SAR TEST REPORT

Test Report No.: 11834856S-A-R1

Applicant : **OLYMPUS CORPORATION**

Type of Equipment : **Wireless LAN/Bluetooth Module**

Model No. : **S080WIFI-PCA** (*. Installed into the specified platform: DIGITAL VOICE RECORDER)

FCC ID : **YSKW80**

Test Standard : **FCC 47CFR §2.1093**

Test Result : **Complied**

Highest Reported SAR(1g) [W/kg]				Platform			Remarks (DTS band)				Remarks (UNII band)			
DTS band	U-NII band (-1,-2A,-2C,-3)	SAR type	SAR Limit	No.	Type	Model	Frequency [MHz]	Mode	Output power (average) [dBm]		Frequency [MHz]	Mode	Output power (average) [dBm]	
									Measured	Max.			Measured	Max
0.59	**0.54**	**Body-worn**	**1.6**	1	DIGITAL VOICE RECORDER	DS-9500	2412	11g (6Mbps)	12.48	12.5	5700	11a (6Mbps)	7.70	9

*. **Highest reported SAR (1g) across all exposure conditions and on this platform = " 0.59 W/kg (body-worn)."**
*. Since highest reported SAR (1g) on a platform of S080WIFI-PCA (EUT) which obtained in accordance with KDB447498 (v06) was kept under 0.8 W/kg, this EUT was approved to operate multi-platform (which were tested in above.).

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8. This report is a revised version of 11834856S-A. 11834856S-A is replaced with this report.

Date of test: January 24~26, 2018

Test engineer: H. Naka
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Toyokazu Imamura
Leader, Consumer Technology Division

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☒ There is no testing item of "Non-accreditation".

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RTL02610

REVISION HISTORY

Revision	Test report No.	Date	Page revised	Contents
Original	11834856S-A	February 6, 2018	-	-
1	11834856S-A-R1	March 2, 2018	3,7	Correction of typo

*. 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	OLYMPUS CORPORATION
Address	2951 Ishikawa-machi, Hachioji-shi, Tokyo 192-8507, Japan
Telephone Number	81-42-642-2283
Contact Person	Kazuma Tajiri

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT and platform

	EUT	Platform
Type of Equipment	Wireless LAN/Bluetooth Module	DIGITAL VOICE RECORDER
Model Number	S080WIFI-PCA	DS-9500
Serial Number	No. 2 (Bluetooth), No.6 (Wi-Fi)	PP1-1-05(Bluetooth), PP1-1-44 (Wi-Fi)
Condition of EUT	Production prototype	Production prototype
	(*. Not for sale: These samples are equivalent to mass-produced items.)	
Receipt Date of Sample	September 7, 2017 (*. EUT for power measurement.) *. No modification by the test Lab. January 22, 2018 (*. EUT for SAR test.) *. No modification by the test Lab. *.After power measurement, the EUT was returned to a customer to install into a platform.	
Rating	DC3.35V~ DC4.2V	DC3.6V (Li-ion battery)
	*. The EUT is installed into the specified the platform that was operated by the re-chargeable Li-ion battery.	
Country of Mass-production	Vietnam	Vietnam
Category Identified	Portable device (*. Since EUT may contact and/or very close to a human body during Wi-Fi or Bluetooth operation, the partial-body SAR (1g) shall be observed.)	
Feature of EUT	Model: S080WIFI-PCA (referred to as the EUT in this report) is a Wireless LAN/Bluetooth Module which installs into the specified platform.	
SAR Accessory	None	

2.2 Product Description (Wireless LAN/Bluetooth Module)

Equipment type		Transceiver
Frequency of operation	Bluetooth	2.4GHz band: (2402~2480) MHz (BDR (Basic Data Rate), EDR (Enhanced Data Rate), LE (Low Energy mode))
	Wi-Fi	2.4GHz band: (2412~2462) MHz (b, g, n20); U-NII-1: (5180~5240) MHz (a, n20, ac20) / (5190, 5230) MHz (n40, ac40) / 5210 MHz (ac80); U-NII-2A: (5260~5320) MHz (a, n20, ac20) / (5270, 5310) MHz (n40, ac40) / 5290 MHz (ac80); U-NII-2C: (5500~5580, 5660~5700) MHz (a, n20, ac20) / (5510, 5550, 5670) MHz (n40), ac40) / 5530 MHz (ac80); U-NII-3: (5745~5825) MHz (a, n20, ac20) / (5755, 5795) MHz (n40, ac40) / 5775 MHz (ac80);
Channel spacing	Bluetooth	1MHz (BDR, EDR), 2MHz (LE)
	Wi-Fi	5 MHz (2.4GHz band), 20 MHz (U-NII-1, U-NII- 2A, U-NII-2C, U-NII-3)
Bandwidth	Bluetooth	79MHz
	Wi-Fi	20 MHz (b, g, a, n20, ac20), 40 MHz (n40, ac40), 80 MHz (ac80)
Type of modulation	Bluetooth	FHSS: GFSK (*. EDR: GFSK+ π/4-DQPSK, GFSK+ 8DPSK)
	Wi-Fi	DSSS: DBPSK, DQPSK, CCK (b); OFDM: BPSK, QPSK, 16QAM, 64QAM, 256QAM (*.256QAM is only for ac80) (g, a, n20, ac20, n40, ac40, ac80)

Typical and maximum transmit power (*. The measured output power (conducted) refers to section 6 in this report.)			2.4GHz		U-NII-1		U-NII-2A		U-NII-2C		U-NII-3	
	Mode	Data rate	Typical	Max.	Typical	Max.	Typical	Max.	Typical	Max.	Typical	Max.
	BDR	1Mbps	N/A	8.3 dBm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	EDR	1Mbps	N/A	4.1 dBm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	LE	2Mbps	N/A	7.5 dBm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	b	1~11Mbps	10 dBm	12.5 dBm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	g	6~54Mbps	10 dBm	12.5 dBm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	a	6~54Mbps	N/A	N/A	8 dBm	10 dBm	8 dBm	10 dBm	7 dBm	9 dBm	7 dBm	9 dBm
	n20	MCS0~7	10 dBm	12.5 dBm	8 dBm	10 dBm	8 dBm	10 dBm	7 dBm	9 dBm	7 dBm	9 dBm
	ac20	MCS0~8	N/A	N/A	8 dBm	10 dBm	8 dBm	10 dBm	7 dBm	9 dBm	7 dBm	9 dBm
	n40	MCS0~7	N/A	N/A	8 dBm	10 dBm	8 dBm	10 dBm	7 dBm	9 dBm	7 dBm	9 dBm
	ac40	MCS0~9	N/A	N/A	8 dBm	10 dBm	8 dBm	10 dBm	7 dBm	9 dBm	7 dBm	9 dBm
	ac80	MCS0~9	N/A	N/A	8 dBm	10 dBm	8 dBm	10 dBm	7 dBm	9 dBm	7 dBm	9 dBm

Power rating	DC 3.35V~ DC 4.2V				
Quantity of Antenna	1 piece	Antenna type	Invert L	Antenna connector type	Not applicable (printed)
Antenna gain (peak)	-2.9 dBi (2.4GHz band), 1.3 dBi (5GHz band)				

*. b: IEEE 802.11b, g: IEEE 802.11g, a: IEEE 802.11a, n20: IEEE 802.11n(20HT), n40: IEEE 802.11n(40HT), ac20: IEEE 802.11ac(20VHT), ac40: IEEE 802.11n(40VHT), ac80: IEEE 802.11ac(80VHT)

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

*. Wi-Fi and Bluetooth were not transmitted simultaneously. Therefore simultaneously transmitted SAR was not considered.

SECTION 3: Test specification, procedures and results

3.1 Test specification

FCC47CFR 2.1093: Radiofrequency radiation exposure evaluation: portable devices.

