On your side

# TEST REPORT

FCCSARTestfor certification ofA3LSMM307FN

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-SR-1908-FC005-R4

DATE OF ISSUE
Aug. 31, 2019

HCT Co., Ltd.
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FCC SAR Test for certification

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FCC ID
A3LSMM307FN

| | |
|---|---|
| Applicant | SAMSUNG Electronics Co., Ltd<br>129, Samsung-ro, Yeongtong-gu, Suwon-Si, Gyeonggi-do, 16677 Rep. of Korea |
| Product Name<br>Model Name | Mobile Phone<br>SM-M307FN/DS |
| Date of Test | Aug. 01, 2019 ~ Aug. 09, 2019 |
| FCC Rule Part(s) | CFR §2.1093 |
| Test Results | Refer to the present document |

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.

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

Tested by
Da-sol, Lee

Technical Manager
In-ho, Park

HCT CO., LTD.
Soo Chan Lee
SooChan Lee / CEO
Accredited by KOLAS, Republic of KOREA

# REVISION HISTORY

The revision history for this test reportis shown in table.

| Revision No. | Date of Issue | Description |
|---|---|---|
| 0 | Aug.14, 2019 | Initial Release |
| 1 | Aug.21, 2019 | Revised Page 12,14<br>Revised page 132 Attachment 5 |
| 2 | Aug.29, 2019 | Revised page 1, 2, 3 6 |
| 3 | Aug.30, 2019 | Revised page 79,136,137,140 |
| 4 | Aug.31, 2019 | Revised Sec 4.7 |

This laboratory is not accredited for the test results marked *.
The above Test Report is the accredited test result by KOLAS(Korea Laboratory Accreditation Scheme)

# CONTENTS

## 1. Test Regulations

The tests were performed according to the following regulations:

| | |
|---|---|
| **Test Standard** | IEEE Standard 1528-2013& KDB procedures |
| **Test Method** | - FCC KDB Publication 941225 D01 3G SAR Procedures v03r01<br>- FCC KDB Publication 941225 D06 Hot Spot SAR v02r01<br>- FCC KDB Publication 941225 D05 SAR for LTE Devices v02r05<br>- FCC KDB Publication 941225 D05A LTE Rel.10 KDB Inquiry sheet v01r02<br>- FCC KDB Publication 248227 D01 802.11 Wi-Fi SAR v02r02<br>- FCC KDB Publication 447498 D01 General SAR Guidance v06<br>- FCC KDB Publication 648474 D04 Handset SAR v01r03<br>- FCC KDB Publication 616217 D04 v01r02 (Proximity Sensor)<br>- FCC KDB Publication 865664 D01 SAR measurement 100 ㎒ to 6 ㎓ v01r04<br>- FCC KDB Publication 865664 D02 SAR Reporting v01r02<br>- October 2013 TCB Workshop Notes (GPRS testing criteria)<br>- April 2015 TCB Workshop Notes (Simultaneous transmission summation clarified) |

## 2. Test Location

### 2.1Test Laboratory

| | |
|---|---|
| **Company Name** | HCT Co., Ltd. |
| **Address** | 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA |
| **Telephone** | 031-645-6300 |
| **Fax.** | 031-645-6401 |

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 (Tesing No. KT197) |

## 3. Information of the EUT

### 3.1General Information of the EUT

| | |
|---|---|
| **Model Name** | SM-M307FN/DS |
| **Equipment Type** | Mobile Phone |
| **FCC ID** | A3LSMM307FN |
| **Application Type:** | Certification |
| **Applicant** | SAMSUNG Electronics Co., Ltd. |

3.2 Attestation of test result of device under test

| The Highest Reported SAR (W/Kg) | | | | | | |
|---|---|---|---|---|---|---|
| Band | Tx. Frequency | Equipment Class | Reported SAR (W/kg) | | | |
| | | | 1g Head | 1g Body-Worn | 1g Hotspot | 10g Extremity |
| GSM/GPRS/EDGE 850 | 824.2 ㎒~ 848.8 ㎒ | PCE | 0.36 | 0.35 | 0.57 | N/A |
| GSM/GPRS/EDGE 1900 | 1 850.2 ㎒ ~ 1 909.8 ㎒ | PCE | 0.14 | 0.18 | 0.45 | N/A |
| UMTS 850 | 826.4 ㎒ ~ 846.6 ㎒ | PCE | 0.28 | 0.31 | 0.44 | N/A |
| UMTS1900 | 1 852.4 ㎒ ~ 1 907.6 ㎒ | PCE | 0.23 | 0.44 | 0.71 | N/A |
| LTE Band 5 (Cell) | 824.7 ㎒~ 848.3 ㎒ | PCE | 0.26 | 0.32 | 0.41 | N/A |
| LTE TDD Band 41 | 2 498.5 ㎒~2 687.5 ㎒ | PCE | 0.15 | 0.30 | 0.60 | N/A |
| 802.11b | 2 412 ㎒ ~ 2 462 ㎒ | DTS | <0.10 | <0.10 | 0.11 | N/A |
| U-NII-1 | 5 180 ㎒~ 5 240 ㎒ | NII | N/A | N/A | N/A | N/A |
| U-NII-2A | 5 260 ㎒~ 5 320 ㎒ | NII | 0.191 | 0.69 | N/A | 1.79 |
| U-NII-2C | 5500 ㎒ ~ 5720 ㎒ | NII | 0.221 | <0.10 | N/A | 0.83 |
| U-NII-3 | 5745 ㎒ ~ 5 825 ㎒ | NII | 0.219 | <0.10 | 0.15 | N/A |
| Bluetooth | 2 402 ㎒ ~ 2 480 ㎒ | DSS | <0.10 | <0.10 | <0.10 | N/A |
| Simultaneous SAR per KDB 690783 D01v01r03 | | | 0.58 | 1.12 | 0.87 | N/A |
| Date(s) of Tests: | Aug.01, 2019 ~ Aug. 09, 2019 | | | | | |

# 4. Device Under Test Description

## 4.1DUT specification

| Device Wireless specification overview | | |
|---|---|---|
| Band & Mode | Operating Mode | Tx Frequency |
| GSM850 | Voice / Data | 824.2 ㎒ ~ 848.8 ㎒ |
| GSM1900 | Voice / Data | 1850.2 ㎒ ~ 1909.8 ㎒ |
| UMTS 850 | Voice / Data | 826.4 ㎒ ~ 846.6 ㎒ |
| UMTS1900 | Voice / Data | 1 852.4 ㎒ ~ 1 907.6 ㎒ |
| LTE Band 5 (Cell) | Voice / Data | 824.7 ㎒ ~ 848.3 ㎒ |
| LTE TDD Band 41 | Voice / Data | 2 498.5 ㎒~2 687.5 ㎒ |
| U-NII-1 | Voice / Data | 5180 ㎒~5240 ㎒ |
| U-NII-2A | Voice / Data | 5260 ㎒ ~ 5320 ㎒ |
| U-NII-2C | Voice / Data | 5500 ㎒~ 5720 ㎒ |
| U-NII-3 | Voice / Data | 5745 ㎒ ~ 5825 ㎒ |
| 2.4 ㎓ WLAN | Data | 2412 ㎒~ 2462 ㎒ |
| Bluetooth / LE 5.0 | Data | 2 402 ㎒~ 2 480 ㎒ |
| ANT+ | Data | 2 402 ㎒ ~ 2 480 ㎒ |
| NFC | Data | 13.56 ㎒ |

| Device Description | | |
|---|---|---|
| Device Dimension | Overall (Length x Width): 159.1mm x 75.1 mm<br>Overall Diagonal: 165mm<br>Display Diagonal: 157mm | |
| Battery Information | Standard (Li-ion Polymer Battery) | |
| | Battery Model Name: EB-BM207ABY | |
| HW version | REV1.0 | |
| SW version | A307FNDS.001 | |
| Device Serial Numbers | Mode | Serial Number |
| | LTE Band 5, LTE Band 41, GSM 850 | SGH0349M |
| | UMTS 850, UMTS 1900 | SGF5513M |
| | GSM1 900, Bluetooth, 2.4 ㎓ WLAN | SGH0384M |
| | 5 ㎓ WLAN | SGH0362M |
| | The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics are within operational tolerances expected for production units. | |

### 4.2Power Reduction for SAR

This device utilizes a power reduction mechanism 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 selecton 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 .

## 4.3Nominal 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.

### 4.3.1Maximum 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 | 34.0 | 34.0 | 31.0 | 29.0 | 28.0 | 27.5 | 25.0 | 23.5 | 22.0 |
| | Nominal | 33.0 | 33.0 | 30.0 | 28.0 | 27.0 | 26.5 | 24.0 | 22.5 | 21.0 |
| GSM/GPRS/EDGE1900 | Maximum | 31.0 | 31.0 | 28.5 | 26.5 | 25.5 | 26.0 | 24.0 | 23.0 | 21.0 |
| | Nominal | 30.0 | 30.0 | 27.5 | 25.5 | 24.5 | 25.0 | 23.0 | 22.0 | 20.0 |

| Mode / Band | | Modulated Average (dBm) | | | |
|---|---|---|---|---|---|
| | | 3GPP WCDMA | 3GPP HSDPA | 3GPP HSUPA | DC-HSDPA |
| UMTS Band 5 (850 ㎒) | Maximum | 25.0 | 24.0 | 24.0 | 24.0 |
| | Nominal | 24.0 | 23.0 | 23.0 | 23.0 |
| UMTS Band 2 (1900 ㎒) | Maximum | 24.0 | 23.5 | 23.5 | 23.5 |
| | Nominal | 23.0 | 22.5 | 22.5 | 22.5 |

| Mode / Band | | Modulated Average (dBm) |
|---|---|---|
| LTE Band 5 (Cell) | Maximum | 25.0 |
| | Nominal | 24.0 |
| LTE TDD Band 41 | Maximum | 25.0 |
| | Nominal | 24.0 |

4.3.2Reduced PCE Power (Gripsensor)

| 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/EDGE1900 Grip sensor | Maximum | 30 | 27 | 24.5 | 22.5 | 21.5 | 22 | 20 | 19.5 | 17.5 |
| | Nominal | 29 | 26 | 23.5 | 21.5 | 20.5 | 21 | 19 | 18.5 | 16.5 |

| Mode / Band | | Modulated Average (dBm) | | | |
|---|---|---|---|---|---|
| | | 3GPP WCDMA | 3GPP HSDPA | 3GPP HSUPA | DC-HSDPA |
| UMTS Band 2 (1900 ㎒) Grip sensor | Maximum | 23 | 22 | 22 | 22 |
| | Nominal | 22 | 21 | 21 | 21 |

4.3.3MaximumWLAN Power

| Mode / Band | | | Modulated Average (dBm) | | | | |
|---|---|---|---|---|---|---|---|
| Mode | Channel | | 802.11b | 802.11g | | 802.11n | |
| | | | 1~11Mbps | 6~36Mbps | 48~54Mbps | MCS0~4 | MCS5~7 |
| 2.4GHzWIFI | Ch.1~ Ch.11 | Maximum | 18.5 | 18.5 | 16 | 18.5 | 16 |
| | | Nominal | 17.5 | 17.5 | 15 | 17.5 | 15 |

| Mode / Band | | | Modulated Average (dBm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 11a | | 11b | 11g | 11n | | 11ac | |
| | | | 6~36Mbps | 48~54Mbps | N/A | N/A | MCS0~4 | MCS5~7 | MCS0~4 | MCS5~8 |
| 5GHzWIFI (20 ㎒ (Inactive) | (U-NII-1) 5200 ㎒ | Maximum | 16 (CH36:15) | 13 | N/A | N/A | 16 (CH36:15) | 13 | 16 (CH36:15) | 13 |
| | | Nominal | 15 (CH36:14) | 12 | N/A | N/A | 15 (CH36:14) | 12 | 15 (CH36:14) | 12 |
| | (U-NII-2A) 5300 ㎒ | Maximum | 16 | 12 | N/A | N/A | 16 | 12 | 16 | 12 |
| | | Nominal | 15 | 11 | N/A | N/A | 15 | 11 | 15 | 11 |
| | (U-NII-2C) 5500 ㎒ | Maximum | 16 | 12.5 | N/A | N/A | 16 (Ch 100 :12.5) | 12.5 (Ch 100 :12.5) | 16 | 12.5 |
| | | Nominal | 15 | 11.5 | N/A | N/A | 15 (Ch 100 :11.5) | 11.5 (Ch 100 :11.5) | 15 | 11.5 |
| | (U-NII-3) 5800 ㎒ | Maximum | 16 | 13 | N/A | N/A | 16 | 13 | 16 | 13 |
| | | Nominal | 15 | 12 | N/A | N/A | 15 | 12 | 15 | 12 |
| 5GHzWIFI (40 ㎒) (Inactive) | (U-NII-1) 5200 ㎒ | Maximum | N/A | N/A | N/A | N/A | 14 (CH38: 12.5) | 12.5 (CH38: 12.5) | 14 (CH38: 12.5) | 12.5 (CH38: 12.5) |
| | | Nominal | N/A | N/A | N/A | N/A | 13 (CH38: 11.5) | 11.5 (CH38: 11.5) | 13 (CH38: 11.5) | 11.5 (CH38: 11.5) |
| | (U-NII-2A) 5300 ㎒ | Maximum | N/A | N/A | N/A | N/A | 14 (Ch62 : 11) | 12 (Ch62 : 11) | 14 (Ch62 : 11) | 12 (Ch62 : 11) |
| | | Nominal | N/A | N/A | N/A | N/A | 13 (Ch62 : 10) | 11 (Ch62 : 10) | 13 (Ch62 : 10) | 11 (Ch62 : 10) |
| | (U-NII-2C) 5500 ㎒ | Maximum | N/A | N/A | N/A | N/A | 14 (Ch102 : 10) | 13 (Ch102 : 10) | 14 (Ch102 : 10) | 13 (Ch102 : 10) |
| | | Nominal | N/A | N/A | N/A | N/A | 13 (Ch102 : 9) | 12 (Ch102 : 9) | 13 (Ch102 : 9) | 12 (Ch102 : 9) |
| | (U-NII-3) 5800 ㎒ | Maximum | N/A | N/A | N/A | N/A | 14 | 13.5 | 14 | 13.5 |
| | | Nominal | N/A | N/A | N/A | N/A | 13 | 12.5 | 13 | 12.5 |
| 5GHzWIFI (80 ㎒) (Inactive) | (U-NII-1) 5200 ㎒ | Maximum | N/A | N/A | N/A | N/A | N/A | N/A | 8.5 | 8.5 |
| | | Nominal | N/A | N/A | N/A | N/A | N/A | N/A | 7.5 | 7.5 |
| | (U-NII-2A) 5300 ㎒ | Maximum | N/A | N/A | N/A | N/A | N/A | N/A | 9.5 | 9.5 |
| | | Nominal | N/A | N/A | N/A | N/A | N/A | N/A | 8.5 | 8.5 |
| | (U-NII-2C) 5500 ㎒ | Maximum | N/A | N/A | N/A | N/A | N/A | N/A | 14 (Ch106:10) | 13 (Ch106:10) |
| | | Nominal | N/A | N/A | N/A | N/A | N/A | N/A | 13 (Ch106:9) | 12 (Ch106:9) |
| | (U-NII-3) 5800 ㎒ | Maximum | N/A | N/A | N/A | N/A | N/A | N/A | 14 | 13 |
| | | Nominal | N/A | N/A | N/A | N/A | N/A | N/A | 13 | 12 |

4.3.4Reduced WLAN Power (Held to ear)

| Mode / Band | | Modulated Average (dBm) | | | | | |
|---|---|---|---|---|---|---|---|
| Mode | Channel | | 802.11b | 802.11g | | 802.11n | |
| | | | 1~11Mbps | 6~36Mbps | 48~54Mbps | MCS0~4 | MCS5~7 |
| 2.4GHzWIFI | Ch.1~ Ch.11 | Maximum | 16 | 16 | 16 | 16 | 16 |
| | | Nominal | 15 | 15 | 15 | 15 | 15 |

| Mode / Band | | | Modulated Average (dBm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 11a | | 11b | 11g | 11n | | 11ac | |
| | | | 6~36Mbps | 48~54Mbps | N/A | N/A | MCS0~4 | MCS5~7 | MCS0~4 | MCS5~8 |
| 5GHzWIFI (20 ㎒) (Active) | (U-NII-1) 5200 ㎒ | Maximum | 14 | 13 | N/A | N/A | 14 | 13 | 14 | 13 |
| | | Nominal | 13 | 12 | N/A | N/A | 13 | 12 | 13 | 12 |
| | (U-NII-2A) 5300 ㎒ | Maximum | 14 | 12 | N/A | N/A | 14 | 12 | 14 | 12 |
| | | Nominal | 13 | 11 | N/A | N/A | 13 | 11 | 13 | 11 |
| | (U-NII-2C) 5500 ㎒ | Maximum | 14 | 12.5 | N/A | N/A | 14 (Ch100:12.5) | 12.5 (Ch100:12.5) | 14 | 12.5 |
| | | Nominal | 13 | 11.5 | N/A | N/A | 13 (Ch100:11.5) | 11.5 (Ch 100:11.5) | 13 | 11.5 |
| | (U-NII-3) 5800 ㎒ | Maximum | 14 | 13 | N/A | N/A | 14 | 13 | 14 | 13 |
| | | Nominal | 13 | 12 | N/A | N/A | 13 | 12 | 13 | 12 |
| 5GHzWIFI (40 ㎒) (Active) | (U-NII-1) 5200 ㎒ | Maximum | N/A | N/A | N/A | N/A | 14 (CH38: 12.5) | 12.5 (CH38: 12.5) | 14 (CH38: 12.5) | 12.5 (CH38: 12.5) |
| | | Nominal | N/A | N/A | N/A | N/A | 13 (CH38: 11.5) | 11.5 (CH38: 11.5) | 13 (CH38: 11.5) | 11.5 (CH38: 11.5) |
| | (U-NII-2A) 5300 ㎒ | Maximum | N/A | N/A | N/A | N/A | 14 (Ch62 : 11) | 12 (Ch62 : 11) | 14 (Ch62 : 11) | 12 (Ch62 : 11) |
| | | Nominal | N/A | N/A | N/A | N/A | 13 (Ch62 : 10) | 11 (Ch62 : 10) | 13 (Ch62 : 10) | 11 (Ch62 : 10) |
| | (U-NII-2C) 5500 ㎒ | Maximum | N/A | N/A | N/A | N/A | 14 (Ch102:10) | 13 (Ch102:10) | 14 (Ch102:10) | 13 (Ch102:10) |
| | | Nominal | N/A | N/A | N/A | N/A | 13 (Ch102:9) | 12 (Ch102:9) | 13 (Ch102:9) | 12 (Ch102:9) |
| | (U-NII-3) 5800 ㎒ | Maximum | N/A | N/A | N/A | N/A | 14 | 13.5 | 14 | 13.5 |
| | | Nominal | N/A | N/A | N/A | N/A | 13 | 12.5 | 13 | 12.5 |
| 5GHzWIFI (80 ㎒) (Active) | (U-NII-1) 5200 ㎒ | Maximum | N/A | N/A | N/A | N/A | N/A | N/A | 8.5 | 8.5 |
| | | Nominal | N/A | N/A | N/A | N/A | N/A | N/A | 7.5 | 7.5 |
| | (U-NII-2A) 5300 ㎒ | Maximum | N/A | N/A | N/A | N/A | N/A | N/A | 9.5 | 9.5 |
| | | Nominal | N/A | N/A | N/A | N/A | N/A | N/A | 8.5 | 8.5 |
| | (U-NII-2C) 5500 ㎒ | Maximum | N/A | N/A | N/A | N/A | N/A | N/A | 14 (Ch106:10) | 13 (Ch106:10) |
| | | Nominal | N/A | N/A | N/A | N/A | N/A | N/A | 13 (Ch106:9) | 12 (Ch106:9) |
| | (U-NII-3) 5800 ㎒ | Maximum | N/A | N/A | N/A | N/A | N/A | N/A | 14 | 13 |
| | | Nominal | N/A | N/A | N/A | N/A | N/A | N/A | 13 | 12 |

4.3.5Bluetooth Power

| Mode / Band | | Modulated Average (dBm) |
|---|---|---|
| Bluetooth BR | Maximum | 9.5 |
| | Nominal | 8.5 |
| Bluetooth EDR | Maximum | 7 |
| | Nominal | 6 |
| Bluetooth LE | Maximum | 6.5 |
| | Nominal | 5.5 |

## 4.4LTE Information

| Item. | | Description | | | | |
|---|---|---|---|---|---|---|
| Frequency Range | | LTE Band 5 (Cell) | 824.7 ㎒~ 848.3 ㎒ | | | |
| | | LTE TDD Band 41 | 2 498.5 ㎒~2 687.5 ㎒ | | | |
| Channel Bandwidths | | LTE Band 5 (Cell) | 1.4 ㎒, 3 ㎒, 5 ㎒, 10 ㎒ | | | |
| | | LTE TDD Band 41 | 5 ㎒, 10 ㎒, 15 ㎒, 20 ㎒ | | | |
| Ch. No.& Freq.(㎒) | | Low | Mid | | High | |
| LTE Band 5 | 1.4 ㎒ | 824.7 (20407) | 836.5 (20525) | | 848.3 (20643) | |
| | 3 ㎒ | 825.5 (20415) | 836.5 (20525) | | 847.5 (20635) | |
| | 5 ㎒ | 826.5 (20425) | 836.5 (20525) | | 846.5 (20625) | |
| | 10 ㎒ | 829.0 (20450) | 836.5 (20525) | | 844.0 (20600) | |
| LTE Band 41 | 5 ㎒ | 2498.5(39675) | 2545.8(40148) | 2593.0(40620) | 2640.3(41093) | 2687.5(41565) |
| | 10 ㎒ | 2501.0(39700) | 2547.0(40160) | 2593.0(40620) | 2639.0(41080) | 2685.0(41540) |
| | 15 ㎒ | 2503.5(39725) | 2548.3(41073) | 2593.0(40620) | 2637.8(41068) | 2682.5(41515) |
| | 20 ㎒ | 2506.0(39750) | 2549.5(40185) | 2593.0(40620) | 2636.5(41055) | 2680.0(41490) |
| UE Category | | | LTE Rel. 10, UE Category 4 | | | |
| Modulations Supported in UL | | | QPSK, 16QAM | | | |
| LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3 | | | Yes | | | |
| A-MPR disabled for SAR Testing. | | | Yes | | | |
| LTE Carrier Aggregation | | | This device does not support downlink and uplink Carrier Aggregation for US region. | | | |
| LTE Release 10 information | | | This device does not support full CA features on 3GPP Release 10. The following LTE Release 10 features are not supported. Uplink and Downlink Carrier aggregations, Relay, HetNet, Enhanced MIMO, elCl, WiFi offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA. | | | |

## 4.5DUT 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 |
| UMTS 850 | Yes | Yes | Yes | Yes | Yes | No |
| UMTS 1900 | Yes | Yes | Yes | Yes | Yes | No |
| LTE Band 5 | Yes | Yes | Yes | Yes | Yes | No |
| LTE 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.

## 4.6Near 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.

## 4.7SAR 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 + 2.4 GHz 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 |
| UMTS + 2.4 GHz WiFi | Yes | Yes | Yes | Yes |
| UMTS + 5 GHz WiFi | Yes | Yes | Yes | Yes |
| UMTS + 2.4 GHz Bluetooth | Yes* | Yes | Yes* | Yes |
| LTE+ 2.4 GHz WiFi | Yes | Yes | Yes | Yes |
| LTE+ 5 GHz WiFi | Yes | Yes | Yes | Yes |
| LTE+ 2.4 GHz Bluetooth | Yes* | Yes | Yes* | Yes |

1. Bluetooth cannot transmit simultaneously with WLAN.
2. All licensed modes share the same antenna path and cannot transmit simultaneously.
3. UMTS +WLAN scenario also represents the UMTS Voice/DATA + WLAN hotspot scenario.
4. GPRS/EDGE does not support pre-installed VOIP applications.
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. This device supports VoLTE.
9. This device supports VoWIFI.
10. 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.

## 4.8SAR Test Considerations

### 4.8.1WiFi

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) 256 QAM is supported
d) TDWR channels are supported.
e) Straddle channels are supported
f) Band gap channels are supported

### 4.8.2Bluetooth LE

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

$$\frac{MaxPowerofChannel(mW)}{TestSeparationDistance(mm)} * \sqrt{Frequency(GHz)} \leq 3.0(1\text{g SAR}), 7.5(10\text{g SAR})$$

| Mode | | Frequency | Maximum Allowed Power | Separation Distance | ≤ 3.0 | ≤ 7.5 |
|---|---|---|---|---|---|---|
| | | [㎒] | [mW] | [mm] | 1-g SAR | 10-g SAR |
| Bluetooth LE | Head SAR | 2 480 | 4 | 5 | 1.3 | |
| | Body Worn SAR | | | 15 | 0.4 | |
| | Tethering SAR | | | 10 | 0.6 | |
| | Extremity SAR | | | 5 | | 1.3 |

Based on the maximum conducted power of Bluetooth LE and antenna to use separation distance, Bluetooth LE SAR was not required [(4/5)*√2.480] = 1.3≤3.0, [(4/15)*√2.480] = 0.4≤3.0 for 1-g SAR, [(4/10)*√2.480] = 0.6≤3.0 for 1-g SAR, [(4/5)*√2.480] = 1.3≤7.5 for 10-g SAR.

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

4.8.3Licensed Transmitter(s)

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

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

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

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

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 SARnumbers listed must be consistent with the highest reported test results required by the published RFexposure KDB procedures. When the measured SAR is not at the maximum tune-up tolerance limit ormaximum output power allowed for production units, the measured results are scaled to the maximumconditions to determine compliance; the scaled results are referred to as the reported SAR.

The Reported SAR = The Measured SAR *-$\frac{Maximumtune-up(mW)}{Measured\ Conducted\ Power(mW)}$

## 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 GHz. 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 derivativeof the incremental electromagnetic energy(d*W*)absorbed by (dissipated in) an incremental mass (d*m*) contained in a volume element (d*V*) of a givendensity ($\rho$). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbingbody.

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

Figure 1. SAR Mathematical Equation

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

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

Where:

$\sigma$ = conductivity of the tissue-simulant material (S/m)

$\rho$ = mass density of the tissue-simulant material (kg/m³)

$E$ = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in 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

## 6.1SAR 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 ofhigh precision robotics system (Staubli), robot controller, Pentium III computer, near-fieldprobe, probe alignment sensor, and the generic twin phantom containing the brain equivalentmaterial. The robot is a six-axis industrial robot performing precise movements to position theprobe 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 XPor Windows 7is working with SAR Measurement system DASY4& DASY5, A/Dinterface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cellcontroller to allow software manipulation of the robot. A data acquisition electronic (DAE)circuit performs the signal amplification, signal multiplexing, AD-conversion, offsetmeasurements, mechanical surface detection, collision detection, etc. is connected to theElectro-optical coupler (EOC). The EOC performs the conversion from the optical into digitalelectric signal of the DAE and transfers data to the PC plug-in card.

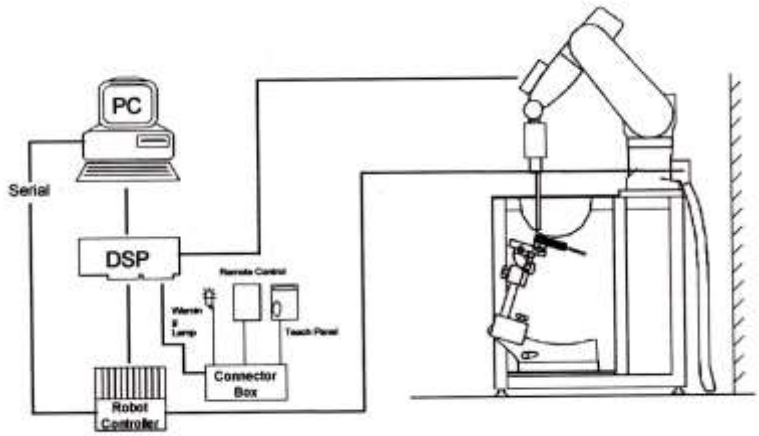



Figure 2. HCT SAR Lab. Test Measurement Set-up

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 bodywas measured at a distance no more than 5.0 mm from the innersurface 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 tipof the probe (it is different from the probe type) and the distance between the surface and the lowest measuring point is 1.2mm. Theextrapolationwas based on a least square algorithm. A polynomial of the fourth order wascalculated through the points in z-axes. This polynomial was then used to evaluate the pointsbetweenthe 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 (1g or 10g) 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 morethan 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>$^1/_2 \cdot \delta \cdot \ln(2) \pm 0.5$ 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">MaximumareascanSpatialresolution:$\Delta x_{Area}, \Delta y_{Area}$</td><td>≤2 GHz: ≤15 mm<br>2-3 GHz: ≤12 mm</td><td>3-4 GHz: ≤12 mm<br>4-6 GHz: ≤10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in themeasurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or ydimension of the test device with at least one measurementpoint on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan Spatial resolution: $\Delta x_{zoom}, \Delta y_{zoom}$</td><td>≤ 2 GHz: ≤8mm<br>2-3 GHz: ≤5mm*</td><td>3-4 GHz: ≤5 mm*<br>4-6 GHz: ≤4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan Spatial resolution normal to phantomsurface</td><td colspan="2">uniform grid:$\Delta z_{zoom}(n)$</td><td>≤ 5 mm</td><td>3-4 GHz: ≤4 mm<br>4-5 GHz: ≤3 mm<br>5-6 GHz: ≤2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{zoom}(1)$: between1st two Points closest to phantom surface</td><td>≤ 4 mm</td><td>3-4 GHz: ≤3 mm<br>4-5 GHz: ≤2.5 mm<br>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<br>4-5 GHz: ≥25 mm<br>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.<br>* 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

## 8.1EAR 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.

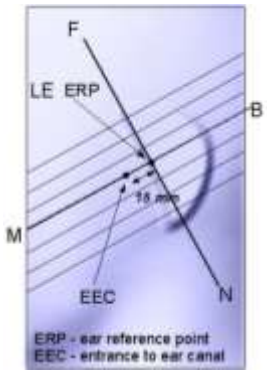



Figure 8-1
Close-up side view of ERP

## 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

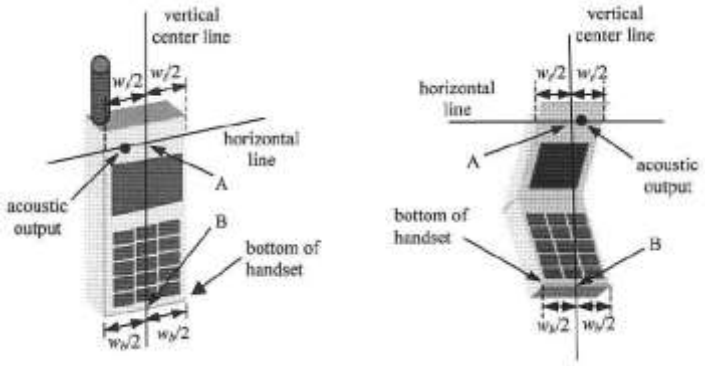



Figure 6-3. Handset vertical and horizontal reference lines

## 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.

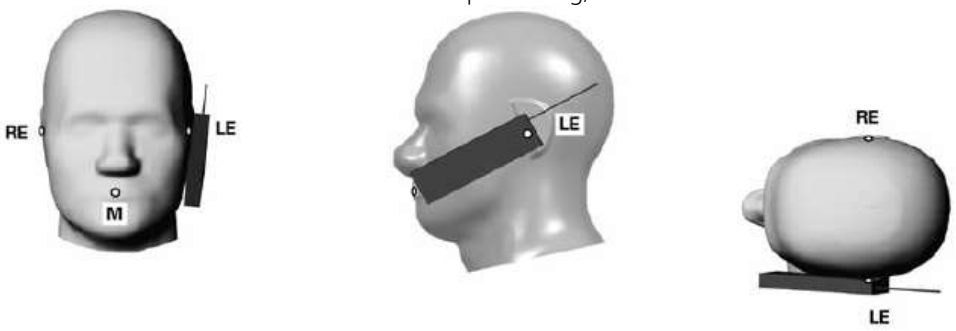



Figure 8.4 Cheek/ Touch position of the wireless device

## 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.

## 8.7Wireless 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.

## 8.9Bluetooth 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 * (Brain) | 1.60 | 8.00 |
| SPATIAL AVERAGE SAR ** (Whole Body) | 0.08 | 0.40 |
| SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist) | 4.00 | 20.00 |

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 ofemployment 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.

## 10.23G 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

### 10.2.3Procedures 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 SARmeasurements were taken with a fully charged battery. In order to verify that the device was testedand maintained at full power, this was configured with the base station simulator. The SAR measurementSoftware calculates a reference point at the start and end of the test to Cheek for power drifts. IfconductedPower deviations of more than 5 % occurred, the tests were repeated.

## 10.3 SAR Measurement Conditions for UMTS

10.3.1Output 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 12.2kbps RMC with the TPC bits all "1s". the 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode.Otherwise, SAR is measured using and applicable RMC configuration with the corresponding spreading code or DPDCHn, for the highest reported SAR configuration in 12.2kbps RMC.

10.3.3SAR 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 HSUPAThe 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.

