Wi-Fi) transmitters
KDB 865664 D01 (v01r03): SAR measurement 100MHz to 6GHz
IEEE Std. 1528-2003: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
IEEE Std. 1528-2013: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.
(*. The reference for Uncertainty in SAR correction for deviations in permittivity and conductivity, in clause E.3.2.)

3.2 Exposure limit

Environments of exposure limit	Whole-Body (averaged over the entire body)	Partial-Body (averaged over any 1g of tissue)	Hands, Wrists, Feet and Ankles (averaged over any 10g of tissue)
(A) Limits for Occupational /Controlled Exposure (W/kg)	0.4	8.0	20.0
(B) Limits for General population /Uncontrolled Exposure (W/kg)	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.

The limit applied in this test report is;

General population / uncontrolled exposure, Partial-Body (averaged over any 1g of tissue) limit: 1.6 W/kg

3.3 Procedures and Results

		Wi-Fi (DTS) 2412~2462 MHz	Wi-Fi (UNII-1) 5180~5240 MHz	Wi-Fi (UNII-2A) 5260~5320 MHz	Wi-Fi (UNII-2C) 5500~5700 MHz	Wi-Fi (UNII-3) 5745~5825 MHz
Test Procedure		SAR measurement; KDB 447498, KDB 248227, KDB 865664, IEEE Std.1528				
Platform model	Category	FCC 47CFR §2.1093 (Portable device)				
Platform ID#2: M292C	Results (SAR(1g))	Complied	Complied	Complied	Complied	Complied
	Reported SAR value	**0.31 W/kg**	**not applied** (*. ≤1.2 W/kg for UNII-2A)	**0.23 W/kg**	**0.37 W/kg**	**0.34 W/kg**
	Measured SAR value	0.200 W/kg	-	0.179 W/kg	0.237 W/kg	0.254 W/kg
	Operation mode	11b, 2437 MHz	-	11a, 5300 MHz	11a, 5580 MHz	11a, 5785 MHz
	Output power (scaled factor)	16.16 dBm (×1.53)	-	11.95 dBm (×1.27)	10.11 dBm (×1.55)	10.74 dBm (×1.34)
Platform ID#3: M316A	Results (SAR(1g))	Complied	Complied	Complied	Complied	Complied
	Reported SAR value	**0.36 W/kg**	**not applied** (*. ≤1.2 W/kg for UNII-2A)	**0.43 W/kg**	**not applied** (*. Since there is enough antenna separation distance, the SAR test of 5GHz band was reduced.)	**not applied**
	Measured SAR value	0.238 W/kg	-	0.338 W/kg	-	-
	Operation mode	11b, 2437 MHz	-	11a, 5300 MHz	-	-
	Output power (scaled factor)	16.16 dBm (×1.53)	-	11.95 dBm (×1.27)	-	-
Platform ID#4: M316C	Results (SAR(1g))	Complied	Complied	Complied	Complied	Complied
	Reported SAR value	**0.10 W/kg**	**not applied** (*. Since there is enough antenna separation distance, the SAR test of 5GHz band was reduced.)	**not applied**	**not applied**	**not applied**
	Measured SAR value	0.0657 W/kg	-	-	-	-
	Operation mode	11b, 2437 MHz	-	-	-	-
	Output power (scaled factor)	16.16 dBm (×1.53)	-	-	-	-

Note: UL Japan's SAR Work Procedures No.13-EM-W0429 and 13-EM-W0430. No addition, deviation nor exclusion has been made from standards

Test outline: Where this product is built into a new platform, it was verified whether multiplatform conditions can be suited in according with section 2) of 5.2.2 2 in KDB447498 D01 (v05r02).

Consideration of the test results: **The highest reported SAR (1g) of this platform was kept; ≤ 0.8 W/kg.**
Since highest reported SAR (1g) on these platforms which obtained in accordance with KDB447498(v05r02) were kept under 0.8 W/kg, the EUT was approved to operate multi-platform. (Highest reported SAR(1g) of EUT was 0.73 W/kg with platform ID#1. Referred to SAR test report: 10834988S-A, UL Japan, Inc. published.).

3.4 Test Location

No.7 shielded room (2.76 m (Width) × 3.76 m (Depth) × 2.4 m (Height)) for SAR testing.

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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number: +81 463 50 6400 / Facsimile number: +81 463 50 6401

3.5 Confirmation before SAR testing

3.5.1 Average power for SAR tests

Before SAR test, the RF wiring for the sample had been switched to the antenna conducted power measurement line from the antenna line and the average power was measured. The result is shown in Section 6.

*. The EUT transmission power was verified that it was within 2dB lower than the maximum tune-up tolerance limit when it was set the rated power. (Clause 4.1, KDB447498 D01(v05))

Step.1 Check the power by data rate and operation channel

The data rate check was measured for all modes in one of default channel. For the SAR test reference, the average output power was measured on the low/middle/high channels with the worst data rate condition in.

11b		11g		11a		11n(20HT)		
Modulation	Data rate [Mbps]	Modulation	Data rate [Mbps]	Modulation	Data rate [Mbps]	Modulation	Spatial Stream	MCS Index
DBPSK/DSSS	1	BPSK/OFDM	6	BPSK/OFDM	6	BPSK/OFDM	1	MCS0
DQPSK/DSSS	2	BPSK/OFDM	9	BPSK/OFDM	9	QPSK/OFDM	1	MCS1
CCK/DSSS	5.5	QPSK/OFDM	12	QPSK/OFDM	12	QPSK/OFDM	1	MCS2
CCK/DSSS	11	QPSK/OFDM	18	QPSK/OFDM	18	16QAM/OFDM	1	MCS3
		16QAM/OFDM	24	16QAM/OFDM	24	16QAM/OFDM	1	MCS4
		16QAM/OFDM	36	16QAM/OFDM	36	64QAM/OFDM	1	MCS5
		64QAM/OFDM	48	64QAM/OFDM	48	64QAM/OFDM	1	MCS6
		64QAM/OFDM	54	64QAM/OFDM	54	64QAM/OFDM	1	MCS7

Step.2 Consideration of SAR test channel

For the SAR test reference, the average output power was measured on the low/middle/high channels with the worst data rate condition in step 1 in the above.

3.6 Confirmation after SAR testing

It was checked that the power drift [W] is within ±5% in the evaluation procedure of SAR testing. The verification of power drift during the SAR test is that DASY5 system calculates the power drift by measuring the e-filed at the same location at beginning and the end of the scan measurement for each test position.
The result is shown in APPENDIX 2.

*. DASY5 system calculation Power drift value[dB] =20log(Ea)/(Eb) (where, Before SAR testing: Eb[V/m] / After SAR testing: Ea[V/m])

Limit of power drift[W] = ±5%
Power drift limit (X) [dB] = 10log(P_drift)=10log(1.05/1)=10log(1.05)-10log(1)=0.21dB
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
Power drift limit (X) dB=10log(P_drift)=10log(E_drift)^2=20log(E_drift)
From the above mentioned, **the calculated power drift of DASY5 system must be the less than ±0.21dB.**

3.7 Test setup of EUT and SAR measurement procedure

3.7.1 Consideration of SAR test reduction by the antenna separation distance: M292C (Platform ID#2)

Antenna separation distances in each test setup plan are shown as follows.

Setup plan	Explanation of SAR test setup plan (*. Refer to Appendix 1 for test setup photographs which had been tested.)	D [mm]	Type
Front	When test is required, the front surface of a platform is touched to the Flat phantom.	8.5	Body-touch
Top-front	When test is required, the front part on the top (near an antenna) of a platform is touched to the Flat phantom.	10	
Right	When test is required, the right surface of a platform is touched to the Flat phantom.	20.4	
Bottom	When test is required, the bottom surface of a platform is touched to the Flat phantom.	39.8	
Left	When test is required, the left surface of a platform is touched to the Flat phantom.	72.6	
Rear	When test is required, the rear surface of a platform is touched to the Flat phantom.	123.5	

*. **D:** Antenna separation distance. It is the distance from the EUT antenna inside a platform to the outer surface of platform which an operator may touch.
*. Size of EUT (VRL4149-0601F): 27 mm (width) × 35 mm (depth) × 2.5 mm max (thickness)
*. Size of platform ID#2 (M292C): 103 mm (width) × 159 mm (depth) × 65 mm (height)

(cont'd)

(cont'd)
KDB 447498 D01 (v05) was taken into consideration to reduce SAR test.

Consideration of SAR test reduction by the antenna separation distance (100MHz~6GHz, ≤50mm)												
Band, Mode		Setup Position	Minimum distance [mm]	Minimum distance [mm] (rounded)	Upper frequency [GHz]	Max. tune-up power [dBm]	Max. tune-up power [mW]	Max. tune-up power [mW] (rounded)	Exclusion factor (*1)	Standalone SAR Test Required? (>3, Tested)		Remarks
Wi-Fi, 2.4GHz	11b	Front	8.5	**9**	2.462	18	63.1	**63**	**11.0**	>3.0	Require	-
		Top-front	10	**10**	2.462	18	63.1	**63**	**9/9**	>3.0	Require	-
		Right	20.4	**20**	2.462	18	63.1	**63**	**4.9**	>3.0	Require	-
		Bottom	39.8	**40**	2.462	18	63.1	**63**	**2.5**	≤3.0	Reduced	SAR for 11g, n(20) are also reduced. (Power: 11b > 11g, n(20))
	11g, n(20HT)	Front	2.5	**9**	2.462	13	20.0	**20**	**3.5**	>3.0	Require	-
		Top-front	8.4	**10**	2.462	13	20.0	**20**	**3.1**	>3.0	Require	-
		Right	24	**20**	2.462	13	20.0	**20**	**1.6**	≤3.0	Reduced	-
Wi--Fi, W52&53	11a	Front	2.5	**9**	5.32	13	20.0	**20**	**5.1**	>3.0	Require	-
		Top-front	8.4	**10**	5.32	13	20.0	**20**	**4.6**	>3.0	Require	-
		Right	24	**20**	5.32	13	20.0	**20**	**2.3**	≤3.0	Reduced	SAR for 11n(20) is also reduced. (Power: 11a > n(20))
		Bottom	28	**40**	5.32	13	20.0	**20**	**1.2**	≤3.0	Reduced	
	11n (20HT)	Front	2.5	**9**	5.32	13	20.0	**20**	**4.1**	>3.0	Require	-
		Top-front	8.4	**10**	5.32	13	20.0	**20**	**3.7**	>3.0	Require	-
Wi--Fi, W56	11a	Front	2.5	**9**	5.7	12	15.8	**16**	**4.2**	>3.0	Require	-
		Top-front	8.4	**10**	5.7	12	15.8	**16**	**3.8**	>3.0	Require	-
		Right	24	**20**	5.7	12	15.8	**16**	**1.9**	≤3.0	Reduced	SAR for 11n(20) is also reduced. (Power: 11a > n(20))
		Bottom	28	**40**	5.7	12	15.8	**16**	**1.0**	≤3.0	Reduced	
	11n (20HT)	Front	2.5	**9**	5.7	12	15.8	**16**	**3.4**	>3.0	Require	-
		Top-front	8.4	**10**	5.7	12	15.8	**16**	**3.1**	>3.0	Require	-
Wi--Fi, W58	11a	Front	2.5	**9**	5.825	12	15.8	**16**	**4.3**	>3.0	Require	-
		Top-front	8.4	**10**	5.825	12	15.8	**16**	**3.9**	>3.0	Require	-
		Right	24	**20**	5.825	12	15.8	**16**	**1.9**	≤3.0	Reduced	SAR for 11n(20) is also reduced. (Power: 11a > n(20))
		Bottom	28	**40**	5.825	12	15.8	**16**	**1.0**	≤3.0	Reduced	
	11n (20HT)	Front	2.5	**9**	5.825	12	15.8	**16**	**3.5**	>3.0	Require	-
		Top-front	8.4	**10**	5.825	12	15.8	**16**	**3.1**	>3.0	Require	-

