SAR TEST REPORT

No. I21Z62345-SEM03

For

TCL Communication Ltd.

GSM/UMTS/LTE Mobile phone

Model name: 4188R,4188C

With

Hardware Version: 03

Software Version: LV3V

FCC ID: 2ACCJH159

Issued Date: 2021-12-27

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

CTTL, Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Issue Date	Description
I21Z62345-SEM03	Rev.0	2021-12-27	Initial creation of test report
I21Z62345-SEM03	Rev.1	2022-1-6	Added a description of equipment dimensions on page 66. Updated tune up power of GPRS/EGPRS 850(GMSK) 3TX slots, GPRS/EGPRS 1900(GMSK) 2/3 slots and WCDMA Band II, HSUPA 3 ARFCN of DSI2.

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1 Test Laboratory

1.1 Testing Location

Company Name:	CTTL(Shouxiang)
Address:	No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China100191

1.2 Testing Environment

Temperature:	18°C~25°C,
Relative humidity:	30%~ 70%
Ground system resistance:	< 0.5 Ω
Ambient noise & Reflection:	< 0.012 W/kg

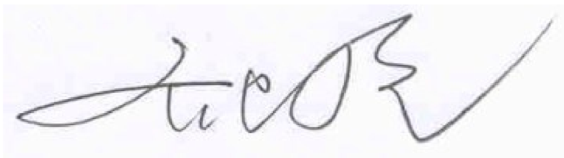
1.3 Project Data

Project Leader:	Qi Dianyuan
Test Engineer:	Lin Xiaojun
Testing Start Date:	December 10, 2021
Testing End Date:	December 20, 2021

1.4 Signature

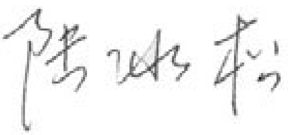
Lin Xiaojun

(Prepared this test report)



Qi Dianyuan

(Reviewed this test report)



Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

2 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for TCL Communication Ltd. GSM/UMTS/LTE Mobile phone 4188R,4188C are as follows:

Table 2.1: Highest Reported SAR (1g)

Mode		Highest Reported SAR (1g)			
		1g SAR Head	1g SAR Hotspot 10mm	1g SAR Body-worn 15mm	10g Product Specific 10-g SAR 0mm
GSM	GSM 850	0.31	0.37	/	/
	PCS 1900	0.16	0.39	0.18	/
WCDMA	UMTS FDD 2	0.33	0.52	0.31	/
	UMTS FDD 4	0.26	1.35	0.24	1.36
	UMTS FDD 5	0.12	0.50	/	/
LTE	LTE Band 2	0.33	0.51	0.52	/
	LTE Band 5	0.36	0.70	/	/
	LTE Band 12	0.34	0.60	/	/
	LTE Band 14	0.31	0.51	/	/
	LTE Band 30	0.23	0.30	0.19	/
	LTE Band 66	0.24	0.53	0.45	/
WLAN 2.4 GHz（Wifi only)		0.51	0.19	/	/
WLAN 2.4 GHz（Wifi+cellular）		0.25	0.11	0.04	0.53

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/kg as averaged over any 1g tissue according to the ANSI C95.1-1992.

For body operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and which provides a minimum separation distance of 10 mm for hotspot and 15mm for body worn between this device and the body of the user. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output.

The measurement together with the test system set-up is described in annex C of this test report. A detailed description of the equipment under test can be found in chapter 4 of this test report. The highest reported SAR value is obtained at the case of **(Table 2.1),** and the values are**: 1.35 W/kg(1g).**

Table 2.2: The sum of reported SAR values for Main antenna and WiFi+BT

	Position	Main antenna	WiFi-2.4G	BT	Sum	Limited
Highest reported SAR value for Head	Right hand, Cheek (LTE Band5)	0.35	0.25	<0.01	**0.60**	**1.6**
Maximum reported SAR value for Body	Rear 10mm (WCDMA1700)	1.00	0.11	<0.01	**1.11**	
	Bottom 10mm (WCDMA1700)	1.35	/	/	**1.35**	
10-g extremity SAR (Separation Distance 0mm)	Bottom Edge (WCDMA1700)	1.36	/	/	**1.36**	**4.0**
	Rear (WCDMA1700)	1.35	0.53	<0.01	**1.88**	

Note：WiFi&BT antenna is located at the top of the device, the distance from the bottom is greater than 25mm, so the test is exempt.

Note1: we have evaluated and chose the highest value of body 10mm and 15mm in the above table.

According to the above tables, the highest sum of reported SAR values is **1.35 W/kg (1g)**. The detail for simultaneous transmission consideration is described in chapter 13.

According to the KDB648474 D04, the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB Publication 865664 D01 to address interactive hand use exposure conditions. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg

3 Client Information

3.1 Applicant Information

Company Name:	TCL Communication Ltd.
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Contact Person:	Gong Zhizhou
E-mail:	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
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3.2 Manufacturer Information

Company Name:	TCL Communication Ltd.
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Contact Person:	Gong Zhizhou
E-mail:	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax:	/

4 Equipment Under Test (EUT) and Ancillary Equipment (AE)

4.1 About EUT

Description:	GSM/UMTS/LTE Mobile phone
Model name:	4188R,4188C
Operating mode(s):	GSM900/850/1800/1900, WCDMA850/1700/1900, BT, Wi-Fi 2.4G, LTE Band2/4/5/12/14/30/66
Tested Tx Frequency:	824 – 849 MHz (GSM 850)
	1850 – 1910 MHz (GSM 1900)
	824–849 MHz (WCDMA 850 Band V)
	1710 – 1755 MHz (WCDMA 1700 Band IV)
	1850–1910 MHz (WCDMA1900 Band II)
	1850 – 1910 MHz(LTE Band 2)
	824 – 849 MHz (LTE Band 5)
	699 – 716 MHz (LTE Band 12)
	779.5 –784.5 MHz (LTE Band 14)
	2307.5 – 2310 MHz (LTE Band 30)
	1710 – 1780 MHz (LTE Band 66)
	2412 – 2462 MHz (Wi-Fi 2.4G)
GPRS/EGPRS Multislot Class:	12
GPRS capability Class:	B
Test device Production information:	Production unit
Device type:	Portable device
Antenna type:	Integrated antenna
Hotspot mode:	Support

4.2Internal Identification of EUT used during the test

EUT ID*	IMEI	HW	SW Version
EUT1	016113000203482	03	LV3V
EUT2	016113000203136	03	LV3V
EUT3	016113000203599	03	LV3V
EUT4	016113000203417	03	LV3V
EUT5	016113000203144	03	LV3V

*EUT ID: is used to identify the test sample in the lab internally.

Note: It is performed to test SAR with the EUT1-3 and conducted power with the EUT4-5.

4.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Battery	TLi028C7	/	VEKEN
AE2	Battery	TLi028C1	/	BYD
AE2	Headset	/	/	DALIN

*AE ID: is used to identify the test sample in the lab internally.

5 TEST METHODOLOGY

5.1 Applicable Limit Regulations

ANSI C95.1–1992:IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

5.2 Applicable Measurement Standards

IEEE 1528–2013: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

KDB447498 D01: General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

KDB648474 D04 Handset SAR v01r03: SAR Evaluation Considerations for Wireless Handsets.

KDB941225 D01 SAR test for 3G devices v03r01: SAR Measurement Procedures for 3G Devices

KDB941225 D05 SAR for LTE Devices v02r05: SAR Evaluation Considerations for LTE Devices

KDB941225 D06 Hotspot Mode SAR v02r01: SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

KDB248227 D01 802.11 Wi-Fi SAR v02r02: SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS

KDB865664 D01SAR measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz.

KDB865664 D02RF Exposure Reporting v01r02: RF Exposure Compliance Reporting and Documentation Considerations

6 Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

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

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = c(\frac{\delta T}{\delta t})$$

Where: C is the specific head capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

