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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 : 2021-03-11

2. Use of Report : Certification

3. Name of Product and Model : Mobile phone
- Model Number : SM-A125F/DS
- Manufacturer and Country of Origin : Samsung Electronics Co., Ltd. / VIETNAM,INDIA

4. FCC ID : A3LSMA125

5. Date of Test : 2021-03-16 ~ 2021-03-20

6. Location of Test : ■ Permanent Testing Lab ☐ On Site Testing (Address: Address of testing location)

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 : Dongkyu Kim (Signature)	Technical Manager Name : Jongwon Ma (Signature)

2021-03-23

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
2021-03-23	Originally issued	-

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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
Manufacturer	:	Samsung Electronics Co., Ltd.
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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
		Industry Canada Registration No. : 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		Mobile phone		
Product Model Number		SM-A125F/DS		
Derivative Model		SM-A125F		
Product Manufacturer		Samsung Electronics Co., Ltd.		
Product Serial Number	Radiation	R38NC02CBXA		
		R38NC02CBVH		
	Conduction	WWAN	R38NC02CBPJ	
		WLAN/Bluetooth	R38NC02CBNL	
Device Overview		Band & Mode	Operating Modes	Tx Frequency (㎒)
		GSM/GPRS/EDGE 850	Voice/Data	824.2 ~ 848.8
		GSM/GPRS/EDGE 1900	Voice/Data	1 850.2 ~ 1 909.8
		WCDMA Band V	Voice/Data	826.4 ~ 846.6
		LTE Band 5	Voice/Data	824.7 ~ 848.3
		LTE Band 41	Voice/Data	2 498.5 ~ 2 687.5
		2.4 ㎓ WLAN	Voice/Data	2 412.0 ~ 2 472.0
		Bluetooth	Data	2 402.0 ~ 2 480.0

2.2 Summary of SAR Test Results

Band	Equipment Class	Highest Reported			
		1g SAR (W/kg)			10g SAR (W/kg)
		Head	Body-Worn	Hotspot	Phablet
GSM/GPRS/EDGE 850	PCE	0.34	0.52	0.61	N/A
GSM/GPRS/EDGE 1900	PCE	0.14	0.24	0.53	N/A
WCDMA Band V	PCE	0.29	0.41	0.49	N/A
LTE Band 5	PCE	0.32	0.38	0.63	N/A
LTE Band 41	PCE	**0.84**	**1.29**	**0.87**	**1.49**
2.4 ㎓ WLAN	DTS	0.34	0.13	0.29	N/A
Bluetooth	DSS	0.11	N/A	N/A	N/A
Simultaneous SAR per KDB 690783 D01v01r03		1.18	1.43	1.16	1.49

2.3 Power Reduction for SAR

This device utilizes a power reduction mechanism for some wireless modes and bands for SAR compliance under portable hotspot conditions. All hotspot SAR evaluations for this device were performed at the maximum allowed output power when hotspot is enabled. FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device when being used in phablet use conditions. Detailed descriptions of the power reduction mechanism are included in the operational description.

This device uses an independent fixed level power reduction mechanism for some wireless Mode operations during voice or VoLTE held to ear scenarios. Per FCC Guidance, the held-to-ear exposure conditions were evaluated at reduced power according to the Head SAR positions described in IEEE 1528-2013. Detailed descriptions of the power reduction mechanism are included in the operational description.

2.4 #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.

2.4.1 Maximum 2G/3G/4G Output Power

Band	Mode	Output Power (dBm)		
		Target	Max. Allowed	SAR Test
GSM 850	GSM Voice	33.00	**34.00**	**Yes**
	GPRS 1 TX	33.00	**34.00**	No
	GPRS 2 TX	32.00	**33.00**	No
	GPRS 3 TX	30.00	**31.00**	No
	GPRS 4 TX	29.00	**30.00**	**Yes**
	EGPRS 1 TX	27.50	**28.50**	No
	EGPRS 2 TX	26.50	**27.50**	No
	EGPRS 3 TX	24.00	**25.00**	No
	EGPRS 4 TX	23.00	**24.00**	No
GSM 1900	GSM Voice	29.50	**30.50**	**Yes**
	GPRS 1 TX	29.50	**30.50**	No
	GPRS 2 TX	28.50	**29.50**	No
	GPRS 3 TX	26.50	**27.50**	No
	GPRS 4 TX	25.50	**26.50**	**Yes**
	EGPRS 1 TX	26.50	**27.50**	No
	EGPRS 2 TX	25.00	**26.00**	No
	EGPRS 3 TX	22.50	**23.50**	No
	EGPRS 4 TX	21.50	**22.50**	No
WCDMA Band V	RMC	24.00	**25.00**	**Yes**
	HSDPA	22.00	**23.00**	No
	HSUPA	22.00	**23.00**	No
	DC-HSDPA	22.00	**23.00**	No
LTE Band 5		24.00	**25.00**	**Yes**
LTE Band 41		22.50	**23.50**	**Yes**

2.4.2 Reduced 2G/3G/4G Output Power–(RCV, Hotspot, Grip Sensor, Ear-jack)

Band	Output Power (dBm)		
	Target	Max. Allowed	SAR Test
LTE Band 41 (RCV)	17.50	**18.50**	**Yes**
LTE Band 41 (Hotspot, Grip Sensor, Ear-jack)	16.00	**17.00**	**Yes**

2.4.3 Maximum WLAN and Bluetooth Output Power

Band	Mode	Channel	Output Power (dB m)		
			Target	Max. Allowed	SAR Test
WLAN 2.4 GHz	802.11b	Except 12,13	18.00	**19.00**	Yes
		12,13	14.00	**15.00**	
	802.11g	Except 1,11,12,13	16.00	**17.00**	No
		1,11	13.00	**14.00**	
		12,13	9.00	**10.00**	
	802.11n(HT20)	Except 1,11,12,13	16.00	**17.00**	No
		1,11	13.00	**14.00**	
		12,13	9.00	**10.00**	
Band	**Mode**	**Channel**	**Output Power (dB m)**		
			Target	**Max. Allowed**	**SAR Test**
Bluetooth	BDR(GFSK)	All Channel	9.00	**10.00**	Yes
	EDR (π/4DQPSK)	All Channel	6.00	**7.00**	No
	EDR(8DPSK)	All Channel	6.00	**7.00**	No
	LE (GFSK)	All Channel	6.00	**7.00**	No

2.4.4 Reduced WLAN Output Power-RCV

Band	Mode	Channel	Output Power (dB m)		
			Target	Max. Allowed	SAR Test
WLAN 2.4 GHz (RCV)	802.11b	All Channel	13.00	**14.00**	Yes
	802.11g	Except 1,11,12,13	13.00	**14.00**	No
		1,11	12.00	**13.00**	
		12,13	8.00	**9.00**	
	802.11n(HT20)	Except 1,11,12,13	13.00	**14.00**	No
		1,11	12.00	**13.00**	
		12,13	8.00	**9.00**	

2.5 #DUT Antenna Locations

The overall dimensions of this device are > 9 x 5 ㎝. A diagram showing the location of the device antennas can be found in Appendix D. Since the diagonal dimension of this device is > 160 ㎜ and < 200 ㎜, it is considered a "Phablet".

Mode	Device Edge for SAR Testing (Front View)					
	Front	Rear	Left Edge	Right Edge	Top	Bottom
GPRS 850	Yes	Yes	Yes	Yes	No	Yes
GPRS 1900	Yes	Yes	Yes	Yes	No	Yes
WCDMA Band V	Yes	Yes	Yes	Yes	No	Yes
LTE Band 5	Yes	Yes	Yes	Yes	No	Yes
LTE Band 41	Yes	Yes	Yes	No	Yes	No
2.4 ㎓ WLAN	Yes	Yes	Yes	No	Yes	No
Bluetooth	No	No	No	No	No	No

Note: Particular DUT edges were not required to be evaluated for Hotspot SAR or Phablet SAR if the edges were greater than 2.5 ㎝ from the transmitting antenna according to FCC KDB Publication 941225 D06v02r01 and FCC KDB Publication 648474 D04v01r03. The antenna document shows the distances between the transmit antennas and the edges of the device.

2.7 #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			
		Head	Body-Worn	Hotspot	Phablet
1	GSM Voice + WLAN 2.4 ㎓	Yes	Yes	No	Yes
2	GSM Voice + 2.4 ㎓ Bluetooth	Yes	Yes	No	Yes
3	WCDMA + WLAN 2.4 ㎓	Yes	Yes	Yes	Yes
4	WCDMA + 2.4 ㎓ Bluetooth	Yes	Yes	Yes	Yes
5	LTE + WLAN 2.4 ㎓	Yes	Yes	Yes	Yes
6	LTE + 2.4 ㎓ Bluetooth	Yes	Yes	Yes	Yes
7	GPRS/EDGE + WLAN 2.4 ㎓	Yes	Yes	Yes	Yes
8	GPRS/EDGE + 2.4 ㎓ Bluetooth	Yes	Yes	Yes	Yes

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.
- WLAN Hotspot is supported for 2.4 ㎓
- This device supports Bluetooth Tethering.
- This device supports VoLTE.
- This device supports VoWIFI.

2.8 Miscellaneous SAR Test Considerations

(A) WIFI/Bluetooth

Since Wireless Router operations are not allowed by the chipset firmware using only 2.4㎓ WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v02r01.

Per FCC KDB Publication 648474 D04v01r03, this device is considered a “phablet” since the diagonal dimension is greater than 160㎜ and less than 200㎜. Phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Phablet SAR was not evaluated for 2.4 ㎓ WLAN, Bluetooth operations since wireless router 1g SAR was < 1.2 W/kg.

Per FCC KDB 447498 D01v06, the 1g SAR exclusion threshold for distances < 50 ㎜ is defined by the following equation:

$$\frac{\text{Max Power of Channel(mW)}}{\text{Test Separation Distance(mm)}} \times \sqrt{\text{Frequency(GHz)}} \leq 3.0(1g-SAR), 7.5(10g-SAR)$$

Mode	Position	Frequency	Maximum Allowed Power	Separation Distance	≤ 3.0 Not Required	≤ 7.5 Not Required
		MHz	mW	mm	1g-SAR	10g-SAR
Bluetooth	Head	2 480.0	10	5	3.2	N/A
	Body-Worn	2 480.0	10	15	1.1	N/A
	Hotspot	2 480.0	10	10	1.6	N/A
	Phablet	2 480.0	10	5	N/A	3.2
Bluetooth LE	Head	2 480.0	5	5	1.6	N/A
	Body-Worn	2 480.0	5	15	0.5	N/A
	Hotspot	2 480.0	5	10	0.8	N/A
	Phablet	2 480.0	5	5	N/A	1.6

Formulas round separation distance to nearest ㎜ and power to nearest ㎽ before calculating thresholds or exemption values.

(B) Licensed Transmitter(s)

GSM/GPRS/EDGE DTM is not supported for US bands. Therefore, the GSM Voice modes in this report do not transmit simultaneously with GPRS/EDGE Data.

This device is only capable of QPSK HSUPA in the uplink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA in KDB 941225 D01v03r01.

LTE SAR for the higher modulations and lower bandwidths were not tested since the maximum average output power of all required channels and configurations was not more than 0.5 dB higher than the highest bandwidth and the reported LTE SAR for the highest bandwidth was less than 1.45 W/kg for all configurations according to FCC KDB 941225 D05v02r04.

2.9 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
- 616217 D04 SAR for laptop and tablets v01r02 (Proximity Sensor)
- 648474 D04 Handset SAR v01r03
- 865664 D01 SAR measurement 100 ㎒ to 6 ㎓ v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 941225 D01 3G SAR Procedures v03r01
- 941225 D05 SAR for LTE Devices v02r05
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02
- 941225 D06 Hotspot Mode v02r01
- October 2014 TCB Workshop Notes (Other LTE Considerations)
- October 2016 TCB Workshop Notes (Bluetooth Duty Factor)
- October 2016 TCB Workshop Notes (DUT Holder Perturbations)
- April 2019 TCB Workshop Notes (Tissue Simulation Liquids)

3. #LTE Information

LTE Information					
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 5 (824.7 ㎒ ~ 848.3 ㎒) LTE Band 41 (2 498.5 ㎒ ~ 2 687.5 ㎒)				
Channel Bandwidths	LTE Band 5: 1.4 ㎒, 3 ㎒, 5 ㎒, 10 ㎒ LTE Band 41: 5 ㎒, 10 ㎒, 15 ㎒, 20 ㎒				
Channel Numbers and Frequencies (㎒)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 5: 1.4 ㎒	824.7 (20 407)		836.5 (20 525)	848.3 (20 643)	
LTE Band 5: 3 ㎒	825.5 (20 415)		836.5 (20 525)	847.5 (20 635)	
LTE Band 5: 5 ㎒	826.5 (20 425)		836.5 (20 525)	846.5 (20 625)	
LTE Band 5: 10 ㎒	829.0 (20 450)		836.5 (20 525)	844.0 (20 600)	
LTE Band 41: 5 ㎒	2 506.0 (39 750)	2 549.5 (40 185)	2 593.0 (40 620)	2 636.5 (41 055)	2 680.0 (41 490)
LTE Band 41: 10 ㎒	2 506.0 (39 750)	2 549.5 (40 185)	2 593.0 (40 620)	2 636.5 (41 055)	2 680.0 (41 490)
LTE Band 41: 15 ㎒	2 506.0 (39 750)	2 549.5 (40 185)	2 593.0 (40 620)	2 636.5 (41 055)	2 680.0 (41 490)
LTE Band 41: 20 ㎒	2 506.0 (39 750)	2 549.5 (40 185)	2 593.0 (40 620)	2 636.5 (41 055)	2 680.0 (41 490)
UE Category	6				
Modulations Supported in UL	QPSK, 16QAM, 64QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3 ~ 6.2.5?(manufacturer attestation to be provided)	YES				
A-MPR(Additional MPR) disabled for SAR Testing?	YES				
LTE Carrier Aggregation Possible Combinations	This device not supports LTE CA.				
LTE Additional Information	The following LTE Release 10 Features are not supported: Relay, HetNet, Enhanced MIMO, eICIC, WIFI Offloading, MDH, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

4. Specific Absorption Rate

4.1 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.

4.2 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.

5. SAR Measurement Procedures

5.1 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.

6. SAR Measurement Configurations

6.1 Ear Reference Point

Figure 1shows the front, back and side views of the SAM phantom. The “M” is the reference point for the center of the mouth, “LE” is the left ear reference point (ERP), and “RE” is the right ERP. The ERPs are 15 mm posterior to the entrance to the Ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 1. The plane Passing, through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck – Front) is perpendicular to the reference plane and passing through the LE (or RE) is called the Reference Pivoting Line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning.

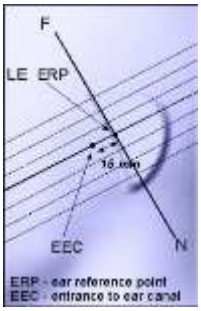


Figure 1
Close-Up Side view of ERP

6.2 Handset Reference Points

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the acoustic output located along the “vertical centerline” on the front of the device aligned to the “ear reference point” (See Figure 3). The acoustic output was than located at the same level as the center of the ear reference point. The test device was positioned so that the “vertical centerline” was bisecting the front surface of the handset at its top and bottom edges, positioning the “ear reference point” on the outer surface of the both the left and right head phantoms on the ear reference point.

Figure 2
Front, back and side view of SAM Twin Phantom

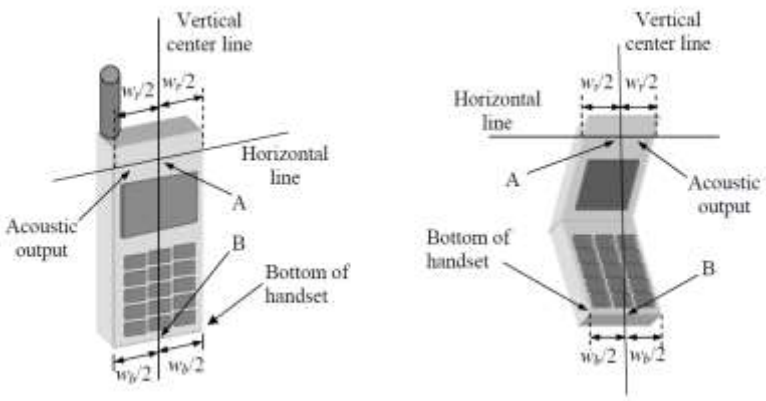


Figure 3
Handset Vertical Center & Horizontal Line Reference Points

6.3 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.

6.4 Positioning for Cheek/Touch

1. The test device was positioned with the device close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 4), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom.

Figure 4: Front, Side and Top View of Cheek Position

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the pinna.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the reference plane.
4. The phone was then rotated around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the device contact with the ear, the device was rotated about the NF line until any point on the handset made contact with a phantom point below the ear (cheek) (See Figure 5).

6.5 Positioning for Ear / 15˚ Tilt

With the test device aligned in the “Cheek Position”:

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15 degrees.
2. The phone was then rotated around the horizontal line by 15 degrees.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the handset touched the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. In this situation, the tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 5).

Figure 5: Front, Side and Top View of Ear/ 15˚ Tilt

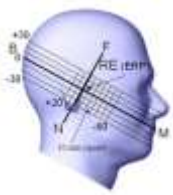


Figure 6: Side view w/ relevant markings

6.6 Body-Worn Accessory Configurations

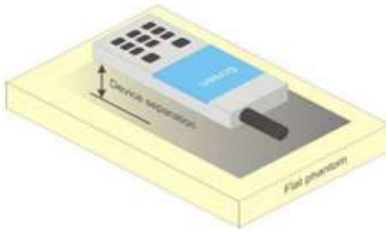


Figure 7
Sample Body-Worn Diagram

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 7). Per FCC KDB Publication 648474 D04v01r03, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.
Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

6.7 Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06v02r01 where SAR test considerations for handsets (L x W ≥ 9 ㎝ x 5 ㎝) are based on a composite test separation distance of 10 ㎜ from the front, back and edges of the device containing transmitting antennas within 2.5 ㎝ of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

6.8 Phablet Configurations

For smart phones with a display diagonal dimension > 150 ㎜ or an overall diagonal dimension > 160 ㎜ that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the phablets procedures outlined in KDB Publication 648474 D04v01r03 should be applied to evaluate SAR compliance. A device marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. In addition to the normally required head and body-worn accessory SAR test procedures required for handsets, the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna <=25 ㎜ from that surface or edge, in direct contact with the phantom, for 10g SAR. The UMPC mini-tablet 1g SAR at 5 ㎜ is not required. When hotspot mode applies, 10g SAR is required only for the surfaces and edges with hotspot mode 1g SAR > 1.2 W/kg.

7. 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.

8. FCC SAR General Measurement Procedures

8.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v06, When SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as reported SAR. Test highest reported SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

8.2 3G SAR Test Reduction Procedure

In FCC KDB Publication 941225 D01v03r01, certain transmission modes within a frequency band and wireless mode evaluated for SAR are defined as primary modes. The equivalent modes considered for SAR test reduction are denoted as secondary modes. When the maximum output power including tune-up tolerance specified for production units in a secondary mode is ≤ 0.25 dB higher than the primary mode or when the highest reported SAR of the primary mode, scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode, is ≤ 1.2 W/kg, SAR measurements are not required for the secondary mode. These criteria are referred to as the 3G SAR test reduction procedure. When the 3G SAR test reduction procedure is not satisfied, SAR measurements are additionally required for the secondary mode.

8.3 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01v03r01 “3G SAR Measurement Procedures.”
The device is placed into a simulated call using a base station simulator in a RF shielded chamber. Establishing connections in this manner ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. Devices under test are evaluated prior to testing, with a fully charged battery and were configured to operate at maximum output power. In order to verify that the device is tested throughout the SAR test at maximum output power, the SAR measurement system measures a “point SAR” at an arbitrary reference point at the start and end of the 1 gram SAR evaluation, to assess for any power drifts during the evaluation. If the power drift deviates by more than 5%, the SAR test and drift measurements are repeated.

8.4 SAR Measurement Conditions for UMTS

8.4.1 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in sec. 5.2 of 3GPP TS 34.121, using the appropriate RMC with TPC (transmit power control) set to all “1s” or applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc) are tabulated in this test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations are identified.

8.4.2 Head SAR Measurements

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR in 3.4 kbps SRB (signaling radio bearer) using the highest reported SAR configuration in 12.2 kbps RMC for head exposure.

8.4.3 Body SAR measurements

SAR for body exposure configurations is measured using the 12.2kbps RMC with the TPC bits all “1s”. the 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using and applicable RMC configuration with the corresponding spreading code or DPDCHn, for the highest reported SAR configuration in 12.2kbps RMC.

