



SAR TEST REPORT

Test Report No.: 11306373S

Applicant : Sony Corporation
Type of Equipment : Digital Paper
Model No. : DPT-RP1
FCC ID : AK8DPTRP1
Test Standard : FCC 47CFR §2.1093
Test Result : Complied

Highest Reported SAR(1g) Value		Antenna No.	Remarks			Output power (average)	
Tune-up value	(Measured)		Band	Frequency	Mode	Measured	Maximum
0.34 W/kg	Calculated	Antenna B	DTS	2480 MHz	Bluetooth, Low energy	-	9 dBm
1.43 W/kg	1.25 W/kg	Antenna B	DTS	2462 MHz	11b (1Mbps, DSSS)	14.44 dBm	15 dBm
1.22 W/kg	1.15 W/kg	Antenna B	UNII	5640 MHz	11a (6Mbps, OFDM)	11.96 dBm	12 dBm

*. Highest reported SAR of this device for body-worn and simultaneous transmission (Bluetooth + Wi-Fi on the Antenna B, 0.34+1.22=1.56 W/kg) are "1.43 W/kg" and "1.56 W/kg".

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Date of test: June 3~21, 2016

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



REVISION HISTORY

Revision	Test report No.	Date	Page revised	Contents
Original	11306373S	July 11, 2016	-	-
-r01	11306373S	July 20, 2016	p1,2,3,11,12	(p3,11,12) Error correction.
-r02	11306373S	July 29, 2016	p1,2,5,8,17,18	(p5,8,17,18) Error correction.

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

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SECTION 1: Customer information

Company Name	Sony Corporation
Address	1-7-1 Konan, Minato-ku, Tokyo 108-0075, Japan

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

Type of Equipment	Digital Paper
Model Number	DPT-RP1
Serial Number	9002505
Condition of EUT	Engineering prototype (*. Not for sale. These samples are equivalent to mass-produced items.)
Country of Mass-production	Japan
Receipt Date of Sample	June 2, 2016 *. No modification by the Lab.
Category Identified	Portable device *. Since EUT may contact and very close to a human body during Wi-Fi operation, the partial-body SAR (1g) shall be observed.
Rating	*. A wireless LAN module power supply is 3.3Vdc via power supply IC from Li-ion battery.
Feature of EUT	The EUT is a Digital Paper which includes the Wireless LAN+Bluetooth+NFC module.
SAR Accessory	None

2.2 Product Description (Transmitter)

Equipment type		Transceiver				
Equipment name		IEEE 802.11 2×2 MIMO a/b/g/n/ac Wireless LAN + Bluetooth + NFC NGFF Module				
Model number		AW-CM389NF				
Frequency of operation	Bluetooth	2.4GHz band: 2402-2480 MHz (BDR (Basic Data Rate), EDR (Enhanced Data Rate), LE (Low Energy mode))				
	WLAN	2.4GHz band: 2412-2462 MHz (b,g,n(HT20)) W52 (U-NII-1): 5180-5240 MHz (a,n(HT20),ac(VHT20)) / 5190-5230 MHz (n(HT40),ac(VHT40)) / 5210 MHz (ac(VHT80)); W53 (U-NII-2A): 5260-5320 MHz (a,n(HT20),ac(VHT20)) / 5270-5310 MHz (n(HT40),ac(VHT40)) / 5290 MHz (ac(VHT80)); W56 (U-NII-2C): 5500-5720 MHz (a,n(HT20),ac(VHT20)) / 5510-5710 MHz (n(HT40),ac(VHT40)) / 5530-5690 MHz (ac(VHT80)) W58 (U-NII-3): 5745-5825 MHz (a,n(HT20),ac(VHT20)) / 5755-5795 MHz (n(HT40),ac(VHT40)) / 5775 MHz (ac(VHT80))				
		Operation mode				
		Wi-Fi		Bluetooth		
		Channel spacing		1MHz (BDR, EDR), 2MHz (LE)		
Bandwidth		79MHz				
Type of modulation		FHSS: GFSK (*: EDR: GFSK+ $\pi/4$ -DQPSK, GFSK+ 8DPSK)				
Antenna		antenna #A (Wi-Fi)		antenna #B (Wi-Fi+Bluetooth)		
Antenna quantity		2 pcs. (*: Separation distance between the antenna #A and the antenna #B: approx.92.5 mm) b,g,a: One selected Tx antenna operation. n(HT20),n(HT40): One selected Tx antenna operation (MCS0-7) / Two Tx antenna operation (MCS8-13) ac(VHT20),ac(VHT40),ac(VHT80): One selected Tx antenna operation (MCS0-8(9)) / Two Tx antenna operation (MCS0-8(9))				
Antenna model		ANT162442DT-2001A2 (cable length: 100 mm)		ANT162442DT-2001A2 (cable length: 100 mm)		
Antenna type		Loop antenna / Connector: PCB side: MHF4, Antenna side: MHF4				
Antenna gain (Peak)		3.75 dBi (2.4GHz), 2.81 dBi (5GHz) (*:including cable loss)		1.38 dBi (2.4GHz), 4.29 dBi (5GHz) (*:including cable loss)		
Transmit power and tolerance (Manufacture variation)	Mode	2.4GHz	U-NII-1 (W52)	UN-NII-2A (W53)	U-NII-2C (W56)	U-NII-3 (W58)
	BDR	2 ± 2 dBm				
	EDR	2 ± 2 dBm				
	LE	7 ± 2 dBm				
	b	13 ± 2 dBm				
	g	13 ± 2 dBm				
	a		10 ± 2 dBm	10 ± 2 dBm	10 ± 2 dBm	9 ± 2 dBm
	n(HT20)	13 ± 2 dBm	10 ± 2 dBm	10 ± 2 dBm	10 ± 2 dBm	9 ± 2 dBm
	n(HT40)		10 ± 2 dBm	10 ± 2 dBm	10 ± 2 dBm	9 ± 2 dBm
	ac(VHT20)		10 ± 2 dBm	10 ± 2 dBm	10 ± 2 dBm	9 ± 2 dBm
	ac(VHT40)		10 ± 2 dBm	10 ± 2 dBm	10 ± 2 dBm	9 ± 2 dBm
	ac(VHT80)		9 ± 2 dBm (*:MCS8-9)	9 ± 2 dBm (*:MCS8-9)	9 ± 2 dBm (*:MCS8-9)	9 ± 2 dBm
* The measured Tx output power (conducted) refers to section 6 in this report.						

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

2.3 Maximum Tune-up Limit

Mode (802.11x) / Band	Average Power (dBm)								
	Bluetooth	a	b	g	n(HT20)	n(HT40)	ac(VHT20)	ac(VHT40)	ac(VHT80)
Bluetooth v2.1+EDR - Ant.B	4								
Bluetooth v4.0 LE - Ant.B	9								
WLAN 2.4 GHz band - Ant.A			15	15	15				
WLAN 2.4 GHz band - Ant.B			15	15	15				
WLAN 2.4 GHz band - Ant.A+B					18				
WLAN 5.2 GHz band (W52) - Ant.A		12			12	12	12	12	10
WLAN 5.2 GHz band (W52) - Ant.B		12			12	12	12	12	10
WLAN 5.2 GHz band (W52) - Ant.A+B					15	15	15	15	13
WLAN 5.3 GHz band (W53) - Ant.A		12			12	12	12	12	10
WLAN 5.3 GHz band (W53) - Ant.B		12			12	12	12	12	10
WLAN 5.3 GHz band (W53) - Ant.A+B					15	15	15	15	13
WLAN 5.6 GHz band (W56) - Ant.A		12			12	12	12	12	10
WLAN 5.6 GHz band (W56) - Ant.B		12			12	12	12	12	10
WLAN 5.6 GHz band (W56) - Ant.A+B					15	15	15	15	13
WLAN 5.8 GHz band (W58) - Ant.A		11			11	11	11	11	10
WLAN 5.8 GHz band (W58) - Ant.B		11			11	11	11	11	10
WLAN 5.8 GHz band (W58) - Ant.A+B					14	14	14	14	13

SECTION 3: Test specification, procedures and results

3.1 Test specification

The US Federal Communications Commission has released the report and order "Guidelines for Evaluating the Environmental Effects of RF Radiation", ET Docket No. 93-62 in August 1996. The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g for an uncontrolled environment and 8.0 mW/g for an occupational/controlled environment as recommended by the ANSI/IEEE standard C95.1-1992. The device should be evaluated at maximum output power (radiated from the antenna) under "worst-case" conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling in accordance with the following measurement procedures..

KDB 447498 D01 (v06):	General RF exposure guidance
KDB 248227 D01 (v02r02):	SAR Guidance for IEEE 802.11 (Wi-Fi) transmitters
KDB 865664 D01 (v01r04):	SAR measurement 100MHz to 6GHz
KDB 616217 D04 (v01r02)	SAR evaluation considerations for laptop, notebook, netbook and tablet computers
IEEE Std. 1528-2003:	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
IEEE Std. 1528-2013:	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.
(*. The reference for Uncertainty in SAR correction for deviations in permittivity and conductivity, in clause E.3.2.)	

3.2 Exposure limit

Environments of exposure limit	Whole-Body (averaged over the entire body)	Partial-Body (averaged over any 1g of tissue)	Hands, Wrists, Feet and Ankles (averaged over any 10g of tissue)
(A) Limits for Occupational /Controlled Exposure (W/kg)	0.4	8.0	20.0
(B) Limits for General population /Uncontrolled Exposure (W/kg)	0.08	1.6	4.0

*. **Occupational/Controlled Environments:** are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

*. **General Population/Uncontrolled Environments:** are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

The limit applied in this test report is;

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

3.3 Procedures and Results

	Bluetooth	Wi-Fi	Wi-Fi (W52)	Wi-Fi (W53)	Wi-Fi (W56 (<5.65GHz))	Wi-Fi (W56 (>5.65GHz) +W58 aggregate)
Frequency band [MHz]	2402~2480	2412~2462	5180~5240	5260~5320	5500~5640	5660~5825
Test Procedure	SAR measurement; KDB 447498, KDB 248227, KDB 865664, IEEE Std.1528					
Category	FCC 47CFR §2.1093 (Portable device)			Limit	SAR(1g): 1.6 W/kg	
Results (SAR(1g))	Complied	Complied		Complied	Complied	
Antenna#	ant.B	ant.A	ant.B	ant.A	ant.B	ant.A
SAR [W/kg]	0.34	1.17	1.43	1.05	0.62	1.10
Reported	Estimated(*2)	0.793	1.25	0.992	0.485	0.986
Measured					0.656	1.15
Operation mode, Frequency [MHz]	LE, 2402	LE, 2402	b(1Mbps), 2462	b(1Mbps), 2462	n20(MCS8), 5300	a(6Mbps), 5300
Time average	8.42	13.33	14.44	-	11.94	11.63
Max. power [dBm]	9	15	15	-	12	12
(scaled factor)	(×1.14)	(×1.47)	(×1.14)	(×1.01)	(×1.09)	(×1.06)
Duty cycle [%]	63.6	63.6	99.8	99.8	90.5	95.6
Duty scaled factor	(N/A)(*2)	(N/A)(*3)	(×1.00)	(×1.00)	(×1.10)	(×1.05)
Batch scaled (*4)	-	×1.00	×1.00	×1.00	×1.06	×1.00

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. (KDB248227 D01 (v02r02), clause 5.3.1) Since highest reported SAR(1g) of W53 band was ≤1.2 W/kg, SAR measurement of W52 band was omitted.

*2. Since Bluetooth power of this EUT is enough small, SAR test for Bluetooth mode was reduced. (Refer to clause 3.7 and clause 7.5 in this report for more detail)

*3. Duty cycle of measured 63.2 % of BLE and 77.2 % of BDR&EDR was nearly equal to highest theory duty cycle. Therefore the duty scaled factor was "×1.00".

*. (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, %)

*4. Refer to Section 6 about "Batch scaled".

