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SAR TEST REPORT

Applicant Name: **SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-Si, Gyeonggi-do, 16677 Rep. of Korea	**Date of Issue:** Apr. 29, 2020 **Test Report No.:** HCT-SR-2004-FC006-R1 **Test Site: HCT CO., LTD.**

FCC ID: A3LSMA516B

Equipment Type:	**Mobile Phone**
Application Type	**Certification**
FCC Rule Part(s):	**CFR §2.1093**
Model Name:	**SM-A516B/DS**
Date of Test:	**Mar. 20, 2020 ~ Apr. 20. 2020**

This device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in FCC KDB procedures and had been tested in accordance with the measurement procedures specified in FCC KDB procedures.

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.

Tested By	Reviewed By
Min-Young Kim Test Engineer SAR Team Certification Division	Yun-jeang, Heo Technical Manager SAR Team Certification Division

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	Apr. 20, 2020	Initial Release
1	Apr. 29, 2020	Appendix H was revised.

This test results were applied only to the test methods required by the standard.

The above Test Report is not related to the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA.

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1. Test Regulations

The tests documented in this report were performed in accordance with FCC CFR § 2.1093, IEEE 1528-2013, ANSI C63.26-2015 the following FCC Published RF exposure KDB procedures:

- FCC KDB Publication 941225 D01 3G SAR Procedures v03r01
- FCC KDB Publication 941225 D06 Hot Spot SAR v02r01
- FCC KDB Publication 941225 D05 SAR for LTE Devices v02r05
- FCC KDB Publication 941225 D05A LTE Rel.10 KDB Inquiry sheet v01r02
- FCC KDB Publication 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB Publication 447498 D01 General SAR Guidance v06
- FCC KDB Publication 648474 D04 Handset SAR v01r03
- FCC KDB Publication 616217 D04 v01r02 (Proximity Sensor)
- FCC KDB Publication 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- FCC KDB Publication 865664 D02 SAR Reporting v01r02
- FCC KDB Publication 690783 D01 SAR Listings on Grants v01r03
- FCC KDB Publication 971168 D01 Power Meas License Digital Systems v03r01

In Addition to the above, the following information was used.

- October 2013 TCB Workshop Notes (GPRS testing criteria)
- April 2015 TCB Workshop Notes (Simultaneous transmission summation clarified)
- October 2016 TCB Workshop Notes (Bluetooth Duty Factor)
- November 2017 TCBC Workshop Notes (LTE Carrier Aggregation)
- April 2018 TCBC Workshop Notes (LTE DL CA SAR Test Exclusion)

2. Test Location

2.1 Test Laboratory

Company Name	HCT Co., Ltd.
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2.2 Test Facilities

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Korea	National Radio Research Agency (Designation No. KR0032)
	KOLAS (Testing No. KT197)

3. Information of the EUT

3.1 General Information of the EUT

Model Name	SM-A516B/DS
Equipment Type	Mobile Phone
FCC ID	A3LSMA516B
Application Type	Certification
Applicant	SAMSUNG Electronics Co., Ltd.

3.2 Attestation of test result of device under test

The Highest Reported SAR						
Band	Tx. Frequency	Equipment Class	Reported SAR (W/kg)			
			1g Head	1g Body-Worn	1g Hotspot	10g Extremity
GSM/GPRS/EDGE 850	824.2 MHz ~ 848.8 MHz	PCE	0.11	0.29	0.50	N/A
GSM/GPRS/EDGE 1900	1 850.2 MHz ~ 1 909.8 MHz	PCE	<0.10	0.28	0.69	1.30
WCDMA 850	826.4 MHz ~ 846.6 MHz	PCE	0.17	0.27	0.58	N/A
WCDMA 1900	1 852.4 MHz ~ 1 907.6 MHz	PCE	**0.20**	0.42	0.77	1.71
LTE Band 4 (AWS)	1 710.7 MHz ~ 1 754.3 MHz	PCE	0.17	**0.53**	**0.96**	**2.27**
LTE Band 5 (Cell)	824.7 MHz ~ 848.3 MHz	PCE	0.20	0.32	0.60	N/A
LTE Band 12	699.7 MHz ~ 715.3 MHz	PCE	0.09	0.32	0.55	N/A
LTE TDD Band 41	2 498.5 MHz ~ 2 687.5 MHz	PCE	<0.10	0.17	0.58	N/A
802.11b	2 412 MHz ~ 2 472 MHz	DTS	**0.24**	**<0.10**	**0.22**	N/A
U-NII-1	5 180 MHz ~ 5 240 MHz	NII	N/A	N/A	N/A	N/A
U-NII-2A	5 260 MHz ~ 5 320 MHz	NII	0.36	<0.10	N/A	**1.40**
U-NII-2C	5 500 MHz ~ 5 720 MHz	NII	**0.47**	0.16	N/A	1.26
U-NII-3	5 745 MHz ~ 5 825 MHz	NII	0.26	**0.16**	**0.38**	N/A
Bluetooth	2 402 MHz ~ 2 480 MHz	DSS	**0.21**	**<0.10**	**<0.10**	N/A
Simultaneous SAR per KDB 690783 D01v01r03			**0.67**	0.69	**1.34**	**3.66**
Date(s) of Tests:	Mar. 20, 2020 ~ Apr. 20. 2020					

4. Device Under Test Description

4.1 DUT specification

Device Wireless specification overview		
Band & Mode	**Operating Mode**	**Tx Frequency**
GSM850	Voice / Data	824.2 MHz ~ 848.8 MHz
GSM1900	Voice / Data	1 850.2 MHz ~ 1 909.8 MHz
WCDMA 850	Voice / Data	826.4 MHz ~ 846.6 MHz
WCDMA 1900	Voice / Data	1 852.4 MHz ~ 1 907.6 MHz
LTE Band 4 (AWS)	Voice / Data	1 710.7 MHz ~ 1 754.3 MHz
LTE Band 5 (Cell)	Voice / Data	824.7 MHz ~ 848.3 MHz
LTE Band 12	Voice / Data	699.7 MHz ~ 715.3 MHz
LTE TDD Band 41	Voice / Data	2 498.5 MHz ~ 2 687.5 MHz
U-NII-1	Voice / Data	5 180 MHz ~ 5 240 MHz
U-NII-2A	Voice / Data	5 260 MHz ~ 5 320 MHz
U-NII-2C	Voice / Data	5 500 MHz ~ 5 720 MHz
U-NII-3	Voice / Data	5 745 MHz ~ 5 825 MHz
2.4 GHz WLAN	Data	2 412 MHz ~ 2 472 MHz
Bluetooth / LE 5.0	Data	2 402 MHz ~ 2 480 MHz
ANT+	Data	2 402 MHz ~ 2 480 MHz
NFC	Data	13.56 MHz
Device Description		
Device Dimension	Overall (Length x Width): 159 mm x 74 mm Overall Diagonal: 169 mm Display Diagonal: 160 mm	
Battery Information	Standard (Li-ion Polymer Battery)	
	Battery Model Name: EB-BA516ABY (ATL)	
Ear-jack	Model Name: EHS61ASF (Cresyn)	
HW version	REV0.1	
SW version	A516B.001	
Device Serial Numbers	**Mode**	**Serial Number**
	LTE B4/ LTEB4 Phablet/ WCDMA 1900/ GSM1900/ GSM1900 Phablet/ 5 GHz WLAN/ LTE B5	HB75158H
	WCDMA 850/ LTE B12/ LTE B41	HB75169H
	GSM850/ 2.4 GHz WLAN/ Bluetooth	HB75157H
	WCDMA1900 Phablet	HB75154H
	The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics are within operational tolerances expected for production units.	

4.2 Power Reduction for SAR

This device utilizes power reduction mechanisms for some wireless modes and bands for SAR compliance under hotspot conditions and under some conditions when the device is being used in close proximity to the user's hand. All hotspot SAR evaluations for this device were performed at the maximum allowed output power when Hotspot is enabled. FCC KDB Publication 616217 D04v01r02 Sec.6 was used as a guideline for selection SAR test distances for device when being used in phablet use conditions.

This device uses an independent fixed level power reduction mechanism for WLAN modes during 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 IEEE1528-2013. Detailed descriptions of the power reduction mechanism are include in the operational description.

The reduced powers for the power reduction mechanisms were conformed via conducted power measurements at the RF Port .

4.3 Nominal and Maximum Output Power Specifications

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

4.3.1 Maximum PCE Output Power

Mode / Band		Voice	Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 Tx Slot	1 Tx Slot	2 Tx Slot	3 Tx Slot	4 Tx Slot	1 Tx Slot	2 Tx Slot	3 Tx Slot	4 Tx Slot
GSM/GPRS/EDGE 850	Maximum	33.5	33.5	31.0	30.5	29.0	28.0	26.0	24.0	23.0
	Nominal	32.5	32.5	30.0	29.5	28.0	27.0	25.0	23.0	22.0
GSM/GPRS/EDGE1900	Maximum	31.5	31.5	29.0	28.0	27.0	26.5	24.5	23.5	22.0
	Nominal	30.5	30.5	28.0	27.0	26.0	25.5	23.5	22.5	21.0

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	DC-HSDPA
WCDMA Band 5 (850 MHz)	Maximum	24.5	24.0	20.5	24.0
	Nominal	23.5	23.0	19.5	23.0
WCDMA Band 2 (1900 MHz)	Maximum	24.5	23.0	21.0	23.0
	Nominal	23.5	22.0	20.0	22.0

Mode / Band		Modulated Average (dBm)
LTE Band 4	Maximum	24.5
	Nominal	23.5
LTE Band 5	Maximum	25.3
	Nominal	24.3
LTE Band 12	Maximum	25.0
	Nominal	24.0
LTE TDD Band 41	Maximum	23.7
	Nominal	22.7

4.3.2 Reduced PCE Power (Hotspot Mode / Grip Sensor on / Ear jack)

Mode / Band		Voice	Burst Average GMSK (dBm)			
		1 Tx Slot	1 Tx Slot	2 Tx Slot	3 Tx Slot	4 Tx Slot
GSM/GPRS/EDGE1900	Maximum	28.5	28.0	26.0	25.0	24.0
	Nominal	27.5	27.0	25.0	24.0	23.0

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	DC-HSDPA
WCDMA Band 2 (1900 MHz) (Hotspot Mode / Grip Sensor on)	Maximum	21.5	21.0	20.0	21.0
	Nominal	20.5	20.0	19.0	20.0

Mode / Band		**Modulated Average (dBm)**		
		Grip Sensor on	Hotspot Mode	Ear jack
LTE Band 4	Maximum	21.5	21.5	21.5
	Nominal	20.5	20.5	20.5

4.3.3 Maximum 2.4 GHz, 5 GHz WIFI output power

IEEE 802.11(in dBm)												
Mode	Protocol	Sensor State	a		b	g		n		ac		
			6~36Mbps	48~54Mbps	1~11Mbps	6~36Mbps	48~54Mbps	MCS0~4	MCS5~7	MCS0~4	MCS5~8	
2.4GHz Wi-Fi	Ch.1 ~ 11	Active	N/A		11	11		11		N/A		
		Inactive	N/A		18	16	14 (CH2: 15) (CH1,11: 13)	16 (CH1,11: 14)	14	N/A		
	Ch.12~13	Active	N/A		7	7		6		N/A		
		Inactive	N/A		7	7		6		N/A		
5GHz Wi-Fi (20MHz BW)	UNII-1	Active	11		N/A	N/A		11		11		
		Inactive	16	14	N/A	N/A		16	14	16	14	
	UNII-2A	Active	11		N/A	N/A		11		11		
		Inactive	16	14	N/A	N/A		16	14	16	14	
	UNII-2C	Active	11		N/A	N/A		11		11		
		Inactive	16 (CH100:14)	14	N/A	N/A		16 (CH100: 14) (CH120: 14.5)	13	16 (CH100: 14)	13	
	UNII-3	Active	11		N/A	N/A		11		11		
		Inactive	16	14	N/A	N/A		16	14	16	14	
5GHz Wi-Fi (40MHz BW)	UNII-1	Active	N/A		N/A	N/A		11		11		
		Inactive	N/A		N/A	N/A		13.5	11.5	13.5	11.5	
	UNII-2A	Active	N/A		N/A	N/A		11		11		
		Inactive	N/A		N/A	N/A		13.5	11.5	13.5	11.5	
	UNII-2C	Active	N/A		N/A	N/A		11		11		
		Inactive	N/A		N/A	N/A		13.5	11.5	13.5	11.5	
	UNII-3	Active	N/A		N/A	N/A		11		11		
		Inactive	N/A		N/A	N/A		13.5	11.5	13.5	11.5	
5GHz Wi-Fi (80MHz BW)	UNII-1	Active	N/A		N/A	N/A		N/A		11		
		Inactive	N/A		N/A	N/A		N/A		13	11	
	UNII-2A	Active	N/A		N/A	N/A		N/A		11		
		Inactive	N/A		N/A	N/A		N/A		13	11	
	UNII-2C	Active	N/A		N/A	N/A		N/A		11		
		Inactive	N/A		N/A	N/A		N/A		13 (CH106: 12)	10	
	UNII-3	Active	N/A		N/A	N/A		N/A		11		
		Inactive	N/A		N/A	N/A		N/A		13	10	

(Tolerance: Target -1.5dB ~ +1.0 dB)

4.3.4 Maximum Bluetooth Power

Mode / Band			Modulated Average (dBm)
Bluetooth	DH5	Maximum	10.5
		Nominal	9.5
	2-DH5	Maximum	8.5
		Nominal	7.5
	3-DH5	Maximum	8.5
		Nominal	7.5
Bluetooth LE	1M	Maximum	7
		Nominal	6
	2M	Maximum	10
		Nominal	9

4.4 LTE Information

Item.		Description
Frequency Range	LTE Band 4 (AWS)	1 710.7 MHz ~ 1 754.3 MHz
	LTE Band 5 (Cell)	824.7 MHz ~ 848.3 MHz
	LTE Band 12	699.7 MHz ~ 715.3 MHz
	LTE TDD Band 41	2 498.5 MHz ~ 2 687.5 MHz
Channel Bandwidths	LTE Band 4 (AWS)	1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz
	LTE Band 5 (Cell)	1.4 MHz, 3 MHz, 5 MHz, 10 MHz
	LTE Band 12	1.4 MHz, 3 MHz, 5 MHz, 10 MHz
	LTE TDD Band 41	5 MHz, 10 MHz, 15 MHz, 20 MHz

Ch. No.& Freq.(MHz)		Low		Mid		High
LTE Band 4	1.4 MHz	1 710.7 (19957)		1 732.5 (20175)		1 754.3 (20393)
	3 MHz	1 711.5 (19965)		1 732.5 (20175)		1 753.5 (20385)
	5 MHz	1 712.5 (19975)		1 732.5 (20175)		1 752.5 (20375)
	10 MHz	1 715.0 (20000)		1 732.5 (20175)		1 750.0 (20350)
	15 MHz	1 717.5 (20025)		1 732.5 (20175)		1 747.5 (20325)
	20 MHz	1 720.0 (20050)		1 732.5 (20175)		1 745.0 (20300)
LTE Band 5	1.4 MHz	824.7 (20407)		836.5 (20525)		848.3 (20643)
	3 MHz	825.5 (20415)		836.5 (20525)		847.5 (20635)
	5 MHz	826.5 (20425)		836.5 (20525)		846.5 (20625)
	10 MHz	829.0 (20450)		836.5 (20525)		844.0 (20600)
LTE Band 12	1.4 MHz	699.7 (23017)		707.5 (23095)		715.3 (23173)
	3 MHz	700.5 (23025)		707.5 (23095)		714.5 (23165)
	5 MHz	701.5 (23035)		707.5 (23095)		713.5 (23155)
	10 MHz	704.0 (23060)		707.5 (23095)		711.0 (23130)
LTE TDD Band 41	5 MHz	2498.5(39675)	2545.8(40148)	2593.0(40620)	2640.3(41093)	2687.5(41565)
	10 MHz	2501.0(39700)	2547.0(40160)	2593.0(40620)	2639.0(41080)	2685.0(41540)
	15 MHz	2503.5(39725)	2548.3(41073)	2593.0(40620)	2637.8(41068)	2682.5(41515)
	20 MHz	2506.0(39750)	2549.5(40185)	2593.0(40620)	2636.5(41055)	2680.0(41490)

UE Category	LTE Rel. 12, DL: Category 11, UL: Category 5	
Modulations Supported in UL	QPSK, 16QAM, 64QAM	
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3	Yes	
A-MPR disabled for SAR Testing.	Yes	
LTE Carrier Aggregation	Up-Link CA	This device dose not supports Up-Link Carrier aggregation in US.
	Down-Link CA	This device supports DL-link Carrier aggregations Inter-band & Intra-band DL 2CA, DL 3CA
LTE Release information	This device does not support full CA features on 3GPP Release 12. The following LTE Release 12 features are not supported. Uplink Carrier aggregations, Relay, HetNet, Enhanced MIMO, elCl, WiFi offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.	

4.5 DUT Antenna Locations

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

This model allows users to exchange data or media files with other Bluetooth enabled devices using Bluetooth, which means they can connect to other Bluetooth enabled devices via Bluetooth tethering. Therefore, SAR test was performed for additional simultaneous transmissions.
Head and Bluetooth Tethering SAR were evaluated for BT BR tethering applications.

Mode	Rear	Front	Left	Right	Bottom	Top
GSM/GPRS/EDGE 850	Yes	Yes	Yes	Yes	Yes	No
GSM/GPRS/EDGE 1900	Yes	Yes	Yes	Yes	Yes	No
WCDMA 850	Yes	Yes	Yes	Yes	Yes	No
WCDMA 1900	Yes	Yes	Yes	Yes	Yes	No
LTE Band 4	Yes	Yes	Yes	Yes	Yes	No
LTE Band 5 (Cell)	Yes	Yes	Yes	Yes	Yes	No
LTE Band 12	Yes	Yes	Yes	Yes	Yes	No
LTE TDD Band 41	Yes	Yes	Yes	Yes	Yes	No
2.4 GHz WLAN	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN	Yes	Yes	Yes	No	No	Yes
Bluetooth	Yes	Yes	Yes	No	No	Yes

Particular EUT edges were not required to be evaluated for Bluetooth Tethering and Hotspot SAR if the edges were > 25 mm from the transmitting antenna according to FCC KDB 941225 D06v02r01 on page 2.
The distance between the transmit antennas and the edges of the device are included in the filing.
- Note: All test configurations are based on front view position.

4.6 Near Field Communications (NFC) Antenna

This EUT 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 SAR _ Setup_ photos.

4.7 SAR Summation Scenario

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

Simultaneous transmission paths

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB 447498 D01v06.

Simultaneous Transmission Scenarios				
Applicable Combination	Head	Body-Worn	Hotspot	Extremity
GSM Voice + 2.4 GHz WiFi	Yes	Yes	N/A	Yes
GSM Voice + 5 GHz WiFi	Yes	Yes	N/A	Yes
GSM Voice + Bluetooth	Yes#	Yes	N/A	Yes
GPRS + 2.4 GHz WiFi	N/A	N/A	Yes	Yes
GPRS + 5 GHz WiFi	N/A	N/A	Yes	Yes
GPRS + Bluetooth	N/A	N/A	Yes#	Yes
WCDMA + 2.4 GHz WiFi	Yes	Yes	Yes	Yes
WCDMA + 5 GHz WiFi	Yes	Yes	Yes	Yes
WCDMA + Bluetooth	Yes#	Yes	Yes#	Yes
LTE + 2.4 GHz WiFi	Yes	Yes	Yes	Yes
LTE + 5 GHz WiFi	Yes	Yes	Yes	Yes
LTE+ Bluetooth	Yes#	Yes	Yes#	Yes

1. Bluetooth cannot transmit simultaneously with WLAN.
2. The device does not support licensed bands simultaneously transmitting.
3. WCDMA +WLAN scenario also represents the WCDMA Voice/DATA + WLAN hotspot scenario.
4. VoIP is supported in GPRS/EDGE .
5. The highest reported SAR for each exposure condition is used for SAR summation purpose.
6. Wi-Fi Hotspot is supported for 2.4 GHz/ UNII-3 of 5 GHz WLAN.
7. This device supports # Bluetooth tethering.
8. 5 GHz Wireless Router is only supported for the UNII-3 by SW, therefore U-NII-1,U-NII2A and U-NII2C were not evaluated for wireless router conditions.

4.8 SAR Test Considerations

4.8.1 WiFi

Since wireless router operations are not allowed by the chipset firmware using U-NII-1, U-NII-2A & U-NII-2C WiFi, WiFi Hotspot SAR test and combinations are considered only 2.4 ㎓ and U-NII-3 for SAR with respected to wireless router configurations according to FCC KDB 941225 D06v02r01.

Since U-NII-1 and U-NII-2A bands have the same maximum output power and the highest reported SAR for U-NII-2A is less than 1.2 W/kg for 1g SAR and is less than 3.0 W/kg for 10g SAR, SAR is not required for U-NII-1 band according to FCC KDB 248227D01v02r02.

This device supports IEEE 802.11 ac with the following features:

a) Up to 80 ㎒ Bandwidth only
b) No aggregate channel configurations
c) 1Tx Antenna output
d) 256 QAM is supported
e) TDWR channels are supported.
f) Straddle channels are supported
g) Band gap channels are supported

4.8.2 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.

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 D05v02r05.

Per FCC KDB 648474 D04v01r03, this device is considered a “Phablet” since the diagonal dimension is greater than 160 mm and less than 200 mm. Therefore, extremity SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR >1.2 W/kg. When hotspot mode applies, 10g SAR required only for the surfaces and edges with hotspot mode scaled to the maximum output power (including tolerance) is 1g SAR > 1.2 W/kg.

This Device supports 64QAM on the uplink for LTE Operations. Conducted powers for 64QAM uplink configurations were measured per section 5.1 of FCC KDB 941225 D05v02r05. SAR was not required for 64QAM sins the highest maximum output power for 64QAM is ≤ 0.5dB higher than the same configuration in QPSK and the reported SAR for QPSK configuration is ≤1.45 W/Kg, per section 5.2.4 for FCC KDB941225 D05v02r05.

This device supports LTE Carrier Aggregation (CA) in the downlink. All uplink communications are identical to Release 8 specifications. Per FCC KDB publication 941225 D05A v01r02, SAR for LTE DL CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.

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.

Per FCC KDB 941225 D01v03r01, 12.2 kbps RMC is the primary mode and HSPA (HSUPA/HSDPA with RMC) is the secondary mode.
Per FCC KDB 941225 D01v03r01, The SAR test exclusion is applied to the secondary mode by the following equation.

$$Adjusted\ \ SAR = Highest\ \ Reported\ \ SAR\ \ x\ \ \frac{Secondary\ \ Max\ \ tune-up\ \ (mW)}{Primary\ \ Max\ \ tune\ \ tune-up(mW)} \leq 1.2\ \ \mathrm{W/kg}.$$

Based on the highest Reported SAR, the secondary mode is not required.

Per FCC KDB 690783 1 D01 SAR Listings on Grants v01r03 and KDB 447498 D01 General RF Exposure Guidance v06 The SAR numbers listed must be consistent with the highest reported test results required by the published RF exposure KDB procedures. When the measured SAR is not at the maximum tune-up tolerance limit or maximum output power allowed for production units, the measured results are scaled to the maximum conditions to determine compliance; the scaled results are referred to as the reported SAR.

The Reported SAR = The Measured SAR x-$\frac{Maximum\ \ tune-up\ \ (mW)}{Measured\ \ Conducted\ \ Power(mW)}$

The Reported SAR for WLAN and Bluetooth
The Reported SAR = The Measured SAR x-$\frac{Maximum\ \ tune-up\ \ (mW)}{Measured\ \ Conducted\ \ Power(mW)}$ x Duty factor

5. Introduction

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices.

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 ㎓. 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York 10017. The measurement procedure described in IEEE/ANSI C95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring 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 National Council on Radiation Protection and Measurements (NCRP) in Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields," NCRP Report No. 86 NCRP, 1986, Bethesda, MD 20814. 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.

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative of the incremental electromagnetic energy (d*W*) absorbed by (dissipated in) an incremental mass (d*m*) contained in a volume element (d*V*) of a given density (*r*). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body.

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

Figure 1. SAR Mathematical Equation

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

$$SAR = \sigma E^2 / \rho$$

Where:

σ = conductivity of the tissue-simulant material (S/m)

ρ = mass density of the tissue-simulant material (kg/㎥)

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 relations 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. Description of test equipment

6.1 SAR MEASUREMENT SETUP

These measurements are performed using the DASY4 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Staubli), robot controller, Pentium III computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Figure.2).

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The PC with Windows XP or Windows 7 is working with SAR Measurement system DASY4 & DASY5, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

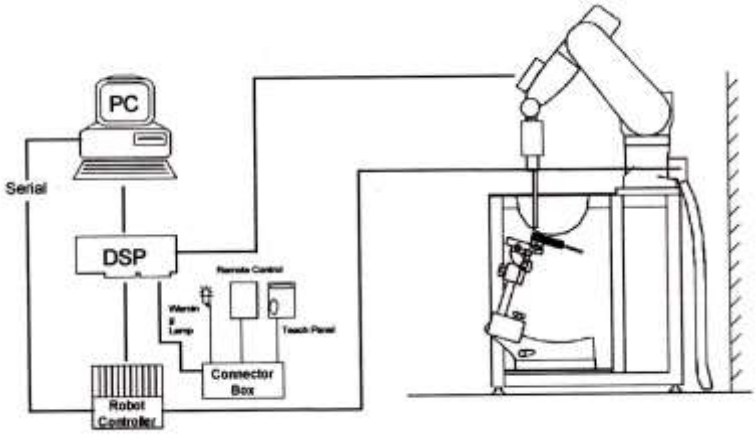


Figure 2. HCT SAR Lab. Test Measurement Set-up

The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in.

7. SAR 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 more than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the DUT's head and body area and the horizontal grid resolution was depending on the FCC KDB 865664 D01v01r04 table 4-1 & IEEE 1528-2013.

2. Based on step, the area of the maximum absorption was determined by sophisticated interpolations routines implemented in DASY software. When an Area Scan has measured all reachable point. DASY system computes the field maximal found in the scanned are, within a range of the maximum. SAR at this fixed point was measured and used as a reference value.

3. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB 865664 D01v01r04 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 (reference from the DASY manual.)

   a. The data at the surface were extrapolated, since the center of the dipoles is no more than 2.7 mm away from the tip of the probe (it is different from the probe type) and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

   b. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed using the 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 integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

   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. If the value changed by more than 5 %, the SAR evaluation and drift measurements were repeated.

Area scan and zoom scan resolution setting follow KDB 865664 D01v01r04 quoted below.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5±1 mm</td><td>$^{1}/_{2}\cdot\delta\cdot\ln(2)\pm0.5$ mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30°±1°</td><td>20°±1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan Spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤15 mm
2-3 GHz: ≤12 mm</td><td>3-4 GHz: ≤12 mm
4-6 GHz: ≤10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan Spatial resolution: Δx_{zoom}, Δy_{zoom}</td><td>≤ 2 GHz: ≤8mm
2-3 GHz: ≤5mm*</td><td>3-4 GHz: ≤5 mm*
4-6 GHz: ≤4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan Spatial resolution normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{zoom}(n)$</td><td>≤ 5 mm</td><td>3-4 GHz: ≤4 mm
4-5 GHz: ≤3 mm
5-6 GHz: ≤2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{zoom}(1)$: between 1 st two Points closest to phantom surface</td><td>≤ 4 mm</td><td>3-4 GHz: ≤3 mm
4-5 GHz: ≤2.5 mm
5-6 GHz: ≤2 mm</td></tr>
<tr><td>$\Delta z_{zoom}(n>1)$: between subsequent Points</td><td colspan="2">$\leq 1.5\cdot\Delta z_{zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3-4 GHz: ≥28 mm
4-5 GHz: ≥25 mm
5-6 GHz: ≥22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

8. Description of Test Position

8.1 EAR REFERENCE POINT

Figure 8-2 shows the front, back and side views of the SAM phantom. The center-of-mouth reference point is labeled “M”, the left ear reference point (ERP) is marked “LE”, and the right ERP is marked “RE.” Each ERP is on the B-M (back-mouth) line located 15 mm behind the entrance-to-ear-canal (EEC) point, as shown in Figure 6-1. The Reference Plane is defined as passing through the two ear reference point and point M. 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.

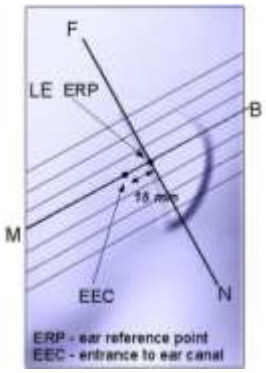


Figure 8-1
Close-up side view of ERP

8.2 HANDSET REFERENCE POINTS

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The device under test 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 8-3). The acoustic output was than located at the same level as the center of the ear reference point. The device under test 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 8-2
Front, back and side views of SAM Twin Phantom

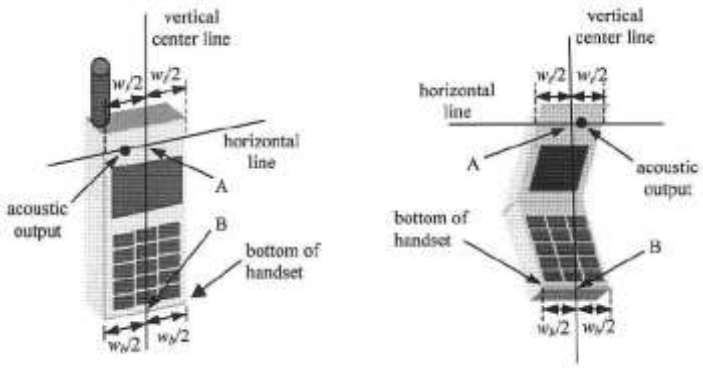


Figure 6-3. Handset vertical and horizontal reference lines

8.3 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameter; relative permittivity ε=3 and loss tangent σ =0.02.

8.4 Position for cheek

Figure 6.4. shows cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

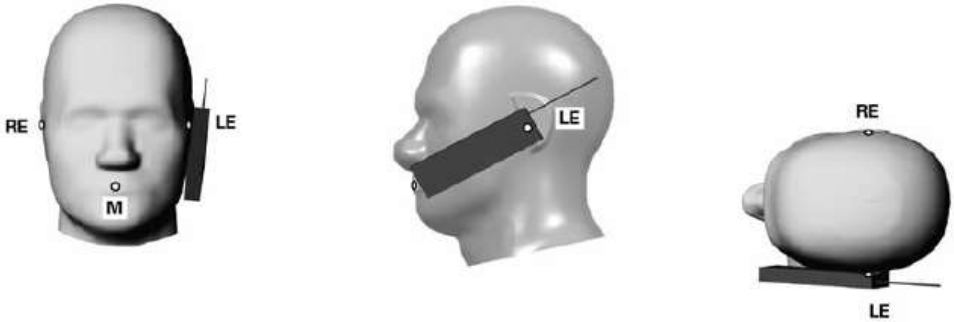


Figure 8.4 Cheek/ Touch position of the wireless device

8.5 Definition of the “tilted” position

Figure 6.5. shows tilted position. Place the device in the cheek position. Then while maintaining the orientation of the device, retract the device parallel to the reference plane far enough away from the phantom to enable a rotation of the device by 15°.

Figure 8.5. Tilt 15°position of the wireless device

8.6 Body-Worn Accessory Configurations

Body-worn operating configurations are tested with the belt-dips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 6-6). 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.. 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 8-6
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 metallic belt-dip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

8.7 Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06v02r01 where SAR test considerations for handsets (L x W≥9cmx5 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 publication 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.

8.8 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.

For smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm 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 D04 v01r03 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-worm 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 scaled to the maximum output power (including tolerance) is 1-g SAR > 1.2 W/kg.

8.9 Additional Test Positions due to Proximity Conditions

This device uses a sensor to reduce output powers in extremity (hand-held) use conditions.

When the sensor detects a user is touching the device on or near to the antenna the device reduces the maximum allowed output power However, the proximity sensor is not active when the device is moved beyond the sensor triggering distance and the maximum output power is no longer limited. Therefore, an additional exposure condition is needed in the vicinity of the triggering distance to ensure SAR is compliant when the device is allowed to operate at a non-reduced output power level.

FCC KDB 616217 D04 v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device at these additional exposure conditions. The smallest separation distance determined by the sensor triggering and sensor coverage for each applicable edge, minus 1 mm. was used as the test separation distance for SAR testing. Sensor triggering distance summary data is included in below table.

Wireless technologies	Position	§6.2 Triggering Distance	§6.3 Coverage	§6.4 Tilt Angle	Worst case distance for Phablet SAR
WWAN (GSM1900, WCDMA1900, LTE B4)	Rear	9	N/A	N/A	8
	Front	7	N/A	N/A	6
	Bottom	13	N/A	N/A	12

8.10 Bluetooth tethering Configurations

Per May 2017 TCBC Workshop documents When Bluetooth tethering applies ,simultaneous transmission SAR needs consideration.

This model allows users to exchange data or media files with other Bluetooth enabled devices using Bluetooth, which means they can connect to other Bluetooth enabled devices via Bluetooth tethering.
Therefore, SAR test was performed for additional simultaneous transmissions.
Head and Bluetooth tethering SAR were evaluated for BT BR tethering applications.

9. RF Exposure Limits

HUMAN EXPOSURE	UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT Occupational (W/kg) or (mW/g)
SPATIAL PEAK SAR * (Partial Body)	1.6	8.0
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.4
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.0	20.0

NOTES:

* The Spatial Peak value of the SAR averaged over any 1 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

** The Spatial Average value of the SAR averaged over the whole-body.

******* The Spatial Peak value of the SAR averaged over any 10 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

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 mad fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

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

10. FCC SAR General Measurement Procedures

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

10.1 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.

10.2 3G SAR Test Reduction Procedure

10.2.1 GSM, GPRS AND EDGE

The following procedures may be considered for each frequency band to determine SAR test reduction for devices operating in GSM/GPRS/EDGE modes to demonstrate RF exposure compliance. GSM voice mode transmits with 1 time-slot. GPRS and EDGE may transmit up to 4 time slots in the 8 time-slot frame according to the multi-slot class implemented in a device.

10.2.2 SAR Test Reduction

In FCC KDB 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.
SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested

10.2.3 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB 941225 D01v03r01-3G SAR Measurement Procedures.
The handset was placed into a simulated call using a base station simulator in a shielded chamber. Such test signals offer a consistent means for testing SAR and are recommended for evaluation SAR measurements were taken with a fully charged battery. In order to verify that the device was tested and maintained at full power, this was configured with the base station simulator. The SAR measurement Software calculates a reference point at the start and end of the test to Cheek for power drifts. If conducted Power deviations of more than 5 % occurred, the tests were repeated.

10.3 SAR Measurement Conditions for WCDMA

10.3.1 Output Power Verification

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

10.3.2 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 DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using and applicable RMC configuration with the corresponding spreading code or DPDCHn, for the highest reported SAR configuration in 12.2 kbps RMC.

10.3.3 SAR Measurements with Rel. 5 HSDPA

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

10.3.4 SAR Measurements with Rel. 6 HSUPA

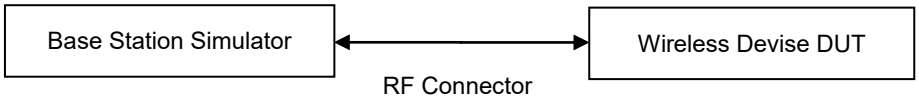
The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 and power control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

10.3.5 DC-HSDPA

SAR is required for Rel.8 DC-HSDPA when SAR is required for Rel.5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in table C.8.1.12 of 3GPP TS34.121-1 to determine SAR test reduction. Primary and secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

DC-HSDPA Configurations

- 3GPP specification TS 34.121-1 Release 8. was used for used for DC-HSDPA guidance.
- H-set 12(QPSK)was conformed to be used during DC-HSDPA measurements.



10.4 SAR Measurement Conditions for LTE

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

10.4.1 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.

10.4.2 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.

10.4.3 A-MPR

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

10.4.4 Required RB Size and RB offsets for SAR testing

According to FCC KDB 941225 D05v02r05

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

10.4.5 Downlink Carrier Aggregation

Conducted power measurements with LTE Carrier aggregation (CA) downlink only active are made in accordance to KDB publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to specifications when downlink carrier aggregation is inactive on the PCC. For every supported combination of downlink only carrier aggregation, additional conducted output Powers are measured with downlink carrier aggregation active for the configuration with highest measured maximum conducted power with the downlink carrier aggregation inactive measured among the channel bandwidth, modulation and RB combinations in each frequency band. Per FCC KDB Publication

941225 D05Av01r02, no SAR measurements are required for carrier aggregation configurations when the average output power with downlink only carrier aggregation active is not more than 0.25dB higher than the average output power with downlink only carrier aggregation inactive.

10.4.6 LTE(TDD) Considerations

According to KDB 941225 D05v02r05, for Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.
SAR was tested with the highest transmission duty factor (63.33 %) using Uplink-downlink configuration 0 and Special subframe configuration 6. LTE TDD Band 41 supports 3GPP TS 36.211 section 4.2 for Type 2 Frame and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special sub frame configurations.

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

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Calculated Duty Cycle – Extended cyclic prefix in uplink x (T_s) x no of S + no of U

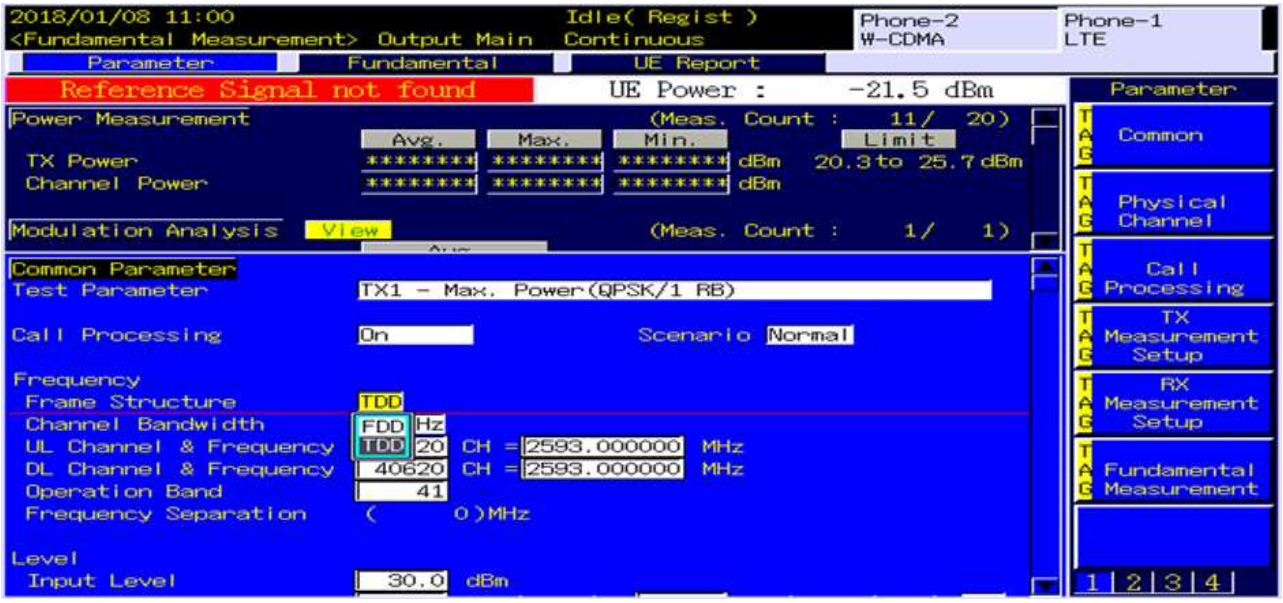
Table 4.2-2: Uplink-downlink configurations.

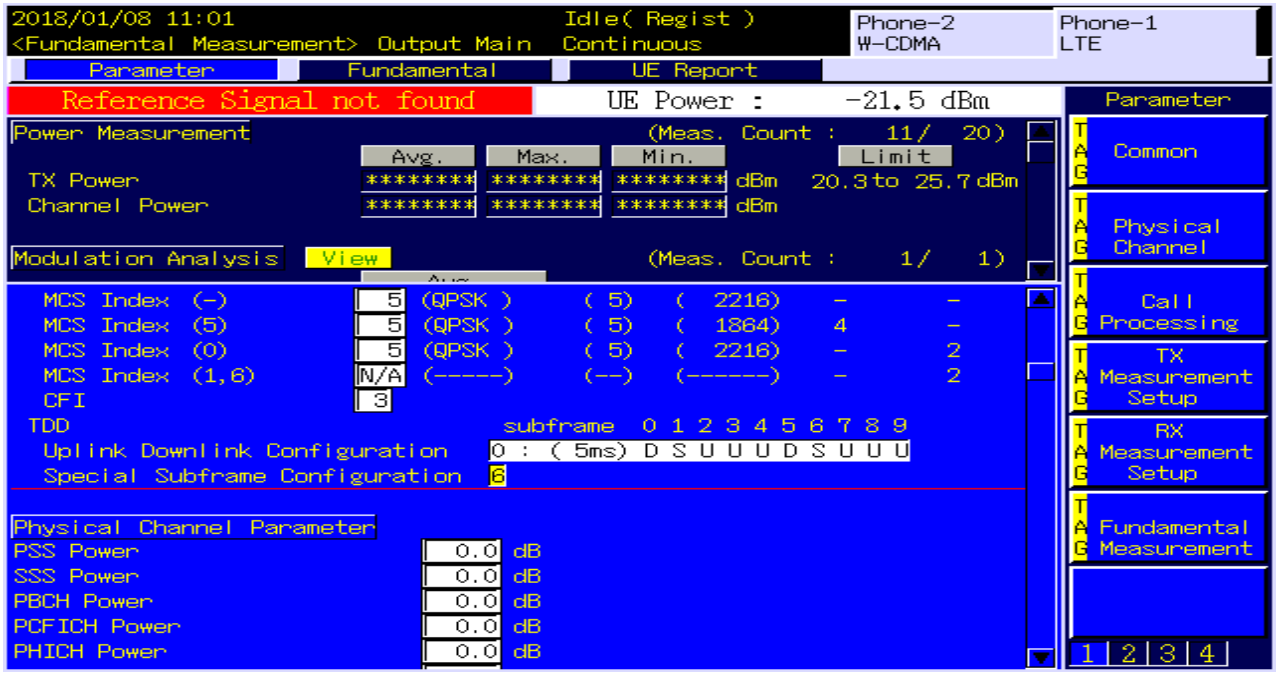
Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U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

Example for calculated Duty Cycle for Uplink-Downlink Configuration 0:
Calculated Duty Cycle = (5120 x (1/(15000 x 2048)) x 2 + 0.006)/0.01 = 63.33 %
Where
T_s = 1/(15000 x 2048) seconds

10.4.6 The Call Box Setup for LTE(TDD)

When you Want to Test for LTE TDD, Please Change Frame Structure TDD and TDD Uplink Downlink Configuration 0 and Special Subframe Configuration 6.





10.5 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.

10.5.1 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 system to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92-96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

10.5.2 U-NII-1 and U-NII-2A

For devices that operate in both U-NII-1 and U-NII2A 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 for 1g SAR or > 3.0 W/kg for 10g SAR. 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 for 1g SAR or > 3.0 W/kg for 10g SAR.

10.5.3 U-NII-2C and U-NII-3

The frequency range covered by U-NII-2C and U-NII-3 is 380 ㎒ (5.47 ㎓ – 5.85 ㎓), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. When Terminal Doppler Weather Radar (TDWR) restriction applies, the channels at 5.60 ㎓ – 5.65 ㎓ in U-NII-2C band must be disabled with acceptable mechanisms and documented in the equipment certification.

Unless band gap channels are permanently disabled, SAR must be considered for these channels.

10.5.4 Initial Test Position Procedure

For exposure conditions with multiple test positions, such as handset operating nest 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 for 1g SAR and ≤ 1.0 W/kg for 10g SAR, no additional testing for the remaining test position is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg for 1g SAR and ≤ 2.0 W/kg for 10g SAR or all test positions are measured.

10.5.5 2.4 ㎓ SAR test Requirements

SAR is measured for 2.4 ㎓ 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:
1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS is 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 ㎓ 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 ㎓ band, the Initial Test Configuration Procedures should be followed.

10.5.6 OFDM Transmission Mode and SAR Test Channel Selection

For the 2.4 ㎓ and 5 ㎓ bands, when the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate and lowest order 802.11 a/g/n/ac mode. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n and 802.11 ac or 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.2., 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.

10.5.7 Initial Test Configuration Procedure

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

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

10.5.8 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 on 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 for 1g SAR and ≤ 3.0 W/kg for 10g SAR, no additional SAR tests for the subsequent test configurations are required.

11. Output Power Specifications

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

Licensed bands

Test Description	Test Procedure Used
Conducted Output Power	- KDB 971168 D01 v03r01 - Section 5.2.4 - ANSI C63.26-2015 - Section 5.2.1 & 5.2.4.2

Test Overview

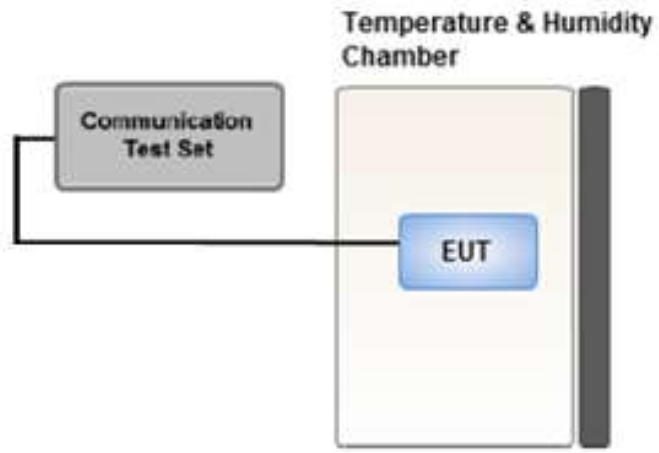
According to ANSI C63.26-2015 Section 5.2.1 when measuring the maximum RF output power from such devices, control over the EUT must be provided either through special test software (provided by manufacturer specifically for compliance testing, but not accessible by an end user) or through use of a base station emulator, communications test set, call box, or similar instrumentation that is capable of establishing a communications link with the EUT to enable control over variable parameters (e.g., output power, OBW, etc.).

