SAR TEST REPORT

Test Report No.: 12656075S-A-R1

Applicant : **Nintendo Co., Ltd.**
Type of Equipment : **Game Console**
Model No. : **HDH-001**
FCC ID : **BKEHDH001**
Test Standard : **FCC 47CFR §2.1093**
Test Result : **Complied (Refer to Section 3.3)**

Highest Reported SAR [W/kg]					Remarks (DTS band)				Remarks (UNII band)			
DTS band	U-NII band	SAR type		Limit	Frequency [MHz]	Mode	Output power (average) [dBm]		Frequency [MHz]	Mode	Output power (average) [dBm]	
							Measured	Max.			Measured	Max
0.76 (Antenna 0)	**1.42** (Antenna 0)	**Body-worn**	**1g**	**1.6**	2412	11b(1Mbps)	17.08	19	5825	ac20(MCS0,SISO)	13.14	14
0.76 (Antenna 0)	**0.64** (Antenna 1)	**Hand-held**	**10g**	**4**	2412	11b(1Mbps)	17.08	19	5670	n40(MCS0)	13.02	15

*. **Highest reported SAR values for body-touch and hand-held rf exposure conditions are "1.42 W/kg (1g)" and "0.76 W/kg (10g)" respectively.**
*. **Highest reported SAR values for simultaneous transmission (Bluetooth (Antenna 0) + Wi-Fi (Antenna 1)) is "0.67 W/kg (10g)".**
*. **Highest reported SAR (1g) values for Co-location (MIMO) is less than 0.04 SPLSR. (*. Antenna separation distance is 79 mm)**

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7. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.
10. This report (-R1) is a revised version of 12656075-A. 12656075-A report is replaced with this report.

Date of test: January 28 ~ February 6, 2019

Test engineer:
Hiroshi Naka
Engineer, Consumer Technology Division

Approved by:
Toyokazu Imamura
Leader, Consumer Technology Division

Based on the manufacturer's declaration, Model HDH-001 can be regarded as equivalent to Model HDH-002 for the radio characteristics related to this application. (Refer Theory of Operation-Differences)

In addition, there was no change in the shape including the antenna position and it was shown that the two models were equivalent from the spot check of the RF characteristics. Therefore, it was judged that the SAR test is unnecessary. The maximum values of SAR without W56 are 1.27 W / kg (Body) and 0.76 W / kg (Hand).

☒ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☐ There is no testing item of "Non-accreditation".

RTL02610

REVISION HISTORY

Revision	Test report No.	Date	Page revised	Contents
Original	12656075S-A	June 24, 2019	-	-
-R1	12656075S-A-R1	July 26, 2019	p1, 2, 3, 4, 5, 8, 16, 24, 78	(p1) Error correcting.; (p2, Contents) Error correcting.; (p3, 2.2) Error correcting of remarks.; (p4) Error correcting of power table.; (p5, 3.3) The number of figures was unified.; (p8, 4.2) Error correcting.; (p16, 7.1) Error correcting. (p24, Appendix 1-1) An overlap on drawing was corrected..; (p78, Plot 4-14) Error correcting.

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

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SECTION 1: Customer information

Company Name	Nintendo Co., Ltd.
Address	11-1 Hokotate-cho, Kamitoba, Minami-ku, Kyoto 601-8501, Japan
Telephone Number	+81-75-662-9600
Facsimile Number	+81-75-662-9624
Contact Person	Kazuya Kuramoto

The information provided from the customer is as follows;
- Applicant, Type of Equipment, Model No., FCC ID on the cover and other relevant pages
- SECTION 1: Customer information
- SECTION 2: Equipment under test (EUT)
- SECTION 4: Operation of EUT during testing
- Appendix 1: The part of Antenna location information, Description of EUT and Support Equipment

* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2, SECTION 4 and Appendix 1.

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

Type of Equipment	Game Console
Model Number	HDH-001
Serial Number	XJW01000021163
Condition of EUT	Engineering prototype (*. Not for sale: These samples are equivalent to mass-produced items.)
Receipt Date of Sample (*. Information from test lab.)	December 27, 2018 (*.EUT for power measurement. No modification by the Lab.) January 26, 2019 (*. EUT for SAR test. No modification by the Lab.) (*. After power measurement, the EUT was returned to a customer.)
Country of Mass-production	China
Category Identified	Portable device *. Since EUT may handle by hand and may contact and/or very close to a human body during Wi-Fi operation, the hand-held SAR (10g) and the partial-body SAR (1g) shall be measured.
Rating	DC3.8 V (Battery) *. This device was operated by the re-chargeable Li-ion battery during the SAR test.
Feature of EUT	Model: HDH-001 (referred to as the EUT in this report) is a Game Console.
SAR Accessory	none

2.2 Product Description (Wireless LAN module, antenna)

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: (2412~2472) MHz (b, g, n20, n40, ac20, ac40); 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 (g, a, n20, ac20, n40, ac40, ac80) (*.256QAM is only for ac80)
Typical and maximum transmit power		*. The specification of typical and maximum transmit power (which may occur) refer to remarks in below. *. The measured output power (conducted) as SAR reference power refers to section 6 in this report.

Antenna	Antenna 0 (Bottom edge)	Antenna 1 (Top edge)
Antenna quantity	2 pcs. (*. Separation distance between the antenna #0 and the antenna #1: 79 mm) Bluetooth: antenna #0, b/g/a: One selected Tx antenna operation, n(20/40HT)/ac(20/40/80VHT): Either one selected Tx antenna operation or two Tx antenna operation simultaneously.	
Antenna type / connector type	Sheet metal antenna / PCB side: MHF2, Antenna side: soldered	Sheet metal antenna / PCB side: MHF2, Antenna side: soldered
Antenna gain (max.power) (*.installed into the platform)	-0.904 dBi (2.4GHz band), 2.949 dBi (5GHz band) (*.including cable loss)	-0.730 dBi (2.4GHz band), 1.994 dBi (5GHz band) (*.including cable loss)

*. 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."

*. **Maximum tune-up tolerance limit** (Maximum power, refer to power table in next page.)
Maximum tune-up tolerance limit is conducted burst average power and is defined by a customer as Duty cycle 100% (continuous transmitting).
The SAR test reference power measurement and the SAR test were applied to the lowest data rate (as higher time-based average power) on each operation mode.

[Power table]

Band	Ch.	Frequency [MHz]	**SISO power** (Conducted, Duty cycle 100%) Mode	D/R or MCS#.	Typical [dBm] Ant.0	Typical [dBm] Ant.1	Max.[dBm] Ant.0	Max.[dBm] Ant.1	**MIMO** (Conducted, Duty cycle 100%) Mode	D/R or MCS#.	Typical [dBm] Ant.0	Typical [dBm] Ant.1	Typical [dBm] Ant.0+1	Max. [dBm] Ant.0+1
2.4GHz Bluetooth	0~78	2402~2480	BDR	DH5	-	N/A	**2.0**	**N/A**	-	-	-	-	-	-
	0~78	2402~2480	EDR	2-DH5	-	N/A	**2.0**	**N/A**	-	-	-	-	-	-
	0~78	2402~2480	EDR	3-DH5	-	N/A	**2.0**	**N/A**	-	-	-	-	-	-
	0~39	2402~2480	LE	-	-	N/A	**2.0**	**N/A**	-	-	-	-	-	-
2.4GHz Wi-Fi (DTS)	1~11	2412~2462	b	1~11 Mbps	17.5	17.5	**19.0**	**19.0**	-	-	-	-	-	-
	12	2467			8.5	8.5	**10.0**	**10.0**	-	-	-	-	-	-
	13	2472			3.5	3.5	**5.0**	**5.0**	-	-	-	-	-	-
	1	2412	g	6~18 Mbps	15.5	15.5	**17.0**	**17.0**	-	-	-	-	-	-
				24~54 Mbps	14.5	14.5	**16.0**	**16.0**						
	2~11	2417~2462		6~18 Mbps	16.5	16.5	**18.0**	**18.0**						
				24~54 Mbps	14.5	14.5	**16.0**	**16.0**						
	12	2467		6~54 Mbps	8.5	8.5	**10.0**	**10.0**	-	-	-	-	-	-
	13	2472			3.5	3.5	**5.0**	**5.0**	-	-	-	-	-	-
	1	2412	n20	MCS0~6	15.5	15.5	**17.0**	**17.0**	n20	MCS8~15	11.0	11.0	14.0	**15.5**
				MCS7	14.5	14.5	**16.0**	**16.0**						
	2~11	2417~2462		MCS0~3	16.5	16.5	**18.0**	**18.0**			12.0	12.0	15.0	**16.5**
				MCS4~6	15.5	15.5	**17.0**	**17.0**						
				MCS7	14.5	14.5	**16.0**	**16.0**						
	12	2467		MCS0~7	8.5	8.5	**10.0**	**10.0**			5.5	5.5	8.5	**10.0**
	13	2472		MCS0~7	3.5	3.5	**5.0**	**5.0**			0.5	0.5	3.5	**5.0**
	1	2412	ac20	MCS0~6	15.5	15.5	**17.0**	**17.0**	ac20	MCS0~8	11.0	11.0	14.0	**15.5**
				MCS7	14.5	14.5	**16.0**	**16.0**						
				MCS8	13.0	13.0	**14.5**	**14.5**						
	2~11	2417~2462		MCS0~3	16.5	16.5	**18.0**	**18.0**			12.0	12.0	15.0	**16.5**
				MCS4~6	15.5	15.5	**17.0**	**17.0**						
				MCS7	14.5	14.5	**16.0**	**16.0**						
				MCS8	13.0	13.0	**14.5**	**14.5**						
	12	2467		MCS0~8	8.5	8.5	**10.0**	**10.0**			5.5	5.5	8.5	**10.0**
	13	2472		MCS0~8	3.5	3.5	**5.0**	**5.0**			0.5	0.5	3.5	**5.0**
	3~10	2422~2457	n40	MCS0~7	8.5	8.5	**10.0**	**10.0**	n40	MCS8~15	8.0	8.0	11.0	**12.5**
	11	2462			8.5	8.5	**10.0**	**10.0**			5.5	5.5	8.5	**10.0**
	3~10	2422~2457	ac40	MCS0~9	8.5	8.5	**10.0**	**10.0**	ac40	MCS0~9	8.0	8.0	11.0	**12.5**
	11	2462			8.5	8.5	**10.0**	**10.0**			5.5	5.5	8.5	**10.0**
U-NII-1	36~48	5180~5240	a	6~54 Mbps	13.5	13.5	**15.0**	**15.0**	-	-	-	-	-	-
	36~48	5180~5240	n20	MCS0~7	13.5	13.5	**15.0**	**15.0**	n20	MCS8~15	10.5	10.5	13.5	**15.0**
	36~48	5180~5240	ac20	MCS0~7	13.5	13.5	**15.0**	**15.0**	ac20	MCS0~8	10.5	10.5	13.5	**15.0**
				MCS8	13.0	13.0	**14.5**	**14.5**						
	38	5190	n40	MCS0~7	10.0	10.0	**11.5**	**11.5**	n40	MCS8~15	7.0	7.0	10.0	**11.5**
	46	5230		MCS0~7	13.5	13.5	**15.0**	**15.0**			10.5	10.5	13.5	**15.0**
	38	5190	ac40	MCS0~9	10.0	10.0	**11.5**	**11.5**	ac40	MCS0~9	7.0	7.0	10.0	**11.5**
	46	5230		MCS0~7	13.5	13.5	**15.0**	**15.0**			10.5	10.5	13.5	**15.0**
				MCS8,9	13.0	13.0	**14.5**	**14.5**						
	42	5210	ac80	MCS0~9	9.0	9.0	**10.5**	**10.5**	ac80	MCS0~9	6.0	6.0	9.0	**10.5**
U-NII-2A	52~64	5260~5320	a	6~54 Mbps	13.5	13.5	**15.0**	**15.0**	-	-	-	-	-	-
	52~64	5260~5320	n20	MCS0~7	13.5	13.5	**15.0**	**15.0**	n20	MCS8~15	10.5	10.5	13.5	**15.0**
	52~64	5260~5320	ac20	MCS0~7	13.5	13.5	**15.0**	**15.0**	ac20	MCS0~8	10.5	10.5	13.5	**15.0**
				MCS8	13.0	13.0	**14.5**	**14.5**						
	54, 62	5270, 5310	n40	MCS0~7	13.5	13.5	**15.0**	**15.0**	n40	MCS8~15	10.5	10.5	13.5	**15.0**
	54, 62	5270, 5310	ac40	MCS0~7	13.5	13.5	**15.0**	**15.0**	ac40	MCS0~9	10.5	10.5	13.5	**15.0**
				MCS8,9	13.0	13.0	**14.5**	**14.5**						
	58	5290	ac80	MCS0~7	9.0	9.0	**10.5**	**10.5**	ac80	MCS0~9	6.0	6.0	9.0	**10.5**
U-NII-2C	100~116	5500~5580	a	6~54 Mbps	13.5	13.5	**15.0**	**15.0**	-	-	-	-	-	-
	132~140	5660~5700							-	-	-	-	-	-
	100~116	5500~5580	n20	MCS0~7	13.5	13.5	**15.0**	**15.0**	n20	MCS8~15	10.5	10.5	13.5	**15.0**
	132~140	5660~5700												
	100~116	5500~5580	ac20	MCS0~7	13.5	13.5	**15.0**	**15.0**	ac20	MCS0~8	10.5	10.5	13.5	**15.0**
				MCS8	11.0	11.0	**12.5**	**12.5**						
	132~140	5660~5700		MCS0~7	13.5	13.5	**15.0**	**15.0**						
				MCS8	11.0	11.0	**12.5**	**12.5**						
	120~128	5600~5640	a,n20,ac20	not use	N/A	N/A	N/A	N/A	n20,ac20	not use	N/A	N/A	N/A	N/A
	144	5720	a,n20,ac20	not use	N/A	N/A	N/A	N/A	n20,ac20	not use	N/A	N/A	N/A	N/A
	102,110	5510,5550	n40	MCS0~7	13.5	13.5	**15.0**	**15.0**	n40	MCS8~15	10.5	10.5	13.5	**15.0**
	134	5670												
	102,110	5510,5550	ac40	MCS0~7	13.5	13.5	**15.0**	**15.0**	ac40	MCS0~9	10.5	10.5	13.5	**15.0**
				MCS8,9	12.0	12.0	**13.5**	**13.5**						
	134	5670		MCS0~7	13.5	13.5	**15.0**	**15.0**						
				MCS8,9	12.0	12.0	**13.5**	**13.5**						
	118,126	5590, 5630	n40,ac40	not use	N/A	N/A	N/A	N/A	n40,ac40	not use	N/A	N/A	N/A	N/A
	142	5710	n40,ac40	not use	N/A	N/A	N/A	N/A	n40,ac40	not use	N/A	N/A	N/A	N/A
	106	5530	ac80	MCS0~9	10.5	10.5	**12.0**	**12.0**	ac80	MCS0~9	7.5	7.5	10.5	**12.0**
	122	5610	ac80	not use	N/A	N/A	N/A	N/A	n40,ac40	not use	N/A	N/A	N/A	N/A
	138	5690	ac80	not use	N/A	N/A	N/A	N/A	n40,ac40	not use	N/A	N/A	N/A	N/A
U-NII-3	149~165	5745~5825	a	6~54 Mbps	12.5	12.5	**14.0**	**14.0**	-	-	-	-	-	-
	149~165	5745~5825	n20	MCS0~7	12.5	12.5	**14.0**	**14.0**	n20	MCS8~15	10.5	10.5	13.5	**15.0**
	149~165	5745~5825	ac20	MCS0~7	12.5	12.5	**14.0**	**14.0**	ac20	MCS0~8	10.5	10.5	13.5	**15.0**
				MCS8	11.0	11.0	**12.5**	**12.5**						
	151, 159	5755, 5795	n40	MCS0~7	12.5	12.5	**14.0**	**14.0**	n40	MCS8~15	10.5	10.5	13.5	**15.0**
	151, 159	5755, 5795	ac40	MCS0~7	12.5	12.5	**14.0**	**14.0**	ac40	MCS0~9	10.5	10.5	13.5	**15.0**
				MCS8,9	12.0	12.0	**13.5**	**13.5**						
	155	5775	ac80	MCS0~7	12.5	12.5	**14.0**	**14.0**	ac80	MCS0~9	10.5	10.5	13.5	**15.0**

Ch.: channel, D/R: data rate, MCS#: MCS index number, Ant.: antenna, Max. Maximum tune-up limit power, N/A: Not applicable.

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 (body touch)
General population / uncontrolled exposure, Extremity (averaged over any 10g of tissue) limit: 4.0 W/kg (hand-held)

3.3 Procedures and Results

Test Procedure	SAR measurement: KDB 447498 D01, KDB 248227 D01, KDB 865664 D01, KDB 914225 D07, IEC Std. 1528		
Category	FCC 47CFR §2.1093 (Portable device)	SAR type	Hand-held, hand-operation. (The bottom surface may touch the body.)

		Bluetooth	Wi-Fi (DTS)			Wi-Fi (U-NII-1)			Wi-Fi (U-NII-2A)			Wi-Fi (U-NII-2C)			Wi-Fi (U-NII-3)			Simultaneous transmission
Frequency [MHz]		2402~2480	2412~2462			5180~5240			5260~5320			5500~5700			5745~5825			
Results (SAR(1g))		Complied (Refer to Section 4.1)	Complied (Refer to Section 7.2)			Complied (Refer to Section 7.3)			Complied (Refer to Section 7.3)			Complied (Refer to Section 7.4)			Complied (Refer to Section 7.5)			Complied (Refer to Section 7.8)
Antenna#		Ant.0	Ant.0		Ant.1	Ant.0		Ant.1	Ant.0		Ant.1	Ant.0		Ant.1	Ant.0		Ant.1	Ant.0+Ant.1
SAR [W/kg]	1g or 10g	*. Lower power, SAR test was exempt.	1g	10g	10g	1g	10g	10g	1g	10g	10g	1g	10g	10g	1g	10g	10g	10g
	Reported		**0.76**	**0.76**	**0.48**	**1.08**	**n/a** (*2)	**n/a** (*2)	**1.27**	**0.32**	**0.24**	**1.15**	**0.36**	**0.64**	**1.42**	**0.19**	**0.40**	**0.67**
	Measured		0.482	0.480	0.301	0.648	n/a	n/a	0.882	0.222	0.160	0.726	0.218	0.355	1.09	0.117	0.295	Bluetooth (Ant.0) + Wi-Fi (Ant.1). *. Co-location (MIMO) was smaller than limit or ≤ 0.04 of SPLSR.
Operation mode (*1), Frequency[MHz]		BDR, EDR, BLE	b, 2412	b, 2412	b, 2462	a, 5240	n/a	n/a	ac40, 5310	n40, 5310	n40, 5310	ac20, 5500	n40, 5510	n40, 5670	ac20, 5825	ac80, 5775	a, 5745	
Output power [dBm]	Burst average	n/a	17.08	17.08	17.00	13.08	n/a	n/a	14.00	13.98	13.73	13.30	13.37	13.02	13.14	13.01	13.33	
	Max. power (scaled factor)	2	19 (1.56)	19 (1.56)	19 (1.58)	15 (1.56)	15 (-)	15 (-)	15 (1.26)	15 (1.26)	15 (1.34)	15 (1.48)	15 (1.46)	15 (1.58)	14 (1.22)	14 (1.26)	14 (1.17)	
Duty cycle [%]		n/a	99.0	99.0	99.0	93.7	n/a	n/a	87.6	87.4	87.4	93.3	87.4	87.4	93.3	77.7	93.7	
Duty scaled factor		n/a	1.01	1.01	1.01	1.07	n/a	n/a	1.14	1.14	1.14	1.07	1.14	1.14	1.07	1.29	1.07	

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
*1. The lowest data rate was selected by SAR test in each operation mode.
*2. Since reported SAR 1g of U-NII-2A was enough lower than 1.2 W/kg(1g), 3 W/kg (10g), SAR test was only applied to a lower channel of U-NII-1 band.
*. Since Bluetooth, Wii-Fi of 2.4GHz and Wi-Fi of 5GHz are used a same antenna, Bluetooth and Wi-Fi, DTS band and UNII band do not transmit simultaneously.
*. (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, %)
*. b: IEEE 802.11b, a: IEEE 802.11a, n40: IEEE 802.11n(40HT), ac20: IEEE 802.11ac(20VHT), ac40: IEEE 802.11n (40VHT), ac80: IEEE 802.11ac(80VHT), n/a: Not applicable.
*. "yellow marker" in the table; The highest reported SAR(1g, 10g) of each band (DTS, U-NII) is shaded with yellow marker.

