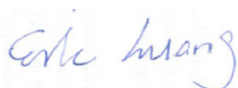


FCC SAR Test Report

APPLICANT : BlackBerry Ltd.
EQUIPMENT : GSM Quad-band / UMTS Penta-band /
LTE Deca-band mobile phone
BRAND NAME : BlackBerry
MODEL NAME : STH100-2 (RJD211LW)
FCC ID : L6ARLD210LW
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 / Deputy 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.)



Table of Contents

1. Statement of Compliance	4
2. Administration Data	5
3. Guidance Standard	5
4. Equipment Under Test (EUT) Information.....	6
4.1 General Information	6
4.2 Accessories and Support Equipment	7
4.3 General LTE SAR Test and Reporting Considerations	8
5. RF Exposure Limits.....	11
5.1 Uncontrolled Environment.....	11
5.2 Controlled Environment.....	11
6. Specific Absorption Rate (SAR).....	12
6.1 Introduction	12
6.2 SAR Definition.....	12
7. System Description and Setup	13
7.1 E-Field Probe	14
7.2 Data Acquisition Electronics (DAE)	14
7.3 Phantom.....	15
7.4 Device Holder.....	16
8. Measurement Procedures	17
8.1 Spatial Peak SAR Evaluation.....	17
8.2 Power Reference Measurement.....	18
8.3 Area Scan	18
8.4 Zoom Scan.....	19
8.5 Volume Scan Procedures.....	19
8.6 Power Drift Monitoring.....	19
9. Test Equipment List.....	20
10. System Verification	22
10.1 Tissue Verification	22
10.2 System Performance Check Results.....	23
11. RF Exposure Positions	24
11.1 Ear and handset reference point	24
11.2 Definition of the cheek position.....	25
11.3 Definition of the tilt position.....	26
11.4 Body Worn Accessory	27
11.5 Wireless Router.....	27
12. Conducted RF Output Power (Unit: dBm).....	28
13. Bluetooth Exclusions Applied	64
14. Antenna Location	65
15. SAR Test Results	66
15.1 Head SAR	68
15.2 Hotspot SAR	73
15.3 Body Worn Accessory SAR.....	79
15.4 Repeated SAR Measurement	82
16. Simultaneous Transmission Analysis.....	83
16.1 Head Exposure Conditions	84
16.2 Hotspot Exposure Conditions.....	85
16.3 Body-Worn Accessory Exposure Conditions	87
17. Uncertainty Assessment	88
18. References.....	91
Appendix A. Plots of System Performance Check	
Appendix B. Plots of High SAR Measurement	
Appendix C. DASY Calibration Certificate	
Appendix D. Test Setup Photos	



Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA642912	Rev. 01	Initial issue of report	Jul. 14, 2016

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **BlackBerry Ltd., GSM Quad-band / UMTS Penta-band / LTE Deca-band mobile phone, STH100-2 (RJD211LW)** are as follows.

Equipment Class	Frequency Band		Highest 1g SAR Summary			Highest Simultaneous Transmission 1g SAR (W/kg)
			Head (Separation 0mm)	Body-worn (Separation 15mm)	Hotspot (Separation 10mm)	
			1g SAR (W/kg)			
Licensed	GSM	GSM850	0.26	0.41	0.51	1.23
		GSM1900	0.19	0.26	1.13	
	WCDMA	Band V	0.18	0.30	0.41	
		Band II	0.25	0.63	1.15	
	LTE	Band 2	0.30	0.52	0.93	
		Band 7	0.10	0.60	1.05	
		Band 38	<0.10	0.38	0.89	
		Band 41	<0.10	0.36	0.79	
DTS	WLAN	2.4GHz WLAN	0.73	<0.10	0.26	1.23
NII		5GHz WLAN	0.30	0.10	0.12	1.15
DSS	2.4GHz Band	Bluetooth	<0.10			0.83
Date of Testing:			2016/05/27~ 2016/07/13			

Note: The SAR value list above are all rounded to two decimal digits.

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

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	BlackBerry Ltd.
Address	2200 University Ave E., Waterloo, ON, CAN. N2K0A7

Manufacturer	
Company Name	TCL Communication Ltd
Address	5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203

3. Guidance Standard

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 D05A Rel.10 LTE SAR Test Guidance v01r02
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	GSM Quad-band / UMTS Penta-band / LTE Deca-band mobile phone
Brand Name	BlackBerry
Model Name	STH100-2 (RJD211LW)
FCC ID	L6ARLD210LW
IMEI Code	004402243119868
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 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2557.5 MHz ~ 2652.5 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2472 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 · HSPA+ (16QAM uplink is not supported) · LTE: QPSK, 16QAM · 802.11b/g/n HT20 · 802.11a/n HT20/HT40 · 802.11ac VHT20/VHT40/VHT80 · Bluetooth v3.0+EDR, Bluetooth v4.0 LE, Bluetooth v4.2 LE · NFC:ASK
HW Version	PIO
SW Version	AAF155
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	Identical Prototype
Remark: 802.11n-HT40 is not supported in 2.4GHz WLAN. - This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation. - This device supports GPRS/EGPRS mode up to multi-slot class 33. - This device does not support DTM operation. - This device 2.4GHz WLAN supports Hotspot operation, and 5.2GHz/ 5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only). - When hotspot mode is enabled, power reduction will be activated and limited to GSM1900 / WCDMA Band II / LTE Band2/7/38/41. - This device has 2 batteries, we chose battery #1 to evaluate full SAR test, and battery #2 verified the worst cases of battery #1.	

4.2 Accessories and Support Equipment

Specification of Accessory				
AC Adapter	Brand Name	N/A	Model Name	UC13US
	Power Rating	I/P: 100 - 240Vac 0.5A, O/P:5V 2.0A		
	Manufacturer	BYD		
	S/N	CBA0059AG4C1		
Battery 1	Brand Name	N/A	Model Name	TLp026EJ
	Power Rating	3.85V 2610mAh		
	Manufacturer	COSLIGHT		
	P/N	C2610010CJ		
Battery 2	Brand Name	N/A	Model Name	TLp026E2
	Power Rating	3.84V 2610mAh		
	Manufacturer	SCUD		
	P/N	C2610011C2		
USB Cable 1	Brand Name	NA	Model Name	NA
	Signal Line Type	1.0 meter, shielded cable, without ferrite core		
	P/N	CDA0000043C8		
USB Cable 2	Brand Name	NA	Model Name	NA
	Signal Line Type	1.0 meter, shielded cable, without ferrite core		
	P/N	CDA0000043C2		
Earphone	Brand Name	NA	Model Name	NA
	Signal Line Type	1.25 meter, non-shielded cable, without ferrite core		
	P/N	CCB0045A15C3		

4.3 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05								
FCC ID	L6ARLD210LW							
Equipment Name	GSM Quad-band / UMTS Penta-band / LTE Deca-band mobile phone							
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2557.5 MHz ~ 2652.5 MHz							
Channel Bandwidth	LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz							
uplink modulations used	QPSK, and 16QAM							
LTE Voice / Data requirements	Voice and Data							
LTE MPR permanently built-in by design	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3							
	Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
		1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
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.							
Power reduction applied to satisfy SAR compliance	1. Yes, when operating in hotspot mode that GSM1900 / WCDMA Band II / LTE Band2/7/38/41 power reduction applied to satisfy SAR compliance.							
LTE Release	R10, Cat 6							
CA Support	Yes							
LTE Carrier Aggregation Combinations	Inter-Band and Intra-Band possible combinations as below page and the detail power verification please referred to page55-56.							
LTE Carrier Aggregation Additional Information	This device does not support full CA features on 3GPP Release 10. It supports a maximum of 2 carriers in the downlink only. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. Due to carrier capability, only the combinations listed above are supported. The following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.							

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 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	40265	2557.5	40290	2560	40315	2562.5	40340	2565				
L-M	40581	2589.1	40590	2590	40598	2590.8	40607	2591.7				
M	40897	2620.7	40890	2620	40881	2619.1	40874	2618.4				
H	41215	2652.5	41190	2650	41165	2647.5	41140	2645				

LTE Carrier Aggregation Combinations									
Inter-Band Combinations				Intra-Band Combinations					
(PCC) B7	(SCC) B20	(PCC) B7	(SCC) B28	(PCC) B7	(SCC) B7	(PCC) B38	(SCC) B38	(PCC) B41	(SCC) B41
20M+20M		20M+15M		20M+20M		20M+20M		20M+20M	
20M+15M		20M+10M		20M+15M		20M+15M		20M+15M	
20M+10M		20M+5M		20M+10M				20M+10M	
20M+5M		15M+15M		15M+20M				20M+5M	
15M+20M		15M+10M		15M+15M				15M+20M	
15M+15M		15M+5M		10M+20M				15M+15M	
15M+10M		10M+15M						10M+20M	
15M+5M		10M+10M						5M+20M	
10M+20M		10M+5M							
10M+15M		5M+15M							
10M+10M		5M+10M							
10M+5M		5M+5M							

General Note:

1. This device supports LTE Carrier Aggregation (CA) in the downlink only.

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:

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

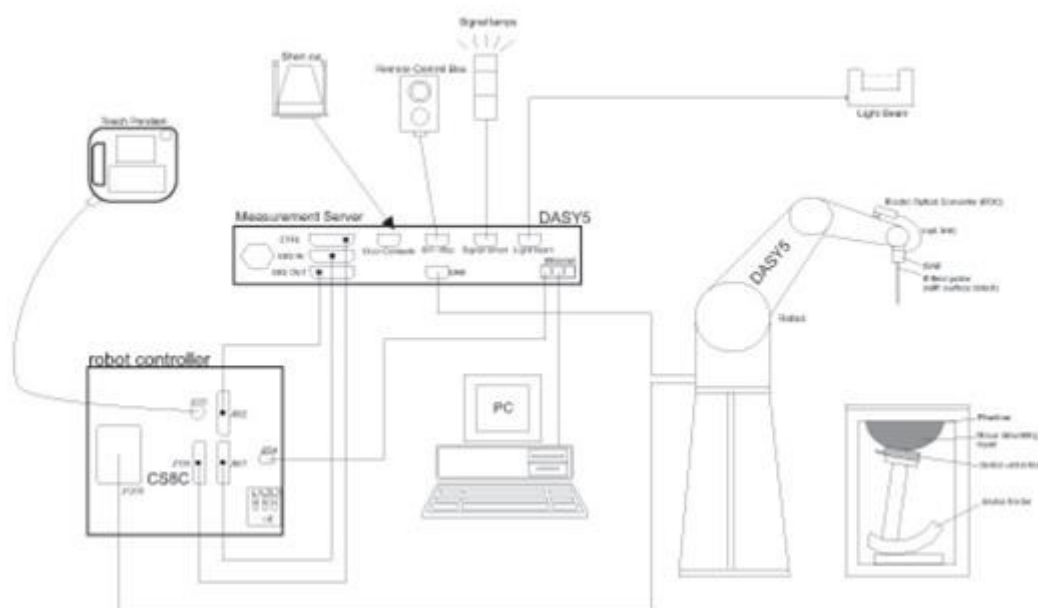
SAR is expressed in units of Watts per kilogram (W/kg)

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

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.

<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>

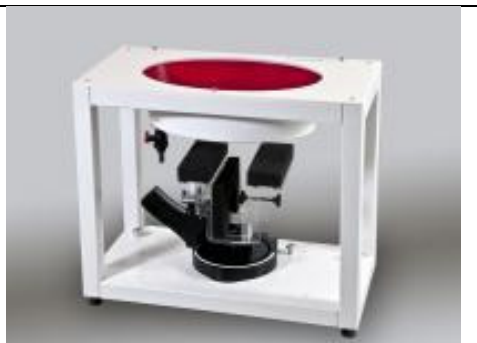
Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom



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 dB0) 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	4d091	2015/11/24	2016/11/23
SPEAG	1900MHz System Validation Kit	D1900V2	5d118	2015/11/23	2016/11/22
SPEAG	2450MHz System Validation Kit	D2450V2	840	2015/11/25	2016/11/24
SPEAG	2600MHz System Validation Kit	D2600V2	1061	2015/11/25	2016/11/24
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	2015/11/26	2016/11/25
SPEAG	Data Acquisition Electronics	DAE4	1279	2016/4/4	2017/4/3
SPEAG	Data Acquisition Electronics	DAE4	905	2015/7/16	2016/7/15
SPEAG	Data Acquisition Electronics	DAE4	917	2015/12/14	2016/12/13
SPEAG	Data Acquisition Electronics	DAE4	1210	2016/05/18	2017/05/17
SPEAG	Dosimetric E-Field Probe	EX3DV4	3801	2015/6/19	2016/6/18
SPEAG	Dosimetric E-Field Probe	EX3DV4	3954	2015/11/27	2016/11/26
SPEAG	Dosimetric E-Field Probe	EX3DV4	3661	2016/5/11	2017/5/10
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1477	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1479	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1644	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1542	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201300654	2015/8/10	2016/8/9
Agilent	Wireless Communication Test Set	E5515C	MY52102706	2016/4/22	2017/4/21
Agilent	ENA Series Network Analyzer	E5071C	MY46111157	2016/4/22	2017/4/21
SPEAG	DAK Kit	DAK3.5	1144	2015/11/24	2016/11/23
R&S	Signal Generator	SMBV100A	258305	2016/1/20	2017/1/19
Anritsu	Power Sensor	MA2411B	0917070	2016/1/20	2017/1/19
Anritsu	Power Meter	ML2495A	1005002	2016/1/20	2017/1/19
Anritsu	Power Sensor	MA2411B	1339163	2016/1/20	2017/1/19
Anritsu	Power Meter	ML2495A	1435004	2016/1/20	2017/1/19
R&S	Spectrum Analyzer	FSV7	101631	2015/8/10	2016/8/9
ARRA	Power Divider	A3200-2	N/A	Note1	
MCL	Attenuation1	BW-S10W5+	N/A	Note1	
MCL	Attenuation2	BW-S10W5+	N/A	Note1	
MCL	Attenuation3	BW-S10W5+	N/A	Note1	
AR	Amplifier	5S1G4	333096	Note1	
mini-circuits	Amplifier	ZVE-3W-83+	162601250	Note1	
Agilent	Dual Directional Coupler	778D	50422	Note1	
PASTERNAK	Dual Directional Coupler	PE2214-10	N/A	Note1	



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 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								
835	40.3	57.9	0.2	1.4	0.2	0	0.90	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								
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
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	Head	22.8	0.918	42.139	0.90	41.50	2.00	1.54	±5	2016.6.11
1900	Head	22.7	1.416	40.540	1.40	40.00	1.14	1.35	±5	2016.5.27
2450	Head	22.5	1.822	37.986	1.80	39.20	1.22	-3.10	±5	2016.6.8
2450	Head	22.6	1.820	39.225	1.80	39.20	1.11	0.06	±5	2016.7.13
2600	Head	22.5	1.981	38.254	1.96	39.00	1.07	-1.91	±5	2016.5.28
5250	Head	22.6	4.873	35.366	4.71	35.95	3.46	-1.62	±5	2016.6.6
5600	Head	22.6	5.230	34.700	5.07	35.50	3.16	-2.25	±5	2016.6.6
5750	Head	22.6	5.389	34.463	5.23	35.35	3.04	-2.51	±5	2016.6.6
835	Body	22.8	1.000	53.704	0.97	55.20	3.09	-2.71	±5	2016.6.9
1900	Body	22.7	1.558	52.841	1.52	53.30	2.50	-0.86	±5	2016.6.10
2450	Body	22.5	1.989	51.422	1.95	52.70	2.00	-2.43	±5	2016.6.14
2600	Body	22.5	2.132	52.902	2.16	52.50	-1.30	0.77	±5	2016.6.13
5250	Body	22.6	5.433	48.099	5.36	48.95	1.36	-1.74	±5	2016.6.11
5600	Body	22.6	5.932	47.427	5.77	48.50	2.81	-2.21	±5	2016.6.11
5750	Body	22.6	6.160	47.112	5.95	48.27	3.53	-2.40	±5	2016.6.11

10.2 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 (%)
2016.6.11	835	Head	250	4d091	3954	905	2.44	9.14	9.76	6.78
2016.5.27	1900	Head	250	5d118	3801	917	10.2	39.4	40.8	3.55
2016.6.8	2450	Head	250	840	3661	917	12.8	50.4	51.2	1.59
2016.7.13	2450	Head	250	840	3954	1210	12.7	50.4	50.8	0.79
2016.5.28	2600	Head	250	1061	3801	917	14.5	58.1	58	-0.17
2016.6.6	5250	Head	100	1113	3954	905	7.93	80.7	79.3	-1.73
2016.6.6	5600	Head	100	1113	3954	905	8.81	83.7	88.1	5.26
2016.6.6	5750	Head	100	1113	3954	905	7.81	80.8	78.1	-3.34
2016.6.9	835	Body	250	4d091	3954	905	2.52	9.55	10.08	5.55
2016.6.10	1900	Body	250	5d118	3801	917	10.5	40.6	42	3.45
2016.6.14	2450	Body	250	840	3954	1279	12.8	51.1	51.2	0.20
2016.6.13	2600	Body	250	1061	3661	917	12.7	54.6	50.8	-6.96
2016.6.11	5250	Body	100	1113	3954	905	7.76	76.5	77.6	1.44
2016.6.11	5600	Body	100	1113	3954	905	8.16	82.4	81.6	-0.97
2016.6.11	5750	Body	100	1113	3954	905	7.45	76.6	74.5	-2.74

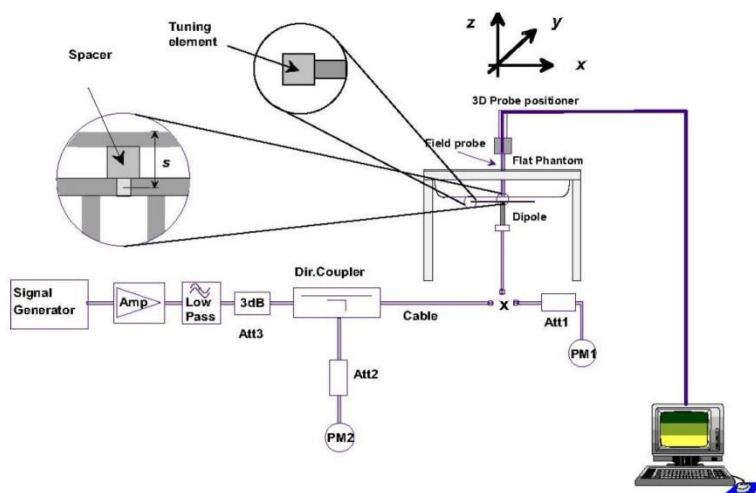


Fig 8.3.1 System Performance Check Setup



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.

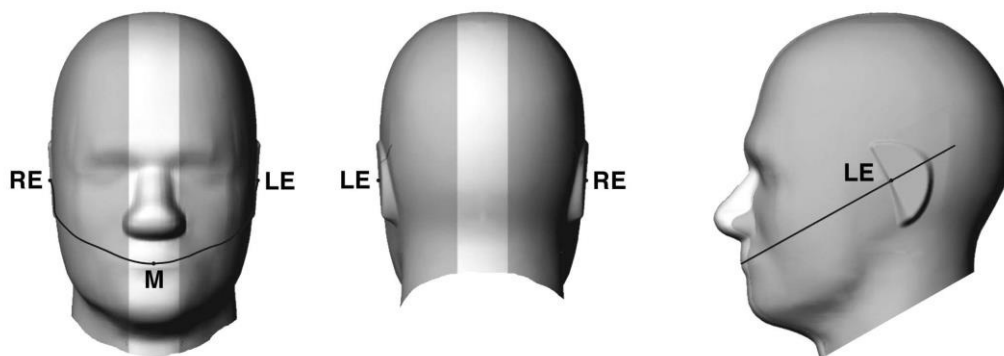


Fig 9.1.1 Front, back, and side views of SAM twin phantom

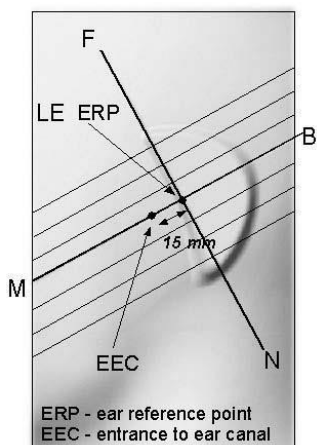


Fig 9.1.2 Close-up side view of phantom showing the ear region.

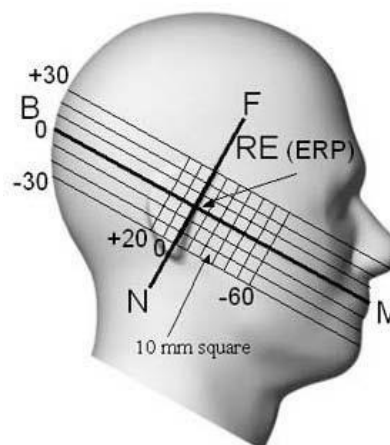


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

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.

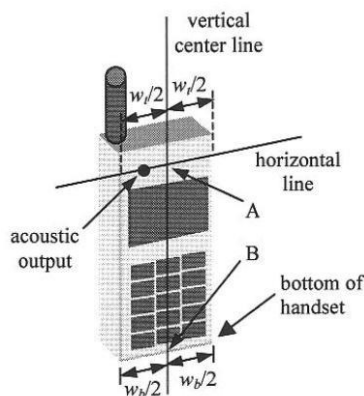


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case"

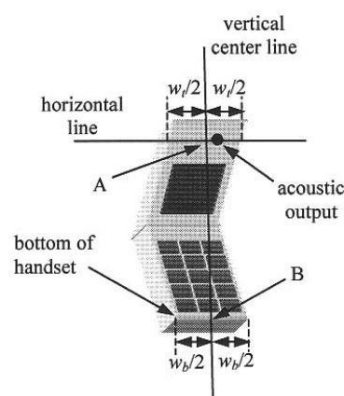


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

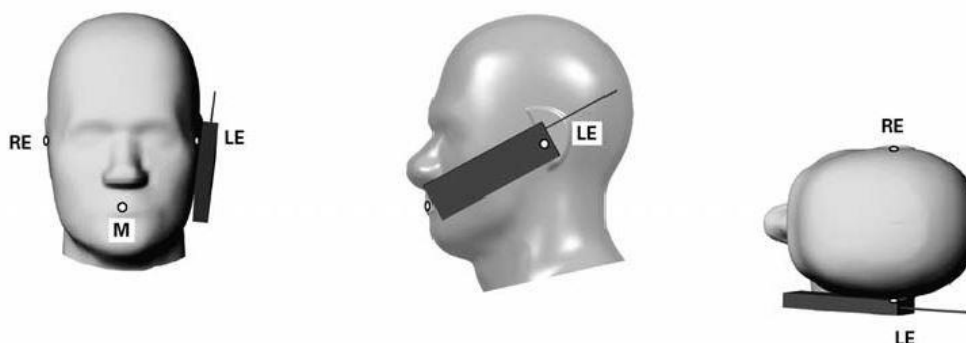


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

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

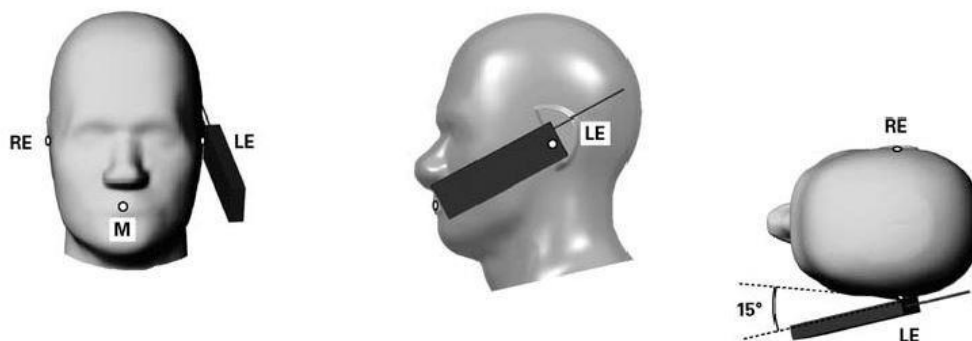


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

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 headset 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 tested 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.

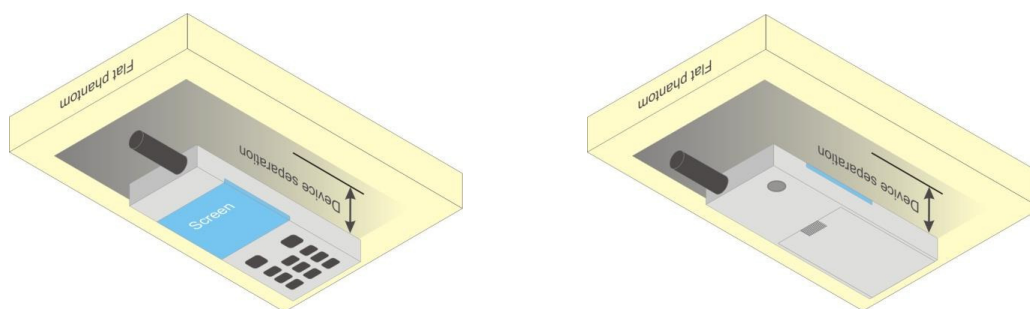


Fig 9.4 Body Worn Position

11.5 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>

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 (4Tx slots) for GSM850 and GPRS (3Tx 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
4. Power reduction which is triggered by hotspot mode is implemented in GSM1900 band, for hotspot mode SAR testing EUT was set in reduced power mode and GPRS 2Tx slot due to its highest frame-average power.

<Full Power Mode>:

Band 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	33.32	33.56	33.69	34.00	24.32	24.56	24.69	25.00
GPRS 1 Tx slot	33.33	33.54	33.68	34.00	24.33	24.54	24.68	25.00
GPRS 2 Tx slots	31.11	31.17	31.10	31.50	25.11	25.17	25.10	25.50
GPRS 3 Tx slots	29.17	29.19	29.34	29.50	24.91	24.93	25.08	25.24
GPRS 4 Tx slots	27.80	28.01	28.95	29.00	24.80	25.01	25.95	26.00
EDGE 1 Tx slot	26.50	26.53	26.63	27.00	17.50	17.53	17.63	18.00
EDGE 2 Tx slots	25.43	25.48	25.56	26.00	19.43	19.48	19.56	20.00
EDGE 3 Tx slots	23.70	23.71	23.62	24.00	19.44	19.45	19.36	19.74
EDGE 4 Tx slots	22.28	22.12	22.17	22.50	19.28	19.12	19.17	19.50

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB

Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB

Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

Band 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	29.61	29.73	29.91	30.50	20.59	20.71	20.88	21.50
GPRS 1 Tx slot	29.59	29.71	29.88	30.50	20.61	20.73	20.91	21.50
GPRS 2 Tx slots	27.64	27.80	28.07	28.50	21.64	21.80	22.07	22.50
GPRS 3 Tx slots	26.02	26.15	26.40	27.00	21.76	21.89	22.14	22.74
GPRS 4 Tx slots	24.76	24.92	25.20	25.50	21.76	21.92	22.20	22.50
EDGE 1 Tx slot	25.21	25.30	25.52	26.00	16.21	16.30	16.52	17.00
EDGE 2 Tx slots	24.05	24.14	24.41	25.00	18.05	18.14	18.41	19.00
EDGE 3 Tx slots	22.43	22.48	22.71	23.00	18.17	18.22	18.45	18.74
EDGE 4 Tx slots	20.71	20.82	21.08	21.50	17.71	17.82	18.08	18.50

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB

Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB

Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

**<Hotspot Reduced Power Mode>:**

Band GSM1900 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	29.95	30.05	30.03	30.50	20.95	21.05	21.03	21.50
GPRS 1 Tx slot	29.92	29.99	29.98	30.50	20.92	20.99	20.98	21.50
GPRS 2 Tx slots	27.15	27.31	27.29	27.50	21.15	21.31	21.29	21.50
GPRS 3 Tx slots	23.92	23.99	24.05	24.50	19.66	19.73	19.79	20.24
GPRS 4 Tx slots	22.77	22.83	22.97	23.50	19.77	19.83	19.97	20.50
EDGE 1 Tx slot	25.79	25.81	25.83	26.00	16.79	16.81	16.83	17.00
EDGE 2 Tx slots	24.67	24.67	24.73	25.00	18.67	18.67	18.73	19.00
EDGE 3 Tx slots	22.02	22.07	22.08	22.50	17.76	17.81	17.82	18.24
EDGE 4 Tx slots	21.41	21.39	21.48	21.50	18.41	18.39	18.48	18.50

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB

Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB

Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

<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 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	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 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 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. 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: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: 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 6: β_{ed} can not be set directly, it is set by Absolute Grant Value.

