



SAR TEST REPORT

No. 2013SAR00025

For

Sony Mobile Communications (China) Co. Ltd

GSM/UMTS/LTE mobile phone

Type number: PM-0350-BV

Marketing name: C5303

With

Hardware Version: A

Software Version: 12.0.A.1.18 / s_atp_huashan_0_0_18_c (WLAN)

FCC ID: PY7PM-0350

Issued Date: 2013-06-02



Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of TMC Beijing.

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Revision Version

| Report Number | Revision | Date | Memo |
|---------------|----------|------------|---|
| 2013SAR00025 | 00 | 2013-03-13 | Initial creation of test report |
| 2013SAR00025 | 01 | 2013-04-28 | <ol style="list-style-type: none"> 1. Add the standard of KDB941225 D01 in section 5.2 on page 10 2. Add the note for release version in table 4.1 on page 9 3. Retest the WCDMA conducted power for channel 4182 in table 11.10 on page 31 and update the corresponding reported SAR in table 14.7&14.8 on page 41&42 4. Add the power tolerance of HSDPA in table 11.4 on page 27 and the conducted power of HSDPA in table 11.10 on page 31 5. Add start RB and MPR in section 11.4 on page 31-33 |
| 2013SAR00025 | 02 | 2013-04-29 | Add the standard of KDB941225 D02 in section 5.2 on page 10 |
| 2013SAR00025 | 03 | 2013-05-02 | <ol style="list-style-type: none"> 1. Add the information for DC-HSDPA in section 9.3 on page 22 2. Add the conducted power for DC-HSDPA in table 11.10 on page 31 |
| 2013SAR00025 | 04 | 2013-05-04 | Add the information of KDB inquiry for DC-HSDPA in section 11.3 on page 31 |
| 2013SAR00025 | 05 | 2013-05-10 | Retest some conducted power values for WiFi 802.11n-HT20 (5G) in section 11.5 on page 35 and update the corresponding reported SAR |
| 2013SAR00025 | 06 | 2013-05-22 | <ol style="list-style-type: none"> 1. Update the table 2.1 on page 6 2. Update the evaluation of simultaneous in table 2.2 on page 7 and table 13.1 on page 38 |
| 2013SAR00025 | 07 | 2013-05-23 | <ol style="list-style-type: none"> 1. Add the notes on page 6 2. Update the SAR value of DTS and UNII for WiFi in table 2.1 on page 6, table 2.2 on page 7 and table 13.1 on page 38 |
| 2013SAR00025 | 08 | 2013-05-26 | Add the measurements of WiFi 5G |
| 2013SAR00025 | 09 | 2013-06-02 | <ol style="list-style-type: none"> 1. Add the note for test channels of 802.11n on page 44 2. Add the note for different software version on page 9 3. Add the statement for PBA of hotspot power back off on page 7 |

TABLE OF CONTENT

| | |
|--|-----------|
| 1 TEST LABORATORY | 5 |
| 1.1 TESTING LOCATION | 5 |
| 1.2 TESTING ENVIRONMENT..... | 5 |
| 1.3 PROJECT DATA | 5 |
| 1.4 SIGNATURE..... | 5 |
| 2 STATEMENT OF COMPLIANCE | 6 |
| 3 CLIENT INFORMATION..... | 8 |
| 3.1 APPLICANT INFORMATION | 8 |
| 3.2 MANUFACTURER INFORMATION | 8 |
| 4 EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) | 9 |
| 4.1 ABOUT EUT | 9 |
| 4.2 INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST | 9 |
| 4.3 INTERNAL IDENTIFICATION OF AE USED DURING THE TEST..... | 10 |
| 5 TEST METHODOLOGY | 10 |
| 5.1 APPLICABLE LIMIT REGULATIONS | 10 |
| 5.2 APPLICABLE MEASUREMENT STANDARDS..... | 10 |
| 6 SPECIFIC ABSORPTION RATE (SAR)..... | 11 |
| 6.1 INTRODUCTION..... | 11 |
| 6.2 SAR DEFINITION..... | 11 |
| 7 TISSUE SIMULATING LIQUIDS..... | 12 |
| 7.1 TARGETS FOR TISSUE SIMULATING LIQUID | 12 |
| 7.2 DIELECTRIC PERFORMANCE | 12 |
| 8 SYSTEM VERIFICATION..... | 17 |
| 8.1 SYSTEM SETUP..... | 17 |
| 8.2 SYSTEM VERIFICATION..... | 18 |
| 9 MEASUREMENT PROCEDURES | 19 |
| 9.1 TESTS TO BE PERFORMED | 19 |
| 9.2 GENERAL MEASUREMENT PROCEDURE..... | 21 |
| 9.3 WCDMA MEASUREMENT PROCEDURES FOR SAR | 22 |
| 9.4 SAR MEASUREMENT FOR LTE..... | 23 |
| 9.5 BLUETOOTH & WI-FI MEASUREMENT PROCEDURES FOR SAR | 23 |
| 9.6 POWER DRIFT..... | 23 |
| 10 AREA SCAN BASED 1-G SAR | 24 |
| 10.1 REQUIREMENT OF KDB..... | 24 |
| 10.2 FAST SAR ALGORITHMS | 24 |
| 11 CONDUCTED OUTPUT POWER..... | 25 |

| | |
|---|------------|
| 11.1 MANUFACTURING TOLERANCE | 25 |
| 11.2 GSM MEASUREMENT RESULT | 29 |
| 11.3 WCDMA MEASUREMENT RESULT..... | 31 |
| 11.4 LTE MEASUREMENT RESULT | 31 |
| 11.5 WI-FI AND BT MEASUREMENT RESULT | 34 |
| 12 SIMULTANEOUS TX SAR CONSIDERATIONS | 36 |
| 12.1 INTRODUCTION..... | 36 |
| 12.2 TRANSMIT ANTENNA SEPARATION DISTANCES | 36 |
| 12.3 SAR MEASUREMENT POSITIONS | 36 |
| 12.4 STANDALONE SAR TEST EXCLUSION CONSIDERATIONS | 37 |
| 13 EVALUATION OF SIMULTANEOUS..... | 38 |
| 14 SAR TEST RESULT | 39 |
| 14.1 SAR RESULTS FOR FAST SAR..... | 39 |
| 14.2 SAR RESULTS FOR STANDARD PROCEDURE | 45 |
| 15 SAR MEASUREMENT VARIABILITY..... | 48 |
| 16 MEASUREMENT UNCERTAINTY | 49 |
| 17 MAIN TEST INSTRUMENTS | 53 |
| ANNEX A GRAPH RESULTS..... | 54 |
| ANNEX B SYSTEM VERIFICATION RESULTS..... | 84 |
| ANNEX C SAR MEASUREMENT SETUP | 99 |
| ANNEX D POSITION OF THE WIRELESS DEVICE IN RELATION TO THE PHANTOM | 105 |
| ANNEX E EQUIVALENT MEDIA RECIPES | 108 |
| ANNEX F SYSTEM VALIDATION | 109 |
| ANNEX G PROBE CALIBRATION CERTIFICATE | 110 |
| ANNEX H DIPOLE CALIBRATION CERTIFICATE..... | 132 |

1 Test Laboratory

1.1 Testing Location

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1.2 Testing Environment

Temperature: 18°C~25 °C,
Relative humidity: 30%~ 70%
Ground system resistance: < 0.5 Ω
Ambient noise & Reflection: < 0.012 W/kg

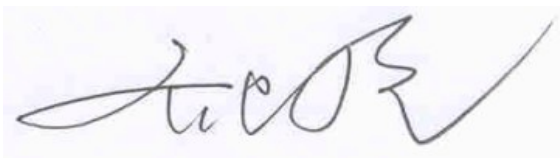
1.3 Project Data

Project Leader: Qi Dianyuan
Test Engineer: Lin Xiaojun
Testing Start Date: February 6, 2013
Testing End Date: May 26, 2013

1.4 Signature



Lin Xiaojun
(Prepared this test report)



Qi Dianyuan
(Reviewed this test report)



Xiao Li
Deputy Director of the laboratory
(Approved this test report)

2 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Sony Mobile Communications (China) Co. Ltd GSM/UMTS/LTE mobile phone PM-0350-BV / C5303 are as follows:

Table 2.1: Highest Reported SAR (1g)

| Exposure Configuration | Technology Band | Highest Reported SAR 1g (W/Kg) | Equipment Class |
|--|------------------|-----------------------------------|-----------------|
| Head (Separation Distance 0mm) | GSM 850 | 0.63 | PCE |
| | PCS 1900 | 0.41 | |
| | UMTS FDD 5 | 0.45 | |
| | LTE Band 5 | 0.38 | |
| | WLAN 2.4&5.8 GHz | 0.31 | DTS |
| | WLAN 5 GHz | 0.06 | UNII |
| Hotspot (Separation Distance 10mm) | GSM 850 | 0.75 | PCE |
| | PCS 1900 | 1.17 | |
| | UMTS FDD 5 | 0.27 | |
| | LTE Band 5 | 0.60 | |
| | WLAN 2.4&5.8 GHz | 0.14 | DTS |
| | WLAN 5 GHz | 0.05 | UNII |
| Body-worn (Data) (Separation Distance 15mm) | GSM 850 | / | PCE |
| | PCS 1900 | 0.95 | |
| | UMTS FDD 5 | / | |
| | LTE Band 5 | / | |
| | WLAN 2.4&5.8 GHz | / | DTS |
| | WLAN 5 GHz | / | UNII |
| Body-worn (Speech) (Separation Distance 15mm) | GSM 850 | 0.59 | PCE |
| | PCS 1900 | 1.08 | |
| | UMTS FDD 5 | 0.42 | |
| | LTE Band 5 | / | |
| | WLAN 2.4&5.8 GHz | / | DTS |
| | WLAN 5 GHz | / | UNII |

Note1: For the bands without power reduction, the SAR values with 10mm are more conservative than the values with 15mm. So these bands are only tested with 10mm for data and 15mm for speech.

Note2: it can't use with speech in the body position for the mode of LTE and WLAN.

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1g tissue according to the ANSI C95.1-1999.

For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and which provides a minimum separation distance of 10 mm for data and 15mm for speech between this device and the body of the user. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output.

The measurement together with the test system set-up is described in annex C of this test report. A detailed description of the equipment under test can be found in chapter 4 of this test report.

The maximum reported SAR value is obtained at the case of (Table 2.1), and the values are: **1.17 W/kg (1g)**.

Table 2.2: The sum of reported SAR values for GSM/WCDMA and WiFi

| | Position | GSM/WCDMA | WiFi (DTS) | Sum1 | WiFi (UNII) | Sum2 |
|--|-------------------------|-----------|------------|-------------|-------------|-------------|
| Maximum reported SAR value for Head | Left hand, Touch cheek | 0.63 | 0.09 | 0.72 | / | / |
| | Right hand, Touch cheek | 0.60 | 0.31 | 0.91 | 0.06 | 0.66 |
| Maximum reported SAR value for Body | Front | 1.09 | 0.04 | 1.13 | / | / |
| | Rear | 0.58 | 0.14 | 0.72 | 0.05 | 0.63 |
| | Bottom | 1.17 | / | / | / | / |

Note: Sum1 is GSM/WCDMA + WiFi (DTS). Sum2 is GSM/WCDMA + WiFi (UNII).

Table 2.3: The sum of reported SAR values for GSM/WCDMA and Bluetooth

| | Position | GSM/WCDMA | BT* | Sum |
|--|------------------------|-----------|------|-------------|
| Maximum reported value for Head | Left hand, Touch cheek | 0.63 | 0.26 | 0.89 |
| Maximum reported SAR value for Body | Bottom | 1.17 | 0.26 | 1.43 |

BT* - Estimated SAR for Bluetooth (see the table 13.3)

According to the above tables, the maximum sum of reported SAR values is **1.43 W/kg (1g)**. The detail for simultaneous transmission consideration is described in chapter 13.

PBA of hotspot power back off is not required as FCC's response of KDB inquiry, and there is one Main antenna working for the transmission of 2G/3G/4G, and neither voice nor data of 2G/3G/4G can transmit simultaneously with each other. Another specific BT/WLAN antenna is working for all transmission modes of BT/WLAN and any transmission mode of BT/WLAN cannot work simultaneously with each other. Main antenna and BT/WLAN antenna can work at the same time.

3 Client Information

3.1 Applicant Information

Company Name: Sony Mobile Communications (China) Co. Ltd
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3.2 Manufacturer Information

Company Name: Sony Mobile Communications (China) Co. Ltd
Address /Post: Sony Mobile R&D Center, No. 16, Guangshun South Street,
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City: Beijing
Postal Code: 100102
Country: China
Contact Person: Ma, Gang
Telephone: +86-10-58656312
Fax: +86-10-58659049

4 Equipment Under Test (EUT) and Ancillary Equipment (AE)

4.1 About EUT

| | |
|---------------------------------------|---|
| Description: | GSM/UMTS/LTE mobile phone |
| Type name: | PM-0350-BV |
| Marketing name: | C5303 |
| Operating mode(s): | GSM 850/900/1800/1900, WCDMA 850/900/2100, BT, Wi-Fi (2.4G&5G), LTE Band 1/3/5/7/8/20 |
| Tested Tx Frequency: | 825 – 848.8 MHz (GSM 850) |
| | 1850.2 – 1910 MHz (GSM 1900) |
| | 826.4–846.6 MHz (WCDMA850 Band V) |
| | 2412 – 2462 MHz (Wi-Fi 2.4G) |
| | 5180 – 5825 MHz (Wi-Fi 5G) |
| | 824.7 – 848.3 MHz (LTE Band 5) |
| GPRS/EGPRS Multislot Class: | 33 |
| GPRS capability Class: | B |
| WCDMA UE Category: | 6 |
| Release Version: | GSM: R8 |
| | GPRS: R8 |
| | UMTS: R8 (HSPA+ and DC-HSDPA only support downlink) |
| | LTE: R9 |
| Test device Production information: | Production unit |
| Device type: | Portable device |
| Antenna type: | Integrated antenna |
| Accessories/Body-worn configurations: | Headset |
| Hotspot mode: | Support simultaneous transmission of hotspot and voice(or data) |
| Form factor: | 13.1cm × 6.7 cm |
| Antenna dimension: | Max length: 53 mm |
| | Max width: 8 mm |

4.2 Internal Identification of EUT used during the test

| EUT ID* | IMEI | SN | HW Version | SW Version |
|---------|-----------------|------------|------------|------------------------|
| EUT1 | 004402450616572 | CB5123BN1M | A | 12.0.A.1.18 |
| EUT2 | 004402450616226 | CB5123BN2M | A | 12.0.A.1.18 |
| EUT3 | 004402450616051 | CB5123BN2Z | A | 12.0.A.1.18 |
| EUT4 | 004402450616424 | CB5123BN0W | A | s_atp_huashan_0_0_18_c |

*EUT ID: is used to identify the test sample in the lab internally.

Note1: It is performed to test SAR with the EUT1, 2 and 4, conducted power of main antenna with the EUT3 and conducted power of WLAN antenna with the EUT4.

Note2: There are different software version between the SAR sample and the WLAN sample. Because the SAR sample is controlled to work by Digital Radio Communication tester, the WLAN sample is controlled to work by the terminal software installed on the PC.

4.3 Internal Identification of AE used during the test

| AE ID* | Description | Model | SN | Manufacturer |
|--------|-------------|--------|----|--------------|
| AE1 | Headset | MH410c | / | Foster |

*AE ID: is used to identify the test sample in the lab internally.

5 TEST METHODOLOGY

5.1 Applicable Limit Regulations

ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

5.2 Applicable Measurement Standards

IEEE 1528–2003: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.

OET Bulletin 65 (Edition 97-01) and Supplement C(Edition 01-01): Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits.

KDB447498 D01: General RF Exposure Guidance v05: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

KDB648474 D04 SAR Handsets Multi Xmitter and Ant v01: SAR Evaluation Considerations for Wireless Handsets.

KDB941225 D01 SAR test for 3G devices v02: SAR Measurement Procedures for 3G Devices

KDB941225 D02 Guidance for 3GPP R6 and R7 HSPA v02v01: 3GPP R6 HSPA and R7 HSPA+ SAR Guidance

KDB941225 D05 SAR for LTE Devices v02: SAR Evaluation Considerations for LTE Devices

KDB941225 D06 Hot Spot SAR v01: SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

KDB248227: SAR measurement procedures for 802.112abg transmitters

KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01: SAR Measurement Requirements for 100 MHz to 6 GHz

KDB865664 D02 SAR Reporting v01: RF Exposure Compliance Reporting and Documentation Considerations

6 Specific Absorption Rate (SAR)

6.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

6.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

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

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

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = c \left(\frac{\delta T}{\delta t} \right)$$

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

Where: σ is the conductivity of the tissue, ρ is the mass density of tissue and E is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7 Tissue Simulating Liquids

7.1 Targets for tissue simulating liquid

Table 7.1: Targets for tissue simulating liquid

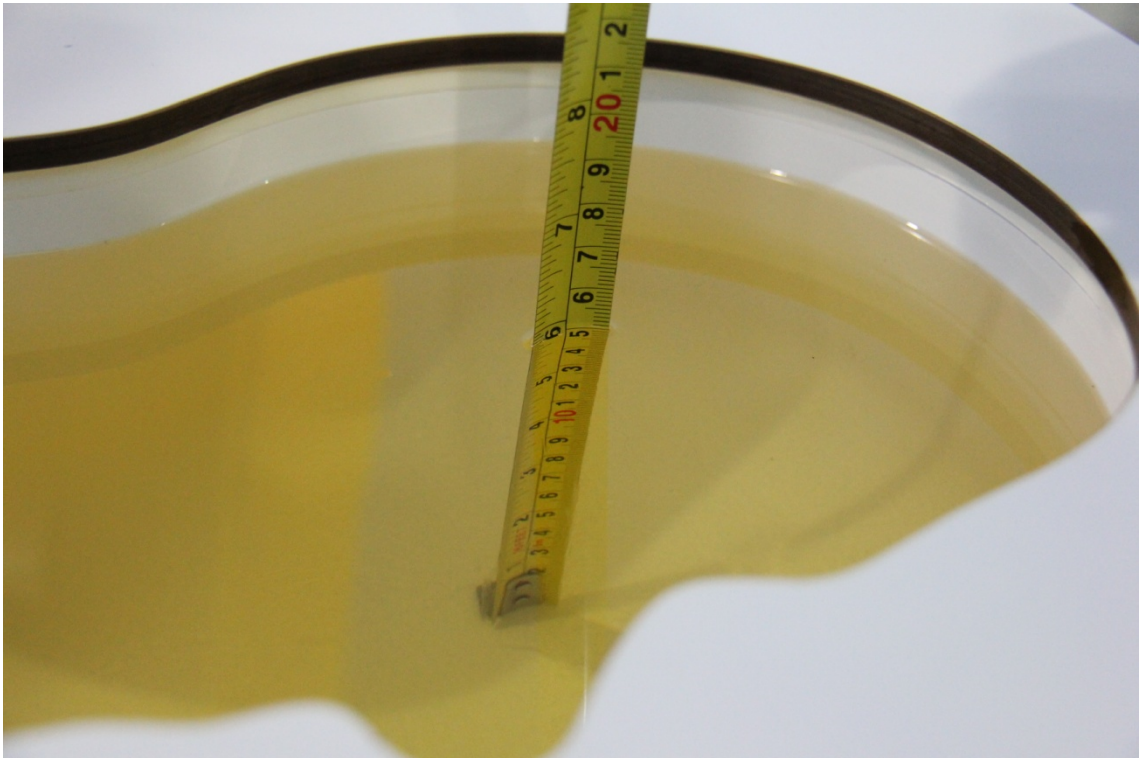
| Frequency (MHz) | Liquid Type | Conductivity (σ) | $\pm 5\%$ Range | Permittivity (ϵ) | $\pm 5\%$ Range |
|-----------------|-------------|---------------------------|-----------------|-----------------------------|-----------------|
| 835 | Head | 0.90 | 0.86~0.95 | 41.5 | 39.4~43.6 |
| 835 | Body | 0.97 | 0.92~1.02 | 55.2 | 52.4~58.0 |
| 1900 | Head | 1.40 | 1.33~1.47 | 40.0 | 38.0~42.0 |
| 1900 | Body | 1.52 | 1.44~1.60 | 53.3 | 50.6~56.0 |
| 2450 | Head | 1.80 | 1.71~1.89 | 39.2 | 37.2~41.2 |
| 2450 | Body | 1.95 | 1.85~2.05 | 52.7 | 50.1~55.3 |
| 5200 | Head | 4.66 | 4.43~4.89 | 35.99 | 34.19~37.79 |
| 5200 | Body | 5.30 | 5.04~5.56 | 49.0 | 46.6~51.4 |
| 5500 | Head | 4.96 | 4.71~5.21 | 35.64 | 33.86~37.42 |
| 5500 | Body | 5.65 | 5.37~5.93 | 48.6 | 46.2~51.0 |
| 5800 | Head | 5.27 | 5.01~5.53 | 35.3 | 33.5~37.1 |
| 5800 | Body | 6.00 | 5.70~6.30 | 48.2 | 45.8~50.6 |

