FCC SAR Test Report

APPLICANT	:	TCL Communication Ltd.
EQUIPMENT	:	LTE USB Modem/4G AP
BRAND NAME	:	ALCATEL ONETOUCH
MODEL NAME	:	Y859NC
MARKETING NAME	:	Link 4 II
FCC ID	:	2ACCJB022
STANDARD	:	FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2003

We, SPORTON INTERNATIONAL (SHENZHEN) 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 (SHENZHEN) INC., the test report shall not be reproduced except in full.

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Approved by: Jones Tsai / Manager

Testing Laboratory
2353

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA561905	Rev. 01	Initial issue of report	Aug. 04, 2015

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **TCL Communication Ltd., LTE USB Modem/4G AP, Y859NC**, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary Body 1g SAR (W/kg) (Separation 10mm)	Highest Simultaneous Transmission 1g SAR (W/kg)
PCB	GSM850	0.51	0.85
	GSM1900	0.29	
	WCDMA Band V	0.33	
	WCDMA Band II	0.30	
	LTE Band 17	0.12	
	LTE Band 5	0.37	
	LTE Band 4	0.34	
	LTE Band 2	0.43	
	LTE Band 7	**0.56**	
DTS	WLAN 2.4GHz Band	0.32	0.85
Date of Testing:		2015/07/18 ~ 2015/07/19	

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 1528-2003 and FCC KDB publications.

2. Administration Data

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.
Test Site Location	1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595

Applicant	
Company Name	TCL Communication Ltd.
Address	5F, C-Tower, No.232, Liangjing Road, Zhangjiang High-tech Park, Pudong, Shanghai, China

Manufacturer	
Company Name	TCL Mobile Communication Co. Ltd. Huizhou
Address	70 Huifeng 4rd., ZhongKai High-Technology Development District, Huizhou, Guangdong, P.R.C. 516006

3. Guidance Standard

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

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2003
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03
- FCC KDB 865664 D02 SAR Reporting v01r01
- FCC KDB 447498 D01 General RF Exposure Guidance v05r02
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r01
- FCC KDB 941225 D01 3G SAR Procedures v03
- FCC KDB 941225 D05 SAR for LTE Devices v02r03
- FCC KDB 941225 D06 Hotspot Mode SAR v02

4. Equipment Under Test (EUT)

4.1 General Information

Product Feature & Specification	
Equipment Name	LTE USB Modem/4G AP
Brand Name	ALCATEL ONETOUCH
Model Name	Y859NC
Marketing Name	Link 4 II
FCC ID	2ACCJB022
IMEI Code	014471000000445
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 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 LTE Band 7: 2502.5 MHz ~ 2567.5 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz
Mode	· GPRS/EGPRS · RMC12.2Kbps · HSDPA · HSUPA · DC-HSDPA · HSPA+ (Downlink Only) · LTE: QPSK, 16QAM · 802.11b/g/n HT20
HW Version	v3.0
SW Version	Y859_00_03.20_06_20150612_2G1G
EUT Stage	Identical Prototype

Remark:
1. This device has no voice function.
2. This device 2.4GHz supports hotspot operation and 802.11n-HT40 is not supported in 2.4GHz WLAN.
3. This device supports GRPS/EGPRS mode up to multi-slot class12.

4.2 Specification of Accessory

Specification of Accessory				
AC Adapter 1	Brand Name	ALCATEL onetouch	Model Name	UC11US
	Power Rating	INPUT:AC100-240V ~50/60Hz 0.2A OUTPUT:DC5.0V-1.0A		
	P/N	CBA0057AG0C2		
AC Adapter 2	Brand Name	ALCATEL onetouch	Model Name	UC11AU
	Power Rating	INPUT:AC100-240V ~50/60Hz 0.2A OUTPUT:DC5.0V-1.0A		
	P/N	CBA0057AC0C2		
AC Adapter 3	Brand Name	ALCATEL onetouch	Model Name	UC11AR
	Power Rating	INPUT:AC100-240V ~50/60Hz 0.2A OUTPUT:DC5.0V-1.0 A		
	P/N	CBA0057AH0C2		
AC Adapter 4	Brand Name	ALCATEL onetouch	Model Name	UC11EU
	Power Rating	INPUT:AC100-240V ~50/60Hz 0.2A OUTPUT:DC5.0V-0.6A		
	P/N	CBA0057AM0C2		
AC Adapter 5	Brand Name	ALCATEL onetouch	Model Name	UC11EU
	Power Rating	INPUT:AC100-240V ~50/60Hz 0.2A OUTPUT:DC5.0V-0.55A		
	P/N	CBA0057AA0C2		
Battery	Brand Name	ALCATEL onetouch	Model Name	TLi018D1
	Power Rating	3.7Vdc, 1800mAh		
USB Cable	Signal Line Type	1 meter, shielded cable, without ferrite core		

4.3 Maximum Tune-up Limit

Mode	Burst average power(dBm)	
	GSM 850	GSM 1900
GPRS (GMSK, 1 Tx slot)	32.00	30.50
GPRS (GMSK, 2 Tx slots)	30.50	28.50
GPRS (GMSK, 3 Tx slots)	28.50	26.50
GPRS (GMSK, 4 Tx slots)	26.00	24.50
EDGE (8PSK, 1 Tx slot)	26.00	26.00
EDGE (8PSK, 2 Tx slots)	24.00	24.00
EDGE (8PSK, 3 Tx slots)	22.00	22.50
EDGE (8PSK, 4 Tx slots)	20.00	20.00

Mode	Average power(dBm)	
	WCDMA Band V	WCDMA Band II
RMC 12.2Kbps	22.00	22.50
HSDPA Subtest-1	20.50	21.00
HSDPA Subtest-2	20.50	21.50
HSDPA Subtest-3	20.00	21.00
HSDPA Subtest-4	20.00	21.00
DC-HSDPA Subtest-1	20.00	19.50
DC-HSDPA Subtest-2	20.00	19.50
DC-HSDPA Subtest-3	20.00	19.50
DC-HSDPA Subtest-4	20.00	19.50
HSUPA Subtest-1	20.50	21.00
HSUPA Subtest-2	19.50	20.00
HSUPA Subtest-3	19.50	20.00
HSUPA Subtest-4	20.00	21.00
HSUPA Subtest-5	20.50	21.00

LTE Band 17				
Average Power (dBm)				
Modulation	BW (MHz)	RB size	MPR	Target Power
QPSK	10	≤ 12	0	23.00
QPSK	10	> 12	1	22.00
16QAM	10	≤ 12	1	22.00
16QAM	10	> 12	2	21.00
QPSK	5	≤ 8	0	23.00
QPSK	5	> 8	1	22.00
16QAM	5	≤ 8	1	22.00
16QAM	5	> 8	2	21.00

LTE Band 5				
Average Power (dBm)				
Modulation	BW (MHz)	RB size	MPR	Target Power
QPSK	10	≤ 12	0	22.50
QPSK	10	> 12	1	21.50
16QAM	10	≤ 12	1	21.50
16QAM	10	> 12	2	20.50
QPSK	5	≤ 8	0	22.50
QPSK	5	> 8	1	21.50
16QAM	5	≤ 8	1	21.50
16QAM	5	> 8	2	20.50
QPSK	3	≤ 4	0	22.50
QPSK	3	> 4	1	21.50
16QAM	3	≤ 4	1	21.50
16QAM	3	> 4	2	20.50
QPSK	1.4	≤ 5	0	22.50
QPSK	1.4	> 5	1	21.50
16QAM	1.4	≤ 5	1	21.50
16QAM	1.4	> 5	2	20.50

LTE Band 4				
Average Power (dBm)				
Modulation	BW (MHz)	RB size	MPR	Target Power
QPSK	20	≤ 18	0	22.50
QPSK	20	> 18	1	21.50
16QAM	20	≤ 18	1	21.50
16QAM	20	> 18	2	20.50
QPSK	15	≤ 16	0	22.50
QPSK	15	> 16	1	21.50
16QAM	15	≤ 16	1	21.50
16QAM	15	> 16	2	20.50
QPSK	10	≤ 12	0	22.50
QPSK	10	> 12	1	21.50
16QAM	10	≤ 12	1	21.50
16QAM	10	> 12	2	20.50
QPSK	5	≤ 8	0	22.50
QPSK	5	> 8	1	21.50
16QAM	5	≤ 8	1	21.50
16QAM	5	> 8	2	20.50
QPSK	3	≤ 4	0	22.50
QPSK	3	> 4	1	21.50
16QAM	3	≤ 4	1	21.50
16QAM	3	> 4	2	20.50
QPSK	1.4	≤ 5	0	22.50
QPSK	1.4	> 5	1	21.50
16QAM	1.4	≤ 5	1	21.50
16QAM	1.4	> 5	2	20.50

LTE Band 2				
Average Power (dBm)				
Modulation	BW (MHz)	RB size	MPR	Target Power
QPSK	20	≤ 18	0	23.00
QPSK	20	> 18	1	22.00
16QAM	20	≤ 18	1	22.00
16QAM	20	> 18	2	21.00
QPSK	15	≤ 16	0	23.00
QPSK	15	> 16	1	22.00
16QAM	15	≤ 16	1	22.00
16QAM	15	> 16	2	21.00
QPSK	10	≤ 12	0	23.00
QPSK	10	> 12	1	22.00
16QAM	10	≤ 12	1	22.00
16QAM	10	> 12	2	21.00
QPSK	5	≤ 8	0	23.00
QPSK	5	> 8	1	22.00
16QAM	5	≤ 8	1	22.00
16QAM	5	> 8	2	21.00
QPSK	3	≤ 4	0	23.00
QPSK	3	> 4	1	22.00
16QAM	3	≤ 4	1	22.00
16QAM	3	> 4	2	21.00
QPSK	1.4	≤ 5	0	23.00
QPSK	1.4	> 5	1	22.00
16QAM	1.4	≤ 5	1	22.00
16QAM	1.4	> 5	2	21.00

LTE Band 7				
Average Power (dBm)				
Modulation	BW (MHz)	RB size	MPR	Target Power
QPSK	20	≤ 18	0	23.50
QPSK	20	> 18	1	22.50
16QAM	20	≤ 18	1	22.50
16QAM	20	> 18	2	21.50
QPSK	15	≤ 16	0	23.50
QPSK	15	> 16	1	22.50
16QAM	15	≤ 16	1	22.50
16QAM	15	> 16	2	21.50
QPSK	10	≤ 12	0	23.50
QPSK	10	> 12	1	22.50
16QAM	10	≤ 12	1	22.50
16QAM	10	> 12	2	21.50
QPSK	5	≤ 8	0	23.50
QPSK	5	> 8	1	22.50
16QAM	5	≤ 8	1	22.50
16QAM	5	> 8	2	21.50

Mode			Average Power (dBm)
2.4GHz WLAN Antenna 0	802.11b	CH 1	14.50
		CH 6	14.50
		CH 11	13.50
	802.11g	CH 1	12.50
		CH 6	12.00
		CH 11	11.00
	802.11n-HT20	CH 1	10.50
		CH 6	10.00
		CH 11	9.50
2.4GHz WLAN Antenna 1	802.11b	CH 1	15.50
		CH 6	15.50
		CH 11	11.50
	802.11g	CH 1	13.00
		CH 6	13.00
		CH 11	9.50
	802.11n-HT20	CH 1	11.00
		CH 6	11.00
		CH 11	8.00
2.4GHz WLAN Antenna 0+1	802.11b	CH 1	17.00
		CH 6	17.00
		CH 11	14.50
	802.11g	CH 1	14.00
		CH 6	13.50
		CH 11	11.50
	802.11n-HT20	CH 1	13.00
		CH 6	13.00
		CH 11	11.00

4.4 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r03	
FCC ID	2ACCJB022
Equipment Name	LTE USB Modem/4G AP
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 LTE Band 7: 2502.5 MHz ~ 2567.5 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 LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz
uplink modulations used	QPSK and 16QAM
LTE Voice / Data requirements	Data Only
LTE MPR permanently built-in by design	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

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

LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.
LTE Release Version	R10, Category 4
CA Support	No

Transmission (H, M, L) channel numbers and frequencies in each LTE band												
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 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)				
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 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 2												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900
LTE Band 7												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510				
M	21100	2535	21100	2535	21100	2535	21100	2535				
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560				

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:

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

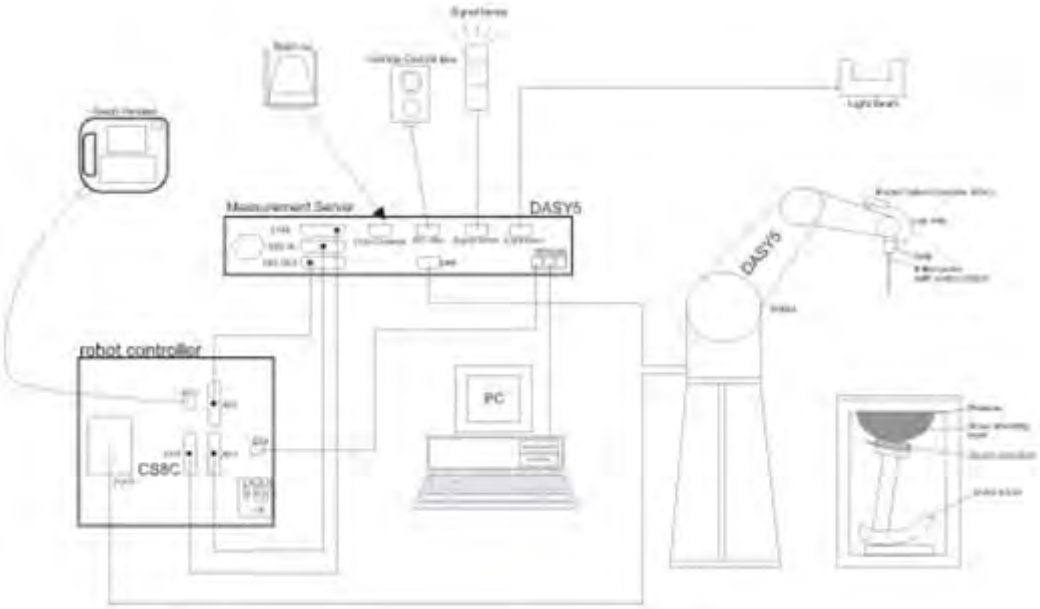
SAR is expressed in units of Watts per kilogram (W/kg)

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

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.

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 power measurement, use engineering software to configure EUT WLAN 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 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 form 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 D01v01r03 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	½·δ·ln(2) ± 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: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ 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 D01v01r03 SAR measurement 100 MHz to 6 GHz.

