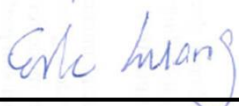


FCC SAR Test Report

APPLICANT : unitech Electronics Co., Ltd.
EQUIPMENT : Rugged Handheld Computer
BRAND NAME : unitech
MODEL NAME : PA726
FCC ID : HLEPA726BTNFL
STANDARD : FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2013

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and had been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.



Reviewed by: Eric Huang / Manager



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.)



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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA7N0405	Rev. 01	Initial issue of report	Feb. 06, 2018



1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **unitech Electronics Co., Ltd., Rugged Handheld Computer, PA726**, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary				Highest Simultaneous Transmission 1g SAR (W/kg)
		Head (Separation 0mm)	Body-worn (Separation 10mm)	Hotspot (Separation 10mm)	Product Specific (Separation 0mm)	
		1g SAR (W/kg)			10g SAR (W/kg)	
Licensed	GSM850	0.35	0.68	0.68		1.58
	GSM1900	0.14	0.70	0.70		
	WCDMA II	0.16	1.07	1.07		
	WCDMA V	0.27	0.55	0.55		
	LTE Band 2	0.18	1.16	1.16		
	LTE Band 4	0.12	0.47	0.47		
	LTE Band 5	0.19	0.42	0.42		
	LTE Band 7	0.08	0.64	0.64		
	LTE Band 41	0.04	0.36	0.38		
DTS	2.4GHz WLAN	0.34	0.08	0.12		1.23
NII	5GHz WLAN	0.46	0.42		0.48	1.58
DSS	Bluetooth	0.11	0.02	0.04		1.17
Date of Testing:		2018/1/14 ~ 2018/1/27				

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

2. Administration Data

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978

Applicant	
Company Name	unitech Electronics Co., Ltd.
Address	5Fl., No. 136, Lane 235, Pao-Chiao Rd. Hsin-Tien Area, New Taipei City, Taiwan 231, R.O.C.

Manufacturer	
Company Name	unitech Electronics Co., Ltd.
Address	5Fl., No. 136, Lane 235, Pao-Chiao Rd. Hsin-Tien Area, New Taipei City, Taiwan 231, R.O.C.

3. Guidance Applied

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

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Rugged Handheld Computer
Brand Name	unitech
Model Name	PA726
FCC ID	HLEPA726BTNFL
IMEI Code	357881013145398
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM WLAN 2.4GHz : 802.11b/g/n HT20 WLAN 5GHz : 802.11a/n/ac HT20/VHT20 Bluetooth BR/EDR/LE NFC:ASK
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Production Unit

4.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05								
FCC ID	HLEPA726BTNFL							
Equipment Name	Rugged Handheld Computer							
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz							
Channel Bandwidth	LTE Band 02:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 04:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 05:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 07: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz							
uplink modulations used	QPSK / 16QAM							
LTE Voice / Data requirements	Data only							
LTE MPR permanently built-in by design	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3							
	Modulation	Channel bandwidth / Transmission bandwidth (N_{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
	64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
	64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
	256 QAM	≥ 1						≤ 5
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)							
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.							

Transmission (H, M, L) channel numbers and frequencies in each LTE band												
LTE Band 2												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900
LTE Band 4												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745
LTE Band 5												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829				
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5	20525	836.5		
H	20643	848.3	20635	847.5	20625	846.5	20600	844				
LTE Band 7												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510				
M	21100	2535	21100	2535	21100	2535	21100	2535				
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560				
LTE Band 38												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580				
M	38000	2595	38000	2595	38000	2595	38000	2595				
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610				
LTE Band 41												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506				
L	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5				
M	40620	2593	40620	2593	40620	2593	40620	2593				
H	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5				
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680				

5. RF Exposure Limits

5.1 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.

5.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

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

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

1. 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.

6. Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$SAR = \frac{d}{dt} \left(\frac{dW}{dm} \right) = \frac{d}{dt} \left(\frac{dW}{\rho dv} \right)$$

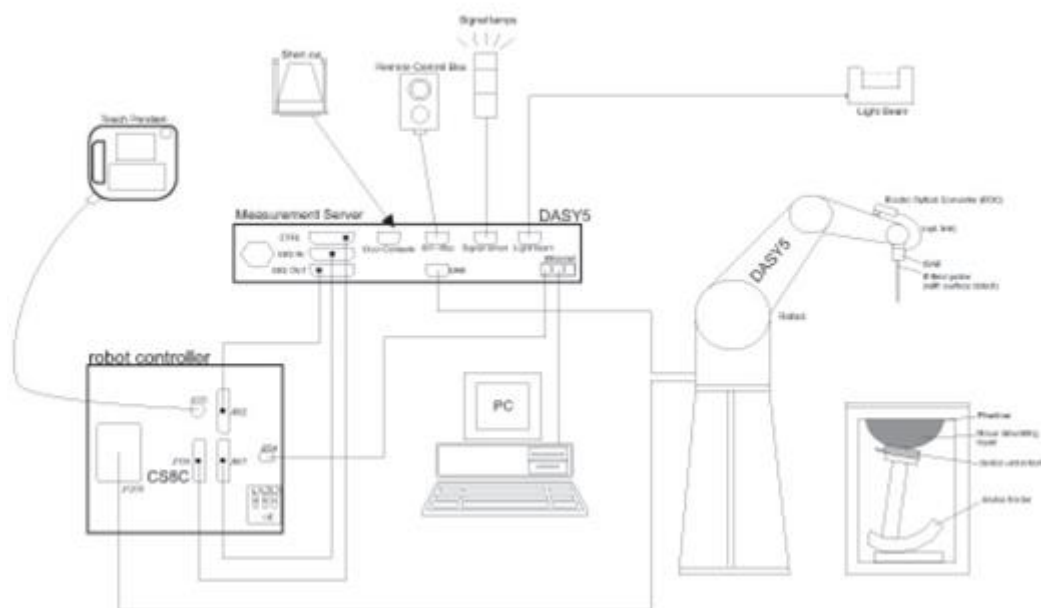
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. System Description and Setup

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

7.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG). The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

<ES3DV3 Probe>

Construction	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – 4 GHz; Linearity: ± 0.2 dB (30 MHz – 4 GHz)	
Directivity	± 0.2 dB in TSL (rotation around probe axis) ± 0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	5 μ W/g – >100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 3.9 mm (body: 12 mm) Distance from probe tip to dipole centers: 3.0 mm	

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – >6 GHz Linearity: ± 0.2 dB (30 MHz – 6 GHz)	
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 μ W/g – >100 mW/g Linearity: ± 0.2 dB (noise: typically <1 μ W/g)	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

7.2 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists 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 and 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 input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



Fig 5.1 Photo of DAE

7.3 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Hand, Right Hand, Flat Phantom	

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

<ELI Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)	
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm	

The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

7.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.



Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

<Mounting Device for Laptops and other Body-Worn Transmitters>

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 positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.



Mounting Device for Laptops

8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

- (a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- (b) Read the WWAN RF power level from the base station simulator.
- (c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
- (d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

- (a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
- (b) Place the EUT in the positions as Appendix D demonstrates.
- (c) Set scan area, grid size and other setting on the DASY software.
- (d) Measure SAR results for the highest power channel on each testing position.
- (e) Find out the largest SAR result on these testing positions of each band
- (f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

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

- (a) Power reference measurement
- (b) Area scan
- (c) Zoom scan
- (d) Power drift measurement

8.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g

8.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

8.3 Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}	≤ 2 GHz: ≤ 15 mm $2 - 3$ GHz: ≤ 12 mm	$3 - 4$ GHz: ≤ 12 mm $4 - 6$ GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

8.4 Zoom Scan

Zoom scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.				
* When zoom scan is required and the <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

8.5 Volume Scan Procedures

The volume scan is used to assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

8.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASy measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	499	Mar. 21, 2017	Mar. 20, 2018
SPEAG	1750MHz System Validation Kit	D1750V2	1068	Nov. 15, 2017	Nov. 14, 2018
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Sep. 28, 2017	Sep. 27, 2018
SPEAG	2450MHz System Validation Kit	D2450V2	736	Sep. 18, 2017	Sep. 17, 2018
SPEAG	2600MHz System Validation Kit	D2600V2	1008	Sep. 18, 2017	Sep. 17, 2018
SPEAG	5GHz System Validation Kit	D5GHzV2	1171	Jul. 18, 2017	Jul. 17, 2018
SPEAG	Data Acquisition Electronics	DAE3	495	May. 22, 2017	May. 21, 2018
SPEAG	Data Acquisition Electronics	DAE4	1399	Nov. 16, 2017	Nov. 15, 2018
SPEAG	Data Acquisition Electronics	DAE4	854	May. 02, 2017	May. 01, 2018
SPEAG	Data Acquisition Electronics	DAE4	853	Jul. 19, 2017	Jul. 18, 2018
SPEAG	Dosimetric E-Field Probe	EX3DV4	3925	May. 24, 2017	May. 23, 2018
SPEAG	Dosimetric E-Field Probe	ES3DV3	3270	Sep. 25, 2017	Sep. 24, 2018
SPEAG	Dosimetric E-Field Probe	EX3DV4	3931	Sep. 29, 2017	Sep. 28, 2018
SPEAG	Dosimetric E-Field Probe	ES3DV3	3169	May. 11, 2017	May. 10, 2018
WonDer	Thermometer	WD-5016	TM560-1	Mar. 17, 2017	Mar. 16, 2018
WonDer	Thermometer	WD-5016	TM560-2	Mar. 17, 2017	Mar. 16, 2018
TECPEL	Thermometer	UL-A03	TM225-1	Mar. 21, 2017	Mar. 20, 2018
TECPEL	Thermometer	UL-A03	TM225-2	Mar. 21, 2017	Mar. 20, 2018
Anritsu	Radio Communication Analyzer	MT8820C	6201381760	May. 17, 2017	May. 16, 2018
Agilent	Wireless Communication Test Set	E5515C	MY50266977	May. 30, 2017	May. 29, 2018
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Dec. 07, 2017	Dec. 06, 2018
Agilent	ENA Network Analyzer	E5071C	MY46104758	Aug. 24, 2017	Aug. 23, 2018
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 26, 2017	Sep. 25, 2018
LINE SEIKI	Digital Thermometer	LKMelectronic	DTM3000SPEZIAL	Sep. 06, 2017	Sep. 05, 2018
Anritsu	Power Meter	ML2495A	1419002	May. 15, 2017	May. 14, 2018
Anritsu	Power Sensor	MA2411B	1339124	May. 15, 2017	May. 14, 2018
Anritsu	Power Meter	ML2495A	1218006	Oct. 06, 2017	Oct. 05, 2018
Anritsu	Power Sensor	MA2411B	1207363	Oct. 06, 2017	Oct. 05, 2018
Agilent	Spectrum Analyzer	E4408B	MY44211028	Aug. 23, 2017	Aug. 22, 2018
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jun. 26, 2017	Jun. 25, 2018
Mini-Circuits	Power Amplifier	ZVE-8G+	D120604	Mar. 09, 2017	Mar. 08, 2018
Mini-Circuits	Power Amplifier	ZHL-42W+	QA1344002	Mar. 09, 2017	Mar. 08, 2018
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

General Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.

10. System Verification

10.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.2.

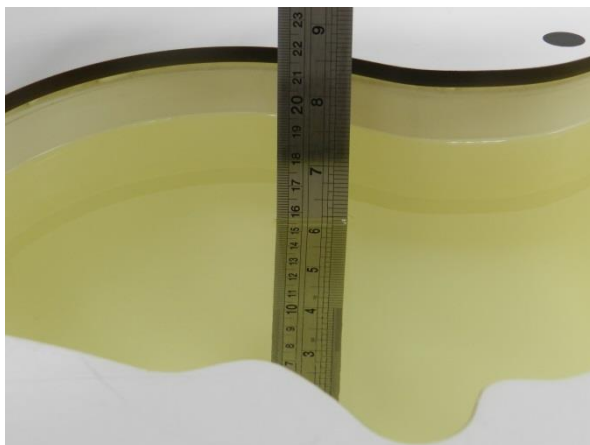


Fig 10.1 Photo of Liquid Height for Head SAR



Fig 10.2 Photo of Liquid Height for Body SAR

10.2 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ϵ_r)
For Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0
For Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
835	HSL	22.5	0.873	43.230	0.90	41.50	-3.00	4.17	±5	2018/1/15
835	HSL	22.7	0.872	43.180	0.90	41.50	-3.11	4.05	±5	2018/1/19
835	MSL	22.5	0.986	56.934	0.97	55.20	1.65	3.14	±5	2018/1/15
835	MSL	22.4	0.992	55.806	0.97	55.20	2.27	1.10	±5	2018/1/16
1750	HSL	22.6	1.362	38.748	1.37	40.10	-0.58	-3.37	±5	2018/1/17
1750	MSL	22.4	1.483	55.402	1.49	53.40	-0.47	3.75	±5	2018/1/16
1900	HSL	22.4	1.455	39.471	1.40	40.00	3.93	-1.32	±5	2018/1/16
1900	HSL	22.5	1.417	40.819	1.40	40.00	1.21	2.05	±5	2018/1/27
1900	MSL	22.4	1.556	51.544	1.52	53.30	2.37	-3.29	±5	2018/1/16
1900	MSL	22.6	1.533	54.553	1.52	53.30	0.86	2.35	±5	2018/1/26
2450	HSL	22.3	1.760	40.494	1.80	39.20	-2.22	3.30	±5	2018/1/18
2450	MSL	22.3	2.022	54.466	1.95	52.70	3.69	3.35	±5	2018/1/14
2450	MSL	22.7	1.976	52.575	1.95	52.70	1.33	-0.24	±5	2018/1/19
2450	MSL	22.6	2.036	53.824	1.95	52.70	4.41	2.13	±5	2018/1/26
2600	HSL	22.6	2.004	37.754	1.96	39.00	2.24	-3.19	±5	2018/1/17
2600	MSL	22.3	2.230	53.903	2.16	52.50	3.24	2.67	±5	2018/1/14
2600	MSL	22.7	2.175	52.060	2.16	52.50	0.69	-0.84	±5	2018/1/19
5250	HSL	22.7	4.597	36.888	4.71	35.95	-2.40	2.61	±5	2018/1/20
5250	MSL	22.5	5.460	47.967	5.36	48.95	1.87	-2.01	±5	2018/1/22
5600	HSL	22.7	4.957	36.843	5.07	35.50	-2.23	3.78	±5	2018/1/21
5600	MSL	22.5	5.929	47.373	5.77	48.50	2.76	-2.32	±5	2018/1/22
5750	HSL	22.7	5.117	36.635	5.22	35.35	-1.97	3.64	±5	2018/1/21
5750	MSL	22.5	6.139	47.129	5.94	48.28	3.35	-2.38	±5	2018/1/22

