



SAR TEST REPORT

No. I19Z62084-SEM03

For

TCL Communication Ltd.

HSUPA/HSDPA/UMTS Quad Bands/GSM Quad Bands/LTE 10

bands mobile phone

Model name: T799H

With

Hardware Version:04

Software Version: 4D3K

FCC ID: 2ACCJN037

Issued Date: 2020-3-4

Note:

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REPORT HISTORY

Report Number	Revision	Issue Date	Description
I19Z62084-SEM03	Rev.0	2020-2-25	Initial creation of test report
I19Z62084-SEM03	Rev.1	2020-3-4	<ol style="list-style-type: none">1. Chapter11.4, revise tune up limit of BT.2. Table13-4, revise estimated SAR for BT.3. Chapter11.4, remove conductive power of 802.11n (20MHz/40MHz) and 802.11ac(20MHz/40MHz/80MHz) for Wi-Fi5G.4. Chapter14, correct a clerical mistake in the evaluation process of multi-Batteries.

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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

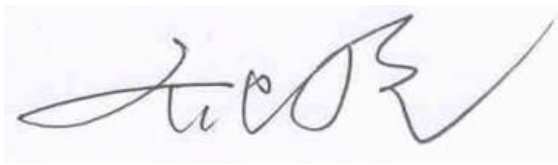
Project Leader:	Qi Dianyuan
Test Engineer:	Lin Xiaojun
Testing Start Date:	February 14, 2020
Testing End Date:	February 20, 2020

1.4 Signature



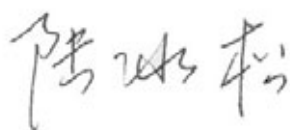
Lin Xiaojun

(Prepared this test report)



Qi Dianyuan

(Reviewed this test report)



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Deputy Director of the laboratory

(Approved this test report)

2 Statement of Compliance

The maximum results of SAR found during testing for TCL Communication Ltd. HSUPA/HSDPA/UMTS Quad Bands/GSM Quad Bands/LTE 10 bands mobile phone T799H are as follows:

Table 2.1: Highest Reported SAR (1g)

Exposure Configuration	Technology Band	Highest Reported SAR 1g(W/kg)	Equipment Class
Head (Separation Distance 0mm)	GSM 850	0.44	PCE
	PCS 1900	0.26	
	UMTS FDD 2	0.09	
	UMTS FDD 5	1.35	
	LTE Band 5	1.23	
	LTE Band 7	0.03	
	LTE Band 41	0.05	
	WLAN 2.4 GHz	0.37	DTS
WLAN 5 GHz	0.22	UNII	
Hotspot (Separation Distance 10mm)	GSM 850	0.97	PCE
	PCS 1900	1.13	
	UMTS FDD 2	1.11	
	UMTS FDD 5	0.81	
	LTE Band 5	0.47	
	LTE Band 7	1.34	
	LTE Band 41	0.93	
	WLAN 2.4 GHz	0.42	DTS
WLAN 5 GHz	0.58	UNII	
Body-worn (Separation Distance 15mm)	PCS 1900	0.68	PCE
	UMTS FDD 2	0.41	
	LTE Band 7	0.49	

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 for hotspot and 15mm for body worn 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: **1.35 W/kg(1g)**.

Table 2.2: The sum of reported SAR values for main antenna and 2.4GWiFi

	Position	Main antenna	WiFi	Sum
Highest reported SAR value for Head	Right hand, Tilt (WCDMA850)	1.35	0.09	1.44
Highest reported SAR value for Body	Bottom 10mm (LTE B7)	1.34	/	1.34

Table 2.3: The sum of reported SAR values for main antenna and 5GWiFi

	Position	Main antenna	WiFi	Sum
Highest reported SAR value for Head	Right hand, Tilt (WCDMA850)	1.35	0.07	1.42
Highest reported SAR value for Body	Rear 10mm (GSM850)	0.97	0.58	1.55

Table 2.4: The sum of reported SAR values for main antenna and BT

	Position	Main antenna	BT	Sum
Maximum reported SAR value for Head	Right hand, Tilt (WCDMA850)	1.35	<0.01	1.35
Maximum reported SAR value for Body	Rear 10mm (GSM850)	0.97	0.33 ^[1]	1.30
Maximum reported SAR value for Body	Bottom 10mm (LTE B7)	1.34	/	1.34

[1] - Estimated SAR for Bluetooth (see the table 13.4)

According to the above tables, the highest sum of reported SAR values is **1.55 W/kg (1g)**. The detail for simultaneous transmission consideration is described in chapter 13.



3 Client Information

3.1 Applicant Information

Company Name:	TCL Communication Ltd.
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Contact Person:	Gong Zhizhou
Contact Email:	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax:	0086-755-36612000-81722

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

4.1 About EUT

Description:	HSUPA/HSDPA/UMTS Quad Bands/GSM Quad Bands/LTE 10 bands mobile phone
Model name:	T799H
Operating mode(s):	GSM 850/900/1800/1900, UMTS FDD1/ 2/5/8, BT, Wi-Fi LTE Band 1/3/5/7/8/20/28/38/40/41
Tested Tx Frequency:	824 – 849 MHz (GSM 850)
	1850 – 1910 MHz (GSM 1900)
	824–849 MHz (WCDMA 850 Band V)
	1850–1910 MHz (WCDMA1900 Band II)
	824 – 849 MHz (LTE Band 5)
	2502.5 – 2567.5 MHz(LTE Band 7)
	2498.5 – 2687.5 MHz (LTE Band 41)
	2412 – 2462 MHz (Wi-Fi 2.4G)
	5.15 – 5.35 GHz 5.725 – 5.825 GHz(Wi-Fi 5G)
GPRS/EGPRS Multislot Class:	12
GPRS capability Class:	B
Test device Production information:	Production unit
Device type:	Portable device
Antenna type:	Integrated antenna
Hotspot mode:	Support

4.2 Internal Identification of EUT used during the test

EUT ID*	IMEI	HW	SW Version
EUT1	352212110000754	04	4D3K
	352212110000762		
EUT2	352212110000879	04	4D3K
	352212110000887		
EUT3	352212110012437	04	4D3K
	352212110012445		
EUT4	352212110012478	04	4D3K
	352212110012486		

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

Note: It is performed to test SAR with the EUT1&2 and conducted power with the EUT3&4.

4.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Battery	Tlp043D7	/	VEKEN
AE2	Battery	TLp043D1	/	BYD
AE3	Headset	MTRO100	/	TES

*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 D01 SAR measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz.

KDB865664 D02 RF 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

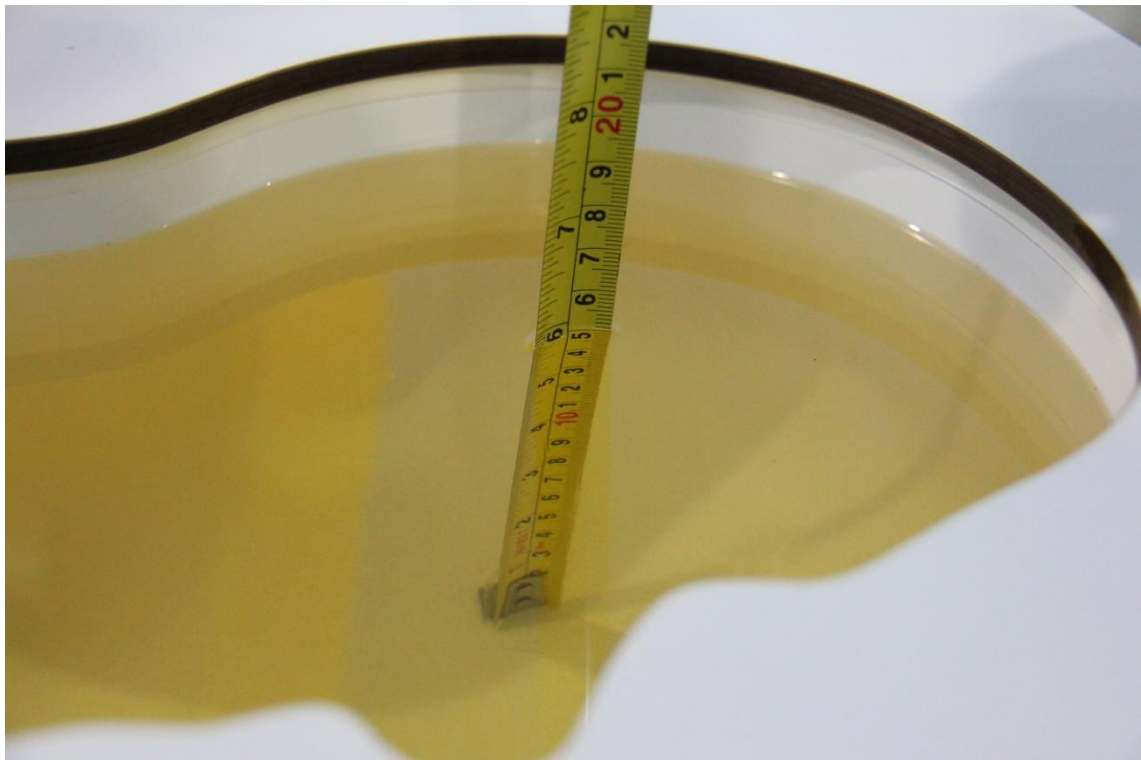
Frequency(MHz)	Liquid Type	Conductivity(σ)	$\pm 5\%$ Range	Permittivity(ϵ)	$\pm 5\%$ Range
835	Head	0.90	0.86~0.95	41.5	39.4~43.6
1900	Head	1.40	1.33~1.47	40.0	38.0~42.0
2450	Head	1.80	1.71~1.89	39.2	37.2~41.2
2600	Head	1.96	1.86~2.06	39.01	37.1~41.0
5250	Head	4.71	4.47~4.95	35.9	34.13~37.73
5600	Head	5.07	4.82~5.32	35.5	33.75~37.31
5750	Head	5.22	4.96~5.48	35.4	33.59~37.13

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 (%)
2020-2-14	Head	835 MHz	41.1	-0.96	0.892	-0.89
2020-2-15	Head	1900 MHz	40.74	1.85	1.408	0.57
2020-2-16	Head	2450 MHz	39.19	-0.03	1.836	2.00
2020-2-17	Head	2600 MHz	38.8	-0.54	1.938	-1.12
2020-2-18	Head	5250 MHz	35.98	0.14	4.625	-1.80
2020-2-19	Head	5600 MHz	35.33	-0.56	5.118	0.95
2020-2-20	Head	5750 MHz	35.44	0.23	5.224	0.08

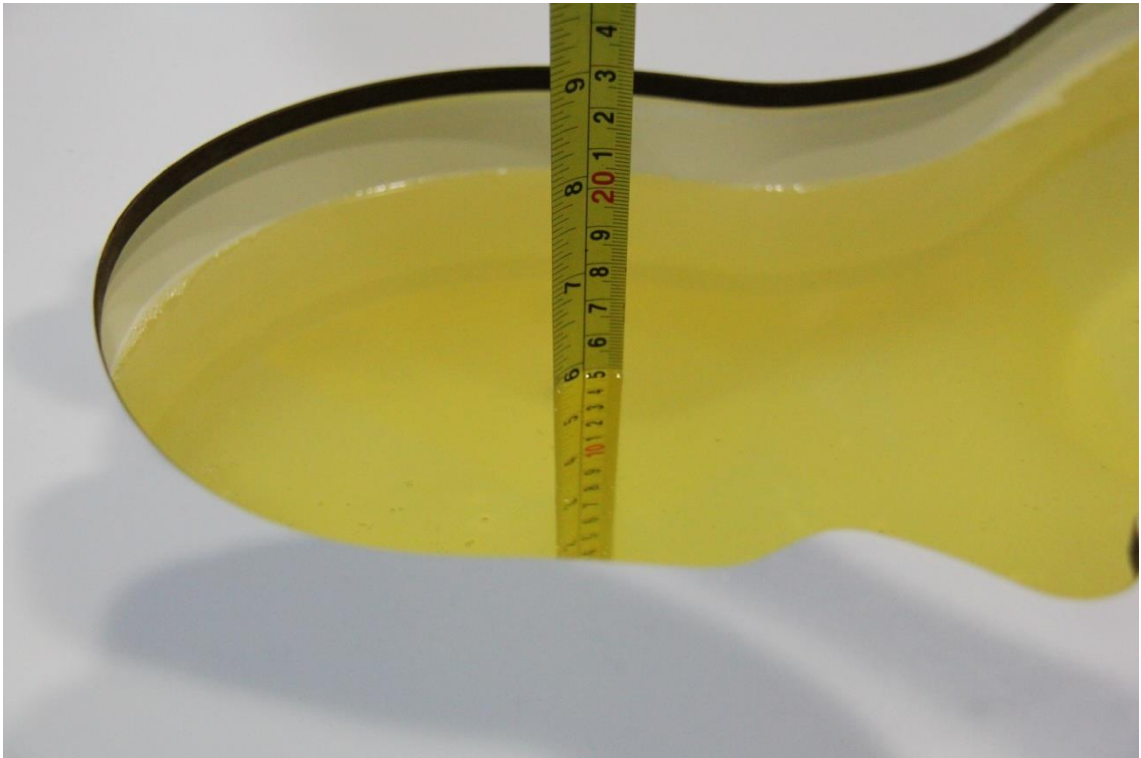
Note: The liquid temperature is 22.0°C



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



Picture 7-2 Liquid depth in the Head Phantom (1900 MHz)



Picture 7-3 Liquid depth in the Head Phantom (2450MHz)



Picture 7-4 Liquid depth in the Head Phantom (2600 MHz)