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

3.3 Procedures and Results

Test Procedure	SAR measurement; KDB 447498, KDB 248227, KDB 865664, IEEE Std.1528					
Category	FCC 47CFR §2.1093 (Portable device)			SAR type	Body touch	
Band (Operation frequency [MHz])	**Bluetooth** (2402-2480)	**Wi-Fi (DTS)** (2412-2462)	**Wi-Fi (U-NII-1)** (5180~5240)	**Wi-Fi (U-NII-2A)** (5260~5320)	**Wi-Fi (U-NII-2C)** (5500~5700)	**Wi-Fi (U-NII-3)** (5745~5825)
Results (Reported SAR(1g))	**Complied**	**Complied**	**Complied**	**Complied**	**Complied**	**Complied**
SAR (1g) Limit [W/kg]	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**
Reported SAR(1g) value	**0.24 W/kg**	**0.59 W/kg**	**0.39 W/kg**	**0.37 W/kg**	**0.54 W/kg**	**0.47 W/kg**
Measured SAR value	0.137 W/kg	0.547 W/kg	0.276 W/kg	0.261 W/kg	0.375 W/kg	0.329 W/kg
Mode, frequency[MHz]	BDR(DH5), 2402	g(6Mbps), 2412	a(6Mbps), 5180	a(6Mbps), 5260	a(6Mbps), 5700	a(6Mbps), 5825
Duty cycle [%] (scaled factor)	78.1 (×1.28)	93.7 (×1.07)	93.5 (×1.07)	93.5 (×1.07)	93.5 (×1.07)	93.5 (×1.07)
Output average power [dBm] (max. power, scaled factor)	7.04 (8.3, ×1.34)	12.48 (12.5, ×1.00)	8.81 (10, ×1.32)	8.84 (10, ×1.31)	7.70 (9, ×1.35)	7.80 (9, ×1.32)

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, %)

3.4 Test Location

UL Japan, Inc., Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number: +81 463 50 6400 / Facsimile number: +81 463 50 6401
JAB Accreditation No. RTL02610
FCC Test Firm Registration Number: 839876

*. Refers to next page for the test room which was used.

Used?	Place	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
☐	No.1 Semi-anechoic chamber	2973D-1	20.6 × 11.3 × 7.65	20.6 × 11.3	10 m
☐	No.2 Semi-anechoic chamber	2973D-2	20.6 × 11.3 × 7.65	20.6 × 11.3	10 m
☐	No.3 Semi-anechoic chamber	2973D-3	12.7 × 7.7 × 5.35	12.7 × 7.7	5 m
☐	No.4 Semi-anechoic chamber	-	8.1 × 5.1 × 3.55	8.1 × 5.1	-
☐	No.1 Shielded room	-	6.8 × 4.1 × 2.7	6.8 × 4.1	-
☐	No.2 Shielded room	-	6.8 × 4.1 × 2.7	6.8 × 4.1	-
☐	No.3 Shielded room	-	6.3 × 4.7 × 2.7	6.3 × 4.7	-
☐	No.4 Shielded room	-	4.4 × 4.7 × 2.7	4.4 × 4.7	-
☐	No.5 Shielded room	-	7.8 × 6.4 × 2.7	7.8 × 6.4	-
☐	No.6 Shielded room	-	7.8 × 6.4 × 2.7	7.8 × 6.4	-
☒	No.7 Shielded room	-	2.76 × 3.76 × 2.4	2.76 × 3.76	-
☐	No.8 Shielded room	-	3.45 × 5.5 × 2.4	3.45 × 5.5	-
☐	No.1 Measurement room	-	2.55 × 4.1 × 2.5	2.55 × 4.1	-

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 (v06))

Step.1 Data rate check (*. The power measurement was applied to the following data rate in each operation mode.**)**

802.11b		802.11g		802.11a		802.11n(HT20)			802.11n(HT40)		
Modulation	Data rate	Modulation	Data rate	Modulation	Data rate	MCS	SS	Modulation	MCS	SS	Modulation
DBPSK/DSSS	1 Mbps	BPSK/OFDM	6 Mbps	BPSK/OFDM	6 Mbps	0	1	BPSK/OFDM	0	1	BPSK/OFDM
DQPSK/DSSS	2 Mbps	BPSK/OFDM	9 Mbps	BPSK/OFDM	9 Mbps	1	1	QPSK/OFDM	1	1	QPSK/OFDM
CCK/DSSS	5.5 Mbps	QPSK/OFDM	12 Mbps	QPSK/OFDM	12 Mbps	2	1	QPSK/OFDM	2	1	QPSK/OFDM
CCK/DSSS	11 Mbps	QPSK/OFDM	18 Mbps	QPSK/OFDM	18 Mbps	3	1	16QAM/OFDM	3	1	16QAM/OFDM
		16QAM/OFDM	24 Mbps	16QAM/OFDM	24 Mbps	4	1	16QAM/OFDM	4	1	16QAM/OFDM
		16QAM/OFDM	36 Mbps	16QAM/OFDM	36 Mbps	5	1	64QAM/OFDM	5	1	64QAM/OFDM
		64QAM/OFDM	48 Mbps	64QAM/OFDM	48 Mbps	6	1	64QAM/OFDM	6	1	64QAM/OFDM
		64QAM/OFDM	54 Mbps	64QAM/OFDM	54 Mbps	7	1	64QAM/OFDM	7	1	64QAM/OFDM

802.11ac(VHT20)			802.11ac(VHT40)			802.11ac(VHT80)			Bluetooth		
MCS	SS	Modulation	MCS	SS	Modulation	MCS	SS	Modulation	Type	Modulation	Packet type
0	1	BPSK/OFDM	0	1	BPSK/OFDM	0	1	BPSK/OFDM	BLE	GFSK/FHSS	BLE (1Mbps)
1	1	QPSK/OFDM	1	1	QPSK/OFDM	1	1	QPSK/OFDM	BDR	GFSK/FHSS	DH1 (1Mbps)
2	1	QPSK/OFDM	2	1	QPSK/OFDM	2	1	QPSK/OFDM	BDR	GFSK/FHSS	DH3 (1Mbps)
3	1	16QAM/OFDM	3	1	16QAM/OFDM	3	1	16QAM/OFDM	BDR	GFSK/FHSS	DH5 (1Mbps)
4	1	16QAM/OFDM	4	1	16QAM/OFDM	4	1	16QAM/OFDM	EDR2	π/4-DQPSK/FHSS	2-DH1 (2Mbps)
5	1	64QAM/OFDM	5	1	64QAM/OFDM	5	1	64QAM/OFDM	EDR2	π/4-DQPSK/FHSS	2-DH3 (2Mbps)
6	1	64QAM/OFDM	6	1	64QAM/OFDM	6	1	64QAM/OFDM	EDR2	π/4-DQPSK/FHSS	2-DH5 (2Mbps)
7	1	64QAM/OFDM	7	1	64QAM/OFDM	7	1	64QAM/OFDM	EDR3	8DPSK/FSSS	3-DH1 (3Mbps)
8	1	256QAM/OFDM	8	1	256QAM/OFDM	8	1	256QAM/OFDM	EDR3	8DPSK/FSSS	3-DH3 (3Mbps)
*. SS: Spatial Stream			9	1	256QAM/OFDM	9	1	256QAM/OFDM	EDR3	8DPSK/FSSS	3-DH5 (3Mbps)

Step.2 Consideration of SAR test channel

For the SAR test reference, on each operation band, the average output power was measured on the low/middle/upper and specified channels with the worst data rate condition.

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

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]	SAR Tested /Reduced (*1)	SAR type
Back	The back surface of DIGITAL VOICE RECORDER is touched to the Flat phantom.	**3.21**	**Tested**	Body-touch
Left	The left surface of DIGITAL VOICE RECORDER is touched to the Flat phantom.	**5.5**	**Tested**	
Front	The front surface of DIGITAL VOICE RECORDER is touched to the Flat phantom.	**14.5**	**Tested**	
Right	The right surface (switch side) of DIGITAL VOICE RECORDER is touched to the Flat phantom.	**44.8**	**Tested**	
Top	The top surface of DIGITAL VOICE RECORDER is touched to the Flat phantom.	**45.7**	**Tested**	
Bottom	The bottom surface of DIGITAL VOICE RECORDER is touched to the Flat phantom.	**68.1**	**Tested**	

*. **D:** Antenna separation distance. It is the distance from the antenna to the outer surface of platform which an operator may touch.
*. Size of EUT: 10 mm (width) × 29.5 mm (height) × 2.8 mm (thickness)
*. Size of platform (DIGITAL VOICE RECORDER): 54.8 mm (width) × 122.8 mm (height) × 18.6 mm (depth)

***1. Consideration for SAR evaluation exemption**
SAR test exclusion considerations according to KDB447498 D01
The following is based on KDB447498D01.

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(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 (2)
[SAR(1g) test exclusion thresholds, mW] = 3 × 50 / SQRT(2.462) = 96mW, where test separation distance=50mm
1. The upper frequency of the frequency band was used in order to calculate standalone SAR test exclusion considerations.
2. Power and distance are rounded to the nearest mW and mm before calculation
3. The result is rounded to one decimal place for comparison
4. The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.
5. "N/A" displayed on below exclusion calculation means not applicable this formula since distance between antenna and surface is > 50 mm.