7.2 Dielectric Performance

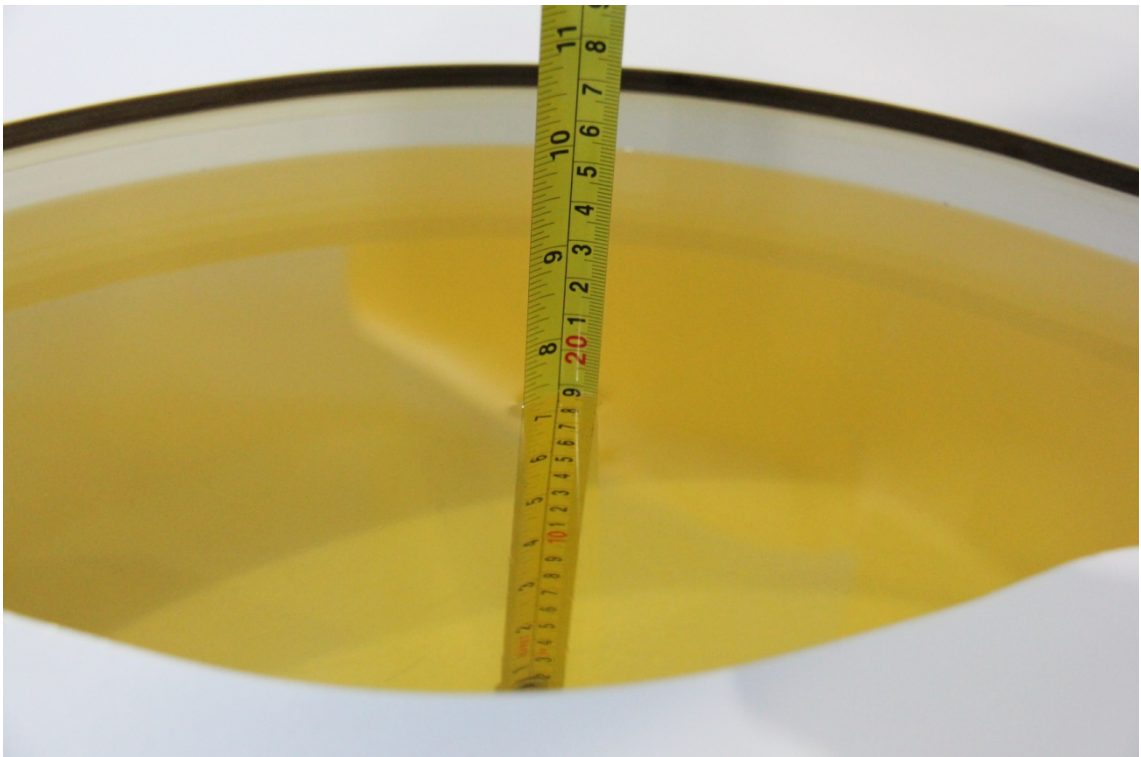
Table 7.2: Dielectric Performance of Tissue Simulating Liquid

| Measurement Date (yyyy-mm-dd) | Type | Frequency | Permittivity ϵ | Drift (%) | Conductivity σ (S/m) | Drift (%) |
|-------------------------------|------|-----------|-------------------------|-----------|-----------------------------|-----------|
| 2013-02-06 | Head | 835 MHz | 40.67 | -2.00 | 0.889 | -1.22 |
| | Body | 835 MHz | 56.48 | 2.32 | 0.983 | 1.34 |
| 2013-02-07 | Head | 1900 MHz | 39.07 | -2.33 | 1.414 | 1.00 |
| | Body | 1900 MHz | 52.31 | -1.86 | 1.534 | 0.92 |
| 2013-02-17 | Head | 2450 MHz | 38.87 | -0.84 | 1.843 | 2.39 |
| | Body | 2450 MHz | 52.26 | -0.83 | 1.968 | 0.92 |
| 2013-03-10 | Head | 5800 MHz | 34.99 | -0.89 | 5.389 | 2.26 |
| | Body | 5800 MHz | 46.52 | -3.49 | 6.014 | 0.23 |
| 2013-05-25 | Head | 5200 MHz | 35.57 | -1.17 | 4.558 | -2.19 |
| | Body | 5200 MHz | 48.24 | -1.55 | 5.167 | -2.51 |
| 2013-05-25 | Head | 5500 MHz | 34.93 | -1.99 | 4.956 | -0.08 |
| | Body | 5500 MHz | 47.59 | -2.08 | 5.639 | -0.19 |
| 2013-05-25 | Head | 5800 MHz | 34.27 | -2.92 | 5.354 | 1.59 |
| | Body | 5800 MHz | 46.93 | -2.63 | 6.127 | 2.12 |

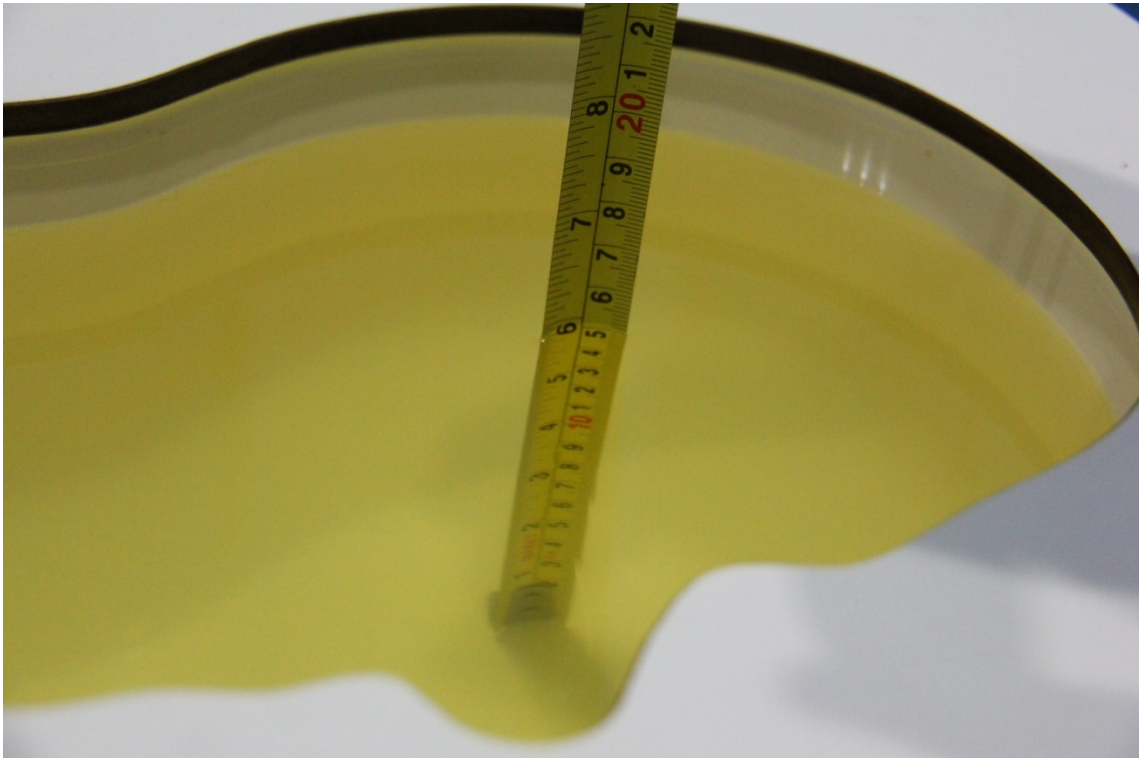
Note: The liquid temperature is 22.0 °C



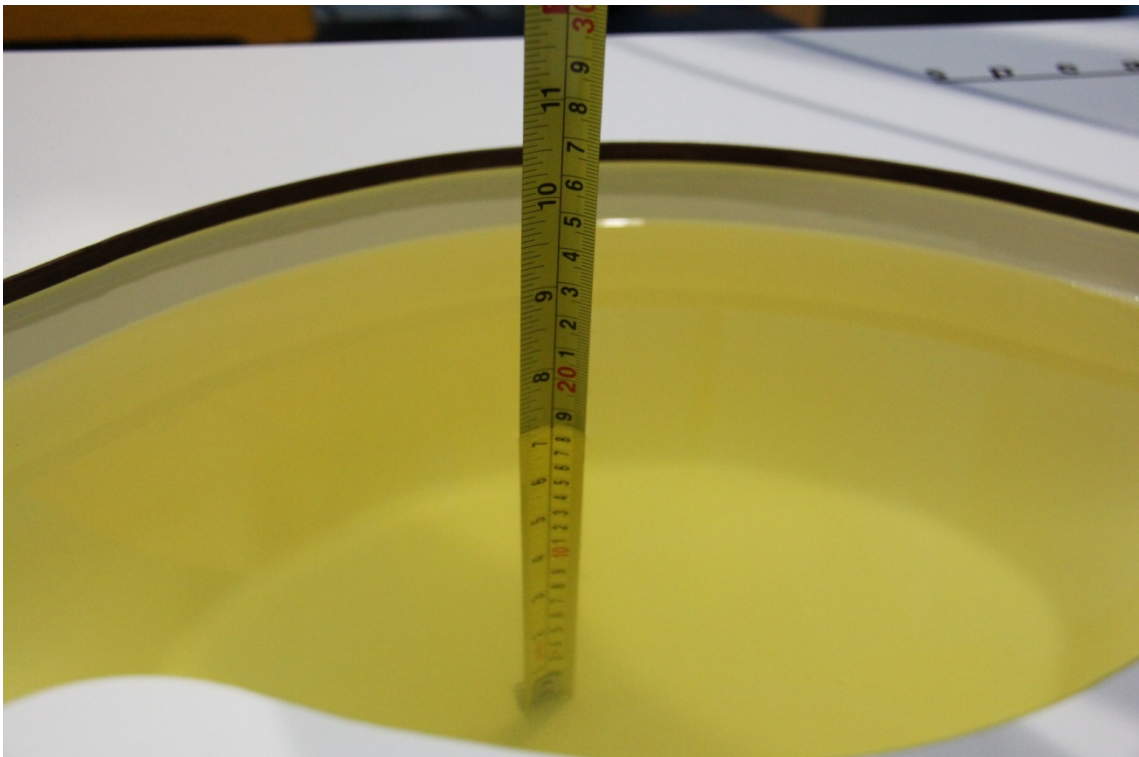
Picture 7-1: Liquid depth in the Head Phantom (835 MHz)



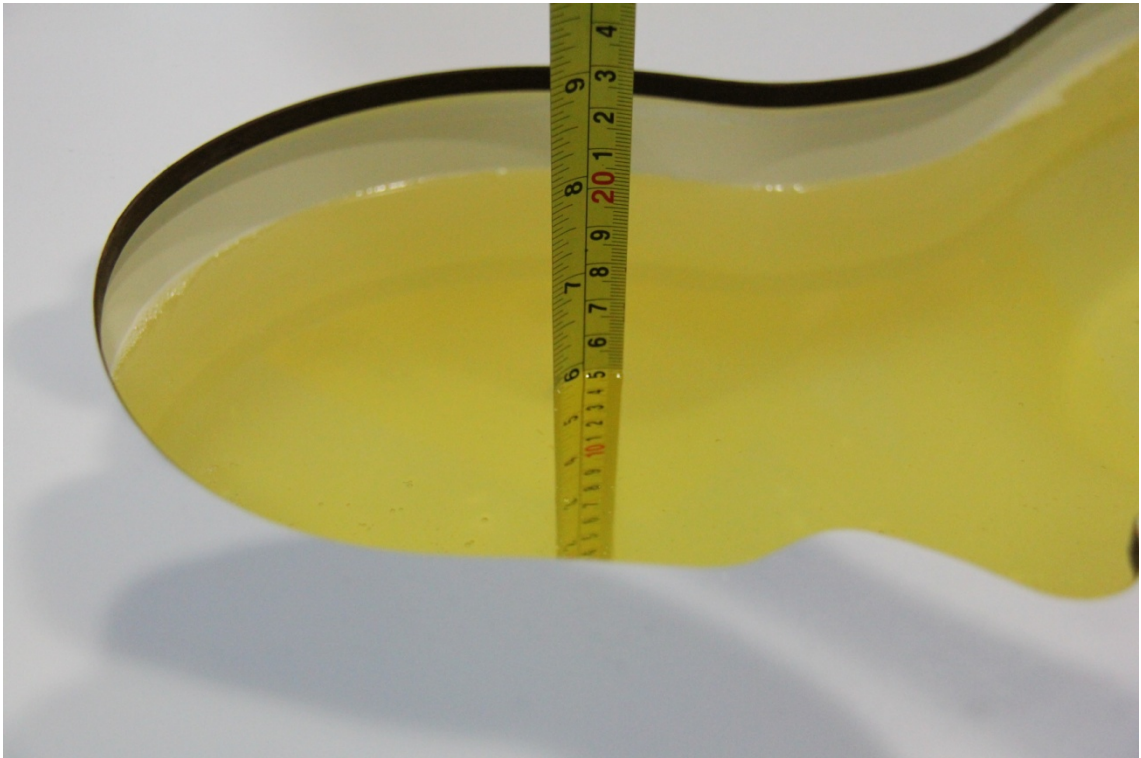
Picture 7-2: Liquid depth in the Flat Phantom (835 MHz)



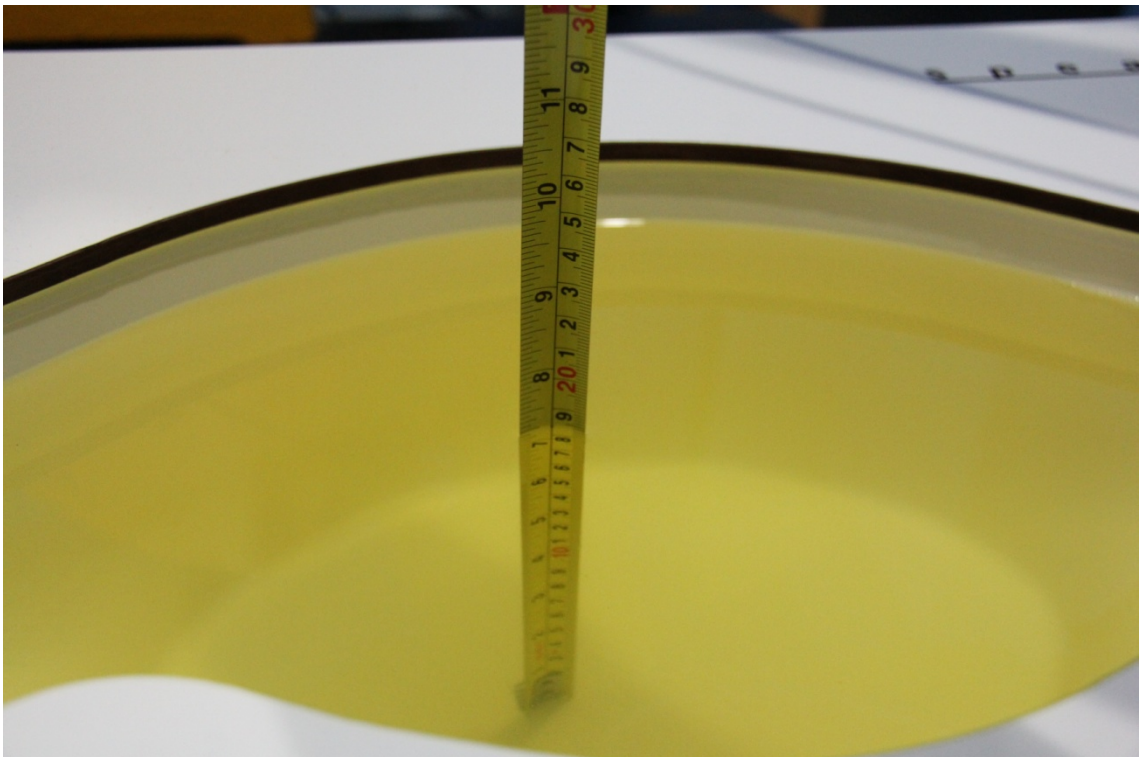
Picture 7-3: Liquid depth in the Head Phantom (1900 MHz)



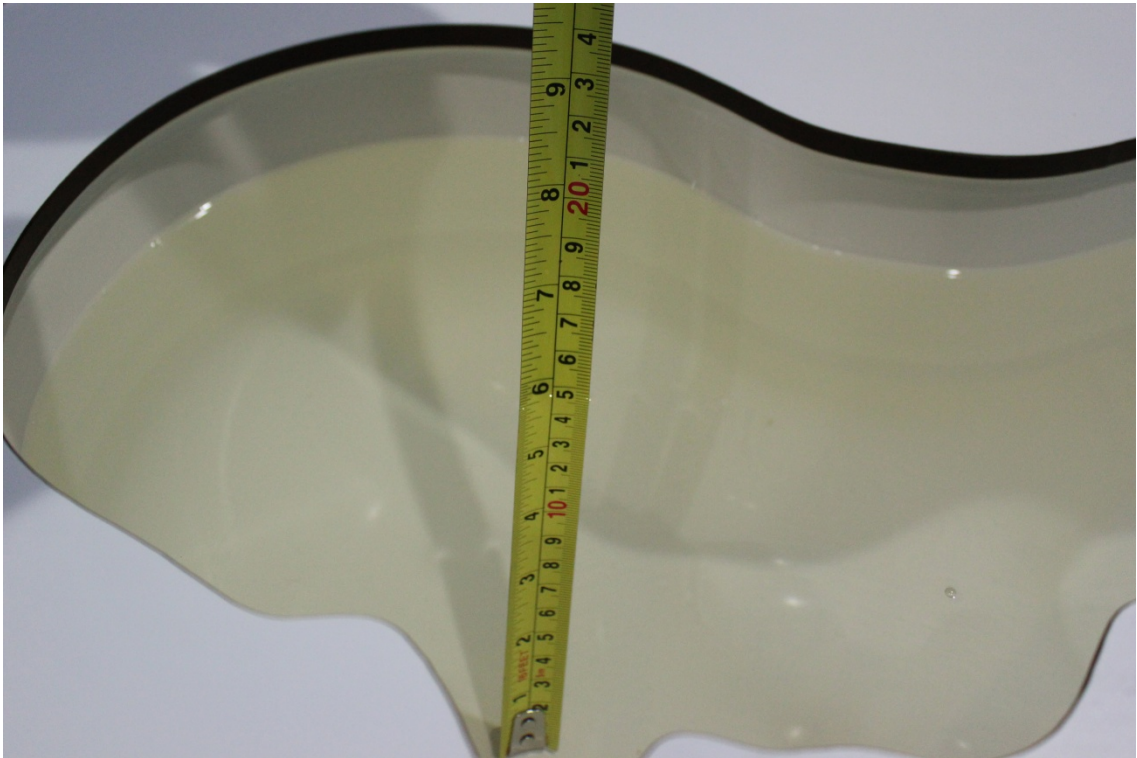
Picture 7-4 Liquid depth in the Flat Phantom (1900MHz)