8.4.4 SAR Measurements with Rel. 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSDPA is measured using and FRC with H-SET 1 in Sub-test and a 12.2 kbps RMC without HSDPA. Handsets with both HSDPA and HSUPA are tested according to release 6 HSPA test procedures. 8.4.5 SAR Measurement with Rel.6 HSUPA The 3G SAR test Reduction Procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSPA is measured with E-DCH Sub-test 5, Using H-Set 1 and QPSK for FRC and a 12.2kbps RMC configured in Test Loop Mode 1 and Power Control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA. When VOIP applies to head exposure, the 3G SAR test reduction procedure is applied with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body SAR measurements are applied to head exposure testing.

8.4.5 SAR Measurements with Rel. 6 HSUPA

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 and power control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA.

8.4.6 SAR Measurements with Rel. 8 DC-HSDPA

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable

8.5 SAR Measurement Conditions for LTE

LTE modes are tested according to FCC KDB 941225 D05v02r05 publication. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluation SAR [4]. The R&S CMW500 or Anritsu MT8820C simulators are used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

8.5.1 Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

8.5.2 MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36. 101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

8.5.3 A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator

8.5.4 Required RB Size and RB offsets for SAR testing

According to FCC KDB 941225 D05v02r05

1. Per sec 4.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
   a. The required channel and offset combination with the highest maximum output power is required for SAR.
   b. When the reported SAR is ≤ 0.8 W/Kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
   c. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel
2. Per Sec 4.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Sec 4.2.1.
3. Per Sec. 4.2.3, QPSK SAR is not required for the 100% all0cation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
4. Per Sec. 4.2.4 and 4.3, SAR test for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sec. 4.2.1 through 4.2.3 is less than or equal to 1/2 dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is < 1.45 W/Kg.

8.5.5 LTE(TDD) Considerations

According to KDB 941225 D05v02r05, for Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with the highest transmission duty factor (63.33 %) using Uplink-downlink configuration 0 and Special sub-frame configuration 6.

LTE TDD Band supports 3GPP TS 36.211 section 4.2 for Type 2 Frame and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special sub frame configurations.

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$	$7680 \cdot T_s$	$(1+X) \cdot 2192 \cdot T_s$	$(1+X) \cdot 2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$(2+X) \cdot 2192 \cdot T_s$	$(2+X) \cdot 2560 \cdot T_s$
5	$6592 \cdot T_s$	$(2+X) \cdot 2192 \cdot T_s$	$(2+X) \cdot 2560 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-
10	$13168 \cdot T_s$	$13152 \cdot T_s$	$12800 \cdot T_s$	-	-	-

Table 4.2-2: Uplink-downlink configurations

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Calculated Duty Cycle – Extended cyclic prefix in uplink x (Ts) x # of S + # of U
Example for calculated Duty Cycle for Uplink-Downlink Configuration 0:
Calculated Duty Cycle = (5120 x [1/(15000 x 2048)] x 2 + 0.006)/0.01 = 63.33 %
Ts = 1/(15000 x 2048) seconds

8.6 SAR Testing with 802.11 Transmitters

The normal network operating configurations are not suitable for measuring the SAR of 802.11 a/b/g transmitters. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable.

8.6.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 – 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

8.6.2 U-NII-1 and U-NII-2A

For devices that operate in both U-NII-1 and U-NII-2A bands, when the same maximum output power is specified for both bands, SAR measurement using OFDM SAR test procedures is not required for U-NII-1 unless the highest reported SAR for U-NII-2A is > 1.2 W/kg. When different maximum output powers is not required unless the highest reported SAR for the U-NII band with the higher maximum output power, adjusted by the ratio of lower to higher specified maximum output power for the two bands, is > 1.2 W/kg. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.3 U-NII-2C and U-NII-3

The frequency range covered by U-NII-2C and U-NII-3 is 380 ㎒ (5.47 – 5.85 ㎓), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. When Terminal Doppler Weather Radar (TDWR) restriction applies, the channels at 5.60 – 5.65 ㎓ in U-NII-2C band must be disabled with acceptable mechanisms and documented in the equipment certification. Unless band gap channels are permanently disabled, SAR must be considered for these channels. When band gap channels are disabled, each band is tested independently according to the normally required OFDM SAR measurement and probe calibration frequency point requirements.

8.6.4 Initial Test Position Procedure

For exposure conditions with multiple test positions, such as handset operating next to the ear, devices with hotspot mode or UMPC mini-tablet, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all positions in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.

8.6.5 2.4 ㎓ SAR Test Requirement

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

1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel; i.e., all channels require testing.

2.4 ㎓ 802.11g/n OFDM are additionally evaluated for SAR if highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 ㎓ band, the Initial Test Configuration Procedures should be followed.

8.6.6 OFDM Transmission Mode and SAR Test Channel Selection

For the 2.4 ㎓ and 5 ㎓ band, when the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n and 802.11ac or 802.11g and 802.11n with the same channel band width, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11a, then 802.11n and 802.11ac or 802.11g then 802.11n, is used for SAR measurement. When maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

8.6.7 Initial Test Configuration Procedure

For OFDM, in both 2.4 and 5 ㎓ bands, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, and lowest data rate. If the average RF output powers of the highest identical transmission modes are within 0.25 ㏈ of each other, mid channel of the transmission mode with highest average RF output power is the initial test channel. Otherwise, the channel of the transmission mode with the highest average RF output conducted power will be the initial test configuration.

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements.

8.6.8 Subsequent Test Configuration Procedures

For OFDM configurations in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure. When the highest reported SAR (for the initial test configuration), adjusted by the ratio of the specified maximum output power of the subsequent test configuration to initial test configuration, is ≤ 1.2 W/kg, no additional SAR tests for the subsequent test configurations are required. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

9. RF Average Conducted Output Power

9.1 GSM Average Conducted Output Power (Maximum Average Power)

Maximum Burst-Average Output Power (dB m)										
Band	Channel	GSM	GPRS (GMSK)				EGPRS (8-PSK)			
		Voice	1Tx	2Tx	3Tx	4Tx	1Tx	2Tx	3Tx	4Tx
GSM 850	128	32.66	32.65	31.85	29.98	28.94	27.17	26.20	24.23	23.12
	190	32.76	32.73	31.90	30.17	29.14	27.37	26.40	24.43	23.33
	251	32.66	32.64	31.90	30.07	29.02	27.32	26.33	24.35	23.26
GSM 1900	512	28.90	28.83	28.38	26.98	25.92	26.24	25.19	23.12	21.84
	661	29.00	28.88	28.41	27.01	25.95	26.21	25.21	23.15	21.91
	810	28.70	28.72	28.26	26.83	25.76	25.99	24.98	22.93	21.68

Maximum Frame-Average Output Power (dB m)										
Band	Channel	GSM	GPRS (GMSK)				EGPRS (8-PSK)			
		Voice	1Tx	2Tx	3Tx	4Tx	1Tx	2Tx	3Tx	4Tx
GSM 850	128	23.63	23.62	25.83	25.72	25.93	18.14	20.18	19.97	20.11
	190	23.73	23.70	25.88	25.91	26.13	18.34	20.38	20.17	20.32
	251	23.63	23.61	25.88	25.81	26.01	18.29	20.31	20.09	20.25
GSM 1900	512	19.87	19.80	22.36	22.72	22.91	17.21	19.17	18.86	18.83
	661	19.97	19.85	22.39	22.75	22.94	17.18	19.19	18.89	18.90
	810	19.67	19.69	22.24	22.57	22.75	16.96	18.96	18.67	18.67
GSM 850	Frame Avg, Target	24.97	24.97	26.98	26.74	**26.99**	19.47	21.48	20.74	20.99
GSM 1900		21.47	21.47	23.48	23.24	**23.49**	18.47	19.98	19.24	19.49

9.2 WCDMA Average Conducted Output Power (Maximum Average Power)

Band	Mode	Average Conducted Power (dB m)			3GPP MPR [dB]
		Channel			
		9 262	9 400	9 538	
WCDMA Band V	RMC	24.11	24.19	23.98	-
	HSDPA-Subtest 1	22.94	22.95	22.96	0
	HSDPA-Subtest 2	22.34	22.19	22.27	0
	HSDPA-Subtest 3	21.43	21.73	21.83	0.5
	HSDPA-Subtest 4	21.43	21.49	21.03	0.5
	HSUPA-Subtest 1	21.14	21.24	21.14	0
	HSUPA-Subtest 2	20.93	20.93	20.87	2
	HSUPA-Subtest 3	21.95	21.93	21.83	1
	HSUPA-Subtest 4	20.65	20.69	20.49	2
	HSUPA-Subtest 5	22.12	22.22	22.14	0
	DC-HSDPA-Subtest 1	22.79	22.87	22.86	0
	DC-HSDPA-Subtest 2	22.99	22.96	22.89	0
	DC-HSDPA-Subtest 3	22.47	22.42	22.48	0.5
	DC-HSDPA-Subtest 4	22.30	22.32	22.39	0.5

9.3 LTE Average Conducted Output Power (Maximum Average Power)

9.3.1 LTE Band 5

Band width	Modulation	RB Size	RB offset	Maximum Average Power	MPR
				20 525	
				836.5 ㎒	
10 ㎒	QPSK	1	0	23.57	0
		1	25	24.01	0
		1	49	23.56	0
		25	0	22.70	1
		25	12	22.64	1
		25	25	22.52	1
		50	0	22.67	1
	16QAM	1	0	22.68	1
		1	25	22.93	1
		1	49	22.68	1
		25	0	21.83	2
		25	12	21.80	2
		25	25	21.72	2
		50	0	21.72	2
	64QAM	1	0	22.23	2
		1	25	22.41	2
		1	49	22.32	2
		25	0	21.27	3
		25	12	21.21	3
		25	25	21.14	3
		50	0	21.20	3

10 ㎒ Bandwidths does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing per KDB 941225 D05 SAR for LTE Devices.

Band width	Modulation	RB Size	RB offset	Maximum Average Power			MPR
				20 425	20 525	20 625	
				826.5 ㎒	836.5 ㎒	846.5 ㎒	
5 ㎒	QPSK	1	0	23.46	23.52	23.51	0
		1	12	23.67	23.76	23.68	0
		1	24	23.48	23.48	23.38	0
		12	0	22.43	22.63	22.57	1
		12	7	22.54	22.61	22.60	1
		12	13	22.53	22.50	22.44	1
		25	0	22.47	22.60	22.51	1
	16QAM	1	0	22.31	22.78	22.52	1
		1	12	22.53	23.05	22.75	1
		1	24	22.34	22.80	22.38	1
		12	0	21.49	21.68	21.61	2
		12	7	21.61	21.72	21.60	2
		12	13	21.56	21.62	21.54	2
		25	0	21.61	21.62	21.71	2
	64QAM	1	0	22.13	22.22	22.23	2
		1	12	22.45	22.54	22.42	2
		1	24	22.16	22.30	22.15	2
		12	0	21.00	21.21	21.15	3
		12	7	21.11	21.20	21.21	3
		12	13	21.11	21.16	21.09	3
		25	0	21.04	21.18	21.11	3

Band width	Modulation	RB Size	RB offset	Maximum Average Power			MPR
				20 415	20 525	20 635	
				825.5 MHz	836.5 MHz	847.5 MHz	
3 MHz	QPSK	1	0	23.43	23.60	23.47	0
		1	8	23.47	23.65	23.44	0
		1	14	23.43	23.58	23.34	0
		8	0	22.40	22.56	22.52	1
		8	4	22.50	22.58	22.48	1
		8	7	22.44	22.54	22.42	1
		15	0	22.50	22.57	22.48	1
	16QAM	1	0	23.12	22.75	22.58	1
		1	8	23.07	22.80	22.52	1
		1	14	23.09	22.73	22.47	1
		8	0	21.71	21.67	21.75	2
		8	4	21.78	21.67	21.71	2
		8	7	21.70	21.65	21.63	2
		15	0	21.60	21.70	21.58	2
	64QAM	1	0	22.26	22.29	22.28	2
		1	8	22.33	22.30	22.26	2
		1	14	22.31	22.27	22.27	2
		8	0	21.04	21.23	21.16	3
		8	4	21.10	21.22	21.21	3
		8	7	21.09	21.21	21.16	3
		15	0	21.04	21.12	21.09	3

Band width	Modulation	RB Size	RB offset	Maximum Average Power			MPR
				20 407	20 525	20 643	
				824.7 MHz	836.5 MHz	848.3 MHz	
1.4 MHz	QPSK	1	0	23.91	23.52	23.35	0
		1	3	23.85	23.71	23.53	0
		1	5	23.91	23.50	23.34	0
		3	0	23.93	23.75	23.49	0
		3	1	24.00	23.65	23.53	0
		3	3	23.97	23.60	23.57	0
		6	0	22.91	22.53	22.44	1
	16QAM	1	0	22.98	22.63	22.47	1
		1	3	22.65	22.84	22.60	1
		1	5	22.44	22.64	22.49	1
		3	0	22.74	22.62	22.71	1
		3	1	22.74	22.65	22.67	1
		3	3	22.73	22.72	22.61	1
		6	0	21.57	21.68	21.48	2
	64QAM	1	0	22.15	22.23	22.19	2
		1	3	22.22	22.31	22.30	2
		1	5	22.13	22.26	22.18	2
		3	0	22.17	22.21	22.16	2
		3	1	22.19	22.22	22.14	2
		3	3	22.22	22.20	22.19	2
		6	0	20.99	21.15	21.05	3

9.3.2 LTE Band 41

Band width	Modulation	RB Size	RB offset	Maximum Average Power					MPR
				39 750	40 185	40 620	41 055	41 490	
				2 506.0 MHz	2 549.5 MHz	2 593.0 MHz	2 636.5 MHz	2 680.0 MHz	
20 MHz	QPSK	1	0	21.88	21.63	21.56	21.92	21.90	0
		1	49	22.20	21.72	21.66	22.53	22.42	0
		1	99	21.50	21.68	21.52	21.90	21.79	0
		50	0	20.96	21.07	20.64	21.17	21.20	1
		50	24	20.97	21.10	20.67	21.26	21.21	1
		50	50	20.87	21.01	20.52	21.22	21.07	1
		100	0	20.95	21.03	20.62	21.21	21.13	1
	16QAM	1	0	20.94	20.66	20.56	20.94	20.68	1
		1	49	21.23	21.03	20.86	21.53	21.15	1
		1	99	21.50	20.50	20.60	20.95	20.56	1
		50	0	19.97	20.11	20.53	20.18	20.15	2
		50	24	20.00	20.09	19.56	20.27	20.17	2
		50	50	19.93	20.08	19.55	20.23	20.04	2
		100	0	19.96	20.08	19.50	20.18	20.09	2
	64QAM	1	0	19.55	19.94	19.52	19.83	19.92	2
		1	49	19.80	20.00	19.57	19.82	20.34	2
		1	99	19.50	19.51	19.50	19.77	19.76	2
		50	0	19.01	19.24	18.53	19.75	19.55	3
		50	24	19.00	19.17	18.63	19.79	19.52	3
		50	50	18.85	19.07	18.82	19.74	19.41	3
		100	0	18.96	19.19	18.69	19.76	19.49	3

Band width	Modulation	RB Size	RB offset	Maximum Average Power					MPR
				39 750	40 185	40 620	41 055	41 490	
				2 506.0 MHz	2 549.5 MHz	2 593.0 MHz	2 636.5 MHz	2 680.0 MHz	
15 MHz	QPSK	1	0	22.07	22.12	22.14	22.17	22.14	0
		1	36	22.03	22.11	22.38	22.33	22.27	0
		1	74	21.66	21.93	22.26	22.16	22.07	0
		36	0	21.04	21.09	21.42	21.27	21.26	1
		36	18	21.02	21.10	21.54	21.29	21.26	1
		36	37	20.82	21.02	21.57	21.27	21.18	1
		75	0	20.99	21.01	21.46	21.29	21.27	1
	16QAM	1	0	21.24	21.02	21.03	21.26	21.03	1
		1	36	21.21	21.06	21.29	21.47	21.14	1
		1	74	20.87	20.85	21.39	21.27	20.97	1
		36	0	20.03	20.13	20.42	20.23	20.19	2
		36	18	19.90	20.11	20.54	20.26	20.20	2
		36	37	19.88	20.02	20.49	20.24	20.14	2
		75	0	19.73	20.06	20.46	20.24	20.19	2
	64QAM	1	0	19.78	20.05	19.50	20.42	20.12	2
		1	36	19.67	19.91	19.55	20.55	20.23	2
		1	74	19.50	19.69	19.56	20.33	20.07	2
		36	0	18.97	19.23	18.71	19.87	19.54	3
		36	18	18.94	19.16	18.81	19.85	19.56	3
		36	37	18.85	19.09	18.90	19.82	19.44	3
		75	0	18.97	19.13	18.76	19.83	19.53	3

Band width	Modulation	RB Size	RB offset	Maximum Average Power					MPR
				39 750	40 185	40 620	41 055	41 490	
				2 506.0 MHz	2 549.5 MHz	2 593.0 MHz	2 636.5 MHz	2 680.0 MHz	
10 MHz	QPSK	1	0	22.14	22.17	22.42	22.32	22.22	0
		1	25	22.17	22.22	22.37	22.47	22.38	0
		1	49	21.88	21.98	22.26	22.28	22.19	0
		25	0	21.03	21.08	21.39	21.33	21.26	1
		25	12	21.01	21.01	21.42	21.27	21.20	1
		25	25	20.97	21.03	21.48	21.30	21.17	1
		50	0	21.04	21.04	21.44	21.28	21.23	1
	16QAM	1	0	21.33	21.09	20.99	21.41	21.14	1
		1	25	21.33	21.13	21.24	21.63	21.31	1
		1	49	21.09	20.96	21.20	21.41	21.08	1
		25	0	20.02	20.08	20.47	20.28	20.20	2
		25	12	19.95	20.03	20.49	20.22	20.12	2
		25	25	20.07	20.04	20.48	20.26	20.10	2
		50	0	20.01	20.07	20.46	20.29	20.19	2
	64QAM	1	0	19.79	20.19	20.33	20.44	20.12	2
		1	25	19.57	19.94	20.29	20.29	20.06	2
		1	49	19.50	19.91	20.52	20.35	20.05	2
		25	0	19.06	19.40	19.69	19.76	19.58	3
		25	12	19.06	19.40	19.79	19.80	19.56	3
		25	25	19.03	19.14	19.82	19.76	19.46	3
		50	0	18.99	19.16	19.70	19.73	19.48	3

Band width	Modulation	RB Size	RB offset	Maximum Average Power					MPR
				39 750	40 185	40 620	41 055	41 490	
				2 506.0 MHz	2 549.5 MHz	2 593.0 MHz	2 636.5 MHz	2 680.0 MHz	
5 MHz	QPSK	1	0	21.95	22.00	22.26	22.23	22.11	0
		1	12	22.16	22.20	22.40	22.46	22.30	0
		1	24	21.85	21.93	22.25	22.17	22.09	0
		12	0	21.00	20.95	21.38	21.23	21.16	1
		12	7	20.96	21.07	21.51	21.29	21.20	1
		12	13	20.81	20.94	21.40	21.21	21.15	1
		25	0	20.89	21.02	21.41	21.26	21.18	1
	16QAM	1	0	21.22	21.04	21.39	21.42	21.13	1
		1	12	21.41	21.22	21.71	21.68	21.35	1
		1	24	21.11	20.93	21.46	21.43	21.09	1
		12	0	19.77	19.97	20.42	20.15	20.11	2
		12	7	19.92	20.02	20.54	20.20	20.12	2
		12	13	19.80	19.92	20.42	20.15	20.05	2
		25	0	19.90	20.06	20.46	20.25	20.14	2
	64QAM	1	0	19.50	19.79	20.28	19.51	19.52	2
		1	12	19.75	19.91	20.54	19.52	19.51	2
		1	24	19.50	19.68	20.38	19.50	19.55	2
		12	0	18.84	19.10	19.69	18.79	18.56	3
		12	7	18.91	19.12	19.84	18.86	18.66	3
		12	13	18.82	19.06	19.80	18.76	18.53	3
		25	0	18.84	19.18	19.81	18.78	18.59	3

