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SAR EVALUATION REPORT

Applicant Name:
Samsung Electronics Co., Ltd.
129, Samsung-ro, Maetan dong,
Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:
2/15/2021 – 3/9/2021
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
1M2102110010-01.A3L

FCC ID: **A3LSMA526JPN**

APPLICANT: **SAMSUNG ELECTRONICS CO., LTD.**

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model: SC-53B

Equipment Class	Band & Mode	Tx Frequency	SAR			
			1g Head (W/kg)	1g Body-Worn (W/kg)	1g Hotspot (W/kg)	10g Phablet (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.25	0.30	0.46	N/A
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	< 0.1	< 0.1	0.22	0.95
PCE	UMTS 850	826.40 - 846.60 MHz	0.24	0.28	0.33	N/A
PCE	LTE Band 12	699.7 - 715.3 MHz	0.32	0.33	0.37	N/A
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.31	0.44	0.53	N/A
PCE	LTE Band 41	2498.5 - 2687.5 MHz	0.41	0.15	0.35	N/A
DTS	2.4 GHz WLAN	2412 - 2472 MHz	0.25	0.10	0.27	N/A
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	N/A	N/A
NII	U-NII-2A	5260 - 5320 MHz	0.28	0.14	N/A	0.72
NII	U-NII-2C	5500 - 5720 MHz	0.59	0.21	N/A	0.92
NII	U-NII-3	5745 - 5825 MHz	0.51	0.21	0.40	N/A
DSS/DTS	Bluetooth	2402 - 2480 MHz	0.31	< 0.1	0.13	N/A
Simultaneous SAR per KDB 690783 D01v01r03:			1.31	0.71	1.07	1.87

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.8 of this report; for North American frequency bands only.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.

Randy Ortanez
President

The SAR Tick is an initiative of the Mobile & Wireless Forum (MWF). While a product may be considered eligible, use of the SAR Tick logo requires an agreement with the MWF. Further details can be obtained by emailing: sartick@mwfai.info.

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2472 MHz
U-NII-1	Voice/Data	5180 - 5240 MHz
U-NII-2A	Voice/Data	5260 - 5320 MHz
U-NII-2C	Voice/Data	5500 - 5720 MHz
U-NII-3	Voice/Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz

1.2 Power Reduction for SAR

This device utilizes a power reduction mechanism for some wireless modes and bands for SAR compliance under portable hotspot conditions and under some conditions when the device is being used in close proximity to the user's hand. 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 WLAN operations during voice or VoIP 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.

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1.3 Nominal and Maximum Output Power Specifications

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

1.3.1 2G/3G/4G Maximum Output Power

GSM/GPRS/EDGE 850										
Power Level		Voice (in dBm)	Data - Burst Average GMSK (in dBm)				Data - Burst Average 8-PSK (in dBm)			
		1 TX Slot	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots
Max	Max allowed power	33.0	33.0	32.0	30.0	27.5	27.0	26.0	24.0	23.0
	Nominal	32.0	32.0	31.0	29.0	26.5	26.0	25.0	23.0	22.0
GSM/GPRS/EDGE 1900										
Power Level		Voice (in dBm)	Data - Burst Average GMSK (in dBm)				Data - Burst Average 8-PSK (in dBm)			
		1 TX Slot	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots
Max	Max allowed power	30.0	30.0	29.0	26.5	25.5	25.5	24.0	23.0	22.0
	Nominal	29.0	29.0	28.0	25.5	24.5	24.5	23.0	22.0	21.0
Hotspot Mode Active	Max allowed power	N/A	28.5	27.5	25.0	24.0	24.0	22.5	21.5	20.5
	Nominal	N/A	27.5	26.5	24.0	23.0	23.0	21.5	20.5	19.5
Proximity Sensor Active	Max allowed power	28.5	28.5	27.5	25.0	24.0	24.0	22.5	21.5	20.5
	Nominal	27.5	27.5	26.5	24.0	23.0	23.0	21.5	20.5	19.5

UMTS Band 5 (850 MHz)				
	Modulated Average Output Power (in dBm)			
	3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6	3GPP DC-HSDPA Rel 8
Max allowed power	25.0	24.5	24.5	24.5
Nominal	24.0	23.5	23.5	23.5

Mode / Band		Modulated Average Output Power (in dBm)
LTE FDD Band 12	Max allowed power	25.5
	Nominal	24.5
LTE FDD Band 5	Max allowed power	25.5
	Nominal	24.5
LTE TDD Band 41	Max allowed power	25.0
	Nominal	24.0

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1.3.2 Maximum Bluetooth and WLAN Output Power

Mode	Band	IEEE 802.11 (in dBm)					
		SISO					
		b		g		n	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
2.4 GHz WIFI	2.45 GHz	19.0	18.0	18.0	17.0	18.0	17.0
		ch. 12: 9.0	8.0	ch. 12: 9.0	8.0	ch. 12: 9.0	8.0
		ch. 13: 3.0	2.0	ch. 13: 3.0	2.0	ch. 13: 3.0	2.0

Mode	Band	IEEE 802.11 (in dBm)					
		SISO					
		a		n		ac	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
5 GHz WIFI (20MHz BW)	5200 MHz	17.0	16.0	17.0	16.0	16.0	15.0
	5300 MHz	17.0	16.0	17.0	16.0	16.0	15.0
	5500 MHz	17.0	16.0	17.0	16.0	16.0	15.0
	5800 MHz	17.0	16.0	17.0	16.0	16.0	15.0
5 GHz WIFI (40MHz BW)	5200 MHz			15.0	14.0	15.0	14.0
				ch. 38: 14.0	13.0	ch. 38: 14.5	13.5
	5300 MHz			15.0	14.0	15.0	14.0
				ch. 62: 13.5	12.5	ch. 62: 13.0	12.0
	5500 MHz			15.0	14.0	15.0	14.0
				ch. 102: 13.0	12.0	ch. 102: 12.5	11.5
	5800 MHz			15.0	14.0	15.0	14.0
5 GHz WIFI (80MHz BW)	5200 MHz					11.5	10.5
	5300 MHz					11.0	10.0
	5500 MHz					13.0	12.0
						ch. 106: 11.0	10.0
	5800 MHz					13.0	12.0

Bluetooth (1Mbps) (in dBm)
16.0

Bluetooth (EDR) (in dBm)
12.0

Bluetooth LE (in dBm)
3.5

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1.3.3 Reduced WLAN Output Power

Mode	Band	IEEE 802.11 (in dBm)					
		SISO					
		b		g		n	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
2.4 GHz WIFI	2.45 GHz	17.0 ch. 12: 9.0 ch. 13: 3.0	16.0 8.0 2.0	17.0 ch. 12: 9.0 ch. 13: 3.0	16.0 8.0 2.0	17.0 ch. 12: 9.0 ch. 13: 3.0	16.0 8.0 2.0

Mode	Band	IEEE 802.11 (in dBm)					
		SISO					
		a		n		ac	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
5 GHz WIFI (20MHz BW)	5200 MHz	14.0	13.0	14.0	13.0	14.0	13.0
	5300 MHz	14.0	13.0	14.0	13.0	14.0	13.0
	5500 MHz	14.0	13.0	14.0	13.0	14.0	13.0
	5800 MHz	14.0	13.0	14.0	13.0	14.0	13.0
5 GHz WIFI (40MHz BW)	5200 MHz			14.0	13.0	14.0	13.0
	5300 MHz			14.0 ch. 62: 13.5	13.0 12.5	14.0 ch. 62: 13.0	13.0 12.0
	5500 MHz			14.0 ch. 102: 13.0	13.0 12.0	14.0 ch. 102: 12.5	13.0 11.5
	5800 MHz			14.0	13.0	14.0	13.0
5 GHz WIFI (80MHz BW)	5200 MHz					11.5	10.5
	5300 MHz					11.0	10.0
	5500 MHz					13.0 ch. 106: 11.0	12.0 10.0
	5800 MHz					13.0	12.0

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1.4 DUT Antenna Locations

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

Table 1-1
Device Edges/Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850	Yes	Yes	No	Yes	Yes	No
GPRS 1900	Yes	Yes	No	Yes	No	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	No
LTE Band 12	Yes	Yes	No	Yes	Yes	No
LTE Band 5 (Cell)	Yes	Yes	No	Yes	Yes	No
LTE Band 41	Yes	Yes	No	Yes	No	Yes
2.4 GHz WLAN	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN	Yes	Yes	Yes	No	No	Yes
Bluetooth	Yes	Yes	Yes	No	No	Yes

Note: Particular DUT edges were not required to be evaluated for wireless router SAR or phablet SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v02r01 Section III and FCC KDB Publication 648474 D04v01r03. The distances between the transmit antennas and the edges of the device are included in the filing. When wireless router mode is enabled, U-NII-1, U-NII-2A, U-NII-2C operations are disabled.

1.5 Near Field Communications (NFC) Antenna

This DUT has NFC operations. The NFC antenna is integrated into the device for this model. Therefore, all SAR tests were performed with the device which already incorporates the NFC antenna. A diagram showing the location of the NFC antenna can be found in Appendix E.

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1.6 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be operating 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.

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Phablet	Notes
1	GSM voice + 2.4 GHz WI-FI	Yes	Yes	N/A	Yes	
2	GSM voice + 5 GHz WI-FI	Yes	Yes	N/A	Yes	
3	GSM voice + 2.4 GHz Bluetooth	Yes^	Yes	N/A	Yes	^ Bluetooth Tethering is considered
4	GSM voice + 2.4 GHz Bluetooth + 5 GHz WI-FI	Yes^	Yes	N/A	Yes	^ Bluetooth Tethering is considered
5	UMTS + 2.4 GHz WI-FI	Yes	Yes	Yes	Yes	
6	UMTS + 5 GHz WI-FI	Yes	Yes	Yes	Yes	
7	UMTS + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
8	UMTS + 2.4 GHz Bluetooth + 5 GHz WI-FI	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
9	LTE + 2.4 GHz WI-FI	Yes	Yes	Yes	Yes	
10	LTE + 5 GHz WI-FI	Yes	Yes	Yes	Yes	
11	LTE + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
12	LTE + 2.4 GHz Bluetooth + 5 GHz WI-FI	Yes^	Yes	Yes^	Yes	^ Bluetooth Tethering is considered
13	GPRS/EDGE + 2.4 GHz WI-FI	N/A	N/A	Yes	Yes	
14	GPRS/EDGE + 5 GHz WI-FI	N/A	N/A	Yes	Yes	
15	GPRS/EDGE + 2.4 GHz Bluetooth	N/A	N/A	Yes^	Yes	^ Bluetooth Tethering is considered
16	GPRS/EDGE + 2.4 GHz Bluetooth + 5 GHz WI-FI	N/A	N/A	Yes^	Yes	^ Bluetooth Tethering is considered

1. 2.4 GHz WLAN and 2.4 GHz Bluetooth share the same antenna path and cannot transmit simultaneously.
2. All licensed modes share the same antenna path and cannot transmit simultaneously.
3. When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.
4. Per the manufacturer, WIFI Direct is not expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Therefore, there are no simultaneous transmission scenarios involving WIFI direct beyond that listed in the above table.
5. 5 GHz Wireless Router is only supported for the U-NII-3 by S/W, therefore U-NII-1, U-NII-2A, and U-NII-2C were not evaluated for wireless router conditions.
6. This device supports VOLTE.
7. This device supports VOWIFI.
8. This device supports Bluetooth Tethering.

1.7 Miscellaneous SAR Test Considerations

(A) WIFI/BT

Since U-NII-1 and U-NII-2A bands have the same maximum output power and the highest reported SAR for U-NII-2A is less than 1.2 W/kg, SAR is not required for U-NII-1 band according to FCC KDB Publication 248227 D01v02r02.

Since Wireless Router operations are not allowed by the chipset firmware using U-NII-1, U-NII-2A & U-NII-2C WIFI, only 2.4 GHz WLAN, 2.4 GHz Bluetooth, and U-NII-3 WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v02r01.

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This device supports IEEE 802.11ac with the following features:
a) Up to 80 MHz Bandwidth only
b) No aggregate channel configurations
c) 1 Tx antenna output
d) 256 QAM is supported
e) TDWR and Band gap channels are supported

Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Because wireless router operations are not supported for U-NII-1, U-NII-2A & U-NII-2C WLAN, phablet SAR tests were performed. Phablet SAR was not evaluated for 2.4 GHz U-NII-3 WLAN operations since wireless router 1g SAR was < 1.2 W/kg.

(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.

Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information)..

1.8 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 941225 D01v03r01, D05v02r04, D05Av01r02, D06v02r01 (2G/3G/4G and Hotspot)
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v06 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 648474 D04v01r03 (Phablet Procedures)
- FCC KDB Publication 616217 D04v01r02 (Proximity Sensor)
- October 2013 TCB Workshop Notes (GPRS Testing Considerations)

1.9 Device Serial Numbers

Several samples with identical hardware were used to support SAR testing. 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. The serial numbers used for each test are indicated alongside the results in Section 11.

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2 LTE INFORMATION

LTE Information					
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 41 (2498.5 - 2687.5 MHz)				
Channel Bandwidths	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 12: 1.4 MHz	699.7 (23017)		707.5 (23095)	715.3 (23173)	
LTE Band 12: 3 MHz	700.5 (23025)		707.5 (23095)	714.5 (23165)	
LTE Band 12: 5 MHz	701.5 (23035)		707.5 (23095)	713.5 (23155)	
LTE Band 12: 10 MHz	704 (23060)		707.5 (23095)	711 (23130)	
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)		836.5 (20525)	848.3 (20643)	
LTE Band 5 (Cell): 3 MHz	825.5 (20415)		836.5 (20525)	847.5 (20635)	
LTE Band 5 (Cell): 5 MHz	826.5 (20425)		836.5 (20525)	846.5 (20625)	
LTE Band 5 (Cell): 10 MHz	829 (20450)		836.5 (20525)	844 (20600)	
LTE Band 41: 5 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 10 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 15 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
UE Category	DL UE Cat 18, UL UE Cat 5				
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 Additional Information	This device does not support full CA features on 3GPP Release 14. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 14 Features are not supported: Relay, HetNet, Enhanced MIMO, eICIC, WIFI Offloading, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA, Carrier Aggregation.				

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3 INTRODUCTION

The FCC and Innovation, Science, and Economic Development Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. [1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [3] and Health Canada RF Exposure Guidelines Safety Code 6 [22]. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave [4] is used for guidance in measuring the Specific Absorption Rate (SAR) due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the International Committee for Non-Ionizing Radiation Protection (ICNIRP) in Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," Report No. Vol 74. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

3.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 3-1).

Equation 3-1
SAR Mathematical Equation

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

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \frac{\sigma \cdot E^2}{\rho}$$

where:

σ = conductivity of the tissue-simulating material (S/m)
ρ = mass density of the tissue-simulating material (kg/m^3)
E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

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4 DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013:

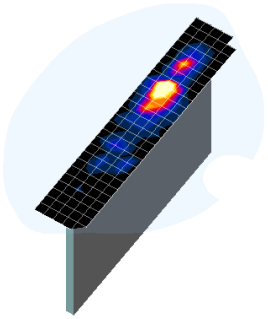

Figure 4-1
Sample SAR Area Scan

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):

   a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).

   b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.

   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

Table 4-1
Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04*

Frequency	Maximum Area Scan Resolution (mm) (Δx_{area}, Δy_{area})	Maximum Zoom Scan Resolution (mm) (Δx_{zoom}, Δy_{zoom})	Maximum Zoom Scan Spatial Resolution (mm)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
			$\Delta z_{zoom}(n)$	$\Delta z_{zoom}(1)$*	$\Delta z_{zoom}(n>1)$*	
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≤ 3	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≤ 2.5	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≤ 2	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 22

*Also compliant to IEEE 1528-2013 Table 6

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5 DEFINITION OF REFERENCE POINTS

5.1 EAR REFERENCE POINT

Figure 5-2 shows the front, back and side views of the SAM Twin Phantom. The point "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 ERP is 15mm posterior to the entrance to the ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 5-1. The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front), also called the Reference Pivoting Line, is not perpendicular to the reference plane (see Figure 5-1). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

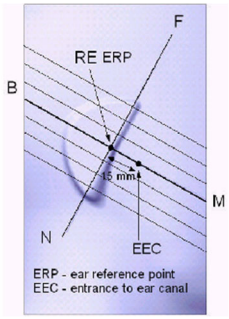

Figure 5-1
Close-Up Side view of ERP

5.2 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 5-3). 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.

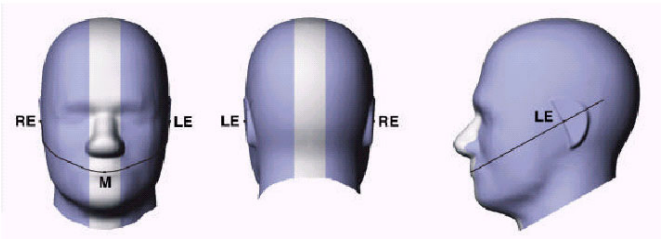

Figure 5-2
Front, back and side view of SAM Twin Phantom

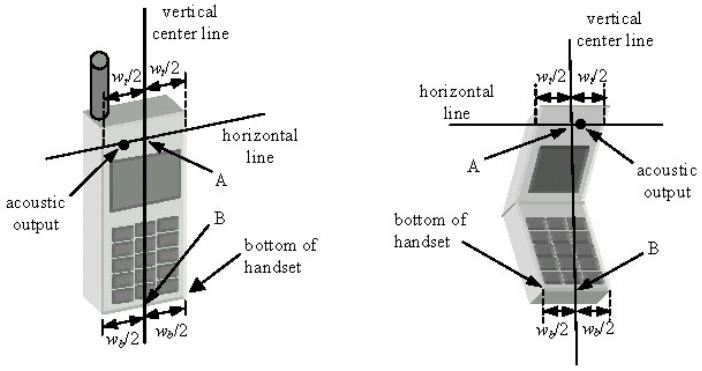

Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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6 TEST CONFIGURATION POSITIONS

6.1 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.

6.2 Positioning for Cheek

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 6-1), 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.

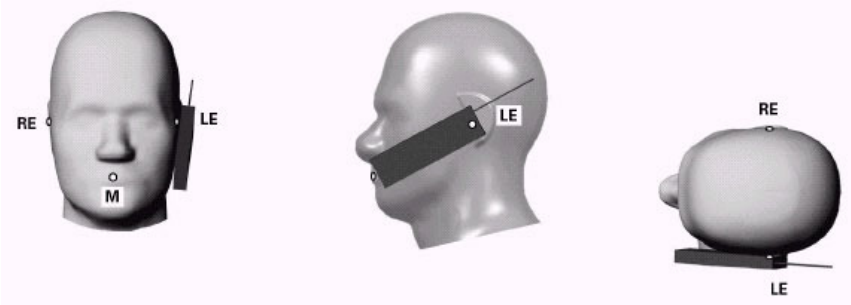

Figure 6-1 Front, Side and Top View of Cheek Position

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 6-2).

6.3 Positioning for Ear / 15º 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 15degrees.
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 6-2).

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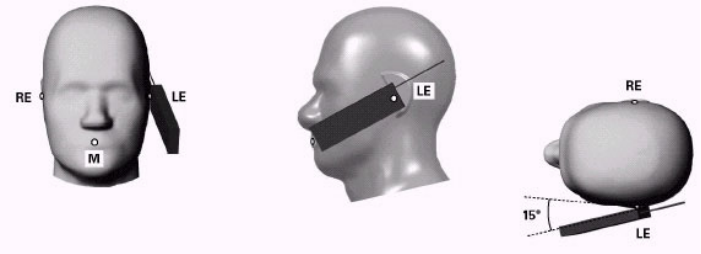

Figure 6-2 Front, Side and Top View of Ear/15º Tilt Position

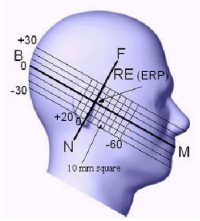

Figure 6-3
Side view w/ relevant markings

6.4 SAR Evaluations near the Mouth/Jaw Regions of the SAM Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones. Per IEEE 1528-2013, a rotated SAM phantom is necessary to allow probe access to such regions. Both SAM heads of the TwinSAM-Chin20 are rotated 20 degrees around the NF line. Each head can be removed from the table for emptying and cleaning.

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04v01r03. The SAR required in these regions of SAM should be measured using a flat phantom. The phone should be positioned with a separation distance of 4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR location identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SAR location to the phone is determined by the straight line passing perpendicularly through the phantom surface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing the required separation at the peak SAR location, the top edge of the phone will be allowed to touch the phantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right while placed in this inclined position to the flat phantom.

6.5 Body-Worn Accessory Configurations

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 6-4). 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.

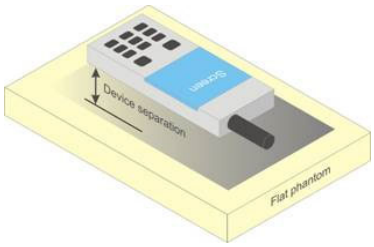

Figure 6-4
Sample Body-Worn Diagram

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

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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.

6.6 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1g body and 10g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D01v06 should be applied to determine SAR test requirements.

Per KDB Publication 447498 D01v06, Cell phones (handsets) are not normally designed to be used on extremities or operated in extremity only exposure conditions. The maximum output power levels of handsets generally do not require extremity SAR testing to show compliance. Therefore, extremity SAR was not evaluated for this device.

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 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm 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.

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6.8 Phablet Configurations

For smart phones with a display diagonal dimension > 150 mm or an overall diagonal dimension > 160 mm 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 mm from that surface or edge, in direct contact with the phantom, for 10g SAR. The UMPC mini-tablet 1g SAR at 5 mm 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.

6.9 Proximity Sensor Considerations

This device uses a power reduction mechanism to reduce output powers in certain use conditions when the device is used close the user's body.

When the device's antenna is within a certain distance of the user, the sensor activates and reduces the maximum allowed output power. However, the sensor is not active when the device is moved beyond the sensor triggering distance and the maximum output power is no longer limited. Therefore, additional evaluation is needed in the vicinity of the triggering distance to ensure SAR is compliant when the device is allowed to operate at a non-reduced output power level. FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device at these additional test positions. Sensor triggering distance summary data is included in Appendix F.

The sensor is designed to support sufficient detection range and sensitivity to cover regions of the sensors in all applicable directions since the sensor entirely covers the antennas.

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7 RF EXPOSURE LIMITS

7.1 Uncontrolled Environment

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.

7.2 Controlled Environment

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.

Table 7-1
SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT *General Population* (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT *Occupational* (W/kg) or (mW/g)
Peak Spatial Average SAR Head	1.6	8.0
Whole Body SAR	0.08	0.4
Peak Spatial Average SAR Hands, Feet, Ankle, Wrists, etc.	4.0	20

1. The Spatial Peak value of the SAR averaged over any 1 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.

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8 FCC MEASUREMENT PROCEDURES

Power measurements for licensed transmitters are performed using a base station simulator under digital average power.

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. The 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 section 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.

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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 12.2 kbps RMC with the TPC bits all "1s". The 3G SAR test reduction procedure is applied to other spreading codes and multiple $DPDCH_n$ configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreading code or $DPDCH_n$, for the highest reported SAR configuration in 12.2 kbps 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 an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, for the highest reported SAR configuration in 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 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-Set 1 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.

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.

8.4.6 SAR Measurement Conditions for 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 D05v02r04 publication. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating 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).

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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 D05v02r04:

a. Per Section 5.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
    i. The required channel and offset combination with the highest maximum output power is required for SAR.
    ii. 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.
    iii. 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.
b. Per Section 5.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 5.2.1.
c. Per Section 5.2.3, QPSK SAR is not required for the 100% allocation 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.
d. Per Section 5.2.4 and 5.3, SAR tests for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sections 5.2.1 through 5.2.3 is less than or equal to ½ 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 TDD

LTE TDD testing is performed using the SAR test guidance provided in FCC KDB 941225 D05v02r04. TDD is tested at the highest duty factor using UL-DL configuration 0 with special subframe configuration 6 and applying the FDD LTE procedures in KDB 941225 D05v02r04. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211 Section 4.

8.6 SAR Testing with 802.11 Transmitters

The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations

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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. See KDB Publication 248227 D01v02r02 for more details.

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 are specified for the bands, SAR measurement for the U-NII band with the lower maximum output power 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 MHz (5.47 – 5.85 GHz), 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 GHz 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. Each band is tested independently according to the normally required OFDM SAR measurement and probe calibration frequency points 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. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.5 2.4 GHz SAR Test Requirements

SAR is measured for 2.4 GHz 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:

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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. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the 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 GHz band, the Initial Test Configuration Procedures should be followed. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.6 OFDM Transmission Mode and SAR Test Channel Selection

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 bandwidth, 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 the 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, 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, lowest data rate and lowest order IEEE 802.11 mode. 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 (See Section 8.6.6). When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

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.

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9 RF CONDUCTED POWERS

9.1 GSM Conducted Powers

Table 9-1
Maximum Conducted Power

Maximum Burst-Averaged Output Power										
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 850	128	31.45	31.43	31.18	**29.30**	26.75	26.07	24.81	22.83	21.54
	190	31.44	31.54	31.11	**29.30**	26.58	25.94	24.52	22.34	21.32
	251	31.29	31.25	31.48	**28.85**	26.73	25.92	24.51	22.35	21.19
GSM 1900	512	28.51	28.25	**28.11**	25.32	24.01	24.26	22.52	22.05	21.37
	661	28.78	28.57	**27.38**	25.16	24.43	24.29	22.42	22.32	21.09
	810	28.50	28.17	**27.53**	25.11	23.84	24.31	22.56	22.41	20.52

Calculated Maximum Frame-Averaged Output Power										
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 850	128	22.25	22.23	24.99	**24.87**	23.57	16.87	18.62	18.40	18.36
	190	22.24	22.34	24.92	**24.87**	23.40	16.74	18.33	17.91	18.14
	251	22.09	22.05	25.29	**24.42**	23.55	16.72	18.32	17.92	18.01
GSM 1900	512	19.31	19.05	**21.92**	20.89	20.83	15.06	16.33	17.62	18.19
	661	19.58	19.37	**21.19**	20.73	21.25	15.09	16.23	17.89	17.91
	810	19.30	18.97	**21.34**	20.68	20.66	15.11	16.37	17.98	17.34
GSM 850	**Frame Avg.Targets:**	22.80	22.80	24.81	**24.57**	23.32	16.80	18.81	18.57	18.82
GSM 1900		19.80	19.80	**21.81**	21.07	21.32	15.30	16.81	17.57	17.82

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Table 9-2
Reduced Conducted Power

Maximum Burst-Averaged Output Power										
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 1900	512	27.50	27.31	**26.18**	24.11	22.67	23.15	21.98	20.02	18.74
	661	27.45	27.55	**26.70**	23.92	22.72	22.91	21.99	20.15	19.05
	810	27.36	27.10	**26.40**	23.80	22.02	23.03	21.78	19.79	18.52

Calculated Maximum Frame-Averaged Output Power										
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
GSM 1900	512	18.30	18.11	**19.99**	19.68	19.49	13.95	15.79	15.59	15.56
	661	18.25	18.35	**20.51**	19.49	19.54	13.71	15.80	15.72	15.87
	810	18.16	17.90	**20.21**	19.37	18.84	13.83	15.59	15.36	15.34

GSM 1900	**Frame Avg.Targets:**	18.30	18.30	**20.31**	19.57	19.82	13.80	15.31	16.07	16.32

Note:

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. GPRS/EDGE (GMSK) output powers were measured with coding scheme setting of 1 (CS1) on the base station simulator. CS1 was configured to measure GPRS output power measurements and SAR to ensure GMSK modulation in the signal. Our Investigation has shown that CS1 - CS4 settings do not have any impact on the output levels or modulation in the GPRS modes.
3. EDGE (8-PSK) output powers were measured with MCS7 on the base station simulator. MCS7 coding scheme was used to measure the output powers for EDGE since investigation has shown that choosing MCS7 coding scheme will ensure 8-PSK modulation. It has been shown that MCS levels that produce 8-PSK modulation do not have an impact on output power.

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GSM Class: B
GPRS Multislot class: 33 (Max 4 Tx uplink slots)
EDGE Multislot class: 33 (Max 4 Tx uplink slots)
DTM Multislot Class: N/A

Figure 9-1
Power Measurement Setup

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9.2 UMTS Conducted Powers

Table 9-3
Maximum Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	
99	WCDMA	12.2 kbps RMC	24.22	24.06	24.06	-
99		12.2 kbps AMR	24.20	24.04	24.04	-
6	HSDPA	Subtest 1	23.11	23.00	22.92	0
6		Subtest 2	23.15	22.94	22.91	0
6		Subtest 3	22.62	22.49	22.42	0.5
6		Subtest 4	22.62	22.50	22.43	0.5
6	HSUPA	Subtest 1	23.13	22.99	22.90	0
6		Subtest 2	21.10	20.98	20.88	2
6		Subtest 3	22.12	21.97	21.90	1
6		Subtest 4	21.10	20.98	20.91	2
6		Subtest 5	23.10	22.99	22.90	0
8	DC-HSDPA	Subtest 1	23.10	22.99	22.90	0
8		Subtest 2	23.13	23.01	22.89	0
8		Subtest 3	22.61	22.47	22.40	0.5
8		Subtest 4	22.62	22.48	22.41	0.5

DC-HSDPA considerations

- 3GPP Specification 34.121-1 Release 8 Ver 8.10.0 was used for DC-HSDPA guidance
- H-Set 12 (QPSK) was confirmed to be used during DC-HSDPA measurements
- The DUT supports UE category 24 for HSDPA

It is expected by the manufacturer that MPR for some HSPA subtests may be up to 1 dB more than specified by 3GPP, but also as low as 0 dB according to the chipset implementation in this model.

Figure 9-2
Power Measurement Setup

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9.3 LTE Conducted Powers

9.3.1 LTE Band 12

Table 9-4
LTE Band 12 Conducted Powers - 10 MHz Bandwidth

LTE Band 12 10 MHz Bandwidth					
Modulation	**RB Size**	**RB Offset**	**Mid Channel** **23095** **(707.5 MHz)** **Conducted Power [dBm]**	**MPR Allowed per 3GPP [dB]**	**MPR [dB]**
QPSK	1	0	24.01	0	0
	1	25	24.06		0
	1	49	**24.11**		0
	25	0	22.87	0-1	1
	25	12	**23.10**		1
	25	25	23.07		1
	50	0	23.00		1
16QAM	1	0	23.37	0-1	1
	1	25	23.25		1
	1	49	23.33		1
	25	0	22.19	0-2	2
	25	12	22.22		2
	25	25	22.12		2
	50	0	22.03		2
64QAM	1	0	22.16	0-2	2
	1	25	22.14		2
	1	49	22.07		2
	25	0	21.32	0-3	3
	25	12	21.36		3
	25	25	21.23		3
	50	0	21.15		3

Note: LTE Band 12 at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, 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.

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Table 9-5
LTE Band 12 Conducted Powers - 5 MHz Bandwidth

LTE Band 12 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23035 (701.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23155 (713.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.02	23.96	24.01	0	0
	1	12	24.05	24.04	24.07		0
	1	24	24.05	24.01	24.05		0
	12	0	23.16	23.14	23.12	0-1	1
	12	6	23.20	23.19	23.09		1
	12	13	23.16	23.12	23.14		1
	25	0	23.18	23.20	23.14		1
16QAM	1	0	23.34	23.49	23.46	0-1	1
	1	12	23.40	23.43	23.45		1
	1	24	23.25	23.34	23.25		1
	12	0	22.22	22.21	22.17	0-2	2
	12	6	22.24	22.21	22.22		2
	12	13	22.28	22.16	22.18		2
	25	0	22.18	22.21	22.12		2
64QAM	1	0	22.23	22.35	22.42	0-2	2
	1	12	22.33	22.28	22.30		2
	1	24	22.39	22.26	22.38		2
	12	0	21.16	21.17	21.19	0-3	3
	12	6	21.18	21.20	21.20		3
	12	13	21.22	21.18	21.22		3
	25	0	21.19	21.20	21.14		3

Table 9-6
LTE Band 12 Conducted Powers - 3 MHz Bandwidth

LTE Band 12 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23025 (700.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23165 (714.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.04	24.03	24.20	0	0
	1	7	24.03	24.06	24.00		0
	1	14	24.07	24.11	23.97		0
	8	0	23.13	23.15	23.15	0-1	1
	8	4	23.23	23.20	23.23		1
	8	7	23.17	23.21	23.15		1
	15	0	23.16	23.23	23.20		1
16QAM	1	0	23.41	23.42	23.44	0-1	1
	1	7	23.37	23.43	23.31		1
	1	14	23.27	23.45	23.26		1
	8	0	22.17	22.22	22.23	0-2	2
	8	4	22.23	22.31	22.25		2
	8	7	22.25	22.29	22.25		2
	15	0	22.16	22.27	22.23		2
64QAM	1	0	22.18	22.41	22.37	0-2	2
	1	7	22.28	22.32	22.34		2
	1	14	22.63	22.35	22.32		2
	8	0	21.16	21.22	21.18	0-3	3
	8	4	21.20	21.26	21.31		3
	8	7	21.18	21.20	21.21		3
	15	0	21.22	21.26	21.23		3

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Table 9-7
LTE Band 12 Conducted Powers -1.4 MHz Bandwidth

LTE Band 12 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23017 (699.7 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23173 (715.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	24.01	23.95	24.01	0	0
	1	2	24.11	24.10	24.02		0
	1	5	24.08	24.03	23.88		0
	3	0	23.95	23.98	23.90		0
	3	2	23.96	24.09	23.98		0
	3	3	23.91	24.01	23.90		0
	6	0	23.02	23.10	23.04	0-1	1
16QAM	1	0	23.31	23.43	23.28	0-1	1
	1	2	23.47	23.55	23.48		1
	1	5	23.43	23.39	23.43		1
	3	0	23.19	23.21	23.24		1
	3	2	23.10	23.28	23.22		1
	3	3	23.16	23.29	23.22		1
	6	0	22.19	22.19	22.17	0-2	2
64QAM	1	0	22.27	22.20	22.30	0-2	2
	1	2	22.29	22.32	22.29		2
	1	5	22.23	22.29	22.21		2
	3	0	22.21	22.23	22.15		2
	3	2	22.16	22.30	22.20		2
	3	3	22.24	22.25	22.21		2
	6	0	21.09	21.12	21.14	0-3	3

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9.3.2 LTE Band 5 (Cell)

Table 9-8
LTE Band 5 (Cell) Conducted Powers - 10 MHz Bandwidth

LTE Band 5 (Cell) 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20525 (836.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**23.60**	0	0
	1	25	23.50		0
	1	49	23.52		0
	25	0	22.50	0-1	1
	25	12	**22.56**		1
	25	25	22.51		1
	50	0	22.50		1
16QAM	1	0	22.75	0-1	1
	1	25	22.83		1
	1	49	22.71		1
	25	0	21.88	0-2	2
	25	12	21.66		2
	25	25	21.64		2
	50	0	21.67		2
64QAM	1	0	21.72	0-2	2
	1	25	21.72		2
	1	49	21.68		2
	25	0	20.71	0-3	3
	25	12	20.76		3
	25	25	20.88		3
	50	0	20.73		3

Note: LTE Band 5 (Cell) at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, 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.

