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Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd

TEST REPORT

SCOPE OF WORK
FCC TESTING– CP3504L

REPORT NUMBER
200810037SZN-005

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SAR TEST REPORT

For

Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd

Smartphone

Model No.: CP3504L

FCC ID: R38YLCP3504L

Report No.: 200810037SZN-005

Issue Date: September 10, 2020

Prepared by

Intertek Testing Services Shenzhen Ltd. Longhua Branch

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1 GENERAL INFORMATION

Applicant:	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd Building B, Boton Science Part Chaguang Road, Xili Town, Nanshan District Shenzhen, China
Manufacturer:	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd Building B, Boton Science Part Chaguang Road, Xili Town, Nanshan District Shenzhen, China
Product Description:	Smartphone
Model Number:	CP3504L
File Number:	200810037SZN-005
Date of Test:	10 August 2020 to 9 September 2020

The above equipment was tested by Intertek Testing Services Shenzhen Ltd. Longhua Branch. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in IEEE 1528-2013 and KDB 865664. This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in ANSI/IEEE C95.1-1992.

The test results of this report relate only to the tested sample identified in this report

Prepared and Checked by:

Leo Li
Project Engineer

Approved by:

Peter Kang
Senior Technical Supervisor
September 10, 2020

2 EQUIPMENT UNDER TEST (EUT) TECHNICAL DESCRIPTION

Characteristics	Description		
Product Name:	Smartphone		
Device type:	Portable device		
Exposure Category:	Uncontrolled Environment/General Population		
Test Mode(s):	GSM/TM1 (GSM system, GSM/GPRS, GMSK modulation)		
	GSM/TM2 (GSM system, EDGE, 8PSK modulation)		
	UMTS/TM1 (WCDMA system, QPSK modulation)		
	UMTS/TM2 (HSDPA system, QPSK modulation)		
	UMTS/TM3 (HSUPA system, QPSK modulation)		
	LTE/TM1 (LTE system, QPSK modulation)		
	LTE/TM2 (LTE system, 16QAM modulation)		
	WiFi 2.4G (DSSS/OFDM)		
	Bluetooth (GFSK, Pi/4 DQPSK, 8DPSK)		
Device Class:	B		
Antenna Type:	WiFi/Bluetooth: Internal permanent antenna GSM/WCDMA/LTE: Internal permanent antenna		
Antenna Gain:	GSM850: -2.1dBm GSM1900: -0.4dBm UMTS850: -0.4dBm UMTS1900: -0.6dBm UMTS1700: -2.0dBm LTE BAND2: -0.4dBm LTE BAND4: -0.6dBm LTE BAND5: -2.0dBm LTE BAND7: 0.2dBm LTE BAND12: -2.4dBm LTE BAND13: -2.1dBm LTE BAND17: -2.5dBm		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM850	824-849	869-894
	GSM1900	1850-1910	1930-1990
	UMTS Band II	1850-1910	1930-1990
	UMTS Band IV	1710-1755	2110-2155
	UMTS Band V	824-849	869-894
	LTE Band II	1850-1910	1930-1990
	LTE Band IV	1710-1755	2110-2155

	LTE Band V	824-849	869-894
	LTE Band VII	2500-2570	2620-2690
	LTE Band XII	699-716	729-746
	LTE Band XIII	777-787	746-756
	LTE Band XVII	704-716	734-746
	BT	2400-2483.5	
	WiFi 2.4G	2412-2462	
GPRS Multislot Class(12)	Max Number of Timeslots in Uplink:	4	
	Max Number of Timeslots in Downlink:	4	
	Max Total Timeslot:	5	
EGPRS Multislot Class(12)	Max Number of Timeslots in Uplink:	4	
	Max Number of Timeslots in Downlink:	4	
	Max Total Timeslot:	5	
HSUPA UE Category:	6		
HSDPA UE Category:	14		
DC-HSDPA Category:	24		
Power Class:	GSM850: 4 GSM1900: 1 UMTS Band II: 3 UMTS Band IV: 3 UMTS Band V: 3 LTE Band 2: 3 LTE Band 4: 3 LTE Band 5: 3 LTE Band 7: 3 LTE Band 12: 3 LTE Band 13: 3 LTE Band 17: 3		
Test Channels (low-mid-high):	128-190-251(GSM850)		
	512-661-810(GSM1900)		
	9262-9400-9538(UMTS Band II)		
	1312-1413-1513(UMTS Band IV)		
	4132-4182-4233(UMTS Band V)		
	18607-18900-19193(LTE Band II BW=1.4MHz)		
	18615-18900-19185(LTE Band II BW=3MHz)		
	18625-18900-19175(LTE Band II BW=5MHz)		
	18650-18900-19150(LTE Band II BW=10MHz)		
	18675-18900-19125(LTE Band II BW=15MHz)		
	18700-18900-19100(LTE Band II BW=20MHz)		
	19957-20175-20393(LTE Band IV BW=1.4MHz)		

	19965-20175-20385(LTE Band IV BW=3MHz)
	19975-20175-20375(LTE Band IV BW=5MHz)
	20000-20175-20350(LTE Band IV BW=10MHz)
	20025-20175-20325(LTE Band IV BW=15MHz)
	20050-20175-20300(LTE Band IV BW=20MHz)
	20407-20525-20643(LTE Band V BW=1.4MHz)
	20415-20525-20635(LTE Band V BW=3MHz)
	20425-20525-20625(LTE Band V BW=5MHz)
	20450-20525-20600(LTE Band V BW=10MHz)
	20775-21100-21425(LTE Band VII BW=5MHz)
	20800-21100-21400(LTE Band VII BW=10MHz)
	20825-21100-21375(LTE Band VII BW=15MHz)
	20850-21100-21350(LTE Band VII BW=20MHz)
	23017-23095-23173(LTE Band XII BW=1.4MHz)
	23025-23095-23165(LTE Band XII BW=3MHz)
	23035-23095-23155(LTE Band XII BW=5MHz)
	23060-23095-23130(LTE Band XII BW=10MHz)
	23205-23230-23255(LTE Band XIII BW=5MHz)
	23230-23230-23230(LTE Band XIII BW=10MHz)
	23755-23790-23825(LTE Band XVII BW=5MHz)
	23780-23790-23800(LTE Band XVII BW=10MHz)
	802.11b/g/n 20M:1-6-11 802.11n 40M:3-6-9 (WiFi 2.4G)
Power supply:	D.C. 3.8V with battery
	D.C. 5V/2A with adaptor
Product Software Version:	CP3503L.200804.V02
Product Hardware Version:	FS176-MB-V2.0

Note:

1. *For more details, please refer to the User's manual of the EUT.*
2. *The sample under test was selected by the Client.*

3 AUXILIARY EQUIPMENT DETAILS

Description	Manufacturer	Description
Power Adapter	SHENZHEN TIANYIN ELECTRONICS CO., LTD	Model: TPA-46050200UU Input: 100-240V~, 50/60Hz, 0.3A Output: DC 5V, 2000mA
USB cable	Provided by applicant	Shielded, Length: 75cm

4 TEST FACILITY

Site Description	
EMC Lab.	The Laboratory has been assessed and proved to be in compliance with CNAS/CL01: 2006(identical to ISO/IEC17025: 2005) The Certificate Registration Number is L0327
	Accredited by FCC The Certificate Registration Number is CN1188
Name of Firm	Intertek Testing Services Shenzhen Ltd. Longhua Branch
Site Location	101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, ShenZhen, P.R. China

5 GUIDANCE STANDARD

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

☒FCC 47CFR §2.1093 Radiofrequency Radiation Exposure Evaluation: Portable Devices

☒ANSI C95.1, 1992: Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.(IEEE Std C95.1-1991)

☒IEEE Std 1528™-2013: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

☒KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz

☒KDB 865664 D02 SAR Reporting v01r02

☒ KDB690783 D01 SAR Listings on Grants v01r03

☒KDB 447498 D01 Mobile Portable RF Exposure v06: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies

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

☒KDB 941225 D01 SAR test for 3G Devices v03r01: SAR Measurement Procesures CDMA2000 1×RTT,1×Ev-Do, WCDMA,HSDPA/HSPA

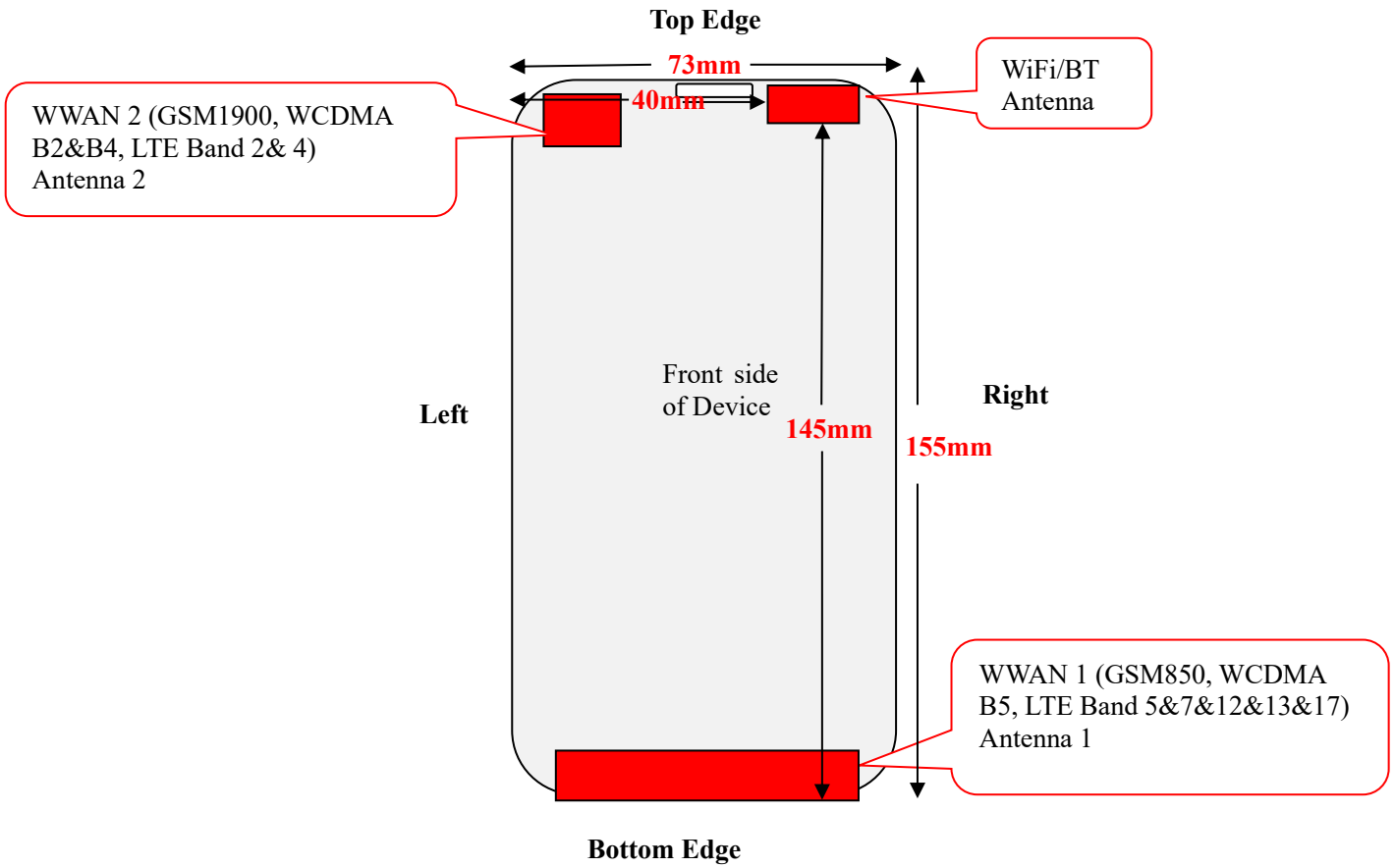
☒KDB 941225 D05 SAR for LTE Devices v02r05: SAR Evaluation Considerations for LTE Devices

☒KDB 941225 D06 Hotspot Mode v02r01: SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

☒KDB 248227 D01 SAR measurement for 802.11 a b g v02r02:SAR Measurement Procedures for 802.11 a/b/g Transtitters

Remark:
This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 11 of this test report are below limits specified in the relevant standards for the tested bands only.

6 EUT ANTENNA LOCATIONS



Test position consideration:

Distance of EUT antenna-to-edge/surface(mm), Test distance:10mm						
Antennas	Back side	Front side	Left Edge	Right Edge	Top Edge	Bottom Edge
WWAN 1	1	5	5	8	145	1
WWAN 2	1	5	2	53	1	145
WLAN	2	5	40	10	1	145
Bluetooth	2	5	40	10	1	145

Test distance:10mm						
Antennas	Back side	Front side	Left Edge	Right Edge	Top Edge	Bottom Edge
WWAN 1	YES	YES	YES	YES	NO	YES
WWAN 2	YES	YES	YES	NO	YES	NO
WLAN	YES	YES	NO	YES	YES	NO
Bluetooth	NO	NO	NO	NO	NO	NO

Note:
1. Head/Body-worn/Hotspot SAR assessments are required.
2. Referring to KDB 941225 D06v02r01, when the overall device length and width are ≥ 9cm * 5cm, the test distance is 10mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.

3. Per KDB 447498 D01v06, for handsets the test separation distance is determined by the smallest distance between the outer surface of the device and the user, which is 0 mm for head SAR, 10 mm for body-worn SAR and hotspot SAR.

The Maximum reported SAR1g

Head SAR Configuration

Mode	Test Position	Channel /Frequency (MHz)	Limit SAR1g 1.6 W/kg	
			Measured SAR1g (W/kg)	Reported SAR1g (W/kg)
UMTS Band IV	Right Cheek	1312/1712.4	1.210	1.32

Body Worn Configuration

Mode	Test Position	Channel /Frequency (MHz)	Limit SAR1g 1.6 W/kg	
			Measured SAR1g (W/kg)	Reported SAR1g (W/kg)
LTE Band 2	Back Side	18700/1860	1.05	1.18

7 RF EXPOSURE

7.1 LIMITS

Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and ankles
0.08	1.6	4.0

Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

7.2 EVALUATION

☒According to FCC KDB447498 D01 and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

1) The 1-g and 10-g SAR test exclusion thresholds 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*)] · [$\sqrt{f_{(GHz)}}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,[16] where

   - $f_{(GHz)}$ is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation[17]
   - The result is rounded to one decimal place for comparison

   The test exclusions are applicable only when the minimum *test separation distance* is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. Portable transmitters with output power greater than the applicable low threshold require SAR testing to qualify for TCB approval.

Exclusion Thresholds = $P\sqrt{F}/D$

P= Maximum turn-up power in mW

F= Channel frequency in GHz

D= Minimum test separation distance in mm

Test Distance (5mm)

Mode	MAX Power (dBm)	Tune Up Power (dBm)	Max Tune Up Power (dBm)	Max Tune Up Power (mW)	Exclusion Thresholds	Limit
WIFI	13.8	13±1	14.0	25.12	7.800	3
Bluetooth	4.19	3.5±1	4.5	2.818	0.887	3
BLE	0.23	-1.0±2	1.0	1.259	0.396	3

Test Distance (10mm)

Mode	MAX Power (dBm)	Tune Up Power (dBm)	Max Tune Up Power (dBm)	Max Tune Up Power (mW)	Exclusion Thresholds	Limit
WIFI	13.8	13±1	14.0	25.12	3.900	3
Bluetooth	4.19	3.5±1	4.5	2.818	0.444	3
BLE	0.23	-1.0±2	1.0	1.259	0.198	3

Result: SAR measurement for WIFI is required.

8 SPECIFIC ABSORPTION RATE (SAR)

8.1 INTRODUCTION

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

8.2 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.

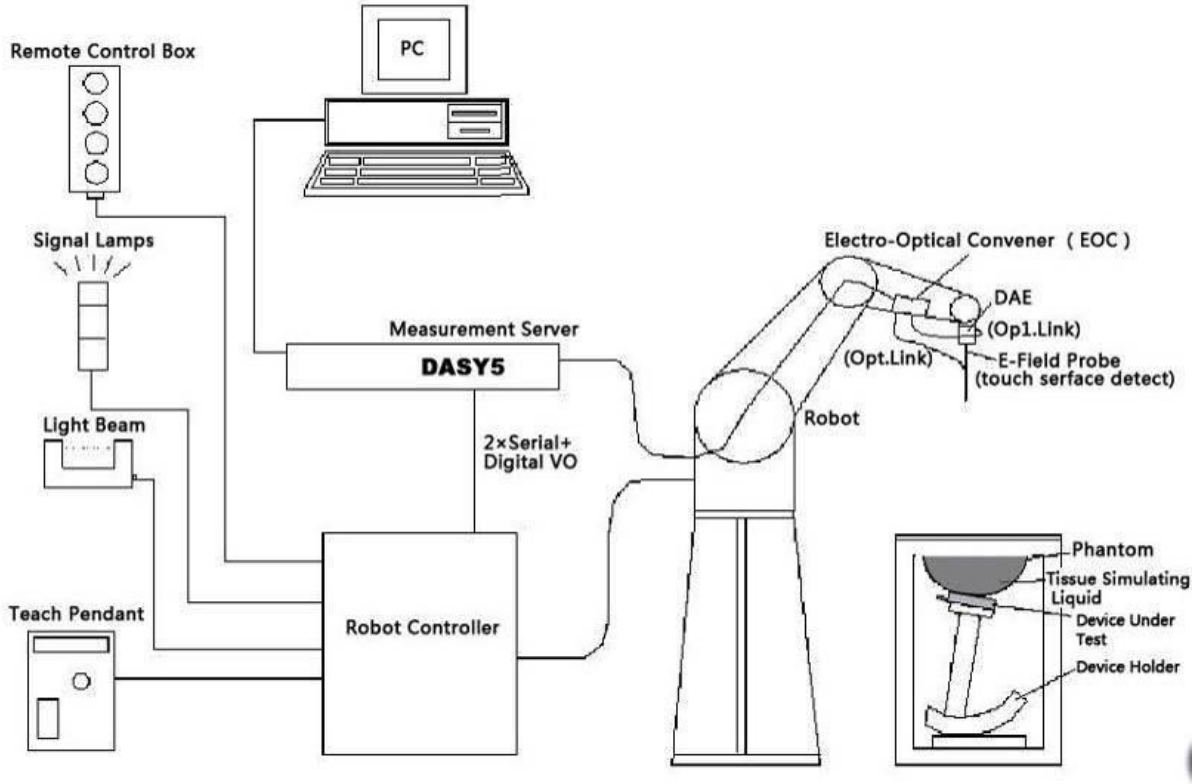
However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

9 SAR MEASUREMENTS SYSTEM CONFIGURATION

9.1 SAR MEASUREMENT SET-UP

The DASY5 system for performing compliance tests consists of the following items:

- 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 Win 7 profesional operating system 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.



Picture 1. SAR Lab Test Measurement Set-up

9.2 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 turning a software approach and looks for the maximum using 2nd ord curve fitting. The approach is stopped at reaching the maximum.

Probe Specifications:

Model: EX3DV4

Calibration: ISO/IEC 17025 calibration service available

Probe Length: 337 mm

Probe Tip Length: 9 mm

Body Diameter: 10 mm

Tip Diameter: 2.5 mm

Application: High Precision dosimetric measurements in any exposure scenario(e.g., very strong gradient fields).

9.3 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 the frequency 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 equate 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).

9.4 OTHER TEST EQUIPMENT

9.4.1 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.

Picture 3: DAE

9.4.2 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX90XL) 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)

Picture 4 DASY 5

9.4.3 Measurement Server

The Measurement server is based on a PC/104 CPU broad with CPU (DASY5: 400 MHz, Intel Celeron), chip disk (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.

Picture 5 Server for DASY 5

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.

9.4.4 Device Holder for Phantom

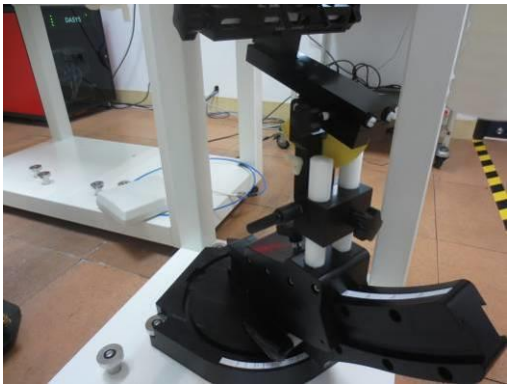
The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. Accurate device positioning is therefore crucial for accurate 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 are 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.



Picture 6: Device Holder

9.4.5 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

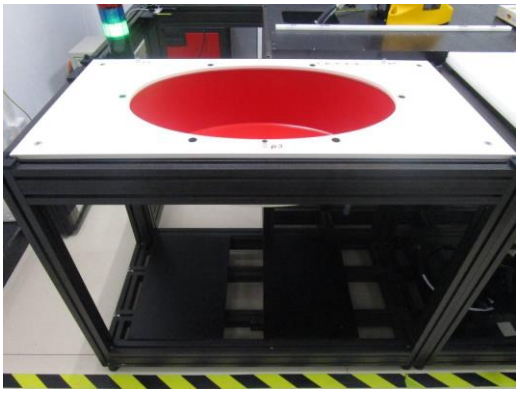
Picture 7: SAM Twin Phantom

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

Shell Thickness 2±0.2 mm

Filling Volume Approx. 30 liters

Dimensions 190×600×0 mm (H x L x W)



Picture 8.ELI Phantom

9.5 SCANNING PROCEDURE

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5 %.

