Certificate #3682.01

TEST REPORT

No. I18D00233-SAR01

For

Client: **Shanghai Sunmi Technology Co.,Ltd.**

Production: **Wireless data POS System**

Model Name: **T5921**

Brand Name: **SUNMI**

FCC ID: **2AH25T5921**

Hardware Version: **QP1665_MB_PCB_V1**

Software Version: **zqp1665_V002_181121**

Issued date: **2019-1-24**

NOTE

1. The test results in this test report relate only to the devices specified in this report.
2. This report shall not be reproduced except in full without the written approval of East China Institute of Telecommunications.
3. KDB has not been approved by A2LA.
4. For the test results, the uncertainty of measurement is not taken into account when judging the compliance with specification, and the results of measurement or the average value of measurement results are taken as the criterion of the compliance with specification directly.

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Revision Version

Report Number	Revision	Date	Memo
I18D00233-SAR01	00	2019-1-17	Initial creation of test report
I18D00233-SAR01	01	2019-1-24	Second creation of test report

CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name	East China Institute of Telecommunications
Address	7-8/F., Area G, No.666, Beijing East Road, Shanghai, China
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1.2. Testing Environment

Normal Temperature	18℃-25℃
Relative Humidity	25%-75%

1.3. Project Data

Project Leader	Yu Anlu
Testing Start Date	2019-1-4
Testing End Date	2019-1-12

1.4. Signature

Yan Hang
(Prepared this test report)

Fu Erliang
(Reviewed this test report)

Zheng Zhongbin
(Approved this test report)

2. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **T5921** are as fol lows

Table 2.1: Max. Reported SAR (10g)

Band	SAR 1g(W/Kg)	SAR 1g(W/Kg)	SAR 10g(W/Kg)
	Body worn(5mm)	Body worn (19mm)	Body worn (0mm)
GSM 850	1.020	0.439	1.216
GSM 1900	1.016	1.359	1.529
WCDMA Band2	0.745	0.778	0.643
WCDMA Band4	0.599	0.570	0.642
WCDMA Band5	0.722	--	0.857
CDMA BC0	1.035	0.538	1.073
CDMA BC1	1.073	0.838	1.127
LTE Band2	1.218	0.023	1.215
LTE Band4	0.810	0.036	0.775
LTE Band7	0.456	0.397	0.375
LTE Band17	0.183	0.102	0.517
2.4G WiFi	0.170	--	0.122
5G WiFi	0.023	--	0.033

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, 4.0 W/Kg as averaged over any 10g tissue according to the ANSI C95.1-1999.

For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

Note: Original 5G test results are obtained from the **Shenzhen BALUN Technology Co.,Ltd** Report and report No. is **BL-SZ18C0348-701**

Table 2.2: Simultaneous SAR

Simultaneous multi-band transmission									
Test Position		2G	3G	4G	2.4GHz		5GHz	SUM	
					BT	WiFi	WiFi	2.4GHz	5GHz
0mm(10g)	Phantom Side	1.216	0.857	0.233	0.067	0.122	0.026	1.338	1.283
	Ground Side	1.529	1.127	1.215	0.067	0.083	0.033	1.612	1.596
5mm(1g)	Phantom Side	1.020	0.346	0.240	0.167	0.119	0.023	1.187	1.187
	Ground Side	1.016	1.073	1.218	0.167	0.170	0.01	1.388	1.385
19mm(1g)	Ground Side	1.359	0.838	0.397	0.044	--	--	1.403	1.403

According to the above table, the maximum sum of reported SAR values for GSM/WCDMA/LTE/CDMA and BT/WiFi is **1.403 W/kg** (1g). GSM/WCDMA/LTE/CDMA and BT/WiFi is **1.612 W/kg** (10g)

3. Client Information

3.1. Applicant Information

Company Name	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Telephone	18721763396
Postcode	200433

3.2. Manufacturer Information

Company Name	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Telephone	18721763396
Postcode	200433

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

4.1. About EUT

Description:	Wireless data POS System
Model name:	T5921
Operation Model(s):	GSM850/GSM900/GSM1800/GSM1900 WCDMA Band I/Band II/Band IV/Band V LTE 2/4/7/17/28;CDMA BC0/BC1 BT4.2,BLE;WiFi 802.11a,b,g,n
Tx Frequency:	824.2-848.8MHz(GSM850) 1850.2-1909.8MHz（GSM1900） 1852.4-1907.6 MHz (WCDMA Band II) 1712.4-1752.6 MHz (WCDMA Band IV) 826.4-846.6MHz (WCDMA Band V) 1850.7 -1909.3 MHz (LTE Band 2) 1710.7 -1754.3 MHz (LTE Band 4) 2502.5 – 2567.5 MHz (LTE Band 7) 706.5 -713.5 MHz (LTE Band 17) 824.7-848.31MHz(CDMA BC0) 1851.25-1908.75MHz(CDMA BC1) 2412- 2462 MHz (WiFi) 5150~5250 MHz(U-NII-1) 5745~5825 MHz(U-NII-3) 2402 – 2480 MHz (BT)
Test device Production information: GPRS/EGPRS Class Mode: GPRS/ EGPRS Multislot Class:	Production unit B 12
Device type:	Portable device
Antenna type:	Inner antenna
Accessories/Body-worn configurations:	N/A
Hotspot Mode:	Not Support
The device employs proximity sensors that detect the presence of the user's body at the back faces of the device. when back body worn condition is detected, GSM850/1900;WCDMA Band II/IV;LTE Band 2/4/7/17;CDMA BC0/BC1 reduced power will be active.	

4.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N06	--	QP1665_MB_PCB_V1	zqp1665_V002_181121	2018-12-11

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

4.3. Internal Identification of AE used during the test

AE ID*	Description	Type	Manufacturer
--	--	--	--

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

5. Reference Documents

5.1. Documents supplied by applicant

All technical documents are supplied by the client or manufacturer, which is the basis of testing.

5.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
ANSI C95.1	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.	**1999**
IEEE 1528	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.	**2013**
KDB648474	Handset SAR	**D04 v01r03**
KDB248227	802 11 WiFi SAR	**D01 v02r02**
KDB447498	General RF Exposure Guidance	**D01 v06**
KDB865664	SAR Measurement 100 MHz to 6 GHz	**D01 v01r04**
KDB865664	RF Exposure Reporting	**D02 v01r02**
KDB941225	3G SAR Procedures	**D01 v03r01**
KDB 941225	SAR for LTE Devices	**D05 v02r04**
KDB 648474	Wireless Chargers Battery Cover	**D03 v01r04**
KDB941225	hotspot SAR	**D06 v02r01**

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 bye xperimental techniques or numerical modeling. The standard recommends limits for two tiers of gr oups, 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 exposu re 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

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

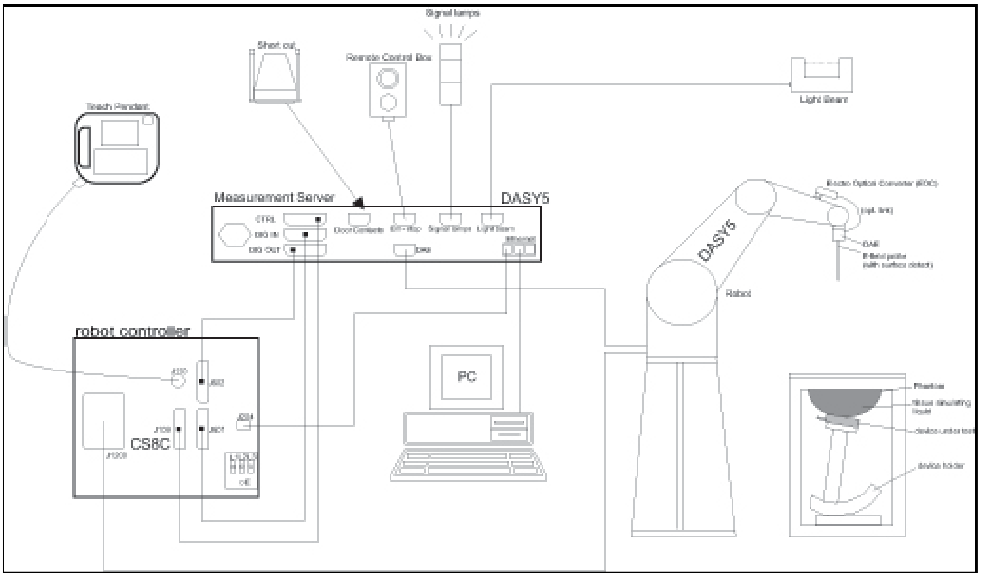
Where: σ is the conductivity of the tissue, ρ is the mass density of tissue and E is the RMS electrical field strength.

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

7. SAR MEASUREMENT SETUP

7.1. Measurement Set-up

The DASY5 system for performing compliance tests is illustrated above graphically. This system consists of the following items:



Picture 7-1 SAR Lab Test Measurement Set-up

- A standard high precision 6-axis robot (Stäubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as
- warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

7.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY5 software reads the reflection durning a software approach and looks for the maximum using 2^{nd} ord curve fitting. The approach is stopped at reaching the maximum.

Probe Specifications:

Model:	**ES3DV3,EX3DV4**
Frequency Range:	**10MHz — 6GHz(EX3DV4)**
	10MHz — 4GHz(ES3DV3)
Calibration:	**In head and body simulating tissue at**
	Frequencies from 835 up to 5800MHz
Linearity:	**± 0.2 dB(30 MHz to 4 GHz) for ES3DV3**
	± 0.2 dB(30 MHz to 6 GHz) for EX3DV4
Dynamic Range:	**10 mW/kg — 100W/kg**
Probe Length:	**330 mm**
Probe Tip Length:	**20 mm**
Body Diameter:	**12 mm**
Tip Diameter:	**2.5 mm (3.9 mm for ES3DV3)**
Tip-Center:	**1 mm (2.0mm for ES3DV4)**
Application:	**SAR Dosimetry Testing**
	Compliance tests of mobile phones
	Dosimetry in strong gradient fields

Picture7-2 Near-field Probe

Picture 7-3 E-field Probe

7.3. E-field Probe Calibration

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm^2) using an RF Signal generator, TEM cell, and RF Power Meter.

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if thefrequency is below 1 GHz and inn a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/ cm^2.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C\frac{\Delta T}{\Delta t}$$

Where:

Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

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

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m^3).

7.4. Other Test Equipment

7.4.1. Data Acquisition Electronics(DAE)

The data acquisition electronics consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock. The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Picture7-4: DAE

7.4.2. Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX90) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchron motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

Picture7-5: DASY 5

7.4.3. Measurement Server

The Measurement server is based on a PC/104 CPU broad with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5: 128MB), RAM (DASY5: 128MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O broad, which is directly connected to the PC/104 bus of the CPU broad.

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

Picture 7-6: Server for DASY 5

7.4.4. Device Holder for Phantom

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

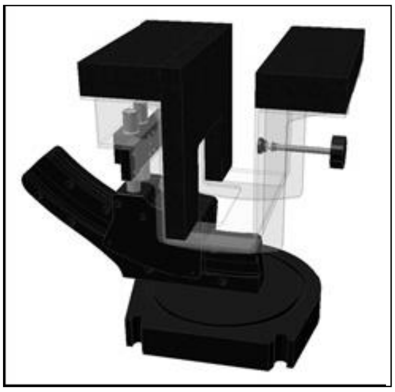
The DASY device holder is constructed of low-loss POM material having the following dielectric parameters:

relative permittivity ε =3 and loss tangent δ =0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin-SAM and ELI phantoms.

Picture7-7: Device Holder



Picture 7-8: Laptop Extension Kit

7.4.5. Phantom

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to

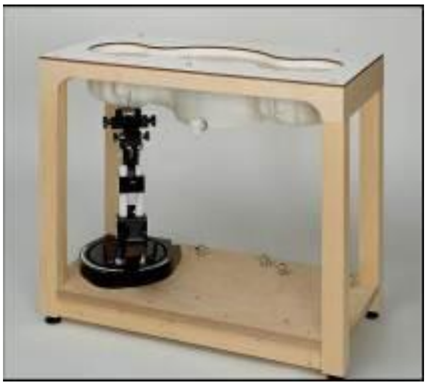
Represent the 90th percentile of the population. The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

Shell Thickness: 2 ± 0. 2 mm

Filling Volume: Approx. 25 liters

Dimensions: 810 x l000 x 500 mm (H x L x W)

Available: Special

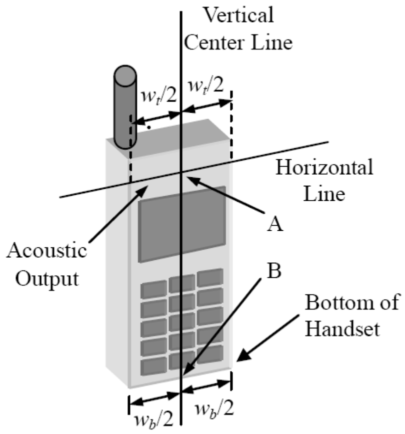


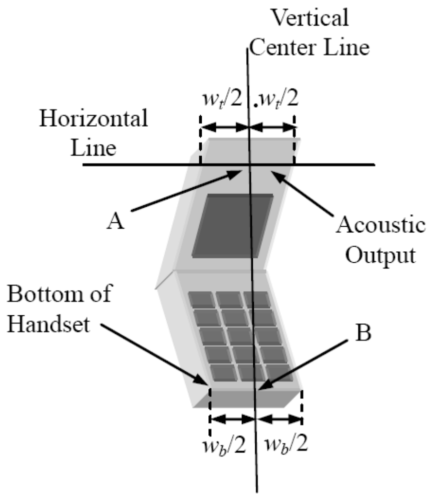
Picture 7-9: SAM Twin Phantom

8. Position of the wireless device in relation to the phantom

8.1. General considerations

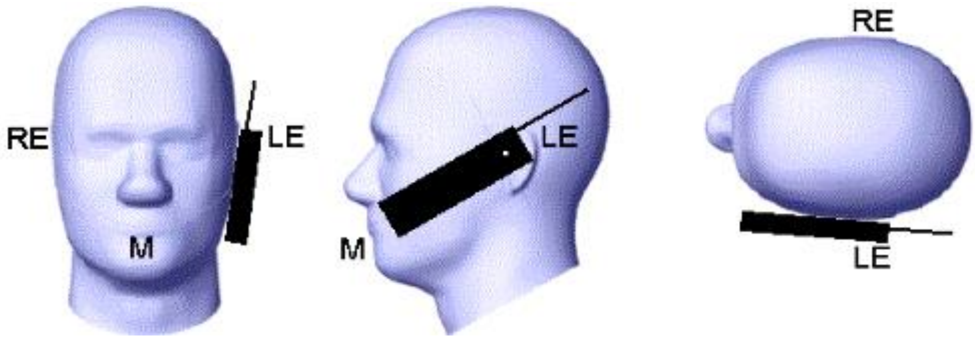
This standard specifies two handset test positions against the head phantom – the “cheek” position and the “tilt” position.



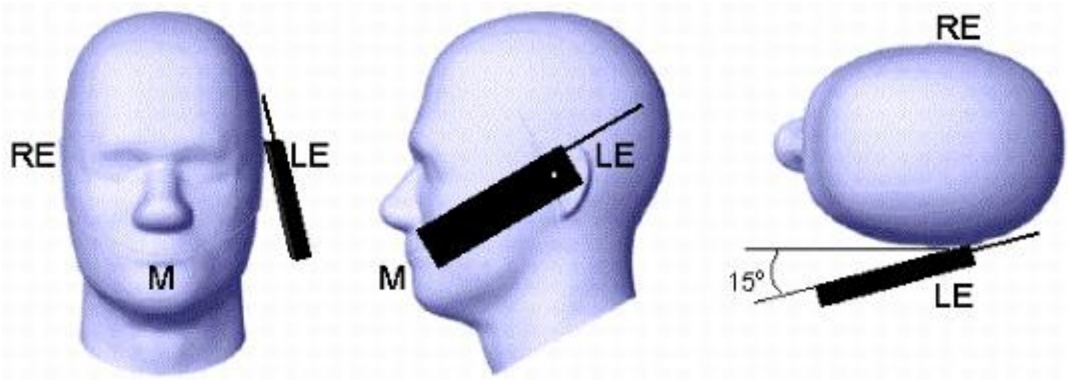


w_t	Width of the handset at the level of the acoustic
w_b	Width of the bottom of the handset
A	Midpoint of the width w_t of the handset at the level of the acoustic output
B	Midpoint of the width w_b of the bottom of the handset

Picture 8-1 Typical “fixed” case handset Picture 8-2 Typical “clam-shell” case handset



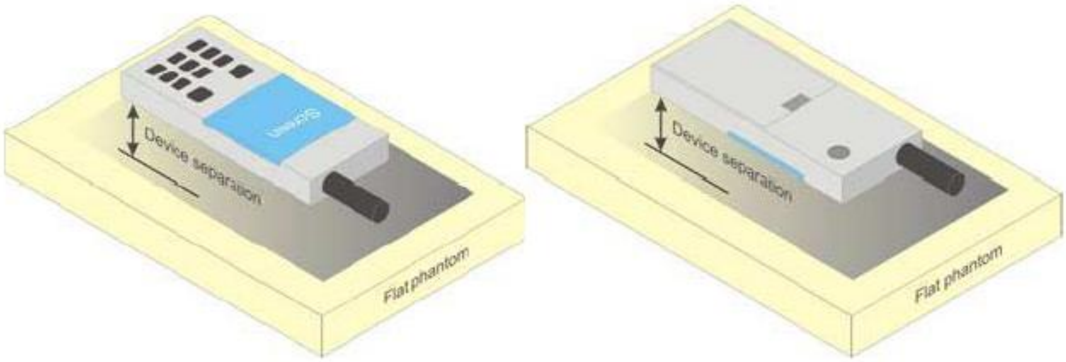
Picture 8-3 Cheek position of the wireless device on the left side of SAM



Picture 8-4 Tilt position of the wireless device on the left side of SAM

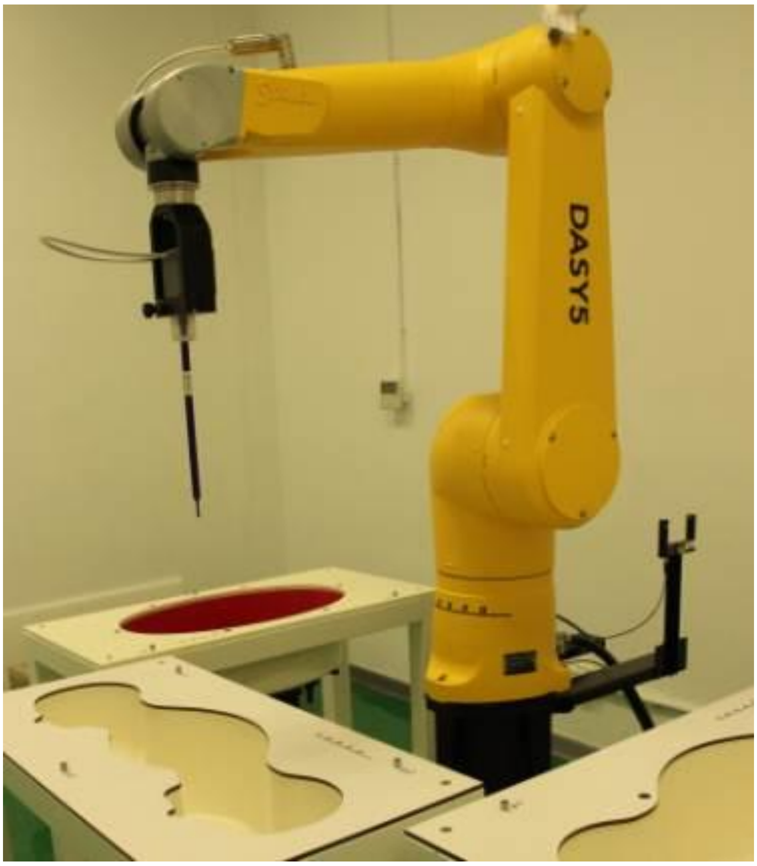
8.2. Body-worn device

A typical example of a body-worn device is a mobile phone, wireless enabled PDA or other battery operated wireless device with the ability to transmit while mounted on a person’s body using a carry accessory approved by the wireless device manufacturer.