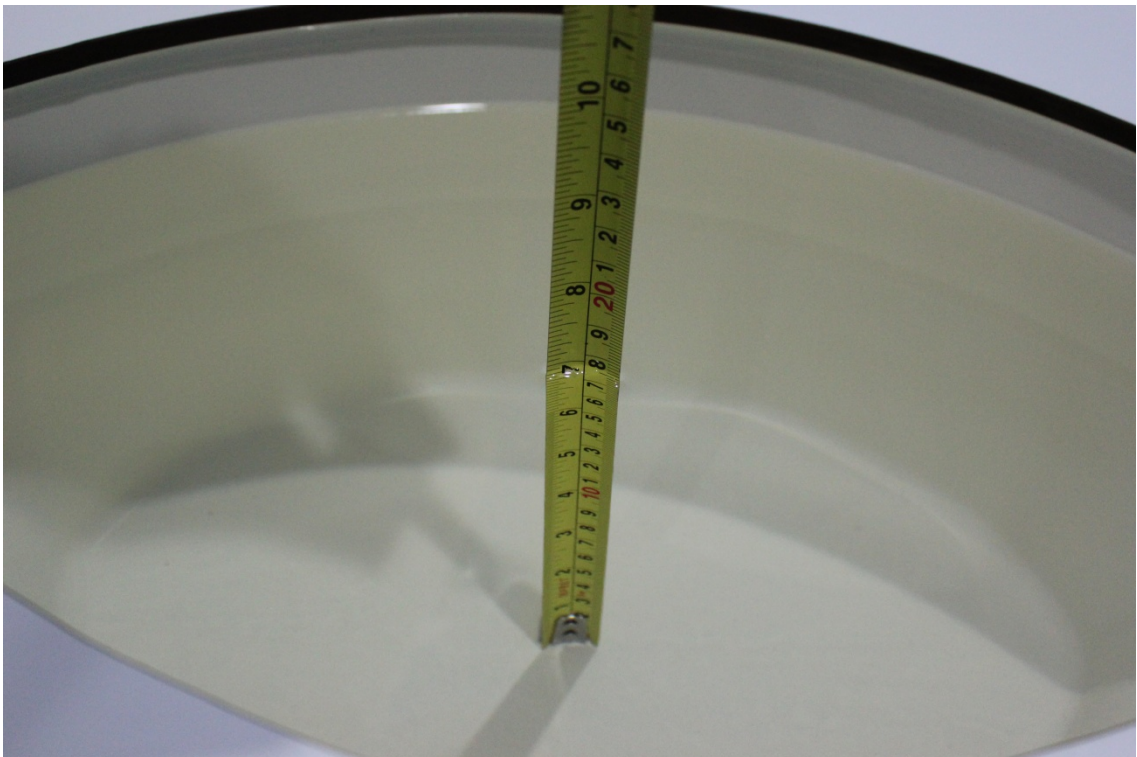
Picture 7-5 Liquid depth in the Head Phantom (2450MHz)



Picture 7-6 Liquid depth in the Flat Phantom (2450MHz)



Picture 7-7 Liquid depth in the Head Phantom (5GHz)

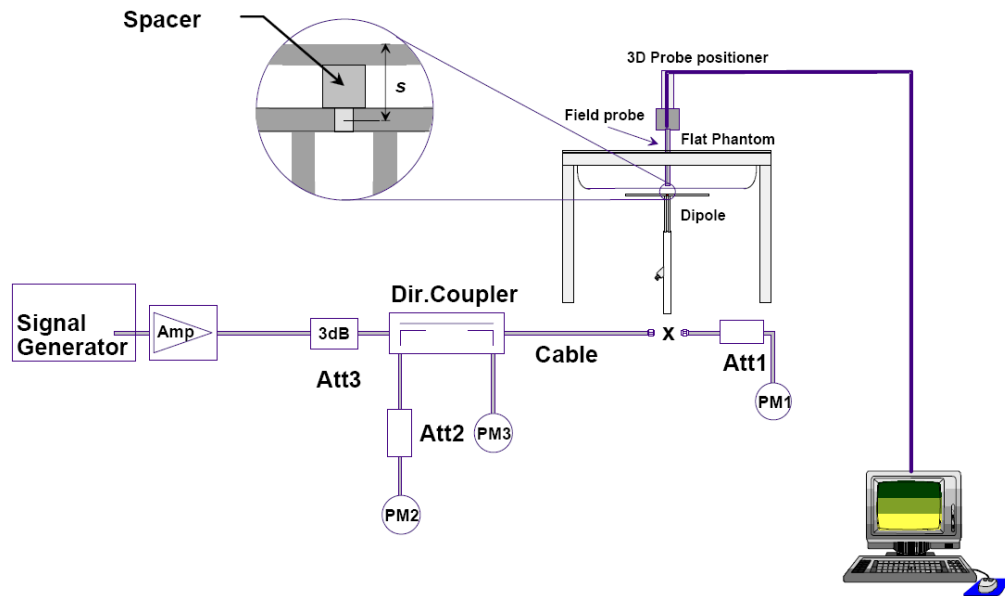


Picture 7-8 Liquid depth in the Flat Phantom (5GHz)

8 System verification

8.1 System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



Picture 8.1 System Setup for System Evaluation



Picture 8.2 Photo of Dipole Setup

8.2 System Verification

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device.

The system verification results are required that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR. The details are presented in annex B.

Table 8.1: System Verification of Head

| Measurement Date (yyyy-mm-dd) | Frequency | Target value (W/kg) | | Measured value (W/kg) | | Deviation | |
|----------------------------------|-----------|---------------------|----------------|-----------------------|----------------|-----------------|----------------|
| | | 10 g Average | 1 g Average | 10 g Average | 1 g Average | 10 g Average | 1 g Average |
| 2013-02-06 | 835 MHz | 6.07 | 9.30 | 6.16 | 9.44 | 1.48% | 1.51% |
| 2013-02-07 | 1900 MHz | 20.6 | 39.1 | 20.04 | 38.44 | -2.72% | -1.69% |
| 2013-02-17 | 2450 MHz | 24.4 | 52.4 | 23.92 | 52.40 | -1.97% | 0.00% |
| 2013-03-10 | 5800 MHz | 23.3 | 81.6 | 22.80 | 81.20 | -2.15% | -0.49% |
| 2013-05-25 | 5200 MHz | 23.4 | 81.5 | 24.00 | 82.70 | 2.56% | 1.47% |
| 2013-05-26 | 5500 MHz | 25.0 | 87.5 | 24.80 | 87.50 | -0.80% | 0.00% |
| 2013-05-26 | 5800 MHz | 23.3 | 81.6 | 23.10 | 81.70 | -0.86% | 0.12% |

Table 8.2: System Verification of Body

| Measurement Date (yyyy-mm-dd) | Frequency | Target value (W/kg) | | Measured value (W/kg) | | Deviation | |
|----------------------------------|-----------|---------------------|----------------|-----------------------|----------------|-----------------|----------------|
| | | 10 g Average | 1 g Average | 10 g Average | 1 g Average | 10 g Average | 1 g Average |
| 2013-02-06 | 835 MHz | 6.20 | 9.36 | 6.40 | 9.60 | 3.23% | 2.56% |
| 2013-02-07 | 1900 MHz | 21.3 | 39.9 | 21.88 | 40.80 | 2.72% | 2.26% |
| 2013-02-17 | 2450 MHz | 23.6 | 50.4 | 23.80 | 51.20 | 0.85% | 1.59% |
| 2013-03-10 | 5800 MHz | 20.4 | 73.8 | 19.70 | 73.10 | -3.43% | -0.95% |
| 2013-05-25 | 5200 MHz | 20.5 | 73.1 | 20.10 | 73.20 | -1.95% | 0.14% |
| 2013-05-26 | 5500 MHz | 21.7 | 78.1 | 21.50 | 77.60 | -0.92% | -0.64% |
| 2013-05-26 | 5800 MHz | 20.4 | 73.8 | 20.00 | 73.40 | -1.96% | -0.54% |

9 Measurement Procedures

9.1 Tests to be performed

In order to determine the highest value of the peak spatial-average SAR of a handset, all device positions, configurations and operational modes shall be tested for each frequency band according to steps 1 to 3 below. A flowchart of the test process is shown in picture 9.1.

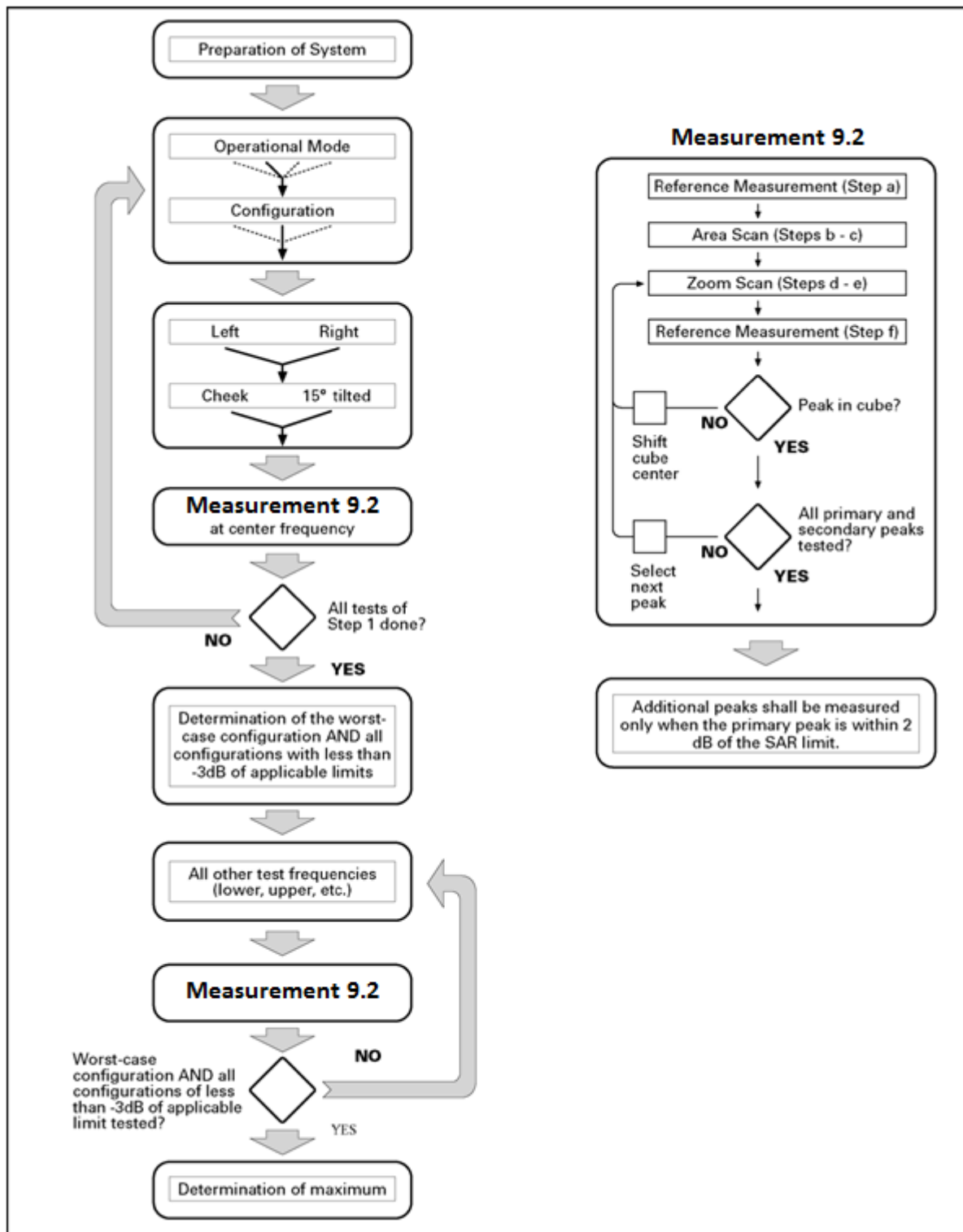
Step 1: The tests described in 9.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

- a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom, as described in annex D),
- b) all configurations for each device position in a), e.g., antenna extended and retracted, and
- c) all operational modes, e.g., analogue and digital, for each device position in a) and configuration in b) in each frequency band.

If more than three frequencies need to be tested according to 11.1 (i.e., $N_c > 3$), then all frequencies, configurations and modes shall be tested for all of the above test conditions.

Step 2: For the condition providing highest peak spatial-average SAR determined in Step 1, perform all tests described in 9.2 at all other test frequencies, i.e., lowest and highest frequencies. In addition, for all other conditions (device position, configuration and operational mode) where the peak spatial-average SAR value determined in Step 1 is within 3 dB of the applicable SAR limit, it is recommended that all other test frequencies shall be tested as well.

Step 3: Examine all data to determine the highest value of the peak spatial-average SAR found in Steps 1 to 2.



Picture 9.1 Block diagram of the tests to be performed

9.2 General Measurement Procedure

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements and fully documented in SAR reports to qualify for TCB approval. Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2003. The results should be documented as part of the system validation records and may be requested to support test results when all the measurement parameters in the following table are not satisfied.

| | | ≤ 3 GHz | > 3 GHz |
|---|------------------------------------|--|---|
| Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface | | 5 ± 1 mm | $\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm |
| Maximum probe angle from probe axis to phantom surface normal at the measurement location | | $30^\circ \pm 1^\circ$ | $20^\circ \pm 1^\circ$ |
| Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area} | | ≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm | 3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm |
| | | When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be \leq the corresponding x or y dimension of the test device with at least one measurement point on the test device. | |
| Maximum zoom scan spatial resolution: Δx_{Zoom} , Δy_{Zoom} | | ≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm* | 3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm* |
| Maximum zoom scan spatial resolution, normal to phantom surface | uniform grid: $\Delta z_{Zoom}(n)$ | ≤ 5 mm | 3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm |
| | graded grid | $\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface | ≤ 4 mm |
| | | $\Delta z_{Zoom}(n>1)$: between subsequent points | $\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$ |
| Minimum zoom scan volume | x, y, z | ≥ 30 mm | 3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm |
| Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details. * When zoom scan is required and the <i>reported</i> 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. | | | |

9.3 WCDMA Measurement Procedures for SAR

The following procedures are applicable to WCDMA handsets operating under 3GPP Release99, Release 5 and Release 6. The default test configuration is to measure SAR with an established radio link between the DUT and a communication test set using a 12.2kbps RMC (reference measurement channel) configured in Test Loop Mode 1. SAR is selectively confirmed for other physical channel configurations (DPCCH & DPDCH_n), HSDPA and HSPA (HSUPA/HSDPA) modes according to output power, exposure conditions and device operating capabilities. Both uplink and downlink should be configured with the same RMC or AMR, when required. SAR for Release 5 HSDPA and Release 6 HSPA are measured using the applicable FRC (fixed reference channel) and E-DCH reference channel configurations. Maximum output power is verified according to applicable versions of 3GPP TS 34.121 and SAR must be measured according to these maximum output conditions. When Maximum Power Reduction (MPR) is not implemented according to Cubic Metric (CM) requirements for Release 6 HSPA, the following procedures do not apply.

For Release 5 HSDPA Data Devices:

| Sub-test | β_c | β_d | β_d (SF) | β_c / β_d | β_{hs} | CM/dB |
|----------|-----------|-----------|----------------|---------------------|--------------|-------|
| 1 | 2/15 | 15/15 | 64 | 2/15 | 4/15 | 0.0 |
| 2 | 12/15 | 15/15 | 64 | 12/15 | 24/25 | 1.0 |
| 3 | 15/15 | 8/15 | 64 | 15/8 | 30/15 | 1.5 |
| 4 | 15/15 | 4/15 | 64 | 15/4 | 30/15 | 1.5 |

For Release 6 HSPA Data Devices

| Sub-test | β_c | β_d | β_d (SF) | β_c / β_d | β_{hs} | β_{ec} | β_{ed} | β_{ed} (SF) | β_{ed} (codes) | CM (dB) | MPR (dB) | AG Index | E-TFCI |
|----------|-----------|-----------|----------------|---------------------|--------------|--------------|--|-------------------|----------------------|---------|----------|----------|--------|
| 1 | 11/15 | 15/15 | 64 | 11/15 | 22/15 | 209/225 | 1039/225 | 4 | 1 | 1.0 | 0.0 | 20 | 75 |
| 2 | 6/15 | 15/15 | 64 | 6/15 | 12/15 | 12/15 | 12/15 | 4 | 1 | 3.0 | 2.0 | 12 | 67 |
| 3 | 15/15 | 9/15 | 64 | 15/9 | 30/15 | 30/15 | $\beta_{ed1}:47/15$ $\beta_{ed2}:47/15$ | 4 | 2 | 2.0 | 1.0 | 15 | 92 |
| 4 | 2/15 | 15/15 | 64 | 2/15 | 4/15 | 4/15 | 56/75 | 4 | 1 | 3.0 | 2.0 | 17 | 71 |
| 5 | 15/15 | 15/15 | 64 | 15/15 | 24/15 | 30/15 | 134/15 | 4 | 1 | 1.0 | 0.0 | 21 | 81 |

Rel.8 DC-HSDPA (Cat 24)

SAR test exclusion for Rel.8 DC-HSDPA must satisfy the SAR test exclusion requirements of Rel.5 HSDPA. SAR test exclusion for DC-HSDPA devices is determined by power measurements according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to qualify for SAR test exclusion.

9.4 SAR Measurement for LTE

SAR tests for LTE are performed with a base station simulator, Rohde & Schwarz CMW500. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. All powers were measured with the CMW 500.

It is performed for conducted power and SAR based on the KDB941225 D05.

9.5 Bluetooth & Wi-Fi Measurement Procedures for SAR

Normal network operating configurations are not suitable for measuring the SAR of 802.11 transmitters in general. 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 that the results are consistent and reliable.

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a 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. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

In order to testing the conducted power of WLAN, the DUT is controlled to transmit WLAN TX as maximum power by the terminal software installed on the PC. The procedure how to control is presented as below:

1. Connect DUT and PC via the USB cable and check the port is opened.
2. Input the command "WLPU" to power on WLAN.
3. Input the command "WTFD" to firmware download.
4. Input the WBTX command to start transmit (i.e., WBTX=1,0,1,1500,25,0,12).
5. Input the command "WIDL" to stop transmit.
6. Input the command "WLPD" to power off WLAN.

9.6 Power Drift

To control the output power stability during the SAR test, DASY4 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Table 14.2 to Table 14.31 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

10 Area Scan Based 1-g SAR

10.1 Requirement of KDB

According to the KDB447498 D01 v05, when the implementation is based the specific polynomial fit algorithm as presented at the 29th Bioelectromagnetics Society meeting (2007) and the estimated 1-g SAR is ≤ 1.2 W/kg, a zoom scan measurement is not required provided it is also not needed for any other purpose; for example, if the peak SAR location required for simultaneous transmission SAR test exclusion can be determined accurately by the SAR system or manually to discriminate between distinctive peaks and scattered noisy SAR distributions from area scans.