Setup Configuration

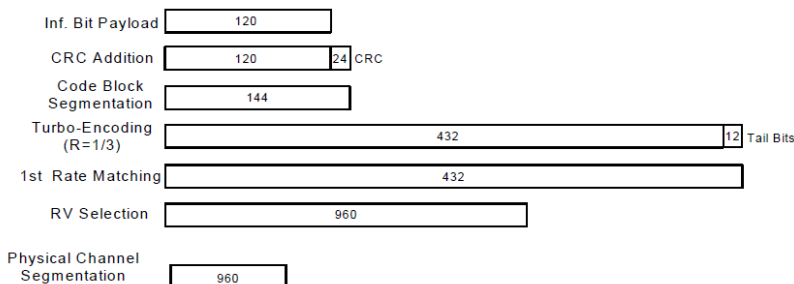
DC-HSDPA 3GPP release 8 Setup Configuration:

- 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 Factor 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. If 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.

<Full Power Mode>:

Band		WCDMA Band V			Tune-up Limit (dBm)	WCDMA Band II			Tune-up Limit (dBm)
TX Channel		4132	4182	4233		9262	9400	9538	
Rx Channel		4357	4407	4458		9662	9800	9938	
Frequency (MHz)		826.4	836.4	846.6		1852.4	1880	1907.6	
3GPP Rel 99	AMR 12.2Kbps	22.72	22.92	22.76	23.50	22.66	22.60	22.77	23.00
3GPP Rel 99	RMC 12.2Kbps	22.74	22.95	22.79	23.50	22.68	22.62	22.80	23.00
3GPP Rel 6	HSDPA Subtest-1	21.93	22.05	21.89	22.50	21.52	21.56	21.61	22.00
3GPP Rel 6	HSDPA Subtest-2	21.97	22.12	21.95	22.50	21.55	21.53	21.60	22.00
3GPP Rel 6	HSDPA Subtest-3	21.49	21.60	21.44	22.00	21.17	21.09	21.12	21.50
3GPP Rel 6	HSDPA Subtest-4	21.45	21.58	21.42	22.00	21.08	21.05	21.11	21.50
3GPP Rel 8	DC-HSDPA Subtest-1	21.92	22.08	21.91	22.50	21.58	21.53	21.60	22.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.98	22.13	21.92	22.50	21.56	21.51	21.62	22.00
3GPP Rel 8	DC-HSDPA Subtest-3	21.48	21.62	21.43	22.00	21.12	21.03	21.19	21.50
3GPP Rel 8	DC-HSDPA Subtest-4	21.51	21.58	21.49	22.00	21.04	21.09	21.11	21.50
3GPP Rel 6	HSUPA Subtest-1	21.89	22.07	22.03	22.50	21.83	21.79	21.89	22.50
3GPP Rel 6	HSUPA Subtest-2	20.01	20.06	19.97	20.50	19.76	19.71	19.83	20.50
3GPP Rel 6	HSUPA Subtest-3	20.94	21.12	20.98	21.50	20.85	20.76	20.84	21.50
3GPP Rel 6	HSUPA Subtest-4	20.02	20.04	19.95	20.50	19.85	19.82	19.94	20.50
3GPP Rel 6	HSUPA Subtest-5	21.92	22.00	21.83	22.50	21.76	21.69	21.85	22.50

<Hotspot Reduced Power Mode>:

Band		WCDMA Band II			Tune-up Limit (dBm)
TX Channel		9262	9400	9538	
Rx Channel		9662	9800	9938	
Frequency (MHz)		1852.4	1880	1907.6	
3GPP Rel 99	AMR 12.2Kbps	20.45	20.30	20.40	21.00
3GPP Rel 99	RMC 12.2Kbps	20.47	20.32	20.43	21.00
3GPP Rel 6	HSDPA Subtest-1	18.94	18.88	19.07	19.50
3GPP Rel 6	HSDPA Subtest-2	18.96	18.92	19.03	19.50
3GPP Rel 6	HSDPA Subtest-3	18.97	18.90	19.06	19.50
3GPP Rel 6	HSDPA Subtest-4	18.92	18.91	19.01	19.50
3GPP Rel 8	DC-HSDPA Subtest-1	19.45	19.40	19.49	20.00
3GPP Rel 8	DC-HSDPA Subtest-2	19.42	19.37	19.45	20.00
3GPP Rel 8	DC-HSDPA Subtest-3	18.95	18.85	18.99	19.50
3GPP Rel 8	DC-HSDPA Subtest-4	18.92	18.81	18.96	19.50
3GPP Rel 6	HSUPA Subtest-1	19.69	19.64	19.75	20.00
3GPP Rel 6	HSUPA Subtest-2	17.65	17.68	17.78	18.00
3GPP Rel 6	HSUPA Subtest-3	18.55	18.56	18.74	19.00
3GPP Rel 6	HSUPA Subtest-4	17.64	17.65	17.72	18.00
3GPP Rel 6	HSUPA Subtest-5	19.10	19.60	19.70	20.00

**<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 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.

<Full Power Mode>

<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	22.10	21.92	21.71	23.00	0
20	QPSK	1	49	22.59	22.15	22.04		
20	QPSK	1	99	21.67	22.14	21.55		
20	QPSK	50	0	21.30	21.29	21.16	22.00	1
20	QPSK	50	24	21.28	21.12	21.14		
20	QPSK	50	50	21.11	21.21	20.97		
20	QPSK	100	0	21.29	21.21	21.16	22.00	1
20	16QAM	1	0	21.04	20.77	20.84		
20	16QAM	1	49	20.76	20.60	20.83		
20	16QAM	1	99	20.64	20.89	20.63	21.00	2
20	16QAM	50	0	20.42	20.28	20.11		
20	16QAM	50	24	20.31	20.21	20.06		
20	16QAM	50	50	19.95	20.04	19.84	21.00	2
20	16QAM	100	0	20.15	20.19	19.98		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	22.37	22.16	21.86	23.00	0
15	QPSK	1	37	22.11	22.20	22.28		
15	QPSK	1	74	21.99	22.19	22.01		
15	QPSK	36	0	21.26	21.20	21.19	22.00	1
15	QPSK	36	20	21.15	21.10	21.08		
15	QPSK	36	39	21.22	21.14	21.03		
15	QPSK	75	0	21.29	21.07	21.14	22.00	1
15	16QAM	1	0	21.47	20.99	20.77		
15	16QAM	1	37	21.11	21.17	20.81		
15	16QAM	1	74	21.15	20.78	20.68	21.00	2
15	16QAM	36	0	20.38	20.16	20.09		
15	16QAM	36	20	20.17	20.10	20.06		
15	16QAM	36	39	20.36	20.12	20.05	21.00	2
15	16QAM	75	0	20.47	20.22	20.15		



Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	22.16	21.99	21.78	23.00	0
10	QPSK	1	25	22.46	22.30	22.40		
10	QPSK	1	49	22.01	22.22	21.80		
10	QPSK	25	0	21.40	21.16	21.15	22.00	1
10	QPSK	25	12	21.23	21.17	21.12		
10	QPSK	25	25	21.17	21.03	21.06		
10	QPSK	50	0	21.32	21.22	21.18	22.00	1
10	16QAM	1	0	20.85	20.86	20.81		
10	16QAM	1	25	20.88	20.82	20.68		
10	16QAM	1	49	20.83	20.89	20.64	21.00	2
10	16QAM	25	0	20.46	20.48	20.20		
10	16QAM	25	12	20.36	20.17	20.23		
10	16QAM	25	25	20.22	20.09	20.09	21.00	2
10	16QAM	50	0	20.40	20.20	20.00		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.05	21.69	21.61	23.00	0
5	QPSK	1	12	22.48	22.21	21.99		
5	QPSK	1	24	22.30	21.81	21.46		
5	QPSK	12	0	21.40	21.06	21.12	22.00	1
5	QPSK	12	7	21.43	21.15	21.09		
5	QPSK	12	13	21.43	21.06	20.92		
5	QPSK	25	0	21.36	21.15	20.95	22.00	1
5	16QAM	1	0	20.80	20.78	21.05		
5	16QAM	1	12	21.24	20.80	20.59		
5	16QAM	1	24	20.72	20.61	20.45	21.00	2
5	16QAM	12	0	20.47	19.91	20.15		
5	16QAM	12	7	20.46	20.12	20.14		
5	16QAM	12	13	20.48	20.19	20.00	21.00	2
5	16QAM	25	0	20.41	20.09	19.93		



Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	22.23	21.76	21.96	23.00	0
3	QPSK	1	8	22.46	21.90	21.89		
3	QPSK	1	14	22.16	21.80	21.67		
3	QPSK	8	0	21.32	21.10	21.02	22.00	1
3	QPSK	8	4	21.46	21.13	21.03		
3	QPSK	8	7	21.50	21.04	20.99		
3	QPSK	15	0	21.42	21.01	21.05	22.00	1
3	16QAM	1	0	21.46	21.00	21.06		
3	16QAM	1	8	21.50	21.08	20.89		
3	16QAM	1	14	21.03	20.97	20.88	21.00	2
3	16QAM	8	0	20.43	20.09	20.31		
3	16QAM	8	4	20.49	20.13	19.96		
3	16QAM	8	7	20.39	20.06	20.01	21.00	2
3	16QAM	15	0	20.21	20.08	20.08		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	22.28	21.70	21.82	23.00	0
1.4	QPSK	1	3	22.39	21.88	21.97		
1.4	QPSK	1	5	22.29	21.73	21.87		
1.4	QPSK	3	0	22.37	21.89	22.11		
1.4	QPSK	3	1	22.46	22.01	22.02		
1.4	QPSK	3	3	22.44	21.89	21.95	22.00	1
1.4	QPSK	6	0	21.42	20.92	20.97		
1.4	16QAM	1	0	20.72	20.83	20.53	22.00	1
1.4	16QAM	1	3	20.88	20.43	20.51		
1.4	16QAM	1	5	21.21	20.46	20.27		
1.4	16QAM	3	0	21.35	20.89	20.86		
1.4	16QAM	3	1	20.91	21.15	21.07		
1.4	16QAM	3	3	21.46	21.20	21.05	21.00	2
1.4	16QAM	6	0	20.06	19.94	20.04		



<LTE Band 7>

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				20850	21100	21350	23.00	0
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	21.94	21.82	21.84		
20	QPSK	1	49	22.65	22.00	22.39	22.00	1
20	QPSK	1	99	22.26	21.84	21.97		
20	QPSK	50	0	21.34	21.32	21.46		
20	QPSK	50	24	21.50	21.33	21.48	22.00	1
20	QPSK	50	50	21.33	21.17	21.39		
20	QPSK	100	0	21.48	21.33	21.46		
20	16QAM	1	0	21.08	21.06	21.19	22.00	1
20	16QAM	1	49	21.41	21.16	21.78		
20	16QAM	1	99	21.29	21.10	20.81		
20	16QAM	50	0	20.28	20.34	20.47	21.00	2
20	16QAM	50	24	20.44	20.35	20.32		
20	16QAM	50	50	20.33	20.30	20.37		
20	16QAM	100	0	20.26	20.22	20.44	23.00	0
Channel				20825	21100	21375		
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	22.10	22.07	22.15	23.00	0
15	QPSK	1	37	22.31	22.39	22.60		
15	QPSK	1	74	22.14	22.24	22.23		
15	QPSK	36	0	21.28	21.41	21.41	22.00	1
15	QPSK	36	20	21.27	21.24	21.48		
15	QPSK	36	39	21.34	21.36	21.30		
15	QPSK	75	0	21.28	21.40	21.40	22.00	1
15	16QAM	1	0	20.97	20.95	21.11		
15	16QAM	1	37	21.06	20.95	21.17		
15	16QAM	1	74	21.08	20.84	20.96	21.00	2
15	16QAM	36	0	20.17	20.20	20.34		
15	16QAM	36	20	20.16	20.26	20.36		
15	16QAM	36	39	20.23	20.15	20.21	21.00	2
15	16QAM	75	0	20.29	20.21	20.49		



Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	21.90	22.02	22.05	23.00	0
10	QPSK	1	25	22.56	22.44	22.23		
10	QPSK	1	49	22.12	21.98	22.14		
10	QPSK	25	0	21.43	21.38	21.47	22.00	1
10	QPSK	25	12	21.29	21.21	21.47		
10	QPSK	25	25	21.28	21.36	21.40		
10	QPSK	50	0	21.25	21.31	21.47	22.00	1
10	16QAM	1	0	21.20	21.10	21.27		
10	16QAM	1	25	21.51	21.55	21.21		
10	16QAM	1	49	21.23	21.19	21.05	21.00	2
10	16QAM	25	0	20.17	20.21	20.60		
10	16QAM	25	12	20.28	20.29	20.54		
10	16QAM	25	25	20.36	20.18	20.21	21.00	2
10	16QAM	50	0	20.27	20.24	20.38		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	21.74	22.01	22.19	23.00	0
5	QPSK	1	12	22.43	22.27	22.42		
5	QPSK	1	24	21.96	21.81	22.01		
5	QPSK	12	0	21.31	21.28	21.56	22.00	1
5	QPSK	12	7	21.32	21.18	21.48		
5	QPSK	12	13	21.27	21.38	21.38		
5	QPSK	25	0	21.42	21.30	21.40	22.00	1
5	16QAM	1	0	20.84	20.54	20.83		
5	16QAM	1	12	20.94	20.75	21.42		
5	16QAM	1	24	20.82	20.40	20.76	21.00	2
5	16QAM	12	0	20.17	20.10	20.55		
5	16QAM	12	7	20.29	20.17	20.70		
5	16QAM	12	13	20.25	20.25	20.47	21.00	2
5	16QAM	25	0	20.10	20.53	20.39		



<Hotspot Reduced Power Mode>

<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	19.67	19.33	19.34	20.50	0
20	QPSK	1	49	19.93	20.21	19.92		
20	QPSK	1	99	19.54	19.71	19.38		
20	QPSK	50	0	19.78	19.88	19.86	20.50	0
20	QPSK	50	24	19.75	19.76	19.69		
20	QPSK	50	50	19.70	19.79	19.75		
20	QPSK	100	0	19.76	19.81	19.58	20.50	0
20	16QAM	1	0	19.69	19.39	19.47		
20	16QAM	1	49	19.48	19.50	19.51		
20	16QAM	1	99	19.38	19.59	19.30	20.50	0
20	16QAM	50	0	19.79	19.76	19.63		
20	16QAM	50	24	19.74	19.55	19.81		
20	16QAM	50	50	19.76	19.76	19.85	20.50	0
20	16QAM	100	0	19.77	19.79	19.77		
Channel				18675	18900	19125		
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	19.83	19.50	19.31	20.50	0
15	QPSK	1	37	19.53	19.83	20.00		
15	QPSK	1	74	19.54	19.58	19.73		
15	QPSK	36	0	19.79	19.68	19.75	20.50	0
15	QPSK	36	20	19.59	19.68	19.82		
15	QPSK	36	39	19.64	19.64	19.85		
15	QPSK	75	0	19.75	19.68	19.68	20.50	0
15	16QAM	1	0	19.69	19.55	19.48		
15	16QAM	1	37	19.24	19.15	19.13		
15	16QAM	1	74	19.27	19.40	19.45	20.50	0
15	16QAM	36	0	19.72	19.71	19.82		
15	16QAM	36	20	19.63	19.66	19.83		
15	16QAM	36	39	19.61	19.69	19.80	20.50	0
15	16QAM	75	0	19.71	19.76	19.89		



Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	19.69	19.54	19.48	20.50	0
10	QPSK	1	25	20.00	19.95	19.97		
10	QPSK	1	49	19.54	19.50	19.47		
10	QPSK	25	0	19.91	19.71	19.82	20.50	0
10	QPSK	25	12	19.61	19.66	19.85		
10	QPSK	25	25	19.63	19.66	19.71		
10	QPSK	50	0	19.72	19.71	19.80		
10	16QAM	1	0	19.72	19.84	19.50	20.50	0
10	16QAM	1	25	19.35	19.43	19.61		
10	16QAM	1	49	19.36	19.52	19.56		
10	16QAM	25	0	20.02	19.85	19.87	20.50	0
10	16QAM	25	12	19.62	19.69	19.81		
10	16QAM	25	25	19.59	19.70	19.83		
10	16QAM	50	0	19.75	19.71	19.84		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	19.53	19.35	19.47	20.50	0
5	QPSK	1	12	20.14	19.75	19.70		
5	QPSK	1	24	19.52	19.27	19.36		
5	QPSK	12	0	19.89	19.67	19.81	20.50	0
5	QPSK	12	7	19.98	19.72	19.80		
5	QPSK	12	13	19.86	19.55	19.70		
5	QPSK	25	0	19.89	19.56	19.71		
5	16QAM	1	0	19.56	19.46	19.57	20.50	0
5	16QAM	1	12	19.46	19.35	19.49		
5	16QAM	1	24	19.35	19.34	19.39		
5	16QAM	12	0	19.73	19.69	19.77	20.50	0
5	16QAM	12	7	19.78	19.74	19.94		
5	16QAM	12	13	19.81	19.66	19.91		
5	16QAM	25	0	19.83	19.76	19.74		

Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	19.85	19.45	19.69	20.50	0
3	QPSK	1	8	19.94	19.51	19.63		
3	QPSK	1	14	19.64	19.44	19.43		
3	QPSK	8	0	19.97	19.67	19.84	20.50	0
3	QPSK	8	4	19.91	19.64	19.83		
3	QPSK	8	7	19.89	19.62	19.72		
3	QPSK	15	0	19.90	19.70	19.62	20.50	0
3	16QAM	1	0	19.67	19.27	19.54		
3	16QAM	1	8	19.43	19.76	19.44		
3	16QAM	1	14	19.65	19.44	19.17	20.50	0
3	16QAM	8	0	19.92	19.73	19.75		
3	16QAM	8	4	19.95	19.71	19.76		
3	16QAM	8	7	20.08	19.67	19.80	20.50	0
3	16QAM	15	0	20.09	19.80	19.62		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	19.56	19.66	19.75	20.50	0
1.4	QPSK	1	3	19.79	19.63	19.82		
1.4	QPSK	1	5	19.81	19.53	19.66		
1.4	QPSK	3	0	19.88	19.64	19.87		
1.4	QPSK	3	1	19.85	19.75	19.83		
1.4	QPSK	3	3	19.87	19.56	19.81		
1.4	QPSK	6	0	19.91	19.55	19.72	20.50	0
1.4	16QAM	1	0	19.67	19.37	19.57	20.50	0
1.4	16QAM	1	3	19.60	19.30	19.61		
1.4	16QAM	1	5	19.59	19.36	19.56		
1.4	16QAM	3	0	19.83	19.80	19.68		
1.4	16QAM	3	1	20.01	19.83	19.91		
1.4	16QAM	3	3	20.02	19.92	19.96		
1.4	16QAM	6	0	19.80	19.72	19.67	20.50	0



<LTE Band 7>

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				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	17.73	17.76	17.81		
20	QPSK	1	49	18.24	18.41	18.49	19.00	0
20	QPSK	1	99	17.92	17.79	18.39		
20	QPSK	50	0	18.16	18.12	18.35		
20	QPSK	50	24	18.17	18.20	18.38	19.00	0
20	QPSK	50	50	18.25	18.21	18.40		
20	QPSK	100	0	18.17	18.21	18.34		
20	16QAM	1	0	17.86	17.65	17.86	19.00	0
20	16QAM	1	49	17.86	18.30	17.96		
20	16QAM	1	99	17.80	17.69	17.93		
20	16QAM	50	0	18.08	18.30	18.14	19.00	0
20	16QAM	50	24	18.20	18.21	18.45		
20	16QAM	50	50	18.14	18.28	18.27		
20	16QAM	100	0	18.13	18.08	18.37		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	17.97	18.11	18.22		
15	QPSK	1	37	18.31	18.11	18.21	19.00	0
15	QPSK	1	74	18.28	18.17	18.29		
15	QPSK	36	0	18.14	18.28	18.11		
15	QPSK	36	20	18.16	18.23	18.23	19.00	0
15	QPSK	36	39	18.22	18.21	18.02		
15	QPSK	75	0	18.14	18.22	18.21		
15	16QAM	1	0	17.89	17.90	17.95	19.00	0
15	16QAM	1	37	18.14	17.97	17.88		
15	16QAM	1	74	17.93	17.81	17.99		
15	16QAM	36	0	18.15	18.20	18.21	19.00	0
15	16QAM	36	20	18.17	18.24	18.05		
15	16QAM	36	39	18.12	18.26	18.25		
15	16QAM	75	0	18.23	18.21	18.05		

Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	17.75	17.87	18.15	19.00	0
10	QPSK	1	25	18.21	18.11	18.21		
10	QPSK	1	49	18.15	17.85	18.22		
10	QPSK	25	0	18.15	18.19	18.22	19.00	0
10	QPSK	25	12	18.20	18.18	18.12		
10	QPSK	25	25	18.15	18.11	18.13		
10	QPSK	50	0	18.18	18.26	18.11		
10	16QAM	1	0	17.83	18.09	17.83	19.00	0
10	16QAM	1	25	17.90	17.68	17.82		
10	16QAM	1	49	17.80	17.47	17.87		
10	16QAM	25	0	18.29	18.20	18.21	19.00	0
10	16QAM	25	12	18.18	18.27	18.12		
10	16QAM	25	25	18.18	18.42	18.33		
10	16QAM	50	0	18.18	18.32	18.23		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	17.59	17.64	17.96	19.00	0
5	QPSK	1	12	18.23	18.38	18.21		
5	QPSK	1	24	17.67	17.71	18.04		
5	QPSK	12	0	18.09	18.22	18.21	19.00	0
5	QPSK	12	7	18.20	18.20	18.40		
5	QPSK	12	13	18.08	18.27	18.35		
5	QPSK	25	0	18.07	18.21	18.35		
5	16QAM	1	0	17.77	17.58	18.31	19.00	0
5	16QAM	1	12	17.94	17.69	18.09		
5	16QAM	1	24	17.76	17.42	18.04		
5	16QAM	12	0	18.26	17.99	18.13	19.00	0
5	16QAM	12	7	18.09	18.12	18.39		
5	16QAM	12	13	18.14	18.31	18.14		
5	16QAM	25	0	18.22	18.35	18.22		

<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.

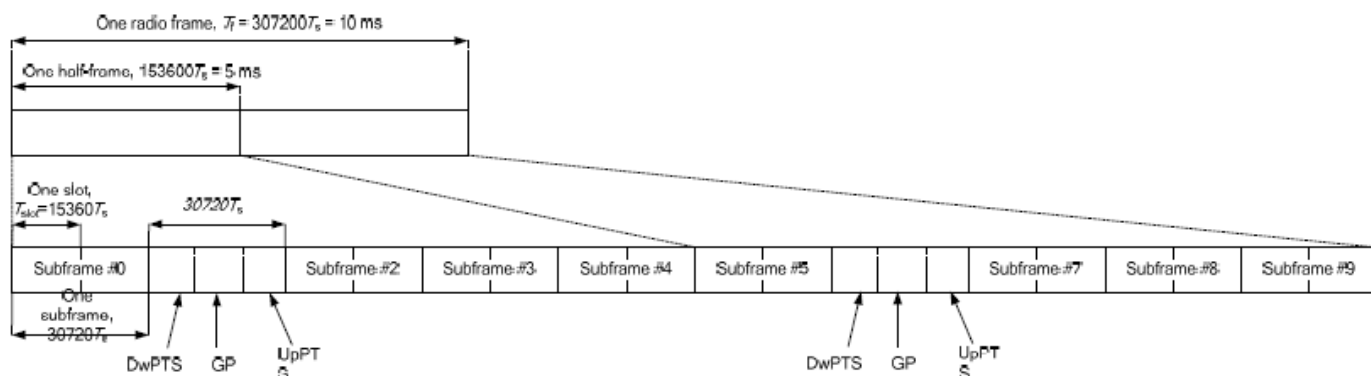


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

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.

