FCC SAR Test Report

APPLICANT	**:**	**ZTE CORPORATION**
EQUIPMENT	**:**	**LTE UFI MODEM**
BRAND NAME	**:**	**ZTE**
MODEL NAME	**:**	**MF90**
FCC ID	**:**	**SRQMF90**
STANDARD	**:**	**FCC 47 CFR Part 2 (2.1093)** **ANSI/IEEE C95.1-1992** **IEEE 1528-2003**

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

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

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager

Testing Laboratory 2627

SPORTON INTERNATIONAL (KUNSHAN) INC.

No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.

Table of Contents

Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA440903	Rev. 01	Initial issue of report	May 23, 2014

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **ZTE CORPORATION, LTE UFI MODEM, MF90**, are as follows.

Equipment Class	Frequency Band	Operating Mode	Highest SAR Summary	
			Body 1g SAR (W/kg) (Gap10mm)	Simultaneous Transmission SAR (W/kg)
PCB	GSM850	Data	0.55	1.36
	GSM1900	Data	1.35	
	WCDMA Band V	Data	0.54	
	WCDMA Band II	Data	1.36	
	LTE Band 7	Data	1.22	
DTS	WLAN 2.4GHz Band	Data	0.10	1.36
	WLAN 5.8GHz Band	Data	0.49	
NII	WLAN 5.2GHz Band	Data	<0.10	1.24
Date of Testing:		04/18/2014 ~ 05/15/2014		

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.

2. Administration Data

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

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

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

3. Guidance 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 SAR meas for 802 11abg v01r02
- FCC KDB 941225 D01 SAR test for 3G devices v02
- FCC KDB 941225 D02 HSPA and 1x Advanced v02r02
- FCC KDB 941225 D03 SAR Test Reduction GSM GPRS EDGE v01
- FCC KDB 941225 D05 SAR for LTE Devices v02r03
- FCC KDB 941225 D06 Hotspot Mode SAR v01r01

4. Equipment Under Test (EUT)

4.1 General Information

Product Feature & Specification	
Equipment Name	LTE UFI MODEM
Brand Name	ZTE
Model Name	MF90
FCC ID	SRQMF90
IMEI Code	359734030258728
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 7: 2502.5 MHz ~ 2567.5 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz
Mode	• GPRS/EGPRS • RMC/AMR 12.2Kbps • HSDPA • HSUPA • DC-HSDPA • HSPA+ • LTE: QPSK, 16QAM • 802.11a/b/g/n HT20/HT40
HW Version	xq5B
SW Version	EN_ZTE_MF90LATINV1.0.0B05
EUT Stage	Identical Prototype

Remark:
1. This device 2.4GHz WLAN supports Hotspot operation, and 2.4GHz / 5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.2GHz supports WiFi Direct (GC only).
2. This device supports GRPS/EGPRS mode up to multi-slot class12.
3. This device has no voice function.

4.2 Maximum Tune-up Limit

Mode	Burst average power(dBm)	
	GSM 850	GSM 1900
GPRS (GMSK, 1 Tx slot)	33.00	31.00
GPRS (GMSK, 2 Tx slots)	32.00	29.00
GPRS (GMSK, 3 Tx slots)	29.00	27.00
GPRS (GMSK, 4 Tx slots)	28.00	25.00
EDGE (8PSK, 1 Tx slot)	27.00	26.00
EDGE (8PSK, 2 Tx slots)	25.00	24.00
EDGE (8PSK, 3 Tx slots)	23.00	22.00
EDGE (8PSK, 4 Tx slots)	23.00	22.00

Mode	Average power(dBm)	
	WCDMA Band V	WCDMA Band II
RMC 12.2Kbps	23.50	23.50
HSDPA Subtest-1	22.00	22.00
HSDPA Subtest-2	22.00	22.00
HSDPA Subtest-3	22.00	22.00
HSDPA Subtest-4	22.00	22.00
DC-HSDPA Subtest-1	23.00	23.00
DC-HSDPA Subtest-2	22.00	22.00
DC-HSDPA Subtest-3	22.00	22.00
DC-HSDPA Subtest-4	22.00	22.00
HSUPA Subtest-1	21.00	21.00
HSUPA Subtest-2	21.00	21.00
HSUPA Subtest-3	21.00	21.00
HSUPA Subtest-4	21.00	22.00
HSUPA Subtest-5	21.00	21.00
HSPA+ (16QAM) Subtest-1	22.50	22.00

LTE Band 7				
Average Power (dBm)				
Modulation	BW (MHz)	RB size	Target 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

Average Power (dBm)					
Mode / Band	IEEE 802.11				
	11a	11b	11g	11n-HT20	11n-HT40
WLAN 2.4 GHz Band Ant.0		15	10	8	8
WLAN 2.4 GHz Band Ant.1		16	11	10	9
WLAN 2.4 GHz Band Ant.0+1(0)				8	7
WLAN 2.4 GHz Band Ant.0+1(1)				10	9
WLAN 2.4 GHz Band Ant.0+1				12	11
WLAN 5.2 GHz Band Ant.0	10			10	10
WLAN 5.2 GHz Band Ant.1	10			10	10
WLAN 5.2 GHz Band Ant.0+1(0)				9	8
WLAN 5.2 GHz Band Ant.0+1(1)				11	10
WLAN 5.2 GHz Band Ant.0+1				13	12
WLAN 5.8 GHz Band Ant.0	9			9	9
WLAN 5.8 GHz Band Ant.1	10			10	10
WLAN 5.8 GHz Band Ant.0+1(0)				10	10
WLAN 5.8 GHz Band Ant.0+1(1)				11	10
WLAN 5.8 GHz Band Ant.0+1				13.5	12.5

4.3 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r03	
FCC ID	SRQMF90
Equipment Name	LTE UFI MODEM
Operating Frequency Range of each LTE transmission band	LTE Band 7: 2502.5 MHz ~ 2567.5 MHz
Channel Bandwidth	5MHz, 10MHz, 15MHz, 20MHz
uplink modulations used	QPSK, and 16QAM
LTE transmitter and antenna implementation (standalone or sharing hardware components / antennas)	A primary antenna is used for LTE and other wireless interfaces (GSM/ WCDMA) for transmitting and receiving. LTE and other wireless interfaces (GSM/ WCDMA) share the same antenna, and cannot transmit simultaneously A 2nd antenna is used for LTE and other wireless interfaces (GSM/WCDMA) for receiving only
LTE Voice / Data requirements	Data only
LTE MPR permanently built-in by design	Yes, per 3GPP TS 36.101 (see Table 6.2.3-1 below)
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.

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

Transmission (H, M, L) channel numbers and frequencies in each LTE band								
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:

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

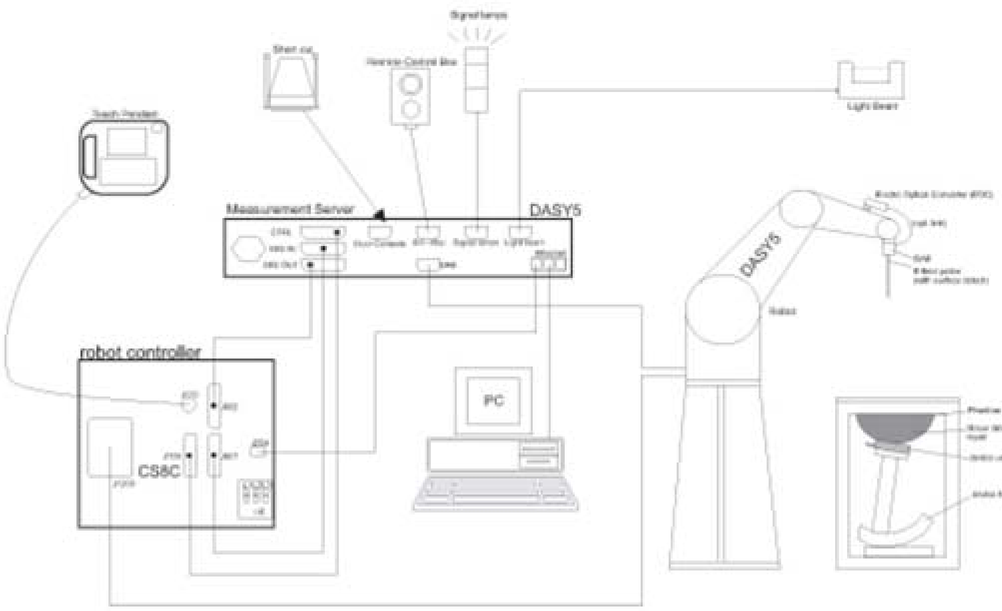
SAR is expressed in units of Watts per kilogram (W/kg)

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

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 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.

<table>
<tr><th colspan="3"></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">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 <u>reported</u> 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.</td></tr>
</table>

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	835MHz System Validation Kit	D835V2	4d151	Mar. 25, 2013	Mar. 23, 2015
SPEAG	1900MHz System Validation Kit	D1900V2	5d170	Mar. 27, 2013	Mar. 25, 2015
SPEAG	2450MHz System Validation Kit	D2450V2	736	Aug. 23, 2013	Aug. 22, 2014
SPEAG	2600MHz System Validation Kit	D2600V2	1061	Mar. 26, 2012	Mar. 24, 2015
SPEAG	5000MHz System Validation Kit	D5GHzV2	1006	Sep. 23, 2013	Sep. 22, 2014
SPEAG	Data Acquisition Electronics	DAE4	1353	Jan. 30, 2014	Jan. 29, 2015
SPEAG	Data Acquisition Electronics	DAE4	1210	Jun. 19, 2013	Jun. 18, 2014
SPEAG	Data Acquisition Electronics	DAE4	1303	Nov. 22, 2013	Nov. 21, 2014
SPEAG	Dosimetric E-Field Probe	EX3DV4	3898	Mar. 10, 2014	Mar. 09, 2015
SPEAG	Dosimetric E-Field Probe	EX3DV4	3857	Jun. 20, 2013	Jun. 19, 2014
SPEAG	Dosimetric E-Field Probe	EX3DV4	3736	Apr. 24, 2014	Apr. 23, 2015
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1753	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1754	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1479	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Agilent	Wireless Communication Test Set	E5515C	MY52102600	Dec. 30, 2013	Dec. 29, 2014
Agilent	Wireless Communication Test Set	E5515C	MY48360820	Jan. 10, 2014	Jan. 09, 2015
Anritsu	Radio communication analyzer	MT8820C	6201074235	Nov. 05, 2013	Nov. 04, 2014
R&S	Signal Generator	SMR40	100455	Jan. 17, 2014	Jan. 16, 2015
Agilent	ENA Series Network Analyzer	E5071C	MY46111157	Dec. 30, 2013	Dec. 29, 2014
Agilent	ENA Series Network Analyzer	E5071C	MY46317418	May 24, 2013	May 23, 2014
Agilent	Dielectric Probe Kit	85070E	MY44300751	NCR	NCR
Agilent	Dielectric Probe Kit	85070E	MY44300475	NCR	NCR
Anritsu	Power Meter	ML2495A	1005002	Feb. 27, 2014	Feb. 26, 2015
Anritsu	Power Meter	ML2495A	1005002	Feb. 27, 2014	Feb. 26, 2015
Anritsu	Power Sensor	MA2411B	917070	Feb. 27, 2014	Feb. 26, 2015
Anritsu	Power Senor	MA2411B	0917070	Feb.27,2014	Feb. 26, 2015
ARRA	Power Divider	A3200-2	N/A	NA	NA
R&S	Spectrum Analyzer	FSP7	101045	Dec. 30, 2013	Dec. 29, 2014
R&S	Spectrum Analyzer	FSP30	101399	May 23, 2013	May 22, 2014
Agilent	Dual Directional Coupler	778D	50422	*CBT	
Woken	Attenuator	WK0602-XX	N/A	*CBT	
PE	Attenuator	PE7005-10	N/A	*CBT	
PE	Attenuator	PE7005- 3	N/A	*CBT	
AR	Power Amplifier	5S1G4M2	0328767	*CBT	
Mini-Circuits	Power Amplifier	ZVE-3W	162601250	*CBT	
Mini-Circuits	Power Amplifier	ZHL-42W+	13440021344	*CBT	

General Note:

1. The calibration certificate of DASY can be referred to appendix C of this report.
2. Referring to KDB 865664 D01v01r03, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole D835V2, SN: 4d151, D1900V2, SN: 5d170, D2600V2, SN: 1061 can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.
4. *CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing an amplifier, coupler and attenuator were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurement.

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								
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
850	Body	22.7	0.967	55.405	0.97	55.20	-0.31	0.37	±5	2014/04/23
1900	Body	22.5	1.519	53.569	1.52	53.30	-0.07	0.50	±5	2014/04/22
2450	Body	22.8	1.943	50.957	1.95	52.70	-0.36	-3.31	±5	2014/05/05
2600	Body	22.6	2.201	52.823	2.16	52.50	1.90	0.62	±5	2014/04/18
5200	Body	22.5	5.287	48.755	5.30	49.00	-0.25	-0.50	±5	2014/05/15
5800	Body	22.5	6.120	47.381	6.00	48.20	2.00	-1.70	±5	2014/05/15

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 SAR (W/kg)	Targeted SAR (W/kg)	Normalized SAR (W/kg)	Deviation (%)
2014/04/23	850	Body	250	4d151	3898	1353	2.24	9.43	8.96	-4.98
2014/04/22	1900	Body	250	5d170	3898	1353	9.69	41.20	38.76	-5.92
2014/05/05	2450	Body	250	736	3857	1210	12.50	51.30	50	-2.53
2014/04/18	2600	Body	250	1061	3898	1353	14.70	55.60	58.8	5.76
2014/05/15	5200	Body	100	1006	3736	1303	7.08	71.50	70.8	-0.98
2014/05/15	5800	Body	100	1006	3736	1303	7.00	72.30	70	-3.18

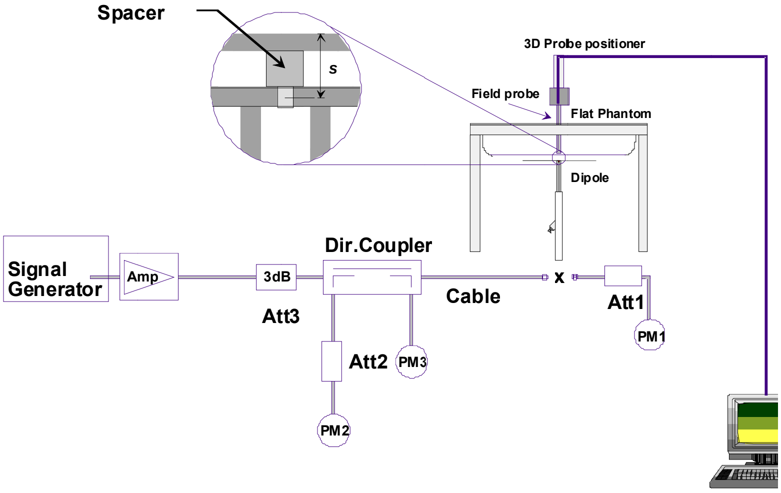


Fig 8.3.1 System Performance Check Setup

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.