9.4 LTE Average Conducted Output Power (Reduced Average Power)

9.4.1 LTE Band 41 (RCV)

Band width	Modulation	RB Size	RB offset	Maximum Average Power					MPR
				39 750	40 185	40 620	41 055	41 490	
				2 506.0 MHz	2 549.5 MHz	2 593.0 MHz	2 636.5 MHz	2 680.0 MHz	
20 MHz	QPSK	1	0	16.88	16.88	16.50	16.92	16.91	0
		1	49	17.25	17.30	17.14	17.50	17.41	0
		1	99	16.51	16.63	16.80	16.92	16.77	0
		50	0	16.95	17.03	16.85	17.23	17.20	0
		50	24	16.97	17.14	17.02	17.29	17.23	0
		50	50	16.85	17.02	16.98	17.23	17.07	0
		100	0	16.92	17.03	16.98	17.20	17.11	0
	16QAM	1	0	16.95	16.73	16.50	16.96	16.69	0
		1	49	17.25	17.02	16.79	17.52	17.10	0
		1	99	16.51	16.50	16.50	16.92	16.55	0
		50	0	16.99	17.07	16.88	17.20	17.16	0
		50	24	16.96	17.08	17.03	17.29	17.19	0
		50	50	16.86	16.96	17.07	17.19	17.04	0
		100	0	16.94	17.03	16.93	17.25	17.12	0
	64QAM	1	0	16.51	16.96	16.50	17.14	16.98	0
		1	49	16.71	17.03	16.64	17.57	17.33	0
		1	99	16.55	16.51	16.51	17.09	16.88	0
		50	0	16.92	17.31	16.59	17.74	17.49	0
		50	24	16.86	17.19	16.68	17.76	17.52	0
		50	50	16.81	17.12	16.82	17.67	17.36	0
		100	0	16.92	17.23	16.74	17.75	17.49	0

Band width	Modulation	RB Size	RB offset	Maximum Average Power					MPR
				39 750	40 185	40 620	41 055	41 490	
				2 506.0 MHz	2 549.5 MHz	2 593.0 MHz	2 636.5 MHz	2 680.0 MHz	
15 MHz	QPSK	1	0	16.87	17.09	16.69	17.11	17.13	0
		1	36	17.21	17.10	16.97	17.34	17.15	0
		1	74	16.71	16.90	16.97	17.09	17.04	0
		36	0	17.05	17.10	16.88	17.23	17.24	0
		36	18	17.04	17.11	16.96	17.29	17.23	0
		36	37	16.85	17.02	17.03	17.22	17.14	0
		75	0	16.92	17.02	16.90	17.21	17.19	0
	16QAM	1	0	17.17	17.09	16.61	17.25	17.05	0
		1	36	17.16	17.07	16.85	17.47	17.20	0
		1	74	16.82	16.86	16.83	17.27	17.00	0
		36	0	16.94	17.07	16.85	17.19	17.14	0
		36	18	16.94	17.05	16.95	17.28	17.23	0
		36	37	16.82	17.03	16.93	17.15	17.10	0
		75	0	16.92	17.01	16.88	17.23	17.15	0
	64QAM	1	0	16.72	17.06	16.51	17.33	17.13	0
		1	36	16.64	16.96	16.52	17.47	17.26	0
		1	74	16.50	16.71	16.53	17.30	17.09	0
		36	0	17.03	17.27	16.61	17.21	17.27	0
		36	18	16.91	17.19	16.68	17.28	17.25	0
		36	37	16.77	17.12	16.77	17.22	17.21	0
		75	0	16.88	17.15	16.72	17.26	17.48	0

Band width	Modulation	RB Size	RB offset	Maximum Average Power					MPR
				39 750	40 185	40 620	41 055	41 490	
				2 506.0 MHz	2 549.5 MHz	2 593.0 MHz	2 636.5 MHz	2 680.0 MHz	
10 MHz	QPSK	1	0	16.88	17.01	16.84	17.25	17.17	0
		1	25	17.20	17.08	17.12	17.42	17.33	0
		1	49	16.70	17.01	17.04	17.26	17.11	0
		25	0	17.08	17.01	16.91	17.22	17.22	0
		25	12	17.06	16.59	16.90	17.25	17.18	0
		25	25	16.82	16.57	16.99	17.21	17.18	0
		50	0	16.91	16.56	16.95	17.21	17.16	0
	16QAM	1	0	17.01	16.68	16.53	17.40	17.14	0
		1	25	17.15	16.66	16.79	17.20	17.26	0
		1	49	16.98	16.50	16.72	17.41	17.10	0
		25	0	16.91	16.50	16.86	17.24	17.10	0
		25	12	16.92	16.54	16.95	17.23	17.09	0
		25	25	16.81	16.50	16.99	17.21	17.10	0
		50	0	16.94	16.53	16.90	17.22	17.13	0
	64QAM	1	0	16.80	16.60	16.50	17.40	17.26	0
		1	25	16.53	16.52	16.51	17.43	17.19	0
		1	49	16.52	16.53	16.59	17.47	17.24	0
		25	0	16.91	16.84	16.75	17.26	17.26	0
		25	12	16.98	16.76	16.74	17.24	17.29	0
		25	25	16.90	16.72	16.83	17.23	17.24	0
		50	0	16.91	16.71	16.73	17.22	17.21	0

Band width	Modulation	RB Size	RB offset	Maximum Average Power					MPR
				39 750	40 185	40 620	41 055	41 490	
				2 506.0 MHz	2 549.5 MHz	2 593.0 MHz	2 636.5 MHz	2 680.0 MHz	
5 MHz	QPSK	1	0	16.97	16.51	16.76	17.18	17.16	0
		1	12	17.02	16.65	17.23	17.44	17.38	0
		1	24	16.98	16.51	16.81	17.22	17.12	0
		12	0	16.96	16.52	16.85	17.21	17.13	0
		12	7	17.00	16.53	16.92	17.24	17.26	0
		12	13	16.92	16.50	16.88	17.22	17.12	0
		25	0	16.99	16.52	16.92	17.30	17.26	0
	16QAM	1	0	17.28	16.52	16.82	17.27	17.20	0
		1	12	17.46	16.83	17.15	17.26	17.48	0
		1	24	17.17	16.58	16.95	17.48	17.16	0
		12	0	16.93	16.51	16.83	17.18	17.07	0
		12	7	16.96	16.58	16.95	17.26	17.14	0
		12	13	16.88	16.52	16.90	17.14	17.06	0
		25	0	17.02	16.50	16.87	17.25	17.17	0
	64QAM	1	0	16.51	16.50	16.62	17.46	17.16	0
		1	12	16.67	16.51	16.64	17.27	17.29	0
		1	24	16.52	16.53	16.51	17.40	17.11	0
		12	0	16.83	16.62	16.70	17.26	17.22	0
		12	7	16.92	16.68	16.75	17.26	17.26	0
		12	13	16.78	16.64	16.74	17.26	17.30	0
		25	0	16.89	16.69	16.77	17.22	17.30	0

9.4.2 LTE Band 41 (Hotspot, Grip Sensor, Ear-jack)

Band width	Modulation	RB Size	RB offset	Maximum Average Power					MPR
				39 750	40 185	40 620	41 055	41 490	
				2 506.0 MHz	2 549.5 MHz	2 593.0 MHz	2 636.5 MHz	2 680.0 MHz	
20 MHz	QPSK	1	0	15.40	15.01	15.02	15.44	15.44	0
		1	49	15.63	15.29	15.70	16.30	15.91	0
		1	99	15.02	15.01	15.36	15.47	15.35	0
		50	0	15.51	15.09	15.37	15.71	15.74	0
		50	24	15.60	15.15	15.52	15.82	15.75	0
		50	50	15.44	15.02	15.47	15.76	15.63	0
		100	0	15.49	15.13	15.56	15.71	15.63	0
	16QAM	1	0	15.50	15.20	15.10	15.47	15.22	0
		1	49	15.78	15.06	15.33	16.10	15.72	0
		1	99	15.11	15.50	15.01	15.48	15.16	0
		50	0	15.49	15.06	15.40	15.74	15.74	0
		50	24	15.51	15.04	15.50	15.82	15.70	0
		50	50	15.41	15.02	15.60	15.76	15.60	0
		100	0	15.50	15.08	15.51	15.73	15.62	0
	64QAM	1	0	15.14	15.01	15.10	15.70	15.52	0
		1	49	15.21	15.02	15.00	16.15	15.87	0
		1	99	15.02	15.02	15.01	15.62	15.43	0
		50	0	15.45	15.28	15.04	16.20	16.02	0
		50	24	15.44	15.19	15.17	16.24	16.05	0
		50	50	15.34	15.14	15.32	16.18	15.87	0
		100	0	15.45	15.27	15.28	16.20	15.99	0

Band width	Modulation	RB Size	RB offset	Maximum Average Power					MPR
				39 750	40 185	40 620	41 055	41 490	
				2 506.0 MHz	2 549.5 MHz	2 593.0 MHz	2 636.5 MHz	2 680.0 MHz	
15 MHz	QPSK	1	0	15.30	15.12	15.22	15.66	15.59	0
		1	36	15.46	15.07	15.43	15.85	15.73	0
		1	74	15.13	15.01	15.46	15.67	15.59	0
		36	0	15.50	15.12	15.42	15.76	15.74	0
		36	18	15.51	15.10	15.50	15.85	15.76	0
		36	37	15.41	15.05	15.53	15.77	15.70	0
		75	0	15.43	15.08	15.53	15.76	15.68	0
	16QAM	1	0	15.70	15.04	15.12	15.77	15.59	0
		1	36	15.64	15.05	15.36	15.98	15.71	0
		1	74	15.35	15.02	15.37	15.76	15.54	0
		36	0	15.52	15.09	15.34	15.74	15.71	0
		36	18	15.46	15.05	15.48	15.82	15.72	0
		36	37	15.38	15.03	15.48	15.72	15.63	0
		75	0	15.47	15.06	15.49	15.73	15.64	0
	64QAM	1	0	15.22	15.08	15.15	15.82	15.69	0
		1	36	15.15	15.02	15.01	15.98	15.80	0
		1	74	15.02	15.11	15.07	15.84	15.65	0
		36	0	15.42	15.34	15.09	16.28	16.08	0
		36	18	15.43	15.27	15.24	16.27	16.08	0
		36	37	15.29	15.15	15.31	16.17	15.96	0
		75	0	15.42	15.17	15.14	16.25	15.97	0

Band width	Modulation	RB Size	RB offset	Maximum Average Power					MPR
				39 750	40 185	40 620	41 055	41 490	
				2 506.0 MHz	2 549.5 MHz	2 593.0 MHz	2 636.5 MHz	2 680.0 MHz	
10 MHz	QPSK	1	0	15.32	15.17	15.41	15.82	15.66	0
		1	25	15.63	15.25	15.67	15.98	15.87	0
		1	49	15.37	15.01	15.56	15.75	15.64	0
		25	0	15.49	15.15	15.42	15.74	15.72	0
		25	12	15.46	15.03	15.42	15.72	15.71	0
		25	25	15.46	15.07	15.47	15.77	15.65	0
		50	0	15.54	15.13	15.49	15.77	15.69	0
	16QAM	1	0	15.77	15.11	15.07	15.93	15.67	0
		1	25	15.84	15.18	15.33	16.12	15.88	0
		1	49	15.54	15.02	15.22	15.91	15.68	0
		25	0	15.51	15.06	15.43	15.78	15.68	0
		25	12	15.45	15.05	15.40	15.72	15.65	0
		25	25	15.50	15.06	15.56	15.72	15.63	0
		50	0	15.52	15.07	15.51	15.70	15.65	0
	64QAM	1	0	15.32	15.10	15.01	16.01	15.78	0
		1	25	15.06	15.03	15.01	15.93	15.64	0
		1	49	15.01	15.02	15.11	15.94	15.69	0
		25	0	15.48	15.38	15.21	15.37	16.08	0
		25	12	15.49	15.26	15.37	15.40	16.07	0
		25	25	15.46	15.23	15.36	15.27	15.97	0
		50	0	15.45	15.25	15.25	15.36	16.02	0

Band width	Modulation	RB Size	RB offset	Maximum Average Power					MPR
				39 750	40 185	40 620	41 055	41 490	
				2 506.0 MHz	2 549.5 MHz	2 593.0 MHz	2 636.5 MHz	2 680.0 MHz	
5 MHz	QPSK	1	0	15.76	15.03	15.29	15.74	15.62	0
		1	12	15.86	15.23	15.58	16.09	15.85	0
		1	24	15.31	15.01	15.34	15.68	15.60	0
		12	0	15.42	15.00	15.31	15.74	15.65	0
		12	7	15.54	15.04	15.48	15.74	15.77	0
		12	13	15.43	15.00	15.38	15.70	15.63	0
		25	0	15.47	15.08	15.52	15.72	15.67	0
	16QAM	1	0	15.74	15.05	15.36	15.99	15.67	0
		1	12	15.95	15.30	15.70	16.24	15.91	0
		1	24	15.66	15.05	15.46	15.92	15.67	0
		12	0	15.42	15.03	15.35	15.61	15.56	0
		12	7	15.46	15.04	15.49	15.70	15.68	0
		12	13	15.38	15.07	15.45	15.62	15.60	0
		25	0	15.55	15.07	15.49	15.74	15.64	0
	64QAM	1	0	15.09	15.01	15.05	15.92	15.71	0
		1	12	15.20	15.02	15.16	16.09	15.82	0
		1	24	15.03	15.20	15.11	15.89	15.66	0
		12	0	15.36	15.16	15.15	16.28	16.07	0
		12	7	15.43	15.16	15.22	16.32	16.09	0
		12	13	15.32	15.12	15.23	16.21	16.01	0
		25	0	15.42	15.18	15.27	16.30	16.05	0

9.5 WLAN Average Conducted Output Power(Maximum Average Power)

Band	Freq. [MHz]	Channel	Mode		
			802.11b	802.11g	802.11n
WLAN 2.4 GHz	2 412.0	1	18.48	13.58	13.51
	2 437.0	6	18.74	16.85	16.84
	2 462.0	11	18.66	13.63	13.65
	2 467.0	12	14.48	9.57	9.46
	2 472.0	13	14.24	9.16	9.12

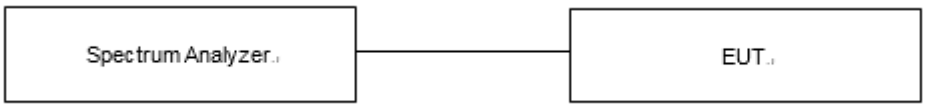
9.6 WLAN Average Conducted Output Power (Reduced Average Power-RCV)

Band	Freq. [MHz]	Channel	Mode		
			802.11b	802.11g	802.11n
WLAN 2.4 GHz	2 412.0	1	13.43	12.55	12.52
	2 437.0	6	13.94	13.93	13.86
	2 462.0	11	13.86	12.79	12.67
	2 467.0	12	13.69	8.65	8.55
	2 472.0	13	13.26	8.11	8.08

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



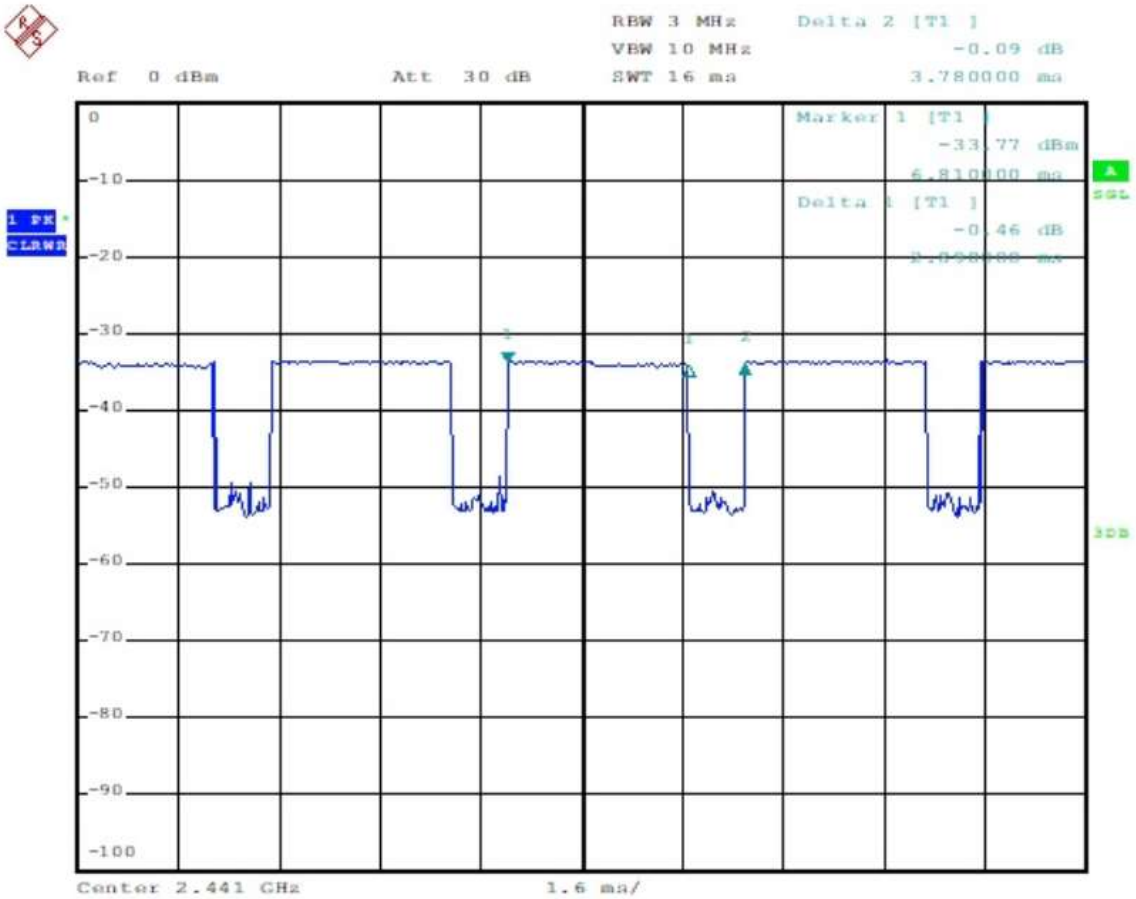
9.7 Bluetooth Average Conducted Output Power

Mode	Freq. [MHz]	Channel	Conducted Powers (dBm)
BDR_DH5 (1 Mbps)	2 402.0	0	9.31
	2 441.0	39	9.73
	2 480.0	78	9.69
EDR_2-DH5 (2 Mbps)	2 402.0	0	5.79
	2 441.0	39	6.00
	2 480.0	78	5.73
EDR_3-DH5 (3 Mbps)	2 402.0	0	5.77
	2 441.0	39	6.00
	2 480.0	78	5.72
LE (1 Mbps) 37	2 402.0	0	5.61
	2 440.0	19	6.76
	2 480.0	39	6.05
LE (1 Mbps) 255	2 402.0	0	5.58
	2 440.0	19	6.77
	2 480.0	39	5.97
LE (2 Mbps) 37	2 402.0	0	5.69
	2 440.0	19	6.78
	2 480.0	39	6.03
LE (2 Mbps) 255	2 402.0	0	5.57
	2 440.0	19	6.77
	2 480.0	39	6.03

9.8 Wireless Band Duty Cycle

Wireless Bands	Frequency Bands	Mode	Duty Cycle (%)
GSM	850 1900	Voice, GPRS(GMSK), EGPRS(8PSK)	Voice: 12.5
			(E)GPRS 1Tx : 12.5
			(E)GPRS 2Tx : 25.0
			(E)GPRS 3Tx : 37.5
			(E)GPRS 4Tx : 50.0
WCDMA	Band V	RMC, HSDPA, HSUPA, DC-HSDPA	100
LTE	FDD Band 5	QPSK, 16QAM, 64QAM	100
	TDD Band 41		63.33
WLAN	2.4 GHz	802.11b	99.60