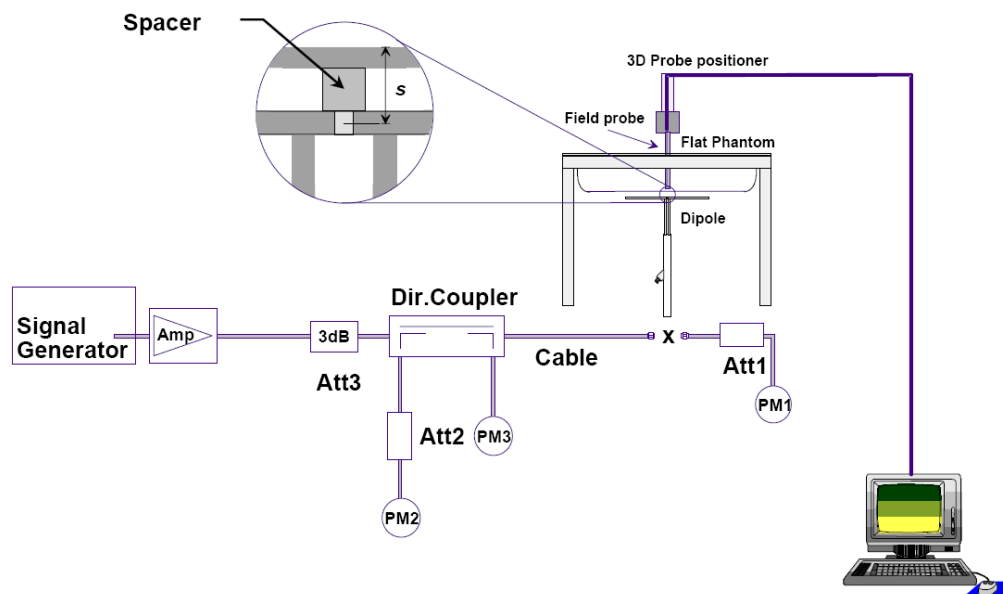


Picture 7-5 Liquid depth in the Head Phantom (5GHz)

8 System verification

8.1 System Setup

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



Picture 8.1 System Setup for System Evaluation



Picture 8.2 Photo of Dipole Setup

8.2 System Verification

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

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

Table 8.1: System Verification of Head

Measurement Date (yyyy-mm-dd)	Frequency	Target value (W/kg)		Measured value(W/kg)		Deviation	
		10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
2020-2-14	835 MHz	6.29	9.70	6.32	9.6	0.48%	-1.03%
2020-2-15	1900 MHz	20.8	39.7	20.84	39.76	0.19%	0.15%
2020-2-16	2450 MHz	24.2	51.6	24.56	51.56	1.49%	-0.08%
2020-2-17	2600 MHz	25.1	55.8	25.4	54.84	1.20%	-1.72%
2020-2-18	5250 MHz	23.2	80.4	23.1	78.8	-0.34%	-1.94%
2020-2-19	5600 MHz	24.1	84.5	23.8	84.5	-1.08%	-0.02%
2020-2-20	5750 MHz	23.0	80.4	23.0	81.3	0.00%	1.14%

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.

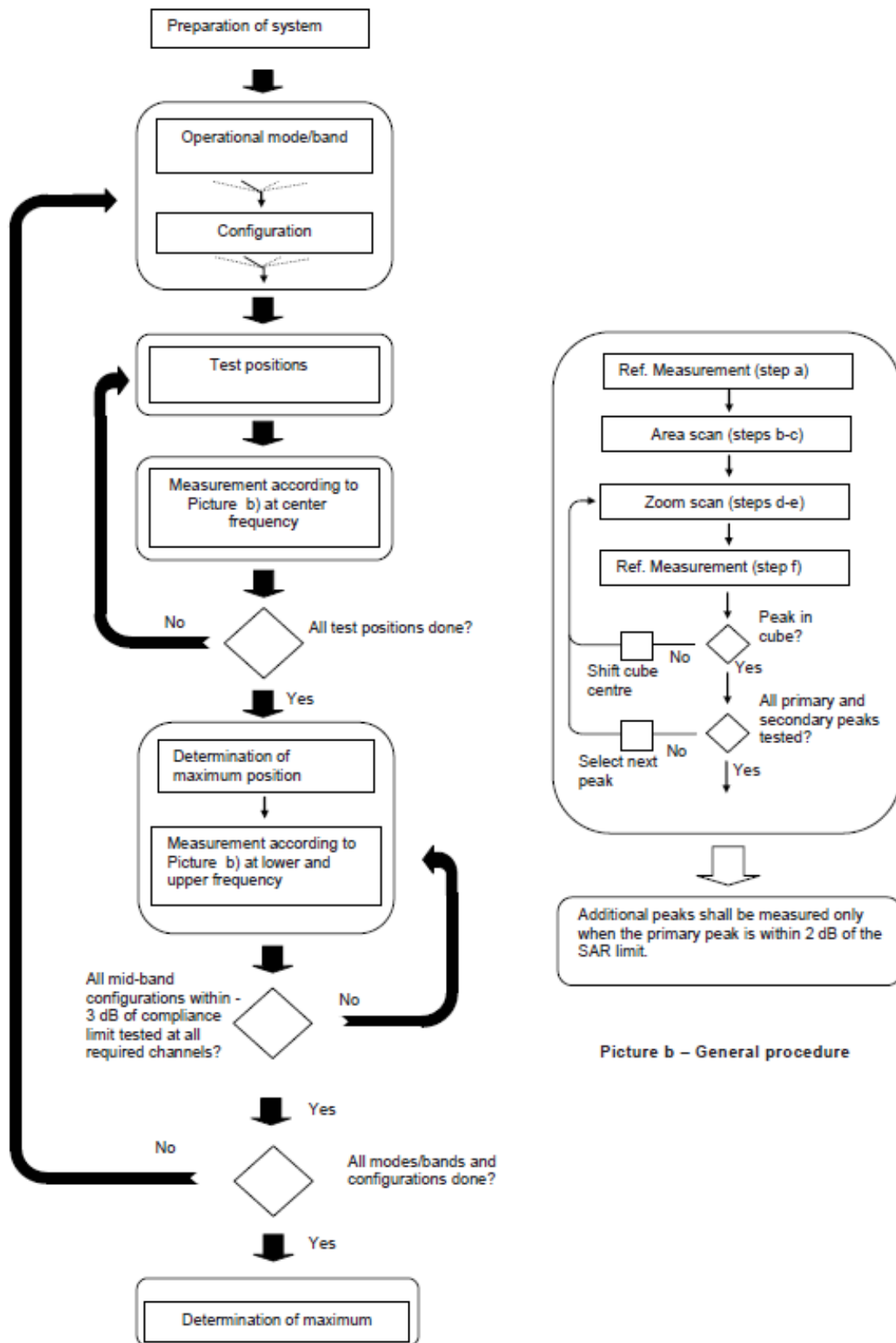
Step 1: The tests described in 9.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

- 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 a – Tests to be performed

Picture b – General procedure

Picture 9.1 Block diagram of the tests to be performed

9.2 General Measurement Procedure

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

		≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location		$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}		≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
		When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be \leq the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom} , Δy_{Zoom}		≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$
Minimum zoom scan volume	x, y, z	≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details. * When zoom scan is required and the <i>reported</i> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.			

9.3 WCDMA Measurement Procedures for SAR

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

For Release 5 HSDPA Data Devices:

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

For Release 6 HSPA Data Devices

Sub-test	β_c	β_d	β_d (SF)	β_c / β_d	β_{hs}	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM (dB)	MPR (dB)	AG Index	E-TFCI
1	11/15	15/15	64	11/15	22/15	209/225	1039/225	4	1	1.5	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 Bio-electromagnetics 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 three sets of tune-up power, Normal power and Low power (Receiver on / Hotspot)

Table: Summary of Receiver detection mechanism

Normal power	Low Power-Receiver on	Low Power-Hotspot on
Power Level A1	Power Level A2	Power Level A3

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.

Table 11.1-1: The conducted power measurement results for GSM, GPRS and EGPRS-A1

GSM 850 Speech (GMSK)	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
	251	190	128			251	190	128
1 Txslot	32.22	32.15	32.01	34.00	/	/	/	/
GSM 850 GPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	251	190	128			251	190	128
1 Txslot	32.34	32.23	32.04	34.00	-9.03	23.31	23.20	23.01
2 Txslots	30.79	30.68	30.44	32.00	-6.02	24.77	24.66	24.42
3Txslots	29.42	29.31	29.32	29.60	-4.26	25.16	25.05	24.86
4 Txslots	28.03	27.93	27.73	29.00	-3.01	25.02	24.92	24.72
GSM 850 EGPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	251	190	128			251	190	128
1 Txslot	32.25	32.14	31.96	33.50	-9.03	23.22	23.11	22.93
2 Txslots	30.70	30.58	30.35	32.10	-6.02	24.68	24.56	24.33
3Txslots	29.31	29.20	29.02	30.90	-4.26	25.05	24.94	24.76
4 Txslots	27.92	27.83	27.64	29.50	-3.01	24.91	24.82	24.63
GSM 850 EGPRS (8PSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	251	190	128			251	190	128
1 Txslot	25.51	25.54	25.69	27.30	-9.03	16.48	16.51	16.66
2 Txslots	23.48	23.63	23.89	25.40	-6.02	17.46	17.61	17.87
3Txslots	22.45	23.40	23.36	24.80	-4.26	18.19	19.14	19.10
4 Txslots	21.15	21.38	21.53	23.00	-3.01	18.14	18.37	18.52
PCS1900 Speech (GMSK)	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	29.36	29.15	29.11	32.00	/	/	/	/
PCS1900 GPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512

1 Txslot	30.67	30.86	30.62	32.00	-9.03	21.64	21.83	21.59
2 Txslots	27.41	27.13	27.03	28.00	-6.02	21.39	21.11	21.01
3Txslots	26.14	25.94	25.86	27.50	-4.26	21.88	21.68	21.60
4 Txslots	24.97	24.87	24.68	26.00	-3.01	21.96	21.86	21.67
PCS1900 EGPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	30.75	30.89	30.64	32.00	-9.03	21.72	21.86	21.61
2 Txslots	27.54	27.19	27.07	29.00	-6.02	21.52	21.17	21.05
3Txslots	26.23	26.00	25.89	27.00	-4.26	21.97	21.74	21.63
4 Txslots	25.07	24.90	24.71	26.00	-3.01	22.06	21.89	21.70
PCS1900 EGPRS (8PSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	25.75	26.00	25.91	27.00	-9.03	16.72	16.97	16.88
2 Txslots	23.80	23.60	23.55	25.00	-6.02	17.78	17.58	17.53
3Txslots	22.53	22.29	22.25	23.50	-4.26	18.27	18.03	17.99
4 Txslots	21.36	21.15	21.04	22.50	-3.01	18.35	18.14	18.03

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 3Txslots for GSM850 and 4Txslots for GSM1900.

Table 11.1-2: The conducted power measurement results for GSM, GPRS and EGPRS-A3

PCS1900 GPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	26.68	26.31	26.30	28.20	-9.03	17.65	17.28	17.27
2 Txslots	23.43	23.16	23.07	25.00	-6.02	17.41	17.14	17.05
3 Txslots	22.35	22.03	21.96	23.90	-4.26	18.09	17.77	17.70
4 Txslots	21.22	20.86	20.81	22.80	-3.01	18.21	17.85	17.80
PCS1900 EGPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	26.66	26.30	26.25	28.20	-9.03	17.63	17.27	17.22
2 Txslots	23.41	23.16	23.03	25.00	-6.02	17.39	17.14	17.01
3 Txslots	22.34	22.03	21.92	23.90	-4.26	18.08	17.77	17.66
4 Txslots	21.21	20.87	20.78	23.00	-3.01	18.20	17.86	17.77
PCS1900 EGPRS (8PSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	25.42	25.24	25.20	27.00	-9.03	16.39	16.21	16.17

2 Txslots	23.65	23.49	23.45	25.00	-6.02	17.63	17.47	17.43
3 Txslots	22.39	22.23	22.17	23.50	-4.26	18.13	17.97	17.91
4 Txslots	21.15	20.99	20.98	22.50	-3.01	18.14	17.98	17.97

NOTES:

1) Division Factors

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

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

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

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

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

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

11.2 WCDMA Measurement result

Table 11.2-1: The conducted Power for WCDMA - A1

Item	band	FDDV result			
	ARFCN	4233 (846.6MHz)	4182 (836.4MHz)	4132 (826.4MHz)	Tune up
WCDMA	\	22.95	22.85	23.04	24.00
HSUPA	1	22.02	21.91	22.10	24.00
	2	20.04	19.93	20.13	24.00
	3	21.01	20.89	21.07	24.00
	4	19.99	19.97	20.11	24.00
	5	21.97	21.98	22.07	24.00
DC-HSDPA	1	22.05	21.92	22.06	24.00
	2	22.08	21.95	22.07	22.50
	3	21.6	21.44	21.61	24.00
	4	21.58	21.43	21.59	22.50
Item	band	FDDII result			
	ARFCN	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)	Tune up
WCDMA	\	23.17	23.23	23.27	24.50
HSUPA	1	22.25	22.34	22.35	23.50
	2	20.34	20.35	20.31	23.50
	3	21.29	21.33	21.30	23.50
	4	20.23	20.27	20.29	23.50
	5	22.19	22.26	22.31	23.50
DC-HSDPA	1	21.39	21.51	21.46	23.50
	2	21.41	21.47	21.45	22.00
	3	20.89	20.94	20.97	23.50
	4	20.88	20.97	20.99	22.00

Table 11.2-2: The conducted Power for WCDMA - A2

Item	band	FDDV result			
	ARFCN	4233 (846.6MHz)	4182 (836.4MHz)	4132 (826.4MHz)	Tune up
WCDMA	\	21.91	21.83	21.96	22.00
HSUPA	1	20.75	20.72	20.85	21.00
	2	18.80	18.75	18.87	21.00
	3	19.88	19.79	19.91	21.00
	4	18.76	18.74	18.85	21.00
	5	20.78	20.73	20.92	21.00
DC-HSDPA	1	20.01	19.87	19.99	21.00
	2	20.02	19.86	20.00	21.00
	3	19.49	19.44	19.51	21.00
	4	19.44	19.42	19.53	21.00

Table 11.2-3: The conducted Power for WCDMA - A3

Item	band	FDDII result			
	ARFCN	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)	Tune up
WCDMA	\	19.66	19.72	19.65	20.00
HSUPA	1	18.62	18.68	18.67	18.50
	2	16.66	16.71	16.68	18.50
	3	17.62	17.63	17.69	18.50
	4	16.59	16.62	16.64	18.50
	5	18.68	18.71	18.74	18.50
DC-HSDPA	1	18.65	18.66	18.64	18.50
	2	18.66	18.67	18.68	17.50
	3	18.17	18.19	18.23	18.50
	4	18.15	18.16	18.21	17.50

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	3	5	10	15	20	
	MHz	MHz	MHz	MHz	MHz	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 – A1

