



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:

01/04/17 – 04/06/17

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Document Serial No.:

1M1702210070-01-R1.A3L

FCC ID:

A3LSC03J

APPLICANT:

SAMSUNG ELECTRONICS CO., LTD.

DUT Type:

Portable Handset

Application Type:

Certification

FCC Rule Part(s):

CFR §2.1093

Model:

SC-03J

Equipment Class	Band & Mode	Tx Frequency	SAR			
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)	10 gm Phablet (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.16	0.30	0.83	N/A
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	< 0.1	0.24	1.07	2.66
PCE	UMTS 850	826.40 - 846.60 MHz	0.20	0.30	0.64	N/A
PCE	LTE Band 12	699.7 - 715.3 MHz	0.12	0.18	0.30	N/A
PCE	LTE Band 17	706.5 - 713.5 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 13	779.5 - 784.5 MHz	< 0.1	0.21	0.44	N/A
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.14	0.19	0.39	N/A
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	0.11	0.49	0.63	N/A
PCE	LTE Band 41	2498.5 - 2687.5 MHz	< 0.1	0.20	0.78	N/A
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.46	0.20	0.37	N/A
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	N/A	N/A
NII	U-NII-2A	5260 - 5320 MHz	0.22	0.12	N/A	1.05
NII	U-NII-2C	5500 - 5720 MHz	0.34	0.40	N/A	1.50
NII	U-NII-3	5745 - 5825 MHz	0.54	0.22	0.39	N/A
DSS/DTS	Bluetooth	2402 - 2480 MHz	0.10	< 0.1	< 0.1	0.68
Simultaneous SAR per KDB 690783 D01v01r03:			1.54	1.18	1.59	2.66

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.

Note: This revised Test Report (S/N: 1M1702210070-01-R1.A3L) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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 Manufacturers Forum (MMF). While a product may be considered eligible, use of the SAR Tick logo requires an agreement with the MMF. Further details can be obtained by emailing: SARTICK@MMFAI.INFO.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 1 of 76

T A B L E O F C O N T E N T S

1	DEVICE UNDER TEST	3
2	LTE INFORMATION	12
3	INTRODUCTION	13
4	DOSIMETRIC ASSESSMENT	14
5	DEFINITION OF REFERENCE POINTS	15
6	TEST CONFIGURATION POSITIONS	16
7	RF EXPOSURE LIMITS	20
8	FCC MEASUREMENT PROCEDURES	21
9	RF CONDUCTED POWERS	26
10	SYSTEM VERIFICATION	46
11	SAR DATA SUMMARY	50
12	FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS	64
13	SAR MEASUREMENT VARIABILITY	70
14	ADDITIONAL TESTING PER FCC GUIDANCE	71
15	EQUIPMENT LIST	72
16	MEASUREMENT UNCERTAINTIES	73
17	CONCLUSION	74
18	REFERENCES	75
APPENDIX A: SAR TEST PLOTS		
APPENDIX B: SAR DIPOLE VERIFICATION PLOTS		
APPENDIX C: PROBE AND DIPOLE CALIBRATION CERTIFICATES		
APPENDIX D: SAR TISSUE SPECIFICATIONS		
APPENDIX E: SAR SYSTEM VALIDATION		
APPENDIX F: DUT ANTENNA DIAGRAM & SAR TEST SETUP PHOTOGRAPHS		
APPENDIX G: CONDUCTED POWERS FOR 4X4 DL MIMO		

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 2 of 76

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 17	Voice/Data	706.5 - 713.5 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2462 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
ANT+	Data	2402 - 2480 MHz
MST	Data	555Hz - 8.33 kHz

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. All hotspot SAR evaluations for this device were performed at the maximum allowed output power when hotspot is enabled. 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.

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.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 3 of 76

1.3.1 Maximum PCE Power

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (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
GSM/GPRS/EDGE 850	Maximum	33.0	33.0	31.5	29.8	27.8	27.0	25.5	24.0	23.0
	Nominal	32.5	32.5	31.0	29.3	27.3	26.5	25.0	23.5	22.5
GSM/GPRS/EDGE 1900	Maximum	30.0	30.0	28.5	26.5	25.0	25.7	24.7	22.7	21.3
	Nominal	29.5	29.5	28.0	26.0	24.5	25.2	24.2	22.2	20.8

Mode / Band		Modulated Average (dBm)		
		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA
UMTS Band 5 (850 MHz)	Maximum	24.5	23.5	23.5
	Nominal	24.0	23.0	23.0

Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	23.5
	Nominal	23.0
LTE Band 17	Maximum	23.5
	Nominal	23.0
LTE Band 13	Maximum	24.0
	Nominal	23.5
LTE Band 5 (Cell)	Maximum	23.5
	Nominal	23.0
LTE Band 4 (AWS)	Maximum	23.0
	Nominal	22.5
LTE Band 41	Maximum	24.0
	Nominal	23.5

1.3.2 Reduced PCE Power – Hotspot Mode

Mode / Band		Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots
GSM/GPRS/EDGE 1900	Maximum	28.0	27.0	25.0	23.0	25.7	24.7	22.7	21.3
	Nominal	27.5	26.5	24.5	22.5	25.2	24.2	22.2	20.8

Mode / Band		Modulated Average (dBm)
LTE Band 4 (AWS)	Maximum	20.5
	Nominal	20.0

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 4 of 76

1.3.3 Maximum Bluetooth and SISO and MIMO WLAN Power

Mode / Band		Modulated Average - Single Tx Chain (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	20.5
	Nominal	20.0
IEEE 802.11g (2.4 GHz)	Maximum	17.5
	Nominal	17.0
IEEE 802.11n (2.4 GHz)	Maximum	16.5
	Nominal	16.0

Mode / Band		Modulated Average - Single Tx Chain (dBm)		
		20 MHz Bandwidth	40 MHz Bandwidth	80 MHz Bandwidth
IEEE 802.11a (5 GHz)	Maximum	15.5		
	Nominal	15.0		
IEEE 802.11n (5 GHz)	Maximum	15.5	15.5	
	Nominal	15.0	15.0	
IEEE 802.11ac (5 GHz)	Maximum	15.5	15.5	15.5
	Nominal	15.0	15.0	15.0

Mode / Band		Modulated Average - MIMO (dBm)	
		20 MHz Bandwidth	
		Ch. 1-10	Ch. 11
IEEE 802.11g (2.4 GHz)	Maximum	20.5	19.5
	Nominal	20.0	19.0
IEEE 802.11n (2.4 GHz)	Maximum	19.5	
	Nominal	19.0	

Mode / Band		Modulated Average - MIMO (dBm)		
		20 MHz Bandwidth	40 MHz Bandwidth	80 MHz Bandwidth
IEEE 802.11a (5 GHz)	Maximum	18.5		
	Nominal	18.0		
IEEE 802.11n (5 GHz)	Maximum	18.5	18.5	
	Nominal	18.0	18.0	
IEEE 802.11ac (5 GHz)	Maximum	18.5	18.5	18.5
	Nominal	18.0	18.0	18.0

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset	Page 5 of 76	

Mode / Band		Modulated Average - Single Tx Chain (dBm)
Bluetooth (1Mbps)	Maximum	16.0
	Nominal	15.5
Bluetooth (EDR)	Maximum	10.0
	Nominal	9.5
Bluetooth LE	Maximum	8.5
	Nominal	8.0

1.3.4 Reduced SISO and MIMO WLAN Power

Mode / Band		Modulated Average - Single Tx Chain (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	16.5
	Nominal	16.0
IEEE 802.11g (2.4 GHz)	Maximum	16.5
	Nominal	16.0
IEEE 802.11n (2.4 GHz)	Maximum	16.5
	Nominal	16.0

Mode / Band		Modulated Average - Single Tx Chain (dBm)		
		20 MHz Bandwidth	40 MHz Bandwidth	80 MHz Bandwidth
IEEE 802.11a (5 GHz)	Maximum	13.5		
	Nominal	13.0		
IEEE 802.11n (5 GHz)	Maximum	13.5	13.5	
	Nominal	13.0	13.0	
IEEE 802.11ac (5 GHz)	Maximum	13.5	13.5	13.5
	Nominal	13.0	13.0	13.0

Mode / Band		Modulated Average - MIMO (dBm)		
		20 MHz Bandwidth	40 MHz Bandwidth	80 MHz Bandwidth
IEEE 802.11g (2.4 GHz)	Maximum	19.5		
	Nominal	19.0		
IEEE 802.11n (2.4 GHz)	Maximum	19.5		
	Nominal	19.0		
IEEE 802.11a (5 GHz)	Maximum	16.5		
	Nominal	16.0		
IEEE 802.11n (5 GHz)	Maximum	16.5	16.5	
	Nominal	16.0	16.0	
IEEE 802.11ac (5 GHz)	Maximum	16.5	16.5	16.5
	Nominal	16.0	16.0	16.0

FCC ID: A3LSC03J		SAR EVALUATION REPORT			Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset			Page 6 of 76

1.3.5 Maximum Powers During Conditions with Simultaneous 2.4 GHz and 5 GHz WLAN

	# Tx	5 GHz WIFI [dBm]		2.4 GHz WIFI [dBm]		802.11 Modes
		Ant1	Ant2	Ant1	Ant2	
2.4 GHz + 5 GHz	2	A	-	-	B	2.4 GHz: b,g,n 5 GHz: a,n,ac
	2	-	A	B	-	
	2	A	-	B	-	
	2	-	A	-	B	
	3	A	A	B	-	2.4 GHz: b, g, n 5 GHz: n, ac, a (CDD + STBC only)
	3	A	A	-	B	
	3	A	-	B	B	2.4 GHz: n, g (CDD + STBC only) 5 GHz: a, n, ac
	3	-	A	B	B	
	4	A	A	B	B	2.4 GHz: n, g (CDD + STBC only) 5 GHz: n, ac, a (CDD + STBC only)

A = 13 dBm

B = 13 dBm

(Upper tolerance: target + 0.5 dB)

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 7 of 76

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 F. 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	Yes
GPRS 1900	Yes	Yes	No	Yes	Yes	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	Yes
LTE Band 12	Yes	Yes	No	Yes	Yes	Yes
LTE Band 13	Yes	Yes	No	Yes	Yes	Yes
LTE Band 5 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 4 (AWS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 41	Yes	Yes	No	Yes	No	Yes
2.4 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
2.4 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 2	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 F.

1.6 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 1-1 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

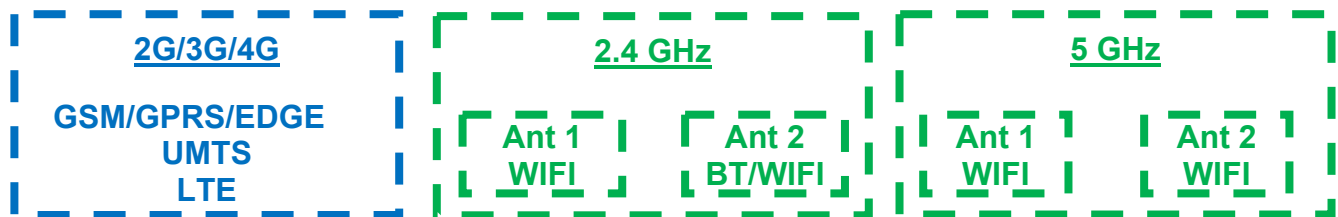


Figure 1-1
Simultaneous Transmission Paths

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.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 8 of 76

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 Wi-Fi + 5 GHz Wi-Fi	Yes	Yes	N/A	Yes	
4	GSM voice + 2.4 GHz Bluetooth	Yes^	Yes	N/A	Yes	'BT Tethering Applications are considered.
5	GSM voice + 2.4 GHz Wi-Fi MIMO	Yes	Yes	N/A	Yes	
6	GSM voice + 5 GHz Wi-Fi MIMO	Yes	Yes	N/A	Yes	
7	GSM voice + 2.4 GHz Wi-Fi MIMO + 5 GHz Wi-Fi MIMO	Yes	Yes	N/A	Yes	
8	UMTS + 2.4 GHz Wi-Fi	Yes	Yes	Yes	Yes	
9	UMTS + 5 GHz Wi-Fi	Yes	Yes	Yes	Yes	
10	UMTS + 2.4 GHz Wi-Fi + 5 GHz Wi-Fi	Yes	Yes	Yes	Yes	
11	UMTS + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	'BT Tethering Applications are considered.
12	UMTS + 2.4 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
13	UMTS + 5 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
14	UMTS + 2.4 GHz Wi-Fi MIMO + 5 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
15	LTE + 2.4 GHz Wi-Fi	Yes	Yes	Yes	Yes	
16	LTE + 5 GHz Wi-Fi	Yes	Yes	Yes	Yes	
17	LTE + 2.4 GHz Wi-Fi + 5 GHz Wi-Fi	Yes	Yes	Yes	Yes	
18	LTE + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	'BT Tethering Applications are considered.
19	LTE + 2.4 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
20	LTE + 5 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
21	LTE + 2.4 GHz Wi-Fi MIMO + 5 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
22	GPRS/EDGE + 2.4 GHz Wi-Fi	N/A	N/A	Yes	Yes	
23	GPRS/EDGE + 5 GHz Wi-Fi	N/A	N/A	Yes	Yes	
24	GPRS/EDGE + 2.4 GHz Wi-Fi + 5 GHz Wi-Fi	N/A	N/A	Yes	Yes	
25	GPRS/EDGE + 2.4 GHz Bluetooth	N/A	N/A	Yes^	Yes	'BT Tethering Applications are considered.
26	GPRS/EDGE + 2.4 GHz Wi-Fi MIMO	N/A	N/A	Yes	Yes	
27	GPRS/EDGE + 5 GHz Wi-Fi MIMO	N/A	N/A	Yes	Yes	
28	GPRS/EDGE + 2.4 GHz Wi-Fi MIMO + 5 GHz Wi-Fi MIMO	N/A	N/A	Yes	Yes	

- Bluetooth cannot transmit simultaneously with WLAN.
- All licensed modes share the same antenna path and cannot transmit simultaneously.
- 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.
- 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 GHz Wireless Router is only supported for the U-NII-3 by S/W, therefore U-NII-1, U-NII2A, and U-NII2C were not evaluated for wireless router conditions.
- This device supports 2x2 MIMO Tx for WLAN. 802.11a/g/n/ac supports CDD and STBC and 802.11n/ac additionally supports SDM.
- This device supports Bluetooth tethering for EDR packet only.
- This device supports VOLTE and VoWIFI.

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 1g SAR for U-NII-2A is less than 1.2 W/kg and 10g SAR is less than 3.0 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 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.

This device supports IEEE 802.11ac with the following features:

- Up to 80 MHz Bandwidth only
- No aggregate channel configurations
- 2 Tx antenna output

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 9 of 76

- 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 and 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.

This device supports downlink 4x4 MIMO operations for LTE Band 41 only. Per FCC Guidance, SAR for downlink 4x4 MIMO was not needed since the maximum average output power in 4x4 downlink MIMO mode was not > 0.25 dB higher than the maximum output power with downlink 4x4 MIMO inactive.

This device supports both LTE B12 and LTE B17. Since the supported frequency span for LTE B17 falls completely within the supported frequency span for LTE B12, both LTE bands have the same target power, and both LTE bands share the same transmission path, SAR was only assessed for LTE B12.

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 scaled to the maximum output power (including tolerance) 1g SAR > 1.2 W/kg.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 10 of 76

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)
- 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.

	Head Serial Number	Body-Worn Serial Number	Hotspot Serial Number	Phablet Serial Number
GSM/GPRS/EDGE 850	D6A55	D6B13	D6B13	-
GSM/GPRS/EDGE 1900	24088	D6D17	D6D17	D6A57
UMTS 850	D6A55	D6B13	D6B13	-
LTE Band 12	D6B13	D6D52	D6D52	-
LTE Band 13	D6B13	D6D52	D6D52	-
LTE Band 5 (Cell)	D6A55	D6B13	D6B13	-
LTE Band 4 (AWS)	D6A57	D6A57	D6A57	-
LTE Band 41	D6D17	D6D17	D6D17	-
2.4 GHz WLAN Ant1/2	0910E	0910E	0910E	-
2.4 GHz WLAN MIMO	15965	0910E	0910E	-
5 GHz WLAN Ant 1	CE1F1	23544	23544	23544
5 GHz WLAN Ant 2	0910E	23544	23544	23544
5 GHz WLAN MIMO	-	23544	23544	-
Bluetooth	0910E	0910E	0910E	0910E

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 11 of 76

2

LTE INFORMATION

LTE Information					
FCC ID	A3LSC03J				
Form Factor	Portable Handset				
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 17 (706.5 - 713.5 MHz)				
	LTE Band 13 (779.5 - 784.5 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 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 17: 5 MHz, 10 MHz				
	LTE Band 13: 5 MHz, 10 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 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 17: 5 MHz	706.5 (23755)		710 (23790)	713.5 (23825)	
LTE Band 17: 10 MHz	709 (23780)		710 (23790)	711 (23800)	
LTE Band 13: 5 MHz	779.5 (23205)		782 (23230)	784.5 (23255)	
LTE Band 13: 10 MHz	N/A		782 (23230)	N/A	
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 4 (AWS): 1.4 MHz	1710.7 (19957)		1732.5 (20175)	1754.3 (20393)	
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)		1732.5 (20175)	1753.5 (20385)	
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)		1732.5 (20175)	1752.5 (20375)	
LTE Band 4 (AWS): 10 MHz	1715 (20000)		1732.5 (20175)	1750 (20350)	
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)		1732.5 (20175)	1747.5 (20325)	
LTE Band 4 (AWS): 20 MHz	1720 (20050)		1732.5 (20175)	1745 (20300)	
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 16 (QPSK, 16QAM, 64QAM, 256QAM) UL UE Cat 5 (QPSK, 16QAM)				
Modulations Supported in UL	QPSK, 16QAM				
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 Release 12 Additional Information	This device does not support full features on 3GPP Release 12. It supports downlink MIMO features as shown in Appendix G. All other uplink communications are identical to the Release 8 Specifications. The following LTE Release 12 Features are not supported: Carrier Aggregation, Relay, HetNet, Enhanced eCIC, WiFi Offloading, MDH, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

FCC ID: A3LSC03J		SAR EVALUATION REPORT			Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset	Page 12 of 76		

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/m³)
- 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]

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 13 of 76

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:

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.

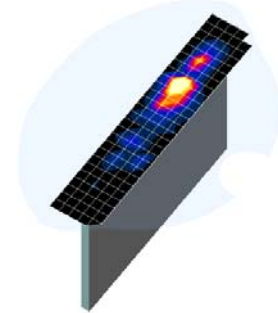


Figure 4-1
Sample SAR Area
Scan

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

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

*Also compliant to IEEE 1528-2013 Table 6

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 14 of 76

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].

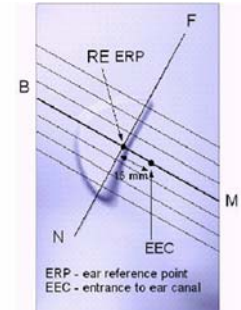


Figure 5-1
Close-Up Side view
of ERP

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 then 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

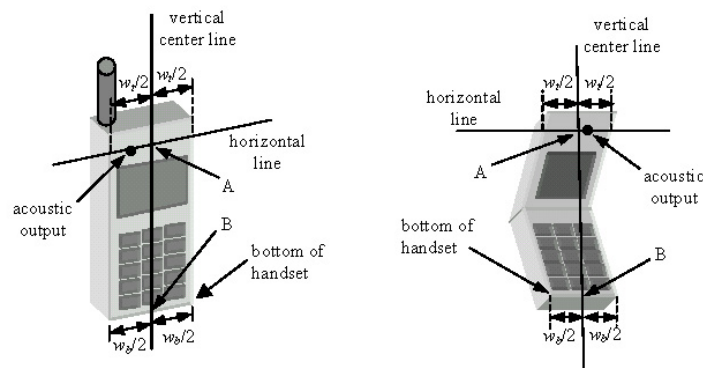


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 15 of 76

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 $\epsilon = 3$ and loss tangent $\delta = 0.02$.

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.

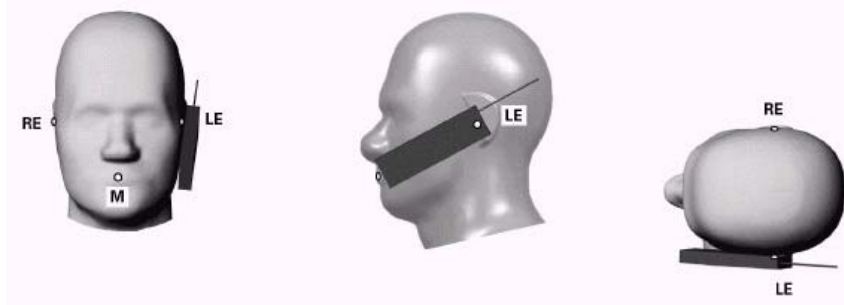


Figure 6-1 Front, Side and Top View of Cheek Position

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 with 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 / 15° Tilt

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

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15 degrees.
2. The phone was then rotated around the horizontal line by 15 degrees.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the handset touched the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. In this situation, the tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 6-2).

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset	Page 16 of 76	

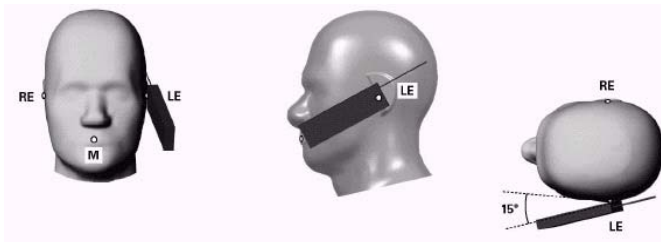


Figure 6-2 Front, Side and Top View of Ear/15° Tilt Position

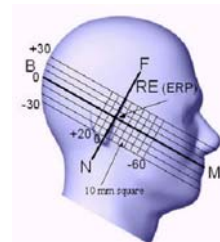


Figure 6-3 Side view w/ relevant markings

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.

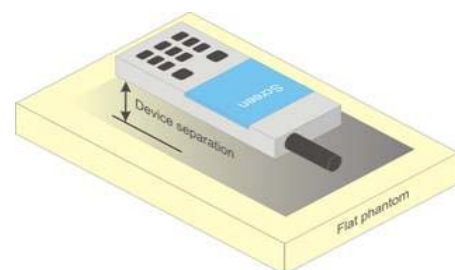


Figure 6-4 Sample Body-Worn Diagram

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 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

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 17 of 76

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 1-g body and 10-g 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 ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) 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.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 18 of 76

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 10-g SAR. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g SAR scaled to the maximum output power (including tolerance) > 1.2 W/kg.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 19 of 76

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 <i>General Population</i> (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT <i>Occupational</i> (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.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 20 of 76

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.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 21 of 76

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.

8.5 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).

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.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 22 of 76

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 ≤ 0.6 W/kg for LTE Band 41 and ≤ 0.8 W/kg for other LTE Bands, 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 $\frac{1}{2}$ dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is < 1.45 W/kg.

8.5.5 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 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.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 23 of 76

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 10-g 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 10-g 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:

- 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 10-g 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

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 24 of 76

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 10-g 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 10-g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.9 MIMO SAR considerations

Per KDB Publication 248227 D01v02r02, the simultaneous SAR provisions in KDB Publication 447498 D01v06 should be applied to determine simultaneous transmission SAR test exclusion for WIFI MIMO. If the sum of 1g single transmission chain SAR measurements is < 1.6 W/kg, no additional SAR measurements for MIMO are required. Alternatively, SAR for MIMO can be measured with all antennas transmitting simultaneously at the specified maximum output power of MIMO operation. When 10-g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 25 of 76

9 RF CONDUCTED POWERS

9.1 GSM Conducted Powers

Table 9-1
Maximum Conducted Powers

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	31.98	31.98	30.12	28.12	26.36	26.81	25.50	23.89	22.74
	190	31.87	31.83	29.96	27.86	26.18	26.53	25.37	23.64	22.46
	251	31.80	31.79	29.81	27.80	26.01	26.34	25.21	23.67	22.40
GSM 1900	512	28.70	28.80	26.69	24.88	23.11	25.09	22.89	21.14	19.90
	661	28.75	28.84	26.71	24.99	23.38	25.19	22.93	21.20	19.92
	810	28.93	29.03	26.68	24.98	23.20	25.18	22.86	21.13	19.83
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	22.95	22.95	24.10	23.86	23.35	17.78	19.48	19.63	19.73
	190	22.84	22.80	23.94	23.60	23.17	17.50	19.35	19.38	19.45
	251	22.77	22.76	23.79	23.54	23.00	17.31	19.19	19.41	19.39
GSM 1900	512	19.67	19.77	20.67	20.62	20.10	16.06	16.87	16.88	16.89
	661	19.72	19.81	20.69	20.73	20.37	16.16	16.91	16.94	16.91
	810	19.90	20.00	20.66	20.72	20.19	16.15	16.84	16.87	16.82
GSM 850	Frame	23.47	23.47	24.98	25.04	24.29	17.47	18.98	19.24	19.49
GSM 1900	Avg.Targets:	20.47	20.47	21.98	21.74	21.49	16.17	18.18	17.94	17.79

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 26 of 76

Table 9-2
Reduced Conducted Powers – Power Reduction

Maximum Burst-Averaged Output Power									
		GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
Band	Channel	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	27.24	26.26	23.97	21.76	25.09	22.89	21.14	19.90
	661	27.41	26.32	24.03	21.85	25.19	22.93	21.20	19.92
	810	27.47	26.24	24.05	21.75	25.18	22.86	21.13	19.83
Calculated Maximum Frame-Averaged Output Power									
		GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
Band	Channel	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	18.21	20.24	19.71	18.75	16.06	16.87	16.88	16.89
	661	18.38	20.30	19.77	18.84	16.16	16.91	16.94	16.91
	810	18.44	20.22	19.79	18.74	16.15	16.84	16.87	16.82
GSM 1900	Frame Avg.Targets:	18.47	20.48	20.24	19.49	16.17	18.18	17.94	17.79

Note:

- 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.
- 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.
- 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 8PSK modulation do not have an impact on output power.

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

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset	Page 27 of 76	

9.2 UMTS Conducted Powers

Table 9-3
Maximum Conducted Powers

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	
99	WCDMA	12.2 kbps RMC	24.21	24.11	23.86	-
99		12.2 kbps AMR	24.24	24.10	23.90	-
6	HSDPA	Subtest 1	23.08	22.99	22.67	0
6		Subtest 2	23.24	23.04	22.74	0
6		Subtest 3	22.62	22.52	22.18	0.5
6		Subtest 4	22.64	22.58	22.21	0.5
6	HSUPA	Subtest 1	23.12	22.82	22.62	0
6		Subtest 2	21.11	21.09	20.72	2
6		Subtest 3	22.10	22.11	21.72	1
6		Subtest 4	21.09	21.08	20.68	2
6		Subtest 5	23.11	23.03	22.71	0

DC-HSDPA is not supported

It is expected by the manufacturer that MPR for some HSPA subtests may be up to 2 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

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 28 of 76

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	MPR Allowed per 3GPP [dB]	MPR [dB]
			23095 (707.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	23.50	0	0
	1	25	23.37		0
	1	49	23.31		0
	25	0	22.47	0-1	1
	25	12	22.43		1
	25	25	22.36		1
	50	0	22.43		1
	1	0	22.50	0-1	1
16QAM	1	25	22.46		1
	1	49	22.41		1
	25	0	21.45	0-2	2
	25	12	21.46		2
	25	25	21.43		2
	50	0	21.48		2

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.

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

LTE Band 12 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23035 (701.5 MHz)	23095 (707.5 MHz)	23155 (713.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.16	23.24	23.17	0	0
	1	12	23.07	23.22	23.10		0
	1	24	23.00	23.19	23.11		0
	12	0	22.09	22.28	22.13	0-1	1
	12	6	22.13	22.29	22.11		1
	12	13	22.05	22.23	22.10		1
	25	0	22.07	22.24	22.12		1
16QAM	1	0	22.32	22.20	22.27	0-1	1
	1	12	22.25	22.17	22.26		1
	1	24	22.22	22.13	22.24		1
	12	0	21.10	21.26	21.16	0-2	2
	12	6	21.13	21.29	21.12		2
	12	13	21.07	21.24	21.11		2
	25	0	21.06	21.28	21.09		2

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 29 of 76

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

LTE Band 12 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23025 (700.5 MHz)	23095 (707.5 MHz)	23165 (714.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.11	23.24	23.14	0	0
	1	7	23.16	23.29	23.26		0
	1	14	23.08	23.21	23.13		0
	8	0	22.15	22.30	22.18	0-1	1
	8	4	22.16	22.33	22.16		1
	8	7	22.11	22.24	22.14		1
16QAM	15	0	22.11	22.25	22.19	0-1	1
	1	0	22.48	22.49	22.48		1
	1	7	22.44	22.50	22.45		1
	1	14	22.32	22.47	22.42	0-2	1
	8	0	21.33	21.31	21.23		2
	8	4	21.24	21.29	21.20		2
	8	7	21.23	21.27	21.18		2
	15	0	21.02	21.21	21.17		2

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	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23017 (699.7 MHz)	23095 (707.5 MHz)	23173 (715.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	22.92	23.16	23.04	0	0
	1	2	23.01	23.21	23.07		0
	1	5	22.92	23.12	23.01		0
	3	0	22.96	23.14	23.06		0
	3	2	23.01	23.18	23.14		0
	3	3	22.96	23.13	23.07		0
	6	0	21.99	22.18	22.11	0-1	1
16QAM	1	0	22.23	22.32	21.93	0-1	1
	1	2	22.24	22.30	21.98		1
	1	5	22.15	22.28	21.92		1
	3	0	22.02	22.27	21.96		1
	3	2	22.05	22.24	22.03		1
	3	3	22.02	22.19	21.98		1
	6	0	21.18	21.31	20.99	0-2	2

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 30 of 76

9.3.2 LTE Band 13

Table 9-8
LTE Band 13 Conducted Powers - 10 MHz Bandwidth

LTE Band 13 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23230 (782.0 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	23.01	0	0
	1	25	22.97		0
	1	49	22.83		0
	25	0	22.05	0-1	1
	25	12	22.02		1
	25	25	21.98		1
	50	0	22.04		1
16QAM	1	0	22.75	0-1	1
	1	25	22.68		1
	1	49	22.57		1
	25	0	21.04	0-2	2
	25	12	20.98		2
	25	25	20.98		2
	50	0	20.97		2

Table 9-9
LTE Band 13 Conducted Powers - 5 MHz Bandwidth

LTE Band 13 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23230 (782.0 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	22.84	0	0
	1	12	22.75		0
	1	24	22.75		0
	12	0	21.87	0-1	1
	12	6	21.85		1
	12	13	21.83		1
	25	0	21.82		1
16QAM	1	0	22.18	0-1	1
	1	12	22.20		1
	1	24	22.16		1
	12	0	20.86	0-2	2
	12	6	20.85		2
	12	13	20.78		2
	25	0	20.84		2

Note: LTE Band 13 at 5 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.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 31 of 76

9.3.3 LTE Band 5 (Cell)

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

LTE Band 5 (Cell) 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20525 (836.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	23.47	0	0
	1	25	23.35		0
	1	49	23.32		0
	25	0	22.37	0-1	1
	25	12	22.36		1
	25	25	22.28		1
	50	0	22.34		1
16QAM	1	0	22.50	0-1	1
	1	25	22.46		1
	1	49	22.42		1
	25	0	21.32	0-2	2
	25	12	21.35		2
	25	25	21.31		2
	50	0	21.37		2

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.

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

LTE Band 5 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20425 (826.5 MHz)	20525 (836.5 MHz)	20625 (846.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.25	23.10	23.08	0	0
	1	12	23.19	23.07	23.01		0
	1	24	23.15	22.66	22.58		0
	12	0	22.19	22.07	22.08	0-1	1
	12	6	22.18	22.10	22.07		1
	12	13	22.12	22.03	22.01		1
	25	0	22.15	22.05	22.04		1
16QAM	1	0	22.43	22.36	21.95	0-1	1
	1	12	22.42	22.32	22.08		1
	1	24	22.47	22.09	21.75		1
	12	0	21.18	21.16	21.14	0-2	2
	12	6	21.20	21.13	21.12		2
	12	13	21.14	21.07	21.07		2
	25	0	21.16	21.06	21.02		2

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 32 of 76

Table 9-12
LTE Band 5 (Cell) Conducted Powers - 3 MHz Bandwidth

LTE Band 5 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20415 (825.5 MHz)	20525 (836.5 MHz)	20635 (847.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.21	23.03	23.07	0	0
	1	7	23.22	23.06	23.14		0
	1	14	23.09	22.94	22.60		0
	8	0	22.17	21.96	22.06	0-1	1
	8	4	22.18	21.97	22.08		1
	8	7	22.14	21.90	22.05		1
	15	0	22.16	21.93	21.99		1
16QAM	1	0	22.45	21.97	22.04	0-1	1
	1	7	22.50	22.02	22.08		1
	1	14	22.42	21.92	21.60		1
	8	0	21.19	20.89	21.08	0-2	2
	8	4	21.20	21.03	21.05		2
	8	7	21.17	21.01	21.02		2
	15	0	21.17	21.05	21.07		2

Table 9-13
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	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20407 (824.7 MHz)	20525 (836.5 MHz)	20643 (848.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.16	23.02	22.95	0	0
	1	2	23.24	23.08	23.00		0
	1	5	23.13	23.03	22.59		0
	3	0	23.15	23.01	22.88		0
	3	2	23.17	23.07	22.89		0
	3	3	23.11	23.00	22.67		0
	6	0	22.12	21.98	21.96	0-1	1
16QAM	1	0	22.34	22.26	22.24	0-1	1
	1	2	22.40	22.35	22.25		1
	1	5	22.33	22.23	21.86		1
	3	0	22.05	22.15	22.10		1
	3	2	22.06	22.18	22.13		1
	3	3	22.01	22.12	21.93		1
	6	0	21.21	21.05	21.01	0-2	2

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 33 of 76

9.3.4 LTE Band 4 (AWS)

Table 9-14
LTE Band 4 (AWS) Conducted Powers - 20 MHz Bandwidth

LTE Band 4 (AWS) 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20175 (1732.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	21.92	0	0
	1	50	21.77		0
	1	99	21.80		0
	50	0	20.94	0-1	1
	50	25	20.92		1
	50	50	20.92		1
	100	0	20.93		1
16QAM	1	0	21.16	0-1	1
	1	50	20.96		1
	1	99	21.07		1
	50	0	19.96	0-2	2
	50	25	19.96		2
	50	50	19.93		2
	100	0	19.95		2

Note: LTE Band 4 at 20 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.

Table 9-15
LTE Band 4 (AWS) Conducted Powers - 15 MHz Bandwidth

LTE Band 4 (AWS) 15 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20025 (1717.5 MHz)	20175 (1732.5 MHz)	20325 (1747.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	21.84	21.63	21.73	0	0
	1	36	21.74	21.52	21.60		0
	1	74	21.71	21.51	21.53		0
	36	0	20.83	20.62	20.71	0-1	1
	36	18	20.83	20.60	20.65		1
	36	37	20.75	20.48	20.64		1
	75	0	20.80	20.52	20.68		1
16QAM	1	0	21.11	20.64	20.97	0-1	1
	1	36	20.91	20.48	20.87		1
	1	74	20.92	20.42	20.77		1
	36	0	19.84	19.61	19.75	0-2	2
	36	18	19.80	19.59	19.68		2
	36	37	19.81	19.47	19.62		2
	75	0	19.78	19.52	19.65		2

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 34 of 76

Table 9-16
LTE Band 4 (AWS) Conducted Powers - 10 MHz Bandwidth

LTE Band 4 (AWS) 10 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20000 (1715.0 MHz)	20175 (1732.5 MHz)	20350 (1750.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	21.83	21.59	21.72	0	0
	1	25	21.75	21.51	21.61		0
	1	49	21.71	21.49	21.48		0
	25	0	20.79	20.59	20.70	0-1	1
	25	12	20.88	20.65	20.63		1
	25	25	20.78	20.45	20.66		1
	50	0	20.80	20.50	20.70		1
16QAM	1	0	21.08	20.63	21.01	0-1	1
	1	25	20.96	20.47	20.91		1
	1	49	20.88	20.37	20.76		1
	25	0	19.89	19.65	19.78	0-2	2
	25	12	19.80	19.63	19.73		2
	25	25	19.78	19.50	19.66		2
	50	0	19.83	19.48	19.60		2

Table 9-17
LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth

LTE Band 4 (AWS) 5 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			19975 (1712.5 MHz)	20175 (1732.5 MHz)	20375 (1752.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	21.83	21.54	21.67	0	0
	1	12	21.70	21.52	21.64		0
	1	24	21.69	21.45	21.43		0
	12	0	20.75	20.55	20.70	0-1	1
	12	6	20.85	20.61	20.60		1
	12	13	20.75	20.43	20.71		1
16QAM	25	0	20.76	20.52	20.70	0-1	1
	1	0	21.05	20.66	21.02		1
	1	12	20.99	20.45	20.92		1
	1	24	20.84	20.40	20.78	0-2	1
	12	0	19.87	19.61	19.74		2
	12	6	19.76	19.61	19.77		2
	12	13	19.77	19.55	19.62	0-2	2
	25	0	19.82	19.51	19.63		2

Table 9-18
LTE Band 4 (AWS) Conducted Powers - 3 MHz Bandwidth

LTE Band 4 (AWS) 3 MHzBandwidth								
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]	
			19965 (1711.5 MHz)	20175 (1732.5 MHz)	20385 (1753.5 MHz)			
			Conducted Power [dBm]					
QPSK	1	0	21.85	21.49	21.68	0	0	
	1	7	21.68	21.52	21.62		0	
	1	14	21.73	21.45	21.46		0	
	8	0	20.75	20.55	20.71	0-1	1	
	8	4	20.81	20.59	20.59		1	
	8	7	20.74	20.41	20.73		1	
16QAM	15	0	20.71	20.49	20.74	0-1	1	
	1	0	21.08	20.70	21.06		0-1	1
	1	7	20.95	20.42	20.96			1
	1	14	20.80	20.36	20.75	0-2		1
	8	0	19.87	19.63	19.75		2	
	8	4	19.73	19.66	19.72		2	
	8	7	19.72	19.59	19.62	0-2	2	
	15	0	19.82	19.48	19.68		2	

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 35 of 76

Table 9-19
LTE Band 4 (AWS) Conducted Powers -1.4 MHz Bandwidth

LTE Band 4 (AWS) 1.4 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			19957 (1710.7 MHz)	20175 (1732.5 MHz)	20393 (1754.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	21.85	21.51	21.64	0	0
	1	2	21.64	21.50	21.60		0
	1	5	21.77	21.44	21.43		0
	3	0	21.80	21.55	21.76		0
	3	2	21.77	21.63	21.56		0
	3	3	21.74	21.37	21.78		0
	6	0	20.69	20.45	20.76	0-1	1
16QAM	1	0	21.03	20.66	21.04	0-1	1
	1	2	20.95	20.37	20.97		1
	1	5	20.82	20.40	20.73		1
	3	0	20.89	20.66	20.70		1
	3	2	20.75	20.71	20.73		1
	3	3	20.69	20.60	20.62		1
	6	0	19.83	19.44	19.70	0-2	2

Table 9-20
Reduced LTE Band 4 (AWS) Conducted Powers - 20 MHz Bandwidth

LTE Band 4 (AWS) 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20175 (1732.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	20.07	0	0
	1	50	19.84		0
	1	99	19.86		0
	50	0	20.08	0-1	0
	50	25	19.99		0
	50	50	19.98		0
	100	0	20.01		0
16QAM	1	0	20.39	0-1	0
	1	50	20.28		0
	1	99	20.28		0
	50	0	20.10	0-2	0
	50	25	20.05		0
	50	50	20.02		0
	100	0	20.04		0

Note: LTE Band 4 at 20 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.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 36 of 76

Table 9-21
Reduced LTE Band 4 (AWS) Conducted Powers - 15 MHz Bandwidth

LTE Band 4 (AWS) 15 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20025 (1717.5 MHz)	20175 (1732.5 MHz)	20325 (1747.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.00	19.80	19.91	0	0
	1	36	19.90	19.67	19.77		0
	1	74	19.92	19.65	19.70		0
	36	0	20.02	19.83	19.86	0-1	0
	36	18	19.99	19.79	19.85		0
	36	37	19.94	19.68	19.78		0
	75	0	19.99	19.73	19.88		0
16QAM	1	0	20.32	20.10	20.17	0-1	0
	1	36	20.19	20.00	20.08		0
	1	74	20.12	20.01	20.00		0
	36	0	20.06	19.83	19.90	0-2	0
	36	18	20.04	19.81	19.88		0
	36	37	19.98	19.77	19.85		0
	75	0	19.98	19.81	19.86		0

Table 9-22
Reduced LTE Band 4 (AWS) Conducted Powers - 10 MHz Bandwidth

LTE Band 4 (AWS) 10 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20000 (1715.0 MHz)	20175 (1732.5 MHz)	20350 (1750.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.01	19.82	19.88	0	0
	1	25	19.86	19.69	19.79		0
	1	49	19.92	19.68	19.73		0
	25	0	19.97	19.83	19.90	0-1	0
	25	12	20.01	19.83	19.89		0
	25	25	19.99	19.67	19.81		0
	50	0	20.04	19.70	19.92		0
16QAM	1	0	20.33	20.08	20.17	0-1	0
	1	25	20.17	19.95	20.12		0
	1	49	20.07	20.01	19.95		0
	25	0	20.10	19.82	19.89	0-2	0
	25	12	20.08	19.86	19.83		0
	25	25	19.98	19.78	19.88		0
	50	0	19.94	19.78	19.88		0

Table 9-23
Reduced LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth

LTE Band 4 (AWS) 5 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			19975 (1712.5 MHz)	20175 (1732.5 MHz)	20375 (1752.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	19.99	19.87	19.87	0	0
	1	12	19.82	19.65	19.78		0
	1	24	19.90	19.70	19.70		0
	12	0	20.00	19.84	19.90	0-1	0
	12	6	20.02	19.79	19.89		0
	12	13	20.03	19.66	19.76		0
	25	0	20.04	19.67	19.90		0
16QAM	1	0	20.37	20.13	20.21	0-1	0
	1	12	20.21	19.94	20.08		0
	1	24	20.06	20.03	19.93		0
	12	0	20.05	19.79	19.90	0-2	0
	12	6	20.12	19.88	19.84		0
	12	13	19.97	19.78	19.88		0
	25	0	19.91	19.78	19.88		0

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 37 of 76

Table 9-24
Reduced LTE Band 4 (AWS) Conducted Powers - 3 MHz Bandwidth

LTE Band 4 (AWS) 3 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			19965 (1711.5 MHz)	20175 (1732.5 MHz)	20385 (1753.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.01	19.89	19.88	0	0
	1	7	19.78	19.69	19.81		0
	1	14	19.95	19.71	19.75		0
	8	0	20.02	19.79	19.95	0-1	0
	8	4	20.04	19.76	19.92		0
	8	7	19.98	19.65	19.76		0
	15	0	20.09	19.72	19.95		0
16QAM	1	0	20.32	20.08	20.22	0-1	0
	1	7	20.22	19.90	20.07		0
	1	14	20.01	20.02	19.95		0
	8	0	20.10	19.82	19.89	0-2	0
	8	4	20.17	19.84	19.83		0
	8	7	20.01	19.75	19.92		0
	15	0	19.96	19.76	19.93		0

Table 9-25
Reduced LTE Band 4 (AWS) Conducted Powers -1.4 MHz Bandwidth

LTE Band 4 (AWS) 1.4 MHzBandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			19957 (1710.7 MHz)	20175 (1732.5 MHz)	20393 (1754.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.02	19.84	19.85	0	0
	1	2	19.81	19.74	19.84		0
	1	5	19.93	19.73	19.74		0
	3	0	20.00	19.76	19.98		0
	3	2	20.00	19.74	19.89		0
	3	3	20.01	19.65	19.81		0
	6	0	20.05	19.75	19.97	0-1	0
16QAM	1	0	20.32	20.06	20.22	0-1	0
	1	2	20.23	19.91	20.02		0
	1	5	20.00	20.07	19.97		0
	3	0	20.09	19.79	19.89		0
	3	2	20.12	19.81	19.86		0
	3	3	19.97	19.72	19.96		0
	6	0	19.91	19.78	19.92	0-2	0

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 38 of 76

9.3.5 LTE Band 41

Table 9-26
LTE Band 41 Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHzBandwidth									
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	23.32	23.45	23.63	23.55	23.73	0	0
	1	50	23.23	23.39	23.48	23.42	23.55		0
	1	99	23.17	23.35	23.47	23.39	23.49		0
	50	0	22.40	22.33	22.46	22.52	22.53	0-1	1
	50	25	22.24	22.30	22.43	22.49	22.50		1
	50	50	22.19	22.28	22.39	22.41	22.44		1
	100	0	22.19	22.27	22.40	22.44	22.46		1
16QAM	1	0	22.63	22.69	22.68	22.49	22.72	0-1	1
	1	50	22.49	22.61	22.66	22.37	22.69		1
	1	99	22.50	22.59	22.62	22.29	22.73		1
	50	0	21.27	21.38	21.42	21.54	21.59	0-2	2
	50	25	21.21	21.26	21.37	21.47	21.55		2
	50	50	21.18	21.25	21.33	21.44	21.52		2
	100	0	21.20	21.31	21.32	21.46	21.43		2

Table 9-27
LTE Band 41 Conducted Powers - 15 MHz Bandwidth

LTE Band 41 15 MHzBandwidth									
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	23.53	23.36	23.72	23.66	23.90	0	0
	1	36	23.46	23.23	23.57	23.50	23.80		0
	1	74	23.41	23.22	23.54	23.48	23.72		0
	36	0	22.48	22.35	22.73	22.68	22.85	0-1	1
	36	18	22.45	22.36	22.62	22.63	22.80		1
	36	37	22.43	22.34	22.57	22.57	22.77		1
	75	0	22.39	22.33	22.58	22.58	22.74		1
16QAM	1	0	22.88	22.36	22.85	22.59	22.98	0-1	1
	1	36	22.79	22.19	22.71	22.46	22.84		1
	1	74	22.75	22.18	22.63	22.44	22.76		1
	36	0	21.45	21.55	21.61	21.76	21.94	0-2	2
	36	18	21.39	21.49	21.58	21.72	21.73		2
	36	37	21.35	21.40	21.52	21.66	21.70		2
	75	0	21.37	21.31	21.55	21.59	21.75		2

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 39 of 76

Table 9-28
LTE Band 41 Conducted Powers - 10 MHz Bandwidth

LTE Band 41 10 MHzBandwidth									
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	23.38	23.31	23.35	23.40	23.49	0	0
	1	25	23.30	23.26	23.24	23.38	23.40		0
	1	49	23.27	23.25	23.26	23.36	23.42		0
	25	0	22.44	22.24	22.35	22.42	22.52	0-1	1
	25	12	22.24	22.23	22.37	22.43	22.54		1
	25	25	22.22	22.21	22.35	22.41	22.45		1
	50	0	22.24	22.25	22.33	22.43	22.47		1
16QAM	1	0	22.30	22.08	22.71	22.77	22.75	0-1	1
	1	25	22.16	22.01	22.61	22.72	22.71		1
	1	49	22.17	22.01	22.56	22.69	22.73		1
	25	0	21.28	21.20	21.30	21.40	21.44	0-2	2
	25	12	21.23	21.22	21.31	21.44	21.45		2
	25	25	21.28	21.18	21.30	21.40	21.40		2
	50	0	21.33	21.23	21.27	21.39	21.42		2

Table 9-29
LTE Band 41 Conducted Powers - 5 MHz Bandwidth

LTE Band 41 5 MHzBandwidth									
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	23.32	23.25	23.35	23.40	23.60	0	0
	1	12	23.26	23.24	23.33	23.44	23.56		0
	1	24	23.36	23.23	23.28	23.46	23.54		0
	12	0	22.28	22.22	22.32	22.49	22.48	0-1	1
	12	6	22.27	22.27	22.37	22.43	22.50		1
	12	13	22.26	22.25	22.33	22.42	22.46		1
	25	0	22.28	22.24	22.36	22.48	22.46		1
16QAM	1	0	22.40	21.85	21.96	22.53	22.44	0-1	1
	1	12	22.39	21.78	21.86	22.50	22.43		1
	1	24	22.42	21.80	21.88	22.52	22.38		1
	12	0	21.24	21.20	21.31	21.46	21.60	0-2	2
	12	6	21.29	21.17	21.26	21.43	21.59		2
	12	13	21.22	21.16	21.29	21.41	21.55		2
	25	0	21.17	21.26	21.40	21.39	21.51		2

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 40 of 76

9.4 WLAN Conducted Powers

Table 9-30
2.4 GHz WLAN Maximum Average RF Power – Antenna 1

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]	
		IEEE Transmission Mode	
		802.11b	802.11g
2412	1	19.54	17.17
2437	6	19.65	16.68
2462	11	19.32	17.00

Table 9-31
2.4 GHz WLAN Maximum Average RF Power – Antenna 2

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]	
		IEEE Transmission Mode	
		802.11b	802.11g
2412	1	18.98	16.74
2437	6	18.79	16.58
2462	11	18.91	16.93

Table 9-32
2.4 GHz WLAN Reduced Average RF Power – Antenna 1 (Held-to-ear)

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	16.41	15.92	16.28
2437	6	16.49	16.30	15.61
2462	11	16.29	15.65	16.17

Table 9-33
2.4 GHz WLAN Reduced Average RF Power – Antenna 2 (Held-to-ear)

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	15.75	16.40	15.84
2437	6	15.69	16.14	15.57
2462	11	16.07	15.57	15.99

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 41 of 76

Table 9-34
5 GHz WLAN Maximum Average RF Power – Antenna 1

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
5210	42	14.89
5290	58	14.56
5530	106	15.16
5610	122	15.34
5690	138	15.33
5775	155	15.04

Table 9-35
5 GHz WLAN Maximum Average RF Power – Antenna 2

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
5210	42	14.89
5290	58	15.11
5530	106	14.80
5610	122	14.82
5690	138	14.69
5775	155	15.01

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 42 of 76

Table 9-36
5 GHz WLAN Reduced Average RF Power – Antenna 1 (Held-to-ear)

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
5210	42	12.90
5290	58	13.30
5530	106	12.95
5610	122	12.90
5690	138	12.93
5775	155	13.20

Table 9-37
5 GHz WLAN Reduced Average RF Power – Antenna 2 (Held-to-ear)

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
5210	42	12.88
5290	58	13.02
5530	106	13.07
5610	122	12.87
5690	138	12.77
5775	155	13.21

Table 9-38
Maximum Output Powers During Conditions with 2.4 GHz and 5 GHz WLAN

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]	
		802.11n	
		ANT1	ANT2
2412	1	12.65	13.04
2437	6	12.96	12.72
2462	11	12.50	13.13
Freq [MHz]	Channel	5GHz (80MHz) Conducted Power [dBm]	
		802.11ac	
		ANT1	ANT2
5210	42	12.90	12.88
5290	58	13.30	13.02
5530	106	12.95	13.07
5610	122	12.90	12.87
5690	138	12.93	12.77
5775	155	13.20	13.21

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset	Page 43 of 76	

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.
- The bolded data rate and channel above were tested for SAR.