Picture 8-5 Test positions for body-worn devices

8.3. DUT Setup Photos



Picture 8-7: Specific Absorption Rate Test Layout

9. Tissue Simulating Liquids

9.1. Equivalent Tissues

The liquid used for the frequency range of 800-3000 MHz consisted of water, sugar, salt, preventol, glycol monobutyl and Cellulose. The liquid has been previously proven to be suited for worst-case. The Table 9.1 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528 and IEC 62209.

Table 9.1. Composition of the Head Tissue Equivalent Matter

Frequency (MHz)	835 Head	835 Body	1900 Head	1900 Body	2450 Head	2450 Body
Ingredients (% by weight)						
Water	41.45	52.5	55.242	69.91	58.79	72.60
Sugar	56.0	45.0	\	\	\	\
Salt	1.45	1.4	0.306	0.13	0.06	0.18
Preventol	0.1	0.1	\	\	\	\
Cellulose	1.0	1.0	\	\	\	\
Glycol Monobutyl	\	\	44.452	29.96	41.15	27.22
Dielectric Parameters Target Value	ε=41.5 σ=0.90	ε=55.2 σ=0.97	ε=40.0 σ=1.40	ε=53.3 σ=1.52	ε=39.2 σ=1.80	ε=52.7 σ=1.95

Table 9.2: 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
835	Body	0.97	0.92～1.02	55.2	52.4～58.0
1800	Head	1.40	1.33～1.47	40.0	38.0～42.0
1800	Body	1.52	1.44～1.60	53.3	50.6～56.0
1900	Head	1.40	1.33～1.47	40.0	38.0～42.0
1900	Body	1.52	1.44～1.60	53.3	50.6～56.0
2450	Head	1.80	1.71～1.89	39.2	37.2～41.2
2450	Body	1.95	1.85～2.05	52.7	50.1～55.3
2600	Head	1.96	1.86~2.06	39.0	37.1~40.9
2600	Body	2.16	2.05~2.27	52.5	59.9~55.1
5200	Head	4.66	4.43~4.89	36.0	34.2~37.8
5200	Body	5.30	5.04~5.57	49.0	46.6~51.5
5800	Head	5.27	5.01~5.53	35.3	33.5~37.1

5800	Body	6.00	5.70~6.30	48.2	45.8~50.6

9.2. Dielectric Performance

Table 9.3: Dielectric Performance of Head Tissue Simulating Liquid

Measurement Value						
Liquid Temperature: 22.5 ℃						
Type	**Frequency**	**Permittivity ε**	**Drift (%)**	**Conductivity σ**	**Drift (%)**	Test Date
Body	750 MHz	57.721	4.00%	0.916	-4.58%	2019/1/11
Body	835 MHz	56.731	2.77%	0.998	2.89%	2019/1/10
Body	1800 MHz	55.227	3.62%	1.479	-2.70%	2019/1/4
Body	1900 MHz	52.078	-2.29%	1.556	2.37%	2019/1/9
Body	2450 MHz	50.131	-4.87%	1.922	-1.44%	2019/1/12
Body	2600MHz	54.370	3.56%	2.112	-2.22%	2019/1/5

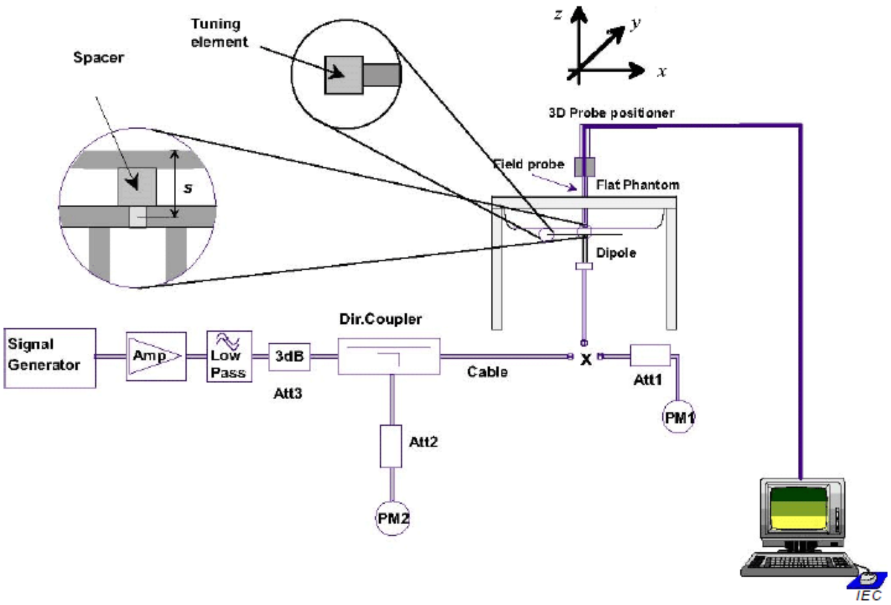
10. System Validation

10.1. System Validation

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performace check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

10.2. System Setup

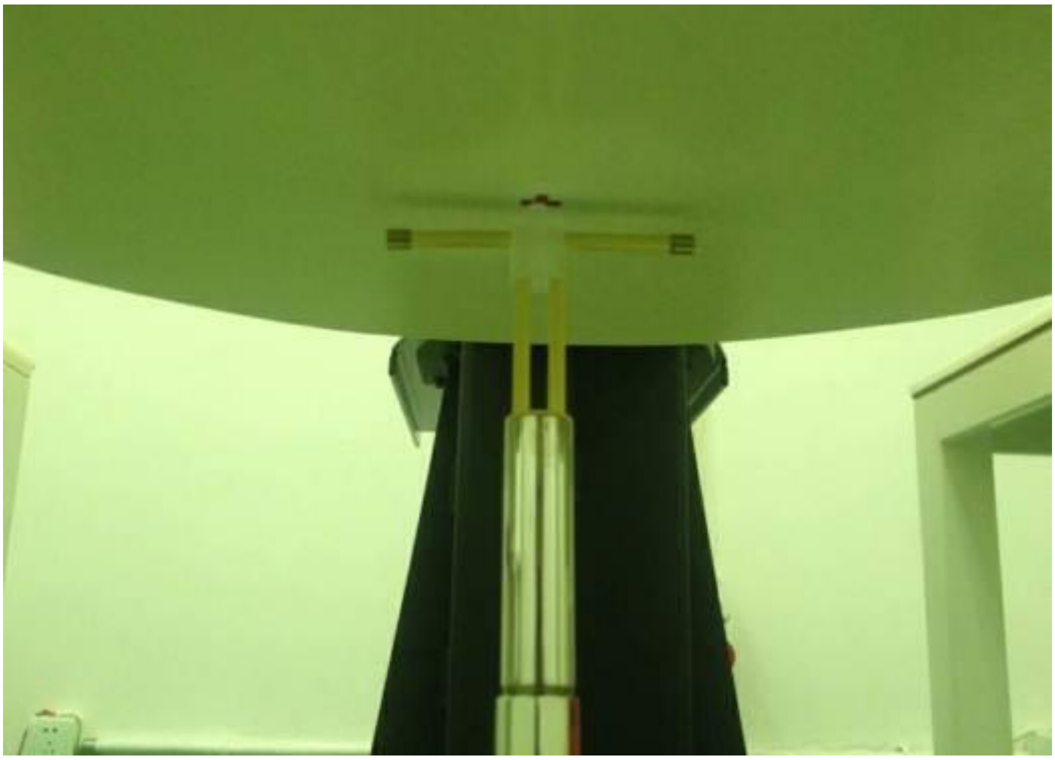
In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. 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 10-1 System Setup for System Evaluation

The output power on dipole port must be calibrated to 24 dBm (250mW) before dipole is connected.

The results are normalized to 1 W input power.



Picture 10-2 Photo of Dipole Setup

Table 10.1: System Verification of Body

Verification Results							
Input power level: 1W							
Frequency	**Target value (W/kg)**		**Measured value (W/kg)**		**Deviation**		**Test date**
	10 g Average	**1 g Average**	**10 g Average**	**1 g Average**	**10 g Average**	**1 g Average**	
750 MHz	5.7	8.55	5.56	8.24	-2.46%	-3.63%	2019/1/11
835 MHz	6.4	9.75	6.64	9.92	3.75%	1.74%	2019/1/10
1750 MHz	19.9	37.4	20.56	38.52	3.32%	2.99%	2019/1/4
1900 MHz	21.2	40.4	21.36	40	0.75%	-0.99%	2019/1/9
2450 MHz	23.5	50.5	23.76	51.6	1.11%	2.18%	2019/1/12
2600 MHz	24.1	54.3	24.8	56.8	2.90%	4.60%	2019/1/5

11. Measurement Procedures

11.1. Tests to be performed

According to the SAR test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement

(b) Area scan

(c) Zoom scan

(d) Power drift measurement

The SAR measurement procedures for each of test conditions are as follows:

(a) Make EUT to transm it maximum output power

(b) Measure conducted output power through RF cable

(c) Place the EUT in the specific position of phantom as Appendix D demonstrates.

(d) Measure SAR results for Middle channel or the highest power channel on each testing position.

(e) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

(f) Record the SAR value

11.2. 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 mm ± 1 mm</td><td>½·δ·ln(2) mm ± 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·$\Delta z_{Zoom}(n-1)$ mm</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 IEEE Std 1528-2013 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 Publication 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>

11.3. 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	MPR (dB)
1	2/15	15/15	64	2/15	4/15	1.5	0.5
2	12/15	15/15	64	12/15	24/25	2.0	1
3	15/15	8/15	64	15/8	30/15	2.0	1
4	15/15	4/15	64	15/4	30/15	2.0	1

For Release 6 HSUPA 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	2.0	1.0	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	3.0	2.0	15	92
4	2/15	15/15	64	2/15	4/15	4/15	56/75	4	1	2.0	1.0	17	71
5	15/15	15/15	64	15/15	24/15	30/15	134/15	4	1	2.0	1.0	21	81

11.4. Bluetooth & WiFi 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.

11.5. 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 Section 15 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

12. Conducted Output Power

12.1. Manufacturing tolerance

Table 12.1: GPRS (GMSK Modulation)

GSM 850 Full power				
Channel		**128**	**190**	**251**
1 Txslots	Maximum Target Value (dBm)	32.0	32.0	32.0
2 Txslots	Maximum Target Value (dBm)	31	31	31
3 Txslots	Maximum Target Value (dBm)	29	29	29
4 Txslots	Maximum Target Value (dBm)	27.5	27.5	27.5
GSM 1900 Full power				
Channel		**512**	**661**	**810**
1 Txslots	Maximum Target Value (dBm)	28	28	28
2 Txslots	Maximum Target Value (dBm)	25	25	25
3 Txslots	Maximum Target Value (dBm)	22.5	22.5	22.5
4 Txslots	Maximum Target Value (dBm)	22	22	22
GSM 850 power reduce				
Channel		**128**	**190**	**251**
1 Txslots	Maximum Target Value (dBm)	25	25	25
2 Txslots	Maximum Target Value (dBm)	24	24	24
3 Txslots	Maximum Target Value (dBm)	22	22	22
4 Txslots	Maximum Target Value (dBm)	20	20	20
GSM 1900 power reduce				
Channel		**512**	**661**	**810**
1 Txslots	Maximum Target Value (dBm)	21	21	21
2 Txslots	Maximum Target Value (dBm)	18	18	18

3 Txslots	Maximum Target Value (dBm)	15.5	15.5	15.5
4 Txslots	Maximum Target Value (dBm)	15	15	15

Table 12.2: EGPRS (8-PSK Modulation)

GSM 850 Full power				
Channel		**128**	**190**	**251**
1 Txslots	Maximum Target Value (dBm)	27.0	27.0	27.0
2 Txslots	Maximum Target Value (dBm)	26.0	26.0	26.0
3 Txslots	Maximum Target Value (dBm)	24.0	24.0	24.0
4 Txslots	Maximum Target Value (dBm)	22.0	22.0	22.0
GSM 1900 Full power				
Channel		**512**	**661**	**810**
1 Txslots	Maximum Target Value (dBm)	25	25	25
2 Txslots	Maximum Target Value (dBm)	24	24	24
3 Txslots	Maximum Target Value (dBm)	22	22	22
4 Txslots	Maximum Target Value (dBm)	21	21	21
GSM 850 power reduce				
Channel		**128**	**190**	**251**
1 Txslots	Maximum Target Value (dBm)	20	20	20
2 Txslots	Maximum Target Value (dBm)	18	18	18
3 Txslots	Maximum Target Value (dBm)	16.5	16.5	16.5
4 Txslots	Maximum Target Value (dBm)	15	15	15
GSM 1900 power reduce				
Channel		**512**	**661**	**810**
1 Txslots	Maximum Target Value (dBm)	18	18	18
2 Txslots	Maximum Target Value (dBm)	17	17	17

3 Txslots	Maximum Target Value (dBm)	15	15	15
4 Txslots	Maximum Target Value (dBm)	14	14	14

Table 12.3: WCDMA Full power

WCDMA Band II			
Channel	Channel 9262	Channel 9400	Channel 9538
Maximum Target Value (dBm)	23	23	23

WCDMA Band II **HSDPA**				
Channel		9262	9400	9538
1	Maximum Target Value (dBm)	23	23	23
2	Maximum Target Value (dBm)	22	22	22
3	Maximum Target Value (dBm)	22	22	22
4	Maximum Target Value (dBm)	22	22	22
WCDMA Band II **HSUPA**				
Channel		9262	9400	9538
1	Maximum Target Value (dBm)	22	22	22
2	Maximum Target Value (dBm)	22	22	22
3	Maximum Target Value (dBm)	22	22	22
4	Maximum Target Value (dBm)	22	22	22
5	Maximum Target Value (dBm)	22	22	22

Table 12.4: WCDMA Reduce power

WCDMA Band II			
Channel	Channel 9262	Channel 9400	Channel 9538
Maximum Target Value (dBm)	17	17	17

WCDMA Band II **HSDPA**			
Channel	9262	9400	9538

1	Maximum Target Value (dBm)	17	17	17
2	Maximum Target Value (dBm)	16	16	16
3	Maximum Target Value (dBm)	16	16	16
4	Maximum Target Value (dBm)	16	16	16
WCDMA Band II **HSUPA**				
Channel		9262	9400	9538
1	Maximum Target Value (dBm)	16	16	16
2	Maximum Target Value (dBm)	16	16	16
3	Maximum Target Value (dBm)	16	16	16
4	Maximum Target Value (dBm)	16	16	16
5	Maximum Target Value (dBm)	16	16	16

Table 12.5: WCDMA Full power

WCDMA Band IV			
Channel	1312	1413	1513
Maximum Target Value (dBm)	23	23	23

WCDMA Band IV **HSDPA**				
Channel		1312	1413	1513
1	Maximum Target Value (dBm)	23	23	23
2	Maximum Target Value (dBm)	22.5	22.5	22.5
3	Maximum Target Value (dBm)	22	22	22
4	Maximum Target Value (dBm)	22	22	22
WCDMA Band IV **HSUPA**				
Channel		1312	1413	1513
1	Maximum Target Value (dBm)	22	22	22
2	Maximum Target Value (dBm)	22	22	22
3	Maximum Target Value (dBm)	22	22	22
4	Maximum Target Value (dBm)	22	22	22
5	Maximum Target Value (dBm)	22	22	22

Table 12.6: WCDMA Reduce power

WCDMA Band IV			
Channel	1312	1413	1513
Maximum Target Value (dBm)	17	17	17

WCDMA Band IV **HSDPA**				
Channel		1312	1413	1513
1	Maximum Target Value (dBm)	16	16	16

2	Maximum Target Value (dBm)	16	16	16
3	Maximum Target Value (dBm)	16	16	16
4	Maximum Target Value (dBm)	16	16	16
WCDMA Band IV **HSUPA**				
Channel		1312	1413	1513
1	Maximum Target Value (dBm)	16	16	16
2	Maximum Target Value (dBm)	16	16	16
3	Maximum Target Value (dBm)	16	16	16
4	Maximum Target Value (dBm)	16	16	16
5	Maximum Target Value (dBm)	16	16	16

Table 12.7: WCDMA Full power

WCDMA Band V			
Channel	4132	4183	4233
Maximum Target Value (dBm)	24	24	24

WCDMA Band V **HSDPA**				
Channel		4132	4183	4233
1	Maximum Target Value (dBm)	23	23	23
2	Maximum Target Value (dBm)	23	23	23
3	Maximum Target Value (dBm)	23	23	23
4	Maximum Target Value (dBm)	23	23	23
WCDMA Band V **HSUPA**				
Channel		4132	4183	4233
1	Maximum Target Value (dBm)	23	23	23
2	Maximum Target Value (dBm)	23	23	23
3	Maximum Target Value (dBm)	23	23	23

4	Maximum Target Value (dBm)	23	23	23
5	Maximum Target Value (dBm)	23	23	23

Table 12.8: LTE Full power

LTE Band2			
RB Size	1	50%	100%
Maximum Target Value (dBm)	21.5	21	20
LTE Band4			
RB Size	1	50%	100%
Maximum Target Value (dBm)	22	22	21
LTE Band7			
RB Size	1	50%	100%
Maximum Target Value (dBm)	22	20.5	20.5
LTE Band17			
RB Size	1	50%	100%
Maximum Target Value (dBm)	22	21	20.5

Table 12.9: LTE Reduce power

LTE Band2			
RB Size	1	50%	100%
Maximum Target Value (dBm)	12	12	11
LTE Band4			
RB Size	1	50%	100%
Maximum Target Value (dBm)	15	15	14
LTE Band7			
RB Size	1	50%	100%
Maximum Target Value (dBm)	16	15	15
LTE Band17			
RB Size	1	50%	100%
Maximum Target Value (dBm)	19	18	17.5

Table 12.10: WiFi

WiFi 802.11b 2.4G			
Channel	Channel 1	Channel 6	Channel 11
Maximum Target Value (dBm)	20.6	20.6	20.6
WiFi 802.11g 2.4G			
Channel	Channel 1	Channel 6	Channel 11
Maximum Target Value (dBm)	20	20	20
WiFi 802.11n 20M 2.4G			
Channel	Channel 1	Channel 6	Channel 11
Maximum Target Value (dBm)	17	17	17
WiFi 802.11n 40M 2.4G			
Channel	Channel 3	Channel 6	Channel 9
Maximum Target Value (dBm)	16	16	18

Table 12.11: Bluetooth

Bluetooth			
Channel	Channel 0	Channel 39	Channel 78
Maximum Target Value (dBm)	6.0	6.0	6.0

Table 12.12: BLE

Bluetooth			
Channel	Channel 0	Channel 19	Channel 39
Maximum Target Value (dBm)	-2	-2	-3

Table 12.13: CDMA Full power

Band	CDMA2000 BC0			CDMA2000 BC1		
Channel	1013	384	777	25	600	1175
Frequency (MHz)	824.7	836.52	848.31	1851.25	1880.00	1908.75
1xRTT RC1 SO55	24	24	24	22	22	22
1xRTT RC3 SO55	24	24	24	22	22	22
1xRTT RC3 SO32(+ F-SCH)	24	24	24	22	22	22
1xRTT RC3 SO32(+SCH)	24	24	24	22	22	22
1xEVDO RTAP 153.6Kbps	24	24	24	22	22	22
1xEVDO RETAP 4096Bits	24	24	24	22	22	22