<Full Power Mode>

<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	21.96	21.30	21.73		
20	QPSK	1	49	22.20	21.90	22.01	22.50	0
20	QPSK	1	99	21.58	21.87	21.68	21.50	1
20	QPSK	50	0	21.07	20.95	20.94		
20	QPSK	50	24	21.44	21.32	20.96		
20	QPSK	50	50	21.10	20.91	20.93	21.50	1
20	QPSK	100	0	21.40	20.92	20.95		
20	16QAM	1	0	20.69	20.51	20.39		
20	16QAM	1	49	20.75	20.59	20.68	21.50	1
20	16QAM	1	99	20.38	20.25	20.29	20.50	2
20	16QAM	50	0	20.18	20.37	20.18		
20	16QAM	50	24	20.12	19.97	19.93		
20	16QAM	50	50	20.03	20.19	20.18	20.50	2
20	16QAM	100	0	20.20	20.01	20.10		
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2577.5	2595	2612.5		
15	QPSK	1	0	21.76	22.00	21.63		
15	QPSK	1	37	22.16	22.00	22.12	22.50	0
15	QPSK	1	74	21.67	21.67	21.65	21.50	1
15	QPSK	36	0	21.46	21.00	20.96		
15	QPSK	36	20	21.27	20.81	21.11		
15	QPSK	36	39	21.26	20.97	21.03	21.50	1
15	QPSK	75	0	21.26	21.15	20.96		
15	16QAM	1	0	20.64	20.60	20.48		
15	16QAM	1	37	20.88	20.73	21.12	21.50	1
15	16QAM	1	74	20.62	20.49	20.62	20.50	2
15	16QAM	36	0	20.19	20.02	19.87		
15	16QAM	36	20	20.18	19.98	20.07		
15	16QAM	36	39	20.16	19.98	20.07	20.50	2
15	16QAM	75	0	20.26	20.11	19.95		

Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	QPSK	1	0	21.92	21.80	21.70	22.50	0
10	QPSK	1	25	22.19	22.11	22.18		
10	QPSK	1	49	21.83	21.65	21.73		
10	QPSK	25	0	21.03	20.79	21.14	21.50	1
10	QPSK	25	12	21.29	20.80	21.23		
10	QPSK	25	25	21.10	20.93	21.05		
10	QPSK	50	0	21.14	20.87	21.00		
10	16QAM	1	0	20.79	20.58	20.42	21.50	1
10	16QAM	1	25	20.77	20.71	20.72		
10	16QAM	1	49	20.62	20.36	20.55		
10	16QAM	25	0	20.35	20.03	20.31	20.50	2
10	16QAM	25	12	20.41	20.41	20.48		
10	16QAM	25	25	20.34	20.21	20.28		
10	16QAM	50	0	20.10	19.96	19.99		
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	21.69	21.45	21.75	22.50	0
5	QPSK	1	12	22.18	21.97	22.09		
5	QPSK	1	24	21.73	21.76	21.50		
5	QPSK	12	0	21.12	21.03	21.04	21.50	1
5	QPSK	12	7	21.08	20.80	21.04		
5	QPSK	12	13	21.14	20.94	21.01		
5	QPSK	25	0	21.05	20.96	20.92		
5	16QAM	1	0	20.82	20.49	20.61	21.50	1
5	16QAM	1	12	20.97	20.74	20.74		
5	16QAM	1	24	20.58	20.46	20.45		
5	16QAM	12	0	20.12	19.82	19.99	20.50	2
5	16QAM	12	7	20.20	19.91	20.06		
5	16QAM	12	13	20.18	19.87	19.94		
5	16QAM	25	0	20.46	20.12	20.23		



<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				40340	40607	40874	41140	23.00	0
Frequency (MHz)				2565	2591.7	2618.4	2645		
20	QPSK	1	0	22.22	21.57	22.16	22.24		
20	QPSK	1	49	22.71	21.95	22.21	22.88	22.00	1
20	QPSK	1	99	21.91	21.67	21.75	22.16		
20	QPSK	50	0	21.39	20.81	20.97	21.40		
20	QPSK	50	24	21.34	20.80	20.93	21.28	22.00	1
20	QPSK	50	50	21.26	20.77	20.90	21.22		
20	QPSK	100	0	21.39	20.84	20.97	21.40		
20	16QAM	1	0	20.77	20.49	20.40	20.45	22.00	1
20	16QAM	1	49	21.14	20.94	20.82	21.22		
20	16QAM	1	99	20.99	20.12	20.64	20.67		
20	16QAM	50	0	20.46	19.89	19.97	20.26	21.00	2
20	16QAM	50	24	20.51	19.85	20.25	20.40		
20	16QAM	50	50	20.84	19.85	20.22	20.34		
20	16QAM	100	0	20.41	19.73	19.88	20.33	23.00	0
Channel				40315	40598	40881	41165		
Frequency (MHz)				2562.5	2590.8	2619.1	2647.5		
15	QPSK	1	0	22.28	21.83	21.85	22.24	23.00	0
15	QPSK	1	37	22.21	21.96	22.20	22.69		
15	QPSK	1	74	22.15	21.63	21.70	22.25		
15	QPSK	36	0	21.41	20.80	21.02	21.11	22.00	1
15	QPSK	36	20	21.47	20.61	21.01	21.29		
15	QPSK	36	39	21.43	20.85	20.93	21.30		
15	QPSK	75	0	21.44	20.81	21.00	21.19	22.00	1
15	16QAM	1	0	20.82	20.63	20.56	20.30		
15	16QAM	1	37	21.31	20.91	20.87	21.17		
15	16QAM	1	74	20.72	20.62	20.11	20.78	21.00	2
15	16QAM	36	0	20.36	19.86	19.97	20.26		
15	16QAM	36	20	20.52	19.80	20.15	20.46		
15	16QAM	36	39	20.54	19.72	19.85	20.30	21.00	2
15	16QAM	75	0	20.55	19.76	20.27	20.34		

Channel				40290	40590	40890	41190	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2560	2590	2620	2650		
10	QPSK	1	0	22.21	21.66	21.92	22.57	23.00	0
10	QPSK	1	25	22.52	21.97	22.51	22.35		
10	QPSK	1	49	22.53	21.67	21.95	22.40		
10	QPSK	25	0	21.40	20.86	20.97	21.22	22.00	1
10	QPSK	25	12	21.35	20.61	21.04	21.33		
10	QPSK	25	25	21.33	20.75	20.89	21.34		
10	QPSK	50	0	21.45	20.77	20.90	21.29		
10	16QAM	1	0	20.84	20.53	20.54	20.73	22.00	1
10	16QAM	1	25	21.03	20.38	20.73	21.11		
10	16QAM	1	49	21.02	20.55	20.47	20.82		
10	16QAM	25	0	20.65	19.97	20.16	20.58	21.00	2
10	16QAM	25	12	20.66	19.85	20.31	20.59		
10	16QAM	25	25	20.64	19.73	20.17	20.56		
10	16QAM	50	0	20.62	19.79	19.99	20.33		
Channel				40265	40581	40897	41215	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2557.5	2589.1	2620.7	2652.5		
5	QPSK	1	0	22.22	21.42	21.61	22.03	23.00	0
5	QPSK	1	12	22.50	21.84	21.95	22.61		
5	QPSK	1	24	22.04	21.50	21.48	22.30		
5	QPSK	12	0	21.17	20.73	21.24	21.26	22.00	1
5	QPSK	12	7	21.37	20.63	21.25	21.59		
5	QPSK	12	13	21.25	20.80	20.86	21.62		
5	QPSK	25	0	21.36	20.70	20.88	20.86		
5	16QAM	1	0	20.58	20.53	20.67	21.08	22.00	1
5	16QAM	1	12	21.18	20.35	20.82	21.12		
5	16QAM	1	24	21.01	20.47	20.48	20.81		
5	16QAM	12	0	20.27	19.96	19.96	19.86	21.00	2
5	16QAM	12	7	20.46	19.81	20.06	20.10		
5	16QAM	12	13	20.39	19.82	19.92	20.20		
5	16QAM	25	0	20.31	20.03	19.90	20.75		

Note: According to KDB 447498 D01v06 there are 4 default test channels in TDD LTE Band41.



<Hotspot reduced Power Mode>

<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	20.50	0
Frequency (MHz)				2580	2595	2610		
20	QPSK	1	0	19.71	19.66	19.78		
20	QPSK	1	49	19.94	19.85	19.93	20.50	0
20	QPSK	1	99	19.54	19.64	19.66		
20	QPSK	50	0	19.99	19.75	19.77		
20	QPSK	50	24	20.07	19.92	19.99	20.50	0
20	QPSK	50	50	19.79	19.79	19.93		
20	QPSK	100	0	19.90	19.83	19.80		
20	16QAM	1	0	19.55	19.47	19.39	20.50	0
20	16QAM	1	49	19.56	19.42	19.64		
20	16QAM	1	99	19.32	19.17	19.23		
20	16QAM	50	0	20.08	19.72	19.96	20.50	0
20	16QAM	50	24	19.99	19.89	19.92		
20	16QAM	50	50	19.86	19.68	19.70		
20	16QAM	100	0	19.89	19.83	19.85	20.50	0
Channel				37825	38000	38175		
Frequency (MHz)				2577.5	2595	2612.5		
15	QPSK	1	0	19.56	19.85	19.56	20.50	0
15	QPSK	1	37	19.81	19.94	20.01		
15	QPSK	1	74	19.64	19.64	19.77		
15	QPSK	36	0	20.31	19.94	19.85	20.50	0
15	QPSK	36	20	20.39	19.85	19.78		
15	QPSK	36	39	19.88	19.75	19.79		
15	QPSK	75	0	19.89	19.87	19.82	20.50	0
15	16QAM	1	0	19.47	19.57	19.23		
15	16QAM	1	37	19.76	19.62	20.02		
15	16QAM	1	74	19.59	19.20	19.26	20.50	0
15	16QAM	36	0	19.99	19.90	19.81		
15	16QAM	36	20	20.14	19.81	19.97		
15	16QAM	36	39	19.87	19.76	19.76	20.50	0
15	16QAM	75	0	19.98	19.88	19.86		



Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	QPSK	1	0	19.74	19.52	19.65	20.50	0
10	QPSK	1	25	20.14	20.14	20.01		
10	QPSK	1	49	19.76	19.62	19.61		
10	QPSK	25	0	20.26	19.96	20.05	20.50	0
10	QPSK	25	12	20.21	19.82	19.77		
10	QPSK	25	25	19.83	19.79	19.78		
10	QPSK	50	0	19.93	19.83	19.81		
10	16QAM	1	0	19.45	19.34	19.50	20.50	0
10	16QAM	1	25	19.74	19.43	19.27		
10	16QAM	1	49	19.27	19.28	19.24		
10	16QAM	25	0	20.18	20.06	20.08	20.50	0
10	16QAM	25	12	20.15	19.94	19.98		
10	16QAM	25	25	19.99	19.99	20.02		
10	16QAM	50	0	19.93	19.73	20.04		
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	19.75	19.72	19.51	20.50	0
5	QPSK	1	12	20.02	19.86	19.80		
5	QPSK	1	24	19.55	19.58	19.50		
5	QPSK	12	0	20.02	19.88	19.81	20.50	0
5	QPSK	12	7	20.01	19.78	19.84		
5	QPSK	12	13	20.07	19.74	19.80		
5	QPSK	25	0	20.12	19.78	19.73		
5	16QAM	1	0	19.60	19.48	19.47	20.50	0
5	16QAM	1	12	19.78	19.64	19.54		
5	16QAM	1	24	19.51	19.30	19.80		
5	16QAM	12	0	19.93	19.80	19.69	20.50	0
5	16QAM	12	7	19.92	19.69	19.71		
5	16QAM	12	13	19.96	19.63	19.73		
5	16QAM	25	0	20.06	20.04	19.96		



<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				40340	40607	40874	41140	20.50	0
Frequency (MHz)				2565	2591.7	2618.4	2645		
20	QPSK	1	0	19.61	19.65	19.90	20.11		
20	QPSK	1	49	19.97	19.89	19.93	20.35	20.50	0
20	QPSK	1	99	19.83	19.57	19.87	20.14		
20	QPSK	50	0	19.99	19.83	19.77	20.24		
20	QPSK	50	24	19.90	19.76	19.68	20.15	20.50	0
20	QPSK	50	50	19.88	19.76	19.72	20.06		
20	QPSK	100	0	20.09	19.15	19.62	20.10		
20	16QAM	1	0	19.37	19.50	19.71	19.86	20.50	0
20	16QAM	1	49	19.74	19.68	19.83	19.80		
20	16QAM	1	99	19.72	19.93	19.75	19.82		
20	16QAM	50	0	19.86	19.70	19.90	20.47	20.50	0
20	16QAM	50	24	20.05	20.11	19.99	19.95		
20	16QAM	50	50	20.05	19.91	19.84	20.05		
20	16QAM	100	0	20.04	19.78	19.91	20.06	20.50	0
Channel				40315	40598	40881	41165		
Frequency (MHz)				2562.5	2590.8	2619.1	2647.5		
15	QPSK	1	0	19.57	19.78	19.73	19.89	20.50	0
15	QPSK	1	37	20.01	20.00	19.92	20.04		
15	QPSK	1	74	19.86	19.91	19.91	20.34		
15	QPSK	36	0	19.78	19.62	19.61	20.02	20.50	0
15	QPSK	36	20	19.89	19.80	19.71	20.02		
15	QPSK	36	39	20.04	19.73	19.88	20.05		
15	QPSK	75	0	19.80	19.81	19.93	20.10	20.50	0
15	16QAM	1	0	19.50	19.25	19.21	19.47		
15	16QAM	1	37	19.92	19.72	19.68	19.75		
15	16QAM	1	74	19.46	19.41	19.45	19.81	20.50	0
15	16QAM	36	0	19.73	19.55	19.61	19.79		
15	16QAM	36	20	19.76	19.63	19.80	19.98		
15	16QAM	36	39	19.91	19.92	19.72	20.10	20.50	0
15	16QAM	75	0	19.95	19.78	19.72	20.05		

Channel				40290	40590	40890	41190	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2560	2590	2620	2650		
10	QPSK	1	0	19.58	19.61	19.61	19.88	20.50	0
10	QPSK	1	25	20.33	19.71	19.78	20.22		
10	QPSK	1	49	19.62	19.80	19.84	20.49		
10	QPSK	25	0	19.79	19.78	19.81	20.09	20.50	0
10	QPSK	25	12	19.94	19.50	19.60	20.09		
10	QPSK	25	25	19.88	19.63	19.89	20.36		
10	QPSK	50	0	19.80	19.52	19.87	20.24		
10	16QAM	1	0	19.23	19.21	19.31	19.67	20.50	0
10	16QAM	1	25	19.49	19.93	19.68	19.98		
10	16QAM	1	49	19.51	19.04	19.52	19.82		
10	16QAM	25	0	19.98	19.78	19.97	19.90	20.50	0
10	16QAM	25	12	20.21	20.00	19.88	20.22		
10	16QAM	25	25	20.14	19.92	19.94	20.12		
10	16QAM	50	0	19.76	19.99	19.78	20.06		
Channel				40265	40581	40897	41215	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2557.5	2589.1	2620.7	2652.5		
5	QPSK	1	0	19.53	19.53	19.52	19.84	20.50	0
5	QPSK	1	12	19.85	19.82	19.62	20.00		
5	QPSK	1	24	19.65	19.61	19.73	20.06		
5	QPSK	12	0	19.77	19.76	19.90	20.21	20.50	0
5	QPSK	12	7	19.89	19.63	19.64	20.00		
5	QPSK	12	13	19.94	19.72	19.96	20.11		
5	QPSK	25	0	19.74	19.51	19.71	20.01		
5	16QAM	1	0	19.46	19.50	19.30	19.73	20.50	0
5	16QAM	1	12	19.71	19.89	20.05	20.00		
5	16QAM	1	24	19.80	19.48	19.63	19.81		
5	16QAM	12	0	19.69	19.62	19.58	20.09	20.50	0
5	16QAM	12	7	19.90	19.17	19.88	20.08		
5	16QAM	12	13	19.74	19.23	19.78	20.04		
5	16QAM	25	0	20.02	19.46	19.63	20.17		

Note: According to KDB 447498 D01v06 there are 4 default test channels in TDD LTE Band41.



LTE Carrier Aggregation Conducted Power

General Note:

- i. According to KDB941225 D05A v01r02, Uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active.
- ii. Uplink maximum output power with downlink carrier aggregation active does not show more than ¼ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.
- iii. The device supports downlink carrier aggregation only. Uplink carrier aggregation is not supported. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
- iv. Selected highest measured power when downlink carrier aggregation is inactive for conducted power comparison with downlink carrier aggregation is active, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.
- v. For non-contiguous intra-band CA, the SCC selected to provide maximum separation from the PCC and must remain fully within the downlink transmission band. For SCC DL RB size and offset will base on the PCC corresponding RB allocation.
- vi. For inter-band CA, the SCC selected highest bandwidth and near the middle of its transmission band. For SCC DL RB size and offset will base on the PCC corresponding RB allocation.

Configure	PCC						SCC				Measured Power	
	LTE Band	BW (MHz)	Freq. (MHz)	Channel	UL# RB	UL RB Offset	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Rel 10 Tx. Power (dBm)	LTE Rel 8 Tx. Power (dBm)
Inter-Band (Full power)	Band 7	20M	2510	20850	1	49	Band 20	20M	806	6300	22.61	22.65
	Band 7	20M	2535	21100	1	49	Band 20	20M	806	6300	22.01	22.00
	Band 7	20M	2560	21350	1	49	Band 20	20M	806	6300	22.36	22.39
	Band 7	20M	2510	20850	1	49	Band 28	15M	780.5	9435	22.62	22.65
	Band 7	20M	2535	21100	1	49	Band 28	15M	780.5	9435	22.05	22.00
	Band 7	20M	2560	21350	1	49	Band 28	15M	780.5	9435	22.37	22.39
Inter-Band (Hotspot reduced power)	Band 7	20M	2510	20850	1	49	Band 20	20M	806	6300	18.21	18.24
	Band 7	20M	2535	21100	1	49	Band 20	20M	806	6300	18.40	18.41
	Band 7	20M	2560	21350	1	49	Band 20	20M	806	6300	18.47	18.49
	Band 7	20M	2510	20850	1	49	Band 28	15M	780.5	9435	18.21	18.24
	Band 7	20M	2535	21100	1	49	Band 28	15M	780.5	9435	18.40	18.41
	Band 7	20M	2560	21350	1	49	Band 28	15M	780.5	9435	18.47	18.49



Configure	PCC						SCC				Measured Power	
	LTE Band	BW (MHz)	Freq. (MHz)	Channel	UL# RB	UL RB Offset	LTE Band	BW (MHz)	Freq. (MHz)	Channel	LTE Rel 10 Tx. Power (dBm)	LTE Rel 8 Tx. Power (dBm)
Intra-Band (Full power)	Band 7	20M	2510	20850	1	49	Band 7	20M	2650	3050	22.60	22.65
	Band 7	20M	2535	21100	1	49	Band 7	20M	2635	2900	22.03	22.00
	Band 7	20M	2535	21100	1	49	Band 7	20M	2675	3300	22.05	22.00
	Band 7	20M	2560	21350	1	49	Band 7	20M	2660	3150	22.36	22.39
	Band 38	20M	2580	37850	1	49	Band 38	20M	2600	38050	22.24	22.20
	Band 38	20M	2595	38000	1	49	Band 38	20M	2575	27800	21.93	21.90
	Band 38	20M	2595	38000	1	49	Band 38	20M	2615	38200	21.96	21.90
	Band 38	20M	2610	38150	1	49	Band 38	20M	2590	37950	22.03	22.01
	Band 41	20M	2565	40340	1	49	Band 41	20M	2585	40540	22.75	22.71
	Band 41	20M	2591.7	40607	1	49	Band 41	20M	2571.7	40407	21.99	21.95
	Band 41	20M	2591.7	40607	1	49	Band 41	20M	2611.7	40807	21.98	21.95
	Band 41	20M	2618.4	40874	1	49	Band 41	20M	2598.4	40674	22.26	22.21
	Band 41	20M	2618.4	40874	1	49	Band 41	20M	2638.4	41074	22.27	22.21
	Band 41	20M	2645	41140	1	49	Band 41	20M	2625	40940	22.86	22.88
Intra-Band (Hotspot reduced power)	Band 7	20M	2510	20850	1	49	Band 7	20M	2650	3050	18.26	18.24
	Band 7	20M	2535	21100	1	49	Band 7	20M	2635	2900	18.43	18.41
	Band 7	20M	2535	21100	1	49	Band 7	20M	2675	3300	18.45	18.41
	Band 7	20M	2560	21350	1	49	Band 7	20M	2660	3150	18.46	18.49
	Band 38	20M	2580	37850	1	49	Band 38	20M	2600	38050	19.90	19.94
	Band 38	20M	2595	38000	1	49	Band 38	20M	2575	27800	19.89	19.85
	Band 38	20M	2595	38000	1	49	Band 38	20M	2615	38200	19.82	19.85
	Band 38	20M	2610	38150	1	49	Band 38	20M	2590	37950	19.91	19.93
	Band 41	20M	2565	40340	1	49	Band 41	20M	2585	40540	19.94	19.97
	Band 41	20M	2591.7	40607	1	49	Band 41	20M	2571.7	40407	19.92	19.89
	Band 41	20M	2591.7	40607	1	49	Band 41	20M	2611.7	40807	19.95	19.89
	Band 41	20M	2618.4	40874	1	49	Band 41	20M	2598.4	40674	19.92	19.93
	Band 41	20M	2618.4	40874	1	49	Band 41	20M	2638.4	41074	19.98	19.93
	Band 41	20M	2645	41140	1	49	Band 41	20M	2625	40940	20.31	20.35

**<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)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b	CH 1	2412	1Mbps	18.42	18.50	97.63
		CH 6	2437		17.85	18.50	
		CH 11	2462		17.35	18.50	
		CH 12	2467		15.42	16.00	
		CH 13	2472		10.23	11.00	
	802.11g	CH 1	2412	6Mbps	15.21	15.50	87.26
		CH 6	2437		14.82	15.50	
		CH 11	2462		14.58	15.50	
		CH 12	2467		13.93	14.50	
		CH 13	2472		8.70	9.00	
	802.11n-HT20	CH 1	2412	MCS0	14.86	15.50	86.50
		CH 6	2437		14.51	15.50	
		CH 11	2462		14.22	15.50	
		CH 12	2467		14.05	15.50	
		CH 13	2472		8.80	9.00	



<5GHz WLAN >

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a	CH 36	5180	6Mbps	16.29	17.00	87.26
		CH 40	5200		16.21	17.00	
		CH 44	5220		15.84	17.00	
		CH 48	5240		15.78	17.00	
	802.11n-HT20	CH 36	5180	MCS0	15.39	16.00	86.94
		CH 40	5200		15.35	16.00	
		CH 44	5220		15.00	16.00	
		CH 48	5240		14.93	16.00	
	802.11n-HT40	CH 38	5190	MCS0	15.40	16.00	75.86
		CH 46	5230		15.01	16.00	
	802.11ac-VHT20	CH 36	5180	MCS0	16.26	16.50	82.92
		CH 40	5200		16.24	16.50	
		CH 44	5220		15.88	16.50	
		CH 48	5240		15.82	16.50	
	802.11ac-VHT40	CH 38	5190	MCS0	16.12	16.50	71.34
		CH 46	5230		15.82	16.50	
	802.11ac-VHT80	CH 42	5210	MCS0	15.70	16.50	55.34

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a	CH 52	5260	6Mbps	15.99	17.00	87.26
		CH 56	5280		15.57	17.00	
		CH 60	5300		15.65	17.00	
		CH 64	5320		15.71	17.00	
	802.11n-HT20	CH 52	5260	MCS0	15.09	16.00	86.94
		CH 56	5280		14.69	16.00	
		CH 60	5300		14.76	16.00	
		CH 64	5320		14.81	16.00	
	802.11n-HT40	CH 54	5270	MCS0	15.10	16.00	75.86
		CH 62	5310		14.83	16.00	
	802.11ac-VHT20	CH 52	5260	MCS0	15.96	16.00	82.92
		CH 56	5280		15.66	16.00	
		CH 60	5300		15.64	16.00	
		CH 64	5320		15.68	16.00	
	802.11ac-VHT40	CH 54	5270	MCS0	15.08	16.00	71.34
		CH 62	5310		14.82	16.00	
	802.11ac-VHT80	CH 58	5290	MCS0	14.43	16.00	55.34

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a	CH 100	5500	6Mbps	15.34	16.00	87.26
		CH 120	5600		14.64	16.00	
		CH 124	5620		14.74	16.00	
		CH 144	5720		14.71	16.00	
	802.11n-HT20	CH 100	5500	MCS0	14.36	15.00	86.94
		CH 120	5600		13.76	15.00	
		CH 124	5620		13.83	15.00	
		CH 144	5720		13.50	15.00	
	802.11n-HT40	CH 102	5510	MCS0	14.43	15.00	75.86
		CH 118	5590		14.21	15.00	
		CH 126	5630		14.22	15.00	
		CH 142	5710		13.62	15.00	
	802.11ac-VHT20	CH 100	5500	MCS0	15.27	15.50	82.92
		CH 120	5600		14.84	15.50	
		CH 124	5620		14.82	15.50	
		CH 144	5720		14.40	15.50	
	802.11ac-VHT40	CH 102	5510	MCS0	15.21	15.50	71.34
		CH 118	5590		15.02	15.50	
		CH 126	5630		14.69	15.50	
		CH 142	5710		14.53	15.50	
	802.11ac-VHT80	CH 106	5530	MCS0	13.14	13.50	55.34
		CH 122	5610		12.68	13.50	
		CH 138	5690		12.54	13.50	

5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a	CH 149	5745	MCS0	14.74	16.00	87.26
		CH 157	5785		15.21	16.00	
		CH 165	5825		15.44	16.00	
	802.11n-HT20	CH 149	5745	MCS0	14.80	15.50	86.94
		CH 157	5785		15.25	15.50	
		CH 165	5825		15.41	15.50	
	802.11n-HT40	CH 151	5755	MCS0	14.83	15.50	75.86
		CH 159	5795		15.22	15.50	
	802.11ac-VHT20	CH 149	5745	MCS0	14.85	15.50	82.92
		CH 157	5785		15.29	15.50	
		CH 165	5825		15.41	15.50	
	802.11ac-VHT40	CH 151	5755	MCS0	14.84	15.50	71.34
		CH 159	5795		15.19	15.50	
	802.11ac-VHT80	CH 155	5775	MCS0	14.95	15.50	55.34

**<2.4GHz Bluetooth>****General Note:**

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

Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
v3.0 with EDR	CH 00	2402	10.45	8.22	8.49
	CH 39	2441	11.08	9.27	9.35
	CH 78	2480	10.31	8.49	8.39
Tune-up Limit			11.50	10.00	10.00

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
v4.0 with LE	CH 00	2402	1.08
	CH 19	2440	1.70
	CH 39	2480	0.37
Tune-up Limit			2.00

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
v4.2 with LE	CH 00	2402	1.07
	CH 19	2440	1.74
	CH 39	2480	0.40
Tune-up Limit			2.00

13. Bluetooth Exclusions Applied

Mode Band	Average power(dBm)		
	Bluetooth v3.0+EDR	Bluetooth v4.0 LE	Bluetooth v4.2 LE
2.4GHz Bluetooth	11.5	2.0	2.0

Note:

- Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

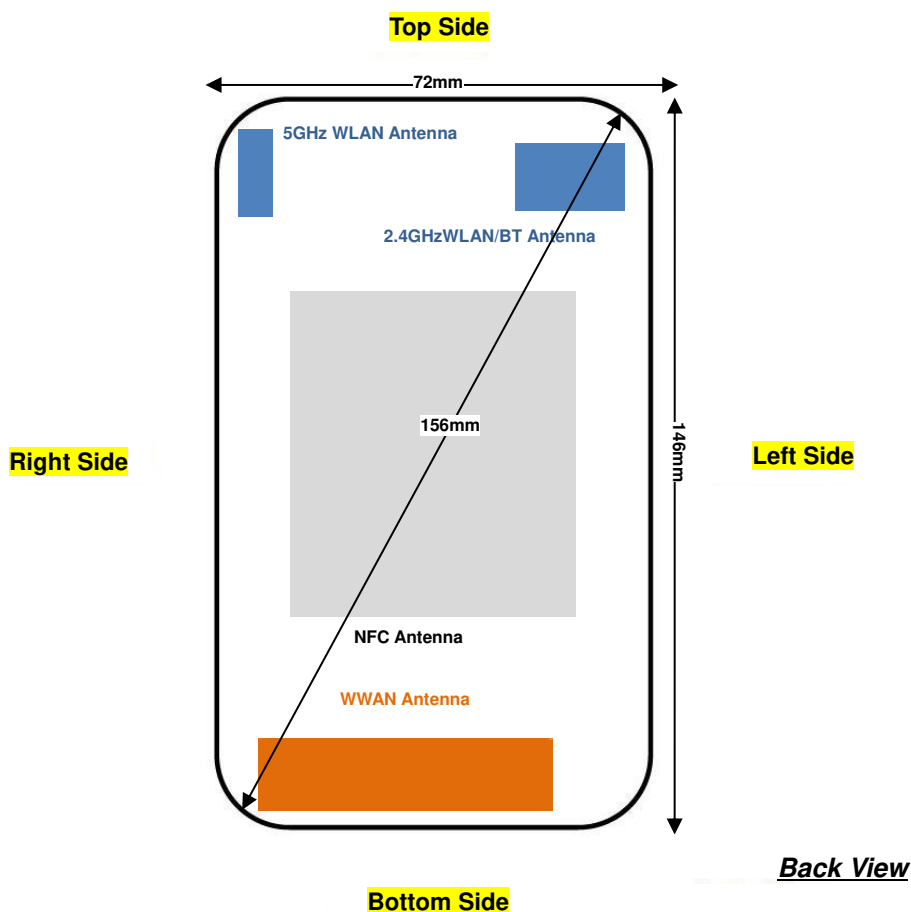
$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$
for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
 - f(GHz) is the RF channel transmit frequency in GHz
 - Power and distance are rounded to the nearest mW and mm before calculation
 - The result is rounded to one decimal place for comparison

Bluetooth Max Power (dBm)	Separation Distance (mm)	Frequency (GHz)	exclusion thresholds
11.5	15	2.48	1.5

Note:

Per KDB 447498 D01v06, the test exclusion threshold is 1.5 which is ≤ 3 , SAR testing is not required.