10.3 System Performance Check Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2018/1/15	835	HSL	250	D835V2-499	ES3DV3 - SN3270	DAE4 Sn854	2.26	9.45	9.04	-4.34
2018/1/19	835	HSL	250	D835V2-499	EX3DV4 - SN3925	DAE4 Sn853	2.26	9.45	9.04	-4.34
2018/1/15	835	MSL	250	D835V2-499	EX3DV4 - SN3931	DAE4 Sn1399	2.55	9.67	10.20	5.48
2018/1/16	835	MSL	250	D835V2-499	ES3DV3 - SN3270	DAE4 Sn854	2.56	9.67	10.24	5.89
2018/1/17	1750	HSL	250	D1750V2-1068	ES3DV3 - SN3270	DAE4 Sn854	9.05	36.70	36.20	-1.36
2018/1/16	1750	MSL	250	D1750V2-1068	ES3DV3 - SN3270	DAE4 Sn854	8.90	37.20	35.60	-4.30
2018/1/16	1900	HSL	250	D1900V2-5d041	ES3DV3 - SN3270	DAE4 Sn854	9.85	40.50	39.40	-2.72
2018/1/27	1900	HSL	250	D1900V2-5d041	ES3DV3 - SN3169	DAE3 Sn495	10.10	40.50	40.40	-0.25
2018/1/16	1900	MSL	250	D1900V2-5d041	ES3DV3 - SN3270	DAE4 Sn854	9.71	40.70	38.84	-4.57
2018/1/26	1900	MSL	250	D1900V2-5d041	ES3DV3 - SN3169	DAE3 Sn495	9.57	40.70	38.28	-5.95
2018/1/18	2450	HSL	250	D2450V2-736	ES3DV3 - SN3270	DAE4 Sn854	12.70	52.40	50.80	-3.05
2018/1/14	2450	MSL	250	D2450V2-736	EX3DV4 - SN3931	DAE4 Sn1399	12.60	50.80	50.40	-0.79
2018/1/19	2450	MSL	250	D2450V2-736	EX3DV4 - SN3925	DAE4 Sn853	12.20	50.80	48.80	-3.94
2018/1/26	2450	MSL	250	D2450V2-736	EX3DV4 - SN3925	DAE3 Sn495	12.70	50.80	50.80	0.00
2018/1/17	2600	HSL	250	D2600V2-1008	ES3DV3 - SN3270	DAE4 Sn854	14.60	56.80	58.40	2.82
2018/1/14	2600	MSL	250	D2600V2-1008	EX3DV4 - SN3931	DAE4 Sn1399	14.30	55.00	57.20	4.00
2018/1/19	2600	MSL	250	D2600V2-1008	EX3DV4 - SN3925	DAE4 Sn853	13.90	55.00	55.60	1.09
2018/1/20	5250	HSL	100	D5GHzV2-1171-5250	EX3DV4 - SN3925	DAE4 Sn853	7.89	81.20	78.90	-2.83
2018/1/22	5250	MSL	100	D5GHzV2-1171-5250	EX3DV4 - SN3925	DAE4 Sn853	8.10	78.10	81.00	3.71
2018/1/21	5600	HSL	100	D5GHzV2-1171-5600	EX3DV4 - SN3931	DAE4 Sn1399	8.76	84.90	87.60	3.18
2018/1/22	5600	MSL	100	D5GHzV2-1171-5600	EX3DV4 - SN3925	DAE4 Sn853	8.28	81.00	82.80	2.22
2018/1/21	5750	HSL	100	D5GHzV2-1171-5750	EX3DV4 - SN3931	DAE4 Sn1399	7.90	82.20	79.00	-3.89
2018/1/22	5750	MSL	100	D5GHzV2-1171-5750	EX3DV4 - SN3925	DAE4 Sn853	7.51	78.70	75.10	-4.57

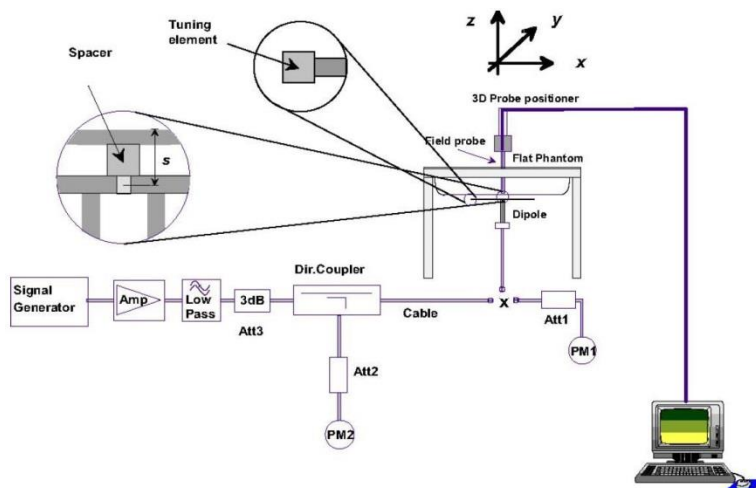


Fig 8.3.1 System Performance Check Setup



Fig 8.3.2 Setup Photo

11. RF Exposure Positions

11.1 Ear and handset reference point

Figure 9.1.1 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 Figure 9.1.2 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 Figure 9.1.3). 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 Figure 9.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

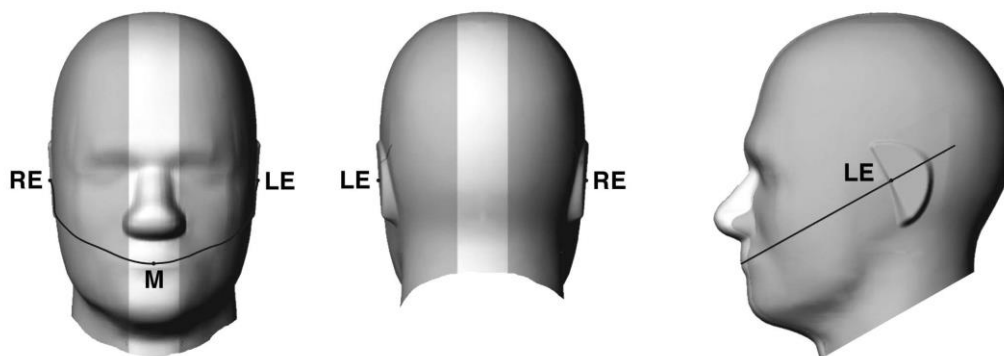


Fig 9.1.1 Front, back, and side views of SAM twin phantom

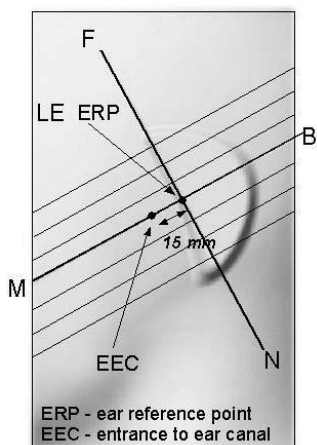


Fig 9.1.2 Close-up side view of phantom showing the ear region.

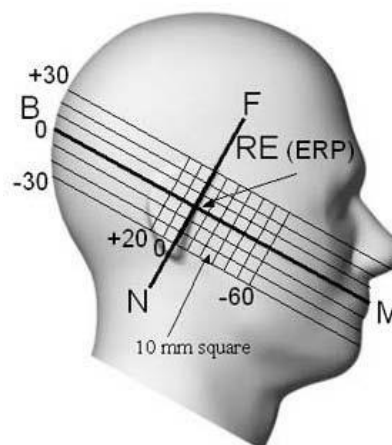


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

11.2 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 front side of the handset—the midpoint of the width w_t of the handset at the level of the acoustic output (point A in Figure 9.2.1 and Figure 9.2.2), and the midpoint of the width w_b 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 Figure 9.2.1). 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 Figure 9.2.2), 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 Figure 9.2.3), 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 Figure 9.2.3. The actual rotation angles should be documented in the test report.

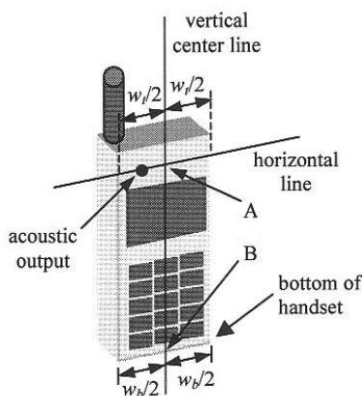


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case"

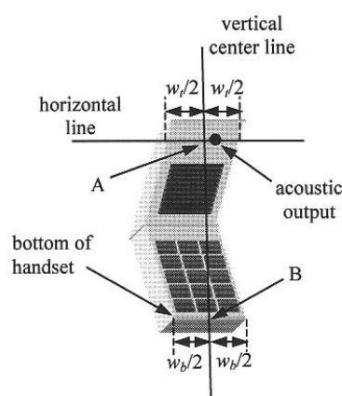


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

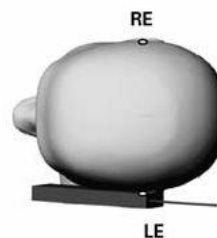
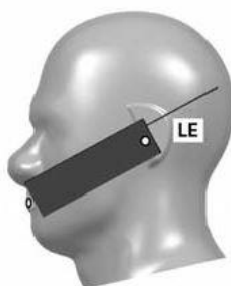
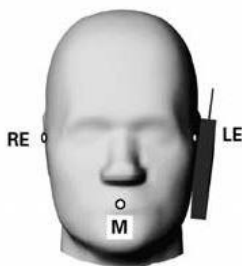


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

11.3 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 Figure 9.3.1. 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

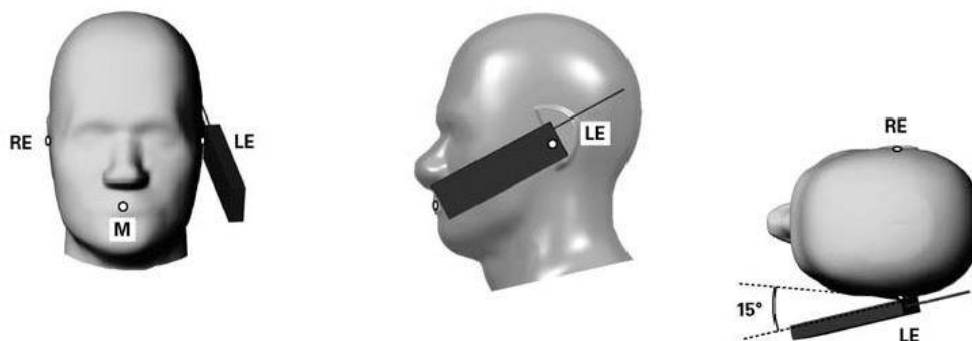


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

11.4 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 Figure 9.4). Per KDB648474 D04v01r03, 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 D01v06 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 $> 1.2 \text{ W/kg}$, 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. 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-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

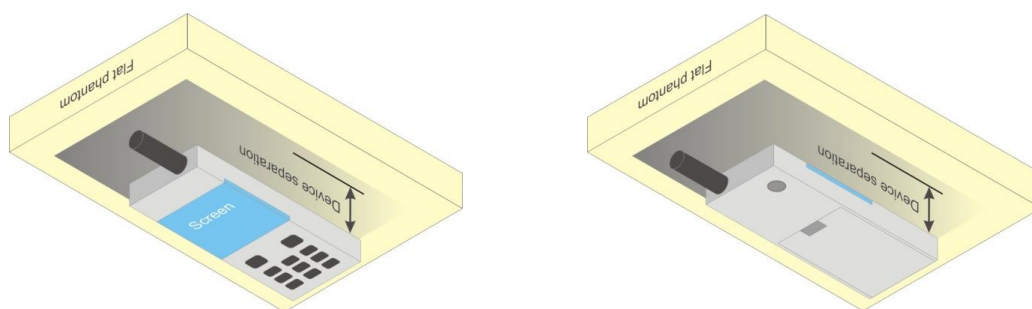


Fig 9.4 Body Worn Position

11.5 Extremity Exposure

For smart phones with a display diagonal dimension $> 15.0 \text{ cm}$ or an overall diagonal dimension $> 16.0 \text{ cm}$ that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, According to KDB648474 D04v01r03, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless modes and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance

1. The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied.
2. The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at $\leq 25 \text{ mm}$ from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions.⁶ The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR $> 1.2 \text{ W/kg}$.



11.6 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 D06 v02r01 where SAR test considerations for handsets ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) 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 from 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 D01v06 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.

12. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

General Note:

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (2Tx slots) for GSM850 and GPRS (4Tx slots) for GSM1900 are considered as the primary mode.
3. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode, SAR measurement is not required for the secondary mode

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	32.05	32.08	32.10	34.50	23.05	23.08	23.10	25.50
GPRS 1 Tx slot	32.10	32.12	32.15	34.50	23.10	23.12	23.15	25.50
GPRS 2 Tx slots	30.30	30.33	30.29	32.00	24.30	24.33	24.29	26.00
GPRS 3 Tx slots	28.63	28.45	28.43	30.00	24.37	24.19	24.17	25.74
GPRS 4 Tx slots	26.87	26.82	26.75	28.00	23.87	23.82	23.75	25.00
EDGE 1 Tx slot	25.67	25.49	25.45	29.00	16.67	16.49	16.45	20.00
EDGE 2 Tx slots	24.59	24.36	24.35	27.50	18.59	18.36	18.35	21.50
EDGE 3 Tx slots	23.01	22.78	22.77	26.00	18.75	18.52	18.51	21.74
EDGE 4 Tx slots	21.89	21.73	21.65	25.00	18.89	18.73	18.65	22.00

GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	29.16	29.02	29.00	31.50	20.16	20.02	20.00	22.50
GPRS 1 Tx slot	29.25	29.10	29.05	31.50	20.25	20.10	20.05	22.50
GPRS 2 Tx slots	28.15	28.00	27.94	29.00	22.15	22.00	21.94	23.00
GPRS 3 Tx slots	26.52	26.23	26.17	27.00	22.26	21.97	21.91	22.74
GPRS 4 Tx slots	24.70	24.51	24.41	26.00	21.70	21.51	21.41	23.00
EDGE 1 Tx slot	24.79	24.40	24.34	28.00	15.79	15.40	15.34	19.00
EDGE 2 Tx slots	23.66	23.21	23.18	26.50	17.66	17.21	17.18	20.50
EDGE 3 Tx slots	22.50	22.02	21.92	25.50	18.24	17.76	17.66	21.24
EDGE 4 Tx slots	21.25	20.86	20.69	24.50	18.25	17.86	17.69	21.50

<WCDMA Conducted Power>

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
3. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
 - i. Set Gain Factors (β_c and β_d) and parameters were set according to each
 - ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
 - iii. Set RMC 12.2Kbps + HSDPA mode.
 - iv. Set Cell Power = -86 dBm
 - v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
 - vi. Select HSDPA Uplink Parameters
 - vii. Set Delta ACK, Delta NACK and Delta CQI = 8
 - viii. Set Ack-Nack Repetition Factor to 3
 - ix. Set CQI Feedback Cycle (k) to 4 ms
 - x. Set CQI Repetition Factor to 2
 - xi. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5
Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$. Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$, and $\Delta_{CQI} = 24/15$ with $\beta_{hs} = 24/15 * \beta_c$. Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases. Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.							