3.4 Addition, deviation and exclusion to the test procedure

No addition, exclusion nor deviation has been made from the test procedure.

3.5 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

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**	(2973D)	**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	-

3.6 Confirmation before SAR testing

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 SAR test reference power measurement and the SAR test were applied to the lowest data rate (as higher time-based average power) on each operation mode. For the SAR test reference power, on each operation band, the average output power was measured on the low/middle/upper and specified channels with the lowest data rate of each operation mode. 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))

3.7 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.**

SECTION 4: Operation of EUT during testing

4.1 Operating modes for SAR testing

This EUT has Bluetooth (BDR, EDR, BLE) and IEEE 802.11b, g, a, n(HT20), n(HT40), ac(VHT20), ac(VTH40), ac(VHT80) continuous transmitting modes. The frequency and the modulation used in the SAR testing are shown as a following.

Operation mode		b		g		n(HT20)			ac(VHT20)			n(HT40)			ac(VHT40)			BDR	EDR	BLE
band		DTS (2.4GHz band)																		
Tx band [MHz]		2402~2472										2422~2462						2402~2480		
Antenna#		0	1	0	1	0	1	0+1	0	1	0+1	0	1	0+1	0	1	0+1	0	0	0	0
Tune-up limit [dBm]		19	19	18	18	18	18	13.5+13.5	18	18	13.5+13.5	10	10	9.5+9.5	10	10	9.5+9.5	2	2	2	2
(*1) SAR test considered? ("*" initial test setup)	Back	○	○	○	×	×	×	×	×	×	×	○	○	×	×	×	×	×	×	×	×
	Front	○	○	×	×	×	×	×	×	×	×	○	○	×	×	×	×	×	×	×	×
	Top	×	○*	×	○	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	Bottom	○*	×	○	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	Right, Left	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Frequency tested		(*2)	(*2)	(*2)	(*2)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Data rate [Mbps]		1	1	6	6	MCS0	MCS0	MCS0	MCS0	MCS0	MCS8	MCS0	MCS0	MCS0	MCS0	MCS0	MCS0	1	2	3	1

Operation mode		a		n(HT20)			ac(VHT20)			n(HT40)			ac(VHT40)			ac(VHT80)		
band		U-NII-1 (*3)																
Tx band [MHz]		5180~5240								5190,5230						5210		
Antenna#		0	1	0	1	0+1	0	1	0+1	0	1	0+1	0	1	0+1	0	1	0+1
Tune-up limit [dBm]		15	15	15	15	12+12	15	15	12+12	15	15	12+12	15	15	12+12	10.5	10.5	7.5+7.5
(*1) SAR test considered? ("*" initial test setup)	Back	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	Front	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	Top	×	×	×	×	×	×	×	×	×	○	×	×	×	×	×	×	×
	Bottom	○	×	○	×	×	○	×	×	○	×	×	○	×	×	×	×	×
	Right, Left	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Frequency tested		(*2)	n/a	(*2)	n/a	n/a	(*2)	n/a	n/a	(*2)	(*2)	n/a	(*2)	n/a	n/a	n/a	n/a	n/a
Data rate [Mbps]		6	6	MCS0	MCS0	MCS8	MCS0	MCS0	MCS0	MCS0	MCS0	MCS8	MCS0	MCS0	MCS0	MCS0	MCS0	MCS0

Operation mode		a		n(HT20)			ac(VHT20)			n(HT40)			ac(VHT40)			ac(VHT80)		
band		U-NII-2A																
Tx band [MHz]		5260~5320								5270,5310						5290		
Antenna#		0	1	0	1	0+1	0	1	0+1	0	1	0+1	0	1	0+1	0	1	0+1
Tune-up limit [dBm]		15	15	15	15	12+12	15	15	12+12	15	15	12+12	15	15	12+12	10.5	10.5	7.5+7.5
(*1) SAR test considered? ("*" initial test setup)	Back	×	×	×	×	×	×	×	×	○	○	×	×	×	×	×	×	×
	Front	○	×	×	×	×	×	×	×	○	○	×	×	×	×	×	×	×
	Top	×	×	×	×	×	×	×	×	×	○*	×	×	×	×	×	×	×
	Bottom	○	×	○	×	×	○	×	×	○*	×	×	○	×	×	×	×	×
	Right, Left	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Frequency tested		(*2)	n/a	(*2)	n/a	n/a	(*2)	n/a	n/a	(*2)	(*2)	n/a	(*2)	n/a	n/a	n/a	n/a	n/a
Data rate [Mbps]		6	6	MCS0	MCS0	MCS8	MCS0	MCS0	MCS0	MCS0	MCS0	MCS8	MCS0	MCS0	MCS0	MCS0	MCS0	MCS0

Operation mode		a		n(HT20)			ac(VHT20)			n(HT40)			ac(VHT40)			ac(VHT80)		
band		U-NII-2C																
Tx band [MHz]		5500~5580, 5660~5700								5510, 5550, 5670						5530		
Antenna#		0	1	0	1	0+1	0	1	0+1	0	1	0+1	0	1	0+1	0	1	0+1
Tune-up limit [dBm]		15	15	15	15	12+12	15	15	12+12	15	15	12+12	15	15	12+12	12	12	9+9
(*1) SAR test considered? ("*" initial test setup)	Back	×	×	×	×	×	×	×	×	○	○	×	×	×	×	×	×	×
	Front	×	×	×	×	×	×	×	×	○	○	×	×	×	×	×	×	×
	Top	×	○	×	×	×	×	×	×	×	○*	×	×	×	×	×	×	×
	Bottom	○	×	○	×	×	○	×	×	○*	×	×	○	×	×	×	×	×
	Right, Left	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Frequency tested		(*2)	(*2)	(*2)	n/a	n/a	(*2)	n/a	n/a	(*2)	(*2)	n/a	(*2)	n/a	n/a	n/a	n/a	n/a
Data rate [Mbps]		6	6	MCS0	MCS0	MCS8	MCS0	MCS0	MCS0	MCS0	MCS0	MCS8	MCS0	MCS0	MCS0	MCS0	MCS0	MCS0

Operation mode		a		n(HT20)			ac(VHT20)			n(HT40)			ac(VHT40)			ac(VHT80)		
band		U-NII-3																
Tx band [MHz]		5745~5825								5755, 5795						5775		
Antenna#		0	1	0	1	0+1	0	1	0+1	0	1	0+1	0	1	0+1	0	1	0+1
Tune-up limit [dBm]		14	14	14	14	12+12	14	14	12+12	14	14	12+12	14	14	12+12	14	14	12+12
Initial test mode? (*1)		-	-	-	-	N/A	-	-	N/A	yes	yes	N/A	-	-	N/A	N/A	N/A	N/A
(*1) SAR test considered? ("*" initial test setup)	Back	×	×	×	×	×	×	×	×	×	×	×	×	×	×	○	○	×
	Front	×	×	×	×	×	×	×	×	×	×	×	×	×	×	○	○	×
	Top	×	○	×	×	×	×	×	×	×	×	×	×	×	×	×	○*	×
	Bottom	○	×	○	×	×	○	×	×	○	×	×	○	×	×	○*	×	×
	Right, Left	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Frequency tested		(*2)	(*2)	(*2)	n/a	n/a	(*2)	n/a	n/a	(*2)	n/a	n/a	(*2)	n/a	n/a	(*2)	(*2)	N/A
Data rate [Mbps]		6	6	MCS0	MCS0	MCS8	MCS0	MCS0	MCS0	MCS0	MCS0	MCS8	MCS0	MCS0	MCS0	MCS0	MCS0	MCS0

Controlled software	HDH-001 WLAN&BT Radio test control (Ver.01)

*1. "○": SAR test was applied. "×": SAR test can be reduced.
*2. The tested frequencies refer to SAR test results in Section 7.
*. 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). n/a: not applied.

4.2 RF exposure conditions

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

Setup plan	SAR type	Explanation of SAR test setup plan (*. Refer to Appendix 1 for the antenna location and the test setup photographs which had been tested.)	D: Separation distance [mm]		
			Antenna 0		Antenna 1
			Wi-Fi	Bluetooth	Wi-Fi
Bottom	Body, 1g	The bottom edge of EUT towards the bottom of the flat phantom.	**2.223**	**2.223**	**≈81**
Back	Hand, 10g	The back surface of EUT towards the bottom of the flat phantom. (*. including the grip size for the Antenna 1)	**6.03**	**6.03**	**≈ 10**
Front	Hand, 10g	The front surface of EUT towards the bottom of the flat phantom.	**2.61**	**2.61**	**2.97**
Top	Hand, 10g	The top edge of EUT towards the bottom of the flat phantom.	**≈82**	**≈82**	**2.723**
Left	Hand, 10g	The left-hand grip edge of EUT towards the bottom of the flat phantom.	**58.873**	**58.873**	**63.673**
Right	Hand, 10g	The right-hand grip edge of EUT towards the bottom of the flat phantom.	**119.673**	**119.673**	**121.473**

*. **D:** Antenna separation distance. It is the distance from an antenna to the outer surface of the host device which an operator may touch.
. Size of EUT: 208.347 mm (width) × 83.72 mm (height) × 13.94 mm (depth) (. The convex portions (joy stick, hand-grip, buttons, etc.) are not contained in size.)

4.3 SAR test exclusion considerations accordance to KDB 447498 D01

The following is based on KDB447498D01.

Step 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)

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.

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.

Step 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

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 step 1) antenna ≤50mm from the user, and for step 2) antenna > 50mm from the user.]

				Calculated threshold value											
Antenna #:				Antenna 0			Antenna 1			Antenna 0			Antenna 1		
Setup:				**Bottom**	**Front**	**Back**	**Top**	**Front**	**Back**	**Left**	**Right**	**Top**	**Left**	**Right**	**Bottom**
Antenna separation distance:				≤5	≤5	6	≤5	≤5	≈10	59	120	82	64	121	81
SAR type (1g: Body/10g: Hand):				1g	10g	10g	10g	10g	10g	10g	10g	10g	10g	10g	1g
Mode (SISO)	Upper Freq. [MHz]	Tune-up limit (conducted) [dBm]	Tune-up limit (conducted) [mW]	Step 1) SAR exclusion calculations for antenna ≤50mm from the user. Judge: "Exempt" when ≤ 3.0 (SAR (1g)), ≤ 7.5 (SAR (10g)); "Test" (SAR test required) when >3.0 (SAR(1g)), >7.5 (SAR(10g)).						Step 2) > 50mm from the user Judge: "Exempt" when Tue-up limit power.is less than calculated threshold power value.					
Bluetooth	2480	2.0	**2**	0.6, **Exempt**	0.6, **Exempt**	0.5, **Exempt**	0.6, **Exempt**	0.6, **Exempt**	0.3, **Exempt**	185 mW, **Exempt**	795 mW, **Exempt**	415 mW, **Exempt**	235 mW, **Exempt**	805 mW, **Exempt**	405 mW, **Exempt**
b	2462	19.0	**79**	**24.8, Test**	**24.8, Test**	**20.7, Test**	**24.8, Test**	**24.8, Test**	**12.4, Test**	186 mW, **Exempt**	796 mW, **Exempt**	416 mW, **Exempt**	236 mW, **Exempt**	806 mW, **Exempt**	406 mW, **Exempt**
g,n20,ac20	2462	18.0	**63**	**19.8, Test**	**19.8, Test**	**16.5, Test**	**19.8, Test**	**19.8, Test**	**9.9, Test**						
n40,ac40	2462	10.0	**10**	**3.1, Test**	3.1, **Exempt**	2.6, **Exempt**	3.1, **Exempt**	3.1, **Exempt**	1.6, **Exempt**						
a,n20,ac20	5240	15.0	**32**	**14.7, Test**	**14.7, Test**	**12.2, Test**	**14.7, Test**	**14.7, Test**	7.4, **Exempt**	152 mW, **Exempt**	762 mW, **Exempt**	382 mW, **Exempt**	202 mW, **Exempt**	772 mW, **Exempt**	372 mW, **Exempt**
n40,ac40	5230	15.0	**32**	**14.6, Test**	**14.6, Test**	**12.2, Test**	**14.6, Test**	**14.6, Test**	7.3, **Exempt**						
ac80	5210	11.0	**13**	**5.9, Test**	5.9, **Exempt**	4.9, **Exempt**	5.9, **Exempt**	5.9, **Exempt**	5.9, **Exempt**						
a,n20,ac20	5320	15.0	**32**	**14.8, Test**	**14.8, Test**	**12.3, Test**	**14.8, Test**	**14.8, Test**	7.4, **Exempt**	155 mW, **Exempt**	765 mW, **Exempt**	385 mW, **Exempt**	205 mW, **Exempt**	775 mW, **Exempt**	375 mW, **Exempt**
n40,ac40	5310	15.0	**32**	**14.7, Test**	**14.7, Test**	**12.3, Test**	**14.7, Test**	**14.7, Test**	7.4, **Exempt**						
ac80	5290	11.0	**13**	**6.0, Test**	6.0, **Exempt**	5.0, **Exempt**	6.0, **Exempt**	6.0, **Exempt**	6.0, **Exempt**						
a,n20,ac20	5700	15.0	**32**	**15.3, Test**	**15.3, Test**	**12.7, Test**	**15.3, Test**	**15.3, Test**	**7.7, Test**	153 mW, **Exempt**	763 mW, **Exempt**	383 mW, **Exempt**	203 mW, **Exempt**	773 mW, **Exempt**	373 mW, **Exempt**
n40,ac40	5670	15.0	**32**	**15.2, Test**	**15.2, Test**	**12.7, Test**	**15.2, Test**	**15.2, Test**	**7.6, Test**						
ac80	5530	12.0	**16**	**7.5, Test**	7.5, **Exempt**	6.3, **Exempt**	7.5, **Exempt**	7.5, **Exempt**	7.5, **Exempt**						
a,n20,ac20	5825	14.0	**25**	**12.1, Test**	**12.1, Test**	**10.1, Test**	**12.1, Test**	**12.1, Test**	6.0, **Exempt**	152 mW, **Exempt**	762 mW, **Exempt**	382 mW, **Exempt**	202 mW, **Exempt**	772 mW, **Exempt**	372 mW, **Exempt**
n40,ac40	5795	14.0	**25**	**12.1, Test**	**12.1, Test**	**10.1, Test**	**12.1, Test**	**12.1, Test**	6.0, **Exempt**						
ac80	5775	14.0	**25**	**12.1, Test**	**12.1, Test**	**10.1, Test**	**12.1, Test**	**12.1, Test**	6.0, **Exempt**						

*. Freq.: Frequency, Mode; 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).
Notes: 1. Power and distance are rounded to the nearest mW and mm before calculation.

4.4 Estimated SAR for simultaneous transmission SAR analysis according to KDB447498 D01

The following is based on KDB447498D01.
When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

[(max. power of channel, including tune-up tolerance, mW) / (minimum test separation distance, mm)]·[√f(GHz)/x] W/kg

*. for test separation distances ≤ 50 mm; where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR
*. 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.
*. When the minimum separation distance is < 5mm, the distance is used 5mm to determine SAR test exclusion.