3.4 Test Location

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

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3.5 Confirmation before SAR testing

3.5.1 Average power for SAR tests

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

*. The EUT transmission power was verified that it was within 2dB lower than the maximum tune-up tolerance limit when it was set the rated power. (Clause 4.1, KDB447498 D01 (v06))

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

802.11b (1×SS)		802.11g (1×SS)		802.11a (1×SS)		802.11a (1×SS)		
Modulation	Data rate	Modulation	Data rate	Modulation	Data rate	Type	Modulation	Packet type
DBPSK/DSSS	1 Mbps	BPSK/OFDM	6 Mbps	BPSK/OFDM	6 Mbps	BLE	GFSK/FHSS	BLE (1Mbps)
DQPSK/DSSS	2 Mbps	BPSK/OFDM	9 Mbps	BPSK/OFDM	9 Mbps	BDR	GFSK/FHSS	DH1 (1Mbps)
CCK/DSSS	5.5 Mbps	QPSK/OFDM	12 Mbps	QPSK/OFDM	12 Mbps		GFSK/FHSS	DH3 (1Mbps)
CCK/DSSS	11 Mbps	QPSK/OFDM	18 Mbps	QPSK/OFDM	18 Mbps		GFSK/FHSS	DH5 (1Mbps)
		16QAM/OFDM	24 Mbps	16QAM/OFDM	24 Mbps	EDR2	$\pi/4$ -DQPSK/FHSS	2DH1 (2Mbps)
		16QAM/OFDM	36 Mbps	16QAM/OFDM	36 Mbps		$\pi/4$ -DQPSK/FHSS	2DH3 (2Mbps)
		64QAM/OFDM	48 Mbps	64QAM/OFDM	48 Mbps		$\pi/4$ -DQPSK/FHSS	2DH5 (2Mbps)
		64QAM/OFDM	54 Mbps	64QAM/OFDM	54 Mbps	EDR3	8DPSK/FSSS	3DH1 (3Mbps)
							8DPSK/FSSS	3DH3 (3Mbps)
							8DPSK/FSSS	3DH5 (3Mbps)

*. SS: Spatial Stream

802.11n(HT20)			802.11n(HT40)			802.11ac(VHT20)			802.11ac(VHT40)			802.11ac(VHT80)		
MCS	SS	Modulation	MCS	SS	Modulation	MCS	SS	Modulation	MCS	SS	Modulation	MCS	SS	Modulation
0	1	BPSK/OFDM	0	1	BPSK/OFDM	0	1 or 2	BPSK/OFDM	0	1 or 2	BPSK/OFDM	0	1 or 2	BPSK/OFDM
1	1	QPSK/OFDM	1	1	QPSK/OFDM	1	1 or 2	QPSK/OFDM	1	1 or 2	QPSK/OFDM	1	1 or 2	QPSK/OFDM
2	1	QPSK/OFDM	2	1	QPSK/OFDM	2	1 or 2	QPSK/OFDM	2	1 or 2	QPSK/OFDM	2	1 or 2	QPSK/OFDM
3	1	16QAM/OFDM	3	1	16QAM/OFDM	3	1 or 2	16QAM/OFDM	3	1 or 2	16QAM/OFDM	3	1 or 2	16QAM/OFDM
4	1	16QAM/OFDM	4	1	16QAM/OFDM	4	1 or 2	16QAM/OFDM	4	1 or 2	16QAM/OFDM	4	1 or 2	16QAM/OFDM
5	1	64QAM/OFDM	5	1	64QAM/OFDM	5	1 or 2	64QAM/OFDM	5	1 or 2	64QAM/OFDM	5	1 or 2	64QAM/OFDM
6	1	64QAM/OFDM	6	1	64QAM/OFDM	6	1 or 2	64QAM/OFDM	6	1 or 2	64QAM/OFDM	6	1 or 2	64QAM/OFDM
7	1	64QAM/OFDM	7	1	64QAM/OFDM	7	1 or 2	64QAM/OFDM	7	1 or 2	64QAM/OFDM	7	1 or 2	64QAM/OFDM
8	2	BPSK/OFDM	8	2	BPSK/OFDM	8	1 or 2	256QAM/OFDM	8	1 or 2	256QAM/OFDM	8	1 or 2	256QAM/OFDM
9	2	QPSK/OFDM	9	2	QPSK/OFDM	-	-	-	9	1 or 2	256QAM/OFDM	9	1 or 2	256QAM/OFDM
10	2	QPSK/OFDM	10	2	QPSK/OFDM									
11	2	16QAM/OFDM	11	2	16QAM/OFDM									
12	2	16QAM/OFDM	12	2	16QAM/OFDM									
13	2	64QAM/OFDM	13	2	64QAM/OFDM									
14	2	64QAM/OFDM	14	2	64QAM/OFDM									
15	2	64QAM/OFDM	15	2	64QAM/OFDM									

Step.2 Consideration of SAR test channel

For the SAR test reference, on each operation band, the average output power was measured on the low/middle/upper and specified channels with the worst data rate condition in step 1 in the above.

3.6 Confirmation after SAR testing

It was checked that the power drift [W] is within $\pm 5\%$ 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] = $20\log(E_a)/(E_b)$ (where, Before SAR testing: $E_b[V/m]$ / After SAR testing: $E_a[V/m]$)

Limit of power drift[W] = $\pm 5\%$

Power drift limit (X) [dB] = $10\log(P_drift) = 10\log(1.05/1) = 10\log(1.05) - 10\log(1) = 0.21\text{dB}$

from E-filed relations with power.

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

Therefore, The correlation of power and the E-filed

Power drift limit (X) dB = $10\log(P_drift) = 10\log(E_drift)^2 = 20\log(E_drift)$

From the above mentioned, **the calculated power drift of DASY5 system must be the less than $\pm 0.21\text{dB}$.**

3.7 Test setup of EUT and SAR measurement procedure

3.7.1 Consideration of SAR test reduction by the antenna separation distance

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

Setup	Explanation of EUT setup position (*: Refer to Appendix 1 for test setup photographs.)	antenna #A		antenna #B		SAR type
		D#A [mm]	SAR Tested /Reduced	D#B [mm]	SAR Tested /Reduced	
Front	The front surface (LCD) of EUT would be arranged so that it may touch to the Flat phantom.	≈2.6	Reduced (*1)	≈2.6	Reduced (*1)	Body-touch
Back	The back surface of EUT was touched to the Flat phantom.	≈3.3	Tested	≈3.3	Tested	
Top	The short edge (near antenna) of EUT was touched to the Flat phantom.	≈1	Tested	≈1	Tested	
Left	The long edge (near antenna #A) of EUT was touched to the Flat phantom.	≈12	Tested	≈141	Reduced (*2)	
Right	The long edge (near antenna #B) of EUT would be arranged so that it may touch to the Flat phantom.	≈171	Reduced (*2)	≈53	Reduced (*2)	
Bottom	The short edge (far end of antenna) of EUT would be arranged so that it may touch to the Flat phantom.	≈287	Reduced (>200 mm)	≈287	Reduced (>200 mm)	

*. D: Antenna separation distance. It is the distance from the antenna to the outer surface of EUT which an operator may touch.

*. Size of EUT (Digital Paper): 224.0 × 302.6 × 5.9 (thickness) [mm]

*1. SAR test was only applied to the back surface and edge surface of EUT in accordance of KDB616217 SAR test requirement guideline.

(KDB 616217 D04 (v1r02)) 4.3 Tablet host platform test requirements

Most recent tablets are designed with an interactive display that may not require a physical keyboard. Both configurations are used in similar manners and require SAR evaluation for the back surface and edges of the tablet. For keyboards that can be unfolded like a laptop, the procedures for laptop platform should also be applied. When the tablet keyboard can be detached from the display screen and also contains a wireless transmitter, SAR testing for the keyboard alone may be required. The antennas in tablets are typically located near the back (bottom) surface and/or along the edges of the devices; therefore, SAR evaluation is required for these configurations. Exposures through the front (top) surface of the display section of a full-size tablet, away from the edges, are generally limited to the user's hands. Exposures to hands for typical consumer transmitters used in tablets are not expected to exceed the extremity SAR limit; therefore, SAR evaluation for the front surface of tablet display screens are generally not necessary, except for tablets that are designed to require continuous operations with the hand(s) next to the antenna(s).

*2. KDB 447498 D01 (v06) was taken into consideration to reduce SAR test.

Consideration of SAR test reduction by the antenna separation distance (100MHz-6GHz, ≤50mm)										
Band, Mode	Setup Position	Minimum distance		Upper frequency [GHz]	Max. tune-up power			Calculation of exclusion (*3)	Standalone SAR test required? (if >3, test required)	Remarks
		[mm]	[mm] (rounded)		[dBm]	[mW]	[mW] (rounded)			
Bluetooth LE	Back (ant.A, ant.B)	3.3	3 (≤5)	2.480	9	7.94	8	2.5	≤3.0	Reduced
	Top (ant.A, ant.B)	1	1 (≤5)	2.480	9	7.94	8	2.5	≤3.0	Reduced
	Left (ant.A)	12	12	2.480	9	7.94	8	1.0	≤3.0	Reduced
WLAN 2.4GHz	Back (ant.A, ant.B)	3.3	3 (≤5)	2.462	15	31.62	32	10.0	>3.0	Required
	Top (ant.A, ant.B)	1	1 (≤5)	2.462	15	31.62	32	10.0	>3.0	Required
	Left (ant.A)	12	12	2.462	15	31.62	32	4.2	>3.0	Required
WLAN W52&53	Back (ant.A, ant.B)	3.3	3 (≤5)	5.32	12	15.85	16	7.4	>3.0	Required
	Top (ant.A, ant.B)	1	1 (≤5)	5.32	12	15.85	16	7.4	>3.0	Required
	Left (ant.A)	12	12	5.32	12	15.85	16	3.1	>3.0	Required
WLAN W56	Back (ant.A, ant.B)	3.3	3 (≤5)	5.72	12	15.85	16	7.7	>3.0	Required
	Top (ant.A, ant.B)	1	1 (≤5)	5.72	12	15.85	16	7.7	>3.0	Required
	Left (ant.A)	12	12	5.72	12	15.85	16	3.2	>3.0	Required
WLAN W58	Back (ant.A, ant.B)	3.3	3 (≤5)	5.825	11	12.59	13	6.3	>3.0	Required
	Top (ant.A, ant.B)	1	1 (≤5)	5.825	11	12.59	13	6.3	>3.0	Required
	Left (ant.A)	12	12	5.825	11	12.59	13	2.6	≤3.0	Reduced

Consideration of SAR test reduction by the antenna separation distance (100MHz-6GHz, >50mm)										
Band, Mode	Position	Minimum distance		Upper frequency [GHz]	Max. tune-up power			Calculation of test exclusion thresholds [mW] (*4)	Standalone SAR test required?	Remarks
		[mm]	[mm] (rounded)		[dBm]	[mW]	[mW] (rounded)			
Bluetooth LE	Right (ant.B)	53	53	2.480	9	7.94	8	136	Reduced	-
WLAN 2.4GHz	Right (ant.B)	53	53	2.462	15	31.62	32	164	Reduced	b,g,n(HT20)
WLAN W52&53	Right (ant.B)	53	53	5.32	12	15.85	16	105	Reduced	a,n(HT20/40), ac(VHT20/40)
WLAN W56	Right (ant.B)	53	53	5.72	12	15.85	16	103	Reduced	a,n(HT20/40), ac(VHT20/40)
WLAN W58	Right (ant.B)	53	53	5.825	11	12.59	13	102	Reduced	a,n(HT20/40), ac(VHT20/40)

*3. KDB 447498 D01 (v06) gives the following formula to calculate the SAR(1g) test exclusion thresholds for 100MHz-6GHz at test separation distance ≤50mm.

$$[(\text{max.power of channel, including tune-up tolerance, mW}) / (\text{min.test separation distance, mm})] \times [\sqrt{f}(\text{GHz})] \leq 3.0 \text{ (for SAR(1g))} \dots\dots\dots \text{formula (1)}$$

If power is calculated from the upper formula (1);

$$[\text{SAR(1g) test exclusion thresholds, mW}] = 3 \times [\text{test separation distance, mm}] / [\sqrt{f}(\text{GHz})] \dots\dots\dots \text{formula (2)}$$

$$[\text{SAR(1g) test exclusion thresholds, mW}] = 3 \times 50 / \text{SQRT}(2.462) = 96\text{mW, where test separation distance}=50\text{mm}$$

*4. KDB 447498 D01 (v06) gives the following formula to calculate the SAR(1g) test exclusion thresholds for 1.5-6GHz at test separation distance >50mm.

$$[\text{test exclusion thresholds, mW}] = [(\text{Power allowed at numeric threshold for 50mm in formula (1)})] + [(\text{test separation distance, mm}) - (50\text{mm})] \times 10 \text{ formula (3)}$$

<Conclusion for consideration for SAR test reduction>

- 1) For antenna #A, Back, Top and Left setup conditions are required the body-touch SAR.
- 2) For antenna #B, Back and Top setup conditions are required the body-touch SAR.

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

Step 1	On 2.4GHz band, Worst SAR search by DSSS mode. Add test for OFDM mode, if it's necessary.
Step 2 ~ Step 4	On W58+W56(>5.65GHz) aggregate band, Worst SAR search by largest channel bandwidth mode with highest power. Repeat test for W56(<5.65GHz) band (Step 3) and W53/52 band (Step 4). *. Check SAR measurement variability, when if the measured SAR(1g) was ≥ 0.80 W/kg and on a highest measured SAR(1g) condition in 2.4GHz band and in 5GHz band.