When the calculated threshold value by a numerical formula above-mentioned in the following table is 3.0 or less, SAR test can be excluded.

[SAR exclusion calculations for antenna ≤50mm from the user.]

Band	Tx mode	Upper frequency [MHz]	Maximum output power		Calculated threshold value						
					Setup	Back	Left	Front	Right	Top	Bottom
			[dBm]	[mW]	D[mm]	≤5(3.21)	6	15	45	46	68
2.4GHz	BDR	2480	8.3	7	Judge	2.2, Reduce	1.8, Reduce	0.7, Reduce	0.2, Reduce	0.2, Reduce	N/A
2.4GHz	b,g,n20	2462	12.5	18	Judge	5.6, Measure	4.7, Measure	1.9, Reduce	0.6, Reduce	0.6, Reduce	N/A
U-NII-1	a,n20/40,ac20/40/80	5240	10	10	Judge	4.6, Measure	3.8, Measure	1.5, Reduce	0.5, Reduce	0.5, Reduce	N/A
U-NII-2A	a,n20/40,ac20/40/80	5320	10	10	Judge	4.6, Measure	3.8, Measure	1.5, Reduce	0.5, Reduce	0.5, Reduce	N/A
U-NII-2C	a,n20/40,ac20/40/80	5700	9	8	Judge	3.8, Measure	3.2, Measure	1.3, Reduce	0.4, Reduce	0.4, Reduce	N/A
U-NII-3	a,n20/40,ac20/40/80	5825	9	8	Judge	3.9, Measure	3.2, Measure	1.3, Reduce	0.4, Reduce	0.4, Reduce	N/A

2) At 1500 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following,
[test exclusion thresholds, mW] = [(Power allowed at numeric threshold for 50mm in formula (1))] + [(test separation distance, mm) - (50mm)] × 10 · formula (3)
1. The upper frequency of the frequency band was used in order to calculate standalone SAR test exclusion considerations.
2. Power and distance are rounded to the nearest mW and mm before calculation
3. "N/A" displayed on below exclusion calculation means not applicable this formula since distance between antenna and surface is ≤ 50 mm.

When output power is less than the calculated threshold value by a numerical formula above-mentioned in the following table, SAR test is excluded.

[SAR exclusion calculations for antenna > 50mm from the user.]

Band	Tx mode	Upper frequency [MHz]	Maximum output power		Calculated threshold value						
					Setup	Back	Left	Front	Right	Top	Bottom
			[dBm]	[mW]	D[mm]	≤5(3.21)	6	15	45	46	68
2.4GHz	BDR	2480	8.3	7	Judge	N/A	N/A	N/A	N/A	N/A	275mW, Reduce
2.4GHz	b,g,n20	2462	12.5	18	Judge	N/A	N/A	N/A	N/A	N/A	276mW, Reduce
U-NII-1	a,n20/40,ac20/40/80	5240	10	10	Judge	N/A	N/A	N/A	N/A	N/A	246mW, Reduce
U-NII-2A	a,n20/40,ac20/40/80	5320	10	10	Judge	N/A	N/A	N/A	N/A	N/A	245mW, Reduce
U-NII-2C	a,n20/40,ac20/40/80	5700	9	8	Judge	N/A	N/A	N/A	N/A	N/A	243mW, Reduce
U-NII-3	a,n20/40,ac20/40/80	5825	9	8	Judge	N/A	N/A	N/A	N/A	N/A	231mW, Reduce

*. b: IEEE 802.11b, g: IEEE 802.11g, a: IEEE 802.11a, n20: IEEE 802.11n(20HT), n40: IEEE 802.11n(40HT), ac20: IEEE 802.11ac(20VHT), ac40: IEEE 802.11n(40VHT), ac80: IEEE 802.11ac(80VHT)

<Conclusion for consideration for SAR test reduction>

1) The all SAR setups of Wi-Fi operation are applied the SAR test in body-liquid, because the platform is small size device.
2) The SAR test of the head-touch was reduced, because this platform was not touch a human head in normal operation.
3) For Bluetooth operation, the SAR test was only applied to the worst SAR setup of Wi-Fi operation, because the measured SAR of Wi-Fi operation was enough small and the Bluetooth power was more than 2dB lower than Wi-Fi power.

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 search by DSSS mode with a highest measurement output power channel. Add test for OFDM mode, if it's necessary.
Step 2 ~Step 4	On U-NII-2A, band, in body liquid, worst SAR search by largest channel bandwidth mode with a highest measurement output power channel. Add test for other bandwidth mode, if it's necessary. Repeat same test procedure in above for U-NII-2C band (step 3) and U-NII-3 band (step 4).

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

SECTION 4: Operation of EUT during testing

4.1 Operation mode for SAR testing

The EUT has Bluetooth (BDR, EDR, Low energy) and IEEE 802.11b, g, a, n(20HT), n(40HT), ac(20VHT), ac(40VHT) and ac(80VHT) continuous transmitting modes. The frequency and the modulation used in the SAR testing are shown as a following.

Operation mode	BDR	EDR	LE	b		g	n20	a	n20	ac20	n40	ac40	ac80	a	n20	ac20	n40	ac40	ac80
band	Bluetooth			2.4GHz band				U-NII-1						U-NII-2A					
Tx band [MHz]	2402~2480			2412~2462				5180~5240			5190, 5230		5210	5260~5320			5270, 5310		5290
Bandwidth [MHz]	1	1	2	20		20	20	20	20	20	40	40	80	20	20	20	40	40	80
Max.power [dBm]	8.3	4.1	7.5	12.5		12.5	12.5	10	10	10	10	10	10	10	10	10	10	10	10
Modulation	FHSS	FHSS	FHSS	DSSS		OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM
D/R [Mbps]	1	2~3-	1	1	5.5	6	MCS0	6	MCS0	MCS0	MCS0	MCS0	MCS0	6	MCS0	MCS0	MCS0	MCS0	MCS0
Frequency tested [MHz]	2402	n/a	n/a	2412	2412, 2437, 2462	2412, 2437, 2462	2412	5180	n/a (*1)	n/a (*1)	5190	n/a (*1)	5210	5260, 5300, 5320	n/a (*1)	n/a (*1)	5270, 5310	n/a (*1)	5290

Operation mode	a	n20	ac20	n40	ac40	ac80	a	n20	ac20	n40	ac40	ac80
band	U-NII-2C						U-NII-3					
Tx band [MHz]	5500~5580, 5660~5700			5510,5550,5670		5530	5745~5825			5755, 5795		5775
Bandwidth [MHz]	20	20	20	40	40	80	20	20	20	40	40	80
Max.power [dBm]	9	9	9	9	9	9	9	9	9	9	9	9
Modulation	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM	OFDM
D/R [Mbps]	6	MCS0	MCS0	MCS0	MCS0	MCS0	6	MCS0	MCS0	MCS0	MCS0	MCS0
Frequency tested [MHz]	5500,5580, 5700	n/a (*1)	n/a (*1)	5510, 5550, 5670	n/a (*1)	5530	5745,5785, 5825	n/a (*1)	n/a (*1)	5755, 5795	n/a (*1)	5775

Controlled software	Bluetooth operation: CYW20704 <CYPRESS> by Blue Tool (v1.9.3). Wi-Fi operation: BCM4339 <BROADCOM> by Tera-Term (v4.8.3). DS-9500 firmware: Version 0.800

*. D/R: Data rate, n/a: SAR test was not applied.
*. b: IEEE 802.11b, g: IEEE 802.11g, a: IEEE 802.11a, n20: IEEE 802.11n(20HT), n40: IEEE 802.11n(40HT), ac20: IEEE 802.11ac(20VHT), ac40: IEEE 802.11n(40VHT), ac80: IEEE 802.11ac(80VHT)
*1. On 5GHz band, in each bandwidth (BW20MHz, BW40MHz, BW80MHz), the SAR test was applied to the operation mode which had the lowest data rate and had lowest modulation in representative.