In some cases, these instruments also include basic digital spectrum analyzer and/or power meter capabilities that can be utilized to measure the RF output power if the specified detectors and requirements can be realized and the measurement functions have been calibrated.

Test Procedure

1. The RF port of the EUT was connected to the Communication Tester via an RF cable.
2. Conducted average power was measured using a calibrated Radio Communication Tester.

Test setup



11.1 GSM

11.1.1 GSM Maximum Conducted Output Power

Mode / Band		Voice	GPRS(GMSK) Data – CS1(dBm)				EDGE Data (dBm)			
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot	EDGE 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot	EDGE 4 TX Slot
Maximum		**33.50**	**33.50**	**31.00**	**30.50**	**29.00**	**28.00**	**26.00**	**24.00**	**23.00**
Nominal		**32.50**	**32.50**	**30.00**	**29.50**	**28.00**	**27.00**	**25.00**	**23.00**	**22.00**
GSM 850	128	33.44	33.45	30.80	30.08	28.25	27.16	25.24	23.65	22.48
	190	33.36	33.37	30.85	30.14	28.14	27.01	24.45	23.56	22.43
	251	23.88	32.90	30.17	29.37	28.07	26.78	24.23	23.25	22.13
Maximum		**31.50**	**31.50**	**29.00**	**28.00**	**27.00**	**26.50**	**24.50**	**23.50**	**22.00**
Nominal		**30.50**	**30.50**	**28.00**	**27.00**	**26.00**	**25.50**	**23.50**	**22.50**	**21.00**
GSM 1900	512	30.31	30.32	27.54	26.53	24.73	25.88	23.73	22.61	21.53
	661	30.48	30.49	27.77	26.80	25.38	26.13	24.03	23.16	21.75
	810	29.55	29.56	26.66	25.85	24.52	25.05	23.11	21.97	20.61

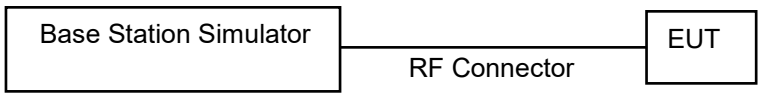
GSM Conducted output powers (Burst-Average)

Mode / Band		Voice	GPRS(GMSK) Data – CS1(dBm)				EDGE Data (dBm)			
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot	EDGE 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot	EDGE 4 TX Slot
Maximum		**24.47**	**24.47**	**24.98**	**26.24**	**25.99**	**18.97**	**19.98**	**19.74**	**19.99**
Nominal		**23.47**	**23.47**	**23.98**	**25.24**	**24.99**	**17.97**	**18.98**	**18.74**	**18.99**
GSM 850	128	24.41	24.42	24.78	25.82	25.24	18.13	19.22	19.39	19.47
	190	24.33	24.34	24.83	25.88	25.13	17.98	18.43	19.30	19.42
	251	14.85	23.87	24.15	25.11	25.06	17.75	18.21	18.99	19.12
Maximum		**22.47**	**22.47**	**22.98**	**23.74**	**23.99**	**17.47**	**18.48**	**19.24**	**18.99**
Nominal		**21.47**	**21.47**	**21.98**	**22.74**	**22.99**	**16.47**	**17.48**	**18.24**	**17.99**
GSM 1900	512	21.28	21.29	21.52	22.27	21.72	16.85	17.71	18.35	18.52
	661	21.45	21.46	21.75	22.54	22.37	17.10	18.01	18.90	18.74
	810	20.52	20.53	20.64	21.59	21.51	16.02	17.09	17.71	17.60

GSM Conducted output powers (Frame-Average)

Note:
Time slot average factor is as follows:
1 Tx slot = 9.03 dB, Frame-Average output power = Burst-Average output power – 9.03 dB
2 Tx slot = 6.02 dB, Frame-Average output power = Burst-Average output power – 6.02 dB
3 Tx slot = 4.26 dB, Frame-Average output power = Burst-Average output power – 4.26 dB
4 Tx slot = 3.01 dB, Frame-Average output power = Burst-Average output power – 3.01 dB

GSM Class : B
GSM voice: Head SAR , Body worn SAR
GPRS/EDGE Multi-slots 33 : Hotspot SAR with GPRS/EDGE
Multi-slot Class 33 with CS 1 (GMSK)



11.1.2 GSM Reduced Conducted Output Power (Hotspot mode activated)

Mode / Band		Voice	GPRS(GMSK) Data – CS1(dBm)			
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot
Maximum		**28.50**	**28.00**	**26.00**	**25.00**	**24.00**
Nominal		**27.50**	**27.00**	**25.00**	**24.00**	**23.00**
GSM 1900	512	27.23	27.25	24.63	23.85	22.27
	661	27.48	27.50	25.06	24.30	22.78
	810	26.37	26.39	23.59	23.14	21.59

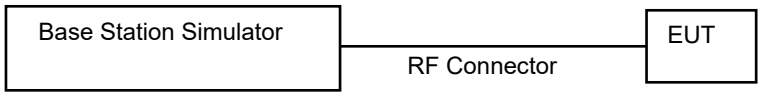
GSM Conducted output powers (Burst-Average)

Mode / Band		Voice	GPRS(GMSK) Data – CS1(dBm)			
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot
Maximum		**19.47**	**19.47**	**19.98**	**20.74**	**20.99**
Nominal		**18.47**	**18.47**	**18.98**	**19.74**	**19.99**
GSM 1900	512	18.20	18.22	18.61	19.59	19.26
	661	18.45	18.47	19.04	20.04	19.77
	810	17.34	17.36	17.57	18.88	18.58

GSM Conducted output powers (Frame-Average)

Note:
Time slot average factor is as follows:
1 Tx slot = 9.03 dB, Frame-Average output power = Burst-Average output power – 9.03 dB
2 Tx slot = 6.02 dB, Frame-Average output power = Burst-Average output power – 6.02 dB
3 Tx slot = 4.26 dB, Frame-Average output power = Burst-Average output power – 4.26 dB
4 Tx slot = 3.01 dB, Frame-Average output power = Burst-Average output power – 3.01 dB

GSM Class : B
GSM voice: Head SAR , Body worn SAR
GPRS/EDGE Multi-slots 33 : Hotspot SAR with GPRS/EDGE
Multi-slot Class 33 with CS 1 (GMSK)



11.1.3 GSM Reduced Conducted Output Power (Grip back Activated / Ear jack)

Mode / Band		Voice	GPRS(GMSK) Data – CS1(dBm)			
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot
Maximum		**28.50**	**28.00**	**26.00**	**25.00**	**24.00**
Nominal		**27.50**	**27.00**	**25.00**	**24.00**	**23.00**
GSM 1900	512	27.21	27.23	24.61	23.83	22.26
	661	27.46	27.47	25.04	24.28	22.76
	810	26.36	26.36	23.58	23.13	21.59

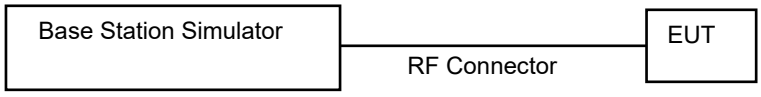
GSM Conducted output powers (Burst-Average)

Mode / Band		Voice	GPRS(GMSK) Data – CS1(dBm)			
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot
Maximum		**19.47**	**19.47**	**19.98**	**20.74**	**20.99**
Nominal		**18.47**	**18.47**	**18.98**	**19.74**	**19.99**
GSM 1900	512	18.18	18.20	18.59	19.57	19.25
	661	18.43	18.44	19.02	20.02	19.75
	810	17.33	17.33	17.56	18.87	18.58

GSM Conducted output powers (Frame-Average)

Note:
Time slot average factor is as follows:
1 Tx slot = 9.03 dB, Frame-Average output power = Burst-Average output power – 9.03 dB
2 Tx slot = 6.02 dB, Frame-Average output power = Burst-Average output power – 6.02 dB
3 Tx slot = 4.26 dB, Frame-Average output power = Burst-Average output power – 4.26 dB
4 Tx slot = 3.01 dB, Frame-Average output power = Burst-Average output power – 3.01 dB

GSM Class : B
GSM voice: Head SAR , Body worn SAR
GPRS/EDGE Multi-slots 33 : Hotspot SAR with GPRS/EDGE
Multi-slot Class 33 with CS 1 (GMSK)



11.2 WCDMA

HSPA+
This DUT is only capable of QPSK HSPA+ in uplink. Therefore, the RF conducted power is not measured according to 941225 D01v03r01 3G SAR.

11.2.1 WCDMA Maximum Conducted Output Power

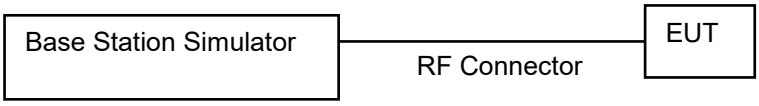
WCDMA Band 5 Maximum Conducted Output Power

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 5 [dBm]			3GPP MPR
		Subtest	UL 4132 DL 4357	UL 4183 DL 4408	UL 4233 DL 4458	
99	WCDMA	12.2 kbps RMC	24.11	24.08	23.91	-
99		12.2 kbps AMR	24.12	24.08	23.90	-
5	HSDPA	Subtest 1	23.82	23.72	22.72	0
5		Subtest 2	23.12	22.97	22.53	0
5		Subtest 3	22.35	22.36	22.32	0.5
5		Subtest 4	22.37	22.34	22.32	0.5
6	HSUPA	Subtest 1	20.38	20.34	20.24	0
6		Subtest 2	18.38	18.34	18.22	2
6		Subtest 3	19.48	19.42	19.30	1
6		Subtest 4	18.38	18.33	18.21	2
6		Subtest 5	21.73	21.70	21.58	0
8	DC-HSDPA	Subtest 1	23.83	23.71	23.54	0
8		Subtest 2	23.25	23.05	22.99	0
8		Subtest 3	22.32	22.11	22.04	0.5
8		Subtest 4	22.30	22.08	22.03	0.5

WCDMA Average Conducted output powers

DC-HSDPA Configurations

- 3GPP specification TS 34.121-1 Release 8. was used for used for DC-HSDPA guidance.
- H-set 12(QPSK)was conformed to be used during DC-HSDPA measurements.



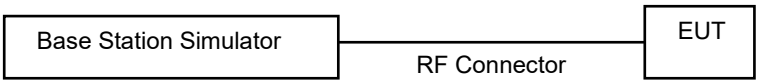
WCDMA Band 2 Maximum Conducted Output Power

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 2 [dBm]			3GPP MPR
		Subtest	UL 9262 DL 9662	UL 9400 DL 9800	UL 9538 DL 9938	
99	WCDMA	12.2 kbps RMC	22.87	23.08	22.60	-
99		12.2 kbps AMR	22.83	23.11	22.63	-
5	HSDPA	Subtest 1	22.20	22.50	22.09	0
5		Subtest 2	22.22	22.53	22.08	0
5		Subtest 3	21.27	21.56	21.08	0.5
5		Subtest 4	21.31	21.54	21.09	0.5
6	HSUPA	Subtest 1	20.27	20.51	20.13	0
6		Subtest 2	18.31	18.63	18.13	2
6		Subtest 3	19.30	19.62	19.13	1
6		Subtest 4	18.31	18.60	18.15	2
6		Subtest 5	20.94	21.25	21.82	0
8	DC-HSDPA	Subtest 1	22.73	22.50	22.09	0
8		Subtest 2	22.23	22.09	21.55	0
8		Subtest 3	21.29	21.08	20.65	0.5
8		Subtest 4	21.26	21.05	20.63	0.5

WCDMA Average Conducted output powers

DC-HSDPA Configurations

- 3GPP specification TS 34.121-1 Release 8. was used for used for DC-HSDPA guidance.
- H-set 12(QPSK) was conformed to be used during DC-HSDPA measurements.



11.2.2 WCDMA Reduced Conducted Output Power (Hotspot mode activated)

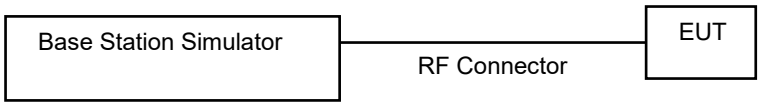
When Power reduction is applied , MPR set to 0
WCDMA Band 2 Hotspot Back-off Power

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 2 [dBm]			3GPP MPR
		Subtest	UL 9262 DL 9662	UL 9400 DL 9800	UL 9538 DL 9938	
99	WCDMA	12.2 kbps RMC	19.81	20.02	19.54	-
99		12.2 kbps AMR	19.79	20.02	19.53	
5	HSDPA	Subtest 1	19.88	20.14	19.65	0
5		Subtest 2	19.88	20.15	19.68	0
5		Subtest 3	19.86	20.08	19.61	0
5		Subtest 4	19.88	20.16	19.62	0
6	HSUPA	Subtest 1	18.94	19.26	18.81	0
6		Subtest 2	18.49	18.77	18.33	0
6		Subtest 3	18.95	19.27	18.87	0
6		Subtest 4	18.55	18.78	18.23	0
6		Subtest 5	18.91	19.25	18.85	0
8	DC-HSDPA	Subtest 1	19.88	19.58	19.49	0
8		Subtest 2	19.93	19.62	19.53	0
8		Subtest 3	19.92	19.61	19.52	0
8		Subtest 4	19.96	19.65	19.46	0

WCDMA Average Conducted output powers

DC-HSDPA Configurations

- 3GPP specification TS 34.121-1 Release 8. was used for used for DC-HSDPA guidance.
- H-set 12(QPSK) was conformed to be used during DC-HSDPA measurements.

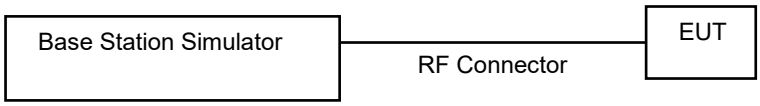


11.2.3 WCDMA Reduced Conducted Output Power – (Grip back/ Ear jack Activated)

When Power reduction is applied , MPR set to 0
WCDMA Band 2 Grip back-off / Ear jack Power

3GPP Release Version	Mode	3GPP 34.121	WCDMA Band 2 [dBm]			3GPP MPR
		Subtest	UL 9262 DL 9662	UL 9400 DL 9800	UL 9538 DL 9938	
99	WCDMA	12.2 kbps RMC	19.80	20.01	19.53	-
99		12.2 kbps AMR	19.79	20.01	19.53	
5	HSDPA	Subtest 1	19.87	20.15	19.67	0
5		Subtest 2	19.87	20.14	19.68	0
5		Subtest 3	19.83	20.10	19.59	0
5		Subtest 4	19.86	20.14	19.61	0
6	HSUPA	Subtest 1	18.92	19.28	18.80	0
6		Subtest 2	18.50	18.76	18.34	0
6		Subtest 3	18.96	19.30	18.88	0
6		Subtest 4	18.56	18.76	18.20	0
6		Subtest 5	18.92	19.24	18.86	0
8	DC-HSDPA	Subtest 1	19.86	19.60	19.50	0
8		Subtest 2	19.92	19.62	19.52	0
8		Subtest 3	19.90	19.60	19.51	0
8		Subtest 4	19.94	19.64	19.48	0

- 3GPP specification TS 34.121-1 Release 8. was used for used for DC-HSDPA guidance.
- H-set 12(QPSK) was conformed to be used during DC-HSDPA measurements.



11.3 LTE Maximum Output Power

LTE B4/5/12 at 20 ㎒ Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

11.3.1 LTE Maximum Conducted Power

[LTE Band 4 Conducted Power]

LTE Band 4 _ 1.4 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19957 Ch. 1710.7 MHz	20175 Ch. 1732.5 MHz	20393 Ch. 1754.3 MHz		
1.4 MHz	QPSK	1	0	23.36	23.07	23.54	0	0
		1	3	23.45	23.11	23.63	0	0
		1	5	23.43	23.13	23.51	0	0
		3	0	23.17	23.06	23.54	0	0
		3	1	23.31	23.17	23.63	0	0
		3	3	23.45	22.93	23.60	0	0
		6	0	22.46	22.11	22.58	0-1	1
	16QAM	1	0	22.69	22.39	22.69	0-1	1
		1	3	22.56	22.04	22.66	0-1	1
		1	5	22.34	22.35	22.49	0-1	1
		3	0	22.45	22.16	22.62	0-1	1
		3	1	22.53	22.12	22.71	0-1	1
		3	3	22.30	22.25	22.66	0-1	1
		6	0	21.51	21.19	21.66	0-2	2
	64QAM	1	0	21.39	21.33	21.69	0-2	2
		1	3	21.49	21.30	21.73	0-2	2
		1	5	21.36	21.33	21.83	0-2	2
		3	0	21.50	21.25	21.67	0-2	2
		3	1	21.60	21.47	21.57	0-2	2
		3	3	21.57	21.19	21.64	0-2	2
		6	0	20.52	20.22	20.38	0-3	3

LTE Band 4 _ 3 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19965 Ch. 1711.5 MHz	20175 Ch. 1732.5 MHz	20385 Ch. 1753.5 MHz		
3 MHz	QPSK	1	0	23.45	23.10	23.56	0	0
		1	7	23.42	23.09	23.57	0	0
		1	14	23.47	23.17	23.58	0	0
		8	0	22.57	22.19	22.70	0-1	1
		8	3	22.54	22.16	22.61	0-1	1
		8	7	22.61	22.23	22.69	0-1	1
		15	0	22.62	22.24	22.70	0-1	1
	16QAM	1	0	22.62	22.36	22.87	0-1	1
		1	7	22.65	22.35	22.77	0-1	1
		1	14	22.71	22.44	22.78	0-1	1
		8	0	21.60	21.25	21.65	0-2	2
		8	3	21.56	21.18	21.63	0-2	2
		8	7	21.59	21.26	21.69	0-2	2
		15	0	21.58	21.25	21.68	0-2	2
	64QAM	1	0	21.69	21.36	21.77	0-2	2
		1	7	21.62	21.29	21.72	0-2	2
		1	14	21.67	21.33	21.64	0-2	2
		8	0	20.53	20.24	20.59	0-3	3
		8	3	20.53	20.18	20.63	0-3	3
		8	7	20.61	20.22	20.67	0-3	3
		15	0	20.57	20.22	20.64	0-3	3

LTE Band 4 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19975 Ch. 1712.5 ㎒	20175 Ch. 1732.5 ㎒	20375 Ch. 1752.5 ㎒		
5 ㎒	QPSK	1	0	23.37	23.17	23.64	0	0
		1	12	23.44	23.13	23.63	0	0
		1	24	23.50	23.15	23.63	0	0
		12	0	22.62	22.26	22.74	0-1	1
		12	6	22.64	22.22	22.73	0-1	1
		12	11	22.62	22.24	22.72	0-1	1
		25	0	22.57	22.25	22.70	0-1	1
	16QAM	1	0	22.68	22.42	22.92	0-1	1
		1	12	22.70	22.41	22.87	0-1	1
		1	24	22.73	22.46	22.94	0-1	1
		12	0	21.58	21.24	21.71	0-2	2
		12	6	21.59	21.22	21.70	0-2	2
		12	11	21.59	21.25	21.70	0-2	2
		25	0	21.58	21.27	21.67	0-2	2
	64QAM	1	0	21.62	21.28	21.77	0-2	2
		1	12	21.65	21.32	21.68	0-2	2
		1	24	21.68	21.32	21.75	0-2	2
		12	0	20.51	20.26	20.71	0-3	3
		12	6	20.54	20.23	20.67	0-3	3
		12	11	20.56	20.22	20.64	0-3	3
		25	0	20.54	20.17	20.63	0-3	3

LTE Band 4 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20000 Ch. 1715 ㎒	20175 Ch. 1732.5 ㎒	20350 Ch. 1750 ㎒		
10 ㎒	QPSK	1	0	23.40	23.18	23.57	0	0
		1	24	23.41	23.16	23.61	0	0
		1	49	23.40	23.21	23.60	0	0
		25	0	22.47	22.26	22.67	0-1	1
		25	12	22.53	22.24	22.64	0-1	1
		25	24	22.50	22.28	22.66	0-1	1
		50	0	22.57	22.30	22.73	0-1	1
	16QAM	1	0	22.66	22.34	22.80	0-1	1
		1	24	22.53	22.33	22.70	0-1	1
		1	49	22.65	22.48	22.85	0-1	1
		25	0	21.52	21.25	21.66	0-2	2
		25	12	21.51	21.25	21.66	0-2	2
		25	24	21.51	21.24	21.63	0-2	2
		50	0	21.54	21.26	21.68	0-2	2
	64QAM	1	0	21.70	21.37	21.85	0-2	2
		1	24	21.61	21.42	21.81	0-2	2
		1	49	21.55	21.38	21.88	0-2	2
		25	0	20.51	20.24	20.60	0-3	3
		25	12	20.47	20.24	20.61	0-3	3
		25	24	20.46	20.24	20.58	0-3	3
		50	0	20.51	20.26	20.66	0-3	3

LTE Band 4 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20025 Ch. 1717.5 ㎒	20175 Ch. 1732.5 ㎒	20325 Ch. 1747.5 ㎒		
15 ㎒	QPSK	1	0	23.46	23.20	23.58	0	0
		1	36	23.36	23.16	23.53	0	0
		1	74	23.43	23.25	23.61	0	0
		36	0	22.52	22.36	22.68	0-1	1
		36	18	22.56	22.33	22.72	0-1	1
		36	39	22.57	22.35	22.76	0-1	1
		75	0	22.54	22.36	22.73	0-1	1
	16QAM	1	0	22.66	22.46	22.82	0-1	1
		1	36	22.67	22.41	22.77	0-1	1
		1	74	22.72	22.47	22.86	0-1	1
		36	0	21.51	21.30	21.69	0-2	2
		36	18	21.56	21.32	21.68	0-2	2
		36	39	21.50	21.33	21.70	0-2	2
		75	0	21.50	21.33	21.68	0-2	2
	64QAM	1	0	21.67	21.33	21.79	0-2	2
		1	36	21.56	21.37	21.69	0-2	2
		1	74	21.63	21.51	21.82	0-2	2
		36	0	20.55	20.29	20.66	0-3	3
		36	18	20.53	20.26	20.65	0-3	3
		36	39	20.52	20.29	20.69	0-3	3
		75	0	20.52	20.31	20.67	0-3	3

LTE Band 4 _ 20 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				20175 Ch. 1732.5 ㎒		
20 ㎒	QPSK	1	0	23.24	0	0
		1	49	23.19	0	0
		1	99	23.27	0	0
		50	0	22.35	0-1	1
		50	25	22.31	0-1	1
		50	49	22.34	0-1	1
		100	0	22.34	0-1	1
	16QAM	1	0	22.43	0-1	1
		1	49	22.39	0-1	1
		1	99	22.57	0-1	1
		50	0	21.34	0-2	2
		50	25	21.29	0-2	2
		50	49	21.28	0-2	2
		100	0	21.30	0-2	2
	64QAM	1	0	21.39	0-2	2
		1	49	21.43	0-2	2
		1	99	21.51	0-2	2
		50	0	20.29	0-3	3
		50	25	20.28	0-3	3
		50	49	20.25	0-3	3
		100	0	20.31	0-3	3

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[LTE Band 5 Conducted Power]

LTE Band 5 _ 1.4 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20407 Ch. 824.7 MHz	20525 Ch. 836.5 MHz	20643 Ch. 848.3 MHz		
1.4 MHz	QPSK	1	0	24.69	24.69	24.49	0	0
		1	3	24.67	24.63	24.45	0	0
		1	5	24.67	24.69	24.48	0	0
		3	0	24.63	24.64	24.42	0	0
		3	1	24.78	24.76	24.56	0	0
		3	3	24.67	24.66	24.44	0	0
		6	0	23.66	23.71	23.44	0-1	1
	16QAM	1	0	23.83	23.88	23.61	0-1	1
		1	3	23.74	23.86	23.48	0-1	1
		1	5	23.83	23.86	23.63	0-1	1
		3	0	23.69	23.68	23.46	0-1	1
		3	1	23.80	23.74	23.50	0-1	1
		3	3	23.66	23.83	23.53	0-1	1
		6	0	22.73	22.75	22.48	0-2	2
	64QAM	1	0	22.81	22.89	22.66	0-2	2
		1	3	22.63	22.90	22.64	0-2	2
		1	5	22.76	22.88	22.65	0-2	2
		3	0	22.75	22.73	22.53	0-2	2
		3	1	22.92	22.87	22.61	0-2	2
		3	3	22.74	22.79	22.51	0-2	2
		6	0	21.70	21.74	21.62	0-3	3

LTE Band 5 _ 3 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20415 Ch. 825.5 MHz	20525 Ch. 836.5 MHz	20635 Ch. 847.5 MHz		
3 MHz	QPSK	1	0	24.73	24.70	24.49	0	0
		1	7	24.68	24.68	24.46	0	0
		1	14	24.70	24.73	24.49	0	0
		8	0	23.81	23.80	23.67	0-1	1
		8	3	23.78	23.78	23.59	0-1	1
		8	7	23.85	23.77	23.62	0-1	1
		15	0	23.84	23.84	23.69	0-1	1
	16QAM	1	0	23.98	23.97	23.68	0-1	1
		1	7	23.78	23.95	23.65	0-1	1
		1	14	24.00	23.96	23.60	0-1	1
		8	0	22.86	22.79	22.59	0-2	2
		8	3	22.78	22.71	22.54	0-2	2
		8	7	22.79	22.82	22.57	0-2	2
		15	0	22.80	22.76	22.60	0-2	2
	64QAM	1	0	22.90	22.86	22.56	0-2	2
		1	7	22.66	22.75	22.67	0-2	2
		1	14	22.80	22.88	22.61	0-2	2
		8	0	21.79	21.76	21.52	0-3	3
		8	3	21.74	21.73	21.52	0-3	3
		8	7	21.76	21.77	21.53	0-3	3
		15	0	21.78	21.74	21.55	0-3	3

LTE Band 5 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20425 Ch. 826.5 ㎒	20525 Ch. 836.5 ㎒	20625 Ch. 846.5 ㎒		
5 ㎒	QPSK	1	0	24.75	24.75	24.55	0	0
		1	12	24.64	24.66	24.47	0	0
		1	24	24.64	24.65	24.51	0	0
		12	0	23.85	23.83	23.70	0-1	1
		12	6	23.80	23.78	23.66	0-1	1
		12	11	23.78	23.80	23.66	0-1	1
		25	0	23.78	23.78	23.63	0-1	1
	16QAM	1	0	23.97	23.96	23.68	0-1	1
		1	12	23.93	23.98	23.65	0-1	1
		1	24	23.86	23.95	23.73	0-1	1
		12	0	22.85	22.81	22.63	0-2	2
		12	6	22.82	22.78	22.62	0-2	2
		12	11	22.78	22.79	22.57	0-2	2
		25	0	22.78	22.75	22.55	0-2	2
	64QAM	1	0	22.95	22.81	22.65	0-2	2
		1	12	22.69	22.74	22.63	0-2	2
		1	24	22.83	22.90	22.64	0-2	2
		12	0	21.78	21.78	21.58	0-3	3
		12	6	21.78	21.75	21.55	0-3	3
		12	11	21.69	21.71	21.55	0-3	3
		25	0	21.70	21.74	21.51	0-3	3

LTE Band 5 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				20525 Ch. 836.5 ㎒		
10 ㎒	QPSK	1	0	24.75	0	0
		1	24	24.71	0	0
		1	49	24.66	0	0
		25	0	23.77	0-1	1
		25	12	23.79	0-1	1
		25	24	23.75	0-1	1
		50	0	23.92	0-1	1
	16QAM	1	0	23.97	0-1	1
		1	24	23.80	0-1	1
		1	49	23.87	0-1	1
		25	0	22.79	0-2	2
		25	12	22.70	0-2	2
		25	24	22.73	0-2	2
		50	0	22.85	0-2	2
	64QAM	1	0	22.88	0-2	2
		1	24	22.78	0-2	2
		1	49	22.66	0-2	2
		25	0	21.75	0-3	3
		25	12	21.72	0-3	3
		25	24	21.68	0-3	3
		50	0	21.77	0-3	3

[LTE Band 12 Conducted Power]

LTE Band 12 _ 1.4 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23017 Ch. 699.7 ㎒	23095 Ch. 707.5 ㎒	23173 Ch. 715.3 ㎒		
1.4 ㎒	QPSK	1	0	24.55	24.33	24.18	0	0
		1	3	24.48	24.30	24.10	0	0
		1	5	24.55	24.30	24.17	0	0
		3	0	24.44	24.25	23.88	0	0
		3	1	24.60	24.38	24.25	0	0
		3	3	24.28	24.34	24.14	0	0
		6	0	23.53	23.33	23.16	0-1	1
	16QAM	1	0	23.71	23.40	23.20	0-1	1
		1	3	23.51	23.31	23.23	0-1	1
		1	5	23.64	23.46	23.26	0-1	1
		3	0	23.53	23.33	23.16	0-1	1
		3	1	23.39	23.40	23.27	0-1	1
		3	3	23.55	23.30	23.23	0-1	1
		6	0	22.56	22.34	22.17	0-2	2
	64QAM	1	0	22.70	22.39	22.29	0-2	2
		1	3	22.41	22.34	22.14	0-2	2
		1	5	22.60	22.45	22.17	0-2	2
		3	0	22.74	22.36	22.22	0-2	2
		3	1	22.77	22.47	22.37	0-2	2
		3	3	22.49	22.38	22.21	0-2	2
		6	0	21.59	21.22	20.81	0-3	3

LTE Band 12 _ 3 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23025 Ch. 700.5 ㎒	23095 Ch. 707.5 ㎒	23165 Ch. 714.5 ㎒		
3 ㎒	QPSK	1	0	24.53	24.32	24.19	0	0
		1	7	24.49	24.29	24.12	0	0
		1	14	24.52	24.34	24.16	0	0
		8	0	23.67	23.41	23.27	0-1	1
		8	3	23.64	23.36	23.21	0-1	1
		8	7	23.66	23.41	23.24	0-1	1
		15	0	23.67	23.43	23.26	0-1	1
	16QAM	1	0	23.73	23.57	23.32	0-1	1
		1	7	23.59	23.51	23.37	0-1	1
		1	14	23.64	23.55	23.33	0-1	1
		8	0	22.61	22.43	22.24	0-2	2
		8	3	22.54	22.31	22.18	0-2	2
		8	7	22.58	22.38	22.21	0-2	2
		15	0	22.56	22.36	22.19	0-2	2
	64QAM	1	0	22.60	22.40	22.37	0-2	2
		1	7	22.54	22.33	22.20	0-2	2
		1	14	22.64	22.38	22.23	0-2	2
		8	0	21.50	21.24	21.13	0-3	3
		8	3	21.46	21.21	21.10	0-3	3
		8	7	21.46	21.30	21.15	0-3	3
		15	0	21.53	21.31	21.12	0-3	3

LTE Band 12 _ 5 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				23035 Ch. 701.5 MHz	23095 Ch. 707.5 MHz	23155 Ch. 713.5 MHz		
5 MHz	QPSK	1	0	24.58	24.38	24.32	0	0
		1	12	24.47	24.28	24.14	0	0
		1	24	24.52	24.31	24.22	0	0
		12	0	23.68	23.48	23.37	0-1	1
		12	6	23.68	23.45	23.33	0-1	1
		12	11	23.66	23.40	23.32	0-1	1
		25	0	23.60	23.40	23.32	0-1	1
	16QAM	1	0	23.69	23.46	23.39	0-1	1
		1	12	23.62	23.52	23.41	0-1	1
		1	24	23.59	23.46	23.34	0-1	1
		12	0	22.61	22.42	22.37	0-2	2
		12	6	22.57	22.39	22.28	0-2	2
		12	11	22.55	22.37	22.28	0-2	2
		25	0	22.49	22.36	22.27	0-2	2
	64QAM	1	0	22.55	22.43	22.34	0-2	2
		1	12	22.62	22.50	22.35	0-2	2
		1	24	22.68	22.41	22.23	0-2	2
		12	0	21.54	21.36	21.32	0-3	3
		12	6	21.50	21.35	21.23	0-3	3
		12	11	21.47	21.34	21.21	0-3	3
		25	0	21.45	21.26	21.19	0-3	3

LTE Band 12 _ 10 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				23095 Ch. 707.5 MHz		
10 MHz	QPSK	1	0	24.43	0	0
		1	24	24.36	0	0
		1	49	24.33	0	0
		25	0	23.45	0-1	1
		25	12	23.40	0-1	1
		25	24	23.41	0-1	1
		50	0	23.63	0-1	1
	16QAM	1	0	23.49	0-1	1
		1	24	23.37	0-1	1
		1	49	23.56	0-1	1
		25	0	22.36	0-2	2
		25	12	22.34	0-2	2
		25	24	22.34	0-2	2
		50	0	22.49	0-2	2
	64QAM	1	0	22.41	0-2	2
		1	24	22.39	0-2	2
		1	49	22.34	0-2	2
		25	0	21.24	0-3	3
		25	12	21.26	0-3	3
		25	24	21.26	0-3	3
		50	0	21.43	0-3	3

[LTE Band 41 Conducted Power]
LTE Band 41 _ 5 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Max. Average Power [dBm]					MPR Allowed Per GPP [dB]	MPR [dB]
				39675 Ch. 2498.5 ㎒	40148 Ch. 2545.8 ㎒	40620 Ch. 2593.0 ㎒	41093 Ch. 2640.3 ㎒	41565 Ch. 2687.5 ㎒		
5 ㎒	QPSK	1	0	22.33	22.54	22.87	22.48	22.50	0	0
		1	12	22.40	22.54	22.90	22.51	22.47	0	0
		1	24	22.36	22.56	22.89	22.51	22.49	0	0
		12	0	21.44	21.65	22.00	21.59	21.62	0-1	1
		12	6	21.38	21.62	22.03	21.61	21.65	0-1	1
		12	11	21.39	21.65	22.03	21.62	21.64	0-1	1
		25	0	21.44	21.70	22.05	21.64	21.64	0-1	1
	16QAM	1	0	21.40	21.67	22.07	21.46	21.57	0-1	1
		1	12	21.42	21.64	21.98	21.39	21.52	0-1	1
		1	24	21.38	21.71	22.06	21.43	21.60	0-1	1
		12	0	20.41	20.59	21.01	20.54	20.62	0-2	2
		12	6	20.35	20.56	21.03	20.56	20.65	0-2	2
		12	11	20.37	20.59	21.05	20.57	20.66	0-2	2
		25	0	20.47	20.68	21.07	20.62	20.66	0-2	2
	64QAM	1	0	20.25	20.32	20.80	20.10	20.35	0-2	2
		1	12	20.25	20.30	20.75	20.27	20.24	0-2	2
		1	24	20.22	20.38	20.79	20.31	20.31	0-2	2
		12	0	19.30	19.53	19.94	19.47	19.57	0-3	3
		12	6	19.23	19.50	19.97	19.49	19.58	0-3	3
		12	11	19.26	19.53	19.98	19.50	19.58	0-3	3
		25	0	19.39	19.62	19.98	19.57	19.60	0-3	3

LTE Band 41 _ 10 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Max. Average Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39700 Ch. 2501 ㎒	40160 Ch. 2547 ㎒	40620 Ch. 2593 ㎒	41080 Ch. 2639 ㎒	41540 Ch. 2685 ㎒		
10 ㎒	QPSK	1	0	22.37	22.65	22.93	22.57	22.57	0	0
		1	24	22.29	22.56	22.83	22.46	22.46	0	0
		1	49	22.34	22.63	22.88	22.53	22.47	0	0
		25	0	21.47	21.79	22.08	21.70	21.66	0-1	1
		25	12	21.45	21.77	22.06	21.69	21.64	0-1	1
		25	24	21.45	21.77	22.04	21.69	21.65	0-1	1
		50	0	21.51	21.83	22.12	21.73	21.69	0-1	1
	16QAM	1	0	21.37	21.60	22.03	21.52	21.64	0-1	1
		1	24	21.27	21.54	21.94	21.45	21.52	0-1	1
		1	49	21.32	21.62	21.99	21.51	21.52	0-1	1
		25	0	20.50	20.79	21.10	20.72	20.73	0-2	2
		25	12	20.46	20.76	21.08	20.69	20.70	0-2	2
		25	24	20.46	20.76	21.08	20.69	20.69	0-2	2
		50	0	20.48	20.77	21.08	20.68	20.66	0-2	2
	64QAM	1	0	20.29	20.49	20.88	20.41	20.60	0-2	2
		1	24	20.19	20.40	20.71	20.31	20.49	0-2	2
		1	49	20.23	20.48	20.76	20.41	20.45	0-2	2
		25	0	19.41	19.71	20.01	19.64	19.62	0-3	3
		25	12	19.39	19.68	19.99	19.61	19.58	0-3	3
		25	24	19.39	19.69	20.00	19.63	19.59	0-3	3
		50	0	19.44	19.73	20.03	19.65	19.61	0-3	3

LTE Band 41 _ 15 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Max. Average Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39725 Ch. 2503.5 ㎒	40173 Ch. 2548.3 ㎒	40620 Ch. 2593.0 ㎒	41068 Ch. 2637.8 ㎒	41515 Ch. 2682.5 ㎒		
15 ㎒	QPSK	1	0	22.44	22.74	22.98	22.59	22.59	0	0
		1	36	22.40	22.67	22.95	22.54	22.46	0	0
		1	74	22.40	22.74	22.93	22.56	22.48	0	0
		36	0	21.53	21.86	22.11	21.70	21.68	0-1	1
		36	18	21.51	21.85	22.09	21.68	21.67	0-1	1
		36	39	21.50	21.85	22.07	21.67	21.62	0-1	1
		75	0	21.51	21.84	22.06	21.70	21.60	0-1	1
	16QAM	1	0	21.54	21.80	22.08	21.76	21.70	0-1	1
		1	36	21.37	21.70	21.99	21.61	21.53	0-1	1
		1	74	21.40	21.80	22.03	21.72	21.54	0-1	1
		36	0	20.50	20.79	21.07	20.63	20.66	0-2	2
		36	18	20.46	20.78	21.06	20.64	20.65	0-2	2
		36	39	20.46	20.78	21.04	20.62	20.60	0-2	2
		75	0	20.50	20.82	21.06	20.67	20.63	0-2	2
	64QAM	1	0	20.30	20.58	20.90	20.40	20.42	0-2	2
		1	36	20.20	20.51	20.84	20.29	20.22	0-2	2
		1	74	20.26	20.60	20.86	20.42	20.28	0-2	2
		36	0	19.46	19.77	20.06	19.61	19.64	0-3	3
		36	18	19.43	19.76	20.04	19.61	19.63	0-3	3
		36	39	19.42	19.77	20.02	19.59	19.58	0-3	3
		75	0	19.47	19.80	20.05	19.66	19.63	0-3	3

LTE Band 41 _ 20 ㎒ Bandwidth

Band width	Modulation	RB Size	RB Offset	Max. Average Power [dBm]					MPR Allowed Per 3GPP [dB]	MPR [dB]
				39750 Ch. 2506.0 ㎒	40185 Ch. 2549.5 ㎒	40620 Ch. 2593.0 ㎒	41055 Ch. 2636.5 ㎒	41490 Ch. 2680.0 ㎒		
20 ㎒	QPSK	1	0	22.50	22.78	**23.00**	22.63	22.64	0	0
		1	49	22.37	22.66	22.83	22.49	22.47	0	0
		1	99	22.42	22.75	22.90	22.56	22.48	0	0
		50	0	21.61	21.97	**22.19**	21.80	21.75	0-1	1
		50	25	21.58	21.93	22.14	21.75	21.69	0-1	1
		50	49	21.58	21.94	22.12	21.76	21.70	0-1	1
		100	0	21.59	21.92	22.09	21.76	21.69	0-1	1
	16QAM	1	0	21.58	21.88	22.07	21.71	21.80	0-1	1
		1	49	21.48	21.75	21.92	21.53	21.63	0-1	1
		1	99	21.49	21.85	22.00	21.63	21.62	0-1	1
		50	0	20.59	20.92	21.16	20.76	20.73	0-2	2
		50	25	20.55	20.88	21.09	20.71	20.66	0-2	2
		50	49	20.55	20.90	21.10	20.72	20.68	0-2	2
		100	0	20.59	20.89	21.09	20.73	20.71	0-2	2
	64QAM	1	0	20.37	20.59	20.86	20.57	20.61	0-2	2
		1	49	20.20	20.51	20.72	20.41	20.47	0-2	2
		1	99	20.23	20.68	20.79	20.50	20.47	0-2	2
		50	0	19.57	19.87	20.10	19.72	19.70	0-3	3
		50	25	19.53	19.84	20.03	19.67	19.63	0-3	3
		50	49	19.53	19.85	20.03	19.68	19.63	0-3	3
		100	0	19.55	19.86	20.05	19.69	19.66	0-3	3

Note; LTE Band 41 has 5 required test channels per FCC KDB 447498 D01v06.
The EUT enables maximum power reduction in accordance with 3GPP 36.101. The MPR settings are configured during the manufacture process and are not configurable by the network, carrier, or end user.

11.3.2 LTE Reduced Conducted Power (Hotspot activated)

[LTE Band 4 Conducted Power]

LTE Band 4 _ 1.4 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19957 Ch. 1710.7 MHz	20175 Ch. 1732.5 MHz	20393 Ch. 1754.3 MHz		
1.4 MHz	QPSK	1	0	20.43	20.13	20.58	0	0
		1	3	20.46	20.15	20.65	0	0
		1	5	20.46	20.15	20.55	0	0
		3	0	20.40	20.10	20.53	0	0
		3	1	20.58	20.25	20.65	0	0
		3	3	20.47	20.20	20.59	0	0
		6	0	20.43	20.14	20.55	0-1	0
	16QAM	1	0	20.67	20.40	20.76	0-1	0
		1	3	20.55	20.26	20.58	0-1	0
		1	5	20.67	20.42	20.70	0-1	0
		3	0	20.45	20.13	20.53	0-1	0
		3	1	20.55	20.38	20.71	0-1	0
		3	3	20.55	20.22	20.62	0-1	0
		6	0	20.49	20.17	20.63	0-2	0
	64QAM	1	0	20.52	20.26	20.65	0-2	0
		1	3	20.59	20.15	20.58	0-2	0
		1	5	20.59	20.22	20.60	0-2	0
		3	0	20.46	20.21	20.58	0-2	0
		3	1	20.57	20.35	20.66	0-2	0
		3	3	20.49	20.19	20.68	0-2	0
		6	0	20.54	20.21	20.59	0-3	0

LTE Band 4 _ 3 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19965 Ch. 1711.5 MHz	20175 Ch. 1732.5 MHz	20385 Ch. 1753.5 MHz		
3 MHz	QPSK	1	0	20.46	20.13	20.61	0	0
		1	7	20.46	20.09	20.54	0	0
		1	14	20.54	20.16	20.62	0	0
		8	0	20.55	20.23	20.67	0-1	0
		8	3	20.60	20.21	20.65	0-1	0
		8	7	20.60	20.25	20.65	0-1	0
		15	0	20.60	20.29	20.71	0-1	0
	16QAM	1	0	20.63	20.41	20.77	0-1	0
		1	7	20.75	20.40	20.72	0-1	0
		1	14	20.65	20.35	20.82	0-1	0
		8	0	20.57	20.27	20.68	0-2	0
		8	3	20.55	20.21	20.61	0-2	0
		8	7	20.60	20.26	20.68	0-2	0
		15	0	20.62	20.32	20.69	0-2	0
	64QAM	1	0	20.67	20.37	20.81	0-2	0
		1	7	20.62	20.20	20.66	0-2	0
		1	14	20.73	20.24	20.68	0-2	0
		8	0	20.52	20.25	20.58	0-3	0
		8	3	20.58	20.25	20.59	0-3	0
		8	7	20.62	20.25	20.67	0-3	0
		15	0	20.58	20.28	20.60	0-3	0

LTE Band 4 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19975 Ch. 1712.5 ㎒	20175 Ch. 1732.5 ㎒	20375 Ch. 1752.5 ㎒		
5 ㎒	QPSK	1	0	20.54	20.21	20.64	0	0
		1	12	20.46	20.15	20.59	0	0
		1	24	20.48	20.17	20.62	0	0
		12	0	20.54	20.28	20.71	0-1	0
		12	6	20.57	20.30	20.73	0-1	0
		12	11	20.58	20.27	20.75	0-1	0
		25	0	20.54	20.23	20.70	0-1	0
	16QAM	1	0	20.72	20.45	20.86	0-1	0
		1	12	20.66	20.40	20.82	0-1	0
		1	24	20.62	20.49	20.92	0-1	0
		12	0	20.58	20.22	20.70	0-2	0
		12	6	20.56	20.25	20.66	0-2	0
		12	11	20.57	20.24	20.65	0-2	0
		25	0	20.57	20.21	20.67	0-2	0
	64QAM	1	0	20.71	20.46	20.76	0-2	0
		1	12	20.61	20.24	20.74	0-2	0
		1	24	20.66	20.38	20.89	0-2	0
		12	0	20.55	20.24	20.68	0-3	0
		12	6	20.53	20.22	20.69	0-3	0
		12	11	20.57	20.29	20.66	0-3	0
		25	0	20.57	20.25	20.64	0-3	0

LTE Band 4 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20000 Ch. 1715 ㎒	20175 Ch. 1732.5 ㎒	20350 Ch. 1750 ㎒		
10 ㎒	QPSK	1	0	20.44	20.23	20.59	0	0
		1	24	20.42	20.22	20.59	0	0
		1	49	20.43	20.33	20.63	0	0
		25	0	20.46	20.24	20.63	0-1	0
		25	12	20.48	20.22	20.58	0-1	0
		25	24	20.46	20.25	20.63	0-1	0
		50	0	20.47	20.28	20.67	0-1	0
	16QAM	1	0	20.55	20.51	20.82	0-1	0
		1	24	20.52	20.33	20.64	0-1	0
		1	49	20.63	20.40	20.83	0-1	0
		25	0	20.46	20.24	20.59	0-2	0
		25	12	20.49	20.22	20.62	0-2	0
		25	24	20.48	20.23	20.61	0-2	0
		50	0	20.49	20.23	20.62	0-2	0
	64QAM	1	0	20.54	20.34	20.76	0-2	0
		1	24	20.54	20.30	20.61	0-2	0
		1	49	20.49	20.35	20.58	0-2	0
		25	0	20.47	20.20	20.58	0-3	0
		25	12	20.46	20.20	20.59	0-3	0
		25	24	20.46	20.22	20.58	0-3	0
		50	0	20.51	20.29	20.63	0-3	0

LTE Band 4 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20025 Ch. 1717.5 ㎒	20175 Ch. 1732.5 ㎒	20325 Ch. 1747.5 ㎒		
15 ㎒	QPSK	1	0	20.49	20.21	20.56	0	0
		1	36	20.31	20.11	20.49	0	0
		1	74	20.43	20.27	20.61	0	0
		36	0	20.51	20.31	20.66	0-1	0
		36	18	20.51	20.28	20.66	0-1	0
		36	39	20.50	20.27	20.69	0-1	0
		75	0	20.47	20.30	20.66	0-1	0
	16QAM	1	0	20.62	20.46	20.82	0-1	0
		1	36	20.68	20.35	20.76	0-1	0
		1	74	20.72	20.51	20.76	0-1	0
		36	0	20.48	20.29	20.64	0-2	0
		36	18	20.48	20.27	20.65	0-2	0
		36	39	20.50	20.30	20.67	0-2	0
		75	0	20.49	20.27	20.63	0-2	0
	64QAM	1	0	20.58	20.37	20.79	0-2	0
		1	36	20.34	20.26	20.60	0-2	0
		1	74	20.51	20.44	20.74	0-2	0
		36	0	20.48	20.23	20.63	0-3	0
		36	18	20.47	20.28	20.61	0-3	0
		36	39	20.49	20.29	20.64	0-3	0
		75	0	20.46	20.27	20.63	0-3	0

LTE Band 4 _ 20 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				20175 Ch. 1732.5 ㎒		
20 ㎒	QPSK	1	0	20.22	0	0
		1	49	20.15	0	0
		1	99	20.24	0	0
		50	0	20.27	0-1	0
		50	25	20.24	0-1	0
		50	49	20.26	0-1	0
		100	0	20.28	0-1	0
	16QAM	1	0	20.39	0-1	0
		1	49	20.33	0-1	0
		1	99	20.55	0-1	0
		50	0	20.26	0-2	0
		50	25	20.24	0-2	0
		50	49	20.24	0-2	0
		100	0	20.25	0-2	0
	64QAM	1	0	20.36	0-2	0
		1	49	20.36	0-2	0
		1	99	20.53	0-2	0
		50	0	20.26	0-3	0
		50	25	20.23	0-3	0
		50	49	20.27	0-3	0
		100	0	20.21	0-3	0

.

