



SAR TEST REPORT

No. I20Z60930-SEM03

For

HMD Global Oy

Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN

Model name: TA-1277

With

Hardware Version: 99651_1_10

Software Version: 00WW_0_070

FCC ID: 2AJOTTA-1277

Issued Date: 2020-7-2

Note:

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No.I20Z60930-SEM03

REPORT HISTORY

Report Number	Revision	Issue Date	Description
I20Z60930-SEM03	Rev.0	2020-7-2	Initial creation of test report

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1 Test Laboratory

1.1 Testing Location

Company Name:	CTTL(Shouxiang)
Address:	No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China100191

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

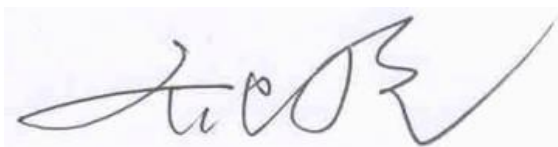
Project Leader:	Qi Dianyuan
Test Engineer:	Lin Xiaojun
Testing Start Date:	June 15, 2020
Testing End Date:	June 20, 2020

1.4 Signature



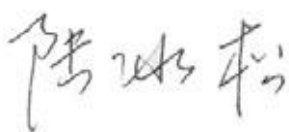
Lin Xiaojun

(Prepared this test report)



Qi Dianyuan

(Reviewed this test report)



Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

2 Statement of Compliance

The maximum results of SAR found during testing for HMD Global Oy Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN TA-1277 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)	GSM850	0.26	PCE
	GSM1900	0.18	
	WCDMA1900	0.21	
	WCDMA1700	0.19	
	WCDMA 850	0.18	
	LTE Band2	0.34	
	LTE Band5	0.23	
	LTE Band7	0.18	
	LTE Band12	0.25	
	LTE Band66	0.29	
	WLAN 2.4 GHz	0.71	DTS
Hotspot (Separation Distance 10mm)	GSM850	0.41	PCE
	GSM1900	1.24	
	WCDMA1900	1.07	
	WCDMA1700	1.25	
	WCDMA 850	0.25	
	LTE Band2	1.19	
	LTE Band5	0.34	
	LTE Band7	0.85	
	LTE Band12	0.41	
	LTE Band66	1.25	
	WLAN 2.4 GHz	0.18	DTS

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 C95.1-1992.

For body 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 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 highest reported SAR value is obtained at the case of **(Table 2.1)**, and the values are: **1.25 W/kg(1g)**.

Table 2.2: The sum of reported SAR values for main antenna and WiFi

	Position	Main antenna	WiFi	Sum
Highest reported SAR value for Head	Left hand, Touch cheek (GSM850)	0.25	0.71	0.96
Highest reported SAR value for Body	Front 10mm (LTE Band66)	1.25	0.13	1.38

Table 2.3: The sum of reported SAR values for main antenna and BT

	Position	Main antenna	BT	Sum
Maximum reported SAR value for Head	Left head, Tilt (LTE Band2)	0.34	0.23 ^[1]	0.57
Maximum reported SAR value for Body	Front 10mm (LTE Band66)	1.25	0.12 ^[1]	1.37

[1] - Estimated SAR for Bluetooth (see the table 13.3)

According to the above tables, the highest sum of reported SAR values is **1.38 W/kg (1g)**. The detail for simultaneous transmission consideration is described in chapter 13.

3 Client Information

3.1 Applicant Information

Company Name:	HMD Global Oy
Address/Post:	Bertel Jungin aukio 9,02600 Espoo, Finland
Contact Person:	Rosario Casillo
Contact Email:	Rosario.Casillo@hmdglobal.com
Telephone:	NA

3.2 Manufacturer Information

Company Name:	HMD Global Oy
Address/Post:	Bertel Jungin aukio 9,02600 Espoo, Finland
Contact Person:	Rosario Casillo
Contact Email:	Rosario.Casillo@hmdglobal.com
Telephone:	NA

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

4.1 About EUT

Description:	Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN
Model name:	TA-1277
Operating mode(s):	GSM850/900/1800/1900 UMTS FDD1/2/4/5/8, BT, Wi-Fi LTE Band1/2/3/4/5/7/8/12/17/28/66
Tested Tx Frequency:	824 – 849 MHz (GSM 850)
	1850 – 1910 MHz (GSM 1900)
	824–849 MHz (WCDMA 850 Band V)
	1710 – 1755 MHz (WCDMA 1700 Band IV)
	1850–1910 MHz (WCDMA1900 Band II)
	1860 – 1900 MHz (LTE Band 2)
	824.7 – 848.3 MHz (LTE Band 5)
	2500 – 2570 MHz (LTE Band 7)
	699 – 716 MHz (LTE Band 12)
	1710 – 1780 MHz (LTE Band 66)
	2412 – 2462 MHz (Wi-Fi 2.4G)
Test device Production information:	Production unit
Device type:	Portable device
Antenna type:	Integrated antenna

4.2 Internal Identification of EUT used during the test

EUT ID*	IMEI	HW	SW Version
EUT1	353181110001039	99651_1_10	00WW_0_070
EUT2	353181110001056	99651_1_10	00WW_0_070
EUT3	353181110001020	99651_1_10	00WW_0_070
EUT4	353181110001008	99651_1_10	00WW_0_070
EUT5	353181110001014	99651_1_10	00WW_0_070
EUT6	353181110000644	99651_1_10	00WW_0_070

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

Note: It is performed to test SAR with the EUT1-4 and conducted power with the EUT5-6.

4.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Battery	WT242	/	Jiade Energy Technology (Zhuhai) Co., Ltd
AE2	Headset	HS-34	/	New Leader Industry Co.,Ltd

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

5 TEST METHODOLOGY

5.1 Applicable Limit Regulations

ANSI C95.1–1992: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 1528–2013: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

KDB447498 D01: General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

KDB648474 D04 Handset SAR v01r03: SAR Evaluation Considerations for Wireless Handsets.

KDB941225 D01 SAR test for 3G devices v03r01: SAR Measurement Procedures for 3G Devices

KDB941225 D05 SAR for LTE Devices v02r05: SAR Evaluation Considerations for LTE Devices

KDB941225 D06 Hotspot Mode SAR v02r01: SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

KDB248227 D01 802.11 Wi-Fi SAR v02r02: SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS

KDB865664 D01SAR measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz.

KDB865664 D02RF Exposure Reporting v01r02: 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

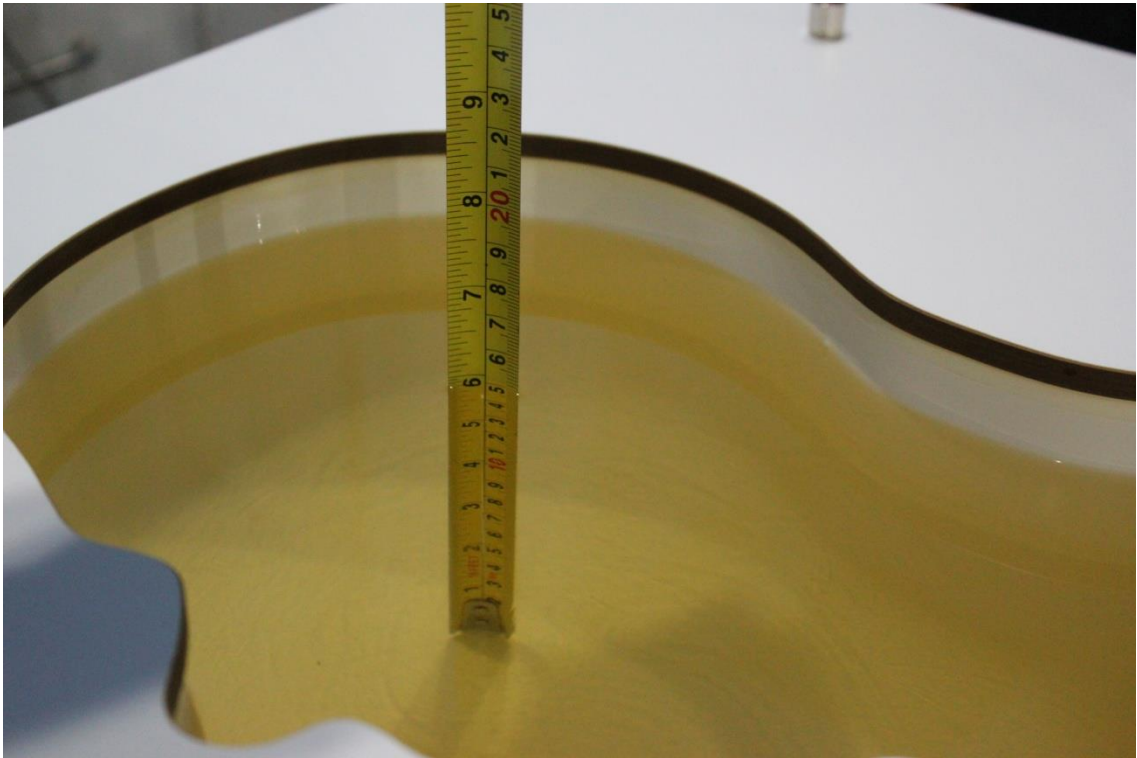
Frequency(MHz)	Liquid Type	Conductivity(σ)	$\pm 5\%$ Range	Permittivity(ϵ)	$\pm 5\%$ Range
750	Head	0.89	0.85~0.93	41.94	39.8~44.0
835	Head	0.90	0.86~0.95	41.5	39.4~43.6
1750	Head	1.37	1.30~1.44	40.08	38.1~42.1
1900	Head	1.40	1.33~1.47	40.0	38.0~42.0
2450	Head	1.80	1.71~1.89	39.2	37.2~41.2
2600	Head	1.96	1.86~2.06	39.01	37.1~41.0

7.2 Dielectric Performance

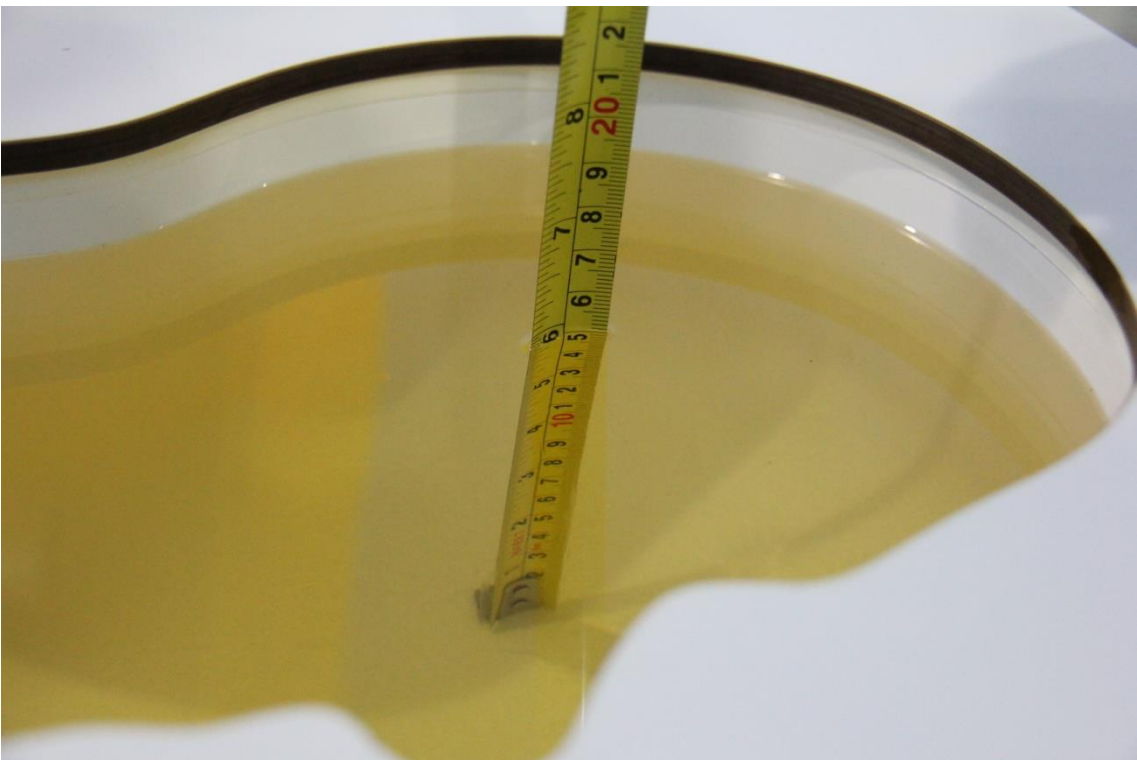
Table 7.2: Dielectric Performance of Tissue Simulating Liquid

Measurement Date (yyyy-mm-dd)	Type	Frequency	Permittivity ϵ	Drift (%)	Conductivity σ (S/m)	Drift (%)
2020-6-20	Head	750 MHz	41.7	-0.57	0.898	0.90
2020-6-21	Head	835 MHz	41.6	0.24	0.901	0.11
2020-6-22	Head	1750 MHz	40.68	1.50	1.38	0.73
2020-6-23	Head	1900 MHz	39.55	-1.13	1.39	-0.71
2020-6-24	Head	2450 MHz	53.36	1.25	1.966	0.82
2020-6-25	Head	2600 MHz	39.57	1.44	1.966	0.31

Note: The liquid temperature is 22.0°C



Picture 7-1 Liquid depth in the Head Phantom (750MHz)



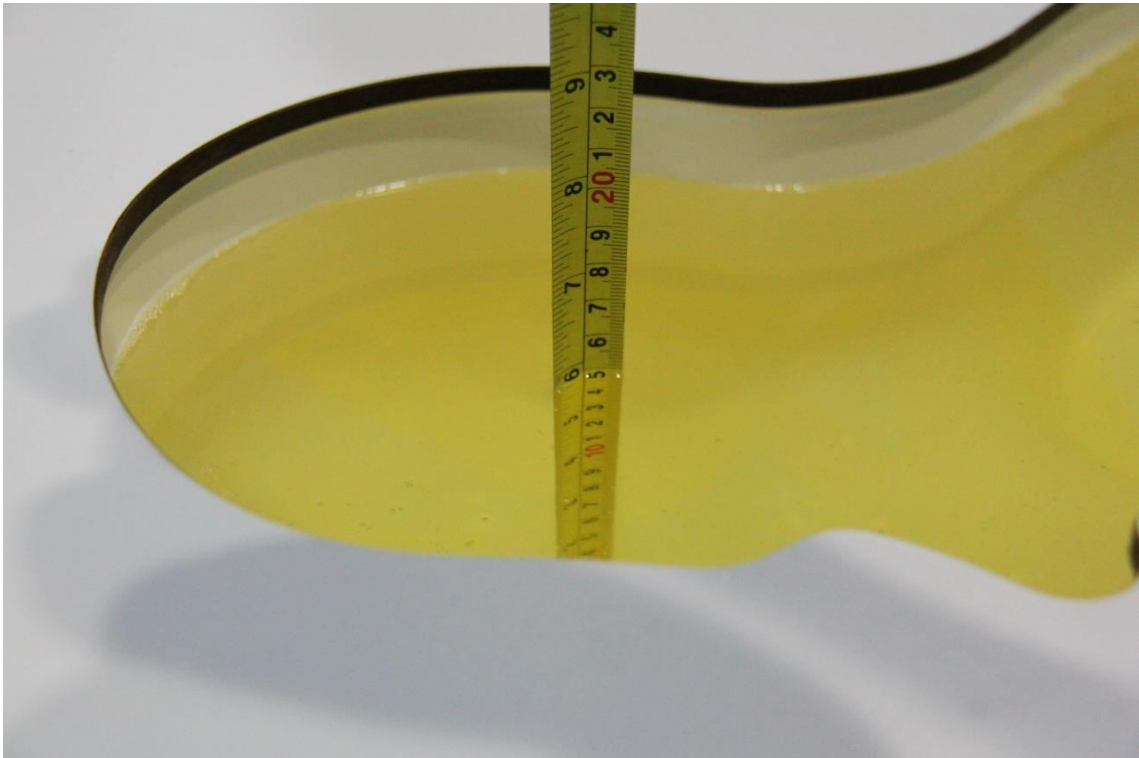
Picture 7-2 Liquid depth in the Head Phantom (835 MHz)