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. For Body mode SAR testing, GPRS / EDGE should be evaluated, therefore the EUT was set in GPRS 2 Tx slots for GSM850/GSM1900 band due to its highest frame-average power.

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) – CS1	**32.82**	32.80	32.81	33.00	23.82	23.80	23.81	24.00
GPRS (GMSK, 2 Tx slots) – CS1	30.86	30.84	30.85	32.00	**24.86**	24.84	24.85	26.00
GPRS (GMSK, 3 Tx slots) – CS1	28.86	28.73	28.78	29.00	24.60	24.47	24.52	24.74
GPRS (GMSK, 4 Tx slots) – CS1	27.54	27.45	27.50	28.00	24.54	24.45	24.50	25.00
EDGE (8PSK, 1 Tx slot) – MCS5	26.00	26.16	26.17	27.00	17.00	17.16	17.17	18.00
EDGE (8PSK, 2 Tx slots) – MCS5	23.84	24.02	24.04	25.00	17.84	18.02	18.04	19.00
EDGE (8PSK, 3 Tx slots) – MCS5	22.00	22.15	22.15	23.00	17.74	17.89	17.89	18.74
EDGE (8PSK, 4 Tx slots) – MCS5	21.80	22.03	22.11	23.00	18.80	19.03	19.11	20.00

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

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) – CS1	29.73	**30.09**	30.01	31.00	20.73	21.09	21.01	22.00
GPRS (GMSK, 2 Tx slots) – CS1	27.80	28.03	27.94	29.00	21.80	**22.03**	21.94	23.00
GPRS (GMSK, 3 Tx slots) – CS1	25.77	26.18	26.05	27.00	21.51	21.92	21.79	22.74
GPRS (GMSK, 4 Tx slots) – CS1	24.51	24.63	24.58	25.00	21.51	21.63	21.58	22.00
EDGE (8PSK, 1 Tx slot) – MCS5	25.43	25.67	25.55	26.00	16.43	16.67	16.55	17.00
EDGE (8PSK, 2 Tx slots) – MCS5	23.33	23.57	23.43	24.00	17.33	17.57	17.43	18.00
EDGE (8PSK, 3 Tx slots) – MCS5	21.48	21.71	21.55	22.00	17.22	17.45	17.29	17.74
EDGE (8PSK, 4 Tx slots) – MCS5	21.00	21.43	21.33	22.00	18.00	18.43	18.33	19.00

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 HSPA+ devices supporting 16 QAM in the uplink, power measurements procedure is according to the configurations in Table C.11.1.4 of 3GPP TS 34.121-1.
4. 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 $\beta_{hs} = 30/15 * \beta_c$.
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.		

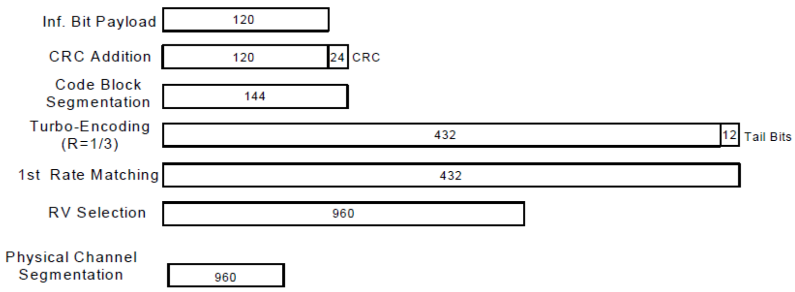


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

HSPA+ 3GPP release 7 (uplink category 7) 16QAM, 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 = 5.2E:HSPA+:UL with 16QAM
   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, C11.1.4, quoted from the TS 34.121-1 s5.2E
   iii. Set Channel Parms
   iv. Set Cell Power = -86 dBm
   v. Set Channel Type = HSPA
   vi. Set UE Target Power =21 dBm
   vii. Power Ctrl Mode= All Up Bits
   viii. Set Manual Uplink DPCH Bc/Bd = Manual
   ix. Set Manual Uplink DPCH Bc and Bd=15,15(for 34.121-1 v8.10.0 table C11.1.4 sub-test 1)
   x. Set HSPA Conn DL Channel Levels
   xi. Set HS-SCCH Configs
   xii. Set RB Test Mode Setup
   xiii. Set Common HSUPA Parameters
   xiv. Set Serving Grant
   xv. Confirm that E-TFCI is equal to the target E-TFCI of 105 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.
Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.
Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signaled to use the extrapolation algorithm.

Setup Configuration

<WCDMA Conducted Power>

General Note:

1. Per KDB 941225 D02v02r02, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/HSUPA/DC-HSDPA /HSPA+ output power is < 0.25dB higher than RMC, or reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/HSUPA/DC-HSDPA/HSPA+ SAR evaluation can be excluded..

Band			WCDMA V				WCDMA II			
TX Channel			4132	4182	4233	Tune-up Limit (dBm)	9262	9400	9538	Tune-up Limit (dBm)
Rx Channel			4357	4407	4458		9662	9800	9938	
Frequency (MHz)			826.4	836.4	846.6		1852.4	1880	1907.6	
3GPP MPR (dB)	3GPP Rel 99	RMC 12.2Kbps	22.40	22.47	**22.66**	23.50	**22.59**	22.58	22.35	23.50
0	3GPP Rel 6	HSDPA Subtest-1	21.34	21.40	21.69	22.00	21.55	21.58	21.35	22.00
0	3GPP Rel 6	HSDPA Subtest-2	20.88	20.96	21.17	22.00	21.00	21.02	20.81	22.00
0.5	3GPP Rel 6	HSDPA Subtest-3	20.81	20.95	21.16	22.00	21.03	21.00	20.85	22.00
0.5	3GPP Rel 6	HSDPA Subtest-4	20.86	20.98	21.18	22.00	21.01	21.06	20.88	22.00
0	3GPP Rel 8	DC-HSDPA Subtest-1	22.35	22.46	22.59	23.00	22.43	22.48	22.52	23.00
0	3GPP Rel 8	DC-HSDPA Subtest-2	21.58	21.76	21.63	22.00	21.49	21.53	21.37	22.00
0.5	3GPP Rel 8	DC-HSDPA Subtest-3	20.79	20.84	20.95	22.00	20.95	21.14	20.87	22.00
0.5	3GPP Rel 8	DC-HSDPA Subtest-4	20.82	20.93	21.05	22.00	21.02	21.03	20.79	22.00
0	3GPP Rel 6	HSUPA Subtest-1	20.50	20.58	20.77	21.00	20.91	20.93	20.73	21.00
2	3GPP Rel 6	HSUPA Subtest-2	20.23	20.33	20.50	21.00	20.52	20.53	20.31	21.00
1	3GPP Rel 6	HSUPA Subtest-3	20.21	20.27	20.44	21.00	20.31	20.29	20.00	21.00
2	3GPP Rel 6	HSUPA Subtest-4	20.60	20.66	20.81	21.00	21.00	21.06	20.82	22.00
0	3GPP Rel 6	HSUPA Subtest-5	20.48	20.56	20.77	21.00	20.83	20.81	20.59	21.00
2.5	3GPP Rel 7	HSPA+ (16QAM) Subtest-1	21.94	21.97	22.01	22.50	21.74	21.65	21.59	22.00

<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 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 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	21.91	21.62	21.90	23.00	0
20	QPSK	1	49	21.93	21.87	21.91		
20	QPSK	1	99	22.05	22.12	22.01		
20	QPSK	50	0	20.78	20.80	20.78	22.00	0-1
20	QPSK	50	24	20.82	20.83	20.80		
20	QPSK	50	49	20.85	20.88	20.84		
20	QPSK	100	0	20.78	20.87	20.70		
20	16QAM	1	0	20.44	20.98	20.87	22.00	0-1
20	16QAM	1	49	20.55	20.95	20.77		
20	16QAM	1	99	21.18	21.00	20.92		
20	16QAM	50	0	19.83	19.84	19.94	21.00	0-2
20	16QAM	50	24	19.87	19.89	19.79		
20	16QAM	50	49	19.96	19.98	19.67		
20	16QAM	100	0	19.85	19.93	19.82		
Channel				20825	21100	21375	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	21.89	21.65	21.90	23.00	0
15	QPSK	1	37	21.99	21.99	21.88		
15	QPSK	1	74	22.01	22.00	21.92		
15	QPSK	36	0	20.84	20.87	20.73	22.00	0-1
15	QPSK	36	18	20.79	21.00	20.71		
15	QPSK	36	37	20.84	20.89	20.78		
15	QPSK	75	0	20.90	20.89	20.71		
15	16QAM	1	0	20.80	20.75	20.52	22.00	0-1
15	16QAM	1	37	20.56	20.81	20.65		
15	16QAM	1	74	20.95	20.82	20.70		
15	16QAM	36	0	19.82	19.75	19.66	21.00	0-2
15	16QAM	36	18	19.90	19.95	19.69		
15	16QAM	36	37	19.77	20.00	19.84		
15	16QAM	75	0	19.92	20.00	19.85		
Channel				20800	21100	21400	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	21.84	21.71	21.74	23.00	0
10	QPSK	1	24	21.90	21.87	21.89		
10	QPSK	1	49	21.96	22.10	21.99		
10	QPSK	25	0	20.88	20.97	20.78	22.00	0-1
10	QPSK	25	12	20.85	20.90	20.83		
10	QPSK	25	24	20.80	20.97	20.77		
10	QPSK	50	0	20.79	20.84	20.72		
10	16QAM	1	0	20.68	20.73	20.95	22.00	0-1
10	16QAM	1	24	20.82	21.08	21.00		
10	16QAM	1	49	20.83	21.30	21.07		
10	16QAM	25	0	20.00	20.09	19.92	21.00	0-2
10	16QAM	25	12	19.95	20.10	19.85		
10	16QAM	25	24	19.84	19.85	19.68		
10	16QAM	50	0	19.89	19.90	19.70		

Channel				20775	21100	21425	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	21.89	21.75	21.78	23.00	0
5	QPSK	1	12	21.81	21.88	21.84		
5	QPSK	1	24	21.93	21.96	21.95		
5	QPSK	12	0	20.92	20.97	20.81	22.00	0-1
5	QPSK	12	6	20.98	21.05	20.74		
5	QPSK	12	11	20.99	21.06	20.71		
5	QPSK	25	0	20.90	20.99	20.67		
5	16QAM	1	0	21.04	20.87	20.73	22.00	0-1
5	16QAM	1	12	20.46	20.78	20.71		
5	16QAM	1	24	21.18	20.96	20.91		
5	16QAM	12	0	19.85	19.99	19.94	21.00	0-2
5	16QAM	12	6	20.08	19.88	19.84		
5	16QAM	12	11	19.94	20.01	19.80		
5	16QAM	25	0	19.90	20.00	19.60		

<WLAN Conducted Power>

General Note:

1. Per KDB 248227, SAR for MIMO was measured with both transmitting simultaneously and was evaluated in dependently of SISO operation. For 2.4 GHz MIMO, 802.11b was evaluated. For 5 GHz MIMO, 802.11a was evaluated.
2. For 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.
3. For 2.4GHz WLAN SISO mode SAR testing, highest average RF output power channel for the lowest data rate for 802.11b were selected for SAR evaluation. 802.11g/n HT20/HT40 were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of 802.11b mode.
4. For 2.4GHz WLAN MIMO mode SAR testing, highest average RF output power channel for the lowest data rate for 802.11n HT20 were selected for SAR evaluation. 802.11n HT40 were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of 802.11n HT20 mode.
5. For 5 GHz WLAN SISO mode SAR testing, highest average RF output power channel for the lowest data rate for 802.11a were selected for SAR evaluation. 802.11n HT20/HT40 modes were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of 802.11a mode.
6. For 5GHz WLAN MIMO mode SAR testing, highest average RF output power channel for the lowest data rate for 802.11n HT20 were selected for SAR evaluation. 802.11n HT40 were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of 802.11n HT20 mode.

<u><2.4GHz WLAN Antenna 0></u>

WLAN 2.4GHz 802.11b Average Power (dBm)					
Power vs. Channel			Power vs. Data Rate		
Channel	Frequency (MHz)	Data Rate 1Mbps	2Mbps	5.5Mbps	11Mbps
CH 1	2412	13.48	14.24	14.09	13.89
CH 6	2437	**14.25**			
CH 11	2462	13.27			

WLAN 2.4GHz 802.11g Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate 6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 1	2412	8.58	9.33	9.22	9.24	9.17	9.22	9.16	9.13
CH 6	2437	**9.47**							
CH 11	2462	8.72							

WLAN 2.4GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 1	2412	7.24	7.75	7.72	7.70	7.84	7.87	7.88	7.85
CH 6	2437	**7.90**							
CH 11	2462	7.15							

WLAN 2.4GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 3	2422	6.18	6.42	6.36	6.18	6.52	6.50	6.38	6.18
CH 6	2437	**6.57**							
CH 9	2452	6.37							

<2.4GHz WLAN Antenna 1>

WLAN 2.4GHz 802.11b Average Power (dBm)					
Power vs. Channel			Power vs. Data Rate		
Channel	Frequency (MHz)	Data Rate 1Mbps	2Mbps	5.5Mbps	11Mbps
CH 1	2412	14.77	15.58	15.51	15.18
CH 6	2437	**15.62**			
CH 11	2462	14.99			

WLAN 2.4GHz 802.11g Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate 6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 1	2412	10.02	10.61	10.59	10.61	10.52	10.61	10.61	10.59
CH 6	2437	**10.62**							
CH 11	2462	10.28							

WLAN 2.4GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 1	2412	9.27	9.35	9.33	9.20	9.30	9.41	9.43	9.22
CH 6	2437	**9.48**							
CH 11	2462	9.06							

WLAN 2.4GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 3	2422	7.71	8.23	7.99	8.15	8.23	8.08	8.07	7.84
CH 6	2437	**8.26**							
CH 9	2452	7.86							

<2.4GHz WLAN Antenna 0+1(0)>

WLAN 2.4GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 1	2412	7.21	7.42	7.51	7.49	7.53	7.58	7.59	7.51
CH 6	2437	**7.60**							
CH 11	2462	7.35							

WLAN 2.4GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 3	2422	6.02	6.42	6.37	6.06	6.28	6.42	6.33	6.07
CH 6	2437	**6.43**							
CH 9	2452	6.18							

<2.4GHz WLAN Antenna 0+1(1)>

WLAN 2.4GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 1	2412	9.14	9.43	9.47	9.26	9.22	9.28	9.14	9.37
CH 6	2437	**9.70**							
CH 11	2462	9.43							