10.3.4SAR 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.

10.3.5DC-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 D05v02r05publication. 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% all0cation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
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. The configuration with the highest duty cycle was used for Power class 3(uplink- downlink configuration 0 at 63.3%). Power class 2(HPUE) does not support uplink-downlink configuration 0 and 6, therefore the highest available duty cycle was used for Power class 2(uplink-downlink configuration 1 at43.3%).
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 subframe 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 # of S + # of U

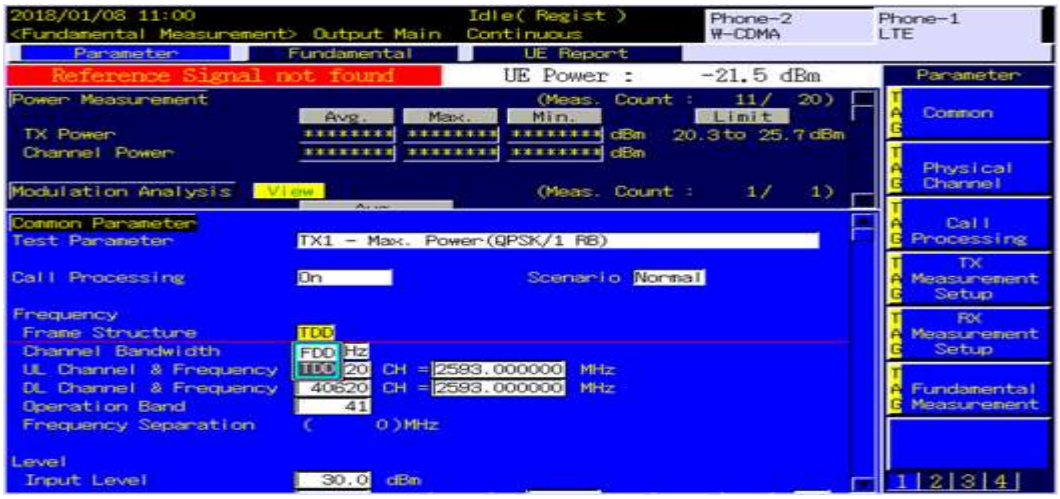
Table 4.2-2: Uplink-downlink configurations.

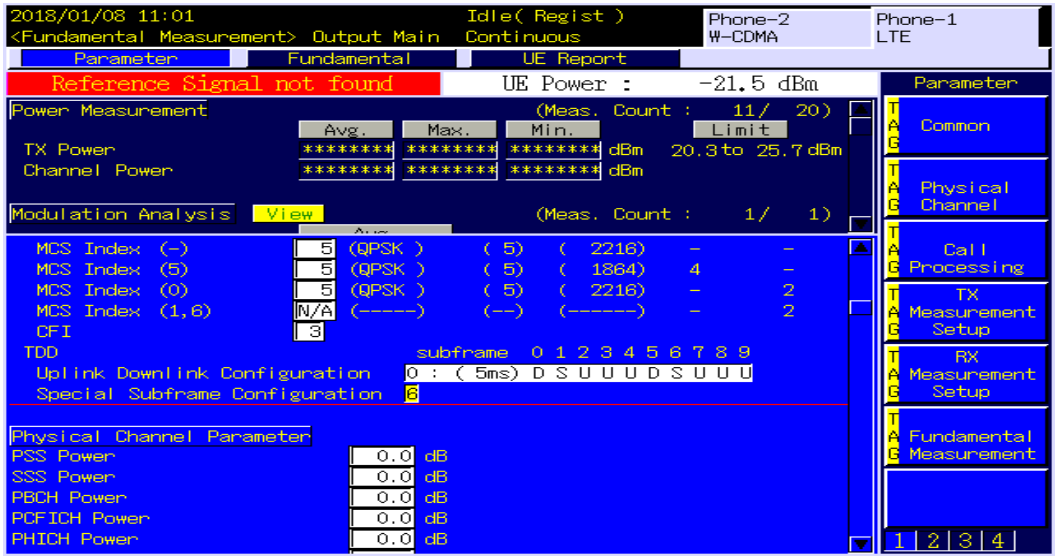
| Uplink-downlink configuration | Downlink-to-Uplink Switch-point periodicity | Subframe number | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | 5 ms | D | S | U | U | U | D | S | U | U | U |
| 1 | 5 ms | D | S | U | U | D | D |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

10.4.7The 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 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed.

10.5.6 OFDM Transmission Mode and SAR Test Channel Selection

For the 2.4 GHz and 5 GHz 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 GHz and 5 GHz 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

Licensed bands

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

Test Overview

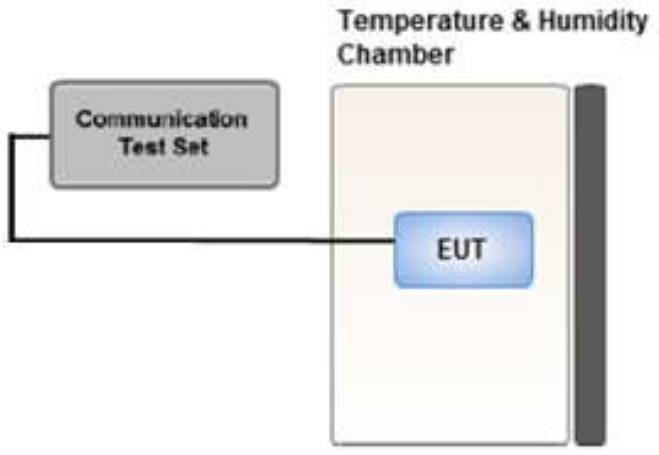
According to ANSI C63.26-2015 Section 5.2.1 when measuring the maximum RF output power from such devices, control over the EUT must be provided either through special test software (provided by manufacturer specifically for compliance testing, but not accessible by an end user) or through use of a base 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**



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.

## 11.1 GSM

### 11.1.1 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 | | 34.00 | 34.00 | 31.00 | 29.00 | 28.00 | 27.50 | 25.00 | 23.50 | 22.00 |
| Nominal | | 33.00 | 33.00 | 30.00 | 28.00 | 27.00 | 26.50 | 24.00 | 22.50 | 21.00 |
| GSM850 | 128 | 32.29 | 32.29 | 29.52 | 28.13 | 26.86 | 26.15 | 23.80 | 21.81 | 20.08 |
| | 190 | 32.19 | 32.19 | 29.38 | 27.99 | 26.91 | 26.33 | 23.90 | 21.81 | 20.12 |
| | 251 | 32.12 | 32.12 | 29.24 | 28.04 | 26.94 | 26.14 | 23.73 | 21.92 | 20.29 |
| Maximum | | 31.00 | 31.00 | 28.50 | 26.50 | 25.50 | 26.00 | 24.00 | 23.00 | 21.00 |
| Nominal | | 30.00 | 30.00 | 27.50 | 25.50 | 24.50 | 25.00 | 23.00 | 22.00 | 20.00 |
| GSM 1900 | 512 | 30.20 | 30.20 | 27.07 | 24.97 | 23.43 | 25.22 | 22.73 | 21.21 | 19.86 |
| | 661 | 30.11 | 30.11 | 26.97 | 25.03 | 23.77 | 25.13 | 22.57 | 21.05 | 19.55 |
| | 810 | 30.03 | 30.03 | 26.93 | 24.86 | 23.39 | 25.00 | 22.45 | 20.96 | 19.41 |

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 | | 24.97 | 24.97 | 24.98 | 24.74 | 24.99 | 18.47 | 18.98 | 19.24 | 18.99 |
| Nominal | | 23.97 | 23.97 | 23.98 | 23.74 | 23.99 | 17.47 | 17.98 | 18.24 | 17.99 |
| GSM850 | 128 | 23.26 | 23.26 | 23.50 | 23.87 | 23.85 | 17.12 | 17.78 | 17.55 | 17.07 |
| | 190 | 23.16 | 23.16 | 23.36 | 23.73 | 23.90 | 17.30 | 17.88 | 17.55 | 17.11 |
| | 251 | 23.09 | 23.09 | 23.22 | 23.78 | 23.93 | 17.11 | 17.71 | 17.66 | 17.28 |
| Maximum | | 21.97 | 21.97 | 22.48 | 22.24 | 22.49 | 16.97 | 17.98 | 18.74 | 17.99 |
| Nominal | | 20.97 | 20.97 | 21.48 | 21.24 | 21.49 | 15.97 | 16.98 | 17.74 | 16.99 |
| GSM 1900 | 512 | 21.17 | 21.17 | 21.05 | 20.71 | 20.42 | 16.19 | 16.71 | 16.95 | 16.85 |
| | 661 | 21.08 | 21.08 | 20.95 | 20.77 | 20.76 | 16.10 | 16.55 | 16.79 | 16.54 |
| | 810 | 21.00 | 21.00 | 20.91 | 20.60 | 20.38 | 15.97 | 16.43 | 16.70 | 16.40 |

GSM Conducted output powers (Frame-Average)

11.1.2 GSMReduced 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 | | 30 | 30 | 27.5 | 25.5 | 24.5 | 25.5 | 23.5 | 22.5 | 20.5 |
| Nominal | | 29 | 29 | 26.5 | 24.5 | 23.5 | 24.5 | 22.5 | 21.5 | 19.5 |
| GSM 1900 | 512 | 28.14 | 28.10 | 25.98 | 24.29 | 22.78 | 25.01 | 23.40 | 22.23 | 19.11 |
| | 661 | 28.68 | 28.62 | 26.40 | 24.68 | 23.20 | 24.89 | 23.37 | 22.18 | 19.21 |
| | 810 | 29.16 | 29.08 | 26.82 | 25.14 | 23.66 | 24.99 | 23.33 | 22.24 | 19.33 |

GSM Conducted output powers (Burst-Average)

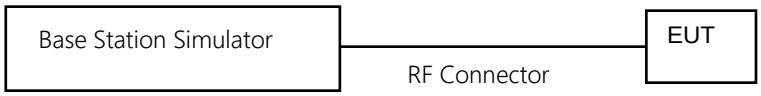
| Mode / Band | | Voice | GPRS(GMSK) Data – CS1 (dBm) | | | | EDGE Data (dBm) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | GSM | GPRS 1 TX Slot | GPRS 2 TX Slot | GPRS 3 TX Slot | GPRS 4 TX Slot | EDGE 1 TX Slot | EDGE 2 TX Slot | EDGE 3 TX Slot | EDGE 4 TX Slot |
| Maximum | | 20.97 | 20.97 | 21.48 | 21.24 | 21.49 | 16.47 | 17.48 | 18.24 | 17.49 |
| Nominal | | 19.97 | 19.97 | 20.48 | 20.24 | 20.49 | 15.47 | 16.48 | 17.24 | 16.49 |
| GSM 1900 | 512 | 19.11 | 19.07 | 19.96 | 20.03 | 19.77 | 15.98 | 17.38 | 17.97 | 16.10 |
| | 661 | 19.65 | 19.59 | 20.38 | 20.42 | 20.19 | 15.86 | 17.35 | 17.92 | 16.20 |
| | 810 | 20.13 | 20.05 | 20.80 | 20.88 | 20.65 | 15.96 | 17.31 | 17.98 | 16.32 |

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)



## 11.2UMTS

HSPA+

This DUT is only capable of QPSK HSPA+ in uplink. Therefore, the RF conducted power is not measured according to 941225 D01 3G SAR.

11.2.1 UMTS Maximum Conducted Output Power

WCDMA Band 5

| 3GPP Release Version | Mode | 3GPP 34.121 | WCDMA Band 5[dBm] | | | 3GPP MPR |
|---|---|---|---|---|---|---|
| | | Subtest | UL4132 DL4357 | UL4183 DL4408 | UL4233 DL4458 | |
| 99 | WCDMA | 12.2 kbps RMC | 24.44 | 24.60 | 24.46 | - |
| 99 | WCDMA | 12.2 kbps AMR | 24.44 | 24.58 | 24.46 | - |
| 5 | HSDPA | Subtest 1 | 23.22 | 23.38 | 23.22 | 0 |
| 5 | | Subtest 2 | 22.81 | 22.93 | 22.83 | 0 |
| 5 | | Subtest 3 | 22.30 | 22.48 | 22.33 | 0.5 |
| 5 | | Subtest 4 | 21.79 | 21.94 | 21.82 | 0.5 |
| 6 | HSUPA | Subtest 1 | 22.27 | 22.48 | 22.32 | 0 |
| 6 | | Subtest 2 | 20.24 | 20.34 | 20.27 | 2 |
| 6 | | Subtest 3 | 21.27 | 201.44 | 21.35 | 1 |
| 6 | | Subtest 4 | 20.24 | 20.36 | 20.25 | 2 |
| 6 | | Subtest 5 | 23.28 | 23.40 | 23.30 | 0 |
| 8 | DC-HSDPA | Subtest1 | 23.16 | 23.32 | 23.29 | 0 |
| 8 | | Subtest2 | 22.73 | 22.89 | 22.98 | 0 |
| 8 | | Subtest3 | 22.19 | 22.45 | 22.40 | 0.5 |
| 8 | | Subtest4 | 21.67 | 21.91 | 21.89 | 0.5 |

WCDMA Average Conducted output powers

WCDMA Band 2

| 3GPP Release Version | Mode | 3GPP 34.121 | WCDMA Band 2[dBm] | | | 3GPP MPR |
|---|---|---|---|---|---|---|
| | | Subtest | UL9262 DL9662 | UL9400 DL9800 | UL9538 DL9938 | |
| 99 | WCDMA | 12.2 kbps RMC | 23.11 | 23.14 | 23.18 | - |
| 99 | WCDMA | 12.2 kbps AMR | 23.12 | 23.14 | 23.17 | - |
| 5 | HSDPA | Subtest 1 | 22.67 | 22.73 | 22.79 | 0 |
| 5 | | Subtest 2 | 22.75 | 22.82 | 22.85 | 0 |
| 5 | | Subtest 3 | 21.70 | 21.78 | 21.77 | 0.5 |
| 5 | | Subtest 4 | 21.70 | 21.79 | 21.77 | 0.5 |
| 6 | HSUPA | Subtest 1 | 22.08 | 22.19 | 22.18 | 0 |
| 6 | | Subtest 2 | 19.74 | 19.84 | 19.77 | 2 |
| 6 | | Subtest 3 | 20.75 | 20.85 | 20.82 | 1 |
| 6 | | Subtest 4 | 19.75 | 19.84 | 19.74 | 2 |
| 6 | | Subtest 5 | 21.64 | 21.74 | 21.74 | 0 |
| 8 | DC-HSDPA | Subtest1 | 22.75 | 22.86 | 22.93 | 0 |
| 8 | | Subtest2 | 22.83 | 22.88 | 22.99 | 0 |
| 8 | | Subtest3 | 22.34 | 22.43 | 22.51 | 0.5 |
| 8 | | Subtest4 | 21.80 | 21.87 | 21.95 | 0.5 |

WCDMA Average Conducted output powers

11.2.2UMTSReduced Conducted Output Power

WCDMA Band 2

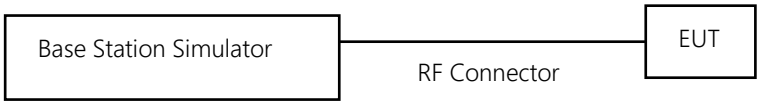
| 3GPP Release Version | Mode | 3GPP 34.121 | WCDMA Band 2[dBm] | | | 3GPP MPR |
|---|---|---|---|---|---|---|
| | | Subtest | UL9262 DL9662 | UL9400 DL9800 | UL9538 DL9938 | |
| 99 | WCDMA | 12.2 kbps RMC | 22.18 | 22.20 | 22.16 | - |
| 99 | WCDMA | 12.2 kbps AMR | 22.12 | 22.13 | 22.10 | - |
| 5 | HSDPA | Subtest 1 | 22.03 | 22.11 | 22.08 | 0 |
| 5 | | Subtest 2 | 22.02 | 22.13 | 22.16 | 0 |
| 5 | | Subtest 3 | 21.72 | 21.79 | 21.79 | 0.5 |
| 5 | | Subtest 4 | 21.72 | 21.81 | 21.79 | 0.5 |
| 6 | HSUPA | Subtest 1 | 21.18 | 21.28 | 21.31 | 0 |
| 6 | | Subtest 2 | 19.75 | 19.84 | 19.80 | 2 |
| 6 | | Subtest 3 | 20.73 | 20.86 | 20.85 | 1 |
| 6 | | Subtest 4 | 19.75 | 19.83 | 19.79 | 2 |
| 6 | | Subtest 5 | 21.07 | 21.20 | 21.24 | 0 |
| 8 | DC-HSDPA | Subtest1 | 22.08 | 22.24 | 22.19 | 0 |
| 8 | | Subtest2 | 22.14 | 22.30 | 22.27 | 0 |
| 8 | | Subtest3 | 22.15 | 22.33 | 22.29 | 0.5 |
| 8 | | Subtest4 | 21.83 | 22.00 | 21.97 | 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.

Itis expected by the manufacturer that MPR for some HSPA Subtests may be up to 2 dB more than specified by 3GPP, But also as low as 1 dB according to the chipset implementation in this model to match manufacturer.



## 11.3 LTE

### 11.3.1 LTE Maximum Conducted Output Power

[ LTE Band 5 Conducted Power]

LTE Band 5 _ 1.4 Bandwidth

| Bandwidth | Modulation | RB Size | RB Offset | Max. Average Power [dBm] | | | MPR Allowed Per 3GPP [dB] | MPR [dB] |
|---|---|---|---|---|---|---|---|---|
| | | | | 20407 Ch. 824.7 ㎒ | 20525 Ch. 836.5 ㎒ | 20643 Ch. 848.3 ㎒ | | |
| 1.4 ㎒ | QPSK | 1 | 0 | 23.91 | 23.90 | 23.85 | 0 | 0 |
| | | 1 | 3 | 23.94 | 23.93 | 23.93 | 0 | 0 |
| | | 1 | 5 | 23.93 | 23.94 | 23.95 | 0 | 0 |
| | | 3 | 0 | 23.90 | 23.88 | 23.82 | 0 | 0 |
| | | 3 | 1 | 23.93 | 23.83 | 23.83 | 0 | 0 |
| | | 3 | 3 | 23.87 | 23.89 | 23.82 | 0 | 0 |
| | | 6 | 0 | 22.84 | 22.81 | 22.85 | 0-1 | 1 |
| | 16QAM | 1 | 0 | 22.69 | 22.53 | 22.73 | 0-1 | 1 |
| | | 1 | 3 | 22.75 | 22.67 | 22.69 | 0-1 | 1 |
| | | 1 | 5 | 22.83 | 22.65 | 22.74 | 0-1 | 1 |
| | | 3 | 0 | 22.69 | 22.64 | 22.66 | 0-1 | 1 |
| | | 3 | 1 | 22.68 | 22.66 | 22.76 | 0-1 | 1 |
| | | 3 | 3 | 22.67 | 22.63 | 22.77 | 0-1 | 1 |
| | | 6 | 0 | 21.89 | 21.80 | 21.85 | 0-2 | 2 |

LTE Band 5 _ 3 Bandwidth

| Bandwidth | Modulation | RB Size | RB Offset | Max. Average Power [dBm] | | | MPR Allowed Per 3GPP [dB] | MPR [dB] |
|---|---|---|---|---|---|---|---|---|
| | | | | 20415 Ch. 825.5 ㎒ | 20525 Ch. 836.5 ㎒ | 20635 Ch. 847.5 ㎒ | | |
| 3 ㎒ | QPSK | 1 | 0 | 24.02 | 23.88 | 23.87 | 0 | 0 |
| | | 1 | 7 | 23.98 | 23.88 | 23.90 | 0 | 0 |
| | | 1 | 14 | 23.91 | 23.82 | 23.87 | 0 | 0 |
| | | 8 | 0 | 22.86 | 22.89 | 22.87 | 0-1 | 1 |
| | | 8 | 3 | 22.90 | 22.86 | 22.87 | 0-1 | 1 |
| | | 8 | 7 | 22.89 | 22.81 | 22.85 | 0-1 | 1 |
| | | 15 | 0 | 22.90 | 22.86 | 22.84 | 0-1 | 1 |
| | 16QAM | 1 | 0 | 22.89 | 22.75 | 22.83 | 0-1 | 1 |
| | | 1 | 7 | 22.69 | 22.72 | 22.77 | 0-1 | 1 |
| | | 1 | 14 | 22.63 | 22.74 | 22.66 | 0-1 | 1 |
| | | 8 | 0 | 21.83 | 21.88 | 21.91 | 0-2 | 2 |
| | | 8 | 3 | 21.83 | 21.88 | 21.88 | 0-2 | 2 |
| | | 8 | 7 | 21.85 | 21.82 | 21.88 | 0-2 | 2 |
| | | 15 | 0 | 21.75 | 21.81 | 21.80 | 0-2 | 2 |

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 | 23.95 | 23.98 | 23.79 | 0 | 0 |
| | | 1 | 12 | 23.89 | 23.99 | 23.78 | 0 | 0 |
| | | 1 | 24 | 23.86 | 23.90 | 23.73 | 0 | 0 |
| | | 12 | 0 | 22.91 | 22.90 | 22.80 | 0-1 | 1 |
| | | 12 | 6 | 22.87 | 22.86 | 22.80 | 0-1 | 1 |
| | | 12 | 11 | 22.86 | 22.86 | 22.80 | 0-1 | 1 |
| | | 25 | 0 | 22.92 | 22.87 | 22.78 | 0-1 | 1 |
| | 16QAM | 1 | 0 | 22.66 | 22.84 | 22.45 | 0-1 | 1 |
| | | 1 | 12 | 22.86 | 22.92 | 22.39 | 0-1 | 1 |
| | | 1 | 24 | 22.59 | 22.74 | 22.53 | 0-1 | 1 |
| | | 12 | 0 | 21.88 | 21.82 | 21.85 | 0-2 | 2 |
| | | 12 | 6 | 21.85 | 21.79 | 21.82 | 0-2 | 2 |
| | | 12 | 11 | 21.80 | 21.72 | 21.82 | 0-2 | 2 |
| | | 25 | 0 | 21.76 | 21.87 | 21.81 | 0-2 | 2 |

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 | 24.06 | 0 | 0 |
| | | 1 | 24 | 23.92 | 0 | 0 |
| | | 1 | 49 | 23.85 | 0 | 0 |
| | | 25 | 0 | 22.96 | 0-1 | 1 |
| | | 25 | 12 | 22.86 | 0-1 | 1 |
| | | 25 | 24 | 22.89 | 0-1 | 1 |
| | | 50 | 0 | 22.90 | 0-1 | 1 |
| | 16QAM | 1 | 0 | 22.61 | 0-1 | 1 |
| | | 1 | 24 | 22.57 | 0-1 | 1 |
| | | 1 | 49 | 22.63 | 0-1 | 1 |
| | | 25 | 0 | 21.89 | 0-2 | 2 |
| | | 25 | 12 | 21.85 | 0-2 | 2 |
| | | 25 | 24 | 21.87 | 0-2 | 2 |
| | | 50 | 0 | 21.88 | 0-2 | 2 |

**Note:** LTE Band 5 at 10 ㎒ 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.

[ LTE Band 41 Conducted Power ]

LTE Band 41 _ 5 Bandwidth

| Band width | Modulation | RB Size | RB Offset | Max. Average Power [dBm] | | | | | MPR Allowed Per 3GPP [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 | 23.91 | 23.77 | 23.70 | 23.75 | 23.79 | 0 | 0 |
| | | 1 | 12 | 23.90 | 23.82 | 23.73 | 23.83 | 23.78 | 0 | 0 |
| | | 1 | 24 | 23.85 | 23.79 | 23.66 | 23.80 | 23.69 | 0 | 0 |
| | | 12 | 0 | 22.92 | 22.77 | 22.72 | 22.78 | 22.85 | 0-1 | 1 |
| | | 12 | 6 | 22.92 | 22.77 | 22.70 | 22.77 | 22.82 | 0-1 | 1 |
| | | 12 | 11 | 22.92 | 22.78 | 22.70 | 22.78 | 22.81 | 0-1 | 1 |
| | | 25 | 0 | 22.91 | 22.75 | 22.70 | 22.80 | 22.83 | 0-1 | 1 |
| | 16QAM | 1 | 0 | 22.88 | 22.70 | 22.49 | 22.73 | 22.70 | 0-1 | 1 |
| | | 1 | 12 | 22.91 | 22.80 | 22.49 | 22.67 | 22.70 | 0-1 | 1 |
| | | 1 | 24 | 22.85 | 22.79 | 22.43 | 22.65 | 22.68 | 0-1 | 1 |
| | | 12 | 0 | 21.85 | 21.69 | 21.63 | 21.65 | 21.74 | 0-2 | 2 |
| | | 12 | 6 | 21.82 | 21.65 | 21.58 | 21.66 | 21.72 | 0-2 | 2 |
| | | 12 | 11 | 21.82 | 21.67 | 21.60 | 21.66 | 21.67 | 0-2 | 2 |
| | | 25 | 0 | 21.93 | 21.78 | 21.76 | 21.84 | 21.90 | 0-2 | 2 |

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 | 23.87 | 23.78 | 23.76 | 23.80 | 23.88 | 0 | 0 |
| | | 1 | 24 | 23.85 | 23.85 | 23.72 | 23.78 | 23.76 | 0 | 0 |
| | | 1 | 49 | 23.81 | 23.86 | 23.66 | 23.79 | 23.67 | 0 | 0 |
| | | 25 | 0 | 22.82 | 22.78 | 22.78 | 22.85 | 22.89 | 0-1 | 1 |
| | | 25 | 12 | 22.80 | 22.77 | 22.71 | 22.85 | 22.83 | 0-1 | 1 |
| | | 25 | 24 | 22.77 | 22.77 | 22.69 | 22.84 | 22.78 | 0-1 | 1 |
| | | 50 | 0 | 22.81 | 22.77 | 22.72 | 22.84 | 22.83 | 0-1 | 1 |
| | 16QAM | 1 | 0 | 22.77 | 22.67 | 22.61 | 22.84 | 22.90 | 0-1 | 1 |
| | | 1 | 24 | 22.63 | 22.71 | 22.54 | 22.82 | 22.80 | 0-1 | 1 |
| | | 1 | 49 | 22.58 | 22.68 | 22.46 | 22.76 | 22.66 | 0-1 | 1 |
| | | 25 | 0 | 21.84 | 21.80 | 21.78 | 21.88 | 21.94 | 0-2 | 2 |
| | | 25 | 12 | 21.79 | 21.82 | 21.75 | 21.87 | 21.90 | 0-2 | 2 |
| | | 25 | 24 | 21.81 | 21.82 | 21.70 | 21.86 | 21.86 | 0-2 | 2 |
| | | 50 | 0 | 21.76 | 21.78 | 21.72 | 21.85 | 21.83 | 0-2 | 2 |

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 | 23.81 | 23.81 | 23.85 | 23.85 | 23.92 | 0 | 0 |
| | | 1 | 36 | 23.75 | 23.83 | 23.73 | 23.86 | 23.80 | 0 | 0 |
| | | 1 | 74 | 23.75 | 23.83 | 23.61 | 23.85 | 23.64 | 0 | 0 |
| | | 36 | 0 | 22.82 | 22.78 | 22.78 | 22.78 | 22.86 | 0-1 | 1 |
| | | 36 | 18 | 22.82 | 22.77 | 22.72 | 22.81 | 22.80 | 0-1 | 1 |
| | | 36 | 39 | 22.81 | 22.79 | 22.68 | 22.79 | 22.71 | 0-1 | 1 |
| | | 75 | 0 | 22.82 | 22.77 | 22.72 | 22.78 | 22.80 | 0-1 | 1 |
| | 16QAM | 1 | 0 | 22.85 | 22.71 | 22.70 | 22.84 | 22.98 | 0-1 | 1 |
| | | 1 | 36 | 22.95 | 22.77 | 22.54 | 22.75 | 22.96 | 0-1 | 1 |
| | | 1 | 74 | 22.93 | 22.82 | 22.38 | 22.85 | 22.74 | 0-1 | 1 |
| | | 36 | 0 | 21.77 | 21.69 | 21.75 | 21.72 | 21.79 | 0-2 | 2 |
| | | 36 | 18 | 21.73 | 21.70 | 21.66 | 21.75 | 21.75 | 0-2 | 2 |
| | | 36 | 39 | 21.73 | 21.71 | 21.63 | 21.77 | 21.68 | 0-2 | 2 |
| | | 75 | 0 | 21.80 | 21.75 | 21.72 | 21.80 | 21.80 | 0-2 | 2 |

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 | 23.83 | 23.81 | 23.88 | 23.92 | 24.05 | 0 | 0 |
| | | 1 | 49 | 23.85 | 23.85 | 23.71 | 23.90 | 23.92 | 0 | 0 |
| | | 1 | 99 | 23.81 | 23.83 | 23.60 | 23.88 | 23.55 | 0 | 0 |
| | | 50 | 0 | 22.78 | 22.75 | 22.79 | 22.85 | 22.89 | 0-1 | 1 |
| | | 50 | 25 | 22.78 | 22.76 | 22.70 | 22.83 | 22.83 | 0-1 | 1 |
| | | 50 | 49 | 22.77 | 22.78 | 22.66 | 22.82 | 22.79 | 0-1 | 1 |
| | | 100 | 0 | 22.77 | 22.76 | 22.70 | 22.82 | 22.82 | 0-1 | 1 |
| | 16QAM | 1 | 0 | 22.80 | 22.65 | 22.82 | 22.91 | 23.02 | 0-1 | 1 |
| | | 1 | 49 | 22.59 | 22.74 | 22.62 | 22.92 | 22.86 | 0-1 | 1 |
| | | 1 | 99 | 22.47 | 22.73 | 22.46 | 22.91 | 22.37 | 0-1 | 1 |
| | | 50 | 0 | 21.77 | 21.76 | 21.79 | 21.87 | 21.91 | 0-2 | 2 |
| | | 50 | 25 | 21.75 | 21.76 | 21.68 | 21.86 | 21.83 | 0-2 | 2 |
| | | 50 | 49 | 21.74 | 21.76 | 21.64 | 21.86 | 21.78 | 0-2 | 2 |
| | | 100 | 0 | 21.77 | 21.73 | 21.72 | 21.81 | 21.82 | 0-2 | 2 |

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.

## 11.4WIFIConductedPowermeasurement method

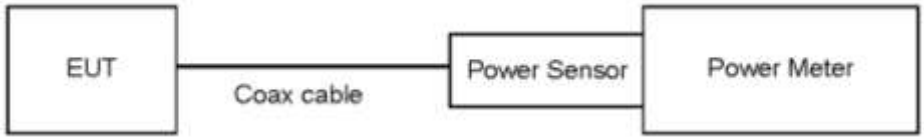
Un-Licensed bands(DTS Band)

| Test Description | Test Procedure Used |
|---|---|
| Conducted Output Power | - KDB 558074 D01v05r02- Section 8.3.2.3<br>- 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



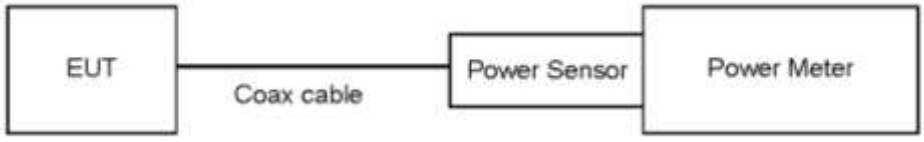

Un-Licensed bands(NII Band)

| 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



11.4.1IEEE 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 | 16.85 |
| | 2 437 | 6 | 18.47 |
| | 2 462 | 11 | 16.32 |
| 802.11g | 2 412 | 1 | 16.87 |
| | 2 437 | 6 | 18.16 |
| | 2 462 | 11 | 17.66 |
| 802.11n (HT20) | 2 412 | 1 | 16.59 |
| | 2 437 | 6 | 17.89 |
| | 2 462 | 11 | 17.47 |

11.4.2IEEE 802.11 (5 GHz) Maximum Conducted Power

| Frequency [MHz] | Channel | IEEE 802.11 a (20 MHz BW) Conducted Power [dBm] | IEEE 802.11n (20 MHz BW) Conducted Power [dBm] | IEEE 802.11ac (20 MHz BW) Conducted Power [dBm] |
|---|---|---|---|---|
| 5 180 | 36 | 13.59 | 13.52 | 13.56 |
| 5 200 | 40 | 14.95 | 14.86 | 14.95 |
| 5 220 | 44 | 15.81 | 15.81 | 15.84 |
| 5 240 | 48 | 14.80 | 14.81 | 14.94 |
| 5 260 | 52 | 14.80 | 14.71 | 14.47 |
| 5 280 | 56 | 14.88 | 14.84 | 14.78 |
| 5 300 | 60 | 14.57 | 14.60 | 14.37 |
| 5 320 | 64 | 14.70 | 14.43 | 14.46 |
| 5 500 | 100 | 13.79 | 11.86 | 13.74 |
| 5 580 | 116 | 15.78 | 15.71 | 15.72 |
| 5600 | 120 | 15.20 | 14.84 | 15.03 |
| 5 620 | 124 | 15.55 | 15.48 | 15.51 |
| 5 720 | 144 | 15.01 | 14.89 | 14.87 |
| 5 745 | 149 | 15.47 | 15.29 | 15.07 |
| 5 785 | 157 | 15.01 | 15.12 | 14.87 |
| 5 825 | 165 | 14.87 | 14.82 | 14.86 |

11.4.3IEEE 802.11 (2.4 ㎓) ReducedConducted Power(Held to ear)

| Mode | Frequency [MHz] | Channel | IEEE 802.11 (2.4 ㎓) Reduced Average Conducted Power [dBm] |
|---|---|---|---|
| 802.11b | 2 412 | 1 | 15.44 |
| | 2 437 | 6 | 15.07 |
| | 2 462 | 11 | 15.53 |
| 802.11g | 2 412 | 1 | 15.92 |
| | 2 437 | 6 | 15.54 |
| | 2 462 | 11 | 15.94 |
| 802.11n (HT20) | 2 412 | 1 | 15.42 |
| | 2 437 | 6 | 15.06 |
| | 2 462 | 11 | 15.51 |

11.4.4IEEE 802.11 (5 ㎓) ReducedConducted Power(Held to ear)

| Mode | Frequency [MHz] | Channel | IEEE 802.11 (5 ㎓) Reduced Average Conducted Power [dBm] |
|---|---|---|---|
| 802.11n (40 MHz BW) | 5190 | 38 | 10.59 |
| | 5230 | 46 | 12.93 |
| | 5270 | 54 | 12.72 |
| | 5310 | 62 | 9.94 |
| | 5510 | 102 | 9.63 |
| | 5590 | 118 | 13.21 |
| | 5630 | 126 | 13.46 |
| | 5710 | 142 | 13.14 |
| | 5755 | 151 | 13.32 |
| | 5795 | 159 | 12.99 |

| Mode | Frequency [MHz] | Channel | IEEE 802.11 (5 ㎓) Reduced Average Conducted Power [dBm] |
|---|---|---|---|
| 802.11ac (80 MHz BW) | 5 210 | 42 | 7.64 |
| | 5 290 | 58 | 8.57 |
| | 5 530 | 106 | 9.32 |
| | 5 610 | 122 | 12.56 |
| | 5 690 | 138 | 12.02 |
| | 5 775 | 155 | 12.45 |

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

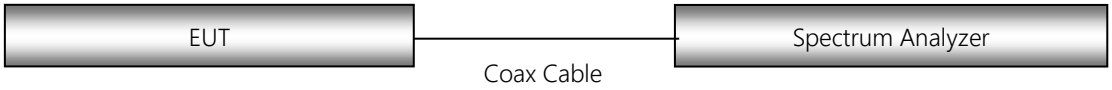
▪ Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.

