



# SAR TEST REPORT


Test Report No.: 12699045S-A

**Applicant** : Canon Inc.  
**Type of Equipment** : Wireless Module  
(It's installed into the platform: Wireless File Transmitter (model: DS586191) and connected to the host device: Digital camera (model: DS126771))  
**Model No.** : ES203  
**FCC ID** : AZD240  
**Test Standard** : FCC 47CFR §2.1093  
**Test Result** : Complied (Refer to Section 3.5)

Highest Reported SAR [W/kg] (Sum of antenna A and B)					Platform		Host device			Remarks (DTS band)			Remarks (UNII band)			Reference SAR test report number	
DTS band	U-NII band	SAR type		Limit	No.	Type /Model	No.	Type	Model	Frequency	Output power		Frequency	Output power			
										[MHz]	(Burst ave.) [dBm]		[MHz]	(Burst ave.) [dBm]			
										Mode	Measured	Max.	Mode	Measured	Max.		
0.25	0.52	Body- touch	1g	1.6	1	Type: Wireless File Transmitter Model: DS586191	-	none	none	2462	10.74	11.5	5300	7.72	8.5	12699045S-A (this report)	
										11b (CDD)	(Ant.A+B)		n20 (CDD)	(Ant.A+B)			
0.23	0.48	Body- touch	1g	1.6			1	Digital Camera	DS126771	2462	10.74	11.5	5290	7.16	8.5		12699045S-A (this report)
										11b (CDD)	(Ant.A+B)		ac80 (MIMO)	(Ant.A+B)			

- \*. **Highest reported SAR (1g) of this configuration for body-touch is "0.25 W/kg (DTS)" and "0.52 W/kg (U-NII)".**  
\*. Since highest reported SAR (1g) on a platform and with connecting the host device which obtained in accordance with KDB447498 (v06) were kept under 0.8 W/kg, this EUT was approved to operate on the multi-platform and with connecting the multi-hosts (which were tested in above the table.).  
\*. The single antenna transmitting mode could not be allowed on this device (model: ES203).  
\*. The simultaneous transmission SAR (1g) of DS586191 and DS126771 were 0.67 W/kg (DTS) and 0.61 W/kg (U-NII) by the estimated  $\Sigma$ SAR, however independent reported SAR (1g) above-mentioned is worst SAR because the antenna separation distance was 57 mm.  
\*. Max. Maximum; ave.: average; Ant.: Antenna; (Mode) 11b: IEEE 802.11b, n20: IEEE 802.11n(20HT), ac80: IEEE 802.11ac(80VHT)
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  - This sample tested is in compliance with the limits of the above regulation.
  - The test results in this test report are traceable to the national or international standards.
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  - This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
  - The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
  - The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
  - The information provided from the customer for this report is identified in SECTION 1.

**Date of test:** May 20 ~ 29, 2019

**Test engineer:**   
Hiroshi Naka  
Engineer, Consumer Technology Division

**Approved by:**   
Toyokazu Imamura  
Leader, Consumer Technology Division

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



CERTIFICATE 1266.03

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## REVISION HISTORY

Revision	Test report No.	Date	Page revised	Contents
Original	12656075S-A	August 21, 2019	-	-

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

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## SECTION 1: Customer information

Company Name	Canon Inc.
Address	16-1, Shimonoge 3-chome, Takatsu-ku, Kawasaki-shi, Kanagawa 213-8512, Japan
Telephone Number	+81-44-330-6818
Contact Person	Yoshihiro Funamizu

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

	EUT	Platform	Host Device
Type of Equipment	Wireless Module	Wireless File Transmitter	Digital camera
Model Number	ES203	DS586191	DS126771
Serial Number	6	10	311
Country of Mass-production	China, Japan	Japan	Japan
Condition of EUT	Engineering prototype (*: Not for sale: These samples are equivalent to mass-produced items.)	Engineering prototype	Engineering prototype
Receipt Date of Sample (*: Information from test lab.)	May 13, 2019 (*: EUT for the power measurement. *: No modification by the Lab.) May 20, 2019 (*: EUT for SAR test. *: No modification by the Lab.) (*: The EUT that had been measured the power of SAR test reference. The EUT was installed into a platform which SAR tested, by the customer.)		
Category Identified	Portable device *: Since the specified platform which includes the EUT (Wireless Module) may contact to a human body during Wi-Fi operation, the partial-body SAR (1g) shall be observed.		
Rating	DC3.3V supplied from the platform. *: The EUT is installed into the specified the platform that was operated by the re-chargeable Li-ion battery.		
Feature of EUT	Model: ES203 (referred to as the EUT in this report) is a Wireless Module which installs into the specified platform: Wireless File Transmitter which is connected with the limited host device.		
SAR Accessory	None		

### 2.2 Product Description (EUT: ES203)

Model	ES203	Equipment type	Transceiver	FCC ID	AZD240
Frequency of operation	2.4GHz band: (2412~2462) 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	5 MHz (2.4GHz band), 20 MHz (U-NII-1, U-NII-2A, U-NII-2C, U-NII-3)				
Bandwidth	20 MHz (b, g, a, n20, ac20), 40 MHz (n40, ac40), 80 MHz (ac80)				
Type of modulation	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 tune-up tolerance limit 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 A	Antenna B
Antenna quantity	2 pcs. (*: Separation distance between the antenna A and the antenna B: ~5 mm) *: The single antenna transmitting mode could not be allowed.	
Antenna type / connector type	Invert-L Pattern antenna / Printed on the PCB.	Invert-L Flexible printed circuit (FPC) antenna / PCB side: U.F.L, Antenna side: soldered
Antenna gain	-1.77 dBi (2.4GHz band), 1.52 dBi (U-NII-1 band), 1.78 dBi (U-NII-2A band), 2.04 dBi (U-NII-2C band), 2.26 dBi (U-NII-3 band), (*: including cable loss)	-3.92 dBi (2.4GHz band), 1.39 dBi (U-NII-1 band), 1.59 dBi (U-NII-2A band), 0.79 dBi (U-NII-2C band), 1.42 dBi (U-NII-3 band), (*: including cable loss)

\*. (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 802.11ac(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.

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Band	Ch.	Frequency [MHz]	Mode	D/R or MCS#	CDD				MCS#	MIMO			
					Typical [dBm]			Max.[dBm]		Typical [dBm]			Max.[dBm]
					Ant.A	Ant.B	Ant.A+B	Ant.A+B		Ant.A	Ant.B	Ant.A+B	Ant.A+B
2.4GHz Wi-Fi (DTS)	1~11	2412-2462	b	1~11 Mbps	6.0	6.0	9.0	11.5					
	1~11	2412-2462	g	6~54 Mbps	6.0	6.0	9.0	11.5					
	1~11	2412-2462	n20	MCS0~7	6.0	6.0	9.0	11.5	MCS8~15	6.0	6.0	9.0	11.5
	3~9	2422-2452	n40	MCS0~7	6.0	6.0	9.0	11.5	MCS8~15	6.0	6.0	9.0	11.5
U-NII-1	36-48	5180-5240	a	6~54 Mbps	3.0	3.0	6.0	8.5					
	36-48	5180-5240	n20	MCS0~7	3.0	3.0	6.0	8.5	MCS8~15	3.0	3.0	6.0	8.5
	36-48	5180-5240	ac20	MCS0~8	3.0	3.0	6.0	8.5	MCS0~7	3.0	3.0	6.0	8.5
	38	5190	n40	MCS0~7	3.0	3.0	6.0	8.5	MCS8~15	3.0	3.0	6.0	8.5
	38	5190	ac40	MCS0~9	3.0	3.0	6.0	8.5	MCS0~9	3.0	3.0	6.0	8.5
	42	5210	ac80	MCS0~9	3.0	3.0	6.0	8.5	MCS0~9	3.0	3.0	6.0	8.5
U-NII-2A	52-64	5260-5320	a	6~54 Mbps	3.0	3.0	6.0	8.5					
	52-64	5260-5320	n20	MCS0~7	3.0	3.0	6.0	8.5	MCS8~15	3.0	3.0	6.0	8.5
	52-64	5260-5320	ac20	MCS0~8	3.0	3.0	6.0	8.5	MCS0~8	3.0	3.0	6.0	8.5
	54, 62	5270, 5310	n40	MCS0~7	3.0	3.0	6.0	8.5	MCS8~15	3.0	3.0	6.0	8.5
	54, 62	5270, 5310	ac40	MCS0~9	3.0	3.0	6.0	8.5	MCS0~9	3.0	3.0	6.0	8.5
	58	5290	ac80	MCS0~9	3.0	3.0	6.0	8.5	MCS0~9	3.0	3.0	6.0	8.5
U-NII-2C	100-116	5500-5580	a	6~54 Mbps	3.0	3.0	6.0	8.0					
	132-140	5660-5700											
	100-116	5500-5580	n20	MCS0~7	3.0	3.0	6.0	8.0	MCS8~15	3.0	3.0	6.0	8.0
	132-140	5660-5700		ac20	MCS0~8	3.0	3.0	6.0	8.0	MCS0~8	3.0	3.0	6.0
	100-116	5500-5580	MCS0~8		3.0	3.0	6.0	8.0	MCS0~8	3.0	3.0	6.0	8.0
	132-140	5660-5700	MCS0~8	3.0	3.0	6.0	8.0	MCS0~8	3.0	3.0	6.0	8.0	
	120-128	5600-5640	a,n20,ac20	not use	N/A	N/A	N/A	N/A	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	not use	N/A	N/A	N/A	N/A
	102,110	5510,5550	n40	MCS0~7	3.0	3.0	6.0	8.0	MCS8~15	3.0	3.0	6.0	8.0
	134	5670											
	102,110	5510,5550	ac40	MCS0~9	3.0	3.0	6.0	8.0	MCS0~9	3.0	3.0	6.0	8.0
	134	5670		MCS0~9	3.0	3.0	6.0	8.0	MCS0~9	3.0	3.0	6.0	8.0
	118,126	5590, 5630	n40,ac40	not use	N/A	N/A	N/A	N/A	not use	N/A	N/A	N/A	N/A
	142	5710	n40,ac40	not use	N/A	N/A	N/A	N/A	not use	N/A	N/A	N/A	N/A
	106	5530	ac80	MCS0~9	3.0	3.0	6.0	8.0	MCS0~9	3.0	3.0	6.0	8.0
	122	5610	ac80	not use	N/A	N/A	N/A	N/A	not use	N/A	N/A	N/A	N/A
	138	5690	ac80	not use	N/A	N/A	N/A	N/A	not use	N/A	N/A	N/A	N/A
U-NII-3	149~165	5745~5825	a	6~54 Mbps	3.0	3.0	6.0	8.5					
	149~165	5745~5825	n20	MCS0~7	3.0	3.0	6.0	8.5	MCS8~15	3.0	3.0	6.0	8.5
	149~165	5745~5825	ac20	MCS0~8	3.0	3.0	6.0	8.5	MCS0~8	3.0	3.0	6.0	8.5
	151, 159	5755, 5795	n40	MCS0~7	3.0	3.0	6.0	8.5	MCS8~15	3.0	3.0	6.0	8.5
	151, 159	5755, 5795	ac40	MCS0~9	3.0	3.0	6.0	8.5	MCS0~9	3.0	3.0	6.0	8.5
	155	5775	ac80	MCS0~9	3.0	3.0	6.0	8.5	MCS0~9	3.0	3.0	6.0	8.5

- \*. CDD: Cyclic Delay Diversity, Ch.: channel, D/R: data rate, MCS#: MCS index number, Ant.: antenna, Max. Maximum tune-up limit power, N/A: Not applicable;  
Ant.: Antenna; (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 802.11ac(40VHT), ac80: IEEE 802.11ac(80VHT).  
\*. The single antenna transmitting mode could not be allowed on the EUT (model: ES203).

## 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.

The tests documented in this report were performed in accordance with FCC 47 CFR Parts 2, IEEE Std.1528-2013 (latest), the following FCC Published RF exposure KDB procedures, and TCB workshop updates.

<b>KDB 447498 D01 (v06):</b>	General RF exposure guidance
<b>KDB 248227 D01 (v02r02):</b>	SAR Guidance for IEEE 802.11 (Wi-Fi) transmitters
<b>KDB 865664 D01 (v01r04):</b>	SAR measurement 100MHz to 6GHz
<b>IEEE Std. 1528-2013:</b>	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)
<b>(A) Limits for Occupational /Controlled Exposure (W/kg)</b>	0.4	8.0	20.0
<b>(B) Limits for General population /Uncontrolled Exposure (W/kg)</b>	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;

<b>General population / Uncontrolled exposure, Partial-Body (averaged over any 1g of tissue) limit: 1.6 W/kg (body touch)</b>
---

### 3.3 Addition, deviation and exclusion to the test procedure

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

### 3.4 Test Location

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A2LA Certificate Number: 1266.03 (FCC Test Firm Registration Number: 626366, ISED Lab Company Number: 2973D)

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

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### 3.5 Procedures and Results

Test Procedure	SAR measurement: KDB 447498 D01, KDB 248227 D01, KDB 865664 D01, IEC Std. 1528		
Category	FCC 47CFR §2.1093 (Portable device)	SAR type	Body-touch

#### [Platform (model: DS586191) alone]

Band	Wi-Fi (DTS)	Wi-Fi (U-NII-1)	Wi-Fi (U-NII-2A)	Wi-Fi (U-NII-2C)	Wi-Fi (U-NII-3)
Operation frequency [MHz]	2412-2462	5180-5240	5260-5320	5500-5700	5745-5825
Results	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)
Transmitted antenna	Antenna A+B simultaneous Tx	Antenna A+B simultaneous Tx	Antenna A+B simultaneous Tx	Antenna A+B simultaneous Tx	Antenna A+B simultaneous Tx
Reported SAR (1g) [W/kg]	<b>0.246</b> (Ant.A+B)	<b>0.386</b> (Ant.A+B)	<b>0.522</b> (Ant.A+B)	<b>0.264</b> (Ant.A+B)	<b>0.152</b> (Ant.A+B)
Measured SAR (1g) [W/kg]	0.207 (Ant.A+B)	0.275 (Ant.A+B)	0.435 (Ant.A+B)	0.227 (Ant.A+B)	0.113 (Ant.A+B)
Mode (Data rate)	b (1Mbps, CDD)	ac80(MCS0, CDD)	n20(MCS0, CDD)	ac80(MCS0, CDD)	ac80(MCS0, CDD)
Frequency [MHz]	2462	5210	5300	5530	5775
Burst average power [dBm]	10.74 (Ant.A+B)	7.06 (Ant.A+B)	7.72 (Ant.A+B)	7.40 (Ant.A+B)	7.26 (Ant.A+B)
Tune-up limit [dBm]	11.5 (Ant.A+B)	8.5 (Ant.A+B)	8.5 (Ant.A+B)	8.0 (Ant.A+B)	8.5 (Ant.A+B)
Tune-up factor	1.19	1.39	1.20	1.15	1.33
Duty cycle [%] (Duty scaled factor)	99.9 (1.00)	99.0 (1.01)	99.8 (1.00)	99.0 (1.01)	99.0 (1.01)