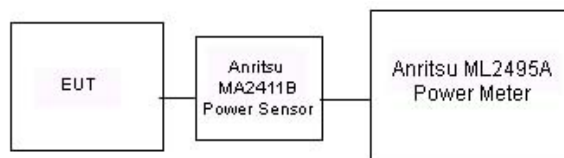


Figure 9-3
Power Measurement Setup for Bandwidths < 50 MHz

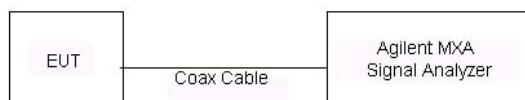


Figure 9-4
Power Measurement Setup for Bandwidths > 50 MHz

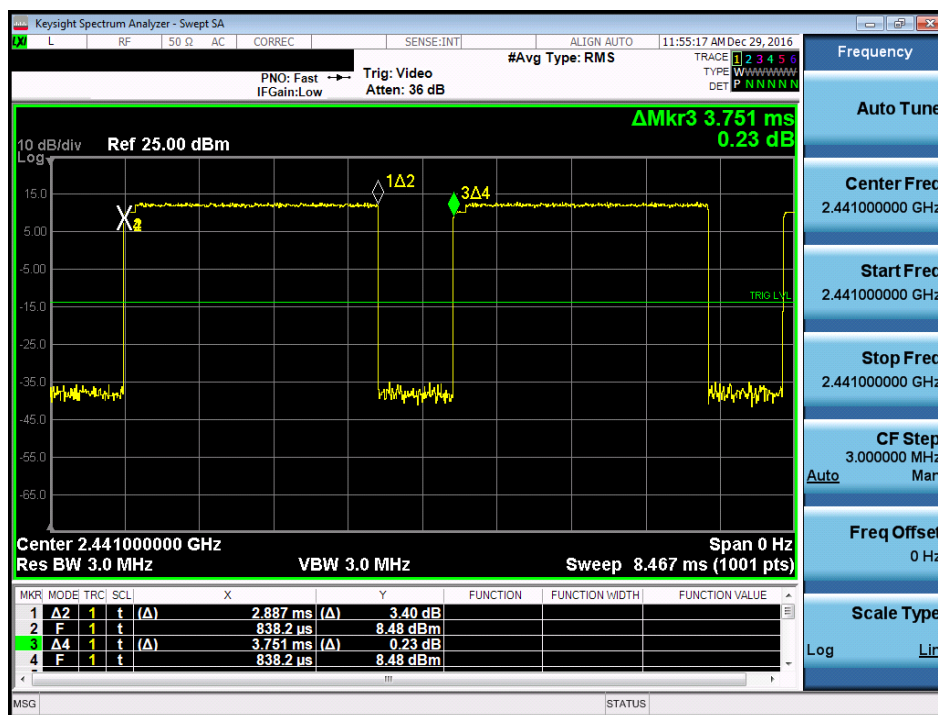
9.5 Bluetooth Conducted Powers

Table 9-39
Bluetooth Average RF Power

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
			[dBm]	[mW]
2402	1.0	0	14.89	30.818
2441	1.0	39	15.65	36.721
2480	1.0	78	15.50	35.493
2402	2.0	0	9.04	8.024
2441	2.0	39	9.97	9.923
2480	2.0	78	9.73	9.402
2402	3.0	0	9.02	7.975
2441	3.0	39	9.82	9.597
2480	3.0	78	9.90	9.769

Note: The bolded data rates and channel above were tested for SAR.

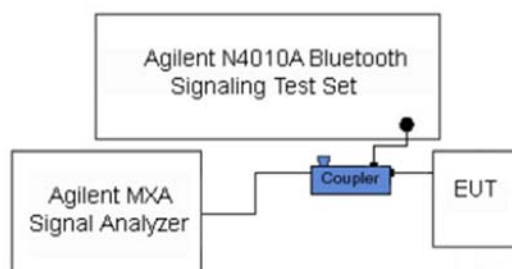
FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 44 of 76



Equation 2

Bluetooth Duty Cycle Calculation

$$\text{Duty Cycle} = \text{Pulse} \frac{\text{Width}}{\text{Period}} * 100\% = \frac{2.887\text{ms}}{3.751\text{ms}} * 100\% = 77.0\%$$



FCC ID: A3LSC03J	 SAR EVALUATION REPORT 		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset	Page 45 of 76

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
2/21/2017	750H	21.5	700	0.868	43.141	0.889	42.201	-2.36%	2.23%
			710	0.877	42.984	0.890	42.149	-1.46%	1.98%
			740	0.903	42.636	0.893	41.994	1.12%	1.53%
			755	0.917	42.414	0.894	41.916	2.57%	1.19%
			770	0.932	42.159	0.895	41.838	4.13%	0.77%
			785	0.940	41.898	0.896	41.760	4.91%	0.33%
2/22/2017	835H	23.2	820	0.900	42.878	0.899	41.578	0.11%	3.13%
			835	0.915	42.698	0.900	41.500	1.67%	2.89%
			850	0.930	42.529	0.916	41.500	1.53%	2.48%
3/27/2017	835H	21.8	820	0.864	40.364	0.899	41.578	-3.89%	-2.92%
			835	0.878	40.195	0.900	41.500	-2.44%	-3.14%
			850	0.892	40.029	0.916	41.500	-2.62%	-3.54%
2/27/2017	1750H	23.0	1710	1.351	39.044	1.348	40.142	0.22%	-2.74%
			1750	1.394	38.870	1.371	40.079	1.68%	-3.02%
			1790	1.434	38.670	1.394	40.016	2.87%	-3.36%
2/24/2017	1900H	22.6	1850	1.369	38.676	1.400	40.000	-2.21%	-3.31%
			1880	1.401	38.520	1.400	40.000	0.07%	-3.70%
			1910	1.434	38.389	1.400	40.000	2.43%	-4.03%
1/10/2017	2450H	23.5	2400	1.812	39.376	1.756	39.289	3.19%	0.22%
			2450	1.867	39.124	1.800	39.200	3.72%	-0.19%
			2500	1.933	38.944	1.855	39.136	4.20%	-0.49%
1/22/2017	2450H	24.0	2400	1.814	38.386	1.756	39.289	3.30%	-2.30%
			2450	1.869	38.155	1.800	39.200	3.83%	-2.67%
			2500	1.931	37.926	1.855	39.136	4.10%	-3.09%
3/15/2017	2450H	22.5	2400	1.824	38.510	1.756	39.289	3.87%	-1.98%
			2450	1.874	38.320	1.800	39.200	4.11%	-2.24%
			2500	1.933	38.028	1.855	39.136	4.20%	-2.83%
			2550	1.983	37.875	1.909	39.073	3.88%	-3.07%
			2600	2.035	37.642	1.964	39.009	3.62%	-3.50%
			2650	2.106	37.467	2.018	38.945	4.36%	-3.80%
			2700	2.149	37.305	2.073	38.882	3.67%	-4.06%
02/27/2017	5200H-5800H	21.3	5240	4.631	35.258	4.696	35.940	-1.38%	-1.90%
			5260	4.652	35.237	4.717	35.917	-1.38%	-1.89%
			5280	4.671	35.229	4.737	35.894	-1.39%	-1.85%
			5300	4.677	35.169	4.758	35.871	-1.70%	-1.96%
			5520	4.904	34.864	4.983	35.620	-1.59%	-2.12%
			5540	4.918	34.828	5.004	35.597	-1.72%	-2.16%
			5600	4.985	34.712	5.065	35.529	-1.58%	-2.30%
			5745	5.138	34.515	5.214	35.363	-1.46%	-2.40%
			5765	5.159	34.495	5.234	35.340	-1.43%	-2.39%
			5785	5.163	34.474	5.255	35.317	-1.75%	-2.39%

FCC ID: A3LSC03J		SAR EVALUATION REPORT			Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 46 of 76	

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
2/22/2017	750B	21.5	700	0.912	56.755	0.959	55.726	-4.90%	1.85%
			710	0.923	56.679	0.960	55.687	-3.85%	1.78%
			740	0.954	56.421	0.963	55.570	-0.93%	1.53%
			755	0.967	56.274	0.964	55.512	0.31%	1.37%
			770	0.980	56.115	0.965	55.453	1.55%	1.19%
			785	0.994	55.976	0.966	55.395	2.90%	1.05%
2/27/2017	835B	20.4	820	0.965	54.739	0.969	55.258	-0.41%	-0.94%
			835	0.977	54.573	0.970	55.200	0.72%	-1.14%
			850	0.989	54.402	0.988	55.154	0.10%	-1.36%
3/6/2017	1750B	20.7	1710	1.409	51.321	1.463	53.537	-3.69%	-4.14%
			1750	1.467	51.204	1.488	53.432	-1.41%	-4.17%
			1790	1.507	51.080	1.514	53.326	-0.46%	-4.21%
2/23/2017	1900B	22.5	1850	1.520	51.787	1.520	53.300	0.00%	-2.84%
			1880	1.556	51.698	1.520	53.300	2.37%	-3.01%
			1910	1.590	51.620	1.520	53.300	4.61%	-3.15%
4/6/2017	1900B	22.2	1850	1.525	52.499	1.520	53.300	0.33%	-1.50%
			1880	1.560	52.451	1.520	53.300	2.63%	-1.59%
			1910	1.593	52.282	1.520	53.300	4.80%	-1.91%
1/4/2017	2450B	22.6	2400	1.935	51.097	1.902	53.300	1.74%	-4.13%
			2450	2.006	50.885	1.950	52.700	2.87%	-3.44%
			2500	2.073	50.681	2.021	52.636	2.57%	-3.71%
1/12/2017	2450B	22.7	2400	1.963	51.025	1.902	52.767	3.21%	-3.30%
			2450	2.035	50.856	1.950	52.700	4.36%	-3.50%
			2500	2.103	50.608	2.021	52.636	4.06%	-3.85%
1/24/2017	2450B	23.7	2400	1.951	52.052	1.902	52.767	2.58%	-1.36%
			2450	2.014	51.856	1.950	52.700	3.28%	-1.60%
			2500	2.086	51.676	2.021	52.636	3.22%	-1.82%
2/22/2017	2450B	23.0	2400	1.951	51.465	1.902	52.767	2.58%	-2.47%
			2450	2.016	51.286	1.950	52.700	3.38%	-2.68%
			2500	2.089	51.074	2.021	52.636	3.36%	-2.97%
			2550	2.159	50.892	2.092	52.573	3.20%	-3.20%
			2600	2.226	50.665	2.163	52.509	2.91%	-3.51%
			2650	2.301	50.498	2.234	52.445	3.00%	-3.71%
3/15/2017	2450B	22.6	2700	2.369	50.288	2.305	52.382	2.78%	-4.00%
			2400	1.958	53.010	1.902	52.767	2.94%	0.46%
			2450	2.029	52.810	1.950	52.700	4.05%	0.21%
			2500	2.094	52.628	2.021	52.636	3.61%	-0.02%
			2550	2.162	52.435	2.092	52.573	3.35%	-0.26%
			2600	2.234	52.254	2.163	52.509	3.28%	-0.49%
03/06/2017	5200B-5800B	22.6	2650	2.295	52.057	2.234	52.445	2.73%	-0.74%
			2700	2.367	51.859	2.305	52.382	2.69%	-1.00%
			5240	5.492	48.351	5.346	48.960	2.73%	-1.24%
			5260	5.527	48.297	5.369	48.933	2.94%	-1.30%
			5280	5.547	48.249	5.393	48.906	2.86%	-1.34%
			5300	5.573	48.220	5.416	48.879	2.90%	-1.35%
			5520	5.871	47.884	5.673	48.580	3.49%	-1.43%
			5540	5.886	47.890	5.696	48.553	3.34%	-1.37%
			5600	5.972	47.760	5.766	48.471	3.57%	-1.47%
			5620	6.004	47.731	5.790	48.444	3.70%	-1.47%
			5680	6.081	47.642	5.860	48.363	3.77%	-1.49%
			5700	6.118	47.577	5.883	48.336	3.99%	-1.57%
03/13/2017	5200B-5800B	23.0	5745	6.182	47.533	5.936	48.275	4.14%	-1.54%
			5765	6.197	47.508	5.959	48.248	3.99%	-1.53%
			5785	6.219	47.479	5.982	48.220	3.96%	-1.54%
			5240	5.467	47.907	5.346	48.960	2.26%	-2.15%
			5260	5.486	47.907	5.369	48.933	2.18%	-2.10%
			5280	5.502	47.854	5.393	48.906	2.02%	-2.15%
			5300	5.535	47.792	5.416	48.879	2.20%	-2.22%
			5520	5.818	47.471	5.673	48.580	2.56%	-2.28%
			5540	5.852	47.404	5.696	48.553	2.74%	-2.37%
			5600	5.917	47.298	5.766	48.471	2.62%	-2.42%
			5620	5.956	47.295	5.790	48.444	2.87%	-2.37%
			5680	6.016	47.214	5.860	48.363	2.66%	-2.38%
			5700	6.049	47.158	5.883	48.336	2.82%	-2.44%
			5745	6.116	47.106	5.936	48.275	3.03%	-2.42%
			5765	6.162	47.113	5.959	48.248	3.41%	-2.35%
			5785	6.180	47.055	5.982	48.220	3.31%	-2.42%

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.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 47 of 76

10.2 Test System Verification

Prior to SAR assessment, the system is verified to $\pm 10\%$ 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 E.

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)	Dipole SN	Probe SN	Measured SAR _{1g} (W/kg)	1 W Target SAR _{1g} (W/kg)	1 W Normalized SAR _{1g} (W/kg)	Deviation _{1g} (%)
G	750	HEAD	02/21/2017	21.6	21.5	0.200	1003	3287	1.640	8.390	8.200	-2.26%
H	835	HEAD	02/22/2017	24.1	23.2	0.200	4d047	3319	1.840	9.130	9.200	0.77%
J	835	HEAD	03/27/2017	21.7	21.8	0.200	4d133	3334	1.870	9.320	9.350	0.32%
E	1750	HEAD	02/27/2017	24.0	23.0	0.100	1008	7406	3.430	36.700	34.300	-6.54%
G	1900	HEAD	02/24/2017	20.5	21.3	0.100	5d080	3287	3.930	39.300	39.300	0.00%
G	2450	HEAD	01/10/2017	23.6	23.0	0.100	797	3287	5.450	52.100	54.500	4.61%
G	2450	HEAD	01/22/2017	23.2	22.5	0.100	981	3287	5.640	52.800	56.400	6.82%
G	2450	HEAD	03/15/2017	22.1	22.5	0.100	797	3287	5.250	52.100	52.500	0.77%
G	2600	HEAD	03/15/2017	22.1	22.5	0.100	1126	3287	6.070	56.300	60.700	7.82%
J	5250	HEAD	02/27/2017	21.1	20.5	0.050	1237	3914	3.760	79.200	75.200	-5.05%
J	5600	HEAD	02/27/2017	21.1	20.5	0.050	1237	3914	3.900	83.300	78.000	-6.36%
J	5750	HEAD	02/27/2017	21.1	20.5	0.050	1237	3914	3.730	81.500	74.600	-8.47%
K	750	BODY	02/22/2017	22.7	21.5	0.200	1161	7409	1.830	8.430	9.150	8.54%
H	835	BODY	02/27/2017	22.1	20.4	0.200	4d047	3319	1.960	9.570	9.800	2.40%
I	1750	BODY	03/06/2017	21.5	20.7	0.100	1008	3213	3.660	37.300	36.600	-1.88%
J	1900	BODY	02/23/2017	23.8	21.3	0.100	5d080	3334	4.180	39.100	41.800	6.91%
G	1900	BODY	04/06/2017	21.9	22.2	0.100	5d149	3287	3.900	39.900	39.000	-2.26%
E	2450	BODY	01/04/2017	24.3	22.6	0.100	981	7406	5.030	50.800	50.300	-0.98%
E	2450	BODY	01/12/2017	24.5	22.7	0.100	981	7406	5.260	50.800	52.600	3.54%
H	2450	BODY	01/24/2017	22.4	22.7	0.100	797	3319	5.210	50.700	52.100	2.76%
E	2450	BODY	03/15/2017	22.9	22.6	0.100	981	7406	4.830	50.800	48.300	-4.92%
E	2600	BODY	02/22/2017	23.5	23.0	0.100	1071	7406	5.710	54.200	57.100	5.35%
E	2600	BODY	03/15/2017	22.9	22.6	0.100	1071	7406	5.590	54.200	55.900	3.14%
K	5250	BODY	03/13/2017	22.5	23.0	0.050	1237	7308	3.430	74.800	68.600	-8.29%
K	5600	BODY	03/13/2017	22.5	23.0	0.050	1237	7308	4.060	77.000	81.200	5.45%
K	5750	BODY	03/13/2017	22.5	23.0	0.050	1237	7308	3.450	75.400	69.000	-8.49%

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 48 of 76

Table 10-4
System Verification Results – 10g

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR _{10g} (W/kg)	1 W Target SAR _{10g} (W/kg)	1 W Normalized SAR _{10g} (W/kg)	Deviation _{10g} (%)
G	1900	BODY	04/06/2017	21.9	22.2	0.100	5d149	3287	2.000	21.100	20.000	-5.21%
E	2450	BODY	01/12/2017	24.5	22.7	0.100	981	7406	2.430	23.800	24.300	2.10%
D	5250	BODY	03/06/2017	21.5	21.3	0.050	1237	3589	0.985	21.000	19.700	-6.19%
D	5600	BODY	03/06/2017	21.5	21.3	0.050	1237	3589	1.040	21.500	20.800	-3.26%
D	5750	BODY	03/06/2017	21.5	21.3	0.050	1237	3589	0.968	20.900	19.360	-7.37%

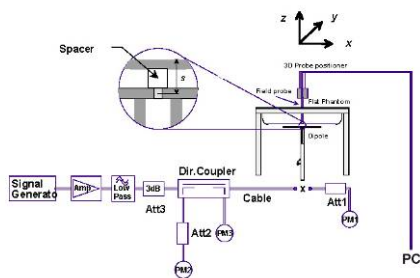


Figure 10-1
System Verification Setup Diagram



Figure 10-2
System Verification Setup Photo

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 49 of 76

11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

**Table 11-1
GSM 850 Head SAR**

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	# of Time Slots	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.0	31.87	-0.11	Right	Cheek	D6A55	1	1:8.3	0.125	1.297	0.162	A1
836.60	190	GSM 850	GSM	33.0	31.87	0.07	Right	Tilt	D6A55	1	1:8.3	0.048	1.297	0.062	
836.60	190	GSM 850	GSM	33.0	31.87	0.15	Left	Cheek	D6A55	1	1:8.3	0.103	1.297	0.134	
836.60	190	GSM 850	GSM	33.0	31.87	-0.01	Left	Tilt	D6A55	1	1:8.3	0.061	1.297	0.079	
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/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	# of Time Slots	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GSM	30.0	28.75	0.05	Right	Cheek	24088	1	1:8.3	0.044	1.334	0.059	
1880.00	661	GSM 1900	GSM	30.0	28.75	0.05	Right	Tilt	24088	1	1:8.3	0.029	1.334	0.039	
1880.00	661	GSM 1900	GSM	30.0	28.75	0.21	Left	Cheek	24088	1	1:8.3	0.053	1.334	0.071	A2
1880.00	661	GSM 1900	GSM	30.0	28.75	0.18	Left	Tilt	24088	1	1:8.3	0.022	1.334	0.029	
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/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna State	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	24.5	24.11	0.03	Right	Cheek	15	D6A55	1:1	0.183	1.094	0.200	A3
836.60	4183	UMTS 850	RMC	24.5	24.11	0.08	Right	Tilt	15	D6A55	1:1	0.077	1.094	0.084	
836.60	4183	UMTS 850	RMC	24.5	24.11	0.06	Left	Cheek	15	D6A55	1:1	0.151	1.094	0.165	
836.60	4183	UMTS 850	RMC	24.5	24.11	0.08	Left	Tilt	15	D6A55	1:1	0.091	1.094	0.100	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram								

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 50 of 76

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	23.5	23.50	0.02	0	Right	Cheek	QPSK	1	0	D6B13	1:1	0.115	1.000	0.115	A4
707.50	23095	Mid	LTE Band 12	10	22.5	22.47	-0.01	1	Right	Cheek	QPSK	25	0	D6B13	1:1	0.101	1.007	0.102	
707.50	23095	Mid	LTE Band 12	10	23.5	23.50	-0.09	0	Right	Tilt	QPSK	1	0	D6B13	1:1	0.054	1.000	0.054	
707.50	23095	Mid	LTE Band 12	10	22.5	22.47	0.16	1	Right	Tilt	QPSK	25	0	D6B13	1:1	0.047	1.007	0.047	
707.50	23095	Mid	LTE Band 12	10	23.5	23.50	-0.02	0	Left	Cheek	QPSK	1	0	D6B13	1:1	0.098	1.000	0.098	
707.50	23095	Mid	LTE Band 12	10	22.5	22.47	-0.03	1	Left	Cheek	QPSK	25	0	D6B13	1:1	0.082	1.007	0.083	
707.50	23095	Mid	LTE Band 12	10	23.5	23.50	-0.01	0	Left	Tilt	QPSK	1	0	D6B13	1:1	0.062	1.000	0.062	
707.50	23095	Mid	LTE Band 12	10	22.5	22.47	0.07	1	Left	Tilt	QPSK	25	0	D6B13	1:1	0.055	1.007	0.055	
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 13 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)			
782.00	23230	Mid	LTE Band 13	10	24.0	23.01	0.14	0	Right	Cheek	QPSK	1	0	D6B13	1:1	0.071	1.256	0.089	A5
782.00	23230	Mid	LTE Band 13	10	23.0	22.05	0.06	1	Right	Cheek	QPSK	25	0	D6B13	1:1	0.058	1.245	0.072	
782.00	23230	Mid	LTE Band 13	10	24.0	23.01	0.16	0	Right	Tilt	QPSK	1	0	D6B13	1:1	0.043	1.256	0.054	
782.00	23230	Mid	LTE Band 13	10	23.0	22.05	0.16	1	Right	Tilt	QPSK	25	0	D6B13	1:1	0.033	1.245	0.041	
782.00	23230	Mid	LTE Band 13	10	24.0	23.01	0.10	0	Left	Cheek	QPSK	1	0	D6B13	1:1	0.066	1.256	0.083	
782.00	23230	Mid	LTE Band 13	10	23.0	22.05	0.11	1	Left	Cheek	QPSK	25	0	D6B13	1:1	0.054	1.245	0.067	
782.00	23230	Mid	LTE Band 13	10	24.0	23.01	-0.20	0	Left	Tilt	QPSK	1	0	D6B13	1:1	0.042	1.256	0.053	
782.00	23230	Mid	LTE Band 13	10	23.0	22.05	0.14	1	Left	Tilt	QPSK	25	0	D6B13	1:1	0.037	1.245	0.046	
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 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	Antenna State	Modulation	RB Size	RB Offset	Device Serial Num ber	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	23.5	23.47	0.00	0	Right	Cheek	15	QPSK	1	0	D6A55	1:1	0.137	1.007	0.138	A6
836.50	20525	Mid	LTE Band 5 (Cell)	10	22.5	22.37	0.03	1	Right	Cheek	15	QPSK	25	0	D6A55	1:1	0.104	1.030	0.107	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	23.47	0.17	0	Right	Tilt	15	QPSK	1	0	D6A55	1:1	0.066	1.007	0.066	
836.50	20525	Mid	LTE Band 5 (Cell)	10	22.5	22.37	0.10	1	Right	Tilt	15	QPSK	25	0	D6A55	1:1	0.048	1.030	0.049	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	23.47	0.11	0	Left	Cheek	15	QPSK	1	0	D6A55	1:1	0.103	1.007	0.104	
836.50	20525	Mid	LTE Band 5 (Cell)	10	22.5	22.37	0.13	1	Left	Cheek	15	QPSK	25	0	D6A55	1:1	0.080	1.030	0.082	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	23.47	0.04	0	Left	Tilt	15	QPSK	1	0	D6A55	1:1	0.085	1.007	0.086	
836.50	20525	Mid	LTE Band 5 (Cell)	10	22.5	22.37	0.07	1	Left	Tilt	15	QPSK	25	0	D6A55	1:1	0.064	1.030	0.066	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT									Head											
Spatial Peak									1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population									averaged over 1 gram											

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 51 of 76

Table 11-7
LTE Band 4 (AWS) 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)		
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.0	21.92	0.14	0	Right	Cheek	QPSK	1	0	D6A57	1:1	0.055	1.282	0.071	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.0	20.94	0.09	1	Right	Cheek	QPSK	50	0	D6A57	1:1	0.038	1.276	0.048	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.0	21.92	0.07	0	Right	Tilt	QPSK	1	0	D6A57	1:1	0.042	1.282	0.054	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.0	20.94	0.14	1	Right	Tilt	QPSK	50	0	D6A57	1:1	0.033	1.276	0.042	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.0	21.92	0.14	0	Left	Cheek	QPSK	1	0	D6A57	1:1	0.085	1.282	0.109	A7
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.0	20.94	0.09	1	Left	Cheek	QPSK	50	0	D6A57	1:1	0.062	1.276	0.079	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.0	21.92	0.13	0	Left	Tilt	QPSK	1	0	D6A57	1:1	0.042	1.282	0.054	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.0	20.94	0.00	1	Left	Tilt	QPSK	50	0	D6A57	1:1	0.032	1.276	0.041	
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
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)		
2680.00	41490	High	LTE Band 41	20	24.0	23.73	0.12	0	Right	Cheek	QPSK	1	0	D6D17	1:1.58	0.048	1.064	0.051	
2680.00	41490	High	LTE Band 41	20	23.0	22.53	-0.16	1	Right	Cheek	QPSK	50	0	D6D17	1:1.58	0.030	1.114	0.033	
2680.00	41490	High	LTE Band 41	20	24.0	23.73	0.13	0	Right	Tilt	QPSK	1	0	D6D17	1:1.58	0.039	1.064	0.041	
2680.00	41490	High	LTE Band 41	20	23.0	22.53	0.16	1	Right	Tilt	QPSK	50	0	D6D17	1:1.58	0.030	1.114	0.033	
2680.00	41490	High	LTE Band 41	20	24.0	23.73	-0.16	0	Left	Cheek	QPSK	1	0	D6D17	1:1.58	0.048	1.064	0.051	A8
2680.00	41490	High	LTE Band 41	20	23.0	22.53	0.12	1	Left	Cheek	QPSK	50	0	D6D17	1:1.58	0.037	1.114	0.041	
2680.00	41490	High	LTE Band 41	20	24.0	23.73	0.13	0	Left	Tilt	QPSK	1	0	D6D17	1:1.58	0.023	1.064	0.024	
2680.00	41490	High	LTE Band 41	20	23.0	22.53	0.16	1	Left	Tilt	QPSK	50	0	D6D17	1:1.58	0.020	1.114	0.022	
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
DTS Head SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	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)	
2437	6	802.11b	DSSS	22	16.5	16.49	0.18	Right	Cheek	1	0910E	1	99.8	0.503	0.458	1.002	1.002	0.460	A9
2437	6	802.11b	DSSS	22	16.5	16.49	0.03	Right	Tilt	1	0910E	1	99.8	0.454	0.380	1.002	1.002	0.382	
2437	6	802.11b	DSSS	22	16.5	16.49	0.01	Left	Cheek	1	0910E	1	99.8	0.147	-	1.002	1.002	-	
2437	6	802.11b	DSSS	22	16.5	16.49	0.21	Left	Tilt	1	0910E	1	99.8	0.199	-	1.002	1.002	-	
2462	11	802.11b	DSSS	22	16.5	16.07	0.12	Right	Cheek	2	0910E	1	99.8	0.384	0.380	1.104	1.002	0.420	
2462	11	802.11b	DSSS	22	16.5	16.07	0.06	Right	Tilt	2	0910E	1	99.8	0.209	0.195	1.104	1.002	0.216	
2462	11	802.11b	DSSS	22	16.5	16.07	-0.17	Left	Cheek	2	0910E	1	99.8	0.138	-	1.104	1.002	-	
2462	11	802.11b	DSSS	22	16.5	16.07	-0.05	Left	Tilt	2	0910E	1	99.8	0.103	-	1.104	1.002	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram											

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 52 of 76

Table 11-10
DTS Head SAR for Conditions with 2.4 GHz and 5 GHz WLAN SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm] (per Antenna)	Ant 1 Conducted Power [dBm]	Ant 2 Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	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)	(Power)	(Duty Cycle)	(W/kg)	
2412	1	802.11n	OFDM	20	13.5	12.65	13.04	0.08	Right	Cheek	MIMO	15965	13	98.9	0.458	0.392	1.216	1.011	0.482	
2412	1	802.11n	OFDM	20	13.5	12.65	13.04	0.16	Right	Tilt	MIMO	15965	13	98.9	0.311	0.224	1.216	1.011	0.275	
2412	1	802.11n	OFDM	20	13.5	12.65	13.04	0.19	Left	Cheek	MIMO	15965	13	98.9	0.140	-	1.216	1.011	-	
2412	1	802.11n	OFDM	20	13.5	12.65	13.04	0.17	Left	Tilt	MIMO	15965	13	98.9	0.099	-	1.216	1.011	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram											

Note: DTS MIMO was additionally evaluated at the maximum allowed output power for operations with Simultaneous 2.4 GHz and 5 GHz WLAN. 5 GHz WLAN was not transmitting during the above evaluations.

Table 11-11
NII Head SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	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)	
5290	58	802.11ac	OFDM	80	13.5	13.30	-0.14	Right	Cheek	1	CE1F1	29.3	95.5	0.427	0.198	1.047	1.047	0.217	
5290	58	802.11ac	OFDM	80	13.5	13.30	0.17	Right	Tilt	1	CE1F1	29.3	95.5	0.249	-	1.047	1.047	-	
5290	58	802.11ac	OFDM	80	13.5	13.30	0.20	Left	Cheek	1	CE1F1	29.3	95.5	0.162	-	1.047	1.047	-	
5290	58	802.11ac	OFDM	80	13.5	13.30	0.19	Left	Tilt	1	CE1F1	29.3	95.5	0.115	-	1.047	1.047	-	
5290	58	802.11ac	OFDM	80	13.5	13.02	0.20	Right	Cheek	2	0910E	29.3	93.2	0.350	0.126	1.117	1.073	0.151	
5290	58	802.11ac	OFDM	80	13.5	13.02	0.20	Right	Tilt	2	0910E	29.3	93.2	0.264	-	1.117	1.073	-	
5290	58	802.11ac	OFDM	80	13.5	13.02	0.16	Left	Cheek	2	0910E	29.3	93.2	0.133	-	1.117	1.073	-	
5290	58	802.11ac	OFDM	80	13.5	13.02	0.19	Left	Tilt	2	0910E	29.3	93.2	0.121	-	1.117	1.073	-	
5530	106	802.11ac	OFDM	80	13.5	12.95	0.19	Right	Cheek	1	CE1F1	29.3	95.5	0.507	0.288	1.135	1.047	0.342	
5530	106	802.11ac	OFDM	80	13.5	12.95	0.17	Right	Tilt	1	CE1F1	29.3	95.5	0.470	-	1.135	1.047	-	
5530	106	802.11ac	OFDM	80	13.5	12.95	0.12	Left	Cheek	1	CE1F1	29.3	95.5	0.214	-	1.135	1.047	-	
5530	106	802.11ac	OFDM	80	13.5	12.95	0.13	Left	Tilt	1	CE1F1	29.3	95.5	0.169	-	1.135	1.047	-	
5530	106	802.11ac	OFDM	80	13.5	13.07	0.13	Right	Cheek	2	0910E	29.3	93.2	0.435	0.217	1.104	1.073	0.257	
5530	106	802.11ac	OFDM	80	13.5	13.07	0.19	Right	Tilt	2	0910E	29.3	93.2	0.326	-	1.104	1.073	-	
5530	106	802.11ac	OFDM	80	13.5	13.07	0.21	Left	Cheek	2	0910E	29.3	93.2	0.262	-	1.104	1.073	-	
5530	106	802.11ac	OFDM	80	13.5	13.07	0.16	Left	Tilt	2	0910E	29.3	93.2	0.211	-	1.104	1.073	-	
5775	155	802.11ac	OFDM	80	13.5	13.20	-0.19	Right	Cheek	1	CE1F1	29.3	95.5	1.254	0.485	1.072	1.047	0.544	A10
5775	155	802.11ac	OFDM	80	13.5	13.20	0.12	Right	Tilt	1	CE1F1	29.3	95.5	0.704	0.275	1.072	1.047	0.309	
5775	155	802.11ac	OFDM	80	13.5	13.20	0.15	Left	Cheek	1	CE1F1	29.3	95.5	0.391	-	1.072	1.047	-	
5775	155	802.11ac	OFDM	80	13.5	13.20	0.16	Left	Tilt	1	CE1F1	29.3	95.5	0.265	-	1.072	1.047	-	
5775	155	802.11ac	OFDM	80	13.5	13.21	-0.20	Right	Cheek	2	0910E	29.3	93.2	0.676	0.273	1.069	1.073	0.313	
5775	155	802.11ac	OFDM	80	13.5	13.21	-0.12	Right	Tilt	2	0910E	29.3	93.2	0.472	-	1.069	1.073	-	
5775	155	802.11ac	OFDM	80	13.5	13.21	0.21	Left	Cheek	2	0910E	29.3	93.2	0.377	-	1.069	1.073	-	
5775	155	802.11ac	OFDM	80	13.5	13.21	0.20	Left	Tilt	2	0910E	29.3	93.2	0.254	-	1.069	1.073	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT																			
Spatial Peak									Head										
Uncontrolled Exposure/General Population									1.6 W/kg (mW/g) averaged over 1 gram										

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 53 of 76

Table 11-12
Bluetooth Head SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode/Band	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 (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441.00	39	Bluetooth	FHSS	10.0	9.97	0.15	Right	Cheek	0910E	2	77.0	0.079	1.007	1.299	0.103	A11
2441.00	39	Bluetooth	FHSS	10.0	9.97	0.12	Right	Tilt	0910E	2	77.0	0.043	1.007	1.299	0.056	
2441.00	39	Bluetooth	FHSS	10.0	9.97	-0.12	Left	Cheek	0910E	2	77.0	0.023	1.007	1.299	0.030	
2441.00	39	Bluetooth	FHSS	10.0	9.97	0.11	Left	Tilt	0910E	2	77.0	0.014	1.007	1.299	0.018	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Head								
Spatial Peak								1.6 W/kg (mW/g)								
Uncontrolled Exposure/General Population								averaged over 1 gram								

11.2 Standalone Body-Worn SAR Data

Table 11-13
GSM/UMTS Body-Worn SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna State	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	31.87	-0.08	15 mm	N/A	D6B13	1	1:8.3	back	0.229	1.297	0.297	A12
1880.00	661	GSM 1900	GSM	30.0	28.75	0.02	15 mm	N/A	D6D17	1	1:8.3	back	0.180	1.334	0.240	A14
836.60	4183	UMTS 850	RMC	24.5	24.11	-0.01	15 mm	15	D6B13	N/A	1:1	back	0.270	1.094	0.295	A16
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
LTE Body-Worn SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna State	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	23.5	23.50	0.00	0	N/A	D6D52	QPSK	1	0	15 mm	back	1:1	0.180	1.000	0.180	A18
707.50	23095	Mid	LTE Band 12	10	22.5	22.47	-0.02	1	N/A	D6D52	QPSK	25	0	15 mm	back	1:1	0.145	1.007	0.146	
782.00	23230	Mid	LTE Band 13	10	24.0	23.01	-0.02	0	N/A	D6D52	QPSK	1	0	15 mm	back	1:1	0.167	1.256	0.210	A20
782.00	23230	Mid	LTE Band 13	10	23.0	22.05	0.03	1	N/A	D6D52	QPSK	25	0	15 mm	back	1:1	0.112	1.245	0.139	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	23.47	-0.02	0	15	D6B13	QPSK	1	0	15 mm	back	1:1	0.184	1.007	0.185	A22
836.50	20525	Mid	LTE Band 5 (Cell)	10	22.5	22.37	0.00	1	15	D6B13	QPSK	25	0	15 mm	back	1:1	0.151	1.030	0.156	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.0	21.92	-0.02	0	N/A	D6A57	QPSK	1	0	15 mm	back	1:1	0.383	1.282	0.491	A24
1732.50	20175	Mid	LTE Band 4 (AWS)	20	22.0	20.94	-0.01	1	N/A	D6A57	QPSK	50	0	15 mm	back	1:1	0.298	1.276	0.380	
2680.00	41490	High	LTE Band 41	20	24.0	23.73	0.07	0	N/A	D6D17	QPSK	1	0	15 mm	back	1:1.58	0.185	1.064	0.197	A26
2680.00	41490	High	LTE Band 41	20	23.0	22.53	0.02	1	N/A	D6D17	QPSK	50	0	15 mm	back	1:1.58	0.176	1.114	0.196	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram											

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 54 of 76

Table 11-15
DTS Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	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	20.5	19.65	0.05	15 mm	1	0910E	1	back	99.8	0.244	0.163	1.216	1.002	0.199	A28
2412	1	802.11b	DSSS	22	20.5	18.98	0.02	15 mm	2	0910E	1	back	99.8	0.129	0.100	1.419	1.002	0.142	
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 11-16
DTS Body-Worn SAR for Conditions with 2.4 GHz and 5 GHz WLAN SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm] (per antenna)	Ant 1 Conducted Power [dBm]	Ant 2 Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	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)	
2412	1	802.11n	OFDM	20	13.5	12.65	13.04	0.12	15 mm	MIMO	0910E	13	back	98.9	0.060	0.042	1.216	1.011	0.052	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT									Body											
Spatial Peak									1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population									averaged over 1 gram											

Note: DTS MIMO was additionally evaluated at the maximum allowed output power for operations with Simultaneous 2.4 GHz and 5 GHz WLAN. 5 GHz WLAN was not transmitting during the above evaluations.

Table 11-17
NII Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	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)	
5290	58	802.11ac	OFDM	80	15.5	14.56	0.09	15 mm	1	23544	29.3	back	95.5	0.133	0.056	1.242	1.047	0.073	
5290	58	802.11ac	OFDM	80	15.5	15.11	0.09	15 mm	2	23544	29.3	back	93.2	0.241	0.099	1.094	1.073	0.116	
5610	122	802.11ac	OFDM	80	15.5	15.34	-0.07	15 mm	1	23544	29.3	back	95.5	0.625	0.371	1.038	1.047	0.403	A30
5610	122	802.11ac	OFDM	80	15.5	14.82	-0.13	15 mm	2	23544	29.3	back	93.2	0.454	0.226	1.169	1.073	0.283	
5775	155	802.11ac	OFDM	80	15.5	15.04	0.10	15 mm	1	23544	29.3	back	95.5	0.427	0.187	1.112	1.047	0.218	
5775	155	802.11ac	OFDM	80	15.5	15.01	-0.12	15 mm	2	23544	29.3	back	93.2	0.323	0.133	1.119	1.073	0.160	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body											
Spatial Peak								1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population								averaged over 1 gram											

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 55 of 76

Table 11-18
NII Body-Worn SAR for Conditions with 2.4 GHz and 5 GHz WLAN SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm] (per antenna)	Ant 1 Conducted Power [dBm]	Ant 2 Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	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)	
5290	58	802.11ac	OFDM	80	13.5	13.30	13.02	-0.11	15 mm	MIMO	23544	58.5	back	88.9	0.261	0.122	1.117	1.125	0.153	
5530	106	802.11ac	OFDM	80	13.5	12.95	13.07	-0.02	15 mm	MIMO	23544	58.5	back	88.9	0.659	0.323	1.135	1.125	0.412	
5775	155	802.11ac	OFDM	80	13.5	13.20	13.21	-0.03	15 mm	MIMO	23544	58.5	back	88.9	0.473	0.202	1.072	1.125	0.244	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram											

Note: NII MIMO was additionally evaluated at the maximum allowed output power for operations with Simultaneous 2.4 GHz and 5 GHz WLAN. 2.4 GHz WLAN was not transmitting during the above evaluations.

Table 11-19
Bluetooth 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 (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g) (W/kg)	Plot #
MHz	Ch.											(W/kg)				
2441	39	Bluetooth	FHSS	16.0	15.65	-0.12	15 mm	0910E	1	back	77.0	0.027	1.084	1.299	0.038	A32
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram							

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 56 of 76

11.3 Standalone Hotspot SAR Data

Table 11-20
GPRS/UMTS Hotspot SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna State	Device Serial Number	# of GPRS Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
824.20	128	GSM 850	GPRS	29.8	28.12	-0.10	10 mm	N/A	D6B13	3	1:2.76	back	0.346	1.472	0.509	
836.60	190	GSM 850	GPRS	29.8	27.86	-0.02	10 mm	N/A	D6B13	3	1:2.76	back	0.532	1.563	0.832	A13
848.80	251	GSM 850	GPRS	29.8	27.80	-0.03	10 mm	N/A	D6B13	3	1:2.76	back	0.517	1.585	0.819	
836.60	190	GSM 850	GPRS	29.8	27.86	-0.07	10 mm	N/A	D6B13	3	1:2.76	front	0.430	1.563	0.672	
836.60	190	GSM 850	GPRS	29.8	27.86	-0.12	10 mm	N/A	D6B13	3	1:2.76	bottom	0.279	1.563	0.436	
836.60	190	GSM 850	GPRS	29.8	27.86	0.00	10 mm	N/A	D6B13	3	1:2.76	right	0.257	1.563	0.402	
836.60	190	GSM 850	GPRS	29.8	27.86	0.10	10 mm	N/A	D6B13	3	1:2.76	left	0.099	1.563	0.155	
1880.00	661	GSM 1900	GPRS	25.0	24.03	0.00	10 mm	N/A	D6D17	3	1:2.76	back	0.361	1.250	0.451	
1880.00	661	GSM 1900	GPRS	25.0	24.03	-0.11	10 mm	N/A	D6D17	3	1:2.76	front	0.393	1.250	0.491	
1850.20	512	GSM 1900	GPRS	25.0	23.97	-0.07	10 mm	N/A	D6D17	3	1:2.76	bottom	0.671	1.268	0.851	
1880.00	661	GSM 1900	GPRS	25.0	24.03	-0.06	10 mm	N/A	D6D17	3	1:2.76	bottom	0.757	1.250	0.946	
1909.80	810	GSM 1900	GPRS	25.0	24.05	-0.06	10 mm	N/A	D6D17	3	1:2.76	bottom	0.861	1.245	1.072	A15
1880.00	661	GSM 1900	GPRS	25.0	24.03	0.04	10 mm	N/A	D6D17	3	1:2.76	right	0.076	1.250	0.095	
1880.00	661	GSM 1900	GPRS	25.0	24.03	-0.17	10 mm	N/A	D6D17	3	1:2.76	left	0.077	1.250	0.096	
1909.80	810	GSM 1900	GPRS	25.0	24.05	0.16	10 mm	N/A	D6D17	3	1:2.76	bottom	0.838	1.245	1.043	
836.60	4183	UMTS 850	RMC	24.5	24.11	-0.01	10 mm	15	D6B13	N/A	1:1	back	0.584	1.094	0.639	A17
836.60	4183	UMTS 850	RMC	24.5	24.11	-0.10	10 mm	15	D6B13	N/A	1:1	front	0.483	1.094	0.528	
836.60	4183	UMTS 850	RMC	24.5	24.11	-0.02	10 mm	15	D6B13	N/A	1:1	bottom	0.333	1.094	0.364	
836.60	4183	UMTS 850	RMC	24.5	24.11	-0.02	10 mm	15	D6B13	N/A	1:1	right	0.304	1.094	0.333	
836.60	4183	UMTS 850	RMC	24.5	24.11	0.01	10 mm	15	D6B13	N/A	1:1	left	0.133	1.094	0.146	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Body									
Spatial Peak							1.6 W/kg (mW/g)									
Uncontrolled Exposure/General Population							averaged over 1 gram									

Note: Blue entry represents variability data

Table 11-21
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	23.5	23.50	-0.10	0	D6D52	QPSK	1	0	10 mm	back	1:1	0.295	1.000	0.295	A19
707.50	23095	Mid	LTE Band 12	10	22.5	22.47	-0.11	1	D6D52	QPSK	25	0	10 mm	back	1:1	0.244	1.007	0.246	
707.50	23095	Mid	LTE Band 12	10	23.5	23.50	-0.02	0	D6D52	QPSK	1	0	10 mm	front	1:1	0.210	1.000	0.210	
707.50	23095	Mid	LTE Band 12	10	22.5	22.47	-0.02	1	D6D52	QPSK	25	0	10 mm	front	1:1	0.173	1.007	0.174	
707.50	23095	Mid	LTE Band 12	10	23.5	23.50	-0.06	0	D6D52	QPSK	1	0	10 mm	bottom	1:1	0.129	1.000	0.129	
707.50	23095	Mid	LTE Band 12	10	22.5	22.47	0.01	1	D6D52	QPSK	25	0	10 mm	bottom	1:1	0.104	1.007	0.105	
707.50	23095	Mid	LTE Band 12	10	23.5	23.50	-0.06	0	D6D52	QPSK	1	0	10 mm	right	1:1	0.178	1.000	0.178	
707.50	23095	Mid	LTE Band 12	10	22.5	22.47	-0.02	1	D6D52	QPSK	25	0	10 mm	right	1:1	0.155	1.007	0.156	
707.50	23095	Mid	LTE Band 12	10	23.5	23.50	0.00	0	D6D52	QPSK	1	0	10 mm	left	1:1	0.107	1.000	0.107	
707.50	23095	Mid	LTE Band 12	10	22.5	22.47	-0.05	1	D6D52	QPSK	25	0	10 mm	left	1:1	0.091	1.007	0.092	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body											
Spatial Peak								1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population								averaged over 1 gram											

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 57 of 76

Table 11-22
LTE Band 13 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)	
782.00	23230	Mid	LTE Band 13	10	24.0	23.01	-0.05	0	D6D52	QPSK	1	0	10 mm	back	1:1	1.256	0.443	A21
782.00	23230	Mid	LTE Band 13	10	23.0	22.05	-0.03	1	D6D52	QPSK	25	0	10 mm	back	1:1	1.245	0.345	
782.00	23230	Mid	LTE Band 13	10	24.0	23.01	0.01	0	D6D52	QPSK	1	0	10 mm	front	1:1	1.256	0.347	
782.00	23230	Mid	LTE Band 13	10	23.0	22.05	-0.07	1	D6D52	QPSK	25	0	10 mm	front	1:1	1.245	0.240	
782.00	23230	Mid	LTE Band 13	10	24.0	23.01	0.04	0	D6D52	QPSK	1	0	10 mm	bottom	1:1	1.256	0.206	
782.00	23230	Mid	LTE Band 13	10	23.0	22.05	-0.02	1	D6D52	QPSK	25	0	10 mm	bottom	1:1	1.245	0.167	
782.00	23230	Mid	LTE Band 13	10	24.0	23.01	0.03	0	D6D52	QPSK	1	0	10 mm	right	1:1	1.256	0.162	
782.00	23230	Mid	LTE Band 13	10	23.0	22.05	-0.03	1	D6D52	QPSK	25	0	10 mm	right	1:1	1.245	0.123	
782.00	23230	Mid	LTE Band 13	10	24.0	23.01	0.02	0	D6D52	QPSK	1	0	10 mm	left	1:1	1.256	0.082	
782.00	23230	Mid	LTE Band 13	10	23.0	22.05	-0.03	1	D6D52	QPSK	25	0	10 mm	left	1:1	1.245	0.070	
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 11-23
LTE Band 5 (Cell) Hotspot SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna State	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)
MHz	Ch.															(W/kg)		(W/kg)
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	23.47	-0.01	0	15	D6B13	QPSK	1	0	10 mm	back	1:1	1.007	0.391
836.50	20525	Mid	LTE Band 5 (Cell)	10	22.5	22.37	-0.03	1	15	D6B13	QPSK	25	0	10 mm	back	1:1	1.030	0.324
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	23.47	-0.13	0	15	D6B13	QPSK	1	0	10 mm	front	1:1	1.007	0.323
836.50	20525	Mid	LTE Band 5 (Cell)	10	22.5	22.37	-0.02	1	15	D6B13	QPSK	25	0	10 mm	front	1:1	1.030	0.269
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	23.47	-0.05	0	15	D6B13	QPSK	1	0	10 mm	bottom	1:1	1.007	0.241
836.50	20525	Mid	LTE Band 5 (Cell)	10	22.5	22.37	-0.06	1	15	D6B13	QPSK	25	0	10 mm	bottom	1:1	1.030	0.194
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	23.47	-0.03	0	15	D6B13	QPSK	1	0	10 mm	right	1:1	1.007	0.219
836.50	20525	Mid	LTE Band 5 (Cell)	10	22.5	22.37	0.01	1	15	D6B13	QPSK	25	0	10 mm	right	1:1	1.030	0.180
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	23.47	-0.01	0	15	D6B13	QPSK	1	0	10 mm	left	1:1	1.007	0.075
836.50	20525	Mid	LTE Band 5 (Cell)	10	22.5	22.37	-0.02	1	15	D6B13	QPSK	25	0	10 mm	left	1:1	1.030	0.064
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 11-24
LTE Band 4 (AWS) 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)	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	20.5	20.07	-0.01	0	D6A57	QPSK	1	0	10 mm	back	1:1	1.104	0.375	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	20.5	20.08	0.00	0	D6A57	QPSK	50	0	10 mm	back	1:1	1.102	0.371	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	20.5	20.07	0.02	0	D6A57	QPSK	1	0	10 mm	front	1:1	1.104	0.367	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	20.5	20.08	-0.08	0	D6A57	QPSK	50	0	10 mm	front	1:1	1.102	0.369	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	20.5	20.07	0.02	0	D6A57	QPSK	1	0	10 mm	bottom	1:1	1.104	0.619	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	20.5	20.08	-0.01	0	D6A57	QPSK	50	0	10 mm	bottom	1:1	1.102	0.625	A25
1732.50	20175	Mid	LTE Band 4 (AWS)	20	20.5	20.07	0.05	0	D6A57	QPSK	1	0	10 mm	right	1:1	1.104	0.051	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	20.5	20.08	0.01	0	D6A57	QPSK	50	0	10 mm	right	1:1	1.102	0.050	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	20.5	20.07	-0.02	0	D6A57	QPSK	1	0	10 mm	left	1:1	1.104	0.108	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	20.5	20.08	-0.03	0	D6A57	QPSK	50	0	10 mm	left	1:1	1.102	0.108	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram										