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

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SECTION 4: Operation of EUT during testing

4.1 Operating modes for SAR testing

This EUT has Bluetooth (BER, EDR, LE) 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	Wi-Fi			Bluetooth			
	b	g	n(HT20)	BLE	BDR	EDR2	EDR3
Tx band [MHz]	2412~2462			2402~2480			
Bandwidth [MHz]	20	20	20	79	79	79	79
SAR Tested/Reduced?	Tested	Tested	Tested	Reduced	Reduced	Reduced	Reduced
Frequency tested [MHz]	(*)1	(*)1	(*)1	-	-	-	-
Data rate [Mbps]	1	6	MCS0, 8	1	1	2	3

Operation mode	a	n(HT20)	ac(VHT20)	n(HT40)	ac(VHT40)	ac(VHT80)	a	n(HT20)	ac(VHT20)	n(HT40)	ac(VHT40)	ac(VHT80)
band	W52 (U-NII-1) (*)2						W53 (U-NII-2A)					
Tx band [MHz]	5180~5240			5190~5230		5210	5260~5320			5270~5310		5290
Bandwidth [MHz]	20	20	20	40	40	80	20	20	20	40	40	80
SAR Tested/Reduced?	Tested	Reduced	Reduced	Reduced	Reduced	Reduced	Tested	Reduced	Reduced	Reduced	Reduced	Reduced
Frequency tested [MHz]	(*)1	-	-	-	-	-	(*)1	(Section 7)	-	(*)1	-	-
Data rate [Mbps]	6	-	-	-	-	-	6	MCS8	-	MCS0	-	-

Operation mode	a	n(HT20)	ac(VHT20)	n(HT40)	ac(VHT40)	ac(VHT80)	a	n(HT20)	ac(VHT20)	n(HT40)	ac(VHT40)	ac(VHT80)
band	W56 (U-NII-2C) (<5.65GHz)						W56 (U-NII-2C) (>5.65GHz)+W58 (U-NII-3) aggregate					
Tx band [MHz]	5500~5640			5510~5630		5530~5610	5660~5825			5670~5795		5690~5775
Bandwidth [MHz]	20	20	20	40	40	80	20	20	20	40	40	80
SAR Tested/Reduced?	Tested	Reduced	Reduced	Reduced	Reduced	Reduced	Tested	Reduced	Reduced	Reduced	Reduced	Reduced
Frequency tested [MHz]	(*)1	(Section 7)	-	(*)1	-	-	(*)1	(Section 7)	-	(*)1	-	-
Data rate [Mbps]	6	MCS8	-	MCS0	-	-	6	MCS8	-	MCS0	-	-

Controlled software	Dut-labtool (Ver.2.0.0.75); Wi-Fi tool (for Wi-Fi test), BT tool (for Bluetooth test)											
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*1. SAR test reduction consideration

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

(*: Ch: Channel, Max: Maximum power in specification, AT: Antenna terminal conducted average power measured, SAR(1g): Reported SAR(1g) [W/kg] with tuned-up)

802.11 Modes	b	g	n	a	n(HT)		ac(VHT)		
Ch. Bandwidth [MHz]	20	20	20	20	20	40	20	40	80
Lowest data rate [Mbps]	1	6	6.5 (MCS0)	6	6.5 (MCS0)	13 (MCS0)	7.2 (MCS0)	15.0 (MCS0)	32.5 (MCS0)

2.4GHz	Ch.	1/6/11	1/6/11	1/6/11					
	Max,mW	32/32/32	32/32/32	32/32/32					
	Ant.A	AT,mW	23/22/22	27/25/28	25/24/26				
	Ant.B	Rp,SAR1g	0.81/1.17	- (b,<1.2W/kg)	- (b,<1.2W/kg)				
		AT,mW	27/25/28	27/25/28	23/23/24				
		Rp,SAR1g	1.28/1.42/1.43	1.14/1.34/1.36	1.22/1.31/1.33				

W52	Ch.			36/40/44/48	36/40/44/48	38/46	36/40/44/48	38/46	42
	Max,mW			16/16/16/16	16/16/16/16	16/16	16/16/16/16	16/16	13
	Ant.A	AT,mW		15/15/16/15	14/15/15/15	11/11	14/15/15/15	11/11	lower power
	Ant.B	Rp,SAR1g		Reduced (*)2	Reduced (*)2	Reduced (*)2	Reduced (*)2	Reduced (*)2	lower power
		AT,mW		15/16/16/16	15/16/15/15	11/11	16/15/15/15	11/11	lower power
		Rp,SAR1g		1.05	Reduced (*)2	Reduced (*)2	Reduced (*)2	Reduced (*)2	lower power

W53	Ch.			52/56/60/64	52/56/60/64	54/62	52/56/60/64	54/62	58
	Max,mW			16/16/16/16	16/16/16/16	16/16	16/16/16/16	16/16	13
	Ant.A	AT,mW		16/15/15/14	15/15/14/14	11/11	15/14/14/14	11/11	lower power
	Ant.B	Rp,SAR1g		0.55/0.59	- (a,<1.2W/kg)	0.56	- (a,<1.2W/kg)	- (n40,<1.2W/kg)	lower power
		AT,mW		16/15/15/15	15/15/15/15	11/11	15/15/15/15	11/11	lower power
		Rp,SAR1g		1.07/1.10/1.07	- (a,<1.2W/kg)	0.99/1.07	- (a,<1.2W/kg)	- (n40,<1.2W/kg)	lower power

W56(<5.65GHz)	Ch.			100/112/116/128	100/112/116/128	102/110/118/126	100/112/116/128	102/110/118/126	106/122
	Max,mW			16/16/16/16	16/16/16/16	16/16/16	16/16/16/16	16/16/16	13
	Ant.A	AT,mW		15/15/15/15	15/15/15/15	11/11/11/11	15/15/15/15	11/11/11/11	lower power
	Ant.B	Rp,SAR1g		0.68/0.72	- (a,<1.2W/kg)	0.61	- (a,<1.2W/kg)	- (n40,<1.2W/kg)	lower power
		AT,mW		16/16/16/16	16/15/16/15	11/11/11/11	16/15/16/16	11/11/11/11	lower power
		Rp,SAR1g		1.14/1.18/1.19	- (a,<1.2W/kg)	1.10/1.15/1.14	- (a,<1.2W/kg)	- (n40,<1.2W/kg)	lower power

W56(>5.65GHz)+W58 aggregate	Ch.			132/149/165	132/149/165	134/142/151/159	132/149/165	134/142/151/159	138/155
	Max,mW			16/13/13	16/13/13	16/16/13/13	16/13/13	16/16/13/13	13
	Ant.A	AT,mW		15/10/11	15/10/11	11/11/11/11	15/10/11	11/12/10/10	lower power
	Ant.B	Rp,SAR1g		0.86/0.66	- (a,<1.2W/kg)	0.72/0.52	- (a,<1.2W/kg)	- (n40,<1.2W/kg)	lower power
		AT,mW		16/12/12	16/12/12	11/11/12/12	16/12/12	11/11/11/12	lower power
		Rp,SAR1g		1.17/1.10/1.14	- (a,<1.2W/kg)	1.10/1.16/0.99/1.07	- (a,<1.2W/kg)	- (n40,<1.2W/kg)	lower power

*1. (KDB248227 D01 (v02r02), clause 5.3.2) At same specified maximum output power mode, the largest channel bandwidth, the lower order modulation and lowest data rate configuration was selected. However, lowest order modulation with 20MHz channel bandwidth mode (11a) was shown the higher SAR result. Therefore the inspection of SAR test setup was performed by 11a mode in all 5GHz band.

*2. (KDB248227 D01 (v02r02), clause 5.3.1) Since highest reported SAR(1g) of U-NII-2A was ≤1.2 W/kg, SAR measurement of U-NII-1 band was omitted.

SECTION 5: Uncertainty Assessment (SAR measurement)

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

*. Table of uncertainties are listed for ISO/IEC 17025.

*. This measurement uncertainty budget is suggested by IEEE Std.1528(2013) and determined by Schmid & Partner Engineering AG (DASY5 Uncertainty Budget). Per KDB 865664 D01 (v01r04) SAR Measurement 100 MHz to 6 GHz Section 2.8.1., when the highest measured SAR(1g) within a frequency band is < 1.5W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std.1528 (2013) is not required in SAR reports submitted for equipment approval.

SECTION 6: Confirmation before testing**6.1 Assessment for the antenna terminal port conducted power of EUT (Worst data rate, worst channel determination)**

Mode	Freq. [MHz]	Data rate [Mbps]	Power spec.		Duty cycle			Antenna A (wifi) power					Antenna B (wifi+bt) power					MIMO AntA+B power				Power Tune-up?
			Typical	Max.	duty cycle [%]	factor [dB]	scaled factor [-]	Set pwr. [dBm]	Time average [dBm]	Δ Max. [dB]	Tune-up factor [-]	SAR Tested?	Set pwr. [dBm]	Time average [dBm]	Δ Max. [dB]	Tune-up factor [-]	SAR Tested?	MIMO target [dBm]	MIMO max. [dBm]	SUM Ave. [dBm]	Δ Max. [dB]	
Blue- tooth LE	2402	1	7.0	9.0	63.6	(*)1	×1.00						9	8.42	-0.58	×1.14	-					Tune-up
	2440	1	7.0	9.0	63.6	(*)1	×1.00						9	8.29	-0.71	×1.18	-					Tune-up
	2480	1	7.0	9.0	63.6	(*)1	×1.00						9	8.08	-0.92	×1.24	-					Tune-up
Blue- tooth BDR	2401	DH5	2.0	4.0	78.5	(*)1	×1.00						0	2.47	-1.53	×1.42	-					-
	2441	DH5	2.0	4.0	78.5	(*)1	×1.00						0	2.47	-1.53	×1.42	-					-
	2480	DH5	2.0	4.0	78.5	(*)1	×1.00						0	2.44	-1.56	×1.43	-					-
Blue- tooth EDR	2401	2DH5	2.0	4.0	78.5	(*)1	×1.00						0	3.76	-0.24	×1.06	-					-
	2441	2DH5	2.0	4.0	78.5	(*)1	×1.00						0	3.62	-0.38	×1.09	-					-
	2480	2DH5	2.0	4.0	78.5	(*)1	×1.00						0	3.43	-0.57	×1.14	-					-
	2401	3DH5	2.0	4.0	78.8	(*)1	×1.00						0	3.74	-0.26	×1.06	-					-
	2441	3DH5	2.0	4.0	78.8	(*)1	×1.00						0	3.61	-0.39	×1.09	-					-
	2480	3DH5	2.0	4.0	78.8	(*)1	×1.00						0	3.41	-0.59	×1.15	-					-
11b	2412	1	13.0	15.0	99.8	0.01	×1.00	-13	13.60	-1.40	×1.38	Tested	13	14.28	-0.72	×1.18	Tested					-
	2437	1	13.0	15.0	99.8	0.01	×1.00	-13	13.34	-1.66	×1.47	-	13	14.00	-1.00	×1.26	Tested					-
	2462	1	13.0	15.0	99.8	0.01	×1.00	-13	13.33	-1.67	×1.47	Tested	13	14.44	-0.56	×1.14	Tested					-
11g	2412	6	13.0	15.0	95.2	0.21	×1.05	14	14.23	-0.77	×1.19	-	14	13.74	-1.26	×1.34	Tested					Tune-up
	2437	6	13.0	15.0	95.2	0.21	×1.05	14	13.97	-1.03	×1.27	-	14	13.62	-1.38	×1.37	Tested					Tune-up
	2462	6	13.0	15.0	95.2	0.21	×1.05	14	14.13	-0.87	×1.22	-	14	13.76	-1.24	×1.33	Tested					Tune-up
11n (HT20) (1Tx)	2412	MCS0	13.0	15.0	94.6	0.24	×1.06	14	14.04	-0.96	×1.25	-	14	13.64	-1.36	×1.37	Tested					Tune-up
	2437	MCS0	13.0	15.0	94.6	0.24	×1.06	14	13.88	-1.12	×1.29	-	14	13.70	-1.30	×1.35	Tested					Tune-up
	2462	MCS0	13.0	15.0	94.6	0.24	×1.06	14	14.23	-0.77	×1.19	-	14	13.87	-1.13	×1.30	Tested					Tune-up
11n (HT20) (2Tx)	2412	MCS8	13.0	15.0	91.2	0.40	×1.10	14	14.13	-0.87	×1.22	-	14	13.62	-1.38	×1.37	-	16.0	18.0	16.89	-1.11	Tune-up
	2437	MCS8	13.0	15.0	91.2	0.40	×1.10	14	13.96	-1.04	×1.27	-	14	13.53	-1.47	×1.40	-	16.0	18.0	16.76	-1.24	Tune-up
	2462	MCS8	13.0	15.0	91.2	0.40	×1.10	14	14.08	-0.92	×1.24	Tested	14	13.66	-1.34	×1.36	Tested	16.0	18.0	16.89	-1.11	Tune-up

*1. Duty cycle of measured 63.2 % of BLE and 77.2 % of BDR&EDR was nearly equal to highest theory duty cycle. Therefore the duty scaled factor was "×1.00".

