SAR TEST REPORT

Test Report No.: 11528791S-A

Applicant : **Canon Inc.**
Type of Equipment : **Wireless LAN module in Digital Radiography**
Model No. : **BM72065 (Wireless LAN module) (*. Installed into the platform (2))**
FCC ID : **AZDBM72065**
Test Standard : **FCC 47CFR §2.1093**
Test Result : **Complied**

Highest Reported SAR Value [W/kg]					Platform / SAR Test Report #			Remarks (DTS band)				Remarks (UNII band)			
Tune-up value		Type	1g /10g	Limit [W/kg]	No.	Type	Model	Frequency [MHz]	Mode	Output power (average) [dBm]		Frequency [MHz]	Mode	Output power (average) [dBm]	
DTS band	UNII band									Measured	Max.			Measured	Max
0.28	0.40	Body-worn	1g	1.6	#2	Digital Radiography	CXDI-810C Wireless (WM5A12)	2462	11b (1Mbp)	12.12	14	5180	11a (6Mbps)	11.33	13
												5590	11n(40HT) (MCS0)	12.19	13
0.34	0.45	Next-of-head	1g	1.6				2462	11n(20HT) (MCS0)	12.10	14	5190	11n(40HT) (MCS0)	11.42	13
0.54	1.02	Hand	10g	4	Report#	This report		2462	11g (6Mbps)	12.12	14	5500	11a (6Mbps)	11.90	13
*. This Wireless LAN Module had installed into the following platforms under 0.8W/kg of reported SAR(1g) (KDB447498 D01 (v06); multi-platform operation requirement).															
0.32	0.67	Body-worn	1g	1.6	#1	Digital Radiography	CXDI-710C Wireless (WM5A11)	2462	11b (1Mbp)	12.07	14	5825	11n(20HT) (MCS0)	11.74	13
0.35	0.66	Next-of-head	1g	1.6				2462	11b (1Mbps)	12.07	14	5825	11n(20HT) (MCS0)	11.74	13
0.62	0.91	Hand	10g	4	Report#	11355753S-A		2462	11g (6Mbps)	12.03	14	5240	11a (6Mbps)	11.78	13

*. **Highest reported SAR of all platforms for body-worn, next-of-head and hand holding are "0.67 W/kg", "0.66 W/kg" and "1.02 W/kg".**
*. Since highest reported SAR on this EUT's platform obtained in accordance with KDB447498 D01 (v06) was kept under 50% of SAR limit, this EUT was approved to operate multi-platform.

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Date of test: January 16~31, 2017

Test engineer:
Hiroshi Naka
Engineer, Consumer Technology Division

Approved by:
Toyokazu Imamura
Leader, Consumer Technology Division

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JAB Testing RTL02610

REVISION HISTORY

Revision	Test report No.	Date	Page revised	Contents
Original	11528791S-A	February 17, 2017	-	-
-r01	11528791S-A	March 13, 2017	p1,2,7,9,13,15,19,21	(p7,9,13,15,19,21) Error correcting.
-r02	11528791S-A	March 21, 2017	p1,2,3,7,9	(p3,7,9) Error correcting.

*. 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	Canon Inc.
Address	9-1, Imaikami-cho, Nakahara-ku, Kawasaki-shi, Kanagawa 211-8501, Japan
Telephone Number	81-3-3758-2111
Facsimile Number	81-44-739-5495
Contact Person	Yasuhiko Minakawa

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

	EUT	Platform
Type of Equipment	Wireless LAN Module	Platform (2): Digital Radiography
Model Number	BM72065	CXDI-810C Wireless (WM5A12)
Serial Number	60128BCC1E6A	16DR-300
Condition of EUT	Engineering prototype	Engineering prototype
	(*. Not for sale: These samples are equivalent to mass-produced items.)	
Receipt Date of Sample	September 20, 2016 (*. EUT for power measurement.) *. No modification by the Lab. January 13, 2017 (*. EUT for SAR test.) *. No modification by the Lab. (*. The EUT that had been measured the power of SAR test reference, was installed into the platform from the beginning. After power measurement, the EUT was returned to the customer and was installed into a platform which SAR tested by the customer.)	
Country of Mass-production	Japan	Japan
Category Identified	Portable device	
Rating	DC3.3V supplied form the platform *. The EUT is installed into the specified the platform that was operated by the re-chargeable Li-ion battery. Therefore, each SAR test, the platform which had built-in EUT was operated with full-charged battery.	
Feature of EUT	The EUT is a Wireless Module which installs into the specified platform: Digital Radiography.	
SAR Accessory	None	

2.2 Product Description (Wireless LAN Module: BM72065)

Frequency band	2.4GHz band		5GHz band				
			-	U-NII-1 (W52)	U-NII-2A (W53)	U-NII-2C (W56)	U-NII-3 (W58)
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)
	n(40HT)	2422~2452 (ch3~9)	n(40HT)	5190~5230 (ch.38~46)	5270~5310 (ch.54~62)	5510~5670 (ch.102~134)	5755, 5795 (ch.151,159)
Channel spacing (MHz)	5 (11b,g,n(20HT))		20 (11b,g,n(20HT)) / 40 (11n(40HT))				
Bandwidth (MHz)	20 (11b,g,n(20HT)) / 40 (11n(40HT))		20 (11b,g,n(20HT)) / 40 (11n(40HT))				
Type of modulation	DSSS: DBPSK, DQPSK, CCK (11b), OFDM: BPSK, QPSK, 16QAM, 64QAM (11g,a,n(20HT),n(40HT))						
Transmit power (typical, maximum channel and data rate) and tolerance (as manufacture variation) (dBm) (*.ch.: channel)	11b	12.0 ±2 (ch.1~11, 1~11Mbps)	11a:	11.0 ±2 (ch.36~48, 6~54Mbps)	11.0 ±2 (ch.52~64, 6~54Mbps)	11.0 ±2 (ch.100~140, 6~54Mbps)	11.0 ±2 (ch.149~165, 6~54Mbps)
	11g, n(20HT)	12.0 ±2 (ch1~11, 6~54Mbps, MCS0~7)	n(20HT)	11.0 ±2 (ch.36~48, MCS0~7)	11.0 ±2 (ch.52~64, MCS0~7)	11.0 ±2 (ch.100~140, MCS0~7)	11.0 ±2 (ch.149~165, MCS0~7)
	n(40HT)	11.0 ±2 (ch.3~9, MCS0~7)	n(40HT)	11.0 ±2 (ch.38,46, MCS0~7)	11.0 ±2 (ch.54,62, MCS0~7)	11.0 ±2 (ch.102~134, MCS0~7)	11.0 ±2 (ch.151,159, MCS0~7)
	*. The measured Tx output power (conducted) refers to Section 6 in this report.						
Power supply	DC 3.3V *.The dc power of BM72065 is supplied from the constant voltage circuit of the platform.						
Radio type	Transceiver						
Antenna quantity / model	1 pc.	146153-100 (cable length: 100 mm) <molex>					
Antenna type / connector type	Pattern antenna (34.9mm × 9mm) / Connector; RF module side: U-FL connector compatible, Antenna side: soldered						
Antenna gain (max.peak)	3.0 dBi (2.4GHz ~ 2.5 GHz) / 4.5 dBi (5.15GHz ~ 5.85 GHz), *.including cable loss.						

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

2.3 SAR test consideration of this platform: CXDI-810C Wireless (WM5A12)

This platform is a large-sized transportable equipment and has a part coming in contact directly with a patient. An operator (a patient become an operator uncommonly) maintains EUT by hand. (Refer to photographs of Appendix 1-3: Usage example)
Because there is not the KDB for the product which is such a design specifications, we decide the SAR test method in below.

Physical characteristics of platform: CXDI-810C Wireless (WM5A12)
Dimensions: 384 × 307.5 × 15.7 mm

- This platform is a transportable equipment, but, because it is a large-sized equipment, an operator (or a patient) fixes the edge of platform to stands and pushes or supports platform to a patient's body part (head, body, arm, hand, foot, etc.) by hand at the time of use.
  The X-ray imaging by platform changes the imaging part of the patient's body at every imaging after having needed several minutes for setting.
- The image transfer time (continuous transfer time) per one imaging is two or three seconds, it is short enough.
  The imaging of the same part can be performed consecutively several times.
  In the case of serial imaging, the image transfer time (continuous transfer time) occupies two or three seconds among the image intervals of 15 seconds. (Duty Cycle: < 20 %)
- On this account, the time when an operator (or patient) is really exposed to RF energy is short.
- In addition, an operator is only a doctor or a legally certified person because platform is medical equipment.
  - Explanatory note in the manual-
  "Only a physician or a legally certified operation should use the product."

In consideration of the terms of use mentioned above, we decide the SAR examination as the following contents.

a) The front (imaging area side) and side edge of platform carries out the Partial-body SAR examination.
   The front of platform comes in contact with a patient directly. In addition, consecutive RF energy may be exposed to the same neighborhood part of the patient although duty cycle is less than 20%.
   Because the front of platform comes in contact with a patient directly, we measure the Partial-body SAR at the position of the touch to a phantom around the antenna of the front and side-edge of platform with continuous transmission in 100% duty cycle as a worse condition.
b) The back of platform carries out the Hand SAR examination.
   An operator (or a patient) fixes the edge of platform to stands and pushes or supports platform to a patient's body part (head, body, arm, hand, foot, etc.) by hand and by holding back of platform at the time of use.
   In addition, consecutive RF energy may be exposed to the same neighborhood part of the patient although duty cycle is less than 20%.
   We measure the Hand SAR at the position of the touch to a phantom around the antenna of the back of platform with continuous transmission in 100% duty cycle as a worse condition.