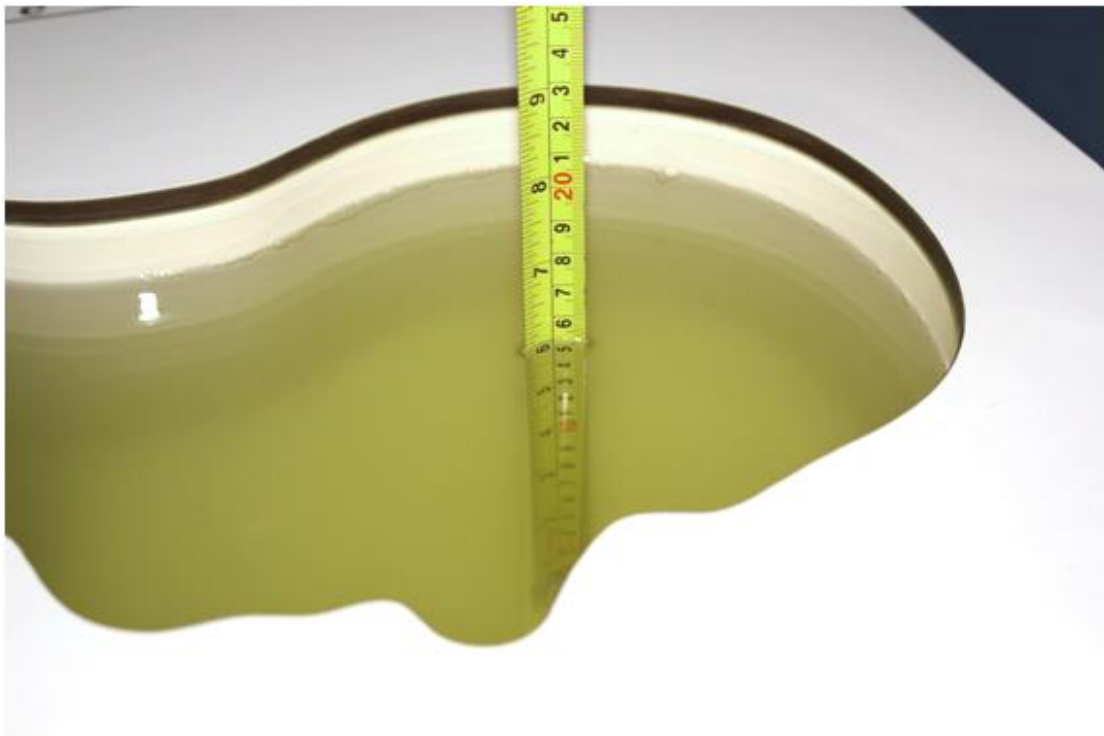
Picture 7-3 Liquid depth in the Head Phantom (1750 MHz)



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



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

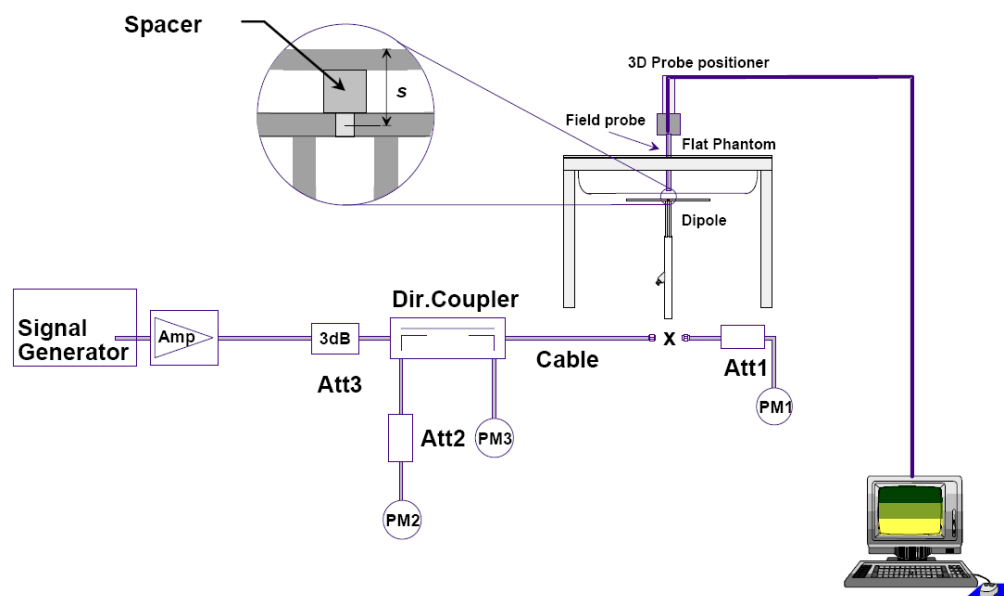


Picture 7-6 Liquid depth in the Head Phantom (2600 MHz)

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
2020-6-20	750 MHz	5.57	8.57	5.52	8.56	-0.90%	-0.12%
2020-6-21	835 MHz	6.29	9.70	6.28	9.8	-0.16%	1.03%
2020-6-22	1750 MHz	19.3	36.6	19.4	36.04	0.52%	-1.53%
2020-6-23	1900 MHz	20.8	39.7	20.6	40.28	-0.96%	1.46%
2020-6-24	2450 MHz	24.2	51.6	24.64	52.56	1.82%	1.86%
2020-6-25	2600 MHz	25.1	55.8	25.24	56.68	0.56%	1.58%

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.

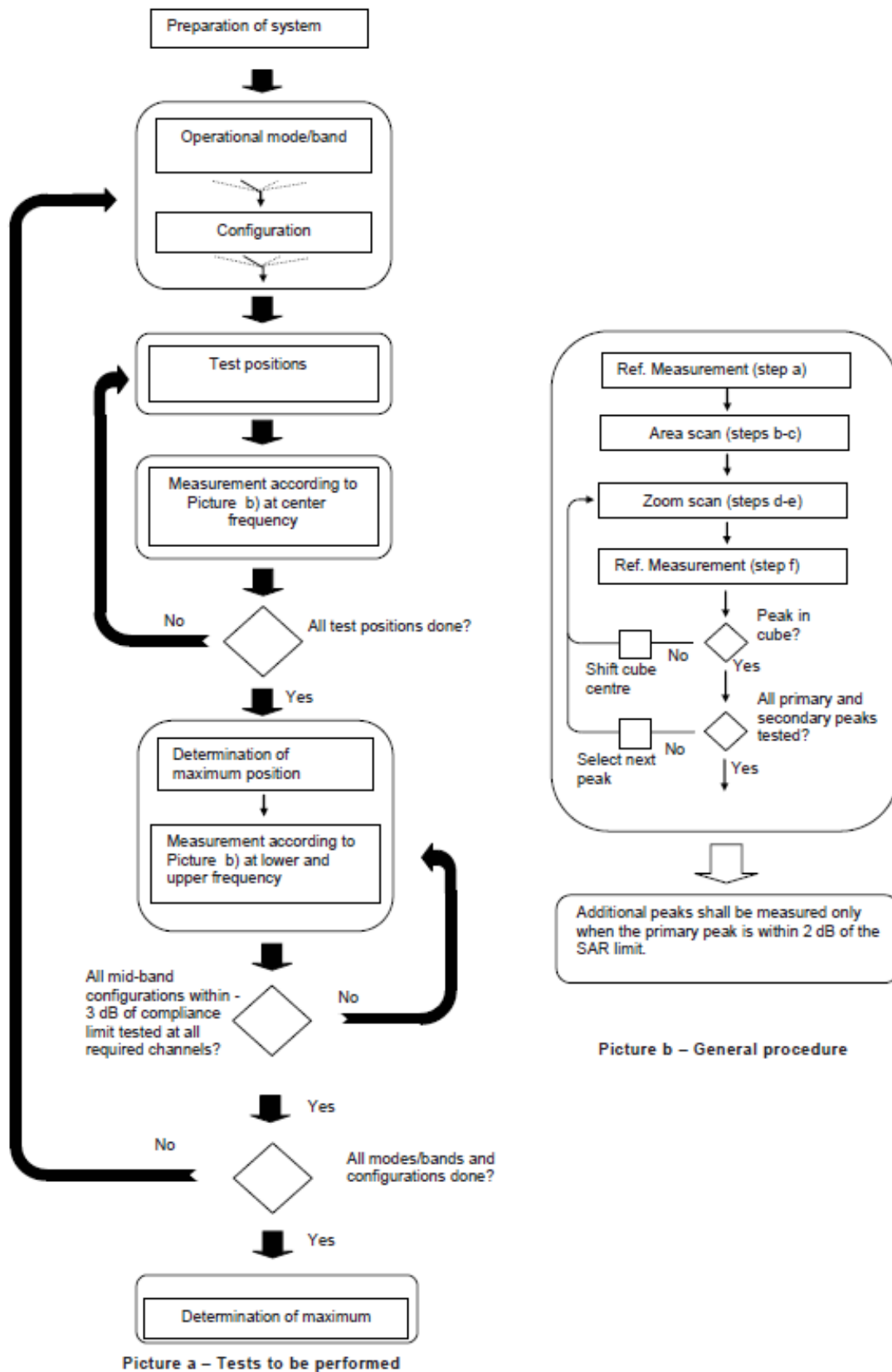
Step 1: The tests described in 9.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

- 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 9.1Block 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	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 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 <u>reported</u> 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	1.5	1.5	20	75
2	6/15	15/15	64	6/15	12/15	12/15	12/15	4	1	1.5	1.5	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}:47/15$ $\beta_{ed2}:47/15$	4	2	1.5	1.5	15	92
4	2/15	15/15	64	2/15	4/15	4/15	56/75	4	1	1.5	1.5	17	71
5	15/15	15/15	64	15/15	24/15	30/15	134/15	4	1	1.5	1.5	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.

SAR is evaluated separately according to the following procedures for the different test positions in each exposure condition – head, body, body-worn accessories and other use conditions. The procedures in the following subsections are applied separately to test each LTE frequency band.

1) QPSK with 1 RB allocation

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

2) QPSK with 50% RB allocation

The procedures required for 1 RB allocation in 1) are applied to measure the SAR for QPSK with 50% RB allocation.

3) QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in 1) and 2) are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

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.

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 section14 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-gSAR 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

For Main antenna, there are two sets of tune-up power, Normal power and Low power, used for different use cases for PCS1900/WCDMA1700/WCDMA1900 and LTE Band2/7/66. Low power status is applied for sensor test of above bands. For other bands, Normal power status is applied for both head and body test.

11.1 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.

Normal Power

Table 11.1-1: The conducted power measurement results for GSM, GPRS and EGPRS

GSM 850 Speech (GMSK)	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
	251	190	128			251	190	128
1 Txslot	33.60	33.56	33.51	35.00	/	/	/	/
GSM 850 GPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	251	190	128			251	190	128
1 Txslot	33.57	33.55	33.46	35.00	-9.03	24.54	24.52	24.43
2 Txslots	32.06	32.05	31.97	33.00	-6.02	26.04	26.03	25.95
3 Txslots	29.28	29.26	29.20	31.00	-4.26	25.02	25.00	24.94
4 Txslots	27.07	27.05	27.00	29.00	-3.01	24.06	24.04	23.99
GSM 850 EGPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	251	190	128			251	190	128
1 Txslot	33.57	33.54	33.46	35.00	-9.03	24.54	24.51	24.43
2 Txslots	32.07	32.05	31.98	33.00	-6.02	26.05	26.03	25.96
3 Txslots	29.28	29.26	29.21	31.00	-4.26	25.02	25.00	24.95
4 Txslots	27.08	27.05	27.00	29.00	-3.01	24.07	24.04	23.99
GSM 850 EGPRS (8PSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	251	190	128			251	190	128
1 Txslot	27.08	27.06	27.04	27.50	-9.03	18.05	18.03	18.01
2 Txslots	25.81	25.82	25.76	26.50	-6.02	19.79	19.80	19.74
3 Txslots	23.55	23.52	23.85	24.50	-4.26	19.29	19.26	19.59
4 Txslots	22.86	22.49	22.29	23.50	-3.01	19.85	19.48	19.28
PCS1900 Speech (GMSK)	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	30.53	30.47	30.70	31.50	/	/	/	/
PCS1900 GPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	30.50	30.46	30.67	31.50	-9.03	21.47	21.43	21.64
2 Txslots	29.15	29.11	29.34	30.00	-6.02	23.13	23.09	23.32

3 Txslots	26.52	26.49	26.76	28.00	-4.26	22.26	22.23	22.50
4 Txslots	24.47	24.45	24.74	26.00	-3.01	21.46	21.44	21.73
PCS1900 EGPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	30.50	30.45	30.66	31.50	-9.03	21.47	21.42	21.63
2 Txslots	29.15	29.11	29.34	30.00	-6.02	23.13	23.09	23.32
3 Txslots	26.51	26.48	26.76	28.00	-4.26	22.25	22.22	22.50
4 Txslots	24.47	24.44	24.74	26.00	-3.01	21.46	21.43	21.73
PCS1900 EGPRS (8PSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	25.50	25.87	26.23	27.00	-9.03	16.47	16.84	17.20
2 Txslots	24.60	24.87	25.13	26.00	-6.02	18.58	18.85	19.11
3 Txslots	22.75	22.95	23.18	24.00	-4.26	18.49	18.69	18.92
4 Txslots	21.70	22.20	22.13	23.00	-3.01	18.69	19.19	19.12

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 GSM850/GSM1900.

Low Power

Table 11.1-2: The conducted power measurement results for GSM, GPRS and EGPRS

PCS1900 Speech (GMSK)	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	30.18	30.15	30.33	31.50	/	/	/	/
PCS1900 GPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	30.16	30.12	30.32	31.50	-9.03	21.13	21.09	21.29
2 Txslots	25.70	25.70	25.97	27.00	-6.02	19.68	19.68	19.95
3 Txslots	23.69	23.68	23.96	25.00	-4.26	19.43	19.42	19.70
4 Txslots	21.62	21.62	21.92	23.00	-3.01	18.61	18.61	18.91
PCS1900 EGPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	30.15	30.11	30.33	31.50	-9.03	21.12	21.08	21.30
2 Txslots	25.69	25.69	25.98	27.00	-6.02	19.67	19.67	19.96
3 Txslots	23.69	23.68	23.97	25.00	-4.26	19.43	19.42	19.71
4 Txslots	21.62	21.62	21.92	23.00	-3.01	18.61	18.61	18.91
PCS1900	Measured Power (dBm)				calculation	Averaged Power (dBm)		

EGPRS (8PSK)	810	661	512			810	661	512
1 Txslot	25.61	25.89	25.95	27.00	-9.03	16.58	16.86	16.92
2 Txslots	21.81	22.14	22.25	23.00	-6.02	15.79	16.12	16.23
3 Txslots	19.65	19.99	20.10	21.00	-4.26	15.39	15.73	15.84
4 Txslots	18.40	18.80	19.13	20.00	-3.01	15.39	15.79	16.12

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 1Txslots for GSM1900.

11.2 WCDMA Measurement result

Table 11.2-1: The conducted Power for WCDMA- Normal power

Item	band	FDDV result			
	ARFCN	4233 (846.6MHz)	4182 (836.4MHz)	4132 (826.4MHz)	Tune up
WCDMA	1	24.62	24.52	24.58	25.00
HSUPA	1	21.6	21.61	21.59	22.00
	2	21.62	21.58	21.57	22.00
	3	22.62	22.61	22.58	23.00
	4	21.17	21.15	21.12	21.50
	5	22.58	22.60	22.56	23.00
DC-HSDPA	1	23.59	23.61	23.56	24.00
	2	23.55	23.57	23.53	24.00
	3	23.05	23.08	23.06	23.50
	4	23.04	23.05	23.03	23.50
HSPA+	1	23.25	23.19	23.15	23.50
Item	band	FDDIV result			
	ARFCN	1513 (1752.6MHz)	1412 (1732.4MHz)	1312 (1712.4MHz)	
WCDMA	1	23.15	23.22	23.14	23.50
HSUPA	1	20.14	20.15	20.17	21.00
	2	20.16	20.13	20.19	21.00
	3	21.14	21.12	21.16	22.00
	4	19.65	19.62	19.69	20.50
	5	21.13	21.11	21.18	22.00
DC-HSDPA	1	22.12	22.11	22.17	23.00
	2	22.01	22.04	22.11	23.00
	3	21.61	21.62	21.67	22.50
	4	21.58	21.63	21.66	22.50
HSPA+	1	21.73	21.56	21.76	22.50
Item	band	FDDII result			
	ARFCN	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)	Tune up
WCDMA	1	24.86	24.77	24.69	25.00
HSUPA	1	21.83	21.85	21.89	22.00
	2	21.81	21.84	21.86	22.00
	3	22.82	22.84	22.88	23.00
	4	21.33	21.35	21.41	21.50
	5	22.79	22.82	22.84	23.00
DC-HSDPA	1	23.85	23.86	23.88	24.00
	2	23.78	23.80	23.85	24.00
	3	23.3	23.32	23.36	23.50
	4	23.27	23.33	23.35	23.50
HSPA+	1	23.40	23.44	23.52	23.50

Table 11.2-2: The conducted Power for WCDMA- Low power

Item	band	FDDIV result			
	ARFCN	1513 (1752.6MHz)	1412 (1732.4MHz)	1312 (1712.4MHz)	
WCDMA	1	17.03	17.11	17.07	18.50
HSUPA	1	14.19	14.18	14.16	15.50
	2	14.23	14.20	14.17	15.50
	3	15.23	15.18	15.17	16.50
	4	13.7	13.64	13.66	15.00
	5	15.19	15.16	15.15	16.50
DC-HSDPA	1	15.19	15.27	15.26	16.50
	2	15.18	15.22	15.24	16.50
	3	14.62	14.72	14.74	16.00
	4	14.63	14.70	14.76	16.00
HSPA+	1	15.72	15.67	15.64	16.50
Item	band	FDDII result			
	ARFCN	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)	Tune up
WCDMA	1	21.27	21.30	21.25	21.50
HSUPA	1	18.33	18.28	18.26	19.50
	2	18.32	18.31	18.24	19.50
	3	19.31	19.23	19.29	20.50
	4	17.81	17.80	17.71	19.00
	5	19.26	19.22	19.25	20.50
DC-HSDPA	1	19.44	19.33	19.29	20.50
	2	19.39	19.28	19.30	20.50
	3	18.87	18.78	18.82	20.00
	4	18.88	18.76	18.79	20.00
HSPA+	1	19.95	19.81	19.82	20.50