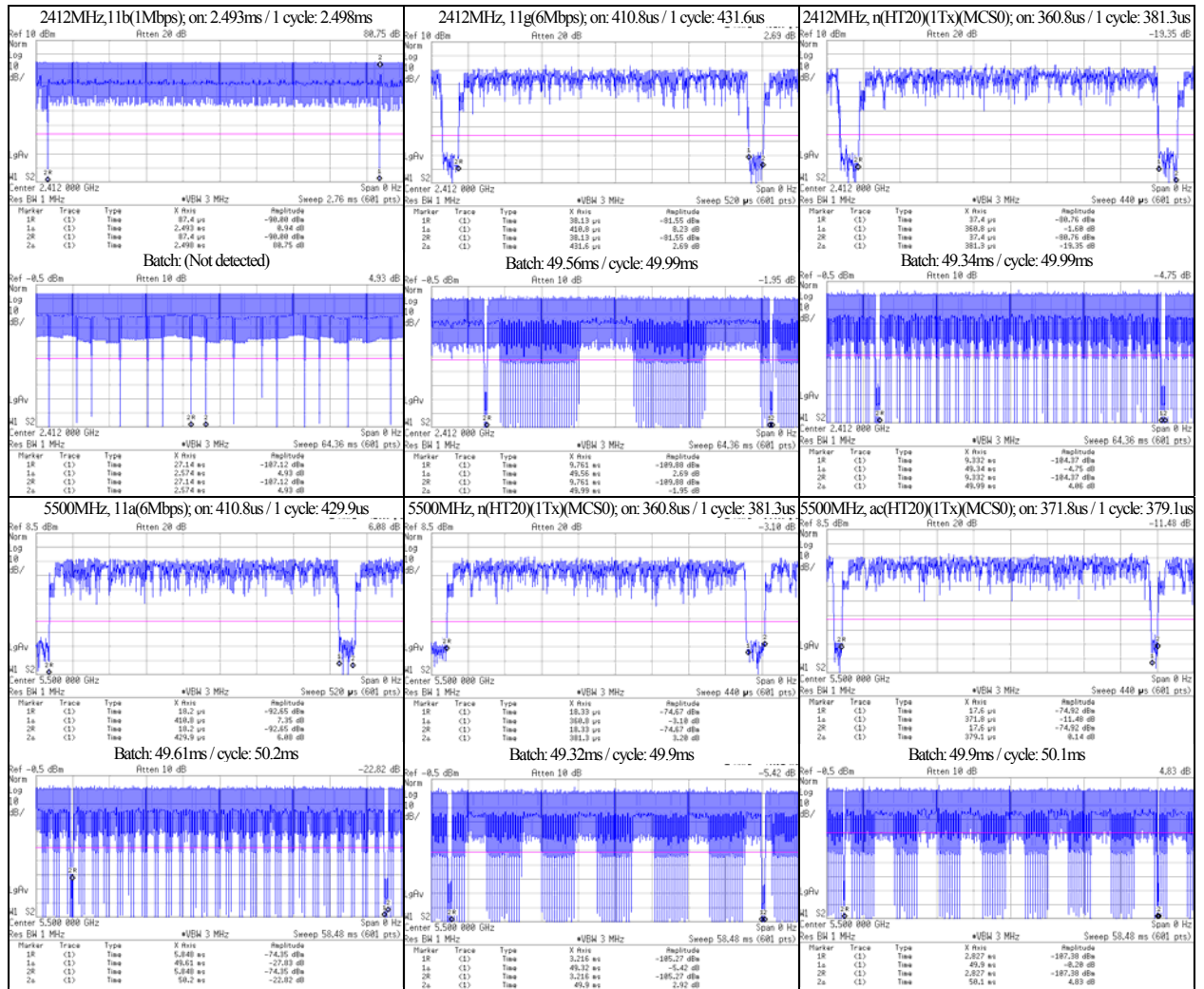
11a	5180	6	10.0	12.0	95.6	0.20	×1.05	11	11.74	-0.26	×1.06	-	11	11.82	-0.18	×1.04	-	-	-	Tune-up
	5200	6	10.0	12.0	95.6	0.20	×1.05	11	11.76	-0.24	×1.06	-	11	11.94	-0.06	×1.01	-	-	-	Tune-up
	5220	6	10.0	12.0	95.6	0.20	×1.05	11	11.93	-0.07	×1.02	-	11	11.94	-0.06	×1.01	Tested	-	-	Tune-up
	5240	6	10.0	12.0	95.6	0.20	×1.05	11	11.84	-0.16	×1.04	-	11	11.92	-0.08	×1.02	-	-	-	Tune-up
	5260	6	10.0	12.0	95.6	0.20	×1.05	11	11.92	-0.08	×1.02	Tested	11	11.94	-0.06	×1.01	Tested	-	-	Tune-up
	5280	6	10.0	12.0	95.6	0.20	×1.05	11	11.75	-0.25	×1.06	-	11	11.78	-0.22	×1.05	-	-	-	Tune-up
	5300	6	10.0	12.0	95.6	0.20	×1.05	11	11.72	-0.28	×1.07	Tested	11	11.75	-0.25	×1.06	Tested	-	-	Tune-up
	5320	6	10.0	12.0	95.6	0.20	×1.05	11	11.61	-0.39	×1.09	-	11	11.73	-0.27	×1.06	Tested	-	-	Tune-up
	5500	6	10.0	12.0	95.6	0.20	×1.05	11	11.70	-0.30	×1.07	-	11	11.92	-0.08	×1.02	Tested	-	-	Tune-up
	5560	6	10.0	12.0	95.6	0.20	×1.05	11	11.74	-0.26	×1.06	-	11	11.95	-0.05	×1.01	-	-	-	Tune-up
	5580	6	10.0	12.0	95.6	0.20	×1.05	11	11.64	-0.36	×1.09	Tested	11	11.92	-0.08	×1.02	Tested	-	-	Tune-up
	5640	6	10.0	12.0	95.6	0.20	×1.05	11	11.81	-0.19	×1.04	Tested	11	11.96	-0.04	×1.01	Tested	-	-	Tune-up
	5660	6	10.0	12.0	95.6	0.20	×1.05	11	11.73	-0.27	×1.06	Tested	11	11.99	-0.01	×1.00	Tested	-	-	Tune-up
	5745	6	9.0	11.0	95.6	0.20	×1.05	10	10.21	-0.79	×1.20	-	10	10.78	-0.22	×1.05	Tested	-	-	Tune-up
	5825	6	9.0	11.0	95.6	0.20	×1.05	10	10.57	-0.43	×1.10	Tested	10	10.96	-0.04	×1.01	Tested	-	-	Tune-up
11n (HT20) (1Tx)	5180	MCS0	10.0	12.0	94.6	0.24	×1.06	11	11.54	-0.46	×1.11	-	11	11.89	-0.11	×1.03	-	-	-	Tune-up
	5200	MCS0	10.0	12.0	94.6	0.24	×1.06	11	11.77	-0.23	×1.05	-	11	11.99	-0.01	×1.00	-	-	-	Tune-up
	5220	MCS0	10.0	12.0	94.6	0.24	×1.06	11	11.73	-0.27	×1.06	-	11	11.86	-0.14	×1.03	-	-	-	Tune-up
	5240	MCS0	10.0	12.0	94.6	0.24	×1.06	11	11.73	-0.27	×1.06	-	11	11.88	-0.12	×1.03	-	-	-	Tune-up
	5260	MCS0	10.0	12.0	94.6	0.24	×1.06	11	11.73	-0.27	×1.06	-	11	11.80	-0.20	×1.05	-	-	-	Tune-up
	5280	MCS0	10.0	12.0	94.6	0.24	×1.06	11	11.68	-0.32	×1.08	-	11	11.78	-0.22	×1.05	-	-	-	Tune-up
	5300	MCS0	10.0	12.0	94.6	0.24	×1.06	11	11.59	-0.41	×1.10	-	11	11.72	-0.28	×1.07	-	-	-	Tune-up
	5320	MCS0	10.0	12.0	94.6	0.24	×1.06	11	11.60	-0.40	×1.10	-	11	11.65	-0.35	×1.08	-	-	-	Tune-up
	5500	MCS0	10.0	12.0	94.6	0.24	×1.06	11	11.75	-0.25	×1.06	-	11	11.96	-0.04	×1.01	-	-	-	Tune-up
	5560	MCS0	10.0	12.0	94.6	0.24	×1.06	11	11.75	-0.25	×1.06	-	11	11.86	-0.14	×1.03	-	-	-	Tune-up
	5580	MCS0	10.0	12.0	94.6	0.24	×1.06	11	11.78	-0.22	×1.05	-	11	11.98	-0.02	×1.00	-	-	-	Tune-up
	5640	MCS0	10.0	12.0	94.6	0.24	×1.06	11	11.69	-0.31	×1.07	-	11	11.90	-0.10	×1.02	-	-	-	Tune-up
	5660	MCS0	10.0	12.0	94.6	0.24	×1.06	11	11.75	-0.25	×1.06	-	11	11.96	-0.04	×1.01	-	-	-	Tune-up
	5745	MCS0	9.0	11.0	94.6	0.24	×1.06	10	10.20	-0.80	×1.20	-	10	10.77	-0.23	×1.05	-	-	-	Tune-up
	5825	MCS0	9.0	11.0	94.6	0.24	×1.06	10	10.46	-0.54	×1.13	-	10	10.96	-0.04	×1.01	-	-	-	Tune-up
11ac (VHT 20) (1Tx)	5180	MCS0	10.0	12.0	98.1	0.08	×1.02	11	11.59	-0.41	×1.10	-	11	11.99	-0.01	×1.00	-	-	-	Tune-up
	5200	MCS0	10.0	12.0	98.1	0.08	×1.02	11	11.67	-0.33	×1.08	-	11	11.76	-0.24	×1.06	-	-	-	Tune-up
	5220	MCS0	10.0	12.0	98.1	0.08	×1.02	11	11.78	-0.22	×1.05	-	11	11.79	-0.21	×1.05	-	-	-	Tune-up
	5240	MCS0	10.0	12.0	98.1	0.08	×1.02	11	11.81	-0.19	×1.04	-	11	11.77	-0.23	×1.05	-	-	-	Tune-up
	5260	MCS0	10.0	12.0	98.1	0.08	×1.02	11	11.81	-0.19	×1.04	-	11	11.81	-0.19	×1.04	-	-	-	Tune-up
	5280	MCS0	10.0	12.0	98.1	0.08	×1.02	11	11.60	-0.40	×1.10	-	11	11.73	-0.27	×1.06	-	-	-	Tune-up
	5300	MCS0	10.0	12.0	98.1	0.08	×1.02	11	11.53	-0.47	×1.11	-	11	11.75	-0.25	×1.06	-	-	-	Tune-up
	5320	MCS0	10.0	12.0	98.1	0.08	×1.02	11	11.59	-0.41	×1.10	-	11	11.77	-0.23	×1.05	-	-	-	Tune-up
	5500	MCS0	10.0	12.0	98.1	0.08	×1.02	11	11.65	-0.35	×1.08	-	11	11.94	-0.06	×1.01	-	-	-	Tune-up
	5560	MCS0	10.0	12.0	98.1	0.08	×1.02	11	11.69	-0.31	×1.07	-	11	11.81	-0.19	×1.04	-	-	-	Tune-up
	5580	MCS0	10.0	12.0	98.1	0.08	×1.02	11	11.75	-0.25	×1.06	-	11	11.92	-0.08	×1.02	-	-	-	Tune-up
	5640	MCS0	10.0	12.0	98.1	0.08	×1.02	11	11.78	-0.22	×1.05	-	11	11.96	-0.04	×1.01	-	-	-	Tune-up
	5660	MCS0	10.0	12.0	98.1	0.08	×1.02	11	11.74	-0.26	×1.06	-	11	11.97	-0.03	×1.01	-	-	-	Tune-up
	5745	MCS0	9.0	11.0	98.1	0.08	×1.02	10	10.21	-0.79	×1.20	-	10	10.84	-0.16	×1.04	-	-	-	Tune-up
	5825	MCS0	9.0	11.0	98.1	0.08	×1.02	10	10.37	-0.63	×1.16	-	10	10.96	-0.04	×1.01	-	-	-	Tune-up