11.3.3 LTE Reduced Conducted Power (Grip Sensor-on, Ear jack activated)

[LTE Band 4 Conducted Power]

LTE Band 4 _ 1.4 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19957 Ch. 1710.7 MHz	20175 Ch. 1732.5 MHz	20393 Ch. 1754.3 MHz		
1.4 MHz	QPSK	1	0	20.53	20.19	20.60	0	0
		1	3	20.55	20.23	20.64	0	0
		1	5	20.51	20.16	20.59	0	0
		3	0	20.43	20.12	20.57	0	0
		3	1	20.64	20.26	20.75	0	0
		3	3	20.55	20.24	20.61	0	0
		6	0	20.50	20.16	20.54	0-1	0
	16QAM	1	0	20.74	20.37	20.78	0-1	0
		1	3	20.58	20.31	20.74	0-1	0
		1	5	20.74	20.36	20.79	0-1	0
		3	0	20.52	20.24	20.61	0-1	0
		3	1	20.62	20.26	20.69	0-1	0
		3	3	20.58	20.35	20.65	0-1	0
		6	0	20.54	20.28	20.58	0-2	0
	64QAM	1	0	20.58	20.32	20.65	0-2	0
		1	3	20.59	20.25	20.62	0-2	0
		1	5	20.69	20.29	20.74	0-2	0
		3	0	20.52	20.26	20.57	0-2	0
		3	1	20.63	20.31	20.75	0-2	0
		3	3	20.61	20.28	20.66	0-2	0
		6	0	20.57	20.26	20.63	0-3	0

LTE Band 4 _ 3 MHz Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19965 Ch. 1711.5 MHz	20175 Ch. 1732.5 MHz	20385 Ch. 1753.5 MHz		
3 MHz	QPSK	1	0	20.54	20.21	20.62	0	0
		1	7	20.51	20.17	20.59	0	0
		1	14	20.54	20.22	20.64	0	0
		8	0	20.60	20.26	20.71	0-1	0
		8	3	20.58	20.25	20.70	0-1	0
		8	7	20.64	20.28	20.69	0-1	0
		15	0	20.67	20.33	20.71	0-1	0
	16QAM	1	0	20.72	20.41	20.89	0-1	0
		1	7	20.83	20.48	20.84	0-1	0
		1	14	20.82	20.38	20.80	0-1	0
		8	0	20.61	20.31	20.71	0-2	0
		8	3	20.63	20.33	20.71	0-2	0
		8	7	20.61	20.33	20.70	0-2	0
		15	0	20.65	20.31	20.69	0-2	0
	64QAM	1	0	20.77	20.33	20.83	0-2	0
		1	7	20.66	20.34	20.67	0-2	0
		1	14	20.72	20.31	20.66	0-2	0
		8	0	20.62	20.30	20.70	0-3	0
		8	3	20.56	20.27	20.67	0-3	0
		8	7	20.64	20.28	20.69	0-3	0
		15	0	20.62	20.35	20.68	0-3	0

LTE Band 4 _ 5 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19975 Ch. 1712.5 ㎒	20175 Ch. 1732.5 ㎒	20375 Ch. 1752.5 ㎒		
5 ㎒	QPSK	1	0	20.60	20.23	20.69	0	0
		1	12	20.52	20.17	20.65	0	0
		1	24	20.56	20.26	20.71	0	0
		12	0	20.60	20.31	20.76	0-1	0
		12	6	20.63	20.34	20.75	0-1	0
		12	11	20.65	20.36	20.77	0-1	0
		25	0	20.58	20.31	20.75	0-1	0
	16QAM	1	0	20.77	20.33	20.78	0-1	0
		1	12	20.77	20.36	20.87	0-1	0
		1	24	20.76	20.46	20.81	0-1	0
		12	0	20.60	20.31	20.75	0-2	0
		12	6	20.63	20.31	20.72	0-2	0
		12	11	20.61	20.28	20.69	0-2	0
		25	0	20.62	20.30	20.68	0-2	0
	64QAM	1	0	20.70	20.39	20.80	0-2	0
		1	12	20.69	20.17	20.74	0-2	0
		1	24	20.83	20.46	20.91	0-2	0
		12	0	20.62	20.30	20.71	0-3	0
		12	6	20.58	20.27	20.71	0-3	0
		12	11	20.63	20.25	20.72	0-3	0
		25	0	20.61	20.24	20.69	0-3	0

LTE Band 4 _ 10 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20000 Ch. 1715 ㎒	20175 Ch. 1732.5 ㎒	20350 Ch. 1750 ㎒		
10 ㎒	QPSK	1	0	20.48	20.26	20.67	0	0
		1	24	20.49	20.28	20.66	0	0
		1	49	20.53	20.35	20.67	0	0
		25	0	20.55	20.33	20.68	0-1	0
		25	12	20.56	20.32	20.69	0-1	0
		25	24	20.54	20.34	20.68	0-1	0
		50	0	20.53	20.31	20.73	0-1	0
	16QAM	1	0	20.76	20.40	20.98	0-1	0
		1	24	20.67	20.42	20.71	0-1	0
		1	49	20.77	20.49	20.93	0-1	0
		25	0	20.52	20.27	20.64	0-2	0
		25	12	20.47	20.28	20.66	0-2	0
		25	24	20.47	20.27	20.62	0-2	0
		50	0	20.56	20.33	20.73	0-2	0
	64QAM	1	0	20.66	20.47	20.77	0-2	0
		1	24	20.67	20.33	20.76	0-2	0
		1	49	20.59	20.40	20.76	0-2	0
		25	0	20.53	20.27	20.63	0-3	0
		25	12	20.55	20.31	20.63	0-3	0
		25	24	20.55	20.30	20.67	0-3	0
		50	0	20.56	20.33	20.66	0-3	0

LTE Band 4 _ 15 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20025 Ch. 1717.5 ㎒	20175 Ch. 1732.5 ㎒	20325 Ch. 1747.5 ㎒		
15 ㎒	QPSK	1	0	20.50	20.28	20.63	0	0
		1	36	20.41	20.17	20.52	0	0
		1	74	20.47	20.29	20.69	0	0
		36	0	20.59	20.35	20.66	0-1	0
		36	18	20.56	20.34	20.70	0-1	0
		36	39	20.54	20.40	20.72	0-1	0
		75	0	20.57	20.37	20.70	0-1	0
	16QAM	1	0	20.70	20.45	20.73	0-1	0
		1	36	20.59	20.39	20.71	0-1	0
		1	74	20.72	20.42	20.85	0-1	0
		36	0	20.56	20.35	20.70	0-2	0
		36	18	20.55	20.38	20.70	0-2	0
		36	39	20.55	20.34	20.70	0-2	0
		75	0	20.54	20.32	20.70	0-2	0
	64QAM	1	0	20.71	20.48	20.76	0-2	0
		1	36	20.51	20.28	20.68	0-2	0
		1	74	20.62	20.44	20.81	0-2	0
		36	0	20.55	20.33	20.68	0-3	0
		36	18	20.58	20.35	20.70	0-3	0
		36	39	20.53	20.34	20.69	0-3	0
		75	0	20.53	20.35	20.68	0-3	0

LTE Band 4 _ 20 ㎒ Bandwidth

Bandwidth	Modulation	RB Size	RB Offset	Max. Average Power [dBm]	MPR Allowed Per 3GPP [dB]	MPR [dB]
				20175 Ch. 1732.5 ㎒		
20 ㎒	QPSK	1	0	20.26	0	0
		1	49	20.27	0	0
		1	99	20.37	0	0
		50	0	20.35	0-1	0
		50	25	20.33	0-1	0
		50	49	20.34	0-1	0
		100	0	20.36	0-1	0
	16QAM	1	0	20.54	0-1	0
		1	49	20.44	0-1	0
		1	99	20.54	0-1	0
		50	0	20.35	0-2	0
		50	25	20.30	0-2	0
		50	49	20.34	0-2	0
		100	0	20.29	0-2	0
	64QAM	1	0	20.43	0-2	0
		1	49	20.44	0-2	0
		1	99	20.54	0-2	0
		50	0	20.35	0-3	0
		50	25	20.30	0-3	0
		50	49	20.38	0-3	0
		100	0	20.32	0-3	0

The EUT enables maximum power reduction in accordance with 3GPP 36.101. The MPR settings are configured during the manufacture process and are not configurable by the network, carrier, or end user.

11.3.4 LTE Down-link Carrier Aggregation Conducted Powers

SAR test exclusion for LTE downlink Carrier Aggregation is determined by power measurements according to the number component carriers(CCs) supported by test product implementation. For those configurations required by April 2018 TCBC Workshop notes, conducted power measurements with LTE Carrier Aggregation(CA) (downlink only) active are made in accordance to KDB Publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier(s)(SCC) on the downlink only.

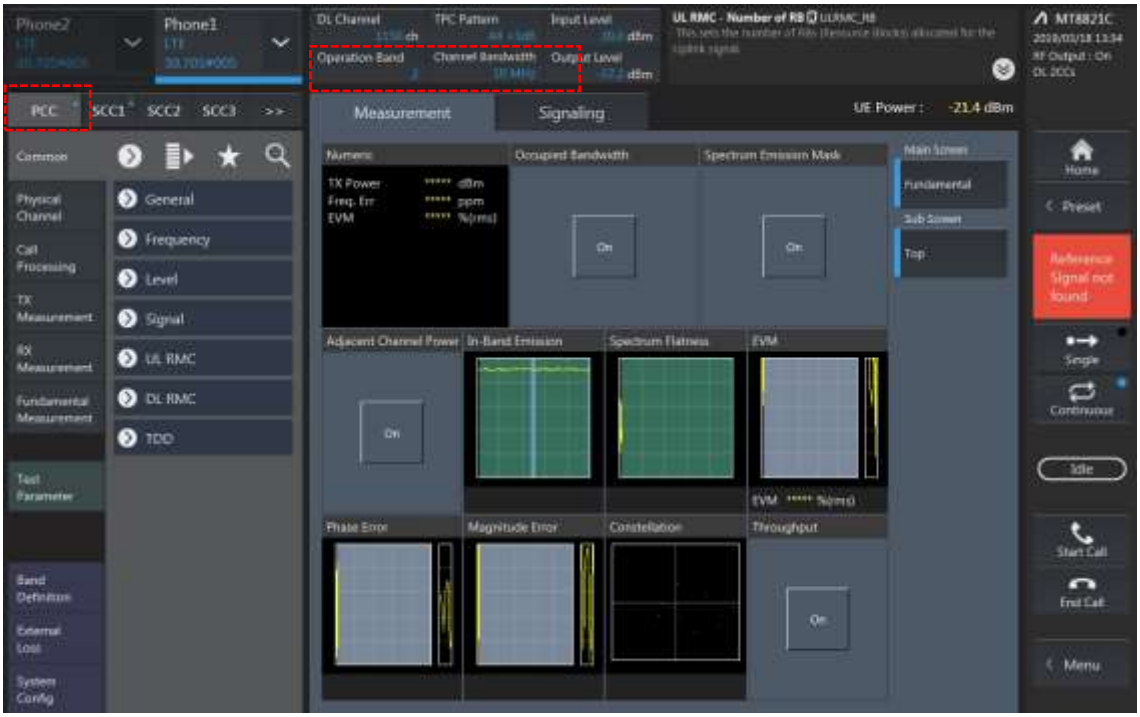
Downlink Carrier aggregation:

1. This device only supports downlink carrier aggregation. For every supported combination of downlink carrier aggregation, power measurements were performed with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.
2. All control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
3. Per FCC KDB publication 941225 D05A v01r02, Section C)3)b)ii), PCC uplink channel was selected at downlink carrier aggregation combinations. The downlink PCC channel was paired with the selected PCC uplink channel according to normal configurations without carrier aggregation.
4. For continuous intra-band carrier aggregation, the downlink channel spacing between the component carriers was set to multiple of 300kHz less than the nominal channel spacing defined in section 5.4.1A of 3GPP TS 36.521.
5. For non-continuous intra-band carrier aggregation, the downlink channel spacing between the component carriers was set to be larger than the nominal channel spacing and provided maximum separation between the component carriers.
6. All selected downlink channels remained fully within the downlink transmission band of the respective component carrier.

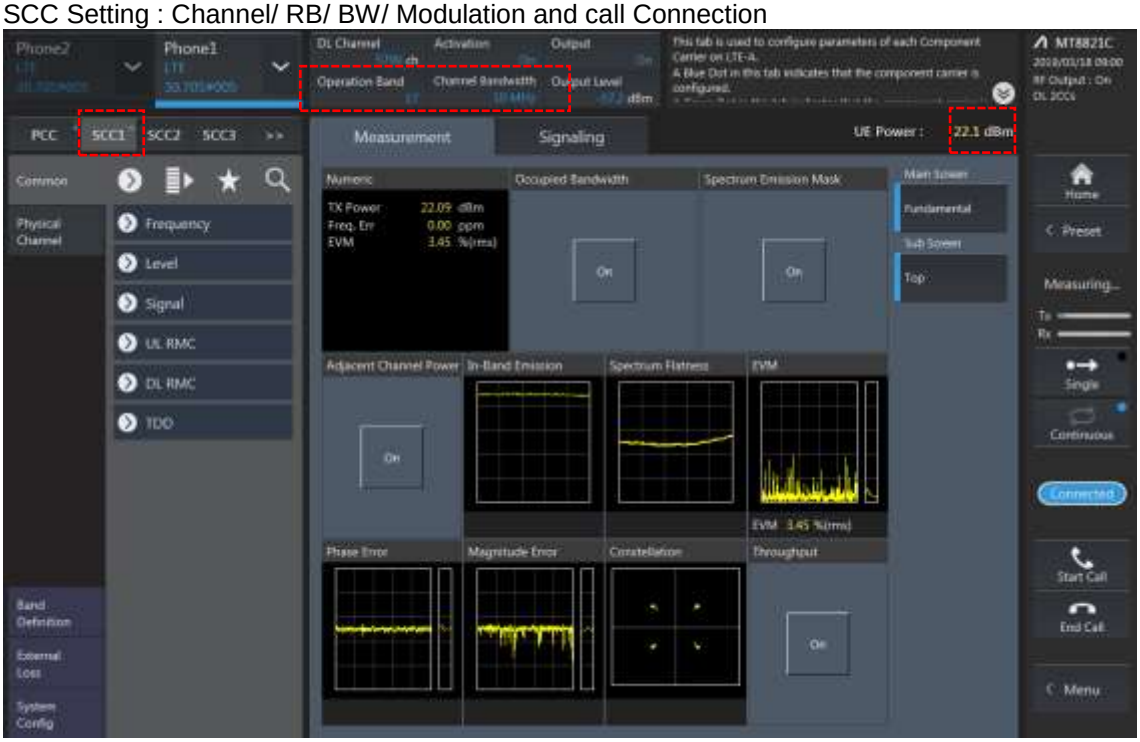
Power Measurement setup

LTE Down Link 2CA Call Setup

PCC Setting : Channel/ RB/ BW/ Modulation



SCC Setting : Channel/ RB/ BW/ Modulation and call Connection

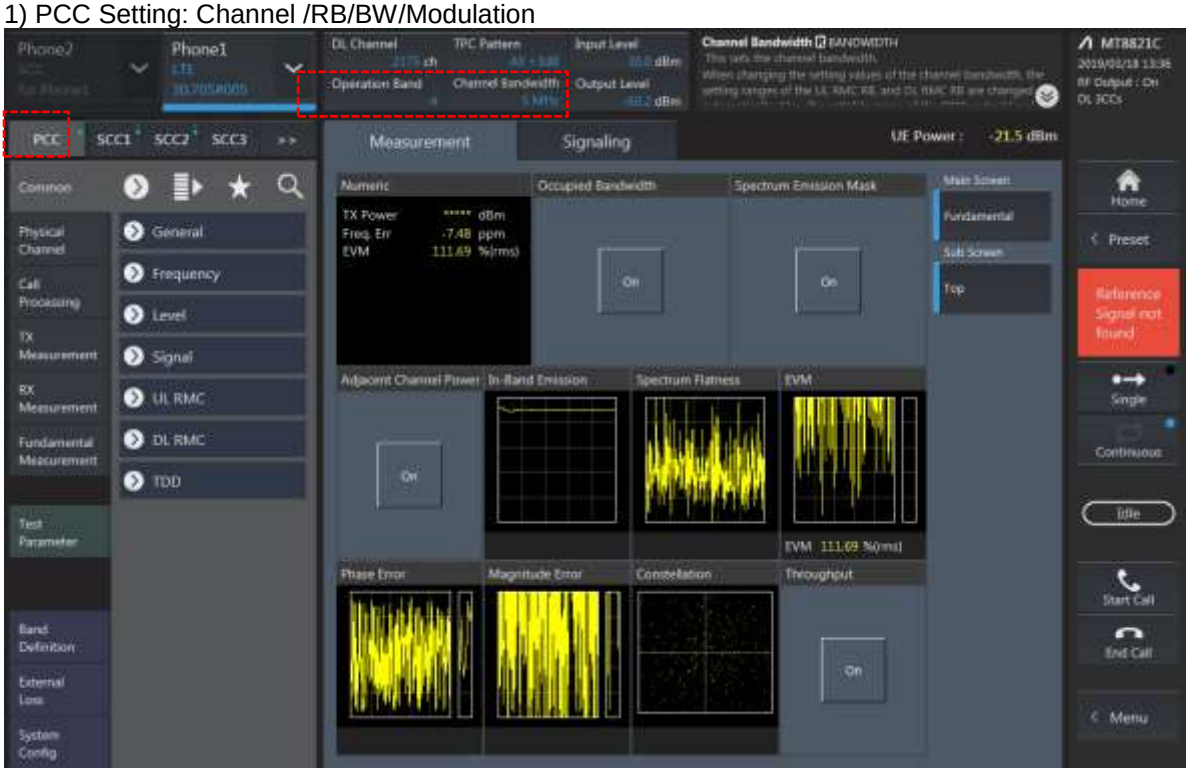


2CA Downlink Carrier aggregation conducted Powers

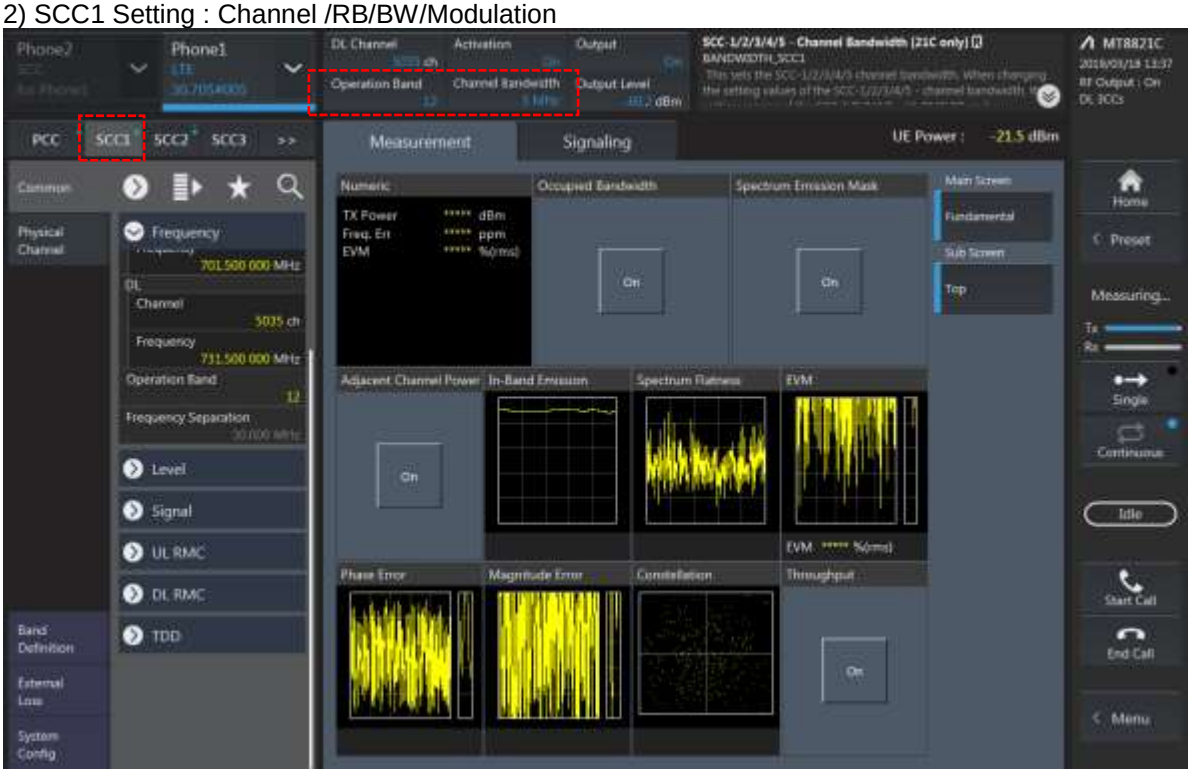
Combination	PCC									SCC				Tx Power		
	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Channel	SCC DL Frequency	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled(dBm)	Deviation (2)-(1)
41A-41A(0)	41	20	40620	2593	40620	2593	QPSK	1	0	41	20	41490	2680	23	23.16	0.16
41A-41A(1)	41	10	40620	2593	40620	2593	QPSK	1	0	41	20	41490	2680	22.93	23.09	0.16
41C(0,1,2,3)	41	20	40620	2593	40620	2593	QPSK	1	0	41	20	40383	2569.3	23	23.12	0.12

LTE Down Link 3CA Call Setup

1) PCC Setting: Channel /RB/BW/Modulation



2) SCC1 Setting : Channel /RB/BW/Modulation



3) SCC2 Setting (Channel /RB/BW/Modulation)and call Connection

3CA Downlink Carrier aggregation conducted Powers

Combination	PCC									SCC				SCC				Tx Power		
	Band	BW	PCC UL Channel	PCC UL Frequency	PCC DL Channel	PCC DL Frequency	Modulation	RB	offset	Band	BW	SCC DL Channel	SCC DL Frequency	Band	BW	SCC DL Channel	SCC DL Frequency	LTE Single Carrier Tx Power (dBm)	LTE Tx Power with DL CA Enabled(dBm)	Deviation (2)-(1)
41A+41C(0,1,2,3)	41	20	40620	2593	40620	2593	QPSK	1	0	41	20	41292	2660.2	41	20	41490	2680	23	23.09	0.09
41C+41A	41	20	40620	2593	40620	2593	QPSK	1	0	41	20	40383	2569.3	41	20	39750	2506	23	23.12	0.12
41D(0)	41	20	40620	2593	40620	2593	QPSK	1	0	41	20	40383	2569.3	41	20	40185	2549.5	23	23.13	0.13

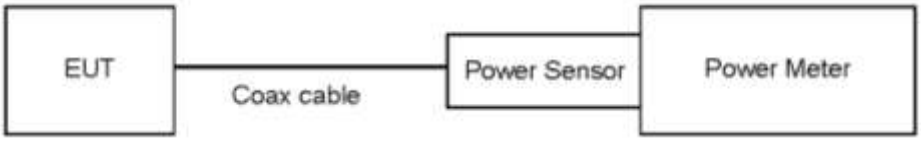
11.4 WIFI Conducted Power measurement method

Un-Licensed bands (DTS Band)

Test Description	Test Procedure Used
Conducted Output Power	- KDB 558074 v05 - Section 8.3.2.3 - ANSI 63.10-2013 - Section 11.9.2.3

Test Procedure
1. Measure the duty cycle.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Test setup

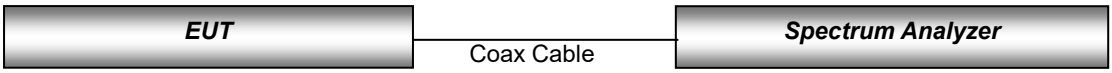


Un-Licensed bands (NII Band)

Test Description	Test Procedure Used
Conducted Output Power	- KDB 789033 D02 v02r01 - Section E.3.a

Test Procedure
1. Measure the duty cycle.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Test setup



11.4.1 IEEE 802.11 (2.4 GHz) Maximum Conducted Power

Mode	Frequency [MHz]	Channel	IEEE 802.11 (2.4 GHz) Average RF Conducted Power [dBm]
802.11b	2 412	1	17.88
	2 437	6	17.95
	2 462	11	17.85
	2 467	12	6.97
	2 472	13	6.38
802.11g	2 412	1	13.54
	2 417	2	15.59
	2 437	6	16.39
	2 462	11	13.43
	2 467	12	7.45
	2 472	13	6.95
802.11n (HT20)	2 412	1	13.22
	2 437	6	15.12
	2 462	11	13.23
	2 467	12	5.29
	2 472	13	5.81

11.4.2 IEEE 802.11 (2.4 GHz) Reduced Conducted Power (Held to ear VOIP)

Mode	Frequency [MHz]	Channel	IEEE 802.11 (2.4 GHz) Reduced Average Conducted Power [dBm]
802.11b	2 412	1	10.91
	2 437	6	10.88
	2 462	11	10.26
	2 467	12	6.97
	2 472	13	6.38
802.11g	2 412	1	10.51
	2 437	6	10.57
	2 462	11	10.07
	2 467	12	7.45
	2 472	13	6.95
802.11n (HT20)	2 412	1	9.70
	2 437	6	10.20
	2 462	11	9.59
	2 467	12	5.29
	2 472	13	5.81

11.4.3 IEEE 802.11 (5 GHz) Maximum Conducted Power

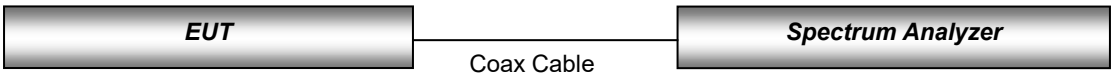
Mode	Frequency [MHz]	Channel	IEEE 802.11 (5 GHz) Average RF Conducted Power [dBm]
802.11a (20 MHz BW)	5 180	36	15.67
	5 200	40	15.67
	5 220	44	15.63
	5 240	48	15.68
	5 260	52	15.88
	5 280	56	15.73
	5 300	60	15.74
	5 320	64	15.40
	5 500	100	13.41
	5 600	120	14.74
	5 620	124	14.63
	5 720	144	14.80
	5 745	149	15.21
	5 785	157	15.14
	5 825	165	15.00

11.4.4 IEEE 802.11 (5 GHz) Maximum Conducted Power

Mode	Frequency [MHz]	Channel	IEEE 802.11 (5 GHz) Reduced Average Conducted Power [dBm]
802.11ac (80 MHz BW)	5 210	42	11.42
	5 290	58	11.50
	5 530	106	10.59
	5 610	122	10.92
	5 690	138	10.68
	5 775	155	11.03

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 mode 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.

Test Configuration

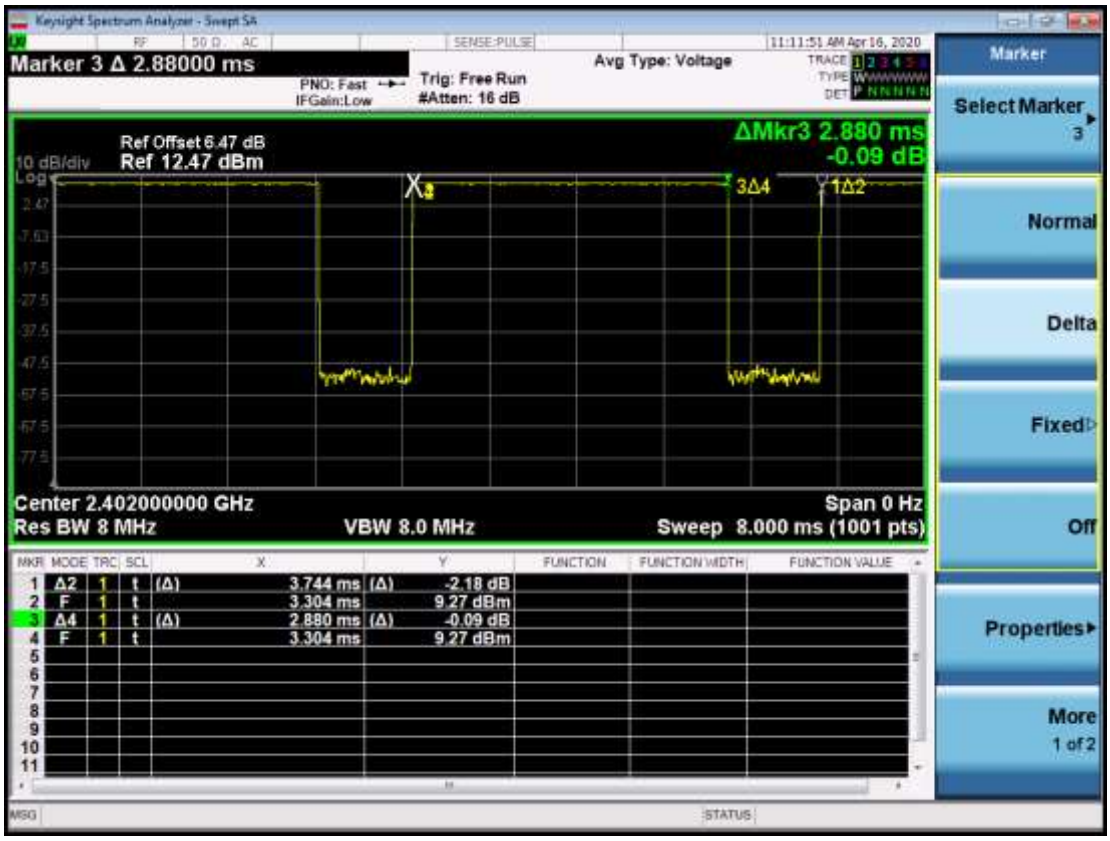


11.5 Bluetooth Conducted Power

The Burst averaged-conducted power

Mode	Channel	Bluetooth Power [dBm]
DH5	0	9.37
	39	9.53
	78	9.77
2-DH5	0	7.37
	39	7.45
	78	7.58
3-DH5	0	7.38
	39	7.44
	78	7.58

Per October 2016 TCB Workshop Notes:
When call box and Bluetooth protocol are used for Bluetooth SAR measurement, time-domain plot is required to identify duty factor for supporting the test setup and result.
Bluetooth duty cycle was measured using Bluetooth tester equipment (CBT / R&S) with Bluetooth DH5 mode.



Duty Cycle

= (BT-On time /BT-Full time) =(2.880/3.744) = 0.769 (DH5)

Duty factor= 1/Duty cycle : 1.300

12. System Verification

12.1 Tissue Verification

The body simulating material is calibrated by HCT using the DAKS 3.5 to determine the conductivity and permittivity.

Table for Head Tissue Verification									
Date of Tests	Tissue Temp. (°C)	Tissue Type	Freq. (MHz)	Measured Conductivity σ (S/m)	Measured Dielectric Constant, ε_r	Target Conductivity σ (S/m)	Target Dielectric Constant, ε_r	% dev σ	% dev ε
03/20/2020	23.0	750H	705	0.852	42.367	0.889	42.174	-4.16%	0.46%
			710	0.857	42.260	0.890	42.148	-3.71%	0.27%
			750	0.899	41.741	0.893	41.940	0.67%	-0.47%
03/20/2020	23.0	835H	820	0.923	42.552	0.899	41.577	2.67%	2.35%
			835	0.938	42.364	0.900	41.500	4.22%	2.08%
			850	0.951	42.174	0.916	41.500	3.82%	1.62%
03/20/2020	20.1	1800H	1710	1.306	40.447	1.348	40.144	-3.12%	0.75%
			1750	1.342	40.362	1.371	40.080	-2.12%	0.70%
			1800	1.385	40.196	1.400	40.000	-1.07%	0.49%
03/20/2020	21.4	1900H	1850	1.365	38.302	1.400	40.000	-2.50%	-4.25%
			1900	1.417	38.117	1.400	40.000	1.21%	-4.71%
			1910	1.429	38.060	1.400	40.000	2.07%	-4.85%
04/09/2020	22.5	2450H	2400	1.746	39.798	1.756	39.290	-0.57%	1.29%
			2450	1.810	39.645	1.800	39.200	0.56%	1.14%
			2500	1.862	39.485	1.855	39.140	0.38%	0.88%
03/25/2020	21.0	2450H	2400	1.751	39.149	1.756	39.290	-0.28%	-0.36%
			2450	1.809	38.937	1.800	39.200	0.50%	-0.67%
			2500	1.859	38.700	1.855	39.140	0.22%	-1.12%
03/23/2020	20.1	2600H	2500	1.853	38.257	1.855	39.140	-0.11%	-2.26%
			2600	1.943	37.874	1.964	39.010	-1.07%	-2.91%
			2690	2.050	37.534	2.062	38.894	-0.58%	-3.50%
04/08/2020	20.3	5180H-5825H	5180	4.532	37.236	4.635	36.010	-2.22%	3.40%
			5250	4.615	37.118	4.706	35.930	-1.93%	3.31%
			5280	4.640	37.080	4.737	35.894	-2.05%	3.30%
			5320	4.689	37.022	4.778	35.846	-1.86%	3.28%
			5500	4.888	36.752	4.963	35.640	-1.51%	3.12%
			5600	5.007	36.626	5.065	35.530	-1.15%	3.08%
			5750	5.178	36.369	5.219	35.360	-0.79%	2.85%
			5800	5.217	36.288	5.270	35.300	-1.01%	2.80%
			5825	5.240	36.250	5.296	35.270	-1.06%	2.78%

Table for Body Tissue Verification									
Date of Tests	Tissue Temp. (°C)	Tissue Type	Freq. (MHz)	Measured Conductivity σ (S/m)	Measured Dielectric Constant, ε_r	Target Conductivity σ (S/m)	Target Dielectric Constant, ε_r	% dev σ	% dev ε
03/20/2020	20.6	750B	705	0.915	54.924	0.959	55.710	-4.59%	-1.41%
			710	0.920	54.860	0.960	55.690	-4.17%	-1.49%
			750	0.961	54.383	0.963	55.530	-0.21%	-2.07%
04/06/2020	21.1	835B	820	0.943	53.609	0.969	55.260	-2.68%	-2.99%
			835	0.959	53.410	0.970	55.200	-1.13%	-3.24%
			850	0.971	53.172	0.988	55.150	-1.72%	-3.59%
03/20/2020	20.1	835B	820	0.943	56.615	0.969	55.260	-2.68%	2.45%
			835	0.962	56.469	0.970	55.200	-0.82%	2.30%
			850	0.971	56.361	0.988	55.150	-1.72%	2.20%
03/20/2020	20.6	835B	820	0.941	53.560	0.969	55.260	-2.89%	-3.08%
			835	0.960	53.387	0.970	55.200	-1.03%	-3.28%
			850	0.973	53.220	0.988	55.150	-1.52%	-3.50%
04/10/2020	22.3	1800B	1710	1.426	54.914	1.463	53.534	-2.53%	2.58%
			1750	1.468	54.830	1.488	53.430	-1.34%	2.62%
			1800	1.520	54.651	1.520	53.300	0.00%	2.53%
04/14/2020	22.8	1800B	1710	1.410	53.878	1.463	53.534	-3.62%	0.64%
			1750	1.443	53.846	1.488	53.430	-3.02%	0.78%
			1800	1.491	53.723	1.520	53.300	-1.91%	0.79%
04/06/2020	21.1	1900B	1850	1.481	53.601	1.520	53.300	-2.57%	0.56%
			1900	1.524	53.518	1.520	53.300	0.26%	0.41%
			1910	1.539	53.581	1.520	53.300	1.25%	0.53%
04/20/2020	20.1	1900B	1850	1.482	53.609	1.520	53.300	-2.50%	0.58%
			1900	1.527	53.518	1.520	53.300	0.46%	0.41%
			1910	1.542	53.539	1.520	53.300	1.45%	0.45%
04/09/2020	22.5	2450B	2400	1.871	53.671	1.902	52.770	-1.63%	1.71%
			2450	1.946	53.619	1.950	52.700	-0.21%	1.74%
			2500	2.002	53.504	2.021	52.640	-0.94%	1.64%
03/25/2020	21.0	2450B	2400	1.906	52.764	1.902	52.770	0.21%	-0.01%
			2450	1.968	52.624	1.950	52.700	0.92%	-0.14%
			2500	2.026	52.458	2.021	52.640	0.25%	-0.35%
03/24/2020	20.2	2600B	2500	1.957	55.095	2.021	52.640	-3.17%	4.66%
			2600	2.078	54.778	2.163	52.510	-3.93%	4.32%
			2690	2.186	54.523	2.291	52.394	-4.58%	4.06%
04/08/2020	20.7	5180B-5825B	5180	5.408	48.962	5.276	49.038	2.50%	-0.15%
			5250	5.382	48.589	5.358	48.950	0.45%	-0.74%
			5280	5.483	49.346	5.393	48.908	1.67%	0.90%
			5320	5.479	48.286	5.439	48.852	0.74%	-1.16%
			5500	5.688	48.870	5.650	48.610	0.67%	0.53%
			5600	5.926	48.396	5.766	48.470	2.77%	-0.15%
			5750	6.124	48.463	5.942	48.270	3.06%	0.40%
			5800	5.750	48.544	6.000	48.200	-4.17%	0.71%
			5825	5.916	48.178	6.029	48.165	-1.87%	0.03%

12.2 System Verification

Input Power: 50 mW

Freq. [MHz]	Date	Probe (S/N)	Dipole (S/N)	Liquid	Amb. Temp. [°C]	Liquid Temp. [°C]	1 W Target SAR_{1g} (SPEAG) [W/kg]	50mW Measured SAR_{1g} [W/kg]	1 W Normalized SAR_{1g} [W/kg]	Deviation [%]	Limit [%]
750	03/20/2020	7370	1014	Head	23.2	23.0	8.25	0.419	8.38	+ 1.58	± 10
750	03/20/2020	3863		Body	20.8	20.6	8.48	0.413	8.26	- 2.59	± 10
835	03/20/2020	7370	441	Head	23.2	23.0	9.69	0.495	9.9	+ 2.17	± 10
835	04/06/2020	3797		Body	21.1	21.1	9.73	0.469	9.38	- 3.60	± 10
835	03/20/2020	3076		Body	20.2	20.1	9.73	0.505	10.1	+ 3.80	± 10
835	03/20/2020	3863		Body	20.8	20.6	9.73	0.475	9.5	- 2.36	± 10
1 800	03/20/2020	3076	2d015	Head	20.2	20.1	38.5	2.02	40.4	+ 4.94	± 10
1 800	04/10/2020	3863		Body	22.5	22.3	38.3	1.92	38.4	+ 0.26	± 10
1 800	04/14/2020	3968		Body	22.9	22.8	38.3	1.93	38.6	+ 0.78	± 10
1 900	03/20/2020	3797	5d061	Head	21.6	21.4	39.9	1.94	38.8	- 2.76	± 10
1 900	04/06/2020	3797		Body	21.1	21.1	39.8	2.13	42.6	+ 7.04	± 10
1 900	04/20/2020	3797		Body	20.3	20.1	39.8	1.95	39.0	- 2.01	± 10
2 450	04/09/2020	3968	743	Head	22.7	22.5	53.4	2.69	53.8	+ 0.75	± 10
2 450	03/25/2020	3863		Head	21.2	21.0	53.4	2.56	51.2	- 4.12	± 10
2 450	04/09/2020	3968		Body	22.7	22.5	51.5	2.65	53.0	+ 2.91	± 10
2 450	03/25/2020	3863		Body	21.2	21.0	51.5	2.62	52.4	+ 1.75	± 10
2 600	03/23/2020	3863	1106	Head	20.3	20.1	56.5	2.81	56.2	- 0.53	± 10
2 600	03/24/2020	3863		Body	20.4	20.2	55.1	2.83	56.6	+ 2.72	± 10
5 250	04/08/2020	7370	1107	Head	20.5	20.3	81.6	4.20	84.0	+ 2.94	± 10
5 250	04/08/2020	3967		Body	20.7	20.7	75.4	3.82	76.4	+ 1.33	± 10
5 600	04/08/2020	7370		Head	20.5	20.3	84.0	4.28	85.6	+ 1.90	± 10
5 600	04/08/2020	3967		Body	20.7	20.7	78.5	4.07	81.4	+ 3.69	± 10
5 750	04/08/2020	7370		Head	20.5	20.3	80.9	4.07	81.4	+ 0.62	± 10
5 750	04/08/2020	3967		Body	20.7	20.7	76.6	3.77	75.4	- 1.57	± 10

System Verification Results – Extremity SAR Input Power: 50 mW

Freq. [MHz]	Date	Probe (S/N)	Dipole (S/N)	Liquid	Amb. Temp. [°C]	Liquid Temp. [°C]	1 W Target SAR_{10g} (SPEAG) [W/kg]	50mW Measured SAR_{10g} [W/kg]	1 W Normalized SAR_{10g} [W/kg]	Deviation [%]	Limit [%]
1 800	04/14/2020	3968	2d015	Body	22.9	22.8	20.2	1.01	20.2	+ 0.00	± 10
1 900	04/20/2020	3797	5d061	Body	20.3	20.1	20.9	1.02	20.4	- 2.39	± 10
5 250	04/08/2020	3967	1107	Body	20.7	20.7	21.0	1.08	21.6	+ 2.86	± 10
5 600	04/08/2020	3967	1107	Body	20.7	20.7	21.8	1.15	23.0	+ 5.50	± 10

12.3 System Verification Procedure

SAR measurement was prior to assessment, the system is verified to the ± 10 % of the specifications at each frequency band by using the system verification kit. (Graphic Plots Attached)
- Cabling the system, using the verification kit equipment.
- Generate about 50 ㎽ Input level from the signal generator to the Dipole Antenna.
- Dipole antenna was placed below the flat phantom.
- The measured one-gram SAR at the surface of the phantom above the dipole feed-point should be within 10 % of the target reference value.
- The results are normalized to 1 W input power.

Note;
SAR Verification was performed according to the FCC KDB 865664 D01v01r04.