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 58 of 76

Table 11-25
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)		
2680.00	41490	High	LTE Band 41	20	24.0	23.73	0.02	0	D6D17	QPSK	1	0	10 mm	back	1:1.58	0.416	1.064	0.443	
2680.00	41490	High	LTE Band 41	20	23.0	22.53	0.07	1	D6D17	QPSK	50	0	10 mm	back	1:1.58	0.327	1.114	0.364	
2680.00	41490	High	LTE Band 41	20	24.0	23.73	0.02	0	D6D17	QPSK	1	0	10 mm	front	1:1.58	0.367	1.064	0.390	
2680.00	41490	High	LTE Band 41	20	23.0	22.53	0.05	1	D6D17	QPSK	50	0	10 mm	front	1:1.58	0.286	1.114	0.319	
2506.00	39750	Low	LTE Band 41	20	24.0	23.32	0.01	0	D6D17	QPSK	1	0	10 mm	bottom	1:1.58	0.449	1.169	0.525	
2549.50	40185	Low-Mid	LTE Band 41	20	24.0	23.45	-0.04	0	D6D17	QPSK	1	0	10 mm	bottom	1:1.58	0.580	1.135	0.658	
2593.00	40620	Mid	LTE Band 41	20	24.0	23.63	-0.01	0	D6D17	QPSK	1	0	10 mm	bottom	1:1.58	0.691	1.089	0.752	
2636.50	41055	Mid-High	LTE Band 41	20	24.0	23.55	-0.12	0	D6D17	QPSK	1	0	10 mm	bottom	1:1.58	0.702	1.109	0.779	A27
2680.00	41490	High	LTE Band 41	20	24.0	23.73	-0.05	0	D6D17	QPSK	1	0	10 mm	bottom	1:1.58	0.631	1.064	0.671	
2680.00	41490	High	LTE Band 41	20	23.0	22.53	-0.04	1	D6D17	QPSK	50	0	10 mm	bottom	1:1.58	0.481	1.114	0.536	
2680.00	41490	High	LTE Band 41	20	23.0	22.46	-0.08	1	D6D17	QPSK	100	0	10 mm	bottom	1:1.58	0.463	1.132	0.524	
2680.00	41490	High	LTE Band 41	20	24.0	23.73	0.01	0	D6D17	QPSK	1	0	10 mm	left	1:1.58	0.202	1.064	0.215	
2680.00	41490	High	LTE Band 41	20	23.0	22.53	0.04	1	D6D17	QPSK	50	0	10 mm	left	1:1.58	0.158	1.114	0.176	
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 11-26
WLAN Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	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	20.5	19.65	0.16	10 mm	1	0910E	1	back	99.8	0.447	0.306	1.216	1.002	0.373	A29
2437	6	802.11b	DSSS	22	20.5	19.65	0.10	10 mm	1	0910E	1	front	99.8	0.135	-	1.216	1.002	-	
2437	6	802.11b	DSSS	22	20.5	19.65	-0.10	10 mm	1	0910E	1	top	99.8	0.420	-	1.216	1.002	-	
2437	6	802.11b	DSSS	22	20.5	19.65	-0.01	10 mm	1	0910E	1	left	99.8	0.040	-	1.216	1.002	-	
2412	1	802.11b	DSSS	22	20.5	18.98	0.03	10 mm	2	0910E	1	back	99.8	0.314	0.256	1.419	1.002	0.364	
2412	1	802.11b	DSSS	22	20.5	18.98	0.15	10 mm	2	0910E	1	front	99.8	0.128	-	1.419	1.002	-	
2412	1	802.11b	DSSS	22	20.5	18.98	0.20	10 mm	2	0910E	1	top	99.8	0.036	-	1.419	1.002	-	
2412	1	802.11b	DSSS	22	20.5	18.98	0.00	10 mm	2	0910E	1	left	99.8	0.146	-	1.419	1.002	-	
5775	155	802.11ac	OFDM	80	15.5	15.04	0.15	10 mm	1	23544	29.3	back	95.5	0.834	0.331	1.112	1.047	0.385	
5775	155	802.11ac	OFDM	80	15.5	15.04	0.19	10 mm	1	23544	29.3	front	95.5	0.112	-	1.112	1.047	-	
5775	155	802.11ac	OFDM	80	15.5	15.04	-0.11	10 mm	1	23544	29.3	top	95.5	0.236	-	1.112	1.047	-	
5775	155	802.11ac	OFDM	80	15.5	15.04	0.19	10 mm	1	23544	29.3	left	95.5	0.018	-	1.112	1.047	-	
5775	155	802.11ac	OFDM	80	15.5	15.01	-0.07	10 mm	2	23544	29.3	back	93.2	0.423	0.213	1.119	1.073	0.256	
5775	155	802.11ac	OFDM	80	15.5	15.01	-0.16	10 mm	2	23544	29.3	front	93.2	0.099	-	1.119	1.073	-	
5775	155	802.11ac	OFDM	80	15.5	15.01	-0.03	10 mm	2	23544	29.3	top	93.2	0.152	-	1.119	1.073	-	
5775	155	802.11ac	OFDM	80	15.5	15.01	0.19	10 mm	2	23544	29.3	left	93.2	0.022	-	1.119	1.073	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body											
Spatial Peak								1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population								averaged over 1 gram											

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 59 of 76

Table 11-27
WLAN Hotspot SAR for Conditions with 2.4 GHz and 5 GHz WLAN SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm] (per antenna)	Ant 1 Conducted Power [dBm]	Ant 2 Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	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)	
2412	1	802.11n	OFDM	20	13.5	12.65	13.04	0.14	10 mm	MIMO	0910E	13	back	98.9	0.132	0.093	1.216	1.011	0.114	
2412	1	802.11n	OFDM	20	13.5	12.65	13.04	0.17	10 mm	MIMO	0910E	13	front	98.9	0.048	-	1.216	1.011	-	
2412	1	802.11n	OFDM	20	13.5	12.65	13.04	0.09	10 mm	MIMO	0910E	13	top	98.9	0.089	-	1.216	1.011	-	
2412	1	802.11n	OFDM	20	13.5	12.65	13.04	0.17	10 mm	MIMO	0910E	13	left	98.9	0.044	-	1.216	1.011	-	
5775	155	802.11ac	OFDM	80	13.5	13.20	13.21	0.07	10 mm	MIMO	23544	58.5	back	88.9	0.757	0.332	1.072	1.125	0.400	A31
5775	155	802.11ac	OFDM	80	13.5	13.20	13.21	0.19	10 mm	MIMO	23544	58.5	front	88.9	0.108	-	1.072	1.125	-	
5775	155	802.11ac	OFDM	80	13.5	13.20	13.21	0.16	10 mm	MIMO	23544	58.5	top	88.9	0.336	0.149	1.072	1.125	0.180	
5775	155	802.11ac	OFDM	80	13.5	13.20	13.21	0.13	10 mm	MIMO	23544	58.5	left	88.9	0.023	-	1.072	1.125	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT									Body											
Spatial Peak									1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population									averaged over 1 gram											

Note: DTS and NII MIMO were additionally evaluated at the maximum allowed output power for operations with Simultaneous 2.4 GHz and 5 GHz WLAN. 5 GHz WLAN was not transmitting during 2.4 GHz WLAN evaluations, and 2.4 GHz WLAN was not transmitting during 5 GHz WLAN evaluations.

Table 11-28
Bluetooth 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 (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	10.0	9.97	-0.20	1.0 cm	0910E	2	back	77.0	0.030	1.007	1.299	0.039	A33
2441	39	Bluetooth	FHSS	10.0	9.97	0.08	1.0 cm	0910E	2	front	77.0	0.009	1.007	1.299	0.012	
2441	39	Bluetooth	FHSS	10.0	9.97	-0.13	1.0 cm	0910E	2	top	77.0	0.001	1.007	1.299	0.001	
2441	39	Bluetooth	FHSS	10.0	9.97	0.16	1.0 cm	0910E	2	left	77.0	0.009	1.007	1.299	0.012	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Body									
Spatial Peak							1.6 W/kg (mW/g)									
Uncontrolled Exposure/General Population							averaged over 1 gram									

11.4 Standalone Phablet SAR Data

Table 11-29
GPRS Phablet SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of GPRS Slots	Duty Cycle	Side	SAR (10g)	Scaling Factor	Reported SAR (10g) (W/kg)	Plot #
MHz	Ch.											(W/kg)			
1850.20	512	GSM 1900	GPRS	26.5	24.88	-0.06	0 mm	D6A57	3	1:2.76	bottom	1.780	1.452	2.585	
1880.00	661	GSM 1900	GPRS	26.5	24.99	-0.04	0 mm	D6A57	3	1:2.76	bottom	1.880	1.416	2.662	A34
1909.80	810	GSM 1900	GPRS	26.5	24.98	-0.03	0 mm	D6A57	3	1:2.76	bottom	1.750	1.419	2.483	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Phablet								
Spatial Peak							4.0 W/kg (mW/g)								
Uncontrolled Exposure/General Population							averaged over 10 grams								

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 60 of 76

**Table 11-30
WLAN Phablet SAR**

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	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)	
5290	58	802.11ac	OFDM	80	15.5	14.56	0.05	0 mm	1	23544	29.3	back	95.5	5.826	0.581	1.242	1.047	0.756	
5290	58	802.11ac	OFDM	80	15.5	14.56	0.20	0 mm	1	23544	29.3	front	95.5	1.541	-	1.242	1.047	-	
5290	58	802.11ac	OFDM	80	15.5	14.56	0.12	0 mm	1	23544	29.3	top	95.5	0.899	-	1.242	1.047	-	
5290	58	802.11ac	OFDM	80	15.5	14.56	0.12	0 mm	1	23544	29.3	left	95.5	0.045	-	1.242	1.047	-	
5290	58	802.11ac	OFDM	80	15.5	15.11	-0.16	0 mm	2	23544	29.3	back	93.2	13.971	0.893	1.094	1.073	1.048	
5290	58	802.11ac	OFDM	80	15.5	15.11	0.15	0 mm	2	23544	29.3	front	93.2	3.597	0.327	1.094	1.073	0.384	
5290	58	802.11ac	OFDM	80	15.5	15.11	-0.18	0 mm	2	23544	29.3	top	93.2	1.374	-	1.094	1.073	-	
5290	58	802.11ac	OFDM	80	15.5	15.11	0.16	0 mm	2	23544	29.3	left	93.2	0.361	-	1.094	1.073	-	
5610	122	802.11ac	OFDM	80	15.5	15.34	-0.19	0 mm	1	23544	29.3	back	95.5	7.943	1.380	1.038	1.047	1.500	A35
5610	122	802.11ac	OFDM	80	15.5	15.34	0.19	0 mm	1	23544	29.3	front	95.5	5.177	0.524	1.038	1.047	0.569	
5610	122	802.11ac	OFDM	80	15.5	15.34	0.18	0 mm	1	23544	29.3	top	95.5	2.689	-	1.038	1.047	-	
5610	122	802.11ac	OFDM	80	15.5	15.34	0.12	0 mm	1	23544	29.3	left	95.5	0.197	-	1.038	1.047	-	
5610	122	802.11ac	OFDM	80	15.5	14.82	-0.19	0 mm	2	23544	29.3	back	93.2	15.143	0.788	1.169	1.073	0.988	
5610	122	802.11ac	OFDM	80	15.5	14.82	0.12	0 mm	2	23544	29.3	front	93.2	2.121	-	1.169	1.073	-	
5610	122	802.11ac	OFDM	80	15.5	14.82	0.15	0 mm	2	23544	29.3	top	93.2	1.663	-	1.169	1.073	-	
5610	122	802.11ac	OFDM	80	15.5	14.82	0.14	0 mm	2	23544	29.3	left	93.2	0.259	-	1.169	1.073	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Phablet 4.0 W/kg (mW/g) averaged over 10 grams											
Spatial Peak																			
Uncontrolled Exposure/General Population																			

**Table 11-31
Bluetooth Phablet SAR**

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.													(W/kg)			(W/kg)	
2441	39	Bluetooth	FHSS	16.0	16.0	15.65	0.09	0 mm	0910E	1	back	77.0	77.0	0.482	1.084	1.299	0.679	A36
2441	39	Bluetooth	FHSS	16.0	16.0	15.65	0.15	0 mm	0910E	1	front	77.0	77.0	0.208	1.084	1.299	0.293	
2441	39	Bluetooth	FHSS	16.0	16.0	15.65	-0.20	0 mm	0910E	1	top	77.0	77.0	0.065	1.084	1.299	0.092	
2441	39	Bluetooth	FHSS	16.0	16.0	15.65	0.12	0 mm	0910E	1	left	77.0	77.0	0.043	1.084	1.299	0.061	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT									Phablet									
Spatial Peak									4.0 W/kg (mW/g)									
Uncontrolled Exposure/General Population									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.
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.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 61 of 76

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. Per FCC KDB 865664 D01v01r04, variability SAR tests were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 13 for variability analysis.
9. 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).
10. 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 scaled to the maximum output power (including tolerance) $1g$ SAR > 1.2 W/kg.
11. When 10-g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.
12. This device supports dynamic antenna tuning for some bands. Per FCC Guidance, SAR was measured according to the normally required SAR measurement configurations with tuner active. The auto-tune state determined by the device was verified before and after each SAR measurement and is listed in tables above. Please see Section 14 for supplemental data.
13. 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.

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 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 $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel was used.
4. When 10-g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

UMTS Notes:

1. UMTS mode in was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03r01. AMR and HSPA SAR was not required per the 3G Test Reduction Procedure in KDB Publication 941225 D01v03r01.
2. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel was used.
3. When 10-g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

LTE Notes:

1. LTE Considerations: 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.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 62 of 76

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 (scaled) for LTE Band 41 SAR measured at the highest output power channel in a given a test configuration was > 0.6 W/kg, 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 and hotspot 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, 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 single transmission chain 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 single transmission chain 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. See Section 8.6.6 for more information.
4. Per KDB Publication 248227 D01v02r02, SAR for MIMO was evaluated by following the simultaneous SAR provisions from KDB Publication 447498 D01v06 by either evaluating the sum of the 1g SAR values of each antenna transmitting independently or making a SAR measurement with both antennas transmitting simultaneously. Please see Section 12 for complete analysis.
5. 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 or all test channels were measured.
6. When 10-g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.
7. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated EMC test reports.

Bluetooth Notes:

1. Body-worn and Phablet 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 9.6 for the time-domain plot and calculation for the duty factor of the device.
2. Head and hotspot Bluetooth SAR was evaluated for BT EDR tethering applications.
3. Head and Hotspot Bluetooth SAR were measured with the device connected to a call box with hopping disabled with 2DH5 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 9.6 for the time-domain plot and calculation for the duty factor of the device.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 63 of 76

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 1-g SAR for all the simultaneous transmitting antennas in a specific 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 1-g or 10-g 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 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 Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	GSM 850	0.162	0.460	0.420	0.622	0.582	1.042
	GSM 1900	0.071	0.460	0.420	0.531	0.491	0.951
	UMTS 850	0.200	0.460	0.420	0.660	0.620	1.080
	LTE Band 12	0.115	0.460	0.420	0.575	0.535	0.995
	LTE Band 13	0.089	0.460	0.420	0.549	0.509	0.969
	LTE Band 5 (Cell)	0.138	0.460	0.420	0.598	0.558	1.018
	LTE Band 4 (AWS)	0.109	0.460	0.420	0.569	0.529	0.989
	LTE Band 41	0.051	0.460	0.420	0.511	0.471	0.931

FCC ID: A3LSC03J		SAR EVALUATION REPORT			Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset			Page 64 of 76

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 Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	GSM 850	0.162	0.544	0.313	0.706	0.475	1.019
	GSM 1900	0.071	0.544	0.313	0.615	0.384	0.928
	UMTS 850	0.200	0.544	0.313	0.744	0.513	1.057
	LTE Band 12	0.115	0.544	0.313	0.659	0.428	0.972
	LTE Band 13	0.089	0.544	0.313	0.633	0.402	0.946
	LTE Band 5 (Cell)	0.138	0.544	0.313	0.682	0.451	0.995
	LTE Band 4 (AWS)	0.109	0.544	0.313	0.653	0.422	0.966
	LTE Band 41	0.051	0.544	0.313	0.595	0.364	0.908

Table 12-3
Simultaneous Transmission Scenario with 2.4 GHz MIMO and 5 GHz MIMO WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	4	1+2	1+3	1+2+3
Head SAR	GSM 850	0.162	0.482	0.544	0.313	0.644	0.706	1.501
	GSM 1900	0.071	0.482	0.544	0.313	0.553	0.615	1.410
	UMTS 850	0.200	0.482	0.544	0.313	0.682	0.744	1.539
	LTE Band 12	0.115	0.482	0.544	0.313	0.597	0.659	1.454
	LTE Band 13	0.089	0.482	0.544	0.313	0.571	0.633	1.428
	LTE Band 5 (Cell)	0.138	0.482	0.544	0.313	0.620	0.682	1.477
	LTE Band 4 (AWS)	0.109	0.482	0.544	0.313	0.591	0.653	1.448
	LTE Band 41	0.051	0.482	0.544	0.313	0.533	0.595	1.390

Table 12-4
Simultaneous Transmission Scenario with Bluetooth (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM 850	0.162	0.103	0.265
	GSM 1900	0.071	0.103	0.174
	UMTS 850	0.200	0.103	0.303
	LTE Band 12	0.115	0.103	0.218
	LTE Band 13	0.089	0.103	0.192
	LTE Band 5 (Cell)	0.138	0.103	0.241
	LTE Band 4 (AWS)	0.109	0.103	0.212
	LTE Band 41	0.051	0.103	0.154

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset	Page 65 of 76	

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 Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body-Worn	GSM 850	0.297	0.199	0.142	0.496	0.439	0.638
	GSM 1900	0.240	0.199	0.142	0.439	0.382	0.581
	UMTS 850	0.295	0.199	0.142	0.494	0.437	0.636
	LTE Band 12	0.180	0.199	0.142	0.379	0.322	0.521
	LTE Band 13	0.210	0.199	0.142	0.409	0.352	0.551
	LTE Band 5 (Cell)	0.185	0.199	0.142	0.384	0.327	0.526
	LTE Band 4 (AWS)	0.491	0.199	0.142	0.690	0.633	0.832
	LTE Band 41	0.197	0.199	0.142	0.396	0.339	0.538

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 Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body-Worn	GSM 850	0.297	0.403	0.283	0.700	0.580	0.983
	GSM 1900	0.240	0.403	0.283	0.643	0.523	0.926
	UMTS 850	0.295	0.403	0.283	0.698	0.578	0.981
	LTE Band 12	0.180	0.403	0.283	0.583	0.463	0.866
	LTE Band 13	0.210	0.403	0.283	0.613	0.493	0.896
	LTE Band 5 (Cell)	0.185	0.403	0.283	0.588	0.468	0.871
	LTE Band 4 (AWS)	0.491	0.403	0.283	0.894	0.774	1.177
	LTE Band 41	0.197	0.403	0.283	0.600	0.480	0.883

Table 12-7
Simultaneous Transmission Scenario with 2.4 GHz MIMO and 5 GHz MIMO WLAN (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body-Worn	GSM 850	0.297	0.052	0.412	0.761
	GSM 1900	0.240	0.052	0.412	0.704
	UMTS 850	0.295	0.052	0.412	0.759
	LTE Band 12	0.180	0.052	0.412	0.644
	LTE Band 13	0.210	0.052	0.412	0.674
	LTE Band 5 (Cell)	0.185	0.052	0.412	0.649
	LTE Band 4 (AWS)	0.491	0.052	0.412	0.955
	LTE Band 41	0.197	0.052	0.412	0.661

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset	Page 66 of 76	

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM 850	0.297	0.038	0.335
	GSM 1900	0.240	0.038	0.278
	UMTS 850	0.295	0.038	0.333
	LTE Band 12	0.180	0.038	0.218
	LTE Band 13	0.210	0.038	0.248
	LTE Band 5 (Cell)	0.185	0.038	0.223
	LTE Band 4 (AWS)	0.491	0.038	0.529
	LTE Band 41	0.197	0.038	0.235

12.5 Hotspot SAR Simultaneous Transmission Analysis

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 (“-”).

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	0.832	0.373	0.364	1.205	1.196	1.569
	GPRS 1900	1.072	0.373	0.364	1.445	1.436	See Table Below
	UMTS 850	0.639	0.373	0.364	1.012	1.003	1.376
	LTE Band 12	0.295	0.373	0.364	0.668	0.659	1.032
	LTE Band 13	0.443	0.373	0.364	0.816	0.807	1.180
	LTE Band 5 (Cell)	0.391	0.373	0.364	0.764	0.755	1.128
	LTE Band 4 (AWS)	0.625	0.373	0.364	0.998	0.989	1.362
	LTE Band 41	0.779	0.373	0.364	1.152	1.143	1.516

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	Back	0.451	0.373	0.364	0.824	0.815	1.188
	Front	0.491	0.373*	0.364*	0.864	0.855	1.228
	Top	-	0.373*	0.364*	0.373	0.364	0.737
	Bottom	1.072	-	-	1.072	1.072	1.072
	Right	0.095	-	-	0.095	0.095	0.095
	Left	0.096	0.373*	0.364*	0.469	0.460	0.833

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 67 of 76

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 Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	0.832	0.385	0.256	1.217	1.088	1.473
	GPRS 1900	1.072	0.385	0.256	1.457	1.328	See Table Below
	UMTS 850	0.639	0.385	0.256	1.024	0.895	1.280
	LTE Band 12	0.295	0.385	0.256	0.680	0.551	0.936
	LTE Band 13	0.443	0.385	0.256	0.828	0.699	1.084
	LTE Band 5 (Cell)	0.391	0.385	0.256	0.776	0.647	1.032
	LTE Band 4 (AWS)	0.625	0.385	0.256	1.010	0.881	1.266
	LTE Band 41	0.779	0.385	0.256	1.164	1.035	1.420

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	Back	0.451	0.385	0.256	0.836	0.707	1.092
	Front	0.491	0.385*	0.256*	0.876	0.747	1.132
	Top	-	0.385*	0.256*	0.385	0.256	0.641
	Bottom	1.072	-	-	1.072	1.072	1.072
	Right	0.095	-	-	0.095	0.095	0.095
	Left	0.096	0.385*	0.256*	0.481	0.352	0.737

Table 12-11
Simultaneous Transmission Scenario with 2.4 GHz MIMO and 5 GHz MIMO WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	GPRS 850	0.832	0.114	0.400	1.346
	GPRS 1900	1.072	0.114	0.400	1.586
	UMTS 850	0.639	0.114	0.400	1.153
	LTE Band 12	0.295	0.114	0.400	0.809
	LTE Band 13	0.443	0.114	0.400	0.957
	LTE Band 5 (Cell)	0.391	0.114	0.400	0.905
	LTE Band 4 (AWS)	0.625	0.114	0.400	1.139
	LTE Band 41	0.779	0.114	0.400	1.293

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.832	0.039	0.871
	GPRS 1900	1.072	0.039	1.111
	UMTS 850	0.639	0.039	0.678
	LTE Band 12	0.295	0.039	0.334
	LTE Band 13	0.443	0.039	0.482
	LTE Band 5 (Cell)	0.391	0.039	0.430
	LTE Band 4 (AWS)	0.625	0.039	0.664
	LTE Band 41	0.779	0.039	0.818

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset	Page 68 of 76	

12.6 Phablet SAR 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.

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.

The devices edges that are not required to be evaluated for SAR are indicated with (“-”).

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

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Phablet SAR	Back	-	1.500	1.048	1.500	1.048	2.548
	Front	-	0.569	0.384	0.569	0.384	0.953
	Top	-	1.500*	1.048*	1.500	1.048	2.548
	Bottom	2.662	-	-	2.662	2.662	2.662
	Right	-	-	-	0.000	0.000	0.000
	Left	-	1.500*	1.048*	1.500	1.048	2.548

Table 12-14
Simultaneous Transmission Scenario – Bluetooth (Phablet)

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	-	0.679	0.679
	Front	-	0.293	0.293
	Top	-	0.092	0.092
	Bottom	2.662	-	2.662
	Right	-	-	0.000
	Left	-	0.061	0.061

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.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 69 of 76

13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

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

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

- 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
- 2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).
- 3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .
- 4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg
- 5) When 10-g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

Table 13-1
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	# of Time Slots	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.						(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1900	1909.80	810	GSM 1900	GPRS	3	bottom	10 mm	0.861	0.838	1.03	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram							

13.2 Measurement Uncertainty

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

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 70 of 76

14 ADDITIONAL TESTING PER FCC GUIDANCE

14.1 Tuner Testing

The following test procedures were followed to demonstrate that the SAR results in Section 11 represented the appropriate SAR test conditions. For bands with dynamic tuning implemented, SAR was measured according to the required FCC SAR test procedures with the dynamic tuner active to allow the device to automatically tune to the antenna state for the respective RF exposure test configurations. Additional single point SAR time-sweep measurements were evaluated for other tuner states to determine that the other tuner configurations would result in equivalent or lower SAR values. The additional tuner hardware has no influence to the antenna characteristics, other than impedance matching.

To evaluate all of the tuner states, the 80 tuner states were divided evenly among band, mode and exposure combinations so that at least one single point SAR measurement was measured among the configurations. Single point time-sweep measurements were performed at the peak SAR location determined by the zoom scan of the configuration with the highest reported SAR for each combination. The tuner state was able to be established remotely so that the device was not moved for the entire series of single point SAR for the tuner states in each combination. The SAR probe remained stationary at the same position throughout the entire series of single point measurements for each combination.

The operational description contains more information about the design and implementation of the dynamic antenna tuning.

Table 14-1
Supplemental Head and Body SAR Data

Supplemental Head SAR Data				Supplemental Body SAR Data			
LTE Band 5		UMTS 850		LTE Band 5		UMTS 850	
QPSK, 10MHz Bandwidth, 1 RB, 0 RB Offset		RMC		QPSK, 10MHz Bandwidth, 1 RB, 0 RB Offset		RMC	
Test Position	Right Cheek	Test Position	Right Cheek	Test Position	Back Side	Test Position	Back Side
				Spacing	10 mm	Spacing	10 mm
Frequency (MHz)	836.5	Frequency (MHz)	836.6	Frequency (MHz)	836.5	Frequency (MHz)	836.6
Channel	20525	Channel	4183	Channel	20525	Channel	4183
Measured 1g SAR (W/kg)	0.137	Measured 1g SAR (W/kg)	0.183	Measured 1g SAR (W/kg)	0.388	Measured 1g SAR (W/kg)	0.584
Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)	
Auto-tune (State 15)	0.159	Auto-tune (State 15)	0.192	Auto-tune (State 15)	0.560	Auto-tune (State 15)	0.843
Default (State 15)	0.145	Default (State 15)	0.181	Default (State 15)	0.560	Default (State 15)	0.848
State 2	0.021	State 1	0.017	State 0	0.489	State 0	0.749
State 6	0.066	State 5	0.067	State 4	0.172	State 3	0.193
State 10	0.103	State 9	0.127	State 7	0.338	State 8	0.605
State 12	0.115	State 11	0.146	State 13	0.475	State 15	0.848
State 14	0.146	State 15	0.181	State 15	0.560	State 16	0.438
State 15	0.145	State 16	0.089	State 19	0.056	State 17	0.032
State 24	0.051	State 18	0.009	State 21	0.105	State 20	0.098
State 29	0.071	State 22	0.038	State 26	0.243	State 23	0.251
State 30	0.091	State 25	0.067	State 31	0.355	State 27	0.396
State 34	0.011	State 30	0.109	State 33	0.029	State 28	0.408
State 35	0.015	State 32	0.093	State 37	0.094	State 38	0.180
State 42	0.058	State 36	0.025	State 39	0.144	State 41	0.281
State 47	0.097	State 40	0.069	State 44	0.220	State 45	0.354
State 48	0.100	State 43	0.084	State 52	0.126	State 46	0.505
State 55	0.063	State 49	0.012	State 54	0.215	State 51	0.140
State 57	0.078	State 50	0.019	State 56	0.307	State 60	0.563
State 62	0.116	State 53	0.051	State 58	0.331	State 61	0.575
State 65	0.089	State 59	0.115	State 66	0.322	State 69	0.520
State 68	0.150	State 63	0.148	State 67	0.445	State 72	0.844
State 75	0.117	State 64	0.180	State 70	0.324	State 73	0.517
State 76	0.145	State 71	0.144	State 73	0.350	State 74	0.504
State 79	0.118	State 77	0.109	State 76	0.560	State 78	0.506

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 71 of 76

15 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	8753ES	S-Parameter Network Analyzer	6/28/2016	Annual	6/28/2017	MY40000670
Agilent	E5515C	Wireless Communications Test Set	1/8/2015	Triennial	1/8/2018	GB43163447
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46170464
Agilent	N5182A	MXG Vector Signal Generator	10/27/2016	Annual	10/27/2017	MY47420603
Agilent	N5182A	MXG Vector Signal Generator	2/28/2017	Annual	2/28/2018	MY47420800
Amplifier Research	1551G6	Amplifier	CBT	N/A	CBT	433971
Amplifier Research	1551G6	Amplifier	CBT	N/A	CBT	433972
Anritsu	MA24106A	USB Power Sensor	6/2/2016	Annual	6/2/2017	1231535
Anritsu	MA24106A	USB Power Sensor	6/2/2016	Annual	6/2/2017	1231538
Anritsu	MA24106A	USB Power Sensor	6/2/2016	Annual	6/2/2017	1244512
Anritsu	MA24106A	USB Power Sensor	6/2/2016	Annual	6/2/2017	1244515
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1339018
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	1039008
Anritsu	MT8820C	Radio Communication Analyzer	9/15/2016	Annual	9/15/2017	6200901190
Control Company	4352	Ultra Long Stem Thermometer	3/8/2016	Biennial	3/8/2018	160261694
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
Mitutoyo	CD-6"CSX	Digital Caliper	3/2/2016	Biennial	3/2/2018	13264162
Mitutoyo	CD-6"CSX	Digital Caliper	3/2/2016	Biennial	3/2/2018	13264165
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	11/6/2015	Biennial	11/6/2017	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	CMU200	Base Station Simulator	3/29/2016	Annual	3/29/2017	836371/0079
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	7/20/2016	Annual	7/20/2017	132885
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2/10/2017	Annual	2/10/2018	162125
Seekonk	NC-100	Torque Wrench (8" lb)	9/1/2016	Biennial	9/1/2018	21053
Seekonk	NC-100	Torque Wrench (8" lb)	8/30/2016	Biennial	8/30/2018	N/A
SPEAG	D1750V2	1750 MHz SAR Dipole	5/9/2016	Annual	5/9/2017	1148
SPEAG	D1765V2	1765 MHz SAR Dipole	5/11/2016	Annual	5/11/2017	1008
SPEAG	D1900V2	1900 MHz SAR Dipole	7/8/2016	Annual	7/8/2017	5d080
SPEAG	D1900V2	1900 MHz SAR Dipole	7/15/2016	Annual	7/15/2017	5d149
SPEAG	D2450V2	2450 MHz SAR Dipole	9/13/2016	Annual	9/13/2017	797
SPEAG	D2450V2	2450 MHz SAR Dipole	7/25/2016	Annual	7/25/2017	981
SPEAG	D2600V2	2600 MHz SAR Dipole	9/13/2016	Annual	9/13/2017	1071
SPEAG	D2600V2	2600 MHz SAR Dipole	7/25/2016	Annual	7/25/2017	1126
SPEAG	D5GHzV2	5 GHz SAR Dipole	8/2/2016	Annual	8/2/2017	1237
SPEAG	D750V3	750 MHz SAR Dipole	1/11/2017	Annual	1/11/2018	1003
SPEAG	D750V3	750 MHz SAR Dipole	7/13/2016	Annual	7/13/2017	1161
SPEAG	D835V2	835 MHz SAR Dipole	7/13/2016	Annual	7/13/2017	4d047
SPEAG	D835V2	835 MHz SAR Dipole	7/14/2016	Annual	7/14/2017	4d133
SPEAG	ES3DV3	SAR Probe	3/18/2016	Annual	3/18/2017	3209
SPEAG	ES3DV3	SAR Probe	2/10/2017	Annual	2/10/2018	3213
SPEAG	ES3DV3	SAR Probe	9/19/2016	Annual	9/19/2017	3287
SPEAG	ES3DV3	SAR Probe	3/18/2016	Annual	3/18/2017	3319
SPEAG	ES3DV3	SAR Probe	11/15/2016	Annual	11/15/2017	3334
SPEAG	EX3DV4	SAR Probe	1/13/2017	Annual	1/13/2018	3589
SPEAG	EX3DV4	SAR Probe	2/13/2017	Annual	2/13/2018	3914
SPEAG	EX3DV4	SAR Probe	7/21/2016	Annual	7/21/2017	7308
SPEAG	EX3DV4	SAR Probe	4/19/2016	Annual	4/19/2017	7406
SPEAG	EX3DV4	SAR Probe	5/17/2016	Annual	5/17/2017	7409
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/11/2016	Annual	5/11/2017	859
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/9/2017	Annual	2/9/2018	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/11/2016	Annual	11/11/2017	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/22/2016	Annual	8/22/2017	1364
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/14/2016	Annual	3/14/2017	1368
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/14/2016	Annual	4/14/2017	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/14/2016	Annual	9/14/2017	1408
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/16/2017	Annual	1/16/2018	1466

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.

-Each equipment item was used solely within its respective calibration period.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 72 of 76

16 MEASUREMENT UNCERTAINTIES

a	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	Tol. (± %)	Prob. Dist.	Div.	c _i 1gm	c _i 10 gms	1gm u _i (± %)	10gms u _i (± %)	v _i
Measurement System								
Probe Calibration	6.55	N	1	1.0	1.0	6.6	6.6	∞
Axial Isotropy	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	2.0	R	1.73	1.0	1.0	1.2	1.2	∞
Linearity	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	0.25	R	1.73	1.0	1.0	0.1	0.1	∞
Readout Electronics	0.3	N	1	1.0	1.0	0.3	0.3	∞
Response Time	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions - Noise	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
RF Ambient Conditions - Reflections	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	6.7	R	1.73	1.0	1.0	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Test Sample Related								
Test Sample Positioning	2.7	N	1	1.0	1.0	2.7	2.7	35
Device Holder Uncertainty	1.67	N	1	1.0	1.0	1.7	1.7	5
Output Power Variation - SAR drift measurement	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
SAR Scaling	0.0	R	1.73	1.0	1.0	0.0	0.0	∞
Phantom & Tissue Parameters								
Phantom Uncertainty (Shape & Thickness tolerances)	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	4.2	N	1	0.78	0.71	3.3	3.0	10
Liquid Permittivity - measurement uncertainty	4.1	N	1	0.23	0.26	1.0	1.1	10
Liquid Conductivity - Temperature Uncertainty	3.4	R	1.73	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Uncertainty	0.6	R	1.73	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)	RSS					11.5	11.3	60
Expanded Uncertainty (95% CONFIDENCE LEVEL)	k=2					23.0	22.6	

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 73 of 76

17 CONCLUSION

17.1 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]

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 74 of 76

18 REFERENCES

- [1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, Aug. 1996.
- [2] ANSI/IEEE C95.1-2005, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, 2006.
- [3] ANSI/IEEE C95.1-1992, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, Sept. 1992.
- [4] ANSI/IEEE C95.3-2002, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave, New York: IEEE, December 2002.
- [5] IEEE Standards Coordinating Committee 39 –Standards Coordinating Committee 34 – IEEE Std. 1528-2013, IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.
- [6] NCRP, National Council on Radiation Protection and Measurements, Biological Effects and Exposure Criteria for RadioFrequency Electromagnetic Fields, NCRP Report No. 86, 1986. Reprinted Feb. 1995.
- [7] T. Schmid, O. Egger, N. Kuster, Automated E-field scanning system for dosimetric assessments, IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.
- [8] K. Pokovic, T. Schmid, N. Kuster, Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies, ICECOM97, Oct. 1997, pp. 1 -124.
- [9] K. Pokovic, T. Schmid, and N. Kuster, E-field Probe with improved isotropy in brain simulating liquids, Proceedings of the ELMAR, Zadar, Croatia, June 23-25, 1996, pp. 172-175.
- [10] Schmid & Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.
- [11] V. Hombach, K. Meier, M. Burkhardt, E. Kuhn, N. Kuster, The Dependence of EM Energy Absorption upon Human Modeling at 900 MHz, IEEE Transaction on Microwave Theory and Techniques, vol. 44 no. 10, Oct. 1996, pp. 1865-1873.
- [12] N. Kuster and Q. Balzano, Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300MHz, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.
- [13] G. Hartsgrrove, A. Kraszewski, A. Surowiec, Simulated Biological Materials for Electromagnetic Radiation Absorption Studies, University of Ottawa, Bioelectromagnetics, Canada: 1987, pp. 29-36.
- [14] Q. Balzano, O. Garay, T. Manning Jr., Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.
- [15] W. Gander, Computermathematick, Birkhaeuser, Basel, 1992.
- [16] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, Numerical Recipes in C, The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.
- [17] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 75 of 76

- [18] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), Human Exposure to Electromagnetic Fields High-frequency: 10kHz-300GHz, Jan. 1995.
- [19] Prof. Dr. Niels Kuster, ETH, Eidgenössische Technische Hochschule Zürich, Dosimetric Evaluation of the Cellular Phone.
- [20] IEC 62209-1, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz), Feb. 2005.
- [21] Innovation, Science, Economic Development Canada RSS-102 Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) Issue 5, March 2015.
- [22] Health Canada Safety Code 6 Limits of Human Exposure to Radio Frequency Electromagnetic Fields in the Frequency Range from 3 kHz – 300 GHz, 2015
- [23] FCC SAR Test Procedures for 2G-3G Devices, Mobile Hotspot and UMPC Devices KDB Publications 941225, D01-D07
- [24] SAR Measurement Guidance for IEEE 802.11 Transmitters, KDB Publication 248227 D01
- [25] FCC SAR Considerations for Handsets with Multiple Transmitters and Antennas, KDB Publications 648474 D03-D04
- [26] FCC SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers, FCC KDB Publication 616217 D04
- [27] FCC SAR Measurement and Reporting Requirements for 100MHz – 6 GHz, KDB Publications 865664 D01-D02
- [28] FCC General RF Exposure Guidance and SAR Procedures for Dongles, KDB Publication 447498, D01-D02
- [29] Anexo à Resolução No. 533, de 10 de Setembro de 2009.
- [30] IEC 62209-2, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 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), Mar. 2010.

FCC ID: A3LSC03J		SAR EVALUATION REPORT		Approved by: Quality Manager
Document S/N: 1M1702210070-01- R1.A3L	Test Dates: 01/04/17 – 04/06/17	DUT Type: Portable Handset		Page 76 of 76

APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6A55

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; $\sigma = 0.917$ S/m; $\epsilon_r = 42.68$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Test Date: 02-22-2017; Ambient Temp: 24.1°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3319; ConvF(6.16, 6.16, 6.16); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

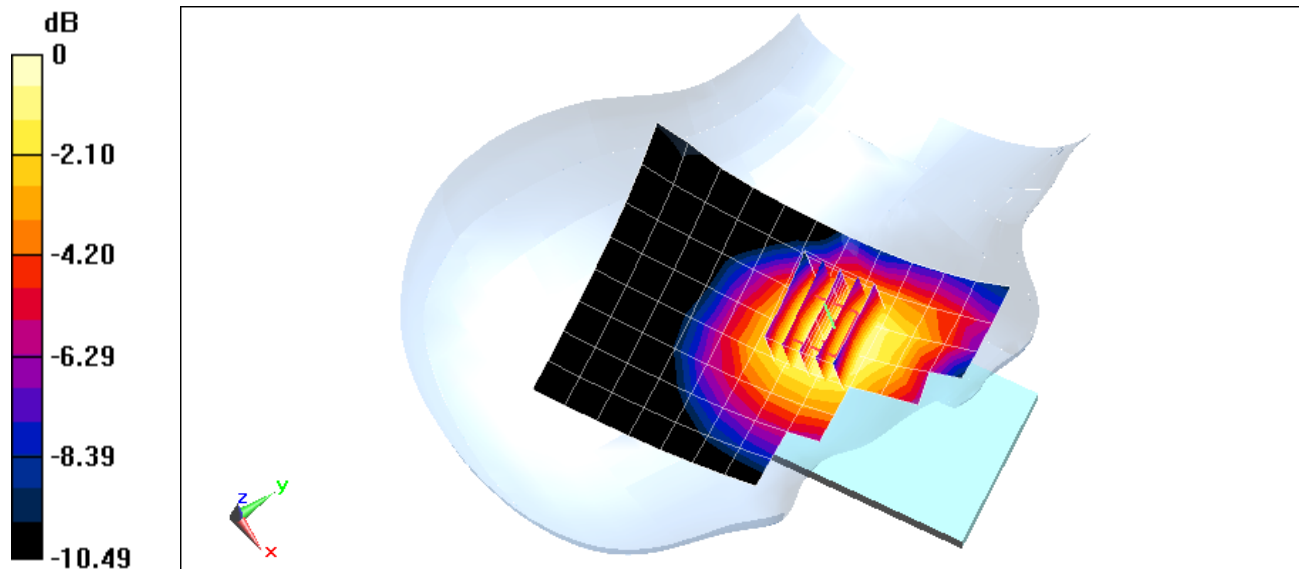
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.15 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.155 W/kg

SAR(1 g) = 0.125 W/kg



0 dB = 0.135 W/kg = -8.70 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: 24088

Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.401 \text{ S/m}$; $\epsilon_r = 38.52$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-24-2017; Ambient Temp: 20.5°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3287; ConvF(5.27, 5.27, 5.27); Calibrated: 9/19/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 9/14/2016

Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

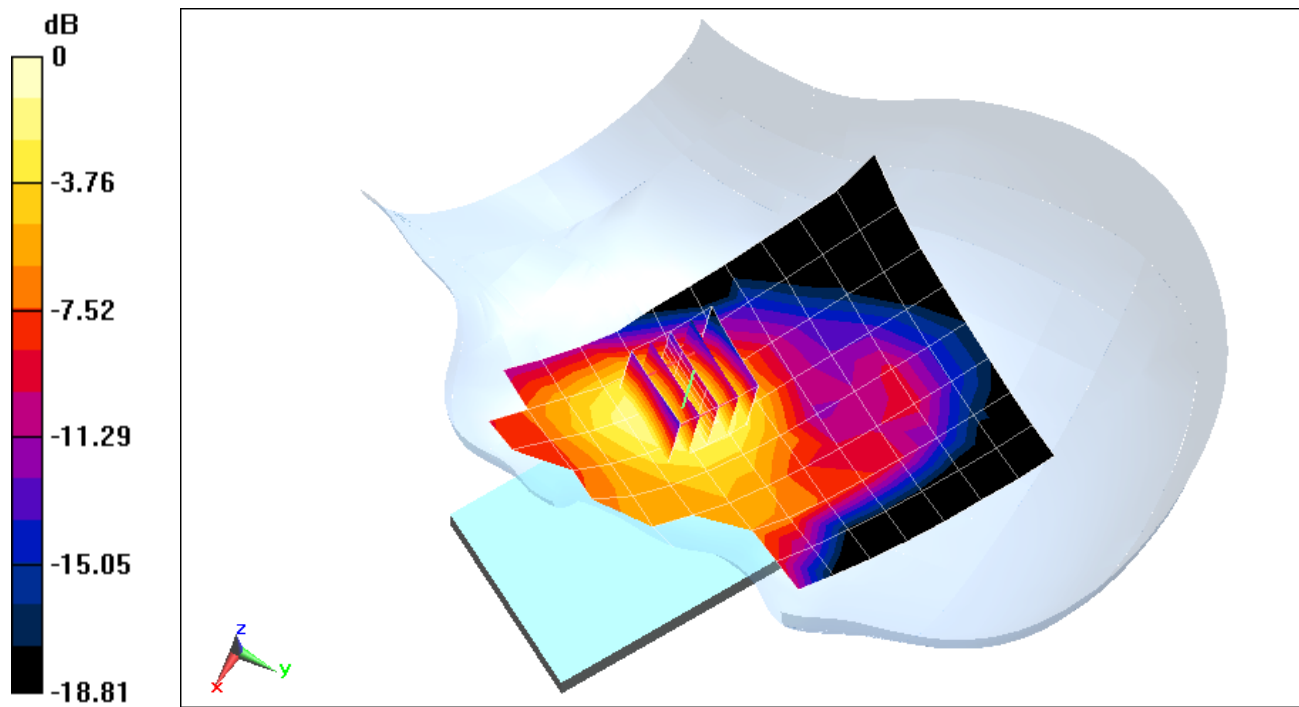
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 6.434 V/m; Power Drift = 0.21 dB

Peak SAR (extrapolated) = 0.0840 W/kg

SAR(1 g) = 0.053 W/kg



0 dB = 0.0625 W/kg = -12.04 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6A55

Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.879 \text{ S/m}$; $\epsilon_r = 40.177$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 03-27-2017; Ambient Temp: 21.7°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3334; ConvF(6.49, 6.49, 6.49); Calibrated: 11/15/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 11/11/2016

Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

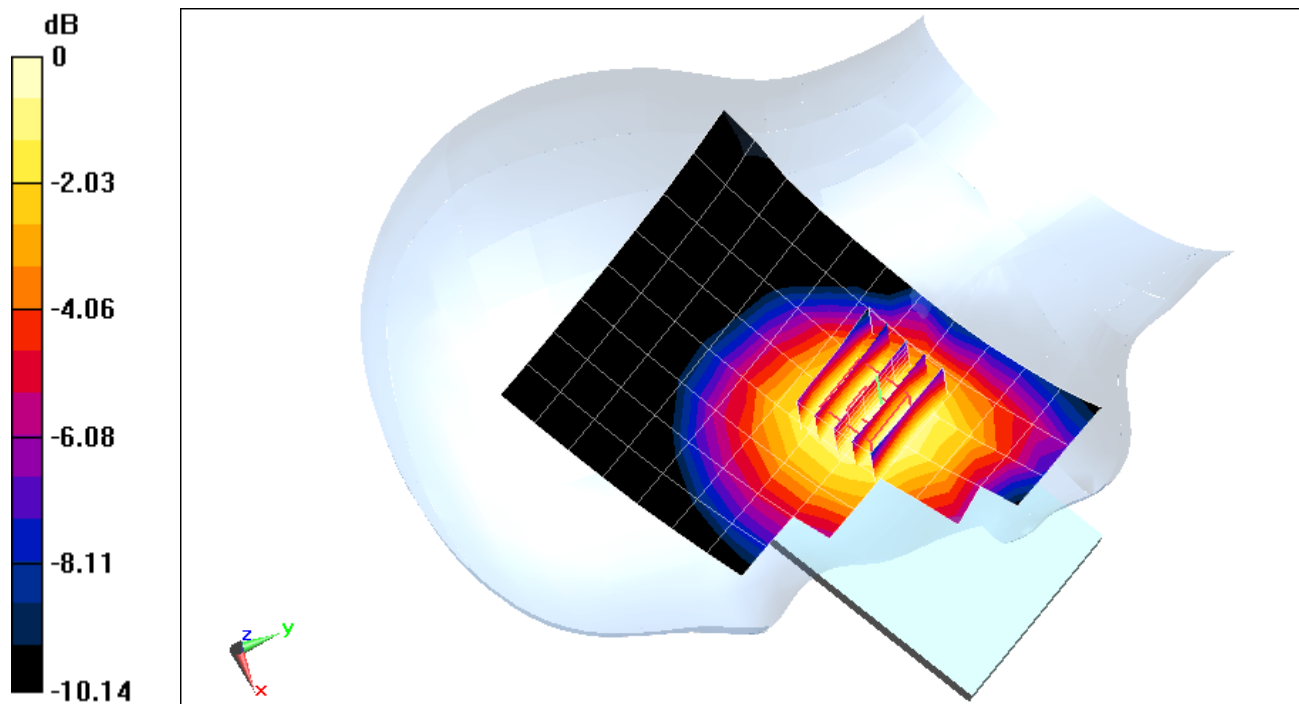
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (6x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 14.94 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.237 W/kg