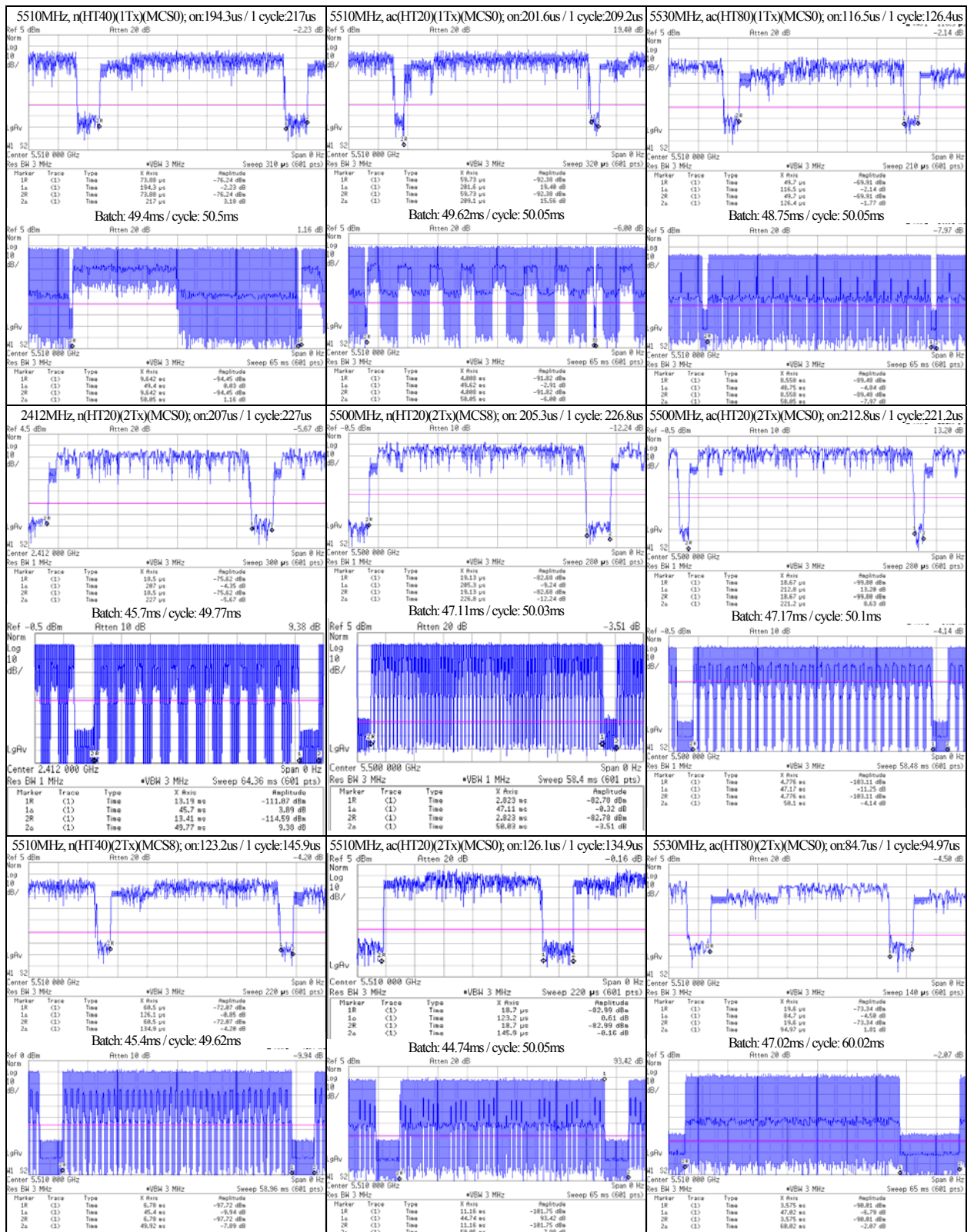
(cont'd)

Mode	Freq.	Data rate	Power spec.		Duty cycle			Antenna A (wifi) power					Antenna B (wifi+bt) power					MIMO AntA+B power				Power Tune-up?
			Typical	Max.	duty cycle	factor	scaled factor	Set pwr.	Time average	Δ Max.	Tune-up factor	SAR Tested?	Set pwr.	Time average	Δ Max.	Tune-up factor	SAR Tested?	MIMO target	MIMO max.	SUM Ave.	Δ Max.	
	[MHz]	[Mbps]	[dBm]	[dBm]	[%]	[dB]	[-]	[dBm]	[dBm]	[dB]	[-]		[dBm]	[dBm]	[dB]	[-]		[dBm]	[dBm]	[dBm]	[dB]	
11n (HT40) (1Tx)	5190	MCS0	10.0	12.0	89.5	0.48	×1.12	10	10.45	-1.55	×1.43	-	10	10.48	-1.52	×1.42	-	-	-	-	-	
	5230	MCS0	10.0	12.0	89.5	0.48	×1.12	10	10.51	-1.49	×1.41	-	10	10.37	-1.63	×1.46	-	-	-	-	-	
	5270	MCS0	10.0	12.0	89.5	0.48	×1.12	10	10.58	-1.42	×1.39	-	10	10.32	-1.68	×1.47	Tested	-	-	-	-	
	5310	MCS0	10.0	12.0	89.5	0.48	×1.12	10	10.56	-1.44	×1.39	Tested	10	10.34	-1.66	×1.47	Tested	-	-	-	-	
	5510	MCS0	10.0	12.0	89.5	0.48	×1.12	10	10.51	-1.49	×1.41	-	10	10.43	-1.57	×1.44	Tested	-	-	-	-	
	5550	MCS0	10.0	12.0	89.5	0.48	×1.12	10	10.42	-1.58	×1.44	-	10	10.48	-1.52	×1.42	-	-	-	-	-	
	5590	MCS0	10.0	12.0	89.5	0.48	×1.12	10	10.44	-1.56	×1.43	Tested	10	10.58	-1.42	×1.39	Tested	-	-	-	-	
	5630	MCS0	10.0	12.0	89.5	0.48	×1.12	10	10.37	-1.63	×1.46	-	10	10.54	-1.46	×1.40	Tested	-	-	-	-	
	5670	MCS0	10.0	12.0	89.5	0.48	×1.12	10	10.44	-1.56	×1.43	-	10	10.46	-1.54	×1.43	Tested	-	-	-	-	
	5710	MCS0	10.0	12.0	89.5	0.48	×1.12	10	10.49	-1.51	×1.42	Tested	10	10.51	-1.49	×1.41	Tested	-	-	-	-	
5755	MCS0	9.0	11.0	89.5	0.48	×1.12	10	10.26	-0.74	×1.19	Tested	10	10.68	-0.32	×1.08	Tested	-	-	-	Tune-up		
5795	MCS0	9.0	11.0	89.5	0.48	×1.12	10	10.28	-0.72	×1.18	-	10	10.84	-0.16	×1.04	Tested	-	-	-	Tune-up		
11ac (VHT 40) (1Tx)	5190	MCS0	10.0	12.0	96.4	0.16	×1.04	10	10.37	-1.63	×1.46	-	10	10.37	-1.63	×1.46	-	-	-	-	-	
	5230	MCS0	10.0	12.0	96.4	0.16	×1.04	10	10.50	-1.50	×1.41	-	10	10.25	-1.75	×1.50	-	-	-	-	-	
	5270	MCS0	10.0	12.0	96.4	0.16	×1.04	10	10.43	-1.57	×1.44	-	10	10.27	-1.73	×1.49	-	-	-	-	-	
	5310	MCS0	10.0	12.0	96.4	0.16	×1.04	10	10.19	-1.81	×1.52	-	10	10.19	-1.81	×1.52	-	-	-	-	-	
	5510	MCS0	10.0	12.0	96.4	0.16	×1.04	10	10.43	-1.57	×1.44	-	10	10.23	-1.77	×1.50	-	-	-	-	-	
	5550	MCS0	10.0	12.0	96.4	0.16	×1.04	10	10.49	-1.51	×1.42	-	10	10.50	-1.50	×1.41	-	-	-	-	-	
	5590	MCS0	10.0	12.0	96.4	0.16	×1.04	10	10.35	-1.65	×1.46	-	10	10.42	-1.58	×1.44	-	-	-	-	-	
	5630	MCS0	10.0	12.0	96.4	0.16	×1.04	10	10.45	-1.55	×1.43	-	10	10.49	-1.51	×1.42	-	-	-	-	-	
	5670	MCS0	10.0	12.0	96.4	0.16	×1.04	10	10.33	-1.67	×1.47	-	10	10.42	-1.58	×1.44	-	-	-	-	-	
	5710	MCS0	10.0	12.0	96.4	0.16	×1.04	10	10.63	-1.37	×1.37	-	10	10.47	-1.53	×1.42	-	-	-	-	-	
5755	MCS0	9.0	11.0	96.4	0.16	×1.04	10	10.06	-0.94	×1.24	-	10	10.57	-0.43	×1.10	-	-	-	-	Tune-up		
5795	MCS0	9.0	11.0	96.4	0.16	×1.04	10	10.20	-0.80	×1.20	-	10	10.85	-0.15	×1.04	-	-	-	-	Tune-up		
11ac (VHT 80) (1Tx)	5210	MCS0	8.0	10.0	92.2	0.35	×1.08	8	8.52	-1.48	×1.41	-	8	8.63	-1.37	×1.37	-	-	-	-	-	
	5290	MCS0	8.0	10.0	92.2	0.35	×1.08	8	8.72	-1.28	×1.34	-	8	8.52	-1.48	×1.41	-	-	-	-	-	
	5530	MCS0	8.0	10.0	92.2	0.35	×1.08	8	8.71	-1.29	×1.35	-	8	8.76	-1.24	×1.33	-	-	-	-	-	
	5610	MCS0	8.0	10.0	92.2	0.35	×1.08	8	8.57	-1.43	×1.39	-	8	8.64	-1.36	×1.37	-	-	-	-	-	
	5690	MCS0	8.0	10.0	92.2	0.35	×1.08	8	8.64	-1.36	×1.37	-	8	8.58	-1.42	×1.39	-	-	-	-	-	
	5775	MCS0	8.0	10.0	92.2	0.35	×1.08	8	8.40	-1.60	×1.45	-	8	8.81	-1.19	×1.32	-	-	-	-	-	
11n (HT20) (2Tx)	5180	MCS0	10.0	12.0	90.5	0.43	×1.10	11	11.81	-0.19	×1.04	-	11	11.82	-0.18	×1.04	-	13.0	15.0	14.83	-0.17	Tune-up
	5200	MCS0	10.0	12.0	90.5	0.43	×1.10	11	11.88	-0.12	×1.03	-	11	11.84	-0.16	×1.04	-	13.0	15.0	14.87	-0.13	Tune-up
	5220	MCS0	10.0	12.0	90.5	0.43	×1.10	11	11.94	-0.06	×1.01	-	11	11.90	-0.10	×1.02	-	13.0	15.0	14.93	-0.07	Tune-up
	5240	MCS0	10.0	12.0	90.5	0.43	×1.10	11	11.96	-0.04	×1.01	-	11	11.94	-0.06	×1.01	-	13.0	15.0	14.96	-0.04	Tune-up
	5260	MCS0	10.0	12.0	90.5	0.43	×1.10	11	11.93	-0.07	×1.02	-	11	11.95	-0.05	×1.01	-	13.0	15.0	14.95	-0.05	Tune-up
	5280	MCS0	10.0	12.0	90.5	0.43	×1.10	11	11.85	-0.15	×1.04	-	11	11.84	-0.16	×1.04	-	13.0	15.0	14.86	-0.14	Tune-up
	5300	MCS0	10.0	12.0	90.5	0.43	×1.10	11	11.63	-0.37	×1.09	-	11	11.98	-0.02	×1.00	-	13.0	15.0	14.82	-0.18	Tune-up
	5320	MCS0	10.0	12.0	90.5	0.43	×1.10	11	11.61	-0.39	×1.09	-	11	11.79	-0.21	×1.05	-	13.0	15.0	14.71	-0.29	Tune-up
	5500	MCS0	10.0	12.0	90.5	0.43	×1.10	11	11.67	-0.33	×1.08	-	11	11.96	-0.04	×1.01	-	13.0	15.0	14.83	-0.17	Tune-up
	5560	MCS0	10.0	12.0	90.5	0.43	×1.10	11	11.62	-0.38	×1.09	-	11	11.98	-0.02	×1.00	-	13.0	15.0	14.81	-0.19	Tune-up
	5580	MCS0	10.0	12.0	90.5	0.43	×1.10	11	11.61	-0.39	×1.09	-	11	11.99	-0.01	×1.00	-	13.0	15.0	14.81	-0.19	Tune-up
	5640	MCS0	10.0	12.0	90.5	0.43	×1.10	11	11.75	-0.25	×1.06	-	11	11.96	-0.04	×1.01	-	13.0	15.0	14.87	-0.13	Tune-up
	5660	MCS0	10.0	12.0	90.5	0.43	×1.10	11	11.90	-0.10	×1.02	-	11	11.98	-0.02	×1.00	-	13.0	15.0	14.95	-0.05	Tune-up
	5745	MCS0	9.0	11.0	90.5	0.43	×1.10	10	10.18	-0.82	×1.21	-	10	10.77	-0.23	×1.05	-	12.0	14.0	13.49	-0.51	Tune-up
5825	MCS0	9.0	11.0	90.5	0.43	×1.10	10	10.42	-0.58	×1.14	-	10	10.96	-0.04	×1.01	-	12.0	14.0	13.71	-0.29	Tune-up	
11ac (VHT 20) (2Tx)	5180	MCS0	10.0	12.0	96.2	0.17	×1.04	11	11.67	-0.33	×1.08	-	11	12.07	0.07	×0.98	-	13.0	15.0	14.89	-0.11	Tune-up
	5200	MCS0	10.0	12.0	96.2	0.17	×1.04	11	11.82	-0.18	×1.04	-	11	11.93	-0.07	×1.02	-	13.0	15.0	14.89	-0.11	Tune-up
	5220	MCS0	10.0	12.0	96.2	0.17	×1.04	11	11.92	-0.08	×1.02	-	11	11.85	-0.15	×1.04	-	13.0	15.0	14.90	-0.10	Tune-up
	5240	MCS0	10.0	12.0	96.2	0.17	×1.04	11	11.97	-0.03	×1.01	-	11	11.91	-0.09	×1.02	-	13.0	15.0	14.95	-0.05	Tune-up
	5260	MCS0	10.0	12.0	96.2	0.17	×1.04	11	11.96	-0.04	×1.01	-	11	11.92	-0.08	×1.02	-	13.0	15.0	14.95	-0.05	Tune-up
	5280	MCS0	10.0	12.0	96.2	0.17	×1.04	11	11.86	-0.14	×1.03	-	11	12.04	0.04	×0.99	-	13.0	15.0	14.96	-0.04	Tune-up
	5300	MCS0	10.0	12.0	96.2	0.17	×1.04	11	11.60	-0.40	×1.10	-	11	12.13	0.13	×0.97	-	13.0	15.0	14.88	-0.12	Tune-up
	5320	MCS0	10.0	12.0	96.2	0.17	×1.04	11	11.59	-0.41	×1.10	-	11	12.14	0.14	×0.97	-	13.0	15.0	14.88	-0.12	Tune-up
	5500	MCS0	10.0	12.0	96.2	0.17	×1.04	11	11.67	-0.33	×1.08	-	11	12.08	0.08	×0.98	-	13.0	15.0	14.89	-0.11	Tune-up
	5560	MCS0	10.0	12.0	96.2	0.17	×1.04	11	11.65	-0.35	×1.08	-	11	12.09	0.09	×0.98	-	13.0	15.0	14.89	-0.11	Tune-up
	5580	MCS0	10.0	12.0	96.2	0.17	×1.04	11	11.80	-0.20	×1.05	-	11	12.12	0.12	×0.97	-	13.0	15.0	14.97	-0.03	Tune-up
	5640	MCS0	10.0	12.0	96.2	0.17	×1.04	11	11.69	-0.31	×1.07	-	11	12.12	0.12	×0.97	-	13.0	15.0	14.92	-0.08	Tune-up
	5660	MCS0	10.0	12.0	96.2	0.17	×1.04	11	11.86	-0.14	×1.03	-	11	12.09	0.09	×0.98	-	13.0	15.0	14.99	-0.0	