11.3 LTE Measurement result

Table 13.3-1: Maximum Power Reduction (MPR) for LTE

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR (dB)
	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	3

Table 13.3-2: The tune up for LTE – Normal Power

Band	Tune up
LTE Band 2	25
LTE Band 5	25
LTE Band 7	24.5
LTE Band 12	25
LTE Band 66	24

Table 11.3-3: The tune up for LTE – Low Power

Band	Tune up
LTE Band 2	21
LTE Band 7	21.5
LTE Band 66	19

Normal power

Table 11.3-4: The conducted Power for LTE

Band 2					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	Actual output power (dBm)		
	RB offset		QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	1909.3 (19193)	23.80	22.77	22.12
		1880 (18900)	23.78	22.86	22.21
		1850.7 (18607)	23.84	23.15	22.50
	1RB-Middle (3)	1909.3 (19193)	24.00	22.89	22.24
		1880 (18900)	23.97	23.04	22.39
		1850.7 (18607)	24.07	23.22	22.57
	1RB-Low (0)	1909.3 (19193)	23.80	22.76	22.11
		1880 (18900)	23.79	22.84	22.19
		1850.7 (18607)	23.84	23.13	22.48
	3RB-High (3)	1909.3 (19193)	23.80	22.96	22.31
		1880 (18900)	23.80	22.88	22.23
		1850.7 (18607)	23.83	23.05	22.40
	3RB-Middle (1)	1909.3 (19193)	23.86	22.98	22.33
		1880 (18900)	23.86	22.91	22.26
		1850.7 (18607)	23.89	23.06	22.41
	3RB-Low (0)	1909.3 (19193)	23.83	22.87	22.22
		1880 (18900)	23.79	22.87	22.22
		1850.7 (18607)	23.88	23.00	22.35
	6RB (0)	1909.3 (19193)	23.00	21.98	21.33
		1880 (18900)	22.89	21.97	21.32
		1850.7 (18607)	22.97	21.83	21.18
3MHz	1RB-High (14)	1908.5 (19185)	23.86	22.82	22.17
		1880 (18900)	23.87	22.75	22.10
		1851.5 (18615)	23.93	23.23	22.58
	1RB-Middle (7)	1908.5 (19185)	24.02	22.99	22.34
		1880 (18900)	23.99	22.90	22.25
		1851.5 (18615)	24.05	23.35	22.70
	1RB-Low (0)	1908.5 (19185)	23.93	22.84	22.19
		1880 (18900)	23.82	22.80	22.15
		1851.5 (18615)	23.99	23.21	22.56
	8RB-High (7)	1908.5 (19185)	22.96	21.90	21.25
		1880 (18900)	22.94	21.99	21.34
		1851.5 (18615)	22.99	22.04	21.39
	8RB-Middle (4)	1908.5 (19185)	23.02	22.00	21.35
		1880 (18900)	22.98	22.04	21.39
		1851.5 (18615)	23.00	22.04	21.39
	8RB-Low (0)	1908.5 (19185)	23.05	21.96	21.31
		1880 (18900)	22.96	22.01	21.36
		1851.5 (18615)	23.04	21.99	21.34
	15RB (0)	1908.5 (19185)	22.91	21.87	21.22
		1880 (18900)	22.91	21.96	21.31
		1851.5 (18615)	22.94	21.92	21.27

5MHz	1RB-High (24)	1907.5 (19175)	23.84	22.80	22.15
		1880 (18900)	23.85	22.92	22.27
		1852.5 (18625)	23.78	23.30	22.65
	1RB-Middle (12)	1907.5 (19175)	24.07	23.08	22.43
		1880 (18900)	24.15	23.21	22.56
		1852.5 (18625)	24.03	23.53	22.88
	1RB-Low (0)	1907.5 (19175)	23.81	22.86	22.21
		1880 (18900)	23.86	22.95	22.30
		1852.5 (18625)	23.80	23.25	22.60
	12RB-High (13)	1907.5 (19175)	22.85	21.86	21.21
		1880 (18900)	22.84	21.92	21.27
		1852.5 (18625)	22.97	22.06	21.41
	12RB-Middle (6)	1907.5 (19175)	23.04	22.00	21.35
		1880 (18900)	22.99	22.02	21.37
		1852.5 (18625)	23.02	22.08	21.43
	12RB-Low (0)	1907.5 (19175)	22.97	21.97	21.32
		1880 (18900)	22.95	21.99	21.34
		1852.5 (18625)	22.93	22.01	21.36
	25RB (0)	1907.5 (19175)	22.94	21.83	21.18
		1880 (18900)	22.93	21.95	21.30
		1852.5 (18625)	22.95	21.99	21.34
10MHz	1RB-High (49)	1905 (19150)	23.89	22.77	22.12
		1880 (18900)	23.82	22.73	22.08
		1855 (18650)	23.87	23.23	22.58
	1RB-Middle (24)	1905 (19150)	23.97	22.95	22.30
		1880 (18900)	24.02	22.90	22.25
		1855 (18650)	24.03	23.37	22.72
	1RB-Low (0)	1905 (19150)	23.83	22.85	22.20
		1880 (18900)	23.79	22.75	22.10
		1855 (18650)	23.90	23.18	22.53
	25RB-High (25)	1905 (19150)	22.82	21.88	21.23
		1880 (18900)	22.85	21.89	21.24
		1855 (18650)	23.04	22.06	21.41
	25RB-Middle (12)	1905 (19150)	22.96	22.04	21.39
		1880 (18900)	22.95	21.98	21.33
		1855 (18650)	22.98	21.99	21.34
	25RB-Low (0)	1905 (19150)	22.91	21.96	21.31
		1880 (18900)	23.01	22.04	21.39
		1855 (18650)	22.94	21.99	21.34
	50RB (0)	1905 (19150)	22.85	21.91	21.26
		1880 (18900)	22.91	21.93	21.28
		1855 (18650)	22.96	21.99	21.34

15MHz	1RB-High (74)	1902.5 (19125)	23.90	23.00	22.35
		1880 (18900)	23.72	22.71	22.06
		1857.5 (18675)	23.77	23.13	22.48
	1RB-Middle (37)	1902.5 (19125)	23.97	23.20	22.55
		1880 (18900)	23.87	22.81	22.16
		1857.5 (18675)	23.89	23.24	22.59
	1RB-Low (0)	1902.5 (19125)	23.82	23.21	22.56
		1880 (18900)	23.79	22.68	22.03
		1857.5 (18675)	23.85	23.15	22.50
	36RB-High (38)	1902.5 (19125)	23.08	21.92	21.27
		1880 (18900)	22.91	21.87	21.22
		1857.5 (18675)	23.05	22.05	21.40
	36RB-Middle (19)	1902.5 (19125)	23.06	21.98	21.33
		1880 (18900)	23.03	21.93	21.28
		1857.5 (18675)	23.00	22.04	21.39
	36RB-Low (0)	1902.5 (19125)	22.92	21.80	21.15
		1880 (18900)	23.04	21.96	21.31
		1857.5 (18675)	23.00	21.99	21.34
	75RB (0)	1902.5 (19125)	22.98	21.89	21.24
		1880 (18900)	23.04	21.98	21.33
		1857.5 (18675)	23.02	22.00	21.35
20MHz	1RB-High (99)	1900 (19100)	23.01	22.33	21.44
		1880 (18900)	23.02	22.45	21.60
		1860 (18700)	23.00	22.52	21.49
	1RB-Middle (50)	1900 (19100)	23.36	22.92	21.88
		1880 (18900)	23.44	22.84	21.85
		1860 (18700)	23.44	22.99	21.81
	1RB-Low (0)	1900 (19100)	23.04	22.52	21.53
		1880 (18900)	23.08	22.36	21.58
		1860 (18700)	23.01	22.49	21.49
	50RB-High (50)	1900 (19100)	22.30	21.33	20.73
		1880 (18900)	22.21	21.20	20.53
		1860 (18700)	22.41	21.45	20.75
	50RB-Middle (25)	1900 (19100)	22.35	21.43	20.71
		1880 (18900)	22.30	21.32	20.65
		1860 (18700)	22.34	21.39	20.65
	50RB-Low (0)	1900 (19100)	22.33	21.37	20.65
		1880 (18900)	22.31	21.31	20.68
		1860 (18700)	22.24	21.27	20.56
	100RB (0)	1900 (19100)	22.30	21.33	20.68
		1880 (18900)	22.31	21.33	20.60
		1860 (18700)	22.29	21.36	20.65

Band 5					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	Actual output power (dBm)		
	RB offset		QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	848.3 (20643)	23.75	22.76	21.85
		836.5 (20525)	23.76	22.79	21.88
		824.7 (20407)	23.80	23.11	22.20
	1RB-Middle (3)	848.3 (20643)	23.95	22.92	22.01
		836.5 (20525)	23.95	22.98	22.07
		824.7 (20407)	24.00	23.24	22.33
	1RB-Low (0)	848.3 (20643)	23.68	22.71	21.80
		836.5 (20525)	23.79	22.73	21.82
		824.7 (20407)	23.82	23.08	22.17
	3RB-High (3)	848.3 (20643)	23.90	22.95	22.04
		836.5 (20525)	23.80	22.82	21.91
		824.7 (20407)	23.87	22.98	22.07
	3RB-Middle (1)	848.3 (20643)	23.90	23.00	22.09
		836.5 (20525)	23.85	22.87	21.96
		824.7 (20407)	23.91	23.03	22.12
	3RB-Low (0)	848.3 (20643)	23.84	22.98	22.07
		836.5 (20525)	23.83	22.80	21.89
		824.7 (20407)	23.92	23.00	22.09
	6RB (0)	848.3 (20643)	22.87	22.07	21.16
		836.5 (20525)	22.82	21.94	21.03
		824.7 (20407)	22.86	21.78	20.87
3MHz	1RB-High (14)	847.5 (20635)	23.76	22.73	21.82
		836.5 (20525)	23.78	22.64	21.73
		825.5 (20415)	23.89	23.15	22.24
	1RB-Middle (7)	847.5 (20635)	23.89	22.88	21.97
		836.5 (20525)	23.88	22.78	21.87
		825.5 (20415)	24.01	23.29	22.38
	1RB-Low (0)	847.5 (20635)	23.78	22.79	21.88
		836.5 (20525)	23.72	22.67	21.76
		825.5 (20415)	23.83	23.10	22.19
	8RB-High (7)	847.5 (20635)	22.78	21.88	20.97
		836.5 (20525)	22.79	21.91	21.00
		825.5 (20415)	22.82	21.93	21.02
	8RB-Middle (4)	847.5 (20635)	22.85	21.93	21.02
		836.5 (20525)	22.85	21.97	21.06
		825.5 (20415)	22.86	21.97	21.06
	8RB-Low (0)	847.5 (20635)	22.80	21.86	20.95
		836.5 (20525)	22.80	21.95	21.04
		825.5 (20415)	22.80	21.93	21.02
	15RB (0)	847.5 (20635)	22.82	21.80	20.89
		836.5 (20525)	22.81	21.86	20.95
		825.5 (20415)	22.79	21.86	20.95

5MHz	1RB-High (24)	846.5 (20625)	23.78	22.78	21.87
		836.5 (20525)	23.81	22.85	21.94
		826.5 (20425)	23.77	23.25	22.34
	1RB-Middle (12)	846.5 (20625)	23.99	23.00	22.09
		836.5 (20525)	24.06	23.09	22.18
		826.5 (20425)	23.97	23.47	22.56
	1RB-Low (0)	846.5 (20625)	23.72	22.78	21.87
		836.5 (20525)	23.79	22.86	21.95
		826.5 (20425)	23.70	23.18	22.27
	12RB-High (13)	846.5 (20625)	22.77	21.87	20.96
		836.5 (20525)	22.78	21.86	20.95
		826.5 (20425)	22.82	21.98	21.07
	12RB-Middle (6)	846.5 (20625)	22.82	21.92	21.01
		836.5 (20525)	22.83	21.95	21.04
		826.5 (20425)	22.85	22.00	21.09
	12RB-Low (0)	846.5 (20625)	22.78	21.86	20.95
		836.5 (20525)	22.77	21.87	20.96
		826.5 (20425)	22.73	21.96	21.05
	25RB (0)	846.5 (20625)	22.78	21.78	20.87
		836.5 (20525)	22.78	21.85	20.94
		826.5 (20425)	22.78	21.93	21.02
10MHz	1RB-High (49)	844 (20600)	23.44	22.73	21.83
		836.5 (20525)	23.39	22.39	21.74
		829 (20450)	23.40	22.31	21.74
	1RB-Middle (24)	844 (20600)	23.46	22.75	21.85
		836.5 (20525)	23.47	22.46	21.84
		829 (20450)	23.53	22.38	21.87
	1RB-Low (0)	844 (20600)	23.30	22.70	21.85
		836.5 (20525)	23.23	22.38	21.76
		829 (20450)	23.38	22.30	21.78
	25RB-High (25)	844 (20600)	22.34	21.41	20.68
		836.5 (20525)	22.38	21.47	20.69
		829 (20450)	22.42	21.43	20.72
	25RB-Middle (12)	844 (20600)	22.39	21.47	20.71
		836.5 (20525)	22.40	21.51	20.68
		829 (20450)	22.43	21.43	20.70
	25RB-Low (0)	844 (20600)	22.40	21.47	20.75
		836.5 (20525)	22.40	21.50	20.71
		829 (20450)	22.38	21.41	20.69
	50RB (0)	844 (20600)	22.37	21.38	20.73
		836.5 (20525)	22.40	21.45	20.69
		829 (20450)	22.40	21.38	20.67

Band 7					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	Actual output power (dBm)		
	RB offset		QPSK	16QAM	64QAM
5MHz	1RB-High (24)	2567.5 (21425)	23.57	22.61	20.73
		2535 (21100)	23.56	22.60	20.72
		2502.5 (20775)	23.38	22.78	20.90
	1RB-Middle (12)	2567.5 (21425)	23.80	22.81	20.93
		2535 (21100)	23.79	22.87	20.99
		2502.5 (20775)	23.61	23.02	21.14
	1RB-Low (0)	2567.5 (21425)	23.54	22.56	20.68
		2535 (21100)	23.52	22.59	20.71
		2502.5 (20775)	23.38	22.78	20.90
	12RB-High (13)	2567.5 (21425)	22.56	21.66	19.78
		2535 (21100)	22.55	21.58	19.70
		2502.5 (20775)	22.48	21.56	19.68
	12RB-Middle (6)	2567.5 (21425)	22.64	21.75	19.87
		2535 (21100)	22.59	21.61	19.73
		2502.5 (20775)	22.49	21.56	19.68
	12RB-Low (0)	2567.5 (21425)	22.62	21.68	19.80
		2535 (21100)	22.54	21.57	19.69
		2502.5 (20775)	22.39	21.49	19.61
	25RB (0)	2567.5 (21425)	22.57	21.62	19.74
		2535 (21100)	22.54	21.55	19.67
		2502.5 (20775)	22.43	21.47	19.59
10MHz	1RB-High (49)	2565 (21400)	23.58	22.58	20.70
		2535 (21100)	23.53	22.45	20.57
		2505 (20800)	23.48	22.75	20.87
	1RB-Middle (24)	2565 (21400)	23.63	22.66	20.78
		2535 (21100)	23.61	22.52	20.64
		2505 (20800)	23.53	22.77	20.89
	1RB-Low (0)	2565 (21400)	23.54	22.52	20.64
		2535 (21100)	23.50	22.41	20.53
		2505 (20800)	23.48	22.72	20.84
	25RB-High (25)	2565 (21400)	22.59	21.77	19.89
		2535 (21100)	22.61	21.61	19.73
		2505 (20800)	22.56	21.53	19.65
	25RB-Middle (12)	2565 (21400)	22.58	21.79	19.91
		2535 (21100)	22.57	21.61	19.73
		2505 (20800)	22.42	21.47	19.59
	25RB-Low (0)	2565 (21400)	22.59	21.71	19.83
		2535 (21100)	22.57	21.56	19.68
		2505 (20800)	22.41	21.42	19.54
	50RB (0)	2565 (21400)	22.58	21.69	19.81
		2535 (21100)	22.56	21.55	19.67
		2505 (20800)	22.45	21.45	19.57