SAR(1 g) = 0.183 W/kg



0 dB = 0.205 W/kg = -6.88 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6B13

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; $\sigma = 0.875$ S/m; $\epsilon_r = 43.023$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Test Date: 02-21-2017; Ambient Temp: 21.6°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3287; ConvF(6.96, 6.96, 6.96); Calibrated: 9/19/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 9/14/2016

Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 12, Right Head, Cheek, Mid.ch

10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

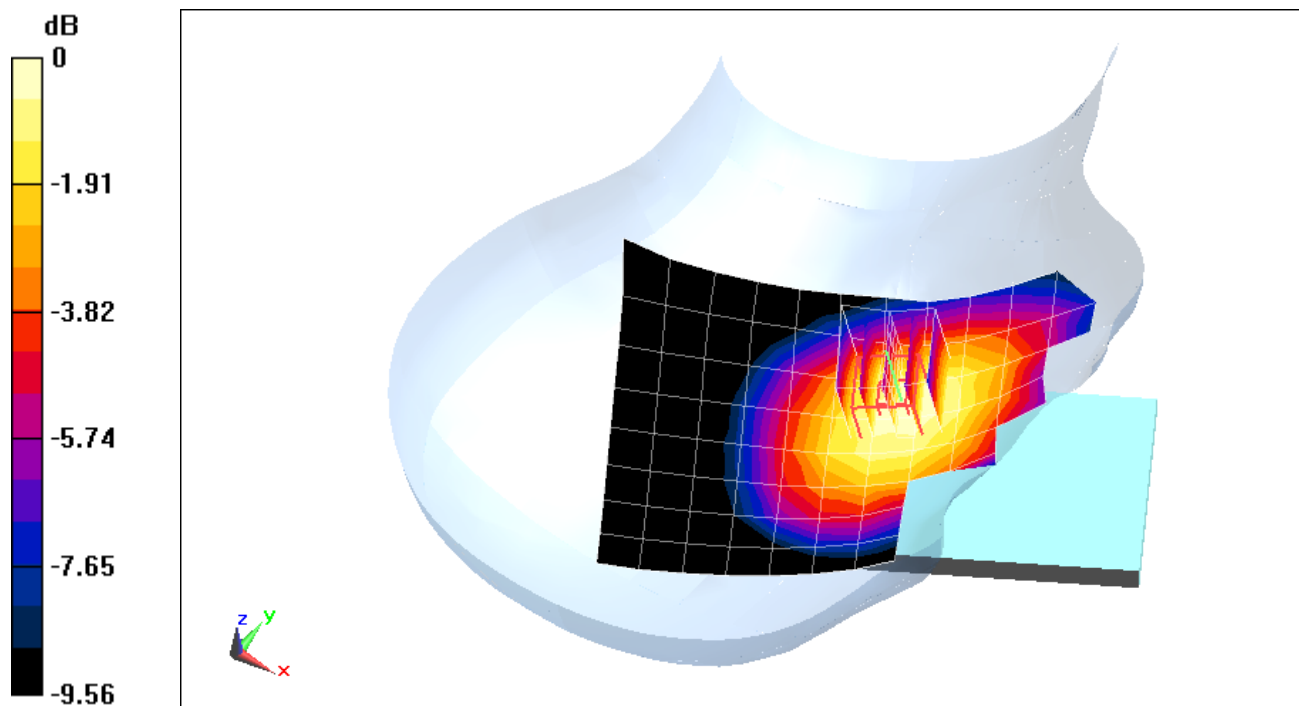
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.19 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.147 W/kg

SAR(1 g) = 0.115 W/kg



0 dB = 0.128 W/kg = -8.93 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6B13

Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1

Medium: 750 Head Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 0.938 \text{ S/m}$; $\epsilon_r = 41.95$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 02-21-2017; Ambient Temp: 21.6°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3287; ConvF(6.96, 6.96, 6.96); Calibrated: 9/19/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 9/14/2016

Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 13, Right Head, Cheek, Mid.ch

10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

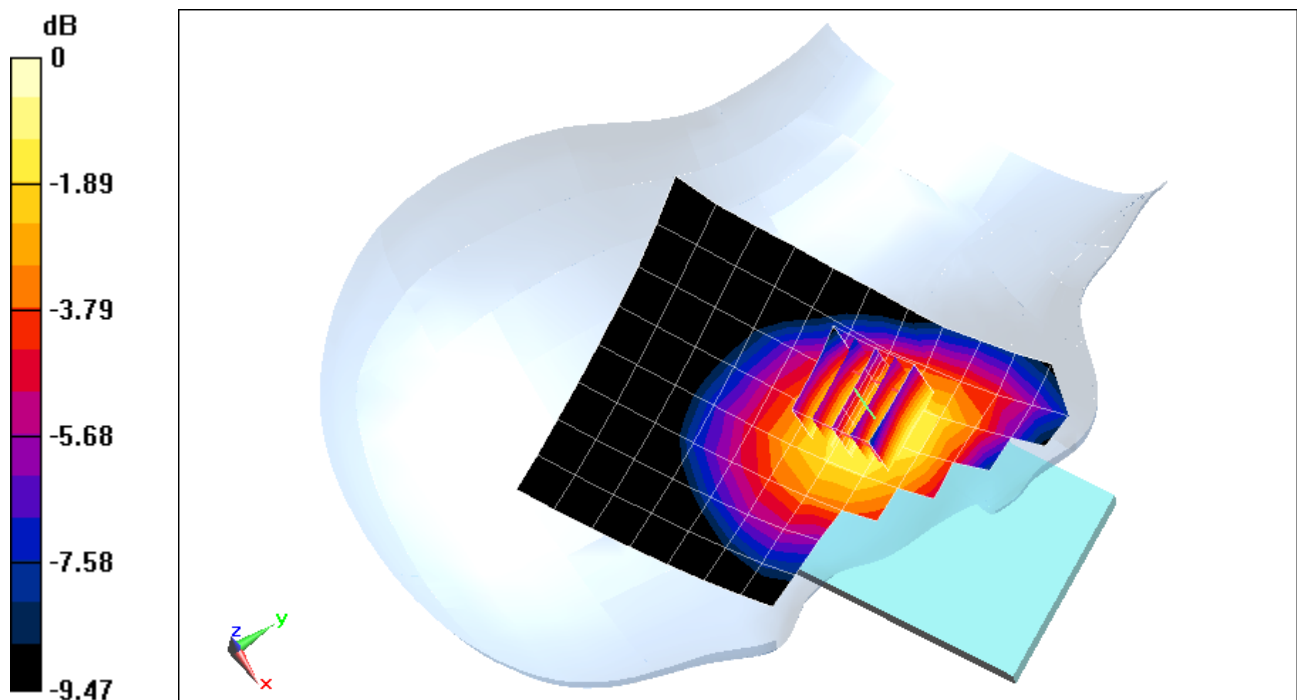
Area Scan (9x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 9.366 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.0900 W/kg

SAR(1 g) = 0.071 W/kg



0 dB = 0.0776 W/kg = -11.10 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6A55

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; $\sigma = 0.916$ S/m; $\epsilon_r = 42.681$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Test Date: 02-22-2017; Ambient Temp: 24.1°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3319; ConvF(6.16, 6.16, 6.16); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 5 (Cell.), Right Head, Cheek, Mid.ch

10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

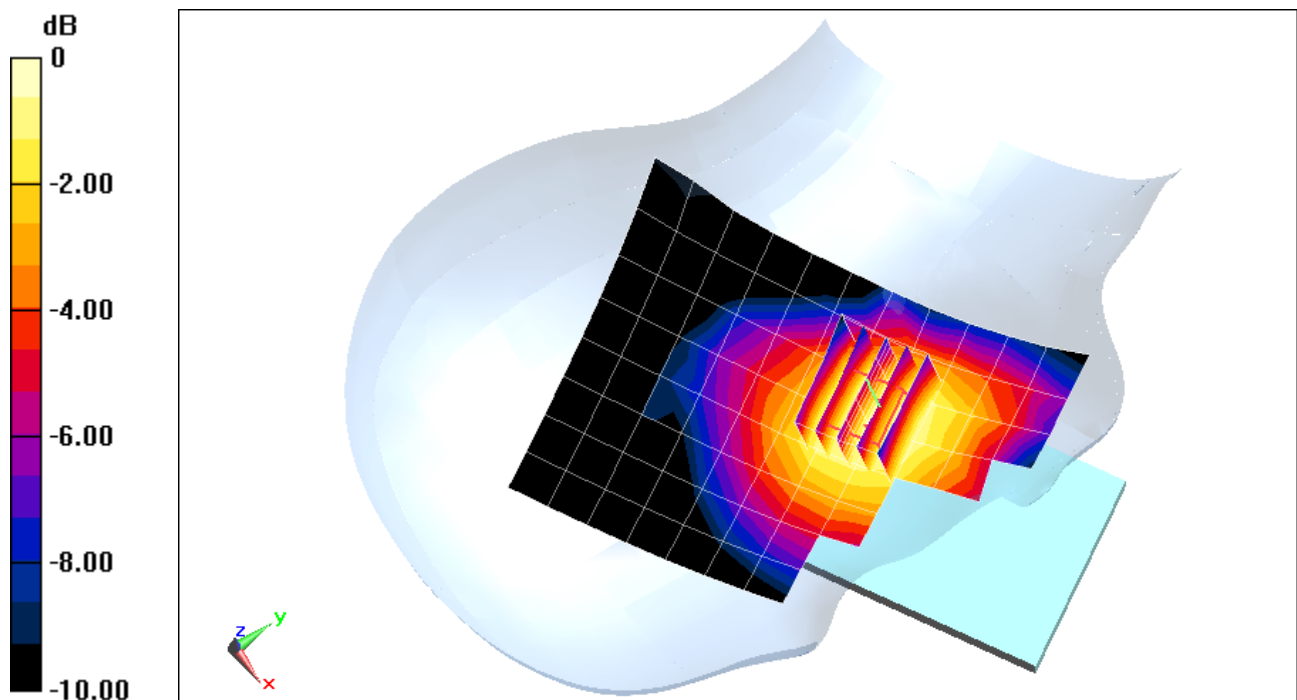
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.31 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.170 W/kg

SAR(1 g) = 0.137 W/kg



0 dB = 0.148 W/kg = -8.30 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6A57

Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.375 \text{ S/m}$; $\epsilon_r = 38.946$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 02-27-2017; Ambient Temp: 24.0°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7406; ConvF(8.85, 8.85, 8.85); Calibrated: 4/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/14/2016

Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 4 (AWS), Left Head, Cheek, Mid.ch

20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

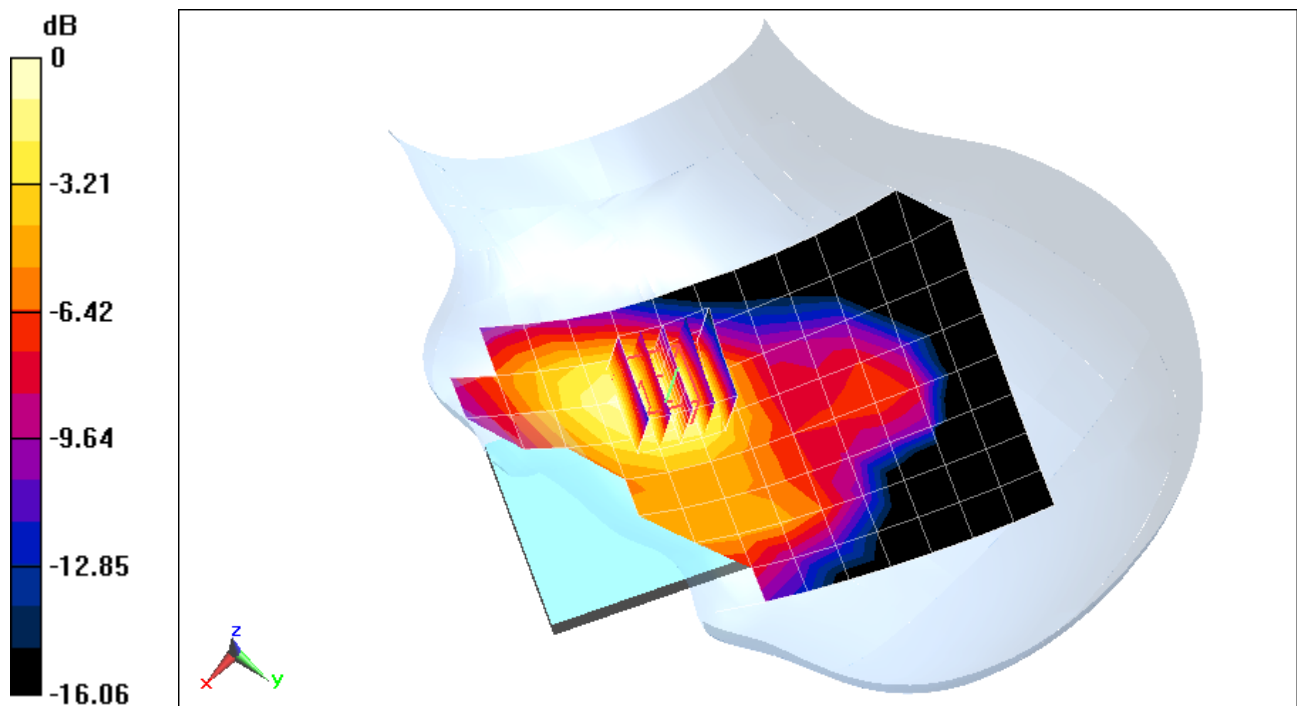
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 8.542 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.125 W/kg

SAR(1 g) = 0.085 W/kg



0 dB = 0.108 W/kg = -9.67 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6D17

Communication System: UID 0, LTE Band 41; Frequency: 2680 MHz; Duty Cycle: 1:1.58

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2680 \text{ MHz}$; $\sigma = 2.132 \text{ S/m}$; $\epsilon_r = 37.37$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 03-15-2017; Ambient Temp: 22.1°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3287; ConvF(4.41, 4.41, 4.41); Calibrated: 9/19/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 9/14/2016

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

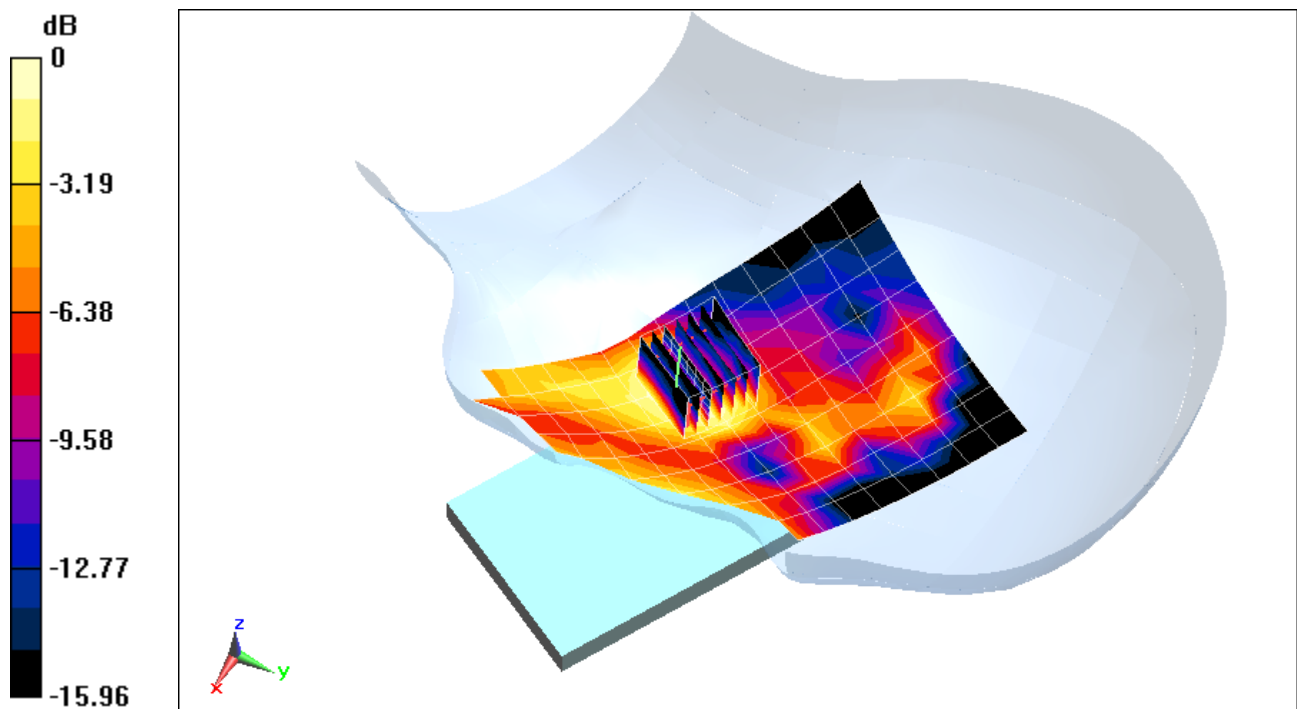
Area Scan (10x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 6.087 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.0910 W/kg

SAR(1 g) = 0.048 W/kg



0 dB = 0.0597 W/kg = -12.24 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: 0910E

Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Head; Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$; $\sigma = 1.853 \text{ S/m}$; $\epsilon_r = 39.19$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-10-2017; Ambient Temp: 23.6°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3287; ConvF(4.54, 4.54, 4.54); Calibrated: 9/19/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 9/14/2016

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Antenna 1, 22 MHz Bandwidth

Right Head, Cheek, Ch 6, 1 Mbps

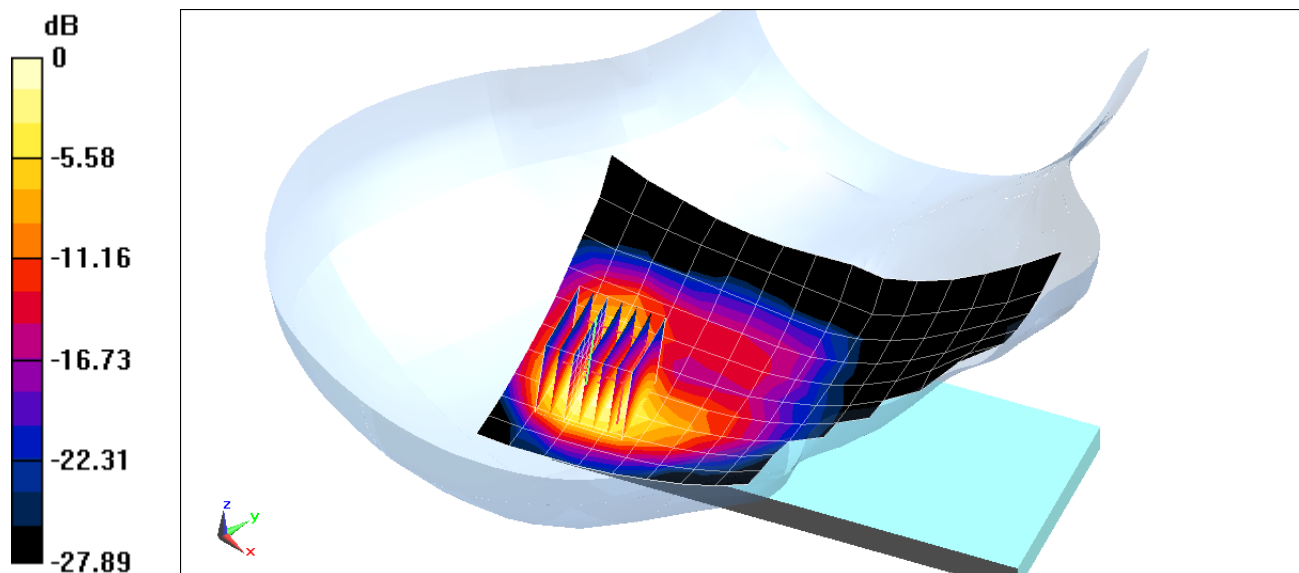
Area Scan (11x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 15.11 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 1.26 W/kg

SAR(1 g) = 0.458 W/kg



0 dB = 0.631 W/kg = -2.00 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: CE1F1

Communication System: UID 0, 802.11ac 5.2-5.8 GHz Band; Frequency: 5775 MHz; Duty Cycle: 1:1

Medium: 5GHz Medium parameters used (interpolated):

$f = 5775$ MHz; $\sigma = 5.161$ S/m; $\epsilon_r = 34.484$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Test Date: 02-27-2017; Ambient Temp: 21.1°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3914; ConvF(4.91, 4.91, 4.91); Calibrated: 2/13/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 11/11/2016

Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11ac, Antenna 1, U-NII-3, 80 MHz Bandwidth

Right Head, Cheek, Ch 155, 29.3 Mbps

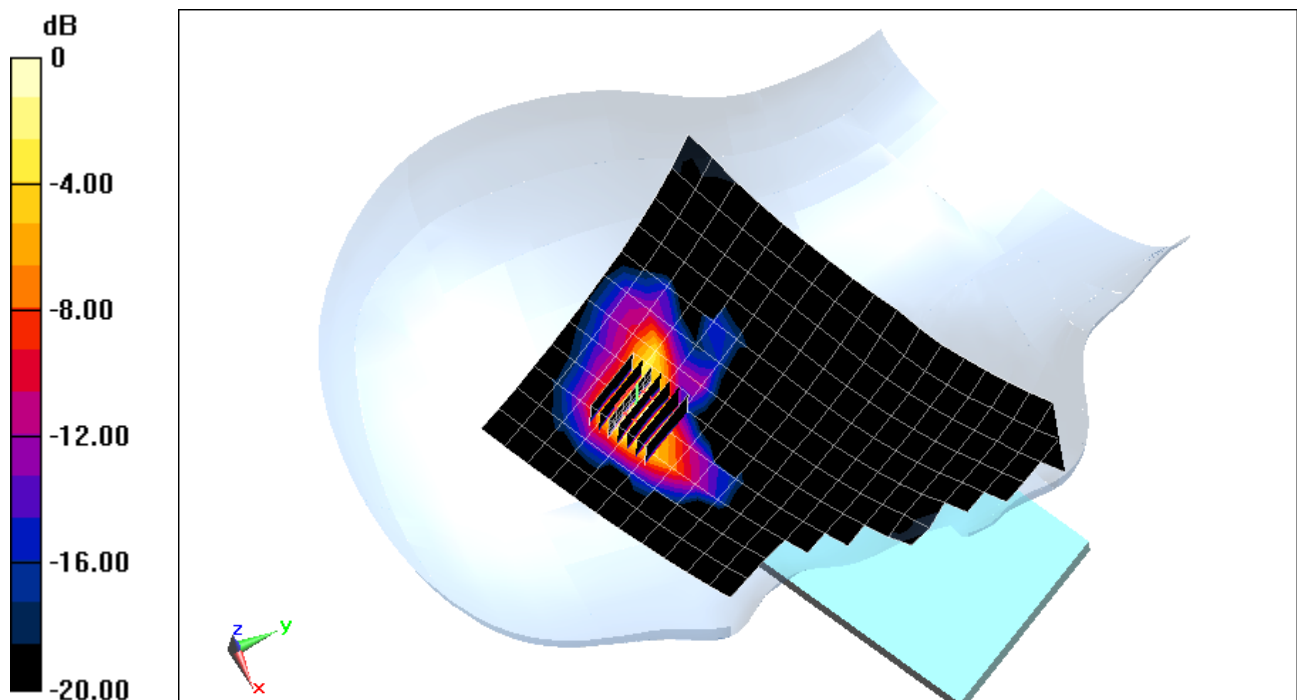
Area Scan (13x22x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 4.213 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 2.18 W/kg

SAR(1 g) = 0.485 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: 0910E

Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.299

Medium: 2450 Head; Medium parameters used (interpolated):

$f = 2441 \text{ MHz}$; $\sigma = 1.859 \text{ S/m}$; $\epsilon_r = 38.197$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 01-22-2017; Ambient Temp: 23.2°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3287; ConvF(4.54, 4.54, 4.54); Calibrated: 9/19/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 9/14/2016

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Bluetooth, Right Head, Cheek, Ch 39, 2Mbps

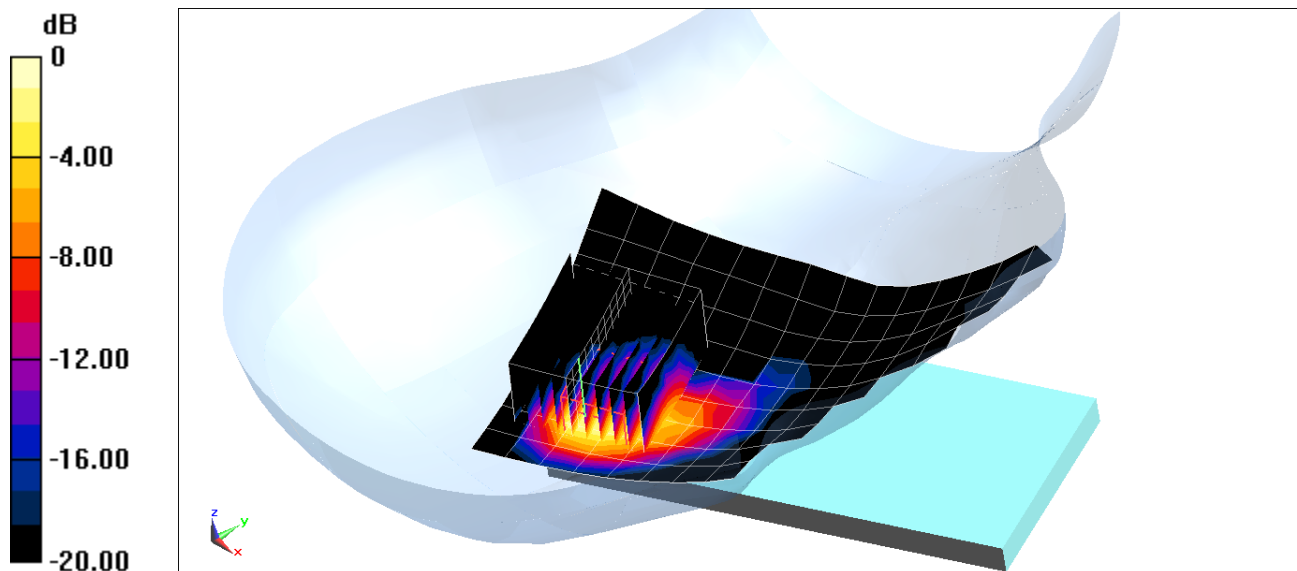
Area Scan (10x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (11x10x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 2.710 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.178 W/kg

SAR(1 g) = 0.079 W/kg



0 dB = 0.107 W/kg = -9.71 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6B13

Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.978 \text{ S/m}$; $\epsilon_r = 54.555$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-27-2017; Ambient Temp: 22.1°C; Tissue Temp: 20.4°C

Probe: ES3DV3 - SN3319; ConvF(6.04, 6.04, 6.04); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

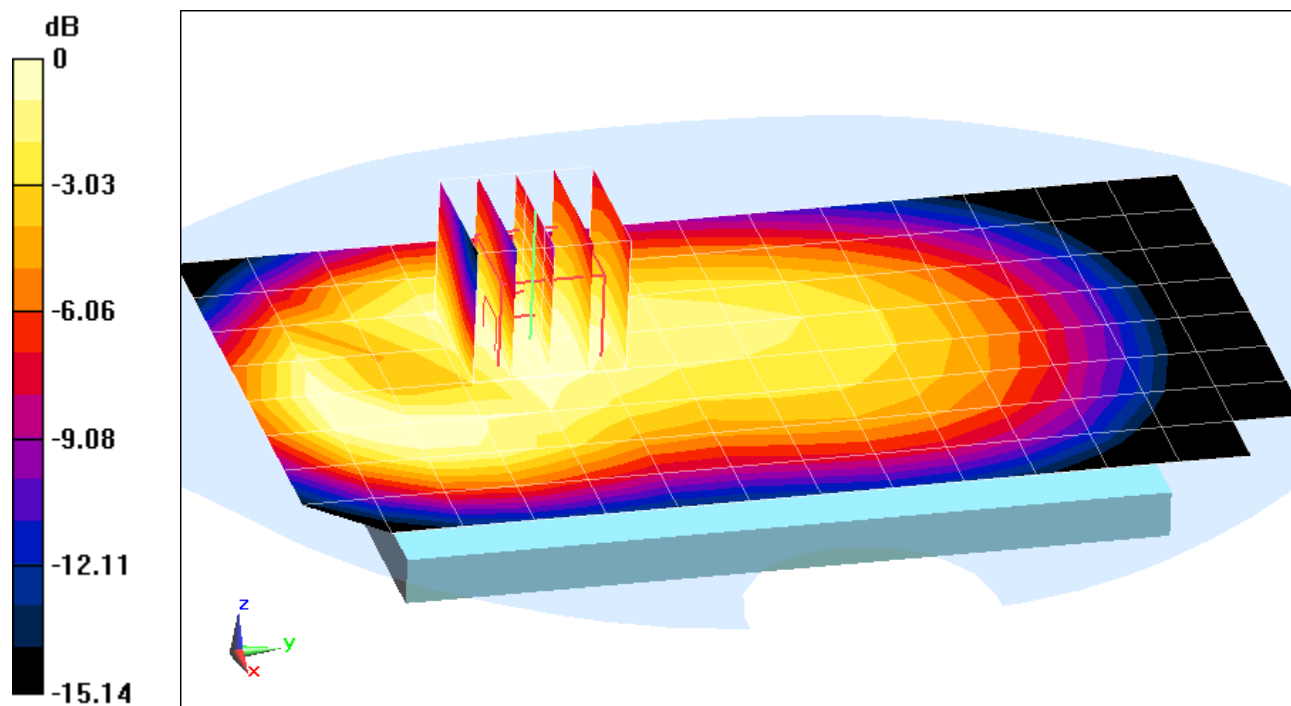
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 15.87 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.301 W/kg

SAR(1 g) = 0.229 W/kg



0 dB = 0.252 W/kg = -5.99 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6B13

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):

$f = 836.6 \text{ MHz}$; $\sigma = 0.978 \text{ S/m}$; $\epsilon_r = 54.555$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-27-2017; Ambient Temp: 22.1°C; Tissue Temp: 20.4°C

Probe: ES3DV3 - SN3319; ConvF(6.04, 6.04, 6.04); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

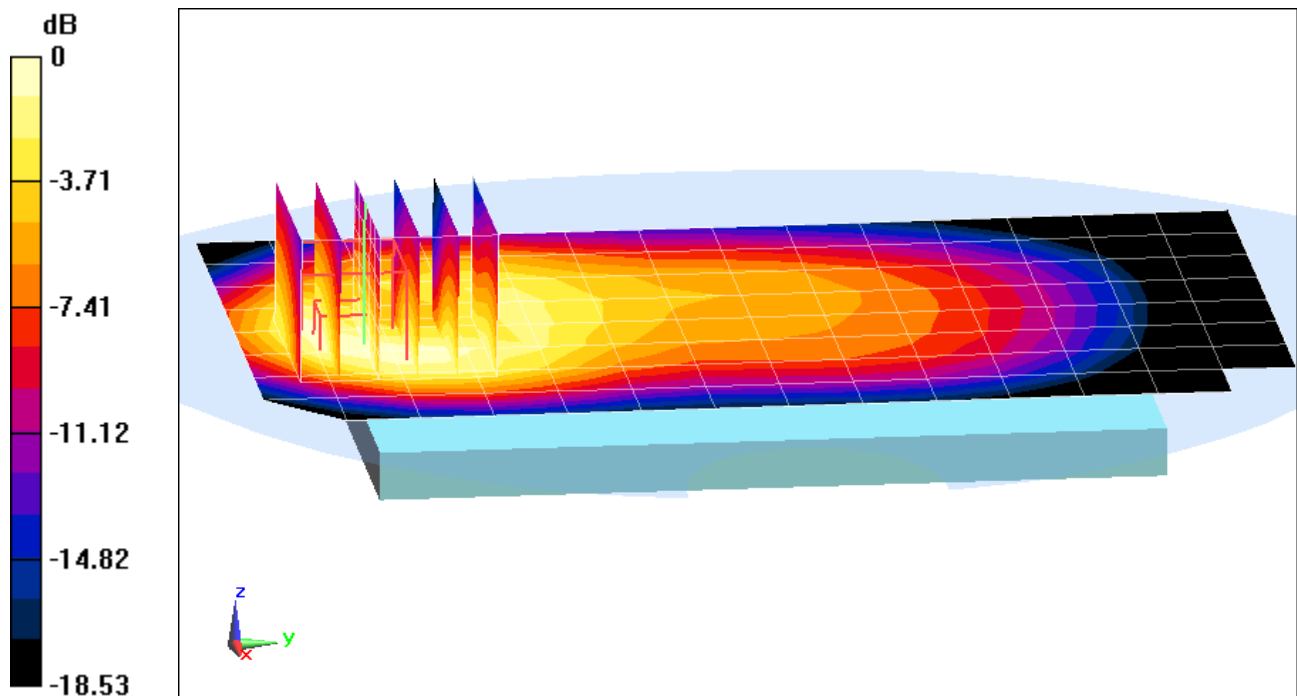
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 23.43 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.897 W/kg

SAR(1 g) = 0.532 W/kg



0 dB = 0.622 W/kg = -2.06 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6D17

Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.556 \text{ S/m}$; $\epsilon_r = 51.698$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-23-2017; Ambient Temp: 23.8°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3334; ConvF(4.91, 4.91, 4.91); Calibrated: 11/15/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 11/11/2016

Phantom: SAM with CRP v4.0 Left; Type: QD000P40CD; Serial: TP:1692

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

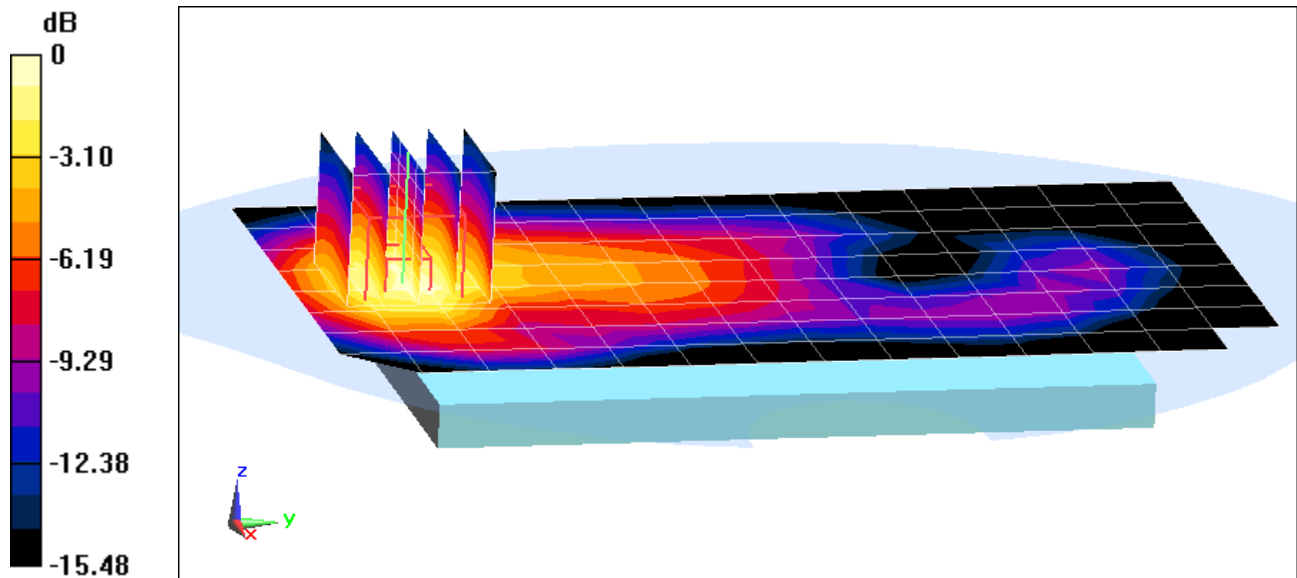
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 11.53 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.281 W/kg

SAR(1 g) = 0.180 W/kg



0 dB = 0.215 W/kg = -6.68 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6D17

Communication System: UID 0, GSM GPRS; 3 Tx slots; Frequency: 1909.8 MHz; Duty Cycle: 1:2.76

Medium: 1900 Body Medium parameters used:

$f = 1910 \text{ MHz}$; $\sigma = 1.59 \text{ S/m}$; $\epsilon_r = 51.62$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2017; Ambient Temp: 23.8°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3334; ConvF(4.91, 4.91, 4.91); Calibrated: 11/15/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 11/11/2016

Phantom: SAM with CRP v4.0 Left; Type: QD000P40CD; Serial: TP:1692

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 1900, Body SAR, Bottom Edge, High.ch, 3 Tx Slots

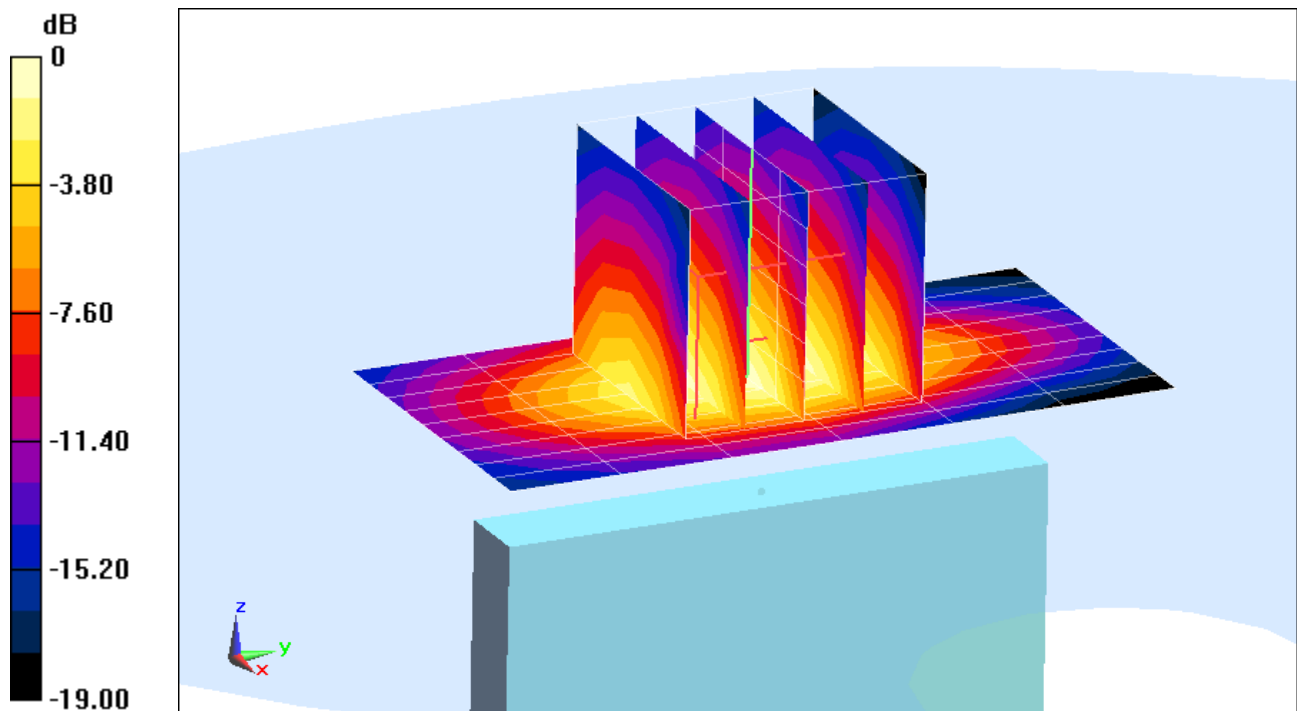
Area Scan (10x7x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 25.19 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.48 W/kg

SAR(1 g) = 0.861 W/kg



0 dB = 1.08 W/kg = 0.33 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6B13

Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.978 \text{ S/m}$; $\epsilon_r = 54.555$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-27-2017; Ambient Temp: 22.1°C; Tissue Temp: 20.4°C

Probe: ES3DV3 - SN3319; ConvF(6.04, 6.04, 6.04); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

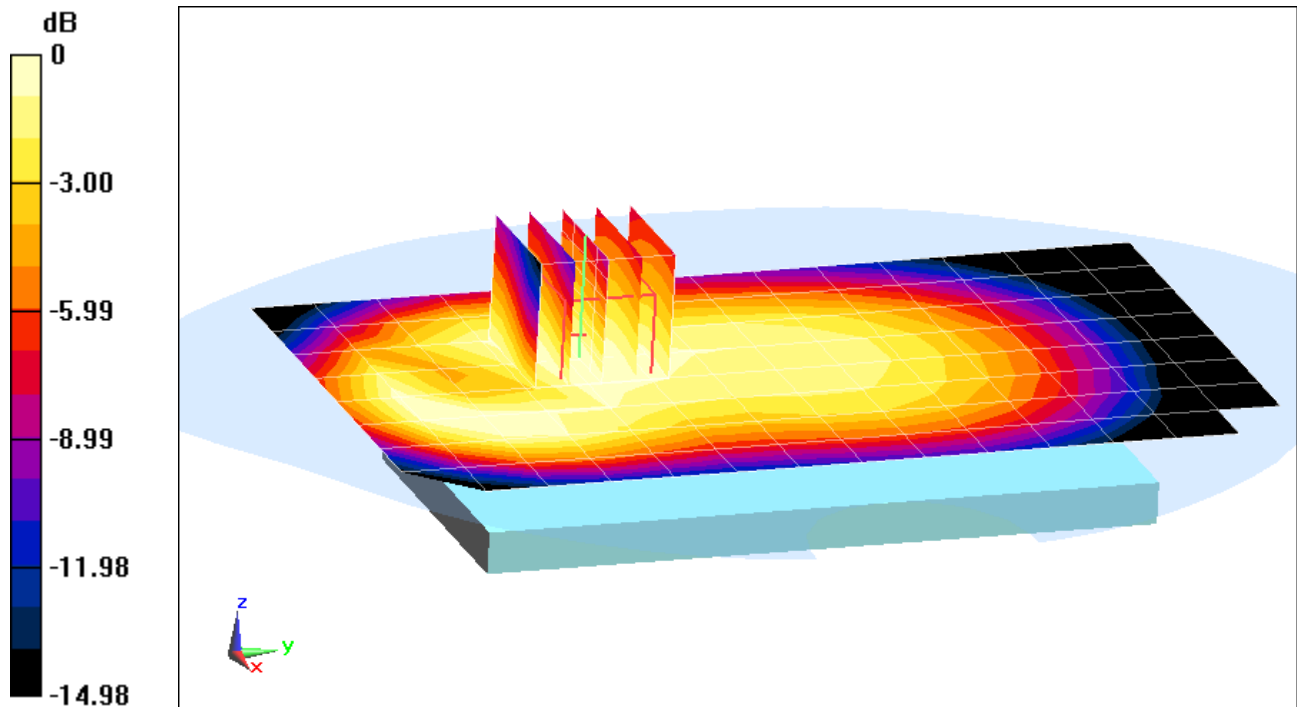
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 17.19 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.354 W/kg

SAR(1 g) = 0.270 W/kg



0 dB = 0.297 W/kg = -5.27 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6B13

Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.978 \text{ S/m}$; $\epsilon_r = 54.555$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-27-2017; Ambient Temp: 22.1°C; Tissue Temp: 20.4°C

Probe: ES3DV3 - SN3319; ConvF(6.04, 6.04, 6.04); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

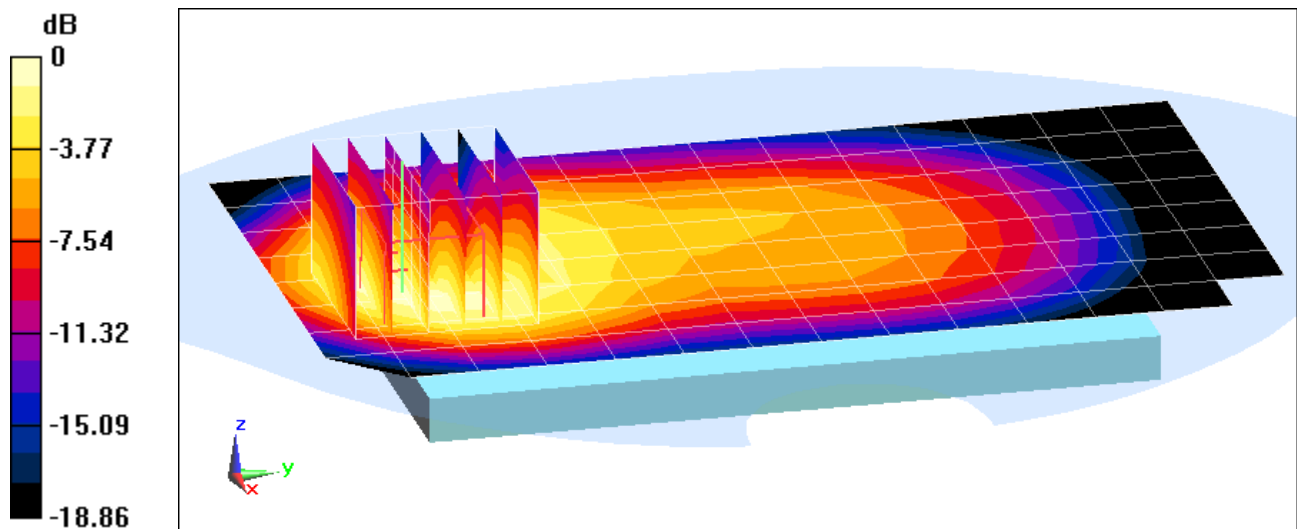
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 25.10 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.992 W/kg

SAR(1 g) = 0.584 W/kg



0 dB = 0.706 W/kg = -1.51 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6D52

Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 750 Body Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.92 \text{ S/m}$; $\epsilon_r = 56.698$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-22-2017; Ambient Temp: 22.7°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(9.46, 9.46, 9.46); Calibrated: 5/17/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 12, Body SAR, Back side, Mid.ch

10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

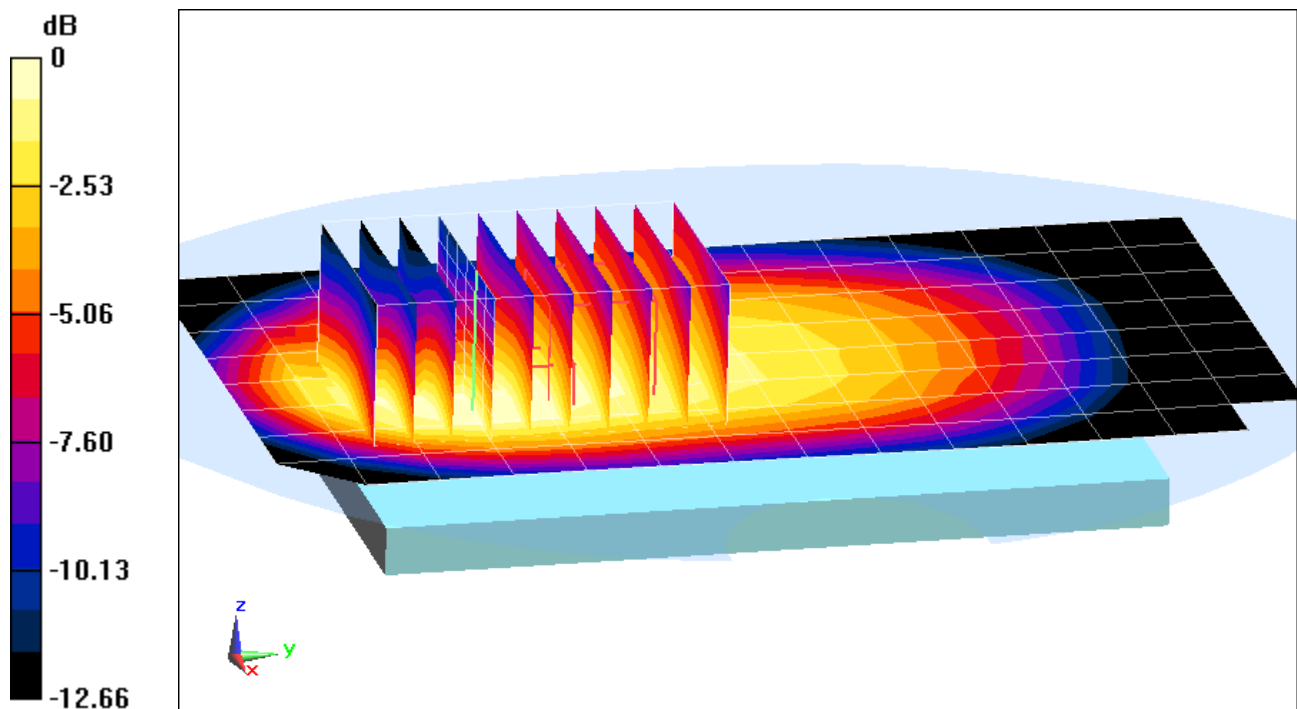
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (7x10x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 13.84 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.268 W/kg

SAR(1 g) = 0.180 W/kg



0 dB = 0.232 W/kg = -6.35 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6D52

Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 750 Body Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.92 \text{ S/m}$; $\epsilon_r = 56.698$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-22-2017; Ambient Temp: 22.7°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(9.46, 9.46, 9.46); Calibrated: 5/17/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 12, Body SAR, Back side, Mid.ch