*. In addition, because the following instructions for the operator are mentioned in a manual, the physical part of the operator does not touch directly the antenna part of the back.
   - Explanatory note in the manual -
   "Please do not adhere to your hands and body to an antenna part to restrain exposure of the RF energy when conducting an X-ray examination."

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 (v06): General RF exposure guidance
KDB 248227 D01 (v02r02): SAR Guidance for IEEE 802.11 (Wi-Fi) transmitters
KDB 865664 D01 (v01r04): SAR measurement 100MHz to 6GHz
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.

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
General population / uncontrolled exposure, Hands (averaged over any 10g of tissue) limit: 4 W/kg

3.3 Procedures and Results

Band (Frequency [MHz])	Wi-Fi (DTS) (2412-2462)		Wi-Fi (U-NII-1) (5180~5240)(W52)		Wi-Fi (U-NII-2A) (5260~5320)(W53)		Wi-Fi (U-NII-2C) (5500~5700)(W56)		Wi-Fi (U-NII-3) (5745~5825)(W58)	
Test Procedure	SAR measurement; KDB 447498, KDB 248227, KDB 865664, IEEE Std.1528									
Category	FCC 47CFR §2.1093 (Portable device)									
Results (SAR(1g) limit)	Complied (≤ 1.6 W/kg)		Complied (≤ 1.6 W/kg)		Complied (≤ 1.6 W/kg)		Complied (≤ 1.6 W/kg)		Complied (≤ 1.6 W/kg)	
SAR type	Body touch	Next of head	Body touch	Next of head	Body touch	Next of head	Body touch	Next of head	Body touch	Next of head
Liquid type	Body	Head	Body	Head	Body	Head	Body	Head	Body	Head
Reported SAR value	0.28 W/kg	0.34 W/kg	0.40 W/kg	0.45 W/kg	0.33 W/kg	0.42 W/kg	0.40 W/kg	0.42 W/kg	0.28 W/kg	0.34 W/kg
Measured SAR value	0.184 W/kg	0.216 W/kg	0.270 W/kg	0.313 W/kg	0.220 W/kg	0.293 W/kg	0.328 W/kg	0.364 W/kg	0.218 W/kg	0..252 W/kg
Operation mode, frequency[MHz]	11b(1Mbps), 2462	n20(MCS0), 2462	11a(6Mbps), 5180	n40(MCS0), 5190	11a(6Mbps), 5300	n20(MCS0), 5260	n40(MCS0), 5590	n20(MCS0), 5580	n20(MCS0), 5745	11a(6Mbps), 5745
Duty cycle [%] (scaled factor)	100 (×1.00)	100 (×1.00)	100 (×1.00)	100 (×1.00)	100 (×1.00)	100 (×1.00)	100 (×1.00)	100 (×1.00)	100 (×1.00)	100 (×1.00)
Output power [dBm] (max. power, scaled factor)	12.12 (14, ×1.54)	12.10 (14, ×1.55)	11.33 (13, ×1.47)	11.42 (13, ×1.44)	11.27 (13, ×1.49)	11.48 (13, ×1.42)	12.19 (13, ×1.21)	12.41 (13, ×1.15)	11.90 (13, ×1.30)	11.75 (13, ×1.33)

Results (SAR(10g) limit)	Complied (≤ 4 W/kg)	Complied (≤ 4 W/kg)	Complied (≤ 4 W/kg)	Complied (≤ 4 W/kg)	Complied (≤ 4 W/kg)
SAR type	Hand holding	Hand holding	Hand holding	Hand holding	Hand holding
Liquid type	Body	Body	Body	Body	Body
Reported SAR value	0.54 W/kg	0.88 W/kg	0.66 W/kg	1.02 W/kg	0.85 W/kg
Measured SAR value	0.353 W/kg	0.614 W/kg	0.467 W/kg	0.792 W/kg	0.656 W/kg
Operation mode, frequency[MHz]	11b(1Mbps), 2462	n40(MCS0), 5190	n20(MCS0), 5260	11a(6Mbps), 5500	11a(6Mbps), 5825
Duty cycle [%] (scaled factor)	100 (×1.00)	100 (×1.00)	100 (×1.00)	100 (×1.00)	100 (×1.00)
Output power [dBm] (max. power, scaled factor)	12.12 (14, ×1.54)	11.42 (13, ×1.44)	11.48 (13, ×1.42)	11.90 (13, ×1.29)	11.89 (13, ×1.29)

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

*. (Calculating formula) Corrected SAR to max.power (W/kg) = (Measured SAR (W/kg)) × (Duty scaled) × (Tune-up factor)
where; Tune-up factor [-] = 1 / (10 ^ ("Δmax (max.power - burst average power), dB" / 10)), Duty scaled factor [-] = 100(%) / (duty cycle, %)

Test outline: Where this product is built into a new platform (2), it was verified whether multiplatform conditions can be suited in according with section 2) of 5.2.2 in KDB447498 D01 (v06).

Consideration of the test results: **The highest reported SAR (1g) of this platform (2) was kept; ≤ 0.8 W/kg (SAR(1g)), ≤ 2 W/kg (SAR(10g)).**
Since highest reported SAR on this EUT's platform obtained in accordance with KDB447498 D01 (v06) was kept under 50% of SAR limit, this EUT was approved to operate multi-platform.

3.4 Test Location

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

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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 platform 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 (v06))

Step.1 Data rate check (*. The platform supported the following data rate in each operation mode.)

11b		11g		11a		11n(20HT)			11n(40HT)		
Mod (DSSS)	Data rate	Mod (OFDM)	Data rate	Mod (OFDM)	Data rate	MCS Index	Spatial Stream	Mod (OFDM)	MCS Index	Spatial Stream	Mod (OFDM)
DBPSK	1 Mbps	BPSK	6 Mbps	BPSK	6 Mbps	MCS0	1	BPSK	MCS0	1	BPSK
DQPSK	2 Mbps	BPSK	9 Mbps	BPSK	9 Mbps	MCS1	1	QPSK	MCS1	1	QPSK
CCK	5.5 Mbps	QPSK	12 Mbps	QPSK	12 Mbps	MCS2	1	QPSK	MCS2	1	QPSK
CCK	11 Mbps	QPSK	18 Mbps	QPSK	18 Mbps	MCS3	1	16QAM	MCS3	1	16QAM
*:Mod; Modulation		16QAM	24 Mbps	16QAM	24 Mbps	MCS4	1	16QAM	MCS4	1	16QAM
		16QAM	36 Mbps	16QAM	36 Mbps	MCS5	1	64QAM	MCS5	1	64QAM
		64QAM	48 Mbps	64QAM	48 Mbps	MCS6	1	64QAM	MCS6	1	64QAM
		64QAM	54 Mbps	64QAM	54 Mbps	MCS7	1	64QAM	MCS7	1	64QAM

Step.2 Consideration of SAR test channel

For the SAR test reference, on each operation band, the average output power was measured on the lower/middle/upper and specified 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 platform and SAR measurement procedure

After considering the outline of Flat Panel Sensor, the SAR test was carried out on the following setup conditions.

Setup	Explanation of platform setup position (*. Refer to Appendix 1 for test setup photographs.)	Antenna separation [mm]	SAR Tested /Reduced	SAR type
Front	When test is required, the front surface (patient side) of platform was touched to the Flat phantom.	**13.4**	**Tested**	Body /Head touch
Short side (Right)	When test is required, the short side edge surface (right, near an antenna side) of platform was touched to the Flat phantom.	**10**	**Tested**	
Short side (Left)	When test is required, the short side edge surface (left) of platform was touched to the Flat phantom.	**365**	Reduced (>200 mm)	
Long side (Top)	When test is required, the long side edge surface (top) of platform was touched to the Flat phantom.	**136**	Reduced (>50 mm)	
Long side (Bottom)	When test is required, the long side edge surface (bottom) of platform was touched to the Flat phantom.	**136.5**	Reduced (>50 mm)	
Back	When test is required, the back surface (operator side) of platform was touched to the Flat phantom.	**2.1**	**Tested**	Hand holding

*. **Separation:** Antenna separation distance. It is the distance from the antenna to the outer surface of platform which a human may touch.
. Size of platform: 384 (W) × 307.5 (D) × 15.7 (thickness) [mm] (. Size of EUT: 28 (W) × 32 (D) × 2.8 (thickness) [mm])

Consideration for SAR evaluation exemption

KDB 447498 D01 (v06) 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		Upper frequency [GHz]	Maximum power			Calculation of exclusion (*1)	SAR type	SAR test exclusion		Remarks
		[mm]	[mm] (rounded)		[dBm]	[mW]	[mW] (rounded)			Judge for Exclusion	Standalone SAR test required?	
WLAN 2.4GHz b,g,n(20HT)	Front	13.4	**13**	2.462	14.0	25.12	**25**	**3.0**	1g	**≤3.0**	*Reduced*	*. SAR test was applied.
	Long side (Right)	10	**10**					**3.9**	1g	**≤3.0**	**(>3) Required**	-
	(Reference threshold)	50	**50**					**0.8**	1g	**≤3.0**	*Reduced*	>50mm can reduce SAR test.
	Back	2.1	**2 (≤5)**					**7.8**	10g	**≤7.5**	**(>7.5) Required**	-
WLAN W52&53 a,n(20/40HT)	Front	13.4	**13**	5.32	13.0	19.95	**20**	**3.5**	1g	**≤3.0**	**(>3) Required**	-
	Long side (Right)	10	**10**					**4.6**	1g	**≤3.0**	**(>3) Required**	-
	(Reference threshold)	50	**50**					**0.9**	1g	**≤3.0**	*Reduced*	>50mm can reduce SAR test.
	Back	2.1	**2 (≤5)**					**23.1**	10g	**≤7.5**	**(>7.5) Required**	-
WLAN W56 a,n(20/40HT)	Front	13.4	**13**	5.7	13.0	19.95	**20**	**3.7**	1g	**≤3.0**	**(>3) Required**	-
	Long side (Right)	10	**10**					**4.8**	1g	**≤3.0**	**(>3) Required**	-
	(Reference threshold)	50	**50**					**1.0**	1g	**≤3.0**	*Reduced*	>50mm can reduce SAR test.
	Back	2.1	**2 (≤5)**					**23.9**	10g	**≤7.5**	**(>7.5) Required**	-
WLAN W58 a,n(20/40HT)	Front	13.4	**13**	5.825	13.0	19.95	**20**	**3.7**	1g	**≤3.0**	**(>3) Required**	-
	Long side (Right)	10	**10**					**4.8**	1g	**≤3.0**	**(>3) Required**	-
	(Reference threshold)	50	**50**					**1.0**	1g	**≤3.0**	*Reduced*	>50mm can reduce SAR test.
	Back	2.1	**2 (≤5)**					**24.1**	10g	**≤7.5**	**(>7.5) Required**	-