13. SAR Test Data Summary

13.1 SAR Measurement Results

GSM 850 Head SAR											
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dB)	(dB)	(dB)			(W/kg)		(W/kg)	
824.2	128	GSM	33.5	33.44	-0.08	Left Cheek	1:8.3	0.076	1.014	0.077	-
824.2	128	GSM	33.5	33.44	0.02	Left Tilt	1:8.3	0.045	1.014	0.046	-
824.2	128	GSM	33.5	33.44	0.10	Right Cheek	1:8.3	0.112	1.014	**0.114**	1
824.2	128	GSM	33.5	33.44	0.01	Right Tilt	1:8.3	0.042	1.014	0.043	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Head 1.6 W/kg Averaged over 1 gram					

GSM 1900 Head SAR											
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dB)	(dB)	(dB)			(W/kg)		(W/kg)	
1 880	661	GSM	31.5	30.48	-0.12	Left Cheek	1:8.3	0.059	1.265	**0.075**	2
1 880	661	GSM	31.5	30.48	-0.04	Left Tilt	1:8.3	0.045	1.265	0.057	-
1 880	661	GSM	31.5	30.48	0.17	Right Cheek	1:8.3	0.043	1.265	0.054	-
1 880	661	GSM	31.5	30.48	0.01	Right Tilt	1:8.3	0.028	1.265	0.035	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Head 1.6 W/kg Averaged over 1 gram					

WCDMA 850 Head SAR											
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dB)	(dB)	(dB)			(W/kg)		**(W/kg)**	
836.6	4183	RMC	24.5	24.08	-0.09	Left Cheek	1:1	0.112	1.102	0.123	-
836.6	4183	RMC	24.5	24.08	0.01	Left Tilt	1:1	0.063	1.102	0.069	-
836.6	4183	RMC	24.5	24.08	0.10	Right Cheek	1:1	0.151	1.102	**0.166**	3
836.6	4183	RMC	24.5	24.08	0.12	Right Tilt	1:1	0.065	1.102	0.072	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Head 1.6 W/kg (mW/g) Averaged over 1 gram					

WCDMA 1900 Head SAR											
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dB)	(dB)	(dB)			(W/kg)		**(W/kg)**	
1 880	9400	RMC	24.5	23.08	0.05	Left Cheek	1:1	0.141	1.387	**0.196**	4
1 880	9400	RMC	24.5	23.08	0.01	Left Tilt	1:1	0.066	1.387	0.092	-
1 880	9400	RMC	24.5	23.08	-0.10	Right Cheek	1:1	0.093	1.387	0.129	-
1 880	9400	RMC	24.5	23.08	0.06	Right Tilt	1:1	0.066	1.387	0.092	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Head 1.6 W/kg (mW/g) Averaged over 1 gram					

LTE Band 4 Head SAR																
Frequency		Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	MPR	RB Size	RB offset	Duty Cycle	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(dBm)	(dBm)	(dB)		(dB)				(W/kg)		(W/kg)	
1 732.5	20175	QPSK	20	24.5	23.27	0.11	Left Cheek	0	1	99	1:1	0.130	1.327	**0.173**	5
1 732.5	20175	QPSK	20	23.5	22.35	0.17	Left Cheek	1	50	0	1:1	0.110	1.303	0.143	-
1 732.5	20175	QPSK	20	24.5	23.27	0.01	Left Tilt	0	1	99	1:1	0.090	1.327	0.119	-
1 732.5	20175	QPSK	20	23.5	22.35	0.06	Left Tilt	1	50	0	1:1	0.072	1.303	0.094	-
1 732.5	20175	QPSK	20	24.5	23.27	0.16	Right Cheek	0	1	99	1:1	0.099	1.327	0.131	-
1 732.5	20175	QPSK	20	23.5	22.35	0.12	Right Cheek	1	50	0	1:1	0.081	1.303	0.106	-
1 732.5	20175	QPSK	20	24.5	23.27	-0.15	Right Tilt	0	1	99	1:1	0.081	1.327	0.107	-
1 732.5	20175	QPSK	20	23.5	22.35	0.04	Right Tilt	1	50	0	1:1	0.069	1.303	0.090	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Head 1.6 W/kg Averaged over 1 gram								

LTE Band 5 Head SAR																
Frequency		Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	MPR	RB Size	RB offset	Duty Cycle	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(dBm)	(dBm)	(dB)		(dB)				(W/kg)		(W/kg)	
836.5	20525	QPSK	10	25.3	24.75	0.02	Left Cheek	0	1	0	1:1	0.139	1.135	0.158	-
836.5	20525	QPSK	10	24.3	23.79	-0.16	Left Cheek	1	25	12	1:1	0.104	1.125	0.117	-
836.5	20525	QPSK	10	25.3	24.75	-0.08	Left Tilt	0	1	0	1:1	0.091	1.135	0.103	-
836.5	20525	QPSK	10	24.3	23.79	-0.08	Left Tilt	1	25	12	1:1	0.057	1.125	0.064	-
836.5	20525	QPSK	10	25.3	24.75	0.16	Right Cheek	0	1	0	1:1	0.177	1.135	**0.201**	6
836.5	20525	QPSK	10	24.3	23.79	0.16	Right Cheek	1	25	12	1:1	0.138	1.125	0.155	-
836.5	20525	QPSK	10	25.3	24.75	0.06	Right Tilt	0	1	0	1:1	0.086	1.135	0.098	-
836.5	20525	QPSK	10	24.3	23.79	-0.03	Right Tilt	1	25	12	1:1	0.068	1.125	0.077	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Head 1.6 W/kg Averaged over 1 gram								

LTE Band 12 Head SAR															
Frequency		Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	MPR	RB Size	RB offset	Duty Cycle	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(dBm)	(dBm)	(dB)		(dB)				(W/kg)		(W/kg)	
707.5	23095	QPSK	10	25.0	24.43	-0.14	Left Cheek	0	1	0	1:1	0.065	1.140	0.074	-
707.5	23095	QPSK	10	24.0	23.45	0.19	Left Cheek	1	25	0	1:1	0.050	1.135	0.057	-
707.5	23095	QPSK	10	25.0	24.43	-0.03	Left Tilt	0	1	0	1:1	0.032	1.140	0.036	-
707.5	23095	QPSK	10	24.0	23.45	0.07	Left Tilt	1	25	0	1:1	0.023	1.135	0.026	-
707.5	23095	QPSK	10	25.0	24.43	0.03	Right Cheek	0	1	0	1:1	0.082	1.140	**0.093**	7
707.5	23095	QPSK	10	24.0	23.45	0.17	Right Cheek	1	25	0	1:1	0.063	1.135	0.072	-
707.5	23095	QPSK	10	25.0	24.43	0.06	Right Tilt	0	1	0	1:1	0.031	1.140	0.035	-
707.5	23095	QPSK	10	24.0	23.45	0.11	Right Tilt	1	25	0	1:1	0.023	1.135	0.026	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Head 1.6 W/kg Averaged over 1 gram								

LTE TDD Band 41 Head SAR															
Frequency		Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	MPR	RB Size	RB offset	Duty Cycle	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(dBm)	(dBm)	(dB)		(dB)				(W/kg)		(W/kg)	
2 593	40620	QPSK	20	23.7	23.00	-0.12	Left Cheek	0	1	0	1:1.58	0.057	1.175	**0.067**	8
2 593	40620	QPSK	20	22.7	22.19	0.11	Left Cheek	1	50	0	1:1.58	0.047	1.125	0.053	-
2 593	40620	QPSK	20	23.7	23.00	0.12	Left Tilt	0	1	0	1:1.58	0.022	1.175	0.026	-
2 593	40620	QPSK	20	22.7	22.19	0.01	Left Tilt	1	50	0	1:1.58	0.017	1.125	0.019	-
2 593	40620	QPSK	20	23.7	23.00	0.01	Right Cheek	0	1	0	1:1.58	0.042	1.175	0.049	-
2 593	40620	QPSK	20	22.7	22.19	0.01	Right Cheek	1	50	0	1:1.58	0.034	1.125	0.038	-
2 593	40620	QPSK	20	23.7	23.00	-0.11	Right Tilt	0	1	0	1:1.58	0.039	1.175	0.046	-
2 593	40620	QPSK	20	22.7	22.19	-0.16	Right Tilt	1	50	0	1:1.58	0.033	1.125	0.037	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Head 1.6 W/kg Averaged over 1 gram								

DTS Head SAR															
Frequency		Mode	Band width	Data Rate	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Area Scan Peak SAR	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(Mbps)	(dBm)	(dBm)	(dB)			(W/kg)	(W/kg)		(Duty)	(W/kg)	
2 412	1	802.11b	20	1	12	10.91		Left Cheek	99.38	0.0887		1.285	1.006		-
2 412	1	802.11b	20	1	12	10.91		Left Tilt	99.38	0.0793		1.285	1.006		-
2 412	1	802.11b	20	1	12	10.91	0.10	Right Cheek	99.38	0.379	0.182	1.285	1.006	**0.235**	9
2 412	1	802.11b	20	1	12	10.91		Right Tilt	99.38	0.208		1.285	1.006		-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg Averaged over 1 gram							

NII Head SAR															
Frequency		Mode	Band width	Data Rate	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Area Scan Peak SAR	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(Mbps)	(dBm)	(dBm)	(dB)			(W/kg)	(W/kg)		(Duty)	(W/kg)	
5 290	58	802.11ac	80	MCS0	12	11.50		Left Cheek	85.12	0.189		1.122	1.175		-
5 290	58	802.11ac	80	MCS0	12	11.50		Left Tilt	85.12	0.0906		1.122	1.175		-
5 290	58	802.11ac	80	MCS0	12	11.50	0.09	Right Check	85.12	0.799	0.274	1.122	1.175	0.361	-
5 290	58	802.11ac	80	MCS0	12	11.50		Right Tilt	85.12	0.330		1.122	1.175		-
5 610	122	802.11ac	80	MCS0	12	10.92		Left Cheek	85.12	0.257		1.282	1.175		-
5 610	122	802.11ac	80	MCS0	12	10.92		Left Tilt	85.12	0.125		1.282	1.175		-
5 610	122	802.11ac	80	MCS0	12	10.92	0.10	Right Cheek	85.12	1.040	0.312	1.282	1.175	**0.470**	10
5 610	122	802.11ac	80	MCS0	12	10.92	0.18	Right Tilt	85.12	0.411	0.158	1.282	1.175	0.238	-
5 775	155	802.11ac	80	MCS0	12	11.03		Left Cheek	85.12	0.184		1.250	1.175		-
5 775	155	802.11ac	80	MCS0	12	11.03		Left Tilt	85.12	0.130		1.250	1.175		-
5 775	155	802.11ac	80	MCS0	12	11.03	0.13	Right Cheek	85.12	0.513	0.174	1.250	1.175	0.256	-
5 775	155	802.11ac	80	MCS0	12	11.03		Right Tilt	85.12	0.185		1.250	1.175		-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg Averaged over 1 gram							

DSS Head SAR											
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dBm)	(dBm)	(dB)		(W/kg)		(Duty)	(W/kg)	
2 480	78	Bluetooth DH5	10.5	9.77	-0.15	Left Cheek	0.025	1.183	1.300	0.038	-
2 480	78	Bluetooth DH5	10.5	9.77	0.12	Left Tilt	0.025	1.183	1.300	0.038	-
2 480	78	Bluetooth DH5	10.5	9.77	-0.14	Right Cheek	0.138	1.183	1.300	**0.212**	11
2 480	78	Bluetooth DH5	10.5	9.77	-0.14	Right Tilt	0.077	1.183	1.300	0.118	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Head 1.6 W/kg (mW/g) Averaged over 1 gram					

13.2 Body-worn SAR Measurement Results

GSM/ WCDMA Body-Worn SAR													
Frequency		Mode		Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.			(dB)	(dB)	(dB)			(mm)	(W/kg)		(W/kg)	
824.2	128	GSM 850 Voice		33.5	33.44	-0.05	Rear	1:8.3	15	0.285	1.014	**0.289**	12
824.2	128	GSM 850 Voice		33.5	33.44	-0.10	Front	1:8.3	15	0.183	1.014	0.186	-
1 880	661	GSM 1900 Voice		31.5	30.48	-0.04	Rear	1:8.3	15	0.186	1.265	0.235	-
1 880	661	GSM 1900 Voice		31.5	30.48	-0.05	Front	1:8.3	15	0.218	1.265	**0.276**	13
836.6	4183	WCDMA 850	RMC	24.5	24.08	-0.05	Rear	1:1	15	0.248	1.102	**0.273**	14
836.6	4183	WCDMA 850	RMC	24.5	24.08	0.01	Front	1:1	15	0.200	1.102	0.220	-
1 880	9400	WCDMA 1900	RMC	24.5	23.08	0.02	Rear	1:1	15	0.286	1.387	0.397	-
1 880	9400	WCDMA 1900	RMC	24.5	23.08	0.03	Front	1:1	15	0.305	1.387	**0.423**	15
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg Averaged over 1 gram						

LTE Body-Worn SAR																	
Frequency		Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	MPR	RB Size	RB offset	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(dBm)	(dBm)	(dB)		(dB)				(mm)	(W/kg)		(W/kg)	
1 732.5	20175	LTE 4 QPSK	20	24.5	23.27	-0.01	Rear	0	1	99	1:1	15	0.400	1.327	**0.531**	16
1 732.5	20175		20	23.5	22.35	-0.03	Rear	1	50	0	1:1	15	0.315	1.303	0.410	-
1 732.5	20175		20	24.5	23.27	-0.07	Front	0	1	99	1:1	15	0.386	1.327	0.512	-
1 732.5	20175		20	23.5	22.35	-0.03	Front	1	50	0	1:1	15	0.305	1.303	0.397	-
836.5	20525	LTE 5 QPSK	10	25.3	24.75	-0.06	Rear	0	1	0	1:1	15	0.279	1.135	**0.317**	17
836.5	20525		10	24.3	23.79	-0.09	Rear	1	25	12	1:1	15	0.221	1.125	0.249	-
836.5	20525		10	25.3	24.75	0.04	Front	0	1	0	1:1	15	0.223	1.135	0.253	-
836.5	20525		10	24.3	23.79	0.01	Front	1	25	12	1:1	15	0.175	1.125	0.197	-
707.5	23095	LTE 12 QPSK	10	25.0	24.43	-0.01	Rear	0	1	0	1:1	15	0.281	1.140	**0.320**	18
707.5	23095		10	24.0	23.45	-0.02	Rear	1	25	0	1:1	15	0.231	1.135	0.262	-
707.5	23095		10	25.0	24.43	-0.01	Front	0	1	0	1:1	15	0.234	1.140	0.267	-
707.5	23095		10	24.0	23.45	-0.02	Front	1	25	0	1:1	15	0.185	1.135	0.210	-
2 593	40620	LTE 41 QPSK	20	23.7	23.00	-0.16	Rear	0	1	0	1:1.58	15	0.137	1.175	0.161	-
2 593	40620		20	22.7	22.19	-0.05	Rear	1	50	0	1:1.58	15	0.115	1.125	0.129	-
2 593	40620		20	23.7	23.00	-0.10	Front	0	1	0	1:1.58	15	0.144	1.175	**0.169**	19
2 593	40620		20	22.7	22.19	-0.13	Front	1	50	0	1:1.58	15	0.121	1.125	0.136	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg Averaged over 1 gram										

DTS Body-Worn SAR																	
Frequency		Mode	Band width	Data Rate	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Distance	Area Scan Peak SAR	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(Mbps)	(dBm)	(dBm)	(dB)			(mm)	(W/kg)	(W/kg)		(Duty)	(W/kg)	
2 437	6	802.11b	20	1	19	17.95	0.18	Rear	99.38	15	0.0865	0.057	1.274	1.006	**0.073**	20
2 437	6	802.11b	20	1	19	17.95		Front	99.38	15	0.0677		1.274	1.006		-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Body 1.6 W/kg (mW/g) Averaged over 1 gram								

NII Body-Worn SAR																
Frequency		Mode	Band width	Data Rate	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Distance	Area Scan Peak SAR	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(Mbps)	(dBm)	(dBm)	(dB)			(mm)	(W/kg)	(W/kg)		(Duty)	(W/kg)	
5 260	52	802.11a	20	6	17	15.88	0.01	Rear	93.61	15	0.126	0.058	1.294	1.068	0.080	-
5 260	52	802.11a	20	6	17	15.88		Front	93.61	15	0.0992		1.294	1.068		-
5 720	144	802.11a	20	6	17	14.80	0.16	Rear	93.61	15	0.209	0.091	1.660	1.068	0.161	-
5 720	144	802.11a	20	6	17	14.80		Front	93.61	15	0.111		1.660	1.068		-
5 745	149	802.11a	20	6	17	15.21	0.07	Rear	93.61	15	0.231	0.101	1.510	1.068	**0.163**	21
5 745	149	802.11a	20	6	17	15.21		Front	93.61	15	0.116		1.510	1.068		-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Body 1.6 W/kg (mW/g) Averaged over 1 gram								

DSS Body-Worn SAR												
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Distance	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dBm)	(dBm)	(dB)		(mm)	(W/kg)		(Duty)	(W/kg)	
2 480	78	Bluetooth DH5	10.5	9.77	-0.13	Rear	15	0.00878	1.183	1.300	**0.014**	22
2 480	78	Bluetooth DH5	10.5	9.77	0.14	Front	15	0.00689	1.183	1.300	0.011	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram					

13.3 Hotspot SAR Measurement Results

GSM 850 Hotspot SAR												
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dB)	(dB)	(dB)			(mm)	(W/kg)		(W/kg)	
836.6	190	GPRS 3Tx	30.5	30.14	-0.03	Rear	1:2.77	10	0.459	1.086	**0.498**	23
836.6	190	GPRS 3Tx	30.5	30.14	-0.09	Front	1:2.77	10	0.431	1.086	0.468	-
836.6	190	GPRS 3Tx	30.5	30.14	0.09	Left	1:2.77	10	0.058	1.086	0.063	-
836.6	190	GPRS 3Tx	30.5	30.14	-0.01	Right	1:2.77	10	0.263	1.086	0.286	-
836.6	190	GPRS 3Tx	30.5	30.14	0.14	Bottom	1:2.77	10	0.356	1.086	0.387	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Body 1.6 W/kg Averaged over 1 gram						

GSM 1900 Hotspot SAR												
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dB)	(dB)	(dB)			(mm)	(W/kg)		(W/kg)	
1 880	661	GPRS 4Tx	24.0	22.78	0.12	Rear	1:2.075	10	0.263	1.324	0.348	-
1 880	661	GPRS 4Tx	24.0	22.78	0.19	Front	1:2.075	10	0.271	1.324	0.359	-
1 880	661	GPRS 4Tx	24.0	22.78	-0.15	Left	1:2.075	10	0.025	1.324	0.033	-
1 880	661	GPRS 4Tx	24.0	22.78	0.12	Right	1:2.075	10	0.040	1.324	0.053	-
1 880	661	GPRS 4Tx	24.0	22.78	0.19	Bottom	1:2.075	10	0.521	1.324	**0.690**	24
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Body 1.6 W/kg Averaged over 1 gram						

WCDMA 850 Hotspot SAR												
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dB)	(dB)	(dB)			(mm)	(W/kg)		(W/kg)	
836.6	4183	RMC	24.5	24.08	-0.04	Rear	1:1	10	0.524	1.102	**0.577**	25
836.6	4183	RMC	24.5	24.08	0.01	Front	1:1	10	0.328	1.102	0.361	-
836.6	4183	RMC	24.5	24.08	0.15	Left	1:1	10	0.054	1.102	0.060	-
836.6	4183	RMC	24.5	24.08	-0.01	Right	1:1	10	0.192	1.102	0.212	-
836.6	4183	RMC	24.5	24.08	0.18	Bottom	1:1	10	0.262	1.102	0.289	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Body 1.6 W/kg Averaged over 1 gram						

WCDMA 1900 Hotspot SAR												
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dB)	(dB)	(dB)			(mm)	(W/kg)		(W/kg)	
1 880	9400	RMC	21.5	20.02	-0.05	Rear	1:1	10	0.205	1.406	0.288	-
1 880	9400	RMC	21.5	20.02	0.06	Front	1:1	10	0.265	1.406	0.373	-
1 880	9400	RMC	21.5	20.02	-0.19	Left	1:1	10	0.025	1.406	0.035	-
1 880	9400	RMC	21.5	20.02	0.02	Right	1:1	10	0.049	1.406	0.069	-
1 880	9400	RMC	21.5	20.02	0.19	Bottom	1:1	10	0.545	1.406	**0.766**	26
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Body 1.6 W/kg Averaged over 1 gram						

LTE Band 4 Hotspot SAR																
Frequency		Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	MPR	RB Size	RB offset	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(dBm)	(dBm)	(dB)		(dB)				(mm)	(W/kg)		(W/kg)	
1 732.5	20175	QPSK	20	21.5	20.24	-0.11	Rear	0	1	99	1:1	10	0.344	1.337	0.460	-
1 732.5	20175	QPSK	20	21.5	20.27	-0.06	Rear	0	50	0	1:1	10	0.337	1.327	0.447	-
1 732.5	20175	QPSK	20	21.5	20.24	-0.18	Front	0	1	99	1:1	10	0.376	1.337	0.503	-
1 732.5	20175	QPSK	20	21.5	20.27	-0.08	Front	0	50	0	1:1	10	0.369	1.327	0.490	-
1 732.5	20175	QPSK	20	21.5	20.24	0.11	Left	0	1	99	1:1	10	0.057	1.337	0.076	-
1 732.5	20175	QPSK	20	21.5	20.27	-0.07	Left	0	50	0	1:1	10	0.059	1.327	0.078	-
1 732.5	20175	QPSK	20	21.5	20.24	0.07	Right	0	1	99	1:1	10	0.068	1.337	0.091	-
1 732.5	20175	QPSK	20	21.5	20.27	0.16	Right	0	50	0	1:1	10	0.068	1.327	0.090	-
1 732.5	20175	QPSK	20	21.5	20.24	0.07	Bottom	0	1	99	1:1	10	0.683	1.337	0.913	-
1 732.5	20175	QPSK	20	21.5	20.27	-0.07	Bottom	0	50	0	1:1	10	0.707	1.327	0.938	-
1 732.5	20175	QPSK	20	21.5	20.28	0.16	Bottom	0	100	0	1:1	10	0.728	1.324	**0.964**	27
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg Averaged over 1 gram									

LTE Band 5 Hotspot SAR																
Frequency		Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	MPR	RB Size	RB offset	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(dBm)	(dBm)	(dB)		(dB)				(mm)	(W/kg)		(W/kg)	
836.5	20525	QPSK	10	25.3	24.75	-0.05	Rear	0	1	0	1:1	10	0.532	1.135	**0.604**	28
836.5	20525	QPSK	10	24.3	23.79	-0.06	Rear	1	25	12	1:1	10	0.427	1.125	0.480	-
836.5	20525	QPSK	10	25.3	24.75	0.01	Front	0	1	0	1:1	10	0.400	1.135	0.454	-
836.5	20525	QPSK	10	24.3	23.79	0.04	Front	1	25	12	1:1	10	0.324	1.125	0.365	-
836.5	20525	QPSK	10	25.3	24.75	0.05	Left	0	1	0	1:1	10	0.056	1.135	0.064	-
836.5	20525	QPSK	10	24.3	23.79	0.13	Left	1	25	12	1:1	10	0.047	1.125	0.053	-
836.5	20525	QPSK	10	25.3	24.75	0.03	Right	0	1	0	1:1	10	0.267	1.135	0.303	-
836.5	20525	QPSK	10	24.3	23.79	0.05	Right	1	25	12	1:1	10	0.198	1.125	0.223	-
836.5	20525	QPSK	10	25.3	24.75	0.12	Bottom	0	1	0	1:1	10	0.336	1.135	0.381	-
836.5	20525	QPSK	10	24.3	23.79	0.14	Bottom	1	25	12	1:1	10	0.268	1.125	0.302	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg Averaged over 1 gram									

LTE Band 12 Hotspot SAR																	
Frequency		Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	MPR	RB Size	RB offset	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(dBm)	(dBm)	(dB)		(dB)				(mm)	(W/kg)		(W/kg)	
707.5	23095	QPSK	10	25.0	24.43	-0.05	Rear	0	1	0	1:1	10	0.485	1.140	**0.553**	29
707.5	23095	QPSK	10	24.0	23.45	-0.06	Rear	1	25	0	1:1	10	0.371	1.135	0.421	-
707.5	23095	QPSK	10	25.0	24.43	0.01	Front	0	1	0	1:1	10	0.322	1.140	0.367	-
707.5	23095	QPSK	10	24.0	23.45	-0.02	Front	1	25	0	1:1	10	0.253	1.135	0.287	-
707.5	23095	QPSK	10	25.0	24.43	0.07	Left	0	1	0	1:1	10	0.124	1.140	0.141	-
707.5	23095	QPSK	10	24.0	23.45	0.06	Left	1	25	0	1:1	10	0.104	1.135	0.118	-
707.5	23095	QPSK	10	25.0	24.43	0.07	Right	0	1	0	1:1	10	0.192	1.140	0.219	-
707.5	23095	QPSK	10	24.0	23.45	0.04	Right	1	25	0	1:1	10	0.159	1.135	0.180	-
707.5	23095	QPSK	10	25.0	24.43	0.15	Bottom	0	1	0	1:1	10	0.257	1.140	0.293	-
707.5	23095	QPSK	10	24.0	23.45	0.12	Bottom	1	25	0	1:1	10	0.199	1.135	0.226	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg Averaged over 1 gram									

LTE TDD Band 41 Hotspot SAR																	
Frequency		Mode	Band width	Tune-Up Limit	Meas. Power	Power Drift	Test Position	MPR	RB Size	RB offset	Duty Cycle	Distance	Meas. SAR	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(dBm)	(dBm)	(dB)		(dB)				(mm)	(W/kg)		(W/kg)	
2 593	40620	QPSK	20	23.7	23.00	-0.19	Rear	0	1	0	1:1.58	10	0.218	1.175	0.256	-
2 593	40620	QPSK	20	22.7	22.19	-0.08	Rear	0	50	0	1:1.58	10	0.183	1.125	0.206	-
2 593	40620	QPSK	20	23.7	23.00	0.06	Front	0	1	0	1:1.58	10	0.265	1.175	0.311	-
2 593	40620	QPSK	20	22.7	22.19	-0.18	Front	0	50	0	1:1.58	10	0.221	1.125	0.249	-
2 593	40620	QPSK	20	23.7	23.00	0.01	Left	0	1	0	1:1.58	10	0.190	1.175	0.223	-
2 593	40620	QPSK	20	22.7	22.19	-0.17	Left	0	50	0	1:1.58	10	0.155	1.125	0.174	-
2 593	40620	QPSK	20	23.7	23.00	0.18	Right	0	1	0	1:1.58	10	0.065	1.175	0.076	-
2 593	40620	QPSK	20	22.7	22.19	0.03	Right	0	50	0	1:1.58	10	0.056	1.125	0.063	-
2 593	40620	QPSK	20	23.7	23.00	0.11	Bottom	0	1	0	1:1.58	10	0.495	1.175	**0.582**	30
2 593	40620	QPSK	20	22.7	22.19	-0.01	Bottom	0	50	0	1:1.58	10	0.418	1.125	0.470	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg Averaged over 1 gram									

DTS Hotspot SAR																	
Frequency		Mode	Band width	Data Rate	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Distance	Area Scan Peak SAR	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(Mbps)	(dBm)	(dBm)	(dB)			(mm)	(W/kg)	(W/kg)		(Duty)	(W/kg)	
2 437	6	802.11b	20	1	19	17.95		Rear	99.38	10	0.162		1.274	1.006		-
2 437	6	802.11b	20	1	19	17.95		Front	99.38	10	0.153		1.274	1.006		-
2 437	6	802.11b	20	1	19	17.95	0.13	Left	99.38	10	0.286	0.170	1.274	1.006	**0.218**	31
2 437	6	802.11b	20	1	19	17.95		Top	99.38	10	0.100		1.274	1.006		-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Body 1.6 W/kg Averaged over 1 gram								

5GHz WLAN Hotspot SAR																
Frequency		Mode	Band width	Data Rate	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Distance	Area Scan Peak SAR	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(Mbps)	(dBm)	(dBm)	(dB)			(mm)	(W/kg)	(W/kg)		(Duty)	(W/kg)	
5 745	149	802.11a	20	6	17	15.21		Rear	93.61	10	0.351		1.510	1.068		-
5 745	149	802.11a	20	6	17	15.21		Front	93.61	10	0.220		1.510	1.068		-
5 745	149	802.11a	20	6	17	15.21	-0.13	Left	93.61	10	0.577	0.234	1.510	1.068	**0.377**	32
5 745	149	802.11a	20	6	17	15.21		Top	93.61	10	0.0959		1.510	1.068		-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Body 1.6 W/kg Averaged over 1 gram								

DSS Tethering SAR												
Frequency		Mode	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Distance	Meas. SAR	Scaling Factor	Scaling Factor	Scaled SAR	Plot No.
MHz	Ch.		(dBm)	(dBm)	(dB)		(mm)	(W/kg)		(Duty)	(W/kg)	
2 480	78	Bluetooth DH5	10.5	9.77	0.12	Rear	10	0.017	1.183	1.300	0.026	-
2 480	78	Bluetooth DH5	10.5	9.77	0.10	Front	10	0.015	1.183	1.300	0.023	-
2 480	78	Bluetooth DH5	10.5	9.77	0.18	Left	10	0.031	1.183	1.300	**0.048**	33
2 480	78	Bluetooth DH5	10.5	9.77	-0.16	Top	10	0.00976	1.183	1.300	0.015	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram					

13.4 Phablet SAR Measurement Considerations

Per FCC KDB 648474 D04v01r03, this device is considered a “Phablet” since the diagonal dimension is greater than 160 mm and less than 200 mm. Therefore, extremity SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR >1.2 W/kg. When hotspot mode applies, 10g SAR required only for the surfaces and edges with hotspot mode scaled to the maximum output power (including tolerance) is 1g SAR > 1.2 W/kg.

13.5 Phablet SAR Measurement Results

GSM 1900 Phablet SAR 10g													
Frequency		Mode	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	Sensor	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Scaled SAR (W/kg)	Plot No.
MHz	Ch.												
1 880	661	GPRS 4Tx	27.0	25.38	-0.06	Rear	OFF	1:2.075	8	0.377	1.452	0.547	-
1 880	661	GPRS 4Tx	27.0	25.38	0.04	Front	OFF	1:2.075	6	0.527	1.452	0.765	-
1 880	661	GPRS 4Tx	27.0	25.38	0.12	Bottom	OFF	1:2.075	12	0.441	1.452	0.640	-
1 880	661	GPRS 4Tx	27.0	25.38	0.17	Left	N/A	1:2.075	0	0.102	1.452	0.148	-
1 880	661	GPRS 4Tx	27.0	25.38	-0.01	Right	N/A	1:2.075	0	0.213	1.452	0.309	-
1 880	661	GPRS 4Tx	24.0	22.76	-0.02	Rear	ON	1:2.075	0	0.695	1.330	0.924	-
1 880	661	GPRS 4Tx	24.0	22.76	-0.12	Front	ON	1:2.075	0	0.974	1.330	**1.295**	34
1 880	661	GPRS 4Tx	24.0	22.76	0.14	Bottom	ON	1:2.075	0	0.793	1.330	1.055	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Hand 4.0 W/kg Averaged over 10 gram						

WCDMA 1900 Phablet SAR 10g													
Frequency		Mode	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	Sensor	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Scaled SAR (W/kg)	Plot No.
MHz	Ch.												
1 880.0	9400	RMC	24.5	23.08	-0.06	Rear	OFF	1:1	8	0.320	1.387	0.444	-
1 880.0	9400	RMC	24.5	23.08	-0.02	Front	OFF	1:1	6	0.527	1.387	0.731	-
1 880.0	9400	RMC	24.5	23.08	0.16	Bottom	OFF	1:1	12	0.745	1.387	1.033	-
1 880.0	9400	RMC	24.5	23.08	-0.11	Left	N/A	1:1	0	0.082	1.387	0.114	-
1 880.0	9400	RMC	24.5	23.08	-0.08	Right	N/A	1:1	0	0.163	1.387	0.226	-
1 880.0	9400	RMC	21.5	20.01	0.02	Rear	ON	1:1	0	0.826	1.409	1.164	-
1 880.0	9400	RMC	21.5	20.01	0.17	Front	ON	1:1	0	1.19	1.409	1.677	-
1 880.0	9400	RMC	21.5	20.01	0.11	Bottom	ON	1:1	0	1.21	1.409	**1.705**	35
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Hand 4.0 W/kg Averaged over 10 gram						

LTE Band 4 Phablet SAR 10g																	
Frequency		Mode	Band Width	Tune-Up Limit (dB)	Meas. Power (dB)	Power Drift (dB)	Test Position	Sensor	MPR (dB)	RB Size	RB Offset	Duty Cycle	Distance (mm)	Meas. SAR (W/kg)	Scaling Factor	Scaled SAR (W/kg)	Plot No.
MHz	Ch.																
1 732.5	20175	QPSK	20	24.5	23.27	-0.10	Rear	OFF	0	1	99	1:1	8	0.590	1.327	0.783	-
1 732.5	20175	QPSK	20	23.5	22.35	-0.09	Rear	OFF	1	50	0	1:1	8	0.462	1.303	0.602	-
1 732.5	20175	QPSK	20	24.5	23.27	-0.08	Front	OFF	0	1	99	1:1	6	0.795	1.327	1.055	-
1 732.5	20175	QPSK	20	23.5	22.35	0.01	Front	OFF	1	50	0	1:1	6	0.624	1.303	0.813	-
1 732.5	20175	QPSK	20	24.5	23.27	0.04	Bottom	OFF	0	1	99	1:1	12	0.587	1.327	0.779	-
1 732.5	20175	QPSK	20	23.5	22.35	-0.03	Bottom	OFF	1	50	0	1:1	12	0.445	1.303	0.580	-
1 732.5	20175	QPSK	20	24.5	23.27	-0.03	Left	N/A	0	1	99	1:1	0	0.219	1.327	0.291	-
1 732.5	20175	QPSK	20	23.5	22.35	0.01	Left	N/A	0	50	0	1:1	0	0.171	1.303	0.223	-
1 732.5	20175	QPSK	20	24.5	23.27	-0.09	Right	N/A	0	1	99	1:1	0	0.259	1.327	0.344	-
1 732.5	20175	QPSK	20	23.5	22.35	0.05	Right	N/A	0	50	0	1:1	0	0.200	1.303	0.261	-
1 732.5	20175	QPSK	20	21.5	20.37	0.11	Rear	ON	0	1	99	1:1	0	1.0	1.297	1.297	-
1 732.5	20175	QPSK	20	21.5	20.35	0.18	Rear	ON	0	50	0	1:1	0	1.01	1.303	1.316	-
1 732.5	20175	QPSK	20	21.5	20.37	0.10	Front	ON	0	1	99	1:1	0	1.38	1.297	1.790	-
1 732.5	20175	QPSK	20	21.5	20.35	0.16	Front	ON	0	50	0	1:1	0	1.39	1.303	1.811	-
1 732.5	20175	QPSK	20	21.5	20.37	0.07	Bottom	ON	0	1	99	1:1	0	1.60	1.297	2.075	-
1 732.5	20175	QPSK	20	21.5	20.35	0.07	Bottom	ON	0	50	0	1:1	0	1.74	1.303	**2.267**	36
1 732.5	20175	QPSK	20	21.5	20.36	0.10	Bottom	ON	0	100	0	1:1	0	1.70	1.300	2.210	-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Hand 4.0 W/kg Averaged over 10 gram									

5 GHz WLAN Phablet SAR 10g																	
Frequency		Mode	Band width	Data Rate	Tune-Up Limit	Meas. Power	Power Drift	Test Position	Duty Cycle	Distance	Area Scan Peak SAR	Meas. SAR	Scaling Factor	Scaling Factor (Duty)	Scaled SAR	Plot No.
MHz	Ch.		(MHz)	(Mbps)	(dBm)	(dBm)	(dB)			(mm)	(W/kg)	(W/kg)			(W/kg)	
5 260	52	802.11a	20	6	17	15.88		Rear	93.61	0	1.9		1.294	1.068		-
5 260	52	802.11a	20	6	17	15.88	0.10	Front	93.61	0	5.09	0.529	1.294	1.068	0.731	-
5 260	52	802.11a	20	6	17	15.88	0.14	Left	93.61	0	8.7	1.01	1.294	1.068	**1.396**	37
5 260	52	802.11a	20	6	17	15.88		Top	93.61	0	0.481		1.294	1.068		-
5 720	144	802.11a	20	6	17	14.80		Rear	93.61	0	2.88		1.660	1.068		-
5 720	144	802.11a	20	6	17	14.80		Front	93.61	0	4.93		1.660	1.068		-
5 720	144	802.11a	20	6	17	14.80	-0.18	Left	93.61	0	10.1	0.713	1.660	1.068	1.264	-
5 720	144	802.11a	20	6	17	14.80		Top	93.61	0	1.06		1.660	1.068		-
ANSI/ IEEE C95.1 - 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population										Hand 4.0 W/kg Averaged over 10 gram						

13.6 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, FCC KDB Procedure.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all 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 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.
7. Per FCC KDB 648474 D04v01r03, SAR was evaluated without a headset connected to the device. Since the standalone reported SAR was ≤ 1.2 W/kg, no additional SAR evaluation using a headset cable were required.
8. Per KDB 648474 D04v01r03, this device is considered a “Phablet” since the diagonal dimension is > 160 mm and < 200 mm. When hotspot mode applies, extremity SAR is required only for the surfaces and edges with hotspot mode scaled to the maximum output power (with tolerance) is 1 g SAR > 1.2 W/kg.. For LTE Band 41, 1 g SAR > 0.9 W/kg (=1.2*(0.6/0.8)) is applied.
9. Per FCC KDB 865664 D01v01r04, variability SAR measurement were not performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg for 1g SAR and >2 for 10g SAR Please see Section 15 for variability analysis.
10. This device utilizes power reduction for some wireless mode and technologies, as outlined in sec. 4.3 The maximum output power allowed for each transmitter and exposure condition was evaluated for SAR compliance based on expected use conditions and simultaneous scenarios.
11. During SAR testing for the Hotspot conditions per KDB 941225 D06v02r01, the actual portable hotspot operation (with actual simultaneous transmission of a transmitter with WiFi) was not activated.

GSM/GPRS Test Notes:

1. This EUT’S GSM and GPRS device class is B.
2. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
3. Justification for reduced test configurations per KDB 941225 D01v03r01: The source-based time-averaged output power was evaluated for all multi-slot operations. The multi-slot configuration with the highest frame averaged output power including tolerance was evaluated for SAR.
4. Per FCC KDB 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 1/2 dB, instead of the middle channel, the highest output power channel must be used.
5. 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.

WCDMA Notes:

1. The 12.2 kbps RMC mode is the primary mode per KDB 941225 D01v03r01.
2. WCDMA SAR 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.
3. Per FCC KDB 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 channel highest output power channel was used.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Consideration for LTE Devices in FCC KDB 941225 D05v02r05.
2. According to FCC KDB 941225 D05v02r05:
   When the reported SAR is ≤ 0.8 W/kg, testing of the 100% RB allocation and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the 1RB, 50%RB and 100%RB allocation with highest output power for that channel.
   Only one channel, and as reported SAR values for 1RB allocation and 50%RB allocation were less than 1.45W/Kg only the highest power RB offset for each allocation was required.
3. 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 target MPR is indicated alongside the SAR results.
4. When Power reduction is applied , MPR is 0
5. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator.
6. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) LTE TDD Band 41 SAR measured at the highest output power channel for each test configuration is ≤ 0.6 W/kg then testing at the other channels is not required for such test configurations.
7. TDD LTE was tested using UL-DL configuration 0 with 6 UL sub frames and 2S sub frames using extended cyclic prefix only and special sub frame configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Sec. 4, the duty factor using extended cyclic prefix is 0.633(cf=1.58).
8. Per KDB 941225 D05Av01r02, SAR for LTE Carrier Aggregation operations was not needed because the maximum average output power in LTE CA mode was not > 0.25 dB higher than the maximum output power when downlink CA was not activated.
9. SAR test reduction is applied using the following criteria:
   Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is >0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel. Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are >0.8 W/kg, testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation <1.45 W/kg. Testing for 16-QAM modulation is not required because the reported SAR for QPSK is <1.45 W/kg and its output power is not more than 0.5 dB higher than that a QPSK. Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is <1.45 W/kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

WLAN Notes:

1. For held-to-ear and hotspot operations, the initial test position procedures were applied. For initial test position, the highest extrapolated peak SAR will be used. When reported SAR for the initial test position is ≤ 0.4 W/kg for 1g SAR and ≤ 1.0 W/kg for 10g SAR, 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 results is ≤ 0.8 W/kg for 1g SAR and ≤ 2.0 W/kg for 10g SAR or all test position are measured.
2. Per KDB 2482227 D01v02r02 justification for test configurations of 2.4 ㎓ 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 ㎓ 802.11 g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR.
3. Per KDB 2482227 D01v02r02 justification for test configurations of 5 ㎓ WiFi Single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission mode were not investigated since the highest reported SAR for initial test configuration adjusted by the ration of maximum output powers is less than 1.2 W/kg for 1g SAR and less than 3.0 W/kg for 10 g SAR.
4. When the maximum reported 1g averaged SAR is ≤ 0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg or all test channels were measured.
5. The device was configured to transmit continuously at the required data rated, 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 WLAN test reports.

Bluetooth Notes:

1. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation and Tx Tests mode type. Per October 2016 TCBC Workshop Notes, the reported SAR was scaled to 100% transmission duty factor to determine compliance. Please see sec.11 for the time-domain plot and calculation for duty factor of the device.
2. Head and Bluetooth tethering SAR were evaluated for BT BR tethering applications.

14. Simultaneous SAR Analysis

This device is contains transmitters that may operate simultaneously. Therefore, simultaneous transmission analysis is required. Per KDB Publication 447498 D01v06 4.3.2, simultaneous transmission SAR test exclusion may be applied when the sum of 1g SAR and 10g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6W/kg for 1g SAR and ≤4 W/kg for 10g SAR. The different test positions in an exposure condition may be considered collectively to determine SAR exclusion according to the sum of 1g or 10g SAR.

14.1 Head SAR Simultaneous Transmission Analysis.

Simultaneous Transmission Summation Scenario with 2.4 GHz WLAN				
Exposure condition	Band	WWAN SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	∑ 1-g SAR (W/kg)
Head SAR	GSM 850	0.114	0.235	0.349
	GSM 1900	0.075	0.235	0.310
	WCDMA 850	0.166	0.235	0.401
	WCDMA 1900	0.196	0.235	0.431
	LTE Band 4	0.173	0.235	0.408
	LTE Band 5	0.201	0.235	0.436
	LTE Band 12	0.093	0.235	0.328
	LTE Band 41	0.067	0.235	0.302

Simultaneous Transmission Summation Scenario with 5 GHz WLAN				
Exposure condition	Band	WWAN SAR (W/kg)	5 GHz WLAN SAR (W/kg)	∑ 1-g SAR (W/kg)
Head SAR	GSM 850	0.114	0.470	0.584
	GSM 1900	0.075	0.470	0.545
	WCDMA 850	0.166	0.470	0.636
	WCDMA 1900	0.196	0.470	0.666
	LTE Band 4	0.173	0.470	0.643
	LTE Band 5	0.201	0.470	**0.671**
	LTE Band 12	0.093	0.470	0.563
	LTE Band 41	0.067	0.470	0.537

Simultaneous Transmission Summation Scenario with Bluetooth				
Exposure condition	Band	WWAN SAR (W/kg)	Bluetooth (W/kg)	∑ 1-g SAR (W/kg)
Head SAR	GSM 850	0.114	0.212	0.326
	GSM 1900	0.075	0.212	0.287
	WCDMA 850	0.166	0.212	0.378
	WCDMA 1900	0.196	0.212	0.408
	LTE Band 4	0.173	0.212	0.385
	LTE Band 5	0.201	0.212	0.413
	LTE Band 12	0.093	0.212	0.305
	LTE Band 41	0.067	0.212	0.279

14.2 Body-Worn SAR Simultaneous Transmission Analysis.

Simultaneous Transmission Summation Scenario with 2.4 GHz WLAN					
Exposure condition	Distance (mm)	Band	WWAN SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	∑ 1-g SAR (W/kg)
Body-worn	15	GSM 850	0.289	0.073	0.362
		GSM 1900	0.276	0.073	0.349
		WCDMA 850	0.273	0.073	0.346
		WCDMA 1900	0.423	0.073	0.496
		LTE Band 4	0.531	0.073	0.604
		LTE Band 5	0.317	0.073	0.390
		LTE Band 12	0.320	0.073	0.393
		LTE Band 41	0.169	0.073	0.242

Simultaneous Transmission Summation Scenario with 5 GHz WLAN					
Exposure condition	Distance (mm)	Band	WWAN SAR (W/kg)	5 GHz WLAN SAR (W/kg)	∑ 1-g SAR (W/kg)
Body-worn	15	GSM 850	0.289	0.163	0.452
		GSM 1900	0.276	0.163	0.439
		WCDMA 850	0.273	0.163	0.436
		WCDMA 1900	0.423	0.163	0.586
		LTE Band 4	0.531	0.163	**0.694**
		LTE Band 5	0.317	0.163	0.480
		LTE Band 12	0.320	0.163	0.483
		LTE Band 41	0.169	0.163	0.332

Simultaneous Transmission Summation Scenario with Bluetooth					
Exposure condition	Distance (mm)	Band	WWAN SAR (W/kg)	Bluetooth SAR (W/kg)	∑ 1-g SAR (W/kg)
Body-worn	15	GSM 850	0.289	0.014	0.303
		GSM 1900	0.276	0.014	0.290
		WCDMA 850	0.273	0.014	0.287
		WCDMA 1900	0.423	0.014	0.437
		LTE Band 4	0.531	0.014	0.545
		LTE Band 5	0.317	0.014	0.331
		LTE Band 12	0.320	0.014	0.334
		LTE Band 41	0.169	0.014	0.183

14.3 Hotspot SAR Simultaneous Transmission Analysis.

Simultaneous Transmission Summation Scenario with 2.4 GHz WLAN					
Exposure condition	Distance (mm)	Band	WWAN SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	∑ 1-g SAR (W/kg)
Hotspot	10	GSM 850	0.498	0.218	0.716
		GSM 1900	0.690	0.218	0.908
		WCDMA 850	0.577	0.218	0.795
		WCDMA 1900	0.766	0.218	0.984
		LTE Band 4	0.964	0.218	1.182
		LTE Band 5	0.604	0.218	0.822
		LTE Band 12	0.553	0.218	0.771
		LTE Band 41	0.582	0.218	0.800

Simultaneous Transmission Summation Scenario with 5 GHz WLAN					
Exposure condition	Distance (mm)	Band	WWAN SAR (W/kg)	5 GHz WLAN SAR (W/kg)	∑ 1-g SAR (W/kg)
Hotspot	10	GSM 850	0.498	0.377	0.875
		GSM 1900	0.690	0.377	1.067
		WCDMA 850	0.577	0.377	0.954
		WCDMA 1900	0.766	0.377	1.143
		LTE Band 4	0.964	0.377	**1.341**
		LTE Band 5	0.604	0.377	0.981
		LTE Band 12	0.553	0.377	0.930
		LTE Band 41	0.582	0.377	0.959

Simultaneous Transmission Summation Scenario with Bluetooth					
Exposure condition	Distance (mm)	Band	WWAN SAR (W/kg)	Bluetooth SAR (W/kg)	∑ 1-g SAR (W/kg)
Bluetooth Tethering	10	GSM 850	0.498	0.048	0.546
		GSM 1900	0.690	0.048	0.738
		WCDMA 850	0.577	0.048	0.625
		WCDMA 1900	0.766	0.048	0.814
		LTE Band 4	0.964	0.048	1.012
		LTE Band 5	0.604	0.048	0.652
		LTE Band 12	0.553	0.048	0.601
		LTE Band 41	0.582	0.048	0.630

14.4 Phablet SAR Simultaneous Transmission Analysis

Phablet 10g SAR Simultaneous Transmission Scenario with 5 ㎓ WLAN MIMO			
Band	WWAN SAR(W/kg)	5 ㎓ WLAN Ant.(W/kg)	∑ 10-g SAR(W/kg)
	1	2	1+2
GSM 1900	1.295	1.396	2.691
WCDMA 1900	1.705	1.396	3.101
LTE Band 4	2.267	1.396	**3.663**

14.5 Simultaneous Transmission Conclusion

The above numerical summed SAR Results are 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 IEEE1528-2013.