Band	Tune up
LTE Band 5	24
LTE Band 7	24
LTE Band 41	24

Table 13.3-3: The tune up for LTE – A2

Band	Tune up
LTE Band 5	22

Table 13.3-4: The tune up for LTE – A3

Band	Tune up
LTE Band 7	21

Table 11.3-5: The conducted Power for LTE - A1

Band 5						
Bandwidth (MHz)	RB allocation	Frequency (MHz)	QPSK	16QAM	64QAM	
	RB offset (Start RB)		Actual output power (dBm)	Actual output power (dBm)	Actual output power (dBm)	
1.4 MHz	1RB High (5)	848.3	22.90	21.87	21.53	
		836.5	22.98	22.15	21.32	
		824.7	23.05	22.37	21.51	
	1RB Middle (3)	848.3	22.96	21.92	21.60	
		836.5	23.02	22.20	21.56	
		824.7	23.09	22.39	21.54	
	1RB Low (0)	848.3	22.90	21.88	21.54	
		836.5	22.99	22.10	21.43	
		824.7	23.05	22.36	21.47	
	3RB High (3)	848.3	22.77	21.99	21.44	
		836.5	22.97	22.11	21.44	
		824.7	22.99	22.18	21.40	
	3RB Middle (1)	848.3	22.93	22.10	21.52	
		836.5	22.99	22.15	21.52	
		824.7	23.03	22.26	21.41	
	3RB Low (0)	848.3	22.80	22.05	21.46	
		836.5	22.92	22.10	21.50	
		824.7	22.97	22.19	21.46	
	6RB (0)	848.3	21.99	21.18	20.35	
		836.5	21.97	21.19	20.36	
		824.7	22.07	21.03	20.30	
	3 MHz	1RB High (14)	847.5	22.95	21.92	22.57
			836.5	22.97	21.92	21.50
			825.5	23.08	22.44	21.55
1RB Middle (7)		847.5	23.01	22.00	21.68	
		836.5	23.07	22.06	21.66	
		825.5	23.19	22.50	21.64	

	1RB Low (0)	847.5	22.99	21.96	21.54	
		836.5	22.96	21.98	21.63	
		825.5	23.13	22.47	21.53	
	8RB High (7)	847.5	22.05	21.09	20.49	
		836.5	22.02	21.23	20.42	
		825.5	22.15	21.24	20.43	
	8RB Middle (4)	847.5	22.05	21.16	20.52	
		836.5	22.08	21.26	20.48	
		825.5	22.16	21.28	20.44	
	8RB Low (0)	847.5	22.02	21.09	20.45	
		836.5	22.04	21.25	20.40	
		825.5	22.18	21.27	20.43	
	15RB (0)	847.5	22.03	21.06	20.49	
		836.5	22.09	21.20	20.38	
		825.5	22.16	21.25	20.44	
5 MHz	1RB High (24)	846.5	23.02	22.02	21.56	
		836.5	23.07	22.20	21.63	
		826.5	23.04	22.57	21.52	
	1RB Middle (12)	846.5	23.02	22.01	21.66	
		836.5	23.10	22.19	21.48	
		826.5	23.06	22.57	21.58	
	1RB Low (0)	846.5	23.00	22.07	21.55	
		836.5	23.10	22.24	21.59	
		826.5	23.11	22.59	21.61	
	12RB High (13)	846.5	22.05	21.11	20.51	
		836.5	22.10	21.21	20.45	
		826.5	22.13	21.32	20.42	
	12RB Middle (6)	846.5	22.10	21.20	20.54	
		836.5	22.14	21.26	20.47	
		826.5	22.17	21.36	20.49	
	12RB Low (0)	846.5	22.06	21.14	20.43	
		836.5	22.12	21.25	20.43	
		826.5	22.17	21.34	20.44	
	25RB (0)	846.5	22.07	21.04	20.43	
		836.5	22.10	21.23	20.42	
		826.5	22.14	21.24	20.39	
	10 MHz	1RB High (49)	844.0	22.96	21.79	21.52
			836.5	23.01	22.38	21.53
			829.0	23.04	22.16	21.53
1RB Middle (24)		844.0	22.96	21.89	21.55	
		836.5	22.99	22.43	21.55	
		829.0	22.98	22.08	21.49	
1RB Low (0)		844.0	22.93	21.93	21.66	
		836.5	23.00	22.39	21.54	
		829.0	23.08	22.08	21.55	
25RB High (25)		844.0	22.04	21.09	20.42	
		836.5	22.06	21.18	20.40	
		829.0	22.20	21.35	20.38	

	25RB Middle (12)	844.0	22.11	21.17	20.54
		836.5	22.07	21.24	20.47
		829.0	22.19	21.37	20.49
	25RB Low (0)	844.0	22.03	21.15	20.51
		836.5	22.07	21.18	20.42
		829.0	22.15	21.30	20.44
	50RB (0)	844.0	22.06	21.14	20.52
		836.5	22.12	21.21	20.42
		829.0	22.21	21.30	20.43

Band 7						
Bandwidth (MHz)	RB allocation	Frequency (MHz)	QPSK	16QAM	64QAM	
	RB offset (Start RB)		Actual output power (dBm)	Actual output power (dBm)	Actual output power (dBm)	
5 MHz	1RB High (24)	2567.5	23.96	21.85	21.20	
		2535	23.65	22.17	21.50	
		2502.5	23.54	21.62	20.97	
	1RB Middle (12)	2567.5	23.94	21.83	21.17	
		2535	23.60	22.09	21.42	
		2502.5	23.54	21.63	20.98	
	1RB Low (0)	2567.5	23.71	21.82	21.17	
		2535	23.60	22.12	21.46	
		2502.5	23.54	21.57	20.92	
	12RB High (13)	2567.5	22.30	21.81	21.15	
		2535	22.13	21.81	21.16	
		2502.5	22.00	21.63	20.98	
	12RB Middle (6)	2567.5	22.28	21.84	21.18	
		2535	22.16	21.83	21.17	
		2502.5	22.06	21.64	20.99	
	12RB Low (0)	2567.5	22.28	21.80	21.14	
		2535	22.11	21.81	21.16	
		2502.5	21.98	21.58	20.93	
	25RB (0)	2567.5	22.24	21.74	21.08	
		2535	22.11	21.74	21.09	
		2502.5	22.04	21.51	20.86	
	10 MHz	1RB High (49)	2565	23.92	21.61	20.96
			2535	23.66	22.04	21.38
			2505	23.49	21.54	20.90
1RB Middle (24)		2565	23.84	21.58	20.93	
		2535	23.59	21.97	21.31	
		2505	23.40	21.56	20.91	
1RB Low (0)		2565	23.82	21.59	20.94	
		2535	23.63	21.96	21.30	
		2505	23.48	21.49	20.84	
25RB High (25)		2565	22.27	21.76	21.10	
		2535	22.16	21.75	21.10	
		2505	22.03	21.65	21.00	

	25RB Middle (12)	2565	22.24	21.76	21.11	
		2535	22.12	21.76	21.11	
		2505	22.01	21.65	21.00	
	25RB Low (0)	2565	22.21	21.75	21.10	
		2535	22.10	21.69	21.04	
		2505	22.01	21.61	20.96	
	50RB (0)	2565	22.22	21.75	21.10	
		2535	22.15	21.70	21.05	
		2505	22.00	21.61	20.96	
15 MHz	1RB High (74)	2562.5	23.84	21.59	20.94	
		2535	23.65	22.03	21.37	
		2507.5	23.59	21.89	21.23	
	1RB Middle (37)	2562.5	23.81	21.60	20.95	
		2535	23.61	21.98	21.32	
		2507.5	23.53	21.89	21.23	
	1RB Low (0)	2562.5	23.72	21.61	20.97	
		2535	23.46	21.97	21.31	
		2507.5	23.55	21.82	21.16	
	36RB High (38)	2562.5	22.32	21.85	21.19	
		2535	22.19	21.80	21.14	
		2507.5	22.06	21.57	20.92	
	36RB Middle (19)	2562.5	22.28	21.88	21.22	
		2535	22.18	21.79	21.14	
		2507.5	22.07	21.60	20.95	
	36RB Low (0)	2562.5	22.28	21.84	21.19	
		2535	22.15	21.73	21.07	
		2507.5	22.03	21.55	20.90	
	75RB (0)	2562.5	22.28	21.85	21.20	
		2535	22.15	21.76	21.11	
		2507.5	22.02	21.57	20.92	
	20 MHz	1RB High (99)	2560	23.64	22.20	21.54
			2535	23.63	22.10	21.43
			2510	23.61	21.97	21.31
		1RB Middle (50)	2560	23.76	22.20	21.53
			2535	23.55	22.00	21.34
			2510	23.45	21.85	21.20
1RB Low (0)		2560	23.67	22.20	21.53	
		2535	23.58	22.00	21.34	
		2510	23.46	21.82	21.16	
50RB High (50)		2560	22.26	21.76	21.11	
		2535	22.20	21.77	21.11	
		2510	22.14	21.68	21.03	
50RB Middle (25)		2560	22.25	21.79	21.14	
		2535	22.19	21.78	21.12	
		2510	22.06	21.58	20.93	
50RB Low (0)		2560	22.24	21.80	21.15	
		2535	22.11	21.67	21.02	
		2510	22.02	21.51	20.86	

	100RB (0)	2560	22.18	21.82	21.16
		2535	22.13	21.70	21.05
		2510	22.14	21.65	21.00

Band 41					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	QPSK	16QAM	64QAM
	RB offset (Start RB)		Actual output power (dBm)	Actual output power (dBm)	Actual output power (dBm)
5 MHz	1RB High (24)	2687.5	23.49	21.91	21.30
		2640.3	23.51	21.47	21.22
		2593	23.79	21.84	21.28
		2545.8	23.65	21.97	21.29
		2498.5	23.41	21.39	21.02
	1RB Middle (12)	2687.5	23.47	21.85	21.31
		2640.3	23.62	21.52	21.20
		2593	23.82	21.88	21.23
		2545.8	23.67	21.96	21.27
		2498.5	23.43	21.36	20.99
	1RB Low (0)	2687.5	23.47	21.80	21.29
		2640.3	23.53	21.52	21.20
		2593	23.77	21.74	21.27
		2545.8	23.70	21.89	21.29
		2498.5	23.34	21.35	20.97
	12RB High (13)	2687.5	22.18	21.89	21.35
		2640.3	22.04	21.67	21.30
		2593	22.32	21.96	21.32
		2545.8	22.30	21.93	21.37
		2498.5	21.94	21.56	21.07
	12RB Middle (6)	2687.5	22.17	21.92	21.40
		2640.3	22.06	21.68	21.32
		2593	22.35	21.93	21.34
		2545.8	22.31	21.91	21.42
		2498.5	21.97	21.55	21.07
	12RB Low (0)	2687.5	22.09	21.89	21.35
		2640.3	22.06	21.66	21.32
		2593	22.34	21.89	21.34
		2545.8	22.22	21.90	21.38
		2498.5	21.97	21.51	21.06
	25RB (0)	2687.5	22.19	21.89	21.37
		2640.3	22.03	21.66	21.31
		2593	22.35	21.95	21.33

		2545.8	22.36	21.98	21.37
		2498.5	21.91	21.51	21.07
10 MHz	1RB High (49)	2685	23.82	21.95	21.95
		2639	23.55	21.61	21.24
		2593	23.84	21.93	21.34
		2547	23.76	22.02	21.39
		2501	23.49	21.61	21.07
	1RB Middle (24)	2685	23.52	21.85	21.32
		2639	23.51	21.55	21.25
		2593	23.85	21.88	21.27
		2547	23.78	22.01	21.34
		2501	23.43	21.54	20.99
	1RB Low (0)	2685	23.83	22.46	21.98
		2639	23.56	21.59	21.28
		2593	23.87	21.91	21.33
		2547	23.74	21.96	21.41
		2501	23.42	21.48	21.03
	25RB High (25)	2685	22.37	21.77	21.64
		2639	22.07	21.72	21.34
		2593	22.39	21.80	21.38
		2547	22.36	21.82	21.46
		2501	22.06	21.70	21.11
	25RB Middle (12)	2685	22.24	21.92	21.51
		2639	22.08	21.65	21.42
		2593	22.36	21.95	21.41
		2547	22.30	21.97	21.47
		2501	22.03	21.70	21.16
	25RB Low (0)	2685	22.35	21.92	21.64
		2639	22.05	21.69	21.37
		2593	22.38	21.98	21.39
2547		22.32	21.91	21.46	
2501		22.02	21.62	21.10	
50RB (0)	2685	22.36	21.85	21.54	
	2639	22.08	21.69	21.34	
	2593	22.34	21.80	21.36	
	2547	22.34	21.80	21.37	
	2501	22.04	21.70	21.08	
15 MHz	1RB High (74)	2682.5	23.72	21.81	21.42
		2637.8	23.51	21.58	21.34
		2593	23.80	21.87	21.43
		2548.3	23.80	21.97	21.50

		2503.5	23.47	21.60	21.29
	1RB Middle (37)	2682.5	23.59	21.80	21.44
		2637.8	23.54	21.50	21.32
		2593	23.82	21.86	21.38
		2548.3	23.77	21.83	21.40
		2503.5	23.31	21.43	21.07
	1RB Low (0)	2682.5	23.52	21.81	21.42
		2637.8	23.56	21.53	21.45
		2593	23.89	21.91	21.42
		2548.3	23.74	21.92	21.48
		2503.5	23.31	21.43	21.09
	36RB High (38)	2682.5	22.21	21.89	21.54
		2637.8	22.07	21.66	21.41
		2593	22.32	21.92	21.46
		2548.3	22.35	21.92	21.48
		2503.5	22.05	21.60	21.24
	36RB Middle (19)	2682.5	22.14	21.81	21.51
		2637.8	22.09	21.63	21.44
		2593	22.32	21.94	21.46
		2548.3	22.32	21.92	21.47
		2503.5	21.92	21.52	21.19
	36RB Low (0)	2682.5	22.13	21.78	21.54
		2637.8	22.05	21.64	21.43
		2593	22.30	21.93	21.48
		2548.3	22.21	21.86	21.47
		2503.5	21.87	21.46	21.13
	75RB (0)	2682.5	22.17	21.81	21.51
		2637.8	22.09	21.68	21.38
		2593	22.33	21.97	21.44
		2548.3	22.27	21.86	21.44
2503.5		22.00	21.64	21.23	
20 MHz	1RB High (99)	2680	23.51	21.53	23.29
		2636.5	23.52	21.50	21.41
		2593	23.86	22.03	21.46
		2549.5	23.80	21.78	21.51
		2506	23.48	21.48	21.41
	1RB Middle (50)	2680	23.60	21.62	21.52
		2636.5	23.49	21.44	21.40
		2593	23.77	21.93	21.46
		2549.5	23.76	21.72	21.49
		2506	23.32	21.30	21.16
	1RB	2680	23.53	21.33	23.35