Table 12.14: CDMA Reduce power

Band	CDMA2000 BC0			CDMA2000 BC1		
Channel	1013	384	777	25	600	1175
Frequency (MHz)	824.7	836.52	848.31	1851.25	1880.00	1908.75
1xRTT RC1 SO55	18	18	18	16	16	16
1xRTT RC3 SO55	18	18	18	16	16	16
1xRTT RC3 SO32(+ F-SCH)	18	18	18	16	16	16
1xRTT RC3 SO32(+SCH)	18	18	18	16	16	16
1xEVDO RTAP 153.6Kbps	18	18	18	16	16	16
1xEVDO RETAP 4096Bits	18	18	18	16	16	16

12.2. GSM Measurement result

Table 12.15: The conducted power measurement results for GPRS/EGPRS Full power

GSM 850	Measured Power (dBm)			calculation	Averaged Power (dBm)		
GMSK	**128**	**190**	**251**		**128**	**190**	**251**
1 Txslot	31.05	31.24	31.34	-9.03dB	22.02	22.21	22.31
2 Txslots	30.13	30.32	30.42	-6.02dB	24.11	24.3	24.4
3 Txslots	28.05	28.15	28.25	-4.26dB	23.79	23.89	23.99
4 Txslots	26.96	26.93	27.03	-3.01dB	23.95	23.92	24.02
GSM 1900	Measured Power (dBm)			calculation	Averaged Power (dBm)		
GMSK	**512**	**661**	**810**		**512**	**661**	**810**
1 Txslot	27.25	27.14	27.6	-9.03dB	18.22	18.11	18.57
2 Txslots	24.81	24.84	24.92	-6.02dB	18.79	18.82	18.9
3 Txslots	22.04	22.14	22.17	-4.26dB	17.78	17.88	17.91
4 Txslots	21.29	21.34	21.38	-3.01dB	18.28	18.33	18.37

Table 12.16: The conducted power measurement results for GPRS/EGPRS Reduce power

GSM 850	Measured Power (dBm)			calculation	Averaged Power (dBm)		
GMSK	**128**	**190**	**251**		**128**	**190**	**251**
1 Txslot	24.05	24.22	24.35	-9.03dB	15.02	15.19	15.32
2 Txslots	23.13	23.27	23.39	-6.02dB	17.11	17.25	17.37
3 Txslots	20.85	20.96	21.13	-4.26dB	16.59	16.7	16.87
4 Txslots	19.86	19.83	19.93	-3.01dB	16.85	16.82	16.92
GSM 1900	Measured Power (dBm)			calculation	Averaged Power (dBm)		
GMSK	**512**	**661**	**810**		**512**	**661**	**810**
1 Txslot	20.25	20.17	20.49	-9.03dB	11.22	11.14	11.46
2 Txslots	17.61	17.77	17.85	-6.02dB	11.59	11.75	11.83
3 Txslots	14.97	14.94	15.02	-4.26dB	10.71	10.68	10.76
4 Txslots	14.21	14.22	14.24	-3.01dB	11.2	11.21	11.23

Table 12.17: The conducted power measurement results for E-GPRS Full power

GSM 850	Measured Power (dBm)			calculation	Averaged Power (dBm)		
8-PSK	**128**	**190**	**251**		**128**	**190**	**251**
1 Txslot	26.23	26.04	26.15	-9.03dB	17.2	17.01	17.12
2 Txslots	25.02	25.07	25.12	-6.02dB	19	19.05	19.1
3 Txslots	23.01	23.04	23.08	-4.26dB	18.75	18.78	18.82
4 Txslots	21.61	21.71	21.76	-3.01dB	18.6	18.7	18.75
GSM 1900	Measured Power (dBm)			calculation	Averaged Power (dBm)		
8-PSK	**512**	**661**	**810**		**512**	**661**	**810**
1 Txslot	24.15	24.02	24.33	-9.03dB	15.12	14.99	15.3
2 Txslots	23.13	23.11	23.23	-6.02dB	17.11	17.09	17.21
3 Txslots	21.06	21.01	21.13	-4.26dB	16.8	16.75	16.87

4 Txslots	20.21	20.18	20.21	-3.01dB	17.2	17.17	17.2

Table 12.18: The conducted power measurement results for E-GPRS Reduce power

GSM 850 8-PSK	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	128	**190**	**251**		**128**	**190**	**251**
1 Txslot	19.22	19.04	19.11	-9.03dB	10.19	10.01	10.08
2 Txslots	17.95	17.93	17.92	-6.02dB	11.93	11.91	11.9
3 Txslots	15.96	15.99	16.02	-4.26dB	11.7	11.73	11.76
4 Txslots	14.55	14.61	14.63	-3.01dB	11.54	11.6	11.62
GSM 1900 8-PSK	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	512	**661**	**810**		**512**	**661**	**810**
1 Txslot	17.11	17.02	17.13	-9.03dB	8.08	7.99	8.1
2 Txslots	16.05	16.02	16.11	-6.02dB	10.03	10	10.09
3 Txslots	13.99	13.92	14.04	-4.26dB	9.73	9.66	9.78
4 Txslots	13.15	13.02	13.08	-3.01dB	10.14	10.01	10.07

NOTES:

1) Division Factors

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

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

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

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

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

According to the conducted power as above, the body measurements are performed with 2Txslots for 850MHz ; 2Txslots for1900MHz;

12.3. WCDMA Measurement result

Table 12.19: The conducted Power for WCDMA Full power

Item	**band**	**WCDMA BAND II result(dBm)**		
	ARFCN	**9262 (1852.4MHz)**	**9400 (1880.0MHz)**	**9538 (1907.6MHz)**
WCDMA	****	22.97	22.84	22.86
HSDPA	**1**	22.22	22.1	22.14
	2	22.02	21.92	21.9
	3	21.75	21.61	21.65
	4	21.65	21.54	21.55
HSUPA	**1**	21.65	21.51	21.48
	2	21.62	21.52	21.49
	3	21.62	21.57	21.53
	4	21.55	21.34	21.41
	5	21.26	21.17	21.24
Item	**band**	**WCDMA BAND V result(dBm)**		

	ARFCN	Channel 4132 (826.4MHz)	Channel 4183 (836.6MHz)	Channel 4233 (846.6MHz)
WCDMA	\	23.26	23.34	23.28
HSDPA	1	22.54	22.61	22.54
	2	22.32	22.41	22.36
	3	21.99	22.11	22.07
	4	21.91	22.01	21.94
HSUPA	1	21.89	22.01	21.93
	2	21.94	21.95	21.97
	3	21.93	22.09	21.9
	4	21.74	21.79	21.81
	5	21.54	21.69	21.7
Item	band	WCDMA BAND IV result(dBm)		
	ARFCN	Channel 1312 (1712.4MHz)	Channel 1413 (1732.6MHz)	Channel 1513 (1752.6MHz)
WCDMA	\	22.88	22.92	22.96
HSDPA	1	22.16	22.19	22.22
	2	21.94	21.99	22.04
	3	21.61	21.69	21.75
	4	21.53	21.59	21.62
HSUPA	1	21.51	21.59	21.61
	2	21.56	21.53	21.65
	3	21.55	21.67	21.58
	4	21.36	21.37	21.49
	5	21.16	21.27	21.38

Table 12.20: The conducted Power for WCDMA Reduce power

Item	band	WCDMA BAND II result(dBm)		
	ARFCN	9262 (1852.4MHz)	9400 (1880.0MHz)	9538 (1907.6MHz)
WCDMA	\	16.87	16.84	16.89
HSDPA	1	16.15	16.11	16.15
	2	15.93	15.91	15.97
	3	15.6	15.61	15.68
	4	15.52	15.51	15.55
HSUPA	1	15.5	15.51	15.54
	2	15.55	15.45	15.58
	3	15.54	15.59	15.51
	4	15.35	15.29	15.42
	5	15.15	15.19	15.31
Item	band	WCDMA BAND IV result(dBm)		

	ARFCN	Channel 1312 (1712.4MHz)	Channel 1413 (1732.6MHz)	Channel 1513 (1752.6MHz)
WCDMA	****	16.54	16.52	16.58
HSDPA	**1**	15.79	15.78	15.86
	2	15.59	15.6	15.62
	3	15.32	15.29	15.37
	4	15.22	15.22	15.27
HSUPA	**1**	15.22	15.19	15.2
	2	15.19	15.2	15.21
	3	15.19	15.25	15.25
	4	15.12	15.02	15.13
	5	14.83	14.85	14.96

12.4. LTE Measurement result

Table 12.21: The conducted Power for LTE Band 2/4/7/17 Full power

Band2						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18607 1850.7MHz	Channel 18900 1880MHz	Channel 19193 1909.3MHz
1.4MHz	QPSK	1	0	20.58	20.68	20.63
		1	2	20.52	20.77	20.56
		1	5	20.44	20.61	20.46
		3	0	20.49	20.7	20.56
		3	1	20.61	20.7	20.71
		3	2	20.41	20.88	20.64
		6	0	19.4	19.6	19.47
	16QAM	1	0	19.78	19.52	20.04
		1	2	19.6	20.08	19.75
		1	5	19.46	19.65	19.53
		3	0	19.77	19.75	19.73
		3	1	19.82	19.99	19.57
		3	2	19.79	20.08	19.71
		6	0	18.61	18.67	18.67
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18615 1851.5MHz	Channel 18900 1880MHz	Channel 19185 1908.5MHz
3MHz	QPSK	1	0	20.7	20.61	20.68
		1	8	20.67	20.61	20.71
		1	14	20.41	20.55	20.29
		8	0	19.58	19.84	19.74
		8	4	19.64	19.74	19.54
		8	7	19.61	19.71	19.44
		15	0	19.53	19.75	19.6
	16QAM	1	0	19.55	19.48	19.3
		1	8	19.39	19.72	19.66
		1	15	19.41	19.07	19.09
		8	0	18.6	18.92	18.83
		8	4	18.65	18.77	18.7
		8	7	18.75	18.74	18.63
		15	0	18.53	18.87	18.82
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		

				Channel 18625 1852.5MHz	Channel 18900 1880MHz	Channel 19175 1907.5MHz
5MHz	QPSK	1	0	20.78	20.69	20.68
		1	13	20.65	20.66	20.75
		1	24	20.66	20.35	20.37
		12	0	19.71	19.77	19.69
		12	6	19.69	19.68	19.68
		12	13	19.79	19.55	19.5
		25	0	19.59	19.67	19.6
	16QAM	1	0	19.42	20.08	19.87
		1	13	19.3	19.96	19.35
		1	24	19.34	19.28	19.08
		12	0	18.68	18.71	18.91
		12	6	18.53	18.76	18.76
		12	13	18.71	18.71	18.63
		25	0	18.75	18.96	18.7
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18650 1855MHz	Channel 18900 1880MHz	Channel 19150 1905MHz
10MHz	QPSK	1	0	20.66	20.66	20.36
		1	25	20.72	20.91	20.65
		1	49	20.58	20.35	20.42
		25	0	19.68	19.73	19.52
		25	13	19.83	19.71	19.54
		25	25	19.68	19.59	19.52
		50	0	19.56	19.62	19.54
	16QAM	1	0	19.47	19.92	19.26
		1	25	19.88	19.96	19.74
		1	49	20.05	19.3	19.13
		25	0	18.63	18.79	18.63
		25	13	18.57	18.66	18.72
		25	25	18.58	18.54	18.8
		50	0	18.59	18.67	18.63
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18675 1857.5MHz	Channel 18900 1880MHz	Channel 19125 1902.5MHz
15MHz	QPSK	1	0	20.87	20.73	20.58
		1	38	21.18	20.59	21.02
		1	74	21.17	20.54	20.49

		36	0	19.77	19.72	19.45
		36	18	19.81	19.68	19.52
		36	39	19.74	19.54	19.6
		75	0	19.69	19.84	19.57
	16QAM	1	0	18.7	19.86	18.61
		1	38	19.24	19.89	19.08
		1	74	19.25	19.17	18.73
		36	0	18.66	18.83	18.52
		36	18	18.6	18.79	18.79
		36	39	18.76	18.58	18.77
		75	0	18.59	18.65	18.58

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18700 1860MHz	Channel 18900 1880MHz	Channel 19100 1900MHz
20MHz	QPSK	1	0	20.78	20.66	20.57
		1	50	21.18	20.92	20.75
		1	99	20.74	20.34	20.53
		50	0	19.65	19.72	19.44
		50	25	19.72	19.61	19.54
		50	50	19.47	19.45	19.52
		100	0	19.69	19.84	19.57
	16QAM	1	0	19.47	19.74	18.84
		1	50	19.68	19.61	19.39
		1	99	19.13	18.72	19.22
		50	0	18.87	18.89	18.47
		50	25	18.87	18.85	18.68
		50	50	18.65	18.68	18.69
		100	0	18.7	18.68	18.53

Band4

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 19957 1710.7MHz	Channel 20175 1732.5MHz	Channel 20393 1754.3MHz
1.4MHz	QPSK	1	0	21.51	21.21	21.27
		1	2	21.55	21.25	21.26
		1	5	21.53	21.11	21.11
		3	0	21.6	21.36	21.3
		3	1	21.56	21.42	21.32
		3	2	21.48	21.44	21.37
		6	0	20.45	20.42	20.32
	16QAM	1	0	20.44	20.28	19.98

		1	2	20.47	20.49	20.17
		1	5	20.36	20.21	20.1
		3	0	20.79	20.42	20.48
		3	1	20.82	20.58	20.48
		3	2	20.81	20.43	20.49
		6	0	19.69	19.4	19.25

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 19965 1711.5MHz	Channel 20175 1732.5MHz	Channel 20385 1753.5MHz
3MHz	QPSK	1	0	21.49	21.3	21.12
		1	8	21.48	21.23	21.3
		1	14	21.29	21.28	21.26
		8	0	20.59	20.59	20.32
		8	4	20.64	20.57	20.26
		8	7	20.54	20.57	20.27
		15	0	20.58	20.58	20.2
	16QAM	1	0	20.65	19.94	19.77
		1	8	20.15	19.98	20.37
		1	15	19.97	20.04	20.19
		8	0	19.53	19.56	19.1
		8	4	19.6	19.64	19.14
		8	7	19.59	19.49	19.36
		15	0	19.51	19.53	19.27

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 19975 1712.5MHz	Channel 20175 1732.5MHz	Channel 20375 1752.5MHz
5MHz	QPSK	1	0	21.39	21.29	21.04
		1	13	21.32	21.17	21.2
		1	24	21.27	21.28	21.29
		12	0	20.45	20.45	20.32
		12	6	20.51	20.54	20.22
		12	13	20.47	20.39	20.13
		25	0	20.43	20.39	20.13
	16QAM	1	0	20.08	20.4	20.58
		1	13	20.76	20.28	20.53
		1	24	20.66	20.53	20.28
		12	0	19.63	19.42	19.35
		12	6	19.49	19.54	19.57
		12	13	19.55	19.46	19.24
		25	0	19.66	19.46	19.36

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20000 1715MHz	Channel 20175 1732.5MHz	Channel 20350 1750MHz
10MHz	QPSK	1	0	21.3	21.24	21.22
		1	25	21.47	21.43	21.33
		1	49	20.93	21.35	21.23
		25	0	20.46	20.31	20.28
		25	13	20.56	20.46	20.3
		25	25	20.28	20.39	20.07
		50	0	20.35	20.39	20.23
	16QAM	1	0	20.35	20.26	20.07
		1	25	20.49	20.68	20.61
		1	49	19.8	20.23	19.77
		25	0	19.51	19.35	19.14
		25	13	19.5	19.5	19.16
		25	25	19.33	19.44	19.06
		50	0	19.45	19.51	19.17
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20025 1717.5MHz	Channel 20175 1732.5MHz	Channel 20325 1747.5MHz
15MHz	QPSK	1	0	21.47	21.55	21.33
		1	38	21.26	21.67	21.3
		1	74	21.46	21.49	21.18
		36	0	20.4	20.43	20.33
		36	18	20.38	20.53	20.36
		36	39	20.22	20.53	19.98
		75	0	20.38	20.38	20.17
	16QAM	1	0	20.14	20.02	20.07
		1	38	19.84	20.47	19.82
		1	74	19.5	20.56	19.38
		36	0	19.38	19.4	19.33
		36	18	19.45	19.43	19.36
		36	39	19.27	19.53	19.11
		75	0	19.21	19.44	19.26
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20050 1720MHz	Channel 20175 1732.5MHz	Channel 20300 1745MHz
20MHz	QPSK	1	0	21.54	21.48	21.75
		1	50	21.25	21.33	21.34

		1	99	21.19	21.14	21.1
		50	0	20.41	20.42	20.58
		50	25	20.33	20.46	20.37
		50	50	20.41	20.45	20.17
		100	0	20.39	20.35	20.15
	16QAM	1	0	19.92	20.23	20.27
		1	50	20.12	20.14	20.12
		1	99	19.69	19.88	19.43
		50	0	19.64	19.49	19.33
		50	25	19.56	19.44	19.46
		50	50	19.62	19.41	19.38
		100	0	19.56	19.46	19.43

Band7						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20775 2502.5MHz	Channel 21100 2535MHz	Channel 21425 2567.5MHz
5MHz	QPSK	1	0	20.55	20.74	20.77
		1	13	20.48	20.75	20.84
		1	24	20.66	20.72	20.67
		12	0	19.72	19.93	19.97
		12	6	19.74	19.89	19.99
		12	13	19.65	19.81	19.78
		25	0	19.76	19.87	19.87
	16QAM	1	0	19.42	19.92	19.58
		1	13	19.36	20.02	19.65
		1	24	19.47	19.77	19.85
		12	0	18.69	19.09	18.85
		12	6	18.73	18.92	18.83
		12	13	18.65	18.98	18.83
		25	0	18.86	19.02	18.89
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20800 2505MHz	Channel 21100 2535MHz	Channel 21400 2565MHz
10MHz	QPSK	1	0	20.85	20.91	20.84
		1	25	20.93	21.07	21
		1	49	20.78	20.82	20.68
		25	0	19.83	20	19.88
		25	13	19.86	19.96	19.98
		25	25	19.92	19.84	19.87

		50	0	19.97	19.96	19.84
	16QAM	1	0	19.37	19.39	19.49
		1	25	19.62	20.1	19.65
		1	49	19.45	19.65	19.32
		25	0	18.96	19.11	19.03
		25	13	18.82	19	19.07
		25	25	18.89	18.82	19.08
		50	0	19	18.92	18.74
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20825 2507.5MHz	Channel 21100 2535MHz	Channel 21375 2562.5MHz
15MHz	QPSK	1	0	20.63	20.81	20.84
		1	38	20.92	20.72	21.13
		1	74	21.18	20.75	20.86
		36	0	19.77	19.94	19.9
		36	18	19.85	19.91	19.88
		36	39	19.72	19.84	19.83
		75	0	19.85	19.94	19.79
	16QAM	1	0	19.35	19.73	19.55
		1	38	19.43	20	19.49
		1	74	19.19	19.8	19.42
		36	0	18.84	18.92	18.96
		36	18	19.02	19	18.95
		36	39	18.96	18.87	18.93
		75	0	19.01	19.03	18.87
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20850 2510MHz	Channel 21100 2535MHz	Channel 21350 2560MHz
20MHz	QPSK	1	0	21.02	20.88	21.08
		1	50	20.95	21.1	20.98
		1	99	21	20.99	20.79
		50	0	19.89	20.01	20.09
		50	25	19.96	20.01	19.95
		50	50	20.01	19.95	20
		100	0	19.89	19.99	19.89
	16QAM	1	0	19.26	19.33	19.1
		1	50	19.67	19.83	19.75
		1	99	19.18	19.21	19.35
		50	0	18.88	18.93	19.07
		50	25	18.98	18.92	18.9