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

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7 Tissue Simulating Liquids

7.1 Targets for tissue simulating liquid

Table 7.1: Targets for tissue simulating liquid

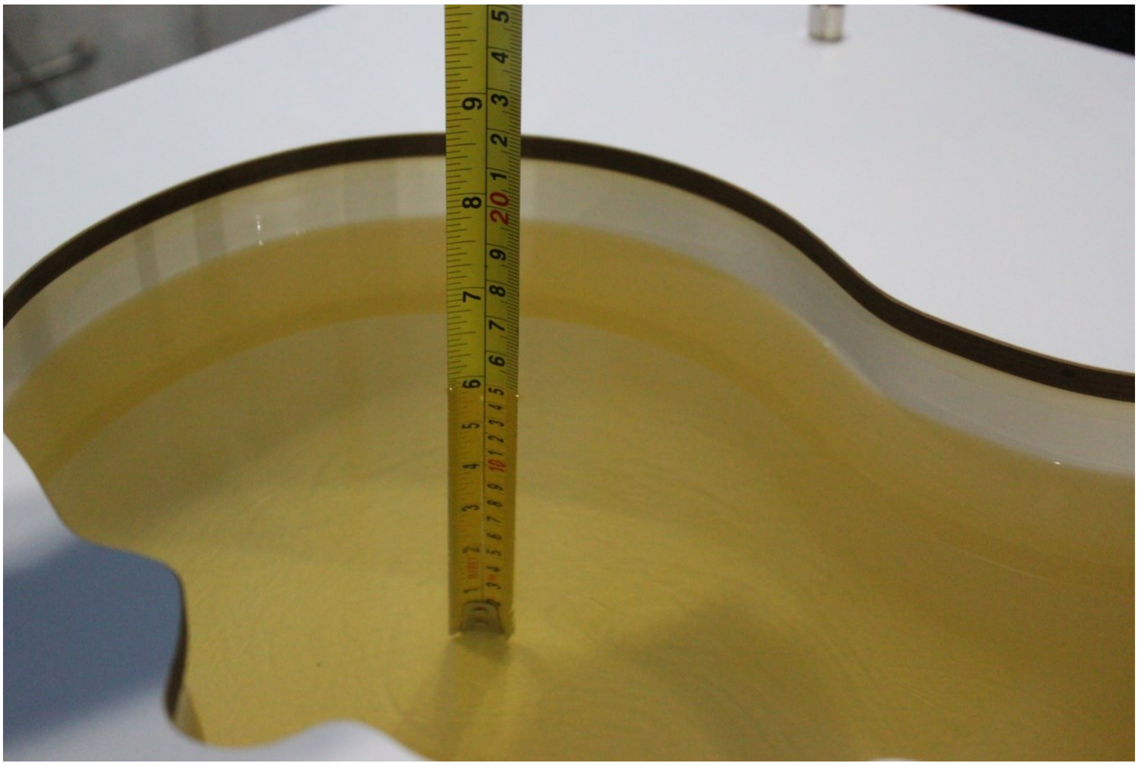
Frequency(MHz)	Liquid Type	Conductivity(σ)	±10% Range	Permittivity(ε)	± 10% Range
750	Head	0.89	0.80～0.98	41.94	37.75～46.13
835	Head	0.90	0.81～0.99	41.5	37.35～45.65
1750	Head	1.40	1.26～1.54	40.0	36～44
1900	Head	1.40	1.26～1.54	40.0	36～44
2300	Head	1.67	1.59～1.75	39.47	37.5～41.4
2450	Head	1.80	1.62～1.98	39.2	35.28～43.12

7.2 Dielectric Performance

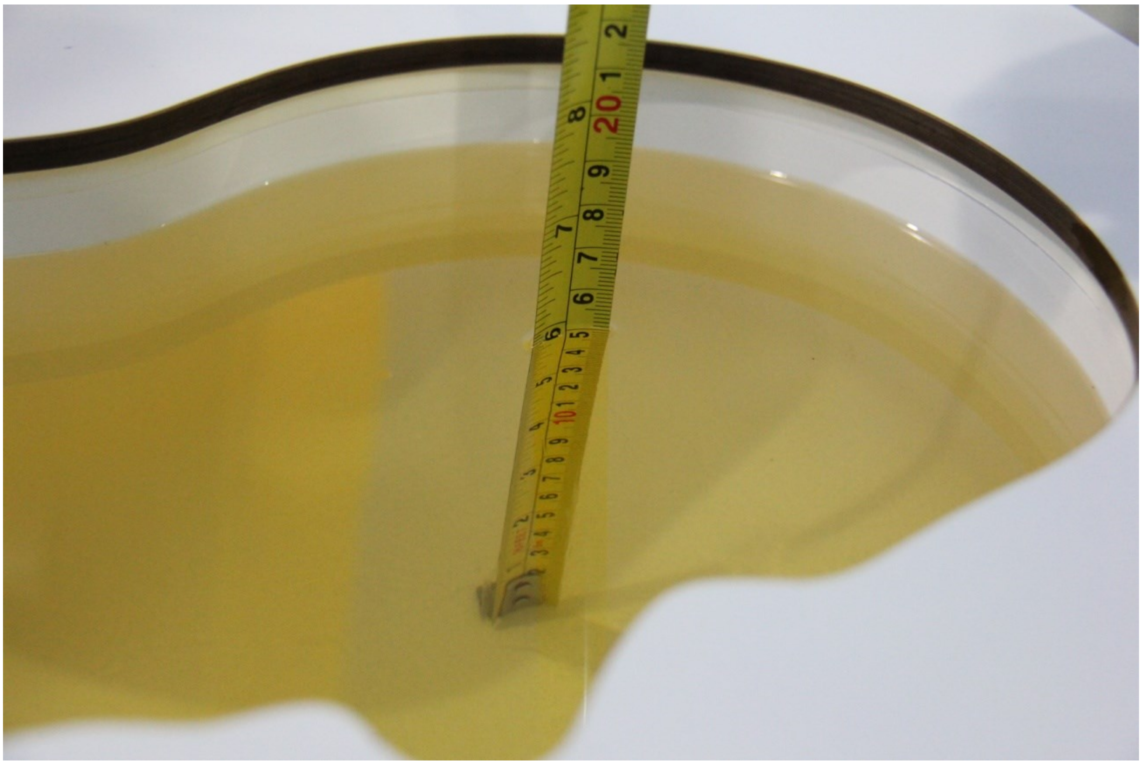
Table 7.3: Dielectric Performance of Tissue Simulating Liquid

Measurement Date (yyyy-mm-dd)	Type	Frequency	Permittivity ε	Drift (%)	Conductivity σ (S/m)	Drift (%)
2021/12/10	Head	750 MHz	42.07	0.31	0.897	0.79
2021/12/11	Head	750 MHz	41.89	-0.12	0.874	-1.80
2021/12/12	Head	835 MHz	40.84	-1.59	0.903	0.33
2021/12/13	Head	835 MHz	40.8	-1.69	0.889	-1.22
2021/12/14	Head	1750 MHz	40.1	0.05	1.38	0.73
2021/12/15	Head	1750 MHz	39.45	-1.57	1.37	0.00
2021/12/16	Head	1900 MHz	39.44	-1.40	1.397	-0.21
2021/12/17	Head	1900 MHz	39.61	-0.98	1.387	-0.93
2021/12/18	Head	2300 MHz	40.23	1.85	1.679	0.54
2021/12/19	Head	2450 MHz	39.19	-0.03	1.836	2.00
2021/12/20	Head	2450 MHz	38.58	-1.58	1.8	0.00