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{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 1st 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 *reported* SAR from the *area scan based 1-g SAR estimation* 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. 19, 2014	Nov. 18, 2015
SPEAG	835MHz System Validation Kit	D835V2	4d091	Nov. 21, 2014	Nov. 20, 2015
SPEAG	1750MHz System Validation Kit	D1750V2	1069	Nov. 21, 2014	Nov. 20, 2015
SPEAG	1900MHz System Validation Kit	D1900V2	5d118	Nov. 21, 2014	Nov. 20, 2015
SPEAG	2450MHz System Validation Kit	D2450V2	840	Nov. 19, 2014	Nov. 18, 2015
SPEAG	2600MHz System Validation Kit	D2600V2	1061	Nov. 19, 2014	Nov. 18, 2015
SPEAG	Data Acquisition Electronics	DAE4	1386	Feb. 19, 2015	Feb. 18, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	7346	Jan. 08, 2015	Jan. 07, 2016
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1670	NCR	NCR
SPEAG	SAM Twin Phantom	QD OVA 001 BB	TP-1233	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201432827	Jan. 16, 2015	Jan. 15, 2016
Agilent	Wireless Communication Test Set	E5515C	MY50267224	Sep. 29, 2014	Sep. 28, 2015
R&S	Network Analyzer	ZVB8	100106	Sep. 29, 2014	Sep. 28, 2015
Speag	Dielectric Assessment KIT	DAK-3.5	1032	NCR	NCR
R&S	Signal Generator	SMBV100A	258305	Jan. 23, 2015	Jan. 22, 2016
Anritsu	Power Sensor	MA2411B	1207253	Jan. 28, 2015	Jan. 27, 2016
Anritsu	Power Sensor	MA2411B	0917070	Jan. 23, 2015	Jan. 22, 2016
Anritsu	Power Meter	ML2495A	1218010	Jan. 28, 2015	Jan. 27, 2016
Anritsu	Power Meter	ML2495A	1005002	Jan. 23, 2015	Jan. 22, 2016
ARRA	Power Divider	A3200-2	N/A	NA	NA
R&S	Spectrum Analyzer	FSP30	101362	Sep. 29, 2014	Sep. 28, 2015
Agilent	Dual Directional Coupler	778D	50422	Note	
Woken	Attenuator 1	WK0602-XX	N/A	Note	
PE	Attenuator 2	PE7005-10	N/A	Note	
PE	Attenuator 3	PE7005- 3	N/A	Note	
AR	Power Amplifier	5S1G4M2	0328767	Note	
Mini-Circuits	Power Amplifier	ZVE-3W	162601250	Note	

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

10. System Verification

10.1 Tissue Verification

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

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
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
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	Body	22.7	0.970	54.642	0.96	55.50	1.04	-1.55	±5	2015/7/18
835	Body	22.6	0.972	53.975	0.97	55.20	0.21	-2.22	±5	2015/7/18
1750	Body	22.6	1.527	52.020	1.49	53.40	2.48	-2.58	±5	2015/7/18
1900	Body	22.7	1.538	53.790	1.52	53.30	1.18	0.92	±5	2015/7/18
2450	Body	22.6	1.992	52.319	1.95	52.70	2.15	-0.72	±5	2015/7/19
2600	Body	22.8	2.196	50.730	2.16	52.50	1.67	-3.37	±5	2015/7/19

10.2 System Performance Check Results

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

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2015/7/18	750	Body	250	D750V3-1065	7346	1386	2.11	8.64	8.44	-2.31
2015/7/18	835	Body	250	D835V2-4d091	7346	1386	2.28	9.60	9.12	-5.00
2015/7/18	1750	Body	250	D1750V2-1069	7346	1386	9.00	38.10	36.00	-5.51
2015/7/18	1900	Body	250	D1900V2-5d118	7346	1386	9.52	40.00	38.08	-4.80
2015/7/19	2450	Body	250	D2450V2-840	7346	1386	12.70	51.00	50.80	-0.39
2015/7/19	2600	Body	250	D2600V2-1061	7346	1386	13.30	54.90	53.20	-3.10

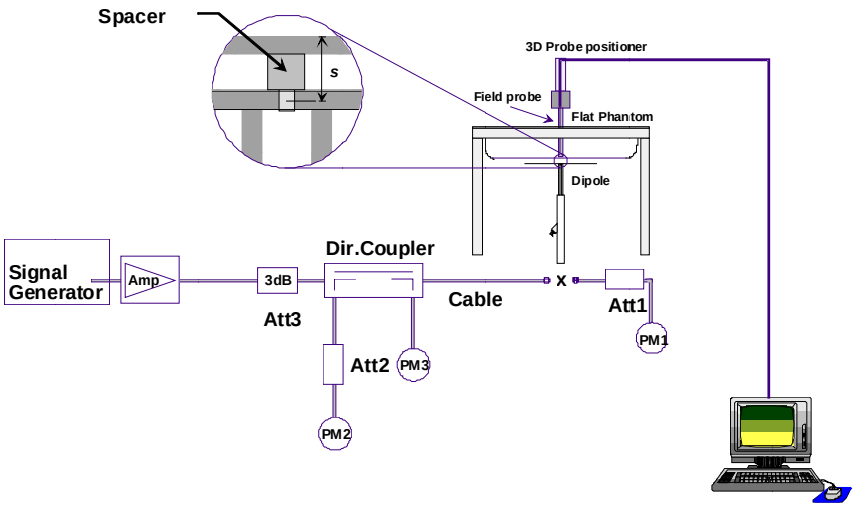


Fig 8.3.1 System Performance Check Setup

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 1 cm.

<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 HDB Publication 941225 D06 v02 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined form general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body accessory SAR tests.

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

12. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

General Note:

1. Per KDB 447498 D01v05r02, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03, for hotspot and body SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the EUT was set in GPRS (2Tx slots) for GSM850/GSM1900.

Band GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GPRS (GMSK, 1 Tx slot)	31.35	31.41	**31.43**	32.00	22.35	22.41	22.43	23.00
GPRS (GMSK, 2 Tx slots)	30.05	30.06	30.20	30.50	24.05	24.06	**24.20**	24.50
GPRS (GMSK, 3 Tx slots)	27.91	28.10	28.16	28.50	23.65	23.84	23.90	24.24
GPRS (GMSK, 4 Tx slots)	25.23	25.28	25.32	26.00	22.23	22.28	22.32	23.00
EDGE (8PSK, 1 Tx slot)	25.58	25.60	25.69	26.00	16.58	16.60	16.69	17.00
EDGE (8PSK, 2 Tx slots)	23.58	23.59	23.62	24.00	17.58	17.59	17.62	18.00
EDGE (8PSK, 3 Tx slots)	21.83	21.85	21.90	22.00	17.57	17.59	17.64	17.74
EDGE (8PSK, 4 Tx slots)	19.75	19.84	19.98	20.00	16.75	16.84	16.98	17.00
Band GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GPRS (GMSK, 1 Tx slot)	**29.99**	29.56	29.30	30.50	20.99	20.56	20.30	21.50
GPRS (GMSK, 2 Tx slots)	28.10	27.85	27.59	28.50	**22.10**	21.85	21.59	22.50
GPRS (GMSK, 3 Tx slots)	26.12	25.79	25.55	26.50	21.86	21.53	21.29	22.24
GPRS (GMSK, 4 Tx slots)	23.80	23.53	23.42	24.50	20.80	20.53	20.42	21.50
EDGE (8PSK, 1 Tx slot)	25.67	25.39	25.12	26.00	16.67	16.39	16.12	17.00
EDGE (8PSK, 2 Tx slots)	23.60	23.18	23.05	24.00	17.60	17.18	17.05	18.00
EDGE (8PSK, 3 Tx slots)	22.01	21.70	21.57	22.50	17.75	17.44	17.31	18.24
EDGE (8PSK, 4 Tx slots)	19.92	19.62	19.43	20.00	16.92	16.62	16.43	17.00

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.
The calculated method are shown as below:
Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB
Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

<WCDMA Conducted Power>

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01 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} (Note1, 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 Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_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 Δ_{NACK} = 30/15 with β_{hs} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_c.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, 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 β_c = 11/15 and β_d = 15/15.

Setup Configuration

HSUPA Setup Configuration:

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

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	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	β_{ed}1: 47/15 β_{ed}2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c .

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_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 β_c = 10/15 and β_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 β_c = 14/15 and β_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: β_c/β_d=2/15
      b). Subtest 2: β_c/β_d=12/15
      c). Subtest 3: β_c/β_d=15/8
      d). Subtest 4: β_c/β_d=15/4
   vi. Set Delta ACK, Delta NACK and Delta CQI = 8
   vii. Set Ack-Nack Repetition Factor to 3
   viii. Set CQI Feedback Cycle (k) to 4 ms
   ix. Set CQI Repetition Factor to 2
   x. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

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

C.8.1.12 Fixed Reference Channel Definition H-Set 12

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

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

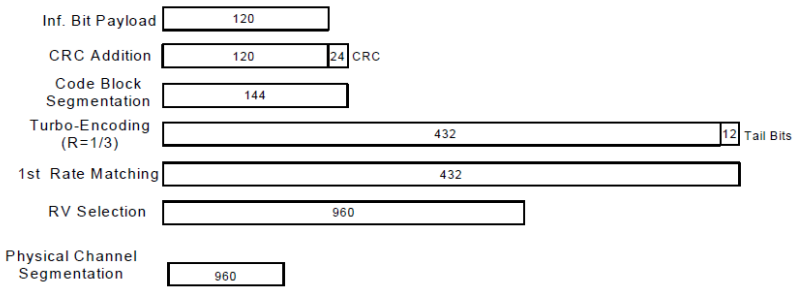


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<WCDMA Conducted Power>

General Note:

1. Per KDB 941225 D01v03, SAR for Body exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”.
2. Per KDB 941225 D01v03, RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

Band			WCDMA Band V			WCDMA Band II		
TX Channel			4132	4182	4233	9262	9400	9538
Rx Channel			4357	4407	4458	9662	9800	9938
Frequency (MHz)			826.4	836.4	846.6	1852.4	1880	1907.6
MPR (dB)	3GPP Rel 99	RMC 12.2Kbps	21.32	21.52	**21.54**	**22.01**	21.94	21.92
0	3GPP Rel 6	HSDPA Subtest-1	20.24	20.32	20.30	20.75	20.66	20.88
0	3GPP Rel 6	HSDPA Subtest-2	20.34	20.38	20.35	21.05	20.68	21.02
0.5	3GPP Rel 6	HSDPA Subtest-3	19.78	19.51	19.82	20.50	20.15	20.48
0.5	3GPP Rel 6	HSDPA Subtest-4	19.79	19.84	19.85	20.53	20.17	20.49
0	3GPP Rel 8	DC-HSDPA Subtest-1	19.70	19.66	19.71	19.11	18.88	19.35
0	3GPP Rel 8	DC-HSDPA Subtest-2	19.69	19.74	19.71	19.08	18.90	19.35
0.5	3GPP Rel 8	DC-HSDPA Subtest-3	19.67	19.73	19.70	19.13	18.87	19.38
0.5	3GPP Rel 8	DC-HSDPA Subtest-4	19.60	19.65	19.65	19.10	18.87	19.32
0	3GPP Rel 6	HSUPA Subtest-1	20.25	20.42	19.61	20.57	20.16	20.45
2	3GPP Rel 6	HSUPA Subtest-2	18.92	18.79	19.08	19.95	19.66	19.93
1	3GPP Rel 6	HSUPA Subtest-3	19.13	18.90	19.10	19.75	19.33	19.60
2	3GPP Rel 6	HSUPA Subtest-4	19.21	19.53	19.29	20.47	19.63	20.51
0	3GPP Rel 6	HSUPA Subtest-5	20.20	20.25	20.31	20.75	20.60	20.70

<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r03, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r03, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r03, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r03, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r03, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r03, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r03, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r03, smaller bandwidth SAR testing is not required.

<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	21.96	22.16	22.15	23.00	0
10	QPSK	1	24	22.13	22.26	**22.29**		
10	QPSK	1	49	22.11	22.18	22.17		
10	QPSK	25	0	21.24	21.25	21.34	22.00	0-1
10	QPSK	25	12	21.21	21.23	21.31		
10	QPSK	25	24	21.25	21.28	21.35		
10	QPSK	50	0	21.21	21.23	21.26		
10	16QAM	1	0	21.12	21.20	21.38	22.00	0-1
10	16QAM	1	24	21.32	21.48	21.39		
10	16QAM	1	49	21.29	21.47	21.43		
10	16QAM	25	0	20.27	20.34	20.19	21.00	0-2
10	16QAM	25	12	20.31	20.31	20.30		
10	16QAM	25	24	20.41	20.26	20.42		
10	16QAM	50	0	20.52	20.25	20.42		
Channel				23755	23790	23825	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				706.5	710	713.5		
5	QPSK	1	0	22.09	22.07	22.14	23.00	0
5	QPSK	1	12	22.08	22.16	22.07		
5	QPSK	1	24	22.08	22.14	22.22		
5	QPSK	12	0	21.18	21.16	21.17	22.00	0-1
5	QPSK	12	6	21.21	21.28	21.15		
5	QPSK	12	11	21.27	21.26	21.17		
5	QPSK	25	0	21.24	21.26	21.17		
5	16QAM	1	0	20.94	21.08	21.00	22.00	0-1
5	16QAM	1	12	21.09	21.11	20.90		
5	16QAM	1	24	20.94	21.08	21.01		
5	16QAM	12	0	20.27	20.24	20.26	21.00	0-2
5	16QAM	12	6	20.30	20.36	20.26		
5	16QAM	12	11	20.26	20.34	20.18		
5	16QAM	25	0	20.19	20.29	20.21		

<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	21.89	22.01	21.96	22.50	0
10	QPSK	1	24	21.92	22.04	21.97		
10	QPSK	1	49	22.02	22.08	22.09		
10	QPSK	25	0	21.03	21.00	21.02	21.50	0-1
10	QPSK	25	12	21.02	20.98	21.01		
10	QPSK	25	24	21.07	21.09	21.15		
10	QPSK	50	0	21.06	21.05	21.14		
10	16QAM	1	0	20.65	20.64	20.64	21.50	0-1
10	16QAM	1	24	20.67	20.63	20.72		
10	16QAM	1	49	20.62	20.62	20.68		
10	16QAM	25	0	20.06	20.16	20.03	20.50	0-2
10	16QAM	25	12	20.03	20.14	20.14		
10	16QAM	25	24	20.09	20.04	20.06		
10	16QAM	50	0	20.00	20.08	20.11		
Channel				20425	20525	20625	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	21.92	21.96	22.00	22.50	0
5	QPSK	1	12	21.93	22.07	21.97		
5	QPSK	1	24	21.95	22.05	22.02		
5	QPSK	12	0	20.99	21.00	21.01	21.50	0-1
5	QPSK	12	6	21.05	21.03	21.01		
5	QPSK	12	11	21.01	21.07	21.08		
5	QPSK	25	0	20.94	21.03	21.00		
5	16QAM	1	0	21.19	21.00	21.08	21.50	0-1
5	16QAM	1	12	21.04	21.19	21.16		
5	16QAM	1	24	21.13	21.14	21.34		
5	16QAM	12	0	20.04	20.05	20.07	20.50	0-2
5	16QAM	12	6	20.01	20.06	20.02		
5	16QAM	12	11	20.10	20.09	20.10		
5	16QAM	25	0	20.09	20.05	20.12		
Channel				20415	20525	20635	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	21.86	21.99	22.01	22.50	0
3	QPSK	1	7	21.90	21.87	21.99		
3	QPSK	1	14	21.95	22.02	22.00		
3	QPSK	8	0	20.93	21.04	21.02	21.50	0-1
3	QPSK	8	4	20.92	21.04	21.08		
3	QPSK	8	7	20.97	21.02	21.07		
3	QPSK	15	0	20.95	20.99	21.11		
3	16QAM	1	0	20.89	20.96	21.07	21.50	0-1
3	16QAM	1	7	20.95	20.90	21.01		
3	16QAM	1	14	21.03	20.90	21.05		
3	16QAM	8	0	19.86	20.05	20.04	20.50	0-2
3	16QAM	8	4	19.97	20.04	20.09		
3	16QAM	8	7	19.91	20.03	20.21		
3	16QAM	15	0	19.97	20.07	20.16		