[SAR 1g]

SISO/ MIMO	Mode	Upper Freq.[GHz] Ant.0 BT	Upper Freq.[GHz] Ant.0 Wi-Fi	Upper Freq.[GHz] Ant.1 Wi-Fi	Max.P [mW] Ant.0 BT	Max.P [mW] Ant.0 Wi-Fi	Max.P [mW] Ant.1 Wi-Fi	Estimated SAR 1g value [W/kg] Ant.0 BT Bottom	Estimated SAR 1g value [W/kg] Ant.0 Wi-Fi Bottom	Estimated SAR 1g value [W/kg] Ant.1 Wi-Fi Bottom	Estimated Σ SAR 1g value [W/kg] (≤ 1.6 W/kg) Bottom	Distance between antenna [mm] (*2) Bottom	Simulated SPLSR value Bottom
SISO	BT(ant.0)+b(ant.1)	2.48	-	2.462	2	-	79	0.08	-	0.4	0.48	79	n/a
MIMO	n20(ant.0+ant.1)	-	2.462	2.462	-	22	22	-	0.92	0.4	1.32	79	n/a
SISO	BT(ant.0)+a(ant.1)	2.48	-	5.24	2	-	32	0.08	-	0.4	0.48	79	n/a
MIMO	n20(ant.0+ant.1)	-	5.24	5.24	-	16	16	-	0.98	0.4	1.38	79	n/a
SISO	BT(ant.0)+a(ant.1)	2.48	-	5.32	2	-	32	0.08	-	0.4	0.48	79	n/a
MIMO	n20(ant.0+ant.1)	-	5.32	5.32	-	16	16	-	0.98	0.4	1.38	79	n/a
SISO	BT(ant.0)+a(ant.1)	2.48	-	5.7	2	-	32	0.08	-	0.4	0.48	79	n/a
MIMO	n20(ant.0+ant.1)	-	5.7	5.7	-	16	16	-	1.02	0.4	1.42	79	n/a
SISO	BT(ant.0)+a(ant.1)	2.48	-	5.825	2	-	25	0.08	-	0.4	0.48	79	n/a
MIMO	n20(ant.0+ant.1)	-	5.825	5.825	-	16	16	-	1.03	0.4	1.43	79	n/a
Antenna separation distance [mm]								≤5	≤5	≥50	-	-	-

[SAR 10g]

SISO/ MIMO	Mode	Upper Freq.[GHz] Ant.0 BT	Upper Freq.[GHz] Ant.0 Wi-Fi	Upper Freq.[GHz] Ant.1 Wi-Fi	Max.P [mW] Ant.0 BT	Max.P [mW] Ant.0 Wi-Fi	Max.P [mW] Ant.1 Wi-Fi	Estimated SAR 1g value [W/kg] BT-Ant.0 (*1) Back	Top	Front	Left	Right	Wi-Fi-Ant.0 Back	Top	Front	Left	Right	Wi-Fi-Ant.1 Back	Top	Front	Left	Right
SISO	BT(ant.0)+b(ant.1)	2.48	-	2.462	2	-	79	0.03	0.03	0.03	0.03	0.03	-	-	-	-	-	1.32	1.32	1.32	1.0	1.0
MIMO	n20(ant.0+ant.1)	-	2.462	2.462	-	22	22	-	-	-	-	-	0.31	1.0	0.37	1.0	1.0	0.37	0.37	0.37	1.0	1.0
SISO	BT(ant.0)+a(ant.1)	2.48	-	5.24	2	-	32	0.03	0.03	0.03	0.03	0.03	-	-	-	-	-	0.78	0.78	0.78	1.0	1.0
MIMO	n20(ant.0+ant.1)	-	5.24	5.24	-	16	16	-	-	-	-	-	0.33	1.0	0.39	1.0	1.0	0.39	0.39	0.39	1.0	1.0
SISO	BT(ant.0)+a(ant.1)	2.48	-	5.32	2	-	32	0.03	0.03	0.03	0.03	0.03	-	-	-	-	-	0.79	0.79	0.79	1.0	1.0
MIMO	n20(ant.0+ant.1)	-	5.32	5.32	-	16	16	-	-	-	-	-	0.33	1.0	0.39	1.0	1.0	0.39	0.39	0.39	1.0	1.0
SISO	BT(ant.0)+a(ant.1)	2.48	-	5.7	2	-	32	0.03	0.03	0.03	0.03	0.03	-	-	-	-	-	0.82	0.82	0.82	1.0	1.0
MIMO	n20(ant.0+ant.1)	-	5.7	5.7	-	16	16	-	-	-	-	-	0.34	1.0	0.41	1.0	1.0	0.41	0.41	0.41	1.0	1.0
SISO	BT(ant.0)+a(ant.1)	2.48	-	5.825	2	-	25	0.03	0.03	0.03	0.03	0.03	-	-	-	-	-	0.64	0.64	0.64	1.0	1.0
MIMO	n20(ant.0+ant.1)	-	5.825	5.825	-	15	15	-	-	-	-	-	0.34	1.0	0.41	1.0	1.0	0.41	0.41	0.41	1.0	1.0
Antenna separation distance [mm]								6	≥50	≤5	≥50	≥50	6	≥50	≤5	≥50	≥50	≤5	≤5	≤5	≥50	≥50

SISO/ MIMO	Mode	Upper Freq.[GHz] Ant.0 BT	Upper Freq.[GHz] Ant.0 Wi-Fi	Upper Freq.[GHz] Ant.1 Wi-Fi	Max.P [mW] Ant.0 BT	Max.P [mW] Ant.0 Wi-Fi	Max.P [mW] Ant.1 Wi-Fi	Estimated Σ SAR 1g value [W/kg] (≤ 4.0 W/kg) Back	Top	Front	Left	Right	The distance between antenna [mm] (*2) Back	Top	Front	Left	Right	Simulated SPLSR value Back	Top	Front	Left	Right
SISO	BT(ant.0)+b(ant.1)	2.48	-	2.462	2	-	79	1.35	1.35	1.35	1.03	1.03	79	79	79	79	79	n/a	n/a	n/a	n/a	n/a
MIMO	n20(ant.0+ant.1)	-	2.462	2.462	-	22	22	0.68	1.37	0.74	2.00	2.00	79	79	79	79	79	n/a	n/a	n/a	n/a	n/a
SISO	BT(ant.0)+a(ant.1)	2.48	-	5.24	2	-	32	0.81	0.81	0.81	1.03	1.03	79	79	79	79	79	n/a	n/a	n/a	n/a	n/a
MIMO	n20(ant.0+ant.1)	-	5.24	5.24	-	16	16	0.72	1.39	0.78	2.00	2.00	79	79	79	79	79	n/a	n/a	n/a	n/a	n/a
SISO	BT(ant.0)+a(ant.1)	2.48	-	5.32	2	-	32	0.82	0.82	0.82	1.03	1.03	79	79	79	79	79	n/a	n/a	n/a	n/a	n/a
MIMO	n20(ant.0+ant.1)	-	5.32	5.32	-	16	16	0.72	1.39	0.79	2.00	2.00	79	79	79	79	79	n/a	n/a	n/a	n/a	n/a
SISO	BT(ant.0)+a(ant.1)	2.48	-	5.7	2	-	32	0.85	0.85	0.85	1.03	1.03	79	79	79	79	79	n/a	n/a	n/a	n/a	n/a
MIMO	n20(ant.0+ant.1)	-	5.7	5.7	-	16	16	0.75	1.41	0.81	2.00	2.00	79	79	79	79	79	n/a	n/a	n/a	n/a	n/a
SISO	BT(ant.0)+a(ant.1)	2.48	-	5.825	2	-	25	0.67	0.67	0.67	1.03	1.03	79	79	79	79	79	n/a	n/a	n/a	n/a	n/a
MIMO	n20(ant.0+ant.1)	-	5.825	5.825	-	15	15	0.76	1.41	0.82	2.00	2.00	79	79	79	79	79	n/a	n/a	n/a	n/a	n/a

*. Ant.0: Antenna 0, Ant1: Antenna 1, Freq.: Frequency, Max.P: Maximum power, BT: Bluetooth, b: IEEE 802.11b, a: IEEE 802.11a, n20: IEEE 802.11n(20HT), n/a: not applied.
*. RF transmitter will choose either Wi-Fi 2.4GHz or Wi-Fi 5GHz according to the network signal condition, therefore, 2.4GHz Wi-Fi and 5GHz Wi-Fi will not operate simultaneously at any moment.
*1. For Bluetooth operation, since the estimated SAR 1g value of 5mm separation distance was smaller than 0.4 W/kg (1.0 W/kg for SAR 10g), the estimated SAR 1g value of 5mm separation distance was used for the test separation distances is > 50 mm. Same approach was applied for SAR 10g consideration.
2. The distance between antenna 0 and antenna 1: back/front/left/right: 79 mm (.minimum physical distance), top/bottom: 79 mm (*. Even if the antenna is piled at this direction, the physical distance separate is 79mm.).

Notes: 1. Power and distance are rounded to the nearest mW and mm before calculation.
2. The upper frequency of the frequency band had maximum output power and was used in order to calculate standalone SAR test exclusion considerations.
3. The estimated Σ SAR 1g value is calculated based on the same configuration and the same test position.
4. The estimated results (SAR value, SPLSR value) are rounded to two decimal place for comparison.
5. (Calculating formula) Per KDB447498 D01(v06), SPLSR = (SAR1 + SAR2)^1.5 / (minimum antenna separation distance, mm)
where; the minimum antenna separation distance is determined by the closest physical separation of the antennas, according to geometric center of the antennas.

SECTION 5: Uncertainty Assessment (SAR measurement)

Although this standard determines only the limit value of uncertainty, there is no applicable rule of uncertainty in this. Therefore, the following results are derived depending on whether or not laboratory uncertainty is applied.

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) - Worst data rate/channel determination

(2.4GHz band)

Mode	Frequency		Data rate	Power spec.		Duty cycle		Antenna 0 power (Wi-Fi , Bluetooth)					Antenna 1 power (Wi-Fi)					MIMO Ant.0+1 power				
				Typical	Max.	duty cycle	scaled factor	Set pwr.	Burst Ave.	Δ Max.	Tune-up factor	Time Ave.	Set pwr.	Burst Ave.	Δ Max.	Tune-up factor	Time Ave.	MIMO target	MIMO max.	SUM Burst Ave.	Δ Max.	SUM Time Ave.
	[MHz]	CH	[Mbps]	[dBm]	[dBm]	[%]	[-]	[-]	[dBm]	[dB]	[-]	[dBm]	[-]	[dBm]	[dB]	[-]	[dBm]	[dBm]	[dBm]	[dBm]	[dB]	[dBm]
BLE	2402	0	1	0	2.0	-	-	-	n/a (*4)	-	-	n/a (*4)										
	2440	19	1	0	2.0	-	-	-	n/a (*4)	-	-	n/a (*4)										
	2480	39	1	0	2.0	-	-	-	n/a (*4)	-	-	n/a (*4)										
BDR	2401	0	DH5	0	2.0	-	-	-	n/a (*4)	-	-	n/a (*4)										
	2441	39	DH5	0	2.0	-	-	-	n/a (*4)	-	-	n/a (*4)										
	2480	78	DH5	0	2.0	-	-	-	n/a (*4)	-	-	n/a (*4)										
EDR	2401	0	2DH5	0	2.0	-	-	-	n/a (*4)	-	-	n/a (*4)										
	2441	39	2DH5	0	2.0	-	-	-	n/a (*4)	-	-	n/a (*4)										
	2480	78	2DH5	0	2.0	-	-	-	n/a (*4)	-	-	n/a (*4)										
	2401	0	3DH5	0	2.0	-	-	-	n/a (*4)	-	-	n/a (*4)										
	2441	39	3DH5	0	2.0	-	-	-	n/a (*4)	-	-	n/a (*4)										
	2480	78	3DH5	0	2.0	-	-	-	n/a (*4)	-	-	n/a (*4)										
b	2412	1	1	17.5	**19.0**	99.0	1.01	70	**17.08**	-1.92	1.56	17.04	70	**17.01**	-1.99	1.58	16.97					
	2437	6	1	17.5	**19.0**	99.0	1.01	70	**17.15**	-1.85	1.53	17.11	70	**17.06**	-1.94	1.56	17.02					
	2462	11	1	17.5	**19.0**	99.0	1.01	70	**17.00**	-2.00	1.58	16.96	70	**17.00**	-2.00	1.58	16.96					
	2467	12	1	8.5	**10.0**	99.0	1.01	34	**7.72**	-	-	7.68	34	**8.44**	-	-	8.40					
	2472	13	1	3.5	**5.0**	99.0	1.01	14	**2.76**	-	-	2.72	14	**3.59**	-	-	3.55					
g (*2)	2412	1	6	15.5	**17.0**	93.7	1.07	68(*1)	**16.32**	-0.68	1.17	16.04	68(*1)	**16.15**	-0.85	1.22	15.87					
	2437	6	6	16.5	**18.0**	93.7	1.07	68(*1)	**16.20**	-1.80	1.51	15.92	68(*1)	**16.16**	-1.84	1.53	15.88					
	2462	11	6	16.5	**18.0**	93.7	1.07	68(*1)	**16.02**	-1.98	1.58	15.74	68(*1)	**16.04**	-1.96	1.57	15.76					
	2467	12	6	8.5	**10.0**	93.7	1.07	36(*1)	**8.21**	-	-	7.93	36(*1)	**8.65**	-	-	8.37					
	2472	13	6	3.5	**5.0**	93.7	1.07	16(*1)	**3.11**	-	-	2.83	16(*1)	**3.93**	-	-	3.65					
n20 SISO (*2)	2412	1	MCS0	15.5	**17.0**	93.2	1.07	68(*1)	**16.11**	-0.89	1.23	15.80	68(*1)	**16.36**	-0.64	1.16	16.05					
	2437	6	MCS0	16.5	**18.0**	93.2	1.07	68(*1)	**16.09**	-1.91	1.55	15.78	68(*1)	**16.10**	-1.90	1.55	15.79					
	2462	11	MCS0	16.5	**18.0**	93.2	1.07	68(*1)	**16.05**	-1.95	1.57	15.74	68(*1)	**16.00**	-2.00	1.58	15.69					
	2467	12	MCS0	8.5	**10.0**	93.2	1.07	36(*1)	**8.01**	-	-	7.70	36(*1)	**8.66**	-	-	8.35					
	2472	13	MCS0	3.5	**5.0**	93.2	1.07	16(*1)	**2.81**	-	-	2.50	16(*1)	**3.70**	-	-	3.39					
ac20 SISO (*2)	2412	1	MCS0	15.5	**17.0**	93.3	1.07	68(*1)	**16.14**	-0.86	1.22	15.84	68(*1)	**16.09**	-0.91	1.23	15.79					
	2437	6	MCS0	16.5	**18.0**	93.3	1.07	68(*1)	**16.08**	-1.92	1.56	15.77	68(*1)	**16.14**	-1.86	1.53	15.73					
	2462	11	MCS0	16.5	**18.0**	93.3	1.07	68(*1)	**16.03**	-1.97	1.57	15.73	68(*1)	**16.00**	-2.00	1.58	15.70					
	2467	12	MCS0	8.5	**10.0**	93.3	1.07	36(*1)	**8.02**	-	-	7.72	36(*1)	**8.58**	-	-	8.28					
	2472	13	MCS0	3.5	**5.0**	93.3	1.07	16(*1)	**2.89**	-	-	2.59	16(*1)	**3.90**	-	-	3.60					
n40 SISO (*2)	2422	2	MCS0	8.5	**10.0**	87.3	1.15	34	**8.56**	-1.44	1.39	7.97	34	**8.92**	-1.08	1.28	8.33					
	2437	6	MCS0	8.5	**10.0**	87.3	1.15	34	**8.49**	-1.50	1.41	7.90	34	**8.73**	-1.27	1.34	8.13					
	2462	11	MCS0	8.5	**10.0**	87.3	1.15	34	**8.31**	-1.69	1.48	7.72	34	**8.72**	-1.28	1.34	8.13					
ac40 SISO (*2)	2422	2	MCS0	8.5	**10.0**	87.3	1.15	34	**8.60**	-1.40	1.38	8.01	34	**8.87**	-1.13	1.30	8.28					
	2437	6	MCS0	8.5	**10.0**	87.3	1.15	34	**8.36**	-1.63	1.46	7.77	34	**8.73**	-1.27	1.34	8.13					
	2462	11	MCS0	8.5	**10.0**	87.3	1.15	34	**8.30**	-1.70	1.48	7.71	34	**8.73**	-1.27	1.34	8.14					
n20 MIMO (*3)	2412	1	MCS8	11.0	**12.5**	87.6	1.14	52(*1)	12.48	-	-	11.91		12.49	-	-	11.92	14.0	**15.5**	15.49	-	14.92
	2437	6	MCS8	12.0	**13.5**	87.6	1.14	52(*1)	12.29	-	-	11.72		12.22	-	-	11.65	15.0	**16.5**	15.26	-	14.70
	2462	11	MCS8	12.0	**13.5**	87.6	1.14	52(*1)	12.19	-	-	11.62		12.20	-	-	11.63	15.0	**16.5**	15.21	-	14.63
	2467	12	MCS8	5.5	**7.0**	87.6	1.14	26(*1)	5.31	-	-	4.74		6.08	-	-	5.51	8.5	**11.0**	8.73	-	8.16
	2472	13	MCS8	0.5	**2.0**	87.6	1.14	6(*1)	0.31	-	-	-0.26		1.42	-	-	0.85	3.5	**5.0**	3.91	-	3.34
ac20 MIMO (*3)	2412	1	MCS0	11.0	**12.5**	87.8	1.14	52(*1)	12.50	-	-	11.93		12.47	-	-	11.90	14.0	**15.5**	15.49	-	14.93
	2437	6	MCS0	12.0	**13.5**	87.8	1.14	52(*1)	12.34	-	-	11.77		12.57	-	-	12.00	15.0	**16.5**	15.47	-	14.90
	2462	11	MCS0	12.0	**13.5**	87.8	1.14	52(*1)	12.31	-	-	11.74		12.20	-	-	11.63	15.0	**16.5**	15.27	-	14.70
	2467	12	MCS0	5.5	**7.0**	87.8	1.14	26(*1)	5.38	-	-	4.81		6.16	-	-	5.59	8.5	**11.0**	8.80	-	8.23
	2472	13	MCS0	0.5	**2.0**	87.8	1.14	6(*1)	0.29	-	-	-0.28		1.35	-	-	0.78	3.5	**5.0**	3.86	-	3.30
n40 MIMO (*3)	2422	2	MCS8	8.0	**9.5**	78.4	1.28	32	7.67	-	-	6.61		8.40	-	-	7.34	11.0	**12.5**	11.06	-	10.00
	2437	6	MCS8	8.0	**9.5**	78.4	1.28	32	7.79	-	-	6.72		8.21	-	-	7.16	11.0	**12.5**	11.01	-	9.96
	2457	10	MCS8	8.0	**9.5**	78.4	1.28	32	7.65	-	-	6.59		8.25	-	-	7.19	11.0	**12.5**	10.97	-	9.91
	2462	11	MCS8	5.5	**7.0**	78.4	1.28	22	4.99	-	-	3.93		5.59	-	-	4.53	8.5	**10.0**	8.31	-	7.25
ac40 MIMO (*3)	2422	2	MCS0	8.0	**9.5**	78.6	1.27	32	7.89	-	-	6.84		8.44	-	-	7.39	11.0	**12.5**	11.18	-	10.13
	2437	6	MCS0	8.0	**9.5**	78.6	1.27	32	7.82	-	-	6.78		8.23	-	-	7.19	11.0	**12.5**	11.04	-	9.99
	2457	10	MCS0	8.0	**9.5**	78.6	1.27	32	7.56	-	-	6.51		8.36	-	-	7.31	11.0	**12.5**	10.99	-	9.94
	2462	11	MCS0	5.5	**7.0**	78.6	1.27	22	4.96	-	-	3.91		5.61	-	-	4.56	8.5	**10.0**	8.31	-	7.26

*. Initial SAR test channel was chosen. (shaded yellow marker) This mode has the highest tune-up power, highest duty cycle and lowest modulation.

*. CH: Channel; Power spec.: Power specification; Max.: Maximum; Set pwr.: Setting power; Burst Ave.: Measured burst average power; SUM Ave.: Sum of antenna 0 power and antenna 1 power; n/a: Not applied, Not applicable; Mode; b: IEEE 802.11b, g: IEEE 802.11g, n20: IEEE 802.11n(20HT), n40: IEEE 802.11n(40HT), ac20: IEEE 802.11ac(20VHT), ac40: IEEE 802.11n(40VHT).

*1. The power setting was adjusted so that measured average power was not more than 2 dB lower than the maximum tune-up tolerance limit.