*1. Parenthesis 1), Clause 4.3.1, KDB 447498 D01 (v06) 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)), 7.5(for SAR(10g)) ··· 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 (2a)
[SAR(10g) test exclusion thresholds, mW] = 7.5 × [test separation distance, mm] / [√f(GHz)] ····· formula (2b)

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

Step 1	On 2.4GHz band, in body liquid, worst SAR (for both body touching and for hand-holding) search by DSSS mode. Add test for OFDM mode, if it's necessary. Repeat test in head liquid for SAR of head touching.
Step 2	On W52/53 band, in body liquid, worst SAR (for both body touching and for hand-holding) search by largest channel bandwidth mode with highest power. Repeat test in head liquid for SAR of head touching.
Step 3	On W56 band, in body liquid, worst SAR (for both body touching and for hand-holding) search by largest channel bandwidth mode with highest power. Repeat test in head liquid for SAR of head touching.
Step 4	On W58 band, in body liquid, worst SAR (for both body touching and for hand-holding) search by largest channel bandwidth mode with highest power. Repeat test in head liquid for SAR of head touching.

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

SECTION 4: 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 (ε',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 (v01r04) SAR Measurement 100 MHz to 6 GHz 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 5: Operation of platform during testing

5.1 Operating modes for SAR testing

The EUT has IEEE 802.11b, g, a, n(20HT) and n(40HT) continuous transmitting modes. The frequency and the modulation used in the SAR testing are shown as a following.

Operation mode			b	g	n20	n40	a	n20	n40	a	n20	n40	a	n20	n40	a	n20	n40
band			DTS				U-NII-1(W52)			U-NII-2A(W53)			U-NII-2C(W56)			U-NII-3(W58)		
Tx band [MHz]			2412~2462			2422 ~2452	5180~5240		5190, 5230	5260~5320		5270, 5310	5500~5700		5510 ~5670	5745~5825		5755, 5795
Bandwidth [MHz]			20	20	20	40	20	20	40	20	20	40	20	20	40	20	20	40
Max.power [dBm]			14	14	14	13	13	13	13	13	13	13	13	13	13	13	13	13
Modulation			DSSS	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM
Data rate [Mbps]			1	6	MCS0	MCS0	6	MCS0	MCS0	6	MCS0	MCS0	6	MCS0	MCS0	6	MCS0	MCS0
Frequency tested [MHz]	S	Body	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1	*1
	A	Head	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
	R	Hand	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3

Controlled software	**"W8787 (802.11a/g/b/n) Test Menu of Labtool" mode** (for antenna terminal conducted power measurement.) Set Tx parameters which includes; "band (2.4G/5G)", "band width (20MHz/40MHz)", "channel", "Power", "modulation method(DSSS/OFDM)", "data rate", "start/stop" by host PC via SD card board. **"rftest" mode** (for SAR test) Set Tx parameters which includes; "antenna# (1)", "channel", "BW(0:20MHz, 1:40MHz)", "Power(dBm, 12 or 11)", "data rate (0: 1Mbps, 5:6Mbps, 14:MCS0)", "on/off (2:on/18:off)" by host PC via LAN cable.

(cont'd)

5.1 Operating modes for SAR testing (cont'd)

SAR test reduction consideration

***1. [Table 1. Output power and Body-SAR test channel selection and Reported SAR(1g) [W/kg] (Results) and test reduction plan]**

802.11 Modes	b	g	n(20HT)	n(40HT)	a	n(20HT)	n(40HT)
Data rate [Mbps]	1 (lowest)	6 (lowest)	MCS0 (lowest)	MCS0 (lowest)	6 (lowest)	MCS0 (lowest)	MCS0 (lowest)
2.4GHz, Ch.	*1/6/11*	*1/6/11*	*1 6/11*	*1 6/11*			
Max. power [mW]	25/25/25	25/25/25	25/25/25	20/20/20			
Measured Ave. [mW]	17 / 16 / 16	16 / 16 / 16	16 / 16 / 16	14 / 14 / 13			
Reported SAR 1g	**0.28** /0.27 /**0.28**	0.24 (*1)	0.24 (*1)	0.20 (lower power)			
W52, Ch.					*36/40/44/48*	*36/40/44/48*	*38/46*
Max. power [mW]					20/20/20/20	20/20/20/20	20/20
Measured Ave. [mW]					14/13/14/14	15/14/14/13	14/14
Reported SAR 1g					**0.40**	Reduced (W53≤1.2W/kg)	0.33 / 0.32
W53, Ch.					*52/56/60/64*	*52/56/60/64*	*54/62*
Max. power [mW]					20/20/20/20	20/20/20/20	20/20
Measured Ave. [mW]					14 / 14 / 13 / 14	14 / 15 / 13 / 14	14 / 13
Reported SAR 1g					0.30 / **0.33** / **0.33**	0.30	0.30 / 0.26
W56, Ch.					*100/116/120/140*	*100/116/120/140*	*102/110/118/134*
Max. power [mW]					20/20/20/20	20/20/20/20	20/20/20/20
Measured Ave. [mW]					15 / 17 / 16 / 15	16 / 17 / 17 / 16	15 / 16 / 17 / 15
Reported SAR 1g					0.30	0.36 / 0.37 / 0.37 / 0.30	0.37 / 0.38 / **0.40** / 0.36
W58, Ch.					*149/157/165*	*149/157/165*	*151/159*
Max. power [mW]					20/20/20	20/20/20	20/20
Measured Ave. [mW]					15 / 14 / 15	15 / 14 / 16	15 / 14
Reported SAR 1g					0.23	**0.28** / 0.24 / 0.23	0.27 / 0.27

***2. [Table 2. Output power and Head-SAR test channel selection and Reported SAR(1g) [W/kg] (Results) and test reduction plan]**

802.11 Modes	B	g	n(20HT)	n(40HT)	a	n(20HT)	n(40HT)
Data rate [Mbps]	1 (lowest)	6 (lowest)	MCS0 (lowest)	MCS0 (lowest)	6 (lowest)	MCS0 (lowest)	MCS0 (lowest)
2.4GHz, Ch.	*1/6/11*	*1/6/11*	*1 6/11*	*1 6/11*			
Max. power [mW]	25/25/25	25/25/25	25/25/25	20/20/20			
Measured Ave. [mW]	17 / 16 / 16	16 / 16 / 16	16 / 16 / 16	14 / 14 / 13			
Reported SAR 1g	0.24 /0.32 /0.31	0.26 (*1)	0.29 /0.31 /**0.34**	0.25 (lower power)			
W52, Ch.					*36/40/44/48*	*36/40/44/48*	*38/46*
Max. power [mW]					20/20/20/20	20/20/20/20	20/20
Measured Ave. [mW]					14/13/14/14	15/14/14/13	14/14
Reported SAR 1g					Reduced (W53≤1.2W/kg)	0.39	**0.45** / 0.38
W53, Ch.					*52/56/60/64*	*52/56/60/64*	*54/62*
Max. power [mW]					20/20/20/20	20/20/20/20	20/20
Measured Ave. [mW]					14 / 14 / 13 / 14	14 / 15 / 13 / 14	14 / 13
Reported SAR 1g					0.41	**0.42** / 0.36 / 0.35	0.36 / 0.40
W56, Ch.					*100/116/120/140*	*100/116/120/140*	*102/110/118/134*
Max. power [mW]					20/20/20/20	20/20/20/20	20/20/20/20
Measured Ave. [mW]					15 / 17 / 16 / 15	16 / 17 / 17 / 16	15 / 16 / 17 / 15
Reported SAR 1g					0.38	0.40 / **0.42** / 0.41 / 0.38	0.41 / **0.42** / 0.30 / 0.40
W58, Ch.					*149/157/165*	*149/157/165*	*151/159*
Max. power [mW]					20/20/20	20/20/20	20/20
Measured Ave. [mW]					15 / 14 / 15	15 / 14 / 16	15 / 14
Reported SAR 1g					**0.34** / 0.29 / 0.28	0.27	0.32 / 0.25

***3. [Table 3. Output power and Hand-SAR test channel selection and Reported SAR(10g) [W/kg] (Results) and test reduction plan]**