Consideration of SAR test reduction by the antenna separation distance (100MHz~6GHz, >50mm)											
Band, Mode		Setup Position	Minimum distance [mm]	Minimum distance [mm] (rounded)	Upper frequency [GHz]	Max.tune-up power [dBm]	Max.tune-up power [mW]	Max.tune-up power [mW] (rounded)	Test exclusion thresholds [mW] (*2)	Standalone SAR test Required?	Remarks
Wi-Fi, 2.4GHz	11b	Left	72.6	**73**	2.462	18	63.1	**63**	**326**	Reduced	SAR for 11g, n(20) are also reduced. (Power: 11b > 11g, n(20))
		Rear	123.5	**124**	2.462	18	63.1	**63**	**836**	Reduced	
Wi-Fi, W52&53	11a	Left	65.6	**66**	5.825	13	20.0	**20**	**295**	Reduced	SAR for 11n(20) is also reduced. (Power: 11a > n(20))
		Rear	87.2	**87**	5.825	13	20.0	**20**	**805**	Reduced	
Wi-Fi, W56	11a	Left	65.6	**66**	5.825	12	15.8	**16**	**293**	Reduced	SAR for 11n(20) is also reduced. (Power: 11a > n(20))
		Rear	87.2	**87**	5.825	12	15.8	**16**	**803**	Reduced	
Wi-Fi, W58	11a	Left	72.6	**73**	5.825	12	15.8	**16**	**292**	Reduced	SAR for 11n(20) is also reduced. (Power: 11a > n(20))
		Rear	123.5	**124**	5.825	12	15.8	**16**	**802**	Reduced	

*1. Parenthesis 1), Clause 4.3.1, KDB 447498 D01 (v05r01) gives the following formula to calculate the SAR(1g) test exclusion thresholds for 100MHz-6GHz at test separation distance ≤50mm.
[(max.power of channel, including tune-up tolerance, mW) / (min.test separation distance, mm)] × [√f (GHz)] ≤ 3.0 (for SAR(1g)) ····· formula (1)
If power is calculated from the upper formula (1);
[SAR(1g) test exclusion thresholds, mW] = 3 × [test separation distance, mm] / [√f (GHz)] ····· formula (2)
*2. Parenthesis 2), Clause 4.3.1, KDB 447498 D01 (v05r01) gives the following formula to calculate the SAR(1g) test exclusion thresholds for 1.5-6GHz at test separation distance >50mm.
[test exclusion thresholds, mW] = [(Power allowed at numeric threshold for 50mm in formula (1))] + [(test separation distance, mm) - (50mm)] × 10 formula (3)

Conclusion for consideration for SAR test reduction

1) For 2.4GHz and 11b mode, Front, Top-front and Right setup conditions of a platform are considered body-touch SAR and require the SAR evaluation in body-liquid. Setup of other surfaces of a platform are reduced because there is enough antenna separation distance.
2) For 5GHz band and 11a mode, Front and Top-front setup conditions of a platform are considered body-touch SAR and require the SAR evaluation in body-liquid. Setup of other surfaces of a platform are reduced because there is enough antenna separation distance.
3) Since the printer which is platform of EUT is carried by using the belt clip, SAR test of front-of- face is not considered.

By the determined test setup shown above, the SAR test was applied in the following procedures.

Step 1	For 2.4GHz band;	Determine "Initial test position" by manufacture's antenna location drawing. Determine the highest reported SAR(1g) of DSSS mode. (*. 11b mode has highest average power.) Determine the highest reported SAR(1g) of OFDM mode.
Step 2	For 5GHz band;	Determine the highest reported SAR(1g) of OFDM mode.

*. During SAR test, the radiated power is always monitored by Spectrum Analyzer.

3.7.2 Consideration of SAR test reduction by the antenna separation distance: M316A (Platform ID#3)

Antenna separation distances in each test setup plan are shown as follows.

Setup plan	Explanation of SAR test setup plan (*. Refer to Appendix 1 for test setup photographs which had been tested.)	D [mm]	Type
Top	When test is required, the top surface of a platform is touched to the Flat phantom.	13.6	Body-touch
Right	When test is required, the right surface of a platform is touched to the Flat phantom.	17.4	
Front	When test is required, the front surface of a platform is touched to the Flat phantom.	42.8	
Bottom	When test is required, the bottom surface of a platform is touched to the Flat phantom.	43.5	
Left	When test is required, the left surface of a platform is touched to the Flat phantom.	65.6	
Rear	When test is required, the rear surface of a platform is touched to the Flat phantom.	87.2	

*. **D:** Antenna separation distance. It is the distance from the EUT antenna inside a platform to the outer surface of platform which an operator may touch.
*. Size of EUT (VRL4149-0601F): 27 mm (width) × 35 mm (depth) × 2.5 mm max (thickness)
*. Size of platform ID#2 (M292C): 110 mm (width) × 140 mm (depth) × 64 mm (height)

KDB 447498 D01 (v05) was taken into consideration to reduce SAR test.

Consideration of SAR test reduction by the antenna separation distance (100MHz~6GHz, ≤50mm)

Band, Mode		Setup Position	Minimum distance [mm]	Minimum distance [mm] (rounded)	Upper frequency [GHz]	Max. tune-up power [dBm]	Max. tune-up power [mW]	Max. tune-up power [mW] (rounded)	Exclusion factor (*1)	Standalone SAR Test Required? (>3, Tested)		Remarks
Wi-Fi, 2.4GHz	11b	Top	13.6	**14**	2.462	18	63.1	**63**	**7.1**	**>3.0**	**Require**	-
		Right	17.4	**17**	2.462	18	63.1	**63**	**5.8**	**>3.0**	**Require**	-
		Front	42.8	**43**	2.462	18	63.1	**63**	**2.3**	≤3.0	Reduced	SAR for 11g, n(20) are also reduced.
		Bottom	43.5	**44**	2.462	18	63.1	**63**	**2.2**	≤3.0	Reduced	(Power: 11b > 11g, n(20))
	11g, n(20HT)	Top	13.6	**14**	2.462	13	20.0	**20**	**2.2**	≤3.0	Reduced	-
		Right	17.4	**17**	2.462	13	20.0	**20**	**1.8**	≤3.0	Reduced	-
Wi–Fi, W52&53	11a	Top	13.6	**14**	5.32	13	20.0	**20**	**3.3**	**>3.0**	**Require**	
		Right	17.4	**17**	5.32	13	20.0	**20**	**2.7**	≤3.0	Reduced	SAR for 11n(20) is also reduced.
		Front	42.8	**43**	5.32	13	20.0	**20**	**1.1**	≤3.0	Reduced	(Power: 11a > n(20))
		Bottom	43.5	**44**	5.32	13	20.0	**20**	**1.0**	≤3.0	Reduced	
Wi–Fi, W56	11a	Top	13.6	**14**	5.7	12	15.8	**16**	**2.7**	≤3.0	Reduced	
		Right	17.4	**17**	5.7	12	15.8	**16**	**2.2**	≤3.0	Reduced	SAR for 11n(20) is also reduced.
		Front	42.8	**43**	5.7	12	15.8	**16**	**0.9**	≤3.0	Reduced	(Power: 11a > n(20))
		Bottom	43.5	**44**	5.7	12	15.8	**16**	**0.9**	≤3.0	Reduced	
Wi–Fi, W58	11a	Top	13.6	**14**	5.825	12	15.8	**16**	**2.8**	≤3.0	Reduced	
		Right	17.4	**17**	5.825	12	15.8	**16**	**2.3**	≤3.0	Reduced	SAR for 11n(20) is also reduced.
		Front	42.8	**43**	5.825	12	15.8	**16**	**0.9**	≤3.0	Reduced	(Power: 11a > n(20))
		Bottom	43.5	**44**	5.825	12	15.8	**16**	**0.9**	≤3.0	Reduced	

Consideration of SAR test reduction by the antenna separation distance (100MHz~6GHz, >50mm)

Band, Mode		Setup Position	Minimum distance [mm]	Minimum distance [mm] (rounded)	Upper frequency [GHz]	Max.tune-up power [dBm]	Max.tune-up power [mW]	Max.tune-up power [mW] (rounded)	Test exclusion thresholds [mW] (*2)	Standalone SAR test Required?	Remarks
Wi-Fi, 2.4GHz	11b	Left	65.6	**66**	2.462	18	63.1	**63**	**256**	Reduced	SAR for 11g, n(20) are also reduced.
		Rear	87.2	**87**	2.462	18	63.1	**63**	**466**	Reduced	(Power: 11b > 11g, n(20))
Wi-Fi, W52&53	11a	Left	65.6	**66**	5.825	13	20.0	**20**	**225**	Reduced	SAR for 11n(20) is also reduced.
		Rear	87.2	**87**	5.825	13	20.0	**20**	**435**	Reduced	(Power: 11a > n(20))
Wi-Fi, W56	11a	Left	65.6	**66**	5.825	12	15.8	**16**	**223**	Reduced	SAR for 11n(20) is also reduced.
		Rear	87.2	**87**	5.825	12	15.8	**16**	**433**	Reduced	(Power: 11a > n(20))
Wi-Fi, W58	11a	Left	65.6	**66**	5.825	12	15.8	**16**	**222**	Reduced	SAR for 11n(20) is also reduced.
		Rear	87.2	**87**	5.825	12	15.8	**16**	**432**	Reduced	(Power: 11a > n(20))

