

Variant FCC SAR Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : LTE uFi
BRAND NAME : ZTE
MODEL NAME : MF923
FCC ID : SRQ-MF923
STANDARD : FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2013

This is a variant report which is only valid together with the original test report. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.



Prepared by: Mark Qu / Manager



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China



Table of Contents

- 1. Statement of Compliance 4**
- 2. Administration Data 5**
- 3. Guidance Applied..... 5**
- 4. Equipment Under Test (EUT) Information..... 6**
 - 4.1 General Information 6
 - 4.2 General LTE SAR Test and Reporting Considerations 7
- 5. RF Exposure Limits..... 9**
 - 5.1 Uncontrolled Environment..... 9
 - 5.2 Controlled Environment..... 9
- 6. Specific Absorption Rate (SAR).....10**
 - 6.1 Introduction10
 - 6.2 SAR Definition.....10
- 7. System Description and Setup11**
 - 7.1 E-Field Probe12
 - 7.2 Data Acquisition Electronics (DAE)12
 - 7.3 Phantom.....13
 - 7.4 Device Holder.....14
- 8. Measurement Procedures15**
 - 8.1 Spatial Peak SAR Evaluation15
 - 8.2 Power Reference Measurement.....16
 - 8.3 Area Scan16
 - 8.4 Zoom Scan.....17
 - 8.5 Volume Scan Procedures.....17
 - 8.6 Power Drift Monitoring.....17
- 9. Test Equipment List18**
- 10. System Verification19**
 - 10.1 Tissue Simulating Liquids.....19
 - 10.2 Tissue Verification20
 - 10.3 System Performance Check Results.....21
- 11. RF Exposure Positions22**
 - 11.2 Wireless Router.....22
- 12. Conducted RF Output Power (Unit: dBm).....23**
- 13. WLAN Exclusions Applied40**
- 14. Antenna Location41**
- 15. SAR Test Results42**
 - 15.1 Body SAR42
 - 15.2 Repeated SAR Measurement43
- 16. Simultaneous Transmission Analysis44**
 - 16.1 Body Exposure Conditions45
- 17. Uncertainty Assessment47**
- 18. References.....50**
- Appendix A. Plots of System Performance Check**
- Appendix B. Plots of High SAR Measurement**
- Appendix C. DASYS Calibration Certificate**
- Appendix D. Test Setup Photos**
- Appendix E. Product Equality Declaration**



1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **ZTE CORPORATION, LTE uFi, MF923**, are as follows.

Equipment Class	Frequency Band		Highest 1g SAR Summary		Highest Simultaneous Transmission 1g SAR (W/kg)
			Body (Separation 10mm)		
			1g SAR (W/kg)		
Licensed	WCDMA	WCDMA V	0.61		1.59
		WCDMA II	1.08		
	LTE	LTE Band 17	0.65		
		LTE Band 5	0.61		
		LTE Band 4	1.11		
		LTE Band 2	1.20		
DTS	WLAN	2.4GHz WLAN	0.10		1.25
NII	WLAN	5GHz WLAN	0.66		1.59
Date of Testing:			2016/09/23~2016/09/27		

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



2. Administration Data

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958

Applicant	
Company Name	ZTE CORPORATION
Address	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P. R. China

Manufacturer	
Company Name	ZTE CORPORATION
Address	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P. R. China

3. Guidance Applied

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

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 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	LTE uFi
Brand Name	ZTE
Model Name	MF923
FCC ID	SRQ-MF923
IMEI Code	865135023724600
Wireless Technology and Frequency Range	WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz
Mode	<ul style="list-style-type: none"> · RMC 12.2Kbps · HSDPA · HSUPA · DC-HSDPA · HSPA+ (16QAM uplink is not supported) · LTE: QPSK, 16QAM · LTE Carrier Aggregation (Downlink only) · 802.11a/b/g/n HT20/HT40
HW Version	xx4A
SW Version	MF923V2.3
EUT Stage	Identical Prototype
Remark:	
<ol style="list-style-type: none"> 1. This device 2.4GHz WLAN supports hotspot operation and 5.2GHz/5.8GHz WLAN supports WiFi Direct (GC/GO), 2. This device has no voice function. 	



4.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05																																							
FCC ID	SRQ-MF923																																						
Equipment Name	LTE uFi																																						
Operating Frequency Range of each LTE transmission band	LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz																																						
Channel Bandwidth	LTE Band 17: 5MHz, 10MHz LTE Band 5: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 4: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 2: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz																																						
uplink modulations used	QPSK, and 16QAM																																						
LTE Voice / Data requirements	Data only																																						
LTE MPR permanently built-in by design	<p align="center">Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</p> <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th> <th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th> <th rowspan="2">MPR (dB)</th> </tr> <tr> <th>1.4 MHz</th> <th>3.0 MHz</th> <th>5 MHz</th> <th>10 MHz</th> <th>15 MHz</th> <th>20 MHz</th> </tr> </thead> <tbody> <tr> <td>QPSK</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 2</td> </tr> </tbody> </table>	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
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.																																						
LTE Carrier Aggregation Combinations	Inter-Band possible combinations as below page and the detail power verification please referred to page 36.																																						
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 4												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745
LTE Band 5												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829				
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5				
H	20643	848.3	20635	847.5	20625	846.5	20600	844				
LTE Band 17												
	Bandwidth 5 MHz				Bandwidth 10 MHz							
	Channel #		Freq.(MHz)		Channel #		Freq. (MHz)					
L	23755		706.5		23780		709					
M	23790		710		23790		710					
H	23825		713.5		23800		711					

LTE Carrier Aggregation Combinations									
Inter-Band Combinations									
(PCC) B2	(SCC) B17	(PCC) B17	(SCC) B2	(PCC) B4	(SCC) B17	(PCC) B4	(SCC) B29	(PCC) B2	(SCC) B29
10M + 10M		10M + 10M		10M + 10M		10M + 10M		10M + 10M	
10M + 5M		10M + 5M		10M + 5M		10M + 5M		10M + 5M	
5M + 10M		5M + 10M		5M + 10M		5M + 10M		5M + 10M	
5M + 5M		5M + 5M		5M + 5M		5M + 5M		5M + 5M	



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:

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

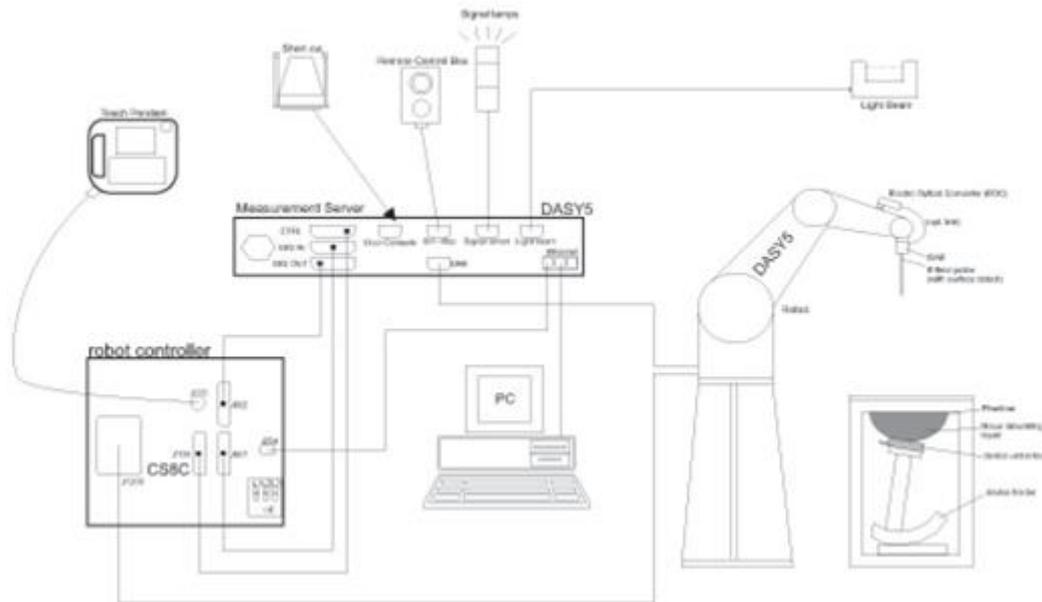
SAR is expressed in units of Watts per kilogram (W/kg)

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

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 µW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 µW/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° ± 1°	20° ± 1°
Maximum area scan spatial resolution: $\Delta x_{Area}, \Delta y_{Area}$	≤ 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 ≤ 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 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 shoes 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: $\Delta x_{Zoom}, \Delta y_{Zoom}$		≤ 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: $\Delta z_{Zoom}(n)$	≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm	
	graded grid	$\Delta z_{Zoom}(1)$: 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
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
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 for 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	750MHz System Validation Kit	D750V3	1065	Nov. 24, 2015	Nov. 23, 2016
SPEAG	835MHz System Validation Kit	D835V2	4d091	Nov. 24, 2015	Nov. 23, 2016
SPEAG	1750MHz System Validation Kit	D1750V2	1069	Nov. 23, 2015	Nov. 22, 2016
SPEAG	1900MHz System Validation Kit	D1900V2	5d118	Nov. 23, 2015	Nov. 22, 2016
SPEAG	2450MHz System Validation Kit	D2450V2	840	Nov. 25, 2015	Nov. 24, 2016
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	Nov. 26, 2015	Nov. 25, 2016
SPEAG	Data Acquisition Electronics	DAE4	1279	Apr. 04, 2016	Apr. 03, 2017
SPEAG	Data Acquisition Electronics	DAE4	1210	May 18, 2016	May 17, 2017
SPEAG	Dosimetric E-Field Probe	EX3DV4	3954	Nov. 27, 2015	Nov. 26, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3857	May 25, 2016	May 24, 2017
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	6201563814	Mar. 21, 2016	Mar. 20, 2017
Agilent	Wireless Communication Test Set	E5515C	MY52102706	Apr. 22, 2016	Apr. 21, 2017
Agilent	ENA Series Network Analyzer	E5071C	MY46111157	Apr. 22, 2016	Apr. 21, 2017
SPEAG	DAK Kit	DAK3.5	1144	Nov. 24, 2015	Nov. 23, 2016
R&S	Signal Generator	SMBV100A	258305	Jan. 20, 2016	Jan. 19, 2017
R&S	CBT BLUETOOTH TESTER	CBT	101137	Aug. 09, 2016	Aug. 08, 2017
R&S	Spectrum Analyzer	FSV7	101631	Aug. 08, 2016	Aug. 07, 2017
AR	Amplifier	5S1G4	333096	NCR	NCR
Anritsu	Power Sensor	MA2411B	0917070	Jan. 20, 2016	Jan. 19, 2017
Anritsu	Power Meter	ML2495A	1005002	Jan. 20, 2016	Jan. 19, 2017
Anritsu	Power Sensor	MA2411B	1339163	Jan. 20, 2016	Jan. 19, 2017
Anritsu	Power Meter	ML2495A	1435004	Jan. 20, 2016	Jan. 19, 2017
ARRA	Power Divider	A3200-2	N/A	NA	NA
MCL	Attenuation1	BW-S10W5+	N/A	NA	NA
MCL	Attenuation2	BW-S10W5+	N/A	NA	NA
MCL	Attenuation3	BW-S10W5+	N/A	NA	NA
Agilent	Dual Directional Coupler	778D	50422	N/A	N/A
PASTERNAK	Dual Directional Coupler	PE2214-10	N/A	N/A	N/A

General Note:

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

10. System Verification

10.1 Tissue Simulating Liquids

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

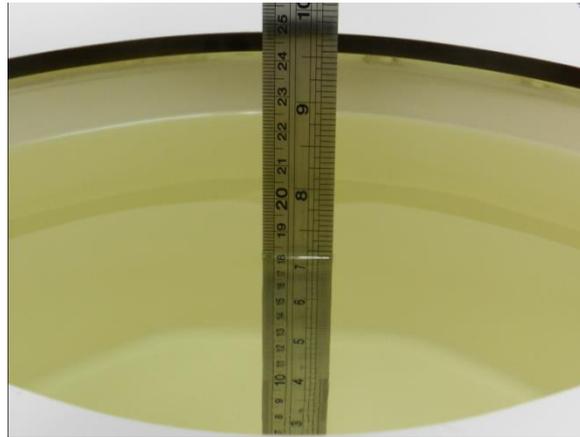


Fig 10.1 Photo of Liquid Height for Body SAR

10.2 Tissue Verification

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

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ε _r)
For Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1750	70.2	0	0	0.4	0	29.4	1.49	53.4
1900	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