WLAN 2.4GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 3	2422	8.29	8.44	8.64	8.43	8.60	8.53	8.55	8.41
CH 6	2437	**8.74**							
CH 9	2452	8.43							

<2.4GHz WLAN Antenna 0+1>

WLAN 2.4GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 1	2412	11.29	11.55	11.61	11.48	11.47	11.53	11.44	11.55
CH 6	2437	**11.78**							
CH 11	2462	11.52							

WLAN 2.4GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 3	2422	10.31	10.56	10.66	10.41	10.60	10.61	10.60	10.41
CH 6	2437	**10.75**							
CH 9	2452	10.46							

<5GHz WLAN Antenna 0>

WLAN 5GHz 802.11a Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate 6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 36	5180	**9.43**	9.25	8.84	9.35	9.37	9.17	9.25	8.78
CH 40	5200	9.28							
CH 44	5220	9.25							
CH 48	5240	9.13							
CH 149	5745	7.65	8.39	8.39	8.51	8.50	8.47	8.44	8.45
CH 153	5765	7.85							
CH 157	5785	8.25							
CH 161	5805	8.32							
CH 165	5825	**8.52**							

WLAN 5GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 36	5180	**9.65**	9.58	9.48	9.44	9.49	9.61	9.59	9.32
CH 40	5200	9.46							
CH 44	5220	9.29							
CH 48	5240	9.20							
CH 149	5745	8.32	8.36	8.30	8.31	8.39	8.43	8.30	8.36
CH 153	5765	8.19							
CH 157	5785	8.26							
CH 161	5805	8.42							
CH 165	5825	**8.46**							

WLAN 5GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 38	5190	**9.55**	9.50	8.52	9.37	9.49	9.54	9.43	9.33
CH 46	5230	9.30							
CH 151	5755	8.47	8.44	8.44	8.47	8.14	8.33	8.27	8.25
CH 159	5795	**8.53**							

<5GHz WLAN Antenna 1>

WLAN 5GHz 802.11a Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate 6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 36	5180	**9.44**	9.13	9.06	9.11	9.15	9.28	9.15	8.97
CH 40	5200	9.03							
CH 44	5220	8.93							
CH 48	5240	8.86							
CH 149	5745	8.49	9.15	9.24	9.23	9.18	9.31	9.18	9.26
CH 153	5765	8.58							
CH 157	5785	9.14							
CH 161	5805	9.01							
CH 165	5825	**9.40**							

WLAN 5GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 36	5180	**9.66**	9.59	9.45	9.47	9.59	9.65	9.59	9.14
CH 40	5200	9.46							
CH 44	5220	9.40							
CH 48	5240	9.46							
CH 149	5745	9.13	9.12	9.03	9.11	9.13	9.06	9.05	8.96
CH 153	5765	9.22							
CH 157	5785	9.26							
CH 161	5805	9.23							
CH 165	5825	**9.29**							

WLAN 5GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 38	5190	**9.56**	9.34	9.02	9.19	9.32	9.20	9.22	8.81
CH 46	5230	9.37							
CH 151	5755	8.68	9.50	9.44	9.38	9.43	9.54	9.48	9.57
CH 159	5795	**9.61**							

<5GHz WLAN Antenna 0+1(0)>

WLAN 5GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 36	5180	**8.15**	8.10	8.11	8.04	8.00	8.13	8.09	7.94
CH 40	5200	8.00							
CH 44	5220	7.94							
CH 48	5240	7.96							
CH 149	5745	7.80	9.63	9.58	9.42	9.52	9.57	9.63	9.62
CH 153	5765	9.19							
CH 157	5785	9.49							
CH 161	5805	**9.77**							
CH 165	5825	9.67							

WLAN 5GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 38	5190	**7.57**	7.31	7.43	7.39	7.51	7.49	7.55	6.96
CH 46	5230	7.36							
CH 151	5755	8.79	8.86	8.91	8.87	9.12	8.95	8.96	8.77
CH 159	5795	**9.13**							

<5GHz WLAN Antenna 0+1(1)>

WLAN 5GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 36	5180	**10.49**	10.22	10.34	10.11	10.40	10.40	10.34	10.20
CH 40	5200	10.36							
CH 44	5220	10.30							
CH 48	5240	10.33							
CH 149	5745	9.58	10.20	10.30	10.30	10.00	10.26	10.21	10.31
CH 153	5765	9.88							
CH 157	5785	10.10							
CH 161	5805	**10.35**							
CH 165	5825	10.33							

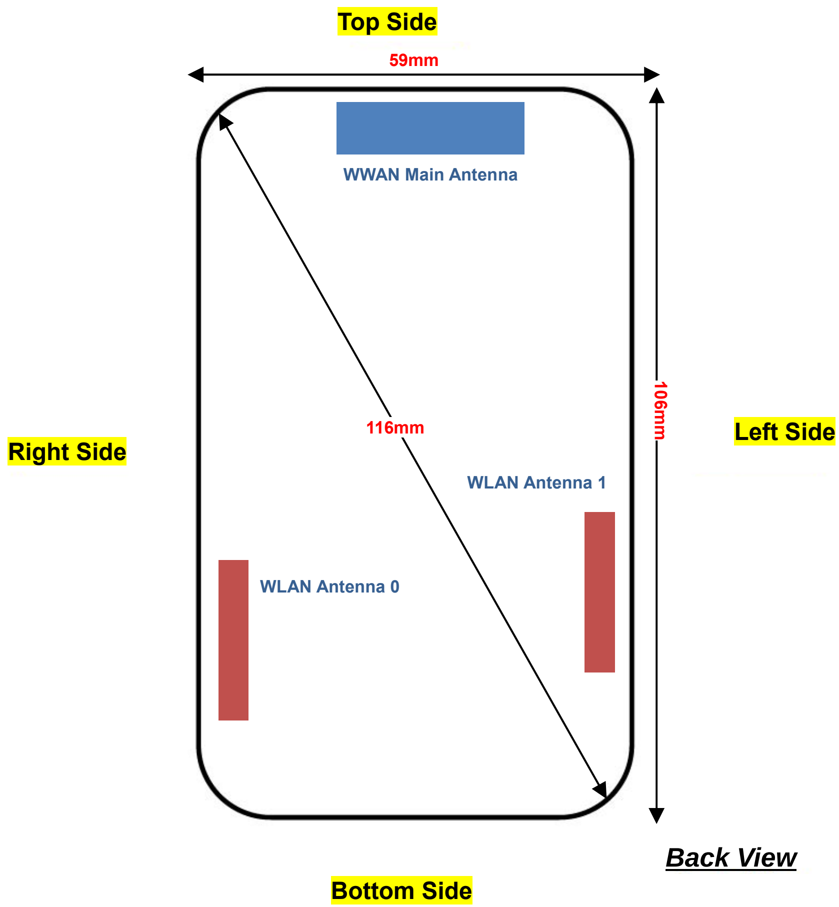
WLAN 5GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 38	5190	**9.23**	9.11	9.18	8.74	8.98	9.19	9.20	9.03
CH 46	5230	9.03							
CH 151	5755	8.98	9.08	9.02	9.03	9.28	9.39	9.05	9.06
CH 159	5795	**9.44**							

<5GHz WLAN Antenna 0+1>

WLAN 5GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 36	5180	**12.49**	12.30	12.38	12.21	12.38	12.42	12.37	12.22
CH 40	5200	12.35							
CH 44	5220	12.29							
CH 48	5240	12.32							
CH 149	5745	11.79	13.02	13.01	13.03	12.78	12.99	12.94	12.99
CH 153	5765	12.56							
CH 157	5785	12.81							
CH 161	5805	**13.09**							
CH 165	5825	13.06							

WLAN 5GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS8	MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 38	5190	**11.49**	11.32	11.40	11.13	11.31	11.43	11.47	11.13
CH 46	5230	11.28							
CH 151	5755	11.89	11.98	11.97	11.96	12.21	12.19	12.02	11.93
CH 159	5795	**12.30**							

13. Antenna Location



<Transmission configuration>

Wireless Interface	SISO Mode		MIMO Mode
	Antenna 0 <Tx/Rx>	Antenna 1 <Tx/Rx>	Antenna 0+1 <Tx/Rx>
WLAN 2.4GHz 802.11b/g	yes	yes	
WLAN 2.4GHz 802.11n HT20/HT40	yes	yes	yes
WLAN 5GHz 802.11a	yes	yes	
WLAN 5GHz 802.11an HT20/HT40	yes	yes	yes

Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	≤ 25mm	≤ 25mm	≤ 25mm	89mm	≤ 25mm	≤ 25mm
WLAN Antenna 0	≤ 25mm	≤ 25mm	74mm	≤ 25mm	≤ 25mm	53mm
WLAN Antenna 1	≤ 25mm	≤ 25mm	59mm	≤ 25mm	53mm	≤ 25mm

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

General Note:

1. Referring to KDB 941225 D06 v01r01, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge

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. For Body mode SAR testing, GPRS and EDGE should be evaluated, therefore the EUT was set in GPRS 2 Tx slots for GSM850/GSM1900 band due to its highest frame-average power.
4. Per KDB 941225 D02v02r02, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/HSUPA/DC-HSDPA/HSPA+ output power is < 0.25dB higher than RMC, or reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/ HSUPA/HSPA+/DC-HSDPA SAR evaluation can be excluded.
5. 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.
6. Per KDB 941225 D05v02r03, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
7. 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.
8. 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.
9. 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.
10. This device 2.4GHz WLAN supports Hotspot operation, and 2.4GHz / 5.8GHz WLAN supports WiFi Direct (Group Client / Group Owner), and 5.2GHz supports WiFi Direct (Group Client only).
11. "N/A" stands for there is no cube to be found with the highest averaged SAR value.

14.1 Body SAR

Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	≤ 25mm	≤ 25mm	≤ 25mm	89mm	≤ 25mm	≤ 25mm
WLAN Antenna 0	≤ 25mm	≤ 25mm	74mm	≤ 25mm	≤ 25mm	53mm
WLAN Antenna 1	≤ 25mm	≤ 25mm	59mm	≤ 25mm	53mm	≤ 25mm

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

General Note:

1. Referring to KDB 941225 D06 v01r01, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
#01	**GSM850**	**GPRS (GMSK 2 Tx slots)**	**Front**	**1**	**128**	**824.2**	30.86	**32**	1.300	**0.14**	**0.426**	**0.554**
	GSM850	GPRS (GMSK 2 Tx slots)	Back	1	128	824.2	30.86	32	1.300	0.01	0.424	0.551
	GSM850	GPRS (GMSK 2 Tx slots)	Left side	1	128	824.2	30.86	32	1.300	-0.01	0.257	0.334
	GSM850	GPRS (GMSK 2 Tx slots)	Right side	1	128	824.2	30.86	32	1.300	0.05	0.258	0.335
	GSM850	GPRS (GMSK 2 Tx slots)	Top side	1	128	824.2	30.86	32	1.300	0.04	0.044	0.057
	GSM1900	GPRS (GMSK 2 Tx slots)	Front	1	661	1880	28.03	29	1.250	-0.01	0.715	0.894
	GSM1900	GPRS (GMSK 2 Tx slots)	Back	1	661	1880	28.03	29	1.250	0.03	0.682	0.853
	GSM1900	GPRS (GMSK 2 Tx slots)	Left side	1	661	1880	28.03	29	1.250	0.11	0.118	0.148
	GSM1900	GPRS (GMSK 2 Tx slots)	Right side	1	661	1880	28.03	29	1.250	0.09	0.286	0.358
	GSM1900	GPRS (GMSK 2 Tx slots)	Top side	1	661	1880	28.03	29	1.250	0.01	1.010	1.263
	GSM1900	GPRS (GMSK 2 Tx slots)	Front	1	512	1850.2	27.80	29	1.318	0.03	0.803	1.059
	GSM1900	GPRS (GMSK 2 Tx slots)	Front	1	810	1909.8	27.94	29	1.276	0.01	0.499	0.637
	GSM1900	GPRS (GMSK 2 Tx slots)	Back	1	512	1850.2	27.80	29	1.318	0.04	0.792	1.044
	GSM1900	GPRS (GMSK 2 Tx slots)	Back	1	810	1909.8	27.94	29	1.276	0.09	0.475	0.606
#02	**GSM1900**	**GPRS (GMSK 2 Tx slots)**	**Top side**	**1**	**512**	**1850.2**	**27.80**	**29**	**1.318**	**0.04**	**1.020**	**1.345**
	GSM1900	GPRS (GMSK 2 Tx slots)	Top side	1	810	1909.8	27.94	29	1.276	-0.05	0.711	0.908

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
#03	**WCDMA Band V**	**RMC 12.2K**	**Front**	**1**	**4233**	**846.6**	**22.66**	**23.5**	**1.213**	**0.04**	**0.447**	**0.542**
	WCDMA Band V	RMC 12.2K	Back	1	4233	846.6	22.66	23.5	1.213	-0.03	0.437	0.530
	WCDMA Band V	RMC 12.2K	Left side	1	4233	846.6	22.66	23.5	1.213	0.01	0.296	0.359
	WCDMA Band V	RMC 12.2K	Right side	1	4233	846.6	22.66	23.5	1.213	0.05	0.275	0.334
	WCDMA Band V	RMC 12.2K	Top side	1	4233	846.6	22.66	23.5	1.213	0.06	0.041	0.050
	WCDMA Band II	RMC 12.2K	Front	1	9262	1852.4	22.59	23.5	1.233	-0.14	0.664	0.819
	WCDMA Band II	RMC 12.2K	Back	1	9262	1852.4	22.59	23.5	1.233	0.09	0.63	0.777
	WCDMA Band II	RMC 12.2K	Left side	1	9262	1852.4	22.59	23.5	1.233	-0.03	0.147	0.181
	WCDMA Band II	RMC 12.2K	Right side	1	9262	1852.4	22.59	23.5	1.233	-0.05	0.312	0.385
	WCDMA Band II	RMC 12.2K	Top side	1	9262	1852.4	22.59	23.5	1.233	0.06	0.878	1.083
	WCDMA Band II	RMC 12.2K	Front	1	9400	1880	22.58	23.5	1.236	-0.1	0.772	0.954
	WCDMA Band II	RMC 12.2K	Front	1	9538	1907.6	22.35	23.5	1.303	0.01	0.706	0.920
#04	**WCDMA Band II**	**RMC 12.2K**	**Top side**	**1**	**9400**	**1880**	**22.58**	**23.5**	**1.236**	**0.03**	**1.100**	**1.360**
	WCDMA Band II	RMC 12.2K	Top side	1	9538	1907.6	22.35	23.5	1.303	-0.02	0.922	1.202