15MHz	1RB-High (74)	2562.5 (21375)	23.46	22.36	20.57
		2535 (21100)	23.47	22.74	20.86
		2507.5 (20825)	23.39	22.67	20.79
	1RB-Middle (37)	2562.5 (21375)	23.56	22.44	20.56
		2535 (21100)	23.56	22.82	20.94
		2507.5 (20825)	23.52	22.73	20.85
	1RB-Low (0)	2562.5 (21375)	23.41	22.36	20.58
		2535 (21100)	23.40	22.75	20.87
		2507.5 (20825)	23.41	22.63	20.75
	36RB-High (38)	2562.5 (21375)	22.57	21.64	19.76
		2535 (21100)	22.66	21.61	19.73
		2507.5 (20825)	22.61	21.40	19.52
	36RB-Middle (19)	2562.5 (21375)	22.61	21.63	19.75
		2535 (21100)	22.61	21.59	19.71
		2507.5 (20825)	22.55	21.43	19.55
	36RB-Low (0)	2562.5 (21375)	22.54	21.61	19.73
		2535 (21100)	22.58	21.54	19.66
		2507.5 (20825)	22.49	21.38	19.50
	75RB (0)	2562.5 (21375)	22.56	21.65	19.77
		2535 (21100)	22.62	21.57	19.69
		2507.5 (20825)	22.52	21.44	19.56
20MHz	1RB-High (99)	2560 (21350)	23.35	22.72	20.84
		2535 (21100)	23.34	22.67	20.70
		2510 (20850)	23.24	22.69	20.65
	1RB-Middle (50)	2560 (21350)	23.72	23.12	21.13
		2535 (21100)	23.67	22.96	21.06
		2510 (20850)	23.61	22.99	21.89
	1RB-Low (0)	2560 (21350)	23.34	22.71	20.83
		2535 (21100)	23.26	22.63	20.71
		2510 (20850)	23.14	22.60	20.69
	50RB-High (50)	2560 (21350)	22.60	21.64	19.99
		2535 (21100)	22.56	21.54	19.91
		2510 (20850)	22.52	21.50	19.91
	50RB-Middle (25)	2560 (21350)	22.55	21.67	20.00
		2535 (21100)	22.53	21.52	19.94
		2510 (20850)	22.46	21.46	19.91
	50RB-Low (0)	2560 (21350)	22.52	21.63	19.96
		2535 (21100)	22.52	21.47	19.89
		2510 (20850)	22.32	21.25	19.78
	100RB (0)	2560 (21350)	22.62	21.68	19.98
		2535 (21100)	22.55	21.54	19.89
		2510 (20850)	22.45	21.42	19.85

Band 12					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	Actual output power (dBm)		
	RB offset		QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	715.3	23.75	22.71	21.76
		707.5	23.82	22.87	21.92
		699.7	23.81	23.13	22.18
	1RB-Middle (3)	715.3	23.91	22.86	21.91
		707.5	23.94	22.98	22.03
		699.7	23.99	23.26	22.31
	1RB-Low (0)	715.3	23.73	22.73	21.78
		707.5	23.81	22.80	21.85
		699.7	23.80	23.09	22.14
	3RB-High (3)	715.3	23.86	22.97	22.02
		707.5	23.87	22.85	21.90
		699.7	23.87	23.02	22.07
	3RB-Middle (1)	715.3	23.81	23.01	22.06
		707.5	23.87	22.89	21.94
		699.7	23.93	22.99	22.04
	3RB-Low (0)	715.3	23.82	22.96	22.01
		707.5	23.84	22.85	21.90
		699.7	23.85	22.98	22.03
	6RB (0)	715.3	22.84	21.96	21.01
		707.5	22.85	21.98	21.03
		699.7	22.78	21.67	20.72
3MHz	1RB-High (14)	714.5	23.82	22.69	21.74
		707.5	23.85	22.67	21.72
		700.5	23.89	23.18	22.23
	1RB-Middle (7)	714.5	23.92	22.92	21.97
		707.5	23.95	22.79	21.84
		700.5	23.99	23.30	22.35
	1RB-Low (0)	714.5	23.84	22.88	21.93
		707.5	23.77	22.67	21.72
		700.5	23.85	23.09	22.14
	8RB-High (7)	714.5	22.84	21.85	20.90
		707.5	22.83	21.93	20.98
		700.5	22.82	21.90	20.95
	8RB-Middle (4)	714.5	22.89	21.92	20.97
		707.5	22.88	21.99	21.04
		700.5	22.88	21.94	20.99
	8RB-Low (0)	714.5	22.86	21.88	20.93
		707.5	22.84	21.90	20.95
		700.5	22.84	21.93	20.98
	15RB (0)	714.5	22.80	21.76	20.81
		707.5	22.86	21.87	20.92
		700.5	22.82	21.84	20.89

5MHz	1RB-High (24)	713.5	23.76	22.74	21.79
		707.5	23.81	22.85	21.90
		701.5	23.74	23.27	22.32
	1RB-Middle (12)	713.5	24.03	23.05	22.10
		707.5	24.06	23.05	22.10
		701.5	24.05	23.48	22.53
	1RB-Low (0)	713.5	23.77	22.83	21.88
		707.5	23.82	22.87	21.92
		701.5	23.72	23.18	22.23
	12RB-High (13)	713.5	22.79	21.84	20.89
		707.5	22.79	21.84	20.89
		701.5	22.86	21.96	21.01
	12RB-Middle (6)	713.5	22.91	21.94	20.99
		707.5	22.87	21.92	20.97
		701.5	22.87	21.98	21.03
	12RB-Low (0)	713.5	22.84	21.88	20.93
		707.5	22.83	21.88	20.93
		701.5	22.84	21.97	21.02
	25RB (0)	713.5	22.85	21.82	20.87
		707.5	22.83	21.85	20.90
		701.5	22.83	21.94	20.99
10MHz	1RB-High (49)	711	23.21	22.12	21.79
		707.5	23.30	22.58	21.90
		704	23.21	22.24	21.92
	1RB-Middle (24)	711	23.29	22.24	21.98
		707.5	23.33	22.66	22.01
		704	23.34	22.35	22.04
	1RB-Low (0)	711	23.16	22.12	21.95
		707.5	23.24	22.57	22.01
		704	23.19	22.19	21.92
	25RB-High (25)	711	22.26	21.29	20.91
		707.5	22.24	21.31	20.88
		704	22.30	21.41	20.94
	25RB-Middle (12)	711	22.31	21.34	20.95
		707.5	22.28	21.33	20.92
		704	22.28	21.42	20.95
	25RB-Low (0)	711	22.25	21.32	20.98
		707.5	22.26	21.33	20.92
		704	22.30	21.43	20.98
	50RB (0)	711	22.25	21.27	20.93
		707.5	22.28	21.30	20.91
		704	22.32	21.34	20.93

Band 66					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	Actual output power (dBm)		
	RB offset		QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	1779.3 (132665)	23.12	22.06	21.15
		1745 (132322)	23.06	22.38	21.47
		1710.7 (131979)	22.94	22.03	21.12
	1RB-Middle (3)	1779.3 (132665)	23.33	22.20	21.29
		1745 (132322)	23.16	22.50	21.59
		1710.7 (131979)	23.12	22.13	21.22
	1RB-Low (0)	1779.3 (132665)	23.11	22.03	21.12
		1745 (132322)	23.06	22.36	21.45
		1710.7 (131979)	22.91	22.02	21.11
	3RB-High (3)	1779.3 (132665)	23.04	22.02	21.11
		1745 (132322)	23.06	22.20	21.29
		1710.7 (131979)	23.07	22.19	21.28
	3RB-Middle (1)	1779.3 (132665)	23.06	22.04	21.13
		1745 (132322)	23.09	22.27	21.36
		1710.7 (131979)	23.05	22.29	21.38
	3RB-Low (0)	1779.3 (132665)	23.01	22.00	21.09
		1745 (132322)	23.07	22.21	21.30
		1710.7 (131979)	22.98	22.23	21.32
	6RB (0)	1779.3 (132665)	22.20	21.26	20.35
		1745 (132322)	22.18	21.01	20.10
		1710.7 (131979)	22.11	21.28	20.37
3MHz	1RB-High (14)	1778.5 (132657)	23.15	21.86	20.95
		1745 (132322)	23.12	22.39	21.48
		1711.5 (131987)	23.00	22.05	21.14
	1RB-Middle (7)	1778.5 (132657)	23.24	22.04	21.13
		1745 (132322)	23.23	22.43	21.52
		1711.5 (131987)	23.16	22.21	21.30
	1RB-Low (0)	1778.5 (132657)	23.11	21.97	21.06
		1745 (132322)	23.11	22.39	21.48
		1711.5 (131987)	23.04	22.08	21.17
	8RB-High (7)	1778.5 (132657)	22.17	21.13	20.22
		1745 (132322)	22.15	21.12	20.21
		1711.5 (131987)	22.09	21.10	20.19
	8RB-Middle (4)	1778.5 (132657)	22.21	21.19	20.28
		1745 (132322)	22.17	21.17	20.26
		1711.5 (131987)	22.13	21.14	20.23
	8RB-Low (0)	1778.5 (132657)	22.21	21.19	20.28
		1745 (132322)	22.17	21.16	20.25
		1711.5 (131987)	22.11	21.09	20.18
	15RB (0)	1778.5 (132657)	22.12	21.09	20.18
		1745 (132322)	22.10	21.13	20.22
		1711.5 (131987)	22.05	21.03	20.12

5MHz	1RB-High (24)	1777.5 (132647)	23.09	22.10	21.19
		1745 (132322)	22.99	22.47	21.56
		1712.5 (131997)	23.00	22.11	21.20
	1RB-Middle (12)	1777.5 (132647)	23.32	22.35	21.44
		1745 (132322)	23.23	22.46	21.55
		1712.5 (131997)	23.28	22.33	21.42
	1RB-Low (0)	1777.5 (132647)	23.08	22.10	21.19
		1745 (132322)	22.99	22.45	21.54
		1712.5 (131997)	22.95	22.09	21.18
	12RB-High (13)	1777.5 (132647)	22.09	21.07	20.16
		1745 (132322)	22.11	21.20	20.29
		1712.5 (131997)	22.17	21.14	20.23
	12RB-Middle (6)	1777.5 (132647)	22.19	21.17	20.26
		1745 (132322)	22.15	21.23	20.32
		1712.5 (131997)	22.15	21.15	20.24
	12RB-Low (0)	1777.5 (132647)	22.14	21.11	20.20
		1745 (132322)	22.12	21.22	20.31
		1712.5 (131997)	22.07	21.07	20.16
	25RB (0)	1777.5 (132647)	22.08	21.03	20.12
		1745 (132322)	22.10	21.15	20.24
		1712.5 (131997)	22.08	21.04	20.13
10MHz	1RB-High (49)	1775 (132622)	23.10	21.91	21.00
		1745 (132322)	23.10	22.38	21.47
		1715 (132022)	23.01	22.08	21.17
	1RB-Middle (24)	1775 (132622)	23.24	22.03	21.12
		1745 (132322)	23.22	22.48	21.57
		1715 (132022)	23.10	22.18	21.27
	1RB-Low (0)	1775 (132622)	23.07	21.99	21.08
		1745 (132322)	23.06	22.37	21.46
		1715 (132022)	22.96	22.02	21.11
	25RB-High (25)	1775 (132622)	22.07	21.08	20.17
		1745 (132322)	22.12	21.12	20.21
		1715 (132022)	22.19	21.24	20.33
	25RB-Middle (12)	1775 (132622)	22.15	21.16	20.25
		1745 (132322)	22.14	21.15	20.24
		1715 (132022)	22.15	21.24	20.33
	25RB-Low (0)	1775 (132622)	22.21	21.20	20.29
		1745 (132322)	22.13	21.13	20.22
		1715 (132022)	22.11	21.21	20.30
	50RB (0)	1775 (132622)	22.13	21.09	20.18
		1745 (132322)	22.12	21.13	20.22
		1715 (132022)	22.15	21.17	20.26

15MHz	1RB-High (74)	1772.5 (132597)	23.01	22.26	21.35
		1745 (132322)	23.03	22.29	21.38
		1717.5 (132047)	22.97	21.94	21.03
	1RB-Middle (37)	1772.5 (132597)	23.16	22.41	21.50
		1745 (132322)	23.17	22.40	21.49
		1717.5 (132047)	23.09	22.03	21.12
	1RB-Low (0)	1772.5 (132597)	23.01	22.35	21.44
		1745 (132322)	23.03	22.32	21.41
		1717.5 (132047)	22.96	21.91	21.00
	36RB-High (38)	1772.5 (132597)	22.27	21.19	20.28
		1745 (132322)	22.26	21.12	20.21
		1717.5 (132047)	22.26	21.18	20.27
	36RB-Middle (19)	1772.5 (132597)	22.28	21.22	20.31
		1745 (132322)	22.27	21.15	20.24
		1717.5 (132047)	22.23	21.13	20.22
	36RB-Low (0)	1772.5 (132597)	22.32	21.23	20.32
		1745 (132322)	22.26	21.10	20.19
		1717.5 (132047)	22.16	21.12	20.21
	75RB (0)	1772.5 (132597)	22.27	21.19	20.28
		1745 (132322)	22.25	21.18	20.27
		1717.5 (132047)	22.24	21.17	20.26
20MHz	1RB-High (99)	1770 (132572)	23.11	22.44	21.51
		1745 (132322)	23.12	22.48	21.59
		1720 (132072)	23.15	22.67	21.55
	1RB-Middle (50)	1770 (132572)	23.45	22.84	21.89
		1745 (132322)	23.52	22.82	21.86
		1720 (132072)	23.55	23.00	21.87
	1RB-Low (0)	1770 (132572)	23.04	22.47	21.53
		1745 (132322)	23.11	22.45	21.58
		1720 (132072)	23.05	22.47	21.57
	50RB-High (50)	1770 (132572)	22.22	21.27	20.63
		1745 (132322)	22.30	21.28	20.64
		1720 (132072)	22.42	21.48	20.75
	50RB-Middle (25)	1770 (132572)	22.33	21.38	20.75
		1745 (132322)	22.35	21.31	20.72
		1720 (132072)	22.38	21.43	20.69
	50RB-Low (0)	1770 (132572)	22.36	21.38	20.80
		1745 (132322)	22.35	21.32	20.77
		1720 (132072)	22.37	21.39	20.68
	100RB (0)	1770 (132572)	22.29	21.33	20.66
		1745 (132322)	22.33	21.31	20.66
		1720 (132072)	22.41	21.44	20.70

Low power

Band 2					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	Actual output power (dBm)		
	RB offset		QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	1909.3 (19193)	20.25	19.81	18.82
		1880 (18900)	20.29	19.89	18.90
		1850.7 (18607)	20.31	20.12	19.13
	1RB-Middle (3)	1909.3 (19193)	20.44	19.98	18.99
		1880 (18900)	20.50	20.10	19.11
		1850.7 (18607)	20.46	20.28	19.29
	1RB-Low (0)	1909.3 (19193)	20.22	19.78	18.79
		1880 (18900)	20.29	19.90	18.91
		1850.7 (18607)	20.29	20.10	19.11
	3RB-High (3)	1909.3 (19193)	20.44	20.04	19.05
		1880 (18900)	20.40	19.89	18.90
		1850.7 (18607)	20.35	20.03	19.04
	3RB-Middle (1)	1909.3 (19193)	20.45	20.03	19.04
		1880 (18900)	20.46	19.97	18.98
		1850.7 (18607)	20.47	19.97	18.98
	3RB-Low (0)	1909.3 (19193)	20.39	19.99	19.00
		1880 (18900)	20.38	19.93	18.94
		1850.7 (18607)	20.38	20.04	19.05
	6RB (0)	1909.3 (19193)	19.38	18.98	17.99
		1880 (18900)	19.36	18.96	17.97
		1850.7 (18607)	19.38	18.71	17.72
3MHz	1RB-High (14)	1908.5 (19185)	20.28	19.81	18.82
		1880 (18900)	20.31	19.73	18.74
		1851.5 (18615)	20.38	20.20	19.21
	1RB-Middle (7)	1908.5 (19185)	20.44	19.98	18.99
		1880 (18900)	20.48	19.92	18.93
		1851.5 (18615)	20.52	20.31	19.32
	1RB-Low (0)	1908.5 (19185)	20.30	19.87	18.88
		1880 (18900)	20.28	19.79	18.80
		1851.5 (18615)	20.34	20.17	19.18
	8RB-High (7)	1908.5 (19185)	19.36	18.83	17.84
		1880 (18900)	19.36	18.90	17.91
		1851.5 (18615)	19.32	18.88	17.89
	8RB-Middle (4)	1908.5 (19185)	19.41	18.89	17.90
		1880 (18900)	19.40	18.94	17.95
		1851.5 (18615)	19.38	18.93	17.94
	8RB-Low (0)	1908.5 (19185)	19.37	18.81	17.82
		1880 (18900)	19.38	18.95	17.96
		1851.5 (18615)	19.39	18.87	17.88
	15RB (0)	1908.5 (19185)	19.39	18.76	17.77
		1880 (18900)	19.39	18.86	17.87
		1851.5 (18615)	19.37	18.80	17.81

5MHz	1RB-High (24)	1907.5 (19175)	20.28	19.81	18.82
		1880 (18900)	20.35	19.91	18.92
		1852.5 (18625)	20.23	20.19	19.20
	1RB-Middle (12)	1907.5 (19175)	20.55	20.12	19.13
		1880 (18900)	20.63	20.16	19.17
		1852.5 (18625)	20.53	20.48	19.49
	1RB-Low (0)	1907.5 (19175)	20.27	19.81	18.82
		1880 (18900)	20.32	19.87	18.88
		1852.5 (18625)	20.20	20.15	19.16
	12RB-High (13)	1907.5 (19175)	19.41	18.86	17.87
		1880 (18900)	19.43	18.89	17.90
		1852.5 (18625)	19.42	18.92	17.93
	12RB-Middle (6)	1907.5 (19175)	19.44	18.93	17.94
		1880 (18900)	19.46	18.95	17.96
		1852.5 (18625)	19.43	19.03	18.04
	12RB-Low (0)	1907.5 (19175)	19.38	18.85	17.86
		1880 (18900)	19.41	18.88	17.89
		1852.5 (18625)	19.35	18.87	17.88
	25RB (0)	1907.5 (19175)	19.36	18.73	17.74
		1880 (18900)	19.42	18.85	17.86
		1852.5 (18625)	19.38	18.84	17.85
10MHz	1RB-High (49)	1905 (19150)	20.32	19.80	18.81
		1880 (18900)	20.31	19.78	18.79
		1855 (18650)	20.36	20.12	19.13
	1RB-Middle (24)	1905 (19150)	20.40	19.93	18.94
		1880 (18900)	20.39	19.88	18.89
		1855 (18650)	20.45	20.26	19.27
	1RB-Low (0)	1905 (19150)	20.26	19.80	18.81
		1880 (18900)	20.28	19.74	18.75
		1855 (18650)	20.34	20.12	19.13
	25RB-High (25)	1905 (19150)	19.41	18.88	17.89
		1880 (18900)	19.45	18.91	17.92
		1855 (18650)	19.39	18.83	17.84
	25RB-Middle (12)	1905 (19150)	19.38	18.92	17.93
		1880 (18900)	19.43	18.85	17.86
		1855 (18650)	19.41	18.86	17.87
	25RB-Low (0)	1905 (19150)	19.49	18.97	17.98
		1880 (18900)	19.50	18.86	17.87
		1855 (18650)	19.28	18.77	17.78
	50RB (0)	1905 (19150)	19.42	18.87	17.88
		1880 (18900)	19.49	18.86	17.87
		1855 (18650)	19.39	18.81	17.82

