TEST REPORT

No.I20N00391-SAR

For

TCL Communication Ltd.

LTE/UMTS/GSM Smartphone

Model Name: 5030J, 5130J

With

Hardware Version: FS180-MB-V0.2

Software Version: 5030J_OFAR_1SIM_V1.4_20200331_UNLOCK

FCC ID: 2ACCJB118

Issued Date: 2020-04-23

Test Laboratory:

SAICT, Shenzhen Academy of Information and Communications Technology

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I20N00391-SAR	Rev.0	1st edition	2020-04-10
I20N00391-SAR	Rev.1	1.Updated section 4.3&10.2&10.4&11.2 2. Added section 13.4	2020-04-19
I20N00391-SAR	Rev.2	1.Updated section 4.3 2. Updated Table 13.12	2020-04-23

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1. Summary of Test Report

1.1. Test Items

Description:	LTE/UMTS/GSM Smartphone
Model Name:	5030J, 5130J
Applicant's name:	TCL Communication Ltd.
Manufacturer's Name:	TCL Communication Ltd.

1.2. Test Standards

ANSI C95.1–1992, IEEE 1528–2013

1.3. Test Result

Pass. Please refer to "13. Summary of Test Results"

1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China

1.5. Project Data

Testing Start Date: 2020-03-12 Testing End Date: 2020-04-01

1.6. Signature

Li yongfu
(Prepared this test report)

Zhang Yunzhuan
(Reviewed this test report)

Cao Junfei
(Approved this test report)

2. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for TCL Communication Ltd. LTE/UMTS/GSM Smartphone 5030J, 5130J are as follows:

Table 2.1: Highest Reported SAR for Head (1g)

Exposure Configuration	Technology Band	Highest Reported SAR 1g(W/Kg)	Equipment Class
Head	GSM850	0.26	PCE
	GSM1900	1.11	
	WCDMA Band 2	**1.34**	
	WCDMA Band 4	1.06	
	WCDMA Band 5	0.23	
	LTE Band 2	0.95	
	LTE Band 4	1.04	
	LTE Band 7	0.32	
	WLAN 2.4GHz	0.28	DTS

Table 2.2: Highest Reported SAR for Body (1g)

Exposure Configuration	Technology Band	Highest Reported SAR 1g(W/Kg)	Equipment Class
Hotspot/Body-worn	GSM850	0.46	PCE
	GSM1900	0.80	
	WCDMA Band 2	1.16	
	WCDMA Band 4	0.86	
	WCDMA Band 5	0.41	
	LTE Band 2	1.23	
	LTE Band 4	0.89	
	LTE Band 7	0.63	
	WLAN 2.4GHz	0.13	DTS

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1g tissue according to the ANSI C95.1-1992.

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 & 2.2),** and the value is**: 1.34 W/kg (1g).**

Table2.3: The sum of reported SAR values for main antenna and WLAN

/	Position	WWAN Antenna (W/kg)	WLAN (W/kg)	Sum (W/kg)
Highest reported SAR value for Head	Right Touch	1.34	0.11	1.45
Highest reported SAR value for Body	Rear	1.23	0.13	1.36

Note: the test positions of above tables are for the worse case that has been evaluated.

Table2.4: The sum of reported SAR values for main antenna and Bluetooth

/	Position	WWAN Antenna (W/kg)	Bluetooth (W/kg)	Sum (W/kg)
Highest reported SAR value for Head	Right Touch	1.34	0.19	1.53
Highest reported SAR value for Body	Rear	1.23	0.09	1.32

Note: the test positions of above tables are for the worse case that has been evaluated.

According to the above tables, the highest sum of reported SAR values is **1.53 W/kg (1g)**.

The detail for simultaneous transmission consideration is described in chapter 12.

3. Client Information

3.1. Applicant Information

Company Name:	TCL Communication Ltd.
Address /Post:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
City:	/
Country:	/
Telephone:	0086-755-36611722

3.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address /Post:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
City:	/
Country:	/
Telephone:	0086-755-36611722

4. Equipment under Test (EUT) and Ancillary Equipment (AE)

4.1. About EUT

Description:	LTE/UMTS/GSM Smartphone
Model Name:	5030J, 5130J
Marketing Name:	Alcatel 1SE
Operating mode(s):	GSM850/1900, WCDMA Band2/4/5, LTE Band 2/4/7, Bluetooth, WLAN2.4G
Condition of EUT as received	No obvious damage in appearance
Tested Tx Frequency:	825 – 848.8MHz (GSM 850)
	1850.2 – 1910MHz (GSM 1900)
	1852.4 – 1907.6MHz (WCDMA Band 2)
	1712.4 – 1752.6MHz (WCDMA Band 4)
	826.4 – 846.6MHz (WCDMA Band 5)
	1850.7 – 1909.3MHz (LTE Band 2)
	1710.7 – 1754.3MHz (LTE Band 4)
	2502.5 – 2567.5MHz (LTE Band 7)
	2412 – 2462MHz (WLAN 2.4G)
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
Product Dimensions:	Long 159mm ;Wide 71mm ; Overall Diagonal 163mm
Display Diagonal:	154mm

Remark:

1. This device does not support DTM operation.
2. There is one power reduction level of WWAN antenna.
3. For WWAN transmitter

   Head exposure conditions:

   Reduced power level 1 – GSM1900, WCDMA Band 2/4, LTE Band 2/4

   While the device WWAN is transmitting at the WWAN antenna and the audio is actively routed through the earpiece receiver, power reduction enabled for those bands.

4.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
UT01aa	354827110000138	FS180-MB-V0.2	5030J_OFAR_1SIM_V1.4_20200331_UNLOCK
UT07aa	354827110000088	FS180-MB-V0.2	5030J_OFAR_1SIM_V1.4_20200331_UNLOCK
UT08aa	354827110000096	FS180-MB-V0.2	5030J_OFAR_1SIM_V1.4_20200331_UNLOCK
UT10aa	354827110000112	FS180-MB-V0.2	5030J_OFAR_1SIM_V1.4_20200331_UNLOCK

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

Note: It is performed to test SAR with the UT 07aa & 08aa & 10aa, and conducted power with the UT01aa.

4.3. Internal Identification of AE used during the test

AE ID*	Description	Type	Manufacturer
AE1	Battery	TLp038D7	VENKE
AE2	Battery	TLp038DA	TIANMAO
AE3	Headset	WH15/CCB0046A10C1	JUWEI
AE4	Headset	WH15/CCB0046A10C4	MEIHAO

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

Note: The device has two types of batteries and headsets. AE1 battery was used for the initial test, AE2 battery was used for verification tests with the worst configuration.

4.4 General Description

LTE/UMTS/GSM Smartphone 5130J manufactured by TCL Communication Ltd.is a variant model based on 5030J for conformance test. According to client's description, the table below shows the difference between model 5130J and 5030J:

Changes	5130J	5030J
Brand Name	TCL	Alcatel

Note: According to the declaration of differences by manufacturer, the two model data are shared.

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: Experimental Techniques.

KDB 447498 D01 General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

KDB 648474 D04 Handset SAR v01r03: SAR Evaluation Considerations for Wireless Handsets.

KDB 941225 D01 SAR test for 3G devices v03r01: SAR Measurement Procedures for 3G Devices

KDB 941225 D05 SAR for LTE Devices v02r05: SAR Evaluation Considerations for LTE Devices

KDB 941225 D06 Hot Spot SAR v02r01: SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

KDB 248227 D01 802.11 Wi-Fi SAR v02r02: SAR Guidance for IEEE 802.11 (Wi-Fi) Transmitters.

KDB 865664 D01SAR measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz.

KDB 865664 D02 RF Exposure Reporting v01r02: RF Exposure Compliance Reporting and Documentation Considerations

TCB workshop April 2019; RF Exposure Procedures (Tissue Simulating Liquids)

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 head 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

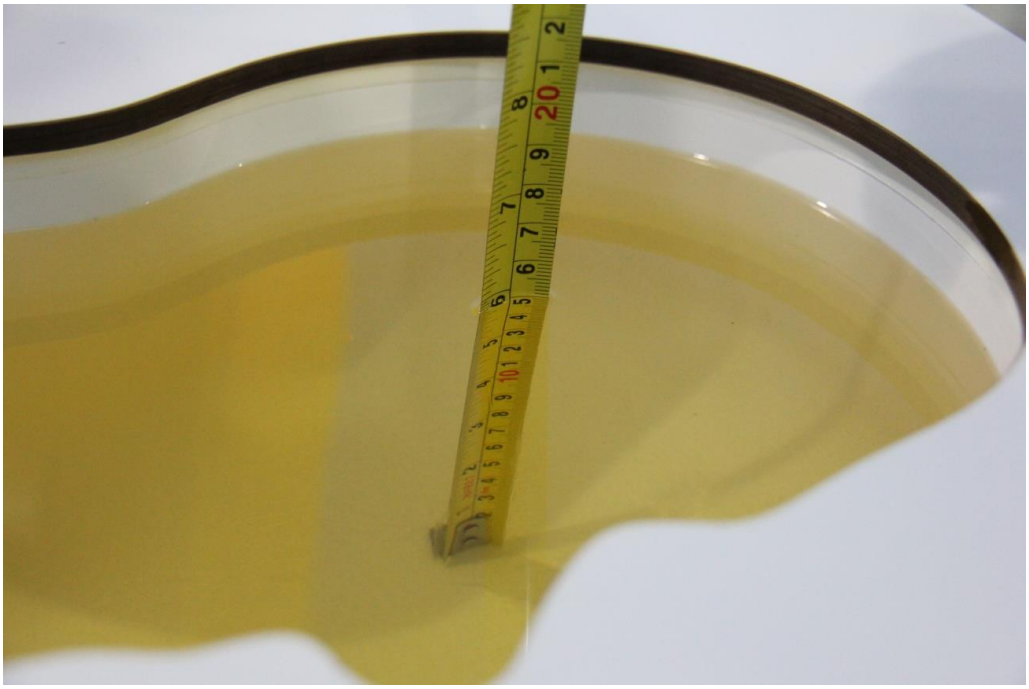
Frequency (MHz)	Liquid Type	Conductivity (σ)	± 5% Range	Permittivity (ε)	± 5% Range
835	Head	0.90	0.86～0.95	41.5	39.4～43.6
1750	Head	1.37	1.30～1.44	40.1	38.1～42.1
1900	Head	1.40	1.33～1.47	40.0	38.0～42.0
2450	Head	1.80	1.71～1.89	39.2	37.2～41.2
2550	Head	1.91	1.81～2.01	39.1	37.1～41.0