There must not be any warning or alert messages due to various measurement concerns identified by the SAR system; for example, noise in measurements, peaks too close to scan boundary, peaks are too sharp, spatial resolution and uncertainty issues etc. The SAR system verification must also demonstrate that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR (See Annex B). When all the SAR results for each exposure condition in a frequency band and wireless mode are based on estimated 1-g SAR, the 1-g SAR for the highest SAR configuration must be determined by a zoom scan.

10.2 Fast SAR Algorithms

The approach is based on the area scan measurement applying a frequency dependent attenuation parameter. This attenuation parameter was empirically determined by analyzing a large number of phones. The MOTOROLA FAST SAR was developed and validated by the MOTOROLA Research Group in Ft. Lauderdale.

In the initial study, an approximation algorithm based on Linear fit was developed. The accuracy of the algorithm has been demonstrated across a broad frequency range (136-2450 MHz) and for both 1- and 10-g averaged SAR using a sample of 264 SAR measurements from 55 wireless handsets. For the sample size studied, the root-mean-squared errors of the algorithm are 1.2% and 5.8% for 1- and 10-g averaged SAR, respectively. The paper describing the algorithm in detail is expected to be published in August 2004 within the Special Issue of Transactions on MTT.

In the second step, the same research group optimized the fitting algorithm to an Polynomial fit whereby the frequency validity was extended to cover the range 30-6000MHz. Details of this study can be found in the BEMS 2007 Proceedings.

Both algorithms are implemented in DASY software.

11 Conducted Output Power

When WiFi Hotspot mode is activated (AP ON), in all operating modes, the conducted output power of GSM1900 will be reduced. When WiFi Hotspot mode is deactivated (AP OFF), the RF output power level return to their normal RF power level.

11.1 Manufacturing tolerance

When the hotspot mode is ON:

Table 11.1: GPRS and EGPRS

| GSM 1900 GPRS (GMSK) | | | | |
|-----------------------|----------------------|-------------|-------------|-------------|
| Channel | | 810 | 661 | 512 |
| 1 Txslot | Target (dBm) | 28 | 28 | 28 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 2 Txslots | Target (dBm) | 25 | 25 | 25 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 3Txslots | Target (dBm) | 23 | 23 | 23 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 4 Txslots | Target (dBm) | 22 | 22 | 22 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| GSM 1900 EGPRS (GMSK) | | | | |
| Channel | | 810 | 661 | 512 |
| 1 Txslot | Target (dBm) | 28 | 28 | 28 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 2 Txslots | Target (dBm) | 25 | 25 | 25 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 3Txslots | Target (dBm) | 23 | 23 | 23 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 4 Txslots | Target (dBm) | 22 | 22 | 22 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| GSM 1900 EGPRS (8PSK) | | | | |
| Channel | | 810 | 661 | 512 |
| 1 Txslot | Target (dBm) | 25 | 25 | 25 |
| | Tolerance \pm (dB) | -2.0 ~ +1.0 | -2.0 ~ +1.0 | -2.0 ~ +1.0 |
| 2 Txslots | Target (dBm) | 23 | 23 | 23 |
| | Tolerance \pm (dB) | -2.0 ~ +1.0 | -2.0 ~ +1.0 | -2.0 ~ +1.0 |
| 3Txslots | Target (dBm) | 22 | 22 | 22 |
| | Tolerance \pm (dB) | -2.0 ~ +1.0 | -2.0 ~ +1.0 | -2.0 ~ +1.0 |
| 4 Txslots | Target (dBm) | 21 | 21 | 21 |
| | Tolerance \pm (dB) | -2.0 ~ +1.0 | -2.0 ~ +1.0 | -2.0 ~ +1.0 |

When the hotspot mode is OFF:

Table 11.2: GSM Speech

| GSM 850 | | | |
|----------------------|-------------|-------------|-------------|
| Channel | Channel 251 | Channel 190 | Channel 128 |
| Target (dBm) | 33 | 33 | 33 |
| Tolerance \pm (dB) | -1.5 ~ +1.0 | -1.5 ~ +1.0 | -1.5 ~ +1.0 |
| GSM 1900 | | | |
| Channel | Channel 810 | Channel 661 | Channel 512 |
| Target (dBm) | 30 | 30 | 30 |
| Tolerance \pm (dB) | -1.5 ~ +1.0 | -1.5 ~ +1.0 | -1.5 ~ +1.0 |

Table 11.3: GPRS and EGPRS

| GSM 850 GPRS (GMSK) | | | | |
|----------------------|----------------------|-------------|-------------|-------------|
| Channel | | 251 | 190 | 128 |
| 1 Txslot | Target (dBm) | 33 | 33 | 33 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 2 Txslots | Target (dBm) | 30 | 30 | 30 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 3Txslots | Target (dBm) | 28.5 | 28.5 | 28.5 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 4 Txslots | Target (dBm) | 27.5 | 27.5 | 27.5 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| GSM 850 EGPRS (GMSK) | | | | |
| Channel | | 251 | 190 | 128 |
| 1 Txslot | Target (dBm) | 33 | 33 | 33 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 2 Txslots | Target (dBm) | 30 | 30 | 30 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 3Txslots | Target (dBm) | 28.5 | 28.5 | 28.5 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 4 Txslots | Target (dBm) | 27.5 | 27.5 | 27.5 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| GSM 850 EGPRS (8PSK) | | | | |
| Channel | | 251 | 190 | 128 |
| 1 Txslot | Target (dBm) | 26.5 | 26.5 | 26.5 |
| | Tolerance \pm (dB) | -2.0 ~ +1.0 | -2.0 ~ +1.0 | -2.0 ~ +1.0 |
| 2 Txslots | Target (dBm) | 25.5 | 25.5 | 25.5 |
| | Tolerance \pm (dB) | -2.0 ~ +1.0 | -2.0 ~ +1.0 | -2.0 ~ +1.0 |
| 3Txslots | Target (dBm) | 24.5 | 24.5 | 24.5 |
| | Tolerance \pm (dB) | -2.0 ~ +1.0 | -2.0 ~ +1.0 | -2.0 ~ +1.0 |
| 4 Txslots | Target (dBm) | 23.5 | 23.5 | 23.5 |
| | Tolerance \pm (dB) | -2.0 ~ +1.0 | -2.0 ~ +1.0 | -2.0 ~ +1.0 |

| GSM 1900 GPRS (GMSK) | | | | |
|-----------------------|----------------------|-------------|-------------|-------------|
| Channel | | 810 | 661 | 512 |
| 1 Txslot | Target (dBm) | 30 | 30 | 30 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 2 Txslots | Target (dBm) | 27 | 27 | 27 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 3Txslots | Target (dBm) | 25 | 25 | 25 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 4 Txslots | Target (dBm) | 23.8 | 23.8 | 23.8 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| GSM 1900 EGPRS (GMSK) | | | | |
| Channel | | 810 | 661 | 512 |
| 1 Txslot | Target (dBm) | 30 | 30 | 30 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 2 Txslots | Target (dBm) | 27 | 27 | 27 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 3Txslots | Target (dBm) | 25 | 25 | 25 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| 4 Txslots | Target (dBm) | 23.8 | 23.8 | 23.8 |
| | Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| GSM 1900 EGPRS (8PSK) | | | | |
| Channel | | 810 | 661 | 512 |
| 1 Txslot | Target (dBm) | 25.5 | 25.5 | 25.5 |
| | Tolerance \pm (dB) | -2.0 ~ +1.0 | -2.0 ~ +1.0 | -2.0 ~ +1.0 |
| 2 Txslots | Target (dBm) | 24.5 | 24.5 | 24.5 |
| | Tolerance \pm (dB) | -2.0 ~ +1.0 | -2.0 ~ +1.0 | -2.0 ~ +1.0 |
| 3Txslots | Target (dBm) | 23.5 | 23.5 | 23.5 |
| | Tolerance \pm (dB) | -2.0 ~ +1.0 | -2.0 ~ +1.0 | -2.0 ~ +1.0 |
| 4 Txslots | Target (dBm) | 22.5 | 22.5 | 22.5 |
| | Tolerance \pm (dB) | -2.0 ~ +1.0 | -2.0 ~ +1.0 | -2.0 ~ +1.0 |

Table 11.4: WCDMA

| WCDMA 850 CS | | | |
|--------------------------|--------------|--------------|--------------|
| Channel | Channel 4233 | Channel 4182 | Channel 4132 |
| Target (dBm) | 24 | 24 | 24 |
| Tolerance \pm (dB) | -1.0 ~ +0.7 | -1.0 ~ +0.7 | -1.0 ~ +0.7 |
| HSDPA (sub-test 1/2/3/4) | | | |
| Channel | Channel 4233 | Channel 4182 | Channel 4132 |
| Target (dBm) | 22 | 22 | 22 |
| Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |
| HSUPA (sub-test 1/5) | | | |
| Channel | Channel 4233 | Channel 4182 | Channel 4132 |
| Target (dBm) | 23 | 23 | 23 |
| Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |

| HSUPA (sub-test 2/3/4) | | | |
|------------------------|--------------|--------------|--------------|
| Channel | Channel 4233 | Channel 4182 | Channel 4132 |
| Target (dBm) | 22 | 22 | 22 |
| Tolerance \pm (dB) | -1.0 ~ +1.0 | -1.0 ~ +1.0 | -1.0 ~ +1.0 |

Table 11.5: LTE

| Mode | Target (dBm) | Tolerance \pm (dB) |
|------------|--------------|----------------------|
| LTE Band 5 | 23 | -1.0 ~ +1.0 |

Table 11.6: Bluetooth

| Bluetooth | | | |
|----------------------|-------------|-------------|-------------|
| Channel | Channel 0 | Channel 39 | Channel 78 |
| Target (dBm) | 4 | 4 | 4 |
| Tolerance \pm (dB) | -7.0 ~ +7.0 | -7.0 ~ +7.0 | -7.0 ~ +7.0 |

Table 11.7: WiFi

| Mode | Target (dBm) | Tolerance \pm (dB) |
|------------------------|--------------|----------------------|
| 802.11 b | 13 | -3.0 ~ +3.0 |
| 802.11 g | 12 | -5.0 ~ +3.0 |
| 802.11 n (2.4GHz HT20) | 11 | -3.0 ~ +3.0 |
| 802.11 a | 11 | -3.0 ~ +2.0 |
| 802.11 n (5GHz HT20) | 10 | -3.0 ~ +3.0 |
| 802.11 n (5GHz HT40) | 9 | -3.0 ~ +3.0 |

11.2 GSM Measurement result

During the process of testing, the EUT was controlled via Agilent Digital Radio Communication tester (E5515C) to ensure the maximum power transmission and proper modulation. This result contains conducted output power for the EUT. In all cases, the measured peak output power should be greater and within 5% than EMI measurement.

Table 11.7: The conducted power measurement results for GSM850/1900

| GSM 850MHz | Conducted Power (dBm) | | |
|----------------|------------------------|-----------------------|------------------------|
| | Channel 251(848.8MHz) | Channel 190(836.6MHz) | Channel 128(824.2MHz) |
| | 33.32 | 33.54 | 33.35 |
| GSM 1900MHz | Conducted Power (dBm) | | |
| | Channel 810(1909.8MHz) | Channel 661(1880MHz) | Channel 512(1850.2MHz) |
| | 30.58 | 30.72 | 30.44 |

Table 11.8: The conducted power measurement results for GPRS and EGPRS

| GSM 850 GPRS (GMSK) | Measured Power (dBm) | | | calculation | Averaged Power (dBm) | | |
|-------------------------|----------------------|-------|-------|----------------|----------------------|--------------|--------------|
| | 251 | 190 | 128 | | 251 | 190 | 128 |
| 1 Txslot | 33.38 | 33.59 | 33.41 | -9.03dB | 24.35 | 24.56 | 24.38 |
| 2 Txslots | 30.10 | 30.20 | 30.24 | -6.02dB | 24.08 | 24.18 | 24.22 |
| 3Txslots | 28.71 | 28.82 | 28.88 | -4.26dB | 24.45 | 24.56 | 24.62 |
| 4 Txslots | 27.60 | 27.68 | 27.72 | -3.01dB | 24.59 | 24.67 | 24.71 |
| GSM 850 EGPRS (GMSK) | Measured Power (dBm) | | | calculation | Averaged Power (dBm) | | |
| | 251 | 190 | 128 | | 251 | 190 | 128 |
| 1 Txslot | 33.36 | 33.58 | 33.39 | -9.03dB | 24.33 | 24.55 | 24.36 |
| 2 Txslots | 30.41 | 30.54 | 30.58 | -6.02dB | 24.39 | 24.52 | 24.56 |
| 3Txslots | 28.71 | 28.84 | 28.89 | -4.26dB | 24.45 | 24.58 | 24.63 |
| 4 Txslots | 27.55 | 27.60 | 27.72 | -3.01dB | 24.54 | 24.59 | 24.71 |
| GSM 850 EGPRS (8PSK) | Measured Power (dBm) | | | calculation | Averaged Power (dBm) | | |
| | 251 | 190 | 128 | | 251 | 190 | 128 |
| 1 Txslot | 26.57 | 26.70 | 26.77 | -9.03dB | 17.54 | 17.67 | 17.74 |
| 2 Txslots | 25.53 | 25.61 | 25.73 | -6.02dB | 19.51 | 19.59 | 19.71 |
| 3Txslots | 24.45 | 24.56 | 24.68 | -4.26dB | 20.19 | 20.30 | 20.42 |
| 4 Txslots | 23.39 | 23.51 | 23.62 | -3.01dB | 20.38 | 20.50 | 20.61 |
| PCS1900 GPRS (GMSK) | Measured Power (dBm) | | | calculation | Averaged Power (dBm) | | |
| | 810 | 661 | 512 | | 810 | 661 | 512 |
| 1 Txslot | 30.68 | 30.66 | 30.65 | -9.03dB | 21.65 | 21.63 | 21.62 |
| 2 Txslots | 27.38 | 27.34 | 27.21 | -6.02dB | 21.36 | 21.32 | 21.19 |
| 3Txslots | 25.53 | 25.45 | 25.40 | -4.26dB | 21.27 | 21.19 | 21.14 |
| 4 Txslots | 24.39 | 24.27 | 24.10 | -3.01dB | 21.38 | 21.26 | 21.09 |
| PCS1900 EGPRS (GMSK) | Measured Power (dBm) | | | calculation | Averaged Power (dBm) | | |
| | 810 | 661 | 512 | | 810 | 661 | 512 |
| 1 Txslot | 30.68 | 30.44 | 30.23 | -9.03dB | 21.65 | 21.41 | 21.20 |
| 2 Txslots | 27.41 | 27.37 | 27.21 | -6.02dB | 21.39 | 21.35 | 21.19 |
| 3Txslots | 25.50 | 25.49 | 25.35 | -4.26dB | 21.24 | 21.23 | 21.09 |
| 4 Txslots | 24.39 | 24.24 | 24.15 | -3.01dB | 21.38 | 21.23 | 21.14 |

| PCS1900 EGPRS (8PSK) | Measured Power (dBm) | | | calculation | Averaged Power (dBm) | | |
|-------------------------|----------------------|-------|-------|-------------|----------------------|--------------|--------------|
| | 810 | 661 | 512 | | 810 | 661 | 512 |
| 1 Txslot | 26.42 | 26.49 | 26.44 | -9.03dB | 17.39 | 17.46 | 17.41 |
| 2 Txslots | 24.06 | 24.04 | 23.98 | -6.02dB | 18.04 | 18.02 | 17.96 |
| 3Txslots | 23.13 | 23.07 | 23.01 | -4.26dB | 18.87 | 18.81 | 18.75 |
| 4 Txslots | 22.13 | 22.09 | 22.02 | -3.01dB | 19.12 | 19.08 | 19.01 |

NOTES:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with 4Txslots for GSM850 and 1Txslots for GSM1900.

Note: According to the KDB941225 D03, “when SAR tests for EDGE or EGPRS mode is necessary, GMSK modulation should be used”.

Hotspot

There is power reduction enabled for this model for GSM1900. The power reduction is enabled when the user enables hotspot mode via the manufacturer software. The tables below show the measured powers with hotspot.

Table 11.9: The conducted power measurement results for GPRS and EGPRS

| PCS1900 GPRS (GMSK) | Measured Power (dBm) | | | calculation | Averaged Power (dBm) | | |
|-------------------------|----------------------|-------|-------|-------------|----------------------|--------------|--------------|
| | 810 | 661 | 512 | | 810 | 661 | 512 |
| 1 Txslot | 27.73 | 27.65 | 27.54 | -9.03dB | 18.70 | 18.62 | 18.51 |
| 2 Txslots | 25.04 | 24.99 | 24.98 | -6.02dB | 19.02 | 18.97 | 18.96 |
| 3Txslots | 23.12 | 23.16 | 23.12 | -4.26dB | 18.86 | 18.90 | 18.86 |
| 4 Txslots | 22.02 | 21.97 | 21.87 | -3.01dB | 19.01 | 18.96 | 18.86 |
| PCS1900 EGPRS (GMSK) | Measured Power (dBm) | | | calculation | Averaged Power (dBm) | | |
| | 810 | 661 | 512 | | 810 | 661 | 512 |
| 1 Txslot | 27.74 | 27.66 | 27.57 | -9.03dB | 18.71 | 18.63 | 18.54 |
| 2 Txslots | 25.04 | 25.01 | 24.92 | -6.02dB | 19.02 | 18.99 | 18.90 |
| 3Txslots | 23.17 | 23.19 | 23.10 | -4.26dB | 18.91 | 18.93 | 18.84 |
| 4 Txslots | 22.02 | 21.96 | 21.90 | -3.01dB | 19.01 | 18.95 | 18.89 |
| PCS1900 EGPRS (8PSK) | Measured Power (dBm) | | | calculation | Averaged Power (dBm) | | |
| | 810 | 661 | 512 | | 810 | 661 | 512 |
| 1 Txslot | 25.80 | 25.82 | 25.82 | -9.03dB | 16.77 | 16.79 | 16.79 |
| 2 Txslots | 23.88 | 23.85 | 23.71 | -6.02dB | 17.86 | 17.83 | 17.69 |
| 3Txslots | 22.84 | 22.82 | 22.78 | -4.26dB | 18.58 | 18.56 | 18.52 |
| 4 Txslots | 21.82 | 21.83 | 21.76 | -3.01dB | 18.81 | 18.82 | 18.75 |

NOTES:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB
 2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB
 3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB
 4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with 2Txslots for GSM1900.

11.3 WCDMA Measurement result

Table 11.10: The conducted Power for WCDMA850/1900

| Item | band | FDDV result | | |
|----------------------|-------|-----------------|-----------------|-----------------|
| | ARFCN | 4233 (846.6MHz) | 4182 (836.4MHz) | 4132 (826.4MHz) |
| WCDMA | \ | 24.66 | 24.69 | 24.68 |
| HSDPA | 1 | 22.5 | 22.5 | 22.7 |
| | 2 | 22.6 | 22.6 | 22.8 |
| | 3 | 22.8 | 22.9 | 22.8 |
| | 4 | 22.7 | 22.8 | 22.7 |
| HSUPA | 1 | 22.25 | 22.66 | 22.68 |
| | 2 | 21.87 | 22.04 | 21.38 |
| | 3 | 21.45 | 21.07 | 21.07 |
| | 4 | 22.06 | 22.49 | 22.32 |
| | 5 | 22.85 | 23.00 | 22.91 |
| DC-HSDPA (Cat 24) | 1 | 22.91 | 22.78 | 22.82 |
| | 2 | 22.81 | 22.81 | 22.90 |
| | 3 | 22.88 | 22.82 | 22.99 |
| | 4 | 22.82 | 22.77 | 22.90 |

Note1: DC-HSDPA power measurements have been performed in accordance with methods agreed with the FCC via KDB inquiry.