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
750	Body	22.6	0.971	56.196	0.96	55.5	1.15	1.25	±5	2016/9/23
835	Body	22.6	0.969	55.694	0.97	55.2	-0.10	0.89	±5	2016/9/23
1750	Body	22.7	1.539	54.578	1.49	53.4	3.29	2.21	±5	2016/9/25
1900	Body	22.7	1.552	53.309	1.52	53.3	2.11	0.02	±5	2016/9/25
2450	Body	22.7	2.007	52.577	1.95	52.7	2.92	-0.23	±5	2016/9/27
5250	Body	22.7	5.279	48.534	5.36	48.90	-1.51	-0.75	±5	2016/9/27
5750	Body	22.7	6.113	47.156	5.94	48.30	2.91	-2.37	±5	2016/9/27

10.3 System Performance Check Results

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

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2016/9/23	750	Body	250	1065	3954	1279	2.29	8.86	9.16	3.39
2016/9/23	835	Body	250	4d091	3954	1279	2.44	9.55	9.76	2.20
2016/9/25	1750	Body	250	1069	3857	1210	8.46	35.9	33.84	-5.74
2016/9/25	1900	Body	250	5d118	3857	1210	9.66	40.6	38.64	-4.83
2016/9/27	2450	Body	250	840	3954	1279	12.9	51.1	51.6	0.98
2016/9/27	5250	Body	100	1113	3954	1279	7.46	76.5	74.6	-2.48
2016/9/27	5750	Body	100	1113	3954	1279	7.48	76.6	74.8	-2.35

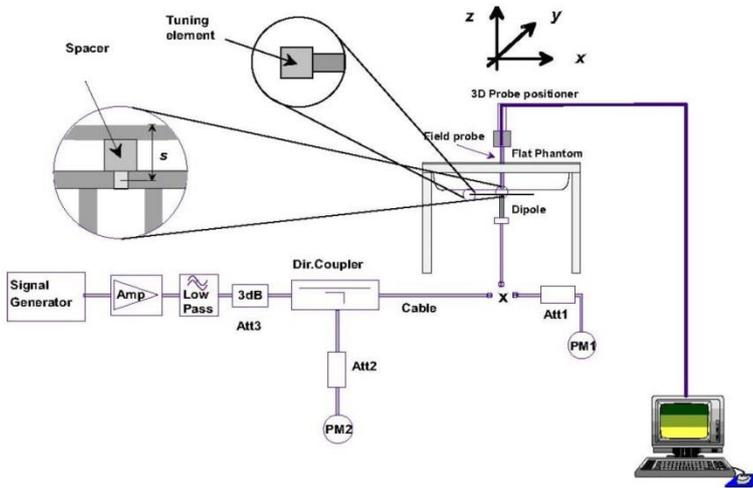


Fig 8.3.1 System Performance Check Setup



Fig 8.3.2 Setup Photo



11. RF Exposure Positions

11.1 Body Position

- (a) To position the device parallel to the phantom surface with all sides and either keypad up or down.
- (b) To adjust the device parallel to the flat phantom.
- (c) To adjust the distance between the device and the flat phantom to 10mm.

<EUT Setup Photos>

Please refer to Appendix D for the test setup photos.

11.2 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 x W \geq 9 cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined 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)

<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-TFCl
 - viii. Confirm that E-TFCl is equal to the target E-TFCl of 75 for sub-test 1, and other subtest's E-TFCl
- 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-TFCl
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: $\Delta_{ACK}, \Delta_{NACK}$ 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.		

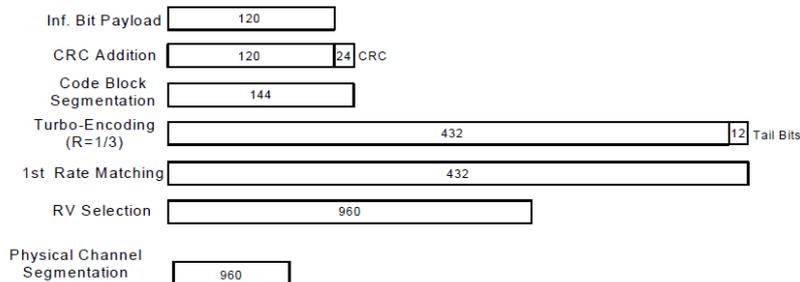


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration



<WCDMA Conducted Power>

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		4132	4182	4233	
Rx Channel		9662	9800	9938		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6	826.4	836.4	846.6		
3GPP Rel 99	RMC 12.2Kbps	22.27	22.63	22.47	23.50	22.87	22.98	23.13	24.00
3GPP Rel 6	HSDPA Subtest-1	21.60	21.97	21.79	22.50	22.07	22.21	22.31	22.50
3GPP Rel 6	HSDPA Subtest-2	21.66	22.09	21.86	22.50	22.03	22.20	22.21	22.50
3GPP Rel 6	HSDPA Subtest-3	21.15	21.58	21.35	22.00	21.61	21.71	21.81	22.00
3GPP Rel 6	HSDPA Subtest-4	21.13	21.58	21.34	22.00	21.60	21.70	21.79	22.00
3GPP Rel 8	DC-HSDPA Subtest-1	21.53	21.90	21.72	22.50	22.01	22.18	22.28	22.50
3GPP Rel 8	DC-HSDPA Subtest-2	21.52	22.01	21.85	22.50	22.05	22.15	22.21	22.50
3GPP Rel 8	DC-HSDPA Subtest-3	21.08	21.45	21.24	22.00	21.45	21.56	21.80	22.00
3GPP Rel 8	DC-HSDPA Subtest-4	21.12	21.49	21.11	22.00	21.52	21.58	21.75	22.00
3GPP Rel 6	HSUPA Subtest-1	21.66	21.43	21.31	22.00	21.43	21.79	22.15	22.50
3GPP Rel 6	HSUPA Subtest-2	20.20	20.96	20.80	22.00	20.80	21.14	20.80	22.50
3GPP Rel 6	HSUPA Subtest-3	20.19	20.70	20.39	21.50	20.73	20.77	20.89	22.00
3GPP Rel 6	HSUPA Subtest-4	20.78	21.28	20.98	21.50	21.32	21.07	21.18	22.00
3GPP Rel 6	HSUPA Subtest-5	21.60	21.90	21.80	22.00	22.20	22.15	22.20	22.50



<LTE Conducted Power>

<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	22.36	22.93	22.25	23.5	0
20	QPSK	1	49	22.58	22.95	22.82		
20	QPSK	1	99	22.57	21.84	22.35		
20	QPSK	50	0	21.68	21.97	21.98	22.5	1
20	QPSK	50	24	21.76	21.92	21.98		
20	QPSK	50	50	21.85	22.04	22.00		
20	QPSK	100	0	21.81	21.96	21.99	22.5	1
20	16QAM	1	0	21.54	21.93	21.49		
20	16QAM	1	49	21.97	21.97	22.07		
20	16QAM	1	99	21.86	21.30	21.42	21.5	2
20	16QAM	50	0	20.66	20.86	20.93		
20	16QAM	50	24	20.73	20.94	20.98		
20	16QAM	50	50	20.72	20.98	20.96	21.5	2
20	16QAM	100	0	20.79	20.97	20.99		
Channel				18675	18900	19125		
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	22.52	22.80	22.82	23.5	0
15	QPSK	1	37	22.60	22.87	22.83		
15	QPSK	1	74	21.94	22.31	22.72		
15	QPSK	36	0	21.70	22.04	21.94	22.5	1
15	QPSK	36	20	21.76	22.00	21.94		
15	QPSK	36	39	21.76	22.01	21.92		
15	QPSK	75	0	21.82	21.96	21.94	22.5	1
15	16QAM	1	0	21.38	21.66	21.66		
15	16QAM	1	37	21.32	21.76	21.82		
15	16QAM	1	74	20.99	21.31	21.50	21.5	2
15	16QAM	36	0	20.69	20.84	20.94		
15	16QAM	36	20	20.73	20.92	20.95		
15	16QAM	36	39	20.73	20.96	20.96	21.5	2
15	16QAM	75	0	20.78	20.95	21.02		



Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	22.53	22.96	22.89	23.5	0
10	QPSK	1	25	22.63	22.89	22.92		
10	QPSK	1	49	21.86	22.49	22.85		
10	QPSK	25	0	21.63	21.93	22.00	22.5	1
10	QPSK	25	12	21.64	21.96	21.86		
10	QPSK	25	25	21.65	22.02	21.92		
10	QPSK	50	0	21.69	22.06	21.95	22.5	1
10	16QAM	1	0	21.62	21.96	22.16		
10	16QAM	1	25	21.66	22.02	22.12		
10	16QAM	1	49	21.13	21.92	21.93	21.5	2
10	16QAM	25	0	20.58	20.89	20.98		
10	16QAM	25	12	20.67	20.94	20.88		
10	16QAM	25	25	20.70	20.92	20.93	21.5	2
10	16QAM	50	0	20.66	20.99	21.14		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.50	22.88	22.75	23.5	0
5	QPSK	1	12	22.53	22.93	22.81		
5	QPSK	1	24	22.37	22.70	22.74		
5	QPSK	12	0	21.62	21.92	21.94	22.5	1
5	QPSK	12	7	21.49	21.92	21.92		
5	QPSK	12	13	21.59	22.15	21.89		
5	QPSK	25	0	21.65	21.99	21.94	22.5	1
5	16QAM	1	0	21.80	21.80	21.77		
5	16QAM	1	12	21.71	21.81	21.60		
5	16QAM	1	24	21.77	21.71	21.73	21.5	2
5	16QAM	12	0	20.65	21.01	20.98		
5	16QAM	12	7	20.71	21.03	20.97		
5	16QAM	12	13	20.58	21.07	21.03	21.5	2
5	16QAM	25	0	20.71	20.92	21.00		



Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	22.63	23.00	22.90	23.5	0
3	QPSK	1	8	22.53	22.88	22.73		
3	QPSK	1	14	22.48	22.92	22.83		
3	QPSK	8	0	21.68	21.93	21.92	22.5	1
3	QPSK	8	4	21.72	21.92	21.90		
3	QPSK	8	7	21.65	22.13	21.92		
3	QPSK	15	0	21.71	21.99	21.98		
3	16QAM	1	0	21.72	22.00	22.01	22.5	1
3	16QAM	1	8	21.45	22.09	22.06		
3	16QAM	1	14	21.66	22.06	21.95		
3	16QAM	8	0	20.65	20.95	20.91	21.5	2
3	16QAM	8	4	20.76	20.97	20.89		
3	16QAM	8	7	20.72	20.81	20.99		
3	16QAM	15	0	20.67	20.94	20.94		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	22.62	23.00	22.82	23.5	0
1.4	QPSK	1	3	22.58	23.01	22.95		
1.4	QPSK	1	5	22.68	22.94	22.90		
1.4	QPSK	3	0	22.69	22.98	22.87		
1.4	QPSK	3	1	22.64	22.98	22.83		
1.4	QPSK	3	3	22.56	22.95	22.88		
1.4	QPSK	6	0	21.70	21.97	21.92	22.5	1
1.4	16QAM	1	0	21.70	22.18	22.03	22.5	1
1.4	16QAM	1	3	21.73	22.12	21.91		
1.4	16QAM	1	5	21.67	22.08	22.12		
1.4	16QAM	3	0	21.49	21.90	21.81		
1.4	16QAM	3	1	21.57	21.92	21.85		
1.4	16QAM	3	3	21.58	21.87	21.86		
1.4	16QAM	6	0	20.71	21.00	20.84	21.5	2



<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	22.17	22.56	22.70	23.5	0
20	QPSK	1	49	22.96	23.14	22.89		
20	QPSK	1	99	22.56	22.59	22.37		
20	QPSK	50	0	22.18	22.18	22.19	22.5	1
20	QPSK	50	24	22.19	22.23	22.22		
20	QPSK	50	50	22.13	22.15	22.18		
20	QPSK	100	0	22.20	22.14	22.24		
20	16QAM	1	0	21.07	21.57	21.66	22.5	1
20	16QAM	1	49	21.56	21.84	21.65		
20	16QAM	1	99	21.45	21.52	21.39		
20	16QAM	50	0	21.17	21.18	21.14	21.5	2
20	16QAM	50	24	21.28	21.06	21.08		
20	16QAM	50	50	21.06	21.09	21.04		
20	16QAM	100	0	21.09	21.11	21.13		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	22.66	23.10	23.13	23.5	0
15	QPSK	1	37	23.02	23.20	23.09		
15	QPSK	1	74	22.97	23.10	22.84		
15	QPSK	36	0	22.17	22.16	22.21	22.5	1
15	QPSK	36	20	22.13	22.10	22.17		
15	QPSK	36	39	22.02	22.13	22.13		
15	QPSK	75	0	22.24	22.21	22.18		
15	16QAM	1	0	21.73	21.88	22.19	22.5	1
15	16QAM	1	37	21.79	21.98	21.75		
15	16QAM	1	74	21.77	21.68	21.93		
15	16QAM	36	0	21.10	21.12	21.07	21.5	2
15	16QAM	36	20	21.07	21.07	21.05		
15	16QAM	36	39	20.79	21.01	21.11		
15	16QAM	75	0	21.27	21.20	21.18		



Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	22.87	23.13	23.02	23.5	0
10	QPSK	1	25	23.08	23.13	23.15		
10	QPSK	1	49	22.93	22.89	23.04		
10	QPSK	25	0	22.17	22.12	22.18	22.5	1
10	QPSK	25	12	22.11	22.12	22.17		
10	QPSK	25	25	22.08	22.13	22.11		
10	QPSK	50	0	22.13	22.13	22.26	22.5	1
10	16QAM	1	0	22.17	22.26	22.28		
10	16QAM	1	25	22.15	22.33	22.09		
10	16QAM	1	49	22.15	22.17	22.32	21.5	2
10	16QAM	25	0	21.03	21.13	21.14		
10	16QAM	25	12	21.09	21.08	21.11		
10	16QAM	25	25	21.06	21.06	21.07	21.5	2
10	16QAM	50	0	21.13	21.09	21.15		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	22.95	23.15	23.20	23.5	0
5	QPSK	1	12	23.07	23.05	23.02		
5	QPSK	1	24	23.02	23.11	23.07		
5	QPSK	12	0	22.12	22.19	22.10	22.5	1
5	QPSK	12	7	22.14	22.10	22.09		
5	QPSK	12	13	22.11	22.15	22.11		
5	QPSK	25	0	22.14	22.12	22.10	22.5	1
5	16QAM	1	0	21.74	21.91	21.95		
5	16QAM	1	12	21.84	21.84	21.72		
5	16QAM	1	24	21.86	21.89	21.85	21.5	2
5	16QAM	12	0	21.07	21.15	21.07		
5	16QAM	12	7	21.10	21.08	20.97		
5	16QAM	12	13	21.17	21.03	21.10	21.5	2
5	16QAM	25	0	21.13	21.10	20.99		



Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	23.01	23.19	23.08	23.5	0
3	QPSK	1	8	23.18	23.14	23.08		
3	QPSK	1	14	23.12	23.14	23.08		
3	QPSK	8	0	22.10	22.19	22.06	22.5	1
3	QPSK	8	4	22.17	22.14	22.10		
3	QPSK	8	7	22.12	22.08	22.13		
3	QPSK	15	0	22.21	22.19	22.16	22.5	1
3	16QAM	1	0	22.18	22.28	22.26		
3	16QAM	1	8	22.28	22.25	22.16		
3	16QAM	1	14	22.33	22.27	22.27	21.5	2
3	16QAM	8	0	21.08	21.08	21.06		
3	16QAM	8	4	21.15	21.04	21.00		
3	16QAM	8	7	21.13	21.10	21.04	21.5	2
3	16QAM	15	0	21.12	21.12	21.08		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	23.08	23.08	23.04	23.5	0
1.4	QPSK	1	3	23.04	23.13	23.16		
1.4	QPSK	1	5	23.08	23.18	23.20		
1.4	QPSK	3	0	23.03	23.18	23.22		
1.4	QPSK	3	1	22.97	23.21	23.14		
1.4	QPSK	3	3	23.00	23.21	23.14	22.5	1
1.4	QPSK	6	0	22.10	22.18	22.13		
1.4	16QAM	1	0	21.80	22.02	22.12	22.5	1
1.4	16QAM	1	3	22.02	21.97	21.99		
1.4	16QAM	1	5	21.94	22.07	21.99		
1.4	16QAM	3	0	22.09	22.23	22.15		
1.4	16QAM	3	1	22.02	22.07	22.08		
1.4	16QAM	3	3	21.99	22.17	22.08	21.5	2
1.4	16QAM	6	0	20.96	21.00	21.05		



<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	23.41	23.46	23.42	24	0
10	QPSK	1	25	23.31	23.41	23.30		
10	QPSK	1	49	23.37	23.33	23.18		
10	QPSK	25	0	22.43	22.38	22.36	23	1
10	QPSK	25	12	22.41	22.36	22.27		
10	QPSK	25	25	22.34	22.30	22.26		
10	QPSK	50	0	22.46	22.39	22.31	23	1
10	16QAM	1	0	22.54	22.75	22.49		
10	16QAM	1	25	22.55	22.48	22.50		
10	16QAM	1	49	22.52	22.49	22.42	22	2
10	16QAM	25	0	21.43	21.40	21.32		
10	16QAM	25	12	21.42	21.38	21.31		
10	16QAM	25	25	21.54	21.32	21.32	22	2
10	16QAM	50	0	21.33	21.28	21.27		
Channel				20425	20525	20625		
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	23.37	23.22	23.09	24	0
5	QPSK	1	12	23.30	23.22	23.32		
5	QPSK	1	24	23.30	23.27	23.12		
5	QPSK	12	0	22.43	22.46	22.30	23	1
5	QPSK	12	7	22.56	22.33	22.38		
5	QPSK	12	13	22.40	22.31	22.32		
5	QPSK	25	0	22.40	22.44	22.26	23	1
5	16QAM	1	0	22.14	22.33	22.24		
5	16QAM	1	12	22.36	22.21	22.33		
5	16QAM	1	24	22.20	22.17	22.12	22	2
5	16QAM	12	0	21.34	21.42	21.26		
5	16QAM	12	7	21.58	21.27	21.34		
5	16QAM	12	13	21.41	21.24	21.18	22	2
5	16QAM	25	0	21.39	21.43	21.26		



Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	23.55	23.34	23.45	24	0
3	QPSK	1	8	23.36	23.33	23.34		
3	QPSK	1	14	23.49	23.38	23.41		
3	QPSK	8	0	22.48	22.36	22.37	23	1
3	QPSK	8	4	22.44	22.38	22.26		
3	QPSK	8	7	22.43	22.50	22.18		
3	QPSK	15	0	22.43	22.32	22.27		
3	16QAM	1	0	22.51	22.65	22.68	23	1
3	16QAM	1	8	22.53	22.54	22.50		
3	16QAM	1	14	22.51	22.57	22.37		
3	16QAM	8	0	21.43	21.36	21.38	22	2
3	16QAM	8	4	21.52	21.39	21.29		
3	16QAM	8	7	21.50	21.39	21.29		
3	16QAM	15	0	21.33	21.34	21.33		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	23.34	23.37	23.25	24	0
1.4	QPSK	1	3	23.41	23.40	23.25		
1.4	QPSK	1	5	23.38	23.31	23.20		
1.4	QPSK	3	0	23.33	23.46	23.33		
1.4	QPSK	3	1	23.41	23.42	23.33		
1.4	QPSK	3	3	23.43	23.42	23.30		
1.4	QPSK	6	0	22.50	22.50	22.33	23	1
1.4	16QAM	1	0	22.06	22.08	22.01	23	1
1.4	16QAM	1	3	22.08	22.29	22.01		
1.4	16QAM	1	5	21.98	22.03	22.01		
1.4	16QAM	3	0	22.24	22.18	22.17		
1.4	16QAM	3	1	22.42	22.11	22.07		
1.4	16QAM	3	3	22.43	22.22	22.12		
1.4	16QAM	6	0	21.24	21.21	21.13	22	2



<LTE Band 17>

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				23780	23790	23800		
Frequency (MHz)				709	710	711		
10	QPSK	1	0	23.37	23.25	23.32	23.5	0
10	QPSK	1	25	23.30	23.40	23.34		
10	QPSK	1	49	23.39	23.42	23.45		
10	QPSK	25	0	22.45	22.37	22.37	22.5	1
10	QPSK	25	12	22.36	22.39	22.46		
10	QPSK	25	25	22.47	22.46	22.48		
10	QPSK	50	0	22.41	22.45	22.50	22.5	1
10	16QAM	1	0	22.41	22.45	22.45		
10	16QAM	1	25	22.47	22.42	22.48		
10	16QAM	1	49	22.43	22.48	22.49	21.5	2
10	16QAM	25	0	21.48	21.43	21.47		
10	16QAM	25	12	21.38	21.42	21.45		
10	16QAM	25	25	21.49	21.47	21.45	21.5	2
10	16QAM	25	25	21.49	21.47	21.45		
10	16QAM	50	0	21.30	21.43	21.46		
Channel				23755	23790	23825	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				706.5	710	713.5		
5	QPSK	1	0	23.34	23.28	23.23	23.5	0
5	QPSK	1	12	23.26	23.34	23.31		
5	QPSK	1	24	23.32	23.47	23.37		
5	QPSK	12	0	22.50	22.40	22.38	22.5	1
5	QPSK	12	7	22.50	22.41	22.46		
5	QPSK	12	13	22.48	22.44	22.49		
5	QPSK	25	0	22.41	22.36	22.47	22.5	1
5	16QAM	1	0	22.25	22.27	22.30		
5	16QAM	1	12	22.20	22.23	22.44		
5	16QAM	1	24	22.29	22.38	22.33	21.5	2
5	16QAM	12	0	21.43	21.29	21.32		
5	16QAM	12	7	21.44	21.37	21.45		
5	16QAM	12	13	21.46	21.43	21.37	21.5	2
5	16QAM	12	13	21.46	21.43	21.37		
5	16QAM	25	0	21.50	21.37	21.46		



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. During the carrier aggregation conducted power measurements we have attention to throughput traffic to make sure all the power measurement is corrected.

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	Band 2	10M	1855	18650	1	0	Band 17	10M	739	5780	22.54	22.53
	Band 2	10M	1880	18900	1	0	Band 17	10M	739	5780	22.95	22.96
	Band 2	10M	1905	19150	1	0	Band 17	10M	739	5780	22.85	22.89
	Band 17	10M	709	23780	1	49	Band 2	10M	1960	900	23.35	23.39
	Band 17	10M	710	23790	1	49	Band 2	10M	1960	900	23.38	23.42
	Band 17	10M	711	23800	1	49	Band 2	10M	1960	900	23.41	23.45
	Band 4	10M	1715	20000	1	25	Band 17	10M	739	5780	23.05	23.08
	Band 4	10M	1732.5	20175	1	25	Band 17	10M	739	5780	23.14	23.13
	Band 4	10M	1750	20350	1	25	Band 17	10M	739	5780	23.16	23.15
	Band 4	10M	1715	20000	1	25	Band 29	10M	722.5	9715	23.05	23.08
	Band 4	10M	1732.5	20175	1	25	Band 29	10M	722.5	9715	23.14	23.13
	Band 4	10M	1750	20350	1	25	Band 29	10M	722.5	9715	23.16	23.15
	Band 2	10M	1855	18650	1	0	Band 29	10M	722.5	9715	22.54	22.53
	Band 2	10M	1880	18900	1	0	Band 29	10M	722.5	9715	22.95	22.96
Band 2	10M	1905	19150	1	0	Band 29	10M	722.5	9715	22.85	22.89	

<WLAN Conducted Power>

<2.4GHz WLAN ANT 0>

2.4GHz WLAN	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11b	CH 1	2412	1Mbps	13.46	14.50	99.31
		CH 6	2437		13.00	14.50	
		CH 11	2462		13.43	14.50	
	802.11g	CH 1	2412	6Mbps	10.42	11.00	95.65
		CH 6	2437		12.36	13.00	
		CH 11	2462		11.22	11.50	
	802.11n-HT20	CH 1	2412	MCS0	11.50	12.50	95.76
		CH 6	2437		11.20	12.50	
		CH 11	2462		12.13	12.50	
802.11n-HT40	CH 3	2422	MCS0	5.97	6.50	91.06	
	CH 6	2437		5.89	6.50		
	CH 9	2452		6.35	6.50		

<2.4GHz WLAN ANT 1>

2.4GHz WLAN	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11b	CH 1	2412	1Mbps	13.55	15.00	99.26
		CH 6	2437		14.21	15.00	
		CH 11	2462		14.17	15.00	
	802.11g	CH 1	2412	6Mbps	10.72	11.00	95.29
		CH 6	2437		13.19	14.00	
		CH 11	2462		11.43	12.00	
	802.11n-HT20	CH 1	2412	MCS0	10.94	12.00	95.07
		CH 6	2437		11.45	12.00	
		CH 11	2462		11.81	12.50	
802.11n-HT40	CH 3	2422	MCS0	6.48	7.50	90.43	
	CH 6	2437		6.66	7.50		
	CH 9	2452		6.96	7.50		