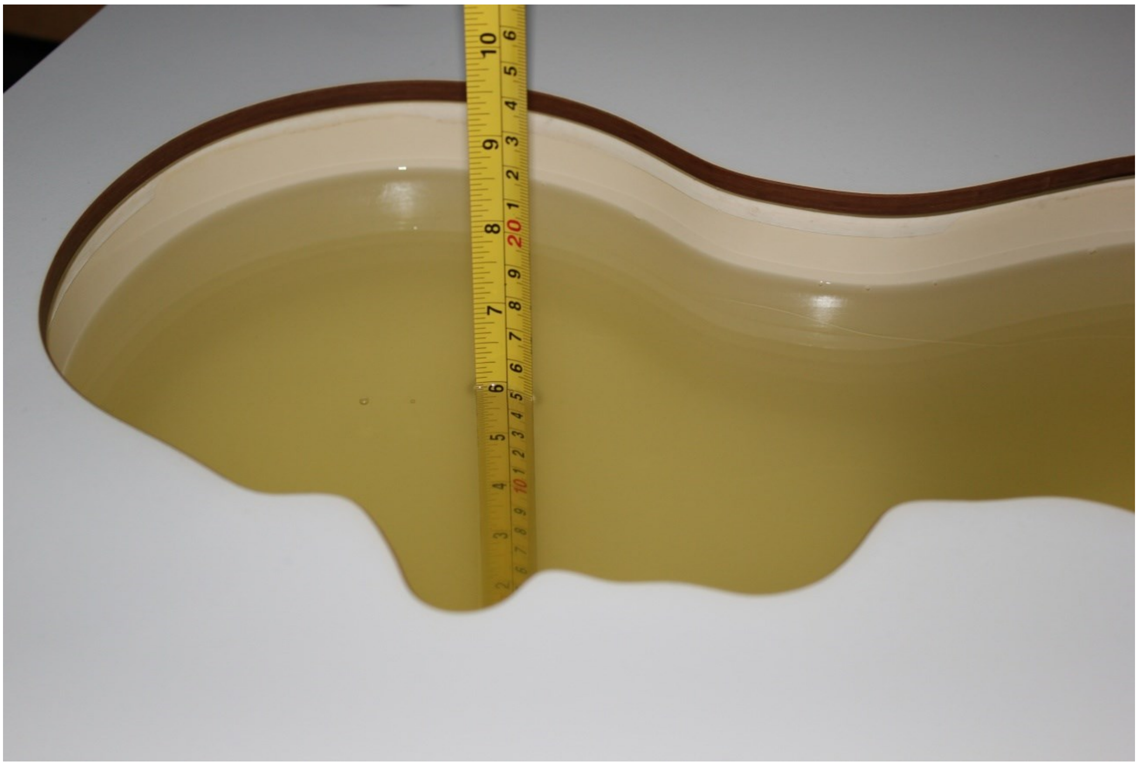
Note: The liquid temperature is 22.0℃



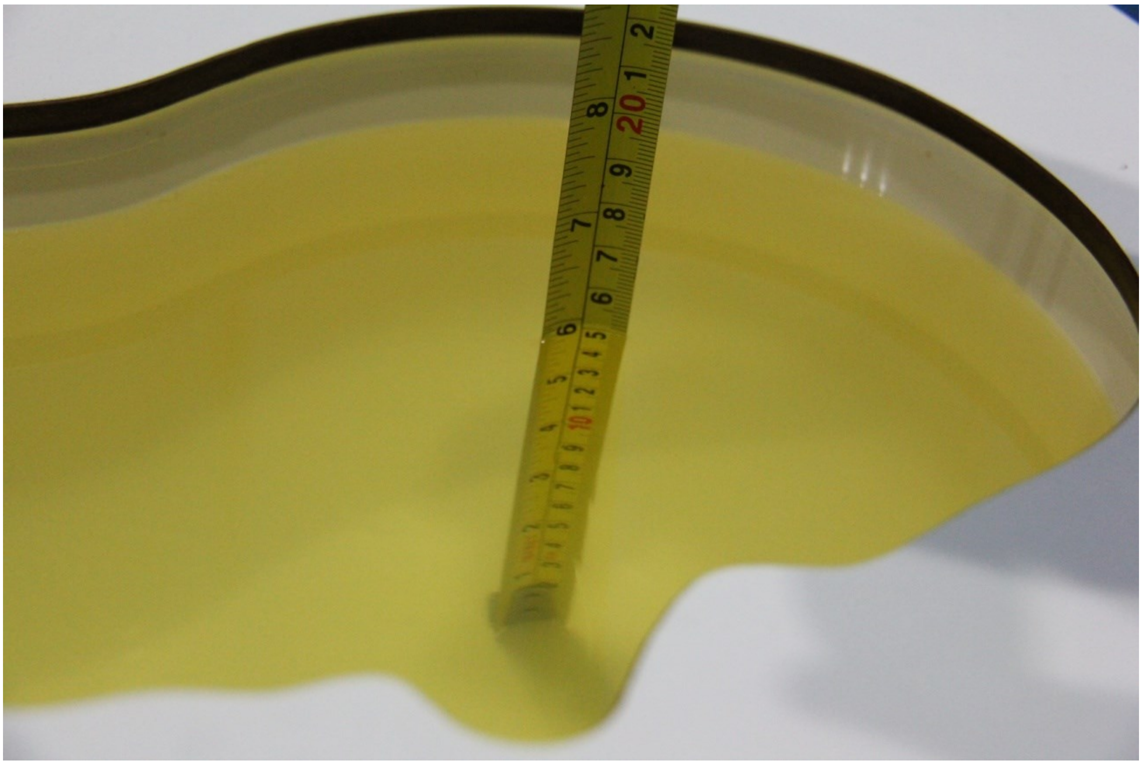
Picture 7-1 Liquid depth in the Head Phantom (750MHz)



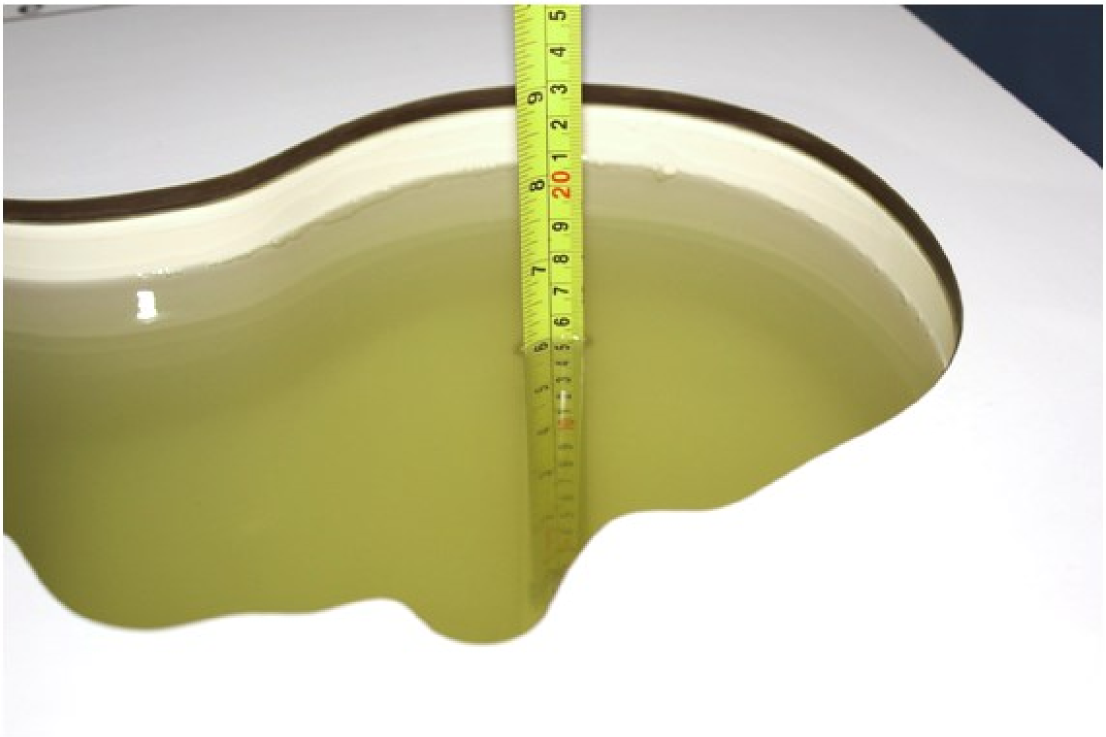
Picture 7-2 Liquid depth in the Head Phantom (835 MHz)



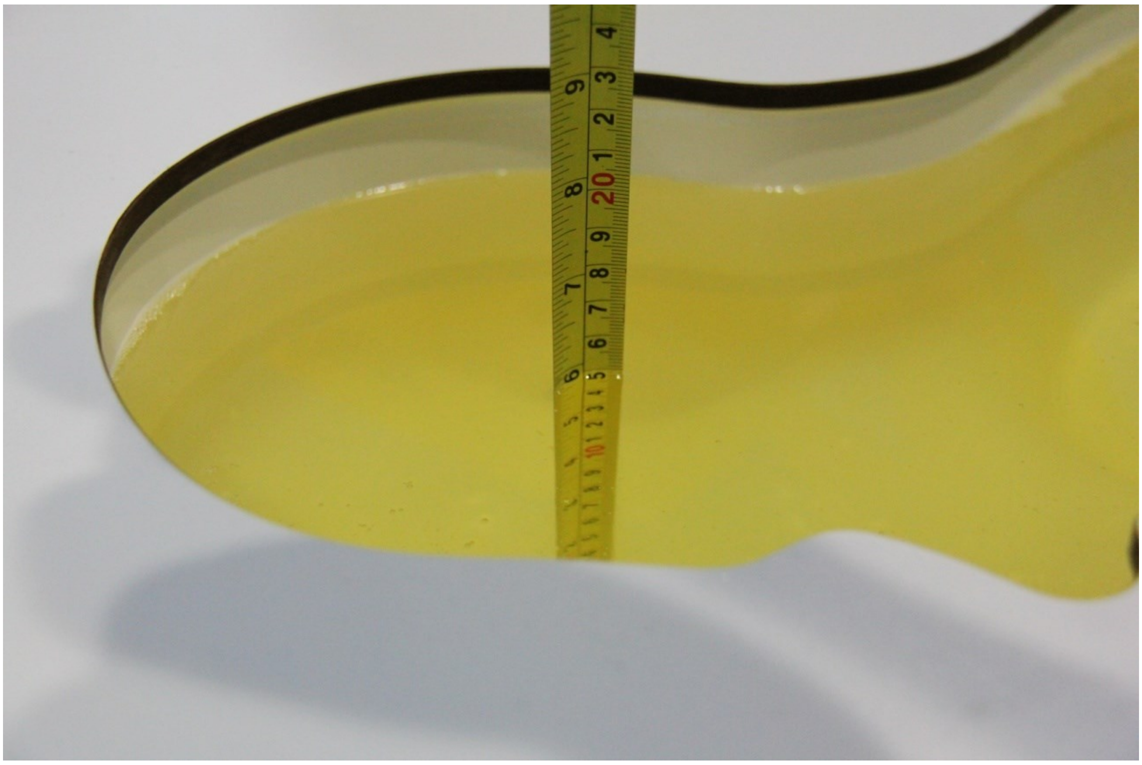
Picture 7-3 Liquid depth in the Head Phantom (1750 MHz)



Picture 7-4 Liquid depth in the Head Phantom (1900 MHz)



Picture 7-5 Liquid depth in the Head Phantom (2300 MHz Head)

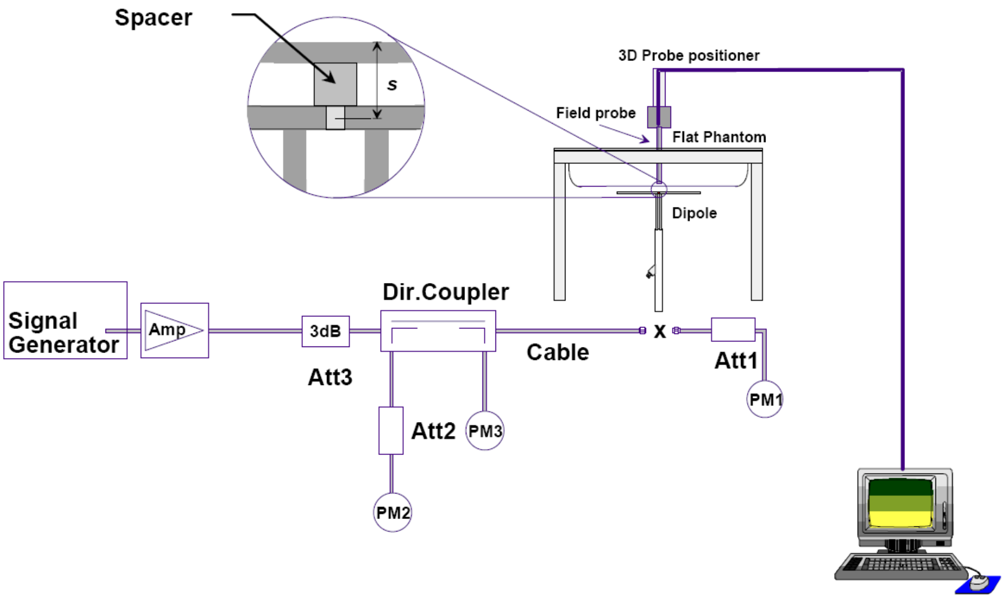


Picture 7-6 Liquid depth in the Head Phantom (2450MHz)