15MHz	1RB-High (74)	1902.5 (19125)	20.25	20.17	19.18
		1880 (18900)	20.23	19.65	18.66
		1857.5 (18675)	20.57	20.04	19.05
	1RB-Middle (37)	1902.5 (19125)	20.33	20.25	19.26
		1880 (18900)	20.34	19.78	18.79
		1857.5 (18675)	20.34	20.13	19.14
	1RB-Low (0)	1902.5 (19125)	20.28	20.16	19.17
		1880 (18900)	20.23	19.66	18.67
		1857.5 (18675)	20.30	20.06	19.07
	36RB-High (38)	1902.5 (19125)	19.36	18.73	17.74
		1880 (18900)	19.36	18.80	17.81
		1857.5 (18675)	19.40	18.82	17.83
	36RB-Middle (19)	1902.5 (19125)	19.44	18.75	17.76
		1880 (18900)	19.44	18.80	17.81
		1857.5 (18675)	19.39	18.84	17.85
	36RB-Low (0)	1902.5 (19125)	19.38	18.75	17.76
		1880 (18900)	19.42	18.76	17.77
		1857.5 (18675)	19.31	18.75	17.76
	75RB (0)	1902.5 (19125)	19.38	18.75	17.76
		1880 (18900)	19.38	18.79	17.80
		1857.5 (18675)	19.35	18.75	17.76
20MHz	1RB-High (99)	1900 (19100)	20.00	19.56	18.38
		1880 (18900)	20.01	19.51	18.35
		1860 (18700)	20.05	19.59	18.33
	1RB-Middle (50)	1900 (19100)	20.50	20.06	18.67
		1880 (18900)	20.44	19.86	19.52
		1860 (18700)	20.46	20.05	18.56
	1RB-Low (0)	1900 (19100)	20.04	19.62	18.48
		1880 (18900)	20.02	19.45	18.41
		1860 (18700)	20.06	19.59	18.37
	50RB-High (50)	1900 (19100)	19.47	18.55	17.49
		1880 (18900)	19.16	18.12	17.45
		1860 (18700)	19.40	18.51	17.40
	50RB-Middle (25)	1900 (19100)	19.40	18.43	17.54
		1880 (18900)	19.34	18.33	17.53
		1860 (18700)	19.36	18.45	17.40
	50RB-Low (0)	1900 (19100)	19.36	18.41	17.55
		1880 (18900)	19.41	18.35	17.52
		1860 (18700)	19.35	18.45	17.37
	100RB (0)	1900 (19100)	19.44	18.48	17.50
		1880 (18900)	19.27	18.28	17.49
		1860 (18700)	19.39	18.55	17.38

Band 7					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	Actual output power (dBm)		
	RB offset		QPSK	16QAM	64QAM
5MHz	1RB-High (24)	2567.5 (21425)	20.11	19.32	18.33
		2535 (21100)	20.27	19.52	18.53
		2502.5 (20775)	20.24	19.76	18.77
	1RB-Middle (12)	2567.5 (21425)	20.45	19.68	18.69
		2535 (21100)	20.54	19.80	18.81
		2502.5 (20775)	20.48	19.99	19.00
	1RB-Low (0)	2567.5 (21425)	20.16	19.39	18.40
		2535 (21100)	20.25	19.50	18.51
		2502.5 (20775)	20.18	19.76	18.77
	12RB-High (13)	2567.5 (21425)	19.25	18.33	17.34
		2535 (21100)	19.38	18.50	17.51
		2502.5 (20775)	19.32	18.51	17.52
	12RB-Middle (6)	2567.5 (21425)	19.38	18.50	17.51
		2535 (21100)	19.50	18.58	17.59
		2502.5 (20775)	19.41	18.57	17.58
	12RB-Low (0)	2567.5 (21425)	19.33	18.42	17.43
		2535 (21100)	19.40	18.51	17.52
		2502.5 (20775)	19.29	18.49	17.50
	25RB (0)	2567.5 (21425)	19.34	18.33	17.34
		2535 (21100)	19.39	18.50	17.51
		2502.5 (20775)	19.39	18.44	17.45
10MHz	1RB-High (49)	2565 (21400)	20.27	19.37	18.38
		2535 (21100)	20.32	19.40	18.41
		2505 (20800)	20.23	19.72	18.73
	1RB-Middle (24)	2565 (21400)	20.38	19.50	18.51
		2535 (21100)	20.46	19.53	18.54
		2505 (20800)	20.41	19.92	18.93
	1RB-Low (0)	2565 (21400)	20.30	19.39	18.40
		2535 (21100)	20.27	19.37	18.38
		2505 (20800)	20.24	19.72	18.73
	25RB-High (25)	2565 (21400)	19.31	18.41	17.42
		2535 (21100)	19.43	18.54	17.55
		2505 (20800)	19.47	18.50	17.51
	25RB-Middle (12)	2565 (21400)	19.41	18.52	17.53
		2535 (21100)	19.48	18.55	17.56
		2505 (20800)	19.42	18.45	17.46
	25RB-Low (0)	2565 (21400)	19.42	18.57	17.58
		2535 (21100)	19.50	18.59	17.60
		2505 (20800)	19.35	18.43	17.44
	50RB (0)	2565 (21400)	19.38	18.46	17.47
		2535 (21100)	19.49	18.52	17.53
		2505 (20800)	19.41	18.47	17.48

15MHz	1RB-High (74)	2562.5 (21375)	20.20	19.65	18.66
		2535 (21100)	20.28	19.88	18.89
		2507.5 (20825)	20.19	19.22	18.23
	1RB-Middle (37)	2562.5 (21375)	20.35	19.76	18.77
		2535 (21100)	20.39	19.96	18.97
		2507.5 (20825)	20.31	19.33	18.34
	1RB-Low (0)	2562.5 (21375)	20.25	19.70	18.71
		2535 (21100)	20.25	19.88	18.89
		2507.5 (20825)	20.22	19.27	18.28
	36RB-High (38)	2562.5 (21375)	19.27	18.35	17.36
		2535 (21100)	19.42	18.43	17.44
		2507.5 (20825)	19.39	18.40	17.41
	36RB-Middle (19)	2562.5 (21375)	19.33	18.42	17.43
		2535 (21100)	19.47	18.43	17.44
		2507.5 (20825)	19.44	18.39	17.40
	36RB-Low (0)	2562.5 (21375)	19.39	18.43	17.44
		2535 (21100)	19.47	18.45	17.46
		2507.5 (20825)	19.38	18.33	17.34
	75RB (0)	2562.5 (21375)	19.32	18.35	17.36
		2535 (21100)	19.48	18.45	17.46
		2507.5 (20825)	19.30	18.36	17.37
20MHz	1RB-High (99)	2560 (21350)	19.90	19.47	18.16
		2535 (21100)	20.01	19.66	18.23
		2510 (20850)	19.93	19.56	18.26
	1RB-Middle (50)	2560 (21350)	20.46	19.90	18.61
		2535 (21100)	20.36	20.02	18.64
		2510 (20850)	20.38	19.92	18.53
	1RB-Low (0)	2560 (21350)	19.94	19.47	18.25
		2535 (21100)	20.02	19.63	18.29
		2510 (20850)	19.97	19.51	18.06
	50RB-High (50)	2560 (21350)	19.13	18.12	17.08
		2535 (21100)	19.30	18.37	17.26
		2510 (20850)	19.28	18.33	17.23
	50RB-Middle (25)	2560 (21350)	19.29	18.29	17.23
		2535 (21100)	19.41	18.47	17.36
		2510 (20850)	19.29	18.33	17.33
	50RB-Low (0)	2560 (21350)	19.36	18.40	17.38
		2535 (21100)	19.44	18.50	17.47
		2510 (20850)	19.23	18.23	17.25
	100RB (0)	2560 (21350)	19.28	18.30	17.20
		2535 (21100)	19.41	18.48	17.38
		2510 (20850)	19.26	18.29	17.24

Band 66					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	Actual output power (dBm)		
	RB offset		QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	1779.3 (132665)	18.43	17.85	16.53
		1745 (132322)	18.52	18.20	16.54
		1710.7 (131979)	18.42	17.85	16.54
	1RB-Middle (3)	1779.3 (132665)	18.59	18.09	16.64
		1745 (132322)	18.71	18.34	16.70
		1710.7 (131979)	18.57	17.95	16.64
	1RB-Low (0)	1779.3 (132665)	18.46	17.76	16.55
		1745 (132322)	18.51	18.18	16.55
		1710.7 (131979)	18.20	17.71	16.54
	3RB-High (3)	1779.3 (132665)	18.54	17.88	16.50
		1745 (132322)	18.55	18.01	16.54
		1710.7 (131979)	18.18	18.03	16.55
	3RB-Middle (1)	1779.3 (132665)	18.45	17.93	16.55
		1745 (132322)	18.62	18.09	16.62
		1710.7 (131979)	18.32	17.99	16.61
	3RB-Low (0)	1779.3 (132665)	18.44	17.80	16.51
		1745 (132322)	18.55	18.01	16.54
		1710.7 (131979)	18.12	17.97	16.55
	6RB (0)	1779.3 (132665)	17.50	16.85	15.41
		1745 (132322)	17.55	16.76	15.52
		1710.7 (131979)	17.31	17.00	15.45
3MHz	1RB-High (14)	1778.5 (132657)	18.56	17.82	16.65
		1745 (132322)	18.66	18.28	16.74
		1711.5 (131987)	18.58	17.97	16.71
	1RB-Middle (7)	1778.5 (132657)	18.65	17.96	16.74
		1745 (132322)	18.80	18.46	16.79
		1711.5 (131987)	18.72	18.13	16.84
	1RB-Low (0)	1778.5 (132657)	18.50	17.87	16.65
		1745 (132322)	18.66	18.32	16.73
		1711.5 (131987)	18.50	18.00	16.62
	8RB-High (7)	1778.5 (132657)	17.54	16.99	15.56
		1745 (132322)	17.59	16.95	15.60
		1711.5 (131987)	17.56	16.92	15.57
	8RB-Middle (4)	1778.5 (132657)	17.59	16.99	15.55
		1745 (132322)	17.62	17.03	15.62
		1711.5 (131987)	17.55	16.94	15.61
	8RB-Low (0)	1778.5 (132657)	17.55	17.01	15.56
		1745 (132322)	17.57	17.02	15.61
		1711.5 (131987)	17.60	16.92	15.56
	15RB (0)	1778.5 (132657)	17.55	16.90	15.53
		1745 (132322)	17.57	16.91	15.55
		1711.5 (131987)	17.58	16.89	15.50

5MHz	1RB-High (24)	1777.5 (132647)	18.41	17.87	16.46
		1745 (132322)	18.45	18.25	16.46
		1712.5 (131997)	18.51	17.92	18.48
	1RB-Middle (12)	1777.5 (132647)	18.71	18.16	16.72
		1745 (132322)	18.72	18.50	16.83
		1712.5 (131997)	18.77	18.19	16.88
	1RB-Low (0)	1777.5 (132647)	18.45	17.90	16.46
		1745 (132322)	18.45	18.25	16.49
		1712.5 (131997)	18.44	17.85	16.50
	12RB-High (13)	1777.5 (132647)	17.48	16.79	15.43
		1745 (132322)	17.50	16.89	15.48
		1712.5 (131997)	17.54	16.86	15.52
	12RB-Middle (6)	1777.5 (132647)	17.51	16.86	15.50
		1745 (132322)	17.57	16.98	15.54
		1712.5 (131997)	17.57	16.88	15.52
	12RB-Low (0)	1777.5 (132647)	17.51	16.88	15.49
		1745 (132322)	17.53	16.96	15.54
		1712.5 (131997)	17.50	16.80	15.48
	25RB (0)	1777.5 (132647)	17.45	16.78	15.43
		1745 (132322)	17.51	16.86	15.53
		1712.5 (131997)	17.50	16.74	15.47
10MHz	1RB-High (49)	1775 (132622)	18.40	17.76	16.49
		1745 (132322)	18.52	18.16	16.60
		1715 (132022)	18.47	17.83	16.59
	1RB-Middle (24)	1775 (132622)	18.61	17.91	16.65
		1745 (132322)	18.71	18.34	16.83
		1715 (132022)	18.65	18.03	16.76
	1RB-Low (0)	1775 (132622)	18.43	17.76	16.58
		1745 (132322)	18.52	18.15	16.59
		1715 (132022)	18.42	17.81	16.58
	25RB-High (25)	1775 (132622)	17.55	16.84	15.48
		1745 (132322)	17.55	16.89	15.55
		1715 (132022)	17.57	17.00	15.57
	25RB-Middle (12)	1775 (132622)	17.59	16.90	15.53
		1745 (132322)	17.59	16.89	15.57
		1715 (132022)	17.60	17.02	15.56
	25RB-Low (0)	1775 (132622)	17.61	16.93	15.57
		1745 (132322)	17.61	16.94	15.63
		1715 (132022)	17.54	16.94	15.51
	50RB (0)	1775 (132622)	17.59	16.87	15.51
		1745 (132322)	17.60	16.87	15.61
		1715 (132022)	17.59	16.91	15.55

15MHz	1RB-High (74)	1772.5 (132597)	18.28	17.55	16.37
		1745 (132322)	18.39	18.00	16.40
		1717.5 (132047)	18.37	18.23	16.46
	1RB-Middle (37)	1772.5 (132597)	18.53	17.76	16.67
		1745 (132322)	18.61	18.20	16.68
		1717.5 (132047)	18.56	18.36	16.62
	1RB-Low (0)	1772.5 (132597)	18.33	17.64	16.45
		1745 (132322)	18.40	18.01	16.57
		1717.5 (132047)	18.36	18.10	16.48
	36RB-High (38)	1772.5 (132597)	17.48	16.75	15.40
		1745 (132322)	17.53	16.83	15.47
		1717.5 (132047)	17.54	16.80	15.47
	36RB-Middle (19)	1772.5 (132597)	17.56	16.80	15.47
		1745 (132322)	17.53	16.84	15.49
		1717.5 (132047)	17.55	16.81	15.50
	36RB-Low (0)	1772.5 (132597)	17.55	16.84	15.52
		1745 (132322)	17.56	16.86	15.55
		1717.5 (132047)	17.49	16.75	15.43
	75RB (0)	1772.5 (132597)	17.47	16.80	15.43
		1745 (132322)	17.54	16.79	15.50
		1717.5 (132047)	17.54	16.84	15.45
20MHz	1RB-High (99)	1770 (132572)	18.21	17.80	16.26
		1745 (132322)	18.26	17.65	16.33
		1720 (132072)	18.33	17.81	16.28
	1RB-Middle (50)	1770 (132572)	18.67	18.24	16.75
		1745 (132322)	18.68	18.18	16.72
		1720 (132072)	18.73	18.27	16.70
	1RB-Low (0)	1770 (132572)	18.22	17.80	16.30
		1745 (132322)	18.27	17.64	16.26
		1720 (132072)	18.35	17.88	16.21
	50RB-High (50)	1770 (132572)	17.46	16.47	15.41
		1745 (132322)	17.52	16.45	15.49
		1720 (132072)	17.62	16.68	15.56
	50RB-Middle (25)	1770 (132572)	17.60	16.59	15.48
		1745 (132322)	17.60	16.53	15.51
		1720 (132072)	17.59	16.62	15.48
	50RB-Low (0)	1770 (132572)	17.59	16.62	15.57
		1745 (132322)	17.60	16.56	15.63
		1720 (132072)	17.54	16.59	15.52
	100RB (0)	1770 (132572)	17.53	16.56	15.49
		1745 (132322)	17.55	16.54	15.52
		1720 (132072)	17.62	16.66	15.52

11.4 Wi-Fi and BT Measurement result

The maximum tune up of BT is 7.5dBm.