#### [Platform (model: DS586191) + Host device (model: DS126771, digital camera) combination]

Band	Wi-Fi (DTS)	Wi-Fi (U-NII-1)	Wi-Fi (U-NII-2A)	Wi-Fi (U-NII-2C)	Wi-Fi (U-NII-3)	Host device and platform simultaneous Tx.
Operation frequency [MHz]	2412-2462	5180-5240	5260-5320	5500-5700	5745-5825	
Results	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 7.7)
Transmitted antenna	Antenna A+B simultaneous Tx	Antenna A+B simultaneous Tx	Antenna A+B simultaneous Tx	Antenna A+B simultaneous Tx	Antenna A+B simultaneous Tx	-
Reported SAR (1g) [W/kg]	<b>0.225</b> (Ant.A+B)	<b>0.371</b> (Ant.A+B)	<b>0.481</b> (Ant.A+B)	<b>0.265</b> (Ant.A+B)	<b>0.145</b> (Ant.A+B)	<b>(0.67)</b> (*, Simulated)
Measured SAR (1g) [W/kg]	0.189 (Ant.A+B)	0.264 (Ant.A+B)	0.347 (Ant.A+B)	0.228 (Ant.A+B)	0.108 (Ant.A+B)	-
Mode (Data rate)	b (1Mbps, CDD)	ac80(MCS0, CDD)	ac80(MCS0, MIMO)	ac80(MCS0, CDD)	ac80(MCS0, CDD)	-
Frequency [MHz]	2462	5210	5290	5530	5775	-
Burst average power [dBm]	10.74 (Ant.A+B)	7.06 (Ant.A+B)	7.16 (Ant.A+B)	7.40 (Ant.A+B)	7.26 (Ant.A+B)	-
Tune-up limit [dBm]	11.5 (Ant.A+B)	8.5 (Ant.A+B)	8.5 (Ant.A+B)	8.0 (Ant.A+B)	8.5 (Ant.A+B)	-
Tune-up factor	1.19	1.39	1.36	1.15	1.33	-
Duty cycle [%] (Duty scaled factor)	99.9 (1.00)	99.0 (1.01)	98.2 (1.02)	99.0 (1.01)	99.0 (1.01)	-

**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

- \*. SAR test was applied to U-NII-1 band, even though the reported SAR 1g of U-NII-2A was enough lower than 1.2 W/kg.
- \*. Since Wi-Fi of 2.4GHz and Wi-Fi of 5GHz are used a same antenna, 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 [-] =  $1 / (10^{(\Delta_{\text{max}}(\text{max.power} - \text{burst average power}) / 10)})$ , Duty scaled factor [-] = 100(%) / (duty cycle, %)
- \*. (Mode) b: IEEE 802.11b, ac80: IEEE 802.11ac(80VHT), n/a: Not applicable.
- \*. "yellow marker" in the table; The highest reported SAR(1g) of each band (DTS, U-NII) is shaded with yellow marker.

**Test outline:** Where the EUT is built into a new platform (10), it was verified whether multi-platform conditions can be suited in according with section 2) of 5.2.2 in KDB447498 D01 (v06).

Consideration of the test results:	<b>The highest reported SAR (1g) of this platform and host device combination were kept; ≤ 0.8 W/kg. Since highest reported SAR (1g) on this EUT's platform obtained in accordance with KDB447498 D01 (v06) was kept under 0.8 W/kg, this EUT was approved to operate multi-platform.</b>
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### 3.6 SAR measurement procedure

#### 3.6.1 Normal SAR measurement procedure

##### Step 1: 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 proceeded with the lowest data rate (which has the higher time-based average power typically) on each operation mode. Therefore, the average output power was measured on the lower, middle (or near middle), upper and specified channels with the lowest data rate of each operation mode. The power of other data rate was also measured to confirm the time-base average power and when it's required. The power measurement 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 2: Power reference measurement

Measurement of the E-field at a fixed location above the central position of flat phantom (or/and furthermore an interpolated peak SAR location of area scan in step 2) was used as a reference value for assessing the power drop.

##### Step 3: Area Scan (Area scan parameters: KDB 865664 D01 (v01r04).)

The SAR distribution at the exposed side of head or body position was measured at a distance of each device from the inner surface of the shell. The area covered the entire dimension of the antenna of EUT and suitable horizontal grid spacing of EUT. Based on these data, the area of the maximum absorption was determined by splines interpolation.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: $\Delta x_{Area}$ , $\Delta y_{Area}$	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

##### Step 4: Zoom Scan and post-processing (Zoom scan parameters: KDB 865664 D01 (v01r04).)

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure.

A volume of 30 mm (X) × 30 mm (Y) × 30 mm (Z) (or more) was assessed by measuring 7×7×7 points (or more), ≤ 3GHz.

A volume of 28 mm (X) × 28 mm (Y) × 24mm (Z) (or more) was assessed by measuring 8×8×7 points (or more) (by “Ratio step” method (\*1)), > 3 GHz.

When the SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are proceeded for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.

	≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{Zoom}$ , $\Delta y_{Zoom}$	≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm *	3 – 4 GHz: ≤ 5 mm * 4 – 6 GHz: ≤ 4 mm *
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
	$\Delta z_{Zoom}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface $\Delta z_{Zoom}(n>1)$ : between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$
Minimum zoom scan volume	x, y, z	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.		
* When zoom scan is required and the <u>reported</u> SAR from the area scan based <i>1-g SAR estimation</i> procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.		

##### Step 5: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 2. It was checked that the power drift is within ±5% in the evaluation procedure of SAR testing. The verification of power drift during the SAR test is that DASY 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 SAR plot data of APPENDIX 2.

\*. DASY 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;  $S = E \times H = E^2 / \eta = P / (4 \times \pi \times r^2)$  ( $\eta$ : Space impedance) →  $P = (E^2 \times 4 \times \pi \times r^2) / \eta$

Therefore, The correlation of power and the E-filed

Power drift limit (X) dB = 10log(P\_drift) = 10log(E\_drift)^2 = 20log(E\_drift)

From the above mentioned, **the calculated power drift of DASY system must be the less than (±) 0.21dB.**

##### Step 5: Z-Scan

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not be larger than the step size in Z-direction.

\*. The all SAR tests were conservatively performed with test separation distance 0 mm. The phantom bottom thickness is approx. 2mm. Typical distance from probe tip to dipole centers is 1mm. The distance between the SAR probe tip to the surface of test device which is touched the bottom surface of the phantom is approx. 3 mm for 2.4GHz band and 2.4 mm for 5GHz band.

\*1. “Ratio step” method parameters used; the first measurement point: “1.4mm” from the phantom surface, the initial z grid separation: “1.4mm”, subsequent graded grid ratio: “1.4”. These parameters comply with the requirement of KDB 865664 D01 and recommended by Schmid & Partner Engineering AG (DASY5 manual).



## SECTION 4: Operation of EUT during testing

### 4.1 Operating modes for SAR testing

This EUT has IEEE 802.11b, 11g, 11a, 11n(HT20), 11n(HT40), 11ac(VHT20), 11ac(VHT40) and 11ac(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)	n(HT40)
band	DTS (2.4GHz band)			
Tx band [MHz]	2412~2462		2422~2452	
Antenna#	A+B	A+B	A+B	A+B
Tune-up limit [dBm]	11.5	11.5	11.5	11.5
SAR test considered? (***) initial test setup)	Front	○*	×	×
	Side-Left	○	×	×
	Side-Right	○	×	×
	Top	○	×	×
	Back	○	×	×
	Bottom	○	×	×
Frequency tested	(*)1	n/a	n/a	n/a
Data rate [Mbps/MCS#]	1, CDD	6, CDD	MCS0, CDD	MCS8, MIMO

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	U-NII-1 (*2)						U-NII-2A					
Tx band [MHz]	5180~5240			5190,5230			5260~5320			5270,5310		
Antenna#	A+B	A+B	A+B	A+B	A+B	A+B	A+B	A+B	A+B	A+B	A+B	A+B
Tune-up limit [dBm]	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
SAR test considered? (***) initial test setup)	Front	×	×	×	×	×	○*	×	×	×	×	○*
	Side-Left	×	×	×	×	×	×	×	×	×	×	○
	Side-Right	×	×	×	×	×	×	×	×	×	×	○
	Top	×	×	×	×	×	×	×	×	×	×	○
	Back	×	×	×	×	×	×	×	×	×	×	○
	Bottom	×	×	×	×	×	×	×	×	×	×	○
Frequency tested	n/a	n/a	n/a	n/a	n/a	5210	n/a	n/a	(*)1	(*)1	n/a	5290
Data rate [Mbps/MCS#]	6, CDD	MCS0, CDD	MCS8, CDD	MCS0, CDD	MCS8, CDD	MCS0, CDD	6, CDD	MCS0, CDD	MCS8, CDD	MCS0, CDD	MCS8, CDD	MCS0, CDD
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	U-NII-2C						U-NII-3					
Tx band [MHz]	5500~5580, 5660~5700			5510, 5550, 5670			5745~5825			5755, 5795		
Antenna#	A+B	A+B	A+B	A+B	A+B	A+B	A+B	A+B	A+B	A+B	A+B	A+B
Tune-up limit [dBm]	8.0	8.0	8.0	8.0	8.0	8.0	8.5	8.5	8.5	8.5	8.5	8.5
SAR test considered? (***) initial test setup)	Front	×	×	×	×	×	○*	×	×	×	×	○*
	Side-Left	×	×	×	×	×	○	×	×	×	×	○
	Side-Right	×	×	×	×	×	○	×	×	×	×	○
	Top	×	×	×	×	×	○	×	×	×	×	○
	Back	×	×	×	×	×	○	×	×	×	×	○
	Bottom	×	×	×	×	×	○	×	×	×	×	○
Frequency tested	n/a	n/a	n/a	n/a	n/a	5530	n/a	n/a	n/a	n/a	n/a	5775
Data rate [Mbps/MCS#]	6, CDD	MCS0, CDD	MCS8, CDD	MCS0, CDD	MCS8, CDD	MCS0, CDD	6, CDD	MCS0, CDD	MCS8, CDD	MCS0, CDD	MCS8, CDD	MCS0, CDD
Controlled software	RF Test (Ver.01)											

\*1. The tested frequencies refer to SAR test results in Section 7.

\*. SAR test considered; "○": SAR test was applied. "×": SAR test can be reduced, Setup) Front: It's including Front-top-tilt, Front-tip, Front-Left and Front-Right; (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 802.11ac (40VHT), ac80: IEEE 802.11ac (80VHT). n/a: not applied.

\*. Since reported SAR1g values of highest channel band width (80MHz) which had the highest tune-up limit power were shown lower than 0.8W/kg, SAR test of lower channel band width (20MHz, 40MHz) was omitted.

### 4.2 RF exposure conditions

EUT's antenna separation distances in each SAR test setup plan are shown as follows.

SAR test setup plan	SAR type	Antenna A	Antenna B
		Antenna to edge/surface	Antenna to edge/surface
		SAR test required?	SAR test required?
		Note	Note
Front-top-tilt	Body-touch	≈ 7 mm	≈ 2 mm
Front-tip		≈ 14 mm	≈ 5 mm
Front-Left		≈ 14 mm	≈ 5 mm
Front-Right		≈ 14 mm	≈ 5 mm
Side-Left		≈ 4 mm	≈ 11 mm
Side-Right		≈ 5 mm	≈ 14 mm
Top		≈ 5 mm	≈ 12 mm
Back-top-tilt		≈ 3 mm	≈ 9 mm
Bottom		≈ 55 mm	≈ 35 mm

\*. Refer to Appendix 1 for the antenna location and the test setup photographs which had been tested.

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#### 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  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \times [\sqrt{f(\text{GHz})}] \leq 3.0$  (for SAR(1g)),  $7.5$  (for SAR(10g)) ..... formula (1)  
If power is calculated from the upper formula (1);

$[\text{SAR}(1\text{g}) \text{ test exclusion thresholds, mW}] = 3 \times [\text{test separation distance, mm}] / [\sqrt{f(\text{GHz})}]$  ..... 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  $\leq 50$  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,

$[\text{test exclusion thresholds, mW}] = [(\text{Power allowed at numeric threshold for 50mm in formula (1)}) + ((\text{test separation distance, mm}) - (50\text{mm})) \times 10]$  ..... 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]				Calculated threshold value							
Setup:				Front-top-tilt	Front-tip, Front-Left, Front-Right	Back-top-tilt	Top	Side-Left	Side-Right	Bottom	
Antenna # (*:The antenna near the surface.):				B	B	A	A	A	A	B	
Antenna separation distance:				$\leq 5$	$\leq 5$	$\leq 5$	$\leq 5$	$\leq 5$	$\leq 5$	35	
Mode	Upper Freq. [MHz]	Tune-up limit Antenna A+B [dBm]	[mW]	Step 1) SAR exclusion calculations for antenna $\leq 50$ mm from the user. Judge: "Exempt" when $\leq 3.0$ / "Test" (SAR test required) when $> 3.0$							
b.g.n20/40	2462	11.5	14	4.4, Test	4.4, Test	4.4, Test	4.4, Test	4.4, Test	4.4, Test	0.6, Exempt	
a.n20/40,ac20/40/80	5240	8.5	7	3.2, Test	3.2, Test	3.2, Test	3.2, Test	3.2, Test	3.2, Test	0.5, Exempt	
a.n20/40,ac20/40/80	5320	8.5	7	3.2, Test	3.2, Test	3.2, Test	3.2, Test	3.2, Test	3.2, Test	0.5, Exempt	
a.n20/40,ac20/40/80	5700	8.0	6	2.9, Exempt	2.9, Exempt	2.9, Exempt	2.9, Exempt	2.9, Exempt	2.9, Exempt	0.4, Exempt	
a.n20/40,ac20/40/80	5825	8.5	7	3.4, Test	3.4, Test	3.4, Test	3.4, Test	3.4, Test	3.4, Test	0.5, Exempt	

\*. Freq.: Frequency, (Mode) b: IEEE 802.11b, g: IEEE 802.11g, a: IEEE 802.11a, n20/40: IEEE 802.11n(20MHz/40MHz), IEEE 802.11n(40MHz), ac20/40/80: IEEE 802.11ac(20MHz/40MHz/80MHz), IEEE 802.11ac(40VHT), IEEE 802.11ac(80VHT)

Notes: 1. Power and distance are rounded to the nearest mW and mm before calculation.