14. 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	127mm	≤ 25mm	≤ 25mm	≤ 25mm
BT&2.4GHz WLAN	≤ 25mm	≤ 25mm	≤ 25mm	126mm	52mm	≤ 25mm
5GHz WLAN	≤ 25mm	≤ 25mm	≤ 25mm	124mm	≤ 25mm	64mm

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	Yes	Yes	No	Yes	Yes	Yes
BT&2.4GHz WLAN	Yes	Yes	Yes	No	No	Yes
5GHz WLAN	Yes	Yes	Yes	No	Yes	No

General Note:

Referring to KDB 941225 D06 v02r01, when the overall device length and width are ≥ 9cm*5cm, 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

15. 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/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - d. For WLAN: 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. When hotspot mode is enabled, power reduction will be activated to limit the maximum power of GSM1900 band, UMTS band 2, LTE band 2/7/38/41.
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.

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 GPRS (4Tx slots) for GSM850 and GPRS (3Tx 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.
3. Power reduction which is triggered by hotspot mode is implemented in GSM1900 band, for hotspot mode SAR testing EUT was set in reduced power mode and GPRS 2 Tx slot due to its highest frame-average power.

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. If 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.

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 $> \text{not } \frac{1}{2}$ 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 $> \text{not } \frac{1}{2}$ 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 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.

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, for U-NII-1 Head and Body-worn 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.



15.1 Head SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS 4 Tx slots	Right Cheek	251	848.8	28.95	29.00	1.012	0.06	#1	0.192	0.194
	GSM850	GPRS 4 Tx slots	Right Tilted	251	848.8	28.95	29.00	1.012	0.02	#1	0.122	0.123
01	GSM850	GPRS 4 Tx slots	Left Cheek	251	848.8	28.95	29.00	1.012	0.09	#1	0.259	0.262
	GSM850	GPRS 4 Tx slots	Left Tilted	251	848.8	28.95	29.00	1.012	0.1	#1	0.117	0.118
	GSM850	GPRS 4 Tx slots	Left Cheek	251	848.8	28.95	29.00	1.012	0.05	#2	0.247	0.250
02	GSM1900	GPRS 3 Tx slots	Right Cheek	810	1909.8	26.40	27.00	1.148	0.19	#1	0.167	0.192
	GSM1900	GPRS 3 Tx slots	Right Tilted	810	1909.8	26.40	27.00	1.148	0.12	#1	0.043	0.049
	GSM1900	GPRS 3 Tx slots	Left Cheek	810	1909.8	26.40	27.00	1.148	0.16	#1	0.103	0.118
	GSM1900	GPRS 3 Tx slots	Left Tilted	810	1909.8	26.40	27.00	1.148	0.06	#1	0.054	0.062
	GSM1900	GPRS 3 Tx slots	Right Cheek	810	1909.8	26.40	27.00	1.148	0.11	#2	0.134	0.154

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA Band V	RMC12.2Kbps	Right Cheek	4182	836.4	22.95	23.50	1.135	0.01	#1	0.113	0.128
	WCDMA Band V	RMC12.2Kbps	Right Tilted	4182	836.4	22.95	23.50	1.135	0.05	#1	0.073	0.083
03	WCDMA Band V	RMC12.2Kbps	Left Cheek	4182	836.4	22.95	23.50	1.135	0.03	#1	0.157	0.178
	WCDMA Band V	RMC12.2Kbps	Left Tilted	4182	836.4	22.95	23.50	1.135	-0.11	#1	0.069	0.078
	WCDMA Band V	RMC12.2Kbps	Left Cheek	4182	836.4	22.95	23.50	1.135	0.09	#2	0.145	0.165
04	WCDMA Band II	RMC12.2Kbps	Right Cheek	9538	1907.6	22.80	23.00	1.047	-0.14	#1	0.241	0.252
	WCDMA Band II	RMC12.2Kbps	Right Tilted	9538	1907.6	22.80	23.00	1.047	0.11	#1	0.072	0.075
	WCDMA Band II	RMC12.2Kbps	Left Cheek	9538	1907.6	22.80	23.00	1.047	-0.15	#1	0.154	0.161
	WCDMA Band II	RMC12.2Kbps	Left Tilted	9538	1907.6	22.80	23.00	1.047	0.13	#1	0.099	0.104
	WCDMA Band II	RMC12.2Kbps	Right Cheek	9538	1907.6	22.80	23.00	1.047	-0.14	#2	0.241	0.252

**<LTE SAR>**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
05	LTE Band 2	20M	QPSK	1RB	49Offset	Right Cheek	18700	1860	22.59	23.00	1.099	0.16	#1	0.272	0.299
	LTE Band 2	20M	QPSK	50RB	0Offset	Right Cheek	18700	1860	21.30	22.00	1.175	0.12	#1	0.212	0.249
	LTE Band 2	20M	QPSK	1RB	49Offset	Right Tilted	18700	1860	22.59	23.00	1.099	0.06	#1	0.068	0.075
	LTE Band 2	20M	QPSK	50RB	0Offset	Right Tilted	18700	1860	21.30	22.00	1.175	0.13	#1	0.051	0.060
	LTE Band 2	20M	QPSK	1RB	49Offset	Left Cheek	18700	1860	22.59	23.00	1.099	0.12	#1	0.171	0.188
	LTE Band 2	20M	QPSK	50RB	0Offset	Left Cheek	18700	1860	21.30	22.00	1.175	0.05	#1	0.131	0.154
	LTE Band 2	20M	QPSK	1RB	49Offset	Left Tilted	18700	1860	22.59	23.00	1.099	0.1	#1	0.110	0.121
	LTE Band 2	20M	QPSK	50RB	0Offset	Left Tilted	18700	1860	21.30	22.00	1.175	0.09	#1	0.083	0.098
	LTE Band 2	20M	QPSK	1RB	49Offset	Right Cheek	18700	1860	22.59	23.00	1.099	0.09	#2	0.212	0.233
	LTE Band 7	20M	QPSK	1RB	49Offset	Right Cheek	20850	2510	22.65	23.00	1.084	0.07	#1	0.073	0.079
	LTE Band 7	20M	QPSK	50RB	24Offset	Right Cheek	20850	2510	21.50	22.00	1.122	0.11	#1	0.055	0.062
	LTE Band 7	20M	QPSK	1RB	49Offset	Right Tilted	20850	2510	22.65	23.00	1.084	0.12	#1	0.030	0.033
	LTE Band 7	20M	QPSK	50RB	24Offset	Right Tilted	20850	2510	21.50	22.00	1.122	0.08	#1	0.024	0.027
06	LTE Band 7	20M	QPSK	1RB	49Offset	Left Cheek	20850	2510	22.65	23.00	1.084	0.11	#1	0.088	0.095
	LTE Band 7	20M	QPSK	50RB	24Offset	Left Cheek	20850	2510	21.50	22.00	1.122	0.05	#1	0.070	0.079
	LTE Band 7	20M	QPSK	1RB	49Offset	Left Tilted	20850	2510	22.65	23.00	1.084	0.19	#1	0.058	0.063
	LTE Band 7	20M	QPSK	50RB	24Offset	Left Tilted	20850	2510	21.50	22.00	1.122	0.08	#1	0.046	0.052
	LTE Band 7	20M	QPSK	1RB	49Offset	Left Cheek	20850	2510	22.65	23.00	1.084	0.02	#2	0.057	0.062



Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 38	20M	QPSK	1RB	49Offset	Right Cheek	38000	2595	21.90	22.50	1.148	62.9	1.006	0.02	#1	0.023	0.027
	LTE Band 38	20M	QPSK	50RB	24Offset	Right Cheek	38000	2595	21.32	21.50	1.042	62.9	1.006	0.09	#1	0.024	0.025
	LTE Band 38	20M	QPSK	1RB	49Offset	Right Tilted	38000	2595	21.90	22.50	1.148	62.9	1.006	0.08	#1	0.010	0.011
	LTE Band 38	20M	QPSK	50RB	24Offset	Right Tilted	38000	2595	21.32	21.50	1.042	62.9	1.006	0.07	#1	0.010	0.010
07	LTE Band 38	20M	QPSK	1RB	49Offset	Left Cheek	38000	2595	21.90	22.50	1.148	62.9	1.006	0.02	#1	0.027	0.031
	LTE Band 38	20M	QPSK	50RB	24Offset	Left Cheek	38000	2595	21.32	21.50	1.042	62.9	1.006	0.13	#1	0.026	0.027
	LTE Band 38	20M	QPSK	1RB	49Offset	Left Tilted	38000	2595	21.90	22.50	1.148	62.9	1.006	0.14	#1	0.016	0.018
	LTE Band 38	20M	QPSK	50RB	24Offset	Left Tilted	38000	2595	21.32	21.50	1.042	62.9	1.006	0.11	#1	0.014	0.015
	LTE Band 38	20M	QPSK	1RB	49Offset	Left Cheek	38000	2595	21.90	22.50	1.148	62.9	1.006	0.02	#2	0.025	0.029
	LTE Band 41	20M	QPSK	1RB	49Offset	Right Cheek	41140	2645	22.88	23.00	1.028	62.9	1.006	0.12	#1	0.033	0.034
	LTE Band 41	20M	QPSK	50RB	0Offset	Right Cheek	41140	2645	21.40	22.00	1.148	62.9	1.006	0.06	#1	0.030	0.035
	LTE Band 41	20M	QPSK	1RB	49Offset	Right Tilted	41140	2645	22.88	23.00	1.028	62.9	1.006	0.11	#1	0.009	0.009
	LTE Band 41	20M	QPSK	50RB	0Offset	Right Tilted	41140	2645	21.40	22.00	1.148	62.9	1.006	0.09	#1	0.008	0.009
08	LTE Band 41	20M	QPSK	1RB	49Offset	Left Cheek	41140	2645	22.88	23.00	1.028	62.9	1.006	0.14	#1	0.081	0.084
	LTE Band 41	20M	QPSK	50RB	0Offset	Left Cheek	41140	2645	21.40	22.00	1.148	62.9	1.006	0.12	#1	0.052	0.060
	LTE Band 41	20M	QPSK	1RB	49Offset	Left Tilted	41140	2645	22.88	23.00	1.028	62.9	1.006	0.09	#1	0.017	0.018
	LTE Band 41	20M	QPSK	50RB	0Offset	Left Tilted	41140	2645	21.40	22.00	1.148	62.9	1.006	0.12	#1	0.017	0.020
	LTE Band 41	20M	QPSK	1RB	49Offset	Left Cheek	41140	2645	22.88	23.00	1.028	62.9	1.006	0.05	#2	0.072	0.074



<WLAN SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Peak SAR	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
09	WLAN 2.4GHz	802.11b 1Mbps	Right Cheek	1	2412	18.42	18.50	1.019	97.63	1.024	0.05	0.926	#1	0.698	0.728
	WLAN 2.4GHz	802.11b 1Mbps	Right Tilted	1	2412	18.42	18.50	1.019	97.63	1.024	0.02	0.636	#1	0.426	0.444
	WLAN 2.4GHz	802.11b 1Mbps	Left Cheek	1	2412	18.42	18.50	1.019	97.63	1.024		0.519	#1		
	WLAN 2.4GHz	802.11b 1Mbps	Left Tilted	1	2412	18.42	18.50	1.019	97.63	1.024		0.464	#1		
	WLAN 2.4GHz	802.11b 1Mbps	Right Cheek	1	2412	18.42	18.50	1.019	97.63	1.024	0.05		#2	0.696	0.726

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Peak SAR	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 5.3GHz	802.11a 6Mbps	Right Cheek	52	5260	15.99	17.00	1.262	87.26	1.146		0.357	#1		
	WLAN 5.3GHz	802.11a 6Mbps	Right Tilted	52	5260	15.99	17.00	1.262	87.26	1.146		0.151	#1		
10	WLAN 5.3GHz	802.11a 6Mbps	Left Cheek	52	5260	15.99	17.00	1.262	87.26	1.146	0.12	0.460	#1	0.148	0.214
	WLAN 5.3GHz	802.11a 6Mbps	Left Tilted	52	5260	15.99	17.00	1.262	87.26	1.146		0.372	#1		
	WLAN 5.3GHz	802.11a 6Mbps	Left Cheek	52	5260	15.99	17.00	1.262	87.26	1.146	0.01		#2	0.132	0.191
	WLAN 5.5GHz	802.11a 6Mbps	Right Cheek	100	5500	15.34	16.00	1.164	87.26	1.146		0.849	#1		
	WLAN 5.5GHz	802.11a 6Mbps	Right Tilted	100	5500	15.34	16.00	1.164	87.26	1.146		0.411	#1		
11	WLAN 5.5GHz	802.11a 6Mbps	Left Cheek	100	5500	15.34	16.00	1.164	87.26	1.146	-0.07	0.956	#1	0.222	0.296
	WLAN 5.5GHz	802.11a 6Mbps	Left Tilted	100	5500	15.34	16.00	1.164	87.26	1.146		0.642	#1		
	WLAN 5.5GHz	802.11a 6Mbps	Left Cheek	100	5500	15.34	16.00	1.164	87.26	1.146	-0.04		#2	0.184	0.245
	WLAN 5.8GHz	802.11a 6Mbps	Right Cheek	165	5825	15.44	16.00	1.138	87.26	1.146		0.0877	#1		
	WLAN 5.8GHz	802.11a 6Mbps	Right Tilted	165	5825	15.44	16.00	1.138	87.26	1.146		0.113	#1		
12	WLAN 5.8GHz	802.11a 6Mbps	Left Cheek	165	5825	15.44	16.00	1.138	87.26	1.146	-0.13	0.525	#1	0.116	0.151
	WLAN 5.8GHz	802.11a 6Mbps	Left Tilted	165	5825	15.44	16.00	1.138	87.26	1.146		0.324	#1		
	WLAN 5.8GHz	802.11a 6Mbps	Left Cheek	165	5825	15.44	16.00	1.138	87.26	1.146	0.01		#2	0.104	0.136

**<Bluetooth SAR>**

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Battery	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
36	Bluetooth	1Mbps	Right Cheek	39	2441	11.08	11.50	1.102	#1	-0.17	0.075	0.083
	Bluetooth	1Mbps	Right Tilted	39	2441	11.08	11.50	1.102	#1	-0.11	0.052	0.057
	Bluetooth	1Mbps	Left Cheek	39	2441	11.08	11.50	1.102	#1	-0.1	0.040	0.044
	Bluetooth	1Mbps	Left Tilted	39	2441	11.08	11.50	1.102	#1	-0.04	0.036	0.040
	Bluetooth	1Mbps	Right Cheek	39	2441	11.08	11.50	1.102	#2	0.12	0.073	0.080



15.2 Hotspot SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Power Reduction	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS 4 Tx Slots	Front	10	OFF	251	848.8	28.95	29	1.012	-0.12	#1	0.324	0.328
13	GSM850	GPRS 4 Tx Slots	Back	10	OFF	251	848.8	28.95	29	1.012	-0.18	#1	0.508	0.514
	GSM850	GPRS 4 Tx Slots	Left Side	10	OFF	251	848.8	28.95	29	1.012	-0.17	#1	0.310	0.314
	GSM850	GPRS 4 Tx Slots	Right Side	10	OFF	251	848.8	28.95	29	1.012	-0.14	#1	0.194	0.196
	GSM850	GPRS 4 Tx Slots	Bottom Side	10	OFF	251	848.8	28.95	29	1.012	-0.15	#1	0.145	0.147
	GSM850	GPRS 4 Tx Slots	Back	10	OFF	251	848.8	28.95	29	1.012	-0.03	#2	0.461	0.466
	GSM1900	GPRS 2 Tx slots	Front	10	On	661	1880	27.31	27.5	1.045	-0.01	#1	0.527	0.551
	GSM1900	GPRS 2 Tx slots	Back	10	On	661	1880	27.31	27.5	1.045	-0.1	#1	0.723	0.755
	GSM1900	GPRS 2 Tx slots	Left Side	10	On	661	1880	27.31	27.5	1.045	0.03	#1	0.100	0.104
	GSM1900	GPRS 2 Tx slots	Right Side	10	On	661	1880	27.31	27.5	1.045	0.02	#1	0.199	0.208
	GSM1900	GPRS 2 Tx slots	Bottom Side	10	On	661	1880	27.31	27.5	1.045	0.08	#1	0.900	0.940
14	GSM1900	GPRS 2 Tx slots	Bottom Side	10	On	512	1850.2	27.15	27.5	1.084	0.17	#1	1.040	1.127
	GSM1900	GPRS 2 Tx slots	Bottom Side	10	On	810	1909.8	27.29	27.5	1.050	0.06	#1	0.816	0.856
	GSM1900	GPRS 2 Tx slots	Bottom Side	10	On	512	1850.2	27.15	27.5	1.084	0.02	#2	0.916	0.993
	GSM1900	GPRS 2 Tx slots	Bottom Side	10	On	661	1880	27.31	27.5	1.045	0.15	#2	0.660	0.690
	GSM1900	GPRS 2 Tx slots	Bottom Side	10	On	810	1909.8	27.29	27.5	1.050	0.15	#2	0.588	0.617



<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Power Reduction	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
15	WCDMA Band V	RMC 12.2Kbps	Front	OFF	10	4182	836.4	22.95	23.5	1.135	-0.11	#1	0.199	0.226
	WCDMA Band V	RMC 12.2Kbps	Back	OFF	10	4182	836.4	22.95	23.5	1.135	-0.15	#1	0.358	0.406
	WCDMA Band V	RMC 12.2Kbps	Left Side	OFF	10	4182	836.4	22.95	23.5	1.135	-0.1	#1	0.183	0.208
	WCDMA Band V	RMC 12.2Kbps	Right Side	OFF	10	4182	836.4	22.95	23.5	1.135	-0.14	#1	0.117	0.133
	WCDMA Band V	RMC 12.2Kbps	Bottom Side	OFF	10	4182	836.4	22.95	23.5	1.135	-0.16	#1	0.083	0.094
	WCDMA Band V	RMC 12.2Kbps	Back	OFF	10	4182	836.4	22.95	23.5	1.135	-0.16	#2	0.345	0.392
16	WCDMA Band II	RMC 12.2Kbps	Front	On	10	9262	1852.4	20.47	21	1.130	-0.03	#1	0.505	0.571
	WCDMA Band II	RMC 12.2Kbps	Back	On	10	9262	1852.4	20.47	21	1.130	0	#1	0.720	0.813
	WCDMA Band II	RMC 12.2Kbps	Back	On	10	9400	1880	20.32	21	1.169	0.02	#1	0.819	0.958
	WCDMA Band II	RMC 12.2Kbps	Back	On	10	9538	1907.6	20.43	21	1.140	0.14	#1	0.852	0.971
	WCDMA Band II	RMC 12.2Kbps	Left Side	On	10	9262	1852.4	20.47	21	1.130	0.06	#1	0.121	0.137
	WCDMA Band II	RMC 12.2Kbps	Right Side	On	10	9262	1852.4	20.47	21	1.130	0.06	#1	0.222	0.251
	WCDMA Band II	RMC 12.2Kbps	Bottom Side	On	10	9262	1852.4	20.47	21	1.130	0.09	#1	0.786	0.888
	WCDMA Band II	RMC 12.2Kbps	Bottom Side	On	10	9400	1880	20.32	21	1.169	0.03	#1	0.895	1.047
	WCDMA Band II	RMC 12.2Kbps	Bottom Side	On	10	9538	1907.6	20.43	21	1.140	0.04	#1	1.010	1.152
	WCDMA Band II	RMC 12.2Kbps	Bottom Side	On	10	9538	1907.6	20.43	21	1.140	0.02	#2	0.894	1.019
	WCDMA Band II	RMC 12.2Kbps	Bottom Side	On	10	9262	1852.4	20.47	21	1.130	0.09	#2	0.694	0.784
	WCDMA Band II	RMC 12.2Kbps	Bottom Side	On	10	9400	1880	20.32	21	1.169	0.03	#2	0.772	0.903



<LTE SAR>

Plot No.	Band	BW (MHz)	Mode	RB Size	RB offset	Test Position	Power Reduction	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20M	QPSK	1RB	49Offset	Front	On	10	18900	1880	20.21	20.5	1.069	-0.11	#1	0.582	0.622
	LTE Band 2	20M	QPSK	50RB	0Offset	Front	On	10	18900	1880	19.88	20.5	1.153	-0.03	#1	0.583	0.672
	LTE Band 2	20M	QPSK	1RB	49Offset	Back	On	10	18900	1880	20.21	20.5	1.069	0.11	#1	0.666	0.712
	LTE Band 2	20M	QPSK	50RB	0Offset	Back	On	10	18900	1880	19.88	20.5	1.153	-0.17	#1	0.666	0.768
	LTE Band 2	20M	QPSK	50RB	0Offset	Left Side	On	10	18900	1880	20.21	20.5	1.069	0.01	#1	0.107	0.114
	LTE Band 2	20M	QPSK	50RB	0Offset	Left Side	On	10	18900	1880	19.88	20.5	1.153	-0.01	#1	0.107	0.123
	LTE Band 2	20M	QPSK	1RB	49Offset	Right Side	On	10	18900	1880	20.21	20.5	1.069	0.16	#1	0.136	0.145
	LTE Band 2	20M	QPSK	50RB	0Offset	Right Side	On	10	18900	1880	19.88	20.5	1.153	0	#1	0.136	0.157
	LTE Band 2	20M	QPSK	1RB	49Offset	Bottom Side	On	10	18900	1880	20.21	20.5	1.069	0.11	#1	0.754	0.806
	LTE Band 2	20M	QPSK	1RB	49Offset	Bottom Side	On	10	18700	1860	19.93	20.5	1.140	0.01	#1	0.691	0.788
17	LTE Band 2	20M	QPSK	1RB	49Offset	Bottom Side	On	10	19100	1900	19.92	20.5	1.143	-0.13	#1	0.815	0.931
	LTE Band 2	20M	QPSK	50RB	0Offset	Bottom Side	On	10	18900	1880	19.88	20.5	1.153	0.07	#1	0.749	0.864
	LTE Band 2	20M	QPSK	50RB	0Offset	Bottom Side	On	10	18700	1860	19.78	20.5	1.180	0.03	#1	0.702	0.829
	LTE Band 2	20M	QPSK	50RB	0Offset	Bottom Side	On	10	19100	1900	19.86	20.5	1.159	0.13	#1	0.802	0.929
	LTE Band 2	20M	QPSK	100RB	0Offset	Bottom Side	On	10	18900	1880	19.81	20.5	1.172	0.17	#1	0.736	0.863
	LTE Band 2	20M	QPSK	1RB	49Offset	Bottom Side	On	10	19100	1900	19.92	20.5	1.143	0.19	#2	0.807	0.922
	LTE Band 2	20M	QPSK	1RB	49Offset	Bottom Side	On	10	18700	1860	19.93	20.5	1.140	0.02	#2	0.647	0.738
	LTE Band 2	20M	QPSK	1RB	49Offset	Bottom Side	On	10	18900	1880	20.21	20.5	1.069	0.03	#2	0.706	0.755



Plot No.	Band	BW (MHz)	Mode	RB Size	RB offset	Test Position	Power Reduction	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 7	20M	QPSK	1RB	49Offset	Front	On	10	21350	2560	18.49	19	1.125	0.03	#1	0.466	0.524
	LTE Band 7	20M	QPSK	50RB	50Offset	Front	On	10	21350	2560	18.4	19	1.148	-0.12	#1	0.464	0.533
	LTE Band 7	20M	QPSK	1RB	49Offset	Back	On	10	21350	2560	18.49	19	1.125	-0.03	#1	0.333	0.374
	LTE Band 7	20M	QPSK	50RB	50Offset	Back	On	10	21350	2560	18.4	19	1.148	0.02	#1	0.364	0.418
	LTE Band 7	20M	QPSK	1RB	49Offset	Left Side	On	10	21350	2560	18.49	19	1.125	-0.03	#1	0.092	0.103
	LTE Band 7	20M	QPSK	50RB	50Offset	Left Side	On	10	21350	2560	18.4	19	1.148	-0.15	#1	0.093	0.107
	LTE Band 7	20M	QPSK	1RB	49Offset	Right Side	On	10	21350	2560	18.49	19	1.125	-0.17	#1	0.213	0.240
	LTE Band 7	20M	QPSK	50RB	50Offset	Right Side	On	10	21350	2560	18.4	19	1.148	-0.15	#1	0.174	0.200
	LTE Band 7	20M	QPSK	1RB	49Offset	Bottom Side	On	10	21350	2560	18.49	19	1.125	-0.06	#1	0.918	1.032
18	LTE Band 7	20M	QPSK	1RB	49Offset	Bottom Side	On	10	20850	2510	18.24	19	1.191	0.17	#1	0.885	1.054
	LTE Band 7	20M	QPSK	1RB	49Offset	Bottom Side	On	10	21100	2535	18.41	19	1.146	-0.14	#1	0.858	0.983
	LTE Band 7	20M	QPSK	50RB	50Offset	Bottom Side	On	10	21350	2560	18.4	19	1.148	-0.13	#1	0.890	1.022
	LTE Band 7	20M	QPSK	50RB	50Offset	Bottom Side	On	10	20850	2510	18.25	19	1.189	-0.19	#1	0.867	1.030
	LTE Band 7	20M	QPSK	50RB	50Offset	Bottom Side	On	10	21100	2535	18.21	19	1.199	-0.19	#1	0.863	1.035
	LTE Band 7	20M	QPSK	100RB	0Offset	Bottom Side	On	10	21350	2560	18.34	19	1.164	-0.05	#1	0.854	0.994
	LTE Band 7	20M	QPSK	1RB	49Offset	Bottom Side	On	10	20850	2510	18.24	19	1.191	0.06	#2	0.858	1.022
	LTE Band 7	20M	QPSK	1RB	49Offset	Bottom Side	On	10	21100	2535	18.41	19	1.146	0.06	#2	0.802	0.919
	LTE Band 7	20M	QPSK	1RB	49Offset	Bottom Side	On	10	21350	2560	18.49	19	1.125	0.05	#2	0.817	0.919