<LTE SAR>

Plot No.	Band	BW (MHz)	RB Size	RB offest	Modulation	Test Position	Gap (cm)	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	1	21100	2535	22.12	23	1.225	-0.05	0.556	0.681
#05	**LTE Band 7**	**20M**	**1**	**99**	**QPSK**	**Back**	**1**	**21100**	**2535**	**22.12**	**23**	**1.225**	**-0.08**	**0.994**	**1.217**
	LTE Band 7	20M	1	99	QPSK	Left side	1	21100	2535	22.12	23	1.225	0.06	0.437	0.535
	LTE Band 7	20M	1	99	QPSK	Right side	1	21100	2535	22.12	23	1.225	0.06	0.261	0.320
	LTE Band 7	20M	1	99	QPSK	Top side	1	21100	2535	22.12	23	1.225	-0.06	0.563	0.689
	LTE Band 7	20M	1	99	QPSK	Back	1	20850	2510	22.05	23	1.245	-0.06	0.842	1.048
	LTE Band 7	20M	1	99	QPSK	Back	1	21350	2560	22.01	23	1.256	-0.01	0.921	1.157
	LTE Band 7	20M	50	49	QPSK	Front	1	21100	2535	20.88	22	1.294	0.09	0.4	0.518
#06	**LTE Band 7**	**20M**	**50**	**49**	**QPSK**	**Back**	**1**	**21100**	**2535**	**20.88**	**22**	**1.294**	**0.02**	**0.746**	**0.965**
	LTE Band 7	20M	50	49	QPSK	Left side	1	21100	2535	20.88	22	1.294	0.02	0.328	0.424
	LTE Band 7	20M	50	49	QPSK	Right side	1	21100	2535	20.88	22	1.294	0.09	0.201	0.260
	LTE Band 7	20M	50	49	QPSK	Top side	1	21100	2535	20.88	22	1.294	0.13	0.397	0.514
	LTE Band 7	20M	50	49	QPSK	Back	1	20850	2510	20.85	22	1.303	-0.05	0.659	0.859
	LTE Band 7	20M	50	49	QPSK	Back	1	21350	2560	20.84	22	1.306	0.02	0.733	0.957
	LTE Band 7	20M	100	0	QPSK	Front	1	21100	2535	20.87	22	1.297	0.13	0.378	0.490
#07	**LTE Band 7**	**20M**	**100**	**0**	**QPSK**	**Back**	**1**	**21100**	**2535**	**20.87**	**22**	**1.297**	**-0.12**	**0.742**	**0.963**
	LTE Band 7	20M	100	0	QPSK	Left side	1	21100	2535	20.87	22	1.297	0.02	0.313	0.406
	LTE Band 7	20M	100	0	QPSK	Right side	1	21100	2535	20.87	22	1.297	0.01	0.203	0.263
	LTE Band 7	20M	100	0	QPSK	Top side	1	21100	2535	20.87	22	1.297	-0.09	0.388	0.503

<DTS SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Antenna	Ch.	Freq. (MHz)	Data Rate (bps)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 2.4GHz	802.11b	Front	1	Ant.0	6	2437	1M	14.25	15	1.189	100	1.000	0.12	0.038	0.045
	WLAN 2.4GHz	802.11b	Back	1	Ant.0	6	2437	1M	14.25	15	1.189	100	1.000	0.10	0.025	0.030
	WLAN 2.4GHz	**802.11b**	**Right side**	**1**	**Ant.0**	**6**	**2437**	**1M**	**14.25**	**15**	**1.189**	**100**	**1.000**	**-0.03**	**0.052**	**0.062**
	WLAN 2.4GHz	802.11b	Bottom Side	1	Ant.0	6	2437	1M	14.25	15	1.189	100	1.000	0.06	0.013	0.015
#08	**WLAN 2.4GHz**	**802.11b**	**Front**	**1**	**Ant.1**	**6**	**2437**	**1M**	**15.62**	**16**	**1.091**	**100**	**1.000**	**0.15**	**0.094**	**0.103**
	WLAN 2.4GHz	802.11b	Back	1	Ant.1	6	2437	1M	15.62	16	1.091	100	1.000	0.13	0.065	0.071
	WLAN 2.4GHz	802.11b	Left side	1	Ant.1	6	2437	1M	15.62	16	1.091	100	1.000	-0.13	0.049	0.053
	WLAN 2.4GHz	802.11b	Bottom Side	1	Ant.1	6	2437	1M	15.62	16	1.091	100	1.000	0.10	0.046	0.050
	WLAN 2.4GHz	**802.11n_HT20**	**Front**	**1**	**Ant.0+1**	**6**	**2437**	**MCS8**	**11.78**	**12**	**1.052**	**90.88**	**1.100**	**0.09**	**0.012**	**0.014**
	WLAN 2.4GHz	802.11n_HT20	Back	1	Ant.0+1	6	2437	MCS8	11.78	12	1.052	90.88	1.100	0.16	0.00674	0.008
	WLAN 2.4GHz	802.11n_HT20	Left side	1	Ant.0+1	6	2437	MCS8	11.78	12	1.052	90.88	1.100	0.07	0.00722	0.008
	WLAN 2.4GHz	802.11n_HT20	Right side	1	Ant.0+1	6	2437	MCS8	11.78	12	1.052	90.88	1.100	0.08	0.00575	0.007
	WLAN 2.4GHz	802.11n_HT20	Bottom Side	1	Ant.0+1	6	2437	MCS8	11.78	12	1.052	90.88	1.100	-0.06	0.00528	0.006
	WLAN 5.8GHz	802.11a	Front	1	Ant.0	165	5825	6M	8.52	9	1.117	95.39	1.048	0.00	N/A	N/A
	WLAN 5.8GHz	802.11a	Back	1	Ant.0	165	5825	6M	8.52	9	1.117	95.39	1.048	0.00	N/A	N/A
	WLAN 5.8GHz	**802.11a**	**Right side**	**1**	**Ant.0**	**165**	**5825**	**6M**	**8.52**	**9**	**1.117**	**95.39**	**1.048**	**0.09**	**0.064**	**0.075**
	WLAN 5.8GHz	802.11a	Bottom Side	1	Ant.0	165	5825	6M	8.52	9	1.117	95.39	1.048	0.00	N/A	N/A
	WLAN 5.8GHz	802.11a	Front	1	Ant.1	165	5825	6M	9.40	10	1.148	95.39	1.048	0.06	0.048	0.058
	WLAN 5.8GHz	802.11a	Back	1	Ant.1	165	5825	6M	9.40	10	1.148	95.39	1.048	0.08	0.06	0.072
#09	**WLAN 5.8GHz**	**802.11a**	**Left side**	**1**	**Ant.1**	**165**	**5825**	**6M**	**9.40**	**10**	**1.148**	**95.39**	**1.048**	**0.02**	**0.403**	**0.485**
	WLAN 5.8GHz	802.11a	Bottom Side	1	Ant.1	165	5825	6M	9.40	10	1.148	95.39	1.048	-0.03	9.30E-06	0.000
	WLAN 5.8GHz	802.11n_HT20	Front	1	Ant.0+1	161	5805	MCS8	13.09	13.5	1.099	90.83	1.101	0.05	0.033	0.040
	WLAN 5.8GHz	802.11n_HT20	Back	1	Ant.0+1	161	5805	MCS8	13.09	13.5	1.099	90.83	1.101	-0.16	0.061	0.074
	WLAN 5.8GHz	**802.11n_HT20**	**Left side**	**1**	**Ant.0+1**	**161**	**5805**	**MCS8**	**13.09**	**13.5**	**1.099**	**90.83**	**1.101**	**-0.04**	**0.399**	**0.483**
	WLAN 5.8GHz	802.11n_HT20	Right side	1	Ant.0+1	161	5805	MCS8	13.09	13.5	1.099	90.83	1.101	0.08	0.057	0.069
	WLAN 5.8GHz	802.11n_HT20	Bottom Side	1	Ant.0+1	161	5805	MCS8	13.09	13.5	1.099	90.83	1.101	-0.02	0.00515	0.006

<NII SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Antenna	Ch.	Freq. (MHz)	Data Rate (bps)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 5.2GHz	**802.11a**	**Front**	**1**	**Ant.0**	**36**	**5180**	**6M**	**9.43**	**10**	**1.140**	**95.39**	**1.048**	**0.06**	**0.028**	**0.033**
	WLAN 5.2GHz	802.11a	Back	1	Ant.0	36	5180	6M	9.43	10	1.140	95.39	1.048	0.05	0.019	0.023
	WLAN 5.2GHz	**802.11a**	**Front**	**1**	**Ant.1**	**36**	**5180**	**6M**	**9.44**	**10**	1.138	**95.38**	**1.048**	**0.03**	**0.027**	**0.032**
	WLAN 5.2GHz	802.11a	Back	1	Ant.1	36	5180	6M	9.44	10	1.138	95.38	1.048	-0.05	0.0074	0.009
#10	**WLAN 5.2GHz**	**802.11n_HT20**	**Front**	**1**	**Ant.0+1**	**36**	**5180**	**MCS8**	**12.49**	**13**	**1.125**	**90.71**	**1.102**	**0.05**	**0.034**	**0.042**
	WLAN 5.2GHz	802.11n_HT20	Back	1	Ant.0+1	36	5180	MCS8	12.49	13	1.125	90.71	1.102	0.12	0.00909	0.011

14.2 Repeated SAR Measurement

No.	Band	BW (MHz)	RB Size	RB offset	Modulation	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	WCDMA Band II	-	-	-	RMC 12.2K	Top side	1	9400	1880	22.58	23.5	1.236	0.03	1.1	1	1.360
2nd	WCDMA Band II	-	-	-	RMC 12.2K	Top side	1	9400	1880	22.58	23.5	1.236	-0.13	1.05	1.05	1.298
1st	LTE Band 7	20M	1	99	QPSK	Back	1	21100	2535	22.12	23	1.225	-0.08	0.994	1	1.217
2nd	LTE Band 7	20M	1	99	QPSK	Back	1	21100	2535	22.12	23	1.225	-0.08	0.965	1.03	1.182

General Note:

1. Per KDB 865664 D01v01r03, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg
2. Per KDB 865664 D01v01r03, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR <1.45W/kg, only one repeated measurement is required.
3. The ratio is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

15. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	LTE UFI MODEM	Note
		Body	
1.	GPRS/EDGE(Data) + WLAN2.4GHz(data)	Yes	2.4GHz Hotspot
2.	WCDMA(Data) + WLAN2.4GHz(data)	Yes	2.4GHz Hotspot
3.	LTE(Data) + WLAN2.4GHz(data)	Yes	2.4GHz Hotspot
4.	GPRS/EDGE(data) + WLAN5GHz(data)	Yes	WiFi Direct
5.	WCDMA(data) + WLAN5GHz(data)	Yes	WiFi Direct
6.	LTE(data) + WLAN5GHz(data)	Yes	WiFi Direct

General Note:

1. This device 2.4GHz WLAN supports hotspot operation, 5.8GHz WLAN supports WiFi Direct (GC/GO) and 5.2GHz supports WiFi Direct (GC only).
2. EUT will choose either WCDMA or LTE according to the network signal condition; therefore, they will not transmit simultaneously.
3. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
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 = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 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 Accessory Exposure Conditions

<PCB + DTS>

WWAN Band		Exposure Position	WWAN SAR (W/kg)	WLAN(Chain 0) DTS Band	WLAN(Chain 0) DTS SAR (W/kg)	Summed SAR (W/kg)
GSM	GSM850	Front	0.554	WLAN2.4GHz	0.045	0.60
		Back	0.551	WLAN2.4GHz	0.030	0.58
		Left side	0.334			0.33
		Right side	0.335	WLAN5.8GHz	0.075	0.41
		Top side	0.057			0.06
		Bottom side		WLAN2.4GHz	0.015	0.02
	GSM1900	Front	1.059	WLAN2.4GHz	0.045	1.10
		Back	1.044	WLAN2.4GHz	0.030	1.07
		Left side	0.148			0.15
		Right side	0.358	WLAN5.8GHz	0.075	0.43
		Top side	1.345			1.35
		Bottom side		WLAN2.4GHz	0.015	0.02
WCMDA	Band V	Front	0.542	WLAN2.4GHz	0.045	0.59
		Back	0.530	WLAN2.4GHz	0.030	0.56
		Left side	0.359			0.36
		Right side	0.334	WLAN5.8GHz	0.075	0.41
		Top side	0.050			0.05
		Bottom side		WLAN2.4GHz	0.015	0.02
	Band II	Front	0.954	WLAN2.4GHz	0.045	1.00
		Back	0.777	WLAN2.4GHz	0.030	0.81
		Left side	0.181			0.18
		Right side	0.385	WLAN5.8GHz	0.075	0.46
		Top side	1.360			1.36
		Bottom side		WLAN2.4GHz	0.015	0.02
LTE	Band 7	Front	0.681	WLAN2.4GHz	0.045	0.73
		Back	1.217	WLAN2.4GHz	0.030	1.25
		Left side	0.535			0.54
		Right side	0.320	WLAN5.8GHz	0.075	0.40
		Top side	0.689			0.69
		Bottom side		WLAN2.4GHz	0.015	0.02