SAR test reduction consideration

[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	n20	a	n20	ac20	n40	ac40	ac80
Data rate [Mbps]	1	5.5	6	MCS0	6	MCS0	MCS0	MCS0	MCS0	MCS0
2.4GHz, Ch.	*1/6/11*	*1/6/11*	*1/6/11*	*1/6/11*						
Max. power [mW]	18/18/18	18/18/18	18/18/18	18/18/18						
Measured Ave. [mW]	14/14/12	16/15/15	14/14/12	14/14/12						
Reported SAR 1g	**0.56**(<0.8)	**0.58**/**0.54**/**0.56**	**0.59**/**0.56**/**0.57**	**0.55**(<0.8)						
U-NII-1, Ch.					*36/40/44/48*	*36/40/44/48*	*36/40/44/48*	*38/46*	*38/46*	*42*
Max. power [mW]					10/10/10/10	10/10/10/10	10/10/10/10	10/10	10/10	10
Measured Ave. [mW]					8/8/8/8	7/7/7/7	7/7/7/7	8/8	8/8	8
Reported SAR 1g					**0.39** (<0.8)	n/a (<1.2, U-NII-2A)		**0.36** (<0.8)	n/a (<1.2, U-NII-2A)	**0.34**
U-NII-2A, Ch.					*52/56/60/64*	*52/56/60/64*	*52/56/60/64*	*54/62*	*54/62*	*58*
Max. power [mW]					10/10/10/10	10/10/10/10	10/10/10/10	10/10	10/10	10
Measured Ave. [mW]					8/8/8/8	7/7/7/7	7/7/7/7	8/8	8/8	8
Reported SAR 1g					**0.37**/**0.34**/**0.35**	n/a (<0.8, ac80)		**0.35**/**0.36**	n/a (<0.8, ac80)	**0.35**
U-NII-2C, Ch.					*100/116/140*	*100/116/140*	*100/116/140*	*102/110/134*	*102/110/134*	*106*
Max. power [mW]					8/8/8	8/8/8	8/8/8	8/8/8	8/8/8	8
Measured Ave. [mW]					6/7/6	6/5/6	5/6/6	6/6/6	6/6/6	6
Reported SAR 1g					**0.46**/**0.48**/**0.54**	n/a (<0.8, ac80)		**0.43**/**0.49**/**0.52**	n/a (<0.8, ac80)	**0.45**
U-NII-3, Ch.					*149/157/165*	*149/157/165*	*149/157/165*	*151/159*	*151/159*	*155*
Max. power [mW]					8/8/8	8/8/8	8/8/8	8/8	8/8	10
Measured Ave. [mW]					6/6/6	6/6/6	6/6/6	7/7	7/7	7
Reported SAR 1g					**0.45**/**0.45**/**0.47**	n/a (<0.8, ac80)		**0.45**/**0.41**	n/a (<0.8, ac80)	**0.42**

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 (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 6: Confirmation before testing

6.1 SAR reference power measurement (*. Antenna terminal conducted average power of EUT)

*. Antenna gain (peak): -2.9 dBi (2.4GHz band), 1.3 dBi 5GHz band)

Mode	Frequency		Data rate	Power Setting (software)	Duty cycle	Duty factor	Duty scaled factor	Measurement Result				Power correction			Was power tuning applied?	Remarks
								Burst power		Time average power		Max. power	Δ from max.	Tune-up factor		
	[MHz]	CH	[Mbps]	[-]	[%]	[dB]	[-]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[dB]	[-]		
BLE	2402	0	1	n/a(fix)	64.4	1.78	×1.55	**5.71**	3.72	3.80	2.40	7.5	-1.79	×1.51	n/a (fix)	(*1)
	2440	19		n/a(fix)	64.4	1.78	×1.55	**5.54**	3.58	3.63	2.31	7.5	-1.96	×1.57	n/a (fix)	(*1)
	2480	39		n/a(fix)	64.4	1.78	×1.55	**5.08**	3.22	3.17	2.07	7.5	-2.42	×1.75	n/a (fix)	(*1)
BT, BDR	2402	0	1 (DH5)	n/a(fix)	78.1	1.09	×1.28	**7.04**	5.06	5.97	3.96	8.3	-1.26	×1.34	n/a (fix)	(*1)
	2441	39		n/a(fix)	78.1	1.09	×1.28	**6.61**	4.58	5.54	3.58	8.3	-1.69	×1.48	n/a (fix)	(*1)
	2480	78		n/a(fix)	78.1	1.09	×1.28	**6.10**	4.07	5.03	3.19	8.3	-2.20	×1.66	n/a (fix)	(*1)
BT, EDR	2402	0	2 (2-DH5)	n/a(fix)	78.1	1.10	×1.28	**2.53**	1.79	1.46	1.40	4.1	-1.57	×1.44	n/a (fix)	(*1)
	2441	39		n/a(fix)	78.1	1.10	×1.28	**2.63**	1.83	1.56	1.43	4.1	-1.47	×1.40	n/a (fix)	(*1)
	2480	78		n/a(fix)	78.1	1.10	×1.28	**2.05**	1.60	0.98	1.25	4.1	-2.05	×1.60	n/a (fix)	(*1)
BT, EDR	2402	0	3 (3-DH5)	n/a(fix)	78.2	1.09	×1.28	**2.49**	1.77	1.42	1.39	4.1	-1.61	×1.45	n/a (fix)	(*1)
	2441	39		n/a(fix)	78.2	1.09	×1.28	**2.51**	1.78	1.44	1.39	4.1	-1.59	×1.44	n/a (fix)	(*1)
	2480	78		n/a(fix)	78.2	1.09	×1.28	**2.02**	1.59	0.95	1.24	4.1	-2.08	×1.61	n/a (fix)	(*1)

*1. The measured duty cycle number of BLE, BDR and EDR was nearly equal to highest theory duty cycle.