▪ 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



11.4.5BluetoothConducted Power

The Burst averaged-conducted power

| Mode | Channel | Bluetooth Power[dBm] |
|---|---|---|
| DH5 | 0 | 8.51 |
| | 39 | 9.45 |
| | 78 | 7.95 |
| 2-DH5 | 0 | 5.84 |
| | 39 | 6.80 |
| | 78 | 5.30 |
| 3-DH5 | 0 | 5.85 |
| | 39 | 6.79 |
| | 78 | 5.31 |

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 protocol. DH5 mode is the highest duty cycle and conducted power. SAR test were performed at DH5 mode.


Duty Cycle

= (BT-On time /BT-Full time) =(2.880/3.752) = 0.768(DH5)

Duty factor= 1/Duty cycle : 1.302

# 12. System Verification

## 12.1 Tissue Verification

The Head /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. (㎒) | Measured Conductivity σ (S/m) | Measured Dielectric Constant, ε | Target Conductivity σ (S/m) | Target Dielectric Constant, ε | % dev σ | % dev ε |
| 08/01/2019 | 21.1 | 835H | 820 | 0.908 | 41.058 | 0.899 | 41.577 | 1.00% | -1.25% |
| | | | 835 | 0.922 | 40.810 | 0.900 | 41.500 | 2.44% | -1.66% |
| | | | 850 | 0.937 | 40.617 | 0.916 | 41.500 | 2.29% | -2.13% |
| 08/02/2019 | 20.9 | 1900H | 1850 | 1.391 | 38.768 | 1.400 | 40.000 | -0.64% | -3.08% |
| | | | 1900 | 1.397 | 39.063 | 1.400 | 40.000 | -0.21% | -2.34% |
| | | | 1910 | 1.398 | 39.135 | 1.400 | 40.000 | -0.14% | -2.16% |
| 08/08/2019 | 19.3 | 2450H | 2400 | 1.739 | 38.606 | 1.756 | 39.290 | -0.97% | -1.74% |
| | | | 2450 | 1.790 | 38.411 | 1.800 | 39.200 | -0.56% | -2.01% |
| | | | 2500 | 1.847 | 38.239 | 1.855 | 39.140 | -0.43% | -2.30% |
| 08/01/2019 | 19.4 | 2600H | 2500 | 1.856 | 38.241 | 1.855 | 39.140 | 0.05% | -2.30% |
| | | | 2600 | 1.949 | 37.849 | 1.964 | 39.010 | -0.76% | -2.98% |
| | | | 2690 | 2.047 | 37.559 | 2.062 | 38.894 | -0.73% | -3.43% |
| 08/08/2019 | 19.2 | 5180H-5825H | 5180 | 4.665 | 35.866 | 4.635 | 36.010 | 0.65% | -0.40% |
| | | | 5250 | 4.758 | 35.697 | 4.706 | 35.930 | 1.10% | -0.65% |
| | | | 5280 | 4.793 | 35.916 | 4.737 | 35.894 | 1.18% | 0.06% |
| | | | 5320 | 4.853 | 35.541 | 4.778 | 35.846 | 1.57% | -0.85% |
| | | | 5500 | 4.964 | 35.354 | 4.963 | 35.640 | 0.02% | -0.80% |
| | | | 5600 | 5.085 | 35.091 | 5.065 | 35.530 | 0.39% | -1.24% |
| | | | 5750 | 5.413 | 34.875 | 5.219 | 35.360 | 3.72% | -1.37% |
| | | | 5800 | 5.271 | 34.921 | 5.270 | 35.300 | 0.02% | -1.07% |
| | | | 5825 | 5.144 | 35.371 | 5.296 | 35.270 | -2.87% | 0.29% |

| Table for Body Tissue Verification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date of Tests | Tissue Temp. (°C) | Tissue Type | Freq. (MHz) | Measured Conductivity σ (S/m) | Measured Dielectric Constant, ε | Target Conductivity σ (S/m) | Target Dielectric Constant, ε | % dev σ | % dev ε |
| 08/02/2019 | 20.7 | 835B | 820 | 0.943 | 56.551 | 0.969 | 55.260 | -2.68% | 2.34% |
| | | | 835 | 0.961 | 56.336 | 0.970 | 55.200 | -0.93% | 2.06% |
| | | | 850 | 0.974 | 56.200 | 0.988 | 55.150 | -1.42% | 1.90% |
| 08/06/2019 | 20.6 | 835B | 820 | 0.944 | 56.378 | 0.969 | 55.260 | -2.58% | 2.02% |
| | | | 835 | 0.961 | 56.261 | 0.970 | 55.200 | -0.93% | 1.92% |
| | | | 850 | 0.973 | 56.104 | 0.988 | 55.150 | -1.52% | 1.73% |
| 08/05/2019 | 20.6 | 1900B | 1850 | 1.480 | 53.632 | 1.520 | 53.300 | -2.63% | 0.62% |
| | | | 1900 | 1.526 | 53.550 | 1.520 | 53.300 | 0.39% | 0.47% |
| | | | 1910 | 1.540 | 53.589 | 1.520 | 53.300 | 1.32% | 0.54% |
| 08/08/2019 | 21.0 | 2450B | 2400 | 1.883 | 53.869 | 1.902 | 52.770 | -1.00% | 2.08% |
| | | | 2450 | 1.944 | 53.668 | 1.950 | 52.700 | -0.31% | 1.84% |
| | | | 2500 | 2.007 | 53.552 | 2.021 | 52.640 | -0.69% | 1.73% |
| 08/01/2019 | 20.7 | 2600B | 2500 | 2.004 | 53.548 | 2.021 | 52.640 | -0.84% | 1.72% |
| | | | 2600 | 2.113 | 53.100 | 2.163 | 52.510 | -2.31% | 1.12% |
| | | | 2690 | 2.223 | 52.965 | 2.291 | 52.394 | -2.97% | 1.09% |
| 08/09/2019 | 20.5 | 5180B-5825B | 5180 | 5.345 | 47.904 | 5.276 | 49.038 | 1.31% | -2.31% |
| | | | 5250 | 5.465 | 47.314 | 5.358 | 48.950 | 2.00% | -3.34% |
| | | | 5280 | 5.602 | 47.634 | 5.393 | 48.908 | 3.88% | -2.60% |
| | | | 5320 | 5.443 | 47.174 | 5.439 | 48.852 | 0.07% | -3.43% |
| | | | 5500 | 5.880 | 46.730 | 5.650 | 48.610 | 4.07% | -3.87% |
| | | | 5600 | 5.968 | 47.043 | 5.766 | 48.470 | 3.50% | -2.94% |
| | | | 5750 | 6.201 | 46.717 | 5.942 | 48.270 | 4.36% | -3.22% |
| | | | 5800 | 6.218 | 46.552 | 6.000 | 48.200 | 3.63% | -3.42% |
| | | | 5825 | 6.128 | 46.690 | 6.029 | 48.165 | 1.64% | -3.06% |

## 12.2 System Verification

### System Verification Results

* Input Power: 50mW

| Freq. [㎒] | 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 [%] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 835 | 08/01/2019 | 3903 | 4d165 | Head | 21.3 | 21.1 | 9.41 | 0.464 | 9.28 | - 1.38 | ± 10 |
| 835 | 08/02/2019 | 3797 | | Body | 20.9 | 20.7 | 9.50 | 0.471 | 9.42 | - 0.84 | ± 10 |
| 835 | 08/06/2019 | 3863 | | Body | 20.8 | 20.6 | 9.50 | 0.471 | 9.42 | - 0.84 | ± 10 |
| 1900 | 08/02/2019 | 3903 | 5d032 | Head | 21.1 | 20.9 | 40.0 | 1.94 | 38.8 | - 3.00 | ± 10 |
| 1900 | 08/05/2019 | 3863 | | Body | 20.8 | 20.6 | 39.7 | 1.93 | 38.6 | - 2.77 | ± 10 |
| 2 450 | 08/08/2019 | 3863 | 743 | Head | 19.5 | 19.3 | 51.8 | 2.57 | 51.4 | - 0.77 | ± 10 |
| 2 450 | 08/08/2019 | 3903 | | Body | 21.2 | 21.0 | 49.9 | 2.50 | 50.0 | + 0.20 | ± 10 |
| 2 600 | 08/01/2019 | 3863 | 1015 | Head | 19.6 | 19.4 | 58.1 | 2.84 | 56.8 | - 2.24 | ± 10 |
| 2 600 | 08/01/2019 | 3797 | | Body | 20.9 | 20.7 | 54.8 | 2.58 | 51.6 | - 5.84 | ± 10 |
| 5 250 | 08/08/2019 | 3863 | 1253 | Head | 19.5 | 19.2 | 82.0 | 4.09 | 81.8 | - 0.24 | ± 10 |
| 5 250 | 08/09/2019 | 3863 | | Body | 20.9 | 20.5 | 78.0 | 3.71 | 74.2 | - 4.87 | ± 10 |
| 5 600 | 08/08/2019 | 3863 | | Head | 19.5 | 19.2 | 83.8 | 4.24 | 84.8 | + 1.19 | ± 10 |
| 5 600 | 08/09/2019 | 3863 | | Body | 20.9 | 20.5 | 81.6 | 4.17 | 83.4 | + 2.21 | ± 10 |
| 5 750 | 08/08/2019 | 3863 | | Head | 19.5 | 19.2 | 82.3 | 4.15 | 83 | + 0.85 | ± 10 |
| 5 750 | 08/09/2019 | 3863 | | Body | 20.9 | 20.5 | 77.3 | 3.96 | 79.2 | + 2.46 | ± 10 |

### System Verification Results

* Input Power: 50mW

| Freq. [㎒] | 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 [%] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 250 | 08/09/2019 | 3863 | 1253 | Body | 20.9 | 20.5 | 21.6 | 1.05 | 21.0 | - 2.78 | ± 10 |
| 5 600 | 08/09/2019 | 3863 | 1253 | Body | 20.9 | 20.5 | 22.6 | 1.14 | 22.8 | + 0.88 | ± 10 |

## 12.3 System Verification Procedure

SAR measurement was prior to assessment, the system is verified to the ± 10 % of the specifications at each frequencybandby using the system verification kit. (Graphic Plots Attached)
- Cabling the system, using the verification kit equipment.
- Generate about 50mW 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 Head SAR Measurement Results

| GSM 850 Head SAR | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | Duty Cycle | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | |
| 836.6 | 190 | Voice | 34.0 | 32.19 | -0.12 | Left Cheek | 1:8.3 | 0.199 | 1.517 | 0.302 | - |
| 836.6 | 190 | Voice | 34.0 | 32.19 | 0.01 | Left Tilt | 1:8.3 | 0.116 | 1.517 | 0.176 | - |
| 836.6 | 190 | Voice | 34.0 | 32.19 | -0.03 | Right Cheek | 1:8.3 | 0.235 | 1.517 | **0.356** | 1 |
| 836.6 | 190 | Voice | 34.0 | 32.19 | 0.13 | Right Tilt | 1:8.3 | 0.123 | 1.517 | 0.187 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | Head<br>1.6 W/kg<br>Averaged over 1 gram | | | | |

| GSM 1900 Head SAR | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | Duty Cycle | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | |
| 1880 | 661 | Voice | 31.0 | 30.11 | -0.16 | Left Cheek | 1:8.3 | 0.115 | 1.227 | **0.141** | 2 |
| 1880 | 661 | Voice | 31.0 | 30.11 | 0.16 | Left Tilt | 1:8.3 | 0.069 | 1.227 | 0.085 | - |
| 1880 | 661 | Voice | 31.0 | 30.11 | -0.10 | Right Cheek | 1:8.3 | 0.076 | 1.227 | 0.093 | - |
| 1880 | 661 | Voice | 31.0 | 30.11 | 0.18 | Right Tilt | 1:8.3 | 0.058 | 1.227 | 0.071 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | Head<br>1.6 W/kg<br>Averaged over 1 gram | | | | |

| UMTS 850 Head SAR | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | Duty Cycle | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | |
| 836.6 | 4183 | RMC | 25.0 | 24.60 | 0.02 | Left Cheek | 1:1 | 0.214 | 1.096 | 0.235 | - |
| 836.6 | 4183 | RMC | 25.0 | 24.60 | 0.11 | Left Tilt | 1:1 | 0.122 | 1.096 | 0.134 | - |
| 836.6 | 4183 | RMC | 25.0 | 24.60 | -0.13 | Right Cheek | 1:1 | 0.258 | 1.096 | **0.283** | 3 |
| 836.6 | 4183 | RMC | 25.0 | 24.60 | 0.06 | Right Tilt | 1:1 | 0.127 | 1.096 | 0.139 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | Head<br>1.6 W/kg<br>Averaged over 1 gram | | | | |

| UMTS1900 Head SAR | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | Duty Cycle | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | |
| 1 880 | 9400 | RMC | 24.0 | 23.14 | -0.11 | Left Cheek | 1:1 | 0.186 | 1.219 | **0.227** | 4 |
| 1 880 | 9400 | RMC | 24.0 | 23.14 | 0.10 | Left Tilt | 1:1 | 0.105 | 1.219 | 0.128 | - |
| 1 880 | 9400 | RMC | 24.0 | 23.14 | -0.16 | Right Cheek | 1:1 | 0.117 | 1.219 | 0.143 | - |
| 1 880 | 9400 | RMC | 24.0 | 23.14 | 0.18 | Right Tilt | 1:1 | 0.087 | 1.219 | 0.106 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | Head<br>1.6 W/kg<br>Averaged over 1 gram | | | | |

| LTE Band 5 (Cell) Head SAR | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Band Width | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | MPR (dB) | RB Size | RB Offset | Duty Cycle | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | | | | |
| 836.5 | 20525 | QPSK | 10 | 25.0 | 24.06 | -0.10 | Left Cheek | 0 | 1 | 0 | 1:1 | 0.181 | 1.242 | 0.225 | - |
| 836.5 | 20525 | QPSK | 10 | 24.0 | 22.96 | 0.18 | Left Cheek | 1 | 25 | 0 | 1:1 | 0.144 | 1.271 | 0.183 | - |
| 836.5 | 20525 | QPSK | 10 | 25.0 | 24.06 | 0.12 | Left Tilt | 0 | 1 | 0 | 1:1 | 0.109 | 1.242 | 0.135 | - |
| 836.5 | 20525 | QPSK | 10 | 24.0 | 22.96 | 0.18 | Left Tilt | 1 | 25 | 0 | 1:1 | 0.087 | 1.271 | 0.111 | - |
| 836.5 | 20525 | QPSK | 10 | 25.0 | 24.06 | 0.17 | Right Cheek | 0 | 1 | 0 | 1:1 | 0.205 | 1.242 | **0.255** | 5 |
| 836.5 | 20525 | QPSK | 10 | 24.0 | 22.96 | 0.11 | Right Cheek | 1 | 25 | 0 | 1:1 | 0.164 | 1.271 | 0.208 | - |
| 836.5 | 20525 | QPSK | 10 | 25.0 | 24.06 | -0.01 | Right Tilt | 0 | 1 | 0 | 1:1 | 0.107 | 1.242 | 0.133 | - |
| 836.5 | 20525 | QPSK | 10 | 24.0 | 22.96 | 0.15 | Right Tilt | 1 | 25 | 0 | 1:1 | 0.084 | 1.271 | 0.107 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | | Head<br>1.6 W/kg<br>Averaged over 1 gram | | | | | | | |

| LTE TDD Band 41 Head SAR | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Band Width | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | MPR (dB) | RB Size | RB Offset | Duty Cycle | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | | | | |
| 2 680 | 41490 | QPSK | 20 | 25.0 | 24.05 | -0.18 | Left Cheek | 0 | 1 | 0 | 1:1.58 | 0.089 | 1.245 | 0.111 | - |
| 2 680 | 41490 | QPSK | 20 | 24.0 | 22.89 | 0.12 | Left Cheek | 1 | 50 | 0 | 1:1.58 | 0.067 | 1.291 | 0.086 | - |
| 2 680 | 41490 | QPSK | 20 | 25.0 | 24.05 | 0.16 | Left Tilt | 0 | 1 | 0 | 1:1.58 | 0.059 | 1.245 | 0.073 | - |
| 2 680 | 41490 | QPSK | 20 | 24.0 | 22.89 | 0.18 | Left Tilt | 1 | 50 | 0 | 1:1.58 | 0.043 | 1.291 | 0.056 | - |
| 2 680 | 41490 | QPSK | 20 | 25.0 | 24.05 | -0.04 | Right Cheek | 0 | 1 | 0 | 1:1.58 | 0.073 | 1.245 | 0.091 | - |
| 2 680 | 41490 | QPSK | 20 | 24.0 | 22.89 | 0.15 | Right Cheek | 1 | 50 | 0 | 1:1.58 | 0.054 | 1.291 | 0.070 | - |
| 2 680 | 41490 | QPSK | 20 | 25.0 | 24.05 | -0.11 | Right Tilt | 0 | 1 | 0 | 1:1.58 | 0.119 | 1.245 | **0.148** | 6 |
| 2 680 | 41490 | QPSK | 20 | 24.0 | 22.89 | -0.01 | Right Tilt | 1 | 50 | 0 | 1:1.58 | 0.084 | 1.291 | 0.108 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | | Head<br>1.6 W/kg<br>Averaged over 1 gram | | | | | | | |

| DTS Head SAR | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Band width (㎒) | Data Rate (Mbps) | Tune-Up Limit (dBm) | Meas. Power (dBm) | Power Drift (dB) | Test Position | Duty Cycle | Area Scan Peak SAR (W/kg) | Meas. SAR (W/kg) | Scaling Factor | Scaling Factor (Duty) | Scaled SAR (W/kg) | Plot No. |
| ㎒ | Ch. | | | | | | | | | | | | | | |
| 2 462 | 11 | 802.11b | 22 | 1 | 16 | 15.53 | | Left Cheek | 98.7 | 0.0517 | | 1.114 | 1.013 | | - |
| 2 462 | 11 | 802.11b | 22 | 1 | 16 | 15.53 | | Left Tilt | 98.7 | 0.0474 | | 1.114 | 1.013 | | - |
| 2 462 | 11 | 802.11b | 22 | 1 | 16 | 15.53 | -0.17 | Right Cheek | 98.7 | 0.0885 | 0.049 | 1.114 | 1.013 | **0.055** | 7 |
| 2 462 | 11 | 802.11b | 22 | 1 | 16 | 15.53 | | Right Tilt | 98.7 | 0.0847 | | 1.114 | 1.013 | | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | | | Head<br>1.6 W/kg<br>Averaged over 1 gram | | | | | | |

| NII Head SAR | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Band width (㎒) | Data Rate (Mbps) | Tune-Up Limit (dBm) | Meas. Power (dBm) | Power Drift (dB) | Test Position | Duty Cycle | Area Scan Peak SAR (W/kg) | Meas. SAR (W/kg) | Scaling Factor | Scaling Factor (Duty) | Scaled SAR (W/kg) | Plot No. |
| ㎒ | Ch. | | | | | | | | | | | | | | |
| 5 270 | 54 | 802.11n | 40 | MCS0 | 14 | 12.72 | | Left Cheek | 87.13 | 0.349 | | 1.343 | 1.148 | | - |
| 5 270 | 54 | 802.11n | 40 | MCS0 | 14 | 12.72 | 0.18 | Left Tilt | 87.13 | 0.559 | 0.124 | 1.343 | 1.148 | 0.191 | - |
| 5 270 | 54 | 802.11n | 40 | MCS0 | 14 | 12.72 | | Right Cheek | 87.13 | 0.337 | | 1.343 | 1.148 | | - |
| 5 270 | 54 | 802.11n | 40 | MCS0 | 14 | 12.72 | | Right Tilt | 87.13 | 0.549 | | 1.343 | 1.148 | | - |
| 5 610 | 122 | 802.11ac | 80 | MCS0 | 14 | 12.56 | | Left Cheek | 85.63 | 0.362 | | 1.393 | 1.168 | | - |
| 5 610 | 122 | 802.11ac | 80 | MCS0 | 14 | 12.56 | 0.06 | Left Tilt | 85.63 | 0.546 | 0.136 | 1.393 | 1.168 | **0.221** | 8 |
| 5 610 | 122 | 802.11ac | 80 | MCS0 | 14 | 12.56 | | Right Cheek | 85.63 | 0.371 | | 1.393 | 1.168 | | - |
| 5 610 | 122 | 802.11ac | 80 | MCS0 | 14 | 12.56 | | Right Tilt | 85.63 | 0.525 | | 1.393 | 1.168 | | - |
| 5 775 | 155 | 802.11ac | 80 | MCS0 | 14 | 12.45 | | Left Cheek | 85.63 | 0.474 | | 1.429 | 1.168 | | - |
| 5 775 | 155 | 802.11ac | 80 | MCS0 | 14 | 12.45 | | Left Tilt | 85.63 | 0.547 | | 1.429 | 1.168 | | - |
| 5 775 | 155 | 802.11ac | 80 | MCS0 | 14 | 12.45 | | Right Cheek | 85.63 | 0.439 | | 1.429 | 1.168 | | - |
| 5 775 | 155 | 802.11ac | 80 | MCS0 | 14 | 12.45 | 0.18 | Right Tilt | 85.63 | 0.739 | 0.131 | 1.429 | 1.168 | 0.219 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | | | Head<br>1.6 W/kg<br>Averaged over 1 gram | | | | | | |

| DSS Head SAR | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Tune-Up Limit (dBm) | Meas. Power (dBm) | Power Drift (dB) | Test Position | Meas. SAR (W/kg) | Scaling Factor | Scaling Factor (Duty) | Reported SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | |
| 2 441 | 39 | Bluetooth DH5 | 9.5 | 9.45 | -0.10 | Left Cheek | 0.00544 | 1.012 | 1.302 | 0.007 | - |
| 2 441 | 39 | Bluetooth DH5 | 9.5 | 9.45 | 0.17 | Left Tilt | 0.00513 | 1.012 | 1.302 | 0.007 | - |
| 2 441 | 39 | Bluetooth DH5 | 9.5 | 9.45 | -0.19 | Right Cheek | 0.011 | 1.012 | 1.302 | **0.014** | 9 |
| 2 441 | 39 | Bluetooth DH5 | 9.5 | 9.45 | 0.15 | Right Tilt | 0.011 | 1.012 | 1.302 | 0.014 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | Head<br>1.6 W/kg<br>Averaged over 1 gram | | | | |

13.2 Body-worn SAR Measurement Results

| GSM/ UMTS Body-Worn SAR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | Duty Cycle | Distance (mm) | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | |
| 836.6 | 190 | GSM850 Voice | 34.0 | 32.19 | 0.16 | Rear | 1:8.3 | 15 | 0.228 | 1.517 | **0.346** | 10 |
| 1 880 | 661 | GSM1900 Voice | 31.0 | 30.11 | 0.06 | Rear | 1:8.3 | 15 | 0.146 | 1.227 | **0.179** | 11 |
| 836.6 | 4183 | UMTS850(RMC) | 25.0 | 24.60 | 0.03 | Rear | 1:1 | 15 | 0.278 | 1.096 | **0.305** | 12 |
| 1 880 | 9400 | UMTS1900(RMC) | 24.0 | 23.14 | 0.01 | Rear | 1:1 | 15 | 0.357 | 1.219 | **0.435** | 13 |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | |

| LTE Body-Worn SAR | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Band Width | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | MPR (dB) | RB Size | RB Offset | Duty Cycle | Distance (mm) | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | | | | | |
| 836.5 | 20525 | LTE 5 QPSK | 10 | 25.0 | 24.06 | 0.01 | Rear | 0 | 1 | 0 | 1:1 | 15 | 0.258 | 1.242 | **0.320** | 14 |
| 836.5 | 20525 | | 10 | 24.0 | 22.96 | -0.02 | Rear | 1 | 25 | 0 | 1:1 | 15 | 0.204 | 1.271 | 0.259 | - |
| 2 680 | 41490 | LTE 41 QPSK | 20 | 25.0 | 24.05 | -0.12 | Rear | 0 | 1 | 0 | 1:1.58 | 15 | 0.237 | 1.245 | **0.295** | 15 |
| 2 680 | 41490 | | 20 | 24.0 | 22.89 | 0.09 | Rear | 1 | 50 | 0 | 1:1.58 | 15 | 0.183 | 1.291 | 0.236 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | | | | |

| DTS Body-Worn SAR | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Band width (MHz) | Data Rate (Mbps) | Tune-Up Limit (dBm) | Meas. Power (dBm) | Power Drift (dB) | Test Position | Duty Cycle | Distance (mm) | Area Scan Peak SAR (W/kg) | Meas. SAR (W/kg) | Scaling Factor | Scaling Factor (Duty) | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | | | | | |
| 2 437 | 6 | 802.11b | 22 | 1 | 18.5 | 18.47 | 0.16 | Rear | 98.7 | 15 | 0.0899 | 0.052 | 1.007 | 1.013 | **0.053** | 16 |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | | |

| NII Body-Worn SAR | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Band width (㎒) | Data Rate (Mbps) | Tune-Up Limit (dBm) | Meas. Power( dBm) | Power Drift (dB) | Test Position | Duty Cycle | Distance (mm) | Area Scan Peak SAR (W/kg) | Meas. SAR (W/kg) | Scaling Factor | Scaling Factor (Duty) | Scaled SAR (W/kg) | Plot No. |
| ㎒ | Ch. | | | | | | | | | | | | | | | |
| 5 260 | 52 | 802.11a | 20 | 6 | 16 | 14.80 | 0.16 | Rear | 92.98 | 15 | 1.09 | 0.485 | 1.318 | 1.076 | **0.688** | 17 |
| 5 600 | 120 | 802.11a | 20 | 6 | 16 | 15.20 | 0.01 | Rear | 92.98 | 15 | 0.196 | 0.071 | 1.202 | 1.076 | 0.092 | - |
| 5 745 | 149 | 802.11a | 20 | 6 | 16 | 15.47 | 0.01 | Rear | 92.98 | 15 | 0.140 | 0.049 | 1.130 | 1.076 | 0.060 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | | |

| DSS Body-Worn SAR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Tune-Up Limit (dBm) | Meas. Power (dBm) | Power Drift (dB) | Test Position | Distance (mm | Meas. SAR (W/kg) | Scaling Factor | Scaling Factor (Duty) | Scaled SAR (W/kg) | Plot No. |
| ㎒ | Ch. | | | | | | | | | | | |
| 2 441 | 39 | Bluetooth DH5 | 9.5 | 9.45 | -0.17 | Rear | 15 | 0.0018 | 1.012 | 1.302 | **0.002** | 18 |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | |

13.3 Hotspot SAR Measurement Results

| GSM 850 Hotspot SAR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | Duty Cycle | Distance (mm) | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | |
| 836.6 | 190 | GPRS 4Tx | 28.0 | 26.91 | -0.14 | Rear | 1:2.07 | 10 | 0.444 | 1.285 | **0.571** | 19 |
| 836.6 | 190 | GPRS 4Tx | 28.0 | 26.91 | 0.01 | Front | 1:2.07 | 10 | 0.218 | 1.285 | 0.280 | - |
| 836.6 | 190 | GPRS 4Tx | 28.0 | 26.91 | 0.11 | Left | 1:2.07 | 10 | 0.135 | 1.285 | 0.173 | - |
| 836.6 | 190 | GPRS 4Tx | 28.0 | 26.91 | -0.01 | Right | 1:2.07 | 10 | 0.267 | 1.285 | 0.343 | - |
| 836.6 | 190 | GPRS 4Tx | 28.0 | 26.91 | 0.13 | Bottom | 1:2.07 | 10 | 0.110 | 1.285 | 0.141 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | |

| GSM 1900 Hotspot SAR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | Duty Cycle | Distance (mm) | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | |
| 1 880 | 661 | GPRS 4Tx | 25.5 | 23.77 | -0.01 | Rear | 1:2.07 | 10 | 0.304 | 1.489 | **0.453** | 20 |
| 1 880 | 661 | GPRS 4Tx | 25.5 | 23.77 | -0.08 | Front | 1:2.07 | 10 | 0.177 | 1.489 | 0.264 | - |
| 1 880 | 661 | GPRS 4Tx | 25.5 | 23.77 | 0.14 | Left | 1:2.07 | 10 | 0.207 | 1.489 | 0.308 | - |
| 1 880 | 661 | GPRS 4Tx | 25.5 | 23.77 | 0.10 | Right | 1:2.07 | 10 | 0.036 | 1.489 | 0.054 | - |
| 1 880 | 661 | GPRS 4Tx | 25.5 | 23.77 | -0.05 | Bottom | 1:2.07 | 10 | 0.288 | 1.489 | 0.429 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | |

| UMTS 850 Hotspot SAR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | Duty Cycle | Distance (mm) | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | |
| 836.6 | 4183 | RMC | 25.0 | 24.60 | 0.12 | Rear | 1:1 | 10 | 0.402 | 1.096 | **0.441** | 21 |
| 836.6 | 4183 | RMC | 25.0 | 24.60 | 0.03 | Front | 1:1 | 10 | 0.209 | 1.096 | 0.229 | - |
| 836.6 | 4183 | RMC | 25.0 | 24.60 | 0.07 | Left | 1:1 | 10 | 0.104 | 1.096 | 0.114 | - |
| 836.6 | 4183 | RMC | 25.0 | 24.60 | 0.02 | Right | 1:1 | 10 | 0.211 | 1.096 | 0.231 | - |
| 836.6 | 4183 | RMC | 25.0 | 24.60 | 0.16 | Bottom | 1:1 | 10 | 0.086 | 1.096 | 0.094 | |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | |

| UMTS 1900 Hotspot SAR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | Duty Cycle | Distance (mm) | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | |
| 1880.0 | 9400 | RMC | 24.0 | 23.14 | 0.18 | Rear | 1:1 | 10 | 0.585 | 1.219 | **0.713** | 22 |
| 1880.0 | 9400 | RMC | 24.0 | 23.14 | -0.11 | Front | 1:1 | 10 | 0.351 | 1.219 | 0.428 | - |
| 1880.0 | 9400 | RMC | 24.0 | 23.14 | 0.16 | Left | 1:1 | 10 | 0.294 | 1.219 | 0.358 | - |
| 1880.0 | 9400 | RMC | 24.0 | 23.14 | 0.10 | Right | 1:1 | 10 | 0.074 | 1.219 | 0.090 | - |
| 1880.0 | 9400 | RMC | 24.0 | 23.14 | 0.07 | Bottom | 1:1 | 10 | 0.362 | 1.219 | 0.441 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | |

| LTE Band 5 (Cell) Hotspot SAR | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Band Width | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | MPR (dB) | RB Size | RB Offset | Duty Cycle | Distance (mm) | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | | | | | |
| 836.5 | 20525 | QPSK | 10 | 25.0 | 24.06 | 0.03 | Rear | 0 | 1 | 0 | 1:1 | 10 | 0.331 | 1.242 | **0.411** | 23 |
| 836.5 | 20525 | QPSK | 10 | 24.0 | 22.96 | 0.02 | Rear | 1 | 25 | 0 | 1:1 | 10 | 0.278 | 1.271 | 0.353 | - |
| 836.5 | 20525 | QPSK | 10 | 25.0 | 24.06 | -0.03 | Front | 0 | 1 | 0 | 1:1 | 10 | 0.197 | 1.242 | 0.245 | - |
| 836.5 | 20525 | QPSK | 10 | 24.0 | 22.96 | -0.04 | Front | 1 | 25 | 0 | 1:1 | 10 | 0.155 | 1.271 | 0.197 | - |
| 836.5 | 20525 | QPSK | 10 | 25.0 | 24.06 | 0.08 | Left | 0 | 1 | 0 | 1:1 | 10 | 0.125 | 1.242 | 0.155 | - |
| 836.5 | 20525 | QPSK | 10 | 24.0 | 22.96 | 0.09 | Left | 1 | 25 | 0 | 1:1 | 10 | 0.097 | 1.271 | 0.123 | - |
| 836.5 | 20525 | QPSK | 10 | 25.0 | 24.06 | 0.01 | Right | 0 | 1 | 0 | 1:1 | 10 | 0.210 | 1.242 | 0.261 | - |
| 836.5 | 20525 | QPSK | 10 | 24.0 | 22.96 | 0.01 | Right | 1 | 25 | 0 | 1:1 | 10 | 0.164 | 1.271 | 0.208 | - |
| 836.5 | 20525 | QPSK | 10 | 25.0 | 24.06 | 0.10 | Bottom | 0 | 1 | 0 | 1:1 | 10 | 0.030 | 1.242 | 0.037 | - |
| 836.5 | 20525 | QPSK | 10 | 24.0 | 22.96 | 0.14 | Bottom | 1 | 25 | 0 | 1:1 | 10 | 0.024 | 1.271 | 0.031 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | | | | |

| LTE TDD Band 41 Hotspot SAR | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Band Width | Tune-Up Limit (dB) | Meas. Power (dB) | Power Drift (dB) | Test Position | MPR (dB) | RB Size | RB Offset | Duty Cycle | Distance (mm) | Meas. SAR (W/kg) | Scaling Factor | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | | | | | |
| 2 680 | 41490 | QPSK | 20 | 25.0 | 24.05 | 0.19 | Rear | 0 | 1 | 0 | 1:1.58 | 10 | 0.479 | 1.245 | **0.596** | 24 |
| 2 680 | 41490 | QPSK | 20 | 24.0 | 22.89 | -0.07 | Rear | 1 | 50 | 0 | 1:1.58 | 10 | 0.338 | 1.291 | 0.436 | - |
| 2 680 | 41490 | QPSK | 20 | 25.0 | 24.05 | 0.14 | Front | 0 | 1 | 0 | 1:1.58 | 10 | 0.204 | 1.245 | 0.254 | - |
| 2 680 | 41490 | QPSK | 20 | 24.0 | 22.89 | 0.11 | Front | 1 | 50 | 0 | 1:1.58 | 10 | 0.158 | 1.291 | 0.204 | - |
| 2 680 | 41490 | QPSK | 20 | 25.0 | 24.05 | 0.12 | Left | 0 | 1 | 0 | 1:1.58 | 10 | 0.179 | 1.245 | 0.223 | - |
| 2 680 | 41490 | QPSK | 20 | 24.0 | 22.89 | 0.15 | Left | 1 | 50 | 0 | 1:1.58 | 10 | 0.138 | 1.291 | 0.178 | - |
| 2 680 | 41490 | QPSK | 20 | 25.0 | 24.05 | -0.01 | Right | 0 | 1 | 0 | 1:1.58 | 10 | 0.096 | 1.245 | 0.120 | - |
| 2 680 | 41490 | QPSK | 20 | 24.0 | 22.89 | 0.06 | Right | 1 | 50 | 0 | 1:1.58 | 10 | 0.074 | 1.291 | 0.096 | - |
| 2 680 | 41490 | QPSK | 20 | 25.0 | 24.05 | 0.13 | Bottom | 0 | 1 | 0 | 1:1.58 | 10 | 0.190 | 1.245 | 0.237 | - |
| 2 680 | 41490 | QPSK | 20 | 24.0 | 22.89 | -0.16 | Bottom | 1 | 50 | 0 | 1:1.58 | 10 | 0.148 | 1.291 | 0.191 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | | | | |

| DTSHotspot SAR | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Band width (MHz) | Data Rate (Mbps) | Tune-Up Limit (dBm) | Meas. Power( dBm) | Power Drift (dB) | Test Position | Duty Cycle | Distance (mm) | Area Scan Peak SAR (W/kg) | Meas. SAR (W/kg) | Scaling Factor | Scaling Factor (Duty) | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | | | | | |
| 2 437 | 6 | 802.11b | 22 | 1 | 18.5 | 18.47 | 0.18 | Rear | 98.7 | 10 | 0.203 | 0.110 | 1.007 | 1.013 | **0.112** | 25 |
| 2 437 | 6 | 802.11b | 22 | 1 | 18.5 | 18.47 | | Front | 98.7 | 10 | 0.0581 | | 1.007 | 1.013 | | - |
| 2 437 | 6 | 802.11b | 22 | 1 | 18.5 | 18.47 | | Left | 98.7 | 10 | 0.0268 | | 1.007 | 1.013 | | - |
| -2 437 | 6 | 802.11b | 22 | 1 | 18.5 | 18.47 | | Top | 98.7 | 10 | 0.0616 | | 1.007 | 1.013 | | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | | | | |

| 5 GHz WLAN Hotspot SAR | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Band width (MHz) | Data Rate (Mbps) | Tune-Up Limit (dBm) | Meas. Power (dBm) | Power Drift (dB) | Test Position | Duty Cycle | Distance (mm) | Area Scan Peak SAR (W/kg) | Meas. SAR (W/kg) | Scaling Factor | Scaling Factor (Duty) | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | | | | | |
| 5 745 | 149 | 802.11a | 20 | 6 | 16.0 | 15.47 | | Rear | 92.98 | 10 | 0.225 | | 1.130 | 1.076 | | - |
| 5 745 | 149 | 802.11a | 20 | 6 | 16.0 | 15.47 | | Front | 92.98 | 10 | 0.107 | | 1.130 | 1.076 | | - |
| 5 745 | 149 | 802.11a | 20 | 6 | 16.0 | 15.47 | | Left | 92.98 | 10 | 0.0553 | | 1.130 | 1.076 | | - |
| 5 745 | 149 | 802.11a | 20 | 6 | 16.0 | 15.47 | 0.19 | Top | 92.98 | 10 | 0.360 | 0.127 | 1.130 | 1.076 | **0.154** | 26 |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | | |

| DSSTethering SAR | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Tune-Up Limit (dBm) | Meas. Power (dBm) | Power Drift (dB) | Test Position | Distance (mm) | Meas. SAR (W/kg) | Scaling Factor | Scaling Factor (Duty) | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | |
| 2 441 | 39 | Bluetooth DH5 | 9.5 | 9.45 | -0.19 | Rear | 10 | 0.011 | 1.012 | 1.302 | **0.014** | 27 |
| 2 441 | 39 | Bluetooth DH5 | 9.5 | 9.45 | 0.12 | Front | 10 | 0.00107 | 1.012 | 1.302 | 0.001 | - |
| 2 441 | 39 | Bluetooth DH5 | 9.5 | 9.45 | 0.10 | Left | 10 | 0.0017 | 1.012 | 1.302 | 0.002 | - |
| 2 441 | 39 | Bluetooth DH5 | 9.5 | 9.45 | 0.18 | Top | 10 | 0.00246 | 1.012 | 1.302 | 0.003 | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | Body<br>1.6 W/kg<br>Averaged over 1 gram | | | | | |

13.4 Phablet SAR Measurement Results

| 5 GHz WLAN Phablet SAR | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | | Mode | Band width (MHz) | Data Rate (Mbps) | Tune-Up Limit (dBm) | Meas. Power( dBm) | Power Drift (dB) | Test Position | Duty Cycle | Distance (mm) | Area Scan Peak SAR (W/kg) | Meas. SAR (W/kg) | Scaling Factor | Scaling Factor (Duty) | Scaled SAR (W/kg) | Plot No. |
| MHz | Ch. | | | | | | | | | | | | | | | |
| 5 260 | 52 | 802.11a | 20 | 6 | 16 | 14.80 | 0.01 | Rear | 92.98 | 0 | 16.5 | 1.26 | 1.318 | 1.076 | **1.787** | 28 |
| 5 260 | 52 | 802.11a | 20 | 6 | 16 | 14.80 | | Front | 92.98 | 0 | 3.00 | | 1.318 | 1.076 | | - |
| 5 260 | 52 | 802.11a | 20 | 6 | 16 | 14.80 | | Left | 92.98 | 0 | 1.19 | | 1.318 | 1.076 | | - |
| 5 260 | 52 | 802.11a | 20 | 6 | 16 | 14.80 | -0.12 | Top | 92.98 | 0 | 10.1 | 1.09 | 1.318 | 1.076 | 1.546 | - |
| 5 600 | 120 | 802.11a | 20 | 6 | 16 | 15.20 | 0.01 | Rear | 92.98 | 0 | 5.98 | 0.645 | 1.202 | 1.076 | 0.834 | - |
| 5 600 | 120 | 802.11a | 20 | 6 | 16 | 15.20 | | Front | 92.98 | 0 | 1.22 | | 1.202 | 1.076 | | - |
| 5 600 | 120 | 802.11a | 20 | 6 | 16 | 15.20 | | Left | 92.98 | 0 | 0.621 | | 1.202 | 1.076 | | - |
| 5 600 | 120 | 802.11a | 20 | 6 | 16 | 15.20 | | Top | 92.98 | 0 | 5.77 | | 1.202 | 1.076 | | - |
| ANSI/ IEEE C95.1 - 1992 – Safety Limit<br>Spatial Peak<br>Uncontrolled Exposure/ General Population | | | | | | | | | | Hand<br>4.0 W/kg<br>Averaged over 10 gram | | | | | | |

## 13.5 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, 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.
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.

UMTS Notes:

1. The 12.2 kbps RMC mode is the primary mode per KDB 941225 D01v03r01.
2. UMTS 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. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator.
5. 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.
6. TDD LTE was tested using UL-DL configuration 0 with 6 UL subframes and 2S subframes using extended cyclic prefix only and special subframe configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Sec. 4, the duty factor using extended cyclic prefix is 0.633(cf=1.58).
7. 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 GHzWiFi Single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11 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 GHzWiFi 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.9.4.3 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.

### 14.1Simultaneous Transmission Summation for Head

| Exposure condition | Band | WWAN SAR (W/kg) | 2.4 GHz WLAN SAR (W/kg) | ∑ 1-g SAR (W/kg) |
|---|---|---|---|---|
| Head SAR | GSM 850 | 0.356 | 0.055 | 0.411 |
| | GSM 1900 | 0.141 | 0.055 | 0.196 |
| | UMTS 850 | 0.283 | 0.055 | 0.338 |
| | UMTS 1900 | 0.227 | 0.055 | 0.282 |
| | LTE Band 5 | 0.255 | 0.055 | 0.310 |
| | LTE Band 41 | 0.148 | 0.055 | 0.203 |

| Exposure condition | Band | WWAN SAR (W/kg) | 5 GHz WLAN SAR (W/kg) | ∑ 1-g SAR (W/kg) |
|---|---|---|---|---|
| Head SAR | GSM 850 | 0.356 | 0.221 | **0.577** |
| | GSM 1900 | 0.141 | 0.221 | 0.362 |
| | UMTS 850 | 0.283 | 0.221 | 0.504 |
| | UMTS 1900 | 0.227 | 0.221 | 0.448 |
| | LTE Band 5 | 0.255 | 0.221 | 0.476 |
| | LTE Band 41 | 0.148 | 0.221 | 0.369 |

| Exposure condition | Band | WWAN SAR (W/kg) | Bluetooth SAR (W/kg) | ∑ 1-g SAR (W/kg) |
|---|---|---|---|---|
| Head SAR | GSM 850 | 0.356 | 0.014 | 0.370 |
| | GSM 1900 | 0.141 | 0.014 | 0.155 |
| | UMTS 850 | 0.283 | 0.014 | 0.297 |
| | UMTS 1900 | 0.227 | 0.014 | 0.241 |
| | LTE Band 5 | 0.255 | 0.014 | 0.269 |
| | LTE Band 41 | 0.148 | 0.014 | 0.162 |

14.2Simultaneous Transmission Summation for Body-Worn

| Exposure condition | Distance (mm) | Band | WWAN SAR (W/kg) | 2.4 ㎓ WLAN SAR (W/kg) | ∑ 1-g SAR (W/kg) |
|---|---|---|---|---|---|
| Body-worn | 15 | GSM 850 | 0.346 | 0.053 | 0.399 |
| | | GSM 1900 | 0.179 | 0.053 | 0.232 |
| | | UMTS 850 | 0.305 | 0.053 | 0.358 |
| | | UMTS 1900 | 0.435 | 0.053 | 0.488 |
| | | LTE Band 5 | 0.320 | 0.053 | 0.373 |
| | | LTE Band 41 | 0.295 | 0.053 | 0.348 |

| Exposure condition | Distance (mm) | Band | WWAN SAR (W/kg) | 5 ㎓ WLAN SAR (W/kg) | ∑ 1-g SAR (W/kg) |
|---|---|---|---|---|---|
| Body-worn | 15 | GSM 850 | 0.346 | 0.688 | 1.034 |
| | | GSM 1900 | 0.179 | 0.688 | 0.867 |
| | | UMTS 850 | 0.305 | 0.688 | 0.993 |
| | | UMTS 1900 | 0.435 | 0.688 | **1.123** |
| | | LTE Band 5 | 0.320 | 0.688 | 1.008 |
| | | LTE Band 41 | 0.295 | 0.688 | 0.983 |

| Exposure condition | Distance (mm) | Band | WWAN SAR (W/kg) | Bluetooth SAR (W/kg) | ∑ 1-g SAR (W/kg) |
|---|---|---|---|---|---|
| Body-worn | 15 | GSM 850 | 0.346 | 0.002 | 0.348 |
| | | GSM 1900 | 0.179 | 0.002 | 0.181 |
| | | UMTS 850 | 0.305 | 0.002 | 0.307 |
| | | UMTS 1900 | 0.435 | 0.002 | 0.437 |
| | | LTE Band 5 | 0.320 | 0.002 | 0.322 |
| | | LTE Band 41 | 0.295 | 0.002 | 0.297 |

14.3Simultaneous Transmission Summation for Hotspot

| 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 | 0.571 | 0.112 | 0.683 |
| | | GSM 1900 | 0.453 | 0.112 | 0.565 |
| | | UMTS 850 | 0.441 | 0.112 | 0.553 |
| | | UMTS 1900 | 0.713 | 0.112 | 0.825 |
| | | LTE Band 5 | 0.411 | 0.112 | 0.523 |
| | | LTE Band 41 | 0.596 | 0.112 | 0.708 |

| Exposure condition | Distance (mm) | Band | WWAN SAR (W/kg) | 5 GHz WLAN SAR (W/kg) | ∑ 1-g SAR (W/kg) |
|---|---|---|---|---|---|
| Hotspot | 10 | GSM 850 | 0.571 | 0.154 | 0.725 |
| | | GSM 1900 | 0.453 | 0.154 | 0.607 |
| | | UMTS 850 | 0.441 | 0.154 | 0.595 |
| | | UMTS 1900 | 0.713 | 0.154 | **0.867** |
| | | LTE Band 5 | 0.411 | 0.154 | 0.565 |
| | | LTE Band 41 | 0.596 | 0.154 | 0.750 |

| Exposure condition | Distance (mm) | Band | WWAN SAR (W/kg) | Bluetooth SAR (W/kg) | ∑ 1-g SAR (W/kg) |
|---|---|---|---|---|---|
| Hotspot | 10 | GSM 850 | 0.571 | 0.014 | 0.585 |
| | | GSM 1900 | 0.453 | 0.014 | 0.467 |
| | | UMTS 850 | 0.441 | 0.014 | 0.455 |
| | | UMTS 1900 | 0.713 | 0.014 | 0.727 |
| | | LTE Band 5 | 0.411 | 0.014 | 0.425 |
| | | LTE Band 41 | 0.596 | 0.014 | 0.610 |

### 14.4Phablet SAR Simultaneous Transmission Analysis

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.

| Exposure condition | Distance (mm) | Band | WWAN SAR (W/kg) | 5 ㎓ WLAN SAR (W/kg) | ∑ 10-g SAR (W/kg) |
|---|---|---|---|---|---|
| Phablet SAR | 0 | GSM 1900 | - | 1.787 | 1.787 |
| | | UMTS 1900 | - | 1.787 | 1.787 |

### 14.5Simultaneous 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 measurementis ≥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-TX60 | F10/ 5D1CA1/ C/ 01 | 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 | TX60 XLspeag | F10/ 5D1CA1/ A/ 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 | Teach Pendant (Joystick) | S-0123 | 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 |
| SPEAG | DAE3 | 504 | 02/22/2019 | Annual | 02/22/2020 |
| SPEAG | DAE4 | 869 | 09/19/2018 | Annual | 09/19/2019 |
| SPEAG | DAE4 | 1225 | 11/16/2018 | Annual | 11/16/2019 |
| SPEAG | E-Field Probe EX3DV4 | 3903 | 09/24/2018 | Annual | 09/24/2019 |
| SPEAG | E-Field Probe EX3DV4 | 3863 | 05/15/2019 | Annual | 05/15/2020 |
| SPEAG | E-Field Probe EX3DV4 | 3797 | 11/22/2018 | Annual | 11/22/2019 |
| SPEAG | Dipole D835V2 | 4d165 | 09/18/2018 | Annual | 09/18/2019 |
| SPEAG | Dipole D1900V2 | 5d032 | 02/21/2019 | Annual | 02/21/2020 |
| SPEAG | Dipole D2450V2 | 743 | 01/28/2019 | Annual | 01/28/2020 |
| SPEAG | Dipole D2600V2 | 1015 | 11/20/2018 | Annual | 11/20/2019 |
| SPEAG | Dipole D5GHzV2 | 1253 | 11/22/2018 | Annual | 11/22/2019 |
| Agilent | Power Meter E4419B | MY41291386 | 10/11/2018 | Annual | 10/11/2019 |
| Agilent | Power Meter N1911A | MY45101406 | 09/06/2018 | Annual | 09/06/2019 |
| Agilent | Power Sensor 8481A | SG1091286 | 10/11/2018 | Annual | 10/11/2019 |
| Agilent | Power Sensor 8481A | MY41090873 | 10/11/2018 | Annual | 10/11/2019 |
| Agilent | Power Sensor N1921A | MY55220026 | 09/06/2018 | Annual | 09/06/2019 |
| SPEAG | DAKS 3.5 | 1031 | 04/16/2019 | Annual | 04/16/2020 |
| SPEAG | VNA-R140 | 0050813 | 03/11/2019 | Annual | 03/11/2020 |

| Manufacturer | Type / Model | S/N | Calib. Date | Calib.Interval | Calib.Due |
|---|---|---|---|---|---|
| Agilent | WIRELESS COMMUNICATION E5515C | MY48361100 | 10/02/2018 | Annual | 10/02/2019 |
| Agilent | Signal Generator N5182A | MY47070230 | 05/08/2019 | Annual | 05/08/2020 |
| Agilent | 11636B/Power Divider | 58698 | 02/28/2019 | Annual | 03/06/2020 |
| TESTO | 175-H1/Thermometer | 40331936309 | 01/29/2019 | Annual | 01/29/2020 |
| TESTO | 175-H1/Thermometer | 40331939309 | 01/29/2019 | Annual | 01/29/2020 |
| TESTO | 175-H1/Thermometer | 40331915309 | 01/29/2019 | Annual | 01/29/2020 |
| EMPOWER | RF Power Amplifier | 1084 | 07/31/2019 | Annual | 07/31/2020 |
| MICRO LAB | LP Filter / LA-15N | 10453 | 10/11/2018 | Annual | 10/11/2019 |
| MICRO LAB | LP Filter / LA-30N | - | 10/11/2018 | Annual | 10/11/2019 |
| MICRO LAB | LP Filter / LA-60N | 32011 | 10/11/2018 | Annual | 10/11/2019 |
| 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 | 10/31/2018 | Annual | 10/31/2019 |
| HP | Dual Directional Coupler | 16072 | 10/11/2018 | Annual | 10/11/2019 |
| Anritsu | Radio Communication Tester MT8820C | 6201074225 | 03/05/2019 | Annual | 03/05/2020 |
| Anritsu | Radio Communication Tester MT8821C | 6261849028 | 03/07/2019 | Annual | 03/07/2020 |
| R&S | Bluetooth CBT | 100272 | 03/04/2019 | Annual | 03/04/2020 |

1. The E-field probe was calibrated by SPEAG, by the waveguide technique procedure. Dipole Verification measurement is performed byHCT 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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Attachment 1. – SAR Test Plots

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 21.1 ℃ |
| Ambient Temperature: | 21.3 ℃ |
| Test Date: | 08/01/2019 |
| Plot No.: | 1 |

**DUT: SM-M307FN/DS; Type: bar**

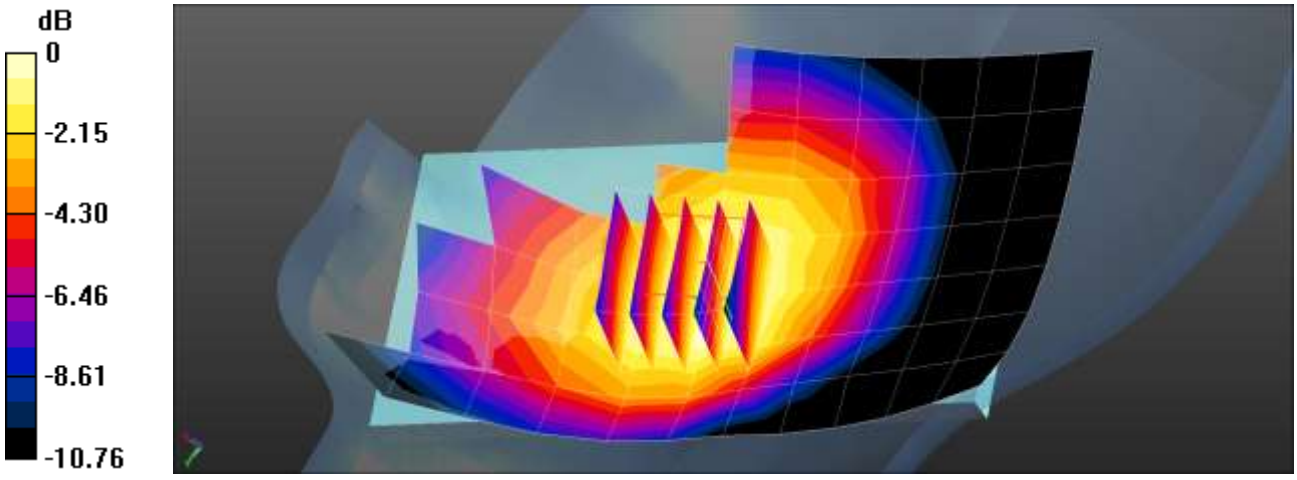
Communication System: UID 0, GSM 850 (0); Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.924 S/m; $\varepsilon_r$ = 40.783; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.25, 10.25, 10.25); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

**GSM850 Head Right Touch 190ch/Area Scan (8x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.279 W/kg

**GSM850 Head Right Touch 190ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.743 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.314 W/kg
**SAR(1 g) = 0.235 W/kg; SAR(10 g) = 0.175 W/kg**
Maximum value of SAR (measured) = 0.282 W/kg




0 dB = 0.282 W/kg = −5.50 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.9 °C |
| Ambient Temperature: | 21.1 °C |
| Test Date: | 08/02/2019 |
| Plot No.: | 2 |

**DUT: SM-M307FN/DS; Type: bar**

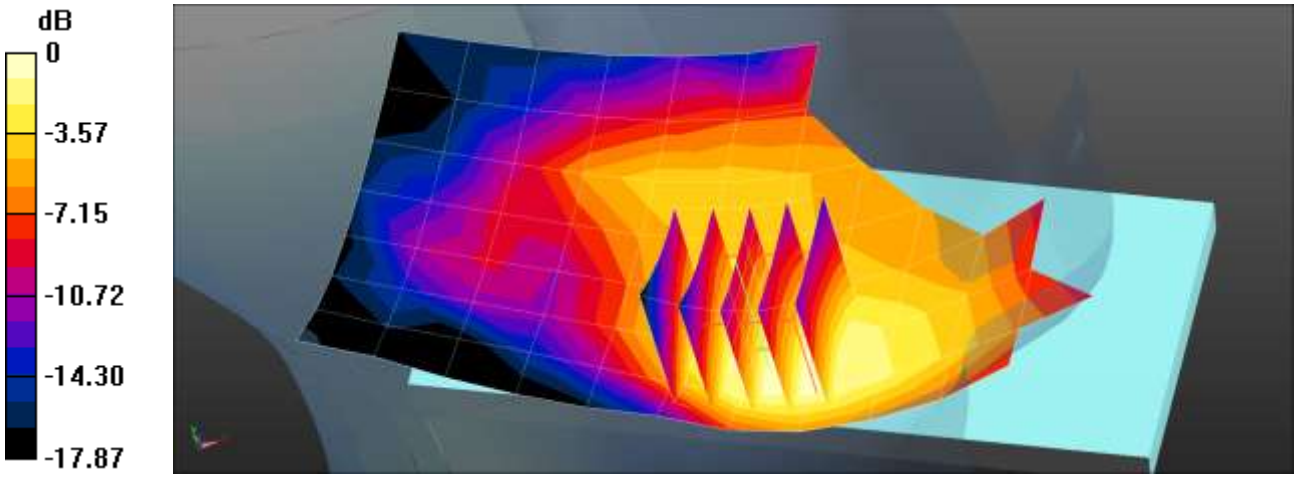
Communication System: UID 0, GSM 1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.402 S/m; $\varepsilon_r$ = 37.889; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.34, 8.34, 8.34); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

**GSM1900 Head Left Touch 661ch/Area Scan (8x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.144 W/kg

**GSM1900 Head Left Touch 661ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.825 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.178 W/kg
**SAR(1 g) = 0.115 W/kg; SAR(10 g) = 0.073 W/kg**
Maximum value of SAR (measured) = 0.155 W/kg




0 dB = 0.155 W/kg = −8.10 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 21.1 ℃ |
| Ambient Temperature: | 21.3 ℃ |
| Test Date: | 08/01/2019 |
| Plot No.: | 3 |

**DUT: SM-M307FN/DS; Type: bar**

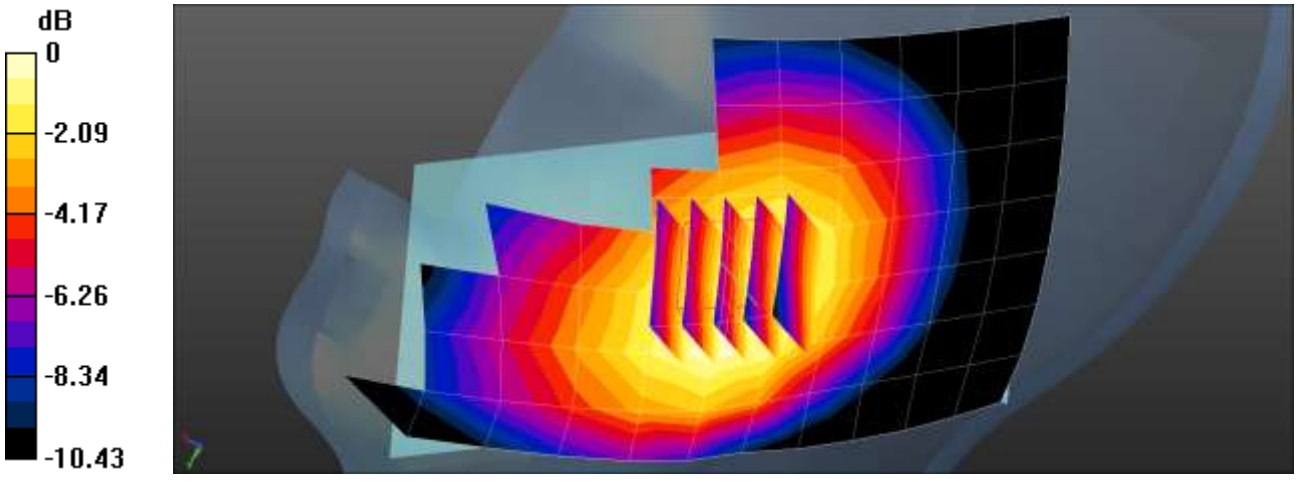
Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.924 S/m; $\varepsilon_r$ = 40.783; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.25, 10.25, 10.25); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

**WCDMA850 Head Right Touch 4183ch/Area Scan (8x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.304 W/kg

**WCDMA850 Head Right Touch 4183ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.857 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.335 W/kg
**SAR(1 g) = 0.258 W/kg; SAR(10 g) = 0.192 W/kg**
Maximum value of SAR (measured) = 0.309 W/kg




0 dB = 0.309 W/kg = −5.10 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.9 °C |
| Ambient Temperature: | 21.1 °C |
| Test Date: | 08/02/2019 |
| Plot No.: | 4 |

**DUT: SM-M307FN/DS; Type: bar**

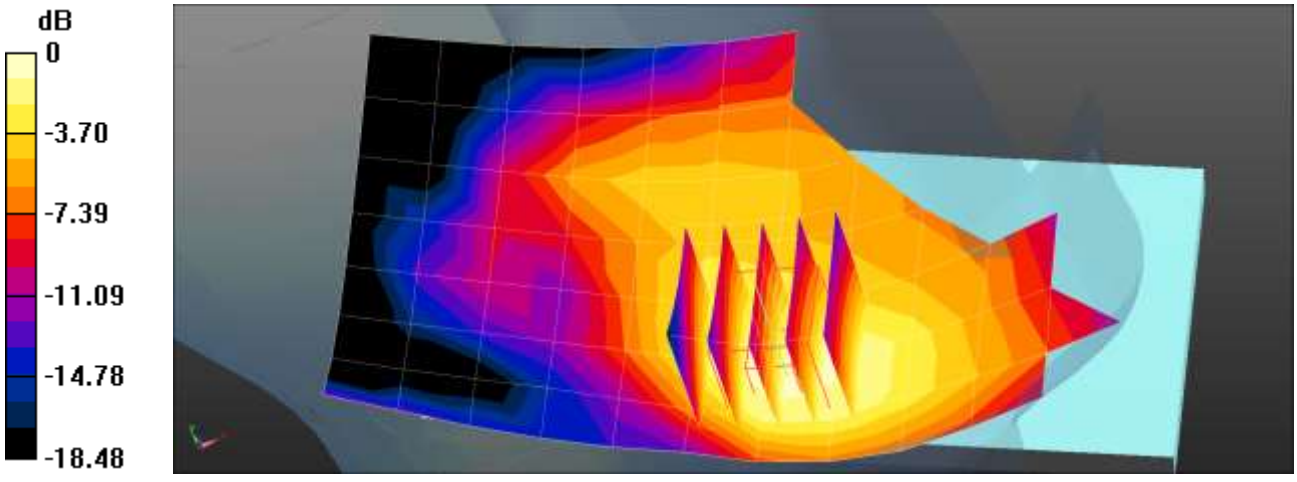
Communication System: UID 0, WCDMA1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.402 S/m; $\varepsilon_r$ = 37.889; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.34, 8.34, 8.34); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

**WCDMA1900 Head Left Touch 9400ch/Area Scan (8x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.238 W/kg

**WCDMA1900 Head Left Touch 9400ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.096 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.289 W/kg
**SAR(1 g) = 0.186 W/kg; SAR(10 g) = 0.118 W/kg**
Maximum value of SAR (measured) = 0.250 W/kg




0 dB = 0.250 W/kg = −6.02 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 21.1 ℃ |
| Ambient Temperature: | 21.3 ℃ |
| Test Date: | 08/01/2019 |
| Plot No.: | 5 |