10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

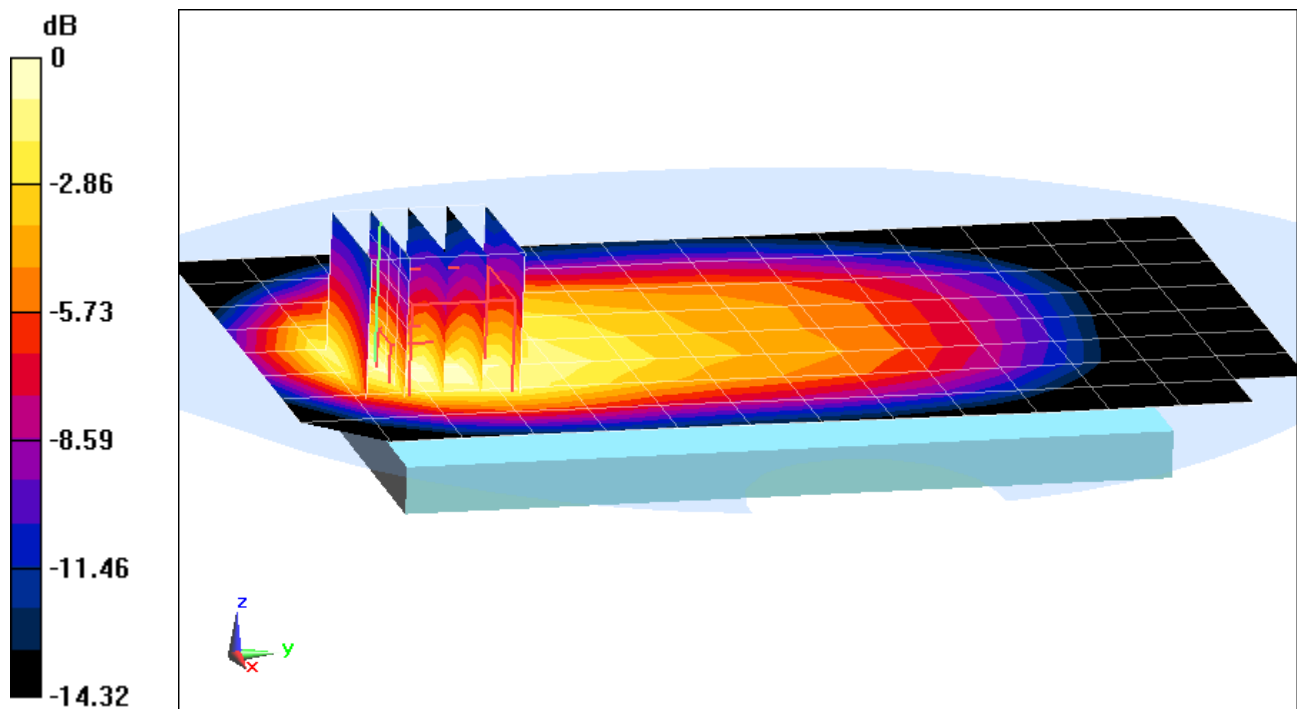
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 18.28 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.527 W/kg

SAR(1 g) = 0.295 W/kg



0 dB = 0.425 W/kg = -3.72 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6D52

Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1

Medium: 750 Body Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 0.991 \text{ S/m}$; $\epsilon_r = 56.004$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-22-2017; Ambient Temp: 22.7°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(9.46, 9.46, 9.46); Calibrated: 5/17/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 13, Body SAR, Back side, Mid.ch

10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

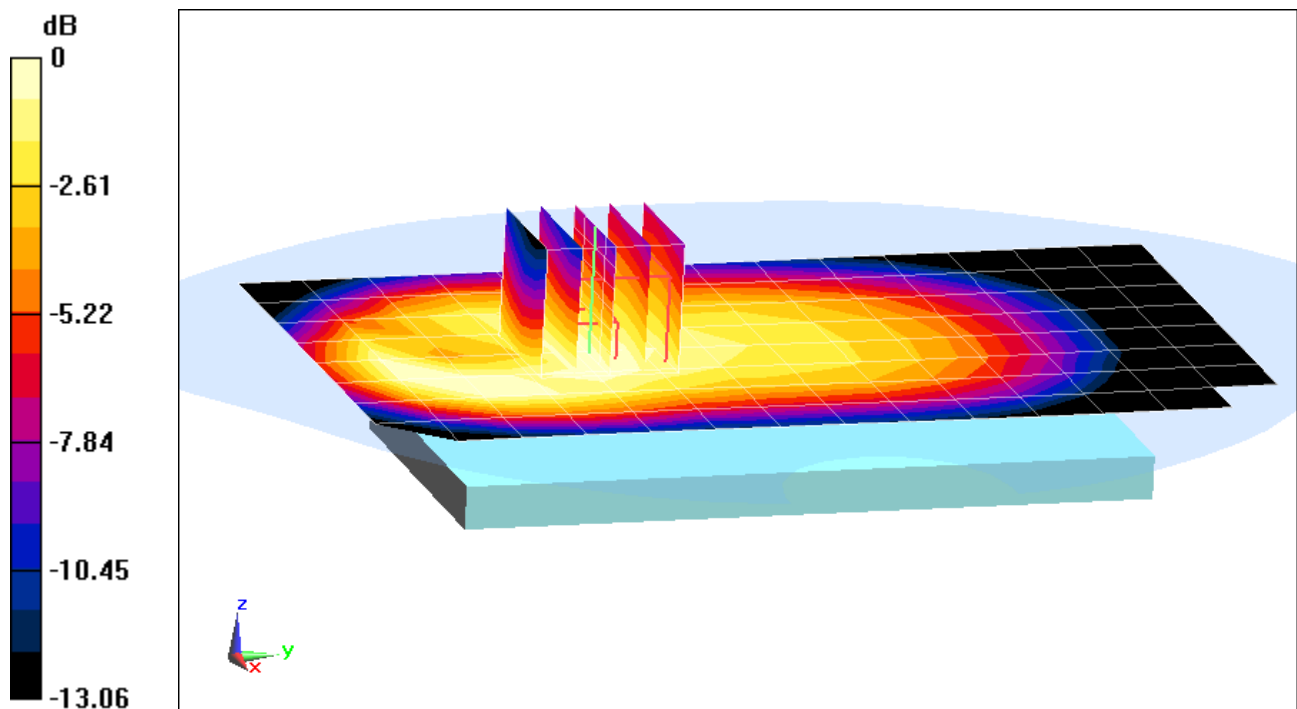
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 13.29 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.237 W/kg

SAR(1 g) = 0.167 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6D52

Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1

Medium: 750 Body Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 0.991 \text{ S/m}$; $\epsilon_r = 56.004$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-22-2017; Ambient Temp: 22.7°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(9.46, 9.46, 9.46); Calibrated: 5/17/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 13, Body SAR, Back side, Mid.ch

10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

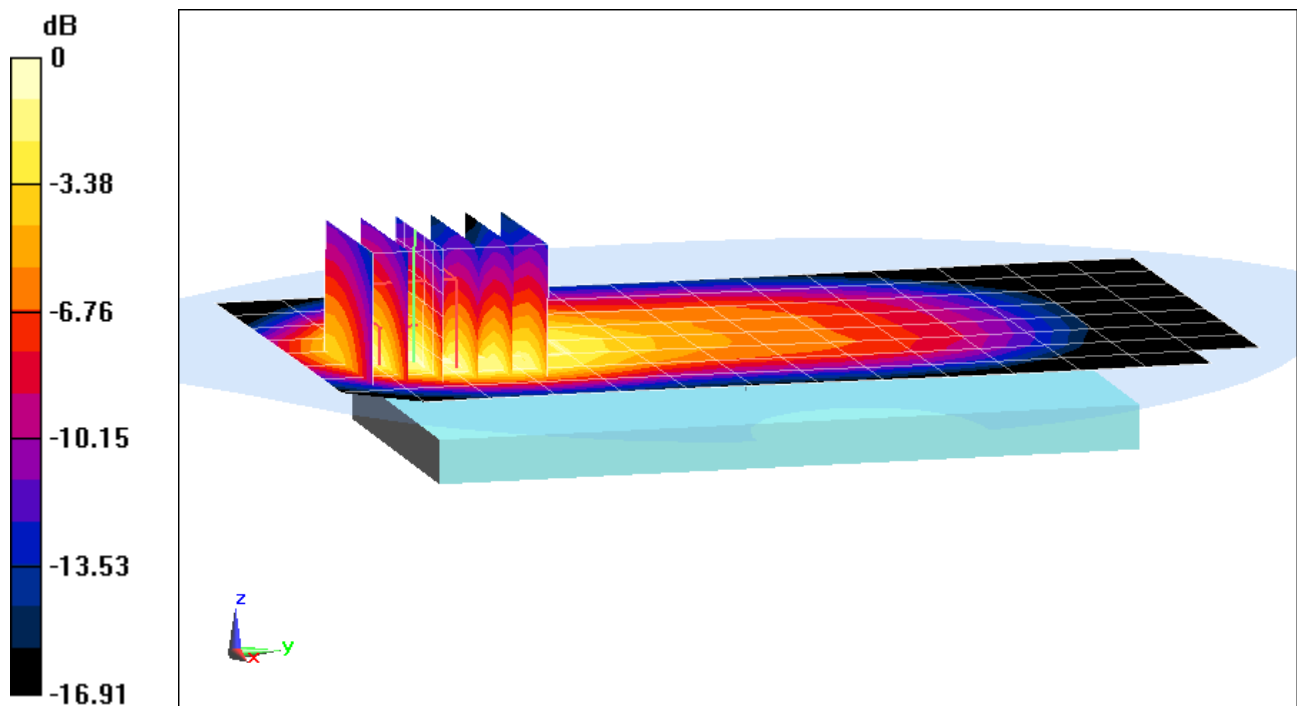
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 18.58 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.621 W/kg

SAR(1 g) = 0.353 W/kg



0 dB = 0.512 W/kg = -2.91 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6B13

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; $\sigma = 0.978$ S/m; $\epsilon_r = 54.556$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-27-2017; Ambient Temp: 22.1°C; Tissue Temp: 20.4°C

Probe: ES3DV3 - SN3319; ConvF(6.04, 6.04, 6.04); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

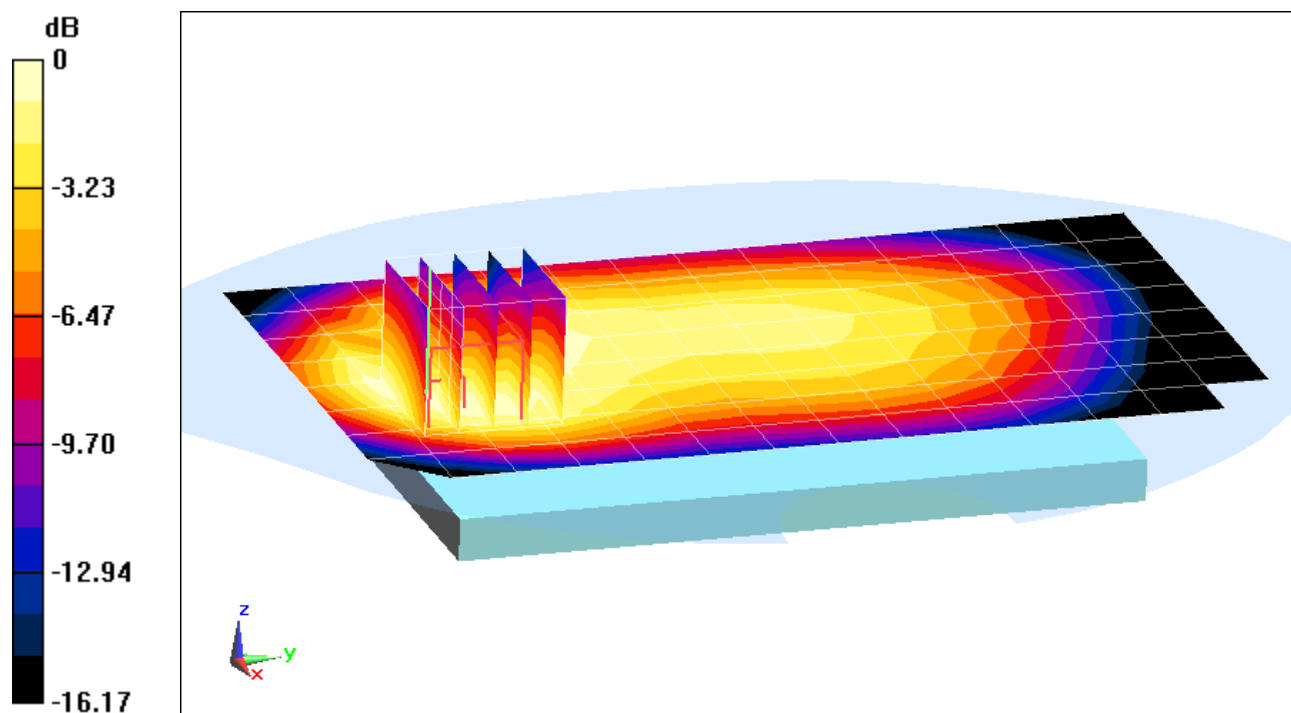
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.32 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.291 W/kg

SAR(1 g) = 0.184 W/kg



0 dB = 0.215 W/kg = -6.68 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6B13

Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.5 \text{ MHz}$; $\sigma = 0.978 \text{ S/m}$; $\epsilon_r = 54.556$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-27-2017; Ambient Temp: 22.1°C; Tissue Temp: 20.4°C

Probe: ES3DV3 - SN3319; ConvF(6.04, 6.04, 6.04); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

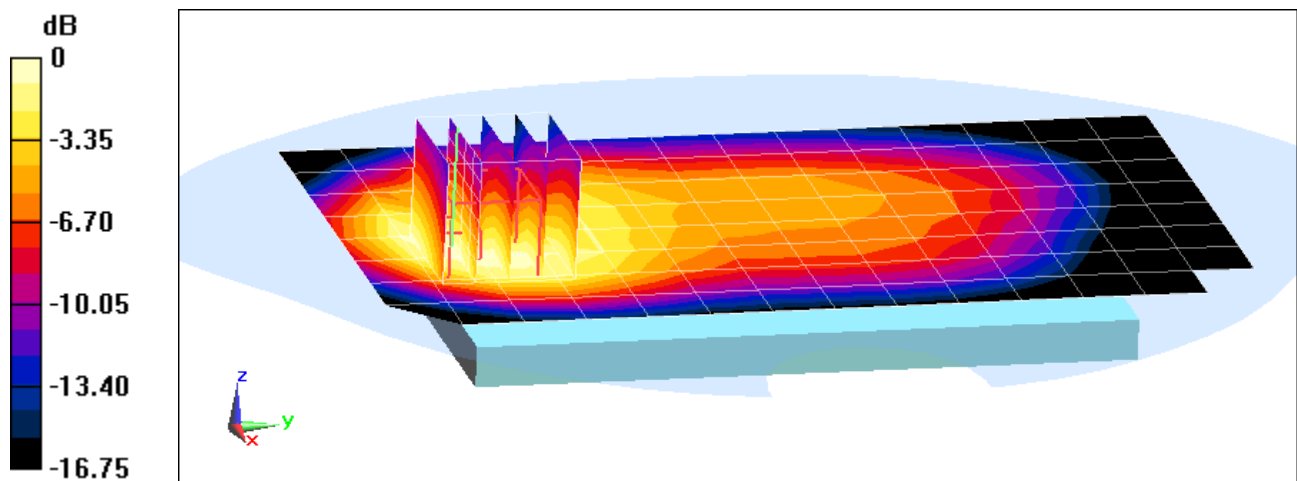
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 20.60 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.650 W/kg

SAR(1 g) = 0.388 W/kg



0 dB = 0.464 W/kg = -3.33 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6A57

Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.442 \text{ S/m}$; $\epsilon_r = 51.255$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-06-2017; Ambient Temp: 21.5°C; Tissue Temp: 20.7°C

Probe: ES3DV3 - SN3213; ConvF(5.09, 5.09, 5.09); Calibrated: 2/10/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2017

Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 4 (AWS), Body SAR, Back side, Mid.ch
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

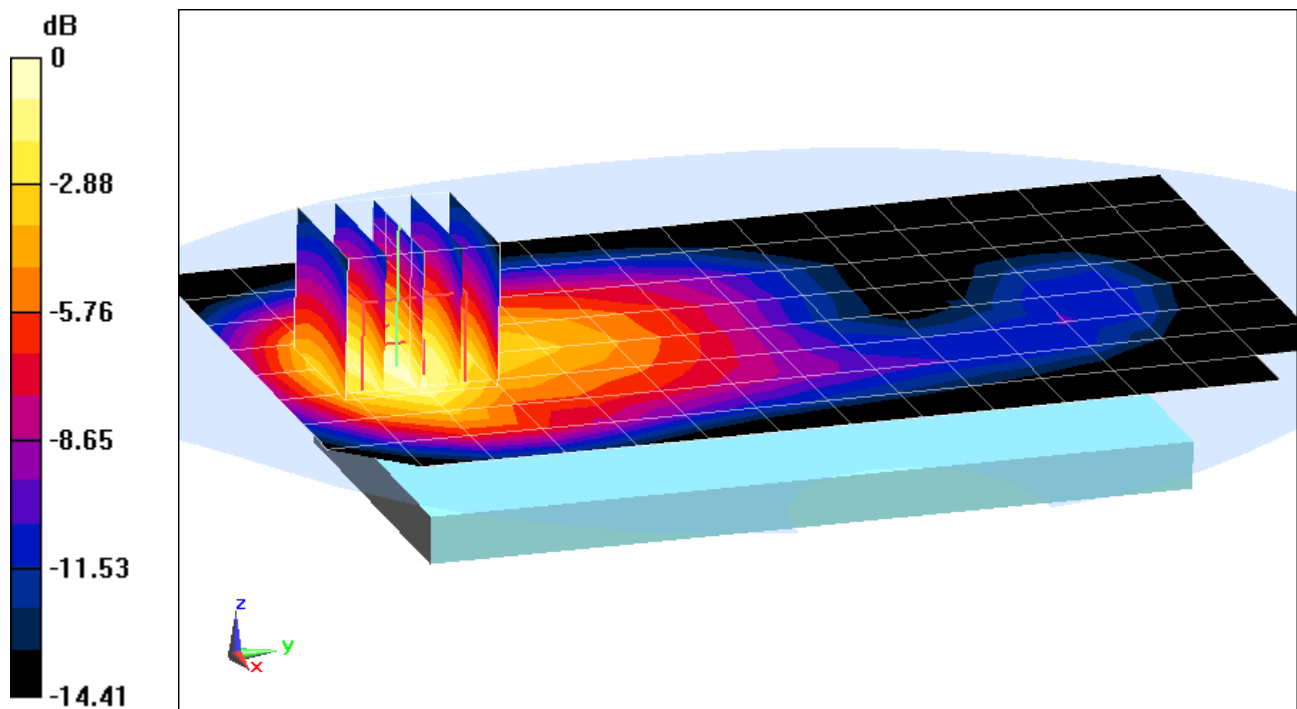
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 17.32 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.580 W/kg

SAR(1 g) = 0.383 W/kg



0 dB = 0.453 W/kg = -3.44 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6A57

Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5$ MHz; $\sigma = 1.442$ S/m; $\epsilon_r = 51.255$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-06-2017; Ambient Temp: 21.5°C; Tissue Temp: 20.7°C

Probe: ES3DV3 - SN3213; ConvF(5.09, 5.09, 5.09); Calibrated: 2/10/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2017

Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: LTE Band 4 (AWS), Body SAR, Bottom Edge, Mid.ch
20 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset

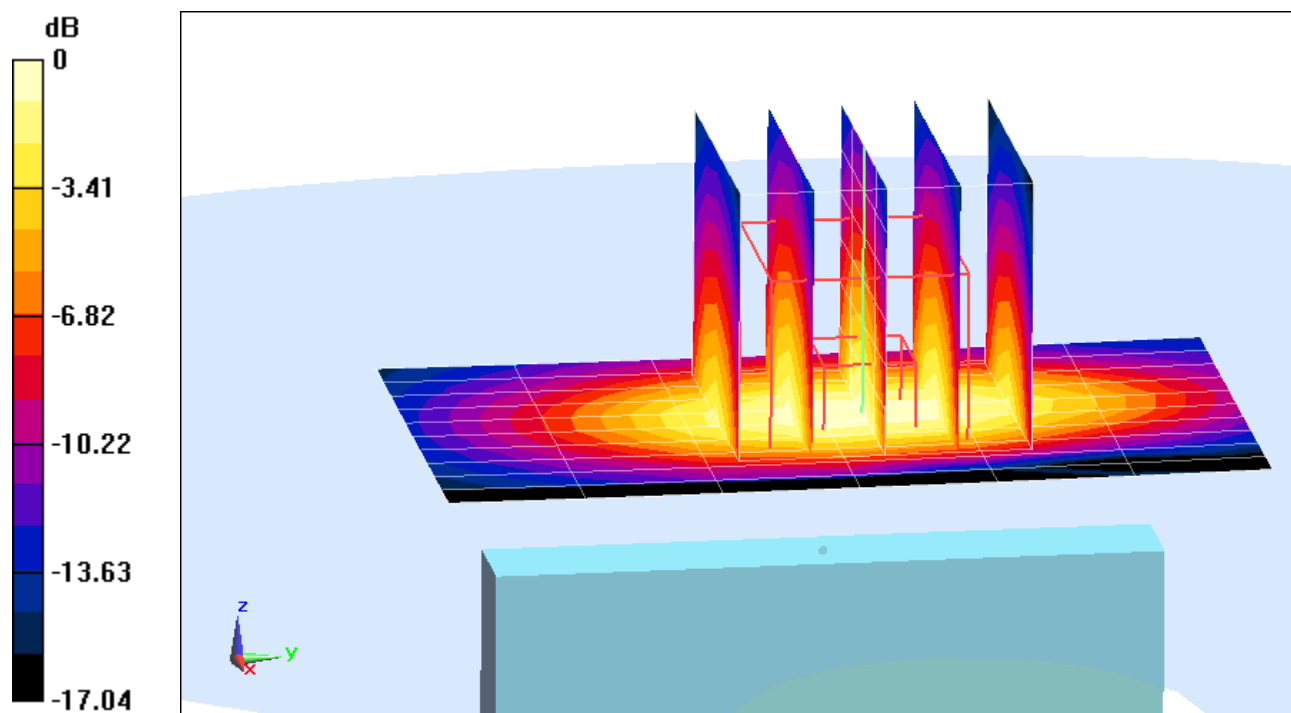
Area Scan (11x7x1): Measurement grid: dx=5mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.40 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.940 W/kg

SAR(1 g) = 0.567 W/kg



0 dB = 0.701 W/kg = -1.54 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6D17

Communication System: UID 0, LTE Band 41; Frequency: 2680 MHz; Duty Cycle: 1:1.58

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2680$ MHz; $\sigma = 2.342$ S/m; $\epsilon_r = 50.372$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-22-2017; Ambient Temp: 23.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7406; ConvF(6.94, 6.94, 6.94); Calibrated: 4/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/14/2016

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

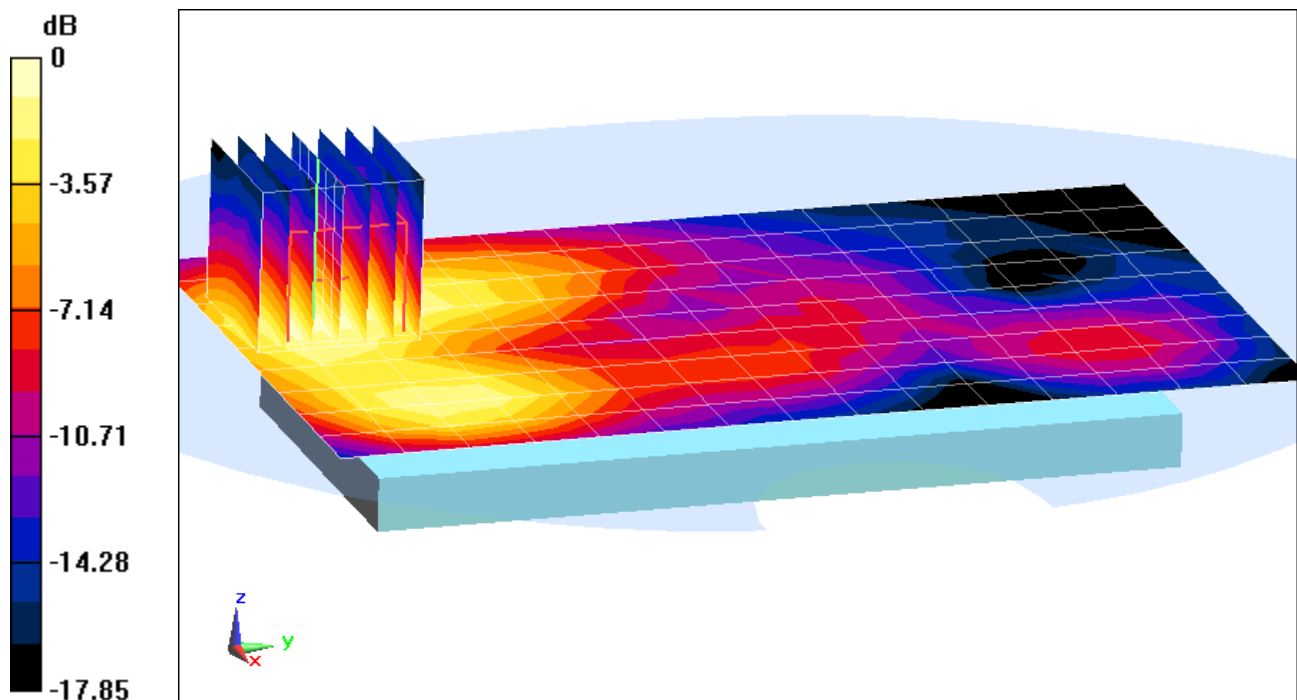
Area Scan (10x16x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.184 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.358 W/kg

SAR(1 g) = 0.185 W/kg



0 dB = 0.289 W/kg = -5.39 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6D17

Communication System: UID 0, LTE Band 41; Frequency: 2636.5 MHz; Duty Cycle: 1:1.58

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2636.5$ MHz; $\sigma = 2.279$ S/m; $\epsilon_r = 52.11$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-15-2017; Ambient Temp: 22.9°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7406; ConvF(6.94, 6.94, 6.94); Calibrated: 4/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/14/2016

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

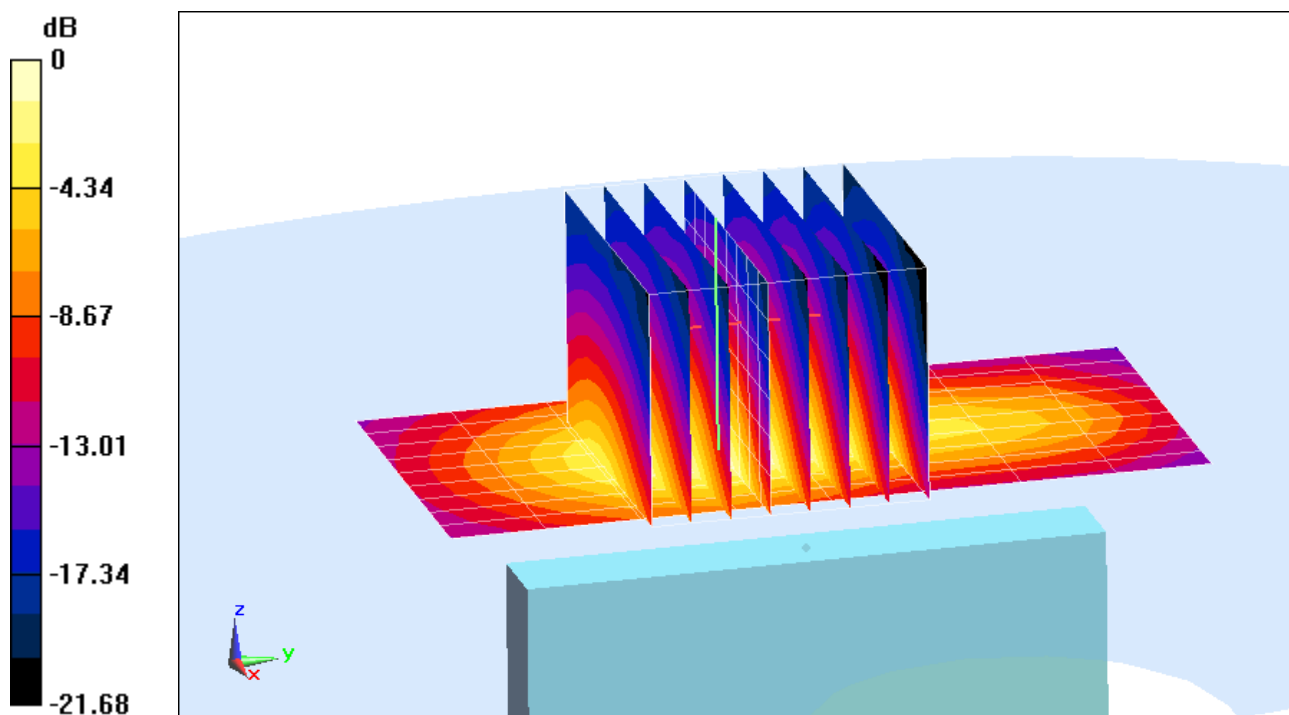
Area Scan (10x9x1): Measurement grid: dx=5mm, dy=12mm

Zoom Scan (9x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.35 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 0.702 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: 0910E

Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$; $\sigma = 1.988 \text{ S/m}$; $\epsilon_r = 50.94$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-04-2017; Ambient Temp: 24.3°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/14/2016

Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Antenna 1, 22 MHz Bandwidth

Body SAR, Ch 06, 1 Mbps, Back Side

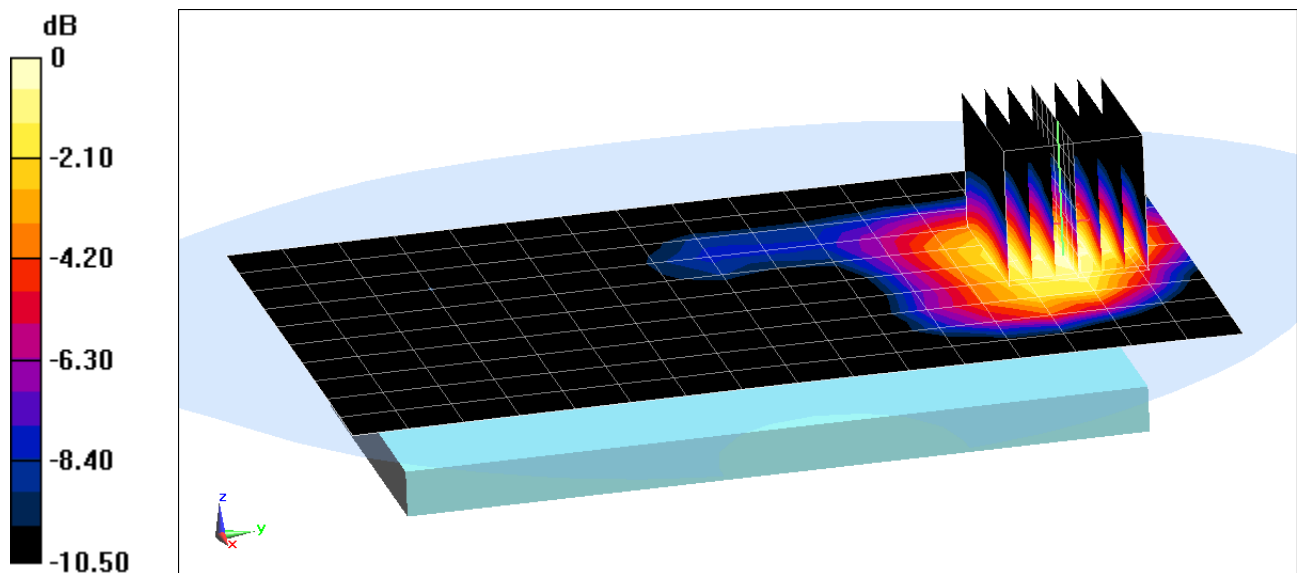
Area Scan (11x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (9x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 9.421 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.298 W/kg

SAR(1 g) = 0.163 W/kg



0 dB = 0.245 W/kg = -6.11 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: 0910E

Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$; $\sigma = 1.988 \text{ S/m}$; $\epsilon_r = 50.94$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-04-2017; Ambient Temp: 24.3°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/14/2016

Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11b, Antenna 1, 22 MHz Bandwidth

Body SAR, Ch 06, 1 Mbps, Back Side

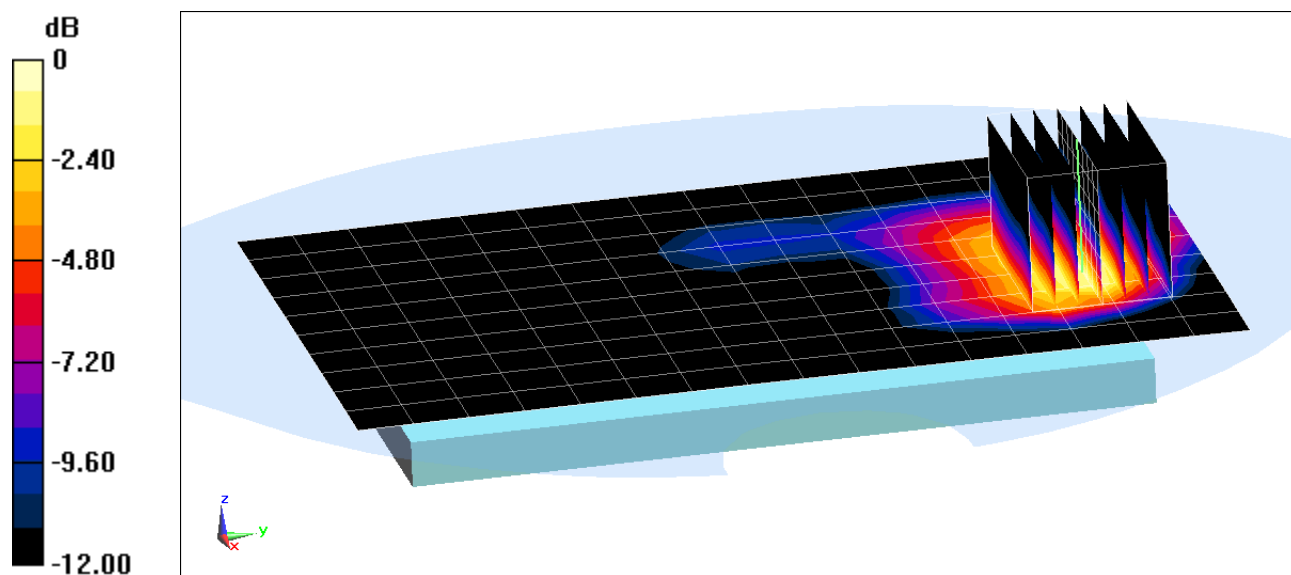
Area Scan (11x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (9x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.14 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.620 W/kg

SAR(1 g) = 0.306 W/kg



0 dB = 0.489 W/kg = -3.11 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: 23544

Communication System: UID 0, 802.11ac 5.2-5.8 GHz Band; Frequency: 5610 MHz; Duty Cycle: 1:1

Medium: 5GHz Body Medium parameters used (interpolated):

$f = 5610 \text{ MHz}$; $\sigma = 5.937 \text{ S/m}$; $\epsilon_r = 47.297$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-13-2017; Ambient Temp: 22.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7308; ConvF(3.75, 3.75, 3.75); Calibrated: 7/21/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11ac, Antenna 1, UNII-2C, 80 MHz Bandwidth

Body SAR, Ch 122, 29.3 Mbps, Back Side

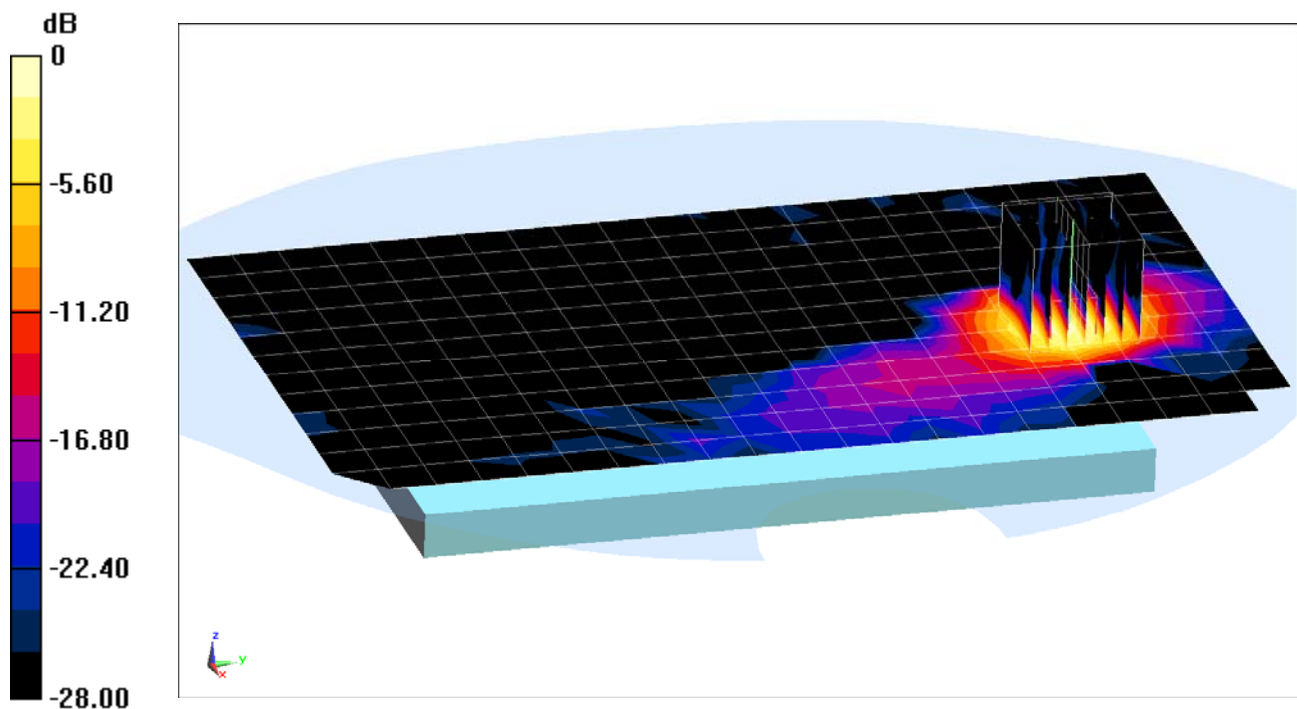
Area Scan (12x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Reference Value = 8.183 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 1.38 W/kg

SAR(1 g) = 0.371 W/kg



0 dB = 0.655 W/kg = -1.84 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: 23544

Communication System: UID 0, 802.11ac 5.2-5.8 GHz Band; Frequency: 5775 MHz; Duty Cycle: 1:1

Medium: 5GHz Body Medium parameters used (interpolated):

$f = 5775 \text{ MHz}$; $\sigma = 6.171 \text{ S/m}$; $\epsilon_r = 47.084$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-13-2017; Ambient Temp: 22.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7308; ConvF(4.04, 4.04, 4.04); Calibrated: 7/21/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11ac, MIMO, UNII-3, 80 MHz Bandwidth

Body SAR, Ch 155, 58.5 Mbps, Back Side

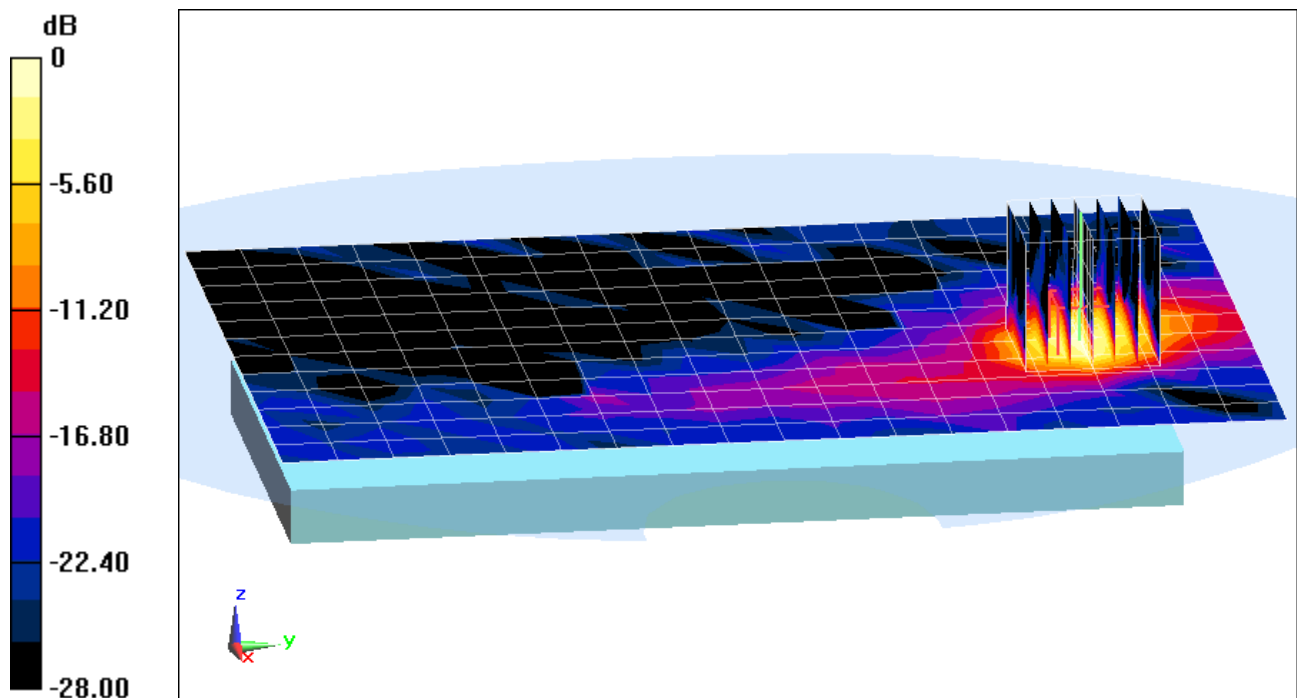
Area Scan (12x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Reference Value = 8.061 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.39 W/kg

SAR(1 g) = 0.332 W/kg



0 dB = 0.867 W/kg = -0.62 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: 0910E

Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.299

Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2441 \text{ MHz}$; $\sigma = 2.022 \text{ S/m}$; $\epsilon_r = 50.886$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-12-2017; Ambient Temp: 24.5°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/14/2016

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

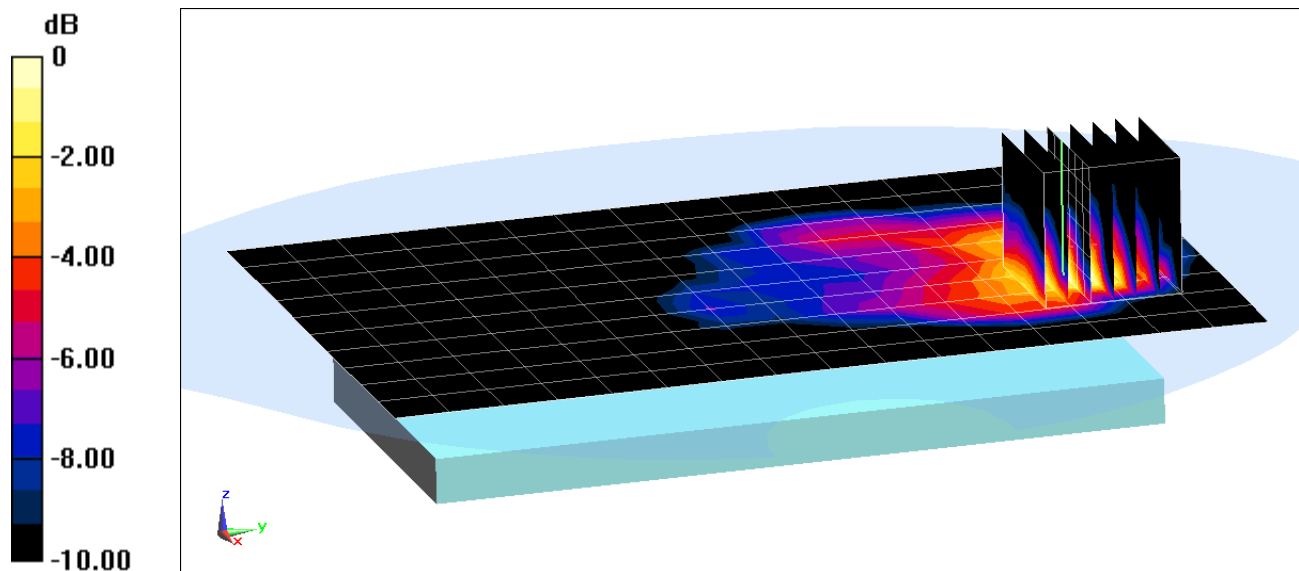
Area Scan (11x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 3.815 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.0520 W/kg

SAR(1 g) = 0.027 W/kg



0 dB = 0.0402 W/kg = -13.96 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: 0910E

Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.299

Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2441 \text{ MHz}$; $\sigma = 2.003 \text{ S/m}$; $\epsilon_r = 51.891$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-24-2017; Ambient Temp: 22.4°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3319; ConvF(4.2, 4.2, 4.2); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: Bluetooth, Body SAR, Ch 39, 2 Mbps, Back Side

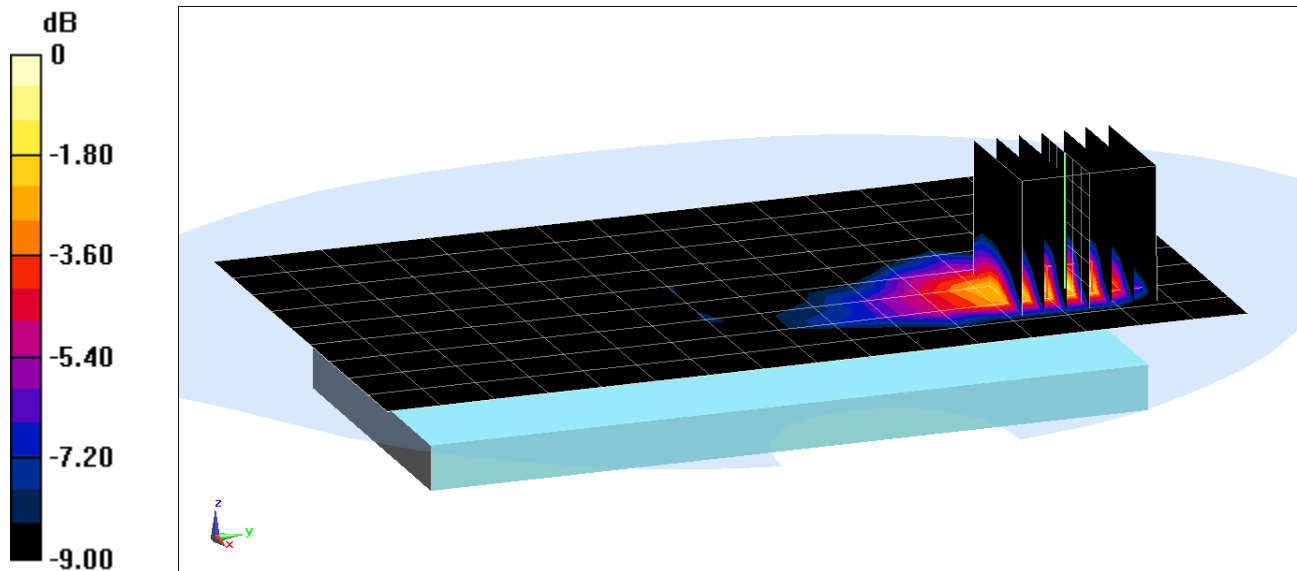
Area Scan (10x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 3.730 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 0.0750 W/kg

SAR(1 g) = 0.030 W/kg



0 dB = 0.0431 W/kg = -13.66 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: D6A57

Communication System: UID 0, GSM GPRS; 3 Tx slots (0); Frequency: 1880 MHz; Duty Cycle: 1:2.76

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.56 \text{ S/m}$; $\epsilon_r = 52.451$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 0.0 cm

Test Date: 04-06-2017; Ambient Temp: 21.9°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3287; ConvF(4.94, 4.94, 4.94); Calibrated: 9/19/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 9/14/2016

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Mode: GPRS 1900, Body SAR, Bottom Edge, Mid.ch, 3 Tx Slots