		50	50	18.88	18.89	19.01
		100	0	18.78	18.87	18.85

Band 17						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 23755 706.5 MHz	Channel 23790 710 MHz	Channel 23825 713.5MHz
5MHz	QPSK	1	0	20.99	20.93	20.9
		1	13	20.94	20.87	21
		1	24	20.6	20.98	21.09
		12	0	20.19	20.05	19.98
		12	6	20.13	20.01	20.08
		12	13	20.02	20.01	20.18
		25	0	20.15	20.05	20.05
	16QAM	1	0	19.38	19.49	19.27
		1	13	19.48	19.67	20.29
		1	24	19.41	19.75	19.63
		12	0	19.15	19.2	18.76
		12	6	19.18	18.81	18.84
		12	13	18.96	18.86	19.09
		25	0	19.05	18.91	19.04
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel23780 709MHz	Channel23790 710 MHz	Channel23800 711 MHz
10MHz	QPSK	1	0	21.03	21.03	20.89
		1	25	20.79	20.9	20.9
		1	49	20.92	21.3	20.92
		25	0	20.2	20.1	20.01
		25	13	20.1	20.18	20.06
		25	25	20.19	20.15	20.16
		50	0	20.13	20.07	20.05
	16QAM	1	0	19.57	19.51	19.61
		1	25	19.48	19.55	19.73
		1	49	19.7	19.78	19.73
		25	0	19.13	19.16	18.93
		25	13	19.16	18.99	19.05
		25	25	19.12	19.03	19.17
		50	0	19.16	19.06	19.07

Table 12.22: The conducted Power for LTE Band 2/4/7/17 Reduce power

Band2						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18607 1850.7MHz	Channel 18900 1880MHz	Channel 19193 1909.3MHz
1.4MHz	QPSK	1	0	10.15	10.05	10.25
		1	2	11.01	10.91	11.11
		1	5	11.34	11.24	11.44
		3	0	11.45	11.55	11.75
		3	1	11.32	11.42	11.62
		3	2	11.24	11.34	11.54
		6	0	10.18	10.28	10.48
	16QAM	1	0	9.92	10.02	10.22
		1	2	10.14	10.24	10.44
		1	5	10.01	10.11	10.31
		3	0	10.23	10.33	10.53
		3	1	10.49	10.59	10.79
		3	2	10.28	10.38	10.58
		6	0	9.53	9.63	9.83
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18615 1851.5MHz	Channel 18900 1880MHz	Channel 19185 1908.5MHz
3MHz	QPSK	1	0	11.43	11.33	11.63
		1	8	11.27	11.17	11.47
		1	14	11.24	11.14	11.44
		8	0	10.56	10.46	10.76
		8	4	10.48	10.38	10.68
		8	7	10.4	10.3	10.6
		15	0	10.39	10.29	10.59
	16QAM	1	0	10.42	10.32	10.62
		1	8	10.01	9.91	10.21
		1	15	10	9.9	10.2
		8	0	10.1	10	10.3
		8	4	9.94	9.84	10.14
		8	7	9.64	9.54	9.84
		15	0	9.81	9.71	10.01
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18625 1852.5MHz	Channel 18900 1880MHz	Channel 19175 1907.5MHz

5MHz	QPSK	1	0	11.12	11.02	11.22
		1	13	11.39	11.29	11.49
		1	24	11.42	11.32	11.52
		12	0	10.36	10.26	10.46
		12	6	10.28	10.18	10.38
		12	13	10.37	10.27	10.47
		25	0	10.35	10.25	10.45
	16QAM	1	0	10.61	10.51	10.71
		1	13	10.49	10.39	10.59
		1	24	9.99	9.89	10.09
		12	0	10.38	10.28	10.48
		12	6	10.3	10.2	10.4
		12	13	9.9	9.8	10
		25	0	10.18	10.08	10.28
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18650 1855MHz	Channel 18900 1880MHz	Channel 19150 1905MHz
10MHz	QPSK	1	0	10.73	10.63	10.83
		1	25	11.14	11.04	11.24
		1	49	11.23	11.13	11.33
		25	0	10.08	9.98	10.18
		25	13	10.2	10.1	10.3
		25	25	10.35	10.25	10.45
		50	0	10.15	10.05	10.25
	16QAM	1	0	9.52	9.42	9.62
		1	25	10.65	10.55	10.75
		1	49	10.13	10.03	10.23
		25	0	9.73	9.63	9.83
		25	13	10.21	10.11	10.31
		25	25	9.88	9.78	9.98
		50	0	9.78	9.68	9.88
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18675 1857.5MHz	Channel 18900 1880MHz	Channel 19125 1902.5MHz
15MHz	QPSK	1	0	10.64	10.54	10.74
		1	38	11.1	11	11.2
		1	74	11.55	11.45	11.65
		36	0	9.74	9.64	9.84
		36	18	10.01	9.91	10.11
		36	39	10.23	10.13	10.33

		75	0	9.98	9.88	10.08
	16QAM	1	0	9.29	9.19	9.39
		1	38	10.13	10.03	10.23
		1	74	10.11	10.01	10.21
		36	0	8.83	8.73	8.93
		36	18	9.76	9.66	9.86
		36	39	9.99	9.89	10.09
		75	0	9.38	9.28	9.48
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18700 1860MHz	Channel 18900 1880MHz	Channel 19100 1900MHz
20MHz	QPSK	1	0	11.78	11.48	11.58
		1	50	11.76	11.46	11.56
		1	99	11.55	11.25	11.35
		50	0	10.56	10.46	10.66
		50	25	10.89	10.69	10.79
		50	50	10.09	10.09	10.19
		100	0	10.84	10.74	10.64
	16QAM	1	0	8.9	8.8	9
		1	50	9.74	9.64	9.84
		1	99	10.15	10.05	10.25
		50	0	8.85	8.75	8.95
		50	25	9.06	8.96	9.16
		50	50	9.63	9.53	9.73
		100	0	8.99	8.89	9.09

Band4

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 19957 1710.7MHz	Channel 20175 1732.5MHz	Channel 20393 1754.3MHz
1.4MHz	QPSK	1	0	14.35	14.05	13.5
		1	2	14.38	14.05	13.28
		1	5	14.29	13.91	13.17
		3	0	14.37	14.05	13.27
		3	1	14.46	14.21	13.51
		3	2	14.35	14.22	13.41
		6	0	13.39	13.07	12.3
	16QAM	1	0	13.03	12.71	12.49
		1	2	13.11	12.57	12.11
		1	5	13.01	12.52	12.52
		3	0	13.34	12.98	12.27

		3	1	13.44	12.96	12.33
		3	2	13.34	13.24	12.41
		6	0	12.45	12.16	11.48
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 19965 1711.5MHz	Channel 20175 1732.5MHz	Channel 20385 1753.5MHz
3MHz	QPSK	1	0	14.35	14.15	13.33
		1	8	14.11	13.86	13.33
		1	14	14.13	14.15	13.24
		8	0	13.42	13.23	12.24
		8	4	13.4	13.24	12.25
		8	7	13.3	13.04	12.32
		15	0	13.37	12.96	12.2
	16QAM	1	0	13.39	12.74	12.47
		1	8	13.24	13.18	12.52
		1	15	12.86	13.12	12.53
		8	0	12.55	12.26	11.35
		8	4	12.53	12.28	11.47
		8	7	12.42	12.28	11.53
		15	0	12.45	12.18	11.28
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 19975 1712.5MHz	Channel 20175 1732.5MHz	Channel 20375 1752.5MHz
5MHz	QPSK	1	0	14.38	13.95	13.43
		1	13	14.26	13.86	13.37
		1	24	13.83	13.94	13.33
		12	0	13.33	12.99	12.44
		12	6	13.17	13.03	12.41
		12	13	13.06	12.85	12.34
		25	0	13.14	12.86	12.37
	16QAM	1	0	13.01	12.94	12.01
		1	13	13.21	13.14	11.98
		1	24	12.72	12.97	12.22
		12	0	12.3	11.91	11.36
		12	6	12.34	11.95	11.33
		12	13	12.32	12.09	11.35
		25	0	12.38	11.99	11.37
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20000	Channel 20175	Channel 20350

				1715MHz	1732.5MHz	1750MHz
10MHz	QPSK	1	0	14.35	13.96	13.78
		1	25	14.39	14.08	13.7
		1	49	13.84	13.87	13.48
		25	0	13.39	13.08	12.54
		25	13	13.34	13.17	12.54
		25	25	13.15	13.11	12.36
		50	0	13.32	13.08	12.55
	16QAM	1	0	12.98	12.91	12.53
		1	25	12.95	13.27	12.63
		1	49	12.67	12.59	12.22
		25	0	12.49	12.16	11.84
		25	13	12.42	12.16	11.61
		25	25	12.24	12.2	11.32
		50	0	12.4	12.16	11.52

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20025 1717.5MHz	Channel 20175 1732.5MHz	Channel 20325 1747.5MHz
15MHz	QPSK	1	0	14.35	14.22	13.95
		1	38	14.4	14.23	13.78
		1	74	14.14	13.87	13.45
		36	0	13.41	13.1	12.75
		36	18	13.36	13.18	12.69
		36	39	13.07	13.15	12.44
		75	0	13.34	13.13	12.66
	16QAM	1	0	13.03	12.49	12.64
		1	38	12.69	12.56	12.17
		1	74	12.85	12.45	12.12
		36	0	12.48	12.06	11.93
		36	18	12.43	12.25	11.86
		36	39	12.24	12.14	11.6
		75	0	12.31	12.1	11.72

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20050 1720MHz	Channel 20175 1732.5MHz	Channel 20300 1745MHz
20MHz	QPSK	1	0	14.42	14.3	14.43
		1	50	14.37	14.09	13.78
		1	99	14	13.75	13.41
		50	0	13.47	13.49	13.48

		50	25	13.28	13.05	12.68
		50	50	13.15	13.03	12.45
		100	0	13.21	13.02	12.74
	16QAM	1	0	13.11	13.07	13.04
		1	50	12.84	12.75	12.32
		1	99	12.53	12.46	12.15
		50	0	12.35	12.32	12.18
		50	25	12.24	12.29	11.93
		50	50	12.19	12.19	11.58
		100	0	12.35	12.15	11.88

Band7						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20775 2502.5MHz	Channel 21100 2535MHz	Channel 21425 2567.5MHz
5MHz	QPSK	1	0	15.14	15.4	15.23
		1	13	15.08	15.46	15.32
		1	24	15.21	15.22	15.27
		12	0	14.19	14.4	14.37
		12	6	14.29	14.38	14.33
		12	13	14.05	14.29	14.3
		25	0	14.21	14.31	14.34
	16QAM	1	0	13.98	13.94	14
		1	13	14.57	14.67	13.98
		1	24	14.09	14.52	13.89
		12	0	13.39	13.5	13.36
		12	6	13.49	13.4	13.42
		12	13	13.33	13.38	13.3
		25	0	13.5	13.48	13.42
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20800 2505MHz	Channel 21100 2535MHz	Channel 21400 2565MHz
10MHz	QPSK	1	0	15.43	15.35	15.51
		1	25	15.36	15.64	15.54
		1	49	15.2	15.48	15.35
		25	0	14.23	14.41	14.52
		25	13	14.4	14.65	14.51
		25	25	14.46	14.5	14.38
		50	0	14.45	14.51	14.33
	16QAM	1	0	13.92	14.21	14.03

		1	25	13.92	14.13	14.17
		1	49	14.05	14.17	14.09
		25	0	13.49	13.46	13.43
		25	13	13.34	13.51	13.46
		25	25	13.51	13.51	13.43
		50	0	13.48	13.49	13.39
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20825 2507.5MHz	Channel 21100 2535MHz	Channel 21375 2562.5MHz
15MHz	QPSK	1	0	15.27	15.63	15.68
		1	38	15.48	15.73	15.83
		1	74	15.46	15.6	15.44
		36	0	14.43	14.57	14.49
		36	18	14.55	14.52	14.6
		36	39	14.56	14.44	14.57
		75	0	14.45	14.57	14.6
	16QAM	1	0	14.07	14.14	14.18
		1	38	14.58	14.01	14.06
		1	74	14.15	14.19	14.07
		36	0	13.36	13.49	13.61
		36	18	13.38	13.54	13.52
		36	39	13.5	13.39	13.52
		75	0	13.38	13.4	13.5
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20850 2510MHz	Channel 21100 2535MHz	Channel 21350 2560MHz
20MHz	QPSK	1	0	15.75	15.7	15.24
		1	50	15.82	15.86	15.82
		1	99	15.84	15.82	15.85
		50	0	14.25	14.36	14.52
		50	25	14.34	14.39	14.41
		50	50	14.31	14.22	14.37
		100	0	14.17	14.34	14.26
	16QAM	1	0	14.02	14.42	13.84
		1	50	14.41	15.06	14.33
		1	99	14.2	14.33	14.13
		50	0	13.5	13.63	13.71
		50	25	13.64	13.69	13.7
		50	50	13.69	13.54	13.7
		100	0	13.57	13.53	13.59

Band 17						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 23755 706.5 MHz	Channel 23790 710 MHz	Channel 23825 713.5MHz
5MHz	QPSK	1	0	17.66	17.58	17.63
		1	13	17.76	17.66	17.72
		1	24	17.71	17.72	17.5
		12	0	16.95	16.85	16.84
		12	6	16.99	16.9	16.96
		12	13	16.94	16.85	16.9
		25	0	17.03	16.83	16.93
	16QAM	1	0	16.34	16.22	16.25
		1	13	16.46	16.51	16.32
		1	24	16.15	16.24	16.28
		12	0	15.65	15.58	15.51
		12	6	15.85	15.54	15.75
		12	13	15.8	15.58	15.7
		25	0	15.85	15.69	15.78
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel23780 709MHz	Channel23790 710 MHz	Channel23800 711 MHz
10MHz	QPSK	1	0	17.63	17.81	17.61
		1	25	17.68	17.6	17.57
		1	49	17.85	18.07	18.02
		25	0	17.11	16.97	16.97
		25	13	16.99	17.02	16.97
		25	25	16.96	16.97	16.91
		50	0	17.01	16.87	16.98
	16QAM	1	0	16.44	15.97	16.28
		1	25	17.06	16.62	16.59
		1	49	16.47	16.01	16.28
		25	0	15.92	15.89	15.88
		25	13	15.99	15.82	16
		25	25	15.97	15.78	15.88
		50	0	15.93	15.79	15.86

12.5. WiFi and BT Measurement result

Table 12.23: The conducted power for Bluetooth

GFSK			
Channel	Ch0 (2402 MHz)	Ch39 (2441MHz)	CH78 (2480MHz)
Conducted Output Power (dBm)	4.73	5.12	4.01
π/4 DQPSK			
Channel	Ch0 (2402 MHz)	Ch39 (2441MHz)	CH78 (2480MHz)
Conducted Output Power (dBm)	3.98	4.12	3.68
8DPSK			
Channel	Ch0 (2402 MHz)	Ch39 (2441MHz)	CH78 (2480MHz)
Conducted Output Power (dBm)	2.89	4.21	3.07

Table 12.24: The conducted power for BLE

GFSK			
Channel	Ch0 (2402 MHz)	Ch19 (2440MHz)	CH39 (2480MHz)
Conducted Output Power (dBm)	-3.97	-2.98	-4.12

NOTE: According to KDB447498 D01 BT standalone SAR are not required, because maximum average output power is less than 10mW.

When the standalone SAR test exclusion is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to the 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, and x = 18.75 for 10-g SAR.

SAR body value of BT is 0.167 W/Kg for 1g. SAR body value of BT is 0.0.067 W/Kg for 10g.

The default power measurement procedures are:

a) Power must be measured at each transmit antenna port according to the DSSS and OFDM transmission configurations in each standalone and aggregated frequency band.

b) Power measurement is required for the transmission mode configuration with the highest maximum output power specified for production units.

1) When the same highest maximum output power specification applies to multiple transmission modes, the largest channel bandwidth configuration with the lowest order modulation and lowest data rate is measured.

2) When the same highest maximum output power is specified for multiple largest channel bandwidth configurations with the same lowest order modulation or lowest order modulation and lowest data rate, power measurement is required for all equivalent 802.11 configurations with the same maximum output power.

c) For each transmission mode configuration, power must be measured for the highest and lowest channels; and at the mid-band channel(s) when there are at least 3 channels. For configurations with multiple mid-band channels, due to an even number of channels, both channels should be measured.

During WLAN SAR testing EUT is configured with the WLAN continuous TX tool, and the transmission duty factor was monitored on the spectrum analyzer with zero-span setting，the duty cycle is 100%.