11b	2412	1	1	11	98.9	0.05	×1.01	**11.54**	14.26	11.49	14.09	12.5	-0.96	×1.25	adjusted	-
	2437	6	1	11	98.9	0.05	×1.01	**11.33**	13.58	11.28	13.43	12.5	-1.17	×1.31	adjusted	-
	2462	11	1	11	98.9	0.05	×1.01	**10.95**	12.45	10.90	12.30	12.5	-1.55	×1.43	adjusted	-
11b	2412	1	5.5	11	94.7	0.24	×1.06	**12.13**	16.33	11.89	15.45	12.5	-0.37	×1.09	adjusted	-
	2437	6	5.5	11	94.7	0.24	×1.06	**11.82**	15.21	11.58	14.39	12.5	-0.68	×1.17	adjusted	-
	2462	11	5.5	11	94.7	0.24	×1.06	**11.66**	14.66	11.42	13.87	12.5	-0.84	×1.21	adjusted	-
11g	2412	1	6	11	93.7	0.28	×1.07	**12.48**	17.70	12.20	16.60	12.5	-0.02	×1.00	adjusted	-
	2437	6	6	11	93.7	0.28	×1.07	**12.34**	17.14	12.06	16.07	12.5	-0.16	×1.04	adjusted	-
	2462	11	6	11	93.7	0.28	×1.07	**12.15**	16.41	11.87	15.38	12.5	-0.35	×1.08	adjusted	-
11n (20HT)	2412	1	MCS0	11	93.1	0.31	×1.07	**12.21**	16.63	11.90	15.49	12.5	-0.29	×1.07	adjusted	-
	2437	6	MCS0	11	93.1	0.31	×1.07	**12.26**	16.83	11.95	15.67	12.5	-0.24	×1.06	adjusted	-
	2462	11	MCS0	11	93.1	0.31	×1.07	**11.93**	15.60	11.62	14.52	12.5	-0.57	×1.14	adjusted	-
11a	5180	36	6	7	93.5	0.29	×1.07	**8.81**	7.60	8.52	7.11	10.0	-1.19	×1.32	adjusted	-
	5200	40	6	7	93.5	0.29	×1.07	**8.82**	7.62	8.53	7.13	10.0	-1.18	×1.31	adjusted	-
	5220	44	6	7	93.5	0.29	×1.07	**8.82**	7.62	8.53	7.13	10.0	-1.18	×1.31	adjusted	-
	5240	48	6	7	93.5	0.29	×1.07	**8.87**	7.71	8.58	7.21	10.0	-1.13	×1.30	adjusted	-
	5260	52	6	7	93.5	0.29	×1.07	**8.84**	7.66	8.55	7.16	10.0	-1.16	×1.31	adjusted	-
	5280	56	6	7	93.5	0.29	×1.07	**9.08**	8.09	8.79	7.57	10.0	-0.92	×1.24	adjusted	-
	5300	60	6	7	93.5	0.29	×1.07	**9.11**	8.15	8.82	7.62	10.0	-0.89	×1.23	adjusted	-
	5320	64	6	7	93.5	0.29	×1.07	**8.92**	7.80	8.63	7.29	10.0	-1.08	×1.28	adjusted	-
	5500	100	6	6	93.5	0.29	×1.07	**7.72**	5.92	7.43	5.53	9.0	-1.28	×1.34	adjusted	-
	5580	116	6	6	93.5	0.29	×1.07	**8.19**	6.59	7.90	6.17	9.0	-0.81	×1.21	adjusted	-
	5700	140	6	6	93.5	0.29	×1.07	**7.70**	5.89	7.41	5.51	9.0	-1.30	×1.35	adjusted	-
	5745	149	6	6	93.5	0.29	×1.07	**7.96**	6.25	7.67	5.85	9.0	-1.04	×1.27	adjusted	-
	5785	157	6	6	93.5	0.29	×1.07	**7.84**	6.08	7.55	5.69	9.0	-1.16	×1.31	adjusted	-
	5825	165	6	6	93.5	0.29	×1.07	**7.80**	6.03	7.51	5.64	9.0	-1.20	×1.32	adjusted	-
11n (20HT)	5180	36	MCS0	7	93.3	0.30	×1.07	**8.49**	7.06	8.19	6.59	10.0	-1.51	×1.42	adjusted	-
	5200	40	MCS0	7	93.3	0.30	×1.07	**8.31**	6.78	8.01	6.32	10.0	-1.69	×1.48	adjusted	-
	5220	44	MCS0	7	93.3	0.30	×1.07	**8.33**	6.81	8.03	6.35	10.0	-1.67	×1.47	adjusted	-
	5240	48	MCS0	7	93.3	0.30	×1.07	**8.53**	7.13	8.23	6.65	10.0	-1.47	×1.40	adjusted	-
	5260	52	MCS0	7	93.3	0.30	×1.07	**8.59**	7.23	8.29	6.75	10.0	-1.41	×1.38	adjusted	-
	5280	56	MCS0	7	93.3	0.30	×1.07	**8.52**	7.11	8.22	6.64	10.0	-1.48	×1.41	adjusted	-
	5300	60	MCS0	7	93.3	0.30	×1.07	**8.56**	7.18	8.26	6.70	10.0	-1.44	×1.39	adjusted	-
	5320	64	MCS0	7	93.3	0.30	×1.07	**8.53**	7.13	8.23	6.65	10.0	-1.47	×1.40	adjusted	-
	5500	100	MCS0	6	93.3	0.30	×1.07	**7.44**	5.55	7.14	5.18	9.0	-1.56	×1.43	adjusted	-
	5580	116	MCS0	6	93.3	0.30	×1.07	**7.29**	5.36	6.99	5.00	9.0	-1.71	×1.48	adjusted	-
	5700	140	MCS0	6	93.3	0.30	×1.07	**7.65**	5.82	7.35	5.43	9.0	-1.35	×1.36	adjusted	-
	5745	149	MCS0	6	93.3	0.30	×1.07	**7.58**	5.73	7.28	5.35	9.0	-1.42	×1.39	adjusted	-
	5785	157	MCS0	6	93.3	0.30	×1.07	**7.54**	5.68	7.24	5.30	9.0	-1.46	×1.40	adjusted	-
	5825	165	MCS0	6	93.3	0.30	×1.07	**7.49**	5.61	7.19	5.24	9.0	-1.51	×1.42	adjusted	-
11ac (20VHT)	5180	36	MCS0	7	93.2	0.31	×1.07	**8.53**	7.13	8.22	6.64	10.0	-1.47	×1.40	adjusted	-
	5200	40	MCS0	7	93.2	0.31	×1.07	**8.47**	7.03	8.16	6.55	10.0	-1.53	×1.42	adjusted	-
	5220	44	MCS0	7	93.2	0.31	×1.07	**8.49**	7.06	8.18	6.58	10.0	-1.51	×1.42	adjusted	-
	5240	48	MCS0	7	93.2	0.31	×1.07	**8.50**	7.08	8.19	6.59	10.0	-1.50	×1.41	adjusted	-
	5260	52	MCS0	7	93.2	0.31	×1.07	**8.55**	7.16	8.24	6.67	10.0	-1.45	×1.40	adjusted	-
	5280	56	MCS0	7	93.2	0.31	×1.07	**8.63**	7.29	8.32	6.79	10.0	-1.37	×1.37	adjusted	-
	5300	60	MCS0	7	93.2	0.31	×1.07	**8.65**	7.33	8.34	6.82	10.0	-1.35	×1.36	adjusted	-
	5320	64	MCS0	7	93.2	0.31	×1.07	**8.60**	7.24	8.29	6.75	10.0	-1.40	×1.38	adjusted	-
	5500	100	MCS0	6	93.2	0.31	×1.07	**7.38**	5.47	7.07	5.09	9.0	-1.62	×1.45	adjusted	-
	5580	116	MCS0	6	93.2	0.31	×1.07	**7.40**	5.50	7.09	5.12	9.0	-1.60	×1.45	adjusted	-
	5700	140	MCS0	6	93.2	0.31	×1.07	**7.64**	5.81	7.33	5.41	9.0	-1.36	×1.37	adjusted	-
	5745	149	MCS0	6	93.2	0.31	×1.07	**7.50**	5.62	7.19	5.24	9.0	-1.50	×1.41	adjusted	-
	5785	157	MCS0	6	93.2	0.31	×1.07	**7.52**	5.65	7.21	5.26	9.0	-1.48	×1.41	adjusted	-
	5825	165	MCS0	6	93.2	0.31	×1.07	**7.46**	5.57	7.15	5.19	9.0	-1.54	×1.43	adjusted	-

(cont'd)

Mode	Frequency		Data rate	Power Setting (software)	Duty cycle	Duty factor	Duty scaled factor	Measurement Result				Power correction			Was power tuning applied?	Remarks
								Burst power		Time average power		Max. power	Δ from max.	Tune-up factor		
	[MHz]	CH	[Mbps]	[-]	[%]	[dB]	[-]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[dB]	[-]		
11n (40HT)	5190	38	MCS0	7	87.4	0.58	×1.14	**8.79**	7.57	8.21	6.62	10	-1.21	×1.32	adjusted	-
	5230	46	MCS0	7	87.4	0.58	×1.14	**8.75**	7.50	8.17	6.56	10	-1.25	×1.33	adjusted	-
	5270	54	MCS0	7	87.4	0.58	×1.14	**8.79**	7.57	8.21	6.62	10	-1.21	×1.32	adjusted	-
	5310	62	MCS0	7	87.4	0.58	×1.14	**8.89**	7.74	8.31	6.78	10	-1.11	×1.29	adjusted	-
	5510	102	MCS0	6	87.4	0.58	×1.14	**7.93**	6.21	7.35	5.43	9	-1.07	×1.28	adjusted	-
	5550	110	MCS0	6	87.4	0.58	×1.14	**8.01**	6.32	7.43	5.53	9	-0.99	×1.26	adjusted	-
	5670	134	MCS0	6	87.4	0.58	×1.14	**7.98**	6.28	7.40	5.50	9	-1.02	×1.26	adjusted	-
	5755	151	MCS0	6	87.4	0.58	×1.14	**8.27**	6.71	7.69	5.87	9	-0.73	×1.18	adjusted	-
	5795	159	MCS0	6	87.4	0.58	×1.14	**8.24**	6.67	7.66	5.83	9	-0.76	×1.19	adjusted	-
11ac (40VHT)	5190	38	MCS0	7	87.4	0.58	×1.14	**8.94**	7.83	8.36	6.85	10	-1.06	×1.28	adjusted	-
	5230	46	MCS0	7	87.4	0.58	×1.14	**8.88**	7.73	8.30	6.76	10	-1.12	×1.29	adjusted	-
	5270	54	MCS0	7	87.4	0.58	×1.14	**8.83**	7.64	8.25	6.68	10	-1.17	×1.31	adjusted	-
	5310	62	MCS0	7	87.4	0.58	×1.14	**8.86**	7.69	8.28	6.73	10	-1.14	×1.30	adjusted	-
	5510	102	MCS0	6	87.4	0.58	×1.14	**8.14**	6.52	7.56	5.70	9	-0.86	×1.22	adjusted	-
	5550	110	MCS0	6	87.4	0.58	×1.14	**8.04**	6.37	7.46	5.57	9	-0.96	×1.25	adjusted	-
	5670	134	MCS0	6	87.4	0.58	×1.14	**8.10**	6.46	7.52	5.65	9	-0.90	×1.23	adjusted	-
	5755	151	MCS0	6	87.4	0.58	×1.14	**8.36**	6.85	7.78	6.00	9	-0.64	×1.16	adjusted	-
	5795	159	MCS0	6	87.4	0.58	×1.14	**8.40**	6.92	7.82	6.05	9	-0.60	×1.15	adjusted	-
11ac (80VHT)	5210	42	MCS0	7	77.3	1.12	×1.29	**8.96**	7.87	7.84	6.08	10	-1.04	×1.27	adjusted	-
	5290	58	MCS0	7	77.3	1.12	×1.29	**8.94**	7.83	7.82	6.05	10	-1.06	×1.28	adjusted	-
	5530	106	MCS0	6	77.3	1.12	×1.29	**8.06**	6.40	6.94	4.94	9	-0.94	×1.24	adjusted	-
	5775	155	MCS0	6	77.3	1.12	×1.29	**8.41**	6.93	7.29	5.36	9	-0.59	×1.15	adjusted	-