7.2. Dielectric Performance

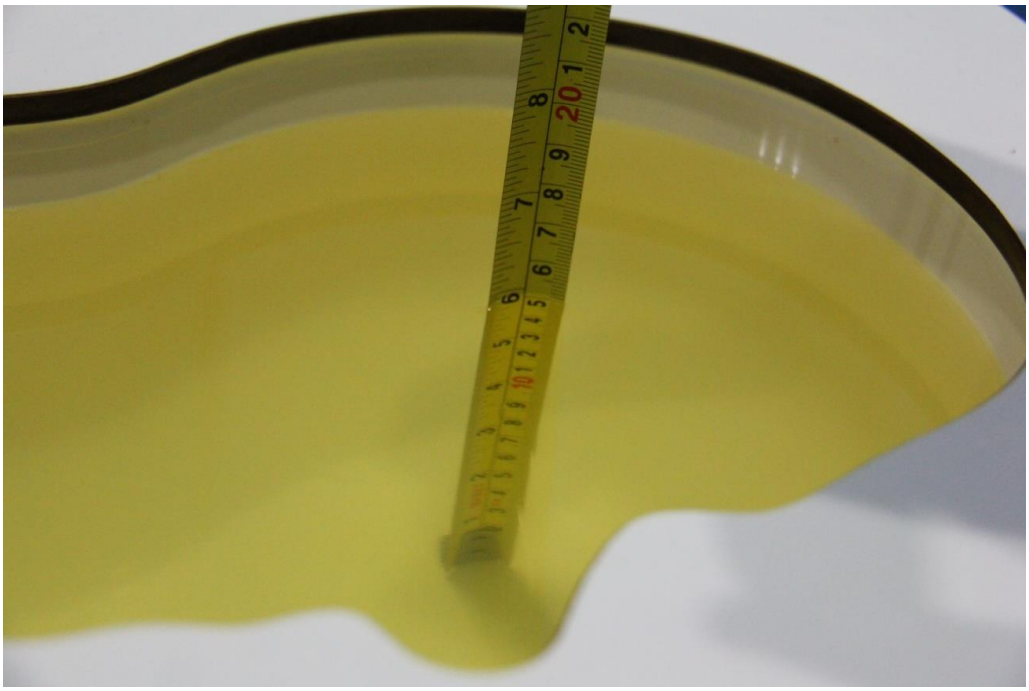
Table 7.2: Dielectric Performance of Tissue Simulating Liquid

Measurement Date (yyyy-mm-dd)	Type	Frequency	Conductivity σ (S/m)	Drift (%)	Permittivity ε	Drift (%)
2020-03-12	Head	835	0.884	-1.78	41.96	1.11
2020-03-28	Head	1750	1.352	-1.31	39.57	-1.32
2020-04-01	Head	1900	1.419	1.36	39.15	-2.13
2020-03-30	Head	2450	1.832	1.78	38.72	-1.22
2020-03-13	Head	2550	1.953	2.25	38.34	-1.94

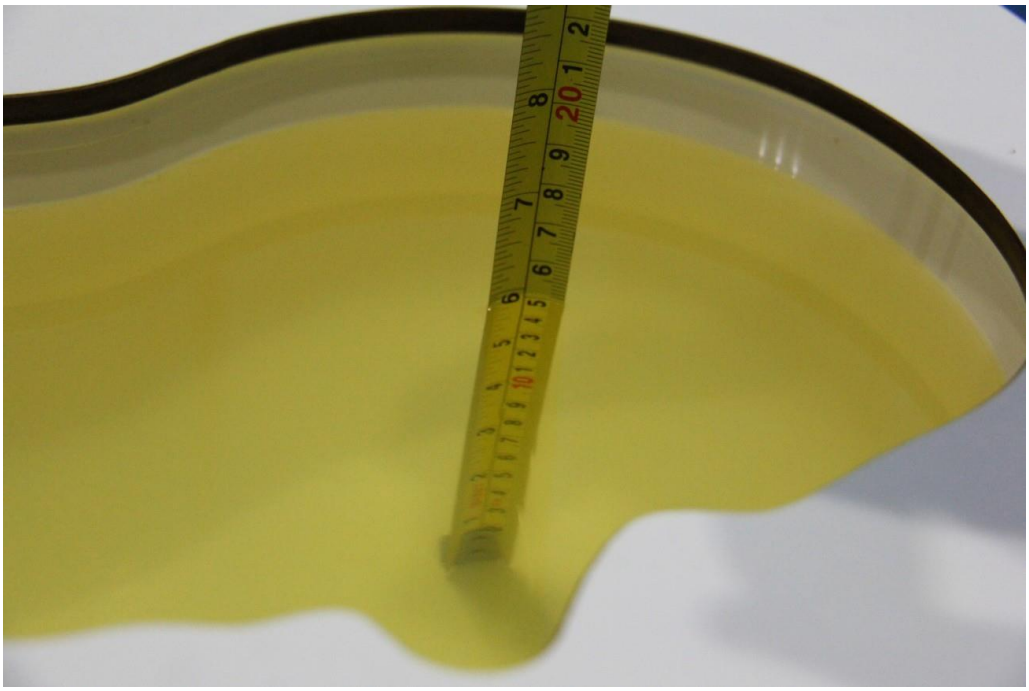
Note: The liquid temperature is 22.0°C.



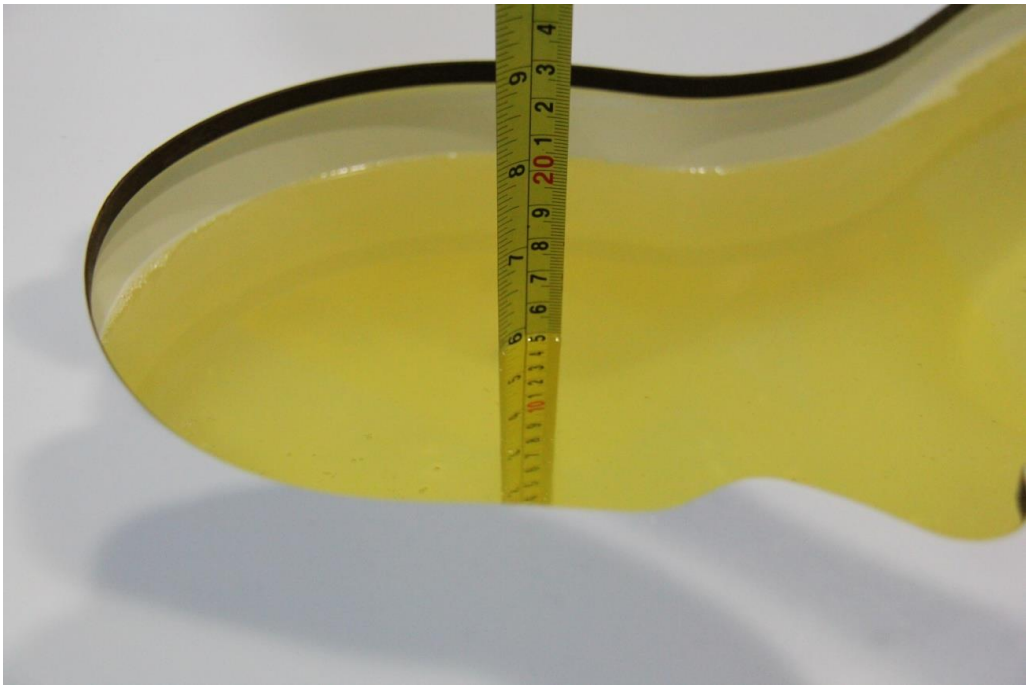
Picture 7-1: Liquid depth in the Head Phantom (835MHz)



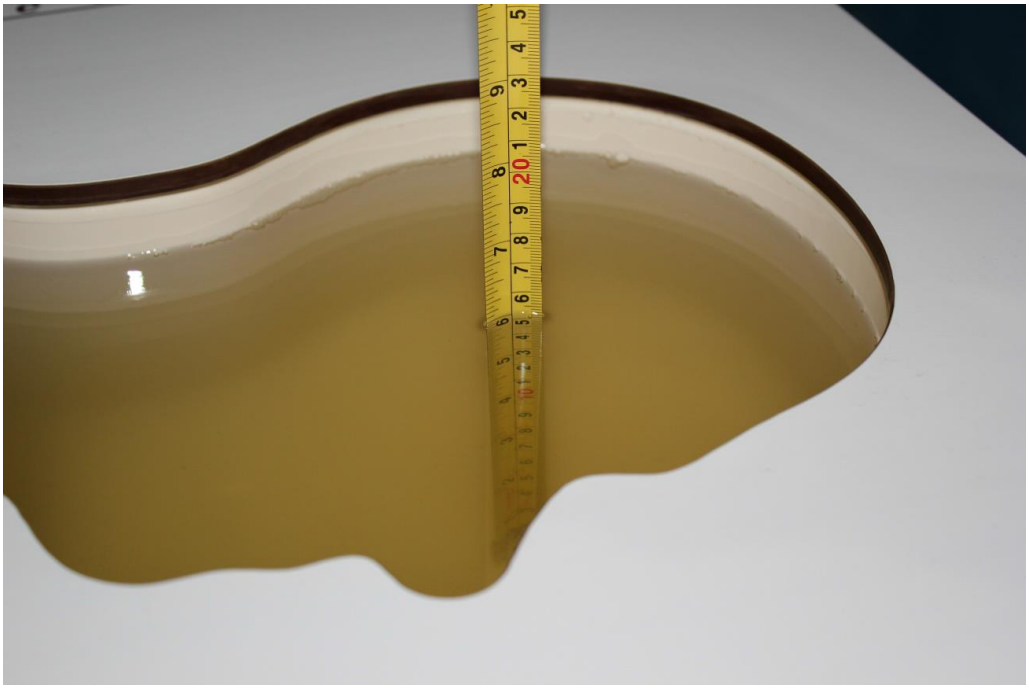
Picture 7-2: Liquid depth in the Head Phantom (1750MHz)



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



Picture 7-4: Liquid depth in the Head Phantom(2450MHz)

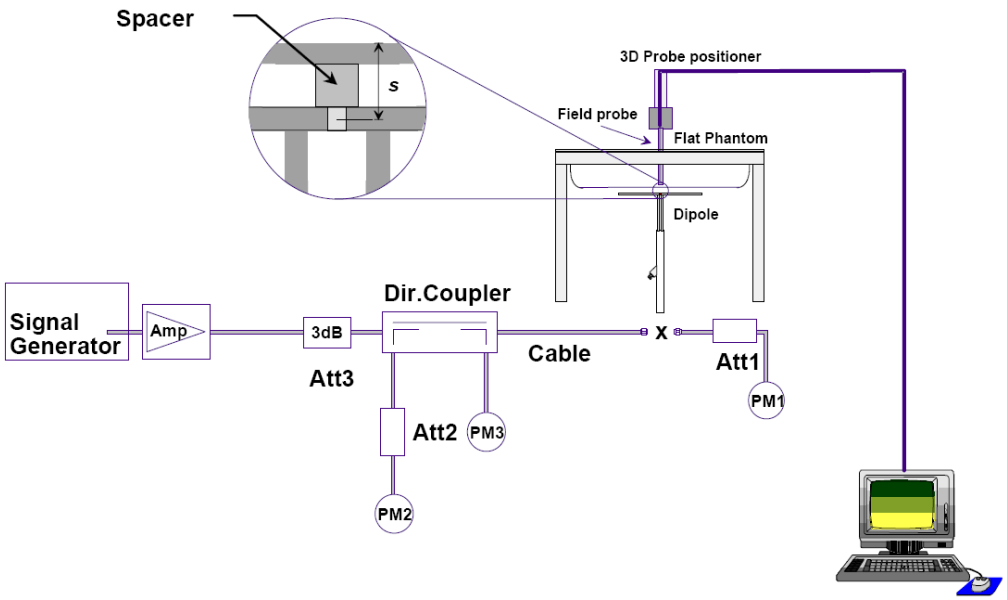


Picture 7-5: Liquid depth in the Head Phantom(2550MHz)

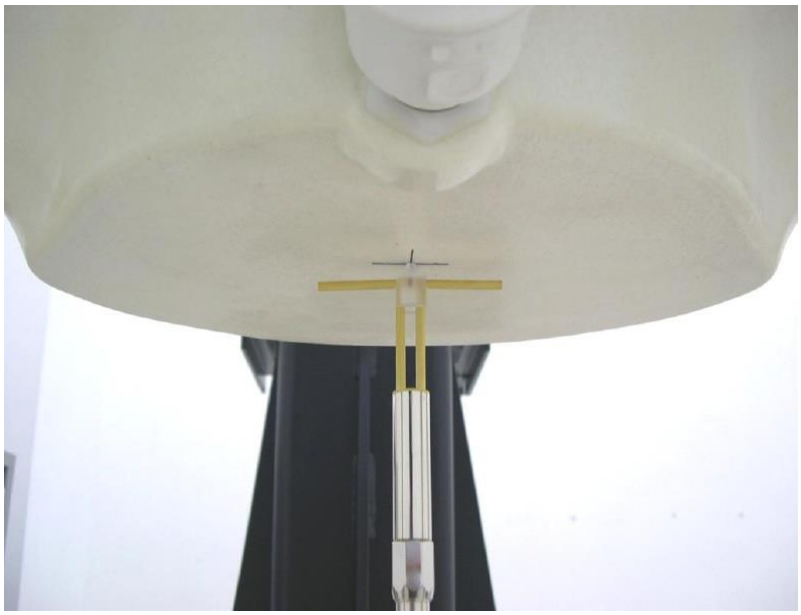
8. System verification

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.