	Low (0)	2636.5	23.53	21.49	21.53
		2593	23.82	21.94	21.58
		2549.5	23.70	21.69	21.57
		2506	23.37	21.26	21.18
	50RB High (50)	2680	22.38	21.97	21.71
		2636.5	22.12	21.72	21.47
		2593	22.39	21.96	21.49
		2549.5	22.33	21.95	21.53
		2506	22.10	21.73	21.33
	50RB Middle (25)	2680	22.20	21.85	21.58
		2636.5	22.13	21.69	21.52
		2593	22.42	21.86	21.51
		2549.5	22.34	21.98	21.52
		2506	22.09	21.77	21.30
	50RB Low (0)	2680	22.29	21.90	21.72
		2636.5	22.09	21.70	21.55
		2593	22.27	21.82	21.55
		2549.5	22.28	21.93	21.53
		2506	21.90	21.60	21.19
	100RB (0)	2680	22.29	21.80	21.70
2636.5		22.12	21.68	21.51	
2593		22.41	21.99	21.50	
2549.5		22.27	21.90	21.51	
2506		22.06	21.69	21.29	

Table 11.3-6: The conducted Power for LTE – A2

Band 5						
Bandwidth (MHz)	RB allocation	Frequency (MHz)	QPSK	16QAM	64QAM	
	RB offset (Start RB)		Actual output power (dBm)	Actual output power (dBm)	Actual output power (dBm)	
1.4 MHz	1RB High (5)	848.3	21.68	21.69	21.41	
		836.5	21.80	21.88	21.60	
		824.7	21.85	21.97	21.89	
	1RB Middle (3)	848.3	21.74	21.72	21.44	
		836.5	21.84	21.95	21.67	
		824.7	21.91	21.91	21.93	
	1RB Low (0)	848.3	21.69	21.64	21.37	
		836.5	21.82	21.88	21.60	
		824.7	21.86	21.98	21.89	
	3RB High (3)	848.3	21.71	21.84	21.56	
		836.5	21.78	21.87	21.59	
		824.7	21.84	21.90	21.72	
	3RB Middle (1)	848.3	21.78	21.90	21.61	
		836.5	21.83	21.95	21.67	
		824.7	21.91	21.96	21.77	
	3RB Low (0)	848.3	21.67	21.80	21.52	
		836.5	21.78	21.89	21.61	
		824.7	21.85	21.98	21.72	
	6RB (0)	848.3	21.80	20.96	20.70	
		836.5	21.74	21.01	20.75	
		824.7	21.84	20.82	20.56	
	3 MHz	1RB High (14)	847.5	21.78	21.72	21.44
			836.5	21.82	21.73	21.45
			825.5	21.91	21.99	21.90
		1RB Middle (7)	847.5	21.88	21.81	21.53
			836.5	21.87	21.83	21.55
			825.5	21.91	21.90	21.91
1RB Low (0)		847.5	21.80	21.78	21.50	
		836.5	21.82	21.77	21.49	
		825.5	21.91	21.99	21.93	
8RB High (7)		847.5	21.84	20.90	20.64	
		836.5	21.82	21.02	20.76	
		825.5	21.93	21.00	20.74	
8RB Middle (4)		847.5	21.89	20.93	20.67	
		836.5	21.89	21.07	20.81	
		825.5	22.00	21.06	20.80	
8RB Low (0)		847.5	21.85	20.90	20.64	
		836.5	21.85	21.04	20.78	
		825.5	21.93	21.04	20.78	
15RB (0)		847.5	21.83	20.81	20.55	
		836.5	21.88	20.96	20.70	
		825.5	21.91	21.01	20.75	

5 MHz	1RB High (24)	846.5	21.88	21.86	21.58	
		836.5	21.79	21.92	21.97	
		826.5	21.90	21.95	21.67	
	1RB Middle (12)	846.5	21.91	21.88	21.60	
		836.5	21.79	21.95	21.95	
		826.5	21.94	21.93	21.65	
	1RB Low (0)	846.5	21.92	21.92	21.64	
		836.5	21.79	22.00	21.90	
		826.5	21.94	21.97	21.68	
	12RB High (13)	846.5	21.85	20.90	20.64	
		836.5	21.83	21.06	20.80	
		826.5	21.87	21.02	20.76	
	12RB Middle (6)	846.5	21.88	20.97	20.71	
		836.5	21.90	21.13	20.87	
		826.5	21.97	21.06	20.79	
	12RB Low (0)	846.5	21.82	20.96	20.70	
		836.5	21.87	21.11	20.84	
		826.5	21.94	21.05	20.79	
	25RB (0)	846.5	21.83	20.90	20.64	
		836.5	21.90	21.07	20.80	
		826.5	21.91	20.94	20.68	
	10 MHz	1RB High (49)	844.0	21.81	21.92	21.74
			836.5	21.77	21.81	21.53
			829.0	21.89	21.83	21.55
		1RB Middle (24)	844.0	21.86	21.91	21.83
			836.5	21.81	21.88	21.60
			829.0	21.87	21.78	21.50
1RB Low (0)		844.0	21.81	21.98	21.89	
		836.5	21.82	21.87	21.59	
		829.0	21.90	21.76	21.49	
25RB High (25)		844.0	21.82	20.90	20.64	
		836.5	21.85	21.04	20.77	
		829.0	21.90	21.11	20.84	
25RB Middle (12)		844.0	21.88	20.99	20.73	
		836.5	21.91	21.07	20.80	
		829.0	21.95	21.07	20.81	
25RB Low (0)		844.0	21.85	20.92	20.66	
		836.5	21.85	21.06	20.80	
		829.0	21.92	21.04	20.78	
50RB (0)		844.0	21.83	20.93	20.67	
		836.5	21.88	20.96	20.70	
		829.0	21.98	21.07	20.80	

Table 11.3-7: The conducted Power for LTE – A3

Band 7						
Bandwidth (MHz)	RB allocation	Frequency (MHz)	QPSK	16QAM	64QAM	
	RB offset (Start RB)		Actual output power (dBm)	Actual output power (dBm)	Actual output power (dBm)	
5 MHz	1RB High (24)	2567.5	20.58	20.91	20.73	
		2535	20.56	20.98	20.96	
		2502.5	20.37	20.66	20.48	
	1RB Middle (12)	2567.5	20.54	20.85	20.67	
		2535	20.47	20.97	20.97	
		2502.5	20.35	20.60	20.41	
	1RB Low (0)	2567.5	20.59	20.90	20.71	
		2535	20.53	20.96	20.97	
		2502.5	20.34	20.60	20.41	
	12RB High (13)	2567.5	20.71	20.89	20.71	
		2535	20.58	20.84	20.66	
		2502.5	20.44	20.64	20.45	
	12RB Middle (6)	2567.5	20.74	20.87	20.69	
		2535	20.57	20.88	20.70	
		2502.5	20.49	20.67	20.48	
	12RB Low (0)	2567.5	20.71	20.88	20.70	
		2535	20.58	20.84	20.66	
		2502.5	20.46	20.63	20.44	
	25RB (0)	2567.5	20.69	20.80	20.62	
		2535	20.57	20.79	20.61	
		2502.5	20.51	20.56	20.37	
	10 MHz	1RB High (49)	2565	20.74	20.73	20.55
			2535	20.52	20.61	20.42
			2505	20.39	20.98	20.80
1RB Middle (24)		2565	20.68	20.72	20.54	
		2535	20.49	20.57	20.38	
		2505	20.34	20.90	20.72	
1RB Low (0)		2565	20.67	20.75	20.57	
		2535	20.47	20.53	20.35	
		2505	20.33	20.87	20.69	
25RB High (25)		2565	20.75	20.91	20.73	
		2535	20.62	20.78	20.60	
		2505	20.50	20.66	20.47	
25RB Middle (12)		2565	20.75	20.90	20.72	
		2535	20.62	20.76	20.58	
		2505	20.49	20.68	20.49	
25RB Low (0)		2565	20.69	20.91	20.73	
		2535	20.56	20.77	20.59	
		2505	20.49	20.61	20.42	
50RB (0)		2565	20.75	20.83	20.65	
		2535	20.59	20.75	20.57	
		2505	20.50	20.62	20.43	

15 MHz	1RB High (74)	2562.5	20.65	20.95	20.93
		2535	20.51	20.63	20.44
		2507.5	20.47	20.91	20.73
	1RB Middle (37)	2562.5	20.59	20.96	20.95
		2535	20.45	20.55	20.37
		2507.5	20.44	20.87	20.69
	1RB Low (0)	2562.5	20.57	20.98	20.99
		2535	20.45	20.52	20.34
		2507.5	20.46	20.88	20.69
	36RB High (38)	2562.5	20.72	20.85	20.67
		2535	20.56	20.74	20.56
		2507.5	20.45	20.60	20.42
	36RB Middle (19)	2562.5	20.67	20.83	20.65
		2535	20.56	20.73	20.55
		2507.5	20.43	20.62	20.43
	36RB Low (0)	2562.5	20.67	20.75	20.57
		2535	20.51	20.65	20.47
		2507.5	20.42	20.64	20.46
	75RB (0)	2562.5	20.71	20.82	20.64
		2535	20.53	20.74	20.56
		2507.5	20.44	20.57	20.38
20 MHz	1RB High (99)	2560	20.49	20.91	20.96
		2535	20.43	20.96	20.92
		2510	20.41	20.96	20.99
	1RB Middle (50)	2560	20.48	20.95	20.96
		2535	20.44	20.98	20.84
		2510	20.23	20.98	20.80
	1RB Low (0)	2560	20.47	20.93	20.94
		2535	20.39	20.99	20.84
		2510	20.26	20.98	20.80
	50RB High (50)	2560	20.72	20.84	20.66
		2535	20.60	20.74	20.55
		2510	20.59	20.76	20.57
	50RB Middle (25)	2560	20.73	20.89	20.71
		2535	20.60	20.76	20.57
		2510	20.46	20.67	20.48
	50RB Low (0)	2560	20.67	20.86	20.68
		2535	20.57	20.73	20.55
		2510	20.45	20.62	20.43
	100RB (0)	2560	20.68	20.86	20.68
		2535	20.59	20.72	20.53
		2510	20.55	20.72	20.54

11.4 Wi-Fi and BT Measurement result

The maximum output power of BT is 11.65dBm.

The maximum tune up of BT is 12dBm.

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

Wi-Fi 2.4G Normal Power - Audio receiver is INACTIVE

802.11b(dBm)				
Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps
11(2462MHz)	19.03	/	/	/
6(2437(MHz)	19.69	19.64	19.59	19.41
1(2412MHz)	19.10	/	/	/
Tune up	21	21	21	21

802.11g(dBm)								
Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
11(2462MHz)	17.25	/	/	17.86	/	/	/	/
6(2437(MHz)	17.78	17.72	17.63	18.38	18.08	16.78	16.73	16.20
1(2412MHz)	17.35	/	/	17.95	/	/	/	/
Tune up	19.5	19.5	19.5	20	20.5	18.5	18.5	17.5

802.11n(dBm) - 20MHz								
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
11(2462MHz)	17.05	/	/	/	/	/	/	/
6(2437(MHz)	17.58	17.36	18.24	18.14	17.80	16.20	16.17	15.75
1(2412MHz)	17.20	/	/	/	/	/	/	/
Tune up	19.5	19.5	20	20.5	20.5	17.5	17.5	17.5

802.11n(dBm) - 40MHz								
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
9(2452MHz)	18.91	18.74	18.52	18.29	18.04	16.46	16.38	15.52
6(2437MHz)	18.45	/	/	/	/	/	/	/
3(2422MHz)	17.92	/	/	/	/	/	/	/
Tune up	19.5	19.5	19.5	19.5	19.5	17.5	17.5	17.5



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Wi-Fi 5G Normal Power - Audio receiver is INACTIVE

802.11a(dBm)								
Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
36(5180 MHz)	16.59	/	/	17.60	/	/	/	/
40(5200 MHz)	16.67	/	/	17.54	/	/	/	/
44(5220 MHz)	16.64	/	/	18.01	/	/	/	/
48(5240 MHz)	16.93	16.89	16.81	17.57	17.32	15.77	15.78	15.76
Tune up	17.5	18.5	18.5	19	19	17.5	17	17
52(5260 MHz)	16.43	16.68	16.82	17.66	17.45	15.68	15.72	15.67
56(5280 MHz)	16.31	/	/	17.40	/	/	/	/
60(5300 MHz)	16.37	/	/	17.37	/	/	/	/
64(5320 MHz)	16.29	/	/	17.27	/	/	/	/
Tune up	17	18	18	18	18.5	17	17	17
100(5500 MHz)	16.34	/	/	16.90	/	/	/	/
104(5520 MHz)	16.38	16.20	16.28	17.14	16.92	16.14	16.22	16.17
108(5540 MHz)	16.17	/	/	16.91	/	/	/	/
112(5560 MHz)	15.98	/	/	16.76	/	/	/	/
116(5580 MHz)	15.95	/	/	16.55	/	/	/	/
120(5600 MHz)	15.81	/	/	16.29	/	/	/	/
124(5620 MHz)	15.46	/	/	16.06	/	/	/	/
128(5640 MHz)	15.44	/	/	16.10	/	/	/	/
132(5660 MHz)	15.36	/	/	15.81	/	/	/	/
136(5680 MHz)	15.22	/	/	15.79	/	/	/	/
140(5700 MHz)	15.42	/	/	15.94	/	/	/	/
144(5720 MHz)	15.53	/	/	16.05	/	/	/	/
Tune up	17	18	18	18	18.5	17	17	17
149(5745 MHz)	15.94	/	/	15.98	/	/	/	/
153(5765 MHz)	16.17	/	/	16.08	/	/	/	/
157(5785 MHz)	16.72	/	/	16.34	/	/	/	/
161(5805 MHz)	16.95	/	/	16.73	/	/	/	/
165(5825 MHz)	16.98	16.06	16.51	16.64	15.98	15.94	14.15	14.12
Tune up	18.5	18.5	19	19	19	17.5	17.5	17.5



Wi-Fi 2.4G Low Power - Audio receiver is ACTIVE

802.11b(dBm)				
Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps
11(2462MHz)	/	/	15.70	/
6(2437(MHz)	16.19	16.13	16.31	16.28
1(2412MHz)	/	/	16.25	/
Tune up	16.5	16.5	16.5	16.5