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	2.890	3.780	0.765	1.307



10. System Verification

10.1 Tissue Verification

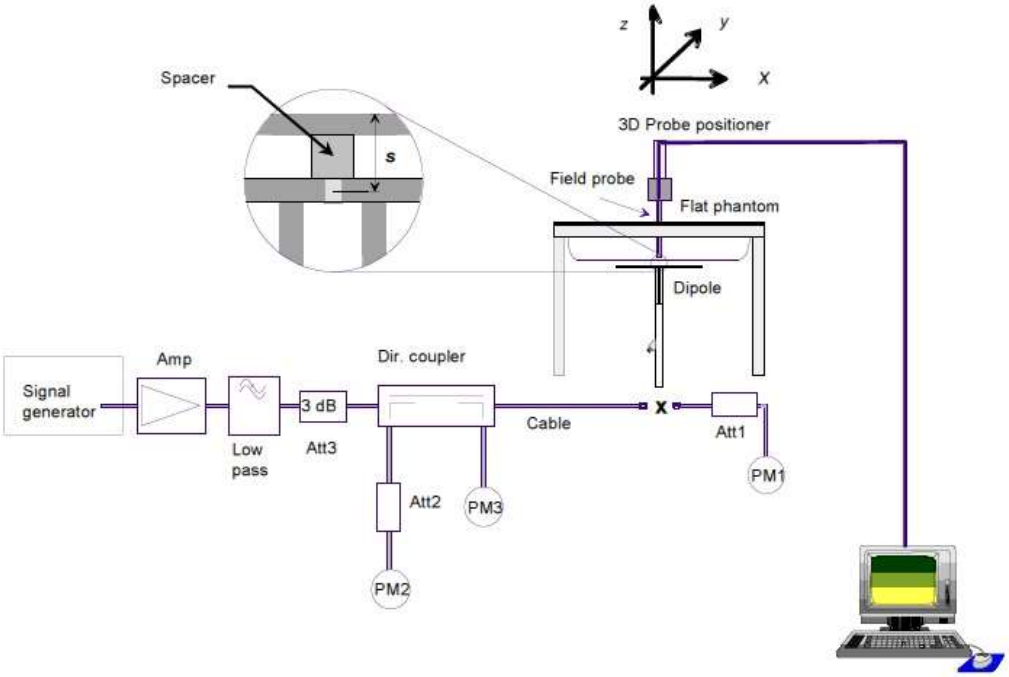
The dielectric properties for this Tissue Simulant Liquids were measured by using the SPEAG Model DAK3.5 Dielectric Probe in conjunction with Agilent E5071B Network Analyzer (300 ㎑ – 8 500 ㎒). The Conductivity (σ) and Permittivity (ρ) are listed in Table 1.For the SAR measurement given in this report.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

Freq. (㎒)	Limit/Measured		Permittivity (ρ)	Conductivity (σ)	Temp. (°C)
850.0	Recommended Limit		41.50 ± 5 % (39.43 ~ 43.58)	0.92 ± 5 % (0.87 ~ 0.97)	22 ± 2
	Measured	2021-03-17	41.54	0.95	20.82
850.0	Recommended Limit		41.50 ± 5 % (39.43 ~ 43.58)	0.92 ± 5 % (0.87 ~ 0.97)	22 ± 2
	Measured	2021-03-18	41.30	0.90	21.32
1 900.0	Recommended Limit		40.00 ± 5 % (38.00 ~ 42.00)	1.40 ± 5 % (1.33 ~ 1.47)	22 ± 2
	Measured	2021-03-16	40.90	1.45	21.21
2 450.0	Recommended Limit		39.20 ± 5 % (37.24 ~ 41.16)	1.80 ± 5 % (1.71 ~ 1.89)	22 ± 2
	Measured	2021-03-19	40.86	1.73	21.25
2 600.0	Recommended Limit		39.00 ± 5 % (37.05 ~ 40.95)	1.96 ± 5 % (1.86 ~ 2.06)	22 ± 2
	Measured	2021-03-17	38.48	1.97	20.95
2 600.0	Recommended Limit		39.00 ± 5 % (37.05 ~ 40.95)	1.96 ± 5 % (1.86 ~ 2.06)	22 ± 2
	Measured	2021-03-18	38.51	1.97	20.83
2 600.0	Recommended Limit		39.00 ± 5 % (37.05 ~ 40.95)	1.96 ± 5 % (1.86 ~ 2.06)	22 ± 2
	Measured	2021-03-19	38.24	1.96	21.03
2 600.0	Recommended Limit		39.00 ± 5 % (37.05 ~ 40.95)	1.96 ± 5 % (1.86 ~ 2.06)	22 ± 2
	Measured	2021-03-20	38.79	1.97	20.78

<Table 1. Measurement result of Tissue electric parameters>

10.2 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 t arget 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) ℃, th e relative humidity was in the range(50 ± 20)% and the liquid depth Above the ear/grid refer ence points was above 15 ㎝ 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)		
D850V2 SN: 1006	EX3DV4 SN: 7540	850.0	HSL	Recommended Limit 1g (Normalized)		9.95 ± 10 % (8.96 ~ 10.95)
				Measured	2021-03-17	10.40
D850V2 SN: 1006	EX3DV4 SN: 7540	850.0	HSL	Recommended Limit 1g (Normalized)		9.95 ± 10 % (8.96 ~ 10.95)
				Measured	2021-03-18	9.76
D1900V2 SN: 5d160	EX3DV4 SN: 7540	1 900.0	HSL	Recommended Limit 1g (Normalized)		39.40 ± 10 % (35.46 ~ 43.34)
				Measured	2021-03-16	41.20
D2450V2 SN: 895	EX3DV4 SN: 7540	2 450.0	HSL	Recommended Limit 1g (Normalized)		52.40 ± 10 % (47.16 ~ 57.64)
				Measured	2021-03-19	51.00
D2600V2 SN: 1050	EX3DV4 SN: 3928	2 600.0	HSL	Recommended Limit 1g (Normalized)		56.20 ± 10 % (50.58 ~ 61.82)
				Measured	2021-03-17	54.10
D2600V2 SN: 1050	EX3DV4 SN: 3928	2 600.0	HSL	Recommended Limit 1g (Normalized)		56.20 ± 10 % (50.58 ~ 61.82)
				Measured	2021-03-18	54.80
D2600V2 SN: 1050	EX3DV4 SN: 3928	2 600.0	HSL	Recommended Limit 1g (Normalized)		56.20 ± 10 % (50.58 ~ 61.82)
				Measured	2021-03-19	54.40
D2600V2 SN: 1050	EX3DV4 SN: 3928	2 600.0	HSL	Recommended Limit 1g (Normalized)		56.20 ± 10 % (50.58 ~ 61.82)
				Measured	2021-03-20	56.10

<Table 2. System Verification Result>

11. SAR Test Results

11.1 Standalone Head SAR Test Results

GSM 850									
Mode	EUT Position	Distance (㎜)	Frequency (㎒)	Measured Conducted Power (dB m)	Max. Tune-up Power (dB m)	Power Scaling Factor	Measured 1 g SAR (W/kg)	Scaled 1 g SAR (W/kg)	Plot No.
Voice	Right Cheek	0	836.6	32.76	34.00	1.330	0.181	0.241	
	Right Tilt	0	836.6	32.76	34.00	1.330	0.093	0.124	
	Left Cheek	0	836.6	32.76	34.00	1.330	0.153	0.203	
	Left Tilt	0	836.6	32.76	34.00	1.330	0.082	0.109	
GPRS 4Tx	Right Cheek	0	836.6	29.14	30.00	1.219	0.277	**0.338**	1
	Right Tilt	0	836.6	29.14	30.00	1.219	0.140	0.171	
	Left Cheek	0	836.6	29.14	30.00	1.219	0.254	0.310	
	Left Tilt	0	836.6	29.14	30.00	1.219	0.137	0.167	

GSM 1900									
Mode	EUT Position	Distance (㎜)	Frequency (㎒)	Measured Conducted Power (dB m)	Max. Tune-up Power (dB m)	Power Scaling Factor	Measured 1 g SAR (W/kg)	Scaled 1 g SAR (W/kg)	Plot No.
Voice	Right Cheek	0	1 880.0	29.00	30.50	1.413	0.043	0.061	
	Right Tilt	0	1 880.0	29.00	30.50	1.413	0.044	0.062	
	Left Cheek	0	1 880.0	29.00	30.50	1.413	0.067	0.095	
	Left Tilt	0	1 880.0	29.00	30.50	1.413	0.042	0.059	
GPRS 4Tx	Right Cheek	0	1 880.0	25.95	26.50	1.135	0.082	0.093	
	Right Tilt	0	1 880.0	25.95	26.50	1.135	0.082	0.093	
	Left Cheek	0	1 880.0	25.95	26.50	1.135	0.124	**0.141**	2
	Left Tilt	0	1 880.0	25.95	26.50	1.135	0.080	0.091	

WCDMA Band V									
Mode	EUT Position	Distance (㎜)	Frequency (㎒)	Measured Conducted Power (dB m)	Max. Tune-up Power (dB m)	Power Scaling Factor	Measured 1 g SAR (W/kg)	Scaled 1 g SAR (W/kg)	Plot No.
RMC	Right Cheek	0	836.6	24.19	25.00	1.205	0.239	**0.288**	3
	Right Tilt	0	836.6	24.19	25.00	1.205	0.128	0.154	
	Left Cheek	0	836.6	24.19	25.00	1.205	0.201	0.242	
	Left Tilt	0	836.6	24.19	25.00	1.205	0.111	0.134	

LTE Band 5									
Mode	**EUT Position**	**Distance (㎜)**	**Frequency (㎒)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Measured 1 g SAR (W/kg)**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
QPSK 10M 1RB 25Offset	Right Cheek	0	836.5	24.01	25.00	1.256	0.256	**0.322**	4
QPSK 10M 25RB 0Offset	Right Cheek	0	836.5	22.70	24.00	1.349	0.197	0.266	
QPSK 10M 1RB 25Offset	Right Tilt	0	836.5	24.01	25.00	1.256	0.121	0.152	
QPSK 10M 25RB 0Offset	Right Tilt	0	836.5	22.70	24.00	1.349	0.095	0.128	
QPSK 10M 1RB 25Offset	Left Cheek	0	836.5	24.01	25.00	1.256	0.208	0.261	
QPSK 10M 25RB 0Offset	Left Cheek	0	836.5	22.70	24.00	1.349	0.164	0.221	
QPSK 10M 1RB 25Offset	Left Tilt	0	836.5	24.01	25.00	1.256	0.105	0.132	
QPSK 10M 25RB 0Offset	Left Tilt	0	836.5	22.70	24.00	1.349	0.082	0.111	

LTE Band 41									
Mode	**EUT Position**	**Distance (㎜)**	**Frequency (㎒)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Measured 1 g SAR (W/kg)**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
QPSK 20M 1RB 49Offset	Right Cheek	0	2 636.5	17.50	18.50	1.259	0.509	0.641	
QPSK 20M 1RB 49Offset	Right Cheek	0	2 506.0	17.25	18.50	1.334	0.569	0.759	
QPSK 20M 1RB 49Offset	Right Cheek	0	2 549.5	17.30	18.50	1.318	0.548	0.722	
QPSK 20M 1RB 49Offset	Right Cheek	0	2 593.0	17.14	18.50	1.368	0.532	0.728	
QPSK 20M 1RB 49Offset	Right Cheek	0	2 680.0	17.41	18.50	1.285	0.532	0.684	
QPSK 20M 50RB 24Offset	Right Cheek	0	2 636.5	17.29	18.50	1.321	0.497	0.657	
QPSK 20M 50RB 24Offset	Right Cheek	0	2 506.0	16.97	18.50	1.422	0.579	0.823	
QPSK 20M 50RB 24Offset	Right Cheek	0	2 549.5	17.14	18.50	1.368	0.613	**0.839**	5
QPSK 20M 50RB 24Offset	Right Cheek	0	2 593.0	17.02	18.50	1.406	0.537	0.755	
QPSK 20M 50RB 24Offset	Right Cheek	0	2 680.0	17.23	18.50	1.340	0.506	0.678	
QPSK 20M 100RB 0Offset	Right Cheek	0	2 636.5	17.20	18.50	1.349	0.503	0.679	
QPSK 20M 1RB 49Offset	Right Tilt	0	2 636.5	17.50	18.50	1.259	0.170	0.214	
QPSK 20M 50RB 24Offset	Right Tilt	0	2 636.5	17.29	18.50	1.321	0.164	0.217	
QPSK 20M 1RB 49Offset	Left Cheek	0	2 636.5	17.50	18.50	1.259	0.125	0.157	
QPSK 20M 50RB 24Offset	Left Cheek	0	2 636.5	17.29	18.50	1.321	0.119	0.157	
QPSK 20M 1RB 49Offset	Left Tilt	0	2 636.5	17.50	18.50	1.259	0.051	0.064	
QPSK 20M 50RB 24Offset	Left Tilt	0	2 636.5	17.29	18.50	1.321	0.050	0.066	

2.4 ㎓ WLAN											
Mode	**EUT Position**	**Distance (㎜)**	**Frequency (㎒)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Duty Cycle Compensate Factor**	**Area scan Max 1g SAR (W/kg))**	**Measured 1 g SAR (W/kg**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
802.11b	Right Cheek	0	2 437.0	13.94	14.00	1.014	1.004	0.355	0.335	**0.341**	6
	Right Tilt	0	2 437.0	13.94	14.00	1.014	1.004	0.237	-	-	
	Left Cheek	0	2 437.0	13.94	14.00	1.014	1.004	0.146	-	-	
	Left Tilt	0	2 437.0	13.94	14.00	1.014	1.004	0.148	-	-	

Note: When the reported SAR is ≤ 0.4 W/kg, further SAR measurement within this exposure condition are not required Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR is ≤ 0.8 W/kg or all test positions are measured.

Bluetooth										
Mode	**EUT Position**	**Distance (㎜)**	**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.**
BDR_ DH5	Right Cheek	0	2 441.0	9.73	10.00	1.064	1.307	0.081	**0.113**	7
	Right Tilt	0	2 441.0	9.73	10.00	1.064	1.307	0.061	0.085	
	Left Cheek	0	2 441.0	9.73	10.00	1.064	1.307	0.036	0.050	
	Left Tilt	0	2 441.0	9.73	10.00	1.064	1.307	0.037	0.051	

11.2 Standalone Body-Worn SAR Test Results

GSM 850									
Mode	EUT Position	Distance (mm)	Frequency (MHz)	Measured Conducted Power (dB m)	Max. Tune-up Power (dB m)	Power Scaling Factor	Measured 1 g SAR (W/kg)	Scaled 1 g SAR (W/kg)	Plot No.
Voice	Front	15	836.6	32.76	34.00	1.330	0.158	0.210	
	Rear	15	836.6	32.76	34.00	1.330	0.271	0.360	
GPRS 4Tx	Front	15	836.6	29.14	30.00	1.219	0.240	0.293	
	Rear	15	836.6	29.14	30.00	1.219	0.426	**0.519**	8

GSM 1900									
Mode	EUT Position	Distance (mm)	Frequency (MHz)	Measured Conducted Power (dB m)	Max. Tune-up Power (dB m)	Power Scaling Factor	Measured 1 g SAR (W/kg)	Scaled 1 g SAR (W/kg)	Plot No.
Voice	Front	15	1 880.0	29.00	30.50	1.413	0.075	0.106	
	Rear	15	1 880.0	29.00	30.50	1.413	0.115	0.162	
GPRS 4Tx	Front	15	1 880.0	25.95	26.50	1.135	0.141	0.160	
	Rear	15	1 880.0	25.95	26.50	1.135	0.210	**0.238**	9

WCDMA Band V									
Mode	EUT Position	Distance (mm)	Frequency (MHz)	Measured Conducted Power (dB m)	Max. Tune-up Power (dB m)	Power Scaling Factor	Measured 1 g SAR (W/kg)	Scaled 1 g SAR (W/kg)	Plot No.
RMC	Front	15	836.6	24.19	25.00	1.205	0.209	0.252	
	Rear	15	836.6	24.19	25.00	1.205	0.338	**0.407**	10

LTE Band 5									
Mode	EUT Position	Distance (mm)	Frequency (MHz)	Measured Conducted Power (dB m)	Max. Tune-up Power (dB m)	Power Scaling Factor	Measured 1 g SAR (W/kg)	Scaled 1 g SAR (W/kg)	Plot No.
QPSK 10M 1RB 25Offset	Front	15	836.5	24.01	25.00	1.256	0.197	0.247	
QPSK 10M 25RB 0Offset	Front	15	836.5	22.70	24.00	1.349	0.148	0.200	
QPSK 10M 1RB 25Offset	Rear	15	836.5	24.01	25.00	1.256	0.301	**0.378**	11
QPSK 10M 25RB 0Offset	Rear	15	836.5	22.70	24.00	1.349	0.222	0.299	

LTE Band 41									
Mode	**EUT Position**	**Distance (㎜)**	**Frequency (㎒)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Measured 1 g SAR (W/kg)**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
QPSK 20M 1RB 49Offset	Front	15	2 636.5	22.53	23.50	1.250	0.200	0.250	
QPSK 20M 50RB 24Offset	Front	15	2 636.5	21.26	22.50	1.330	0.154	0.205	
QPSK 20M 1RB 49Offset	Rear	15	2 636.5	22.53	23.50	1.250	0.836	1.045	
QPSK 20M 1RB 49Offset	Rear	15	2 506.0	22.20	23.50	1.349	0.740	0.998	
QPSK 20M 1RB 49Offset	Rear	15	2 549.5	21.72	23.50	1.507	0.853	**1.285**	12
QPSK 20M 1RB 49Offset	Rear	15	2 593.0	21.66	23.50	1.528	0.720	1.100	
QPSK 20M 1RB 49Offset	Rear	15	2 680.0	22.42	23.50	1.282	0.802	1.028	
QPSK 20M 50RB 24Offset	Rear	15	2 636.5	21.26	22.50	1.330	0.644	0.857	
QPSK 20M 50RB 24Offset	Rear	15	2 506.0	20.97	22.50	1.422	0.733	1.042	
QPSK 20M 50RB 24Offset	Rear	15	2 549.5	21.10	22.50	1.380	0.756	1.043	
QPSK 20M 50RB 24Offset	Rear	15	2 593.0	20.67	22.50	1.524	0.800	1.219	
QPSK 20M 50RB 24Offset	Rear	15	2 680.0	21.21	22.50	1.346	0.663	0.892	
QPSK 20M 100RB 0Offset	Rear	15	2 636.5	21.21	22.50	1.346	0.618	0.832	
Device without Holder									
QPSK 20M 1RB 49Offset	Rear	15	2 549.5	21.72	23.50	1.507	0.818	1.233	
Earphone									
QPSK 20M 1RB 49Offset	Rear	15	2 549.5	15.29	17.00	1.483	0.300	0.445	
Repeated SAR Test									
QPSK 20M 1RB 49Offset	Rear	15	2 549.5	21.72	23.50	1.507	0.821	1.237	

2.4 ㎓ WLAN											
Mode	**EUT Position**	**Distance (㎜)**	**Frequency (㎒)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Duty Cycle Compensate Factor**	**Area scan Max 1g SAR (W/kg))**	**Measured 1 g SAR (W/kg**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
802.11b	Front	15	2 437.0	18.74	19.00	1.062	1.004	0.105	-	-	
	Rear	15	2 437.0	18.74	19.00	1.062	1.004	0.140	0.123	**0.131**	13

Note: When the reported SAR is ≤ 0.4 W/kg, further SAR measurement within this exposure condition are not required Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR is ≤ 0.8 W/kg or all test positions are measured.