*2. According to KDB248227 D01, SAR is required for g, n20, ac20, n40 and ac40 channels 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.

*3. The standalone (SISO) SAR results were considered acceptable for the MIMO simultaneous transmission analysis as the MIMO power does not exceed the SISO power. The antenna separation distance will not be less than 50mm.

*4. Since the Bluetooth power was enough lower to exempt the SAR test, the power measurement was also reduced for the Bluetooth operation.

(5GHz band)

Mode	Frequency		Data rate	Power spec.		Duty cycle		Antenna 0 power (Wi-Fi , Bluetooth)					Antenna 1 power (Wi-Fi)					MIMO Ant.0+1 power				
				Typical	Max.	duty cycle	scaled factor	Set pwr.	Burst Ave.	Δ Max.	Tune-up factor	Time Ave.	Set pwr.	Burst Ave.	Δ Max.	Tune-up factor	Time Ave.	MIMO target	MIMO max.	SUM Burst Ave.	Δ Max.	SUM Time Ave.
	[MHz]	CH	[Mbps]	[dBm]	[dBm]	[%]	[-]	[-]	[dBm]	[dB]	[-]	[dBm]	[-]	[dBm]	[dB]	[-]	[dBm]	[dBm]	[dBm]	[dBm]	[dB]	[dBm]
a (*4)	5180	36	6	13.5	**15.0**	93.7	1.07	54	**13.06**	-1.94	1.56	12.78	54	**13.30**	-1.70	1.48	13.02					
	5200	40	6	13.5	**15.0**	93.7	1.07	54	**13.06**	-1.94	1.56	12.78	54	**13.18**	-1.82	1.52	12.90					
	5220	44	6	13.5	**15.0**	93.7	1.07	54	**13.00**	-2.00	1.58	12.72	54	**13.02**	-1.98	1.58	12.74					
	5240	48	6	13.5	**15.0**	93.7	1.07	54	**13.08**	-1.92	1.56	12.80	54	**13.11**	-1.89	1.55	12.83					
	5260	52	6	13.5	**15.0**	93.7	1.07	54	**13.12**	-1.88	1.54	12.84	54	**13.05**	-1.95	1.57	12.77					
	5280	56	6	13.5	**15.0**	93.7	1.07	54	**13.17**	-1.83	1.52	12.89	54	**13.18**	-1.82	1.52	12.90					
	5300	60	6	13.5	**15.0**	93.7	1.07	54	**13.49**	-1.51	1.42	13.21	54	**13.11**	-1.89	1.55	12.83					
	5320	64	6	13.5	**15.0**	93.7	1.07	54	**13.56**	-1.44	1.39	13.28	54	**13.37**	-1.63	1.46	13.09					
	5500	100	6	13.5	**15.0**	93.7	1.07	54	**13.45**	-1.55	1.43	13.17	54	**13.78**	-1.22	1.32	13.50					
	5580	116	6	13.5	**15.0**	93.7	1.07	54	**13.22**	-1.78	1.51	12.94	54	**13.49**	-1.51	1.42	13.21					
	5700	140	6	13.5	**15.0**	93.7	1.07	54	**13.34**	-1.66	1.47	13.06	54	**13.19**	-1.81	1.52	12.91					
	5745	149	6	12.5	**14.0**	93.7	1.07	54	**13.36**	-0.64	1.16	13.08	54	**13.33**	-0.67	1.17	13.05					
	5785	157	6	12.5	**14.0**	93.7	1.07	54	**13.20**	-0.80	1.20	12.92	54	**13.59**	-0.41	1.10	13.31					
	5825	165	6	12.5	**14.0**	93.7	1.07	54	**13.21**	-0.79	1.20	12.93	54	**13.55**	-0.45	1.11	13.27					
n20 SISO (*4)	5180	36	MCS0	13.5	**15.0**	93.2	1.07	54	**13.00**	-2.00	1.58	12.69	54	**13.24**	-1.76	1.50	12.93					
	5200	40	MCS0	13.5	**15.0**	93.2	1.07	54	**12.95**	-2.05	1.60	12.64	54	**13.32**	-1.68	1.47	13.01					
	5220	44	MCS0	13.5	**15.0**	93.2	1.07	54	**13.12**	-1.88	1.54	12.81	54	**13.04**	-1.96	1.57	12.73					
	5240	48	MCS0	13.5	**15.0**	93.2	1.07	54	**13.00**	-2.00	1.58	12.69	54	**13.03**	-1.97	1.57	12.72					
	5260	52	MCS0	13.5	**15.0**	93.2	1.07	54	**13.24**	-1.76	1.50	12.93	54	**13.03**	-1.97	1.57	12.72					
	5280	56	MCS0	13.5	**15.0**	93.2	1.07	54	**13.30**	-1.70	1.48	12.99	54	**13.20**	-1.80	1.51	12.89					
	5300	60	MCS0	13.5	**15.0**	93.2	1.07	54	**13.25**	-1.75	1.50	12.94	54	**13.02**	-1.98	1.58	12.71					
	5320	64	MCS0	13.5	**15.0**	93.2	1.07	54	**13.30**	-1.70	1.48	12.99	54	**13.26**	-1.74	1.49	12.95					
	5500	100	MCS0	13.5	**15.0**	93.2	1.07	54	**13.24**	-1.76	1.50	12.93	54	**13.81**	-1.19	1.32	13.50					
	5580	116	MCS0	13.5	**15.0**	93.2	1.07	54	**13.05**	-1.95	1.57	12.74	54	**13.44**	-1.56	1.43	13.13					
	5700	140	MCS0	13.5	**15.0**	93.2	1.07	54	**13.22**	-1.78	1.51	12.91	54	**13.05**	-1.95	1.57	12.74					
	5745	149	MCS0	12.5	**14.0**	93.2	1.07	54	**13.29**	-0.71	1.18	12.98	54	**13.23**	-0.77	1.19	12.92					
	5785	157	MCS0	12.5	**14.0**	93.2	1.07	54	**13.25**	-0.75	1.19	12.94	54	**13.45**	-0.55	1.14	13.14					
	5825	165	MCS0	12.5	**14.0**	93.2	1.07	54	**13.11**	-0.89	1.23	12.80	54	**13.62**	-0.38	1.09	13.31					
ac20 SISO (*4)	5180	36	MCS0	13.5	**15.0**	93.3	1.07	54	**13.01**	-1.99	1.58	12.71	54	**13.20**	-1.80	1.51	12.90					
	5200	40	MCS0	13.5	**15.0**	93.3	1.07	54	**12.91**	-2.09	1.62	12.61	54	**13.03**	-1.97	1.57	12.73					
	5220	44	MCS0	13.5	**15.0**	93.3	1.07	54	**13.09**	-1.91	1.55	12.79	54	**13.04**	-1.96	1.57	12.74					
	5240	48	MCS0	13.5	**15.0**	93.3	1.07	54	**13.10**	-1.90	1.55	12.80	54	**13.04**	-1.96	1.57	12.74					
	5260	52	MCS0	13.5	**15.0**	93.3	1.07	54	**13.08**	-1.92	1.56	12.78	54	**13.09**	-1.91	1.55	12.79					
	5280	56	MCS0	13.5	**15.0**	93.3	1.07	54	**13.25**	-1.75	1.50	12.95	54	**13.03**	-1.97	1.57	12.73					
	5300	60	MCS0	13.5	**15.0**	93.3	1.07	54	**13.18**	-1.82	1.52	12.88	54	**13.26**	-1.74	1.49	12.96					
	5320	64	MCS0	13.5	**15.0**	93.3	1.07	54	**13.40**	-1.60	1.45	13.10	54	**13.25**	-1.75	1.50	12.95					
	5500	100	MCS0	13.5	**15.0**	93.3	1.07	54	**13.30**	-1.70	1.48	13.00	54	**13.83**	-1.17	1.31	13.53					
	5580	116	MCS0	13.5	**15.0**	93.3	1.07	54	**13.30**	-1.70	1.48	13.00	54	**13.49**	-1.51	1.42	13.19					
	5700	140	MCS0	13.5	**15.0**	93.3	1.07	54	**13.12**	-1.88	1.54	12.82	54	**13.02**	-1.98	1.58	12.72					
	5745	149	MCS0	12.5	**14.0**	93.3	1.07	54	**13.32**	-0.68	1.17	13.02	54	**13.26**	-0.74	1.19	12.96					
	5785	157	MCS0	12.5	**14.0**	93.3	1.07	54	**13.21**	-0.79	1.20	12.91	54	**13.52**	-0.48	1.12	13.22					
	5825	165	MCS0	12.5	**14.0**	93.3	1.07	54	**13.14**	-0.86	1.22	12.84	54	**13.46**	-0.54	1.13	13.16					
n40 SISO (*4)	5190	38	MCS0	10.0	**11.5**	87.4	1.14	44(*1)	**9.93**	(*2)	-	9.35	44(*1)	**10.08**	(*2)	-	9.50					
	5230	46	MCS0	13.5	**15.0**	87.4	1.14	58(*1)	**13.73**	-1.27	1.34	13.15	58(*1)	**13.34**	-1.66	1.47	12.76					
	5270	54	MCS0	13.5	**15.0**	87.4	1.14	58(*1)	**13.68**	-1.32	1.36	13.10	58(*1)	**13.65**	-1.35	1.36	13.07					
	5310	62	MCS0	13.5	**15.0**	87.4	1.14	58(*1)	**13.98**	-1.02	1.26	13.40	58(*1)	**13.73**	-1.27	1.34	13.15					
	5510	102	MCS0	13.5	**15.0**	87.4	1.14	54	**13.37**	-1.63	1.46	12.79	54	**13.53**	-1.47	1.40	12.95					
	5550	110	MCS0	13.5	**15.0**	87.4	1.14	54	**13.18**	-1.82	1.52	12.60	54	**13.25**	-1.75	1.50	12.67					
	5670	134	MCS0	13.5	**15.0**	87.4	1.14	54	**13.06**	-1.94	1.56	12.48	54	**13.02**	-1.98	1.58	12.44					
	5755	151	MCS0	12.5	**14.0**	87.4	1.14	54	**13.17**	-0.83	1.21	12.59	54	**13.26**	-0.74	1.19	12.68					
	5795	159	MCS0	12.5	**14.0**	87.4	1.14	54	**13.16**	-0.84	1.21	12.58	54	**13.25**	-0.75	1.19	12.67					
ac40 SISO (*4)	5190	38	MCS0	10.0	**11.5**	87.6	1.14	44(*1)	**9.88**	(*2)	-	9.31	44(*1)	**10.36**	(*2)	-	9.79					
	5230	46	MCS0	13.5	**15.0**	87.6	1.14	58(*1)	**13.42**	-1.58	1.44	12.85	58(*1)	**13.62**	-1.38	1.37	13.05					
	5270	54	MCS0	13.5	**15.0**	87.6	1.14	58(*1)	**13.60**	-1.40	1.38	13.03	58(*1)	**13.60**	-1.40	1.38	13.03					
	5310	62	MCS0	13.5	**15.0**	87.6	1.14	58(*1)	**14.00**	-1.00	1.26	13.43	58(*1)	**13.68**	-1.32	1.36	13.11					
	5510	102	MCS0	13.5	**15.0**	87.6	1.14	54	**13.39**	-1.61	1.45	12.82	54	**13.64**	-1.36	1.37	13.07					
	5550	110	MCS0	13.5	**15.0**	87.6	1.14	54	**13.23**	-1.77	1.50	12.66	54	**13.27**	-1.73	1.49	12.70					
	5670	134	MCS0	13.5	**15.0**	87.6	1.14	54	**13.15**	-1.85	1.53	12.58	54	**13.02**	-1.98	1.58	12.45					
	5755	151	MCS0	12.5	**14.0**	87.6	1.14	54	**13.21**	-0.79	1.20	12.64	54	**13.20**	-0.80	1.20	12.63					
	5795	159	MCS0	12.5	**14.0**	87.6	1.14	54	**13.18**	-0.82	1.21	12.61	54	**13.23**	-0.77	1.19	12.66					
ac80 SISO (*4)	5210	42	MCS0	9.0	**10.5**	77.7	1.29	40(*1)	**8.64**	-	-	7.54	40(*1)	**9.03**	-	-	7.93					
	5290	58	MCS0	9.0	**10.5**	77.7	1.29	40(*1)	**8.86**	-	-	7.76	40(*1)	**9.32**	-	-	8.22					
	5530	106	MCS0	10.5	**12.0**	77.7	1.29	-	- (*3)	-	-	-	-	- (*3)	-	-	-					
	5775	155	MCS0	12.5	**14.0**	77.7	1.29	54	**13.01**	-0.99	1.26	11.91	54	**13.06**	-0.94	1.24	11.96					

*. Initial SAR test channel was chosen. (shaded yellow marker) This mode has the higher bandwidth with the highest tune-up power.

(cont'd)

(cont'd)(5GHz band)

Mode	Frequency		Data rate	Power spec.		Duty cycle		Antenna 0 power (Wi-Fi, Bluetooth)					Antenna 1 power (Wi-Fi)					MIMO Ant.0+1 power				
				Typical	Max.	duty cycle	scaled factor	Set pwr.	Burst Ave.	Δ Max.	Tune-up factor	Time Ave.	Set pwr.	Burst Ave.	Δ Max.	Tune-up factor	Time Ave.	MIMO target	MIMO max.	SUM Burst Ave.	Δ Max.	SUM Time Ave.
	[MHz]	CH	[Mbps]	[dBm]	[dBm]	[%]	[-]	[-]	[dBm]	[dB]	[-]	[dBm]	[-]	[dBm]	[dB]	[-]	[dBm]	[dBm]	[dBm]	[dBm]	[dB]	[dBm]
n20 MIMO (*5)	5180	36	MCS8	10.5	**12.0**	87.7	1.14	42	9.73	-	-	9.16		10.43	-	-	9.86	13.5	**15.0**	13.10	-	12.53
	5200	40	MCS8	10.5	**12.0**	87.7	1.14	42	9.84	-	-	9.27		10.30	-	-	9.73	13.5	**15.0**	13.09	-	12.52
	5220	44	MCS8	10.5	**12.0**	87.7	1.14	42	9.83	-	-	9.26		10.26	-	-	9.69	13.5	**15.0**	13.06	-	12.49
	5240	48	MCS8	10.5	**12.0**	87.7	1.14	42	9.93	-	-	9.36		10.28	-	-	9.71	13.5	**15.0**	13.12	-	12.55
	5260	52	MCS8	10.5	**12.0**	87.7	1.14	42	9.75	-	-	9.18		10.50	-	-	9.93	13.5	**15.0**	13.15	-	12.58
	5280	56	MCS8	10.5	**12.0**	87.7	1.14	42	9.83	-	-	9.26		10.44	-	-	9.87	13.5	**15.0**	13.16	-	12.59
	5300	60	MCS8	10.5	**12.0**	87.7	1.14	42	9.98	-	-	9.41		10.52	-	-	9.95	13.5	**15.0**	13.27	-	12.70
	5320	64	MCS8	10.5	**12.0**	87.7	1.14	42	10.11	-	-	9.54		10.51	-	-	9.94	13.5	**15.0**	13.33	-	12.75
	5500	100	MCS8	10.5	**12.0**	87.7	1.14	42	10.23	-	-	9.66		10.93	-	-	10.36	13.5	**15.0**	13.60	-	13.03
	5580	116	MCS8	10.5	**12.0**	87.7	1.14	42	10.08	-	-	9.51		10.48	-	-	9.91	13.5	**15.0**	13.30	-	12.72
	5700	140	MCS8	10.5	**12.0**	87.7	1.14	42	10.27	-	-	9.70		10.37	-	-	9.80	13.5	**15.0**	13.33	-	12.76
	5745	149	MCS8	10.5	**12.0**	87.7	1.14	42	10.51	-	-	9.94		10.41	-	-	9.84	13.5	**15.0**	13.47	-	12.90
	5785	157	MCS8	10.5	**12.0**	87.7	1.14	42	10.40	-	-	9.83		10.57	-	-	10.00	13.5	**15.0**	13.49	-	12.93
	5825	165	MCS8	10.5	**12.0**	87.7	1.14	42	10.31	-	-	9.74		10.57	-	-	10.00	13.5	**15.0**	13.45	-	12.88
ac20 MIMO (*5)	5180	36	MCS0	10.5	**12.0**	87.8	1.14	42	9.79	-	-	9.22		10.35	-	-	9.78	13.5	**15.0**	13.09	-	12.52
	5200	40	MCS0	10.5	**12.0**	87.8	1.14	42	9.87	-	-	9.30		10.43	-	-	9.86	13.5	**15.0**	13.17	-	12.60
	5220	44	MCS0	10.5	**12.0**	87.8	1.14	42	9.88	-	-	9.31		10.22	-	-	9.65	13.5	**15.0**	13.06	-	12.49
	5240	48	MCS0	10.5	**12.0**	87.8	1.14	42	9.91	-	-	9.34		10.20	-	-	9.63	13.5	**15.0**	13.07	-	12.50
	5260	52	MCS0	10.5	**12.0**	87.8	1.14	42	9.80	-	-	9.23		10.38	-	-	9.81	13.5	**15.0**	13.11	-	12.54
	5280	56	MCS0	10.5	**12.0**	87.8	1.14	42	9.82	-	-	9.25		10.41	-	-	9.84	13.5	**15.0**	13.13	-	12.56
	5300	60	MCS0	10.5	**12.0**	87.8	1.14	42	9.94	-	-	9.37		10.41	-	-	9.84	13.5	**15.0**	13.19	-	12.62
	5320	64	MCS0	10.5	**12.0**	87.8	1.14	42	10.11	-	-	9.54		10.54	-	-	9.97	13.5	**15.0**	13.34	-	12.77
	5500	100	MCS0	10.5	**12.0**	87.8	1.14	42	10.31	-	-	9.74		10.89	-	-	10.32	13.5	**15.0**	13.62	-	13.05
	5580	116	MCS0	10.5	**12.0**	87.8	1.14	42	10.10	-	-	9.53		10.43	-	-	9.86	13.5	**15.0**	13.28	-	12.71
	5700	140	MCS0	10.5	**12.0**	87.8	1.14	42	10.29	-	-	9.72		10.43	-	-	9.86	13.5	**15.0**	13.37	-	12.80
	5745	149	MCS0	10.5	**12.0**	87.8	1.14	42	10.45	-	-	9.88		10.37	-	-	9.80	13.5	**15.0**	13.42	-	12.85
	5785	157	MCS0	10.5	**12.0**	87.8	1.14	42	10.38	-	-	9.81		10.57	-	-	10.00	13.5	**15.0**	13.48	-	12.92
	5825	165	MCS0	10.5	**12.0**	87.8	1.14	42	10.27	-	-	9.70		10.67	-	-	10.10	13.5	**15.0**	13.48	-	12.91
n40 MIMO (*5)	5190	38	MCS8	7.0	**8.5**	79.0	1.27	32(*1)	6.57	-	-	5.55		7.44	-	-	6.42	10.0	**11.5**	10.04	-	9.02
	5230	46	MCS8	10.5	**12.0**	79.0	1.27	42	9.77	-	-	8.75		10.23	-	-	9.21	13.5	**15.0**	13.01	-	12.00
	5270	54	MCS8	10.5	**12.0**	79.0	1.27	42	9.80	-	-	8.78		10.41	-	-	9.39	13.5	**15.0**	13.13	-	12.11
	5310	62	MCS8	10.5	**12.0**	79.0	1.27	42	10.04	-	-	9.02		10.49	-	-	9.47	13.5	**15.0**	13.28	-	12.26
	5510	102	MCS8	10.5	**12.0**	79.0	1.27	42	10.32	-	-	9.30		11.00	-	-	9.98	13.5	**15.0**	13.68	-	12.66
	5550	110	MCS8	10.5	**12.0**	79.0	1.27	42	10.25	-	-	9.23		11.04	-	-	10.02	13.5	**15.0**	13.67	-	12.66
	5670	134	MCS8	10.5	**12.0**	79.0	1.27	42	10.13	-	-	9.11		10.65	-	-	9.63	13.5	**15.0**	13.41	-	12.39
	5755	151	MCS8	10.5	**12.0**	79.0	1.27	42	10.59	-	-	9.57		10.62	-	-	9.60	13.5	**15.0**	13.62	-	12.60
	5795	159	MCS8	10.5	**12.0**	79.0	1.27	42	10.44	-	-	9.42		10.66	-	-	9.64	13.5	**15.0**	13.56	-	12.54
ac40 MIMO (*5)	5190	38	MCS0	7.0	**8.5**	79.1	1.26	32(*1)	6.55	-	-	5.53		7.42	-	-	6.40	10.0	**11.5**	10.02	-	9.00
	5230	46	MCS0	10.5	**12.0**	79.1	1.26	42	9.72	-	-	8.70		10.26	-	-	9.24	13.5	**15.0**	13.01	-	11.99
	5270	54	MCS0	10.5	**12.0**	79.1	1.26	42	9.81	-	-	8.79		10.42	-	-	9.40	13.5	**15.0**	13.14	-	12.12
	5310	62	MCS0	10.5	**12.0**	79.1	1.26	42	9.88	-	-	8.86		10.47	-	-	9.45	13.5	**15.0**	13.20	-	12.17
	5510	102	MCS0	10.5	**12.0**	79.1	1.26	42	10.34	-	-	9.32		11.07	-	-	10.05	13.5	**15.0**	13.73	-	12.71
	5550	110	MCS0	10.5	**12.0**	79.1	1.26	42	10.27	-	-	9.25		10.98	-	-	9.96	13.5	**15.0**	13.65	-	12.63
	5670	134	MCS0	10.5	**12.0**	79.1	1.26	42	10.27	-	-	9.25		10.67	-	-	9.65	13.5	**15.0**	13.48	-	12.46
	5755	151	MCS0	10.5	**12.0**	79.1	1.26	42	10.65	-	-	9.63		10.60	-	-	9.58	13.5	**15.0**	13.63	-	12.62
	5795	159	MCS0	10.5	**12.0**	79.1	1.26	42	10.57	-	-	9.55		10.64	-	-	9.62	13.5	**15.0**	13.62	-	12.60
ac80 MIMO (*5)	5210	42	MCS0	6.0	**7.5**	67.1	1.49	28(*1)	5.48	-	-	3.75		5.79	-	-	4.06	9.0	**10.5**	8.65	-	6.92
	5290	58	MCS0	6.0	**7.5**	67.1	1.49	28(*1)	5.59	-	-	3.86		5.82	-	-	4.09	9.0	**10.5**	8.72	-	6.98
	5530	106	MCS0	7.5	**9.0**	67.1	1.49	-	- (*3)	-	-	-		- (*3)	-	-	-	10.5	**12.0**	- (*3)	-	-
	5775	155	MCS0	10.5	**12.0**	67.1	1.49	42	10.47	-	-	8.74		10.41	-	-	8.68	13.5	**15.0**	13.45	-	11.72