**DUT: SM-M307FN/DS; Type: bar**

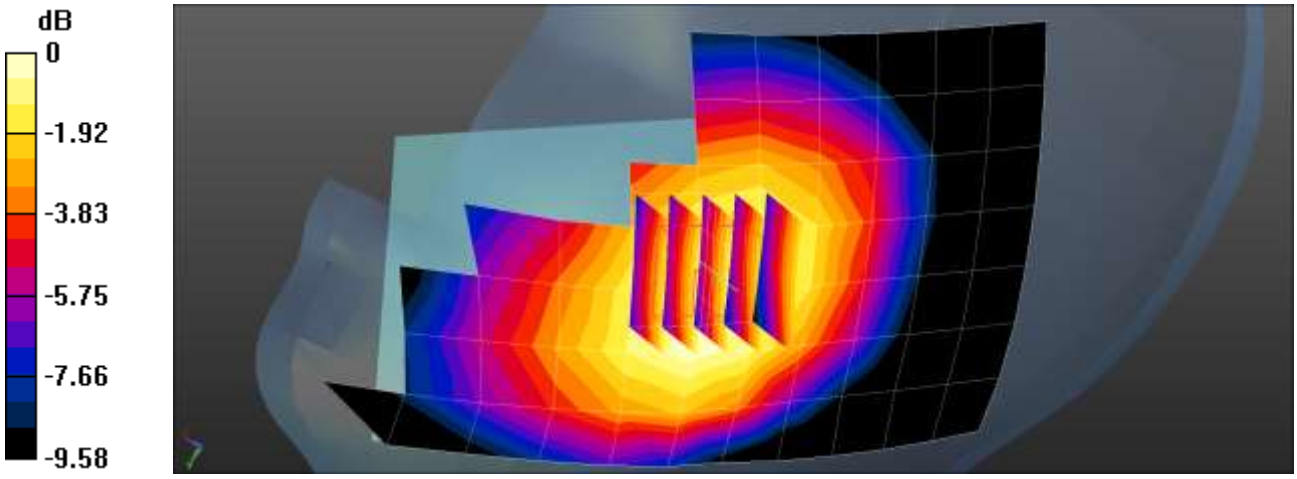
Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; $\sigma$ = 0.924 S/m; $\varepsilon_r$ = 40.784; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.25, 10.25, 10.25); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

**LTE Band 5 Head Right Touch QPSK 10MHz 1 RB 0offset 20525ch/Area Scan (8x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.238 W/kg

**LTE Band 5 Head Right Touch QPSK 10MHz 1 RB 0offset 20525ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.761 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.263 W/kg
**SAR(1 g) = 0.205 W/kg; SAR(10 g) = 0.156 W/kg**
Maximum value of SAR (measured) = 0.242 W/kg




0 dB = 0.242 W/kg = −6.16 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 19.4 ℃ |
| Ambient Temperature: | 19.6 ℃ |
| Test Date: | 08/01/2019 |
| Plot No.: | 6 |

**DUT: SM-M307FN/DS; Type: bar**

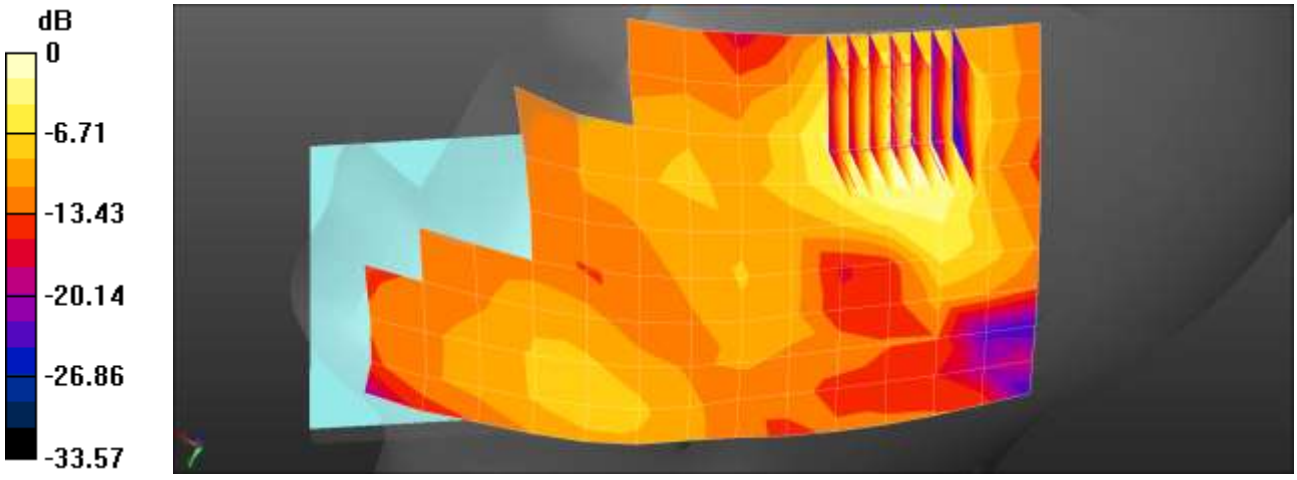
Communication System: UID 0, LTE Band41 (0); Frequency: 2680 MHz;Duty Cycle: 1:1.58016
Medium parameters used: f = 2680 MHz; $\sigma$ = 2.039 S/m; $\varepsilon_r$ = 37.614; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.32, 7.32, 7.32); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: Twin-SAM V4.0
- Measurement SW: DASY52, Version 52.10 (2);

**LTE Band 41 Head Right Tilt QPSK 20MHz 1RB 0offset 41490ch/Area Scan (10x16x1):** Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.182 W/kg

**LTE Band 41 Head Right Tilt QPSK 20MHz 1RB 0offset 41490ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.609 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.227 W/kg
**SAR(1 g) = 0.119 W/kg; SAR(10 g) = 0.058 W/kg**




0 dB = 0.182 W/kg = −7.40 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 19.3 ℃ |
| Ambient Temperature: | 19.5 ℃ |
| Test Date: | 08/06/2019 |
| Plot No.: | 7 |

**DUT: SM-M307FN/DS; Type: bar**

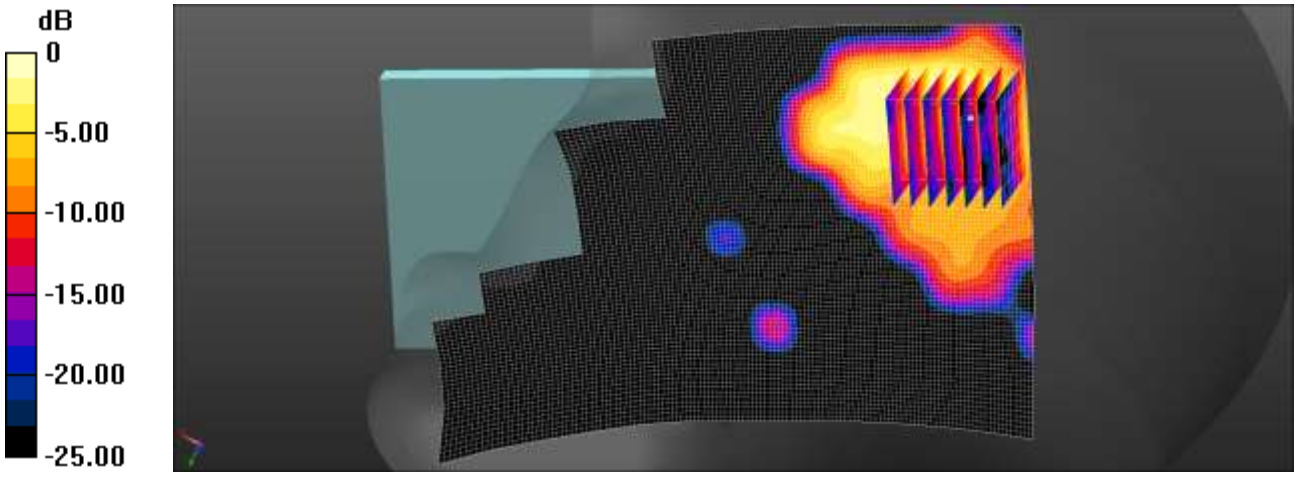
Communication System: UID 0, 2450MHz FCC (0); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; $\sigma$ = 1.809 S/m; $\varepsilon_r$ = 38.349; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.61, 7.61, 7.61); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: Twin-SAM V4.0(Left-Left)
- Measurement SW: DASY52, Version 52.10 (2);

**8021.11b Head Right Touch 1Mbps 11ch/Area Scan (91x151x1):** Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0885 W/kg

**8021.11b Head Right Touch 1Mbps 11ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.283 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.117 W/kg
**SAR(1 g) = 0.049 W/kg; SAR(10 g) = 0.023 W/kg**
Maximum value of SAR (measured) = 0.0893 W/kg




0 dB = 0.0893 W/kg = −10.49 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 19.2 ℃ |
| Ambient Temperature: | 19.5 ℃ |
| Test Date: | 08/08/2019 |
| Plot No.: | 8 |

**DUT: SM-M307FN/DS; Type: bar**

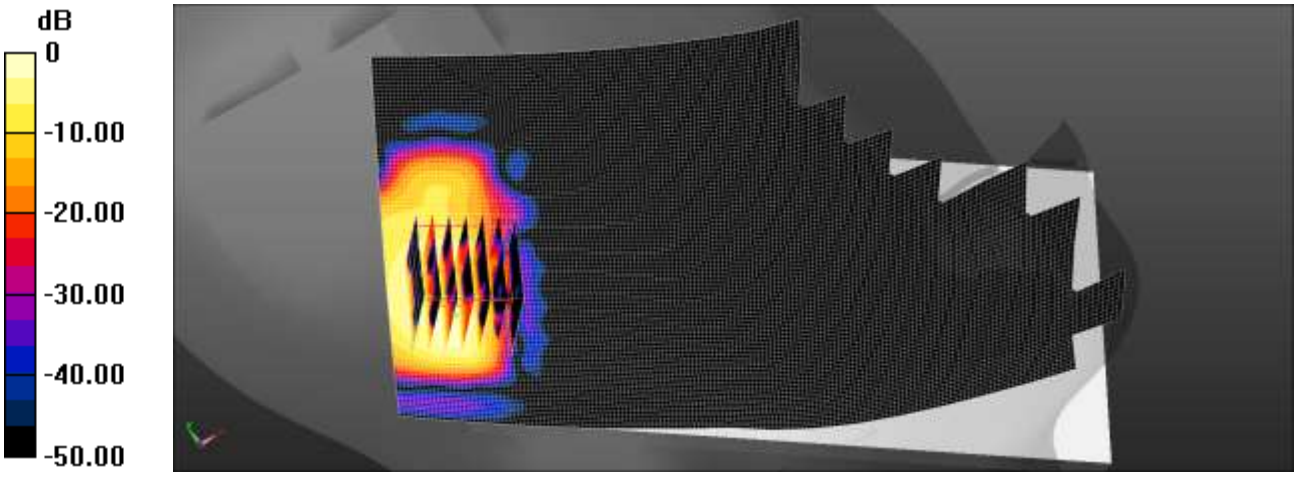
Communication System: UID 0, WIFI 5GHz (0); Frequency: 5610 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5610 MHz; $\sigma$ = 5.119 S/m; $\varepsilon_r$ = 35.215; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.69, 4.69, 4.69); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: Twin-SAM V4.0 (Left-Right)
- Measurement SW: DASY52, Version 52.10 (2);

**802.11ac 80 Head Left Tilt MCS0 122ch/Area Scan (101x181x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.546 W/kg

**802.11ac 80 Head Left Tilt MCS0 122ch/Zoom Scan (7x7x7)/Cube0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 4.509 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.495 W/kg
**SAR(1 g) = 0.136 W/kg; SAR(10 g) = 0.043 W/kg**
Maximum value of SAR (measured) = 0.316 W/kg




0 dB = 0.546 W/kg = −2.63 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 19.3 ℃ |
| Ambient Temperature: | 19.5 ℃ |
| Test Date: | 08/08/2019 |
| Plot No.: | 9 |

**DUT: SM-M307FN/DS; Type: bar**

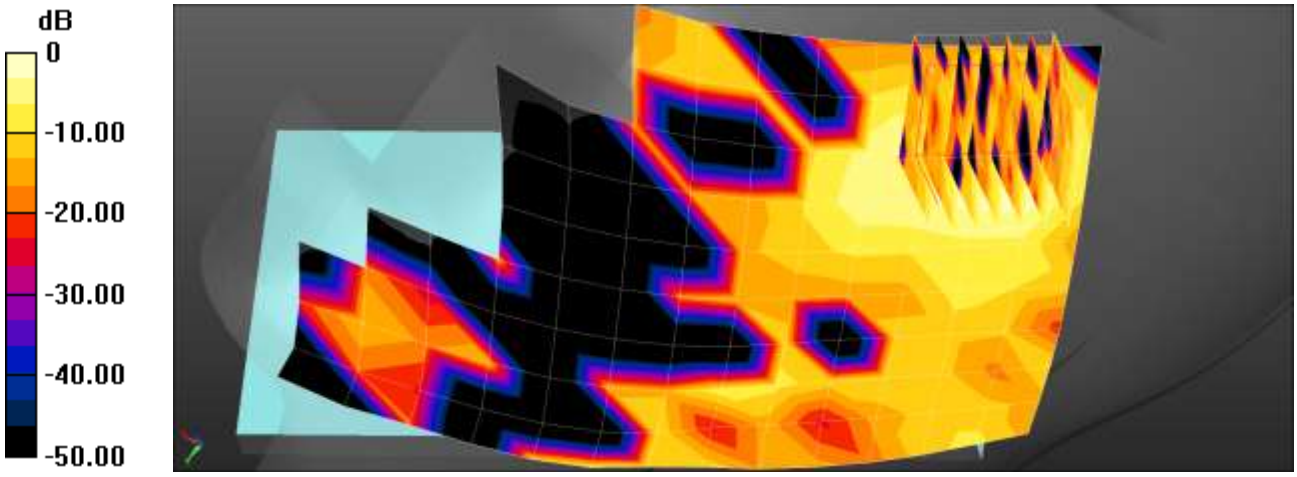
Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz;Duty Cycle: 1:1.302
Medium parameters used (interpolated): f = 2441 MHz; $\sigma$ = 1.786 S/m; $\varepsilon_r$ = 38.473; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.61, 7.61, 7.61); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: Twin-SAM V4.0(Left-Left)
- Measurement SW: DASY52, Version 52.10 (2);

**Bluetooth Head Right Touch DH5 39ch/Area Scan (10x16x1):** Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.0201 W/kg

**Bluetooth Head Right Touch DH5 39ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.634 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.0340 W/kg
**SAR(1 g) = 0.011 W/kg; SAR(10 g) = 0.00504 W/kg**
Maximum value of SAR (measured) = 0.0206 W/kg




0 dB = 0.0201 W/kg = −16.97 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.7 °C |
| Ambient Temperature: | 20.9 °C |
| Test Date: | 08/02/2019 |
| Plot No.: | 10 |

**DUT: SM-M307FN/DS; Type: bar**

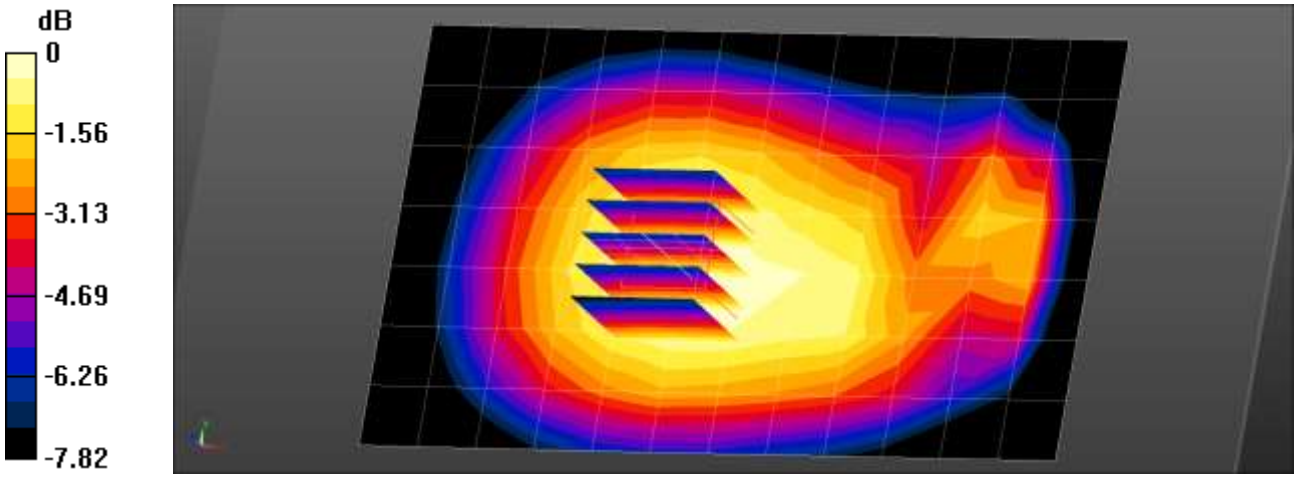
Communication System: UID 0, GSM 850 (0); Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.962 S/m; $\varepsilon_r$ = 56.322; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(9.16, 9.16, 9.16); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

**GSM850 Body-worn Rear Voice 190ch/Area Scan (13x8x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.271 W/kg

**GSM850 Body-worn Rear Voice 190ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.97 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.307 W/kg
**SAR(1 g) = 0.228 W/kg; SAR(10 g) = 0.174 W/kg**
Maximum value of SAR (measured) = 0.279 W/kg




0 dB = 0.279 W/kg = -5.54 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.6 °C |
| Ambient Temperature: | 20.8 °C |
| Test Date: | 08/05/2019 |
| Plot No.: | 11 |

**DUT: SM-M307FN/DS; Type: bar**

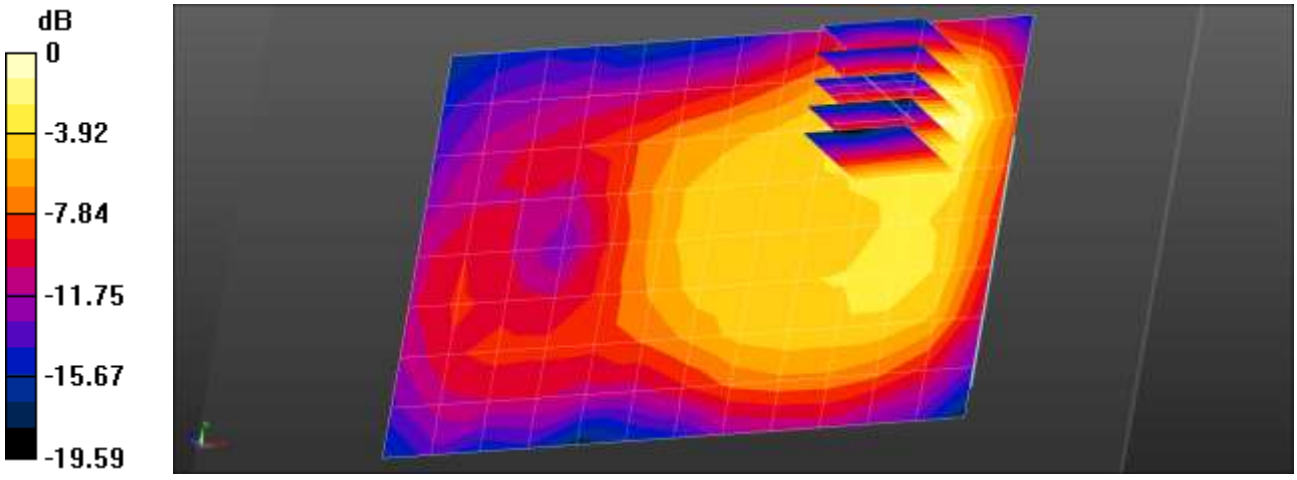
Communication System: UID 0, GSM 1900 1Tx (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.512 S/m; $\varepsilon_r$ = 53.625; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.99, 7.99, 7.99); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

**GSM 1900 Body worn Rear 661ch/Area Scan (13x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.216 W/kg

**GSM 1900 Body worn Rear 661ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.365 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.272 W/kg
**SAR(1 g) = 0.146 W/kg; SAR(10 g) = 0.078 W/kg**
Maximum value of SAR (measured) = 0.223 W/kg




0 dB = 0.223 W/kg = -6.52 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 19.5 ℃ |
| Ambient Temperature: | 19.8 ℃ |
| Test Date: | 08/06/2019 |
| Plot No.: | 12 |

**DUT: SM-M307FN/DS; Type: bar**

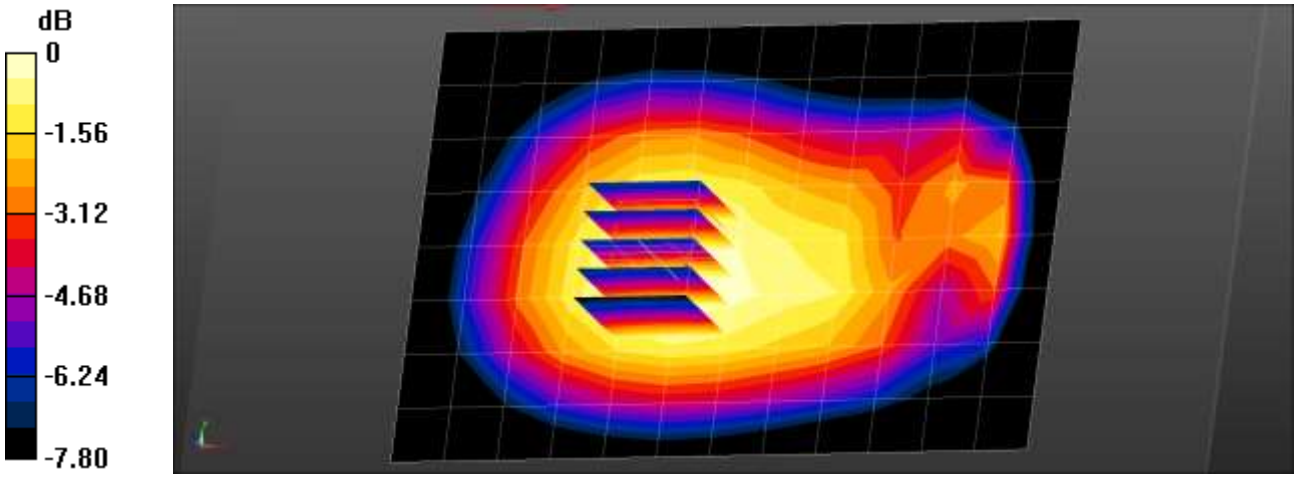
Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.962 S/m; $\varepsilon_r$ = 56.254; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(9.72, 9.72, 9.72); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

**WCDMA 850 Body worn Rear 4183ch/Area Scan (13x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.332 W/kg

**WCDMA 850 Body worn Rear 4183ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.61 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.361 W/kg
**SAR(1 g) = 0.278 W/kg; SAR(10 g) = 0.211 W/kg**
Maximum value of SAR (measured) = 0.333 W/kg




0 dB = 0.333 W/kg = -4.78 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.6 °C |
| Ambient Temperature: | 20.8 °C |
| Test Date: | 08/05/2019 |
| Plot No.: | 13 |

**DUT: SM-M307FN/DS; Type: bar**

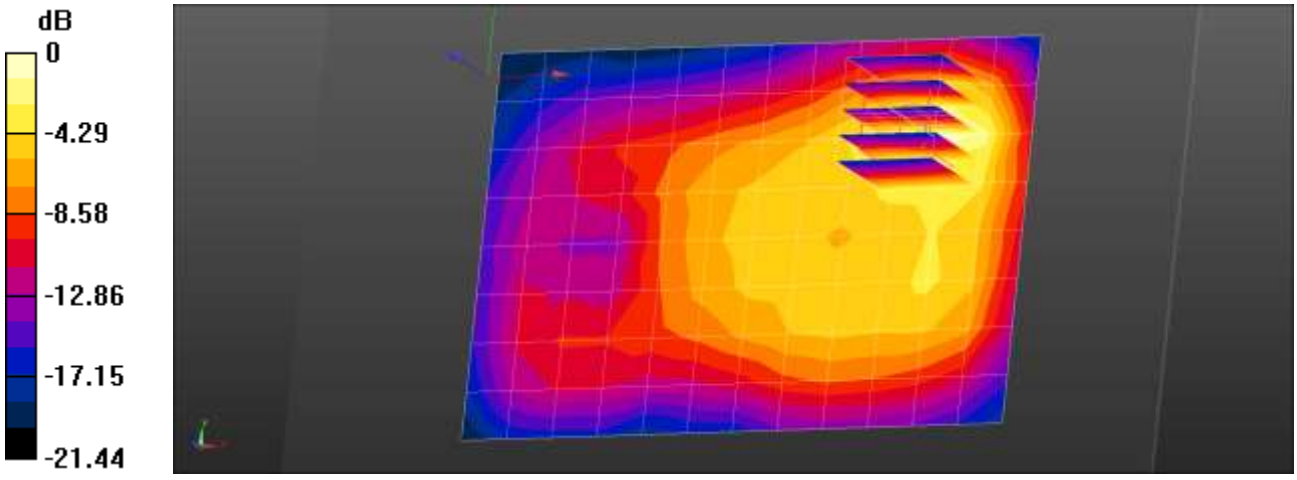
Communication System: UID 0, WCDMA1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.512 S/m; $\varepsilon_r$ = 53.625; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.99, 7.99, 7.99); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

**WCDMA 1900 Bodyworn Rear 9400ch/Area Scan (13x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.551 W/kg

**WCDMA 1900 Bodyworn Rear 9400ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.98 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.697 W/kg
**SAR(1 g) = 0.357 W/kg; SAR(10 g) = 0.186 W/kg**
Maximum value of SAR (measured) = 0.568 W/kg




0 dB = 0.568 W/kg = -2.46 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.7 °C |
| Ambient Temperature: | 20.9 °C |
| Test Date: | 08/02/2019 |
| Plot No.: | 14 |

**DUT: SM-M307FN/DS; Type: bar**

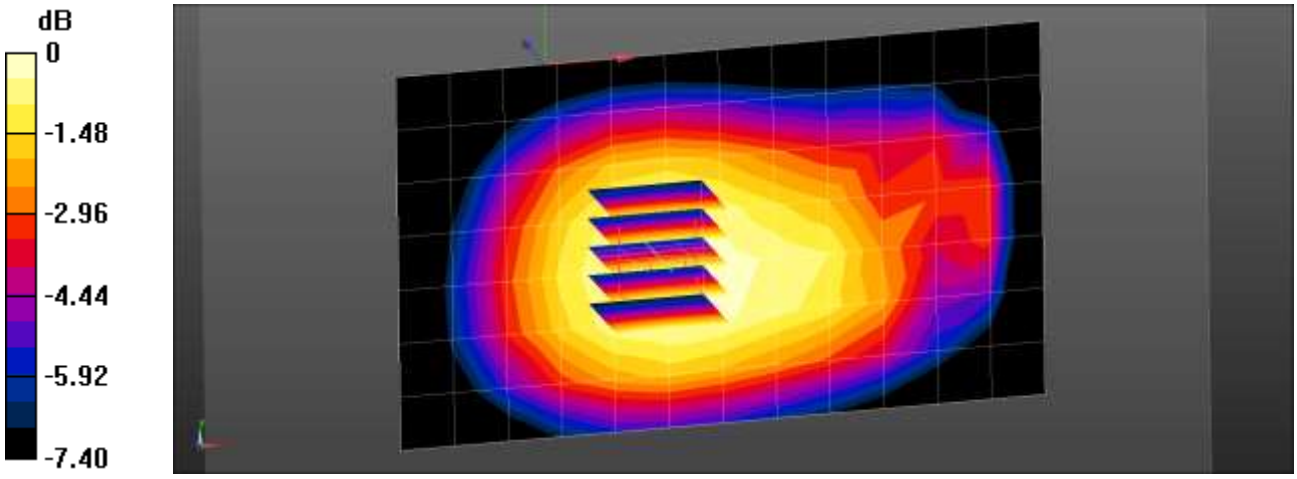
Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; $\sigma$ = 0.962 S/m; $\varepsilon_r$ = 56.322; $\rho$ = 1000kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(9.16, 9.16, 9.16); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

**LTE Band 5 Body-worn Rear QPSK 10MHz 1RB 0offset 20525ch/Area Scan (13x8x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.310 W/kg

**LTE Band 5 Body-worn Rear QPSK 10MHz 1RB 0offset 20525ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.25 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.341 W/kg
**SAR(1 g) = 0.258 W/kg; SAR(10 g) = 0.197 W/kg**
Maximum value of SAR (measured) = 0.311 W/kg




0 dB = 0.311 W/kg = -5.07 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.7 °C |
| Ambient Temperature: | 20.9 °C |
| Test Date: | 08/01/2019 |
| Plot No.: | 15 |

**DUT: SM-M307FN/DS; Type: bar**

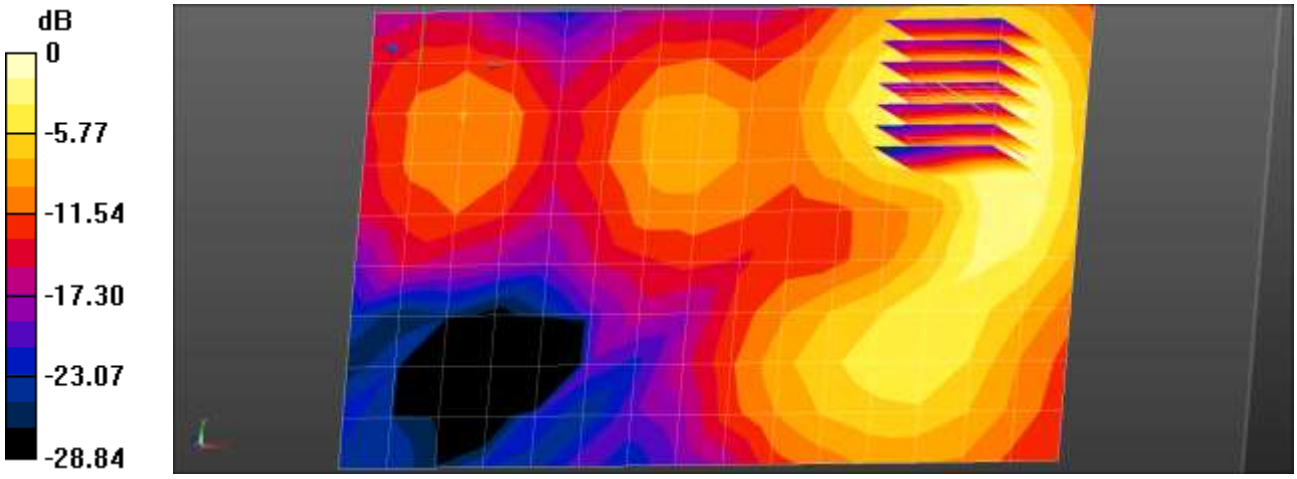
Communication System: UID 0, LTE Band 41 (0); Frequency: 2680 MHz;Duty Cycle: 1:1.58016
Medium parameters used: f = 2680 MHz; $\sigma$ = 2.216 S/m; $\varepsilon_r$ = 53.049; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.05, 7.05, 7.05); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

**LTE Band 41 Body-worn Rear QPSK 20MHz 1RB 0offset 41490ch/Area Scan (16x10x1):** Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.376 W/kg

**LTE Band 41 Body-worn Rear QPSK 20MHz 1RB 0offset 41490ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.870 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.489 W/kg
**SAR(1 g) = 0.237 W/kg; SAR(10 g) = 0.118 W/kg**
Maximum value of SAR (measured) = 0.388 W/kg




0 dB = 0.388 W/kg = -4.11 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 21.0 ℃ |
| Ambient Temperature: | 21.2 ℃ |
| Test Date: | 08/08/2019 |
| Plot No.: | 16 |

**DUT: SM-M307FN/DS; Type: bar**

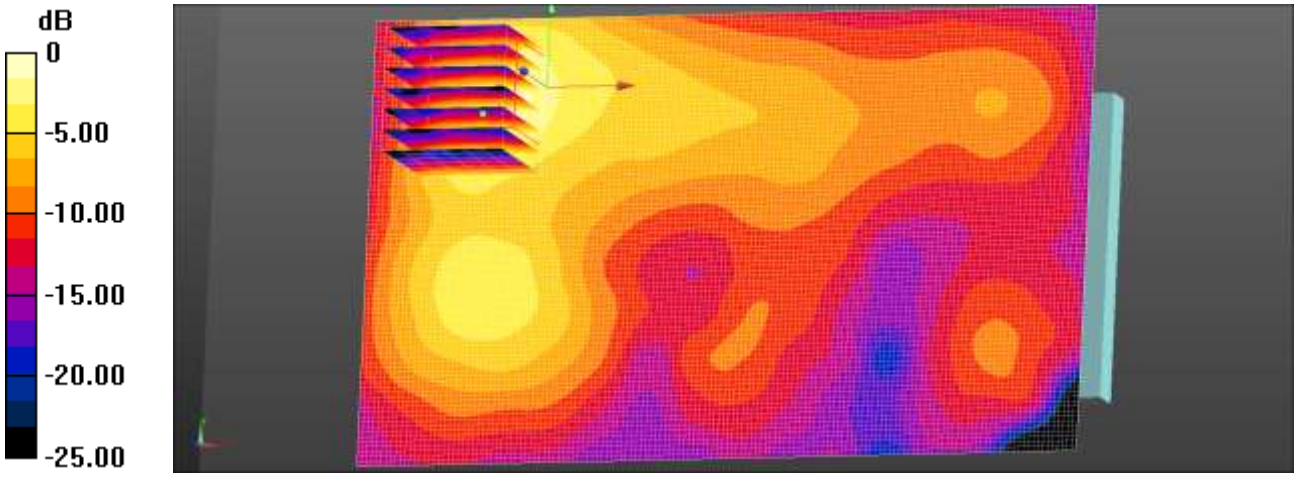
Communication System: UID 0, 2450MHz FCC (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; $\sigma$ = 1.936 S/m; $\varepsilon_r$ = 53.676; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.51, 7.51, 7.51); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

**802.11b Body Worn Rear 1Mbps 6ch/Area Scan (151x91x1):** Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0899 W/kg

**802.11b Body Worn Rear 1Mbps 6ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.197 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.109 W/kg
**SAR(1 g) = 0.052 W/kg; SAR(10 g) = 0.025 W/kg**
Maximum value of SAR (measured) = 0.0858 W/kg