802.11 Modes	b	g	n(20HT)	n(40HT)	a	n(20HT)	n(40HT)
Data rate [Mbps]	1 (lowest)	6 (lowest)	MCS0 (lowest)	MCS0 (lowest)	6 (lowest)	MCS0 (lowest)	MCS0 (lowest)
2.4GHz, Ch.	*1/6/11*	*1/6/11*	*1 6/11*	*1 6/11*			
Max. power [mW]	25/25/25	25/25/25	25/25/25	20/20/20			
Measured Ave. [mW]	17 / 16 / 16	16 / 16 / 16	16 / 16 / 16	14 / 14 / 13			
Reported SAR 10g	0.43 /0.49 /**0.54**	0.24 (*1)	0.24 (*1)	0.20 (lower power)			
W52, Ch.					*36/40/44/48*	*36/40/44/48*	*38/46*
Max. power [mW]					20/20/20/20	20/20/20/20	20/20
Measured Ave. [mW]					14/13/14/14	15/14/14/13	14/14
Reported SAR 10g					Reduced (W53≤3w/kg)	0.79	**0.99** / 0.71
W53, Ch.					*52/56/60/64*	*52/56/60/64*	*54/62*
Max. power [mW]					20/20/20/20	20/20/20/20	20/20
Measured Ave. [mW]					14 / 14 / 13 / 14	14 / 15 / 13 / 14	14 / 13
Reported SAR 10g					0.59	**0.66** / 0.58 / 0.65	0.65 / **0.66**
W56, Ch.					*100/116/120/140*	*100/116/120/140*	*102/110/118/134*
Max. power [mW]					20/20/20/20	20/20/20/20	20/20/20/20
Measured Ave. [mW]					15 / 17 / 16 / 15	16 / 17 / 17 / 16	15 / 16 / 17 / 15
Reported SAR 10g					**1.02** / 0.97 / 0.92 / 0.74	0.96	**1.02** / **1.02** / 0.96 / 0.74
W58, Ch.					*149/157/165*	*149/157/165*	*151/159*
Max. power [mW]					20/20/20	20/20/20	20/20
Measured Ave. [mW]					15 / 14 / 15	15 / 14 / 16	15 / 14
Reported SAR 10g					0.70 / 0.73 / **0.85**	0.83	0.74 / 0.67

*. Ch: Channel, Max: Maximum power in specification, AT: Antenna terminal conducted average power measured, SAR(1g): Reported SAR(1g) [W/kg] with tuned-up
*1. (KDB248227 D01) Since the reported SAR(1g) value of 11b mode was ≤0.8 W/kg, SAR test was only applied the worst SAR channel of 11b for OFDM mode.
*. The SAR testing was applied to lower, middle and upper channels for the worst SAR condition in each operation band.

SECTION 6: Confirmation before testing

6.1 Assessment for the antenna terminal port conducted power of platform (Worst data rate, worst channel determination)

*. Antenna gain (peak): 3.0 dBi (2.4~2.5 GHz) / 4.5 dBi (5.15~5.85 GHz)

Mode	Frequency		Data rate	Power Setting	Duty cycle	Duty factor	Duty scaled factor	Time average power		PAR	Power tolerance & correction			Power Tune-up?	Remarks
								Result		[dB]	Target & (+)tolerance	Deviation from max	Tune-up factor		
	[MHz]	CH	[Mbps]	[dBm]	[%]	[dB]	[-]	[dBm]	[mW]		[dBm]	(-2≤x<0)[dB]	[-]		
11b	2412	1	1	12	100	0.00	×1.00	**12.19**	16.56	2.61	12.0+2	-1.81	×1.52	default	-
	2437	6	1	12	100	0.00	×1.00	**12.02**	15.92	2.60	12.0+2	-1.98	×1.58	default	-
	2462	11	1	12	100	0.00	×1.00	**12.12**	16.29	2.61	12.0+2	-1.88	×1.54	default	-
11g	2412	1	6	12	100	0.00	×1.00	**12.13**	16.33	9.34	12.0+2	-1.87	×1.54	default	-
	2437	6	6	12	100	0.00	×1.00	**12.01**	15.89	9.39	12.0+2	-1.99	×1.58	default	-
	2462	11	6	12	100	0.00	×1.00	**12.10**	16.22	9.88	12.0+2	-1.90	×1.55	default	-
11n (20HT)	2412	1	MCS0	12	100	0.00	×1.00	**12.12**	16.29	9.02	12.0+2	-1.88	×1.54	default	-
	2437	6	MCS0	12	100	0.00	×1.00	**12.01**	15.89	8.95	12.0+2	-1.99	×1.58	default	-
	2462	11	MCS0	12	100	0.00	×1.00	**12.11**	16.26	8.95	12.0+2	-1.89	×1.55	default	-
11n (40HT)	2422	3	MCS0	11	100	0.00	×1.00	**11.36**	13.68	9.10	11.0+2	-1.64	×1.46	default	-
	2437	6	MCS0	11	100	0.00	×1.00	**11.36**	13.68	9.21	11.0+2	-1.64	×1.46	default	-
	2452	9	MCS0	11	100	0.00	×1.00	**11.27**	13.40	8.91	11.0+2	-1.73	×1.49	default	-
11a	5180	36	6	11	100	0.00	×1.00	**11.33**	13.58	10.25	11.0+2	-1.67	×1.47	default	-
	5200	40	6	11	100	0.00	×1.00	**11.28**	13.43	10.14	11.0+2	-1.72	×1.49	default	-
	5220	44	6	11	100	0.00	×1.00	**11.53**	14.22	10.01	11.0+2	-1.47	×1.40	default	-
	5240	48	6	11	100	0.00	×1.00	**11.36**	13.68	10.11	11.0+2	-1.64	×1.46	default	-
	5260	52	6	11	100	0.00	×1.00	**11.48**	14.06	10.14	11.0+2	-1.52	×1.42	default	-
	5280	56	6	11	100	0.00	×1.00	**11.60**	14.45	10.01	11.0+2	-1.40	×1.38	default	-
	5300	60	6	11	100	0.00	×1.00	**11.27**	13.40	10.10	11.0+2	-1.73	×1.49	default	-
	5320	64	6	11	100	0.00	×1.00	**11.37**	13.71	10.15	11.0+2	-1.63	×1.46	default	-
	5500	100	6	11	100	0.00	×1.00	**11.90**	15.49	10.01	11.0+2	-1.10	×1.29	default	-
	5580	116	6	11	100	0.00	×1.00	**12.34**	17.14	10.00	11.0+2	-0.66	×1.16	default	-
	5600	120	6	11	100	0.00	×1.00	**12.16**	16.44	9.97	11.0+2	-0.84	×1.21	default	-
	5700	140	6	11	100	0.00	×1.00	**11.70**	14.79	9.99	11.0+2	-1.30	×1.35	default	-
	5745	149	6	11	100	0.00	×1.00	**11.75**	14.96	9.83	11.0+2	-1.25	×1.33	default	-
	5785	157	6	11	100	0.00	×1.00	**11.59**	14.42	9.62	11.0+2	-1.41	×1.38	default	-
	5825	165	6	11	100	0.00	×1.00	**11.89**	15.45	9.40	11.0+2	-1.11	×1.29	default	-
11n (20HT)	5180	36	MCS0	11	100	0.00	×1.00	**11.65**	14.62	9.25	11.0+2	-1.35	×1.36	default	-
	5200	40	MCS0	11	100	0.00	×1.00	**11.31**	13.52	9.20	11.0+2	-1.69	×1.48	default	-
	5220	44	MCS0	11	100	0.00	×1.00	**11.55**	14.29	9.23	11.0+2	-1.45	×1.40	default	-
	5240	48	MCS0	11	100	0.00	×1.00	**11.24**	13.30	9.13	11.0+2	-1.76	×1.50	default	-
	5260	52	MCS0	11	100	0.00	×1.00	**11.48**	14.06	9.31	11.0+2	-1.52	×1.42	default	-
	5280	56	MCS0	11	100	0.00	×1.00	**11.66**	14.66	9.25	11.0+2	-1.34	×1.36	default	-
	5300	60	MCS0	11	100	0.00	×1.00	**11.28**	13.43	9.15	11.0+2	-1.72	×1.49	default	-
	5320	64	MCS0	11	100	0.00	×1.00	**11.45**	13.96	9.04	11.0+2	-1.55	×1.43	default	-
	5500	100	MCS0	11	100	0.00	×1.00	**12.00**	15.85	8.89	11.0+2	-1.00	×1.26	default	-
	5580	116	MCS0	11	100	0.00	×1.00	**12.41**	17.42	9.03	11.0+2	-0.59	×1.15	default	-
	5600	120	MCS0	11	100	0.00	×1.00	**12.32**	17.06	9.09	11.0+2	-0.68	×1.17	default	-
	5700	140	MCS0	11	100	0.00	×1.00	**11.95**	15.67	9.08	11.0+2	-1.05	×1.27	default	-
	5745	149	MCS0	11	100	0.00	×1.00	**11.85**	15.85	8.95	11.0+2	-1.00	×1.30	default	-
	5785	157	MCS0	11	100	0.00	×1.00	**11.56**	14.32	8.79	11.0+2	-1.44	×1.39	default	-
	5825	165	MCS0	11	100	0.00	×1.00	**12.00**	15.31	8.55	11.0+2	-1.15	×1.26	default	-
11n (40HT)	5190	38	MCS0	11	100	0.00	×1.00	**11.42**	13.87	9.64	11.0+2	-1.58	×1.44	default	-
	5230	46	MCS0	11	100	0.00	×1.00	**11.39**	13.77	9.59	11.0+2	-1.61	×1.45	default	-
	5270	54	MCS0	11	100	0.00	×1.00	**11.34**	13.61	9.67	11.0+2	-1.66	×1.47	default	-
	5310	62	MCS0	11	100	0.00	×1.00	**11.07**	12.79	9.47	11.0+2	-1.93	×1.56	default	-
	5510	102	MCS0	11	100	0.00	×1.00	**11.85**	15.31	9.21	11.0+2	-1.15	×1.30	default	-
	5550	110	MCS0	11	100	0.00	×1.00	**12.07**	16.11	9.35	11.0+2	-0.93	×1.24	default	-
	5590	118	MCS0	11	100	0.00	×1.00	**12.19**	16.56	9.22	11.0+2	-0.81	×1.21	default	-
	5670	134	MCS0	11	100	0.00	×1.00	**11.83**	15.24	9.26	11.0+2	-1.17	×1.31	default	-
	5755	151	MCS0	11	100	0.00	×1.00	**11.86**	15.35	9.13	11.0+2	-1.14	×1.30	default	-
	5795	159	MCS0	11	100	0.00	×1.00	**11.51**	14.16	9.00	11.0+2	-1.49	×1.41	default	-

*. Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test in following tables.