*. CH: Channel; Power spec.: Power specification; Max.: Maximum; Set pwr.: Setting power; Burst Ave.: Measured burst average power; SUM Ave.: Sum of antenna 0 power and antenna 1 power; Mode; 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. The power setting was adjusted so that measured average power was not more than 2 dB lower than the maximum tune-up tolerance limit.

*2. Since the lower channel of this mode had lower power than other channels, the lower channel of other mode was tested to verify the SAR at lower channel.

*3. Since the power of 5530MHz in ac80 mode was changed smaller than the lower bandwidth mode after initial power measurement, the power of this channel was not measured again and not applied the SAR test.

*4. When the same transmission mode configurations have the same maximum output power on the same channel for the a/n/ac modes, the channel with the largest bandwidth and lowest data rate is selected.

*5. The standalone (SISO) SAR results were considered acceptable for the MIMO simultaneous transmission analysis as the MIMO power does not exceed the SISO power. The antenna separation distance will not be less than 50mm.

*6. When the specified maximum output power is the same for both UNII band I and UNII band 2A, begin SAR measurement in UNII band 2A; and if the highest reported SAR for UNII band 2A is; ≤ 1.2 W/kg, SAR is not required for UNII band I / > 1.2 W/kg, both bands should be tested independently for SAR.

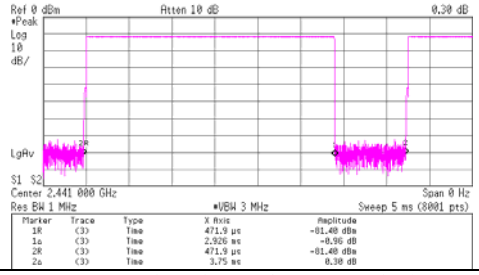
*. Calculating formula: Burst power (dBm) = (P/M Reading, dBm)+(Cable loss, dB)+(Attenuator, dB)+(duty factor, dB)
Duty cycle: (duty cycle, %) = (Tx on time, ms) / (1 cycle time, ms) × 100, where Duty factor (dBm) = 10 × log (100/(duty cycle, %))
Duty cycle scaled factor: Duty cycle correction factor for obtained SAR value, Duty scaled factor [-] = 100(%) / (duty cycle, %)
ΔMax. (Deviation form maximum power, dB) = (Burst power measured (average, dBm)) - (Max.tune-up limit power (average, dBm))
Tune-up factor: Power tune-up factor for obtained SAR value, Tune-up factor [-] = 1 / (10 ^ ("Deviation from max., dB" / 10))

*. Date measured: January 8~11, 2019 / Measured by: H. Naka / Place: No. 1 measurement room. (25 ±1 deg.C./50 ±10 %RH)

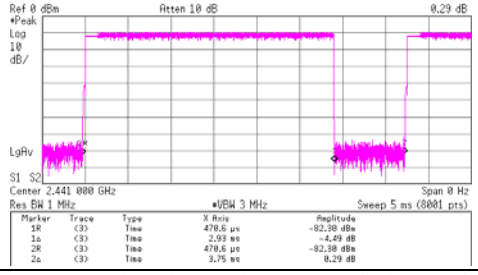
*. Uncertainty of antenna port conducted test; (±) 0.81 dB (Average power), (±) 0.95 dB (Average power, BW80MHz), (±) 0.012 % (duty cycle).

*. Duty cycle conformation. Date measured: January 8~11, 2019 / Measured by: Y, Ishikawa / Place: No. 1 measurement room. (25 ±1 deg.C./50 ±10 %RH)

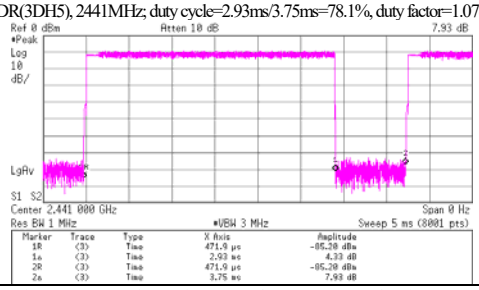
BDR(DH5), 2441MHz; duty cycle=2.926ms/3.75ms=78.0%, duty factor=1.08dB



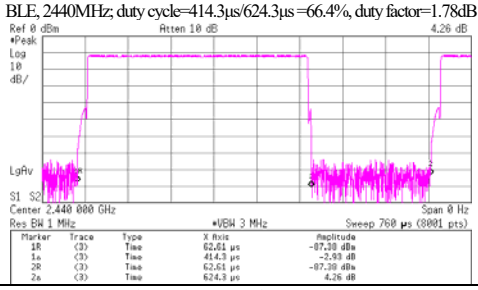
EDR(2DH5), 2441MHz; duty cycle=2.93ms/3.75ms=78.1%, duty factor=1.07dB



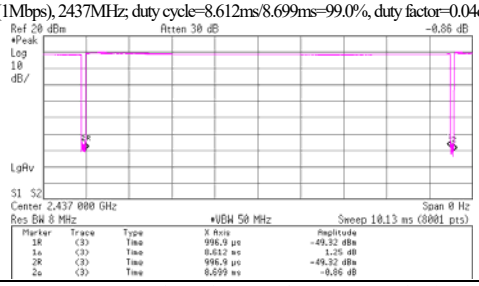
EDR(3DH5), 2441MHz; duty cycle=2.93ms/3.75ms=78.1%, duty factor=1.07dB



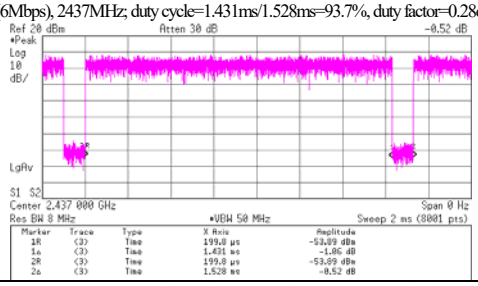
BLE, 2440MHz; duty cycle=414.3µs/624.3µs =66.4%, duty factor=1.78dB



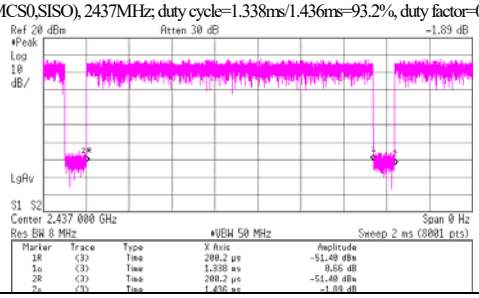
b(1Mbps), 2437MHz; duty cycle=8.612ms/8.699ms=99.0%, duty factor=0.04dB



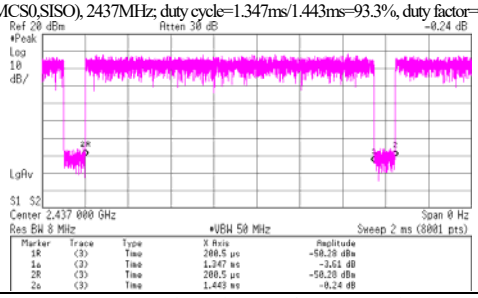
g(6Mbps), 2437MHz; duty cycle=1.431ms/1.528ms=93.7%, duty factor=0.28dB



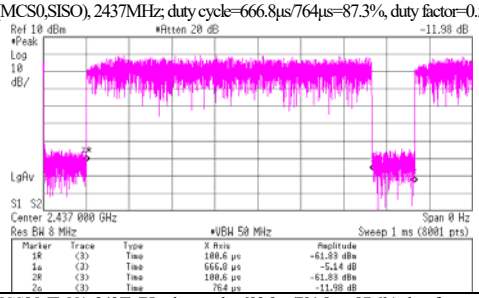
n20(MCS0,SISO), 2437MHz; duty cycle=1.338ms/1.436ms=93.2%, duty factor=0.31dB



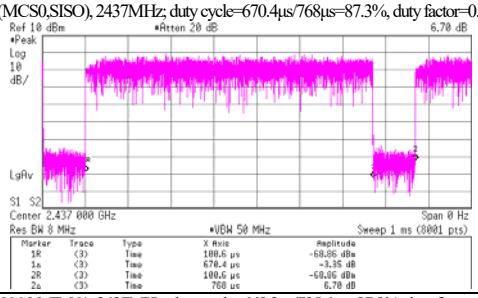
ac20(MCS0,SISO), 2437MHz; duty cycle=1.347ms/1.443ms=93.3%, duty factor=0.30dB



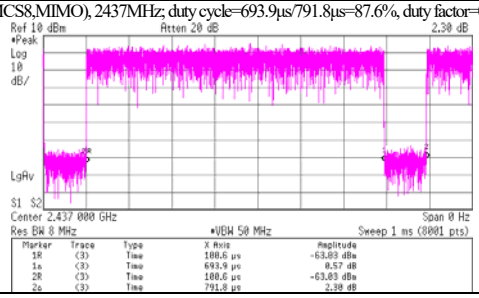
n40(MCS0,SISO), 2437MHz; duty cycle=666.8µs/764µs=87.3%, duty factor=0.59dB



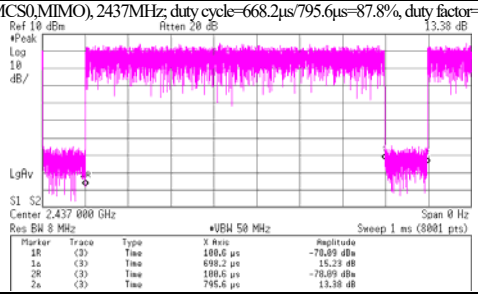
ac40(MCS0,SISO), 2437MHz; duty cycle=670.4µs/768µs=87.3%, duty factor=0.59dB



n20(MCS8,MIMO), 2437MHz; duty cycle=693.9µs/791.8µs=87.6%, duty factor=0.59dB

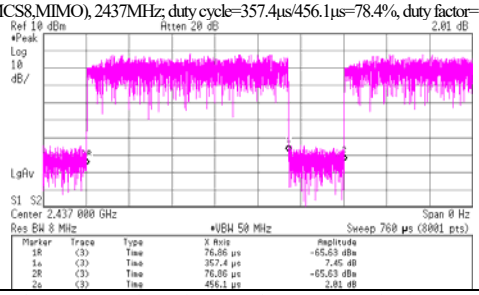


ac20(MCS0,MIMO), 2437MHz; duty cycle=668.2µs/795.6µs=87.8%, duty factor=0.57dB

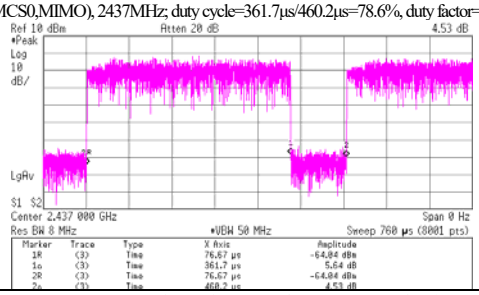


(cont'd)

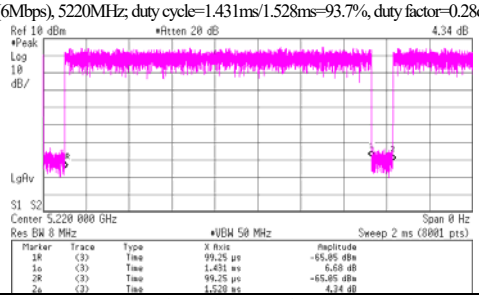
n40(MCS8,MIMO), 2437MHz; duty cycle=357.4μs/456.1μs=78.4%, duty factor=1.06dB



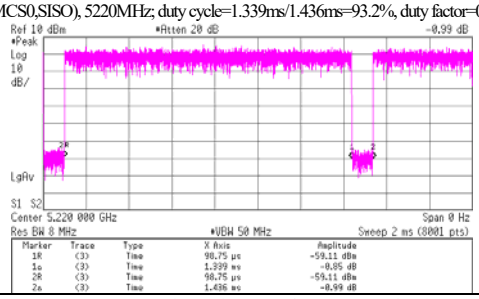
ac40(MCS0,MIMO), 2437MHz; duty cycle=361.7μs/460.2μs=78.6%, duty factor=1.05dB



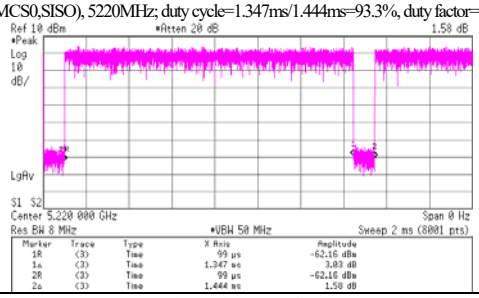
a(6Mbps), 5220MHz; duty cycle=1.431ms/1.528ms=93.7%, duty factor=0.28dB



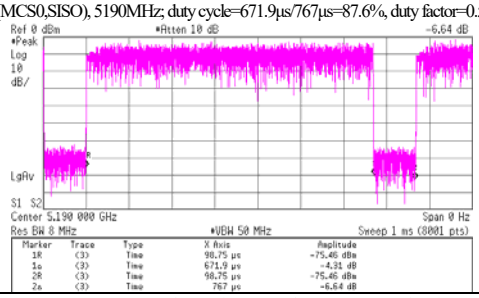
n20(MCS0,SISO), 5220MHz; duty cycle=1.339ms/1.436ms=93.2%, duty factor=0.31dB



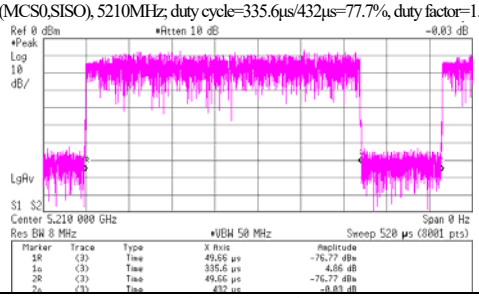
ac20(MCS0,SISO), 5220MHz; duty cycle=1.347ms/1.444ms=93.3%, duty factor=0.30dB



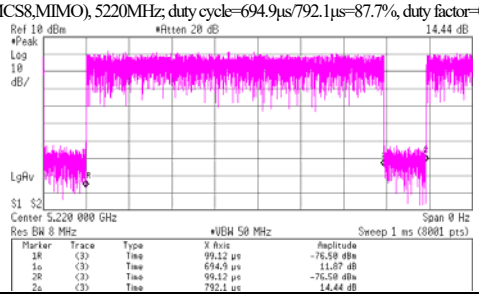
n40(MCS0,SISO), 5190MHz; duty cycle=671.9μs/767μs=87.6%, duty factor=0.57dB