**Since the platform was small device, SAR test was considered to and applied to the all surface of the platform.**

#### 4.4 Estimated SAR for simultaneous transmission (and Co-location) 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:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{minimum test separation distance, mm})] \times [\sqrt{f(\text{GHz})} \times x] \text{ W/kg}$

- \*. for test separation distances  $\leq 50$  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  $< 5$  mm, the distance is used 5mm to determine SAR test exclusion.

	Upper F [GHz]		P [mW]		Estimated SAR 1g value [W/kg]												Estimated $\Sigma$ SAR 1g value (Ant.A+B) [W/kg] ( $\leq 1.6$ W/kg)						Simulated SPLSR value ( $\leq 0.04$ ) (When if $\Sigma$ SAR 1g is: $>1.6$ W/kg)					
Mode	Ant.A	Ant.B	Ant. A	Ant. B	Ant.A						Ant.B						Front	Side.L	Side.R	Top	Back	Btm	Front	Side.L	Side.R	Top	Back	Btm
					Front	Side.L	Side.R	Top	Back	Btm	Front	Side.L	Side.R	Top	Back	Btm												
b.g.n	2.462	2.462	7	7	0.21	0.29	0.29	0.29	0.29	0.4	0.29	0.13	0.11	0.12	0.16	0.04	0.50	0.43	0.40	0.42	0.46	0.44	0.006	0.005	0.004	0.005	0.005	
a.n,ac	5.24	5.24	4	4	0.17	0.24	0.24	0.24	0.24	0.4	0.24	0.11	0.09	0.10	0.14	0.04	0.42	0.36	0.33	0.35	0.38	0.44	0.005	0.004	0.003	0.004	0.004	0.005
a.n,ac	5.32	5.32	4	4	0.18	0.25	0.25	0.25	0.25	0.4	0.25	0.11	0.09	0.10	0.14	0.04	0.42	0.36	0.33	0.35	0.38	0.44	0.005	0.004	0.003	0.004	0.004	0.005
a.n,ac	5.7	5.7	3	3	0.14	0.19	0.19	0.19	0.19	0.4	0.19	0.09	0.07	0.08	0.11	0.03	0.33	0.28	0.26	0.27	0.30	0.43	0.003	0.003	0.002	0.002	0.003	0.005
a.n,ac	5.825	5.825	4	4	0.18	0.26	0.26	0.26	0.26	0.4	0.26	0.12	0.09	0.11	0.14	0.04	0.44	0.37	0.35	0.36	0.40	0.44	0.006	0.005	0.004	0.005	0.005	0.005
Antenna separation distance [mm]					7	$\leq 5$	$\leq 5$	$\leq 5$	$\leq 5$	55	$\leq 5$	11	14	12	9	35												

\*. Ant.A: Antenna A, Ant.B: Antenna B, F: Frequency, P: Tune-up limit power on each antenna, Setup Side.L: Side-Left, Side.R: Side-Right, Btm: Bottom; Mode) b: IEEE 802.11b, g: IEEE 802.11g, a: IEEE 802.11a, n: IEEE 802.11n (20MHz/40MHz), ac: IEEE 802.11ac(20MHz/40MHz/80MHz), n/a: not applicable.

\*. 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.

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  $\Sigma$  SAR 1g value is calculated based on the same configuration and the same test position.

4. The estimated results (SAR value) are rounded to two decimal place for comparison.

5. (Calculating formula) Per KDB447498 D01(v06),

$\text{SPLSR} = (\text{SAR1} + \text{SAR2})^{1.5} / (\text{minimum antenna separation distance, mm})$

where; the minimum antenna separation distance is determined by the closest physical separation of the antennas, according to geometric center of the antennas.

\*. SPLSR should be calculated, when the estimated  $\Sigma$  SAR 1g value is higher than 1.6 W/kg.

**Simultaneous transmission SAR measurement (Volume Scan) is not required because the sum of the SAR(1g) is  $< 1.6$  W/kg.**

## SECTION 5: Uncertainty Assessment (SAR measurement/Daily check)

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

Uncertainty of SAR measurement (2.4-6GHz) (*.e&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
<b>A Measurement System (DASY5)</b>						(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>B Test Sample Related</b>								
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 %	∞
<b>C Phantom and Setup</b>								
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 %	∞
<b>Combined Standard Uncertainty</b>						±13.7 %	±13.6 %	733
<b>Expanded Uncertainty (k=2)</b>						±27.4 %	±27.2 %	

\*. 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.

Uncertainty of daily check (2.4-6GHz) (*.e&σ tolerance: ≤±5%, DAK3.5, CW) (v08)							1g SAR	10g SAR
Combined measurement uncertainty of the measurement system (k=1)							± 11.0 %	± 10.9 %
Expanded uncertainty (k=2)							± 22.1 %	± 21.8 %
Error Description (v08)	Uncertainty Value	Probability distribution	Divisor	ci (1g)	ci (10g)	ui (1g)	ui (10g)	Vi, veff
<b>A Measurement System (DASY5)</b>						(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	0	0 %	0 %	∞
4 Probe linearity	±4.7 %	Rectangular	√3	1	1	±2.7 %	±2.7 %	∞
5 Probe modulation response (CW)	±0.0 %	Rectangular	√3	1	1	0 %	0 %	∞
6 System detection limit	±1.0 %	Rectangular	√3	1	1	±0.6 %	±0.6 %	∞
7 Boundary effects	±4.8 %	Rectangular	√3	1	1	±2.8 %	±2.8 %	∞
8 System readout electronics (DAE)	±0.3 %	Normal	1	1	1	±0.3 %	±0.3 %	∞
9 Response Time Error (<5ms/100ms wait)	±0.0 %	Rectangular	√3	1	1	0 %	0 %	∞
10 Integration Time Error (CW)	±0.0 %	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>B Test Sample Related</b>								
16 Deviation of the experimental source	±3.5 %	Normal	1	1	1	±3.5 %	±3.5 %	∞
17 Dipole to liquid distance (10mm±0.2mm,<2deg.)	±2.0 %	Rectangular	√3	1	1	±1.2 %	±1.2 %	∞
18 Drift of output power (measured, <0.2dB)	±2.3 %	Rectangular	√3	1	1	±1.3 %	±1.3 %	∞
<b>C Phantom and Setup</b>								
19 Phantom uncertainty	±2.0 %	Rectangular	√3	1	1	±1.2 %	±1.2 %	∞
20 Algorithm for correcting SAR (e,σ: ≤5%)	±1.2 %	Normal	1	1	0.84	±1.2 %	±0.97 %	∞
21 Liquid conductivity (meas.) (DAK3.5)	±3.0 %	Normal	1	0.78	0.71	±2.3 %	±2.1 %	∞
22 Liquid permittivity (meas.) (DAK3.5)	±3.1 %	Normal	1	0.23	0.26	±0.7 %	±0.8 %	∞
23 Liquid Conductivity-temp.uncertainty (≤2deg.C.)	±5.3 %	Rectangular	√3	0.78	0.71	±2.4 %	±2.2 %	∞
24 Liquid Permittivity-temp.uncertainty (≤2deg.C.)	±0.9 %	Rectangular	√3	0.23	0.26	±0.1 %	±0.1 %	∞
<b>Combined Standard Uncertainty</b>						±11.0 %	±10.9 %	
<b>Expanded Uncertainty (k=2)</b>						±22.1 %	±21.8 %	

\*. This measurement uncertainty budget is suggested by IEEE Std. 1528(2013) and determined by Schmid & Partner Engineering AG (DASY5 Uncertainty Budget).

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## SECTION 6: Confirmation before testing

### 6.1 SAR reference power measurement (antenna terminal conducted average power of EUT) - Worst data rate/channel determination