802.11g(dBm)								
Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
11(2462MHz)	/	/	/	15.91	/	/	/	/
6(2437(MHz)	15.86	15.84	15.83	16.70	16.48	16.17	16.23	16.29
1(2412MHz)	/	/	/	16.11	/	/	/	/
Tune up	17	17.5	17.5	17.5	18	18	18	18

802.11n(dBm)-20MHz								
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
11(2462MHz)	/	/	/	15.91	/	/	/	/
6(2437(MHz)	15.71	15.58	16.60	16.69	16.47	16.46	16.50	16.49
1(2412MHz)	/	/	/	16.00	/	/	/	/
Tune up	16.8	17.3	18.3	17.5	18	17.5	17.5	17.5

802.11n(dBm)-40MHz								
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
9(2452MHz)	16.60	16.51	16.52	16.42	16.33	16.28	16.29	16.21
6(2437MHz)	16.29	/	/	/	/	/	/	/
3(2422MHz)	16.90	/	/	/	/	/	/	/
Tune up	17.5	18	18	18	17.5	17.5	17.5	17.5



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Wi-Fi 5G Low Power - Audio receiver is ACTIVE

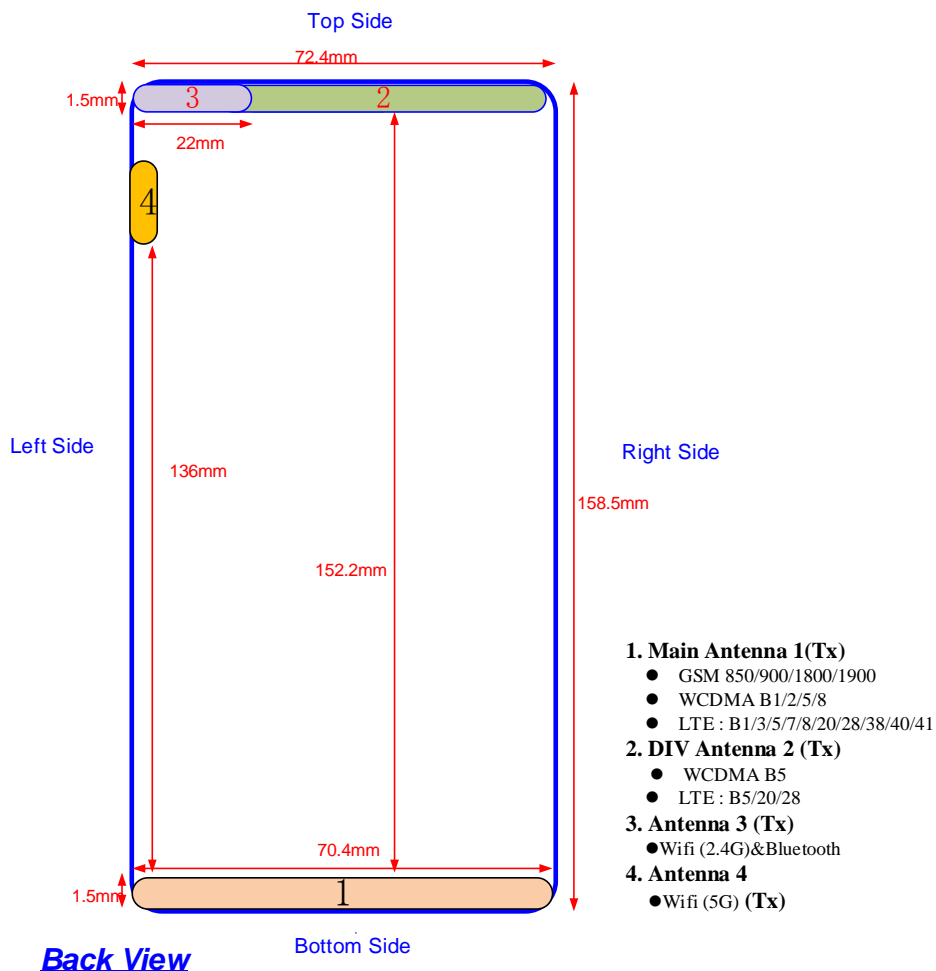
802.11a(dBm)								
Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
36(5180 MHz)	13.42	/	/	14.23	/	/	/	/
40(5200 MHz)	13.48	/	/	14.18	/	/	/	/
44(5220 MHz)	13.46	/	/	14.23	/	/	/	/
48(5240 MHz)	13.69	13.66	13.59	14.21	14.01	13.75	13.76	13.74
Tune up	14.3	15.5	15.5	15.5	16	15.5	15.5	15.5
52(5260 MHz)	13.29	13.49	13.60	14.28	14.11	12.68	12.71	12.67
56(5280 MHz)	13.19	/	/	14.07	/	/	/	/
60(5300 MHz)	13.24	/	/	14.05	/	/	/	/
64(5320 MHz)	13.17	/	/	13.96	/	/	/	/
100(5500 MHz)	13.21	/	/	13.67	/	/	/	/
104(5520 MHz)	13.25	13.10	13.16	13.86	13.68	13.05	13.12	13.08
108(5540 MHz)	13.08	/	/	13.67	/	/	/	/
112(5560 MHz)	12.92	/	/	13.55	/	/	/	/
116(5580 MHz)	12.90	/	/	13.38	/	/	/	/
120(5600 MHz)	12.78	/	/	13.17	/	/	/	/
124(5620 MHz)	12.50	/	/	12.99	/	/	/	/
128(5640 MHz)	12.49	/	/	13.02	/	/	/	/
132(5660 MHz)	12.42	/	/	12.78	/	/	/	/
136(5680 MHz)	12.31	/	/	12.77	/	/	/	/
140(5700 MHz)	12.47	/	/	12.89	/	/	/	/
144(5720 MHz)	12.56	/	/	12.98	/	/	/	/
Tune up	13.5	15	15	14.5	15.5	15	15	15
149(5745 MHz)	12.89	/	/	12.92	/	/	/	/
153(5765 MHz)	12.75	/	/	13.00	/	/	/	/
157(5785 MHz)	12.52	/	/	13.21	/	/	/	/
161(5805 MHz)	12.71	/	/	13.53	/	/	/	/
165(5825 MHz)	12.73	12.99	13.35	13.46	13.92	13.89	13.44	13.42
Tune up	13.5	15	15	14.5	15.5	15	15	15

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	12	15.85	No
		Body	19.20	12	15.85	Yes
2.4GHz WLAN	2.45	Head	9.58	18	63.10	No
		Body	19.17	21	125.89	No
5GHz WLAN	5.2	Head	6.58	16	39.81	No
		Body	13.16	19	79.43	No
	5.3	Head	6.52	15.5	35.48	No
		Body	13.03	18.5	70.79	No
	5.6	Head	6.34	15.5	35.48	No
		Body	12.68	18.5	70.79	No
	5.8	Head	6.23	15.5	35.48	No
		Body	12.46	19	79.43	No

13 Evaluation of Simultaneous

Table 13.1: The sum of reported SAR values for main antenna and 2.4GWiFi

	Position	Main antenna	WiFi	Sum
Highest reported SAR value for Head	Right hand, Tilt (WCDMA850)	1.35	0.09	1.44
Highest reported SAR value for Body	Bottom 10mm (LTE B7)	1.34	/	1.34

Table 13.2: The sum of reported SAR values for main antenna and 5GWiFi

	Position	Main antenna	WiFi	Sum
Highest reported SAR value for Head	Right hand, Tilt (WCDMA850)	1.35	0.07	1.42
Highest reported SAR value for Body	Rear 10mm (GSM850)	0.97	0.58	1.55

Table 13.3: The sum of reported SAR values for main antenna and BT

	Position	Main antenna	BT	Sum
Maximum reported SAR value for Head	Right hand, Tilt (WCDMA850)	1.35	<0.01	1.35
Maximum reported SAR value for Body	Rear 10mm (GSM850)	0.97	0.33 ^[1]	1.30
Maximum reported SAR value for Body	Bottom 10mm (LTE B7)	1.34	/	1.34

[1] - Estimated SAR for Bluetooth (see the table 13.4)

Table 13.4: Estimated SAR for Bluetooth

Mode/Band	F (GHz)	Position	Distance (mm)	Upper limit of power *		Estimated _{1g} (W/kg)
				dBm	mW	
Bluetooth	2.441	Body	10	12	15.85	0.33

* - 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.



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

Conclusion:

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

14 SAR Test Result

It is determined by user manual for the distance between the EUT and the phantom bottom. The distance is 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
Speech for GSM850	1:2.67
Speech for GSM 1900	1:2
GPRS&EGPRS for GSM850	1:2.67
GPRS&EGPRS for GSM1900	1:2
WCDMA<E FDD	1:1
LTE TDD	1:1.58

The evaluation of multi-SIM cards:

We'll perform the head measurement in all bands with the primary SIM card depending on the evaluation of multi-SIM cards and retest on highest value point with other SIM cards. Then, repeat the measurement in the Body test.

Frequency		Mode/Band	Side	Position	SIM Type	1g SAR (W/kg)	Power Drift
MHz	Channel						
836.6	190	GSM850	Right	Cheek	SIM1	0.407	-0.01
836.6	190	GSM850	Right	Cheek	SIM2	0.387	0.05

Note: According to the values in the above table, the **SIM1** is the primary SIM card.

We'll perform the head measurement with the SIM1 and retest on highest value point with others.

Frequency		Mode/Band	Position	SIM Type	1g SAR (W/kg)	Power Drift
MHz	Channel					
836.6	190	GSM850	Rear	SIM1	0.906	-0.04
836.6	190	GSM850	Rear	SIM2	0.868	0.06

Note: According to the values in the above table, the **SIM1** is the primary SIM card.

We'll perform the body measurement with the SIM1 and retest on highest value point with others.

The evaluation of multi-Batteries:

We'll perform the head measurement in all bands with the primary Battery depending on the evaluation of multi-Batteries and retest on highest value point with other Battery. Then, repeat the measurement in the Body test.

Frequency		Mode/Band	Side	Position	Battery	1g SAR (W/kg)	PowerDrift
MHz	Channel						
836.6	190	GSM850	Right	Cheek	B1	0.407	-0.01
836.6	190	GSM850	Right	Cheek	B2	0.385	0.06

Note: According to the values in the above table, the **B1** is the primary Battery.

We'll perform the head measurement with the B1 and retest on highest value point with others.

Frequency		Mode/Band	Position	Battery	1g SAR (W/kg)	PowerDrift
MHz	Channel					
836.6	190	GSM850	Rear	B1	0.906	-0.04
836.6	190	GSM850	Rear	B2	0.855	-0.08

Note: According to the values in the above table, the **B1** is the primary Battery.

We'll perform the body measurement with the B1 and retest on highest value point with others.

Note

S1: SIM1

S2: SIM2

B1: The battery of Tlp043D7 by VEKEN

B2: The battery of Tlp043D1 by BYD

H: The Headset of MTRO100 by TES

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(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
190	836.6	Left	Touch	/	29.31	29.6	0.304	0.32	0.247	0.26	0.10
190	836.6	Left	Tilt	/	29.31	29.6	0.163	0.17	0.120	0.13	0.15
251	848.8	Right	Touch	/	29.42	29.6	0.371	0.39	0.287	0.30	-0.07
190	836.6	Right	Touch	Fig.1	29.31	29.6	0.407	0.44	0.314	0.34	-0.01
128	824.2	Right	Touch	/	29.32	29.6	0.400	0.43	0.305	0.33	-0.16
190	836.6	Right	Tilt	/	29.31	29.6	0.164	0.18	0.128	0.14	-0.09
190	836.6	Right	Touch	S2	29.31	29.6	0.387	0.41	0.291	0.31	-0.01
190	836.6	Right	Touch	B2	29.31	29.6	0.385	0.41	0.302	0.32	0.06

Note: the head SAR of GSM850 is tested with GPRS (3Txslots) mode because of VoIP.

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

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
Ambient Temperature: 22.9 °C Liquid Temperature: 22.5 °C											
190	836.6	GPRS (3)	Front	/	29.31	29.6	0.729	0.78	0.423	0.45	0.11
251	848.8	GPRS (3)	Rear	/	29.42	29.6	0.898	0.94	0.502	0.52	0.07
190	836.6	GPRS (3)	Rear	Fig.2	29.31	29.6	0.906	0.97	0.529	0.57	-0.04
128	824.2	GPRS (3)	Rear	/	29.32	29.6	0.867	0.92	0.500	0.53	0.02
190	836.6	GPRS (3)	Left	/	29.31	29.6	0.136	0.15	0.086	0.09	-0.08
190	836.6	GPRS (3)	Right	/	29.31	29.6	0.403	0.43	0.255	0.27	0.11
190	836.6	GPRS (3)	Bottom	/	29.31	29.6	0.562	0.60	0.258	0.28	-0.10
190	836.6	EGPRS (3)	Rear	/	29.31	29.6	0.900	0.96	0.511	0.55	0.07
190	836.6	GPRS (3)	Rear	S2	29.31	29.6	0.868	0.93	0.502	0.54	0.06
190	836.6	GPRS (3)	Rear	B2	29.31	29.6	0.855	0.91	0.496	0.53	-0.08

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

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

Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measure d SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measure d SAR(10g) (W/kg)	Reporte d SAR(10 g) (W/kg)	Power Drift (dB)
Ch.	MHz										
Ambient Temperature: 22.9 °C Liquid Temperature: 22.5 °C											
810	1909.8	Left	Touch	/	24.97	26	0.169	0.21	0.106	0.13	0.10
661	1880	Left	Touch	/	24.87	26	0.182	0.24	0.116	0.15	0.14
512	1850.2	Left	Touch	Fig.3	24.68	26	0.191	0.26	0.121	0.16	0.05
661	1880	Left	Tilt	/	24.87	26	0.095	0.12	0.056	0.07	-0.01
661	1880	Right	Touch	/	24.87	26	0.101	0.13	0.068	0.09	-0.06
661	1880	Right	Tilt	/	24.87	26	0.074	0.10	0.045	0.06	0.04
512	1850.2	Left	Touch	S2	24.68	26	0.175	0.24	0.111	0.15	0.07
512	1850.2	Left	Touch	B2	24.68	26	0.185	0.25	0.113	0.15	0.12

Note: the head SAR of GSM1900 is tested with GPRS (4Txslots) mode because of VoIP.