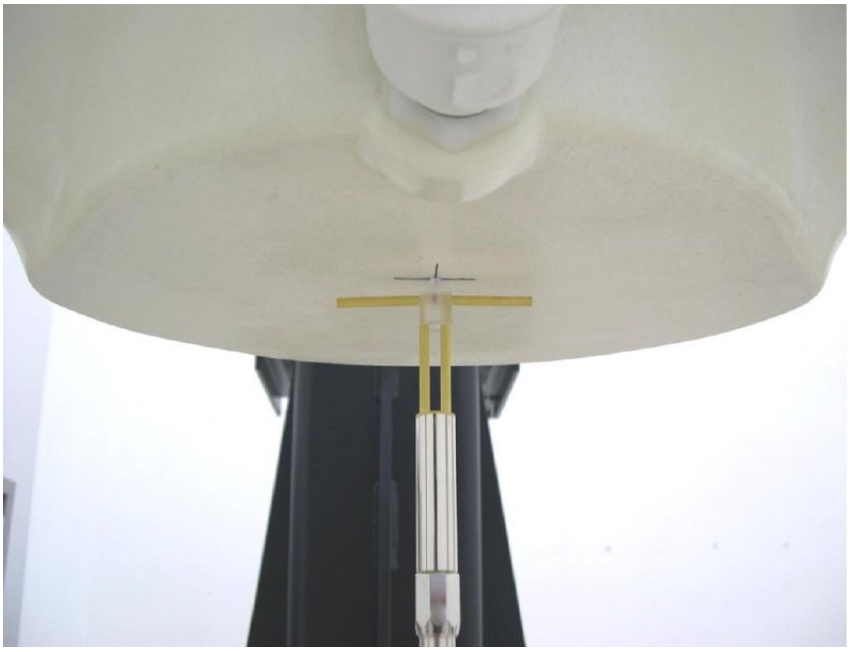
8 System verification

8.1 System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



Picture 8.1 System Setup for System Evaluation



Picture 8.2 Photo of Dipole Setup

8.2 System Verification

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device.

The system verification results are required that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR. The details are presented in annex B.

Table 8.1: System Verification of Head

Measurement Date (yyyy-mm-dd)	Frequency	Target value (W/kg)		Measured value(W/kg)		Deviation	
		10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
2021/12/10	750 MHz	5.65	8.68	5.6	8.44	-0.88%	-2.76%
2021/12/11	750 MHz	5.65	8.68	5.48	8.52	-3.01%	-1.84%
2021/12/12	835 MHz	6.24	9.63	6.24	9.48	0.00%	-1.56%
2021/12/13	835 MHz	6.24	9.63	6.36	9.64	1.92%	0.10%
2021/12/14	1750 MHz	19.4	36.9	18.92	36	-2.47%	-2.44%
2021/12/15	1750 MHz	19.4	36.9	19.2	35.76	-1.03%	-3.09%
2021/12/16	1900 MHz	20.9	40.1	20.96	39.76	0.29%	-0.85%
2021/12/17	1900 MHz	20.9	40.1	20.68	39.12	-1.05%	-2.44%
2021/12/18	2300 MHz	24.3	50.1	23.84	49.8	-1.89%	-0.60%
2021/12/19	2450 MHz	24.9	53.3	24.88	52.48	-0.08%	-1.54%
2021/12/20	2450 MHz	24.9	53.3	24.84	51.16	-0.24%	-4.02%

9 Measurement Procedures

9.1 Tests to be performed

In order to determine the highest value of the peak spatial-average SAR of a handset, all device positions, configurations and operational modes shall be tested for each frequency band according to steps 1 to 3 below. A flowchart of the test process is shown in picture 9.1.

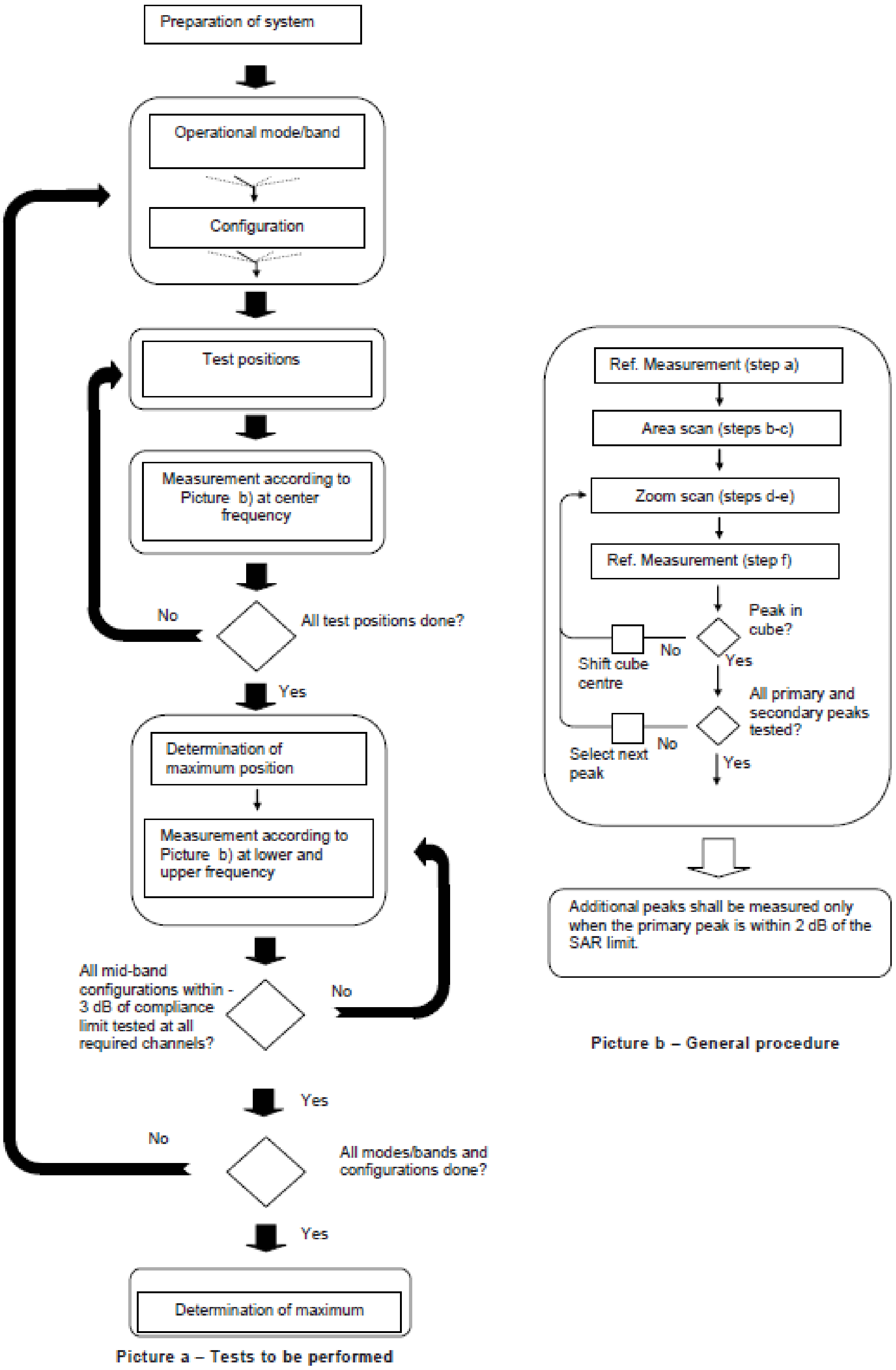
Step 1: The tests described in 9.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom, as described in annex D),
b) all configurations for each device position in a), e.g., antenna extended and retracted, and
c) all operational modes, e.g., analogue and digital, for each device position in a) and configuration in b) in each frequency band.

If more than three frequencies need to be tested according to 11.1 (i.e., N_c > 3), then all frequencies, configurations and modes shall be tested for all of the above test conditions.

Step 2: For the condition providing highest peak spatial-average SAR determined in Step 1,perform all tests described in 9.2 at all other test frequencies, i.e., lowest and highest frequencies. In addition, for all other conditions (device position, configuration and operational mode) where the peak spatial-average SAR value determined in Step 1 is within3 dB of the applicable SAR limit, it is recommended that all other test frequencies shall be tested as well.

Step 3: Examine all data to determine the highest value of the peak spatial-average SAR found in Steps 1 to 2.