<table>
<tr><th colspan="2" rowspan="2">WWAN Band</th><th rowspan="2">Exposure Position</th><th>WWAN</th><th colspan="2">WLAN(Chain 1) DTS</th><th rowspan="2">Summed SAR (W/kg)</th></tr>
<tr><th>SAR (W/kg)</th><th>Band</th><th>SAR (W/kg)</th></tr>
<tr><td rowspan="12">GSM</td><td rowspan="6">GSM850</td><td>Front</td><td>0.554</td><td>WLAN2.4GHz</td><td>0.103</td><td>0.66</td></tr>
<tr><td>Back</td><td>0.551</td><td>WLAN2.4GHz</td><td>0.071</td><td>0.62</td></tr>
<tr><td>Left side</td><td>0.334</td><td>WLAN5.8GHz</td><td>0.485</td><td>0.82</td></tr>
<tr><td>Right side</td><td>0.335</td><td></td><td></td><td>0.34</td></tr>
<tr><td>Top side</td><td>0.057</td><td></td><td></td><td>0.06</td></tr>
<tr><td>Bottom side</td><td></td><td>WLAN2.4GHz</td><td>0.050</td><td>0.05</td></tr>
<tr><td rowspan="6">GSM1900</td><td>Front</td><td>1.059</td><td>WLAN2.4GHz</td><td>0.103</td><td>1.16</td></tr>
<tr><td>Back</td><td>1.044</td><td>WLAN2.4GHz</td><td>0.071</td><td>1.12</td></tr>
<tr><td>Left side</td><td>0.148</td><td>WLAN5.8GHz</td><td>0.485</td><td>0.63</td></tr>
<tr><td>Right side</td><td>0.358</td><td></td><td></td><td>0.36</td></tr>
<tr><td>Top side</td><td>1.345</td><td></td><td></td><td>1.35</td></tr>
<tr><td>Bottom side</td><td></td><td>WLAN2.4GHz</td><td>0.050</td><td>0.05</td></tr>
<tr><td rowspan="12">WCMDA</td><td rowspan="6">Band V</td><td>Front</td><td>0.542</td><td>WLAN2.4GHz</td><td>0.103</td><td>0.65</td></tr>
<tr><td>Back</td><td>0.530</td><td>WLAN2.4GHz</td><td>0.071</td><td>0.60</td></tr>
<tr><td>Left side</td><td>0.359</td><td>WLAN5.8GHz</td><td>0.485</td><td>0.84</td></tr>
<tr><td>Right side</td><td>0.334</td><td></td><td></td><td>0.33</td></tr>
<tr><td>Top side</td><td>0.050</td><td></td><td></td><td>0.05</td></tr>
<tr><td>Bottom side</td><td></td><td>WLAN2.4GHz</td><td>0.050</td><td>0.05</td></tr>
<tr><td rowspan="6">Band II</td><td>Front</td><td>0.954</td><td>WLAN2.4GHz</td><td>0.103</td><td>1.06</td></tr>
<tr><td>Back</td><td>0.777</td><td>WLAN2.4GHz</td><td>0.071</td><td>0.85</td></tr>
<tr><td>Left side</td><td>0.181</td><td>WLAN5.8GHz</td><td>0.485</td><td>0.67</td></tr>
<tr><td>Right side</td><td>0.385</td><td></td><td></td><td>0.39</td></tr>
<tr><td>Top side</td><td>1.360</td><td></td><td></td><td>1.36</td></tr>
<tr><td>Bottom side</td><td></td><td>WLAN2.4GHz</td><td>0.050</td><td>0.05</td></tr>
<tr><td rowspan="6">LTE</td><td rowspan="6">Band 7</td><td>Front</td><td>0.681</td><td>WLAN2.4GHz</td><td>0.103</td><td>0.78</td></tr>
<tr><td>Back</td><td>1.217</td><td>WLAN2.4GHz</td><td>0.071</td><td>1.29</td></tr>
<tr><td>Left side</td><td>0.535</td><td>WLAN5.8GHz</td><td>0.485</td><td>1.02</td></tr>
<tr><td>Right side</td><td>0.320</td><td></td><td></td><td>0.32</td></tr>
<tr><td>Top side</td><td>0.689</td><td></td><td></td><td>0.69</td></tr>
<tr><td>Bottom side</td><td></td><td>WLAN2.4GHz</td><td>0.050</td><td>0.05</td></tr>
</table>

WWAN Band		Exposure Position	WWAN SAR (W/kg)	WLAN(Chain 0+1) DTS Band	WLAN(Chain 0+1) DTS SAR (W/kg)	Summed SAR (W/kg)
GSM	GSM850	Front	0.554	WLAN5.8GHz	0.040	0.59
		Back	0.551	WLAN5.8GHz	0.074	0.63
		Left side	0.334	WLAN5.8GHz	0.483	0.82
		Right side	0.335	WLAN5.8GHz	0.069	0.40
		Top side	0.057			0.06
		Bottom side		WLAN2.4GHz	0.006	0.01
	GSM1900	Front	1.059	WLAN5.8GHz	0.040	1.10
		Back	1.044	WLAN5.8GHz	0.074	1.12
		Left side	0.148	WLAN5.8GHz	0.483	0.63
		Right side	0.358	WLAN5.8GHz	0.069	0.43
		Top side	1.345			1.35
		Bottom side		WLAN2.4GHz	0.006	0.01
WCMDA	Band V	Front	0.542	WLAN5.8GHz	0.040	0.58
		Back	0.530	WLAN5.8GHz	0.074	0.60
		Left side	0.359	WLAN5.8GHz	0.483	0.84
		Right side	0.334	WLAN5.8GHz	0.069	0.40
		Top side	0.050			0.05
		Bottom side		WLAN2.4GHz	0.006	0.01
	Band II	Front	0.954	WLAN5.8GHz	0.040	0.99
		Back	0.777	WLAN5.8GHz	0.074	0.85
		Left side	0.181	WLAN5.8GHz	0.483	0.66
		Right side	0.385	WLAN5.8GHz	0.069	0.45
		Top side	1.360			1.36
		Bottom side		WLAN2.4GHz	0.006	0.01
LTE	Band 7	Front	0.681	WLAN5.8GHz	0.040	0.72
		Back	1.217	WLAN5.8GHz	0.074	1.29
		Left side	0.535	WLAN5.8GHz	0.483	1.02
		Right side	0.320	WLAN5.8GHz	0.069	0.39
		Top side	0.689			0.69
		Bottom side		WLAN2.4GHz	0.006	0.01

<PCB + NII>

WWAN Band		Exposure Position	WWAN SAR (W/kg)	WLAN(Chain 0) NII Band	WLAN(Chain 0) NII SAR (W/kg)	Summed SAR (W/kg)
GSM	GSM850	Front	0.554	WLAN5.2GHz	0.033	0.59
		Back	0.551	WLAN5.2GHz	0.023	0.57
	GSM1900	Front	1.059	WLAN5.2GHz	0.033	1.09
		Back	1.044	WLAN5.2GHz	0.023	1.07
WCMDA	Band V	Front	0.542	WLAN5.2GHz	0.033	0.58
		Back	0.530	WLAN5.2GHz	0.023	0.55
	Band II	Front	0.954	WLAN5.2GHz	0.033	0.99
		Back	0.777	WLAN5.2GHz	0.023	0.80
LTE	Band 7	Front	0.681	WLAN5.2GHz	0.033	0.71
		Back	1.217	WLAN5.2GHz	0.023	1.24

WWAN Band		Exposure Position	WWAN SAR (W/kg)	WLAN(Chain 1) NII Band	WLAN(Chain 1) NII SAR (W/kg)	Summed SAR (W/kg)
GSM	GSM850	Front	0.554	WLAN5.2GHz	0.032	0.59
		Back	0.551	WLAN5.2GHz	0.009	0.56
	GSM1900	Front	1.059	WLAN5.2GHz	0.032	1.09
		Back	1.044	WLAN5.2GHz	0.009	1.05
WCMDA	Band V	Front	0.542	WLAN5.2GHz	0.032	0.57
		Back	0.530	WLAN5.2GHz	0.009	0.54
	Band II	Front	0.954	WLAN5.2GHz	0.032	0.99
		Back	0.777	WLAN5.2GHz	0.009	0.79
LTE	Band 7	Front	0.681	WLAN5.2GHz	0.032	0.71
		Back	1.217	WLAN5.2GHz	0.009	1.23

WWAN Band		Exposure Position	WWAN SAR (W/kg)	WLAN(Chain 0+1)NII Band	WLAN(Chain 0+1)NII SAR (W/kg)	Summed SAR (W/kg)
GSM	GSM850	Front	0.554	WLAN5.2GHz	0.042	0.60
		Back	0.551	WLAN5.2GHz	0.011	0.56
	GSM1900	Front	1.059	WLAN5.2GHz	0.042	1.10
		Back	1.044	WLAN5.2GHz	0.011	1.06
WCMDA	Band V	Front	0.542	WLAN5.2GHz	0.042	0.58
		Back	0.530	WLAN5.2GHz	0.011	0.54
	Band II	Front	0.954	WLAN5.2GHz	0.042	1.00
		Back	0.777	WLAN5.2GHz	0.011	0.79
LTE	Band 7	Front	0.681	WLAN5.2GHz	0.042	0.72
		Back	1.217	WLAN5.2GHz	0.011	1.23

Test Engineer： Fulu Hu and 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 14.1. 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 14.2. Uncertainty Budget for frequency range 300 MHz to 3 GHz

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.55	Normal	1	1	1	± 6.55 %	± 6.55 %
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	2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %
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	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Probe Positioning	9.9	Rectangular	√3	1	1	± 5.7 %	± 5.7 %
Max. SAR Eval.	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
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						± 12.8 %	± 12.6 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						**± 25.6 %**	**± 25.2 %**

Table 14.3. Uncertainty Budget for frequency range 3 GHz to 6 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 v01r02, “SAR Measurement Procedures for 802.11 a/b/g Transmitters”, May 2007

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

[7] FCC KDB 941225 D01 v02, “SAR Measurement Procedures for 3G Devices – CDMA 2000 / Ev-Do / WCDMA / HSDPA / HSPA”, October 2007

[8] FCC KDB 941225 D02 v02r02, “SAR Guidance for HSPA, HSPA+, DC-HSDPA and 1x-Advanced”, May 2013.

[9] FCC KDB 941225 D03 v01, “Recommended SAR Test Reduction Procedures for GSM / GPRS / EDGE”, December 2008

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

[11] FCC KDB 941225 D06 v01r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", May 2013.

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

[13] 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.

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2014/4/23

System Check_Body_835MHz_140423

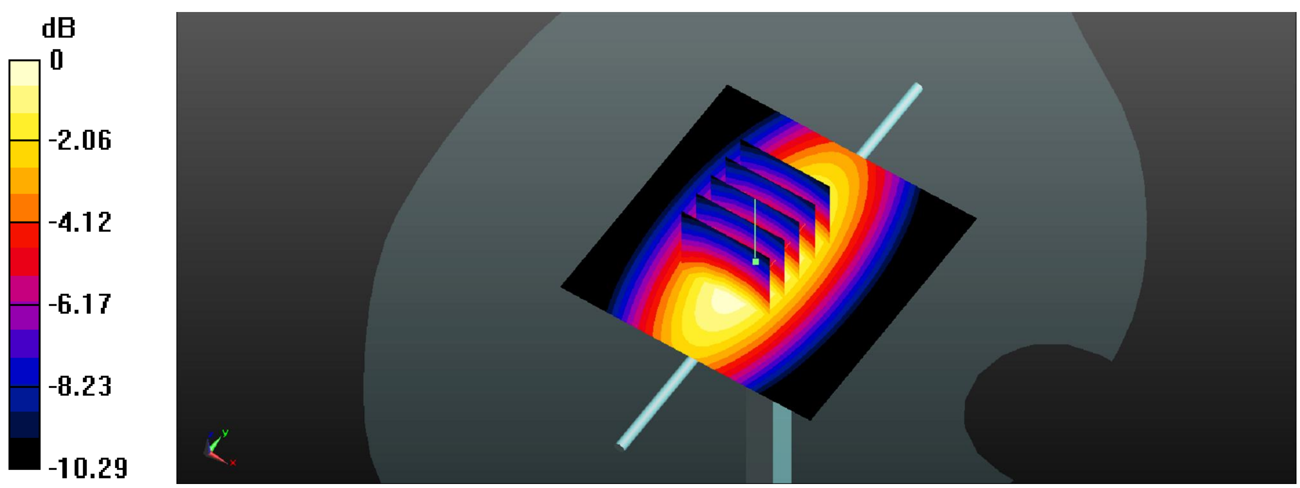
DUT: D835V2 - SN: 4d151

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_835_140423 Medium parameters used: f = 835 MHz; $\sigma = 0.967$ S/m; $\varepsilon_r = 55.405$; $\rho = 1000$ kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3898; ConvF(9.63, 9.63, 9.63); Calibrated: 2014/3/10;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1353; Calibrated: 2014/1/30
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.41 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.908 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.28 W/kg
SAR(1 g) = 2.24 W/kg; SAR(10 g) = 1.48 W/kg
Maximum value of SAR (measured) = 2.40 W/kg



0 dB = 2.40 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014/4/22

System Check_Body_1900MHz_140422

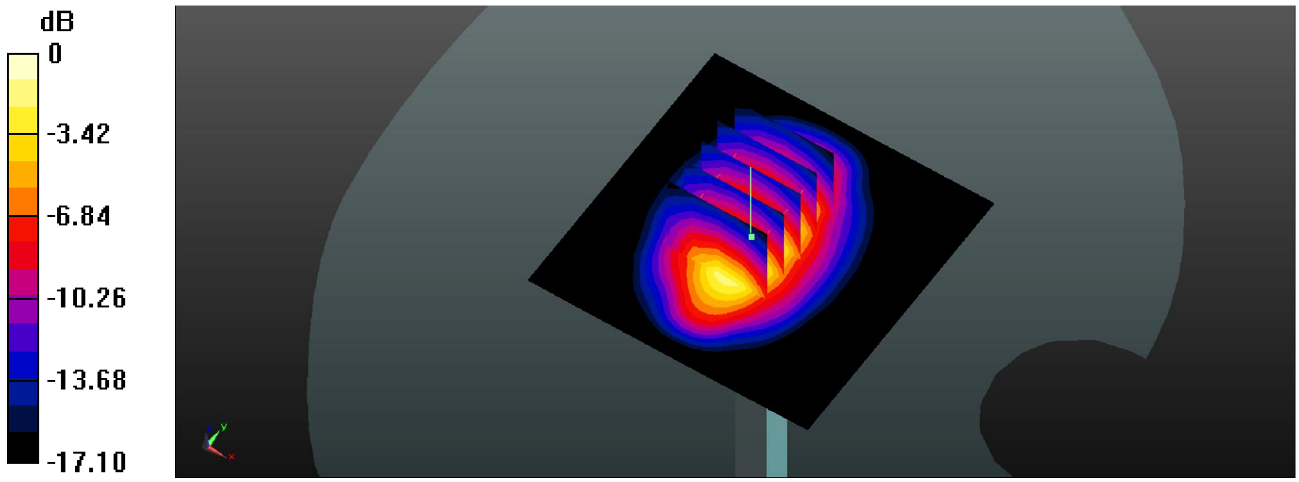
DUT: D1900V2 - SN: 5d170

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_140422 Medium parameters used: f = 1900 MHz; σ = 1.519 S/m; ε_r = 53.569; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3898; ConvF(7.83, 7.83, 7.83); Calibrated: 2014/3/10;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1353; Calibrated: 2014/1/30
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 13.1 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.978 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 16.4 W/kg
SAR(1 g) = 9.69 W/kg; SAR(10 g) = 5.07 W/kg
Maximum value of SAR (measured) = 13.1 W/kg