11.3 Standalone Hotspot SAR Test Results

GSM 850									
Mode	**EUT Position**	**Distance (㎜)**	**Frequency (㎒)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Measured 1 g SAR (W/kg)**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
GPRS 4Tx	Front	10	836.6	29.14	30.00	1.219	0.232	0.283	
	Rear	10	836.6	29.14	30.00	1.219	0.501	**0.611**	14
	Left	10	836.6	29.14	30.00	1.219	0.167	0.204	
	Right	10	836.6	29.14	30.00	1.219	0.333	0.406	
	Bottom	10	836.6	29.14	30.00	1.219	0.136	0.166	

GSM 1900									
Mode	**EUT Position**	**Distance (㎜)**	**Frequency (㎒)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Measured 1 g SAR (W/kg)**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
GPRS 4Tx	Front	10	1 880.0	25.95	26.50	1.135	0.257	0.292	
	Rear	10	1 880.0	25.95	26.50	1.135	0.468	**0.531**	15
	Left	10	1 880.0	25.95	26.50	1.135	0.208	0.236	
	Right	10	1 880.0	25.95	26.50	1.135	0.103	0.117	
	Bottom	10	1 880.0	25.95	26.50	1.135	0.383	0.435	

WCDMA Band V									
Mode	**EUT Position**	**Distance (㎜)**	**Frequency (㎒)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Measured 1 g SAR (W/kg)**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
RMC	Front	10	836.6	24.19	25.00	1.205	0.198	0.239	
	Rear	10	836.6	24.19	25.00	1.205	0.405	**0.488**	16
	Left	10	836.6	24.19	25.00	1.205	0.152	0.183	
	Right	10	836.6	24.19	25.00	1.205	0.271	0.327	
	Bottom	10	836.6	24.19	25.00	1.205	0.111	0.134	

LTE Band 5									
Mode	EUT Position	Distance (mm)	Frequency (MHz)	Measured Conducted Power (dB m)	Max. Tune-up Power (dB m)	Power Scaling Factor	Measured 1 g SAR (W/kg)	Scaled 1 g SAR (W/kg)	Plot No.
QPSK 10M 1RB 25Offset	Front	10	836.5	24.01	25.00	1.256	0.196	0.246	
QPSK 10M 25RB 0Offset	Front	10	836.5	22.70	24.00	1.349	0.149	0.201	
QPSK 10M 1RB 25Offset	Rear	10	836.5	24.01	25.00	1.256	0.500	**0.628**	17
QPSK 10M 25RB 0Offset	Rear	10	836.5	22.70	24.00	1.349	0.396	0.534	
QPSK 10M 1RB 25Offset	Left	10	836.5	24.01	25.00	1.256	0.150	0.188	
QPSK 10M 25RB 0Offset	Left	10	836.5	22.70	24.00	1.349	0.113	0.152	
QPSK 10M 1RB 25Offset	Right	10	836.5	24.01	25.00	1.256	0.246	0.309	
QPSK 10M 25RB 0Offset	Right	10	836.5	22.70	24.00	1.349	0.173	0.233	
QPSK 10M 1RB 25Offset	Bottom	10	836.5	24.01	25.00	1.256	0.124	0.156	
QPSK 10M 25RB 0Offset	Bottom	10	836.5	22.70	24.00	1.349	0.096	0.130	

LTE Band 41									
Mode	**EUT Position**	**Distance (mm)**	**Frequency (MHz)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Measured 1 g SAR (W/kg)**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
QPSK 20M 1RB 49Offset	Front	10	2 636.5	16.30	17.00	1.175	0.102	0.120	
QPSK 20M 50RB 24Offset	Front	10	2 636.5	15.82	17.00	1.312	0.097	0.127	
QPSK 20M 1RB 49Offset	Rear	10	2 636.5	16.30	17.00	1.175	0.509	0.598	
QPSK 20M 50RB 24Offset	Rear	10	2 636.5	15.82	17.00	1.312	0.480	0.630	
QPSK 20M 50RB 24Offset	Rear	10	2 506.0	15.60	17.00	1.380	0.536	0.740	
QPSK 20M 50RB 24Offset	Rear	10	2 549.5	15.15	17.00	1.531	0.566	**0.867**	18
QPSK 20M 50RB 24Offset	Rear	10	2 593.0	15.52	17.00	1.406	0.599	0.842	
QPSK 20M 50RB 24Offset	Rear	10	2 680.0	15.75	17.00	1.334	0.442	0.590	
QPSK 20M 100RB 0Offset	Rear	10	2 636.5	15.71	17.00	1.346	0.487	0.656	
QPSK 20M 1RB 49Offset	Left	10	2 636.5	16.30	17.00	1.175	0.490	0.576	
QPSK 20M 50RB 24Offset	Left	10	2 636.5	15.82	17.00	1.312	0.471	0.618	
QPSK 20M 50RB 24Offset	Left	10	2 506.0	15.60	17.00	1.380	0.401	0.553	
QPSK 20M 50RB 24Offset	Left	10	2 549.5	15.15	17.00	1.531	0.462	0.707	
QPSK 20M 50RB 24Offset	Left	10	2 593.0	15.52	17.00	1.406	0.493	0.693	
QPSK 20M 50RB 24Offset	Left	10	2 680.0	15.75	17.00	1.334	0.462	0.616	
QPSK 20M 100RB 0Offset	Left	10	2 636.5	15.71	17.00	1.346	0.467	0.629	
QPSK 20M 1RB 49Offset	Top	10	2 636.5	16.30	17.00	1.175	0.037	0.043	
QPSK 20M 50RB 24Offset	Top	10	2 636.5	15.82	17.00	1.312	0.036	0.047	

Note: Hotspot mode supports power reduction. When the measured SAR is scaled to the maximum tune-up limit, the adjusted SAR is > 1.2 W/kg. Therefore, Phablet 10g SAR testing is required for this band.

2.4 GHz WLAN											
Mode	**EUT Position**	**Distance (mm)**	**Frequency (MHz)**	**Measured Conducted Power (dB m)**	**Max. Tune-up Power (dB m)**	**Power Scaling Factor**	**Duty Cycle Compensate Factor**	**Area scan Max 1g SAR (W/kg))**	**Measured 1 g SAR (W/kg**	**Scaled 1 g SAR (W/kg)**	**Plot No.**
802.11b	Front	10	2 437.0	18.74	19.00	1.062	1.004	0.196	-	-	
	Rear	10	2 437.0	18.74	19.00	1.062	1.004	0.312	0.274	**0.292**	19
	Left	10	2 437.0	18.74	19.00	1.062	1.004	0.143	-	-	
	Top	10	2 437.0	18.74	19.00	1.062	1.004	0.181	-	-	

Note: When the reported SAR is ≤ 0.4 W/kg, further SAR measurement within this exposure condition are not required Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR is ≤ 0.8 W/kg or all test positions are measured.

11.4 Standalone Phablet SAR Test Results

LTE Band 41									
Mode	EUT Position	Distance (㎜)	Frequency (㎒)	Measured Conducted Power (dB m)	Max. Tune-up Power (dB m)	Power Scaling Factor	Measured 10 g SAR (W/kg)	Scaled 10 g SAR (W/kg)	Plot No.
Grip Sensor Off									
QPSK 20M 1RB 49Offset	Front	0	2 636.5	22.53	23.50	1.250	1.190	**1.488**	20
QPSK 20M 50RB 24Offset	Front	0	2 636.5	21.26	22.50	1.330	0.927	1.233	
QPSK 20M 1RB 49Offset	Rear	14	2 636.5	22.53	23.50	1.250	0.499	0.624	
QPSK 20M 50RB 24Offset	Rear	14	2 636.5	21.26	22.50	1.330	0.386	0.513	
QPSK 20M 1RB 49Offset	Left	14	2 636.5	22.53	23.50	1.250	0.457	0.571	
QPSK 20M 50RB 24Offset	Left	14	2 636.5	21.26	22.50	1.330	0.351	0.467	
QPSK 20M 1RB 49Offset	Top	0	2 636.5	22.53	23.50	1.250	0.191	0.239	
QPSK 20M 50RB 24Offset	Top	0	2 636.5	21.26	22.50	1.330	0.156	0.207	
Grip Sensor On									
QPSK 20M 1RB 49Offset	Rear	0	2 636.5	16.30	17.00	1.175	0.932	1.095	
QPSK 20M 50RB 24Offset	Rear	0	2 636.5	15.82	17.00	1.312	0.902	1.183	
QPSK 20M 1RB 49Offset	Left	0	2 636.5	16.30	17.00	1.175	1.060	1.246	
QPSK 20M 50RB 24Offset	Left	0	2 636.5	15.82	17.00	1.312	1.030	1.351	

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, and FCC KDB Publication 447498 D01v06.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings and the standard batteries are the only options.
4. Liquid tissue depth was at least 15 ㎝.
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. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 15 ㎜ was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
8. Per FCC KDB Publication 648474 D04v01r03, body-worn SAR was evaluated without a headset connected to the device. Since the standalone reported body-worn SAR was ≤ 1.2 W/kg, no additional body-worn SAR evaluations using a headset cable were required.
9. This device utilizes power reduction for some wireless modes, as outlined in Section 2.3. The maximum output power allowed for each transmitter and exposure condition was evaluated for SAR compliance based on expected use conditions and simultaneous transmission scenarios.

GSM Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
2. This device supports GSM VOIP in the head and body-worn configurations; therefore GPRS was additionally evaluated for head and body-worn compliance.
3. Justification for reduced test configurations per KDB Publication 941225 D01v03r01 and October 2013 TCB Workshop Notes: The source-based frame-averaged output power was evaluated for all GPRS/EDGE slot configurations. The configuration with the highest target frame averaged output power was evaluated for hotspot SAR. When the maximum frame-averaged powers are equivalent across two or more slots (within 0.25 dB), the configuration with the most number of time slots was tested.
4. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). Since the maximum output power variation across the required test channels is not > ½ dB, the middle channel was used for testing.

WCDMA Notes:

1. UMTS mode in was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03r01. AMR and HSPA SAR was not required per the 3G Test Reduction Procedure in KDB Publication 941225 D01v03r01.
2. 2. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g evaluations then testing at the other channels is not required for such test configuration(s).

LTE Notes:

1. Justification Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
2. When the reported SAR is > 0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
3. Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.
4. Testing for 16-QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.
5. Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.
6. A-MPR was disabled for all SAR tests by setting NS=01 and MCC=001 on the base station simulator.
7. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).
8. TDD LTE was tested using UL-DL configuration 0 with 6 UL sub frames and 2S sub-frames using extended cyclic prefix only and special sub frame configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Sec. 4, the duty factor using extended cyclic prefix is 0.633(cf=1.58).
9. For LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing; therefore, the requirement for H, M and L channels may not fully apply.

WLAN & Bluetooth Notes:

1. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4㎓ WIFI operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4㎓ 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR.
2. 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.
3. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n then ac) is selected.
4. When the maximum reported 1g averaged SAR is ≤0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured.

12. 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.

12.1 Estimated SAR

When standalone SAR is not required to be measured, per FCC KDB 447498 D01v06 4.3.2 b), the following equation must be used to estimate the standalone 1g or 10g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(\text{GHz})}}{7.5} \times \frac{(\text{Max Power of channel, mW})}{\text{Min. Separation Distance, mm}}$$

Mode	Position	Frequency	Maximum Allowed Power	Separation Distance	Estimated 1g SAR
		MHz	mW	mm	W/kg
Bluetooth	Body-worn	2 480.0	10	15	0.140
	Hotspot	2 480.0	10	10	0.210

Notes:
- Bluetooth SAR was not required to be measured per FCC KDB Publication 447498 D01v06.
- Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

12.2 Simultaneous Transmission Analysis

Exposure Condition /Position		licensed	WLAN 2.4 GHz	Bluetooth	Summation	
		[①]	[②]	[③]	[①+②]	[①+③]
GSM/GPRS 850 Band						
Head	Right Cheek	0.338	0.341	0.113	0.679	0.451
	Right Tilt	0.171	0.341	0.085	0.512	0.256
	Left Cheek	0.310	0.341	0.050	0.651	0.360
	Left Tilt	0.167	0.341	0.051	0.508	0.218
Body-Worn	Front	0.293	0.131	0.140	0.424	0.433
	Rear	0.519	0.131	0.140	0.650	0.659
Hotspot	Front	0.283	0.292	0.210	0.575	0.493
	Rear	0.611	0.292	0.210	0.903	0.821
	Left	0.204	0.292	0.210	0.496	0.414
	Right	0.406	-	-	0.406	0.406
	Top	-	0.292	0.210	0.292	0.210
	Bottom	0.166	-	-	0.166	0.166
GSM/GPRS 1900 Band						
Head	Right Cheek	0.093	0.341	0.113	0.434	0.206
	Right Tilt	0.093	0.341	0.085	0.434	0.178
	Left Cheek	0.141	0.341	0.050	0.482	0.191
	Left Tilt	0.091	0.341	0.051	0.432	0.142
Body-Worn	Front	0.160	0.131	0.140	0.291	0.300
	Rear	0.238	0.131	0.140	0.369	0.378
Hotspot	Front	0.292	0.292	0.210	0.584	0.502
	Rear	0.531	0.292	0.210	0.823	0.741
	Left	0.236	0.292	0.210	0.528	0.446
	Right	0.117	-	-	0.117	0.117
	Top	-	0.292	0.210	0.292	0.210
	Bottom	0.435	-	-	0.435	0.435

Exposure Condition /Position		licensed	WLAN 2.4 GHz	Bluetooth	Summation	
		[①]	[②]	[③]	[①+②]	[①+③]
WCDMA Band V						
Head	Right Cheek	0.288	0.341	0.113	0.629	0.401
	Right Tilt	0.154	0.341	0.085	0.495	0.239
	Left Cheek	0.242	0.341	0.050	0.583	0.292
	Left Tilt	0.134	0.341	0.051	0.475	0.185
Body-Worn	Front	0.252	0.131	0.140	0.383	0.392
	Rear	0.407	0.131	0.140	0.538	0.547
Hotspot	Front	0.239	0.292	0.210	0.531	0.449
	Rear	0.488	0.292	0.210	0.780	0.698
	Left	0.183	0.292	0.210	0.475	0.393
	Right	0.327	-	-	0.327	0.327
	Top	-	0.292	0.210	0.292	0.210
	Bottom	0.134	-	-	0.134	0.134
LTE Band 5						
Head	Right Cheek	0.322	0.341	0.113	0.663	0.435
	Right Tilt	0.152	0.341	0.085	0.493	0.237
	Left Cheek	0.261	0.341	0.050	0.602	0.311
	Left Tilt	0.132	0.341	0.051	0.473	0.183
Body-Worn	Front	0.247	0.131	0.140	0.378	0.387
	Rear	0.378	0.131	0.140	0.509	0.518
Hotspot	Front	0.246	0.292	0.210	0.538	0.456
	Rear	0.628	0.292	0.210	0.920	0.838
	Left	0.188	0.292	0.210	0.480	0.398
	Right	0.309	-	-	0.309	0.309
	Top	-	0.292	0.210	0.292	0.210
	Bottom	0.156	-	-	0.156	0.156

Exposure Condition /Position		licensed	WLAN 2.4 GHz	Bluetooth	Summation	
		[①]	[②]	[③]	[①+②]	[①+③]
LTE Band 41						
Head	Right Cheek	0.839	0.341	0.113	1.180	0.952
	Right Tilt	0.217	0.341	0.085	0.558	0.302
	Left Cheek	0.157	0.341	0.050	0.498	0.207
	Left Tilt	0.066	0.341	0.051	0.407	0.117
Body-Worn	Front	0.250	0.131	0.140	0.381	0.390
	Rear	1.285	0.131	0.140	1.416	1.425
Hotspot	Front	0.127	0.292	0.210	0.419	0.337
	Rear	0.867	0.292	0.210	1.159	1.077
	Left	0.707	0.292	0.210	0.999	1.077
	Right	-	-	-	-	-
	Top	0.047	0.292	0.210	0.339	0.257
	Bottom	-	-	-	-	-
Phablet	Front	1.488	-	-	1.488	1.488
	Rear	1.183	-	-	1.183	1.183
	Left	1.351	-	-	1.351	1.351
	Right	-	-	-	-	-
	Top	0.239	-	-	0.239	0.239
	Bottom	-	-	-	-	-

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.
- ※ " – " = SAR test exclusion

13. DUT Holder Perturbations

Per Oct. 2016 TCB Workshop, When the highest reported SAR of an antenna is > 1.2 W/kg, holder perturbation verification is required for each antenna, using the highest SAR configuration among all applicable frequency bands.

Rear sides are evaluated without DUT holder.(Refer to Appendix F. test setup photo)

Frequency Band [㎒]	Band	RF Exposure Condition	EUT Position	Highest reported SAR [W/kg]	Without holder reported SAR [W/kg]	Deviation [%]
2 600.0	LTE Band 41	Body-Worn	Rear	1.285	1.233	-4.05

Note: It was confirmed that the deviation is within the measurement uncertainty and the SAR value does not increase due to DUT holder.

14. 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/kg.
2) **When the original highest measured SAR is ≥ 0.80 W/㎏, 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.

RF Exposure Conditions	Band	Mode	Frequency (㎒)	EUT Position	Separation Distance (㎜)	Measured 1 g SAR (W/kg)	Repeated 1g SAR (W/kg)	Ratio
Body-Worn	LTE Band 41	QPSK 20M 1RB 49Offset	2 549.5	Rear	15	0.853	0.821	1.04

15. 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.

16. 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 - 1	-	-
Shield Room	-	8F - 3	-	-
DASY5 Robot	TX90XL speag	F07/554JA1/A/01	-	-
DASY6 Robot	TX90XL speag	F/18/0004968/A/001	-	-
Phantom	Twin SAM Phantom	1363	-	-
Phantom	Twin SAM Phantom	1984	-	-
Mounting Device	Mounting Device	-	-	-
DAE	DAE4	666	2021-01-22	2022-01-22
DAE	DAE4	1342	2020-05-25	2021-05-25
Probe	EX3DV4	3928	2021-02-23	2022-02-23
Probe	EX3DV4	7540	2020-04-28	2021-04-28
ESG Vector Signal Generator	E4438C	MY42080486	2020-05-11	2021-05-11
ESG Vector Signal Generator	E4438C	MY42080845	2021-02-25	2022-02-25
Dual Power Meter	E4419B	GB43312301	2020-05-12	2021-05-12
Dual Power Meter	EPM-442A	GB37480680	2020-05-12	2021-05-12
Power Sensor	8481H	2703A11902	2020-05-12	2021-05-12
Power Sensor	8481H	3318A18090	2020-05-12	2021-05-12
Power Sensor	8481H	3318A 19379	2020-05-12	2021-05-12
Power Sensor	8481H	3318A 19377	2020-05-12	2021-05-12
Attenuator	8491A	21552	2020-05-12	2021-05-12
Attenuator	8491A	35560	2020-05-12	2021-05-12
Attenuator	8491A	35934	2020-05-12	2021-05-12
Attenuator	8491B 3dB	17387	2020-05-12	2021-05-12
Attenuator	8491B-6dB	MY39270294	2020-05-12	2021-05-12
Attenuator	8491B 10dB	29425	2020-05-12	2021-05-12
Power Amplifier	AMP2027	10010	2020-05-12	2021-05-12
Power Amplifier	GRF5039	1062	2020-05-12	2021-05-12
Power Amplifier	2055-BBS3Q7E9I	1005D/C0521	2021-02-25	2022-02-25
Dual Directional Coupler	778D-012	50136	2020-05-12	2021-05-12
Dual Directional Coupler	772D	2839A160504	2020-05-12	2021-05-12
Dual Directional Coupler	772D	2839A00719	2020-05-12	2021-05-12
Low Pass Filter	NLP-1000+	VUU79701846	2020-05-12	2021-05-12
Low Pass Filter	VLF-3000+	31831	2020-05-12	2021-05-12
Low Pass Filter	LA-30N	40058	2020-05-12	2021-05-12

Equipment	Model	Serial Number	Date of Calibration	Due date of next Calibration
Dipole Validation Kits	D850V2	1006	2020-04-21	2022-04-21
Dipole Validation Kits	D1900V2	5d160	2020-04-22	2022-04-22
Dipole Validation Kits	D2450V2	895	2020-07-21	2022-07-21
Dipole Validation Kits	D2600V2	1050	2020-07-21	2022-07-21
Network Analyzer	E5071B	MY42403524	2021-02-15	2022-02-15
Dielectric Assessment Kit	DAK-3.5	1078	2020-05-19	2021-05-19
Humidity/Temp	MHB-382SD	46307	2021-03-08	2022-03-08
Humidity/Temp	MHB-382SD	73871	2020-05-14	2021-05-14
Wideband Radio Cmmunication Tester	CMW500	132423	2021-02-25	2022-02-25
Wideband Radio Communication Tester	CMW500	132120	2020-05-11	2021-05-11
Spectrum Analyzer	FSP7	100289	2020-12-23	2021-12-23

17. Test System Verification Results

Date: 3/17/2021

Test Laboratory: KCTL Inc.
File Name: 850 MHz Verification Input Power 250 mW 2021-03-17.da52:0

DUT: Dipole 850 MHz D850V2, Type: D850V2, Serial: D850V2 - SN:1006

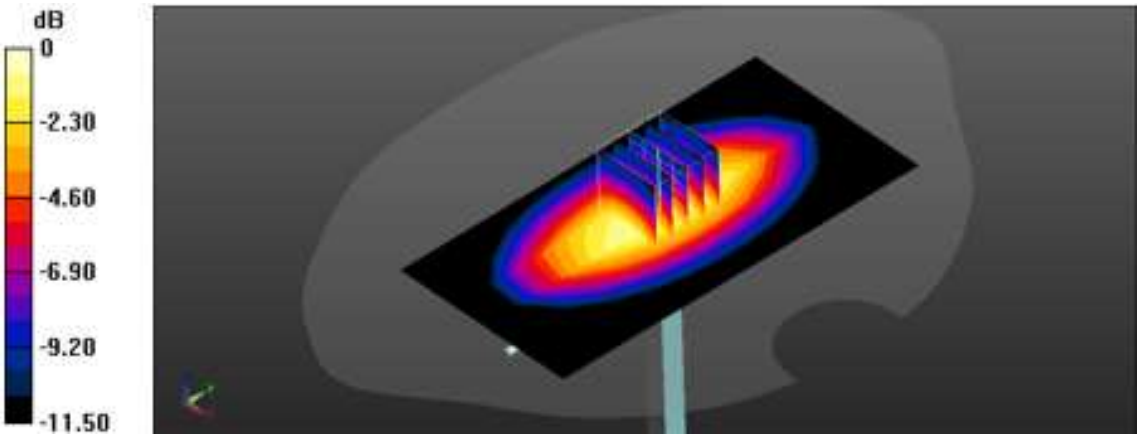
Communication System: UID 0, CW (0); Frequency: 850 MHz; Duty Cycle: 1:1
Medium parameters used: f = 850 MHz; σ = 0.95 S/m; ε_r = 41.54; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540;ConvF(9.32, 9.32, 9.32) @ 850 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