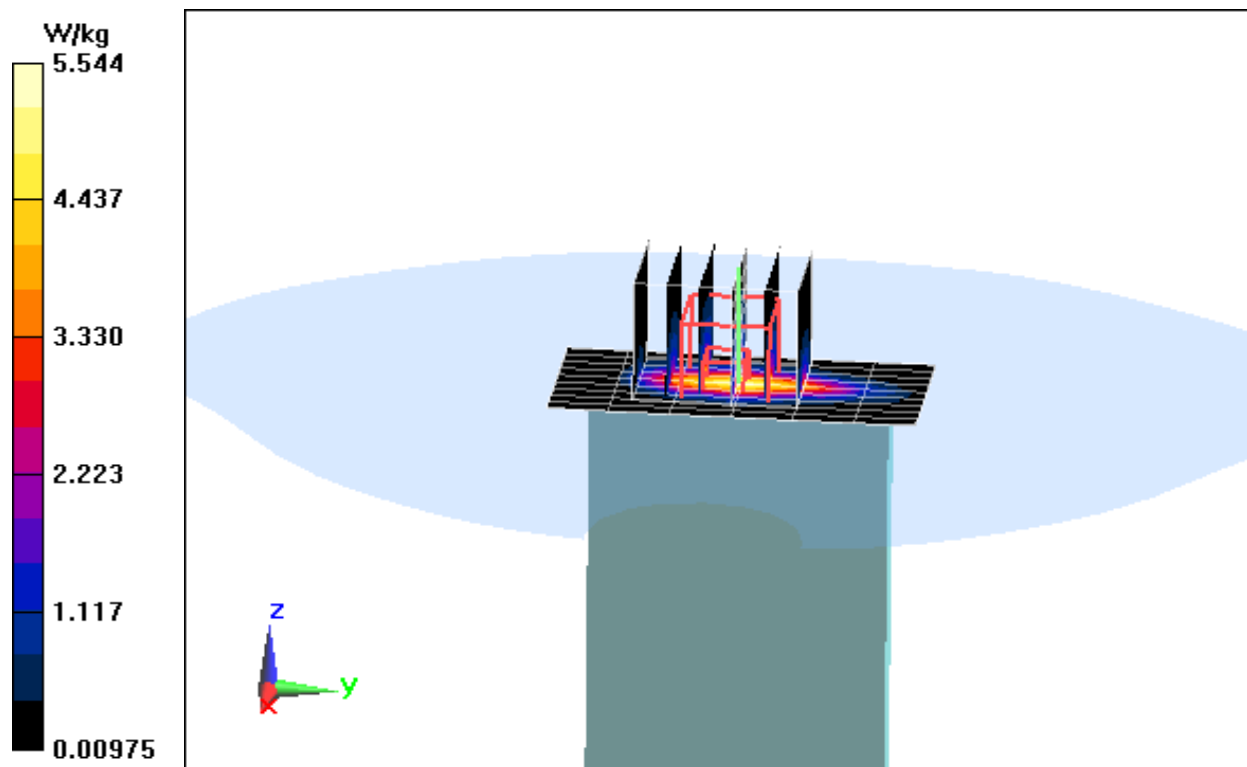
Area Scan (10x7x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 56.03 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 8.30 W/kg

SAR(10 g) = 1.88 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: 23544

Communication System: UID 0, IEEE 802.11ac; Frequency: 5610 MHz; Duty Cycle: 1:1

Medium: 5GHz Body Medium parameters used (interpolated):

$f = 5610 \text{ MHz}$; $\sigma = 5.988 \text{ S/m}$; $\epsilon_r = 47.746$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 03-06-2017; Ambient Temp: 21.5°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3589; ConvF(3.82, 3.82, 3.82); Calibrated: 1/13/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1466; Calibrated: 1/16/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11ac, Antenna 1, UNII-2C, 80 MHz Bandwidth

Body SAR, Ch 122, 29.3 Mbps, Back Side

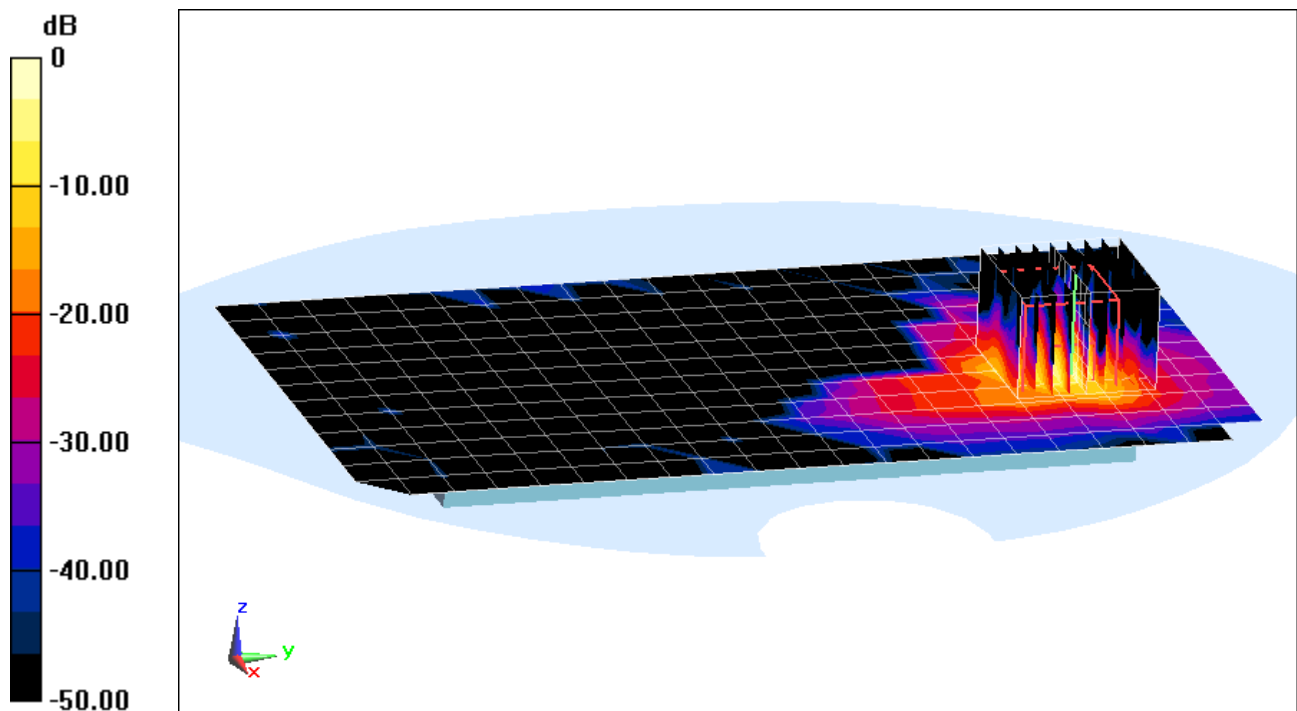
Area Scan (13x22x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Reference Value = 36.54 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 56.8 W/kg

SAR(10 g) = 1.38 W/kg



0 dB = 26.9 W/kg = 14.30 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSC03J; Type: Portable Handset; Serial: 0910E

Communication System: UID 0, Bluetooth; Frequency: 2441 MHz; Duty Cycle: 1:1.299

Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2441 \text{ MHz}$; $\sigma = 2.022 \text{ S/m}$; $\epsilon_r = 50.886$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-12-2017; Ambient Temp: 24.5°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/14/2016

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

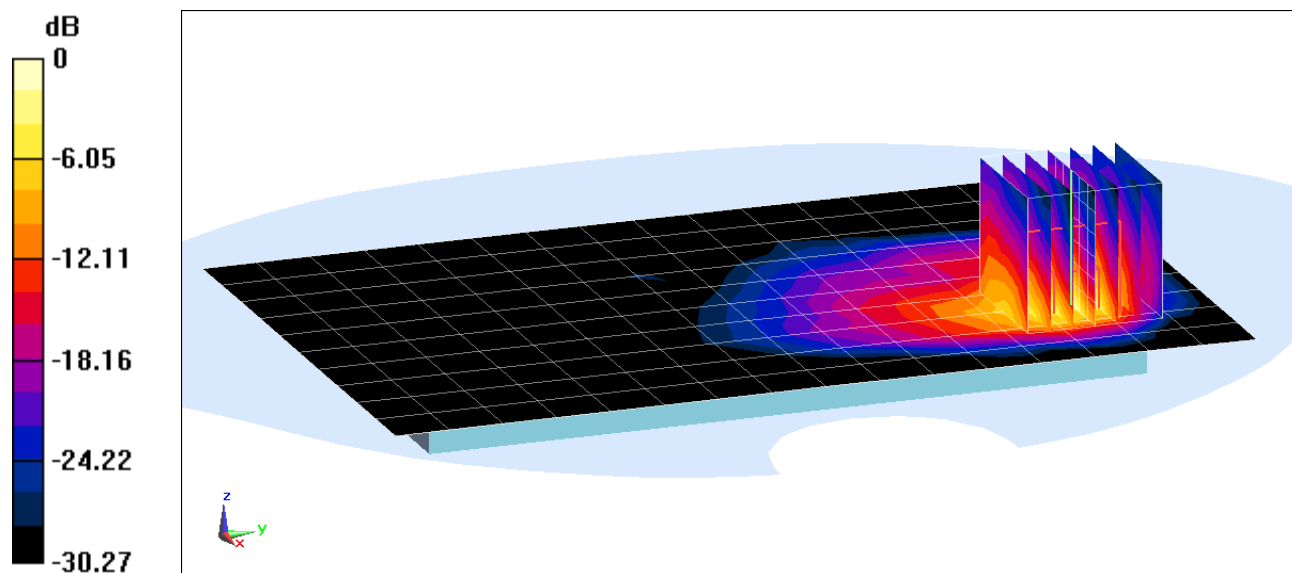
Area Scan (11x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 29.01 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 5.27 W/kg

SAR(10 g) = 0.482 W/kg



0 dB = 3.51 W/kg = 5.45 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

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 (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.912 \text{ S/m}$; $\epsilon_r = 42.488$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-21-2017; Ambient Temp: 21.6°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3287; ConvF(6.96, 6.96, 6.96); Calibrated: 9/19/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 9/14/2016

Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

750 MHz System Verification at 23.0 dBm (200 mW)

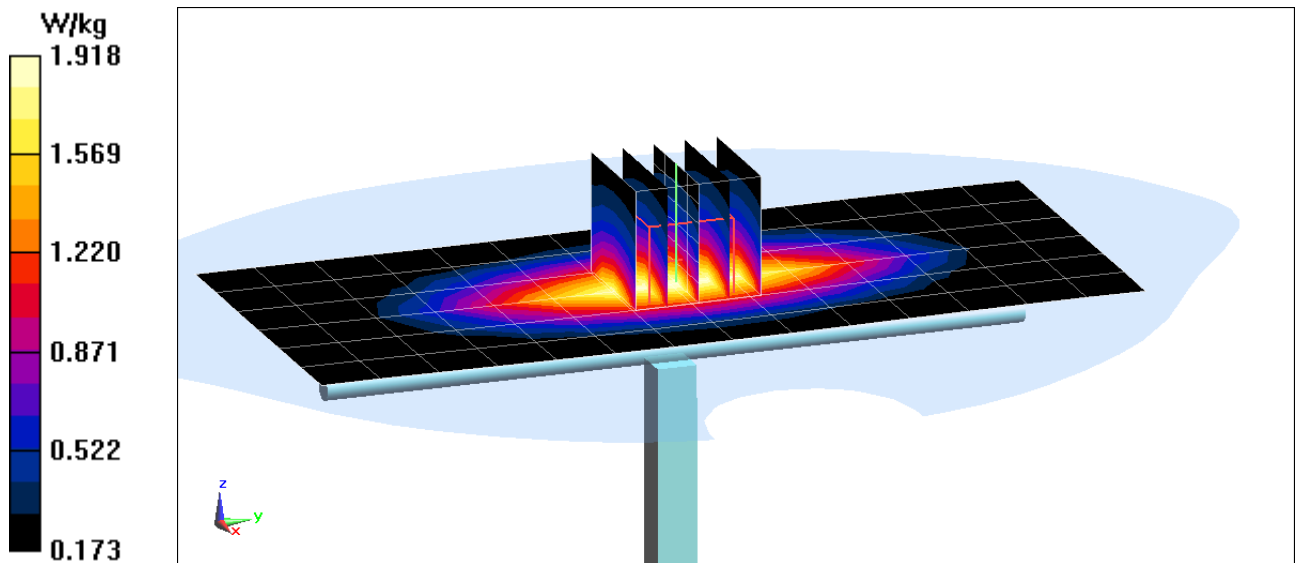
Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.43 W/kg

SAR(1 g) = 1.64 W/kg

Deviation(1 g) = -2.26%



PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head; Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.915 \text{ S/m}$; $\epsilon_r = 42.698$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-22-2017; Ambient Temp: 24.1°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3319; ConvF(6.16, 6.16, 6.16); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification at 23.0 dBm (200 mW)

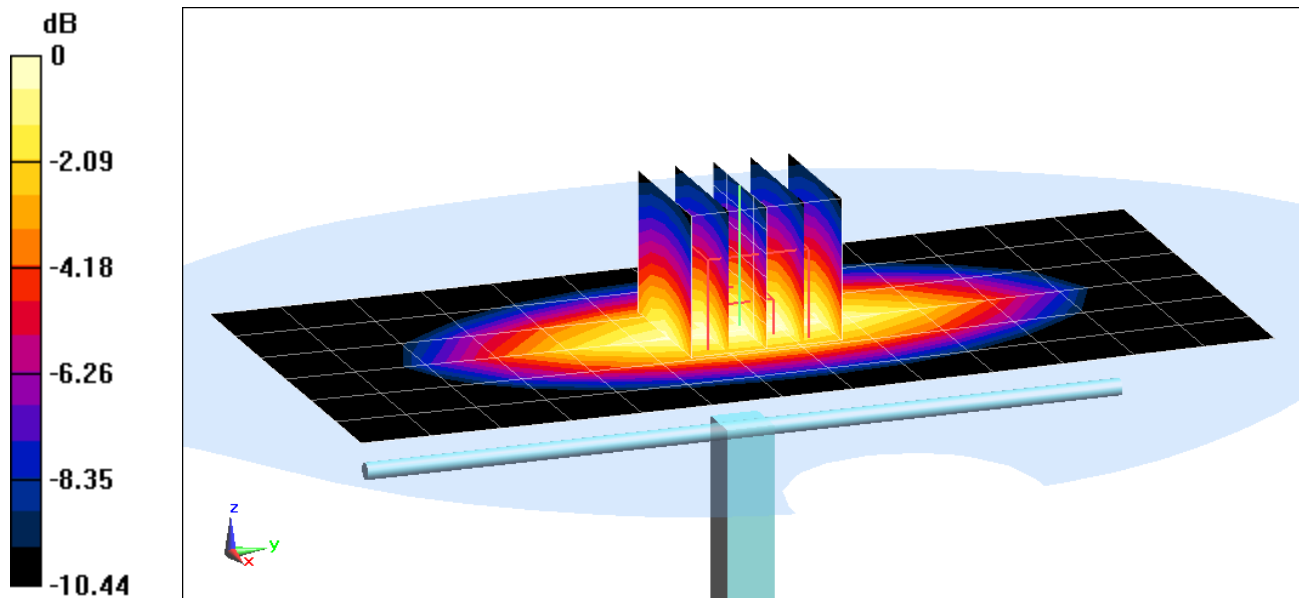
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.62 W/kg

SAR(1 g) = 1.84 W/kg

Deviation(1 g) = 0.77%



0 dB = 2.14 W/kg = 3.30 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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:

$f = 835 \text{ MHz}$; $\sigma = 0.878 \text{ S/m}$; $\epsilon_r = 40.195$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-27-2017; Ambient Temp: 21.7°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3334; ConvF(6.49, 6.49, 6.49); Calibrated: 11/15/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 11/11/2016

Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification at 23.0 dBm (200 mW)

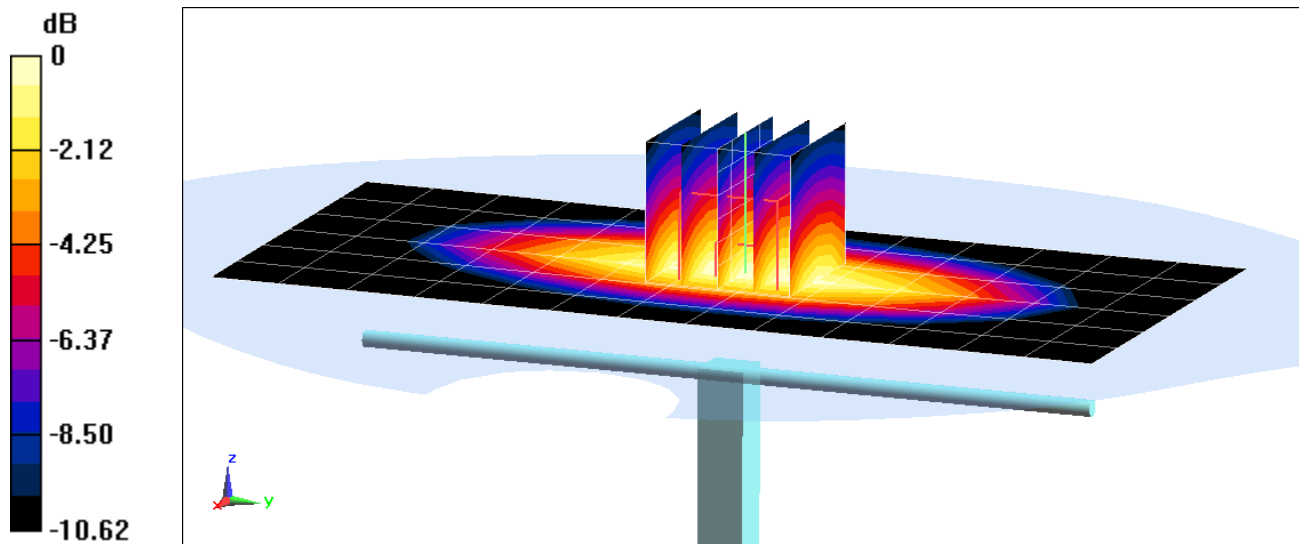
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.75 W/kg

SAR(1 g) = 1.87 W/kg

Deviation(1 g) = 0.32%



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.394 \text{ S/m}$; $\epsilon_r = 38.87$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-27-2017; Ambient Temp: 24.0°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7406; ConvF(8.85, 8.85, 8.85); Calibrated: 04/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 04/14/2016

Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1750 MHz System Verification at 20.0 dBm (100 mW)

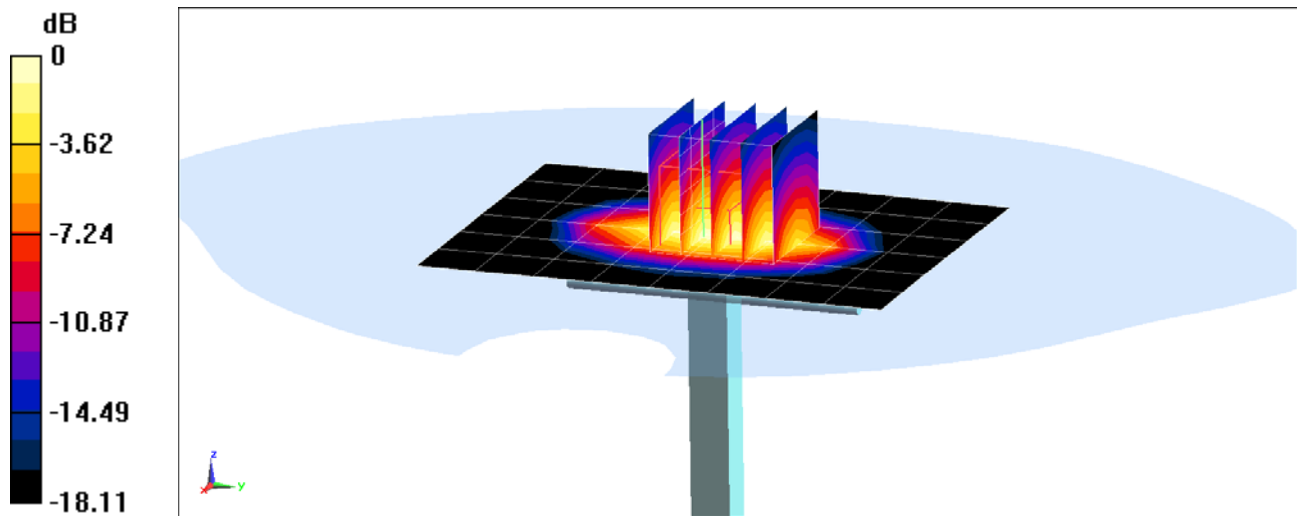
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Peak SAR (extrapolated) = 6.11 W/kg

SAR(1 g) = 3.43 W/kg

Deviation(1 g) = -6.54%



0 dB = 5.11 W/kg = 7.08 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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 (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.423 \text{ S/m}$; $\epsilon_r = 38.433$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-24-2017; Ambient Temp: 20.5°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3287; ConvF(5.27, 5.27, 5.27); Calibrated: 9/19/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 9/14/2016

Phantom: SAM Left; Type: QD000P40CA; Serial: TP:82355

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification at 20.0 dBm (100 mW)

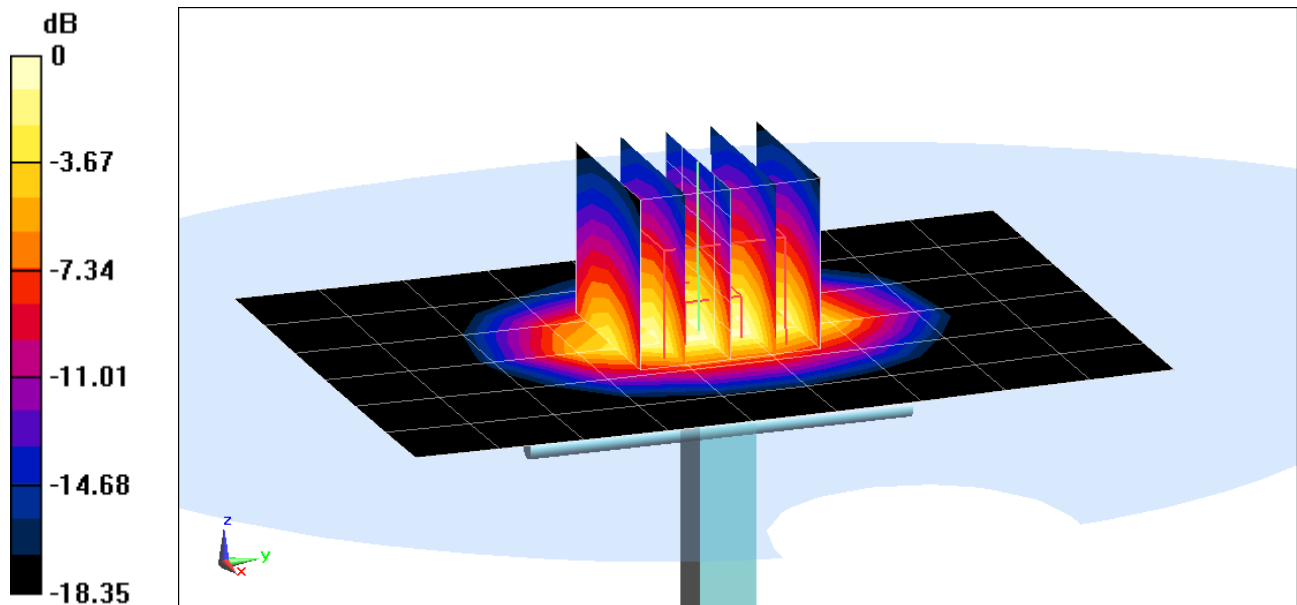
Area Scan (7x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 7.31 W/kg

SAR(1 g) = 3.93 W/kg

Deviation(1 g) = 0.00%



0 dB = 5.01 W/kg = 7.00 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Head; Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.867 \text{ S/m}$; $\epsilon_r = 39.124$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-10-2017; Ambient Temp: 23.6°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3287; ConvF(4.54, 4.54, 4.54); Calibrated: 9/19/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 9/14/2016

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification at 20.0 dBm (100 mW)

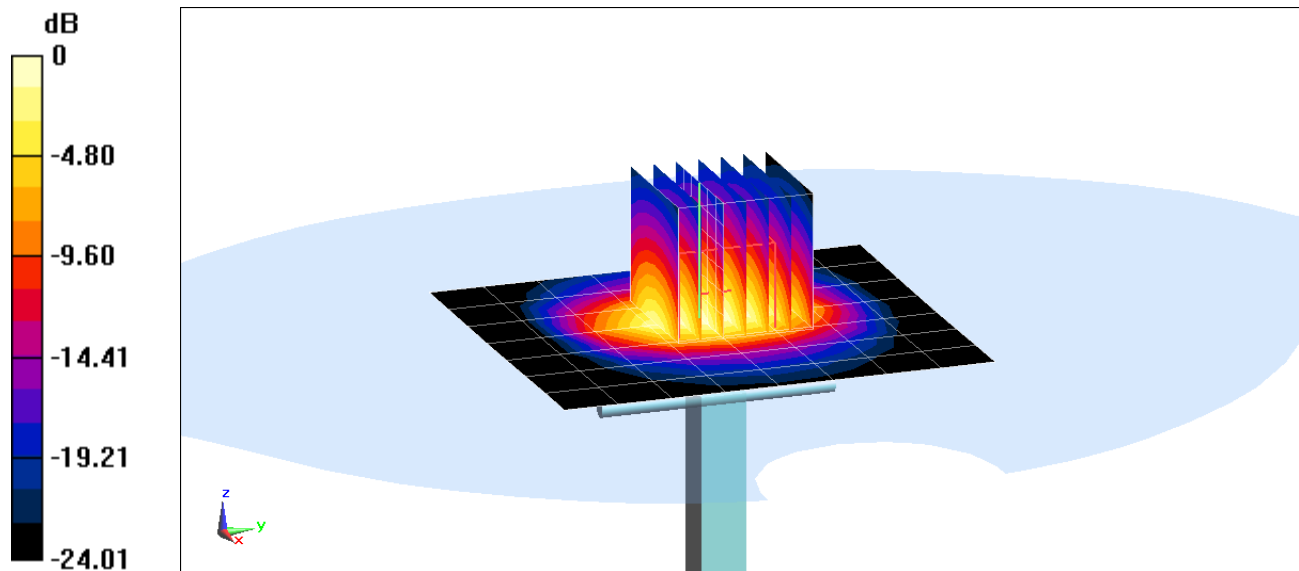
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 11.6 W/kg

SAR(1 g) = 5.45 W/kg

Deviation(1 g) = 4.61%



0 dB = 7.27 W/kg = 8.62 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 981

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Head; Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.869 \text{ S/m}$; $\epsilon_r = 38.155$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-22-2017; Ambient Temp: 23.2°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3287; ConvF(4.54, 4.54, 4.54); Calibrated: 9/19/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 9/14/2016

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification at 20.0 dBm (100 mW)

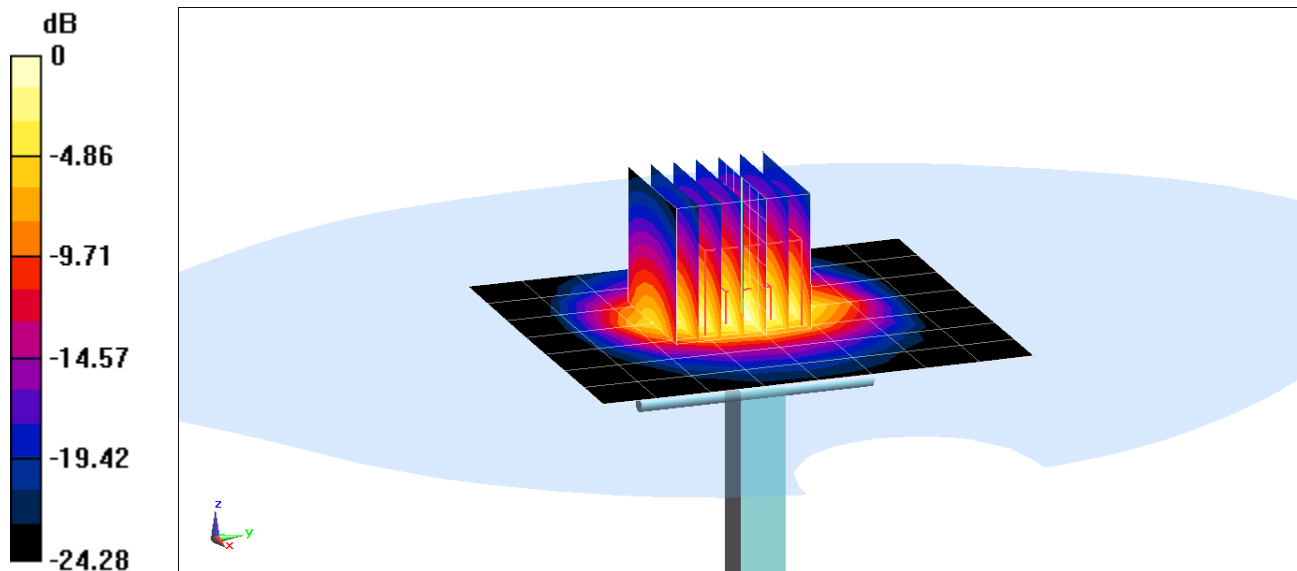
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 11.9 W/kg

SAR(1 g) = 5.64 W/kg

Deviation(1 g) = 6.82%



0 dB = 7.52 W/kg = 8.76 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1126

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2600$ MHz; $\sigma = 2.035$ S/m; $\epsilon_r = 37.642$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-15-2017; Ambient Temp: 22.1°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3287; ConvF(4.41, 4.41, 4.41); Calibrated: 9/19/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 9/14/2016

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2600 MHz System Verification at 20.0 dBm (100 mW)

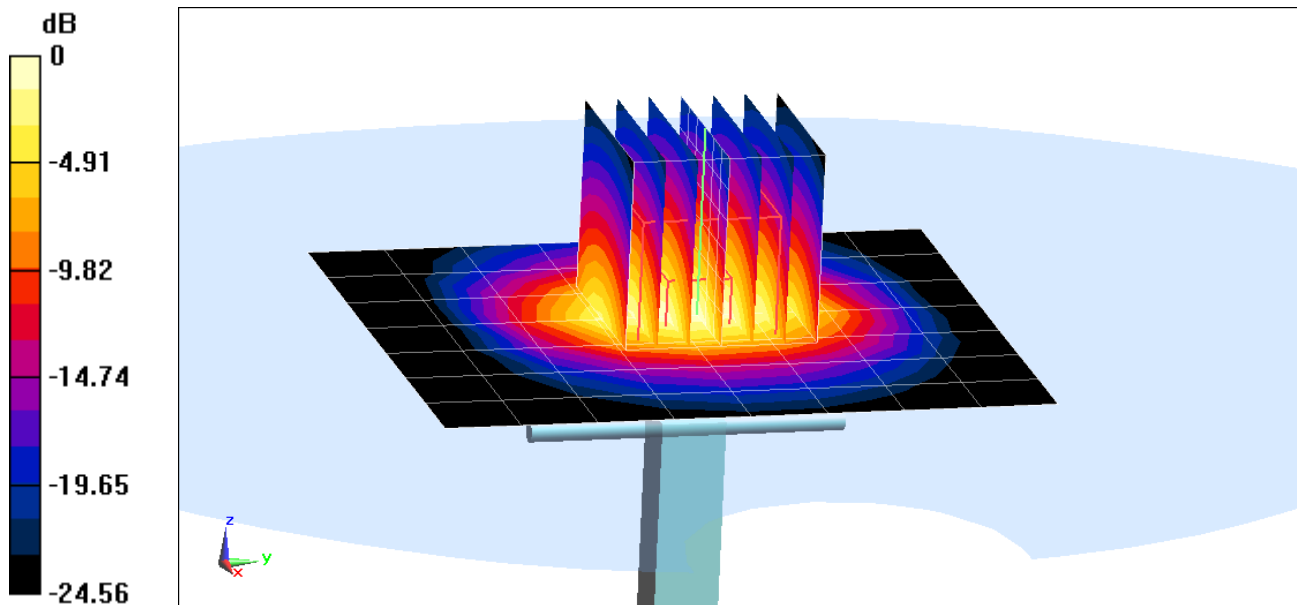
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 13.5 W/kg

SAR(1 g) = 6.07 W/kg

Deviation(1 g) = 7.82%



0 dB = 8.12 W/kg = 9.10 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: 5GHz Medium parameters used (interpolated):

$f = 5250 \text{ MHz}$; $\sigma = 4.642 \text{ S/m}$; $\epsilon_r = 35.248$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-27-2017; Ambient Temp: 21.1°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3914; ConvF(5.49, 5.49, 5.49); Calibrated: 2/13/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 11/11/2016

Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5250 MHz System Verification at 17.0 dBm (50 mW)

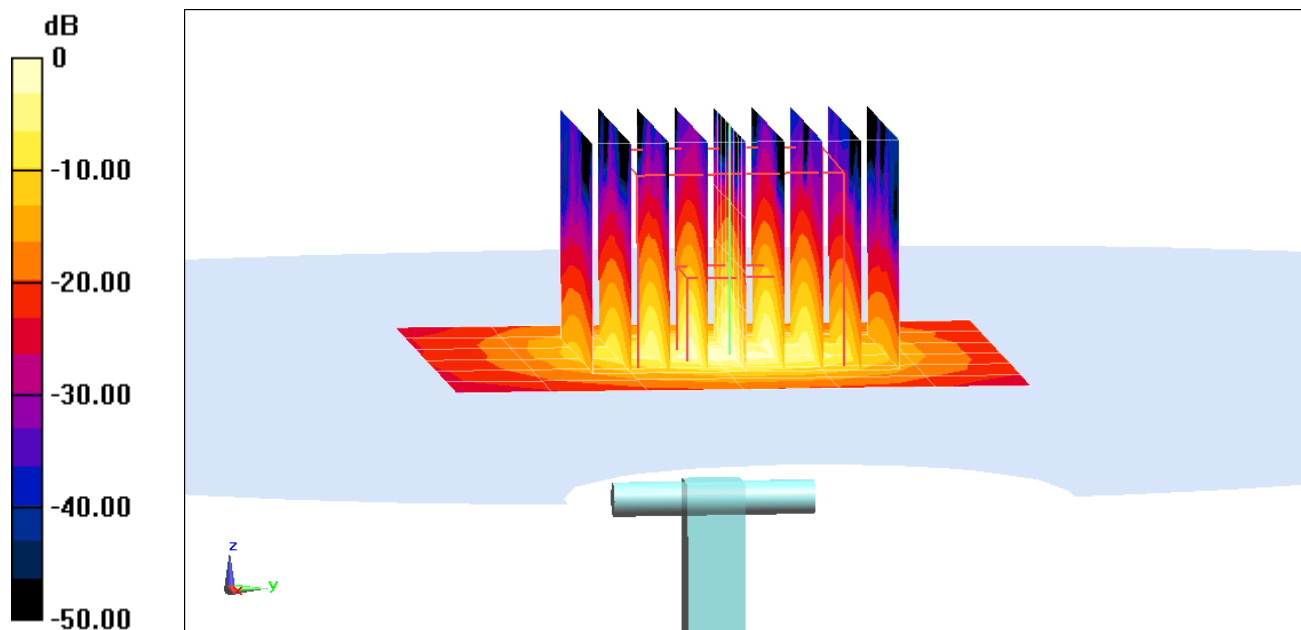
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 16.7 W/kg

SAR(1 g) = 3.76 W/kg

Deviation(1 g) = -5.05%



0 dB = 9.75 W/kg = 9.89 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: 5GHz Medium parameters used:

$f = 5600 \text{ MHz}$; $\sigma = 4.985 \text{ S/m}$; $\epsilon_r = 34.712$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-27-2017; Ambient Temp: 21.1°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3914; ConvF(4.94, 4.94, 4.94); Calibrated: 2/13/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 11/11/2016

Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5600 MHz System Verification at 17.0 dBm (50 mW)

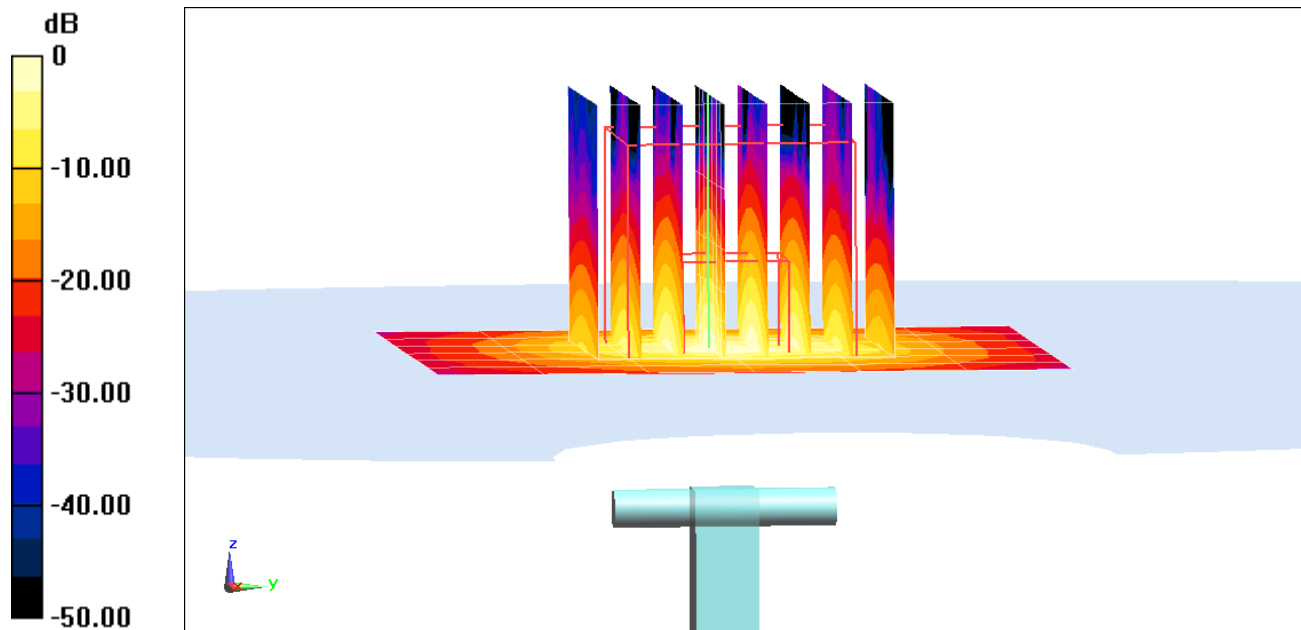
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 18.0 W/kg

SAR(1 g) = 3.90 W/kg

Deviation(1 g) = -6.36%



0 dB = 9.86 W/kg = 9.94 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: 5GHz Medium parameters used (interpolated):

$f = 5750 \text{ MHz}$; $\sigma = 5.143 \text{ S/m}$; $\epsilon_r = 34.51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-27-2017; Ambient Temp: 21.1°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3914; ConvF(4.91, 4.91, 4.91); Calibrated: 2/13/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 11/11/2016

Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1800

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5750 MHz System Verification at 17.0 dBm (50 mW)

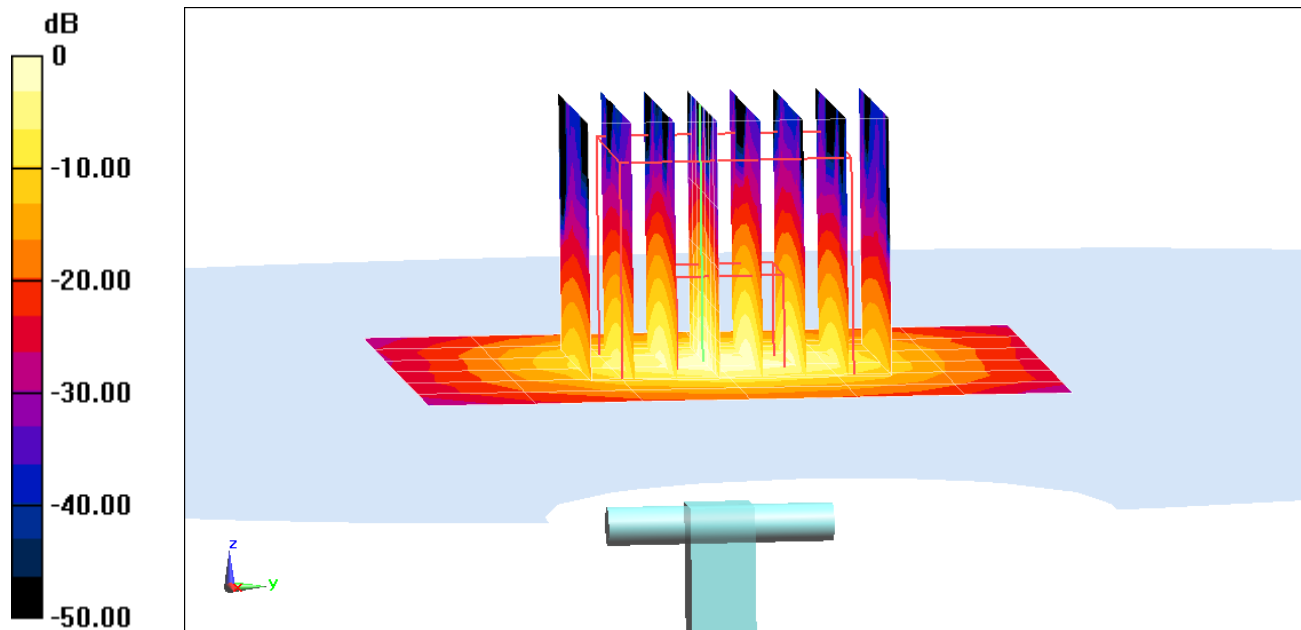
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 17.6 W/kg

SAR(1 g) = 3.73 W/kg

Deviation(1 g) = -8.47%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1161

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: 750 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.963 \text{ S/m}$; $\epsilon_r = 56.323$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-22-2017; Ambient Temp: 22.7°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7409; ConvF(9.46, 9.46, 9.46); Calibrated: 5/17/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

750 MHz System Verification at 23.0 dBm (200 mW)

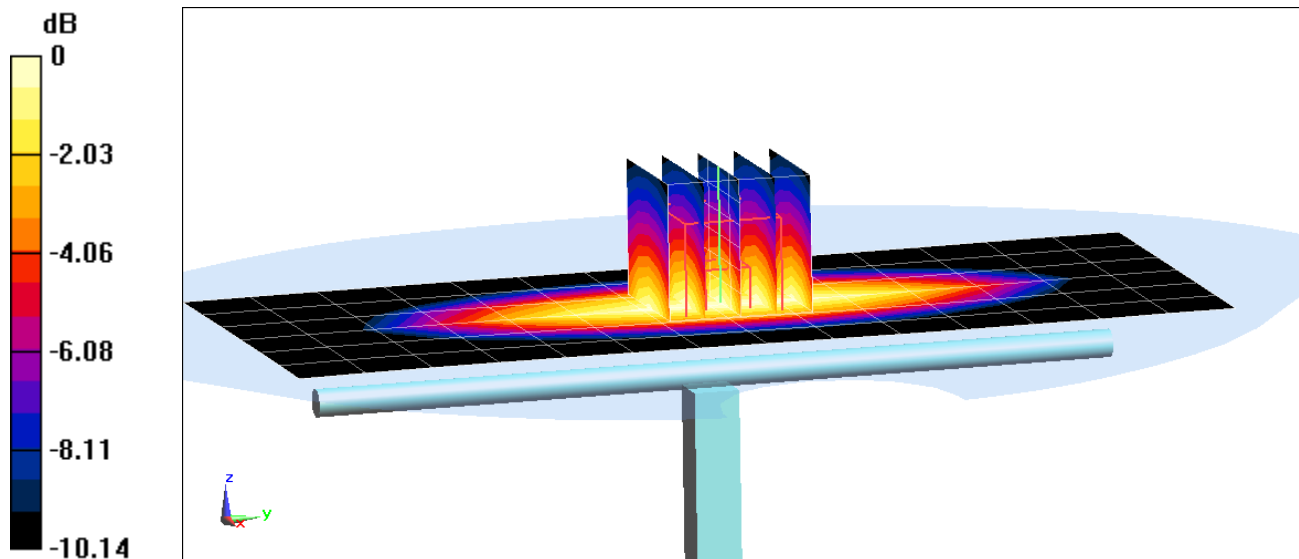
Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.76 W/kg

SAR(1 g) = 1.83 W/kg

Deviation(1 g) = 8.54%



0 dB = 2.44 W/kg = 3.87 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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:

$f = 835 \text{ MHz}$; $\sigma = 0.977 \text{ S/m}$; $\epsilon_r = 54.573$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 02-27-2017; Ambient Temp: 22.1°C; Tissue Temp: 20.4°C

Probe: ES3DV3 - SN3319; ConvF(6.04, 6.04, 6.04); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

835 MHz System Verification at 23.0 dBm (200 mW)

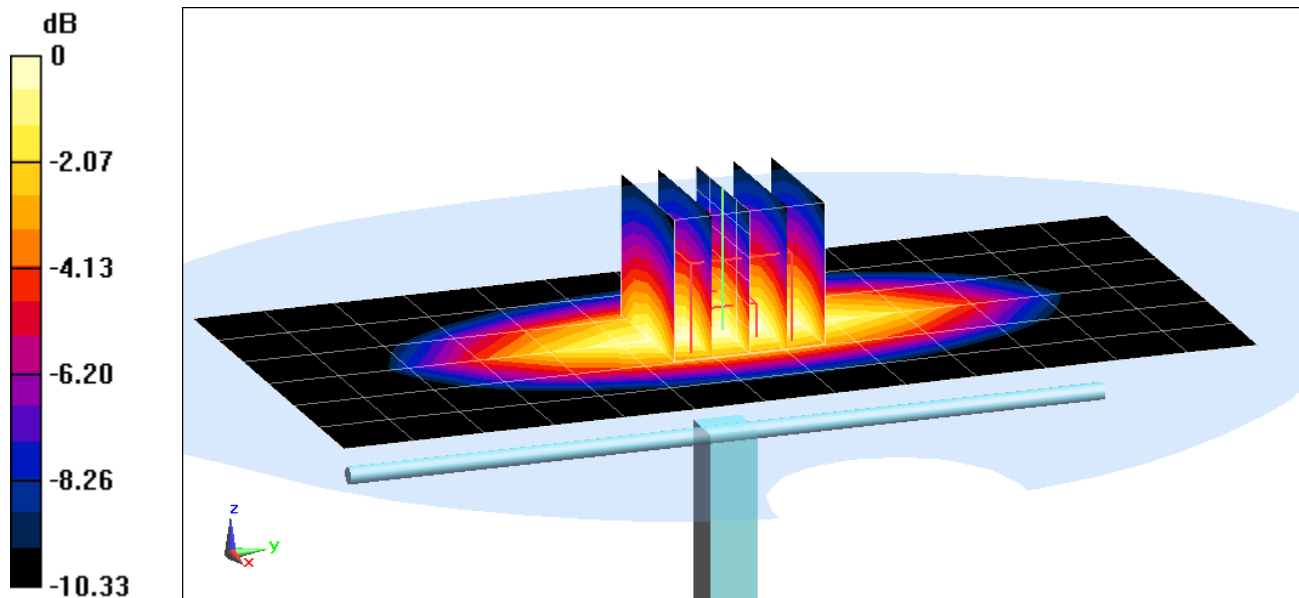
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.88 W/kg

SAR(1 g) = 1.96 W/kg

Deviation(1 g) = 2.40%



0 dB = 2.29 W/kg = 3.60 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.467 \text{ S/m}$; $\epsilon_r = 51.204$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-06-2017; Ambient Temp: 21.5°C; Tissue Temp: 20.7°C

Probe: ES3DV3 - SN3213; ConvF(5.09, 5.09, 5.09); Calibrated: 2/10/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2017

Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1750 MHz System Verification at 20.0 dBm (100 mW)

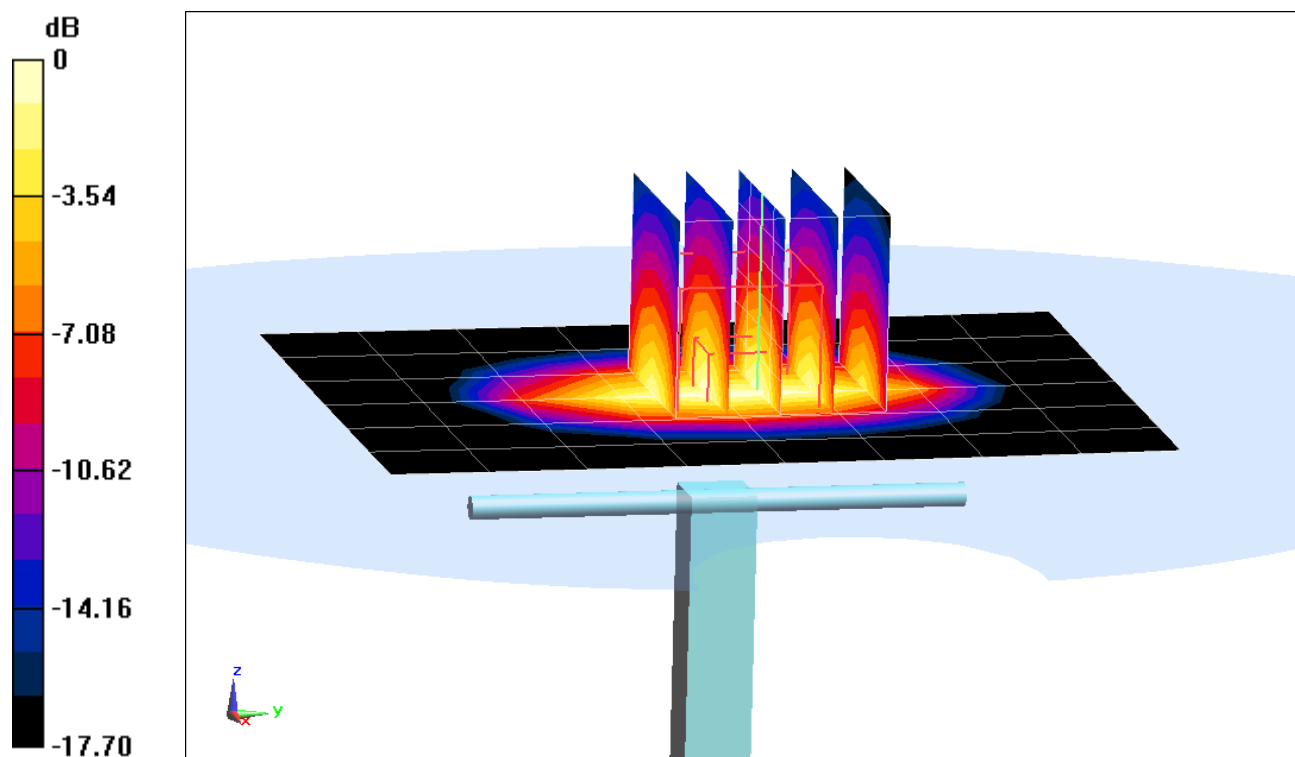
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Peak SAR (extrapolated) = 6.52 W/kg