Plot No.	Band	BW (MHz)	Mode	RB Size	RB offset	Test Position	Power Reduction	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 38	20M	QPSK	1RB	49Offset	Front	On	10	38000	2595	19.85	20.5	1.161	62.9	1.006	-0.01	#1	0.451	0.527
	LTE Band 38	20M	QPSK	50RB	24Offset	Front	On	10	38000	2595	19.92	20.5	1.143	62.9	1.006	0.01	#1	0.358	0.412
	LTE Band 38	20M	QPSK	1RB	49Offset	Back	On	10	38000	2595	19.85	20.5	1.161	62.9	1.006	-0.13	#1	0.321	0.375
	LTE Band 38	20M	QPSK	50RB	24Offset	Back	On	10	38000	2595	19.92	20.5	1.143	62.9	1.006	0.02	#1	0.283	0.325
	LTE Band 38	20M	QPSK	1RB	49Offset	Left Side	On	10	38000	2595	19.85	20.5	1.161	62.9	1.006	-0.09	#1	0.082	0.096
	LTE Band 38	20M	QPSK	50RB	24Offset	Left Side	On	10	38000	2595	19.92	20.5	1.143	62.9	1.006	-0.1	#1	0.085	0.098
	LTE Band 38	20M	QPSK	1RB	49Offset	Right Side	On	10	38000	2595	19.85	20.5	1.161	62.9	1.006	-0.15	#1	0.064	0.075
	LTE Band 38	20M	QPSK	50RB	24Offset	Right Side	On	10	38000	2595	19.92	20.5	1.143	62.9	1.006	-0.11	#1	0.064	0.074
19	LTE Band 38	20M	QPSK	1RB	49Offset	Bottom Side	On	10	38000	2595	19.85	20.5	1.161	62.9	1.006	-0.1	#1	0.761	0.889
	LTE Band 38	20M	QPSK	50RB	24Offset	Bottom Side	On	10	38000	2595	19.92	20.5	1.143	62.9	1.006	-0.14	#1	0.738	0.849
	LTE Band 38	20M	QPSK	100RB	0Offset	Bottom Side	On	10	38000	2595	19.83	20.5	1.167	62.9	1.006	-0.03	#1	0.720	0.845
	LTE Band 38	20M	QPSK	1RB	49Offset	Bottom Side	On	10	38000	2595	19.85	20.5	1.161	62.9	1.006	-0.09	#2	0.702	0.820
	LTE Band 41	20M	QPSK	1RB	49Offset	Front	On	10	41140	2645	20.35	20.5	1.035	62.9	1.006	0.1	#1	0.436	0.454
	LTE Band 41	20M	QPSK	50RB	0Offset	Front	On	10	41140	2645	20.24	20.5	1.062	62.9	1.006	0.16	#1	0.418	0.446
	LTE Band 41	20M	QPSK	1RB	49Offset	Back	On	10	41140	2645	20.35	20.5	1.035	62.9	1.006	0.15	#1	0.337	0.351
	LTE Band 41	20M	QPSK	50RB	0Offset	Back	On	10	41140	2645	20.24	20.5	1.062	62.9	1.006	0.17	#1	0.323	0.345
	LTE Band 41	20M	QPSK	1RB	49Offset	Left Side	On	10	41140	2645	20.35	20.5	1.035	62.9	1.006	-0.06	#1	0.084	0.087
	LTE Band 41	20M	QPSK	50RB	0Offset	Left Side	On	10	41140	2645	20.24	20.5	1.062	62.9	1.006	-0.06	#1	0.085	0.091
	LTE Band 41	20M	QPSK	1RB	49Offset	Right Side	On	10	41140	2645	20.35	20.5	1.035	62.9	1.006	-0.12	#1	0.091	0.095
	LTE Band 41	20M	QPSK	50RB	0Offset	Right Side	On	10	41140	2645	20.24	20.5	1.062	62.9	1.006	-0.16	#1	0.092	0.098
20	LTE Band 41	20M	QPSK	1RB	49Offset	Bottom Side	On	10	41140	2645	20.35	20.5	1.035	62.9	1.006	0.03	#1	0.761	0.792
	LTE Band 41	20M	QPSK	50RB	0Offset	Bottom Side	On	10	41140	2645	20.24	20.5	1.062	62.9	1.006	-0.09	#1	0.709	0.757
	LTE Band 41	20M	QPSK	1RB	49Offset	Bottom Side	On	10	41140	2645	20.35	20.5	1.035	62.9	1.006	0.11	#2	0.691	0.720



<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Peak SAR	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
21	WLAN 2.4GHz	802.11b 1Mbps	Front	10	1	2412	18.42	18.5	1.019	97.63	1.024		0.148	#1		
	WLAN 2.4GHz	802.11b 1Mbps	Back	10	1	2412	18.42	18.5	1.019	97.63	1.024	-0.1	0.318	#1	0.246	0.257
	WLAN 2.4GHz	802.11b 1Mbps	Left Side	10	1	2412	18.42	18.5	1.019	97.63	1.024		0.116	#1		
	WLAN 2.4GHz	802.11b 1Mbps	Top Side	10	1	2412	18.42	18.5	1.019	97.63	1.024		0.107	#1		
	WLAN 2.4GHz	802.11b 1Mbps	Back	10	1	2412	18.42	18.5	1.019	97.63	1.024	0.19		#2	0.178	0.186

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Peak SAR	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
22	WLAN 5.2GHz	802.11a 6Mbps	Front	10	36	5180	16.29	17	1.178	87.26	1.146	0.00965		#1		
	WLAN 5.2GHz	802.11a 6Mbps	Back	10	36	5180	16.29	17	1.178	87.26	1.146	0	0.284	#1	0.086	0.116
	WLAN 5.2GHz	802.11a 6Mbps	Right Side	10	36	5180	16.29	17	1.178	87.26	1.146		0.025	#1		
	WLAN 5.2GHz	802.11a 6Mbps	Top Side	10	36	5180	16.29	17	1.178	87.26	1.146		0.049	#1		
	WLAN 5.2GHz	802.11a 6Mbps	Back	10	36	5180	16.29	17	1.178	87.26	1.146	0		#2	0.060	0.081
23	WLAN 5.8GHz	802.11a 6Mbps	Front	10	165	5825	15.44	16	1.138	87.26	1.146		0	#1		
	WLAN 5.8GHz	802.11a 6Mbps	Back	10	165	5825	15.44	16	1.138	87.26	1.146	0	0.277	#1	0.071	0.093
	WLAN 5.8GHz	802.11a 6Mbps	Right Side	10	165	5825	15.44	16	1.138	87.26	1.146		0.041	#1		
	WLAN 5.8GHz	802.11a 6Mbps	Top Side	10	165	5825	15.44	16	1.138	87.26	1.146		0.031	#1		
	WLAN 5.8GHz	802.11a 6Mbps	Back	10	165	5825	15.44	16	1.138	87.26	1.146	0		#2	0.059	0.077



15.3 Body Worn Accessory SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS 4 Tx Slots	Front	15	251	848.8	28.95	29	1.012	-0.18	#1	0.279	0.282
24	GSM850	GPRS 4 Tx slots	Back	15	251	848.8	28.95	29	1.012	-0.03	#1	0.404	0.409
	GSM850	GPRS 4 Tx slots	Back	15	251	848.8	28.95	29	1.012	-0.17	#2	0.378	0.382
	GSM1900	GPRS 3 Tx slots	Front	15	810	1909.8	26.4	27	1.148	-0.11	#1	0.194	0.223
25	GSM1900	GPRS 3 Tx slots	Back	15	810	1909.8	26.4	27	1.148	0.08	#1	0.230	0.264
	GSM1900	GPRS 3 Tx slots	Back	15	810	1909.8	26.4	27	1.148	-0.15	#2	0.211	0.242

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA Band V	RMC 12.2Kbps	Front	15	4182	836.4	22.95	23.5	1.135	-0.08	#1	0.174	0.197
26	WCDMA Band V	RMC 12.2Kbps	Back	15	4182	836.4	22.95	23.5	1.135	-0.07	#1	0.268	0.304
	WCDMA Band V	RMC 12.2Kbps	Back	15	4182	836.4	22.95	23.5	1.135	-0.14	#2	0.245	0.278
	WCDMA Band II	RMC 12.2Kbps	Front	15	9538	1907.6	22.8	23	1.047	0.06	#1	0.430	0.450
27	WCDMA Band II	RMC 12.2Kbps	Back	15	9538	1907.6	22.8	23	1.047	0.09	#1	0.604	0.632
	WCDMA Band II	RMC 12.2Kbps	Back	15	9538	1907.6	22.8	23	1.047	-0.14	#2	0.566	0.593

**<LTE SAR>**

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)	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20M	QPSK	1RB	49Offset	Front	15	18700	1860	22.59	23.00	1.099	0.02	#1	0.403	0.443
	LTE Band 2	20M	QPSK	50RB	0Offset	Front	15	18700	1860	21.30	22.00	1.175	-0.09	#1	0.311	0.365
28	LTE Band 2	20M	QPSK	1RB	49Offset	Back	15	18700	1860	22.59	23.00	1.099	0.04	#1	0.476	0.523
	LTE Band 2	20M	QPSK	50RB	0Offset	Back	15	18700	1860	21.30	22.00	1.175	0.14	#1	0.391	0.459
	LTE Band 2	20M	QPSK	1RB	49Offset	Back	15	18700	1860	22.59	23.00	1.099	-0.1	#2	0.438	0.481
29	LTE Band 7	20M	QPSK	1RB	49Offset	Front	15	20850	2510	22.65	23.00	1.084	0.03	#1	0.554	0.600
	LTE Band 7	20M	QPSK	50RB	24Offset	Front	15	20850	2510	21.50	22.00	1.122	-0.02	#1	0.430	0.482
	LTE Band 7	20M	QPSK	1RB	49Offset	Back	15	20850	2510	22.65	23.00	1.084	-0.02	#1	0.464	0.503
	LTE Band 7	20M	QPSK	50RB	24Offset	Back	15	20850	2510	21.50	22.00	1.122	-0.03	#1	0.374	0.420
	LTE Band 7	20M	QPSK	1RB	49Offset	Front	15	20850	2510	22.65	23.00	1.084	0.1	#2	0.553	0.599

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	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
30	LTE Band 38	20M	QPSK	1RB	49Offset	Front	15	38000	2595	21.90	22.50	1.148	62.9	1.006	0.12	#1	0.330	0.381
	LTE Band 38	20M	QPSK	50RB	24Offset	Front	15	38000	2595	21.32	21.50	1.042	62.9	1.006	0.11	#1	0.251	0.263
	LTE Band 38	20M	QPSK	1RB	49Offset	Back	15	38000	2595	21.90	22.50	1.148	62.9	1.006	0.09	#1	0.291	0.336
	LTE Band 38	20M	QPSK	50RB	24Offset	Back	15	38000	2595	21.32	21.50	1.042	62.9	1.006	0.02	#1	0.210	0.220
	LTE Band 38	20M	QPSK	1RB	49Offset	Front	15	38000	2595	21.90	22.50	1.148	62.9	1.006	-0.15	#2	0.266	0.307
31	LTE Band 41	20M	QPSK	1RB	49Offset	Front	15	41140	2645	22.88	23.00	1.028	62.9	1.006	0.04	#1	0.349	0.361
	LTE Band 41	20M	QPSK	50RB	0Offset	Front	15	41140	2645	21.40	22.00	1.148	62.9	1.006	0.07	#1	0.255	0.295
	LTE Band 41	20M	QPSK	1RB	49Offset	Back	15	41140	2645	22.88	23.00	1.028	62.9	1.006	0.02	#1	0.331	0.342
	LTE Band 41	20M	QPSK	50RB	0Offset	Back	15	41140	2645	21.40	22.00	1.148	62.9	1.006	0.04	#1	0.233	0.269
	LTE Band 41	20M	QPSK	1RB	49Offset	Front	15	41140	2645	22.88	23.00	1.028	62.9	1.006	0.12	#2	0.299	0.309



<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Peak SAR	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4 GHz	802.11b 1Mbps	Front	15	1	2412	18.42	18.5	1.019	97.63	1.024		0.038	#1		
32	WLAN2.4 GHz	802.11b 1Mbps	Back	15	1	2412	18.42	18.5	1.019	97.63	1.024	-0.01	0.109	#1	0.048	0.050
	WLAN2.4 GHz	802.11b 1Mbps	Back	15	1	2412	18.42	18.5	1.019	97.63	1.024	0.03		#2	0.042	0.044

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Peak SAR	Battery	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 5.3GHz	802.11a 6Mbps	Front	15	52	5260	15.99	17	1.125	87.26	1.146		0	#1		
33	WLAN 5.3GHz	802.11a 6Mbps	Back	15	52	5260	15.99	17	1.125	87.26	1.146	0	0.165	#1	0.042	0.054
	WLAN 5.3GHz	802.11a 6Mbps	Back	15	52	5260	15.99	17	1.125	87.26	1.146	0		#2	0.021	0.027
	WLAN 5.5GHz	802.11a 6Mbps	Front	15	100	5500	15.34	16.00	1.164	87.26	1.146		0.010	#1		
34	WLAN 5.5GHz	802.11a 6Mbps	Back	15	100	5500	15.34	16.00	1.164	87.26	1.146	0	0.297	#1	0.076	0.101
	WLAN 5.5GHz	802.11a 6Mbps	Back	15	100	5500	15.34	16.00	1.164	87.26	1.146	0		#2	0.067	0.089
	WLAN 5.8GHz	802.11a 6Mbps	Front	15	165	5825	15.44	16.00	1.138	87.26	1.146		0	#1		
35	WLAN 5.8GHz	802.11a 6Mbps	Back	15	165	5825	15.44	16.00	1.138	87.26	1.146	0	0.141	#1	0.029	0.038
	WLAN 5.8GHz	802.11a 6Mbps	Back	15	165	5825	15.44	16.00	1.138	87.26	1.146	0		#2	0.027	0.035



15.4 Repeated SAR Measurement

No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Power Reduction	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	GSM1900	-	-	-	-	GPRS 2 Tx slots	Bottom Side	10	On	512	1850.2	27.15	27.5	1.084	0.17	1.040	1	1.127
2nd	GSM1900	-	-	-	-	GPRS 2 Tx slots	Bottom Side	10	On	512	1850.2	27.15	27.5	1.084	0.07	1.010	1.030	1.095
1st	LTE Band 7	20M	QPSK	1RB	49Offset	-	Bottom Side	10	On	21350	2560	18.49	19	1.125	-0.06	0.918	1	1.032
2nd	LTE Band 7	20M	QPSK	1RB	49Offset	-	Bottom Side	10	On	21350	2560	18.49	19	1.125	0.03	0.915	1.003	1.029

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8\text{W/kg}$.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR $< 1.45\text{W/kg}$, 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.

16. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Portable Handset			Note
		Head	Body-worn	Hotspot	
1.	GSM Voice + WLAN2.4GHz	Yes	Yes		
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes	Hotspot
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes	Hotspot
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes	Hotspot
5.	GSM Voice + Bluetooth	Yes	Yes		
6.	GPRS/EDGE + Bluetooth	Yes	Yes		WWAN VoIP
7.	WCDMA+ Bluetooth	Yes	Yes		WWAN VoIP
8.	LTE + Bluetooth	Yes	Yes		WWAN VoIP
9.	GSM Voice + WLAN5.3/5.5GHz	Yes	Yes		
10.	GPRS/EDGE + WLAN5.3/5.5GHz	Yes	Yes		WiFi Direct(GC only)
11.	WCDMA + WLAN5.3/5.5GHz	Yes	Yes		WiFi Direct(GC only)
12.	LTE + WLAN5.3/5.5GHz	Yes	Yes		WiFi Direct(GC only)
13.	GSM Voice + WLAN5.2/5.8GHz	Yes	Yes		
14.	GPRS/EDGE + WLAN5.2/5.8GHz	Yes	Yes	Yes	WiFi Direct(GC/GO)
15.	WCDMA + WLAN5.2/5.8GHz	Yes	Yes	Yes	WiFi Direct(GC/GO)
16.	LTE + WLAN5.2/5.8GHz	Yes	Yes	Yes	WiFi Direct(GC/GO)

General Note:

- This device supported VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. 3rd party VoIP) and LTE Supports VoLTE operation.
- This device 2.4GHz WLAN supports Hotspot operation, and 5.2GHz/ 5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only).
- EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
- WLAN2.4GHz and Bluetooth share the same antenna, and cannot transmit simultaneously.
- Though EUT has independent antenna for WLAN 2.4GHz and WLAN 5GHz, 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.
- Chose the worse zoom scan SAR of WLAN2.4GHz and WLAN 5GHz SAR for co-located with WWAN analysis.
- The Scaled SAR summation is calculated based on the same configuration and test position.
- Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - Scalar SAR summation $< 1.6\text{W/kg}$.
 - $\text{SPLSR} = (\text{SAR}_1 + \text{SAR}_2)^{1.5} / (\text{min. separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - If $\text{SPLSR} \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - Simultaneously transmission SAR measurement, and the reported multi-band SAR $< 1.6\text{W/kg}$.
- For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v06 based on the formula below.
 - (max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm) $\cdot [\sqrt{f(\text{GHz})}/x] \text{ W/kg}$ for test separation distances $\leq 50 \text{ mm}$; where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
 - When the minimum separation distance is $< 5\text{mm}$, the distance is used 5mm to determine SAR test exclusion.
 - 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is $> 50 \text{ mm}$.

Bluetooth Max Power	Exposure Position	Body worn
	Test separation	15 mm
11.5 dBm	Estimated SAR (W/kg)	0.196 W/kg



16.1 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	0.194	0.728	0.296	0.083	0.92	0.49	0.28
		Right Tilted	0.123	0.728	0.296	0.057	0.85	0.42	0.18
		Left Cheek	0.262	0.728	0.296	0.044	0.99	0.56	0.31
		Left Tilted	0.118	0.728	0.296	0.040	0.85	0.41	0.16
	GSM1900	Right Cheek	0.192	0.728	0.296	0.083	0.92	0.49	0.28
		Right Tilted	0.049	0.728	0.296	0.057	0.78	0.35	0.11
		Left Cheek	0.118	0.728	0.296	0.044	0.85	0.41	0.16
		Left Tilted	0.062	0.728	0.296	0.040	0.79	0.36	0.10
WCDMA	Band V	Right Cheek	0.128	0.728	0.296	0.083	0.86	0.42	0.21
		Right Tilted	0.083	0.728	0.296	0.057	0.81	0.38	0.14
		Left Cheek	0.178	0.728	0.296	0.044	0.91	0.47	0.22
		Left Tilted	0.078	0.728	0.296	0.040	0.81	0.37	0.12
	Band II	Right Cheek	0.252	0.728	0.296	0.083	0.98	0.55	0.34
		Right Tilted	0.075	0.728	0.296	0.057	0.80	0.37	0.13
		Left Cheek	0.161	0.728	0.296	0.044	0.89	0.46	0.21
		Left Tilted	0.104	0.728	0.296	0.040	0.83	0.40	0.14
LTE	Band 2	Right Cheek	0.299	0.728	0.296	0.083	1.03	0.60	0.38
		Right Tilted	0.075	0.728	0.296	0.057	0.80	0.37	0.13
		Left Cheek	0.188	0.728	0.296	0.044	0.92	0.48	0.23
		Left Tilted	0.121	0.728	0.296	0.040	0.85	0.42	0.16
	Band 7	Right Cheek	0.079	0.728	0.296	0.083	0.81	0.38	0.16
		Right Tilted	0.033	0.728	0.296	0.057	0.76	0.33	0.09
		Left Cheek	0.095	0.728	0.296	0.044	0.82	0.39	0.14
		Left Tilted	0.063	0.728	0.296	0.040	0.79	0.36	0.10
	Band 38	Right Cheek	0.027	0.728	0.296	0.083	0.76	0.32	0.11
		Right Tilted	0.011	0.728	0.296	0.057	0.74	0.31	0.07
		Left Cheek	0.031	0.728	0.296	0.044	0.76	0.33	0.08
		Left Tilted	0.018	0.728	0.296	0.040	0.75	0.31	0.06
	Band 41	Right Cheek	0.035	0.728	0.296	0.083	0.76	0.33	0.12
		Right Tilted	0.009	0.728	0.296	0.057	0.74	0.31	0.07
		Left Cheek	0.084	0.728	0.296	0.044	0.81	0.38	0.13
		Left Tilted	0.020	0.728	0.296	0.040	0.75	0.32	0.06

16.2 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	2.4GHz WLAN	5GHz WLAN		
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
GSM	GSM850	Front	0.328	0.257	0.116	0.59	0.44
		Back	0.514	0.257	0.116	0.77	0.63
		Left side	0.314	0.257		0.57	0.31
		Right side	0.196		0.116	0.20	0.31
		Top side		0.257	0.116	0.26	0.12
		Bottom side	0.147			0.15	0.15
	GSM1900	Front	0.551	0.257	0.116	0.81	0.67
		Back	0.755	0.257	0.116	1.01	0.87
		Left side	0.104	0.257		0.36	0.10
		Right side	0.208		0.116	0.21	0.32
		Top side		0.257	0.116	0.26	0.12
		Bottom side	1.127			1.13	1.13
WCDMA	Band V	Front	0.226	0.257	0.116	0.48	0.34
		Back	0.406	0.257	0.116	0.66	0.52
		Left side	0.208	0.257		0.47	0.21
		Right side	0.133		0.116	0.13	0.25
		Top side		0.257	0.116	0.26	0.12
		Bottom side	0.094			0.09	0.09
	Band II	Front	0.571	0.257	0.116	0.83	0.69
		Back	0.971	0.257	0.116	1.23	1.09
		Left side	0.137	0.257		0.39	0.14
		Right side	0.251		0.116	0.25	0.37
		Top side		0.257	0.116	0.26	0.12
		Bottom side	1.152			1.15	1.15

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN		
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
LTE	Band 2	Front	0.672	0.257	0.116	0.93	0.79
		Back	0.768	0.257	0.116	1.03	0.88
		Left side	0.123	0.257		0.38	0.12
		Right side	0.157		0.116	0.16	0.27
		Top side		0.257	0.116	0.26	0.12
		Bottom side	0.931			0.93	0.93
	Band 7	Front	0.533	0.257	0.116	0.79	0.65
		Back	0.418	0.257	0.116	0.68	0.53
		Left side	0.107	0.257		0.36	0.11
		Right side	0.240		0.116	0.24	0.36
		Top side		0.257	0.116	0.26	0.12
		Bottom side	1.054			1.05	1.05
	Band 38	Front	0.527	0.257	0.116	0.78	0.64
		Back	0.375	0.257	0.116	0.63	0.49
		Left side	0.098	0.257		0.36	0.10
		Right side	0.075		0.116	0.08	0.19
		Top side		0.257	0.116	0.26	0.12
		Bottom side	0.889			0.89	0.89
	Band 41	Front	0.454	0.257	0.116	0.71	0.57
		Back	0.351	0.257	0.116	0.61	0.47
		Left side	0.091	0.257		0.35	0.09
		Right side	0.098		0.116	0.10	0.21
		Top side		0.257	0.116	0.26	0.12
		Bottom side	0.792			0.79	0.79

16.3 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)	Estimated 1g SAR (W/kg)			
GSM	GSM850	Front	0.282	0.050	0.101	0.196	0.33	0.38	0.48
		Back	0.409	0.050	0.101	0.196	0.46	0.51	0.61
	GSM1900	Front	0.223	0.050	0.101	0.196	0.27	0.32	0.42
		Back	0.264	0.050	0.101	0.196	0.31	0.37	0.46
WCDMA	Band V	Front	0.197	0.050	0.101	0.196	0.25	0.30	0.39
		Back	0.304	0.050	0.101	0.196	0.35	0.41	0.50
	Band II	Front	0.450	0.050	0.101	0.196	0.50	0.55	0.65
		Back	0.632	0.050	0.101	0.196	0.68	0.73	0.83
LTE	Band 2	Front	0.443	0.050	0.101	0.196	0.49	0.54	0.64
		Back	0.523	0.050	0.101	0.196	0.57	0.62	0.72
	Band 7	Front	0.600	0.050	0.101	0.196	0.65	0.70	0.80
		Back	0.503	0.050	0.101	0.196	0.55	0.60	0.70
	Band 38	Front	0.381	0.050	0.101	0.196	0.43	0.48	0.58
		Back	0.336	0.050	0.101	0.196	0.39	0.44	0.53
	Band 41	Front	0.361	0.050	0.101	0.196	0.41	0.46	0.56
		Back	0.342	0.050	0.101	0.196	0.39	0.44	0.54

Test Engineer : Frank Qiao

17. Uncertainty Assessment

The component of uncertainty may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainty by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in table below.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor ^(a)	$1/k^{(b)}$	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) k is the coverage factor

Table 17.1. Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	6.0	N	1	1	1	6.0	6.0
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	1.0	R	1.732	1	1	0.6	0.6
Linearity	4.7	R	1.732	1	1	2.7	2.7
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6
Modulation Response	3.2	R	1.732	1	1	1.8	1.8
Readout Electronics	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	R	1.732	1	1	0.0	0.0
Integration Time	2.6	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2
Probe Positioning	2.9	R	1.732	1	1	1.7	1.7
Max. SAR Eval.	2.0	R	1.732	1	1	1.2	1.2
Test Sample Related							
Device Positioning	3.0	N	1	1	1	3.0	3.0
Device Holder	3.6	N	1	1	1	3.6	3.6
Power Drift	5.0	R	1.732	1	1	2.9	2.9
Power Scaling	0.0	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.1	R	1.732	1	1	3.5	3.5
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						11.4%	11.4%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						22.9%	22.7%

Table 17.2. Uncertainty Budget for frequency range 300 MHz to 3 GHz

Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	7.0	N	1	1	1	7.0	7.0
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	2.0	R	1.732	1	1	1.2	1.2
Linearity	4.7	R	1.732	1	1	2.7	2.7
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6
Modulation Response	3.2	R	1.732	1	1	1.8	1.8
Readout Electronics	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	R	1.732	1	1	0.0	0.0
Integration Time	2.6	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2
Probe Positioning	6.7	R	1.732	1	1	3.9	3.9
Max. SAR Eval.	4.0	R	1.732	1	1	2.3	2.3
Test Sample Related							
Device Positioning	3.0	N	1	1	1	3.0	3.0
Device Holder	3.6	N	1	1	1	3.6	3.6
Power Drift	5.0	R	1.732	1	1	2.9	2.9
Power Scaling	0.0	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.6	R	1.732	1	1	3.8	3.8
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						12.8%	12.7%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						25.5%	25.4%

Table 17.3. Uncertainty Budget for frequency range 3 GHz to 6 GHz

18. 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 D05A v01r02, "Rel. 10 LTE SAR Test Guidance and KDB Inquiries", Oct 2015
- [11] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.
- [12] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [13] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.



Appendix A. Plots of System Performance Check

The plots are shown as follows.