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

802.11b(dBm)				
Channel\data	1Mbps	2Mbps	5.5Mbps	11Mbps
11(2462MHz)	17.31	/	17.41	/
6(2437MHz)	17.54	17.55	17.70	17.38
1(2412MHz)	16.92	/	17.05	/
Tune up	18.00	18.00	18.00	18.00

802.11g(dBm)								
Channel\data	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
11(2462MHz)	14.61	/	/	/	/	/	/	14.82
6(2437MHz)	14.93	14.91	14.89	14.89	14.87	14.62	15.01	15.02
1(2412MHz)	14.39	/	/	/	/	/	/	14.48
Tune up	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00
802.11n(dBm)-20MHz								
Channel\data	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
11(2462MHz)	12.50	/	/	/	/	/	12.64	/
6(2437MHz)	12.90	12.67	12.91	12.67	12.68	12.98	13.00	12.98
1(2412MHz)	12.42	/	/	/	/	/	12.50	/
Tune up	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
802.11n(dBm)-40MHz								
Channel\data	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
9(2452MHz)	12.98	/	/	/	/	12.99	/	/
6(2437MHz)	12.92	/	/	/	/	12.96	/	/
3(2422MHz)	12.99	12.95	12.97	12.95	12.95	13.01	13.00	13.00
Tune up	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00

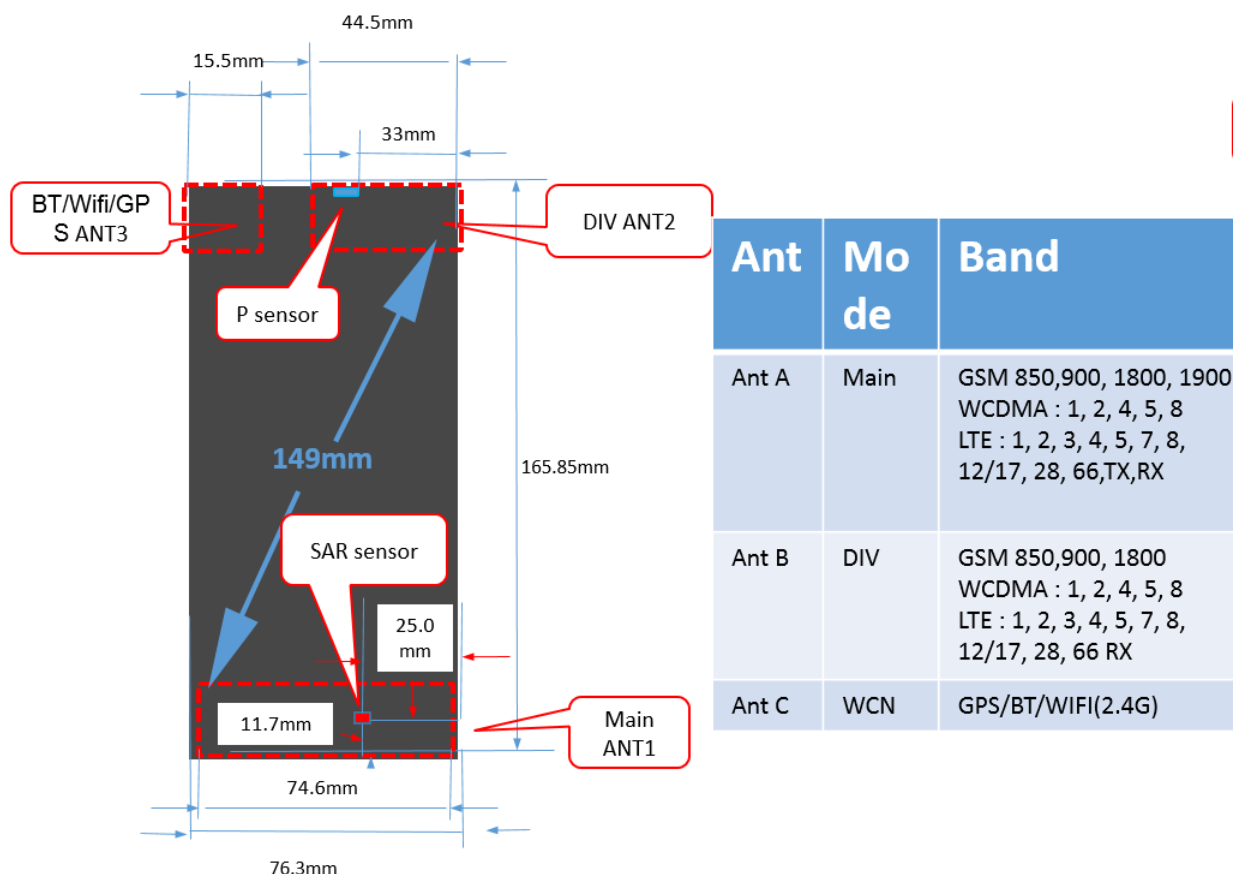
12 Simultaneous TX SAR Considerations

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
Main antenna	Yes	Yes	Yes	Yes	No	Yes
WLAN	Yes	Yes	No	Yes	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

Table 12.1: Standalone SAR test exclusion considerations

Band/Mode	F(GHz)	Position	SAR test exclusion threshold(mW)	RF output power		SAR test exclusion
				dBm	mW	
Bluetooth	2.441	Head	9.60	7.5	5.62	Yes
		Body	19.20	7.5	5.62	Yes
2.4GHz WLAN	2.45	Head	9.58	18	63.1	No
		Body	19.17	18	63.1	No

13 Evaluation of Simultaneous

Table 13.1: The sum of reported SAR values for main antenna and WiFi

	Position	Main antenna	WiFi	Sum
Highest reported SAR value for Head	Left hand, Touch cheek (GSM850)	0.25	0.71	0.96
Highest reported SAR value for Body	Front 10mm (LTE Band66)	1.25	0.13	1.38

Table 13.2: The sum of reported SAR values for main antenna and BT

	Position	Main antenna	BT	Sum
Maximum reported SAR value for Head	Left head, Tilt (LTE Band2)	0.34	0.23 ^[1]	0.57
Maximum reported SAR value for Body	Front 10mm (LTE Band66)	1.25	0.12 ^[1]	1.37

[1] - Estimated SAR for Bluetooth (see the table 13.3)

Table 13.3: Estimated SAR for Bluetooth

Mode/Band	F (GHz)	Position	Distance (mm)	Upper limit of power *		Estimated _{1g} (W/kg)
				dBm	mW	
Bluetooth	2.441	Head	5	7.5	5.62	0.23
Bluetooth	2.441	Body	10	7.5	5.62	0.12

* - 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)]·[√f(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<1.6W/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 10 mm or 15mm and just applied to the condition of body worn accessory.

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-gSAR 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

Mode	Duty Cycle
GSM850	1:4
GSM1900 Low power	1:8.3
GSM1900 Normal power	1:4
WCDMA<E FDD	1:1
LTE TDD	1:1.58

14.1 SAR results for Fast SAR

Table 14.1-1: SAR Values (GSM 850 MHz Band - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C					
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz										
190	836.6	Left	Cheek	/	32.05	33	0.151	0.19	0.202	0.25	-0.12
190	836.6	Left	Tilt	/	32.05	33	0.093	0.12	0.12	0.15	0.08
251	848.8	Right	Cheek	/	32.06	33	0.154	0.19	0.201	0.25	-0.09
190	836.6	Right	Cheek	Fig.1	32.05	33	0.162	0.20	0.211	0.26	-0.04
128	824.2	Right	Cheek	/	31.97	33	0.13	0.16	0.17	0.22	0.11
190	836.6	Right	Tilt	/	32.05	33	0.127	0.16	0.159	0.20	-0.1

Note: the head SAR of GSM850 is tested with GPRS (2Txslots) mode because of VoIP.

Table 14.1-2: SAR Values (GSM 850 MHz Band - Body)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C					
Frequency		Mode (number of timeslots)	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz										
190	836.6	GPRS (2)	Front	/	32.05	33	0.123	0.15	0.208	0.26	-0.06
251	848.8	GPRS (2)	Rear	Fig.2	32.06	33	0.193	0.24	0.332	0.41	0
190	836.6	GPRS (2)	Rear	/	32.05	33	0.175	0.22	0.307	0.38	0.08
128	824.2	GPRS (2)	Rear	/	31.97	33	0.205	0.26	0.288	0.37	-0.14
190	836.6	GPRS (2)	Left	/	32.05	33	0.115	0.14	0.184	0.23	0.06
190	836.6	GPRS (2)	Right	/	32.05	33	0.113	0.14	0.179	0.22	-0.03
190	836.6	GPRS (2)	Bottom	/	32.05	33	0.042	0.05	0.08	0.10	0.08
251	848.8	EGPRS (2)	Rear	/	32.07	33	0.18	0.22	0.25	0.31	-0.09

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

Table 14.1-3: SAR Values (GSM 1900 MHz Band - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C					
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz										
661	1880	Left	Cheek	/	29.11	30	0.086	0.11	0.127	0.16	0.14
810	1909.8	Left	Tilt	/	29.15	30	0.079	0.10	0.129	0.16	-0.09
661	1880	Left	Tilt	Fig.3	29.11	30	0.091	0.11	0.147	0.18	-0.02
512	1850.2	Left	Tilt	/	29.34	30	0.085	0.10	0.138	0.16	0.07
661	1880	Right	Cheek	/	29.11	30	0.08	0.10	0.12	0.15	-0.08

661	1880	Right	Tilt	/	29.11	30	0.055	0.07	0.089	0.11	0.01
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Note: the head SAR of GSM1900 is tested with GPRS (2Txslots) mode because of VoIP.

Table 14.1-4: SAR Values (GSM 1900 MHz Band - Body)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C											
Frequency		Mode (number of timeslots)	Test Position	Figure No.	Conducte d Power (dBm)	Max. tune-up 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)
Ch.	MHz										
810	1909.8	GPRS (2)	Front	/	29.15	30	0.376	0.46	0.75	0.91	0.05
661	1880	GPRS (2)	Front	/	29.11	30	0.414	0.51	0.801	0.98	0.08
512	1850.2	GPRS (2)	Front	/	29.34	30	0.44	0.51	0.85	0.99	-0.06
661	1880	GPRS (2)	Left	/	29.11	30	0.107	0.13	0.2	0.25	-0.06
661	1880	GPRS (2)	Right	/	29.11	30	0.102	0.13	0.194	0.24	0.09
661	1880	GPRS (2)	Rear	Note2	29.11	30	0.191	0.23	0.355	0.44	0.14
661	1880	GPRS (2)	Bottom	Note2	29.11	30	0.33	0.41	0.657	0.81	0.09
661	1880	GPRS (1)	Rear	/	30.12	31.5	0.269	0.37	0.511	0.70	-0.03
810	1909.8	GPRS (1)	Bottom	/	30.16	31.5	0.342	0.47	0.668	0.91	0.07
661	1880	GPRS (1)	Bottom	/	30.12	31.5	0.413	0.57	0.808	1.11	-0.14
512	1850.2	GPRS (1)	Bottom	Fig.4	30.32	31.5	0.48	0.63	0.942	1.24	0.07
512	1850.2	GPRS (1)	Bottom	/	30.33	31.5	0.435	0.57	0.854	1.12	0.07
512	1850.2	EGPRS(1)	Front	Note3	30.32	31.5	1.75	2.30	4.26	5.59	0.07
512	1850.2	GPRS (1)	Bottom	headset	30.32	31.5	0.445	0.58	0.91	1.19	0.1

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

Note2: The distance between the EUT and the phantom bottom is 20 by sensor (See detail in annex I).

Note3: The distance between the EUT and the phantom bottom is 0mm

Table 14.1-5: SAR Values (WCDMA 1900 MHz Band - Head)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figur e No.	Conducted Power (dBm)	Max. tune- up Power (dBm)	Measure d SAR(10g (W/kg)	Reported SAR(10g (W/kg)	Measure d SAR(1g (W/kg)	Reporte d SAR(1g (W/kg)	Power Drift (dB)
Ch.	MHz										
9400	1880	Left	Cheek	/	24.77	25	0.103	0.11	0.153	0.16	0.08
9538	1907.6	Left	Tilt	/	24.86	25	0.083	0.09	0.137	0.14	-0.10
9400	1880	Left	Tilt	Fig.5	24.77	25	0.12	0.13	0.196	0.21	-0.07
9262	1852.4	Left	Tilt	/	24.69	25	0.106	0.11	0.172	0.18	0.08
9400	1880	Right	Cheek	/	24.77	25	0.097	0.10	0.152	0.16	-0.03
9400	1880	Right	Tilt	/	24.77	25	0.077	0.08	0.121	0.13	-0.02

Table 14.1-6: SAR Values (WCDMA 1900 MHz Band - Body)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C				
Frequency		Test Position	Figure No.	Conduct ed Power (dBm)	Max. tune-up 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)
Ch.	MHz									
9538	1907.6	Front	/	24.86	25	0.361	0.37	0.689	0.71	-0.09
9400	1880	Front	/	24.77	25	0.375	0.40	0.718	0.76	0.14
9262	1852.4	Front	Fig.6	24.69	25	0.519	0.56	0.999	1.07	-0.06
9400	1880	Left	/	24.77	25	0.104	0.11	0.199	0.21	-0.06
9400	1880	Right	/	24.77	25	0.087	0.09	0.173	0.18	0.07
9400	1880	Rear	Note2	24.77	25	0.132	0.14	0.242	0.26	-0.09
9400	1880	Bottom	Note2	24.77	25	0.201	0.21	0.384	0.40	0.14
9538	1907.6	Rear	/	21.27	21.5	0.247	0.26	0.432	0.46	-0.08
9400	1880	Rear	/	21.3	21.5	0.273	0.29	0.509	0.53	0.12
9262	1852.4	Rear	/	21.25	21.5	0.327	0.35	0.634	0.67	-0.06
9538	1907.6	Bottom	/	21.27	21.5	0.373	0.39	0.741	0.78	0.07
9400	1880	Bottom	/	21.3	21.5	0.419	0.44	0.84	0.88	0.12
9262	1852.4	Bottom	/	21.25	21.5	0.486	0.51	0.957	1.01	0.04

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

Note2: The distance between the EUT and the phantom bottom is 20mm by sensor (See detail in annex I).

Table 14.1-7: SAR Values (WCDMA 1700 MHz Band - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5 °C					
Frequency		Side	Test Position	Figure No.	Conducte d Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measure d SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
1412	1732.4	Left	Cheek	/	23.22	23.5	0.054	0.06	0.076	0.08	0.05
1412	1732.4	Left	Tilt	/	23.22	23.5	0.031	0.03	0.048	0.05	-0.01
1513	1752.6	Right	Cheek	Fig.7	23.15	23.5	0.111	0.12	0.176	0.19	-0.06
1412	1732.4	Right	Cheek	/	23.22	23.5	0.075	0.08	0.119	0.13	0.16
1312	1712.4	Right	Cheek	/	23.14	23.5	0.109	0.12	0.174	0.19	0.07
1412	1732.4	Right	Tilt	/	23.22	23.5	0.046	0.05	0.071	0.08	-0.09

Table 14.1-8: SAR Values (WCDMA 1700 MHz Band - Body)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C				
Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz									
1513	1752.6	Front	/	23.15	23.5	0.548	0.59	1.05	1.14	-0.10
1412	1732.5	Front	Fig.8	23.22	23.5	0.6	0.64	1.17	1.25	-0.07
1312	1712.4	Front	/	23.14	23.5	0.589	0.64	1.13	1.23	0.05
1412	1732.5	Left	/	23.22	23.5	0.037	0.04	0.064	0.07	0.04
1412	1732.5	Right	/	23.22	23.5	0.155	0.17	0.27	0.29	-0.01
1412	1732.5	Rear	Note2	23.22	23.5	0.341	0.36	0.617	0.66	0.06
1513	1752.6	Bottom	Note2	23.15	23.5	0.508	0.55	0.948	1.03	0.15
1412	1732.5	Bottom	Note2	23.22	23.5	0.554	0.59	1.02	1.09	-0.13
1312	1712.4	Bottom	Note2	23.14	23.5	0.572	0.62	1.05	1.14	0.03
1513	1752.6	Rear	/	17.03	18.5	0.306	0.43	0.594	0.83	-0.1
1412	1732.5	Rear	/	17.11	18.5	0.339	0.47	0.661	0.91	-0.12
1312	1712.4	Rear	/	17.07	18.5	0.356	0.49	0.691	0.96	0.06
1513	1752.6	Bottom	/	17.03	18.5	0.364	0.51	0.709	0.99	0.07
1412	1732.5	Bottom	/	17.11	18.5	0.397	0.55	0.763	1.05	-0.07
1312	1712.4	Bottom	/	17.07	18.5	0.41	0.57	0.783	1.09	0.02
1412	1732.5	Front	Note3	17.11	18.5	1.66	2.29	3.86	5.32	-0.16
1412	1732.5	Front	headset	23.22	23.5	0.551	0.59	1.04	1.11	0.05

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

Note2: The distance between the EUT and the phantom bottom is 20mm by sensor (See detail in annex I).

Note3: The distance between the EUT and the phantom bottom is 0mm.