<2.4GHz WLAN ANT 0+1>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11n-HT20	CH 1	2412	MCS0	11.74	13.00	90.86
		CH 6	2437		11.80	13.00	
		CH 11	2462		12.29	13.00	
	802.11n-HT40	CH 3	2422	MCS0	9.30	10.00	77.63
		CH 6	2437		9.43	10.00	
		CH 9	2452		9.79	10.00	

<5GHz WLAN Antenna 0>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a	CH 36	5180	6Mbps	10.45	11.00	95.32
		CH 40	5200		10.44	11.00	
		CH 44	5220		10.48	11.00	
		CH 48	5240		10.49	11.00	
	802.11n-HT20	CH 36	5180	MCS0	10.11	10.50	95.05
		CH 40	5200		9.81	10.50	
		CH 44	5220		9.87	10.50	
		CH 48	5240		10.03	10.50	
802.11n-HT40	CH 38	5190	MCS0	9.76	10.50	89.86	
	CH 46	5230		9.60	10.50		
5.8GHz WLAN	802.11a	CH 149	5745	MCS0	9.33	10.00	95.32
		CH 157	5785		9.40	10.00	
		CH 165	5825		9.62	10.00	
	802.11n-HT20	CH 149	5745	MCS0	9.00	10.00	95.05
		CH 157	5785		9.52	10.00	
		CH 165	5825		9.54	10.00	
	802.11n-HT40	CH 151	5755	MCS0	9.33	10.00	89.86
CH 159		5795	9.01		10.00		



<5GHz WLAN Antenna 1>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %	
5.2GHz WLAN	802.11a	CH 36	5180	6Mbps	10.47	11.00	95.32	
		CH 40	5200		10.46	11.00		
		CH 44	5220		10.15	11.00		
		CH 48	5240		10.00	11.00		
	802.11n-HT20	CH 36	5180	MCS0	10.38	11.00	94.77	
		CH 40	5200		10.27	11.00		
		CH 44	5220		10.08	11.00		
		CH 48	5240		10.14	11.00		
	802.11n-HT40	CH 38	5190	MCS0	9.99	11.00	90.36	
		CH 46	5230		9.66	11.00		
	5.8GHz WLAN	802.11a	CH 149	5745	MCS0	10.60	12.00	95.32
			CH 157	5785		10.91	12.00	
CH 165			5825	11.18		12.00		
802.11n-HT20		CH 149	5745	MCS0	9.69	11.00	94.77	
		CH 157	5785		10.00	11.00		
		CH 165	5825		10.16	11.00		
802.11n-HT40		CH 151	5755	MCS0	11.28	12.00	90.36	
		CH 159	5795		11.36	12.00		

<5GHz WLAN Antenna 0+1>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11n-HT20	CH 36	5180	MCS0	13.50	14.00	90.82
		CH 40	5200		13.26	14.00	
		CH 44	5220		13.20	14.00	
		CH 48	5240		13.23	14.00	
	802.11n-HT40	CH 38	5190	MCS0	13.67	14.50	83.41
		CH 46	5230		13.74	14.50	
5.8GHz WLAN	802.11n-HT20	CH 149	5745	MCS0	12.73	14.00	90.82
		CH 157	5785		12.79	14.00	
		CH 165	5825		13.24	14.00	
	802.11n-HT40	CH 151	5755	MCS0	11.37	12.00	83.41
		CH 159	5795		11.26	12.00	

13. WLAN Exclusions Applied

Mode Band	Average power(dBm)	
	5.2GHz WLAN(antenna 0/1)	5.8G WLAN(antenna 0)
WLAN	11	10

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:

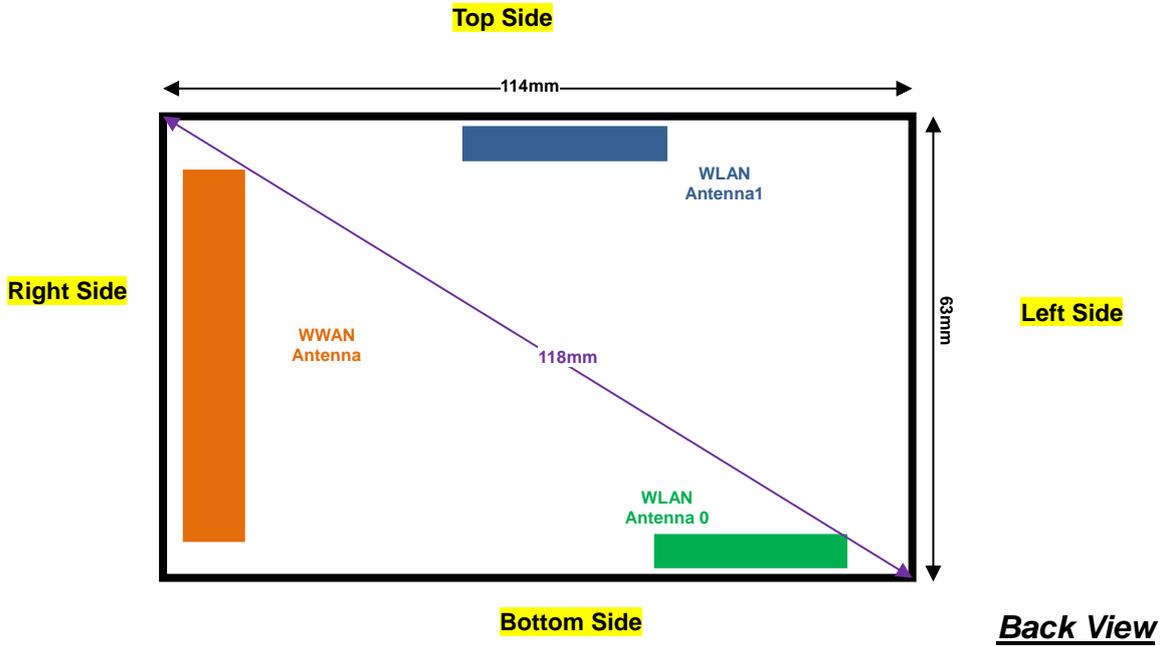
$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$
 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
 - f(GHz) is the RF channel transmit frequency in GHz
 - Power and distance are rounded to the nearest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

WLAN Max Power (dBm)	Separation Distance (mm)	Frequency (GHz)	Exclusion Thresholds
11	10	5.25	3.0
10	10	5.85	2.4

Note:

Per KDB 447498 D01v06, for WLAN 5.2GHz, the test exclusion threshold is 3.0 which is ≤ 3, SAR testing is not required. For WLAN 5.8GHz, the test exclusion threshold is 2.4 which is ≤ 3, So SAR test for 5.8GHz antenna 0 can be excluded.

14. Antenna Location



Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN	≤ 25mm	≤ 25mm	≤ 25mm	≤ 25mm	≤ 25mm	97mm
WLAN(0)	≤ 25mm	≤ 25mm	55mm	≤ 25mm	74mm	≤ 25mm
WLAN(1)	≤ 25mm	≤ 25mm	≤ 25mm	55mm	55mm	39mm

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN	Yes	Yes	Yes	Yes	Yes	No
WLAN(0)	Yes	Yes	No	Yes	No	Yes
WLAN(1)	Yes	Yes	Yes	No	No	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

15.1 Body SAR

<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)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
#01	WCDMA Band V	RMC 12.2Kbps	Back	10	4233	846.6	23.13	24.00	1.222	-0.05	0.498	0.608
#02	WCDMA Band II	RMC 12.2Kbps	Front	10	9262	1852.4	22.27	23.50	1.327	-0.11	0.816	1.083
	WCDMA Band II	RMC 12.2Kbps	Front	10	9400	1880	22.63	23.50	1.222	-0.01	0.816	0.997
	WCDMA Band II	RMC 12.2Kbps	Front	10	9538	1907.6	22.47	23.50	1.268	0.03	0.814	1.032

<LTE SAR>

Plot No.	Band	BW (MHz)	RB Size	RB offset	Modulation	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
#03	LTE Band 17	10	1	49	QPSK	Front	10	23800	711	23.45	23.50	1.012	-0.16	0.645	0.652
#04	LTE Band 5	10	1	0	QPSK	Back	10	20450	829	23.41	24.00	1.146	-0.18	0.531	0.608
#05	LTE Band 4	20	1	0	QPSK	Front	10	20300	1745	22.70	23.50	1.202	-0.18	0.926	1.113
	LTE Band 4	20	1	0	QPSK	Front	10	20050	1720	22.17	23.50	1.358	-0.18	0.789	1.072
	LTE Band 4	20	1	0	QPSK	Front	10	20175	1732.5	22.56	23.50	1.242	-0.18	0.766	0.951
	LTE Band 2	20	1	0	QPSK	Back	10	18700	1860	22.36	23.50	1.300	0.04	0.704	0.915
#06	LTE Band 2	20	1	0	QPSK	Back	10	18900	1880	22.93	23.50	1.140	0.09	1.050	1.197
	LTE Band 2	20	1	0	QPSK	Back	10	19100	1900	22.25	23.50	1.334	-0.04	0.05	0.890

Note: Use the FA460508-01 RB offset verified the worse SAR test.

< DTS WLAN SAR >

Plot No.	Band	Mode	Test Position	Gap (mm)	Ant.	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 2.4GHz	802.11b 1Mbps	Bottom side	10	0	6	2437	13.00	14.50	1.413	99.31	1.007	-0.05	0.049	0.070
#07	WLAN 2.4GHz	802.11b 1Mbps	Top side	10	1	6	2437	14.21	15.00	1.199	99.26	1.007	-0.09	0.086	0.104
	WLAN 2.4GHz	802.11n-HT20 MCS0	Top side	10	0+1	11	2462	12.29	13.00	1.178	90.86	1.101	-0.07	0.023	0.030

<UNII WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ant.	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
#08	WLAN 5.2GHz	802.11n-HT20, MCS0	Bottom side	10	0+1	44	5220	13.20	14.00	1.202	90.82	1.101	-0.09	0.497	0.658
	WLAN 5.8GHz	802.11a, MCS0	Front	10	1	165	5825	11.18	12.00	1.208	95.32	1.049	-0.11	0.056	0.071
	WLAN 5.8GHz	802.11n-HT20 MCS0	Bottom side	10	0+1	165	5825	13.24	14.00	1.191	90.82	1.101	-0.01	0.325	0.426

15.2 Repeated SAR Measurement

No.	Band	BW (MHz)	RB Size	RB offset	Modulation	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 4	20	1	0	QPSK	Front	10	20300	1745	22.70	23.50	1.202	-0.18	0.926	1	1.113
2nd	LTE Band 4	20	1	0	QPSK	Front	10	20300	1745	22.70	23.50	1.202	-0.17	0.867	1.068	1.042
1st	LTE Band 2	20	1	0	QPSK	Back	10	18900	1880	22.93	23.50	1.140	0.09	1.050	1	1.197
2nd	LTE Band 2	20	1	0	QPSK	Back	10	18900	1880	22.93	23.50	1.140	0.04	1.030	1.019	1.174

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8W/kg$.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR $< 1.45W/kg$, 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	LTE uFi	Note
		Body	
1.	WCDMA + WLAN2.4GHz SISO	Yes	Hotspot
2.	WCDMA + WLAN2.4GHz MIMO	Yes	Hotspot
3.	LTE + WLAN2.4GHz SISO	Yes	Hotspot
4.	LTE + WLAN2.4GHz MIMO	Yes	Hotspot
5.	WCDMA + WLAN5GHz SISO	Yes	WWAN VoIP
6.	WCDMA + WLAN5GHz MIMO	Yes	WWAN VoIP
7.	LTE + WLAN5GHz SISO	Yes	WWAN VoIP
8.	LTE + WLAN5GHz MIMO	Yes	WWAN VoIP
9.	WLAN Chain 0 + WLAN Chain 1	Yes	-

General Note:

1. This device has no voice function.
2. This device 2.4GHz WLAN supports hotspot operation, 5.2GHz/5.8GHz WLAN supports hotspot /WiFi Direct (GC/GO).
3. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, they will not transmit simultaneously.
4. EUT will choose either WCDMA or LTE according to the network signal condition; therefore, they will not transmit simultaneously.
5. The worst case 5 GHz WLAN reported SAR for each configuration was used for SAR summation, regardless of whether the WLAN channel has WiFi Direct(GC/GO). Therefore, the following summations represent the absolute worst cases for simultaneous transmission with 5 GHz WLAN.
6. For simultaneously transmission SAR analysis, SAR values only considered the worst position which we did perform SAR testing on FA460508-01, and other test results were leverage from the parent model which referred to the test report number FA460508-01.
7. The reported SAR summation is calculated based on the same configuration and test position.
8. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - i) Scalar SAR summation < 1.6W/kg.
 - ii) $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - iii) If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
9. For simultaneous transmission analysis, WLAN 5GHz SAR is estimated per KDB 447498 D01v06 based on the formula below.
 - i) $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})} / x] \text{ W/kg}$ for test separation distances $\leq 50 \text{ mm}$; where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
 - ii) When the minimum separation distance is < 5mm, the distance is used 5mm to determine SAR test exclusion.
 - iii) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