Setup Configuration

HSUPA Setup Configuration:

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting * :
 - i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
 - ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
 - iii. Set Cell Power = -86 dBm
 - iv. Set Channel Type = 12.2k + HSPA
 - v. Set UE Target Power
 - vi. Power Ctrl Mode= Alternating bits
 - vii. Set and observe the E-TFCI
 - viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
- d. The transmitted maximum output power was recorded.

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/25	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$. For sub-test 5, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 5/15$ with $\beta_{hs} = 5/15 * \beta_c$.

Note 2: CM = 1 for $\beta_d/\beta_c = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

Setup Configuration

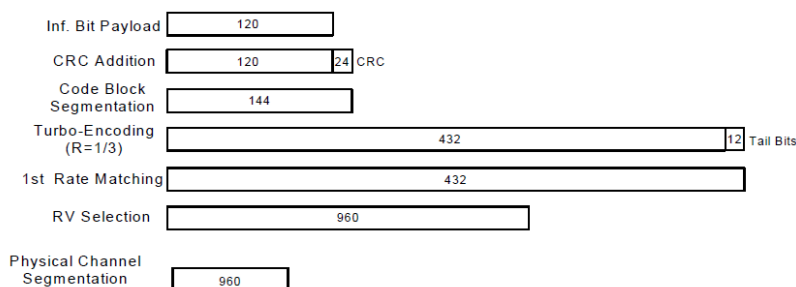
DC-HSDPA 3GPP release 8 Setup Configuration:

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration below
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
 - i. Set RMC 12.2Kbps + HSDPA mode.
 - ii. Set Cell Power = -25 dBm
 - iii. Set HS-DSCH Configuration Type to FRC (H-set 12, QPSK)
 - iv. Select HSDPA Uplink Parameters
 - v. Set Gain Factors (β_c and β_d) and parameters were set according to each Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
 - a). Subtest 1: $\beta_c/\beta_d=2/15$
 - b). Subtest 2: $\beta_c/\beta_d=12/15$
 - c). Subtest 3: $\beta_c/\beta_d=15/8$
 - d). Subtest 4: $\beta_c/\beta_d=15/4$
 - vi. Set Delta ACK, Delta NACK and Delta CQI = 8
 - vii. Set Ack-Nack Repetition Factor to 3
 - viii. Set CQI Feedback Cycle (k) to 4 ms
 - ix. Set CQI Repetition Cycle to 2
 - x. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification. A summary of these settings are illustrated below:

C.8.1.12 Fixed Reference Channel Definition H-Set 12
Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)
Setup Configuration

<WCDMA Conducted Power>
General Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is $\leq \frac{1}{4}$ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than $\frac{1}{4}$ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		4132	4182	4233	
Rx Channel		9662	9800	9938		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		826.4	836.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	21.39	21.41	21.43	21.50	22.58	22.68	22.61	24.00
3GPP Rel 99	RMC 12.2Kbps	21.40	21.42	21.44	21.50	22.61	22.69	22.65	24.00
3GPP Rel 6	HSDPA Subtest-1	20.36	20.48	20.36	21.00	21.77	21.70	21.67	23.50
3GPP Rel 6	HSDPA Subtest-2	20.38	20.50	20.32	21.00	21.82	21.80	21.66	23.50
3GPP Rel 6	HSDPA Subtest-3	19.96	19.94	19.84	20.50	21.33	21.30	21.16	23.00
3GPP Rel 6	HSDPA Subtest-4	19.92	19.95	19.82	20.50	21.33	21.31	21.17	23.00
3GPP Rel 8	DC-HSDPA Subtest-1	20.26	20.38	20.26	21.00	21.70	21.59	21.56	23.50
3GPP Rel 8	DC-HSDPA Subtest-2	20.24	20.37	20.23	21.00	21.79	21.71	21.63	23.50
3GPP Rel 8	DC-HSDPA Subtest-3	19.82	19.88	19.76	20.50	21.24	21.24	21.08	23.00
3GPP Rel 8	DC-HSDPA Subtest-4	19.81	19.85	19.75	20.50	21.32	21.25	21.09	23.00
3GPP Rel 6	HSUPA Subtest-1	20.43	20.45	20.42	21.00	21.75	21.73	21.72	23.50
3GPP Rel 6	HSUPA Subtest-2	18.43	18.53	18.44	19.00	19.69	19.72	19.70	21.50
3GPP Rel 6	HSUPA Subtest-3	19.38	19.40	19.36	20.00	20.79	20.75	20.61	22.50
3GPP Rel 6	HSUPA Subtest-4	18.48	18.44	18.37	19.00	19.75	19.79	19.68	21.50
3GPP Rel 6	HSUPA Subtest-5	20.42	20.46	20.38	21.00	21.70	21.70	21.60	23.50

<LTE Conducted Power>**General Note:**

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4 / B5 / B38 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE band 38 SAR test was covered by Band 41; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. the maximum output power, including tolerance, for the smaller band is $\leq$ the larger band to qualify for the SAR test exclusion
 - b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band



<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	22.02	21.92	21.91	22.5	0
20	QPSK	1	49	22.49	22.38	22.50		
20	QPSK	1	99	22.27	22.26	22.12		
20	QPSK	50	0	21.26	21.22	21.25	21.5	1
20	QPSK	50	24	21.10	21.12	21.23		
20	QPSK	50	50	21.21	21.18	21.20		
20	QPSK	100	0	21.14	21.31	21.19	21.5	1
20	16QAM	1	0	21.05	20.97	21.03		
20	16QAM	1	49	20.95	20.88	20.97		
20	16QAM	1	99	20.81	20.85	20.90	20.5	2
20	16QAM	50	0	20.40	20.22	20.40		
20	16QAM	50	24	20.28	20.20	20.30		
20	16QAM	50	50	20.25	20.03	20.27	20.5	2
20	16QAM	100	0	20.16	20.05	20.25		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	22.28	22.25	22.17	22.5	0
15	QPSK	1	37	22.20	22.17	22.47		
15	QPSK	1	74	22.16	21.98	22.22		
15	QPSK	36	0	21.18	20.99	21.27	21.5	1
15	QPSK	36	20	21.28	21.13	21.28		
15	QPSK	36	39	21.28	21.03	21.22		
15	QPSK	75	0	21.11	21.10	21.19	21.5	1
15	16QAM	1	0	21.00	20.95	20.99		
15	16QAM	1	37	20.80	20.94	20.98		
15	16QAM	1	74	20.84	20.81	20.95	20.5	2
15	16QAM	36	0	20.23	20.16	20.32		
15	16QAM	36	20	20.35	20.32	20.21		
15	16QAM	36	39	20.34	20.21	20.29	20.5	2
15	16QAM	75	0	20.27	20.26	20.34		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	22.02	21.97	22.01	22.5	0
10	QPSK	1	25	22.45	22.24	22.38		
10	QPSK	1	49	22.00	21.94	22.01		
10	QPSK	25	0	21.27	21.25	21.24	21.5	1
10	QPSK	25	12	21.14	21.12	21.21		
10	QPSK	25	25	21.15	21.24	21.26		
10	QPSK	50	0	21.25	21.30	21.26	21.5	1
10	16QAM	1	0	21.06	20.90	21.01		
10	16QAM	1	25	21.09	21.14	21.14		
10	16QAM	1	49	20.97	20.94	20.99	20.5	2
10	16QAM	25	0	20.49	20.23	20.30		
10	16QAM	25	12	20.22	20.34	20.48		
10	16QAM	25	25	20.23	20.12	20.33	20.5	2
10	16QAM	50	0	20.23	20.02	20.33		



Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.21	22.04	21.81	22.5	0
5	QPSK	1	12	22.48	22.45	22.40		
5	QPSK	1	24	21.78	21.99	21.84		
5	QPSK	12	0	21.23	21.08	21.24	21.5	1
5	QPSK	12	7	21.12	21.06	21.22		
5	QPSK	12	13	21.21	21.07	21.22		
5	QPSK	25	0	21.26	21.08	21.23	21.5	1
5	16QAM	1	0	20.96	20.87	20.89		
5	16QAM	1	12	20.84	21.20	20.97		
5	16QAM	1	24	20.78	20.83	20.87	20.5	2
5	16QAM	12	0	20.12	19.98	20.19		
5	16QAM	12	7	20.29	19.88	20.21		
5	16QAM	12	13	20.30	19.99	20.23	20.5	2
5	16QAM	25	0	20.10	20.06	20.26		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	22.34	22.02	22.18	22.5	0
3	QPSK	1	8	22.33	22.31	22.04		
3	QPSK	1	14	22.16	22.27	21.98		
3	QPSK	8	0	21.25	21.04	21.21	21.5	1
3	QPSK	8	4	21.24	21.01	21.22		
3	QPSK	8	7	21.30	21.02	21.22		
3	QPSK	15	0	21.22	21.12	21.17	21.5	1
3	16QAM	1	0	21.00	20.92	20.99		
3	16QAM	1	8	20.82	20.79	20.88		
3	16QAM	1	14	20.94	20.97	21.04	20.5	2
3	16QAM	8	0	19.96	20.17	20.31		
3	16QAM	8	4	20.46	20.26	20.20		
3	16QAM	8	7	20.32	20.14	20.26	20.5	2
3	16QAM	15	0	20.08	20.17	20.29		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	22.23	22.09	22.05	22.5	0
1.4	QPSK	1	3	22.38	22.18	22.02		
1.4	QPSK	1	5	22.28	22.16	21.94		
1.4	QPSK	3	0	22.22	22.28	22.27		
1.4	QPSK	3	1	22.26	22.39	22.43		
1.4	QPSK	3	3	22.25	22.27	22.34		
1.4	QPSK	6	0	21.20	21.06	21.20	21.5	1
1.4	16QAM	1	0	21.00	21.00	21.07	21.5	1
1.4	16QAM	1	3	21.17	21.09	21.20		
1.4	16QAM	1	5	20.99	20.99	21.03		
1.4	16QAM	3	0	21.16	21.19	21.11		
1.4	16QAM	3	1	21.21	21.23	21.39		
1.4	16QAM	3	3	21.25	21.16	21.18		
1.4	16QAM	6	0	20.18	20.02	20.08	20.5	2



<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	22.34	22.40	22.94	24	0
20	QPSK	1	49	22.91	23.30	23.02		
20	QPSK	1	99	22.56	22.68	22.82		
20	QPSK	50	0	21.77	21.91	21.90	23	1
20	QPSK	50	24	21.76	21.68	21.86		
20	QPSK	50	50	21.76	21.64	21.79		
20	QPSK	100	0	21.75	21.86	21.92	23	1
20	16QAM	1	0	21.56	21.62	21.88		
20	16QAM	1	49	21.54	21.57	21.61		
20	16QAM	1	99	21.51	21.64	21.64	22	2
20	16QAM	50	0	20.67	20.87	21.03		
20	16QAM	50	24	20.56	20.69	20.73		
20	16QAM	50	50	20.84	20.63	20.78	22	2
20	16QAM	100	0	20.72	20.80	20.88		
Channel				20025	20175	20325		
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	22.64	22.62	23.11	24	0
15	QPSK	1	37	22.60	22.99	23.25		
15	QPSK	1	74	22.72	22.69	22.75		
15	QPSK	36	0	21.74	21.88	21.85	23	1
15	QPSK	36	20	21.77	21.66	21.60		
15	QPSK	36	39	21.69	21.79	21.88		
15	QPSK	75	0	21.70	21.82	21.78	23	1
15	16QAM	1	0	21.62	21.55	21.89		
15	16QAM	1	37	21.62	21.55	21.78		
15	16QAM	1	74	21.54	21.73	21.70	22	2
15	16QAM	36	0	20.73	20.79	20.72		
15	16QAM	36	20	20.65	20.81	20.73		
15	16QAM	36	39	20.62	20.86	20.88	22	2
15	16QAM	75	0	20.79	20.88	20.85		
Channel				20000	20175	20350		
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	22.54	22.51	22.60	24	0
10	QPSK	1	25	22.75	22.90	23.12		
10	QPSK	1	49	22.44	22.63	22.73		
10	QPSK	25	0	21.82	21.79	21.98	23	1
10	QPSK	25	12	21.71	21.83	21.93		
10	QPSK	25	25	21.73	21.59	21.86		
10	QPSK	50	0	21.79	21.88	21.90	23	1
10	16QAM	1	0	21.61	21.62	21.72		
10	16QAM	1	25	21.73	21.77	21.74		
10	16QAM	1	49	21.47	21.57	21.82	22	2
10	16QAM	25	0	20.89	21.06	20.99		
10	16QAM	25	12	20.60	20.88	21.02		
10	16QAM	25	25	20.92	21.01	20.86	22	2
10	16QAM	50	0	20.79	20.68	20.88		



Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	22.47	22.67	22.45	24	0
5	QPSK	1	12	22.75	23.08	22.86		
5	QPSK	1	24	22.34	22.69	22.58		
5	QPSK	12	0	21.54	21.63	21.77	23	1
5	QPSK	12	7	21.74	21.78	21.70		
5	QPSK	12	13	21.80	21.65	21.88		
5	QPSK	25	0	21.81	21.64	21.75	23	1
5	16QAM	1	0	21.50	21.57	21.67		
5	16QAM	1	12	21.39	21.46	21.39		
5	16QAM	1	24	21.41	21.55	21.60	22	2
5	16QAM	12	0	20.39	20.70	20.74		
5	16QAM	12	7	20.62	20.55	20.79		
5	16QAM	12	13	20.69	20.74	20.80	22	2
5	16QAM	25	0	20.99	20.71	20.94		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	22.43	22.63	22.60	24	0
3	QPSK	1	8	22.59	22.70	22.55		
3	QPSK	1	14	22.67	22.70	22.48		
3	QPSK	8	0	21.74	21.79	21.85	23	1
3	QPSK	8	4	21.85	21.83	21.83		
3	QPSK	8	7	21.80	21.91	21.82		
3	QPSK	15	0	21.74	21.79	21.86	23	1
3	16QAM	1	0	21.55	21.73	21.35		
3	16QAM	1	8	21.56	21.54	21.50		
3	16QAM	1	14	21.67	21.65	21.52	22	2
3	16QAM	8	0	20.73	21.22	20.77		
3	16QAM	8	4	20.98	20.55	20.85		
3	16QAM	8	7	20.94	20.90	20.80	22	2
3	16QAM	15	0	20.55	20.89	20.67		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	22.55	22.62	22.73	24	0
1.4	QPSK	1	3	22.56	22.60	22.88		
1.4	QPSK	1	5	22.50	22.54	22.85		
1.4	QPSK	3	0	22.68	22.96	22.84	23	1
1.4	QPSK	3	1	22.82	23.24	22.87		
1.4	QPSK	3	3	22.64	22.95	22.98		
1.4	QPSK	6	0	21.55	21.75	21.96	23	1
1.4	16QAM	1	0	21.58	21.61	21.66	23	1
1.4	16QAM	1	3	21.70	21.80	21.86		
1.4	16QAM	1	5	21.39	21.64	21.73		
1.4	16QAM	3	0	21.60	21.80	21.74	22	2
1.4	16QAM	3	1	21.65	21.85	21.92		
1.4	16QAM	3	3	21.76	21.81	21.91		
1.4	16QAM	6	0	20.58	20.57	20.65	22	2