0 dB = 13.1 W/kg

System Check_Body_2450MHz_140505

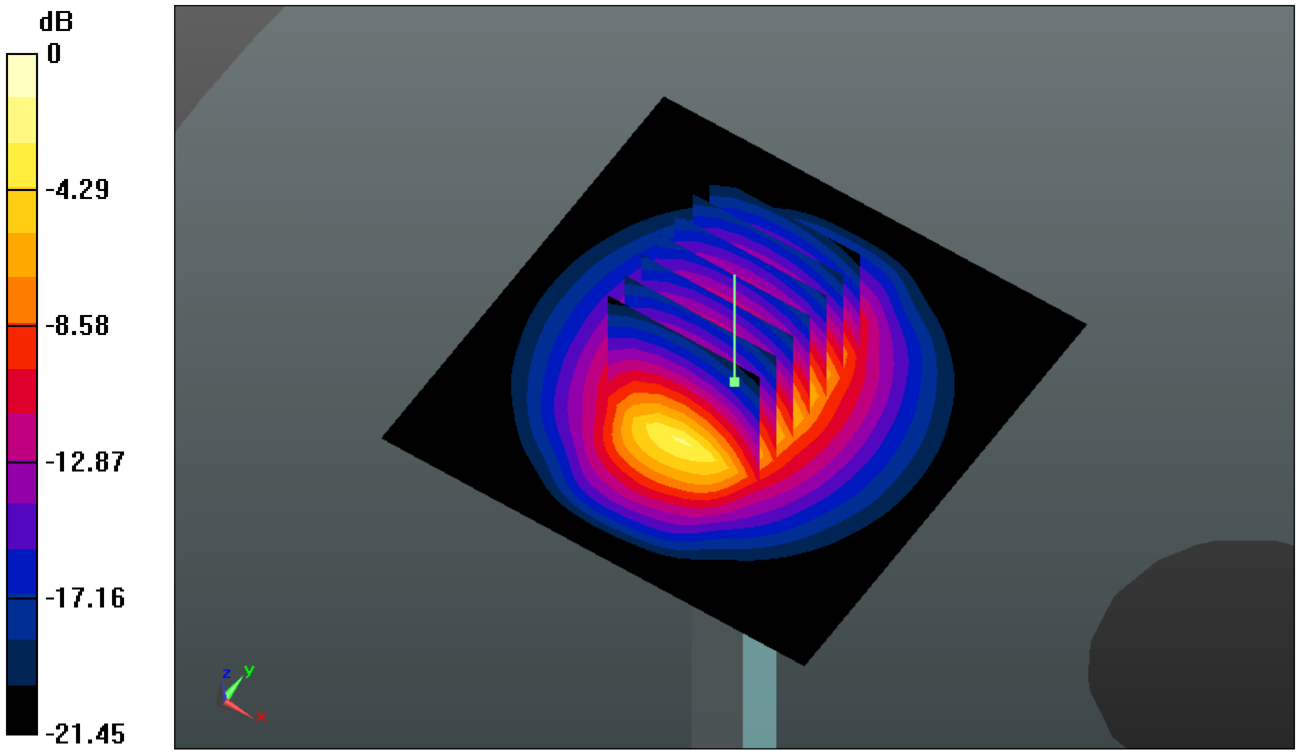
DUT: D2450V2 - SN: 736

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450_140505 Medium parameters used: f = 2450 MHz; σ = 1.943 mho/m; ε_r = 50.957; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7, 7, 7); Calibrated: 2013.06.20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2013.06.19
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.4.5 (3634)

Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 19.636 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 86.464 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 25.876 W/kg
SAR(1 g) = 12.5 mW/g; SAR(10 g) = 5.8 mW/g
Maximum value of SAR (measured) = 19.222 mW/g



0 dB = 19.220mW/g

System Check_Body_2600MHz_140418

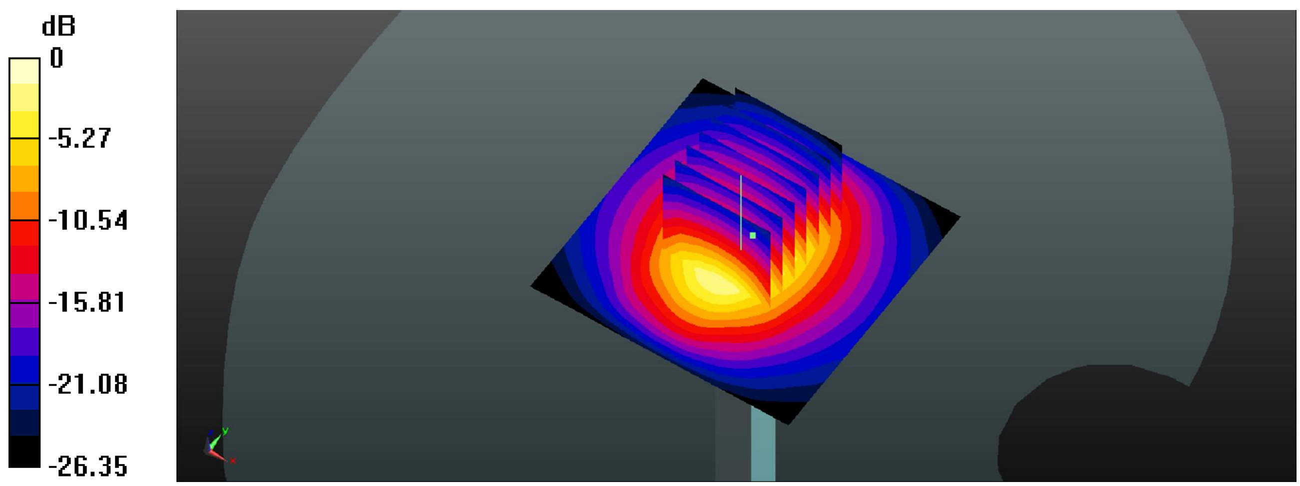
DUT: D2600V2 - SN: 1061

Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: MSL_2600_140418 Medium parameters used: f = 2600 MHz; $\sigma = 2.201$ S/m; $\varepsilon_r = 52.823$; $\rho = 1000$ kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3898; ConvF(7.06, 7.06, 7.06); Calibrated: 2014/3/10;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1353; Calibrated: 2014/1/30
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 25.1 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.4 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 34.1 W/kg
SAR(1 g) = 14.7 W/kg; SAR(10 g) = 6.48 W/kg
Maximum value of SAR (measured) = 23.2 W/kg



0 dB = 23.2 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.05.15

System Check_Body_5200MHz_140515

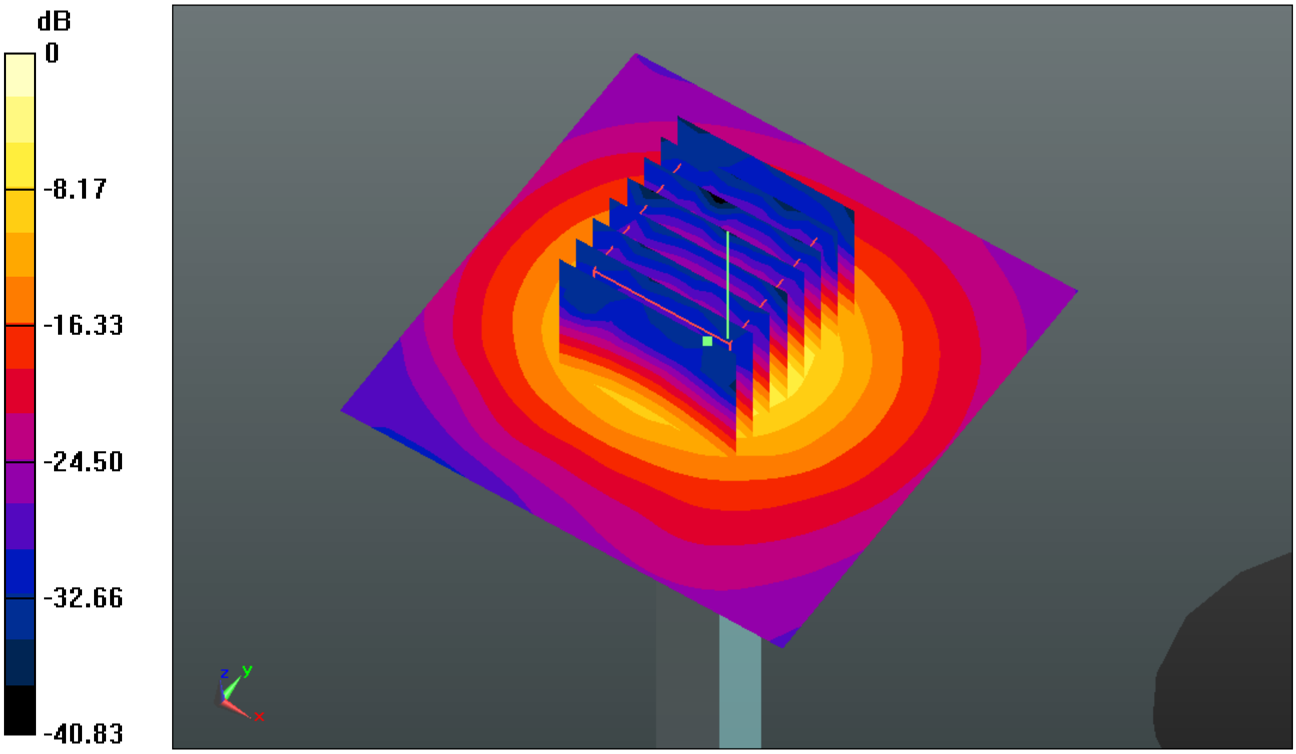
DUT: D5GHzV2-SN:1006

Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: MSL_5000_140515 Medium parameters used: f = 5200 MHz; σ = 5.287 mho/m; ε_r = 48.755; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3736; ConvF(4.27, 4.27, 4.27); Calibrated: 2014.04.24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 2014.04.23
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.4.5 (3634)

Pin=100mW/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.517 mW/g

Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 40.056 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 28.707 W/kg
SAR(1 g) = 7.08 mW/g; SAR(10 g) = 1.99 mW/g
Maximum value of SAR (measured) = 16.812 mW/g



0 dB = 16.810mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.05.15

System Check_Body_5800MHz_140515

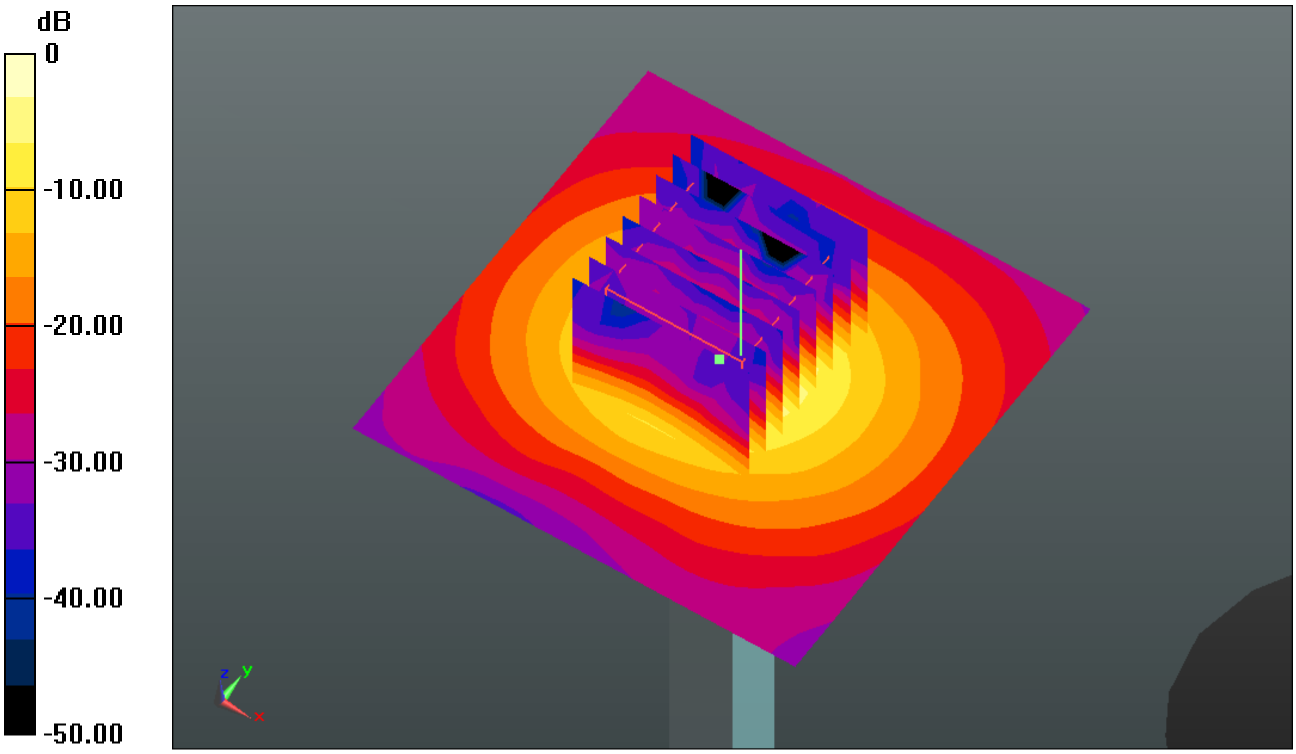
DUT: D5GHzV2-SN:1006

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: MSL_5000_140515 Medium parameters used: f = 5800 MHz; σ = 6.12 mho/m; ε_r = 47.381; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3736; ConvF(3.9, 3.9, 3.9); Calibrated: 2014.04.24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 2014.04.23
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.4.5 (3634)

Pin=100mW/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 17.433 mW/g

Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 36.609 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 31.068 W/kg
SAR(1 g) = 7 mW/g; SAR(10 g) = 1.95 mW/g
Maximum value of SAR (measured) = 17.353 mW/g



0 dB = 17.350mW/g

Appendix B. Plots of SAR Measurement

The plots are shown as follows.