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

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
Ambient Temperature: 22.9 °C		Liquid Temperature: 22.5 °C									
661	1880	GPRS (4)	Front	/	20.86	22.8	0.310	0.48	0.160	0.25	0.16
661	1880	GPRS (4)	Rear	/	20.86	22.8	0.380	0.59	0.193	0.30	-0.17
661	1880	GPRS (4)	Left	/	20.86	22.8	0.030	0.05	0.014	0.02	0.15
661	1880	GPRS (4)	Right	/	20.86	22.8	0.078	0.12	0.037	0.06	-0.09
810	1909.8	GPRS (4)	Bottom	/	21.22	22.8	0.539	0.78	0.276	0.40	-0.05
661	1880	GPRS (4)	Bottom	/	20.86	22.8	0.611	0.96	0.325	0.51	0.18
512	1850.2	GPRS (4)	Bottom	Fig.4	20.81	22.8	0.712	1.13	0.369	0.58	-0.05
661	1880	EGPRS (4)	Bottom	/	20.78	23	0.665	1.11	0.341	0.57	-0.09
512	1850.2	GPRS (4)	Bottom	S2	20.81	22.8	0.667	1.05	0.347	0.55	0.01
512	1850.2	GPRS (4)	Bottom	B2	20.81	22.8	0.664	1.05	0.349	0.55	0.03
512	1850.2	GPRS (4)	Bottom	Note1	24.68	26	5.630	7.63	2.120	2.87	-0.05

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

Note1: The distance between the EUT and the phantom bottom is 0mm

Table 14.1-5: SAR Values (GSM 1900 MHz Band - Body)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
Ambient Temperature: 22.9 °C		Liquid Temperature: 22.5 °C									
661	1880	GPRS (4)	Front	/	24.87	26	0.445	0.58	0.237	0.31	-0.12
810	1909.8	GPRS (4)	Rear	/	24.97	26	0.511	0.65	0.278	0.35	-0.02
661	1880	GPRS (4)	Rear	Fig.5	24.87	26	0.522	0.68	0.29	0.38	0.14
512	1850.2	GPRS (4)	Rear	/	24.68	26	0.488	0.66	0.255	0.35	0.02
661	1880	EGPRS (4)	Rear	/	24.9	26	0.455	0.59	0.246	0.32	0.06
661	1880	GPRS (4)	Rear	S2	24.87	26	0.51	0.66	0.281	0.36	0.03
661	1880	GPRS (4)	Rear	B2	24.87	26	0.489	0.63	0.269	0.35	0.06

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

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

Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
Ambient Temperature: 22.9 °C		Liquid Temperature: 22.5 °C									
9538	1907.6	Left	Touch	/	23.17	24.5	0.057	0.08	0.037	0.05	-0.09

9400	1880	Left	Touch	Fig.6	23.23	24.5	0.066	0.09	0.042	0.06	0.09
9262	1852.4	Left	Touch	/	23.27	24.5	0.055	0.07	0.035	0.05	0.11
9400	1880	Left	Tilt	/	23.23	24.5	0.000	0.00	0.000	0.00	-0.17
9400	1880	Right	Touch	/	23.23	24.5	0.045	0.06	0.029	0.04	0.03
9400	1880	Right	Tilt	/	23.23	24.5	0.000	0.00	0.000	0.00	-0.15
9400	1880	Left	Touch	S2	23.23	24.5	0.063	0.08	0.038	0.05	0.02
9400	1880	Left	Touch	B2	23.23	24.5	0.063	0.08	0.040	0.05	0.14

Table 14.1-7: 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(1g)	Reported SAR(1g)	Measured SAR(10g)	Reported SAR(10g)	Power Drift (dB)
Ch.	MHz					(W/kg)	(W/kg)	(W/kg)	(W/kg)	
9400	1880	Front	/	19.72	20	0.531	0.57	0.271	0.29	-0.10
9400	1880	Rear	/	19.72	20	0.591	0.63	0.312	0.33	0.09
9400	1880	Left	/	19.72	20	0.028	0.03	0.017	0.02	0.13
9400	1880	Right	/	19.72	20	0.113	0.12	0.055	0.06	-0.14
9538	1907.6	Bottom	/	19.66	20	1.030	1.11	0.533	0.58	0.17
9400	1880	Bottom	Fig.7	19.72	20	1.040	1.11	0.537	0.57	-0.05
9262	1852.4	Bottom	/	19.65	20	0.954	1.03	0.493	0.53	0.13
9400	1880	Bottom	S2	19.72	20	0.968	1.03	0.509	0.54	0.07
9400	1880	Bottom	B2	19.72	20	0.971	1.04	0.514	0.55	-0.08
9400	1880	Bottom	Note1	23.23	24.5	6.420	8.60	2.510	3.36	-0.06

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

Note1: The distance between the EUT and the phantom bottom is 0mm

Table 14.1-8: 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(1g)	Reported SAR(1g)	Measured SAR(10g)	Reported SAR(10g)	Power Drift (dB)
Ch.	MHz					(W/kg)	(W/kg)	(W/kg)	(W/kg)	
9400	1880	Front	/	23.23	24.5	0.257	0.34	0.145	0.19	0.05
9538	1907.6	Rear	/	23.17	24.5	0.289	0.39	0.154	0.21	0.03
9400	1880	Rear	Fig.8	23.23	24.5	0.308	0.41	0.172	0.23	0.04
9262	1852.4	Rear	/	23.27	24.5	0.279	0.37	0.149	0.20	0.06
9400	1880	Rear	S2	23.23	24.5	0.29	0.39	0.162	0.22	0.03
9400	1880	Rear	B2	23.23	24.5	0.286	0.38	0.158	0.21	-0.04

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

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

Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
Ambient Temperature: 22.9 °C Liquid Temperature: 22.5 °C											
4233	846.6	Left	Touch	/	21.91	22	0.969	0.99	0.531	0.54	-0.06
4183	836.6	Left	Touch	/	21.83	22	0.926	0.96	0.507	0.53	-0.12
4132	826.4	Left	Touch	/	21.96	22	0.785	0.79	0.428	0.43	-0.07
4233	846.6	Left	Tilt	/	21.91	22	1.020	1.04	0.535	0.55	-0.18
4183	836.6	Left	Tilt	/	21.83	22	1.000	1.04	0.528	0.55	-0.13
4132	826.4	Left	Tilt	/	21.96	22	0.900	0.91	0.466	0.47	0.05
4233	846.6	Right	Touch	/	21.91	22	1.240	1.27	0.656	0.67	0.01
4183	836.6	Right	Touch	/	21.83	22	1.270	1.32	0.662	0.69	-0.06
4132	826.4	Right	Touch	/	21.96	22	1.210	1.22	0.649	0.66	0.01
4233	846.6	Right	Tilt	/	21.91	22	1.270	1.30	0.596	0.61	0.18
4183	836.6	Right	Tilt	Fig.9	21.83	22	1.300	1.35	0.608	0.63	-0.05
4132	826.4	Right	Tilt	/	21.96	22	1.290	1.30	0.595	0.60	-0.09
4183	836.6	Right	Tilt	S2	21.83	22	1.210	1.26	0.551	0.57	-0.07
4183	836.6	Left	Touch	B2	21.83	22	1.220	1.27	0.571	0.59	-0.05

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

Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz									
Ambient Temperature: 22.9 °C Liquid Temperature: 22.5 °C										
4233	846.6	Front	Fig.10	22.95	24	0.639	0.81	0.353	0.45	0.08
4183	836.6	Front	/	22.85	24	0.612	0.80	0.333	0.43	0.07
4132	826.4	Front	Fig.13	23.04	24	0.440	0.55	0.244	0.30	0.16
4183	836.6	Rear	/	22.85	24	0.512	0.67	0.275	0.36	0.12
4183	836.6	Left	/	22.85	24	0.401	0.52	0.255	0.33	-0.02
4183	836.6	Right	/	22.85	24	0.091	0.12	0.057	0.07	-0.15
4183	836.6	Bottom	/	22.85	24	0.524	0.68	0.242	0.32	0.16
4233	846.6	Front	S2	22.95	24	0.576	0.73	0.334	0.43	0.04
4233	846.6	Front	B2	22.95	24	0.618	0.79	0.340	0.43	-0.08

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

Table 14.1-11: SAR Values (LTE Band5 - Head)

Frequency		Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5 °C				
Ch.	MHz	Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
20600	844	1RB_Middle	Left	Touch	/	21.86	22	0.867	0.90	0.474	0.49	0.03
20525	836.5	1RB_Low	Left	Touch	/	21.82	22	0.807	0.84	0.439	0.46	0.01
20450	829	1RB_Low	Left	Touch	/	21.9	22	0.672	0.69	0.363	0.37	-0.16
20600	844	1RB_Middle	Left	Tilt	/	21.86	22	0.899	0.93	0.471	0.49	-0.01
20525	836.5	1RB_Low	Left	Tilt	/	21.82	22	0.839	0.87	0.437	0.46	-0.08
20450	829	1RB_Low	Left	Tilt	/	21.9	22	0.709	0.73	0.369	0.38	-0.15
20600	844	1RB_Middle	Right	Touch	/	21.86	22	1.100	1.14	0.591	0.61	-0.04
20525	836.5	1RB_Low	Right	Touch	/	21.82	22	1.030	1.07	0.557	0.58	-0.11
20450	829	1RB_Low	Right	Touch	/	21.9	22	0.983	1.01	0.520	0.53	0.00
20600	844	1RB_Middle	Right	Tilt	/	21.86	22	1.180	1.22	0.577	0.60	-0.09
20525	836.5	1RB_Low	Right	Tilt	/	21.82	22	1.190	1.24	0.578	0.60	-0.08
20450	829	1RB_Low	Right	Tilt	/	21.9	22	1.020	1.04	0.474	0.49	0.02
20600	844	25RB_Mid	Left	Touch	/	21.88	22	0.911	0.94	0.497	0.51	-0.09
20525	836.5	25RB_Mid	Left	Touch	/	21.91	22	0.847	0.86	0.463	0.47	0.18
20450	829	25RB_Mid	Left	Touch	/	21.95	22	0.728	0.74	0.394	0.40	0.17
20600	844	25RB_Mid	Left	Tilt	/	21.88	22	0.901	0.93	0.473	0.49	0.01
20525	836.5	25RB_Mid	Left	Tilt	/	21.91	22	0.870	0.89	0.455	0.46	-0.18
20450	829	25RB_Mid	Left	Tilt	/	21.95	22	0.750	0.76	0.391	0.40	-0.16
20600	844	25RB_Mid	Right	Touch	/	21.88	22	1.100	1.13	0.595	0.61	0.16
20525	836.5	25RB_Mid	Right	Touch	/	21.91	22	1.070	1.09	0.577	0.59	-0.14
20450	829	25RB_Mid	Right	Touch	/	21.95	22	1.020	1.03	0.541	0.55	-0.12
20600	844	25RB_Mid	Right	Tilt	Fig.11	21.88	22	1.200	1.23	0.590	0.61	-0.03
20525	836.5	25RB_Mid	Right	Tilt	/	21.91	22	1.190	1.21	0.585	0.60	-0.05
20450	829	25RB_Mid	Right	Tilt	/	21.95	22	1.065	1.08	0.494	0.50	-0.02
20450	829	50RB	Left	Touch	/	21.98	22	0.778	0.78	0.422	0.42	0.01
20450	829	50RB	Left	Tilt	/	21.98	22	0.797	0.80	0.413	0.41	-0.14
20450	829	50RB	Right	Touch	/	21.98	22	1.030	1.03	0.556	0.56	-0.02
20450	829	50RB	Right	Tilt	/	21.98	22	1.160	1.17	0.562	0.56	0.14
20600	844	25RB_Mid	Right	Tilt	B2	21.88	22	1.090	1.12	0.553	0.57	0.08
20600	844	25RB_Mid	Right	Tilt	/	21.88	22	1.150	1.18	0.547	0.56	0.06

Note: The LTE mode is QPSK_10MHz.

Table 14.1-12: SAR Values (LTE Band5 - Body)

Frequency		Mode	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
Ambient Temperature: 22.9 °C Liquid Temperature: 22.5 °C											
20450	829	1RB_Low	Front	Fig.12	23.08	24	0.383	0.47	0.216	0.27	-0.09
20450	829	1RB_Low	Rear	/	23.08	24	0.326	0.40	0.183	0.23	0.04
20450	829	1RB_Low	Left	/	23.08	24	0.282	0.35	0.186	0.23	-0.02
20450	829	1RB_Low	Right	/	23.08	24	0.081	0.10	0.054	0.07	-0.06
20450	829	1RB_Low	Top	/	23.08	24	0.000	0.00	0.000	0.00	-0.02
20450	829	25RB_High	Front	/	22.2	23	0.345	0.41	0.195	0.23	-0.09
20450	829	25RB_High	Rear	/	22.2	23	0.290	0.35	0.162	0.19	0.15
20450	829	25RB_High	Left	/	22.2	23	0.253	0.30	0.167	0.20	0.11
20450	829	25RB_High	Right	/	22.2	23	0.082	0.10	0.054	0.07	0.11
20450	829	25RB_High	Top	/	22.2	23	0.000	0.00	0.000	0.00	-0.18
20450	829	1RB_Low	Front	S2	23.08	24	0.363	0.45	0.201	0.25	-0.12
20450	829	1RB_Low	Front	B2	23.08	24	0.355	0.44	0.208	0.26	-0.08

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

Note2: The LTE mode is QPSK_10MHz.

Table 14.1-13: SAR Values (LTE Band7 - Head)

Frequency		Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz											
Ambient Temperature: 22.9 °C Liquid Temperature: 22.5 °C												
21350	2560	1RB_Mid	Left	Touch	/	23.76	24	0.022	0.02	0.012	0.01	-0.03
21350	2560	1RB_Mid	Left	Tilt	/	23.76	24	0.014	0.01	0.007	0.01	0.07
21350	2560	1RB_Mid	Right	Touch	Fig.13	23.76	24	0.026	0.03	0.015	0.02	-0.09
21350	2560	1RB_Mid	Right	Tilt	/	23.76	24	0.022	0.02	0.011	0.01	-0.08
21350	2560	50RB_High	Left	Touch	/	22.26	23	0.020	0.02	0.010	0.01	0.00
21350	2560	50RB_High	Left	Tilt	/	22.26	23	0.012	0.01	0.005	0.01	-0.11
21350	2560	50RB_High	Right	Touch	/	22.26	23	0.025	0.03	0.015	0.02	0.00
21350	2560	50RB_High	Right	Tilt	/	22.26	23	0.017	0.02	0.008	0.01	0.05
21350	2560	1RB_Mid	Right	Touch	S2	23.76	24	0.024	0.03	0.014	0.01	0.02
21350	2560	1RB_High	Right	Touch	B2	23.76	24	0.024	0.03	0.014	0.01	0.01

Note: The LTE mode is QPSK_20MHz.