<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	22.68	22.70	22.65	24	0
10	QPSK	1	25	23.29	22.90	22.97		
10	QPSK	1	49	22.69	22.92	22.75		
10	QPSK	25	0	22.04	22.13	22.06	23	1
10	QPSK	25	12	22.18	22.11	22.04		
10	QPSK	25	25	22.17	22.08	22.00		
10	QPSK	50	0	22.12	22.11	22.04	23	1
10	16QAM	1	0	22.17	21.79	21.75		
10	16QAM	1	25	22.00	22.03	22.06		
10	16QAM	1	49	21.81	21.83	21.85	22	2
10	16QAM	25	0	21.05	21.18	21.02		
10	16QAM	25	12	21.13	21.11	21.06		
10	16QAM	25	25	21.08	21.34	21.14	22	2
10	16QAM	50	0	21.14	21.18	21.10		
Channel				20425	20525	20625		
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	22.73	22.58	22.56	24	0
5	QPSK	1	12	23.00	23.15	23.28		
5	QPSK	1	24	22.67	22.59	22.79		
5	QPSK	12	0	21.90	22.15	22.02	23	1
5	QPSK	12	7	21.96	22.12	22.11		
5	QPSK	12	13	21.95	22.02	22.08		
5	QPSK	25	0	21.99	22.01	21.98	23	1
5	16QAM	1	0	21.68	21.75	21.64		
5	16QAM	1	12	21.63	21.74	21.82		
5	16QAM	1	24	21.66	21.75	21.77	22	2
5	16QAM	12	0	20.97	21.11	20.91		
5	16QAM	12	7	20.92	21.13	20.99		
5	16QAM	12	13	20.91	20.78	20.88	22	2
5	16QAM	25	0	20.95	21.07	20.98		
Channel				20415	20525	20635		
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.60	23.02	22.90	24	0
3	QPSK	1	8	22.91	22.75	23.00		
3	QPSK	1	14	22.56	22.70	22.72		
3	QPSK	8	0	22.01	22.08	22.07	23	1
3	QPSK	8	4	21.95	21.97	22.12		
3	QPSK	8	7	22.06	22.11	22.13		
3	QPSK	15	0	22.07	22.07	22.11	23	1
3	16QAM	1	0	21.89	21.94	21.90		
3	16QAM	1	8	21.77	21.77	21.83		
3	16QAM	1	14	21.82	21.89	21.91	22	2
3	16QAM	8	0	21.02	21.14	21.16		
3	16QAM	8	4	21.06	21.07	21.02		
3	16QAM	8	7	20.77	21.10	21.14	22	2
3	16QAM	15	0	20.85	21.03	20.90		



Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.99	22.98	22.94	24	0
1.4	QPSK	1	3	23.06	23.00	23.03		
1.4	QPSK	1	5	22.86	22.92	22.90		
1.4	QPSK	3	0	23.11	22.99	23.07		
1.4	QPSK	3	1	23.26	23.19	23.11		
1.4	QPSK	3	3	23.11	23.16	23.12	23	1
1.4	QPSK	6	0	22.08	22.03	22.03		
1.4	16QAM	1	0	21.84	21.81	21.88	23	1
1.4	16QAM	1	3	22.03	22.05	22.05		
1.4	16QAM	1	5	21.80	21.88	21.94		
1.4	16QAM	3	0	22.00	22.07	22.04		
1.4	16QAM	3	1	22.03	22.04	22.08		
1.4	16QAM	3	3	21.98	22.08	22.10	22	2
1.4	16QAM	6	0	21.03	20.94	21.12		



<LTE Band 7>

Channel	Frequency (MHz)	20850	21100	21350	Tune-up limit (dBm)	MPR (dB)
Channel	Frequency (MHz)	2510	2535	2560		
20	QPSK 1 0	22.50	22.39	22.36	23.5	0
20	QPSK 1 49	23.00	23.33	22.86		
20	QPSK 1 99	22.39	23.11	22.35		
20	QPSK 50 0	21.88	22.08	22.11	22.5	1
20	QPSK 50 24	21.98	22.09	22.05		
20	QPSK 50 50	21.93	22.15	22.12		
20	QPSK 100 0	21.93	22.03	22.06	22.5	1
20	16QAM 1 0	21.89	21.53	21.38		
20	16QAM 1 49	21.77	22.01	21.96		
20	16QAM 1 99	21.78	21.87	21.27	21.5	2
20	16QAM 50 0	21.09	21.00	21.25		
20	16QAM 50 24	21.01	21.30	21.06		
20	16QAM 50 50	20.90	21.27	21.18	20.96	21.14
20	16QAM 100 0	20.96	21.14	21.19		
Channel	Frequency (MHz)	20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Channel	Frequency (MHz)	2507.5	2535	2562.5		
15	QPSK 1 0	23.02	22.69	22.49	23.5	0
15	QPSK 1 37	23.24	23.24	23.06		
15	QPSK 1 74	22.88	23.32	22.38		
15	QPSK 36 0	22.06	22.12	22.18	22.5	1
15	QPSK 36 20	21.99	22.15	22.11		
15	QPSK 36 39	22.00	22.19	22.13		
15	QPSK 75 0	21.94	22.10	22.13	22.5	1
15	16QAM 1 0	21.96	21.71	21.81		
15	16QAM 1 37	22.08	21.98	21.92		
15	16QAM 1 74	21.99	22.02	21.62	21.5	2
15	16QAM 36 0	21.08	21.08	21.23		
15	16QAM 36 20	21.02	21.18	21.20		
15	16QAM 36 39	21.06	21.20	21.28	21.06	21.19
15	16QAM 75 0	21.06	21.19	21.28		
Channel	Frequency (MHz)	20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Channel	Frequency (MHz)	2505	2535	2565		
10	QPSK 1 0	22.84	22.85	22.36	23.5	0
10	QPSK 1 25	23.29	23.22	23.02		
10	QPSK 1 49	22.75	23.19	22.38		
10	QPSK 25 0	22.08	22.14	22.12	22.5	1
10	QPSK 25 12	22.12	22.15	22.15		
10	QPSK 25 25	21.96	22.14	22.15		
10	QPSK 50 0	21.99	22.15	22.15	22.5	1
10	16QAM 1 0	21.65	21.94	21.63		
10	16QAM 1 25	21.92	22.21	22.20		
10	16QAM 1 49	21.83	21.96	21.72	21.5	2
10	16QAM 25 0	21.12	21.15	21.38		
10	16QAM 25 12	21.17	21.24	21.30		
10	16QAM 25 25	21.02	21.26	21.46	21.04	21.20
10	16QAM 50 0	21.04	21.20	21.36		



Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	22.76	22.71	22.39	23.5	0
5	QPSK	1	12	23.12	23.31	23.04		
5	QPSK	1	24	22.80	23.18	22.55		
5	QPSK	12	0	22.11	22.17	22.06	22.5	1
5	QPSK	12	7	22.04	22.14	22.07		
5	QPSK	12	13	22.08	22.13	22.10		
5	QPSK	25	0	22.02	22.08	22.11		
5	16QAM	1	0	22.17	21.89	21.71	22.5	1
5	16QAM	1	12	22.14	22.17	21.93		
5	16QAM	1	24	21.95	21.98	21.87		
5	16QAM	12	0	21.06	21.32	21.21	21.5	2
5	16QAM	12	7	21.26	21.21	21.35		
5	16QAM	12	13	21.12	21.26	21.24		
5	16QAM	25	0	21.08	21.19	21.22		

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

SAR was tested with a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by 3GPP.

- 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
- “special subframe S” contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS
- Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.

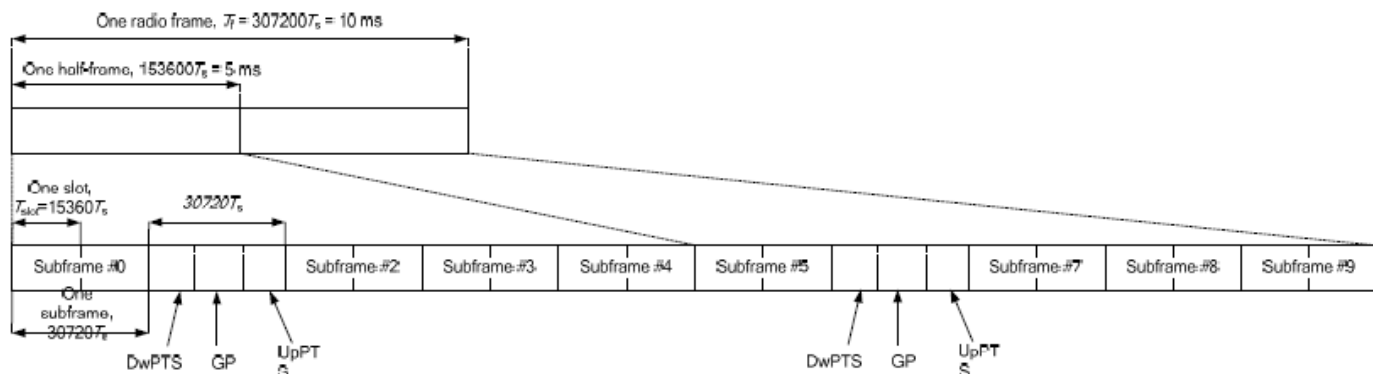


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$			$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$	-	-
8	$24144 \cdot T_s$			-		
9	$13168 \cdot T_s$			-		

Special subframe (30720·T _s): Normal cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
Uplink duty factor in one special subframe	0~4	7.13%	8.33%
	5~9	14.3%	16.7%

Special subframe(30720·T _s): Extended cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
Uplink duty factor in one special subframe	0~3	7.13%	8.33%
	4~7	14.3%	16.7%

The highest duty factor is resulted from:

- Uplink-downlink configuration: 0. In a half-frame consisted of 5 subframes, uplink operation is in 3 uplink subframes and 1 special subframe.
- special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
- for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is:
 $(3+0.167)/5 = 63.3\%$
- for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is:
 $(3+0.143)/5 = 62.9\%$
- For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $63.3\%/62.9\% = 1.006$ is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

<LTE Band 38>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				37850	38000	38150		
Frequency (MHz)				2580	2595	2610		
20	QPSK	1	0	23.04	23.22	23.27	24	0
20	QPSK	1	49	23.68	23.92	23.71		
20	QPSK	1	99	23.53	23.57	23.56		
20	QPSK	50	0	22.56	22.50	22.69	23	1
20	QPSK	50	24	22.59	22.74	22.69		
20	QPSK	50	50	22.59	22.61	22.79		
20	QPSK	100	0	22.58	22.75	22.65	23	1
20	16QAM	1	0	22.09	22.28	22.02		
20	16QAM	1	49	22.36	22.43	22.41		
20	16QAM	1	99	21.99	22.35	22.32	22	2
20	16QAM	50	0	21.52	21.71	21.57		
20	16QAM	50	24	21.82	21.53	21.81		
20	16QAM	50	50	21.85	21.53	21.85	22	2
20	16QAM	100	0	21.42	21.47	21.59		
Channel				37825	38000	38175		
Frequency (MHz)				2577.5	2595	2612.5		
15	QPSK	1	0	23.43	23.41	23.40	24	0
15	QPSK	1	37	23.90	23.82	23.87		
15	QPSK	1	74	23.43	23.46	23.46		
15	QPSK	36	0	22.95	22.71	22.61	23	1
15	QPSK	36	20	22.53	22.82	22.86		
15	QPSK	36	39	22.58	22.63	22.72		
15	QPSK	75	0	22.78	22.56	22.67	23	1
15	16QAM	1	0	22.11	22.11	22.39		
15	16QAM	1	37	22.41	22.20	22.37		
15	16QAM	1	74	22.39	22.21	22.22	22	2
15	16QAM	36	0	21.78	21.48	21.74		
15	16QAM	36	20	21.50	21.53	21.73		
15	16QAM	36	39	21.73	21.72	21.56	22	2
15	16QAM	75	0	21.54	21.50	21.69		
Channel				37800	38000	38200		
Frequency (MHz)				2575	2595	2615		
10	QPSK	1	0	23.46	23.49	23.64	24	0
10	QPSK	1	25	23.65	23.55	23.85		
10	QPSK	1	49	23.65	23.76	23.62		
10	QPSK	25	0	22.84	22.71	22.81	23	1
10	QPSK	25	12	22.66	22.58	22.90		
10	QPSK	25	25	22.80	22.56	22.73		
10	QPSK	50	0	22.66	22.57	22.68	23	1
10	16QAM	1	0	22.39	22.24	22.40		
10	16QAM	1	25	22.38	22.14	22.46		
10	16QAM	1	49	22.32	22.06	21.96	22	2
10	16QAM	25	0	21.76	21.79	21.88		
10	16QAM	25	12	21.79	21.75	21.88		
10	16QAM	25	25	21.72	21.68	21.93	22	2
10	16QAM	50	0	21.57	21.50	21.89		



Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	23.34	23.49	23.49	24	0
5	QPSK	1	12	23.67	23.63	23.79		
5	QPSK	1	24	23.44	23.40	23.42		
5	QPSK	12	0	22.88	22.59	22.67	23	1
5	QPSK	12	7	22.89	22.63	22.65		
5	QPSK	12	13	22.55	22.54	22.67		
5	QPSK	25	0	22.53	22.53	22.80		
5	16QAM	1	0	22.19	22.32	22.35	23	1
5	16QAM	1	12	22.14	22.12	22.92		
5	16QAM	1	24	22.29	22.28	22.34		
5	16QAM	12	0	21.47	21.48	21.67	22	2
5	16QAM	12	7	21.61	21.55	21.71		
5	16QAM	12	13	21.57	21.50	21.65		
5	16QAM	25	0	21.75	21.74	21.91		