Table 14.1-9: SAR Values (WCDMA 850 MHz Band - Head)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figure No.	Conduct ed Power (dBm)	Max. tune-up Power (dBm)	Measure d SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reporte d SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
4233	846.6	Left	Cheek	/	26.42	25	0.139	0.10	0.181	0.13	-0.16
4183	836.6	Left	Cheek	Fig.9	24.52	25	0.128	0.14	0.163	0.18	0.05
4132	826.4	Left	Cheek	/	24.58	25	0.115	0.13	0.149	0.16	-0.09
4183	836.6	Left	Tilt	/	24.52	25	0.041	0.05	0.051	0.06	0.14
4183	836.6	Right	Cheek	/	24.52	25	0.112	0.13	0.146	0.16	0.11
4183	836.6	Right	Tilt	/	24.52	25	0.079	0.09	0.101	0.11	-0.6

Table 14.1-10: SAR Values (WCDMA 850 MHz Band - Body)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C				
Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz									
4183	836.6	Front	/	24.52	25	0.082	0.09	0.128	0.14	-0.14
4233	846.6	Rear	/	26.42	25	0.115	0.08	0.183	0.13	0.12
4183	836.6	Rear	Fig.10	24.52	25	0.13	0.15	0.227	0.25	-0.02
4132	826.4	Rear	/	24.58	25	0.114	0.13	0.182	0.20	-0.06
4183	836.6	Left	/	24.52	25	0.101	0.11	0.153	0.17	0.14
4183	836.6	Right	/	24.52	25	0.084	0.09	0.125	0.14	0.02
4183	836.6	Bottom	/	24.52	25	0.033	0.04	0.055	0.06	-0.03

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

Table 14.1-11: SAR Values (LTE Band2 - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C						
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz											
18900	1880	1RB_Mid	Left	Cheek	/	23.44	25	0.108	0.15	0.166	0.24	-0.14
18900	1880	1RB_Mid	Left	Tilt	Fig.11	23.44	25	0.147	0.21	0.238	0.34	-0.05
18900	1880	1RB_Mid	Right	Cheek	/	23.44	25	0.121	0.17	0.188	0.27	0.02
18900	1880	1RB_Mid	Right	Tilt	/	23.44	25	0.122	0.17	0.208	0.30	-0.08
18700	1860	50RB-High	Left	Cheek	/	22.41	24	0.093	0.13	0.145	0.21	-0.01
18700	1860	50RB-High	Left	Tilt	/	22.41	24	0.101	0.15	0.165	0.24	0.14
18700	1860	50RB-High	Right	Cheek	/	22.41	24	0.074	0.11	0.114	0.16	0.11
18700	1860	50RB-High	Right	Tilt	/	22.41	24	0.1	0.14	0.158	0.23	-0.09

Note1: The LTE mode is QPSK_20MHz.

Table 14.1-12: SAR Values (LTE Band2 - Body)

Frequency		Ambient Temperature: 22.9 °C				Liquid Temperature: 22.5°C				
Ch.	MHz	Mode	Figure No.	Conduct ed Power (dBm)	Max. tune- up 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)
19100	1900	1RB-Middle Front	/	23.36	25	0.327	0.48	0.613	0.89	0.06
18900	1880	1RB-Middle Front	/	23.44	25	0.383	0.55	0.657	0.94	-0.13
18700	1860	1RB-Middle Front	/	23.44	25	0.357	0.51	0.631	0.90	0.11
18900	1880	1RB-Middle Left Edge	/	23.44	25	0.094	0.13	0.159	0.23	-0.03
18900	1880	1RB-Middle Right Edge	/	23.44	25	0.101	0.14	0.175	0.25	0.02
18900	1880	1RB-Middle Rear	Note2	23.44	25	0.153	0.22	0.259	0.37	0.12
18900	1880	1RB-Middle Bottom	Note2	23.44	25	0.262	0.38	0.453	0.65	0.01
18700	1860	50RB-High Front	/	22.41	24	0.287	0.41	0.491	0.71	0.02
18700	1860	50RB-High Left	/	22.41	24	0.071	0.10	0.122	0.18	-0.04
18700	1860	50RB-High Right	/	22.41	24	0.084	0.12	0.146	0.21	-0.04
18700	1860	50RB-High Rear	Note2	22.41	24	0.13	0.19	0.219	0.32	0.08
18700	1860	50RB-High Bottom	Note2	22.41	24	0.222	0.32	0.395	0.57	0.01
19100	1900	1RB-Middle Rear	/	20.5	21	0.343	0.38	0.585	0.66	0.01
19100	1900	1RB-Middle Bottom	Fig.12	20.5	21	0.539	0.60	1.06	1.19	-0.14
18900	1880	1RB-Middle Bottom	/	20.44	21	0.493	0.56	0.97	1.10	0.02
18700	1860	1RB-Middle Bottom	/	20.46	21	0.503	0.57	1.01	1.14	-0.09
19100	1900	50RB-High Rear	/	19.47	20	0.302	0.34	0.513	0.58	0.08
19100	1900	50RB-High Bottom	/	19.47	20	0.472	0.53	0.941	1.06	-0.14
18900	1880	50RB-Low Bottom	/	19.41	20	0.432	0.49	0.854	0.98	0.08
18700	1860	50RB-High Bottom	/	19.4	20	0.416	0.48	0.831	0.95	-0.09
19100	1900	100RB Bottom	/	19.44	20	0.393	0.45	0.803	0.91	0.07

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

Note2: The distance between the EUT and the phantom bottom is 20mm by sensor (See detail in annex I).

Note3: The LTE mode is QPSK_20MHz.

Table 14.1-13: SAR Values (LTE Band5 - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5 °C						
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz											
20450	829	1RB-Mid	Left	Cheek	/	23.53	25	0.119	0.17	0.151	0.21	-0.06
20450	829	1RB-Mid	Left	Tilt	/	23.53	25	0.075	0.11	0.093	0.13	-0.01
20450	829	1RB-Mid	Right	Cheek	Fig.13	23.53	25	0.125	0.18	0.161	0.23	0
20450	829	1RB-Mid	Right	Tilt	/	23.53	25	0.086	0.12	0.111	0.16	0.12
20450	829	25RB-Mid	Left	Cheek	/	22.43	24	0.096	0.14	0.123	0.18	0.11
20450	829	25RB-Mid	Left	Tilt	/	22.43	24	0.056	0.08	0.069	0.10	-0.03
20450	829	25RB-Mid	Right	Cheek	/	22.43	24	0.078	0.11	0.101	0.14	-0.08
20450	829	25RB-Mid	Right	Tilt	/	22.43	24	0.062	0.09	0.077	0.11	0.09

Note1: The LTE mode is QPSK_10MHz.

Table 14.1-14: SAR Values (LTE Band5 - Body)

Ambient Temperature: 22.9 °C					Liquid Temperature: 22.5°C					
Frequency		Mode	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz									
20450	829	1RB-Middle Front	/	23.53	25	0.089	0.12	0.148	0.21	-0.09
20450	829	1RB-Middle Rear	Fig.14	23.53	25	0.143	0.20	0.242	0.34	0.03
20450	829	1RB-Middle Left	/	23.53	25	0.1	0.14	0.157	0.22	0.08
20450	829	1RB-Middle Right	/	23.53	25	0.094	0.13	0.149	0.21	-0.07
20450	829	1RB-Middle Bottom	/	23.53	25	0.030	0.04	0.061	0.09	0.12
20450	829	25RB-Middle Front	/	22.43	24	0.068	0.10	0.114	0.16	-0.05
20450	829	25RB-Middle Rear	/	22.43	24	0.112	0.16	0.202	0.29	0.09
20450	829	25RB-Middle Left	/	22.43	24	0.076	0.11	0.124	0.18	-0.14
20450	829	25RB-Middle Right	/	22.43	24	0.075	0.11	0.117	0.17	-0.06
20450	829	25RB-Middle Bottom	/	22.43	24	0	0.00	0	0.00	/

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

Note2: The LTE mode is QPSK_10MHz.

Table 14.1-15: SAR Values (LTE Band7 - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5 °C						
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz											
21350	2560	1RB-Mid	Left	Cheek	/	23.72	24.5	0.048	0.06	0.091	0.11	0.08
21350	2560	1RB-Mid	Left	Tilt	/	23.72	24.5	0.028	0.03	0.056	0.07	0.12
21350	2560	1RB-Mid	Right	Cheek	Fig.15	23.72	24.5	0.076	0.09	0.149	0.18	0.03
21350	2560	1RB-Mid	Right	Tilt	/	23.72	24.5	0.022	0.03	0.05	0.06	-0.07
21350	2560	50RB-High	Left	Cheek	/	22.6	23.5	0.025	0.03	0.048	0.06	0.02
21350	2560	50RB-High	Left	Tilt	/	22.6	23.5	0.016	0.02	0.033	0.04	-0.06
21350	2560	50RB-High	Right	Cheek	/	22.6	23.5	0.036	0.04	0.07	0.09	-0.04
21350	2560	50RB-High	Right	Tilt	/	22.6	23.5	0	0.00	0	0.00	/

Note1: The LTE mode is QPSK_20MHz.

Table 14.1-16: SAR Values (LTE Band7 - Body)

Ambient Temperature: 22.9 °C				Liquid Temperature: 22.5 °C						
Frequency		Mode	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz									
21350	2560	1RB-Middle Front	/	23.72	24.5	0.299	0.36	0.568	0.68	-0.1
21350	2560	1RB-Middle Left	/	23.72	24.5	0.067	0.08	0.117	0.14	-0.07
21350	2560	1RB-Middle Right	/	23.72	24.5	0.194	0.23	0.354	0.42	0.14
21350	2560	1RB-Middle Rear	Note2	23.72	24.5	0.254	0.30	0.477	0.57	0.12
21350	2560	1RB-Middle Bottom	Note2	23.72	24.5	0.288	0.34	0.538	0.64	0.03
21350	2560	50RB-High Front	/	22.6	23.5	0.268	0.33	0.509	0.63	-0.07
21350	2560	50RB-High Left	/	22.6	23.5	0.039	0.05	0.071	0.09	-0.09
21350	2560	50RB-High Right	/	22.6	23.5	0.146	0.18	0.265	0.33	0.07
21350	2560	50RB-High Rear	Note2	22.6	23.5	0.202	0.25	0.39	0.48	0.02
21350	2560	50RB-High Bottom	Note2	22.6	23.5	0.222	0.27	0.414	0.51	-0.08
21350	2560	1RB-Middle Rear	Fig.16	20.46	21.5	0.287	0.36	0.67	0.85	-0.02
21100	2535	1RB-Middle Rear	/	20.36	21.5	0.256	0.33	0.593	0.77	0.06
20850	2510	1RB-Middle Rear	/	20.38	21.5	0.241	0.31	0.573	0.74	0.09
21350	2560	1RB-Middle Bottom	/	20.46	21.5	0.27	0.34	0.624	0.79	-0.07
21100	2535	50RB-Low Rear	/	19.44	20.5	0.22	0.28	0.51	0.65	0.07
21100	2535	50RB-Low Bottom	/	19.44	20.5	0.209	0.27	0.485	0.62	-0.04
21100	2535	100RB Rear	/	19.41	20.5	0.216	0.28	0.493	0.63	0.08

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

Note2: The distance between the EUT and the phantom bottom is 20mm by sensor (See detail in annex I).

Note3: The LTE mode is QPSK_20MHz.

Table 14.1-17: SAR Values (LTE Band12- Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C						
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz											
23060	704	1RB-Mid	Left	Cheek	/	23.34	25	0.112	0.16	0.141	0.21	0.02
23060	704	1RB-Mid	Left	Tilt	/	23.34	25	0.074	0.11	0.092	0.13	-0.08
23060	704	1RB-Mid	Right	Cheek	/	23.34	25	0.13	0.19	0.168	0.25	0.07
23060	704	1RB-Mid	Right	Tilt	Fig.17	23.34	25	0.055	0.08	0.07	0.10	-0.07
23130	711	25RB-Mid	Left	Cheek	/	22.31	24	0.09	0.13	0.114	0.17	0.02
23130	711	25RB-Mid	Left	Tilt	/	22.31	24	0.057	0.08	0.071	0.10	-0.07
23130	711	25RB-Mid	Right	Cheek	/	22.31	24	0.061	0.09	0.077	0.11	-0.14
23130	711	25RB-Mid	Right	Tilt	/	22.31	24	0.045	0.07	0.058	0.09	0.15

Note1: The LTE mode is QPSK_10MHz.

Table 14.1-18: SAR Values (LTE Band12 - Body)

Ambient Temperature: 22.9 °C					Liquid Temperature: 22.5°C					
Frequency		Mode	Figure No.	Conduct ed Power (dBm)	Max. tune-up 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)
Ch.	MHz									
23060	704	1RB-Middle Front	/	23.34	25	0.139	0.20	0.183	0.27	-0.02
23060	704	1RB-Middle Rear	Fig.18	23.34	25	0.214	0.31	0.281	0.41	0.08
23060	704	1RB-Middle Left	/	23.34	25	0.151	0.22	0.215	0.32	0.14
23060	704	1RB-Middle Right	/	23.34	25	0.164	0.24	0.235	0.34	0.02
23060	704	1RB-Middle Bottom		23.34	25	0.034	0.05	0.068	0.10	-0.09
23130	711	25RB-Middle Front	/	22.31	24	0.117	0.17	0.153	0.23	-0.14
23130	711	25RB-Middle Rear	/	22.31	24	0.182	0.27	0.237	0.35	0.08
23130	711	25RB-Middle Left	/	22.31	24	0.138	0.20	0.195	0.29	-0.1
23130	711	25RB-Middle Right	/	22.31	24	0.145	0.21	0.207	0.31	0.02
23130	711	25RB-Middle Bottom	/	22.31	24	0.029	0.04	0.052	0.08	-0.09

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

Note5: The LTE mode is QPSK_10MHz.

Table 14.1-19: SAR Values (LTE Band66 - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C						
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz											
132072	1720	1RB-Mid	Left	Cheek	/	23.55	25	0.074	0.10	0.102	0.14	-0.03
132072	1720	1RB-Mid	Left	Tilt	/	23.55	25	0.035	0.05	0.058	0.08	0.07
132072	1720	1RB-Mid	Right	Cheek	Fig.19	23.55	25	0.131	0.18	0.205	0.29	-0.07
132072	1720	1RB-Mid	Right	Tilt	/	23.55	25	0.053	0.07	0.077	0.11	-0.06
132072	1720	50RB-High	Left	Cheek	/	22.42	24	0.053	0.08	0.073	0.11	0.07
132072	1720	50RB-High	Left	Tilt	/	22.42	24	0.032	0.05	0.048	0.07	-0.14
132072	1720	50RB-High	Right	Cheek	/	22.42	24	0.073	0.11	0.11	0.16	0.11
132072	1720	50RB-High	Right	Tilt	/	22.42	24	0.038	0.05	0.054	0.08	0.1

Note1: The LTE mode is QPSK_20MHz.

Table 14.1-20: SAR Values (LTE Band66 - Body)

Ambient Temperature: 22.9 °C					Liquid Temperature: 22.5°C					
Frequency		Mode	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz									
132572	1770	1RB-Middle Front	/	23.45	24	0.574	0.65	1.03	1.17	-0.07
132322	1745	1RB-Middle Front	/	23.52	24	0.512	0.57	0.98	1.09	0.03
132072	1720	1RB-Middle Front	Fig.20	23.55	24	0.6	0.67	1.13	1.25	0.07
132072	1720	1RB-Middle Left	/	23.55	24	0.043	0.05	0.074	0.08	-0.06
132072	1720	1RB-Middle Right	/	23.55	24	0.133	0.15	0.222	0.25	0.08
132572	1770	1RB-Middle Rear	Note1	23.45	24	0.387	0.44	0.687	0.78	0.07
132322	1745	1RB-Middle Rear	Note1	23.52	24	0.403	0.45	0.718	0.80	0.08
132072	1720	1RB-Middle Rear	Note1	23.55	24	0.429	0.48	0.754	0.84	-0.04
132572	1770	1RB-Middle Bottom	Note1	23.45	24	0.453	0.51	0.817	0.93	-0.07
132322	1745	1RB-Middle Bottom	Note1	23.52	24	0.471	0.53	0.836	0.93	-0.09
132072	1720	1RB-Middle Bottom	Note1	23.55	24	0.501	0.56	0.891	0.99	0.12
132572	1770	50RB-low Front	/	22.36	23	0.413	0.48	0.837	0.97	-0.09
132322	1745	50RB-low Front	/	22.35	23	0.456	0.53	0.851	0.99	8.00
132072	1720	50RB-High Front	/	22.42	23	0.49	0.56	0.919	1.05	0.11
132072	1720	50RB-High Left	/	22.42	23	0.03	0.03	0.052	0.06	0.06
132072	1720	50RB-High Right	/	22.42	23	0.128	0.15	0.215	0.25	-0.08
132072	1720	50RB-High Rear	Note1	22.42	23	0.304	0.35	0.54	0.62	-0.01
132572	1770	50RB-High Bottom	Note1	22.36	23	0.428	0.50	0.733	0.85	-0.09
132322	1745	50RB-High Bottom	Note1	22.35	23	0.406	0.47	0.714	0.83	0.04
132072	1720	50RB-High Bottom	Note1	22.42	23	0.453	0.52	0.799	0.91	0.08
132072	1720	100RB Front	/	22.41	23	0.402	0.46	0.812	0.93	0.11

132072	1720	100RB Rear	Note1	22.41	23	0.298	0.34	0.506	0.58	0.03
132072	1720	100RB Bottom	Note1	22.41	23	0.384	0.44	0.763	0.87	0.09
132572	1770	1RB-Middle Rear	/	18.67	19	0.413	0.45	0.798	0.86	0.04
132322	1745	1RB-Middle Rear	/	18.68	19	0.407	0.44	0.732	0.79	0.02
132072	1720	1RB-Middle Rear	/	18.73	19	0.441	0.47	0.84	0.89	0.12
132572	1770	1RB-Middle Bottom	/	18.67	19	0.402	0.43	0.917	0.99	-0.05
132322	1745	1RB-Middle Bottom	/	18.68	19	0.453	0.49	0.942	1.01	-0.09
132072	1720	1RB-Middle Bottom	/	18.73	19	0.508	0.54	0.976	1.04	-0.01
132072	1720	50RB-High Rear	/	17.62	18	0.322	0.35	0.619	0.68	-0.06
132572	1770	50RB-Middle Bottom	/	17.6	18	0.349	0.38	0.714	0.78	-0.11
132322	1745	50RB-Low Bottom	/	17.6	18	0.358	0.39	0.728	0.80	-0.06
132072	1720	50RB-High Bottom	/	17.62	18	0.389	0.42	0.751	0.82	-0.14
132072	1720	100RB Rear	/	17.62	18	0.312	0.34	0.584	0.64	-0.01
132072	1720	100RB Bottom	/	17.62	18	0.369	0.40	0.738	0.81	-0.01
132072	1720	1RB-Middle Front	Note2	18.67	19	1.94	2.09	4.42	4.77	0.14
132072	1720	1RB-Middle Front	headset	23.55	24	0.551	0.61	0.994	1.10	0.11

Note: The distance between the EUT and the phantom bottom is 10mm. The LTE mode is QPSK_20MHz.