Channel				20407	20525	20643	Tune up Limit (dBm)	Target MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	21.93	22.07	22.06	22.50	0
1.4	QPSK	1	2	21.88	22.05	22.08		
1.4	QPSK	1	5	21.94	22.06	22.07		
1.4	QPSK	3	0	21.93	22.02	22.03		
1.4	QPSK	3	1	21.95	22.07	22.07		
1.4	QPSK	3	2	21.94	22.05	22.04		
1.4	QPSK	6	0	20.96	21.01	21.20	21.50	0-1
1.4	16QAM	1	0	21.18	21.22	21.34	21.50	0-1
1.4	16QAM	1	2	21.04	21.11	21.32		
1.4	16QAM	1	5	21.15	21.16	21.17		
1.4	16QAM	3	0	20.91	20.98	20.97		
1.4	16QAM	3	1	20.85	20.90	21.01		
1.4	16QAM	3	2	20.85	20.88	21.00		
1.4	16QAM	6	0	19.96	20.13	20.20	20.50	0-2

<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	21.59	21.65	21.75	22.50	0
20	QPSK	1	49	21.58	21.60	21.74		
20	QPSK	1	99	21.63	21.74	**21.76**		
20	QPSK	50	0	20.57	20.67	20.77	21.50	0-1
20	QPSK	50	24	20.58	20.70	20.78		
20	QPSK	50	49	20.54	20.57	20.72		
20	QPSK	100	0	20.55	20.60	20.62		
20	16QAM	1	0	20.25	20.35	20.57	21.50	0-1
20	16QAM	1	49	20.21	20.21	20.50		
20	16QAM	1	99	20.23	20.92	20.49		
20	16QAM	50	0	19.56	19.59	19.70	20.50	0-2
20	16QAM	50	24	19.59	19.62	19.79		
20	16QAM	50	49	19.54	19.56	19.77		
20	16QAM	100	0	19.48	19.68	19.67		
Channel				20025	20175	20325	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	21.61	21.72	21.71	22.50	0
15	QPSK	1	37	21.45	21.62	21.74		
15	QPSK	1	74	21.51	21.65	21.72		
15	QPSK	36	0	20.52	20.70	20.59	21.50	0-1
15	QPSK	36	18	20.48	20.65	20.67		
15	QPSK	36	37	20.59	20.61	20.72		
15	QPSK	75	0	20.49	20.70	20.63		
15	16QAM	1	0	20.58	20.53	20.74	21.50	0-1
15	16QAM	1	37	20.57	20.68	20.57		
15	16QAM	1	74	20.38	20.56	20.67		
15	16QAM	36	0	19.47	19.61	19.63	20.50	0-2
15	16QAM	36	18	19.49	19.56	19.60		
15	16QAM	36	37	19.59	19.63	19.65		
15	16QAM	75	0	19.59	19.72	19.70		
Channel				20000	20175	20350	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	21.42	21.66	21.74	22.50	0
10	QPSK	1	24	21.47	21.58	21.69		
10	QPSK	1	49	21.36	21.63	21.72		
10	QPSK	25	0	20.57	20.64	20.60	21.50	0-1
10	QPSK	25	12	20.58	20.62	20.70		
10	QPSK	25	24	20.47	20.69	20.65		
10	QPSK	50	0	20.47	20.65	20.72		
10	16QAM	1	0	20.38	20.82	20.76	21.50	0-1
10	16QAM	1	24	20.72	20.73	20.80		
10	16QAM	1	49	20.55	20.78	20.83		
10	16QAM	25	0	19.57	19.73	19.72	20.50	0-2
10	16QAM	25	12	19.63	19.72	19.71		
10	16QAM	25	24	19.54	19.77	19.76		
10	16QAM	50	0	19.43	19.75	19.73		

Channel				19975	20175	20375	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	21.39	21.57	21.67	22.50	0
5	QPSK	1	12	21.42	21.57	21.64		
5	QPSK	1	24	21.52	21.59	21.65		
5	QPSK	12	0	20.52	20.70	20.65	21.50	0-1
5	QPSK	12	6	20.55	20.71	20.64		
5	QPSK	12	11	20.51	20.57	20.71		
5	QPSK	25	0	20.54	20.62	20.73		
5	16QAM	1	0	20.19	20.41	20.46	21.50	0-1
5	16QAM	1	12	20.31	20.44	20.43		
5	16QAM	1	24	20.30	20.42	20.53		
5	16QAM	12	0	19.57	19.74	19.74	20.50	0-2
5	16QAM	12	6	19.61	19.68	19.74		
5	16QAM	12	11	19.54	19.65	19.69		
5	16QAM	25	0	19.52	19.60	19.62		
Channel				19965	20175	20385	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	21.45	21.68	21.75	22.50	0
3	QPSK	1	7	21.43	21.62	21.72		
3	QPSK	1	14	21.54	21.55	21.73		
3	QPSK	8	0	20.56	20.67	20.69	21.50	0-1
3	QPSK	8	4	20.54	20.63	20.70		
3	QPSK	8	7	20.50	20.71	20.68		
3	QPSK	15	0	20.55	20.69	20.72		
3	16QAM	1	0	20.28	20.43	20.24	21.50	0-1
3	16QAM	1	7	20.13	20.40	20.52		
3	16QAM	1	14	20.22	20.39	20.28		
3	16QAM	8	0	19.61	19.75	19.79	20.50	0-2
3	16QAM	8	4	19.59	19.83	19.80		
3	16QAM	8	7	19.58	19.80	19.77		
3	16QAM	15	0	19.61	19.67	19.74		
Channel				19957	20175	20393	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	21.34	21.60	21.65	22.50	0
1.4	QPSK	1	2	21.46	21.72	21.71		
1.4	QPSK	1	5	21.51	21.70	21.73		
1.4	QPSK	3	0	21.47	21.66	21.67		
1.4	QPSK	3	1	21.50	21.64	21.71		
1.4	QPSK	3	2	21.51	21.65	21.68		
1.4	QPSK	6	0	20.48	20.68	20.66	21.50	0-1
1.4	16QAM	1	0	20.61	20.78	20.74	21.50	0-1
1.4	16QAM	1	2	20.74	20.91	20.73		
1.4	16QAM	1	5	20.60	20.86	20.96		
1.4	16QAM	3	0	20.39	20.54	20.59		
1.4	16QAM	3	1	20.30	20.61	20.55		
1.4	16QAM	3	2	20.50	20.50	20.60		
1.4	16QAM	6	0	19.49	19.68	19.71	20.50	0-2

<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	21.76	22.38	22.39	23.00	0
20	QPSK	1	49	21.66	22.10	22.26		
20	QPSK	1	99	21.64	22.08	22.10		
20	QPSK	50	0	20.98	21.24	21.41	22.00	0-1
20	QPSK	50	24	20.97	21.14	21.31		
20	QPSK	50	49	20.76	21.13	21.09		
20	QPSK	100	0	20.89	21.14	21.23		
20	16QAM	1	0	20.65	21.02	21.60	22.00	0-1
20	16QAM	1	49	20.76	21.14	21.57		
20	16QAM	1	99	20.63	21.40	21.41		
20	16QAM	50	0	19.85	20.08	20.44	21.00	0-2
20	16QAM	50	24	20.03	20.10	20.33		
20	16QAM	50	49	19.87	20.21	20.19		
20	16QAM	100	0	20.04	20.08	20.24		
Channel				18675	18900	19125	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	21.69	21.96	22.33	23.00	0
15	QPSK	1	37	21.72	22.13	22.07		
15	QPSK	1	74	21.73	22.25	22.13		
15	QPSK	36	0	20.90	21.04	21.34	22.00	0-1
15	QPSK	36	18	20.92	21.14	21.35		
15	QPSK	36	37	20.93	21.20	21.01		
15	QPSK	75	0	20.83	21.13	21.13		
15	16QAM	1	0	20.79	20.91	21.58	22.00	0-1
15	16QAM	1	37	20.94	21.01	21.42		
15	16QAM	1	74	20.82	20.95	21.30		
15	16QAM	36	0	19.85	20.10	20.37	21.00	0-2
15	16QAM	36	18	19.89	20.07	20.40		
15	16QAM	36	37	19.99	20.14	20.12		
15	16QAM	75	0	19.88	20.08	20.21		
Channel				18650	18900	19150	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	21.69	22.10	22.22	23.00	0
10	QPSK	1	24	21.68	22.04	22.17		
10	QPSK	1	49	21.65	22.20	22.15		
10	QPSK	25	0	20.78	20.99	21.14	22.00	0-1
10	QPSK	25	12	20.93	21.13	21.04		
10	QPSK	25	24	20.81	21.16	20.92		
10	QPSK	50	0	20.87	21.12	21.07		
10	16QAM	1	0	20.65	20.83	21.17	22.00	0-1
10	16QAM	1	24	20.70	20.80	20.85		
10	16QAM	1	49	20.49	20.83	20.92		
10	16QAM	25	0	20.02	20.11	20.36	21.00	0-2
10	16QAM	25	12	20.00	20.25	20.16		
10	16QAM	25	24	19.91	20.29	20.07		
10	16QAM	50	0	19.80	20.04	20.10		

Channel				18625	18900	19175	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	21.63	21.91	22.06	23.00	0
5	QPSK	1	12	21.64	21.87	21.76		
5	QPSK	1	24	21.75	21.99	22.07		
5	QPSK	12	0	20.92	21.05	21.01	22.00	0-1
5	QPSK	12	6	20.94	21.16	20.86		
5	QPSK	12	11	20.91	21.00	21.07		
5	QPSK	25	0	20.81	21.16	20.96		
5	16QAM	1	0	21.03	20.92	20.96	22.00	0-1
5	16QAM	1	12	20.83	21.10	20.81		
5	16QAM	1	24	20.98	21.04	20.94		
5	16QAM	12	0	19.97	20.13	20.02	21.00	0-2
5	16QAM	12	6	19.82	20.15	19.86		
5	16QAM	12	11	19.95	20.06	19.96		
5	16QAM	25	0	19.84	20.11	20.03		
Channel				18615	18900	19185	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	21.69	21.96	21.87	23.00	0
3	QPSK	1	7	21.68	21.91	21.88		
3	QPSK	1	14	21.66	22.00	22.12		
3	QPSK	8	0	20.99	21.16	21.06	22.00	0-1
3	QPSK	8	4	20.97	21.03	21.13		
3	QPSK	8	7	20.90	20.97	21.17		
3	QPSK	15	0	20.92	21.09	21.06		
3	16QAM	1	0	20.65	20.84	20.69	22.00	0-1
3	16QAM	1	7	20.71	20.92	20.87		
3	16QAM	1	14	20.76	21.00	21.07		
3	16QAM	8	0	19.92	20.05	19.99	21.00	0-2
3	16QAM	8	4	19.87	20.06	20.06		
3	16QAM	8	7	19.80	20.06	20.22		
3	16QAM	15	0	19.92	20.07	20.02		
Channel				18607	18900	19193	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	21.72	22.10	22.02	23.00	0
1.4	QPSK	1	2	21.66	21.98	22.05		
1.4	QPSK	1	5	21.69	21.93	22.16		
1.4	QPSK	3	0	21.73	22.06	22.14		
1.4	QPSK	3	1	21.74	22.00	22.16		
1.4	QPSK	3	2	21.72	22.01	22.13		
1.4	QPSK	6	0	21.02	21.11	21.27	22.00	0-1
1.4	16QAM	1	0	20.68	20.95	20.92	22.00	0-1
1.4	16QAM	1	2	20.69	20.93	20.94		
1.4	16QAM	1	5	20.74	20.99	21.33		
1.4	16QAM	3	0	20.94	21.07	21.09		
1.4	16QAM	3	1	20.86	21.13	21.13		
1.4	16QAM	3	2	20.86	21.04	21.12		
1.4	16QAM	6	0	20.04	20.09	20.19	21.00	0-2

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune up Limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	22.52	22.66	22.11	23.50	0
20	QPSK	1	49	22.58	22.73	22.27		
20	QPSK	1	99	22.96	22.76	22.39		
20	QPSK	50	0	21.60	21.60	21.23	22.50	0-1
20	QPSK	50	24	21.62	21.61	21.25		
20	QPSK	50	49	21.64	21.63	21.33		
20	QPSK	100	0	21.47	21.45	21.21		
20	16QAM	1	0	21.49	21.64	21.47	22.50	0-1
20	16QAM	1	49	21.46	21.33	21.31		
20	16QAM	1	99	21.78	21.34	21.52		
20	16QAM	50	0	20.67	20.58	20.31	21.50	0-2
20	16QAM	50	24	20.71	20.55	20.36		
20	16QAM	50	49	20.75	20.52	20.21		
20	16QAM	100	0	20.65	20.55	20.31		
Channel				20825	21100	21375	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	22.65	22.60	22.34	23.50	0
15	QPSK	1	37	22.55	22.44	22.27		
15	QPSK	1	74	22.88	22.35	22.32		
15	QPSK	36	0	21.58	21.53	21.33	22.50	0-1
15	QPSK	36	18	21.52	21.47	21.32		
15	QPSK	36	37	21.51	21.49	21.30		
15	QPSK	75	0	21.59	21.56	21.29		
15	16QAM	1	0	21.57	21.58	21.09	22.50	0-1
15	16QAM	1	37	21.45	21.44	21.03		
15	16QAM	1	74	21.45	21.28	21.26		
15	16QAM	36	0	20.55	20.58	20.30	21.50	0-2
15	16QAM	36	18	20.59	20.52	20.31		
15	16QAM	36	37	20.61	20.55	20.37		
15	16QAM	75	0	20.63	20.65	20.35		
Channel				20800	21100	21400	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	22.54	22.58	22.17	23.50	0
10	QPSK	1	24	22.58	22.39	22.11		
10	QPSK	1	49	22.73	22.30	22.36		
10	QPSK	25	0	21.58	21.51	21.28	22.50	0-1
10	QPSK	25	12	21.51	21.48	21.32		
10	QPSK	25	24	21.65	21.54	21.29		
10	QPSK	50	0	21.52	21.51	21.32		
10	16QAM	1	0	21.48	21.36	21.27	22.50	0-1
10	16QAM	1	24	21.40	21.30	21.09		
10	16QAM	1	49	21.54	21.26	21.34		
10	16QAM	25	0	20.66	20.62	20.60	21.50	0-2
10	16QAM	25	12	20.57	20.59	20.34		
10	16QAM	25	24	20.83	20.54	20.37		
10	16QAM	50	0	20.70	20.53	20.40		