Table 14.1-14: SAR Values (LTE Band7 - Body)

Frequency		Mode	Test Position	Figure No.	Conduct ed Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C											
21350	2560	1RB_High	Front	/	20.49	21	0.385	0.43	0.189	0.21	-0.03
21350	2560	1RB_High	Rear	/	20.49	21	0.429	0.48	0.212	0.24	0.03
21350	2560	1RB_High	Left	/	20.49	21	0.131	0.15	0.058	0.07	0.11
21350	2560	1RB_High	Right	/	20.49	21	0.117	0.13	0.059	0.07	0.04
21350	2560	1RB_High	Bottom	/	20.49	21	0.915	1.03	0.435	0.49	0.16
21100	2535	1RB_Mid	Bottom	/	20.44	21	1.070	1.22	0.509	0.58	-0.10
20850	2510	1RB_High	Bottom	/	20.41	21	1.150	1.32	0.551	0.63	-0.14
21350	2560	50RB_Mid	Front	/	20.73	21	0.417	0.44	0.204	0.22	-0.07
21350	2560	50RB_Mid	Rear	/	20.73	21	0.463	0.49	0.229	0.24	-0.11
21350	2560	50RB_Mid	Left	/	20.73	21	0.138	0.15	0.061	0.06	0.02
21350	2560	50RB_Mid	Right	/	20.73	21	0.136	0.14	0.069	0.07	0.05
21350	2560	50RB_Mid	Bottom	/	20.73	21	0.971	1.03	0.462	0.49	-0.09
21100	2535	50RB_Mid	Bottom	/	20.6	21	1.110	1.22	0.529	0.58	0.17
20850	2510	50RB_High	Bottom	Fig.14	20.59	21	1.220	1.34	0.583	0.64	-0.04
21350	2560	100RB	Bottom	/	20.68	21	0.963	1.04	0.457	0.49	-0.18
20850	2510	50RB_High	Bottom	S2	20.59	21	1.140	1.25	0.550	0.60	0.03
20850	2510	50RB_High	Bottom	B2	20.59	21	1.170	1.29	0.547	0.60	-0.14
20850	2510	50RB_High	Bottom	H	20.59	21	1.156	1.27	0.556	0.61	-0.06
20850	2510	50RB_High	Bottom	Note1	22.14	23	4.190	5.11	1.890	2.30	-0.02

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

Note1: The distance between the EUT and the phantom bottom is 0mm

Note2: The LTE mode is QPSK_20MHz.

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

Frequency		Mode	Test Position	Figure No.	Conduct ed Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C											
21350	2560	1RB_High	Front	/	23.76	24	0.35	0.37	0.179	0.19	-0.04
21350	2560	1RB_High	Rear	/	23.76	24	0.386	0.41	0.204	0.22	-0.07
21350	2560	50RB_High	Front	/	22.26	23	0.376	0.45	0.193	0.23	0.06
21350	2560	50RB_High	Rear	Fig.15	22.26	23	0.417	0.49	0.221	0.26	0.03
21350	2560	50RB_High	Rear	S2	22.26	23	0.406	0.48	0.215	0.25	-0.08
21350	2560	50RB_High	Rear	B2	22.26	23	0.386	0.46	0.196	0.23	0.07

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

Note2: The LTE mode is QPSK_20MHz.

Table 14.1-16: SAR Values (LTE Band41 - Head)

Frequency		Ambient Temperature: 22.9°C					Liquid Temperature: 22.5°C					
Ch.	MHz	Mode	Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
40620	2593	1RB_High	Left	Touch	/	23.86	24	0.035	0.04	0.015	0.02	-0.03
40620	2593	1RB_High	Left	Tilt	/	23.86	24	0.028	0.03	0.014	0.01	0.01
40620	2593	1RB_High	Right	Touch	Fig.16	23.86	24	0.048	0.05	0.027	0.03	0.04
40620	2593	1RB_High	Right	Tilt	/	23.86	24	0.04	0.04	0.020	0.02	0.07
40620	2593	50RB_Mid	Left	Touch	/	21.99	22	0.028	0.03	0.013	0.01	-0.11
40620	2593	50RB_Mid	Left	Tilt	/	21.99	22	0.027	0.03	0.011	0.01	0.03
40620	2593	50RB_Mid	Right	Touch	/	21.99	22	0.04	0.04	0.019	0.02	-0.06
40620	2593	50RB_Mid	Right	Tilt	/	21.99	22	0.036	0.04	0.017	0.02	0.08
40620	2593	1RB_High	Right	Touch	S2	23.86	24	0.039	0.04	0.019	0.02	0.03
40620	2593	1RB_High	Right	Touch	B2	23.86	24	0.043	0.04	0.023	0.02	-0.05

Note: The LTE mode is QPSK_20MHz.

Table 14.1-17: SAR Values (LTE Band41 - Body)

Frequency		Ambient Temperature: 22.9°C					Liquid Temperature: 22.5°C					
Ch.	MHz	Mode	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)	
40620	2593	1RB_High	Front	/	23.86	24	0.263	0.27	0.135	0.14	0.01	
40620	2593	1RB_High	Rear	/	23.86	24	0.302	0.31	0.156	0.16	0.02	
40620	2593	1RB_High	Left	/	23.86	24	0.078	0.08	0.034	0.04	0.02	
40620	2593	1RB_High	Right	/	23.86	24	0.077	0.08	0.045	0.05	-0.04	
40620	2593	1RB_High	Bottom	/	23.86	24	0.632	0.65	0.305	0.31	-0.08	
40620	2593	50RB_Mid	Front	/	22.42	23	0.325	0.37	0.163	0.19	-0.03	
40620	2593	50RB_Mid	Rear	/	22.42	23	0.417	0.48	0.218	0.25	0.06	
40620	2593	50RB_Mid	Left	/	22.42	23	0.126	0.14	0.058	0.07	-0.09	
40620	2593	50RB_Mid	Right	/	22.42	23	0.125	0.14	0.057	0.07	0.03	
41490	2680	50RB_High	Bottom	/	22.38	23	0.736	0.85	0.323	0.37	0.02	
41055	2636.5	50RB_Mid	Bottom	/	22.13	23	0.751	0.92	0.328	0.40	0.05	
40620	2593	50RB_Mid	Bottom	Fig.17	22.42	23	0.813	0.93	0.365	0.42	0.06	
40185	2549.5	50RB_Mid	Bottom	/	22.34	23	0.763	0.89	0.353	0.41	0.03	
39750	2506	50RB_High	Bottom	/	22.10	23	0.734	0.90	0.338	0.42	-0.08	
40620	2593	100RB	Bottom	/	22.41	23	0.730	0.84	0.331	0.38	-0.07	
40620	2593	50RB_Mid	Bottom	S2	22.42	23	0.755	0.86	0.343	0.39	0.07	
40620	2593	50RB_Mid	Bottom	B2	22.42	23	0.747	0.85	0.335	0.38	0.05	

Note1: The distance between the EUT and the phantom bottom is 10mm. Note2: The LTE mode is QPSK_20MHz.

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(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
190	836.6	Right	Touch	Fig.1	29.31	29.6	0.407	0.44	0.314	0.34	29.31

Note: the head SAR of GSM850 is tested with GPRS (3Txslots) 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	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
190	836.6	GPRS (3)	Rear	Fig.2	29.31	29.6	0.906	0.97	0.529	0.57	-0.04

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(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
512	1850.2	Left	Touch	Fig.3	24.68	26	0.191	0.26	0.121	0.16	0.05

Note: the head SAR of GSM1900 is tested with GPRS (4Txslots) 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.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
512	1850.2	GPRS (4)	Bottom	Fig.4	20.81	22.8	0.712	1.13	0.369	0.58	-0.05

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

Table 14.2-5: SAR Values (GSM 1900 MHz Band - Body)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
661	1880	GPRS (4)	Rear	Fig.5	24.87	26	0.522	0.68	0.29	0.38	0.14

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

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

Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measure d SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measure d SAR(10g) (W/kg)	Reporte d SAR(10 g) (W/kg)	Power Drift (dB)
Ch.	MHz										
9400	1880	Left	Touch	Fig.6	23.23	24.5	0.066	0.09	0.042	0.06	0.09

Table 14.2-7: SAR Values (WCDMA 1900 MHz Band - Body)

Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz									
9400	1880	Bottom	Fig.7	19.72	20	1.040	1.11	0.537	0.57	-0.05

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

Table 14.2-8: SAR Values (WCDMA 1900 MHz Band - Body)

Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz									
9400	1880	Rear	Fig.8	23.23	24.5	0.308	0.41	0.172	0.23	0.04

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

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

Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measure d SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reporte d SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
4183	836.6	Right	Tilt	Fig.9	21.83	22	1.300	1.35	0.608	0.63	-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(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz									
4233	846.6	Front	Fig.10	22.95	24	0.639	0.81	0.353	0.45	0.08

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

Table 14.2-11: 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(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz											
20600	844	25RB_Mid	Right	Tilt	Fig.11	21.88	22	1.200	1.23	0.590	0.61	-0.03

Note: The LTE mode is QPSK_10MHz.

Table 14.2-12: SAR Values (LTE Band5 - Body)

Ambient Temperature: 22.9 °C						Liquid Temperature: 22.5 °C						
Frequency		Mode	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)	
Ch.	MHz											
20450	829	1RB_Low	Front	Fig.12	23.08	24	0.383	0.47	0.216	0.27	-0.09	

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

Note2: The LTE mode is QPSK_10MHz.

Table 14.2-13: 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(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz											
21350	2560	1RB_Mid	Right	Touch	Fig.13	23.76	24	0.026	0.03	0.015	0.02	-0.09

Note1: The LTE mode is QPSK_20MHz.

Table 14.2-14: SAR Values (LTE Band7 - Body)

Frequency		Mode	Test Position	Figure No.	Conduct ed Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)	
Ch.	MHz											
		Ambient Temperature: 22.9 °C					Liquid Temperature: 22.5 °C					
20850	2510	50RB_High	Bottom	Fig.14	20.59	21	1.220	1.34	0.583	0.64	-0.04	

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

Note2: The LTE mode is QPSK_20MHz.

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

Frequency		Mode	Test Position	Figure No.	Conduct ed Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)	
Ch.	MHz											
		Ambient Temperature: 22.9 °C					Liquid Temperature: 22.5 °C					
21350	2560	50RB_High	Rear	Fig.15	22.26	23	0.417	0.49	0.221	0.26	0.03	

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

Note2: The LTE mode is QPSK_20MHz.

Table 14.2-16: SAR Values (LTE Band41 - Head)

Frequency		Mode	Side	Test Position	Figure No.	Conduct ed Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measure d SAR(10g) (W/kg)	Reporte d SAR(10g) (W/kg)	Powe r Drift (dB)
Ch.	MHz											
		Ambient Temperature: 22.9 °C					Liquid Temperature: 22.5 °C					
40620	2593	1RB_High	Right	Touch	Fig.16	23.86	24	0.048	0.05	0.027	0.03	0.04

Note: The LTE mode is QPSK_20MHz.

Table 14.2-17: SAR Values (LTE Band41 - Body)

Frequency		Mode	Test Position	Figure No.	Conduct ed Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)	
Ch.	MHz											
		Ambient Temperature: 22.9 °C					Liquid Temperature: 22.5 °C					
40620	2593	50RB_Mid	Bottom	Fig.17	22.42	23	0.813	0.93	0.365	0.42	0.06	

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)

Frequency		Side	Test Position	Figure No.	Ambient Temperature: 22.9 °C		Liquid Temperature: 22.5 °C		Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
MHz	Ch.				Conducte d Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)			
2437	6	Left	Touch	/	16.31	16.5	0.351	0.37	0.163	0.17	0.03
2437	6	Left	Tilt	/	16.31	16.5	0.274	0.29	0.109	0.11	-0.01
2437	6	Right	Touch	/	16.31	16.5	0.119	0.12	0.054	0.06	0.07
2437	6	Right	Tilt	/	16.31	16.5	0.088	0.09	0.038	0.04	0.06
2437	6	Left	Touch	S2	16.31	16.5	0.319	0.33	0.153	0.16	0.08
2437	6	Left	Touch	B2	16.31	16.5	0.324	0.34	0.141	0.15	0.03

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)

Frequency		Side	Test Position	Figure No.	Ambient Temperature: 22.9 °C		Liquid Temperature: 22.5 °C		Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Power Drift (dB)
MHz	Ch.				Conducte d Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)			
2437	6	Left	Touch	Fig.18	16.31	16.5	0.353	0.37	0.165	0.17	0.03

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 \leq 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 \leq 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)

Frequency		Side	Test Position	Ambient Temperature: 22.9 °C		Liquid Temperature: 22.5 °C		Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.			Actual duty factor	maximum duty factor				
2437	6	Left	Touch	99%	100%	0.37	0.37		

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

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

Frequency		Test Position	Figure No.	Ambient Temperature: 22.9 °C		Liquid Temperature: 22.5°C				Power Drift (dB)
MHz	Ch.			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)	
2437	6	Front	/	19.69	21	0.146	0.20	0.083	0.11	-0.07
2437	6	Rear	/	19.69	21	0.195	0.26	0.101	0.14	-0.05
2437	6	Right	/	19.69	21	0.308	0.42	0.149	0.20	-0.03
2437	6	Top	/	19.69	21	0.089	0.12	0.045	0.06	0.15
2437	6	Right	S2	19.69	21	0.289	0.39	0.134	0.18	0.02
2437	6	Right	B2	19.69	21	0.272	0.37	0.125	0.17	-0.07

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

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

Frequency		Test Position	Figure No.	Ambient Temperature: 22.9 °C		Liquid Temperature: 22.5°C				Power Drift (dB)
MHz	Ch.			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)	
2437	6	Right	Fig.19	19.69	21	0.311	0.42	0.151	0.20	-0.03
2437	6	Rear	/	19.69	21	0.192	0.26	0.098	0.13	-0.05

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 \leq 0.8 W/kg.