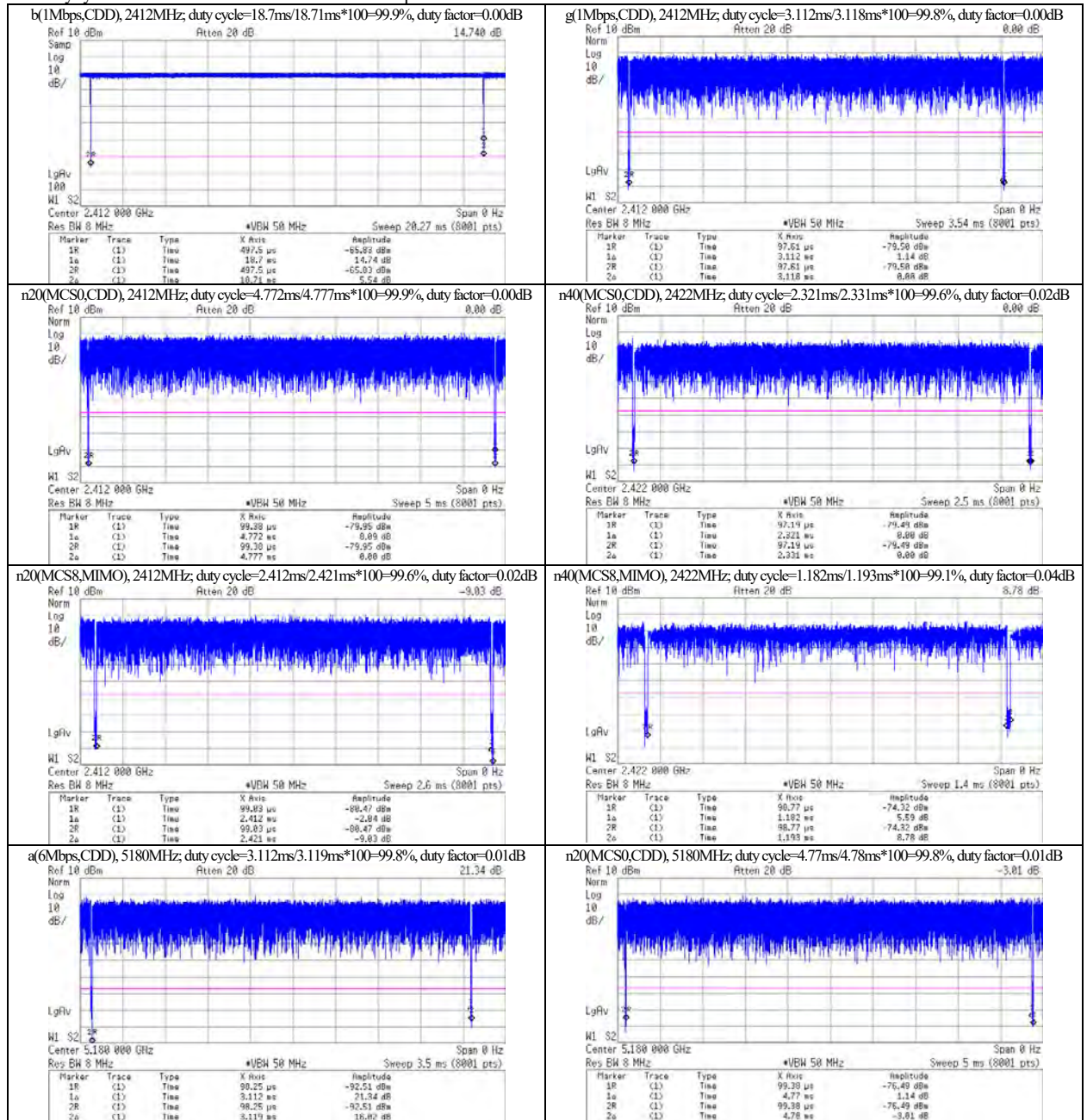
Mode	Frequency		Data rate	Duty cycle			Power spec.			Antenna A power			Antenna B power			Σ (Ant.A+Ant.B) power							
				Duty cycle	Duty factor	Scaled factor	*each antenna	Set pwr.	Burst Ave.	Δ Max.	Tune-up factor	Time Ave.	Burst Ave.	Δ Max.	Tune-up factor	Time Ave.	A+B target	A+B max.	Burst Ave.	Δ Max.	Tune-up factor	Time Ave.	
	[MHz]	CH	[Mbps]	[%]	[dB]	[-]	Typ. [dBm]	Max. [dBm]	[-]	[dBm]	[dB]	[-]	[dBm]	[dBm]	[dB]	[-]	[dBm]	[dBm]	[dBm]	[dB]	[-]	[dBm]	
b CDD	2412	1	1	99.9	0.00	1.00	6.0	8.5	7(*1)	7.25	-1.25	1.33	7.25	7.22	-1.28	1.34	7.22	9.0	11.5	10.24	-1.26	1.34	10.24
	2437	6	1	99.9	0.00	1.00	6.0	8.5	7(*1)	7.35	-1.15	1.30	7.35	7.71	-0.79	1.20	7.71	9.0	11.5	10.54	-0.96	1.25	10.54
	2462	11	1	99.9	0.00	1.00	6.0	8.5	7(*1)	7.41	-1.09	1.29	7.41	8.03	-0.47	1.11	8.03	9.0	11.5	10.74	-0.76	1.19	10.74
g CDD (*2)	2412	1	6	99.8	0.01	1.00	6.0	8.5	7(*1)	7.10	-1.40	1.38	7.09	7.11	-1.39	1.38	7.10	9.0	11.5	10.12	-1.38	1.37	10.11
	2437	6	6	99.8	0.01	1.00	6.0	8.5	7(*1)	7.21	-1.29	1.35	7.20	7.58	-0.92	1.24	7.57	9.0	11.5	10.41	-1.09	1.29	10.40
	2462	11	6	99.8	0.01	1.00	6.0	8.5	7(*1)	7.26	-1.24	1.33	7.25	7.87	-0.63	1.16	7.86	9.0	11.5	10.58	-0.92	1.24	10.58
n20 CDD (*2)	2412	1	MCS0	99.9	0.00	1.00	6.0	8.5	7(*1)	7.26	-1.24	1.33	7.26	7.31	-1.19	1.32	7.31	9.0	11.5	10.31	-1.19	1.32	10.29
	2437	6	MCS0	99.9	0.00	1.00	6.0	8.5	7(*1)	7.40	-1.10	1.29	7.40	7.76	-0.74	1.19	7.76	9.0	11.5	10.60	-0.90	1.23	10.60
	2462	11	MCS0	99.9	0.00	1.00	6.0	8.5	7(*1)	7.44	-1.06	1.28	7.44	8.06	-0.44	1.11	8.06	9.0	11.5	10.77	-0.73	1.18	10.77
n40 CDD (*2)	2422	3	MCS0	99.6	0.02	1.00	6.0	8.5	7(*1)	7.24	-1.26	1.34	7.22	7.44	-1.06	1.28	7.42	9.0	11.5	10.35	-1.15	1.30	10.33
	2437	6	MCS0	99.6	0.02	1.00	6.0	8.5	7(*1)	7.30	-1.20	1.32	7.28	7.67	-0.83	1.21	7.65	9.0	11.5	10.50	-1.00	1.26	10.48
	2452	9	MCS0	99.6	0.02	1.00	6.0	8.5	7(*1)	7.34	-1.16	1.31	7.32	7.87	-0.63	1.16	7.85	9.0	11.5	10.62	-0.88	1.22	10.61
n20 MIMO (*2)	2412	1	MCS8	99.6	0.02	1.00	6.0	8.5	7(*1)	7.28	-1.22	1.32	7.26	7.33	-1.17	1.31	7.31	9.0	11.5	10.32	-1.18	1.31	10.29
	2437	6	MCS8	99.6	0.02	1.00	6.0	8.5	7(*1)	7.39	-1.11	1.29	7.37	7.77	-0.73	1.18	7.75	9.0	11.5	10.59	-0.91	1.23	10.58
	2462	11	MCS8	99.6	0.02	1.00	6.0	8.5	7(*1)	7.45	-1.05	1.27	7.43	8.07	-0.43	1.10	8.05	9.0	11.5	10.78	-0.72	1.18	10.76
n40 MIMO (*2)	2422	3	MCS8	99.1	0.04	1.01	6.0	8.5	7(*1)	7.26	-1.24	1.33	7.22	7.43	-1.07	1.28	7.39	9.0	11.5	10.35	-1.15	1.30	10.31
	2437	6	MCS8	99.1	0.04	1.01	6.0	8.5	7(*1)	7.32	-1.18	1.31	7.28	7.69	-0.81	1.21	7.65	9.0	11.5	10.52	-0.98	1.25	10.48
	2452	9	MCS8	99.1	0.04	1.01	6.0	8.5	7(*1)	7.38	-1.12	1.29	7.34	7.89	-0.61	1.15	7.85	9.0	11.5	10.65	-0.85	1.22	10.61
a CDD	5180	36	6	99.8	0.01	1.00	3.0	5.5	4(*1)	4.47	-1.03	1.27	4.46	4.60	-0.90	1.23	4.59	6.0	8.5	7.54	-0.96	1.25	7.54
	5200	40	6	99.8	0.01	1.00	3.0	5.5	4(*1)	4.43	-1.07	1.28	4.42	4.62	-0.88	1.22	4.61	6.0	8.5	7.54	-0.96	1.25	7.53
	5220	44	6	99.8	0.01	1.00	3.0	5.5	4(*1)	4.40	-1.10	1.29	4.39	4.64	-0.86	1.22	4.63	6.0	8.5	7.53	-0.97	1.25	7.52
	5240	48	6	99.8	0.01	1.00	3.0	5.5	4(*1)	4.45	-1.05	1.27	4.44	4.60	-0.90	1.23	4.59	6.0	8.5	7.54	-0.96	1.25	7.53
	5260	52	6	99.8	0.01	1.00	3.0	5.5	4(*1)	4.50	-1.00	1.26	4.49	4.56	-0.94	1.24	4.55	6.0	8.5	7.54	-0.96	1.25	7.53
	5280	56	6	99.8	0.01	1.00	3.0	5.5	4(*1)	4.57	-0.93	1.24	4.56	4.56	-0.94	1.24	4.55	6.0	8.5	7.57	-0.93	1.24	7.57
	5300	60	6	99.8	0.01	1.00	3.0	5.5	4(*1)	4.44	-1.06	1.28	4.43	4.58	-0.92	1.24	4.57	6.0	8.5	7.52	-0.98	1.25	7.51
	5320	64	6	99.8	0.01	1.00	3.0	5.5	4(*1)	4.46	-1.04	1.27	4.45	4.61	-0.89	1.23	4.60	6.0	8.5	7.54	-0.96	1.25	7.54
	5500	100	6	99.8	0.01	1.00	3.0	5.0	3	3.90	-1.10	1.29	3.89	3.61	-1.39	1.38	3.60	6.0	8.0	6.77	-1.23	1.33	6.76
	5580	116	6	99.8	0.01	1.00	3.0	5.0	3	3.88	-1.12	1.29	3.87	3.72	-1.28	1.34	3.71	6.0	8.0	6.81	-1.19	1.32	6.80
	5700	140	6	99.8	0.01	1.00	3.0	5.0	3	3.38	-1.62	1.45	3.37	4.10	-0.90	1.23	4.09	6.0	8.0	6.77	-1.23	1.33	6.75
	5745	149	6	99.8	0.01	1.00	3.0	5.5	4(*1)	4.88	-0.62	1.15	4.87	4.74	-0.76	1.19	4.73	6.0	8.5	7.82	-0.68	1.17	7.81
	5785	157	6	99.8	0.01	1.00	3.0	5.5	4(*1)	4.50	-1.00	1.26	4.49	4.51	-0.99	1.26	4.50	6.0	8.5	7.51	-0.99	1.26	7.51
	5825	165	6	99.8	0.01	1.00	3.0	5.5	4(*1)	4.12	-1.38	1.37	4.11	4.27	-1.23	1.33	4.26	6.0	8.5	7.20	-1.30	1.35	7.20
n20 CDD	5180	36	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.66	-0.84	1.21	4.65	4.82	-0.68	1.17	4.81	6.0	8.5	7.75	-0.75	1.19	7.75
	5200	40	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.63	-0.87	1.22	4.62	4.83	-0.67	1.17	4.82	6.0	8.5	7.74	-0.76	1.19	7.73
	5220	44	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.58	-0.92	1.24	4.57	4.82	-0.68	1.17	4.81	6.0	8.5	7.71	-0.79	1.20	7.70
	5240	48	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.64	-0.86	1.22	4.63	4.79	-0.71	1.18	4.78	6.0	8.5	7.72	-0.78	1.20	7.72
	5260	52	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.71	-0.79	1.20	4.70	4.76	-0.74	1.19	4.75	6.0	8.5	7.75	-0.75	1.19	7.74
	5280	56	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.74	-0.76	1.19	4.73	4.76	-0.74	1.19	4.75	6.0	8.5	7.76	-0.74	1.19	7.75
	5300	60	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.64	-0.86	1.22	4.63	4.77	-0.73	1.18	4.76	6.0	8.5	7.72	-0.78	1.20	7.70
	5320	64	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.67	-0.83	1.21	4.66	4.80	-0.70	1.17	4.79	6.0	8.5	7.75	-0.75	1.19	7.73
	5500	100	MCS0	99.8	0.01	1.00	3.0	5.0	3	4.09	-0.91	1.23	4.08	3.79	-1.21	1.32	3.78	6.0	8.0	6.95	-1.05	1.27	6.95
	5580	116	MCS0	99.8	0.01	1.00	3.0	5.0	3	4.08	-0.92	1.24	4.07	3.88	-1.12	1.29	3.87	6.0	8.0	6.99	-1.01	1.26	6.98
	5700	140	MCS0	99.8	0.01	1.00	3.0	5.0	3	3.61	-1.39	1.38	3.60	4.30	-0.70	1.17	4.29	6.0	8.0	6.98	-1.02	1.26	6.97
	5745	149	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	5.12	-0.38	1.09	5.11	4.95	-0.55	1.14	4.94	6.0	8.5	8.05	-0.45	1.11	8.03
	5785	157	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.73	-0.77	1.19	4.72	4.73	-0.77	1.19	4.72	6.0	8.5	7.74	-0.76	1.19	7.72
	5825	165	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.30	-1.20	1.32	4.29	4.45	-1.05	1.27	4.44	6.0	8.5	7.39	-1.11	1.29	7.38
ac20 CDD	5180	36	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.67	-0.83	1.21	4.66	4.81	-0.69	1.17	4.80	6.0	8.5	7.75	-0.75	1.19	7.74
	5200	40	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.59	-0.91	1.23	4.58	4.82	-0.68	1.17	4.81	6.0	8.5	7.72	-0.78	1.20	7.71
	5220	44	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.58	-0.92	1.24	4.57	4.84	-0.66	1.16	4.83	6.0	8.5	7.72	-0.78	1.20	7.71
	5240	48	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.64	-0.86	1.22	4.63	4.78	-0.72	1.18	4.77	6.0	8.5	7.72	-0.78	1.20	7.71
	5260	52	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.70	-0.80	1.20	4.69	4.76	-0.74	1.19	4.75	6.0	8.5	7.74	-0.76	1.19	7.73
	5280	56	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.73	-0.77	1.19	4.72	4.75	-0.75	1.19	4.74	6.0	8.5	7.75	-0.75	1.19	7.74
	5300	60	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.63	-0.87	1.22	4.62	4.77	-0.73	1.18	4.76	6.0	8.5	7.71	-0.79	1.20	7.70
	5320	64	MCS0	99.8	0.01	1.00	3.0	5.5	4(*1)	4.66	-0.84	1.21	4.65	4.82	-0.68	1.17	4.81	6.0	8.5	7.75	-0.75	1.19	7.75
	5500	100																					