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Table 9-9
LTE Band 5 (Cell) Conducted Powers - 5 MHz Bandwidth

LTE Band 5 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20425 (826.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20625 (846.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.74	23.55	23.53	0	0
	1	12	23.71	23.60	23.52		0
	1	24	23.73	23.53	23.53		0
	12	0	22.87	22.55	22.59	0-1	1
	12	6	22.85	22.70	22.66		1
	12	13	22.81	22.68	22.57		1
	25	0	22.82	22.64	22.60		1
16QAM	1	0	22.97	22.80	22.85	0-1	1
	1	12	22.77	22.93	22.64		1
	1	24	22.80	22.94	22.94		1
	12	0	21.94	21.64	21.63	0-2	2
	12	6	21.95	21.77	21.66		2
	12	13	21.88	21.74	21.62		2
	25	0	21.92	21.65	21.66		2
64QAM	1	0	22.05	21.78	22.00	0-2	2
	1	12	21.98	21.85	21.77		2
	1	24	21.87	21.82	21.71		2
	12	0	20.94	20.65	20.64	0-3	3
	12	6	20.99	20.75	20.67		3
	12	13	20.90	20.70	20.65		3
	25	0	20.85	20.62	20.63		3

Table 9-10
LTE Band 5 (Cell) Conducted Powers - 3 MHz Bandwidth

LTE Band 5 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20415 (825.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20635 (847.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.73	23.52	23.40	0	0
	1	7	23.64	23.53	23.48		0
	1	14	23.78	23.55	23.48		0
	8	0	22.82	22.63	22.49	0-1	1
	8	4	22.85	22.65	22.60		1
	8	7	22.81	22.65	22.58		1
	15	0	22.87	22.69	22.56		1
16QAM	1	0	22.94	22.75	22.54	0-1	1
	1	7	22.94	23.00	22.73		1
	1	14	22.79	22.89	22.70		1
	8	0	21.90	21.68	21.57	0-2	2
	8	4	21.90	21.74	21.71		2
	8	7	21.91	21.75	21.63		2
	15	0	21.91	21.69	21.63		2
64QAM	1	0	22.02	21.72	21.71	0-2	2
	1	7	21.97	21.80	21.65		2
	1	14	22.09	21.78	21.67		2
	8	0	20.89	20.62	20.53	0-3	3
	8	4	20.93	20.67	20.64		3
	8	7	20.88	20.66	20.58		3
	15	0	20.96	20.74	20.59		3

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Table 9-11
LTE Band 5 (Cell) Conducted Powers -1.4 MHz Bandwidth

LTE Band 5 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20407 (824.7 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20643 (848.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	23.66	23.46	23.39	0	0
	1	2	23.68	23.54	23.44		0
	1	5	23.57	23.44	23.38		0
	3	0	23.63	23.51	23.33		0
	3	2	23.63	23.47	23.33		0
	3	3	23.62	23.42	23.36		0
	6	0	22.83	22.55	22.48	0-1	1
16QAM	1	0	23.01	22.81	22.74	0-1	1
	1	2	23.15	22.93	22.93		1
	1	5	23.07	22.76	22.76		1
	3	0	22.91	22.72	22.59		1
	3	2	22.98	22.72	22.67		1
	3	3	22.89	22.65	22.58		1
	6	0	21.89	21.63	21.60	0-2	2
64QAM	1	0	21.85	21.75	21.66	0-2	2
	1	2	21.96	21.76	21.66		2
	1	5	21.89	21.73	21.61		2
	3	0	21.89	21.63	21.55		2
	3	2	21.90	21.69	21.60		2
	3	3	21.85	21.63	21.57		2
	6	0	20.85	20.58	20.53	0-3	3

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9.3.3 LTE Band 41

Table 9-12
LTE Band 41 Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	**23.71**	23.61	23.43	23.00	23.08	0	0
	1	50	23.68	23.70	23.52	23.09	23.38		0
	1	99	23.64	23.59	23.45	23.08	23.38		0
	50	0	22.70	22.67	22.69	22.09	22.26	0-1	1
	50	25	22.59	22.71	22.64	22.05	22.56		1
	50	50	**22.81**	22.63	22.58	22.00	22.54		1
	100	0	22.71	22.65	22.61	22.02	22.55		1
16QAM	1	0	22.71	22.79	22.23	21.75	22.04	0-1	1
	1	50	22.97	22.77	22.10	21.80	22.32		1
	1	99	22.77	22.80	22.22	21.76	22.24		1
	50	0	21.81	21.67	21.43	21.00	21.24	0-2	2
	50	25	21.77	21.75	21.50	20.94	21.23		2
	50	50	21.74	21.71	21.26	21.01	21.25		2
	100	0	21.78	21.64	21.33	20.87	21.27		2
64QAM	1	0	21.49	21.34	20.80	20.62	21.03	0-2	2
	1	50	21.47	21.38	21.05	20.54	21.10		2
	1	99	21.54	21.37	20.95	20.56	21.06		2
	50	0	20.96	20.78	20.44	19.99	20.49	0-3	3
	50	25	20.87	20.80	20.32	20.03	20.52		3
	50	50	20.91	20.65	20.24	19.92	20.51		3
	100	0	20.85	20.65	20.33	19.92	20.49		3

Table 9-13
LTE Band 41 Conducted Powers - 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.52	23.54	23.24	23.05	23.09	0	0
	1	36	23.62	23.66	23.40	23.18	23.37		0
	1	74	23.72	23.37	23.27	22.96	23.44		0
	36	0	22.68	22.75	22.50	22.28	22.38	0-1	1
	36	18	22.84	22.81	22.62	22.29	22.50		1
	36	37	22.82	22.76	22.52	22.24	22.60		1
	75	0	22.78	22.79	22.43	22.21	22.51		1
16QAM	1	0	22.80	22.77	22.34	22.21	22.23	0-1	1
	1	36	22.77	22.84	22.50	22.27	22.56		1
	1	74	22.91	22.52	22.38	22.09	22.66		1
	36	0	21.65	21.71	21.49	21.22	21.34	0-2	2
	36	18	21.78	21.82	21.55	21.21	21.45		2
	36	37	21.72	21.71	21.45	21.22	21.54		2
	75	0	21.79	21.79	21.47	21.23	21.54		2
64QAM	1	0	21.32	21.26	21.03	20.78	20.79	0-2	2
	1	36	21.42	21.46	21.19	20.86	21.19		2
	1	74	21.50	21.16	20.98	20.70	21.25		2
	36	0	20.71	20.78	20.54	20.30	20.44	0-3	3
	36	18	20.87	20.89	20.61	20.33	20.56		3
	36	37	20.87	20.79	20.54	20.23	20.65		3
	75	0	20.81	20.83	20.53	20.25	20.61		3

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Table 9-14
LTE Band 41 Conducted Powers - 10 MHz Bandwidth

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.66	23.63	23.31	23.01	23.28	0	0
	1	25	23.73	23.81	23.57	23.26	23.56		0
	1	49	23.81	23.52	23.31	22.99	23.35		0
	25	0	22.85	22.87	22.62	22.28	22.52	0-1	1
	25	12	22.93	23.02	22.69	22.36	22.66		1
	25	25	22.96	22.86	22.63	22.33	22.62		1
	50	0	22.89	22.92	22.63	22.29	22.61		1
16QAM	1	0	22.84	22.74	22.44	22.16	22.37	0-1	1
	1	25	22.98	23.08	22.25	22.19	22.71		1
	1	49	22.97	22.60	22.39	22.09	22.48		1
	25	0	21.87	21.95	21.62	21.32	21.54	0-2	2
	25	12	22.03	22.02	21.77	21.26	21.51		2
	25	25	21.99	21.90	21.61	21.35	21.67		2
	50	0	21.91	21.94	21.69	21.34	21.67		2
64QAM	1	0	21.18	21.40	21.06	20.80	21.02	0-2	2
	1	25	21.54	21.62	21.30	20.76	21.38		2
	1	49	21.59	21.28	21.02	20.79	21.15		2
	25	0	20.87	20.98	20.66	20.36	20.60	0-3	3
	25	12	21.02	21.04	20.77	20.45	20.75		3
	25	25	21.02	20.87	20.65	20.37	20.64		3
	50	0	21.01	21.02	20.74	20.41	20.76		3

Table 9-15
LTE Band 41 Conducted Powers - 5 MHz Bandwidth

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	23.75	23.90	23.56	23.26	23.53	0	0
	1	12	23.76	23.83	23.55	23.30	23.55		0
	1	24	23.78	23.78	23.48	23.25	23.57		0
	12	0	22.89	22.98	22.69	22.39	22.60	0-1	1
	12	6	22.94	22.94	22.69	22.41	22.69		1
	12	13	22.95	22.93	22.67	22.38	22.65		1
	25	0	22.93	22.97	22.71	22.39	22.68		1
16QAM	1	0	22.88	23.04	22.70	22.24	22.54	0-1	1
	1	12	22.87	22.91	22.56	22.30	22.64		1
	1	24	22.95	22.97	22.69	22.22	22.67		1
	12	0	21.87	21.91	21.62	21.32	21.54	0-2	2
	12	6	21.91	21.95	21.61	21.32	21.68		2
	12	13	21.92	21.89	21.62	21.41	21.64		2
	25	0	21.97	22.01	21.74	21.36	21.72		2
64QAM	1	0	21.55	21.65	21.28	21.03	21.30	0-2	2
	1	12	21.53	21.58	21.29	20.96	21.29		2
	1	24	21.63	21.61	21.28	21.00	21.41		2
	12	0	20.91	20.95	20.66	20.35	20.57	0-3	3
	12	6	20.95	20.98	20.69	20.39	20.68		3
	12	13	20.97	20.94	20.64	20.41	20.68		3
	25	0	20.98	20.98	20.71	20.38	20.68		3

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9.4 WLAN Conducted Powers

Table 9-16
2.4 GHz WLAN Maximum Average RF Power

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	18.52	17.94	17.72
2437	6	18.66	17.82	17.97
2462	11	18.59	17.62	17.89

Table 9-17
5 GHz WLAN Maximum Average RF Power

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	16.61	16.53	15.57
5200	40	16.85	16.96	15.61
5220	44	16.84	16.69	15.71
5240	48	16.70	16.99	15.98
5260	52	16.79	16.69	15.64
5280	56	16.89	16.71	15.79
5300	60	16.62	16.61	15.61
5320	64	16.94	16.98	15.97
5500	100	16.65	16.54	15.93
5600	120	16.69	16.42	15.89
5620	124	16.78	16.71	15.33
5720	144	16.92	16.79	15.74
5745	149	16.66	16.70	15.84
5785	157	16.51	16.95	15.94
5825	165	16.59	16.98	15.48

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Table 9-18
2.4 GHz WLAN Reduced Average RF Power

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	16.97	16.83	16.71
2437	6	16.71	16.85	16.68
2462	11	16.60	16.60	16.94

Table 9-19
5 GHz WLAN Reduced Average RF Power

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
5190	38	13.14	13.17
5230	46	13.39	13.39
5270	54	13.15	13.14
5310	62	12.84	12.62
5510	102	12.93	12.37
5550	110	13.39	13.22
5590	118	13.18	13.18
5630	126	13.04	13.03
5710	142	13.21	13.24
5755	151	13.03	13.47
5795	159	13.50	13.44

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.

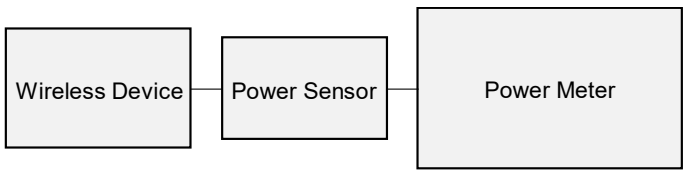

Figure 9-3
Power Measurement Setup

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9.5 Bluetooth Conducted Powers

Table 9-20
Bluetooth Average RF Power

Frequency [MHz]	Data Rate [Mbps]	Mod.	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	1.0	GFSK	0	15.13	32.608
2441	1.0	GFSK	39	16.58	45.535
2480	1.0	GFSK	78	16.00	39.796
2402	2.0	π/4-DQPSK	0	11.51	14.159
2441	2.0	π/4-DQPSK	39	12.82	19.130
2480	2.0	π/4-DQPSK	78	12.35	17.176
2402	3.0	8DPSK	0	11.53	14.222
2441	3.0	8DPSK	39	12.86	19.316
2480	3.0	8DPSK	78	12.42	17.473

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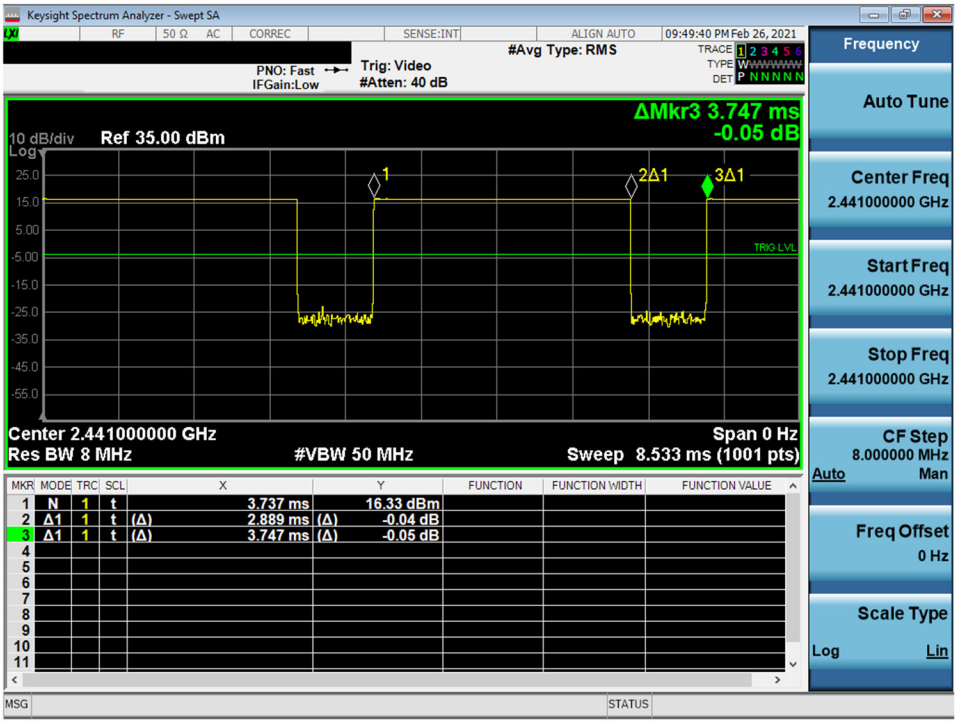

Figure 9-4
Bluetooth Transmission Plot

Equation 9-1
Bluetooth Duty Cycle Calculation

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.889ms}{3.747ms} * 100\% = 77.1\%$$

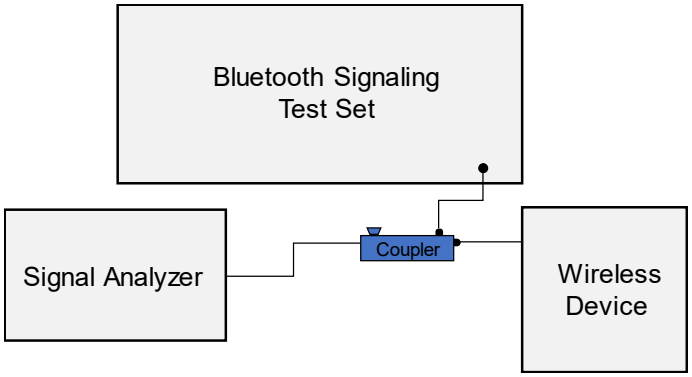

Figure 9-5
Power Measurement Setup

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10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Head Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
02/16/2021	750 Head	21.6	680	0.846	44.370	0.888	42.305	-4.73%	4.88%
			695	0.860	44.158	0.889	42.227	-3.26%	4.57%
			700	0.865	44.091	0.889	42.201	-2.70%	4.48%
			710	0.874	43.957	0.890	42.149	-1.80%	4.29%
			725	0.888	43.760	0.891	42.071	-0.34%	4.01%
			750	0.912	43.441	0.894	41.942	2.01%	3.57%
			770	0.931	43.174	0.895	41.838	4.02%	3.19%
02/16/2021	835 Head	22.2	820	0.884	42.159	0.899	41.578	-1.67%	1.40%
			835	0.899	41.971	0.900	41.500	-0.11%	1.13%
			850	0.913	41.787	0.916	41.500	-0.33%	0.69%
03/09/2021	835 Head	22.5	820	0.882	40.729	0.899	41.578	-1.89%	-2.04%
			835	0.898	40.531	0.900	41.500	-0.22%	-2.33%
			850	0.913	40.340	0.916	41.500	-0.33%	-2.80%
03/09/2021	1900 Head	23.2	1850	1.399	39.920	1.400	40.000	-0.07%	-0.20%
			1860	1.410	39.874	1.400	40.000	0.71%	-0.31%
			1880	1.430	39.789	1.400	40.000	2.14%	-0.53%
			1900	1.451	39.715	1.400	40.000	3.64%	-0.71%
			1905	1.456	39.694	1.400	40.000	4.00%	-0.76%
			1910	1.461	39.673	1.400	40.000	4.36%	-0.82%
02/22/2021	2450 Head	22.6	2400	1.796	41.043	1.756	39.289	2.28%	4.46%
			2450	1.857	40.840	1.800	39.200	3.17%	4.18%
			2480	1.892	40.724	1.833	39.162	3.22%	3.99%
			2500	1.916	40.641	1.855	39.136	3.29%	3.85%
			2510	1.928	40.597	1.866	39.123	3.32%	3.77%
03/07/2021	2450 Head	23.2	2400	1.808	40.160	1.756	39.289	2.96%	2.22%
			2450	1.867	39.942	1.800	39.200	3.72%	1.89%
			2480	1.904	39.824	1.833	39.162	3.87%	1.69%
03/02/2021	5200-5800 Head	20.3	5180	4.641	35.091	4.635	36.009	0.13%	-2.55%
			5190	4.650	35.074	4.645	35.998	0.11%	-2.57%
			5200	4.659	35.051	4.655	35.986	0.09%	-2.60%
			5210	4.671	35.020	4.666	35.975	0.11%	-2.65%
			5220	4.684	34.994	4.676	35.963	0.17%	-2.69%
			5240	4.709	34.942	4.696	35.940	0.28%	-2.78%
			5250	4.720	34.919	4.706	35.929	0.30%	-2.81%
			5260	4.734	34.904	4.717	35.917	0.36%	-2.82%
			5270	4.747	34.896	4.727	35.906	0.42%	-2.81%
			5280	4.758	34.889	4.737	35.894	0.44%	-2.80%
			5290	4.769	34.875	4.748	35.883	0.44%	-2.81%
			5300	4.779	34.852	4.758	35.871	0.44%	-2.84%
			5310	4.789	34.826	4.768	35.860	0.44%	-2.88%
			5320	4.796	34.803	4.778	35.849	0.38%	-2.92%
			5500	5.002	34.458	4.963	35.643	0.79%	-3.32%
			5510	5.014	34.451	4.973	35.632	0.82%	-3.31%
			5520	5.023	34.441	4.983	35.620	0.80%	-3.31%
			5530	5.035	34.416	4.994	35.609	0.82%	-3.35%
			5540	5.047	34.393	5.004	35.597	0.86%	-3.38%
			5550	5.060	34.364	5.014	35.586	0.92%	-3.43%
			5560	5.075	34.345	5.024	35.574	1.02%	-3.45%
			5580	5.106	34.314	5.045	35.551	1.21%	-3.48%
			5600	5.130	34.280	5.065	35.529	1.28%	-3.52%
			5610	5.138	34.258	5.076	35.518	1.22%	-3.55%
			5620	5.147	34.242	5.086	35.506	1.20%	-3.56%
			5640	5.167	34.184	5.106	35.483	1.19%	-3.66%
			5660	5.194	34.137	5.127	35.460	1.31%	-3.73%
			5670	5.210	34.128	5.137	35.449	1.42%	-3.73%
			5680	5.223	34.111	5.147	35.437	1.48%	-3.74%
			5690	5.237	34.102	5.158	35.426	1.53%	-3.74%
			5700	5.248	34.087	5.168	35.414	1.55%	-3.75%
			5710	5.259	34.075	5.178	35.403	1.56%	-3.75%
			5720	5.267	34.063	5.188	35.391	1.52%	-3.75%
			5745	5.298	34.002	5.214	35.363	1.61%	-3.85%
			5750	5.304	33.989	5.219	35.357	1.63%	-3.87%
			5755	5.311	33.975	5.224	35.351	1.67%	-3.89%
			5765	5.324	33.957	5.234	35.340	1.72%	-3.91%
			5775	5.336	33.935	5.245	35.329	1.73%	-3.95%
			5785	5.349	33.920	5.255	35.317	1.79%	-3.96%
			5795	5.361	33.912	5.265	35.305	1.82%	-3.95%
			5805	5.373	33.902	5.275	35.294	1.86%	-3.94%
			5825	5.391	33.865	5.296	35.271	1.79%	-3.99%

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Table 10-2
Measured Body Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
02/15/2021	750 Body	20.7	680	0.914	55.143	0.958	55.804	-4.59%	-1.18%
			695	0.919	55.105	0.959	55.745	-4.17%	-1.15%
			700	0.921	55.088	0.959	55.726	-3.96%	-1.14%
			710	0.925	55.058	0.960	55.687	-3.65%	-1.13%
			725	0.931	55.014	0.961	55.629	-3.12%	-1.11%
			750	0.941	54.952	0.964	55.531	-2.39%	-1.04%
			770	0.948	54.910	0.965	55.453	-1.76%	-0.98%
02/16/2021	835 Body	21.9	820	0.941	53.555	0.969	55.258	-2.89%	-3.08%
			835	0.957	53.415	0.970	55.200	-1.34%	-3.23%
			850	0.974	53.269	0.988	55.154	-1.42%	-3.42%
03/08/2021	835 Body	20.9	820	0.936	54.401	0.969	55.258	-3.41%	-1.55%
			835	0.952	54.238	0.970	55.200	-1.86%	-1.74%
			850	0.969	54.078	0.988	55.154	-1.92%	-1.95%
03/08/2021	1900 Body	23.8	1850	1.517	52.413	1.520	53.300	-0.20%	-1.66%
			1860	1.528	52.378	1.520	53.300	0.53%	-1.73%
			1880	1.551	52.314	1.520	53.300	2.04%	-1.85%
			1900	1.573	52.255	1.520	53.300	3.49%	-1.96%
			1905	1.579	52.240	1.520	53.300	3.88%	-1.99%
			1910	1.584	52.223	1.520	53.300	4.21%	-2.02%
02/19/2021	2450 Body	24.5	2400	1.978	52.440	1.902	52.767	4.00%	-0.62%
			2450	2.035	52.294	1.950	52.700	4.36%	-0.77%
			2480	2.069	52.212	1.993	52.662	3.81%	-0.85%
02/22/2021	2450 Body	24.2	2400	1.968	52.387	1.902	52.767	3.47%	-0.72%
			2450	2.028	52.244	1.950	52.700	4.00%	-0.87%
			2480	2.063	52.158	1.993	52.662	3.51%	-0.96%
			2500	2.087	52.099	2.021	52.636	3.27%	-1.02%
			2510	2.098	52.068	2.035	52.623	3.10%	-1.05%
03/06/2021	2450 Body	24.1	2400	1.945	52.073	1.902	52.767	2.26%	-1.32%
			2450	2.004	51.932	1.950	52.700	2.77%	-1.46%
			2480	2.038	51.848	1.993	52.662	2.26%	-1.55%
02/15/2021	5200–5800 Body	23.0	5180	5.329	47.374	5.276	49.041	1.00%	-3.40%
			5190	5.333	47.369	5.288	49.028	0.85%	-3.38%
			5200	5.337	47.340	5.299	49.014	0.72%	-3.42%
			5210	5.342	47.305	5.311	49.001	0.58%	-3.46%
			5220	5.354	47.264	5.323	48.987	0.58%	-3.52%
			5240	5.390	47.186	5.346	48.960	0.82%	-3.62%
			5250	5.411	47.167	5.358	48.947	0.99%	-3.64%
			5260	5.432	47.164	5.369	48.933	1.17%	-3.62%
			5270	5.450	47.173	5.381	48.919	1.28%	-3.57%
			5280	5.465	47.178	5.393	48.906	1.34%	-3.53%
			5290	5.473	47.179	5.404	48.892	1.28%	-3.50%
			5300	5.477	47.178	5.416	48.879	1.13%	-3.48%
			5310	5.482	47.170	5.428	48.865	0.99%	-3.47%
			5320	5.489	47.129	5.439	48.851	0.92%	-3.53%
			5500	5.742	46.844	5.650	48.607	1.63%	-3.63%
			5510	5.749	46.856	5.661	48.594	1.55%	-3.58%
			5520	5.756	46.859	5.673	48.580	1.46%	-3.54%
			5530	5.758	46.838	5.685	48.566	1.28%	-3.56%
			5540	5.772	46.782	5.696	48.553	1.33%	-3.65%
			5550	5.786	46.713	5.708	48.539	1.37%	-3.76%
			5560	5.806	46.673	5.720	48.526	1.50%	-3.82%
			5580	5.847	46.647	5.743	48.499	1.81%	-3.82%
			5600	5.880	46.672	5.766	48.471	1.98%	-3.71%
			5610	5.894	46.674	5.778	48.458	2.01%	-3.68%
			5620	5.904	46.667	5.790	48.444	1.97%	-3.67%
			5640	5.912	46.594	5.813	48.417	1.70%	-3.77%
			5660	5.941	46.542	5.837	48.390	1.78%	-3.82%
			5670	5.956	46.514	5.848	48.376	1.85%	-3.85%
			5680	5.977	46.494	5.860	48.363	2.00%	-3.86%
			5690	5.993	46.488	5.872	48.349	2.06%	-3.85%
			5700	6.007	46.507	5.883	48.336	2.11%	-3.78%
			5710	6.016	46.523	5.895	48.322	2.05%	-3.72%
			5720	6.019	46.528	5.907	48.309	1.90%	-3.69%
			5745	6.037	46.439	5.936	48.275	1.70%	-3.80%
			5750	6.043	46.414	5.942	48.268	1.70%	-3.84%
			5755	6.051	46.387	5.947	48.261	1.75%	-3.88%
			5765	6.071	46.345	5.959	48.248	1.88%	-3.94%
			5775	6.092	46.306	5.971	48.234	2.03%	-4.00%
			5785	6.119	46.292	5.982	48.220	2.29%	-4.00%
			5795	6.143	46.303	5.994	48.207	2.49%	-3.95%
			5800	6.152	46.313	6.000	48.200	2.53%	-3.91%
			5805	6.160	46.326	6.006	48.193	2.56%	-3.87%
			5825	6.174	46.365	6.029	48.166	2.41%	-3.74%

The above measured tissue parameters were used in the DASY software. The DASY software was used to perform interpolation to determine the dielectric parameters at the SAR test device frequencies (per KDB Publication 865664 D01v01r04 and IEEE 1528-2013 6.6.1.2). The tissue parameters listed in the SAR test plots may slightly differ from the table above due to significant digit rounding in the software.

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10.2 Test System Verification

Prior to SAR assessment, the system is verified to ±10% of the SAR measurement on the reference dipole at the time of calibration by the calibration facility. Full system validation status and result summary can be found in Appendix D.

Table 10-3
System Verification Results – 1g

System Verification TARGET & MEASURED												
SAR System	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp. (C)	Liquid Temp. (C)	Input Power (W)	Source SN	Probe SN	Measured SAR_{1g} (W/kg)	1W Target SAR_{1g} (W/kg)	1W Normalized SAR_{1g} (W/kg)	$Deviation_{1g}$ (%)
H	750	Head	02/16/2021	21.5	21.5	0.200	1003	7357	1.650	8.780	1.756	-6.04%
P	835	Head	02/16/2021	23.7	22.2	0.200	4d133	7308	1.760	9.430	8.800	-6.68%
D	835	Head	03/09/2021	22.7	22.5	0.200	4d132	3589	1.890	9.660	1.932	-2.17%
H	1900	Head	03/09/2021	21.3	21.5	0.100	5d080	7357	4.070	39.800	3.980	2.26%
E	2450	Head	02/22/2021	21.9	22.6	0.100	719	7571	5.170	51.400	5.140	0.58%
E	2450	Head	03/07/2021	23.2	23.0	0.100	719	7571	5.080	51.400	5.140	-1.17%
H	5250	Head	03/02/2021	21.3	20.4	0.050	1191	7357	3.790	79.800	3.990	-5.01%
H	5600	Head	03/02/2021	21.3	20.4	0.050	1191	7357	3.850	81.800	4.090	-5.87%
H	5750	Head	03/02/2021	21.3	20.4	0.050	1191	7357	3.650	79.300	3.965	-7.94%
P	750	Body	02/15/2021	22.5	20.7	0.200	1054	7308	1.630	8.530	1.706	-4.45%
I	835	Body	02/16/2021	21.6	21.4	0.200	4d047	7551	2.010	9.470	1.894	6.12%
E	835	Body	03/08/2021	21.9	21.1	0.200	4d047	7571	2.020	9.470	1.894	6.65%
J	1900	Body	03/08/2021	20.1	22.0	0.100	5d080	7410	4.210	39.200	3.920	7.40%
K	2450	Body	02/19/2021	23.5	24.5	0.100	719	7409	5.330	50.700	5.070	5.13%
K	2450	Body	02/22/2021	23.4	22.5	0.100	719	7409	5.270	50.700	5.070	3.94%
K	2450	Body	03/06/2021	23.1	22.6	0.100	719	7409	5.210	50.700	5.070	2.76%
G	5250	Body	02/15/2021	23.5	23.0	0.050	1191	7406	3.530	74.600	3.730	-5.36%
G	5600	Body	02/15/2021	23.5	23.0	0.050	1191	7406	3.750	78.100	3.905	-3.97%
G	5750	Body	02/15/2021	23.5	23.0	0.050	1191	7406	3.560	74.900	3.745	-4.94%

Table 10-4
System Verification Results – 10g

SAR System	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp. (C)	Liquid Temp. (C)	Input Power (W)	Source SN	Probe SN	Measured SAR_{10g} (W/kg)	1W Target SAR_{10g} (W/kg)	1W Normalized SAR_{10g} (W/kg)	$Deviation_{10g}$ (%)
J	1900	Body	03/08/2021	20.1	22.0	0.100	5d080	7410	2.160	20.600	2.060	4.85%
G	5250	Body	02/15/2021	23.5	23.0	0.050	1191	7406	0.982	21.000	1.050	-6.48%
G	5600	Body	02/15/2021	23.5	23.0	0.050	1191	7406	1.050	21.700	1.085	-3.23%
G	5750	Body	02/15/2021	23.5	23.0	0.050	1191	7406	0.975	20.800	1.040	-6.25%

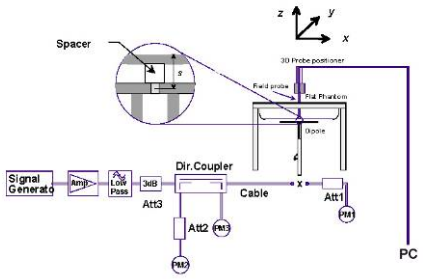

Figure 10-1
System Verification Setup Diagram

Figure 10-2
System Verification Setup Photo

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11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
GSM 850 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.0	31.44	0.16	Right	Cheek	16448	1:8.3	0.176	1.432	0.252	A1
836.60	190	GSM 850	GSM	33.0	31.44	0.03	Right	Tilt	16448	1:8.3	0.082	1.432	0.117	
836.60	190	GSM 850	GSM	33.0	31.44	0.00	Left	Cheek	16448	1:8.3	0.152	1.432	0.218	
836.60	190	GSM 850	GSM	33.0	31.44	-0.01	Left	Tilt	16448	1:8.3	0.082	1.432	0.117	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-2
GSM 1900 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GSM	30.0	28.78	0.10	Right	Cheek	16448	1:8.3	0.026	1.324	0.034	
1880.00	661	GSM 1900	GSM	30.0	28.78	0.19	Right	Tilt	16448	1:8.3	0.025	1.324	0.033	
1880.00	661	GSM 1900	GSM	30.0	28.78	0.16	Left	Cheek	16448	1:8.3	0.049	1.324	0.065	A2
1880.00	661	GSM 1900	GSM	30.0	28.78	-0.16	Left	Tilt	16448	1:8.3	0.026	1.324	0.034	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-3
UMTS 850 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	25.0	24.06	0.01	Right	Cheek	01150	1:1	0.196	1.242	0.243	A3
836.60	4183	UMTS 850	RMC	25.0	24.06	0.12	Right	Tilt	01150	1:1	0.089	1.242	0.111	
836.60	4183	UMTS 850	RMC	25.0	24.06	0.10	Left	Cheek	01150	1:1	0.190	1.242	0.236	
836.60	4183	UMTS 850	RMC	25.0	24.06	0.13	Left	Tilt	01150	1:1	0.101	1.242	0.125	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