15. SAR Measurement Variability and Uncertainty

In accordance with KDB procedure 865664 D01v01r04 SAR measurement 100 ㎒ to 6 ㎓, SAR additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

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

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg for 1g SAR or < 2.0 W/kg for 10g SAR; steps 2) through 4) do not apply.

2) When the original highest measured 1g SAR is ≥ 0.80 W/kg or 10g SAR ≥ 2.0W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg for 1g SAR or ≥ 3.625 W/kg for 10g SAR (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg for 1g SAR or ≥3.75 W/kg for 10g SAR and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

16. Measurement Uncertainty

The measured SAR was <1.5 W/Kg for 1g SAR and <3.75 W/Kg For 10g SAR for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE1528-2013 was not required.

17. SAR Test Equipment

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
SPEAG	Triple Modular Phantom	-	N/A	N/A	N/A
SPEAG	SAM Phantom	-	N/A	N/A	N/A
HP	SAR System Control PC	-	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F12/5K9GA1/C/01	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F17/59CHA1/C/01	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F17/59RAA1/C/01	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F13/5R4XF1/C/01	N/A	N/A	N/A
Staubli	CS8Cspeag-TX90	F11/5K3RA1/C/01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F12/5K9GA1/A/01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F17/59CHA1/A/01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F17/59RAA1/A/01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F13/5R4XF1/A/01	N/A	N/A	N/A
Staubli	TX90 XLspeag	F11/5K3RA1/A/01	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	S-1206 0513	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	010963	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	011578	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	S-1338 1332	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	S-1203 0309	N/A	N/A	N/A
SPEAG	DAE4	1225	11/18/2019	Annual	11/18/2020
SPEAG	DAE3	446	07/18/2019	Annual	07/18/2020
SPEAG	DAE4	1417	02/26/2020	Annual	02/26/2021
SPEAG	DAE4	868	09/04/2019	Annual	09/04/2020
SPEAG	DAE4	648	05/23/2019	Annual	05/23/2020
SPEAG	DAE4	652	02/03/2020	Annual	02/03/2021
SPEAG	E-Field Probe EX3DV4	3797	11/28/2019	Annual	11/28/2020
SPEAG	E-Field Probe EX3DV4	7370	08/29/2019	Annual	08/29/2020
SPEAG	E-Field Probe EX3DV4	3863	05/15/2019	Annual	05/15/2020
SPEAG	E-Field Probe EX3DV4	3968	09/27/2019	Annual	09/27/2020
SPEAG	E-Field Probe EX3DV4	3967	02/25/2020	Annual	02/25/2021
SPEAG	E-Field Probe ES3DV3	3076	07/23/2019	Annual	07/23/2020
SPEAG	Dipole D750V3	1014	05/27/2019	Annual	05/27/2020
SPEAG	Dipole D835V2	441	08/23/2019	Annual	08/23/2020
SPEAG	Dipole D1800V2	2d015	09/19/2019	Annual	09/19/2020
SPEAG	Dipole D1900V2	5d061	01/21/2020	Annual	01/21/2021
SPEAG	Dipole D2450V2	743	02/20/2020	Annual	02/20/2021
SPEAG	Dipole D2600V2	1106	09/19/2019	Annual	09/19/2020
SPEAG	Dipole D5GHzV2	1107	09/26/2019	Annual	09/26/2020
Agilent	Power Meter E4419B	MY41291386	10/07/2019	Annual	10/07/2020
Agilent	Power Meter N1911A	MY45101406	09/10/2019	Annual	09/10/2020
Agilent	Power Sensor 8481A	SG1091286	10/07/2019	Annual	10/07/2020
Agilent	Power Sensor 8481A	MY41090873	10/07/2019	Annual	10/07/2020
Agilent	Power Sensor N1921A	MY55220026	09/06/2019	Annual	09/06/2020
SPEAG	DAKS 3.5	1031	04/16/2019	Annual	04/16/2020
SPEAG	DAKS 3.5	1038	03/24/2020	Annual	03/24/2021
H.P	Network Analyzer /8753ES	JP39240221	01/28/2020	Annual	01/28/2021
Agilent	WIRELESS COMMUNICATION E5515C	MY48361100	10/07/2019	Annual	10/07/2020

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
Agilent	Signal Generator N5182A	MY47070230	05/08/2019	Annual	05/08/2020
Agilent	11636B/Power Divider	58698	02/28/2020	Annual	02/28/2021
TESTO	175-H1/Thermometer	40331915309	01/29/2020	Annual	01/29/2021
TESTO	175-H1/Thermometer	40331922309	01/29/2020	Annual	01/29/2021
TESTO	175-H1/Thermometer	40332651310	01/29/2020	Annual	01/29/2021
TESTO	175-H1/Thermometer	40331949309	01/29/2020	Annual	01/29/2021
TESTO	175-H1/Thermometer	40331939309	01/29/2020	Annual	01/29/2021
EMPOWER	RF Power Amplifier	1084	07/23/2019	Annual	07/23/2020
EMPOWER	RF Power Amplifier	1011	10/08/2019	Annual	10/08/2020
MICRO LAB	LP Filter / LA-15N	10453	10/07/2019	Annual	10/07/2020
MICRO LAB	LP Filter / LA-30N	-	10/07/2019	Annual	10/07/2020
MICRO LAB	LP Filter / LA-60N	32011	10/07/2019	Annual	10/07/2020
Apitech	Attenuator (3dB) 18B-03	1	06/04/2019	Annual	06/04/2020
Agilent	Attenuator (20dB) 33340C	1642	05/08/2019	Annual	05/08/2020
Agilent	Directional Bridge	3140A03878	06/12/2019	Annual	06/12/2020
Agilent	MXA Signal Analyzer N9020A	MY50510407	10/29/2019	Annual	10/29/2020
HP	Dual Directional Coupler	16072	10/07/2019	Annual	10/07/2020
Anritsu	Radio Communication Tester MT8820C	6201074225	03/02/2020	Annual	03/02/2021
Anritsu	Radio Communication Tester MT8821C	6201502997	08/09/2019	Annual	08/09/2020
R&S	Bluetooth CBT	100272	03/02/2020	Annual	03/02/2021

* The E-field probe was calibrated by SPEAG, by the waveguide technique procedure. Dipole Verification measurement is performed by HCT Lab. before each test. The brain/body simulating material is calibrated by HCT using the DAKS 3.5 to determine the conductivity and permittivity (dielectric constant) of the brain/body-equivalent material.

18. Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the ANSI/ IEEE C95.1 - 2005.

These measurements were taken to simulate the RF effects 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 abortion and distribution of electromagnetic energy in the body are very complex phenomena the 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.

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Appendix

Please refer to test setup photo file no. as follows.

Appendix A. DUT Ant. Information & Test SETUP PHOTO
Appendix B. SAR Test Plots
Appendix C. Dipole Verification Plots
Appendix D. SAR Tissue Characterization
Appendix E. SAR System Validation
Appendix F. Probe Calibration Data
Appendix G. Dipole Calibration Data
Appendix H. Power reduction verification

End of Report

Appendix B. – SAR Test Plots

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 23.0 ℃
Ambient Temperature: 23.2 ℃
Test Date: 03/20/2020
Plot No.: 1

DU: SM-A516B/DS; Type: Bar

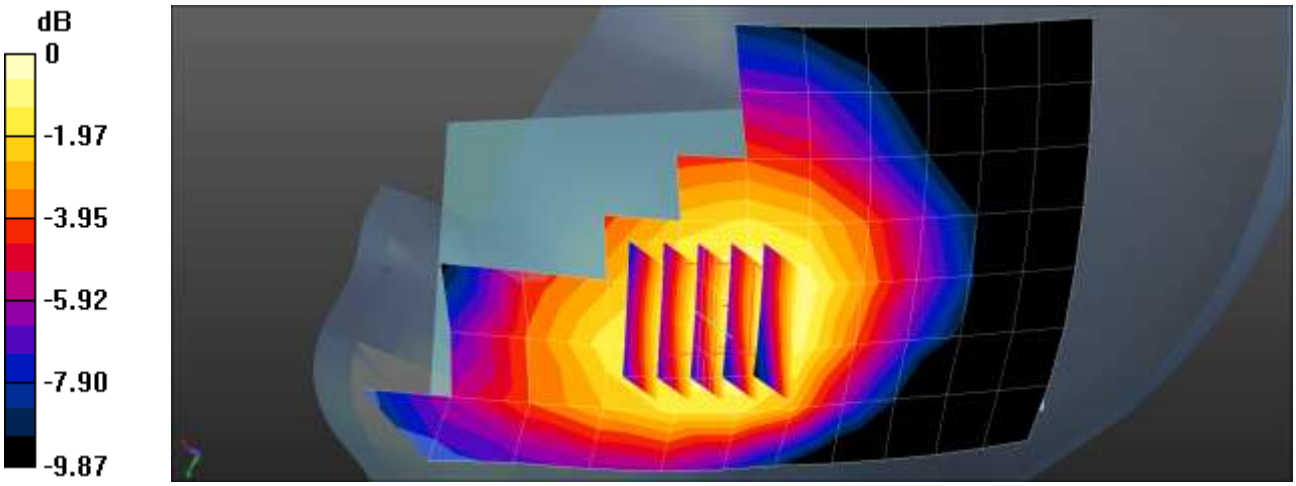
Communication System: UID 0, GSM 850 (0); Frequency: 824.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.928 S/m; ε_r = 42.5; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN7370; ConvF(9.88, 9.88, 9.88); Calibrated: 2019-08-29;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2020-02-03
- Phantom: SAM with CRP v5.0_Right
- Measurement SW: DASY52, Version 52.10 (4);

GSM850 Head Right Touch 128ch/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.133 W/kg

GSM850 Head Right Touch 128ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.826 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.148 W/kg
SAR(1 g) = 0.112 W/kg; SAR(10 g) = 0.085 W/kg



0 dB = 0.133 W/kg = -8.76 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 21.4 ℃
Ambient Temperature: 21.6 ℃
Test Date: 03/20/2020
Plot No.: 2

DUT: SM-A516B/DS; Type: Bar

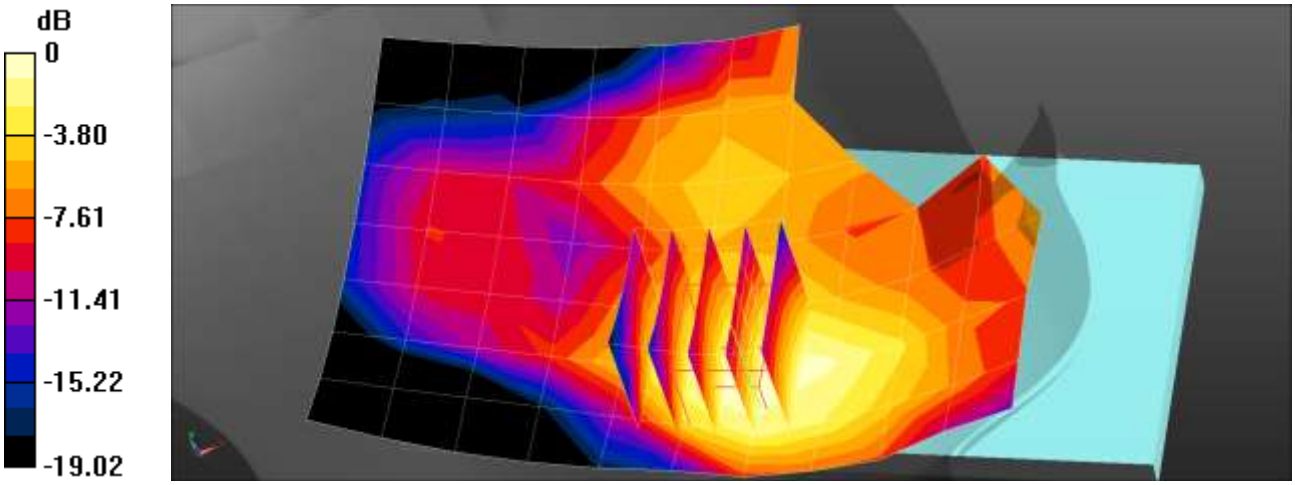
Communication System: UID 0, GSM1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.399 S/m; ε_r = 38.24; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.75, 7.75, 7.75); Calibrated: 2019-11-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: Twin-SAM V4.0 Right
- Measurement SW: DASY52, Version 52.10 (4);

GSM1900 Head Left Touch 661ch/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0733 W/kg

GSM1900 Head Left Touch 661ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.133 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.0940 W/kg
SAR(1 g) = 0.059 W/kg; SAR(10 g) = 0.036 W/kg
Maximum value of SAR (measured) = 0.0766 W/kg



0 dB = 0.0766 W/kg = -11.16 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 23.0 ℃
Ambient Temperature: 23.2 ℃
Test Date: 03/20/2020
Plot No.: 3

DUT: SM-A516B/DS; Type: Bar

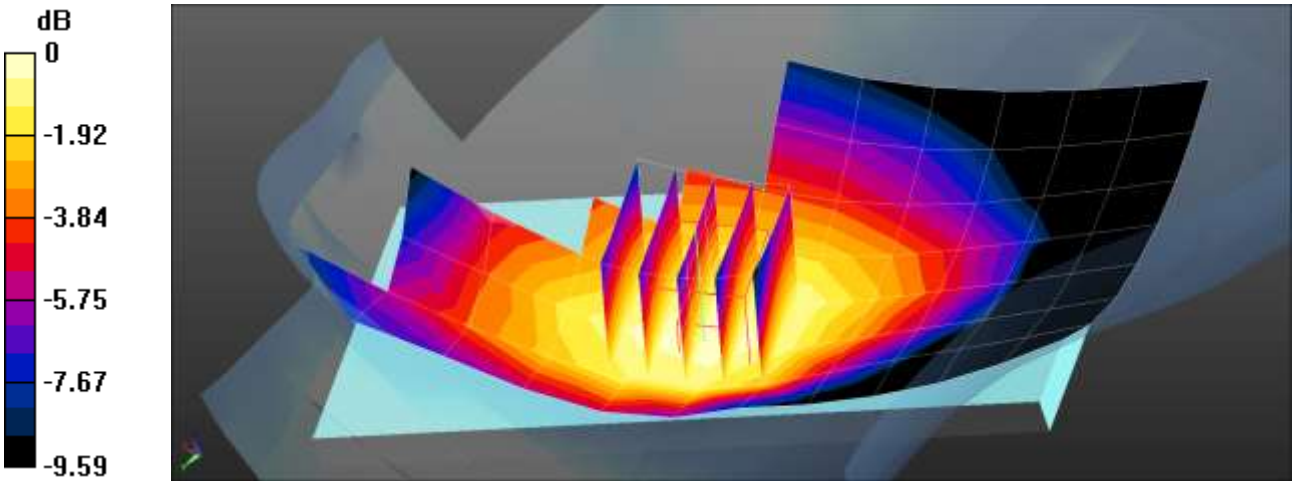
Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.94 S/m; ε_r = 42.343; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN7370; ConvF(9.88, 9.88, 9.88); Calibrated: 2019-08-29;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2020-02-03
- Phantom: SAM with CRP v5.0_Right
- Measurement SW: DASY52, Version 52.10 (4);

WCDMA B5 Head Right Touch 4183ch/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.178 W/kg

WCDMA B5 Head Right Touch 4183ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.296 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.197 W/kg
SAR(1 g) = 0.151 W/kg; SAR(10 g) = 0.115 W/kg
Maximum value of SAR (measured) = 0.179 W/kg



0 dB = 0.179 W/kg = -7.47 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 21.4 ℃
Ambient Temperature: 21.6 ℃
Test Date: 03/20/2020
Plot No.: 4

DUT: SM-A516B/DS; Type: Bar

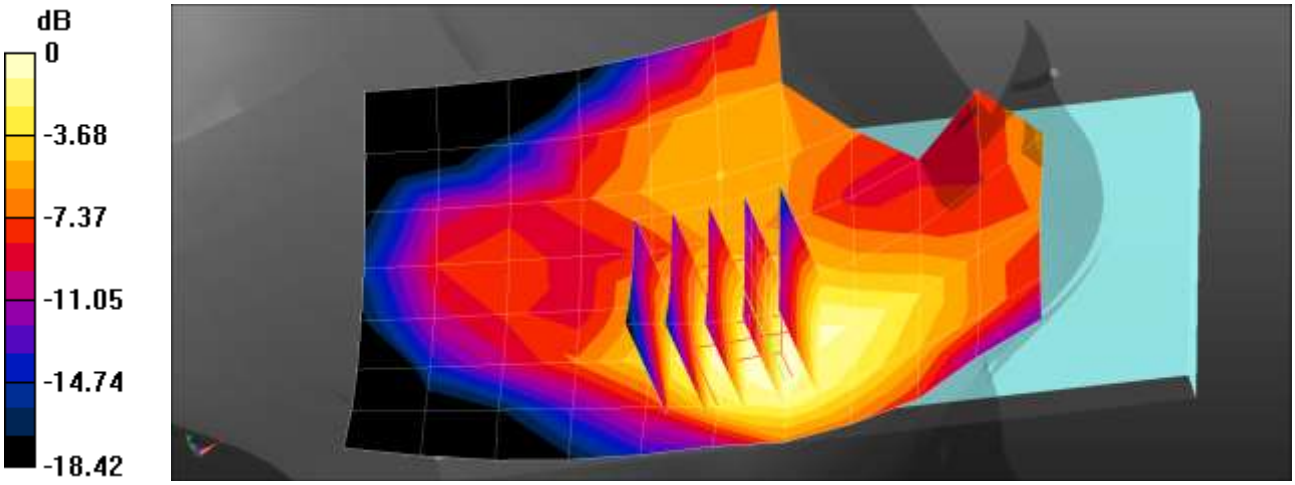
Communication System: UID 0, WCDMA Band 2 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.399 S/m; ε_r = 38.24; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.75, 7.75, 7.75); Calibrated: 2019-11-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: Twin-SAM V4.0 Right
- Measurement SW: DASY52, Version 52.10 (4);

WCDMA1900 Head Left Touch 9400ch/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.173 W/kg

WCDMA1900 Head Left Touch 9400ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.415 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.228 W/kg
SAR(1 g) = 0.141 W/kg; SAR(10 g) = 0.086 W/kg
Maximum value of SAR (measured) = 0.187 W/kg



0 dB = 0.187 W/kg = -7.28 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.1 ℃
Ambient Temperature: 20.2 ℃
Test Date: 03/20/2020
Plot No.: 5

DUT: SM-A516B/DS; Type: Bar

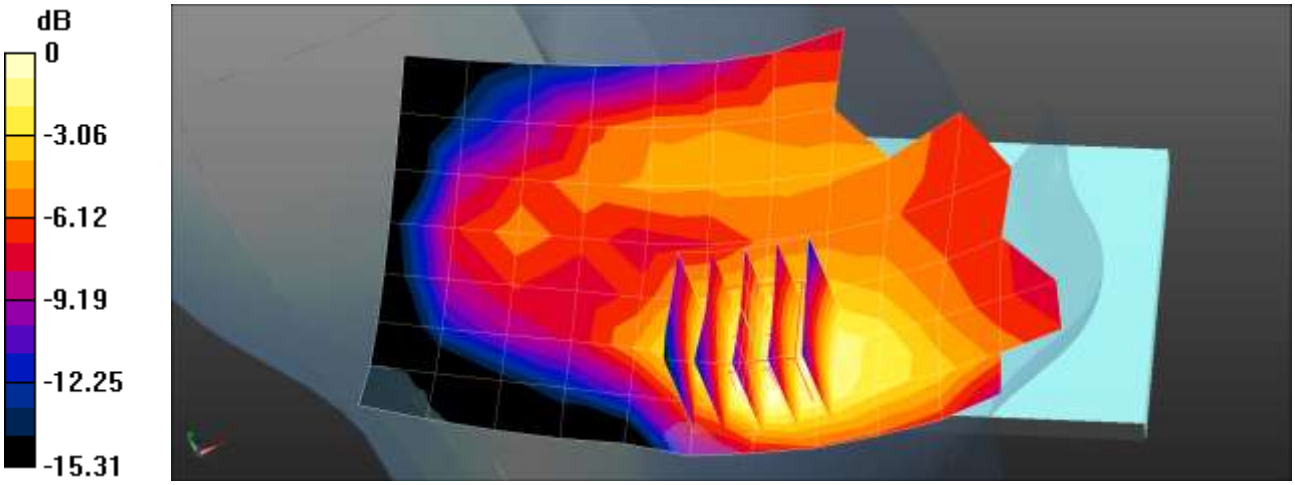
Communication System: UID 0, LTE Band 4 (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.326 S/m; ε_r = 40.386; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY Configuration:

- Probe: ES3DV3 - SN3076; ConvF(5.34, 5.34, 5.34); Calibrated: 2019-07-23;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2019-05-23
- Phantom: SAM_Left_20170913
- Measurement SW: DASY52, Version 52.10 (4);

LTE Band4 Head Left Touch QPSK 20MHz 1RB 99offset 20175ch/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.137 W/kg

LTE Band4 Head Left Touch QPSK 20MHz 1RB 99offset 20175ch/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.674 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.186 W/kg
SAR(1 g) = 0.130 W/kg; SAR(10 g) = 0.087 W/kg
Maximum value of SAR (measured) = 0.146 W/kg



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

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 23.0 ℃
Ambient Temperature: 23.2 ℃
Test Date: 03/20/2020
Plot No.: 6

DUT: SM-A516B/DS; Type: Bar

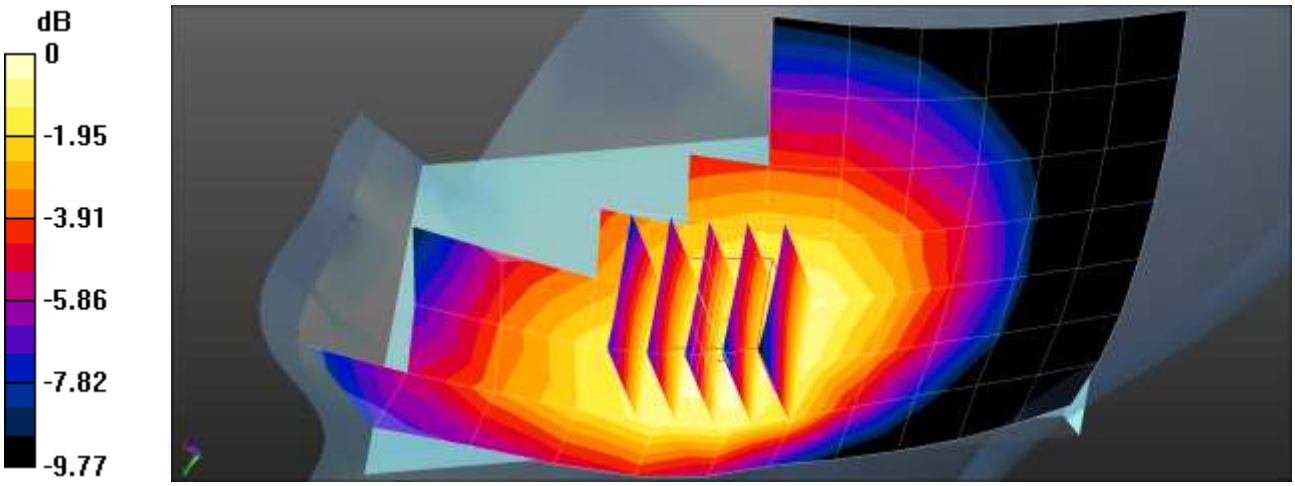
Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.94 S/m; ε_r = 42.345; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN7370; ConvF(9.88, 9.88, 9.88); Calibrated: 2019-08-29;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2020-02-03
- Phantom: SAM with CRP v5.0_Right
- Measurement SW: DASY52, Version 52.10 (4);

LTE Band 5 Head Right Touch QPSK 10MHz 1RB 0offset 20525ch/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.210 W/kg

LTE Band 5 Head Right Touch QPSK 10MHz 1RB 0offset 20525ch/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.870 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.226 W/kg
SAR(1 g) = 0.177 W/kg; SAR(10 g) = 0.136 W/kg
Maximum value of SAR (measured) = 0.209 W/kg



0 dB = 0.209 W/kg = -6.80 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 23.0 ℃
Ambient Temperature: 23.2 ℃
Test Date: 03/20/2020
Plot No.: 7

DUT: SM-A516B/DS; Type: Bar

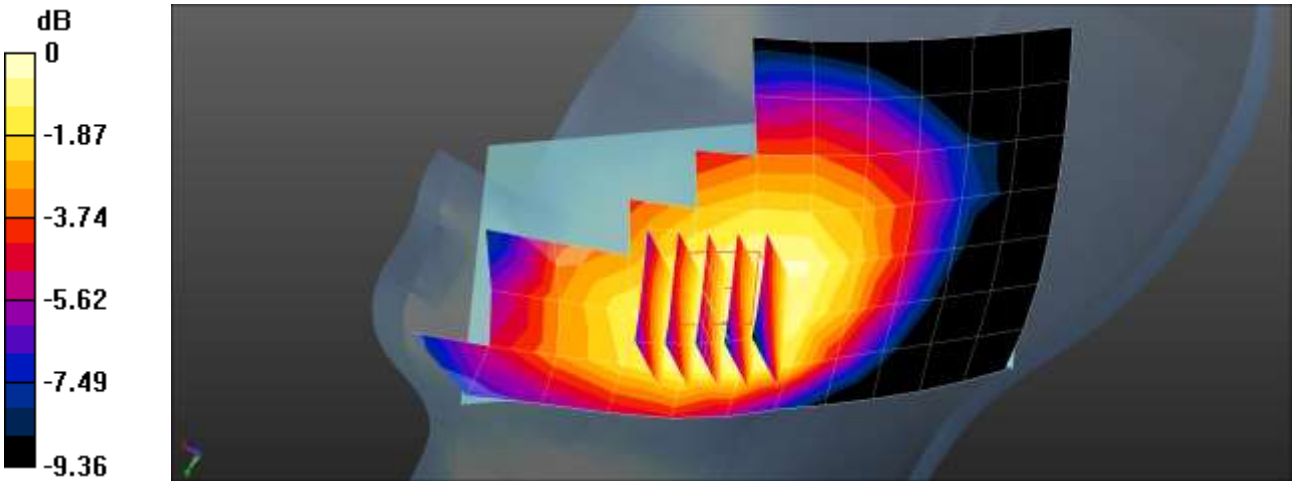
Communication System: UID 0, LTE Band 12 (0); Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.856 S/m; ε_r = 42.313; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN7370; ConvF(10.27, 10.27, 10.27); Calibrated: 2019-08-29;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2020-02-03
- Phantom: SAM with CRP v5.0_Right
- Measurement SW: DASY52, Version 52.10 (4);

LTE Band 12 Head Right Touch QPSK 10MHz 1RB 0offset 23095ch/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0941 W/kg

LTE Band 12 Head Right Touch QPSK 10MHz 1RB 0offset 23095ch/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.433 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.103 W/kg
SAR(1 g) = 0.082 W/kg; SAR(10 g) = 0.065 W/kg
Maximum value of SAR (measured) = 0.0945 W/kg



0 dB = 0.0945 W/kg = -10.25 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.1 ℃
Ambient Temperature: 20.3 ℃
Test Date: 03/23/2020
Plot No.: 8

DUT: SM-A516B/DS; Type: Bar

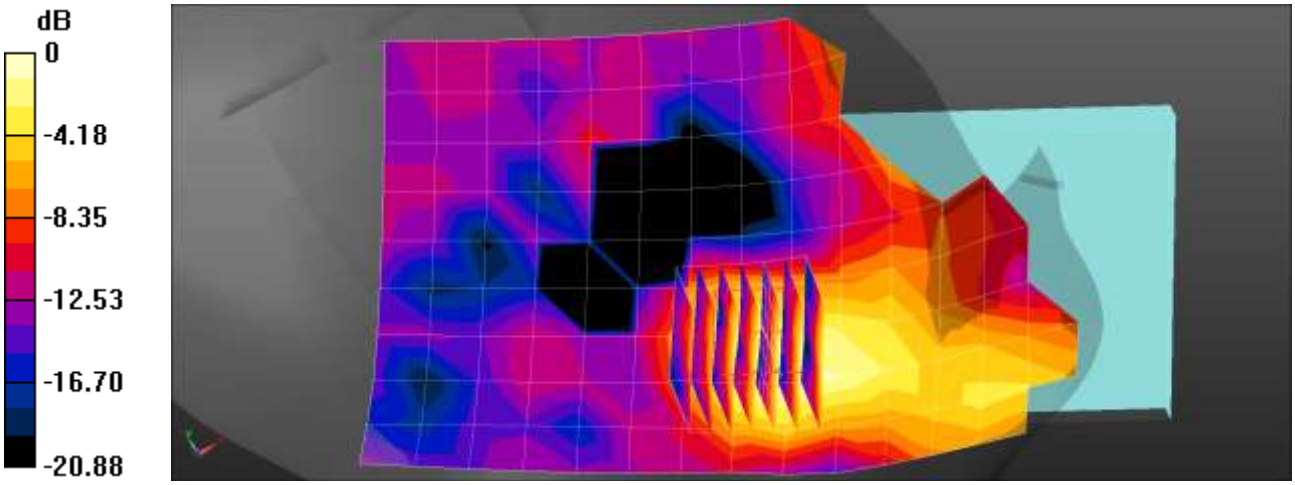
Communication System: UID 0, LTE Band41 (0); Frequency: 2593 MHz;Duty Cycle: 1:1.58016
Medium parameters used (interpolated): f = 2593 MHz; σ = 1.942 S/m; ε_r = 37.876; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.32, 7.32, 7.32); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: Twin-SAM V4.0(Left-Left)
- Measurement SW: DASY52, Version 52.10 (4);

LTE Band 41 Head Left Touch QPSK 20MHz 1RB 0offset 40620ch/Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.0858 W/kg

LTE Band 41 Head Left Touch QPSK 20MHz 1RB 0offset 40620ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.081 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.112 W/kg
SAR(1 g) = 0.057 W/kg; SAR(10 g) = 0.029 W/kg
Maximum value of SAR (measured) = 0.0895 W/kg



0 dB = 0.0895 W/kg = -10.48 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 22.5 ℃
Ambient Temperature: 22.7 ℃
Test Date: 04/09/2020
Plot No.: 9

DUT: SM-A516B/DS; Type: Bar

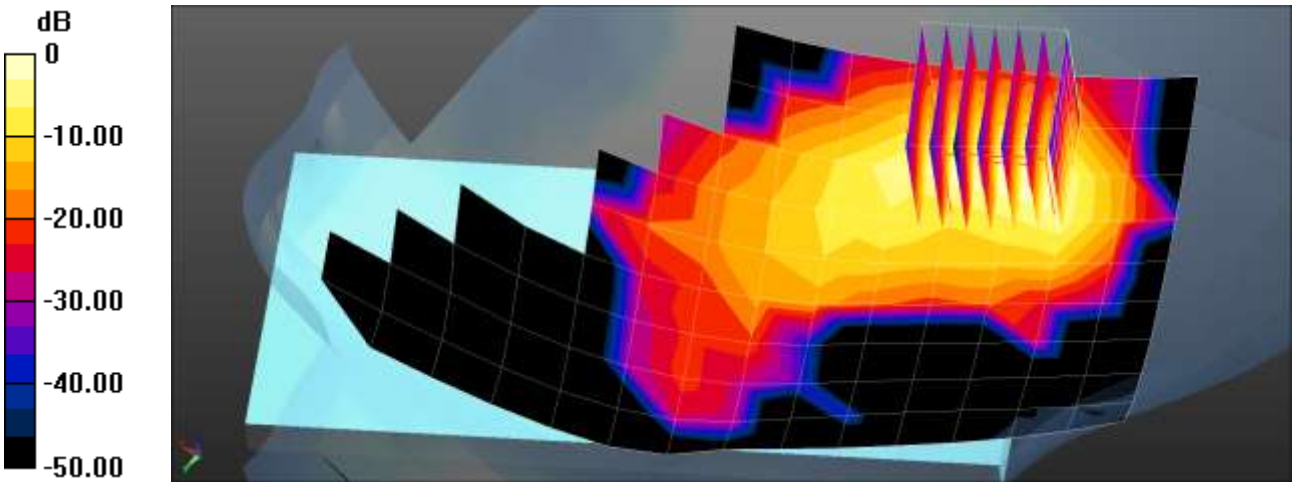
Communication System: UID 0, 2450MHz FCC (0); Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2412 MHz; σ = 1.759 S/m; ε_r = 39.782; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.6, 7.6, 7.6); Calibrated: 2019-09-27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn868; Calibrated: 2019-09-04
- Phantom: SAM with CRP v5.0_F
- Measurement SW: DASY52, Version 52.10 (4);

802.11b Head Right Touch 1Mbps 1ch/Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.364 W/kg

802.11b Head Right Touch 1Mbps 1ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.450 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.484 W/kg
SAR(1 g) = 0.182 W/kg; SAR(10 g) = 0.072 W/kg
Maximum value of SAR (measured) = 0.342 W/kg



0 dB = 0.364 W/kg = -4.39 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.3 ℃
Ambient Temperature: 20.5 ℃
Test Date: 04/08/2020
Plot No.: 10

DUT: SM-A516B/DS; Type: Bar

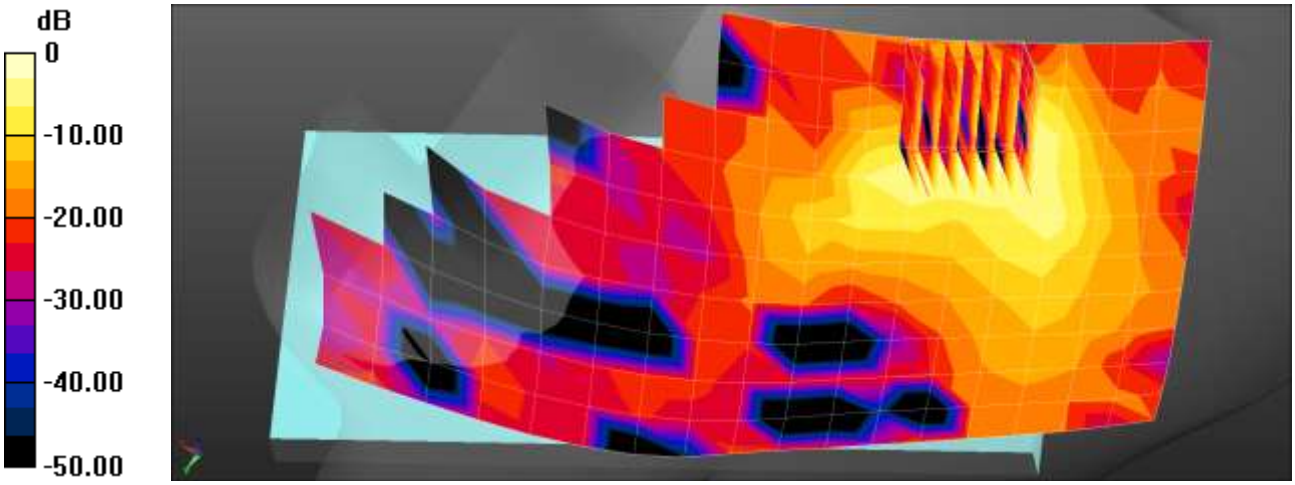
Communication System: UID 0, WIFI 5GHz (0); Frequency: 5610 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5610 MHz; σ = 5.018 S/m; ε_r = 36.615; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN7370; ConvF(4.51, 4.51, 4.51); Calibrated: 2019-08-29;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2020-02-03
- Phantom: Twin-SAM V4.0 (Left-Right)
- Measurement SW: DASY52, Version 52.10 (4);

802.11ac80 Head Right Touch MCS0 122ch/Area Scan (11x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.711 W/kg

802.11ac80 Head Right Touch MCS0 122ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 4.181 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 1.86 W/kg
SAR(1 g) = 0.312 W/kg; SAR(10 g) = 0.095 W/kg
Maximum value of SAR (measured) = 0.842 W/kg



0 dB = 0.711 W/kg = -1.48 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 21.0 ℃
Ambient Temperature: 21.2 ℃
Test Date: 03/25/2020
Plot No.: 11

DUT: SM-A516B/DS; Type: Bar

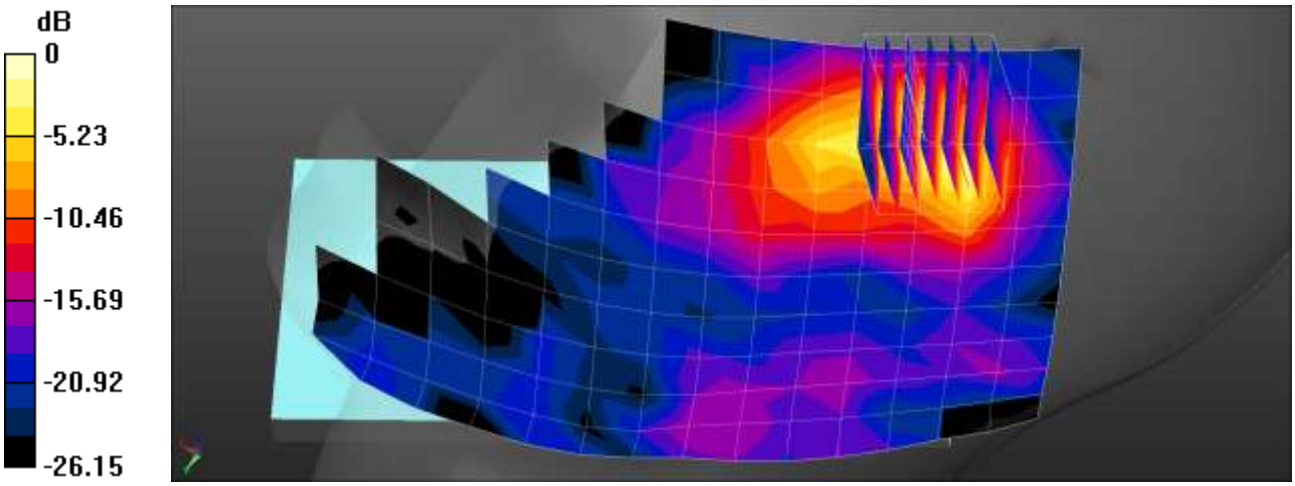
Communication System: UID 0, Bluetooth (0); Frequency: 2480 MHz;Duty Cycle: 1:1.3
Medium parameters used: f = 2480 MHz; σ = 1.844 S/m; ε_r = 38.848; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.61, 7.61, 7.61); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: Twin-SAM V4.0(Left-Left)
- Measurement SW: DASY52, Version 52.10 (4);

Bluetooth Head Right Touch DH5 78ch/Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.292 W/kg

Bluetooth Head Right Touch DH5 78ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.629 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.414 W/kg
SAR(1 g) = 0.138 W/kg; SAR(10 g) = 0.054 W/kg
Maximum value of SAR (measured) = 0.299 W/kg



0 dB = 0.299 W/kg = -5.24 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.1 ℃
Test Date: 04/06/2020
Plot No.: 12

DUT: SM-A516B/DS; Type: Bar

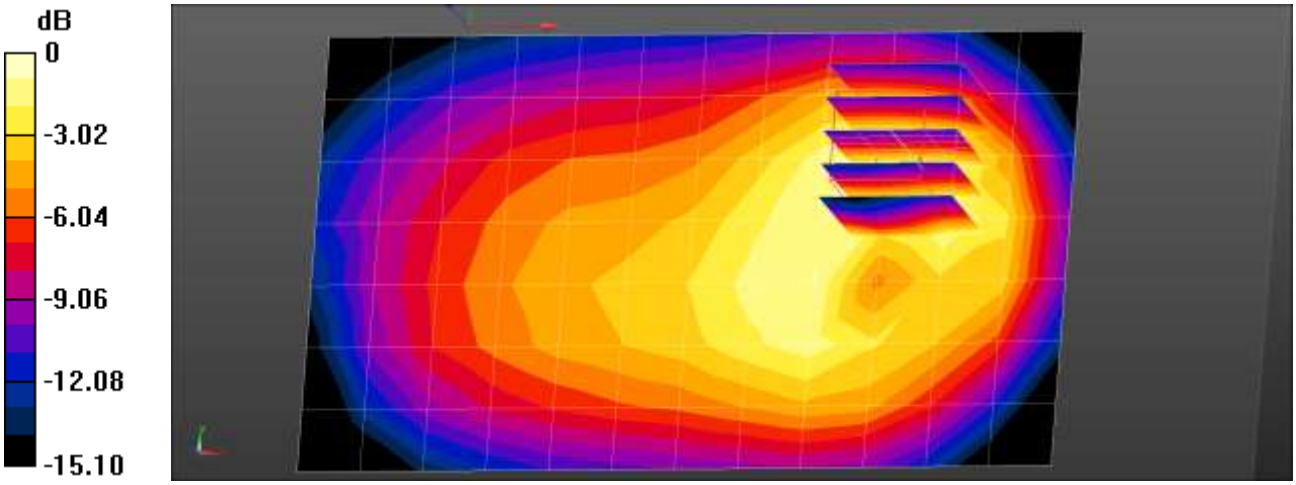
Communication System: UID 0, GSM 850 (0); Frequency: 824.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.949 S/m; ε_r = 53.555; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.97, 8.97, 8.97); Calibrated: 2019-11-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

GSM850 Body-Worn Rear 128ch/Area Scan (13x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.387 W/kg

GSM850 Body-Worn Rear 128ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.14 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.481 W/kg
SAR(1 g) = 0.285 W/kg; SAR(10 g) = 0.175 W/kg
Maximum value of SAR (measured) = 0.405 W/kg



0 dB = 0.405 W/kg = -3.93 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.1 ℃
Ambient Temperature: 20.3 ℃
Test Date: 04/20/2020
Plot No.: 13

DUT: SM-A516B/DS; Type: Bar

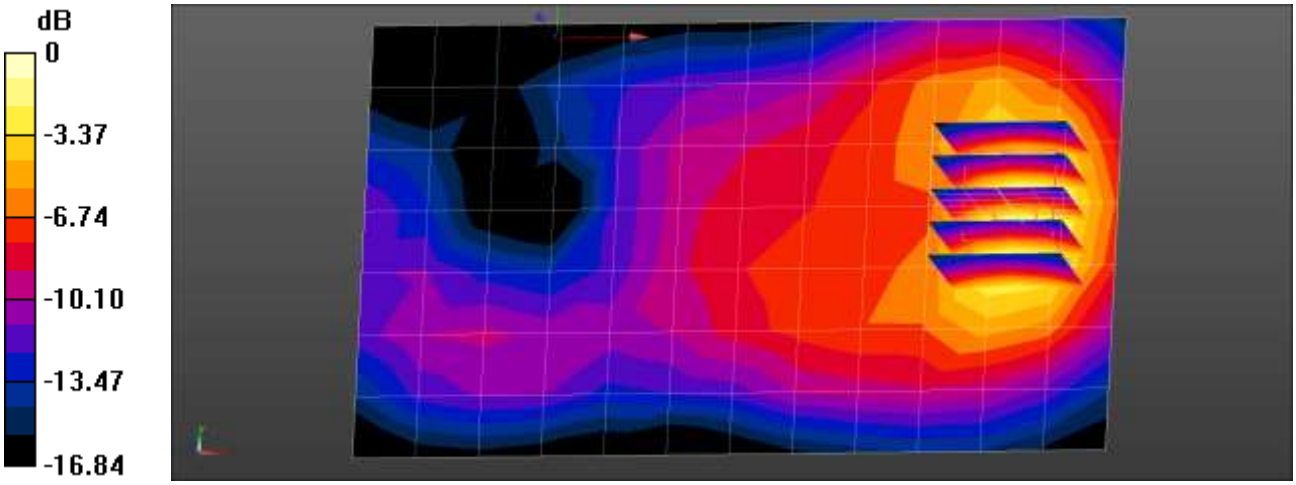
Communication System: UID 0, GSM 1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.517 S/m; ε_r = 53.591; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.61, 7.61, 7.61); Calibrated: 2019-11-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

GSM1900 Body-Worn Front 661ch/Area Scan (13x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.234 W/kg

GSM1900 Body-Worn Front 661ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.710 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.368 W/kg
SAR(1 g) = 0.218 W/kg; SAR(10 g) = 0.123 W/kg
Maximum value of SAR (measured) = 0.316 W/kg



0 dB = 0.316 W/kg = −5.00 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.1 ℃
Ambient Temperature: 20.2 ℃
Test Date: 03/20/2020
Plot No.: 14