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
2020-03-12	835 MHz	6.29	9.62	6.12	9.24	-2.70	-3.95
2020-03-28	1750 MHz	19.3	36.4	18.96	35.52	-1.76	-2.42
2020-04-01	1900 MHz	21.0	40.5	21.48	42.00	2.29	3.70
2020-03-30	2450 MHz	24.1	52.0	24.48	53.60	1.58	3.08
2020-03-13	2550 MHz	26.5	57.8	27.32	60.40	3.09	4.50

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.

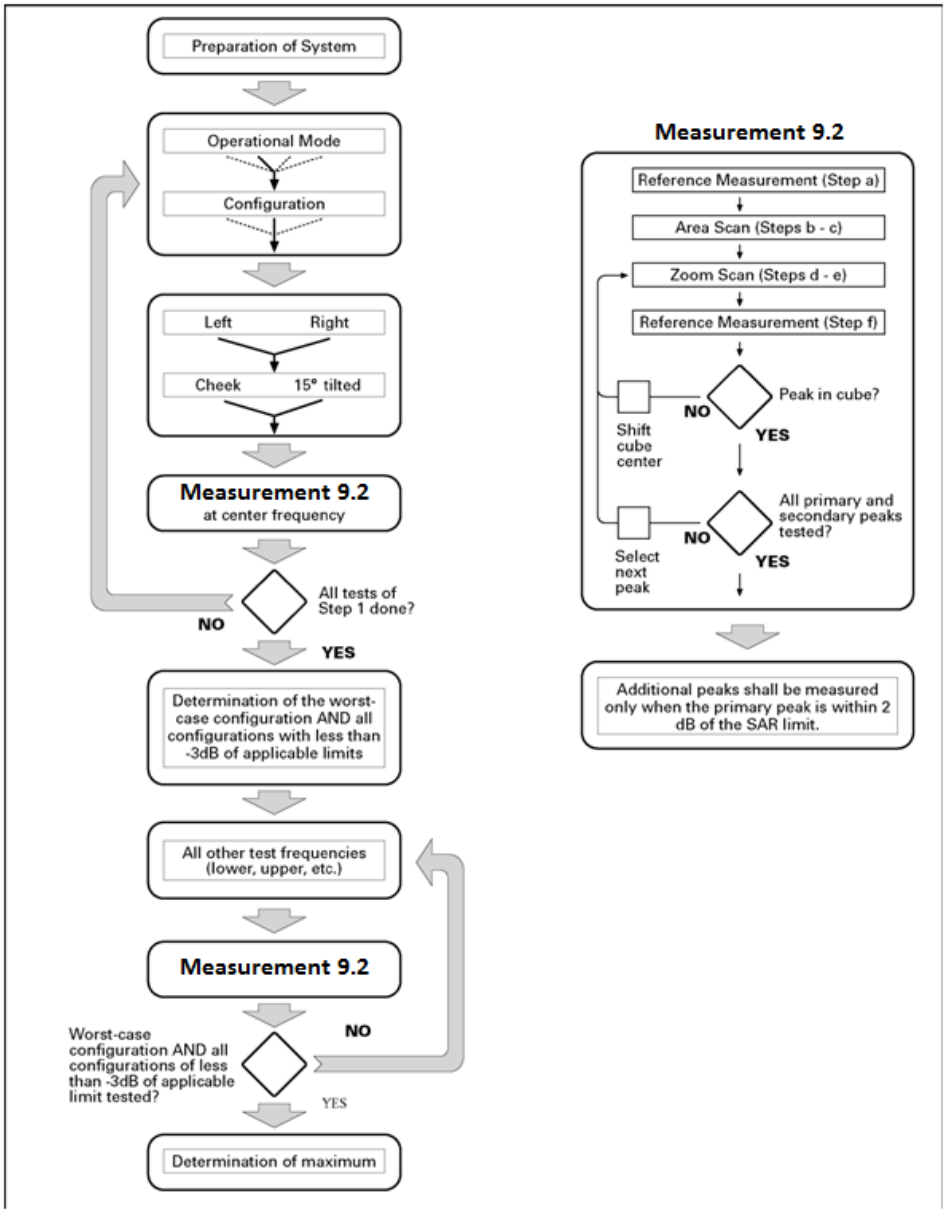
Step 1: The tests described in 9.2 shall be performed at the channel that is closest to the center of the transmit frequency band (f_c) for:

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

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

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

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



Picture 9.1 Block diagram of the tests to be performed

9.2. General Measurement Procedure

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements and fully documented in SAR reports to qualify for TCB approval. Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2013. 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.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

9.3. WCDMA Measurement Procedures for SAR

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

For Release 5 HSDPA Data Devices:

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

For Release 6 HSPA Data Devices

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

9.4. Bluetooth & WLAN 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.

9.5. SAR Measurement for LTE

SAR tests for LTE are performed with a base station simulator, Anristu MT8820C. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. All powers were measured with the Anristu MT8820C.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.

9.6. Power Drift

To control the output power stability during the SAR test, DASY5 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 Section 14 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

10. Conducted Output Power

10.1. 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 10.1: The conducted power measurement results for GSM

Full Power				
GSM 850MHz	Tune up	Conducted Power(dBm)		
		Channel 251(848.8MHz)	Channel 190(836.6MHz)	Channel 128(824.2MHz)
	34	33.38	33.45	33.51
GSM 1900MHz	Tune up	Conducted Power(dBm)		
		Channel 810(1909.8MHz)	Channel 661(1880MHz)	Channel512(1850.2MHz)
	30.5	30.12	30.21	30.28
Reduced power level 1				
GSM 1900MHz	Tune up	Conducted Power(dBm)		
		Channel 810(1909.8MHz)	Channel 661(1880MHz)	Channel512(1850.2MHz)
	28.5	27.82	27.97	28.04

Table 10.2: The conducted power measurement results for GPRS and EGPRS

Full Power								
GPRS850/ EGPRS850	Tune up	Measured Power (dBm)			calculation	Average Power (dBm)		
		251	190	128		251	190	128
1Tx-slots	34	33.37	33.43	33.49	-9.03dB	24.34	24.40	24.46
2Tx-slots	32	**31.13**	**31.30**	**31.45**	-6.02dB	**25.11**	**25.28**	**25.43**
3Tx-slots	30	29.17	29.31	29.43	-4.26dB	24.91	25.05	25.17
4Tx-slots	28	27.15	27.28	27.37	-3.01dB	24.14	24.27	24.36
EGPRS 850 (8PSK)	Tune up	Measured Power (dBm)			calculation	Measured Power (dBm)		
		251	190	128		251	190	128
1Tx-slots	28	26.57	26.32	26.45	-9.03dB	17.54	17.29	17.42
2Tx-slots	26.5	25.36	25.20	25.41	-6.02dB	19.34	19.18	19.39
3Tx-slots	24	22.81	22.39	22.55	-4.26dB	18.55	18.13	18.29
4Tx-slots	21.5	20.04	19.82	20.08	-3.01dB	17.03	16.81	17.07

Full Power								
GPRS1900/ EGPRS1900	Tune up	Measured Power (dBm)			calculation	Average Power (dBm)		
		810	661	512		810	661	512
1Tx-slots	31	30.11	30.19	30.25	-9.03dB	21.08	21.16	21.22
2Tx-slots	29	27.68	27.87	28.04	-6.02dB	21.66	21.85	22.02
3Tx-slots	27.5	**26.13**	**26.28**	**26.51**	-4.26dB	**21.87**	**22.02**	**22.25**
4Tx-slots	25.5	24.11	24.34	24.51	-3.01dB	21.10	21.33	21.50
EGPRS 1900 (8PSK)	Tune up	Measured Power (dBm)			calculation	Measured Power (dBm)		
		810	661	512		810	661	512
1Tx-slots	26.5	25.67	26.14	25.67	-9.03dB	16.64	17.11	16.64
2Tx-slots	25	23.62	24.29	23.76	-6.02dB	17.60	18.27	17.74
3Tx-slots	22	20.31	21.19	20.57	-4.26dB	16.05	16.93	16.31
4Tx-slots	18	16.88	17.54	17.15	-3.01dB	13.87	14.53	14.14

Note:

1) Division Factors

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

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

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

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

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

According to the conducted power as above, the body measurements are performed with 2Txslots for 850MHz and 3Txslots for 1900MHz.

10.2. WCDMA Measurement result

Table 10.3: T The conducted power measurement results WCDMA

Full Power					
Item	band	WCDMA Band 2			
	ARFCN	Tune up	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)
WCDMA	\	24	23.5	23.3	23.0
HSUPA	1	21	20.4	20.2	20.0
	2	22	21.1	20.7	20.5
	3	21.5	20.8	20.5	20.2
	4	22	21.3	20.9	20.8
	5	24	23.2	23.0	22.5
HSDPA	1	24	23.4	23.2	22.6
	2	24	23.0	22.8	22.4
	3	23.5	22.7	22.5	22.3
	4	23.5	22.7	22.5	22.3
DC-HSDPA	1	24	23.3	23.3	22.8
	2	24	23.0	22.9	22.6
	3	23.5	22.6	22.6	22.4
	4	23.5	22.6	22.6	22.6
Reduced power level 1					
Item	band	WCDMA Band 2			
	ARFCN	Tune up	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)
WCDMA	\	19.5	19.17	19.06	18.79
HSUPA	1	16.5	16.20	16.14	15.98
	2	17.5	16.56	16.44	16.21
	3	17	16.35	16.20	16.03
	4	17.5	16.55	16.42	16.18
	5	19	18.21	18.12	18.03
HSDPA	1	19.5	19.04	18.99	18.73
	2	19.5	19.00	18.95	18.68
	3	19	18.57	18.43	18.35
	4	19	18.52	18.41	18.32
DC-HSDPA	1	19.5	19.02	18.95	18.69
	2	19.5	18.94	18.88	18.57
	3	19	18.58	18.45	18.39
	4	19	18.50	18.42	18.36