Note1: The distance between the EUT and the phantom bottom is 20mm by sensor (See detail in annex I).

Note2: The distance between the EUT and the phantom bottom is 0mm

14.2 SAR results for Standard procedure

There is zoom scan measurement to be added for the highest measured SAR in each exposure configuration/band.

Table 14.2-1: SAR Values (GSM 850 MHz Band - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C				
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)
Ch.	MHz									
190	836.6	Right	Cheek	Fig.1	32.05	33	0.162	0.20	0.211	0.26

Note: the head SAR of GSM850 is tested with GPRS (2Txslots) mode because of VoIP.

Table 14.2-2: SAR Values (GSM 850 MHz Band - Body)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5 °C											
Frequency		Mode (number of timeslots)	Test Position	Figur e No.	Conducte d Power (dBm)	Max. tune- up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measure d SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
251	848.8	GPRS (2)	Rear	Fig.2	32.06	33	0.193	0.24	0.332	0.41	0

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

Table 14.2-3: SAR Values (GSM 1900 MHz Band - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C					
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz										
661	1880	Left	Tilt	Fig.3	29.11	30	0.091	0.11	0.147	0.18	-0.02

Note: the head SAR of GSM1900 is tested with GPRS (2Txslots) mode because of VoIP.

Table 14.2-4: SAR Values (GSM 1900 MHz Band - Body)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C											
Frequency		Mode (number of timeslots)	Test Position	Figure No.	Conducte d Power (dBm)	Max. tune-up 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)
Ch.	MHz										
512	1850.2	GPRS (1)	Bottom	Fig.4	30.32	31.5	0.48	0.63	0.942	1.24	0.07

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

Table 14.2-5: SAR Values (WCDMA 1900 MHz Band - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C					
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz										
9400	1880	Left	Tilt	Fig.5	24.77	25	0.12	0.13	0.196	0.21	-0.07

Table 14.2-6: SAR Values (WCDMA 1900 MHz Band - Body)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C				
Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz									
9262	1852.4	Front	/	24.69	25	0.519	0.56	0.999	1.07	-0.06

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

Table 14.2-7: SAR Values (WCDMA 1700 MHz Band - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C					
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz										
1513	1752.6	Right	Cheek	Fig.7	23.15	24	0.111	0.13	0.176	0.21	-0.06

Table 14.2-8: SAR Values (WCDMA 1700 MHz Band - Body)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C				
Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz									
1412	1732.5	Front	Fig.8	23.22	23.5	0.6	0.64	1.17	1.25	-0.07

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

Table 14.2-9: SAR Values (WCDMA 850 MHz Band - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C					
Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz										
4183	836.6	Left	Cheek	Fig.9	24.52	25	0.128	0.14	0.163	0.18	0.05

Table 14.2-10: SAR Values (WCDMA 850 MHz Band - Body)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C				
Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz									
4183	836.6	Rear	Fig.10	24.52	25	0.13	0.15	0.227	0.25	-0.02

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

Table 14.2-11: SAR Values (LTE Band2 - Head)

Ambient Temperature: 22.9°C						Liquid Temperature: 22.5°C					
Frequency		Mode	Side	Test Positio n	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)
Ch.	MHz										
18900	1880	1RB_Mid	Left	Tilt	Fig.11	23.44	25	0.147	0.21	0.238	0.34

Note1: The LTE mode is QPSK_20MHz.

Table 14.2-12: SAR Values (LTE Band2 - Body)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C				
Frequency		Mode	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz									
19100	1900	1RB-Middle Bottom	Fig.12	20.5	21	0.539	0.60	1.06	1.19	-0.14

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

Note2: The LTE mode is QPSK_20MHz.

Table 14.2-13: SAR Values (LTE Band5 - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C					
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)
Ch.	MHz										
20450	829	1RB-Mid	Right	Cheek	Fig.13	23.53	25	0.125	0.18	0.161	0.23

Note1: The LTE mode is QPSK_10MHz.

Table 14.2-14: SAR Values (LTE Band5 - Body)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C				
Frequency		Mode	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz									
20450	829	1RB-Middle Rear	Fig.14	23.53	25	0.143	0.20	0.242	0.34	0.03

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

Note2: The LTE mode is QPSK_10MHz.

Table 14.2-15: SAR Values (LTE Band7 - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C					
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)
Ch.	MHz										
21350	2560	1RB-Mid	Right	Cheek	Fig.15	23.72	24.5	0.076	0.09	0.149	0.18

Note1: The LTE mode is QPSK_20MHz.

Table 14.2-16: SAR Values (LTE Band7 - Body)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C				
Frequency		Mode	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz									
21350	2560	1RB-Middle Rear	Fig.16	20.46	21.5	0.287	0.36	0.67	0.85	-0.02

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

Note2: The LTE mode is QPSK_20MHz.

Table 14.2-17: SAR Values (LTE Band12- Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C					
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)
Ch.	MHz										
23060	704	1RB-Mid	Right	Cheek	/	23.34	25	0.13	0.19	0.168	0.25

Note1: The LTE mode is QPSK_10MHz.

Table 14.2-18: SAR Values (LTE Band12 - Body)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C				
Frequency		Mode	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz									
23060	704	1RB-Middle Rear	Fig.18	23.34	25	0.214	0.31	0.281	0.41	0.08

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

Note5: The LTE mode is QPSK_10MHz.

Table 14.2-19: SAR Values (LTE Band66 - Head)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C						
Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz											
132072	1720	1RB-Mid	Right	Cheek	Fig.19	23.55	25	0.131	0.18	0.205	0.29	-0.07

Note1: The LTE mode is QPSK_20MHz.

Table 14.2-20: SAR Values (LTE Band66 - Body)

Ambient Temperature: 22.9 °C					Liquid Temperature: 22.5°C					
Frequency		Mode	Figure No.	Conducted Power (dBm)	Max. tune-up 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)
Ch.	MHz									
132072	1720	1RB-Middle Front	Fig.20	23.55	24	0.6	0.67	1.13	1.25	0.07

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

Note2: The LTE mode is QPSK_20MHz.

14.3 WLAN Evaluation for 2.4G

According to the KDB248227 D01, SAR is measured for 2.4GHz 802.11b DSSS using the initial test position procedure.

Head Evaluation

Table 14.3-1: SAR Values (WLAN - Head)– 802.11b (Fast SAR)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5°C					
Frequency		Side	Test Position	Figure No.	Conducte d Power (dBm)	Max. tune- up 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	Cheek	/	17.7	18	0.321	0.34	0.618	0.66	0.08
2437	6	Left	Tilt	/	17.7	18	0	0.00	0	0.00	/
2437	6	Right	Cheek	/	17.7	18	0.227	0.24	0.378	0.41	0.04
2437	6	Right	Tilt	/	17.7	18	0.195	0.21	0.355	0.38	-0.06

As shown above table, the initial test position for head is “Left Touch”. So the head SAR of WLAN is presented as below:

Table 14.3-2: SAR Values (WLAN - Head)– 802.11b (Full SAR)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5 °C					
Frequency		Side	Test Position	Figure No.	Conducte d Power (dBm)	Max. tune- up 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	Cheek	Fig.21	17.7	18	0.323	0.35	0.658	0.71	0.01

Note1: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest estimated 1-g SAR conditions determined by area scans, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg.

Note2: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. The scaled reported SAR is presented as below.

Table 14.3-3: SAR Values (WLAN - Head) – 802.11b (Scaled Reported SAR)

Ambient Temperature: 22.9 °C				Liquid Temperature: 22.5°C			
Frequency		Side	Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.						
2437	6	Left	Cheek	100%	100%	0.71	0.71

SAR is not required for OFDM because the 802.11b adjusted SAR ≤ 1.2 W/kg.

Body Evaluation

Table 14.3-4: SAR Values (WLAN - Body)– 802.11b (Fast SAR)

Ambient Temperature: 22.9 °C					Liquid Temperature: 22.5°C					
Frequency		Test Position	Figure No.	Conducte d Power (dBm)	Max. tune-up 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	/	17.7	18	0.067	0.07	0.122	0.13	-0.08
2437	6	Rear	/	17.7	18	0.096	0.10	0.184	0.20	-0.12
2437	6	Rear	/	17.7	18	0.075	0.08	0.141	0.15	0.12
2437	6	Top	/	17.7	18	0.054	0.06	0.102	0.11	0.07

As shown above table, the initial test position for body is “Rear”. So the body SAR of WLAN is presented as below:

Table 14.3-5: SAR Values (WLAN - Body)– 802.11b (Full SAR)

Ambient Temperature: 22.9°C					Liquid Temperature: 22.5°C					
Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up 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	Rear	Fig.22	17.7	18	0.087	0.09	0.167	0.18	-0.12

Note1: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest estimated 1-g SAR conditions determined by area scans, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg.

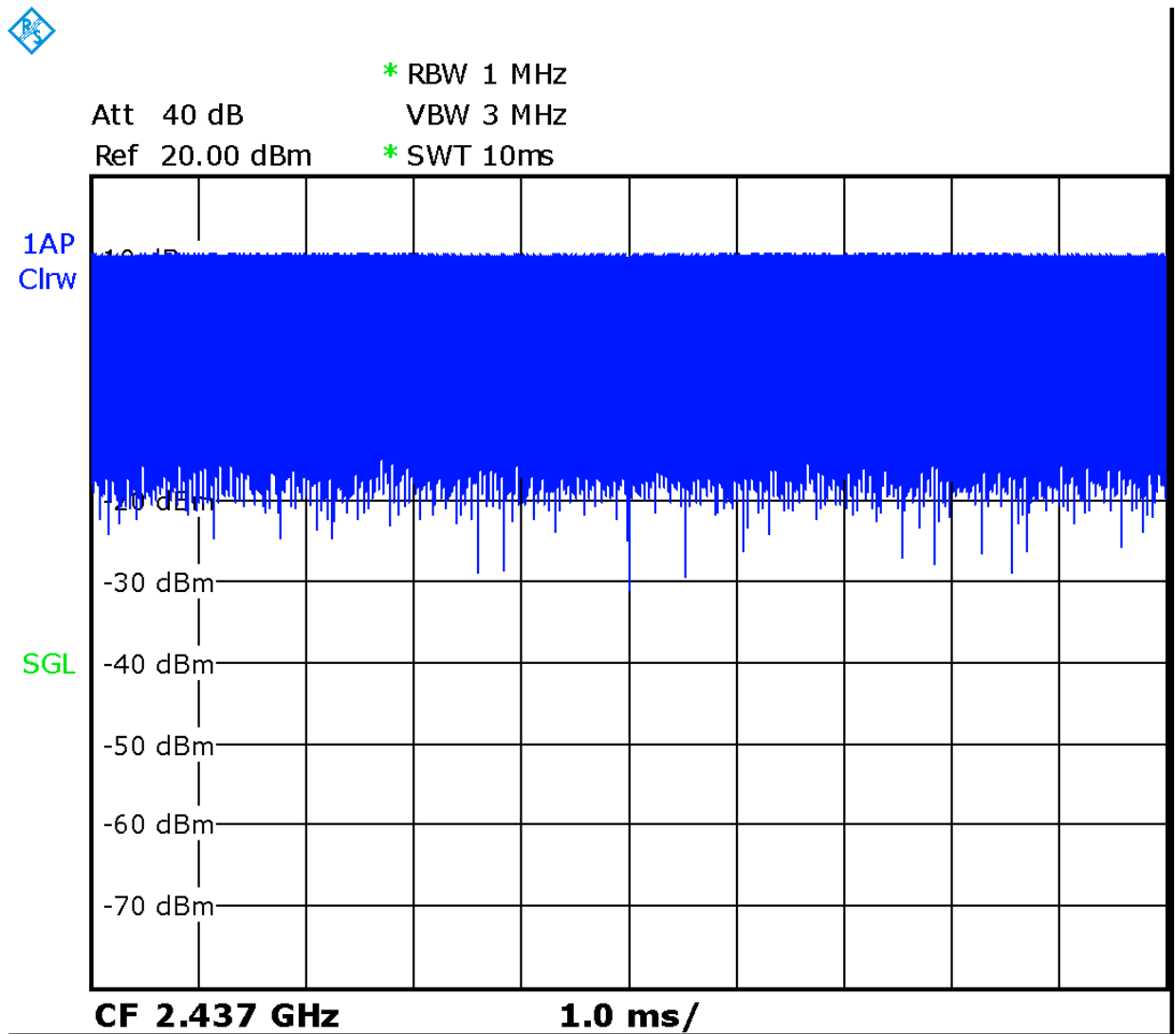
Note2: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. The scaled reported SAR is presented as below.

Table 14.3-6: SAR Values (WLAN - Body) – 802.11b (Scaled Reported SAR)

Ambient Temperature: 22.9 °C				Liquid Temperature: 22.5°C		
Frequency		Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.					
2437	6	Rear	100%	100%	0.18	0.18

SAR is not required for OFDM because the 802.11b adjusted SAR ≤ 1.2 W/kg.



Picture 14.1 Duty factor plot

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 ($\sim 10\%$ 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 LTE B2 (1g)

Channel Number	Frequency (MHz)	Mode	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio
661	1880	Front GPRS 10mm	0.801	0.784	1.02
512	1850.2	Front GPRS 10mm	0.85	0.839	1.01
661	1880	Bottom Edge GPRS 10mm	0.808	0.79	1.02
512	1850.2	Bottom Edge GPRS 10mm	0.942	0.929	1.01
512	1850.2	Bottom Edge EGPRS 10mm	0.854	0.839	1.02
1513	1752.6	Front 10mm	1.05	0.991	1.06
1412	1732.5	Front 10mm	1.17	1.09	1.07
1312	1712.4	Front 10mm	1.13	1.03	1.10
1513	1752.6	Bottom 20mm	0.948	0.926	1.02
1412	1732.5	Bottom 20mm	1.02	0.994	1.03
1312	1712.4	Bottom 20mm	1.05	0.991	1.06
9262	1852.4	Front 10mm	0.999	0.974	1.03
9400	1880	Bottom Edge 10mm	0.84	0.823	1.02
9262	1852.4	Bottom Edge 10mm	0.957	0.933	1.03
19100	1900	1RB-Middle Bottom Edge 10mm	1.06	0.99	1.07

18900	1880	1RB-Middle Bottom Edge 10mm	0.97	0.956	1.01
18700	1860	1RB-Middle Bottom Edge 10mm	1.01	0.989	1.02
19100	1900	50RB-High Bottom Edge 10mm	0.941	0.929	1.01
18900	1880	50RB-Low Bottom Edge 10mm	0.854	0.821	1.04
18700	1860	50RB-High Bottom Edge 10mm	0.831	0.829	1.00
19100	1900	100RB Bottom Edge 10mm	0.803	0.781	1.03
132572	1770	1RB-Middle Front 10mm	1.03	0.981	1.05
132322	1745	1RB-Middle Front 10mm	0.98	0.969	1.01
132072	1720	1RB-Middle Front 10mm	1.13	1.03	1.10
132572	1770	1RB-Middle Bottom Edge 20mm	0.817	0.791	1.03
132322	1745	1RB-Middle Bottom Edge 20mm	0.836	0.82	1.02
132072	1720	1RB-Middle Bottom Edge 20mm	0.891	0.878	1.01
132572	1770	50RB-low Front 10mm	0.837	0.82	1.02
132322	1745	50RB-low Front 10mm	0.851	0.825	1.03
132072	1720	50RB-High Front 10mm	0.919	0.893	1.03
132072	1720	100RB Front 10mm	0.812	0.79	1.03
132072	1720	1RB-Middle Rear 10mm	0.84	0.828	1.01
132572	1770	1RB-Middle Bottom Edge 10mm	0.917	0.9	1.02
132322	1745	1RB-Middle Bottom Edge 10mm	0.942	0.929	1.01
132072	1720	1RB-Middle Bottom Edge 10mm	0.976	0.96	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	6.0	N	1	1	1	6.0	6.0	∞
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	N	1	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	$u_c' = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					9.55	9.43	257
Expanded uncertainty (confidence interval of 95 %)	$u_e = 2u_c$					19.1	18.9	

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	6.55	N	1	1	1	6.55	6.55	∞
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	RFambient 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		$u'_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						10.7	10.6	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						21.4	21.1	

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	6.0	N	1	1	1	6.0	6.0	∞
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	RFambient 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	∞