*1. Parenthesis 1), Clause 4.3.1, KDB 447498 D01 (v05r01) gives the following formula to calculate the SAR(1g) test exclusion thresholds for 100MHz-6GHz at test separation distance ≤50mm.
[(max.power of channel, including tune-up tolerance, mW) / (min.test separation distance, mm)] × [√f (GHz)] ≤ 3.0 (for SAR(1g)) ·····formula (1)
If power is calculated from the upper formula (1);
[SAR(1g) test exclusion thresholds, mW] = 3 × [test separation distance, mm] / [√f (GHz)] ·····formula (2)
*2. Parenthesis 2), Clause 4.3.1, KDB 447498 D01 (v05r01) gives the following formula to calculate the SAR(1g) test exclusion thresholds for 1.5-6GHz at test separation distance >50mm.
[test exclusion thresholds, mW] = [(Power allowed at numeric threshold for 50mm in formula (1))] + [(test separation distance, mm) - (50mm)] × 10 formula (3)

Conclusion for consideration for SAR test reduction

1) For 2.4GHz and 11b mode, Top and Right setup conditions of a platform are considered body-touch SAR and require the SAR evaluation in body-liquid. Setup of other surfaces of a platform are reduced because there is enough antenna separation distance.
2) For 5GHz band, since there is enough antenna separation distance, SAR test is reduced for all platform surface.
3) Since the printer which is platform of EUT is carried by using the belt clip, SAR test of front-of- face is not considered.

By the determined test setup shown above, the SAR test was applied in the following procedures.

Step 1	For 2.4GHz band;	Determine "Initial test position" by manufacture's antenna location drawing. Determine the highest reported SAR(1g) of DSSS mode. (*. 11b mode has highest average power.) Determine the highest reported SAR(1g) of OFDM mode.
Step 2	For 5GHz band;	Determine the highest reported SAR(1g) of OFDM mode.

*. During SAR test, the radiated power is always monitored by Spectrum Analyzer.

3.7.3 Consideration of SAR test reduction by the antenna separation distance: M316C (Platform ID#4)

Antenna separation distances in each test setup plan are shown as follows.

Setup plan	Explanation of SAR test setup plan (*. Refer to Appendix 1 for test setup photographs which had been tested.)	D [mm]	Type
Right	When test is required, the right surface of a platform is touched to the Flat phantom.	17.4	Body-touch
Top	When test is required, the top surface of a platform is touched to the Flat phantom.	18.5	
Front	When test is required, the front surface of a platform is touched to the Flat phantom.	42.8	
Bottom	When test is required, the bottom surface of a platform is touched to the Flat phantom.	43.5	
Left	When test is required, the left surface of a platform is touched to the Flat phantom.	65.6	
Rear	When test is required, the rear surface of a platform is touched to the Flat phantom.	87.2	

*. **D:** Antenna separation distance. It is the distance from the EUT antenna inside a platform to the outer surface of platform which an operator may touch.
*. Size of EUT (VRL4149-0601F): 27 mm (width) × 35 mm (depth) × 2.5 mm max (thickness)
*. Size of platform ID#2 (M292C): 110 mm (width) × 140 mm (depth) × 64.6 mm (height)

KDB 447498 D01 (v05) was taken into consideration to reduce SAR test.

Consideration of SAR test reduction by the antenna separation distance (100MHz~6GHz, ≤50mm)

Band, Mode		Setup Position	Minimum distance [mm]	Minimum distance [mm] (rounded)	Upper frequency [GHz]	Max. tune-up power [dBm]	Max. tune-up power [mW]	Max. tune-up power [mW] (rounded)	Exclusion factor (*1)	Standalone SAR Test Required? (>3, Tested)		Remarks
Wi-Fi, 2.4GHz	11b	Right	17.4	**17**	2.462	18	63.1	**63**	**5.8**	**>3.0**	**Require**	-
		Top	18.5	**19**	2.462	18	63.1	**63**	**5.2**	**>3.0**	**Require**	-
		Front	42.8	**43**	2.462	18	63.1	**63**	**2.3**	≤3.0	Reduced	SAR for 11g, n(20) are also reduced.
		Bottom	43.5	**44**	2.462	18	63.1	**63**	**2.2**	≤3.0	Reduced	(Power: 11b > 11g, n(20))
	11g, n(20HT)	Right	17.4	**17**	2.462	13	20.0	**20**	**1.8**	≤3.0	Reduced	-
		Top	18.5	**19**	2.462	13	20.0	**20**	**1.7**	≤3.0	Reduced	-
Wi–Fi, W52&53	11a	Right	17.4	**17**	5.32	13	20.0	**20**	**2.7**	≤3.0	Reduced	
		Top	18.5	**19**	5.32	13	20.0	**20**	**2.4**	≤3.0	Reduced	SAR for 11n(20) is also reduced.
		Front	42.8	**43**	5.32	13	20.0	**20**	**1.1**	≤3.0	Reduced	(Power: 11a > n(20))
		Bottom	43.5	**44**	5.32	13	20.0	**20**	**1.0**	≤3.0	Reduced	
Wi–Fi, W56	11a	Right	17.4	**17**	5.7	12	15.8	**16**	**2.2**	≤3.0	Reduced	
		Top	18.5	**19**	5.7	12	15.8	**16**	**2.0**	≤3.0	Reduced	SAR for 11n(20) is also reduced.
		Front	42.8	**43**	5.7	12	15.8	**16**	**0.9**	≤3.0	Reduced	(Power: 11a > n(20))
		Bottom	43.5	**44**	5.7	12	15.8	**16**	**0.9**	≤3.0	Reduced	
Wi–Fi, W58	11a	Right	17.4	**17**	5.825	12	15.8	**16**	**2.3**	≤3.0	Reduced	
		Top	18.5	**19**	5.825	12	15.8	**16**	**2.0**	≤3.0	Reduced	SAR for 11n(20) is also reduced.
		Front	42.8	**43**	5.825	12	15.8	**16**	**0.9**	≤3.0	Reduced	(Power: 11a > n(20))
		Bottom	43.5	**44**	5.825	12	15.8	**16**	**0.9**	≤3.0	Reduced	

Consideration of SAR test reduction by the antenna separation distance (100MHz~6GHz, >50mm)

Band, Mode		Setup Position	Minimum distance [mm]	Minimum distance [mm] (rounded)	Upper frequency [GHz]	Max.tune-up power [dBm]	Max.tune-up power [mW]	Max.tune-up power [mW] (rounded)	Test exclusion thresholds [mW] (*2)	Standalone SAR test Required?	Remarks
Wi-Fi, 2.4GHz	11b	Left	65.6	**66**	2.462	18	63.1	**63**	**256**	Reduced	SAR for 11g, n(20) are also reduced.
		Rear	87.2	**87**	2.462	18	63.1	**63**	**466**	Reduced	(Power: 11b > 11g, n(20))
Wi-Fi, W52&53	11a	Left	65.6	**66**	5.825	13	20.0	**20**	**225**	Reduced	SAR for 11n(20) is also reduced.
		Rear	87.2	**87**	5.825	13	20.0	**20**	**435**	Reduced	(Power: 11a > n(20))
Wi-Fi, W56	11a	Left	65.6	**66**	5.825	12	15.8	**16**	**223**	Reduced	SAR for 11n(20) is also reduced.
		Rear	87.2	**87**	5.825	12	15.8	**16**	**433**	Reduced	(Power: 11a > n(20))
Wi-Fi, W58	11a	Left	65.6	**66**	5.825	12	15.8	**16**	**222**	Reduced	SAR for 11n(20) is also reduced.
		Rear	87.2	**87**	5.825	12	15.8	**16**	**432**	Reduced	(Power: 11a > n(20))

*1. Parenthesis 1), Clause 4.3.1, KDB 447498 D01 (v05r01) gives the following formula to calculate the SAR(1g) test exclusion thresholds for 100MHz-6GHz at test separation distance ≤50mm.
[(max.power of channel, including tune-up tolerance, mW) / (min.test separation distance, mm)] × [√f (GHz)] ≤ 3.0 (for SAR(1g)) ·····formula (1)
If power is calculated from the upper formula (1);
[SAR(1g) test exclusion thresholds, mW] = 3 × [test separation distance, mm] / [√f (GHz)] ·····formula (2)
*2. Parenthesis 2), Clause 4.3.1, KDB 447498 D01 (v05r01) gives the following formula to calculate the SAR(1g) test exclusion thresholds for 1.5-6GHz at test separation distance >50mm.
[test exclusion thresholds, mW] = [(Power allowed at numeric threshold for 50mm in formula (1))] + [(test separation distance, mm) - (50mm)] × 10 formula (3)

Conclusion for consideration for SAR test reduction

1) For 2.4GHz and 11b mode, Right and Top setup conditions of a platform are considered body-touch SAR and require the SAR evaluation in body-liquid. Setup of other surfaces of a platform are reduced because there is enough antenna separation distance.
2) For 5GHz band, since there is enough antenna separation distance, SAR test is reduced for all platform surface.
3) Since the printer which is platform of EUT is carried by using the belt clip, SAR test of front-of- face is not considered.

By the determined test setup shown above, the SAR test was applied in the following procedures.

Step 1	For 2.4GHz band;	Determine "Initial test position" by manufacture's antenna location drawing. Determine the highest reported SAR(1g) of DSSS mode. (*. 11b mode has highest average power.) Determine the highest reported SAR(1g) of OFDM mode.
Step 2	For 5GHz band;	Determine the highest reported SAR(1g) of OFDM mode.

*. During SAR test, the radiated power is always monitored by Spectrum Analyzer.

SECTION 4: Operation of EUT during testing

4.1 Operating modes for SAR testing

This EUT has IEEE.802.11b/g/a/11n(20HT) continuous transmitting modes.
The frequency and the operation mode which carried out the SAR test are shown below.