Full Power					
Item	band	WCDMA Band 4			
	ARFCN	Tune up	1513 (1752.6MHz)	1413 (1732.6MHz)	1312 (1712.4MHz)
WCDMA	\	24	23.4	23.3	23.2
HSUPA	1	21	19.8	19.8	19.8
	2	21	19.6	19.8	19.6
	3	21	19.8	19.9	19.9
	4	21	19.9	19.9	20.0
	5	23	21.9	22.0	21.9
HSDPA	1	23	22.3	22.6	22.3
	2	23	22.1	22.4	22.0
	3	22.5	21.7	22.0	21.5
	4	22.5	21.7	21.9	21.5
DC-HSDPA	1	23	22.4	22.5	22.4
	2	23	22.2	22.3	22.1
	3	22.5	21.8	22.0	21.6
	4	22.5	21.8	21.8	21.7
Reduced power level 1					
Item	band	WCDMA Band 4			
	ARFCN	Tune up	1513 (1752.6MHz)	1413 (1732.6MHz)	1312 (1712.4MHz)
WCDMA	\	18.5	18.08	17.73	18.09
HSUPA	1	15.5	13.97	13.88	14.01
	2	15.5	14.19	14.03	14.25
	3	15.5	14.84	14.65	14.88
	4	15.5	14.11	14.96	14.18
	5	17.5	16.28	16.16	16.35
HSDPA	1	17.5	17.09	16.95	17.17
	2	17.5	17.04	16.91	17.11
	3	17	16.29	16.18	16.35
	4	17	16.22	16.10	16.33
DC-HSDPA	1	17.5	17.06	16.90	17.15
	2	17.5	17.01	16.88	17.10
	3	17	16.25	16.16	16.33
	4	17	16.22	16.08	16.30

Full Power					
Item	band	WCDMA Band 5			
	ARFCN	Tune up	4233 (846.6MHz)	4182 (836.4MHz)	4132 (826.4MHz)
WCDMA	\	23.5	22.7	23.2	22.9
HSUPA	1	21	20.2	20.3	20.0
	2	21	20.5	20.5	20.3
	3	21	20.3	20.4	20.1
	4	21	20.3	20.3	20.0
	5	23	21.7	22.1	21.7
HSDPA	1	23	21.2	21.3	21.3
	2	23	21.8	21.9	21.7
	3	23	21.7	21.9	21.7
	4	23	21.8	21.8	21.7
DC-HSDPA	1	23	21.3	21.3	21.4
	2	23	21.8	21.8	21.8
	3	23	21.8	21.9	21.7
	4	23	21.9	21.8	21.7

10.3. LTE Measurement result

Table 10.4: The conducted Power for LTE

Full Power							
LTE Band 2				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
1.4 MHz				1909.3MHz	1880MHz	1850.7MHz	
	1RB	High	QPSK	23.33	23.05	22.72	24
			16QAM	22.95	22.19	22.33	23
		Middle	QPSK	23.32	22.96	22.71	24
			16QAM	23.02	22.14	22.35	23
		Low	QPSK	23.38	22.99	22.73	24
			16QAM	23.00	22.18	22.36	23
	3RB	High	QPSK	23.46	23.05	22.84	24
			16QAM	22.74	22.21	22.12	23
		Middle	QPSK	23.52	23.08	22.79	24
			16QAM	22.82	22.18	22.10	23
		Low	QPSK	23.48	22.99	22.74	24
			16QAM	22.78	22.23	22.13	23
	6RB	/	QPSK	22.45	21.94	21.77	23
			16QAM	21.30	20.89	20.62	22
3 MHz				1908.5MHz	1880MHz	1851.5MHz	/
	1RB	High	QPSK	23.39	23.02	22.76	24
			16QAM	22.99	22.03	22.30	23
		Middle	QPSK	23.37	22.91	22.75	24
			16QAM	23.00	21.99	22.35	23
		Low	QPSK	23.35	22.94	22.73	24
			16QAM	22.96	21.98	22.35	23
	8RB	High	QPSK	22.49	22.05	21.75	23
			16QAM	21.63	21.18	21.03	22
		Middle	QPSK	22.44	21.98	21.74	23
			16QAM	21.69	21.14	21.01	22
		Low	QPSK	22.41	22.01	21.74	23
			16QAM	21.67	21.10	21.06	22
	15RB	/	QPSK	22.40	21.96	21.76	23
			16QAM	21.64	21.13	21.02	22

Full Power							
LTE Band 2				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
5 MHz				1907.5MHz	1880MHz	1852.5MHz	
	1RB	High	QPSK	23.33	22.97	22.69	24
			16QAM	23.02	22.60	22.35	23
		Middle	QPSK	23.30	22.89	22.79	24
			16QAM	23.02	22.55	22.35	23
		Low	QPSK	23.29	22.84	22.77	24
			16QAM	22.94	22.50	22.39	23
	12RB	High	QPSK	22.43	21.93	21.80	23
			16QAM	21.63	21.20	20.95	22
		Middle	QPSK	22.40	22.03	21.76	23
			16QAM	21.57	21.13	20.95	22
		Low	QPSK	22.32	21.97	21.82	23
			16QAM	21.52	21.09	20.94	22
	25RB	/	QPSK	22.38	21.90	21.74	23
			16QAM	21.47	21.06	20.85	22
10 MHz				1905MHz	1880MHz	1855MHz	/
	1RB	High	QPSK	23.36	23.11	22.71	24
			16QAM	22.87	22.56	22.29	23
		Middle	QPSK	23.36	23.01	22.69	24
			16QAM	22.82	22.39	22.28	23
		Low	QPSK	23.24	22.94	22.73	24
			16QAM	22.75	22.39	22.21	23
	25RB	High	QPSK	22.50	22.01	21.78	23
			16QAM	21.77	21.38	21.11	22
		Middle	QPSK	22.33	22.07	21.84	23
			16QAM	21.62	21.35	21.08	22
		Low	QPSK	22.30	21.92	21.76	23
			16QAM	21.69	21.27	21.11	22
	50RB	/	QPSK	22.35	21.99	21.76	23
			16QAM	21.43	21.15	20.88	22

Full Power							
LTE Band 2				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
15 MHz				1902.5MHz	1880MHz	1857.5MHz	
	1RB	High	QPSK	23.37	23.00	22.69	24
			16QAM	23.06	22.79	22.44	23
		Middle	QPSK	23.27	22.90	22.73	24
			16QAM	22.98	22.69	22.41	23
		Low	QPSK	23.27	22.82	22.76	24
			16QAM	22.92	22.68	22.45	23
	36RB	High	QPSK	22.34	22.11	21.77	23
			16QAM	21.47	21.12	20.92	22
		Middle	QPSK	22.35	22.03	21.86	23
			16QAM	21.49	21.10	20.90	22
		Low	QPSK	22.31	21.93	21.82	23
			16QAM	21.40	21.04	20.93	22
	75RB	/	QPSK	22.35	22.03	21.74	23
			16QAM	21.54	21.19	20.94	22
20 MHz				1900MHz	1880MHz	1860MHz	/
	1RB	High	QPSK	**23.10**	**23.15**	**22.77**	24
			16QAM	23.05	22.34	22.48	23
		Middle	QPSK	22.98	22.99	22.65	24
			16QAM	22.88	22.17	22.42	23
		Low	QPSK	22.97	22.95	22.76	24
			16QAM	22.84	22.14	22.48	23
	50RB	High	QPSK	**22.12**	**22.04**	**21.86**	23
			16QAM	21.48	21.24	21.02	22
		Middle	QPSK	21.98	22.03	21.73	23
			16QAM	21.39	21.17	20.94	22
		Low	QPSK	21.91	21.91	21.76	23
			16QAM	21.42	21.12	20.99	22
	100RB	/	QPSK	**22.01**	21.96	21.80	23
			16QAM	21.43	21.19	21.02	22

Reduced power level 1							
LTE Band 2				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
1.4 MHz				1909.3MHz	1880MHz	1850.7MHz	
	1RB	High	QPSK	17.17	16.85	16.80	18.5
			16QAM	16.44	16.17	16.02	17.5
		Middle	QPSK	17.37	17.06	17.00	18.5
			16QAM	16.64	16.38	16.23	17.5
		Low	QPSK	17.19	16.91	16.82	18.5
			16QAM	16.47	16.24	16.04	17.5
	3RB	High	QPSK	17.31	17.00	16.95	18.5
			16QAM	16.29	16.04	15.88	17.5
		Middle	QPSK	17.38	17.09	17.02	18.5
			16QAM	16.37	16.12	15.97	17.5
		Low	QPSK	17.33	17.04	16.96	18.5
			16QAM	16.32	16.08	15.89	17.5
	6RB	/	QPSK	16.28	16.01	15.95	17.5
			16QAM	15.53	15.28	14.99	16.5
3 MHz				1908.5MHz	1880MHz	1851.5MHz	/
	1RB	High	QPSK	17.21	16.82	16.80	18.5
			16QAM	16.48	16.14	16.03	17.5
		Middle	QPSK	17.40	17.08	17.00	18.5
			16QAM	16.68	16.41	16.25	17.5
		Low	QPSK	17.21	16.97	16.83	18.5
			16QAM	16.49	16.26	16.10	17.5
	8RB	High	QPSK	16.31	15.98	15.92	17.5
			16QAM	15.52	15.22	14.92	16.5
		Middle	QPSK	16.35	16.06	15.99	17.5
			16QAM	15.56	15.30	14.98	16.5
		Low	QPSK	16.31	16.07	15.98	17.5
			16QAM	15.52	15.30	14.97	16.5
	15RB	/	QPSK	16.31	16.03	15.96	17.5
			16QAM	15.49	15.25	14.92	16.5

Reduced power level 1							
LTE Band 2				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
5 MHz				1907.5MHz	1880MHz	1852.5MHz	
	1RB	High	QPSK	16.85	16.46	16.57	**18.5**
			16QAM	16.14	15.89	15.82	**17.5**
		Middle	QPSK	17.37	17.10	16.92	**18.5**
			16QAM	16.67	16.54	16.22	**17.5**
		Low	QPSK	16.96	16.72	16.49	**18.5**
			16QAM	16.27	16.16	15.77	**17.5**
	12RB	High	QPSK	16.20	15.96	15.89	**17.5**
			16QAM	15.37	15.07	14.85	**16.5**
		Middle	QPSK	16.36	16.20	15.99	**17.5**
			16QAM	15.54	15.28	14.95	**16.5**
		Low	QPSK	16.26	16.12	15.86	**17.5**
			16QAM	15.44	15.20	14.82	**16.5**
	25RB	/	QPSK	16.23	16.06	15.88	**17.5**
			16QAM	15.41	15.13	14.83	**16.5**
10 MHz				1905MHz	1880MHz	1855MHz	/
	1RB	High	QPSK	17.63	17.03	17.39	**18.5**
			16QAM	16.89	16.38	16.71	**17.5**
		Middle	QPSK	17.42	17.08	16.74	**18.5**
			16QAM	16.68	16.47	16.11	**17.5**
		Low	QPSK	17.24	17.07	16.39	**18.5**
			16QAM	16.50	16.41	15.74	**17.5**
	25RB	High	QPSK	16.61	16.24	16.19	**17.5**
			16QAM	15.74	15.38	15.28	**16.5**
		Middle	QPSK	16.47	16.24	15.87	**17.5**
			16QAM	15.61	15.38	14.95	**16.5**
		Low	QPSK	16.42	16.27	15.68	**17.5**
			16QAM	15.56	15.42	14.77	**16.5**
	50RB	/	QPSK	16.51	16.26	15.94	**17.5**
			16QAM	15.65	15.41	15.03	**16.5**