0 dB = 0.0858 W/kg = −10.67 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.5 °C |
| Ambient Temperature: | 20.9 °C |
| Test Date: | 08/09/2019 |
| Plot No.: | 17 |

**DUT: SM-M307FN/DS; Type: bar**

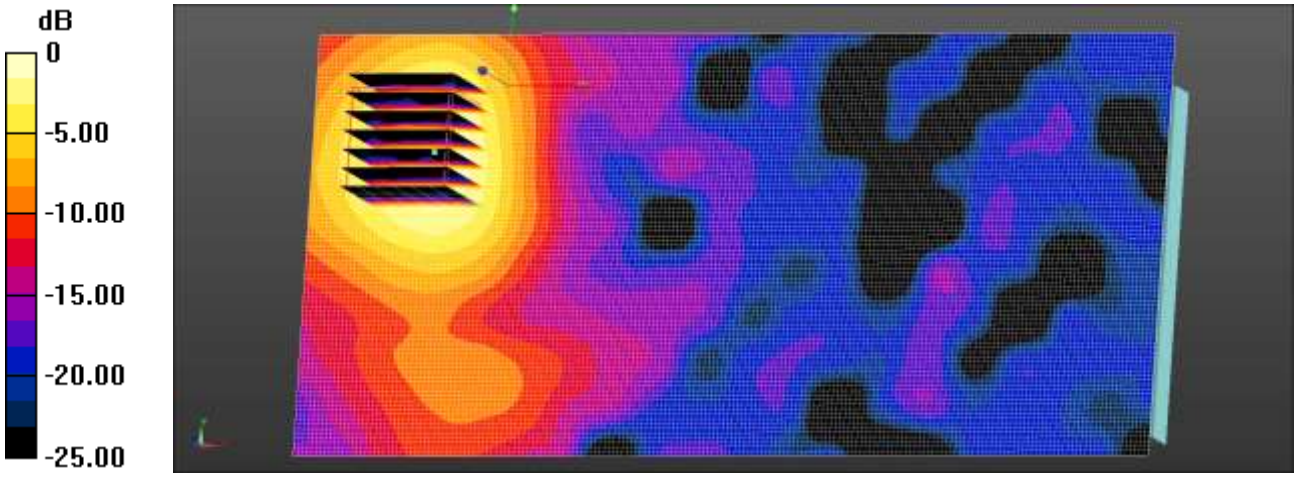
Communication System: UID 0, WIFI 5GHz (0); Frequency: 5260 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5260 MHz; $\sigma$ = 5.64 S/m; $\varepsilon_r$ = 47.547; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.4, 4.4, 4.4); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (2);

**802.11a Body Worn Rear 6Mbps 52ch/Area Scan (191x91x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.09 W/kg

**802.11a Body Worn Rear 6Mbps 52ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 0.9910 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 1.61 W/kg
**SAR(1 g) = 0.485 W/kg; SAR(10 g) = 0.184 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: | 21.0 ℃ |
| Ambient Temperature: | 21.2 ℃ |
| Test Date: | 08/08/2019 |
| Plot No.: | 18 |

**DUT: SM-M307FN/DS; Type: bar**

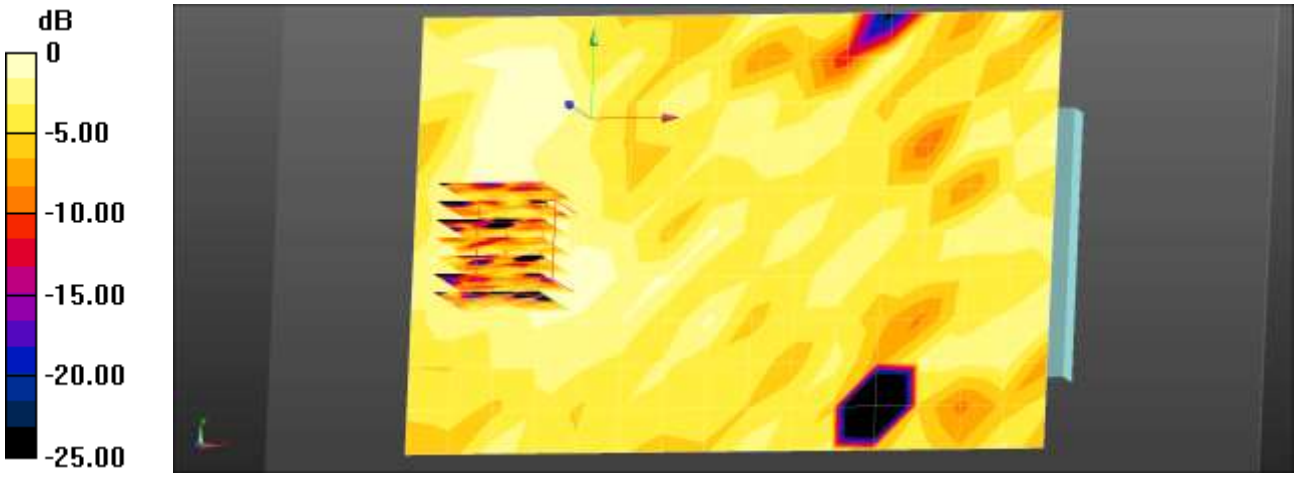
Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz;DutyCycle: 1:1.302
Medium parameters used (interpolated): f = 2441 MHz; $\sigma$ = 1.94 S/m; $\varepsilon_r$ = 53.662; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.51, 7.51, 7.51); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

**Bluetooth Body-worn Rear DH5 39ch/Area Scan (16x11x1):** Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.00340 W/kg

**Bluetooth Body-worn Rear DH5 39ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.5570 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.00374 W/kg
**SAR(1 g) = 0.0018 W/kg; SAR(10 g) = 0.000763 W/kg**
Maximum value of SAR (measured) = 0.00289 W/kg




0 dB = 0.00289 W/kg = −25.39 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.7 °C |
| Ambient Temperature: | 20.9 °C |
| Test Date: | 08/02/2019 |
| Plot No.: | 19 |

**DUT: SM-M307FN/DS; Type: bar**

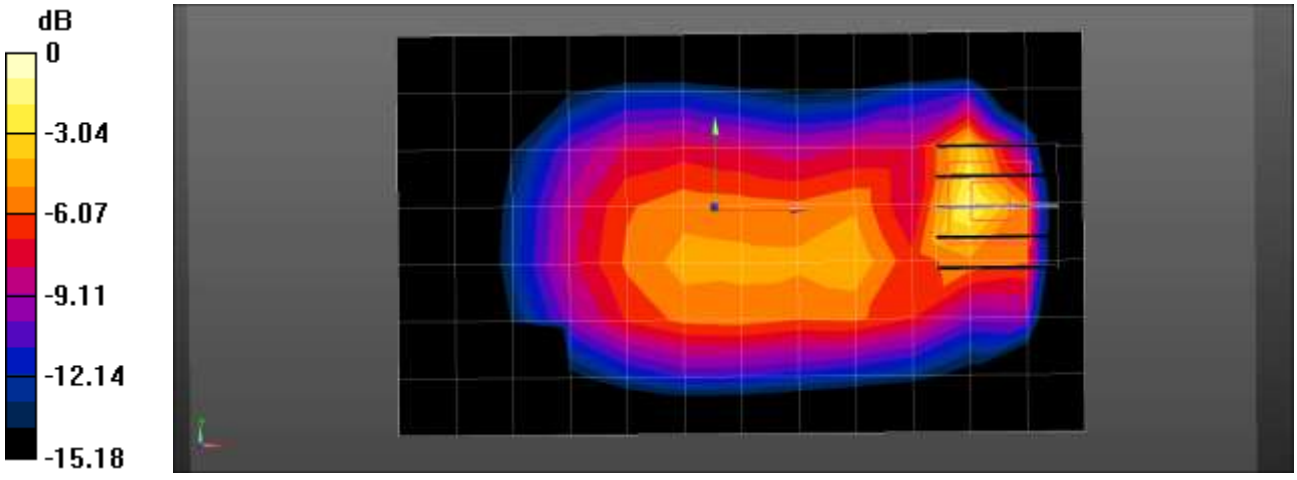
Communication System: UID 0, GSM850 GPRS 4TX (0); Frequency: 836.6 MHz;Duty Cycle: 1:2.07491
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.962 S/m; $\varepsilon_r$ = 56.322; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(9.16, 9.16, 9.16); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

**GSM850 Body Rear GPRS 4Tx 190ch/Area Scan (13x8x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.570 W/kg

**GSM850 Body Rear GPRS 4Tx 190ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.52 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.834 W/kg
**SAR(1 g) = 0.444 W/kg; SAR(10 g) = 0.242 W/kg**
Maximum value of SAR (measured) = 0.671 W/kg




0 dB = 0.671 W/kg = -1.73 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.6 °C |
| Ambient Temperature: | 20.8 °C |
| Test Date: | 08/05/2019 |
| Plot No.: | 20 |

**DUT: SM-M307FN/DS; Type: bar**

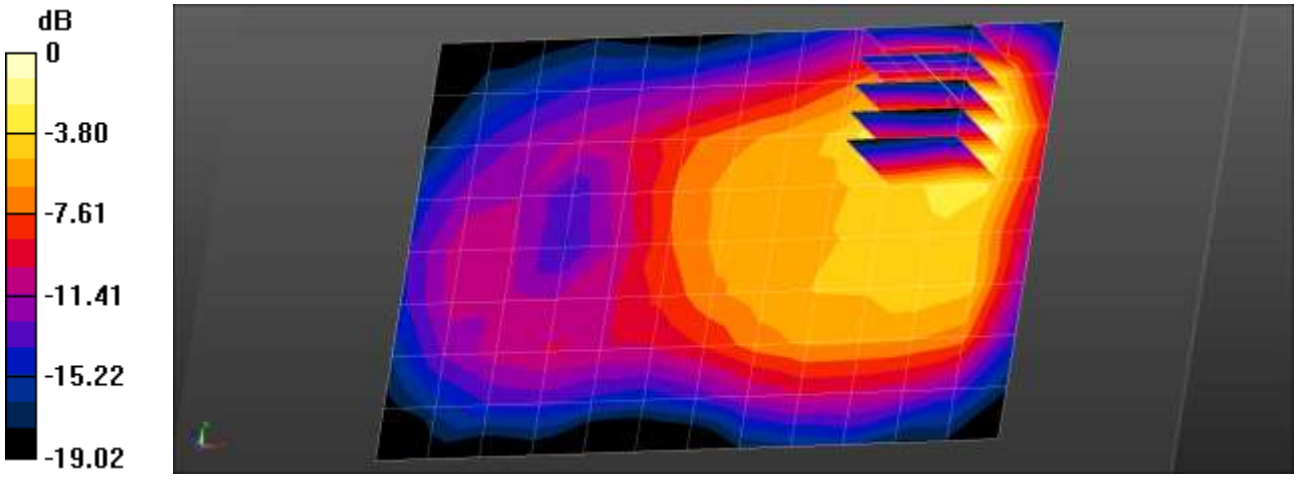
Communication System: UID 0, GSM 1900 4Tx (0); Frequency: 1880 MHz;Duty Cycle: 1:2.07491
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.512 S/m; $\varepsilon_r$ = 53.625; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.99, 7.99, 7.99); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

**GSM 1900 Body Rear 4Tx 661ch/Area Scan (13x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.480 W/kg

**GSM 1900 Body Rear 4Tx 661ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.482 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.611 W/kg
**SAR(1 g) = 0.304 W/kg; SAR(10 g) = 0.155 W/kg**
Maximum value of SAR (measured) = 0.452 W/kg




0 dB = 0.452 W/kg = -3.45 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 19.5 ℃ |
| Ambient Temperature: | 19.8 ℃ |
| Test Date: | 08/06/2019 |
| Plot No.: | 21 |

**DUT: SM-M307FN/DS; Type: bar**

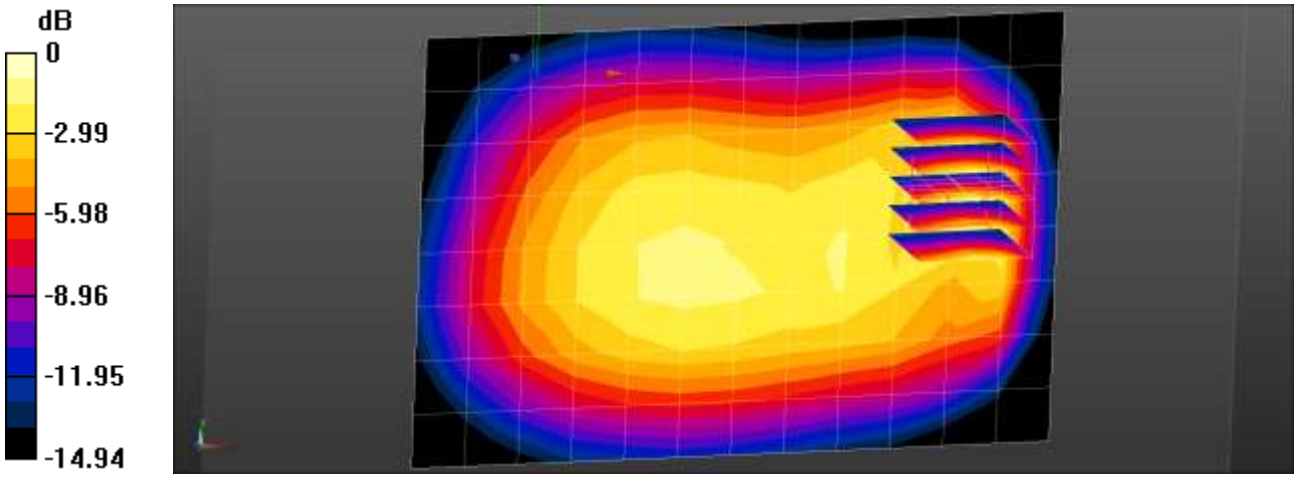
Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.962 S/m; $\varepsilon_r$ = 56.254; $\rho$ = 1000kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(9.72, 9.72, 9.72); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

**WCDMA 850 Body Rear 4183ch/Area Scan (13x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.442 W/kg

**WCDMA 850 Body Rear 4183ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.64 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.709 W/kg
**SAR(1 g) = 0.402 W/kg; SAR(10 g) = 0.224 W/kg**
Maximum value of SAR (measured) = 0.597 W/kg




0 dB = 0.597 W/kg = -2.24 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.6 °C |
| Ambient Temperature: | 20.8 °C |
| Test Date: | 08/05/2019 |
| Plot No.: | 22 |

**DUT: SM-M307FN/DS; Type: bar**

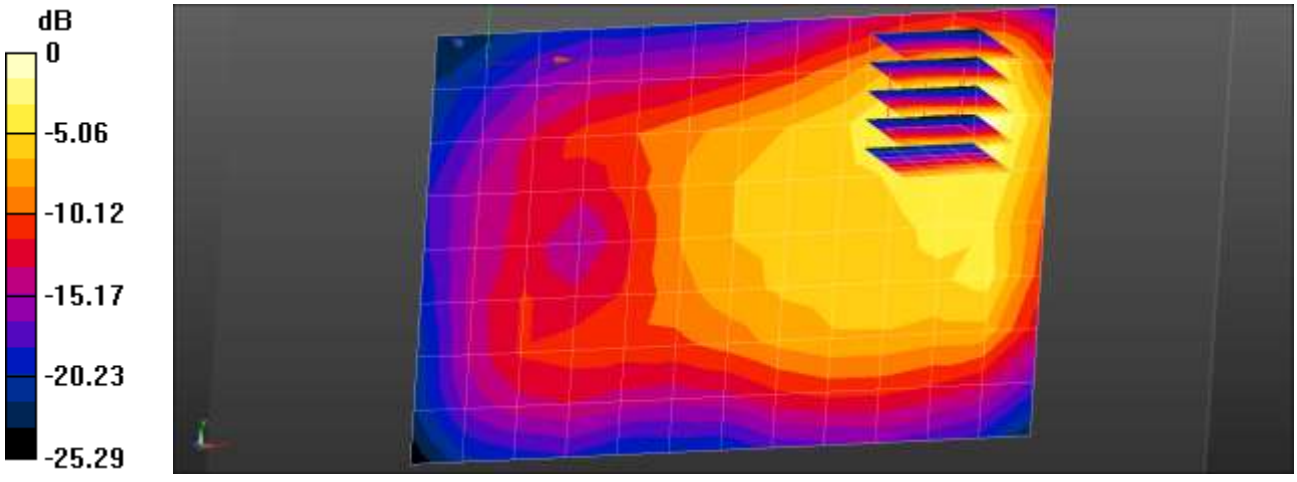
Communication System: UID 0, WCDMA1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.512 S/m; $\varepsilon_r$ = 53.625; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.99, 7.99, 7.99); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

**WCDMA 1900 Body Rear 9400ch/Area Scan (13x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.927 W/kg

**WCDMA 1900 Body Rear 9400ch/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.22 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 1.21 W/kg
**SAR(1 g) = 0.585 W/kg; SAR(10 g) = 0.298 W/kg**
Maximum value of SAR (measured) = 0.880 W/kg




0 dB = 0.927 W/kg = -0.33 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.7 °C |
| Ambient Temperature: | 20.9 °C |
| Test Date: | 08/02/2019 |
| Plot No.: | 23 |

**DUT: SM-M307FN/DS; Type: bar**

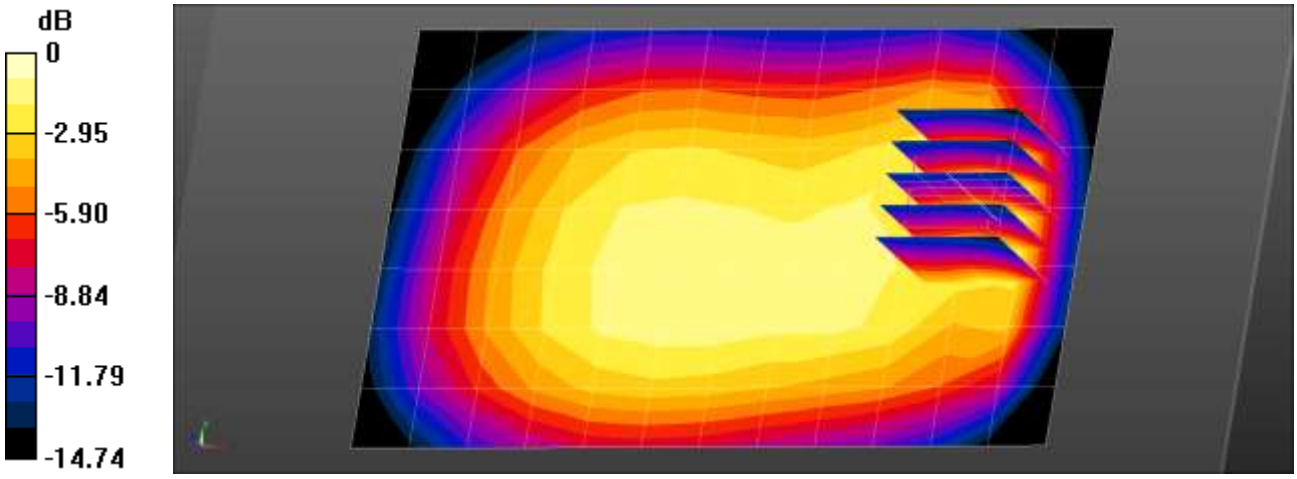
Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; $\sigma$ = 0.962 S/m; $\varepsilon_r$ = 56.322; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(9.16, 9.16, 9.16); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

**LTE Band 5 Body Rear QPSK 10MHz 1RB 0offset 20525ch/Area Scan (13x8x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.412 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 = 20.34 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.620 W/kg
**SAR(1 g) = 0.331 W/kg; SAR(10 g) = 0.188 W/kg**
Maximum value of SAR (measured) = 0.506 W/kg




0 dB = 0.506 W/kg = -2.96 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 19.9 ℃ |
| Ambient Temperature: | 20.1 ℃ |
| Test Date: | 08/02/2019 |
| Plot No.: | 24 |

**DUT: SM-M307FN/DS; Type: bar**

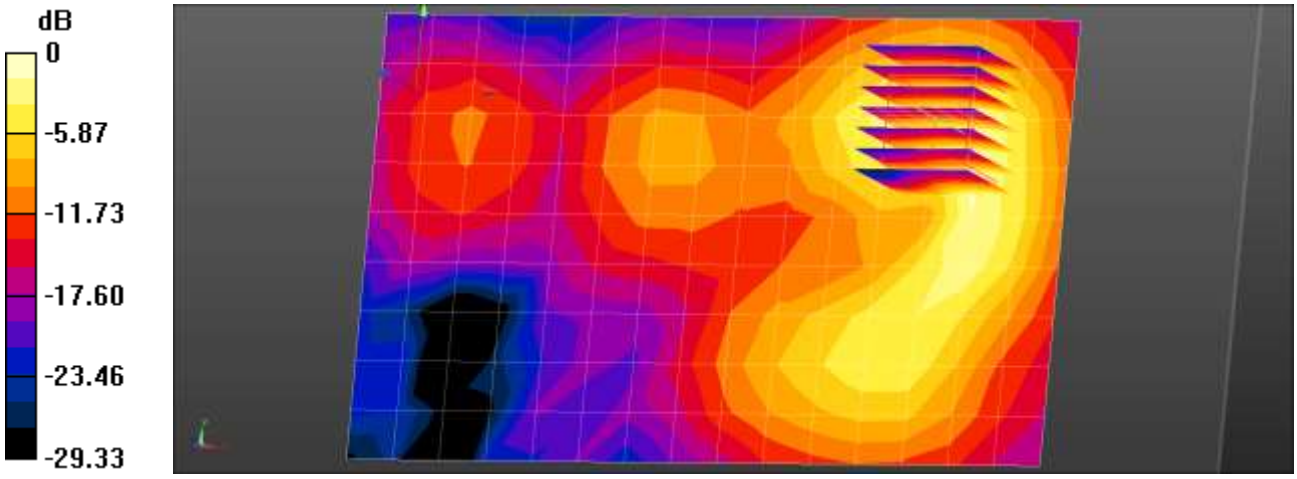
Communication System: UID 0, LTE Band 41 (0); Frequency: 2680 MHz;Duty Cycle: 1:1.58016
Medium parameters used: f = 2680 MHz; $\sigma$ = 2.216 S/m; $\varepsilon_r$ = 53.049; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.05, 7.05, 7.05); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16 1
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

**LTE Band 41 Body Rear QPSK 20MHz 1RB 0offset 41490ch/Area Scan (16x10x1):** Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.697 W/kg

**LTE Band 41 Body Rear QPSK 20MHz 1RB 0offset 41490ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.118 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 1.02 W/kg
**SAR(1 g) = 0.479 W/kg; SAR(10 g) = 0.221 W/kg**
Maximum value of SAR (measured) = 0.807 W/kg




0 dB = 0.807 W/kg = -0.93 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 21.0 ℃ |
| Ambient Temperature: | 21.2 ℃ |
| Test Date: | 08/08/2019 |
| Plot No.: | 25 |

**DUT: SM-M307FN/DS; Type: bar**

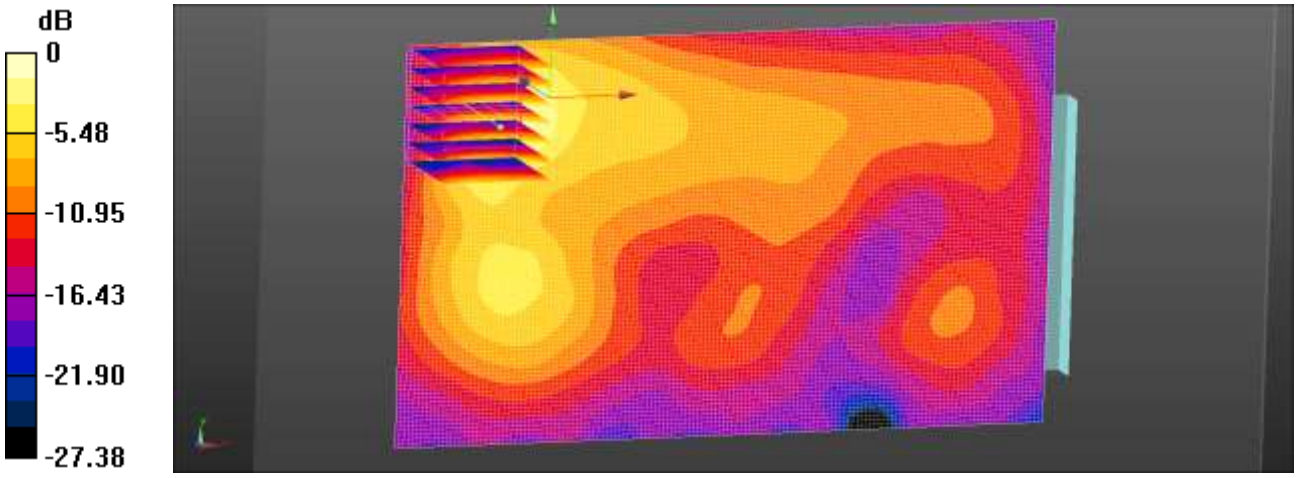
Communication System: UID 0, 2450MHz FCC (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; $\sigma$ = 1.936 S/m; $\varepsilon_r$ = 53.676; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.51, 7.51, 7.51); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

**802.11b Body Rear 1Mbps 6ch/Area Scan (151x91x1):** Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.203 W/kg

**802.11b Body Rear 1Mbps 6ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.829 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.243 W/kg
**SAR(1 g) = 0.110 W/kg; SAR(10 g) = 0.050 W/kg**
Maximum value of SAR (measured) = 0.195 W/kg




0 dB = 0.195 W/kg = −7.10 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.5 °C |
| Ambient Temperature: | 20.9 °C |
| Test Date: | 08/09/2019 |
| Plot No.: | 26 |

**DUT: SM-M307FN/DS; Type: bar**

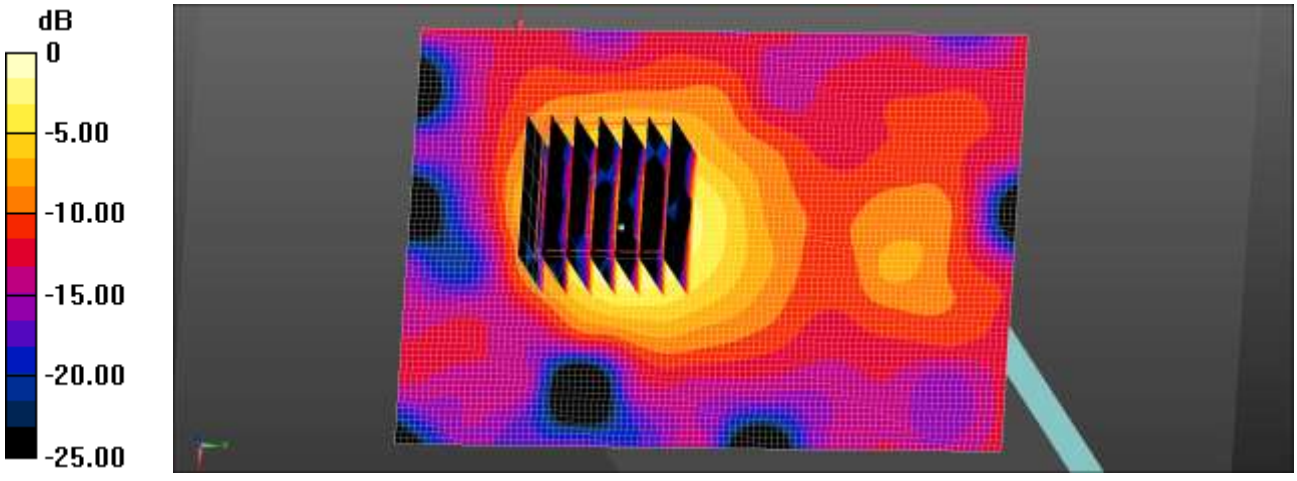
Communication System: UID 0, WIFI 5GHz (0); Frequency: 5745 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5745 MHz; $\sigma$ = 6.129 S/m; $\varepsilon_r$ = 46.972; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.21, 4.21, 4.21); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (2);

**802.11a Body Top 6Mbps 149ch/Area Scan (71x101x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.360 W/kg

**802.11a Body Top 6Mbps 149ch/Zoom Scan (7x7x7)/Cube 0:**Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 5.401 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.494 W/kg
**SAR(1 g) = 0.127 W/kg; SAR(10 g) = 0.042 W/kg**
Maximum value of SAR (measured) = 0.355 W/kg




0 dB = 0.355 W/kg = −4.50 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 21.0 ℃ |
| Ambient Temperature: | 21.2 ℃ |
| Test Date: | 08/08/2019 |
| Plot No.: | 27 |

**DUT: SM-M307FN/DS; Type: bar**

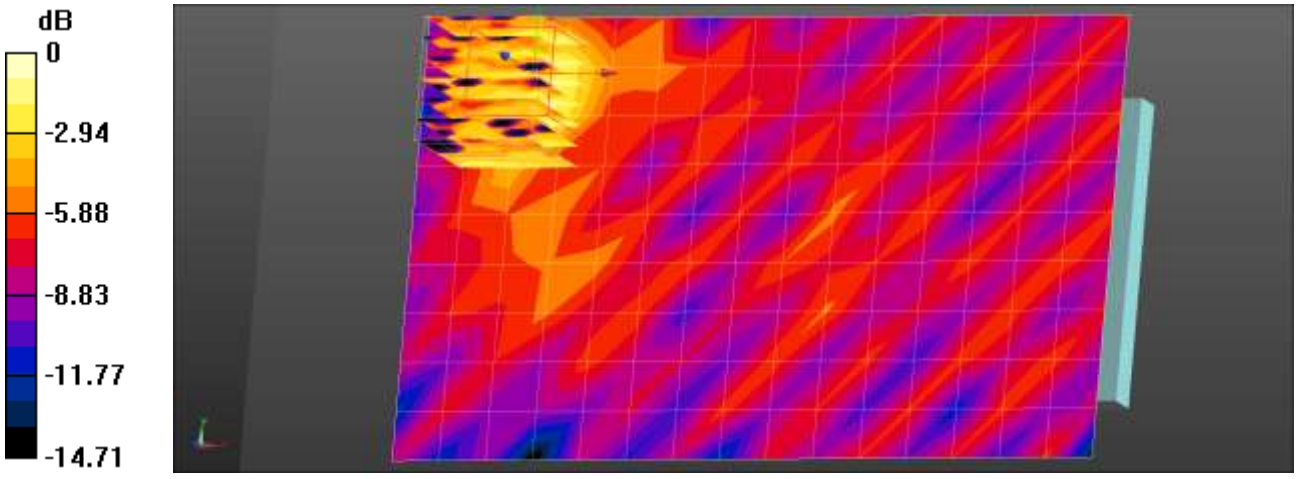
Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz;DutyCycle: 1:1.302
Medium parameters used (interpolated): f = 2441 MHz; $\sigma$ = 1.94 S/m; $\varepsilon_r$ = 53.662; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.51, 7.51, 7.51); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

**Bluetooth Body Rear DH5 39ch/Area Scan (16x10x1):** Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.0149 W/kg

**Bluetooth Body Rear DH5 39ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.004 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.0330 W/kg
**SAR(1 g) = 0.011 W/kg; SAR(10 g) = 0.0032 W/kg**
Maximum value of SAR (measured) = 0.0167 W/kg




0 dB = 0.0149 W/kg = −18.28 dBW/kg

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| EUT Type: | Mobile Phone |
| Liquid Temperature: | 20.5 °C |
| Ambient Temperature: | 20.9 °C |
| Test Date: | 08/09/2019 |
| Plot No.: | 28 |

**DUT: SM-M307FN/DS; Type: bar**

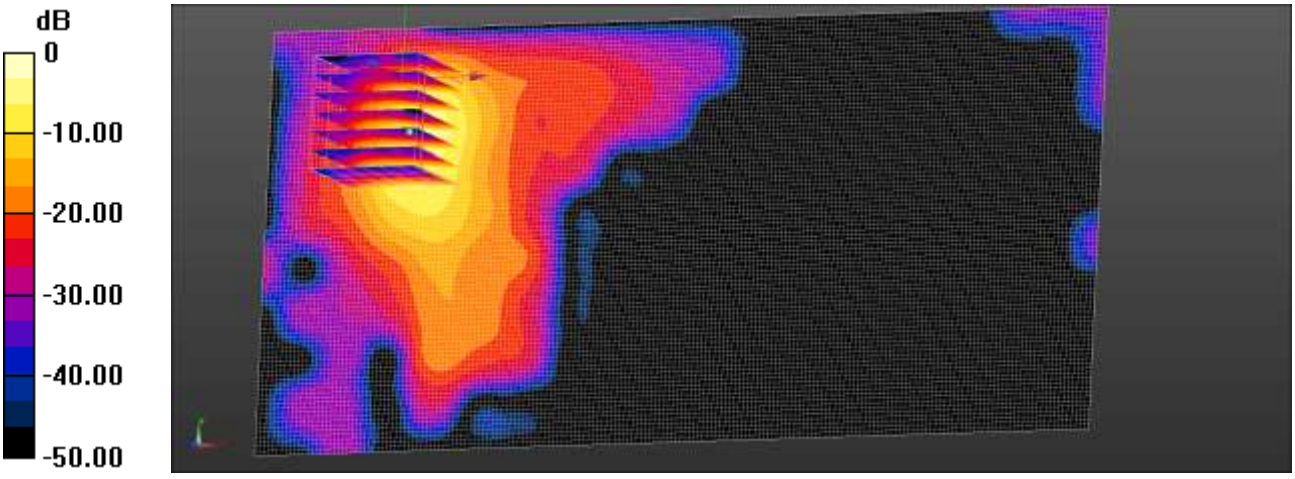
Communication System: UID 0, WIFI 5GHz (0); Frequency: 5260 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5260 MHz; $\sigma$ = 5.64 S/m; $\varepsilon_r$ = 47.547; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.4, 4.4, 4.4); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C_20171020
- Measurement SW: DASY52, Version 52.10 (2);