DUT: SM-A516B/DS; Type: Bar

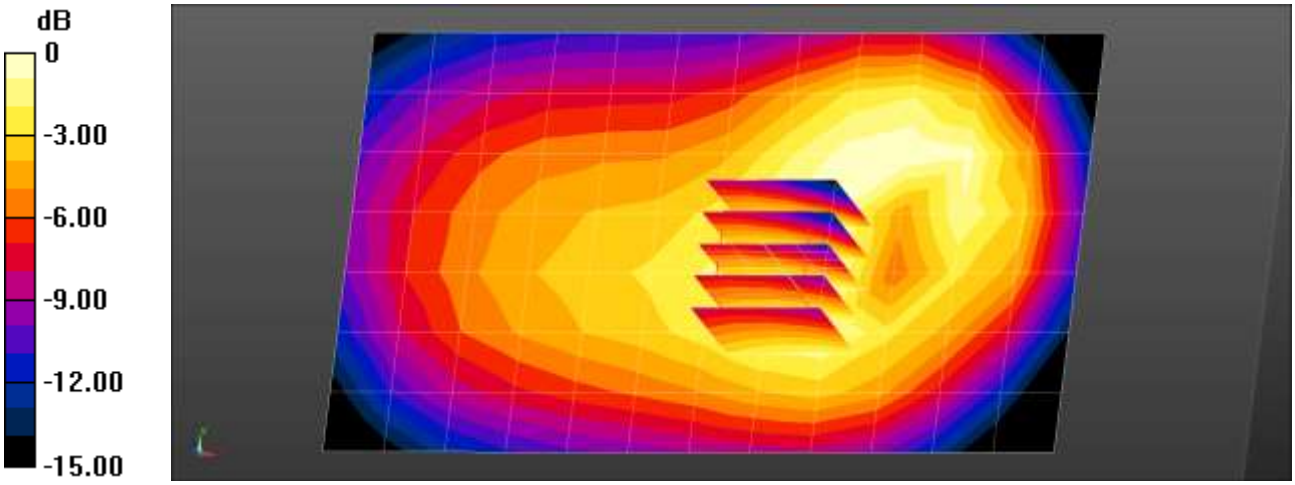
Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.963 S/m; ε_r = 56.45; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3076; ConvF(5.97, 5.97, 5.97); Calibrated: 2019-07-23;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2019-05-23
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

WCDMA Band5 Body Worn Rear 4183ch/Area Scan (13x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.278 W/kg

WCDMA Band5 Body Worn Rear 4183ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.77 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.335 W/kg
SAR(1 g) = 0.248 W/kg; SAR(10 g) = 0.172 W/kg
Maximum value of SAR (measured) = 0.280 W/kg



0 dB = 0.280 W/kg = -5.53 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.1 ℃
Test Date: 04/06/2020
Plot No.: 15

DUT: SM-A516B/DS; Type: Bar

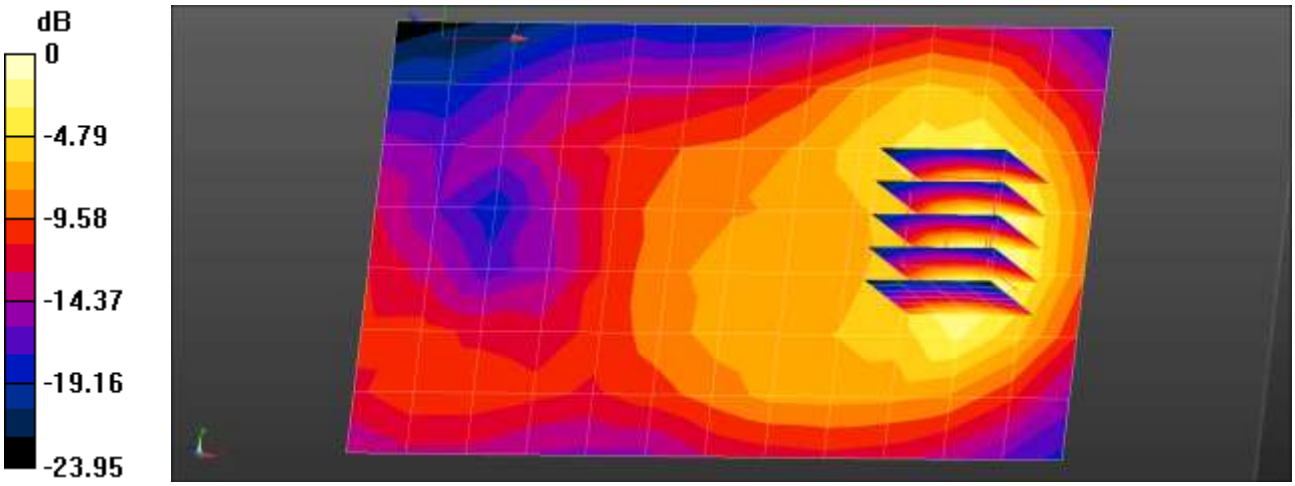
Communication System: UID 0, WCDMA1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.517 S/m; ε_r = 53.59; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.61, 7.61, 7.61); Calibrated: 2019-11-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

WCDMA Band2 Body Worn Front 9400ch/Area Scan (13x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.407 W/kg

WCDMA Band2 Body Worn Front 9400ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.793 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.513 W/kg
SAR(1 g) = 0.305 W/kg; SAR(10 g) = 0.171 W/kg
Maximum value of SAR (measured) = 0.441 W/kg



0 dB = 0.407 W/kg = -3.91 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 22.3 ℃
Ambient Temperature: 22.4 ℃
Test Date: 04/10/2020
Plot No.: 16

DUT: SM-A516B/DS; Type: Bar

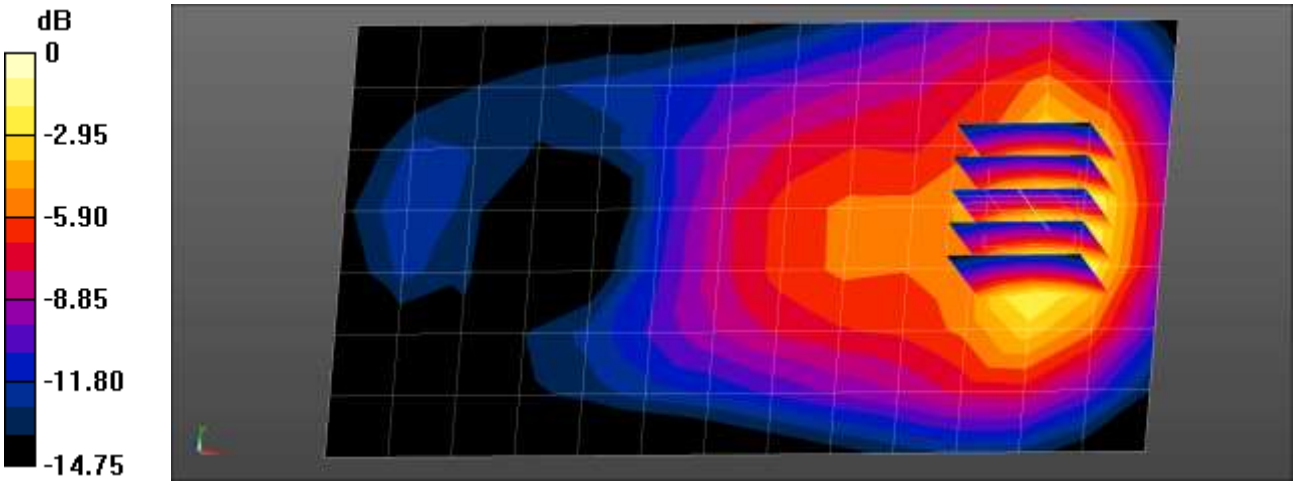
Communication System: UID 0, LTE Band 4 (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.43 S/m; ε_r = 53.882; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(8.3, 8.3, 8.3); Calibrated: 2019-09-27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn868; Calibrated: 2019-09-04
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.10 (4);

LTE band 4 Body Worn Rear QPSK 20MHz 1RB 99offset 20175ch/Area Scan (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.501 W/kg

LTE band 4 Body Worn Rear QPSK 20MHz 1RB 99offset 20175ch/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.073 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.641 W/kg
SAR(1 g) = 0.400 W/kg; SAR(10 g) = 0.237 W/kg
Maximum value of SAR (measured) = 0.560 W/kg



0 dB = 0.560 W/kg = -2.52 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.6 ℃
Ambient Temperature: 20.8 ℃
Test Date: 03/20/2020
Plot No.: 17

DUT: SM-A516B/DS; Type: Bar

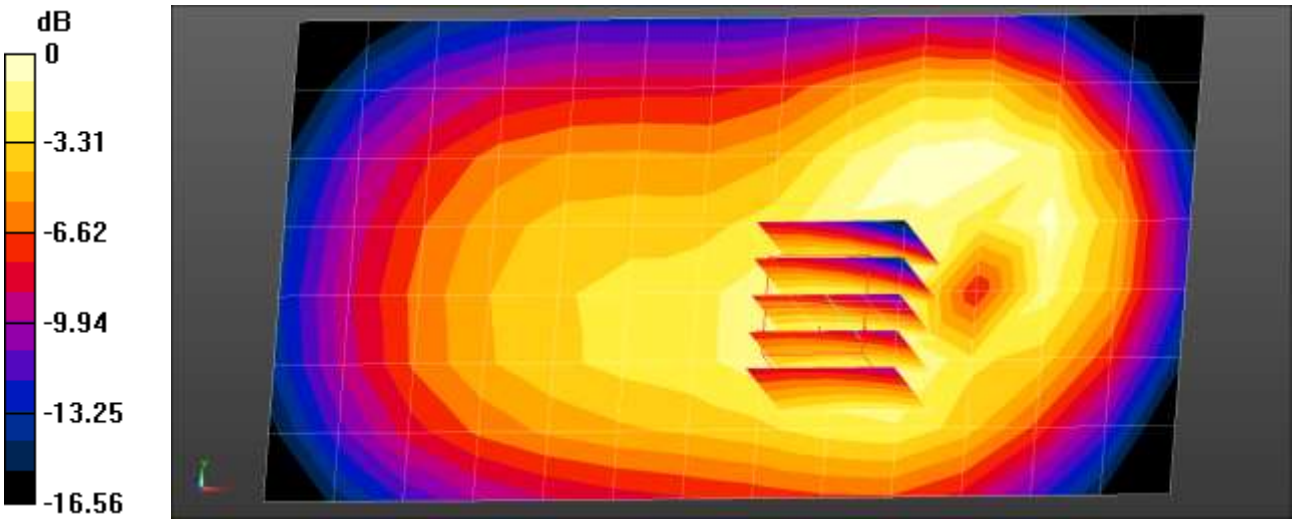
Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.962 S/m; ε_r = 53.362; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(9.72, 9.72, 9.72); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (4);

LTE Band 5 Body Rear QPSK 10MHz 1RB 0offset 20525ch/Area Scan (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.336 W/kg

LTE Band 5 Body Rear QPSK 10MHz 1RB 0offset 20525ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.16 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.395 W/kg
SAR(1 g) = 0.279 W/kg; SAR(10 g) = 0.194 W/kg
Maximum value of SAR (measured) = 0.354 W/kg



0 dB = 0.354 W/kg = -4.51 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.6 ℃
Ambient Temperature: 20.8 ℃
Test Date: 03/20/2020
Plot No.: 18

DUT: SM-A516B/DS; Type: Bar

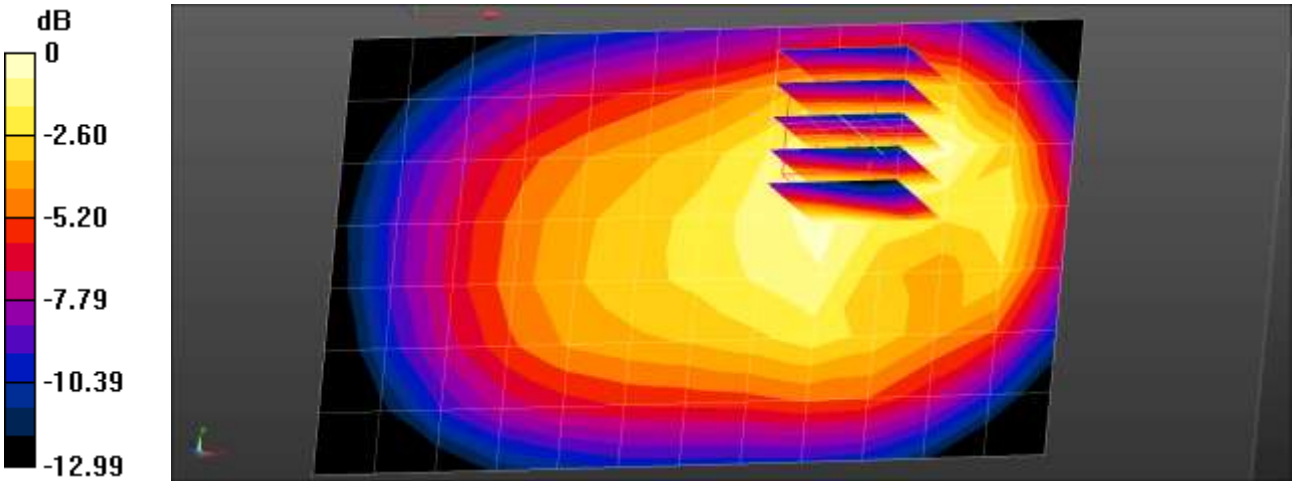
Communication System: UID 0, LTE 12 (0); Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.919 S/m; ε_r = 54.892; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(9.88, 9.88, 9.88); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (4);

LTE Band 12 Body Rear QPSK 10MHz 1RB 0offset 23095ch/Area Scan (13x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.373 W/kg

LTE Band 12 Body Rear QPSK 10MHz 1RB 0offset 23095ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.95 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.439 W/kg
SAR(1 g) = 0.281 W/kg; SAR(10 g) = 0.185 W/kg
Maximum value of SAR (measured) = 0.377 W/kg



0 dB = 0.377 W/kg = -4.24 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.2 ℃
Ambient Temperature: 20.4 ℃
Test Date: 03/24/2020
Plot No.: 19

DUT: SM-A516B/DS; Type: Bar

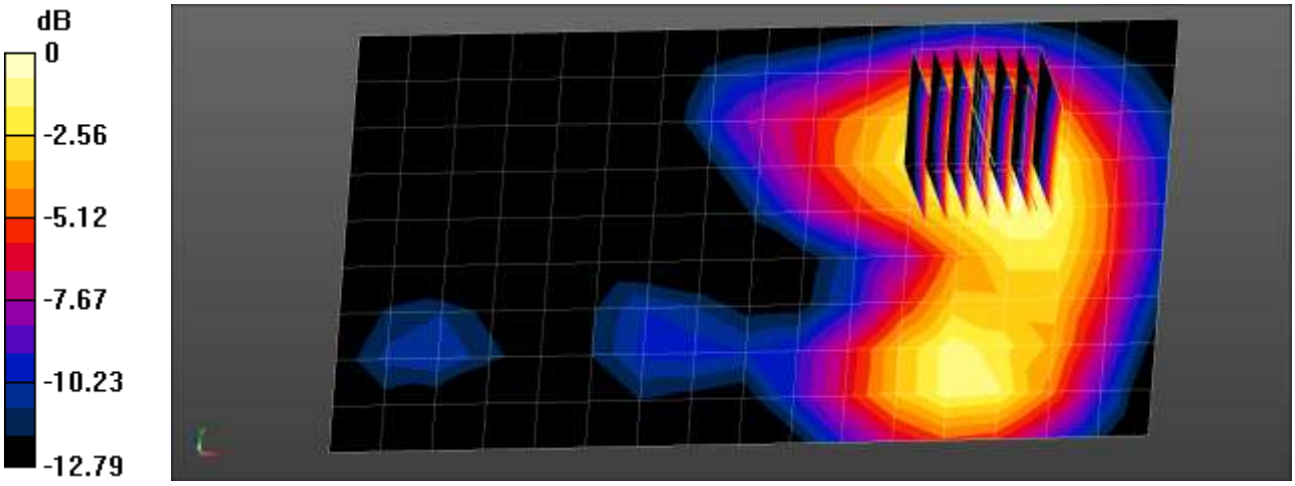
Communication System: UID 0, LTE Band41 (0); Frequency: 2593 MHz;Duty Cycle: 1:1.58016
Medium parameters used (interpolated): f = 2593 MHz; σ = 2.066 S/m; ε_r = 54.809; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.34, 7.34, 7.34); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (4);

LTE Band 41 Body-Worn Front QPSK 20MHz 1RB 0offset 40620ch/Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.208 W/kg

LTE Band 41 Body-Worn Front QPSK 20MHz 1RB 0offset 40620ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.245 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.270 W/kg
SAR(1 g) = 0.144 W/kg; SAR(10 g) = 0.081 W/kg
Maximum value of SAR (measured) = 0.220 W/kg



0 dB = 0.220 W/kg = -6.58 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 22.5 ℃
Ambient Temperature: 22.7 ℃
Test Date: 04/09/2020
Plot No.: 20

DUT: SM-A516B/DS; Type: Bar

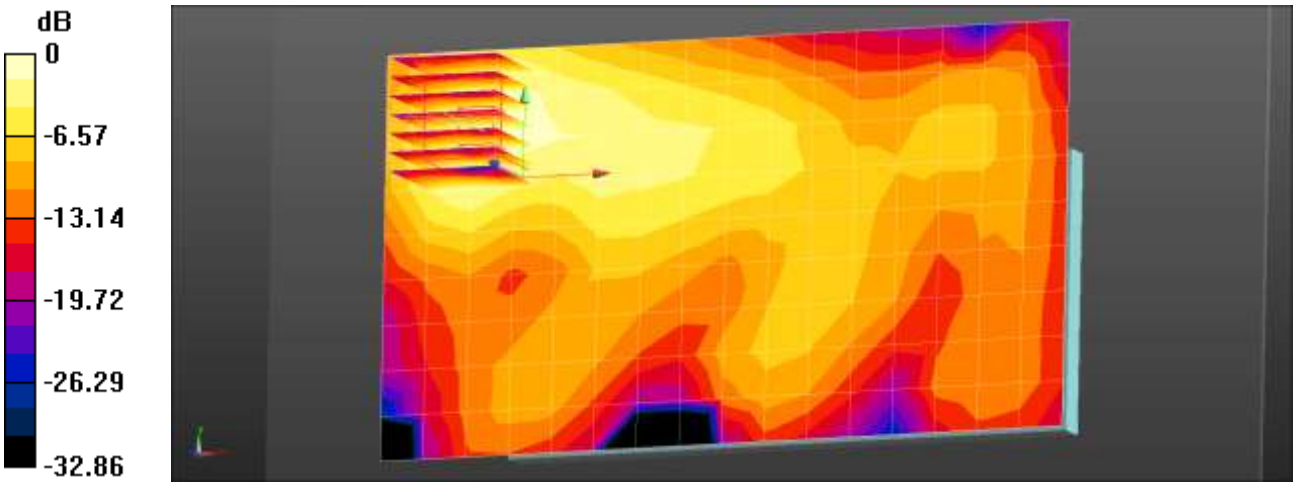
Communication System: UID 0, 2450MHz FCC (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.932 S/m; ε_r = 53.682; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.68, 7.68, 7.68); Calibrated: 2019-09-27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn868; Calibrated: 2019-09-04
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.10 (4);

802.11b Body Worn Rear 1Mbps 6ch/Area Scan (17x10x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.0816 W/kg

802.11b Body Worn Rear 1Mbps 6ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.433 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.108 W/kg
SAR(1 g) = 0.057 W/kg; SAR(10 g) = 0.030 W/kg
Maximum value of SAR (measured) = 0.0889 W/kg



0 dB = 0.0889 W/kg = -10.51 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.7 ℃
Ambient Temperature: 20.7 ℃
Test Date: 04/08/2020
Plot No.: 21

DUT: SM-A516B/DS; Type: Bar

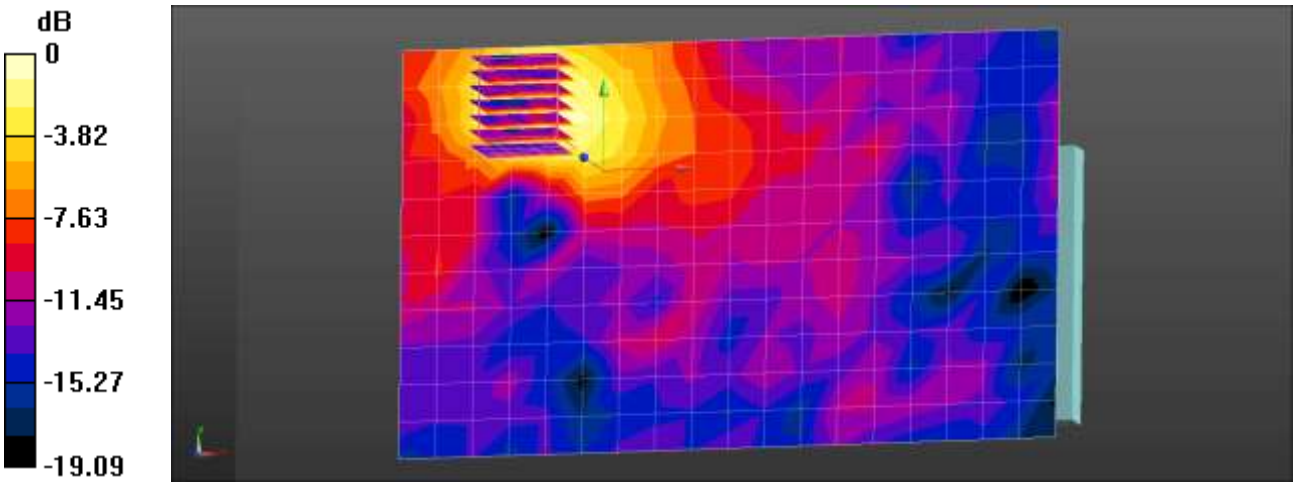
Communication System: UID 0, WIFI 5GHz UNII3 (0); Frequency: 5745 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5745 MHz; σ = 6.149 S/m; ε_r = 48.649; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3967; ConvF(4.22, 4.22, 4.22); Calibrated: 2020-02-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2020-02-26
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

802.11a BodyWorn Rear 6Mbps 149ch/Area Scan (19x12x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.218 W/kg

802.11a BodyWorn Rear 6Mbps 149ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 1.594 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.383 W/kg
SAR(1 g) = 0.101 W/kg; SAR(10 g) = 0.042 W/kg
Maximum value of SAR (measured) = 0.232 W/kg



0 dB = 0.218 W/kg = -6.61 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 21.0 ℃
Ambient Temperature: 21.2 ℃
Test Date: 03/25/2020
Plot No.: 22

DUT: SM-A516B/DS; Type: Bar

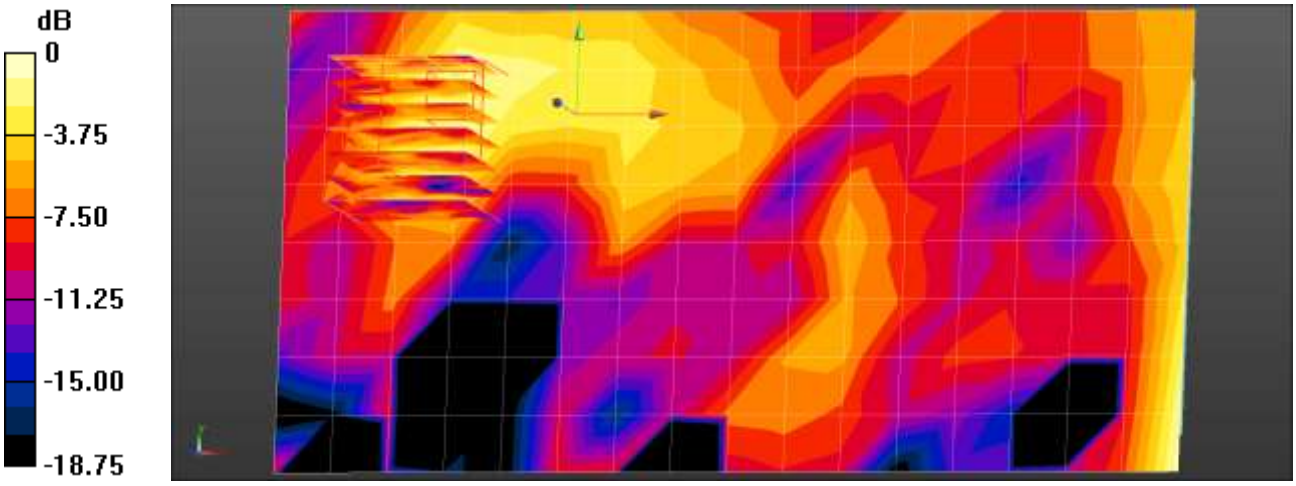
Communication System: UID 0, Bluetooth (0); Frequency: 2480 MHz;Duty Cycle: 1:1.3
Medium parameters used: f = 2480 MHz; σ = 2.004 S/m; ε_r = 52.529; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.74, 7.74, 7.74); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (4);

Bluetooth Body-Worn Rear DH5 78ch/Area Scan (17x9x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.0111 W/kg

Bluetooth Body-Worn Rear DH5 78ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.292 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.0170 W/kg
SAR(1 g) = 0.00878 W/kg; SAR(10 g) = 0.00502 W/kg
Maximum value of SAR (measured) = 0.0131 W/kg



0 dB = 0.0131 W/kg = -18.83 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.1 ℃
Test Date: 04/06/2020
Plot No.: 23

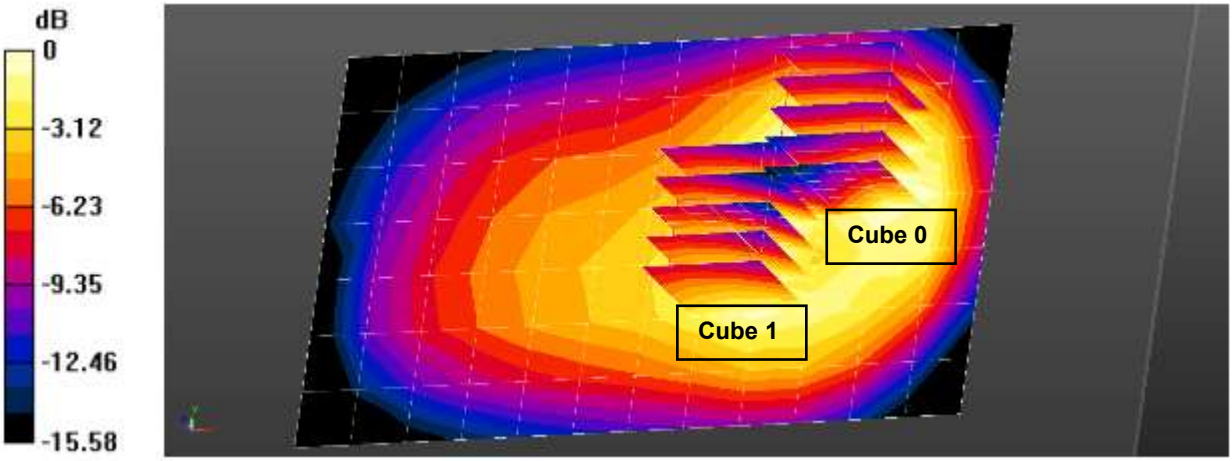
DUT: SM-A516B/DS; Type: Bar

Communication System: UID 0, GSM850 GPRS 3TX (0); Frequency: 836.6 MHz;Duty Cycle: 1:2.77013
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.961 S/m; ε_r = 53.387; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.97, 8.97, 8.97); Calibrated: 2019-11-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

GSM850 Body Rear 3Tx 190ch/Area Scan (13x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.631 W/kg
GSM850 Body Rear 3Tx 190ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.96 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.779 W/kg
SAR(1 g) = 0.459 W/kg; SAR(10 g) = 0.277 W/kg
Maximum value of SAR (measured) = 0.651 W/kg
GSM850 Body Rear 3Tx 190ch/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.96 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.585 W/kg
SAR(1 g) = 0.383 W/kg; SAR(10 g) = 0.259 W/kg
Maximum value of SAR (measured) = 0.496 W/kg



0 dB = 0.496 W/kg = -3.05 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.1 ℃
Ambient Temperature: 20.3 ℃
Test Date: 04/20/2020
Plot No.: 24

DUT: SM-A516B/DS; Type: Bar

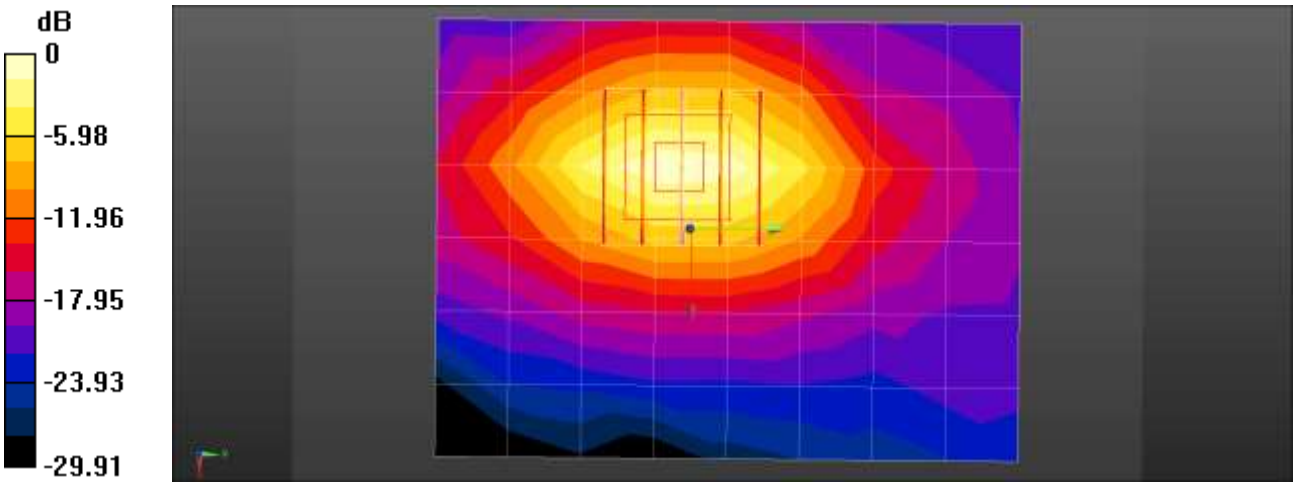
Communication System: UID 0, GSM 1900 4TX (0); Frequency: 1880 MHz;Duty Cycle: 1:2.07491
Medium parameters used: f = 1880 MHz; σ = 1.517 S/m; ε_r = 53.591; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.61, 7.61, 7.61); Calibrated: 2019-11-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

GSM1900 Body Bottom 4Tx 661ch/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.752 W/kg

GSM1900 Body Bottom 4Tx 661ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.34 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.932 W/kg
SAR(1 g) = 0.521 W/kg; SAR(10 g) = 0.267 W/kg
Maximum value of SAR (measured) = 0.797 W/kg



0 dB = 0.797 W/kg = −0.99 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.1 ℃
Ambient Temperature: 20.2 ℃
Test Date: 03/20/2020
Plot No.: 25

DUT: SM-A516B/DS; Type: Bar

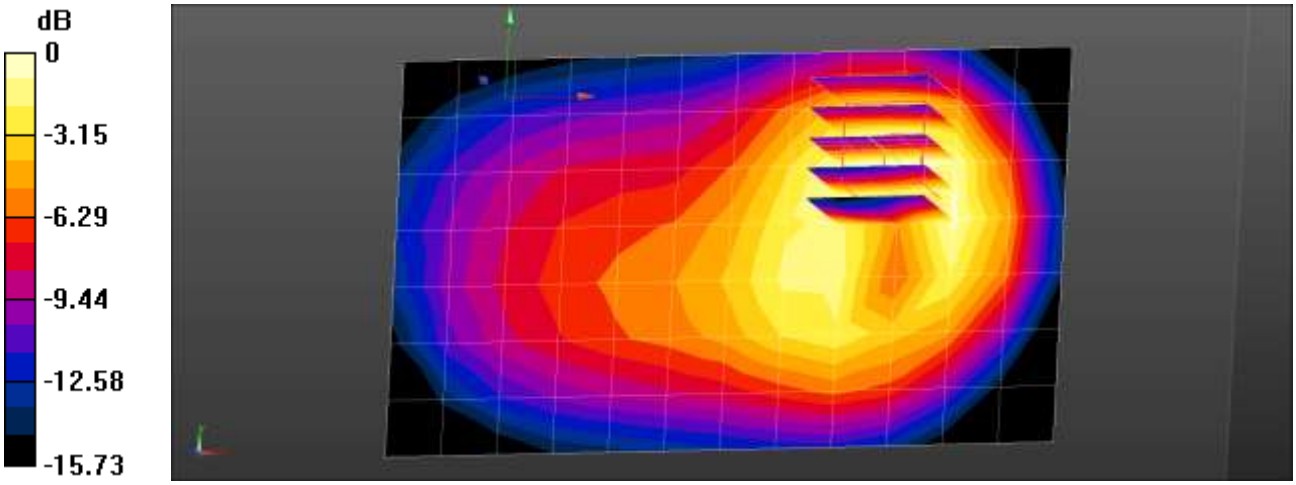
Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.963 S/m; ε_r = 56.45; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3076; ConvF(5.97, 5.97, 5.97); Calibrated: 2019-07-23;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2019-05-23
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

WCDMA Band5 Body Rear 4183ch/Area Scan (13x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.625 W/kg

WCDMA Band5 Body Rear 4183ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.32 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.862 W/kg
SAR(1 g) = 0.524 W/kg; SAR(10 g) = 0.314 W/kg
Maximum value of SAR (measured) = 0.623 W/kg



0 dB = 0.623 W/kg = -2.06 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.1 ℃
Test Date: 04/06/2020
Plot No.: 26

DUT: SM-A516B/DS; Type: Bar

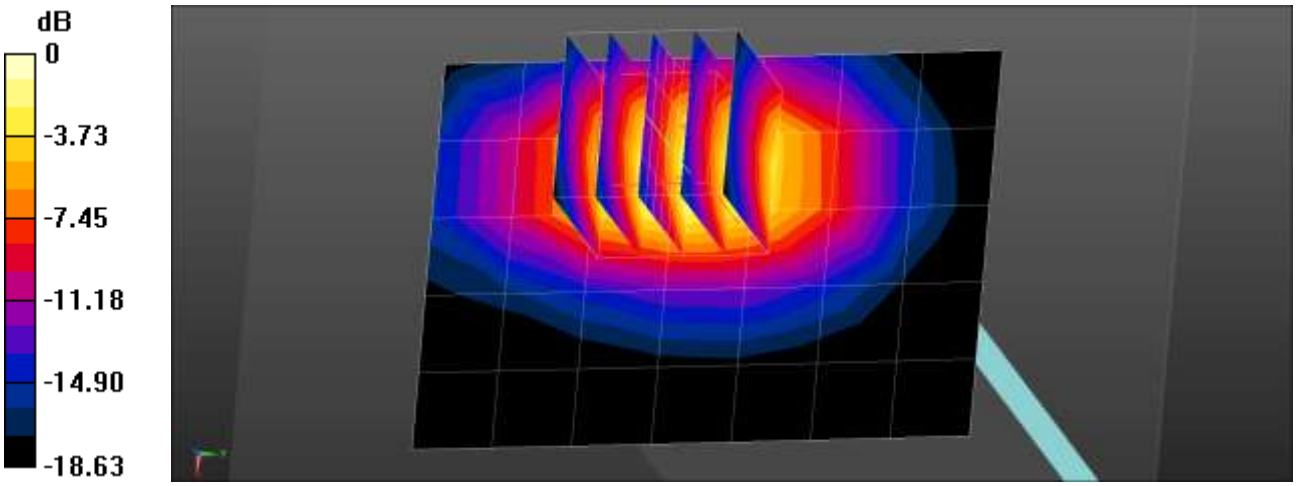
Communication System: UID 0, WCDMA1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.517 S/m; ε_r = 53.59; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.61, 7.61, 7.61); Calibrated: 2019-11-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

WCDMA Band2 Body Bottom 9400ch/Area Scan (6x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.548 W/kg

WCDMA Band2 Body Bottom 9400ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.51 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.971 W/kg
SAR(1 g) = 0.545 W/kg; SAR(10 g) = 0.284 W/kg
Maximum value of SAR (measured) = 0.821 W/kg



0 dB = 0.821 W/kg = -0.86 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 22.3 ℃
Ambient Temperature: 22.4 ℃
Test Date: 04/10/2020
Plot No.: 27

DUT: SM-A516B/DS; Type: Bar

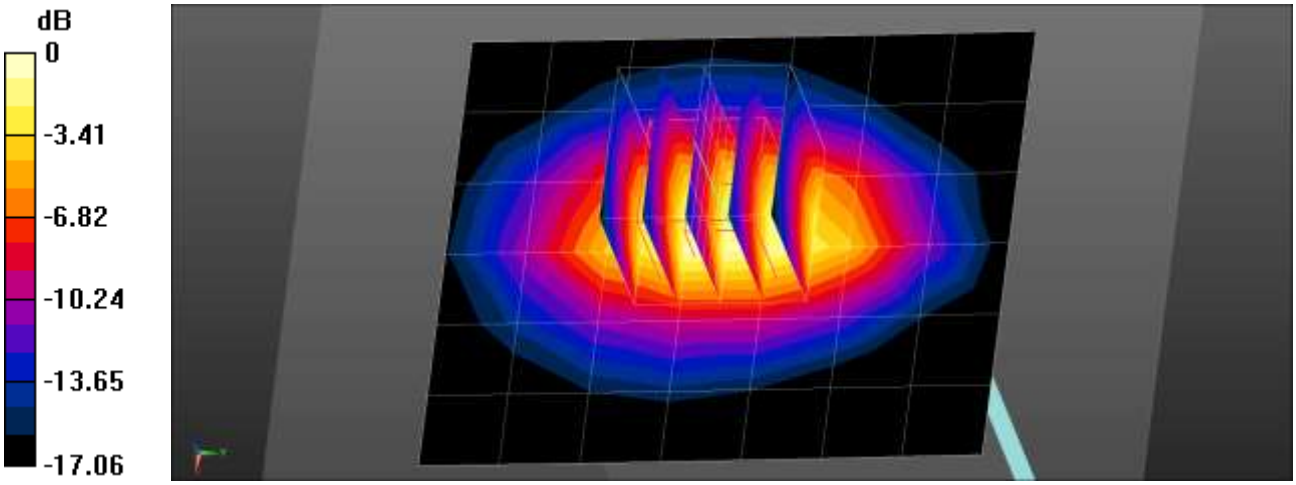
Communication System: UID 0, LTE Band 4 (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.43 S/m; ε_r = 53.882; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(8.3, 8.3, 8.3); Calibrated: 2019-09-27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn868; Calibrated: 2019-09-04
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.10 (4);

LTE band 4 Body Bottom Hotspot QPSK 20MHz 100RB 0offset 20175ch/Area Scan (7x8x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.864 W/kg

LTE band 4 Body Bottom Hotspot QPSK 20MHz 100RB 0offset 20175ch/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.37 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.728 W/kg; SAR(10 g) = 0.395 W/kg
Maximum value of SAR (measured) = 1.06 W/kg



0 dB = 1.06 W/kg = 0.25 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.6 ℃
Ambient Temperature: 20.8 ℃
Test Date: 03/20/2020
Plot No.: 28

DUT: SM-A516B/DS; Type: Bar

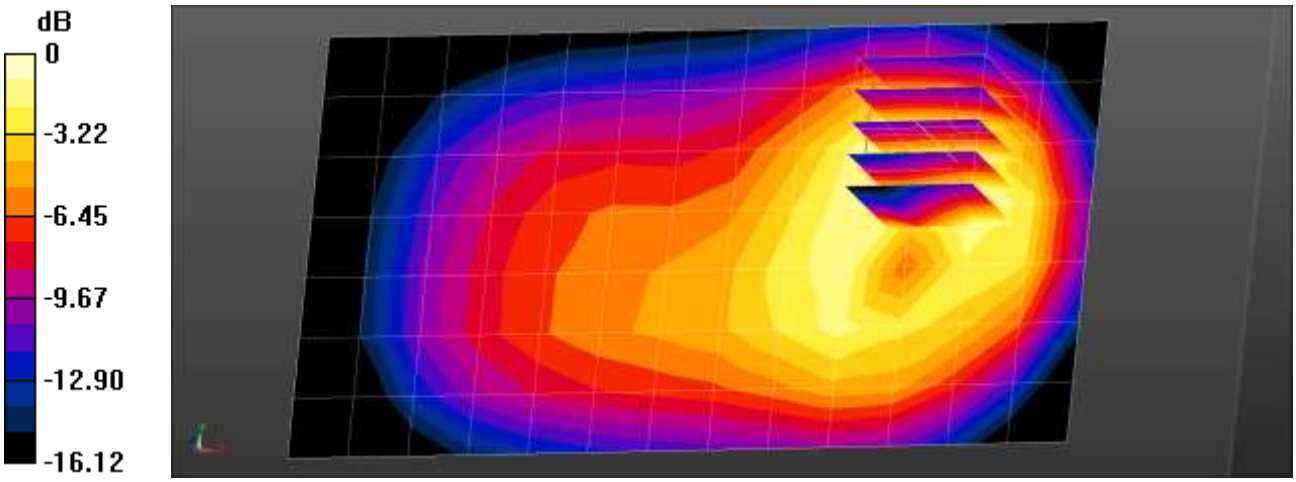
Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.962 S/m; ε_r = 53.362; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(9.72, 9.72, 9.72); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (4);

LTE Band 5 Body Rear QPSK 10MHz 1RB 0offset 20525ch/Area Scan (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.707 W/kg

LTE Band 5 Body Rear QPSK 10MHz 1RB 0offset 20525ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.26 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.903 W/kg
SAR(1 g) = 0.532 W/kg; SAR(10 g) = 0.319 W/kg
Maximum value of SAR (measured) = 0.754 W/kg



0 dB = 0.754 W/kg = -1.23 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.6 ℃
Ambient Temperature: 20.8 ℃
Test Date: 03/20/2020
Plot No.: 29

DUT: SM-A516B/DS; Type: Bar

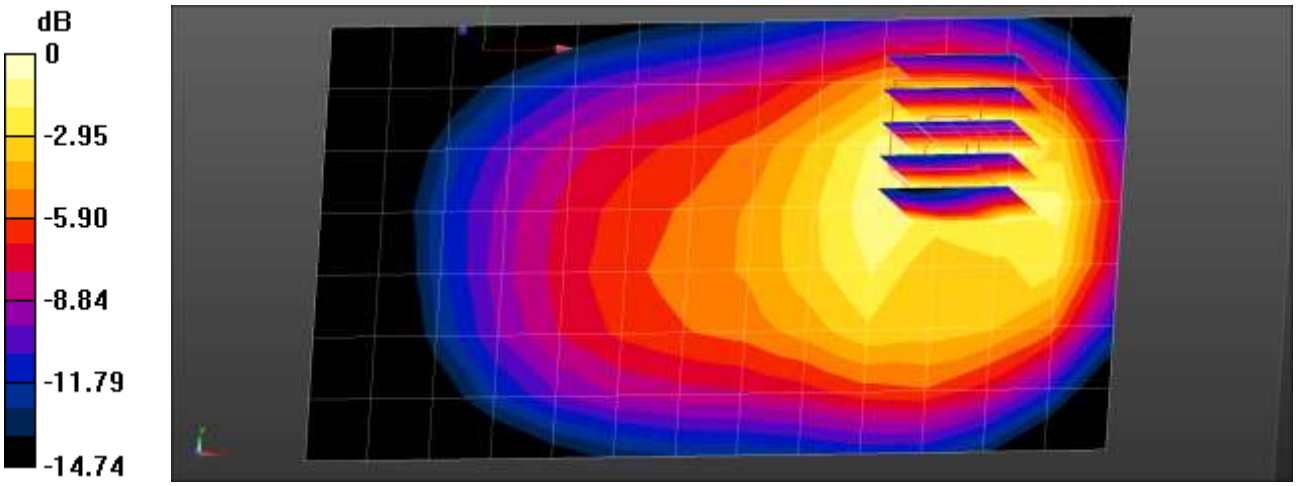
Communication System: UID 0, LTE 12 (0); Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.919 S/m; ε_r = 54.892; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(9.88, 9.88, 9.88); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (4);

LTE Band 12 Body Rear QPSK 10MHz 1RB 0offset 23095ch/Area Scan (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.666 W/kg

LTE Band 12 Body Rear QPSK 10MHz 1RB 0offset 23095ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.51 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.833 W/kg
SAR(1 g) = 0.485 W/kg; SAR(10 g) = 0.294 W/kg
Maximum value of SAR (measured) = 0.705 W/kg



0 dB = 0.705 W/kg = -1.52 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.2 ℃
Ambient Temperature: 20.4 ℃
Test Date: 03/24/2020
Plot No.: 30

DUT: SM-A516B/DS; Type: Bar

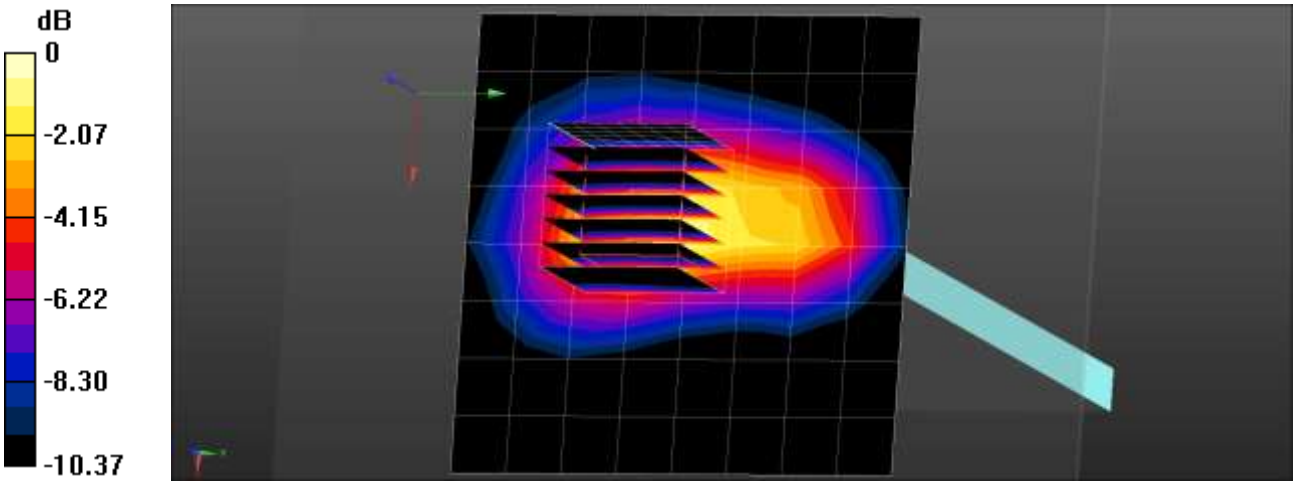
Communication System: UID 0, LTE Band41 (0); Frequency: 2593 MHz;Duty Cycle: 1:1.58016
Medium parameters used (interpolated): f = 2593 MHz; σ = 2.066 S/m; ε_r = 54.809; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.34, 7.34, 7.34); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (4);