Reduced power level 1							
LTE Band 2				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
15 MHz				1902.5MHz	1880MHz	1857.5MHz	
	1RB	High	QPSK	17.34	16.89	17.50	**18.5**
			16QAM	16.57	16.20	16.81	**17.5**
		Middle	QPSK	17.35	17.10	16.88	**18.5**
			16QAM	16.59	16.51	16.28	**17.5**
		Low	QPSK	17.36	17.46	16.70	**18.5**
			16QAM	16.59	16.76	16.02	**17.5**
	36RB	High	QPSK	16.39	16.07	16.36	**17.5**
			16QAM	15.56	15.22	15.47	**16.5**
		Middle	QPSK	16.33	16.21	16.02	**17.5**
			16QAM	15.50	15.35	15.10	**16.5**
		Low	QPSK	16.40	16.46	15.87	**17.5**
			16QAM	15.57	15.61	14.98	**16.5**
	75RB	/	QPSK	16.39	16.27	16.12	**17.5**
			16QAM	15.56	15.41	15.23	**16.5**
20 MHz				1900MHz	1880MHz	1860MHz	/
	1RB	High	QPSK	**18.05**	17.88	**18.12**	**18.5**
			16QAM	17.30	17.06	17.42	**17.5**
		Middle	QPSK	17.23	16.99	16.89	**18.5**
			16QAM	16.51	16.27	16.22	**17.5**
		Low	QPSK	17.40	**18.00**	16.62	**18.5**
			16QAM	16.67	17.20	15.91	**17.5**
	50RB	High	QPSK	**16.65**	16.39	16.58	**17.5**
			16QAM	15.85	15.45	15.74	**16.5**
		Middle	QPSK	16.32	16.22	15.98	**17.5**
			16QAM	15.54	15.29	15.15	**16.5**
		Low	QPSK	16.24	16.49	15.61	**17.5**
			16QAM	15.45	15.55	14.77	**16.5**
	100RB	/	QPSK	**16.44**	16.44	16.11	**17.5**
			16QAM	15.63	15.48	15.25	**16.5**

Full Power							
LTE Band 4				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
1.4 MHz				1754.3MHz	1732.5MHz	1710.7MHz	
	1RB	High	QPSK	23.11	22.97	22.80	24
			16QAM	22.38	22.57	22.53	23
		Middle	QPSK	23.09	22.96	22.81	24
			16QAM	22.42	22.58	22.55	23
		Low	QPSK	23.08	22.95	22.83	24
			16QAM	22.40	22.59	22.51	23
	3RB	High	QPSK	23.30	23.02	23.01	24
			16QAM	22.50	22.32	22.29	23
		Middle	QPSK	23.35	22.99	22.92	24
			16QAM	22.53	22.37	22.33	23
		Low	QPSK	23.29	23.07	22.96	24
			16QAM	22.48	22.36	22.25	23
	6RB	/	QPSK	22.27	21.99	21.89	23
			16QAM	21.22	20.86	20.78	22
3 MHz				1753.5MHz	1732.5MHz	1711.5MHz	/
	1RB	High	QPSK	23.10	23.04	22.91	24
			16QAM	22.45	22.43	22.37	23
		Middle	QPSK	23.14	22.96	22.87	24
			16QAM	22.46	22.48	22.39	23
		Low	QPSK	23.14	23.00	22.95	24
			16QAM	22.48	22.43	22.41	23
	8RB	High	QPSK	22.26	21.95	21.89	23
			16QAM	21.52	21.26	21.19	22
		Middle	QPSK	22.29	22.04	21.90	23
			16QAM	21.54	21.31	21.16	22
		Low	QPSK	22.23	22.06	21.98	23
			16QAM	21.50	21.27	21.21	22
	15RB	/	QPSK	22.25	22.02	22.03	23
			16QAM	21.44	21.24	21.15	22

Full Power							
LTE Band 4				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
5 MHz				1752.5MHz	1732.5MHz	1712.5MHz	
	1RB	High	QPSK	23.04	22.94	22.84	24
			16QAM	22.92	22.60	22.55	23
		Middle	QPSK	23.10	22.96	22.84	24
			16QAM	22.88	22.59	22.54	23
		Low	QPSK	23.05	22.94	22.86	24
			16QAM	22.91	22.62	22.54	23
	12RB	High	QPSK	22.17	21.98	21.83	23
			16QAM	21.30	21.15	21.07	22
		Middle	QPSK	22.28	22.00	21.91	23
			16QAM	21.31	21.16	21.05	22
		Low	QPSK	22.24	21.95	21.90	23
			16QAM	21.36	21.12	21.04	22
	25RB	/	QPSK	22.27	21.94	21.98	23
			16QAM	21.34	21.09	21.04	22
10 MHz				1750MHz	1732.5MHz	1715MHz	/
	1RB	High	QPSK	23.19	22.96	22.85	24
			16QAM	22.60	22.52	22.40	23
		Middle	QPSK	23.13	22.92	22.89	24
			16QAM	22.53	22.42	22.39	23
		Low	QPSK	23.20	22.94	22.97	24
			16QAM	22.55	22.44	22.37	23
	25RB	High	QPSK	22.19	22.01	21.99	23
			16QAM	21.59	21.42	21.24	22
		Middle	QPSK	22.27	22.02	21.91	23
			16QAM	21.54	21.32	21.34	22
		Low	QPSK	22.21	21.99	22.01	23
			16QAM	21.57	21.38	21.32	22
	50RB	/	QPSK	22.20	21.95	21.98	23
			16QAM	21.42	21.15	21.11	22

Full Power							
LTE Band 4				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
15 MHz				1747.5MHz	1732.5MHz	1717.5MHz	
	1RB	High	QPSK	23.17	22.97	22.90	24
			16QAM	22.79	22.63	22.50	23
		Middle	QPSK	23.13	22.89	22.76	24
			16QAM	22.80	22.53	22.51	23
		Low	QPSK	23.11	22.97	22.86	24
			16QAM	22.77	22.59	22.59	23
	36RB	High	QPSK	22.30	22.13	21.96	23
			16QAM	21.29	21.13	21.01	22
		Middle	QPSK	22.23	21.98	22.00	23
			16QAM	21.32	21.10	21.03	22
		Low	QPSK	22.16	22.12	21.97	23
			16QAM	21.29	21.18	21.09	22
	75RB	/	QPSK	22.21	22.06	21.85	23
			16QAM	21.44	21.15	21.08	22
20 MHz				1745MHz	1732.5MHz	1720MHz	/
	1RB	High	QPSK	**23.09**	22.96	**22.95**	24
			16QAM	22.97	22.67	22.54	23
		Middle	QPSK	23.07	22.90	22.81	24
			16QAM	22.94	22.58	22.53	23
		Low	QPSK	23.02	**22.98**	22.91	24
			16QAM	22.91	22.65	22.58	23
	50RB	High	QPSK	22.24	22.09	22.07	23
			16QAM	21.31	21.15	21.09	22
		Middle	QPSK	**22.30**	22.09	21.94	23
			16QAM	21.34	21.14	21.06	22
		Low	QPSK	22.18	22.01	22.02	23
			16QAM	21.25	21.17	21.07	22
	100RB	/	QPSK	**22.19**	22.01	21.95	23
			16QAM	21.38	21.14	21.07	22

Reduced power level 1							
LTE Band 4				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
1.4 MHz				1754.3MHz	1732.5MHz	1710.7MHz	
	1RB	High	QPSK	16.42	16.19	16.35	17.5
			16QAM	15.88	15.64	15.76	17
		Middle	QPSK	16.62	16.44	16.50	17.5
			16QAM	16.08	15.93	15.91	17
		Low	QPSK	16.41	16.28	16.27	17.5
			16QAM	15.88	15.74	15.69	17
	3RB	High	QPSK	16.56	16.37	16.48	17.5
			16QAM	15.71	15.55	15.56	17
		Middle	QPSK	16.63	16.48	16.47	17.5
			16QAM	15.80	15.63	15.58	17
		Low	QPSK	16.56	16.43	16.39	17.5
			16QAM	15.73	15.59	15.49	17
	6RB	/	QPSK	15.65	15.51	15.46	16.5
			16QAM	14.87	14.65	14.53	16
3 MHz				1753.5MHz	1732.5MHz	1711.5MHz	/
	1RB	High	QPSK	16.44	16.15	16.53	17.5
			16QAM	15.89	15.62	15.93	17
		Middle	QPSK	16.61	16.46	16.61	17.5
			16QAM	16.05	15.92	16.03	17
		Low	QPSK	16.42	16.32	16.29	17.5
			16QAM	15.88	15.80	15.70	17
	8RB	High	QPSK	15.65	15.46	15.63	16.5
			16QAM	14.83	14.58	14.67	16
		Middle	QPSK	15.69	15.55	15.63	16.5
			16QAM	14.86	14.67	14.67	16
		Low	QPSK	15.65	15.56	15.51	16.5
			16QAM	14.83	14.68	14.55	16
	15RB	/	QPSK	15.65	15.52	15.58	16.5
			16QAM	14.79	14.61	14.58	16

Reduced power level 1							
LTE Band 4				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
5 MHz				1752.5MHz	1732.5MHz	1712.5MHz	
	1RB	High	QPSK	16.08	15.70	16.34	17.5
			16QAM	15.54	15.19	15.78	17
		Middle	QPSK	16.60	16.44	16.68	17.5
			16QAM	16.04	15.92	16.09	17
		Low	QPSK	16.10	16.04	15.93	17.5
			16QAM	15.58	15.53	15.37	17
	12RB	High	QPSK	15.56	15.32	15.68	16.5
			16QAM	14.69	14.38	14.65	16
		Middle	QPSK	15.71	15.58	15.72	16.5
			16QAM	14.84	14.64	14.71	16
		Low	QPSK	15.57	15.50	15.47	16.5
			16QAM	14.69	14.56	14.44	16
	25RB	/	QPSK	15.57	15.42	15.59	16.5
			16QAM	14.68	14.47	14.55	16
10 MHz				1750MHz	1732.5MHz	1715MHz	/
	1RB	High	QPSK	16.93	16.25	17.04	17.5
			16QAM	16.38	15.76	16.52	17
		Middle	QPSK	16.58	16.40	16.38	17.5
			16QAM	16.06	15.88	15.85	17
		Low	QPSK	16.52	16.47	15.62	17.5
			16QAM	15.96	15.98	15.10	17
	25RB	High	QPSK	15.94	15.56	15.97	16.5
			16QAM	15.04	14.61	15.01	16
		Middle	QPSK	15.77	15.60	15.56	16.5
			16QAM	14.87	14.65	14.60	16
		Low	QPSK	15.74	15.69	15.25	16.5
			16QAM	14.84	14.74	14.30	16
	50RB	/	QPSK	15.84	15.63	15.63	16.5
			16QAM	14.95	14.69	14.67	16