System Performance Check/850 MHz Verification Input Power 250 mW 2021-03-17/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.37 W/kg

System Performance Check/850 MHz Verification Input Power 250 mW 2021-03-17/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 62.57 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 4.02 W/kg
SAR(1 g) = 2.6 W/kg; SAR(10 g) = 1.66 W/kg
Smallest distance from peaks to all points 3 dB below = 16 mm
Ratio of SAR at M2 to SAR at M1 = 64.1%
Maximum value of SAR (measured) = 3.54 W/kg



0 dB = 3.54 W/kg = 5.49 dBW/kg

Date: 3/18/2021

Test Laboratory: KCTL Inc.
File Name: 850 MHz Verification Input Power 250 mW 2021-03-18.da52:0

DUT: Dipole 850 MHz D850V2, Type: D850V2, Serial: D850V2 - SN:1006

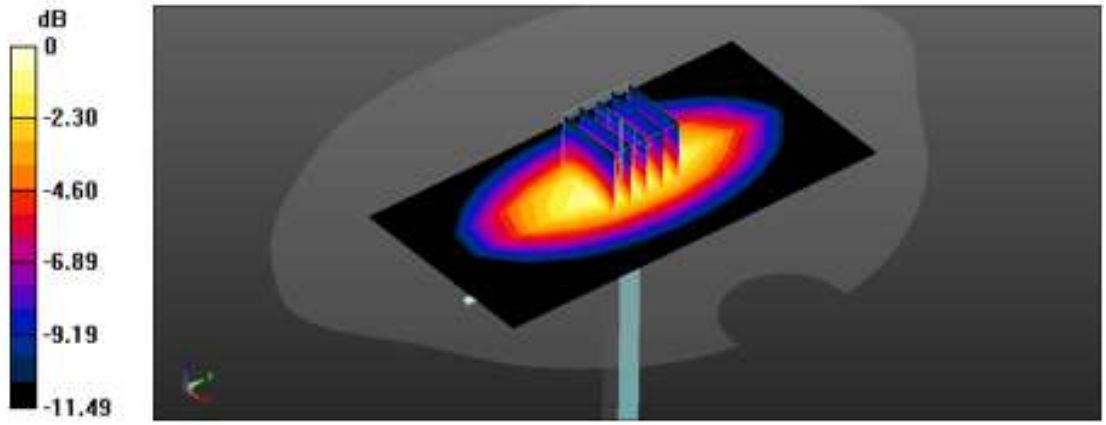
Communication System: UID 0, CW (0); Frequency: 850 MHz; Duty Cycle: 1:1
Medium parameters used: f = 850 MHz; σ = 0.9 S/m; ε_r = 41.299; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540;ConvF(9.32, 9.32, 9.32) @ 850 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

System Performance Check/850 MHz Verification Input Power 250 mW 2021-03-18/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.20 W/kg

System Performance Check/850 MHz Verification Input Power 250 mW 2021-03-18/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 62.78 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 3.74 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.57 W/kg
Smallest distance from peaks to all points 3 dB below = 17.2 mm
Ratio of SAR at M2 to SAR at M1 = 64.9%
Maximum value of SAR (measured) = 3.30 W/kg



0 dB = 3.30 W/kg = 5.19 dBW/kg

Date: 3/16/2021

Test Laboratory: KCTL Inc.
File Name: 1900 MHz Verification Input Power 250 mW 2021-03-16.da52:0

DUT: Dipole 1900 MHz D1900V2, Type: D1900V2, Serial: D1900V2 - SN:5d160

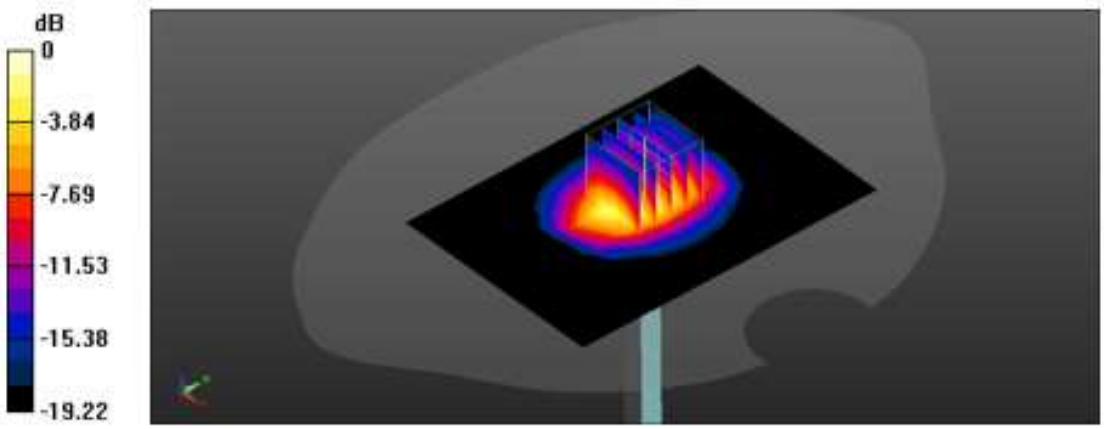
Communication System: UID 0, CW (0); Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.445 S/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540;ConvF(8.17, 8.17, 8.17) @ 1900 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

System Performance Check (without Area Scan)/1900 MHz Verification Input Power 250 mW 2021-03-16/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 14.4 W/kg

System Performance Check (without Area Scan)/1900 MHz Verification Input Power 250 mW 2021-03-16/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 104.5 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 19.5 W/kg
SAR(1 g) = 10.3 W/kg; SAR(10 g) = 5.23 W/kg
Smallest distance from peaks to all points 3 dB below = 9.6 mm
Ratio of SAR at M2 to SAR at M1 = 52.2%
Maximum value of SAR (measured) = 16.1 W/kg



0 dB = 16.1 W/kg = 12.07 dBW/kg

Date: 3/19/2021

Test Laboratory: KCTL Inc.
File Name: 2450 MHz Verification Iuput Power 100 mW 2021-03-19.da52:0

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 = 1.732 S/m; ε_r = 40.86; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

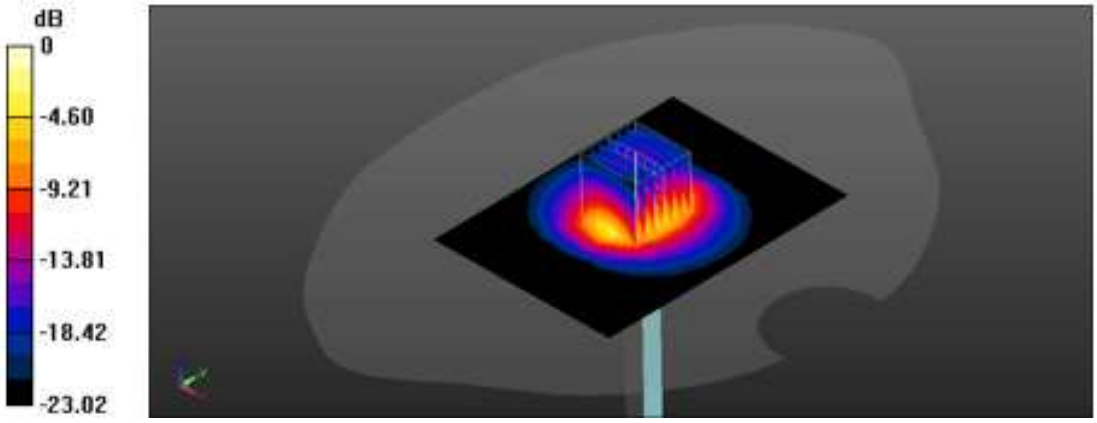
- Probe: EX3DV4 - SN7540;ConvF(7.46, 7.46, 7.46) @ 2450 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

System Performance Check (without Area Scan)/2450 MHz Verification Input Power 100 mW 2021-03-19/Area Scan (9x12x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 7.79 W/kg

System Performance Check (without Area Scan)/2450 MHz Verification Input Power 100 mW 2021-03-19/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 71.03 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 10.8 W/kg
SAR(1 g) = 5.1 W/kg; SAR(10 g) = 2.34 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 47.1%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 8.60 W/kg



0 dB = 8.60 W/kg = 9.34 dBW/kg

Date: 2021-03-17

Test Laboratory: KCTL Inc.
File Name: 2600 MHz Verification Input Power 100 mW 2021-03.17.da5:0

DUT: Dipole 2600 MHz D2600V2, Type: D2600V2, Serial: D2600V2 - SN:1050

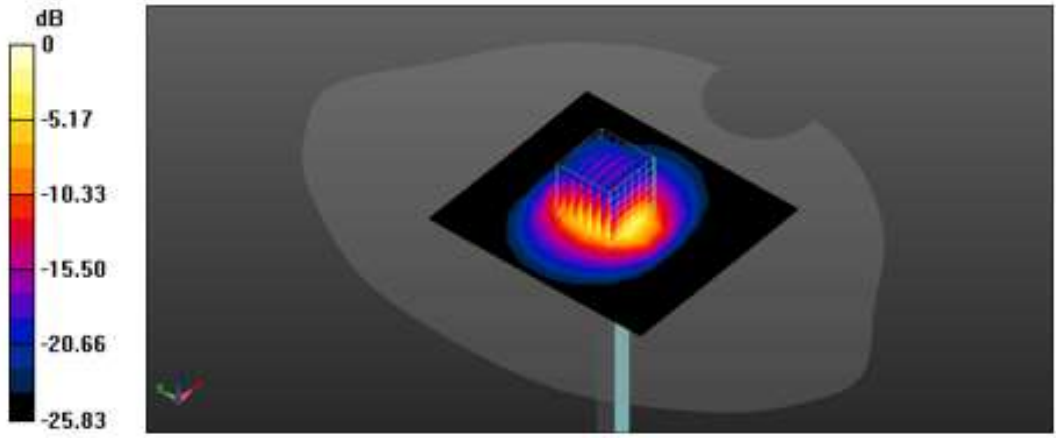
Communication System: UID 0, CW (0); Frequency: 2600 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 1.971 S/m; ε_r = 38.483; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3928;ConvF(7.21, 7.21, 7.21) @ 2600 MHz; Calibrated: 2021-02-23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn666; Calibrated: 2021-01-22
- Phantom: Twin-SAM V4.0 -1; Type: QD 000 P40 CC; Serial: 1363
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/2600 MHz Verification Input Power 100 mW 2021-03-17/Area Scan (10x11x1):
Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 7.84 W/kg

Configuration/2600 MHz Verification Input Power 100 mW 2021-03-17/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 72.55 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 12.4 W/kg
SAR(1 g) = 5.41 W/kg; SAR(10 g) = 2.34 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 43.2%
Maximum value of SAR (measured) = 9.53 W/kg



0 dB = 9.53 W/kg = 9.79 dBW/kg

Date: 2021-03-18

Test Laboratory: KCTL Inc.
File Name: 2600 MHz Verification Input Power 100 mW 2021-03.18.da5:0

DUT: Dipole 2600 MHz D2600V2, Type: D2600V2, Serial: D2600V2 - SN:1050

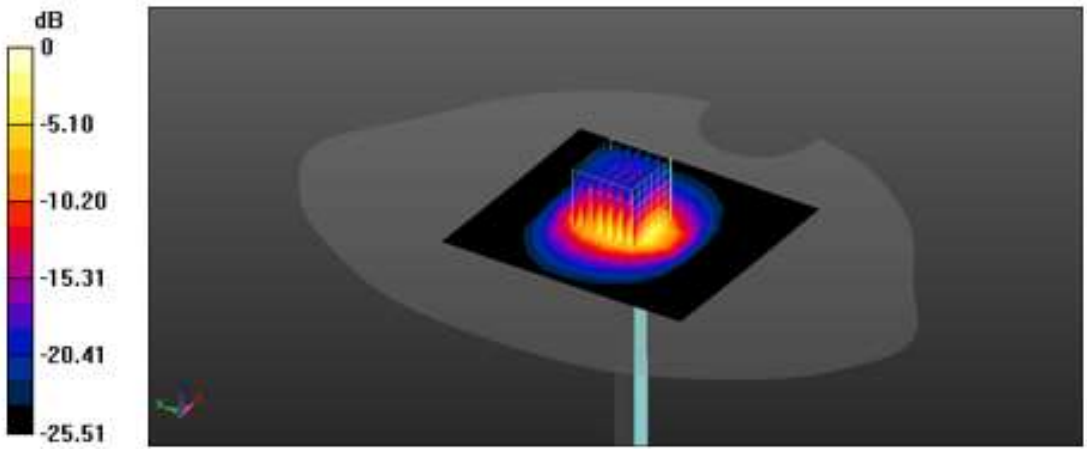
Communication System: UID 0, CW (0); Frequency: 2600 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 1.97 S/m; ε_r = 38.506; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3928;ConvF(7.21, 7.21, 7.21) @ 2600 MHz; Calibrated: 2021-02-23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn666; Calibrated: 2021-01-22
- Phantom: Twin-SAM V4.0 -1; Type: QD 000 P40 CC; Serial: 1363
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/2600 MHz Verification Input Power 100 mW 2021-03-18/Area Scan (10x11x1):
Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 7.94 W/kg

Configuration/2600 MHz Verification Input Power 100 mW 2021-03-18/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 71.65 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 12.5 W/kg
SAR(1 g) = 5.48 W/kg; SAR(10 g) = 2.37 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 43.2%
Maximum value of SAR (measured) = 9.65 W/kg



0 dB = 9.65 W/kg = 9.85 dBW/kg

Date: 2021-03-19

Test Laboratory: KCTL Inc.
File Name: 2600 MHz Verification Input Power 100 mW 2021-03.19.da5:0

DUT: Dipole 2600 MHz D2600V2, Type: D2600V2, Serial: D2600V2 - SN:1050

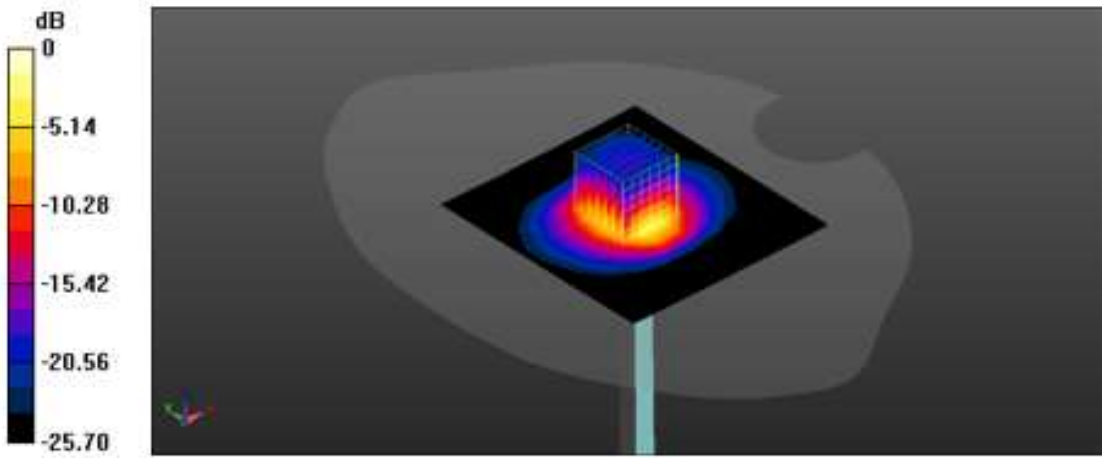
Communication System: UID 0, CW (0); Frequency: 2600 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 1.961 S/m; ε_r = 38.236; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3928;ConvF(7.21, 7.21, 7.21) @ 2600 MHz; Calibrated: 2021-02-23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn666; Calibrated: 2021-01-22
- Phantom: Twin-SAM V4.0 -1; Type: QD 000 P40 CC; Serial: 1363
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/2600 MHz Verification Input Power 100 mW 2021-03-19/Area Scan (10x11x1):
Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 7.76 W/kg

Configuration/2600 MHz Verification Input Power 100 mW 2021-03-19/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 72.26 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 12.5 W/kg
SAR(1 g) = 5.44 W/kg; SAR(10 g) = 2.34 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 43.2%
Maximum value of SAR (measured) = 9.66 W/kg



0 dB = 9.66 W/kg = 9.85 dBW/kg

Date: 2021-03-20

Test Laboratory: KCTL Inc.
File Name: 2600 MHz Verification Input Power 100 mW 2021-03.20.da5:0

DUT: Dipole 2600 MHz D2600V2, Type: D2600V2, Serial: D2600V2 - SN:1050

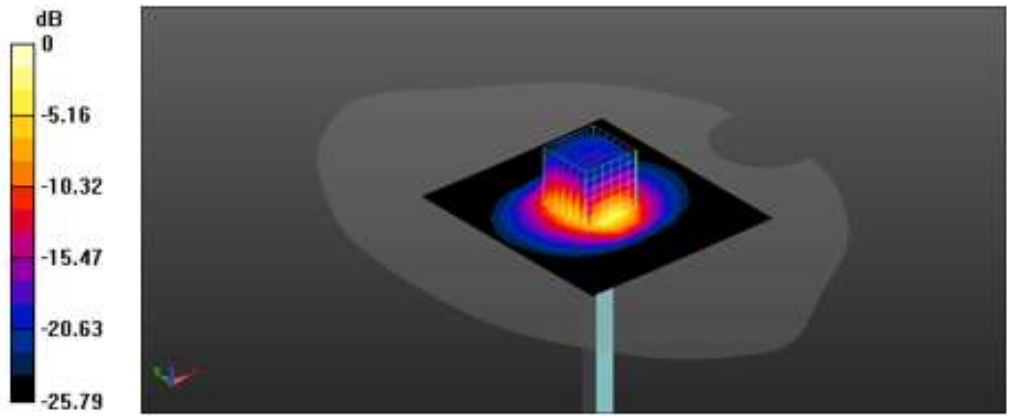
Communication System: UID 0, CW (0); Frequency: 2600 MHz; Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 1.97 S/m; ε_r = 38.794; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3928;ConvF(7.21, 7.21, 7.21) @ 2600 MHz; Calibrated: 2021-02-23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn666; Calibrated: 2021-01-22
- Phantom: Twin-SAM V4.0 -1; Type: QD 000 P40 CC; Serial: 1363
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/2600 MHz Verification Input Power 100 mW 2021-03-20/Area Scan (10x11x1):
Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 8.00 W/kg

Configuration/2600 MHz Verification Input Power 100 mW 2021-03-20/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 71.81 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 12.8 W/kg
SAR(1 g) = 5.61 W/kg; SAR(10 g) = 2.42 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 43.2%
Maximum value of SAR (measured) = 9.91 W/kg



0 dB = 9.91 W/kg = 9.96 dBW/kg

18. Test Results

1)

Date: 3/18/2021

Test Laboratory: KCTL Inc.
File Name: 1.GSM850_Head.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

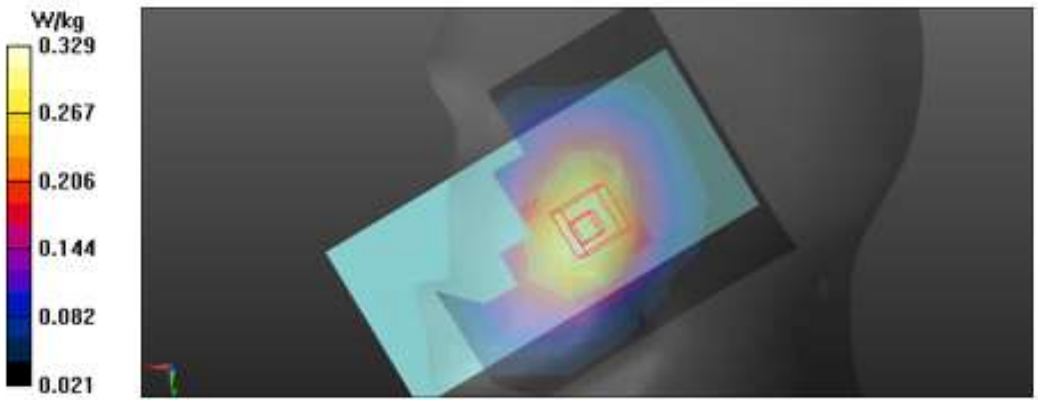
Communication System: UID 0, GSM850_4TX (0); Frequency: 836.6 MHz; Duty Cycle: 1:2.07491
Medium parameters used: f = 836.6 MHz; σ = 0.886 S/m; ε_r = 41.391; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540;ConvF(9.32, 9.32, 9.32) @ 836.6 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/GSM850_GPRS 4Tx_CH190_Right Cheek/Area Scan (9x10x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.332 W/kg