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

Mode	Frequency	Data rate	On-time	1 cycle	Duty cycle	Duty scaled	Batch	Batch cycle	Batch cycle	Batch scaled	Remarks
11b	2412MHz	1Mbps	2.493ms	2.498ms	99.8%(>85%)	×1.00	not detected	not detected	not detected	-	-
11g	2412MHz	6Mbps	410.8us	431.6us	95.2%(>85%)	×1.05	49.56ms	49.99ms	99.1% (≈100%)	×1.00	Add the duty factor to measured power. Batch is regarded as a continuous transmission and makes batch factor ×1.0.
11n(HT20)(1Tx)	2412MHz	MCS0	360.8us	381.3us	94.6%(>85%)	×1.06	49.34ms	49.99ms	98.7% (≈100%)	×1.00	
11a	5500MHz	6Mbps	410.8us	429.9us	95.6%(>85%)	×1.05	49.61ms	50.2ms	98.8% (≈100%)	×1.00	
11n(HT20)(1Tx)	5500MHz	MCS0	360.8us	381.3us	94.6%(>85%)	×1.06	49.32ms	49.9ms	98.8% (≈100%)	×1.00	
11ac(VHT20)(1Tx)	5500MHz	MCS0	371.8us	379.1us	98.1%(>85%)	×1.02	49.9ms	50.1ms	99.6% (≈100%)	×1.00	
11n(HT40)(1Tx)	5510MHz	MCS0	194.3us	217.0us	89.5%(>85%)	×1.12	49.4ms	50.5ms	97.8% (≈100%)	×1.00	Add the duty factor to measured power. Measured SAR is corrected by the batch factor.
11ac(VHT40)(1Tx)	5510MHz	MCS0	201.6ms	209.1ms	96.2%(>85%)	×1.04	49.62ms	50.05ms	99.1% (≈100%)	×1.00	
11ac(VHT80)(1Tx)	5530MHz	MCS0	116.5us	126.4us	92.2%(>85%)	×1.08	48.75ms	50.05ms	97.4% (≈100%)	×1.00	
11n(HT20)(2Tx)	2412MHz	MCS8	207.0us	227.0us	91.2%(>85%)	×1.10	45.7ms	49.77ms	91.8%	×1.09	
11n(HT20)(2Tx)	5500MHz	MCS8	205.3us	226.8us	90.5%(>85%)	×1.10	47.11ms	50.03ms	94.2%	×1.06	
11ac(VHT20)(2Tx)	5500MHz	MCS0	212.8us	221.2us	96.2%(>85%)	×1.00	47.17ms	50.1ms	94.2%	×1.06	Measured SAR is corrected by the batch factor.
11n(HT40)(2Tx)	5510MHz	MCS8	123.2us	145.9us	94.4%(>85%)	×1.00	45.4ms	49.62ms	95.5%	×1.05	
11ac(VHT40)(2Tx)	5510MHz	MCS0	126.1us	134.9us	93.5%(>85%)	×1.07	44.74	50.05	89.4%	×1.12	
11ac(VHT80)(2Tx)	5530MHz	MCS0	84.7us	94.97us	99.8%(>85%)	×1.00	47.02	60.02	78.3%	×1.28	





SECTION 7: SAR Measurement results**7.1 SAR test results (Wi-Fi, 2.4 GHz band)**

Measurement date: June 20 and 21, 2016

Measurement by: Hiroshi Naka

[Liquid measurement]

Target Frequency [MHz]	Liquid type	Liquid parameters (*a)								ASAR Coefficients(*c)		Date measured		
		Permittivity (εr) [-]				Conductivity [S/m]				Temp. [deg.C.]	Depth [mm]			
		Target	Measured		Limit (*b)	Target	Measured		Limit (*b)					
			Meas.	Δεr [%]			Meas.	Δσ [%]						
2412	Body	52.75	50.78	-3.7	-5% ≤ εr-meas	1.914	1.973	+3.1	0% ≤ σ-meas	22.5	154	+2.34	not required.	June 20, 2016 before SAR test. (June 21, 2016 (*1))
2437		52.72	50.69	-3.9		1.938	2.010	+3.7				+2.66	not required.	
2462		52.68	50.62	-3.9	≤ 0%	1.967	2.033	+3.4	≤ +5%			+2.49	not required.	

*1. It was within 24 hours from measurement on June 20, 2016 and same liquid temperature, so measured parameters on June 20 were used on June 21 continuously.

[SAR measurement results]

*. Setup "Back" was worst by preliminary SAR test of 2.4GHz band, so SAR test had been begun from a setup "Back" with DSSS mode.

SAR measurement results											Reported SAR (1g) [W/kg]							Remarks	
Mode	Frequency [MHz] (Channel)	Data rate [Mbps]	EUT setup				Power drift [dB]	SAR (1g) [W/kg]			SAR plot # in Appendix 2-2	Duty cycle correction			Output average power correction				SAR Corrected (*d)
			Ant. No.	Position	Gap [mm]	BTY. ID		Max.value of multi-peak				Duty [%]	Duty scaled	Batch scaled	Meas. [dBm]	Max. [dBm]	Tune-up factor		
								Meas.	ASAR [%]	ASAR corrected									
Step 1: 2.4GHz band																			
11b	2462(11)	1	B	Back	0	#0	0.02	1.25	+2.49	n/a (*c)	Plot 1-1	99.8	×1.00	×1.00	14.44	15	×1.14	1.425	Higher, Ant.B.
	2412(1)				0	#0	0	1.09	+2.34	n/a (*c)	Plot 1-3	99.8	×1.00	×1.00	14.28	15	×1.18	1.286	-
	2437(6)				0	#0	0.02	1.13	+2.66	n/a (*c)	Plot 1-4	99.8	×1.00	×1.00	14.00	15	×1.26	1.424	-
	2412(11)	1	A	Back	0	#0	0.03	0.59	+2.34	n/a (*c)	Plot 1-5	99.8	×1.00	×1.00	13.60	15	×1.38	0.814	-
	2462(11)				0	#1	0.02	0.793	+2.49	n/a (*c)	Plot 1-2	95.2	×1.00	×1.00	13.33	15	×1.47	1.166	Higher, Ant.A
11g	2462(11)	6	B	Back	0	#0	0.02	0.975	+2.48	n/a (*c)	Plot 1-6	95.2	×1.05	×1.00	13.76	15	×1.33	1.362	-
	2412(1)				0	#0	0.01	0.809	+2.34	n/a (*c)	Plot 1-7	95.2	×1.05	×1.00	13.74	15	×1.34	1.138	-
	2437(6)				0	#0	0.03	0.933	+2.66	n/a (*c)	Plot 1-8	95.2	×1.05	×1.00	13.62	15	×1.37	1.342	-
11n (HT20)	2462(11)	MCS0	B	Back	0	#2	0.09	0.967	+2.48	n/a (*c)	Plot 1-9	94.6	×1.06	×1.00	13.87	15	×1.30	1.333	-
	2437(6)				0	#2	-0.01	0.916	+2.66	n/a (*c)	Plot 1-10	94.6	×1.06	×1.00	13.70	15	×1.35	1.311	-
	2412(1)				0	#2	0.02	0.837	+2.34	n/a (*c)	Plot 1-11	94.6	×1.06	×1.00	13.64	15	×1.37	1.215	-
11n (HT20)	2462(11)	MCS8 MIMO	A+B	Back	0	#2	-0.07 -0.04	0.722 0.665	+2.48	n/a (*c)	Plot 1-12	91.2	×1.10	×1.09	13.66 14.08	15 15	×1.36 ×1.24	1.177 0.989	Ant.B. Ant.A.
11b	2462(11)	1	B	Top	0	#2	-0.08	0.480	+2.49	n/a (*c)	Plot 1-13	99.8	×1.00	×1.00	14.44	15	×1.14	0.547	-
	2412(11)				0	#2	-0.01	0.421	+2.34	n/a (*c)	Plot 1-14	99.8	×1.00	×1.00	13.60	15	×1.38	0.581	-
	2462(11)				0	#2	-0.01	0.583	+2.49	n/a (*c)	Plot 1-15	95.2	×1.00	×1.00	13.33	15	×1.47	0.857	-
11n (HT20)	2462(11)	MCS8 MIMO	A+B	Top	0	#2	0.01 -0.03	0.496 0.343	+2.48	n/a (*c)	Plot 1-16	91.2	×1.10	×1.09	14.08 13.66	15 15	×1.24 ×1.36	0.737 0.559	Ant.A. Ant.B.
11b	2412(1)	1	A	Left	0	#0	0.03	0.105	+2.34	n/a (*c)	Plot 1-17	99.8	×1.00	×1.00	13.60	15	×1.38	0.145	-
11b	2462(11)	1	B	Back	0	#1	-0.08	1.11	+2.49	n/a (*c)	Plot 1-18	99.8	×1.00	×1.00	14.44	15	×1.14	1.265	*. Repeat worst.

Note:

*. Gap: It is the separation distance between the nearest position of platform outer surface and the bottom outer surface of phantom;

Ant.: Antenna, BTY ID: Battery ID, Max.: maximum, Meas.: Measured value, n/a: not applied.

*. During test, the EUT was operated with full charged battery and without I/F cable. Battery ID No.#0, #1 and #2 were same model (Refer to Appendix 1).

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

SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
2412, 2437, 2462 MHz	2450MHz	within ±50MHz of calibration frequency	7.16	±12.0%

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

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

*b. Refer to KDB865664 D01 (v01r04), item 2), Clause 2.6; "When nominal tissue dielectric parameters are recorded in the probe calibration data; for example, only target values and tolerance are reported, the measured εr and σ of the liquid used in routine measurements must be: ≤ the target εr and ≥ the target σ values and also within 5% of the required target dielectric parameters."

c. The coefficients are parameters defined in clause E.3.3.2, IEEE Std 1528(2013). Since the measured liquid parameters were ≤ the target εr and ≥ the target σ values and also within 5% of the required target dielectric parameters, the measured SAR was not compensated by ΔSAR coefficients (. Clause 2) of 2.6, KDB865664 D01 (v01r04)).