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Table 11-4
LTE Band 12 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.5	24.11	-0.14	0	Right	Cheek	QPSK	1	49	01150	1:1	0.233	1.377	0.321	A4
707.50	23095	Mid	LTE Band 12	10	24.5	23.10	0.05	1	Right	Cheek	QPSK	25	12	01150	1:1	0.190	1.380	0.262	
707.50	23095	Mid	LTE Band 12	10	25.5	24.11	-0.11	0	Right	Tilt	QPSK	1	49	01150	1:1	0.108	1.377	0.149	
707.50	23095	Mid	LTE Band 12	10	24.5	23.10	0.02	1	Right	Tilt	QPSK	25	12	01150	1:1	0.087	1.380	0.120	
707.50	23095	Mid	LTE Band 12	10	25.5	24.11	0.10	0	Left	Cheek	QPSK	1	49	01150	1:1	0.189	1.377	0.260	
707.50	23095	Mid	LTE Band 12	10	24.5	23.10	0.06	1	Left	Cheek	QPSK	25	12	01150	1:1	0.162	1.380	0.224	
707.50	23095	Mid	LTE Band 12	10	25.5	24.11	-0.07	0	Left	Tilt	QPSK	1	49	01150	1:1	0.075	1.377	0.103	
707.50	23095	Mid	LTE Band 12	10	24.5	23.10	-0.07	1	Left	Tilt	QPSK	25	12	01150	1:1	0.074	1.380	0.102	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-5
LTE Band 5 (Cell) Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	23.60	0.12	0	Right	Cheek	QPSK	1	0	01150	1:1	0.178	1.549	0.276	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	22.56	0.00	1	Right	Cheek	QPSK	25	12	01150	1:1	0.157	1.563	0.245	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	23.60	0.13	0	Right	Tilt	QPSK	1	0	01150	1:1	0.075	1.549	0.116	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	22.56	0.12	1	Right	Tilt	QPSK	25	12	01150	1:1	0.068	1.563	0.106	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	23.60	0.15	0	Left	Cheek	QPSK	1	0	01150	1:1	0.198	1.549	0.307	A5
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	22.56	-0.06	1	Left	Cheek	QPSK	25	12	01150	1:1	0.131	1.563	0.205	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	23.60	-0.03	0	Left	Tilt	QPSK	1	0	01150	1:1	0.091	1.549	0.141	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	22.56	0.05	1	Left	Tilt	QPSK	25	12	01150	1:1	0.063	1.563	0.098	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-6
LTE Band 41 Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2506.00	39750	Low	LTE Band 41	20	25.0	23.71	0.08	0	Right	Cheek	QPSK	1	0	01143	1:1.58	0.171	1.346	0.230	
2506.00	39750	Low	LTE Band 41	20	24.0	22.81	0.08	1	Right	Cheek	QPSK	50	50	01143	1:1.58	0.136	1.315	0.179	
2506.00	39750	Low	LTE Band 41	20	25.0	23.71	0.09	0	Right	Tilt	QPSK	1	0	01143	1:1.58	0.130	1.346	0.175	
2506.00	39750	Low	LTE Band 41	20	24.0	22.81	0.18	1	Right	Tilt	QPSK	50	50	01143	1:1.58	0.103	1.315	0.135	
2506.00	39750	Low	LTE Band 41	20	25.0	23.71	0.13	0	Left	Cheek	QPSK	1	0	01143	1:1.58	0.302	1.346	**0.406**	A6
2506.00	39750	Low	LTE Band 41	20	24.0	22.81	0.16	1	Left	Cheek	QPSK	50	50	01143	1:1.58	0.231	1.315	0.304	
2506.00	39750	Low	LTE Band 41	20	25.0	23.71	0.10	0	Left	Tilt	QPSK	1	0	01143	1:1.58	0.156	1.346	0.210	
2506.00	39750	Low	LTE Band 41	20	24.0	22.81	0.02	1	Left	Tilt	QPSK	50	50	01143	1:1.58	0.120	1.315	0.158	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram									

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Table 11-7
DTS Head SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	17.0	16.97	0.12	Right	Cheek	12066	1	98.9	0.347	-	1.007	1.011	-	
2412	1	802.11b	DSSS	22	17.0	16.97	0.12	Right	Tilt	12066	1	98.9	0.351	-	1.007	1.011	-	
2412	1	802.11b	DSSS	22	17.0	16.97	0.13	Left	Cheek	12066	1	98.9	0.247	-	1.007	1.011	-	
2412	1	802.11b	DSSS	22	17.0	16.97	0.07	Left	Tilt	12066	1	98.9	0.356	0.242	1.007	1.011	**0.246**	A7
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**								**Head** **1.6 W/kg (mW/g)** averaged over 1 gram										

Table 11-8
NII Head SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
5270	54	802.11n	OFDM	40	14.0	13.15	0.10	Right	Cheek	01143	13.5	94.9	0.399	0.216	1.216	1.054	0.277	
5270	54	802.11n	OFDM	40	14.0	13.15	0.16	Right	Tilt	01143	13.5	94.9	0.298	-	1.216	1.054	-	
5270	54	802.11n	OFDM	40	14.0	13.15	0.13	Left	Cheek	01143	13.5	94.9	0.121	-	1.216	1.054	-	
5270	54	802.11n	OFDM	40	14.0	13.15	0.15	Left	Tilt	01143	13.5	94.9	0.111	-	1.216	1.054	-	
5550	110	802.11n	OFDM	40	14.0	13.39	0.19	Right	Cheek	01143	13.5	94.9	1.011	0.487	1.151	1.054	**0.591**	A8
5550	110	802.11n	OFDM	40	14.0	13.39	0.18	Right	Tilt	01143	13.5	94.9	0.733	0.286	1.151	1.054	0.347	
5550	110	802.11n	OFDM	40	14.0	13.39	0.13	Left	Cheek	01143	13.5	94.9	0.330	-	1.151	1.054	-	
5550	110	802.11n	OFDM	40	14.0	13.39	0.13	Left	Tilt	01143	13.5	94.9	0.237	-	1.151	1.054	-	
5795	159	802.11n	OFDM	40	14.0	13.50	-0.19	Right	Cheek	01143	13.5	94.9	0.787	0.428	1.122	1.054	0.506	
5795	159	802.11n	OFDM	40	14.0	13.50	0.15	Right	Tilt	01143	13.5	94.9	0.620	0.282	1.122	1.054	0.333	
5795	159	802.11n	OFDM	40	14.0	13.50	0.16	Left	Cheek	01143	13.5	94.9	0.277	-	1.122	1.054	-	
5795	159	802.11n	OFDM	40	14.0	13.50	0.12	Left	Tilt	01143	13.5	94.9	0.289	-	1.122	1.054	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**								**Head** **1.6 W/kg (mW/g)** averaged over 1 gram										

Table 11-9
DSS Head SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441.00	39	Bluetooth	FHSS	17.0	16.58	0.03	Right	Cheek	01168	1	77.1	0.157	1.102	1.297	0.224	
2441.00	39	Bluetooth	FHSS	17.0	16.58	-0.12	Right	Tilt	01168	1	77.1	0.179	1.102	1.297	0.256	
2441.00	39	Bluetooth	FHSS	17.0	16.58	0.10	Left	Cheek	01168	1	77.1	0.142	1.102	1.297	0.203	
2441.00	39	Bluetooth	FHSS	17.0	16.58	0.15	Left	Tilt	01168	1	77.1	0.218	1.102	1.297	**0.312**	A9
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**								**Head** **1.6 W/kg (mW/g)** averaged over 1 gram								

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11.2 Standalone Body-Worn SAR Data

Table 11-10
GSM/UMTS Body-Worn SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.0	31.44	-0.03	15 mm	16554	1	1:8.3	back	0.206	1.432	0.295	A10
1880.00	661	GSM 1900	GSM	30.0	28.78	0.08	15 mm	16554	1	1:8.3	back	0.032	1.324	0.042	A12
836.60	4183	UMTS 850	RMC	25.0	24.06	0.01	15 mm	01192	N/A	1:1	back	0.222	1.242	0.276	A14
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-11
LTE Body-Worn SAR

MEASUREMENT RESULTS																		
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.5	24.11	0.12	0	01127	QPSK	1	49	15 mm	back	1:1	0.242	1.377	0.333	A16
707.50	23095	Mid	LTE Band 12	10	24.5	23.10	-0.03	1	01127	QPSK	25	12	15 mm	back	1:1	0.190	1.380	0.262	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	23.60	0.00	0	01192	QPSK	1	0	15 mm	back	1:1	0.284	1.549	**0.440**	A18
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	22.56	0.03	1	01192	QPSK	25	12	15 mm	back	1:1	0.231	1.563	0.361	
2506.00	39750	Low	LTE Band 41	20	25.0	23.71	0.10	0	01168	QPSK	1	0	15 mm	back	1:1.58	0.112	1.346	0.151	A20
2506.00	39750	Low	LTE Band 41	20	24.0	22.81	0.12	1	01168	QPSK	50	50	15 mm	back	1:1.58	0.090	1.315	0.118	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-12
DTS Body-Worn SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	19.0	18.66	0.19	15 mm	01168	1	back	98.9	0.130	0.089	1.081	1.011	**0.097**	A22
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram										

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Table 11-13
NII Body-Worn SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
5320	64	802.11a	OFDM	20	17.0	16.94	0.14	15 mm	01135	6	back	97.6	0.268	0.130	1.014	1.025	0.135	
5720	144	802.11a	OFDM	20	17.0	16.92	0.15	15 mm	01135	6	back	97.6	0.454	0.198	1.019	1.025	**0.207**	A24
5745	149	802.11a	OFDM	20	17.0	16.66	0.13	15 mm	01135	6	back	97.6	0.454	0.192	1.081	1.025	**0.213**	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**								**Body** **1.6 W/kg (mW/g)** averaged over 1 gram										

Table 11-14
DSS Body-Worn SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	17.0	16.58	0.14	15 mm	01168	1	back	77.1	0.043	1.102	1.297	**0.061**	A26
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Body** **1.6 W/kg (mW/g)** averaged over 1 gram									

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11.3 Standalone Hotspot SAR Data

Table 11-15
GPRS/UMTS Hotspot SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GPRS	30.0	29.30	-0.15	10 mm	16554	3	1:2.76	back	0.390	1.175	0.458	A11
836.60	190	GSM 850	GPRS	30.0	29.30	0.11	10 mm	16554	3	1:2.76	front	0.325	1.175	0.382	
836.60	190	GSM 850	GPRS	30.0	29.30	-0.01	10 mm	16554	3	1:2.76	bottom	0.095	1.175	0.112	
836.60	190	GSM 850	GPRS	30.0	29.30	-0.01	10 mm	16554	3	1:2.76	right	0.352	1.175	0.414	
1880.00	661	GSM 1900	GPRS	27.5	26.70	0.05	10 mm	16554	2	1:4.15	back	0.182	1.202	0.219	A13
1880.00	661	GSM 1900	GPRS	27.5	26.70	0.01	10 mm	16554	2	1:4.15	front	0.111	1.202	0.133	
1880.00	661	GSM 1900	GPRS	27.5	26.70	-0.20	10 mm	16554	2	1:4.15	bottom	0.166	1.202	0.200	
1880.00	661	GSM 1900	GPRS	27.5	26.70	0.04	10 mm	16554	2	1:4.15	left	0.116	1.202	0.139	
836.60	4183	UMTS 850	RMC	25.0	24.06	0.00	10 mm	01192	N/A	1:1	back	0.268	1.242	0.333	A15
836.60	4183	UMTS 850	RMC	25.0	24.06	0.02	10 mm	01192	N/A	1:1	front	0.253	1.242	0.314	
836.60	4183	UMTS 850	RMC	25.0	24.06	0.01	10 mm	01192	N/A	1:1	bottom	0.102	1.242	0.127	
836.60	4183	UMTS 850	RMC	25.0	24.06	0.04	10 mm	01192	N/A	1:1	right	0.229	1.242	0.284	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-16
LTE Band 12 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
707.50	23095	Mid	LTE Band 12	10	25.5	24.11	-0.01	0	01127	QPSK	1	49	10 mm	back	1:1	0.271	1.377	0.373	A17
707.50	23095	Mid	LTE Band 12	10	24.5	23.10	0.02	1	01127	QPSK	25	12	10 mm	back	1:1	0.220	1.380	0.304	
707.50	23095	Mid	LTE Band 12	10	25.5	24.11	0.05	0	01127	QPSK	1	49	10 mm	front	1:1	0.223	1.377	0.307	
707.50	23095	Mid	LTE Band 12	10	24.5	23.10	-0.03	1	01127	QPSK	25	12	10 mm	front	1:1	0.196	1.380	0.270	
707.50	23095	Mid	LTE Band 12	10	25.5	24.11	-0.02	0	01127	QPSK	1	49	10 mm	bottom	1:1	0.063	1.377	0.087	
707.50	23095	Mid	LTE Band 12	10	24.5	23.10	0.07	1	01127	QPSK	25	12	10 mm	bottom	1:1	0.054	1.380	0.075	
707.50	23095	Mid	LTE Band 12	10	25.5	24.11	0.04	0	01127	QPSK	1	49	10 mm	right	1:1	0.199	1.377	0.274	
707.50	23095	Mid	LTE Band 12	10	24.5	23.10	0.12	1	01127	QPSK	25	12	10 mm	right	1:1	0.168	1.380	0.232	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

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Table 11-17
LTE Band 5 (Cell) Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	23.60	0.01	0	01192	QPSK	1	0	10 mm	back	1:1	0.342	1.549	**0.530**	A19
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	22.56	-0.03	1	01192	QPSK	25	12	10 mm	back	1:1	0.281	1.563	0.439	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	23.60	0.01	0	01192	QPSK	1	0	10 mm	front	1:1	0.292	1.549	0.452	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	22.56	0.00	1	01192	QPSK	25	12	10 mm	front	1:1	0.240	1.563	0.375	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	23.60	0.04	0	01192	QPSK	1	0	10 mm	bottom	1:1	0.097	1.549	0.150	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	22.56	0.00	1	01192	QPSK	25	12	10 mm	bottom	1:1	0.080	1.563	0.125	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	23.60	0.03	0	01192	QPSK	1	0	10 mm	right	1:1	0.309	1.549	0.479	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	22.56	-0.01	1	01192	QPSK	25	12	10 mm	right	1:1	0.260	1.563	0.406	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**										**Body** **1.6 W/kg (mW/g)** averaged over 1 gram									

Table 11-18
LTE Band 41 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.															(W/kg)		(W/kg)	
2506.00	39750	Low	LTE Band 41	20	25.0	23.71	0.15	0	01168	QPSK	1	0	10 mm	back	1:1.58	0.210	1.346	0.283	
2506.00	39750	Low	LTE Band 41	20	24.0	22.81	0.20	1	01168	QPSK	50	50	10 mm	back	1:1.58	0.174	1.315	0.229	
2506.00	39750	Low	LTE Band 41	20	25.0	23.71	0.11	0	01168	QPSK	1	0	10 mm	front	1:1.58	0.222	1.346	0.299	
2506.00	39750	Low	LTE Band 41	20	24.0	22.81	0.08	1	01168	QPSK	50	50	10 mm	front	1:1.58	0.179	1.315	0.235	
2506.00	39750	Low	LTE Band 41	20	25.0	23.71	0.01	0	01168	QPSK	1	0	10 mm	bottom	1:1.58	0.259	1.346	0.349	A21
2506.00	39750	Low	LTE Band 41	20	24.0	22.81	-0.01	1	01168	QPSK	50	50	10 mm	bottom	1:1.58	0.212	1.315	0.279	
2506.00	39750	Low	LTE Band 41	20	25.0	23.71	0.02	0	01168	QPSK	1	0	10 mm	left	1:1.58	0.231	1.346	0.311	
2506.00	39750	Low	LTE Band 41	20	24.0	22.81	0.08	1	01168	QPSK	50	50	10 mm	left	1:1.58	0.186	1.315	0.245	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**										**Body** **1.6 W/kg (mW/g)** averaged over 1 gram									

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Table 11-19
WLAN Hotspot SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	19.0	18.66	0.06	10 mm	01168	1	back	98.9	0.221	0.153	1.081	1.011	0.167	
2437	6	802.11b	DSSS	22	19.0	18.66	0.11	10 mm	01168	1	front	98.9	0.132	-	1.081	1.011	-	
2437	6	802.11b	DSSS	22	19.0	18.66	0.14	10 mm	01168	1	top	98.9	0.368	0.247	1.081	1.011	**0.270**	A23
2437	6	802.11b	DSSS	22	19.0	18.66	0.12	10 mm	01168	1	left	98.9	0.080	-	1.081	1.011	-	
5745	149	802.11a	OFDM	20	17.0	16.66	0.19	10 mm	01135	6	back	97.6	0.758	0.326	1.081	1.025	0.361	
5745	149	802.11a	OFDM	20	17.0	16.66	-0.17	10 mm	01135	6	front	97.6	0.208	-	1.081	1.025	-	
5745	149	802.11a	OFDM	20	17.0	16.66	0.17	10 mm	01135	6	top	97.6	0.272	-	1.081	1.025	-	
5745	149	802.11a	OFDM	20	17.0	16.66	0.14	10 mm	01135	6	left	97.6	0.799	0.365	1.081	1.025	**0.404**	A25

ANSI / IEEE C95.1 1992 - SAFETY LIMIT	Body
Spatial Peak	1.6 W/kg (mW/g)
Uncontrolled Exposure/General Population	averaged over 1 gram

Table 11-20
DSS Hotspot SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	17.0	16.58	0.12	10 mm	01168	1	back	77.1	0.089	1.102	1.297	**0.127**	
2441	39	Bluetooth	FHSS	17.0	16.58	0.12	10 mm	01168	1	front	77.1	0.038	1.102	1.297	0.054	
2441	39	Bluetooth	FHSS	17.0	16.58	0.03	10 mm	01168	1	top	77.1	0.093	1.102	1.297	**0.133**	A27
2441	39	Bluetooth	FHSS	17.0	16.58	0.10	10 mm	01168	1	left	77.1	0.020	1.102	1.297	0.029	

ANSI / IEEE C95.1 1992 - SAFETY LIMIT	Body
Spatial Peak	1.6 W/kg (mW/g)
Uncontrolled Exposure/General Population	averaged over 1 gram

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11.4 Standalone Phablet SAR Data

Table 11-21
GPRS Phablet SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1850.20	512	GSM 1900	GPRS	29.0	28.11	-0.07	9 mm	16554	2	1:4.15	back	0.092	1.227	0.113	
1850.20	512	GSM 1900	GPRS	29.0	28.11	-0.06	5 mm	16554	2	1:4.15	front	0.191	1.227	0.234	
1850.20	512	GSM 1900	GPRS	29.0	28.11	0.08	7 mm	16554	2	1:4.15	bottom	0.122	1.227	0.150	
1850.20	512	GSM 1900	GPRS	29.0	28.11	-0.04	0 mm	16554	2	1:4.15	left	0.405	1.227	0.497	
1880.00	661	GSM 1900	GPRS	27.5	26.70	0.01	0 mm	16554	2	1:4.15	back	0.790	1.202	**0.950**	A28
1880.00	661	GSM 1900	GPRS	27.5	26.70	-0.13	0 mm	16554	2	1:4.15	front	0.635	1.202	0.763	
1880.00	661	GSM 1900	GPRS	27.5	26.70	-0.06	0 mm	16554	2	1:4.15	bottom	0.482	1.202	0.579	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Phablet** **4.0 W/kg (mW/g)** averaged over 10 grams								

Table 11-22
WLAN Phablet SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
5320	64	802.11a	OFDM	20	17.0	16.94	0.12	0 mm	01135	6	back	97.6	3.859	-	1.014	1.025	-	
5320	64	802.11a	OFDM	20	17.0	16.94	0.14	0 mm	01135	6	front	97.6	3.017	-	1.014	1.025	-	
5320	64	802.11a	OFDM	20	17.0	16.94	0.13	0 mm	01135	6	top	97.6	1.473	-	1.014	1.025	-	
5320	64	802.11a	OFDM	20	17.0	16.94	0.12	0 mm	01135	6	left	97.6	6.715	0.695	1.014	1.025	0.722	
5720	144	802.11a	OFDM	20	17.0	16.92	0.17	0 mm	01135	6	back	97.6	4.653	-	1.019	1.025	-	
5720	144	802.11a	OFDM	20	17.0	16.92	0.01	0 mm	01135	6	front	97.6	5.433	-	1.019	1.025	-	
5720	144	802.11a	OFDM	20	17.0	16.92	0.15	0 mm	01135	6	top	97.6	3.173	-	1.019	1.025	-	
5720	144	802.11a	OFDM	20	17.0	16.92	0.14	0 mm	01135	6	left	97.6	11.139	0.881	1.019	1.025	**0.920**	A29
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**								**Phablet** **4.0 W/kg (mW/g)** averaged over 10 grams										

11.5 SAR Test Notes

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. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. 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.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.

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6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 15 mm 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.
7. 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.
8. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v02r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
9. Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is > 160 mm and < 200 mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg.
10. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information).
11. This device utilizes power reduction for some wireless modes and technologies, as outlined in Section 1.3. 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.
12. Unless otherwise noted, when 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds below.
13. Per FCC KDB Publication 865664 D01v01r04, variability SAR tests were not required since measured SAR results for all frequency bands were less than 0.8 W/kg for 1g and 2.0 W/kg for 10g.

GSM Test Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
2. 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.
3. 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). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

UMTS Notes:

1. UMTS mode 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. 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). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

LTE Notes:

1. LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r04. The general test procedures used for testing can be found in Section 8.5.4.

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2. 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.
3. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).
4. Per FCC KDB Publication 447498 D01v06, when the reported LTE Band 41 SAR measured at the highest output power channel in a given a test configuration was > 0.6 W/kg for 1g evaluations, testing at the other channels was required for such test configurations.
5. TDD LTE was tested per the guidance provided in FCC KDB Publication 941225 D05v02r04. Testing was performed using UL-DL configuration 0 with 6 UL subframes and 2 S subframes using extended cyclic prefix only and special subframe configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Section 4, the duty factor for special subframe configuration 6 using extended cyclic prefix is 0.633.

WLAN Notes:

1. For held-to-ear, hotspot, and phablet operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg for 1g evaluations, no additional testing for the remaining test positions was 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.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 8.6.5 for more information.
3. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg for 1g evaluations. See Section 8.6.6 for more information.
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.
5. 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. Procedures used to measure the duty factor are identical to that in the associated EMC test reports.

Bluetooth Notes

1. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation and Tx Tests test mode type. Per October 2016 TCB Workshop Notes, the reported SAR was scaled to the 100% transmission duty factor to determine compliance. See Section 9.5 for the time domain plot and calculation for the duty factor of the device.
2. Head and Hotspot Bluetooth SAR were evaluated for BT BR tethering applications.

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12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 Introduction

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.

12.2 Simultaneous Transmission Procedures

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 SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 W/kg. 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.

Per FCC KDB Publication 941225 D06v02r01, the devices edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR ("-").

(*) For test positions that were not required to be evaluated for WLAN SAR per FCC KDB publication 248227, the worst case WLAN SAR result for the applicable exposure conditions was used for simultaneous transmission analysis.

12.3 Head SAR Simultaneous Transmission Analysis

Table 12-1
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM 850	0.252	0.246	0.498
	GSM 1900	0.065	0.246	0.311
	UMTS 850	0.243	0.246	0.489
	LTE Band 12	0.321	0.246	0.567
	LTE Band 5 (Cell)	0.307	0.246	0.553
	LTE Band 41	0.406	0.246	**0.652**

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Table 12-2
Simultaneous Transmission Scenario with 5 GHz WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM 850	0.252	0.591	0.843
	GSM 1900	0.065	0.591	0.656
	UMTS 850	0.243	0.591	0.834
	LTE Band 12	0.321	0.591	0.912
	LTE Band 5 (Cell)	0.307	0.591	0.898
	LTE Band 41	0.406	0.591	**0.997**

Table 12-3
Simultaneous Transmission Scenario with Bluetooth (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM 850	0.252	0.312	0.564
	GSM 1900	0.065	0.312	0.377
	UMTS 850	0.243	0.312	0.555
	LTE Band 12	0.321	0.312	0.633
	LTE Band 5 (Cell)	0.307	0.312	0.619
	LTE Band 41	0.406	0.312	**0.718**

Table 12-4
Simultaneous Transmission Scenario with Bluetooth and 5 GHz WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	GSM 850	0.252	0.312	0.591	1.155
	GSM 1900	0.065	0.312	0.591	0.968
	UMTS 850	0.243	0.312	0.591	1.146
	LTE Band 12	0.321	0.312	0.591	1.224
	LTE Band 5 (Cell)	0.307	0.312	0.591	1.210
	LTE Band 41	0.406	0.312	0.591	**1.309**

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12.4 Body-Worn Simultaneous Transmission Analysis

Table 12-5
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM 850	0.295	0.097	0.392
	GSM 1900	0.042	0.097	0.139
	UMTS 850	0.276	0.097	0.373
	LTE Band 12	0.333	0.097	0.430
	LTE Band 5 (Cell)	0.440	0.097	**0.537**
	LTE Band 41	0.151	0.097	0.248

Table 12-6
Simultaneous Transmission Scenario with 5 GHz WLAN (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM 850	0.295	0.213	0.508
	GSM 1900	0.042	0.213	0.255
	UMTS 850	0.276	0.213	0.489
	LTE Band 12	0.333	0.213	0.546
	LTE Band 5 (Cell)	0.440	0.213	**0.653**
	LTE Band 41	0.151	0.213	0.364

Table 12-7
Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM 850	0.295	0.061	0.356
	GSM 1900	0.042	0.061	0.103
	UMTS 850	0.276	0.061	0.337
	LTE Band 12	0.333	0.061	0.394
	LTE Band 5 (Cell)	0.440	0.061	**0.501**
	LTE Band 41	0.151	0.061	0.212

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Table 12-8
Simultaneous Transmission Scenario with Bluetooth and 5 GHz WLAN (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body-Worn	GSM 850	0.295	0.061	0.213	0.569
	GSM 1900	0.042	0.061	0.213	0.316
	UMTS 850	0.276	0.061	0.213	0.550
	LTE Band 12	0.333	0.061	0.213	0.607
	LTE Band 5 (Cell)	0.440	0.061	0.213	**0.714**
	LTE Band 41	0.151	0.061	0.213	0.425

12.5 Hotspot SAR Simultaneous Transmission Analysis

Table 12-9
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.458	0.270	0.728
	GPRS 1900	0.219	0.270	0.489
	UMTS 850	0.333	0.270	0.603
	LTE Band 12	0.373	0.270	0.643
	LTE Band 5 (Cell)	0.530	0.270	**0.800**
	LTE Band 41	0.349	0.270	0.619

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Table 12-10
Simultaneous Transmission Scenario with 5 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.458	0.404	0.862
	GPRS 1900	0.219	0.404	0.623
	UMTS 850	0.333	0.404	0.737
	LTE Band 12	0.373	0.404	0.777
	LTE Band 5 (Cell)	0.530	0.404	**0.934**
	LTE Band 41	0.349	0.404	0.753

Table 12-11
Simultaneous Transmission Scenario with Bluetooth (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.458	0.133	0.591
	GPRS 1900	0.219	0.133	0.352
	UMTS 850	0.333	0.133	0.466
	LTE Band 12	0.373	0.133	0.506
	LTE Band 5 (Cell)	0.530	0.133	**0.663**
	LTE Band 41	0.349	0.133	0.482

Table 12-12
Simultaneous Transmission Scenario with Bluetooth and 5 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz Bluetooth SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	GPRS 850	0.458	0.133	0.404	0.995
	GPRS 1900	0.219	0.133	0.404	0.756
	UMTS 850	0.333	0.133	0.404	0.870
	LTE Band 12	0.373	0.133	0.404	0.910
	LTE Band 5 (Cell)	0.530	0.133	0.404	**1.067**
	LTE Band 41	0.349	0.133	0.404	0.886

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12.6 Phablet Simultaneous Transmission Analysis

Per FCC KDB Publication 648474 D04 Handset SAR, Phablet SAR tests were not required if wireless router 1g SAR (scaled to the maximum output power, including tolerance) < 1.2 W/kg. Therefore, no further analysis beyond the tables included in this section was required to determine that possible simultaneous transmission scenarios would not exceed the SAR limit.

For SAR summation, the highest reported SAR across all test distances was used as the most conservative evaluation for simultaneous transmission analysis for each device edge.

Table 12-13
Simultaneous Transmission Scenario with 5 GHz WLAN (Phablet)

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	0.950	0.920*	**1.870**
	Front	0.763	0.920*	1.683
	Top	-	0.920*	0.920
	Bottom	0.579	-	0.579
	Left	0.497	0.920	1.417

12.7 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013 Section 6.3.4.1.2.

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13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, variability SAR tests were not required since measured SAR results for all frequency bands were less than 0.8 W/kg for 1g and 2.0 W/kg for 10g.

13.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg for 1g and <3.75 W/kg for 10g for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE 1528-2013 was not required.