System Check_Head_835MHz_160611**DUT: D835V2 - SN:4d091**

Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL_850_160611 Medium parameters used: $f = 835$ MHz; $\sigma = 0.918$ S/m; $\epsilon_r = 42.139$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.1, 10.1, 10.1); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM2; Type: SAM; Serial: TP-1542
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 3.08 W/kg

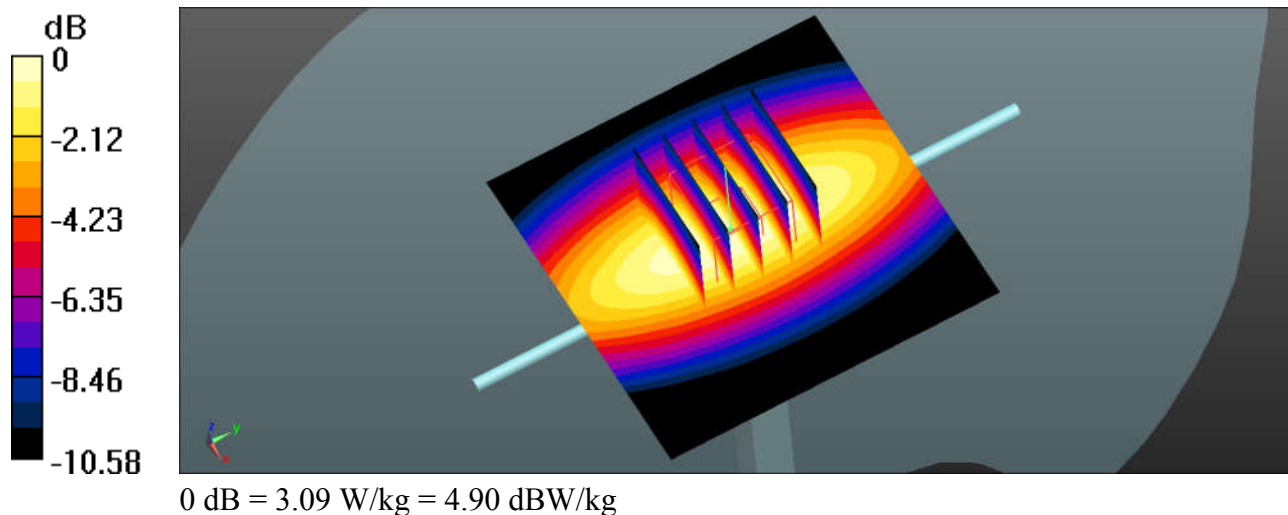
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 53.32 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 3.59 W/kg

SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.6 W/kg

Maximum value of SAR (measured) = 3.09 W/kg



System Check_Head_1900MHz_160527**DUT: D1900V2 - SN:5d118**

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL_1900_160527 Medium parameters used: $f = 1900$ MHz; $\sigma = 1.416$ S/m; $\epsilon_r = 40.54$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(7.38, 7.38, 7.38); Calibrated: 2015.6.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn917; Calibrated: 2015.12.14
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 14.7 W/kg

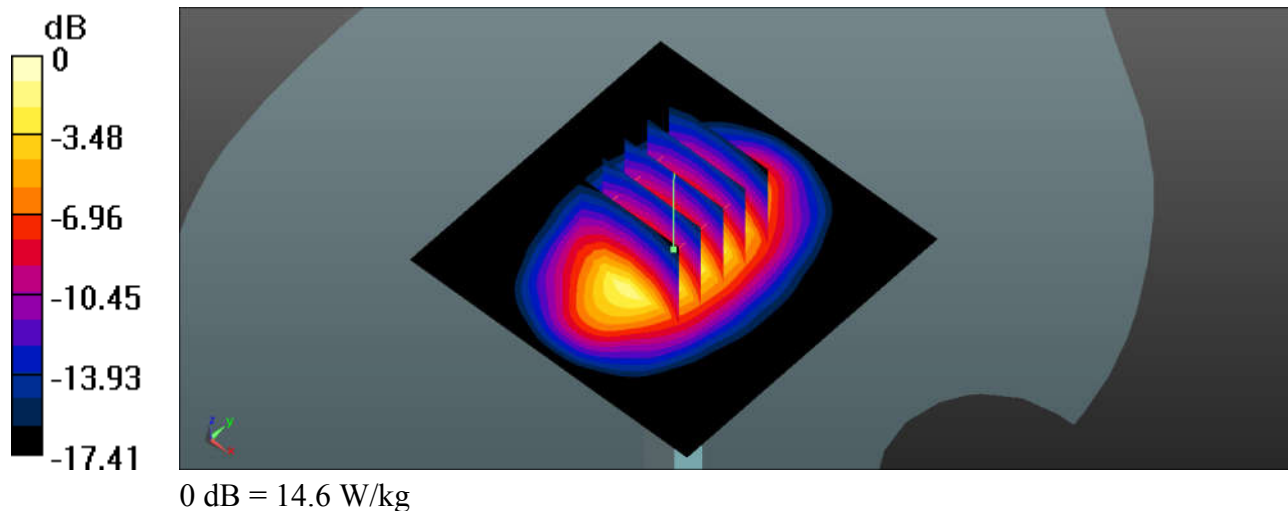
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 90.04 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 18.6 W/kg

SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.34 W/kg

Maximum value of SAR (measured) = 14.6 W/kg



System Check_Head_2450MHz_160608**DUT: D2450V2 - SN:840**

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL_2450_160608 Medium parameters used: $f = 2450$ MHz; $\sigma = 1.822$ S/m; $\epsilon_r = 37.986$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3661; ConvF(7.32, 7.32, 7.32); Calibrated: 2016.5.11;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn917; Calibrated: 2015.12.14
- Phantom: SAM2; Type: SAM; Serial: TP-1477
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 20.4 W/kg

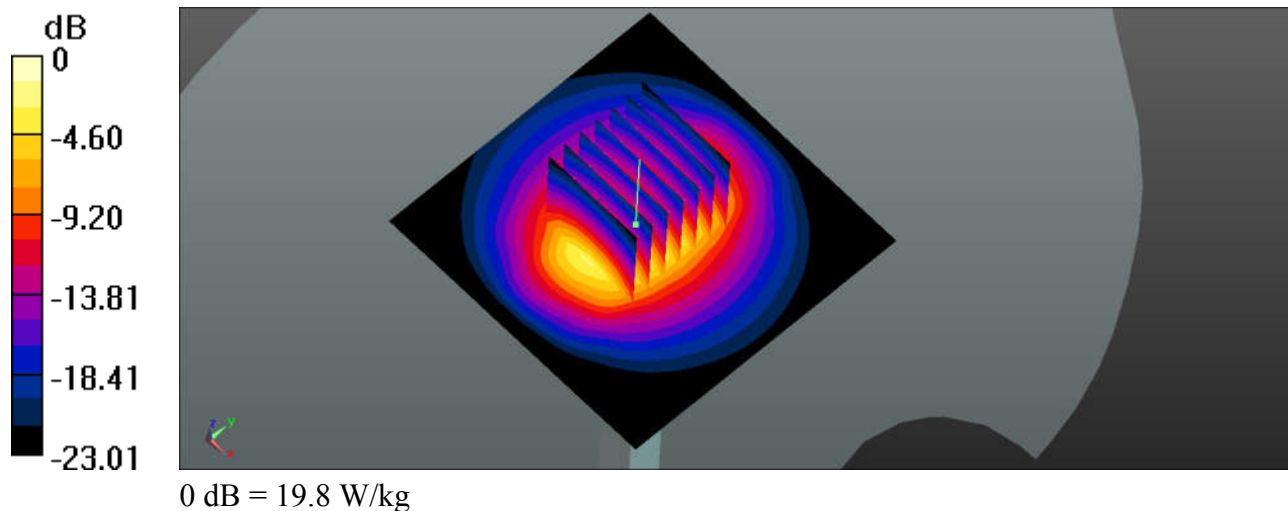
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.66 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 26.8 W/kg

SAR(1 g) = 12.8 W/kg; SAR(10 g) = 5.81 W/kg

Maximum value of SAR (measured) = 19.8 W/kg



System Check_Head_2450MHz_160713**DUT: D2450V2 - SN:840**

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL_2450_160713 Medium parameters used: $f = 2450$ MHz; $\sigma = 1.82$ S/m; $\epsilon_r = 39.225$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(7.32, 7.32, 7.32); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2016.5.18
- Phantom: SAM1; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 20.0 W/kg

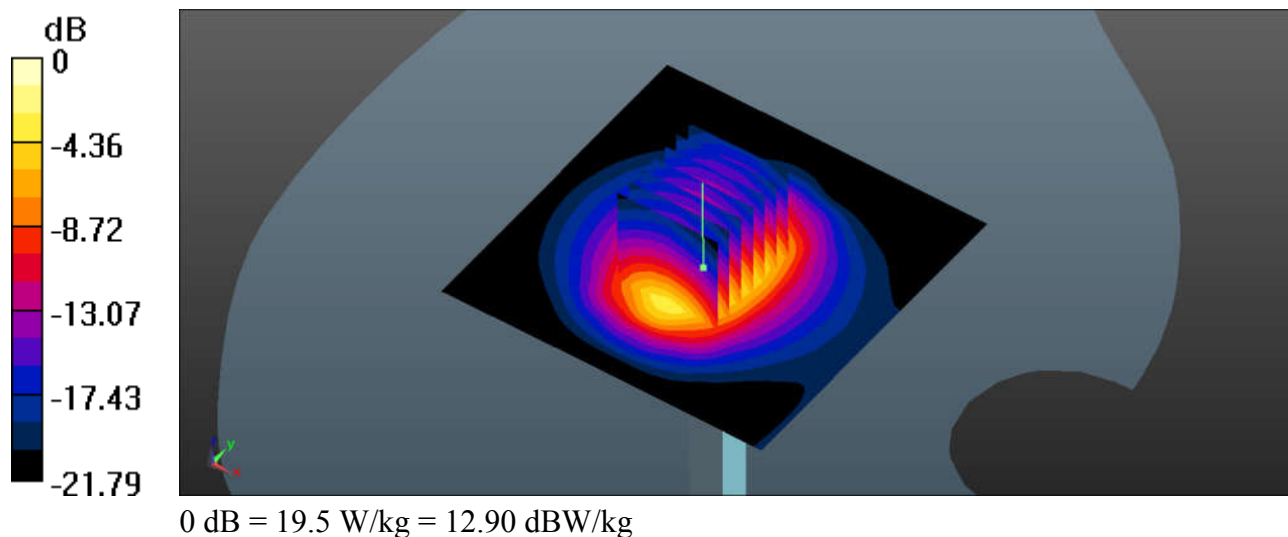
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.71 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 26.4 W/kg

SAR(1 g) = 12.7 W/kg; SAR(10 g) = 5.89 W/kg

Maximum value of SAR (measured) = 19.5 W/kg



System Check_Head_2600MHz_160528**DUT: D2600V2 - SN:1061**

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: HSL_2600_160528 Medium parameters used: $f = 2600$ MHz; $\sigma = 1.981$ S/m; $\epsilon_r = 38.254$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(6.6, 6.6, 6.6); Calibrated: 2015.6.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn917; Calibrated: 2015.12.14
- Phantom: SAM2; Type: SAM; Serial: TP-1477
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 23.0 W/kg

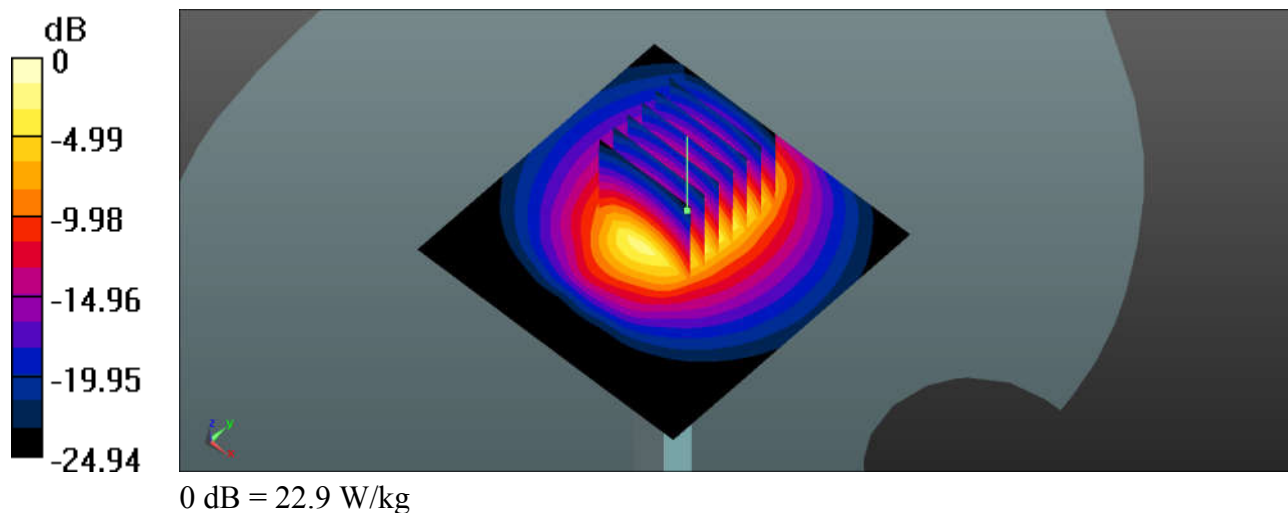
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.01 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 31.5 W/kg

SAR(1 g) = 14.5 W/kg; SAR(10 g) = 6.4 W/kg

Maximum value of SAR (measured) = 22.9 W/kg



System Check_Head_5250MHz_160606**DUT: D5GHzV2 - SN:1113**

Communication System: UID 0, CW (0); Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: HSL_5000_160606 Medium parameters used: $f = 5250$ MHz; $\sigma = 4.873$ S/m; $\epsilon_r = 35.366$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.97, 4.97, 4.97); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical SurfaceDetection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM1; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 15.6 W/kg

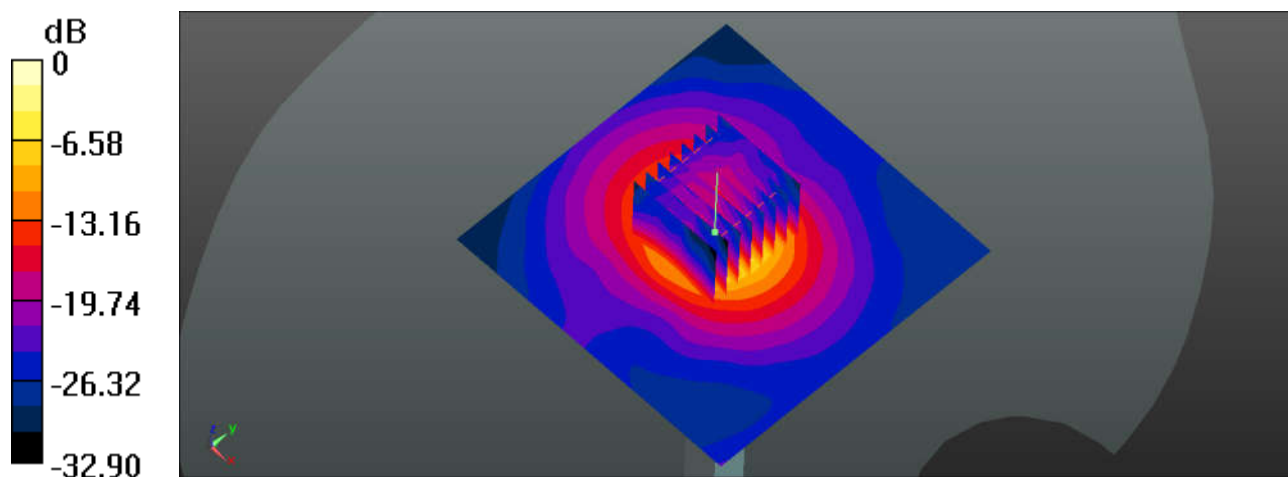
Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 40.56 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 29.5 W/kg

SAR(1 g) = 7.93 W/kg; SAR(10 g) = 2.34 W/kg

Maximum value of SAR (measured) = 18.5 W/kg



0 dB = 18.5 W/kg = 12.67 dBW/kg

System Check_Head_5600MHz_160606**DUT: D5GHzV2 - SN:1113**

Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: HSL_5000_160606 Medium parameters used: $f = 5600$ MHz; $\sigma = 5.23$ S/m; $\epsilon_r = 34.7$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.37, 4.37, 4.37); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM1; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 21.3 W/kg

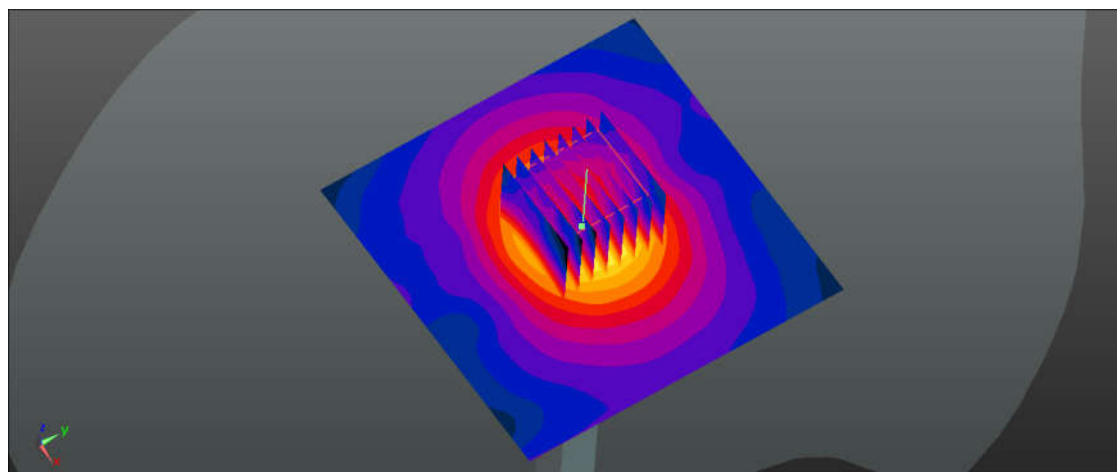
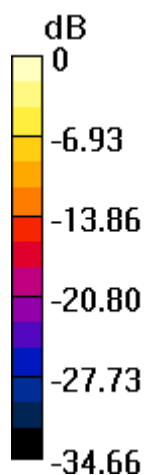
Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 41.91 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 33.1 W/kg

SAR(1 g) = 8.81 W/kg; SAR(10 g) = 2.62 W/kg

Maximum value of SAR (measured) = 21.1 W/kg



0 dB = 21.1 W/kg = 13.24 dBW/kg

System Check_Head_5750MHz_160606**DUT: D5GHzV2 - SN:1113**

Communication System: UID 0, CW (0); Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: HSL_5000_160606 Medium parameters used: $f = 5750$ MHz; $\sigma = 5.389$ S/m; $\epsilon_r = 34.463$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.38, 4.38, 4.38); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical SurfaceDetection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM1; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 15.7 W/kg

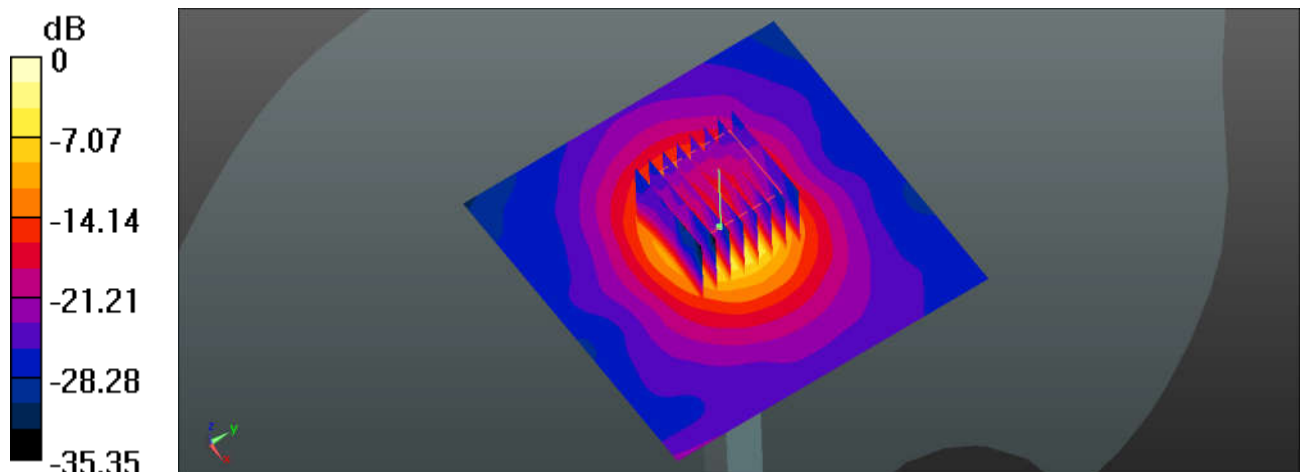
Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 38.42 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 31.0 W/kg

SAR(1 g) = 7.81 W/kg; SAR(10 g) = 2.31 W/kg

Maximum value of SAR (measured) = 18.9 W/kg



0 dB = 18.9 W/kg = 12.76 dBW/kg

System Check_Body_835MHz_160609**DUT: D835V2 - SN:4d091**

Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1

Medium: MSL_850_160609 Medium parameters used: $f = 835$ MHz; $\sigma = 1$ S/m; $\epsilon_r = 53.704$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.17, 10.17, 10.17); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM2; Type: SAM; Serial: TP-1542
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 3.17 W/kg

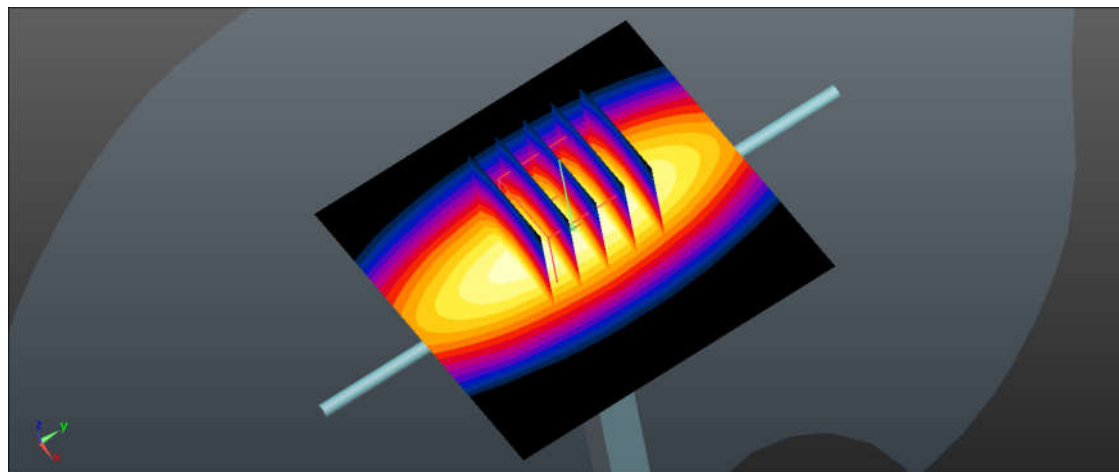
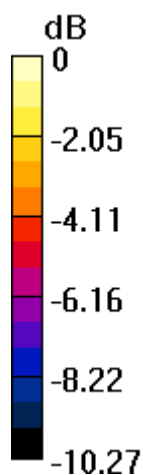
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 52.39 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 3.58 W/kg

SAR(1 g) = 2.52 W/kg; SAR(10 g) = 1.63 W/kg

Maximum value of SAR (measured) = 3.19 W/kg



0 dB = 3.19 W/kg

System Check_Body_1900MHz_160610**DUT: D1900V2 - SN:5d118**

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL_1900_160610 Medium parameters used: $f = 1900$ MHz; $\sigma = 1.558$ S/m; $\epsilon_r = 52.841$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(7.14, 7.14, 7.14); Calibrated: 2015.6.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn917; Calibrated: 2015.12.14
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 14.7 W/kg

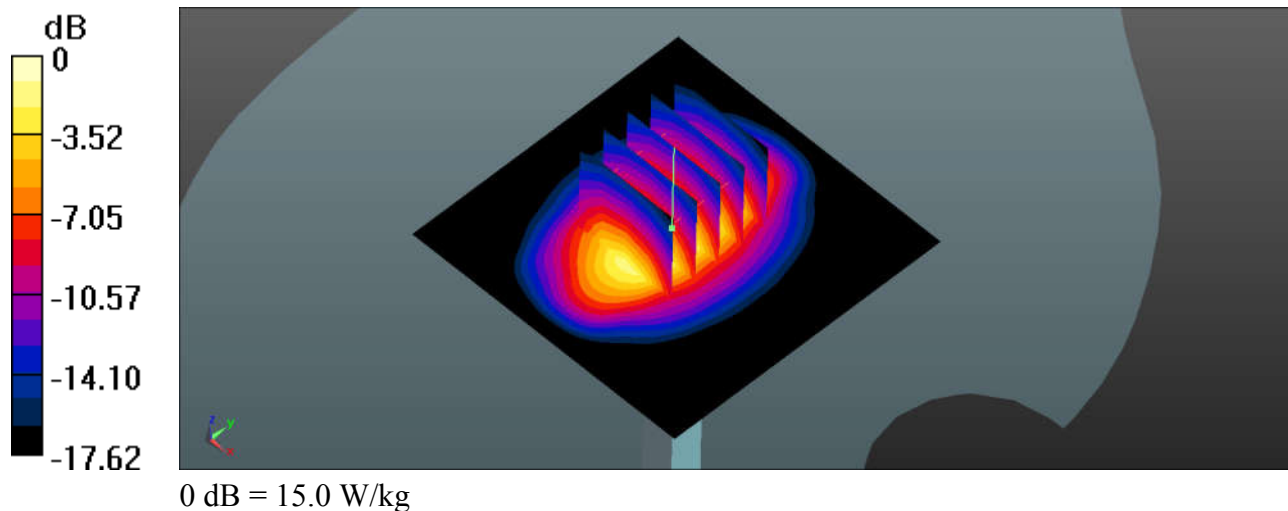
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 84.14 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 18.8 W/kg

SAR(1 g) = 10.5 W/kg; SAR(10 g) = 5.46 W/kg

Maximum value of SAR (measured) = 15.0 W/kg



System Check_Body_2450MHz_160614**DUT: D2450V2 - SN:840**

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: MSL_2450_160614 Medium parameters used: $f = 2450$ MHz; $\sigma = 1.989$ S/m; $\epsilon_r = 51.422$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(7.45, 7.45, 7.45); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1279; Calibrated: 2016.4.4
- Phantom: SAM2; Type: SAM; Serial: TP-1542
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 19.3 W/kg

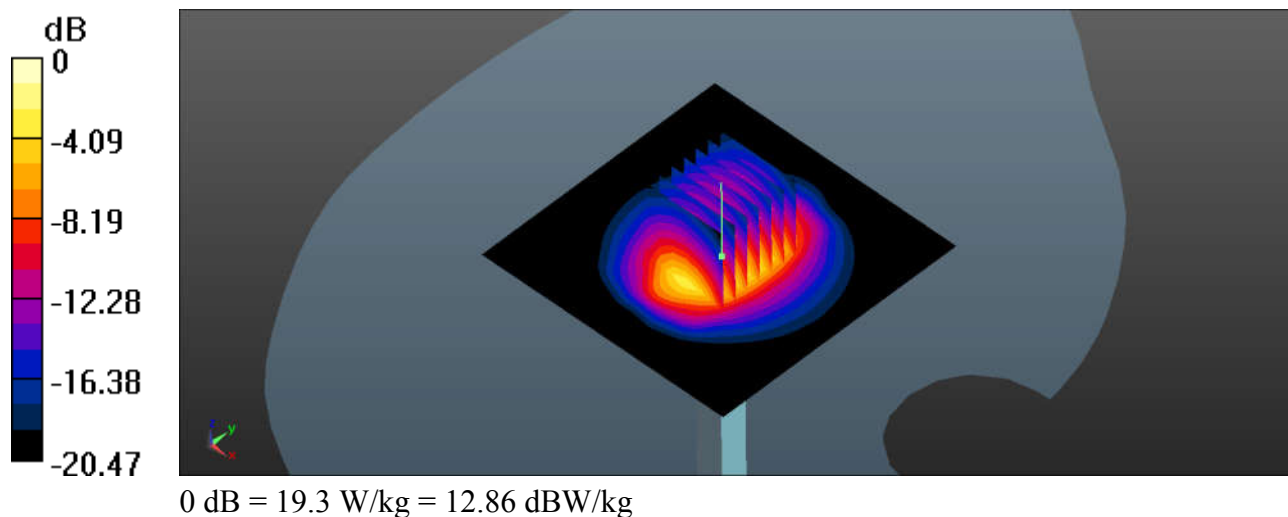
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 86.13 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 25.2 W/kg