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014/4/23

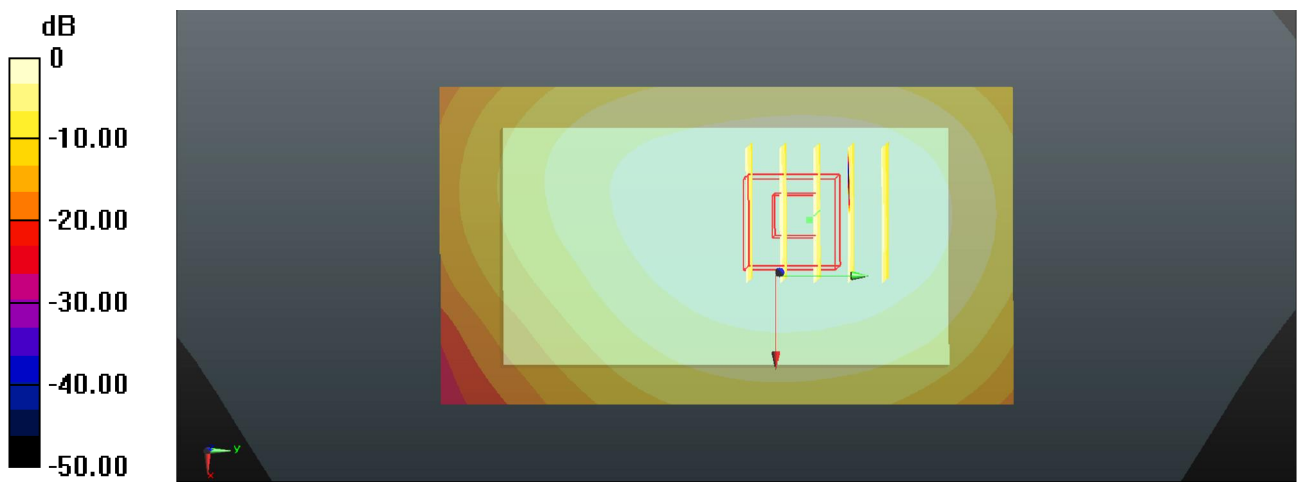
#01 GSM850_GPRS (GMSK 2 Tx slots)_Front_1.0cm_Ch128

Communication System: GPRS (GMSK 2 Tx slot); Frequency: 824.2 MHz;Duty Cycle: 1:4.15
Medium: MSL_835_140423 Medium parameters used: f = 824.2 MHz; σ = 0.956 S/m; ε_r = 55.497; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3898; ConvF(9.63, 9.63, 9.63); Calibrated: 2014/3/10;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1353; Calibrated: 2014/1/30
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Ch128/Area Scan (51x91x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.496 W/kg

Ch128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.777 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.735 W/kg
SAR(1 g) = 0.426 W/kg; SAR(10 g) = 0.308 W/kg
Maximum value of SAR (measured) = 0.493 W/kg



0 dB = 0.493 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab　　　　　Date: 2014/4/22

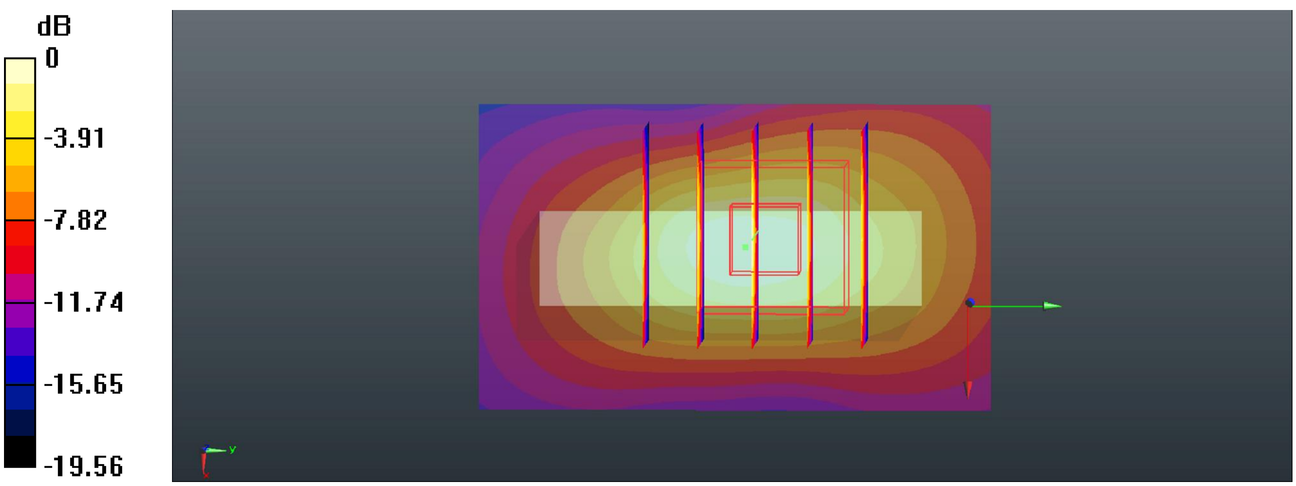
#02 GSM1900_GPRS (GMSK 2 Tx slots)_Top side_1.0cm_Ch512

Communication System: GPRS (GMSK 2 Tx slot); Frequency: 1850.2 MHz;Duty Cycle: 1:4.15
Medium: MSL_1900_140422 Medium parameters used: f = 1850.2 MHz; σ = 1.459 S/m; ε_r = 53.59; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3898; ConvF(7.83, 7.83, 7.83); Calibrated: 2014/3/10;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1353; Calibrated: 2014/1/30
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Ch512/Area Scan (31x51x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.40 W/kg

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.550 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.70 W/kg
SAR(1 g) = 1.020 W/kg; SAR(10 g) = 0.520 W/kg
Maximum value of SAR (measured) = 1.42 W/kg



0 dB = 1.42 W/kg

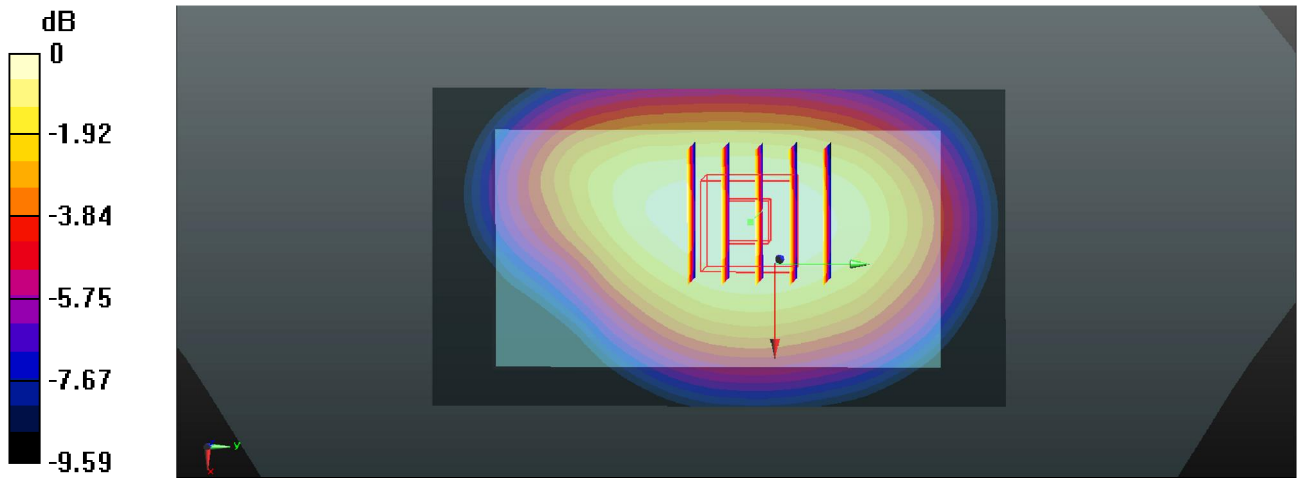
#03 WCDMA Band V_RMC 12.2K_Front_1.0cm_Ch4233

Communication System: WCDMA ; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: MSL_835_140423 Medium parameters used: f = 846.6 MHz; σ = 0.979 S/m; ε_r = 55.296; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3898; ConvF(9.63, 9.63, 9.63); Calibrated: 2014/3/10;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1353; Calibrated: 2014/1/30
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

C4233/Area Scan (51x91x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.518 W/kg

C4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.292 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.574 W/kg
SAR(1 g) = 0.447 W/kg; SAR(10 g) = 0.330 W/kg
Maximum value of SAR (measured) = 0.520 W/kg



0 dB = 0.520 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014/4/22

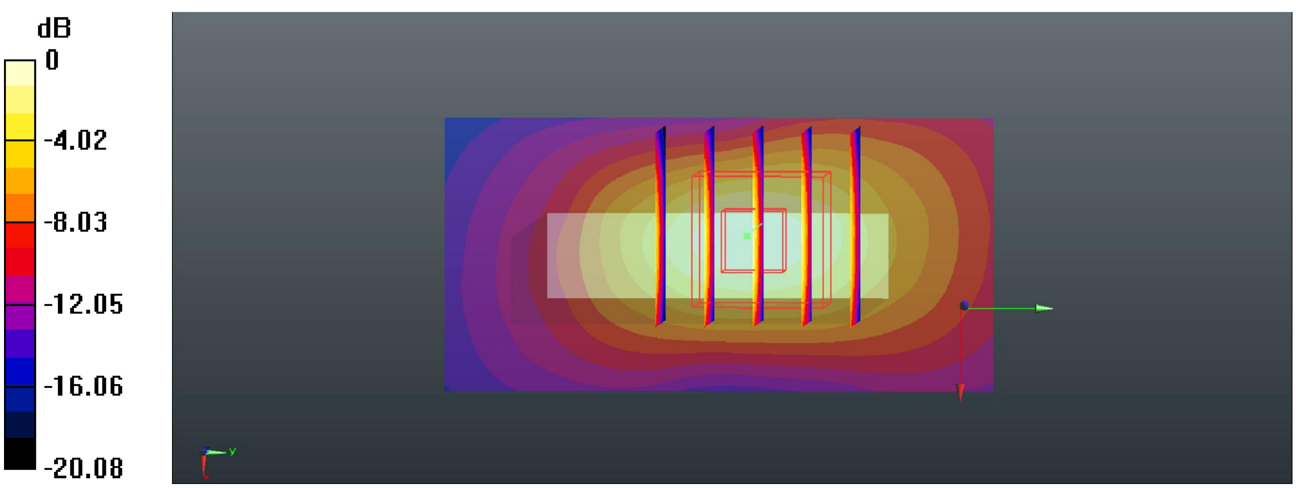
#04 WCDMA Band II_RMC 12.2K_Top side_1.0cm_Ch9400

Communication System: WCDMA ; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_140422 Medium parameters used: f = 1880 MHz; σ = 1.498 S/m; ε_r = 53.575; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3898; ConvF(7.83, 7.83, 7.83); Calibrated: 2014/3/10;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1353; Calibrated: 2014/1/30
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Ch9400/Area Scan (31x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.49 W/kg

Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.307 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.86 W/kg
SAR(1 g) = 1.100 W/kg; SAR(10 g) = 0.552 W/kg
Maximum value of SAR (measured) = 1.48 W/kg



0 dB = 1.48 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2014/4/18

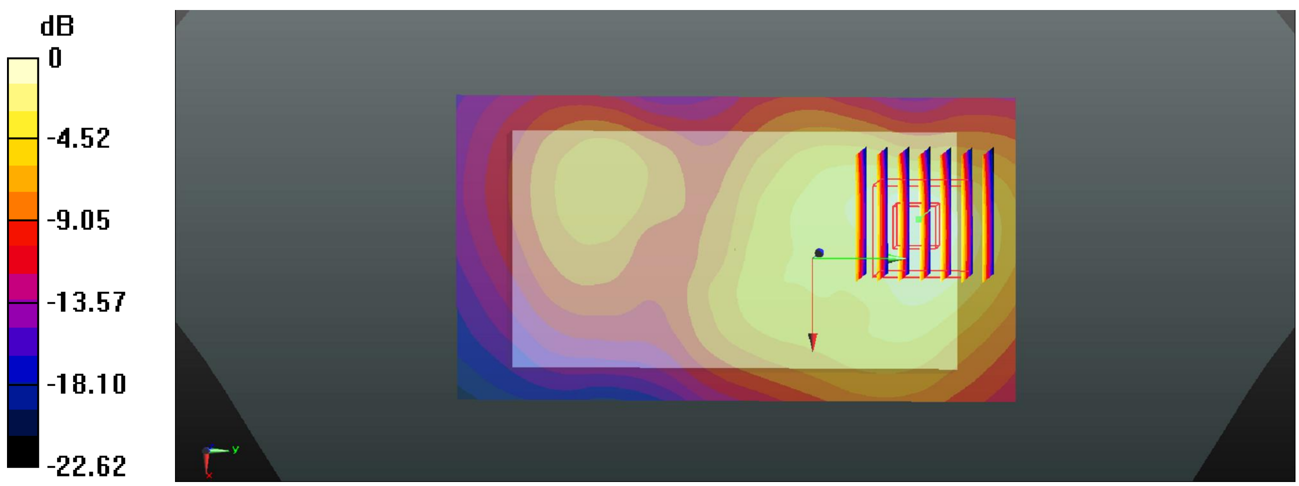
#05 LTE Band 7_QPSK_20M(1,99)_Back_1.0cm_Ch21100

Communication System: LTE; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium: MSL_2600_140418 Medium parameters used: f = 2535 MHz; σ = 2.126 S/m; ε_r = 52.894; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3898; ConvF(7.06, 7.06, 7.06); Calibrated: 2014/3/10;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1353; Calibrated: 2014/1/30
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Ch21100/Area Scan (61x111x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.48 W/kg

Ch21100/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.831 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.89 W/kg
SAR(1 g) = 0.994 W/kg; SAR(10 g) = 0.494 W/kg
Maximum value of SAR (measured) = 1.44 W/kg



0 dB = 1.44 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014/4/18

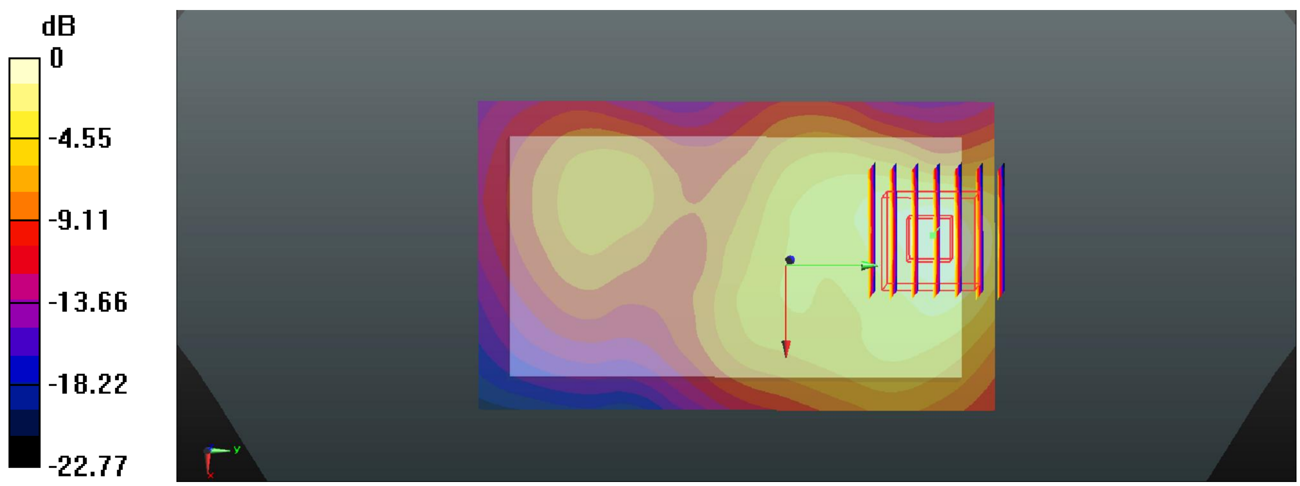
#06 LTE Band 7_QPSK_20M(50,49)_Back_1.0cm_Ch21100