Note2: HSDPA&HSUPA&DC-HSDPA body SAR for WCDMA850 are not required, because maximum average output power of each RF channel with HSDPA&HSUPA&DC-HSDPA active is not 1/4 dB higher than that measured without HSDPA&HSUPA&DC-HSDPA and the maximum SAR for WCDMA850 are not above 75% of the SAR limit.

11.4 LTE Measurement result

| Band 5 | | | | | | | |
|--------------------|-------------------------|--------------------|-------------------------------|------------------------------|-----|------------------------------|-----|
| Bandwidth (MHz) | RB allocation | Frequency (MHz) | Max. Target Power (dBm) | QPSK | | 16QAM | |
| | RB offset (Start RB) | | | Actual output power (dBm) | MPR | Actual output power (dBm) | MPR |
| 1.4 MHz | 1RB High (5) | 848.3 | 23 | 23.44 | 0 | 22.23 | 1 |
| | | 836.5 | 23 | 23.65 | 0 | 22.81 | 1 |
| | | 824.7 | 23 | 23.94 | 0 | 22.73 | 1 |

| | | | | | | | | |
|-------------------|-------------------|-------------------|-------|-------|-------|-------|-------|---|
| | 1RB Middle (3) | 848.3 | 23 | 23.53 | 0 | 22.90 | 1 | |
| | | 836.5 | 23 | 23.61 | 0 | 22.82 | 1 | |
| | | 824.7 | 23 | 23.91 | 0 | 22.98 | 1 | |
| | 1RB Low (0) | 848.3 | 23 | 23.55 | 0 | 22.90 | 1 | |
| | | 836.5 | 23 | 23.52 | 0 | 22.98 | 1 | |
| | | 824.7 | 23 | 23.86 | 0 | 22.97 | 1 | |
| | 3RB High (3) | 848.3 | 23 | 23.55 | 0 | 22.50 | 1 | |
| | | 836.5 | 23 | 23.83 | 0 | 22.78 | 1 | |
| | | 824.7 | 23 | 23.85 | 0 | 22.78 | 1 | |
| | 3RB Middle (1) | 848.3 | 23 | 23.59 | 0 | 22.65 | 1 | |
| | | 836.5 | 23 | 23.80 | 0 | 22.87 | 1 | |
| | | 824.7 | 23 | 23.87 | 0 | 22.80 | 1 | |
| | 3RB Low (0) | 848.3 | 23 | 23.66 | 0 | 22.55 | 1 | |
| | | 836.5 | 23 | 23.74 | 0 | 22.88 | 1 | |
| | | 824.7 | 23 | 23.90 | 0 | 22.77 | 1 | |
| | 6RB (0) | 848.3 | 23 | 22.64 | 1 | 21.60 | 2 | |
| | | 836.5 | 23 | 22.79 | 1 | 21.97 | 2 | |
| | | 824.7 | 23 | 22.92 | 1 | 21.54 | 2 | |
| | 3 MHz | 1RB High (14) | 847.5 | 23 | 23.74 | 0 | 22.75 | 1 |
| | | | 836.5 | 23 | 23.76 | 0 | 22.84 | 1 |
| | | | 825.5 | 23 | 23.77 | 0 | 22.84 | 1 |
| | | 1RB Middle (7) | 847.5 | 23 | 23.81 | 0 | 22.85 | 1 |
| | | | 836.5 | 23 | 23.93 | 0 | 22.95 | 1 |
| | | | 825.5 | 23 | 23.87 | 0 | 22.99 | 1 |
| | | 1RB Low (0) | 847.5 | 23 | 23.79 | 0 | 22.98 | 1 |
| | | | 836.5 | 23 | 23.83 | 0 | 22.92 | 1 |
| | | | 825.5 | 23 | 23.92 | 0 | 22.98 | 1 |
| 8RB High (7) | | 847.5 | 23 | 22.60 | 1 | 21.71 | 2 | |
| | | 836.5 | 23 | 22.76 | 1 | 21.87 | 2 | |
| | | 825.5 | 23 | 22.80 | 1 | 21.90 | 2 | |
| 8RB Middle (4) | | 847.5 | 23 | 22.73 | 1 | 21.85 | 2 | |
| | | 836.5 | 23 | 22.71 | 1 | 21.83 | 2 | |
| | | 825.5 | 23 | 22.84 | 1 | 21.97 | 2 | |
| 8RB Low (0) | | 847.5 | 23 | 22.82 | 1 | 21.85 | 2 | |
| | | 836.5 | 23 | 22.72 | 1 | 21.83 | 2 | |
| | | 825.5 | 23 | 22.87 | 1 | 21.96 | 2 | |
| 15RB (0) | | 847.5 | 23 | 22.62 | 1 | 21.81 | 2 | |
| | | 836.5 | 23 | 22.67 | 1 | 21.80 | 2 | |
| | | 825.5 | 23 | 22.89 | 1 | 21.93 | 2 | |
| 5 MHz | | 1RB High (24) | 846.5 | 23 | 23.57 | 0 | 22.98 | 1 |
| | | | 836.5 | 23 | 23.69 | 0 | 22.69 | 1 |
| | | | 826.5 | 23 | 23.74 | 0 | 22.80 | 1 |

| | | | | | | | | |
|---------------------|--------------------|--------------------|-------|-------|-------|-------|-------|---|
| | 1RB Middle (12) | 846.5 | 23 | 23.72 | 0 | 22.67 | 1 | |
| | | 836.5 | 23 | 23.80 | 0 | 22.66 | 1 | |
| | | 826.5 | 23 | 23.72 | 0 | 22.64 | 1 | |
| | 1RB Low (0) | 846.5 | 23 | 23.72 | 0 | 23.00 | 1 | |
| | | 836.5 | 23 | 23.76 | 0 | 22.59 | 1 | |
| | | 826.5 | 23 | 23.85 | 0 | 22.76 | 1 | |
| | 12RB High (13) | 846.5 | 23 | 22.70 | 1 | 21.94 | 2 | |
| | | 836.5 | 23 | 22.71 | 1 | 21.83 | 2 | |
| | | 826.5 | 23 | 22.54 | 1 | 21.63 | 2 | |
| | 12RB Middle (6) | 846.5 | 23 | 22.66 | 1 | 21.71 | 2 | |
| | | 836.5 | 23 | 22.68 | 1 | 21.78 | 2 | |
| | | 826.5 | 23 | 22.79 | 1 | 21.79 | 2 | |
| | 12RB Low (0) | 846.5 | 23 | 22.65 | 1 | 21.85 | 2 | |
| | | 836.5 | 23 | 22.71 | 1 | 21.75 | 2 | |
| | | 826.5 | 23 | 22.99 | 1 | 21.88 | 2 | |
| | 25RB (0) | 846.5 | 23 | 22.62 | 1 | 21.54 | 2 | |
| | | 836.5 | 23 | 22.68 | 1 | 21.70 | 2 | |
| | | 826.5 | 23 | 22.65 | 1 | 21.66 | 2 | |
| | 10 MHz | 1RB High (49) | 844.0 | 23 | 23.66 | 0 | 22.91 | 1 |
| | | | 836.5 | 23 | 23.87 | 0 | 22.94 | 1 |
| | | | 829.0 | 23 | 23.60 | 0 | 22.99 | 1 |
| | | 1RB Middle (24) | 844.0 | 23 | 23.90 | 0 | 22.95 | 1 |
| | | | 836.5 | 23 | 23.88 | 0 | 22.93 | 1 |
| | | | 829.0 | 23 | 23.74 | 0 | 23.00 | 1 |
| | | 1RB Low (0) | 844.0 | 23 | 23.66 | 0 | 22.82 | 1 |
| | | | 836.5 | 23 | 23.77 | 0 | 22.86 | 1 |
| | | | 829.0 | 23 | 23.98 | 0 | 22.97 | 1 |
| 25RB High (25) | | 844.0 | 23 | 22.76 | 1 | 21.81 | 2 | |
| | | 836.5 | 23 | 22.64 | 1 | 21.72 | 2 | |
| | | 829.0 | 23 | 22.77 | 1 | 21.69 | 2 | |
| 25RB Middle (12) | | 844.0 | 23 | 22.63 | 1 | 21.79 | 2 | |
| | | 836.5 | 23 | 22.65 | 1 | 21.72 | 2 | |
| | | 829.0 | 23 | 22.56 | 1 | 21.55 | 2 | |
| 25RB Low (0) | | 844.0 | 23 | 22.52 | 1 | 21.68 | 2 | |
| | | 836.5 | 23 | 22.68 | 1 | 21.74 | 2 | |
| | | 829.0 | 23 | 22.56 | 1 | 21.63 | 2 | |
| 50RB (0) | | 844.0 | 23 | 22.54 | 1 | 21.48 | 2 | |
| | | 836.5 | 23 | 22.55 | 1 | 21.57 | 2 | |
| | | 829.0 | 23 | 22.48 | 1 | 21.48 | 2 | |

11.5 Wi-Fi and BT Measurement result

The output power of BT antenna is as following:

| Mode | Conducted Power (dBm) | | |
|---------------|-----------------------|----------------------|----------------------|
| | Channel 0 (2402MHz) | Channel 39 (2441MHz) | Channel 78 (2480MHz) |
| GFSK | 6.10 | 6.75 | 4.01 |
| EDR2M-4_DQPSK | 7.06 | 7.65 | 5.01 |
| EDR3M-8DPSK | 7.44 | 7.93 | 5.39 |

The average conducted power for Wi-Fi is as following:

802.11b (dBm)

| Channel\data rate | 1Mbps | 2Mbps | 5.5Mbps | 11Mbps |
|-------------------|-------|-------|---------|--------|
| 1 | 14.92 | 14.94 | 15.01 | 14.97 |
| 6 | 14.64 | 14.63 | 14.68 | 14.66 |
| 11 | 15.07 | 15.08 | 15.13 | 15.08 |

802.11g (dBm)

| Channel\data rate | 6Mbps | 9Mbps | 12Mbps | 18Mbps | 24Mbps | 36Mbps | 48Mbps | 54Mbps |
|-------------------|-------|-------|--------|--------|--------|--------|--------|--------|
| 1 | 13.28 | 13.24 | 13.27 | 13.20 | 13.16 | 13.13 | 13.08 | 12.59 |
| 6 | 13.13 | 13.10 | 13.11 | 13.07 | 13.03 | 12.99 | 12.96 | 12.51 |
| 11 | 13.57 | 13.54 | 13.50 | 13.49 | 13.47 | 13.40 | 13.32 | 12.90 |

802.11n (dBm) - HT20 (2.4G)

| Channel\data rate | MCS0 | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 |
|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 12.31 | 12.28 | 12.26 | 12.21 | 12.16 | 12.12 | 12.11 | 12.06 |
| 6 | 12.21 | 12.17 | 12.14 | 12.09 | 12.05 | 12.01 | 11.97 | 11.93 |
| 11 | 12.56 | 12.54 | 12.53 | 12.47 | 12.44 | 12.39 | 12.36 | 12.31 |

802.11a (dBm)

| Channel\data rate | 6Mbps | 9Mbps | 12Mbps | 18Mbps | 24Mbps | 36Mbps | 48Mbps | 54Mbps |
|-------------------|-------|-------|--------|--------|--------|--------|--------|--------|
| 36(5180 MHz) | 12.35 | 12.31 | 12.42 | 12.30 | 12.31 | 12.28 | 12.21 | 12.22 |
| 40(5200 MHz) | 11.90 | 11.98 | 11.82 | 11.51 | 11.77 | 11.82 | 11.33 | 11.36 |
| 44(5220 MHz) | 12.02 | 12.05 | 12.10 | 12.06 | 12.02 | 11.95 | 11.93 | 11.89 |
| 48(5240 MHz) | 12.03 | 11.95 | 11.93 | 11.92 | 11.91 | 11.83 | 11.78 | 11.82 |
| 52(5260 MHz) | 12.14 | 12.06 | 12.05 | 12.04 | 11.99 | 11.99 | 11.93 | 11.89 |
| 56(5280 MHz) | 12.09 | 12.08 | 12.08 | 12.11 | 12.03 | 12.02 | 11.92 | 11.95 |
| 60(5300 MHz) | 12.10 | 12.15 | 12.13 | 12.11 | 12.08 | 12.04 | 12.02 | 12.01 |
| 64(5320 MHz) | 12.12 | 12.15 | 12.12 | 12.10 | 12.07 | 12.06 | 12.02 | 11.98 |
| 100(5500 MHz) | 12.87 | 12.87 | 12.90 | 12.83 | 12.85 | 12.78 | 12.85 | 12.79 |
| 104(5520 MHz) | 12.99 | 12.99 | 12.97 | 12.97 | 12.95 | 12.94 | 12.90 | 12.88 |
| 108(5540 MHz) | 12.03 | 11.99 | 11.97 | 11.92 | 11.95 | 11.89 | 11.85 | 11.83 |
| 112(5560 MHz) | 12.16 | 12.15 | 12.15 | 12.14 | 12.11 | 12.07 | 12.03 | 12.07 |
| 116(5580 MHz) | 11.90 | 11.93 | 11.96 | 11.89 | 11.88 | 11.88 | 11.83 | 11.80 |
| 120(5600 MHz) | 12.04 | 11.96 | 12.01 | 11.93 | 11.92 | 11.91 | 11.82 | 11.88 |
| 124(5620 MHz) | 11.39 | 11.33 | 11.38 | 11.34 | 11.29 | 11.31 | 11.20 | 11.19 |
| 128(5640 MHz) | 11.93 | 11.95 | 11.92 | 11.88 | 11.87 | 11.87 | 11.78 | 11.76 |
| 132(5660 MHz) | 12.01 | 11.98 | 12.02 | 11.96 | 11.87 | 11.89 | 11.90 | 11.85 |

| | | | | | | | | |
|---------------|-------|-------|--------|-------|-------|-------|-------|-------|
| 136(5680 MHz) | 12.27 | 12.31 | 12.26/ | 12.23 | 11.72 | 12.18 | 12.16 | 11.68 |
| 140(5700 MHz) | 12.89 | 12.93 | 12.92 | 12.83 | 12.85 | 12.81 | 12.80 | 12.73 |
| 149(5745 MHz) | 13.00 | 13.00 | 12.94 | 12.98 | 12.90 | 12.96 | 12.84 | 12.89 |
| 153(5765 MHz) | 12.96 | 12.92 | 12.95 | 12.93 | 12.82 | 12.84 | 12.83 | 12.79 |
| 157(5785 MHz) | 12.80 | 12.90 | 12.83 | 12.86 | 12.82 | 12.77 | 12.71 | 12.74 |
| 161(5805 MHz) | 12.14 | 12.07 | 12.04 | 12.06 | 12.01 | 12.02 | 11.92 | 11.87 |
| 165(5825 MHz) | 11.95 | 11.95 | 11.97 | 11.93 | 11.92 | 11.88 | 11.80 | 11.85 |

802.11n (dBm) - HT20 (5G)

| Channel\data rate | 6Mbps | 9Mbps | 12Mbps | 18Mbps | 24Mbps | 36Mbps | 48Mbps | 54Mbps |
|-------------------|--------|-------|--------|--------|--------|--------|--------|--------|
| 36(5180 MHz) | 12.71. | 12.64 | 12.58 | 12.55 | 12.58 | 12.42 | 12.47 | 12.84 |
| 40(5200 MHz) | 12.67 | 12.65 | 12.61 | 12.56 | 12.51 | 12.55 | 12.47 | 12.41 |
| 44(5220 MHz) | 12.79 | 12.78 | 12.74 | 12.68 | 12.67 | 12.59 | 12.53 | 12.55 |
| 48(5240 MHz) | 12.44 | 12.43 | 12.37 | 12.32 | 12.27 | 12.25 | 12.20 | 12.23 |
| 52(5260 MHz) | 12.95 | 12.92 | 12.93 | 12.83 | 12.85 | 12.82 | 12.75 | 12.74 |
| 56(5280 MHz) | 12.73 | 12.67 | 12.67 | 12.65 | 12.59 | 12.55 | 12.53 | 12.51 |
| 60(5300 MHz) | 12.42 | 12.39 | 12.40 | 12.31 | 12.28 | 12.31 | 12.23 | 12.15 |
| 64(5320 MHz) | 12.68 | 12.70 | 12.70 | 12.62 | 12.60 | 12.50 | 12.48 | 12.50 |
| 100(5500 MHz) | 12.93 | 12.88 | 12.86 | 12.82 | 12.81 | 12.77 | 12.73 | 12.76 |
| 104(5520 MHz) | 12.83 | 12.78 | 12.77 | 12.69 | 12.62 | 12.78 | 12.61 | 12.68 |
| 108(5540 MHz) | 12.34 | 12.31 | 12.32 | 12.26 | 12.35 | 12.23 | 12.24 | 12.15 |
| 112(5560 MHz) | 11.98 | 11.85 | 11.85 | 11.75 | 11.77 | 11.67 | 11.68 | 11.59 |
| 116(5580 MHz) | 12.28 | 12.26 | 12.27 | 12.17 | 12.19 | 12.07 | 12.04 | 12.07 |
| 120(5600 MHz) | 11.98 | 11.98 | 11.95 | 11.87 | 11.84 | 11.85 | 11.81 | 11.80 |
| 124(5620 MHz) | 11.79 | 11.74 | 11.80 | 11.71 | 12.11 | 12.14 | 12.12 | 11.62 |
| 128(5640 MHz) | 12.97 | 12.96 | 12.98 | 12.92 | 12.90 | 12.87 | 12.84 | 12.86 |
| 132(5660 MHz) | 12.39 | 12.36 | 12.32 | 12.33 | 12.25 | 12.23 | 12.24 | 12.26 |
| 136(5680 MHz) | 12.87 | 12.69 | 12.73 | 12.67 | 12.66 | 12.56 | 12.54 | 12.45 |
| 140(5700 MHz) | 12.98 | 12.96 | 12.97 | 12.93 | 12.91 | 12.89 | 12.90 | 12.94 |
| 149(5745 MHz) | 12.99 | 12.96 | 12.97 | 12.98 | 12.98 | 12.89 | 12.90 | 12.88 |
| 153(5765 MHz) | 12.91 | 12.88 | 12.90 | 12.83 | 12.74 | 12.69 | 12.66 | 12.65 |
| 157(5785 MHz) | 12.87 | 12.75 | 12.77 | 12.7 | 12.75 | 12.13 | 12.59 | 12.6 |
| 161(5805 MHz) | 12.53 | 12.44 | 12.46 | 12.37 | 12.35 | 12.37 | 12.25 | 12.31 |
| 165(5825 MHz) | 12.20 | 12.23 | 12.23 | 12.16 | 12.11 | 12.09 | 12.00 | 11.98 |