Calculating formula: $\Delta SAR(1g) = C_{\epsilon r} \times \Delta \epsilon r + C_{\sigma} \times \Delta \sigma$, $C_{\epsilon r} = 7.854E-4 \times f^2 + 9.402E-3 \times f^2 - 2.742E-2 \times f + 0.2026$, $C_{\sigma} = 9.804E-3 \times f^2 + 8.661E-2 \times f + 0.7829$ $\Delta SAR \text{ corrected SAR } (1g) (W/kg) = (Meas. SAR(1g) (W/kg)) \times (100 - (\Delta SAR(\%))) / 100$

*d. Calculating formula: Reported SAR (1g) (W/kg) = (Measured SAR (1g) (W/kg)) × (Duty scaled) × (Batch 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^{ΔSAR/10} ("Deviation from max., dB" / 10))

7.2 SAR test result (Wi-Fi, 5 GHz band)

Measurement date: June 10~17, 2016

Measurement by: Hiroshi Naka

[Liquid measurement]

Target Frequency [MHz]	Liquid type	Liquid parameters (*a)								ASAR Coefficients(*c)		Date measured		
		Permittivity (εr) [-]				Conductivity [S/m]				Temp. [deg.C.]	Depth [mm]		ΔSAR (1g) [%]	Correction required?
		Target	Measured		Limit (*)	Target	Measured		Limit (*)					
5660	Body	48.39	46.71	-3.5	-5% ≤ εr-meas ≤ 0%	5.837	6.049	+3.6	0% ≤ σ-meas ≤ +5%	23.5	150	+0.52	not required.	June 10, 2016 before SAR test
5670		48.38	46.61	-3.7		5.848	6.048	+3.4				+0.57	not required.	
5710		48.32	46.60	-3.6		5.895	6.130	+4.0				+0.53	not required.	
5745		48.27	46.50	-3.7		5.936	6.170	+4.0				+0.55	not required.	
5755		48.26	46.51	-3.6		5.947	6.197	+4.2				+0.53	not required.	
5795		48.21	46.43	-3.7		5.994	6.185	+3.2				+0.59	not required.	
5825		48.17	46.43	-3.6		6.029	6.275	+4.1				+0.54	not required.	
5660	Body	48.39	46.36	-4.2	-5% ≤ εr-meas ≤ 0%	5.837	5.994	+2.7	0% ≤ σ-meas ≤ +5%	23.5	150	+0.71	not required.	June 13, 2016 before SAR test
5670		48.38	46.25	-4.4		5.848	6.010	+2.8				+0.75	not required.	
5710		48.32	46.24	-4.3		5.895	6.043	+2.5				+0.74	not required.	
5745		48.27	46.31	-4.1		5.936	6.136	+3.4				+0.66	not required.	
5755		48.26	46.15	-4.4		5.947	6.122	+2.9				+0.74	not required.	
5795		48.21	46.14	-4.3		5.994	6.174	+3.0				+0.72	not required.	
5825		48.17	46.05	-4.4		6.029	6.201	+2.9				+0.75	not required.	
5500	Body	48.61	46.88	-3.5	-5% ≤ εr-meas ≤ 0%	5.650	5.816	+3.0	0% ≤ σ-meas ≤ +5%	23.5	150	+0.58	not required.	June 14, 2016 before SAR test (June 15, 2016 (*1))
5510		48.59	46.98	-3.3		5.661	5.847	+3.3				+0.53	not required.	
5580		48.53	46.88	-3.4		5.720	5.897	+3.1				+0.54	not required.	
5590		48.50	46.86	-3.4		5.743	5.931	+3.3				+0.53	not required.	
5630		48.43	46.73	-3.5		5.801	5.982	+3.1				+0.56	not required.	
5640		48.42	46.71	-3.5		5.813	6.061	+4.3				+0.51	not required.	
5180	Body	49.04	47.63	-2.9	-5% ≤ εr-meas ≤ 0%	5.276	5.440	+3.1	0% ≤ σ-meas ≤ +5%	23.5	150	+0.51	not required.	June 16, 2016 before SAR test (June 17, 2016 (*2))
5220		48.99	47.52	-3.0		5.323	5.487	+3.1				+0.52	not required.	
5240		48.96	47.55	-2.9		5.346	5.521	+3.3				+0.49	not required.	
5260		48.93	47.56	-2.8		5.369	5.544	+3.3				+0.47	not required.	
5270		48.92	47.51	-2.9		5.381	5.574	+3.6				+0.47	not required.	
5300		48.88	47.50	-2.8		5.416	5.555	+2.6				+0.48	not required.	
5310		48.87	47.41	-3.0		5.428	5.609	+3.3				+0.49	not required.	
5320		48.85	47.39	-3.0		5.439	5.606	+3.1				+0.50	not required.	

Note:

- *1. It was within 24 hours from measurement on June 14, 2016 and same liquid temperature, so measured parameters on June 14 were used on June 15 continuously.
 *2. It was within 24 hours from measurement on June 16, 2016 and same liquid temperature, so measured parameters on June 16 were used on June 17 continuously.

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

*b. Refer to KDB865664 D01 (v01r04), item 2), Clause 2.6; "When nominal tissue dielectric parameters are recorded in the probe calibration data; for example, only target values and tolerance are reported, the measured εr and σ of the liquid used in routine measurements must be: ≤ the target εr and ≥ the target σ values and also within 5% of the required target dielectric parameters."

c. The coefficients are parameters defined in clause E.3.3.2, IEEE Std 1528(2013). Since the measured liquid parameters were ≤ the target εr and ≥ the target σ values and also within 5% of the required target dielectric parameters, the measured SAR was not compensated by ΔSAR coefficients (Clause 2) of 2.6, KDB865664 D01 (v01r04).

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

$\Delta\text{SAR corrected SAR (1g) (W/kg)} = (\text{Meas. SAR(1g) (W/kg)}) \times (100 - (\Delta\text{SAR}(\%)) / 100$

[SAR measurement results]

*. Setup "Top" was worst by preliminary SAR test of 5GHz band, so SAR test had been begun from a setup "Top".

SAR measurement results											Reported SAR (1g) [W/kg]								Remarks	
Mode	Frequency [MHz] (Channel)	Data rate [Mbps]	EUT setup				Power drift [dB]	SAR (1g) [W/kg]			SAR plot # in Appendix 2-2	Duty cycle correction			Output average power correction			SAR Corrected (*b)		
			Ant. No.	Position	Gap [mm]	BTY. ID		Max. value of multi-peak				Duty [%]	Duty scaled	Batch scaled	Meas. [dBm]	Max. [dBm]	Tune-up factor			
								Meas.	ASAR [%]	ASAR corrected										
Step 2: W56(>5.65GHz) + W58 aggregate band (*1)(*2)																				
11n (HT40)	5710(142)	MCS0	B	Top	0	#2	-0.08	0.736	+0.74	n/a (*a)	Plot 2-3	89.5	×1.12	×1.00	10.51	12	×1.41	1.162	-	
	5670(134)				0	#0	-0.05	0.685	+0.75	n/a (*a)	Plot 2-4	89.5	×1.12	×1.00	10.46	12	×1.43	1.097	-	
	5755(151)				0	#0	0	0.815	+0.74	n/a (*a)	Plot 2-5	89.5	×1.12	×1.00	10.68	11	×1.08	0.986	-	
	5795(159)	MCS0	A	Top	0	#2	0	0.922	+0.72	n/a (*a)	Plot 2-6	89.5	×1.12	×1.00	10.84	11	×1.04	1.074	-	
	5710(142)				0	#0	-0.01	0.453	+0.74	n/a (*a)	Plot 2-7	89.5	×1.12	×1.00	10.49	12	×1.42	0.720	-	
	5755(151)				0	#0	-0.03	0.388	+0.74	n/a (*a)	Plot 2-8	89.5	×1.12	×1.00	10.26	11	×1.19	0.517	-	
11a (*2)	5660(132)	6	B	Top	0	#1	-0.04	1.11	+0.52	n/a (*a)	Plot 2-1	95.6	×1.05	×1.00	11.99	12	×1.00	1.166	Higher, Ant.B.	
	5825(165)				0	#1	-0.03	1.07	+0.54	n/a (*a)	Plot 2-9	95.6	×1.05	×1.00	10.96	11	×1.01	1.135	-	
	5745(149)				0	#1	0.01	0.999	+0.55	n/a (*a)	Plot 2-10	95.6	×1.05	×1.00	10.78	11	×1.05	1.101	-	
	5660(132)	6	A	Top	0	#0	0.02	0.722	+0.52	n/a (*a)	Plot 2-2	95.6	×1.05	×1.00	11.73	12	×1.06	0.804	Highest, Ant.A	
	5825(165)				0	#1	0.03	0.571	+0.54	n/a (*a)	Plot 2-11	95.6	×1.05	×1.00	10.57	11	×1.10	0.660	-	
	5660(132)				0	#2	-0.02 0.10	0.944 0.634	+0.71	n/a (*a)	Plot 2-12	90.5	×1.10	×1.06	11.98 11.90	12 12	×1.00 ×1.02	1.101 0.754	Ant.B. Ant.A.	
11a	5660(132)	6	B	Back	0	#0	-0.13	0.665	+0.71	n/a (*a)	Plot 2-13	95.6	×1.05	×1.00	11.99	12	×1.00	0.698	-	
	5825(165)				0	#0	-0.10	0.580	+0.75	n/a (*a)	Plot 2-14	95.6	×1.05	×1.00	10.96	11	×1.01	0.615	-	
	5660(132)	6	A	Back	0	#0	-0.09	0.596	+0.71	n/a (*a)	Plot 2-15	95.6	×1.05	×1.00	11.73	12	×1.06	0.663	-	
	5825(165)				0	#0	-0.08	0.382	+0.75	n/a (*a)	Plot 2-16	95.6	×1.05	×1.00	10.57	11	×1.10	0.441	-	
11n (HT20)	5660(132)	MCS8 MIMO	A+B	Back	0	#0	-0.05 -0.10	0.595 0.495	+0.71	n/a (*a)	Plot 2-17	90.5	×1.10	×1.06	11.98 11.90	12 12	×1.00 ×1.02	0.694 0.589	Ant.B. Ant.A.	
Step 3: W56(<5.65GHz) band (*2)																				
11n (HT40)	5590(118)	MCS0	B	Top	0	#0	0.03	0.736	+0.53	n/a (*a)	Plot 3-3	89.5	×1.12	×1.00	10.58	12	×1.39	1.146	-	
	5630(126)				0	#0	0	0.730	+0.56	n/a (*a)	Plot 3-4	89.5	×1.12	×1.00	10.58	12	×1.39	1.136	-	
	5510(102)	MCS0	A	Top	0	#0	-0.05	0.679	+0.53	n/a (*a)	Plot 3-5	89.5	×1.12	×1.00	10.43	12	×1.44	1.095	-	
	5590(118)				0	#0	-0.02	0.380	+0.53	n/a (*a)	Plot 3-6	89.5	×1.12	×1.00	10.44	12	×1.43	0.609	-	
11a (*2)	5580(116)	6	B	Top	0	#0	0.01	1.1	+0.54	n/a (*a)	Plot 3-7	95.6	×1.05	×1.00	11.92	12	×1.02	1.178	-	
	5640(128)				0	#0	-0.01	1.12	+0.51	n/a (*a)	Plot 3-8	95.6	×1.05	×1.00	11.96	12	×1.01	1.188	Higher, Ant.B.	
	5500(100)				0	#0	0	1.06	+0.58	n/a (*a)	Plot 3-9	95.6	×1.05	×1.00	11.92	12	×1.02	1.135	-	
	5580(116)	6	A	Top	0	#2	-0.04	0.593	+0.54	n/a (*a)	Plot 3-10	95.6	×1.05	×1.00	11.64	12	×1.09	0.679	-	
	5640(128)				0	#2	0.01	0.656	+0.51	n/a (*a)	Plot 3-2	95.6	×1.05	×1.00	11.81	12	×1.04	0.716	Higher, Ant.A	
	5640(128)				0	#3	0.04 0.03	0.998 0.563	+0.51	n/a (*a)	Plot 3-11	90.5	×1.10	×1.06	11.96 11.75	12 12	×1.01 ×1.06	1.175 0.696	Ant.B. Ant.A.	
11a	5580(116)	6	B	Back	0	#0	-0.04	0.882	+0.54	n/a (*a)	Plot 3-12	95.6	×1.05	×1.00	11.96	12	×1.02	0.945	-	
	5640(128)				0	#0	-0.06	0.828	+0.51	n/a (*a)	Plot 3-13	95.6	×1.05	×1.00	11.92	12	×1.01	0.878	-	
	5580(116)	6	A	Back	0	#0	-0.01	0.589	+0.54	n/a (*a)	Plot 3-14	95.6	×1.05	×1.00	11.64	12	×1.09	0.674	-	
	5640(128)				0	#0	-0.09	0.691	+0.51	n/a (*a)	Plot 3-15	95.6	×1.05	×1.00	11.81	12	×1.04	0.755	-	
11n (HT20)	5580(116)	MCS8 MIMO	A+B	Back	0	#1	0.11 0.11	0.807 0.462	+0.54	n/a (*a)	Plot 3-16	90.5	×1.10	×1.06	11.99 11.61	12 12	×1.00 ×1.09	0.941 0.587	Ant.B. Ant.A.	
11a	5580(116)	6	A	Left	0	#1	0.19	0.167	+0.54	n/a (*a)	Plot 3-17	95.6	×1.05	×1.00	11.64	12	×1.09	0.191	-	
11a	5640(128)	6	A	Top	0	#1	-0.03	1.15	+0.51	n/a (*a)	Plot 3-1	95.6	×1.05	×1.00	11.96	12	×1.12	1.220	*. Repeat worst. Highest, Ant.B.	
Step 4: W53 + W52 band (*2)																				
11n (HT40)	5310(62)	MCS0	B	Top	0	#2	-0.07	0.649	+0.49	n/a (*a)	Plot 4-3	89.5	×1.12	×1.00	10.34	12	×1.47	1.069	-	
	5270(54)				0	#2	0	0.598	+0.47	n/a (*a)	Plot 4-4	89.5	×1.12	×1.00	10.32	12	×1.47	0.985	-	
	5310(62)	MCS0	A	Top	0	#2	-0.05	0.359	+0.49	n/a (*a)	Plot 4-5	89.5	×1.12	×1.00	10.56	12	×1.39	0.559	-	
11a (*2)	5260(52)	6	B	Top	0	#1	-0.08	0.995	+0.47	n/a (*a)	Plot 4-6	95.6	×1.05	×1.00	11.94	12	×1.01	1.055	-	
	5300(60)				0	#1	0	0.986	+0.48	n/a (*a)	Plot 4-1	95.6	×1.05	×1.00	11.75	12	×1.06	1.097	Higher, Ant.B.	
	5320(64)				0	#1	-0.02	0.960	+0.50	n/a (*a)	Plot 4-7	95.6	×1.05	×1.00	11.73	12	×1.06	1.068	-	
	5220(44)	6	A	Top	0	#1	0.05	0.992	+0.52	n/a (*a)	Plot 4-8	95.6	×1.05	×1.00	11.94	12	×1.01	1.052	-	
	5260(52)				0	#2	-0.05	0.512	+0.47	n/a (*a)	Plot 4-9	95.6	×1.05	×1.00	11.92	12	×1.02	0.548	-	
	5300(60)				0	#2	-0.06	0.529	+0.48	n/a (*a)	Plot 4-2	95.6	×1.05	×1.00	11.72	12	×1.07	0.594	-	
11n (HT20)	5300(60)	MCS8 MIMO	A+B	Top	0	#0	0 -0.02	0.905 0.485	+0.48	n/a (*a)	Plot 4-10	90.5	×1.10	×1.06	11.98 11.63	12 12	×1.00 ×1.09	1.055 0.616	Ant.B. Higher, Ant.A	
11a	5260(52)	6	B	Back	0	#2	-0.20	0.776	+0.47	n/a (*a)	Plot 4-11	95.6	×1.05	×1.00	11.94	12	×1.01	0.823	-	
	5300(60)				0	#2	-0.11	0.743	+0.48	n/a (*a)	Plot 4-12	95.6	×1.05	×1.00	11.75	12	×1.06	0.827	-	
	5260(52)	6	A	Back	0	#2	-0.02	0.400	+0.47	n/a (*a)	Plot 4-13	95.6	×1.05	×1.00	11.92	12	×1.02	0.428	-	
11a	5260(52)	6	A	Left	0	#2	-0.05	0.206	+0.47	n/a (*a)	Plot 4-14	95.6	×1.05	×1.00	11.92	12	×1.02	0.221	-	