Communication System: LTE; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium: MSL_2600_140418 Medium parameters used: f = 2535 MHz; σ = 2.126 S/m; ε_r = 52.894; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3898; ConvF(7.06, 7.06, 7.06); Calibrated: 2014/3/10;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1353; Calibrated: 2014/1/30
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Ch21100/Area Scan (61x101x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.01 W/kg

Ch21100/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.145 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.746 W/kg; SAR(10 g) = 0.367 W/kg
Maximum value of SAR (measured) = 1.08 W/kg



0 dB = 1.08 W/kg

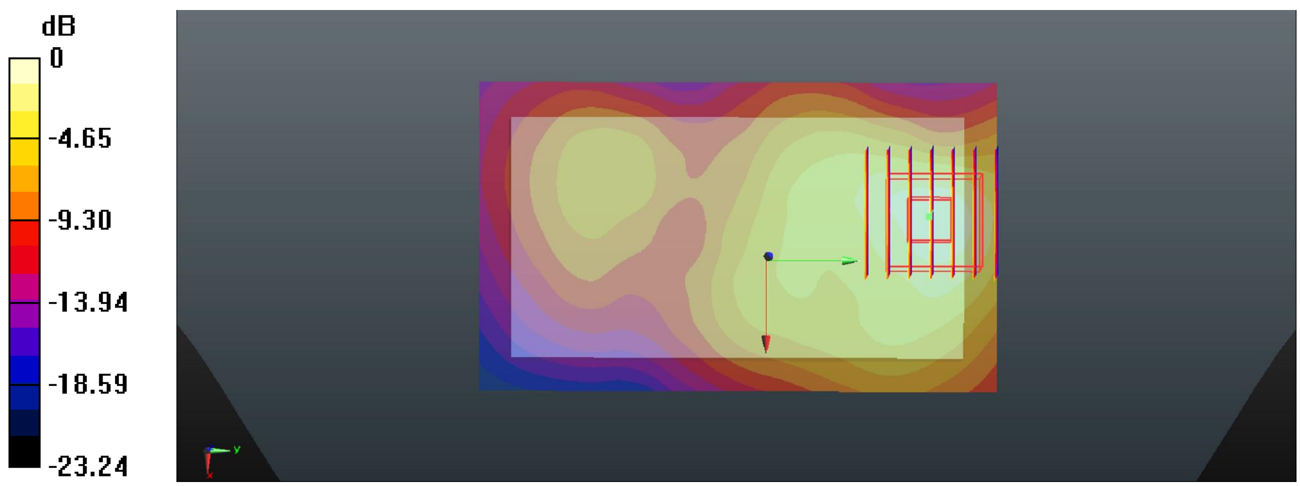
#07 LTE Band 7_QPSK_20M(100,0)_Back_1.0cm_Ch21100

Communication System: LTE; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium: MSL_2600_140418 Medium parameters used: f = 2535 MHz; σ = 2.126 S/m; ε_r = 52.894; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3898; ConvF(7.06, 7.06, 7.06); Calibrated: 2014/3/10;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1353; Calibrated: 2014/1/30
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Ch21100/Area Scan (61x101x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.00 W/kg

Ch21100/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.316 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.742 W/kg; SAR(10 g) = 0.365 W/kg
Maximum value of SAR (measured) = 1.09 W/kg



0 dB = 1.09 W/kg

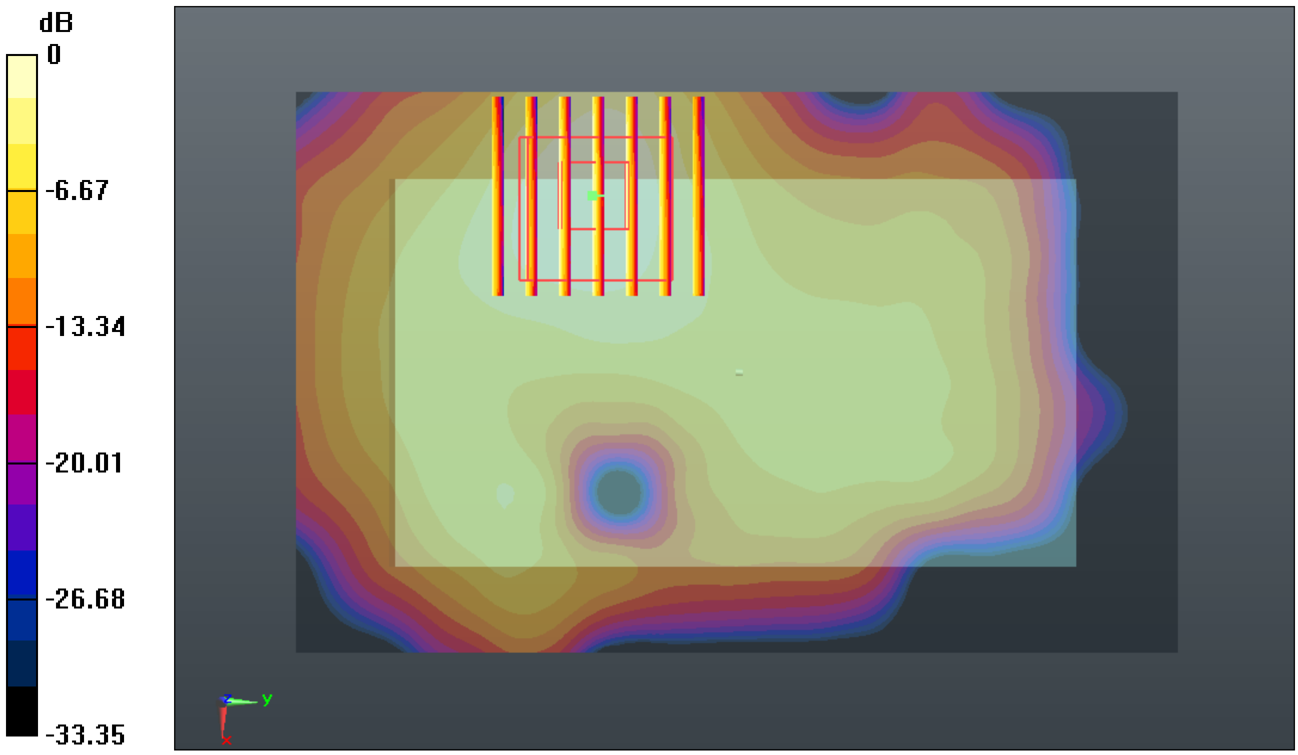
#08_WLAN 2.4GHz_802.11b_1M_Front 1cm_Ch6_Ant.1

Communication System: WIFI (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: MSL_2450_140505 Medium parameters used: f = 2437 MHz; σ = 1.924 mho/m; ε_r = 51.014; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7, 7, 7); Calibrated: 2013.06.20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2013.06.19
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.4.5 (3634)

Ch6/Area Scan (71x111x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.141 mW/g

Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.989 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.196 W/kg
SAR(1 g) = 0.094 mW/g; SAR(10 g) = 0.046 mW/g
Maximum value of SAR (measured) = 0.143 mW/g



0 dB = 0.140mW/g

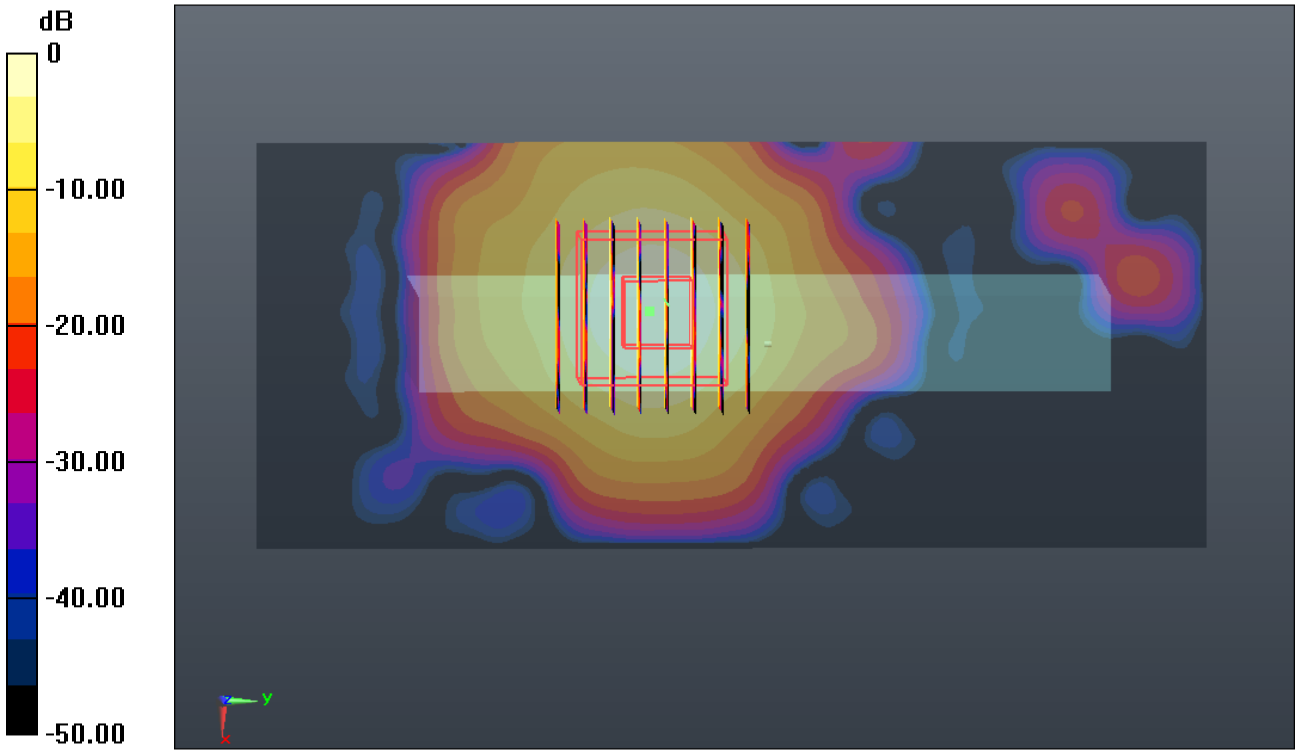
#09_WLAN 5.8GHz_802.11a_6M_Left Side 1cm_Ch165_Ant.1

Communication System: WIFI (0); Frequency: 5825 MHz;Duty Cycle: 1:1.048
Medium: MSL_5000_140515 Medium parameters used: f = 5825 MHz; σ = 6.16 mho/m; ε_r = 47.269; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3736; ConvF(3.9, 3.9, 3.9); Calibrated: 2014.04.24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 2014.04.23
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.4.5 (3634)

Ch165/Area Scan (61x141x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.991 mW/g

Ch165/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 2.618 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.625 W/kg
SAR(1 g) = 0.403 mW/g; SAR(10 g) = 0.121 mW/g
Maximum value of SAR (measured) = 0.950 mW/g



0 dB = 0.950mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2014.05.15

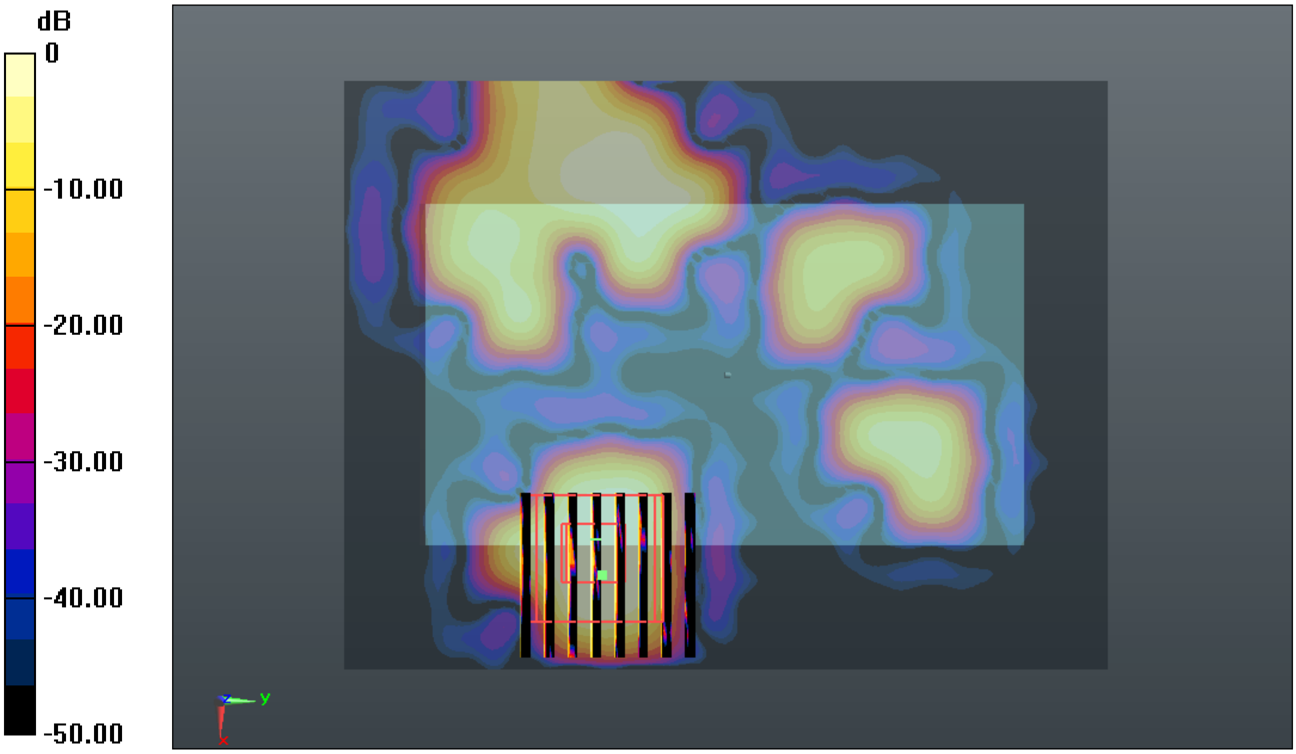
#10_WLAN 5.2GHz_802.11a_6M_Front 1cm_Ch36_Ant.0+1

Communication System: WIFI (0); Frequency: 5180 MHz;Duty Cycle: 1:1.102
Medium: MSL_5000_140515 Medium parameters used: f = 5180 MHz; σ = 5.257 mho/m; ε_r = 48.801; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3736; ConvF(4.27, 4.27, 4.27); Calibrated: 2014.04.24
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 2014.04.23
- Phantom: SAM1; Type: SAM; Serial: TP-1479
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.4.5 (3634)

Ch36/Area Scan (101x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.299 mW/g

Ch36/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.360 W/kg
SAR(1 g) = 0.034 mW/g; SAR(10 g) = 0.011 mW/g
Maximum value of SAR (measured) = 0.107 mW/g



0 dB = 0.110mW/g