Duty Cycle 802.11b mode

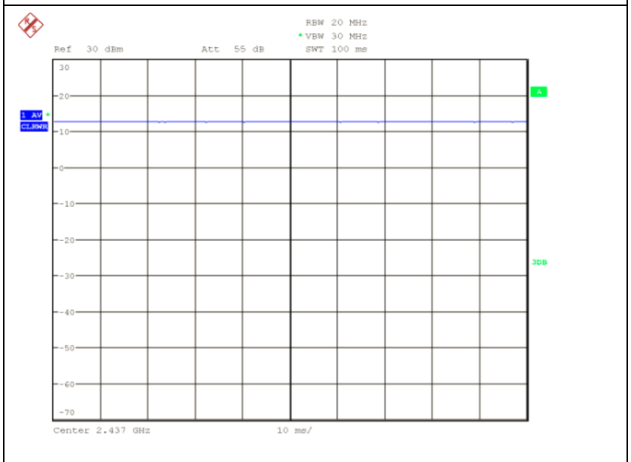


Table 12.25: The average conducted power for WiFi

Mode	Channel	Frequence	Average power(dBm)
802.11 b	1	2412 MHZ	19.89
	6	2437 MHZ	19.97
	11	2462 MHZ	20.26
802.11 g	1	2412 MHZ	18.51
	6	2437 MHZ	18.69
	11	2462 MHZ	19.08
802.11 n 20M	1	2412 MHZ	15.66
	6	2437 MHZ	15.96
	11	2462 MHZ	16.41
802.11 n 40M	3	2422 MHZ	15.63
	6	2437 MHZ	15.88
	9	2452 MHZ	17.26

2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.

a) When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.

b) When the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

12.6. CDMA Measurement result

Table 12.26: The conducted Power for CDMA Full power

Band	CDMA2000 BC0			CDMA2000 BC1		
Channel	1013	384	777	25	600	1175
Frequency (MHz)	824.7	836.52	848.31	1851.25	1880.00	1908.75
1xRTT RC1 SO55	24.31	24.32	24.36	23.64	23.67	23.63
1xRTT RC3 SO55	24.35	24.35	24.39	23.62	23.69	23.67
1xRTT RC3 SO32(+ F-SCH)	24.28	24.31	24.32	23.57	23.53	23.54
1xRTT RC3 SO32(+SCH)	24.24	24.25	24.27	23.58	23.55	23.51
1xEVDO RTAP 153.6Kbps	24.51	24.55	24.51	23.79	23.81	23.78
1xEVDO RETAP 4096Bits	23.39	23.43	23.21	23.69	23.61	23.68

Table 12.27: The conducted Power for CDMA Reduce power

Band	CDMA2000 BC0			CDMA2000 BC1		
Channel	1013	384	777	25	600	1175
Frequency (MHz)	824.7	836.52	848.31	1851.25	1880.00	1908.75
1xRTT RC1 SO55	17.23	17.14	17.33	15.51	15.58	15.52
1xRTT RC3 SO55	17.19	17.12	17.37	15.53	15.56	15.57
1xRTT RC3 SO32(+ F-SCH)	17.14	17.13	17.31	15.64	15.66	15.41
1xRTT RC3 SO32(+SCH)	17.16	17.11	17.37	15.59	15.55	15.54
1xEVDO RTAP 153.6Kbps	17.22	17.23	17.22	15.57	15.48	15.59
1xEVDO RETAP 4096Bits	17.1	17.11	17.14	15.47	15.49	15.44

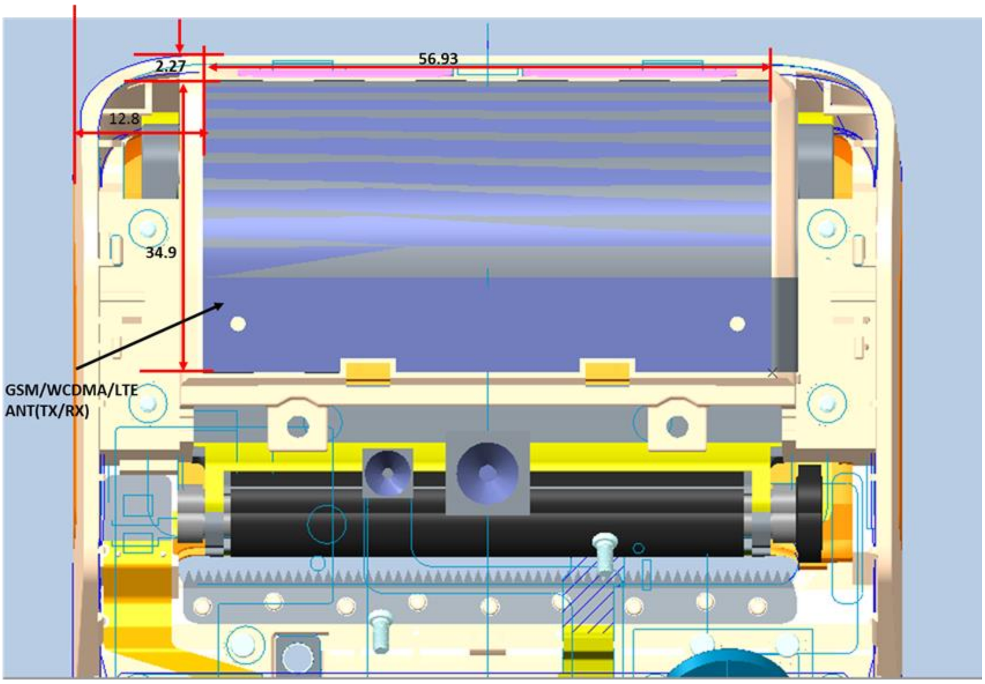
13. Simultaneous TX SAR Considerations

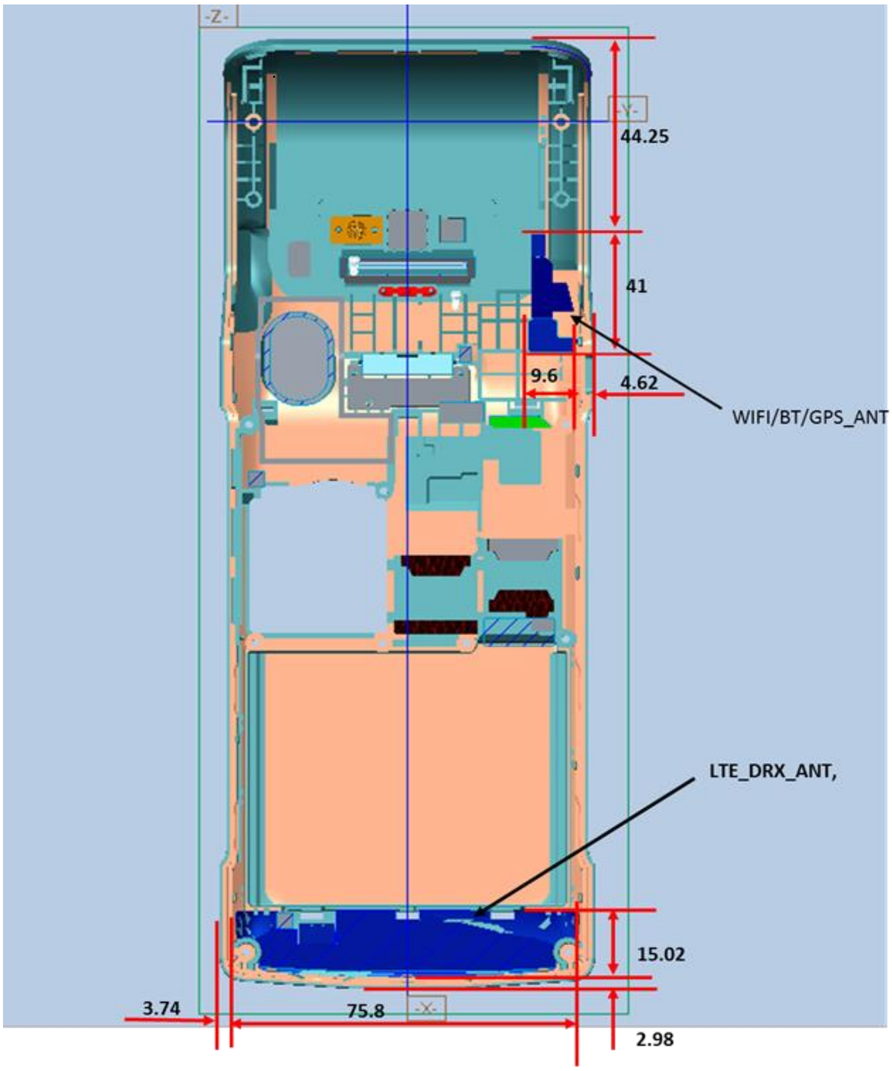
13.1. Introduction

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 WiFi can transmit simultaneous with other transmitters.

13.2. Transmit Antenna Separation Distances





Picture 13.1 Antenna Locations

13.3. 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

According to the KDB447498 appendix A, the SAR test exclusion threshold for 2450MHz at 5mm test separation distances is 10mW.

$$\frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} * \sqrt{\text{Frequency (GHz)}} \leq 3.0$$

Based on the above equation, Bluetooth SAR was not required:

Evaluation=1.254＜3.0

14. Power Reduction by Proximity Sensing

A proximity sensor for power reduction is implemented in this device to address RF exposure compliance when the cellular antenna is positioned close to the user's body. The sensor's mechanical structure is designed to fit within the enclosure design used in this device and also extended around the edge and top of the antenna element in order to optimize sensitivity in these orientations. This design combines the antenna printed directly on a plastic part and proximity sensor FPC (Flexible Printed Circuit) bonded together into one piece. According to KDB 616217 D04 SAR for laptop and tablets v01r02

14.1. Procedures for determining proximity sensor triggering distances

The following procedures should be applied to determine proximity sensor triggering distances for the back surface and individual edges of a tablet. Conducted power is monitored qualitatively to identify the general triggering characteristics and recorded quantitatively, versus spacing, as required by the procedures. Unless there is built-in test software that reports the triggering conditions and enables the power levels to be confirmed separately, monitoring of conducted power during the triggering tests typically requires internal access to the antenna ports inside the tablet, which may interfere with the triggering tests.

(1) The relevant transmitter should be set to operate at its normal maximum output power.
(2) The entire back surface or edge of the tablet is positioned below a flat phantom filled with the required tissue-equivalent medium, and positioned at least 20 mm further than the distance that triggers power reduction.
(3) It should be ensured that the cables required for power measurements are not interfering with the proximity sensor. Cable losses should be properly compensated to report the measured power results.
(4) The back surface or edge is moved toward the phantom in 3 mm steps until the sensor triggers.
(5) The back surface or edge is then moved back (further away) from the phantom by at least 5 mm or until maximum output power is returned to the normal maximum level.
(6) The back surface or edge is again moved toward the phantom, but in 1 mm steps, until it is at least 5 mm past the triggering point or touching the phantom. If 1 mm resolution is not suitable for the sensor triggering sensitivity, a KDB inquiry should be submitted to determine alternative test configurations.
(7) If the tablet is not touching the phantom, it is moved in 3 mm steps until it touches the phantom to confirm that the sensor remains triggered and the maximum power stays reduced.
(8) The process is then reversed by moving the tablet away from the phantom according to steps 4) to 7), to determine triggering release, until it is at least 10 mm beyond the point that triggers the return of normal maximum power.
(9) The measured output power within ± 5 mm of the triggering points, or until the tablet is touching the phantom, for movements to and from the phantom should be tabulated in the SAR report.

(10) If the sensor design and implementation allow additional variations for triggering distance tolerances, multiple samples should be tested to determine the most conservative distance required for SAR evaluation.

(11) To ensure all production units are compliant, it is generally necessary to reduce the triggering distance determined from the triggering tests by 1 mm, or more if it is necessary, and use the smallest distance for movements to and from the phantom, minus 1 mm, as the sensor triggering distance for determining the SAR measurement distance.

14.2. Procedures for determining antenna and proximity sensor coverage

The sensing regions are usually limited to areas near the sensor element. If a sensor is spatially offset from the antenna(s), it is necessary to verify sensor triggering for conditions where the antenna is next to the user but the sensor is laterally further away to ensure sensor coverage is sufficient for reducing the power to maintain compliance. The following are used to determine if additional SAR measurements may be necessary due to sensor and antenna offset. 25 These procedures do not apply and are not required for configurations where the antenna and sensor are collocated and the peak SAR location is overlapping with the sensor.

(1) The back surface or edge of the tablet is positioned at a test separation distance less than or equal to the distance required for back surface or edge triggering, with both the antenna and sensor pad located at least 20 mm laterally outside the edge (boundary) of the phantom, along the direction of maximum antenna and sensor offset. For the back surface, if the direction of maximum offset is not aligned with the tablet coordinates (physical edges) the tablet test position would not be aligned with the phantom coordinates (orientations). Each applicable tablet edge should be positioned perpendicularly to the phantom to determine sensor coverage. For antennas and/or sensors located near the corner of a tablet, both adjacent edges must be considered.

(2) The similar sequence of steps applied to determine sensor triggering distance in section 6.2 are used to verify back surface and edge sensor coverage by moving the tablet (sensor and antenna) horizontally toward the phantom while maintaining the same vertical separation between the back surface or edge and the phantom.

(3) After the exact location where triggering of power reduction is determined, with respect to the sensor and antenna, the tablet movement should be continued, in 3 mm increments, until both the sensor and antenna(s) are fully under the phantom and at least 20 mm inside the phantom edge.

(4) The process is then repeated from the opposite direction, starting at the other end of the maximum antenna and sensor offset, by rotating the tablet 180° along the vertical axis.

(5) The triggering points should be documented graphically, with the antenna and sensor clearly identified, along with all relevant dimensions.

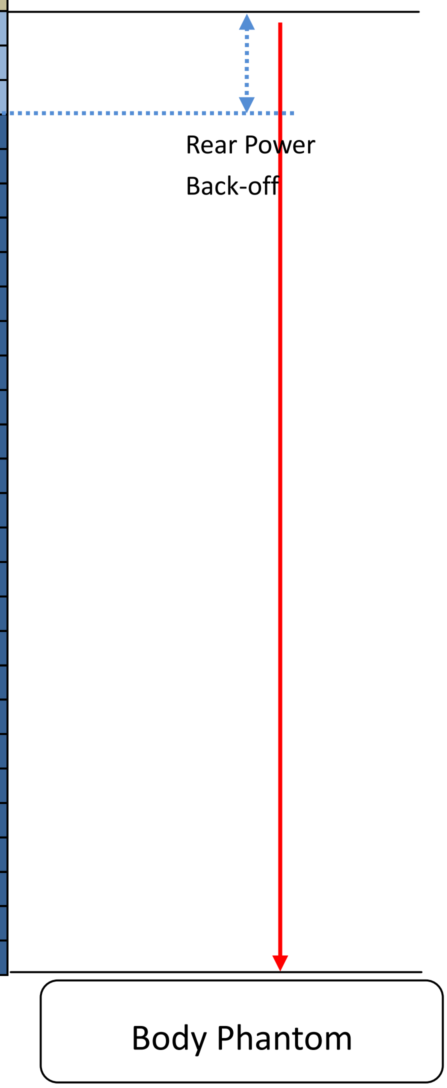
(6) If the subsequently measured peak SAR location for the antenna is not between the triggering points, established by the sensor coverage tests from opposite ends of the antenna and sensor, additional SAR tests may be required for conditions where only part of the back surface or edge of a tablet corresponding to the antenna is in proximity to the user and the sensor may not be triggering as desired. A KDB inquiry must be submitted by the test lab to determine if additional tests are required and the proper test configurations to use for testing. This may include situations where the sensor coverage region is too small for the antenna, the sensor is located too far away from the antenna, the sensor location is insufficient to cover multiple antennas or the antenna is at the corner of a tablet etc.

14.3. Proximity Sensor Status Table of trigger distance

As per the KDB 616217 D04 SAR for laptop and tablets v01r02, section 6.2, the following procedure is used to determine the triggering distances.

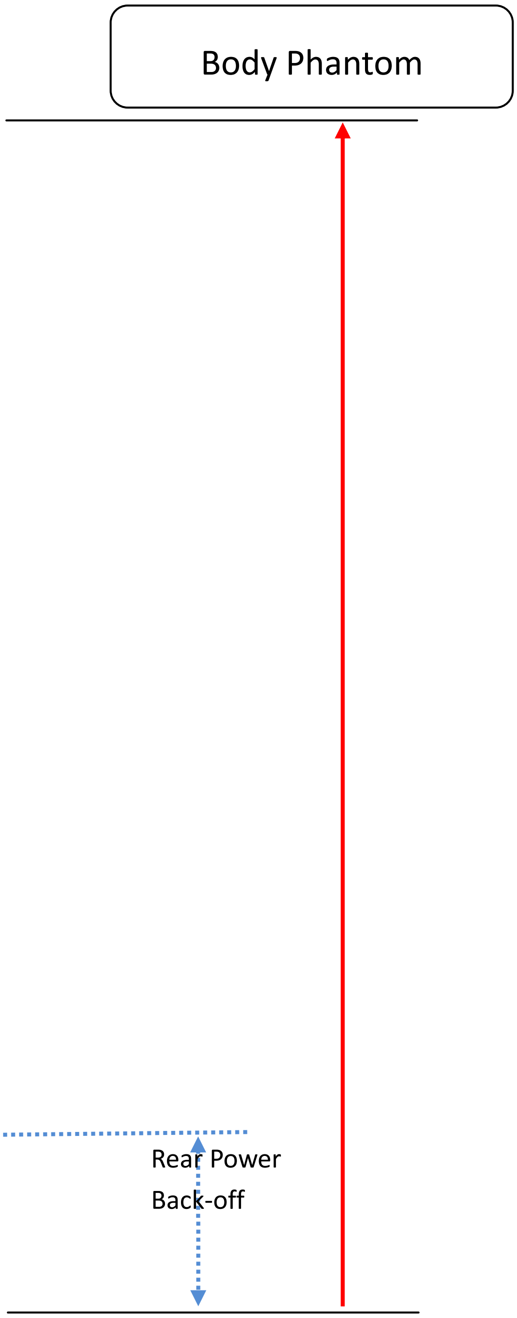
Proximity Sensor Status Table when DUT is moving towards the phantom

Distance to the DUT (mm)	Proximity Sensor Status – Rear Surface
30	OFF
27	OFF
26	OFF
25	ON
24	ON
23	ON
22	ON
21	ON
20	ON
19	ON
18	ON
17	ON
16	ON
15	ON
14	ON
13	ON
12	ON
11	ON
10	ON
9	ON
8	ON
7	ON
6	ON
5	ON
4	ON
3	ON
2	ON
1	ON



Proximity Sensor Status Table when DUT is moving away the phantom

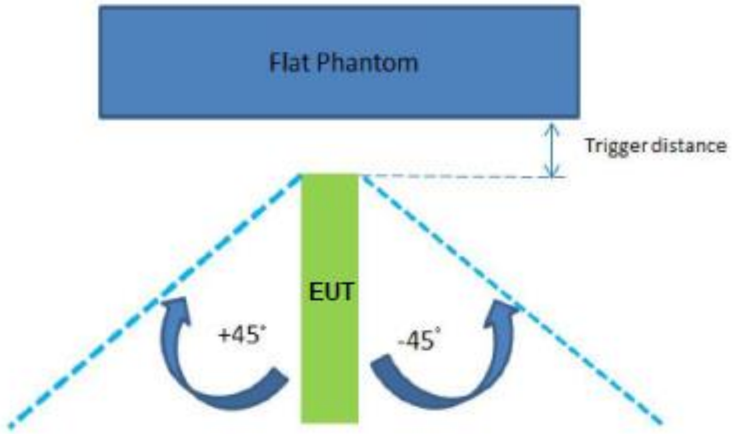
Distance to the DUT (mm)	Proximity Sensor Status – Rear Surface
0	ON
1	ON
2	ON
3	ON
4	ON
5	ON
6	ON
7	ON
8	ON
9	ON
10	ON
11	ON
12	ON
13	ON
14	ON
15	ON
16	ON
17	ON
18	ON
19	ON
20	ON
21	ON
22	ON
23	ON
24	ON
25	ON
26	OFF
27	OFF
28	OFF
29	OFF
30	OFF



14.4. Tilt angle influences to proximity sensor triggering

As per the KDB 616217 D04 SAR for laptop and tablets v01r02, section 6.4, the following procedure is used to determine the tilt angle influences to proximity sensor triggering.

Note: EUT does not support the hotspot mode, so the EUT SAR evaluation is not need to edges.

