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TEST REPORT

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KCTL

1. Client

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
- Date of Receipt : 2021-08-19

2. Use of Report : Class II Permissive change

3. Name of Product and Model : Smart Wearable
- Model Number : SM-R890
- Manufacturer and Country of Origin : Samsung Electronics Co., Ltd. / VIETNAM

4. FCC ID : A3LSMR890

5. Date of Test : 2021-09-01 ~ 2021-09-03

6. Location of Test : ■ Permanent Testing Lab □ On Site Testing
(Address: 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

7. Test Standards : IEEE 1528-2013, ANSI/IEEE C95.1, KDB Publication

8. Test Results : Refer to the test result in the test report

Affirmation	Tested by Name : Choongki Lee (Signature)	Technical Manager Name : Jongwon Ma (Signature)

2021-09-18

KCTL Inc.

As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.

REPORT REVISION HISTORY

Date	Revision	Page No
2021-09-17	Originally issued	-
2021-09-18	Updated FCC ID	1

Note: The Report No. KR21-SPF0065 is superseded by the report No. KR21-SPF0065-A

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Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

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1. General information

Client	:	Samsung Electronics Co., Ltd.
Address	:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
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Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132 VCCI Registration No. : R-3327, G-198, C-3706, T-1849 CAB Identifier: KR0040, ISED Number: 8035A KOLAS No.: KT231

1.1 Report Overview

This report details the results of testing carried out on the samples listed in section 2, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this test report is used in any configuration other than that detailed in the test report, the manufacturer must ensure the new configuration complies with all relevant standards and certification requirements. Any mention of KCTL Inc. Wireless lab or testing done by KCTL Inc. Wireless lab made in connection with the distribution or use of the tested product must be approved in writing by KCTL Inc. Wireless lab.

2. Device information

2.1 Basic description

Product Name		Smart Wearable		
Product Model Number		SM-R890		
Product Manufacturer		Samsung Electronics Co., Ltd		
Product Serial Number	Radiation	R3AR404SR0P		
		R3AR404SPCB		
		R3AR404SPFW		
		R3AR404SN3N		
	WLAN Conduction	R3AR501PZFR		
Mode of Operation		WLAN 802.11a,b,g,n, Bluetooth, NFC(Only RX)		
Tx Freq. Range		Band & Mode	Operating Modes	Tx Frequency(㎒)
		WLAN 2.4 ㎓	Voice/Data	2 412.0 ~ 2 472.0
		U-NII-1	Voice/Data	5 180.0 ~ 5 240.0
		U-NII-2A	Voice/Data	5 260.0 ~ 5 320.0
		U-NII-2C	Voice/Data	5 500.0 ~ 5 720.0
		U-NII-3	Voice/Data	5 745.0 ~ 5 825.0
		Bluetooth	Data	2 402.0 ~ 2 480.0
TDWR Information		5.60 ㎓~ 5.65 ㎓ band (TDWR) is supported by the device.		

Note: This C2PC Report is intended to verify changes to the original model SM-R890.
Please refer to the FCC filing(Product Equality Declaration) document for differences between the original and changed models.

2.2 Summary of SAR Test Results

Band	Equipment Class	Highest Reported	
		1g SAR (W/kg)	10g SAR (W/kg)
		Next to Mouth	Extremity
WLAN 2.4 ㎓	DTS	0.44	0.17
U-NII-2A	NII	< 0.10	0.28
U-NII-2C	NII	< 0.10	0.62
U-NII-3	NII	< 0.10	**1.38**
Bluetooth	DSS	**0.53**	0.17
Simultaneous SAR per KDB 690783 D01v01r03		0.63	1.55

2.3 #Maximum Tune-up power

This device operates using the following maximum output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v06.

2.3.1 #Maximum WLAN and Bluetooth Output Power

Band	Mode	Channel	Output Power (dB m)		
			Target	Max. Allowed	SAR Test
WLAN 2.4 GHz	802.11b	1~11	16.00	**17.00**	Yes
		12	10.00	**11.00**	
		13	7.00	**8.00**	
	802.11g	1~11	16.00	**17.00**	No
		12	10.00	**11.00**	
		13	7.00	**8.00**	
	802.11n(HT20)	1~11	16.00	**17.00**	No
		12	10.00	**11.00**	
		13	7.00	**8.00**	
NII	802.11a	All Channel	15.00	**16.00**	Yes
	802.11n(HT20)	All Channel	15.00	**16.00**	No

Note: When the specified maximum output power is the same for both UNII Band1 and UNII Band 2A, begins SAR measurement in UNII band 2A; and if the highest reported SAR for U NII band 2A is ≤ 1.2W/kg, SAR is not required for U-NII-1 band for that configuration; otherwise, each band is tested independently for SAR.

Band	Mode	Channel	Output Power (dB m)		
			Target	Max. Allowed	SAR Test
Bluetooth	BDR(GFSK)	All Channel	15.00	**16.00**	Yes
	EDR (π/4DQPSK)	All Channel	8.00	**9.00**	No
	EDR(8DPSK)	All Channel	8.00	**9.00**	No
	LE(GFSK)	All Channel	7.00	**8.00**	No

2.4 #DUT Antenna Locations

A diagram showing the location of the device antennas can be found in Appendix C

Mode	Device Edge for SAR Testing (Front View)		
	Next to Mouth	Extremity	Edge
	Front (10㎜)	Rear (0㎜)	
WLAN 2.4 GHz	Yes	Yes	N/A
NII	Yes	Yes	N/A
Bluetooth	Yes	Yes	N/A

2.5 #Simultaneous Transmission Configurations

According to FCC KDB 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds.
This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v06 4.3.2 procedures.

No.	Scenario	RF Exposure Condition	
		Next to Mouth	Extremity
1	WLAN 5 ㎓ + 2.4 ㎓ Bluetooth	Yes	
2	WLAN 2.4 ㎓ + 2.4 ㎓ Bluetooth	No	
3	WLAN 2.4 ㎓ + WLAN 5 ㎓ (RSDB Scenario)	No	

Notes:

- It does not to transmit simultaneously the Bluetooth and 2.4 ㎓ WLAN.
- It is to use the Bluetooth and 2.4 ㎓ WLAN same antenna path.

2.6 SAR Test Methods and Procedures

The tests documented in this report were performed in accordance with IEEE 1528-2013 and the following published KDB procedures:

- IEEE 1528-2013
- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 865664 D01 SAR measurement 100 ㎒ to 6 ㎓ v01r04
- 865664 D02 RF Exposure Reporting v01r02
- April 2019 TCB Workshop Notes (Tissue Simulating Liquids)
- October 2016 TCB Workshop Notes (Bluetooth Duty Factor)

3. Specific Absorption Rate

3.1 Introduction

The SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational / controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

3.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$\mathbf{SAR} = \frac{\mathbf{d}}{\mathbf{dt}}\left(\frac{\mathbf{dW}}{\mathbf{dm}}\right) = \frac{\mathbf{d}}{\mathbf{dt}}\left(\frac{\mathbf{dW}}{\boldsymbol{\rho}\mathbf{dv}}\right)$$

SAR is expressed in units of Watts per kilogram (W/kg)
SAR measurement can be either related to the temperature elevation in tissue by

$$\mathbf{SAR} = \mathbf{C}\left(\frac{\boldsymbol{\delta}\mathbf{T}}{\boldsymbol{\delta}\mathbf{t}}\right)$$

Where: C is the specific head capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

$$\mathbf{SAR} = \frac{\boldsymbol{\sigma}|\mathbf{E}|^2}{\boldsymbol{\rho}}$$

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength. However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

4. SAR Measurement Procedures

4.1 SAR Scan Procedures

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 1.4 mm. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scan & Zoom Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot and Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing1 g and 10 g of simulated tissue. If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly. Area Scan & Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 mm ± 1 mm	½·δ·ln(2) mm 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: Δx_{Area}, Δy_{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.	
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{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: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details. * When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB Publication 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 3: 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 1.

5. SAR Measurement Configurations

5.1 Watch-Device

Transmitters that are built-in within a wrist watch or similar wrist-worn devices typically operate in speaker mode for voice communication, with the device worn on the wrist and positioned next to mouth. Next to the mouth exposure requires 1g SAR, and the wrist-worn condition requires 10g extremity SAR. Next to the mouth use is evaluated with the front of the device positioned at 10 mm from a flat phantom filled with head tissue-equivalent medium. SAR for wrist exposure is evaluated with the back of the devices positioned in direct contact against a flat phantom fill with head tissue-equivalent medium.