The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles.

The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot. Before starting the area scan a grid spacing is set according to FCC KDB Publication 865664. During scan the distance of the probe to the phantom remains unchanged. After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

Zoom Scan

After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm.

Spatial Peak Detection

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses. The DASY5 system allows evaluations that combine measured data and robot positions, such as:

• maximum search

• extrapolation

• boundary correction

• peak search for averaged SAR

During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space.

They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation.

A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

Table 1: Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01

Frequency	Maximum Area Scan Resolution (mm) (Δxarea, Δyarea)	Maximum Zoom Scan Resolution (mm) (Δxzoom, Δyzoom)	Maximum Zoom Scan Spatial Resolution (mm) Δzzoom(n)	Minimum Zoom Scan Volume (mm) (x,y,z)
≤2 GHz	≤15	≤8	≤5	≥ 30
2-3 GHz	≤12	≤5	≤5	≥30
3-4 GHz	≤12	≤5	≤4	≥28
4-5 GHz	≤10	≤4	≤3	≥25
5-6 GHz	≤10	≤4	≤2	≥22

9.6 DATA STORAGE AND EVALUATION

9.6.1 Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DAE4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device set up, the parameter can be corrected afterwards and the data can be re-evaluated.
The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a loss less media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

9.6.2 Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:

- Sensitivity $Norm_i$, a_{i0}, a_{i1}, a_{i2}
- Conversion factor $ConvF_i$
- Diode compression point Dcp_i

Device parameters:

- Frequency f
- Crest factor cf

Media parameters:
- Conductivity
- Density

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$\mathbf{V_i = U_i + U_i^2 \cdot c\,f / dcp_i}$$

With $\mathbf{V_i}$ = compensated signal of channel i (i = x, y, z)

$\mathbf{U_i}$ = input signal of channel i (i = x, y, z)

cf = crest factor of exciting field (DASY parameter)

dcp_i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be

evaluated:

E-field probes: $\mathbf{E_i = (V_i / Norm_i \cdot ConvF)^{1/2}}$

H-field probes: $\mathbf{H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f}$

With $\mathbf{V_i}$ = compensated signal of channel i (i = x, y, z)

$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)

[mV/(V/m)2] for E-field Probes

ConvF = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

$\mathbf{E_i}$ = electric field strength of channel i in V/m

$\mathbf{H_i}$ = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$\mathbf{E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}}$

The primary field data are used to calculate the derived field units.

$\mathbf{SAR = (E_{tot})\ 2 \cdot \sigma / (\rho \cdot 1000)}$

with **SAR** = local specific absorption rate in mW/g

$\mathbf{E_{tot}}$ = total field strength in V/m

σ = conductivity in [mho/m] or [Siemens/m]

ρ = equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.
$\mathbf{P_{pwe} = E_{tot}^2 / 3770}$ **or** $\mathbf{P_{pwe} = H_{tot}^2 \cdot 37.7}$
with $\mathbf{P_{pwe}}$ = equivalent power density of a plane wave in mW/cm^2
$\mathbf{E_{tot}}$ = total electric field strength in V/m ; $\mathbf{H_{tot}}$ = total magnetic field strength in A/m

9.7 TISSUE-EQUIVALENT LIQUID

9.7.1 Tissue-equivalent Liquid Ingredients

The liquid is consisted of water, salt and Glycol. The liquid has previously been proven to be suited for worst-case. The Table 2 & 3 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the KDB 865664 D01.

Table 2: Recommended Dielectric Performance of Tissue

Recommended Dielectric Performance of Tissue												
Ingredients (% by weight)	Frequency (MHz)											
	750		835		1800		1900		2450		2600	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	40.52	51.83	41.46	52.4	55.2	70.2	54.9	40.4	62.7	73.2	54.8	68.1
Salt (Nacl)	1.61	1.52	1.45	1.4	0.3	0.4	0.18	0.5	0.5	0.04	0.1	0.01
Sugar	57.67	46.45	56.0	45.0	0.0	0.0	0.0	58.0	0.0	0.0	0.0	0.0
HEC	0.1	0.1	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Bactericide	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Triton x-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0	0.0	0.0
DGBE	0.0	0.0	0.0	0.0	44.5	29.4	44.92	0.0	0.0	26.4	45.1	31.8
Dielectric	40.93	54.32	42.54	56.1	40.0	53.3	39.9	54.0	39.8	52.5	39.0	52.5
Conductivity	0.87	0.95	0.91	0.95	1.40	1.52	1.42	1.45	1.88	1.78	1.96	2.15

9.7.2 Tissue-equivalent Liquid Properties

Table 3: Dielectric Performance of Head Tissue Simulating Liquid

Temperature: 21°C Relative humidity: 57%				
Frequency (MHz)	Measured Date	Description	Dielectric Parameters	
			εr	σ(s/m)
750	Aug 24,2020	Target Value ±5% window	41.50 39.43 — 43.58	0.90 0.855 — 0.945
		Measurement Value	41.86	0.90
835	Aug 25,2020	Target Value ±5% window	41.50 39.43 — 43.58	0.90 0.855 — 0.945
		Measurement Value	41.50	0.89
1750	Aug 26,2020	Target Value ±5% window	40.00 38.00 — 42.00	1.40 1.33 — 1.47
		Measurement Value	40.02	1.38
1900	Aug 27,2020	Target Value ±5% window	40.00 38.00 — 42.00	1.40 1.33 — 1.47
		Measurement Value	39.75	1.45
2450	Aug 28,2020	Target Value ±5% window	39.2 37.24— 41.16	1.80 1.71 — 1.89
		Measurement Value	37.97	1.88
2600	Aug 29,2017	Target Value ±5% window	39.0 37.05 — 40.95	1.96 1.87 — 2.05
		Measurement Value	39.53	2.02

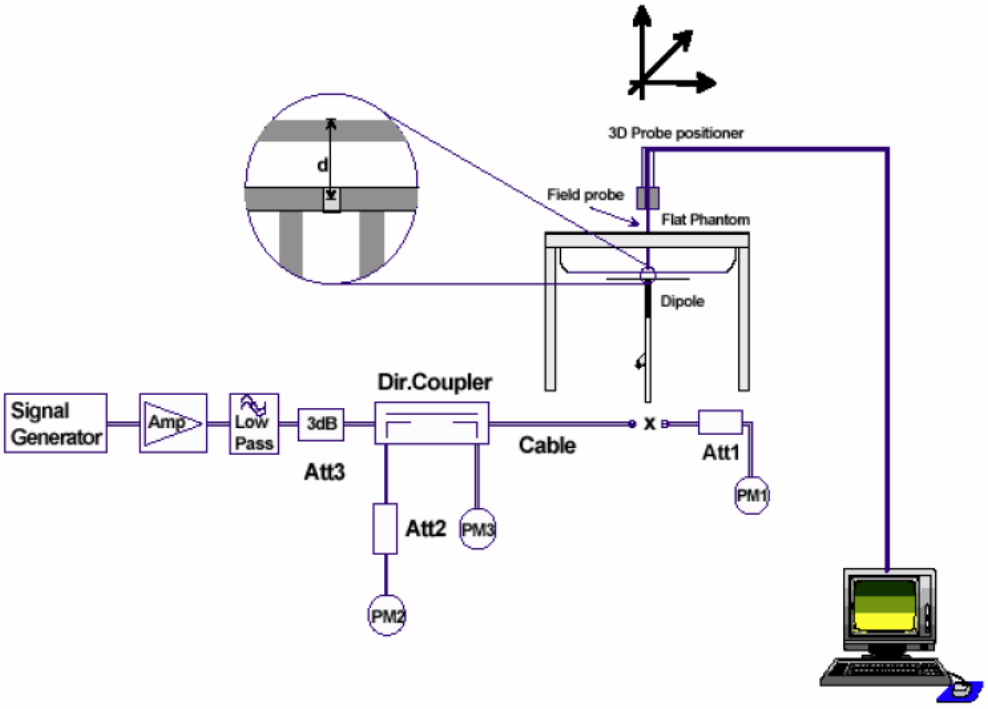
Table 4: Dielectric Performance of Body Tissue Simulating Liquid

Temperature: 21°C Relative humidity: 57%				
Frequency (MHz)	Measured Date	Description	Dielectric Parameters	
			εr	σ(s/m)
750	Aug 24,2020	Target Value ±5% window	54.92 52.17 — 57.67	0.97 0.922 — 1.018
		Measurement Value	54.86	0.95
835	Aug 25,2020	Target Value ±5% window	55.2 52.25 — 57.75	0.97 0.922 — 1.018
		Measurement Value	55.87	0.95
1750	Aug 26,2020	Target Value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60
		Measurement Value	53.13	1.48
1900	Aug 27,2020	Target Value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60
		Measurement Value	51.05	1.57
2450	Aug 28,2020	Target Value ±5% window	52.70 50.07 — 55.34	1.95 1.86 — 2.05
		Measurement Value	50.71	2.02
2600	Aug 29,2017	Target Value ±5% window	52.50 49.88 — 55.12	2.16 2.06 — 2.26
		Measurement Value	51.83	2.21

9.8 SYSTEM CHECK

9.8.1 Description of System Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the table 5. System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10 %). System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.



Picture 10. System Check Set-up

Justification for Extended SAR Dipole Calibrations
Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (< - 20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB 865664 D01:

9.8.2 System Check Results

Table 5: System Check for Simulating Liquid

Measurement Date	Frequency (MHz)	Liquid Type (head/body)	1W Target SAR1g (W/kg)	Measured SAR1g (W/kg)	1W Normalized SAR1g (W/kg)	Limit(±10% Deviation)
Aug 24,2020	750	head	8.34	1.95	7.8	6.5
Aug 24,2020	750	body	8.72	2.03	8.12	6.9
Aug 25,2020	835	head	9.51	2.58	10.32	8.5
Aug 25,2020	835	body	9.66	2.55	10.2	5.6
Aug 26,2020	1750	head	37.1	8.89	35.56	4.2
Aug 26,2020	1750	body	38.0	9.9	39.6	4.2
Aug 27,2020	1900	head	38.5	8.97	35.88	6.8
Aug 27,2020	1900	body	40.3	10.1	40.4	0.2
Aug 28,2020	2450	head	53.1	13.3	53.2	0.2
Aug 28,2020	2450	body	50.7	13.8	55.2	8.9
Aug 29,2020	2600	head	56.8	13.9	55.6	2.1
Aug 29,2020	2600	body	54.9	14.0	56.0	2.0

Note: system check input power: 250mW.

10 MEASUREMENT PROCEDURES

10.1 GENERAL DESCRIPTION OF TEST PROCEDURES

A communication link is set up with a System Simulator(SS) by air link, and a call is established. Then EUT is commanded to operate at maximum transmitting power.
Connection to the EUT is established via air interface with CMU 200, and the EUT is set to maximum output power . The EUT battery must be fully charged and checked periodically during the test to as certain uniform power output. The antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30 dB.

10.2 MEASUREMENT VARIABILITY

Per FCC KDB Publication 865664 D01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.
SAR Measurement Variability was assessed using the following procedures for each frequency band:

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

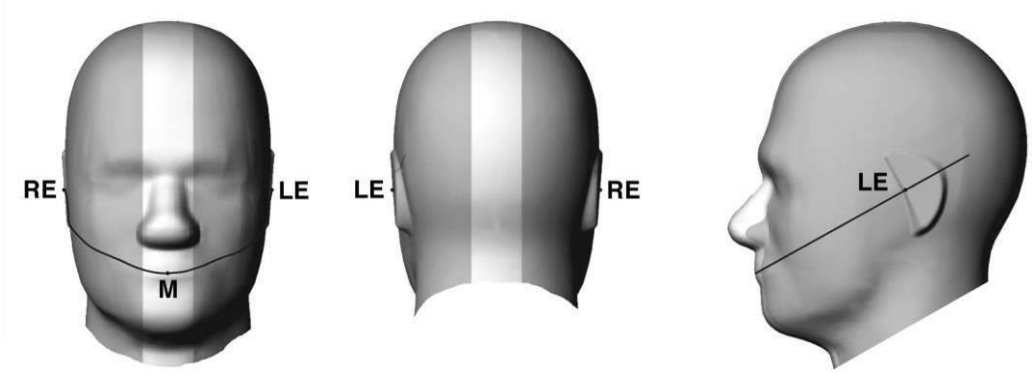
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

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

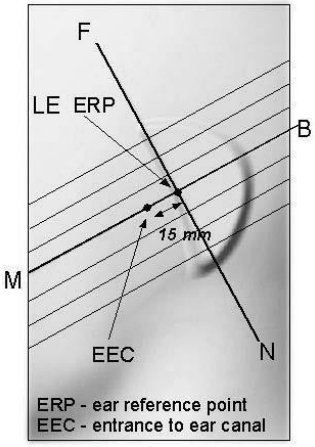
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

10.3 TEST POSITIONS REQUIREMENTS

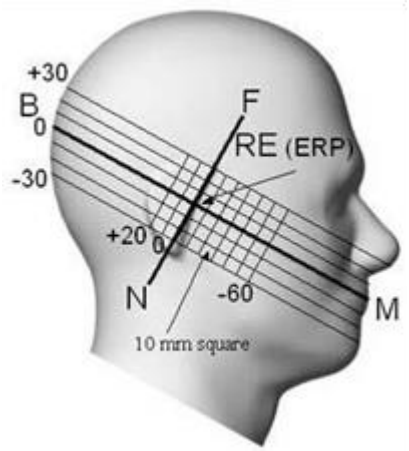
(1) Ear and handset reference point
Picture11 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M,” the left ear reference point (ERP) is marked “LE,” and the right ERP is marked “RE.” Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Picture12.The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Picture13). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Picture12. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.



Picture11 Front, back, and side views of SAM twin phantom



Picture12 Close-up side view of phantom showing the ear region.

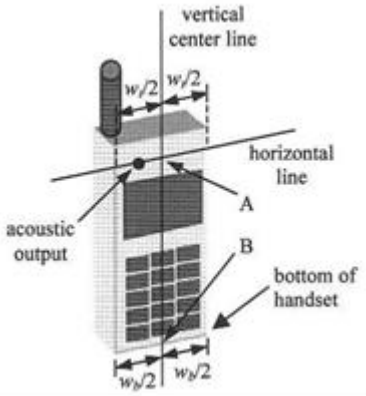


Picture13 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

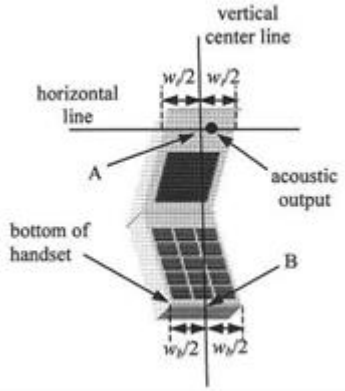
(2) Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the Phantom Side of the handset—the midpoint of the width wt of the handset at the level of the acoustic output (point A in Picture 14 and Picture 15), and the midpoint of the width wb of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Picture 14). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Picture 15), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Picture 16), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on

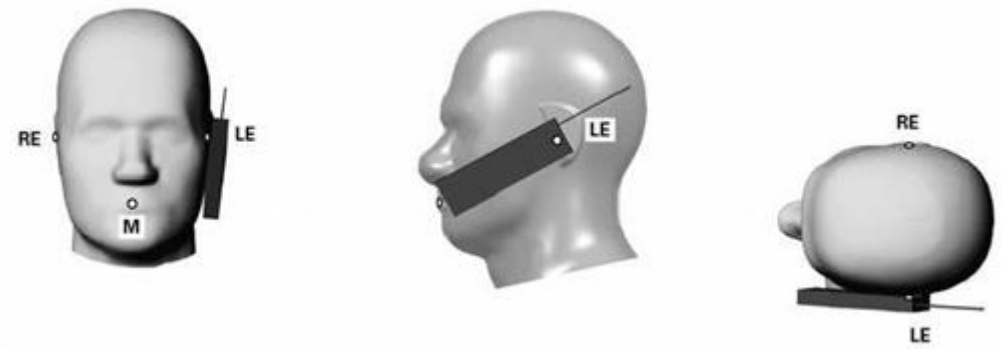
the handset is in contact with a phantom point below the pinna on the cheek. See Picture 16. The actual rotation angles should be documented in the test report.



Picture14 Handset vertical and horizontal reference lines—“fixed case



Picture15 Handset vertical and horizontal reference lines—“clam-shell case”



Picture16 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

(3) Definition of the tilt position

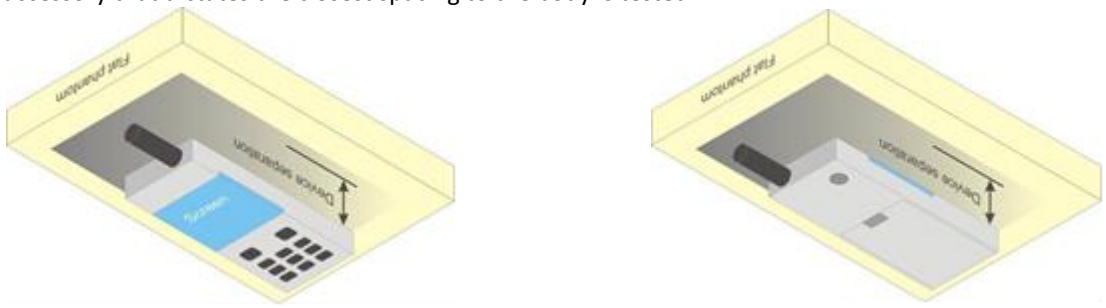
1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Picture 17. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

Picture17 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

(4) Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Picture 18). Per KDB 648474 D04v01r02, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v05r02 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is < 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are test with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.



Picture18 Body Worn Position

(5) Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06v01r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined form general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some
body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v05r02 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

10.4 TEST COFIGURATION

10.4.1 GSM Test Configuration

SAR tests for GSM 850 and GSM 1900, a communication link is set up with a System Simulator (SS) by air link. Using CMU200 the power level is set to “5” for GSM 850, set to “0” for GSM 1900. Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslots is 5.

According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot. The allowed power reduction in the multi-slot configuration is as following: Output power of reductions:

Table 6: The allowed power reduction in the multi-slot configuration

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power(dB)
1	0
2	0 to 3,0
3	1,8 to 4,8
4	3,0 to 6,0

10.4.2 UMTS Test Configuration

10.4.2.1 3G SAR Test Reduction Procedure

In the following procedures, the mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.3 This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as “otherwise” in the applicable procedures; SAR measurement is required for the secondary mode.

10.4.2.2 Output power Verification

Maximum output power is verified on the high, middle and low channels according to procedures described in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1’s” for WCDMA/HSDPA or by applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA) are requied in the SAR report. All configurations that are not supported by the handset or cannot be measured due to technical or equipment limitations must be clearly identified.

10.4.2.3 Head SAR

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR in 3.4 kbps SRB (signaling radio bearer) using the highest reported SAR configuration in 12.2 kbps RMC for head exposure.

10.4.2.4 Body-Worn Accessory SAR

SAR for body-worn accessory configurations is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreaing code or DPDCHn, for the highest reported body-worn accessory exposure SAR configuration in 12.2 kbps RMC. When more than 2 DPDCHn are supported by the handset, it may be necessary to configure additional DPDCHn using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC.

11 TEST RESULTS

11.1.1.1 Conducted Power Results

Test Condition:

1. Conducted Measurement
   EUT was set for low, mid, high channel with modulated mode and highest RF output power.
   The base station simulator was connected to the antenna terminal.
2. Conducted Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is ±1.5dB.
3. Environmental Conditions

Temperature	22°C
Relative Humidity	55%
Atmospheric Pressure	1009mbar

4. Test Date: September 5,2020
   Tested By: Leo Li

Test Procedures:

Mobile Phone radio output power measurement

1. The transmitter output port was connected to base station emulator.
2. Establish communication link between emulator and EUT and set EUT to operate at maximum output power all the time.
3. Select lowest, middle, and highest channels for each band and different possible test mode.
4. Measure the conducted peak burst power and conducted average burst power from EUT antenna port.

Other radio output power measurement:

The output power was measured using power meter at low, mid, and hi channels.

Source-based Time Averaged Burst Power Calculation:

For TDMA, the following duty cycle factor was used to calculate the source-based time average power

Number of Time slot	1	2	3	4
Duty Cycle	1:8	1:4	1:2.66	1:2
Duty cycle factor	-9.03 dB	-6.02 dB	-4.26 dB	-3.01 dB
Crest Factor	8	4	2.66	2

Remark: *Time slot duty cycle factor = 10 * log (Time Slot Duty Cycle)*

Source based time averaged power = Maximum burst averaged power (1 Uplink) – 9.03 dB
Source based time averaged power = Maximum burst averaged power (2 Uplink) – 6.02 dB
Source based time averaged power = Maximum burst averaged power (3 Uplink) – 4.26 dB
Source based time averaged power = Maximum burst averaged power (4 Uplink) – 3.01 dB

Burst Average Power (dBm);								
Band	**GSM850**				**PCS1900**			
Channel	128	190	251	Tune up Power tolerant	512	661	810	Tune up Power tolerant
Frequency (MHz)	824.2	836.6	848.8	/	1850.2	1880	1909.8	/
GSM Voice	32.73	32.36	**33.54**	33±1	29.60	**30.26**	29.83	29.5±1
GPRS 1 slots	33.09	33.10	33.04	32.5±1	29.51	30.22	29.87	29.5±1
GPRS 2 slots	31.11	31.11	31.07	30.5±1	27.33	27.91	27.34	27±1
GPRS 3 slots	29.05	29.05	29.01	28.5±1	25.66	26.24	25.65	25.5±1
GPRS 4 slots	26.97	26.99	26.95	26±1	23.55	24.11	23.52	23.5±1
EGPRS 1 slots	26.53	26.69	26.42	26±1	26.02	26.55	25.95	26±1
EGPRS 2 slots	24.82	24.94	24.71	24±1	25.89	26.44	25.83	25.5±1
EGPRS 3 slots	22.38	22.51	22.33	22±1	25.74	26.29	25.67	25.5±1
EGPRS 4 slots	19.96	20.20	19.99	19.5±1	23.63	24.16	23.54	23.5±1

Remark:
GPRS, CS1 coding scheme.
EGPRS, MCS5 coding scheme.
Multi 1 Slot, Support Max 4 downlink, 1 uplink, 5 working link
Multi 2 Slots, Support Max 4 downlink, 2 uplink, 5 working link
Multi 3 Slots, Support Max 4 downlink, 3 uplink, 5 working link
Multi 4 Slots, Support Max 4 downlink, 4 uplink, 5 working link

When the mobile phone is close to the human ear, the product system recognizes the receiver, so as to reduce the transmission power of the main board in the call frequency band, reduce the radiation of the product to the human body, and reach the SAR test standard of FCC certification. The band which reduce the transmission power is GSM1900, the Burst Average Power is listed in the follow table.