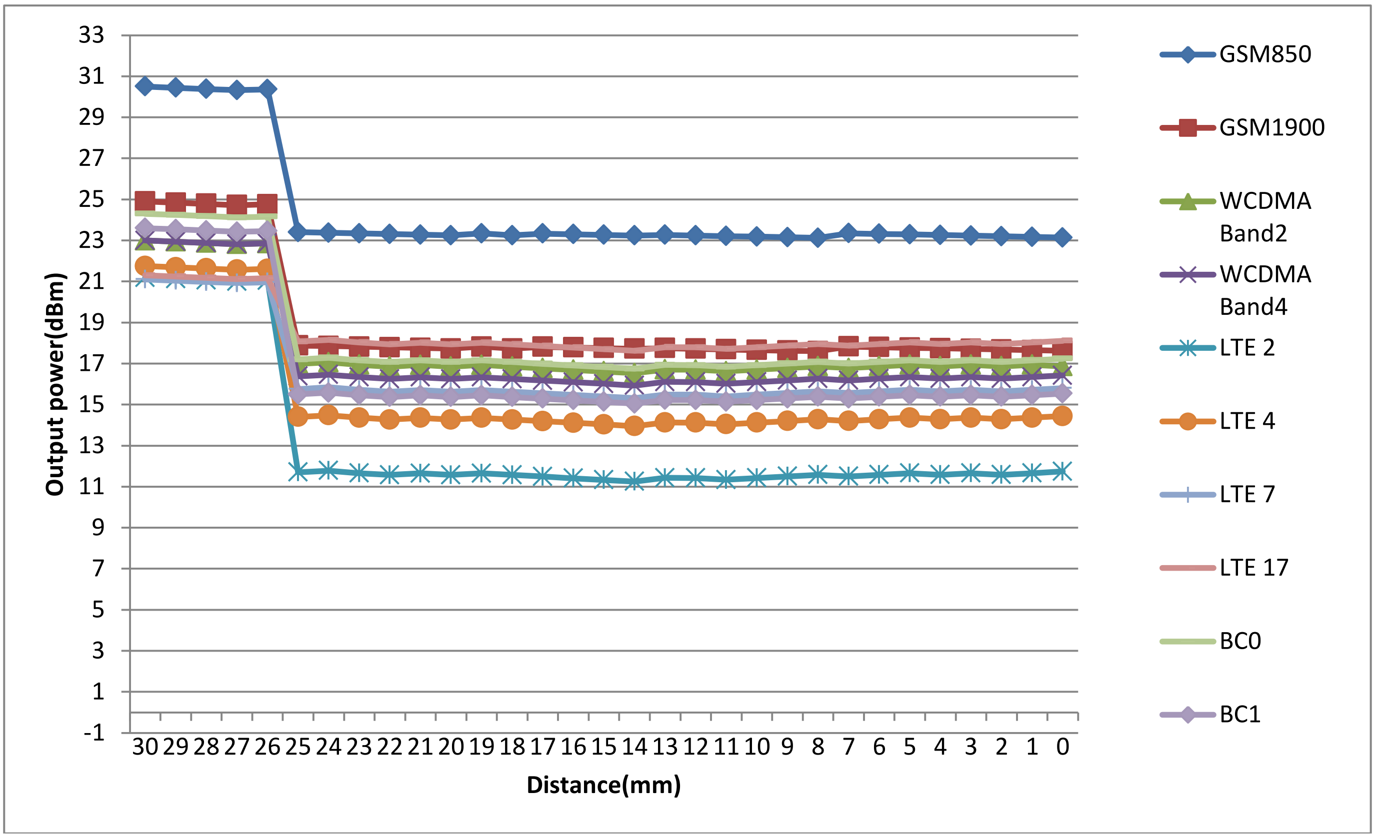


Distance to the DUT (mm)	Proximity Sensor Status 0° to +45°	Proximity Sensor Status 0° to -45°
15	OFF	OFF
14	OFF	OFF
13	OFF	OFF
12	OFF	OFF
11	OFF	OFF
10	OFF	OFF
9	OFF	OFF
8	OFF	OFF
7	OFF	OFF
6	OFF	OFF
5	ON	ON
4	ON	ON
3	ON	ON
2	ON	ON
1	ON	ON
0	ON	ON

14.5. Power Reduction per Air-interface

The following graphs show the power level and the distance from the DUT to the flat phantom for the Rear Surface.

Rear Surface



14.6. Proximity Sensor Coverage Area

According to KDB 616217 D04, Proximity Sensor Coverage Area of not request when the antenna and sensor are collocated and the peak SAR location is overlapping with the sensor.

15. SAR Test Result

Table 15.1: SAR Values (GSM 850 MHz Band-Body)

Frequency MHz	Frequency Ch.	Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Power reduce												
836.6	190	GPRS 2TS	Class12	Toward Ground	5	/	23.27	23.5	1.054	0.589	0.621	-0.10
Full power												
836.6	190	GPRS 2TS	Class12	Toward Phantom	5	/	30.32	31	1.169	0.845	0.988	-0.04
824.2	128	GPRS 2TS	Class12	Toward Phantom	5	/	30.13	31	1.222	0.822	1.004	-0.07
848.8	251	GPRS 2TS	Class12	Toward Phantom	5	/	30.42	31	1.143	0.825	0.943	0.09
836.6	190	GPRS 2TS	Class12	Toward Ground	19	/	30.32	31	1.169	0.375	0.439	0.11
Repeated												
836.6	190	GPRS 2TS	Class12	Toward Phantom	5	1	30.32	31	1.169	0.872	1.020	-0.1
Frequency MHz	**Frequency Ch.**	**Mode /Band**	**GPRS 2TS**	**Test Position**	**Spacing (mm)**	**Figure No.**	**Measured average power (dBm)**	**Maximum allowed Power (dBm)**	**Scaling factor**	**Measured SAR(10g) (W/kg)**	**Reported SAR(10g) (W/kg)**	**Power Drift (dB)**
Power reduce												
836.6	190	GPRS 2TS	Class12	Toward Ground	0	/	23.27	23.5	1.054	0.684	0.721	-0.02
Full power												
836.6	190	GPRS 2TS	Class12	Toward Phantom	0	2	30.32	31	1.169	1.04	1.216	-0.07

Table 15.2: SAR Values (GSM 1900 MHz Band-Body)

Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Power reduce												
1880	661	GPRS 2TS	Class12	Toward Ground	5	/	17.77	18	1.054	0.964	1.016	0.15
1850.2	512	GPRS 2TS	Class12	Toward Ground	5	/	17.61	18	1.094	0.805	0.881	0.08
1909.8	810	GPRS 2TS	Class12	Toward Ground	5	/	17.85	18	1.035	0.599	0.620	0.07
Repeated												
1880	661	GPRS 2TS	Class12	Toward Ground	5	/	17.77	18	1.054	0.941	0.992	-0.04
Full power												
1880	661	GPRS 2TS	Class12	Toward Phantom	5	/	24.84	25	1.038	0.18	0.187	-0.03
1880	661	GPRS 2TS	Class12	Toward Ground	19	3	24.84	25	1.038	1.31	1.359	-0.08
Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Power reduce												
1880	661	GPRS 2TS	Class12	Toward Ground	0	4	17.77	18	1.054	1.45	1.529	-0.16
Full power												
1880	661	GPRS 2TS	Class12	Toward Phantom	0	/	24.84	25	1.038	0.207	0.215	0.02

Table 15.3: SAR Values (WCDMA Band II -Body)

Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Power reduce												
1880	9400	Band II	12.2kbps RMC	Toward Ground	5	/	16.84	17	1.038	0.718	0.745	-0.11
Full power												
1880	9400	Band II	12.2kbps RMC	Toward Phantom	5	/	22.84	23	1.038	0.106	0.110	-0.05
1880	9400	Band II	12.2kbps RMC	Toward Ground	19	5	22.84	23	1.038	0.75	0.778	0.12
Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Power reduce												
1880	9400	Band II	12.2kbps RMC	Toward Ground	0	6	16.84	17	1.038	0.62	0.643	0.09
Full power												
1880	9400	Band II	12.2kbps RMC	Toward Phantom	0	/	22.84	23	1.038	0.077	0.080	0.02

Table 15.4: SAR Values (WCDMA Band IV -Body)

Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Power reduce												
1732.6	1413	Band IV	12.2kbps RMC	Toward Ground	5	/	16.52	17	1.117	0.536	0.599	-0.06
Full power												
1732.6	1413	Band IV	12.2kbps RMC	Toward Phantom	5	/	22.92	23	1.019	0.068	0.069	0.17
1732.6	1413	Band IV	12.2kbps RMC	Toward Ground	19	7	22.92	23	1.019	0.56	0.570	-0.01
Frequency		**Mode /Band**	**Service /Headset**	**Test Position**	**Spacing (mm)**	**Figure No.**	**Measured average power (dBm)**	**Maximum allowed Power (dBm)**	**Scaling factor**	**Measured SAR(10g) (W/kg)**	**Reported SAR(10g) (W/kg)**	**Power Drift (dB)**
MHz	**Ch.**											
Power reduce												
1732.6	1413	Band IV	12.2kbps RMC	Toward Ground	0	8	16.52	17	1.117	0.575	0.642	0.03
Full power												
1732.6	1413	Band IV	12.2kbps RMC	Toward Phantom	0	/	22.92	23	1.019	0.066	0.067	-0.08

Table 15.5: SAR Values (WCDMA Band V -Body)

Frequency MHz	Frequency Ch.	Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Full power												
836.6	4183	Band V	12.2kbps RMC	Toward Ground	5	9	23.34	24	1.164	0.62	0.722	-0.18
836.6	4183	Band V	12.2kbps RMC	Toward Phantom	5	/	23.34	24	1.164	0.238	0.277	-0.13
Frequency MHz	**Frequency Ch.**	**Mode /Band**	**Service /Headset**	**Test Position**	**Spacing (mm)**	**Figure No.**	**Measured average power (dBm)**	**Maximum allowed Power (dBm)**	**Scaling factor**	**Measured SAR(10g) (W/kg)**	**Reported SAR(10g) (W/kg)**	**Power Drift (dB)**
Full power												
836.6	4183	Band V	12.2kbps RMC	Toward Phantom	0	/	23.34	24	1.164	0.27	0.314	0.01
836.6	4183	Band V	12.2kbps RMC	Toward Ground	0	10	23.34	24	1.164	0.736	0.857	0.12

Table 15.6: SAR Values (LTE Band 2 -Body)

Frequency		Configuration	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
Power reduce											
1860	18700	20M 1RB 50offset	Toward Ground	5	/	11.76	12	1.057	0.803	0.849	-0.07
1880	18900	20M 1RB 50offset	Toward Ground	5	/	11.46	12	1.132	0.878	0.994	0.09
1900	19100	20M 1RB 50offset	Toward Ground	5	11	11.56	12	1.107	0.955	1.057	0.03
1860	18700	20M 50RB 25offset	Toward Ground	5	/	10.89	12	1.291	0.671	0.866	0.02
1880	18900	20M 50RB 25offset	Toward Ground	5	/	10.69	12	1.352	0.901	1.218	0.03
1900	19100	20M 50RB 25offset	Toward Ground	5	/	10.79	12	1.321	0.746	0.986	0.05
Repeated											
1900	19100	20M 1RB 50offset	Toward Ground	5	/	11.56	12	1.107	0.94	1.040	0.05
100%RB											
1880	18900	20M 100RB 0offset	Toward Ground	5	/	10.74	11	1.062	0.553	0.587	0.05
Full power											
1860	18700	20M 1RB 50offset	Toward Phantom	5	/	21.18	21.5	1.076	0.081	0.087	0.16
1860	18700	20M 50RB 25offset	Toward Phantom	5	/	19.72	21	1.343	0.061	0.082	0.11
1860	18700	20M 1RB 50offset	Toward Ground	19	/	21.18	21.5	1.076	0.019	0.020	0.04
1860	18700	20M 50RB 25offset	Toward Ground	19	/	19.72	21	1.343	0.017	0.023	0.03
Frequency		Configuration	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
MHz	Ch.										

Power reduce											
1860	18700	20M 1RB 50offset	Toward Ground	0	12	11.76	12	1.057	1.1	1.162	0.08
1860	18700	20M 50RB 25offset	Toward Ground	0	/	10.89	12	1.291	0.941	1.215	0.09
Full power											
1860	18700	20M 1RB 50offset	Toward Phantom	0	/	21.18	21.5	1.076	0.05	0.054	0.11
1860	18700	20M 50RB 25offset	Toward Phantom	0	/	19.72	21	1.343	0.038	0.051	0.13

Table 15.7: SAR Values (LTE Band 4 -Body)

Frequency		Configuration	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
Power reduce											
1745	20300	20M 1RB 0offset	Toward Ground	5	13	14.43	15	1.140	0.71	0.810	-0.15
1745	20300	20M 50RB 0offset	Toward Ground	5	/	13.48	15	1.419	0.515	0.731	0.05
1720	20050	20M 1RB 0offset	Toward Ground	5	/	14.42	15	1.143	0.599	0.685	0.03
1732.5	20175	20M 1RB 0offset	Toward Ground	5	/	14.3	15	1.175	0.659	0.774	0.07
100%RB											
1732.5	20175	20M 100RB 0offset	Toward Ground	5	/	13.02	14	1.253	0.437	0.548	0.03
Full power											
1745	20300	20M 1RB 0offset	Toward Phantom	5	/	21.75	22	1.059	0.09	0.095	0.06
1745	20300	20M 50RB 0offset	Toward Phantom	5	/	20.58	22	1.387	0.073	0.101	0.08
1745	20300	20M 1RB 0offset	Toward Ground	19	/	21.75	22	1.059	0.03	0.032	0.13
1745	20300	20M 50RB 0offset	Toward Ground	19	/	20.58	22	1.387	0.026	0.036	0.1

Frequency		Configuration	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
MHz	Ch.										
Power reduce											
1745	20300	20M 1RB 0offset	Toward Ground	0	14	14.43	15	1.140	0.68	0.775	0.19
1745	20300	20M 50RB 0offset	Toward Ground	0	/	13.48	15	1.419	0.513	0.728	0.03
Full power											
1745	20300	20M 1RB 0offset	Toward Phantom	0	/	21.75	22	1.059	0.057	0.060	-0.02

1745	20300	20M 50RB 0offset	Toward Phantom	0	/	20.58	22	1.387	0.048	0.067	-0.03

Table 15.8: SAR Values (LTE Band 7 -Body)

Frequency		Configuration	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.										
Power reduce											
2535	21100	20M 1RB 50offset	Toward Ground	5	15	15.86	16	1.033	0.442	0.456	0.10
2560	21350	20M 50RB 0offset	Toward Ground	5	/	14.52	15	1.117	0.347	0.388	0.01
Full power											
2535	21100	20M 1RB 50offset	Toward Phantom	5	/	21.1	22	1.230	0.195	0.240	0.06
2560	21350	20M 50RB 0offset	Toward Phantom	5	/	20.09	20.5	1.099	0.163	0.179	0.07
2535	21100	20M 1RB 50offset	Toward Ground	19	/	21.1	22	1.230	0.323	0.397	0.09
2560	21350	20M 50RB 0offset	Toward Ground	19	/	20.09	20.5	1.099	0.259	0.285	0.09
Frequency		Configuration	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
MHz	Ch.										
Power reduce											
2535	21100	20M 1RB 50offset	Toward Ground	0	16	15.86	16	1.033	0.363	0.375	0.01
2560	21350	20M 50RB 0offset	Toward Ground	0	/	14.52	15	1.117	0.279	0.312	0.08
Full power											
2535	21100	20M 1RB 50offset	Toward Phantom	0	/	21.1	22	1.230	0.113	0.139	-0.12
2560	21350	20M 50RB 0offset	Toward Phantom	0	/	20.09	20.5	1.099	0.098	0.108	0.13

Table 15.9: SAR Values (LTE Band 17 -Body)

Frequency MHz	Frequency Ch.	Configuration	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Power reduce											
710	23790	10M 1RB 49offset	Toward Ground	5	17	18.07	19	1.239	0.148	0.183	0.13
710	23790	10M 25RB 13offset	Toward Ground	5	/	17.02	18	1.253	0.111	0.139	0.02
Full power											
710	23790	10M 1RB 49offset	Toward Phantom	5	/	21.3	22	1.175	0.148	0.174	0.03
710	23790	10M 25RB 13offset	Toward Phantom	5	/	20.18	21	1.208	0.111	0.134	0.02
710	23790	10M 1RB 49offset	Toward Ground	19	/	21.3	22	1.175	0.087	0.102	0.14
710	23790	10M 25RB 13offset	Toward Ground	19	/	20.18	21	1.208	0.063	0.076	0.09
Frequency MHz	Frequency Ch.	Configuration	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Power reduce											
710	23790	10M 1RB 49offset	Toward Ground	5	18	18.07	19	1.239	0.417	0.517	0.16
710	23790	10M 25RB 13offset	Toward Ground	5	/	17.02	18	1.253	0.324	0.406	0.04
Full power											
710	23790	10M 1RB 49offset	Toward Phantom	0	/	21.3	22	1.175	0.198	0.233	-0.01
710	23790	10M 25RB 13offset	Toward Phantom	0	/	20.18	21	1.208	0.151	0.182	-0.08

Table 15.10: SAR Values (CDMA BC0-Body)

Frequency MHz	Frequency Ch.	Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Power reduce												
836.52	384	CDMA BC0	1xEV-DO-0	Toward Ground	5	/	17.23	18	1.194	0.847	1.011	0.14
824.7	1013	CDMA BC0	1xEV-DO-0	Toward Ground	5	/	17.22	18	1.197	0.638	0.764	0.12
848.31	777	CDMA BC0	1xEV-DO-0	Toward Ground	5	19	17.22	18	1.197	0.865	1.035	0.16
Repeated												
848.31	777	CDMA BC0	1xEV-DO-0	Toward Ground	5	/	17.22	18	1.197	0.857	1.026	0.01
Full power												
836.52	384	CDMA BC0	1xEV-DO-0	Toward Phantom	5	/	23.34	24	1.164	0.297	0.346	0.02
836.52	384	CDMA BC0	1xEV-DO-0	Toward Ground	19	/	23.34	24	1.164	0.462	0.538	-0.05

Frequency MHz	Frequency Ch.	Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
Power reduce												
836.52	384	CDMA BC0	1xEV-DO-0	Toward Ground	0	20	17.23	18	1.194	0.899	1.073	0.05
Full power												
836.52	384	CDMA BC0	1xEV-DO-0	Toward Phantom	0	/	23.34	24	1.164	0.365	0.425	0.07

Table 15.11: SAR Values (CDMA BC1-Body)

Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Power reduce												
1880	600	CDMA BC1	1xEV-DO-0	Toward Ground	5	21	15.48	16	1.127	0.952	1.073	-0.13
1851.25	25	CDMA BC1	1xEV-DO-0	Toward Ground	5	/	15.57	16	1.104	0.922	1.018	0.15
1908.75	1175	CDMA BC1	1xEV-DO-0	Toward Ground	5	/	15.59	16	1.099	0.946	1.040	0.13
Repeated												
1880	600	CDMA BC1	1xEV-DO-0	Toward Ground	5	/	15.48	16	1.127	0.921	1.038	0.02
Full power												
1880	600	CDMA BC1	1xEV-DO-0	Toward Phantom	5	/	21.7	22	1.072	0.0865	0.093	0.06
1880	600	CDMA BC1	1xEV-DO-0	Toward Ground	19	/	21.7	22	1.072	0.78	0.836	0.06
1851.25	25	CDMA BC1	1xEV-DO-0	Toward Ground	19	/	21.87	22	1.030	0.813	0.838	0.14
1908.75	1175	CDMA BC1	1xEV-DO-0	Toward Ground	19	/	21.89	22	1.026	0.76	0.779	0.06
Repeated												
1851.25	25	CDMA BC1	1xEV-DO-0	Toward Ground	19	/	21.87	22	1.030	0.768	0.791	0.06
Frequency		Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
MHz	Ch.											
Power reduce												
1880	600	CDMA BC1	1xEV-DO-0	Toward Ground	0	22	15.48	16	1.127	1	1.127	0.18
Full power												
1880	600	CDMA BC1	1xEV-DO-0	Toward Phantom	0	/	21.87	22	1.030	0.087	0.090	0.18

Table 15.12: SAR Values (WiFi 802.11b - Body)

Frequency MHz	Frequency Ch.	Mode /Band	Service /Headset	Test Position	Spacing (mm)	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Full power												
2462	11	WiFi 2450	802.11b	Toward Phantom	5	/	20.26	21	1.186	0.1	0.119	0.04
2462	11	WiFi 2450	802.11b	Toward Ground	5	23	20.26	21	1.186	0.143	0.170	0.17
Frequency MHz	**Frequency Ch.**	**Mode /Band**	**Service /Headset**	**Test Position**	**Spacing (mm)**	**Figure No.**	**Measured average power (dBm)**	**Maximum allowed Power (dBm)**	**Scaling factor**	**Measured SAR(10g) (W/kg)**	**Reported SAR(10g) (W/kg)**	**Power Drift (dB)**
Full power												
2462	11	WiFi 2450	802.11b	Toward Phantom	0	24	20.26	21	1.186	0.103	0.122	-0.10
2462	11	WiFi 2450	802.11b	Toward Ground	0	/	20.26	21	1.186	0.07	0.083	0.12

16. Simultaneous TX SAR Considerations

Table16.1 Simultaneous transmission SAR

Standalone SAR for 2G(W/Kg)				
Test Position		GSM 850	GSM 1900	Highest SAR
0mm	Phantom Side	1.216	0.215	1.216
0mm	Ground Side	0.721	1.529	1.529
5mm	Phantom Side	1.020	0.187	1.020
5mm	Ground Side	0.621	1.016	1.016
19mm	Ground Side	0.439	1.359	1.359

Standalone SAR for 3G(W/Kg)							
Test Position		WCDMA Band II	WCDMA Band IV	WCDMA Band V	BC0	BC1	Highest SAR
0mm	Phantom Side	0.080	0.067	0.857	0.425	0.090	0.857
0mm	Ground Side	0.643	0.642	0.314	1.073	1.127	1.127
5mm	Phantom Side	0.110	0.069	0.277	0.346	0.093	0.346
5mm	Ground Side	0.745	0.599	0.722	1.035	1.073	1.073
19mm	Ground Side	0.778	0.570	--	0.538	0.838	0.838

Standalone SAR for 4G (W/Kg)						
Test Position		LTE Band 2	LTE Band 4	LTE Band7	LTE Band 17	Highest SAR
0mm	Phantom Side	0.054	0.067	0.139	0.233	0.233
0mm	Ground Side	1.215	0.775	0.375	0.517	1.215
5mm	Phantom Side	0.087	0.101	0.240	0.174	0.240
5mm	Ground Side	1.218	0.810	0.456	0.183	1.218
19mm	Ground Side	0.023	0.036	0.397	0.102	0.397

Simultaneous multi-band transmission									
Test Position		2G	3G	4G	2.4GHz		5GHz	SUM	
					BT	WiFi	WiFi	2.4GHz	5GHz
0mm(10g)	Phantom Side	1.216	0.857	0.233	0.067	0.122	0.026	1.338	1.283
	Ground Side	1.529	1.127	1.215	0.067	0.083	0.033	1.612	1.596
5mm(1g)	Phantom Side	1.020	0.346	0.240	0.167	0.119	0.023	1.187	1.187
	Ground Side	1.016	1.073	1.218	0.167	0.170	0.01	1.388	1.385
19mm(1g)	Ground Side	1.359	0.838	0.397	0.044	--	--	1.403	1.403

According to the conducted power measurement result, we can draw the conclusion that: stand-alone SAR for WiFi should be performed. Then, simultaneous transmission SAR for WiFi/BT is considered with measurement results of GSM/WCDMA/LTE/CDMA and WiFi/BT. According to the above table, the sum of reported SAR values for GSM/WCDMA/LTECDMA and WiFi<1.6W/kg. So the simultaneous transmission SAR is not required for WiFi/BT transmitter.