4.1.1 Operating modes for SAR testing: M292C (Platform ID#2)

Operation mode		11b	11g	11n(20HT)	11a	11n(20HT)	11a	11n(20HT)	11a	11n(20HT)	11a	11n(20HT)
Tx band [MHz]		2412~2462			5180~5240 (UNII-1)		5260~5320 (UNII-2A)		5500~5700 (UNII-2C)		5745~5825 (UNII-3)	
Frequency [MHz]		2437	2437	n/a (*2)	n/a (*3)	n/a (*3)	5300	n/a (*2)	5580, 5600	n.a (*2)	5785	n/a (*2)
(*1) Data rate [Mbps]		1	6	-	-	-	6	-	6	-	6	-
Modulation		DBPSK /DSSS	BPSK /OFDM	-	-	-	BPSK /OFDM	-	BPSK /OFDM	-	BPSK /OFDM	-
Controlled software		WiFi Control Application Ver.3.0 This software was installed to host PC. During conducted power measurement and SAR test, the host PC was connected to the EUT via ribbon flat cable to supply the power and to control the specified operation mode with tuning the power. The default power setting number of software and the tuned power setting number which is tuned within 2dB from the maximum power are shown below.										
Power setting [-]	Conducted	default: 18 tune-up: 19	default: 14 tune-up: -	default: 14 tune-up: -	default: 14 tune-up: -	default: 13 tune-up: -	default: 14 tune-up: -	default: 13 tune-up: -	default: 14 tune-up: -	default: 13 tune-up: 14,15	default: 14 tune-up: 16	default: 13 tune-up: 15
	SAR	tune-up: 19	default: 14	n/a	n/a	n/a	default: 14	n/a	default: 14	n/a	tune-up: 16	n/a

*. n/a: SAR test was not applied.
*1. (KDB248227, clause 5.3.2) The SAR was measured by lowest data rate.
*2. (KDB248227, clause 5.3.2) The SAR was only measured by lower order modulation of OFDM mode.
*3. (KDB248227, clause 5.3.1) Since highest reported SAR(1g) of UNII-2A was ≤1.2 W/kg, SAR measurement of UNII-1 band was omitted.

4.1.2 Operating modes for SAR testing: M316A (Platform ID#3)

Operation mode		11b	11g	11n(20HT)	11a	11n(20HT)	11a	11n(20HT)	11a	11n(20HT)	11a	11n(20HT)
Tx band [MHz]		2412~2462			5180~5240 (UNII-1)		5260~5320 (UNII-2A)		5500~5700 (UNII-2C)		5745~5825 (UNII-3)	
Frequency [MHz]		2437	2437	n/a (*5)	n/a (*6)	n/a (*6)	5300	n/a (*5)	n/a (*7)	n/a (*7)	n/a (*7)	n/a (*7)
(*4) Data rate [Mbps]		1	6	-	-	-	6	-	-	-	-	-
Modulation		DBPSK /DSSS	BPSK /OFDM	-	-	-	BPSK /OFDM	-	-	-	-	-
Controlled software		WiFi Control Application Ver.3.0 This software was installed to host PC. During conducted power measurement and SAR test, the host PC was connected to the EUT via ribbon flat cable to supply the power and to control the specified operation mode with tuning the power. The default power setting number of software and the tuned power setting number which is tuned within 2dB from the maximum power are shown below.										
Power setting [-]	Conducted	default: 18 tune-up: 19	default: 14 tune-up: -	default: 14 tune-up: -	default: 14 tune-up: -	default: 13 tune-up: -	default: 14 tune-up: -	default: 13 tune-up: -	default: 14 tune-up: -	default: 13 tune-up: 14,15	default: 14 tune-up: 16	default: 13 tune-up: 15
	SAR	tune-up: 19	default: 14	n/a	n/a	n/a	default: 14	n/a	n/a	n/a	n/a	n/a

*. n/a: SAR test was not applied.
*4. (KDB248227, clause 5.3.2) The SAR was measured by lowest data rate.
*5. (KDB248227, clause 5.3.2) The SAR was only measured by lower order modulation of OFDM mode.
*6. (KDB248227, clause 5.3.1) Since highest reported SAR(1g) of UNII-2A was ≤1.2 W/kg, SAR measurement of UNII-1 band was omitted.
*7. (KDB447498) For 5GHz, since there is enough antenna separation distance, SAR test is reduced.

4.1.3 Operating modes for SAR testing: M316C (Platform ID#4)

Operation mode		11b	11g	11n(20HT)	11a	11n(20HT)	11a	11n(20HT)	11a	11n(20HT)	11a	11n(20HT)
Tx band [MHz]		2412~2462			5180~5240 (UNII-1)		5260~5320 (UNII-2A)		5500~5700 (UNII-2C)		5745~5825 (UNII-3)	
Frequency [MHz]		2437	2437	n/a (*8)	n/a (*9)	n/a (*9)	n/a (*9)	n/a (*9)	n/a (*9)	n/a (*9)	n/a (*9)	n/a (*9)
(*8) Data rate [Mbps]		1	6	-	-	-	-	-	-	-	-	-
Modulation		DBPSK /DSSS	BPSK /OFDM	-	-	-	-	-	-	-	-	-
Controlled software		WiFi Control Application Ver.3.0 This software was installed to host PC. During conducted power measurement and SAR test, the host PC was connected to the EUT via ribbon flat cable to supply the power and to control the specified operation mode with tuning the power. The default power setting number of software and the tuned power setting number which is tuned within 2dB from the maximum power are shown below.										
Power setting [-]	Conducted	default: 18 tune-up: 19	default: 14 tune-up: -	default: 14 tune-up: -	default: 14 tune-up: -	default: 13 tune-up: -	default: 14 tune-up: -	default: 13 tune-up: -	default: 14 tune-up: -	default: 13 tune-up: 14,15	default: 14 tune-up: 16	default: 13 tune-up: 15
	SAR	tune-up: 19	default: 14	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

*. n/a: SAR test was not applied.
*8. (KDB248227, clause 5.3.2) The SAR was measured by lowest data rate.
*9. (KDB447498) For 5GHz, since there is enough antenna separation distance, SAR test is reduced.

SECTION 5: Uncertainty Assessment (SAR measurement)

Uncertainty of SAR measurement (2.4-6GHz) (*.ε&σ: ≤ ± 5%, DAK3.5, Tx: ≈100% duty cycle) (v08)	1g SAR	10g SAR
Combined measurement uncertainty of the measurement system (k=1)	± 13.7%	± 13.6%
Expanded uncertainty (k=2)	± 27.4%	± 27.2%

	Error Description (2.4-6GHz) (v08)	Uncertainty Value	Probability distribution	Divisor	ci (1g)	ci (10g)	ui (1g)	ui (10g)	Vi, veff
A	**Measurement System** (DASY5)						(std. uncertainty)	(std. uncertainty)	
1	Probe Calibration Error	±6.55 %	Normal	1	1	1	±6.55 %	±6.55 %	∞
2	Axial isotropy Error	±4.7 %	Rectangular	√3	√0.5	√0.5	±1.9 %	±1.9 %	∞
3	Hemispherical isotropy Error	±9.6 %	Rectangular	√3	√0.5	√0.5	±3.9 %	±3.9 %	∞
4	Linearity Error	±4.7 %	Rectangular	√3	1	1	±2.7 %	±2.7 %	∞
5	Probe modulation response	±2.4 %	Rectangular	√3	1	1	±1.4 %	±1.4 %	∞
6	Sensitivity Error (detection limit)	±1.0 %	Rectangular	√3	1	1	±0.6 %	±0.6 %	∞
7	Boundary effects Error	±4.3%	Rectangular	√3	1	1	±2.5 %	±2.5 %	∞
8	Readout Electronics Error(DAE)	±0.3 %	Rectangular	√3	1	1	±0.3 %	±0.3 %	∞
9	Response Time Error	±0.8 %	Normal	1	1	1	±0.8 %	±0.8 %	∞
10	Integration Time Error (≈100% duty cycle)	±0 %	Rectangular	√3	1	1	0 %	0 %	∞
11	RF ambient conditions-noise	±3.0 %	Rectangular	√3	1	1	±1.7 %	±1.7 %	∞
12	RF ambient conditions-reflections	±3.0 %	Rectangular	√3	1	1	±1.7 %	±1.7 %	∞
13	Probe positioner mechanical tolerance	±3.3 %	Rectangular	√3	1	1	±1.9 %	±1.9 %	∞
14	Probe Positioning with respect to phantom shell	±6.7 %	Rectangular	√3	1	1	±3.9 %	±3.9 %	∞
15	Max. SAR evaluation (Post-processing)	±4.0 %	Rectangular	√3	1	1	±2.3 %	±2.3 %	∞
B	**Test Sample Related**								
16	Device Holder or Positioner Tolerance	±3.6 %	Normal	1	1	1	±3.6 %	±3.6 %	5
17	Test Sample Positioning Error	±5.0 %	Normal	1	1	1	±5.0 %	±5.0 %	145
18	Power scaling	±0%	Rectangular	√3	1	1	±0 %	±0 %	∞
19	Drift of output power (measured, <0.2dB)	±2.3%	Rectangular	√3	1	1	±2.9 %	±2.9 %	∞
C	**Phantom and Setup**								
20	Phantom uncertainty (shape, thickness tolerances)	±7.5 %	Rectangular	√3	1	1	±4.3 %	±4.3 %	∞
21	Algorithm for correcting SAR (e',σ: ≤5%)	±1.2 %	Normal	1	1	0.84	±1.2 %	±0.97 %	∞
22	Measurement Liquid Conductivity Error (DAK3.5)	±3.0 %	Normal	1	0.78	0.71	±2.3 %	±2.1 %	7
23	Measurement Liquid Permittivity Error (DAK3.5)	±3.1 %	Normal	1	0.23	0.26	±0.7 %	±0.8 %	7
24	Liquid Conductivity-temp.uncertainty (≤2deg.C.)	±5.3 %	Rectangular	√3	0.78	0.71	±2.4 %	±2.2 %	∞
25	Liquid Permittivity-temp.uncertainty (≤2deg.C.)	±0.9 %	Rectangular	√3	0.23	0.26	±0.1 %	±0.1 %	∞
	Combined Standard Uncertainty						**±13.7** %	**±13.6** %	733
	Expanded Uncertainty (k=2)						**±27.4 %**	**±27.2 %**	

*. Table of uncertainties are listed for ISO/IEC 17025.
*. This measurement uncertainty budget is suggested by IEEE Std.1528(2013) and determined by Schmid & Partner Engineering AG (DASY5 Uncertainty Budget). Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01 Section 2.8.1., when the highest measured SAR(1g) within a frequency band is < 1.5W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std.1528 (2013) is not required in SAR reports submitted for equipment approval.