<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	22.59	22.61	22.87	22.88	22.09	24	0
20	QPSK	1	49	22.97	23.08	23.11	23.02	22.67		
20	QPSK	1	99	22.64	22.97	23.28	22.88	22.16		
20	QPSK	50	0	22.04	22.32	22.11	21.99	21.68	23	1
20	QPSK	50	24	22.01	22.34	22.40	21.94	21.63		
20	QPSK	50	50	22.06	22.03	22.12	22.12	21.55		
20	QPSK	100	0	22.05	22.10	22.12	21.95	21.64	23	1
20	16QAM	1	0	21.39	21.80	21.46	21.71	21.21		
20	16QAM	1	49	21.78	21.82	22.46	21.85	21.40		
20	16QAM	1	99	21.39	21.83	21.90	21.42	21.10	22	2
20	16QAM	50	0	21.02	21.41	21.02	21.11	20.54		
20	16QAM	50	24	21.10	21.45	21.24	20.97	20.51		
20	16QAM	50	50	21.12	21.13	21.22	21.05	20.45	22	2
20	16QAM	100	0	20.99	21.31	21.07	20.89	20.48		
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	22.68	22.82	22.84	22.79	22.38	24	0
15	QPSK	1	37	22.91	23.27	23.23	23.19	22.93		
15	QPSK	1	74	22.77	23.02	22.96	22.75	22.00		
15	QPSK	36	0	21.95	22.32	22.11	22.18	21.67	23	1
15	QPSK	36	20	22.03	22.10	22.42	22.03	21.68		
15	QPSK	36	39	22.01	22.28	22.22	21.96	21.57		
15	QPSK	75	0	21.97	22.36	22.15	21.97	21.67	23	1
15	16QAM	1	0	21.45	21.82	21.62	21.77	21.18		
15	16QAM	1	37	22.21	21.96	22.48	21.98	21.59		
15	16QAM	1	74	21.47	21.90	21.70	21.69	21.00	22	2
15	16QAM	36	0	21.01	21.10	21.15	21.04	20.48		
15	16QAM	36	20	21.08	21.34	21.23	20.95	20.52		
15	16QAM	36	39	21.09	21.27	21.19	20.94	20.46	22	2
15	16QAM	75	0	21.00	21.22	21.10	21.17	20.57		
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	22.82	22.89	23.02	22.95	22.49	24	0
10	QPSK	1	25	22.89	23.15	23.06	22.98	22.86		
10	QPSK	1	49	22.95	22.93	23.18	22.88	22.17		
10	QPSK	25	0	21.94	22.03	22.14	22.18	21.71	23	1
10	QPSK	25	12	22.13	22.07	22.15	21.91	21.55		
10	QPSK	25	25	22.18	22.05	22.17	22.10	21.63		
10	QPSK	50	0	22.10	22.05	22.18	21.98	21.84	23	1
10	16QAM	1	0	21.47	21.54	21.65	21.54	21.19		
10	16QAM	1	25	21.75	21.90	21.70	21.55	21.42		
10	16QAM	1	49	21.41	21.71	21.48	21.68	21.26	22	2
10	16QAM	25	0	21.21	21.32	21.37	21.26	20.76		
10	16QAM	25	12	21.27	21.37	21.42	21.14	20.81		
10	16QAM	25	25	21.38	21.34	21.12	21.30	21.02	22	2
10	16QAM	50	0	21.18	21.16	21.23	20.91	20.66		



FCC SAR Test Report

Report No. : FA7N0405

Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5		
5	QPSK	1	0	22.72	22.69	22.90	22.76	22.46	24	0
5	QPSK	1	12	22.80	23.00	23.26	23.05	22.68		
5	QPSK	1	24	22.79	22.83	22.81	22.74	22.29		
5	QPSK	12	0	21.90	22.30	22.24	21.84	21.55	23	1
5	QPSK	12	7	22.12	22.15	22.39	22.02	21.63		
5	QPSK	12	13	21.98	22.02	22.17	21.99	21.55		
5	QPSK	25	0	21.90	22.09	22.11	22.01	21.60	23	1
5	16QAM	1	0	21.63	21.76	21.82	21.62	21.11		
5	16QAM	1	12	21.64	21.88	22.32	21.71	21.34		
5	16QAM	1	24	21.49	21.83	21.92	21.40	21.13	22	2
5	16QAM	12	0	20.84	21.08	21.16	20.86	20.44		
5	16QAM	12	7	20.89	21.20	21.27	20.99	20.54		
5	16QAM	12	13	20.92	21.07	21.18	20.85	20.47	22	2
5	16QAM	25	0	21.06	21.32	21.42	21.12	20.70		

<WLAN Conducted Power>**General Note:**

1. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
2. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
3. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
4. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.¹⁸ The initial test position procedure is described in the following:
 - a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
 - b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
 - c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

<2.4GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	17.69	18.00	97.63
		6	2437	17.66	18.00	
		11	2462	17.64	18.00	
	802.11g 6Mbps	1	2412	14.59	15.00	87.26
		6	2437	15.67	16.00	
		11	2462	13.98	15.00	
	802.11n-HT20 MCS0	1	2412	13.75	14.00	85.91
		6	2437	14.87	15.00	
		11	2462	13.13	14.00	

<5GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	14.79	15.00	87.26
		40	5200	14.87	15.00	
		44	5220	14.83	15.00	
		48	5240	14.90	15.00	
	802.11n-HT20 MCS0	36	5180	14.76	15.00	86.49
		40	5200	14.82	15.00	
		44	5220	14.70	15.00	
		48	5240	14.78	15.00	
	802.11ac-VHT20 MCS0	36	5180	13.63	15.00	94.74
		40	5200	13.81	15.00	
		44	5220	13.73	15.00	
		48	5240	13.79	15.00	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	14.99	15.00	87.26
		56	5280	14.94	15.00	
		60	5300	14.95	15.00	
		64	5320	14.93	15.00	
	802.11n-HT20 MCS0	52	5260	14.89	15.00	86.49
		56	5280	14.91	15.00	
		60	5300	14.95	15.00	
		64	5320	14.93	15.00	
	802.11ac-VHT20 MCS0	52	5260	13.85	15.00	94.74
		56	5280	13.95	15.00	
		60	5300	13.98	15.00	
		64	5320	13.96	15.00	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	14.69	15.00	87.26
		116	5580	14.99	15.00	
		124	5620	14.98	15.00	
		132	5660	14.70	15.00	
		144	5720	14.65	15.00	
	802.11n-HT20 MCS0	100	5500	14.94	15.00	86.49
		116	5580	14.83	15.00	
		124	5620	14.90	15.00	
		132	5660	14.93	15.00	
		144	5720	14.66	15.00	
	802.11ac-VHT20 MCS0	100	5500	13.74	15.00	94.74
		116	5580	13.71	15.00	
		124	5620	13.85	15.00	
		132	5660	13.76	15.00	
		144	5720	13.99	15.00	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a MCS0	149	5745	14.72	15.00	87.26
		157	5785	14.71	15.00	
		165	5825	14.89	15.00	
	802.11n-HT20 MCS0	149	5745	14.74	15.00	86.49
		157	5785	14.79	15.00	
		165	5825	14.80	15.00	
	802.11ac-VHT20 MCS0	149	5745	13.93	15.00	94.74
		157	5785	13.95	15.00	
		165	5825	13.96	15.00	

<2.4GHz Bluetooth>

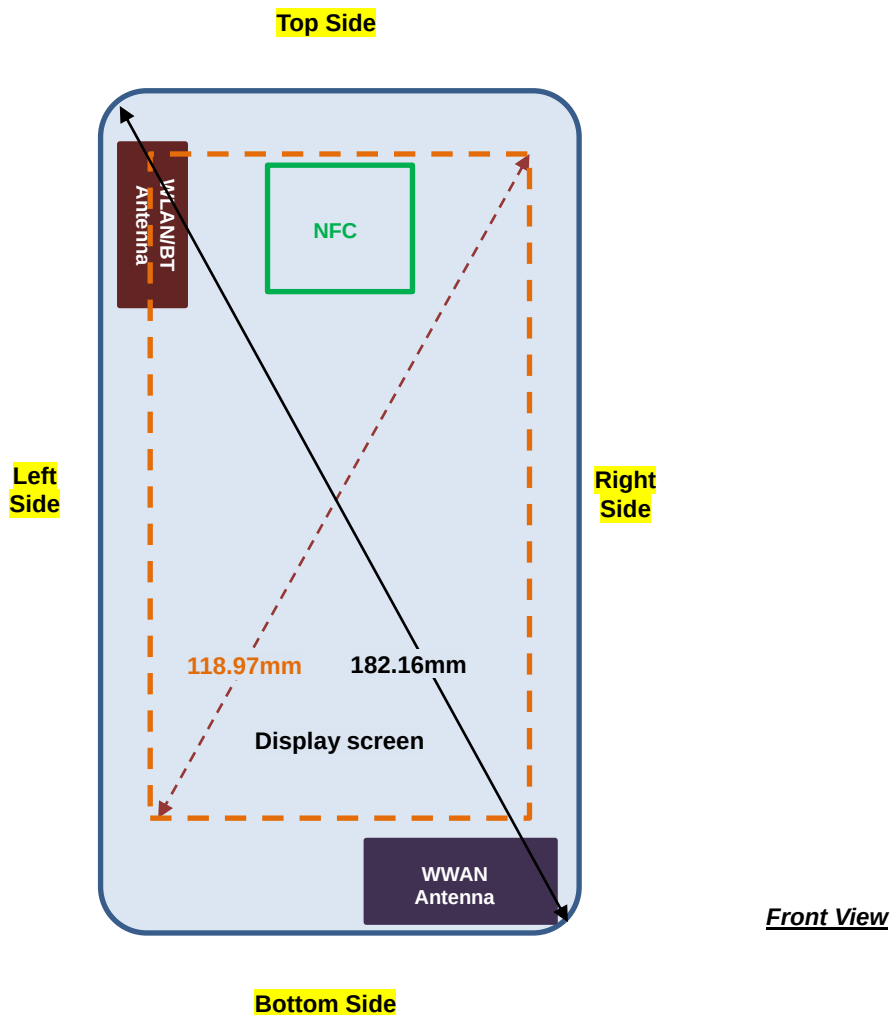
Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	11.86	9.92	9.90
	CH 39	2441	12.16	10.28	10.29
	CH 78	2480	12.21	10.30	10.26
Tune-up Limit			13.50	11.50	11.50

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
LE	CH 00	2402	2.67
	CH 19	2440	2.98
	CH 39	2480	2.82
Tune-up Limit			3.00

General Note:

- For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.

13. Antenna Location



Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	>25mm
BT&WLAN	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	>25mm	≤ 25mm

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	Yes	Yes	No	Yes	Yes	No
BT&WLAN	Yes	Yes	Yes	No	No	Yes

General Note:

- Referring to KDB 941225 D06 v02r01, when the overall device length and width are $\geq 9\text{cm} \times 5\text{cm}$, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge

14. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
 - c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - d. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
 - e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $63.3\%/62.9\% = 1.006$ is applied to scale-up the measured SAR result.
The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
 - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
 - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
5. For 5GHz WLAN product specific SAR is necessary too, due to an overall diagonal dimension is > 16 cm.

GSM Note:

1. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the the GPRS (2Tx slots) for GSM850 and GPRS (4Tx slots) for GSM1900 are considered as the primary mode.
2. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode, SAR measurement is not required for the secondary mode.

UMTS Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is $\leq \frac{1}{4}$ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than $\frac{1}{4}$ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B38 / B5 / B4 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE band 38 SAR test was covered by Band 41; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. The maximum output power, including tolerance, for the smaller band is $\leq$ the larger band to qualify for the SAR test exclusion.
 - b. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.

WLAN Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per KDB 248227 D01v02r02, U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band.
3. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
4. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.



14.1 Head SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS (2 Tx slots)	Right Cheek	0mm		189	836.4	30.33	32.00	1.469	0.01	0.188	0.276
	GSM850	GPRS (2 Tx slots)	Right Tilted	0mm		189	836.4	30.33	32.00	1.469	0.09	0.105	0.154
01	GSM850	GPRS (2 Tx slots)	Left Cheek	0mm		189	836.4	30.33	32.00	1.469	-0.05	0.235	0.345
	GSM850	GPRS (2 Tx slots)	Left Tilted	0mm		189	836.4	30.33	32.00	1.469	-0.12	0.115	0.169
	GSM850	GPRS (2 Tx slots)	Left Cheek	0mm	Handstrap	189	836.4	30.33	32.00	1.469	-0.14	0.232	0.341
02	GSM1900	GPRS (4 Tx slots)	Right Cheek	0mm		512	1850.2	24.70	26.00	1.349	-0.05	0.105	0.142
	GSM1900	GPRS (4 Tx slots)	Right Tilted	0mm		512	1850.2	24.70	26.00	1.349	-0.06	0.043	0.058
	GSM1900	GPRS (4 Tx slots)	Left Cheek	0mm		512	1850.2	24.70	26.00	1.349	0.11	0.053	0.071
	GSM1900	GPRS (4 Tx slots)	Left Tilted	0mm		512	1850.2	24.70	26.00	1.349	0.1	0.019	0.026
	GSM1900	GPRS (4 Tx slots)	Right Cheek	0mm	Handstrap	512	1850.2	24.70	26.00	1.349	0.05	0.070	0.094

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
03	WCDMA II	RMC 12.2Kbps	Right Cheek	0mm		9538	1907.6	21.44	21.50	1.014	0	0.159	0.161
	WCDMA II	RMC 12.2Kbps	Right Tilted	0mm		9538	1907.6	21.44	21.50	1.014	0.05	0.072	0.073
	WCDMA II	RMC 12.2Kbps	Left Cheek	0mm		9538	1907.6	21.44	21.50	1.014	0.02	0.139	0.141
	WCDMA II	RMC 12.2Kbps	Left Tilted	0mm		9538	1907.6	21.44	21.50	1.014	0.07	0.076	0.077
	WCDMA II	RMC 12.2Kbps	Right Cheek	0mm	Handstrap	9538	1907.6	21.44	21.50	1.014	0	0.153	0.155
	WCDMA V	RMC 12.2Kbps	Right Cheek	0mm		4182	836.4	22.69	24.00	1.352	0.14	0.147	0.199
	WCDMA V	RMC 12.2Kbps	Right Tilted	0mm		4182	836.4	22.69	24.00	1.352	0.03	0.087	0.118
04	WCDMA V	RMC 12.2Kbps	Left Cheek	0mm		4182	836.4	22.69	24.00	1.352	0.11	0.203	0.274
	WCDMA V	RMC 12.2Kbps	Left Tilted	0mm		4182	836.4	22.69	24.00	1.352	0.11	0.099	0.134
	WCDMA V	RMC 12.2Kbps	Left Cheek	0mm	Handstrap	4182	836.4	22.69	24.00	1.352	-0.16	0.201	0.272