LTE Band 41 Body Bottom QPSK 20MHz 1RB 0offset 40620ch/Area Scan (9x9x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.656 W/kg

LTE Band 41 Body Bottom QPSK 20MHz 1RB 0offset 40620ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.91 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.985 W/kg
SAR(1 g) = 0.495 W/kg; SAR(10 g) = 0.254 W/kg
Maximum value of SAR (measured) = 0.791 W/kg



0 dB = 0.791 W/kg = -1.02 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 22.5 ℃
Ambient Temperature: 22.7 ℃
Test Date: 04/09/2020
Plot No.: 31

DUT: SM-A516B/DS; Type: Bar

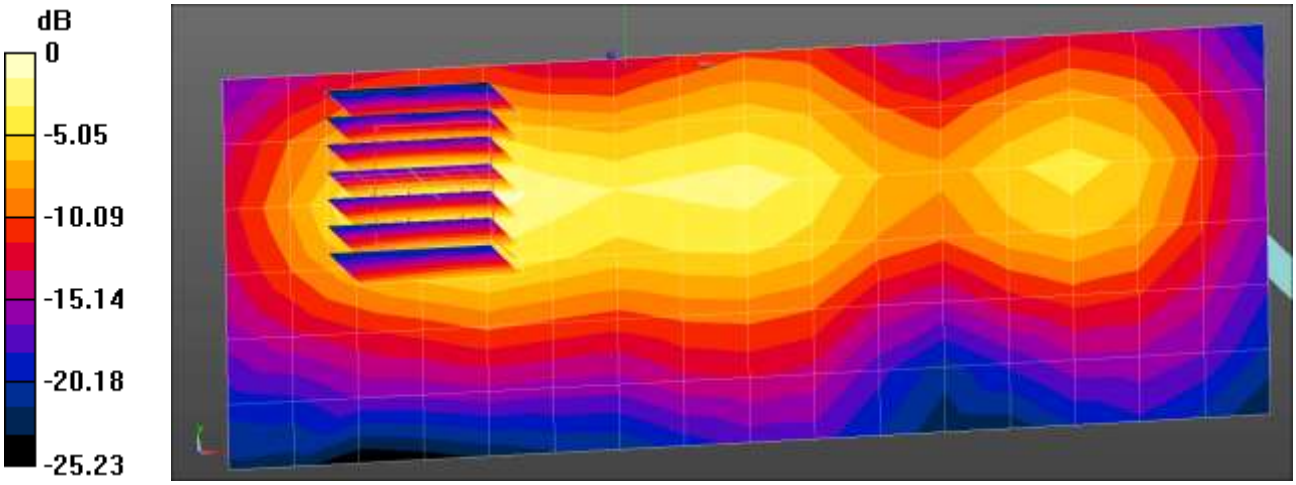
Communication System: UID 0, 2450MHz FCC (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.932 S/m; ε_r = 53.682; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.68, 7.68, 7.68); Calibrated: 2019-09-27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn868; Calibrated: 2019-09-04
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.10 (4);

802.11b Body Left 1Mbps 6ch/Area Scan (17x7x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.272 W/kg

802.11b Body Left 1Mbps 6ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.764 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.355 W/kg
SAR(1 g) = 0.170 W/kg; SAR(10 g) = 0.080 W/kg
Maximum value of SAR (measured) = 0.286 W/kg



0 dB = 0.286 W/kg = -5.44 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.7 ℃
Ambient Temperature: 20.7 ℃
Test Date: 04/08/2020
Plot No.: 32

DUT: SM-A516B/DS; Type: Bar

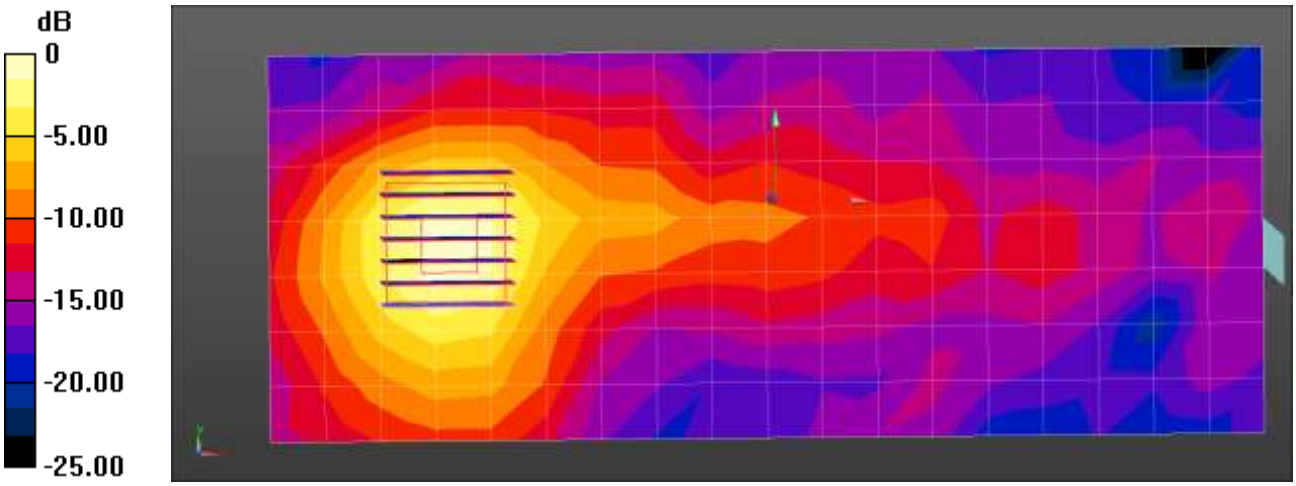
Communication System: UID 0, WIFI 5GHz UNII3 (0); Frequency: 5745 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5745 MHz; σ = 6.149 S/m; ε_r = 48.649; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3967; ConvF(4.22, 4.22, 4.22); Calibrated: 2020-02-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2020-02-26
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

802.11a Body Left 6Mbps 149ch/Area Scan (19x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.467 W/kg

802.11a Body Left 6Mbps 149ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 3.154 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.918 W/kg
SAR(1 g) = 0.234 W/kg; SAR(10 g) = 0.087 W/kg
Maximum value of SAR (measured) = 0.550 W/kg



0 dB = 0.550 W/kg = -2.60 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 21.0 ℃
Ambient Temperature: 21.2 ℃
Test Date: 03/25/2020
Plot No.: 33

DUT: SM-A516B/DS; Type: Bar

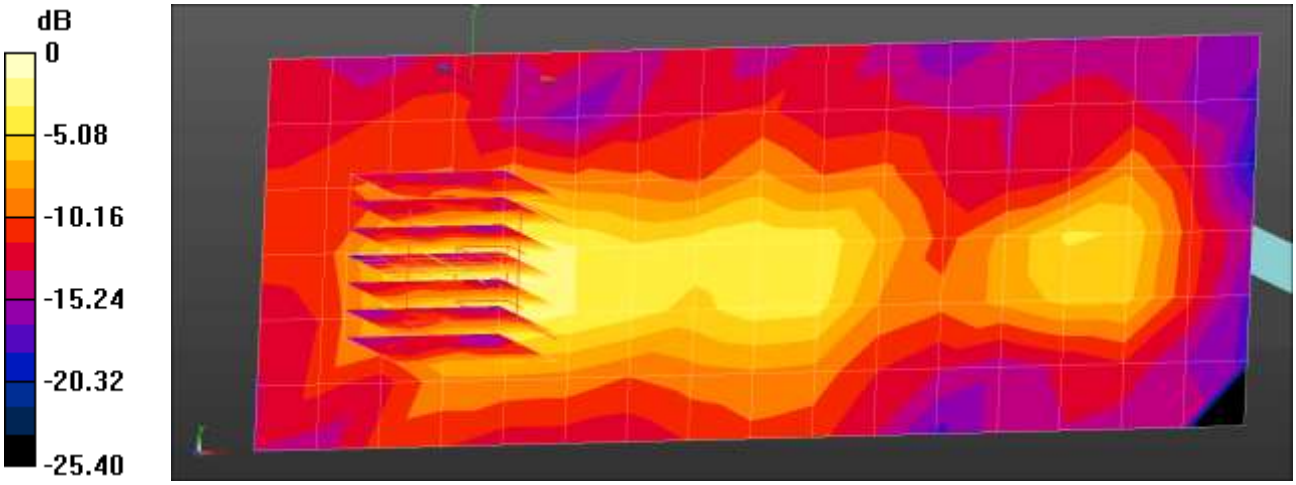
Communication System: UID 0, Bluetooth (0); Frequency: 2480 MHz;Duty Cycle: 1:1.3
Medium parameters used: f = 2480 MHz; σ = 2.004 S/m; ε_r = 52.529; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.74, 7.74, 7.74); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (4);

Bluetooth Body Left DH5 78ch/Area Scan (17x7x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.0351 W/kg

Bluetooth Body Left DH5 78ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.600 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.0650 W/kg
SAR(1 g) = 0.031 W/kg; SAR(10 g) = 0.015 W/kg
Maximum value of SAR (measured) = 0.0522 W/kg



0 dB = 0.0522 W/kg = -12.82 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.1 ℃
Ambient Temperature: 20.3 ℃
Test Date: 04/20/2020
Plot No.: 34

DUT: SM-A516B/DS; Type: Bar

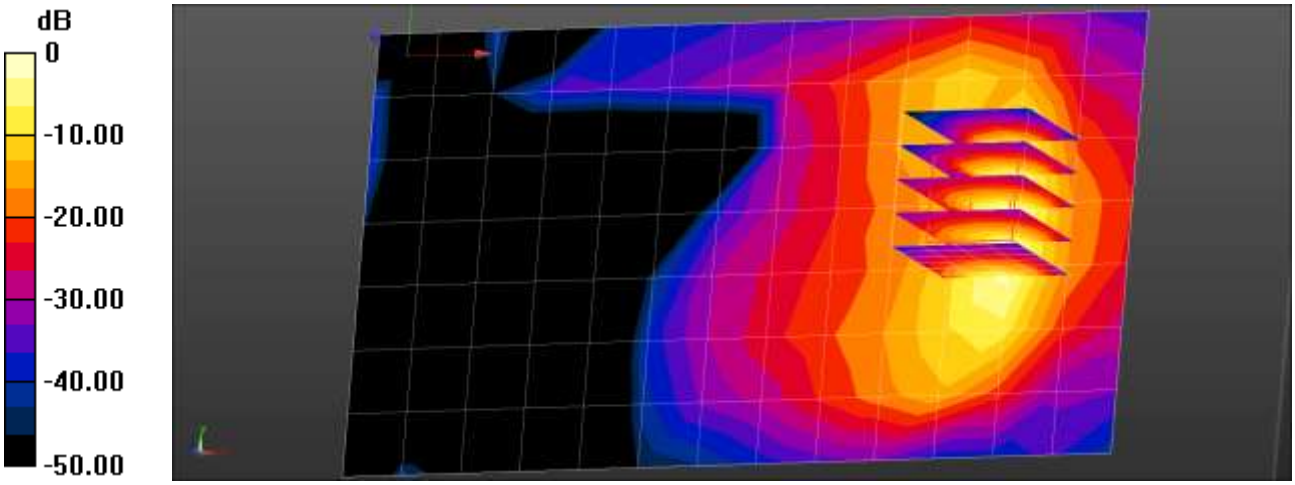
Communication System: UID 0, GSM 1900 4TX (0); Frequency: 1880 MHz;Duty Cycle: 1:2.07491
Medium parameters used: f = 1880 MHz; σ = 1.517 S/m; ε_r = 53.591; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.61, 7.61, 7.61); Calibrated: 2019-11-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

GSM1900 Body Front 4Tx 661ch/Area Scan (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.85 W/kg

GSM1900 Body Front 4Tx 661ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.299 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 5.37 W/kg
SAR(1 g) = 2.38 W/kg; SAR(10 g) = 0.974 W/kg
Maximum value of SAR (measured) = 3.82 W/kg



0 dB = 3.85 W/kg = 5.85 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 19.6 ℃
Ambient Temperature: 19.7 ℃
Test Date: 04/13/2020
Plot No.: 35

DUT: SM-A516B/DS; Type: Bar

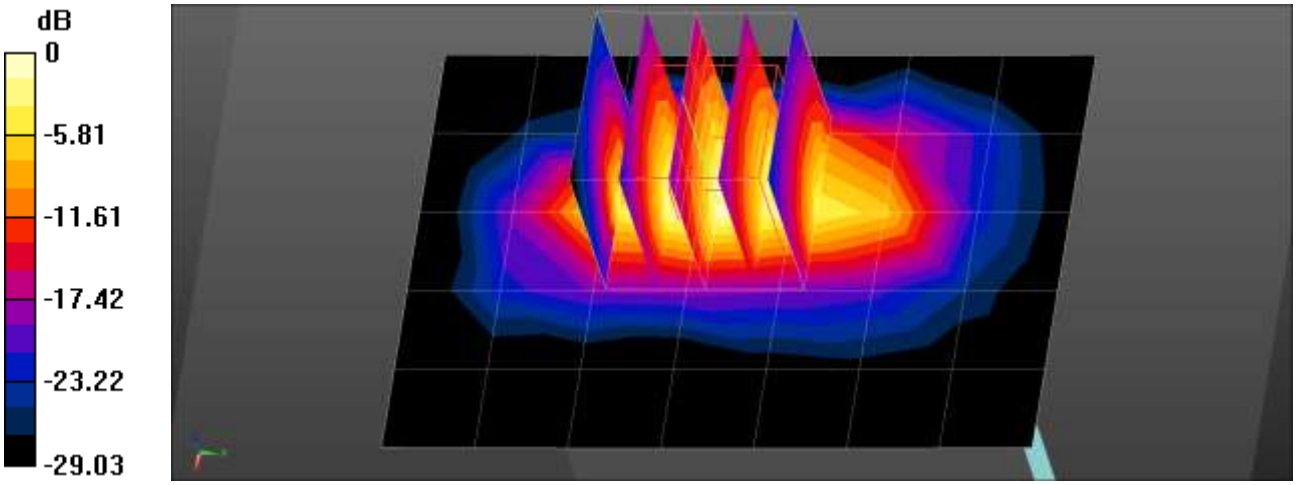
Communication System: UID 0, WCDMA1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.515 S/m; ε_r = 53.569; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.61, 7.61, 7.61); Calibrated: 2019-11-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

WCDMA Band2 Body Bottom 9400ch/Area Scan (6x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 4.62 W/kg

WCDMA Band2 Body Bottom 9400ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.70 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 6.84 W/kg
SAR(1 g) = 2.99 W/kg; SAR(10 g) = 1.21 W/kg
Maximum value of SAR (measured) = 5.32 W/kg



0 dB = 5.32 W/kg = 7.26 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 22.8 ℃
Ambient Temperature: 22.9 ℃
Test Date: 04/14/2020
Plot No.: 36

DUT: SM-A516B/DS; Type: Bar

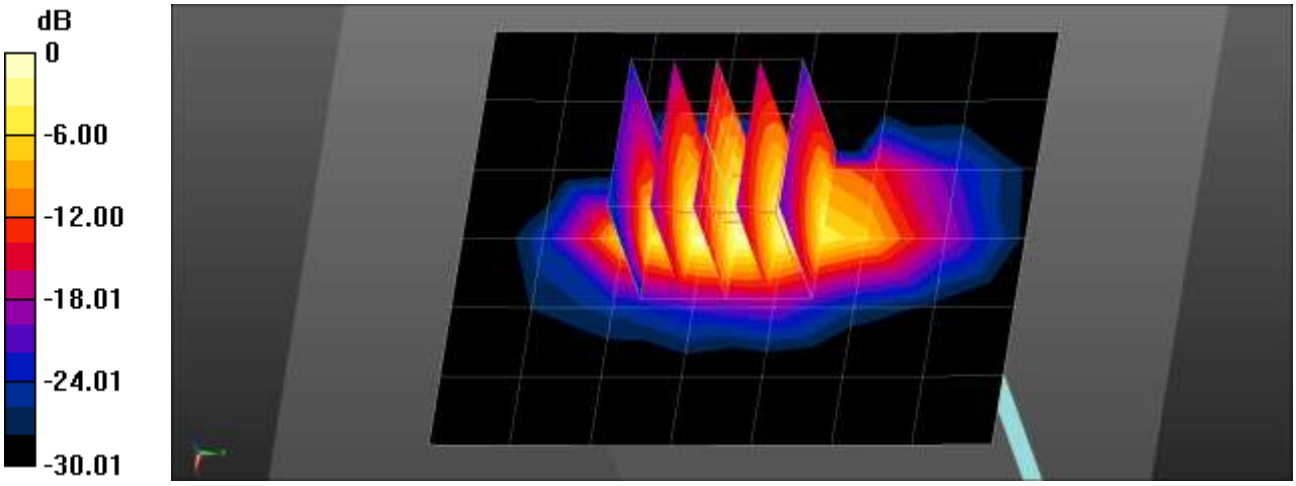
Communication System: UID 0, LTE Band 4 (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.432 S/m; ε_r = 53.87; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(8.3, 8.3, 8.3); Calibrated: 2019-09-27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn868; Calibrated: 2019-09-04
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.10 (4);

LTE band 4 Body Bottom QPSK 20MHz 50RB 0offset 20175ch/Area Scan (7x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.10 W/kg

LTE band 4 Body Bottom QPSK 20MHz 50RB 0offset 20175ch/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 69.47 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 8.85 W/kg
SAR(1 g) = 4.05 W/kg; SAR(10 g) = 1.74 W/kg
Maximum value of SAR (measured) = 7.51 W/kg



0 dB = 7.51 W/kg = 8.76 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Mobile Phone
Liquid Temperature: 20.7 ℃
Ambient Temperature: 20.7 ℃
Test Date: 04/08/2020
Plot No.: 37

DUT: SM-A516B/DS; Type: Bar

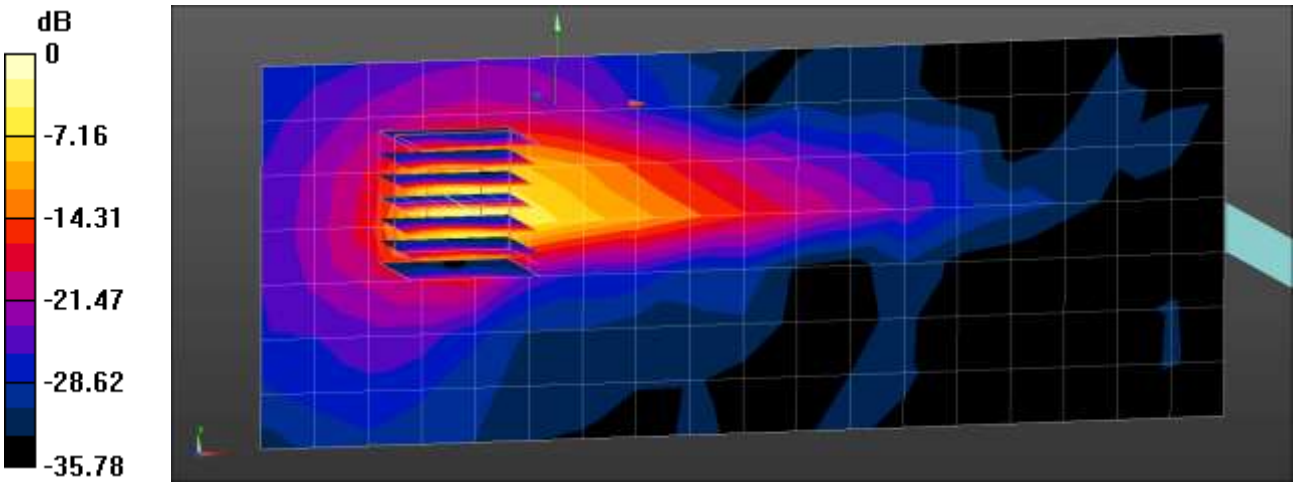
Communication System: UID 0, WIFI 5GHz UNII2A (0); Frequency: 5260 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5260 MHz; σ = 5.454 S/m; ε_r = 48.654; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3967; ConvF(4.51, 4.51, 4.51); Calibrated: 2020-02-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2020-02-26
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

802.11a Body Left 6Mbps 52ch/Area Scan (19x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 7.49 W/kg

802.11a Body Left 6Mbps 52ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 2.310 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 31.7 W/kg
SAR(1 g) = 4.76 W/kg; SAR(10 g) = 1.01 W/kg
Maximum value of SAR (measured) = 12.7 W/kg



0 dB = 12.7 W/kg = 11.04 dBW/kg

Appendix C. – Dipole Verification Plots

■ **Verification Data (750 MHz Head)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 23.0 ℃
Test Date: 03/20/2020

DUT: Dipole 750 MHz D750V3; Type: D750V3

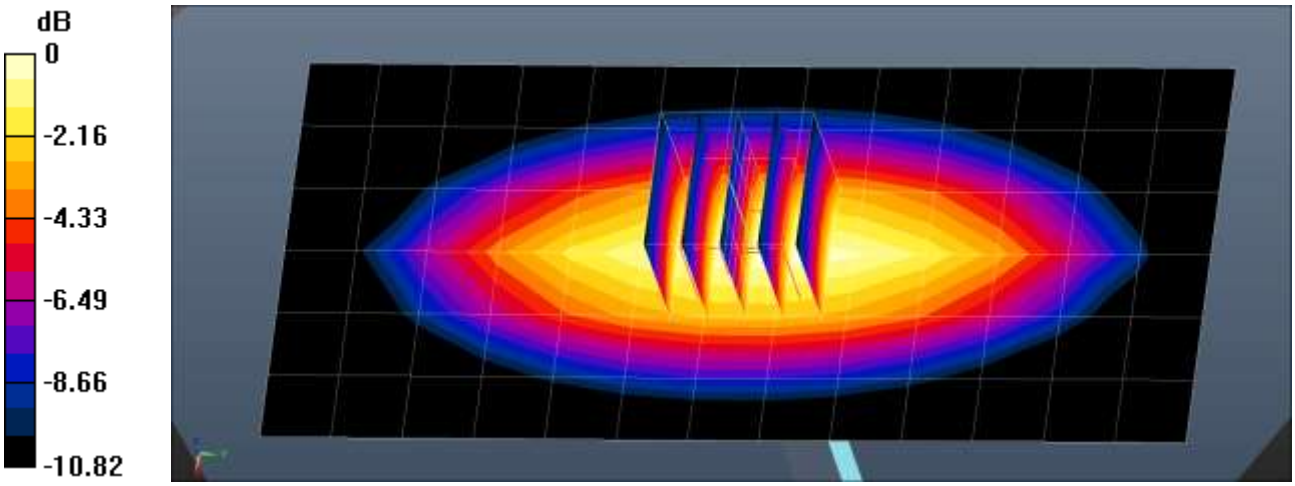
Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.899 S/m; ε_r = 41.741; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN7370; ConvF(10.27, 10.27, 10.27); Calibrated: 2019-08-29;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2020-02-03
- Phantom: SAM with CRP v5.0_Right
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/750MHz Head Verification/Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.569 W/kg

Dipole/750MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.58 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.677 W/kg
SAR(1 g) = 0.419 W/kg; SAR(10 g) = 0.273 W/kg
Maximum value of SAR (measured) = 0.582 W/kg



0 dB = 0.582 W/kg = -2.35 dBW/kg

■ **Verification Data (750 MHz Body)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.6 ℃
Test Date: 03/20/2020

DUT: Dipole 750 MHz D750V3; Type: D750V3

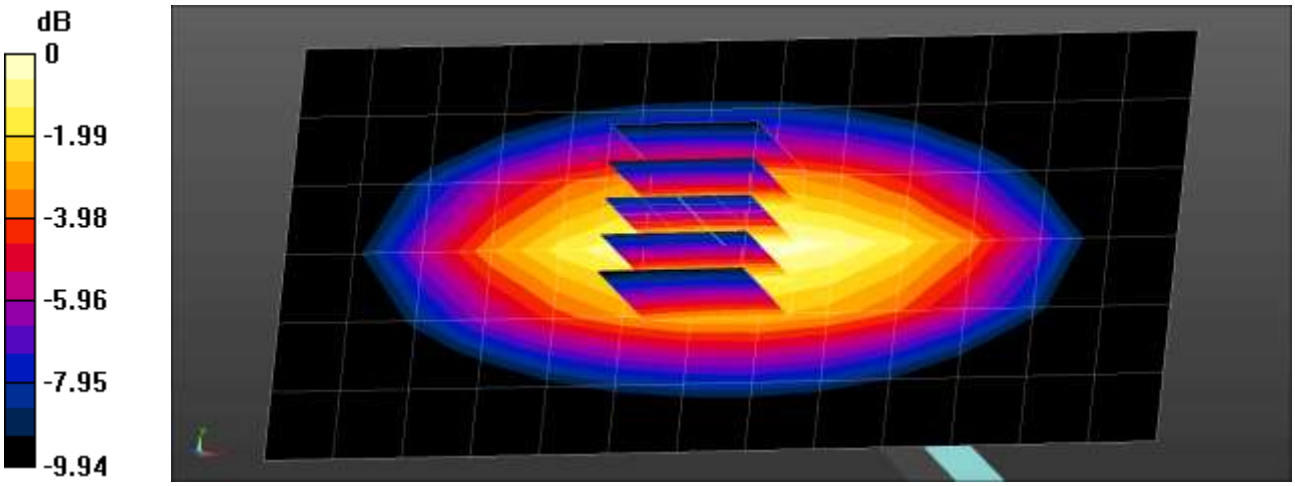
Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.961 S/m; ε_r = 54.383; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(9.88, 9.88, 9.88); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/750MHz Body Verification/Area Scan (14x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.543 W/kg

Dipole/750MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.78 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.631 W/kg
SAR(1 g) = 0.413 W/kg; SAR(10 g) = 0.276 W/kg
Maximum value of SAR (measured) = 0.553 W/kg



0 dB = 0.553 W/kg = -2.57 dBW/kg

■ **Verification Data (835 MHz Head)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 23.0 ℃
Test Date: 03/20/2020

DUT: Dipole 835 MHz D835V2; Type: D835V2

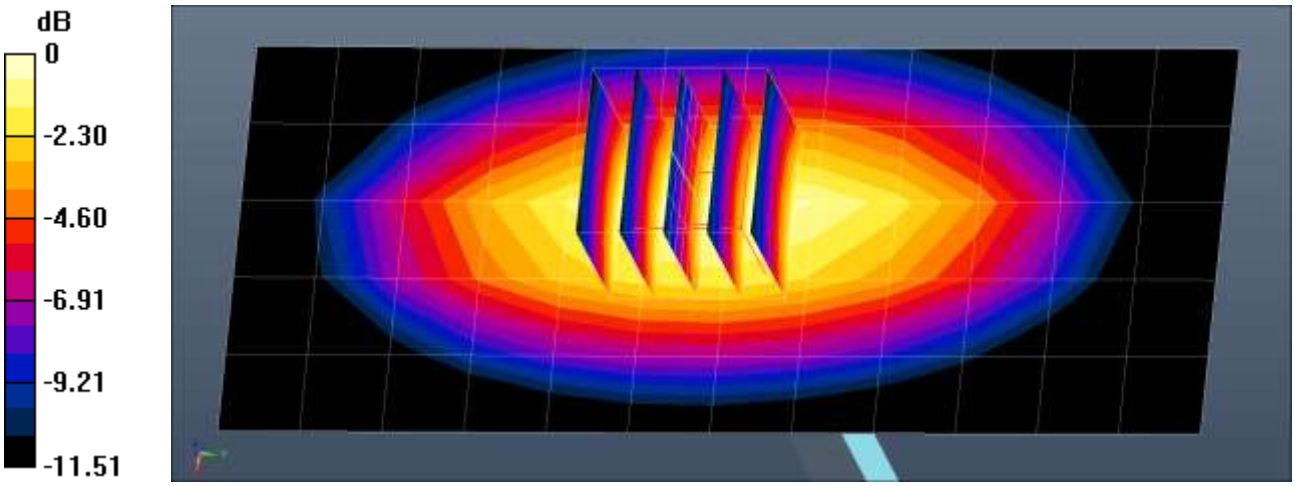
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; σ = 0.938 S/m; ε_r = 42.364; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN7370; ConvF(9.88, 9.88, 9.88); Calibrated: 2019-08-29;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2020-02-03
- Phantom: SAM with CRP v5.0_Right
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/835MHz Head Verification/Area Scan (6x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.657 W/kg

Dipole/835MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.48 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.803 W/kg
SAR(1 g) = 0.495 W/kg; SAR(10 g) = 0.317 W/kg
Maximum value of SAR (measured) = 0.691 W/kg



0 dB = 0.691 W/kg = -1.61 dBW/kg

■ **Verification Data (835 MHz Body)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 21.1 ℃
Test Date: 04/06/2020

DUT: Dipole 835 MHz D835V2; Type: D835V2

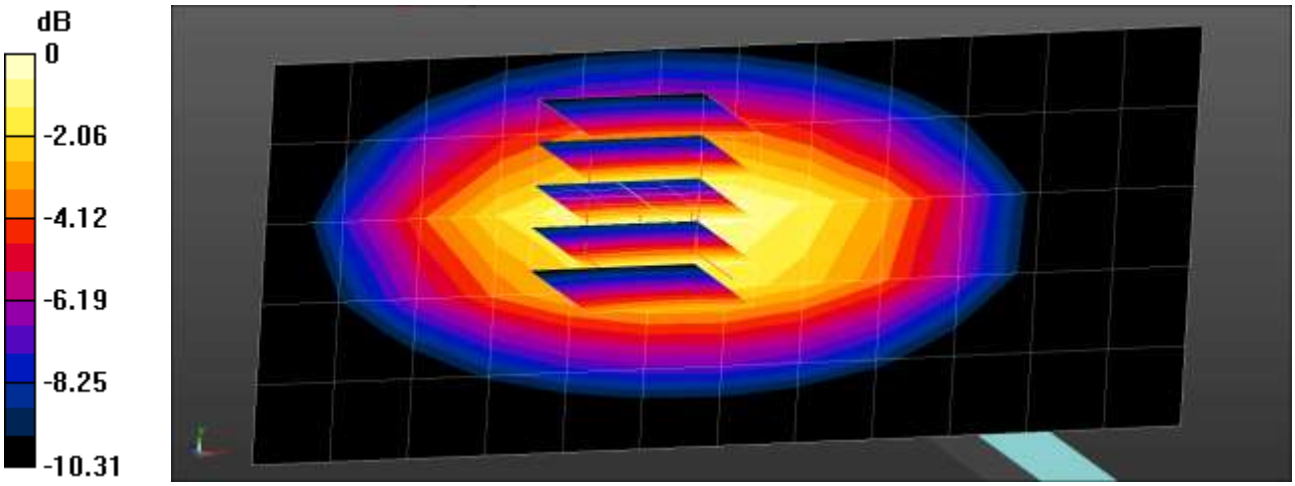
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; σ = 0.959 S/m; ε_r = 53.41; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(8.97, 8.97, 8.97); Calibrated: 2019-11-28;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/835MHz Body Verification/Area Scan (13x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.527 W/kg

Dipole/835MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.93 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.693 W/kg
SAR(1 g) = 0.469 W/kg; SAR(10 g) = 0.308 W/kg
Maximum value of SAR (measured) = 0.547 W/kg



0 dB = 0.547 W/kg = -2.62 dBW/kg

■ **Verification Data (835 MHz Body)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.1 ℃
Test Date: 03/20/2020

DUT: Dipole 835 MHz D835V2; Type: D835V2

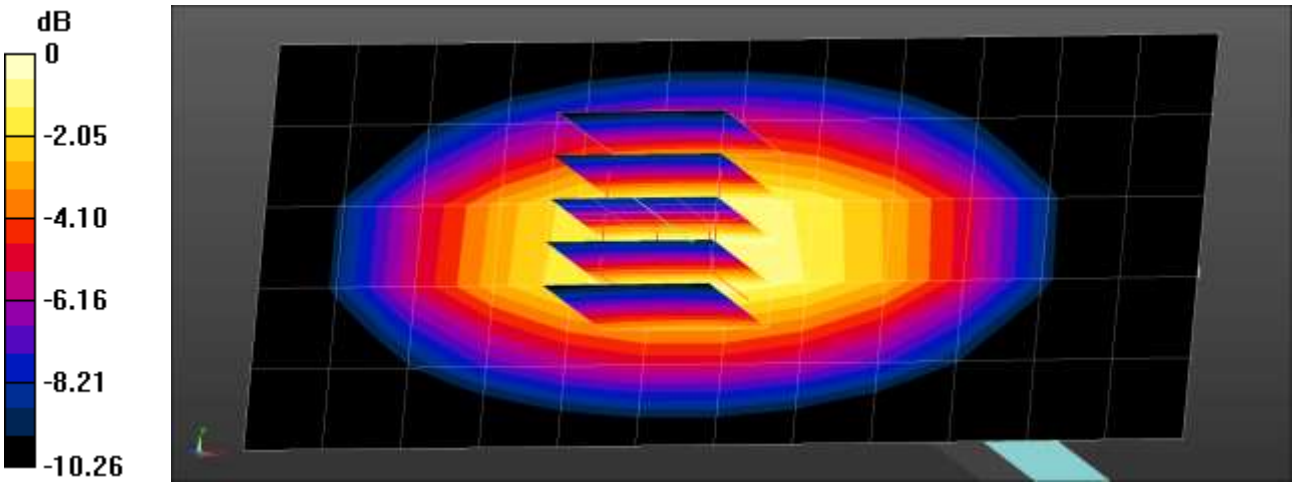
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; σ = 0.962 S/m; ε_r = 56.469; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: ES3DV3 - SN3076; ConvF(5.97, 5.97, 5.97); Calibrated: 2019-07-23;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2019-05-23
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/835MHz Body Verification/Area Scan (13x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.497 W/kg

Dipole/835MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.95 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.735 W/kg
SAR(1 g) = 0.505 W/kg; SAR(10 g) = 0.332 W/kg
Maximum value of SAR (measured) = 0.589 W/kg



0 dB = 0.589 W/kg = -2.30 dBW/kg

■ **Verification Data (835 MHz Body)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.6 ℃
Test Date: 03/20/2020

DUT: Dipole 835 MHz D835V2; Type: D835V2

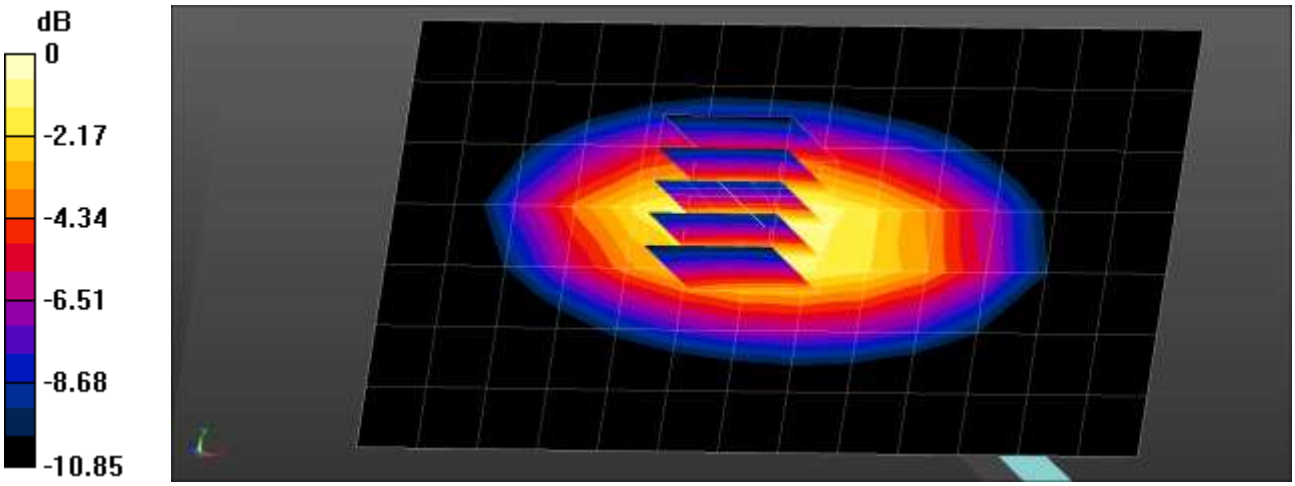
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; σ = 0.96 S/m; ε_r = 53.387; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(9.72, 9.72, 9.72); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/835MHz Body Verification/Area Scan (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.586 W/kg

Dipole/835MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.98 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.745 W/kg
SAR(1 g) = 0.475 W/kg; SAR(10 g) = 0.307 W/kg
Maximum value of SAR (measured) = 0.647 W/kg



0 dB = 0.647 W/kg = -1.89 dBW/kg

■ **Verification Data (1 800 MHz Head)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.1 ℃
Test Date: 03/20/2020

DUT: Dipole 1800 MHz D1800V2; Type: D1800V2

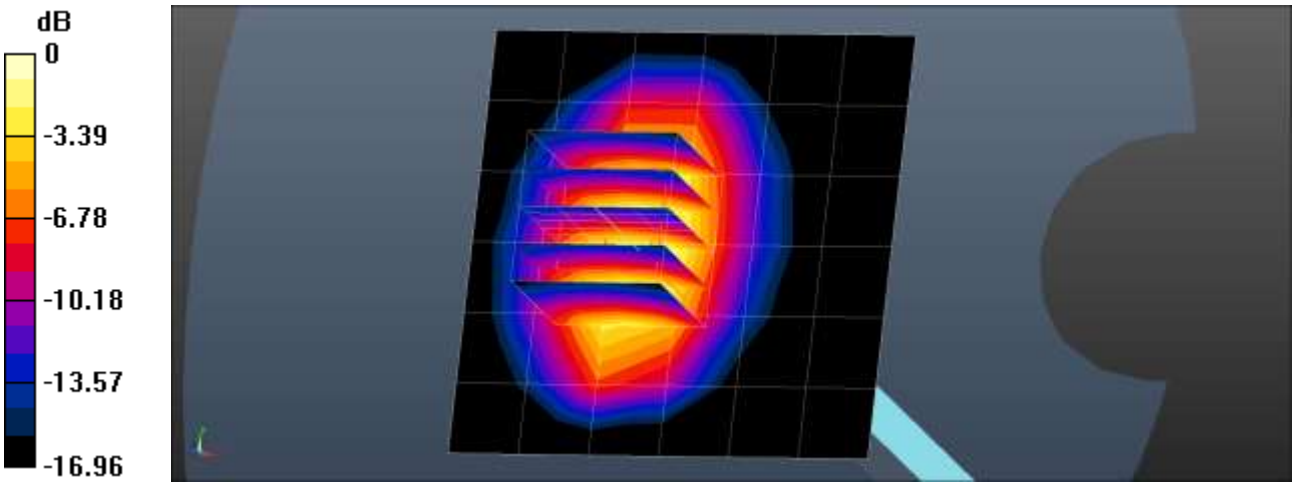
Communication System: UID 0, CW (0); Frequency: 1800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.385 S/m; ε_r = 40.196; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3076; ConvF(5.34, 5.34, 5.34); Calibrated: 2019-07-23;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2019-05-23
- Phantom: SAM_Left_20170913
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/1800MHz Head Verification/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.01 W/kg

Dipole/1800MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.51 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 3.58 W/kg
SAR(1 g) = 2.02 W/kg; SAR(10 g) = 1.07 W/kg
Maximum value of SAR (measured) = 2.55 W/kg



0 dB = 2.55 W/kg = 4.07 dBW/kg

■ **Verification Data (1 800 MHz Body)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 22.3 ℃
Test Date: 04/10/2020

DUT: Dipole 1800 MHz D1800V2; Type: D1800V2

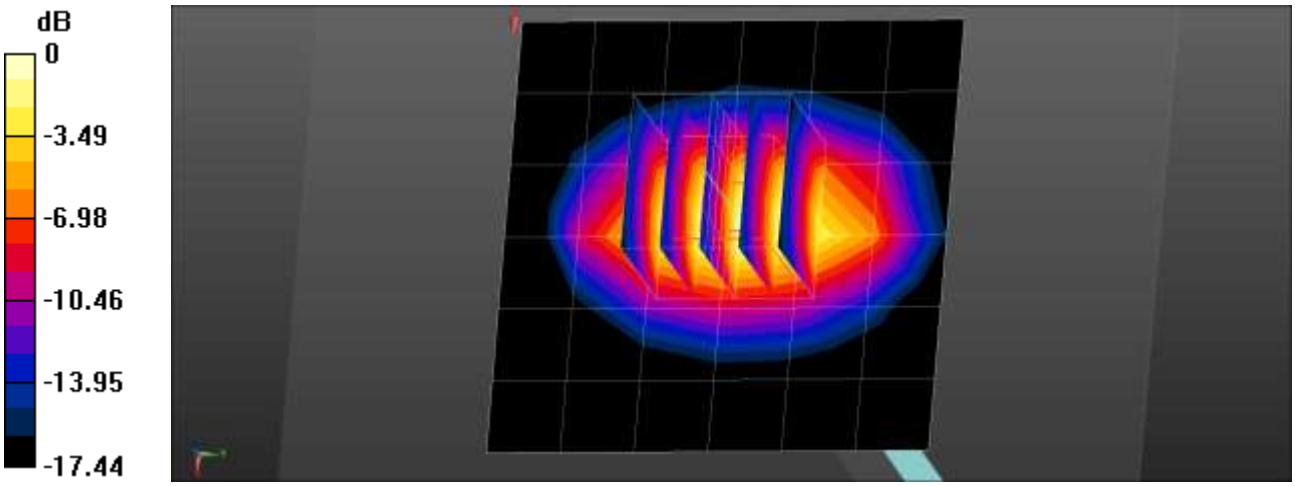
Communication System: UID 0, CW (0); Frequency: 1800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.52 S/m; ε_r = 54.651; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(8.23, 8.23, 8.23); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/1800MHz Body Verification/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.79 W/kg

Dipole/1800MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 44.35 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 3.61 W/kg
SAR(1 g) = 1.92 W/kg; SAR(10 g) = 0.993 W/kg
Maximum value of SAR (measured) = 3.02 W/kg



0 dB = 3.02 W/kg = 4.80 dBW/kg

■ **Verification Data (1 800 MHz Body)**

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	22.8 ℃
Test Date:	04/14/2020

DUT: Dipole 1800 MHz D1800V2; Type: D1800V2

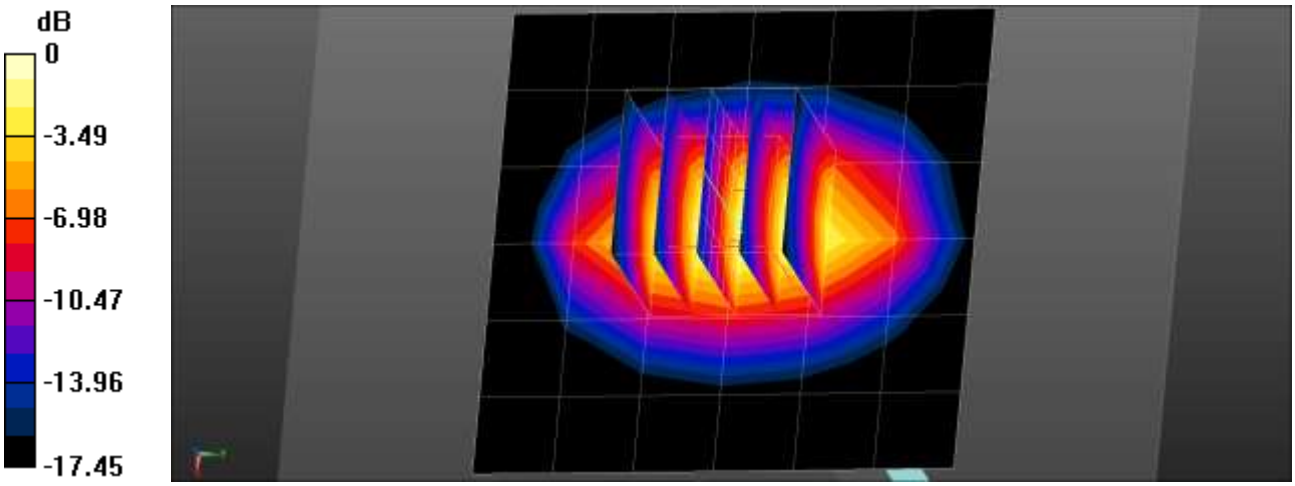
Communication System: UID 0, CW (0); Frequency: 1800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.491 S/m; ε_r = 53.723; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(8.3, 8.3, 8.3); Calibrated: 2019-09-27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn868; Calibrated: 2019-09-04
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/1800MHz Body Verification/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.93 W/kg

Dipole/1800MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 45.84 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.57 W/kg
SAR(1 g) = 1.93 W/kg; SAR(10 g) = 1.01 W/kg
Maximum value of SAR (measured) = 3.01 W/kg



0 dB = 3.01 W/kg = 4.79 dBW/kg

■ **Verification Data (1 900 ㎒ Head)**

Test Laboratory:	HCT CO., LTD
Input Power	0.05 W
Liquid Temp:	21.4 ℃
Test Date:	03/20/2020