Reduced power level 1							
LTE Band 4				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
15 MHz				1747.5MHz	1732.5MHz	1717.5MHz	
	1RB	High	QPSK	16.70	15.86	16.91	**17.5**
			16QAM	16.09	15.35	16.41	**17**
		Middle	QPSK	16.59	16.40	16.60	**17.5**
			16QAM	16.04	15.88	16.07	**17**
		Low	QPSK	16.97	16.87	15.95	**17.5**
			16QAM	16.38	16.36	15.43	**17**
	36RB	High	QPSK	15.81	15.32	16.05	**16.5**
			16QAM	14.91	14.37	15.10	**16**
		Middle	QPSK	15.76	15.54	15.74	**16.5**
			16QAM	14.88	14.60	14.77	**16**
		Low	QPSK	15.94	15.90	15.50	**16.5**
			16QAM	15.06	14.97	14.54	**16**
	75RB	/	QPSK	15.87	15.62	15.79	**16.5**
			16QAM	14.98	14.67	14.84	**16**
20 MHz				1745MHz	1732.5MHz	1720MHz	/
	1RB	High	QPSK	**17.64**	16.40	**16.94**	**18**
			16QAM	17.06	15.88	16.17	**17.5**
		Middle	QPSK	16.62	16.30	16.16	**18**
			16QAM	16.10	15.79	15.46	**17.5**
		Low	QPSK	17.60	**17.03**	16.07	**18**
			16QAM	17.01	16.50	15.09	**17.5**
	50RB	High	QPSK	**16.17**	15.48	**15.64**	**17**
			16QAM	15.28	14.53	14.82	**16.5**
		Middle	QPSK	15.85	15.54	15.26	**17**
			16QAM	14.97	14.60	14.42	**16.5**
		Low	QPSK	16.08	**15.84**	15.05	**17**
			16QAM	15.20	14.90	14.51	**16.5**
	100RB	/	QPSK	**16.11**	15.65	15.25	**17**
			16QAM	15.21	14.70	14.61	**16.5**

Full Power							
LTE-FDD Band 7				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
5 MHz				2567.4MHz	2535MHz	2502.5MHz	
	1RB	High	QPSK	22.86	22.51	22.82	24
			16QAM	22.61	22.34	22.30	23
		Middle	QPSK	22.78	22.54	22.80	24
			16QAM	22.55	22.30	22.36	23
		Low	QPSK	22.82	22.49	22.77	24
			16QAM	22.60	22.32	22.37	23
	12RB	High	QPSK	21.86	21.61	21.96	23
			16QAM	21.08	20.77	21.04	22
		Middle	QPSK	21.93	21.72	21.85	23
			16QAM	21.05	20.77	21.09	22
		Low	QPSK	21.87	21.62	22.00	23
			16QAM	21.03	20.75	21.13	22
	25RB	/	QPSK	21.91	21.64	21.89	23
			16QAM	21.02	20.71	21.22	22
10 MHz				2565MHz	2535MHz	2505MHz	/
	1RB	High	QPSK	22.80	22.59	22.83	24
			16QAM	22.38	22.18	22.38	23
		Middle	QPSK	22.85	22.55	22.77	24
			16QAM	22.36	22.09	22.32	23
		Low	QPSK	22.74	22.58	22.69	24
			16QAM	22.33	22.04	22.32	23
	25RB	High	QPSK	22.05	21.64	21.95	23
			16QAM	21.26	21.01	21.22	22
		Middle	QPSK	21.94	21.67	21.84	23
			16QAM	21.26	20.95	21.22	22
		Low	QPSK	21.93	21.72	21.97	23
			16QAM	21.27	20.96	21.18	22
	50RB	/	QPSK	21.99	21.65	21.89	23
			16QAM	21.07	20.81	21.10	22

Full Power							
LTE-FDD Band 7				Actual output Power (dBm)			Tune up
Band-width	RB allocation	RB offset	Modulation	High	Middle	Low	
15 MHz				2562.5MHz	2535MHz	2507.5MHz	
	1RB	High	QPSK	22.90	22.60	22.81	24
			16QAM	22.71	22.51	22.28	23
		Middle	QPSK	22.88	22.51	22.79	24
			16QAM	22.68	22.39	22.21	23
		Low	QPSK	22.70	22.60	22.80	24
			16QAM	22.64	22.46	22.28	23
	36RB	High	QPSK	22.09	21.70	21.94	23
			16QAM	21.06	20.75	21.17	22
		Middle	QPSK	21.97	21.71	21.93	23
			16QAM	21.05	20.76	21.17	22
		Low	QPSK	21.92	21.65	21.93	23
			16QAM	20.96	20.69	21.17	22
	75RB	/	QPSK	21.86	21.73	21.90	23
			16QAM	21.15	20.88	21.07	22
20 MHz				2560MHz	2535MHz	2510MHz	/
	1RB	High	QPSK	**23.00**	**22.84**	**22.90**	24
			16QAM	22.70	22.17	22.58	23
		Middle	QPSK	22.90	22.65	22.88	24
			16QAM	22.59	22.03	22.56	23
		Low	QPSK	22.68	22.70	22.79	24
			16QAM	22.48	22.04	22.55	23
	50RB	High	QPSK	**22.03**	**21.72**	**22.01**	23
			16QAM	21.09	20.91	21.03	22
		Middle	QPSK	22.03	21.60	21.95	23
			16QAM	21.06	20.81	21.12	22
		Low	QPSK	21.84	21.72	21.89	23
			16QAM	21.09	20.82	21.01	22
	100RB	/	QPSK	21.92	21.62	22.04	23
			16QAM	21.10	20.81	21.14	22

10.4. Bluetooth and WLAN Measurement result

Table 10.13: The conducted Power measurement results for Bluetooth

Bluetooth	Tune up	Averaged Power (dBm)	
GFSK	**6.5**	Ch.0 (2402 MHz)	5.97
	5.5	Ch39 (2441 MHz)	4.60
	5.5	Ch78 (2480 MHz)	4.34
EDR2M-4_DQPSK	**5.5**	Ch.0 (2402 MHz)	4.83
	4.5	Ch39 (2441 MHz)	3.23
	4.5	Ch78 (2480 MHz)	3.29
EDR3M-8DPSK	**6.5**	Ch.0 (2402 MHz)	5.90
	5.5	Ch39 (2441 MHz)	4.57
	5.5	Ch78 (2480 MHz)	4.34
BLE	**-6.5**	Ch0（2402MHz）	-7.67
	-5.5	Ch19（2440MHz）	-6.20
	-5.5	Ch39（2480MHz）	-6.26

Table 10.14: The conducted Power measurement results for WLAN 2.4G

WLAN 2.4GHz	Tune up	Averaged Power (dBm) Duty Cycle: **100%**	
802.11b	**12**	Ch.1(2412MHz)	11.15
	11	Ch.6(2437Mhz)	10.12
	13	Ch.11(2462MHz)	**12.05**
802.11g	**10**	Ch.1(2412MHz)	8.85
	9	Ch.6(2437Mhz)	8.34
	11	Ch.11(2462MHz)	9.78
802.11n(20MHz)	**8**	Ch.1(2412MHz)	7.18
	8	Ch.6(2437Mhz)	7.15
	10	Ch.11(2462MHz)	8.96

11. Simultaneous TX SAR Considerations

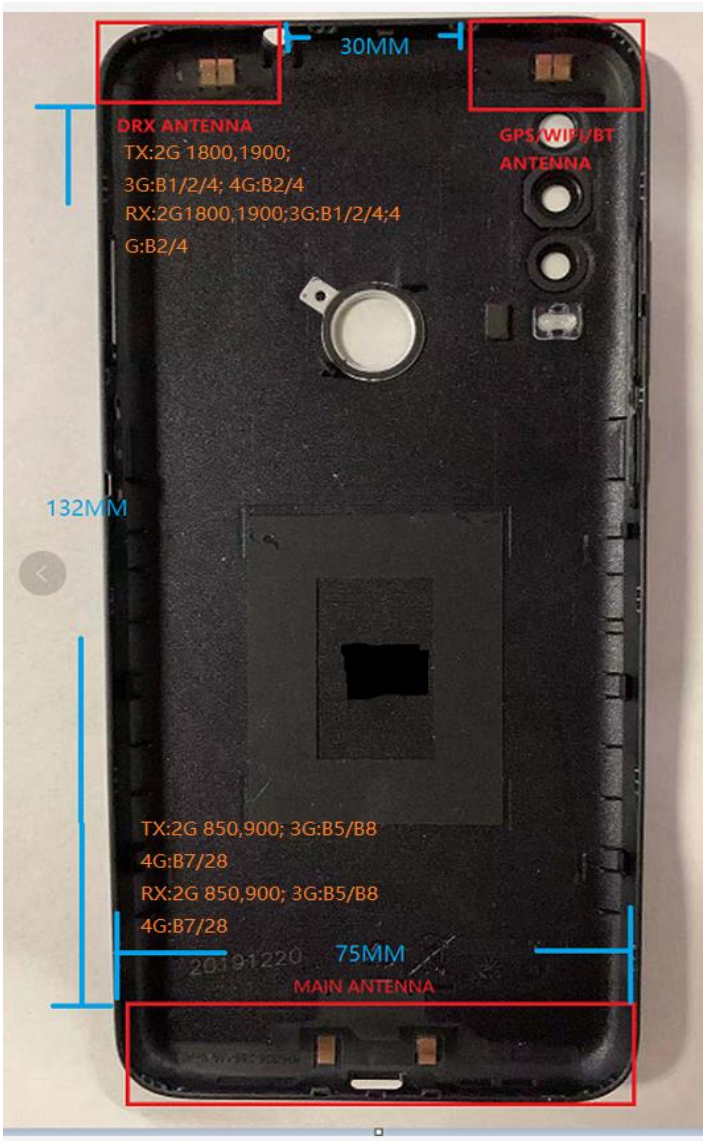
11.1. Introduction

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 WLAN can transmit simultaneous with other transmitters.

11.2. Transmit Antenna Separation Distances

Top Side

Left Side



Right Side

Bottom Side

Picture 11.1 Antenna Locations (Front View)

/	Frequency Bands
DRX Antenna	GSM1900, WCDMA Band2/4, LTE Band 2/4
Main Antenna	GSM850, WCDMA Band5, LTE Band 7

11.3. SAR Measurement Positions

According to the KDB941225 D06 Hot Spot SAR, the edges with less than 25mm distance to the antennas need to be tested for SAR.

SAR measurement positions						
Mode	Front	Rear	Left edge	Right edge	Top edge	Bottom edge
DRX antenna	Yes	Yes	Yes	Yes	Yes	No
Main antenna	Yes	Yes	Yes	Yes	No	Yes
WLAN antenna	Yes	Yes	Yes	Yes	Yes	No

11.4. 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:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where

- f(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 11.1: 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	6.5	4.5	Yes
		Body	19.20	6.5	4.5	Yes
2.4GHz WLAN	2.45	Head	9.58	13	20.0	No
		Body	19.17	13	20.0	No

12. Evaluation of Simultaneous

Table 12.1: The sum of reported SAR values for main antenna and WLAN

/	Position	WWAN Antenna (W/kg)	WLAN (W/kg)	Sum (W/kg)
Highest reported SAR value for Head	Right Touch	1.34	0.11	1.45
Highest reported SAR value for Body	Rear	1.23	0.13	1.36

Note: the test positions of above tables are for the worse case that has been evaluated.

Table 12.2: The sum of reported SAR values for main antenna and Bluetooth

/	Position	WWAN Antenna (W/kg)	Bluetooth (W/kg)	Sum (W/kg)
Highest reported SAR value for Head	Right Touch	1.34	0.19	1.53
Highest reported SAR value for Body	Rear	1.23	0.09	1.32

Note: the test positions of above tables are for the worse case that has been evaluated.

Table 12.3: Estimated SAR for Bluetooth

Position	f (GHz)	Distance (mm)	Upper limit of power *		Estimated$_{1g}$ (W/kg)
			dBm	mW	
Head	2.441	5	6.5	4.5	0.19
Body	2.441	10	6.5	4.5	0.09

* - Maximum possible output power declared by manufacturer

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm;
Where x = 7.5 for 1-g SAR.
When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

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

13. Summary of Test Results

According to the client's decision rule in the test registration form, which is "based on the measurement results as the basis of the conformity statement", the test conclusion of this report meets the limit requirements.