Picture 9.1Block diagram of the tests to be performed

9.2 General Measurement Procedure

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements and fully documented in SAR reports to qualify for TCB approval. Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2013. The results should be documented as part of the system validation records and may be requested to support test results when all the measurement parameters in the following table are not satisfied.

<table>
<tr><td colspan="3"></td><td>$\leq$ 3 GHz</td><td>$>$ 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>$\leq$ 2 GHz: $\leq$ 15 mm
2 – 3 GHz: $\leq$ 12 mm</td><td>3 – 4 GHz: $\leq$ 12 mm
4 – 6 GHz: $\leq$ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>$\leq$ 2 GHz: $\leq$ 8 mm
2 – 3 GHz: $\leq$ 5 mm*</td><td>3 – 4 GHz: $\leq$ 5 mm*
4 – 6 GHz: $\leq$ 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>$\leq$ 5 mm</td><td>3 – 4 GHz: $\leq$ 4 mm
4 – 5 GHz: $\leq$ 3 mm
5 – 6 GHz: $\leq$ 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>$\leq$ 4 mm</td><td>3 – 4 GHz: $\leq$ 3 mm
4 – 5 GHz: $\leq$ 2.5 mm
5 – 6 GHz: $\leq$ 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>$\geq$ 30 mm</td><td>3 – 4 GHz: $\geq$ 28 mm
4 – 5 GHz: $\geq$ 25 mm
5 – 6 GHz: $\geq$ 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 $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 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>

9.3 WCDMA Measurement Procedures for SAR

The following procedures are applicable to WCDMA handsets operating under 3GPP Release99, Release 5 and Release 6. The default test configuration is to measure SAR with an established radio link between the DUT and a communication test set using a 12.2kbps RMC (reference measurement channel) configured in Test Loop Mode 1. SAR is selectively confirmed for other physical channel configurations (DPCCH & $DPDCH_n$), HSDPA and HSPA (HSUPA/HSDPA) modes according to output power, exposure conditions and device operating capabilities. Both uplink and downlink should be configured with the same RMC or AMR, when required. SAR for Release 5 HSDPA and Release 6 HSPA are measured using the applicable FRC (fixed reference channel) and E-DCH reference channel configurations. Maximum output power is verified according to applicable versions of 3GPP TS 34.121 and SAR must be measured according to these maximum output conditions. When Maximum Power Reduction (MPR) is not implemented according to Cubic Metric (CM) requirements for Release 6 HSPA, the following procedures do not apply.

For Release 5 HSDPA Data Devices:

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}	CM/dB
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15	15/15	64	12/15	24/25	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

For Release 6 HSPA Data Devices

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM (dB)	MPR (dB)	AG Index	E-TFCI
1	11/15	15/15	64	11/15	22/15	209/225	1039/225	4	1	1.5	1.5	20	75
2	6/15	15/15	64	6/15	12/15	12/15	12/15	4	1	1.5	1.5	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	1.5	1.5	15	92
4	2/15	15/15	64	2/15	4/15	4/15	56/75	4	1	1.5	1.5	17	71
5	15/15	15/15	64	15/15	24/15	30/15	134/15	4	1	1.5	1.5	21	81

Rel.8 DC-HSDPA (Cat 24)

SAR test exclusion for Rel.8 DC-HSDPA must satisfy the SAR test exclusion requirements of Rel.5 HSDPA. SAR test exclusion for DC-HSDPA devices is determined by power measurements according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to qualify for SAR test exclusion.

9.4 SAR Measurement for LTE

SAR tests for LTE are performed with a base station simulator, Rohde & Rchwarz CMW500. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. All powers were measured with the CMW 500.
It is performed for conducted power and SAR based on the KDB941225 D05.
SAR is evaluated separately according to the following procedures for the different test positions in each exposure condition – head, body, body-worn accessories and other use conditions. The procedures in the following subsections are applied separately to test each LTE frequency band.

1) QPSK with 1 RB allocation
   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 among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.
2) QPSK with 50% RB allocation
   The procedures required for 1 RB allocation in 1) are applied to measure the SAR for QPSK with 50% RB allocation.
3) QPSK with 100% RB allocation
   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 in 1) and 2) 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.

TDD test:

TDD testing is performed using guidance from FCC KDB 941225 D05 v02r05 and the SAR test guidance provided in April 2013 TCB works hop notes. TDD is tested at the highest duty factor using UL-DL configuration 0 with special subframe configuration 6 and applying the FDD LTE procedures in KDB 941225 D05 v02r05. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211.

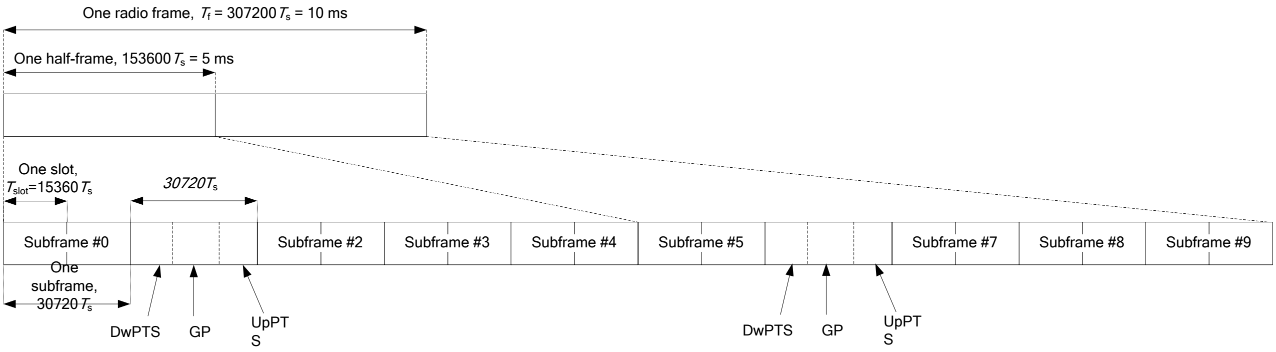


Figure 9.2: Frame structure type 2 (for 5 ms switch-point periodicity)

Table 9.1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

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

Table 9.2: Uplink-downlink configurations

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

Duty factor is calculated by:

Duty factor = uplink frame*6+UpPTS*2/one frame length

= $(30720.T_s * 6+5120.\ T_s*2)/307200.T_s$

= 0.633

According to the KDB 447498 D01, SAR should be evaluated at more than 3 frequencies for devices supporting transmit bands wider than 100MHz. Oct.2014 FCC-TCB conference notes (Dec. 2014 rev.) specifies the 5 test channels to use for 3GPP band 41 SAR evaluation.

9.5 Bluetooth & Wi-Fi Measurement Procedures for SAR

Normal network operating configurations are not suitable for measuring the SAR of 802.11 transmitters in general. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure that the results are consistent and reliable.
Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

9.6 Power Drift

To control the output power stability during the SAR test, DASY5 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in section14 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

10 Area Scan Based 1-g SAR

10.1 Requirement of KDB

According to the KDB447498 D01 v06, when the implementation is based the specific polynomial fit algorithm as presented at the 29th Bioelectromagnetics Society meeting (2007) and the estimated 1-gSAR is ≤ 1.2 W/kg, a zoom scan measurement is not required provided it is also not needed for any other purpose; for example, if the peak SAR location required for simultaneous transmission SAR test exclusion can be determined accurately by the SAR system or manually to discriminate between distinctive peaks and scattered noisy SAR distributions from area scans.

There must not be any warning or alert messages due to various measurement concerns identified by the SAR system; for example, noise in measurements, peaks too close to scan boundary, peaks are too sharp, spatial resolution and uncertainty issues etc. The SAR system verification must also demonstrate that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR (See Annex B). When all the SAR results for each exposure condition in a frequency band and wireless mode are based on estimated 1-g SAR, the 1-g SAR for the highest SAR configuration must be determined by a zoom scan.

10.2 Fast SAR Algorithms

The approach is based on the area scan measurement applying a frequency dependent attenuation parameter. This attenuation parameter was empirically determined by analyzing a large number of phones. The MOTOROLA FAST SAR was developed and validated by the MOTOROLA Research Group in Ft. Lauderdale.

In the initial study, an approximation algorithm based on Linear fit was developed. The accuracy of the algorithm has been demonstrated across a broad frequency range (136-2450 MHz)and for both 1- and 10-g averaged SAR using a sample of 264 SAR measurements from 55wireless handsets. For the sample size studied, the root-mean-squared errors of the algorithm mare 1.2% and 5.8% for 1- and 10-g averaged SAR, respectively. The paper describing the algorithm in detail is expected to be published in August 2004 within the Special Issue of Transactions on MTT.

In the second step, the same research group optimized the fitting algorithm to an Polynomial fit whereby the frequency validity was extended to cover the range 30-6000MHz. Details of this study can be found in the BEMS 2007 Proceedings.

Both algorithms are implemented in DASY software.