Channel				20775	21100	21425	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	22.58	22.59	22.19	23.50	0
5	QPSK	1	12	22.65	22.50	22.32		
5	QPSK	1	24	22.71	22.46	22.31		
5	QPSK	12	0	21.59	21.57	21.28	22.50	0-1
5	QPSK	12	6	21.60	21.54	21.38		
5	QPSK	12	11	21.54	21.50	21.33		
5	QPSK	25	0	21.60	21.57	21.37		
5	16QAM	1	0	21.73	21.84	21.39	22.50	0-1
5	16QAM	1	12	21.82	21.71	21.39		
5	16QAM	1	24	21.83	21.55	21.48		
5	16QAM	12	0	20.61	20.48	20.30	21.50	0-2
5	16QAM	12	6	20.61	20.52	20.29		
5	16QAM	12	11	20.55	20.46	20.35		
5	16QAM	25	0	20.60	20.51	20.29		

<WLAN Conducted Power>

General Note:

1. For WLAN SAR testing was performed on single antenna RF power in SISO mode is larger or equal to the single antenna RF power in MIMO mode, and for RF exposure assessment of MIMO mode simultaneous transmission exclusion analysis was performed with SAR test results of each antenna in SISO mode.
2. Per KDB 248227 D01v02r01, the simultaneous SAR provisions in KDB publication 447498 should be applied to determine simultaneous transmission SAR test exclusion for WiFi MIMO. If the sum of 1g single transmission chain SAR measurements is < 1.6W/kg and SAR peak to location ratio < 0.04, no additional SAR measurements for MIMO.
3. Per KDB 248227 D01v02r01, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in the 2.4 band, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
4. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
5. For OFDM transmission configurations in the 2.4 GHz band, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
6. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
   a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
   b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
   c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

<2.4GHz WLAN Antenna 0>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN Antenna 0	802.11b	CH 1	2412	1Mbps	**14.01**	14.50	100.00
		CH 6	2437		13.54	14.50	
		CH 11	2462		12.79	13.50	
	802.11g	CH 1	2412	6Mbps	12.07	12.50	97.84
		CH 6	2437		11.54	12.00	
		CH 11	2462		10.90	11.00	
	802.11n-HT20	CH 1	2412	MCS0	10.37	10.50	96.89
		CH 6	2437		9.85	10.00	
		CH 11	2462		9.27	9.50	

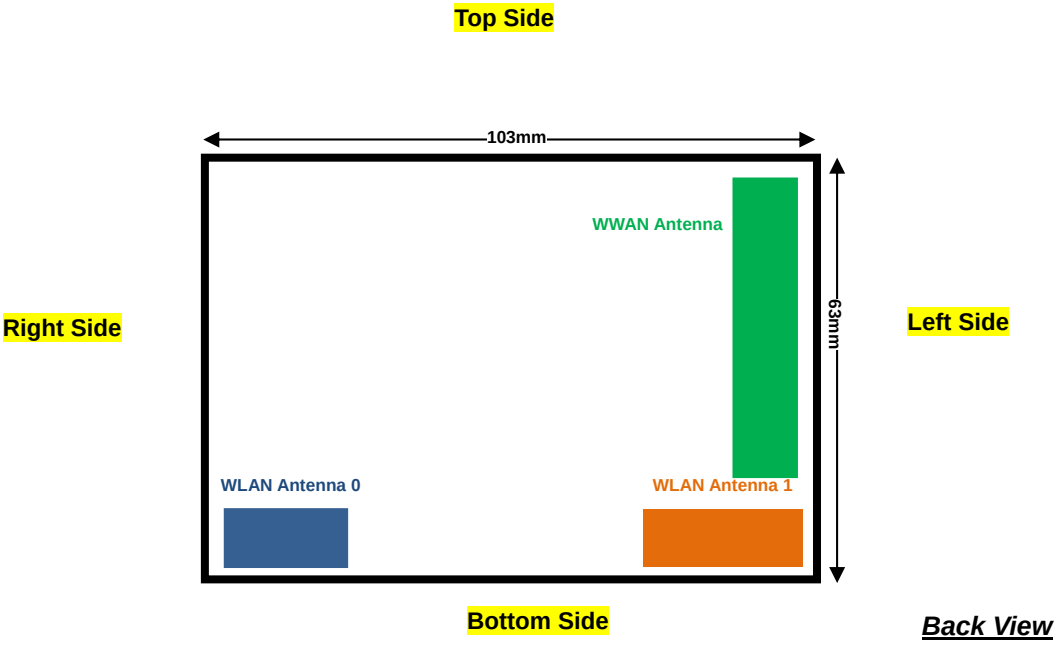
<2.4GHz WLAN Antenna 1>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN Antenna 1	802.11b	CH 1	2412	1Mbps	**14.71**	15.50	100.00
		CH 6	2437		14.56	15.50	
		CH 11	2462		10.89	11.50	
	802.11g	CH 1	2412	6Mbps	12.67	13.00	97.84
		CH 6	2437		12.57	13.00	
		CH 11	2462		9.39	9.50	
	802.11n-HT20	CH 1	2412	MCS0	10.67	11.00	96.89
		CH 6	2437		10.58	11.00	
		CH 11	2462		7.68	8.00	

<2.4GHz WLAN Antenna 0+1>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN Antenna 0+1	802.11b	CH 1	2412	1Mbps	**16.63**	17.00	100.00
		CH 6	2437		16.22	17.00	
		CH 11	2462		13.96	14.50	
	802.11g	CH 1	2412	6Mbps	13.54	14.00	97.84
		CH 6	2437		13.18	13.50	
		CH 11	2462		11.27	11.50	
	802.11n-HT20	CH 1	2412	MCS0	12.78	13.00	96.89
		CH 6	2437		12.50	13.00	
		CH 11	2462		10.67	11.00	

13. Antenna Location



Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Bottom Side	Top Side	Right Side	Left Side
WWAN	≤ 25mm	≤ 25mm	≤ 25mm	≤ 25mm	88mm	≤ 25mm
WLAN (0)	≤ 25mm	≤ 25mm	≤ 25mm	51mm	≤ 25mm	82mm
WLAN (1)	≤ 25mm	≤ 25mm	≤ 25mm	51mm	82mm	≤ 25mm

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

14. SAR Test Results

General Note:

1. Per KDB 447498 D01v05r02, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v05r02, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. KDB 865664 D01v01r03, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.

GSM Note:

1. Per KDB 941225 D01v03, for hotspot and body SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the EUT was set in GPRS (2Tx slots) for GSM850/GSM1900.

UMTS Note:

1. Per KDB 941225 D01v03, SAR for next to the Body exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”.
2. Per KDB 941225 D01v03, RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

LTE Note:

1. Per KDB 941225 D05v02r03, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r03, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r03, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r03, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r03, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r03, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r03, smaller bandwidth SAR testing is not required.

WLAN Note:

1. Per KDB 248227 D01v02r01, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
3. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
4. For WLAN SAR testing was performed on single antenna RF power in SISO mode is larger or equal to the single antenna RF power in MIMO mode, and for RF exposure assessment of MIMO mode simultaneous transmission exclusion analysis was performed with SAR test results of each antenna in SISO mode.
5. Per KDB 248227 D01v02r01, the simultaneous SAR provisions in KDB publication 447498 should be applied to determine simultaneous transmission SAR test exclusion for WiFi MIMO. If the sum of 1g single transmission chain SAR measurements is < 1.6W/kg and SAR peak to location ratio < 0.04, no additional SAR measurements for MIMO.
6. This device 2.4GHz WLAN supports Hotspot operation.
7. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

14.1 Body SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS(2 Tx slots)	Front	10	251	848.8	30.20	30.50	1.072	0.03	0.468	0.501
#01	GSM850	GPRS(2 Tx slots)	Back	10	251	848.8	30.20	30.50	1.072	0.06	0.474	**0.508**
	GSM850	GPRS(2 Tx slots)	Left Side	10	251	848.8	30.20	30.50	1.072	-0.10	0.097	0.104
	GSM850	GPRS(2 Tx slots)	Top Side	10	251	848.8	30.20	30.50	1.072	-0.09	0.169	0.181
	GSM850	GPRS(2 Tx slots)	Bottom Side	10	251	848.8	30.20	30.50	1.072	-0.07	0.147	0.158
#02	GSM1900	GPRS(2 Tx slots)	Front	10	512	1850.2	28.10	28.50	1.096	0.05	0.262	**0.287**
	GSM1900	GPRS(2 Tx slots)	Back	10	512	1850.2	28.10	28.50	1.096	-0.02	0.251	0.275
	GSM1900	GPRS(2 Tx slots)	Left Side	10	512	1850.2	28.10	28.50	1.096	-0.09	0.171	0.187
	GSM1900	GPRS(2 Tx slots)	Top Side	10	512	1850.2	28.10	28.50	1.096	-0.10	0.162	0.178
	GSM1900	GPRS(2 Tx slots)	Bottom Side	10	512	1850.2	28.10	28.50	1.096	-0.13	0.041	0.045

<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)
	WCDMA Band V	RMC 12.2Kbps	Front	10	4233	846.6	21.54	22.00	1.112	-0.08	0.287	0.319
#03	WCDMA Band V	RMC 12.2Kbps	Back	10	4233	846.6	21.54	22.00	1.112	0.04	0.294	**0.327**
	WCDMA Band V	RMC 12.2Kbps	Left Side	10	4233	846.6	21.54	22.00	1.112	0.01	0.059	0.066
	WCDMA Band V	RMC 12.2Kbps	Top Side	10	4233	846.6	21.54	22.00	1.112	-0.06	0.104	0.116
	WCDMA Band V	RMC 12.2Kbps	Bottom Side	10	4233	846.6	21.54	22.00	1.112	-0.05	0.091	0.101
#04	WCDMA Band II	RMC 12.2Kbps	Front	10	9262	1852.4	22.01	22.50	1.119	-0.06	0.269	**0.301**
	WCDMA Band II	RMC 12.2Kbps	Back	10	9262	1852.4	22.01	22.50	1.119	-0.03	0.260	0.291
	WCDMA Band II	RMC 12.2Kbps	Left Side	10	9262	1852.4	22.01	22.50	1.119	-0.07	0.167	0.187
	WCDMA Band II	RMC 12.2Kbps	Top Side	10	9262	1852.4	22.01	22.50	1.119	-0.05	0.170	0.190
	WCDMA Band II	RMC 12.2Kbps	Bottom Side	10	9262	1852.4	22.01	22.50	1.119	-0.01	0.042	0.047

<LTE SAR>

Plot No.	Band	BW (MHz)	RB Size	RB offset	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)
	LTE Band 17	10M	1	24	QPSK	Front	10	23800	711	22.29	23.00	1.178	-0.06	0.076	0.089
	LTE Band 17	10M	25	24	QPSK	Front	10	23800	711	21.35	22.00	1.161	-0.09	0.061	0.071
#05	LTE Band 17	10M	1	24	QPSK	Back	10	23800	711	22.29	23.00	1.178	-0.04	0.104	**0.122**
	LTE Band 17	10M	25	24	QPSK	Back	10	23800	711	21.35	22.00	1.161	0.05	0.083	0.096
	LTE Band 17	10M	1	24	QPSK	Left Side	10	23800	711	22.29	23.00	1.178	-0.03	0.045	0.053
	LTE Band 17	10M	25	24	QPSK	Left Side	10	23800	711	21.35	22.00	1.161	-0.03	0.036	0.042
	LTE Band 17	10M	1	24	QPSK	Top Side	10	23800	711	22.29	23.00	1.178	-0.09	0.024	0.028
	LTE Band 17	10M	25	24	QPSK	Top Side	10	23800	711	21.35	22.00	1.161	-0.06	0.020	0.023
	LTE Band 17	10M	1	24	QPSK	Bottom Side	10	23800	711	22.29	23.00	1.178	-0.07	0.028	0.033
	LTE Band 17	10M	25	24	QPSK	Bottom Side	10	23800	711	21.35	22.00	1.161	-0.01	0.023	0.027
	LTE Band 5	10M	1	49	QPSK	Front	10	20600	844	22.09	22.50	1.099	-0.02	0.336	0.369
	LTE Band 5	10M	25	24	QPSK	Front	10	20600	844	21.15	21.50	1.084	-0.04	0.267	0.289
#06	LTE Band 5	10M	1	49	QPSK	Back	10	20600	844	22.09	22.50	1.099	0.02	0.340	**0.374**
	LTE Band 5	10M	25	24	QPSK	Back	10	20600	844	21.15	21.50	1.084	0.09	0.279	0.302
	LTE Band 5	10M	1	49	QPSK	Left Side	10	20600	844	22.09	22.50	1.099	-0.08	0.071	0.078
	LTE Band 5	10M	25	24	QPSK	Left Side	10	20600	844	21.15	21.50	1.084	-0.03	0.056	0.061
	LTE Band 5	10M	1	49	QPSK	Top Side	10	20600	844	22.09	22.50	1.099	-0.05	0.125	0.137
	LTE Band 5	10M	25	24	QPSK	Top Side	10	20600	844	21.15	21.50	1.084	-0.06	0.098	0.106
	LTE Band 5	10M	1	49	QPSK	Bottom Side	10	20600	844	22.09	22.50	1.099	-0.03	0.102	0.112
	LTE Band 5	10M	25	24	QPSK	Bottom Side	10	20600	844	21.15	21.50	1.084	-0.17	0.082	0.089
	LTE Band 4	20M	1	99	QPSK	Front	10	20300	1745	21.76	22.50	1.186	-0.08	0.150	0.178
	LTE Band 4	20M	50	24	QPSK	Front	10	20300	1745	20.78	21.50	1.180	-0.05	0.115	0.136
	LTE Band 4	20M	1	99	QPSK	Back	10	20300	1745	21.76	22.50	1.186	-0.08	0.209	0.248
	LTE Band 4	20M	50	24	QPSK	Back	10	20300	1745	20.78	21.50	1.180	0.03	0.164	0.194
#07	LTE Band 4	20M	1	99	QPSK	Left Side	10	20300	1745	21.76	22.50	1.186	0.04	0.290	**0.344**
	LTE Band 4	20M	50	24	QPSK	Left Side	10	20300	1745	20.78	21.50	1.180	-0.04	0.235	0.277
	LTE Band 4	20M	1	99	QPSK	Top Side	10	20300	1745	21.76	22.50	1.186	-0.06	0.119	0.141
	LTE Band 4	20M	50	24	QPSK	Top Side	10	20300	1745	20.78	21.50	1.180	-0.07	0.089	0.105
	LTE Band 4	20M	1	99	QPSK	Bottom Side	10	20300	1745	21.76	22.50	1.186	-0.02	0.034	0.040
	LTE Band 4	20M	50	24	QPSK	Bottom Side	10	20300	1745	20.78	21.50	1.180	-0.03	0.025	0.030
	LTE Band 2	20M	1	0	QPSK	Front	10	19100	1900	22.39	23.00	1.151	0.04	0.354	0.407
	LTE Band 2	20M	50	0	QPSK	Front	10	19100	1900	21.41	22.00	1.146	0.07	0.293	0.336
#08	LTE Band 2	20M	1	0	QPSK	Back	10	19100	1900	22.39	23.00	1.151	-0.11	0.375	**0.432**
	LTE Band 2	20M	50	0	QPSK	Back	10	19100	1900	21.41	22.00	1.146	-0.02	0.315	0.361
	LTE Band 2	20M	1	0	QPSK	Left Side	10	19100	1900	22.39	23.00	1.151	-0.08	0.199	0.229
	LTE Band 2	20M	50	0	QPSK	Left Side	10	19100	1900	21.41	22.00	1.146	-0.07	0.163	0.187
	LTE Band 2	20M	1	0	QPSK	Top Side	10	19100	1900	22.39	23.00	1.151	-0.07	0.137	0.158
	LTE Band 2	20M	50	0	QPSK	Top Side	10	19100	1900	21.41	22.00	1.146	0.01	0.112	0.128
	LTE Band 2	20M	1	0	QPSK	Bottom Side	10	19100	1900	22.39	23.00	1.151	-0.01	0.039	0.045
	LTE Band 2	20M	50	0	QPSK	Bottom Side	10	19100	1900	21.41	22.00	1.146	-0.02	0.034	0.039