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14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	85033E	3.5mm Standard Calibration Kit	6/6/2020	Annual	6/6/2021	MY53402352
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	8753ES	S-Parameter Network Analyzer	9/16/2020	Annual	9/16/2021	MY40000670
Agilent	E4438C	ESG Vector Signal Generator	8/10/2020	Annual	8/10/2021	MY47270002
Agilent	E5515C	Wireless Communications Test Set	12/15/2020	Annual	12/15/2021	GB42361078
Agilent	N5182A	MXG Vector Signal Generator	5/13/2020	Annual	5/13/2021	MY47420603
Agilent	N9020A	MXA Signal Analyzer	12/21/2020	Annual	12/21/2021	MY50200571
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433972
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433974
Anritsu	MA24106A	USB Power Sensor	6/3/2020	Annual	6/3/2021	2018527
Anritsu	MA24106A	USB Power Sensor	6/8/2020	Annual	6/8/2021	1344555
Anritsu	ML2495A	Power Meter	11/3/2020	Annual	11/3/2021	1039008
Anritsu	ML2496A	Power Meter	3/23/2020	Annual	3/23/2021	1351001
Anritsu	MA2411B	Pulse Power Sensor	12/18/2020	Annual	12/18/2021	1126066
Anritsu	MT8820C	Radio Communication Analyzer	9/17/2020	Annual	9/17/2021	6201300731
Anritsu	MT8820C	Radio Communication Analyzer	9/30/2020	Annual	9/30/2021	6201240328
Anritsu	MT8821C	Radio Communication Analyzer	6/15/2020	Annual	6/15/2021	6201381794
Anritsu	MT8821C	Radio Communication Analyzer	7/3/2020	Annual	7/3/2021	6262150047
Anritsu	MT8862A	Wireless Connectivity Test Set	10/29/2020	Annual	10/29/2021	6261782395
Control Company	4040	Therm./ Clock/ Humidity Monitor	2/17/2020	Biennial	2/17/2022	200113269
Control Company	4040	Therm./ Clock/ Humidity Monitor	2/17/2020	Biennial	2/17/2022	200113274
Control Company	4352	Long Stem Thermometer	6/26/2019	Biennial	6/26/2021	192282744
Control Company	4352	Long Stem Thermometer	6/26/2019	Biennial	6/26/2021	192282739
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46170464
SPEAG	DAK-3.5	Dielectric Assessment Kit	10/14/2020	Annual	10/14/2021	1091
KEYSIGHT	E4438C	VECTOR SIGNAL GENERATOR	6/22/2020	Annual	6/22/2021	MY45092078
Keysight Technologies	AT/N6705B	DC Power Supply	N/A	N/A	N/A	MY53001315
Keysight Technologies	N6705B	DC Power Analyzer	4/27/2019	Biennial	4/27/2021	MY53004059
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	NC-100	Torque Wrench	12/1/2020	Annual	12/1/2021	N/A
Pasternack	NC-100	Torque Wrench	8/4/2020	Biennial	8/4/2022	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	ZNLE6	Vector Network Analyzer	9/29/2020	Annual	9/29/2021	101307
Rohde& Schwarz	CMW500	Wideband Radio Communication Tester	9/17/2020	Annual	9/17/2021	145663
Rohde& Schwarz	CMW500	Wideband Radio Communication Tester	9/23/2020	Annual	9/23/2021	151849
SPEAG	D750V3	750 MHz SAR Dipole	3/16/2020	Annual	3/16/2021	1003
SPEAG	D835V2	835 MHz SAR Dipole	10/19/2018	Triennial	10/19/2021	4d133
SPEAG	D835V2	835 MHz SAR Dipole	1/21/2021	Annual	1/21/2022	4d132
SPEAG	D1900V2	1900 MHz SAR Dipole	10/23/2018	Triennial	10/23/2021	5d080
SPEAG	D2450V2	2450 MHz SAR Dipole	8/14/2020	Annual	8/14/2021	719
SPEAG	D5GHzV2	5 GHz SAR Dipole	9/10/2020	Annual	9/10/2021	1191
SPEAG	D750V3	750 MHz SAR Dipole	3/11/2020	Annual	3/11/2021	1054
SPEAG	D835V2	835 MHz SAR Dipole	3/13/2019	Biennial	3/13/2021	4d047
SPEAG	EX3DV4	SAR Probe	4/21/2020	Annual	4/21/2021	7357
SPEAG	EX3DV4	SAR Probe	7/31/2020	Annual	7/31/2021	7308
SPEAG	EX3DV4	SAR Probe	1/20/2021	Annual	1/20/2022	3589
SPEAG	EX3DV4	SAR Probe	12/11/2020	Annual	12/11/2021	7571
SPEAG	EX3DV4	SAR Probe	10/20/2020	Annual	10/20/2021	7551
SPEAG	EX3DV4	SAR Probe	7/20/2020	Annual	7/20/2021	7410
SPEAG	EX3DV4	SAR Probe	6/23/2020	Annual	6/23/2021	7409
SPEAG	EX3DV4	SAR Probe	6/23/2020	Annual	6/23/2021	7406
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/15/2020	Annual	4/15/2021	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/11/2020	Annual	8/11/2021	1450
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/13/2021	Annual	1/13/2022	1558
SPEAG	DAE4	Data Acquisition Electronics	12/7/2020	Annual	12/7/2021	1533
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/16/2020	Annual	10/16/2021	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/15/2020	Annual	7/15/2021	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2020	Annual	6/18/2021	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/14/2020	Annual	5/14/2021	1583

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

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15 MEASUREMENT UNCERTAINTIES

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	Div.	c_i 1gm	c_i 10 gms	1gm u_i (± %)	10gms u_i (± %)	v_i
Measurement System									
Probe Calibration	E.2.1	6.55	N	1	1	1	6.6	6.6	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	E.2.3	2	R	1.732	1	1	1.2	1.2	∞
Linearity	E.2.4	0.3	N	1	1	1	0.3	0.3	∞
System Detection Limits	E.2.4	0.25	R	1.732	1	1	0.1	0.1	∞
Readout Electronics	E.2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	R	1.732	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.732	1	1	1.5	1.5	∞
RF Ambient Conditions - Noise	E.6.1	3	R	1.732	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	3	R	1.732	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.8	R	1.732	1	1	0.5	0.5	∞
Probe Positioning w/ respect to Phantom	E.6.3	6.7	R	1.732	1	1	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	4	R	1.732	1	1	2.3	2.3	∞
Test Sample Related									
Test Sample Positioning	E.4.2	3.12	N	1	1	1	3.1	3.1	35
Device Holder Uncertainty	E.4.1	1.67	N	1	1	1	1.7	1.7	5
Output Power Variation - SAR drift measurement	E.2.9	5	R	1.732	1	1	2.9	2.9	∞
SAR Scaling	E.6.5	0	R	1.732	1	1	0.0	0.0	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	E.3.3	4.3	N	1	0.78	0.71	3.3	3.0	76
Liquid Permittivity - measurement uncertainty	E.3.3	4.2	N	1	0.23	0.26	1.0	1.1	75
Liquid Conductivity - Temperature Uncertainty	E.3.4	3.4	R	1.732	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Unceritainty	E.3.4	0.6	R	1.732	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)			RSS				11.6	11.4	191
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				23.2	22.8	

The above measurement uncertainties are according to IEEE Std. 1528-2013

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16 CONCLUSION

16.1 Measurement Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Innovation, Science, and Economic Development Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]

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APPENDIX A: SAR TEST DATA

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DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 16448

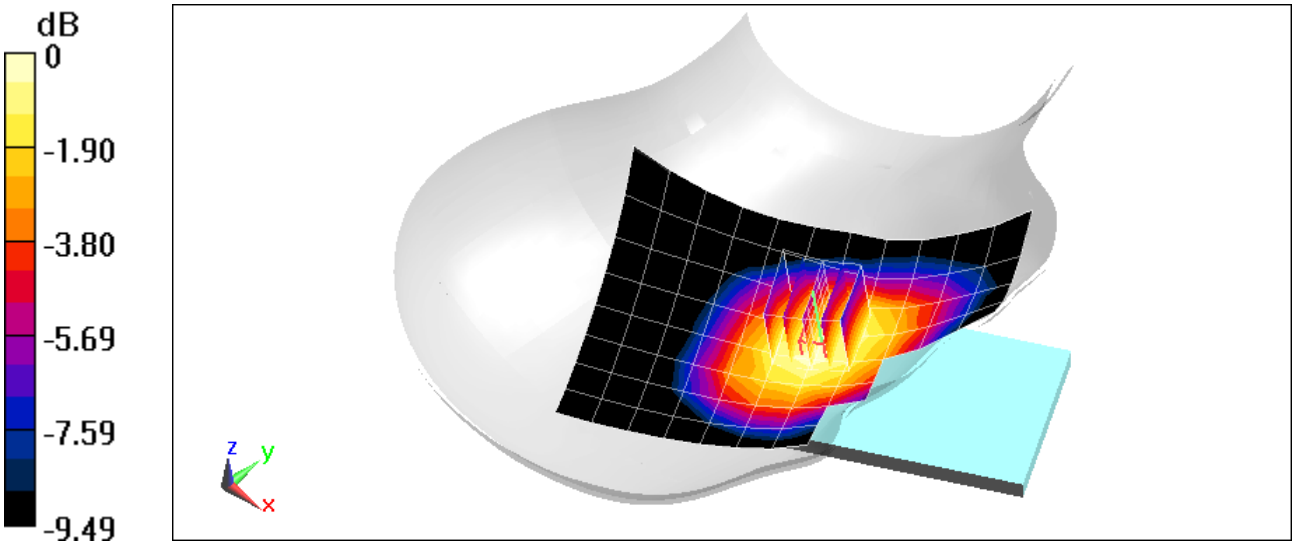
Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: 835 Head; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.9 S/m; ε_r = 40.511; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 03/09/2021; Ambient Temp: 22.7°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3589; ConvF(8.57, 8.57, 8.57) @ 836.6 MHz; Calibrated: 1/20/2021
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 1/13/2021
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1646
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: GSM 850, Right Head, Cheek, Mid.ch

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.12 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.231 W/kg
SAR(1 g) = 0.176 W/kg



0 dB = 0.212 W/kg = -6.74 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 16448

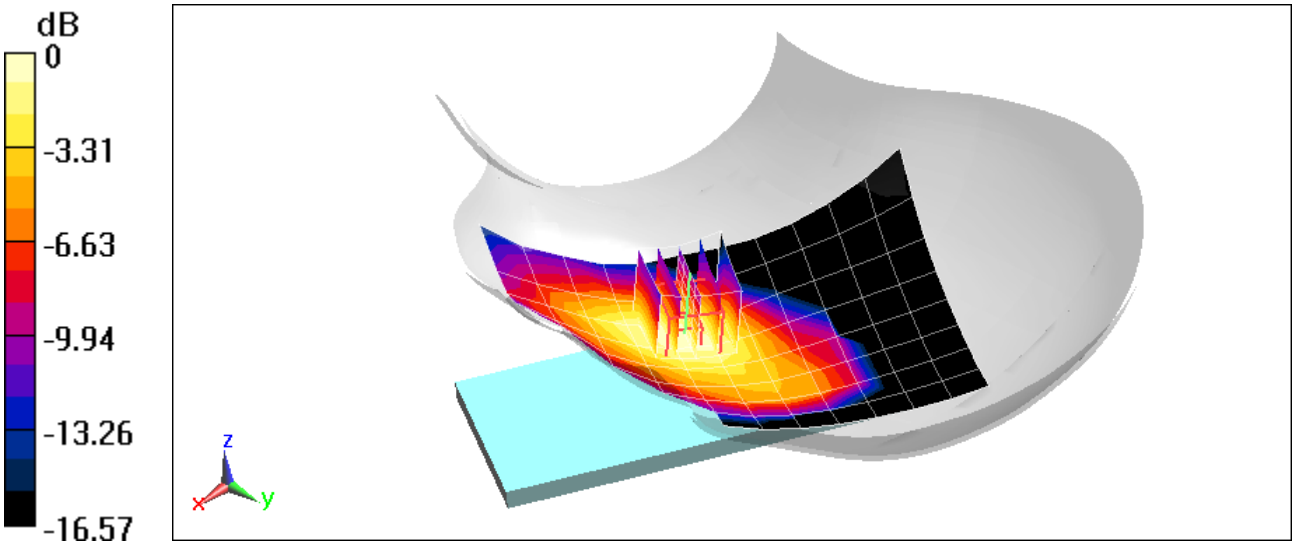
Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Head; Medium parameters used:
f = 1880 MHz; σ = 1.43 S/m; ε_r = 39.789; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 03/09/2021; Ambient Temp: 21.3°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(8.32, 8.32, 8.32) @ 1880 MHz; Calibrated: 4/21/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/15/2020
Phantom: Twin-SAM V5.0 Left 30; Type: QD 000 P40 CD; Serial: 1715
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: GSM 1900, Left Head, Cheek, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.091 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.0760 W/kg
SAR(1 g) = 0.049 W/kg



0 dB = 0.0657 W/kg = -11.82 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01150

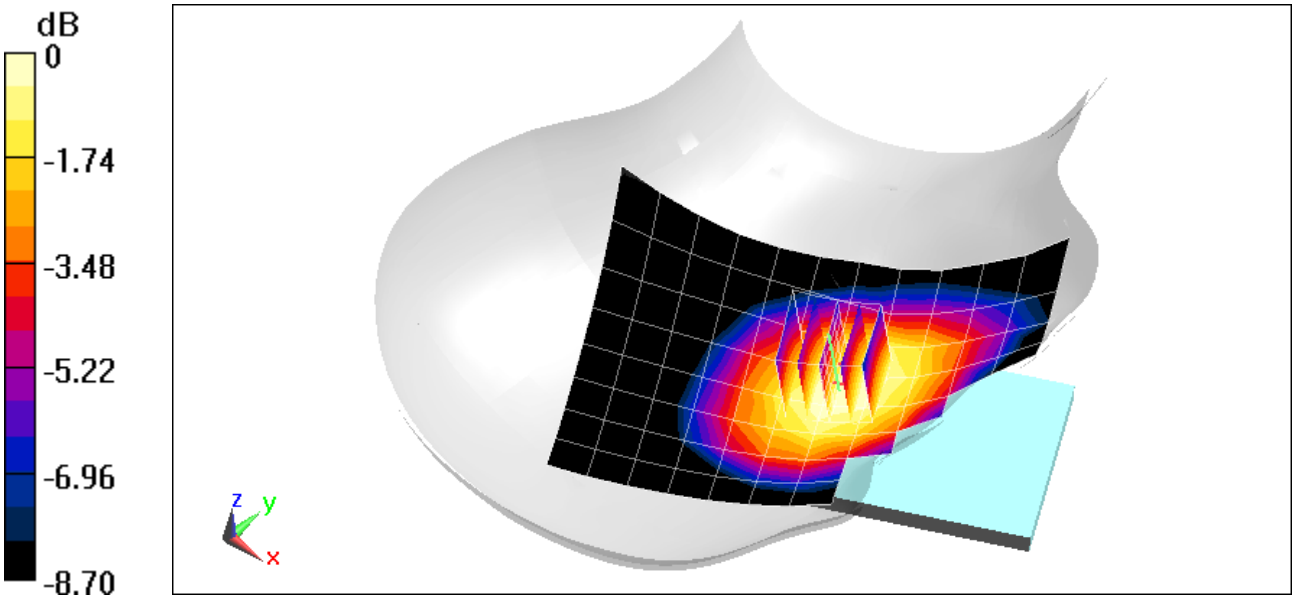
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.9 S/m; ε_r = 41.951; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 02/16/2021; Ambient Temp: 23.7°C; Tissue Temp: 22.2°C

Probe: EX3DV4 - SN7308; ConvF(10.17, 10.17, 10.17) @ 836.6 MHz; Calibrated: 7/31/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/11/2020
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: UMTS 850, Right Head, Cheek, Mid.ch

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.31 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.247 W/kg
SAR(1 g) = 0.196 W/kg



0 dB = 0.230 W/kg = -6.38 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01150

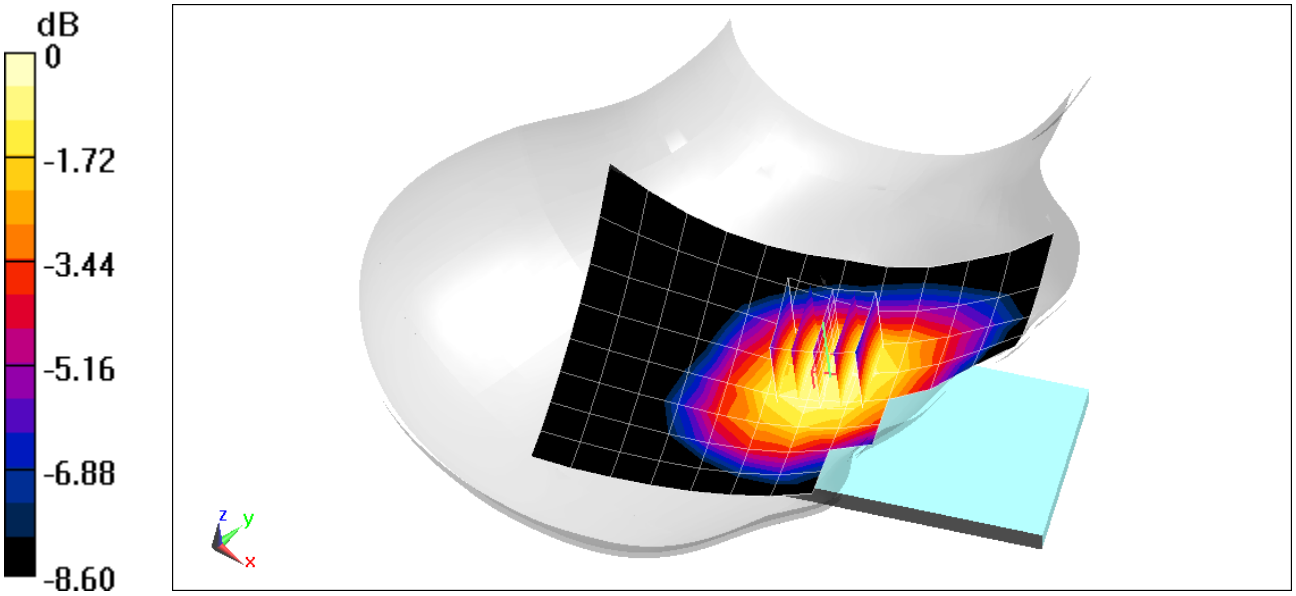
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Head; Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.872 S/m; ε_r = 43.991; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 02/16/2021; Ambient Temp: 21.5°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(10.23, 10.23, 10.23) @ 707.5 MHz; Calibrated: 4/21/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/15/2020
Phantom: Twin-SAM V5.0 Left 30; Type: QD 000 P40 CD; Serial: 1715
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: LTE Band 12, Right Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 49 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.29 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.282 W/kg
SAR(1 g) = 0.233 W/kg



0 dB = 0.267 W/kg = -5.73 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01150

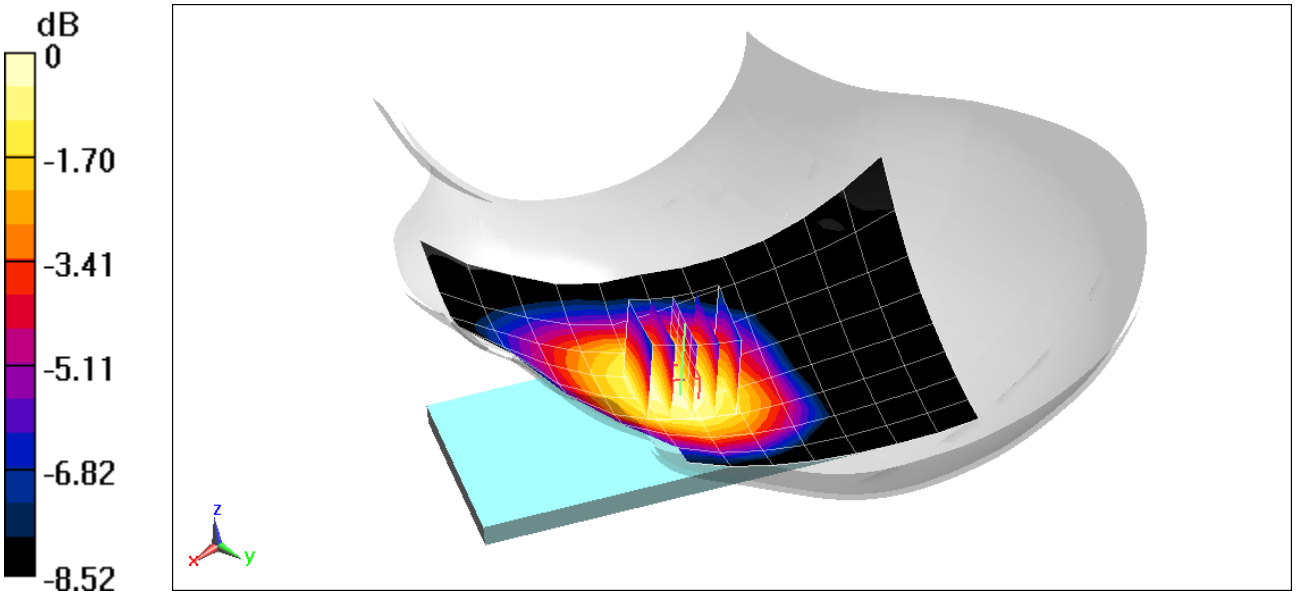
Communication System: UID 0, LTE Band 5 (Cell.); Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.9 S/m; ε_r = 41.953; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 02/16/2021; Ambient Temp: 23.7°C; Tissue Temp: 22.2°C

Probe: EX3DV4 - SN7308; ConvF(10.17, 10.17, 10.17) @ 836.5 MHz; Calibrated: 7/31/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/11/2020
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: LTE Band 5 (Cell.), Left Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.87 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.248 W/kg
SAR(1 g) = 0.198 W/kg



0 dB = 0.230 W/kg = -6.38 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01143

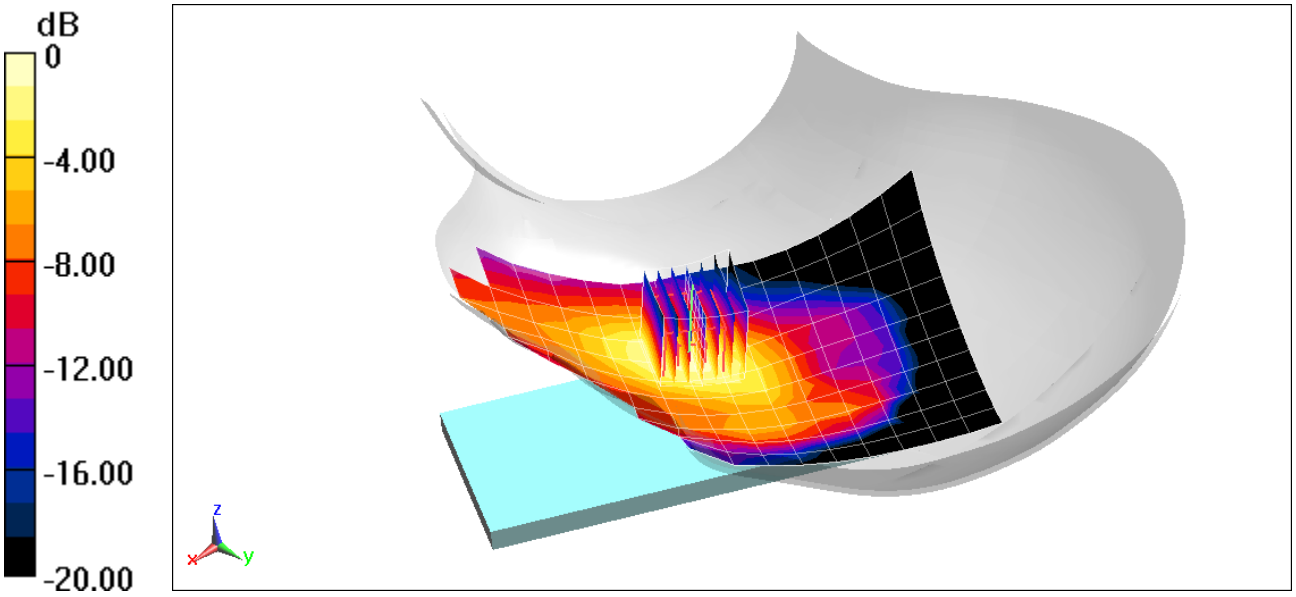
Communication System: UID 0, LTE Band 41 (Class 3); Frequency: 2506 MHz; Duty Cycle: 1:1.58
Medium: 2450 Head; Medium parameters used (interpolated):
f = 2506 MHz; σ = 1.923 S/m; ε_r = 40.615; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 02/22/2021; Ambient Temp: 21.9°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7571; ConvF(7.28, 7.28, 7.28) @ 2506 MHz; Calibrated: 12/11/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1533; Calibrated: 12/7/2020
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: LTE Band 41, Left Head, Cheek, Low.ch, QPSK,
20 MHz Bandwidth, 1 RB, 0 RB Offset

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.74 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.569 W/kg
SAR(1 g) = 0.302 W/kg



0 dB = 0.465 W/kg = -3.33 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 12066

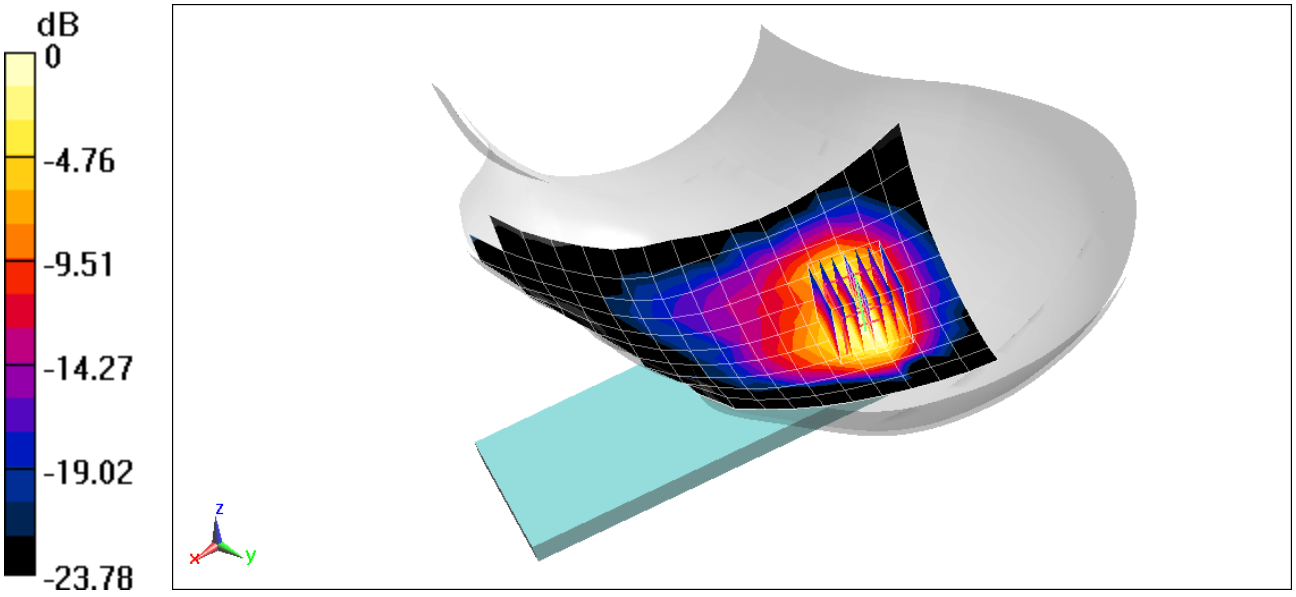
Communication System: UID 0, 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Head; Medium parameters used (interpolated):
f = 2412 MHz; σ = 1.811 S/m; ε_r = 40.994; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 02/22/2021; Ambient Temp: 21.9°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7571; ConvF(7.28, 7.28, 7.28) @ 2412 MHz; Calibrated: 12/11/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1533; Calibrated: 12/7/2020
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: IEEE 802.11b, 22 MHz Bandwidth, Left Head, Tilt, Ch 1, 1 Mbps

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.34 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.510 W/kg
SAR(1 g) = 0.242 W/kg



0 dB = 0.410 W/kg = -3.87 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01143

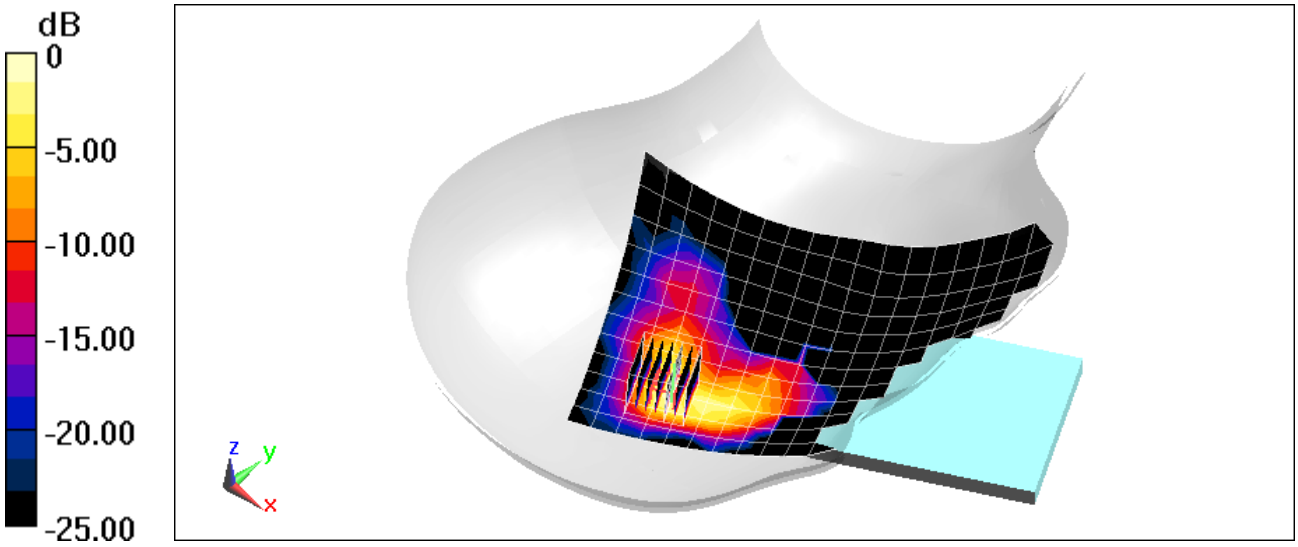
Communication System: UID 0, IEEE 802.11n; Frequency: 5550 MHz; Duty Cycle: 1:1
Medium: 5200-5800 Head; Medium parameters used:
f = 5550 MHz; σ = 5.06 S/m; ε_r = 34.364; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 03/02/2021; Ambient Temp: 21.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7357; ConvF(4.93, 4.93, 4.93) @ 5550 MHz; Calibrated: 4/21/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/15/2020
Phantom: Twin-SAM V5.0 Left 20; Type: QD 000 P40 CD; Serial: 1715
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: IEEE 802.11n, U-NII-2C, 40 MHz Bandwidth,
Right Head, Cheek, Ch 110, 13.5 Mbps

Area Scan (13x22x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 3.940 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 2.48 W/kg
SAR(1 g) = 0.487 W/kg



0 dB = 1.31 W/kg = 1.17 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01168

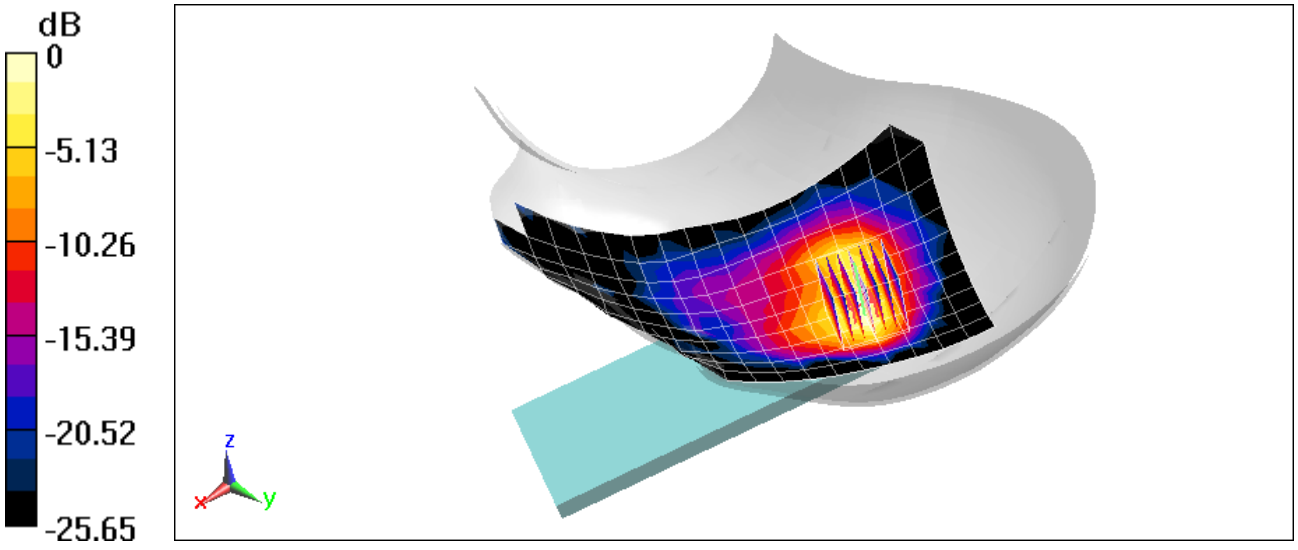
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.297
Medium: 2450 Head; Medium parameters used (interpolated):
f = 2441 MHz; σ = 1.856 S/m; ε_r = 39.981; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 03/07/2021; Ambient Temp: 23.2°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7571; ConvF(7.28, 7.28, 7.28) @ 2441 MHz; Calibrated: 12/11/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1533; Calibrated: 12/7/2020
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: Bluetooth, Left Head, Tilt, Ch 39, 1 Mbps

Area Scan (11x19x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.16 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.462 W/kg
SAR(1 g) = 0.218 W/kg



0 dB = 0.367 W/kg = -4.35 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 16554

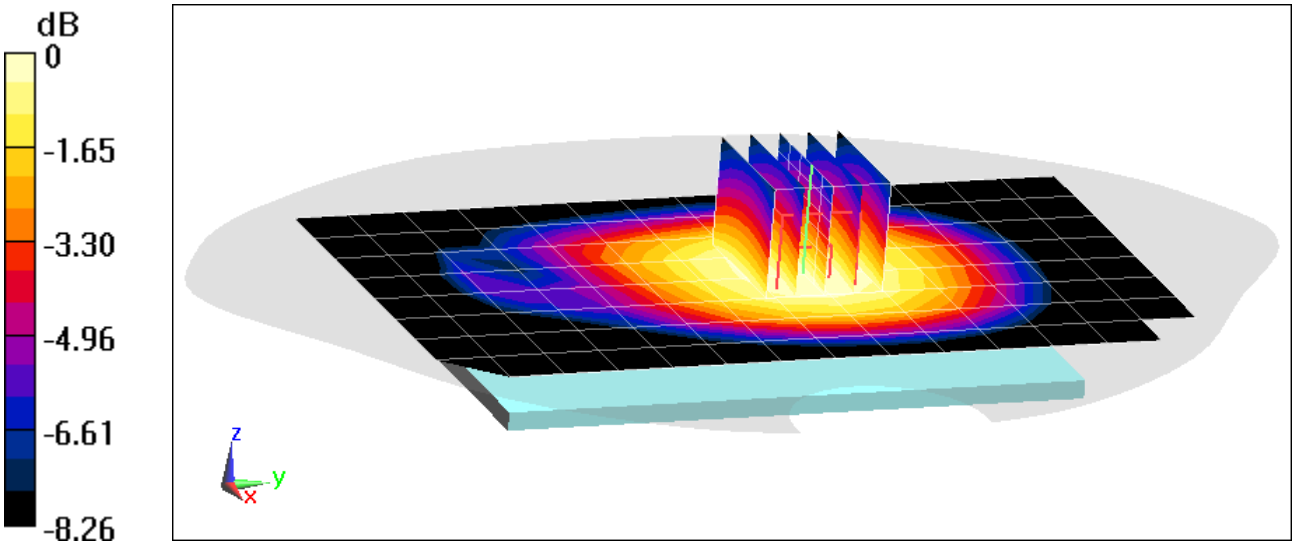
Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.954 S/m; ε_r = 54.221; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03/08/2021; Ambient Temp: 21.9°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7571; ConvF(9.99, 9.99, 9.99) @ 836.6 MHz; Calibrated: 12/11/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1533; Calibrated: 12/7/2020
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: GSM 850, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.81 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.277 W/kg
SAR(1 g) = 0.206 W/kg



0 dB = 0.251 W/kg = -6.00 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 16554

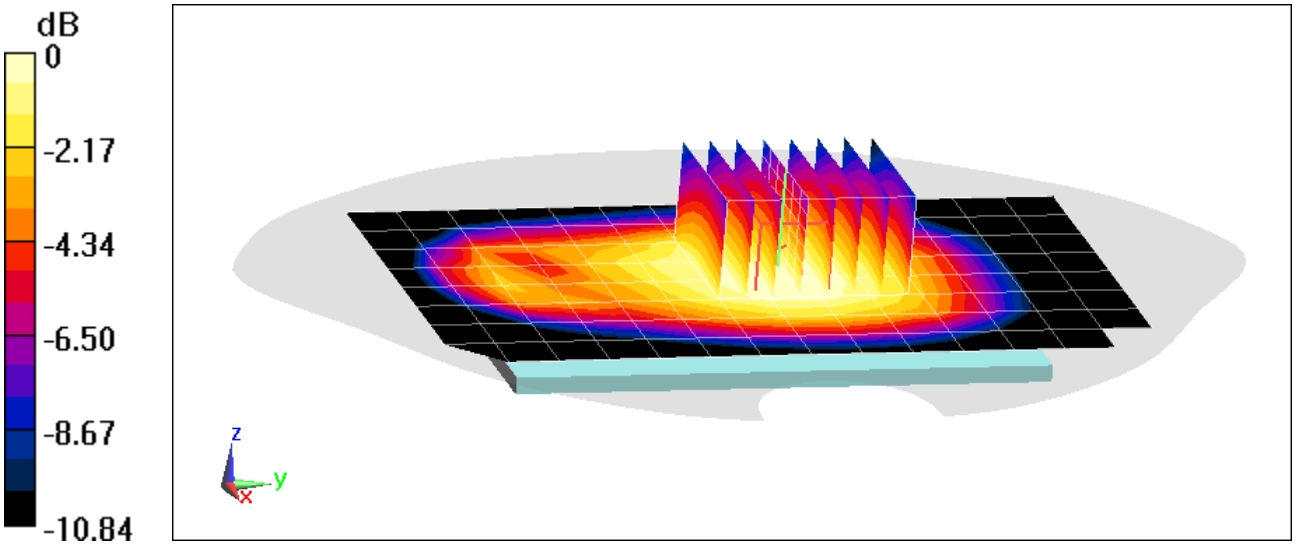
Communication System: UID 0, GSM GPRS; 3 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.76
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.954 S/m; ε_r = 54.221; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03/08/2021; Ambient Temp: 21.9°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7571; ConvF(9.99, 9.99, 9.99) @ 836.6 MHz; Calibrated: 12/11/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1533; Calibrated: 12/7/2020
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: GPRS 850, Body SAR, Back side, Mid.ch, 3 Tx Slots