11 Conducted Output Power

Table1: Summery of Receiver detection mechanism

Antenna	Receiver OFF +Hotspot OFF (Body scenario)	Receiver ON/Hotspot OFF&ON (Head scenario)	Receiver OFF +Hotspot ON (Body scenario)
Standalone	DSI0	DSI1	DSI2

11.1 GSM Measurement result

Table 11.1-1: The conducted power measurement results for GSM, GPRS and EGPRS-
DSI0/1/2/3

GSM 850 Speech (GMSK)	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
	251	190	128			251	190	128
1 Txslot	32.19	32.16	32.10	33.30	/	/	/	/
GSM 850 GPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	251	190	128			251	190	128
1 Txslot	32.14	32.12	32.06	33.30	-9.03	23.11	23.09	23.03
2 Txslots	**29.89**	**29.88**	**29.85**	**30.50**	**-6.02**	**23.87**	**23.86**	**23.83**
3Txslots	27.92	27.91	27.92	28.00	-4.26	23.66	23.65	23.66
4 Txslots	26.66	26.66	26.67	27.00	-3.01	23.65	23.65	23.66
GSM 850 EGPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	251	190	128			251	190	128
1 Txslot	32.19	32.14	32.08	33.30	-9.03	23.16	23.11	23.05
2 Txslots	**29.92**	**29.91**	**29.87**	**30.50**	**-6.02**	**23.90**	**23.89**	**23.85**
3Txslots	27.95	27.93	27.93	28.00	-4.26	23.69	23.67	23.67
4 Txslots	26.68	26.68	26.69	27.00	-3.01	23.67	23.67	23.68
GSM 850 EGPRS (8PSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	251	190	128			251	190	128
1 Txslot	26.95	27.02	26.77	27.50	-9.03	17.92	17.99	17.74
2 Txslots	23.88	23.82	23.78	24.50	-6.02	17.86	17.80	17.76
3Txslots	22.67	22.56	22.66	23.50	-4.26	18.41	18.30	18.40
4 Txslots	20.89	20.76	20.88	21.50	-3.01	17.88	17.75	17.87

NOTES:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with 2Txslots for GSM850

Table 11.1-2: The conducted power measurement results for GSM, GPRS and EGPRS

DSI0

PCS1900 Speech (GMSK)	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	26.99	26.92	27.16	28.30	/	/	/	/
PCS1900 GPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	26.98	26.89	27.12	28.30	-9.03	17.95	17.86	18.09
2 Txslots	24.01	24.05	24.03	25.50	-6.02	17.99	18.03	18.01
3Txslots	22.26	22.14	22.30	23.50	-4.26	18.00	17.88	18.04
4 Txslots	**21.08**	**20.90**	**21.06**	**23.00**	**-3.01**	**18.07**	**17.89**	**18.05**
PCS1900 EGPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	26.96	26.88	27.11	28.30	-9.03	17.93	17.85	18.08
2 Txslots	24.09	24.03	24.02	25.50	-6.02	18.07	18.01	18.00
3Txslots	22.25	22.13	22.28	23.50	-4.26	17.99	17.87	18.02
4 Txslots	**21.07**	**21.09**	**21.05**	**23.00**	**-3.01**	**18.06**	**18.08**	**18.04**
PCS1900 EGPRS (8PSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	23.37	23.27	23.07	23.50	-9.03	14.34	14.24	14.04
2 Txslots	20.40	20.21	20.06	21.50	-6.02	14.38	14.19	14.04
3Txslots	19.03	18.43	18.67	20.00	-4.26	14.77	14.17	14.41
4 Txslots	17.46	17.13	16.96	18.50	-3.01	14.45	14.12	13.95

NOTES:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with 4Txslots for GSM1900.

Table 11.1-3: The conducted power measurement results for GSM, GPRS and EGPRS

DSI1

PCS1900 Speech (GMSK)	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	29.13	29.16	29.39	30.30	/	/	/	/
PCS1900 GPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	29.11	29.12	29.37	30.30	-9.03	20.08	20.09	20.34
2 Txslots	**27.40**	**27.35**	**27.58**	**28.00**	**-6.02**	**21.38**	**21.33**	**21.56**
3Txslots	24.96	24.86	24.85	25.00	-4.26	20.70	20.60	20.59
4 Txslots	23.88	23.79	23.96	24.00	-3.01	20.87	20.78	20.95
PCS1900 EGPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	29.10	29.13	29.37	30.30	-9.03	20.07	20.10	20.34
2 Txslots	**27.39**	**27.36**	**27.58**	**28.00**	**-6.02**	**21.37**	**21.34**	**21.56**
3Txslots	24.95	24.87	24.91	25.00	-4.26	20.69	20.61	20.65
4 Txslots	23.87	23.79	23.96	24.00	-3.01	20.86	20.78	20.95
PCS1900 EGPRS (8PSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	26.19	26.08	25.77	26.50	-9.03	17.16	17.05	16.74
2 Txslots	24.27	24.10	23.90	24.50	-6.02	18.25	18.08	17.88
3Txslots	23.24	23.03	22.92	23.50	-4.26	18.98	18.77	18.66
4 Txslots	22.26	22.01	21.88	22.50	-3.01	19.25	19.00	18.87

NOTES:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with 2Txslots for GSM1900.

Table 11.1-4: The conducted power measurement results for GSM, GPRS and EGPRS

DSI2

PCS1900 Speech (GMSK)	Measured Power (dBm)			Tune up	calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	25.91	25.82	26.04	27.30	/	/	/	/
PCS1900 GPRS (GMSK)	Measured Power (dBm)				calculation	Averaged Power (dBm)		
	810	661	512			810	661	512
1 Txslot	25.93	25.83	26.05	27.30	-9.03	16.90	16.80	17.02

2 Txslots	23.02	22.92	23.10	24.00	-6.02	17.00	16.90	17.08
3Txslots	21.32	21.15	21.26	22.50	-4.26	17.01	16.89	17.05
4 Txslots	**20.03**	**20.01**	**20.09**	**21.00**	**-3.01**	**17.02**	**17.00**	**17.08**
PCS1900	Measured Power (dBm)				calculation	Averaged Power (dBm)		
EGPRS (GMSK)	810	661	512			810	661	512
1 Txslot	25.90	25.82	26.04	27.30	-9.03	16.87	16.79	17.01
2 Txslots	23.00	22.90	23.08	24.00	-6.02	16.98	16.88	17.06
3Txslots	21.30	21.13	21.30	22.50	-4.26	17.04	16.87	17.04
4 Txslots	**20.01**	**20.02**	**20.09**	**21.00**	**-3.01**	**17.00**	**17.01**	**17.08**
PCS1900	Measured Power (dBm)				calculation	Averaged Power (dBm)		
EGPRS (8PSK)	810	661	512			810	661	512
1 Txslot	22.47	22.19	22.05	23.50	-9.03	13.44	13.16	13.02
2 Txslots	19.41	19.17	19.47	20.50	-6.02	13.39	13.15	13.45
3Txslots	17.58	17.38	17.11	18.50	-4.26	13.32	13.12	12.55
4 Txslots	16.34	16.23	15.98	17.50	-3.01	13.33	13.22	12.97

NOTES:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with 4Txslots for GSM1900.

11.2 WCDMA Measurement result

Table 11.2-1: The conducted Power for WCDMA DSI0

Item	band	FDDV result			
	ARFCN	4233 (846.6MHz)	4182 (836.4MHz)	4132 (826.4MHz)	Tune up
WCDMA	\	23.24	23.36	23.41	24.50
HSUPA	1	20.63	20.61	20.55	21.50
	2	20.61	20.56	20.55	21.50
	3	21.63	21.60	21.56	22.00
	4	20.17	20.21	20.13	21.00
	5	21.61	21.59	21.54	22.50
HSPA+		22.06	22.07	22.15	23.00
DC-HSDPA	1	22.43	22.51	22.57	23.50
	2	22.42	22.49	22.46	23.50
	3	21.95	22.02	22.06	23.00
	4	21.94	22.00	22.04	23.00

Item	band	FDDIV result			
	ARFCN	1513 (1752.6MHz)	1412 (1732.4MHz)	1312 (1712.4MHz)	
WCDMA	\	20.95	20.68	20.97	21.5
HSUPA	1	20.72	20.52	20.74	21.0
	2	20.85	20.58	20.86	20.5
	3	20.88	20.60	20.88	20.5
	4	19.35	19.10	19.39	19.0
	5	20.85	20.62	20.86	20.5
HSPA+		20.54	20.19	20.47	21.0
DC-HSDPA	1	20.83	20.70	20.95	21.5
	2	20.82	20.69	20.95	21.5
	3	20.52	20.60	20.54	21.5
	4	20.31	20.21	20.45	21.0
Item	band	FDDII result			
	ARFCN	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)	
WCDMA	\	21.45	21.42	21.43	22.50
HSUPA	1	19.89	19.79	19.56	20.50
	2	19.49	19.40	19.56	20.50
	3	20.49	20.43	20.58	21.50
	4	19.05	18.99	19.05	20.00
	5	20.45	20.40	20.55	21.50
HSPA+		21.06	21.17	21.08	22.00
DC-HSDPA	1	21.38	21.40	21.42	22.00
	2	21.36	21.39	21.42	22.00
	3	20.88	20.90	20.91	21.50
	4	20.86	20.89	20.90	21.50

Table 11.2-1: The conducted Power for WCDMA DSI1

Item	band	FDDV result			
	ARFCN	4233 (846.6MHz)	4182 (836.4MHz)	4132 (826.4MHz)	Tune up
WCDMA	\	22.13	22.18	22.13	23.00
HSUPA	1	20.82	20.83	20.82	21.50
	2	20.46	20.47	20.45	21.50
	3	21.45	21.46	21.45	22.50
	4	19.96	19.97	19.95	21.00
	5	21.44	21.45	21.46	22.50
HSPA+		21.98	22.07	21.97	22.50
DC-HSDPA	1	22.47	22.43	22.42	23.00
	2	22.48	22.42	22.40	23.00
	3	21.98	21.94	21.93	22.50
	4	21.97	21.95	21.92	22.50
Item	band	FDDIV result			
	ARFCN	1513 (1752.6MHz)	1412 (1732.4MHz)	1312 (1712.4MHz)	