SAR(1 g) = 3.66 W/kg

Deviation(1 g) = -1.88%



0 dB = 4.54 W/kg = 6.57 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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 (interpolated):

$f = 1900$ MHz; $\sigma = 1.579$ S/m; $\epsilon_r = 51.646$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-23-2017; Ambient Temp: 23.8°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3334; ConvF(4.91, 4.91, 4.91); Calibrated: 11/15/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 11/11/2016

Phantom: SAM with CRP v4.0 Left; Type: QD000P40CD; Serial: TP:1692

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification at 20.0 dBm (100 mW)

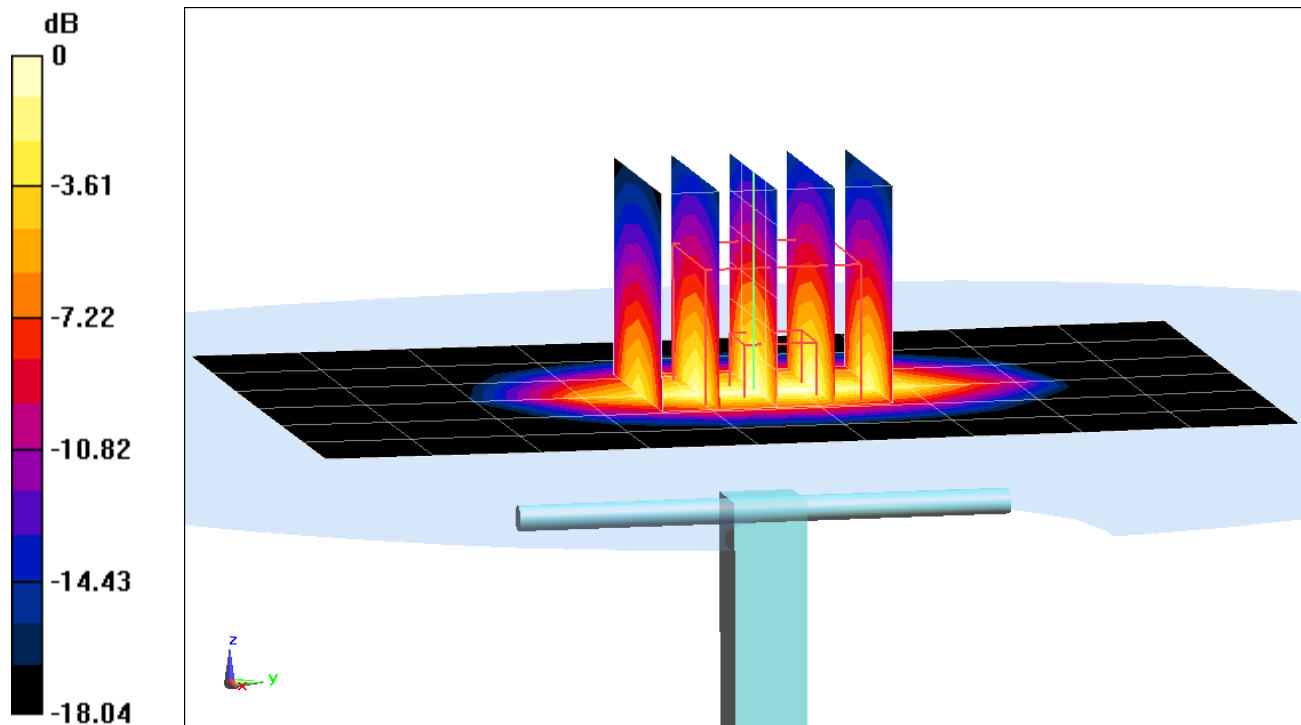
Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Peak SAR (extrapolated) = 7.55 W/kg

SAR(1 g) = 4.18 W/kg

Deviation(1 g) = 6.91%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.582 \text{ S/m}$; $\epsilon_r = 52.338$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 04-06-2017; Ambient Temp: 21.9°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3287; ConvF(4.94, 4.94, 4.94); Calibrated: 9/19/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 9/14/2016

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

1900 MHz System Verification at 20.0 dBm (100 mW)

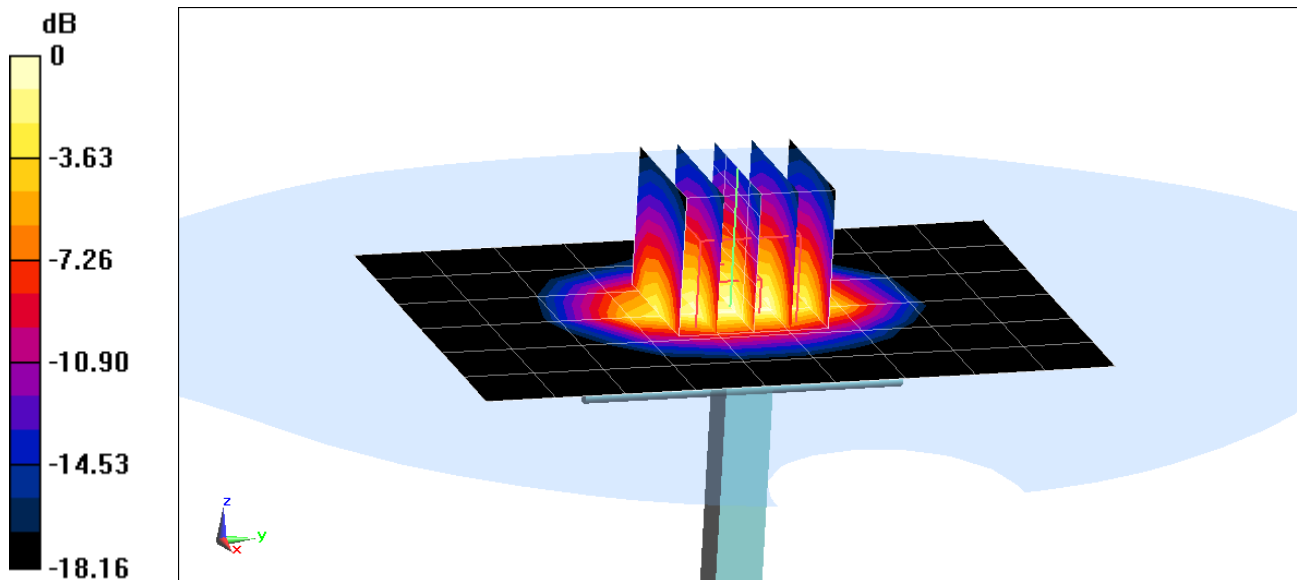
Area Scan (7x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 7.09 W/kg

SAR(1 g) = 3.9 W/kg; SAR(10 g) = 2 W/kg

Deviation(1 g) = -2.26%; Deviation(10 g) = -5.21%



0 dB = 4.96 W/kg = 6.95 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 981

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Body; Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 2.035 \text{ S/m}$; $\epsilon_r = 50.856$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-12-2017; Ambient Temp: 24.5°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/14/2016

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification at 20.0 dBm (100 mW)

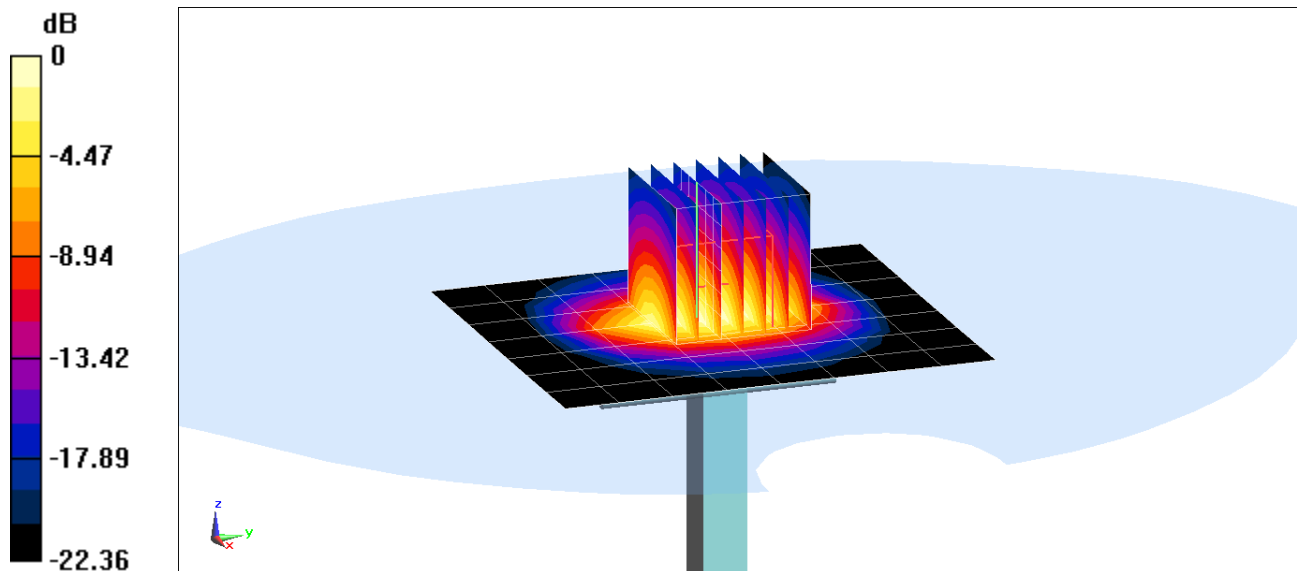
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 10.9 W/kg

SAR(10 g) = 2.43 W/kg

Deviation(10 g) = 2.10%



0 dB = 8.69 W/kg = 9.39 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Body; Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 2.014 \text{ S/m}$; $\epsilon_r = 51.856$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-24-2017; Ambient Temp: 22.4°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3319; ConvF(4.2, 4.2, 4.2); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification at 20.0 dBm (100 mW)

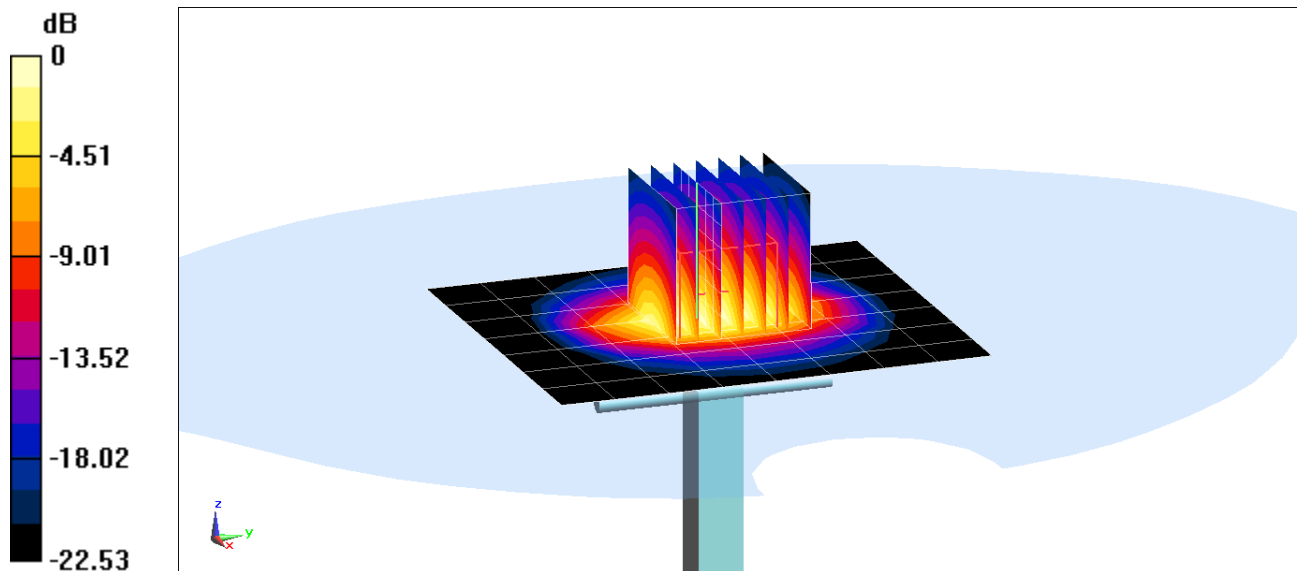
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 10.9 W/kg

SAR(1 g) = 5.21 W/kg

Deviation(1 g) = 2.76%



0 dB = 6.85 W/kg = 8.36 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 981

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 2.029 \text{ S/m}$; $\epsilon_r = 52.81$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-15-2017; Ambient Temp: 22.9°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 04/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 04/14/2016

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2450 MHz System Verification at 20.0 dBm (100 mW)

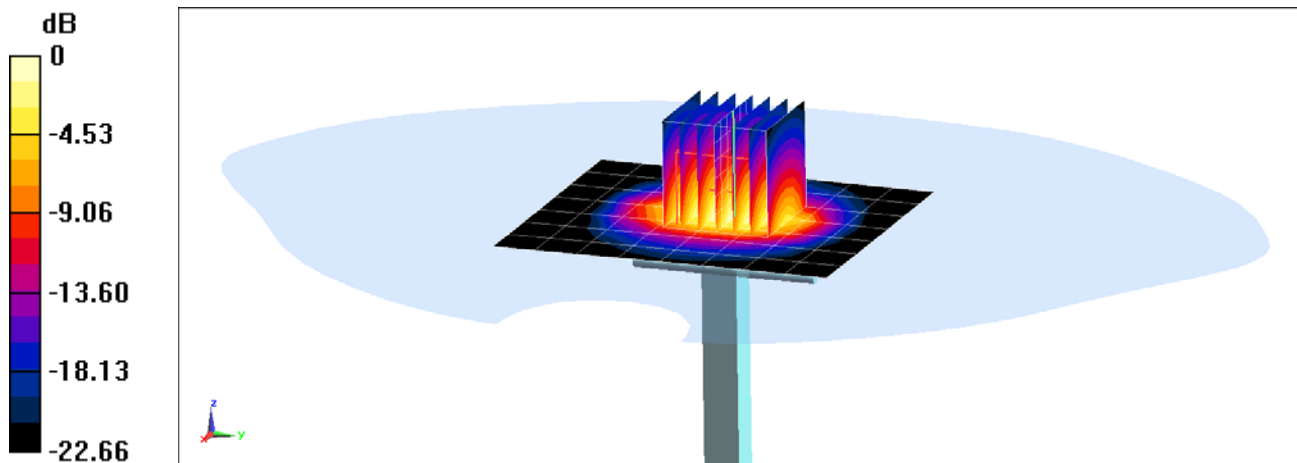
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 10.1 W/kg

SAR(1 g) = 4.83 W/kg

Deviation(1 g) = -4.92%



0 dB = 8.13 W/kg = 9.10 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1071

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2600$ MHz; $\sigma = 2.226$ S/m; $\epsilon_r = 50.665$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-22-2017; Ambient Temp: 23.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7406; ConvF(6.94, 6.94, 6.94); Calibrated: 04/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 04/14/2016

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

2600 MHz System Verification at 20.0 dBm (100 mW)

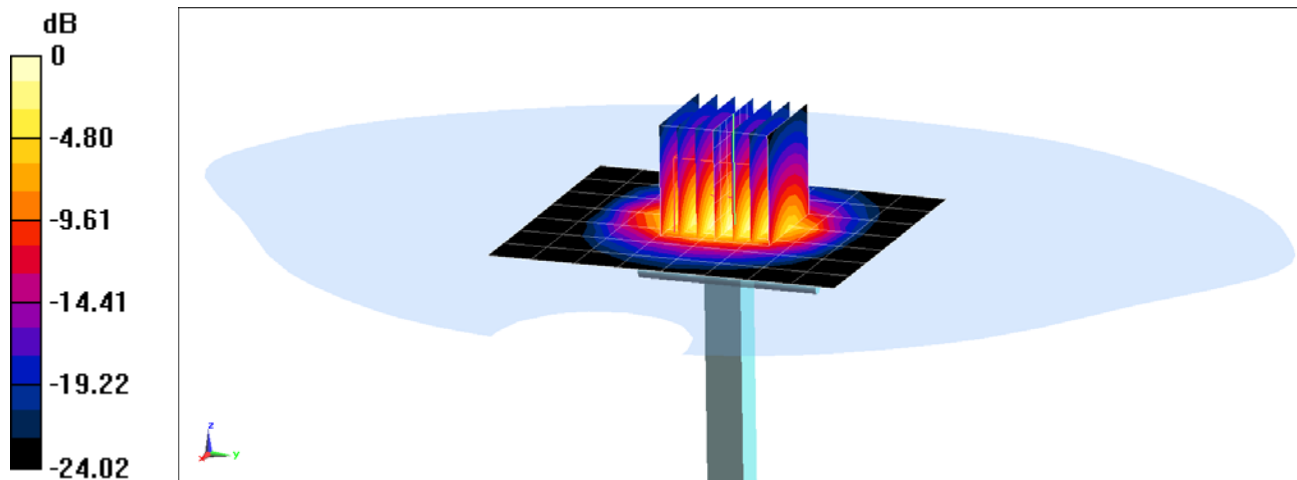
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 12.4 W/kg

SAR(1 g) = 5.71 W/kg

Deviation(1 g) = 5.35%



0 dB = 9.81 W/kg = 9.92 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: 5GHz Body Medium parameters used (interpolated):

$f = 5250 \text{ MHz}$; $\sigma = 5.476 \text{ S/m}$; $\epsilon_r = 47.907$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-13-2017; Ambient Temp: 22.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7308; ConvF(4.45, 4.45, 4.45); Calibrated: 7/21/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5250 MHz System Verification at 17.0 dBm (50 mW)

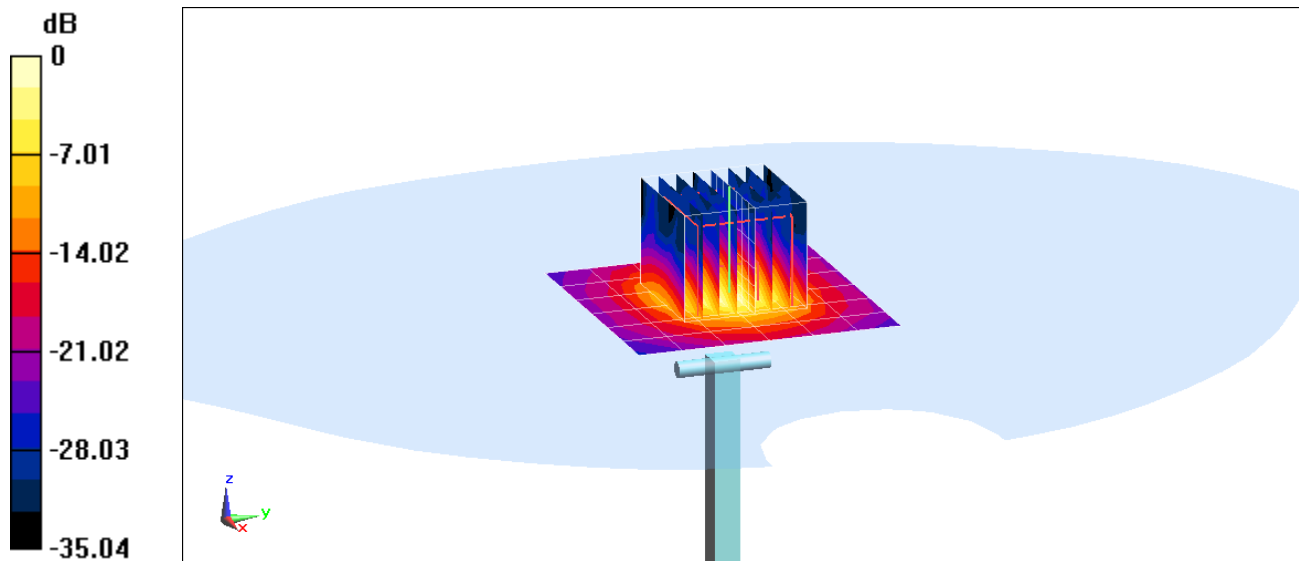
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 14.0 W/kg

SAR(1 g) = 3.43 W/kg

Deviation(1 g) = -8.29%



0 dB = 8.22 W/kg = 9.15 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5600 \text{ MHz}$; $\sigma = 5.917 \text{ S/m}$; $\epsilon_r = 47.298$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-13-2017; Ambient Temp: 22.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7308; ConvF(3.75, 3.75, 3.75); Calibrated: 7/21/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5600 MHz System Verification at 17.0 dBm (50 mW)

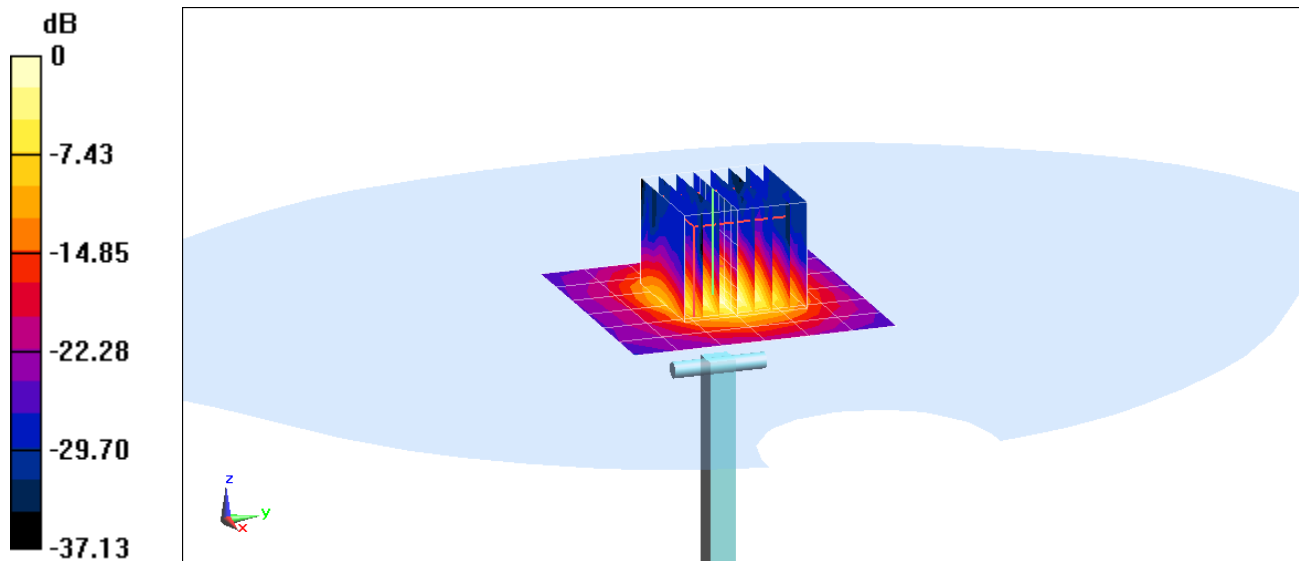
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 16.7 W/kg

SAR(1 g) = 4.06 W/kg

Deviation(1 g) = 5.45%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: 5GHz Body Medium parameters used (interpolated):

$f = 5750 \text{ MHz}$; $\sigma = 6.127 \text{ S/m}$; $\epsilon_r = 47.108$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-13-2017; Ambient Temp: 22.5°C; Tissue Temp: 23.0°C

Probe: EX3DV4 - SN7308; ConvF(4.04, 4.04, 4.04); Calibrated: 7/21/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5750 MHz System Verification at 17.0 dBm (50 mW)

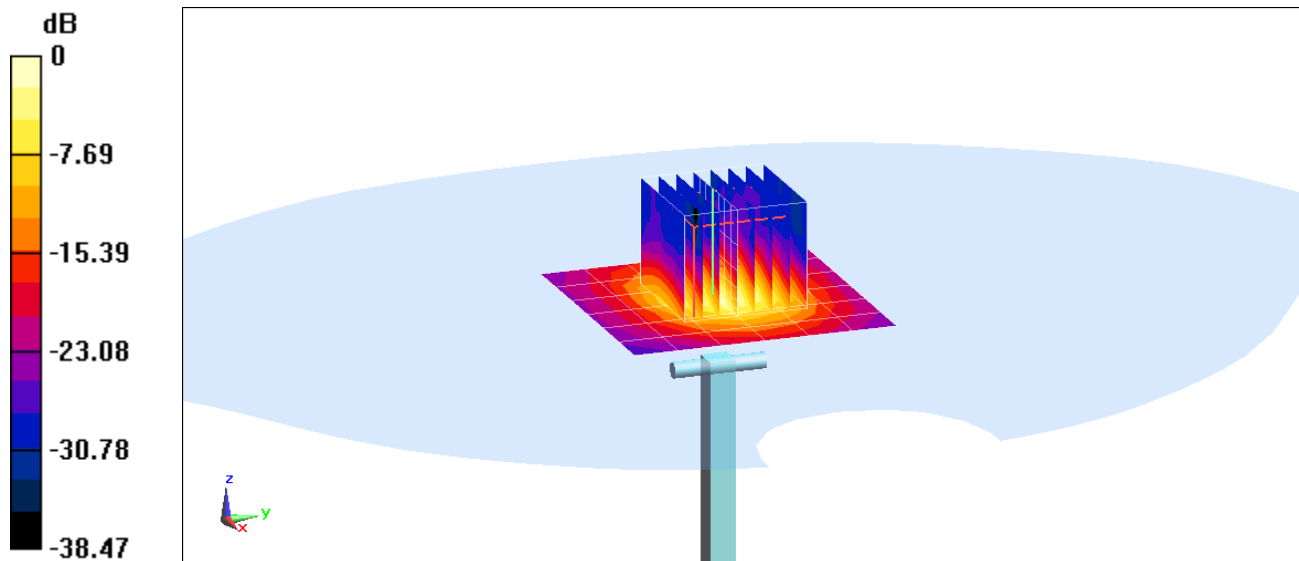
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 14.9 W/kg

SAR(1 g) = 3.45 W/kg

Deviation(1 g) = -8.49%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: 5GHz Body Medium parameters used (interpolated):

$f = 5250 \text{ MHz}$; $\sigma = 5.51 \text{ S/m}$; $\epsilon_r = 48.324$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-06-2017; Ambient Temp: 21.5°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3589; ConvF(4.19, 4.19, 4.19); Calibrated: 1/13/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1466; Calibrated: 1/16/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5250 MHz System Verification at 17.0 dBm (50 mW)

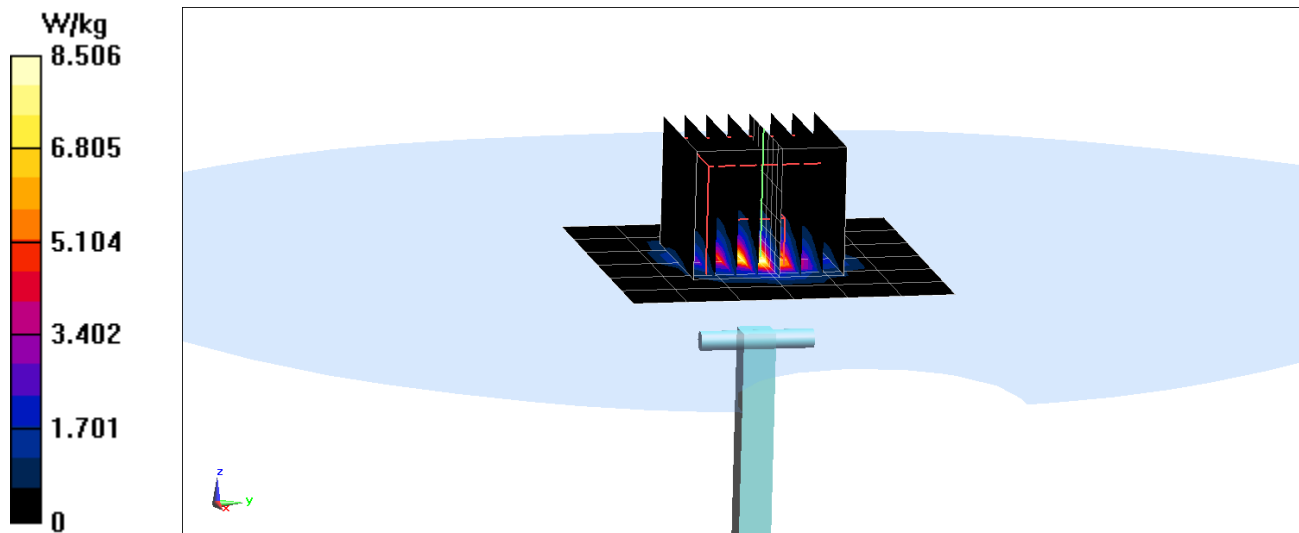
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

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(10 g) = 0.985 W/kg

Deviation(10 g) = -6.19%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: 5GHz Body Medium parameters used:

$f = 5600 \text{ MHz}$; $\sigma = 5.972 \text{ S/m}$; $\epsilon_r = 47.76$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-06-2017; Ambient Temp: 21.5°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3589; ConvF(3.82, 3.82, 3.82); Calibrated: 1/13/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1466; Calibrated: 1/16/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5600 MHz System Verification at 17.0 dBm (50 mW)

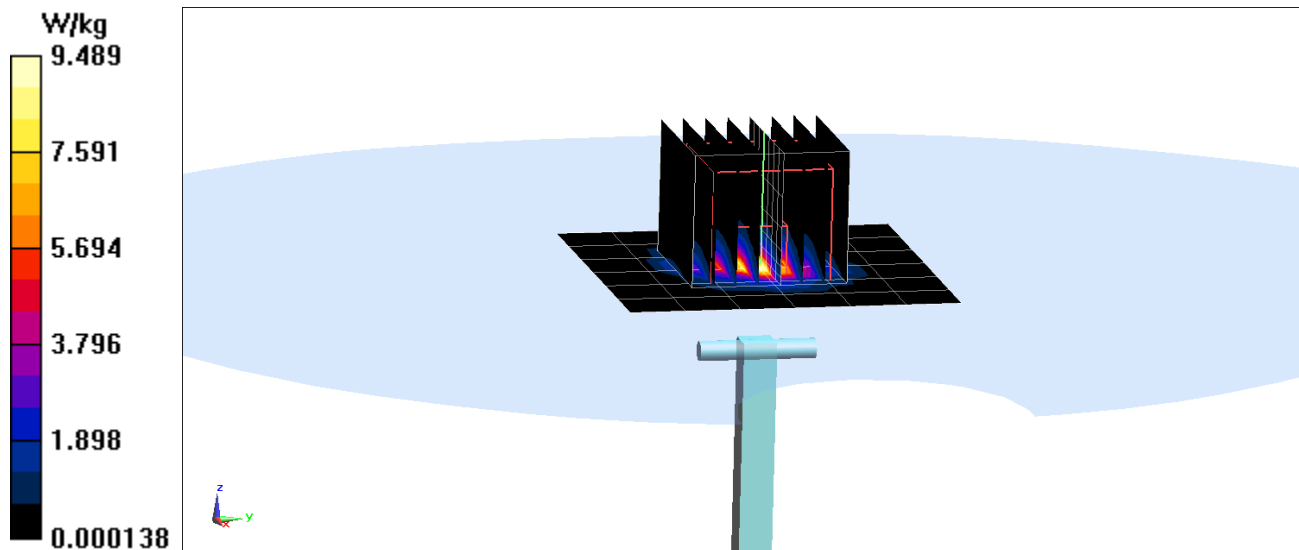
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 18.3 W/kg

SAR(10 g) = 1.04 W/kg

Deviation(10 g) = -3.26%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: 5GHz Body Medium parameters used (interpolated):

$f = 5750 \text{ MHz}$; $\sigma = 6.186 \text{ S/m}$; $\epsilon_r = 47.527$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-06-2017; Ambient Temp: 21.5°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3589; ConvF(3.83, 3.83, 3.83); Calibrated: 1/13/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1466; Calibrated: 1/16/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

5750 MHz System Verification at 17.0 dBm (50 mW)

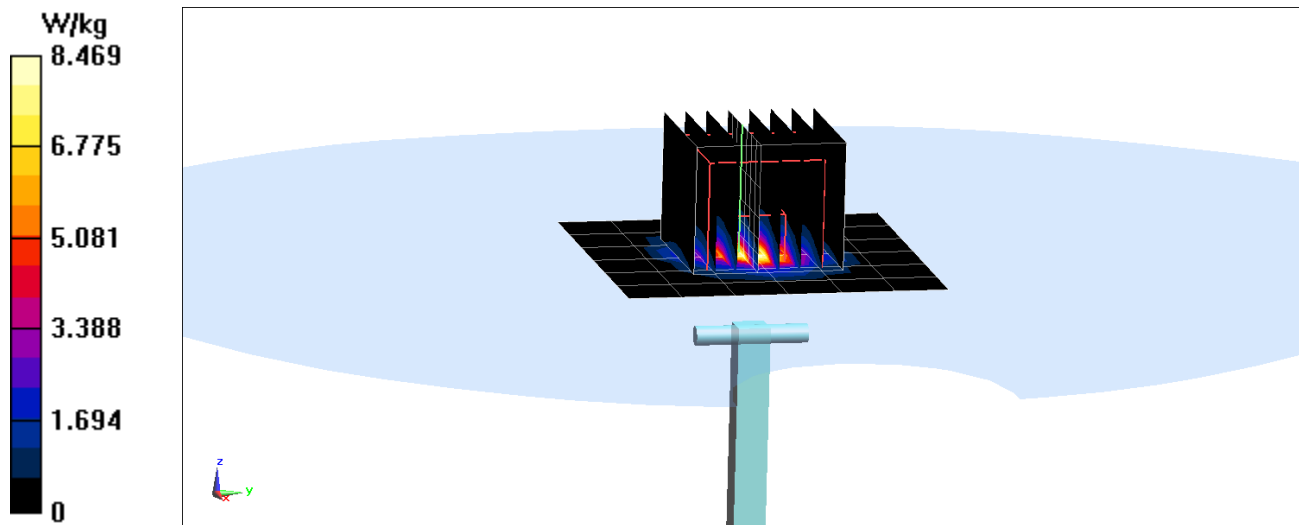
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 16.5 W/kg

SAR(10 g) = 0.968 W/kg

Deviation(10 g) = -7.37%



APPENDIX C: PROBE CALIBRATION



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Client **PC Test**

Certificate No: **D750V3-1003_Jan17**

CALIBRATION CERTIFICATE

Object **D750V3 - SN:1003**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

BNV
01/26/2017

Calibration date: **January 11, 2017**

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 $(22 \pm 3)^{\circ}\text{C}$ 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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	31-Dec-16 (No. EX3-7349_Dec16)	Dec-17
DAE4	SN: 601	04-Jan-17 (No. DAE4-601_Jan17)	Jan-18
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

Calibrated by: **Jeton Kastrati** Name Function
Laboratory Technician

Signature
[Signature]

Approved by: **Katja Pokovic** Technical Manager

Issued: January 11, 2017

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



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**

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:

- 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- 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	V52.8.8
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 $\pm$ 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 $\pm$ 0.2) °C	41.6 $\pm$ 6 %	0.89 mho/m $\pm$ 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	2.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.39 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.43 W/kg $\pm$ 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 $\pm$ 0.2) °C	54.2 $\pm$ 6 %	0.96 mho/m $\pm$ 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	2.21 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.79 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.45 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.78 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.3 Ω - 1.4 j Ω
Return Loss	- 27.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.4 Ω - 6.0 j Ω
Return Loss	- 24.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.034 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
Manufactured on	January 21, 2009

DASY5 Validation Report for Head TSL

Date: 11.01.2017

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: $f = 750 \text{ MHz}$; $\sigma = 0.89 \text{ S/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.17, 10.17, 10.17); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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

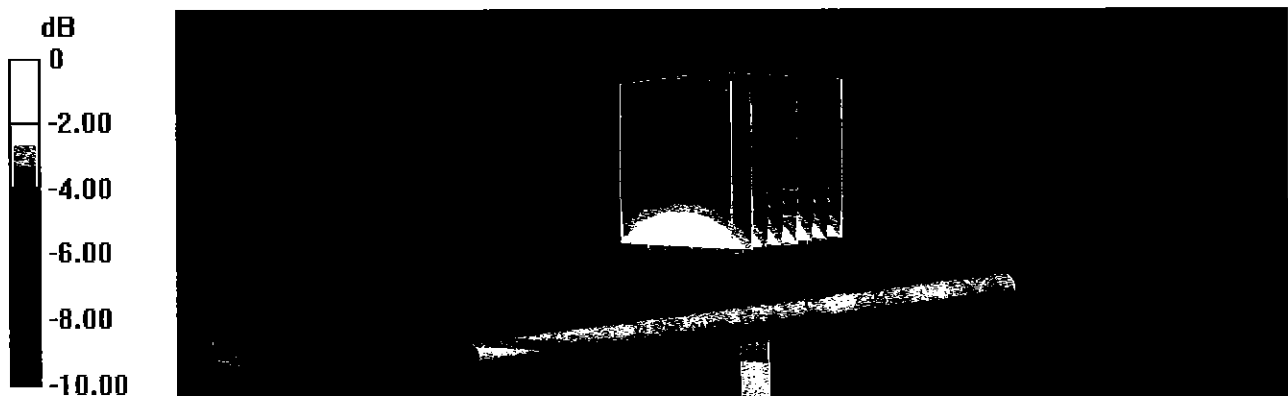
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 59.38 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.20 W/kg

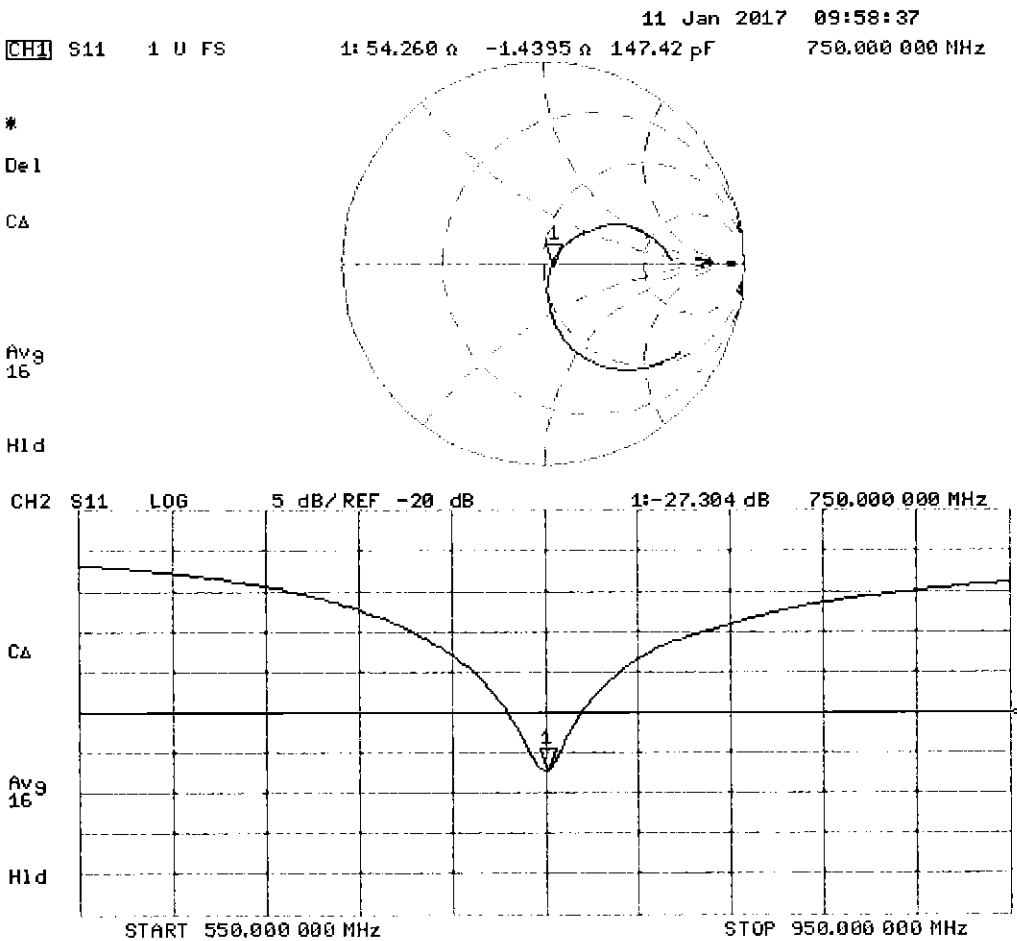
SAR(1 g) = 2.1 W/kg; SAR(10 g) = 1.36 W/kg

Maximum value of SAR (measured) = 2.82 W/kg



0 dB = 2.82 W/kg = 4.50 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 10.01.2017

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: $f = 750 \text{ MHz}$; $\sigma = 0.96 \text{ S/m}$; $\epsilon_r = 54.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.99, 9.99, 9.99); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAB4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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

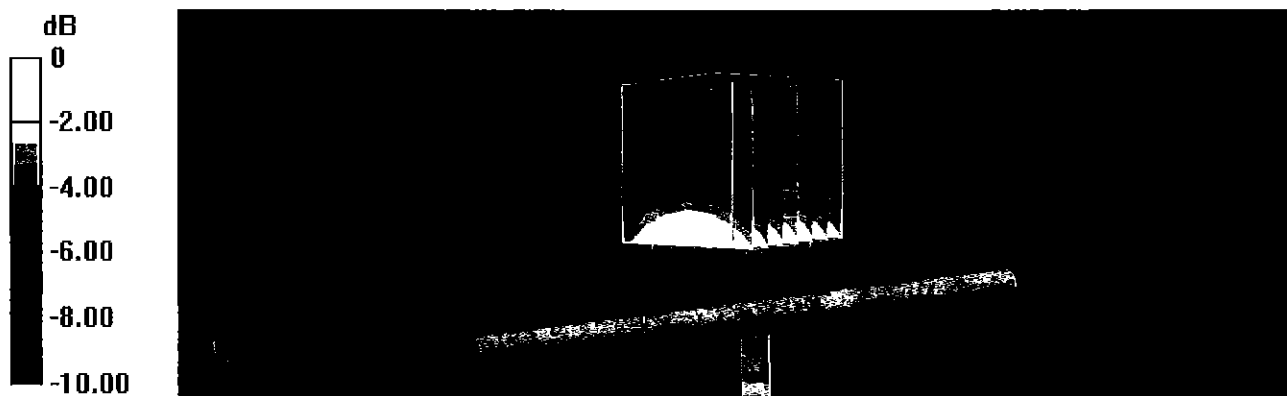
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 58.22 V/m; Power Drift = -0.02 dB

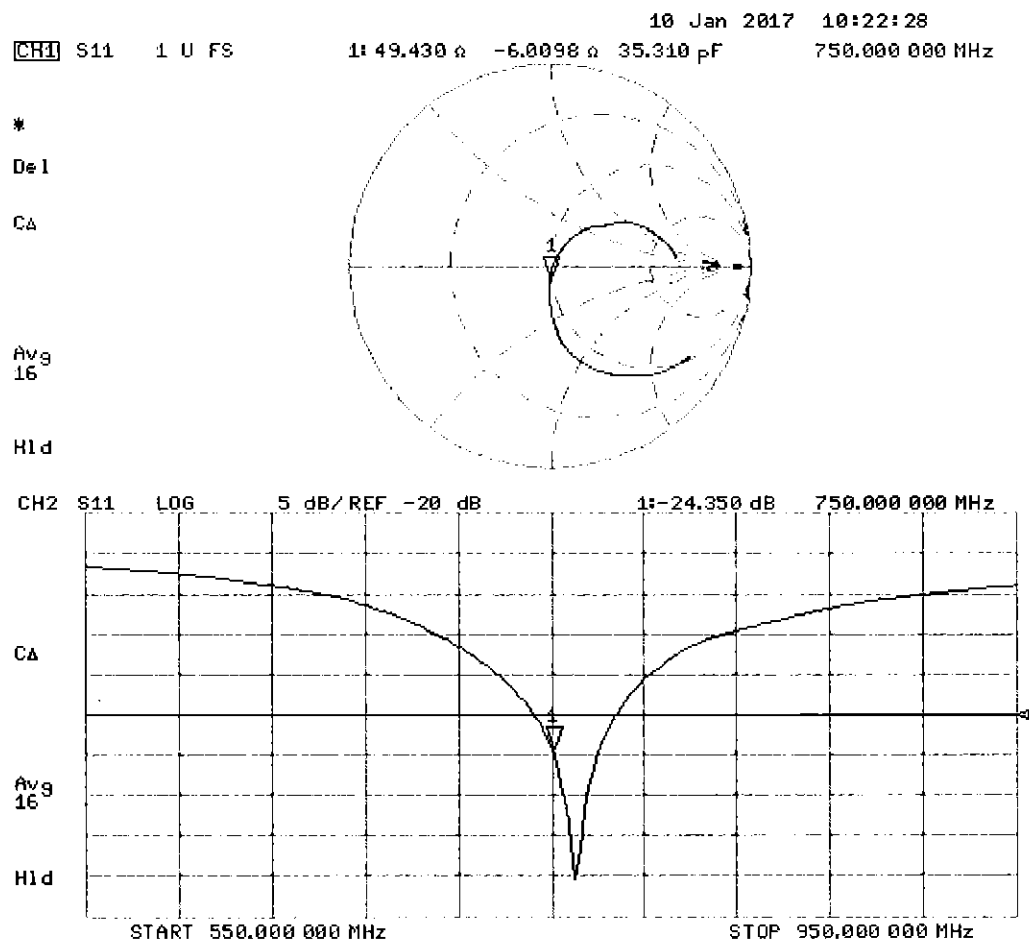
Peak SAR (extrapolated) = 3.40 W/kg

SAR(1 g) = 2.21 W/kg; SAR(10 g) = 1.45 W/kg

Maximum value of SAR (measured) = 2.98 W/kg



Impedance Measurement Plot for Body TSL





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: **D750V3-1161_Jul16**

CALIBRATION CERTIFICATE

Object **D750V3 - SN:1161**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **July 13, 2016**

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&T'E critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

Calibrated by: **Claudio Leubler** Name: **Claudio Leubler** Function: **Laboratory Technician**

Approved by: **Katja Pokovic** Technical Manager

Signature

Issued: July 13, 2016

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

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:

- 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- 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	V52.8.8
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 $\pm$ 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 $\pm$ 0.2) °C	40.9 $\pm$ 6 %	0.91 mho/m $\pm$ 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	2.09 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.17 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.39 W/kg $\pm$ 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 $\pm$ 0.2) °C	55.1 $\pm$ 6 %	0.99 mho/m $\pm$ 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	8.43 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.53 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.6 Ω - 0.9 j Ω
Return Loss	- 25.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.2 Ω - 4.0 j Ω
Return Loss	- 28.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.033 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
Manufactured on	November 19, 2015

DASY5 Validation Report for Head TSL

Date: 13.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1161

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.91 \text{ S/m}$; $\epsilon_r = 40.9$; $\rho = 1000 \text{ kg/m}^3$

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); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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

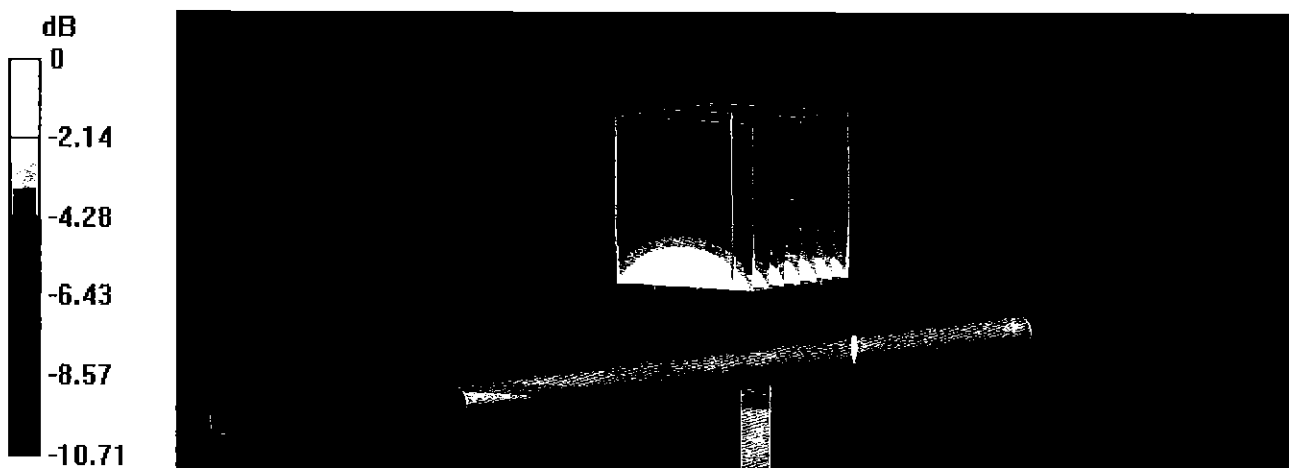
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 58.07 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 3.13 W/kg