<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
05	LTE Band 2	20M	QPSK	1	49	Right Cheek	0mm		19100	1900	22.50	22.50	1.000	0.07	0.177	0.177
	LTE Band 2	20M	QPSK	50	0	Right Cheek	0mm		18700	1860	21.26	21.50	1.057	0.11	0.129	0.136
	LTE Band 2	20M	QPSK	1	49	Right Tilted	0mm		19100	1900	22.50	22.50	1.000	0.15	0.071	0.071
	LTE Band 2	20M	QPSK	50	0	Right Tilted	0mm		18700	1860	21.26	21.50	1.057	0.01	0.064	0.068
	LTE Band 2	20M	QPSK	1	49	Left Cheek	0mm		19100	1900	22.50	22.50	1.000	0.08	0.139	0.139
	LTE Band 2	20M	QPSK	50	0	Left Cheek	0mm		18700	1860	21.26	21.50	1.057	0	0.084	0.089
	LTE Band 2	20M	QPSK	1	49	Left Tilted	0mm		19100	1900	22.50	22.50	1.000	0.08	0.058	0.058
	LTE Band 2	20M	QPSK	50	0	Left Tilted	0mm		18700	1860	21.26	21.50	1.057	-0.02	0.019	0.020
	LTE Band 2	20M	QPSK	1	49	Right Cheek	0mm	Handstrap	19100	1900	22.50	22.50	1.000	-0.18	0.162	0.162
06	LTE Band 4	20M	QPSK	1	49	Right Cheek	0mm		20175	1732.5	23.30	24.00	1.175	0.11	0.099	0.116
	LTE Band 4	20M	QPSK	50	0	Right Cheek	0mm		20175	1732.5	21.91	23.00	1.285	0.07	0.081	0.104
	LTE Band 4	20M	QPSK	1	49	Right Tilted	0mm		20175	1732.5	23.30	24.00	1.175	0.08	0.039	0.046
	LTE Band 4	20M	QPSK	50	0	Right Tilted	0mm		20175	1732.5	21.91	23.00	1.285	0.07	0.032	0.041
	LTE Band 4	20M	QPSK	1	49	Left Cheek	0mm		20175	1732.5	23.30	24.00	1.175	-0.06	0.046	0.054
	LTE Band 4	20M	QPSK	50	0	Left Cheek	0mm		20175	1732.5	21.91	23.00	1.285	0.14	0.038	0.049
	LTE Band 4	20M	QPSK	1	49	Left Tilted	0mm		20175	1732.5	23.30	24.00	1.175	-0.09	0.031	0.036
	LTE Band 4	20M	QPSK	50	0	Left Tilted	0mm		20175	1732.5	21.91	23.00	1.285	0.04	0.026	0.033
	LTE Band 4	20M	QPSK	1	49	Right Cheek	0mm	Handstrap	20175	1732.5	23.30	24.00	1.175	-0.07	0.096	0.113
	LTE Band 5	10M	QPSK	1	25	Right Cheek	0mm		20450	829	23.29	24.00	1.178	0.19	0.142	0.167
	LTE Band 5	10M	QPSK	25	12	Right Cheek	0mm		20450	829	22.18	23.00	1.208	0.11	0.111	0.134
	LTE Band 5	10M	QPSK	1	25	Right Tilted	0mm		20450	829	23.29	24.00	1.178	-0.13	0.090	0.106
	LTE Band 5	10M	QPSK	25	12	Right Tilted	0mm		20450	829	22.18	23.00	1.208	0.03	0.067	0.081
07	LTE Band 5	10M	QPSK	1	25	Left Cheek	0mm		20450	829	23.29	24.00	1.178	-0.14	0.158	0.186
	LTE Band 5	10M	QPSK	25	12	Left Cheek	0mm		20450	829	22.18	23.00	1.208	-0.08	0.128	0.155
	LTE Band 5	10M	QPSK	1	25	Left Tilted	0mm		20450	829	23.29	24.00	1.178	-0.1	0.073	0.086
	LTE Band 5	10M	QPSK	25	12	Left Tilted	0mm		20450	829	22.18	23.00	1.208	0.02	0.057	0.069
	LTE Band 5	10M	QPSK	1	25	Left Cheek	0mm	Handstrap	20450	829	23.29	24.00	1.178	-0.03	0.127	0.150
	LTE Band 7	20M	QPSK	1	49	Right Cheek	0mm		21100	2535	23.33	23.50	1.040	0.1	0.050	0.052
	LTE Band 7	20M	QPSK	50	50	Right Cheek	0mm		21100	2535	22.15	22.50	1.084	0.09	0.043	0.047
	LTE Band 7	20M	QPSK	1	49	Right Tilted	0mm		21100	2535	23.33	23.50	1.040	0.1	0.021	0.022
	LTE Band 7	20M	QPSK	50	50	Right Tilted	0mm		21100	2535	22.15	22.50	1.084	0.11	0.017	0.018
08	LTE Band 7	20M	QPSK	1	49	Left Cheek	0mm		21100	2535	23.33	23.50	1.040	0.12	0.080	0.083
	LTE Band 7	20M	QPSK	50	50	Left Cheek	0mm		21100	2535	22.15	22.50	1.084	-0.05	0.057	0.062
	LTE Band 7	20M	QPSK	1	49	Left Tilted	0mm		21100	2535	23.33	23.50	1.040	0.12	0.024	0.025
	LTE Band 7	20M	QPSK	50	50	Left Tilted	0mm		21100	2535	22.15	22.50	1.084	-0.06	0.018	0.020
	LTE Band 7	20M	QPSK	1	49	Left Cheek	0mm	Handstrap	21100	2535	23.33	23.50	1.040	0	0.073	0.076



<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	99	Right Cheek	0mm		40620	2593	23.28	24.00	1.180	62.9	1.006	0.1	0.016	0.019
	LTE Band 41	20M	QPSK	50	24	Right Cheek	0mm		40620	2593	22.40	23.00	1.148	62.9	1.006	0.14	0.021	0.024
	LTE Band 41	20M	QPSK	1	99	Right Tilted	0mm		40620	2593	23.28	24.00	1.180	62.9	1.006	0.14	0.004	0.005
	LTE Band 41	20M	QPSK	50	24	Right Tilted	0mm		40620	2593	22.40	23.00	1.148	62.9	1.006	0.18	0.006	0.007
	LTE Band 41	20M	QPSK	1	99	Left Cheek	0mm		40620	2593	23.28	24.00	1.180	62.9	1.006	0.01	0.028	0.033
09	LTE Band 41	20M	QPSK	50	24	Left Cheek	0mm		40620	2593	22.40	23.00	1.148	62.9	1.006	-0.07	0.030	0.035
	LTE Band 41	20M	QPSK	1	99	Left Tilted	0mm		40620	2593	23.28	24.00	1.180	62.9	1.006	-0.08	0.008	0.009
	LTE Band 41	20M	QPSK	50	24	Left Tilted	0mm		40620	2593	22.40	23.00	1.148	62.9	1.006	0.02	0.006	0.007
	LTE Band 41	20M	QPSK	50	24	Left Cheek	0mm	Handstrap	40620	2593	22.40	23.00	1.148	62.9	1.006	0.07	0.028	0.032

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
10	Bluetooth	1Mbps	Right Cheek	0mm		78	2480	12.21	13.50	1.346	0.09	0.079	0.106
	Bluetooth	1Mbps	Right Tilted	0mm		78	2480	12.21	13.50	1.346	0.1	0.031	0.042
	Bluetooth	1Mbps	Left Cheek	0mm		78	2480	12.21	13.50	1.346	0.16	0.031	0.042
	Bluetooth	1Mbps	Left Tilted	0mm		78	2480	12.21	13.50	1.346	0.1	0.015	0.020
	Bluetooth	1Mbps	Right Cheek	0mm	Handstrap	78	2480	12.21	13.50	1.346	0.14	0.078	0.105

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
11	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm		1	2412	17.69	18.00	1.073	97.63	1.024	-0.01	0.305	0.335
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	0mm		1	2412	17.69	18.00	1.073	97.63	1.024	0.1	0.147	0.162
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm		1	2412	17.69	18.00	1.073	97.63	1.024	0.06	0.155	0.170
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm		1	2412	17.69	18.00	1.073	97.63	1.024	-0.01	0.078	0.086
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Handstrap	1	2412	17.69	18.00	1.073	97.63	1.024	-0.04	0.301	0.331
12	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm		52	5260	14.99	15.00	1.002	87.26	1.146	0	0.396	0.455
	WLAN5GHz	802.11a 6Mbps	Right Tilted	0mm		52	5260	14.99	15.00	1.002	87.26	1.146	0.11	0.282	0.324
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm		52	5260	14.99	15.00	1.002	87.26	1.146	-0.13	0.210	0.241
	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm		52	5260	14.99	15.00	1.002	87.26	1.146	0.12	0.165	0.189
	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm	Handstrap	52	5260	14.99	15.00	1.002	87.26	1.146	0.15	0.356	0.409
13	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm		116	5580	14.99	15.00	1.002	87.26	1.146	-0.19	0.140	0.161
	WLAN5GHz	802.11a 6Mbps	Right Tilted	0mm		116	5580	14.99	15.00	1.002	87.26	1.146	0.13	0.098	0.113
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm		116	5580	14.99	15.00	1.002	87.26	1.146	-0.13	0.100	0.115
	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm		116	5580	14.99	15.00	1.002	87.26	1.146	-0.04	0.074	0.085
	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm	Handstrap	116	5580	14.99	15.00	1.002	87.26	1.146	-0.12	0.087	0.100
14	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm		165	5825	14.89	15.00	1.025	87.26	1.146	-0.12	0.108	0.127
	WLAN5GHz	802.11a 6Mbps	Right Tilted	0mm		165	5825	14.89	15.00	1.025	87.26	1.146	0.09	0.047	0.055
	WLAN5GHz	802.11a 6Mbps	Left Cheek	0mm		165	5825	14.89	15.00	1.025	87.26	1.146	-0.16	0.105	0.123
	WLAN5GHz	802.11a 6Mbps	Left Tilted	0mm		165	5825	14.89	15.00	1.025	87.26	1.146	-0.14	0.053	0.062
	WLAN5GHz	802.11a 6Mbps	Right Cheek	0mm	Handstrap	165	5825	14.89	15.00	1.025	87.26	1.146	-0.15	0.039	0.046

**14.2 Hotspot SAR****<GSM SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
15	GSM850	GPRS (2 Tx slots)	Front	10mm		189	836.4	30.33	32.00	1.469	0.03	0.456	0.670
	GSM850	GPRS (2 Tx slots)	Back	10mm		189	836.4	30.33	32.00	1.469	-0.1	0.461	0.677
	GSM850	GPRS (2 Tx slots)	Right Side	10mm		189	836.4	30.33	32.00	1.469	0.05	0.081	0.119
	GSM850	GPRS (2 Tx slots)	Bottom Side	10mm		189	836.4	30.33	32.00	1.469	0.05	0.265	0.389
	GSM850	GPRS (2 Tx slots)	Back	10mm	Handstrap	189	836.4	30.33	32.00	1.469	0.04	0.180	0.264
16	GSM1900	GPRS (4 Tx slots)	Front	10mm		512	1850.2	24.70	26.00	1.349	-0.01	0.215	0.290
	GSM1900	GPRS (4 Tx slots)	Back	10mm		512	1850.2	24.70	26.00	1.349	0.01	0.516	0.696
	GSM1900	GPRS (4 Tx slots)	Right Side	10mm		512	1850.2	24.70	26.00	1.349	0.06	0.106	0.143
	GSM1900	GPRS (4 Tx slots)	Bottom Side	10mm		512	1850.2	24.70	26.00	1.349	-0.08	0.273	0.368
	GSM1900	GPRS (4 Tx slots)	Back	10mm	Handstrap	512	1850.2	24.70	26.00	1.349	-0.04	0.446	0.602

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
17	WCDMA II	RMC 12.2Kbps	Front	10mm		9538	1907.6	21.44	21.50	1.014	0.04	0.411	0.417
	WCDMA II	RMC 12.2Kbps	Back	10mm		9538	1907.6	21.44	21.50	1.014	0.05	1.050	1.065
	WCDMA II	RMC 12.2Kbps	Back	10mm		9262	1852.4	21.40	21.50	1.023	-0.03	0.603	0.617
	WCDMA II	RMC 12.2Kbps	Back	10mm		9400	1880	21.42	21.50	1.019	-0.08	0.823	0.838
	WCDMA II	RMC 12.2Kbps	Right Side	10mm		9538	1907.6	21.44	21.50	1.014	-0.05	0.139	0.141
	WCDMA II	RMC 12.2Kbps	Bottom Side	10mm		9538	1907.6	21.44	21.50	1.014	-0.03	0.610	0.618
	WCDMA II	RMC 12.2Kbps	Back	10mm	Handstrap	9538	1907.6	21.44	21.50	1.014	0.07	0.260	0.264
18	WCDMA V	RMC 12.2Kbps	Front	10mm		4182	836.4	22.69	24.00	1.352	-0.01	0.408	0.552
	WCDMA V	RMC 12.2Kbps	Back	10mm		4182	836.4	22.69	24.00	1.352	-0.04	0.393	0.531
	WCDMA V	RMC 12.2Kbps	Right Side	10mm		4182	836.4	22.69	24.00	1.352	0.01	0.067	0.091
	WCDMA V	RMC 12.2Kbps	Bottom Side	10mm		4182	836.4	22.69	24.00	1.352	0.08	0.227	0.307
	WCDMA V	RMC 12.2Kbps	Front	10mm	Handstrap	4182	836.4	22.69	24.00	1.352	-0.01	0.380	0.514