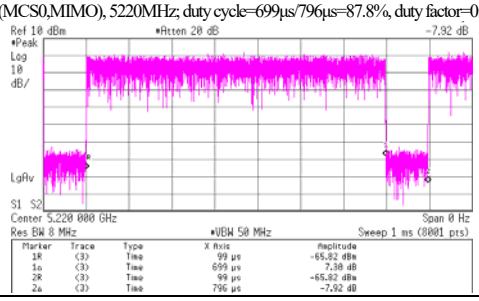
ac80(MCS0,SISO), 5210MHz; duty cycle=335.6μs/432μs=77.7%, duty factor=1.10dB



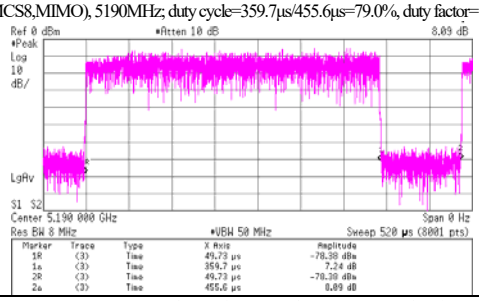
n20(MCS8,MIMO), 5220MHz; duty cycle=694.9μs/792.1μs=87.7%, duty factor=0.57dB



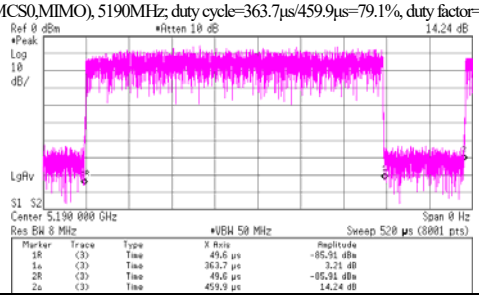
ac20(MCS0,MIMO), 5220MHz; duty cycle=699μs/796μs=87.8%, duty factor=0.57dB



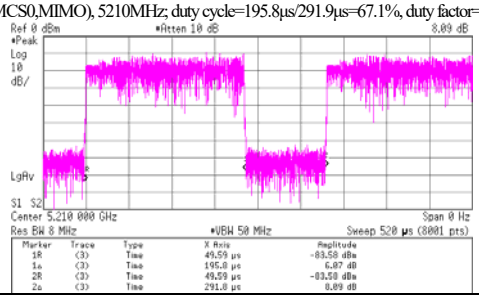
n40(MCS8,MIMO), 5190MHz; duty cycle=359.7μs/455.6μs=79.0%, duty factor=1.02dB



ac40(MCS0,MIMO), 5190MHz; duty cycle=363.7μs/459.9μs=79.1%, duty factor=1.02dB



ac80(MCS0,MIMO), 5210MHz; duty cycle=195.8μs/291.9μs=67.1%, duty factor=1.73dB



SECTION 7: SAR Measurement results

7.1 Liquid parameters

Measurement date: June 28 ~ February 6, 2019 Measurement by: Hiroshi Naka

[Liquid measurement]

Target Frequency [MHz]	Liquid type	Liquid parameters (*a) Permittivity (εr) [-] Target	Measured Meas.	Measured Δεr [%]	Limit (*b)	Conductivity [S/m] Target	Measured Meas.	Measured Δσ [%]	Limit (*b)	Temp. [deg.C.]	Depth [mm]	ΔSAR Coefficients(*c) ΔSAR [%] (1g)	ΔSAR [%] (10g)	Correction required?	Date measured
2412	Body	52.75	50.94	-3.4	-5% ≤ εr-meas. ≤ 0%	1.914	1.969	+2.9	0% ≤ σ-meas. ≤ +5%	21.9	151	+2.19	+1.32	not required.	January 28~29, 2019, before SAR test (*1)
2437		52.72	50.85	-3.6		1.938	2.003	+3.4				+2.43	+1.45	not required.	
2462		52.68	50.74	-3.7		1.967	2.038	+3.6				+2.56	+1.52	not required.	
5180	Body	49.04	48.51	-1.1	-5% ≤ εr-meas. ≤ 0%	5.276	5.334	+1.1	0% ≤ σ-meas. ≤ +5%	23.0	151	+0.19	+0.22	not required.	January 30, 2019, before SAR test
5190		49.03	48.45	-1.2		5.288	5.343	+1.0				+0.21	+0.24	not required.	
5220		48.99	48.40	-1.2		5.323	5.391	+1.3				+0.21	+0.24	not required.	
5230		48.97	48.42	-1.1		5.334	5.405	+1.3				+0.19	+0.22	not required.	
5240		48.96	48.40	-1.1		5.346	5.422	+1.4				+0.19	+0.22	not required.	
5260		48.93	48.36	-1.2		5.369	5.438	+1.3				+0.20	+0.23	not required.	
5270		48.92	48.35	-1.2		5.381	5.459	+1.4				+0.19	+0.22	not required.	
5300		48.88	48.30	-1.2		5.416	5.494	+1.4				+0.19	+0.23	not required.	
5310		48.87	48.28	-1.2		5.428	5.501	+1.4				+0.20	+0.24	not required.	
5320		48.85	48.25	-1.2		5.439	5.512	+1.3				+0.20	+0.24	not required.	
5500	Body	48.61	47.97	-1.3	-5% ≤ εr-meas. ≤ 0%	5.650	5.768	+2.1	0% ≤ σ-meas. ≤ +5%	23.0	151	+0.17	+0.24	not required.	January 31, 2019, before SAR test
5510		48.59	47.97	-1.3		5.661	5.775	+2.0				+0.17	+0.24	not required.	
5550		48.54	47.90	-1.3		5.708	5.827	+2.1				+0.17	+0.24	not required.	
5580		48.50	47.87	-1.3		5.743	5.874	+2.3				+0.16	+0.23	not required.	
5670		48.49	47.85	-1.3		5.755	5.883	+2.2				+0.16	+0.24	not required.	
5700		48.38	47.70	-1.4		5.848	6.006	+2.7				+0.15	+0.25	not required.	
5745	Body	48.27	47.60	-1.4	-5% ≤ εr-meas. ≤ 0%	5.936	6.108	+2.9	0% ≤ σ-meas. ≤ +5%	23.0	151	+0.15	+0.25	not required.	February 1, 2019, before SAR test
5755		48.26	47.58	-1.4		5.947	6.134	+3.1				+0.14	+0.25	not required.	
5775		48.23	47.56	-1.4		5.971	6.155	+3.1				+0.14	+0.25	not required.	
5785		48.22	47.51	-1.5		5.982	6.172	+3.2				+0.15	+0.27	not required.	
5795		48.21	47.52	-1.4		5.994	6.182	3.1				+0.14	+0.27	not required.	
5825		48.17	47.49	-1.4		6.029	6.220	+3.2				+0.14	+0.26	not required.	
5180	Body	49.04	48.42	-1.3	-5% ≤ εr-meas. ≤ 0%	5.276	5.364	+1.7	0% ≤ σ-meas. ≤ +5%	23.0	151	+0.22	+0.24	not required.	February 4, 2019, before SAR test
5190		49.03	48.43	-1.2		5.288	5.370	+1.6				+0.21	+0.23	not required.	
5220		48.99	48.37	-1.3		5.323	5.417	+1.8				+0.21	+0.23	not required.	
5230		48.97	48.34	-1.3		5.334	5.434	+1.9				+0.21	+0.24	not required.	
5240		48.96	48.32	-1.3		5.346	5.446	+1.9				+0.21	+0.23	not required.	
5260		48.93	48.27	-1.4		5.369	5.480	+2.1				+0.21	+0.24	not required.	
5270		48.92	48.25	-1.4		5.381	5.484	+1.9				+0.22	+0.25	not required.	
5300		48.88	48.23	-1.3		5.416	5.531	+2.1				+0.20	+0.23	not required.	
5310		48.87	48.20	-1.4		5.428	5.533	+1.9				+0.21	+0.25	not required.	
5320		48.85	48.21	-1.3		5.439	5.540	+1.9				+0.20	+0.24	not required.	
5500	Body	48.61	47.93	-1.4	-5% ≤ εr-meas. ≤ 0%	5.650	5.793	+2.5	0% ≤ σ-meas. ≤ +5%	23.0	151	+0.17	+0.24	not required.	February 5, 2019, before SAR test
5510		48.59	47.90	-1.4		5.661	5.793	+2.3				+0.19	+0.26	not required.	
5550		48.54	47.82	-1.5		5.708	5.866	+2.8				+0.18	+0.25	not required.	
5580		48.50	47.79	-1.5		5.743	5.898	+2.7				+0.17	+0.25	not required.	
5670		48.49	47.75	-1.5		5.755	5.917	+2.8				+0.18	+0.27	not required.	
5700		48.38	47.62	-1.6		5.848	6.026	+3.1				+0.17	+0.28	not required.	
5745	Body	48.27	47.50	-1.6	-5% ≤ εr-meas. ≤ 0%	5.936	6.130	+3.3	0% ≤ σ-meas. ≤ +5%	23.0	151	+0.17	+0.30	not required.	February 6, 2019, before SAR test
5755		48.26	47.48	-1.6		5.947	6.148	+3.4				+0.17	+0.30	not required.	
5775		48.23	47.45	-1.6		5.971	6.181	+3.5				+0.16	+0.30	not required.	
5785		48.22	47.46	-1.6		5.982	6.183	+3.4				+0.16	+0.29	not required.	
5795		48.21	47.43	-1.6		5.994	6.196	+3.4				+0.17	+0.30	not required.	
5825		48.17	47.38	-1.6		6.029	6.250	+3.7				+0.16	+0.31	not required.	

*1. On January 29, it was within 24 hours from measurement on January 28 and same liquid temperature, so parameters of January 28 were used continuously.

*a. The target values of (2000, 2450, 3000 and 5800) MHz are parameters defined in Appendix A of KDB 865664 D01. For other frequencies, the target nominal dielectric values shall be obtained by linear interpolation between the higher and lower tabulated figures. Above 5800MHz were obtained using linear extrapolation.

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

*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

7.2 SAR results: 2.4 GHz band

Test setup			Mode	Data rate [Mbps] or [MCS]	Frequency		Duty cycle		Power correction			SAR results [W/kg] (Max.value of multi-peak)				SAR plot # in Appendix 2-2	SAR type	SAR Limit [W/kg]	Remarks
Test position "*" is Initial test position.	Gap [mm]	Source power			[MHz]	CH	Duty [%]	Duty scaled factor	Tune-up limit [dBm]	Meas. [dBm]	Tune-up factor	Meas.	ΔSAR [%]	ΔSAR corrected	Reported (*b)				
[Tx: Antenna 0]																			
Bottom*	0	Battery	b	1	2412	1	99.0	1.01	19.0	17.08	1.56	**0.482**	+2.19	n/a (*a)	**0.759**	1-1	1g	1.6	*Higher, SAR1g
		Battery			2437	6	99.0	1.01	19.0	17.15	1.53	**0.442**	+2.43	n/a (*a)	**0.683**	1-3	1g	1.6	-
		Battery			2462	11	99.0	1.01	19.0	17.00	1.58	**0.408**	+2.56	n/a (*a)	**0.651**	1-4	1g	1.6	-
Front	0	USB	b	1	2412	1	99.0	1.01	19.0	17.08	1.56	**0.307**	+1.32	n/a (*a)	**0.484**	1-5	10g	4.0	-
		USB			2437	6	99.0	1.01	19.0	17.15	1.53	**0.285**	+1.45	n/a (*a)	**0.440**	1-6	10g	4.0	-
		USB			2462	11	99.0	1.01	19.0	17.00	1.58	**0.280**	+1.52	n/a (*a)	**0.447**	1-7	10g	4.0	-
Back	0	USB	b	1	2412	1	99.0	1.01	19.0	17.08	1.56	**0.480**	+1.32	n/a (*a)	**0.756**	1-2	10g	4.0	*Higher, SAR10g
		USB			2437	6	99.0	1.01	19.0	17.15	1.53	**0.446**	+1.45	n/a (*a)	**0.689**	1-8	10g	4.0	-
		USB			2462	11	99.0	1.01	19.0	17.00	1.58	**0.392**	+1.52	n/a (*a)	**0.626**	1-9	10g	4.0	-
[Tx: Antenna 1]																			
Top*	0	USB	b	1	2412	1	99.0	1.01	19.0	17.01	1.58	**0.242**	+1.32	n/a (*a)	**0.386**	1-10	10g	4.0	-
		USB			2437	6	99.0	1.01	19.0	17.06	1.56	**0.275**	+1.45	n/a (*a)	**0.433**	1-11	10g	4.0	-
		USB			2462	11	99.0	1.01	19.0	17.00	1.58	**0.301**	+1.52	n/a (*a)	**0.480**	1-12	10g	4.0	-
Front	0	USB	b	1	2412	1	99.0	1.01	19.0	17.01	1.58	**0.229**	+1.32	n/a (*a)	**0.365**	1-13	10g	4.0	-
		USB			2437	6	99.0	1.01	19.0	17.06	1.56	**0.246**	+1.45	n/a (*a)	**0.388**	1-14	10g	4.0	-
		USB			2462	11	99.0	1.01	19.0	17.00	1.58	**0.261**	+1.52	n/a (*a)	**0.417**	1-15	10g	4.0	-
Back	0	USB	b	1	2412	1	99.0	1.01	19.0	17.01	1.58	**n/a**	+1.32	n/a (*a)	**n/a**	-	10g	4.0	-
		USB			2437	6	99.0	1.01	19.0	17.06	1.56	**0.062**	+1.45	n/a (*a)	**0.098**	1-16	10g	4.0	<2
		USB			2462	11	99.0	1.01	19.0	17.00	1.58	**n/a**	+1.52	n/a (*a)	**n/a**	-	10g	4.0	-
[Tx: Antenna 0] (OFDM mode)																			
Bottom	0	Battery	g	6	2412	1	93.7	1.07	17.0	16.32	1.17	**0.405**	+2.19	n/a (*a)	**0.507**	1-17	1g	1.6	-
		Battery			2437	6	93.7	1.07	18.0	16.20	1.51	**0.349**	+2.43	n/a (*a)	**0.564**	1-18	1g	1.6	-
		Battery			2462	11	93.7	1.07	18.0	16.02	1.58	**0.339**	+2.56	n/a (*a)	**0.573**	1-19	1g	1.6	-
Back	0	USB	g	6	2412	1	93.7	1.07	17.0	16.32	1.17	**0.401**	+1.32	n/a (*a)	**0.502**	1-20	10g	4.0	-
		USB			2437	6	93.7	1.07	18.0	16.20	1.51	**0.359**	+1.45	n/a (*a)	**0.580**	1-21	10g	4.0	-
		USB			2462	11	93.7	1.07	18.0	16.02	1.58	**0.310**	+1.52	n/a (*a)	**0.524**	1-22	10g	4.0	-
[Tx: Antenna 1] (OFDM mode)																			
Top	0	USB	g	6	2412	1	93.7	1.07	17.0	16.15	1.22	**0.196**	+1.32	n/a (*a)	**0.256**	1-23	10g	4.0	-
		USB			2437	6	93.7	1.07	18.0	16.16	1.53	**0.225**	+1.45	n/a (*a)	**0.368**	1-24	10g	4.0	-
		USB			2462	11	93.7	1.07	18.0	16.04	1.57	**0.238**	+1.52	n/a (*a)	**0.400**	1-25	10g	4.0	-

*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))

Notes:
*. Highest measured output power channel was tested initially according to KDB 248227 D01.
*. Since the power of 2467 MHz (CH12) and 2472 MHz (CH13) are more than 9 dB lower than other SAR tested frequencies, the SAR test was omitted.
*. **2.4GHz SAR test reduction procedures, in KDB248227 D01 (v02r02)**
(DSSS mode) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg (for SAR (1g)) or ≤ 2.0 W/kg (for SAR (10g)), , no further SAR testing is required for 802.11b DSSS in that exposure configuration.
(OFDM mode) 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 (for SAR(1g)) or ≤ 3W/kg (for SAR(10g)). Refer to the following table for the estimated SAR of OFDM mode.

OFDM mode	ANT. #	Maximum tune-up tolerance limit				OFDM scaled factor [-] (b)/(a)×100	DSSS reported SAR value			Estimated SAR value: OFDM [W/kg]	Exclusion limit [W/kg]	Standalone SAR test require?
		DSSS		OFDM								
		[dBm]	[mW] (a)	[dBm]	[mW] (b)		type	Setup	[W/kg]			
11g, n20, ac20	0	19.0	79	18.0	63	0.797	1g	Bottom	0.759	**0.605**	**≤ 1.2**	**No**
n40, ac40	0	19.0	79	10.0	10	0.127	1g	Bottom	0.759	**0.096**	**≤ 1.2**	**No**
(MIMO) n20, ac20	0	19.0	79	13.5	22	0.278	1g	Bottom	0.759	**0.211**	**≤ 1.2**	**No**
(MIMO) n40, ac40	0	19.0	79	9.5	9	0.114	1g	Bottom	0.759	**0.087**	**≤ 1.2**	**No**
11g, n20, ac20	0	19.0	79	18.0	63	0.797	10g	Back	0.756	**0.603**	**≤ 3**	**No**
n40, ac40	0	19.0	79	10.0	10	0.127	10g	Back	0.756	**0.096**	**≤ 3**	**No**
(MIMO) n20, ac20	0	19.0	79	13.5	22	0.278	10g	Back	0.756	**0.210**	**≤ 3**	**No**
(MIMO) n40, ac40	0	19.0	79	9.5	9	0.114	10g	Back	0.756	**0.086**	**≤ 3**	**No**
11g, n20, ac20	1	19.0	79	18.0	63	0.797	10g	Back	0.480	**0.383**	**≤ 3**	**No**
n40, ac40	1	19.0	79	10.0	10	0.127	10g	Back	0.480	**0.061**	**≤ 3**	**No**
(MIMO) n20, ac20	1	19.0	79	13.5	22	0.278	10g	Back	0.480	**0.133**	**≤ 3**	**No**
(MIMO) n40, ac40	1	19.0	79	9.5	9	0.114	10g	Back	0.480	**0.055**	**≤ 3**	**No**

*. Gap: It is the separation distance between the outer surface of product and the bottom outer surface of phantom; CH: Channel; Meas.: Measured value; n/a: not applied; Max.: Maximum; ANT.#: Antenna ID number 0 or 1; Mode; b: IEEE 802.11b, g: IEEE 802.11g, n20: IEEE 802.11n(20HT), n40: IEEE 802.11n(40HT), ac20: IEEE 802.11ac(20VHT), ac40: IEEE 802.11ac(40VHT).
*. During test, the EUT was operated by build-in rechargeable Li-ion battery with connecting USB cable (charging and setting Tx parameters).
*. 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 ±50MHz of calibration frequency	7.32	±12.0%