802.11n (dBm) - HT40 (5G)

| Channel\data rate | MCS0 | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 |
|-------------------|-------|-------|-------|------|------|------|------|------|
| 38(5190 MHz) | 9.39 | 9.12 | 8.92 | 8.88 | 8.78 | 8.79 | 8.70 | 8.66 |
| 46(5230 MHz) | 9.75 | 9.47 | 9.29 | 9.24 | 9.14 | 9.15 | 9.04 | 9.01 |
| 54(5270 MHz) | 9.73 | 9.45 | 9.27 | 9.21 | 9.12 | 9.13 | 9.03 | 8.98 |
| 62(5310 MHz) | 9.50 | 9.22 | 9.03 | 8.98 | 8.87 | 8.87 | 8.79 | 8.74 |
| 102(5510 MHz) | 10.09 | 9.79 | 9.61 | 9.57 | 9.46 | 9.48 | 9.38 | 9.33 |
| 110(5550 MHz) | 9.77 | 9.48 | 9.29 | 9.23 | 9.14 | 9.15 | 9.05 | 9.01 |
| 118(5590 MHz) | 10.51 | 10.22 | 10.02 | 9.97 | 9.87 | 9.89 | 9.79 | 9.72 |

| | | | | | | | | |
|---------------|-------|-------|-------|-------|------|------|------|------|
| 126(5630 MHz) | 10.49 | 10.20 | 10.03 | 9.97 | 9.86 | 9.86 | 9.78 | 9.72 |
| 134(5670 MHz) | 10.48 | 10.20 | 10.01 | 9.96 | 9.86 | 9.88 | 9.78 | 9.70 |
| 151(5755 MHz) | 9.64 | 9.37 | 9.17 | 9.11 | 9.01 | 9.02 | 8.93 | 8.88 |
| 159(5795 MHz) | 10.58 | 10.29 | 10.09 | 10.05 | 9.95 | 9.95 | 9.87 | 9.81 |

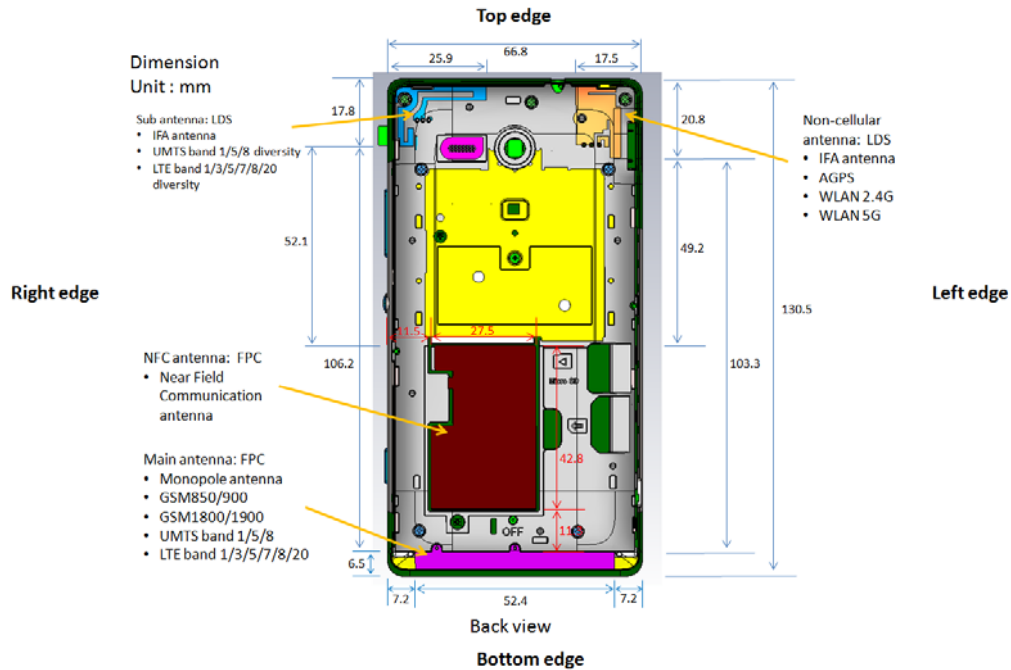
12 Simultaneous TX SAR Considerations

12.1 Introduction

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” are applicable to handsets with built-in unlicensed transmitters such as 802.11 a/b/g and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

For this device, the BT and Wi-Fi can transmit simultaneous with other transmitters.

12.2 Transmit Antenna Separation Distances



Picture 12.1 Antenna Locations

12.3 SAR Measurement Positions

According to the KDB941225 D06 Hot Spot SAR v01, the edges with less than 2.5 cm distance to the antennas need to be tested for SAR.

| SAR measurement positions | | | | | | |
|---------------------------|-------|------|-----------|------------|----------|-------------|
| Mode | Front | Rear | Left edge | Right edge | Top edge | Bottom edge |
| GSM850/1900 | Yes | Yes | Yes | Yes | No | Yes |
| UMTS band 5 | Yes | Yes | Yes | Yes | No | Yes |
| LTE band 5 | Yes | Yes | Yes | Yes | No | Yes |
| WLAN | Yes | Yes | Yes | No | Yes | No |

12.4 Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied. The 1-g SAR test exclusion threshold for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR, where

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

Appendix A

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

| MHz | 5 | 10 | 15 | 20 | 25 | mm |
|------|----|----|-----|-----|-----|-----------------------------------|
| 150 | 39 | 77 | 116 | 155 | 194 | SAR Test Exclusion Threshold (mW) |
| 300 | 27 | 55 | 82 | 110 | 137 | |
| 450 | 22 | 45 | 67 | 89 | 112 | |
| 835 | 16 | 33 | 49 | 66 | 82 | |
| 900 | 16 | 32 | 47 | 63 | 79 | |
| 1500 | 12 | 24 | 37 | 49 | 61 | |
| 1900 | 11 | 22 | 33 | 44 | 54 | |
| 2450 | 10 | 19 | 29 | 38 | 48 | |
| 3600 | 8 | 16 | 24 | 32 | 40 | |
| 5200 | 7 | 13 | 20 | 26 | 33 | |
| 5400 | 6 | 13 | 19 | 26 | 32 | |
| 5800 | 6 | 12 | 19 | 25 | 31 | |

Picture 12.2 Power Thresholds

Table 12.1: Standalone SAR test exclusion considerations

| Band/Mode | F(GHz) | SAR test exclusion threshold (mW) | RF output power | | SAR test exclusion |
|----------------------|--------|-----------------------------------|-----------------|-------|--------------------|
| | | | dBm | mW | |
| Bluetooth | 2.441 | 19 | 7.93 | 6.21 | Yes |
| 2.4GHz WLAN 802.11 b | 2.45 | 19 | 15.13 | 32.58 | No |
| 5GHz WLAN 802.11 a | 5.745 | 12 | 13.00 | 19.95 | No |
| 5GHz WLAN 802.11 n | 5.745 | 12 | 13.14 | 20.61 | No |

13 Evaluation of Simultaneous

Table 13.1: The sum of reported SAR values for GSM/WCDMA and WiFi

| | Position | GSM/WCDMA | WiFi (DTS) | Sum1 | WiFi (UNII) | Sum2 |
|-------------------------------------|-------------------------|-----------|------------|-------------|-------------|-------------|
| Maximum reported SAR value for Head | Left hand, Touch cheek | 0.63 | 0.09 | 0.72 | / | / |
| | Right hand, Touch cheek | 0.60 | 0.31 | 0.91 | 0.06 | 0.66 |
| Maximum reported SAR value for Body | Front | 1.09 | 0.04 | 1.13 | / | / |
| | Rear | 0.58 | 0.14 | 0.72 | 0.05 | 0.63 |
| | Bottom | 1.17 | / | / | / | / |

Note: Sum1 is GSM/WCDMA + WiFi (DTS). Sum2 is GSM/WCDMA + WiFi (UNII).

Table 13.2: The sum of reported SAR values for GSM/WCDMA and Bluetooth

| | Position | GSM/WCDMA | BT* | Sum |
|-------------------------------------|------------------------|-----------|------|-------------|
| Maximum reported SAR value for Head | Left hand, Touch cheek | 0.63 | 0.26 | 0.89 |
| Maximum reported SAR value for Body | Bottom | 1.17 | 0.26 | 1.43 |

BT* - Estimated SAR for Bluetooth (see the table 13.3)

Table 13.3: Estimated SAR for Bluetooth

| Mode/Band | F (GHz) | Distance (mm) | Upper limit of power * | | Estimated _{1g} (W/kg) |
|-----------|---------|---------------|------------------------|-------|--------------------------------|
| | | | dBm | mW | |
| Bluetooth | 2.441 | 10 | 11 | 12.59 | 0.26 |

* - Maximum possible output power declared by manufacturer

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] [$\sqrt{f(\text{GHz})/x}$] W/kg for test separation distances ≤ 50 mm;

where $x = 7.5$ for 1-g SAR.

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

Conclusion:

According to the above tables, the sum of reported SAR values is < 1.6 W/kg. So the simultaneous transmission SAR with volume scans is not required.

14 SAR Test Result

It is determined by user manual for the distance between the EUT and the phantom bottom.

The distance is 10mm for data and 15mm for speech in all bands except GSM1900, and just applied to the condition of body worn accessory. About GSM1900, the distance is 10mm for AP ON and 15mm for AP OFF.

It is performed for all SAR measurements with area scan based 1-g SAR estimation (Fast SAR). A zoom scan measurement is added when the estimated 1-g SAR is the highest measured SAR in each exposure configuration, wireless mode and frequency band combination or more than 1.2W/kg.

The calculated SAR is obtained by the following formula:

$$\text{Reported SAR} = \text{Measured SAR} \times 10^{(P_{\text{Target}} - P_{\text{Measured}})/10}$$

Where P_{Target} is the power of manufacturing upper limit;

P_{Measured} is the measured power in chapter 11.

Table 14.1: Duty Cycle

| AP OFF | Duty Cycle |
|------------------------|-------------------|
| Speech for GSM850/1900 | 1:8.3 |
| GPRS&EGPRS for GSM850 | 1:2 |
| GPRS&EGPRS for GSM1900 | 1:8.3 |
| WCDMA850&WiFi | 1:1 |
| AP ON | Duty Cycle |
| GPRS&EGPRS for GSM1900 | 1:4 |

14.1 SAR results for Fast SAR

Table 14.2: SAR Values (GSM 850 MHz Band - Head) – AP OFF

| Frequency | | Side | Test Position | Figure No. | Ambient Temperature: 22.5 °C | | Liquid Temperature: 22.0 °C | | | Power Drift (dB) |
|-----------|-----|-------|---------------|------------|------------------------------|--------------------------|-----------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | |
| 848.8 | 251 | Left | Touch | Fig.1 | 33.32 | 0.427 | 0.50 | 0.535 | 0.63 | 0.15 |
| 836.6 | 190 | Left | Touch | / | 33.54 | 0.364 | 0.40 | 0.529 | 0.59 | -0.15 |
| 824.2 | 128 | Left | Touch | / | 33.35 | 0.295 | 0.34 | 0.428 | 0.50 | 0.17 |
| 836.6 | 190 | Left | Tilt | / | 33.54 | 0.208 | 0.23 | 0.299 | 0.33 | 0.00 |
| 848.8 | 251 | Right | Touch | / | 33.32 | 0.397 | 0.46 | 0.515 | 0.60 | 0.15 |
| 836.6 | 190 | Right | Touch | / | 33.54 | 0.349 | 0.39 | 0.506 | 0.56 | 0.04 |
| 824.2 | 128 | Right | Touch | / | 33.35 | 0.284 | 0.33 | 0.412 | 0.48 | 0.00 |
| 836.6 | 190 | Right | Tilt | / | 33.54 | 0.215 | 0.24 | 0.307 | 0.34 | -0.06 |

Table 14.3: SAR Values (GSM 850 MHz Band - Body) – AP OFF

| Frequency | | Mode (number of timeslots) | Test Position | Figure No. | Ambient Temperature: 22.5 °C | | Liquid Temperature: 22.0 °C | | | Power Drift (dB) |
|-----------|-----|----------------------------------|---------------------|---------------|------------------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|------------------------|
| MHz | Ch. | | | | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | |
| 848.8 | 251 | GPRS (4) | Front | Fig.2 | 27.60 | 0.403 | 0.56 | 0.540 | 0.75 | 0.01 |
| 836.6 | 190 | GPRS (4) | Front | / | 27.68 | 0.381 | 0.52 | 0.508 | 0.69 | -0.04 |
| 824.2 | 128 | GPRS (4) | Front | / | 27.72 | 0.344 | 0.46 | 0.449 | 0.60 | 0.03 |
| 836.6 | 190 | GPRS (4) | Rear | / | 27.68 | 0.327 | 0.44 | 0.425 | 0.58 | -0.14 |
| 836.6 | 190 | GPRS (4) | Left | / | 27.68 | 0.348 | 0.47 | 0.496 | 0.67 | 0.11 |
| 836.6 | 190 | GPRS (4) | Right | / | 27.68 | 0.344 | 0.47 | 0.500 | 0.68 | 0.04 |
| 836.6 | 190 | GPRS (4) | Bottom | / | 27.68 | 0.114 | 0.15 | 0.219 | 0.30 | 0.13 |
| 848.8 | 251 | EGPRS (4) | Front | / | 27.55 | 0.321 | 0.45 | 0.500 | 0.70 | 0.02 |
| 848.8 | 251 | Speech | Front (Headset1) | / | 33.32 | 0.389 | 0.45 | 0.504 | 0.59 | 0.17 |

Note1: The distance between the EUT and the phantom bottom is 10mm for data and 15mm for speech.

Note2: The type of Headset1 is MH410c

Table 14.4: SAR Values (GSM 1900 MHz Band - Head) – AP OFF

| Frequency | | Side | Test Position | Figure No. | Ambient Temperature: 22.6 °C | | Liquid Temperature: 22.1 °C | | | Power Drift (dB) |
|-----------|-----|-------|------------------|---------------|------------------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|------------------------|
| MHz | Ch. | | | | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | |
| 1909.8 | 810 | Left | Touch | / | 30.58 | 0.172 | 0.19 | 0.297 | 0.33 | -0.10 |
| 1880 | 661 | Left | Touch | / | 30.72 | 0.186 | 0.20 | 0.321 | 0.34 | 0.08 |
| 1850.2 | 512 | Left | Touch | Fig.3 | 30.44 | 0.226 | 0.26 | 0.364 | 0.41 | 0.14 |
| 1880 | 661 | Left | Tilt | / | 30.72 | 0.063 | 0.07 | 0.108 | 0.12 | 0.03 |
| 1909.8 | 810 | Right | Touch | / | 30.58 | 0.177 | 0.19 | 0.307 | 0.34 | -0.02 |
| 1880 | 661 | Right | Touch | / | 30.72 | 0.164 | 0.17 | 0.298 | 0.32 | 0.12 |
| 1850.2 | 512 | Right | Touch | / | 30.44 | 0.154 | 0.18 | 0.280 | 0.32 | 0.02 |
| 1880 | 661 | Right | Tilt | / | 30.72 | 0.090 | 0.10 | 0.154 | 0.16 | 0.04 |

Table 14.5: SAR Values (GSM 1900 MHz Band - Body) – AP ON

| Frequency | | Mode (number of timeslots) | Test Position | Figure No. | Ambient Temperature: 22.6 °C | | Liquid Temperature: 22.1 °C | | | Power Drift (dB) |
|-----------|-----|----------------------------------|------------------|---------------|------------------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|------------------------|
| MHz | Ch. | | | | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | |
| 1909.8 | 810 | GPRS (2) | Front | / | 25.04 | 0.468 | 0.58 | 0.869 | 1.08 | 0.08 |
| 1880 | 661 | GPRS (2) | Front | / | 24.99 | 0.475 | 0.60 | 0.867 | 1.09 | -0.10 |
| 1850.2 | 512 | GPRS (2) | Front | / | 24.98 | 0.415 | 0.52 | 0.756 | 0.96 | 0.10 |
| 1880 | 661 | GPRS (2) | Rear | / | 24.99 | 0.244 | 0.31 | 0.413 | 0.52 | 0.14 |
| 1880 | 661 | GPRS (2) | Left | / | 24.99 | 0.051 | 0.06 | 0.084 | 0.11 | -0.03 |
| 1880 | 661 | GPRS (2) | Right | / | 24.99 | 0.023 | 0.03 | 0.038 | 0.05 | 0.07 |

| | | | | | | | | | | |
|--------|-----|-----------|--------|-------|-------|-------|-------------|--------------|-------------|-------|
| 1909.8 | 810 | GPRS (2) | Bottom | Fig.4 | 25.04 | 0.499 | 0.62 | 0.937 | 1.17 | -0.07 |
| 1880 | 661 | GPRS (2) | Bottom | / | 24.99 | 0.462 | 0.58 | 0.870 | 1.10 | -0.05 |
| 1850.2 | 512 | GPRS (2) | Bottom | / | 24.98 | 0.415 | 0.52 | 0.787 | 1.00 | -0.14 |
| 1909.8 | 810 | EGPRS (2) | Bottom | / | 25.04 | 0.487 | 0.61 | 0.915 | 1.14 | -0.01 |

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table 14.6: SAR Values (GSM 1900 MHz Band - Body) – AP OFF

| Frequency | | Mode (number of timeslots) | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|------------------------------|-----|----------------------------------|----------------------|---------------|-----------------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|------------------------|
| MHz | Ch. | | | | | | | | | |
| Ambient Temperature: 22.6 °C | | | | | Liquid Temperature: 22.1 °C | | | | | |
| 1880 | 661 | GPRS (1) | Front | / | 30.66 | 0.432 | 0.47 | 0.745 | 0.81 | -0.03 |
| 1880 | 661 | GPRS (1) | Rear | / | 30.66 | 0.259 | 0.28 | 0.409 | 0.44 | -0.04 |
| 1880 | 661 | GPRS (1) | Left | / | 30.66 | 0.050 | 0.05 | 0.078 | 0.08 | -0.03 |
| 1880 | 661 | GPRS (1) | Right | / | 30.66 | 0.032 | 0.03 | 0.051 | 0.06 | 0.04 |
| 1909.8 | 810 | GPRS (1) | Bottom | / | 30.68 | 0.485 | 0.52 | 0.885 | 0.95 | 0.15 |
| 1880 | 661 | GPRS (1) | Bottom | / | 30.66 | 0.428 | 0.46 | 0.778 | 0.84 | -0.05 |
| 1850.2 | 512 | GPRS (1) | Bottom | / | 30.65 | 0.382 | 0.41 | 0.688 | 0.75 | -0.07 |
| 1909.8 | 810 | EGPRS (1) | Bottom | / | 30.68 | 0.446 | 0.48 | 0.833 | 0.90 | 0.00 |
| 1880 | 661 | EGPRS (1) | Bottom | / | 30.44 | 0.418 | 0.48 | 0.777 | 0.88 | 0.00 |
| 1850.2 | 512 | EGPRS (1) | Bottom | / | 30.23 | 0.394 | 0.47 | 0.728 | 0.87 | 0.03 |
| 1909.8 | 810 | Speech | Bottom (Headset1) | Fig.5 | 30.58 | 0.555 | 0.61 | 0.983 | 1.08 | 0.05 |
| 1880 | 661 | Speech | Bottom (Headset1) | / | 30.72 | 0.450 | 0.48 | 0.821 | 0.88 | 0.02 |
| 1850.2 | 512 | Speech | Bottom (Headset1) | / | 30.44 | 0.411 | 0.47 | 0.743 | 0.85 | -0.01 |

Note1: The distance between the EUT and the phantom bottom is 15mm.