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Note:

- *1. The power difference was within the 1dB for W58 and W56 band, so W58 and W56 (>5.65GHz) was aggregated.
- *2. Higher SAR was measured with BW20MHz mode more than BW40MHz mode, so the setup condition was inspected by 11a mode which had lowest data rate of the BW20MHz.
- *. Gap: It is the separation distance between the nearest position of platform outer surface and the bottom outer surface of phantom;
- Ant.: Antenna, BTY ID: Battery ID, Max.: maximum, Meas.: Measured value, n/a: not applied.
- *. During test, the EUT was operated with full charged battery and without I/F cable. Battery ID No.#0, #1 and #2 were same model (Refer to Appendix 1).
- *. Calibration frequency of the SAR measurement probe (and used conversion factors)

SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
5180, 5220, 5240, 5260, 5270, 5300, 5310, 5320 MHz	5250 MHz	within ±110 MHz of calibration frequency	4.37	±13.1 %
5500, 5510, 5580, 5590, 5630, 5640 MHz	5600 MHz	within ±110 MHz of calibration frequency	3.65	±13.1 %
5660, 5670, 5710, 5745, 5755, 5795, 5825 MHz	5750 MHz	within ±110 MHz of calibration frequency	3.96	±13.1 %

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

- *a. The coefficients are parameters defined in clause E.3.3.2, IEEE Std 1528(2013). Since the measured liquid parameters were ≤ the target ϵ_r and ≥ the target σ values and also within 5% of the required target dielectric parameters, the measured SAR was not compensated by Δ SAR coefficients (*. Clause 2) of 2.6, KDB865664 D01 (v01r04)).

Calculating formula: Δ SAR(1g) = $C_{\epsilon_r} \times \Delta\epsilon_r + C_{\sigma} \times \Delta\sigma$, $C_{\epsilon_r} = -7.854E-4 \times \epsilon_r^3 + 9.402E-3 \times \epsilon_r^2 - 2.742E-2 \times \epsilon_r + 0.2026$, $C_{\sigma} = 9.804E-3 \times \sigma^3 - 8.661E-2 \times \sigma^2 + 2.981E-2 \times \sigma + 0.7829$

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

- *b. Calculating formula: Reported SAR (1g) (W/kg) = (Measured SAR (1g) (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))

7.3 SAR Measurement Variability

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; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, 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.

Mode	Frequency [MHz]	Data rate	EUT setup		Measured SAR (1g) [W/kg]		Largest to Smallest SAR Ratio	Remarks
			Antenna	Position	Original	Repeated		
11b	2462 (11ch)	1Mbps	A	Back	1.25	1.11	1.126	*. Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.
11a	5640 (128ch)	6Mbps	A	Top	1.12	1.15	1.027	*. Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20.

7.4 Simultaneous transmission evaluation

Simultaneous transmission scenario							Σ1g SAR [W/kg] (≤1.6)	SPLSR (Yes /No)	Calculated distance [mm]	SPLSR (≤ 0.04)	Volume Scan (Yes/No)	Figure	Remarks
Test position	Mode	Highest Reported SAR(1g) [W/kg] (Standalone base)											
		Antenna A		Antenna B									
		Wi-Fi DTS Band	Wi-Fi UNII band	Wi-Fi DTS Band	Wi-Fi UNII band	Bluetooth (BT) (*4)							
Top	SISO(*3)	0.857	-	-	-	(0.336)	0.857	No	-	-	-	-	Wi-Fi or BT
	SISO(*3)	-	-	0.547	-	(0.336)	0.547	No	-	-	-	-	Wi-Fi or BT
	SISO	-	0.804	-	-	0.336	1.140	No	-	-	-	-	Wi-Fi + BT
	SISO	-	-	-	1.220	0.336	1.556	No	-	-	-	-	Wi-Fi + BT
	MIMO(*3)	0.737	-	0.559	-	(0.336)	1.296	No	-	-	-	-	MIMO or SISO+BT
	MIMO	-	0.696	-	1.175	0.336	2.207	Yes	123.0	0.027	No	A	MIMO+BT
Back	SISO(*3)	1.166	-	-	-	(0.336)	1.166	No	-	-	-	-	Wi-Fi or BT
	SISO(*3)	-	-	1.425	-	(0.336)	1.425	No	-	-	-	-	Wi-Fi or BT
	SISO	-	0.755	-	-	0.336	1.091	No	-	-	-	-	Wi-Fi + BT
	SISO	-	-	-	0.945	0.336	1.281	No	-	-	-	-	Wi-Fi + BT
	MIMO(*3)	0.989	-	1.177	-	(0.336)	2.166	Yes	120.6	0.026	No	B	MIMO or SISO+BT
	MIMO	-	0.587	-	0.941	0.336	1.864	Yes	117.2	0.022	No	C	MIMO+BT

*3. Time division system.

General Note:

- 1) Bluetooth and Wi-Fi antenna B share the same antenna, and cannot transmit simultaneously on 2.4GHz band.
- 2) EUT 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.
- 3) The Reported SAR simulation is calculated based on the same configuration and test position.
- 4) Per KDB447498 D01(v06), simultaneously transmission SAR is compliant if;
 - (1) Reported SAR summation < 1.6 W/kg
 - (2) "SPLSR = (SAR1 + SAR2) * 1.5 / (minimum antenna separation distance, mm)", and the peak separation distance is determined from the square root of [(x1-x2)² + (y1-y2)² + (z1-z2)²], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR location in the zoom scan. (where; "SAR1" is highest reported SAR(1g) on antenna A, "SAR2" is sum of simulated SAR(1g) of bluetooth and highest reported SAR(1g) on antenna B when it is 5GHz Wi-Fi operated.)
 - (3) if SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.
 - (4) Simultaneously transmission SAR, and the reported multi-band SAR < 1.6 W/kg.

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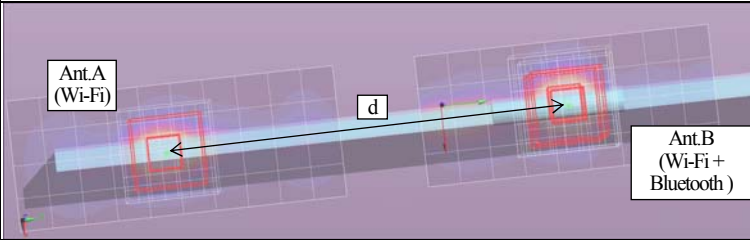
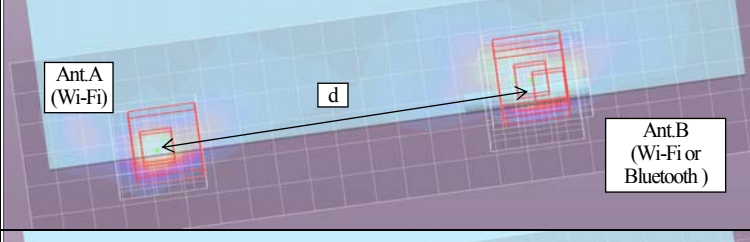
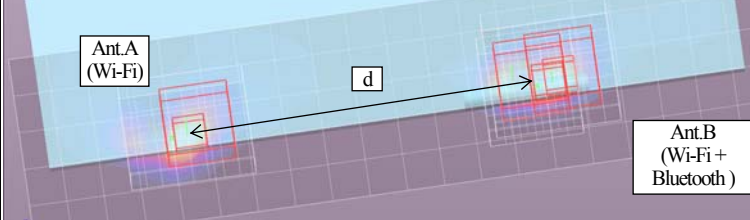
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5) For simultaneously transmission analysis, Bluetooth SAR is estimated per KDB447498 D01(v06) based on the formula below.

- (1) $[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{minimum test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})/x}] \text{ W/kg}$, for test separation distances ≤ 50 mm; where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR
- (2) When the minimum separation distance is < 5 mm, the distance is used 5mm to determine SAR test exclusion.
- (3) Bluetooth estimated SAR is conservatively determined by 5mm separation, for all applicable exposure positions.

Bluetooth maximum power	Exposure Position	Minimum separation distance	Estimated SAR
9 dBm	All SAR test setup	< 5 mm for all SAR test setup	0.336 W/kg

*. SPLAR calculation

Fig	Plot of SAR test result	Mode	Ant.	Peak SAR [W/kg]	x	y	z	d [mm]		
A		n20(MCS8)	A	2.93	-0.06	-7.92	-0.27	123.0		
		n20(MCS8)	B	5.03	-0.24	4.38	-0.33			
		n20(MCS8)	A	2.93	-0.06	-7.92	-0.27	125.4		
		Bluetooth(BLE)	B	0.245	-0.20	4.62	-0.31			
		n20(MCS8)	B	5.03	-0.24	4.38	-0.33	2.4		
		Bluetooth(BLE)	B	0.245	-0.20	4.62	-0.31			
	*. The location of Antenna B's Wi-Fi and Antenna B's Bluetooth is regarded as the same place by near enough.									
	*. 123.0mm is used as the calculated separation distance									
	B		n20(MCS8)	A	1.94	6.90	14.74	-0.08	120.6	
			n20(MCS8)	B	2.24	-5.16	14.54	-0.19		
n20(MCS8)			A	1.94	6.90	14.74	-0.08	117.2		
Bluetooth(BLE)			B	0.587	-4.82	14.58	-0.20			
*. 120.6mm is used as the calculated separation distance										
C				n20(MCS8)	A	1.94	6.90	14.74	-0.08	120.6
		n20(MCS8)		B	2.24	-5.16	14.54	-0.19		
		n20(MCS8)		A	1.94	6.90	14.74	-0.08	117.2	
		Bluetooth(BLE)		B	0.587	-4.82	14.58	-0.20		
		n20(MCS8)		B	2.24	-5.16	14.54	-0.19	3.4	
	Bluetooth(BLE)	B		0.587	-4.82	14.58	-0.20			
	*. The location of Antenna B's Wi-Fi and Antenna B's Bluetooth is regarded as the same place by near enough.									
	*. 117.2mm is used as the calculated separation distance									

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

5.2.1 802.11b DSSS SAR Test Requirements

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

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

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

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

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

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

5.1.1 Initial Test Position SAR Test Reduction Procedure

- 1) When the reported SAR of the initial test position is $\leq 0.4 \text{ W/kg}$, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combination within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).
- 2) When the reported SAR of the initial test position is $> 0.4 \text{ W/kg}$, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is $\leq 0.8 \text{ W/kg}$ or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.
- 3) For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is $> 0.8 \text{ W/kg}$, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is $\leq 1.2 \text{ W/kg}$ or all required channels are tested.