Band	**PCS1900**			
Channel	512	661	810	Tune up Power tolerant
Frequency (MHz)	1850.2	1880	1909.8	/
GSM Voice	28.54	29.91	30.22	29.5±1

Source Based time Average Power (dBm)								
Band	**GSM850**				**PCS1900**			
Channel	128	190	251	Time Average factor	512	661	810	Time Average factor
Frequency (MHz)	824.2	836.6	848.8	/	1850.2	1880	1909.8	/
GSM Voice	23.7	23.33	**24.52**	-9.03	20.57	**21.23**	20.8	-9.03
GPRS 1 slots	24.06	24.07	24.01	-9.03	20.48	21.19	20.84	-9.03
GPRS 2 slots	25.09	**25.09**	25.05	-6.02	21.31	21.89	21.32	-6.02
GPRS 3 slots	24.79	24.79	24.75	-4.26	21.4	21.98	21.39	-4.26
GPRS 4 slots	23.96	23.98	23.94	-3.01	20.54	21.1	20.51	-3.01
EGPRS 1 slots	17.5	17.66	17.39	-9.03	16.99	17.52	16.92	-9.03
EGPRS 2 slots	18.8	18.92	18.69	-6.02	19.87	20.42	19.81	-6.02
EGPRS 3 slots	18.12	18.25	18.07	-4.26	21.48	**22.03**	21.41	-4.26
EGPRS 4 slots	16.95	17.19	16.98	-3.01	20.62	21.15	20.53	-3.01
Remark: Time average factor = 1 uplink , 10*log(1/8)=-9.03dB , 2 uplink , 10*log(2/8)=-6.02dB , 3 uplink , 10*log(3/8)=-4.26dB ,4 uplink , 10*log(4/8)=-3.01dB Source based time average power = Burst Average power + Time Average factor								

Note:

1, GSM 850: DUT was set in GPRS(2Tx slots) due to the Maximum source-base time average output power for body SAR.

2, GSM 1900: DUT was set in EGPRS(3Tx slots) due to the Maximum source-base time average output power for body SAR.

WCDMA - Average Power (dBm)												
Band	**WCDMA Band II**				**WCDMA Band IV**				**WCDMA Band V**			
Channel	**9262**	**9400**	**9538**	**Tune up Power tolerant**	**1312**	**1413**	**1513**	**Tune up Power tolerant**	**4132**	**4183**	**4233**	**Tune up Power tolerant**
Frequency (MHz)	**1852.4**	**1880**	**1907.6**	**/**	**1712.4**	**1732.6**	**1752.6**	**/**	**826.4**	**836.6**	**846.6**	**/**
RMC 12.2k	22.65	23.21	23.32	22.5±1	22.57	22.82	23.36	22.5±1	23.25	23.29	23.31	22.5±1
HSDPA Subtest-1	22.72	23.42	23.03	22.5±1	22.60	22.86	23.32	22.5±1	23.27	23.32	23.32	22.5±1
HSDPA Subtest-2	22.71	23.42	23.06	22.5±1	22.58	22.87	23.33	22.5±1	23.26	23.32	23.29	22.5±1
HSDPA Subtest-3	22.71	23.43	23.06	22.5±1	22.57	22.86	23.34	22.5±1	23.25	23.33	23.30	22.5±1
HSDPA Subtest-4	22.71	23.44	23.02	22.5±1	22.56	22.84	23.30	22.5±1	23.27	23.33	23.31	22.5±1
HSUPA Subtest-1	19.99	20.37	20.18	20±1	18.46	19.63	19.95	19±1	19.89	19.65	21.04	21±1
HSUPA Subtest-2	21.10	21.41	21.23	21±1	18.40	19.00	19.36	19±1	20.80	20.56	22.05	21.5±1
HSUPA Subtest-3	21.13	21.44	21.29	21±1	18.68	19.72	19.57	19±1	20.79	20.54	22.04	21.5±1
HSUPA Subtest-4	20.92	21.28	21.08	21±1	18.88	19.47	19.78	19±1	20.04	19.76	21.18	20.5±1
HSUPA Subtest-5	22.82	23.24	23.07	22.5±1	20.88	21.50	21.68	21±1	21.74	21.49	22.97	22±1

When the mobile phone is close to the human ear, the product system recognizes the receiver, so as to reduce the transmission power of the main board in the call frequency band, reduce the radiation of the product to the human body, and reach the SAR test standard of FCC certification. The band which reduce the transmission power is WCDMA Band II and Band IV, the Burst Average Power is listed in the follow table:

Band	**WCDMA Band II**				**WCDMA Band IV**			
Channel	**9262**	**9400**	**9538**	**Tune up Power tolerant**	**1312**	**1413**	**1513**	**Tune up Power tolerant**
Frequency (MHz)	**1852.4**	**1880**	**1907.6**	**/**	**1712.4**	**1732.6**	**1752.6**	**/**
RMC 12.2k	20.08	**20.30**	20.10	19.5±1	19.63	**19.96**	19.28	19±1
HSDPA Subtest-1	18.39	20.26	20.09	18.5±2	19.67	19.91	19.25	19±1
HSDPA Subtest-2	18.40	20.24	20.09	18.5±2	19.59	19.92	19.30	19±1
HSDPA Subtest-3	18.39	20.24	20.06	18.5±2	19.59	19.93	19.30	19±1
HSDPA Subtest-4	18.37	20.24	20.06	18.5±2	19.63	19.91	19.33	19±1
HSUPA Subtest-1	15.34	17.05	16.97	16.5±2	16.20	16.51	15.95	16±1
HSUPA Subtest-2	16.24	17.96	17.95	17±1	16.29	16.60	16.00	16±1
HSUPA Subtest-3	16.15	17.92	17.86	17±1	16.75	17.05	16.49	16.5±1
HSUPA Subtest-4	17.40	18.98	19.18	18.5±2	16.45	16.76	16.20	16±1
HSUPA Subtest-5	19.29	21.09	21.12	19.5±2	18.32	19.28	18.03	18.5±1

LTE Power Reduction

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of "NS_01".

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-
Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.					

LTE Band 2:

BW(MHz)	Ch.	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
1.4MHz	18607	1850.7	QPSK	1	0	23.27	22.5±1	/
				1	2	23.19	22.5±1	/
				1	5	23.11	22.5±1	/
				3	0	23.29	22.5±1	/
				3	1	23.29	22.5±1	/
				3	2	23.18	22.5±1	/
				6	0	22.25	22.5±1	/
			16QAM	1	0	22.50	22.0±1	0.5
				1	2	22.21	22.0±1	0.5
				1	5	22.30	22.0±1	0.5
				3	0	22.09	22.0±1	0.5
				3	1	22.18	22.0±1	0.5
				3	2	22.21	22.0±1	0.5
				6	0	21.47	22.0±1	0.5
	18900	1880	QPSK	1	0	23.23	22.5±1	/
				1	2	23.14	22.5±1	/
				1	5	23.18	22.5±1	/
				3	0	23.37	22.5±1	/
				3	1	23.36	22.5±1	/
				3	2	23.41	22.5±1	/
				6	0	22.27	22.0±1	/
			16QAM	1	0	22.48	22.0±1	0.5
				1	2	22.58	22.0±1	0.5
				1	5	22.66	22.0±1	0.5
				3	0	22.43	22.0±1	0.5
				3	1	22.45	22.0±1	0.5
				3	2	22.52	22.0±1	0.5
				6	0	21.38	22.0±1	0.5
	19193	1909.3	QPSK	1	0	22.72	22.5±1	/
				1	2	22.91	22.5±1	/
				1	5	22.65	22.5±1	/
				3	0	22.70	22.5±1	/
				3	1	22.89	22.5±1	/
				3	2	22.89	22.5±1	/
				6	0	21.67	22.5±1	/
			16QAM	1	0	21.83	21.5±1	1.0
				1	2	21.98	21.5±1	1.0
				1	5	21.66	21.5±1	1.0
				3	0	21.59	21.5±1	1.0
				3	1	21.71	21.5±1	1.0
				3	2	21.79	21.5±1	1.0
				6	0	20.89	21.5±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
3MHz	18615	1851.5	QPSK	1	0	22.67	22.5±1	/
				1	8	22.68	22.5±1	/
				1	14	22.61	22.5±1	/
				6	0	21.62	22.5±1	/
				6	4	21.61	22.5±1	/
				6	9	21.62	22.5±1	/
				15	0	21.61	22.5±1	/
			16QAM	1	0	21.57	21.5±1	1.0
				1	8	21.58	21.5±1	1.0
				1	14	21.04	21.5±1	1.0
				6	0	20.92	21.5±1	1.0
				6	4	20.87	21.5±1	1.0
				6	9	20.90	21.5±1	1.0
				15	0	20.64	21.5±1	1.0
	18900	1880	QPSK	1	0	23.30	22.5±1	/
				1	8	23.31	22.5±1	/
				1	14	23.38	22.5±1	/
				6	0	22.25	22.5±1	/
				6	4	22.33	22.5±1	/
				6	9	22.26	22.5±1	/
				15	0	22.37	22.5±1	/
			16QAM	1	0	23.06	22.5±1	/
				1	8	23.07	22.5±1	/
				1	14	22.85	22.5±1	/
				6	0	21.56	22.5±1	/
				6	4	21.56	22.5±1	/
				6	9	21.60	22.5±1	/
				15	0	21.45	21.5±1	1.0
	19185	1908.5	QPSK	1	0	22.74	22.5±1	/
				1	8	22.87	22.5±1	/
				1	14	22.83	22.5±1	/
				6	0	21.88	22.5±1	/
				6	4	21.86	22.5±1	/
				6	9	21.86	22.5±1	/
				15	0	21.72	22.5±1	/
			16QAM	1	0	21.83	21.5±1	1.0
				1	8	22.03	21.5±1	1.0
				1	14	21.91	21.5±1	1.0
				6	0	21.12	21.5±1	1.0
				6	4	21.05	21.5±1	1.0
				6	9	21.14	21.5±1	1.0
				15	0	20.90	21.5±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
5MHz	18625	1852.5	QPSK	1	0	22.69	22.5±1	/
				1	12	22.69	22.5±1	/
				1	24	22.73	22.5±1	/
				12	0	21.56	22.5±1	/
				12	6	21.68	22.5±1	/
				12	11	21.70	22.5±1	/
				25	0	21.57	22.5±1	/
			16QAM	1	0	21.35	21±1	1.5
				1	12	21.45	21±1	1.5
				1	24	21.44	21±1	1.5
				12	0	20.60	21±1	1.5
				12	6	20.72	21±1	1.5
				12	11	20.71	21±1	1.5
				25	0	20.44	21±1	1.5
	18900	1880	QPSK	1	0	23.50	22.5±1	/
				1	12	23.48	22.5±1	/
				1	24	23.46	22.5±1	/
				12	0	22.29	22.5±1	/
				12	6	22.30	22.5±1	/
				12	11	22.41	22.5±1	/
				25	0	22.36	22.5±1	/
			16QAM	1	0	22.31	22.0±1	0.5
				1	12	22.31	22.0±1	0.5
				1	24	22.28	22.0±1	0.5
				12	0	21.46	22.0±1	0.5
				12	6	21.43	22.0±1	0.5
				12	11	21.47	22.0±1	0.5
				25	0	21.47	22.0±1	0.5
	19175	1907.5	QPSK	1	0	22.98	22.5±1	/
				1	12	23.09	22.5±1	/
				1	24	22.88	22.5±1	/
				12	0	21.94	22.5±1	/
				12	6	21.81	22.5±1	/
				12	11	21.95	22.5±1	/
				25	0	21.78	22.5±1	/
			16QAM	1	0	21.39	21.5±1	1.0
				1	12	21.31	21.5±1	1.0
				1	24	21.34	21.5±1	1.0
				12	0	20.89	21.5±1	1.0
				12	6	20.98	21.5±1	1.0
				12	11	20.97	21.5±1	1.0
				25	0	21.04	21.5±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	18650	1855	QPSK	1	0	22.58	22.5±1	/
				1	24	22.52	22.5±1	/
				1	49	22.56	22.5±1	/
				25	0	21.47	22.5±1	/
				25	12	21.47	22.5±1	/
				25	24	21.60	22.5±1	/
				50	0	21.50	22.5±1	/
			16QAM	1	0	20.89	21.5±1	1.0
				1	24	20.86	21.5±1	1.0
				1	49	20.89	21.5±1	1.0
				25	0	20.71	21.5±1	1.0
				25	12	20.71	21.5±1	1.0
				25	24	20.64	21.5±1	1.0
				50	0	20.68	21.5±1	1.0
	18900	1880	QPSK	1	0	23.27	22.5±1	/
				1	24	23.29	22.5±1	/
				1	49	23.42	22.5±1	/
				25	0	22.28	22.5±1	/
				25	12	22.22	22.5±1	/
				25	24	22.24	22.5±1	/
				50	0	22.26	22.5±1	/
			16QAM	1	0	22.10	22.0±1	0.5
				1	24	22.15	22.0±1	0.5
				1	49	22.06	22.0±1	0.5
				25	0	21.58	22.0±1	0.5
				25	12	21.49	22.0±1	0.5
				25	24	21.52	22.0±1	0.5
				50	0	21.42	22.0±1	0.5
	19150	1905	QPSK	1	0	22.87	22.5±1	/
				1	24	23.03	22.5±1	/
				1	49	22.74	22.5±1	/
				25	0	21.88	22.5±1	/
				25	12	21.78	22.5±1	/
				25	24	21.89	22.5±1	/
				50	0	21.92	22.5±1	/
			16QAM	1	0	21.81	21.5±1	1.0
				1	24	21.72	21.5±1	1.0
				1	49	21.51	21.5±1	1.0
				25	0	20.85	21.5±1	1.0
				25	12	20.93	21.5±1	1.0
				25	24	20.90	21.5±1	1.0
				50	0	21.01	21.5±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
15MHz	18675	1857.5	QPSK	1	0	22.10	22.5±1	/
				1	37	22.25	22.5±1	/
				1	74	22.36	22.5±1	/
				36	0	21.38	22.5±1	/
				36	16	21.56	22.5±1	/
				36	35	21.37	22.5±1	/
				75	0	21.55	22.5±1	/
			16QAM	1	0	21.54	21.5±1	1.0
				1	37	21.36	21.5±1	1.0
				1	74	21.41	21.5±1	1.0
				36	0	21.34	21.5±1	1.0
				36	16	21.56	21.5±1	1.0
				36	35	21.38	21.5±1	1.0
				75	0	20.80	21.5±1	1.0
	18900	1880	QPSK	1	0	23.24	22.5±1	/
				1	37	23.27	22.5±1	/
				1	74	23.11	22.5±1	/
				36	0	22.55	22.5±1	/
				36	16	22.45	22.5±1	/
				36	35	22.54	22.5±1	/
				75	0	22.32	22.5±1	/
			16QAM	1	0	22.51	22.0±1	0.5
				1	37	22.57	22.0±1	0.5
				1	74	22.45	22.0±1	0.5
				36	0	22.48	22.0±1	0.5
				36	16	22.40	22.0±1	0.5
				36	35	22.52	22.0±1	0.5
				75	0	21.41	22.0±1	0.5
	19125	1902.5	QPSK	1	0	22.82	22.5±1	/
				1	37	23.11	22.5±1	/
				1	74	23.02	22.5±1	/
				36	0	21.70	22.5±1	/
				36	16	21.98	22.5±1	/
				36	35	21.83	22.5±1	/
				75	0	21.96	22.5±1	/
			16QAM	1	0	21.82	22.0±1	0.5
				1	37	21.96	22.0±1	0.5
				1	74	21.59	22.0±1	0.5
				36	0	21.95	22.0±1	0.5
				36	16	21.74	22.0±1	0.5
				36	35	21.63	22.0±1	0.5
				75	0	21.17	22.0±1	0.5

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
20MHz	18700	1860	QPSK	1	0	22.52	22.5±1	/
				1	49	22.55	22.5±1	/
				1	99	23.00	22.5±1	/
				50	0	21.56	21.5±1	1.0
				50	24	21.56	21.5±1	1.0
				50	49	21.77	21.5±1	1.0
				100	0	21.64	21.5±1	1.0
			16QAM	1	0	22.40	21.5±1	1.0
				1	49	22.08	21.5±1	1.0
				1	99	22.04	21.5±1	1.0
				50	0	20.70	21.5±1	1.0
				50	24	20.71	21.5±1	1.0
				50	49	20.95	21.5±1	1.0
				100	0	20.91	21.5±1	1.0
	18900	1880	QPSK	1	0	23.40	22.5±1	/
				1	49	23.16	22.5±1	/
				1	99	23.44	22.5±1	/
				50	0	22.36	21.5±1	1.0
				50	24	22.38	21.5±1	1.0
				50	49	22.27	21.5±1	1.0
				100	0	22.38	21.5±1	1.0
			16QAM	1	0	22.29	22.0±1	0.5
				1	49	22.30	22.0±1	0.5
				1	99	22.08	22.0±1	0.5
				50	0	21.53	22.0±1	0.5
				50	24	21.52	22.0±1	0.5
				50	49	21.51	22.0±1	0.5
				100	0	21.47	22.0±1	0.5
	19100	1900	QPSK	1	0	23.09	22.5±1	/
				1	49	23.19	22.5±1	/
				1	99	22.82	22.5±1	/
				50	0	22.21	21.5±1	1.0
				50	24	22.21	21.5±1	1.0
				50	49	21.99	21.5±1	1.0
				100	0	22.04	21.5±1	1.0
			16QAM	1	0	21.77	22.0±1	0.5
				1	49	21.56	22.0±1	0.5
				1	99	21.97	22.0±1	0.5
				50	0	21.41	22.0±1	0.5
				50	24	21.36	22.0±1	0.5
				50	49	21.18	22.0±1	0.5
				100	0	21.26	22.0±1	0.5

LTE Band 4:

BW(MHz)	Ch.	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
1.4MHz	19957	1710.7	QPSK	1	0	22.60	22.0±1	1.0
				1	2	22.61	22.0±1	1.0
				1	5	22.64	22.0±1	1.0
				3	0	22.67	22.0±1	1.0
				3	1	22.67	22.0±1	1.0
				3	2	22.67	22.0±1	1.0
				6	0	21.49	22.0±1	1.0
			16QAM	1	0	21.66	22.0±1	1.0
				1	2	21.63	22.0±1	1.0
				1	5	21.63	22.0±1	1.0
				3	0	21.52	21.0±1	2.0
				3	1	21.53	21.0±1	2.0
				3	2	21.50	21.0±1	2.0
				6	0	20.77	21.0±1	2.0
	20175	1732.5	QPSK	1	0	22.81	22.0±1	1.0
				1	2	22.77	22.0±1	1.0
				1	5	22.79	22.0±1	1.0
				3	0	22.89	22.0±1	1.0
				3	1	22.93	22.0±1	1.0
				3	2	22.93	22.0±1	1.0
				6	0	21.87	22.0±1	1.0
			16QAM	1	0	22.53	22.0±1	1.0
				1	2	22.71	22.0±1	1.0
				1	5	22.56	22.0±1	1.0
				3	0	21.55	22.0±1	1.0
				3	1	21.54	22.0±1	1.0
				3	2	21.59	22.0±1	1.0
				6	0	21.07	22.0±1	1.0
	20393	1754.3	QPSK	1	0	23.53	23.0±1	/
				1	2	23.48	23.0±1	/
				1	5	23.56	23.0±1	/
				3	0	23.38	23.0±1	/
				3	1	23.42	23.0±1	/
				3	2	23.38	23.0±1	/
				6	0	22.42	23.0±1	/
			16QAM	1	0	23.85	23.0±1	/
				1	2	23.88	23.0±1	/
				1	5	23.83	23.0±1	/
				3	0	22.48	22.0±1	1.0
				3	1	22.40	22.0±1	1.0
				3	2	22.40	22.0±1	1.0
				6	0	21.62	22.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
3MHz	19965	1711.5	QPSK	1	0	22.55	22.0±1	1.0
				1	8	22.52	22.0±1	1.0
				1	14	22.53	22.0±1	1.0
				6	0	21.46	22.0±1	1.0
				6	4	21.48	22.0±1	1.0
				6	9	21.47	22.0±1	1.0
				15	0	21.49	22.0±1	1.0
			16QAM	1	0	21.50	22.0±1	1.0
				1	8	21.46	22.0±1	1.0
				1	14	21.51	22.0±1	1.0
				8	0	20.76	21.0±1	2.0
				8	4	20.75	21.0±1	2.0
				8	9	20.76	21.0±1	2.0
				15	0	20.45	21.0±1	2.0
	20175	1732.5	QPSK	1	0	22.79	22.0±1	1.0
				1	8	22.84	22.0±1	1.0
				1	14	22.77	22.0±1	1.0
				6	0	21.73	22.0±1	1.0
				6	4	21.92	22.0±1	1.0
				6	9	21.74	22.0±1	1.0
				15	0	21.74	22.0±1	1.0
			16QAM	1	0	22.59	22.0±1	1.0
				1	8	22.53	22.0±1	1.0
				1	14	22.58	22.0±1	1.0
				6	0	21.04	21.0±1	2.0
				6	4	21.04	21.0±1	2.0
				6	9	21.10	21.0±1	2.0
				15	0	20.98	21.0±1	2.0
	20385	1753.5	QPSK	1	0	23.26	23.0±1	/
				1	8	23.30	23.0±1	/
				1	14	23.27	23.0±1	/
				6	0	22.43	22.0±1	1.0
				6	4	22.42	22.0±1	1.0
				6	9	22.43	22.0±1	1.0
				15	0	22.37	22.0±1	1.0
			16QAM	1	0	22.22	22.0±1	1.0
				1	8	22.16	22.0±1	1.0
				1	14	22.16	22.0±1	1.0
				8	0	21.68	22.0±1	1.0
				8	4	21.68	22.0±1	1.0
				8	9	21.74	22.0±1	1.0
				15	0	21.59	22.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
5MHz	19975	1712.5	QPSK	1	0	22.67	22.0±1	1.0
				1	49	22.65	22.0±1	1.0
				1	99	22.63	22.0±1	1.0
				12	0	21.56	22.0±1	1.0
				12	24	21.53	22.0±1	1.0
				12	49	21.58	22.0±1	1.0
				25	0	21.56	22.0±1	1.0
			16QAM	1	0	21.29	22.0±1	1.0
				1	49	21.28	22.0±1	1.0
				1	99	21.34	22.0±1	1.0
				12	0	20.56	21.0±1	2.0
				12	24	20.56	21.0±1	2.0
				12	49	20.61	21.0±1	2.0
				25	0	20.39	21.0±1	2.0
	20175	1732.5	QPSK	1	0	22.90	23.0±1	/
				1	49	23.03	23.0±1	/
				1	99	23.03	23.0±1	/
				12	0	21.64	22.0±1	1.0
				12	24	21.82	22.0±1	1.0
				12	49	21.82	22.0±1	1.0
				25	0	21.84	22.0±1	1.0
			16QAM	1	0	21.79	21.0±1	2.0
				1	49	21.72	21.0±1	2.0
				1	99	21.61	21.0±1	2.0
				12	0	20.82	21.0±1	2.0
				12	24	21.02	21.0±1	2.0
				12	49	20.95	21.0±1	2.0
				25	0	21.01	21.0±1	2.0
	20375	1752.5	QPSK	1	0	23.63	23.0±1	/
				1	49	23.58	23.0±1	/
				1	99	23.70	23.0±1	/
				12	0	22.30	22.0±1	1.0
				12	24	22.41	22.0±1	1.0
				12	49	22.40	22.0±1	1.0
				25	0	22.41	22.0±1	1.0
			16QAM	1	0	21.70	22.0±1	1.0
				1	49	21.72	22.0±1	1.0
				1	99	21.80	22.0±1	1.0
				12	0	21.47	22.0±1	1.0
				12	24	21.48	22.0±1	1.0
				12	49	21.44	22.0±1	1.0
				25	0	21.50	22.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	20000	1715	QPSK	1	0	22.52	22.0±1	1.0
				1	49	22.53	22.0±1	1.0
				1	99	22.35	22.0±1	1.0
				25	0	21.57	22.0±1	1.0
				25	24	21.52	22.0±1	1.0
				25	49	21.48	22.0±1	1.0
				50	0	21.44	22.0±1	1.0
			16QAM	1	0	20.90	21.0±1	2.0
				1	49	20.82	21.0±1	2.0
				1	99	20.79	21.0±1	2.0
				25	0	20.60	21.0±1	2.0
				25	24	20.62	21.0±1	2.0
				25	49	20.63	21.0±1	2.0
				50	0	20.61	21.0±1	2.0
	20175	1732.5	QPSK	1	0	22.94	22.0±1	1.0
				1	49	22.78	22.0±1	1.0
				1	99	22.76	22.0±1	1.0
				25	0	21.82	22.0±1	1.0
				25	24	21.68	22.0±1	1.0
				25	49	21.62	22.0±1	1.0
				50	0	21.71	22.0±1	1.0
			16QAM	1	0	21.78	21.0±1	2.0
				1	49	21.64	21.0±1	2.0
				1	99	21.41	21.0±1	2.0
				25	0	20.92	21.0±1	2.0
				25	24	21.12	21.0±1	2.0
				25	49	20.91	21.0±1	2.0
				50	0	21.04	21.0±1	2.0
	20350	1750	QPSK	1	0	23.39	23.0±1	/
				1	49	23.26	23.0±1	/
				1	99	23.03	23.0±1	/
				25	0	22.22	22.0±1	1.0
				25	24	22.18	22.0±1	1.0
				25	49	22.05	22.0±1	1.0
				50	0	22.18	22.0±1	1.0
			16QAM	1	0	21.84	22.0±1	1.0
				1	49	22.02	22.0±1	1.0
				1	99	22.20	22.0±1	1.0
				25	0	21.26	22.0±1	1.0
				25	24	21.26	22.0±1	1.0
				25	49	21.20	22.0±1	1.0
				50	0	21.37	22.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
15MHz	20025	1717.5	QPSK	1	0	22.59	22.0±1	1.0
				1	49	22.61	22.0±1	1.0
				1	99	22.54	22.0±1	1.0
				36	0	21.72	22.0±1	1.0
				36	24	21.71	22.0±1	1.0
				36	49	21.69	22.0±1	1.0
				75	0	21.44	22.0±1	1.0
			16QAM	1	0	21.72	22.0±1	1.0
				1	49	21.79	22.0±1	1.0
				1	99	21.74	22.0±1	1.0
				36	0	21.69	21.0±1	2.0
				36	24	21.76	21.0±1	2.0
				36	49	21.74	21.0±1	2.0
				75	0	20.65	21.0±1	2.0
	20175	1732.5	QPSK	1	0	22.91	22.0±1	1.0
				1	49	22.65	22.0±1	1.0
				1	99	22.99	22.0±1	1.0
				36	0	21.46	22.0±1	1.0
				36	24	21.74	22.0±1	1.0
				36	49	21.68	22.0±1	1.0
				75	0	21.74	22.0±1	1.0
			16QAM	1	0	21.60	21.0±1	2.0
				1	49	21.80	21.0±1	2.0
				1	99	21.46	21.0±1	2.0
				36	0	21.86	21.0±1	2.0
				36	24	21.61	21.0±1	2.0
				36	49	21.42	21.0±1	2.0
				75	0	21.02	21.0±1	2.0
	20325	1747.5	QPSK	1	0	23.13	23.0±1	/
				1	49	23.27	23.0±1	/
				1	99	22.98	23.0±1	/
				36	0	21.89	22.0±1	1.0
				36	24	21.92	22.0±1	1.0
				36	49	22.13	22.0±1	1.0
				75	0	22.08	22.0±1	1.0
			16QAM	1	0	21.81	22.0±1	1.0
				1	49	22.03	22.0±1	1.0
				1	99	22.16	22.0±1	1.0
				36	0	21.96	22.0±1	1.0
				36	24	21.99	22.0±1	1.0
				36	49	22.05	22.0±1	1.0
				75	0	21.24	22.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
20MHz	20050	1720	QPSK	1	0	22.75	22.0±1	1.0
				1	49	22.54	22.0±1	1.0
				1	99	22.62	22.0±1	1.0
				50	0	21.43	22.0±1	1.0
				50	24	21.44	22.0±1	1.0
				50	49	21.60	22.0±1	1.0
				100	0	21.52	22.0±1	1.0
			16QAM	1	0	22.24	22.0±1	1.0
				1	49	22.04	22.0±1	1.0
				1	99	22.05	22.0±1	1.0
				50	0	20.66	21.0±1	2.0
				50	24	20.61	21.0±1	2.0
				50	49	20.63	21.0±1	2.0
				100	0	20.59	21.0±1	2.0
	20175	1732.5	QPSK	1	0	23.06	23.0±1	/
				1	49	22.80	23.0±1	/
				1	99	22.48	23.0±1	/
				50	0	21.75	22.0±1	1.0
				50	24	21.97	22.0±1	1.0
				50	49	21.75	22.0±1	1.0
				100	0	21.83	22.0±1	1.0
			16QAM	1	0	21.58	22.0±1	1.0
				1	49	21.86	22.0±1	1.0
				1	99	21.33	22.0±1	1.0
				50	0	20.86	21.0±1	2.0
				50	24	20.85	21.0±1	2.0
				50	49	21.03	21.0±1	2.0
				100	0	20.87	21.0±1	2.0
	20300	1745	QPSK	1	0	23.01	23.0±1	/
				1	49	23.41	23.0±1	/
				1	99	23.31	23.0±1	/
				50	0	22.16	22.0±1	1.0
				50	24	22.08	22.0±1	1.0
				50	49	22.03	22.0±1	1.0
				100	0	22.11	22.0±1	1.0
			16QAM	1	0	21.51	22.0±1	1.0
				1	49	21.24	22.0±1	1.0
				1	99	21.03	22.0±1	1.0
				50	0	21.25	22.0±1	1.0
				50	24	21.49	22.0±1	1.0
				50	49	21.24	22.0±1	1.0
				100	0	21.18	22.0±1	1.0

LTE Band 5:

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
1.4MHz	20407	824.7	QPSK	1	0	22.75	22.5±1	/
				1	49	22.80	22.5±1	/
				1	99	22.75	22.5±1	/
				12	0	22.77	22.5±1	/
				12	24	22.73	22.5±1	/
				12	49	22.73	22.5±1	/
				25	0	21.75	22.5±1	/
			16QAM	1	0	21.66	21.0±1	1.5
				1	49	21.70	21.0±1	1.5
				1	99	21.72	21.0±1	1.5
				12	0	21.42	21.0±1	1.5
				12	24	21.40	21.0±1	1.5
				12	49	21.30	21.0±1	1.5
				25	0	20.79	21.0±1	1.5
	20525	836.5	QPSK	1	0	22.75	22.5±1	/
				1	49	22.79	22.5±1	/
				1	99	22.73	22.5±1	/
				12	0	22.93	22.5±1	/
				12	24	22.93	22.5±1	/
				12	49	22.92	22.5±1	/
				25	0	22.00	22.5±1	/
			16QAM	1	0	22.57	22.0±1	0.5
				1	49	22.53	22.0±1	0.5
				1	99	22.60	22.0±1	0.5
				12	0	21.72	22.0±1	0.5
				12	24	21.77	22.0±1	0.5
				12	49	21.74	22.0±1	0.5
				25	0	21.13	22.0±1	0.5
	20643	848.3	QPSK	1	0	23.00	22.5±1	/
				1	49	23.03	22.5±1	/
				1	99	23.03	22.5±1	/
				12	0	22.93	22.0±1	0.5
				12	24	22.98	22.0±1	0.5
				12	49	22.82	22.0±1	0.5
				25	0	21.92	22.0±1	0.5
			16QAM	1	0	22.89	22.0±1	0.5
				1	49	22.97	22.0±1	0.5
				1	99	22.92	22.0±1	0.5
				12	0	21.73	22.0±1	0.5
				12	24	21.64	22.0±1	0.5
				12	49	21.83	22.0±1	0.5
				25	0	21.18	22.0±1	0.5

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
3MHz	20415	825.5	QPSK	1	0	22.86	22.5±1	/
				1	49	22.77	22.5±1	/
				1	99	22.91	22.5±1	/
				25	0	21.74	22.5±1	/
				25	24	21.75	22.5±1	/
				25	49	21.70	22.5±1	/
				50	0	21.74	22.5±1	/
			16QAM	1	0	21.69	21.0±1	1.5
				1	49	21.47	21.0±1	1.5
				1	99	21.74	21.0±1	1.5
				25	0	20.88	21.0±1	1.5
				25	24	20.90	21.0±1	1.5
				25	49	20.91	21.0±1	1.5
				50	0	20.63	21.0±1	1.5
	20525	836.5	QPSK	1	0	22.78	22.5±1	/
				1	49	22.79	22.5±1	/
				1	99	22.80	22.5±1	/
				25	0	21.96	22.5±1	/
				25	24	21.84	22.5±1	/
				25	49	22.10	22.5±1	/
				50	0	22.12	22.5±1	/
			16QAM	1	0	22.68	22.0±1	0.5
				1	49	22.52	22.0±1	0.5
				1	99	22.57	22.0±1	0.5
				25	0	20.96	21.0±1	1.5
				25	24	20.96	21.0±1	1.5
				25	49	21.25	21.0±1	1.5
				50	0	21.28	21.0±1	1.5
	20635	847.5	QPSK	1	0	22.97	22.5±1	/
				1	49	22.95	22.5±1	/
				1	99	22.98	22.5±1	/
				25	0	22.02	22.0±1	0.5
				25	24	22.15	22.0±1	0.5
				25	49	21.90	22.0±1	0.5
				50	0	22.10	22.0±1	0.5
			16QAM	1	0	21.97	22.0±1	0.5
				1	49	21.88	22.0±1	0.5
				1	99	21.96	22.0±1	0.5
				25	0	21.22	22.0±1	0.5
				25	24	21.26	22.0±1	0.5
				25	49	21.23	22.0±1	0.5
				50	0	20.88	22.0±1	0.5

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
5MHz	20425	826.5	QPSK	1	0	22.83	22.5±1	/
				1	49	22.80	22.5±1	/
				1	99	22.84	22.5±1	/
				36	0	21.72	22.5±1	/
				36	24	21.74	22.5±1	/
				36	49	21.80	22.5±1	/
				75	0	21.68	22.5±1	/
			16QAM	1	0	21.32	21.0±1	1.5
				1	49	21.41	21.0±1	1.5
				1	99	21.54	21.0±1	1.5
				36	0	20.73	21.0±1	1.5
				36	24	20.84	21.0±1	1.5
				36	49	20.81	21.0±1	1.5
				75	0	20.57	21.0±1	1.5
	20525	836.5	QPSK	1	0	22.96	22.5±1	/
				1	49	22.93	22.5±1	/
				1	99	22.94	22.5±1	/
				36	0	22.00	22.5±1	/
				36	24	21.86	22.5±1	/
				36	49	21.86	22.5±1	/
				75	0	22.02	22.5±1	/
			16QAM	1	0	21.67	22.0±1	0.5
				1	49	21.84	22.0±1	0.5
				1	99	21.60	22.0±1	0.5
				36	0	21.25	22.0±1	0.5
				36	24	20.70	22.0±1	0.5
				36	49	20.77	22.0±1	0.5
				75	0	21.15	22.0±1	0.5
	20625	846.5	QPSK	1	0	23.07	22.5±1	/
				1	49	23.01	22.5±1	/
				1	99	23.06	22.5±1	/
				36	0	22.09	22.0±1	0.5
				36	24	21.97	22.0±1	0.5
				36	49	21.96	22.0±1	0.5
				75	0	22.11	22.0±1	0.5
			16QAM	1	0	21.24	22.0±1	0.5
				1	49	21.24	22.0±1	0.5
				1	99	21.27	22.0±1	0.5
				36	0	21.15	22.0±1	0.5
				36	24	20.98	22.0±1	0.5
				36	49	21.17	22.0±1	0.5
				75	0	21.05	22.0±1	0.5

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	20450	829	QPSK	1	0	22.68	22.5±1	/
				1	49	22.82	22.5±1	/
				1	99	22.71	22.5±1	/
				50	0	21.81	21.5±1	1.0
				50	24	21.80	21.5±1	1.0
				50	49	21.66	21.5±1	1.0
				100	0	21.64	21.5±1	1.0
			16QAM	1	0	21.07	21.0±1	1.5
				1	49	21.08	21.0±1	1.5
				1	99	21.07	21.0±1	1.5
				50	0	20.73	21.0±1	1.5
				50	24	20.81	21.0±1	1.5
				50	49	21.05	21.0±1	1.5
				100	0	20.79	21.0±1	1.5
	20525	836.5	QPSK	1	0	23.02	22.5±1	/
				1	49	23.11	22.5±1	/
				1	99	22.99	22.5±1	/
				50	0	21.97	21.5±1	1.0
				50	24	21.90	21.5±1	1.0
				50	49	21.87	21.5±1	1.0
				100	0	22.03	21.5±1	1.0
			16QAM	1	0	21.62	22.0±1	0.5
				1	49	21.76	22.0±1	0.5
				1	99	21.86	22.0±1	0.5
				50	0	20.97	21.5±1	1.0
				50	24	21.25	21.5±1	1.0
				50	49	20.97	21.5±1	1.0
				100	0	21.17	21.5±1	1.0
	20600	844	QPSK	1	0	22.95	22.5±1	/
				1	49	22.89	22.5±1	/
				1	99	22.93	22.5±1	/
				50	0	21.86	21.5±1	1.0
				50	24	21.83	21.5±1	1.0
				50	49	21.90	21.5±1	1.0
				100	0	21.99	21.5±1	1.0
			16QAM	1	0	21.56	22.0±1	0.5
				1	49	21.52	22.0±1	0.5
				1	99	21.60	22.0±1	0.5
				50	0	20.90	21.5±1	1.0
				50	24	20.91	21.5±1	1.0
				50	49	20.93	21.5±1	1.0
				100	0	20.97	21.5±1	1.0

LTE Band 7:

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
5MHz	20775	2502.5	QPSK	1	0	22.12	22.0±1	/
				1	49	22.23	22.0±1	/
				1	99	22.31	22.0±1	/
				12	0	21.25	21.0±1	1.0
				12	24	21.25	21.0±1	1.0
				12	49	21.28	21.0±1	1.0
				25	0	21.31	21.0±1	1.0
			16QAM	1	0	21.51	21.0±1	1.0
				1	49	21.01	21.0±1	1.0
				1	99	20.94	21.0±1	1.0
				12	0	20.47	21.0±1	1.0
				12	24	20.43	21.0±1	1.0
				12	49	20.52	21.0±1	1.0
				25	0	20.31	21.0±1	1.0
	21100	2535	QPSK	1	0	22.36	22.0±1	/
				1	49	22.35	22.0±1	/
				1	99	22.46	22.0±1	/
				12	0	21.35	21.0±1	1.0
				12	24	21.35	21.0±1	1.0
				12	49	21.29	21.0±1	1.0
				25	0	21.30	21.0±1	1.0
			16QAM	1	0	20.96	21.0±1	1.0
				1	49	21.09	21.0±1	1.0
				1	99	21.02	21.0±1	1.0
				12	0	20.41	21.0±1	1.0
				12	24	20.40	21.0±1	1.0
				12	49	20.39	21.0±1	1.0
				25	0	20.47	21.0±1	1.0
	21425	2567.5	QPSK	1	0	22.78	22.0±1	/
				1	49	22.67	22.0±1	/
				1	99	22.61	22.0±1	/
				12	0	21.63	21.0±1	1.0
				12	24	21.62	21.0±1	1.0
				12	49	21.62	21.0±1	1.0
				25	0	21.63	21.0±1	1.0
			16QAM	1	0	21.05	21.0±1	1.0
				1	49	21.07	21.0±1	1.0
				1	99	21.12	21.0±1	1.0
				12	0	20.63	21.0±1	1.0
				12	24	20.68	21.0±1	1.0
				12	49	20.67	21.0±1	1.0
				25	0	20.82	21.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	20800	2505	QPSK	1	0	22.42	22.0±1	/
				1	49	22.50	22.0±1	/
				1	99	22.33	22.0±1	/
				25	0	21.37	21.0±1	1.0
				25	24	21.33	21.0±1	1.0
				25	49	21.33	21.0±1	1.0
				50	0	21.45	21.0±1	1.0
			16QAM	1	0	20.91	21.0±1	1.0
				1	49	20.73	21.0±1	1.0
				1	99	20.95	21.0±1	1.0
				25	0	20.51	21.0±1	1.0
				25	24	20.59	21.0±1	1.0
				25	49	20.51	21.0±1	1.0
				50	0	20.49	21.0±1	1.0
	21100	2535	QPSK	1	0	22.22	22.0±1	/
				1	49	22.38	22.0±1	/
				1	99	22.21	22.0±1	/
				25	0	21.31	21.0±1	1.0
				25	24	21.45	21.0±1	1.0
				25	49	21.35	21.0±1	1.0
				50	0	21.39	21.0±1	1.0
			16QAM	1	0	21.44	21.0±1	1.0
				1	49	21.49	21.0±1	1.0
				1	99	21.33	21.0±1	1.0
				25	0	20.51	21.0±1	1.0
				25	24	20.52	21.0±1	1.0
				25	49	20.55	21.0±1	1.0
				50	0	20.51	21.0±1	1.0
	21400	2565	QPSK	1	0	22.39	22.0±1	/
				1	49	22.48	22.0±1	/
				1	99	22.56	22.0±1	/
				25	0	21.57	21.0±1	1.0
				25	24	21.63	21.0±1	1.0
				25	49	21.56	21.0±1	1.0
				50	0	21.52	21.0±1	1.0
			16QAM	1	0	21.27	21.0±1	1.0
				1	49	21.28	21.0±1	1.0
				1	99	21.27	21.0±1	1.0
				25	0	20.59	21.0±1	1.0
				25	24	20.60	21.0±1	1.0
				25	49	20.64	21.0±1	1.0
				50	0	20.84	21.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
15MHz	20825	2507.5	QPSK	1	0	22.51	22.0±1	/
				1	49	22.61	22.0±1	/
				1	99	22.37	22.0±1	/
				36	0	21.69	21.0±1	1.0
				36	24	21.57	21.0±1	1.0
				36	49	21.70	21.0±1	1.0
				75	0	21.42	21.0±1	1.0
			16QAM	1	0	21.71	21.0±1	1.0
				1	49	21.58	21.0±1	1.0
				1	99	21.69	21.0±1	1.0
				36	0	21.76	21.0±1	1.0
				36	24	21.69	21.0±1	1.0
				36	49	21.56	21.0±1	1.0
				75	0	20.60	21.0±1	1.0
	21100	2535	QPSK	1	0	22.13	22.0±1	/
				1	49	22.26	22.0±1	/
				1	99	22.46	22.0±1	/
				36	0	21.70	21.0±1	1.0
				36	24	21.55	21.0±1	1.0
				36	49	21.44	21.0±1	1.0
				75	0	21.33	21.0±1	1.0
			16QAM	1	0	21.46	21.0±1	1.0
				1	49	21.54	21.0±1	1.0
				1	99	21.71	21.0±1	1.0
				36	0	21.55	21.0±1	1.0
				36	24	21.47	21.0±1	1.0
				36	49	21.70	21.0±1	1.0
				75	0	20.46	21.0±1	1.0
	21375	2562.5	QPSK	1	0	22.48	22.0±1	/
				1	49	22.32	22.0±1	/
				1	99	22.53	22.0±1	/
				36	0	21.10	21.0±1	1.0
				36	24	21.42	21.0±1	1.0
				36	49	21.26	21.0±1	1.0
				75	0	21.50	21.0±1	1.0
			16QAM	1	0	21.08	21.0±1	1.0
				1	49	21.36	21.0±1	1.0
				1	99	21.28	21.0±1	1.0
				36	0	21.07	21.0±1	1.0
				36	24	21.29	21.0±1	1.0
				36	49	21.29	21.0±1	1.0
				75	0	20.67	21.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
20MHz	20850	2510	QPSK	1	0	22.71	22.0±1	/
				1	49	22.69	22.0±1	/
				1	99	22.54	22.0±1	/
				50	0	21.41	21.0±1	1.0
				50	24	21.33	21.0±1	1.0
				50	49	21.55	21.0±1	1.0
				100	0	21.51	21.0±1	1.0
			16QAM	1	0	21.99	21.0±1	1.0
				1	49	21.89	21.0±1	1.0
				1	99	21.90	21.0±1	1.0
				50	0	20.55	21.0±1	1.0
				50	24	20.51	21.0±1	1.0
				50	49	20.52	21.0±1	1.0
				100	0	20.66	21.0±1	1.0
	21100	2535	QPSK	1	0	22.39	22.0±1	/
				1	49	22.42	22.0±1	/
				1	99	22.66	22.0±1	/
				50	0	21.52	21.0±1	1.0
				50	24	21.16	21.0±1	1.0
				50	49	21.51	21.0±1	1.0
				100	0	21.39	21.0±1	1.0
			16QAM	1	0	21.15	21.0±1	1.0
				1	49	21.20	21.0±1	1.0
				1	99	21.45	21.0±1	1.0
				50	0	20.36	21.0±1	1.0
				50	24	20.61	21.0±1	1.0
				50	49	20.61	21.0±1	1.0
				100	0	20.36	21.0±1	1.0
	21350	2560	QPSK	1	0	22.52	22.0±1	/
				1	49	22.34	22.0±1	/
				1	99	22.70	22.0±1	/
				50	0	21.53	21.0±1	1.0
				50	24	21.36	21.0±1	1.0
				50	49	21.33	21.0±1	1.0
				100	0	21.44	21.0±1	1.0
			16QAM	1	0	20.80	21.0±1	1.0
				1	49	21.00	21.0±1	1.0
				1	99	21.13	21.0±1	1.0
				50	0	20.82	21.0±1	1.0
				50	24	20.63	21.0±1	1.0
				50	49	20.61	21.0±1	1.0
				100	0	20.60	21.0±1	1.0

LTE Band 12：

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
1.4MHz	23017	699.7	QPSK	1	0	22.95	22.5±1	/
				1	49	22.93	22.5±1	/
				1	99	22.97	22.5±1	/
				12	0	22.94	22.5±1	/
				12	24	22.95	22.5±1	/
				12	49	22.92	22.5±1	/
				25	0	22.03	22.5±1	/
			16QAM	1	0	21.79	21.5±1	1.0
				1	49	21.98	21.5±1	1.0
				1	99	22.04	21.5±1	1.0
				12	0	21.53	21.5±1	1.0
				12	24	21.61	21.5±1	1.0
				12	49	21.52	21.5±1	1.0
				25	0	20.95	21.5±1	1.0
	23095	707.5	QPSK	1	0	22.73	22.5±1	/
				1	49	22.92	22.5±1	/
				1	99	22.88	22.5±1	/
				12	0	23.00	22.5±1	/
				12	24	23.05	22.5±1	/
				12	49	23.04	22.5±1	/
				25	0	21.92	22.5±1	/
			16QAM	1	0	22.41	22.0±1	0.5
				1	49	22.90	22.0±1	0.5
				1	99	22.47	22.0±1	0.5
				12	0	21.60	21.5±1	1.0
				12	24	21.59	21.5±1	1.0
				12	49	21.65	21.5±1	1.0
				25	0	20.93	21.5±1	1.0
	23173	715.3	QPSK	1	0	22.93	22.0±1	0.5
				1	49	22.92	22.0±1	0.5
				1	99	22.82	22.0±1	0.5
				12	0	22.94	22.0±1	0.5
				12	24	22.90	22.0±1	0.5
				12	49	22.93	22.0±1	0.5
				25	0	21.94	22.0±1	0.5
			16QAM	1	0	22.87	22.0±1	0.5
				1	49	22.94	22.0±1	0.5
				1	99	22.90	22.0±1	0.5
				12	0	21.79	22.0±1	0.5
				12	24	21.78	22.0±1	0.5
				12	49	21.76	22.0±1	0.5
				25	0	21.41	22.0±1	0.5

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
3MHz	23025	700.5	QPSK	1	0	23.10	22.5±1	/
				1	49	22.98	22.5±1	/
				1	99	23.01	22.5±1	/
				25	0	21.94	22.5±1	/
				25	24	21.93	22.5±1	/
				25	49	21.98	22.5±1	/
				50	0	21.90	22.5±1	/
			16QAM	1	0	21.70	21.5±1	1.0
				1	49	21.63	21.5±1	1.0
				1	99	21.43	21.5±1	1.0
				25	0	21.15	21.5±1	1.0
				25	24	21.15	21.5±1	1.0
				25	49	21.19	21.5±1	1.0
				50	0	20.90	21.5±1	1.0
	23095	707.5	QPSK	1	0	22.84	22.5±1	/
				1	49	22.92	22.5±1	/
				1	99	22.94	22.5±1	/
				25	0	22.02	22.5±1	/
				25	24	22.28	22.5±1	/
				25	49	22.29	22.5±1	/
				50	0	22.04	22.5±1	/
			16QAM	1	0	22.51	22.0±1	0.5
				1	49	22.56	22.0±1	0.5
				1	99	22.85	22.0±1	0.5
				25	0	21.18	21.5±1	1.0
				25	24	21.37	21.5±1	1.0
				25	49	21.26	21.5±1	1.0
				50	0	21.21	21.5±1	1.0
	23165	714.5	QPSK	1	0	23.03	22.5±1	/
				1	49	23.04	22.5±1	/
				1	99	23.14	22.5±1	/
				25	0	22.10	22.0±1	0.5
				25	24	22.08	22.0±1	0.5
				25	49	21.88	22.0±1	0.5
				50	0	21.76	22.0±1	0.5
			16QAM	1	0	21.97	22.0±1	0.5
				1	49	21.88	22.0±1	0.5
				1	99	21.84	22.0±1	0.5
				25	0	21.34	22.0±1	0.5
				25	24	21.44	22.0±1	0.5
				25	49	21.56	22.0±1	0.5
				50	0	21.05	22.0±1	0.5

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
5MHz	23035	701.5	QPSK	1	0	23.12	22.5±1	/
				1	49	23.17	22.5±1	/
				1	99	23.08	22.5±1	/
				36	0	22.04	22.5±1	/
				36	24	21.92	22.5±1	/
				36	49	21.98	22.5±1	/
				75	0	21.91	22.5±1	/
			16QAM	1	0	21.62	21.5±1	1.0
				1	49	21.61	21.5±1	1.0
				1	99	21.59	21.5±1	1.0
				36	0	21.04	21.5±1	1.0
				36	24	20.91	21.5±1	1.0
				36	49	20.83	21.5±1	1.0
				75	0	20.83	21.5±1	1.0
	23095	707.5	QPSK	1	0	23.15	22.5±1	/
				1	49	23.18	22.5±1	/
				1	99	23.02	22.5±1	/
				36	0	21.97	22.5±1	/
				36	24	22.28	22.5±1	/
				36	49	22.27	22.5±1	/
				75	0	22.06	22.5±1	/
			16QAM	1	0	22.08	22.0±1	0.5
				1	49	21.61	22.0±1	0.5
				1	99	21.76	22.0±1	0.5
				36	0	21.36	21.5±1	1.0
				36	24	21.37	21.5±1	1.0
				36	49	21.00	21.5±1	1.0
				75	0	21.35	21.5±1	1.0
	23155	713.5	QPSK	1	0	23.23	22.5±1	/
				1	49	23.22	22.5±1	/
				1	99	23.18	22.5±1	/
				36	0	21.98	22.0±1	0.5
				36	24	21.95	22.0±1	0.5
				36	49	22.15	22.0±1	0.5
				75	0	22.43	22.0±1	0.5
			16QAM	1	0	21.17	22.0±1	0.5
				1	49	21.36	22.0±1	0.5
				1	99	21.45	22.0±1	0.5
				36	0	21.28	22.0±1	0.5
				36	24	21.57	22.0±1	0.5
				36	49	21.18	22.0±1	0.5
				75	0	21.27	22.0±1	0.5

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	23060	704	QPSK	1	0	23.40	22.5±1	/
				1	49	23.32	22.5±1	/
				1	99	23.44	22.5±1	/
				50	0	22.21	22.5±1	/
				50	24	22.65	22.5±1	/
				50	49	22.21	22.5±1	/
				100	0	22.26	22.5±1	/
			16QAM	1	0	21.74	21.5±1	1.0
				1	49	21.66	21.5±1	1.0
				1	99	21.68	21.5±1	1.0
				50	0	21.42	21.5±1	1.0
				50	24	21.41	21.5±1	1.0
				50	49	21.66	21.5±1	1.0
				100	0	21.32	21.5±1	1.0
	23095	707.5	QPSK	1	0	23.18	22.5±1	/
				1	49	23.24	22.5±1	/
				1	99	23.27	22.5±1	/
				50	0	22.63	22.5±1	/
				50	24	22.46	22.5±1	/
				50	49	22.64	22.5±1	/
				100	0	22.23	22.5±1	/
			16QAM	1	0	22.32	22.0±1	0.5
				1	49	22.33	22.0±1	0.5
				1	99	22.23	22.0±1	0.5
				50	0	21.74	21.5±1	1.0
				50	24	21.75	21.5±1	1.0
				50	49	21.77	21.5±1	1.0
				100	0	21.42	21.5±1	1.0
	23130	711	QPSK	1	0	23.18	22.5±1	/
				1	49	23.12	22.5±1	/
				1	99	23.21	22.5±1	/
				50	0	22.31	22.0±1	0.5
				50	24	22.46	22.0±1	0.5
				50	49	22.20	22.0±1	0.5
				100	0	22.19	22.0±1	0.5
			16QAM	1	0	21.89	22.0±1	0.5
				1	49	21.93	22.0±1	0.5
				1	99	22.19	22.0±1	0.5
				50	0	21.19	22.0±1	0.5
				50	24	21.57	22.0±1	0.5
				50	49	21.17	22.0±1	0.5
				100	0	21.75	22.0±1	0.5

LTE Band 13:

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
5MHz	23205	779.5	QPSK	1	0	23.28	22.5±1	/
				1	49	23.15	22.5±1	/
				1	99	23.29	22.5±1	/
				12	0	22.30	22.0±1	0.5
				12	24	22.30	22.0±1	0.5
				12	49	22.25	22.0±1	0.5
				25	0	22.13	22.0±1	0.5
			16QAM	1	0	21.72	21.5±1	1.0
				1	49	21.98	21.5±1	1.0
				1	99	21.80	21.5±1	1.0
				12	0	21.37	21.5±1	1.0
				12	24	21.30	21.5±1	1.0
				12	49	21.53	21.5±1	1.0
				25	0	21.41	21.5±1	1.0
	23230	782	QPSK	1	0	23.30	22.5±1	/
				1	49	23.33	22.5±1	/
				1	99	23.44	22.5±1	/
				12	0	22.23	22.0±1	0.5
				12	24	22.43	22.0±1	0.5
				12	49	22.26	22.0±1	0.5
				25	0	22.28	22.0±1	0.5
			16QAM	1	0	21.87	22.0±1	0.5
				1	49	21.98	22.0±1	0.5
				1	99	22.24	22.0±1	0.5
				12	0	21.45	21.5±1	1.0
				12	24	21.56	21.5±1	1.0
				12	49	21.56	21.5±1	1.0
				25	0	21.30	21.5±1	1.0
	23255	784.5	QPSK	1	0	23.30	22.5±1	/
				1	49	23.41	22.5±1	/
				1	99	23.35	22.5±1	/
				12	0	22.48	22.0±1	0.5
				12	24	22.48	22.0±1	0.5
				12	49	22.41	22.0±1	0.5
				25	0	22.39	22.0±1	0.5
			16QAM	1	0	21.80	22.0±1	0.5
				1	49	21.63	22.0±1	0.5
				1	99	21.74	22.0±1	0.5
				12	0	21.33	22.0±1	0.5
				12	24	21.47	22.0±1	0.5
				12	49	21.47	22.0±1	0.5
				25	0	21.55	22.0±1	0.5

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	23230	782	QPSK	1	0	23.43	22.5±1	/
				1	49	23.38	22.5±1	/
				1	99	23.35	22.5±1	/
				25	0	22.25	22.0±1	0.5
				25	24	22.25	22.0±1	0.5
				25	49	22.44	22.0±1	0.5
				50	0	22.39	22.0±1	0.5
			16QAM	1	0	21.67	21.5±1	1.0
				1	49	21.81	21.5±1	1.0
				1	99	21.80	21.5±1	1.0
				25	0	21.72	21.5±1	1.0
				25	24	21.72	21.5±1	1.0
				25	49	21.52	21.5±1	1.0
				50	0	21.38	21.5±1	1.0

LTE Band 17:

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
5MHz	23755	706.5	QPSK	1	0	23.48	23.0±1	/
				1	12	23.40	23.0±1	/
				1	24	23.48	23.0±1	/
				12	0	22.78	23.0±1	/
				12	6	22.78	23.0±1	/
				12	13	22.50	23.0±1	/
				25	0	22.73	23.0±1	/
			16QAM	1	0	21.98	23.0±1	/
				1	12	22.07	23.0±1	/
				1	24	22.37	23.0±1	/
				12	0	21.76	22.0±1	1.0
				12	6	21.74	22.0±1	1.0
				12	13	21.44	22.0±1	1.0
				25	0	21.63	22.0±1	1.0
	23790	710	QPSK	1	0	23.62	23.0±1	/
				1	12	23.64	23.0±1	/
				1	24	23.60	23.0±1	/
				12	0	22.42	23.0±1	/
				12	6	22.48	23.0±1	/
				12	13	22.53	23.0±1	/
				25	0	22.53	23.0±1	/
			16QAM	1	0	22.08	22.0±1	1.0
				1	12	22.14	22.0±1	1.0
				1	24	22.25	22.0±1	1.0
				12	0	21.50	22.0±1	1.0
				12	6	21.46	22.0±1	1.0
				12	13	21.51	22.0±1	1.0
				25	0	21.85	22.0±1	1.0
	23825	713.5	QPSK	1	0	23.67	23.0±1	/
				1	12	23.67	23.0±1	/
				1	24	23.71	23.0±1	/
				12	0	22.43	23.0±1	/
				12	6	22.64	23.0±1	/
				12	13	22.42	23.0±1	/
				25	0	22.54	23.0±1	/
			16QAM	1	0	21.94	22.0±1	1.0
				1	12	22.05	22.0±1	1.0
				1	24	21.80	22.0±1	1.0
				12	0	21.50	22.0±1	1.0
				12	6	21.60	22.0±1	1.0
				12	13	21.87	22.0±1	1.0
				25	0	21.88	22.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	20800	709	QPSK	1	0	23.63	23.0±1	/
				1	24	23.49	23.0±1	/
				1	49	23.59	23.0±1	/
				25	0	22.82	23.0±1	/
				25	12	22.86	23.0±1	/
				25	25	22.51	23.0±1	/
				50	0	22.47	23.0±1	/
			16QAM	1	0	22.14	22.0±1	1.0
				1	24	21.89	22.0±1	1.0
				1	49	21.91	22.0±1	1.0
				25	0	21.70	22.0±1	1.0
				25	12	21.85	22.0±1	1.0
				25	25	21.88	22.0±1	1.0
				50	0	21.50	22.0±1	1.0
	21100	710	QPSK	1	0	23.46	23.0±1	/
				1	24	23.62	23.0±1	/
				1	49	23.49	23.0±1	/
				25	0	22.43	23.0±1	/
				25	12	22.50	23.0±1	/
				25	25	22.52	23.0±1	/
				50	0	22.43	23.0±1	/
			16QAM	1	0	22.69	22.0±1	1.0
				1	24	22.88	22.0±1	1.0
				1	49	22.60	22.0±1	1.0
				25	0	21.69	22.0±1	1.0
				25	12	21.76	22.0±1	1.0
				25	25	21.77	22.0±1	1.0
				50	0	21.93	22.0±1	1.0
	21400	711	QPSK	1	0	23.38	23.0±1	/
				1	24	23.37	23.0±1	/
				1	49	23.52	23.0±1	/
				25	0	22.45	23.0±1	/
				25	12	22.68	23.0±1	/
				25	25	22.46	23.0±1	/
				50	0	22.50	23.0±1	/
			16QAM	1	0	22.13	22.0±1	1.0
				1	24	22.42	22.0±1	1.0
				1	49	22.05	22.0±1	1.0
				25	0	21.50	22.0±1	1.0
				25	12	21.61	22.0±1	1.0
				25	25	21.78	22.0±1	1.0
				50	0	21.93	22.0±1	1.0

***Refer to October 2014 TCB workshop RF exposure slides, the operating bandwidth of the LTE Band 17 (704 – 716 MHz) is smaller than the LTE Band 12 (699 – 716 MHz). For overlapping bands, only larger band (LTE Band 12) was tested.**

When the mobile phone is close to the human ear, the product system recognizes the receiver, so as to reduce the transmission power of the main board in the call frequency band, reduce the radiation of the product to the human body, and reach the SAR test standard of FCC certification. The band which reduce the transmission power is WCDMA Band II and Band IV, the Burst Average Power is listed in the follow table:

LTE Band 2：

BW(MHz)	Ch.	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
1.4MHz	18607	1850.7	QPSK	1	0	19.04	19.0±1	1.0
				1	2	18.82	19.0±1	1.0
				1	5	18.89	19.0±1	1.0
				3	0	18.96	19.0±1	1.0
				3	1	18.93	19.0±1	1.0
				3	2	18.92	19.0±1	1.0
				6	0	18.05	19.0±1	1.0
			16QAM	1	0	17.78	18.0±1	2.0
				1	2	17.73	18.0±1	2.0
				1	5	17.95	18.0±1	2.0
				3	0	17.71	18.0±1	2.0
				3	1	17.81	18.0±1	2.0
				3	2	17.72	18.0±1	2.0
				6	0	18.02	18.0±1	2.0
	18900	1880	QPSK	1	0	19.88	19.0±1	1.0
				1	2	19.25	19.0±1	1.0
				1	5	19.20	19.0±1	1.0
				3	0	19.30	19.0±1	1.0
				3	1	19.09	19.0±1	1.0
				3	2	19.30	19.0±1	1.0
				6	0	19.26	19.0±1	1.0
			16QAM	1	0	19.05	19.0±1	1.0
				1	2	18.68	19.0±1	1.0
				1	5	18.99	19.0±1	1.0
				3	0	18.95	19.0±1	1.0
				3	1	19.11	19.0±1	1.0
				3	2	19.11	19.0±1	1.0
				6	0	19.07	19.0±1	1.0
	19193	1909.3	QPSK	1	0	19.17	19.0±1	1.0
				1	2	19.45	19.0±1	1.0
				1	5	19.20	19.0±1	1.0
				3	0	19.36	19.0±1	1.0
				3	1	19.37	19.0±1	1.0
				3	2	19.27	19.0±1	1.0
				6	0	19.29	19.0±1	1.0
			16QAM	1	0	18.98	19.0±1	1.0
				1	2	19.20	19.0±1	1.0
				1	5	19.25	19.0±1	1.0
				3	0	19.07	19.0±1	1.0
				3	1	19.18	19.0±1	1.0
				3	2	19.17	19.0±1	1.0
				6	0	19.10	19.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
3MHz	18615	1851.5	QPSK	1	0	18.05	19.0±1	1.0
				1	8	18.23	19.0±1	1.0
				1	14	18.13	19.0±1	1.0
				6	0	18.17	19.0±1	1.0
				6	4	18.14	19.0±1	1.0
				6	9	18.16	19.0±1	1.0
				15	0	18.15	19.0±1	1.0
			16QAM	1	0	17.85	18.0±1	2.0
				1	8	18.03	18.0±1	2.0
				1	14	17.93	18.0±1	2.0
				6	0	18.12	18.0±1	2.0
				6	4	18.12	18.0±1	2.0
				6	9	18.09	18.0±1	2.0
				15	0	18.04	18.0±1	2.0
	18900	1880	QPSK	1	0	18.55	19.0±1	1.0
				1	8	19.73	19.0±1	1.0
				1	14	19.19	19.0±1	1.0
				6	0	19.53	19.0±1	1.0
				6	4	18.93	19.0±1	1.0
				6	9	19.52	19.0±1	1.0
				15	0	19.23	19.0±1	1.0
			16QAM	1	0	18.93	19.0±1	1.0
				1	8	18.29	19.0±1	1.0
				1	14	19.45	19.0±1	1.0
				6	0	19.50	19.0±1	1.0
				6	4	18.91	19.0±1	1.0
				6	9	19.50	19.0±1	1.0
				15	0	19.14	19.0±1	1.0
	19185	1908.5	QPSK	1	0	19.08	19.0±1	1.0
				1	8	19.40	19.0±1	1.0
				1	14	19.50	19.0±1	1.0
				6	0	19.50	19.0±1	1.0
				6	4	19.50	19.0±1	1.0
				6	9	19.32	19.0±1	1.0
				15	0	19.40	19.0±1	1.0
			16QAM	1	0	19.07	19.0±1	1.0
				1	8	19.39	19.0±1	1.0
				1	14	19.48	19.0±1	1.0
				6	0	19.34	19.0±1	1.0
				6	4	19.48	19.0±1	1.0
				6	9	19.47	19.0±1	1.0
				15	0	19.38	19.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
5MHz	18625	1852.5	QPSK	1	0	18.76	19.0±1	1.0
				1	12	19.18	19.0±1	1.0
				1	24	18.72	19.0±1	1.0
				12	0	18.00	19.0±1	1.0
				12	6	18.02	19.0±1	1.0
				12	11	18.03	19.0±1	1.0
				25	0	18.02	19.0±1	1.0
			16QAM	1	0	17.79	18.0±1	2.0
				1	12	17.78	18.0±1	2.0
				1	24	18.22	18.0±1	2.0
				12	0	18.04	18.0±1	2.0
				12	6	18.04	18.0±1	2.0
				12	11	18.05	18.0±1	2.0
				25	0	17.97	18.0±1	2.0
	18900	1880	QPSK	1	0	19.74	19.0±1	1.0
				1	12	18.81	19.0±1	1.0
				1	24	19.25	19.0±1	1.0
				12	0	18.66	19.0±1	1.0
				12	6	19.62	19.0±1	1.0
				12	11	19.73	19.0±1	1.0
				25	0	19.47	19.0±1	1.0
			16QAM	1	0	19.61	19.0±1	1.0
				1	12	18.73	19.0±1	1.0
				1	24	19.12	19.0±1	1.0
				12	0	19.68	19.0±1	1.0
				12	6	18.56	19.0±1	1.0
				12	11	19.62	19.0±1	1.0
				25	0	19.45	19.0±1	1.0
	19175	1907.5	QPSK	1	0	19.24	19.0±1	1.0
				1	12	18.97	19.0±1	1.0
				1	24	19.64	19.0±1	1.0
				12	0	19.34	19.0±1	1.0
				12	6	19.46	19.0±1	1.0
				12	11	19.46	19.0±1	1.0
				25	0	19.40	19.0±1	1.0
			16QAM	1	0	19.12	19.0±1	1.0
				1	12	19.53	19.0±1	1.0
				1	24	18.88	19.0±1	1.0
				12	0	19.40	19.0±1	1.0
				12	6	19.41	19.0±1	1.0
				12	11	19.29	19.0±1	1.0
				25	0	19.39	19.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	18650	1855	QPSK	1	0	18.57	19.0±1	1.0
				1	24	19.48	19.0±1	1.0
				1	49	19.14	19.0±1	1.0
				25	0	18.83	19.0±1	1.0
				25	12	18.55	19.0±1	1.0
				25	24	18.56	19.0±1	1.0
				50	0	18.68	19.0±1	1.0
			16QAM	1	0	17.29	18.0±1	2.0
				1	24	17.38	18.0±1	2.0
				1	49	17.95	18.0±1	2.0
				25	0	17.56	18.0±1	2.0
				25	12	17.55	18.0±1	2.0
				25	24	17.83	18.0±1	2.0
				50	0	17.69	18.0±1	2.0
	18900	1880	QPSK	1	0	20.75	20.0±1	/
				1	24	19.53	20.0±1	/
				1	49	19.03	20.0±1	/
				25	0	20.47	20.0±1	/
				25	12	19.77	20.0±1	/
				25	24	20.46	20.0±1	/
				50	0	19.69	20.0±1	/
			16QAM	1	0	19.77	20.0±1	/
				1	24	19.27	20.0±1	/
				1	49	20.48	20.0±1	/
				25	0	19.77	20.0±1	/
				25	12	20.45	20.0±1	/
				25	24	20.46	20.0±1	/
				50	0	19.67	20.0±1	/
	19150	1905	QPSK	1	0	18.89	19.0±1	1.0
				1	24	19.60	19.0±1	1.0
				1	49	19.74	19.0±1	1.0
				25	0	19.35	19.0±1	1.0
				25	12	19.36	19.0±1	1.0
				25	24	19.80	19.0±1	1.0
				50	0	19.58	19.0±1	1.0
			16QAM	1	0	19.58	19.0±1	1.0
				1	24	19.73	19.0±1	1.0
				1	49	18.87	19.0±1	1.0
				25	0	19.30	19.0±1	1.0
				25	12	19.31	19.0±1	1.0
				25	24	19.74	19.0±1	1.0
				50	0	19.55	19.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
15MHz	18675	1857.5	QPSK	1	0	19.50	19.0±1	1.0
				1	37	18.65	19.0±1	1.0
				1	74	19.82	19.0±1	1.0
				36	0	18.96	19.0±1	1.0
				36	16	18.65	19.0±1	1.0
				36	35	18.77	19.0±1	1.0
				75	0	18.93	19.0±1	1.0
			16QAM	1	0	17.64	18.0±1	2.0
				1	37	17.77	18.0±1	2.0
				1	74	18.95	18.0±1	2.0
				36	0	18.95	18.0±1	2.0
				36	16	17.77	18.0±1	2.0
				36	35	17.65	18.0±1	2.0
				75	0	17.94	18.0±1	2.0
	18900	1880	QPSK	1	0	19.62	20.0±1	/
				1	37	20.94	20.0±1	/
				1	74	19.47	20.0±1	/
				36	0	19.73	19.0±1	1.0
				36	16	18.36	19.0±1	1.0
				36	35	19.20	19.0±1	1.0
				75	0	19.72	19.0±1	1.0
			16QAM	1	0	19.20	19.0±1	1.0
				1	37	18.35	19.0±1	1.0
				1	74	19.67	19.0±1	1.0
				36	0	19.67	19.0±1	1.0
				36	16	18.36	19.0±1	1.0
				36	35	19.20	19.0±1	1.0
				75	0	19.68	19.0±1	1.0
	19125	1902.5	QPSK	1	0	19.05	20.0±1	/
				1	37	19.89	20.0±1	/
				1	74	19.02	20.0±1	/
				36	0	19.05	19.0±1	1.0
				36	16	18.00	19.0±1	1.0
				36	35	18.87	19.0±1	1.0
				75	0	18.86	19.0±1	1.0
			16QAM	1	0	18.01	19.0±1	1.0
				1	37	18.87	19.0±1	1.0
				1	74	19.05	19.0±1	1.0
				36	0	19.05	19.0±1	1.0
				36	16	18.87	19.0±1	1.0
				36	35	18.00	19.0±1	1.0
				75	0	18.80	19.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
20MHz	18700	1860	QPSK	1	0	19.57	19.0±1	1.0
				1	49	19.56	19.0±1	1.0
				1	99	19.63	19.0±1	1.0
				50	0	18.96	19.0±1	1.0
				50	24	18.22	19.0±1	1.0
				50	49	18.30	19.0±1	1.0
				100	0	18.12	19.0±1	1.0
			16QAM	1	0	18.65	18.0±1	2.0
				1	49	17.65	18.0±1	2.0
				1	99	17.75	18.0±1	2.0
				50	0	18.91	18.0±1	2.0
				50	24	17.31	18.0±1	2.0
				50	49	17.33	18.0±1	2.0
				100	0	18.09	18.0±1	2.0
	18900	1880	QPSK	1	0	20.34	20.0±1	/
				1	49	19.65	20.0±1	/
				1	99	19.87	20.0±1	/
				50	0	19.04	19.0±1	1.0
				50	24	18.51	19.0±1	1.0
				50	49	19.78	19.0±1	1.0
				100	0	19.75	19.0±1	1.0
			16QAM	1	0	18.68	19.0±1	1.0
				1	49	19.47	19.0±1	1.0
				1	99	19.12	19.0±1	1.0
				50	0	18.50	19.0±1	1.0
				50	24	19.76	19.0±1	1.0
				50	49	19.06	19.0±1	1.0
				100	0	19.72	19.0±1	1.0
	19100	1900	QPSK	1	0	20.11	20.0±1	/
				1	49	19.81	20.0±1	/
				1	99	19.96	20.0±1	/
				50	0	19.36	19.0±1	1.0
				50	24	18.23	19.0±1	1.0
				50	49	18.98	19.0±1	1.0
				100	0	18.71	19.0±1	1.0
			16QAM	1	0	18.70	19.0±1	1.0
				1	49	19.99	19.0±1	1.0
				1	99	18.84	19.0±1	1.0
				50	0	18.02	19.0±1	1.0
				50	24	19.40	19.0±1	1.0
				50	49	18.22	19.0±1	1.0
				100	0	18.68	19.0±1	1.0

LTE Band 4:

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
1.4MHz	19957	1710.7	QPSK	1	0	17.94	18.0±1	/
				1	2	17.57	18.0±1	/
				1	5	17.92	18.0±1	/
				3	0	17.95	18.0±1	/
				3	1	17.98	18.0±1	/
				3	2	17.80	18.0±1	/
				6	0	17.89	18.0±1	/
			16QAM	1	0	17.52	18.0±1	/
				1	2	17.82	18.0±1	/
				1	5	17.87	18.0±1	/
				3	0	17.79	18.0±1	/
				3	1	17.81	18.0±1	/
				3	2	17.61	18.0±1	/
				6	0	17.89	18.0±1	/
	20175	1732.5	QPSK	1	0	17.85	18.0±1	/
				1	2	17.81	18.0±1	/
				1	5	18.02	18.0±1	/
				3	0	17.89	18.0±1	/
				3	1	17.91	18.0±1	/
				3	2	17.92	18.0±1	/
				6	0	17.88	18.0±1	/
			16QAM	1	0	17.66	18.0±1	/
				1	2	17.69	18.0±1	/
				1	5	17.85	18.0±1	/
				3	0	17.71	18.0±1	/
				3	1	17.74	18.0±1	/
				3	2	17.75	18.0±1	/
				6	0	17.72	18.0±1	/
	20393	1754.3	QPSK	1	0	17.14	17.0±1	1.0
				1	2	16.87	17.0±1	1.0
				1	5	17.16	17.0±1	1.0
				3	0	17.12	17.0±1	1.0
				3	1	16.99	17.0±1	1.0
				3	2	17.11	17.0±1	1.0
				6	0	17.03	17.0±1	1.0
			16QAM	1	0	17.00	17.0±1	1.0
				1	2	16.71	17.0±1	1.0
				1	5	16.96	17.0±1	1.0
				3	0	16.80	17.0±1	1.0
				3	1	16.94	17.0±1	1.0
				3	2	16.94	17.0±1	1.0
				6	0	16.87	17.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
3MHz	19965	1711.5	QPSK	1	0	17.52	18.0±1	/
				1	8	17.92	18.0±1	/
				1	14	17.79	18.0±1	/
				6	0	17.65	18.0±1	/
				6	4	17.81	18.0±1	/
				6	9	17.82	18.0±1	/
				15	0	17.74	18.0±1	/
			16QAM	1	0	17.62	18.0±1	/
				1	8	17.74	18.0±1	/
				1	14	17.34	18.0±1	/
				8	0	17.79	18.0±1	/
				8	4	17.78	18.0±1	/
				8	9	17.63	18.0±1	/
				15	0	17.65	18.0±1	/
	20175	1732.5	QPSK	1	0	17.74	18.0±1	/
				1	8	17.94	18.0±1	/
				1	14	17.87	18.0±1	/
				6	0	17.86	18.0±1	/
				6	4	17.91	18.0±1	/
				6	9	17.91	18.0±1	/
				15	0	17.88	18.0±1	/
			16QAM	1	0	17.49	18.0±1	/
				1	8	17.69	18.0±1	/
				1	14	17.60	18.0±1	/
				6	0	17.93	18.0±1	/
				6	4	17.93	18.0±1	/
				6	9	17.88	18.0±1	/
				15	0	17.81	18.0±1	/
	20385	1753.5	QPSK	1	0	16.82	17.0±1	1.0
				1	8	17.46	17.0±1	1.0
				1	14	17.21	17.0±1	1.0
				6	0	17.38	17.0±1	1.0
				6	4	17.08	17.0±1	1.0
				6	9	17.38	17.0±1	1.0
				15	0	17.22	17.0±1	1.0
			16QAM	1	0	16.84	17.0±1	1.0
				1	8	17.46	17.0±1	1.0
				1	14	17.23	17.0±1	1.0
				8	0	17.40	17.0±1	1.0
				8	4	17.39	17.0±1	1.0
				8	9	17.09	17.0±1	1.0
				15	0	17.23	17.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
5MHz	19975	1712.5	QPSK	1	0	17.47	18.0±1	/
				1	49	17.66	18.0±1	/
				1	99	17.02	18.0±1	/
				12	0	17.63	18.0±1	/
				12	24	17.40	18.0±1	/
				12	49	17.63	18.0±1	/
				25	0	17.52	18.0±1	/
			16QAM	1	0	17.53	18.0±1	/
				1	49	17.09	18.0±1	/
				1	99	17.74	18.0±1	/
				12	0	17.45	18.0±1	/
				12	24	17.68	18.0±1	/
				12	49	17.67	18.0±1	/
				25	0	17.50	18.0±1	/
	20175	1732.5	QPSK	1	0	17.35	18.0±1	/
				1	49	18.01	18.0±1	/
				1	99	17.52	18.0±1	/
				12	0	17.73	18.0±1	/
				12	24	17.81	18.0±1	/
				12	49	17.82	18.0±1	/
				25	0	17.78	18.0±1	/
			16QAM	1	0	17.26	18.0±1	/
				1	49	17.91	18.0±1	/
				1	99	17.41	18.0±1	/
				12	0	17.76	18.0±1	/
				12	24	17.84	18.0±1	/
				12	49	17.84	18.0±1	/
				25	0	17.82	18.0±1	/
	20375	1752.5	QPSK	1	0	17.68	17.0±1	1.0
				1	49	16.59	17.0±1	1.0
				1	99	17.60	17.0±1	1.0
				12	0	17.11	17.0±1	1.0
				12	24	17.67	17.0±1	1.0
				12	49	17.68	17.0±1	1.0
				25	0	17.40	17.0±1	1.0
			16QAM	1	0	17.57	17.0±1	1.0
				1	49	16.51	17.0±1	1.0
				1	99	17.50	17.0±1	1.0
				12	0	17.66	17.0±1	1.0
				12	24	17.66	17.0±1	1.0
				12	49	17.09	17.0±1	1.0
				25	0	17.43	17.0±1	1.0

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	20000	1715	QPSK	1	0	17.34	18.0±1	/
				1	49	17.67	18.0±1	/
				1	99	17.17	18.0±1	/
				25	0	17.54	18.0±1	/
				25	24	17.38	18.0±1	/
				25	49	17.38	18.0±1	/
				50	0	17.45	18.0±1	/
			16QAM	1	0	17.18	18.0±1	/
				1	49	17.00	18.0±1	/
				1	99	17.54	18.0±1	/
				25	0	17.41	18.0±1	/
				25	24	17.56	18.0±1	/
				25	49	17.41	18.0±1	/
				50	0	17.48	18.0±1	/
	20175	1732.5	QPSK	1	0	17.74	18.0±1	/
				1	49	17.92	18.0±1	/
				1	99	17.89	18.0±1	/
				25	0	17.91	18.0±1	/
				25	24	17.97	18.0±1	/
				25	49	17.91	18.0±1	/
				50	0	17.92	18.0±1	/
			16QAM	1	0	17.66	18.0±1	/
				1	49	17.48	18.0±1	/
				1	99	17.63	18.0±1	/
				25	0	17.94	18.0±1	/
				25	24	17.93	18.0±1	/
				25	49	18.00	18.0±1	/
				50	0	17.93	18.0±1	/
	20350	1750	QPSK	1	0	17.37	18.0±1	/
				1	49	18.07	18.0±1	/
				1	99	18.51	18.0±1	/
				25	0	18.43	18.0±1	/
				25	24	18.43	18.0±1	/
				25	49	17.79	18.0±1	/
				50	0	18.11	18.0±1	/
			16QAM	1	0	17.38	18.0±1	/
				1	49	18.51	18.0±1	/
				1	99	18.08	18.0±1	/
				25	0	18.41	18.0±1	/
				25	24	18.41	18.0±1	/
				25	49	17.77	18.0±1	/
				50	0	18.11	18.0±1	/

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
15MHz	20025	1717.5	QPSK	1	0	17.20	18.0±1	/
				1	49	17.59	18.0±1	/
				1	99	17.56	18.0±1	/
				36	0	17.76	18.0±1	/
				36	24	17.71	18.0±1	/
				36	49	17.37	18.0±1	/
				75	0	17.46	18.0±1	/
			16QAM	1	0	17.37	18.0±1	/
				1	49	17.71	18.0±1	/
				1	99	17.76	18.0±1	/
				36	0	17.76	18.0±1	/
				36	24	17.38	18.0±1	/
				36	49	17.72	18.0±1	/
				75	0	17.48	18.0±1	/
	20175	1732.5	QPSK	1	0	17.66	18.0±1	/
				1	49	17.88	18.0±1	/
				1	99	17.93	18.0±1	/
				36	0	17.67	18.0±1	/
				36	24	17.62	18.0±1	/
				36	49	17.41	18.0±1	/
				75	0	17.88	18.0±1	/
			16QAM	1	0	17.41	18.0±1	/
				1	49	17.62	18.0±1	/
				1	99	17.67	18.0±1	/
				36	0	17.34	18.0±1	/
				36	24	17.67	18.0±1	/
				36	49	17.62	18.0±1	/
				75	0	17.84	18.0±1	/
	20325	1747.5	QPSK	1	0	17.72	17.5±1	0.5
				1	49	18.09	17.5±1	0.5
				1	99	16.79	17.5±1	0.5
				36	0	18.10	17.5±1	0.5
				36	24	16.67	17.5±1	0.5
				36	49	17.87	17.5±1	0.5
				75	0	17.75	17.5±1	0.5
			16QAM	1	0	18.23	17.5±1	0.5
				1	49	16.58	17.5±1	0.5
				1	99	17.87	17.5±1	0.5
				36	0	18.18	17.5±1	0.5
				36	24	17.90	17.5±1	0.5
				36	49	16.67	17.5±1	0.5
				75	0	17.77	17.5±1	0.5

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
20MHz	20050	1720	QPSK	1	0	18.59	18.0±1	/
				1	49	17.18	18.0±1	/
				1	99	17.68	18.0±1	/
				50	0	17.23	17.5±1	0.5
				50	24	17.20	17.5±1	0.5
				50	49	17.87	17.5±1	0.5
				100	0	17.52	17.5±1	0.5
			16QAM	1	0	17.32	18.0±1	/
				1	49	17.81	18.0±1	/
				1	99	18.72	18.0±1	/
				50	0	17.25	18.0±1	/
				50	24	17.90	18.0±1	/
				50	49	17.23	18.0±1	/
				100	0	17.54	18.0±1	/
	20175	1732.5	QPSK	1	0	17.71	18.0±1	/
				1	49	18.14	18.0±1	/
				1	99	17.78	18.0±1	/
				50	0	17.93	17.5±1	0.5
				50	24	17.76	17.5±1	0.5
				50	49	17.77	17.5±1	0.5
				100	0	17.83	17.5±1	0.5
			16QAM	1	0	17.59	18.0±1	/
				1	49	17.97	18.0±1	/
				1	99	17.54	18.0±1	/
				50	0	17.98	18.0±1	/
				50	24	17.84	18.0±1	/
				50	49	17.82	18.0±1	/
				100	0	17.84	18.0±1	/
	20300	1745	QPSK	1	0	17.63	18.0±1	/
				1	49	18.00	18.0±1	/
				1	99	18.61	18.0±1	/
				50	0	18.15	17.5±1	0.5
				50	24	17.87	17.5±1	0.5
				50	49	18.07	17.5±1	0.5
				100	0	17.98	17.5±1	0.5
			16QAM	1	0	17.52	18.0±1	/
				1	49	17.90	18.0±1	/
				1	99	18.49	18.0±1	/
				50	0	18.09	18.0±1	/
				50	24	18.13	18.0±1	/
				50	49	17.87	18.0±1	/
				100	0	17.96	18.0±1	/