SECTION 6: Confirmation before testing

6.1 SAR reference power measurement (antenna terminal conducted power) / Worst data rate, worst channel determination

Mode	Freq.	Data rate	Power Setting (soft)	Duty cycle	Duty factor	Duty scaled factor	Average power			Peak power	PAR	Target power & factor			SAR Tested / Reduced			Power Tune -up?
							Result		ΔRef.			Target (including variation)	Deviation from max (-2≤x<0)	Tune -up factor	Platform ID			
															#2	#3	#4	
	[MHz]	[Mbps]	[-]	[%]	[dB]	[-]	[dBm]	[mW]	[dB]	[dB]	[dB]	[dBm]	[dB]	[-]	M292C	M316A	M316C	
11b	2412	**1**	18	100	0.00	×1.00	15.80	38.05	-0.23	18.29	2.5	18.0	-2.20	×1.66	-	-	-	default
	2412	2	18	100	0.00	×1.00	15.75	37.62	-	18.37	2.6	18.0	-2.25	×1.68	-	-	-	default
	2412	5.5	18	100	0.00	×1.00	15.69	37.10	-	18.37	2.7	18.0	-2.31	×1.70	-	-	-	default
	2412	11	18	100	0.00	×1.00	15.70	37.19	-	18.27	2.6	18.0	-2.30	×1.70	-	-	-	default
	2437	**1**	18	100	0.00	×1.00	16.03	40.12	Ref.b18	19.00	3.0	18.0	-1.97	×1.57	-	-	-	default
	2462	**1**	18	100	0.00	×1.00	16.20	41.73	0.17	18.40	2.2	18.0	-1.80	×1.51	-	-	-	default
	2412	**1**	19	100	0.00	×1.00	16.03	40.12	-0.13	18.59	2.6	18.0	-1.97	×1.57	Reduced	Reduced	Reduced	Tune-up
	2437	**1**	19	100	0.00	×1.00	16.16	41.34	Ref.b19	19.10	2.9	18.0	-1.84	×1.53	**Tested**	**Tested**	**Tested**	Tune-up
	2462	**1**	19	100	0.00	×1.00	16.30	42.70	0.14	18.63	2.3	18.0	-1.70	×1.48	Reduced	Reduced	Reduced	Tune-up
11g	2412	**6**	14	100	0.00	×1.00	12.01	15.90	-0.18	21.17	9.2	13.0	-0.99	×1.25	-	-	-	default
	2412	9	14	100	0.00	×1.00	11.95	15.68	-	20.42	8.5	13.0	-1.05	×1.27	-	-	-	default
	2412	12	14	100	0.00	×1.00	11.94	15.65	-	21.10	9.2	13.0	-1.06	×1.28	-	-	-	default
	2412	18	14	100	0.00	×1.00	11.90	15.50	-	20.72	8.8	13.0	-1.10	×1.29	-	-	-	default
	2412	24	14	100	0.00	×1.00	11.89	15.47	-	21.28	9.4	13.0	-1.11	×1.29	-	-	-	default
	2412	36	14	100	0.00	×1.00	11.82	15.22	-	20.82	9.0	13.0	-1.18	×1.31	-	-	-	default
	2412	48	14	100	0.00	×1.00	11.78	15.08	-	20.69	8.9	13.0	-1.22	×1.32	-	-	-	default
	2412	56	14	100	0.00	×1.00	11.74	14.94	-	20.94	9.2	13.0	-1.26	×1.34	-	-	-	default
	2437	**6**	14	100	0.00	×1.00	12.19	16.57	Ref.g14	21.36	9.2	13.0	-0.81	×1.20	**Tested**	**Tested**	**Tested**	default
	2462	**6**	14	100	0.00	×1.00	12.15	16.42	-0.04	20.98	8.8	13.0	-0.85	×1.22	-	-	-	default
11n (20HT)	2412	**MCS0**	14	100	0.00	×1.00	12.01	15.90	-0.05	20.62	8.6	13.0	-0.99	×1.25	-	-	-	default
	2412	MCS1	14	100	0.00	×1.00	11.96	15.72	-	20.54	8.6	13.0	-1.04	×1.27	-	-	-	default
	2412	MCS2	14	100	0.00	×1.00	11.94	15.65	-	20.52	8.6	13.0	-1.06	×1.28	-	-	-	default
	2412	MCS3	14	100	0.00	×1.00	11.87	15.40	-	20.37	8.5	13.0	-1.13	×1.30	-	-	-	default
	2412	MCS4	14	100	0.00	×1.00	11.84	15.29	-	20.45	8.6	13.0	-1.16	×1.30	-	-	-	default
	2412	MCS5	14	100	0.00	×1.00	11.84	15.29	-	20.58	8.7	13.0	-1.16	×1.30	-	-	-	default
	2412	MCS6	14	100	0.00	×1.00	11.85	15.32	-	20.39	8.5	13.0	-1.15	×1.30	-	-	-	default
	2412	MCS7	14	100	0.00	×1.00	11.82	15.22	-	20.57	8.8	13.0	-1.18	×1.31	-	-	-	default
	2437	**MCS0**	14	100	0.00	×1.00	12.06	16.08	Ref.2n14	20.86	8.8	13.0	-0.94	×1.24	Reduced	Reduced	Reduced	default
	2462	**MCS0**	14	100	0.00	×1.00	11.92	15.57	-0.14	20.40	8.5	13.0	-1.08	×1.28	-	-	-	default
11a	5180	**MCS0**	14	100	0.00	×1.00	11.97	15.73	-0.02	22.52	10.6	13.0	-1.03	×1.27	-	-	-	default
	5200	**MCS0**	14	100	0.00	×1.00	11.90	15.47	-0.09	22.40	10.5	13.0	-1.10	×1.29	-	-	-	default
	5220	**MCS0**	14	100	0.00	×1.00	11.99	15.80	Ref.w52a14	22.42	10.4	13.0	-1.01	×1.26	Reduced	Reduced	Reduced	default
	5240	**MCS0**	14	100	0.00	×1.00	11.97	15.73	-0.02	22.26	10.3	13.0	-1.03	×1.27	-	-	-	default
	5260	**MCS0**	14	100	0.00	×1.00	12.13	16.32	-0.02	22.00	9.9	13.0	-0.87	×1.22	Reduced	Reduced	-	default
	5280	**MCS0**	14	100	0.00	×1.00	11.85	15.30	-0.10	21.57	9.7	13.0	-1.15	×1.30	-	-	-	default
	5300	**MCS0**	14	100	0.00	×1.00	11.95	15.65	Ref.w53a14	21.50	9.6	13.0	-1.05	×1.27	**Tested**	**Tested**	Reduced	default
	5320	**MCS0**	14	100	0.00	×1.00	11.94	15.62	-0.01	21.55	9.6	13.0	-1.06	×1.28	Reduced	Reduced	-	default
	5500	**MCS0**	14	100	0.00	×1.00	10.44	11.06	0.30	18.90	8.5	12.0	-1.56	×1.43	Reduced	-	-	default
	5500	MCS1	14	100	0.00	×1.00	10.42	11.01	-	18.46	8.0	12.0	-1.58	×1.44	-	-	-	default
	5500	MCS2	14	100	0.00	×1.00	10.39	10.93	-	18.76	8.4	12.0	-1.61	×1.45	-	-	-	default
	5500	MCS3	14	100	0.00	×1.00	10.39	10.93	-	18.78	8.4	12.0	-1.61	×1.45	-	-	-	default
	5500	MCS4	14	100	0.00	×1.00	10.36	10.85	-	18.93	8.6	12.0	-1.64	×1.46	-	-	-	default
	5500	MCS5	14	100	0.00	×1.00	10.28	10.66	-	18.61	8.3	12.0	-1.72	×1.49	-	-	-	default
	5500	MCS6	14	100	0.00	×1.00	10.31	10.73	-	18.59	8.3	12.0	-1.69	×1.48	-	-	-	default
	5500	MCS7	14	100	0.00	×1.00	10.30	10.71	-	18.49	8.2	12.0	-1.70	×1.48	-	-	-	default
	5520	**MCS0**	14	100	0.00	×1.00	10.46	11.11	0.32	18.87	8.4	12.0	-1.54	×1.43	-	-	-	default
	5540	**MCS0**	14	100	0.00	×1.00	10.37	10.88	0.23	18.47	8.1	12.0	-1.63	×1.46	-	-	-	default
	5560	**MCS0**	14	100	0.00	×1.00	10.18	10.41	0.04	18.18	8.0	12.0	-1.82	×1.52	-	-	-	default
	5580	**MCS0**	14	100	0.00	×1.00	10.11	10.25	-0.03	18.16	8.1	12.0	-1.89	×1.55	-	-	-	default
	5600	**MCS0**	14	100	0.00	×1.00	10.14	10.32	Ref.w56a14	18.17	8.0	12.0	-1.86	×1.54	**Tested**	Reduced	Reduced	default
	5620	**MCS0**	14	100	0.00	×1.00	10.13	10.29	-0.01	18.16	8.0	12.0	-1.87	×1.54	-	-	-	default
	5640	**MCS0**	14	100	0.00	×1.00	10.18	10.41	0.04	18.15	8.0	12.0	-1.82	×1.52	-	-	-	default
	5660	**MCS0**	14	100	0.00	×1.00	10.12	10.27	-0.02	17.85	7.7	12.0	-1.88	×1.54	-	-	-	default
	5680	**MCS0**	14	100	0.00	×1.00	10.02	10.04	-0.12	17.83	7.8	12.0	-1.98	×1.58	Reduced	-	-	default
	5700	**MCS0**	14	100	0.00	×1.00	9.16	8.23	-0.98	17.43	8.3	12.0	-2.84	×1.92	-	-	-	default
	5745	**MCS0**	14	100	0.00	×1.00	9.46	8.82	-0.07	16.43	7.0	12.0	-2.54	×1.80	-	-	-	default
	5765	**MCS0**	14	100	0.00	×1.00	9.33	8.56	-0.20	16.42	7.1	12.0	-2.67	×1.85	-	-	-	default
	5785	**MCS0**	14	100	0.00	×1.00	9.53	8.97	Ref.w58a14	16.44	6.9	12.0	-2.47	×1.77	-	-	-	default
	5805	**MCS0**	14	100	0.00	×1.00	9.36	8.62	-0.17	16.18	6.8	12.0	-2.64	×1.84	-	-	-	default
	5825	**MCS0**	14	100	0.00	×1.00	9.33	8.56	-0.20	16.09	6.7	12.0	-2.67	×1.85	-	-	-	default
	5745	**MCS0**	16	100	0.00	×1.00	10.63	11.55	-0.11	16.77	6.1	12.0	-1.37	×1.37	Reduced	-	-	Tune-up
	5785	**MCS0**	16	100	0.00	×1.00	10.74	11.85	Ref.w58a16	16.49	5.8	12.0	-1.26	×1.34	**Tested**	Reduced	Reduced	Tune-up
	5825	**MCS0**	16	100	0.00	×1.00	10.41	10.98	-0.33	15.57	5.2	12.0	-1.59	×1.44	Reduced	-	-	Tune-up