**<FDD LTE SAR>**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20M	QPSK	1	49	Front	10mm		19100	1900	22.50	22.50	1.000	0.14	0.493	0.493
	LTE Band 2	20M	QPSK	50	0	Front	10mm		18700	1860	21.26	21.50	1.057	0.01	0.230	0.243
19	LTE Band 2	20M	QPSK	1	49	Back	10mm		19100	1900	22.50	22.50	1.000	0.17	1.160	1.160
	LTE Band 2	20M	QPSK	1	49	Back	10mm		18700	1860	22.49	22.50	1.002	0.13	0.777	0.779
	LTE Band 2	20M	QPSK	1	49	Back	10mm		18900	1880	22.38	22.50	1.028	0.05	1.070	1.100
	LTE Band 2	20M	QPSK	50	0	Back	10mm		18700	1860	21.26	21.50	1.057	-0.05	0.468	0.495
	LTE Band 2	20M	QPSK	100	0	Back	10mm		18900	1880	21.31	21.50	1.045	0.06	0.761	0.795
	LTE Band 2	20M	QPSK	1	49	Right Side	10mm		19100	1900	22.50	22.50	1.000	0.05	0.128	0.128
	LTE Band 2	20M	QPSK	50	0	Right Side	10mm		18700	1860	21.26	21.50	1.057	-0.02	0.114	0.120
	LTE Band 2	20M	QPSK	1	49	Bottom Side	10mm		19100	1900	22.50	22.50	1.000	0	0.772	0.772
	LTE Band 2	20M	QPSK	50	0	Bottom Side	10mm		18700	1860	21.26	21.50	1.057	0.06	0.393	0.415
	LTE Band 2	20M	QPSK	1	49	Back	10mm	Handstrap	19100	1900	22.50	22.50	1.000	-0.1	0.285	0.285
	LTE Band 4	20M	QPSK	1	49	Front	10mm		20175	1732.5	23.30	24.00	1.175	-0.14	0.191	0.224
	LTE Band 4	20M	QPSK	50	0	Front	10mm		20175	1732.5	21.91	23.00	1.285	0.09	0.154	0.198
20	LTE Band 4	20M	QPSK	1	49	Back	10mm		20175	1732.5	23.30	24.00	1.175	-0.07	0.398	0.468
	LTE Band 4	20M	QPSK	50	0	Back	10mm		20175	1732.5	21.91	23.00	1.285	0.12	0.329	0.423
	LTE Band 4	20M	QPSK	1	49	Right Side	10mm		20175	1732.5	23.30	24.00	1.175	0.08	0.160	0.188
	LTE Band 4	20M	QPSK	50	0	Right Side	10mm		20175	1732.5	21.91	23.00	1.285	0.07	0.131	0.168
	LTE Band 4	20M	QPSK	1	49	Bottom Side	10mm		20175	1732.5	23.30	24.00	1.175	0.06	0.269	0.316
	LTE Band 4	20M	QPSK	50	0	Bottom Side	10mm		20175	1732.5	21.91	23.00	1.285	-0.02	0.219	0.281
	LTE Band 4	20M	QPSK	1	49	Back	10mm	Handstrap	20175	1732.5	23.30	24.00	1.175	-0.1	0.385	0.452
21	LTE Band 5	10M	QPSK	1	25	Front	10mm		20450	829	23.29	24.00	1.178	-0.05	0.360	0.424
	LTE Band 5	10M	QPSK	25	12	Front	10mm		20450	829	22.18	23.00	1.208	-0.08	0.292	0.353
	LTE Band 5	10M	QPSK	1	25	Back	10mm		20450	829	23.29	24.00	1.178	-0.12	0.316	0.372
	LTE Band 5	10M	QPSK	25	12	Back	10mm		20450	829	22.18	23.00	1.208	-0.07	0.251	0.303
	LTE Band 5	10M	QPSK	1	25	Right Side	10mm		20450	829	23.29	24.00	1.178	-0.04	0.069	0.081
	LTE Band 5	10M	QPSK	25	12	Right Side	10mm		20450	829	22.18	23.00	1.208	0.05	0.056	0.068
	LTE Band 5	10M	QPSK	1	25	Bottom Side	10mm		20450	829	23.29	24.00	1.178	0.18	0.216	0.254
	LTE Band 5	10M	QPSK	25	12	Bottom Side	10mm		20450	829	22.18	23.00	1.208	-0.05	0.172	0.208
	LTE Band 5	10M	QPSK	1	25	Front	10mm	Handstrap	20450	829	23.29	24.00	1.178	-0.11	0.335	0.394
	LTE Band 7	20M	QPSK	1	49	Front	10mm		21100	2535	23.33	23.50	1.040	0.04	0.290	0.302
	LTE Band 7	20M	QPSK	50	50	Front	10mm		21100	2535	22.15	22.50	1.084	-0.02	0.230	0.249
22	LTE Band 7	20M	QPSK	1	49	Back	10mm		21100	2535	23.33	23.50	1.040	-0.16	0.617	0.642
	LTE Band 7	20M	QPSK	50	50	Back	10mm		21100	2535	22.15	22.50	1.084	0.06	0.491	0.532
	LTE Band 7	20M	QPSK	1	49	Right Side	10mm		21100	2535	23.33	23.50	1.040	0.02	0.080	0.083
	LTE Band 7	20M	QPSK	50	50	Right Side	10mm		21100	2535	22.15	22.50	1.084	0.01	0.061	0.066
	LTE Band 7	20M	QPSK	1	49	Bottom Side	10mm		21100	2535	23.33	23.50	1.040	0.02	0.580	0.603
	LTE Band 7	20M	QPSK	50	50	Bottom Side	10mm		21100	2535	22.15	22.50	1.084	-0.12	0.459	0.498
	LTE Band 7	20M	QPSK	1	49	Back	10mm	Handstrap	21100	2535	23.33	23.50	1.040	-0.02	0.542	0.564

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	99	Front	10mm		40620	2593	23.28	24.00	1.180	62.9	1.006	0.15	0.164	0.195
	LTE Band 41	20M	QPSK	50	24	Front	10mm		40620	2593	22.40	23.00	1.148	62.9	1.006	0.03	0.137	0.158
	LTE Band 41	20M	QPSK	1	99	Back	10mm		40620	2593	23.28	24.00	1.180	62.9	1.006	0.15	0.302	0.359
	LTE Band 41	20M	QPSK	50	24	Back	10mm		40620	2593	22.40	23.00	1.148	62.9	1.006	-0.13	0.249	0.288
	LTE Band 41	20M	QPSK	1	99	Right Side	10mm		40620	2593	23.28	24.00	1.180	62.9	1.006	0.04	0.032	0.038
	LTE Band 41	20M	QPSK	50	24	Right Side	10mm		40620	2593	22.40	23.00	1.148	62.9	1.006	0.11	0.026	0.030
23	LTE Band 41	20M	QPSK	1	99	Bottom Side	10mm		40620	2593	23.28	24.00	1.180	62.9	1.006	-0.11	0.316	0.375
	LTE Band 41	20M	QPSK	50	24	Bottom Side	10mm		40620	2593	22.40	23.00	1.148	62.9	1.006	-0.16	0.263	0.304
	LTE Band 41	20M	QPSK	1	99	Bottom Side	10mm	Handstrap	40620	2593	23.28	24.00	1.180	62.9	1.006	-0.12	0.285	0.338

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Front	10mm		78	2480	12.21	13.50	1.346	-0.01	0.015	0.020
	Bluetooth	1Mbps	Back	10mm		78	2480	12.21	13.50	1.346	0.15	0.010	0.013
24	Bluetooth	1Mbps	Left Side	10mm		78	2480	12.21	13.50	1.346	0.08	0.028	0.038
	Bluetooth	1Mbps	Top Side	10mm		78	2480	12.21	13.50	1.346	0.15	0.002	0.002
	Bluetooth	1Mbps	Left Side	10mm	Handstrap	78	2480	12.21	13.50	1.346	0.06	0.027	0.036

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm		1	2412	17.69	18.00	1.073	97.63	1.024	0.01	0.072	0.079
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm		1	2412	17.69	18.00	1.073	97.63	1.024	-0.14	0.061	0.067
25	WLAN2.4GHz	802.11b 1Mbps	Left Side	10mm		1	2412	17.69	18.00	1.073	97.63	1.024	-0.03	0.109	0.120
	WLAN2.4GHz	802.11b 1Mbps	Top Side	10mm		1	2412	17.69	18.00	1.073	97.63	1.024	0.14	0.041	0.045
	WLAN2.4GHz	802.11b 1Mbps	Left Side	10mm	Handstrap	1	2412	17.69	18.00	1.073	97.63	1.024	-0.19	0.095	0.104



14.3 Product Specific SAR

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WLAN5GHz	802.11a 6Mbps	Front	0mm		52	5260	14.99	15.00	1.002	87.26	1.146	-0.14	0.148	0.170
	WLAN5GHz	802.11a 6Mbps	Back	0mm		52	5260	14.99	15.00	1.002	87.26	1.146	-0.01	0.281	0.323
26	WLAN5GHz	802.11a 6Mbps	Left Side	0mm		52	5260	14.99	15.00	1.002	87.26	1.146	0.18	0.414	0.475
	WLAN5GHz	802.11a 6Mbps	Top Side	0mm		52	5260	14.99	15.00	1.002	87.26	1.146	-0.11	0.073	0.084
	WLAN5GHz	802.11a 6Mbps	Left Side	0mm	Handstrap	52	5260	14.99	15.00	1.002	87.26	1.146	0.19	0.404	0.464
	WLAN5GHz	802.11a 6Mbps	Front	0mm		116	5580	14.99	15.00	1.002	87.26	1.146	-0.15	0.104	0.119
	WLAN5GHz	802.11a 6Mbps	Back	0mm		116	5580	14.99	15.00	1.002	87.26	1.146	-0.04	0.171	0.196
27	WLAN5GHz	802.11a 6Mbps	Left Side	0mm		116	5580	14.99	15.00	1.002	87.26	1.146	0.11	0.292	0.335
	WLAN5GHz	802.11a 6Mbps	Top Side	0mm		116	5580	14.99	15.00	1.002	87.26	1.146	-0.16	0.014	0.016
	WLAN5GHz	802.11a 6Mbps	Left Side	0mm	Handstrap	116	5580	14.99	15.00	1.002	87.26	1.146	0.09	0.281	0.323
	WLAN5GHz	802.11a 6Mbps	Front	0mm		165	5825	14.89	15.00	1.025	87.26	1.146	-0.16	0.076	0.089
	WLAN5GHz	802.11a 6Mbps	Back	0mm		165	5825	14.89	15.00	1.025	87.26	1.146	-0.06	0.184	0.216
28	WLAN5GHz	802.11a 6Mbps	Left Side	0mm		165	5825	14.89	15.00	1.025	87.26	1.146	-0.15	0.284	0.334
	WLAN5GHz	802.11a 6Mbps	Top Side	0mm		165	5825	14.89	15.00	1.025	87.26	1.146	-0.03	0.021	0.025
	WLAN5GHz	802.11a 6Mbps	Left Side	0mm	Handstrap	165	5825	14.89	15.00	1.025	87.26	1.146	-0.09	0.258	0.303

14.4 Body Worn Accessory SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS (2 Tx slots)	Front	10mm		189	836.4	30.33	32.00	1.469	0.03	0.456	0.670
29	GSM850	GPRS (2 Tx slots)	Back	10mm		189	836.4	30.33	32.00	1.469	-0.1	0.461	0.677
	GSM850	GPRS (2 Tx slots)	Back	10mm	Handstrap	189	836.4	30.33	32.00	1.469	0.04	0.180	0.264
	GSM1900	GPRS (4 Tx slots)	Front	10mm		512	1850.2	24.70	26.00	1.349	-0.01	0.215	0.290
30	GSM1900	GPRS (4 Tx slots)	Back	10mm		512	1850.2	24.70	26.00	1.349	0.01	0.516	0.696
	GSM1900	GPRS (4 Tx slots)	Back	10mm	Handstrap	512	1850.2	24.70	26.00	1.349	-0.04	0.446	0.602

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA II	RMC 12.2Kbps	Front	10mm		9538	1907.6	21.44	21.50	1.014	0.04	0.411	0.417
31	WCDMA II	RMC 12.2Kbps	Back	10mm		9538	1907.6	21.44	21.50	1.014	0.05	1.050	1.065
	WCDMA II	RMC 12.2Kbps	Back	10mm		9262	1852.4	21.40	21.50	1.023	-0.03	0.603	0.617
	WCDMA II	RMC 12.2Kbps	Back	10mm		9400	1880	21.42	21.50	1.019	-0.08	0.823	0.838
	WCDMA II	RMC 12.2Kbps	Back	10mm	Handstrap	9538	1907.6	21.44	21.50	1.014	0.07	0.260	0.264
32	WCDMA V	RMC 12.2Kbps	Front	10mm		4182	836.4	22.69	24.00	1.352	-0.01	0.408	0.552
	WCDMA V	RMC 12.2Kbps	Back	10mm		4182	836.4	22.69	24.00	1.352	-0.04	0.393	0.531
	WCDMA V	RMC 12.2Kbps	Front	10mm	Handstrap	4182	836.4	22.69	24.00	1.352	-0.01	0.380	0.514

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20M	QPSK	1	49	Front	10mm		19100	1900	22.50	22.50	1.000	0.14	0.493	0.493
	LTE Band 2	20M	QPSK	50	0	Front	10mm		18700	1860	21.26	21.50	1.057	0.01	0.230	0.243
33	LTE Band 2	20M	QPSK	1	49	Back	10mm		19100	1900	22.50	22.50	1.000	0.17	1.160	1.160
	LTE Band 2	20M	QPSK	1	49	Back	10mm		18700	1860	22.49	22.50	1.002	0.13	0.777	0.779
	LTE Band 2	20M	QPSK	1	49	Back	10mm		18900	1880	22.38	22.50	1.028	0.05	1.070	1.100
	LTE Band 2	20M	QPSK	50	0	Back	10mm		18700	1860	21.26	21.50	1.057	-0.05	0.468	0.495
	LTE Band 2	20M	QPSK	100	0	Back	10mm		18900	1880	21.31	21.50	1.045	0.06	0.761	0.795
	LTE Band 2	20M	QPSK	1	49	Back	10mm	Handstrap	19100	1900	22.50	22.50	1.000	-0.1	0.285	0.285
	LTE Band 4	20M	QPSK	1	49	Front	10mm		20175	1732.5	23.30	24.00	1.175	-0.14	0.191	0.224
	LTE Band 4	20M	QPSK	50	0	Front	10mm		20175	1732.5	21.91	23.00	1.285	0.09	0.154	0.198
34	LTE Band 4	20M	QPSK	1	49	Back	10mm		20175	1732.5	23.30	24.00	1.175	-0.07	0.398	0.468
	LTE Band 4	20M	QPSK	50	0	Back	10mm		20175	1732.5	21.91	23.00	1.285	0.12	0.329	0.423
	LTE Band 4	20M	QPSK	1	49	Back	10mm	Handstrap	20175	1732.5	23.30	24.00	1.175	-0.1	0.385	0.452
35	LTE Band 5	10M	QPSK	1	25	Front	10mm		20450	829	23.29	24.00	1.178	-0.05	0.360	0.424
	LTE Band 5	10M	QPSK	25	12	Front	10mm		20450	829	22.18	23.00	1.208	-0.08	0.292	0.353
	LTE Band 5	10M	QPSK	1	25	Back	10mm		20450	829	23.29	24.00	1.178	-0.12	0.316	0.372
	LTE Band 5	10M	QPSK	25	12	Back	10mm		20450	829	22.18	23.00	1.208	-0.07	0.251	0.303
	LTE Band 5	10M	QPSK	1	25	Front	10mm	Handstrap	20450	829	23.29	24.00	1.178	-0.11	0.335	0.394
	LTE Band 7	20M	QPSK	1	49	Front	10mm		21100	2535	23.33	23.50	1.040	0.04	0.290	0.302
	LTE Band 7	20M	QPSK	50	50	Front	10mm		21100	2535	22.15	22.50	1.084	-0.02	0.230	0.249
36	LTE Band 7	20M	QPSK	1	49	Back	10mm		21100	2535	23.33	23.50	1.040	-0.16	0.617	0.642
	LTE Band 7	20M	QPSK	50	50	Back	10mm		21100	2535	22.15	22.50	1.084	0.06	0.491	0.532
	LTE Band 7	20M	QPSK	1	49	Back	10mm	Handstrap	21100	2535	23.33	23.50	1.040	-0.02	0.542	0.564