Plot No.	Band	BW (MHz)	RB Size	RB offset	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)
	LTE Band 7	20M	1	99	QPSK	Front	10	20850	2510	22.96	23.50	1.132	0.08	0.243	0.275
	LTE Band 7	20M	50	49	QPSK	Front	10	20850	2510	21.64	22.50	1.219	0.05	0.214	0.261
#09	LTE Band 7	20M	1	99	QPSK	Back	10	20850	2510	22.96	23.50	1.132	0.02	0.490	**0.555**
	LTE Band 7	20M	50	49	QPSK	Back	10	20850	2510	21.64	22.50	1.219	0.03	0.402	0.490
	LTE Band 7	20M	1	99	QPSK	Left Side	10	20850	2510	22.96	23.50	1.132	-0.08	0.367	0.416
	LTE Band 7	20M	50	49	QPSK	Left Side	10	20850	2510	21.64	22.50	1.219	0.02	0.332	0.405
	LTE Band 7	20M	1	99	QPSK	Top Side	10	20850	2510	22.96	23.50	1.132	-0.07	0.097	0.110
	LTE Band 7	20M	50	49	QPSK	Top Side	10	20850	2510	21.64	22.50	1.219	0.02	0.091	0.111
	LTE Band 7	20M	1	99	QPSK	Bottom Side	10	20850	2510	22.96	23.50	1.132	-0.02	0.022	0.025
	LTE Band 7	20M	50	49	QPSK	Bottom Side	10	20850	2510	21.64	22.50	1.219	-0.08	0.015	0.018

<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	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b, 1Mbps	Front	10	0	1	2412	14.01	14.50	1.119	0.09	0.218	0.244
	WLAN2.4GHz	802.11b, 1Mbps	Back	10	0	1	2412	14.01	14.50	1.119	0.04	0.227	0.254
	WLAN2.4GHz	802.11b, 1Mbps	Right Side	10	0	1	2412	14.01	14.50	1.119	0.06	0.074	0.083
	WLAN2.4GHz	802.11b, 1Mbps	Bottom Side	10	0	1	2412	14.01	14.50	1.119	-0.09	0.162	0.181
	WLAN2.4GHz	802.11b, 1Mbps	Front	10	1	1	2412	14.71	15.50	1.199	0.01	0.194	0.233
	WLAN2.4GHz	802.11b, 1Mbps	Back	10	1	1	2412	14.71	15.50	1.199	-0.02	0.077	0.092
	WLAN2.4GHz	802.11b, 1Mbps	Left Side	10	1	1	2412	14.71	15.50	1.199	-0.07	0.043	0.052
	WLAN2.4GHz	802.11b, 1Mbps	Bottom Side	10	1	1	2412	14.71	15.50	1.199	-0.04	0.085	0.102
#10	WLAN2.4GHz	802.11b, 1Mbps	Front	10	0+1	1	2412	16.63	17.00	1.089	-0.09	0.292	**0.318**
	WLAN2.4GHz	802.11b, 1Mbps	Back	10	0+1	1	2412	16.63	17.00	1.089	-0.01	0.268	0.292
	WLAN2.4GHz	802.11b, 1Mbps	Left Side	10	0+1	1	2412	16.63	17.00	1.089	-0.06	0.027	0.029
	WLAN2.4GHz	802.11b, 1Mbps	Right Side	10	0+1	1	2412	16.63	17.00	1.089	-0.09	0.047	0.051
	WLAN2.4GHz	802.11b, 1Mbps	Bottom Side	10	0+1	1	2412	16.63	17.00	1.089	0.06	0.237	0.258

15. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Body	Note
1.	GPRS/EDGE(Data) + WLAN2.4GHz SISO(data)	Yes	2.4GHz Hotspot
2.	GPRS/EDGE(Data) + WLAN2.4GHz MIMO(data)	Yes	2.4GHz Hotspot
3.	WCDMA(Data) + WLAN2.4GHz SISO(data)	Yes	2.4GHz Hotspot
4.	WCDMA(Data) + WLAN2.4GHz MIMO(data)	Yes	2.4GHz Hotspot
5.	LTE(Data) + WLAN2.4GHz SISO(data)	Yes	2.4GHz Hotspot
6.	LTE(Data) + WLAN2.4GHz MIMO(data)	Yes	2.4GHz Hotspot

General Note:

1. This device 2.4GHz supports hotspot operation
2. EUT will choose GSM, WCDMA and LTE according to the network signal condition; therefore, they will not transmit simultaneously.
3. For WLAN SAR co-location calculation was chosen worst case with SAR test results of SISO /MIMO mode perform evaluation.
4. The Reported SAR summation is calculated based on the same configuration and test position.
5. Per KDB 447498 D01v05r02, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*), and the peak separation distance is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

15.1 Body Exposure Conditions

WWAN Band		Exposure Position	WWAN SAR (W/kg)	WLAN 2.4GHz SAR (W/kg)	Summed SAR (W/kg)	SPLSR	Case No
GSM	GSM850	Front	0.501	0.318	0.82		
		Back	0.508	0.292	0.80		
		Left Side	0.104	0.052	0.16		
		Right Side		0.083	0.08		
		Top Side	0.181		0.18		
		Bottom Side	0.158	0.258	0.42		
	GSM1900	Front	0.287	0.318	0.61		
		Back	0.275	0.292	0.57		
		Left Side	0.187	0.052	0.24		
		Right Side		0.083	0.08		
		Top Side	0.178		0.18		
		Bottom Side	0.045	0.258	0.30		
WCDMA	WCDMA V	Front	0.319	0.318	0.64		
		Back	0.327	0.292	0.62		
		Left Side	0.066	0.052	0.12		
		Right Side		0.083	0.08		
		Top Side	0.116		0.12		
		Bottom Side	0.101	0.258	0.36		
	WCDMA II	Front	0.301	0.318	0.62		
		Back	0.291	0.292	0.58		
		Left Side	0.187	0.052	0.24		
		Right Side		0.083	0.08		
		Top Side	0.190		0.19		
		Bottom Side	0.047	0.258	0.31		

WWAN Band		Exposure Position	WWAN SAR (W/kg)	WLAN 2.4GHz SAR (W/kg)	Summed SAR (W/kg)	SPLSR	Case No
LTE	LTE Band 17	Front	0.089	0.318	0.41		
		Back	0.122	0.292	0.41		
		Left Side	0.053	0.052	0.11		
		Right Side		0.083	0.08		
		Top Side	0.028		0.03		
		Bottom Side	0.033	0.258	0.29		
	LTE Band 5	Front	0.369	0.318	0.69		
		Back	0.374	0.292	0.67		
		Left Side	0.078	0.052	0.13		
		Right Side		0.083	0.08		
		Top Side	0.137		0.14		
		Bottom Side	0.112	0.258	0.37		
	LTE Band 4	Front	0.178	0.318	0.50		
		Back	0.248	0.292	0.54		
		Left Side	0.344	0.052	0.40		
		Right Side		0.083	0.08		
		Top Side	0.141		0.14		
		Bottom Side	0.040	0.258	0.30		
	LTE Band 2	Front	0.407	0.318	0.73		
		Back	0.432	0.292	0.72		
		Left Side	0.229	0.052	0.28		
		Right Side		0.083	0.08		
		Top Side	0.158		0.16		
		Bottom Side	0.045	0.258	0.30		
	LTE Band 7	Front	0.275	0.318	0.59		
		Back	0.555	0.292	**0.85**		
		Left Side	0.416	0.052	0.47		
		Right Side		0.083	0.08		
		Top Side	0.111		0.11		
		Bottom Side	0.025	0.258	0.28		

Test Engineer： Luke Lu

16. Uncertainty Assessment

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

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

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

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

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

(b) κ is the coverage factor

Table 16.1. 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 Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.0	Normal	1	1	1	± 6.0 %	± 6.0 %
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	± 3.9 %
Boundary Effects	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Probe Positioner	0.4	Rectangular	√3	1	1	± 0.2 %	± 0.2 %
Probe Positioning	2.9	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Max. SAR Eval.	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup							
Phantom Uncertainty	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	0.43	± 1.6 %	± 1.1 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	0.49	± 1.7 %	± 1.4 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	0.49	± 1.5 %	± 1.2 %
Combined Standard Uncertainty						± 11.0 %	± 10.8 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						**± 22.0 %**	**± 21.5 %**

Table 16.2. Uncertainty Budget for frequency range 300 MHz to 3 GHz

17. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, December 2003

[4] SPEAG DASY System Handbook

[5] FCC KDB 248227 D01 v02r01, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Jun 2015.

[6] FCC KDB 447498 D01 v05r02, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Feb 2014

[7] FCC KDB 941225 D01 v03, “3G SAR MEAUREMENT PROCEDURES”, Oct 2014

[8] FCC KDB 941225 D05 v02r03, “SAR Evaluation Considerations for LTE Devices”, Dec 2013

[9] FCC KDB 941225 D06 v02, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2014.

[10] FCC KDB 865664 D01 v01r03, "SAR Measurement Requirements for 100 MHz to 6 GHz", Feb 2014.

[11] FCC KDB 865664 D02 v01r01, “RF Exposure Compliance Reporting and Documentation Considerations” May 2013.

Appendix A. Plots of System Performance Check

The plots are shown as follows.

System Check_Body_750MHz_150718

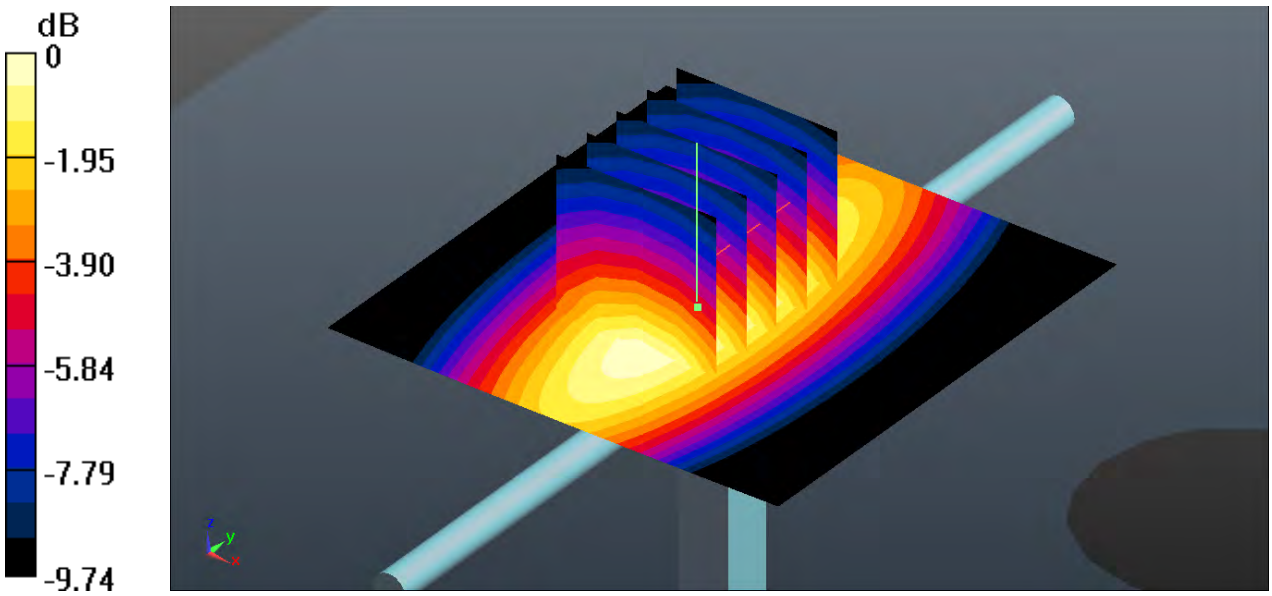
DUT: D750V3-SN: 1065

Communication System: UID 0, CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: MSL_750_150718 Medium parameters used: f = 750 MHz; σ = 0.970 S/m; ε_r = 54.642; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃ ; **Liquid Temperature**: 22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(9.83, 9.83, 9.83); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.37 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 46.06 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 2.74 W/kg
SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.39 W/kg
Maximum value of SAR (measured) = 2.36 W/kg



0 dB = 2.36 W/kg

Test Laboratory:Sporton International Inc SAR Testing Lab Date: 2015.07.18

System Check_Body_835MHz_150718

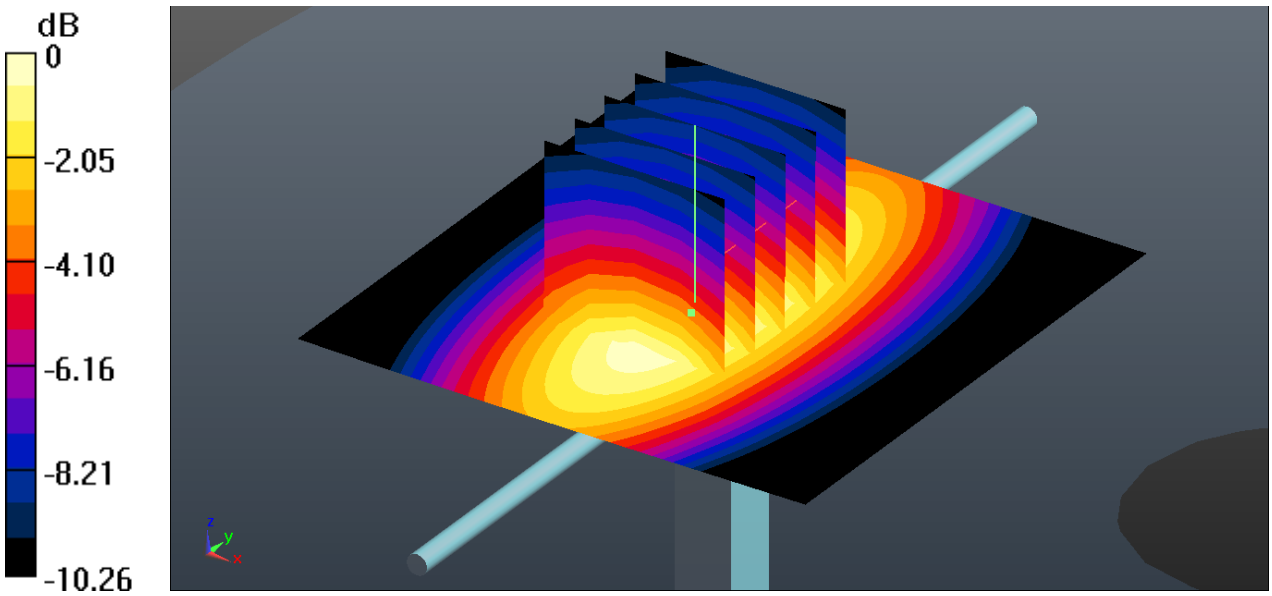
DUT: D835V2-SN: 4d091

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_835_150718 Medium parameters used: f = 835 MHz; σ = 0.972 S/m; ε_r = 53.975; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃ ; **Liquid Temperature**: 22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(9.8, 9.8, 9.8); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.24 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.99 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.06 W/kg
SAR(1 g) = 2.28 W/kg; SAR(10 g) = 1.47 W/kg
Maximum value of SAR (measured) = 2.23 W/kg