SAR(1 g) = 12.8 W/kg; SAR(10 g) = 6.1 W/kg

Maximum value of SAR (measured) = 19.3 W/kg



System Check_Body_2600MHz_160613**DUT: D2600V2 - SN:1061**

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: MSL_2600_160613 Medium parameters used: $f = 2600$ MHz; $\sigma = 2.132$ S/m; $\epsilon_r = 52.902$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3661; ConvF(7.29, 7.29, 7.29); Calibrated: 2016.5.11;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn917; Calibrated: 2015.12.14
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 19.9 W/kg

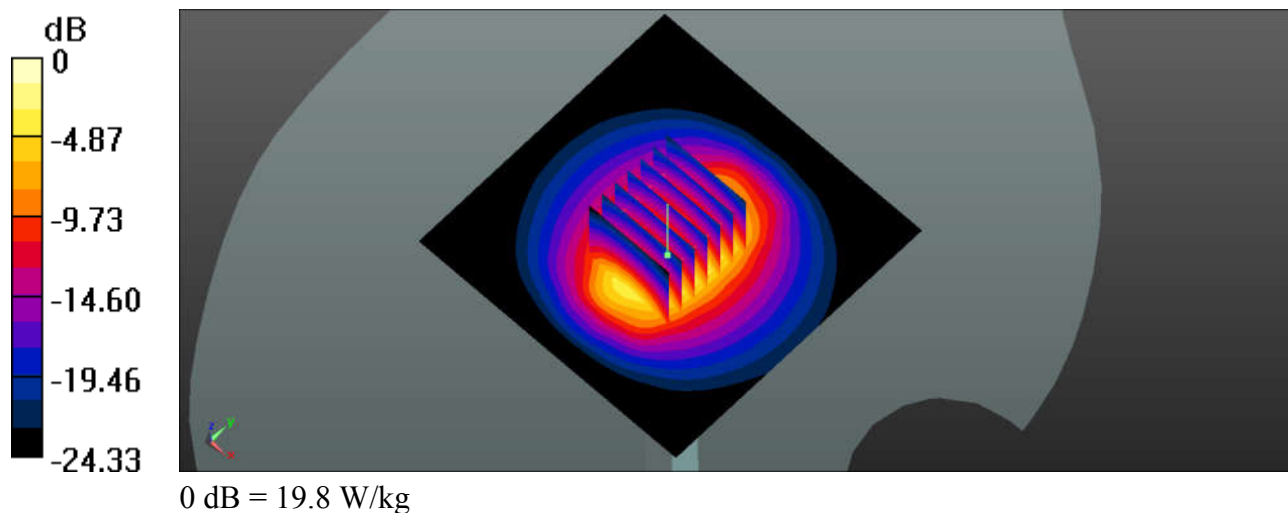
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 81.53 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 27.1 W/kg

SAR(1 g) = 12.7 W/kg; SAR(10 g) = 5.74 W/kg

Maximum value of SAR (measured) = 19.8 W/kg



System Check_Body_5250MHz_160611**DUT: D5GHzV2 - SN:1113**

Communication System: UID 0, CW (0); Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: MSL_5000_160611 Medium parameters used: $f = 5250$ MHz; $\sigma = 5.433$ S/m; $\epsilon_r = 48.099$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.25, 4.25, 4.25); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical SurfaceDetection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM1; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 16.2 W/kg

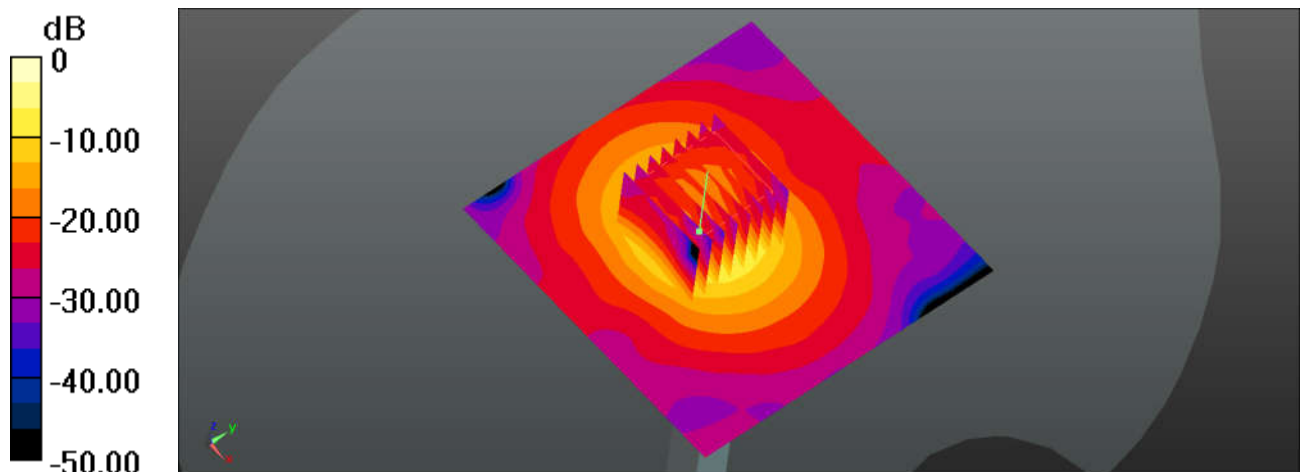
Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 33.20 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 27.7 W/kg

SAR(1 g) = 7.76 W/kg; SAR(10 g) = 2.29 W/kg

Maximum value of SAR (measured) = 18.3 W/kg



0 dB = 18.3 W/kg = 12.62 dBW/kg

System Check_Body_5600MHz_160611**DUT: D5GHzV2 - SN:1113**

Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: MSL_5000_160611 Medium parameters used: $f = 5600$ MHz; $\sigma = 5.932$ S/m; $\epsilon_r = 47.427$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(3.65, 3.65, 3.65); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical SurfaceDetection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM1; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 17.1 W/kg

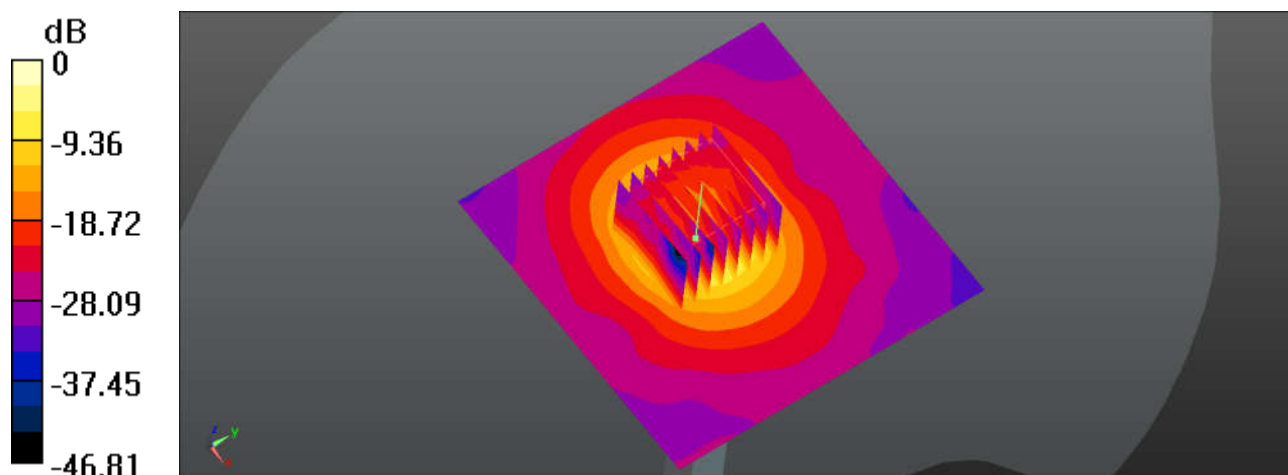
Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 32.92 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 29.8 W/kg

SAR(1 g) = 8.16 W/kg; SAR(10 g) = 2.37 W/kg

Maximum value of SAR (measured) = 20.2 W/kg



0 dB = 20.2 W/kg = 13.05 dBW/kg

System Check_Body_5750MHz_160611**DUT: D5GHzV2 - SN:1113**

Communication System: UID 0, CW (0); Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: MSL_5000_160611 Medium parameters used: $f = 5750$ MHz; $\sigma = 6.16$ S/m; $\epsilon_r = 47.112$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(3.77, 3.77, 3.77); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical SurfaceDetection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM1; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 15.6 W/kg

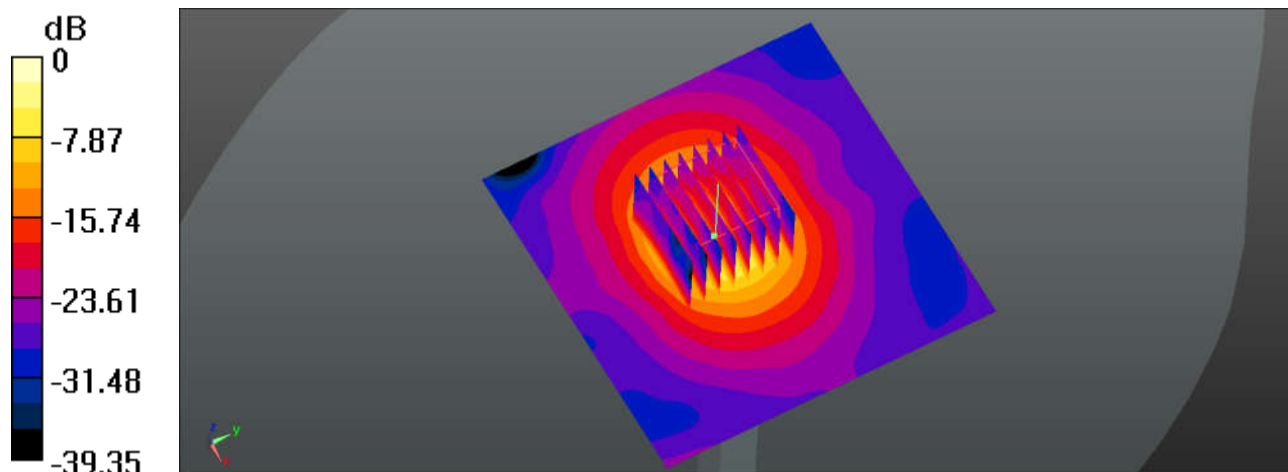
Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 30.92 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 29.2 W/kg

SAR(1 g) = 7.45 W/kg; SAR(10 g) = 2.16 W/kg

Maximum value of SAR (measured) = 19.0 W/kg



0 dB = 19.0 W/kg = 12.79 dBW/kg



Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

01_GSM850_GPRS 4 Tx slots_Left Cheek_0mm_Ch251

Communication System: UID 0, GPRS/EDGE (4 Tx slots) (0); Frequency: 848.8 MHz; Duty Cycle: 1:2.08

Medium: HSL_850_160611 Medium parameters used: $f = 848.8$ MHz; $\sigma = 0.93$ S/m; $\epsilon_r = 41.971$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.1, 10.1, 10.1); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM2; Type: SAM; Serial: TP-1542
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch251/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.313 W/kg

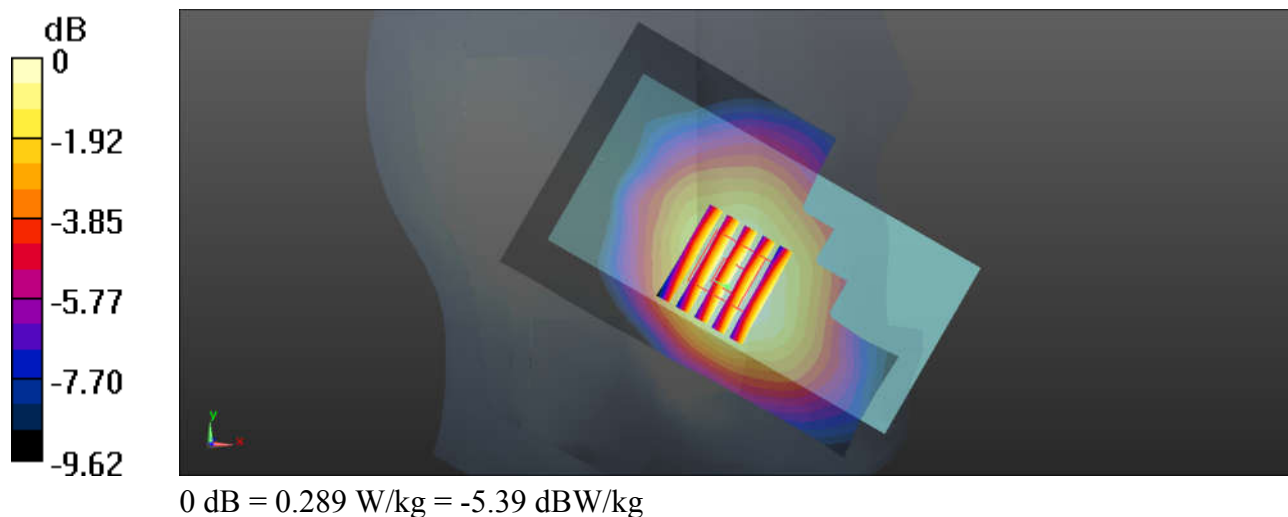
Ch251/Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.712 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.307 W/kg

SAR(1 g) = 0.259 W/kg; SAR(10 g) = 0.202 W/kg

Maximum value of SAR (measured) = 0.289 W/kg



02_GSM1900_GPRS 3 Tx slots_Right Cheek_0mm_Ch810

Communication System: UID 0, GPRS/EDGE (3 Tx slots) (0); Frequency: 1909.8 MHz; Duty Cycle: 1:2.77

Medium: HSL_1900_160527 Medium parameters used: $f = 1909.8$ MHz; $\sigma = 1.426$ S/m; $\epsilon_r = 40.495$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(7.38, 7.38, 7.38); Calibrated: 2015.6.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn917; Calibrated: 2015.12.14
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch810/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.210 W/kg

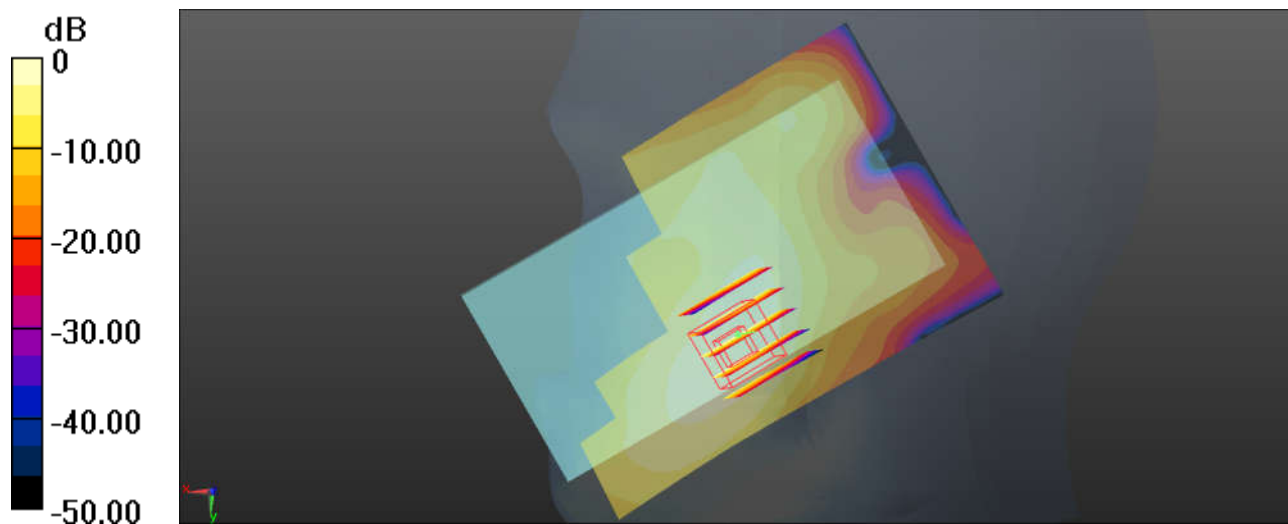
Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.232 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.264 W/kg

SAR(1 g) = 0.167 W/kg; SAR(10 g) = 0.102 W/kg

Maximum value of SAR (measured) = 0.210 W/kg



0 dB = 0.210 W/kg = -6.78 dBW/kg

03_WCDMA Band V_RMC 12.2Kbps_Left Cheek_0mm_Ch4182

Communication System: UID 0, UMTS (0); Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium: HSL_850_160611 Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.919$ S/m; $\epsilon_r = 42.123$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.1, 10.1, 10.1); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM2; Type: SAM; Serial: TP-1542
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch4182/Area Scan (71x111x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 0.186 W/kg

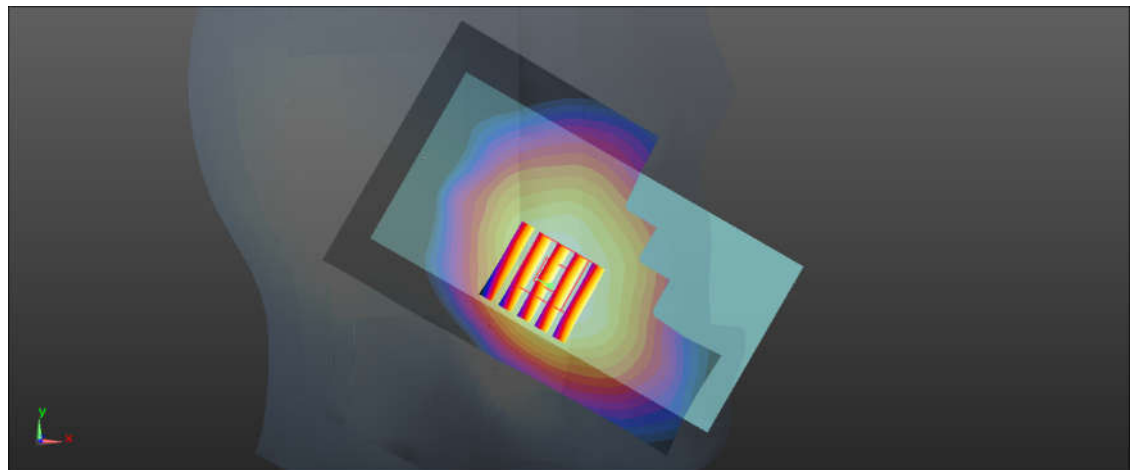
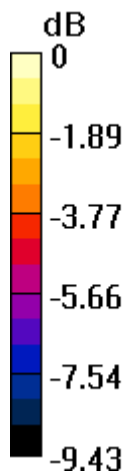
Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 2.636 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.186 W/kg

SAR(1 g) = 0.157 W/kg; SAR(10 g) = 0.123 W/kg

Maximum value of SAR (measured) = 0.174 W/kg



0 dB = 0.174 W/kg = -7.59 dBW/kg

04_WCDMA Band II_RMC 12.2Kbps_Right Cheek_0mm_Ch9538

Communication System: UID 0, UMTS (0); Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: HSL_1900_160527 Medium parameters used: $f = 1907.6$ MHz; $\sigma = 1.424$ S/m; $\epsilon_r = 40.505$; ρ

≈ 1000 kg/m³

Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(7.38, 7.38, 7.38); Calibrated: 2015.6.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn917; Calibrated: 2015.12.14
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch9538/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 0.436 W/kg

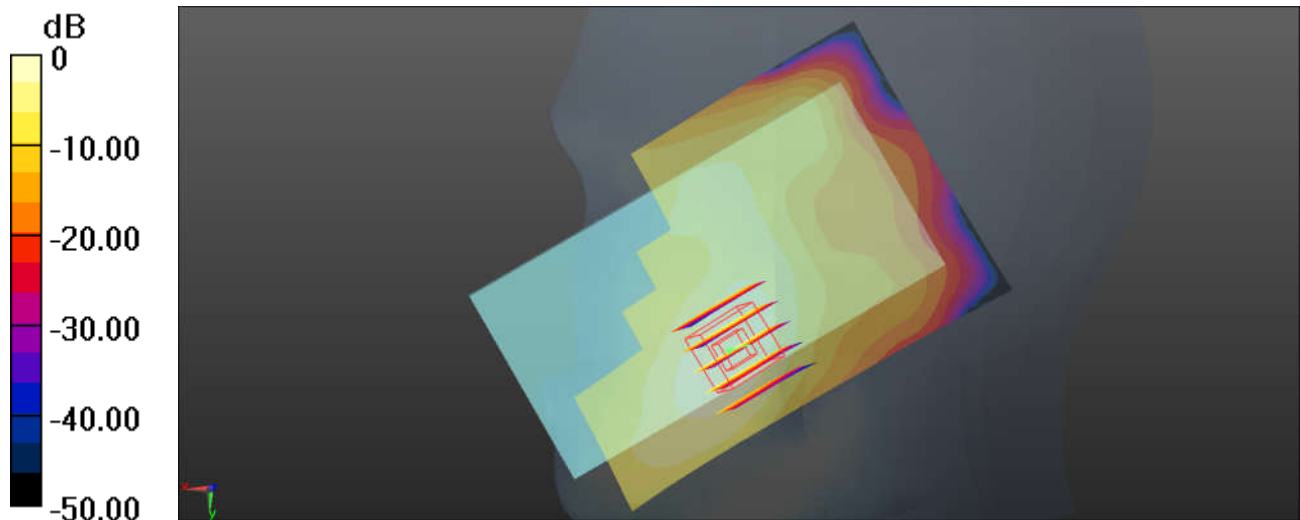
Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 3.165 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.499 W/kg

SAR(1 g) = 0.241 W/kg; SAR(10 g) = 0.152 W/kg

Maximum value of SAR (measured) = 0.431 W/kg



0 dB = 0.436 W/kg = -3.61 dBW/kg

05_LTE Band 2_20M_QPSK_1RB_49Offset_Right Cheek_0mm_Ch18700

Communication System: UID 0, FDD_LTE (0); Frequency: 1860 MHz; Duty Cycle: 1:1
Medium: HSL_1900_160527 Medium parameters used: $f = 1860$ MHz; $\sigma = 1.376$ S/m; $\epsilon_r = 40.709$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(7.38, 7.38, 7.38); Calibrated: 2015.6.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn917; Calibrated: 2015.12.14
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch18700/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.350 W/kg

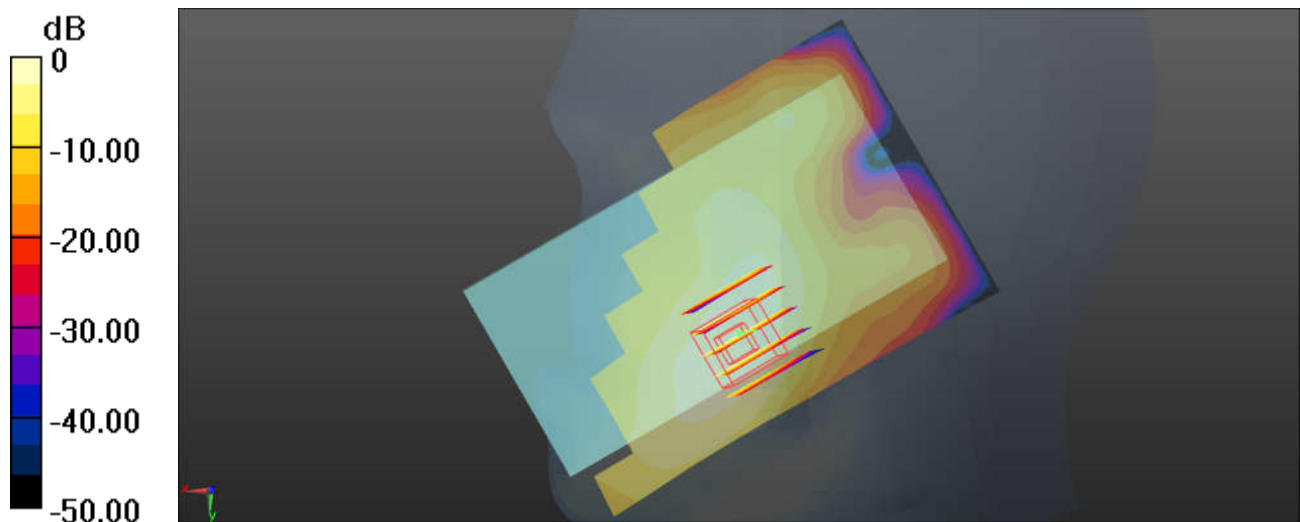
Ch18700/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.409 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.411 W/kg

SAR(1 g) = 0.272 W/kg; SAR(10 g) = 0.167 W/kg

Maximum value of SAR (measured) = 0.335 W/kg



0 dB = 0.350 W/kg = -4.56 dBW/kg

06_LTE Band 7_20M_QPSK_1RB_49Offset_Left Cheek_0mm_Ch20850

Communication System: UID 0, FDD_LTE (0); Frequency: 2510 MHz; Duty Cycle: 1:1

Medium: HSL_2600_160528 Medium parameters used: $f = 2510$ MHz; $\sigma = 1.9$ S/m; $\epsilon_r = 38.66$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(6.6, 6.6, 6.6); Calibrated: 2015.6.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn917; Calibrated: 2015.12.14
- Phantom: SAM2; Type: SAM; Serial: TP-1477
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20850/Area Scan (81x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.117 W/kg

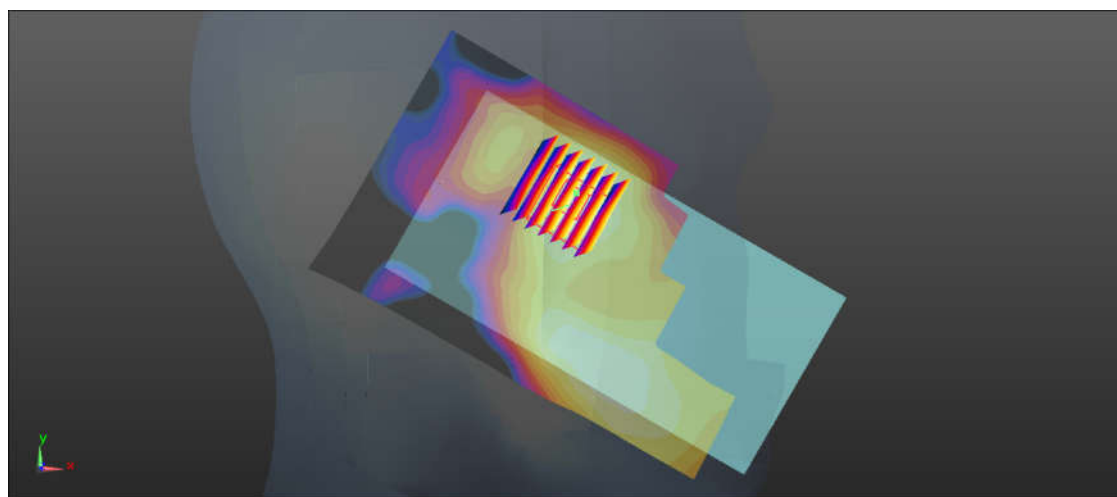
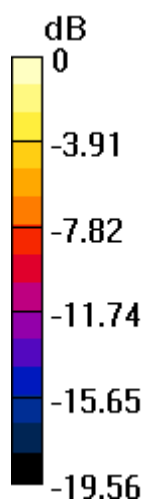
Ch20850/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.737 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.148 W/kg

SAR(1 g) = 0.088 W/kg; SAR(10 g) = 0.050 W/kg

Maximum value of SAR (measured) = 0.119 W/kg



0 dB = 0.119 W/kg = -9.24 dBW/kg

07_LTE Band 38_20M_QPSK_1RB_49Offset_Left Cheek_0mm_Ch38000

Communication System: UID 0, TDD_LTE (0); Frequency: 2595 MHz; Duty Cycle: 1:1.59