WIFI Mode (2.4G)

Mode	Channel number	Frequency (MHz)	Data rate (Mbps)	Average Output Power(dBm)	Average Tune up limited(dBm)
802.11b	1	2412	1	12.3	13±1
	6	2437	1	13.8	13±1
	11	2462	1	13.1	13±1
802.11g	1	2412	6	9.1	10±1
	6	2437	6	10.9	10±1
	11	2462	6	10.3	10±1
802.11n(HT20)	1	2412	MCS0	7.9	9±2
	6	2437	MCS0	10.1	9±2
	11	2462	MCS0	8.9	9±2

Bluetooth Measurement Result

Mode	Frequency (MHz)	Output Power(dBm)	Tune up limited(dBm)
GFSK	2402	4.19	3.5±1
	2441	2.57	3.5±1
	2480	3.28	3.5±1
π/4DQPSK	2402	3.37	2.5±1
	2441	2.48	2.5±1
	2480	2.72	2.5±1
8DPSK	2402	2.84	2.0±1
	2441	2.61	2.0±1
	2480	2.77	2.0±1

BLE Measurement Result

Channel number	Frequency (MHz)	Output Power(dBm)	Tune up limited(dBm)
0	2402	-2.58	-1.0±2
19	2440	0.23	-1.0±2
39	2480	-2.93	-1.0±2

11.2 SAR TEST RESULTS

Table 6: SAR Values of GSM 850MHz Band

Test Positions		Channel		Test Mode	Power(dBm)		SAR 1g(W/Kg), Limit (1.6W/kg)		Plot No.
		CH.	MHz		Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
Right Head	Cheek	251	848.8	Voice call	34.0	33.57	**0.205**	**0.23**	**1**
	Tilt	251	848.8	Voice call	34.0	33.57	0.120	0.13	--
Left Head	Cheek	251	848.8	Voice call	34.0	33.57	0.189	0.21	--
	Tilt	251	848.8	Voice call	34.0	33.57	0.112	0.12	--
Body-worn (10mm Separation)	Front side	251	848.8	Voice call	34.0	33.57	0.224	0.25	--
	Back side	251	848.8	Voice call	34.0	33.57	**0.304**	**0.34**	**2**
Hotspot (10mm Separation)	Front side	190	836.6	GPRS 2 slots	31.5	31.11	0.203	0.22	--
	Back side	190	836.6	GPRS 2 slots	31.5	31.11	**0.287**	**0.31**	**3**
	Left EDGE	190	836.6	GPRS 2 slots	31.5	31.11	0.210	0.23	--
	Right EDGE	190	836.6	GPRS 2 slots	31.5	31.11	0.218	0.24	--
	Bottom EDGE	190	836.6	GPRS 2 slots	31.5	31.11	0.036	0.04	--

Table 7: SAR Values of GSM 1900MHz Band

Test Positions		Channel		Test Mode	Power(dBm)		SAR 1g(W/Kg), Limit (1.6W/kg)		Plot No.
		CH.	MHz		Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
Right Head	Cheek	661	1880	Voice call	30.5	30.26	1.000	1.06	--
	Cheek	512	1850.2	Voice call	30.5	29.60	0.970	**1.19**	--
	Cheek	810	1909.8	Voice call	30.5	30.22	**1.040**	1.11	**4**
	Tilt	661	1880	Voice call	30.5	30.26	0.922	0.97	--
	Tilt	512	1850.2	Voice call	30.5	29.60	0.875	1.08	--
	Tilt	810	1909.8	Voice call	30.5	30.22	0.883	0.94	--
Left Head	Cheek	661	1880	Voice call	30.5	30.26	0.680	0.72	--
	Tilt	661	1880	Voice call	30.5	30.26	0.577	0.61	--
Body-worn (10mm Separation)	Front side	661	1880	Voice call	30.5	30.26	0.223	0.24	--
	Back side	661	1880	Voice call	30.5	30.26	**0.326**	**0.34**	**5**
Hotspot (10mm Separation)	Front side	661	1880	EGPRS 3 slots	26.5	26.29	0.393	0.41	--
	Back side	661	1880	EGPRS 3 slots	26.5	26.29	**0.486**	**0.51**	**6**
	Left EDGE	661	1880	EGPRS 3 slots	26.5	26.29	0.383	0.40	--
	Right EDGE	661	1880	EGPRS 3 slots	26.5	26.29	0.116	0.12	--
	Top EDGE	661	1880	EGPRS 3 slots	26.5	26.29	0.154	0.16	--

Table 8: SAR Values of WCDMA BAND V

Test Positions		Channel		Test Mode	Power(dBm)		SAR 1g(W/Kg), Limit (1.6W/kg)		Plot No.
		CH.	MHz		Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
Right Head	Cheek	4233	846.6	RMC 12.2kbps	23.5	23.31	0.206	0.22	--
	Tilt	4233	846.6	RMC 12.2kbps	23.5	23.31	0.118	0.12	--
Left Head	Cheek	4233	846.6	RMC 12.2kbps	23.5	23.31	**0.221**	**0.23**	**7**
	Tilt	4233	846.6	RMC 12.2kbps	23.5	23.31	0.116	0.12	--
Body-worn (10mm Separation)	Front side	4233	846.6	RMC 12.2kbps	23.5	23.31	0.196	0.20	--
	Back side	4233	846.6	RMC 12.2kbps	23.5	23.31	**0.291**	**0.30**	**8**
Hotspot (10mm Separation)	Front side	4233	846.6	RMC 12.2kbps	23.5	23.31	0.196	0.20	--
	Back side	4233	846.6	RMC 12.2kbps	23.5	23.31	**0.291**	**0.30**	**8**
	Left EDGE	4233	846.6	RMC 12.2kbps	23.5	23.31	0.121	0.13	--
	Right EDGE	4233	846.6	RMC 12.2kbps	23.5	23.31	0.112	0.12	--
	Bottom EDGE	4233	846.6	RMC 12.2kbps	23.5	23.31	0.039	0.04	--

Table 8: SAR Values of WCDMA BAND IV

Test Positions		Channel		Test Mode	Power(dBm)		SAR 1g(W/Kg), Limit (1.6W/kg)		Plot No.
		CH.	MHz		Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
Right Head	Cheek	1413	1732.6	RMC 12.2kbps	20.0	19.96	1.130	1.14	--
	Cheek	1312	1712.4	RMC 12.2kbps	20.0	19.63	**1.210**	**1.32**	**9**
	Cheek	1513	1752.6	RMC 12.2kbps	20.0	19.28	1.060	1.25	--
	Tilt	1413	1732.6	RMC 12.2kbps	20.0	19.96	0.692	0.70	--
Left Head	Cheek	1413	1732.6	RMC 12.2kbps	20.0	19.96	0.562	0.57	--
	Tilt	1413	1732.6	RMC 12.2kbps	20.0	19.96	0.584	0.59	--
Body-worn (10mm Separation)	Front side	1513	1752.6	RMC 12.2kbps	23.5	23.36	0.440	0.45	--
	Back side	1513	1752.6	RMC 12.2kbps	23.5	23.36	**0.665**	**0.69**	**10**
Hotspot (10mm Separation)	Front side	1513	1752.6	RMC 12.2kbps	23.5	23.36	0.440	0.45	--
	Back side	1513	1752.6	RMC 12.2kbps	23.5	23.36	**0.665**	**0.69**	**10**
	Left EDGE	1513	1752.6	RMC 12.2kbps	23.5	23.36	0.356	0.37	--
	Right EDGE	1513	1752.6	RMC 12.2kbps	23.5	23.36	0.114	0.12	--
	Top EDGE	1513	1752.6	RMC 12.2kbps	23.5	23.36	0.211	0.22	--

Table 9: SAR Values of WCDMA BAND II

Test Positions		Channel		Test Mode	Power(dBm)		SAR 1g(W/Kg), Limit (1.6W/kg)		Plot No.
		CH.	MHz		Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
Right Head	Cheek	9440	1880	RMC 12.2kbps	20.5	20.30	0.904	**0.95**	--
	Cheek	9262	1852.4	RMC 12.2kbps	20.5	20.08	**0.929**	**1.02**	**11**
	Cheek	9538	1907.6	RMC 12.2kbps	20.5	20.10	0.874	0.96	--
	Tilt	9440	1880	RMC 12.2kbps	20.5	20.3	0.705	0.74	--
Left Head	Cheek	9440	1880	RMC 12.2kbps	20.5	20.3	0.525	0.55	--
	Tilt	9440	1880	RMC 12.2kbps	20.5	20.3	0.478	0.50	--
Body-worn (10mm Separation)	Front side	9538	1907.6	RMC 12.2kbps	23.5	23.32	0.662	0.69	--
	Back side	9538	1907.6	RMC 12.2kbps	23.5	23.32	**1.020**	1.06	**12**
	Back side	9262	1852.4	RMC 12.2kbps	23.5	22.65	0.934	**1.14**	--
	Back side	9440	1880	RMC 12.2kbps	23.5	23.21	0.958	1.02	--
Hotspot (10mm Separation)	Front side	9538	1907.6	RMC 12.2kbps	23.5	23.32	0.662	0.69	--
	Back side	9538	1907.6	RMC 12.2kbps	23.5	23.32	**1.020**	1.06	**12**
	Back side	9262	1852.4	RMC 12.2kbps	23.5	22.65	0.934	**1.14**	--
	Back side	9440	1880	RMC 12.2kbps	23.5	23.21	0.958	1.02	--
	Left EDGE	9538	1907.6	RMC 12.2kbps	23.5	23.32	0.701	0.73	--
	Right EDGE	9538	1907.6	RMC 12.2kbps	23.5	23.32	0.230	0.24	--
	Top EDGE	9538	1907.6	RMC 12.2kbps	23.5	23.32	0.323	0.34	--

Table 10: SAR Values of LTE BAND 2, 20MHz, QPSK

Test Mode	Test Positions		Channel		Power(dBm)		SAR 1g(W/Kg), Limit (1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #0	Right Head	Cheek	18900	1880	21.0	20.34	**0.887**	1.03	**13**
100%RB#0		Cheek	18900	1880	20.0	19.75	0.825	0.87	--
1RB #99		Cheek	18700	1860	20.0	19.63	0.870	0.95	--
100%RB#0		Cheek	18700	1860	20.0	18.12	0.612	0.94	--
1RB #0		Cheek	19100	1900	21.0	20.11	0.876	**1.08**	--
100%RB#0		Cheek	19100	1900	20.0	18.71	0.789	1.06	--
1RB #0		Tilt	18900	1880	21.0	20.34	0.542	0.63	--
1RB #0	Left Head	Cheek	18900	1880	21.0	20.34	0.341	0.40	--
		Tilt	18900	1880	21.0	20.34	0.336	0.39	--
1RB #99	Body-worn (10mm Separation)	Front side	18900	1880	23.5	23.44	0.569	0.58	--
		Back side	18900	1880	23.5	23.44	1.010	1.02	--
100%RB#0		Back side	18900	1880	22.5	22.38	0.952	0.98	--
1RB #49		Back side	18700	1860	23.5	23.00	**1.050**	**1.18**	**14**
100%RB#0		Back side	18700	1860	22.5	21.64	0.951	1.16	--
1RB #49		Back side	19100	1900	23.5	23.19	0.936	1.01	--
100%RB#0		Back side	19100	1900	22.5	22.04	0.857	0.95	--
1RB #99	Hotspot (10mm Separation)	Front side	18900	1880	23.5	23.44	0.569	0.58	--
		Back side	18900	1880	23.5	23.00	1.010	1.02	--
100%RB#0		Back side	18900	1880	22.5	22.38	0.952	0.98	--
1RB #49		Back side	18700	1860	23.5	23.19	**1.050**	**1.18**	**14**
100%RB#0		Back side	18700	1860	22.5	21.64	0.951	1.16	--
1RB #49		Back side	19100	1900	21.0	20.11	0.936	1.01	--
100%RB#0		Back side	19100	1900	22.5	22.04	0.857	0.95	--
1RB #99		Left EDGE	18900	1880	23.5	23.44	0.575	0.58	--
		Right EDGE	18900	1880	23.5	23.44	0.147	0.15	--
		Top EDGE	18900	1880	23.5	23.44	0.353	0.36	--
50%RB #0	Right Head	Cheek	18900	1880	20.0	19.78	0.803	0.84	--
50%RB #0		Cheek	18700	1860	20.0	18.96	0.775	0.98	--
50%RB #0		Cheek	19100	1900	20.0	19.36	0.721	0.84	--
50%RB #0		Tilt	18900	1880	20.0	19.78	0.562	0.59	--
50%RB #0	Left Head	Cheek	18900	1880	20.0	19.78	0.354	0.37	--

		Tilt	18900	1880	20.0	19.78	0.347	0.37	--
50%RB #24	Body-worn (10mm Separation)	Front side	18900	1880	22.5	22.38	0.451	0.46	--
		Back side	18900	1880	22.5	22.38	0.747	0.77	--
	Hotspot (10mm Separation)	Front side	18900	1880	22.5	22.38	0.451	0.46	--
		Back side	18900	1880	22.5	22.38	0.747	0.77	--
		Right EDGE	18900	1880	22.5	22.38	0.470	0.48	--
		Left EDGE	18900	1880	22.5	22.38	0.116	0.12	--
		Top EDGE	18900	1880	22.5	22.38	0.270	0.28	--

Table 11: SAR Values of LTE BAND 4, 20MHz, QPSK

Test Mode	Test Positions		Channel		Power(dBm)		SAR 1g(W/Kg), Limit(1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #99	Right Head	Cheek	20300	1745	19.0	18.61	**0.975**	1.07	**15**
100%RB#0		Cheek	20300	1745	18.5	17.98	0.881	0.99	--
1RB #0		Cheek	20050	1720	19.0	18.59	0.763	0.84	--
100%RB#0		Cheek	20050	1720	18.5	17.52	0.662	0.83	--
1RB #49		Cheek	20175	1732.5	19.0	18.14	0.896	**1.09**	--
100%RB#0		Cheek	20175	1732.5	18.5	17.83	0.912	1.06	--
1RB #99		Tilt	20300	1745	19.0	18.61	0.574	0.63	--
	Left Head	Cheek	20300	1745	19.0	18.61	0.436	0.48	--
		Tilt	20300	1745	19.0	18.61	0.376	0.41	--
1RB #49	Body-worn (10mm Separation)	Front side	20300	1745	24.0	23.41	0.371	0.42	--
		Back side	20300	1745	24.0	23.41	**0.599**	**0.69**	**16**
	Hotspot (10mm Separation)	Front side	20300	1745	24.0	23.41	0.371	0.42	--
		Back side	20300	1745	24.0	23.41	**0.599**	**0.69**	**16**
		Left EDGE	20300	1745	24.0	23.41	0.366	0.42	--
		Right EDGE	20300	1745	24.0	23.41	0.110	0.13	--
		Top EDGE	20300	1745	24.0	23.41	0.219	0.25	--
50%RB #0	Right Head	Cheek	20300	1745	18.5	18.15	0.961	1.04	--
50%RB #49		Cheek	20050	1720	18.5	17.87	0.875	1.01	--
50%RB #0		Cheek	20175	1732.5	18.5	17.93	0.924	1.05	--
		Tilt	20300	1745	18.5	18.15	0.597	0.65	--
	Left Head	Cheek	20300	1745	18.5	18.15	0.450	0.49	--
		Tilt	20300	1745	18.5	18.15	0.390	0.42	--
	Body-worn (10mm Separation)	Front side	20300	1745	23.0	22.16	0.027	0.03	--
		Back side	20300	1745	23.0	22.16	0.487	0.59	--
	Hotspot (10mm Separation)	Front side	20300	1745	23.0	22.16	0.027	0.03	--
		Back side	20300	1745	23.0	22.16	0.487	0.59	--
		Left EDGE	20300	1745	23.0	22.16	0.282	0.34	--
		Right EDGE	20300	1745	23.0	22.16	0.085	0.10	--
		Top EDGE	20300	1745	23.0	22.16	0.221	0.27	--

Table 11: SAR Values of LTE BAND 5, 10MHz, QPSK

Test Mode	Test Positions		Channel		Power(dBm)		SAR 1g(W/Kg), Limit(1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #49	Right Head	Cheek	20525	836.5	23.5	23.11	**0.158**	**0.17**	**17**
		Tilt	20525	836.5	23.5	23.11	0.064	0.07	--
	Left Head	Cheek	20525	836.5	23.5	23.11	0.150	0.16	--
		Tilt	20525	836.5	23.5	23.11	0.089	0.10	--
	Body-worn (10mm Separation)	Front side	20525	836.5	23.5	23.11	0.175	0.19	--
		Back side	20525	836.5	23.5	23.11	**0.264**	**0.29**	**18**
	Hotspot (10mm Separation)	Front side	20525	836.5	23.5	23.11	0.175	0.19	--
		Back side	20525	836.5	23.5	23.11	**0.264**	**0.29**	**18**
		Left EDGE	20525	836.5	23.5	23.11	0.186	0.20	--
		Right EDGE	20525	836.5	23.5	23.11	0.247	0.27	--
		Bottom EDGE	20525	836.5	23.5	23.11	0.037	0.04	--
50%RB #0	Right Head	Cheek	20625	846.5	22.5	21.97	0.139	0.16	--
		Tilt	20625	846.5	22.5	21.97	0.054	0.06	--
	Left Head	Cheek	20625	846.5	22.5	21.97	0.132	0.15	--
		Tilt	20625	846.5	22.5	21.97	0.076	0.09	--
	Body-worn (10mm Separation)	Front side	20625	846.5	22.5	21.97	0.151	0.17	--
		Back side	20625	846.5	22.5	21.97	0.226	0.26	--
	Hotspot (10mm Separation)	Front side	20625	846.5	22.5	21.97	0.151	0.17	--
		Back side	20625	846.5	22.5	21.97	0.226	0.26	--
		Left EDGE	20625	846.5	22.5	21.97	0.152	0.17	--
		Right EDGE	20625	846.5	22.5	21.97	0.246	0.28	--
		Bottom EDGE	20625	846.5	22.5	21.97	0.032	0.04	--

Table 11: SAR Values of LTE BAND 7, 20MHz, QPSK

Test Mode	Test Positions		Channel		Power(dBm)		SAR 1g(W/Kg), Limit (1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #0	Right Head	Cheek	20850	2510	23.0	22.71	**0.224**	**0.24**	**19**
		Tilt	20850	2510	23.0	22.71	0.083	0.09	--
	Left Head	Cheek	20850	2510	23.0	22.71	0.117	0.13	--
		Tilt	20850	2510	23.0	22.71	0.113	0.12	--
	Body-worn (10mm Separation)	Front side	20850	2510	23.0	22.71	0.398	0.43	--
		Back side	20850	2510	23.0	22.71	**0.580**	**0.62**	**20**
	Hotspot (10mm Separation)	Front side	20850	2510	23.0	22.71	0.398	0.43	--
		Back side	20850	2510	23.0	22.71	**0.580**	**0.62**	**20**
		Left EDGE	20850	2510	23.0	22.71	0.054	0.06	--
		Right EDGE	20850	2510	23.0	22.71	0.279	0.30	--
		Bottom EDGE	20850	2510	23.0	22.71	0.504	0.54	--
50%RB #49	Right Head	Cheek	20850	2510	22.0	21.55	0.178	0.20	--
		Tilt	20850	2510	22.0	21.55	0.106	0.12	--
	Left Head	Cheek	20850	2510	22.0	21.55	0.092	0.10	--
		Tilt	20850	2510	22.0	21.55	0.112	0.12	--
	Body-worn (10mm Separation)	Front side	20850	2510	22.0	21.55	0.313	0.35	--
		Back side	20850	2510	22.0	21.55	0.452	0.50	--
	Hotspot (10mm Separation)	Front side	20850	2510	22.0	21.55	0.313	0.35	--
		Back side	20850	2510	22.0	21.55	0.452	0.50	--
		Left EDGE	20850	2510	22.0	21.55	0.054	0.06	--
		Right EDGE	20850	2510	22.0	21.55	0.211	0.23	--
		Bottom EDGE	20850	2510	22.0	21.55	0.395	0.44	--