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1	99	Front	10mm		40620	2593	23.28	24.00	1.180	62.9	1.006	0.15	0.164	0.195
	LTE Band 41	20M	QPSK	50	24	Front	10mm		40620	2593	22.40	23.00	1.148	62.9	1.006	0.03	0.137	0.158
37	LTE Band 41	20M	QPSK	1	99	Back	10mm		40620	2593	23.28	24.00	1.180	62.9	1.006	0.15	0.302	0.359
	LTE Band 41	20M	QPSK	50	24	Back	10mm		40620	2593	22.40	23.00	1.148	62.9	1.006	-0.13	0.249	0.288
	LTE Band 41	20M	QPSK	1	99	Back	10mm	Handstrap	40620	2593	23.28	24.00	1.180	62.9	1.006	0	0.295	0.350

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
38	Bluetooth	1Mbps	Front	10mm		78	2480	12.21	13.50	1.346	-0.01	0.015	0.020
	Bluetooth	1Mbps	Back	10mm		78	2480	12.21	13.50	1.346	0.15	0.010	0.013
	Bluetooth	1Mbps	Front	10mm	Handstrap	78	2480	12.21	13.50	1.346	-0.04	0.013	0.017

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Handstrap	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
39	WLAN2.4GHz	802.11b 1Mbps	Front	10mm		1	2412	17.69	18.00	1.073	97.63	1.024	0.01	0.072	0.079
	WLAN2.4GHz	802.11b 1Mbps	Back	10mm		1	2412	17.69	18.00	1.073	97.63	1.024	-0.14	0.061	0.067
	WLAN2.4GHz	802.11b 1Mbps	Front	10mm	Handstrap	1	2412	17.69	18.00	1.073	97.63	1.024	-0.06	0.071	0.078
	WLAN5GHz	802.11a 6Mbps	Front	10mm		52	5260	14.99	15.00	1.002	87.26	1.146	-0.13	0.107	0.123
40	WLAN5GHz	802.11a 6Mbps	Back	10mm		52	5260	14.99	15.00	1.002	87.26	1.146	-0.13	0.319	0.366
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Handstrap	52	5260	14.99	15.00	1.002	87.26	1.146	-0.17	0.315	0.362
	WLAN5GHz	802.11a 6Mbps	Front	10mm		116	5580	14.99	15.00	1.002	87.26	1.146	-0.19	0.032	0.037
41	WLAN5GHz	802.11a 6Mbps	Back	10mm		116	5580	14.99	15.00	1.002	87.26	1.146	-0.04	0.254	0.292
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Handstrap	116	5580	14.99	15.00	1.002	87.26	1.146	-0.02	0.244	0.280
	WLAN5GHz	802.11a 6Mbps	Front	10mm		165	5825	14.89	15.00	1.025	87.26	1.146	-0.19	0.030	0.035
42	WLAN5GHz	802.11a 6Mbps	Back	10mm		165	5825	14.89	15.00	1.025	87.26	1.146	-0.05	0.358	0.421
	WLAN5GHz	802.11a 6Mbps	Back	10mm	Handstrap	165	5825	14.89	15.00	1.025	87.26	1.146	-0.04	0.344	0.404

14.5 Repeated SAR Measurement

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 2	20M	QPSK	1	49	Back	10mm	19100	1900	22.50	22.50	1.000	0.17	1.160		1.160
2nd	LTE Band 2	20M	QPSK	1	49	Back	10mm	19100	1900	22.50	22.50	1.000	0.04	1.120	1.04	1.120

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR < 1.45 W/kg, only one repeated measurement is required.
3. The ratio is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

15. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Portable Handset			
		Head	Body-worn	Hotspot	Product Specific
1.	GSM Voice + WLAN2.4GHz	Yes	Yes		Yes
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes	Yes
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes	Yes
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes	Yes
5.	GSM Voice + Bluetooth	Yes	Yes		Yes
6.	GPRS/EDGE + Bluetooth	Yes	Yes	Yes	Yes
7.	WCDMA+ Bluetooth	Yes	Yes	Yes	Yes
8.	LTE + Bluetooth	Yes	Yes	Yes	Yes
9.	GSM Voice + WLAN5GHz	Yes	Yes		Yes
10.	GPRS/EDGE + WLAN5GHz	Yes	Yes		Yes
11.	WCDMA + WLAN5GHz	Yes	Yes		Yes
12.	LTE + WLAN5GHz	Yes	Yes		Yes

General Note:

1. This device WLAN 2.4GHz supports Hotspot operation and Bluetooth support tethering applications.
2. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3. All licensed modes share the same antenna part and cannot transmit simultaneously
4. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
5. The Scaled SAR summation is calculated based on the same configuration and test position.
6. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - i) Scalar SAR summation < 1.6W/kg.
 - ii) $SPLSR = (SAR1 + SAR2)^{1.5} / (\min. \text{ separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - iii) If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

15.1 Head Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth			
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Right Cheek	0.276	0.335	0.455	0.106	0.611	0.731	0.382
		Right Tilted	0.154	0.162	0.324	0.042	0.316	0.478	0.196
		Left Cheek	0.345	0.170	0.241	0.042	0.515	0.586	0.387
		Left Tilted	0.169	0.086	0.189	0.020	0.255	0.358	0.189
	GSM1900	Right Cheek	0.142	0.335	0.455	0.106	0.477	0.597	0.248
		Right Tilted	0.058	0.162	0.324	0.042	0.220	0.382	0.100
		Left Cheek	0.071	0.170	0.241	0.042	0.241	0.312	0.113
		Left Tilted	0.026	0.086	0.189	0.020	0.112	0.215	0.046
WCDMA	WCDMA II	Right Cheek	0.161	0.335	0.455	0.106	0.496	0.616	0.267
		Right Tilted	0.073	0.162	0.324	0.042	0.235	0.397	0.115
		Left Cheek	0.141	0.170	0.241	0.042	0.311	0.382	0.183
		Left Tilted	0.077	0.086	0.189	0.020	0.163	0.266	0.097
	WCDMA V	Right Cheek	0.199	0.335	0.455	0.106	0.534	0.654	0.305
		Right Tilted	0.118	0.162	0.324	0.042	0.280	0.442	0.160
		Left Cheek	0.274	0.170	0.241	0.042	0.444	0.515	0.316
		Left Tilted	0.134	0.086	0.189	0.020	0.220	0.323	0.154
LTE	LTE Band 2	Right Cheek	0.177	0.335	0.455	0.106	0.512	0.632	0.283
		Right Tilted	0.071	0.162	0.324	0.042	0.233	0.395	0.113
		Left Cheek	0.139	0.170	0.241	0.042	0.309	0.380	0.181
		Left Tilted	0.058	0.086	0.189	0.020	0.144	0.247	0.078
	LTE Band 4	Right Cheek	0.116	0.335	0.455	0.106	0.451	0.571	0.222
		Right Tilted	0.046	0.162	0.324	0.042	0.208	0.370	0.088
		Left Cheek	0.054	0.170	0.241	0.042	0.224	0.295	0.096
		Left Tilted	0.036	0.086	0.189	0.020	0.122	0.225	0.056
	LTE Band 5	Right Cheek	0.167	0.335	0.455	0.106	0.502	0.622	0.273
		Right Tilted	0.106	0.162	0.324	0.042	0.268	0.430	0.148
		Left Cheek	0.186	0.170	0.241	0.042	0.356	0.427	0.228
		Left Tilted	0.086	0.086	0.189	0.020	0.172	0.275	0.106
	LTE Band 7	Right Cheek	0.052	0.335	0.455	0.106	0.387	0.507	0.158
		Right Tilted	0.022	0.162	0.324	0.042	0.184	0.346	0.064
		Left Cheek	0.083	0.170	0.241	0.042	0.253	0.324	0.125
		Left Tilted	0.025	0.086	0.189	0.020	0.111	0.214	0.045
	LTE Band 41	Right Cheek	0.024	0.335	0.455	0.106	0.359	0.479	0.130
		Right Tilted	0.007	0.162	0.324	0.042	0.169	0.331	0.049
		Left Cheek	0.035	0.170	0.241	0.042	0.205	0.276	0.077
		Left Tilted	0.009	0.086	0.189	0.020	0.095	0.198	0.029

15.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN 1g SAR (W/kg)	2.4GHz WLAN 1g SAR (W/kg)	Bluetooth 1g SAR (W/kg)		
GSM	GSM850	Front	0.670	0.079	0.020	0.749	0.690
		Back	0.677	0.067	0.013	0.744	0.690
		Left side		0.120	0.038	0.120	0.038
		Right side	0.119			0.119	0.119
		Top side		0.045	0.002	0.045	0.002
		Bottom side	0.389			0.389	0.389
	GSM1900	Front	0.290	0.079	0.020	0.369	0.310
		Back	0.696	0.067	0.013	0.763	0.709
		Left side		0.120	0.038	0.120	0.038
		Right side	0.143			0.143	0.143
		Top side		0.045	0.002	0.045	0.002
		Bottom side	0.368			0.368	0.368
WCDMA	WCDMA II	Front	0.417	0.079	0.020	0.496	0.437
		Back	1.065	0.067	0.013	1.132	1.078
		Left side		0.120	0.038	0.120	0.038
		Right side	0.141			0.141	0.141
		Top side		0.045	0.002	0.045	0.002
		Bottom side	0.618			0.618	0.618
	WCDMA V	Front	0.552	0.079	0.020	0.631	0.572
		Back	0.531	0.067	0.013	0.598	0.544
		Left side		0.120	0.038	0.120	0.038
		Right side	0.091			0.091	0.091
		Top side		0.045	0.002	0.045	0.002
		Bottom side	0.307			0.307	0.307



WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN 1g SAR (W/kg)	2.4GHz WLAN 1g SAR (W/kg)	Bluetooth 1g SAR (W/kg)		
LTE	LTE Band 2	Front	0.493	0.079	0.020	0.572	0.513
		Back	1.160	0.067	0.013	1.227	1.173
		Left side		0.120	0.038	0.120	0.038
		Right side	0.128			0.128	0.128
		Top side		0.045	0.002	0.045	0.002
		Bottom side	0.772			0.772	0.772
	LTE Band 4	Front	0.224	0.079	0.020	0.303	0.244
		Back	0.468	0.067	0.013	0.535	0.481
		Left side		0.120	0.038	0.120	0.038
		Right side	0.188			0.188	0.188
		Top side		0.045	0.002	0.045	0.002
		Bottom side	0.316			0.316	0.316
	LTE Band 5	Front	0.424	0.079	0.020	0.503	0.444
		Back	0.372	0.067	0.013	0.439	0.385
		Left side		0.120	0.038	0.120	0.038
		Right side	0.081			0.081	0.081
		Top side		0.045	0.002	0.045	0.002
		Bottom side	0.254			0.254	0.254
	LTE Band 7	Front	0.302	0.079	0.020	0.381	0.322
		Back	0.642	0.067	0.013	0.709	0.655
		Left side		0.120	0.038	0.120	0.038
		Right side	0.083			0.083	0.083
		Top side		0.045	0.002	0.045	0.002
		Bottom side	0.603			0.603	0.603
	LTE Band 41	Front	0.195	0.079	0.020	0.274	0.215
		Back	0.359	0.067	0.013	0.426	0.372
		Left side		0.120	0.038	0.120	0.038
		Right side	0.038			0.038	0.038
		Top side		0.045	0.002	0.045	0.002
		Bottom side	0.375			0.375	0.375

15.3 Body-Worn Accessory Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth			
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)			
GSM	GSM850	Front	0.670	0.079	0.123	0.020	0.749	0.793	0.690
		Back	0.677	0.067	0.421	0.013	0.744	1.098	0.690
	GSM1900	Front	0.290	0.079	0.123	0.020	0.369	0.413	0.310
		Back	0.696	0.067	0.421	0.013	0.763	1.117	0.709
WCDMA	WCDMA II	Front	0.417	0.079	0.123	0.020	0.496	0.540	0.437
		Back	1.065	0.067	0.421	0.013	1.132	1.486	1.078
	WCDMA V	Front	0.552	0.079	0.123	0.020	0.631	0.675	0.572
		Back	0.531	0.067	0.421	0.013	0.598	0.952	0.544
LTE	LTE Band 2	Front	0.493	0.079	0.123	0.020	0.572	0.616	0.513
		Back	1.160	0.067	0.421	0.013	1.227	1.581	1.173
	LTE Band 4	Front	0.224	0.079	0.123	0.020	0.303	0.347	0.244
		Back	0.468	0.067	0.421	0.013	0.535	0.889	0.481
	LTE Band 5	Front	0.424	0.079	0.123	0.020	0.503	0.547	0.444
		Back	0.372	0.067	0.421	0.013	0.439	0.793	0.385
	LTE Band 7	Front	0.302	0.079	0.123	0.020	0.381	0.425	0.322
		Back	0.642	0.067	0.421	0.013	0.709	1.063	0.655
	LTE Band 41	Front	0.195	0.079	0.123	0.020	0.274	0.318	0.215
		Back	0.359	0.067	0.421	0.013	0.426	0.780	0.372

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16. Uncertainty Assessment

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be $\leq 30\%$, for a confidence interval of $k = 2$. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg. Therefore, the measurement uncertainty table is not required in this report.

17. References

- [1] FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"
- [2] ANSI/IEEE Std. C95.1-1992, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", September 1992
- [3] 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", Sep 2013
- [4] SPEAG DASY System Handbook
- [5] FCC KDB 248227 D01 v02r02, "SAR Guidance for IEEE 802.11 (WiFi) Transmitters", Oct 2015.
- [6] FCC KDB 447498 D01 v06, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", Oct 2015
- [7] FCC KDB 648474 D04 v01r03, "SAR Evaluation Considerations for Wireless Handsets", Oct 2015.
- [8] FCC KDB 941225 D01 v03r01, "3G SAR MEAUREMENT PROCEDURES", Oct 2015
- [9] FCC KDB 941225 D05 v02r05, "SAR Evaluation Considerations for LTE Devices", Dec 2015
- [10] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.
- [11] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [12] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.