17. 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; steps2) 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 ≥ 1.45W/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 17.1: SAR Measurement Variability for Body Value (1g)

Frequency		Configuration	Test Position	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio
MHz	Ch.					
836.6	190	GPRS 2TS	Ground	0.845	0.872	1.032
1880	661	GPRS 2TS	Ground	0.964	0.941	1.024
848.31	777	1xEV-DO-0	Ground	0.865	0.857	1.009
1880	600	1xEV-DO-0	Ground	0.952	0.921	1.034

Note: According to the KDB 865664 D01repeated measurement is not required when the original highest measured SAR is < 0.8 W/kg.

18. Test Equipments Utilized

18.1. SAR Test System

Item.	Instrument Name	Type	Serial Number	Manufacturer	Calibration Date	Valid Period
01	Network analyzer	N5242A	MY51221755	Agilent	Dec 17, 2018	1 year
02	Power meter	NRVD	102257	RS	May 11, 2018	1 year
03	Power sensor	NRV-Z5	100241			
			100644			
04	Signal Generator	E4438C	MY49072044	Agilent	May 11, 2018	1 Year
05	Amplifier	NTWPA-0086010F	12023024	rflight	No Calibration Requested	
06	Coupler	778D	MY4825551	Agilent	May 11, 2018	1 year
07	BTS	E5515C	MY50266468	Agilent	Dec 17, 2018	1 year
		MT8820C	6201240338	Anritsu	Dec 17, 2018	1 year
08	E-field Probe	ES3DV3	3252	SPEAG	Sep 4,2018	1 year
09	DAE	SPEAG DAE4	1244	SPEAG	Dec 3,2018	1 year
10	Dipole Validation Kit	SPEAG D750V3	1144	SPEAG	Oct 26, 2018	3 year
		SPEAG D835V2	4d112	SPEAG	Oct 25, 2018	3 year
		SPEAG D1750V2	1044	SPEAG	Oct 31, 2018	3 year
		SPEAG D1900V2	5d151	SPEAG	Dec 6,2017	3 year
		SPEAG D2450V2	858	SPEAG	Oct 26,2018	3 year
		SPEAG D2600V2	1031	SPEAG	Nov. 1,2018	3 year

19. Measurement Uncertainty

Measurement uncertainty evaluation for SAR test

Error Description	Unc. value, ±%	Prob. Dist.	Div.	c_i 1g	c_i 10g	Std.Unc. ±%,1g	Std.Unc. ±%,10g	V_i v_{eff}
Measurement System								
Probe Calibration	6.0	N	1	1	1	6.0	6.0	∞
Axial Isotropy	0.5	R	$\sqrt{3}$	0.7	0.7	0.2	0.2	∞
Hemispherical Isotropy	2.6	R	$\sqrt{3}$	0.7	0.7	1.1	1.1	∞
Boundary Effects	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
Linearity	0.6	R	$\sqrt{3}$	1	1	0.3	0.3	∞
System Detection Limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Readout Electronics	0.7	N	1	1	1	0.7	0.7	∞
Response Time	0	R	$\sqrt{3}$	1	1	0	0	∞
Integration Time	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
RF Ambient Noise	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
RF Ambient Reflections	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Probe Positioner	1.5	R	$\sqrt{3}$	1	1	0.9	0.9	∞
Probe Positioning	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Max. SAR Eval.	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test Sample Related								
Device Positioning	2.9	N	1	1	1	2.9	2.9	145
Device Holder	3.6	N	1	1	1	3.6	3.6	5
Phantom and Setup								
Phantom Uncertainty	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
Liquid Conductivity (target)	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (meas.)	2.5	N	1	0.64	0.43	1.6	1.1	∞
Liquid Permittivity (target)	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (meas.)	2.5	N	1	0.6	0.49	1.5	1.2	∞
Combined Std. Uncertainty		RSS				9.27	9.07	
Expanded STD Uncertainty		k=2				18.53	18.14	

Measurement uncertainty evaluation for system validation

Error Description	Unc. value, ±%	Prob. Dist.	Div.	c_i 1g	c_i 10g	Std.Unc. ±%,1g	Std.Unc. ±%,10g	V_i V_{eff}
Measurement System								
Probe Calibration	6.0	N	1	1	1	6.0	6.0	∞
Axial Isotropy	0.5	R	$\sqrt{3}$	0.7	0.7	0.2	0.2	∞
Hemispherical Isotropy	2.6	R	$\sqrt{3}$	0.7	0.7	1.1	1.1	∞
Boundary Effects	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
Linearity	0.6	R	$\sqrt{3}$	1	1	0.3	0.3	∞
System Detection Limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Readout Electronics	0.7	N	1	1	1	0.7	0.7	∞
Response Time	0	R	$\sqrt{3}$	1	1	0	0	∞
Integration Time	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
RF Ambient Noise	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
RF Ambient Reflections	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Probe Positioner	1.5	R	$\sqrt{3}$	1	1	0.9	0.9	∞
Probe Positioning	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Max. SAR Eval.	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Diople								
Power Drift	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Dipole Positioning	2.0	N	1	1	1	2.0	2.0	∞
Dipole Input Power	5.0	N	1	1	1	5.0	5.0	∞
Phantom and Setup								
Phantom Uncertainty	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
Liquid Conductivity (target)	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (meas.)	2.5	N	1	0.64	0.43	1.6	1.1	∞
Liquid Permittivity (target)	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (meas.)	2.5	N	1	0.6	0.49	1.5	1.2	∞
Combined Std Uncertainty						±11.2%	±10.9%	387
Expanded Std Uncertainty						**±22.4%**	**±21.8%**	

Measurement uncertainty evaluation for Fast SAR test

Error Description	Unc. value, ±%	Prob. Dist.	Div.	ci	ci	Std.Unc.	Std.Unc.	Vi
				1g	10g	±%,1g	±%,10g	veff
Probe Calibration	6	N	1	1	1	6.00	6.00	∞
Axial Isotropy	0.5	R	√3	0.7	0.7	0.20	0.20	∞
Hemispherical Isotropy	2.6	R	√3	1	1	1.50	1.50	∞
Boundary Effects	0.8	R	√3	0.7	0.7	0.32	0.32	∞
Linearity	0.6	R	√3	1	1	0.35	0.35	∞
System Detection Limits	1	R	√3	1	1	0.58	0.58	∞
Readout Electronics	0.7	R	√3	1	1	0.40	0.40	∞
Response Time	0	N	1	1	1	0.00	0.00	∞
Integration Time	2.6	R	√3	1	1	1.50	1.50	∞
RF Ambient Noise	3	R	√3	1	1	1.73	1.73	∞
RF Ambient Reflections	3	R	√3	1	1	1.73	1.73	∞
Probe Positioner	1.5	R	√3	1	1	0.87	0.87	∞
Probe Positioning	2.9	R	√3	1	1	1.67	1.67	∞
Max. SAR Eval.	1	R	√3	1	1	0.58	0.58	∞
Fast SAR z-Approximation	7	R	√3	1	1	4.04	4.04	∞
Test sample Related								
Test sample Positioning	2.9	N	1	1	1	2.9	2.9	145
Device Holder Uncertainty	3.6	N	1	1	1	3.6	3.6	5
Phantom and Tissue Parameters								
Phantom Uncertainty	4	R	√3	1	1	2.31	2.31	∞
Liquid Conductivity (target)	5	R	√3	0.64	0.43	1.85	1.24	∞
Liquid Conductivity (meas)	2.5	N	1	0.64	0.43	0.92	0.62	∞
Liquid Permittivity (target)	5	R	√3	0.6	0.49	1.73	1.41	∞
Liquid Permittivity (meas)	2.5	N	1	0.6	0.49	0.87	0.71	∞
Combined Std. Uncertainty		RSS				**10.11**	**9.93**	
Expanded STD Uncertainty		k=2				**20.22**	**19.86**	

END OF REPORT BODY

ANNEX A. Graph Results

Fig.1 GPRS850 2TS Phantom Mode Middle Repeated

Date/Time: 2019/1/10
Electronics: DAE4 Sn1244
Medium parameters used: f = 837 MHz; σ = 1.001 S/m; ε_r = 56.715; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃   Liquid Temperature:22.5 ℃
Communication System: GSM 850MHz GPRS 2TS (0); Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Probe: ES3DV3 - SN3252ConvF(6.34, 6.34, 6.34); Calibrated: 9/4/2018
GPRS850 2TS Phantom Mode Middle Repeated/Area Scan (61x121x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.938 W/kg
GPRS850 2TS Phantom Mode Middle Repeated/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.07 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.872 W/kg; SAR(10 g) = 0.608 W/kg
Maximum value of SAR (measured) = 0.925 W/kg

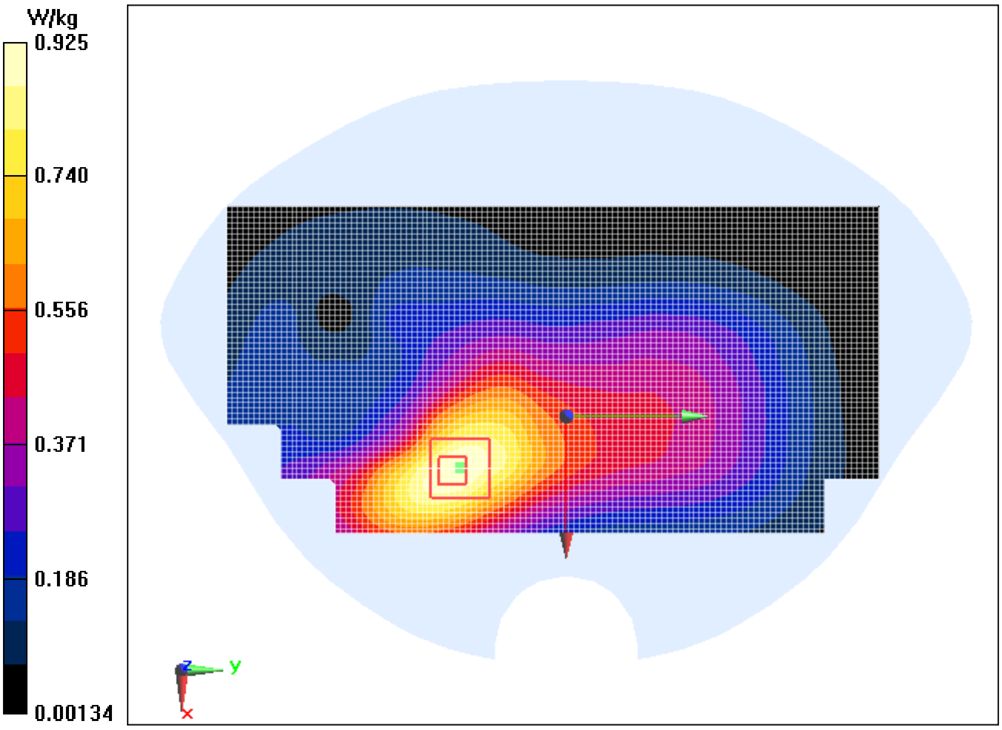


Fig.2GPRS850 2TS Phantom Mode Middle

Date/Time: 2019/1/10
Electronics: DAE4 Sn1244
Medium parameters used: f = 837 MHz; σ = 1.001 S/m; ε_r = 56.715; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 850MHz GPRS 2TS (0); Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Probe: ES3DV3 - SN3252ConvF(6.34, 6.34, 6.34); Calibrated: 9/4/2018
GPRS850 2TS Phantom Mode Middle/Area Scan (61x121x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 1.63 W/kg
GPRS850 2TS Phantom Mode Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.31 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 2.13 W/kg
SAR(1 g) = 1.52 W/kg; SAR(10 g) = 1.04 W/kg
Maximum value of SAR (measured) = 1.61 W/kg

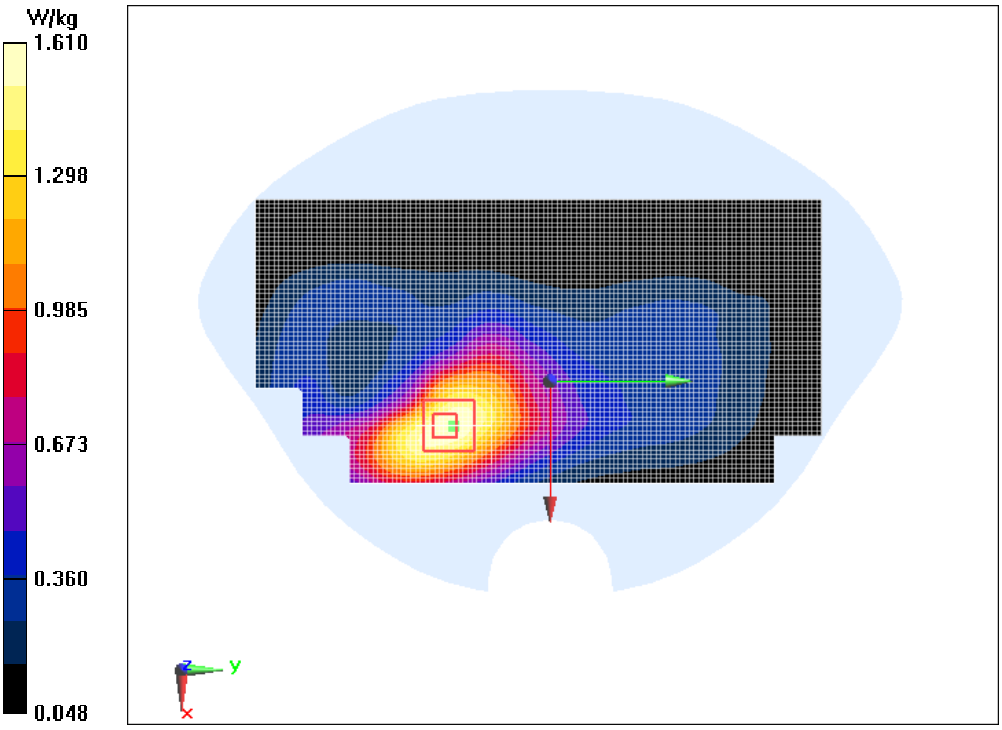


Fig.3 GSM1900 GPRS2TS Ground Mode Middle

Date/Time: 2019/1/9
Electronics: DAE4 Sn1244
Medium parameters used: f = 1880 MHz; σ = 1.536 S/m; ε_r = 52.147; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1900MHz GPRS 2TS (0); Frequency: 1880 MHz; Duty Cycle: 1:4.15
Probe: ES3DV3 - SN3252ConvF(4.77, 4.77, 4.77); Calibrated: 9/4/2018
GPRS2TS Ground Mode Middle/Area Scan (61x81x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 1.4 W/kg
GPRS2TS Ground Mode Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.846 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.97 W/kg
SAR(1 g) = 1.31 W/kg; SAR(10 g) = 0.828 W/kg
Maximum value of SAR (measured) = 1.40 W/kg

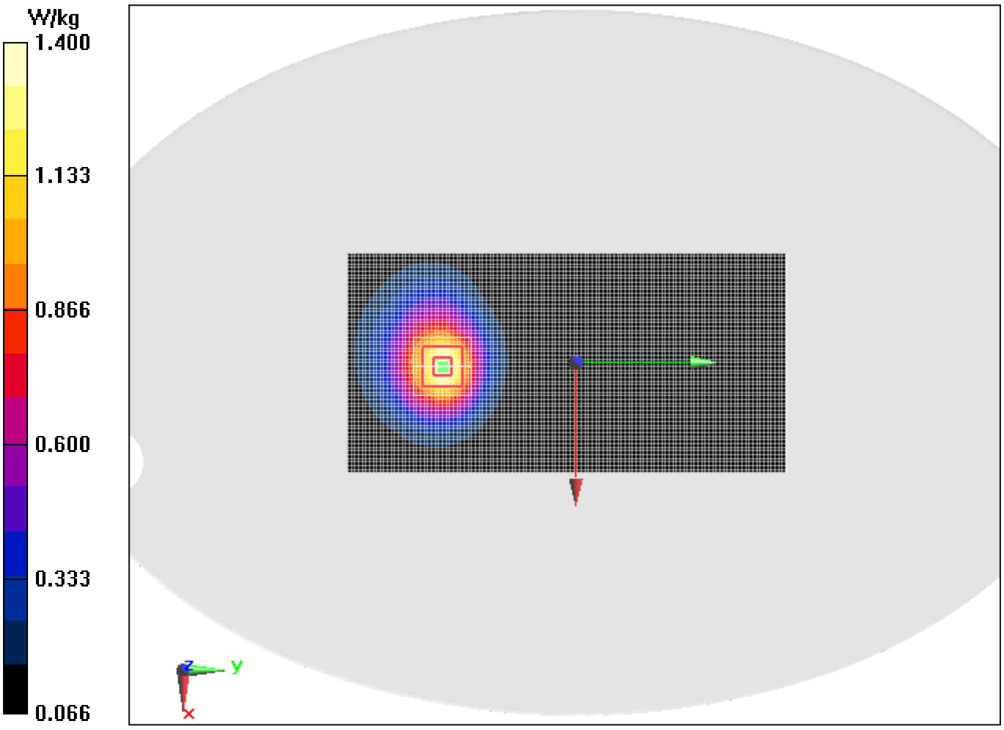


Fig.4 GSM1900GPRS2TS Ground Mode Middle

Date/Time: 2019/1/9
Electronics: DAE4 Sn1244
Medium parameters used: f = 1880 MHz; σ = 1.536 S/m; ε_r = 52.147; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: GSM 1900MHz GPRS 2TS (0); Frequency: 1880 MHz; Duty Cycle: 1:4.15
Probe: ES3DV3 - SN3252ConvF(4.77, 4.77, 4.77); Calibrated: 9/4/2018
GPRS2TS Ground Mode Middle/Area Scan (61x81x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 3.49 W/kg
GPRS2TS Ground Mode Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.729 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 6.32 W/kg
SAR(1 g) = 3.12 W/kg; SAR(10 g) = 1.45 W/kg
Maximum value of SAR (measured) = 3.57 W/kg