Configuration/GSM850_GPRS 4Tx_CH190_Right Cheek/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.72 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.361 W/kg
SAR(1 g) = 0.277 W/kg; SAR(10 g) = 0.204 W/kg
Smallest distance from peaks to all points 3 dB below = 24.6 mm
Ratio of SAR at M2 to SAR at M1 = 76.5%
Maximum value of SAR (measured) = 0.329 W/kg



2)

Date: 3/16/2021

Test Laboratory: KCTL Inc.
File Name: **1.GSM 1900_Head.da53:1**

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

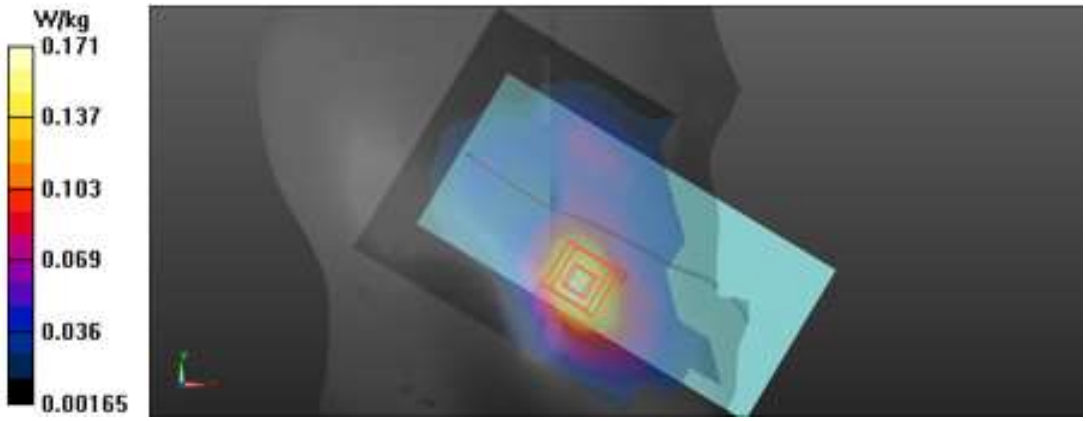
Communication System: UID 0, GSM1900_4TX (0); Frequency: 1880 MHz; Duty Cycle: 1:2.07491
Medium parameters used: f = 1880 MHz; σ = 1.419 S/m; ε_r = 40.947; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540;ConvF(8.17, 8.17, 8.17) @ 1880 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration 2/GSM 1900_GPRS 4Tx_CH661_Left Cheek/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.170 W/kg

Configuration 2/GSM 1900_GPRS 4Tx_CH661_Left Cheek/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.331 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.196 W/kg
SAR(1 g) = 0.124 W/kg; SAR(10 g) = 0.077 W/kg
Smallest distance from peaks to all points 3 dB below = 16 mm
Ratio of SAR at M2 to SAR at M1 = 63.6%
Maximum value of SAR (measured) = 0.171 W/kg



3)

Date: 3/18/2021

Test Laboratory: KCTL Inc.
File Name: 4.WCDMA FDD V_Head.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

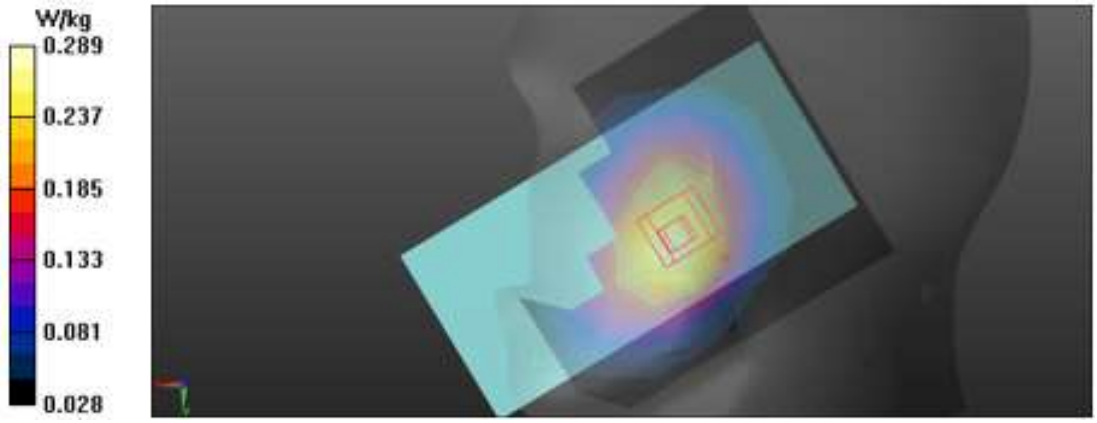
Communication System: UID 0, W-CDMA 850 (Band 5) (0); Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.886 S/m; ε_r = 41.391; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540;ConvF(9.32, 9.32, 9.32) @ 836.6 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/WCDMA FDD V_CH4183_Right Cheek/Area Scan (9x10x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.294 W/kg

Configuration/WCDMA FDD V_CH4183_Right Cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.59 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.315 W/kg
SAR(1 g) = 0.239 W/kg; SAR(10 g) = 0.176 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 = 75.3%
Maximum value of SAR (measured) = 0.289 W/kg



4)

Date: 3/17/2021

Test Laboratory: KCTL Inc.
File Name: 1.LTE Band 5_Head.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.933 S/m; ε_r = 41.675; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

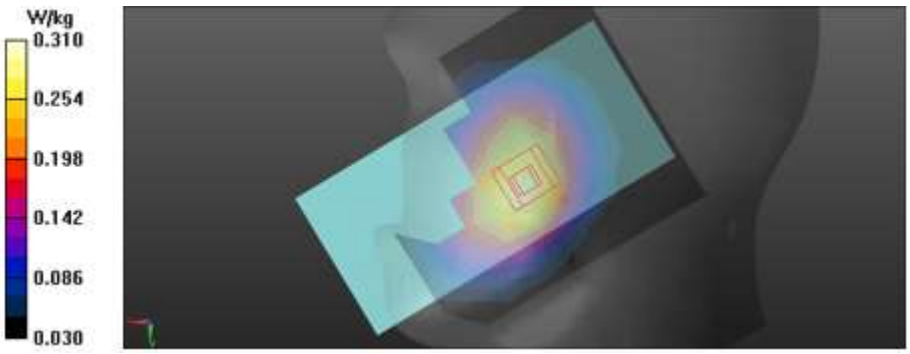
- Probe: EX3DV4 - SN7540;ConvF(9.32, 9.32, 9.32) @ 836.5 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/LTE Band 5_QPSK_10 MHz_1RB_25offset_CH20525_Right Cheek/Area Scan (9x10x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.311 W/kg

Configuration/LTE Band 5_QPSK_10 MHz_1RB_25offset_CH20525_Right Cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.95 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.339 W/kg
SAR(1 g) = 0.256 W/kg; SAR(10 g) = 0.188 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 = 75.8%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.310 W/kg



5)

Date: 2021-03-17

Test Laboratory: KCTL Inc.
File Name: 1.LTE Band 41_QPSK_20 MHz_Head.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBVH

Communication System: UID 0, LTE Band 41 (0); Frequency: 2549.5 MHz; Duty Cycle: 1:1.58016
Medium parameters used (interpolated): f = 2549.5 MHz; σ = 1.959 S/m; ε_r = 38.511; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

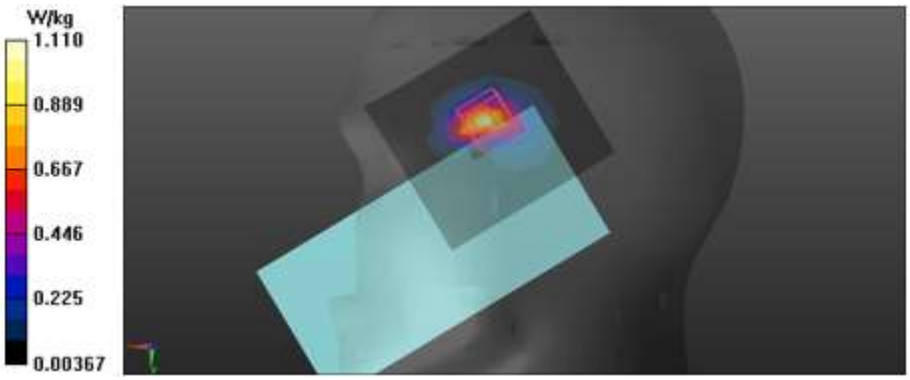
- Probe: EX3DV4 - SN3928;ConvF(7.21, 7.21, 7.21) @ 2549.5 MHz; Calibrated: 2021-02-23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn666; Calibrated: 2021-01-22
- Phantom: Twin-SAM V4.0 -1; Type: QD 000 P40 CC; Serial: 1363
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/LTE Band 41_QPSK_20 MHz_50RB_24offset_CH40185_Right Cheek/Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.10 W/kg

Configuration/LTE Band 41_QPSK_20 MHz_50RB_24offset_CH40185_Right Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.29 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.51 W/kg
SAR(1 g) = 0.613 W/kg; SAR(10 g) = 0.256 W/kg
Smallest distance from peaks to all points 3 dB below = 6.1 mm
Ratio of SAR at M2 to SAR at M1 = 43%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.11 W/kg



6)

Date: 3/19/2021

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

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

Communication System: UID 0, 2.4GWLAN (0); Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.719 S/m; ε_r = 40.901; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

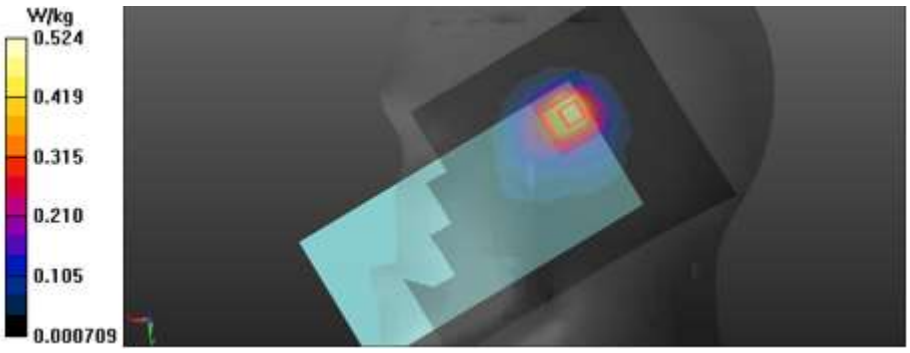
- Probe: EX3DV4 - SN7540;ConvF(7.46, 7.46, 7.46) @ 2437 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/802.11b_CH6_Right Cheek/Area Scan (11x15x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.495 W/kg

Configuration/802.11b_CH6_Right Cheek/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.418 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.687 W/kg
SAR(1 g) = 0.335 W/kg; SAR(10 g) = 0.164 W/kg
Smallest distance from peaks to all points 3 dB below = 8.6 mm
Ratio of SAR at M2 to SAR at M1 = 49.2%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.524 W/kg



7)

Date: 3/19/2021

Test Laboratory: KCTL Inc.
File Name: 4.Bluetooth_Head.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz; Duty Cycle: 1:1.30677
Medium parameters used (interpolated): f = 2441 MHz; σ = 1.726 S/m; ε_r = 40.867; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

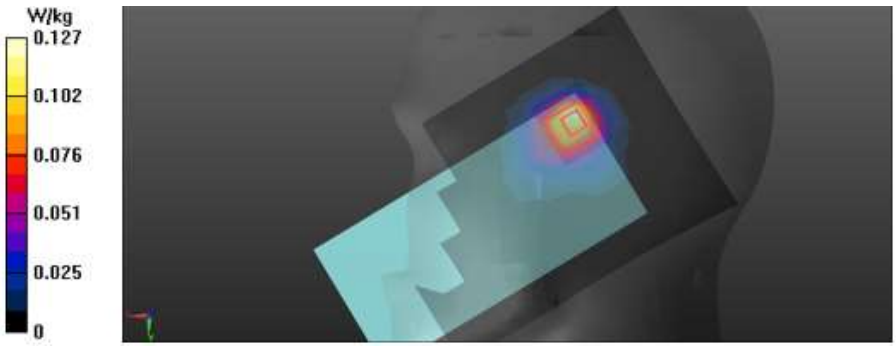
- Probe: EX3DV4 - SN7540;ConvF(7.46, 7.46, 7.46) @ 2441 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/Bluetooth_GFSK_DH5_CH39_Right Cheek/Area Scan (11x15x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.130 W/kg

Configuration/Bluetooth_GFSK_DH5_CH39_Right Cheek/Zoom Scan (8x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.420 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.165 W/kg
SAR(1 g) = 0.081 W/kg; SAR(10 g) = 0.038 W/kg
Smallest distance from peaks to all points 3 dB below = 9.9 mm
Ratio of SAR at M2 to SAR at M1 = 46.2%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.127 W/kg



8)

Date: 3/18/2021

Test Laboratory: KCTL Inc.
File Name: 2.GSM850_Body.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

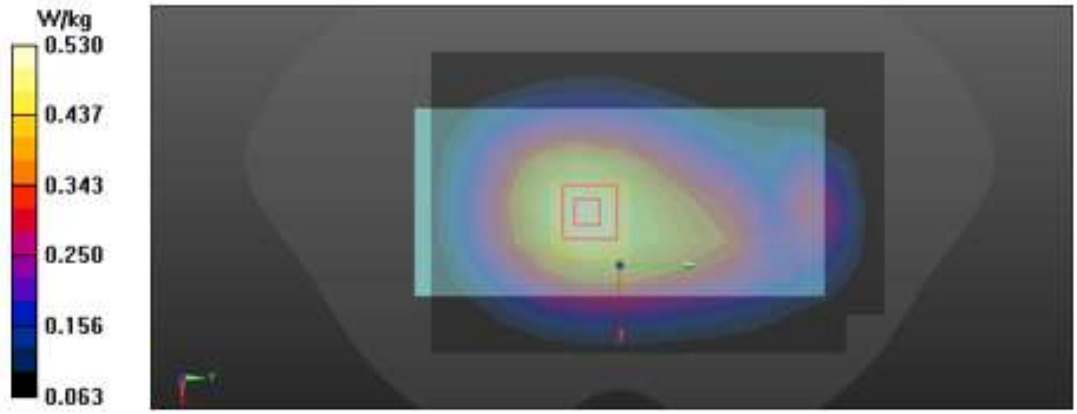
Communication System: UID 0, GSM850_4TX (0); Frequency: 836.6 MHz; Duty Cycle: 1:2.07491
Medium parameters used: f = 836.6 MHz; σ = 0.886 S/m; ε_r = 41.391; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540;ConvF(9.32, 9.32, 9.32) @ 836.6 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/GSM850_GPRS 4Tx_CH190_Rear_15 mm/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.523 W/kg

Configuration/GSM850_GPRS 4Tx_CH190_Rear_15 mm/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.88 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.588 W/kg
SAR(1 g) = 0.426 W/kg; SAR(10 g) = 0.312 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 = 71.8%
Maximum value of SAR (measured) = 0.530 W/kg



9)

Date: 3/16/2021

Test Laboratory: KCTL Inc.
File Name: 2.GSM 1900_Body.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

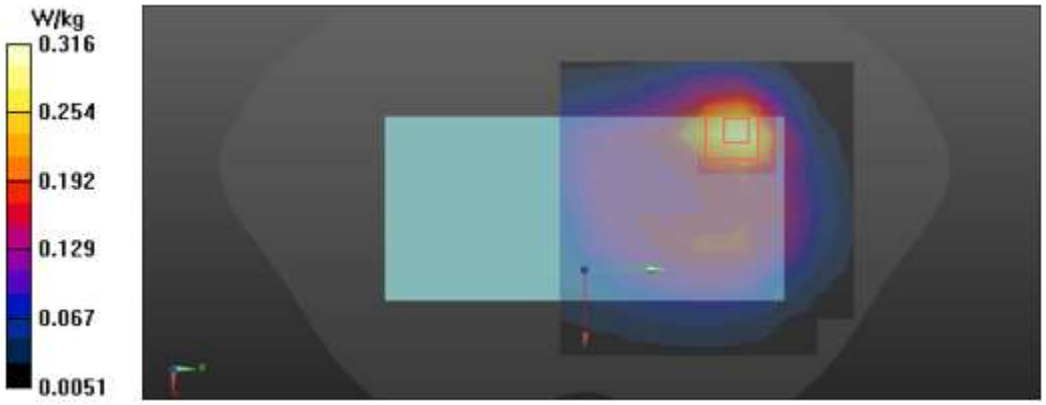
Communication System: UID 0, GSM1900_4TX (0); Frequency: 1880 MHz; Duty Cycle: 1:2.07491
Medium parameters used: f = 1880 MHz; σ = 1.419 S/m; ε_r = 40.947; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540;ConvF(8.17, 8.17, 8.17) @ 1880 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/GSM 1900_GPRS 4Tx_CH661_Rear_15 mm/Area Scan (9x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.314 W/kg

Configuration/GSM 1900_GPRS 4Tx_CH661_Rear_15 mm/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.395 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.381 W/kg
SAR(1 g) = 0.210 W/kg; SAR(10 g) = 0.116 W/kg
Smallest distance from peaks to all points 3 dB below = 15.8 mm
Ratio of SAR at M2 to SAR at M1 = 54.2%
Maximum value of SAR (measured) = 0.316 W/kg



10)

Date: 3/18/2021

Test Laboratory: KCTL Inc.
File Name: 5.WCDMA FDD V_Body.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

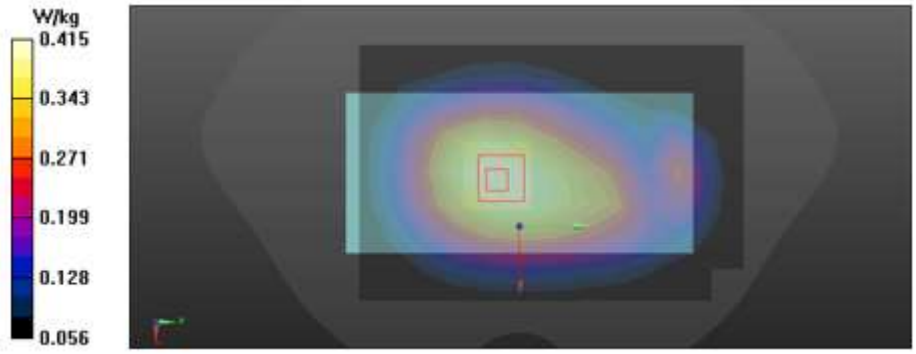
Communication System: UID 0, W-CDMA 850 (Band 5) (0); Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.886 S/m; ε_r = 41.391; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540;ConvF(9.32, 9.32, 9.32) @ 836.6 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/WCDMA FDD V_CH4183_Rear_15 mm/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.420 W/kg

Configuration/WCDMA FDD V_CH4183_Rear_15 mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.45 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.457 W/kg
SAR(1 g) = 0.338 W/kg; SAR(10 g) = 0.251 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 = 74%
Maximum value of SAR (measured) = 0.415 W/kg



11)

Date: 3/17/2021

Test Laboratory: KCTL Inc.
File Name: 2.LTE Band 5_Body.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.933 S/m; ε_r = 41.675; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

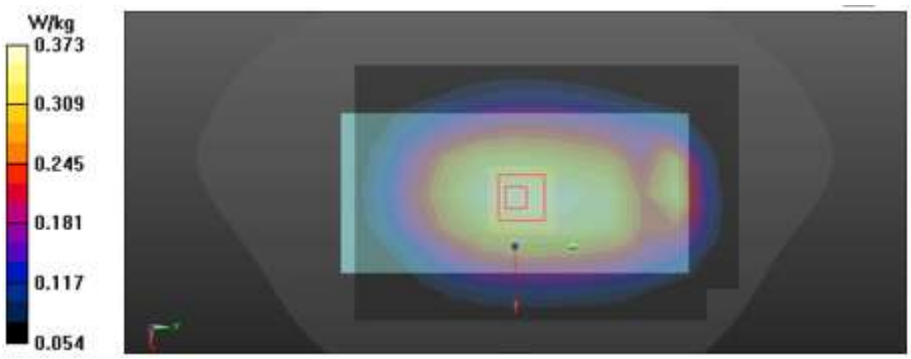
- Probe: EX3DV4 - SN7540;ConvF(9.32, 9.32, 9.32) @ 836.5 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/LTE Band 5_QPSK_10 MHz_1RB_25offset_CH20525_Rear_15 mm/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.365 W/kg