Note2: The type of Headset1 is MH410c

Table 14.7: SAR Values (WCDMA 850 MHz Band - Head) – AP OFF

| Frequency | | Side | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|------------------------------|------|-------|------------------|---------------|-----------------------------|--------------------------------|--------------------------------|-------------------------------|-------------------------------|------------------------|
| MHz | Ch. | | | | | | | | | |
| Ambient Temperature: 22.5 °C | | | | | Liquid Temperature: 22.0 °C | | | | | |
| 846.6 | 4233 | Left | Touch | Fig.6 | 24.66 | 0.356 | 0.36 | 0.447 | 0.45 | -0.11 |
| 836.4 | 4182 | Left | Touch | / | 24.69 | 0.260 | 0.26 | 0.375 | 0.38 | 0.16 |
| 826.4 | 4132 | Left | Touch | / | 24.68 | 0.252 | 0.25 | 0.365 | 0.37 | 0.16 |
| 836.4 | 4182 | Left | Tilt | / | 24.69 | 0.137 | 0.14 | 0.196 | 0.20 | 0.09 |
| 846.6 | 4233 | Right | Touch | / | 24.66 | 0.333 | 0.34 | 0.432 | 0.44 | 0.19 |
| 836.4 | 4182 | Right | Touch | / | 24.69 | 0.257 | 0.26 | 0.371 | 0.37 | 0.14 |
| 826.4 | 4132 | Right | Touch | / | 24.68 | 0.246 | 0.25 | 0.356 | 0.36 | 0.05 |
| 836.4 | 4182 | Right | Tilt | / | 24.69 | 0.176 | 0.18 | 0.252 | 0.25 | 0.02 |

Table 14.8: SAR Values (WCDMA 850 MHz Band - Body) – AP OFF

| Frequency | | Test Position | Figure No. | Ambient Temperature: 22.5 °C | | Liquid Temperature: 22.0 °C | | Power Drift (dB) | |
|-----------|------|------------------|------------|------------------------------|--------------------------|-----------------------------|-------------------------|------------------|-------------------------|
| MHz | Ch. | | | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | | Reported SAR(1g) (W/kg) |
| 846.6 | 4233 | Front | / | 24.66 | 0.095 | 0.10 | 0.127 | 0.13 | -0.18 |
| 836.4 | 4182 | Front | / | 24.69 | 0.161 | 0.16 | 0.207 | 0.21 | 0.04 |
| 826.4 | 4132 | Front | / | 24.68 | 0.212 | 0.21 | 0.270 | 0.27 | -0.06 |
| 836.4 | 4182 | Rear | / | 24.69 | 0.093 | 0.09 | 0.124 | 0.12 | 0.08 |
| 836.4 | 4182 | Left | / | 24.69 | 0.110 | 0.11 | 0.157 | 0.16 | 0.13 |
| 836.4 | 4182 | Right | / | 24.69 | 0.098 | 0.10 | 0.148 | 0.15 | -0.14 |
| 836.4 | 4182 | Bottom | / | 24.69 | 0.093 | 0.09 | 0.180 | 0.18 | -0.00 |
| 826.4 | 4132 | Front (Headset1) | Fig.7 | 24.68 | 0.326 | 0.33 | 0.417 | 0.42 | -0.07 |

Note1: The distance between the EUT and the phantom bottom is 10mm for data and 15mm for speech.

Note2: The type of Headset1 is MH410c

Table 14.9: SAR Values (LTE Band5 - Head) – AP OFF

| Frequency | | Mode | Side | Test Position | Figure No. | Ambient Temperature: 22.5 °C | | Liquid Temperature: 22.0 °C | | Power Drift (dB) | |
|-----------|-------|-----------|-------|---------------|------------|------------------------------|--------------------------|-----------------------------|-------------------------|------------------|-------------------------|
| MHz | Ch. | | | | | Conduct ed Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | | Reported SAR(1g) (W/kg) |
| 829 | 20450 | 1RB_Low | Left | Touch | Fig.8 | 23.98 | 0.301 | 0.30 | 0.382 | 0.38 | -0.10 |
| 829 | 20450 | 25RB_High | Left | Touch | / | 22.77 | 0.218 | 0.29 | 0.276 | 0.37 | 0.05 |
| 829 | 20450 | 1RB_Low | Left | Tilt | / | 23.98 | 0.170 | 0.17 | 0.213 | 0.21 | -0.02 |
| 829 | 20450 | 25RB_High | Left | Tilt | / | 22.77 | 0.117 | 0.16 | 0.147 | 0.20 | 0.06 |
| 829 | 20450 | 1RB_Low | Right | Touch | / | 23.98 | 0.283 | 0.28 | 0.355 | 0.36 | -0.18 |
| 829 | 20450 | 25RB_High | Right | Touch | / | 22.77 | 0.193 | 0.26 | 0.243 | 0.32 | 0.07 |
| 829 | 20450 | 1RB_Low | Right | Tilt | / | 23.98 | 0.192 | 0.19 | 0.242 | 0.24 | -0.13 |
| 829 | 20450 | 25RB_High | Right | Tilt | / | 22.77 | 0.128 | 0.17 | 0.161 | 0.21 | 0.07 |

Note1: The LTE mode is QPSK_10MHz.

Table 14.10: SAR Values (LTE Band5 - Body) – AP OFF

| Frequency | | Mode | Test Position | Figure No. | Ambient Temperature: 22.5 °C | | Liquid Temperature: 22.0 °C | | Power Drift (dB) | |
|-----------|-------|-----------|---------------|------------|------------------------------|--------------------------|-----------------------------|-------------------------|------------------|-------------------------|
| MHz | Ch. | | | | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | | Reported SAR(1g) (W/kg) |
| 829 | 20450 | 1RB_Low | Front | Fig.9 | 23.98 | 0.468 | 0.47 | 0.602 | 0.60 | -0.06 |
| 829 | 20450 | 25RB_High | Front | / | 22.77 | 0.327 | 0.43 | 0.423 | 0.56 | 0.01 |
| 829 | 20450 | 1RB_Low | Rear | / | 23.98 | 0.344 | 0.35 | 0.452 | 0.45 | -0.15 |
| 829 | 20450 | 25RB_High | Rear | / | 22.77 | 0.244 | 0.32 | 0.331 | 0.44 | 0.04 |
| 829 | 20450 | 1RB_Low | Left | / | 23.98 | 0.333 | 0.33 | 0.473 | 0.48 | 0.04 |
| 829 | 20450 | 25RB_High | Left | / | 22.77 | 0.234 | 0.31 | 0.333 | 0.44 | 0.10 |

| | | | | | | | | | | |
|-----|-------|-----------|--------|---|-------|-------|-------------|-------|-------------|-------|
| 829 | 20450 | 1RB_Low | Right | / | 23.98 | 0.313 | 0.31 | 0.456 | 0.46 | -0.19 |
| 829 | 20450 | 25RB_High | Right | / | 22.77 | 0.204 | 0.27 | 0.297 | 0.39 | 0.08 |
| 829 | 20450 | 1RB_Low | Bottom | / | 23.98 | 0.091 | 0.09 | 0.171 | 0.17 | 0.14 |
| 829 | 20450 | 25RB_High | Bottom | / | 22.77 | 0.067 | 0.09 | 0.126 | 0.17 | 0.17 |

Note1: The distance between the EUT and the phantom bottom is 10mm.

Note2: The LTE mode is QPSK_10MHz.

Table 14.11: SAR Values (Wi-Fi 802.11b - Head) – AP OFF

| Frequency | | Side | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|-----------|-----|-------|---------------|------------|-----------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | | | | | | |
| 2437 | 6 | Left | Touch | / | 14.64 | 0.032 | 0.04 | 0.068 | 0.09 | -0.08 |
| 2437 | 6 | Left | Tilt | / | 14.64 | 0.021 | 0.03 | 0.046 | 0.06 | -0.16 |
| 2437 | 6 | Right | Touch | Fig.10 | 14.64 | 0.100 | 0.14 | 0.224 | 0.31 | -0.06 |
| 2437 | 6 | Right | Tilt | / | 14.64 | 0.048 | 0.07 | 0.104 | 0.14 | 0.11 |

Table 14.12: SAR Values (Wi-Fi 802.11b - Body) – AP OFF

| Frequency | | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|-----------|-----|---------------|------------|-----------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | | | | | |
| 2437 | 6 | Front | / | 14.64 | 0.013 | 0.02 | 0.026 | 0.04 | -0.04 |
| 2437 | 6 | Rear | Fig.11 | 14.64 | 0.049 | 0.07 | 0.104 | 0.14 | -0.19 |
| 2437 | 6 | Left | / | 14.64 | 0.026 | 0.04 | 0.055 | 0.08 | 0.17 |
| 2437 | 6 | Top | / | 14.64 | 0.015 | 0.02 | 0.040 | 0.05 | 0.13 |

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table 14.13: SAR Values (Wi-Fi 802.11a - Head) – AP OFF

| Frequency | | Side | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|-----------|-----|-------|---------------|------------|-----------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | | | | | | |
| 5745 | 149 | Left | Touch | / | 13.00 | 0.015 | 0.02 | 0.020 | 0.02 | -0.16 |
| 5745 | 149 | Left | Tilt | / | 13.00 | 0.00791 | 0.01 | 0.011 | 0.01 | 0.17 |
| 5745 | 149 | Right | Touch | / | 13.00 | 0.00945 | 0.01 | 0.039 | 0.04 | 0.16 |
| 5745 | 149 | Right | Tilt | / | 13.00 | 0.00586 | 0.01 | 0.020 | 0.02 | 0.15 |
| 5180 | 36 | Right | Touch | Fig.12 | 12.35 | 0.015 | 0.02 | 0.053 | 0.06 | 0.12 |
| 5260 | 52 | Right | Touch | / | 12.14 | 0.0091 | 0.01 | 0.0521 | 0.06 | -0.14 |
| 5520 | 104 | Right | Touch | / | 12.99 | 0.0351 | 0.04 | 0.0466 | 0.05 | -0.18 |

Table 14.14: SAR Values (Wi-Fi 802.11a - Body) – AP OFF

| Frequency | | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|-----------|-----|------------------------------|------------|-----------------------|-----------------------------|--------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | | | | | |
| | | Ambient Temperature: 22.7 °C | | | Liquid Temperature: 22.2 °C | | | | |
| 5745 | 149 | Front | / | 13.00 | 0.000288 | 0.00 | 0.000716 | 0.00 | -0.19 |
| 5745 | 149 | Rear | Fig.13 | 13.00 | 0.017 | 0.02 | 0.080 | 0.08 | 0.18 |
| 5745 | 149 | Left | / | 13.00 | 0.000452 | 0.00 | 0.000842 | 0.00 | -0.19 |
| 5745 | 149 | Top | / | 13.00 | 0.000297 | 0.00 | 0.000554 | 0.00 | 0.19 |
| 5180 | 36 | Rear | / | 12.35 | 0.00385 | 0.00 | 0.0236 | 0.03 | 0.15 |
| 5260 | 52 | Rear | / | 12.14 | 0.00548 | 0.01 | 0.0352 | 0.04 | 0.13 |
| 5520 | 104 | Rear | / | 12.99 | 0.00305 | 0.00 | 0.0296 | 0.03 | 0.16 |

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table 14.15: SAR Values (Wi-Fi 802.11n - Head) – AP OFF

| Frequency | | Side | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|-----------|-----|------------------------------|---------------|------------|-----------------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | | | | | | |
| | | Ambient Temperature: 22.7 °C | | | Liquid Temperature: 22.2 °C | | | | | |
| 5745 | 149 | Left | Touch | / | 12.99 | 0.033 | 0.03 | 0.037 | 0.04 | 0.16 |
| 5745 | 149 | Left | Tilt | / | 12.99 | 0.00393 | 0.00 | 0.0073 | 0.01 | 0.19 |
| 5745 | 149 | Right | Touch | / | 12.99 | 0.00897 | 0.01 | 0.045 | 0.05 | 0.18 |
| 5745 | 149 | Right | Tilt | / | 12.99 | 0.00259 | 0.00 | 0.00486 | 0.00 | 0.11 |
| 5220 | 44 | Right | Touch | Fig.14 | 12.79 | 0.010 | 0.01 | 0.053 | 0.06 | 0.19 |
| 5260 | 52 | Right | Touch | / | 12.95 | 0.00866 | 0.01 | 0.0415 | 0.04 | 0.14 |
| 5700 | 140 | Right | Touch | / | 12.98 | 0.000488 | 0.00 | 0.00422 | 0.00 | 0.19 |

Table 14.16: SAR Values (Wi-Fi 802.11n - Body) – AP OFF

| Frequency | | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|-----------|-----|------------------------------|------------|-----------------------|-----------------------------|--------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | | | | | |
| | | Ambient Temperature: 22.7 °C | | | Liquid Temperature: 22.2 °C | | | | |
| 5745 | 149 | Front | / | 12.99 | 0.000115 | 0.00 | 0.000287 | 0.00 | 0.18 |
| 5745 | 149 | Rear | Fig.15 | 12.99 | 0.015 | 0.02 | 0.092 | 0.09 | -0.17 |
| 5745 | 149 | Left | / | 12.99 | 0.000425 | 0.00 | 0.00079 | 0.00 | 0.19 |
| 5745 | 149 | Top | / | 12.99 | 0.000542 | 0.00 | 0.00101 | 0.00 | -0.16 |
| 5220 | 44 | Rear | / | 12.79 | 0.00835 | 0.01 | 0.04 | 0.04 | 0.18 |
| 5260 | 52 | Rear | / | 12.95 | 0.00988 | 0.01 | 0.0466 | 0.05 | 0.17 |
| 5700 | 140 | Rear | / | 12.98 | 0.00262 | 0.00 | 0.026 | 0.03 | 0.17 |

Note1: The distance between the EUT and the phantom bottom is 10mm.

Note2: For the test channel 44&140 of 802.11n, the maximum average output channel in each frequency band did not occur in the “default test channels” (table KDB 248227), so the maximum required test channels were tested instead of an adjacent “default test channel”.

14.2 SAR results for Standard procedure

There is not zoom scan measurement to be added except the highest measured SAR in each exposure configuration and band, because all SAR values are < 1.2 W/kg.

Table 14.17: SAR Values (GSM 850 MHz Band - Head) – AP OFF

| Ambient Temperature: 22.5 °C | | | | | Liquid Temperature: 22.0 °C | | | | | |
|------------------------------|-----|------|---------------|------------|-----------------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| Frequency | | Side | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
| MHz | Ch. | | | | | | | | | |
| 848.8 | 251 | Left | Touch | Fig.1 | 33.32 | 0.427 | 0.50 | 0.535 | 0.63 | 0.15 |

Table 14.18: SAR Values (GSM 850 MHz Band - Body) – AP OFF

| Ambient Temperature: 22.5 °C | | | | | Liquid Temperature: 22.0 °C | | | | | |
|------------------------------|-----|----------------------------|---------------|------------|-----------------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| Frequency | | Mode (number of timeslots) | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
| MHz | Ch. | | | | | | | | | |
| 848.8 | 251 | GPRS (4) | Front | Fig.2 | 27.60 | 0.403 | 0.56 | 0.540 | 0.75 | 0.01 |

Note1: The distance between the EUT and the phantom bottom is 10mm for data and 15mm for speech.

Table 14.19: SAR Values (GSM 1900 MHz Band - Head) – AP OFF

| Ambient Temperature: 22.6 °C | | | | | Liquid Temperature: 22.1 °C | | | | | |
|------------------------------|-----|------|---------------|------------|-----------------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| Frequency | | Side | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
| MHz | Ch. | | | | | | | | | |
| 1850.2 | 512 | Left | Touch | Fig.3 | 30.44 | 0.226 | 0.26 | 0.364 | 0.41 | 0.14 |

Table 14.20: SAR Values (GSM 1900 MHz Band - Body) – AP ON

| Ambient Temperature: 22.6 °C | | | | | Liquid Temperature: 22.1 °C | | | | | |
|------------------------------|-----|----------------------------|---------------|------------|-----------------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| Frequency | | Mode (number of timeslots) | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
| MHz | Ch. | | | | | | | | | |
| 1909.8 | 810 | GPRS (2) | Bottom | Fig.4 | 25.04 | 0.499 | 0.62 | 0.937 | 1.17 | -0.07 |

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table 14.21: SAR Values (GSM 1900 MHz Band - Body) – AP OFF

| Ambient Temperature: 22.6 °C | | | | | Liquid Temperature: 22.1 °C | | | | | |
|------------------------------|-----|----------------------------|-------------------|------------|-----------------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| Frequency | | Mode (number of timeslots) | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
| MHz | Ch. | | | | | | | | | |
| 1909.8 | 810 | Speech | Bottom (Headset1) | Fig.5 | 30.58 | 0.555 | 0.61 | 0.983 | 1.08 | 0.05 |

Note1: The distance between the EUT and the phantom bottom is 15mm.

Note2: The type of Headset1 is MH410c

Table 14.22: SAR Values (WCDMA 850 MHz Band - Head) – AP OFF

| Frequency | | Side | Test Position | Figure No. | Ambient Temperature: 22.5 °C | | Liquid Temperature: 22.0 °C | | | Power Drift (dB) |
|-----------|------|------|---------------|------------|------------------------------|--------------------------|-----------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | |
| 846.6 | 4233 | Left | Touch | Fig.6 | 24.66 | 0.356 | 0.36 | 0.447 | 0.45 | -0.11 |

Table 14.23: SAR Values (WCDMA 850 MHz Band - Body) – AP OFF

| Frequency | | Test Position | Figure No. | Ambient Temperature: 22.5 °C | | Liquid Temperature: 22.0 °C | | | Power Drift (dB) |
|-----------|------|------------------|------------|------------------------------|--------------------------|-----------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | |
| 826.4 | 4132 | Front (Headset1) | Fig.7 | 24.68 | 0.326 | 0.33 | 0.417 | 0.42 | -0.07 |

Note1: The distance between the EUT and the phantom bottom is 10mm for data and 15mm for speech.

Note2: The type of Headset1 is MH410c

Table 14.24: SAR Values (LTE Band5 - Head) – AP OFF

| Frequency | | Mode | Side | Test Position | Figure No. | Ambient Temperature: 22.5 °C | | Liquid Temperature: 22.0 °C | | | Power Drift (dB) |
|-----------|-------|---------|------|---------------|------------|------------------------------|--------------------------|-----------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | |
| 829 | 20450 | 1RB_Low | Left | Touch | Fig.8 | 23.98 | 0.301 | 0.30 | 0.382 | 0.38 | -0.10 |

Note1: The LTE mode is QPSK_10MHz.

Table 14.25: SAR Values (LTE Band5 - Body) – AP OFF

| Frequency | | Mode | Test Position | Figure No. | Ambient Temperature: 22.5 °C | | Liquid Temperature: 22.0 °C | | | Power Drift (dB) |
|-----------|-------|---------|---------------|------------|------------------------------|--------------------------|-----------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | |
| 829 | 20450 | 1RB_Low | Front | Fig.9 | 23.98 | 0.468 | 0.47 | 0.602 | 0.60 | -0.06 |

Note1: The distance between the EUT and the phantom bottom is 10mm.

Note2: The LTE mode is QPSK_10MHz.

Table 14.26: SAR Values (Wi-Fi 802.11b - Head) – AP OFF

| Frequency | | Side | Test Position | Figure No. | Ambient Temperature: 22.6 °C | | Liquid Temperature: 22.0 °C | | | Power Drift (dB) |
|-----------|-----|-------|---------------|------------|------------------------------|--------------------------|-----------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | |
| 2437 | 6 | Right | Touch | Fig.10 | 14.64 | 0.100 | 0.14 | 0.224 | 0.31 | -0.06 |

Table 14.27: SAR Values (Wi-Fi 802.11b - Body) – AP OFF

| Frequency | | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|-----------|-----|------------------------------|------------|-----------------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | | | | | |
| | | Ambient Temperature: 22.6 °C | | Liquid Temperature: 22.0 °C | | | | | |
| 2437 | 6 | Rear | Fig.11 | 14.64 | 0.049 | 0.07 | 0.104 | 0.14 | -0.19 |

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table 14.28: SAR Values (Wi-Fi 802.11a - Head) – AP OFF

| Frequency | | Side | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|-----------|-----|------------------------------|---------------|-----------------------------|-----------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | | | | | | |
| | | Ambient Temperature: 22.7 °C | | Liquid Temperature: 22.2 °C | | | | | | |
| 5180 | 36 | Right | Touch | Fig.12 | 12.35 | 0.0148 | 0.02 | 0.0532 | 0.06 | 0.12 |

Table 14.29: SAR Values (Wi-Fi 802.11a - Body) – AP OFF

| Frequency | | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|-----------|-----|------------------------------|------------|-----------------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | | | | | |
| | | Ambient Temperature: 22.7 °C | | Liquid Temperature: 22.2 °C | | | | | |
| 5745 | 149 | Rear | Fig.13 | 13.00 | 0.017 | 0.02 | 0.080 | 0.08 | 0.18 |

Note1: The distance between the EUT and the phantom bottom is 10mm.