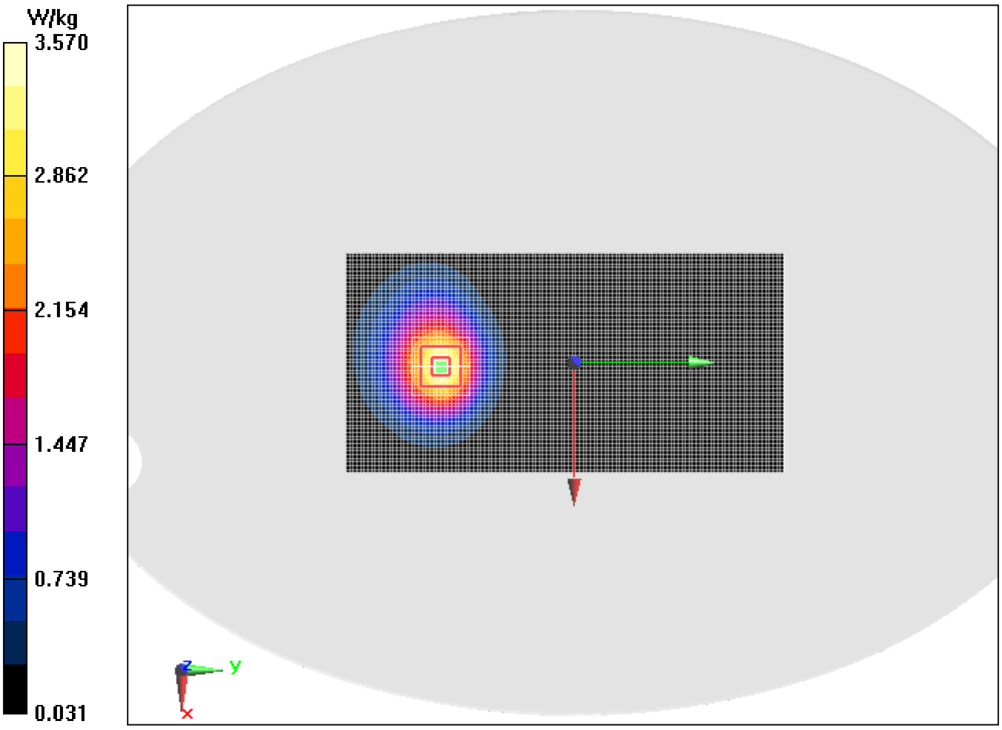


Fig.5 WCDMA Band 2 Ground Mode Middle

Date/Time: 2019/1/9
Electronics: DAE4 Sn1244
Medium parameters used: f = 1880 MHz; σ = 1.536 S/m; ε_r = 52.147; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: WCDMA Professional Band Ⅱ; Frequency: 1880 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.77, 4.77, 4.77); Calibrated: 9/4/2018
WCDMA Band 2 Ground Mode Middle/Area Scan (61x121x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.824 W/kg
WCDMA Band 2 Ground Mode Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.393 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.750 W/kg; SAR(10 g) = 0.473 W/kg
Maximum value of SAR (measured) = 0.812 W/kg

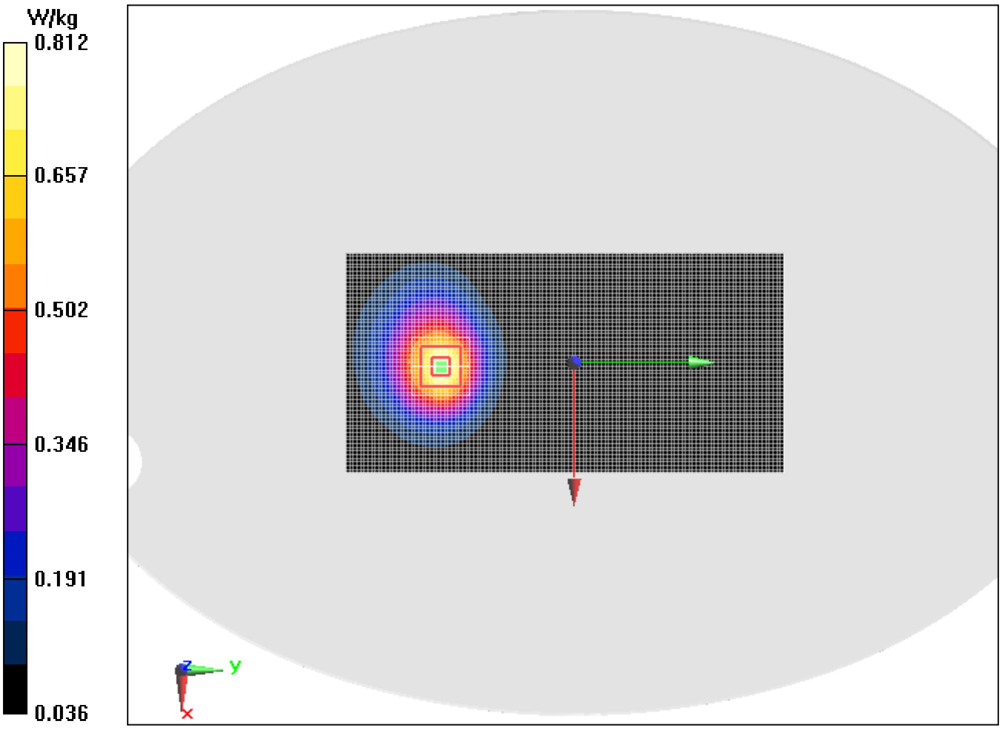


Fig.6 WCDMA Band 2 Ground Mode Middle

Date/Time: 2019/1/9

Electronics: DAE4 Sn1244

Medium parameters used: f = 1880 MHz; σ = 1.536 S/m; ε_r = 52.147; ρ = 1000 kg/m^3

Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃

Communication System: WCDMA Professional Band Ⅱ; Frequency: 1880 MHz; Duty Cycle: 1:1

Probe: ES3DV3 - SN3252ConvF(4.77, 4.77, 4.77); Calibrated: 9/4/2018

WCDMA Band 2 Ground Mode Middle /Area Scan (61x101x1):

Measurement grid: dx=10 mm, dy=10 mm

Maximum value of SAR (Measurement) = 1.46 W/kg

WCDMA Band 2 Ground Mode Middle /Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.7260 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 2.38 W/kg

SAR(1 g) = 1.25 W/kg; SAR(10 g) = 0.620 W/kg

Maximum value of SAR (measured) = 1.37 W/kg

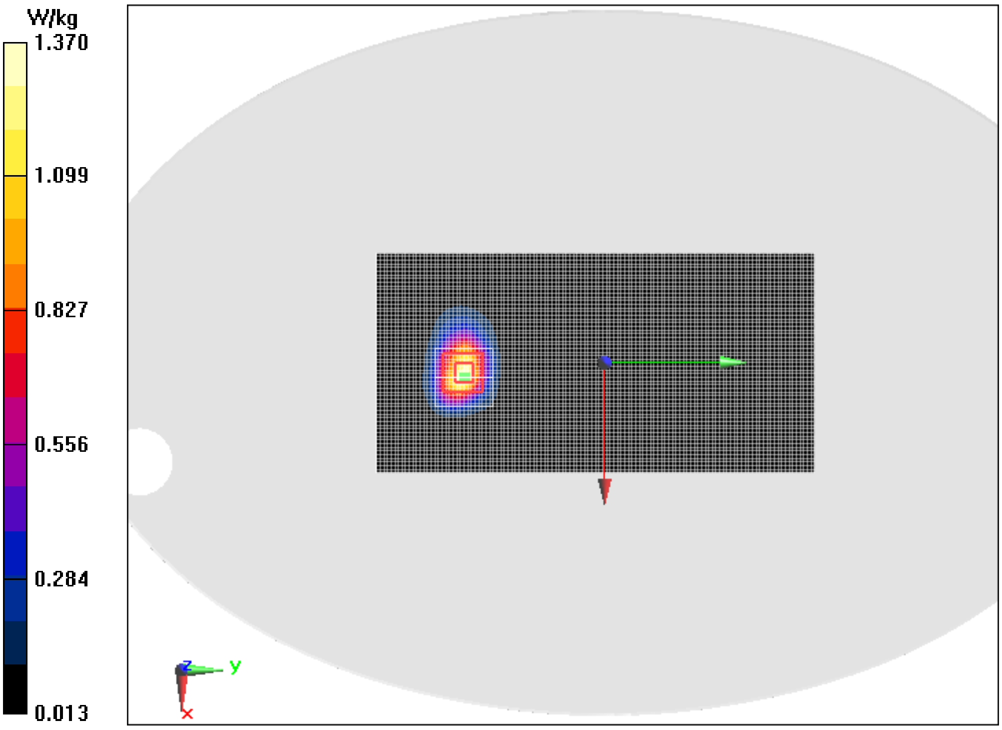


Fig.7 WCDMA Band 4 Ground Mode Middle

Date/Time: 2019/1/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 1733 MHz; σ = 1.408 S/m; ε_r = 55.442; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: WCDMA Professional 1800MHz; Frequency: 1732.6 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.99, 4.99, 4.99); Calibrated: 9/4/2018
WCDMA Band 4 Ground Mode Middle/Area Scan (61x81x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.633 W/kg
WCDMA Band 4 Ground Mode Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.532 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.820 W/kg
SAR(1 g) = 0.560 W/kg; SAR(10 g) = 0.367 W/kg
Maximum value of SAR (measured) = 0.602 W/kg

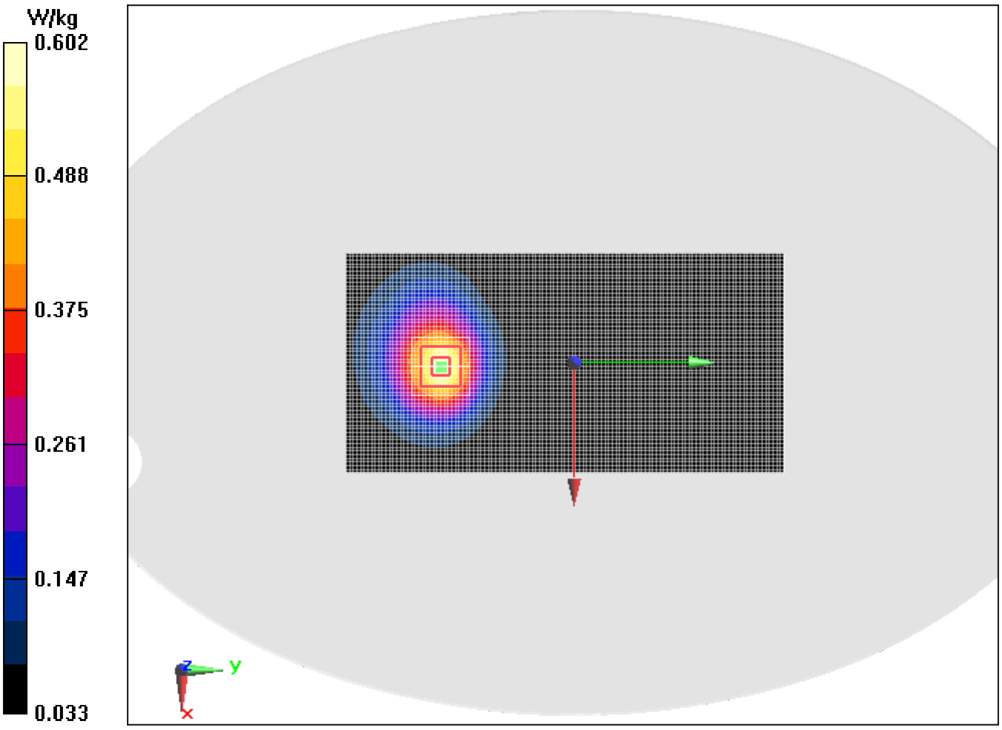


Fig.8 WCDMA Band 4 Ground Mode Middle

Date/Time: 2019/1/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 1733 MHz; σ = 1.408 S/m; ε_r = 55.442; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃   Liquid Temperature:22.5 ℃
Communication System: WCDMA Professional 1800MHz; Frequency: 1732.6 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.99, 4.99, 4.99); Calibrated: 9/4/2018
WCDMA Band 4 Ground Mode Middle/Area Scan (61x121x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 1.27 W/kg
WCDMA Band 4 Ground Mode Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.9780 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.01 W/kg
SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.575 W/kg
Maximum value of SAR (measured) = 1.23 W/kg

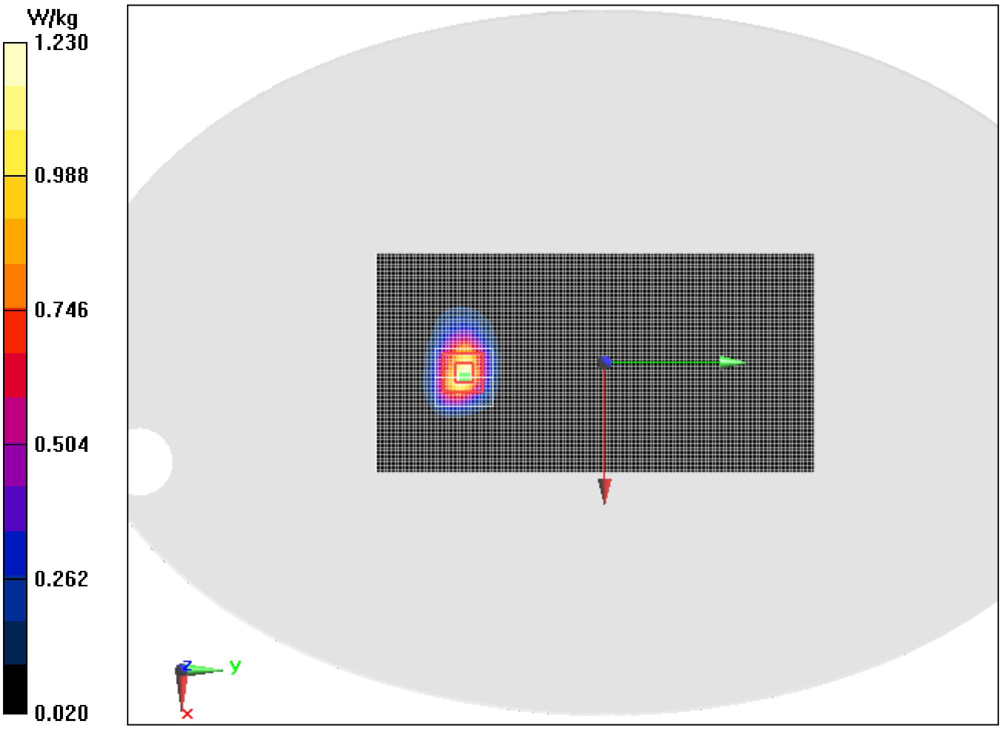


Fig.9 WCDMA Band 5 Ground Mode Middle

Date/Time: 2019/1/10

Electronics: DAE4 Sn1244

Medium parameters used: f = 837 MHz; σ = 1.001 S/m; ε_r = 56.715; ρ = 1000 kg/m^3

Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃

Communication System: WCDMA Professional Band Ⅴ; Frequency: 836.6 MHz; Duty Cycle: 1:1

Probe: ES3DV3 - SN3252ConvF(6.34, 6.34, 6.34); Calibrated: 9/4/2018

WCDMA Band 5 Ground Mode Middle/Area Scan (61x121x1):

Measurement grid: dx=10 mm, dy=10 mm

Maximum value of SAR (Measurement) = 0.568 W/kg

WCDMA Band 5 Ground Mode Middle/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.893 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 1.14 W/kg

SAR(1 g) = 0.620 W/kg; SAR(10 g) = 0.340 W/kg

Maximum value of SAR (measured) = 0.696 W/kg

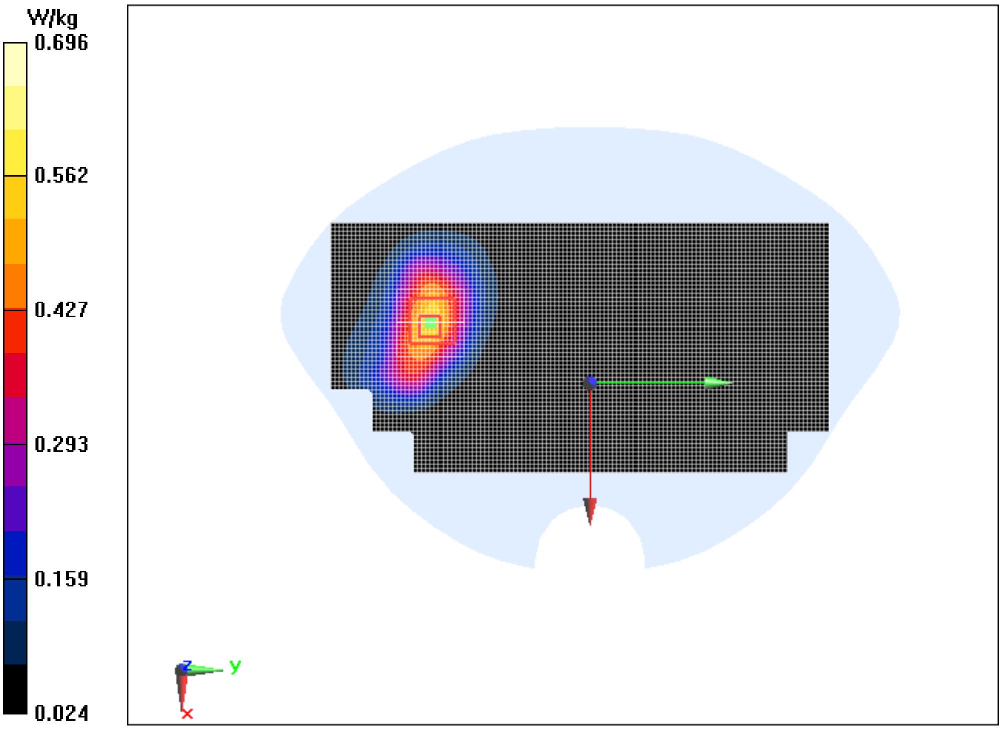


Fig.10 WCDMA Band 5 Ground Mode Middle

Date/Time: 2019/1/10
Electronics: DAE4 Sn1244
Medium parameters used: f = 837 MHz; σ = 1.001 S/m; ε_r = 56.715; ρ = 1000 kg/m^3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: WCDMA Professional Band Ⅴ; Frequency: 836.6 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.34, 6.34, 6.34); Calibrated: 9/4/2018
WCDMA Band 5 Ground Mode Middle/Area Scan (61x121x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 1.76 W/kg
WCDMA Band 5 Ground Mode Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.5440 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 3.23 W/kg
SAR(1 g) = 1.5 W/kg; SAR(10 g) = 0.736 W/kg
Maximum value of SAR (measured) = 1.79 W/kg