WCDMA	\	23.87	23.70	23.80	24.50
HSUPA	1	20.79	20.54	20.86	21.50
	2	20.80	20.50	20.86	21.50
	3	21.75	21.52	21.83	22.50
	4	20.32	20.05	20.37	21.00
	5	21.74	21.52	21.79	22.50
HSPA+		22.31	21.93	22.26	23.00
DC-HSDPA	1	22.54	22.43	22.70	23.50
	2	22.44	22.28	22.60	23.50
	3	22.01	21.91	22.14	23.00
	4	22.05	21.92	22.13	23.00
Item	band	FDDII result			
	ARFCN	9538 (1907.6MHz)	9400 (1880MHz)	9262 (1852.4MHz)	
WCDMA	\	23.53	23.46	23.64	24.00
HSUPA	1	20.51	20.43	20.51	21.50
	2	20.54	20.45	20.52	21.50
	3	21.56	21.42	21.51	22.00
	4	20.09	19.97	20.05	21.00
	5	21.55	21.41	21.50	22.50
HSPA+		22.05	21.97	22.01	23.00
DC-HSDPA	1	22.3	22.38	22.47	23.50
	2	22.16	22.13	22.49	23.50
	3	21.74	21.76	21.81	23.00
	4	21.79	21.90	21.82	23.00

Table 11.2-1: The conducted Power for WCDMA DSI2

Item	band	FDDV result			
	ARFCN	4233 (846.6MHz)	4182 (836.4MHz)	4132 (826.4MHz)	Tune up
WCDMA	\	23.43	23.41	23.46	24.50
HSUPA	1	20.44	20.48	20.46	21.50
	2	20.47	20.49	20.48	21.50
	3	21.47	21.48	21.47	22.00
	4	19.98	20.00	19.97	21.00
	5	21.43	21.44	21.43	22.50
HSPA+		21.97	22.05	22.09	23.00
DC-HSDPA	1	22.53	22.50	22.46	23.50
	2	22.4	22.35	22.34	23.50
	3	21.98	21.95	21.92	23.00
	4	21.97	21.95	21.91	23.00
Item	band	FDDIV result			
	ARFCN	1513 (1752.6MHz)	1412 (1732.4MHz)	1312 (1712.4MHz)	
WCDMA	\	18.83	18.60	18.89	19.50

HSUPA	1	17.24	16.98	17.31	18.00
	2	16.84	16.61	16.91	18.00
	3	17.82	17.58	17.88	18.50
	4	16.35	16.10	16.42	17.50
	5	17.8	17.57	17.88	18.50
HSPA+		18.38	18.10	18.40	19.00
DC-HSDPA	1	18.72	18.44	18.75	19.50
	2	18.7	18.43	18.76	19.50
	3	18.2	17.94	18.25	19.00
	4	18.18	17.95	18.26	19.00
Item	**band**	**FDDII result**			
	ARFCN	**9538 (1907.6MHz)**	**9400 (1880MHz)**	**9262 (1852.4MHz)**	
WCDMA	\	18.54	18.40	18.53	19.50
HSUPA	1	16.97	16.92	17.00	18.00
	2	16.5	16.45	16.52	17.50
	3	17.51	17.45	17.50	18.00
	4	16.02	15.94	16.04	17.00
	5	17.48	17.42	17.47	18.50
HSPA+		18.09	17.90	17.98	19.00
DC-HSDPA	1	18.38	18.18	18.26	19.00
	2	18.4	18.20	18.27	19.00
	3	17.84	17.64	17.70	18.50
	4	17.83	17.65	17.68	18.50

11.3 LTE Measurement result

Table 11.3-1: Maximum Power Reduction (MPR) for LTE-Normal Power

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR (dB)
	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	3

Table 11.3-2: Maximum Power Reduction (MPR) for LTE- Low Power

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR (dB)
	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	0
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	0
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	0

64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	0
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	0

Table 11.3-3: The tune up for LTE

Mode/Band	DSI0 Receiver OFF+ Hotspot OFF	DSI1 Receiver ON+ Hotspot OFF/ON	DSI2 Receiver OFF+ Hotspot ON
FDD Band 2	22.5	24.5	20
FDD Band 5	24.5	22.5	24.5
FDD Band 12	24.5	22.5	24.5
FDD Band 14	24.5	22.5	24.5
FDD Band 30	21	24.5	20
FDD Band 66	22.5	24.5	20

DSI0

Band 2					
Bandwidth (MHz)	RB allocation / RB offset	Frequency (MHz)	Actual output power (dBm) QPSK	16QAM	64QAM
1.4 MHz	1RB_High	1909.3	21.79	21.71	21.5
		1880	21.70	21.53	21.41
		1850.7	21.77	21.65	21.56
	1RB_Middle	1909.3	21.99	21.73	21.65
		1880	21.86	21.63	21.54
		1850.7	21.92	21.82	21.58
	1RB_Low	1909.3	21.81	21.55	21.52
		1880	21.70	21.52	21.45
		1850.7	21.79	21.68	21.47
	3RB_High	1909.3	21.96	21.41	21.52
		1880	21.82	21.31	21.41
		1850.7	21.86	21.36	21.48
	3RB_Middle	1909.3	22.00	21.47	21.61
		1880	21.88	21.41	21.48
		1850.7	21.95	21.41	21.53
	3RB_Low	1909.3	21.96	21.48	21.62
		1880	21.79	21.35	21.47
		1850.7	21.87	21.42	21.53
	6RB	1909.3	21.95	21.56	20.47
		1880	21.80	21.40	20.29
		1850.7	21.85	21.50	20.4
3 MHz	1RB_High	1908.5	21.87	21.55	21.54
		1880	21.74	21.51	21.45
		1851.5	21.79	21.64	21.53
	1RB_Middle	1908.5	21.97	21.72	21.72

		1880	21.92	21.74	21.61
		1851.5	22.02	21.90	21.71
	1RB_Low	1908.5	21.82	21.68	21.58
		1880	21.73	21.61	21.39
		1851.5	21.79	21.62	21.52
	8RB_High	1908.5	21.90	21.44	20.49
		1880	21.76	21.34	20.32
		1851.5	21.78	21.40	20.38
	8RB_Middle	1908.5	21.95	21.51	20.53
		1880	21.78	21.39	20.34
		1851.5	21.83	21.44	20.39
	8RB_Low	1908.5	21.89	21.48	20.47
		1880	21.76	21.34	20.29
		1851.5	21.82	21.40	20.42
	15RB	1908.5	21.86	21.42	20.37
		1880	21.74	21.27	20.22
		1851.5	21.79	21.32	20.3
5 MHz	1RB_High	1907.5	21.70	21.46	21.47
		1880	21.66	21.43	21.39
		1852.5	21.62	21.39	21.39
	1RB_Middle	1907.5	22.04	21.77	21.69
		1880	21.93	21.61	21.51
		1852.5	21.94	21.87	21.67
	1RB_Low	1907.5	21.68	21.51	21.45
		1880	21.60	21.35	21.24
		1852.5	21.70	21.54	21.42
	12RB_High	1907.5	21.78	21.29	20.38
		1880	21.74	21.24	20.26
		1852.5	21.80	21.31	20.34
	12RB_Middle	1907.5	21.91	21.41	20.45
		1880	21.79	21.29	20.33
		1852.5	21.82	21.35	20.37
	12RB_Low	1907.5	21.88	21.41	20.42
		1880	21.76	21.28	20.27
		1852.5	21.75	21.28	20.28
	25RB	1907.5	21.85	21.38	20.4
		1880	21.74	21.30	20.29
		1852.5	21.79	21.32	20.32
10MHz	1RB_High	1905	21.83	21.67	21.54
		1880	21.72	21.61	21.41
		1855	21.64	21.44	21.34
	1RB_Middle	1905	21.88	21.69	21.47
		1880	21.85	21.59	21.52
		1855	21.81	21.66	21.51
	1RB_Low	1905	21.72	21.56	21.38

		1880	21.73	21.49	21.42
		1855	21.78	21.70	21.53
	25RB_High	1905	21.77	21.29	20.28
		1880	21.78	21.28	20.28
		1855	21.83	21.37	20.35
	25RB_Middle	1905	21.90	21.36	20.4
		1880	21.79	21.30	20.28
		1855	21.79	21.29	20.29
	25RB_Low	1905	21.92	21.39	20.41
		1880	21.84	21.34	20.37
		1855	21.76	21.28	20.27
	50RB	1905	21.84	21.35	20.36
		1880	21.84	21.35	20.33
		1855	21.79	21.31	20.3
15MHz	1RB_High	1902.5	21.75	21.54	21.43
		1880	21.63	21.38	21.37
		1857.5	21.55	21.44	21.26
	1RB_Middle	1902.5	21.74	21.60	21.46
		1880	21.70	21.50	21.39
		1857.5	21.73	21.54	21.45
	1RB_Low	1902.5	21.65	21.48	21.4
		1880	21.64	21.39	21.37
		1857.5	21.68	21.59	21.45
	36RB_High	1902.5	21.70	21.20	20.26
		1880	21.75	21.28	20.25
		1857.5	21.73	21.19	20.26
	36RB_Middle	1902.5	21.76	21.27	20.31
		1880	21.78	21.28	20.29
		1857.5	21.73	21.22	20.26
	36RB_Low	1902.5	21.74	21.25	20.26
		1880	21.79	21.32	20.33
		1857.5	21.70	21.24	20.23
	75RB	1902.5	21.75	21.24	20.25
		1880	21.78	21.30	20.31
		1857.5	21.72	21.25	20.22
20MHz	1RB_High	1900	21.96	21.81	21.74
		1880	21.85	21.60	21.6
		1860	21.75	21.53	21.4
	1RB_Middle	1900	22.04	21.80	21.79
		1880	22.00	21.83	21.68
		1860	21.96	21.85	21.62
	1RB_Low	1900	21.83	21.58	21.59
		1880	21.79	21.52	21.46
		1860	21.89	21.73	21.56
	50RB_High	1900	21.87	21.41	20.4
		1880	21.95	21.49	20.47
		1860	21.93	21.45	20.47
	50RB_Middle	1900	21.99	21.53	20.52