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

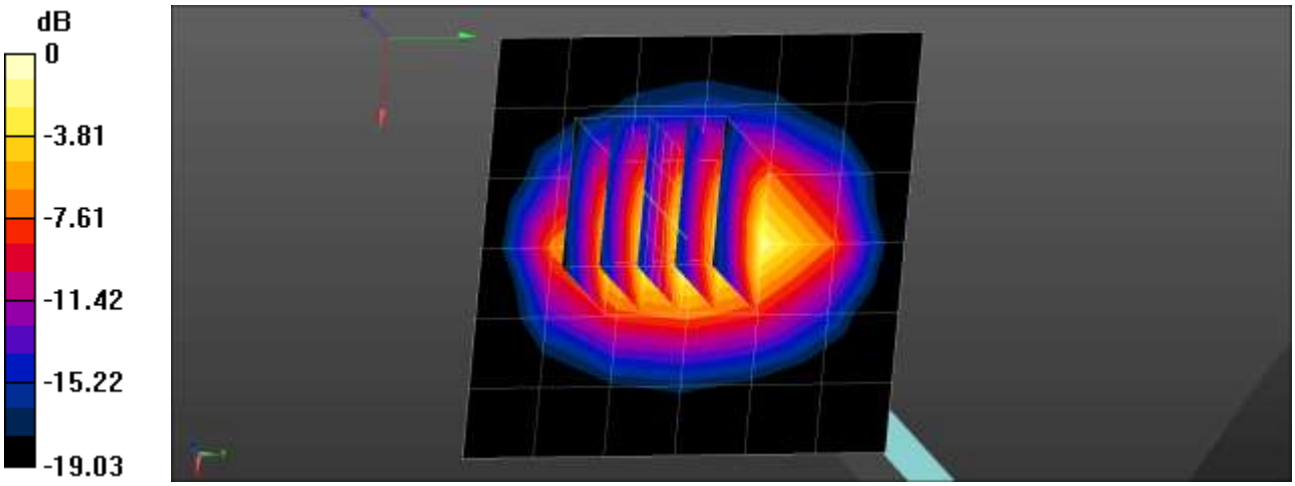
Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.417 S/m; ε_r = 38.117; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.75, 7.75, 7.75); Calibrated: 2019-11-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: Twin-SAM V4.0 Right
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/1900MHz Head Verification/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.19 W/kg

Dipole/1900MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.81 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.92 W/kg
SAR(1 g) = 1.94 W/kg; SAR(10 g) = 0.981 W/kg
Maximum value of SAR (measured) = 3.17 W/kg



0 dB = 3.17 W/kg = 5.01 dBW/kg

■ **Verification Data (1 900 MHz Body)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 21.1 ℃
Test Date: 04/06/2020

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

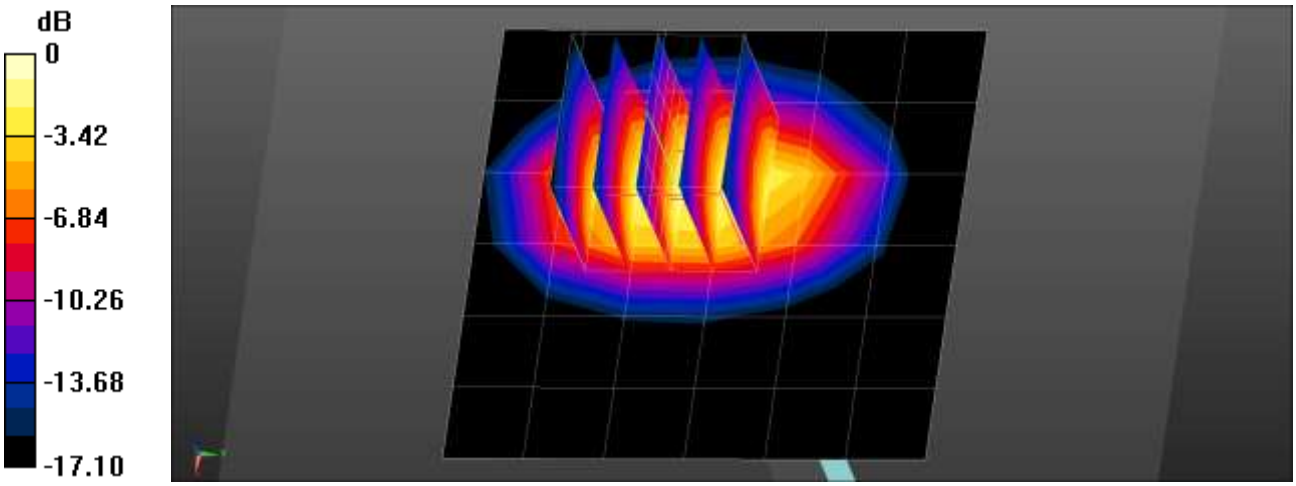
Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.524 S/m; ε_r = 53.518; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.61, 7.61, 7.61); Calibrated: 2019-11-28;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/1900MHz Body Verification/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.19 W/kg

Dipole/1900MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.73 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 3.81 W/kg
SAR(1 g) = 2.13 W/kg; SAR(10 g) = 1.11 W/kg
Maximum value of SAR (measured) = 2.70 W/kg



0 dB = 2.70 W/kg = 4.31 dBW/kg

■ **Verification Data (1 900 MHz Body)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.1 ℃
Test Date: 04/20/2020

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

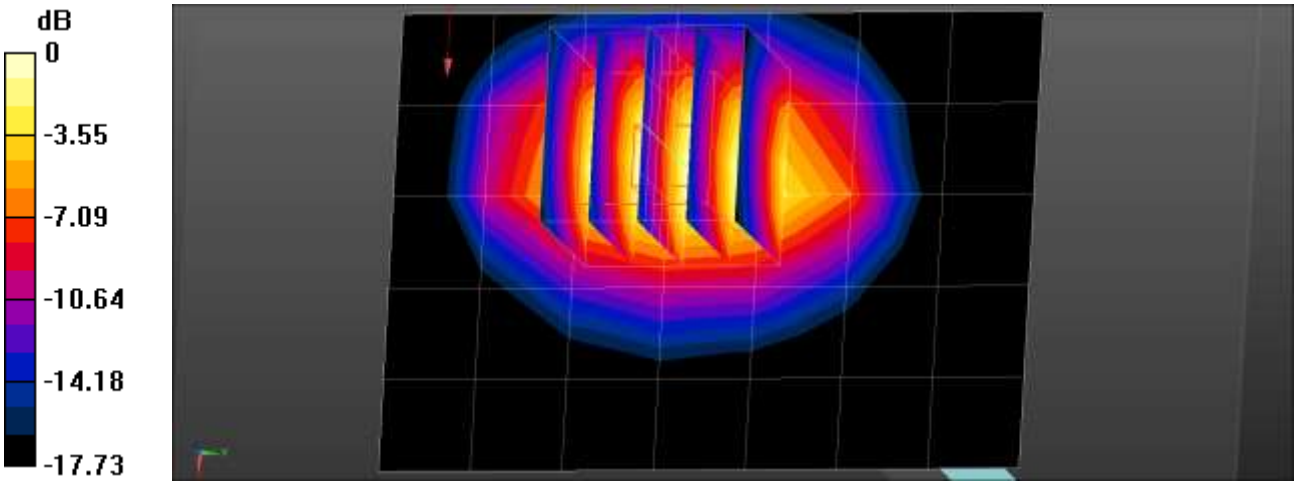
Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.527 S/m; ε_r = 53.518; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.61, 7.61, 7.61); Calibrated: 2019-11-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2019-07-18
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

1900MHz Body Verification/Area Scan (6x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.53 W/kg

1900MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.62 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 1.95 W/kg; SAR(10 g) = 1.02 W/kg
Maximum value of SAR (measured) = 3.00 W/kg



0 dB = 3.00 W/kg = 4.77 dBW/kg

■ **Verification Data (2 450 MHz Head)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 22.5 ℃
Test Date: 04/09/2020

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2

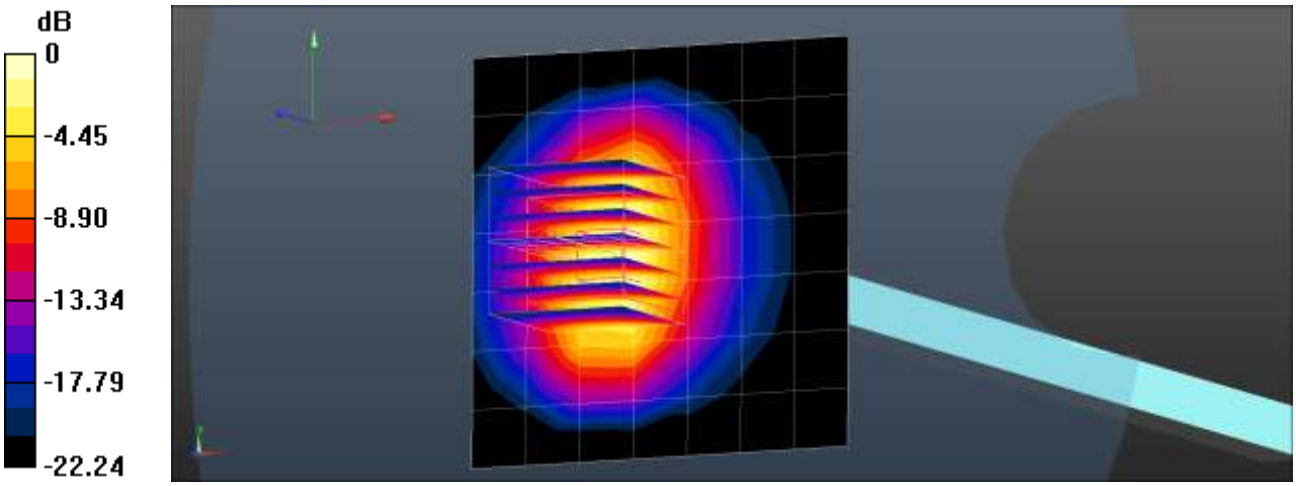
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.81 S/m; ε_r = 39.645; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.6, 7.6, 7.6); Calibrated: 2019-09-27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn868; Calibrated: 2019-09-04
- Phantom: SAM with CRP v5.0_F
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/2450MHz Head Verification/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.63 W/kg

Dipole/2450MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 33.66 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 5.63 W/kg
SAR(1 g) = 2.69 W/kg; SAR(10 g) = 1.23 W/kg
Maximum value of SAR (measured) = 4.56 W/kg



0 dB = 4.56 W/kg = 6.59 dBW/kg

■ **Verification Data (2 450 MHz Head)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 21.0 ℃
Test Date: 03/25/2020

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2

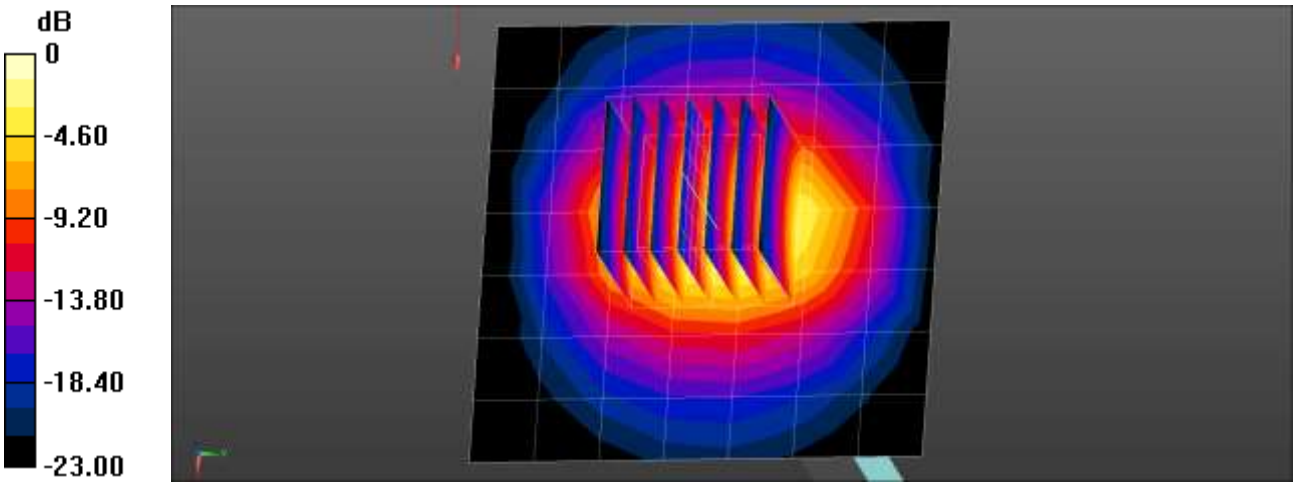
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.809 S/m; ε_r = 38.937; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.61, 7.61, 7.61); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: Twin-SAM V4.0(Left-Left)
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/2450MHz Head Verification/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.81 W/kg

Dipole/2450MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 49.78 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 5.46 W/kg
SAR(1 g) = 2.56 W/kg; SAR(10 g) = 1.17 W/kg
Maximum value of SAR (measured) = 4.36 W/kg



0 dB = 4.36 W/kg = 6.39 dBW/kg

■ **Verification Data (2 450 MHz Body)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 22.5 ℃
Test Date: 04/09/2020

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2

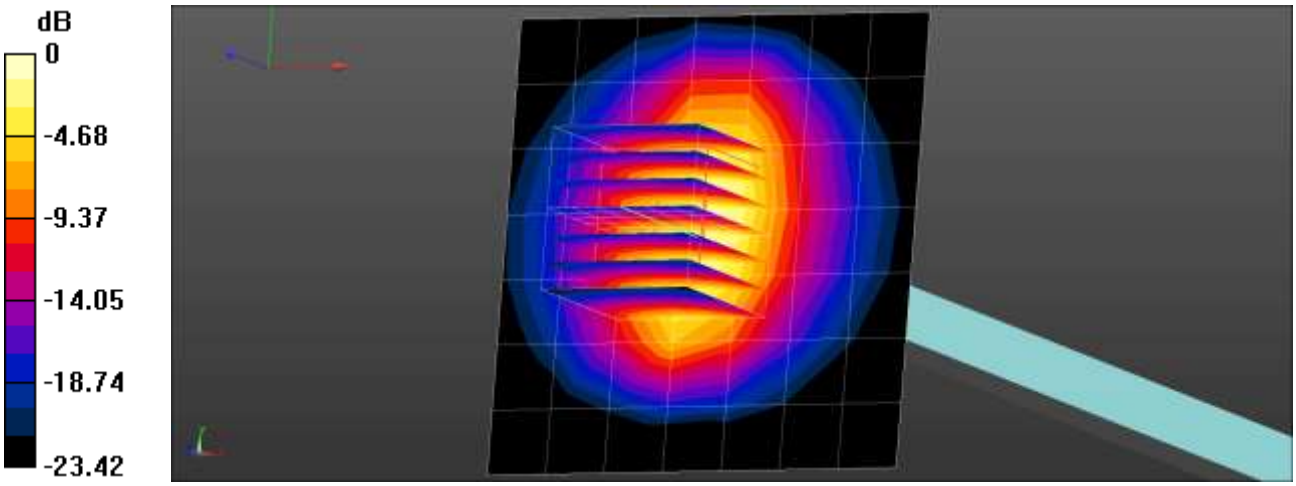
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.946 S/m; ε_r = 53.619; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3968; ConvF(7.68, 7.68, 7.68); Calibrated: 2019-09-27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn868; Calibrated: 2019-09-04
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/2450MHz Body Verification/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.61 W/kg

Dipole/2450MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 48.41 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 5.74 W/kg
SAR(1 g) = 2.65 W/kg; SAR(10 g) = 1.2 W/kg
Maximum value of SAR (measured) = 4.50 W/kg



0 dB = 4.50 W/kg = 6.53 dBW/kg

■ **Verification Data (2 450 MHz Body)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 21.0 ℃
Test Date: 03/25/2020

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2

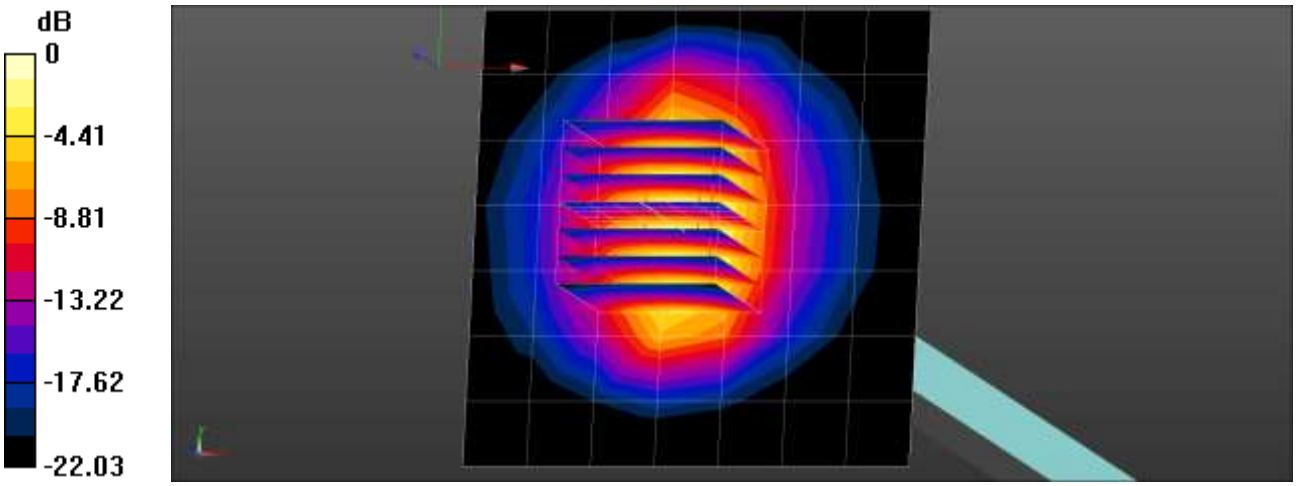
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.968 S/m; ε_r = 52.624; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.74, 7.74, 7.74); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/2450MHz Body Verification (BT)/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.88 W/kg

Dipole/2450MHz Body Verification (BT)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 47.82 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 5.64 W/kg
SAR(1 g) = 2.62 W/kg; SAR(10 g) = 1.19 W/kg
Maximum value of SAR (measured) = 4.49 W/kg



0 dB = 4.49 W/kg = 6.52 dBW/kg

■ **Verification Data (2 600 MHz Head)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.1 ℃
Test Date: 03/23/2020

DUT: Dipole 2600 MHz D2600V2; Type: D2600V2

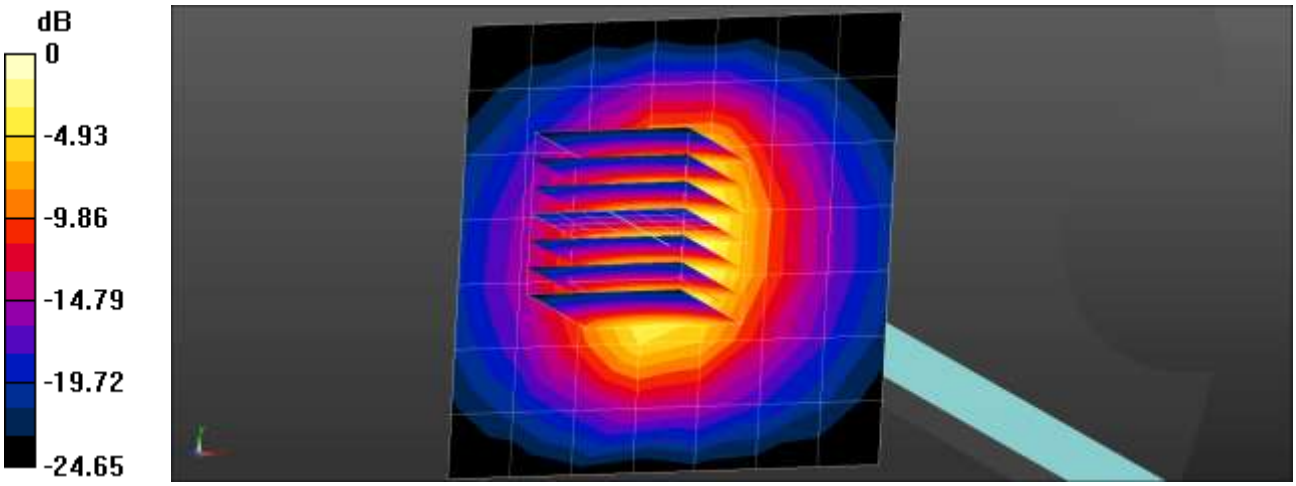
Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 1.943 S/m; ε_r = 37.874; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.32, 7.32, 7.32); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: Twin-SAM V4.0(Left-Left)
- Measurement SW: DASY52, Version 52.10 (2);

Dipole/2600MHz Head Verification/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.76 W/kg

Dipole/2600MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.73 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 6.47 W/kg
SAR(1 g) = 2.81 W/kg; SAR(10 g) = 1.23 W/kg
Maximum value of SAR (measured) = 5.04 W/kg



0 dB = 5.04 W/kg = 7.02 dBW/kg

■ **Verification Data (2 600 MHz Body)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.2 ℃
Test Date: 03/24/2020

DUT: Dipole 2600 MHz D2600V2; Type: D2600V2

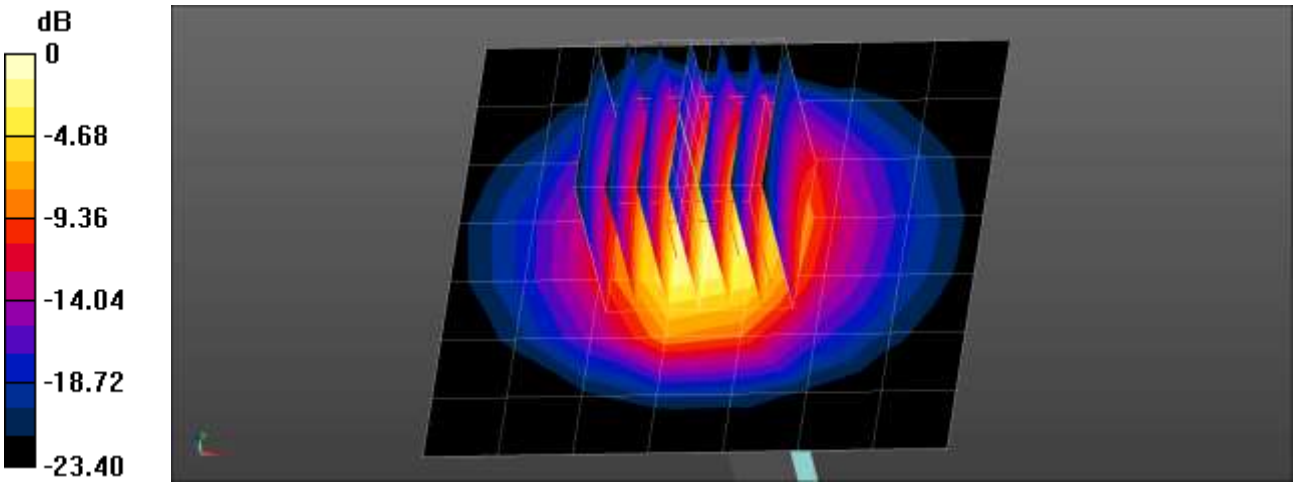
Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 2.078 S/m; ε_r = 54.778; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.34, 7.34, 7.34); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2019-11-18
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/2600MHz Body Verification/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.58 W/kg

Dipole/2600MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 50.36 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 6.42 W/kg
SAR(1 g) = 2.83 W/kg; SAR(10 g) = 1.22 W/kg
Maximum value of SAR (measured) = 5.05 W/kg



0 dB = 5.05 W/kg = 7.03 dBW/kg

■ **Verification Data (5 250 MHz Head)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.3 ℃
Test Date: 04/08/2020

DUT: Dipole D5GHzV2; Type: D5GHzV2

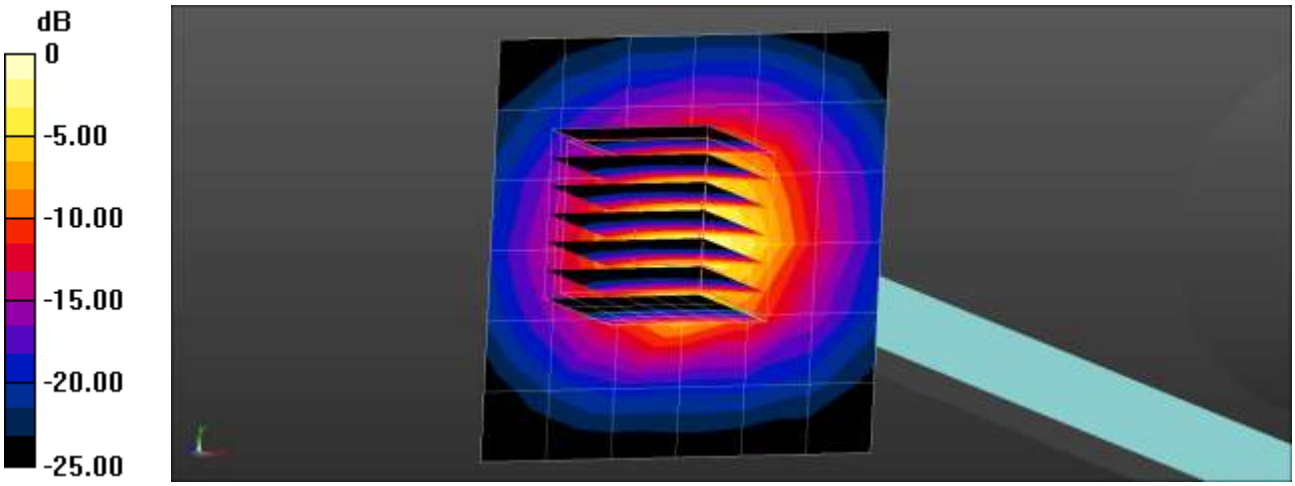
Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5250 MHz; σ = 4.615 S/m; ε_r = 37.118; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN7370; ConvF(5.18, 5.18, 5.18); Calibrated: 2019-08-29;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2020-02-03
- Phantom: Twin-SAM V4.0 (Left-Right)
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/5250MHz Head Verification/Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 10.6 W/kg

Dipole/5250MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 52.98 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 19.3 W/kg
SAR(1 g) = 4.2 W/kg; SAR(10 g) = 1.17 W/kg
Maximum value of SAR (measured) = 10.9 W/kg



0 dB = 10.9 W/kg = 10.37 dBW/kg

■ **Verification Data (5 250 MHz Body)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.7 ℃
Test Date: 04/08/2020

DUT: Dipole D5GHzV2; Type: D5GHzV2

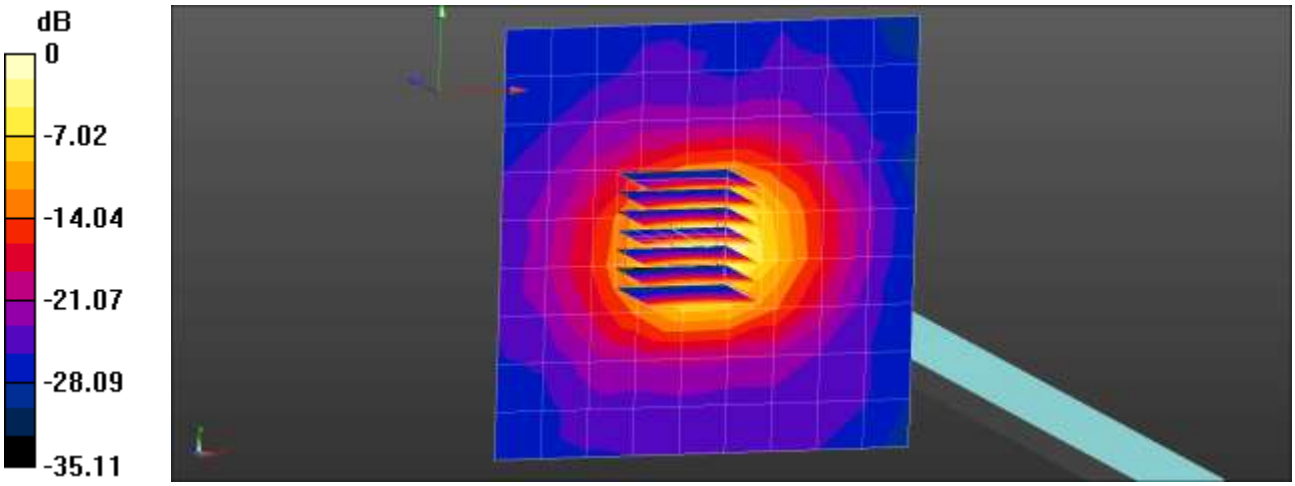
Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5250 MHz; σ = 5.382 S/m; ε_r = 48.589; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3967; ConvF(4.51, 4.51, 4.51); Calibrated: 2020-02-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2020-02-26
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/5250MHz Body Verification/Area Scan (10x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 6.40 W/kg

Dipole/5250MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 47.77 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 16.1 W/kg
SAR(1 g) = 3.82 W/kg; SAR(10 g) = 1.08 W/kg
Maximum value of SAR (measured) = 9.84 W/kg



0 dB = 9.84 W/kg = 9.93 dBW/kg

■ **Verification Data (5 600 MHz Head)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.3 ℃
Test Date: 04/08/2020

DUT: Dipole D5GHzV2; Type: D5GHzV2

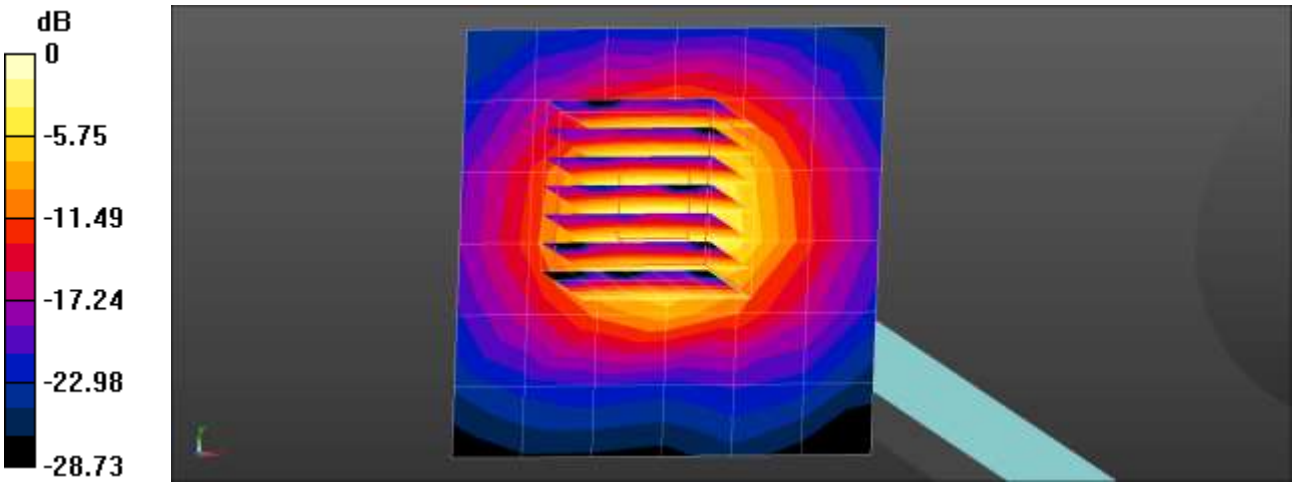
Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.007 S/m; ε_r = 36.626; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN7370; ConvF(4.51, 4.51, 4.51); Calibrated: 2019-08-29;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2020-02-03
- Phantom: Twin-SAM V4.0 (Left-Right)
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/5600MHz Head Verification/Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 9.93 W/kg

Dipole/5600MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 49.56 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 21.3 W/kg
SAR(1 g) = 4.28 W/kg; SAR(10 g) = 1.21 W/kg
Maximum value of SAR (measured) = 11.4 W/kg



0 dB = 9.93 W/kg = 9.97 dBW/kg

■ **Verification Data (5 600 MHz Body)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.7 ℃
Test Date: 04/08/2020

DUT: Dipole D5GHzV2; Type: D5GHzV2

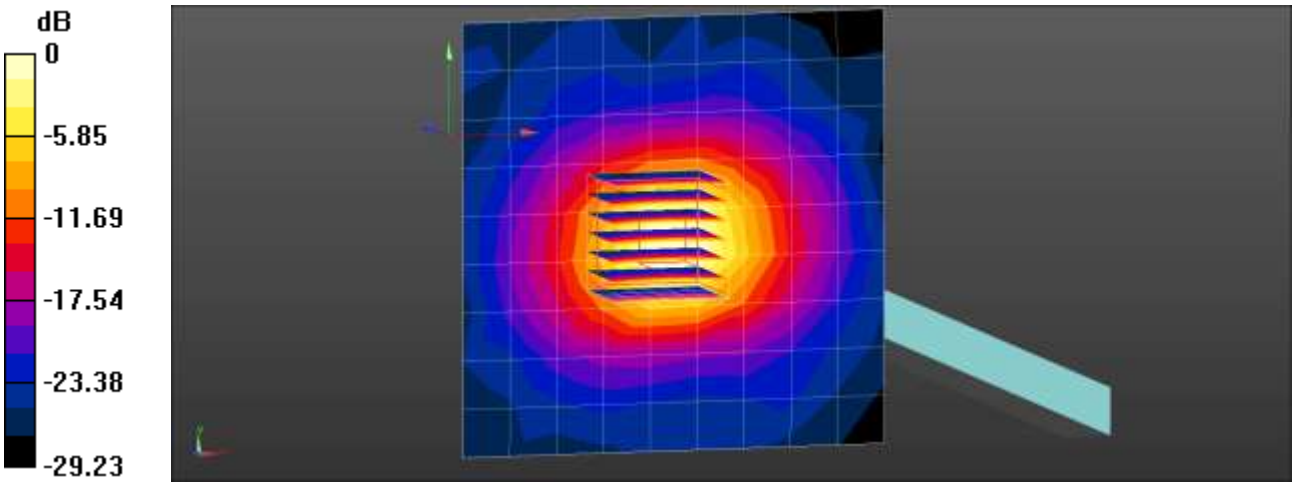
Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.926 S/m; ε_r = 48.396; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3967; ConvF(4.1, 4.1, 4.1); Calibrated: 2020-02-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2020-02-26
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/5600MHz Body Verification/Area Scan (10x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 7.13 W/kg

Dipole/5600MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 47.50 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 18.9 W/kg
SAR(1 g) = 4.07 W/kg; SAR(10 g) = 1.15 W/kg
Maximum value of SAR (measured) = 10.8 W/kg



0 dB = 7.13 W/kg = 8.53 dBW/kg

■ **Verification Data (5 750 MHz Head)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.3 ℃
Test Date: 04/08/2020

DUT: Dipole D5GHzV2; Type: D5GHzV2

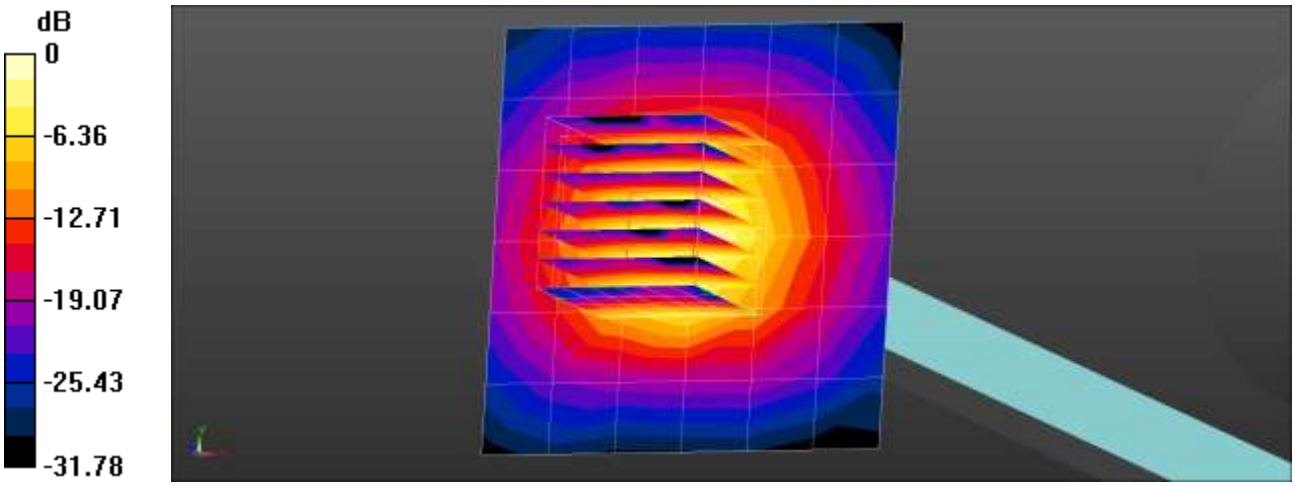
Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5750 MHz; σ = 5.178 S/m; ε_r = 36.369; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN7370; ConvF(4.75, 4.75, 4.75); Calibrated: 2019-08-29;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2020-02-03
- Phantom: Twin-SAM V4.0 (Left-Right)
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/5750MHz Head Verification/Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 10.7 W/kg

Dipole/5750MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 50.10 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 21.0 W/kg
SAR(1 g) = 4.07 W/kg; SAR(10 g) = 1.11 W/kg
Maximum value of SAR (measured) = 10.9 W/kg



0 dB = 10.7 W/kg = 10.29 dBW/kg

■ **Verification Data (5 750 MHz Body)**

Test Laboratory: HCT CO., LTD
Input Power 0.05 W
Liquid Temp: 20.7 ℃
Test Date: 04/08/2020

DUT: Dipole D5GHzV2; Type: D5GHzV2

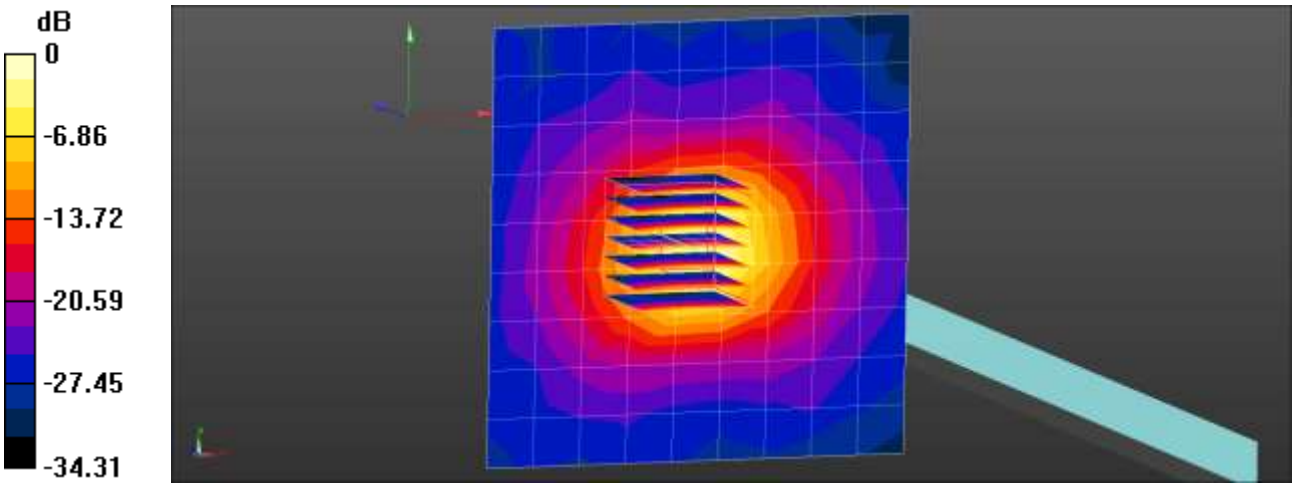
Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5750 MHz; σ = 6.124 S/m; ε_r = 48.463; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3967; ConvF(4.22, 4.22, 4.22); Calibrated: 2020-02-25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2020-02-26
- Phantom: MFP_V5.1C (20deg probe tilt)
- Measurement SW: DASY52, Version 52.10 (4);

Dipole/5750MHz Body Verification/Area Scan (10x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 6.66 W/kg

Dipole/5750MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 45.37 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 18.2 W/kg
SAR(1 g) = 3.77 W/kg; SAR(10 g) = 1.05 W/kg
Maximum value of SAR (measured) = 10.1 W/kg



0 dB = 10.1 W/kg = 10.04 dBW/kg

Appendix D. – SAR Tissue Characterization

The brain and muscle mixtures consist of a viscous gel using hydrox-ethyl cellulose (HEC) gelling agent and saline solution (see Table 3.1). Preservation with a bacteriacide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The mixture characterizations used for the brain and muscle tissue simulating liquids are according to the data by C. Gabriel and G. Harts grove.

Ingredients (% by weight)	Frequency (MHz)											
	750		835		1 750		1 900		2 450 – 2 700		3500 - 5 800	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	41.1	51.7	40.45	53.06	52.6	68.8	54.9	70.17	71.88	73.2	65.52	78.66
Salt (NaCl)	1.4	0.9	1.45	0.94	0.4	0.2	0.18	0.39	0.16	0.1	0.0	0.0
Sugar	57.0	47.2	57.0	44.9	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
HEC	0.2	0	1.0	1.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Bactericide	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.97	0.0	17.24	10.67
DGBE	0.0	0.0	0.0	0.0	47	31	44.92	29.44	7.99	26.7	0.0	0.0
Diethylene glycol hexyl ether	-	-	-	-	-	-	-	-	-	-	-	-

Salt:	99 % Pure Sodium Chloride	Sugar:	98 % Pure Sucrose
Water:	De-ionized, 16M resistivity	HEC:	Hydroxyethyl Cellulose
DGBE:	99 % Di(ethylene glycol) butyl ether,[2-(2-butoxyethoxy) ethanol]		
Triton X-100(ultra-pure):	Polyethylene glycol mono[4-(1,1,3,3-tetramethylbutyl)phenyl] ether		

Composition of the Tissue Equivalent Matter

Appendix E. – SAR Tissue Characterization

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

SAR System No.	Probe	Probe Type	Probe Calibration Point		Dipole	Date	Dielectric Parameters		CW Validation			Modulation Validation		
							Measured Permittivity	Measured Conductivity	Sensitivity	Probe Linearity	Probe Isotropy	MOD. Type	Duty Factor	PAR
12	7370	EX3DV4	Head	750	1014	2019-09-11	41.7	0.87	PASS	PASS	PASS	N/A	N/A	N/A
1	3863	EX3DV4	Body	750	1014	2019-06-07	55.6	0.98	PASS	PASS	PASS	N/A	N/A	N/A
12	7370	EX3DV4	Head	835	441	2019-09-11	41.6	0.91	PASS	PASS	PASS	N/A	N/A	N/A
12	7370	EX3DV4	Head	835	441	2019-09-11	41.6	0.91	PASS	PASS	PASS	GMSK	PASS	N/A
3	3797	EX3DV4	Body	835	441	2019-12-10	55.3	0.98	PASS	PASS	PASS	GMSK	PASS	N/A
11	3076	ES3DV3	Body	835	441	2019-09-03	55.5	0.97	PASS	PASS	PASS	GMSK	PASS	N/A
1	3863	EX3DV4	Body	835	441	2019-09-03	55.4	0.97	PASS	PASS	PASS	N/A	N/A	N/A
11	3076	ES3DV3	Head	1750	2d015	2019-10-01	40.1	1.39	PASS	PASS	PASS	N/A	N/A	N/A
1	3863	EX3DV4	Body	1750	2d015	2019-10-01	53.5	1.52	PASS	PASS	PASS	N/A	N/A	N/A
9	3968	EX3DV4	Body	1750	2d015	2019-10-11	53.5	1.52	PASS	PASS	PASS	N/A	N/A	N/A
3	3797	EX3DV4	Head	1900	5d061	2020-01-31	40.1	1.42	PASS	PASS	PASS	GMSK	PASS	N/A
3	3797	EX3DV4	Body	1900	5d061	2020-01-31	53.3	1.53	PASS	PASS	PASS	GMSK	PASS	N/A
9	3968	EX3DV4	Head	2450	743	2020-03-02	39.4	1.81	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Head	2450	743	2020-03-02	39.4	1.81	PASS	PASS	PASS	OFDM	N/A	PASS
9	3968	EX3DV4	Body	2450	743	2020-03-02	52.8	1.94	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Body	2450	743	2020-03-02	52.8	1.94	PASS	PASS	PASS	OFDM	N/A	PASS
1	3863	EX3DV4	Head	2600	1106	2019-09-28	39.2	1.96	PASS	PASS	PASS	TDD	PASS	N/A
1	3863	EX3DV4	Body	2600	1106	2019-09-28	52.4	2.16	PASS	PASS	PASS	TDD	PASS	N/A
12	7370	EX3DV4	Head	5250	1107	2019-10-11	35.6	4.71	PASS	PASS	PASS	OFDM	N/A	PASS
12	7370	EX3DV4	Head	5600	1107	2019-10-11	35.3	5.04	PASS	PASS	PASS	OFDM	N/A	PASS
12	7370	EX3DV4	Head	5750	1107	2019-10-11	35.8	5.25	PASS	PASS	PASS	OFDM	N/A	PASS
8	3967	EX3DV4	Body	5250	1107	2020-03-11	48.8	5.36	PASS	PASS	PASS	OFDM	N/A	PASS
8	3967	EX3DV4	Body	5600	1107	2020-03-11	48.3	5.78	PASS	PASS	PASS	OFDM	N/A	PASS
8	3967	EX3DV4	Body	5750	1107	2020-03-11	48.4	5.95	PASS	PASS	PASS	OFDM	N/A	PASS

SAR System Validation Summary 1g

SAR System No.	Probe	Probe Type	Probe Calibration Point		Dipole	Date	Dielectric Parameters		CW Validation			Modulation Validation		
							Measured Permittivity	Measured Conductivity	Sensitivity	Probe Linearity	Probe Isotropy	MOD. Type	Duty Factor	PAR
9	3968	EX3DV4	Body	1750	2d015	2019-10-11	53.5	1.52	PASS	PASS	PASS	N/A	N/A	N/A
3	3797	EX3DV4	Body	1900	5d061	2020-01-31	53.3	1.53	PASS	PASS	PASS	GMSK	PASS	N/A
8	3967	EX3DV4	Body	5250	1107	2020-03-11	48.8	5.36	PASS	PASS	PASS	OFDM	N/A	PASS
8	3967	EX3DV4	Body	5600	1107	2020-03-11	48.3	5.78	PASS	PASS	PASS	OFDM	N/A	PASS

SAR System Validation Summary – Extremity SAR Considerations

Note;
All measurement were performed using probes calibrated for CW signal only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664 D01v01r04. SAR system were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5 dB), such as OFDM according to KDB 865664 D01v01r04.