The calculated SAR is obtained by the following formula:

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

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

$P_{Measured}$ is the measured power in chapter 10.

Note:

B2 (Battery): TLp038DA (TIANMAO)

H1 (Headset): WH15/CCB0046A10C1 (JUWEI)

H2 (Headset): WH15/CCB0046A10C4 (MEIHAO)

Duty Cycle

Mode	Duty Cycle
Speech for GSM850/1900	1:8.3
GPRS for GSM850	1:4
GPRS for GSM1900	1:2.67
WCDMA850/1700/1900	1:1
FDD_LTE Band 2/4/7	1:1

13.1. Testing Environment

Temperature:	18°C~25°C
Relative humidity:	30%~70%
Ground system resistance:	<4Ω
Ambient noise & Reflection:	< 0.012 W/kg

13.2. SAR results

Table 13.1: SAR Values (GSM 850 - Head)

Ambient Temperature: 22.8°C Liquid Temperature: 22.2°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
836.6	190	Speech	Left Touch	**1**	33.45	34	**0.229**	**0.26**	0.02
836.6	190	Speech	Left Tilt	/	33.45	34	0.130	0.15	0.01
836.6	190	Speech	Right Touch	/	33.45	34	0.212	0.24	-0.08
836.6	190	Speech	Right Tilt	/	33.45	34	0.130	0.15	0.01
836.6	190	Speech	Left Touch	B2	33.45	34	0.216	0.25	0.09

Table 13.2: SAR Values (GSM 850 -Body)

Ambient Temperature: 22.8°C Liquid Temperature: 22.2°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
Hotspot / Body-Worn Test Data (10mm)									
836.6	190	GPRS	Front	/	31.30	32	0.261	0.31	0.08
836.6	190	GPRS	Rear	**2**	31.30	32	**0.390**	**0.46**	0.14
836.6	190	GPRS	Left	/	31.30	32	0.335	0.39	0.04
836.6	190	GPRS	Right	/	31.30	32	0.192	0.23	0.09
836.6	190	GPRS	Bottom	/	31.30	32	0.058	0.07	0.03
836.6	190	GPRS	Rear	B2	31.30	32	0.381	0.45	0.05

Table 13.3: SAR Values (GSM 1900 - Head)

Ambient Temperature: 22.7°C Liquid Temperature: 22.2°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
1880	661	Speech	Left Touch	/	27.97	28.5	0.421	0.48	0.01
1880	661	Speech	Left Tilt	/	27.97	28.5	0.286	0.32	-0.03
1880	661	Speech	Right Touch	**3**	27.97	28.5	**0.981**	**1.11**	-0.05
1880	661	Speech	Right Tilt	/	27.97	28.5	0.810	0.92	0.00
1909.8	810	Speech	Right Touch	/	27.82	28.5	0.950	**1.11**	0.13
1850.2	512	Speech	Right Touch	/	28.04	28.5	0.932	1.04	0.12
1909.8	810	Speech	Right Tilt	/	27.82	28.5	0.789	0.92	0.00
1850.2	512	Speech	Right Tilt	/	28.04	28.5	0.765	0.85	0.05
1880	661	Speech	Right Touch	B2	27.97	28.5	0.966	1.09	0.05

Table 13.4: SAR Values (GSM 1900 - Body)

Ambient Temperature: 22.4°C Liquid Temperature: 22.0°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
Hotspot / Body-Worn Test Data (10mm)									
1880	661	GPRS	Front	/	26.28	27.5	0.353	0.47	0.01
1880	661	GPRS	Rear	**4**	26.28	27.5	**0.607**	**0.80**	0.17
1880	661	GPRS	Left	/	26.28	27.5	0.209	0.28	0.10
1880	661	GPRS	Right	/	26.28	27.5	0.041	0.05	0.06
1880	661	GPRS	Top	/	26.28	27.5	0.197	0.26	0.01
1880	661	GPRS	Rear	B2	26.28	27.5	0.585	0.77	0.09

Table 13.5: SAR Values (WCDMA Band 2 - Head)

Ambient Temperature: 22.7°C Liquid Temperature: 22.2°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
1880	9400	RMC	Left Touch	/	19.06	19.5	0.602	0.67	-0.02
1880	9400	RMC	Left Tilt	/	19.06	19.5	0.488	0.54	0.01
1880	9400	RMC	Right Touch	/	19.06	19.5	1.100	1.22	0.03
1880	9400	RMC	Right Tilt	/	19.06	19.5	0.688	0.76	0.07
1907.6	9538	RMC	Right Touch	/	19.17	19.5	1.050	1.13	-0.05
1852.4	9262	RMC	Right Touch	/	18.79	19.5	1.130	1.33	0.08
1852.4	9262	RMC	Right Touch	**5** / B2	18.79	19.5	1.140	**1.34**	0.06

Table 13.6: SAR Values (WCDMA Band 2 - Body)

Ambient Temperature: 22.4°C Liquid Temperature: 22.0°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
Hotspot / Body-Worn Test Data (10mm)									
1880	9400	RMC	Front	/	23.3	24	0.698	0.82	0.04
1880	9400	RMC	Rear	/	23.3	24	0.991	**1.16**	-0.04
1880	9400	RMC	Left	/	23.3	24	0.286	0.34	0.08
1880	9400	RMC	Right	/	23.3	24	0.102	0.12	0.05
1880	9400	RMC	Top	/	23.3	24	0.359	0.42	0.04
1907.6	9538	RMC	Rear	**6**	23.5	24	**1.020**	1.14	-0.02
1852.4	9262	RMC	Rear	/	23.0	24	0.861	1.08	0.05
1880	9400	RMC	Rear	B2	23.3	24	0.977	1.15	0.03

Table 13.7: SAR Values (WCDMA Band 4 - Head)

Ambient Temperature: 22.9°C Liquid Temperature: 22.4°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
1732.6	1413	RMC	Left Touch	/	17.73	18.5	0.383	0.46	-0.08
1732.6	1413	RMC	Left Tilt	/	17.73	18.5	0.286	0.34	0.12
1732.6	1413	RMC	Right Touch	/	17.73	18.5	0.845	1.01	0.06
1732.6	1413	RMC	Right Tilt	/	17.73	18.5	0.530	0.63	0.12
1752.6	1513	RMC	Right Touch	**7**	18.08	18.5	**0.962**	**1.06**	0.01
1712.4	1312	RMC	Right Touch	/	18.09	18.5	0.889	0.98	0.10
1752.6	1513	RMC	Right Touch	B2	18.08	18.5	0.904	1.00	-0.11

Table 13.8: SAR Values (WCDMA Band 4 - Body)

Ambient Temperature: 22.6°C Liquid Temperature: 22.1°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
Hotspot / Body-Worn Test Data (10mm)									
1732.6	1413	RMC	Front	/	23.3	24	0.543	0.64	0.01
1732.6	1413	RMC	Rear	/	23.3	24	0.715	0.84	-0.02
1732.6	1413	RMC	Left	/	23.3	24	0.405	0.48	0.01
1732.6	1413	RMC	Right	/	23.3	24	0.100	0.12	0.18
1732.6	1413	RMC	Top	/	23.3	24	0.277	0.33	0.04
1752.6	1513	RMC	Rear	**8**	23.4	24	**0.752**	**0.86**	0.03
1712.4	1312	RMC	Rear	/	23.2	24	0.652	0.78	0.02
1752.6	1513	RMC	Rear	B2	23.4	24	0.735	0.84	0.06

Table 13.9: SAR Values (WCDMA Band 5 - Head)

Ambient Temperature: 22.8°C Liquid Temperature: 22.2°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
836.4	4182	RMC	Left Touch	/	23.2	23.5	0.182	0.20	0.05
836.4	4182	RMC	Left Tilt	/	23.2	23.5	0.091	0.10	0.07
836.4	4182	RMC	Right Touch	**9**	23.2	23.5	**0.213**	**0.23**	0.05
836.4	4182	RMC	Right Tilt	/	23.2	23.5	0.125	0.13	0.04
836.4	4182	RMC	Right Touch	B2	23.2	23.5	0.208	0.22	0.02

Table 13.10: SAR Values (WCDMA Band 5 -Body)

Ambient Temperature: 22.8°C Liquid Temperature: 22.2°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
Hotspot / Body-Worn Test Data (10mm)									
836.4	4182	RMC	Front	/	23.2	23.5	0.188	0.20	0.01
836.4	4182	RMC	Rear	**10**	23.2	23.5	**0.380**	**0.41**	0.02
836.4	4182	RMC	Left	/	23.2	23.5	0.285	0.31	0.09
836.4	4182	RMC	Right	/	23.2	23.5	0.313	0.34	0.05
836.4	4182	RMC	Bottom	/	23.2	23.5	0.055	0.06	0.12
836.4	4182	RMC	Rear	B2	23.2	23.5	0.369	0.40	0.08

Table 13.11: SAR Values (LTE Band 2 - Head)

Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
1860	18700	1RB_99	Left Touch	/	18.12	18.5	0.447	0.49	0.03
1900	19100	50RB_50	Left Touch	/	16.65	17.5	0.358	0.44	0.05
1860	18700	1RB_99	Left Tilt	/	18.12	18.5	0.325	0.35	0.80
1900	19100	50RB_50	Left Tilt	/	16.65	17.5	0.259	0.31	0.07
1860	18700	1RB_99	Right Touch	/	18.12	18.5	0.792	0.86	0.01
1900	19100	50RB_50	Right Touch	/	16.65	17.5	0.619	0.75	0.06
1860	18700	1RB_99	Right Tilt	/	18.12	18.5	0.544	0.59	0.05
1900	19100	50RB_50	Right Tilt	/	16.65	17.5	0.429	0.52	0.04
1900	19100	1RB_99	Right Touch	**11**	18.05	18.5	**0.858**	**0.95**	0.17
1880	18900	1RB_99	Right Touch	/	18.00	18.5	0.798	0.90	0.14
1900	19100	100RB	Right Touch	/	16.44	17.5	0.656	0.84	0.08
1900	19100	1RB_99	Right Touch	B2	18.05	18.5	0.764	0.85	-0.17

Table 13.12: SAR Values (LTE Band 2 - Body)

Ambient Temperature: 22.8°C Liquid Temperature: 22.2°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
Hotspot / Body-Worn Test Data (10mm)									
1880	18900	1RB_99	Front	/	23.15	24	0.582	0.71	-0.01
1900	19100	50RB_50	Front	/	22.12	23	0.494	0.60	-0.07
1880	18900	1RB_99	Rear	/	23.15	24	0.983	1.20	0.05
1900	19100	50RB_50	Rear	/	22.12	23	0.840	1.03	-0.08
1880	18900	1RB_99	Left	/	23.15	24	0.647	0.79	0.10
1900	19100	50RB_50	Left	/	22.12	23	0.557	0.68	0.12
1880	18900	1RB_99	Right	/	23.15	24	0.092	0.11	0.03
1900	19100	50RB_50	Right	/	22.12	23	0.076	0.09	-0.04
1880	18900	1RB_99	Top	/	23.15	24	0.342	0.42	0.05
1900	19100	50RB_50	Top	/	22.12	23	0.285	0.35	0.03
1900	19100	1RB_99	Rear	**12**	23.10	24	**0.998**	**1.23**	0.05
1860	18700	1RB_99	Rear	/	22.77	24	0.918	1.22	0.02
1880	18900	50RB_50	Rear	/	22.04	23	0.806	1.01	0.04
1860	18700	50RB_50	Rear	/	21.86	23	0.779	1.01	-0.03
1900	19100	100RB	Rear	/	22.01	23	0.863	1.08	0.02
1900	19100	1RB_99	Rear	B2	23.10	24	0.913	1.12	0.04
1900	19100	1RB_99	Rear	H1	23.10	24	0.976	1.20	0.06
1900	19100	1RB_99	Rear	H2	23.10	24	0.985	1.21	0.08