*. : SAR test was applied. n/a: not applied; BT: Bluetooth

*. 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) (*.The bold character shows the data rate which has the highest measured power.)																	
11b		11g		11n(20HT)		11a		11n(20HT)		11ac(20VHT)		11n(40HT)		11ac(40VHT)		11ac(80VHT)	
2437MHz		2437MHz		2437MHz		5180MHz		5180MHz		5180MHz		5190MHz		5190MHz		5210MHz	
D/R	Power	D/R	Power	D/R	Power	D/R	Power	D/R	Power	D/R	Power	D/R	Power	D/R	Power	D/R	Power
[Mbps]	**12.5**max	[Mbps]	**12.5**max	[Mbps]	**12.5**max	[Mbps]	**10**max	[Mbps]	**10**max	[Mbps]	**10**max	[Mbps]	**10**max	[Mbps]	**10**max	[Mbps]	**10**max
1	11.28	**6**	**10.39**	**MCS0**	**10.24**	**6**	**8.54**	**MCS0**	**8.19**	**MCS0**	**8.22**	**MCS0**	**8.21**	**MCS0**	**8.36**	**MCS0**	**7.84**
2	11.45	9	10.25	MCS1	9.78	9	8.35	MCS1	7.89	MCS1	7.93	MCS1	7.67	MCS1	7.86	MCS1	6.98
5.5	**11.58**	12	10.08	MCS2	9.51	12	8.23	MCS2	7.62	MCS2	7.67	MCS2	7.25	MCS2	7.26	MCS2	6.47
11	11.18	18	9.81	MCS3	9.33	18	7.86	MCS3	7.49	MCS3	7.37	MCS3	6.84	MCS3	6.94	MCS3	6.01
		24	9.52	MCS4	9.01	24	7.62	MCS4	7.09	MCS4	7.02	MCS4	6.43	MCS4	6.44	MCS4	5.60
		36	9.23	MCS5	8.80	36	7.33	MCS5	6.61	MCS5	6.79	MCS5	5.94	MCS5	6.03	MCS5	5.19
		48	8.80	MCS6	8.73	48	6.85	MCS6	6.44	MCS6	6.61	MCS6	5.78	MCS6	5.79	MCS6	5.08
		56	8.73	MCS7	8.55	56	6.71	MCS7	6.38	MCS7	6.50	MCS7	5.58	MCS7	5.68	MCS7	4.99
										MCS8	6.26			MCS8	5.65	MCS8	4.80
														MCS9	5.25	MCS9	4.73

*. CH: channel, Max: Maximum.

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

*. Date measured: January 17~18, 2018 / Measured by: Hiroshi Naka / Place: preparation room of No. 7 shielded room. ((23~24) deg.C. / (45~55) %RH)

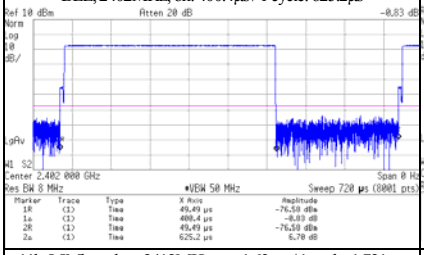
*. Uncertainty of antenna port conducted test; Power measurement uncertainty above 1GHz for this test was: (±) 0.48 dB(Average)/(±) 0.66 dB(Peak).

*. Uncertainty of antenna port conducted test; Duty cycle and time measurement: (±) 0.012 %.

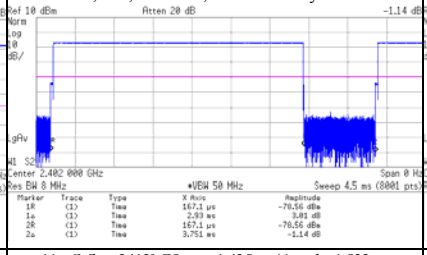
*. Chart of the worst duty cycle for each operation mode. (Refer to next page)

*. Chart of the worst duty cycle for each operation mode.

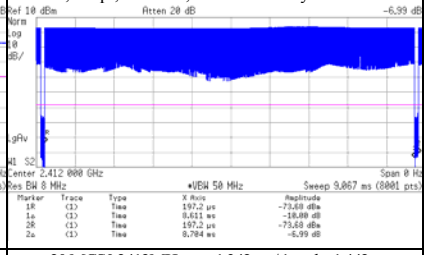
BLE, 2402MHz; on: 400.4µs / 1 cycle: 625.2µs



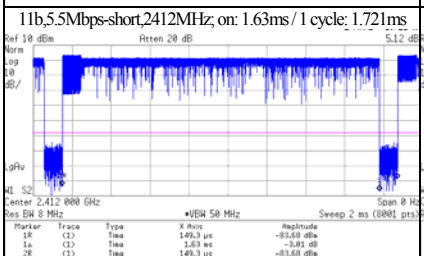
BT-BDR,DH5, 2402MHz; on: 2.93ms / 1 cycle: 3.751ms



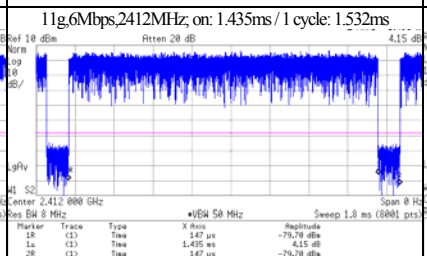
11b,1Mbps,2412MHz; on: 8.611ms / 1 cycle: 8.704ms



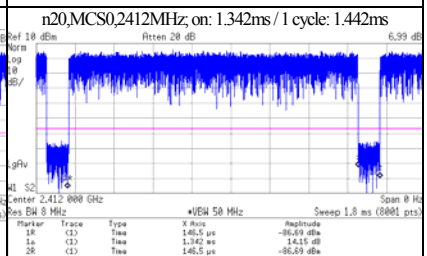
11b,5.5Mbps-short,2412MHz; on: 1.63ms / 1 cycle: 1.721ms



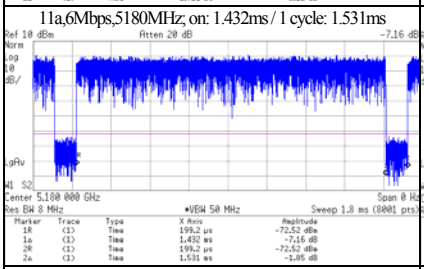
11g,6Mbps,2412MHz; on: 1.435ms / 1 cycle: 1.532ms



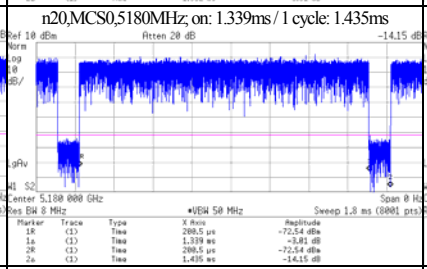
n20,MCS0,2412MHz; on: 1.342ms / 1 cycle: 1.442ms



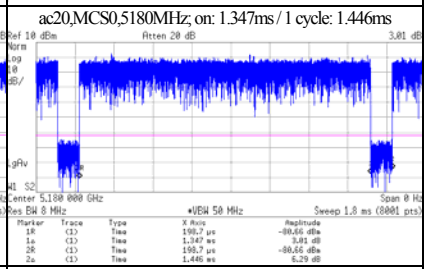
11a,6Mbps,5180MHz; on: 1.432ms / 1 cycle: 1.531ms