Mode	Frequency		Data rate	Duty cycle			Power spec.			Antenna A power				Antenna B power				Σ (Ant.A+Ant.B) power					
				Duty cycle	Duty factor	Scaled factor	*each antenna	Set pwr.	Burst Ave.	Δ Max.	Tune-up factor	Time Ave.	Burst Ave.	Δ Max.	Tune-up factor	Time Ave.	A+B target	A+B max.	Burst Ave.	Δ Max.	Tune-up factor	Time Ave.	
				[%]	[dB]	[-]	Typ. [dBm]	Max. [dBm]	[dBm]	[dB]	[-]	[dBm]	[dBm]	[dB]	[-]	[dBm]	[dBm]	[dBm]	[dB]	[-]	[dBm]		
[MHz]	CH	[Mbps]																					
n40 CDD	5190	38	MCS0	99.6	0.02	1.00	3.0	5.5	4(*1)	4.55	-0.95	1.24	4.53	4.68	-0.82	1.21	4.66	6.0	8.5	7.63	-0.87	1.22	7.60
	5230	46	MCS0	99.6	0.02	1.00	3.0	5.5	4(*1)	4.50	-1.00	1.26	4.48	4.76	-0.74	1.19	4.74	6.0	8.5	7.64	-0.86	1.22	7.63
	5270	54	MCS0	99.6	0.02	1.00	3.0	5.5	4(*1)	4.61	-0.89	1.23	4.59	4.68	-0.82	1.21	4.66	6.0	8.5	7.66	-0.84	1.21	7.63
	5310	62	MCS0	99.6	0.02	1.00	3.0	5.5	4(*1)	4.55	-0.95	1.24	4.53	4.74	-0.76	1.19	4.72	6.0	8.5	7.66	-0.84	1.21	7.63
	5510	102	MCS0	99.6	0.02	1.00	3.0	5.0	3	3.96	-1.04	1.27	3.94	3.93	-1.07	1.28	3.91	6.0	8.0	6.95	-1.05	1.27	6.94
	5550	110	MCS0	99.6	0.02	1.00	3.0	5.0	3	3.86	-1.14	1.30	3.84	4.12	-0.88	1.22	4.10	6.0	8.0	7.00	-1.00	1.26	6.98
	5670	134	MCS0	99.6	0.02	1.00	3.0	5.0	3	3.79	-1.21	1.32	3.77	4.31	-0.69	1.17	4.29	6.0	8.0	7.07	-0.93	1.24	7.05
	5755	151	MCS0	99.6	0.02	1.00	3.0	5.5	4(*1)	4.94	-0.56	1.14	4.92	4.85	-0.65	1.16	4.83	6.0	8.5	7.90	-0.60	1.15	7.88
5795	159	MCS0	99.6	0.02	1.00	3.0	5.5	4(*1)	4.55	-0.95	1.24	4.53	4.63	-0.87	1.22	4.61	6.0	8.5	7.60	-0.90	1.23	7.58	
5190	38	MCS0	99.7	0.01	1.00	3.0	5.5	4(*1)	4.55	-0.95	1.24	4.54	4.67	-0.83	1.21	4.66	6.0	8.5	7.62	-0.88	1.22	7.60	
5230	46	MCS0	99.7	0.01	1.00	3.0	5.5	4(*1)	4.46	-1.04	1.27	4.45	4.76	-0.74	1.19	4.75	6.0	8.5	7.62	-0.88	1.22	7.62	
5270	54	MCS0	99.7	0.01	1.00	3.0	5.5	4(*1)	4.60	-0.90	1.23	4.59	4.70	-0.80	1.20	4.69	6.0	8.5	7.66	-0.84	1.21	7.65	
5310	62	MCS0	99.7	0.01	1.00	3.0	5.5	4(*1)	4.58	-0.92	1.24	4.57	4.73	-0.77	1.19	4.72	6.0	8.5	7.66	-0.84	1.21	7.65	
5510	102	MCS0	99.7	0.01	1.00	3.0	5.0	3	3.94	-1.06	1.28	3.93	3.90	-1.10	1.29	3.89	6.0	8.0	6.93	-1.07	1.28	6.92	
5550	110	MCS0	99.7	0.01	1.00	3.0	5.0	3	3.84	-1.16	1.31	3.83	4.10	-0.90	1.23	4.09	6.0	8.0	6.98	-1.02	1.26	6.97	
5670	134	MCS0	99.7	0.01	1.00	3.0	5.0	3	3.80	-1.20	1.32	3.79	4.25	-0.75	1.19	4.24	6.0	8.0	7.04	-0.96	1.25	7.02	
5755	151	MCS0	99.7	0.01	1.00	3.0	5.5	4(*1)	4.91	-0.59	1.15	4.90	4.82	-0.68	1.17	4.81	6.0	8.5	7.87	-0.63	1.16	7.87	
5795	159	MCS0	99.7	0.01	1.00	3.0	5.5	4(*1)	4.54	-0.96	1.25	4.53	4.61	-0.89	1.23	4.60	6.0	8.5	7.58	-0.92	1.24	7.57	
5210	42	MCS0	99.0	0.04	1.01	3.0	5.5	3	4.09	-1.41	1.38	4.05	4.02	-1.48	1.41	3.98	6.0	8.5	7.06	-1.44	1.39	7.02	
5290	58	MCS0	99.0	0.04	1.01	3.0	5.5	3	4.08	-1.42	1.39	4.04	4.10	-1.40	1.38	4.06	6.0	8.5	7.10	-1.40	1.38	7.07	
5530	106	MCS0	99.0	0.04	1.01	3.0	5.0	3	4.29	-0.71	1.18	4.25	4.49	-0.51	1.12	4.45	6.0	8.0	7.40	-0.60	1.15	7.36	
5775	155	MCS0	99.0	0.04	1.01	3.0	5.5	3	4.28	-1.22	1.32	4.24	4.21	-1.29	1.35	4.17	6.0	8.5	7.26	-1.24	1.33	7.21	
5180	36	MCS8	99.6	0.02	1.00	3.0	5.5	4(*1)	4.62	-0.88	1.22	4.60	4.76	-0.74	1.19	4.74	6.0	8.5	7.70	-0.80	1.20	7.68	
5200	40	MCS8	99.6	0.02	1.00	3.0	5.5	4(*1)	4.58	-0.92	1.24	4.56	4.76	-0.74	1.19	4.74	6.0	8.5	7.68	-0.82	1.21	7.66	
5220	44	MCS8	99.6	0.02	1.00	3.0	5.5	4(*1)	4.52	-0.98	1.25	4.50	4.82	-0.68	1.17	4.80	6.0	8.5	7.68	-0.82	1.21	7.66	
5240	48	MCS8	99.6	0.02	1.00	3.0	5.5	4(*1)	4.61	-0.89	1.23	4.59	4.75	-0.75	1.19	4.73	6.0	8.5	7.69	-0.81	1.21	7.67	
5260	52	MCS8	99.6	0.02	1.00	3.0	5.5	4(*1)	4.67	-0.83	1.21	4.65	4.74	-0.76	1.19	4.72	6.0	8.5	7.72	-0.78	1.20	7.69	
5280	56	MCS8	99.6	0.02	1.00	3.0	5.5	4(*1)	4.72	-0.78	1.20	4.70	4.72	-0.78	1.20	4.70	6.0	8.5	7.72	-0.78	1.20	7.71	
5300	60	MCS8	99.6	0.02	1.00	3.0	5.5	4(*1)	4.62	-0.88	1.22	4.60	4.74	-0.76	1.19	4.72	6.0	8.5	7.69	-0.81	1.21	7.66	
5320	64	MCS8	99.6	0.02	1.00	3.0	5.5	4(*1)	4.66	-0.84	1.21	4.64	4.78	-0.72	1.18	4.76	6.0	8.5	7.73	-0.77	1.19	7.71	
5500	100	MCS8	99.6	0.02	1.00	3.0	5.0	3	4.05	-0.95	1.24	4.03	3.82	-1.18	1.31	3.80	6.0	8.0	6.95	-1.05	1.27	6.93	
5580	116	MCS8	99.6	0.02	1.00	3.0	5.0	3	4.07	-0.93	1.24	4.05	3.88	-1.12	1.29	3.86	6.0	8.0	6.98	-1.02	1.26	6.96	
5700	140	MCS8	99.6	0.02	1.00	3.0	5.0	3	3.59	-1.41	1.38	3.57	4.29	-0.71	1.18	4.27	6.0	8.0	6.97	-1.03	1.27	6.95	
5745	149	MCS8	99.6	0.02	1.00	3.0	5.5	4(*1)	5.10	-0.40	1.10	5.08	4.88	-0.62	1.15	4.86	6.0	8.5	8.01	-0.49	1.12	7.98	
5785	157	MCS8	99.6	0.02	1.00	3.0	5.5	4(*1)	4.69	-0.81	1.21	4.67	4.71	-0.79	1.20	4.69	6.0	8.5	7.71	-0.79	1.20	7.69	
5825	165	MCS8	99.6	0.02	1.00	3.0	5.5	4(*1)	4.30	-1.20	1.32	4.28	4.44	-1.06	1.28	4.42	6.0	8.5	7.38	-1.12	1.29	7.36	
5180	36	MCS0	99.5	0.02	1.01	3.0	5.5	4(*1)	4.57	-0.93	1.24	4.55	4.75	-0.75	1.19	4.73	6.0	8.5	7.67	-0.83	1.21	7.65	
5200	40	MCS0	99.5	0.02	1.01	3.0	5.5	4(*1)	4.52	-0.98	1.25	4.50	4.78	-0.72	1.18	4.76	6.0	8.5	7.66	-0.84	1.21	7.64	
5220	44	MCS0	99.5	0.02	1.01	3.0	5.5	4(*1)	4.47	-1.03	1.27	4.45	4.79	-0.71	1.18	4.77	6.0	8.5	7.64	-0.86	1.22	7.63	
5240	48	MCS0	99.5	0.02	1.01	3.0	5.5	4(*1)	4.53	-0.97	1.25	4.51	4.74	-0.76	1.19	4.72	6.0	8.5	7.65	-0.85	1.22	7.62	
5260	52	MCS0	99.5	0.02	1.01	3.0	5.5	4(*1)	4.59	-0.91	1.23	4.57	4.72	-0.78	1.20	4.70	6.0	8.5	7.66	-0.84	1.21	7.64	
5280	56	MCS0	99.5	0.02	1.01	3.0	5.5	4(*1)	4.64	-0.86	1.22	4.62	4.71	-0.79	1.20	4.69	6.0	8.5	7.69	-0.81	1.21	7.66	
5300	60	MCS0	99.5	0.02	1.01	3.0	5.5	4(*1)	4.54	-0.96	1.25	4.52	4.75	-0.75	1.19	4.73	6.0	8.5	7.66	-0.84	1.21	7.63	
5320	64	MCS0	99.5	0.02	1.01	3.0	5.5	4(*1)	4.56	-0.94	1.24	4.54	4.78	-0.72	1.18	4.76	6.0	8.5	7.69	-0.81	1.21	7.66	
5500	100	MCS0	99.5	0.02	1.01	3.0	5.0	3	4.00	-1.00	1.26	3.98	3.80	-1.20	1.32	3.78	6.0	8.0	6.91	-1.09	1.29	6.89	
5580	116	MCS0	99.5	0.02	1.01	3.0	5.0	3	4.02	-0.98	1.25	4.00	3.78	-1.22	1.32	3.76	6.0	8.0	6.91	-1.09	1.29	6.89	
5700	140	MCS0	99.5	0.02	1.01	3.0	5.0	3	3.56	-1.44	1.39	3.54	4.17	-0.83	1.21	4.15	6.0	8.0	6.88	-1.12	1.29	6.87	
5745	149	MCS0	99.5	0.02	1.01	3.0	5.5	4(*1)	5.03	-0.47	1.11	5.01	4.87	-0.63	1.16	4.85	6.0	8.5	7.96	-0.54	1.13	7.94	
5785	157	MCS0	99.5	0.02	1.01	3.0	5.5	4(*1)	4.66	-0.84	1.21	4.64	4.70	-0.80	1.20	4.68	6.0	8.5	7.69	-0.81	1.21	7.67	
5825	165	MCS0	99.5	0.02	1.01	3.0	5.5	4(*1)	4.21	-1.29	1.35	4.19	4.46	-1.04	1.27	4.44	6.0	8.5	7.35	-1.15	1.30	7.32	
5190	38	MCS8	99.2	0.03	1.01	3.0	5.5	4(*1)	4.56	-0.94	1.24	4.53	4.67	-0.83	1.21	4.64	6.0	8.5	7.63	-0.87	1.22	7.60	
5230	46	MCS8	99.2	0.03	1.01	3.0	5.5	4(*1)	4.48	-1.02	1.26	4.45	4.71	-0.79	1.20	4.68	6.0	8.5	7.61	-0.89	1.23	7.58	
5270	54	MCS8																					

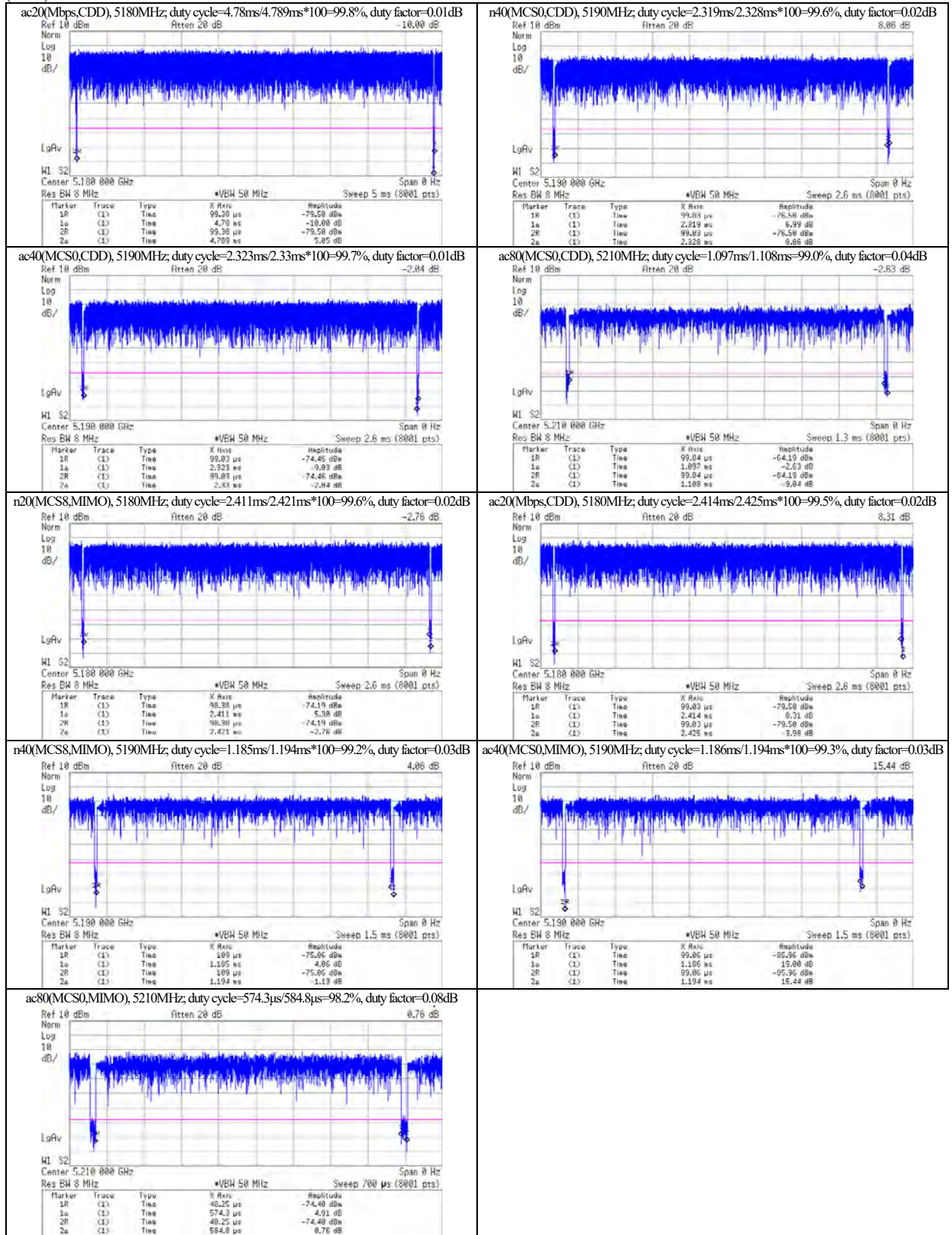


- \*. Initial SAR test channel was chosen. (shaded yellow marker) This mode has the highest tune-up power, highest duty cycle and lowest modulation.
- \*. CH: Channel; Power spec.: Power specification; Typ.: Typical; Max.: Maximum; Set pwr.: Setting power; Burst Ave.: Measured burst average power; SUM Ave.: Sum of antenna 0 power and antenna 1 power; (Mode) b: IEEE 802.11b(CDD), g: IEEE 802.11g(CDD), a: IEEE 802.11a(CDD), 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).
- \*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.
- \*. According to KDB248227 D01, SAR is required for g, n20 and n40 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.
- \*. 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 the lowest data rate is selected.
- \*. When the specified maximum output power is the same for both U-NII-1 band and U-NII-2A band, begin SAR measurement in U-NII-2A band, and if the highest reported SAR for U-NII-2A band is;  $\leq 1.2$  W/kg, SAR is not required for U-NII-1 band /  $> 1.2$  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)  $\times 100$ , where Duty factor (dBm) =  $10 \times \log(100 / (\text{duty cycle, \%}))$   
Duty cycle scaled factor: Duty cycle correction factor for obtained SAR value, Duty scaled factor [-] =  $100(\%) / (\text{duty cycle, \%})$   
 $\Delta$ Max. (Deviation from 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 [-] =  $1 / (10^{(\Delta \text{Max.} / 10)})$
- \*. Date measured: May 13 and 14, 2019 / Measured by: H. Nakai / Place: Preparation room of No. 7 shield room. ((24-25) deg.C. / (40-50) %RH)
- \*. Uncertainty of antenna port conducted test; ( $\pm$ ) 0.81 dB (Average power), ( $\pm$ ) 0.95 dB (Average power, BW80MHz), ( $\pm$ ) 0.012 % (duty cycle).
- \*. Duty cycle conformation of the lowest data rate on each operation mode were shown in the below chart.