Medium: HSL_2600_160528 Medium parameters used: $f = 2595$ MHz; $\sigma = 1.975$ S/m; $\epsilon_r = 38.275$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(6.6, 6.6, 6.6); Calibrated: 2015.6.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn917; Calibrated: 2015.12.14
- Phantom: SAM2; Type: SAM; Serial: TP-1477
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch38000/Area Scan (81x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.0631 W/kg

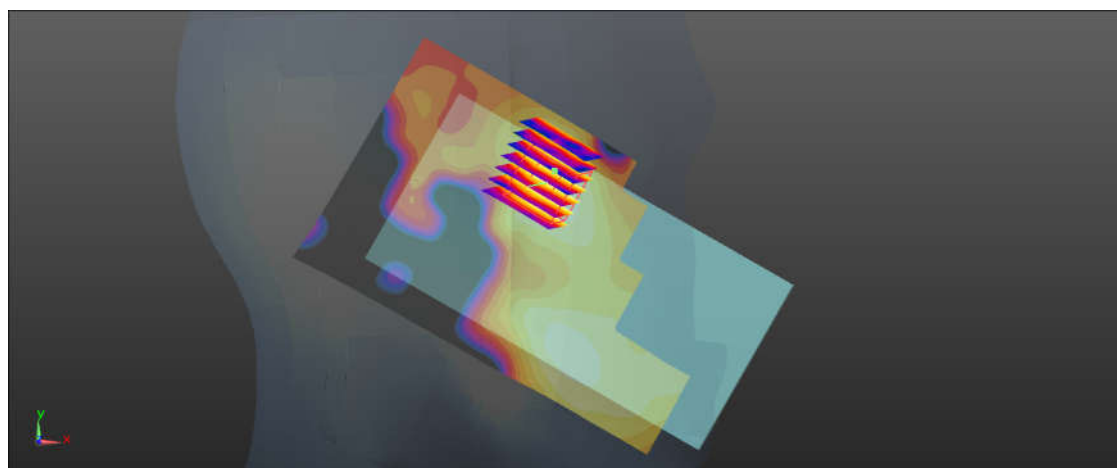
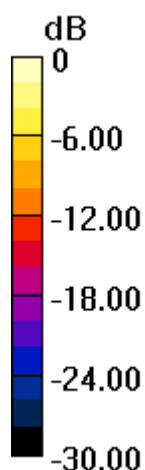
Ch38000/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.740 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.0810 W/kg

SAR(1 g) = 0.027 W/kg; SAR(10 g) = 0.012 W/kg

Maximum value of SAR (measured) = 0.0607 W/kg



0 dB = 0.0631 W/kg = -12.00 dBW/kg

08_LTE Band 41_20M_QPSK_1RB_49Offset_Left Cheek_0mm_Ch41140

Communication System: UID 0, TDD_LTE (0); Frequency: 2645 MHz; Duty Cycle: 1:1.59

Medium: HSL_2600_160528 Medium parameters used: $f = 2645$ MHz; $\sigma = 2.028$ S/m; $\epsilon_r = 38.081$; ρ

$= 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(6.6, 6.6, 6.6); Calibrated: 2015.6.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn917; Calibrated: 2015.12.14
- Phantom: SAM2; Type: SAM; Serial: TP-1477
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch41140/Area Scan (81x151x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm

Maximum value of SAR (interpolated) = 0.108 W/kg

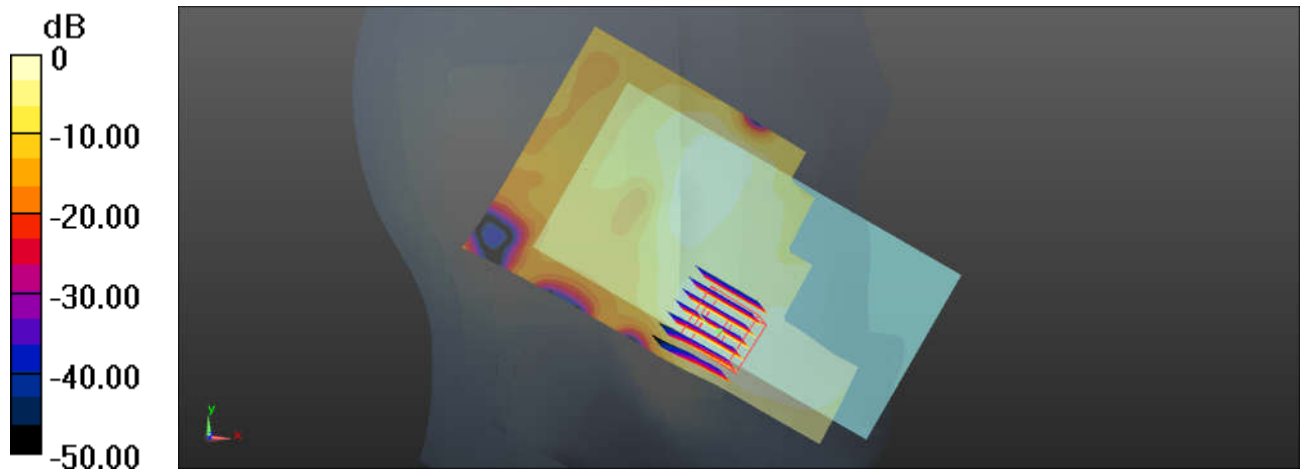
Ch41140/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 2.716 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.153 W/kg

SAR(1 g) = 0.081 W/kg; SAR(10 g) = 0.044 W/kg

Maximum value of SAR (measured) = 0.117 W/kg



0 dB = 0.108 W/kg = -9.67 dBW/kg

09_WLAN2.4GHz_802.11b 1Mbps_Right Cheek_0mm_Ch1

Communication System: UID 0, WIFI (0); Frequency: 2412 MHz; Duty Cycle: 1:1.024

Medium: HSL_2450_160608 Medium parameters used: $f = 2412$ MHz; $\sigma = 1.785$ S/m; $\epsilon_r = 38.135$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3661; ConvF(7.32, 7.32, 7.32); Calibrated: 2016.5.11;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn917; Calibrated: 2015.12.14
- Phantom: SAM2; Type: SAM; Serial: TP-1477
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1/Area Scan (81x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.926 W/kg

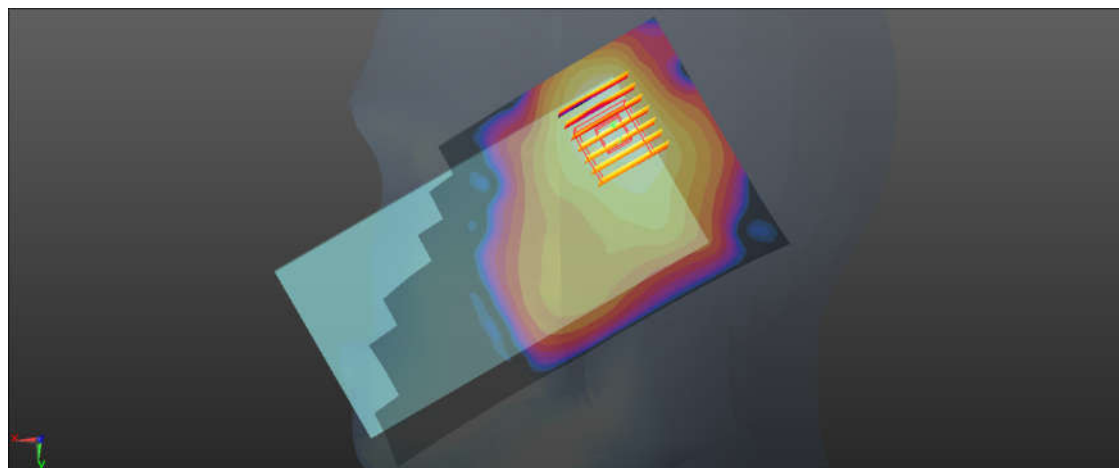
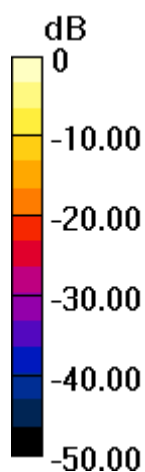
Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.73 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 1.75 W/kg

SAR(1 g) = 0.698 W/kg; SAR(10 g) = 0.268 W/kg

Maximum value of SAR (measured) = 1.27 W/kg



0 dB = 0.926 W/kg = -0.33 dBW/kg

10_WLAN5.3GHz_802.11a 6Mbps_Left Cheek_0mm_Ch52

Communication System: UID 0, WIFI (0); Frequency: 5260 MHz; Duty Cycle: 1:1.146

Medium: HSL_5000_160606 Medium parameters used: $f = 5260$ MHz; $\sigma = 4.882$ S/m; $\epsilon_r = 35.354$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.97, 4.97, 4.97); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM1; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch52/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.460 W/kg

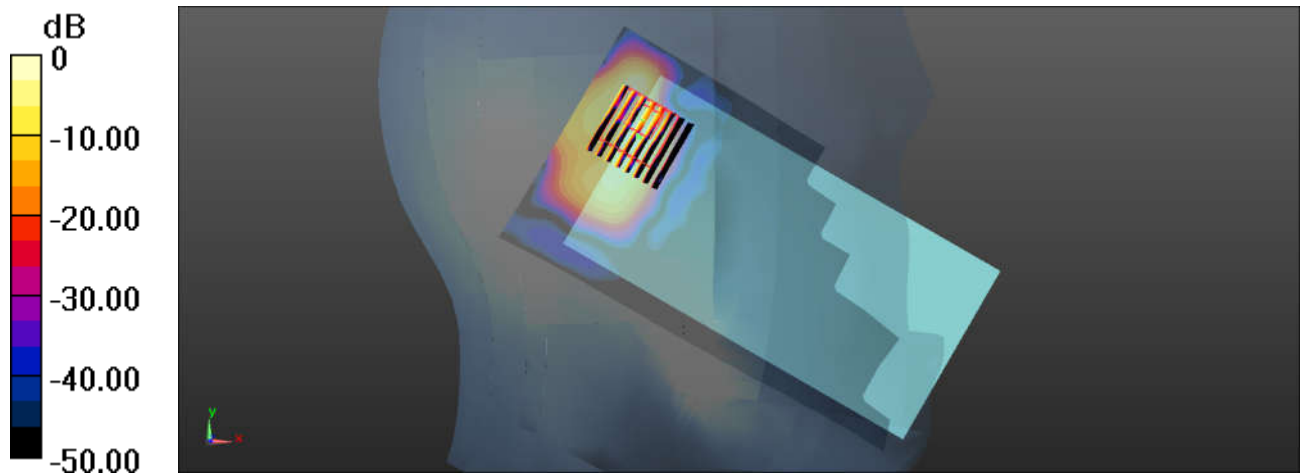
Ch52/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 5.877 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 1.29 W/kg

SAR(1 g) = 0.148 W/kg; SAR(10 g) = 0.034 W/kg

Maximum value of SAR (measured) = 0.444 W/kg



0 dB = 0.444 W/kg = -3.53 dBW/kg

11_WLAN5.5GHz_802.11a 6Mbps_Left Cheek_0mm_Ch100

Communication System: UID 0, WIFI (0); Frequency: 5500 MHz; Duty Cycle: 1:1.146

Medium: HSL_5000_160606 Medium parameters used: $f = 5500$ MHz; $\sigma = 5.133$ S/m; $\epsilon_r = 34.941$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.37, 4.37, 4.37); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM1; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch100/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.956 W/kg

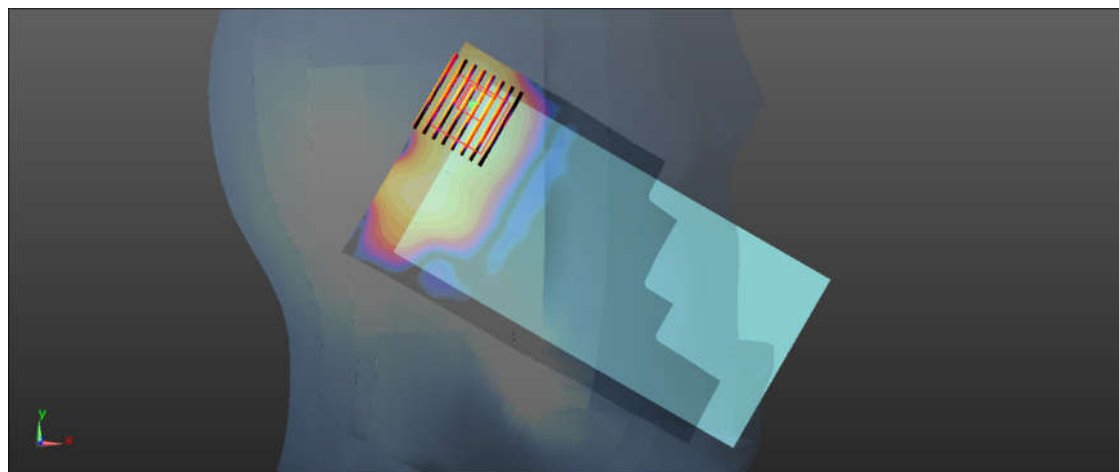
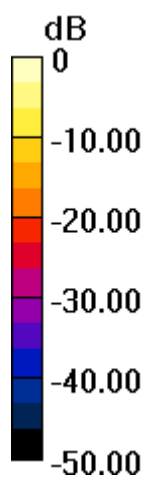
Ch100/Zoom Scan (9x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 5.639 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.805 W/kg

SAR(1 g) = 0.222 W/kg; SAR(10 g) = 0.065 W/kg

Maximum value of SAR (measured) = 0.537 W/kg



0 dB = 0.537 W/kg = -2.70 dBW/kg

12_WLAN5.8GHz_802.11a 6Mbps_Left Cheek_0mm_Ch165

Communication System: UID 0, WIFI (0); Frequency: 5825 MHz; Duty Cycle: 1:1.146

Medium: HSL_5000_160606 Medium parameters used: $f = 5825$ MHz; $\sigma = 5.447$ S/m; $\epsilon_r = 34.209$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.38, 4.38, 4.38); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM1; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch165/Area Scan (91x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.525 W/kg

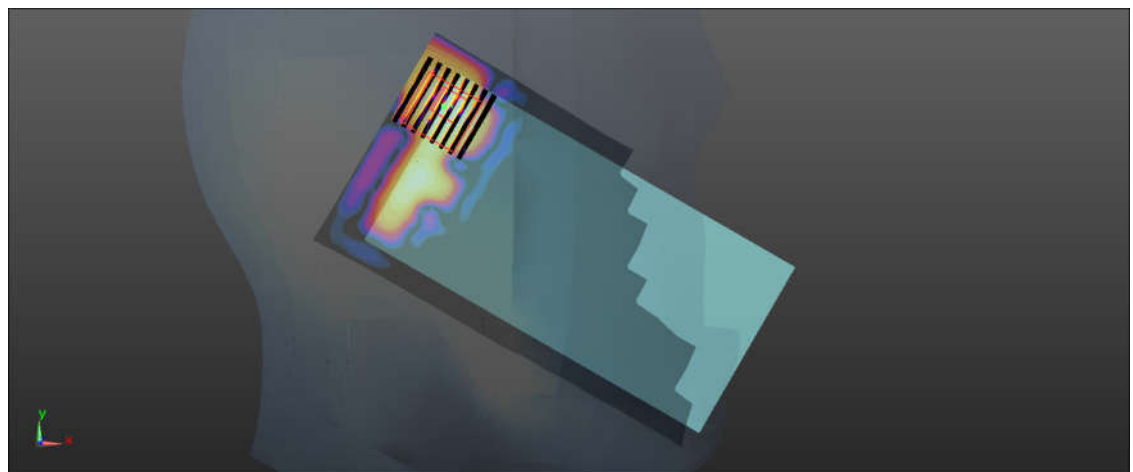
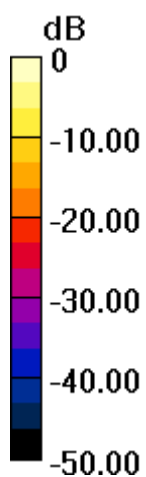
Ch165/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 3.322 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.480 W/kg

SAR(1 g) = 0.116 W/kg; SAR(10 g) = 0.029 W/kg

Maximum value of SAR (measured) = 0.335 W/kg



0 dB = 0.335 W/kg = -4.75 dBW/kg

36_Bluetooth_1Mbps_Right Cheek_0mm_Ch39

Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz; Duty Cycle: 1:1.2

Medium: HSL_2450_160713 Medium parameters used: $f = 2441$ MHz; $\sigma = 1.809$ S/m; $\epsilon_r = 39.264$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(7.32, 7.32, 7.32); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2016.5.18
- Phantom: SAM1; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch39/Area Scan (81x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.157 W/kg

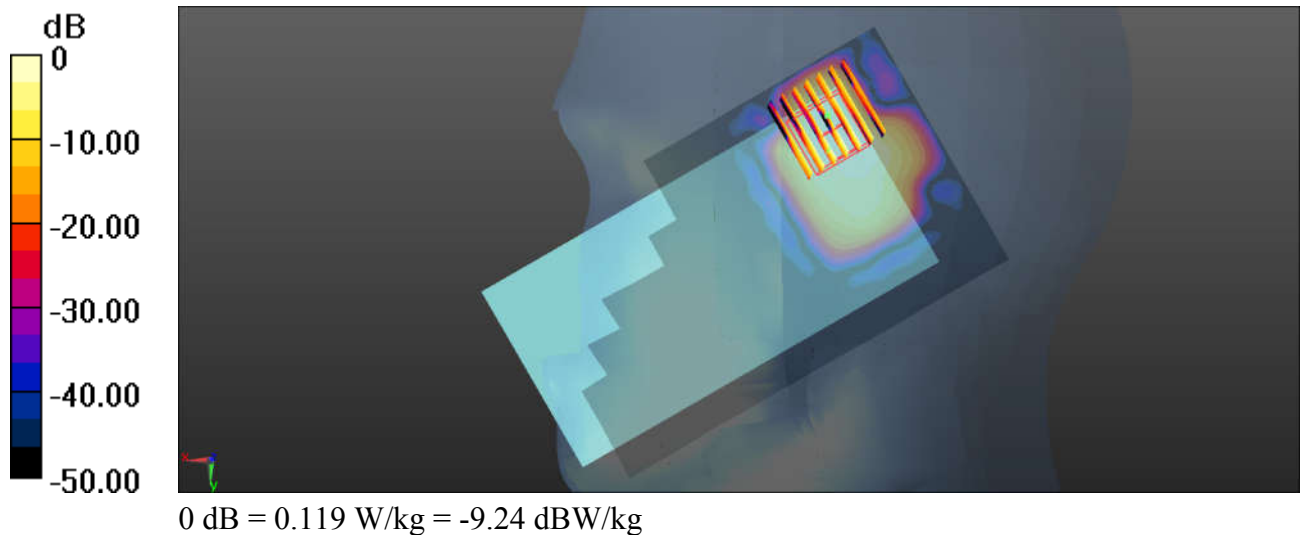
Ch39/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.002 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.170 W/kg

SAR(1 g) = 0.075 W/kg; SAR(10 g) = 0.024 W/kg

Maximum value of SAR (measured) = 0.119 W/kg



13_GSM850_GPRS 4 Tx Slots_Back_10mm_Ch251

Communication System: UID 0, GPRS/EDGE (4 Tx slots) (0); Frequency: 848.8 MHz; Duty Cycle: 1:2.08

Medium: MSL_850_160609 Medium parameters used: $f = 848.8$ MHz; $\sigma = 1.012$ S/m; $\epsilon_r = 53.558$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.17, 10.17, 10.17); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM2; Type: SAM; Serial: TP-1542
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch251/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.719 W/kg

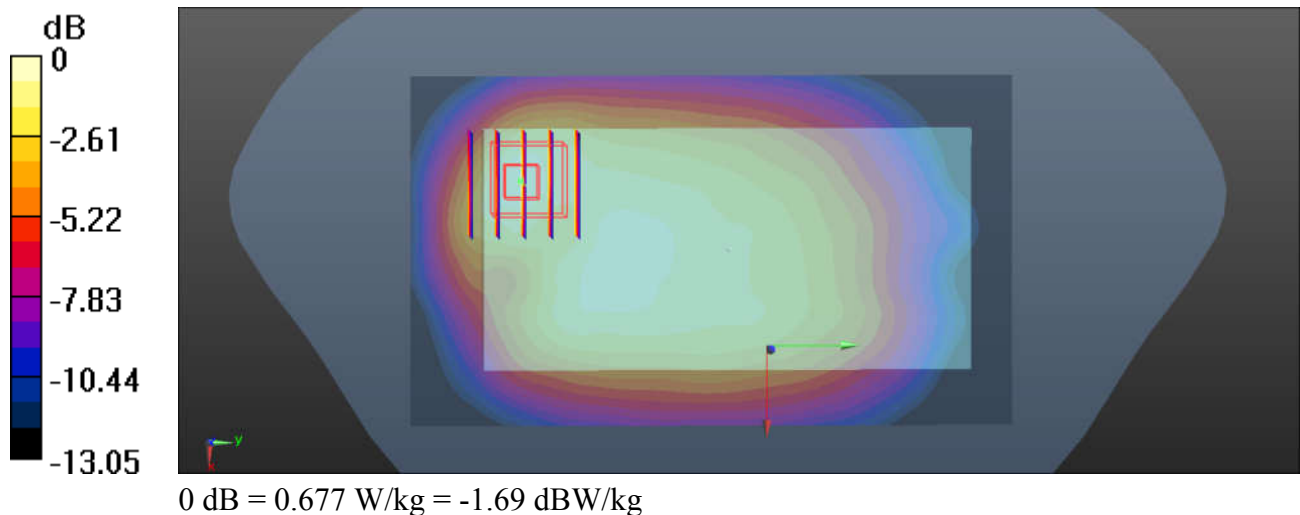
Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.98 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 0.792 W/kg

SAR(1 g) = 0.508 W/kg; SAR(10 g) = 0.310 W/kg

Maximum value of SAR (measured) = 0.677 W/kg



14_GSM1900_GPRS 2 Tx slots_Bottom Side_10mm_Ch512

Communication System: UID 0, GPRS/EDGE (2 Tx slots) (0); Frequency: 1850.2 MHz; Duty Cycle: 1:4.08

Medium: MSL_1900_160610 Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.503$ S/m; $\epsilon_r = 52.986$;

$\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(7.14, 7.14, 7.14); Calibrated: 2015.6.19;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn917; Calibrated: 2015.12.14
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch512/Area Scan (31x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.41 W/kg

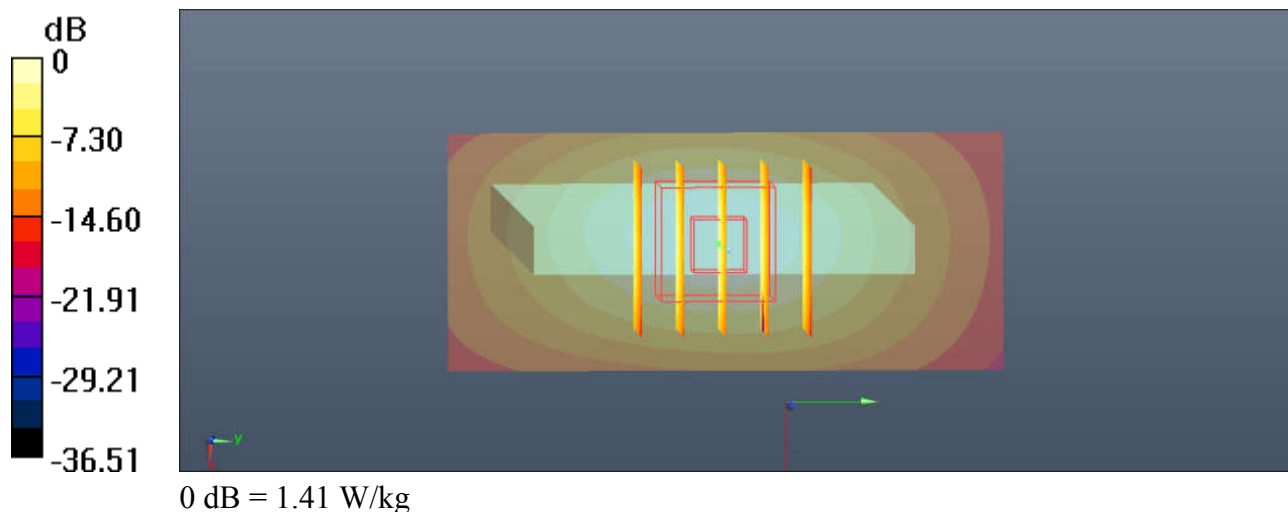
Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 30.59 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 1.67 W/kg

SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.572 W/kg

Maximum value of SAR (measured) = 1.41 W/kg



15_WCDMA Band V_RMC 12.2Kbps_Back_10mm_Ch4182

Communication System: UID 0, UMTS (0); Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium: MSL_850_160609 Medium parameters used: $f = 836.4$ MHz; $\sigma = 1.001$ S/m; $\epsilon_r = 53.693$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.17, 10.17, 10.17); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM2; Type: SAM; Serial: TP-1542
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch4182/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.490 W/kg

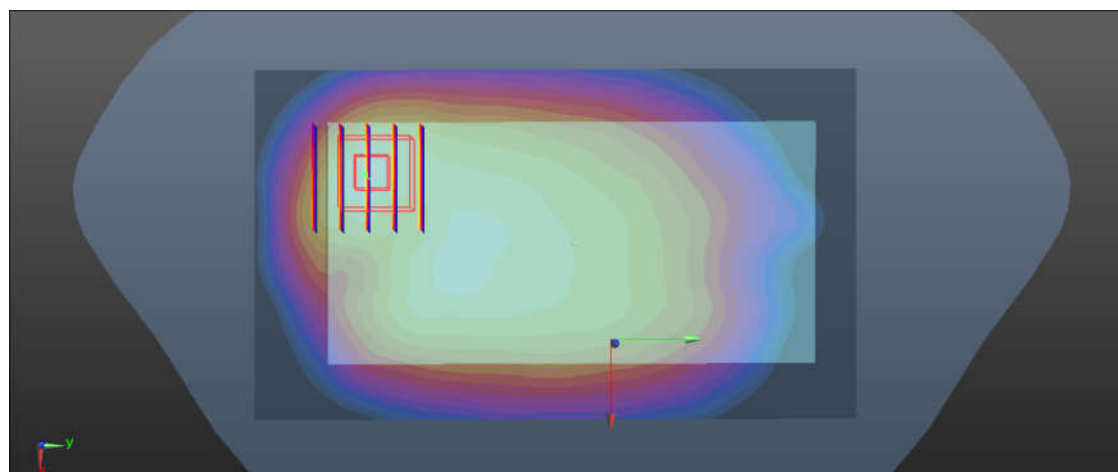
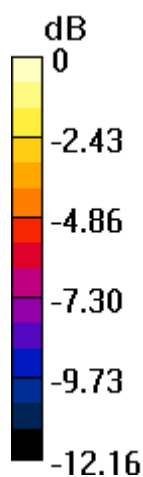
Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.17 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 0.554 W/kg

SAR(1 g) = 0.358 W/kg; SAR(10 g) = 0.220 W/kg

Maximum value of SAR (measured) = 0.472 W/kg



0 dB = 0.472 W/kg = -3.26 dBW/kg