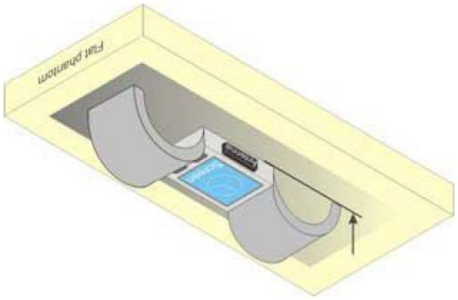


Figure 1
Test position for extremity

5.2 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02.1

6. RF Exposure Limits

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Partial Peak SAR [1)] (Partial)	1.60 mW/g	8.00 mW/g
Partial Average SAR [2)] (Whole Body)	0.08 mW/g	0.40 mW/g
Partial Peak SAR [3)] (Hands/Feet/Ankle/Wrist)	4.00 mW/g	20.00 mW/g

1) The spatial Peak value of the SAR averaged over any 1g gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2) The spatial Average value of the SAR averaged over the whole body.
3) The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

7. RF Average Conducted Output Power

7.1 WLAN Average Conducted Output Power

Band	Freq. [MHz]	Channel	Mode		
			802.11b	802.11g	802.11n(HT20)
WLAN 2.4 GHz	2 412.0	1	16.62	16.13	15.52
	2 437.0	6	16.81	15.95	15.46
	2 462.0	11	16.85	16.04	15.45
	2 467.0	12	10.15	9.89	10.15
	2 472.0	13	6.40	6.20	6.27

Band	Freq. [MHz]	Channel	Mode	
			802.11a	802.11n(HT20)
NII	5 180.0	36	14.66	14.73
	5 200.0	40	14.60	14.30
	5 220.0	44	14.66	14.76
	5 240.0	48	14.61	14.72
	5 260.0	52	15.49	15.26
	5 280.0	56	15.47	15.49
	5 300.0	60	15.43	15.50
	5 320.0	64	15.28	15.37
	5 500.0	100	15.12	15.26
	5 600.0	120	15.17	14.95
	5 620.0	124	15.62	15.63
	5 720.0	144	14.32	14.27
	5 745.0	149	14.63	14.57
	5 785.0	157	14.37	14.40
	5 825.0	165	14.27	14.43

Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission modes with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, due to an even number of channels, both channels were measured.

Power Measurement Setup

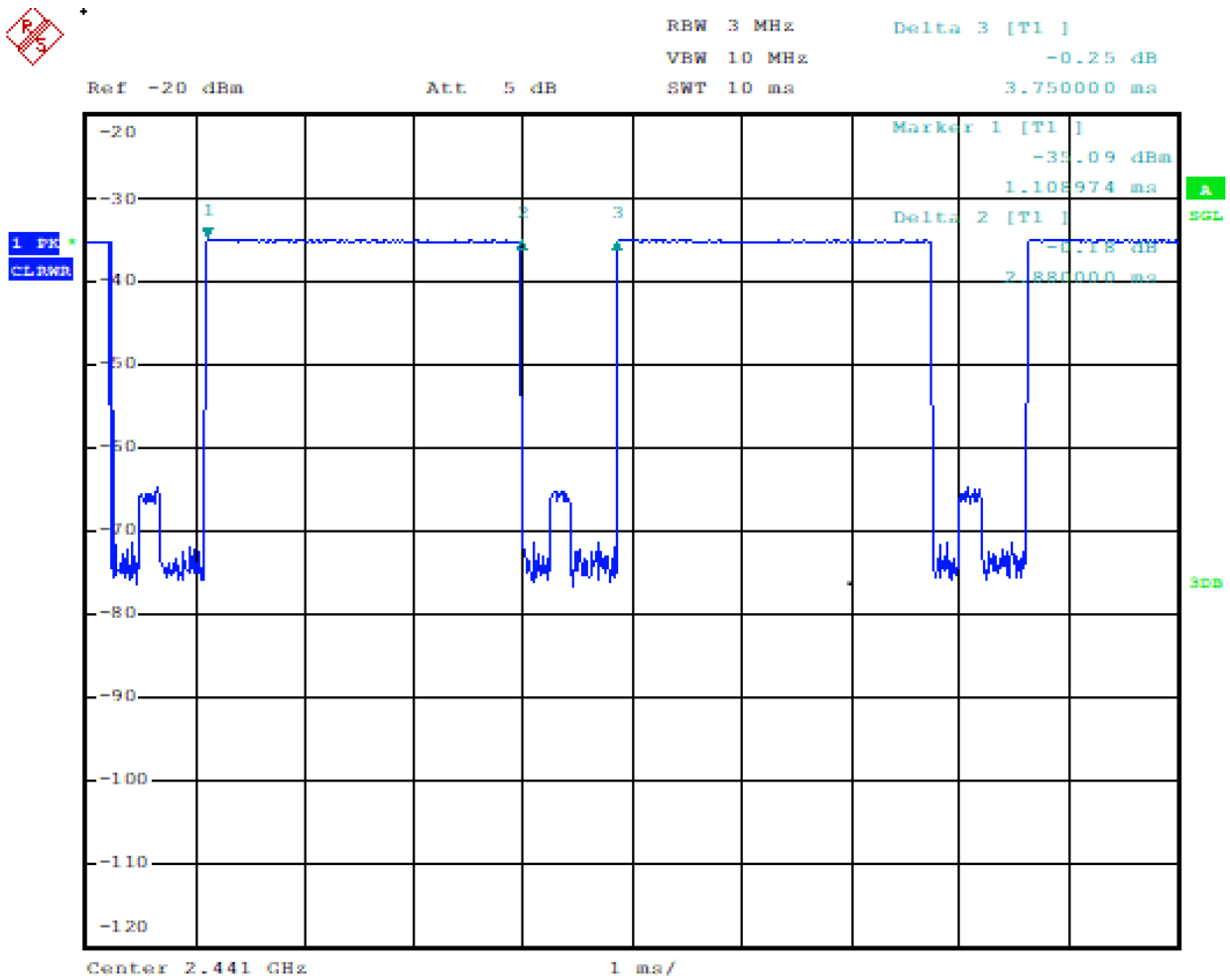
7.2 Bluetooth Average Conducted Output Power

Mode	Freq. [MHz]	Channel	Conducted Powers (dBm)
BDR_DH5 (1 Mbps)	2 402.0	0	14.56
	2 441.0	39	15.15
	2 480.0	78	15.12

7.3 Wireless Bands Duty Cycle

Wireless Bands	Frequency Bands	Mode	Duty Cycle (%)
WLAN	2.4 GHz	802.11b	98.2
	NII	802.11a	92.8

Wireless Bands	Frequency Bands		Mode		Duty Cycle (%)	
	Mode	Packet	On Time (ms)	On-Off Time (ms)	Duty Cycle (%)	Duty Cycle Compensate Factor
Bluetooth	BDR(GFSK)	DH5	2.88	3.75	76.80	1.302