Configuration/LTE Band 5_QPSK_10 MHz_1RB_25offset_CH20525_Rear_15 mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.85 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.412 W/kg
SAR(1 g) = 0.301 W/kg; SAR(10 g) = 0.224 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 = 72.8%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.373 W/kg



12)

Date: 2021-03-18

Test Laboratory: KCTL Inc.
File Name: 2.LTE Band 41_QPSK_20 MHz_Body.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBVH

Communication System: UID 0, LTE Band 41 (0); Frequency: 2549.5 MHz; Duty Cycle: 1:1.58016
Medium parameters used (interpolated): f = 2549.5 MHz; σ = 1.966 S/m; ε_r = 38.495; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

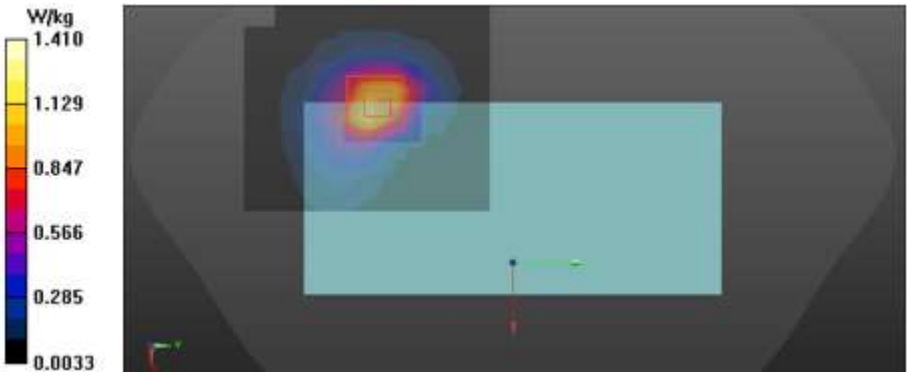
- Probe: EX3DV4 - SN3928;ConvF(7.21, 7.21, 7.21) @ 2549.5 MHz; Calibrated: 2021-02-23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn666; Calibrated: 2021-01-22
- Phantom: Twin-SAM V4.0 -1; Type: QD 000 P40 CC; Serial: 1363
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/LTE Band 41_QPSK_20 MHz_1RB_49offset_CH40185_Rear_15 mm/Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.17 W/kg

Configuration/LTE Band 41_QPSK_20 MHz_1RB_49offset_CH40185_Rear_15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.48 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.77 W/kg
SAR(1 g) = 0.853 W/kg; SAR(10 g) = 0.401 W/kg
Smallest distance from peaks to all points 3 dB below = 9.8 mm
Ratio of SAR at M2 to SAR at M1 = 47.9%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.41 W/kg



13)

Date: 3/19/2021

Test Laboratory: KCTL Inc.
File Name: 2.WLAN 2.4 GHz_Body.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

Communication System: UID 0, 2.4GWLAN (0); Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.719 S/m; ε_r = 40.901; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

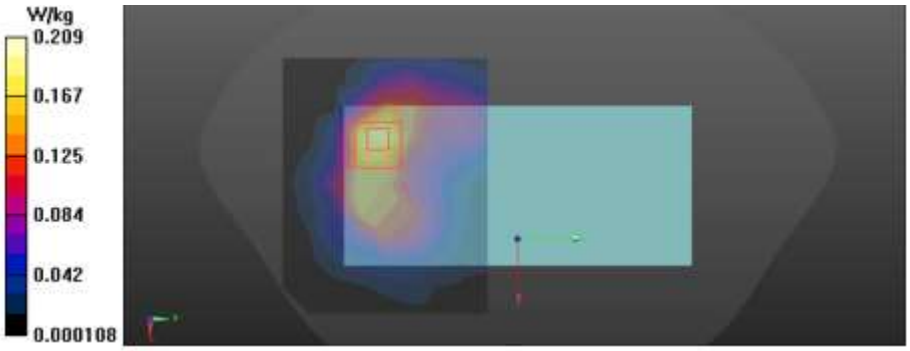
- Probe: EX3DV4 - SN7540;ConvF(7.46, 7.46, 7.46) @ 2437 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/802.11b_CH6_Rear_15 mm/Area Scan (11x9x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.199 W/kg

Configuration/802.11b_CH6_Rear_15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.403 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.263 W/kg
SAR(1 g) = 0.123 W/kg; SAR(10 g) = 0.063 W/kg
Smallest distance from peaks to all points 3 dB below = 14.3 mm
Ratio of SAR at M2 to SAR at M1 = 45.5%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.209 W/kg



14)

Date: 3/18/2021

Test Laboratory: KCTL Inc.
File Name: 3.GSM850_Hotspot.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

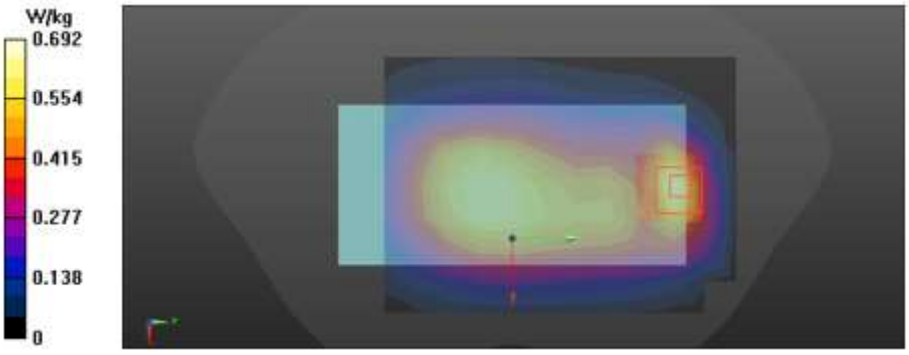
Communication System: UID 0, GSM850_4TX (0); Frequency: 836.6 MHz; Duty Cycle: 1:2.07491
Medium parameters used: f = 836.6 MHz; σ = 0.886 S/m; ε_r = 41.391; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540;ConvF(9.32, 9.32, 9.32) @ 836.6 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/GSM850_GPRS 4Tx_CH190_Rear_10 mm/Area Scan (9x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.692 W/kg

Configuration/GSM850_GPRS 4Tx_CH190_Rear_10 mm/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.52 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.952 W/kg
SAR(1 g) = 0.501 W/kg; SAR(10 g) = 0.275 W/kg
Smallest distance from peaks to all points 3 dB below = 9.6 mm
Ratio of SAR at M2 to SAR at M1 = 54.5%
Maximum value of SAR (measured) = 0.757 W/kg



15)

Date: 3/16/2021

Test Laboratory: KCTL Inc.
File Name: 3.GSM 1900_Hotspot.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

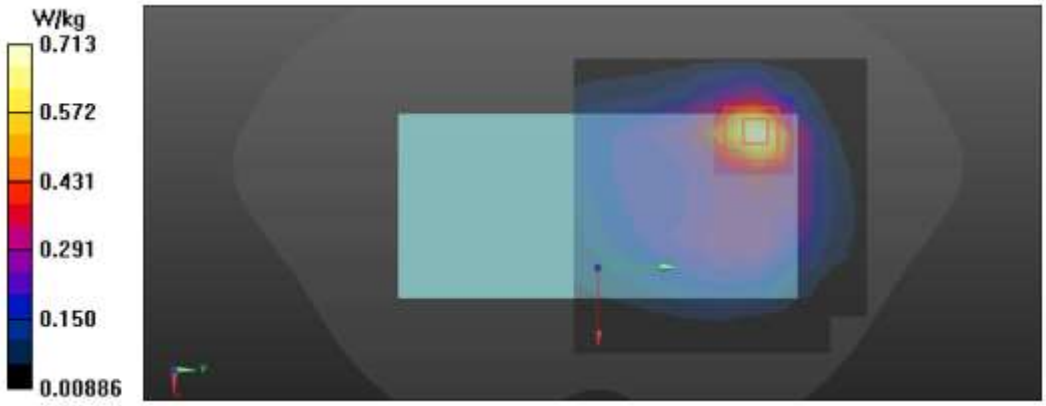
Communication System: UID 0, GSM1900_4TX (0); Frequency: 1880 MHz; Duty Cycle: 1:2.07491
Medium parameters used: f = 1880 MHz; σ = 1.419 S/m; ε_r = 40.947; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540;ConvF(8.17, 8.17, 8.17) @ 1880 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/GSM 1900_GPRS 4Tx_CH661_Rear_10 mm/Area Scan (9x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.743 W/kg

Configuration/GSM 1900_GPRS 4Tx_CH661_Rear_10 mm/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.97 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.896 W/kg
SAR(1 g) = 0.468 W/kg; SAR(10 g) = 0.245 W/kg
Smallest distance from peaks to all points 3 dB below = 11.3 mm
Ratio of SAR at M2 to SAR at M1 = 53%
Maximum value of SAR (measured) = 0.713 W/kg



16)

Date: 3/18/2021

Test Laboratory: KCTL Inc.
File Name: 6.WCDMA FDD V_Hotspot.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

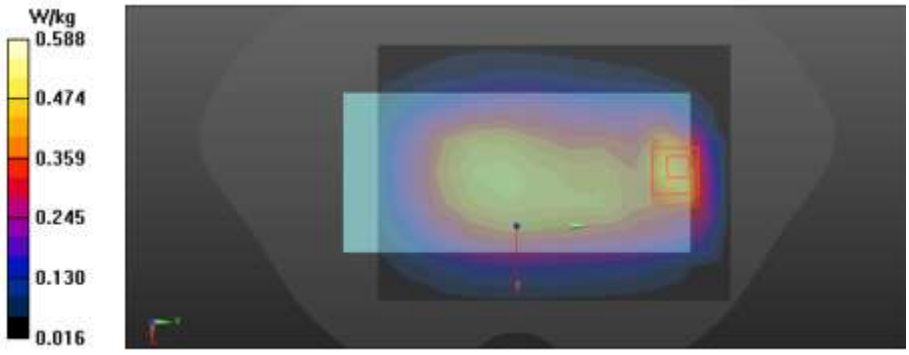
Communication System: UID 0, W-CDMA 850 (Band 5) (0); Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.886 S/m; ε_r = 41.391; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7540;ConvF(9.32, 9.32, 9.32) @ 836.6 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/WCDMA FDD V_CH4183_Rear_10 mm/Area Scan (9x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.501 W/kg

Configuration/WCDMA FDD V_CH4183_Rear_10 mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.43 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.772 W/kg
SAR(1 g) = 0.405 W/kg; SAR(10 g) = 0.225 W/kg
Smallest distance from peaks to all points 3 dB below = 10.7 mm
Ratio of SAR at M2 to SAR at M1 = 55%
Maximum value of SAR (measured) = 0.588 W/kg



17)

Date: 3/17/2021

Test Laboratory: KCTL Inc.
File Name: 3.LTE Band 5_Hotspot.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.933 S/m; ε_r = 41.675; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

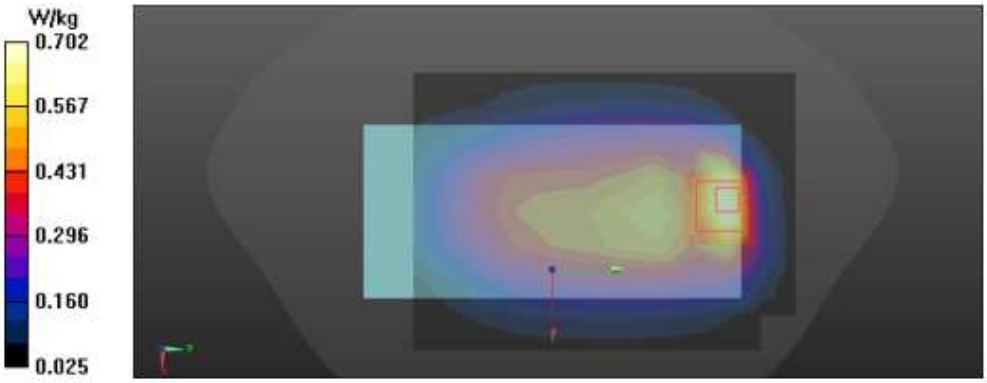
- Probe: EX3DV4 - SN7540;ConvF(9.32, 9.32, 9.32) @ 836.5 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/LTE Band 5_QPSK_10 MHz_1RB_25offset_CH20525_Rear_10 mm/Area Scan (9x12x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.748 W/kg

Configuration/LTE Band 5_QPSK_10 MHz_1RB_25offset_CH20525_Rear_10 mm/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.37 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.935 W/kg
SAR(1 g) = 0.500 W/kg; SAR(10 g) = 0.281 W/kg
Smallest distance from peaks to all points 3 dB below = 9.6 mm
Ratio of SAR at M2 to SAR at M1 = 55.8%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.702 W/kg



18)

Date: 2021-03-19

Test Laboratory: KCTL Inc.
File Name: 3.LTE Band 41_QPSK_20 MHz_Hotspot.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBVH

Communication System: UID 0, LTE Band 41 (0); Frequency: 2549.5 MHz; Duty Cycle: 1:1.58016
Medium parameters used (interpolated): f = 2549.5 MHz; σ = 1.959 S/m; ε_r = 38.225; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

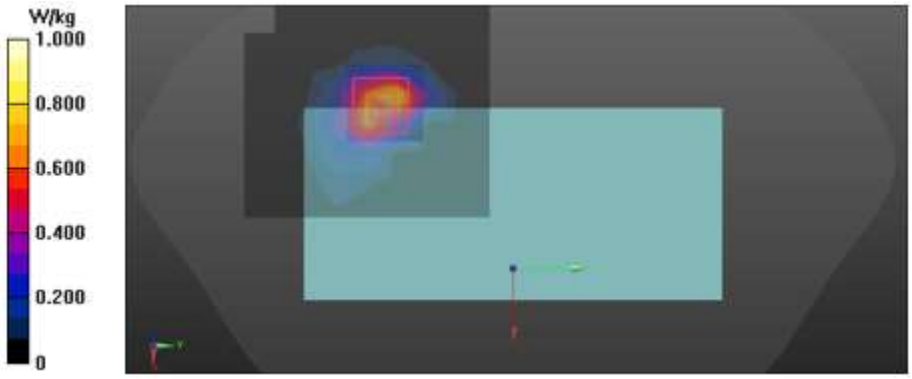
- Probe: EX3DV4 - SN3928;ConvF(7.21, 7.21, 7.21) @ 2549.5 MHz; Calibrated: 2021-02-23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn666; Calibrated: 2021-01-22
- Phantom: Twin-SAM V4.0 -1; Type: QD 000 P40 CC; Serial: 1363
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/LTE Band 41_QPSK_20 MHz_50RB_24offset_CH40185_Rear_10 mm/Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.800 W/kg

Configuration/LTE Band 41_QPSK_20 MHz_50RB_24offset_CH40185_Rear_10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.08 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.28 W/kg
SAR(1 g) = 0.566 W/kg; SAR(10 g) = 0.241 W/kg
Smallest distance from peaks to all points 3 dB below = 8.1 mm
Ratio of SAR at M2 to SAR at M1 = 44.7%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.00 W/kg



19)

Date: 3/19/2021

Test Laboratory: KCTL Inc.
File Name: 3.WLAN 2.4 GHz_Hotspot.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBXA

Communication System: UID 0, 2.4GWLAN (0); Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.719 S/m; ε_r = 40.901; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

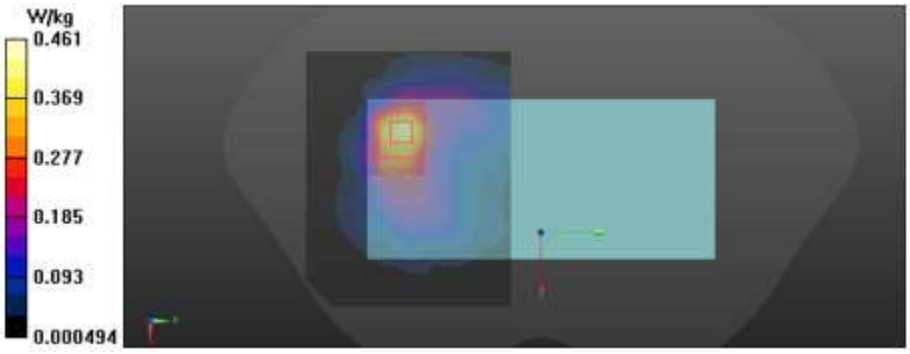
- Probe: EX3DV4 - SN7540;ConvF(7.46, 7.46, 7.46) @ 2437 MHz; Calibrated: 4/28/2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1342; Calibrated: 5/25/2020
- Phantom: Front_Right_Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1984
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/802.11b_CH6_Rear_10 mm/Area Scan (11x9x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.437 W/kg

Configuration/802.11b_CH6_Rear_10 mm/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.335 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.601 W/kg
SAR(1 g) = 0.274 W/kg; SAR(10 g) = 0.131 W/kg
Smallest distance from peaks to all points 3 dB below = 12.4 mm
Ratio of SAR at M2 to SAR at M1 = 45.1%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.461 W/kg



20)

Date: 2021-03-20

Test Laboratory: KCTL Inc.
File Name: 4.LTE Band 41_QPSK_20 MHz_Phablet.da53:0

DUT: SM-A125F/DS, Type: Mobile Phone, Serial: R38NC02CBVH

Communication System: UID 0, LTE Band 41 (0); Frequency: 2636.5 MHz; Duty Cycle: 1:1.58016
Medium parameters used (interpolated): f = 2636.5 MHz; σ = 2.063 S/m; ε_r = 38.405; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

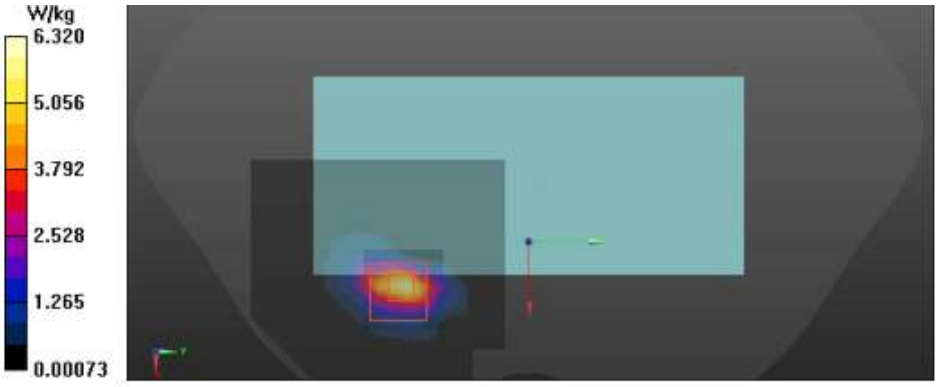
- Probe: EX3DV4 - SN3928;ConvF(7.21, 7.21, 7.21) @ 2636.5 MHz; Calibrated: 2021-02-23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn666; Calibrated: 2021-01-22
- Phantom: Twin-SAM V4.0 -1; Type: QD 000 P40 CC; Serial: 1363
- Measurement SW: DASY52, Version 52.10 (4);

Configuration/LTE Band 41_QPSK_20 MHz_1RB_49offset_CH41055_Front_0 mm/Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 6.40 W/kg

Configuration/LTE Band 41_QPSK_20 MHz_1RB_49offset_CH41055_Front_0 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.161 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 9.36 W/kg
SAR(1 g) = 3.32 W/kg; SAR(10 g) = 1.19 W/kg
Smallest distance from peaks to all points 3 dB below = 5 mm
Ratio of SAR at M2 to SAR at M1 = 39.6%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 6.32 W/kg



Appendixes List

Appendix A	A.1 Probe Calibration certificate (EX3DV4_3928) A.2 Probe Calibration certificate (EX3DV4_7540) A.3 Dipole Calibration certificate (D850V2_1006) A.4 Dipole Calibration certificate (D1900V2_5d160) A.5 Dipole Calibration certificate (D2450V2_895) A.6 Dipole Calibration certificate (D2600V2_1050)
Appendix B	SAR Tissue Specification
Appendix C	Power Reduction Verification
Appendix D	#Antenna Location & Distance
Appendix E	EUT Photo
Appendix F	Test Setup Photo