Data rate (D/R) vs Time average power (dBm)													
11b (2412MHz)		11g (2412MHz)		11n(20HT) (2412MHz)		11n(40HT) (2422MHz)		11a (5500MHz)		11n(20HT) (5500MHz)		11n(40HT) (5510MHz)	
Duty cycle: 100%		Duty cycle: 100%		Duty cycle: 100%		Duty cycle: 100%		Duty cycle: 100%		Duty cycle: 100%		Duty cycle: 100%	
D/R	Power	D/R	Power	D/R	Power	D/R	Power	D/R	Power	D/R	Power	D/R	Power
-	**14 max**	-	**14 max**	-	**14 max**	-	**13 max**	-	**13 max**	-	**13 max**	-	**13 max**
1	**12.19**	**6**	**12.13**	**MCS0**	**12.12**	**MCS0**	**11.36**	**6**	**11.90**	**MCS0**	**12.00**	**MCS0**	**11.91**
2	12.18	9	12.08	MCS1	12.11	MCS1	11.35	9	11.78	MCS1	11.94	MCS1	11.82
5.5	**12.19**	12	12.10	MCS2	12.10	MCS2	11.35	12	11.80	MCS2	11.95	MCS2	11.84
11	**12.19**	18	12.12	MCS3	12.09	MCS3	11.34	18	11.81	MCS3	11.98	MCS3	11.85
		24	12.05	MCS4	12.09	MCS4	11.34	24	11.77	MCS4	11.97	MCS4	11.84
		36	12.01	MCS5	12.09	MCS5	11.33	36	11.81	MCS5	11.97	MCS5	11.80
		48	12.02	MCS6	12.09	MCS6	11.35	48	11.81	MCS6	11.96	MCS6	11.83
		56	12.01	MCS7	12.08	MCS7	11.33	56	11.83	MCS7	11.98	MCS7	11.84

*. PAR: Peak average ratio ("Peak power"-"Average power", in dBm), CH: channel, Max: Maximum.
*. Calculating formula: Time 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: December 19, 2016 / Measured by: Hiroshi Naka / Place: preparation room of No. 7 shielded room. (23 deg.C. / 51 %RH)
*. Uncertainty of antenna port conducted test; Power measurement uncertainty above 1GHz for this test was: (±) 0.72 dB(Average)/(±) 0.85 dB(Peak).
*. Uncertainty of antenna port conducted test; Duty cycle and time measurement: (±) 0.012 %.

6.2 Comparison of power of EMC sample

	RF serial No.	Date power measured	Reference report#	Average power [dBm] ("Bold letter": Highest) (D/R: Data rate [Mbps])														Remarks
				11b: Max.power=14dBm				11a: Max.power=13dBm										
				D/R	2412	2437	2462	D/R	5180	5260	5320	5500	5580	5700	5745	5785	5825	
EMC (Ref.)	60128BCC1E18	Sep. 20, 2016	11355752S-N,-P.	11	**12.45**	12.26	12.20	9	11.92	11.91	**11.95**	12.16	12.24	**12.49**	**12.38**	**12.38**	12.23	-
SAR test (1)	60128BCC1DCA	Sep. 30, 2016	11355753S-A	1	**12.50**	12.30	12.07	6	11.86	11.89	**12.00**	12.60	12.68	**12.84**	**12.26**	11.84	11.76	-
SAR test (2)	60128BCC1E6A	Dec. 19, 2016	This report	1	**12.19**	12.02	12.12	6	11.33	**11.48**	11.37	11.90	**12.34**	11.70	11.75	11.59	**11.89**	-

SECTION 7: SAR Measurement results

Measurement date: January 16 ~ January 31, 2017 Measurement by: Hiroshi Naka

7.1 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]						ΔSAR		Correction required?	
		Target	Measured		Limit	Target	Measured		Limit			1g [%]	10g [%]		
			Meas.	Δεr [%]			Meas.	Δσ [%]							
5180	Body	***49.04***	47.39	-3.4	-5% ≤ εr-meas. ≤ 0%	***5.276***	5.363	+1.6	0% ≤ σ-meas. ≤ +5%	23.4	151	+0.64	+0.77	not required.	January 16, 2017, before SAR test.
5190		***49.03***	47.22	-3.7		***5.288***	5.396	+2.1				+0.69	+0.83	not required.	
5230		***48.99***	47.30	-3.4		***5.334***	5.463	+2.4				+0.62	+0.75	not required.	
5260		***48.93***	47.21	-3.5		***5.369***	5.506	+2.6				+0.63	+0.77	not required.	
5270		***48.92***	47.24	-3.4		***5.381***	5.499	+2.2				+0.63	+0.77	not required.	
5300		***48.88***	47.11	-3.6		***5.416***	5.558	+2.6				+0.64	+0.79	not required.	
5310		***48.87***	47.08	-3.7		***5.428***	5.574	+2.7				+0.64	+0.80	not required.	
5320		***48.85***	47.06	-3.7		***5.439***	5.571	+2.4				+0.66	+0.82	not required.	
5745	Body	***48.27***	46.38	-3.9	-5% ≤ εr-meas. ≤ 0%	***5.936***	6.155	+3.7	0% ≤ σ-meas. ≤ +5%	23.4	151	+0.61	+0.87	not required.	January 17, 2017, before SAR test.
5755		***48.26***	46.43	-3.8		***5.947***	6.142	+3.3				+0.61	+0.86	not required.	
5785		***48.22***	46.37	-3.8		***5.982***	6.210	+3.8				+0.59	+0.85	not required.	
5795		***48.21***	46.37	-3.8		***5.994***	6.213	+3.7				+0.59	+0.85	not required.	
5825		***48.17***	46.25	-4.0		***6.029***	6.260	+3.8				+0.62	+0.90	not required.	
5500	Body	***48.61***	46.78	-3.8	-5% ≤ εr-meas. ≤ 0%	***5.650***	5.799	+2.6	0% ≤ σ-meas. ≤ +5%	23.4	151	+0.64	+0.84	not required.	January 18~19, 2017, before SAR test. (*1)
5510		***48.59***	46.75	-3.8		***5.661***	5.805	+2.5				+0.65	+0.86	not required.	
5550		***48.54***	46.83	-3.5		***5.708***	5.879	+3.0				+0.57	+0.77	not required.	
5580		***48.50***	46.71	-3.7		***5.743***	5.917	+3.0				+0.60	+0.81	not required.	
5590		***48.49***	46.71	-3.7		***5.755***	5.924	+3.0				+0.60	+0.81	not required.	
5600		***48.47***	46.61	-3.9		***5.766***	5.968	+3.5				+0.61	+0.84	not required.	
5670		***48.38***	46.49	-3.9		***5.848***	6.045	+3.4				+0.62	+0.86	not required.	
5700		***48.34***	46.56	-3.7		***5.883***	6.063	+3.1				+0.59	+0.83	not required.	
2412	Head	***39.27***	38.34	-2.4	-5% ≤ εr-meas. ≤ 0%	***1.766***	1.823	+3.2	0% ≤ σ-meas. ≤ +5%	23.8	152	+2.10	+1.23	not required.	January 20, 2017, before SAR test.
2422		***39.25***	38.24	-2.6		***1.775***	1.839	+3.6				+2.32	+1.35	not required.	
2437		***39.22***	38.21	-2.6		***1.788***	1.859	+4.0				+2.49	+1.45	not required.	
2462		***39.18***	38.10	-2.8		***1.813***	1.888	+4.4				+2.60	+1.51	not required.	
2412	Body	***52.75***	50.94	-3.4	-5% ≤ εr-meas. ≤ 0%	***1.914***	1.962	+2.5	0% ≤ σ-meas. ≤ +5%	22.4	152	+2.01	+1.22	not required.	January 23, 2017, before SAR test.
2422		***52.74***	50.89	-3.5		***1.923***	1.976	+2.8				+2.13	+1.29	not required.	
2437		***52.72***	50.90	-3.5		***1.938***	1.992	+2.8				+2.13	+1.28	not required.	
2462		***52.68***	50.80	-3.6		***1.967***	2.029	+3.2				+2.31	+1.38	not required.	
5745	Head	***35.36***	34.91	-1.3	-5% ≤ εr-meas. ≤ +5%	***5.214***	5.009	-3.9	-5% ≤ σ-meas. ≤ +5%	22.4	151	+0.44	+0.47	not required.	January 24, 2017, before SAR test.
5755		***35.35***	34.86	-1.4		***5.224***	5.032	-3.7				+0.44	+0.48	not required.	
5785		***35.32***	34.90	-1.2		***5.255***	5.053	-3.8				+0.41	+0.43	not required.	
5795		***35.31***	34.80	-1.4		***5.265***	5.048	-4.1				+0.47	+0.50	not required.	
5825		***35.27***	34.75	-1.5		***5.296***	5.082	-4.0				+0.47	+0.50	not required.	
5500	Head	***35.64***	35.4	-0.6	-5% ≤ εr-meas. ≤ +5%	***4.963***	4.753	-4.2	-5% ≤ σ-meas. ≤ +5%	22.4	151	+0.30	+0.36	not required.	January 30, 2017, before SAR test.
5510		***35.63***	35.40	-0.7		***4.973***	4.776	-4.0				+0.30	+0.35	not required.	
5550		***35.59***	35.27	-0.9		***5.014***	4.838	-3.5				+0.33	+0.39	not required.	
5580		***35.55***	35.28	-0.8		***5.045***	4.877	-3.3				+0.30	+0.34	not required.	
5590		***35.54***	35.26	-0.8		***5.055***	4.847	-4.1				+0.34	+0.38	not required.	
5600		***35.53***	35.23	-0.8		***5.065***	4.880	-3.7				+0.32	+0.36	not required.	
5670		***35.45***	35.18	-0.8		***5.137***	4.928	-4.1				+0.34	+0.36	not required.	
5700		***35.41***	35.12	-0.8		***5.168***	4.978	-3.7				+0.33	+0.35	not required.	
5180	Head	***36.01***	35.81	-0.6	-5% ≤ εr-meas. ≤ +5%	***4.655***	4.427	-4.5	-5% ≤ σ-meas. ≤ +5%	22.4	151	+0.22	+0.38	not required.	January 31, 2017, before SAR test.
5190		***36.00***	35.86	-0.4		***4.645***	4.454	-4.1				+0.18	+0.32	not required.	
5230		***35.95***	35.81	-0.4		***4.686***	4.514	-3.7				+0.18	+0.29	not required.	
5260		***35.92***	35.72	-0.6		***4.717***	4.543	-3.7				+0.22	+0.34	not required.	
5270		***35.91***	35.83	-0.2		***4.727***	4.533	-4.1				+0.17	+0.27	not required.	
5300		***35.87***	35.70	-0.5		***4.758***	4.556	-4.2				+0.23	+0.35	not required.	
5310		***35.86***	35.60	-0.7		***4.768***	4.568	-4.2				+0.28	+0.40	not required.	
5320		***35.85***	35.58	-0.8		***4.778***	4.574	-4.3				+0.29	+0.41	not required.	