**802.11a Phablet Rear 6Mbps 52ch/Area Scan (191x91x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.5 W/kg

**802.11a Phablet Rear 6Mbps 52ch/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 0 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 32.5 W/kg
**SAR(1 g) = 5.73 W/kg; SAR(10 g) = 1.26 W/kg**
Maximum value of SAR (measured) = 19.3 W/kg




0 dB = 16.5 W/kg = 12.18 dBW/kg

Attachment 2. – Dipole Verification Plots

■Verification Data (835 ㎒ Head)

Test Laboratory: HCT CO., LTD
Input Power 0.05W
Liquid Temp: 21.1 ℃
Test Date: 08/01/2019

DUT: Dipole 835 MHz ; Type: D835V2

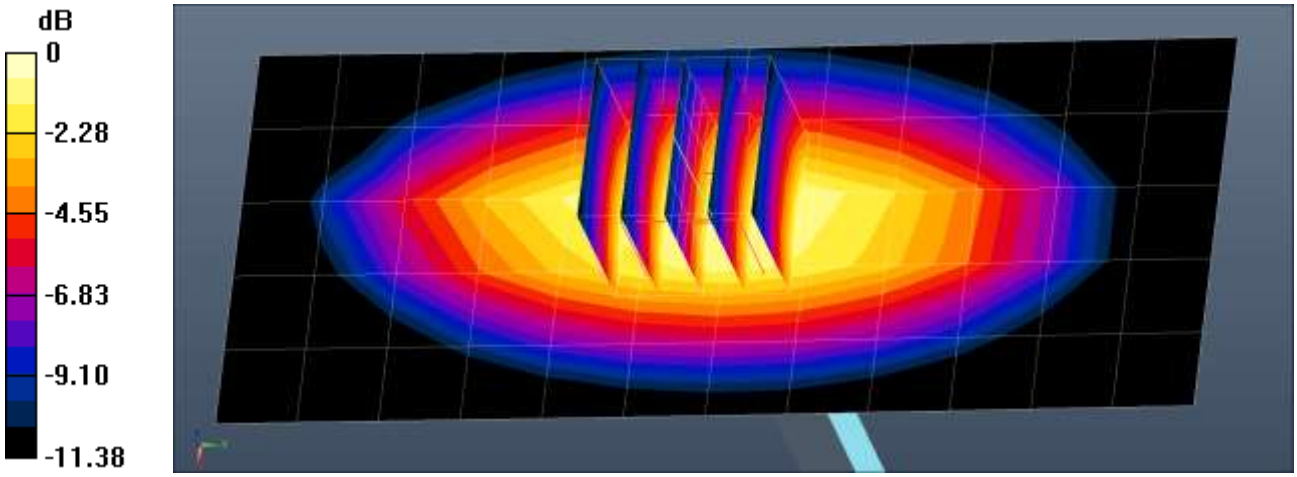
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; $\sigma$ = 0.922 S/m; $\varepsilon_r$ = 40.81; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(10.25, 10.25, 10.25); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/835 MHz Head Verification/Area Scan (6x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.582 W/kg

Dipole/835 MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.29 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.725 W/kg
SAR(1 g) = 0.464 W/kg; SAR(10 g) = 0.297 W/kg
Maximum value of SAR (measured) = 0.636 W/kg




0 dB = 0.636 W/kg = -1.97 dBW/kg

■Verification Data (835 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power 0.05W
Liquid Temp: 20.7 ℃
Test Date: 08/02/2019

DUT: Dipole 835 MHz; Type: D835V2

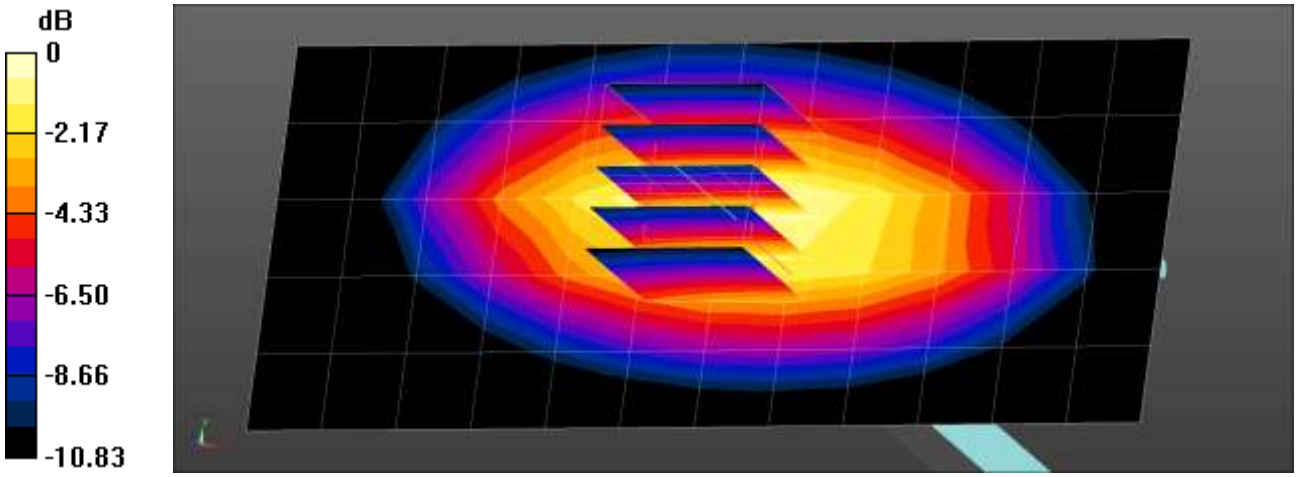
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; $\sigma$ = 0.961 S/m; $\varepsilon_r$ = 56.336; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(9.16, 9.16, 9.16); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

835MHz Body Verification/Area Scan (13x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.602 W/kg

835MHz Body Verification/Zoom Scan(5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.37 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.743 W/kg
SAR(1 g) = 0.471 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 (835 MHz Body)

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| Input Power | 0.05W |
| Liquid Temp: | 20.6℃ |
| Test Date: | 08/06/2019 |

DUT: Dipole 835 MHz; Type: D835V2

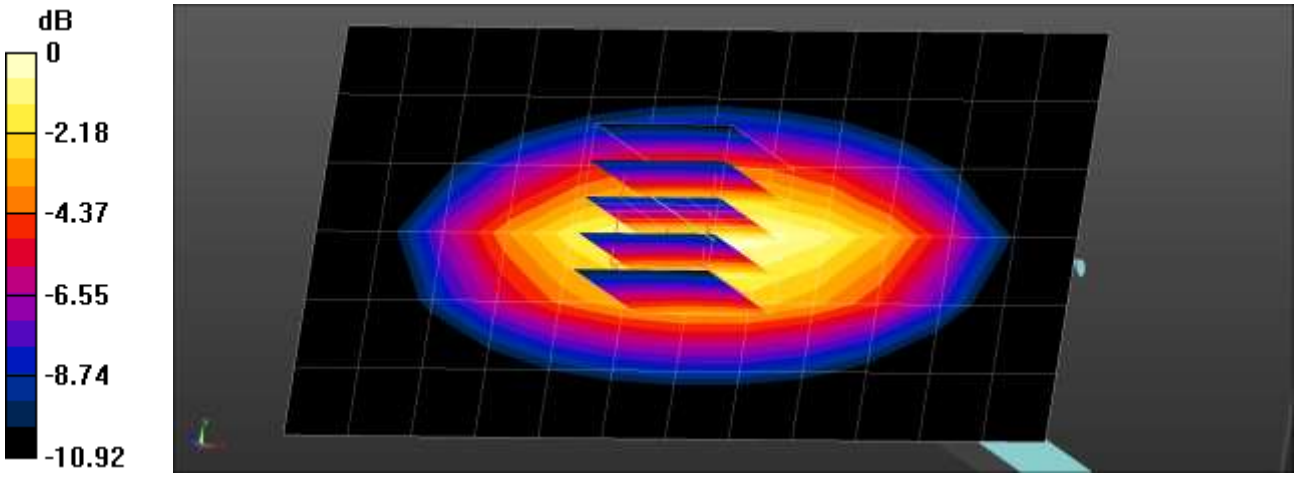
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; $\sigma$ = 0.961 S/m; $\varepsilon_r$ = 56.261; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(9.72, 9.72, 9.72); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

Dipole/835 MHz Body Verification/Area Scan (13x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.624 W/kg

Dipole/835 MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.66 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.723 W/kg
SAR(1 g) = 0.471 W/kg; SAR(10 g) = 0.304 W/kg
Maximum value of SAR (measured) = 0.636 W/kg




0 dB = 0.636 W/kg = -1.97 dBW/kg

■Verification Data (1 900 ㎒ Head)

Test Laboratory: HCT CO., LTD
Input Power 0.05W
Liquid Temp: 20.9℃
Test Date: 08/02/2019

**DUT: Dipole 1900 MHz; Type: D1900V2**

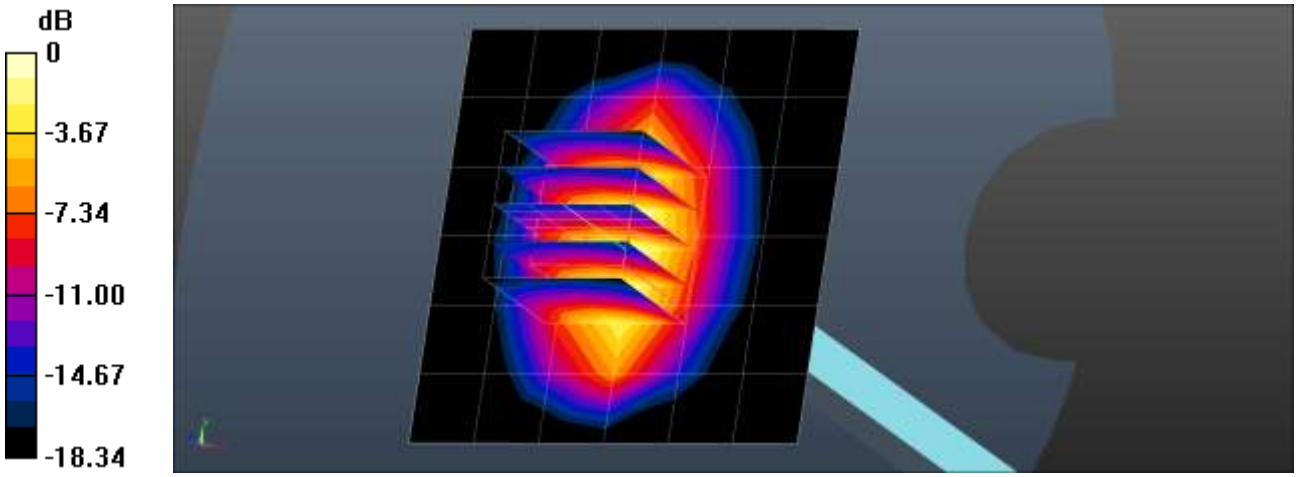
Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.397 S/m; $\varepsilon_r$ = 39.063; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.34, 8.34, 8.34); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: SAM with CRP v5.0
- Measurement SW: DASY52, Version 52.8 (8);

**Dipole/1900 MHz Head Verification/Area Scan (7x7x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.01 W/kg

**Dipole/1900 MHz Head Verification/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.14 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.67 W/kg
**SAR(1 g) = 1.94 W/kg; SAR(10 g) = 0.990 W/kg**
Maximum value of SAR (measured) = 3.08 W/kg




0 dB = 3.08 W/kg = 4.89 dBW/kg

■Verification Data (1 900 ㎒ Body)

Test Laboratory: HCT CO., LTD
Input Power 0.05W
Liquid Temp: 20.6℃
Test Date: 08/05/2019

**DUT: Dipole 1900 MHz; Type: D1900V2**

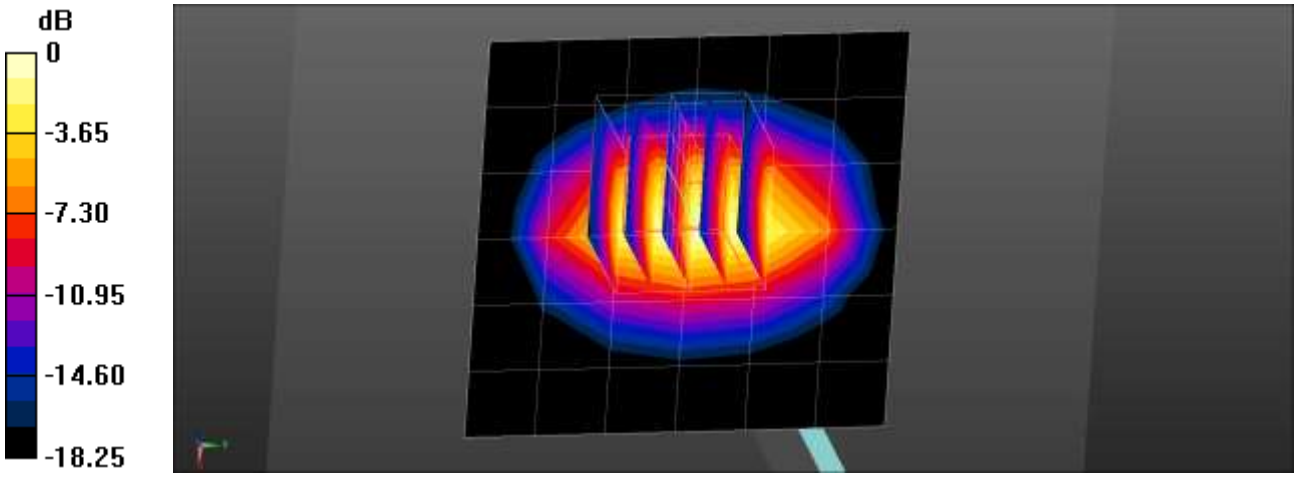
Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.526 S/m; $\varepsilon_r$ = 53.55; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.99, 7.99, 7.99); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

**Dipole/1 900 MHz Body Verification/Area Scan (7x7x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.86 W/kg

**Dipole/1 900 MHz Body Verification/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 44.78 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 3.63 W/kg
**SAR(1 g) = 1.93 W/kg; SAR(10 g) = 0.988 W/kg**
Maximum value of SAR (measured) = 3.05 W/kg




0 dB = 3.05 W/kg = 4.84 dBW/kg

■Verification Data (2 450 ㎒ Head)

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| Input Power | 0.05W |
| Liquid Temp: | 19.3℃ |
| Test Date: | 08/08/2019 |

DUT: Dipole 2450 MHz ; Type: D2450V2

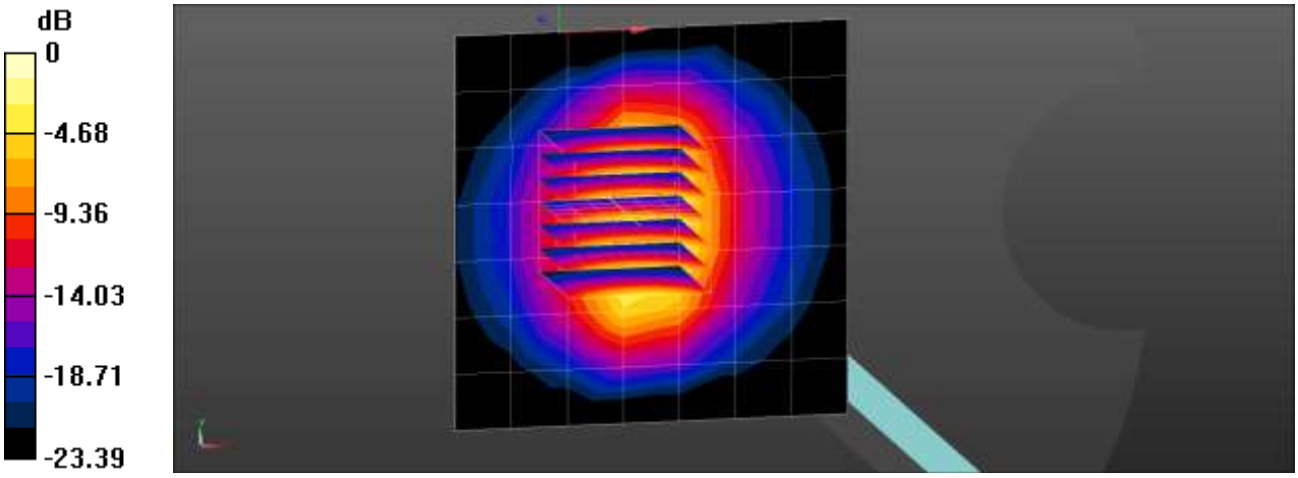
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; $\sigma$ = 1.79 S/m; $\varepsilon_r$ = 38.411; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.61, 7.61, 7.61); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: Twin-SAM V4.0
- Measurement SW: DASY52, Version 52.10 (2);

Dipole/2 450 MHz Head Verification/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.45 W/kg

Dipole/2 450 MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.45 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 5.68 W/kg
SAR(1 g) = 2.57 W/kg; SAR(10 g) = 1.16 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 ㎒ Body)

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| Input Power | 0.05W |
| Liquid Temp: | 21.0℃ |
| Test Date: | 08/08/2019 |

**DUT: Dipole 2450 MHz; Type: D2450V2**

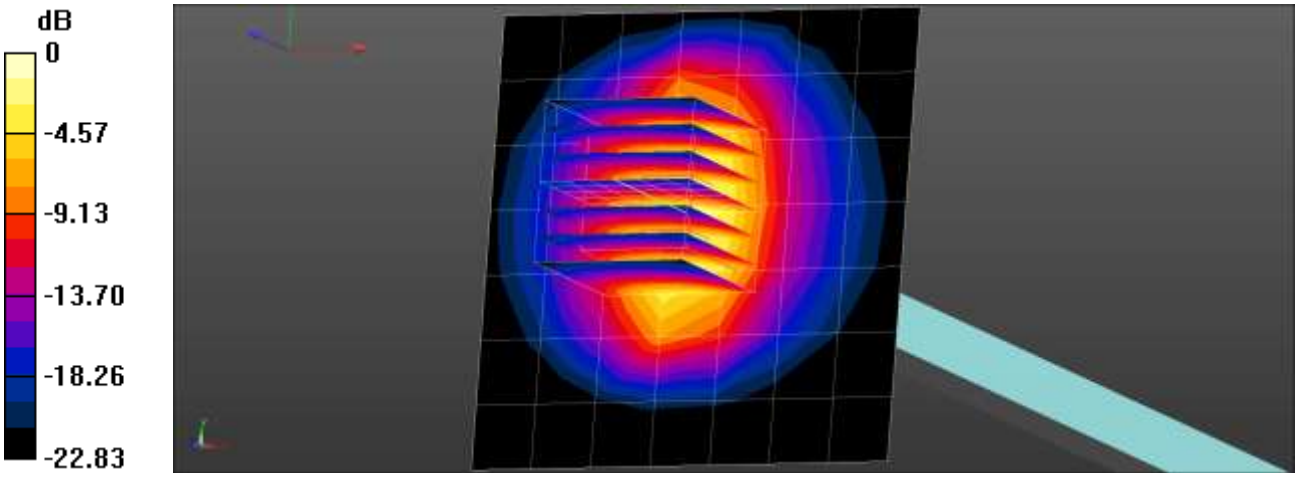
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; $\sigma$ = 1.944 S/m; $\varepsilon_r$ = 53.668; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.51, 7.51, 7.51); Calibrated: 2018-09-24;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2018-09-19
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

**Dipole/2450 MHz Body Verification/Area Scan (8x8x1):** Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.74 W/kg

**Dipole/2450 MHz Body Verification/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 45.85 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 5.41 W/kg
**SAR(1 g) = 2.5 W/kg; SAR(10 g) = 1.12 W/kg**
Maximum value of SAR (measured) = 4.32 W/kg




0 dB = 4.32 W/kg = 6.35 dBW/kg

■Verification Data (2 600 ㎒ Head)

Test Laboratory: HCT CO., LTD
Input Power 0.05W
Liquid Temp: 19.4℃
Test Date: 08/01/2019

DUT: Dipole 2600 MHz; Type: D2600V2

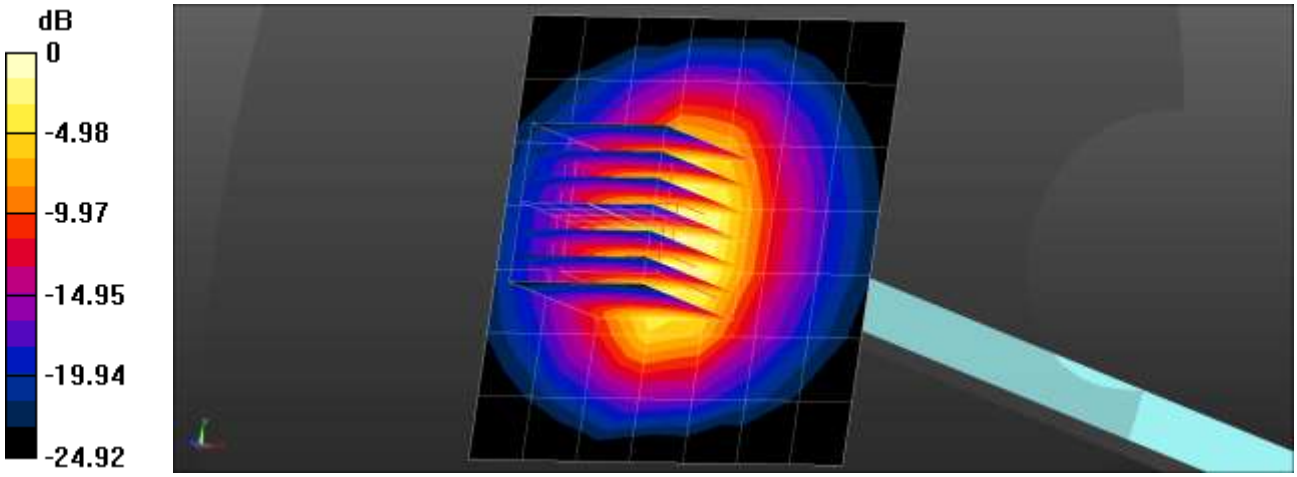
Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; $\sigma$ = 1.949 S/m; $\varepsilon_r$ = 37.849; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.32, 7.32, 7.32); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: Twin-SAM V4.0
- Measurement SW: DASY52, Version 52.10 (2);

Dipole/2 600 MHz Head Verification/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.95 W/kg

Dipole/2 600 MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.18 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 6.54 W/kg
SAR(1 g) = 2.84 W/kg; SAR(10 g) = 1.24 W/kg
Maximum value of SAR (measured) = 5.09 W/kg




0 dB = 5.09 W/kg = 7.07 dBW/kg

■Verification Data (2 600 ㎒ Body)

Test Laboratory: HCT CO., LTD
Input Power 0.05W
Liquid Temp: 20.7℃
Test Date: 08/01/2019

DUT: Dipole 2600 MHz; Type: D2600V2

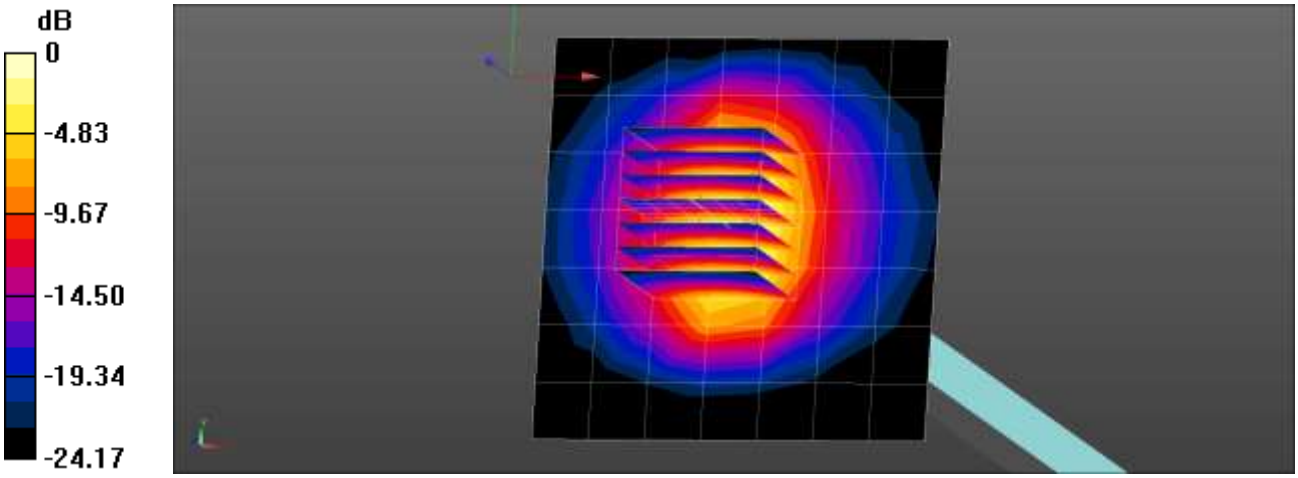
Communication System: UID 0, CW; Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; $\sigma$ = 2.113 S/m; $\varepsilon_r$ = 53.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3797; ConvF(7.05, 7.05, 7.05); Calibrated: 2018-11-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2018-11-16
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

Dipole/2600 MHz Body Verification/Area Scan (8x8x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 3.69 W/kg

Dipole/2600 MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 46.82 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 5.84 W/kg
SAR(1 g) = 2.58 W/kg; SAR(10 g) = 1.13 W/kg
Maximum value of SAR (measured) = 4.53 W/kg




0 dB = 4.53 W/kg = 6.56 dBW/kg

■Verification Data (5 250 ㎒ Head)

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| Input Power | 0.05W |
| Liquid Temp: | 19.2℃ |
| Test Date: | 08/08/2019 |

DUT: Dipole D5GHzV2; Type: D5GHzV2

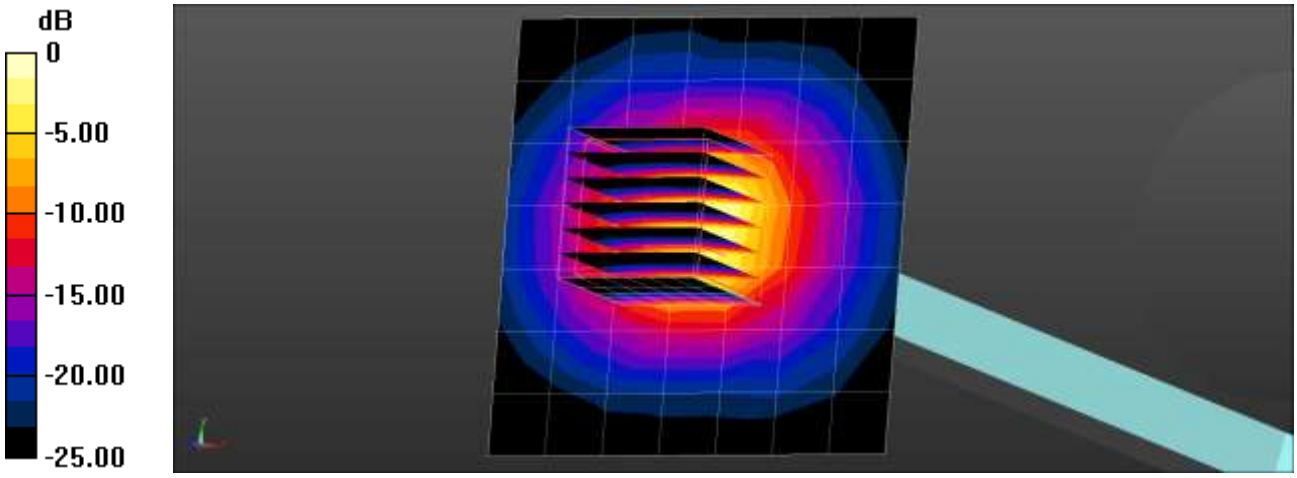
Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5250 MHz; $\sigma$ = 4.758 S/m; $\varepsilon_r$ = 35.697; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(5.09, 5.09, 5.09); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: Twin-SAM V4.0
- Measurement SW: DASY52, Version 52.10 (2);

Dipole/5 250 MHz Head Verification/Area Scan (8x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 6.90 W/kg

Dipole/5 250 MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 51.01 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 17.8 W/kg
SAR(1 g) = 4.09 W/kg; SAR(10 g) = 1.16 W/kg
Maximum value of SAR (measured) = 10.4 W/kg




0 dB = 10.4 W/kg = 10.17 dBW/kg

■Verification Data (5 250 MHz Body)

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| Input Power | 0.05W |
| Liquid Temp: | 20.5℃ |
| Test Date: | 08/09/2019 |

DUT: Dipole D5GHzV2; Type: D5GHzV2

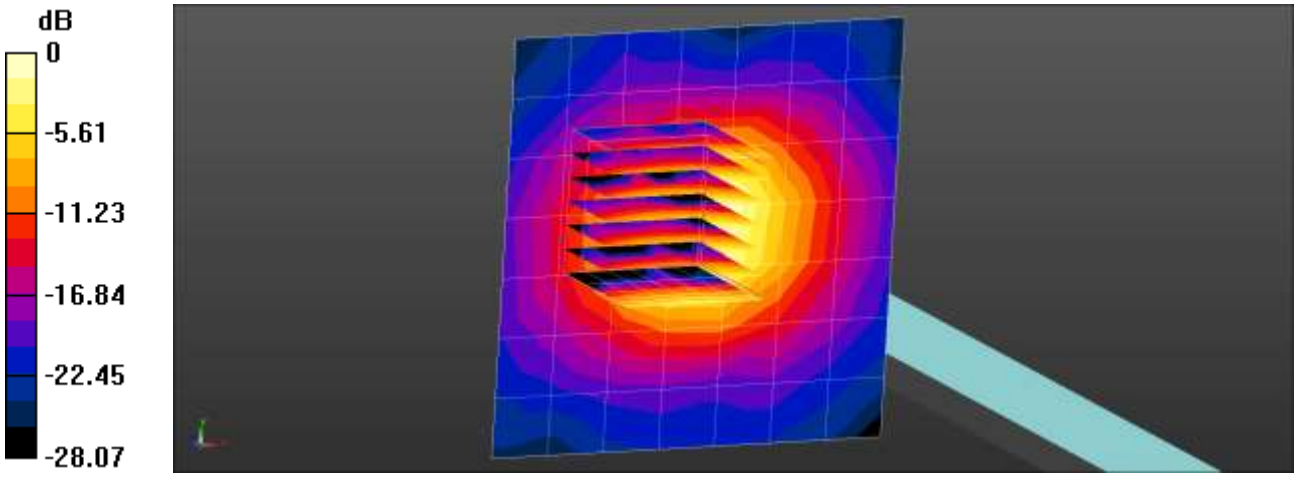
Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5250 MHz; $\sigma$ = 5.465 S/m; $\varepsilon_r$ = 47.314; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.4, 4.4, 4.4); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

Dipole/5 250 MHz Body Verification/Area Scan (8x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 5.86 W/kg

Dipole/5 250 MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 47.26 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 14.7 W/kg
SAR(1 g) = 3.71 W/kg; SAR(10 g) = 1.05 W/kg
Maximum value of SAR (measured) = 9.25 W/kg




0 dB = 5.86 W/kg = 7.68 dBW/kg

■Verification Data (5 600 ㎒ Head)

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| Input Power | 0.05W |
| Liquid Temp: | 19.2℃ |
| Test Date: | 08/08/2019 |