0 dB = 2.23 W/kg

Test Laboratory:Sporton International Inc SAR Testing Lab Date: 2015.07.18

System Check_Body_1750MHz_150718

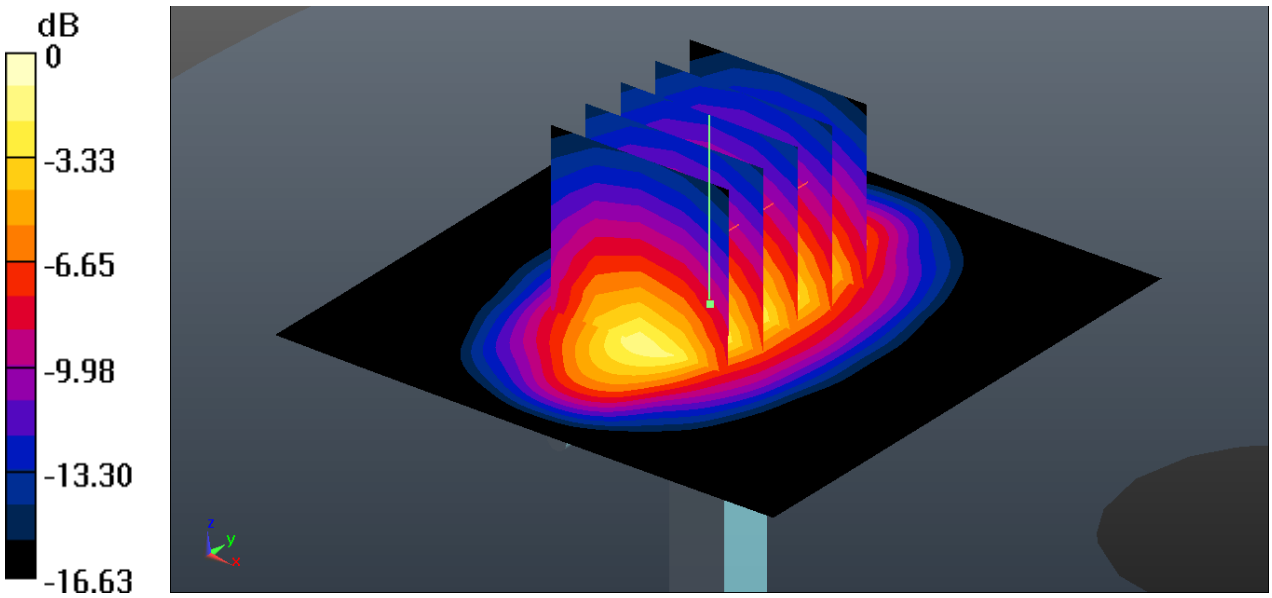
DUT: D1750V2-SN: 1069

Communication System: UID 0, CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: MSL_1800_150718 Medium parameters used: f = 1750 MHz; σ = 1.527 S/m; ε_r = 52.020; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃ ; **Liquid Temperature**: 22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.99, 7.99, 7.99); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.7 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 92.06 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 15.7 W/kg
SAR(1 g) = 9.00 W/kg; SAR(10 g) = 4.81 W/kg
Maximum value of SAR (measured) = 12.5 W/kg



0 dB = 12.5 W/kg

Test Laboratory:Sporton International Inc SAR Testing Lab Date: 2015.07.18

System Check_Body_1900MHz_150718

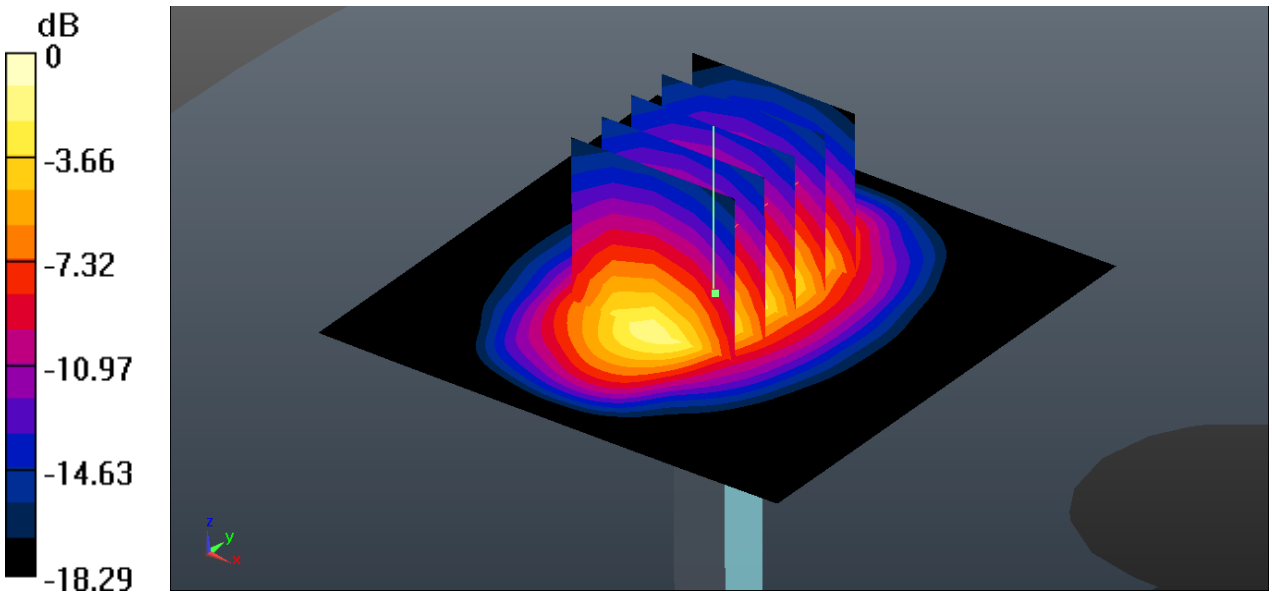
DUT: D1900V2-SN:5d118

Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_150718 Medium parameters used: f = 1900 MHz; σ = 1.538 S/m; ε_r = 53.790; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃ ; **Liquid Temperature**: 22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.57, 7.57, 7.57); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 13.5 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.24 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 9.52 W/kg; SAR(10 g) = 4.93 W/kg
Maximum value of SAR (measured) = 13.6 W/kg



0 dB = 13.6 W/kg

Test Laboratory:Sporton International Inc SAR Testing Lab Date: 2015.07.19

System Check_Body_2450MHz_150719

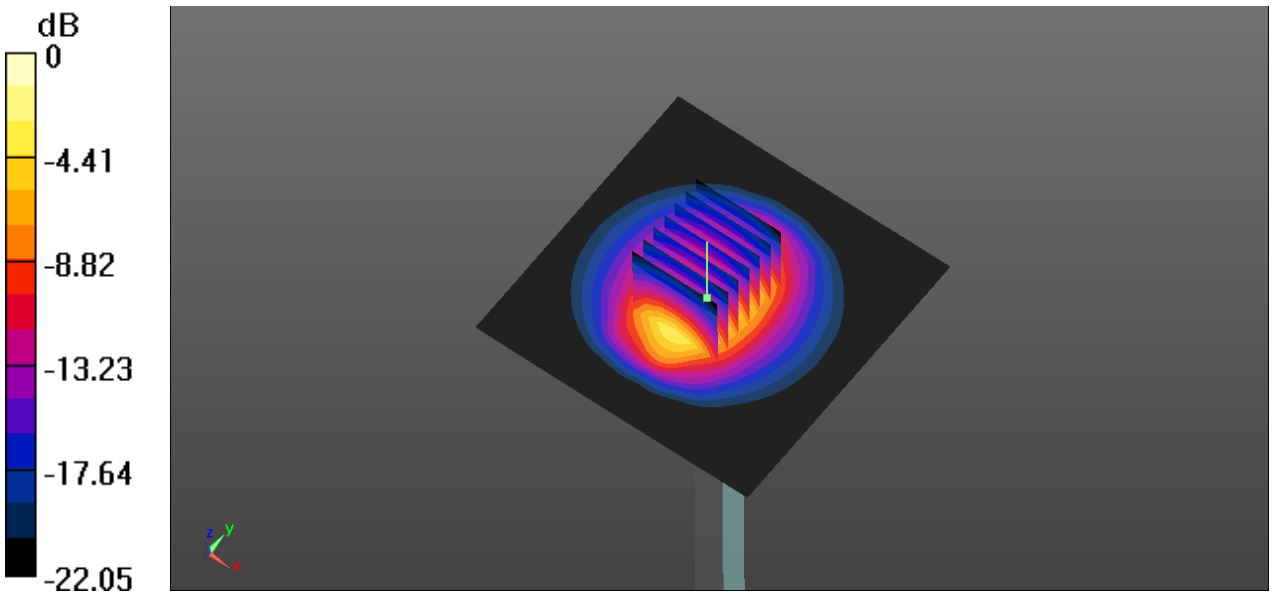
DUT: D2450V2-SN:840

Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450_150719 Medium parameters used: f = 2450 MHz; σ = 1.992 S/m; ε_r = 52.319; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃ ; **Liquid Temperature**: 22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.23, 7.23, 7.23); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM2; Type: QDOVA001BB; Serial: TP:1233
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 19.5 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.15 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 26.2 W/kg
SAR(1 g) = 12.70 W/kg; SAR(10 g) = 5.85 W/kg
Maximum value of SAR (measured) = 19.4 W/kg



0 dB = 19.5 W/kg

Test Laboratory:Sporton International Inc SAR Testing Lab Date: 2015.07.19

System Check_Body_2600MHz_150719

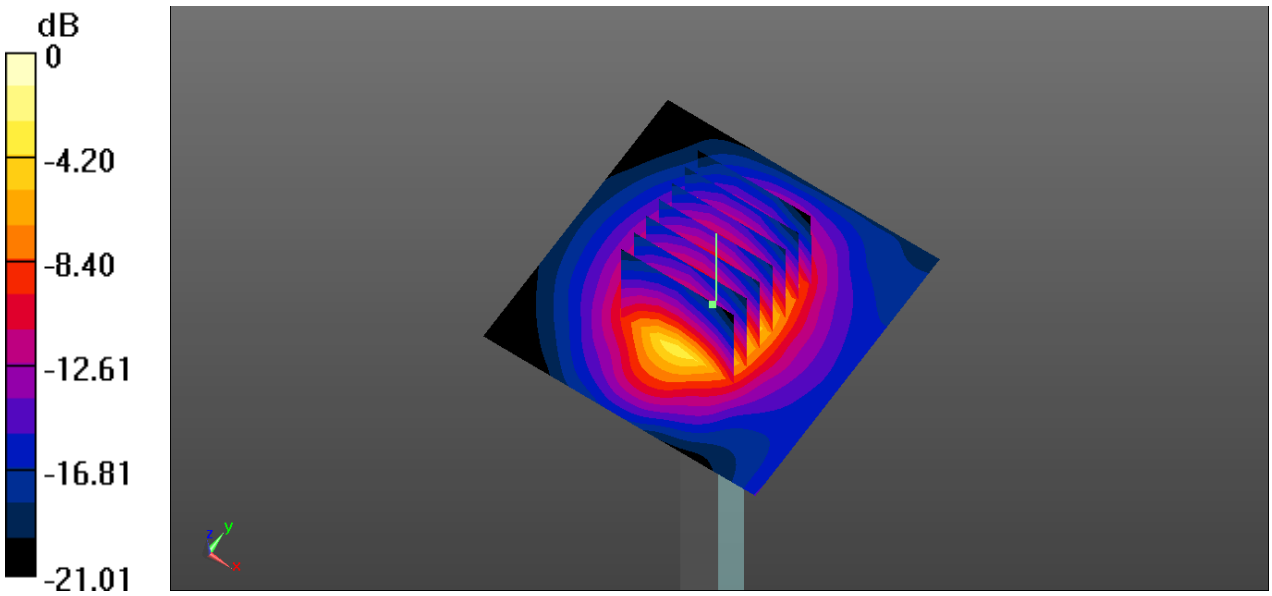
DUT: D2600V2-SN:1061

Communication System: UID 0, CW; Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: MSL_2600_150719 Medium parameters used: f = 2600 MHz; σ = 2.196 S/m; ε_r = 50.730; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃ ; **Liquid Temperature**: 22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.16, 7.16, 7.16); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM2; Type: QDOVA001BB; Serial: TP:1233
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 19.0 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.01 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 25.0 W/kg
SAR(1 g) = 13.30 W/kg; SAR(10 g) = 6.2 W/kg
Maximum value of SAR (measured) = 18.8 W/kg



0 dB = 19.0 W/kg

Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

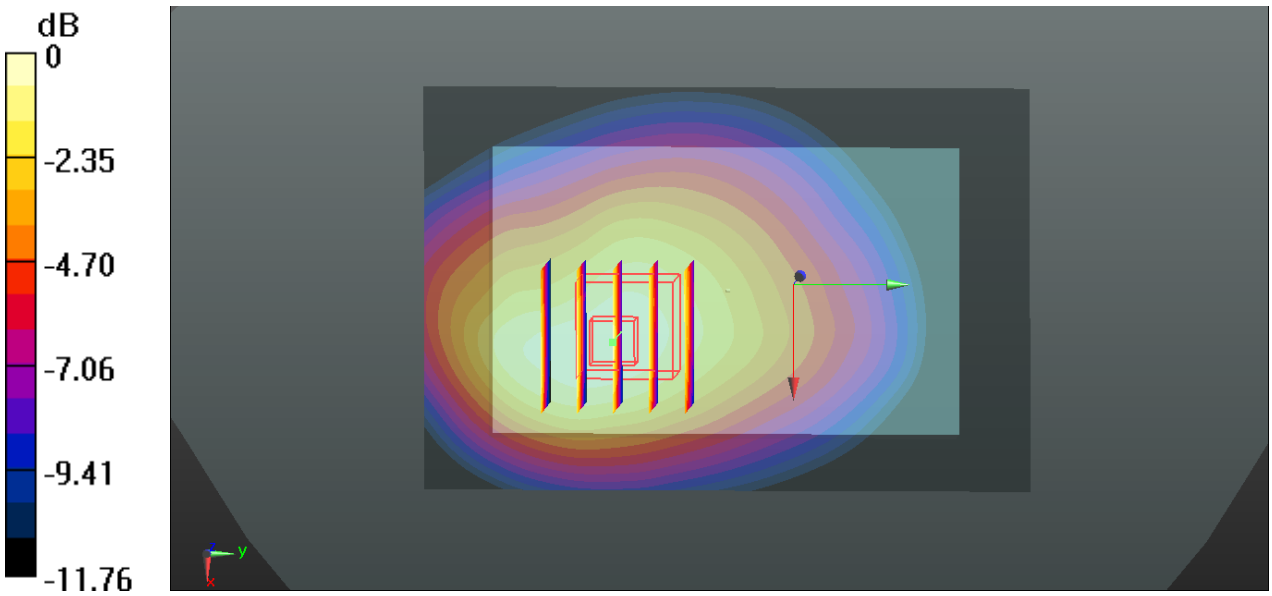
#01_GSM850_GPRS(2 Tx slots)_Back_10mm_Ch251