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.89 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.531 W/kg
SAR(1 g) = 0.390 W/kg



0 dB = 0.481 W/kg = -3.18 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 16554

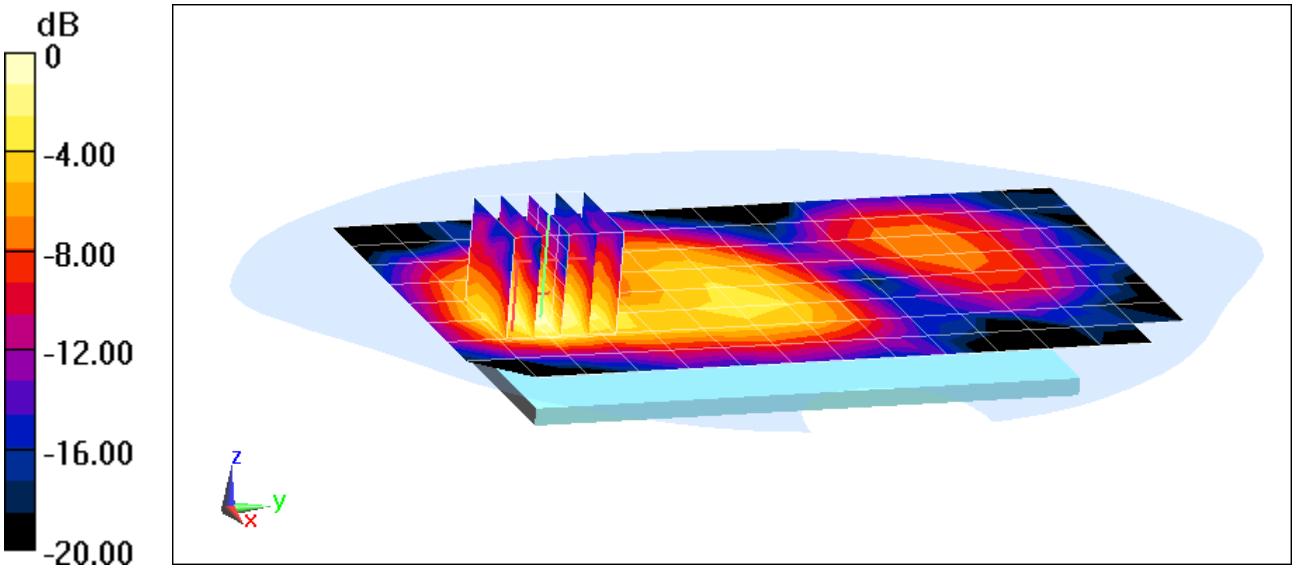
Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: 1900 Body; Medium parameters used:
f = 1880 MHz; σ = 1.551 S/m; ε_r = 52.314; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03/08/2021; Ambient Temp: 20.1°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(7.76, 7.76, 7.76) @ 1880 MHz; Calibrated: 7/20/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/15/2020
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: GSM 1900, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.715 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.0550 W/kg
SAR(1 g) = 0.032 W/kg



0 dB = 0.0471 W/kg = -13.27 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 16554

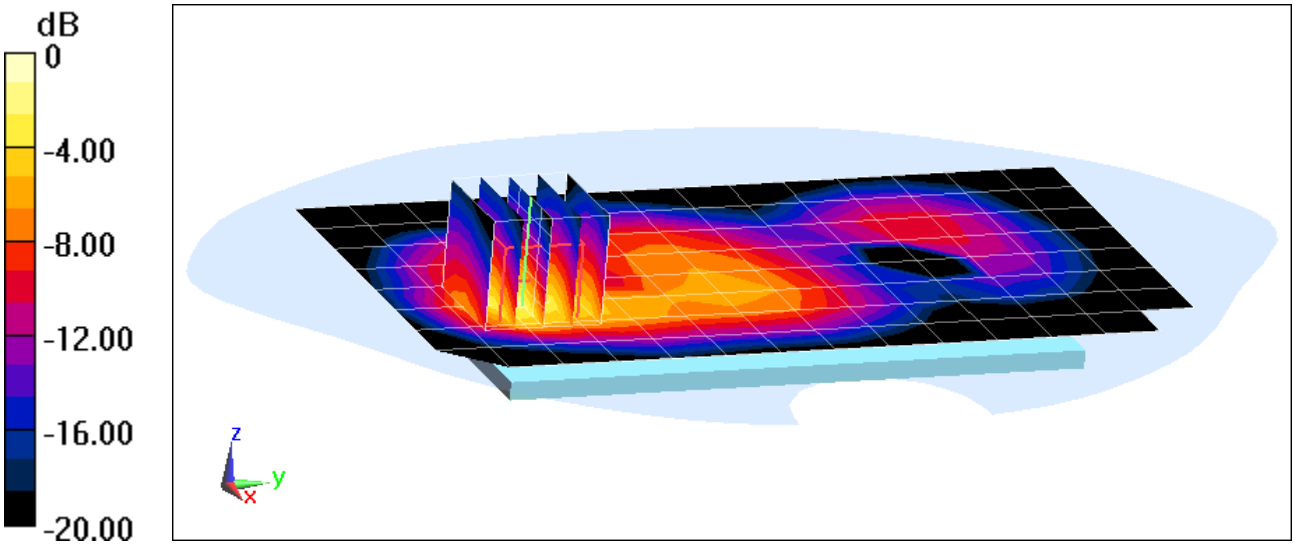
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Body; Medium parameters used:
f = 1880 MHz; σ = 1.551 S/m; ε_r = 52.314; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03/08/2021; Ambient Temp: 20.1°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(7.76, 7.76, 7.76) @ 1880 MHz; Calibrated: 7/20/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/15/2020
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: GPRS 1900, Body SAR, Back side, Mid.ch, 2 Tx Slots

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.53 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.347 W/kg
SAR(1 g) = 0.182 W/kg



0 dB = 0.400 W/kg = -3.98 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01192

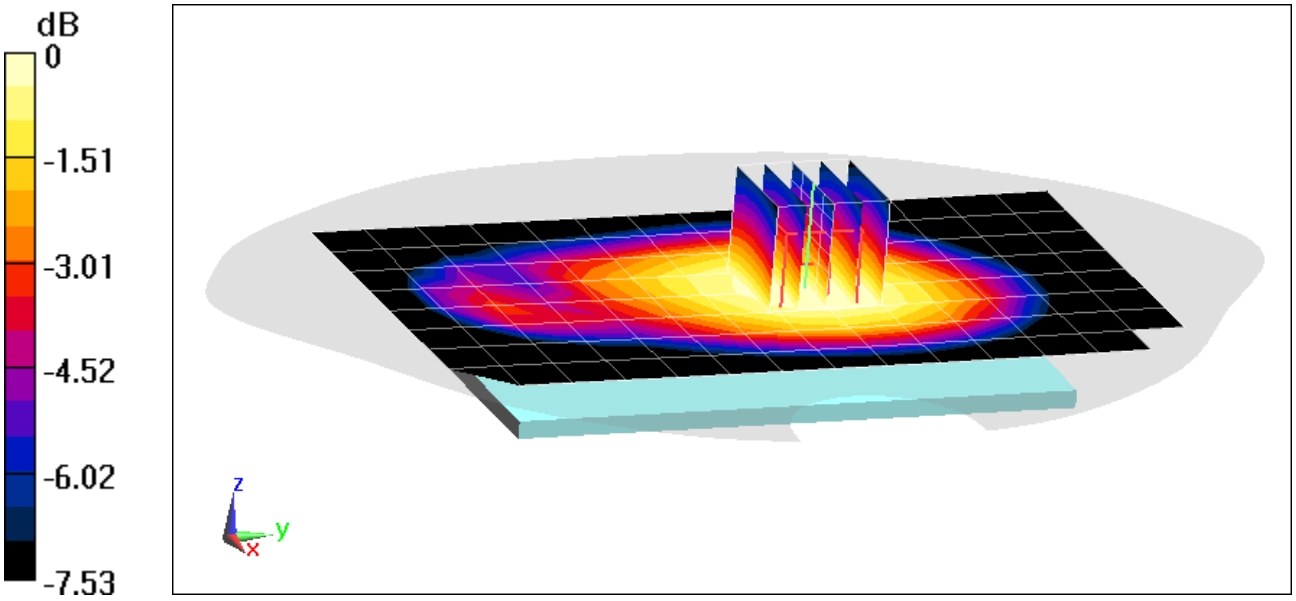
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.959 S/m; ε_r = 53.399; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02/16/2021; Ambient Temp: 21.6°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7551; ConvF(9.94, 9.94, 9.94) @ 836.6 MHz; Calibrated: 10/20/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/16/2020
Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: UMTS 850, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.45 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.293 W/kg
SAR(1 g) = 0.222 W/kg



0 dB = 0.268 W/kg = -5.72 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01192

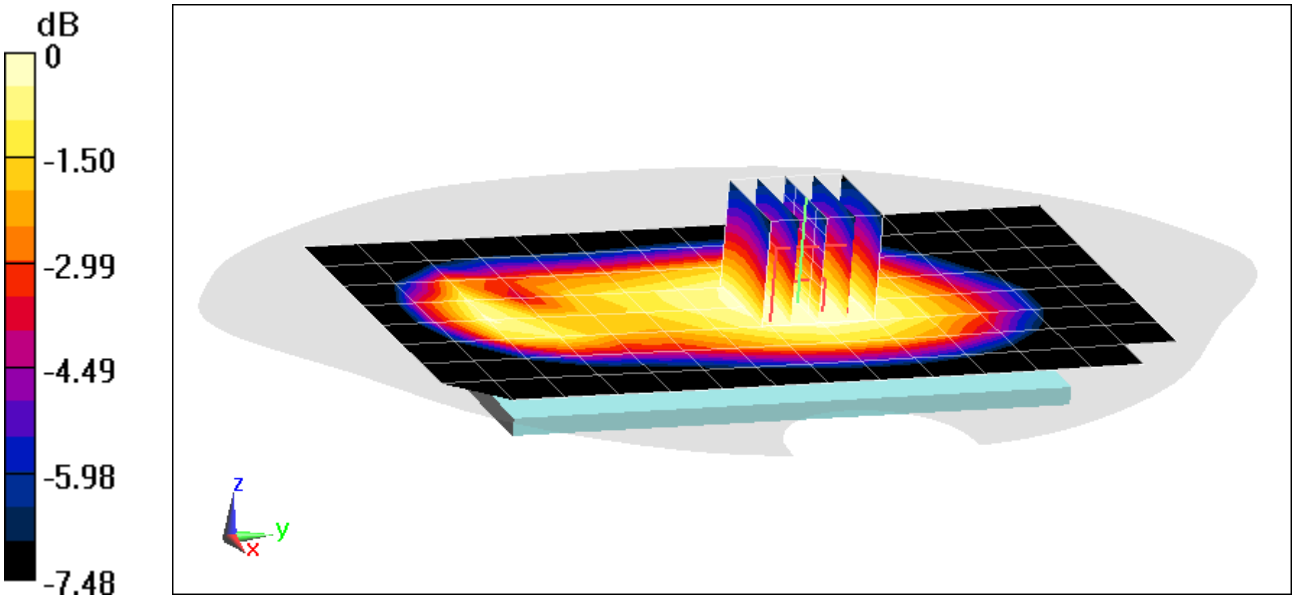
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.959 S/m; ε_r = 53.399; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02/16/2021; Ambient Temp: 21.6°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7551; ConvF(9.94, 9.94, 9.94) @ 836.6 MHz; Calibrated: 10/20/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/16/2020
Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: UMTS 850, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.93 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.351 W/kg
SAR(1 g) = 0.268 W/kg



0 dB = 0.321 W/kg = -4.93 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01127

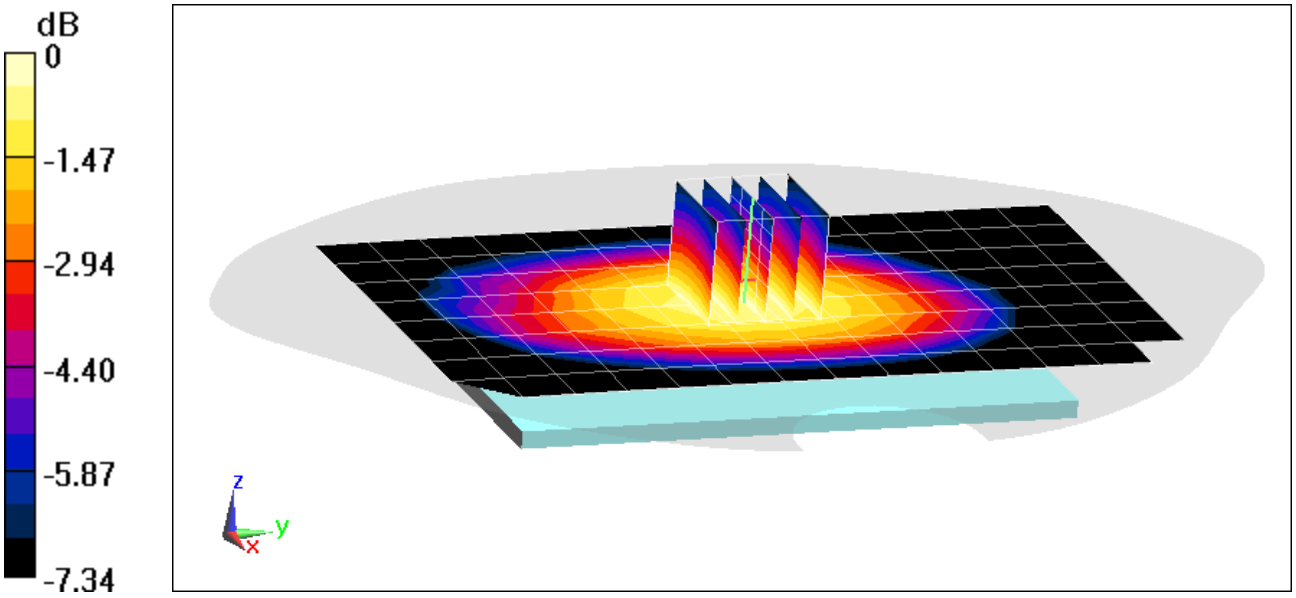
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body; Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.924 S/m; ε_r = 55.066; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02/15/2021; Ambient Temp: 22.5°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7308; ConvF(10.19, 10.19, 10.19) @ 707.5 MHz; Calibrated: 7/31/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/11/2020
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: LTE Band 12, Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 49 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.22 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.328 W/kg
SAR(1 g) = 0.242 W/kg



0 dB = 0.295 W/kg = -5.30 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01127

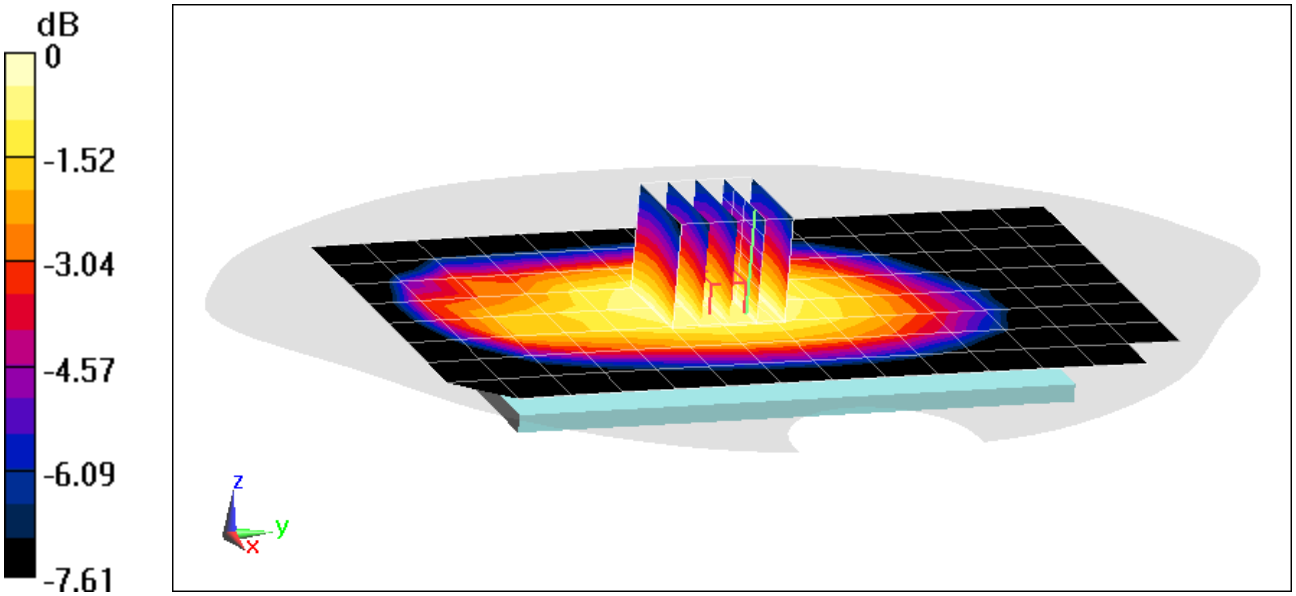
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 Body; Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.924 S/m; ε_r = 55.066; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02/15/2021; Ambient Temp: 22.5°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7308; ConvF(10.19, 10.19, 10.19) @ 707.5 MHz; Calibrated: 7/31/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/11/2020
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: LTE Band 12, Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 49 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.19 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.370 W/kg
SAR(1 g) = 0.271 W/kg



0 dB = 0.331 W/kg = -4.80 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01192

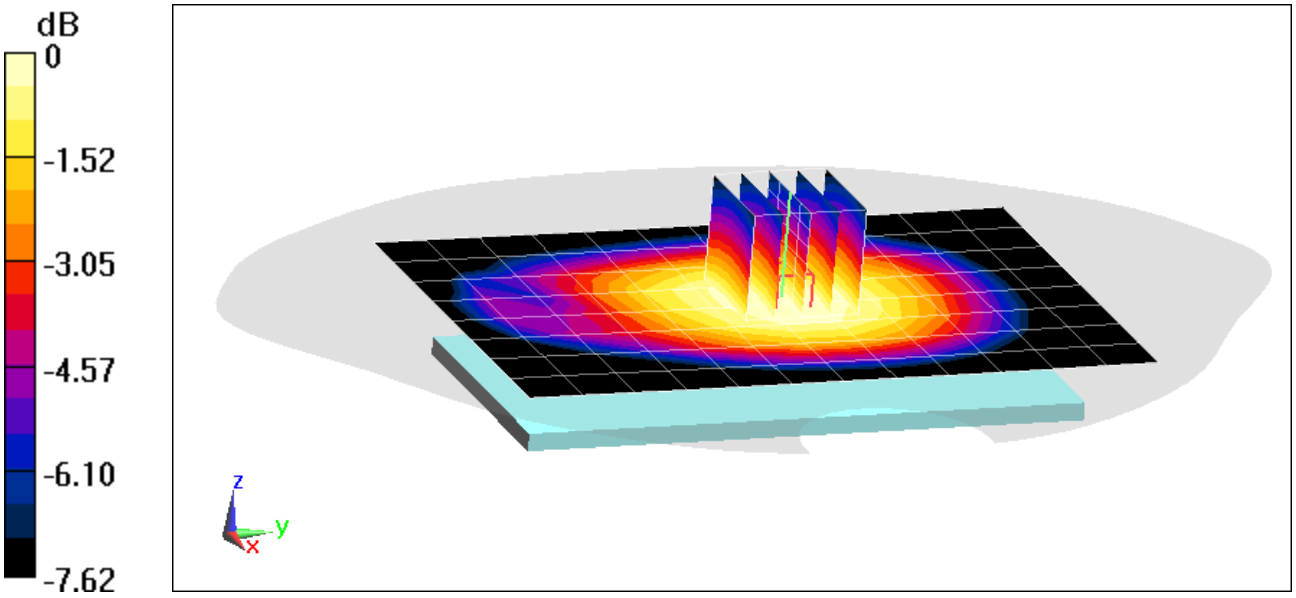
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.959 S/m; ε_r = 53.4; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02/16/2021; Ambient Temp: 21.6°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7551; ConvF(9.94, 9.94, 9.94) @ 836.5 MHz; Calibrated: 10/20/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/16/2020
Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: LTE Band 5 (Cell.), Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.50 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.374 W/kg
SAR(1 g) = 0.284 W/kg



0 dB = 0.342 W/kg = -4.66 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01192

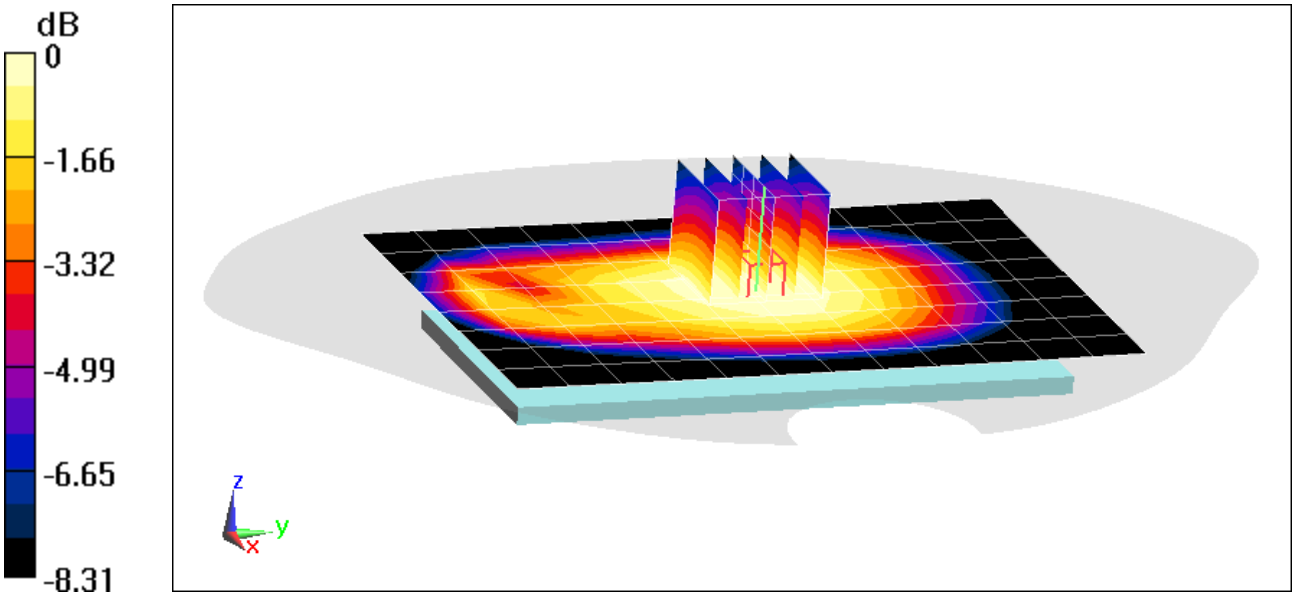
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 Body; Medium parameters used (interpolated):
f = 836.5 MHz; σ = 0.959 S/m; ε_r = 53.4; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02/16/2021; Ambient Temp: 21.6°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7551; ConvF(9.94, 9.94, 9.94) @ 836.5 MHz; Calibrated: 10/20/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/16/2020
Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: LTE Band 5 (Cell.), Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.06 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.447 W/kg
SAR(1 g) = 0.342 W/kg



0 dB = 0.409 W/kg = -3.88 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01168

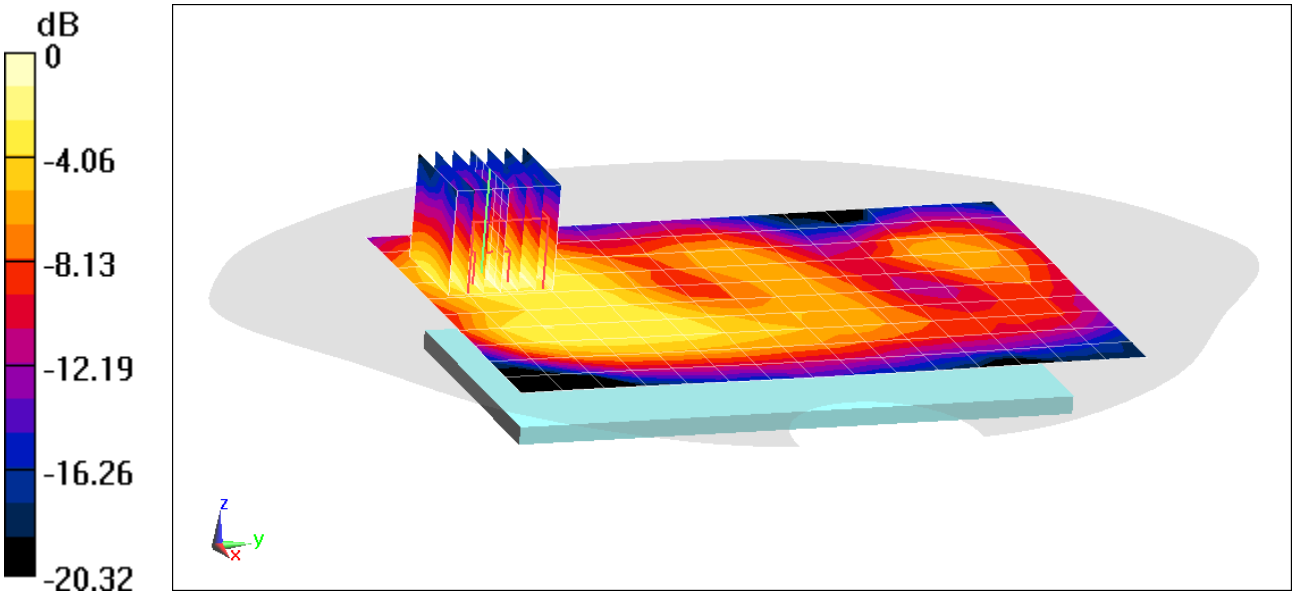
Communication System: UID 0, LTE Band 41 (Class 3); Frequency: 2506 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2506 MHz; σ = 2.094 S/m; ε_r = 52.08; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02/22/2021; Ambient Temp: 23.4°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7409; ConvF(7.24, 7.24, 7.24) @ 2506 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2020
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: LTE Band 41, Body SAR, Back side, Low.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (11x16x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.282 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.208 W/kg
SAR(1 g) = 0.112 W/kg



0 dB = 0.170 W/kg = -7.70 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01168

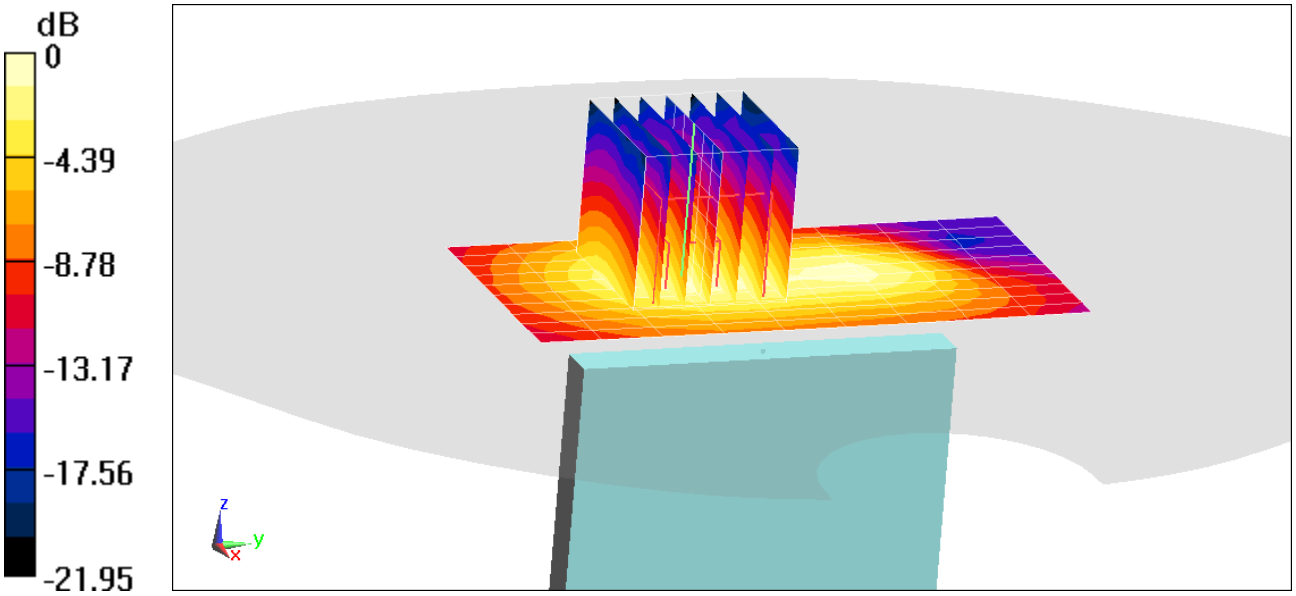
Communication System: UID 0, LTE Band 41 (Class 3); Frequency: 2506 MHz; Duty Cycle: 1:1.58
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2506 MHz; σ = 2.094 S/m; ε_r = 52.08; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02/22/2021; Ambient Temp: 23.4°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7409; ConvF(7.24, 7.24, 7.24) @ 2506 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2020
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: LTE Band 41, Body SAR, Bottom Edge, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (11x10x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.75 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.503 W/kg
SAR(1 g) = 0.259 W/kg



0 dB = 0.409 W/kg = -3.88 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01168

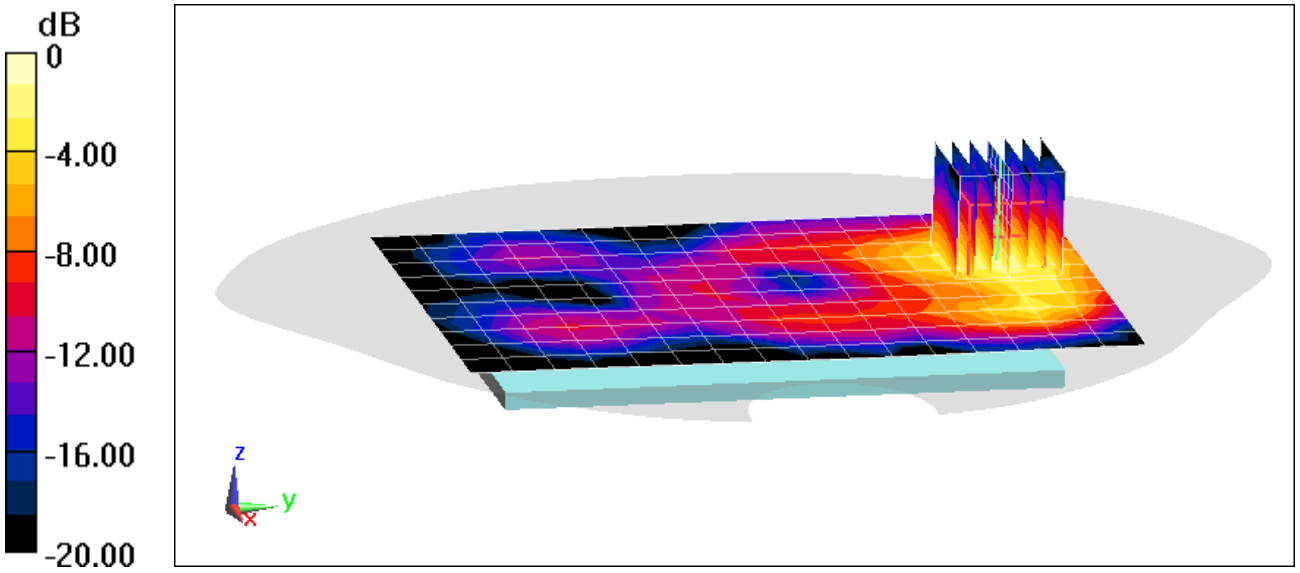
Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2437 MHz; σ = 2.02 S/m; ε_r = 52.332; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02/19/2021; Ambient Temp: 23.5°C; Tissue Temp: 24.5°C

Probe: EX3DV4 - SN7409; ConvF(7.24, 7.24, 7.24) @ 2437 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2020
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: IEEE 802.11b, 22 MHz Bandwidth, Body SAR, Ch 6, 1 Mbps, Back Side

Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.840 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.164 W/kg
SAR(1 g) = 0.089 W/kg



0 dB = 0.200 W/kg = -6.99 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01168

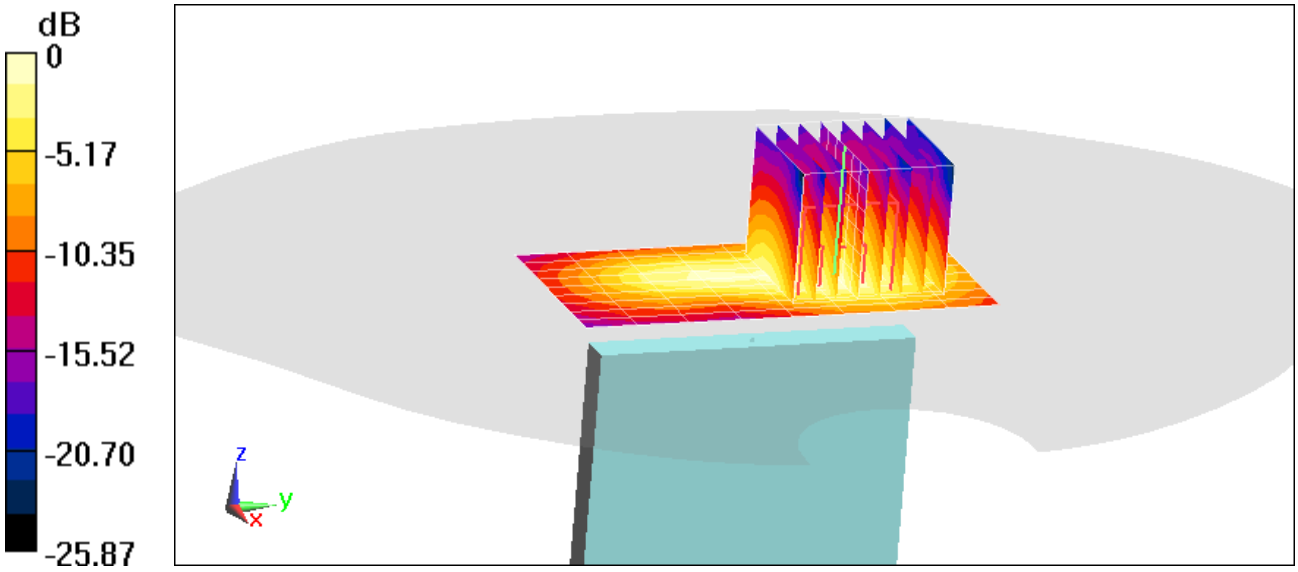
Communication System: UID 0, 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2437 MHz; σ = 2.02 S/m; ε_r = 52.332; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02/19/2021; Ambient Temp: 23.5°C; Tissue Temp: 24.5°C