8. System Verification

8.1 Tissue Verification

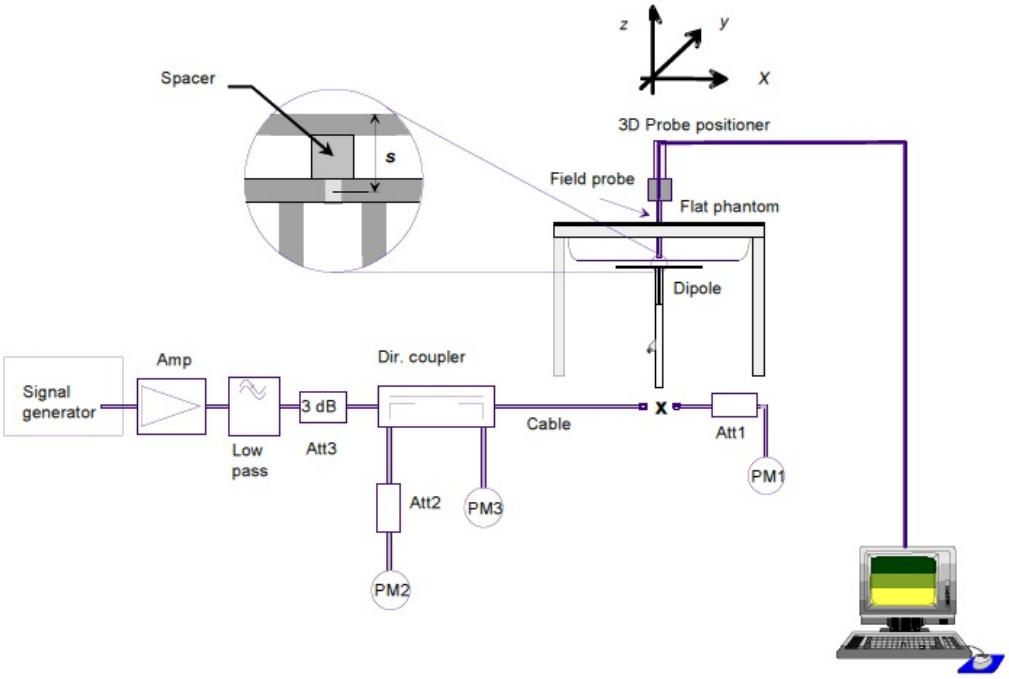
The dielectric properties for this Tissue Simulant Liquids were measured by using the SPEAG Model DAK3.5 Dielectric Probe in conjunction with Agilent E5071B Network Analyzer (300 ㎑ – 8 500 ㎒). The Conductivity (σ) and Permittivity (ρ) are listed in Table 1.For the SAR measurement given in this report. The temperature variation of the Tissue Simulant Liquids was (22 ± 2) ℃.

Freq. (㎒)	Limit/Measured		Permittivity (ρ)	Conductivity (σ)	Temp. (°C)
2 450.0	Recommended Limit		39.20 ± 5 % (37.24~41.16)	1.80 ± 5 % (1.71~1.89)	22 ± 2
	Measured	2021-09-03	37.70	1.83	21.04
5 300.0	Recommended Limit		35.90 ± 5 % (34.11~37.70)	4.76 ± 5 % (4.52~5.00)	22 ± 2
	Measured	2021-09-01	35.80	4.75	20.99
5 600.0	Recommended Limit		35.50 ± 5 % (33.73~37.28)	5.07 ± 5 % (4.82~5.32)	22 ± 2
	Measured	2021-09-01	35.41	5.06	20.99
5 800.0	Recommended Limit		35.30 ± 5 % (33.54~37.07)	5.27 ± 5 % (5.01~5.53)	22 ± 2
	Measured	2021-09-01	35.13	5.24	20.99

<Table 1.Measurement result of Tissue electric parameters>

8.2 Test System Verification

The microwave circuit arrangement for system verification is sketched below picture.
The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within ± 10% from the target SAR values. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the Table 2. During the tests, the ambient temperature of the laboratory was in the range (22 ± 2) ℃, the relative humidity was in the range(50 ± 20)% and the liquid depth Above the ear/grid reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.



Verification Kit	Probe S/N	Frequency (㎒)	Tissue Type	Limit/Measured (Normalized to 1 W)		
D2450V2 SN: 895	EX3DV4 SN: 7540	2 450.0	HSL	Recommended Limit 1g (Normalized)		52.40 ± 10 % (47.16~57.64)
				Measured	2021-09-03	54.90
				Recommended Limit 10g (Normalized)		24.30 ± 10 % (21.87~26.73)
				Measured	2021-09-03	25.90
D5GHzV2 SN: 1293	EX3DV4 SN: 7540	5 300.0	HSL	Recommended Limit 1g (Normalized)		82.30 ± 10 % (74.07~90.53)
				Measured	2021-09-01	85.80
				Recommended Limit 10g (Normalized)		23.60 ± 10 % (21.24~25.96)
				Measured	2021-09-01	25.50
D5GHzV2 SN: 1293	EX3DV4 SN: 7540	5 600.0	HSL	Recommended Limit 1g (Normalized)		83.80 ± 10 % (75.42~92.18)
				Measured	2021-09-01	87.30
				Recommended Limit 10g (Normalized)		23.90 ± 10 % (21.51~26.29)
				Measured	2021-09-01	25.70
D5GHzV2 SN: 1293	EX3DV4 SN: 7540	5 800.0	HSL	Recommended Limit 1g (Normalized)		80.60 ± 10 % (72.54~88.66)
				Measured	2021-09-01	80.50
				Recommended Limit 10g (Normalized)		22.90 ± 10 % (20.61~25.19)
				Measured	2021-09-01	23.90

<Table 2. System Verification 1g/10g Result>

9. SAR Test Results

WLAN 2.4 GHz									
Next to Mouth 802.11b									
EUT Position	**Distance (mm)**	**Frequency (MHz)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Duty Cycle Compensate Factor**	**Measured 1 g SAR (W/kg)**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
Original model worst configuration									
Front	10	2 437.0	16.38	17.00	1.153	1.012	0.389	0.454	-
C2PC Changed model									
Front	10	2 462.0	16.85	17.00	1.035	1.018	0.416	**0.438**	1
Extremity 802.11b									
EUT Position	**Distance (mm)**	**Frequency (MHz)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Duty Cycle Compensate Factor**	**Measured 10 g SAR (W/kg)**	**Scaled 10 g SAR (W/kg)**	**Plot No.**
Original model worst configuration									
Rear	0	2 437.0	16.38	17.00	1.153	1.012	0.149	0.174	-
C2PC Changed model									
Rear	0	2 462.0	16.85	17.00	1.035	1.018	0.161	**0.170**	2

U-NII-2A									
Next to Mouth 802.11a									
EUT Position	**Distance (mm)**	**Frequency (MHz)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Duty Cycle Compensate Factor**	**Measured 1 g SAR (W/kg)**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
Original model worst configuration									
Front	10	5 280.0	15.22	16.00	1.197	1.075	0.028	0.036	-
C2PC Changed model									
Front	10	5 260.0	15.49	16.00	1.125	1.078	0.008	**0.010**	3
Extremity 802.11a									
EUT Position	**Distance (mm)**	**Frequency (MHz)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Duty Cycle Compensate Factor**	**Measured 10 g SAR (W/kg)**	**Scaled 10 g SAR (W/kg)**	**Plot No.**
Original model worst configuration									
Rear	0	5 280.0	15.22	16.00	1.197	1.075	0.367	0.472	-
C2PC Changed model									
Rear	0	5 260.0	15.49	16.00	1.125	1.078	0.228	**0.277**	4

U-NII-2C									
Next to Mouth 802.11a									
EUT Position	**Distance (mm)**	**Frequency (MHz)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Duty Cycle Compensate Factor**	**Measured 1 g SAR (W/kg)**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
Original model worst configuration									
Front	10	5 500.0	15.79	16.00	1.050	1.075	0.036	0.041	-
C2PC Changed model									
Front	10	5 620.0	15.62	16.00	1.091	1.078	0.035	**0.041**	5
Extremity 802.11a									
EUT Position	**Distance (mm)**	**Frequency (MHz)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Duty Cycle Compensate Factor**	**Measured 10 g SAR (W/kg)**	**Scaled 10 g SAR (W/kg)**	**Plot No.**
Original model worst configuration									
Rear	0	5 500.0	15.79	16.00	1.050	1.075	0.562	0.634	-
C2PC Changed model									
Rear	0	5 620.0	15.62	16.00	1.091	1.078	0.529	**0.622**	6

U-NII-3									
Next to Mouth 802.11a									
EUT Position	**Distance (mm)**	**Frequency (MHz)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Duty Cycle Compensate Factor**	**Measured 1 g SAR (W/kg)**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
Original model worst configuration									
Front	10	5 745.0	14.91	16.00	1.285	1.075	0.048	0.066	-
C2PC Changed model									
Front	10	5 745.0	14.63	16.00	1.371	1.078	0.063	**0.093**	7
Extremity 802.11a									
EUT Position	**Distance (mm)**	**Frequency (MHz)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Duty Cycle Compensate Factor**	**Measured 10 g SAR (W/kg)**	**Scaled 10 g SAR (W/kg)**	**Plot No.**
Original model worst configuration									
Rear	0	5 745.0	14.91	16.00	1.285	1.075	0.575	0.794	-
C2PC Changed model									
Rear	0	5 745.0	14.63	16.00	1.371	1.078	0.933	**1.379**	8