Communication System: UID 0, GPRS/EDGE10 (0); Frequency: 848.8 MHz;Duty Cycle: 1:4.15
Medium: MSL_835_150718 Medium parameters used: f = 848.8 MHz; σ = 0.987 S/m; ε_r = 53.847; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃ ; **Liquid Temperature**: 22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(9.8, 9.8, 9.8); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Ch251/Area Scan (61x91x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.587 W/kg

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.8340 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.673 W/kg
SAR(1 g) = 0.474 W/kg; SAR(10 g) = 0.326 W/kg
Maximum value of SAR (measured) = 0.577 W/kg



0 dB = 0.587 W/kg

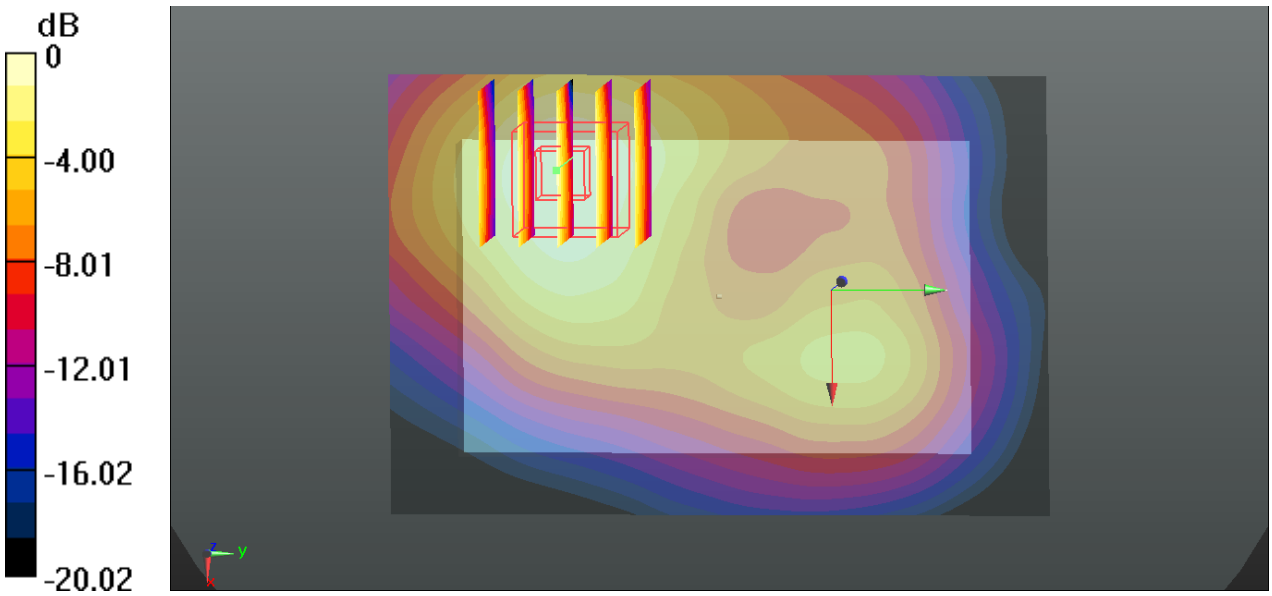
#02_GSM1900_GPRS(2 Tx slots)_Front_10mm_Ch512

Communication System: UID 0, GPRS/EDGE10 (0); Frequency: 1850.2 MHz;Duty Cycle: 1:4.15
Medium: MSL_1900_150718 Medium parameters used: f = 1850.2 MHz; σ = 1.479 S/m; ε_r = 53.882; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃ ; **Liquid Temperature**: 22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.57, 7.57, 7.57); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Ch512/Area Scan (61x91x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.352 W/kg

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.9670 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.398 W/kg
SAR(1 g) = 0.262 W/kg; SAR(10 g) = 0.163 W/kg
Maximum value of SAR (measured) = 0.335 W/kg



0 dB = 0.335 W/kg

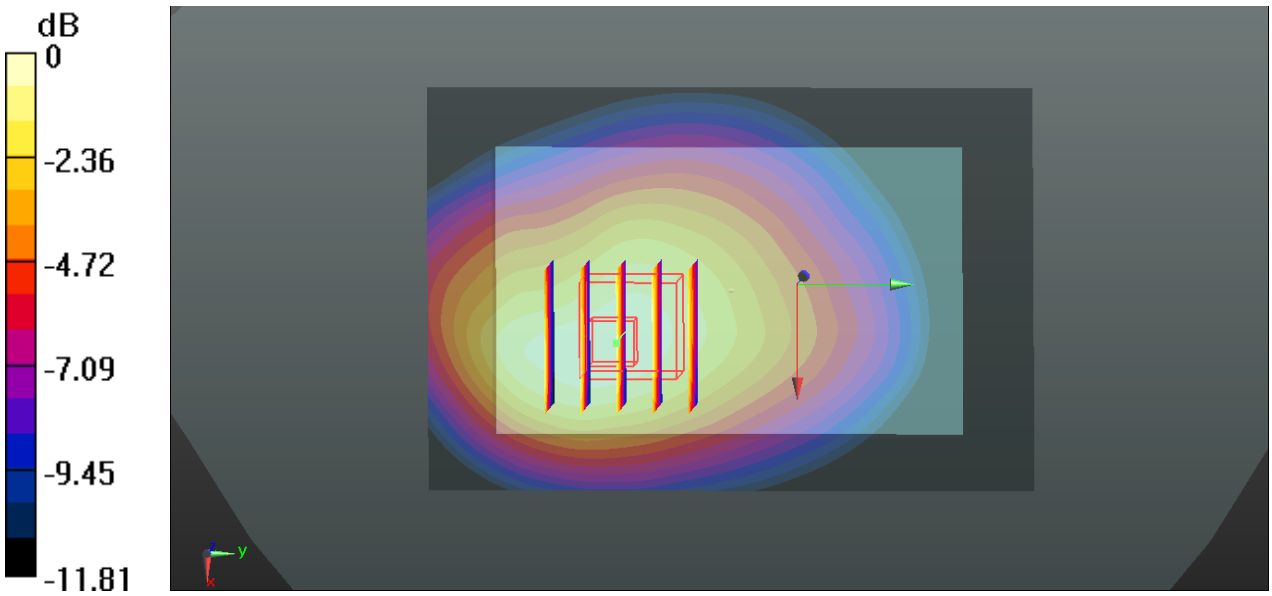
#03_WCDMA Band V_RMC 12.2Kbps_Back_10mm_Ch4233

Communication System: UID 0, UMTS (0); Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: MSL_835_150718 Medium parameters used: f = 846.6 MHz; σ = 0.985 S/m; ε_r = 53.865; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃ ; **Liquid Temperature**: 22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(9.8, 9.8, 9.8); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Ch4233/Area Scan (61x91x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.367 W/kg

Ch4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.6130 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.418 W/kg
SAR(1 g) = 0.294 W/kg; SAR(10 g) = 0.201 W/kg
Maximum value of SAR (measured) = 0.359 W/kg



0 dB = 0.367 W/kg

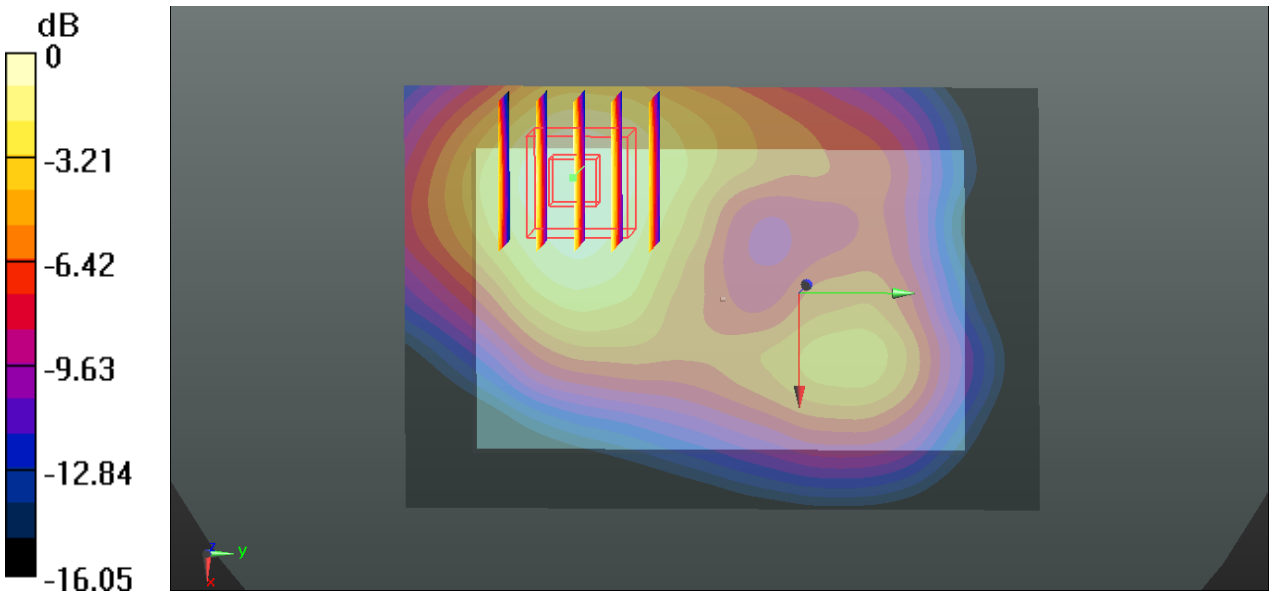
#04_WCDMA Band II_RMC 12.2Kbps_Front_10mm_Ch9262

Communication System: UID 0, UMTS (0); Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: MSL_1900_150718 Medium parameters used: f = 1852.4 MHz; σ = 1.481 S/m; ε_r = 53.876; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃ ; **Liquid Temperature**: 22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.57, 7.57, 7.57); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Ch9262/Area Scan (61x91x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.368 W/kg

Ch9262/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.253 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.406 W/kg
SAR(1 g) = 0.269 W/kg; SAR(10 g) = 0.168 W/kg
Maximum value of SAR (measured) = 0.343 W/kg



0 dB = 0.343 W/kg

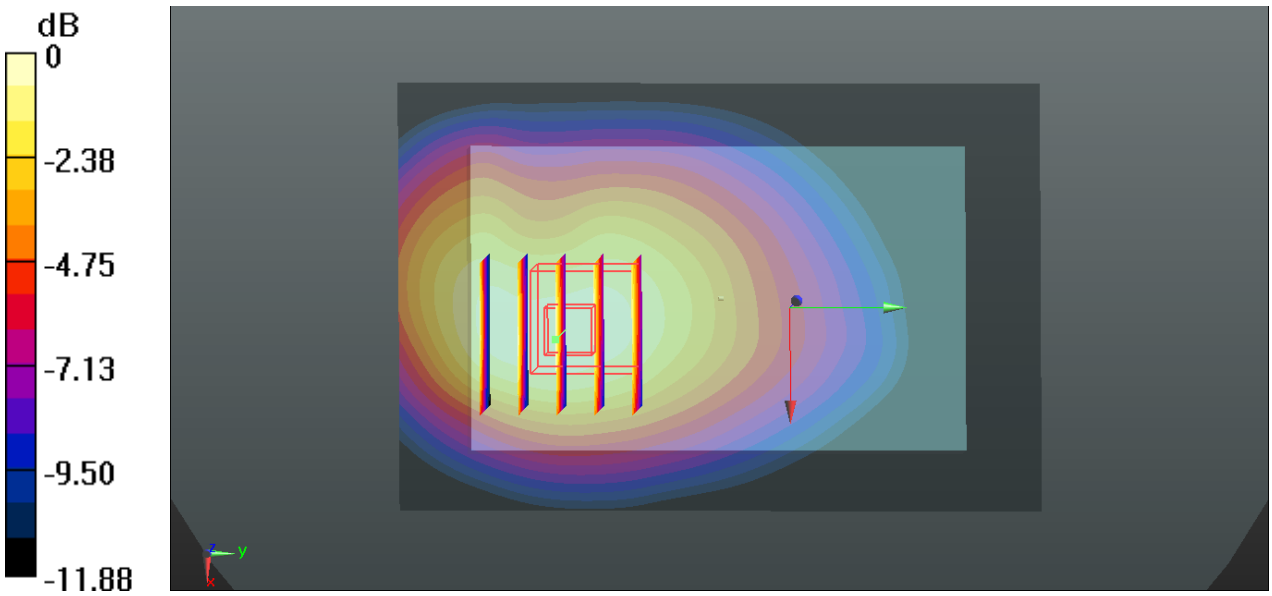
#05_LTE Band 17_10M_QPSK_1RB_24Offset_Back_10mm_Ch23800

Communication System: UID 0, LTE (0); Frequency: 711 MHz;Duty Cycle: 1:1
Medium: MSL_750_150718 Medium parameters used: f = 711 MHz; σ = 0.944 S/m; ε_r = 55.562; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃ ; **Liquid Temperature**: 22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(9.83, 9.83, 9.83); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Ch23800/Area Scan (61x91x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.128 W/kg

Ch23800/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.7230 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.151 W/kg
SAR(1 g) = 0.104 W/kg; SAR(10 g) = 0.071 W/kg
Maximum value of SAR (measured) = 0.129 W/kg