Probe: EX3DV4 - SN7409; ConvF(7.24, 7.24, 7.24) @ 2437 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2020
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: IEEE 802.11b, 22 MHz Bandwidth, Body SAR, Ch 6, 1 Mbps, Top Edge

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.326 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.479 W/kg
SAR(1 g) = 0.247 W/kg



0 dB = 0.390 W/kg = -4.09 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01135

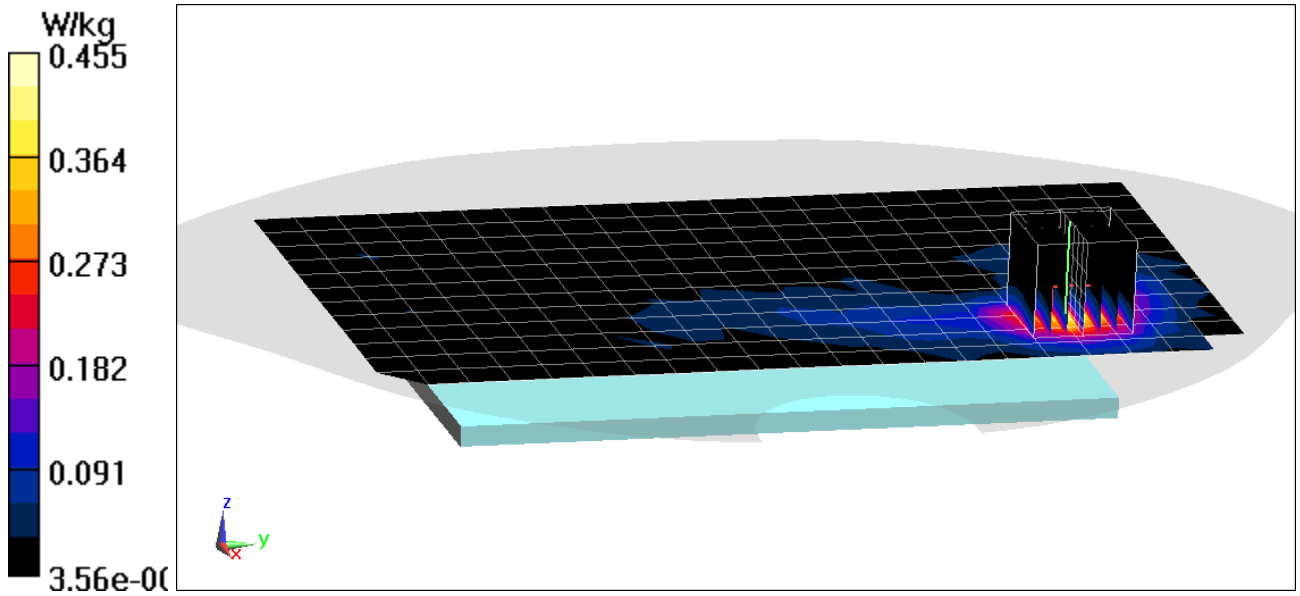
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5720 MHz; Duty Cycle: 1:1
Medium: 5200-5800 Body; Medium parameters used:
f = 5720 MHz; σ = 6.019 S/m; ε_r = 46.528; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02/15/2021; Ambient Temp: 23.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7406; ConvF(4.56, 4.56, 4.56) @ 5720 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1583; Calibrated: 5/14/2020
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: IEEE 802.11a, UNII-2C, 20 MHz Bandwidth, Body SAR,
Ch 144, 6 Mbps, Back Side

Area Scan (13x22x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 5.526 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.783 W/kg
SAR(1 g) = 0.198 W/kg



PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01135

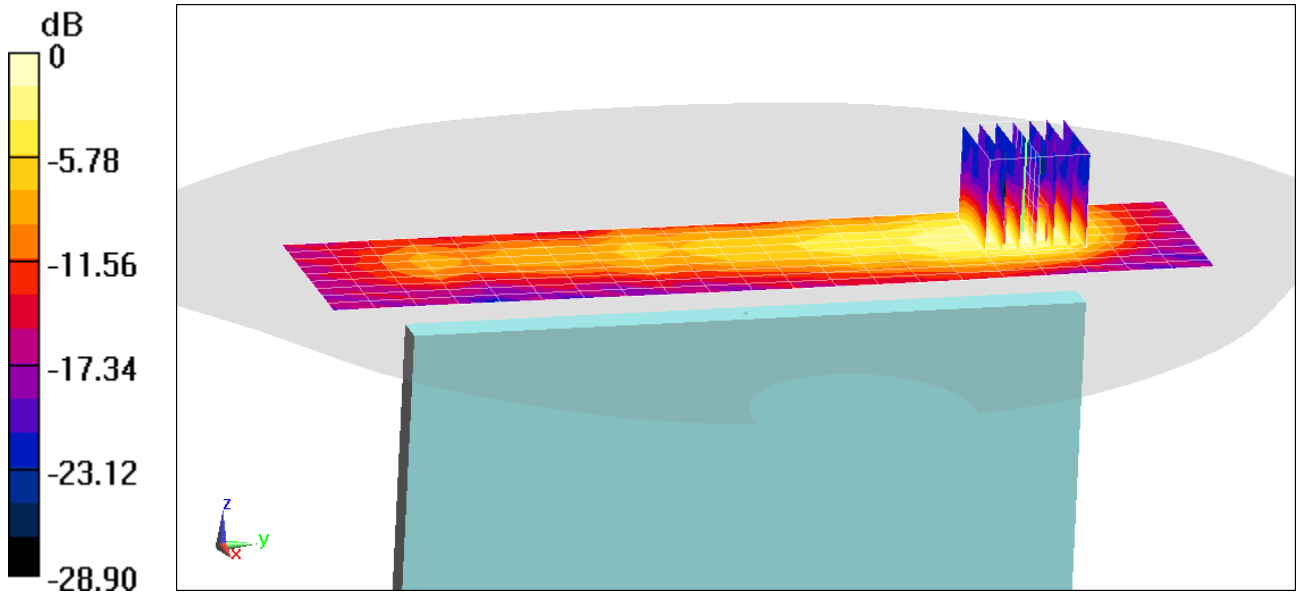
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5745 MHz; Duty Cycle: 1:1
Medium: 5200-5800 Body; Medium parameters used:
f = 5745 MHz; σ = 6.037 S/m; ε_r = 46.439; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02/15/2021; Ambient Temp: 23.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7406; ConvF(4.56, 4.56, 4.56) @ 5745 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1583; Calibrated: 5/14/2020
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: IEEE 802.11a, U-NII-3, 20 MHz Bandwidth, Body SAR,
Ch 149, 6 Mbps, Left Edge

Area Scan (10x22x1): Measurement grid: dx=5mm, dy=10mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 3.492 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.55 W/kg
SAR(1 g) = 0.365 W/kg



0 dB = 0.870 W/kg = -0.60 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01168

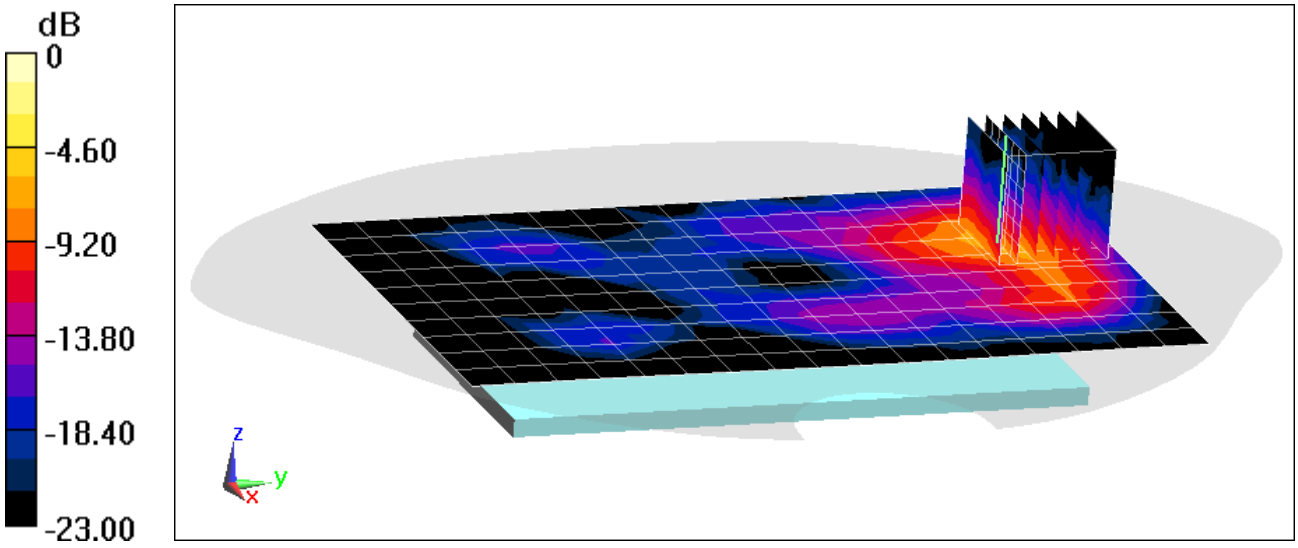
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.297
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2441 MHz; σ = 1.993 S/m; ε_r = 51.957; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03/06/2021; Ambient Temp: 23.1°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7409; ConvF(7.24, 7.24, 7.24) @ 2441 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2020
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: Bluetooth, Body SAR, Ch 39, 1 Mbps, Back Side

Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.361 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.0810 W/kg
SAR(1 g) = 0.043 W/kg



0 dB = 0.300 W/kg = -5.23 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01168

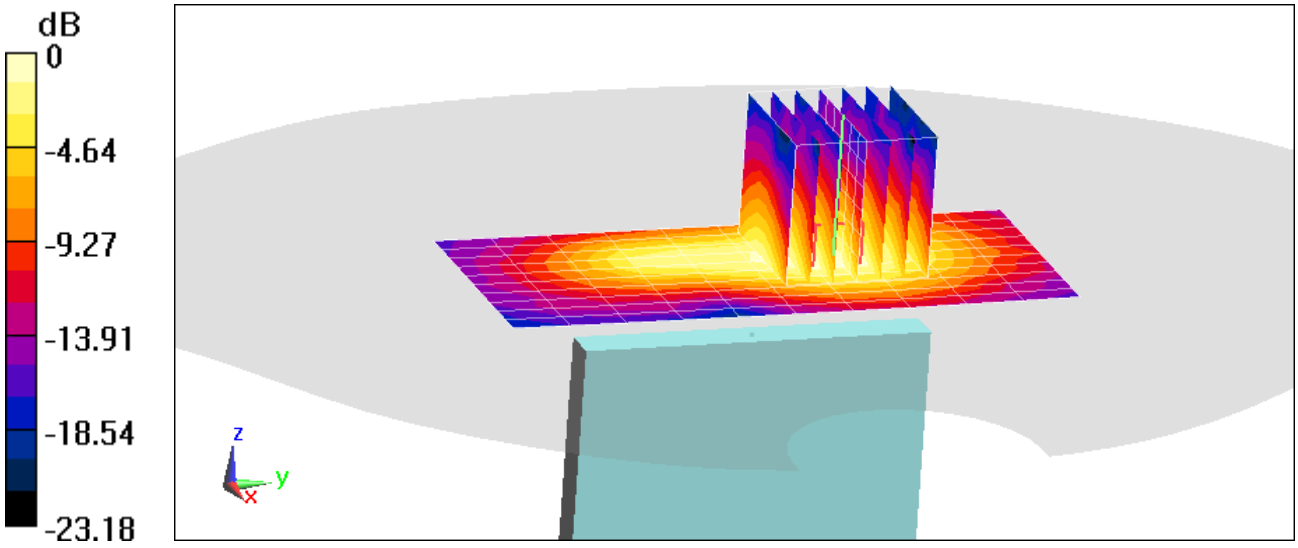
Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.297
Medium: 2450 Body; Medium parameters used (interpolated):
f = 2441 MHz; σ = 1.993 S/m; ε_r = 51.957; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03/06/2021; Ambient Temp: 23.1°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7409; ConvF(7.24, 7.24, 7.24) @ 2441 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2020
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: Bluetooth, Body SAR, Ch 39, 1 Mbps, Top Edge

Area Scan (11x11x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.176 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.181 W/kg
SAR(1 g) = 0.093 W/kg



0 dB = 0.146 W/kg = -8.36 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 16554

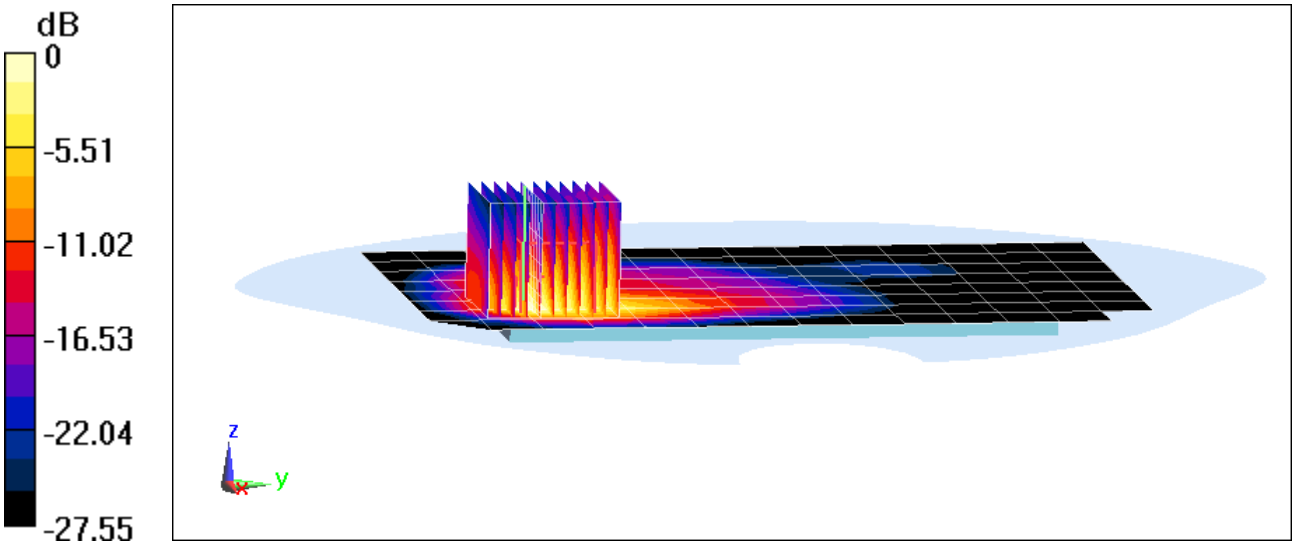
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Body; Medium parameters used:
f = 1880 MHz; σ = 1.551 S/m; ε_r = 52.314; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 03/08/2021; Ambient Temp: 20.1°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(7.76, 7.76, 7.76) @ 1880 MHz; Calibrated: 7/20/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/15/2020
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: GPRS 1900, Phablet SAR, Back side, Mid.ch, 2 Tx Slots

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (10x11x8)/Cube 0: Measurement grid: dx=3.8mm, dy=3.8mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 32.81 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 6.29 W/kg
SAR(10 g) = 0.790 W/kg



0 dB = 3.03 W/kg = 4.81 dBW/kg

PCTEST

DUT: A3LSMA526JPN; Type: Portable Handset; Serial: 01135

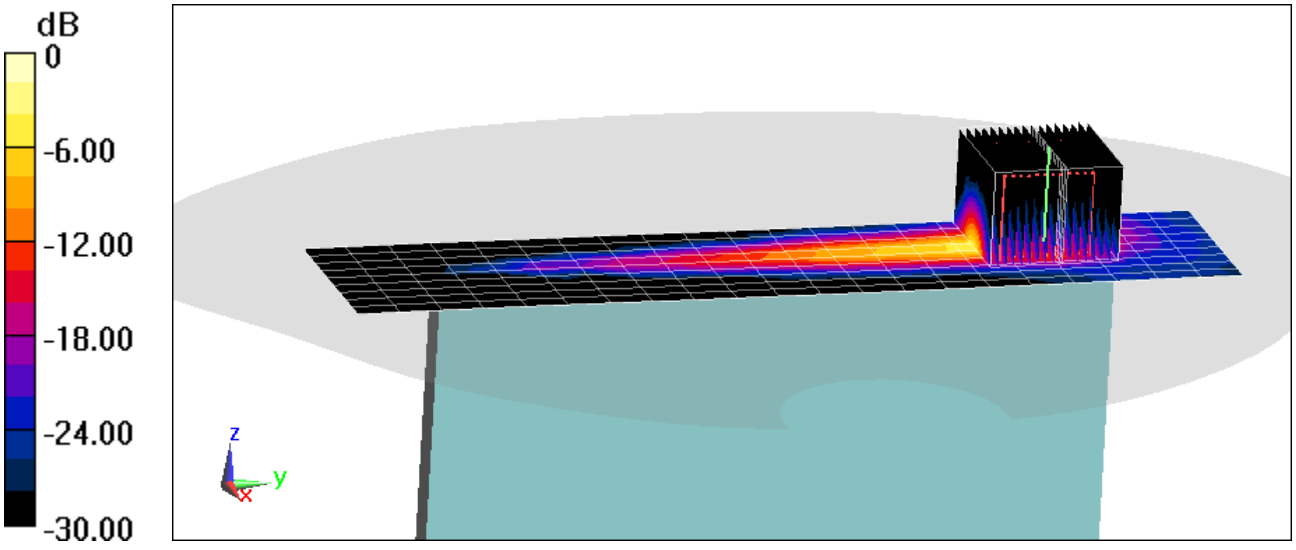
Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5720 MHz; Duty Cycle: 1:1
Medium: 5200-5800 Body; Medium parameters used:
f = 5720 MHz; σ = 6.019 S/m; ε_r = 46.528; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 02/15/2021; Ambient Temp: 23.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7406; ConvF(4.56, 4.56, 4.56) @ 5720 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1583; Calibrated: 5/14/2020
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

Mode: IEEE 802.11a, U-NII-2C, 20 MHz Bandwidth,
Phablet SAR, Ch 144, 6 Mbps, Left Edge

Area Scan (10x22x1): Measurement grid: dx=5mm, dy=10mm
Zoom Scan (17x17x7)/Cube 0: Measurement grid: dx=1.9mm, dy=1.9mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 1.044 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 25.5 W/kg
SAR(10 g) = 0.881 W/kg



0 dB = 13.0 W/kg = 11.14 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

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PCTEST

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1003

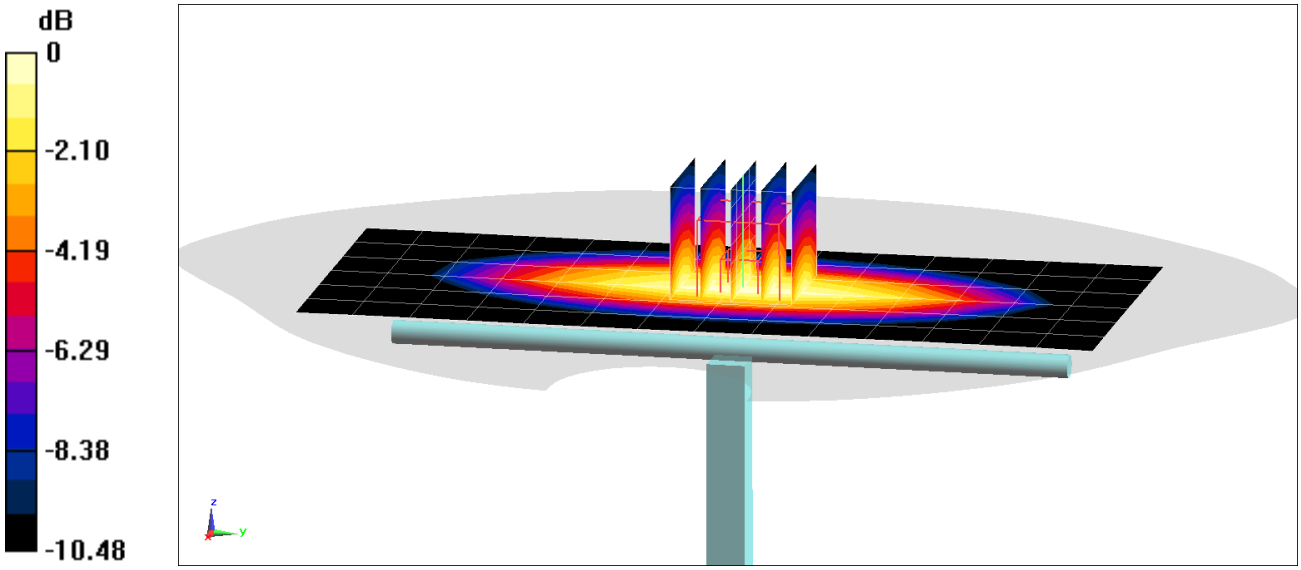
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Head Medium parameters used:
f = 750 MHz; σ = 0.912 S/m; ε_r = 43.441; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02/16/2021; Ambient Temp: 21.5°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(10.23, 10.23, 10.23) @ 750 MHz; Calibrated: 4/21/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/15/2020
Phantom: Twin-SAM V5.0 Left 30; Type: QD 000 P40 CD; Serial: 1715
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

750 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.44 W/kg
SAR(1 g) = 1.65 W/kg
Deviation(1 g) = -6.04%



0 dB = 2.19 W/kg = 3.40 dBW/kg

PCTEST

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d133

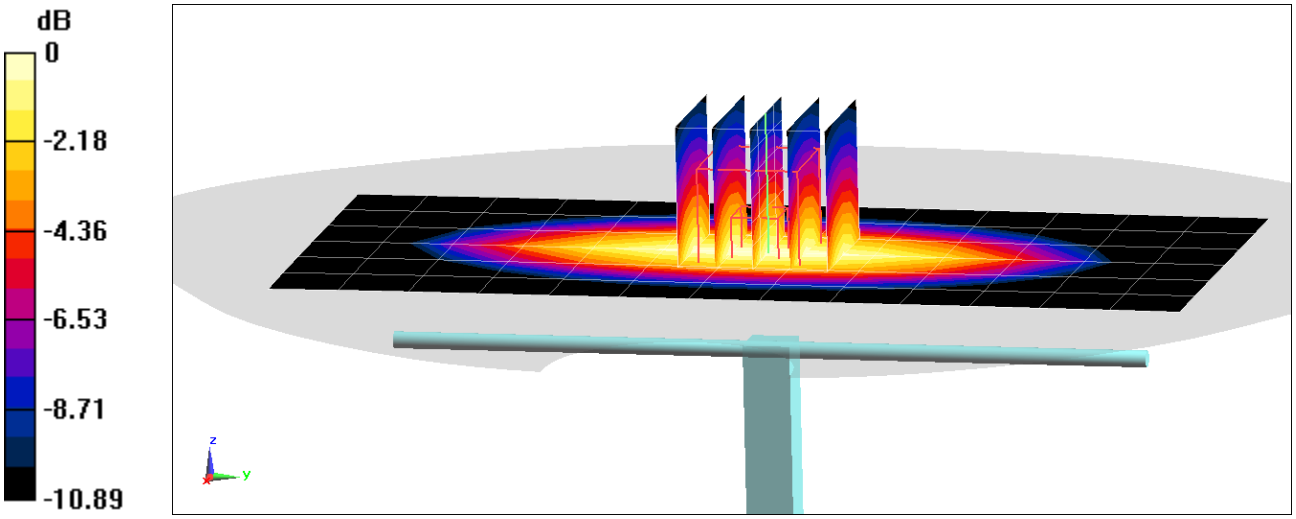
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.899 S/m; ε_r = 41.971; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02/16/2021; Ambient Temp: 23.7°C; Tissue Temp: 22.2°C

Probe: EX3DV4 - SN7308; ConvF(10.17, 10.17, 10.17) @ 835 MHz; Calibrated: 7/31/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/11/2020
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.72 W/kg
SAR(1 g) = 1.76 W/kg
Deviation(1 g) = -6.68%



0 dB = 2.39 W/kg = 3.78 dBW/kg

PCTEST

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d132

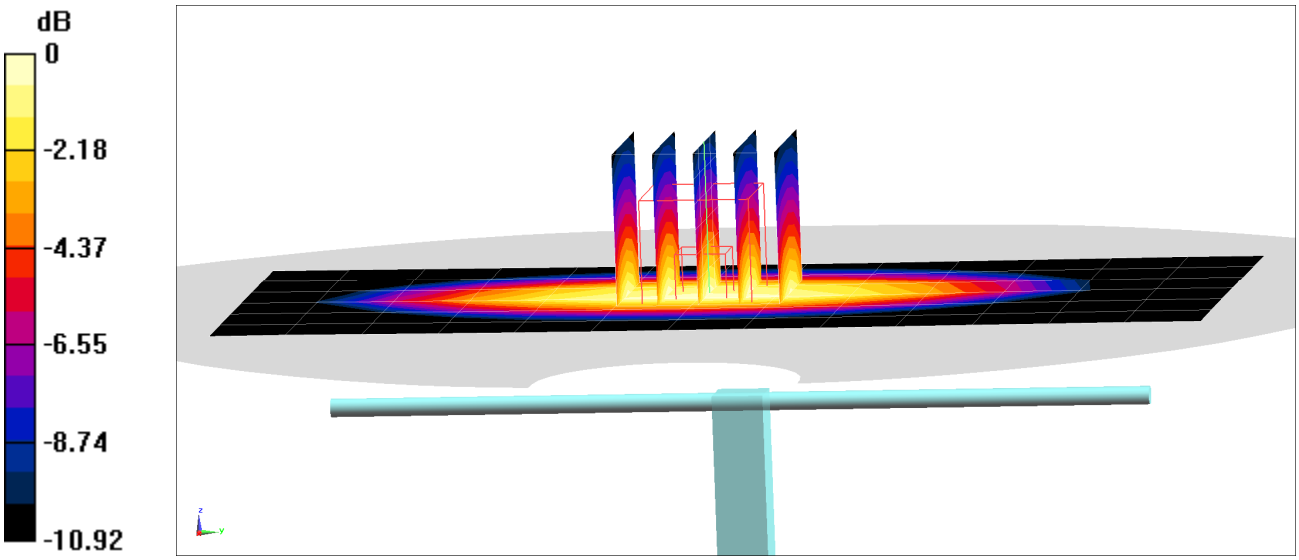
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.898 S/m; ε_r = 40.531; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03/09/2021; Ambient Temp: 22.7°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3589; ConvF(8.57, 8.57, 8.57) @ 835 MHz; Calibrated: 1/20/2021
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1558; Calibrated: 1/13/2021
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1646
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.97 W/kg
SAR(1 g) = 1.89 W/kg
Deviation(1 g) = -2.17%



0 dB = 2.58 W/kg = 4.12 dBW/kg

PCTEST

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

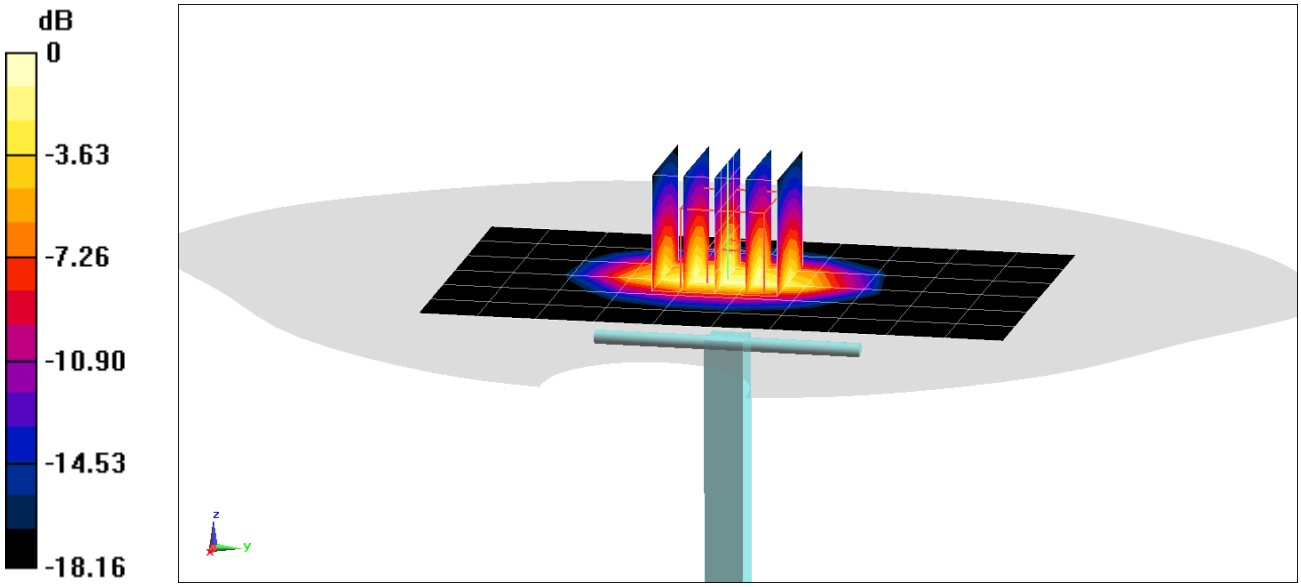
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1900 MHz; σ = 1.451 S/m; ε_r = 39.715; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03/09/2021; Ambient Temp: 21.3°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7357; ConvF(8.32, 8.32, 8.32) @ 1900 MHz; Calibrated: 4/21/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/15/2020
Phantom: Twin-SAM V5.0 Left 30; Type: QD 000 P40 CD; Serial: 1715
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.63 W/kg
SAR(1 g) = 4.07 W/kg
Deviation(1 g) = 2.26%



0 dB = 6.39 W/kg = 8.06 dBW/kg

PCTEST

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

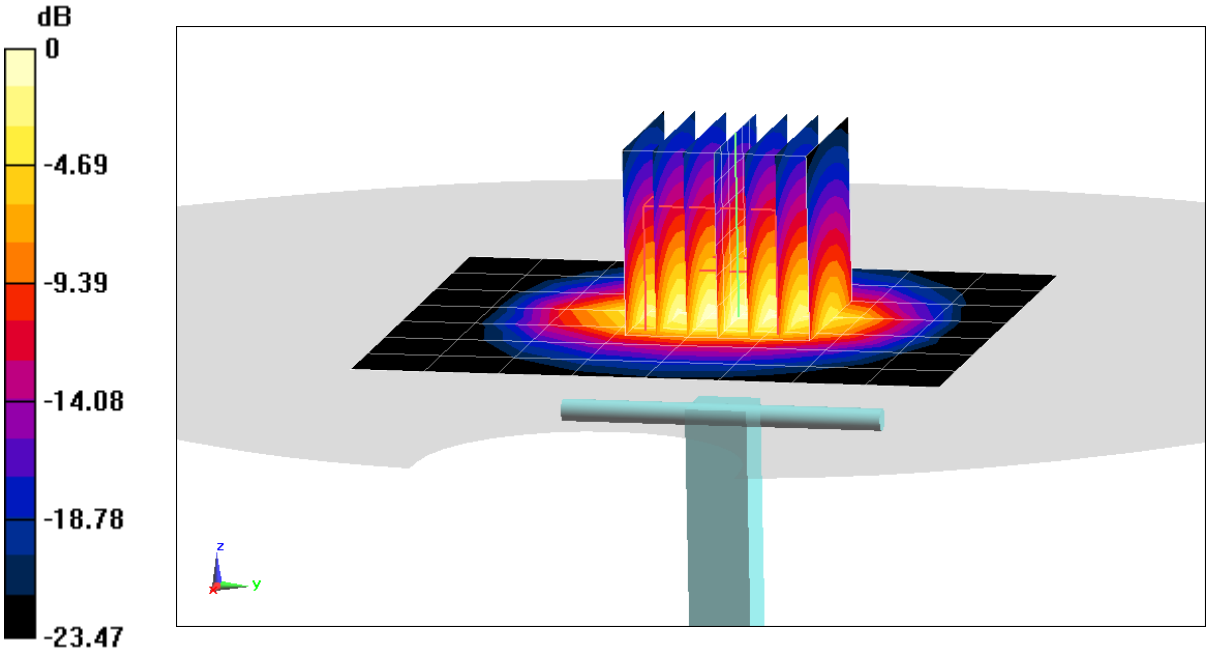
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.857 S/m; ε_r = 40.84; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02/22/2021; Ambient Temp: 21.9°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7571; ConvF(7.28, 7.28, 7.28) @ 2450 MHz; Calibrated: 12/11/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1533; Calibrated: 12/7/2020
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.2 W/kg
SAR(1 g) = 5.17 W/kg
Deviation(1 g) = 0.58%