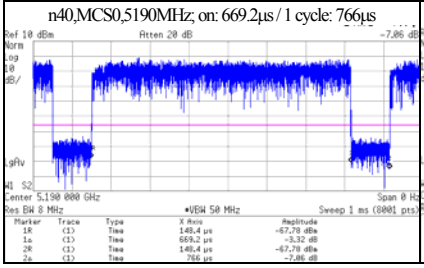
n20,MCS0,5180MHz; on: 1.339ms / 1 cycle: 1.435ms



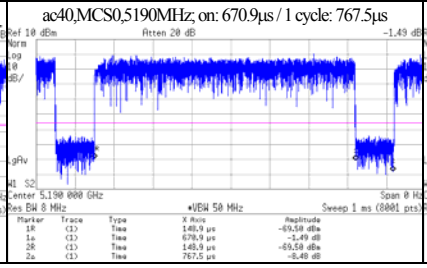
ac20,MCS0,5180MHz; on: 1.347ms / 1 cycle: 1.446ms



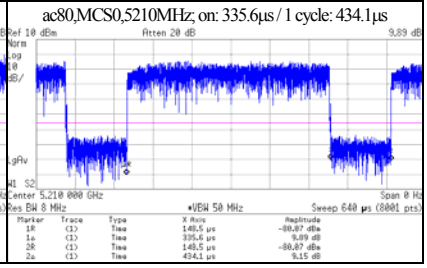
n40,MCS0,5190MHz; on: 669.2µs / 1 cycle: 766µs



ac40,MCS0,5190MHz; on: 670.9µs / 1 cycle: 767.5µs



ac80,MCS0,5210MHz; on: 335.6µs / 1 cycle: 434.1µs



SECTION 7: SAR Measurement results

Measurement date: January 24~26, 2018 Measurement by: Hiroshi Naka

7.1 Liquid parameters

[Liquid measurement]

Frequency [MHz] (Channel)	Liquid type	Liquid parameters (*a)								Temp. [deg.C.]	Depth [mm]	ΔSAR Coefficients(*b)		Date measured
		Permittivity (εr) [-]				Conductivity [S/m]						ΔSAR		
		Target	Measured		Limit	Target	Measured		Limit			1g [%]	Correction required?	
			Meas.	Δεr [%]			Meas.	Δσ [%]						
2402	Body	52.76	50.76	-3.8	-5% ≤ εr-meas. ≤ 0%	1.904	1.964	+3.1	0% ≤ σ-meas. ≤ +5%	22.0	152	+2.39	not required.	January 24, 2018, before SAR test
2412 (1)		52.75	50.71	-3.9		1.914	1.975	+3.2				+2.43	not required.	
2437 (6)		52.72	50.56	-4.1		1.938	2.012	+3.9				+2.78	not required.	
2462 (11)		52.68	50.44	-4.3		1.967	2.035	+3.4				+2.60	not required.	
5180 (36)	Body	49.04	47.20	-3.8	-5% ≤ εr-meas. ≤ 0%	5.276	5.398	+2.3	0% ≤ σ-meas. ≤ +5%	24.0	150	+0.70	not required.	January 25, 2018, before SAR test
5190 (38)		49.03	47.11	-3.9		5.288	5.380	+1.8				+0.75	not required.	
5210 (42)		49.00	47.05	-4.0		5.311	5.408	+1.8				+0.71	not required.	
5260 (52)		48.99	46.89	-4.2		5.369	5.495	+2.3				+0.77	not required.	
5270 (54)		48.97	46.89	-4.2		5.381	5.484	+1.9				+0.78	not required.	
5290 (58)		48.89	46.87	-4.1		5.404	5.500	+1.8				+0.74	not required.	
5300 (60)		48.88	46.87	-4.1		5.416	5.560	+2.7				+0.74	not required.	
5310 (62)		48.87	46.94	-3.9		5.428	5.535	+2.0				+0.73	not required.	
5320 (64)		48.85	46.85	-4.1		5.439	5.547	+2.0				+0.75	not required.	
5500 (100)	Body	48.61	46.50	-4.3	-5% ≤ εr-meas. ≤ 0%	5.650	5.838	+3.3	0% ≤ σ-meas. ≤ +5%	24.0	150	+0.72	not required.	January 25, 2018, before SAR test
5510 (102)		48.59	46.60	-4.1		5.661	5.801	+2.5				+0.72	not required.	
5530 (106)		48.57	46.44	-4.4		5.685	5.824	+2.5				+0.77	not required.	
5550 (110)		48.54	46.38	-4.5		5.708	5.860	+2.7				+0.77	not required.	
5580 (116)		48.50	46.34	-4.5		5.743	5.953	+3.7				+0.73	not required.	
5670 (134)		48.38	46.12	-4.7		5.848	6.033	+3.2				+0.78	not required.	
5700 (140)		48.34	46.18	-4.7		5.883	6.072	+3.2				+0.74	not required.	
5745 (149)	Body	48.27	46.09	-4.5	-5% ≤ εr-meas. ≤ 0%	5.936	6.124	+3.2	0% ≤ σ-meas. ≤ +5%	24.0	150	+0.75	not required.	January 26, 2018, before SAR test
5755 (151)		48.26	46.06	-4.6		5.947	6.150	+3.4				+0.75	not required.	
5775 (155)		48.23	46.02	-4.6		5.971	6.174	+3.4				+0.76	not required.	
5785 (157)		48.22	45.99	-4.6		5.982	6.194	+3.5				+0.76	not required.	
5795 (159)		48.21	45.89	-4.8		5.994	6.196	+3.4				+0.80	not required.	
5825 (165)		48.17	45.79	-4.9		6.029	6.207	+3.0				+0.85	not required.	

7.2 SAR test results

[Measured and Reported (Scaled) SAR results]

SAR measurement results										Reported SAR (1g) [W/kg]						
Mode	Frequency [MHz] (Channel)	Data rate [Mbps]	EUT setup			SAR (1g) [W/kg]			SAR plot # in Appendix 2-2	Duty cycle correction		Output burst average power correction			SAR Corrected (*d)	Remarks
			Position	Battery ID	Gap [mm]	Max. value of multi-peak				Duty [%]	Duty scaled	Meas. [dBm].	Max. [dBm]	Tune-up factor		
						Meas.	ΔSAR [%]	ΔSAR corrected								
Step 1: 2.4GHz Band																
11b	2412(1)	1	Back	#2	0	0.442	+2.43	n/a (*c)	Plot 1-2	98.9	×1.01	11.54	12.5	×1.25	0.558	-
		5.5		#2	0	0.500	+2.43	n/a (*c)	Plot 1-3	94.7	×1.06	12.13	12.5	×1.09	0.578	-
	2437(6)			#2	0	0.438	+2.78	n/a (*c)	Plot 1-4	94.7	×1.06	11.82	12.5	×1.17	0.543	-
	2462(11)			#2	0	0.438	+2.60	n/a (*c)	Plot 1-5	94.7	×1.06	11.66	12.5	×1.21	0.562	-
11g	2412(1)	6		#1	0	0.547	+2.43	n/a (*c)	Plot 1-1	93.7	×1.07	12.48	12.5	×1.00	0.585	Higher SAR, 2.4GHz
	2437(6)			#1	0	0.501	+2.78	n/a (*c)	Plot 1-6	93.7	×1.07	12.34	12.5	×1.04	0.558	-
	2462(11)			#1	0	0.492	+2.60	n/a (*c)	Plot 1-7	93.7	×1.07	12.15	12.5	×1.08	0.569	-
n (20HT)	2412(1)	MCS0		#1	0	0.482	+2.43	n/a (*c)	Plot 1-8	93.1	×1.07	12.21	12.5	×1.07	0.552	-
11b	2412(1)	5.5	Left	#2	0	0.187	+2.43	n/a (*c)	Plot 1-9	94.7	×1.06	12.13	12.5	×1.09	0.216	-
			Front	#2	0	0.029	+2.43	n/a (*c)	Plot 1-10	94.7	×1.06	12.13	12.5	×1.09	0.033	-
			Right	#2	0	0.019	+2.43	n/a (*c)	Plot 1-11	94.7	×1.06	12.13	12.5	×1.09	0.021	-
			Top	#1	0	0.020	+2.43	n/a (*c)	Plot 1-12	94.7	×1.06	12.13	12.5	×1.09	0.024	-
			Bottom	#1	0	0.039	+2.43	n/a (*c)	Plot 1-13	94.7	×1.06	12.13	12.5	×1.09	0.046	-
BDR	2402(0)	DH5	Back	#1	0	0.137	+2.39	n/a (*c)	Plot 1-14	78.1	×1.28	7.04	8.3	×1.34	0.235	-