Table 14.30: SAR Values (Wi-Fi 802.11n - Head) – AP OFF

| Frequency | | Side | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|-----------|-----|------------------------------|---------------|-----------------------------|-----------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | | | | | | |
| | | Ambient Temperature: 22.7 °C | | Liquid Temperature: 22.2 °C | | | | | | |
| 5220 | 44 | Right | Touch | Fig.14 | 12.79 | 0.0104 | 0.01 | 0.0531 | 0.06 | -0.14 |

Table 14.31: SAR Values (Wi-Fi 802.11n - Body) – AP OFF

| Frequency | | Test Position | Figure No. | Conducted Power (dBm) | Measured SAR(10g) (W/kg) | Reported SAR(10g) (W/kg) | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|-----------|-----|------------------------------|------------|-----------------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------|
| MHz | Ch. | | | | | | | | |
| | | Ambient Temperature: 22.7 °C | | Liquid Temperature: 22.2 °C | | | | | |
| 5745 | 149 | Rear | Fig.15 | 12.99 | 0.015 | 0.02 | 0.092 | 0.09 | -0.17 |

Note1: The distance between the EUT and the phantom bottom is 10mm.

15 SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/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 (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

Table 15.1: SAR Measurement Variability for Body GSM 1900 (1g) – AP ON

| Frequency | | Test Position | Spacing (mm) | Original SAR (W/kg) | First Repeated SAR (W/kg) | The Ratio | Second Repeated SAR (W/kg) |
|-----------|-----|---------------|--------------|---------------------|---------------------------|-----------|----------------------------|
| MHz | Ch. | | | | | | |
| 1909.8 | 810 | Bottom | 10 | 0.937 | 0.929 | 1.01 | / |

Table 15.2: SAR Measurement Variability for Body GSM 1900 (1g) – AP OFF

| Frequency | | Test Position | Spacing (mm) | Original SAR (W/kg) | First Repeated SAR (W/kg) | The Ratio | Second Repeated SAR (W/kg) |
|-----------|-----|---------------|--------------|---------------------|---------------------------|-----------|----------------------------|
| MHz | Ch. | | | | | | |
| 1909.8 | 810 | Bottom | 15 | 0.983 | 0.967 | 1.02 | / |

16 Measurement Uncertainty

16.1 Measurement Uncertainty for Normal SAR Tests (300MHz~3GHz)

| No. | Error Description | Type | Uncertainty value | Probably Distribution | Div. | (Ci) 1g | (Ci) 10g | Std. Unc. (1g) | Std. Unc. (10g) | Degree of freedom |
|----------------------------|---|------|-------------------|-----------------------|------------|---------|----------|----------------|-----------------|-------------------|
| Measurement system | | | | | | | | | | |
| 1 | Probe calibration | B | 5.5 | N | 1 | 1 | 1 | 5.5 | 5.5 | ∞ |
| 2 | Isotropy | B | 4.7 | R | $\sqrt{3}$ | 0.7 | 0.7 | 1.9 | 1.9 | ∞ |
| 3 | Boundary effect | B | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| 4 | Linearity | B | 4.7 | R | $\sqrt{3}$ | 1 | 1 | 2.7 | 2.7 | ∞ |
| 5 | Detection limit | B | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| 6 | Readout electronics | B | 0.3 | R | $\sqrt{3}$ | 1 | 1 | 0.3 | 0.3 | ∞ |
| 7 | Response time | B | 0.8 | R | $\sqrt{3}$ | 1 | 1 | 0.5 | 0.5 | ∞ |
| 8 | Integration time | B | 2.6 | R | $\sqrt{3}$ | 1 | 1 | 1.5 | 1.5 | ∞ |
| 9 | RF ambient conditions-noise | B | 0 | R | $\sqrt{3}$ | 1 | 1 | 0 | 0 | ∞ |
| 10 | RF ambient conditions-reflection | B | 0 | R | $\sqrt{3}$ | 1 | 1 | 0 | 0 | ∞ |
| 11 | Probe positioned mech. restrictions | B | 0.4 | R | $\sqrt{3}$ | 1 | 1 | 0.2 | 0.2 | ∞ |
| 12 | Probe positioning with respect to phantom shell | B | 2.9 | R | $\sqrt{3}$ | 1 | 1 | 1.7 | 1.7 | ∞ |
| 13 | Post-processing | B | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| Test sample related | | | | | | | | | | |
| 14 | Test sample positioning | A | 3.3 | N | 1 | 1 | 1 | 3.3 | 3.3 | 71 |
| 15 | Device holder uncertainty | A | 3.4 | N | 1 | 1 | 1 | 3.4 | 3.4 | 5 |
| 16 | Drift of output power | B | 5.0 | R | $\sqrt{3}$ | 1 | 1 | 2.9 | 2.9 | ∞ |
| Phantom and set-up | | | | | | | | | | |
| 17 | Phantom uncertainty | B | 4.0 | R | $\sqrt{3}$ | 1 | 1 | 2.3 | 2.3 | ∞ |
| 18 | Liquid conductivity (target) | B | 5.0 | R | $\sqrt{3}$ | 0.64 | 0.43 | 1.8 | 1.2 | ∞ |
| 19 | Liquid conductivity (meas.) | A | 2.06 | N | 1 | 0.64 | 0.43 | 1.32 | 0.89 | 43 |
| 20 | Liquid permittivity (target) | B | 5.0 | R | $\sqrt{3}$ | 0.6 | 0.49 | 1.7 | 1.4 | ∞ |
| 21 | Liquid permittivity (meas.) | A | 1.6 | N | 1 | 0.6 | 0.49 | 1.0 | 0.8 | 521 |

| | | | | | | | | |
|--|--|--|--|--|--|------|------|-----|
| Combined standard uncertainty | $u_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$ | | | | | 9.25 | 9.12 | 257 |
| Expanded uncertainty (confidence interval of 95 %) | $u_e = 2u_c$ | | | | | 18.5 | 18.2 | |

16.2 Measurement Uncertainty for Normal SAR Tests (3~6GHz)

| No. | Error Description | Type | Uncertainty value | Probably Distribution | Div. | (Ci) 1g | (Ci) 10g | Std. Unc. (1g) | Std. Unc. (10g) | Degree of freedom |
|----------------------------|---|------|-------------------|-----------------------|------------|---------|----------|----------------|-----------------|-------------------|
| Measurement system | | | | | | | | | | |
| 1 | Probe calibration | B | 6.5 | N | 1 | 1 | 1 | 6.5 | 6.5 | ∞ |
| 2 | Isotropy | B | 4.7 | R | $\sqrt{3}$ | 0.7 | 0.7 | 1.9 | 1.9 | ∞ |
| 3 | Boundary effect | B | 2.0 | R | $\sqrt{3}$ | 1 | 1 | 1.2 | 1.2 | ∞ |
| 4 | Linearity | B | 4.7 | R | $\sqrt{3}$ | 1 | 1 | 2.7 | 2.7 | ∞ |
| 5 | Detection limit | B | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| 6 | Readout electronics | B | 0.3 | R | $\sqrt{3}$ | 1 | 1 | 0.3 | 0.3 | ∞ |
| 7 | Response time | B | 0.8 | R | $\sqrt{3}$ | 1 | 1 | 0.5 | 0.5 | ∞ |
| 8 | Integration time | B | 2.6 | R | $\sqrt{3}$ | 1 | 1 | 1.5 | 1.5 | ∞ |
| 9 | RF ambient conditions-noise | B | 0 | R | $\sqrt{3}$ | 1 | 1 | 0 | 0 | ∞ |
| 10 | RF ambient conditions-reflection | B | 0 | R | $\sqrt{3}$ | 1 | 1 | 0 | 0 | ∞ |
| 11 | Probe positioned mech. restrictions | B | 0.8 | R | $\sqrt{3}$ | 1 | 1 | 0.5 | 0.5 | ∞ |
| 12 | Probe positioning with respect to phantom shell | B | 6.7 | R | $\sqrt{3}$ | 1 | 1 | 3.9 | 3.9 | ∞ |
| 13 | Post-processing | B | 4.0 | R | $\sqrt{3}$ | 1 | 1 | 2.3 | 2.3 | ∞ |
| Test sample related | | | | | | | | | | |
| 14 | Test sample positioning | A | 3.3 | N | 1 | 1 | 1 | 3.3 | 3.3 | 71 |
| 15 | Device holder uncertainty | A | 3.4 | N | 1 | 1 | 1 | 3.4 | 3.4 | 5 |
| 16 | Drift of output power | B | 5.0 | R | $\sqrt{3}$ | 1 | 1 | 2.9 | 2.9 | ∞ |
| Phantom and set-up | | | | | | | | | | |
| 17 | Phantom uncertainty | B | 4.0 | R | $\sqrt{3}$ | 1 | 1 | 2.3 | 2.3 | ∞ |
| 18 | Liquid conductivity (target) | B | 5.0 | R | $\sqrt{3}$ | 0.64 | 0.43 | 1.8 | 1.2 | ∞ |
| 19 | Liquid conductivity (meas.) | A | 2.06 | N | 1 | 0.64 | 0.43 | 1.32 | 0.89 | 43 |

| | | | | | | | | | | |
|--|------------------------------|--|-----|---|------------|-----|------|------|------|----------|
| 20 | Liquid permittivity (target) | B | 5.0 | R | $\sqrt{3}$ | 0.6 | 0.49 | 1.7 | 1.4 | ∞ |
| 21 | Liquid permittivity (meas.) | A | 1.6 | N | 1 | 0.6 | 0.49 | 1.0 | 0.8 | 521 |
| Combined standard uncertainty | | $u_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$ | | | | | | 10.8 | 10.7 | 257 |
| Expanded uncertainty (confidence interval of 95 %) | | $u_e = 2u_c$ | | | | | | 21.6 | 21.4 | |

16.3 Measurement Uncertainty for Fast SAR Tests (300MHz~3GHz)

| No. | Error Description | Type | Uncertainty value | Probably Distribution | Div. | (Ci) 1g | (Ci) 10g | Std. Unc. (1g) | Std. Unc. (10g) | Degree of freedom |
|----------------------------|---|------|-------------------|-----------------------|------------|---------|----------|----------------|-----------------|-------------------|
| Measurement system | | | | | | | | | | |
| 1 | Probe calibration | B | 5.5 | N | 1 | 1 | 1 | 5.5 | 5.5 | ∞ |
| 2 | Isotropy | B | 4.7 | R | $\sqrt{3}$ | 0.7 | 0.7 | 1.9 | 1.9 | ∞ |
| 3 | Boundary effect | B | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| 4 | Linearity | B | 4.7 | R | $\sqrt{3}$ | 1 | 1 | 2.7 | 2.7 | ∞ |
| 5 | Detection limit | B | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| 6 | Readout electronics | B | 0.3 | R | $\sqrt{3}$ | 1 | 1 | 0.3 | 0.3 | ∞ |
| 7 | Response time | B | 0.8 | R | $\sqrt{3}$ | 1 | 1 | 0.5 | 0.5 | ∞ |
| 8 | Integration time | B | 2.6 | R | $\sqrt{3}$ | 1 | 1 | 1.5 | 1.5 | ∞ |
| 9 | RF ambient conditions-noise | B | 0 | R | $\sqrt{3}$ | 1 | 1 | 0 | 0 | ∞ |
| 10 | RF ambient conditions-reflection | B | 0 | R | $\sqrt{3}$ | 1 | 1 | 0 | 0 | ∞ |
| 11 | Probe positioned mech. Restrictions | B | 0.4 | R | $\sqrt{3}$ | 1 | 1 | 0.2 | 0.2 | ∞ |
| 12 | Probe positioning with respect to phantom shell | B | 2.9 | R | $\sqrt{3}$ | 1 | 1 | 1.7 | 1.7 | ∞ |
| 13 | Post-processing | B | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| 14 | Fast SAR z-Approximation | B | 7.0 | R | $\sqrt{3}$ | 1 | 1 | 4.0 | 4.0 | ∞ |
| Test sample related | | | | | | | | | | |
| 15 | Test sample positioning | A | 3.3 | N | 1 | 1 | 1 | 3.3 | 3.3 | 71 |
| 16 | Device holder uncertainty | A | 3.4 | N | 1 | 1 | 1 | 3.4 | 3.4 | 5 |
| 17 | Drift of output power | B | 5.0 | R | $\sqrt{3}$ | 1 | 1 | 2.9 | 2.9 | ∞ |

| Phantom and set-up | | | | | | | | | | |
|--|------------------------------|--|------|---|------------|------|------|------|------|----------|
| 18 | Phantom uncertainty | B | 4.0 | R | $\sqrt{3}$ | 1 | 1 | 2.3 | 2.3 | ∞ |
| 19 | Liquid conductivity (target) | B | 5.0 | R | $\sqrt{3}$ | 0.64 | 0.43 | 1.8 | 1.2 | ∞ |
| 20 | Liquid conductivity (meas.) | A | 2.06 | N | 1 | 0.64 | 0.43 | 1.32 | 0.89 | 43 |
| 21 | Liquid permittivity (target) | B | 5.0 | R | $\sqrt{3}$ | 0.6 | 0.49 | 1.7 | 1.4 | ∞ |
| 22 | Liquid permittivity (meas.) | A | 1.6 | N | 1 | 0.6 | 0.49 | 1.0 | 0.8 | 521 |
| Combined standard uncertainty | | $u_c = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$ | | | | | | 10.1 | 9.95 | 257 |
| Expanded uncertainty (confidence interval of 95 %) | | $u_e = 2u_c$ | | | | | | 20.2 | 19.9 | |

16.4 Measurement Uncertainty for Fast SAR Tests (3~6GHz)

| No. | Error Description | Type | Uncertainty value | Probably Distribution | Div. | (Ci) 1g | (Ci) 10g | Std. Unc. (1g) | Std. Unc. (10g) | Degree of freedom |
|---------------------------|---|------|-------------------|-----------------------|------------|---------|----------|----------------|-----------------|-------------------|
| Measurement system | | | | | | | | | | |
| 1 | Probe calibration | B | 6.5 | N | 1 | 1 | 1 | 6.5 | 6.5 | ∞ |
| 2 | Isotropy | B | 4.7 | R | $\sqrt{3}$ | 0.7 | 0.7 | 1.9 | 1.9 | ∞ |
| 3 | Boundary effect | B | 2.0 | R | $\sqrt{3}$ | 1 | 1 | 1.2 | 1.2 | ∞ |
| 4 | Linearity | B | 4.7 | R | $\sqrt{3}$ | 1 | 1 | 2.7 | 2.7 | ∞ |
| 5 | Detection limit | B | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| 6 | Readout electronics | B | 0.3 | R | $\sqrt{3}$ | 1 | 1 | 0.3 | 0.3 | ∞ |
| 7 | Response time | B | 0.8 | R | $\sqrt{3}$ | 1 | 1 | 0.5 | 0.5 | ∞ |
| 8 | Integration time | B | 2.6 | R | $\sqrt{3}$ | 1 | 1 | 1.5 | 1.5 | ∞ |
| 9 | RF ambient conditions-noise | B | 0 | R | $\sqrt{3}$ | 1 | 1 | 0 | 0 | ∞ |
| 10 | RF ambient conditions-reflection | B | 0 | R | $\sqrt{3}$ | 1 | 1 | 0 | 0 | ∞ |
| 11 | Probe positioned mech. Restrictions | B | 0.8 | R | $\sqrt{3}$ | 1 | 1 | 0.5 | 0.5 | ∞ |
| 12 | Probe positioning with respect to phantom shell | B | 6.7 | R | $\sqrt{3}$ | 1 | 1 | 3.9 | 3.9 | ∞ |
| 13 | Post-processing | B | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| 14 | Fast SAR z-Approximation | B | 14.0 | R | $\sqrt{3}$ | 1 | 1 | 8.1 | 8.1 | ∞ |

| Test sample related | | | | | | | | | | |
|--|------------------------------|--|------|---|------------|------|------|------|------|----------|
| 15 | Test sample positioning | A | 3.3 | N | 1 | 1 | 1 | 3.3 | 3.3 | 71 |
| 16 | Device holder uncertainty | A | 3.4 | N | 1 | 1 | 1 | 3.4 | 3.4 | 5 |
| 17 | Drift of output power | B | 5.0 | R | $\sqrt{3}$ | 1 | 1 | 2.9 | 2.9 | ∞ |
| Phantom and set-up | | | | | | | | | | |
| 18 | Phantom uncertainty | B | 4.0 | R | $\sqrt{3}$ | 1 | 1 | 2.3 | 2.3 | ∞ |
| 19 | Liquid conductivity (target) | B | 5.0 | R | $\sqrt{3}$ | 0.64 | 0.43 | 1.8 | 1.2 | ∞ |
| 20 | Liquid conductivity (meas.) | A | 2.06 | N | 1 | 0.64 | 0.43 | 1.32 | 0.89 | 43 |
| 21 | Liquid permittivity (target) | B | 5.0 | R | $\sqrt{3}$ | 0.6 | 0.49 | 1.7 | 1.4 | ∞ |
| 22 | Liquid permittivity (meas.) | A | 1.6 | N | 1 | 0.6 | 0.49 | 1.0 | 0.8 | 521 |
| Combined standard uncertainty | | $u_c = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$ | | | | | | 13.3 | 13.2 | 257 |
| Expanded uncertainty (confidence interval of 95 %) | | $u_e = 2u_c$ | | | | | | 26.6 | 26.4 | |

17 MAIN TEST INSTRUMENTS

Table 17.1: List of Main Instruments

| No. | Name | Type | Serial Number | Calibration Date | Valid Period |
|-----|-----------------------|---------------|---------------|--------------------------|--------------|
| 01 | Network analyzer | E5071C | MY46110673 | February 15, 2013 | One year |
| 02 | Power meter | NRVD | 102083 | September 11, 2012 | One year |
| 03 | Power sensor | NRV-Z5 | 100542 | | |
| 04 | Signal Generator | E4438C | MY49070393 | November 13, 2012 | One Year |
| 05 | Amplifier | VTL5400 | 0505 | No Calibration Requested | |
| 06 | BTS | E5515C | MY48363198 | July 11, 2012 | One year |
| 07 | E-field Probe | SPEAG ES3DV3 | 3149 | April 24, 2012 | One year |
| 08 | E-field Probe | SPEAG EX3DV4 | 3846 | December 20, 2012 | One year |
| 09 | DAE | SPEAG DAE4 | 771 | November 20, 2012 | One year |
| 10 | Dipole Validation Kit | SPEAG D835V2 | 443 | May 03, 2012 | One year |
| 11 | Dipole Validation Kit | SPEAG D1900V2 | 541 | May 09, 2012 | One year |
| 12 | Dipole Validation Kit | SPEAG D2450V2 | 853 | May 02, 2012 | One year |
| 13 | Dipole Validation Kit | SPEAG D5GHzV2 | 1040 | June 19, 2012 | One year |

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