*1. On Jan. 19, it was within 24 hours from measurement on Jan. 18 and same liquid temperature, so measured parameters of Jan. 18 were used continuously

a. The target value is a parameter defined in Appendix A of KDB865664 D01 (v01r04), the dielectric parameters suggested for head and body tissue simulating liquid are given at 2000, 2450, 3000 and 5800MHz. (.The parameters of the head liquid are the same value as IEEE Std. 1528-2013.) Parameters for the frequencies between 2000-3000, 3000-5800MHz were obtained using linear interpolation. Above 5800MHz were obtained using linear extrapolation.

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

$\Delta SAR(10g) = C\varepsilon r \times \Delta\varepsilon r + C\sigma \times \Delta\sigma$, $C\varepsilon r = 3.456 \times 10^{-3} \times f^3 - 3.531 \times 10^{-2} \times f^2 + 7.675 \times 10^{-2} \times f - 0.1860$ / $C\sigma = 4.479 \times 10^{-3} \times f^3 - 1.586 \times 10^{-2} \times f^2 - 0.1972 \times f + 0.7717$

7.2 SAR measurement results (2.4GHz band, SAR for Body/Head/Hand)

[Measured and Reported (Scaled) SAR results]

SAR measurement results											Reported SAR [W/kg]								
Mode	Freq. [MHz] (Channel)	Data rate [Mbps]	platform setup			SAR [W/kg]			SAR plot # in Appendix 2-2	Duty cycle correction		Output average power correction			SAR Corrected (Scaled) (*b)	SAR type (1g /10g)	SAR limit	Remarks
			Position	Gap [mm]	Bty. ID	Max. value of multi-peak				Duty [%]	Duty scaled	Meas. [dBm].	Max. [dBm]	Tune-up factor				
						Meas.	ΔSAR [%]	ΔSAR corrected										
Step 1a: 2.4GHz Band (Body-SAR, by body liquid)																		
11b	2412(1)	1	Right	0	378	**0.185**	+2.01	n/a (*a)	Plot 1a-1	100	×1.00	12.19	14	×1.52	**0.281**	1g	1.6	-
	2437(6)			0	378	**0.169**	+2.13	n/a (*a)	Plot 1a-2	100	×1.00	12.02	14	×1.58	**0.267**	1g	1.6	-
	2462(11)			0	378	**0.184**	+2.31	n/a (*a)	Plot 1a-3	100	×1.00	12.12	14	×1.54	**0.283**	1g	1.6	body-worst,2.4GHz
	2412(1)		Front	0	378	**0.012**	+2.01	n/a (*a)	Plot 1a-4	100	×1.00	12.19	14	×1.52	**0.019**	1g	1.6	-
11g	2412(1)	6	Right	0	378	**0.157**	+2.01	n/a (*a)	Plot 1a-5	100	×1.00	12.13	14	×1.54	**0.242**	1g	1.6	-
n (20HT)	2412(1)	MCS0		0	377	**0.156**	+2.01	n/a (*a)	Plot 1a-6	100	×1.00	12.12	14	×1.54	**0.240**	1g	1.6	-
n (40HT)	2422(3)	MCS0		0	377	**0.139**	+2.13	n/a (*a)	Plot 1a-7	100	×1.00	11.36	13	×1.46	**0.203**	1g	1.6	-
Step 1b: 2.4GHz Band (Head-SAR, by head liquid)																		
11b	2412(1)	1	Right	0	377	**0.160**	+2.10	n/a (*a)	Plot 1b-1	100	×1.00	12.19	14	×1.52	**0.243**	1g	1.6	-
	2437(6)			0	378	**0.205**	+2.49	n/a (*a)	Plot 1b-2	100	×1.00	12.02	14	×1.58	**0.324**	1g	1.6	-
	2462(11)			0	377	**0.201**	+2.60	n/a (*a)	Plot 1b-3	100	×1.00	12.12	14	×1.54	**0.310**	1g	1.6	-
	2412(1)		Front	0	377	**0.021**	+2.10	n/a (*a)	Plot 1b-4	100	×1.00	12.19	14	×1.52	**0.032**	1g	1.6	-
11g	2412(1)	6	Right	0	378	**0.171**	+2.10	n/a (*a)	Plot 1b-5	100	×1.00	12.13	14	×1.54	**0.263**	1g	1.6	-
n (20HT)	2412(1)	MCS0		0	378	**0.190**	+2.10	n/a (*a)	Plot 1b-6	100	×1.00	12.12	14	×1.54	**0.293**	1g	1.6	-
	2437(6)			0	377	**0.196**	+2.49	n/a (*a)	Plot 1b-7	100	×1.00	12.01	14	×1.58	**0.310**	1g	1.6	-
	2462(11)			0	377	**0.216**	+2.60	n/a (*a)	Plot 1b-8	100	×1.00	12.10	14	×1.55	**0.335**	1g	1.6	head-worst,2.4GHz
n (40HT)	2422(3)	MCS0		0	378	**0.169**	+2.32	n/a (*a)	Plot 1b-9	100	×1.00	11.36	13	×1.46	**0.247**	1g	1.6	-
Step 1c: 2.4GHz Band (Hand-SAR, by body liquid)																		
11b	2412(1)	1	Back	0	377	**0.284**	+1.22	n/a (*a)	Plot 1c-1	100	×1.00	12.19	14	×1.52	**0.432**	10g	4	-
	2437(6)			0	377	**0.308**	+1.28	n/a (*a)	Plot 1c-2	100	×1.00	12.02	14	×1.58	**0.487**	10g	4	-
	2462(11)			0	377	**0.353**	+1.38	n/a (*a)	Plot 1c-3	100	×1.00	12.12	14	×1.54	**0.544**	10g	4	hand-worst,2.4GHz
11g	2462(11)	6		0	377	**0.267**	+1.22	n/a (*a)	Plot 1c-4	100	×1.00	12.13	14	×1.54	**0.411**	10g	4	-
n (20HT)	2462(11)	MCS0		0	377	**0.266**	+1.22	n/a (*a)	Plot 1c-5	100	×1.00	12.12	14	×1.54	**0.410**	10g	4	-
n (40HT)	2422(3)	MCS0		0	377	**0.242**	+1.29	n/a (*a)	Plot 1c-6	100	×1.00	11.36	13	×1.46	**0.353**	10g	4	-

Notes:

. Gap: It is the separation distance between the platform outer surface and the bottom outer surface of phantom; Freq.: Frequency; Max.: Maximum; Meas.: Measured value; n/a: not applied; Bty.ID: Battery ID (. Battery ID No.377 and 378 are same. Refer to Appendix 1 for more detail.)

*. During test, the platform was operated with full charged battery.

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

Liquid	SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
Body	2412, 2422, 2437, 2462 MHz	2450 MHz	within ±50MHz of calibration frequency	7.30	±12.0%
Head	2412, 2422, 2437, 2462 MHz	2450 MHz	within ±50MHz of calibration frequency	7.15	±12.0%

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

*a. Since the calculated ΔSAR values of the tested liquid had shown positive correction, the measured SAR was not converted by ΔSAR correction.
Calculating formula: ΔSAR corrected SAR (W/kg) = (Meas. SAR (W/kg)) × (100 - (ΔSAR(%)) / 100

*b. Calculating formula: Reported SAR (W/kg) = (Measured SAR (W/kg)) × (Duty scaled) × (Tune-up factor)
Duty scaled = 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))

(Clause 5.2, 2.4GHz SAR Procedures for 2.4GHz band DSSS and OFDM, in KDB248227 D01 (v02r02))

5.2.1 802.11b DSSS SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1) When the reported SAR of the highest measured maximum output power channel (section 3.1) for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
2) When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

5.2.2 2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied (section 5.3, including sub-sections). SAR is not required for the following 2.4 GHz OFDM conditions.