Table 13.13: SAR Values (LTE Band 4 - Head)

Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
1745	20300	1RB_99	Left Touch	/	17.64	18	0.587	0.64	0.00
1745	20300	50RB_50	Left Touch	/	16.17	17	0.434	0.53	0.04
1745	20300	1RB_99	Left Tilt	/	17.64	18	0.418	0.45	0.04
1745	20300	50RB_50	Left Tilt	/	16.17	17	0.302	0.37	0.06
1745	20300	1RB_99	Right Touch	**13**	17.64	18	**0.957**	**1.04**	0.12
1745	20300	50RB_50	Right Touch	/	16.17	17	0.703	0.85	0.02
1745	20300	1RB_99	Right Tilt	/	17.64	18	0.690	0.75	0.13
1745	20300	50RB_50	Right Tilt	/	16.17	17	0.516	0.62	0.03
1732.5	20175	1RB_0	Right Touch	/	17.03	18	0.805	1.01	0.01
1720	20050	1RB_99	Right Touch	/	16.94	18	0.799	1.02	0.10
1732.5	20175	50RB_0	Right Tilt	/	15.84	17	0.569	0.74	0.03
1720	20050	50RB_50	Right Tilt	/	15.64	17	0.636	0.87	0.09
1745	20300	100RB	Right Touch	/	16.11	17	0.811	1.00	0.12
1745	20300	1RB_99	Right Touch	B2	17.64	18	0.894	0.97	0.12

Table 13.14: SAR Values (LTE Band 4 - Body)

Ambient Temperature: 22.8°C Liquid Temperature: 22.2°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
Hotspot / Body-Worn Test Data (10mm)									
1745	20300	1RB_99	Front	/	23.09	24	0.472	0.58	-0.05
1745	20300	50RB_25	Front	/	22.30	23	0.386	0.45	0.00
1745	20300	1RB_99	Rear	**14**	23.09	24	**0.724**	**0.89**	0.02
1745	20300	50RB_25	Rear	/	22.30	23	0.608	0.71	0.09
1745	20300	1RB_99	Left	/	23.09	24	0.472	0.58	0.09
1745	20300	50RB_25	Left	/	22.30	23	0.370	0.43	0.06
1745	20300	1RB_99	Right	/	23.09	24	0.103	0.13	0.08
1745	20300	50RB_25	Right	/	22.30	23	0.079	0.09	-0.10
1745	20300	1RB_99	Top	/	23.09	24	0.317	0.39	0.08
1745	20300	50RB_25	Top	/	22.30	23	0.248	0.29	0.11
1732.5	20175	1RB_0	Rear	/	22.98	24	0.649	0.82	0.06
1720	20050	1RB_99	Rear	/	22.95	24	0.674	0.86	0.07
1745	20300	100RB	Rear	/	22.19	23	0.586	0.71	0.05
1745	20300	1RB_99	Rear	B2	23.09	24	0.691	0.85	0.03

Table 13.15: SAR Values (LTE Band 7 - Head)

Ambient Temperature: 22.5°C Liquid Temperature: 22.0°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
2560	21350	1RB_99	Left Touch	/	23.00	24	0.151	0.19	0.09
2560	21350	50RB_50	Left Touch	/	22.03	23	0.114	0.14	0.04
2560	21350	1RB_99	Left Tilt	/	23.00	24	0.211	0.27	0.05
2560	21350	50RB_50	Left Tilt	/	22.03	23	0.168	0.21	0.06
2560	21350	1RB_99	Right Touch	/	23.00	24	0.249	0.31	-0.03
2560	21350	50RB_50	Right Touch	/	22.03	23	0.189	0.24	0.06
2560	21350	1RB_99	Right Tilt	/	23.00	24	0.156	0.20	0.08
2560	21350	50RB_50	Right Tilt	/	22.03	23	0.122	0.15	0.07
2560	21350	1RB_99	Right Touch	**15**/B2	23.00	24	**0.256**	**0.32**	0.10

Table 13.16: SAR Values (LTE Band 7 - Body)

Ambient Temperature: 22.8°C Liquid Temperature: 22.2°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
Hotspot / Body-Worn Test Data (10mm)									
2560	21350	1RB_99	Front	/	23.00	24	0.433	0.55	0.08
2560	21350	50RB_50	Front	/	22.03	23	0.343	0.43	0.10
2560	21350	1RB_99	Rear	/	23.00	24	0.478	0.60	0.14
2560	21350	50RB_50	Rear	/	22.03	23	0.400	0.50	0.01
2560	21350	1RB_99	Left	/	23.00	24	0.189	0.24	-0.01
2560	21350	50RB_50	Left	/	22.03	23	0.151	0.19	0.07
2560	21350	1RB_99	Right	/	23.00	24	0.240	0.30	0.07
2560	21350	50RB_50	Right	/	22.03	23	0.192	0.24	0.02
2560	21350	1RB_99	Bottom	/	23.00	24	0.311	0.39	0.07
2560	21350	50RB_50	Bottom	/	22.03	23	0.246	0.31	-0.02
2560	21350	1RB_99	Rear	**16**/B2	23.00	24	**0.498**	**0.63**	0.14

13.3. 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.

Table 13.17: SAR Values (WLAN 2.4G - Head)

Ambient Temperature: 22.6°C Liquid Temperature: 22.0°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
2462	11	802.11 b	Left Touch	/	12.05	13	0.190	0.24	0.07
2462	11	802.11 b	Left Tilt	/	12.05	13	0.119	0.15	0.01
2462	11	802.11 b	Right Touch	/	12.05	13	0.084	0.11	0.04
2462	11	802.11 b	Right Tilt	/	12.05	13	0.079	0.10	0.12
2462	11	802.11 b	Left Touch	**17**/B2	12.05	13	**0.223**	**0.28**	-0.12

Note1: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

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

Table 13.18: SAR Values (WLAN - Head) – 802.11b (Scaled Reported SAR)

Frequency		Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.					
2462	11	Left Touch	100%	100%	0.28	**0.28**

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

Table 13.19: SAR Values (WLAN 2.4G - Body)

Ambient Temperature: 22.6°C Liquid Temperature: 22.0°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.								
Test Data (10mm)									
2462	11	802.11 b	Front	/	12.05	13	0.040	0.05	-0.05
2462	11	802.11 b	Rear	**18**	12.05	13	**0.108**	**0.13**	-0.07
2462	11	802.11 b	Left	/	12.05	13	0.009	0.01	-0.06
2462	11	802.11 b	Right	/	12.05	13	0.062	0.08	0.07
2462	11	802.11 b	Top	/	12.05	13	0.037	0.05	0.03
2462	11	802.11 b	Rear	B2	12.05	13	0.101	0.13	0.11

Note1: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

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

Table 13.20: SAR Values (WLAN - Body) – 802.11b (Scaled Reported SAR)

Ambient Temperature: 22.6°C Liquid Temperature: 22.0°C						
Frequency		Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.					
2462	11	Rear	100%	100%	0.13	**0.13**

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

13.4. Product specific 10g SAR

Table 13.21: SAR Values (LTE Band 2 - Body)

Ambient Temperature: 22.8°C Liquid Temperature: 22.2°C									
Frequency		Test Mode	Test Position	Figure No. / Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift(dB)
MHz	Ch.								
Test Data (0mm)									
1900	19100	1RB_99	Rear	/	23.10	24	**2.91**	**3.58**	0.03

14. SAR Measurement Variability

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

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

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

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

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

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

Table 14.1: SAR Measurement Variability for Head – GSM1900

Frequency		Test Position	Original	1st Repeated	Ratio	2nd Repeated
MHz	Ch.		SAR (W/kg)	SAR (W/kg)		SAR (W/kg)
1880	9400	Right Touch	0.981	0.975	1.01	/

Table 14.2: SAR Measurement Variability for Head – WCDMA Band 2

Frequency		Test Position	Original	1st Repeated	Ratio	2nd Repeated
MHz	Ch.		SAR (W/kg)	SAR (W/kg)		SAR (W/kg)
1852.4	9262	Right Touch	1.14	1.06	1.08	/

Table 14.3: SAR Measurement Variability for Body – WCDMA Band 2

Frequency		Test Position	Original	1st Repeated	Ratio	2nd Repeated
MHz	Ch.		SAR (W/kg)	SAR (W/kg)		SAR (W/kg)
1907.6	9538	Rear	1.02	1.00	1.02	/

Table 14.4: SAR Measurement Variability for Head –WCDMA Band 4

Frequency		Test Position	Original	1st Repeated	Ratio	2nd Repeated
MHz	Ch.		SAR (W/kg)	SAR (W/kg)		SAR (W/kg)
1752.6	1513	Right Touch	0.962	0.954	1.01	/

Table 14.5: SAR Measurement Variability for Head – LTE Band 2

Frequency		Test Position	Original	1st Repeated	Ratio	2nd Repeated
MHz	Ch.		SAR (W/kg)	SAR (W/kg)		SAR (W/kg)
1900	19100	Right Touch	0.858	0.842	1.02	/

Table 14.6: SAR Measurement Variability for Body – LTE Band 2

Frequency		Test Position	Original	1st Repeated	Ratio	2nd Repeated
MHz	Ch.		SAR (W/kg)	SAR (W/kg)		SAR (W/kg)
1900	19100	Rear	0.998	0.987	1.01	/

Table 14.7: SAR Measurement Variability for Head – LTE Band 4

Frequency		Test Position	Original	1st Repeated	Ratio	2nd Repeated
MHz	Ch.		SAR (W/kg)	SAR (W/kg)		SAR (W/kg)
1745	20300	Right Touch	0.957	0.939	1.02	/

15. Measurement Uncertainty

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

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	12	N	2	1	1	6.0	6.0	∞
2	Axial isotropy	B	4.7	R	$\sqrt{3}$	√0.5	√0.5	4.3	4.3	∞
3	Hemispherical isotropy	B	9.6	R	$\sqrt{3}$	1	1	4.8	4.8	∞
4	Boundary effect	B	1.1	R	$\sqrt{3}$	1	1	0.6	0.6	∞
5	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
6	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
7	Modulation response	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
8	Readout electronics	B	1.0	N	1	1	1	1.0	1.0	∞
9	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
10	Integration time	B	1.7	R	$\sqrt{3}$	1	1	1.0	1.0	∞
11	RF ambient conditions-noise	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
12	RF ambient conditions-reflection	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Probe positioned mech. restrictions	B	0.35	R	$\sqrt{3}$	1	1	0.2	0.2	∞
14	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
15	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test sample related										
16	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	5
17	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
18	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
19	Phantom uncertainty	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
20	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
21	Liquid conductivity (meas.)	A	1.3	N	1	0.64	0.43	0.83	0.56	9
22	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
23	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	0.96	0.78	9
Combined standard uncertainty			$u_c^{'} = \sqrt{\sum_{i=1}^{23} c_i^2 u_i^2}$					11.3	11.2	95.5
Expanded uncertainty (Confidence interval of 95 %)			$u_e = 2u_c$					22.6	22.4	