Bluetooth									
Next to Mouth DH5									
EUT Position	**Distance (mm)**	**Frequency (MHz)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Duty Cycle Compensate Factor**	**Measured 1 g SAR (W/kg)**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
Original model worst configuration									
Front	10	2 402.0	14.90	16.00	1.288	1.302	0.318	0.533	-
C2PC Changed model									
Front	10	2 441.0	15.15	16.00	1.216	1.302	0.336	**0.532**	9
Extremity DH5									
EUT Position	**Distance (mm)**	**Frequency (MHz)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Duty Cycle Compensate Factor**	**Measured 10 g SAR (W/kg)**	**Scaled 10 g SAR (W/kg)**	**Plot No.**
Original model worst configuration									
Rear	0	2 402.0	14.90	16.00	1.288	1.302	0.131	0.220	-
C2PC Changed model									
Rear	0	2 441.0	15.15	16.00	1.216	1.302	0.105	**0.166**	10

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication 447498 D01v06.
2. Battery is fully charged for all readings and the standard batteries are the only options.
3. Liquid tissue depth was at least 15 cm.
4. The EUT is tested 2nd hot-spot peak, if it is less than 2 dB below the highest peak.
5. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
6. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
7. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance.
8. This is the C2PC test report to verify changed model, SM-R830 as documented in the C2PC letter. The SAR test was performed in the worst configuration by each exposure condition (Next to Mouth, Extremity) of the original model.

10. Simultaneous Transmission

The following procedures adopted from FCC KDB Publication 447498 D01v06 are applicable to devices with built in unlicensed transmitters such as 802.11 and Bluetooth devices which may simultaneously transmit with the licensed transmitter.
This device contains transmitters that may operate simultaneously. Therefore, simultaneous transmission analysis is required. Per FCC KDB Publication 447498 D01v06 4.3.2 and IEEE 1528-2013 Section 6.3.4.1.2, simultaneous transmission SAR test exclusion may be applied when the sum of the 1g or 10g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is within SAR limits. The different test positions in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1g or 10g SAR.

10.1 Simultaneous Transmission Analysis

Position		NII	Bluetooth	Summation
		[①]	[②]	[①+②]
Next to Mouth (1 g)	Front	0.093	0.532	**0.625**
Extremity (10 g)	Rear	1.379	0.166	**1.545**

Notes:

- Simultaneous transmission SAR test exclusion considerations
  Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneously transmitting antenna. When the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration. Per KDB Publication 447498 D01v06.
- When the sum of SAR1g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR1g 1.6 W/kg), the SPLSR procedures is not required. When the sum of SAR1g is greater than the SAR limit (SAR1g 1.6 W/kg), SAR test exclusion is determined by the SPLSR.

11. SAR Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

1) **Repeated measurements are not required when the original highest measured SAR is < 0.80 W/㎏.**
2) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
3) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Band	Frequency (㎒)	EUT Position	Separation Distance (㎜)	Measured 1 g / 10 g SAR (W/kg)	Measured 1 g / 10 g SAR (W/kg)	Ratio
N/A						

12. Measurement Uncertainty

Per KDB 865664 D01 SAR measurement 100㎒ to 6㎓, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of *k* = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Standard 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg and highest measured 10-g SAR is less 3.75W/kg. Therefore, the measurement uncertainty table is not required in this report.

13. Test Equipment Information

Test Platform	SPEAG DASY5 System			
Version	DASY52: 52.10.4.1527 / SEMCAD: 14.6.14 (7483)			
Location	KCTL Inc, 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea			
Manufacture	SPEAG			
Hardware Reference				
Equipment	Model	Serial Number	Date of Calibration	Due date of next Calibration
Shield Room	-	8F - 4	-	-
DASY6 Robot	TX60 Lspeag	F/19/0007289/A/001	-	-
Phantom	Twin SAM Phantom	1984	-	-
Mounting Device	Mounting Device	-	-	-
DAE	DAE4	1342	2021-06-02	2022-06-02
Probe	EX3DV4	7540	2021-04-29	2022-04-29
ESG Vector Signal Generator	E4438C	MY42080845	2021-05-10	2022-05-10
Dual Power Meter	EPM-442A	GB37480680	2021-05-11	2022-05-11
Power Sensor	8481H	2703A11902	2021-05-11	2022-05-11
Power Sensor	8481H	3318A18090	2021-05-11	2022-05-11
Attenuator	8491A	21552	2021-05-10	2022-05-10
Attenuator	8491A	35560	2021-05-10	2022-05-10
Attenuator	8491A	35934	2021-05-10	2022-05-10
Power Amplifier	AMP2027	10010	2021-05-10	2022-05-10
Dual Directional Coupler	772D	2839A160504	2021-05-10	2022-05-10
Low Pass Filter	VLF-3000+	31831	2021-05-10	2022-05-10
Low Pass Filter	VLF-6000+	31838	2021-05-10	2022-05-10
Dipole Validation Kits	D2450V2	895	2020-07-21	2022-07-21
Dipole Validation Kits	D5GHzV2	1293	2021-07-22	2023-07-22
Network Analyzer	E5071B	MY42403524	2021-02-15	2022-02-15
Dielectric Assessment Kit	DAK-3.5	1078	2021-05-26	2022-05-26
Humidity/Temp	MHB-382SD	46301	2021-05-13	2022-05-13
Wideband Radio Communication Tester	CMW500	132120	2021-05-13	2022-05-13

14. Test System Verification Results

Date: 9/3/2021

Test Laboratory: KCTL Inc.
File Name: 2450 MHz Verification Input Power 100 mW 2021-09-03.da5:0

DUT: Dipole 2450 MHz D2450V2, Type: D2450V2, Serial: D2450V2 - SN:895

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2450 MHz; σ = 1.832 S/m; ε_r = 37.701; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

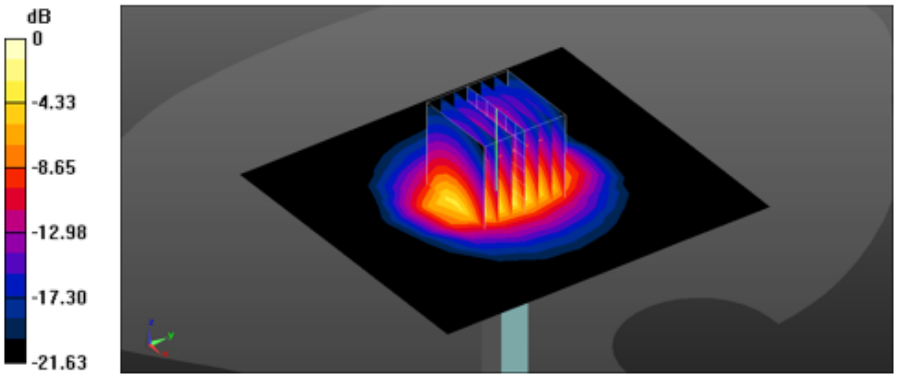
- Probe: EX3DV4 - SN7540; ConvF(7.45, 7.45, 7.45) @ 2450 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/2450 MHz Verification Input Power 100 mW 2021-09-03/Area Scan (10x11x1):
Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 7.55 W/kg

Configuration/2450 MHz Verification Input Power 100 mW 2021-09-03/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 71.46 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 10.8 W/kg
SAR(1 g) = 5.49 W/kg; SAR(10 g) = 2.59 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 51.9%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 8.91 W/kg



0 dB = 8.91 W/kg = 9.50 dBW/kg

Date: 9/1/2021

Test Laboratory: KCTL Inc.
File Name: 5300 MHz Verification Input Power 100 mW 2021-09-01.da5:0

DUT: Dipole D5GHzV2, Type: D5GHzV2, Serial: D5GHzV2 - SN:1293

Communication System: UID 0, CW (0); Frequency: 5300 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5300 MHz; σ = 4.748 S/m; ε_r = 35.798; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