1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
2) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

***. Result of hand SAR was judged after "0.8 W/kg" in the document above-mentioned was changed for "2 W/kg" and "1.2 W/kg" in the document above-mentioned was changed for "3 W/kg".**

7.3 SAR measurement results (5GHz band, SAR for Body/Head/Hand)

[Measured and Reported (Scaled) SAR results]

SAR measurement results										Reported SAR [W/kg]								
Mode	Freq. [MHz] (Channel)	Data rate [Mbps]	platform setup: Position	Gap [mm]	Bty. ID	SAR [W/kg]: Max. value of multi-peak: Meas.	ΔSAR [%]	ΔSAR corrected	SAR plot # in Appendix 2-2	Duty cycle correction: Duty [%]	Duty scaled	Output average power correction: Meas. [dBm].	Max. [dBm]	Tune-up factor	SAR Corrected (Scaled) (*b)	SAR type (1g /10g)	SAR limit	Remarks
Step 2a: W52/53 Band (Body-SAR, by body liquid)																		
n (40HT)	5270(54)	MCS0	Right	0	377	**0.205**	+0.63	n/a (*a)	Plot 2a-1	100	×1.00	11.34	13	×1.47	**0.301**	1g	1.6	-
	5310(62)			0	377	**0.168**	+0.64	n/a (*a)	Plot 2a-2	100	×1.00	11.07	13	×1.56	**0.262**	1g	1.6	-
	5230(46)			0	377	**0.220**	+0.62	n/a (*a)	Plot 2a-3	100	×1.00	11.39	13	×1.45	**0.319**	1g	1.6	-
	5190(38)			0	377	**0.232**	+0.69	n/a (*a)	Plot 2a-4	100	×1.00	11.42	13	×1.44	**0.334**	1g	1.6	-
	5270(54)		Front	0	377	**0.00012**	+0.63	n/a (*a)	Plot 2a-5	100	×1.00	11.34	13	×1.47	**0.0002**	1g	1.6	(Patient side)
n (20HT)	5260(52)	MCS0	Right	0	378	**0.211**	+0.63	n/a (*a)	Plot 2a-6	100	×1.00	11.48	13	×1.42	**0.300**	1g	1.6	a > n(20HT)
11a	5260(52)	6		0	378	**0.213**	+0.63	n/a (*a)	Plot 2a-7	100	×1.00	11.48	13	×1.42	**0.302**	1g	1.6	-
	5300(60)			0	378	**0.220**	+0.64	n/a (*a)	Plot 2a-8	100	×1.00	11.27	13	×1.49	**0.328**	1g	1.6	body-worst, W53.
	5320(64)			0	378	**0.223**	+0.66	n/a (*a)	Plot 2a-9	100	×1.00	11.37	13	×1.46	**0.326**	1g	1.6	-
	5180(36)			0	378	**0.270**	+0.64	n/a (*a)	Plot 2a-10	100	×1.00	11.33	13	×1.47	**0.397**	1g	1.6	body-worst, W52. Tested lowest ch additionally.
Step 2b: W52/53 Band (Head-SAR, by head liquid)																		
n (40HT)	5270(54)	MCS0	Right	0	378	**0.247**	+0.17	n/a (*a)	Plot 2b-1	100	×1.00	11.34	13	×1.47	**0.363**	1g	1.6	-
	5310(62)			0	378	**0.255**	+0.28	n/a (*a)	Plot 2b-2	100	×1.00	11.07	13	×1.56	**0.398**	1g	1.6	-
	5230(46)			0	378	**0.262**	+0.18	n/a (*a)	Plot 2b-3	100	×1.00	11.39	13	×1.45	**0.380**	1g	1.6	-
	5190(38)			0	378	**0.313**	+0.22	n/a (*a)	Plot 2b-4	100	×1.00	11.42	13	×1.44	**0.451**	1g	1.6	head-worst,W52.
	5270(54)		Front	0	378	**0.00908**	+0.17	n/a (*a)	Plot 2b-5	100	×1.00	11.34	13	×1.47	**0.013**	1g	1.6	(Patient side)
11a	5260(52)	MCS0	Right	0	377	**0.291**	+0.22	n/a (*a)	Plot 2b-6	100	×1.00	11.48	13	×1.42	**0.413**	1g	1.6	a < n(20HT)
n (20HT)	5260(52)	6		0	377	**0.293**	+0.22	n/a (*a)	Plot 2b-7	100	×1.00	11.48	13	×1.42	**0.416**	1g	1.6	body-worst, W53.
	5300(60)			0	377	**0.239**	+0.23	n/a (*a)	Plot 2b-8	100	×1.00	11.28	13	×1.49	**0.356**	1g	1.6	-
	5320(64)			0	377	**0.241**	+0.29	n/a (*a)	Plot 2b-9	100	×1.00	11.45	13	×1.43	**0.345**	1g	1.6	-
	5180(36)			0	377	**0.290**	+0.22	n/a (*a)	Plot 2b-10	100	×1.00	11.65	13	×1.36	**0.394**	1g	1.6	Tested lowest ch additionally.
Step 2c: W52/53 Band (Hand-SAR, by body liquid)																		
n (40HT)	5270(54)	MCS0	Back	0	377	**0.444**	+0.77	n/a (*a)	Plot 2c-1	100	×1.00	11.34	13	×1.47	**0.653**	10g	4	-
	5310(62)			0	377	**0.420**	+0.80	n/a (*a)	Plot 2c-2	100	×1.00	11.07	13	×1.56	**0.655**	10g	4	-
	5230(46)			0	377	**0.489**	+0.75	n/a (*a)	Plot 2c-3	100	×1.00	11.39	13	×1.45	**0.709**	10g	4	-
	5190(38)			0	377	**0.614**	+0.77	n/a (*a)	Plot 2c-4	100	×1.00	11.42	13	×1.44	**0.884**	10g	4	hand-worst,W52.
11a	5260(52)	6		0	378	**0.415**	+0.77	n/a (*a)	Plot 2c-5	100	×1.00	11.48	13	×1.42	**0.589**	10g	4	a < n(20HT)
n (20HT)	5260(52)	MCS0		0	378	**0.467**	+0.77	n/a (*a)	Plot 2c-6	100	×1.00	11.48	13	×1.42	**0.663**	10g	4	hand-worst,W53.
	5300(60)			0	377	**0.390**	+0.79	n/a (*a)	Plot 2c-7	100	×1.00	11.55	13	×1.49	**0.581**	10g	4	-
	5320(64)			0	378	**0.453**	+0.82	n/a (*a)	Plot 2c-8	100	×1.00	11.45	13	×1.43	**0.648**	10g	4	-
	5180(36)			0	378	**0.578**	+0.77	n/a (*a)	Plot 2c-9	100	×1.00	11.65	13	×1.36	**0.786**	10g	4	Tested lowest ch additionally.
Step 3a: W56 Band (Body-SAR, by body liquid)																		
n (40HT)	5670(134)	MCS0	Right	0	377	**0.275**	+0.62	n/a (*a)	Plot 3a-1	100	×1.00	11.83	13	×1.31	**0.360**	1g	1.6	-
	5590(118)			0	377	**0.328**	+0.60	n/a (*a)	Plot 3a-2	100	×1.00	12.19	13	×1.21	**0.397**	1g	1.6	body-worst,W56.
	5550(110)			0	377	**0.304**	+0.57	n/a (*a)	Plot 3a-3	100	×1.00	12.07	13	×1.24	**0.377**	1g	1.6	-
	5510(102)			0	377	**0.284**	+0.65	n/a (*a)	Plot 3a-4	100	×1.00	11.85	13	×1.30	**0.369**	1g	1.6	-
	5550(110)		Front	0	377	**0.013**	+0.57	n/a (*a)	Plot 3a-5	100	×1.00	12.07	13	×1.24	**0.016**	1g	1.6	(Patient side)
11a	5580(116)	6	Right	0	378	**0.257**	+0.60	n/a (*a)	Plot 3a-6	100	×1.00	12.34	13	×1.16	**0.298**	1g	1.6	a < n(20HT)
n (20HT)	5580(116)	MCS0		0	378	**0.320**	+0.60	n/a (*a)	Plot 3a-7	100	×1.00	12.41	13	×1.15	**0.368**	1g	1.6	-
	5700(140)			0	378	**0.234**	+0.59	n/a (*a)	Plot 3a-8	100	×1.00	11.95	13	×1.27	**0.297**	1g	1.6	-
	5600(120)			0	378	**0.317**	+0.61	n/a (*a)	Plot 3a-9	100	×1.00	12.32	13	×1.17	**0.371**	1g	1.6	-
	5500(100)			0	378	**0.285**	+0.64	n/a (*a)	Plot 3a-10	100	×1.00	12.00	13	×1.26	**0.359**	1g	1.6	-
Step 3b: W56 Band (Head-SAR, by head liquid)																		
n (40HT)	5670(134)	MCS0	Right	0	378	**0.303**	+0.34	n/a (*a)	Plot 3b-1	100	×1.00	11.83	13	×1.31	**0.397**	1g	1.6	-
	5590(118)			0	378	**0.250**	+0.34	n/a (*a)	Plot 3b-2	100	×1.00	12.19	13	×1.21	**0.303**	1g	1.6	-
	5550(110)			0	378	**0.337**	+0.33	n/a (*a)	Plot 3b-3	100	×1.00	12.07	13	×1.24	**0.418**	1g	1.6	-
	5510(102)			0	378	**0.315**	+0.30	n/a (*a)	Plot 3b-4	100	×1.00	11.85	13	×1.30	**0.410**	1g	1.6	-
	5550(110)		Front	0	378	**0.010**	+0.33	n/a (*a)	Plot 3b-5	100	×1.00	12.07	13	×1.24	**0.012**	1g	1.6	(Patient side)
11a	5580(116)	MCS0	Right	0	377	**0.325**	+0.30	n/a (*a)	Plot 3b-6	100	×1.00	12.34	13	×1.16	**0.377**	1g	1.6	a < n(20HT)
n (20HT)	5580(116)	6		0	377	**0.364**	+0.30	n/a (*a)	Plot 3b-7	100	×1.00	12.41	13	×1.15	**0.419**	1g	1.6	head-worst,W56.
	5700(140)			0	377	**0.299**	+0.33	n/a (*a)	Plot 3b-8	100	×1.00	11.95	13	×1.27	**0.380**	1g	1.6	-
	5600(120)			0	377	**0.354**	+0.32	n/a (*a)	Plot 3b-9	100	×1.00	12.32	13	×1.17	**0.414**	1g	1.6	-
	5500(100)			0	377	**0.318**	+0.30	n/a (*a)	Plot 3b-10	100	×1.00	12.00	13	×1.26	**0.401**	1g	1.6	-
Step 3c: W56 Band (Hand-SAR, by body liquid)																		
n (40HT)	5670(134)	MCS0	Back	0	378	**0.567**	+0.86	n/a (*a)	Plot 3c-1	100	×1.00	11.83	13	×1.31	**0.743**	10g	4	-
	5590(118)			0	378	**0.790**	+0.81	n/a (*a)	Plot 3c-2	100	×1.00	12.19	13	×1.21	**0.956**	10g	4	-
	5550(110)			0	378	**0.820**	+0.77	n/a (*a)	Plot 3c-3	100	×1.00	12.07	13	×1.24	**1.017**	10g	4	-
	5510(102)			0	378	**0.782**	+0.86	n/a (*a)	Plot 3c-4	100	×1.00	11.85	13	×1.30	**1.017**	10g	4	-