0 dB = 0.129 W/kg

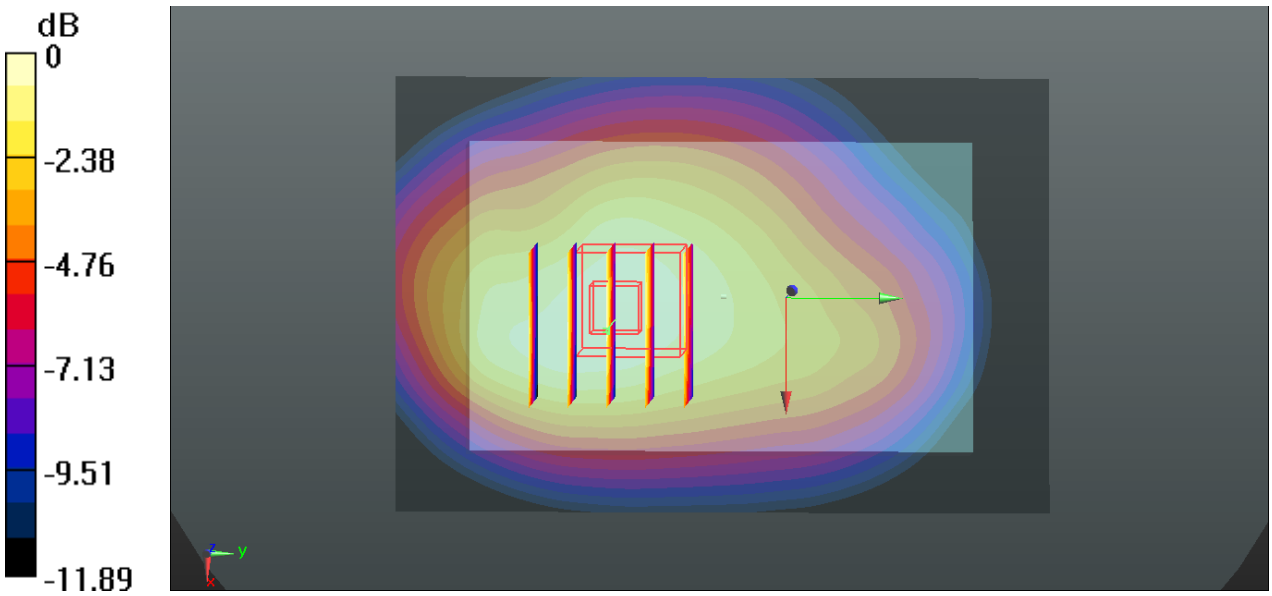
#06_LTE Band 5_10M_QPSK_1RB_49Offset_Back_10mm_Ch20600

Communication System: UID 0, LTE (0); Frequency: 844 MHz;Duty Cycle: 1:1
Medium: MSL_835_150718 Medium parameters used: f = 844 MHz; σ = 0.982 S/m; ε_r = 53.894; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃ ; **Liquid Temperature**: 22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(9.8, 9.8, 9.8); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Ch20600/Area Scan (61x91x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.409 W/kg

Ch20600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.318 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.470 W/kg
SAR(1 g) = 0.340 W/kg; SAR(10 g) = 0.240 W/kg
Maximum value of SAR (measured) = 0.406 W/kg



0 dB = 0.406 W/kg

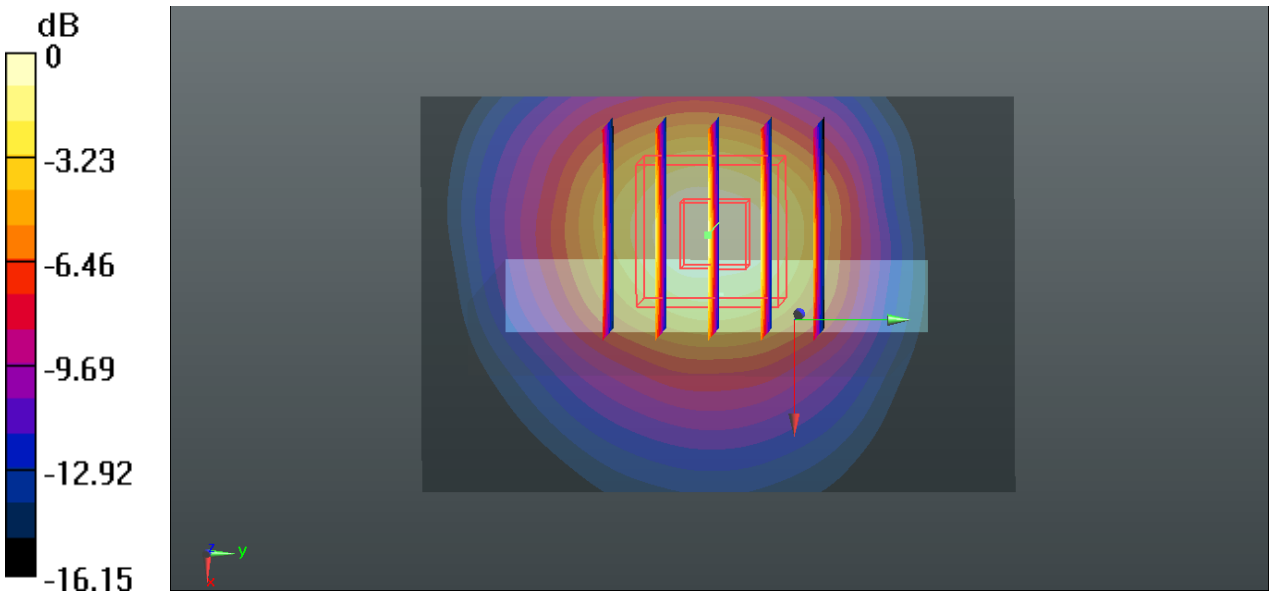
#07_LTE Band 4_20M_QPSK_1RB_99Offset_Left Side_10mm_Ch20300

Communication System: UID 0, LTE (0); Frequency: 1745 MHz;Duty Cycle: 1:1
Medium: MSL_1800_150718 Medium parameters used: f = 1745 MHz; σ = 1.521 S/m; ε_r = 52.039; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃ ; **Liquid Temperature**: 22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.99, 7.99, 7.99); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Ch20300/Area Scan (41x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.427 W/kg

Ch20300/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.517 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.496 W/kg
SAR(1 g) = 0.290 W/kg; SAR(10 g) = 0.155 W/kg
Maximum value of SAR (measured) = 0.404 W/kg



0 dB = 0.404 W/kg

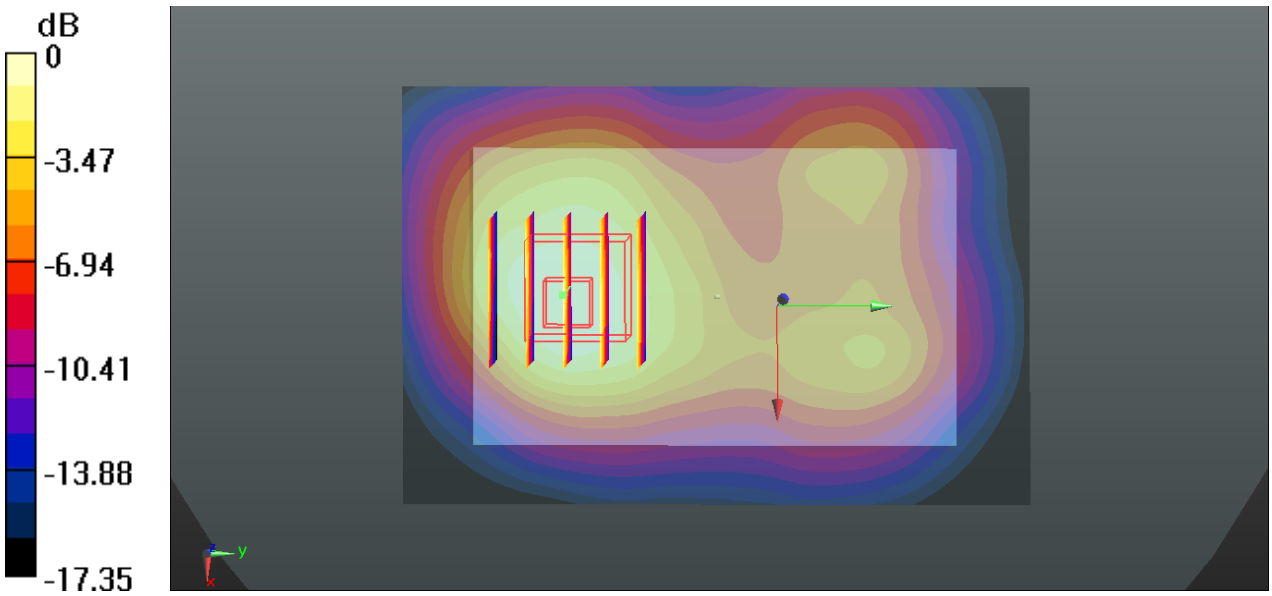
#08_LTE Band 2_20M_QPSK_1RB_0Offset_Back_10mm_Ch19100

Communication System: UID 0, LTE (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_150718 Medium parameters used: f = 1900 MHz; σ = 1.538 S/m; ε_r = 53.79; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃ ; **Liquid Temperature**: 22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.57, 7.57, 7.57); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Ch19100/Area Scan (61x91x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.518 W/kg

Ch19100/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.784 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.581 W/kg
SAR(1 g) = 0.375 W/kg; SAR(10 g) = 0.228 W/kg
Maximum value of SAR (measured) = 0.481 W/kg



0 dB = 0.481 W/kg

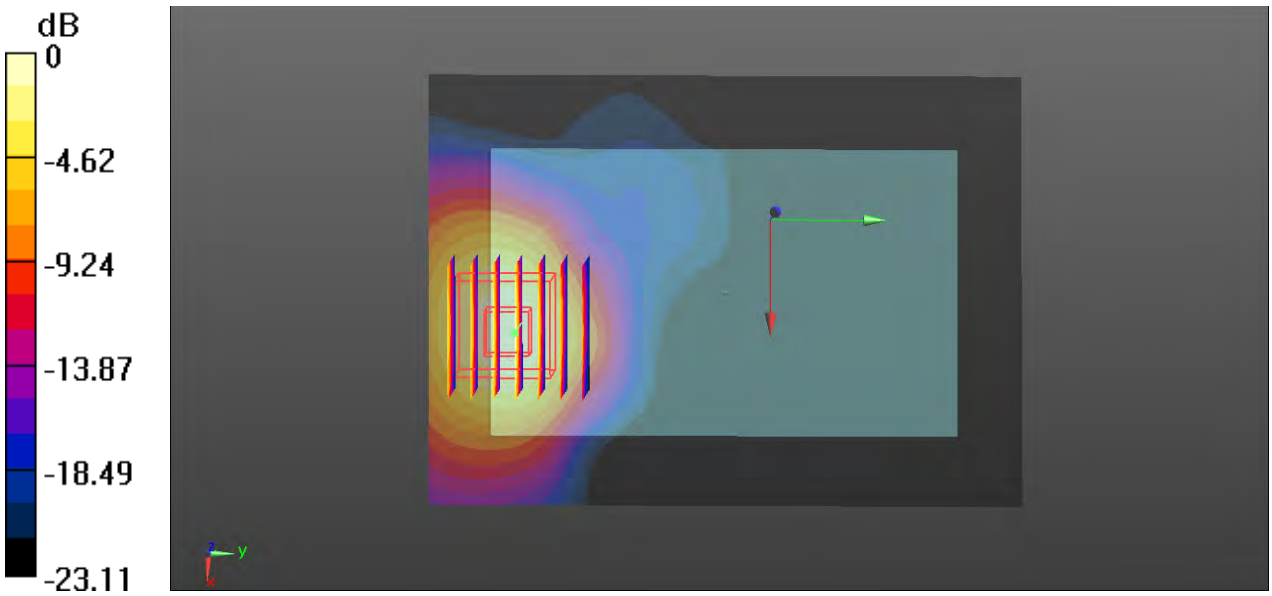
#09_LTE Band 7_20M_QPSK_1RB_99Offset_Back_10mm_Ch20850

Communication System: UID 0, LTE (0); Frequency: 2510 MHz;Duty Cycle: 1:1
Medium: MSL_2600_150719 Medium parameters used: f = 2510 MHz; σ = 2.086 S/m; ε_r = 51.266; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃ ; **Liquid Temperature**: 22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.16, 7.16, 7.16); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM2; Type: QDOVA001BB; Serial: TP:1233
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Ch20850/Area Scan (81x111x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.771 W/kg

Ch20850/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.5750 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.960 W/kg
SAR(1 g) = 0.490 W/kg; SAR(10 g) = 0.240 W/kg
Maximum value of SAR (measured) = 0.713 W/kg



0 dB = 0.771 W/kg

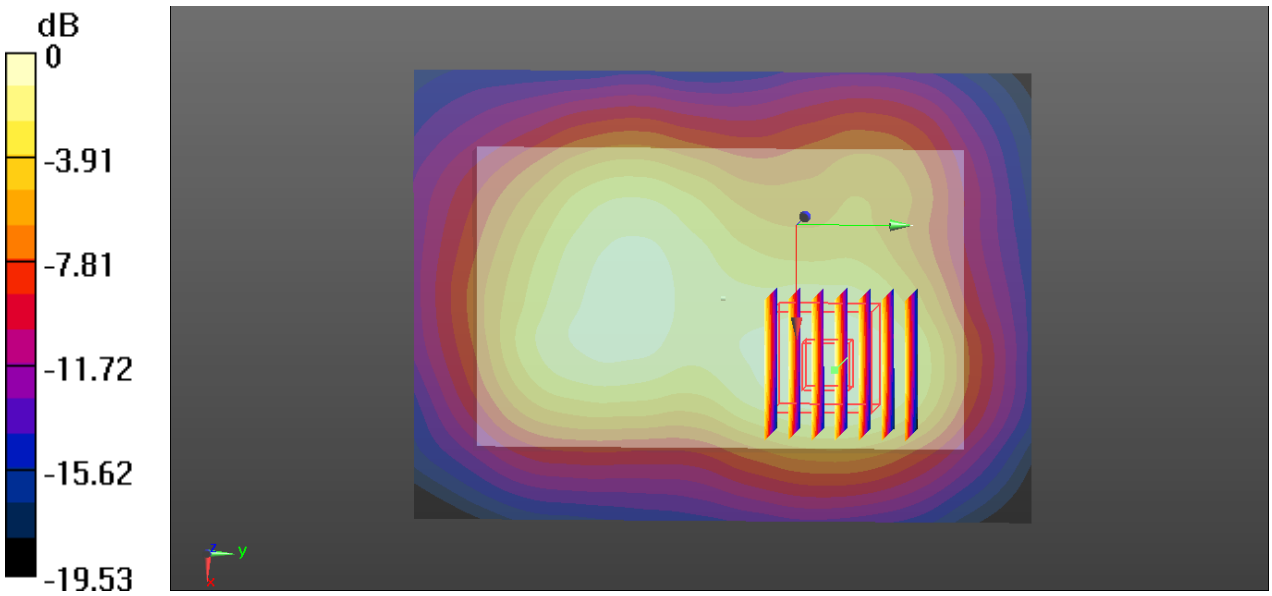
#10_WLAN2.4GHz_802.11b 1Mbps_Front_10mm_Ch1_Ant 0+1

Communication System: UID 0, WIFI (0); Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: MSL_2450_150719 Medium parameters used: f = 2412 MHz; σ = 1.947 S/m; ε_r = 52.484; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃ ; **Liquid Temperature**: 22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7346; ConvF(7.23, 7.23, 7.23); Calibrated: 2015.01.08;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1386; Calibrated: 2015.02.19
- Phantom: SAM2; Type: QDOVA001BB; Serial: TP:1233
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Ch1/Area Scan (81x111x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.424 W/kg

Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.478 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.513 W/kg
SAR(1 g) = 0.292 W/kg; SAR(10 g) = 0.163 W/kg
Maximum value of SAR (measured) = 0.404 W/kg



0 dB = 0.404 W/kg