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

7.3 SAR results: U-NII-1 and U-NII-2A band

Test setup			Mode	Data rate [Mbps] or [MCS]	Frequency		Duty cycle		Power correction			SAR results [W/kg] (Max.value of multi-peak)				SAR plot # in Appendix 2-2	SAR type	SAR Limit [W/kg]	Remarks
Test position "*" is Initial test position.	Gap [mm]	Source power			[MHz]	CH	Duty [%]	Duty scaled factor	Tune-up limit [dBm]	Meas. [dBm]	Tune-up factor	Meas.	ΔSAR [%]	ΔSAR corrected	Reported (*b)				
[Tx: Antenna 0] *. n40 is the initial test mode which has the higher bandwidth with the highest tune-up power and has the lowest modulation.																			
Bottom*	0	Battery	n40	MCS0	5270	54	87.4	1.14	15.0	13.68	1.36	**0.790**	+0.22	n/a (*a)	**1.225**	2-3	1g	1.6	-
		Battery			5310	62	87.4	1.14	15.0	13.98	1.26	**0.839**	+0.20	n/a (*a)	**1.205**	2-4	1g	1.6	>0.8, next ch. >1.2, add U-NII-1.
		Battery			5190	38	87.4	1.14	11.5	9.93	-	**n/a**	-	n/a (*a)	**n/a**	-	1g	1.6	*.lower power.
		Battery			5230	46	87.4	1.14	15.0	13.73	1.34	**0.655**	+0.21	n/a (*a)	**1.001**	2-5	1g	1.6	<1.2
		Battery	ac40	MCS0	5270	54	87.6	1.14	15.0	13.60	1.38	**0.730**	+0.22	n/a (*a)	**1.148**	2-6	1g	1.6	-
		Battery			5310	62	87.6	1.14	15.0	14.00	1.26	**0.882**	+0.21	n/a (*a)	**1.267**	2-1	1g	1.6	>0.8, next ch. >1.2, add U-NII-1. *.Higher, SAR1g
		Battery			5190	38	87.6	1.14	11.5	9.88	-	**n/a**	-	n/a (*a)	**n/a**	-	1g	1.6	*.lower power.
		Battery			5230	46	87.6	1.14	15.0	13.42	1.44	**0.626**	+0.21	n/a (*a)	**1.028**	2-7	1g	1.6	<1.2
		Battery	a	6	5260	52	93.7	1.07	15.0	13.12	1.54	**n/a**	-	n/a (*a)	**n/a**	-	1g	1.6	-
		Battery			5300	60	93.7	1.07	15.0	13.49	1.42	**0.782**	+0.20	n/a (*a)	**1.188**	2-8	1g	1.6	<1.2
		Battery			5320	64	93.7	1.07	15.0	13.56	1.39	**0.838**	+0.20	n/a (*a)	**1.246**	2-9	1g	1.6	>0.8, next ch. >1.2, add U-NII-1.
		Battery			5180	36	93.7	1.07	15.0	13.06	1.56	**0.538**	+0.19	n/a (*a)	**0.898**	2-10	1g	1.6	<1.2
		Battery			5220	44	93.7	1.07	15.0	13.00	1.58	**n/a**	-	n/a (*a)	**n/a**	-	1g	1.6	-
		Battery			5240	48	93.7	1.07	15.0	13.08	1.56	**0.648**	+0.21	n/a (*a)	**1.082**	2-11	1g	1.6	>0.8, next ch.
		Battery	n20	MCS0	5260	52	93.2	1.07	15.0	13.24	1.50	**0.662**	+0.21	n/a (*a)	**1.063**	2-12	1g	1.6	-
		Battery			5300	60	93.2	1.07	15.0	13.25	1.50	**0.755**	+0.20	n/a (*a)	**1.212**	2-13	1g	1.6	>1.2
		Battery			5320	64	93.2	1.07	15.0	13.30	1.48	**0.780**	+0.20	n/a (*a)	**1.235**	2-14	1g	1.6	>0.8, next ch. >1.2, add U-NII-1.
		Battery			5180	36	93.2	1.07	15.0	13.00	1.58	**n/a**	-	n/a (*a)	**n/a**	-	1g	1.6	-
		Battery			5220	44	93.2	1.07	15.0	13.12	1.54	**0.565**	+0.21	n/a (*a)	**0.931**	2-15	1g	1.6	>0.8, next ch.
		Battery			5240	48	93.2	1.07	15.0	13.00	1.58	**0.610**	+0.21	n/a (*a)	**1.031**	2-16	1g	1.6	<1.2
		Battery	ac20	MCS0	5260	52	93.3	1.07	15.0	13.08	1.56	**0.659**	+0.21	n/a (*a)	**1.100**	2-17	1g	1.6	-
		Battery			5300	60	93.3	1.07	15.0	13.18	1.52	**0.744**	+0.20	n/a (*a)	**1.210**	2-18	1g	1.6	>1.2
		Battery			5320	64	93.3	1.07	15.0	13.40	1.45	**0.811**	+0.20	n/a (*a)	**1.258**	2-19	1g	1.6	>0.8, next ch. >1.2, add U-NII-1.
		Battery			5180	36	93.3	1.07	15.0	13.01	1.58	**n/a**	-	n/a (*a)	**n/a**	-	1g	1.6	-
		Battery			5220	44	93.3	1.07	15.0	13.09	1.55	**0.558**	+0.21	n/a (*a)	**0.925**	2-20	1g	1.6	<1.2
		Battery			5240	48	93.3	1.07	15.0	13.10	1.55	**0.595**	+0.21	n/a (*a)	**0.987**	2-21	1g	1.6	>0.8, next ch.
Front	0	USB	n40	MCS0	5270	54	87.4	1.14	15.0	13.68	1.36	**0.203**	+0.25	n/a (*a)	**0.315**	2-22	10g	4.0	<1
		USB			5310	62	87.4	1.14	15.0	13.98	1.26	**0.222**	+0.23	n/a (*a)	**0.319**	2-2	10g	4.0	*.Higher, SAR10g
		USB	a	6	5180	36	93.7	1.07	15.0	13.06	1.56	**0.129**	+0.24	n/a (*a)	**0.215**	2-23	10g	4.0	-
		USB			5260	52	93.7	1.07	15.0	13.12	1.54	**0.188**	+0.24	n/a (*a)	**0.310**	2-24	10g	4.0	-
		USB			5320	64	93.7	1.07	15.0	13.56	1.39	**0.207**	+0.24	n/a (*a)	**0.308**	2-25	10g	4.0	-
Back	0	USB	n40	MCS0	5270	54	87.4	1.14	15.0	13.68	1.36	**n/a**	-	n/a (*a)	**n/a**	-	10g	4.0	-
		USB			5310	62	87.4	1.14	15.0	13.98	1.26	**0.111**	+0.24	n/a (*a)	**0.159**	2-26	10g	4.0	<1
[Tx: Antenna 1] *. n40 is the initial test mode which has the higher bandwidth with the highest tune-up power and has the lowest modulation.																			
Top*	0	USB	n40	MCS0	5270	54	87.4	1.14	15.0	13.65	1.36	**n/a**	-	n/a (*a)	**n/a**	-	10g	4.0	-
		USB			5310	62	87.4	1.14	15.0	13.73	1.34	**0.160**	+0.24	n/a (*a)	**0.244**	2-27	10g	4.0	<1
Front	0	USB	n40	MCS0	5270	54	87.4	1.14	15.0	13.65	1.36	**n/a**	-	n/a (*a)	**n/a**	-	10g	4.0	-
		USB			5310	62	87.4	1.14	15.0	13.73	1.34	**0.130**	+0.24	n/a (*a)	**0.199**	2-28	10g	4.0	<1
Back	0	USB	n40	MCS0	5270	54	87.4	1.14	15.0	13.65	1.36	**n/a**	-	n/a (*a)	**n/a**	-	10g	4.0	-
		USB			5310	62	87.4	1.14	15.0	13.73	1.34	**0.027**	+0.24	n/a (*a)	**0.041**	2-29	10g	4.0	<1

*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))

Notes:
*. Highest measured output power channel was tested initially according to KDB 248227 D01.
*. Since the power of 5190 MHz (CH38) of BW40MHz mode is more than 3 dB lower than other SAR tested frequency, the SAR test was omitted.
*. According to KDB248227D01
1) Highest reported SAR is ≤ 0.4 W/kg (SAR(1g)), ≤ 1 W/kg (SAR(10g)). Therefore, further SAR measurements within this exposure condition are not required.
2) Highest reported SAR is > 0.4 W/kg (SAR(1g)), > 1 W/kg (SAR(10g)). Due to the highest reported SAR for this test position, other test positions in standalone exposure condition were evaluated until a SAR ≤ 0.8 W/kg (SAR(1g)), ≤ 2 W/kg(SAR(10g))was reported.
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(1g)), > 2 W/kg (SAR(10g)), measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg (SAR(1g)), ≤ 3 W/kg(SAR(10g)) or all required test channels are considered.

*. Subsequent test configuration was excluded from the following table according to KDB 248227 D01. SAR is not required for the following exclusion conditions according to KDB 248227 D01.
1) When KDB 447498 D01 SAR test exclusion applies to the initial test configuration.
2) When the highest reported SAR for initial test configuration is adjusted by the ratio of Subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

Subsequent test mode	ANT. #	Maximum tune-up tolerance limit				Scaled factor [-] (b)/(a)×100	Reported SAR value *. Initial test configuration			Estimated SAR value: Subsequent test configuration [W/kg]	Exclusion limit [W/kg]	Standalone SAR test require?
		Initial test configuration		Subsequent test configuration								
		[dBm]	[mW] (a)	[dBm]	[mW] (b)		type	Setup	[W/kg]			
ac80	0	15.0	32	10.5	11	0.344	1g	Bottom	1.267	**0.436**	**≤ 1.2**	**No**
(MIMO) n20/40, ac20/40	0	15.0	32	12.0	16	0.5	1g	Bottom	1.267	**0.634**	**≤ 1.2**	**No**
(MIMO) ac80	0	15.0	32	7.5	6	0.188	1g	Bottom	1.267	**0.238**	**≤ 1.2**	**No**
ac80	0	15.0	32	10.5	11	0.344	10g	Front	0.319	**0.110**	**≤ 3**	**No**
(MIMO) n20/40, ac20/40	0	15.0	32	12.0	16	0.5	10g	Front	0.319	**0.160**	**≤ 3**	**No**
(MIMO) ac80	0	15.0	32	7.5	6	0.188	10g	Front	0.319	**0.060**	**≤ 3**	**No**
ac80	1	15.0	32	10.5	11	0.344	10g	Top	0.244	**0.084**	**≤ 3**	**No**
(MIMO) n20/40, ac20/40	1	15.0	32	12.0	16	0.5	10g	Top	0.244	**0.122**	**≤ 3**	**No**
(MIMO) ac80	1	15.0	32	7.5	6	0.188	10g	Top	0.244	**0.046**	**≤ 3**	**No**

*. Gap: It is the separation distance between the outer surface of product and the bottom outer surface of phantom; CH: Channel; Meas.: Measured value; n/a: not applied; Max.: Maximum; ANT.#: Antenna ID number 0 or 1; Mode; a: IEEE 802.11a, n20: IEEE 802.11n(20HT), n40: IEEE 802.11n(40HT), ac20: IEEE 802.11ac(20VHT), ac40: IEEE 802.11ac(40VHT), ac80: IEEE 802.11ac(80VHT).
*. During test, the EUT was operated by build-in rechargeable Li-ion battery with connecting USB cable (charging and setting Tx parameters).
*. Calibration frequency of the SAR measurement probe (and used conversion factors)

Liquid	SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
Body	5180, 5220, 5230, 5240, 5260, 5270, 5300, 5310, 5320 MHz	5250 MHz	within ±110MHz of calibration frequency	4.49	±13.1%

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

7.4 SAR results: U-NII-2C band

Test setup			Mode	Data rate [Mbps] or [MCS]	Frequency		Duty cycle		Power correction			SAR results [W/kg] (Max.value of multi-peak)				SAR plot # in Appendix 2-2	SAR type	SAR Limit [W/kg]	Remarks
Test position "*" is Initial test position.	Gap [mm]	Source power			[MHz]	CH	Duty [%]	Duty scaled factor	Tune-up limit [dBm]	Meas. [dBm]	Tune-up factor	Meas.	ΔSAR [%]	ΔSAR corrected	Reported (*b)				
[Tx: Antenna 0] *. n40 is the initial test mode which has the higher bandwidth with the highest tune-up power and has the lowest modulation.																			
Bottom*	0	Battery	n40	MCS0	5510	102	87.4	1.14	15.0	13.37	1.46	**0.690**	+0.17	n/a (*a)	**1.148**	3-3	1g	1.6	>0.8, next ch.
		Battery			5550	110	87.4	1.14	15.0	13.18	1.52	**0.590**	+0.18	n/a (*a)	**1.022**	3-4	1g	1.6	<1.2
		Battery			5670	134	87.4	1.14	15.0	13.06	1.56	**0.503**	+0.18	n/a (*a)	**0.895**	3-5	1g	1.6	High CH.
		Battery	ac40	MCS0	5510	102	87.6	1.14	15.0	13.39	1.45	**0.663**	+0.19	n/a (*a)	**1.096**	3-6	1g	1.6	>0.8, next ch.
		Battery			5550	110	87.6	1.14	15.0	13.23	1.50	**0.592**	+0.18	n/a (*a)	**1.012**	3-7	1g	1.6	<1.2
		Battery			5670	134	87.6	1.14	15.0	13.15	1.53	**n/a**	-	n/a (*a)	**n/a**	-	1g	1.6	-
		Battery	a	6	5500	100	93.7	1.07	15.0	13.45	1.43	**0.731**	+0.17	n/a (*a)	**1.119**	3-8	1g	1.6	>0.8, next ch.
		Battery			5580	100	93.7	1.07	15.0	13.22	1.51	**0.623**	+0.16	n/a (*a)	**1.007**	3-9	1g	1.6	<1.2
		Battery			5700	100	93.7	1.07	15.0	13.34	1.47	**0.542**	+0.15	n/a (*a)	**0.853**	3-10	1g	1.6	High CH.
		Battery	n20	MCS0	5500	100	93.2	1.07	15.0	13.24	1.50	**0.710**	+0.17	n/a (*a)	**1.140**	3-11	1g	1.6	>0.8, next ch.
		Battery			5580	100	93.2	1.07	15.0	13.05	1.57	**n/a**	-	n/a (*a)	**n/a**	-	1g	1.6	-
		Battery			5700	100	93.2	1.07	15.0	13.22	1.51	**0.547**	+0.17	n/a (*a)	**0.884**	3-12	1g	1.6	<1.2
		Battery	ac20	MCS0	5500	100	93.3	1.07	15.0	13.30	1.48	**0.726**	+0.17	n/a (*a)	**1.150**	3-1	1g	1.6	>0.8, next ch. *.Higher, SAR1g
		Battery			5580	100	93.3	1.07	15.0	13.30	1.48	**0.595**	+0.17	n/a (*a)	**0.942**	3-13	1g	1.6	<1.2
		Battery			5700	100	93.3	1.07	15.0	13.12	1.54	**0.553**	+0.18	n/a (*a)	**0.911**	3-14	1g	1.6	-
Front	0	USB	n40	MCS0	5510	102	87.4	1.14	15.0	13.37	1.46	**0.218**	+0.24	n/a (*a)	**0.363**	3-15	10g	4.0	<1
		USB			5550	110	87.4	1.14	15.0	13.18	1.52	**n/a**	-	n/a (*a)	**n/a**	-	10g	4.0	-
		USB			5670	134	87.4	1.14	15.0	13.06	1.56	**n/a**	-	n/a (*a)	**n/a**	-	10g	4.0	-
Back	0	USB	n40	MCS0	5510	102	87.4	1.14	15.0	13.37	1.46	**0.097**	+0.24	n/a (*a)	**0.161**	3-16	10g	4.0	-
		USB			5550	110	87.4	1.14	15.0	13.18	1.52	**n/a**	-	n/a (*a)	**n/a**	-	10g	4.0	-
		USB			5670	134	87.4	1.14	15.0	13.06	1.56	**n/a**	-	n/a (*a)	**n/a**	-	10g	4.0	<1
[Tx: Antenna 1] *. n40 is the initial test mode which has the higher bandwidth with the highest tune-up power and has the lowest modulation.																			
Top*	0	USB	n40	MCS0	5510	102	87.4	1.14	15.0	13.53	1.40	**0.303**	+0.26	n/a (*a)	**0.484**	3-17	10g	4.0	<1
		USB			5550	110	87.4	1.14	15.0	13.25	1.50	**0.338**	+0.25	n/a (*a)	**0.578**	3-18	10g	4.0	-
		USB			5670	134	87.4	1.14	15.0	13.02	1.58	**0.355**	+0.27	n/a (*a)	**0.639**	3-2	10g	4.0	*.Higher, SAR10g
		USB	a	6	5500	100	93.7	1.07	15.0	13.78	1.32	**0.323**	+0.24	n/a (*a)	**0.456**	3-19	10g	4.0	<1, Low ch.
		USB			5580	100	93.7	1.07	15.0	13.49	1.42	**0.400**	+0.25	n/a (*a)	**0.608**	3-20	10g	4.0	-
		USB			5700	100	93.7	1.07	15.0	13.19	1.52	**0.338**	+0.28	n/a (*a)	**0.550**	3-21	10g	4.0	High ch.
Front	0	USB	n40	MCS0	5510	102	87.4	1.14	15.0	13.53	1.40	**0.207**	+0.24	n/a (*a)	**0.330**	3-22	10g	4.0	-
		USB			5550	110	87.4	1.14	15.0	13.25	1.50	**n/a**	-	n/a (*a)	**n/a**	-	10g	4.0	-
		USB			5670	134	87.4	1.14	15.0	13.02	1.58	**n/a**	-	n/a (*a)	**n/a**	-	10g	4.0	<1
Back	0	USB	n40	MCS0	5510	102	87.4	1.14	15.0	13.53	1.40	**0.051**	+0.24	n/a (*a)	**0.081**	3-23	10g	4.0	-
		USB			5550	110	87.4	1.14	15.0	13.25	1.50	**n/a**	-	n/a (*a)	**n/a**	-	10g	4.0	-
		USB			5670	134	87.4	1.14	15.0	13.02	1.58	**n/a**	-	n/a (*a)	**n/a**	-	10g	4.0	<1

*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))

Notes:
*. Highest measured output power channel was tested initially according to KDB 248227 D01.
*. Since the power of 5190 MHz (CH38) of BW40MHz mode is more than 3 dB lower than other SAR tested frequency, the SAR test was omitted.
*. According to KDB248227D01
1) Highest reported SAR is ≤ 0.4 W/kg (SAR(1g)), ≤ 1 W/kg (SAR(10g)). Therefore, further SAR measurements within this exposure condition are not required.
2) Highest reported SAR is > 0.4 W/kg (SAR(1g)), > 1 W/kg (SAR(10g)). Due to the highest reported SAR for this test position, other test positions in standalone exposure condition were evaluated until a SAR ≤ 0.8 W/kg (SAR(1g)), ≤ 2 W/kg(SAR(10g))was reported.
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(1g)), > 2 W/kg (SAR(10g)), measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg (SAR(1g)), ≤ 3 W/kg(SAR(10g)) or all required test channels are considered.