WLAN 5.2G Maximum Power	Exposure Position	Body
	Test separation	10 mm
11 dBm	Estimated SAR (W/kg)	0.397W/kg



16.1 Body Exposure Conditions

<WWAN + WLAN2.4GHz >

WWAN Band	Exposure Position	WWAN	WLAN2.4GHz			Summed WWAN+WLAN Ant. 0 SAR (W/kg)	Summed WWAN+WLAN Ant. 1 SAR (W/kg)	Summed WWAN+WLAN Ant. 0+1 SAR (W/kg)	SPLSR	Case No	
		Max. WWAN SAR (W/kg)	Max. WLAN Ant. 0 SAR (W/kg)	Max. WLAN Ant. 1 SAR (W/kg)	Max. WLAN Ant. 0+1 SAR (W/kg)						
WCMDA	Band V	Front	0.639	0.066	0.077	0.026	0.71	0.72	0.67		
		Back	0.608	0.056	0.054	0.023	0.66	0.66	0.63		
		Top side	0.378		0.104	0.028	0.38	0.48	0.41		
		Bottom side	0.389	0.070		0.025	0.46	0.39	0.41		
	Band II	Front	1.083	0.066	0.077	0.026	1.15	1.16	1.11		
		Back	0.926	0.056	0.054	0.023	0.98	0.98	0.95		
		Top side	0.247		0.104	0.028	0.25	0.35	0.28		
		Bottom side	0.302	0.070		0.025	0.37	0.30	0.33		
LTE	Band 17	Front	0.652	0.066	0.077	0.026	0.72	0.73	0.68		
		Back	0.344	0.056	0.054	0.023	0.40	0.40	0.37		
		Top side	0.146		0.104	0.028	0.15	0.25	0.17		
		Bottom side	0.142	0.070		0.025	0.21	0.14	0.17		
	Band 5	Front	0.669	0.066	0.077	0.026	0.74	0.75	0.70		
		Back	0.608	0.056	0.054	0.023	0.66	0.66	0.63		
		Top side	0.424		0.104	0.028	0.42	0.53	0.45		
		Bottom side	0.413	0.070		0.025	0.48	0.41	0.44		
	Band 4	Front	1.113	0.066	0.077	0.026	1.18	1.19	1.14		
		Back	0.924	0.056	0.054	0.023	0.98	0.98	0.95		
		Top side	0.319		0.104	0.028	0.32	0.42	0.35		
		Bottom side	0.442	0.070		0.025	0.51	0.44	0.47		
	Band 2	Front	0.920	0.066	0.077	0.026	0.99	1.00	0.95		
		Back	1.197	0.056	0.054	0.023	1.25	1.25	1.22		
		Top side	0.312		0.104	0.028	0.31	0.42	0.34		
		Bottom side	0.283	0.070		0.025	0.35	0.28	0.31		



<WWAN + WLAN5GHz>

WWAN Band	Exposure Position	WWAN	WLAN5GHz			Summed WWAN+ WLAN Ant. 0 SAR (W/kg)	Summed WWAN+ WLAN Ant. 1 SAR (W/kg)	Summed WWAN+ WLAN Ant. 0+1 SAR (W/kg)	SPLSR	Case No	
		Max. WWAN SAR (W/kg)	Max. WLAN Ant. 0 SAR (W/kg)	Max. WLAN Ant. 1 SAR (W/kg)	Max. WLAN Ant. 0+1 SAR (W/kg)						
WCMDA	Band V	Front	0.639	0.397	0.071	0.213	1.04	0.71	0.85		
		Back	0.608	0.397	0.062	0.095	1.01	0.67	0.70		
		Top side	0.378		0.169	0.140	0.38	0.55	0.52		
		Bottom side	0.389	0.397		0.658	0.79	0.39	1.05		
	Band II	Front	1.083	0.397	0.071	0.213	1.48	1.15	1.30		
		Back	0.926	0.397	0.062	0.095	1.32	0.99	1.02		
		Top side	0.247		0.169	0.140	0.25	0.42	0.39		
		Bottom side	0.302	0.397		0.658	0.70	0.30	0.96		
LTE	Band 17	Front	0.652	0.397	0.071	0.213	1.05	0.72	0.87		
		Back	0.344	0.397	0.062	0.095	0.74	0.41	0.44		
		Top side	0.146		0.169	0.140	0.15	0.32	0.29		
		Bottom side	0.142	0.397		0.658	0.54	0.14	0.80		
	Band 5	Front	0.669	0.397	0.071	0.213	1.07	0.74	0.88		
		Back	0.608	0.397	0.062	0.095	1.01	0.67	0.70		
		Top side	0.424		0.169	0.140	0.42	0.59	0.56		
		Bottom side	0.413	0.397		0.658	0.81	0.41	1.07		
	Band 4	Front	1.113	0.397	0.071	0.213	1.51	1.18	1.33		
		Back	0.924	0.397	0.062	0.095	1.32	0.99	1.02		
		Top side	0.319		0.169	0.140	0.32	0.49	0.46		
		Bottom side	0.442	0.397		0.658	0.84	0.44	1.10		
	Band 2	Front	0.920	0.397	0.071	0.213	1.32	0.99	1.13		
		Back	1.197	0.397	0.062	0.095	1.59	1.26	1.29		
		Top side	0.312		0.169	0.140	0.31	0.48	0.45		
		Bottom side	0.283	0.397		0.658	0.68	0.28	0.94		

Test Engineer : Nick Hu

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/√3	1/√6	1/√2

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

(b) κ 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 941225 D01 v03r01, "3G SAR MEAUREMENT PROCEDURES", Oct 2015
- [8] FCC KDB 941225 D05 v02r05, "SAR Evaluation Considerations for LTE Devices", Dec 2015
- [9] FCC KDB 941225 D05A v01r02, "Rel. 10 LTE SAR Test Guidance and KDB Inquiries", Oct 2015
- [10] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.
- [11] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [12] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.



Appendix A. Plots of System Performance Check

The plots are shown as follows.

System Check_Body_750MHz_160923

DUT: D750V2 - SN:1065

Communication System: UID 0, CW (0); Frequency: 750 MHz; Duty Cycle: 1:1

Medium: MSL_750_160923 Medium parameters used: $f = 750$ MHz; $\sigma = 0.971$ S/m; $\epsilon_r = 56.196$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.22, 10.22, 10.22); 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 (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.88 W/kg

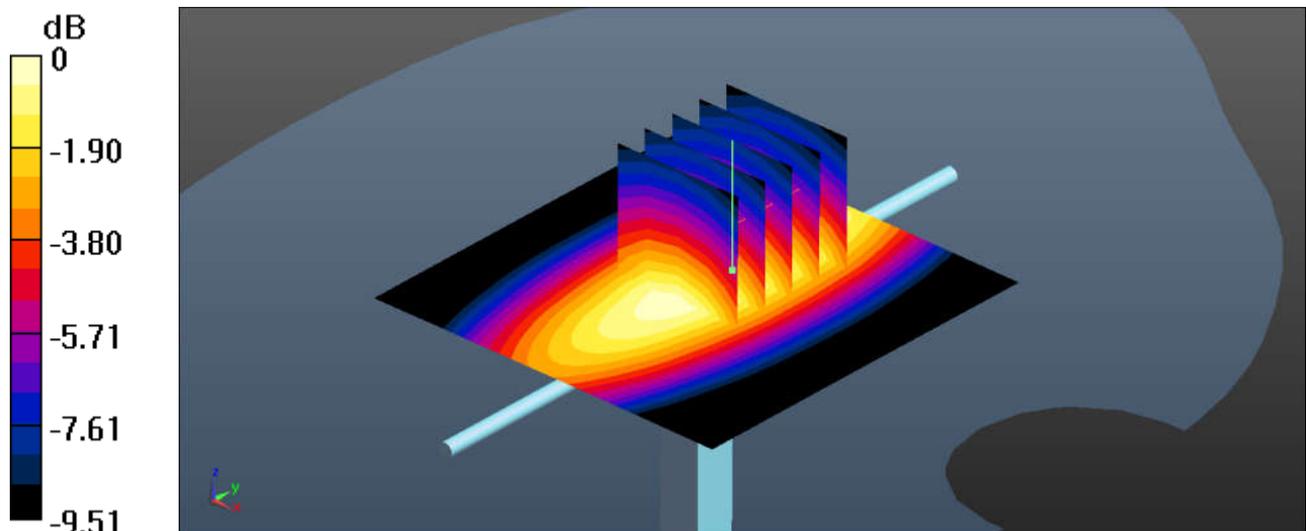
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 50.01 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 3.22 W/kg

SAR(1 g) = 2.29 W/kg; SAR(10 g) = 1.56 W/kg

Maximum value of SAR (measured) = 2.82 W/kg



0 dB = 2.82 W/kg = 4.50 dBW/kg

System Check_Body_835MHz_160923

DUT: D835V2 - SN:4d091

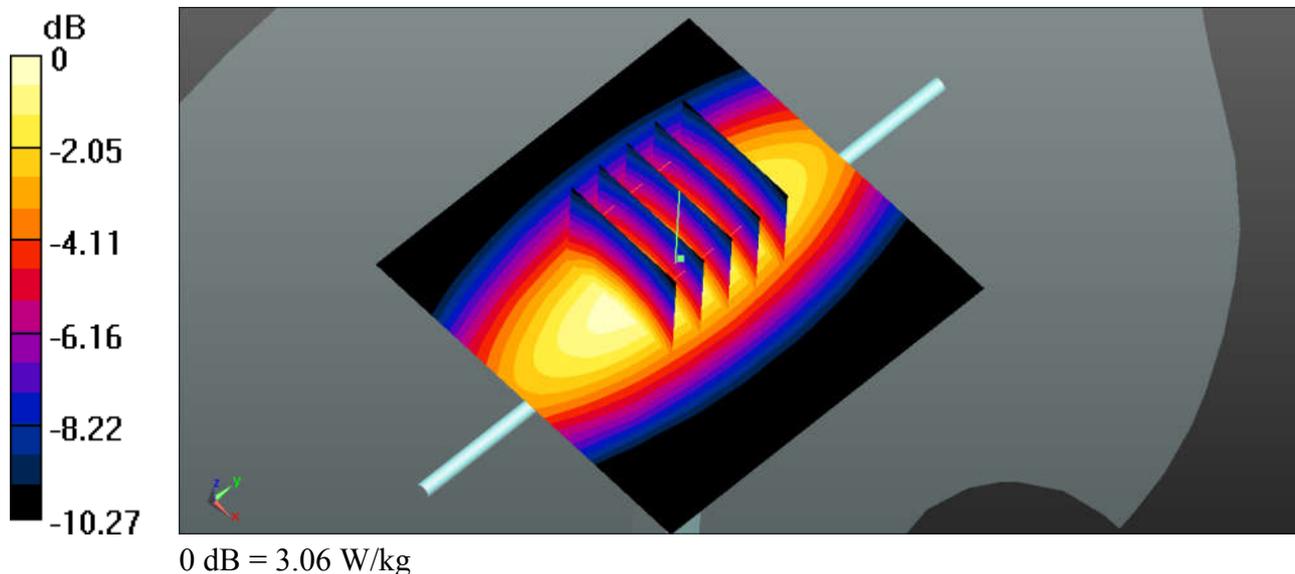
Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL_850_160923 Medium parameters used: $f = 835$ MHz; $\sigma = 0.969$ S/m; $\epsilon_r = 55.694$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.17, 10.17, 10.17); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 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 (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 3.05 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 51.88 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 3.51 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.61 W/kg
Maximum value of SAR (measured) = 3.06 W/kg