0 dB = 8.85 W/kg = 9.47 dBW/kg

PCTEST

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

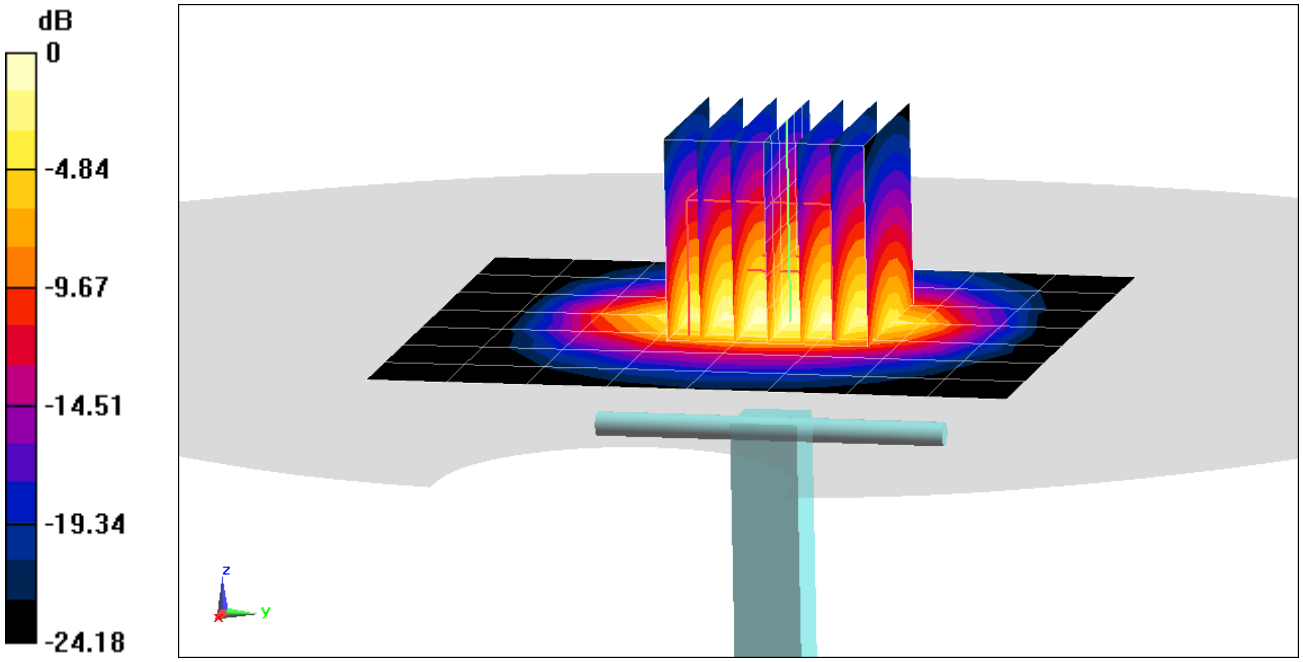
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.867 S/m; ε_r = 39.942; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03/07/2021; Ambient Temp: 23.2°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7571; ConvF(7.28, 7.28, 7.28) @ 2450 MHz; Calibrated: 12/11/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1533; Calibrated: 12/7/2020
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.3 W/kg
SAR(1 g) = 5.08 W/kg
Deviation(1 g) = -1.17%



0 dB = 8.86 W/kg = 9.47 dBW/kg

PCTEST

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

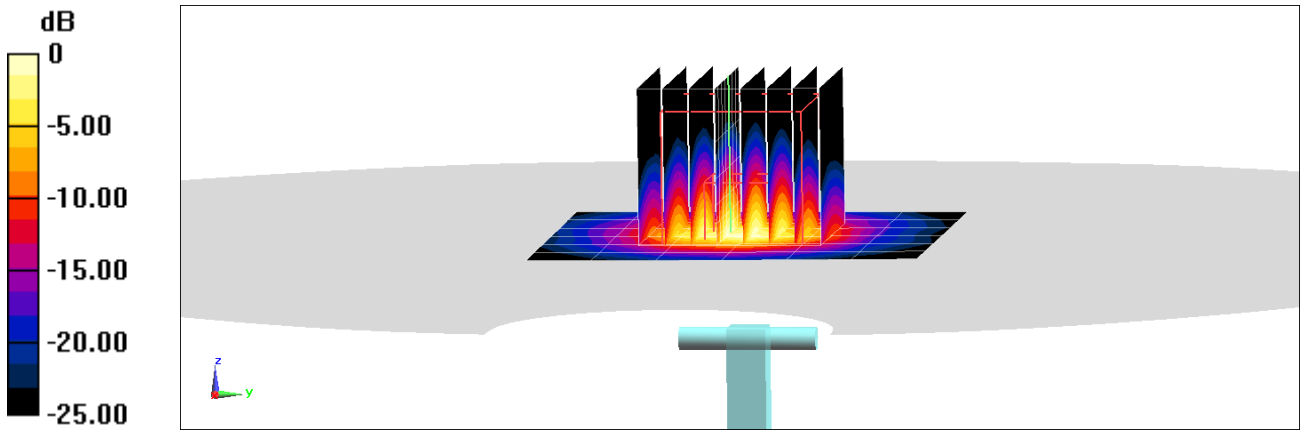
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5200-5800 Head Medium parameters used:
f = 5250 MHz; σ = 4.72 S/m; ε_r = 34.919; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03/02/2021; Ambient Temp: 21.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7357; ConvF(5.5, 5.5, 5.5) @ 5250 MHz; Calibrated: 4/21/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/15/2020
Phantom: Twin-SAM V5.0 Left 20; Type: QD 000 P40 CD; Serial: 1715
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 15.8 W/kg
SAR(1 g) = 3.79 W/kg
Deviation(1 g) = -5.01%



0 dB = 8.90 W/kg = 9.49 dBW/kg

PCTEST

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

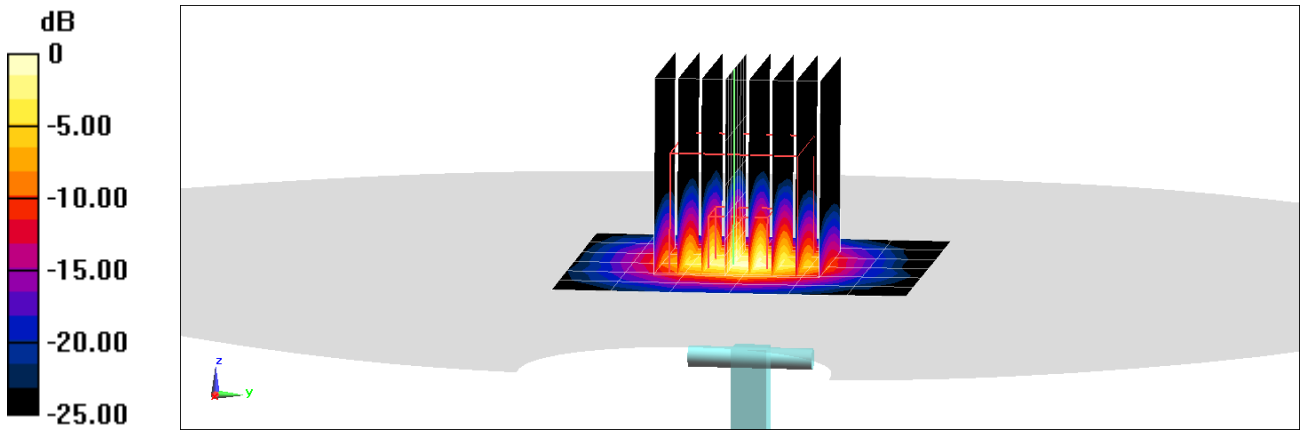
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5200-5800 Head Medium parameters used:
f = 5600 MHz; σ = 5.13 S/m; ε_r = 34.28; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03/02/2021; Ambient Temp: 21.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7357; ConvF(4.93, 4.93, 4.93) @ 5600 MHz; Calibrated: 4/21/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/15/2020
Phantom: Twin-SAM V5.0 Left 20; Type: QD 000 P40 CD; Serial: 1715
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 17.3 W/kg
SAR(1 g) = 3.85 W/kg
Deviation(1 g) = -5.87%



0 dB = 9.55 W/kg = 9.80 dBW/kg

PCTEST

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

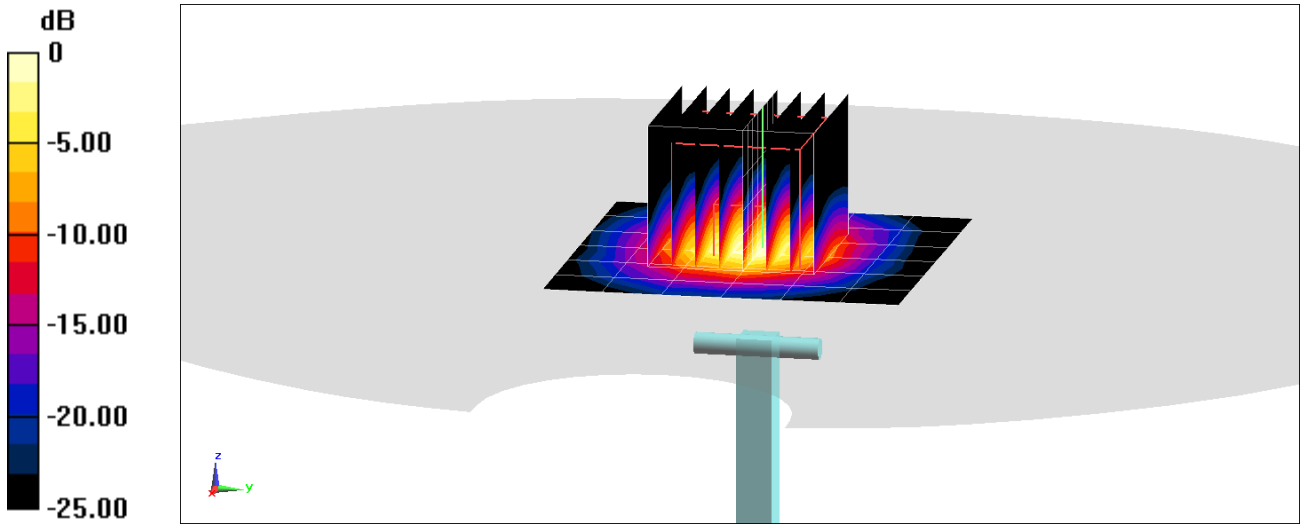
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5200-5800 Head Medium parameters used:
f = 5750 MHz; σ = 5.304 S/m; ε_r = 33.989; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03/02/2021; Ambient Temp: 21.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7357; ConvF(5.05, 5.05, 5.05) @ 5750 MHz; Calibrated: 4/21/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1407; Calibrated: 4/15/2020
Phantom: Twin-SAM V5.0 Left 20; Type: QD 000 P40 CD; Serial: 1715
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 17.1 W/kg
SAR(1 g) = 3.65 W/kg
Deviation(1 g) = -7.94%



0 dB = 9.06 W/kg = 9.57 dBW/kg

PCTEST

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1054

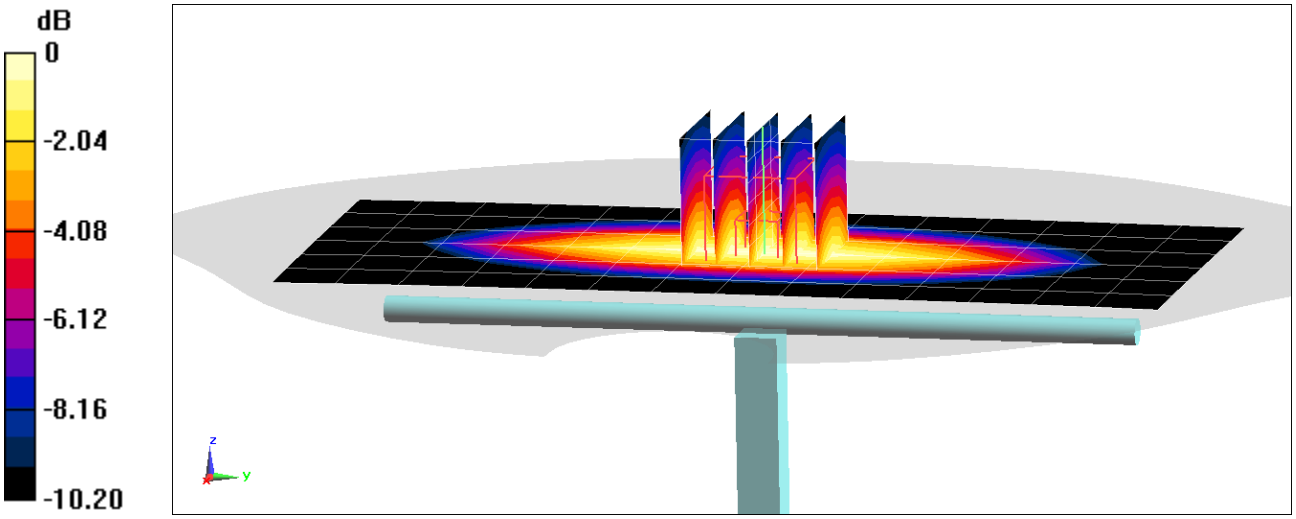
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 Body Medium parameters used:
f = 750 MHz; σ = 0.941 S/m; ε_r = 54.952; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02/15/2021; Ambient Temp: 22.5°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7308; ConvF(10.19, 10.19, 10.19) @ 750 MHz; Calibrated: 7/31/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1450; Calibrated: 8/11/2020
Phantom: Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1792
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

750 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.49 W/kg
SAR(1 g) = 1.63 W/kg
Deviation(1 g) = -4.45%



0 dB = 2.18 W/kg = 3.38 dBW/kg

PCTEST

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047

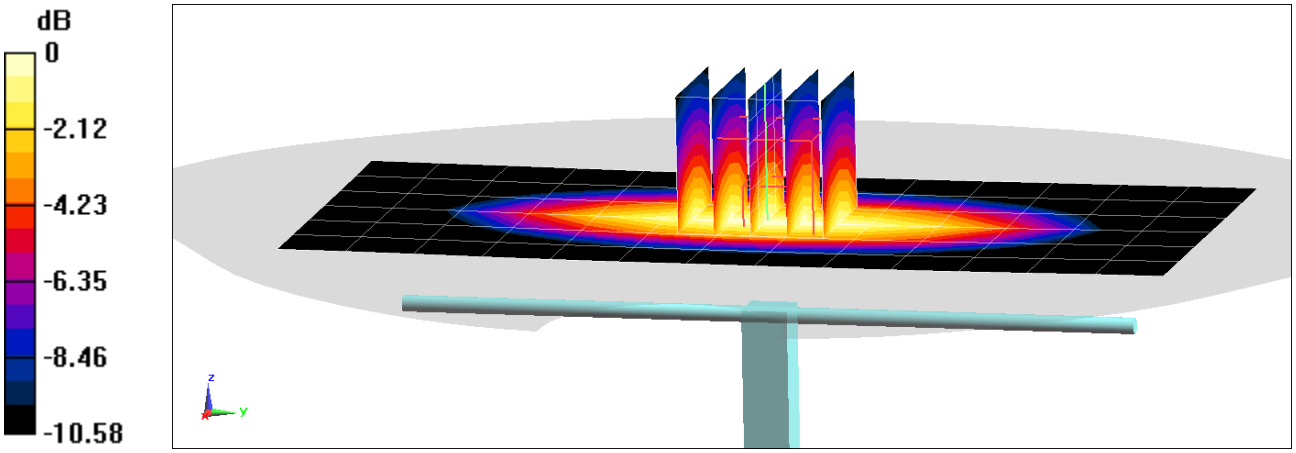
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.957 S/m; ε_r = 53.415; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02/16/2021; Ambient Temp: 21.6°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7551; ConvF(9.94, 9.94, 9.94) @ 835 MHz; Calibrated: 10/20/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 10/16/2020
Phantom: Right Back Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1692
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 3.10 W/kg
SAR(1 g) = 2.01 W/kg
Deviation(1 g) = 6.12%



0 dB = 2.71 W/kg = 4.33 dBW/kg

PCTEST

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047

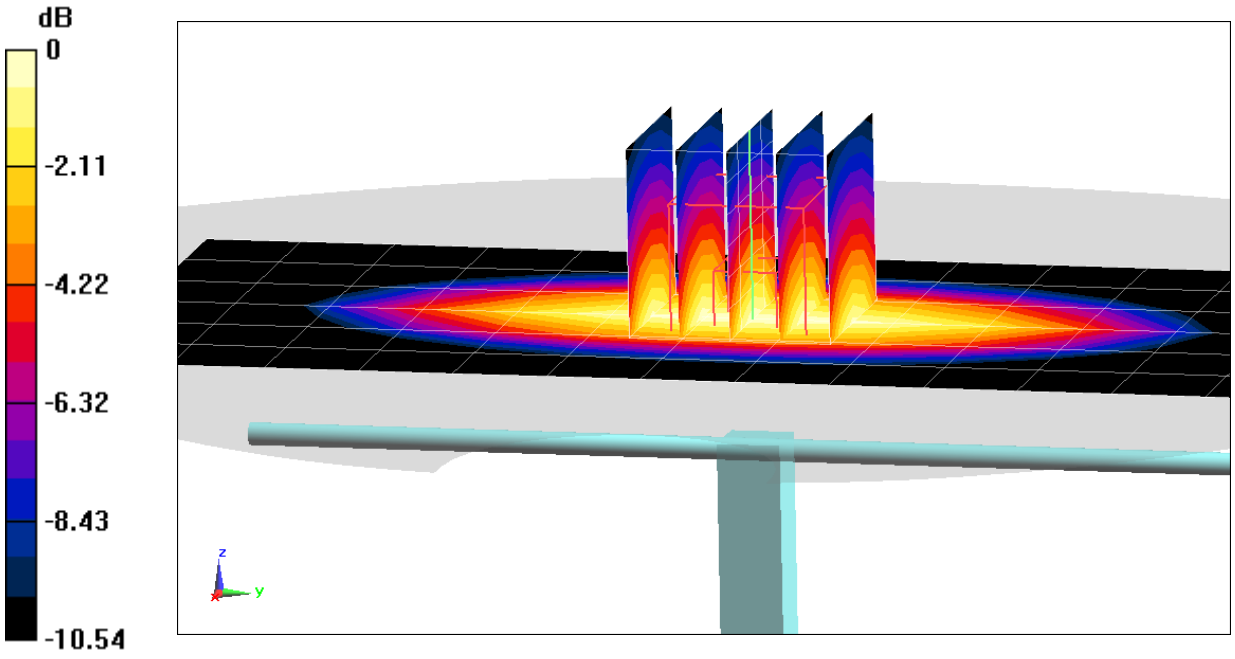
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.952 S/m; ε_r = 54.238; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03/08/2021; Ambient Temp: 21.9°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN7571; ConvF(9.99, 9.99, 9.99) @ 835 MHz; Calibrated: 12/11/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1533; Calibrated: 12/7/2020
Phantom: Twin-SAM V5.0 (30); Type: QD 000 P40 CD; Serial: 1647
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 3.11 W/kg
SAR(1 g) = 2.02 W/kg
Deviation(1 g) = 6.65%



0 dB = 2.73 W/kg = 4.36 dBW/kg

PCTEST

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

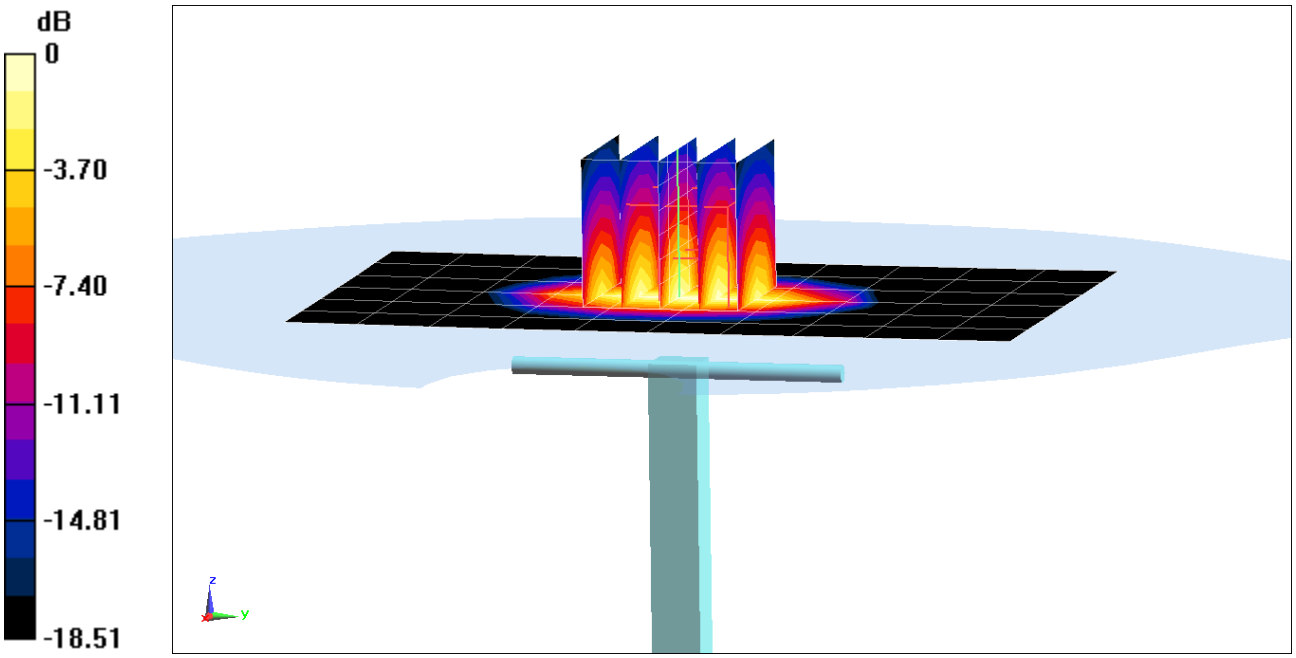
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1900 MHz; σ = 1.573 S/m; ε_r = 52.255; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03/08/2021; Ambient Temp: 20.1°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7410; ConvF(7.76, 7.76, 7.76) @ 1900 MHz; Calibrated: 7/20/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 7/15/2020
Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.76 W/kg
SAR(1 g) = 4.21 W/kg; SAR(10 g) = 2.16 W/kg
Deviation(1 g) = 7.40%; Deviation(10 g) = 4.85%



0 dB = 6.52 W/kg = 8.14 dBW/kg

PCTEST

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

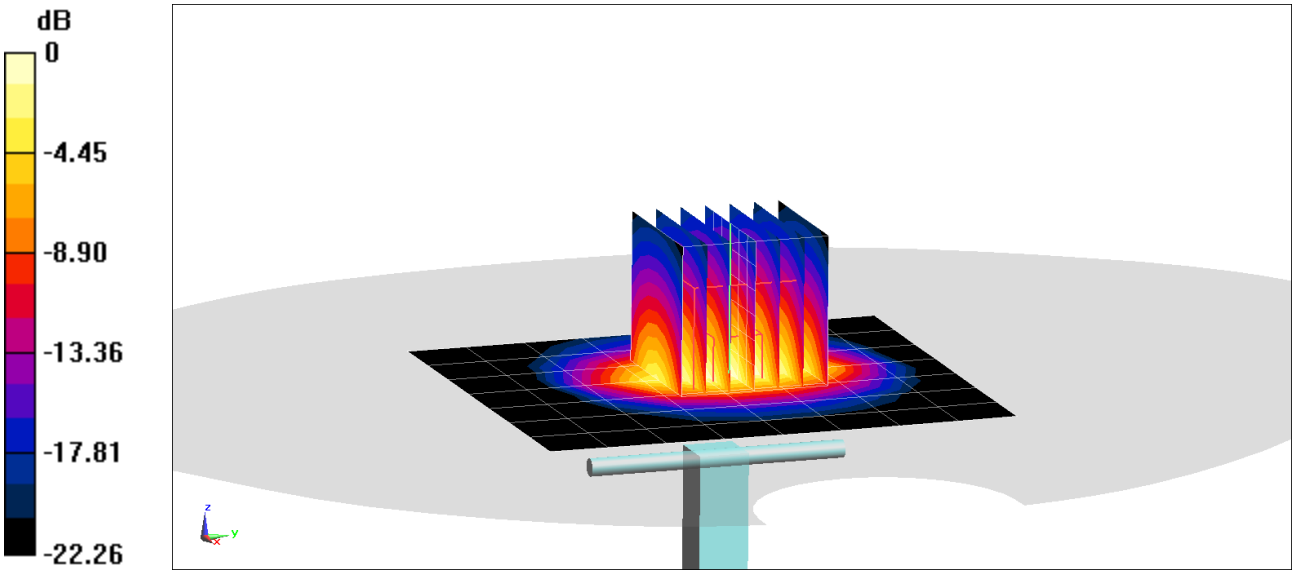
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.035 S/m; ε_r = 52.294; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02/19/2021; Ambient Temp: 23.5°C; Tissue Temp: 24.5°C

Probe: EX3DV4 - SN7409; ConvF(7.24, 7.24, 7.24) @ 2450 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2020
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.2 W/kg
SAR(1 g) = 5.33 W/kg
Deviation(1 g) = 5.13%



0 dB = 9.05 W/kg = 9.57 dBW/kg

PCTEST

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

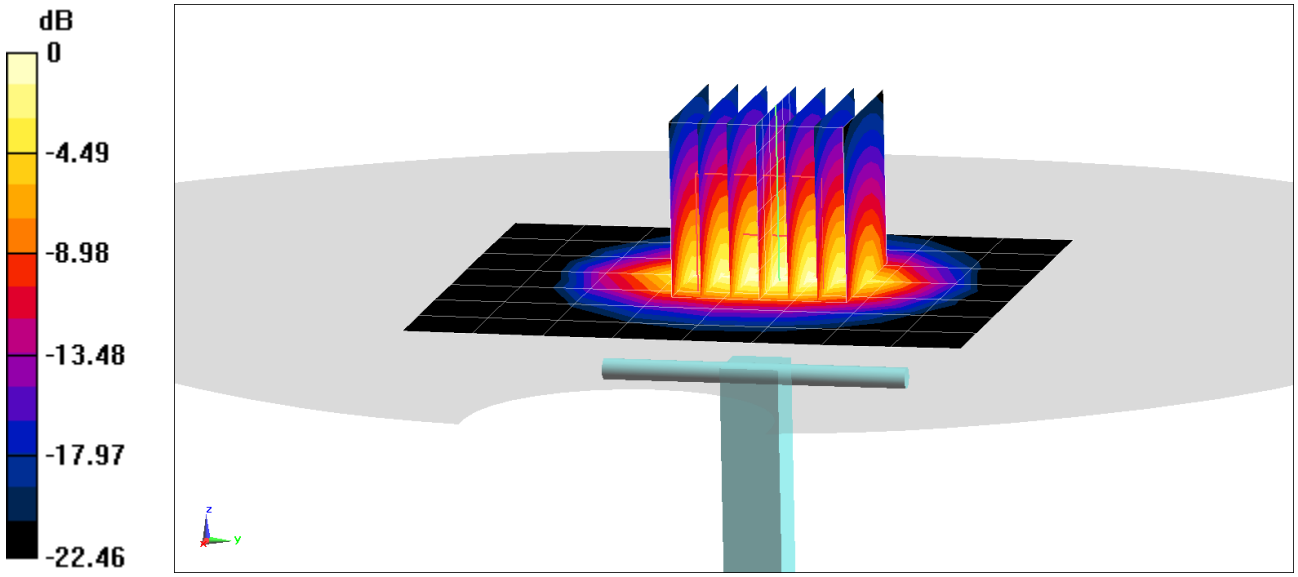
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.028 S/m; ε_r = 52.244; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02/22/2021; Ambient Temp: 23.4°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN7409; ConvF(7.24, 7.24, 7.24) @ 2450 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2020
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.1 W/kg
SAR(1 g) = 5.27 W/kg
Deviation(1 g) = 3.94%



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

PCTEST

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

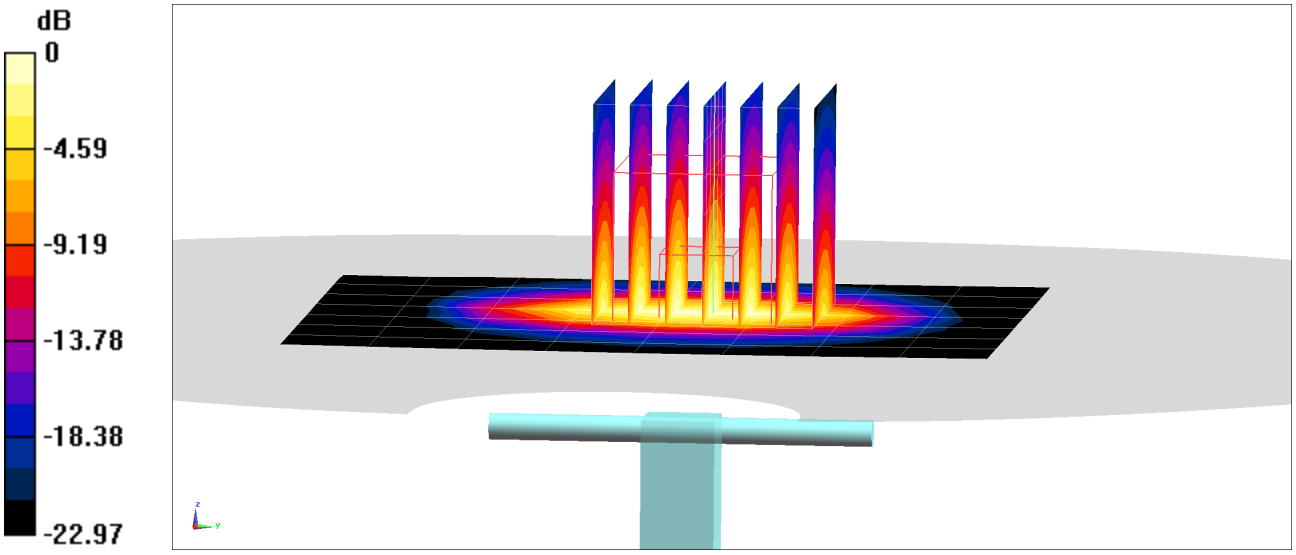
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.004 S/m; ε_r = 51.932; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03/06/2021; Ambient Temp: 23.1°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7409; ConvF(7.24, 7.24, 7.24) @ 2450 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 6/18/2020
Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.0 W/kg
SAR(1 g) = 5.21 W/kg
Deviation(1 g) = 2.76%



0 dB = 8.73 W/kg = 9.41 dBW/kg

PCTEST

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

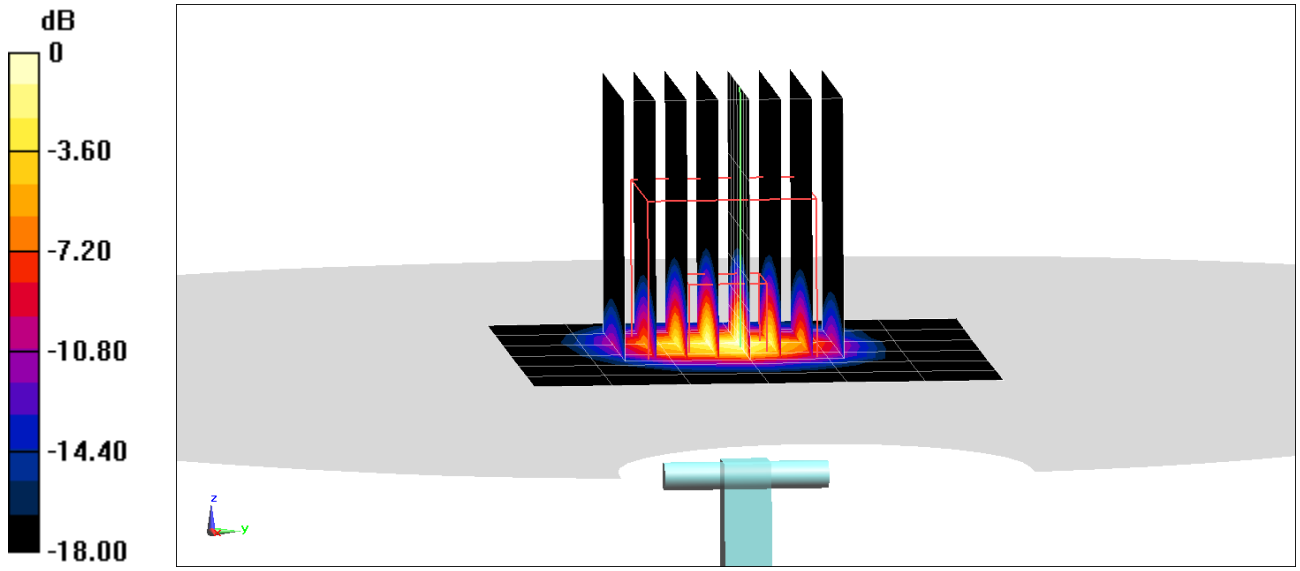
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5200-5800 Body Medium parameters used:
f = 5250 MHz; σ = 5.411 S/m; ε_r = 47.167; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02/15/2021; Ambient Temp: 23.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7406; ConvF(5.05, 5.05, 5.05) @ 5250 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1583; Calibrated: 5/14/2020
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 14.2 W/kg
SAR(1 g) = 3.53 W/kg; SAR(10 g) = 0.982 W/kg
Deviation(1 g) = -5.36%; Deviation(10 g) = -6.48%