*. Subsequent test configuration was excluded from the following table according to KDB 248227 D01. SAR is not required for the following exclusion conditions according to KDB 248227 D01.
1) When KDB 447498 D01 SAR test exclusion applies to the initial test configuration.
2) When the highest reported SAR for initial test configuration is adjusted by the ratio of Subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

Subsequent test mode	ANT. #	Maximum tune-up tolerance limit				Scaled factor [-] (b)/(a)×100	Reported SAR value *. Initial test configuration			Estimated SAR value: Subsequent test configuration [W/kg]	Exclusion limit [W/kg]	Standalone SAR test require?
		Initial test configuration		Subsequent test configuration								
		[dBm]	[mW] (a)	[dBm]	[mW] (b)		type	Setup	[W/kg]			
ac80	0	15.0	32	12.0	16	0.5	1g	Bottom	1.150	**0.575**	**≤ 1.2**	**No**
(MIMO) n20/40, ac20/40	0	15.0	32	12.0	16	0.5	1g	Bottom	1.150	**0.575**	**≤ 1.2**	**No**
(MIMO) ac80	0	15.0	32	9.0	8	0.25	1g	Bottom	1.150	**0.288**	**≤ 1.2**	**No**
ac80	0	15.0	32	10.5	11	0.5	10g	Front	0.363	**0.182**	**≤ 3**	**No**
(MIMO) n20/40, ac20/40	0	15.0	32	12.0	16	0.5	10g	Front	0.363	**0.182**	**≤ 3**	**No**
(MIMO) ac80	0	15.0	32	7.5	6	0.25	10g	Front	0.363	**0.091**	**≤ 3**	**No**
ac80	1	15.0	32	10.5	11	0.5	10g	Top	0.639	**0.320**	**≤ 3**	**No**
(MIMO) n20/40, ac20/40	1	15.0	32	12.0	16	0.5	10g	Top	0.639	**0.320**	**≤ 3**	**No**
(MIMO) ac80	1	15.0	32	7.5	6	0.25	10g	Top	0.639	**0.160**	**≤ 3**	**No**

*. Gap: It is the separation distance between the outer surface of product and the bottom outer surface of phantom; CH: Channel; Meas.: Measured value; n/a: not applied; Max.: Maximum; ANT.#: Antenna ID number 0 or 1; Mode; a: IEEE 802.11a, n20: IEEE 802.11n(20HT), n40: IEEE 802.11n(40HT), ac20: IEEE 802.11ac(20VHT), ac40: IEEE 802.11ac(40VHT), ac80: IEEE 802.11ac(80VHT).
*. During test, the EUT was operated by build-in rechargeable Li-ion battery with connecting USB cable (charging and setting Tx parameters).
*. Calibration frequency of the SAR measurement probe (and used conversion factors)

Liquid	SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
Body	5500, 5510, 5550, 5580, 5670 MHz	5600 MHz	within ±110MHz of calibration frequency	3.92	±13.1%
Body	5700 MHz	5750 MHz	within ±110MHz of calibration frequency	4	±13.1%

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

7.5 SAR results: U-NII-3 band

Test setup			Mode	Data rate [Mbps] or [MCS]	Frequency		Duty cycle		Power correction			SAR results [W/kg] (Max.value of multi-peak)				SAR plot # in Appendix 2-2	SAR type	SAR Limit [W/kg]	Remarks
Test position "*" is Initial test position.	Gap [mm]	Source power			[MHz]	CH	Duty [%]	Duty scaled factor	Tune-up limit [dBm]	Meas. [dBm]	Tune-up factor	Meas.	ΔSAR [%]	ΔSAR corrected	Reported (*b)				
[Tx: Antenna 0] *. ac80 is the initial test mode which has the higher bandwidth with the highest tune-up power and has the lowest modulation.																			
Bottom*	0	Battery	ac80	MCS0	5775	155	77.7	1.29	14.0	13.01	1.26	**0.666**	+0.16	n/a (*a)	**1.083**	4-3	1g	1.6	>0.8
		Battery	n40	MCS0	5755	151	87.4	1.14	14.0	13.17	1.21	**0.670**	+0.14	n/a (*a)	**0.924**	4-4	1g	1.6	>0.8, next ch.
		Battery			5795	159	87.4	1.14	14.0	13.16	1.21	**0.866**	+0.14	n/a (*a)	**1.195**	4-5	1g	1.6	-
		Battery	ac40	MCS0	5755	151	87.6	1.14	14.0	13.21	1.20	**0.703**	+0.17	n/a (*a)	**0.962**	4-6	1g	1.6	>0.8, next ch.
		Battery			5795	159	87.6	1.14	14.0	13.18	1.21	**0.860**	+0.14	n/a (*a)	**1.186**	4-7	1g	1.6	-
		Battery	a	6	5745	149	93.7	1.07	14.0	13.36	1.16	**0.734**	+0.15	n/a (*a)	**0.911**	4-8	1g	1.6	>0.8, next ch.
		Battery			5785	157	93.7	1.07	14.0	13.20	1.20	**0.958**	+0.15	n/a (*a)	**1.230**	4-9	1g	1.6	>1.2
		Battery			5825	165	93.7	1.07	14.0	13.21	1.20	**1.05**	+0.14	n/a (*a)	**1.348**	4-10	1g	1.6	-
		Battery	n20	MCS0	5745	149	93.2	1.07	14.0	13.29	1.18	**0.700**	+0.17	n/a (*a)	**0.884**	4-11	1g	1.6	>0.8, next ch.
		Battery			5785	157	93.2	1.07	14.0	13.25	1.19	**0.912**	+0.16	n/a (*a)	**1.161**	4-12	1g	1.6	<1.2
		Battery			5825	165	93.2	1.07	14.0	13.11	1.23	**1.07**	+0.14	n/a (*a)	**1.408**	4-13	1g	1.6	*.Worst CH.
		Battery	ac20	MCS0	5745	149	93.3	1.07	14.0	13.32	1.17	**0.693**	+0.17	n/a (*a)	**0.868**	4-14	1g	1.6	>0.8, next ch.
		Battery			5785	157	93.3	1.07	14.0	13.21	1.20	**0.887**	+0.16	n/a (*a)	**1.139**	4-15	1g	1.6	<1.2
		Battery			5825	165	93.3	1.07	14.0	13.14	1.22	**1.09**	+0.14	n/a (*a)	**1.423**	4-1	1g	1.6	*.Higher, SAR1g
Front	0	USB	ac80	MCS0	5775	155	77.7	1.29	14.0	13.01	1.26	**0.117**	+0.25	n/a (*a)	**0.190**	4-16	10g	4.0	<1
Back	0	USB	ac80	MCS0	5775	155	77.7	1.29	14.0	13.01	1.26	**0.066**	+0.25	n/a (*a)	**0.107**	4-17	10g	4.0	<1
[Tx: Antenna 1] *. ac80 is the initial test mode which has the higher bandwidth with the highest tune-up power and has the lowest modulation.																			
Top*	0	USB	ac80	MCS0	5775	155	77.7	1.29	14.0	13.06	1.24	**0.217**	+0.25	n/a (*a)	**0.347**	4-18	10g	4.0	<1
		USB	n40	MCS0	5755	151	87.6	1.14	14.0	13.26	1.19	**0.258**	+0.30	n/a (*a)	**0.350**	4-19	10g	4.0	-
		USB			5795	159	87.6	1.14	14.0	13.25	1.19	**0.231**	+0.30	n/a (*a)	**0.313**	4-20	10g	4.0	-
		USB	a	6	5745	149	93.7	1.07	14.0	13.33	1.17	**0.295**	+0.30	n/a (*a)	**0.399**	4-2	10g	4.0	*.Higher, SAR10g
		USB			5785	157	93.7	1.07	14.0	13.59	1.10	**0.259**	+0.29	n/a (*a)	**0.305**	4-21	10g	4.0	-
		USB			5825	165	93.7	1.07	14.0	13.55	1.11	**0.239**	+0.31	n/a (*a)	**0.284**	4-22	10g	4.0	-
Front	0	USB	ac80	MCS0	5775	155	77.7	1.29	14.0	13.06	1.24	**0.123**	+0.25	n/a (*a)	**0.197**	4-23	10g	4.0	<1
Back	0	USB	ac80	MCS0	5775	155	77.7	1.29	14.0	13.06	1.24	**0.023**	+0.25	n/a (*a)	**0.037**	4-24	10g	4.0	<1

*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))

Notes:

*. Highest measured output power channel was tested initially according to KDB 248227 D01.
*. Since the power of 5190 MHz (CH38) of BW40MHz mode is more than 3 dB lower than other SAR tested frequency, the SAR test was omitted.
*. According to KDB248227D01
1) Highest reported SAR is ≤ 0.4 W/kg (SAR(1g)), ≤ 1 W/kg (SAR(10g)). Therefore, further SAR measurements within this exposure condition are not required.
2) Highest reported SAR is > 0.4 W/kg (SAR(1g)), > 1 W/kg (SAR(10g)). Due to the highest reported SAR for this test position, other test positions in standalone exposure condition were evaluated until a SAR ≤ 0.8 W/kg (SAR(1g)), ≤ 2 W/kg(SAR(10g))was reported.
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(1g)), > 2 W/kg (SAR(10g)), measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg (SAR(1g)), ≤ 3 W/kg(SAR(10g)) or all required test channels are considered.
*. Subsequent test configuration was excluded from the following table according to KDB 248227 D01. SAR is not required for the following exclusion conditions according to KDB 248227 D01.
1) When KDB 447498 D01 SAR test exclusion applies to the initial test configuration.
2) When the highest reported SAR for initial test configuration is adjusted by the ratio of Subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

Subsequent test mode	ANT. #	Maximum tune-up tolerance limit				Scaled factor [-] (b)/(a)×100	Reported SAR value *. Initial test configuration			Estimated SAR value: Subsequent test configuration [W/kg]	Exclusion limit [W/kg]	Standalone SAR test require?
		Initial test configuration		Subsequent test configuration			type	Setup	[W/kg]			
		[dBm]	[mW] (a)	[dBm]	[mW] (b)							
(MIMO) n20/40, ac20/40/80	0	14.0	25	12.0	16	0.64	1g	Bottom	1.423	**0.911**	**≤1.2**	**No**
(MIMO) n20/40, ac20/40/80	0	14.0	25	12.0	16	0.64	10g	Front	0.190	**0.122**	**≤3**	**No**
(MIMO) n20/40, ac20/40/80	1	14.0	25	12.0	16	0.64	10g	Top	0.399	**0.255**	**≤3**	**No**

*. Gap: It is the separation distance between the outer surface of product and the bottom outer surface of phantom; CH: Channel; Meas.: Measured value; n/a: not applied; Max.: Maximum; ANT.#: Antenna ID number 0 or 1; Mode; a: IEEE 802.11a, n20: IEEE 802.11n(20HT), n40: IEEE 802.11n(40HT), ac20: IEEE 802.11ac(20VHT), ac40: IEEE 802.11ac(40VHT), ac80: IEEE 802.11ac(80VHT).
*. During test, the EUT was operated by build-in rechargeable Li-ion battery with connecting USB cable (charging and setting Tx parameters).
*. Calibration frequency of the SAR measurement probe (and used conversion factors)

Liquid	SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
Body	5745, 5755, 5775, 5785, 5795, 5825 MHz	5750 MHz	within ±110MHz of calibration frequency	4	±13.1%

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

7.6 SAR Measurement Variability (Repeated measurement requirement)

In accordance with published RF Exposure KDB procedure 865664 D01 (v01r04) SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg (< 2 W/kg for SAR(10g)); steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg (≥ 2 W/kg for SAR(10g)), repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

EUT setup			Mode	Frequency [MHz] (Channel)	Measured SAR [W/kg]			Largest to Smallest SAR Ratio	SAR plot # in Appendix 2-2	
Transmit antenna	Position	Gap [mm]			Type	Original	Repeated		Original	Repeated
Antenna 0	**Bottom**	0	ac20 (MCS0)	5825 (165)	1g	**1.09**	**1.09**	**1.00**	Plot 4-1	Plot 5-1

*. Calculating formula: Largest to Smallest SAR Ratio (%) = (Largest SAR (W/kg)) / Smallest SAR (W/kg); *. Mode; ac20: IEEE 802.11ac(20VHT)

7.7 Device holder perturbation verification

When the highest reported SAR of an antenna is > 1.2 W/kg (> 3 W/kg for SAR(10g)), holder perturbation verification (by Urethane form alone) is required by using the highest SAR configuration among all applicable frequency bands.

EUT setup			Mode	Frequency [MHz] (Channel)	Measured SAR [W/kg]			Device holder perturbation SAR Ratio	Remarks
Transmit antenna	Position	Gap [mm]			Type	Device holder			
						Exist	None		
Antenna 0	**Bottom**	0	ac20 (MCS0)	5825 (165)	1g	**1.09** (Reported: 1.423)	**1.1**	**+0.9 %**	*.It was smaller than 5% of uncertainty of the setup, so influence of a device holder was judged to be no problem.
					SAR plot # in Appendix 2-2	Plot 4-1	Plot 5-2		

*. Calculating formula: Device holder perturbation SAR Ratio (%) = {{((Measured SAR-none (W/kg)) / Measured SAR-exist (W/kg))} - 1}*100
*. Mode; ac20: IEEE 802.11ac(20VHT)

7.8 Simultaneous transmission and Co-location (MIMO) evaluation

Simultaneous transmission scenario										Σ SAR [W/kg] (1g: ≤1.6 10g: ≤4)	SPLSR Check? (Yes / No)	Antenna separation distance-design base [mm]	SPLSR (≤ 0.04)	Volume Scan? (Yes/No)
Test position	Mode	U-NII band	SAR type	Highest Reported SAR (Standalone base) [W/kg]										
				Antenna 1		Antenna 0								
				Wi-Fi (*3) DTS Band	Wi-Fi (*3) UNII band	Wi-Fi (*3) DTS Band	Wi-Fi (*3) UNII band	Bluetooth						
Front	SISO	-	10g	0.385 (b)				0.03 (*1)		0.415	<4, No	-	-	-
	SISO	U-NII-1&2A	10g		0.199 (n40)			0.03 (*1)		0.229	<4, No	-	-	-
		U-NII-2C	10g		0.330 (n40)			0.03 (*1)		0.360	<4, No	-	-	-
		U-NII-3	10g		0.197 (ac80)			0.03 (*1)		0.227	<4, No	-	-	-
	MIMO(*2)	-	10g	0.385 (b)		0.446 (b)				0.831	<4, No	-	-	-
	MIMO(*2)	U-NII-1&2A	10g		0.199 (n40)		0.319 (n40)			0.518	<4, No	-	-	-
		U-NII-2C	10g		0.330 (n40)		0.363 (n40)			0.693	<4, No	-	-	-
		U-NII-3	10g		0.197 (ac80)		0.272 (a)			0.469	<4, No	-	-	-
Back	SISO	-	10g	0.097 (b)				0.03 (*1)		0.127	<4, No	-	-	-
	SISO	U-NII-1&2A	10g		0.040 (n40)			0.03 (*1)		0.070	<4, No	-	-	-
		U-NII-2C	10g		0.073 (n40)			0.03 (*1)		0.103	<4, No	-	-	-
		U-NII-3	10g		0.036 (ac80)			0.03 (*1)		0.063	<4, No	-	-	-
	MIMO(*2)	-	10g	0.097 (b)		0.756 (b)				0.853	<4, No	-	-	-
	MIMO(*2)	U-NII-1&2A	10g		0.040 (n40)		0.159 (n40)			0.199	<4, No	-	-	-
		U-NII-2C	10g		0.073 (n40)		0.161 (n40)			0.234	<4, No	-	-	-
		U-NII-3	10g		0.036 (ac80)		0.107 (ac80)			0.143	<4, No	-	-	-
Top	SISO	-	10g	0.480 (b)				0.03 (*1)		0.510	<4, No	-	-	-
	SISO	U-NII-1&2A	10g		0.244 (n40)			0.03 (*1)		0.274	<4, No	-	-	-
		U-NII-2C	10g		0.639 (n40)			0.03 (*1)		0.669	<4, No	-	-	-
		U-NII-3	10g		0.369 (a)			0.03 (*1)		0.399	<4, No	-	-	-
	MIMO(*2)	-	10g	0.480 (b)		1.0 (*1)				1.480	<4, No	-	-	-
	MIMO(*2)	U-NII-1&2A	10g		0.244 (n40)		1.0 (*1)			1.244	<4, No	-	-	-
		U-NII-2C	10g		0.639 (n40)		1.0 (*1)			1.639	<4, No	-	-	-
		U-NII-3	10g		0.369 (a)		1.0 (*1)			1.369	<4, No	-	-	-
Bottom	SISO	-	1g	0.4 (*1)				0.08 (*1)		0.48	<1.6, No	-	-	-
	SISO	U-NII-1&2A	1g		0.4 (*1)			0.08 (*1)		0.48	<1.6, No	-	-	-
		U-NII-2C	1g		0.4 (*1)			0.08 (*1)		0.48	<1.6, No	-	-	-
		U-NII-3	1g		0.4 (*1)			0.08 (*1)		0.48	<1.6, No	-	-	-
	MIMO(*2)	-	1g	0.4 (*1)		0.759 (b)		-		1.159	<1.6, No	-	-	-
	MIMO(*2)	U-NII-1&2A	1g		0.4 (*1)		1.267 (ac40)			1.667	>1.6, Yes	78.774	0.027	No
		U-NII-2C	1g		0.4 (*1)		1.150 (ac20)			1.550	<1.6, No	-	-	-
		U-NII-3	1g		0.4 (*1)		1.423 (ac20)	-		1.823	>1.6, Yes	78.774	0.031	No

Note: *1. These values are estimated SAR. Refer to section 4.2.
*2. These SAR values were obtained by the SISO mode which has the higher power than MIMO mode on each antenna.
*3. ( ) shows the operation mode. b: IEEE 802.11b; a: IEEE 802.11a, n40: IEEE 802.11n(40HT), ac20: IEEE 802.11ac(20VHT), ac80: IEEE 802.11ac(80VHT).

*. This Wireless module supports both Wi-Fi and Bluetooth on an antenna 0. An antenna 1 is only supported Wi-Fi.
*. Wi-Fi and Bluetooth cannot transmit simultaneously on an antenna 0.
*. Simultaneous transmission SAR measurement (Volume Scan) is not required because the either sum of the SAR(1g) is < 1.6 W/kg (SAR(10g) is < 4 W/kg) or the SPLSR is < 0.04 for all circumstances that require SPLSR calculation.