(cont'd)



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## SECTION 7: SAR Measurement results

### 7.1 Liquid parameters

Target Frequency [MHz]	Liquid type	Liquid parameters (*a)								ASAR Coefficients(*b)		Date measured		
		Permittivity (εr) [-]				Conductivity [S/m]				Temp. [deg.C.]	Depth [mm]		ASAR [%] (1g)	Correction required? (*c)
		Target	Measured		Limit [%]	Target	Measured		Limit [%]					
			Meas.	Δεr [%]			Meas.	Δσ [%]						
2412	Body	52.75	50.42	-4.4	± 5	1.914	1.940	+1.4	± 5	22.5	150	+1.68	Not Required.	May 28, 2019, before SAR test.
2437		52.72	50.34	-4.5		1.938	1.974	+1.9				+1.93	Not Required.	
2462		52.68	50.23	-4.7		1.967	2.006	+2.0				+1.99	Not Required.	
2412	Body	52.75	50.58	-4.1	± 5	1.914	1.938	+1.3	± 5	22.5	150	+1.54	Not Required.	May 29, 2019, before SAR test.
2437		52.72	50.48	-4.2		1.938	1.970	+1.7				+1.77	Not Required.	
2462		52.68	50.37	-4.4		1.967	2.002	+1.8				+1.83	Not Required.	
5210	Body	49.01	48.30	-1.5	± 5	5.299	5.393	+1.8	± 5	23.0	150	+0.25	Not Required.	May 20, 2019, before SAR test.
5260		48.93	48.24	-1.4		5.369	5.469	+1.9				+0.23	Not Required.	
5270		48.92	48.18	-1.5		5.381	5.472	+1.7				+0.25	Not Required.	
5290		48.89	48.16	-1.5		5.404	5.505	+1.9				+0.21	Not Required.	
5300		48.88	48.14	-1.5		5.416	5.518	+1.9				+0.24	Not Required.	
5310		48.87	48.13	-1.5		5.428	5.526	+1.8				+0.24	Not Required.	
5320		48.85	48.11	-1.5		5.439	5.542	+1.9				+0.24	Not Required.	
5530	Body	48.57	47.74	-1.7	± 5	5.685	5.818	+2.4	± 5	23.0	150	+0.24	Not Required.	May 21, 2019, before SAR test.
5775	Body	48.23	47.38	-1.8	± 5	5.971	6.172	+3.4	± 5	23.0	150	+0.20	Not Required.	May 22, 2019, before SAR test.
5210	Body	49.01	48.14	-1.8	± 5	5.299	5.442	+2.7	± 5	23.0	149	+0.29	Not Required.	May 23, 2019, before SAR test.
5240		48.96	48.07	-1.8		5.346	5.487	+2.6				+0.29	Not Required.	
5260		48.93	48.02	-1.9		5.369	5.523	+2.9				+0.29	Not Required.	
5270		48.92	48.01	-1.9		5.381	5.532	+2.8				+0.29	Not Required.	
5290		48.89	47.95	-1.9		5.404	5.559	+2.9				+0.25	Not Required.	
5300		48.88	47.92	-2.0		5.416	5.578	+3.0				+0.30	Not Required.	
5310		48.87	47.92	-1.9		5.428	5.597	+3.1				+0.29	Not Required.	
5320		48.85	47.94	-1.9		5.439	5.600	+3.0				+0.27	Not Required.	
5530	Body	48.57	47.56	-2.1	± 5	5.685	5.879	+3.4	± 5	23.0	149	+0.27	Not Required.	May 24, 2019, before SAR test.
5775	Body	48.23	47.17	-2.2	± 5	5.971	6.218	+4.1	± 5	23.0	149	+0.25	Not Required.	May 24, 2019, before SAR test.

- \*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:  $\Delta\text{SAR}(1\text{g}) = C_{\epsilon r} \times \Delta\epsilon r + C_{\sigma} \times \Delta\sigma$ ,  $C_{\epsilon r} = -7.854\text{E-}4 \times f^3 + 9.402\text{E-}3 \times f^2 - 2.742\text{E-}2 \times f + 0.2026$  /  $C_{\sigma} = 9.804\text{E-}3 \times f^3 - 8.661\text{E-}2 \times f^2 + 2.981\text{E-}2 \times f + 0.7829$
- \*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:  $\Delta\text{SAR corrected SAR (W/kg)} = (\text{Meas. SAR (W/kg)}) \times (100 - (\Delta\text{SAR}(\%))) / 100$



## 7.2 SAR results: 2.4 GHz band

Test setup		Mode	Frequency		Duty cycle		Power correction								SAR(1g) results [W/kg]								SAR plot #
Position “*” is Initial test position.	Gap [mm]		[MHz]	CH	Duty [%]	Duty scaled factor	#A,B		ANT. #A		ANT. #B		ANT. #A+#B		Measured		Reported <sup>(*)</sup>						
							Tune-up limit [dBm]	Meas. [dBm]	T/Up factor (A)	Meas. [dBm]	T/Up factor (B)	Tune-up limit [dBm]	Meas. [dBm]	T/Up factor (C)	Peak1	Peak2	Peak1	T/Up factor used?	Peak2	T/Up factor used?	Σ(Peak1 +Peak2)		
[Platform alone]																							
Front-top-tilt*	0	(DSSS) b 1Mbps	CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.060</b>	N/D	<b>0.071</b>	(C)	N/D	n/a	<b>0.071</b>	1a-2
Side-Left	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.207</b>	N/D	<b>0.246</b>	(C)	N/D	n/a	<b>0.246</b>	1a-1
Side-Right	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.101</b>	N/D	<b>0.120</b>	(C)	N/D	n/a	<b>0.120</b>	1a-3
Front-tip	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.119</b>	N/D	<b>0.142</b>	(C)	N/D	n/a	<b>0.142</b>	1a-4
Front-Left	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.102</b>	N/D	<b>0.121</b>	(C)	N/D	n/a	<b>0.121</b>	1a-5
Front-Right	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.082</b>	N/D	<b>0.098</b>	(C)	N/D	n/a	<b>0.098</b>	1a-6
Top	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.049</b>	N/D	<b>0.058</b>	(C)	N/D	n/a	<b>0.058</b>	1a-7
Back-top-tilt	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.025</b>	N/D	<b>0.030</b>	(C)	N/D	n/a	<b>0.030</b>	1a-8
Bottom	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.00881</b>	N/D	<b>0.010</b>	(C)	N/D	n/a	<b>0.010</b>	1a-9
Side-Left	0		CDD	2412	1	99.9	1.00	8.5	7.25	1.33	7.22	1.34	11.5	10.24	1.34	<b>0.055</b>	<b>0.042</b>	<b>0.073</b>	(A)	<b>0.056</b>	(B)	<b>0.129</b>	1a-10
		CDD	2437	6	99.9	1.00	8.5	7.35	1.30	7.71	1.20	11.5	10.54	1.25	<b>0.164</b>	N/D	<b>0.205</b>	(C)	N/D	n/a	<b>0.205</b>	1a-11	
[Platform + Connected to the Host device]																							
Front-top-tilt*	0	(DSSS) b 1Mbps	CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.084</b>	N/D	<b>0.100</b>	(C)	N/D	n/a	<b>0.100</b>	1b-2
Side-Left	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.189</b>	N/D	<b>0.225</b>	(C)	N/D	n/a	<b>0.225</b>	1b-1
Front-tip	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.155</b>	N/D	<b>0.184</b>	(C)	N/D	n/a	<b>0.184</b>	1b-3
Front-Left	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.178</b>	N/D	<b>0.212</b>	(C)	N/D	n/a	<b>0.212</b>	1b-4
Front-Right	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.086</b>	N/D	<b>0.102</b>	(C)	N/D	n/a	<b>0.102</b>	1b-5
Top	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	<b>0.024</b>	N/D	<b>0.029</b>	(C)	N/D	n/a	<b>0.029</b>	1b-6
Side-Right	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19	*. The SAR tests of these setup configuration were not applied, because these test surface could not be touched to the SAR phantom directly when the platform was connected to the host device.							
Back-top-tilt	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19								
Bottom	0		CDD	2462	11	99.9	1.00	8.5	7.41	1.29	8.03	1.11	11.5	10.74	1.19								
Side-Left	0	CDD	2412	1	99.9	1.00	8.5	7.25	1.33	7.22	1.34	11.5	10.24	1.34	<b>0.036</b>	<b>0.034</b>	<b>0.048</b>	(A)	<b>0.046</b>	(B)	<b>0.094</b>	1b-7	
		CDD	2437	6	99.9	1.00	8.5	7.35	1.30	7.71	1.20	11.5	10.54	1.25	<b>0.161</b>	N/D	<b>0.201</b>	(C)	N/D	n/a	<b>0.201</b>	1b-8	

\*. Gap: It is the separation distance between the outer surface of product and the bottom outer surface of phantom; N/D: 2<sup>nd</sup> Peak was Not Detected; CH: Channel; Meas.: Measured value; T/Up factor: Power Tune-up factor, n/a: not applied; (Mode) b: IEEE 802.11b.

\*a. Calculating formula: Reported SAR (W/kg) = (Measured SAR (W/kg)) × (Tune-up factor (A) or (B) or (C)) × (Duty scaled)  
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:

\*. The higher reported SAR(1g) on each configuration in this operation band is marked (shaded yellow marker).

\*. Highest measured output power channel was tested initially according to KDB 248227 D01.

\*. 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, 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. Refer to the following table for the estimated SAR of OFDM mode.

Subsequent test mode	ANT. #	Maximum tune-up tolerance limit				Scaled factor [-] (b)/(a)×100	Highest reported SAR1g value * DSSS, Initial test configuration		Estimated SAR value: OFDM subsequent test configuration [W/kg]	Exclusion limit [W/kg]	Standalone SAR test require?
		DSSS, Initial test configuration		OFDM, Subsequent test configuration							
		[dBm]	[mW] (a)	[dBm]	[mW] (b)		Setup	[W/kg]			
g, n20/40	A+B	11.5	14	11.5	14	1.00	Side-Left (Platform alone)	0.246	<b>0.25</b>	<b>≤ 1.2</b>	<b>Yes</b>

(Mode) g: IEEE 802.11g, n20/40: IEEE 802.11n(20HT), IEEE 802.11n(40HT)

\*. During test, the EUT was operated by USB bus power and with connecting control cable.

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

Liquid	SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
Body	(2412, 2437, 2462) MHz	2450 MHz	within ± 50 MHz of calibration frequency	7.32	±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 (U-NII-1 and U-NII-2A band)

Test setup		Mode	Frequency		Duty cycle		Power correction							SAR(1g) results [W/kg]							SAR plot #		
Position *** is Initial test position.	Gap [mm]		[MHz]	CH	Duty [%]	Duty scaled factor	#A,B		ANT. #A	ANT. #B	ANT. #A-#B		Measured		Reported								
							Tune-up limit [dBm]	Meas. [dBm]	T/Up factor (A)	Meas. [dBm]	T/Up factor (B)	Tune-up limit [dBm]	Meas. [dBm]	T/Up factor (C)	Peak1	Peak2	Peak1	T/Up factor used?	Peak2	T/Up factor used?		Σ(Peak1 +Peak2)	
[Platform alone]																							
Front-top-tilt*	0	ac80 MCS0	CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	0.346	N/D	0.482	(C)	N/D	n/a	0.482	2a-2
			MIMO	5290	58	98.2	1.02	5.5	4.06	1.39	4.23	1.34	8.5	7.16	1.36	0.344	N/D	0.477	(C)	N/D	n/a	0.477	2a-3
			CDD	5210	42	99.0	1.01	5.5	4.09	1.38	4.02	1.41	8.5	7.06	1.39	0.275	N/D	0.386	(C)	N/D	n/a	0.386	2a-4
			CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	0.104	N/D	0.145	(C)	N/D	n/a	0.145	2a-5
			CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	0.162	N/D	0.226	(C)	N/D	n/a	0.226	2a-6
			CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	0.233	N/D	0.325	(C)	N/D	n/a	0.325	2a-7
			CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	0.223	N/D	0.311	(C)	N/D	n/a	0.311	2a-8
			CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	0.203	N/D	0.283	(C)	N/D	n/a	0.283	2a-9
			CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	0.060	N/D	0.084	(C)	N/D	n/a	0.084	2a-10
			CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	0.155	N/D	0.216	(C)	N/D	n/a	0.216	2a-11
			CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	0.00965	N/D	0.013	(C)	N/D	n/a	0.013	2a-12
Front-top-tilt*	0	n20 MCS0	CDD	5260	52	99.8	1.00	5.5	4.71	1.20	4.76	1.19	8.5	7.75	1.19	0.407	N/D	0.484	(C)	N/D	n/a	0.484	2a-13
			CDD	5300	60	99.8	1.00	5.5	4.64	1.22	4.77	1.18	8.5	7.72	1.20	0.435	N/D	0.522	(C)	N/D	n/a	0.522	2a-1
			CDD	5320	64	99.8	1.00	5.5	4.67	1.21	4.80	1.17	8.5	7.75	1.19	0.428	N/D	0.509	(C)	N/D	n/a	0.509	2a-14
	0	n40 MCS0	MIMO	5300	60	99.6	1.00	5.5	4.62	1.22	4.74	1.19	8.5	7.69	1.21	0.425	N/D	0.514	(C)	N/D	n/a	0.514	2a-15
			CDD	5270	54	99.6	1.00	5.5	4.61	1.23	4.68	1.21	8.5	7.66	1.21	0.409	N/D	0.495	(C)	N/D	n/a	0.495	2a-16
			CDD	5310	62	99.6	1.00	5.5	4.55	1.24	4.74	1.19	8.5	7.66	1.21	0.413	N/D	0.500	(C)	N/D	n/a	0.500	2a-17

#### [Platform + Connected to the Host device]

Front-top-tilt*	0	ac80 MCS0	CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	<b>0.341</b>	N/D	<b>0.475</b>	(C)	N/D	n/a	<b>0.475</b>	2b-2	
			MIMO	5290	58	98.2	1.02	5.5	4.06	1.39	4.23	1.34	8.5	7.16	1.36	<b>0.347</b>	N/D	<b>0.4814</b>	(C)	N/D	n/a	<b>0.481</b>	2b-1	
CDD	5210		42	99.0	1.01	5.5	4.09	1.38	4.02	1.41	8.5	7.06	1.39	<b>0.264</b>	N/D	<b>0.371</b>	(C)	N/D	n/a	<b>0.371</b>	2b-3			
Side-Left	0		CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	<b>0.119</b>	N/D	<b>0.166</b>	(C)	N/D	n/a	<b>0.166</b>	2b-4	
Front-tip	0		CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	<b>0.227</b>	N/D	<b>0.316</b>	(C)	N/D	n/a	<b>0.316</b>	2b-5	
Front-Left	0		CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	<b>0.247</b>	N/D	<b>0.344</b>	(C)	N/D	n/a	<b>0.344</b>	2b-6	
Front-Right	0		CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	<b>0.210</b>	N/D	<b>0.293</b>	(C)	N/D	n/a	<b>0.293</b>	2b-7	
Top	0		CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	<b>0.067</b>	N/D	<b>0.093</b>	(C)	N/D	n/a	<b>0.093</b>	2b-8	
Side-Right	0		CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38	* The SAR tests of these setup configuration were not applied, because these test surface could not be touched to the SAR phantom directly when the platform was connected to the host device.								
Back-top-tilt	0		CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38									
Bottom	0		CDD	5290	58	99.0	1.01	5.5	4.08	1.39	4.10	1.38	8.5	7.10	1.38									
Front-top-tilt*	0		n20 MCS0	CDD	5260	52	99.8	1.00	5.5	4.71	1.20	4.76	1.19	8.5	7.75	1.19	<b>0.379</b>	N/D	<b>0.451</b>	(C)	N/D	n/a	<b>0.451</b>	2b-9
				CDD	5300	60	99.8	1.00	5.5	4.64	1.22	4.77	1.18	8.5	7.72	1.20	<b>0.401</b>	N/D	<b>0.4812</b>	(C)	N/D	n/a	<b>0.481</b>	2b-10
				CDD	5320	64	99.8	1.00	5.5	4.67	1.21	4.80	1.17	8.5	7.75	1.19	<b>0.383</b>	N/D	<b>0.456</b>	(C)	N/D	n/a	<b>0.456</b>	2b-11
	0		n40 MCS0	MIMO	5300	60	99.6	1.00	5.5	4.62	1.22	4.74	1.19	8.5	7.69	1.21	<b>0.392</b>	N/D	<b>0.474</b>	(C)	N/D	n/a	<b>0.474</b>	2b-12
				CDD	5270	54	99.6	1.00	5.5	4.61	1.23	4.68	1.21	8.5	7.66	1.21	<b>0.386</b>	N/D	<b>0.467</b>	(C)	N/D	n/a	<b>0.467</b>	2b-13
				CDD	5310	62	99.6	1.00	5.5	4.55	1.24	4.74	1.19	8.5	7.66	1.21	<b>0.387</b>	N/D	<b>0.468</b>	(C)	N/D	n/a	<b>0.468</b>	2b-14

\* Gap: It is the separation distance between the outer surface of product and the bottom outer surface of phantom; N/D: 2<sup>nd</sup> Peak was Not Detected; CH: Channel; Meas.: Measured value; T/Up factor: Power Tune-up factor, n/a: not applied; (Mode) ac80: IEEE 802.11ac(80VHT).