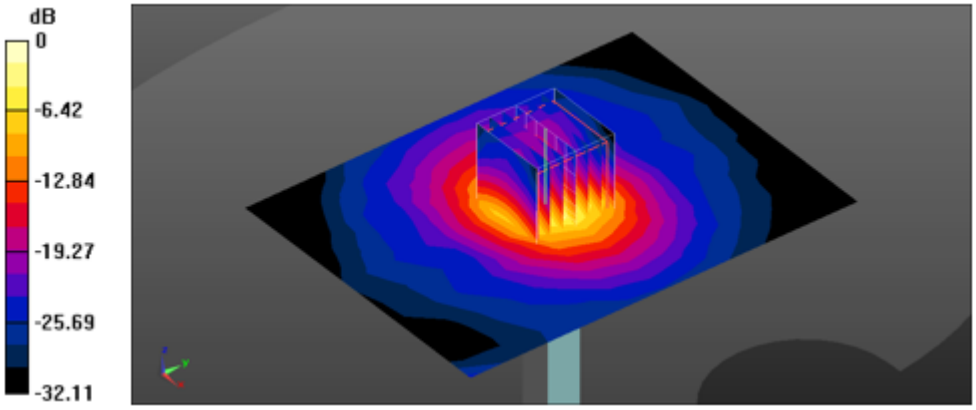
- Probe: EX3DV4 - SN7540; ConvF(5.15, 5.15, 5.15) @ 5300 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/5300 MHz Verification Input Power 100 mW 2021-09-01/Area Scan (10x13x1):
Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 17.4 W/kg

Configuration/5300 MHz Verification Input Power 100 mW 2021-09-01/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.54 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 32.2 W/kg
SAR(1 g) = 8.58 W/kg; SAR(10 g) = 2.55 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 66.9%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 21.1 W/kg



0 dB = 21.1 W/kg = 13.24 dBW/kg

Date: 9/1/2021

Test Laboratory: KCTL Inc.
File Name: 5600 MHz Verification Input Power 100 mW 2021-09-01.da5:0

DUT: Dipole D5GHzV2, Type: D5GHzV2, Serial: D5GHzV2 - SN:1293

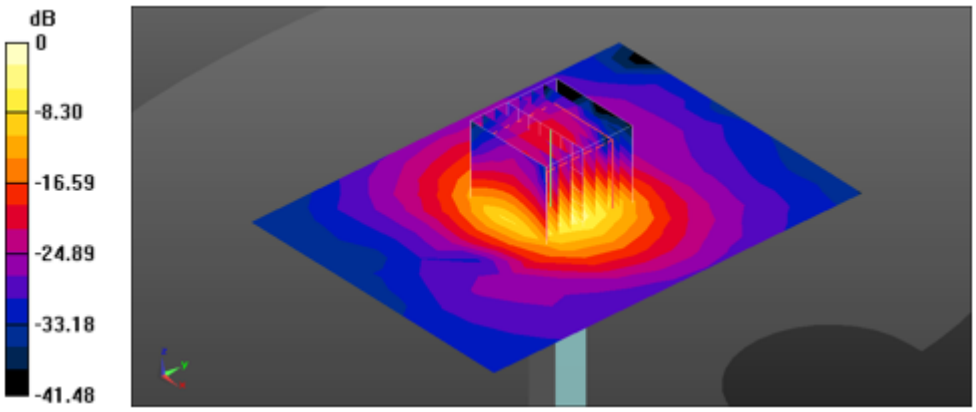
Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.057 S/m; ε_r = 35.407; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540; ConvF(4.55, 4.55, 4.55) @ 5600 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/5600 MHz Verification Input Power 100 mW 2021-09-01/Area Scan (10x13x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 18.7 W/kg

Configuration/5600 MHz Verification Input Power 100 mW 2021-09-01/Zoom Scan (8x8x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 71.15 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 32.6 W/kg
SAR(1 g) = 8.73 W/kg; SAR(10 g) = 2.57 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 67.3%
Maximum value of SAR (measured) = 21.4 W/kg



0 dB = 21.4 W/kg = 13.30 dBW/kg

Date: 9/1/2021

Test Laboratory: KCTL Inc.
File Name: 5800 MHz Verification Input Power 100 mW 2021-09-01.da5:0

DUT: Dipole D5GHzV2, Type: D5GHzV2, Serial: D5GHzV2 - SN:1293

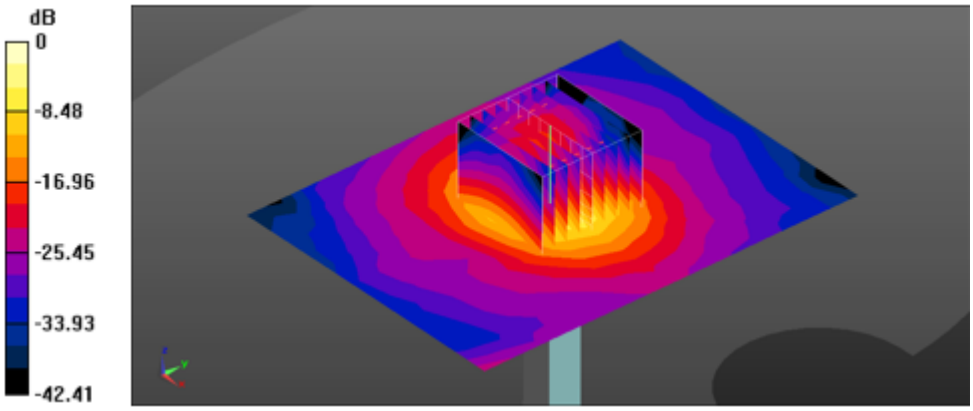
Communication System: UID 0, CW (0); Frequency: 5800 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 5.238 S/m; ε_r = 35.134; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540; ConvF(4.66, 4.66, 4.66) @ 5800 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/5800 MHz Verification Input Power 100 mW 2021-09-01/Area Scan (10x13x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 16.7 W/kg

Configuration/5800 MHz Verification Input Power 100 mW 2021-09-01/Zoom Scan (9x9x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.66 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 29.8 W/kg
SAR(1 g) = 8.05 W/kg; SAR(10 g) = 2.39 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 67.3%
Maximum value of SAR (measured) = 19.7 W/kg



0 dB = 19.7 W/kg = 12.94 dBW/kg

15. Test Results

1)

Date: 9/3/2021

Test Laboratory: KCTL Inc.
File Name: 1. WLAN 2.4 GHz.da53:0

DUT: SM-R890, Type: Smart Wearable, Serial: R3AR404SPFW

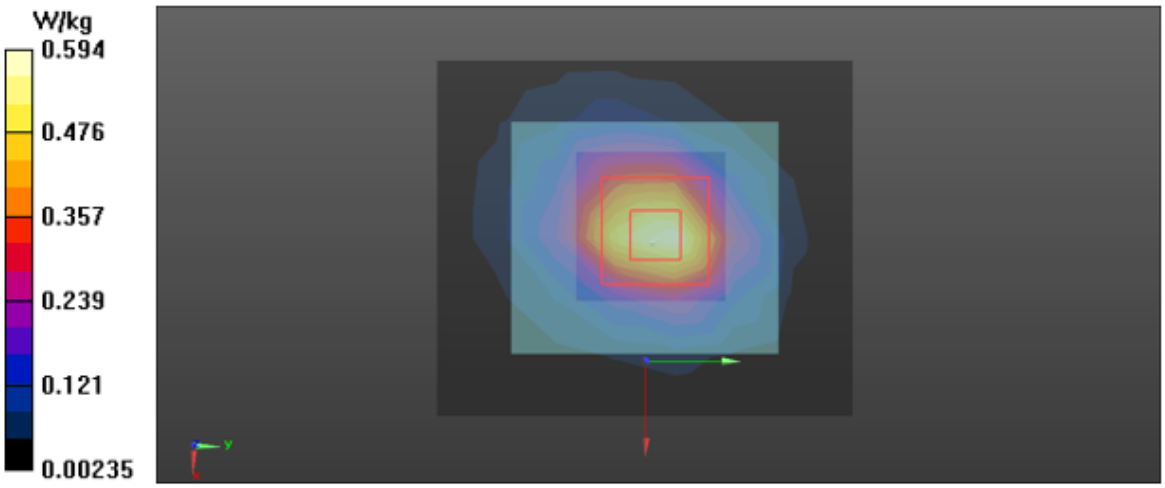
Communication System: UID 0, 2.4GWLAN (0); Frequency: 2462 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.842 S/m; ε_r = 37.679; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540; ConvF(7.45, 7.45, 7.45) @ 2462 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Next to Mouth/802.11_b_CH11_Front_10 mm/Area Scan (7x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.594 W/kg