(cont'd)

7.3 SAR measurement results (5GHz band, SAR for Body/Head/Hand) *(cont'd)*

[Measured and Reported (Scaled) SAR results] ***(cont'd)***

SAR measurement results											Reported SAR [W/kg]								
Mode	Freq. [MHz] (Channel)	Data rate [Mbps]	platform setup: Position	Gap [mm]	Bty. ID	SAR [W/kg] Max. value of multi-peak: Meas.	ΔSAR [%]	ΔSAR corrected	SAR plot # in Appendix 2-2	Duty cycle correction: Duty [%]	Duty scaled	Output average power correction: Meas. [dBm].	Max. [dBm]	Tune-up factor	SAR Corrected (Scaled) (*b)	SAR type (1g /10g)	SAR limit	Remarks
Step 3c: W56 Band (Hand-SAR, by body liquid) ***(cont'd)***																		
n (20HT)	5580(116)	MCS0	Back	0	377	**0.837**	+0.81	n/a (*a)	Plot 3c-5	100	×1.00	12.41	13	×1.15	**0.963**	10g	4	a > n(20HT)
11a	5580(116)	6		0	377	**0.834**	+0.81	n/a (*a)	Plot 3c-6	100	×1.00	12.34	13	×1.16	**0.967**	10g	4	-
	5500(100)			0	378	**0.792**	+0.84	n/a (*a)	Plot 3c-7	100	×1.00	11.90	13	×1.29	**1.022**	10g	4	hand-worst,W56.
	5700(140)			0	378	**0.548**	+0.83	n/a (*a)	Plot 3c-8	100	×1.00	11.70	13	×1.35	**0.740**	10g	4	-
	5600(120)			0	378	**0.761**	+0.84	n/a (*a)	Plot 3c-9	100	×1.00	12.16	13	×1.21	**0.921**	10g	4	-
Step 4a: W58 Band (Body-SAR, by body liquid)																		
n (40HT)	5755(151)	MCS0	Right	0	377	**0.204**	+0.61	n/a (*a)	Plot 4a-1	100	×1.00	11.86	13	×1.30	**0.265**	1g	1.6	-
	5795(159)			0	377	**0.193**	+0.59	n/a (*a)	Plot 4a-2	100	×1.00	11.51	13	×1.41	**0.272**	1g	1.6	-
	5755(151)		Front	0	377	**0.00758**	+0.61	n/a (*a)	Plot 4a-3	100	×1.00	11.86	13	×1.30	**0.010**	1g	1.6	(Patient side)
11a	5825(165)	6	Right	0	377	**0.177**	+0.62	n/a (*a)	Plot 4a-4	100	×1.00	11.89	13	×1.29	**0.228**	1g	1.6	a < n(20HT)
n (20HT)	5825(165)	MCS0		0	377	**0.184**	+0.62	n/a (*a)	Plot 4a-5	100	×1.00	12.00	13	×1.26	**0.232**	1g	1.6	-
	5785(157)			0	378	**0.174**	+0.59	n/a (*a)	Plot 4a-6	100	×1.00	11.56	13	×1.39	**0.242**	1g	1.6	-
	5745(149)			0	378	**0.218**	+0.61	n/a (*a)	Plot 4a-7	100	×1.00	11.85	13	×1.30	**0.283**	1g	1.6	body-worst,W58.(5GHz)
Step 4b: W58 Band (Head-SAR, by head liquid)																		
n (40HT)	5755(151)	MCS0	Right	0	378	**0.189**	+0.44	n/a (*a)	Plot 4b-1	100	×1.00	11.86	13	×1.30	**0.246**	1g	1.6	-
	5795(159)			0	378	**0.225**	+0.47	n/a (*a)	Plot 4b-2	100	×1.00	11.51	13	×1.41	**0.317**	1g	1.6	-
	5755(151)		Front	0	378	**0.00284**	+0.44	n/a (*a)	Plot 4b-3	100	×1.00	11.86	13	×1.30	**0.004**	1g	1.6	(Patient side)
n (20HT)	5825(165)	6		0	377	**0.216**	+0.47	n/a (*a)	Plot 4b-4	100	×1.00	12.00	13	×1.26	**0.272**	1g	1.6	a > n(20HT)
11a	5825(165)	MCS0		0	377	**0.215**	+0.47	n/a (*a)	Plot 4b-5	100	×1.00	11.89	13	×1.29	**0.277**	1g	1.6	-
	5785(157)			0	377	**0.208**	+0.41	n/a (*a)	Plot 4b-6	100	×1.00	11.59	13	×1.38	**0.287**	1g	1.6	-
	5745(149)			0	377	**0.252**	+0.44	n/a (*a)	Plot 4b-7	100	×1.00	11.75	13	×1.33	**0.335**	1g	1.6	head-worst,W58.(5GHz)
Step 4c: W58 Band (Hand-SAR, by body liquid)																		
n (40HT)	5755(151)	MCS0	Back	0	378	**0.513**	+0.86	n/a (*a)	Plot 4c-1	100	×1.00	11.86	13	×1.30	**0.667**	10g	4	-
	5795(159)			0	378	**0.522**	+0.85	n/a (*a)	Plot 4c-2	100	×1.00	11.51	13	×1.41	**0.736**	10g	4	-
n (20HT)	5825(165)	MCS0		0	377	**0.657**	+0.90	n/a (*a)	Plot 4c-3	100	×1.00	12.00	13	×1.26	**0.828**	10g	4	a > n(20HT)
11a	5825(165)	6		0	377	**0.656**	+0.90	n/a (*a)	Plot 4c-4	100	×1.00	11.89	13	×1.29	**0.846**	10g	4	hand-worst,W58.
	5785(157)			0	377	**0.525**	+0.85	n/a (*a)	Plot 4c-5	100	×1.00	11.59	13	×1.38	**0.725**	10g	4	-
	5745(149)			0	377	**0.525**	+0.87	n/a (*a)	Plot 4c-6	100	×1.00	11.75	13	×1.33	**0.698**	10g	4	-

Notes:

. Gap: It is the separation distance between the platform outer surface and the bottom outer surface of phantom; Freq.: Frequency; Max.: Maximum; Meas.: Measured value; n/a: not applied; Bty.ID: Battery ID (. Battery ID No.377 and 378 are same. Refer to Appendix 1 for more detail.)

*. During test, the platform was operated with full charged battery.

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

Liquid	SAR test frequency [MHz]	Probe calibration frequency [MHz]	Validity	Conversion factor	Uncertainty
Body	5180, 5190, 5230, 5260, 5270, 5300, 5310, 5320	5250	within ±110 MHz of calibration frequency	4.30	±13.1 %
	5500, 5510, 5550, 5580, 5590, 5600, 5670, 5700	5600	within ±110 MHz of calibration frequency	3.52	±13.1 %
	5745, 5755, 5785, 5795, 5825	5750	within ±110 MHz of calibration frequency	3.74	±13.1 %
Head	5180, 5190, 5230, 5260, 5270, 5300, 5310, 5320	5250	within ±110 MHz of calibration frequency	4.67	±13.1 %
	5500, 5510, 5550, 5580, 5590, 5600, 5670, 5700	5600	within ±110 MHz of calibration frequency	4.17	±13.1 %
	5745, 5755, 5785, 5795, 5825	5800	within ±110 MHz of calibration frequency	4.10	±13.1 %

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

*a. Since the calculated ΔSAR values of the tested liquid had shown positive correction, the measured SAR was not converted by ΔSAR correction.
Calculating formula: ΔSAR corrected SAR (W/kg) = (Meas. SAR (W/kg)) × (100 - (ΔSAR(%)) / 100

*b. Calculating formula: Reported SAR (W/kg) = (Measured SAR (W/kg)) × (Duty scaled) × (Tune-up factor)
Duty scaled = 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))

(Clause 5: SAR TEST PROCEDURE for 5GHz OFDM band, in KDB248227 D01 (v02r02))

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).

2) When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.

3) For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

***. Result of hand SAR was judged after "0.4 W/kg" in the document above-mentioned was changed for "1 W/kg", "0.8 W/kg" in the document above-mentioned was changed for "2 W/kg" and "1.2 W/kg" in the document above-mentioned was changed for "3 W/kg".**