System Check_Body_1750MHz_160925

DUT: D1750V2 - SN:1069

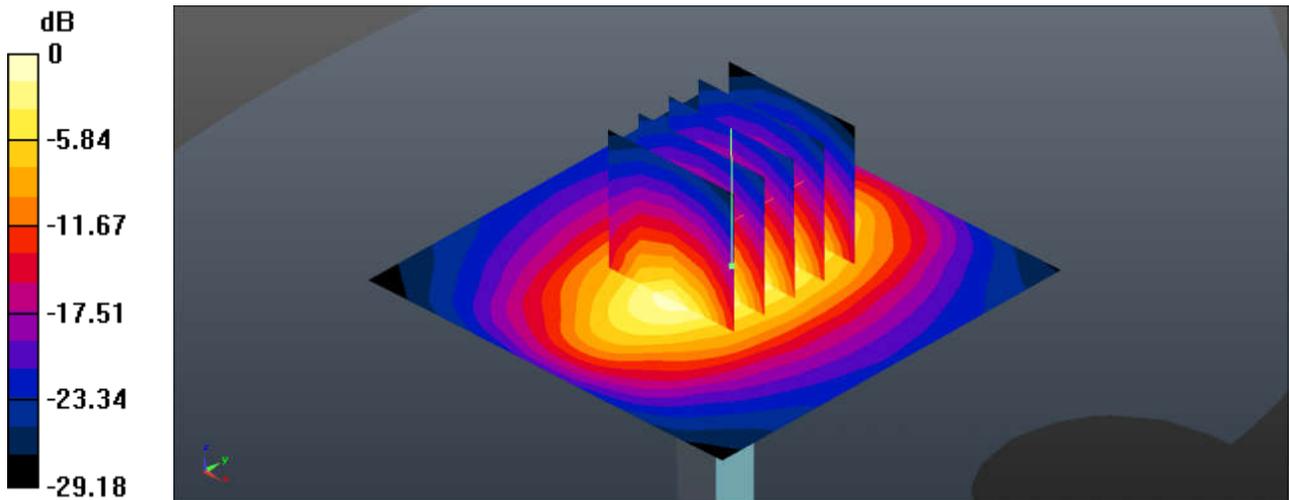
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: MSL_1750_160925 Medium parameters used: $f = 1750$ MHz; $\sigma = 1.539$ S/m; $\epsilon_r = 54.578$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3857; ConvF(7.81, 7.81, 7.81); Calibrated: 2016.5.25;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2016.5.18
- 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) = 12.2 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.85 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 15.2 W/kg
SAR(1 g) = 8.46 W/kg; SAR(10 g) = 4.46 W/kg
Maximum value of SAR (measured) = 12.0 W/kg



0 dB = 12.2 W/kg = 10.86 dBW/kg

System Check_Body_1900MHz_160925

DUT: D1900V2 - SN:5d118

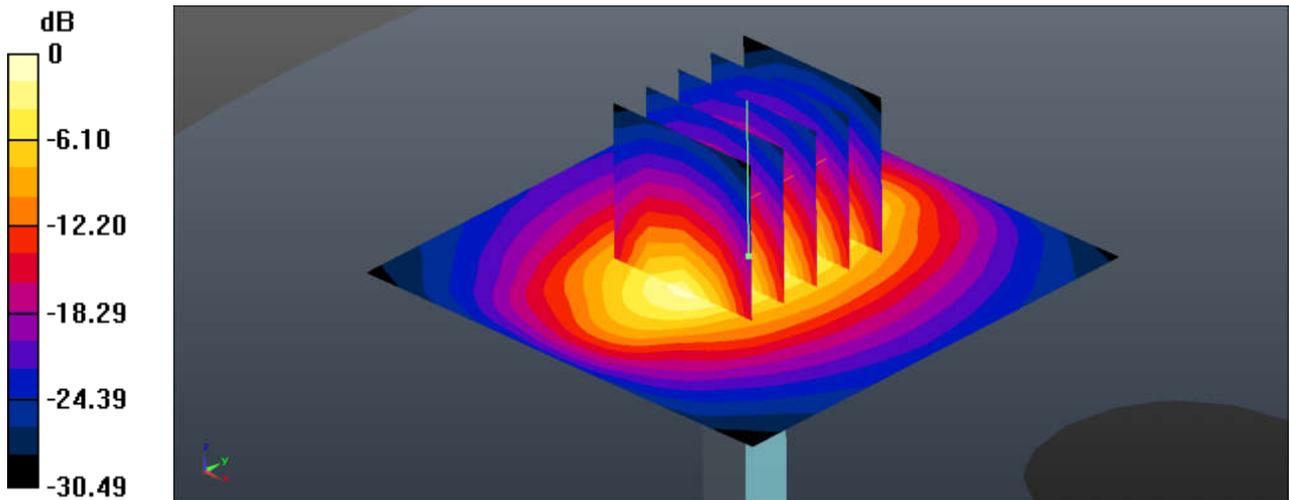
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: MSL_1900_160925 Medium parameters used: $f = 1900$ MHz; $\sigma = 1.552$ S/m; $\epsilon_r = 53.309$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3857; ConvF(7.55, 7.55, 7.55); Calibrated: 2016.5.25;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2016.5.18
- 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) = 13.1 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.85 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 16.6 W/kg
SAR(1 g) = 9.66 W/kg; SAR(10 g) = 4.96 W/kg
Maximum value of SAR (measured) = 13.3 W/kg



0 dB = 13.1 W/kg = 11.17 dBW/kg

System Check_Body_2450MHz_160927

DUT: D2450V2 - SN:840

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

Medium: MSL_2450_160927 Medium parameters used: $f = 2450$ MHz; $\sigma = 2.007$ S/m; $\epsilon_r = 52.577$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.7 °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) = 19.5 W/kg

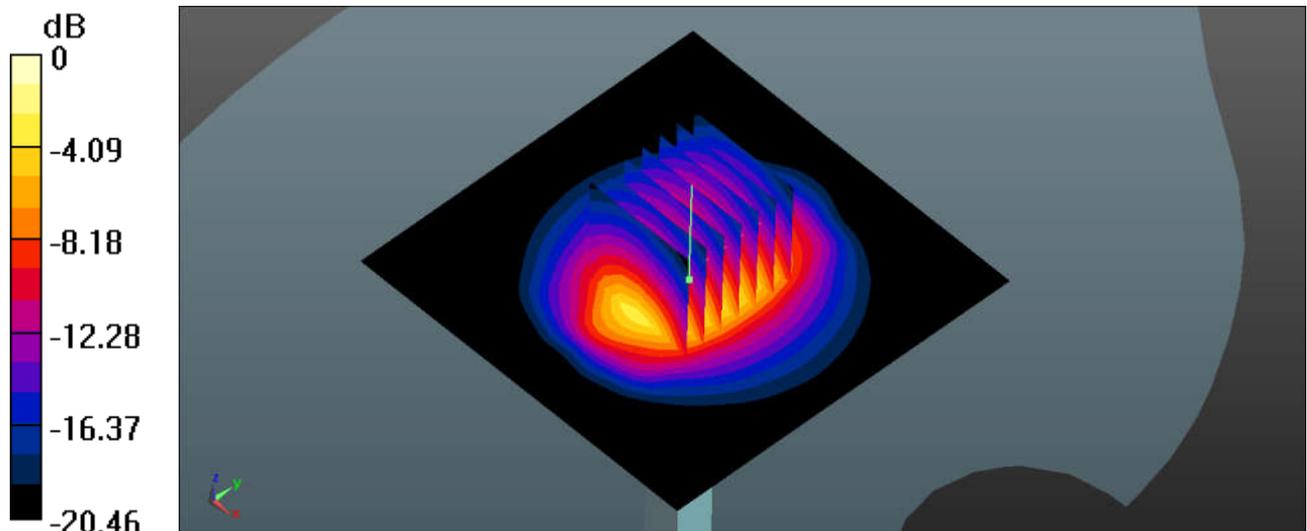
ConfigurationPin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 25.4 W/kg

SAR(1 g) = 12.9 W/kg; SAR(10 g) = 6.15 W/kg

Maximum value of SAR (measured) = 19.4 W/kg



0 dB = 19.4 W/kg

System Check_Body_5250MHz_160927

DUT: D5GHzV2 - SN:1113

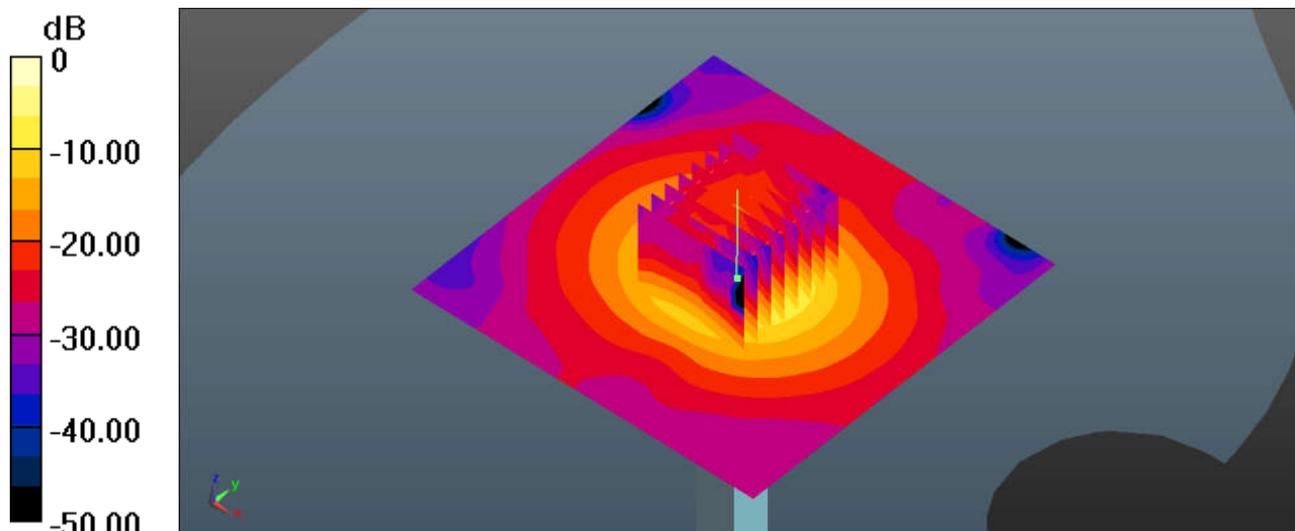
Communication System: UID 0, CW (0); Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: MSL_5000_160927 Medium parameters used: $f = 5200$ MHz; $\sigma = 5.279$ S/m; $\epsilon_r = 48.534$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.25, 4.25, 4.25); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical SurfaceDetection)
- Electronics: DAE4 Sn1279; Calibrated: 2016.4.4
- 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) = 14.0 W/kg

Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 42.29 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 28.0 W/kg
SAR(1 g) = 7.46 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 18.2 W/kg



0 dB = 18.2 W/kg = 12.60 dBW/kg

System Check_Body_5750MHz_160927

DUT: D5GHzV2 - SN:1113

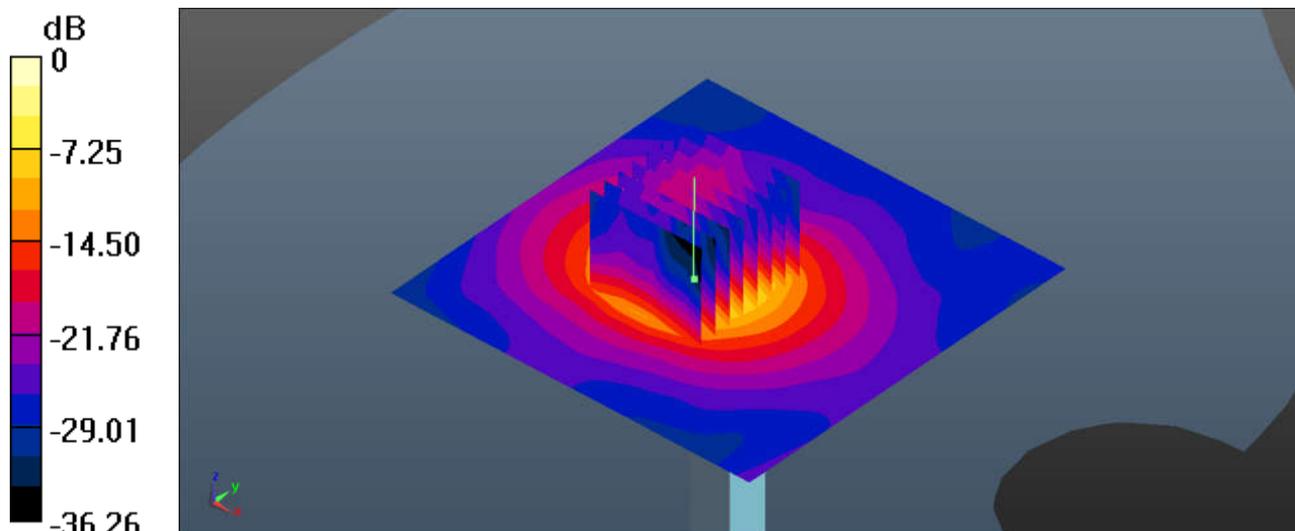
Communication System: UID 0, CW (0); Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: MSL_5000_160927 Medium parameters used: $f = 5800$ MHz; $\sigma = 6.113$ S/m; $\epsilon_r = 47.156$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(3.77, 3.77, 3.77); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical SurfaceDetection)
- Electronics: DAE4 Sn1279; Calibrated: 2016.4.4
- 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) = 15.8 W/kg

Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 30.88 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 29.8 W/kg
SAR(1 g) = 7.48 W/kg; SAR(10 g) = 2.16 W/kg
Maximum value of SAR (measured) = 19.2 W/kg



0 dB = 19.2 W/kg = 12.83 dBW/kg



Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

#01_WCDMA V_RMC12.2Kbps_Back_10mm_Ch4233

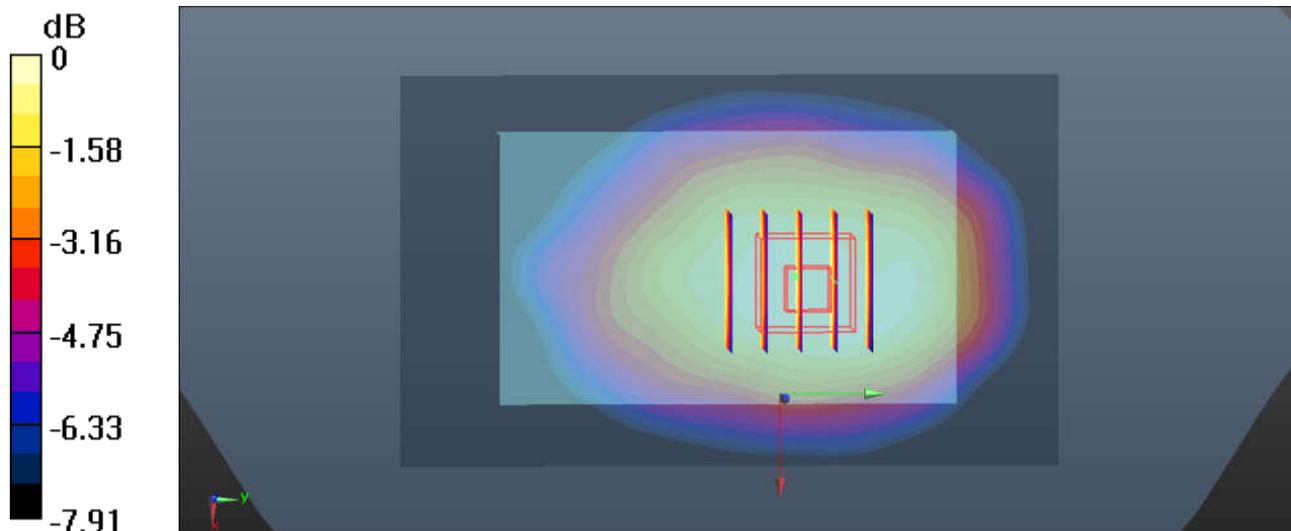
Communication System: UID 0, UMTS (0); Frequency: 846.6 MHz; Duty Cycle: 1:1
Medium: MSL_850_160923 Medium parameters used: $f = 846.6$ MHz; $\sigma = 0.98$ S/m; $\epsilon_r = 55.587$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.17, 10.17, 10.17); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 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)

Ch4233/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.574 W/kg

Ch4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.28 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.576 W/kg
SAR(1 g) = 0.498 W/kg; SAR(10 g) = 0.383 W/kg
Maximum value of SAR (measured) = 0.541 W/kg



#02_WCDMA II_RMC 12.2Kbps_Front_10mm_Ch9262

Communication System: UID 0, UMTS (0); Frequency: 1852.4 MHz; Duty Cycle: 1:1

Medium: MSL_1900_160925 Medium parameters used: $f = 1852.4$ MHz; $\sigma = 1.494$ S/m; $\epsilon_r = 53.417$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3857; ConvF(7.55, 7.55, 7.55); Calibrated: 2016.5.25;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2016.5.18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch9262/Area Scan (71x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.07 W/kg

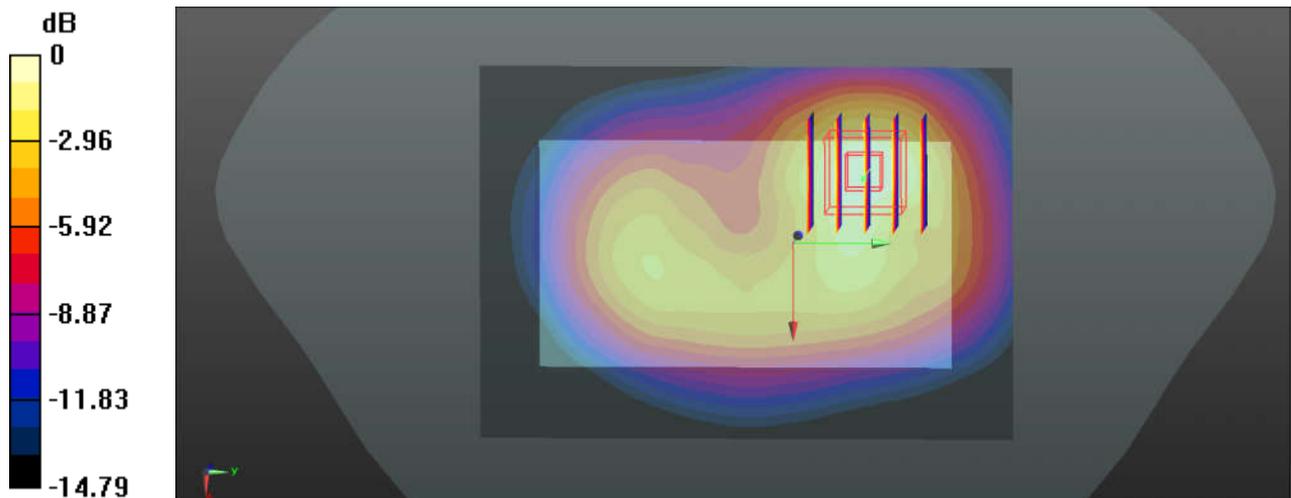
Ch9262/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.35 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.816 W/kg; SAR(10 g) = 0.478 W/kg

Maximum value of SAR (measured) = 1.08 W/kg



0 dB = 1.08 W/kg = 0.33 dBW/kg

#03_LTE Band17_10M_QPSK_1RB_49Offset_Front_10mm_Ch23800

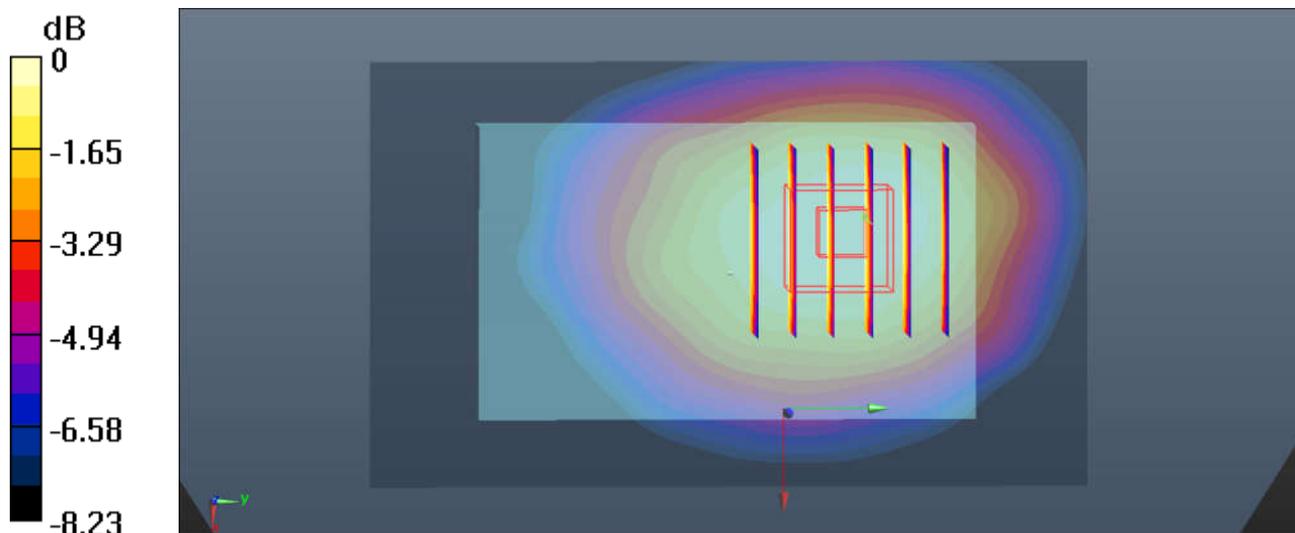
Communication System: UID 0, FDD_LTE (0); Frequency: 711 MHz; Duty Cycle: 1:1
Medium: MSL 750 160923 Medium parameters used: $f = 711$ MHz; $\sigma = 0.935$ S/m; $\epsilon_r = 56.611$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.22, 10.22, 10.22); 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)

Ch23800/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.768 W/kg

Ch23800/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.21 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.752 W/kg
SAR(1 g) = 0.645 W/kg; SAR(10 g) = 0.506 W/kg
Maximum value of SAR (measured) = 0.712 W/kg



0 dB = 0.712 W/kg = -1.48 dBW/kg

#04_LTE Band5_10M_QPSK_1RB_0Offset_Back_10mm_Ch20450

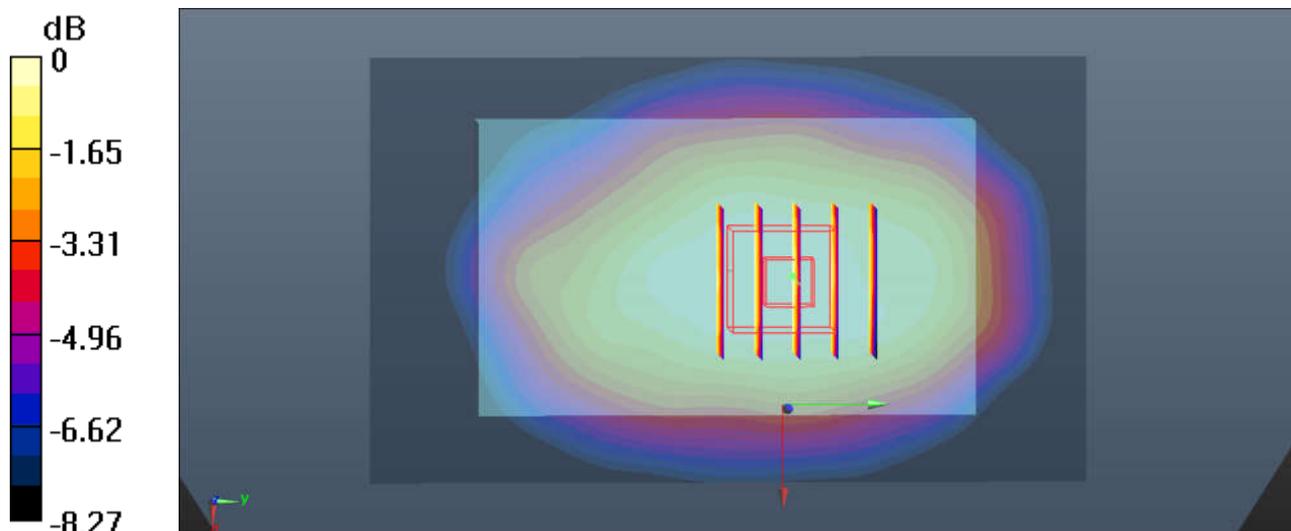
Communication System: UID 0, FDD_LTE (0); Frequency: 829 MHz;Duty Cycle: 1:1
Medium: MSL_850_160923 Medium parameters used: $f = 829$ MHz; $\sigma = 0.964$ S/m; $\epsilon_r = 55.748$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.17, 10.17, 10.17); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 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)

Ch20450/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.630 W/kg

Ch20450/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.29 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.601 W/kg
SAR(1 g) = 0.531 W/kg; SAR(10 g) = 0.417 W/kg
Maximum value of SAR (measured) = 0.583 W/kg