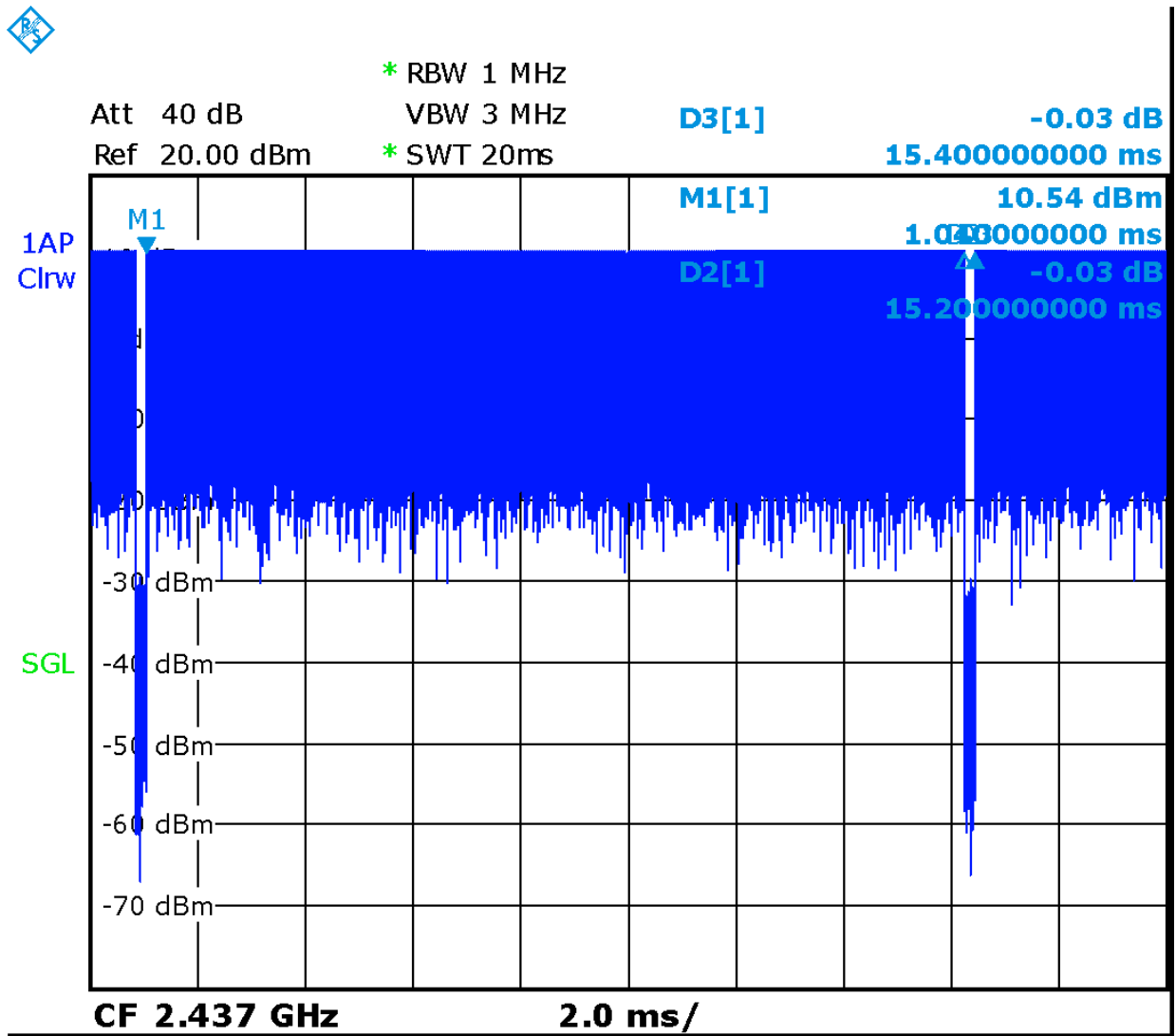
Note2: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is \leq 1.2 W/kg 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)

Frequency		Test Position	Ambient Temperature: 22.9 °C		Liquid Temperature: 22.5°C	
MHz	Ch.		Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
2437	6	Rear	99%	100%	0.42	0.42

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



Picture 14.1 Duty factor plot

14.4 WLAN Evaluation For 5G

Table 14.4-1: OFDM mode specified maximum output power of WLAN antenna

802.11 mode	a	g	n		ac			
Ch. BW(MHz)	20	20	20	40	20	40	80	160
U-NII-1	X		X	X	X	X	X	
U-NII-2A	X		X	X	X	X	X	
U-NII-2C	X							
U-NII-3	X		X	X	X	X	X	
§ 15.247 (5.8 GHz)								

X: maximum(conducted) output power(mW), including tolerance, specified for production units

Table 14.4-2: Maximum output power specified of WLAN antenna - Head

802.11 mode	a	g	n		ac			
Ch. BW(MHz)	20	20	20	40	20	40	80	160
U-NII-1	40		38	38	38	38	38	
U-NII-2A	35		27	27	34	34	34	
U-NII-2C	35		27	27	34	16	34	
U-NII-3	35		27	16	34	16	34	
§ 15.247 (5.8 GHz)								

- The maximum output power specified for production units is the same for all channels, modulations and data rates in each channel bandwidth configuration of the 802.11a/g/n/ac modes.
- The **blue highlighted** cells represent highest output configurations in each standalone or aggregated frequency band, with tune-up tolerance included.

Table 14.4-3: Maximum output power specified of WLAN antenna - Body

802.11 mode	a	g	n		ac			
Ch. BW(MHz)	20	20	20	40	20	40	80	160
U-NII-1	79		71	71	71	71	45	
U-NII-2A	71		63	63	63	63	45	
U-NII-2C	71		63	63	63	63	45	
U-NII-3	79		63	60	50	45	28	
§ 15.247 (5.8 GHz)								

- The maximum output power specified for production units is the same for all channels, modulations and data rates in each channel bandwidth configuration of the 802.11a/g/n/ac modes.
- The **blue highlighted** cells represent highest output configurations in each standalone or aggregated frequency band, with tune-up tolerance included.

Table 14.4-4: Maximum output power measured of WLAN antenna, for the applicable OFDM configurations according to the default power measurement procedures for selection initial test configurations - Head

802.11 mode	a	n		ac		
BW(MHz)	20	20	40	20	40	80
U-NII-1	36/40/44/48 26/26/26/26	36/40/44/48 Lower power	38/46 Lower power	36/40/44/48 Lower power	38/46 Lower power	42 Lower power
U-NII-2A	52/56/60/64 27/26/25/25	52/56/60/64 Lower power	54/62 Lower power	52/56/60/64 Lower power	54/62 Lower power	58 Lower power
U-NII-2C	100/104/108/112/116/120 / 124/128/132/136/140/144 23/24/23/23/22/21/ 20/20/19/19/19/20	100/104/108/112 116/132/136/140 Lower power	100/104/108 8/112 116/132/136 /140 Lower power	100/104/108 /112 116/132/136 /140 Lower power	100/104/108/ 112 116/132/136/ 140 Lower power	155 Lower power
U-NII-3	149/153/157/161/ 165 20/20/21/23/22	149/153/157/161 /165 Lower power	151/159 Lower power	149/153/157 /161/165 Lower power	151/159 Lower power	155 Lower power

- The **bold numbers** is the maximum output measured power (mW).
- Channels with measured maximum power within 0.25dB are considered to have the same measured output. Channels selected for initial test configuration are **highlighted in yellow**.

Table 14.4-5: Maximum output power measured of WLAN antenna, for the applicable OFDM configurations according to the default power measurement procedures for selection initial test configurations - Body

802.11 mode	a	n		ac		
BW(MHz)	20	20	40	20	40	80
U-NII-1	36/40/44/48 58/57/58/57	36/40/44/48 Lower power	38/46 Lower power	36/40/44/48 Lower power	38/46 Lower power	42 Lower power
U-NII-2A	52/56/60/64 58/55/55/53	52/56/60/64 Lower power	54/62 Lower power	52/56/60/64 Lower power	54/62 Lower power	58 Lower power
U-NII-2C	100/104/108/112/116/120/ 124/128/132/136/140/144 49/52/49/47/45/43/	100/104/108/112 116/132/136/140 Lower power	100/104/108 /112 116/132/136	100/104/108 /112 116/132/136	100/104/1 08/112 116/132/1	155 Lower power

	40/41/38/38/39/40		/140 Lower power	/140 Lower power	36/140 Lower power	
U-NII-3	149/153/157/161/ 165 39/41/47/50/50	149/153/157/161 /165 Lower power	151/159 Lower power	149/153/157 /161/165 Lower power	151/159 Lower power	155 Lower power

- The **bold numbers** is the maximum output measured power (mW).
- Channels with measured maximum power within 0.25dB are considered to have the same measured output. Channels selected for initial test configuration are **highlighted in yellow**.

Table 14.4-6: Reported SAR of initial test configuration for Head

802.11 mode	a	n		ac		
		20	40	20	40	80
U-NII-1	36/40/ 44 /48 0.20	36/40/44/48	38/46	36/40/44/48	38/46	42
U-NII-2A	52 /56/60/64 0.22	52/56/60/64	54/62	52/56/60/64	54/62	58
U-NII-2C	100/ 104 /108/112/ 116/120/ 124/128/132/136 /140/144 0.15	100/104/108 /112 116/132/136 /140	100/104/108 /112 116/132/136 /140	100/104/108 /112 116/132/136 /140	100/104/108/1 12 116/132/136/1 40	155
U-NII-3	149/153/157/ 161 /165 0.18	149/153/157 /161/165	151/159	149/153/157 /161/165	151/159	155

Highest measured output power channel tested initially are in **yellow highlight**.

Table 14.4-7: Reported SAR of initial test configuration for Body – 10mm

802.11 mode	a	n		ac		
		20	40	20	40	80
U-NII-1	36/40/ 44 /48 0.55	36/40/44/48	38/46	36/40/44/48	38/46	42
U-NII-2A	52 /56/60/64 0.56	52/56/60/64	54/62	52/56/60/64	54/62	58
U-NII-2C	100/ 104 /108/112/ 116/120/ 124/128/132/136 /140/144 0.44	100/104/108/112 116/132/136/140	100/104/108 /112 116/132/136 /140	100/104/108/112 116/132/136/140	100/104 /108/11 2 116/132 /136/14 0	155
U-NII-3	149/153/157/ 161 /165	149/153/157/161/ 165	151/159	149/153/157/161 /165	151/159	155

0.52				
Highest measured output power channel tested initially are in yellow highlight .				

Table 14.4-9: SAR Values (WLAN 5G - Head)

Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Ch.	MHz										
44	5220	Left	Touch	/	14.23	15.5	0.146	0.20	0.041	0.05	-0.09
44	5220	Left	Tilt	/	14.23	15.5	0.152	0.20	0.048	0.06	0.07
44	5220	Right	Touch	/	14.23	15.5	0.051	0.07	0.018	0.02	0.17
44	5220	Right	Tilt	/	14.23	15.5	0.053	0.07	0.019	0.03	-0.16
52	5260	Left	Touch	Fig.20	14.28	14.5	0.211	0.22	0.066	0.07	-0.01
52	5260	Left	Tilt	/	14.28	14.5	0.163	0.17	0.050	0.05	-0.01
52	5260	Right	Touch	/	14.28	14.5	0.058	0.06	0.021	0.02	0.17
52	5260	Right	Tilt	/	14.28	14.5	0.063	0.07	0.023	0.02	-0.06
104	5520	Left	Touch	/	13.86	14.5	0.133	0.15	0.040	0.05	0.08
104	5520	Left	Tilt	/	13.86	14.5	0.105	0.12	0.032	0.04	-0.15
104	5520	Right	Touch	/	13.86	14.5	0.000	0.00	0.000	0.00	0.13
104	5520	Right	Tilt	/	13.86	14.5	0.042	0.05	0.013	0.02	0.04
161	5805	Left	Touch	/	13.53	14.5	0.130	0.16	0.048	0.06	0.10
161	5805	Left	Tilt	/	13.53	14.5	0.141	0.18	0.050	0.06	-0.04
161	5805	Right	Touch	/	13.53	14.5	0.052	0.07	0.021	0.03	0.17
161	5805	Right	Tilt	/	13.53	14.5	0.057	0.07	0.023	0.03	0.08
52	5260	Left	Touch	S2	14.28	14.5	0.186	0.20	0.057	0.06	-0.04
52	5260	Left	Touch	B2	14.28	14.5	0.193	0.20	0.060	0.06	0.02

Table 14.4-10: SAR Values (WLAN 5G - Body)

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									
44	5220	Front	/	18.01	19	0.084	0.11	0.032	0.04	0.03
44	5220	Rear	/	18.01	19	0.440	0.55	0.175	0.22	-0.08
44	5220	Right	/	18.01	19	0.112	0.14	0.043	0.05	-0.12
44	5220	Top	/	18.01	19	0.123	0.15	0.054	0.07	-0.08
52	5260	Front	/	17.66	18	0.077	0.08	0.032	0.03	0.12
52	5260	Rear	Fig.21	17.66	18	0.516	0.56	0.187	0.20	0.02
52	5260	Right	/	17.66	18	0.117	0.13	0.047	0.05	-0.01
52	5260	Top	/	17.66	18	0.161	0.17	0.068	0.07	0.1
104	5520	Front	/	17.14	18	0.053	0.06	0.021	0.03	0
104	5520	Rear	/	17.14	18	0.359	0.44	0.133	0.16	0.01
104	5520	Right	/	17.14	18	0.092	0.11	0.037	0.05	-0.08

104	5520	Top	/	17.14	18	0.116	0.14	0.048	0.06	-0.09
161	5805	Front	/	16.95	18	0.066	0.08	0.026	0.03	-0.15
161	5805	Rear	Fig.33	16.95	18	0.408	0.52	0.150	0.19	-0.06
161	5805	Right	/	16.95	18.5	0.109	0.16	0.043	0.06	0.12
161	5805	Top	/	16.95	18.5	0.129	0.18	0.049	0.07	-0.02
52	5260	Rear	S2	17.66	18	0.486	0.53	0.162	0.18	0.07
52	5260	Rear	B2	17.66	18	0.456	0.49	0.145	0.16	0.04

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

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 14.4-12: SAR Values (WLAN 5G - Head) (Scaled Reported SAR)

Frequency		Side	Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g) (W/kg)	Scaled reported SAR (1g) (W/kg)
Ch.	MHz						
60	5300	Left	Touch	97%	100%	0.22	0.22

Table 14.4-13 SAR Values (WLAN 5G - Body) (Scaled Reported SAR)

Frequency		Test Position	D (mm)	Actual duty factor	maximum duty factor	Reported SAR (1g) (W/kg)	Scaled reported SAR (1g) (W/kg)
Ch.	MHz						
60	5300	Rear	10	97%	100%	0.56	0.58