SAR(1 g) = 2.09 W/kg; SAR(10 g) = 1.37 W/kg

Maximum value of SAR (measured) = 2.80 W/kg

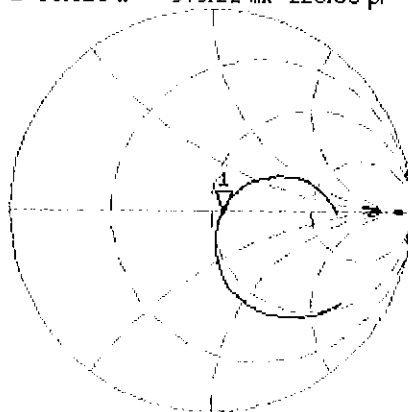


0 dB = 2.80 W/kg = 4.47 dBW/kg

Impedance Measurement Plot for Head TSL

13 Jul 2016 09:55:53
 CH1 S11 1 U FS 1: 55.615 Ω -949.22 m Ω 223.56 pF 750.000 000 MHz

*
 Del
 CA



Avg
 16

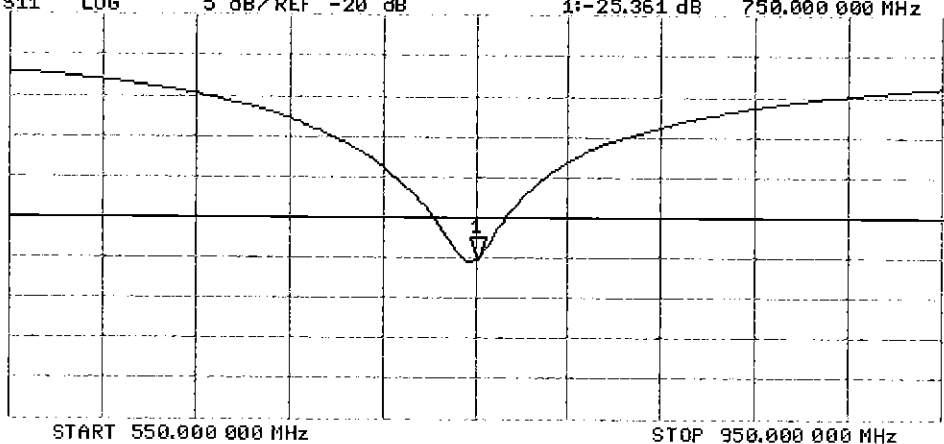
H1 d

CH2 S11 LOG 5 dB/REF -20 dB 1:-25.361 dB 750.000 000 MHz

CA

Avg
 16

H1 d



DASY5 Validation Report for Body TSL

Date: 13.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1161

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.99 \text{ S/m}$; $\epsilon_r = 55.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.99, 9.99, 9.99); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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

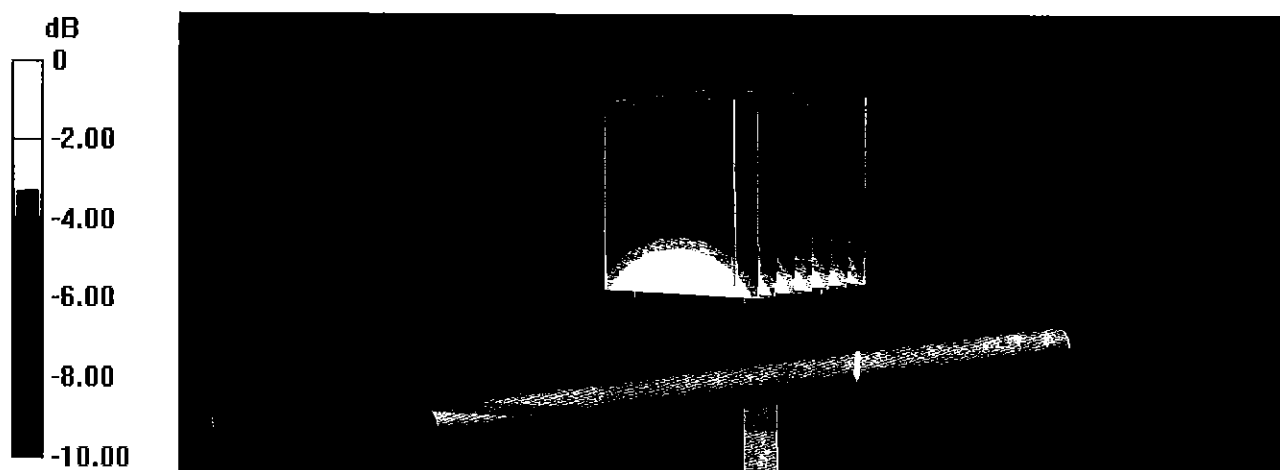
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.33 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 3.22 W/kg

SAR(1 g) = 2.16 W/kg; SAR(10 g) = 1.41 W/kg

Maximum value of SAR (measured) = 2.87 W/kg

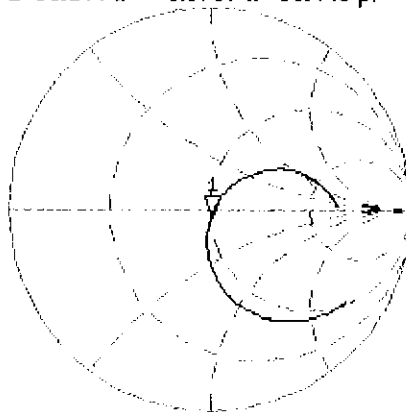


0 dB = 2.87 W/kg = 4.58 dBW/kg

Impedance Measurement Plot for Body TSL

13 Jul 2016 13:16:34
 CH1 S11 1 U FS 1: 50.244 Ω -3.9707 Ω 53.443 pF 750.000 000 MHz

*
 Del
 CA

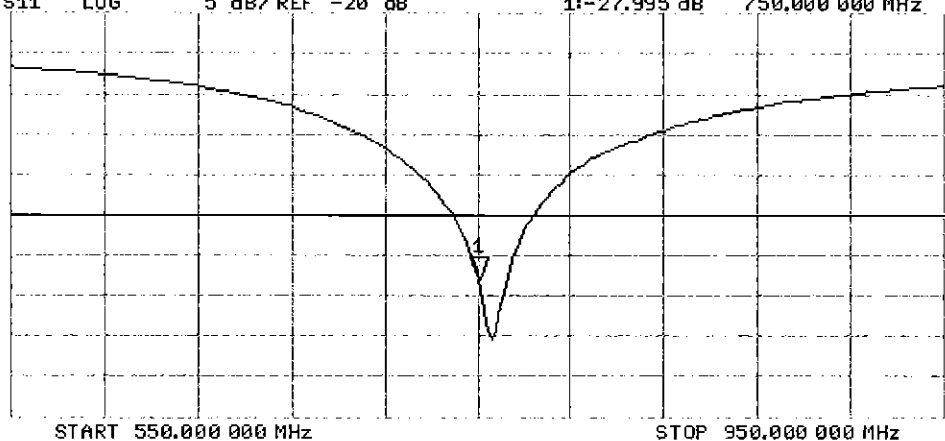


Avg
 16

H1d

CH2 S11 LOG 5 dB/REF -20 dB 1:-27.995 dB 750.000 000 MHz

CA



H1d



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: **D835V2-4d047_Jul16**

CALIBRATION CERTIFICATE

Object **D835V2 - SN:4d047**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **July 13, 2016**

BNV
7/16/2016

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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

Calibrated by: **Jeton Kastrati** Name
Function **Laboratory Technician**

Approved by: **Katja Pokovic** Name
Function **Technical Manager**

Signature

Issued: July 13, 2016

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

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:

- 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- 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	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	40.6 $\pm$ 6 %	0.94 mho/m $\pm$ 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	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.13 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.95 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	54.9 $\pm$ 6 %	1.01 mho/m $\pm$ 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	2.47 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.57 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.24 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.8 Ω - 5.9 j Ω
Return Loss	- 24.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.8 Ω - 8.2 j Ω
Return Loss	- 20.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	None 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
Manufactured on	August 16, 2006

DASY5 Validation Report for Head TSL

Date: 13.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.94 \text{ S/m}$; $\epsilon_r = 40.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.72, 9.72, 9.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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

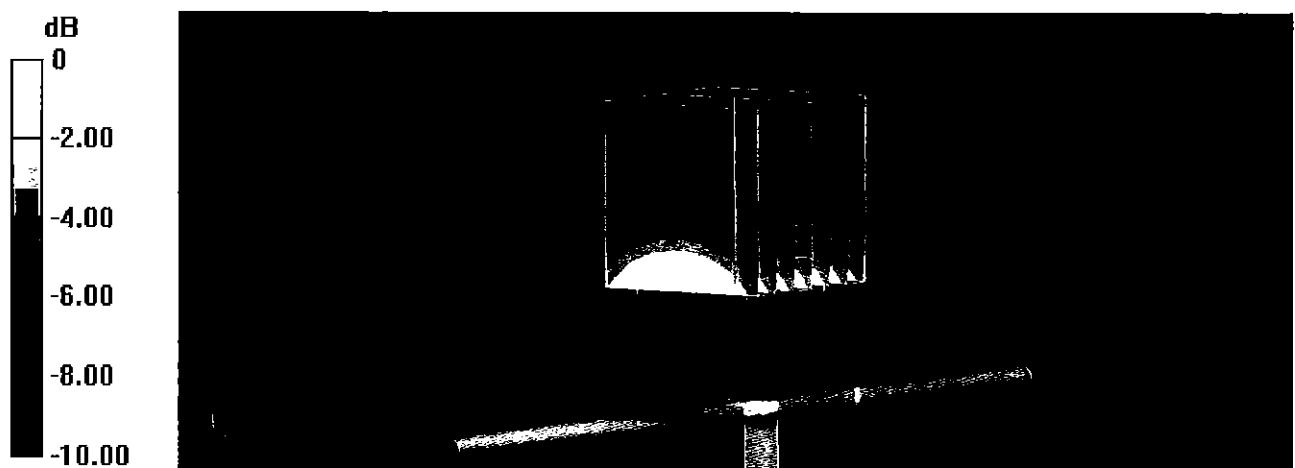
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 60.98 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.56 W/kg

SAR(1 g) = 2.37 W/kg; SAR(10 g) = 1.53 W/kg

Maximum value of SAR (measured) = 3.17 W/kg

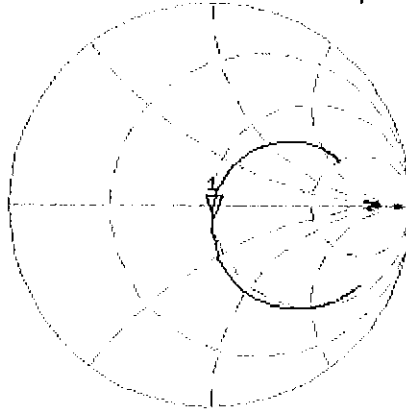


0 dB = 3.17 W/kg = 5.01 dBW/kg

Impedance Measurement Plot for Head TSL

13 Jul 2016 12:00:27
 CH1 S11 1 U FS 1: 49.820 Ω -5.9316 Ω 32.134 pF 835.000 000 MHz

*
 Del
 CA



Avg
 16

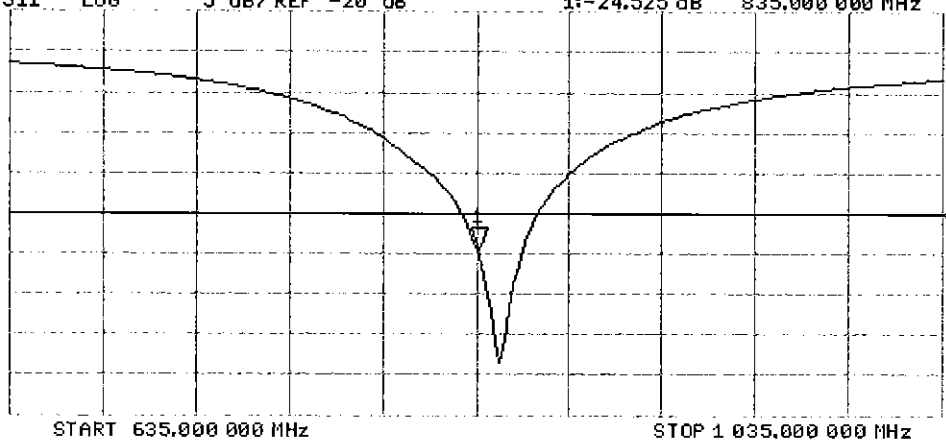
H1d

CH2 S11 LOG 5 dB/REF -20 dB 1:-24.525 dB 835.000 000 MHz

CA

Avg
 16

H1d



DASY5 Validation Report for Body TSL

Date: 13.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 1.01 \text{ S/m}$; $\epsilon_r = 54.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.73, 9.73, 9.73); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 59.88 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.67 W/kg

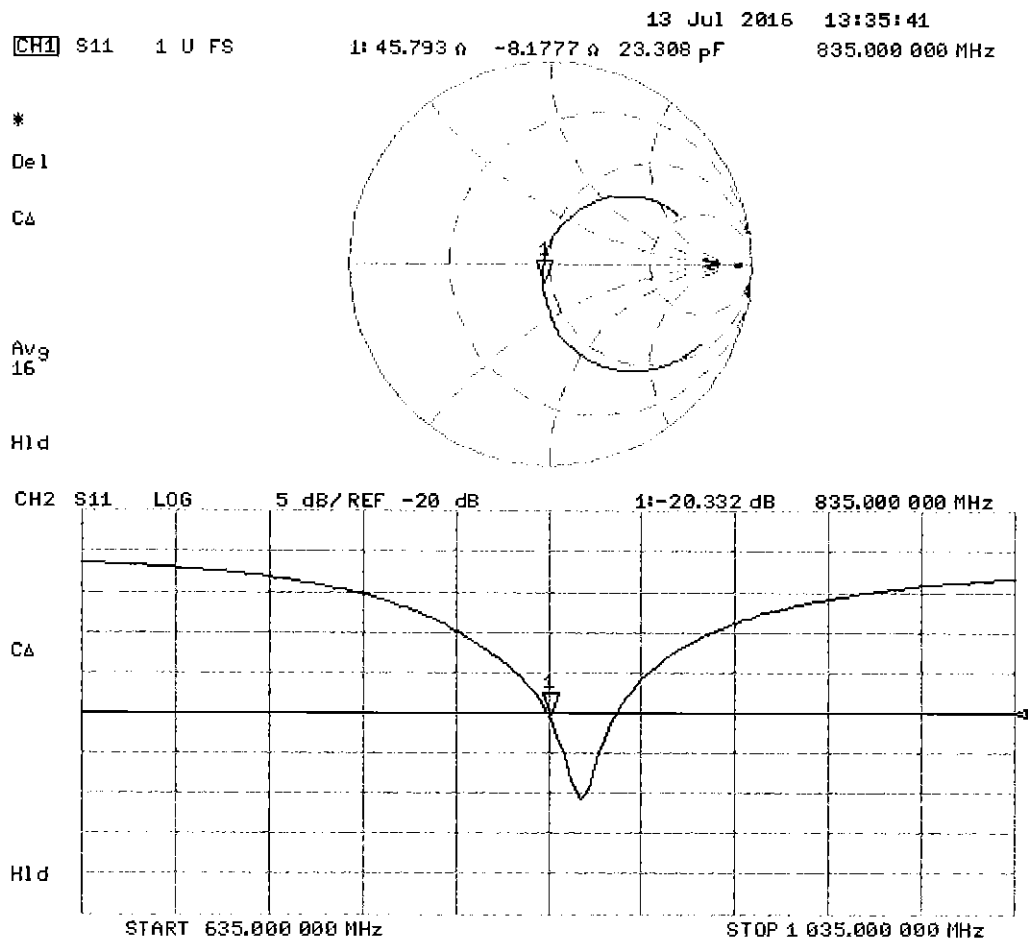
SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.6 W/kg

Maximum value of SAR (measured) = 3.27 W/kg



0 dB = 3.27 W/kg = 5.15 dBW/kg

Impedance Measurement Plot for Body TSL





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: **D835V2-4d133_Jul16**

CALIBRATION CERTIFICATE

Object **D835V2 - SN:4d133**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **July 14, 2016**

BN ✓
07/27/2016

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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

Calibrated by: **Jeton Kastrati**

Function
Laboratory Technician

Signature

Approved by: **Kalja Pokovic**

Technical Manager

Issued: July 14, 2016

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



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**

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:

- 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- 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	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	40.6 $\pm$ 6 %	0.94 mho/m $\pm$ 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	2.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.32 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.57 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.10 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	54.9 $\pm$ 6 %	1.01 mho/m $\pm$ 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	2.45 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.50 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.59 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.20 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.5 Ω - 5.1 j Ω
Return Loss	- 25.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.4 Ω - 7.5 j Ω
Return Loss	- 21.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.395 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
Manufactured on	July 22, 2011

DASY5 Validation Report for Head TSL

Date: 14.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 0.94$ S/m; $\epsilon_r = 40.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.72, 9.72, 9.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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

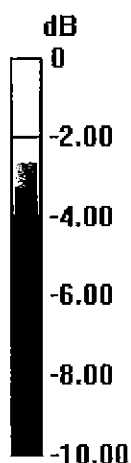
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 61.36 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.64 W/kg

SAR(1 g) = 2.42 W/kg; SAR(10 g) = 1.57 W/kg

Maximum value of SAR (measured) = 3.23 W/kg



0 dB = 3.23 W/kg = 5.09 dBW/kg

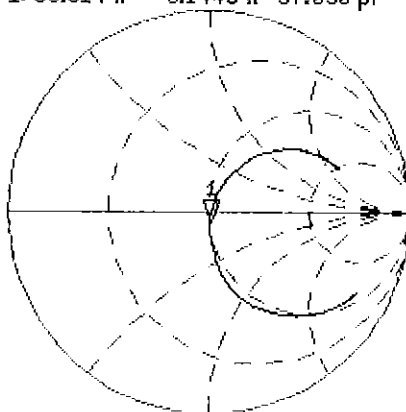
Impedance Measurement Plot for Head TSL

14 Jul 2016 11:38:16
 CH1 S11 1 U FS 1: 50.514 Ω -5.1445 Ω 37.050 pF 835.000 000 MHz

*
 Del
 Ca

Avg
 16

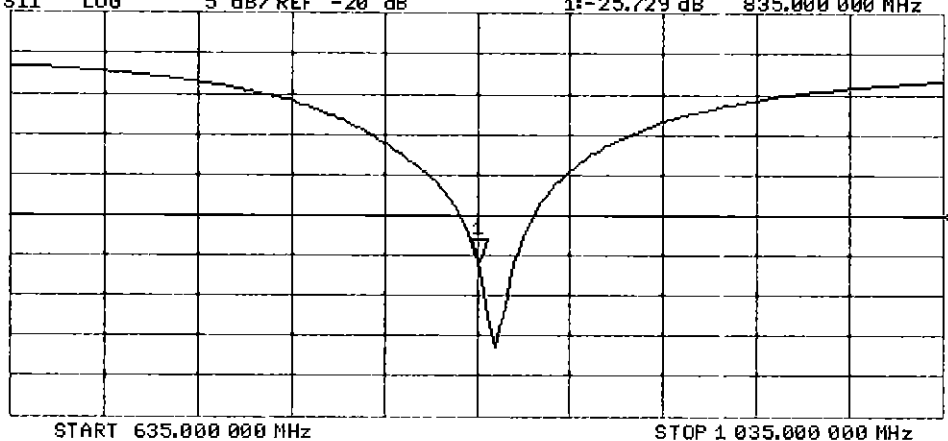
H1d



CH2 S11 LOG 5 dB/REF -20 dB 1:-25.729 dB 835.000 000 MHz

Ca

H1d



DASY5 Validation Report for Body TSL

Date: 13.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 1.01 \text{ S/m}$; $\epsilon_r = 54.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.73, 9.73, 9.73); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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

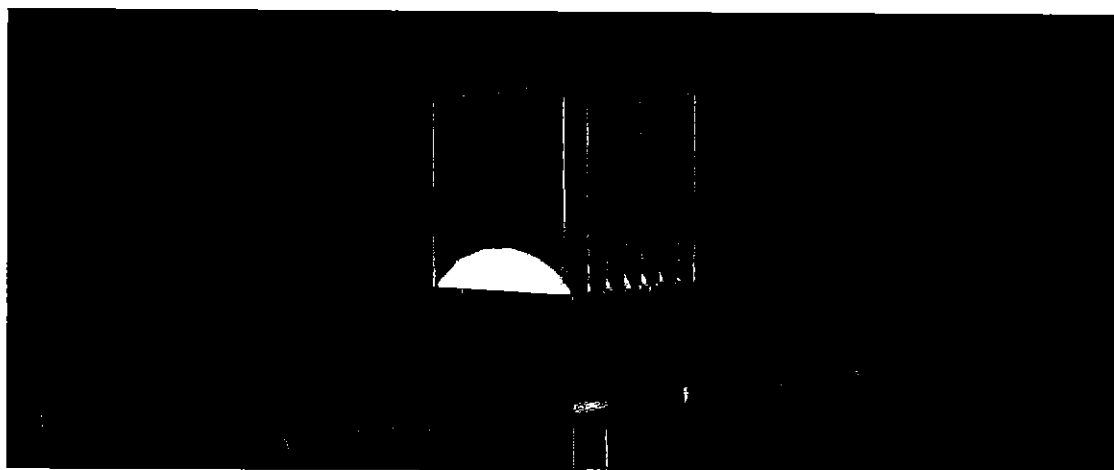
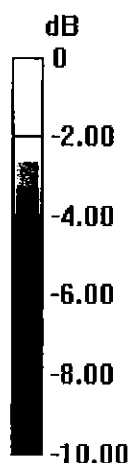
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 59.93 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.62 W/kg

SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.59 W/kg

Maximum value of SAR (measured) = 3.24 W/kg

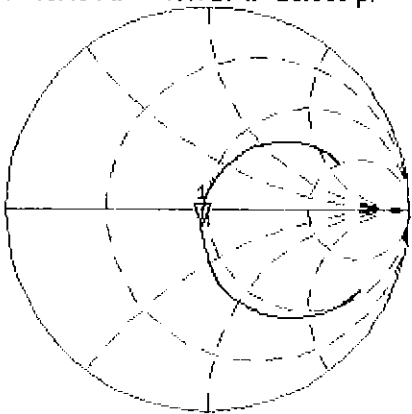


0 dB = 3.24 W/kg = 5.11 dBW/kg

Impedance Measurement Plot for Body TSL

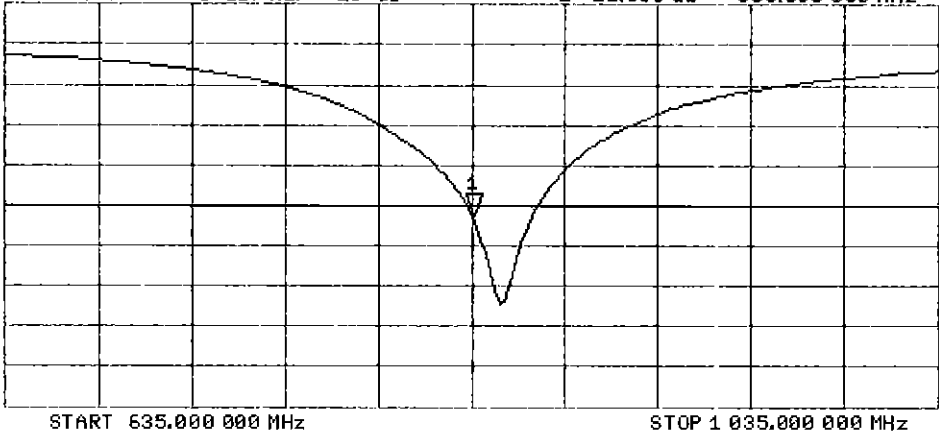
13 Jul 2016 09:27:58
[CH1] S11 1 U FS 1: 46.404 Ω -7.4727 Ω 25.505 pF 835.000 000 MHz

*
De1
CA
Avg
16
H1d



CH2 S11 LOG 5 dB/REF -20 dB 1:-21.336 dB 835.000 000 MHz

CA
Avg
16
H1d





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: **D1750V2-1148_May16**

CALIBRATION CERTIFICATE

Object **D1750V2 - SN: 1148**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **May 09, 2016**

BNV
 5/17/2016

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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	31-Dec-15 (No. EX3-7349_Dec15)	Dec-16
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

Calibrated by: **Michael Weber** Function: **Laboratory Technician**

Signature

Approved by: **Katja Pokovic** Technical Manager

Issued: May 11, 2016

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



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**

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:

- 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- 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	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.7 $\pm$ 6 %	1.36 mho/m $\pm$ 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	9.03 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.2 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.78 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.1 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	53.8 $\pm$ 6 %	1.50 mho/m $\pm$ 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	9.30 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	37.1 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.93 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	19.7 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.9 Ω - 0.7 j Ω
Return Loss	- 43.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.2 Ω - 1.4 j Ω
Return Loss	- 27.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.221 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
Manufactured on	September 30, 2014

DASY5 Validation Report for Head TSL

Date: 09.05.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1148

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.36$ S/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.54, 8.54, 8.54); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

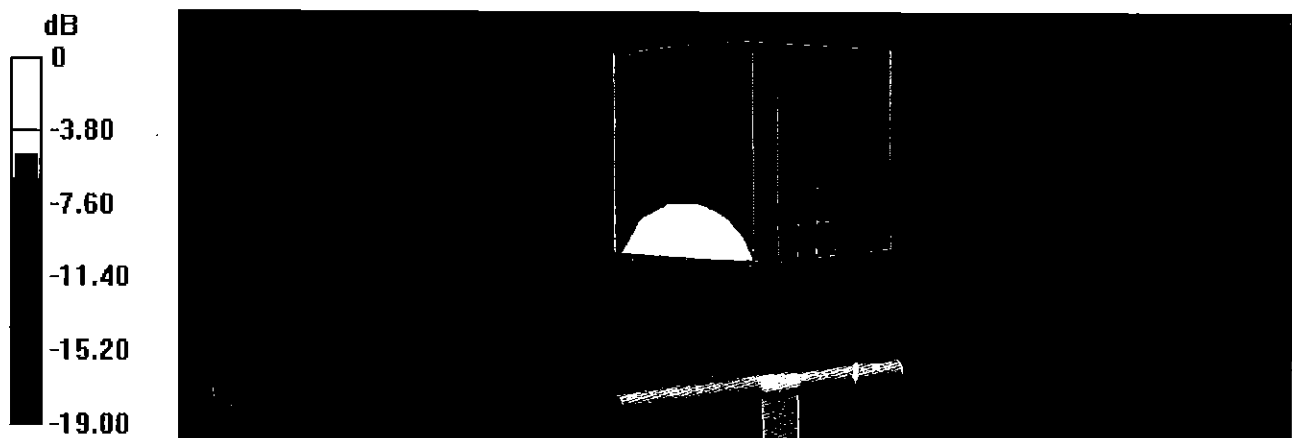
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.5 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 16.7 W/kg

SAR(1 g) = 9.03 W/kg; SAR(10 g) = 4.78 W/kg

Maximum value of SAR (measured) = 13.6 W/kg

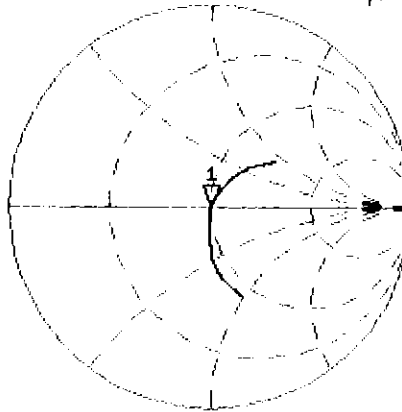


0 dB = 13.6 W/kg = 11.34 dBW/kg

Impedance Measurement Plot for Head TSL

9 May 2016 11:49:12
 [CH1] S11 1 U FS 1: 49.912 Ω -679.69 m Ω 133.81 pF 1 750.000 000 MHz

*
 Del
 CA



Avg
 16

H1d

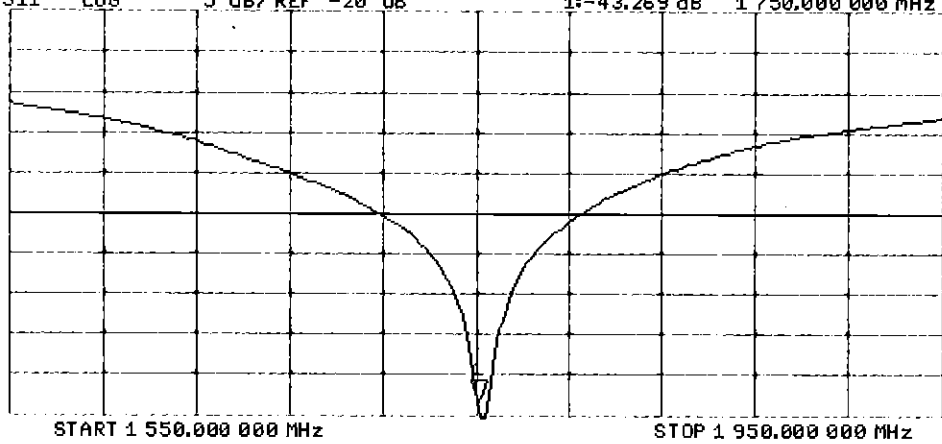
CH2 S11 LOG 5 dB/REF -20 dB 1: -43.269 dB 1 750.000 000 MHz

Del

CA

Avg
 16

H1d



DASY5 Validation Report for Body TSL

Date: 09.05.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1148

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.5$ S/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.25, 8.25, 8.25); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

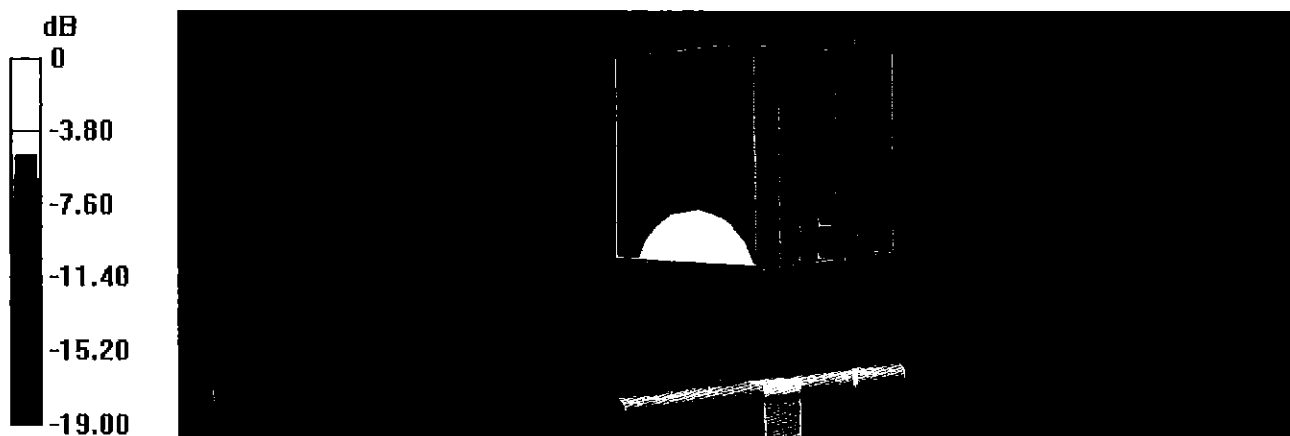
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 102.0 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 16.6 W/kg

SAR(1 g) = 9.3 W/kg; SAR(10 g) = 4.93 W/kg

Maximum value of SAR (measured) = 14.1 W/kg

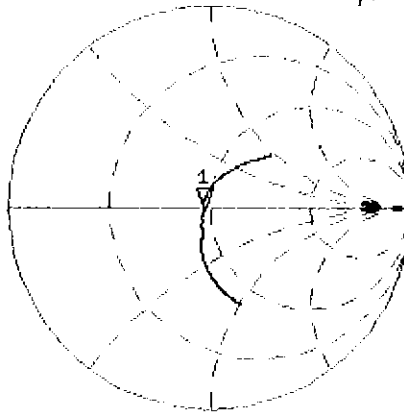


0 dB = 14.1 W/kg = 11.49 dBW/kg

Impedance Measurement Plot for Body TSL

9 May 2016 11:48:41
[CH1] S11 1 U FS 1: 46.205 Ω -1.4258 Ω 63.787 pF 1 750.000 000 MHz

*
De1
CA



Avg
16

H1d

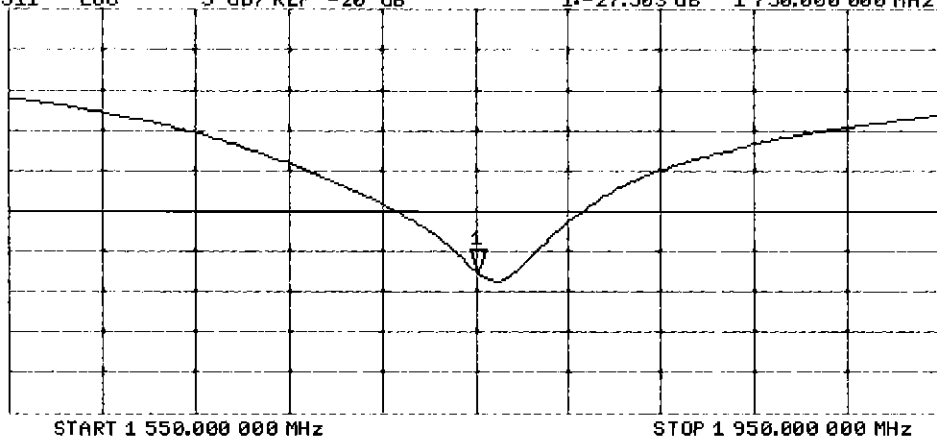
CH2 S11 LOG 5 dB/REF -20 dB 1: -27.503 dB 1 750.000 000 MHz

De1

CA

Avg
16

H1d





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: **D1765V2-1008_May16**

CALIBRATION CERTIFICATE

Object **D1765V2 - SN:1008**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

*BNV
05/23/16*

Calibration date: **May 11, 2016**

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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	31-Dec-15 (No. EX3-7349_Dec15)	Dec-16
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

Calibrated by: **Michael Weber** Name: **Michael Weber** Function: **Laboratory Technician**

Approved by: **Katja Pokovic** Technical Manager

Signature

M. Weber

Katja Pokovic

Issued: May 17, 2016

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



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**

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:

- 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- 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	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.8 $\pm$ 6 %	1.36 mho/m $\pm$ 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	9.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.7 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.81 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.3 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.50 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	53.8 $\pm$ 6 %	1.50 mho/m $\pm$ 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	9.30 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	37.3 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.94 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	19.8 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.8 Ω - 6.0 j Ω
Return Loss	- 24.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.8 Ω - 6.8 j Ω
Return Loss	- 21.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.211 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
Manufactured on	October 06, 2005

DASY5 Validation Report for Head TSL

Date: 11.05.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1765 MHz; Type: D1765V2; Serial: D1765V2 - SN: 1008

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.36$ S/m; $\epsilon_r = 39.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.54, 8.54, 8.54); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

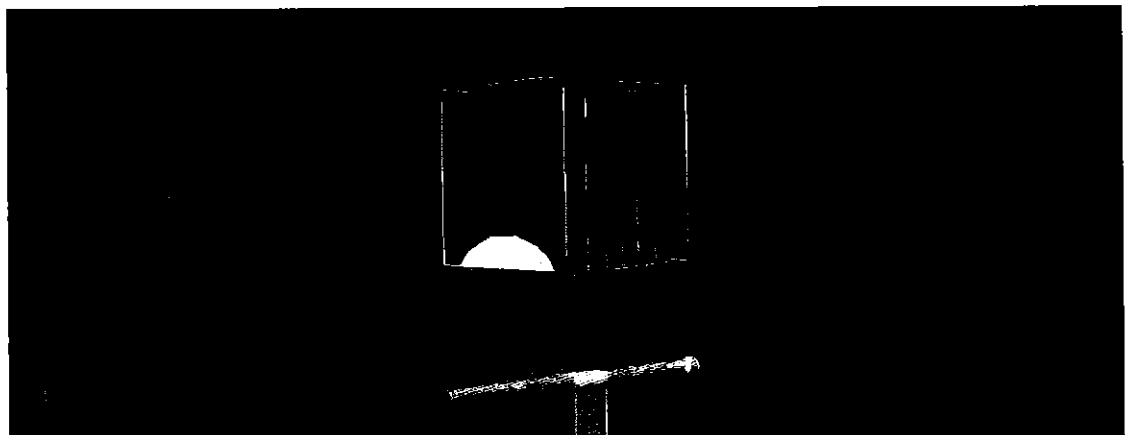
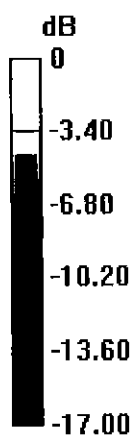
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 104.4 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 16.7 W/kg

SAR(1 g) = 9.1 W/kg; SAR(10 g) = 4.81 W/kg

Maximum value of SAR (measured) = 13.7 W/kg



0 dB = 13.7 W/kg = 11.37 dBW/kg

Impedance Measurement Plot for Head TSL

11 May 2016 13:10:14
 [CH1] S11 1 U FS 1: 48.842 Ω -6.0117 Ω 15.128 pF 1 750.000 000 MHz

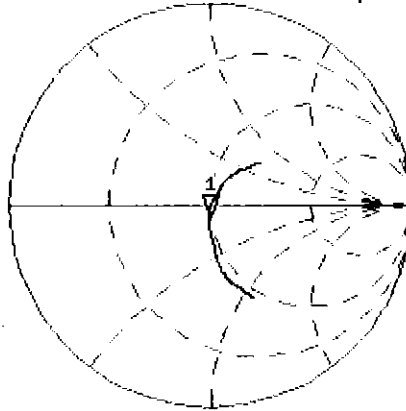
*

De1

Cor

Avg
16

H1d



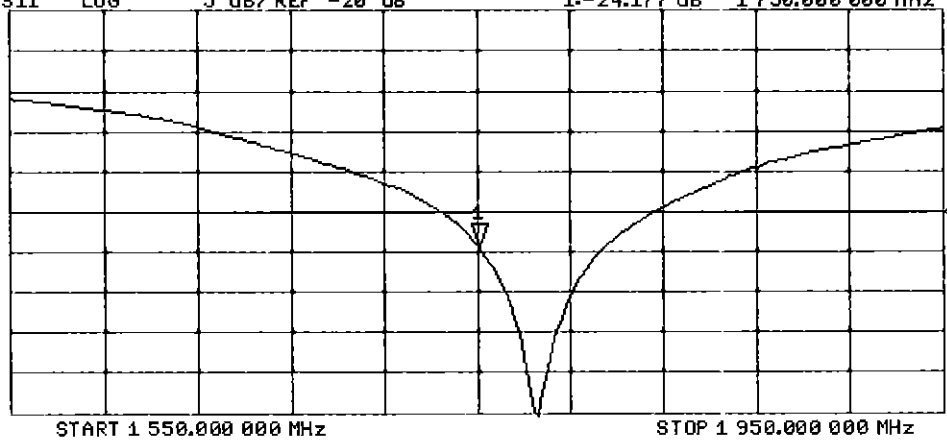
CH2 S11 LOG 5 dB/REF -20 dB 1:-24.177 dB 1 750.000 000 MHz

De1

Cor

Avg
16

H1d



DASY5 Validation Report for Body TSL

Date: 11.05.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1765 MHz; Type: D1765V2; Serial: D1765V2 - SN: 1008

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.5$ S/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.25, 8.25, 8.25); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

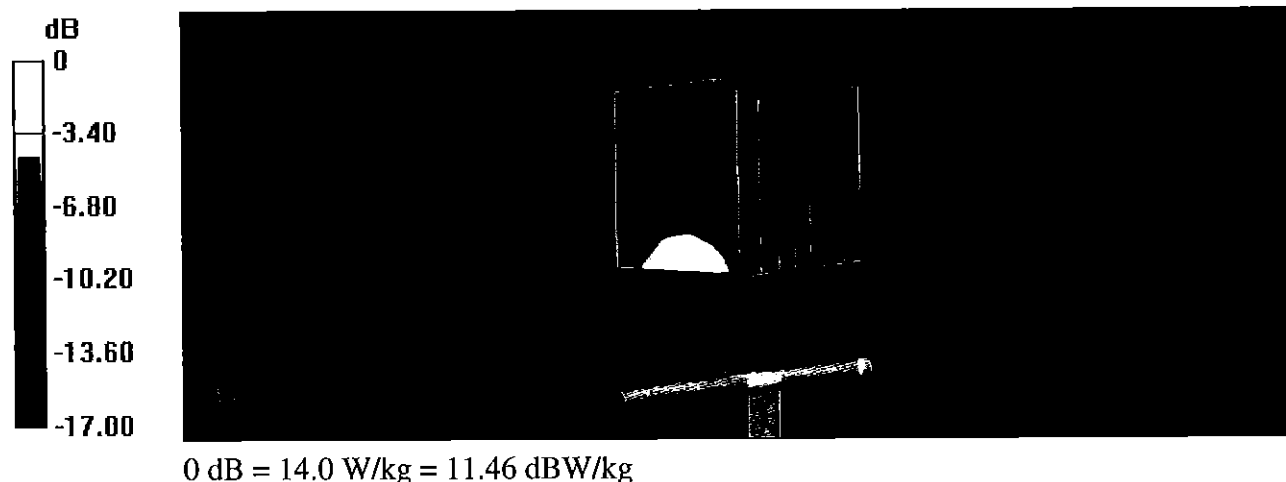
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 100.9 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 16.4 W/kg

SAR(1 g) = 9.3 W/kg; SAR(10 g) = 4.94 W/kg

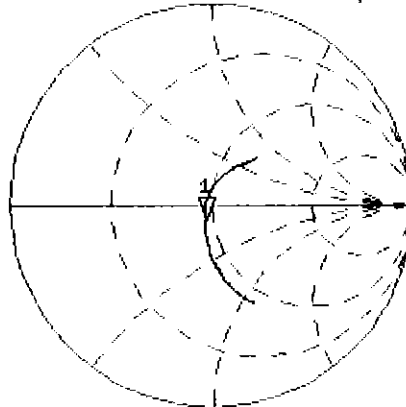
Maximum value of SAR (measured) = 14.0 W/kg



Impedance Measurement Plot for Body TSL

11 May 2016 13:08:31
 [CH1] S11 1 U FS 1: 45.803 Ω -6.7695 Ω 13.435 pF 1 750.000 000 MHz

*
 Del
 Cor



Avg
 16

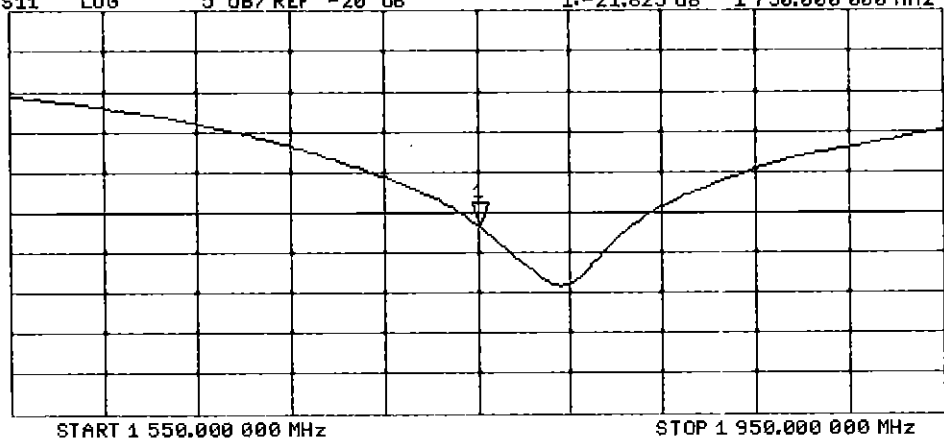
H1d

CH2 S11 LOG 5 dB/REF -20 dB 1:-21.625 dB 1 750.000 000 MHz

Del
 Cor

Avg
 16

H1d





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: **D1900V2-5d080_Jul16**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN:5d080**

Calibration procedure(s) **QA CAL-05.v9**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **July 08, 2016**

BN ✓
7/16/2016

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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

Calibrated by: **Jeton Kastrati** Name **Jeton Kastrati** Function **Laboratory Technician**

Approved by: **Katja Pokovic** Name **Katja Pokovic** Function **Technical Manager**

Signature
[Signature]
[Signature]

Issued: July 13, 2016

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



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**

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:

- 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- 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	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.8 $\pm$ 6 %	1.38 mho/m $\pm$ 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	9.76 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	39.3 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.5 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	52.7 $\pm$ 6 %	1.51 mho/m $\pm$ 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	9.75 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	39.1 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.7 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$52.1 \Omega + 5.3 j\Omega$
Return Loss	- 25.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$47.4 \Omega + 6.8 j\Omega$
Return Loss	- 22.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.192 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
Manufactured on	June 28, 2006

DASY5 Validation Report for Head TSL

Date: 08.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.38$ S/m; $\epsilon_r = 39.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.99, 7.99, 7.99); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

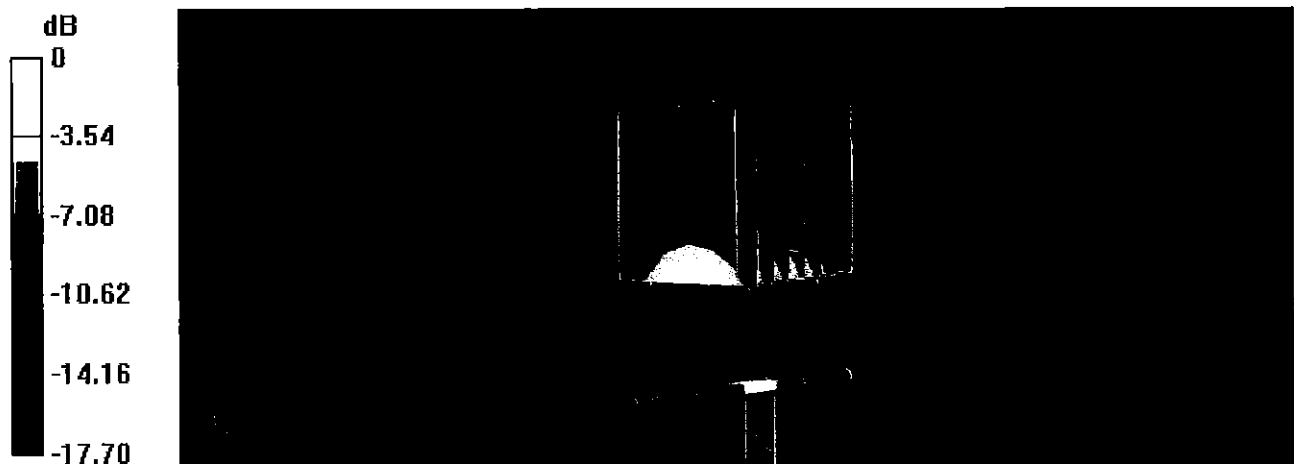
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 106.6 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 18.4 W/kg

SAR(1 g) = 9.76 W/kg; SAR(10 g) = 5.1 W/kg

Maximum value of SAR (measured) = 15.0 W/kg

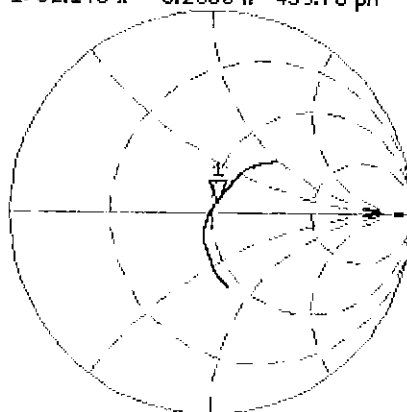


0 dB = 15.0 W/kg = 11.76 dBW/kg

Impedance Measurement Plot for Head TSL

8 Jul 2016 16:18:04
 CH1 S11 1 U FS 1: 52.143 Ω 5.2500 Ω 439.78 μH 1 900.000 000 MHz

*
 Del
 Cor



Avg
 16

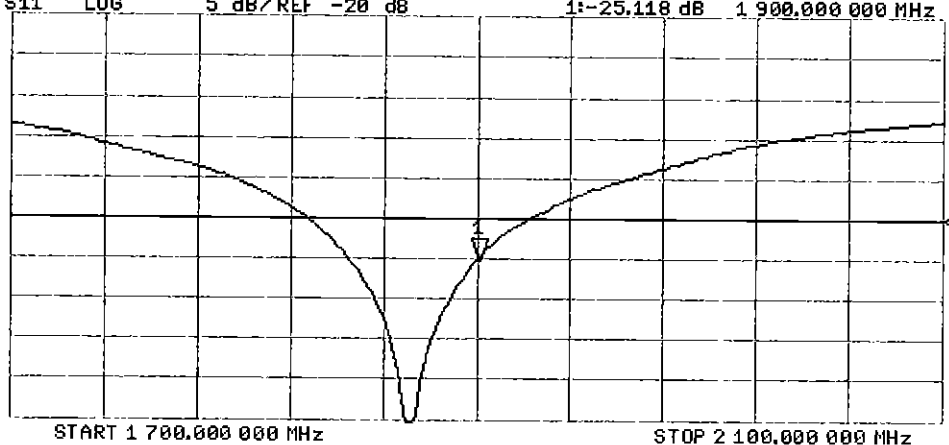
H1d

CH2 S11 LOG 5 dB/REF -20 dB 1:-25.118 dB 1 900.000 000 MHz

Cor

Avg
 16

H1d



DASY5 Validation Report for Body TSL

Date: 08.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.51$ S/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.03, 8.03, 8.03); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.1 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 17.1 W/kg

SAR(1 g) = 9.75 W/kg; SAR(10 g) = 5.17 W/kg

Maximum value of SAR (measured) = 14.7 W/kg

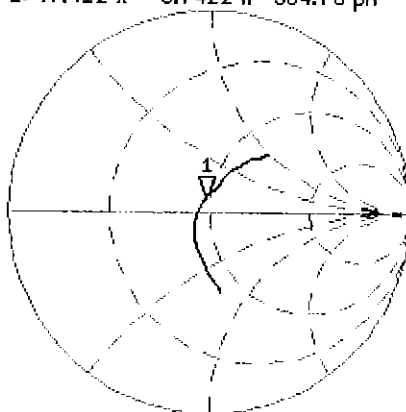


0 dB = 14.7 W/kg = 11.67 dBW/kg

Impedance Measurement Plot for Body TSL

8 Jul 2016 16:16:56
 CH1 S11 1 U FS 1: 47.412 Ω 6.7422 Ω 564.78 μH 1 900.000 000 MHz

*
 Del
 Cor



Avg
 16

H1d

CH2 S11 LOG 5 dB/REF -20 dB 1:-22.620 dB 1 900.000 000 MHz

Cor

Avg
 16

H1d