0 dB = 8.49 W/kg = 9.29 dBW/kg

PCTEST

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

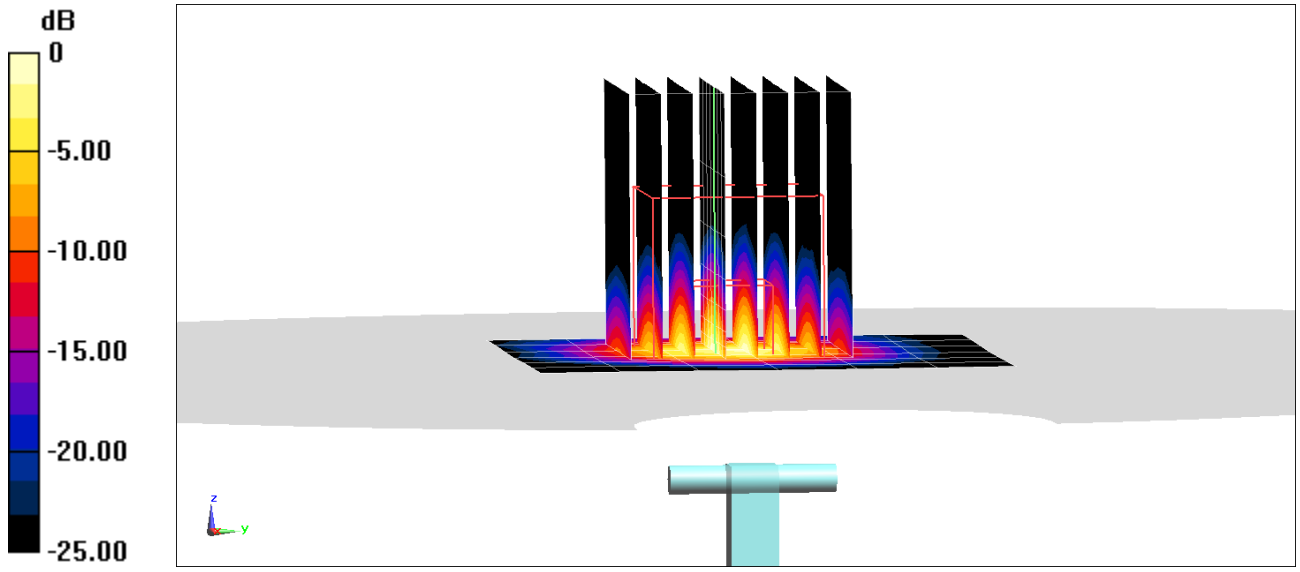
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5200-5800 Body Medium parameters used:
f = 5600 MHz; σ = 5.88 S/m; ε_r = 46.672; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02/15/2021; Ambient Temp: 23.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7406; ConvF(4.37, 4.37, 4.37) @ 5600 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1583; Calibrated: 5/14/2020
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 17.3 W/kg
SAR(1 g) = 3.75 W/kg; SAR(10 g) = 1.05 W/kg
Deviation(1 g) = -3.97%; Deviation(10 g) = -3.23%



0 dB = 9.48 W/kg = 9.77 dBW/kg

PCTEST

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

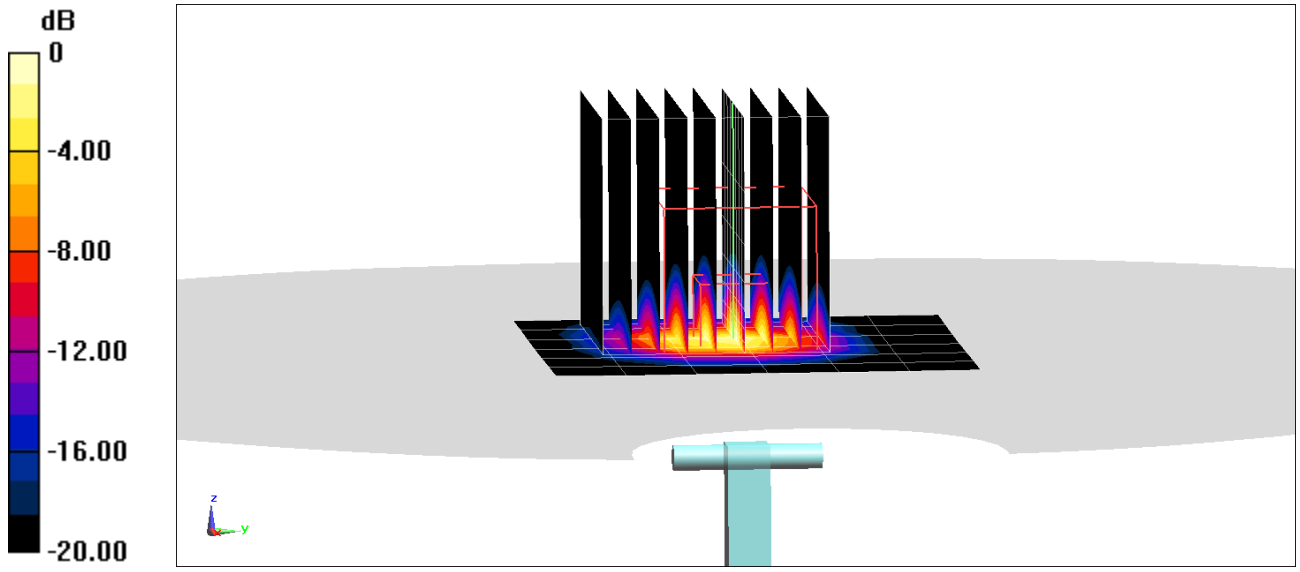
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5200-5800 Body Medium parameters used:
f = 5750 MHz; σ = 6.043 S/m; ε_r = 46.414; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02/15/2021; Ambient Temp: 23.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7406; ConvF(4.56, 4.56, 4.56) @ 5750 MHz; Calibrated: 6/23/2020
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1583; Calibrated: 5/14/2020
Phantom: Front; Type: QD 000 P40 CD; Serial: 1686
Measurement SW: DASY52, Version 52.10 (4);SEMCAD X Version 14.6.14 (7483)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (9x9x8)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 16.3 W/kg
SAR(1 g) = 3.56 W/kg; SAR(10 g) = 0.975 W/kg
Deviation(1 g) = -4.94%; Deviation(10 g) = -6.25%



0 dB = 9.10 W/kg = 9.59 dBW/kg

APPENDIX C: SAR TISSUE SPECIFICATIONS

Measurement Procedure for Tissue verification:

1) The network analyzer and probe system was configured and calibrated.
2) The probe was immersed in the tissue. The tissue was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
3) The complex admittance with respect to the probe aperture was measured
4) The complex relative permittivity ε_r' can be calculated from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\varepsilon_r\varepsilon_0}{\left[\ln(b/a)\right]^2}\int_a^b\int_a^b\int_0^\pi \cos\phi' \frac{\exp\left[-j\omega r(\mu_0\varepsilon_r'\varepsilon_0)^{1/2}\right]}{r} d\phi' d\rho' d\rho$$

where Y is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively, $r^2 = \rho^2 + \rho'^2 - 2\rho\rho'\cos\phi'$, ω is the angular frequency, and $j = \sqrt{-1}$.

3 Composition / Information on ingredients

3.2 Mixtures
Description: Aqueous solution with surfactants and inhibitors
Declarable, or hazardous components:

CAS: 107-21-1 EINECS: 203-473-3 Reg.nr.: 01-2119456816-28-0000	**Ethanediol** STOT RE 2, H373; Acute Tox. 4, H302	>1.0-4.9%
CAS: 68608-26-4 EINECS: 271-781-5 Reg.nr.: 01-2119527859-22-0000	**Sodium petroleum sulfonate** Eye Irrit. 2, H319	< 2.9%
CAS: 107-41-5 EINECS: 203-489-0 Reg.nr.: 01-2119539582-35-0000	**Hexylene Glycol / 2-Methyl-pentane-2,4-diol** Skin Irrit. 2, H315; Eye Irrit. 2, H319	< 2.9%
CAS: 68920-66-1 NLP: 500-236-9 Reg.nr.: 01-2119489407-26-0000	**Alkoxylated alcohol, > C_{16}** Aquatic Chronic 2, H411; Skin Irrit. 2, H315; Eye Irrit. 2, H319	< 2.0%

Additional information:

Not mentioned CAS-, EINECS- or registration numbers are to be regarded as Proprietary/Confidential. The specific chemical identity and/or exact percentage concentration of proprietary components is withheld as a trade secret.

Figure C-1

Note: Liquid recipes are proprietary SPEAG. Since the composition is approximate to the actual liquids utilized, the manufacturer tissue-equivalent liquid data sheets are provided below.

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Measurement Certificate / Material Test

Item Name	**Body Tissue Simulating Liquid (MBBL600-6000V6)**
Product No.	SL AAM U16 BC (Batch: 200803-1)
Manufacturer	SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated DAK probe.

Target Parameters

Target parameters as defined in the KDB 865664 compliance standard.

Test Condition

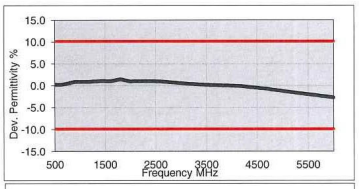
Ambient Condition	22°C ; 30% humidity
TSL Temperature	22°C
Test Date	6-Aug-20
Operator	CL

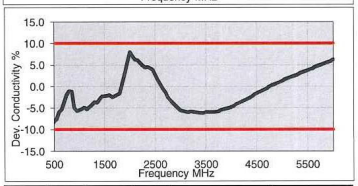
Additional Information

TSL Density
TSL Heat-capacity

Results

	Measured			Target		Diff.to Target [%]	
f [MHz]	e'	e''	sigma	eps	sigma	Δ-eps	Δ-sigma
600	56.3	26.8	0.89	56.1	0.95	0.3	-6.3
750	55.8	22.6	0.94	55.5	0.96	0.5	-2.1
800	55.7	21.6	0.96	55.3	0.97	0.7	-1.0
825	55.7	21.1	0.97	55.2	0.98	0.8	-1.0
835	55.7	20.9	0.98	55.1	0.99	1.0	-0.5
850	55.6	20.7	0.98	55.2	0.99	0.8	-1.0
900	55.5	19.9	1.00	55.0	1.05	0.9	-4.8
1400	54.7	15.9	1.24	54.1	1.28	1.1	-3.1
1450	54.6	15.8	1.27	54.0	1.30	1.1	-2.3
1600	54.4	15.3	1.36	53.8	1.39	1.1	-2.2
1625	54.4	15.3	1.38	53.8	1.41	1.2	-2.1
1640	54.4	15.2	1.39	53.7	1.42	1.3	-2.1
1650	54.3	15.2	1.39	53.7	1.43	1.1	-2.8
1700	54.2	15.1	1.43	53.6	1.46	1.2	-2.1
1750	54.2	15.0	1.46	53.4	1.49	1.4	-2.0
1800	54.1	14.9	1.50	53.3	1.52	1.5	-1.3
1810	54.1	14.9	1.51	53.3	1.52	1.5	-0.7
1825	54.1	14.9	1.52	53.3	1.52	1.5	0.0
1850	54.0	14.9	1.53	53.3	1.52	1.3	0.7
1900	54.0	14.8	1.57	53.3	1.52	1.3	3.3
1950	53.9	14.8	1.60	53.3	1.52	1.1	5.3
2000	53.8	14.8	1.64	53.3	1.52	0.9	7.9
2050	53.8	14.7	1.68	53.2	1.57	1.1	7.0
2100	53.7	14.7	1.72	53.2	1.62	1.0	6.2
2150	53.7	14.7	1.76	53.1	1.66	1.1	6.0
2200	53.6	14.7	1.80	53.0	1.71	1.1	5.3
2250	53.5	14.8	1.85	53.0	1.76	1.0	5.1
2300	53.5	14.8	1.89	52.9	1.81	1.1	4.4
2350	53.4	14.8	1.94	52.8	1.85	1.1	4.9
2400	53.3	14.8	1.98	52.8	1.90	1.0	4.2
2450	53.3	14.9	2.03	52.7	1.95	1.1	4.1
2500	53.2	14.9	2.07	52.6	2.02	1.1	2.5
2550	53.1	15.0	2.12	52.6	2.09	1.0	1.4
2600	53.0	15.0	2.17	52.5	2.16	0.9	0.5





3500	51.4	16.0	3.11	51.3	3.31	0.2	-6.0
3700	51.1	16.2	3.34	51.1	3.55	0.1	-5.9
5200	48.3	18.7	5.42	49.0	5.30	-1.5	2.3
5250	48.2	18.8	5.50	49.0	5.36	-1.6	2.5
5300	48.1	18.9	5.57	48.9	5.42	-1.7	2.8
5500	47.7	19.2	5.86	48.6	5.65	-2.0	3.8
5600	47.5	19.3	6.01	48.5	5.77	-2.1	4.2
5700	47.3	19.4	6.16	48.3	5.88	-2.3	4.8
5800	47.0	19.6	6.32	48.2	6.00	-2.4	5.3
6000	46.6	19.8	6.62	47.9	6.23	-2.7	6.3
6500							
7000							
7500							
8000							
8500							
9000							
9500							
10000							

Figure C-2
600 – 5800 MHz Body Tissue Equivalent Matter

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Measurement Certificate / Material Test

Item Name	**Head Tissue Simulating Liquid (HBBL600-10000V6)**
Product No.	SL AAH U16 BC (Batch: 200805-4)
Manufacturer	SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated DAK probe.

Target Parameters

Target parameters as defined in the IEEE 1528 and IEC 62209 compliance standards.

Test Condition

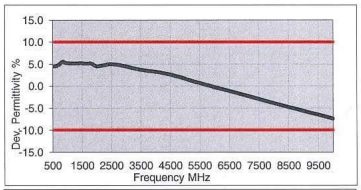
Ambient Condition	22°C ; 30% humidity
TSL Temperature	22°C
Test Date	6-Aug-20
Operator	CL

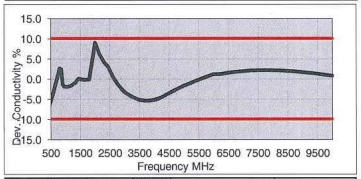
Additional Information

TSL Density
TSL Heat-capacity

Results

	Measured			Target		Diff.to Target [%]	
f [MHz]	ε'	ε''	sigma	eps	sigma	Δ-eps	Δ-sigma
600	44.7	25.7	0.86	42.7	0.88	4.6	-2.5
750	44.1	21.7	0.90	41.9	0.89	5.1	0.7
800	44.0	20.7	0.92	41.7	0.90	5.6	2.5
825	43.9	20.3	0.93	41.6	0.91	5.6	2.6
835	43.9	20.1	0.94	41.5	0.91	5.7	3.1
850	43.8	19.9	0.94	41.5	0.92	5.5	2.6
900	43.7	19.1	0.96	41.5	0.97	5.3	-1.0
1400	42.7	15.1	1.18	40.6	1.18	5.2	0.0
1450	42.6	14.9	1.20	40.5	1.20	5.2	0.0
1600	42.4	14.4	1.28	40.3	1.28	5.2	-0.3
1625	42.4	14.4	1.30	40.3	1.30	5.3	0.1
1640	42.4	14.3	1.31	40.3	1.31	5.3	0.3
1650	42.3	14.3	1.31	40.2	1.31	5.1	-0.2
1700	42.2	14.2	1.34	40.2	1.34	5.1	-0.2
1750	42.2	14.1	1.37	40.1	1.37	5.3	-0.1
1800	42.1	14.0	1.40	40.0	1.40	5.3	0.0
1810	42.1	14.0	1.41	40.0	1.40	5.3	0.7
1825	42.1	13.9	1.42	40.0	1.40	5.3	1.4
1850	42.0	13.9	1.43	40.0	1.40	5.0	2.1
1900	41.9	13.8	1.46	40.0	1.40	4.7	4.3
1950	41.9	13.8	1.49	40.0	1.40	4.7	6.4
2000	41.8	13.7	1.53	40.0	1.40	4.5	9.3
2050	41.7	13.7	1.56	39.9	1.44	4.5	8.0
2100	41.7	13.7	1.60	39.8	1.49	4.7	7.5
2150	41.6	13.6	1.63	39.7	1.53	4.7	6.3
2200	41.5	13.6	1.67	39.6	1.58	4.7	5.8
2250	41.5	13.6	1.70	39.6	1.62	4.9	4.8
2300	41.4	13.6	1.74	39.5	1.67	4.9	4.4
2350	41.3	13.6	1.78	39.4	1.71	4.9	4.0
2400	41.2	13.6	1.82	39.3	1.76	4.9	3.7
2450	41.2	13.6	1.85	39.2	1.80	5.1	2.8
2500	41.1	13.6	1.89	39.1	1.85	5.0	1.9
2550	41.0	13.7	1.94	39.1	1.91	4.9	1.6
2600	40.9	13.7	1.98	39.0	1.96	4.8	0.8





3500	39.4	14.2	2.77	37.9	2.91	3.7	-5.1
3700	39.0	14.3	2.95	37.7	3.12	3.5	-5.3
5200	36.4	15.9	4.61	36.0	4.66	1.3	-1.0
5250	36.4	16.0	4.67	35.9	4.71	1.2	-0.9
5300	36.3	16.0	4.72	35.9	4.76	1.1	-0.7
5500	35.9	16.2	4.96	35.6	4.96	0.7	-0.1
5600	35.7	16.3	5.07	35.5	5.07	0.5	0.2
5700	35.5	16.4	5.19	35.4	5.17	0.3	0.4
5800	35.4	16.5	5.31	35.3	5.27	0.1	0.7
6000	35.0	16.6	5.54	35.1	5.48	-0.2	1.2
6500	34.1	17.1	6.17	34.5	6.07	-1.1	1.6
7000	33.2	17.4	6.78	33.9	6.65	-2.0	2.0
7500	32.3	17.7	7.40	33.3	7.24	-2.9	2.2
8000	31.5	18.0	8.01	32.7	7.84	-3.8	2.2
8500	30.6	18.2	8.63	32.1	8.45	-4.7	2.1
9000	29.8	18.4	9.24	31.5	9.08	-5.6	1.8
9500	29.0	18.6	9.84	31.0	9.71	-6.5	1.3
10000	28.1	18.8	10.44	30.4	10.36	-7.4	0.8

Figure C-3
600 – 5800 MHz Head Tissue Equivalent Matter

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APPENDIX D: SAR SYSTEM VALIDATION

Per FCC KDB Publication 865664 D02v01r02, SAR system validation status should be documented to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles were used with the required tissue- equivalent media for system validation, according to the procedures outlined in FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013. Since SAR probe calibrations are frequency dependent, each probe calibration point was validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

A tabulated summary of the system validation status including the validation date(s), measurement frequencies, SAR probes and tissue dielectric parameters has been included.

Table D-1
SAR System Validation Summary – 1g

SAR System	Freq. (MHz)	Date	Probe SN	Probe Cal Point		Cond. (σ)	Perm. (εr)	CW VALIDATION			MOD. VALIDATION		
								SENSITIVITY	PROBE LINEARITY	PROBE ISOTROPY	MOD. TYPE	DUTY FACTOR	PAR
H	750	12/22/2020	7357	750	Head	0.881	42.984	PASS	PASS	PASS	N/A	N/A	N/A
P	835	09/10/2020	7308	835	Head	0.936	43.187	PASS	PASS	PASS	GMSK	PASS	N/A
D	835	02/02/2021	3589	835	Head	0.927	41.192	PASS	PASS	PASS	GMSK	PASS	N/A
H	1900	05/12/2020	7357	1900	Head	1.456	38.734	PASS	PASS	PASS	GMSK	PASS	N/A
E	2450	01/07/2021	7571	2450	Head	1.847	39.716	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
H	5250	05/07/2020	7357	5250	Head	4.644	35.124	PASS	PASS	PASS	OFDM	N/A	PASS
H	5600	05/07/2020	7357	5600	Head	5.030	34.514	PASS	PASS	PASS	OFDM	N/A	PASS
H	5750	05/07/2020	7357	5750	Head	5.207	34.257	PASS	PASS	PASS	OFDM	N/A	PASS
P	750	09/04/2020	7308	750	Body	0.937	54.916	PASS	PASS	PASS	N/A	N/A	N/A
I	835	02/14/2021	7551	835	Body	0.955	53.517	PASS	PASS	PASS	GMSK	PASS	N/A
E	835	03/04/2021	7571	835	Body	0.943	54.669	PASS	PASS	PASS	GMSK	PASS	N/A
J	1900	12/03/2020	7410	1900	Body	1.561	52.634	PASS	PASS	PASS	GMSK	PASS	N/A
K	2450	07/07/2020	7409	2450	Body	2.018	51.176	PASS	PASS	PASS	OFDM/TDD	PASS	PASS
G	5250	11/02/2020	7406	5250	Body	5.533	47.077	PASS	PASS	PASS	OFDM	N/A	PASS
G	5600	11/02/2020	7406	5600	Body	6.006	46.433	PASS	PASS	PASS	OFDM	N/A	PASS
G	5750	11/02/2020	7406	5750	Body	6.210	46.185	PASS	PASS	PASS	OFDM	N/A	PASS

Table D-2
SAR System Validation Summary – 10g

SAR System	Freq. (MHz)	Date	Probe SN	Probe Cal Point		Cond. (σ)	Perm. (εr)	CW VALIDATION			MOD. VALIDATION		
								SENSITIVITY	PROBE LINEARITY	PROBE ISOTROPY	MOD. TYPE	DUTY FACTOR	PAR
J	1900	12/03/2020	7410	1900	Body	1.561	52.634	PASS	PASS	PASS	GMSK	PASS	N/A
G	5250	11/02/2020	7406	5250	Body	5.533	47.077	PASS	PASS	PASS	OFDM	N/A	PASS
G	5600	11/02/2020	7406	5600	Body	6.006	46.433	PASS	PASS	PASS	OFDM	N/A	PASS
G	5750	11/02/2020	7406	5750	Body	6.210	46.185	PASS	PASS	PASS	OFDM	N/A	PASS

NOTE: While the probes have been calibrated for both CW and modulated signals, all measurements were performed using communication systems calibrated for CW signals only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664 D01v01r04 for scenarios when CW probe calibrations are used with other signal types. SAR systems were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5 dB), such as OFDM according to FCC KDB Publication 865664 D01v01r04.

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APPENDIX F POWER REDUCTION VERIFICATION

Per the May 2017 TCBC Workshop Notes, demonstration of proper functioning of the power reduction mechanisms is required to support the corresponding SAR configurations. The verification process was divided into two parts: (1) evaluation of output power levels for individual or multiple triggering mechanisms and (2) evaluation of the triggering distances for proximity-based sensors.

F.1 Power Verification Procedure

The power verification was performed according to the following procedure:

1. A base station simulator was used to establish a conducted RF connection and the output power was monitored. The power measurements were confirmed to be within expected tolerances for all states before and after a power reduction mechanism was triggered.

2. Step 1 was repeated for all relevant modes and frequency bands for the mechanism being investigated.

3. Steps 1 and 2 were repeated for all individual power reduction mechanisms and combinations thereof. For the combination cases, one mechanism was switched to a 'triggered' state at a time; powers were confirmed to be within tolerances after each additional mechanism was activated.

F.2 Distance Verification Procedure

The distance verification procedure was performed according to the following procedure:

1. A base station simulator was used to establish an RF connection and to monitor the power levels. The device being tested was placed below the relevant section of the phantom with the relevant side or edge of the device facing toward the phantom.

2. The device was moved toward and away from the phantom to determine the distance at which the mechanism triggers and the output power is reduced, per KDB Publication 616217 D04v01r02 and FCC Guidance. Each applicable test position was evaluated. The distances were confirmed to be the same or larger (more conservative) than the minimum distances provided by the manufacturer.

3. Steps 1 and 2 were repeated for low, mid, and high bands, as appropriate (see note below Table F-2 for more details).

4. Steps 1 through 3 were repeated for all distance-based power reduction mechanisms.

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F.3 Main Antenna Verification Summary

Table F-1
Power Measurement Verification for Main Antenna

Mechanism(s)		Mode/Band	Conducted Power (dBm)		
1st	2nd		Un-triggered (Max)	Mechanism #1 (Reduced)	Mechanism #2 (Reduced)
Hotspot On		GPRS 1900 2 Tx Slot	27.09	25.95	
Hotspot On	Grip	GPRS 1900 2 Tx Slot	26.91	25.94	25.94
Grip		GPRS 1900 2 Tx Slot	26.94	25.89	
Grip	Hotspot On	GPRS 1900 2 Tx Slot	26.96	25.83	25.80

Table F-2
Distance Measurement Verification for Main Antenna

Mechanism(s)	Test Condition	Band	Distance Measurements (mm)		Minimum Distance per Manufacturer (mm)
			Moving Toward	Moving Away	
Grip	Phablet - Back Side	Mid	12	14	10
Grip	Phablet - Front Side	Mid	8	10	6
Grip	Phablet - Bottom Edge	Mid	9	11	8

*Note: Mid band refers to: GSM1900

F.4 WIFI Verification Summary

Table F-3
Power Measurement Verification WIFI

Mechanism(s)	Mode/Band	Conducted Power (dBm)	
1st		Un-triggered (Max)	Mechanism #1 (Reduced)
Held-to-Ear	802.11b	17.78	15.89
Held-to-Ear	802.11g	15.69	14.77
Held-to-Ear	802.11n (2.4GHz)	15.63	14.60
Held-to-Ear	802.11a	15.69	12.65
Held-to-Ear	802.11n (5GHz, 20MHz BW)	16.78	13.18
Held-to-Ear	802.11ac (20MHz BW)	15.50	13.12
Held-to-Ear	802.11n (5GHz, 40MHz BW)	14.43	13.44
Held-to-Ear	802.11ac (40MHz BW)	13.80	12.78

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APPENDIX G: PROBE AND DIPOLE CALIBRATION CERTIFICATES

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Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client PC Test

Certificate No: D750V3-1003_Mar20

CALIBRATION CERTIFICATE

Object D750V3 - SN:1003

Calibration procedure(s) QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: March 16, 2020

BN ✓
04/30/2020

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 7349	31-Dec-19 (No. EX3-7349_Dec19)	Dec-20
DAE4	SN: 601	27-Dec-19 (No. DAE4-601_Dec19)	Dec-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-19)	In house check: Oct-20

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 16, 2020

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.5 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.17 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.78 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.77 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.7 ± 6 %	0.96 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.16 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.61 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.42 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.67 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.9 Ω - 0.1 jΩ
Return Loss	- 26.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.8 Ω - 2.4 jΩ
Return Loss	- 30.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.043 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 16.03.2020

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1003

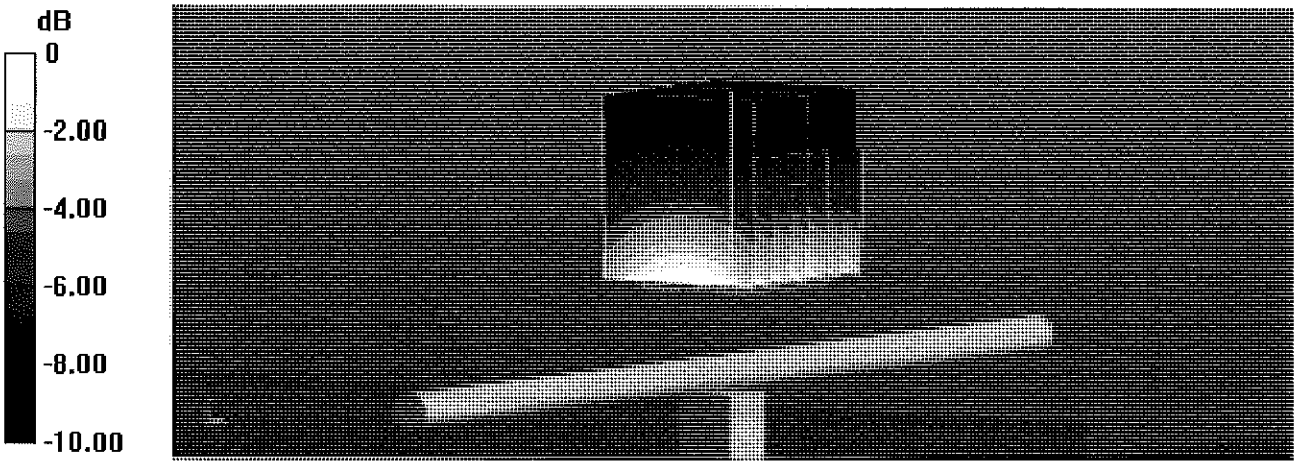
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.88 S/m; ε_r = 42.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.07, 10.07, 10.07) @ 750 MHz; Calibrated: 31.12.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

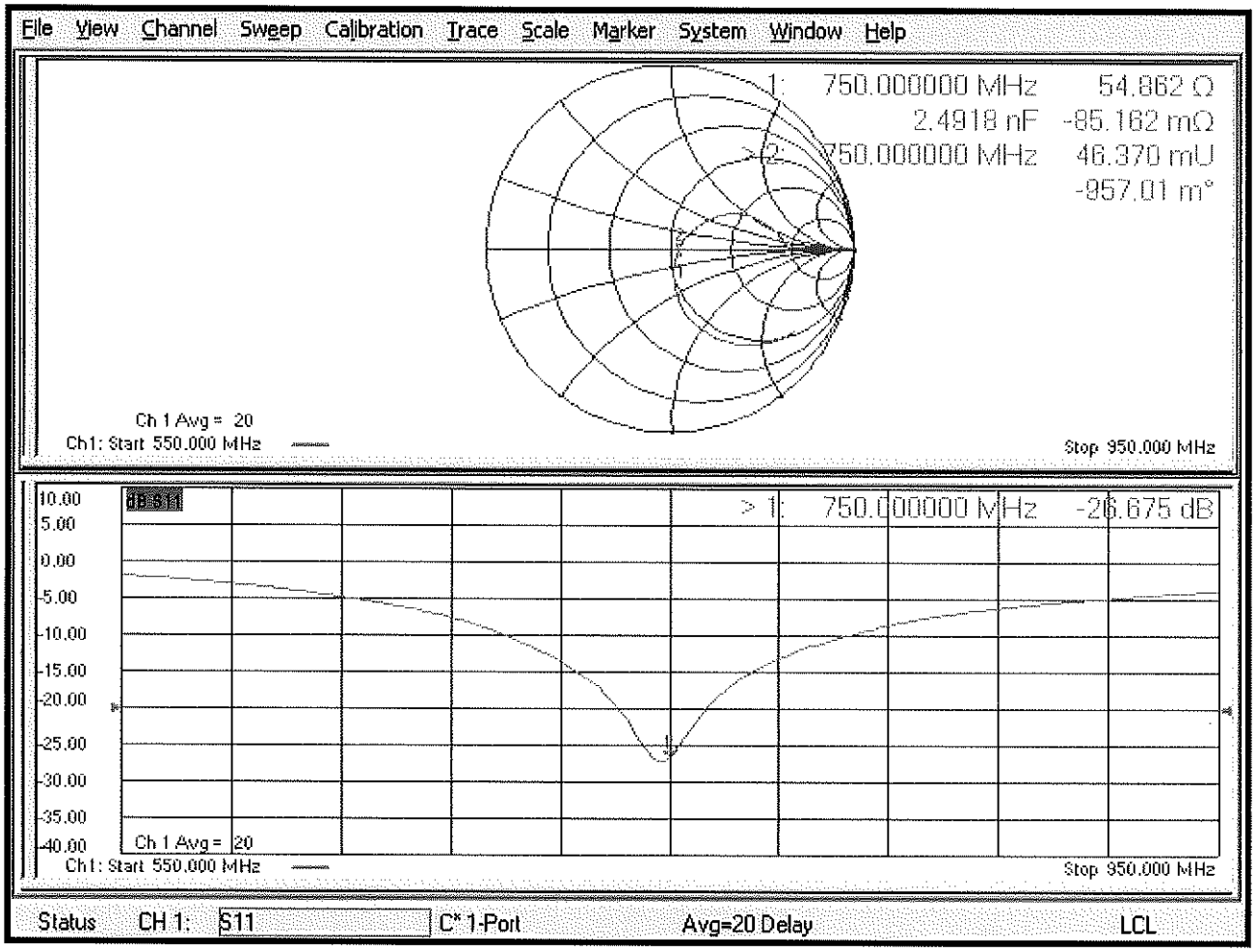
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.72 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.27 W/kg
SAR(1 g) = 2.17 W/kg; SAR(10 g) = 1.43 W/kg
Smallest distance from peaks to all points 3 dB below = 16.5 mm
Ratio of SAR at M2 to SAR at M1 = 66.2%
Maximum value of SAR (measured) = 2.90 W/kg



0 dB = 2.90 W/kg = 4.62 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.03.2020

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1003

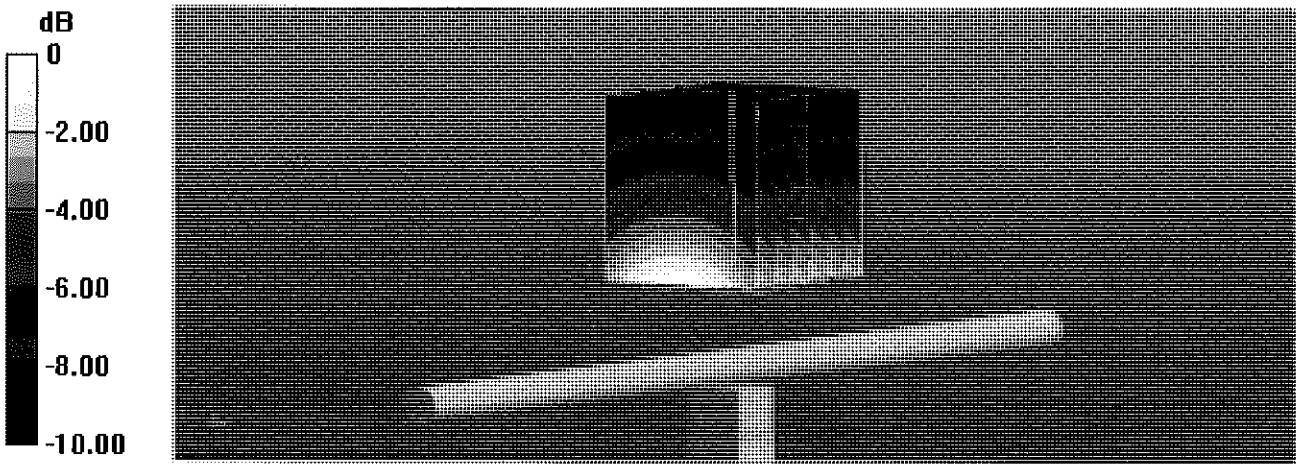
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.96 S/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.61, 10.61, 10.61) @ 750 MHz; Calibrated: 31.12.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.12.2019
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.60 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 3.23 W/kg
SAR(1 g) = 2.16 W/kg; SAR(10 g) = 1.42 W/kg
Smallest distance from peaks to all points 3 dB below = 21.2 mm
Ratio of SAR at M2 to SAR at M1 = 66.6%
Maximum value of SAR (measured) = 2.87 W/kg



0 dB = 2.87 W/kg = 4.58 dBW/kg

Impedance Measurement Plot for Body TSL