(cont'd)

(cont'd)

Mode	Freq.	Data rate	Power Setting (soft)	Duty cycle	Duty factor	Duty scaled factor	Average power Result		Average power ΔRef.	Peak power	PAR	Target power & factor Target (including variation)	Target power & factor Deviation from max (-2≤x<0)	Target power & factor Tune-up factor	SAR Tested / Reduced Platform ID #2	#3	#4	Power Tune-up?
	[MHz]	[Mbps]	[-]	[%]	[dB]	[-]	[dBm]	[mW]	[dB]	[dB]	[dB]	[dBm]	[dB]	[-]	M292C	M316A	M316C	
11n (20HT)	5180	**MCS0**	13	100	0.00	×1.00	10.97	12.49	0.04	21.51	10.5	12.0	-1.03	×1.27	-	-	-	default
	5200	**MCS0**	13	100	0.00	×1.00	10.95	12.43	0.02	20.76	9.8	12.0	-1.05	×1.27	-	-	-	default
	5220	**MCS0**	13	100	0.00	×1.00	10.93	12.38	Ref.w52n13	21.15	10.2	12.0	-1.07	×1.28	Reduced	Reduced	Reduced	default
	5240	**MCS0**	13	100	0.00	×1.00	10.88	12.23	-0.05	21.25	10.4	12.0	-1.12	×1.30	-	-	-	default
	5260	**MCS0**	13	100	0.00	×1.00	10.98	12.52	0.14	20.68	9.7	12.0	-1.02	×1.27	-	-	-	default
	5280	**MCS0**	13	100	0.00	×1.00	10.81	12.04	-0.03	20.54	9.7	12.0	-1.19	×1.32	-	-	-	default
	5300	**MCS0**	13	100	0.00	×1.00	10.84	12.12	Ref.w53n13	20.49	9.7	12.0	-1.16	×1.31	Reduced	Reduced	Reduced	default
	5320	**MCS0**	13	100	0.00	×1.00	10.83	12.09	-0.01	20.79	10.0	12.0	-1.17	×1.31	-	-	-	default
	5500	**MCS0**	13	100	0.00	×1.00	9.22	8.35	0.69	18.15	8.9	11.0	-1.78	×1.51	-	-	-	default
	5500	MCS1	13	100	0.00	×1.00	9.20	8.31	-	17.85	8.7	11.0	-1.80	×1.51	-	-	-	default
	5500	MCS2	13	100	0.00	×1.00	9.15	8.21	-	17.96	8.8	11.0	-1.85	×1.53	-	-	-	default
	5500	MCS3	13	100	0.00	×1.00	9.11	8.14	-	18.21	9.1	11.0	-1.89	×1.55	-	-	-	default
	5500	MCS4	13	100	0.00	×1.00	9.10	8.12	-	18.26	9.2	11.0	-1.90	×1.55	-	-	-	default
	5500	MCS5	13	100	0.00	×1.00	9.08	8.08	-	17.81	8.7	11.0	-1.92	×1.56	-	-	-	default
	5500	MCS6	13	100	0.00	×1.00	9.09	8.10	-	17.76	8.7	11.0	-1.91	×1.55	-	-	-	default
	5500	MCS7	13	100	0.00	×1.00	9.02	7.97	-	17.70	8.7	11.0	-1.98	×1.58	-	-	-	default
	5520	**MCS0**	13	100	0.00	×1.00	9.05	8.03	0.52	17.73	8.7	11.0	-1.95	×1.57	-	-	-	default
	5540	**MCS0**	13	100	0.00	×1.00	9.02	7.97	0.49	17.42	8.4	11.0	-1.98	×1.58	-	-	-	default
	5560	**MCS0**	13	100	0.00	×1.00	9.00	7.94	0.47	17.37	8.4	11.0	-2.00	×1.59	-	-	-	default
	5580	**MCS0**	13	100	0.00	×1.00	8.77	7.53	0.24	17.13	8.4	11.0	-2.23	×1.67	-	-	-	default
	5600	**MCS0**	13	100	0.00	×1.00	8.53	7.12	Ref.w56n13	16.88	8.4	11.0	-2.47	×1.77	-	-	-	default
	5620	**MCS0**	13	100	0.00	×1.00	8.35	6.83	-0.18	16.50	8.2	11.0	-2.65	×1.84	-	-	-	default
	5640	**MCS0**	13	100	0.00	×1.00	8.11	6.47	-0.42	16.26	8.2	11.0	-2.89	×1.95	-	-	-	default
	5660	**MCS0**	13	100	0.00	×1.00	8.32	6.79	-0.21	16.38	8.1	11.0	-2.68	×1.86	-	-	-	default
	5680	**MCS0**	13	100	0.00	×1.00	8.10	6.45	-0.43	16.18	8.1	11.0	-2.90	×1.95	-	-	-	default
	5700	**MCS0**	13	100	0.00	×1.00	7.30	5.37	-1.23	15.59	8.3	11.0	-3.70	×2.35	-	-	-	default
	5500	**MCS0**	14	100	0.00	×1.00	10.33	10.78	-0.04	18.30	8.0	11.0	-0.67	×1.17	-	-	-	Tune-up
	5580	**MCS0**	14	100	0.00	×1.00	10.02	10.04	-0.35	17.56	7.5	11.0	-0.98	×1.25	-	-	-	Tune-up
	5600	**MCS0**	15	100	0.00	×1.00	10.37	10.88	Ref.w56n15	17.60	7.2	11.0	-0.63	×1.16	Reduced	Reduced	Reduced	Tune-up
	5680	**MCS0**	15	100	0.00	×1.00	10.01	10.01	-0.36	17.17	7.2	11.0	-0.99	×1.26	-	-	-	Tune-up
	5700	**MCS0**	15	100	0.00	×1.00	9.49	8.88	-0.88	16.35	6.9	11.0	-1.51	×1.42	-	-	-	Tune-up
	5745	**MCS0**	13	100	0.00	×1.00	8.01	6.32	-0.05	15.47	7.5	11.0	-2.99	×1.99	-	-	-	default
	5765	**MCS0**	13	100	0.00	×1.00	7.86	6.10	-0.20	15.26	7.4	11.0	-3.14	×2.06	-	-	-	default
	5785	**MCS0**	13	100	0.00	×1.00	8.06	6.39	Ref.w58n13	15.39	7.3	11.0	-2.94	×1.97	-	-	-	default
	5805	**MCS0**	13	100	0.00	×1.00	7.97	6.26	-0.09	15.34	7.4	11.0	-3.03	×2.01	-	-	-	default
	5825	**MCS0**	13	100	0.00	×1.00	6.96	4.96	-1.10	13.93	7.0	11.0	-4.04	×1.54	-	-	-	default
	5745	**MCS0**	15	100	0.00	×1.00	9.83	9.61	0.23	16.02	6.2	11.0	-1.17	×1.31	-	-	-	Tune-up
	5785	**MCS0**	15	100	0.00	×1.00	9.60	9.11	Ref.w58n15	15.93	6.3	11.0	-1.40	×1.38	Reduced	Reduced	Reduced	Tune-up
	5825	**MCS0**	15	100	0.00	×1.00	9.12	8.16	-0.48	14.80	5.7	11.0	-1.88	×1.54	-	-	-	Tune-up

*. : SAR test was applied.

***. EUT serial number: B109126. The same EUT (WLAN Complete Module) was used for a different platform when SAR test was performed.**

*. Freq.: Frequency, PAR: Peak average ratio ("Peak power"-"Average power", in dBm), Ch: channel, D/R: Data Rate, pwr: power, Ref: Reference.

*. Calculating formula: Average power-result: Results (dBm) = (P/M Reading, dBm)+(Cable loss, dB)+(Attenuator, dB)+(duty factor, dB)
Duty factor: (duty factor, dBm) = 10 × log (100/(duty cycle, %))
Deviation form max.: (Power deviation, dB) = (results power (average, dBm)) - (Max.-specification output power (average, dBm))
Duty scaled factor: Duty cycle correction factor for obtained SAR value, Duty scaled factor [-] = 100(%) / (duty cycle, %)
Tune-up factor: Power tune-up factor for obtained SAR value, Tune-up factor [-] = 1 / (10 ^ ("Deviation from max., dB" / 10))

*. Date measured: June 3, 2015 / Measured by: Hiroshi Naka / Place: preparation room of No. 7 shielded room. (23 deg.C. / 42 %RH)

*. Uncertainty of antenna port conducted test; Power measurement uncertainty above 1GHz for this test was: (±) 1.5dB

6.2 Comparison of power of EMC sample

			Frequency [MHz] 2.4GHz									Frequency [MHz] W52			W53			W56			W58					
			2412	2437	2462	2412	2437	2462				5180	5220	5240	5260	5300	5320	5500	5580	5700	5745	5785	5825	5745	5785	5825
	D/R: Data rate		Power [dBm]									Power [dBm] (ave: average, pk: peak)														
	mode	D/R	ave	ave	ave	pk	pk	pk	mode	D/R		ave	ave	ave	ave	ave	ave	ave	ave	ave	ave	ave	ave	pk	pk	pk
Radio	11b	11				18.29	19.21	18.55	11a	6		12.26	12.28	12.17	12.62	11.90	11.58	9.98	10.13	8.68				16.39	16.13	15.24
	11b	1					19.03																			
	11g	6				21.49	21.65	21.21																		
SAR	11b	11	15.70			18.27			11a	6		11.97	11.99	11.97	12.13	11.95	11.94	10.44	10.11	9.16	9.46	9.53	9.33	16.43	16.44	16.09
	11b	1	15.80	16.03	16.20	18.29	19.00	18.40																		
	11g	6	12.01	12.19	12.15	21.17	21.36	20.98																		
(*1)Δ Radio -SAR	11b	11				0.02			11a	6			0.29		0.49	-0.05		-0.46	0.02					-0.04	-0.31	
	11b	1					0.03																			
	11g	6					0.29																			