Next to Mouth/802.11_b_CH11_Front_10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.75 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.700 W/kg
SAR(1 g) = 0.416 W/kg; SAR(10 g) = 0.209 W/kg
Smallest distance from peaks to all points 3 dB below = 11 mm
Ratio of SAR at M2 to SAR at M1 = 62.1%
Maximum value of SAR (measured) = 0.596 W/kg



2)

Date: 9/3/2021

Test Laboratory: KCTL Inc.
File Name: 1. WLAN 2.4 GHz.da53:1

DUT: SM-R890, Type: Smart Wearable, Serial: R3AR404SPFW

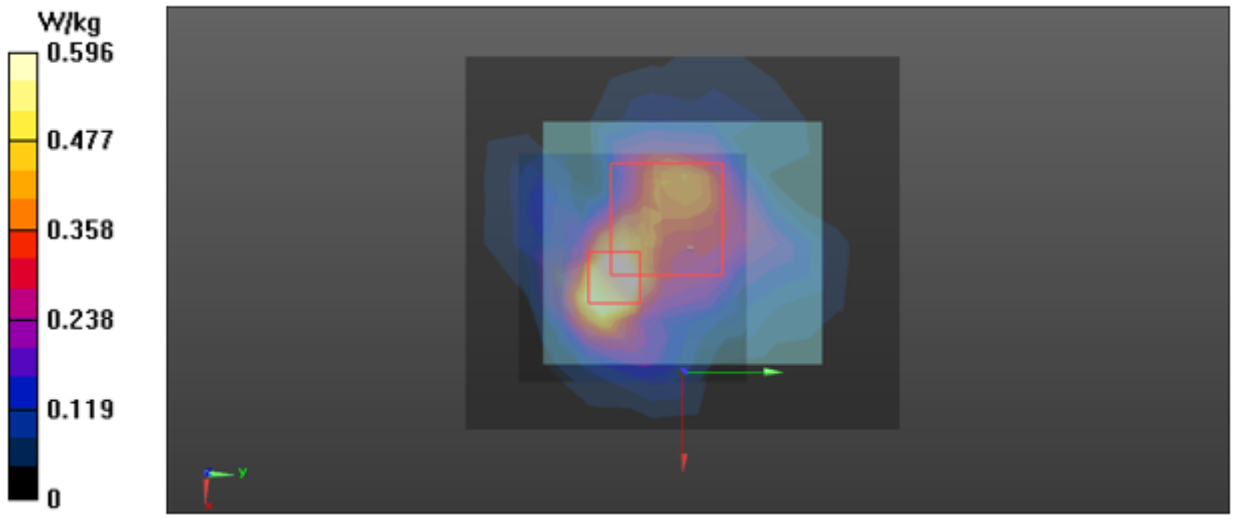
Communication System: UID 0, 2.4GWLAN (0); Frequency: 2462 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.842 S/m; ε_r = 37.679; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540; ConvF(7.45, 7.45, 7.45) @ 2462 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Extremity/802.11_b_CH11_Rear_0 mm/Area Scan (7x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.596 W/kg

Extremity/802.11_b_CH11_Rear_0 mm/Zoom Scan (12x12x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 12.84 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 3.60 W/kg
SAR(1 g) = 0.377 W/kg; SAR(10 g) = 0.161 W/kg
Smallest distance from peaks to all points 3 dB below = 4.7 mm
Ratio of SAR at M2 to SAR at M1 = 66%
Maximum value of SAR (measured) = 0.836 W/kg



3)

Date: 9/1/2021

Test Laboratory: KCTL Inc.
File Name: 1. WLAN 5.3 GHz.da53:0

DUT: SM-R890, Type: Smart Wearable, Serial: R3AR404SPCB

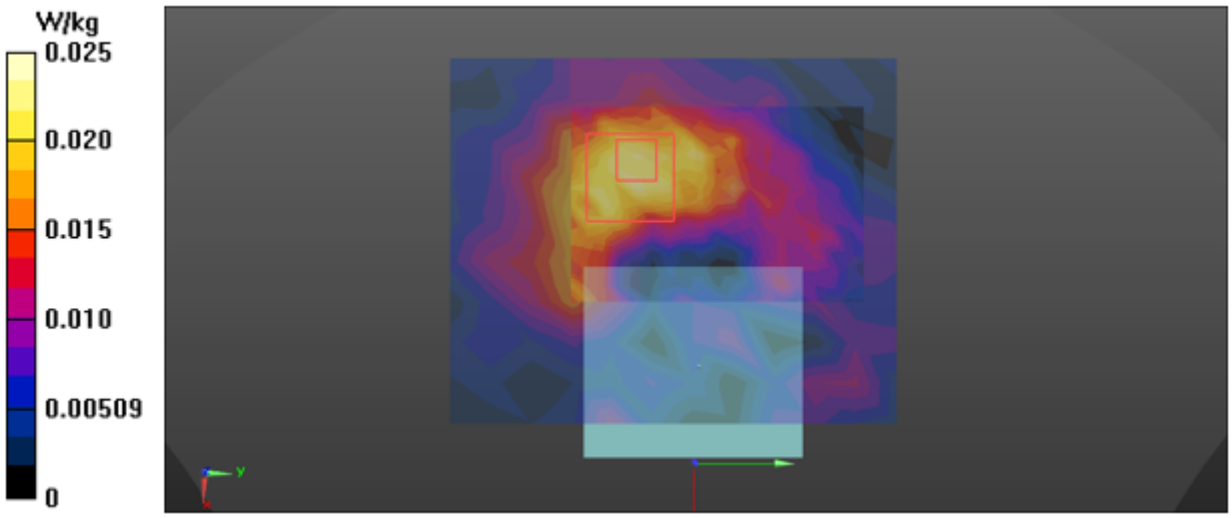
Communication System: UID 0, 5GWLAN (0); Frequency: 5260 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5260 MHz; σ = 4.707 S/m; ε_r = 35.826; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540; ConvF(5.15, 5.15, 5.15) @ 5260 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Next to Mouth/802.11_a_CH52_Front_10 mm/Area Scan (10x12x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.0228 W/kg

Next to Mouth/802.11_a_CH52_Front_10 mm/Zoom Scan (13x19x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 3.992 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.0850 W/kg
SAR(1 g) = 0.00842 W/kg; SAR(10 g) = 0.00358 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 52.4%
Maximum value of SAR (measured) = 0.0255 W/kg



4)

Date: 9/1/2021

Test Laboratory: KCTL Inc.
File Name: 1. WLAN 5.3 GHz.da53:1

DUT: SM-R890, Type: Smart Wearable, Serial: R3AR404SPCB

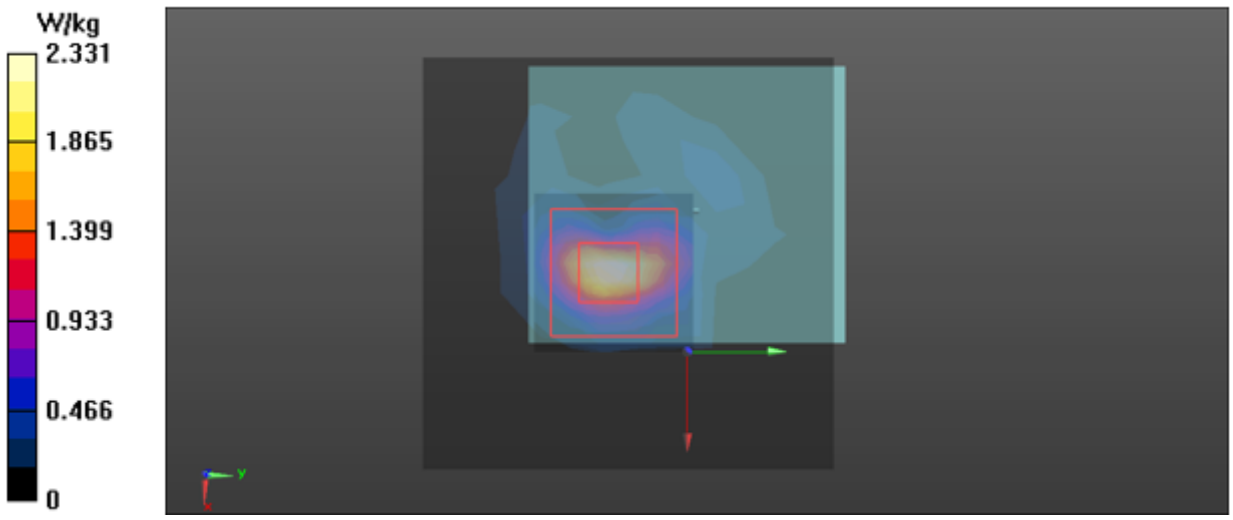
Communication System: UID 0, 5GWLAN (0); Frequency: 5260 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5260 MHz; σ = 4.707 S/m; ε_r = 35.826; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540; ConvF(5.15, 5.15, 5.15) @ 5260 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Extremity/802.11_a_CH52_Rear_0 mm/Area Scan (8x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.53 W/kg