\*a. Calculating formula: Reported SAR (W/kg) = (Measured SAR (W/kg)) × (Tune-up factor (A) or (B) or (C)) × (Duty scaled)  
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:

- \* The higher reported SAR(1g) on each configuration in this operation band is marked (shaded yellow marker).
- \* Highest measured output power channel of IEEE 802.11ac (80VHT) mode which has the highest tune-up power, highest duty cycle and lowest modulation, was tested initially according to KDB 248227 D01.
- \* Initial Test Position SAR Test Reduction Procedure. According to KDB248227D01
  - 1) Highest reported SAR(1g) is < 0.4 W/kg. Therefore, further SAR measurements within this exposure condition are not required. (for U-NII-1 band)
  - 2) Highest reported SAR(1g) is > 0.4 W/kg. Due to the highest reported SAR for this test position, other test positions in standalone exposure condition were evaluated until a SAR(1g) ≤ 0.8 W/kg was reported. (for U-NII-2A band)
  - 3) For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR(1g) is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR(1g) is ≤ 1.2 W/kg or all required test channels are considered.
- \* During test, the EUT was operated by USB bus power and with connecting control cable.
- \* Calibration frequency of the SAR measurement probe (and used conversion factors)

Liquid	SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
Body	(5210, 5260, 5270, 5290, 5300, 5319, 5320) MHz	5250 MHz	within ± 110 MHz 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 (U-NII-2C band)

Test setup		Mode	Frequency		Duty cycle		Power correction								SAR(1g) results [W/kg]								SAR plot #
Position *** is Initial test position.	Gap [mm]		[MHz]	CH	Duty [%]	Duty scaled factor	#A,B	ANT. #A	ANT. #B	ANT. #A+#B		Measured		Reported									
							Tune-up limit [dBm]	Meas. [dBm]	T/Up factor (A)	Meas. [dBm]	T/Up factor (B)	Tune-up limit [dBm]	Meas. [dBm]	T/Up factor (C)	Peak1	Peak2	Peak1	T/Up factor used?	Peak2	T/Up factor used?	Σ(Peak1 +Peak2)		
[Platform alone]																							
Front-top-tilt*	0	ac80 MCS0	CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.196</b>	N/D	<b>0.228</b>	(C)	N/D	n/a	<b>0.228</b>	3a-2
Side-Left	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.123</b>	N/D	<b>0.143</b>	(C)	N/D	n/a	<b>0.143</b>	3a-3
Side-Right	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.190</b>	N/D	<b>0.221</b>	(C)	N/D	n/a	<b>0.221</b>	3a-4
Front-tip	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.227</b>	N/D	<b>0.264</b>	(C)	N/D	n/a	<b>0.264</b>	3a-1
Front-Left	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.208</b>	N/D	<b>0.242</b>	(C)	N/D	n/a	<b>0.242</b>	3a-5
Front-Right	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.177</b>	N/D	<b>0.206</b>	(C)	N/D	n/a	<b>0.206</b>	3a-6
Top	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.099</b>	N/D	<b>0.115</b>	(C)	N/D	n/a	<b>0.115</b>	3a-7
Back-top-tilt	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.223</b>	N/D	<b>0.259</b>	(C)	N/D	n/a	<b>0.259</b>	3a-8
Bottom	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.022</b>	N/D	<b>0.026</b>	(C)	N/D	n/a	<b>0.026</b>	3a-9
[Platform + Connected to the Host device]																							
Front-top-tilt*	0	ac80 MCS0	CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.199</b>	N/D	<b>0.231</b>	(C)	N/D	n/a	<b>0.231</b>	3b-2
Side-Left	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.112</b>	N/D	<b>0.130</b>	(C)	N/D	n/a	<b>0.130</b>	3b-3
Front-tip	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.228</b>	N/D	<b>0.265</b>	(C)	N/D	n/a	<b>0.265</b>	3b-1
Front-Left	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.213</b>	N/D	<b>0.247</b>	(C)	N/D	n/a	<b>0.247</b>	3b-4
Front-Right	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.175</b>	N/D	<b>0.203</b>	(C)	N/D	n/a	<b>0.203</b>	3b-5
Top	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	<b>0.109</b>	N/D	<b>0.127</b>	(C)	N/D	n/a	<b>0.127</b>	3b-6
Side-Right	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15	*. The SAR tests of these setup configuration were not applied, because these test surface could not be touched to the SAR phantom directly when the platform was connected to the host device.							
Back-top-tilt	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15								
Bottom	0		CDD	5530	106	99.0	1.01	5.5	4.29	1.18	4.49	1.12	8.5	7.40	1.15								

- \*. Gap: It is the separation distance between the outer surface of product and the bottom outer surface of phantom; N/D: 2<sup>nd</sup> Peak was Not Detected; CH: Channel; Meas.: Measured value; T/Up factor: Power Tune-up factor, n/a: not applied; (Mode) ac80: IEEE 802.11ac(80VHT).  
\*.a. Calculating formula: Reported SAR (W/kg) = (Measured SAR (W/kg)) × (Tune-up factor (A) or (B) or (C)) × (Duty scaled)  
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:

- \*. The higher reported SAR(1g) on each configuration in this operation band is marked (shaded yellow marker).  
\*. Highest measured output power channel of IEEE 802.11ac (80VHT) mode which has the highest tune-up power, highest duty cycle and lowest modulation, was tested initially according to KDB 248227 D01.  
\*. Initial Test Position SAR Test Reduction Procedure. According to KDB248227D01  
1) Highest reported SAR(1g) is ≤ 0.4 W/kg. Therefore, further SAR measurements within this exposure condition are not required.  
2) Highest reported SAR(1g) is > 0.4 W/kg. Due to the highest reported SAR for this test position, other test positions in standalone exposure condition were evaluated until a SAR(1g) ≤ 0.8 W/kg was reported.  
3) For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR(1g) is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR(1g) is ≤ 1.2 W/kg or all required test channels are considered.  
\*. During test, the EUT was operated by USB bus power and with connecting control cable.  
\*. Calibration frequency of the SAR measurement probe (and used conversion factors)

Liquid	SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
Body	5530 MHz	5600 MHz	within ± 110 MHz of calibration frequency	3.92	±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 (U-NII-3 band)

Test setup		Mode	Frequency		Duty cycle		Power correction								SAR(1g) results [W/kg]								SAR plot #
Position *** is Initial test position.	Gap [mm]		[MHz]	CH	Duty [%]	Duty scaled factor	#A,B	ANT. #A	ANT. #B	ANT. #A+#B		Measured		Reported									
							Tune-up limit [dBm]	Meas. [dBm]	T/Up factor (A)	Meas. [dBm]	T/Up factor (B)	Tune-up limit [dBm]	Meas. [dBm]	T/Up factor (C)	Peak1	Peak2	Peak1	T/Up factor used?	Peak2	T/Up factor used?	Σ(Peak1 +Peak2)		
[Platform alone]																							
Front-top-tilt*	0	ac80 MCS0	CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.092	N/D	0.124	(C)	N/D	n/a	0.124	4a-2
Side-Left	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.062	N/D	0.083	(C)	N/D	n/a	0.083	4a-3
Side-Right	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.063	N/D	0.085	(C)	N/D	n/a	0.085	4a-4
Front-tip	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.101	N/D	0.136	(C)	N/D	n/a	0.136	4a-5
Front-Left	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.099	N/D	0.133	(C)	N/D	n/a	0.133	4a-6
Front-Right	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.079	N/D	0.106	(C)	N/D	n/a	0.106	4a-7
Top	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.058	N/D	0.078	(C)	N/D	n/a	0.078	4a-8
Back-top-tilt	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.113	N/D	0.152	(C)	N/D	n/a	0.152	4a-1
Bottom	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.0538	N/D	0.007	(C)	N/D	n/a	0.007	4a-9
[Platform + Connected to the Host device]																							
Front-top-tilt*	0	ac80 MCS0	CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.094	N/D	0.126	(C)	N/D	n/a	0.126	4b-2
Side-Left	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.060	N/D	0.081	(C)	N/D	n/a	0.081	4b-3
Front-tip	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.108	N/D	0.145	(C)	N/D	n/a	0.145	4b-1
Front-Left	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.107	N/D	0.144	(C)	N/D	n/a	0.144	4b-4
Front-Right	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.083	N/D	0.112	(C)	N/D	n/a	0.112	4b-5
Top	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	0.073	N/D	0.098	(C)	N/D	n/a	0.098	4b-6
Side-Right	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33	*. The SAR tests of these setup configuration were not applied, because these test surface could not be touched to the SAR phantom directly when the platform was connected to the host device.							
Back-top-tilt	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33								
Bottom	0		CDD	5775	155	99.0	1.01	5.5	4.28	1.32	4.21	1.35	8.5	7.26	1.33								

- \*. Gap: It is the separation distance between the outer surface of product and the bottom outer surface of phantom; N/D: 2<sup>nd</sup> Peak was Not Detected; CH: Channel; Meas.: Measured value; T/Up factor: Power Tune-up factor, n/a: not applied; (Mode) ac80: IEEE 802.11ac(80VHT).  
\*a. Calculating formula: Reported SAR (W/kg) = (Measured SAR (W/kg)) × (Tune-up factor (A) or (B) or (C)) × (Duty scaled)  
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:

- \*. The higher reported SAR(1g) on each configuration in this operation band is marked (shaded yellow marker).  
\*. Highest measured output power channel of IEEE 802.11ac (80VHT) mode which has the highest tune-up power, highest duty cycle and lowest modulation, was tested initially according to KDB 248227 D01.  
\*. Initial Test Position SAR Test Reduction Procedure. According to KDB248227D01  
1) Highest reported SAR(1g) is ≤ 0.4 W/kg. Therefore, further SAR measurements within this exposure condition are not required.  
2) Highest reported SAR(1g) is > 0.4 W/kg. Due to the highest reported SAR for this test position, other test positions in standalone exposure condition were evaluated until a SAR(1g) ≤ 0.8 W/kg was reported.  
3) For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR(1g) is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR(1g) is ≤ 1.2 W/kg or all required test channels are considered.  
\*. During test, the EUT was operated by USB bus power and with connecting control cable.  
\*. Calibration frequency of the SAR measurement probe (and used conversion factors)

Liquid	SAR test frequency	Probe calibration frequency	Validity	Conversion factor	Uncertainty
Body	5775 MHz	5750 MHz	within ± 110 MHz of calibration frequency	4.00	±13.1%

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

## 7.6 Co-location (CDD, MIMO) evaluation (Platform alone)

The sum of the SAR(1g) was kept < 1.6 W/kg by the actual measurement.