Table 13: SAR Values of LTE BAND 12, 10MHz, QPSK

Test Mode	Test Positions		Channel		Power(dBm)		SAR 1g(W/Kg), Limit (1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #99	Right Head	Cheek	23060	704	23.5	23.44	**0.128**	**0.13**	**21**
		Tilt	23060	704	23.5	23.44	0.072	0.07	--
	Left Head	Cheek	23060	704	23.5	23.44	0.114	0.12	--
		Tilt	23060	704	23.5	23.44	0.043	0.04	--
	Body-worn (10mm Separation)	Front side	23060	704	23.5	23.44	0.156	0.16	--
		Back side	23060	704	23.5	23.44	**0.238**	**0.24**	**22**
	Hotspot (10mm Separation)	Front side	23060	704	23.5	23.44	0.156	0.16	--
		Back side	23060	704	23.5	23.44	**0.238**	**0.24**	**22**
		Left EDGE	23060	704	23.5	23.44	0.169	0.17	--
		Right EDGE	23060	704	23.5	23.44	0.172	0.17	--
		Bottom EDGE	23060	704	23.5	23.44	0.024	0.02	--
50%RB #24	Right Head	Cheek	23060	704	23.5	22.65	0.094	0.11	--
		Tilt	23060	704	23.5	22.65	0.054	0.07	--
	Left Head	Cheek	23060	704	23.5	22.65	0.080	0.10	--
		Tilt	23060	704	23.5	22.65	0.030	0.04	--
	Body-worn (10mm Separation)	Front side	23060	704	23.5	22.65	0.116	0.14	--
		Back side	23060	704	23.5	22.65	0.185	0.22	--
	Hotspot (10mm Separation)	Front side	23060	704	23.5	22.65	0.116	0.14	--
		Back side	23060	704	23.5	22.65	0.185	0.22	--
		Left EDGE	23060	704	23.5	22.65	0.128	0.16	--
		Right EDGE	23060	704	23.5	22.65	0.128	0.16	--
		Bottom EDGE	23060	704	23.5	22.65	0.019	0.02	--

Table 13: SAR Values of LTE BAND 13, 10MHz, QPSK

Test Mode	Test Positions		Channel		Power(dBm)		SAR 1g(W/Kg), Limit (1.6W/kg)		Plot No.
			CH.	MHz	Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
1RB #0	Right Head	Cheek	23230	782	23.5	23.43	0.147	0.15	--
		Tilt	23230	782	23.5	23.43	0.064	0.07	--
	Left Head	Cheek	23230	782	23.5	23.43	**0.173**	**0.18**	**23**
		Tilt	23230	782	23.5	23.43	0.062	0.06	--
	Body-worn (10mm Separation)	Front side	23230	782	23.5	23.43	0.206	0.21	--
		Back side	23230	782	23.5	23.43	**0.272**	0.28	**24**
	Hotspot (10mm Separation)	Front side	23230	782	23.5	23.43	0.206	0.21	--
		Back side	23230	782	23.5	23.43	**0.272**	0.28	**24**
		Left EDGE	23230	782	23.5	23.43	0.269	0.27	--
		Right EDGE	23230	782	23.5	23.43	0.244	0.25	--
		Bottom EDGE	23230	782	23.5	23.43	0.046	0.05	--
25%RB #49	Right Head	Cheek	23230	782	23.0	22.44	0.144	0.16	--
		Tilt	23230	782	23.0	22.44	0.063	0.07	--
	Left Head	Cheek	23230	782	23.0	22.44	0.136	0.15	--
		Tilt	23230	782	23.0	22.44	0.060	0.07	--
	Body-worn (10mm Separation)	Front side	23230	782	23.0	22.44	0.205	0.23	--
		Back side	23230	782	23.0	22.44	0.266	**0.30**	--
	Hotspot (10mm Separation)	Front side	23230	782	23.0	22.44	0.205	0.23	--
		Back side	23230	782	23.0	22.44	0.266	**0.30**	--
		Left EDGE	23230	782	23.0	22.44	0.261	0.30	--
		Right EDGE	23230	782	23.0	22.44	0.246	0.28	--
		Bottom EDGE	23230	782	23.0	22.44	0.047	0.05	--

Table 14: SAR Values of 802.11b

Test Positions		Channel		Test Mode	Power(dBm)		SAR 1g(W/Kg), Limit (1.6W/kg)		Plot No.
		CH.	MHz		Maximum Turn-up Power(dBm)	Measured output power(dBm)	Measured SAR 1g(W/kg)	Scaled SAR 1g(W/kg)	
Right Head	Cheek	1	2437	1Mbps	14.0	13.8	0.194	0.20	--
	Tilt	1	2437	1Mbps	14.0	13.8	0.264	0.28	--
Left Head	Cheek	1	2437	1Mbps	14.0	13.8	**0.368**	**0.39**	**25**
	Tilt	1	2437	1Mbps	14.0	13.8	0.366	0.38	--
Body-worn (10mm Separation)	Front side	1	2437	1Mbps	14.0	13.8	0.107	0.11	--
	Back side	1	2437	1Mbps	14.0	13.8	**0.145**	**0.15**	**26**
Hotspot (10mm Separation)	Front side	1	2437	1Mbps	14.0	13.8	0.107	0.11	--
	Back side	1	2437	1Mbps	14.0	13.8	**0.145**	**0.15**	**26**
	Left EDGE	1	2437	1Mbps	14.0	13.8	0.019	0.02	--
	Right EDGE	1	2437	1Mbps	14.0	13.8	0.098	0.10	--
	Top EDGE	1	2437	1Mbps	14.0	13.8	0.083	0.09	

Note: According to FCC KDB 2484227 D01v02r02 section 5.2.2, DSSS SAR value*(OFDM power/DSSS power)=0.368*(10^(14.0/10)/10^(13.8/10))=0.39W/kg≤1.2W/kg, SAR for OFDM is not required.

Measurement variability consideration

According to KDB 865664 D01v01r04 section 2.8.1, repeated measurements are required following the procedures as below:

1. Repeated measurement is not required when the original highest measured SAR is < 0.80W/kg; steps 2) through 4) do not apply.
2. When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3. Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4. Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

No Repeated SAR

Simultaneous Transmission SAR Analysis.

List of Mode for Simultaneous Multi-band Transmission:

No.	Configurations	Head SAR	Body-worn SAR	Hotspot SAR
1	GSM(Voice) + WLAN 2.4GHz (Data)	Yes	Yes	-
2	GPRS (Data) + WLAN 2.4GHz (Data)	-	-	Yes
3	GSM(Voice) + Bluetooth (Data)	Yes	Yes	-
4	GPRS (Data) + Bluetooth (Data)	-	-	Yes
5	WCDMA (Voice) + WLAN 2.4GHz (Data)	Yes	Yes	-
6	WCDMA (Data) + WLAN 2.4GHz (Data)	-	-	Yes
7	WCDMA (Voice) + Bluetooth (Data)	Yes	Yes	-
8	WCDMA (Data) + Bluetooth (Data)	-	-	Yes
9	LTE (Date) + WLAN 2.4GHz (Data)	Yes	Yes	Yes
10	LTE (Date) + Bluetooth (Data)	Yes	Yes	Yes

Remark:

1. GSM/ WCDMA/LTE share the same antenna and cannot transmit simultaneously.
2. VOIP is not supported at 2G/ 3G data mode.
3. WLAN and Bluetooth share the same antenna and cannot transmit simultaneously.
4. According to the KDB 447498 D01 v06, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
   (max. power of channel, including tune-up tolerance, mW)/ (min. test separation distance, mm)] ·[√f(GHz)/x] W/kg for test separation distances ≤50 mm;
   where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.
   For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01 v06 as below:

Bluetooth:

Tune-Up Power (dBm)	Max. Power (mW)	Distance (mm)	Frequency (GHz)	X	SAR(1g) 5mm	SAR(1g) 10mm
4.5	2.81	5/10	2.402	7.5	0.12	0.06

5. The maximum SAR summation is calculated based on the same configuration and test position

Simultaneous Transmission SAR

Head SAR
WWAN+ WIFI

Position	WWAN (maximum)		WIFI (maximum)	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Right Cheek	GSM850	**0.23**	0.20	0.43
Right Tilt	GSM850	0.13	0.28	0.41
Left Cheek	GSM850	0.21	**0.39**	0.6
Left Tilt	GSM850	0.12	0.38	0.5
Right Cheek	GSM1900	**1.19**	0.20	1.39
Right Tilt	GSM1900	0.97	0.28	1.25
Left Cheek	GSM1900	1.08	**0.39**	1.47
Left Tilt	GSM1900	0.94	0.38	1.32
Right Cheek	WCDMA Band V	0.22	0.20	0.42
Right Tilt	WCDMA Band V	0.12	0.28	0.4
Left Cheek	WCDMA Band V	**0.23**	**0.39**	0.62
Left Tilt	WCDMA Band V	0.12	0.38	0.5
Right Cheek	WCDMA Band IV	**1.32**	0.20	**1.52**
Right Tilt	WCDMA Band IV	0.70	0.28	0.98
Left Cheek	WCDMA Band IV	0.57	**0.39**	0.96
Left Tilt	WCDMA Band IV	0.59	0.38	0.97
Right Cheek	WCDMA Band II	**1.02**	0.20	1.22
Right Tilt	WCDMA Band II	0.74	0.28	1.02
Left Cheek	WCDMA Band II	0.55	**0.39**	0.94
Left Tilt	WCDMA Band II	0.50	0.38	0.88
Right Cheek	LTE BAND 2	**1.08**	0.20	1.28
Right Tilt	LTE BAND 2	0.63	0.28	0.91
Left Cheek	LTE BAND 2	0.40	**0.39**	0.79
Left Tilt	LTE BAND 2	0.39	0.38	0.77
Right Cheek	LTE BAND 4	**1.09**	0.20	1.29
Right Tilt	LTE BAND 4	0.65	0.28	0.93
Left Cheek	LTE BAND 4	0.49	**0.39**	0.88
Left Tilt	LTE BAND 4	0.42	0.38	0.8
Right Cheek	LTE BAND 5	**0.17**	0.20	0.37
Right Tilt	LTE BAND 5	0.07	0.28	0.35
Left Cheek	LTE BAND 5	0.16	**0.39**	0.55
Left Tilt	LTE BAND 5	0.10	0.38	0.48
Right Cheek	LTE BAND 7	**0.24**	0.20	0.44
Right Tilt	LTE BAND 7	0.12	0.28	0.4
Left Cheek	LTE BAND 7	0.13	**0.39**	0.52
Left Tilt	LTE BAND 7	0.12	0.38	0.5

Right Cheek	LTE BAND 12	**0.13**	0.20	0.33
Right Tilt	LTE BAND 12	0.07	0.28	0.35
Left Cheek	LTE BAND 12	0.12	**0.39**	0.51
Left Tilt	LTE BAND 12	0.04	0.38	0.42
Right Cheek	LTE BAND 13	0.16	0.20	0.36
Right Tilt	LTE BAND 13	0.07	0.28	0.35
Left Cheek	LTE BAND 13	**0.18**	**0.39**	0.57
Left Tilt	LTE BAND 13	0.07	0.38	0.45

WWAN+ Bluetooth

Position	WWAN (maximum)		Bluetooth(5mm)	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Estimated SAR (W/kg)	
Left Cheek	GSM850	0.23	0.12	0.35
Right Cheek	GSM1900	1.19	0.12	1.31
Left Cheek	WCDMA Band V	0.23	0.12	0.35
Right Cheek	WCDMA Band IV	**1.32**	0.12	**1.44**
Right Cheek	WCDMA Band II	1.02	0.12	1.14
Right Cheek	LTE BAND 2(50%RB)	1.08	0.12	1.2
Right Cheek	LTE BAND 4(1RB)	1.09	0.12	1.21
Left Cheek	LTE BAND 5(1RB)	0.17	0.12	0.29
Right Cheek	LTE BAND 7(1RB)	0.24	0.12	0.36
Right Cheek	LTE BAND 12(1RB)	0.13	0.12	0.25
Left Cheek	LTE BAND 13(1RB)	0.18	0.12	0.3

Remark: BT the 1g SAR value is not being captured by the measurement system, the 1g-SAR value is conservatively used for simultaneous transmission analysis.

Body-worn SAR

WWAN+ WIFI

Position	WWAN (maximum)		WIFI (maximum)	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Front	GSM850 (Voice call)	0.25	0.11	0.36
Back		**0.34**	**0.15**	0.49
Front	GSM1900 (Voice call)	0.24	0.11	0.35
Back		**0.34**	**0.15**	0.49
Front	WCDMA Band V	0.20	0.11	0.31
Back		**0.30**	**0.15**	0.45
Front	WCDMA Band IV	0.45	0.11	0.56
Back		**0.69**	**0.15**	0.84
Front	WCDMA Band II	0.69	0.11	0.8
Back		**1.14**	**0.15**	1.29

Front	LTE BAND 2(1RB)	0.58	0.11	0.69
Back		**1.18**	**0.15**	**1.33**
Front	LTE BAND 4(1RB)	0.42	0.11	0.53
Back		**0.69**	**0.15**	0.84
Front	LTE BAND 5(1RB)	0.19	0.11	0.3
Back		**0.29**	**0.15**	0.44
Front	LTE BAND 7(1RB)	0.43	0.11	0.54
Back		**0.26**	**0.15**	0.41
Front	LTE BAND 12(1RB)	0.16	0.11	0.27
Back		**0.24**	**0.15**	0.39
Front	LTE BAND 13(1RB)	0.23	0.11	0.34
Back		**0.30**	**0.15**	0.45

WWAN and Bluetooth

Position	WWAN (maximum)		Bluetooth (10mm)	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Estimated SAR (W/kg)	
Back	GSM850 (Voice call)	0.34	0.06	0.4
Back	GSM1900 (Voice call)	0.34	0.06	0.4
Back	WCDMA Band V	0.30	0.06	0.36
Back	WCDMA Band IV	0.69	0.06	0.75
Back	WCDMA Band II	1.14	0.06	1.2
Back	LTE BAND 2(1RB)	**1.18**	0.06	**1.24**
Back	LTE BAND 4(1RB)	0.69	0.06	0.75
Back	LTE BAND 5(1RB)	0.29	0.06	0.35
Back	LTE BAND 7(1RB)	0.26	0.06	0.32
Back	LTE BAND 12(1RB)	0.24	0.06	0.3
Back	LTE BAND 13(1RB)	0.30	0.06	0.36

Remark: BT the 1g SAR value is not being captured by the measurement system, the 1g-SAR value is conservatively used for simultaneous transmission analysis.

Hotspot SAR

WWAN+ WIFI

Position	WWAN (maximum)		WIFI (maximum)	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Scaled SAR (W/kg)	
Front	GSM850(data)	0.22	0.11	0.33
Back		**0.31**	**0.15**	0.46
Left		0.23	0.02	0.25
Right		0.24	0.10	0.34
Top		-	0.09	0.09
Bottom		0.04	-	0.04
Front	GSM1900(data)	0.41	0.11	0.52
Back		**0.51**	**0.15**	0.66
Left		0.40	0.02	0.42
Right		0.12	0.10	0.22
Top		0.16	0.09	0.25
Bottom		-	-	-
Front	WCDMA Band V	0.20	0.11	0.31
Back		**0.30**	**0.15**	0.45
Left		0.13	0.02	0.15
Right		0.12	0.10	0.22
Top		-	0.09	0.09
Bottom		0.04	-	0.04
Front	WCDMA Band IV	0.45	0.11	0.56
Back		**0.69**	**0.15**	0.84
Left		0.37	0.02	0.39
Right		0.12	0.10	0.22
Top		0.22	0.09	0.31
Bottom		-	-	-
Front	WCDMA Band II	0.69	0.11	0.8
Back		**1.14**	**0.15**	1.29
Left		0.73	0.02	0.75
Right		0.24	0.10	0.34
Top		0.34	0.09	0.43
Bottom		-	-	-
Front	LTE BAND 2	0.58	0.11	0.69
Back		1.18	**0.15**	**1.33**
Left		0.58	0.02	0.6
Right		0.15	0.10	0.25
Top		0.36	0.09	0.45
Bottom		-	-	-
Front	LTE BAND 4	0.42	0.11	0.53
Back		**0.69**	**0.15**	0.84
Left		0.42	0.02	0.44
Right		0.13	0.10	0.23
Top		0.27	0.09	0.36
Bottom		-	-	-
Front	LTE BAND 5	0.19	0.11	0.3

Back		**0.29**	**0.15**	0.44
Left		0.20	0.02	0.22
Right		0.28	0.10	0.38
Top		-	0.09	0.09
Bottom		0.04	-	0.04
Front	LTE BAND 7	0.43	0.11	0.54
Back		**0.62**	**0.15**	0.77
Left		0.06	0.02	0.08
Right		0.30	0.10	0.4
Top		-	0.09	0.09
Bottom		0.54	-	0.54
Front	LTE BAND 12	0.16	0.11	0.27
Back		**0.24**	**0.15**	0.39
Left		0.17	0.02	0.19
Right		0.17	0.10	0.27
Top		-	0.09	0.09
Bottom		0.02	-	0.02
Front	LTE BAND 13(1RB)	0.23	0.11	0.34
Back		**0.30**	**0.15**	0.45
Left		0.30	0.02	0.32
Right		0.28	0.10	0.38
Top		-	0.09	0.09
Bottom		0.05	-	0.05

WWAN+ Bluetooth

Position	WWAN (maximum)		Bluetooth (10mm)	Summed SAR (W/kg)
	Band	Scaled SAR (W/kg)	Estimated SAR (W/kg)	
Back	GSM850	0.31	0.06	0.37
Back	GSM1900	0.51	0.06	0.55
Back	WCDMA Band V	0.30	0.06	0.36
Back	WCDMA Band IV	0.69	0.06	0.75
Back	WCDMA Band II	1.14	0.06	1.2
Back	LTE BAND 2(1RB)	**1.18**	0.06	**1.24**
Back	LTE BAND 4(1RB)	0.69	0.06	0.75
Back	LTE BAND 5(1RB)	0.29	0.06	0.35
Back	LTE BAND 7(1RB)	0.26	0.06	0.32
Back	LTE BAND 12(1RB)	0.24	0.06	0.3
Back	LTE BAND 13(1RB)	0.30	0.06	0.36

Remark: BT the 1g SAR value is not being captured by the measurement system, the 1g-SAR value is conservatively used for simultaneous transmission analysis.

11.3 MAXIMUM GRAPH RESULTS

The graph results see ANNEX C.

12 MEASUREMENT UNCERTAINTY

When the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

13 MAIN TEST INSTRUMENT

	Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☒	SZ060-01	SAR Test System	SPEAG	DASY52 SAR TX90XL	F14/5YJ0B1/A/01	10/22/2019	1 year
☒	SZ060-01-01	E-Field Probe	SPEAG	EX3DV4	7322	10/22/2019	1 year
☒	SZ060-01-03	System Validation Dipole	SPEAG	D750V3	1141	09/23/2019	3 year
☒	SZ060-01-04	System Validation Dipole	SPEAG	D835V2	4d196	9/6/2018	3 year
☒	SZ060-01-05	System Validation Dipole	SPEAG	D900V2	1d182	9/7/2018	3 year
☒	SZ060-01-06	System Validation Dipole	SPEAG	D1750V2	1138	9/13/2018	3 year
☒	SZ060-01-07	System Validation Dipole	SPEAG	D1900V2	5d203	9/11/2018	3 year
☒	SZ060-01-09	System Validation Dipole	SPEAG	D2300V2	1052	9/3/2018	3 year
☒	SZ060-01-10	System Validation Dipole	SPEAG	D2450V2	966	8/31/2018	3 year
☒	SZ060-01-11	System Validation Dipole	SPEAG	D2300V2	1108	8/31/2018	3 year
☒	SZ060-01-12	System Validation Dipole	SPEAG	D5GHzV2	1218	8/31/2018	3 year
☒	SZ060-01-13	Data Acquisition Unit	SPEAG	DAE4	1473	9/24/2019	1 year
☒	SZ060-01-14	Dielectric Assessment Kit	SPEAG	DAKS 3.5	1056	N/A	N/A
☒	SZ060-01-15	Vector Reflectometer	Copper Mountain Technologies	Planar R140	0090614	N/A	N/A
☒	SZ060-01-16	Thermometer	LKM electronics GmbH	DTM3000	3477	8/6/2020	1 year
☒	SZ060-01-17	Power Amplifier	Mini Circuits	ZHL-42W+	QA1449003	5/7/2020	1 year
☒	SZ060-01-18	Power Amplifier	Mini Circuits	ZVE-8G+	111701437	5/7/2020	1 year
☒	SZ060-01-19	SAM Twin Phantom	SPEAG	SAM Twin Phantom V5.0	1888	N/A	N/A
☒	SZ060-01-20	SAM Twin Phantom	SPEAG	SAM Twin Phantom V5.0	1891	N/A	N/A
☒	SZ060-01-21	ELI Phantom	SPEAG	ELI Phantom V6.0	2033	N/A	N/A
☒	SZ180-13	MXG Vector Signal Generator	Keysight	N5182B	MY53051328	10/29/2019	1 year
☒	SZ070-04	Directional Bridge	Agilent	86205A	MY31402141	12/24/2019	1 year
☒	SZ182-02	RF Power Meter	Anritsu	ML2496A	1302005	5/27/2020	1 year
☒	SZ182-03	Average power sensor	R&S	NRP-Z22	101689	5/27/2020	1 year
☒	SZ065-06	Wideband Radio Communication Tester	R&S	CMU200	112012	5/27/2020	1 year
☒	N/A	Device Holder	SPEAG	N/A	N/A	N/A	N/A

ANNEX A: Test Layout and Setup

The graph results see ANNEX A of Appendix 1.

ANNEX B System Check Results

The graph results see ANNEX B of Appendix 1.

ANNEX C: MAXIMUM GRAPH RESULTS

The graph results see ANNEX C of Appendix 1.

ANNEX D: SYSTEM VALIDATION

The graph results see ANNEX D of Appendix 1.

ANNEX E EUT PHOTO

The graph results see ANNEX E of Appendix 1.

ANNEX F PROBE, DAE and DIPOLE CALIBRATION CERTIFICATE

The graph results see ANNEX F of Appendix 2.

**********End The Report**********