Extremity/802.11_a_CH52_Rear_0 mm/Zoom Scan (10x10x7)/Cube 0: Measurement grid: dx=3mm, dy=3mm, dz=1.4mm
Reference Value = 8.168 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 4.49 W/kg
SAR(1 g) = 0.861 W/kg; SAR(10 g) = 0.228 W/kg
Smallest distance from peaks to all points 3 dB below = 4.2 mm
Ratio of SAR at M2 to SAR at M1 = 60%
Maximum value of SAR (measured) = 2.33 W/kg



5)

Date: 9/1/2021

Test Laboratory: KCTL Inc.
File Name: 2. WLAN 5.6 GHz.da53:0

DUT: SM-R890, Type: Smart Wearable, Serial: R3AR404SPFW

Communication System: UID 0, 5GWLAN (0); Frequency: 5620 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5620 MHz; σ = 5.075 S/m; ε_r = 35.392; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

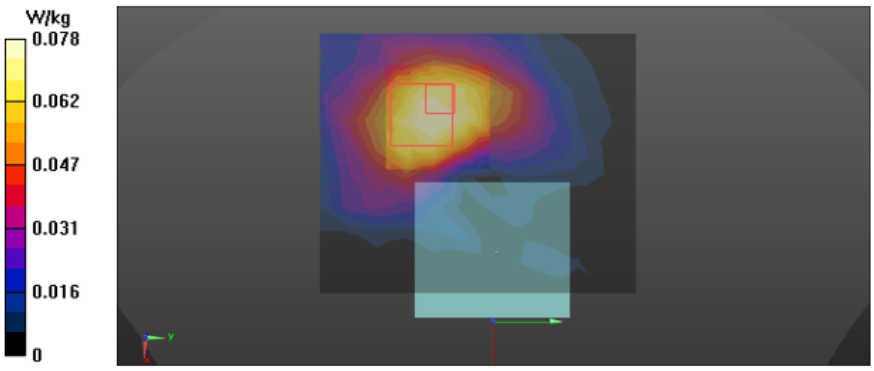
- Probe: EX3DV4 - SN7540; ConvF(4.55, 4.55, 4.55) @ 5620 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Next to Mouth/802.11_a_CH124_Front_10 mm/Area Scan (10x12x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0844 W/kg

Next to Mouth/802.11_a_CH124_Front_10 mm/Zoom Scan (10x10x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 4.305 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.222 W/kg
SAR(1 g) = 0.035 W/kg; SAR(10 g) = 0.014 W/kg
Smallest distance from peaks to all points 3 dB below = 1.6 mm
Ratio of SAR at M2 to SAR at M1 = 60.7%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0776 W/kg



6)

Date: 9/1/2021

Test Laboratory: KCTL Inc.
File Name: 2. WLAN 5.6 GHz.da53:1

DUT: SM-R890, Type: Smart Wearable, Serial: R3AR404SPFW

Communication System: UID 0, 5GWLAN (0); Frequency: 5620 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5620 MHz; σ = 5.075 S/m; ε_r = 35.392; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

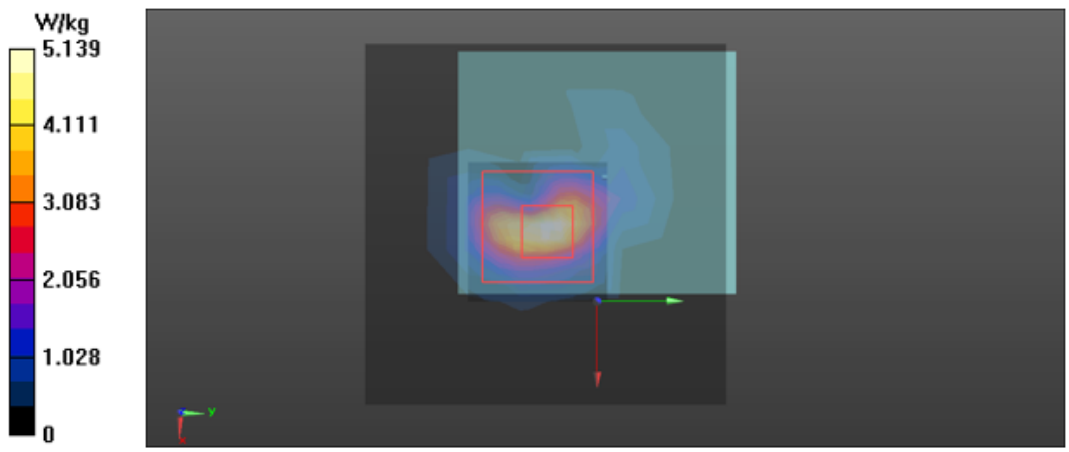
- Probe: EX3DV4 - SN7540; ConvF(4.55, 4.55, 4.55) @ 5620 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Extremity/802.11_a_CH124_Rear_0 mm/Area Scan (8x8x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 3.36 W/kg

Extremity/802.11_a_CH124_Rear_0 mm/Zoom Scan (10x10x7)/Cube 0: Measurement grid: dx=3mm, dy=3mm, dz=1.4mm
Reference Value = 14.80 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 9.85 W/kg
SAR(1 g) = 1.82 W/kg; SAR(10 g) = 0.529 W/kg
Smallest distance from peaks to all points 3 dB below = 4.6 mm
Ratio of SAR at M2 to SAR at M1 = 60.2%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 5.14 W/kg



7)

Date: 9/1/2021

Test Laboratory: KCTL Inc.
File Name: 3. WLAN 5.8 GHz.da53:0

DUT: SM-R890, Type: Smart Wearable, Serial: R3AR404SN3N

Communication System: UID 0, 5GWLAN (0); Frequency: 5745 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5745 MHz; σ = 5.179 S/m; ε_r = 35.254; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

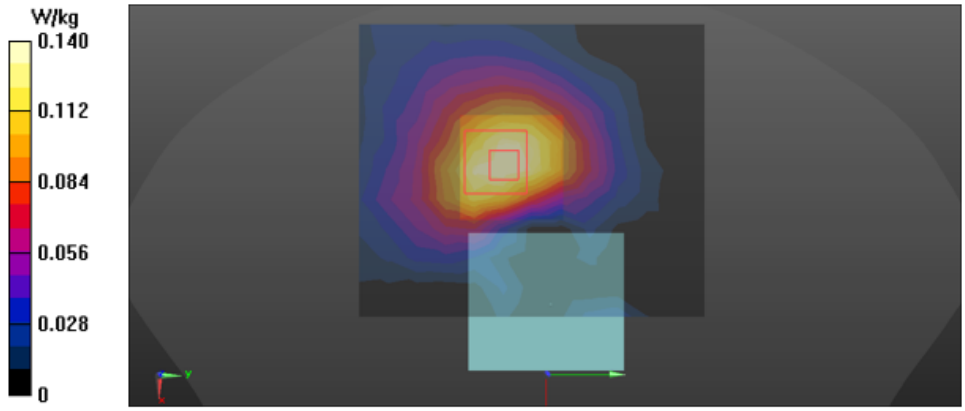
- Probe: EX3DV4 - SN7540; ConvF(4.66, 4.66, 4.66) @ 5745 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Next to Mouth/802.11_a_CH149_Front_10 mm/Area Scan (11x13x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.139 W/kg