Co-location scenario								Σ SAR [W/kg]		SPLSR check=Yes, >1.6	SPLSR check=No, ≤ 1.6	SPLSR check required? (Yes/No)	Antenna separation distance [mm]	SPLSR (≤ 0.04)	Volume Scan? (Yes/No)
Test position	Band	Mode	Highest Reported SAR (1g) [W/kg]												
			Estimated (*1)		Measured (Clause 7.2~7.5) (*2)				Estimated	Measured					
Ant. A	Ant. B	Mode	Ant. A	Ant. B											
Front-top-tilt	DTS	b.g.n20/40	0.21	0.29	ac80	0.07 (2 <sup>nd</sup> Peak was not detected.)	0.50	0.07	No	-	-	-			
	U-NII-1&2A	a.n20/40,ac20/40/80	0.18	0.25	n20	0.52 (2 <sup>nd</sup> Peak was not detected.)	0.43	0.52	No	-	-	-			
	U-NII-2C	a.n20/40,ac20/40/80	0.14	0.19	ac80	0.24 (2 <sup>nd</sup> Peak was not detected.)	0.33	0.24	No	-	-	-			
	U-NII-3	a.n20/40,ac20/40/80	0.18	0.26	ac80	0.12 (2 <sup>nd</sup> Peak was not detected.)	0.44	0.12	No	-	-	-			
Front (Front-tip, Front-Left, Front-Right)	DTS	b.g.n20/40	0.11	0.29	ac80	0.14 (2 <sup>nd</sup> Peak was not detected.)	0.40	0.14	No	-	-	-			
	U-NII-1&2A	a.n20/40,ac20/40/80	0.09	0.25	ac80	0.33 (2 <sup>nd</sup> Peak was not detected.)	0.34	0.33	No	-	-	-			
	U-NII-2C	a.n20/40,ac20/40/80	0.07	0.19	ac80	0.26 (2 <sup>nd</sup> Peak was not detected.)	0.26	0.26	No	-	-	-			
	U-NII-3	a.n20/40,ac20/40/80	0.09	0.26	ac80	0.14 (2 <sup>nd</sup> Peak was not detected.)	0.35	0.14	No	-	-	-			
Back-top-tilt	DTS	b.g.n20/40	0.29	0.16	ac80	0.03 (2 <sup>nd</sup> Peak was not detected.)	0.45	0.03	No	-	-	-			
	U-NII-1&2A	a.n20/40,ac20/40/80	0.25	0.14	ac80	0.22 (2 <sup>nd</sup> Peak was not detected.)	0.39	0.22	No	-	-	-			
	U-NII-2C	a.n20/40,ac20/40/80	0.19	0.11	ac80	0.26 (2 <sup>nd</sup> Peak was not detected.)	0.30	0.26	No	-	-	-			
	U-NII-3	a.n20/40,ac20/40/80	0.26	0.14	ac80	0.15 (2 <sup>nd</sup> Peak was not detected.)	0.40	0.15	No	-	-	-			
Top	DTS	b.g.n20/40	0.29	0.12	ac80	0.06 (2 <sup>nd</sup> Peak was not detected.)	0.41	0.06	No	-	-	-			
	U-NII-1&2A	a.n20/40,ac20/40/80	0.25	0.10	ac80	0.08 (2 <sup>nd</sup> Peak was not detected.)	0.35	0.08	No	-	-	-			
	U-NII-2C	a.n20/40,ac20/40/80	0.19	0.08	ac80	0.12 (2 <sup>nd</sup> Peak was not detected.)	0.27	0.12	No	-	-	-			
	U-NII-3	a.n20/40,ac20/40/80	0.26	0.11	ac80	0.08 (2 <sup>nd</sup> Peak was not detected.)	0.37	0.08	No	-	-	-			
Side-Left	DTS	b.g.n20/40	0.29	0.13	ac80	0.25 (2 <sup>nd</sup> Peak was not detected.)	0.42	0.25	No	-	-	-			
	U-NII-1&2A	a.n20/40,ac20/40/80	0.25	0.11	ac80	0.31 (2 <sup>nd</sup> Peak was not detected.)	0.36	0.31	No	-	-	-			
	U-NII-2C	a.n20/40,ac20/40/80	0.19	0.09	ac80	0.24 (2 <sup>nd</sup> Peak was not detected.)	0.28	0.24	No	-	-	-			
	U-NII-3	a.n20/40,ac20/40/80	0.26	0.12	ac80	0.08 (2 <sup>nd</sup> Peak was not detected.)	0.38	0.08	No	-	-	-			
Side-Right	DTS	b.g.n20/40	0.29	0.11	ac80	0.10 (2 <sup>nd</sup> Peak was not detected.)	0.40	0.10	No	-	-	-			
	U-NII-1&2A	a.n20/40,ac20/40/80	0.25	0.09	ac80	0.28 (2 <sup>nd</sup> Peak was not detected.)	0.34	0.28	No	-	-	-			
	U-NII-2C	a.n20/40,ac20/40/80	0.19	0.07	ac80	0.21 (2 <sup>nd</sup> Peak was not detected.)	0.26	0.21	No	-	-	-			
	U-NII-3	a.n20/40,ac20/40/80	0.26	0.09	ac80	0.09 (2 <sup>nd</sup> Peak was not detected.)	0.35	0.09	No	-	-	-			
Bottom	DTS	b.g.n20/40	0.40	0.04	ac80	0.01 (2 <sup>nd</sup> Peak was not detected.)	0.44	0.01	No	-	-	-			
	U-NII-1&2A	a.n20/40,ac20/40/80	0.40	0.04	ac80	0.01 (2 <sup>nd</sup> Peak was not detected.)	0.44	0.01	No	-	-	-			
	U-NII-2C	a.n20/40,ac20/40/80	0.40	0.03	ac80	0.03 (2 <sup>nd</sup> Peak was not detected.)	0.43	0.03	No	-	-	-			
	U-NII-3	a.n20/40,ac20/40/80	0.40	0.04	ac80	0.01 (2 <sup>nd</sup> Peak was not detected.)	0.44	0.01	No	-	-	-			

Note: \*1. These values are estimated SAR. Refer to section 4.2.

\*2. The highest measured reported SAR values were referred to clause 7.2~7.5.

\*(Mode) b: IEEE 802.11b, g: IEEE 802.11g, a: IEEE 802.11a, n20/40: IEEE 802.11n (20HT)/11n(40HT), ac20/40/80: IEEE 802.11ac(20VHT)/11ac(40VHT)/11ac(80VHT).

\*. "yellow marker" in the table; The highest reported SAR(1g) of each band (DTS, U-NII) is shaded with yellow marker.



## 7.7 Simultaneous transmission evaluation (Platform and host device)

### Simultaneous transmission SAR measurement (Volume Scan) of EUT: ES203) and the host device (digital camera's WM600, BLE) was not required because the sum of the simulated SAR(1g) was < 1.6 W/kg.

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.

#### Estimated ΣSAR1g of Platform (Wireless File Transmitter: DS586191, Wireless module: ES203) (Refer to clause 4.4 in this report.)

Mode	Upper Frequency [GHz]		Max. Power				Estimated SAR 1g value [W/kg]														Estimated Σ SAR 1g value (Ant.A+B) (Platform) [W/kg] (≤ 1.6 W/kg)					
			Ant.A		Ant.B		Ant.A								Ant.B											
	Ant.A	Ant.B	[dBm]	[mW]	[dBm]	[mW]	Front	Side.L	Side.R	Top	Back	Btm	Front	Side.L	Side.R	Top	Back	Btm	Front	Side.L	Side.R	Top	Back	Btm		
b.g.n	2.462	2.462	8.5	7	8.5	7	0.21	0.29	0.29	0.29	0.29	0.40	0.29	0.13	0.11	0.12	0.16	0.04	0.50	0.43	0.40	0.42	0.46	0.44		
a.n.ac	5.24	5.24	5.5	4	5.5	4	0.17	0.24	0.24	0.24	0.24	0.40	0.24	0.11	0.09	0.10	0.14	0.04	0.42	0.36	0.33	0.35	0.38	0.44		
a.n.ac	5.32	5.32	5.5	4	5.5	4	0.18	0.25	0.25	0.25	0.25	0.40	0.25	0.11	0.09	0.10	0.14	0.04	0.42	0.36	0.33	0.35	0.38	0.44		
a.n.ac	5.7	5.7	5	3	5	3	0.14	0.19	0.19	0.19	0.19	0.40	0.19	0.09	0.07	0.08	0.11	0.03	0.33	0.28	0.26	0.27	0.30	0.43		
a.n.ac	5.825	5.825	5.5	4	5.5	4	0.18	0.26	0.26	0.26	0.26	0.40	0.26	0.12	0.09	0.11	0.14	0.04	0.44	0.37	0.35	0.36	0.40	0.44		
Antenna separation distance [mm]							7	≤5	≤5	≤5	≤5	55	≤5	11	14	12	9	35								

#### Estimated SAR1g of Host device (Digital camera: DS126771, Wireless module: WM600) (\*1)

Mode	Upper Frequency [GHz]	Max. Power		Estimated SAR 1g value [W/kg]							
		[dBm]	[mW]	Top-finder-left	Top-finder	Front	Rear	Left	Right	Bottom	
BLE	2.48	8	6	0.25	0.18	0.03	0.03	0.03	0.40	0.40	
Antenna separation distance [mm]				5	7	40	42	50	107	160	
Antenna separation distance [mm]				5	7	40	42	50	107	160	

#### Estimated ΣSAR1g of simultaneous transmission (Host device (WM600) and Platform (ES203))

Simultaneous transmission scenario									Σ SAR [W/kg] (1g: ≤ 1.6)	SPLSR check required? (Yes/No)	Ant. separation distance b/w host device and platform [mm]	SPLSR (≤ 0.04)	Volume Scan? (Yes/No)
Setup position		Highest Reported SAR (1g) [W/kg]											
Host device	Platform	Host device (WM600)			Platform (ES203)								
Front	Side-Left	DTS	BLE	0.03 (*2)	DTS	b.g.n	CDD,MIMO	0.43 (*2)	0.46 (*2)	<1.6, No	57 (*3)	0.005	No
		DTS	BLE	0.03 (*2)	U-NII-1&2A	a.n.ac	CDD,MIMO	0.36 (*2)	0.39 (*2)	<1.6, No	57 (*3)	0.004	No
		DTS	BLE	0.03 (*2)	U-NII-2C	a.n.ac	CDD,MIMO	0.28 (*2)	0.31 (*2)	<1.6, No	57 (*3)	0.003	No
		DTS	BLE	0.03 (*2)	U-NII-3	a.n.ac	CDD,MIMO	0.37 (*2)	0.40 (*2)	<1.6, No	57 (*3)	0.004	No
Top-finder-left	Top	DTS	BLE	0.25 (*2)	DTS	b.g.n	CDD,MIMO	0.42 (*2)	0.67 (*2)	<1.6, No	57 (*3)	0.010	No
		DTS	BLE	0.25 (*2)	U-NII-1&2A	a.n.ac	CDD,MIMO	0.35 (*2)	0.60 (*2)	<1.6, No	57 (*3)	0.008	No
		DTS	BLE	0.25 (*2)	U-NII-2C	a.n.ac	CDD,MIMO	0.27 (*2)	0.52 (*2)	<1.6, No	57 (*3)	0.007	No
		DTS	BLE	0.25 (*2)	U-NII-3	a.n.ac	CDD,MIMO	0.36 (*2)	0.61 (*2)	<1.6, No	57 (*3)	0.008	No
Left	Front (Front-Right)	DTS	BLE	0.03 (*2)	DTS	b.g.n	CDD,MIMO	0.50 (*2)	0.53 (*2)	<1.6, No	57 (*3)	0.007	No
		DTS	BLE	0.03 (*2)	U-NII-1&2A	a.n.ac	CDD,MIMO	0.42 (*2)	0.45 (*2)	<1.6, No	57 (*3)	0.005	No
		DTS	BLE	0.03 (*2)	U-NII-2C	a.n.ac	CDD,MIMO	0.33 (*2)	0.36 (*2)	<1.6, No	57 (*3)	0.004	No
		DTS	BLE	0.03 (*2)	U-NII-3	a.n.ac	CDD,MIMO	0.44 (*2)	0.47 (*2)	<1.6, No	57 (*3)	0.006	No
Left	Side-Right	DTS	BLE	0.03 (*2)	DTS	b.g.n	CDD,MIMO	0.40 (*2)	0.43 (*2)	<1.6, No	57 (*3)	0.005	No
		DTS	BLE	0.03 (*2)	U-NII-1&2A	a.n.ac	CDD,MIMO	0.33 (*2)	0.36 (*2)	<1.6, No	57 (*3)	0.004	No
		DTS	BLE	0.03 (*2)	U-NII-2C	a.n.ac	CDD,MIMO	0.26 (*2)	0.29 (*2)	<1.6, No	57 (*3)	0.003	No
		DTS	BLE	0.03 (*2)	U-NII-3	a.n.ac	CDD,MIMO	0.35 (*2)	0.38 (*2)	<1.6, No	57 (*3)	0.004	No
Left	Bottom	DTS	BLE	0.03 (*2)	DTS	b.g.n	CDD,MIMO	0.44 (*2)	0.47 (*2)	<1.6, No	57 (*3)	0.006	No
		DTS	BLE	0.03 (*2)	U-NII-1&2A	a.n.ac	CDD,MIMO	0.44 (*2)	0.47 (*2)	<1.6, No	57 (*3)	0.006	No
		DTS	BLE	0.03 (*2)	U-NII-2C	a.n.ac	CDD,MIMO	0.43 (*2)	0.46 (*2)	<1.6, No	57 (*3)	0.005	No
		DTS	BLE	0.03 (*2)	U-NII-3	a.n.ac	CDD,MIMO	0.44 (*2)	0.47 (*2)	<1.6, No	57 (*3)	0.006	No

Note: \*1. The host device which employ WM600 is supported only BLE operation by the firmware when the Wireless File Transmitter (platform) is connected.

\*2. These values are estimated SAR.

\*3. This antenna separation distance is specified by the mechanical drawing. Refer to Appendix 1-3.

\*. "yellow marker" in the table; The highest reported SAR(1g) of each band (DTS, U-NII) is shaded with yellow marker.

\*. The single antenna transmitting mode could not be allowed on the EUT (model: ES203).

\*. Simultaneous transmission SAR measurement (Volume Scan) is not required because ΣSAR(1g) is < 1.6 W/kg.

\*. Product description of Wireless Module: WM600. It's installed into the digital camera: DS126771.

Model	WM600	Equipment type	Transceiver	FCC ID	AZD600	ISED certification number	498J-600
Operation mode	Wi-Fi			Bluetooth (Ver. 4.1 with EDR function)			
Frequency of operation	2412-2462 MHz (b.g.n(20HT))			2402-2480 MHz (BDR, EDR, BLE)			
Channel spacing	5 MHz			1MHz (BDR, EDR), 2MHz (BLE)			
Bandwidth	20 MHz (b.g.n(20HT))			79MHz			
Type of modulation	(b) DSSS: DBPSK, DQPSK, CCK (g.n(20HT)) OFDM: BPSK, QPSK, 16QAM, 64QAM			FHSS: GFSK (* EDR: GFSK+π/4-DQPSK, GFSK+8DPSK)			
Transmit typical power and maximum tune-up tolerance limit	Mode	b	g	n(20HT)	BDR	EDR	BLE
	Typical	8.0 dBm	8.0 dBm	7.0 dBm	n/a, (6.0 dBm)	n/a, (6.0 dBm)	6.0 dBm
	Maximum	10.0 dBm	10.0 dBm	9.0 dBm	n/a, (8.0 dBm)	n/a, (8.0 dBm)	8.0 dBm
Remarks	-						
Quantity of Antenna	1 piece	Antenna type	Pattern antenna	Antenna connector type	Not applicable (printed)	Antenna gain (peak)	1.7 dBi
Remarks: *. b: IEEE 802.11b, g: IEEE 802.11g, n20: IEEE 802.11n(20HT); BLE: Bluetooth Low Energy; BDR: Basic Data Rate; EDR: Enhanced Data Rate; n/a: not applied.							
*. The EUT do not use the special transmitting technique such as "beam-forming" and "time-space code diversity."							
*. Since Wi-Fi and Bluetooth are used a same antenna, Wi-Fi and Bluetooth do not transmit simultaneously.							
*. The WM600 which is installed into the DS126771 only support BLE operation when the Wireless File Transmitter (DS58619x) is connected.							