0 dB = 0.583 W/kg = -2.34 dBW/kg

#05_LTE Band 4_20M_QPSK_1RB_0Offset_Front_10mm_Ch20300

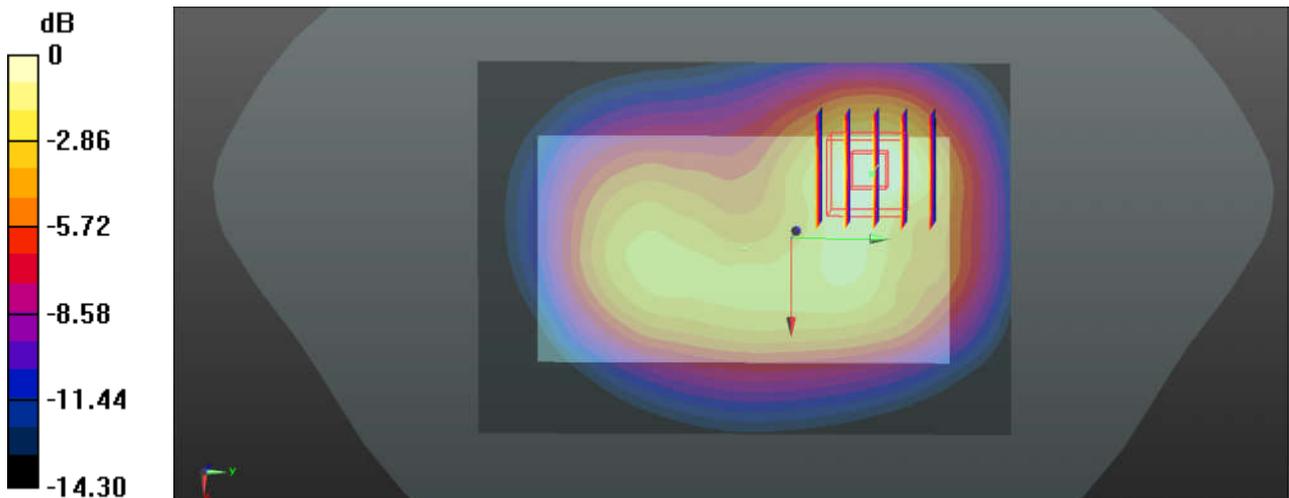
Communication System: UID 0, FDD_LTE (0); Frequency: 1745 MHz; Duty Cycle: 1:1
Medium: MSL_1750_160925 Medium parameters used: $f = 1745$ MHz; $\sigma = 1.53$ S/m; $\epsilon_r = 54.584$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3857; ConvF(7.81, 7.81, 7.81); Calibrated: 2016.5.25;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2016.5.18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20300/Area Scan (71x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.23 W/kg

Ch20300/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.00 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 0.926 W/kg; SAR(10 g) = 0.555 W/kg
Maximum value of SAR (measured) = 1.21 W/kg



0 dB = 1.21 W/kg = 0.83 dBW/kg

#06_LTE Band 2_20M_QPSK_1RB_0Offset_Back_10mm_Ch18900

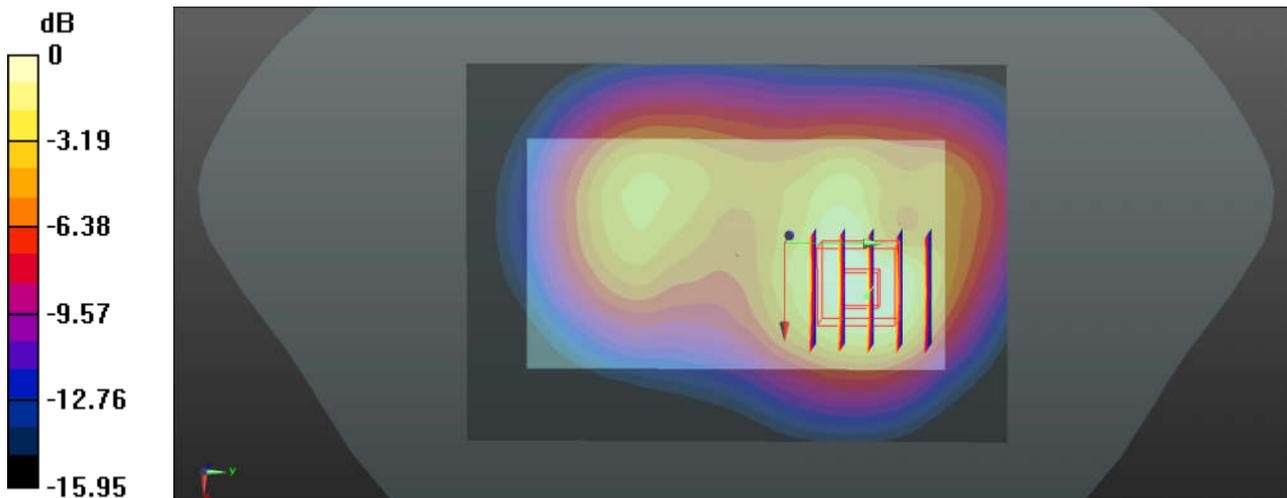
Communication System: UID 0, FDD_LTE (0); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: MSL_1900_160925 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.528$ S/m; $\epsilon_r = 53.361$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3857; ConvF(7.55, 7.55, 7.55); Calibrated: 2016.5.25;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2016.5.18
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch18900/Area Scan (71x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.41 W/kg

Ch18900/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.29 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.74 W/kg
SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.620 W/kg
Maximum value of SAR (measured) = 1.40 W/kg



0 dB = 1.40 W/kg = 1.46 dBW/kg

#07_WLAN2.4G_802.11b 1Mbps_Top Side_10mm_Ch6

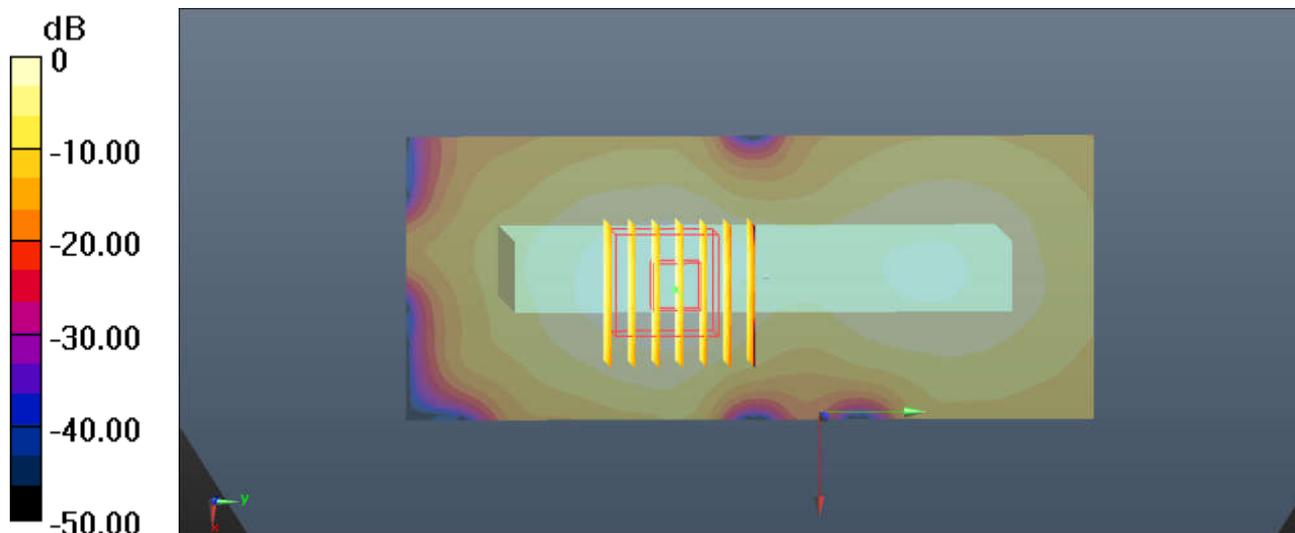
Communication System: UID 0, WIFI (0); Frequency: 2437 MHz; Duty Cycle: 1:1.007
Medium: MSL_2450_160927 Medium parameters used: $f = 2437$ MHz; $\sigma = 1.989$ S/m; $\epsilon_r = 52.626$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.7 °C

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)

Ch6/Area Scan (51x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.127 W/kg

Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.482 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.146 W/kg
SAR(1 g) = 0.086 W/kg; SAR(10 g) = 0.046 W/kg
Maximum value of SAR (measured) = 0.116 W/kg



0 dB = 0.116 W/kg = -9.36 dBW/kg

#08_WLAN5G Band 1_802.11n-HT20 MCS0_Bottom Side_10mm_Ch44

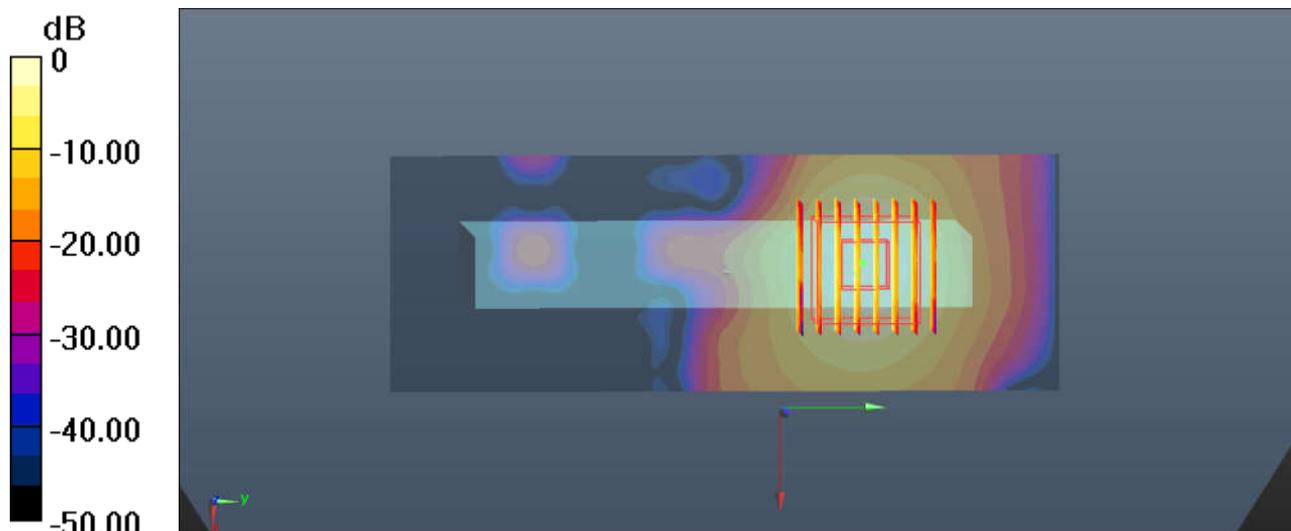
Communication System: UID 0, WIFI (0); Frequency: 5220 MHz; Duty Cycle: 1:1.101
Medium: MSL_5000_160927 Medium parameters used: $f = 5220$ MHz; $\sigma = 5.309$ S/m; $\epsilon_r = 48.504$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.4 °C ; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.25, 4.25, 4.25); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1279; Calibrated: 2016.4.4
- Phantom: SAM1; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch44/Area Scan (51x141x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.15 W/kg

Ch44/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0.8850 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.497 W/kg; SAR(10 g) = 0.172 W/kg
Maximum value of SAR (measured) = 0.989 W/kg



0 dB = 0.989 W/kg = -0.05 dBW/kg



Appendix E. Product Equality Declaration

ZTE CORPORATION**Product Change Description**

As the applicant of the below model, [ZTE Corporation] declares that the product,

[MF923]

[ZTE Corporation]

is the variant of the initial certified product,

[MF923]

[ZTE Corporation]

SOFTWARE MODIFICATIONS:

Protocol Stack changes: NO

MMS/STK changes: NO

JAVA changes: NO

Other changes detailed: NO

HARDWARE MODIFICATION:

Band changes: NO

Power Amplifier changes: Yes, for LTE b2/4/5,WCDMA b1/2/5; The new PA chip component is pin-for-pin compatible and an equivalent chip as old chip, it has the same basic function as the old one, no radio parameters changed.

Antenna changes: NO

PCB Layout changes: NO

Components on PCB changes: NO

LCD changes: NO

Speaker changes: NO

Camera changes: NO

Vibrator changes: NO

Bluetooth changes: NO
FM changes: NO

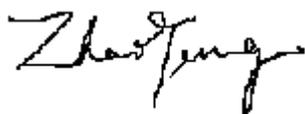
Other changes: SIM slot changed to the second vender.
Touch Panel changed to the second vender.
A LDO(which used for Micro-SD slot power supply)
changed to the second vender.

MECHANICAL MODIFICATIONS:

Use new metal front/back cover or keypad: NO
Mechanical shell changes: NO
Other changes detailed: NO

ACCESSORY MODIFICATIONS:

Battery changes: NO
AC Adaptor changes: NO
Earphone changes: NO



APPROVED BY: zhaoyang

Project Manager:

Date:2010-7-26

Company: ZTE Corporation

Address: B109, #889, Bibo Rd, Zhangjiang Hi-Tech Park, Shanghai,China

Tel:+86-21-68896840

Fax: +86-21-68896835