Next to Mouth/802.11_a_CH149_Front_10 mm/Zoom Scan (10x10x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 5.833 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.222 W/kg
SAR(1 g) = 0.063 W/kg; SAR(10 g) = 0.028 W/kg
Smallest distance from peaks to all points 3 dB below = 16.1 mm
Ratio of SAR at M2 to SAR at M1 = 62.1%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.140 W/kg



8)

Date: 9/1/2021

Test Laboratory: KCTL Inc.
File Name: 3. WLAN 5.8 GHz.da53:1

DUT: SM-R890, Type: Smart Wearable, Serial: R3AR404SN3N

Communication System: UID 0, 5GWLAN (0); Frequency: 5745 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5745 MHz; σ = 5.179 S/m; ε_r = 35.254; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

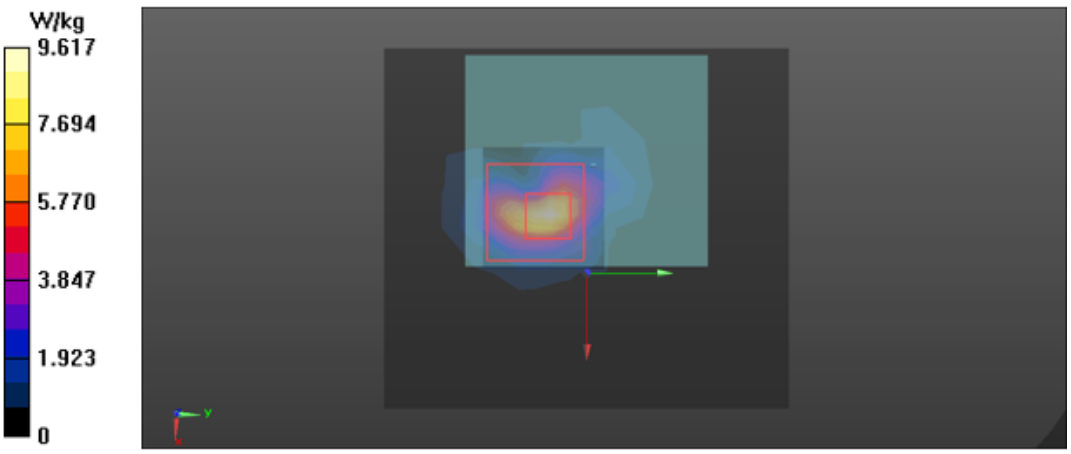
- Probe: EX3DV4 - SN7540; ConvF(4.66, 4.66, 4.66) @ 5745 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Extremity/802.11_a_CH149_Rear_0 mm/Area Scan (9x10x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 6.42 W/kg

Extremity/802.11_a_CH149_Rear_0 mm/Zoom Scan (10x10x7)/Cube 0: Measurement grid: dx=3mm, dy=3mm, dz=1.4mm
Reference Value = 20.03 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 17.6 W/kg
SAR(1 g) = 3.21 W/kg; SAR(10 g) = 0.933 W/kg
Smallest distance from peaks to all points 3 dB below = 4.4 mm
Ratio of SAR at M2 to SAR at M1 = 58.8%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 9.62 W/kg



9)

Date: 9/3/2021

Test Laboratory: KCTL Inc.
File Name: 2. Bluetooth_BDR_DH5.da53:0

DUT: SM-R890, Type: Smart Wearable, Serial: R3AR404SR0P

Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz; Duty Cycle: 1:1.30167
Medium parameters used (interpolated): f = 2441 MHz; σ = 1.827 S/m; ε_r = 37.716; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

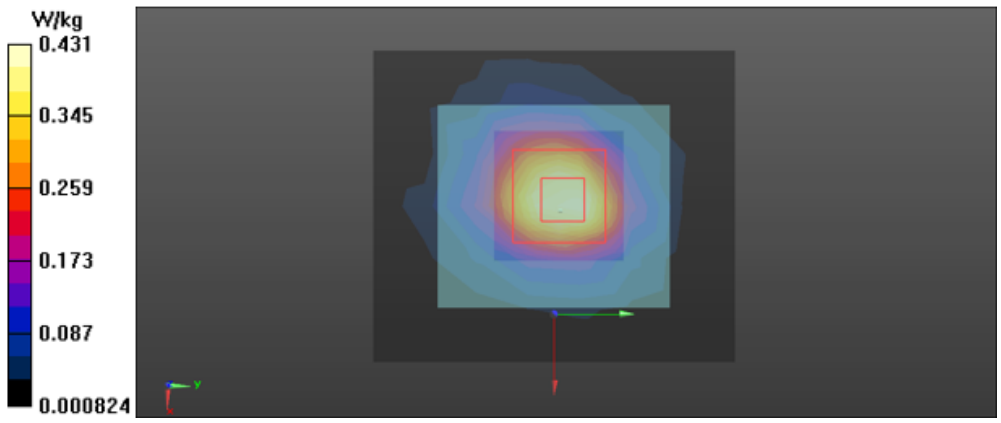
- Probe: EX3DV4 - SN7540; ConvF(7.45, 7.45, 7.45) @ 2441 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Next to Mouth/Bluetooth_BDR_DH5_CH39_Front_10 mm/Area Scan (7x8x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.431 W/kg

Next to Mouth/Bluetooth_BDR_DH5_CH39_Front_10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.78 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.556 W/kg
SAR(1 g) = 0.336 W/kg; SAR(10 g) = 0.170 W/kg
Smallest distance from peaks to all points 3 dB below = 9.8 mm
Ratio of SAR at M2 to SAR at M1 = 63.1%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.480 W/kg



10)

Date: 9/3/2021

Test Laboratory: KCTL Inc.
File Name: 2. Bluetooth_BDR_DH5.da53:1

DUT: SM-R890, Type: Smart Wearable, Serial: R3AR404SR0P

Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz; Duty Cycle: 1:1.30167
Medium parameters used (interpolated): f = 2441 MHz; σ = 1.827 S/m; ε_r = 37.716; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

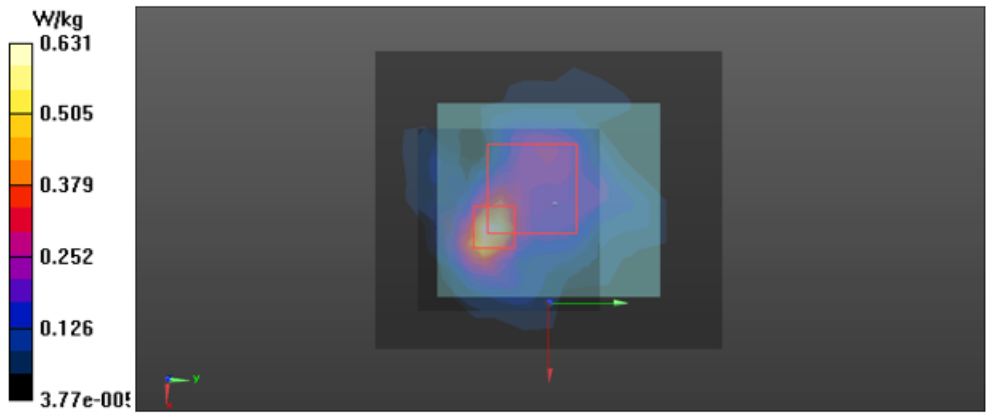
- Probe: EX3DV4 - SN7540; ConvF(7.45, 7.45, 7.45) @ 2441 MHz; ; Calibrated: 4/29/2021
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 6/2/2021
- Phantom: Twin-SAM V8.0_Left; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Extremity/Bluetooth_BDR_DH5_CH39_Rear_0 mm/Area Scan (7x8x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.442 W/kg

Extremity/Bluetooth_BDR_DH5_CH39_Rear_0 mm/Zoom Scan (12x12x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 10.93 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.274 W/kg; SAR(10 g) = 0.105 W/kg
Smallest distance from peaks to all points 3 dB below = 4.7 mm
Ratio of SAR at M2 to SAR at M1 = 69.1%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.631 W/kg



Appendixes List

Appendix A	A.1 Probe Calibration certificate (EX3DV4_7540) A.2 Dipole Calibration certificate (D2450V2_895) A.3 Dipole Calibration certificate (D5GHzV2_1293) A.4 Justification for Extended SAR Dipole Calibrations
Appendix B	SAR Tissue Specification
Appendix C	#Antenna Location & Distance
Appendix D	EUT Photo
Appendix E	Test Setup Photo