*1. Calculating formula: "ΔRadio-SAR (dBm)" = "Radio power (dBm)"-" SAR power (dBm)", at max.SAR&Radio power in each band, at corresponded frequency

*. Radio power refers the test report: 32FE0117-SH-02-A, 32FE0117-SH-02-D, which are UL Japan published. (VRL4149-0601F serial number: 1)

SECTION 7: SAR Measurement results

7.1 SAR test results: M292C (Platform ID#2)

Measurement date: June 10, 11 and 13, 2015 Measurement by: Hiroshi Naka

[Liquid measurement]

Target Frequency [MHz]	Liquid type	Liquid parameters (*a)								Temp. [deg.C.]	Depth [mm]	ΔSAR Coefficients(*b)		Date measured
		Permittivity (εr) [-]				Conductivity [S/m]								
		Target	Measured		Limit	Target	Measured		Limit			ΔSAR (1g) [%]	Correction required?	
			Meas.	Δεr [%]			Meas.	Δσ [%]						
2437	Body	***52.72***	50.79	-3.7	-5% ≤ εr-meas. ≤ 0%	***1.938***	1.961	+1.2	0% ≤ σ-meas. ≤ +5%	23.0	153	+1.41	not required.	June 13, 2015 before SAR test
5300	Body	***48.88***	47.46	-2.9	-5% ≤ εr-meas. ≤ 0%	***5.416***	5.576	+3.0	0% ≤ σ-meas. ≤ +5%	22.8	149	+0.49	not required.	June 10-11, 2015 before SAR test (*1)
5580		***48.50***	46.96	-3.2		***5.743***	5.944	+3.5				+0.48	not required.	
5600		***48.47***	46.87	-3.3		***5.766***	5.960	+3.4				+0.51	not required.	
5785		***48.22***	46.57	-3.4		***5.982***	6.230	+4.1				+0.49	not required.	

*1. On June 11, 2015, the liquid temperature was same as previous measured and it was within 24 hours from last parameter measurement, so the same parameter was also used.

[SAR measurement results] (*. Initial test was determined by the manufacture's detail drawing for antenna location of platform.)

SAR measurement results													Reported SAR (1g) [W/kg]						Remarks
Mode	Freq. [MHz]	Data rate	EUT setup			Liq. temp. [deg.C.]	Power drift [dB]	SAR (1g) [W/kg]			SAR plot # in Appendix 2-2		Conducted power [dBm]		Scaled factor	Tuned-up SAR (*c)	Duty scaled factor [-]	SAR duty corrected (*d)	
			Position	Gap [mm]	Battery	Before /After		Max.value of multi-peak Meas.	ΔSAR [%]	ΔSAR corrected			Ave.	Max.					
2.4GHz band (2412 MHz~2462 MHz):																			
11b	2437	1Mbps /DSSS	**Front**	0	installed	22.8/22.8	0	**0.133**	+1.41	n/a (*b)	Plot A1-2		16.16	18	×1.53	**0.20**	×1.00	n/a	-
	2437		**Top-front**	0	installed	22.8/22.8	-0.02	**0.200**	+1.41	n/a (*b)	Plot A1-1		16.16	18	×1.53	**0.31**	×1.00	n/a	Highest,2.4G
11g	2437	6Mbps /OFDM	**Top-front**	0	installed	22.8/22.8	0.01	**0.081**	+1.41	n/a (*b)	Plot A1-3		12.19	13	×1.21	**0.100**	×1.00	n/a	-
W53 band (UNII-2A, 5260 MHz~5320 MHz):																			
11a	5300	6Mbps /OFDM	**Front**	0	installed	22.8/22.8	-0.02	**0.179**	+0.49	n/a (*b)	Plot A2-1		11.95	13	×1.27	**0.23**	×1.00	n/a	Highest,W53
	5300		**Top-front**	0	installed	22.6/22.7	-0.04	**0.118**	+0.49	n/a (*b)	Plot A2-2		11.95	13	×1.27	**0.15**	×1.00	n/a	-
W56 band (UNII-2C, 5500 MHz~5700 MHz):																			
11a	5580	6Mbps /OFDM	**Front**	0	installed	22.8/22.8	0	**0.193**	+0.48	n/a (*b)	Plot A3-2		10.11	12	×1.55	**0.30**	×1.00	n/a	-
	5580		**Top-front**	0	installed	22.7/22.7	0.07	**0.237**	+0.48	n/a (*b)	Plot A3-1		10.11	12	×1.55	**0.37**	×1.00	n/a	Highest,W56 Highest,UNII
	5600			0	installed	22.6/22.6	-0.01	**0.234**	+0.51	n/a (*b)	Plot A3-3		10.14	12	×1.53	**0.36**	×1.00	n/a	-
W58 band (UNII-3, 5745 MHz~5825 MHz):																			
11a	5785	6Mbps /OFDM	**Front**	0	installed	22.8/22.8	-0.03	**0.254**	+0.49	n/a (*b)	Plot A4-1		10.74	12	×1.34	**0.34**	×1.00	n/a	Highest,W58
	5785		**Top-front**	0	installed	22.7/22.7	0.05	**0.240**	+0.49	n/a (*b)	Plot A4-2		10.74	12	×1.34	**0.32**	×1.00	n/a	-

Notes: *. (KDB248227, clause 5.3.1) Since highest reported SAR(1g) of UNII-2A was ≤1.2 W/kg, SAR measurement of UNII-1 band was omitted.

*. Freq.: Frequency; Gap: It is the separation distance between the nearest position of platform outer surface and the bottom outer surface of phantom; Liq.temp: Liquid temperature; Max.: maximum, Meas.: Measured value; Ave.: Average; n/a: not applied.

*. Calibration frequency of the SAR measurement probe (and used conversion factors)

SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
2437 MHz	2450MHz	within ±50MHz of calibration frequency	7.17	±12.0%
5300 MHz	5250 MHz	within ±110 MHz of calibration frequency	4.53	±13.1 %
5580, 5600 MHz	5600 MHz	within ±110 MHz of calibration frequency	3.78	±13.1 %
5785 MHz	5750 MHz	within ±110 MHz of calibration frequency	4.06	±13.1 %

*. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

*a. The target value is a parameter defined in Appendix A of KDB865664 D01. Parameters for the frequencies 2000-2450, 2450-3000 and 3000-5800 MHz were obtained using linear interpolation. Above 5800MHz were obtained using linear extrapolation.

b. The coefficients are parameters defined in clause E.3.3.2, IEEE Std 1528(2013). Since the measured liquid parameters were ≤ the target εr and ≥ the target σ values and also within 5% of the required target dielectric parameters, the measured SAR was not compensated by ΔSAR coefficients (. Clause 2) of 2.6, KDB865664 D01).

Calculating formula: $\Delta SAR(1g) = C\varepsilon r \times \Delta\varepsilon r + C\sigma \times \Delta\sigma$, $C\varepsilon = -7.854E\text{-}4 \times f^3 + 9.402E\text{-}3 \times f^2 - 2.742E\text{-}2 \times f - 0.2026$ / $C\sigma = 9.804E\text{-}3 \times f^3 - 8.661E\text{-}2 \times f^2 + 2.981E\text{-}2 \times f + 0.7829$

ΔSAR corrected SAR (1g) (W/kg) = (Meas. SAR(1g) (W/kg)) × (100 - (ΔSAR(%)) / 100

*c. Tuned-up SAR by scaled factor: Accordance with KDB 447498 D01; "When SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance (clause 4, 4.1, 4))." (Refer to section 6 in this report for "Scaled factor" of channels, each operation mode.)

Calculating formula: Tuned-up SAR (1g) (W/kg) = (ΔSAR corrected SAR (1g) (W/kg)) × (Scaled factor)

*d. (KDB248227 D01v02)(Clause 2.2; Duty Factor Control)

When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. The reported SAR must be scaled to the maximum transmission duty factor to determine compliance.

Calculating formula: Reported SAR (1g) (=SAR duty corrected SAR (1g)) (W/kg) = (Tuned-up SAR (1g) (W/kg)) × (Duty scaled factor)

(Clause 5: SAR TEST PROCEDURE, in KDB248227 D01v02r01)

5.1.1 Initial Test Position SAR Test Reduction Procedure

1) When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combination within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).

7.2 SAR test results: M316A (Platform ID#3)

Measurement date: June 15, 2015 Measurement by: Hiroshi Naka

[Liquid measurement]

Target Frequency [MHz]	Liquid type	Liquid parameters (*a)								Temp. [deg.C.]	Depth [mm]	ΔSAR Coefficients(*b)		Date measured (*.before SAR test)
		Permittivity (εr) [-]				Conductivity [S/m]								
		Target	Measured		Limit	Target	Measured		Limit			ΔSAR (1g) [%]	Correction required?	
			Meas.	Δεr [%]			Meas.	Δσ [%]						
2437	Body	*52.72*	50.85	-3.5	-5% ≤ εr-meas. ≤ 0%	*1.938*	1.962	+1.3	0% ≤ σ-meas. ≤ +5%	22.7	153	+1.41	not required.	June 15, 2015
5300	Body	*48.88*	46.95	-3.6		*5.416*	5.495	+1.5		22.9	148	+0.75	not required.	June 12, 2015
5300	Body	*48.88*	47.32	-3.2		*5.416*	5.574	+2.9		22.8	146	+0.53	not required.	June 22, 2015

[SAR measurement results] (*. Initial test was determined by the manufacture's detail drawing for antenna location of platform.)