(cont'd)

(cont'd)

SAR measurement results											Reported SAR (1g) [W/kg]							
Mode	Frequency [MHz] (Channel)	Data rate [Mbps]	EUT setup			SAR (1g) [W/kg]			SAR plot # in Appendix 2-2	Duty cycle correction		Output burst average power correction			SAR Corrected (*d)	Remarks
			Position	Battery ID	Gap [mm]	Max. value of multi-peak Meas.	ΔSAR [%]	ΔSAR corrected		Duty [%]	Duty scaled	Meas. [dBm].	Max. [dBm]	Tune-up factor		
Step 2: U-NII-2A and U-NII-1 Band																
ac(80VHT)	5290 (58)	MCS0	Back	#1	0	**0.209**	+0.74	n/a (*c)	Plot 2-3	77.3	×1.29	8.94	10	×1.28	**0.345**	BW80MHz
	5210 (42)			#2	0	**0.209**	+0.71	n/a (*c)	Plot 2-4	77.3	×1.29	8.96	10	×1.27	**0.342**	BW80MHz
n(40HT)	5310 (62)	MCS0		#2	0	**0.242**	+0.73	n/a (*c)	Plot 2-5	87.4	×1.14	8.89	10	×1.29	**0.356**	BW40MHz, represented.
	5270 (54)			#2	0	**0.233**	+0.78	n/a (*c)	Plot 2-6	87.4	×1.14	8.79	10	×1.32	**0.351**	-
	5190(38)			#2	0	**0.238**	+0.75	n/a (*c)	Plot 2-7	87.4	×1.14	8.79	10	×1.32	**0.358**	-
11a	5300 (60)	6		#1	0	**0.261**	+0.74	n/a (*c)	Plot 2-8	93.5	×1.07	9.11	10	×1.23	**0.344**	BW20MHz, represented.
	5320 (64)			#1	0	**0.258**	+0.75	n/a (*c)	Plot 2-9	93.5	×1.07	8.92	10	×1.28	**0.353**	-
	5260 (52)			#1	0	**0.261**	+0.77	n/a (*c)	Plot 2-2	93.5	×1.07	8.84	10	×1.31	**0.366**	Higher SAR, U^NII-2A
	5180 (36)			#1	0	**0.276**	+0.70	n/a (*c)	Plot 2-1	93.5	×1.07	8.81	10	×1.32	**0.390**	Higher SAR, U^NII-1
ac(80VHT)	5290 (58)	MCS0	**Left**	#2	0	**0.058**	+0.74	n/a (*c)	Plot 2-10	77.3	×1.29	8.94	10	×1.28	**0.096**	-
			Front	#1	0	**n/a**	+0.74	n/a (*c)	n/a	*. The zoom scan was not performed, because of the measured interpolated maximum value of area scan was small enough or not detected on the platform.						-
			Right	#1	0	**n/a**	+0.74	n/a (*c)	n/a							-
			Top	#1	0	**n/a**	+0.74	n/a (*c)	n/a							-
			Bottom	#1	0	**n/a**	+0.74	n/a (*c)	n/a							-
Step 3: U-NII-2C Band																
ac(80VHT)	5530 (106)	MCS0	Back	#2	0	**0.283**	+0.77	n/a (*c)	Plot 3-2	77.3	×1.29	8.06	9	×1.24	**0.453**	BW80MHz
n(40HT)	5510 (102)	MCS0		#1	0	**0.293**	+0.72	n/a (*c)	Plot 3-3	87.4	×1.14	7.93	9	×1.28	**0.428**	BW40MHz, represented.
	5670 (134)			#1	0	**0.360**	-+0.78	n/a (*c)	Plot 3-4	87.4	×1.14	7.98	9	×1.26	**0.517**	-
	5550 (110)			#1	0	**0.340**	+0.77	n/a (*c)	Plot 3-5	87.4	×1.14	8.01	9	×1.26	**0.488**	-
11a	5580 (116)	6		#2	0	**0.370**	+0.73	n/a (*c)	Plot 3-6	93.5	×1.07	8.19	9	×1.21	**0.479**	BW20MHz, represented.
	5500 (100)			#1	0	**0.318**	+0.72	n/a (*c)	Plot 3-7	93.5	×1.07	7.72	9	×1.34	**0.456**	-
	5700 (140)			#2	0	**0.375**	+0.74	n/a (*c)	Plot 3-1	93.5	×1.07	7.70	9	×1.35	**0.542**	Higher SAR, U^NII-2C
ac(80VHT)	5530 (106)	MCS0	**Left**	#2	0	**0.042**	+0.77	n/a (*c)	Plot 3-8	77.3	×1.29	8.06	9	×1.24	**0.067**	-
			Front	#1	0	**n/a**	+0.77	n/a (*c)	n/a	*. The zoom scan was not performed, because of the measured interpolated maximum value of area scan was small enough or not detected on the platform.						-
			Right	#1	0	**n/a**	+0.77	n/a (*c)	n/a							-
			Top	#1	0	**n/a**	+0.77	n/a (*c)	n/a							-
			Bottom	#1	0	**n/a**	+0.77	n/a (*c)	n/a							-
Step 4: U-NII-3 Band																
ac(80VHT)	5775 (155)	MCS0	Back	#1	0	**0.284**	+0.76	n/a (*c)	Plot 4-2	77.3	×1.29	8.41	9	×1.15	**0.421**	BW80MHz
n(40HT)	5755 (152)	MCS0		#1	0	**0.337**	+0.75	n/a (*c)	Plot 4-3	87.4	×1.14	8.27	9	×1.18	**0.453**	BW40MHz, represented.
	5795(159)			#1	0	**0.303**	+0.80	n/a (*c)	Plot 4-4	87.4	×1.14	8.24	9	×1.19	**0.411**	-
11a	5745 (149)	6		#2	0	**0.328**	+0.75	n/a (*c)	Plot 4-5	93.5	×1.07	7.96	9	×1.27	**0.446**	BW20MHz, represented.
	5785 (157)			#2	0	**0.320**	+0.76	n/a (*c)	Plot 4-6	93.5	×1.07	7.84	9	×1.31	**0.449**	-
	5825 (165)			#2	0	**0.329**	+0.85	n/a (*c)	Plot 4-1	93.5	×1.07	7.80	9	×1.32	**0.465**	Higher SAR, U^NII-3
ac(80VHT)	5775 (155)	MCS0	**Left**	#2	0	**0.032**	+0.76	n/a (*c)	Plot 4-7	77.3	×1.29	8.41	9	×1.15	**0.047**	-
			Front	#1	0	**n/a**	+0.76	n/a (*c)	n/a	*. The zoom scan was not performed, because of the measured interpolated maximum value of area scan was small enough or not detected on the platform.						-
			Right	#1	0	**n/a**	+0.76	n/a (*c)	n/a							-
			Top	#1	0	**n/a**	+0.76	n/a (*c)	n/a							-
			Bottom	#1	0	**n/a**	+0.76	n/a (*c)	n/a							-

Notes:

*. Gap: It is the separation distance between the EUT outer surface and the bottom outer surface of phantom; Max.: Maximum; Meas.: Measured value; Rep.-SAR: Reported SAR; n/a: not applied;

*. During test, the EUT was operated by rechargeable Li-ion battery and with connecting the host pc via USB cable.

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

Liquid	SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
Body	2412, 2437, 2462 MHz	2450 MHz	within ±50 MHz of calibration frequency	7.38	±12.0 %
Body	5180, 5210, 5260, 5270, 5290, 5300, 5310, 5320 MHz	5250 MHz	within ±110 MHz of calibration frequency	4.65	±13.1 %
Body	5500, 5510, 5530, 5550, 5580, 5670, 5700 MHz	5600 MHz	within ±110 MHz of calibration frequency	3.78	±13.1 %
Body	5745, 5755, 5775, 5785,5795, 5825 MHz	5750 MHz	within ±110 MHz of calibration frequency	4.13	±13.1 %

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

Memo

*a. The target value is a parameter defined in Appendix A of KDB865664 D01 (v01r04), the dielectric parameters suggested are given at 2000, 2450, 3000 and 5800MHz. Parameters for the frequencies between (2000~3000) MHz and (3000~5800) MHz were obtained using linear interpolation. Above 5800MHz were obtained using linear extrapolation.

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

*c. 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

*d. 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))