DUT: Dipole D5GHzV2; Type: D5GHzV2

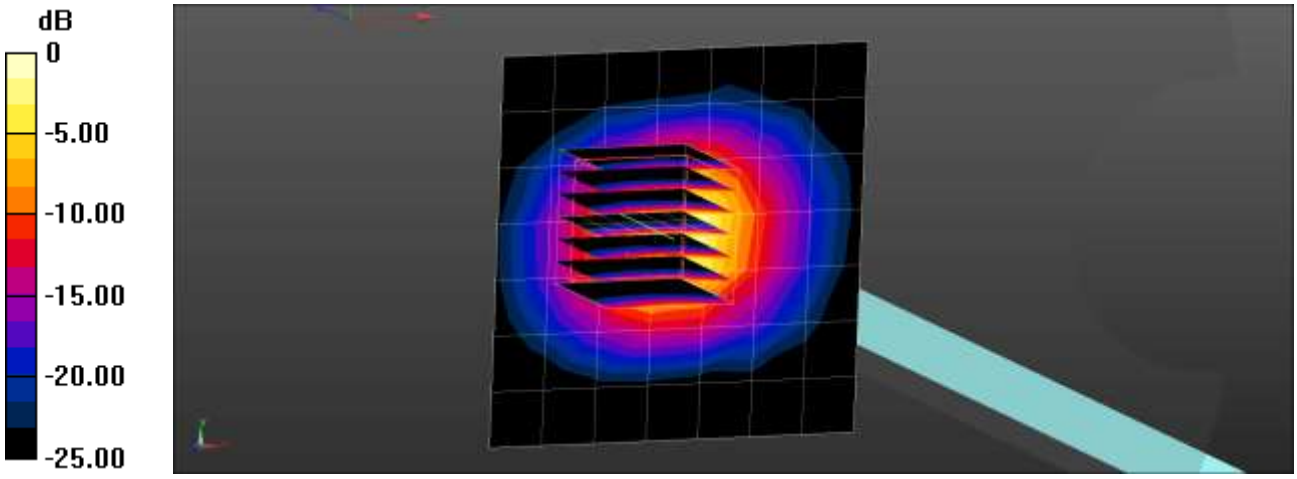
Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; $\sigma$ = 5.085 S/m; $\varepsilon_r$ = 35.091; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.69, 4.69, 4.69); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: Twin-SAM V4.0
- Measurement SW: DASY52, Version 52.10 (2);

Dipole/5 600 MHz Head Verification/Area Scan (8x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 7.73 W/kg

Dipole/5 600 MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 50.93 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 19.5 W/kg
SAR(1 g) = 4.24 W/kg; SAR(10 g) = 1.18 W/kg
Maximum value of SAR (measured) = 11.0 W/kg




0 dB = 11.0 W/kg = 10.41 dBW/kg

■Verification Data (5 600 ㎒ Body)

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| Input Power | 0.05W |
| Liquid Temp: | 20.5℃ |
| Test Date: | 08/09/2019 |

**DUT: Dipole D5GHzV2; Type: D5GHzV2**

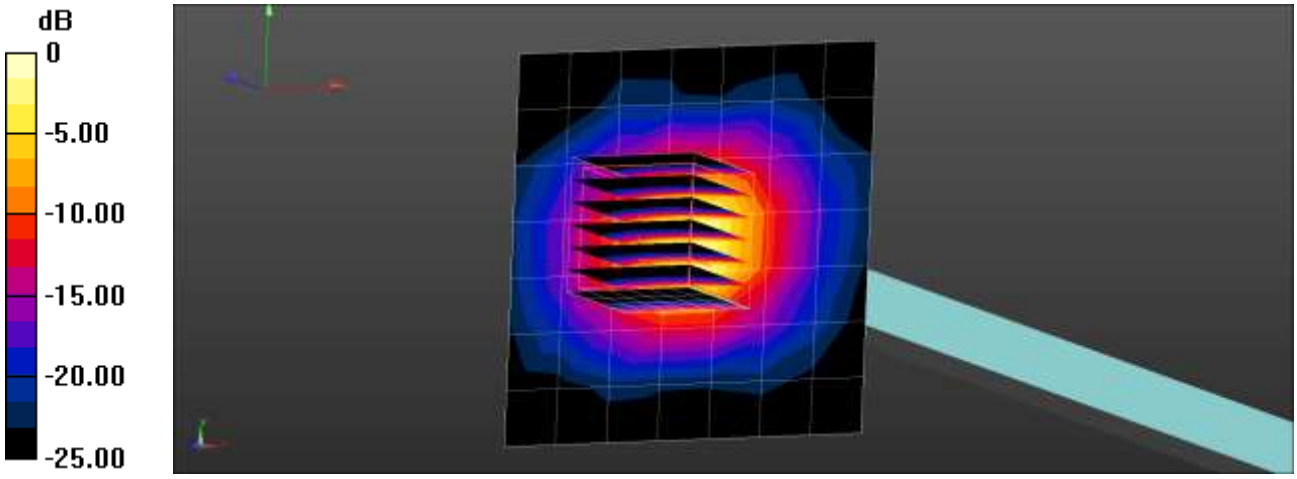
Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; $\sigma$ = 5.968 S/m; $\varepsilon_r$ = 47.043; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(3.94, 3.94, 3.94); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

**Dipole/5 600 MHz Body Verification/Area Scan (8x8x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 6.31 W/kg

**Dipole/5 600 MHz Body Verification/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 49.07 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 18.5 W/kg
**SAR(1 g) = 4.17 W/kg; SAR(10 g) = 1.14 W/kg**
Maximum value of SAR (measured) = 10.9 W/kg




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

■Verification Data (5 750 MHz Head)

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| Input Power | 0.05W |
| Liquid Temp: | 19.2℃ |
| Test Date: | 08/08/2019 |

DUT: Dipole D5GHzV2; Type: D5GHzV2

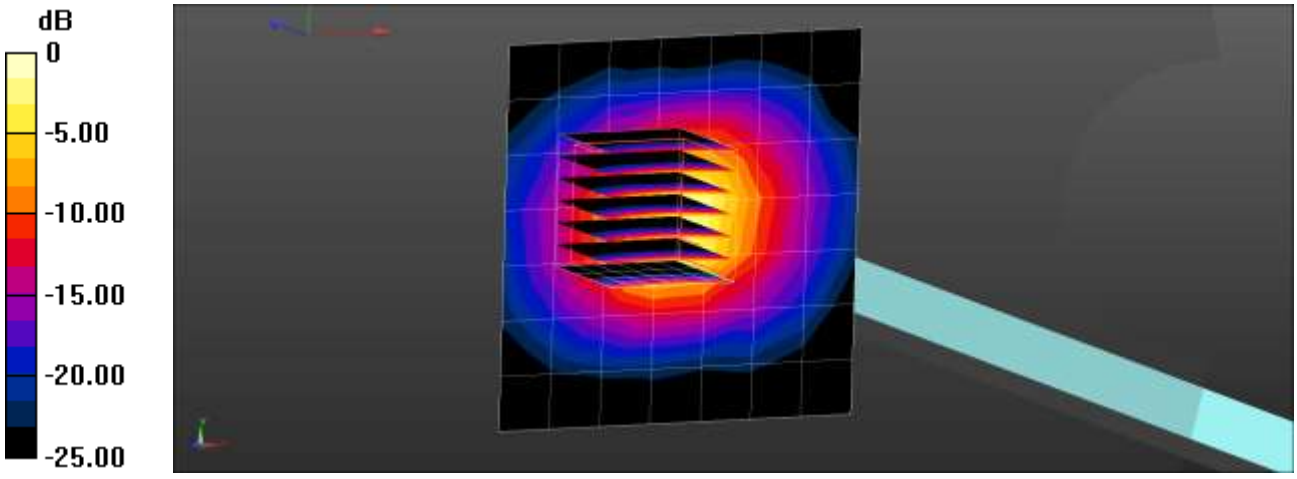
Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5750 MHz; $\sigma$ = 5.413 S/m; $\varepsilon_r$ = 34.875; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.99, 4.99, 4.99); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: Twin-SAM V4.0
- Measurement SW: DASY52, Version 52.10 (2);

Dipole/5 750 MHz Head Verification/Area Scan (8x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 7.94 W/kg

Dipole/5 750 MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 48.37 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 19.9 W/kg
SAR(1 g) = 4.15 W/kg; SAR(10 g) = 1.19 W/kg
Maximum value of SAR (measured) = 10.9 W/kg




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

■Verification Data (5 750 MHz Body)

| | |
|---|---|
| Test Laboratory: | HCT CO., LTD |
| Input Power | 0.05W |
| Liquid Temp: | 20.5℃ |
| Test Date: | 08/09/2019 |

DUT: Dipole D5GHzV2; Type: D5GHzV2

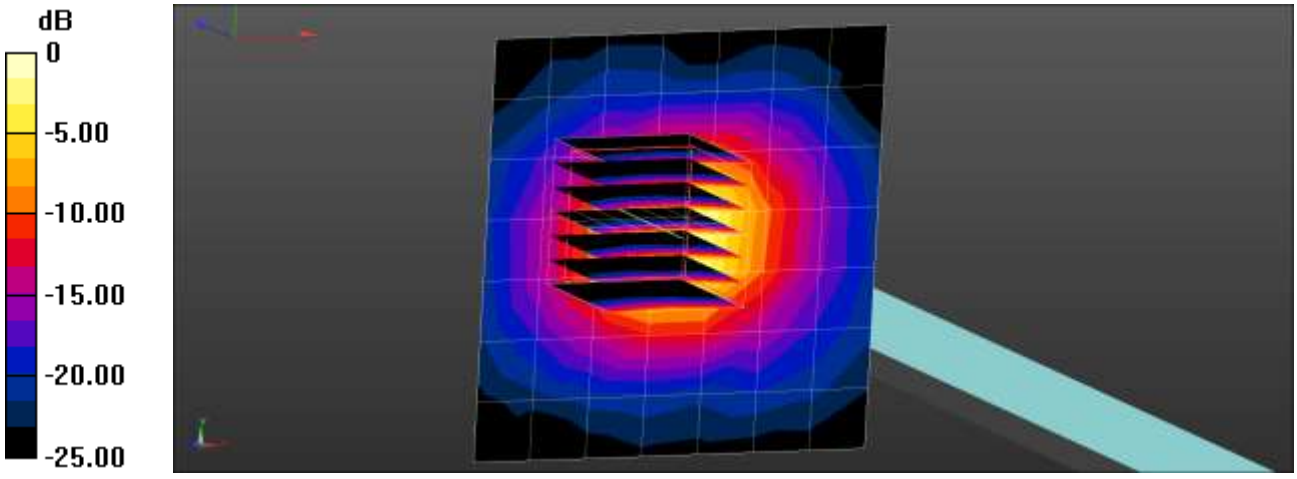
Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5750 MHz; $\sigma$ = 6.201 S/m; $\varepsilon_r$ = 46.717; $\rho$ = 1000 kg/m$^3$
Phantom section: Center Section

DASY Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.21, 4.21, 4.21); Calibrated: 2019-05-15;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn504; Calibrated: 2019-02-22
- Phantom: MFP_V5.1C
- Measurement SW: DASY52, Version 52.10 (2);

Dipole/5 750 MHz Body Verification/Area Scan (8x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 6.47 W/kg

Dipole/5 750 MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio:1.4
Reference Value = 47.07 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 17.7 W/kg
SAR(1 g) = 3.96 W/kg; SAR(10 g) = 1.12 W/kg
Maximum value of SAR (measured) = 10.3 W/kg




0 dB = 10.3 W/kg = 10.13 dBW/kg

## Attachment 3. – 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 bacteriacideis 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 (㎒) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 835 | | 1 900 | | 2 450 – 2 700 | | 5 200 - 5 800 | |
| Tissue Type | Head | Body | Head | Body | Head | Body | Head | Body |
| Water | 40.45 | 53.06 | 54.9 | 70.17 | 71.88 | 73.2 | 65.52 | 78.66 |
| Salt (NaCl) | 1.45 | 0.94 | 0.18 | 0.39 | 0.16 | 0.1 | 0.0 | 0.0 |
| Sugar | 57.0 | 44.9 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 |
| HEC | 1.0 | 1.0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Bactericide | 0.1 | 0.1 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Triton X-100 | 0.0 | 0.0 | 0.0 | 0.0 | 19.97 | 0.0 | 17.24 | 10.67 |
| DGBE | 0.0 | 0.0 | 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

## Attachment 4. – SAR System Validation

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 |
| 5 | 3903 | EX3DV4 | Head | 835 | 4d165 | 2018-10-04 | 41.5 | 0.89 | PASS | PASS | PASS | N/A | N/A | N/A |
| 5 | 3903 | EX3DV4 | Head | 835 | 4d165 | 2018-10-04 | 41.5 | 0.89 | PASS | PASS | PASS | GMSK | PASS | N/A |
| 3 | 3797 | EX3DV4 | Body | 835 | 4d165 | 2018-12-04 | 55.3 | 0.98 | PASS | PASS | PASS | GMSK | PASS | N/A |
| 3 | 3797 | EX3DV4 | Body | 835 | 4d165 | 2018-12-04 | 55.3 | 0.98 | PASS | PASS | PASS | N/A | N/A | N/A |
| 1 | 3863 | EX3DV4 | Body | 835 | 4d165 | 2019-05-27 | 55.4 | 0.97 | PASS | PASS | PASS | GMSK | PASS | N/A |
| 5 | 3903 | EX3DV4 | Head | 1900 | 5d032 | 2019-03-04 | 40.1 | 1.41 | PASS | PASS | PASS | GMSK | PASS | N/A |
| 1 | 3863 | EX3DV4 | Body | 1900 | 5d032 | 2019-05-27 | 53.5 | 1.52 | PASS | PASS | PASS | GMSK | PASS | N/A |
| 1 | 3863 | EX3DV4 | Head | 2450 | 743 | 2019-05-27 | 39.4 | 1.81 | PASS | PASS | PASS | OFDM | N/A | PASS |
| 5 | 3903 | EX3DV4 | Body | 2450 | 743 | 2019-06-10 | 52.8 | 1.94 | PASS | PASS | PASS | OFDM | N/A | PASS |
| 1 | 3863 | EX3DV4 | Head | 2600 | 1015 | 2019-05-27 | 39.2 | 1.96 | PASS | PASS | PASS | TDD | PASS | N/A |
| 3 | 3797 | EX3DV4 | Body | 2600 | 1015 | 2018-12-04 | 52.3 | 2.17 | PASS | PASS | PASS | TDD | PASS | N/A |
| 1 | 3863 | EX3DV4 | Head | 5250 | 1253 | 2019-05-27 | 35.6 | 4.71 | PASS | PASS | PASS | OFDM | N/A | PASS |
| 1 | 3863 | EX3DV4 | Head | 5600 | 1253 | 2019-05-27 | 35.3 | 5.04 | PASS | PASS | PASS | OFDM | N/A | PASS |
| 1 | 3863 | EX3DV4 | Head | 5750 | 1253 | 2019-05-27 | 35.8 | 5.25 | PASS | PASS | PASS | OFDM | N/A | PASS |
| 1 | 3863 | EX3DV4 | Body | 5250 | 1253 | 2019-05-27 | 48.8 | 5.36 | PASS | PASS | PASS | OFDM | N/A | PASS |
| 1 | 3863 | EX3DV4 | Body | 5600 | 1253 | 2019-05-27 | 48.3 | 5.78 | PASS | PASS | PASS | OFDM | N/A | PASS |
| 1 | 3863 | EX3DV4 | Body | 5750 | 1253 | 2019-05-27 | 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 |
| 1 | 3863 | EX3DV4 | Body | 5250 | 1253 | 2019-05-27 | 48.8 | 5.36 | PASS | PASS | PASS | OFDM | N/A | PASS |
| 1 | 3863 | EX3DV4 | Body | 5600 | 1253 | 2019-05-27 | 48.3 | 5.78 | PASS | PASS | PASS | OFDM | N/A | PASS |
| 1 | 3863 | EX3DV4 | Body | 5750 | 1253 | 2019-05-27 | 48.4 | 5.95 | 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.

# Attachment 5. – Power Reduction Verification

Per the May 2017 TCBC Workshop notes, demonstration of proper functioning of the power reduction mechanism is required to support the corresponding SAR Configurations. The verification process was divided into two parts:
1). Evaluation of output power levels for individual triggering mechanism
2) Evaluation of the triggering distances for proximity-based sensors.

## 1. Power Reduction Verification for Main 1 Antenna

This device utilizes a power reduction mechanism of Main1 Ant for WCDMA Band 2 for SAR compliance under hotspot conditions and under some conditions when the device is being used in close proximity to the user's hand. These Power reduction mechanisms cannot merge multiple conditions at the same time. In all cases powers were reduced to the same Power level.

The SAR evaluations of all Power reduction mechanisms for this device were performed at the maximum allowed output Power when the mechanism is triggered.
FCC KDB Publication 616217D04v01r02 section 6 was used as a guideline for selection SAR test distances for this device when being used in phablet use conditions.

For detailed measurement conducted power results, please refer to the Section .11

### 1.1 Power Verification Procedure for Main 1 Ant

The Power verification was performed according to the following procedure:

1. A base station simulator was used to establish a conducted RF connection and output power was monitored. The Power measurements were conformed to be within expected tolerances for all states before and after a power reduction mechanism was triggered.
2. Step 1 was repeated for all relevant modes and frequency bands for the mechanism being investigated.
3. Step 1 and 2 were repeated for all individual power reduction mechanism and combinations thereof. For the combination cases, one mechanism was switched to a "triggered" state at a time; powers were conformed to be within tolerance after each additional mechanism was activated.

Power Reduction Verification for Main1 Ant

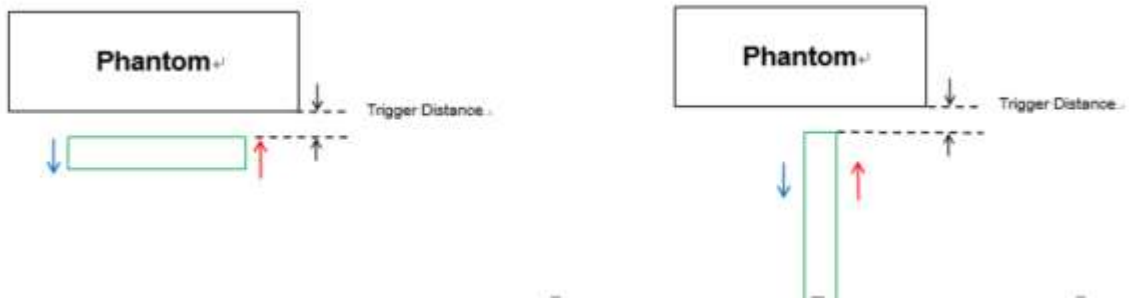
| Mechanism(s) | Mode/Band | Conducted Power (dBm) | | |
|---|---|---|---|---|
| | | Un-triggered (Max Power) | Triggered (Reduced Power) | Triggered (Reduced Power) |
| Grip | WCDMA 2 | 23.18 | 22.20 | |
| Grip | GSM 1900 | 30.20 | 29.16 | |

### 1.2 Procedures for determining proximity sensor triggering distances

(KDB 616217 D04v01r02§6.2)

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

1. A base station simulator was used to establish an RF connection and to monitor the power levels. The device being tested was placed below the relevant section of the phantom with the relevant side or edge of the device facing toward the phantom.
2. The device was moved toward and away from the phantom to determine the distance at which the mechanism triggers and the output power is reduced,per KDB Publication 616217 D04v01r02 .Each applicable test position was evaluated. The distance were conformed to be the same or larger (more conservative) than the minimum distances provided by the manufacturer.
3. Step 1 and 2 were repeated for the relevant modes, as appropriate
4. Steps1 through 3 were repeated for all distance-based power reduction mechanisms.




Proximity Sensor Trigger Distance Assessment KDB 616217 D04§6.2 (Rear /Bottom)

LEGEND

→ Direction of DUT travel for determination of power reduction triggering point

→ Direction of DUT travel for determination of full power resumption triggering point

| Tissue simulating liquid | Trigger distance - Rear | | Trigger distance - Bottom | |
|---|---|---|---|---|
| | Moving toward phantom | Moving from phantom | Moving toward phantom | Moving from phantom |
| 1900Mhz Muscle | 8 | 10 | 5 | 7 |

Rear side – EUT Moving toward (trigger) to the Phantom

The Rear suface of DUT is moved toward the phantom in 3 mm steps until the sensor triggers.

| Band | Distance to DUT Output power (dBm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 29 | 26 | 23 | 20 | 17 | 14 | 11 | 8 |
| WCDMA Band 2 | 23.06 | 23.01 | 23.14 | 23.01 | 23.01 | 23.03 | 23.07 | 22.15 |
| GSM 1900 | 30.05 | 30.04 | 30.06 | 30.10 | 30.03 | 29.93 | 30.05 | 28.50 |

Rear side – EUT Moving toward (trigger) to the Phantom

The Rear surface of DUT is again moved toward the phantom, but in 1 mm steps, until it is at least 5 mm past the triggering point or touching the phantom.

| Band | Distance to DUT Output power (dBm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 |
| WCDMA Band 2 | 23.09 | 23.07 | 23.14 | 23.14 | 23.00 | 22.12 | 22.11 | 22.20 | 22.09 | 22.09 |
| GSM 1900 | 30.14 | 30.10 | 30.10 | 30.18 | 30.12 | 28.55 | 28.67 | 28.66 | 28.52 | 28.56 |

Rear side – EUT Moving away (Release) from the Phantom

The Rear surface is then moved toward the phantom by at least 5 mm or until reduced output power is returned to the Maximum output power.

| Band | Distance to DUT Output power (dBm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 14 |
| WCDMA Band 2 | 22.05 | 22.02 | 22.13 | 22.05 | 22.11 | 23.12 | 23.04 | 23.11 | 23.10 | 23.15 |
| GSM 1900 | 28.63 | 28.66 | 28.64 | 28.51 | 28.53 | 30.10 | 30.14 | 30.08 | 30.13 | 30.06 |

Rear side – EUT Moving away (Release) from the Phantom

If the DUT is touching the phantom, it is moved in 3 mm steps until it move away from phantom to confirm that the sensor remains triggered and the maximum power is returned.

| Band | Distance to DUT Output power (dBm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 | 13 | 16 | 19 | 21 | 24 | 27 | 30 | 33 |
| WCDMA Band 2 | 22.12 | 23.09 | 23.09 | 23.04 | 23.01 | 23.19 | 23.15 | 23.12 | 23.09 |
| GSM 1900 | 28.63 | 30.15 | 30.06 | 30.06 | 30.14 | 30.10 | 30.09 | 30.08 | 30.14 |

Bottom side – EUT Moving toward (trigger) to the Phantom

The Bottomsuface of DUT is moved toward the phantom in 3 mm steps until the sensor triggers.

| Band | Distance to DUT Output power (dBm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 26 | 23 | 20 | 17 | 14 | 11 | 8 | 5 |
| WCDMA Band 2 | 23.07 | 23.13 | 23.03 | 23.15 | 23.15 | 23.10 | 23.13 | 22.09 |
| GSM 1900 | 29.99 | 30.07 | 30.05 | 30.17 | 30.09 | 30.06 | 30.06 | 28.44 |

Bottom side – EUT Moving away (Release) from the Phantom

The Bottom Suface of DUT is again moved toward the phantom, but in 1 mm steps, until it is at least 5 mm past the triggering point or touching the phantom.

| Band | Distance to DUT Output power (dBm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| WCDMA Band 2 | 23.05 | 23.10 | 23.01 | 23.09 | 23.07 | 22.08 | 22.12 | 22.12 | 22.06 | 22.03 |
| GSM 1900 | 30.05 | 30.02 | 30.14 | 30.11 | 30.08 | 28.48 | 28.51 | 28.56 | 28.38 | 28.52 |

Bottom Side – EUT Moving away (Release) from the Phantom

The Bottom surface is then moved toward the phantom by at least 5 mm or until reduced output power is returned to the Maximum output power.

| Band | Distance to DUT Output power (dBm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| WCDMA Band 2 | 22.05 | 22.16 | 22.16 | 22.12 | 22.00 | 23.02 | 23.05 | 23.09 | 23.04 | 22.95 |
| GSM 1900 | 28.58 | 28.63 | 28.72 | 28.55 | 28.65 | 30.17 | 30.22 | 30.13 | 30.14 | 30.18 |

Rear side – EUT Moving away (Release) from the Phantom

If the DUT is touching the phantom, it is moved in 3 mm steps until it move away from phantom to confirm that the sensor remains triggered and the maximum power is returned.

| Band | Distance to DUT Output power (dBm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 5 | 8 | 11 | 14 | 17 | 20 | 23 | 27 |
| WCDMA Band 2 | 22.09 | 23.05 | 22.91 | 22.92 | 22.91 | 23.02 | 23.09 | 23.00 |
| GSM 1900 | 28.67 | 30.12 | 30.07 | 30.09 | 30.00 | 30.21 | 30.07 | 30.07 |

### 1.3 Proximity Sensor Coverage for SAR measurements

(KDB 616217 D04v01r02§6.3)

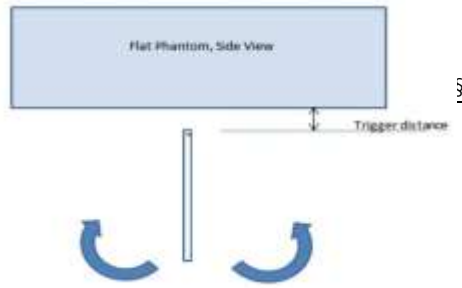
As there is no spatial offset between the antenna and the proximity sensor element, proximity sensor coverage did not need to be assessed.

### 1.4 Proximity Sensor Tilt Angle Assessment

(KDB 616217 D04v01r02 §6.4)

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Bottom side parallel to the base of the flat phantom for each band.
The EUT was rotated about Bottom side for angles up to ±45°. If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated. This procedure was repeated until the power remained reduced for all angles up±45°.

Proximity sensor tilt §6.4




Summary of Tablet Tilt Angle influence to Proximity Sensor Triggering (Bottom side)

| Band (MHz) | Minimumdistance atwhich power reduction was maintained over-45° | Power reduction status | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -45° | -40° | -30° | -20° | -10° | 0° | 10° | 20° | 30° | 40° | 45° |
| WCDMA B2 | mm | On | On | On | On | On | On | On | On | On | On | On |
| GSM 1900 | mm | On | On | On | On | On | On | On | On | On | On | On |

### 1.5 Resulting test positions for Phablet SAR measurements

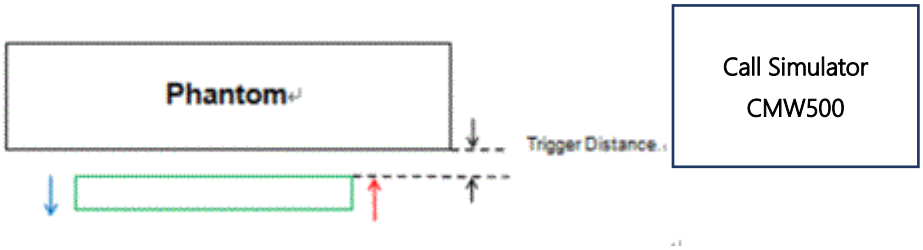
| Main 1 Ant Wireless technologies | Position | §6.2 Triggering Distance | §6.3 Coverage | §6.4 Tilt Angle | Worst case distance for Phablet SAR |
|---|---|---|---|---|---|
| WCDMA B2 | Rear | 8 | N/A | N/A | 7 |
| | Bottom | 5 | N/A | N/A | 4 |
| GSM 1900 | Rear | 8 | N/A | N/A | 7 |
| | Bottom | 5 | N/A | N/A | 4 |

Note:FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device when being used in phablet use conditions

## 2. Power reduction Verification for WLAN Antenna

This device uses a power reduction mechanism for SAR compliance for WLAN operations during voice or VoIP held to ear scenarios.
When a user makes or receives a WLAN voice or WLAN VOIP call, the audio of the call is sent through the earpiece at the top of the device so that the device can be used next to the ear. The IR Sensor located at the top of the device is used to detect when the device is in proximity of the user's head in order to optimize the user's device experience, for example, to dim or turn off the screen to save battery life. For this model, an auxiliary function of the IR sensor is for the purpose of RF Safety
(i.e. reducing output power for Head SAR compliance)
Detailed descriptions of the power reduction mechanism are included in the WLAN operational description document
.We verified the power reduction function with the following procedures.
1) Make a Voice call (VoIP) through a pre-installed VoIP application to call simulator
2) Measure the power while maintaining the voice call..

. For detailed measurement conducted power results, please refer to the Section .9




LEGEND
Direction of DUT travel for determination of power reduction triggering point
Direction of DUT travel for determination of full power resumption triggering point

| Tissue simulating liquid | Trigger distance – Front (mm) | |
|---|---|---|
| | Moving toward phantom | Moving away phantom |
| 2450 Head | 100 | 103 |
| 5000 Head | 100 | 103 |

## 2.1 Power Measurement Verification for WLAN

Front side – EUT Moving toward (trigger) to the Phantom

The Rear suface of DUT is moved toward the phantom in 3 mm steps until the sensor triggers.

| Distance | Distance to DUT Output power (dBm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 121 | 118 | 115 | 112 | 109 | 106 | 103 | 100 |
| 2.4GHz 802.11b | 18.47 | 18.48 | 18.47 | 18.46 | 18.45 | 18.46 | 18.41 | 15.50 |
| 2.4GHz 802.11g | 18.06 | 18.10 | 18.04 | 17.97 | 18.08 | 17.99 | 18.09 | 15.67 |
| 2.4GHz 802.11n | 17.84 | 17.97 | 17.78 | 17.87 | 17.87 | 17.86 | 17.85 | 15.39 |
| 5 GHz 802.11a | 15.59 | 15.45 | 15.64 | 15.56 | 15.48 | 15.54 | 15.48 | 13.65 |
| 5 GHz 802.11n | 15.24 | 15.35 | 15.11 | 15.10 | 15.37 | 15.25 | 15.28 | 13.56 |
| 5 GHz 802.11ac | 15.05 | 15.03 | 15.04 | 14.94 | 15.03 | 15.02 | 15.04 | 13.03 |

Front side – EUT Moving toward (trigger) to the Phantom

The Rear surface of DUT is again moved toward the phantom, but in 1 mm steps, until it is at least 5 mm past the triggering point or touching the phantom.

| Distance | Distance to DUT Output power (dBm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 105 | 104 | 103 | 102 | 101 | 100 | 99 | 98 | 97 | 96 | 95 |
| 2.4GHz 802.11b | 18.34 | 18.28 | 18.38 | 18.22 | 18.40 | 15.42 | 15.52 | 15.37 | 15.53 | 15.44 | 15.42 |
| 2.4GHz 802.11g | 18.00 | 18.09 | 17.94 | 17.91 | 17.95 | 15.62 | 15.74 | 15.55 | 15.53 | 15.62 | 15.62 |
| 2.4GHz 802.11n | 17.76 | 17.73 | 17.80 | 17.72 | 17.77 | 15.32 | 15.31 | 15.24 | 15.34 | 15.43 | 15.32 |
| 5 GHz 802.11a | 15.63 | 15.64 | 15.47 | 15.64 | 15.57 | 13.62 | 13.61 | 13.67 | 13.51 | 13.63 | 13.62 |
| 5 GHz 802.11n | 15.19 | 15.12 | 15.11 | 15.20 | 15.10 | 13.51 | 13.54 | 13.57 | 13.47 | 13.43 | 13.51 |
| 5 GHz 802.11ac | 14.97 | 14.97 | 15.15 | 15.01 | 14.97 | 12.98 | 13.09 | 13.05 | 13.04 | 12.89 | 12.98 |

Front side – EUT Moving away (Release) from the Phantom

The Rear surface is then moved toward the phantom by at least 5 mm or until reduced output power is returned to the Maximum output power.

| Distance | Distance to DUT Output power (dBm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 |
| 2.4GHz 802.11b | 15.40 | 15.48 | 15.40 | 15.42 | 15.44 | 18.28 | 18.21 | 18.15 | 18.26 | 18.34 | 18.28 |
| 2.4GHz 802.11g | 15.65 | 15.68 | 15.64 | 15.56 | 15.67 | 17.94 | 18.08 | 17.81 | 18.04 | 17.92 | 17.94 |
| 2.4GHz 802.11n | 15.36 | 15.37 | 15.23 | 15.24 | 15.39 | 17.74 | 17.68 | 17.83 | 17.62 | 17.68 | 17.74 |
| 5 GHz 802.11a | 13.57 | 13.66 | 13.71 | 13.56 | 13.63 | 15.61 | 15.49 | 15.67 | 15.58 | 15.63 | 15.61 |
| 5 GHz 802.11n | 13.54 | 13.47 | 13.51 | 13.46 | 13.52 | 15.18 | 15.20 | 15.05 | 15.24 | 15.20 | 15.18 |
| 5 GHz 802.11ac | 13.01 | 13.04 | 13.02 | 13.06 | 12.95 | 14.96 | 14.96 | 15.03 | 14.88 | 14.90 | 14.96 |

Front side – EUT Moving away (Release) from the Phantom

The Front surface of DUT is again moved toward the phantom, but in 1 mm steps, until it is at least 5 mm past the triggering point or touching the phantom.

| Distance | Distance to DUT Output power (dBm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 103 | 106 | 109 | 112 | 115 | 118 | 121 | 124 |
| 2.4GHz 802.11b | 15.35 | 18.25 | 18.16 | 18.31 | 18.28 | 18.27 | 18.21 | 18.06 |
| 2.4GHz 802.11g | 15.61 | 17.90 | 17.98 | 17.89 | 17.81 | 17.99 | 17.86 | 17.94 |
| 2.4GHz 802.11n | 15.30 | 17.67 | 17.60 | 17.75 | 17.70 | 17.55 | 17.63 | 17.52 |
| 5 GHz 802.11a | 13.53 | 15.58 | 15.47 | 15.64 | 15.48 | 15.65 | 15.51 | 15.41 |
| 5 GHz 802.11n | 13.47 | 15.10 | 15.09 | 15.07 | 15.21 | 15.13 | 15.04 | 15.07 |
| 5 GHz 802.11ac | 12.99 | 14.93 | 15.00 | 14.87 | 14.89 | 14.96 | 14.92 | 14.92 |