Mode	Freq. [MHz]	Data rate	EUT setup: Position	EUT setup: Gap [mm]	EUT setup: Battery	Liq. temp. [deg.C.] Before /After	Power drift [dB]	SAR (1g) [W/kg] Max.value of multi-peak: Meas.	SAR (1g) [W/kg] Max.value of multi-peak: ΔSAR [%]	SAR (1g) [W/kg] Max.value of multi-peak: ΔSAR corrected	SAR plot # in Appendix 2-2	Reported SAR (1g) [W/kg]: Conducted power [dBm] Ave.	Conducted power [dBm] Max.	Scaled factor	Tuned-up SAR (*c)	Duty scaled factor [-]	SAR duty corrected (*d)	Remarks
2.4GHz band (2412 MHz~2462 MHz):																		
11b	2437	1Mbps /DSSS	**Top-front**	0	installed	22.8/22.8	-0.02	**0.238**	+1.41	n/a (*b)	Plot B1-1	16.16	18	×1.53	**0.36**	×1.00	n/a	Highest,2.4G
	2437		**Top-center**	0	installed	22.6/22.6	-0.01	**0.159**	+1.41	n/a (*b)	Plot B1-2	16.16	18	×1.53	**0.24**	×1.00	n/a	-
	2437		**Right**	0	installed	22.6/22.7	-0.06	**0.032**	+1.41	n/a (*b)	Plot B1-3	16.16	18	×1.53	**0.05**	×1.00	n/a	-
11g	2437	6Mbps /OFDM	**Top-front**	0	installed	22.6/22.6	-0.01	**0.082**	+1.41	n/a (*b)	Plot B1-4	12.19	13	×1.21	**0.100**	×1.00	n/a	-
W53 band (UNII-2A, 5260 MHz~5320 MHz):																		
11a	5300	6Mbps /OFDM	**Top-front**	0	installed	23.0/22.9	-0.04	**0.338**	+0.75	n/a (*b)	Plot B2-1	11.95	13	×1.27	**043**	×1.00	n/a	Highest,W53
	5300		**Top-center**	0	installed	22.7/22.6	0.11	**0.265**	+0.55	n/a (*b)	Plot B2-2	11.95	13	×1.27	**0.34**	×1.00	n/a	-
	5300		**Right**	0	installed	22.8/22.7	-0.04	**0.064**	+0.55	n/a (*b)	Plot B2-3	11.95	13	×1.27	**0.08**	×1.00	n/a	-

W56 band (UNII-2C, 5500 MHz~5700 MHz):

***.** (KDB447498) For W56 band, since there is enough antenna separation distance, SAR test is reduced.

W58 band (UNII-3, 5745 MHz~5825 MHz):

***.** (KDB447498) For W58 band, since there is enough antenna separation distance, SAR test is reduced.

Notes: *. Freq.: Frequency; Gap: It is the separation distance between the nearest position of platform outer surface and the bottom outer surface of phantom; Liq.temp: Liquid temperature; Max.: maximum, Meas.: Measured value; Ave.: Average; n/a: not applied.

*. Calibration frequency of the SAR measurement probe (and used conversion factors)

SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
2437 MHz	2450 MHz	within ±50MHz of calibration frequency	7.17	±12.0%
5300 MHz	5250 MHz	within ±110 MHz of calibration frequency	4.53	±13.1 %

*. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

*a. The target value is a parameter defined in Appendix A of KDB865664 D01. Parameters for the frequencies 2000-2450, 2450-3000 and 3000-5800 MHz were obtained using linear interpolation. Above 5800MHz were obtained using linear extrapolation.

b. The coefficients are parameters defined in clause E.3.3.2, IEEE Std 1528(2013). Since the measured liquid parameters were ≤ the target εr and ≥ the target σ values and also within 5% of the required target dielectric parameters, the measured SAR was not compensated by ΔSAR coefficients (. Clause 2) of 2.6, KDB865664 D01).

Calculating formula: $\Delta SAR(1g) = C\varepsilon r \times \Delta\varepsilon r + C\sigma \times \Delta\sigma$, $C\varepsilon = -7.854E\text{-}4 \times f^3 + 9.402E\text{-}3 \times f^2 - 2.742E\text{-}2 \times f - 0.2026$ / $C\sigma = 9.804E\text{-}3 \times f^3 - 8.661E\text{-}2 \times f^2 + 2.981E\text{-}2 \times f + 0.7829$

ΔSAR corrected SAR (1g) (W/kg) = (Meas. SAR(1g) (W/kg)) × (100 - (ΔSAR(%)) / 100

*c. Tuned-up SAR by scaled factor: Accordance with KDB 447498 D01; "When SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance (clause 4, 4.1, 4))." (Refer to section 6 in this report for "Scaled factor" of channels, each operation mode.)

Calculating formula: Tuned-up SAR (1g) (W/kg) = (ΔSAR corrected SAR (1g) (W/kg)) × (Scaled factor)

*d. (KDB248227 D01v02)(Clause 2.2; Duty Factor Control)

When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. The reported SAR must be scaled to the maximum transmission duty factor to determine compliance.

Calculating formula: Reported SAR (1g) (=SAR duty corrected SAR (1g)) (W/kg) = (Tuned-up SAR (1g) (W/kg)) × (Duty scaled factor)

(Clause 5: SAR TEST PROCEDURE, in KDB248227 D01v02r01)

5.1.1 Initial Test Position SAR Test Reduction Procedure

1) When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combination within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).

7.3 SAR test results: M316C (Platform ID#4)

Measurement date: June 15, 2015 Measurement by: Hiroshi Naka

[Liquid measurement]

Target Frequency [MHz]	Liquid type	Liquid parameters (*a)								Temp. [deg.C.]	Depth [mm]	ΔSAR Coefficients(*b)		Date measured
		Permittivity (εr) [-]				Conductivity [S/m]								
		Target	Measured		Limit	Target	Measured		Limit			ΔSAR (1g) [%]	Correction required?	
			Meas.	Δεr [%]			Meas.	Δσ [%]						
2437	Body	*52.72*	50.85	-3.5	-5% ≤ εr-meas. ≤ 0%	*1.938*	1.962	+1.3	0% ≤ σ-meas. ≤ +5%	22.7	153	+1.41	not required.	June 15, 2015 before SAR test

[SAR measurement results] (*. Initial test was determined by the manufacture's detail drawing for antenna location of platform.)

SAR measurement results													Reported SAR (1g) [W/kg]						Remarks
Mode	Freq. [MHz]	Data rate	EUT setup			Liq. temp. [deg.C.]	Power drift [dB]	SAR (1g) [W/kg]			SAR plot # in Appendix 2-2		Conducted power [dBm]		Scaled factor	Tuned-up SAR (*c)	Duty scaled factor [-]	SAR duty corrected (*d)	
			Position	Gap [mm]	Battery	Before /After		Max.value of multi-peak Meas.	ΔSAR [%]	ΔSAR corrected			Ave.	Max.					
2.4GHz band (2412 MHz~2462 MHz):																			
11b	2437	1Mbps /DSSS	Right	0	installed	22.8/22.7	0.01	**0.066**	+1.41	n/a (*b)	Plot C1-1		16.16	18	×1.53	**0.10**	×1.00	n/a	Highest,2.4G
	2437		Top-front	0	installed	22.7/22.6	-0.02	**0.065**	+1.41	n/a (*b)	Plot C1-2		16.16	18	×1.53	**0.099**	×1.00	n/a	-
	2437		Top-center	0	installed	22.6/22.6	0.05	**0.054**	+1.41	n/a (*b)	Plot C1-3		16.16	18	×1.53	**0.083**	×1.00	n/a	-
11g	2437	6Mbps /OFDM	Right	0	installed	22.6/22.5	0.14	**0.027**	+1.41	n/a (*b)	Plot C1-4		12.19	13	×1.21	**0.032**	×1.00	n/a	-

W52 and W53 band (UNII-1 and UNII-2A, 5180 MHz~5240 MHz and 5260 MHz~5320 MHz):

***.** (KDB447498) For W53 (including W52) band, since there is enough antenna separation distance, SAR test is reduced.

W56 band (UNII-2C, 5500 MHz~5700 MHz):

***.** (KDB447498) For W56 band, since there is enough antenna separation distance, SAR test is reduced.

W58 band (UNII-3, 5745 MHz~5825 MHz):

***.** (KDB447498) For W58 band, since there is enough antenna separation distance, SAR test is reduced.

Notes: *. Freq.: Frequency; Gap: It is the separation distance between the nearest position of platform outer surface and the bottom outer surface of phantom; Liq.temp: Liquid temperature; Max.: maximum, Meas.: Measured value; Ave.: Average; n/a: not applied.

*. Calibration frequency of the SAR measurement probe (and used conversion factors)

SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
2437 MHz	2450MHz	within ±50MHz of calibration frequency	7.17	±12.0%

*. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

*a. The target value is a parameter defined in Appendix A of KDB865664 D01. Parameters for the frequencies 2000-2450, 2450-3000 and 3000-5800 MHz were obtained using linear interpolation. Above 5800MHz were obtained using linear extrapolation.

b. The coefficients are parameters defined in clause E.3.3.2, IEEE Std 1528(2013). Since the measured liquid parameters were ≤ the target εr and ≥ the target σ values and also within 5% of the required target dielectric parameters, the measured SAR was not compensated by ΔSAR coefficients (. Clause 2) of 2.6, KDB865664 D01).

Calculating formula: $\Delta SAR(1g) = C\varepsilon r \times \Delta\varepsilon r + C\sigma \times \Delta\sigma$, $C\varepsilon r = -7.854E\text{-}4 \times f^3 + 9.402E\text{-}3 \times f^2 - 2.742E\text{-}2 \times f - 0.2026$ / $C\sigma = 9.804E\text{-}3 \times f^3 - 8.661E\text{-}2 \times f^2 + 2.981E\text{-}2 \times f + 0.7829$

ΔSAR corrected SAR (1g) (W/kg) = (Meas. SAR(1g) (W/kg)) × (100 - (ΔSAR(%)) / 100

*c. Tuned-up SAR by scaled factor: Accordance with KDB 447498 D01; "When SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance (clause 4, 4.1, 4))." (Refer to section 6 in this report for "Scaled factor" of channels, each operation mode.)

Calculating formula: Tuned-up SAR (1g) (W/kg) = (ΔSAR corrected SAR (1g) (W/kg)) × (Scaled factor)

*d. (KDB248227 D01v02)(Clause 2.2; Duty Factor Control)

When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. The reported SAR must be scaled to the maximum transmission duty factor to determine compliance.

Calculating formula: Reported SAR (1g) (=SAR duty corrected SAR (1g)) (W/kg) = (Tuned-up SAR (1g) (W/kg)) × (Duty scaled factor)

(Clause 5: SAR TEST PROCEDURE, in KDB248227 D01v02r01)

5.1.1 Initial Test Position SAR Test Reduction Procedure

1) When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combination within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).