		1880	22.00	21.52	20.54
		1860	21.94	21.46	20.44
	50RB_Low	1900	21.88	21.43	20.43
		1880	22.08	21.56	20.6
		1860	21.82	21.36	20.35
	100RB	1900	21.89	21.42	20.45
		1880	22.00	21.51	20.55
		1860	21.91	21.42	20.43

DSI1

Band 2					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	Actual output power (dBm)		
	RB offset		QPSK	16QAM	64QAM
1.4 MHz	1RB_High	1909.3	23.72	22.95	22.07
		1880	23.53	22.84	21.76
		1850.7	23.63	22.96	21.95
	1RB_Middle	1909.3	23.86	23.14	22.14
		1880	23.64	22.99	21.98
		1850.7	23.72	23.17	21.97
	1RB_Low	1909.3	23.71	22.99	21.97
		1880	23.52	22.86	21.74
		1850.7	23.60	22.99	21.97
	3RB_High	1909.3	23.87	22.80	21.94
		1880	23.64	22.70	21.72
		1850.7	23.73	22.75	21.86
	3RB_Middle	1909.3	23.91	22.91	22.03
		1880	23.71	22.66	21.84
		1850.7	23.81	22.79	21.91
	3RB_Low	1909.3	23.84	22.78	21.96
		1880	23.61	22.66	21.78
		1850.7	23.73	22.78	21.83
	6RB	1909.3	22.91	22.01	20.85
		1880	22.68	21.79	20.66
		1850.7	22.77	21.89	20.76
3 MHz	1RB_High	1908.5	23.65	23.06	22.02
		1880	23.57	22.97	21.77
		1851.5	23.63	22.88	21.83
	1RB_Middle	1908.5	23.83	23.15	22.09
		1880	23.76	23.00	22.01
		1851.5	23.89	23.07	22.16
	1RB_Low	1908.5	23.66	22.99	21.92
		1880	23.57	22.81	21.82
		1851.5	23.68	23.01	21.86
	8RB_High	1908.5	22.83	21.93	20.88

		1880	22.64	21.71	20.71
		1851.5	22.73	21.82	20.79
	8RB_Middle	1908.5	22.84	21.92	20.92
		1880	22.68	21.76	20.73
		1851.5	22.77	21.87	20.81
	8RB_Low	1908.5	22.83	21.89	20.87
		1880	22.64	21.72	20.72
		1851.5	22.74	21.82	20.79
	15RB	1908.5	22.86	21.86	20.80
		1880	22.64	21.66	20.65
		1851.5	22.73	21.75	20.71
5 MHz	1RB_High	1907.5	23.67	23.04	21.93
		1880	23.50	22.82	21.73
		1852.5	23.51	22.97	21.81
	1RB_Middle	1907.5	23.89	23.11	22.20
		1880	23.79	23.03	21.92
		1852.5	23.78	23.12	21.97
	1RB_Low	1907.5	23.54	22.83	21.84
		1880	23.48	22.86	21.80
		1852.5	23.58	22.97	21.82
	12RB_High	1907.5	22.79	21.84	20.89
		1880	22.68	21.68	20.67
		1852.5	22.74	21.76	20.74
	12RB_Middle	1907.5	22.86	21.87	20.92
		1880	22.70	21.72	20.77
		1852.5	22.79	21.83	20.83
	12RB_Low	1907.5	22.84	21.83	20.86
		1880	22.67	21.69	20.68
		1852.5	22.70	21.72	20.71
	25RB	1907.5	22.84	21.85	20.85
		1880	22.70	21.73	20.72
		1852.5	22.75	21.77	20.76
10MHz	1RB_High	1905	23.78	23.05	22.09
		1880	23.62	22.95	21.87
		1855	23.52	22.93	21.82
	1RB_Middle	1905	23.74	23.04	22.03
		1880	23.71	23.06	21.91
		1855	23.76	23.14	22.03
	1RB_Low	1905	23.61	22.86	21.79
		1880	23.56	22.83	21.77
		1855	23.72	23.13	21.97
	25RB_High	1905	22.76	21.76	20.71
		1880	22.75	21.74	20.74
		1855	22.79	21.80	20.76
	25RB_Middle	1905	22.80	21.82	20.77
		1880	22.73	21.72	20.71
		1855	22.72	21.73	20.72
	25RB_Low	1905	22.88	21.89	20.85

		1880	22.75	21.74	20.72
		1855	22.75	21.75	20.71
	50RB	1905	22.86	21.85	20.82
		1880	22.76	21.75	20.72
		1855	22.76	21.75	20.71
15MHz	1RB_High	1902.5	23.78	23.10	22.00
		1880	23.67	23.05	21.85
		1857.5	23.52	22.75	21.71
	1RB_Middle	1902.5	23.72	22.99	21.99
		1880	23.70	23.05	21.89
		1857.5	23.67	22.94	21.80
	1RB_Low	1902.5	23.61	22.96	21.88
		1880	23.60	22.94	21.70
		1857.5	23.69	23.10	21.86
	36RB_High	1902.5	22.80	21.76	20.74
		1880	22.83	21.75	20.75
		1857.5	22.72	21.73	20.67
	36RB_Middle	1902.5	22.82	21.80	20.77
		1880	22.82	21.75	20.74
		1857.5	22.77	21.72	20.71
	36RB_Low	1902.5	22.82	21.76	20.74
		1880	22.80	21.73	20.73
		1857.5	22.76	21.71	20.67
	75RB	1902.5	22.80	21.76	20.71
		1880	22.80	21.77	20.73
		1857.5	22.76	21.71	20.65
20MHz	1RB_High	1900	23.71	22.95	21.95
		1880	23.58	22.92	21.81
		1860	23.46	22.75	21.76
	1RB_Middle	1900	23.79	23.00	22.05
		1880	23.75	23.09	21.97
		1860	23.75	23.01	21.92
	1RB_Low	1900	23.61	22.92	21.93
		1880	23.51	22.87	21.77
		1860	23.64	23.04	21.86
	50RB_High	1900	22.61	21.61	20.62
		1880	22.79	21.83	20.8
		1860	22.70	21.67	20.65
	50RB_Middle	1900	22.79	21.78	20.77
		1880	22.81	21.79	20.78
		1860	22.73	21.74	20.73
	50RB_Low	1900	22.70	21.70	20.69
		1880	22.84	21.83	20.84
		1860	22.64	21.61	20.57
	100RB	1900	22.70	21.68	20.66
		1880	22.80	21.80	20.79
		1860	22.65	21.65	20.64

DSI2

Band 2					
Bandwidth (MHz)	RB allocation / RB offset	Frequency (MHz)	Actual output power (dBm)		
			QPSK	16QAM	64QAM
1.4 MHz	1RB_High	1909.3	19.02	19.08	19.09
		1880	18.89	19.03	18.83
		1850.7	18.92	19.09	18.97
	1RB_Middle	1909.3	19.07	19.25	19.22
		1880	19.04	19.18	19.06
		1850.7	19.05	19.28	19.01
	1RB_Low	1909.3	19.00	19.07	18.99
		1880	18.88	19.01	18.87
		1850.7	18.94	19.10	18.99
	3RB_High	1909.3	19.03	18.93	19.03
		1880	18.97	18.77	18.91
		1850.7	19.08	18.82	19
	3RB_Middle	1909.3	19.21	18.99	19.1
		1880	19.05	18.88	18.92
		1850.7	19.11	18.99	19.01
	3RB_Low	1909.3	19.15	18.94	19.01
		1880	18.98	18.77	18.9
		1850.7	19.05	18.91	18.97
	6RB	1909.3	19.03	19.03	18.95
		1880	18.98	18.92	18.79
		1850.7	19.04	18.89	18.88
3 MHz	1RB_High	1908.5	19.06	19.16	19.04
		1880	18.91	18.99	19.01
		1851.5	18.95	19.10	19
	1RB_Middle	1908.5	19.17	19.31	19.24
		1880	19.10	19.31	19.11
		1851.5	19.18	19.21	19.19
	1RB_Low	1908.5	19.05	19.12	19.02
		1880	18.93	19.13	18.99
		1851.5	18.99	19.14	19.1
	8RB_High	1908.5	19.07	18.99	18.97
		1880	18.94	18.81	18.82
		1851.5	18.98	18.88	18.86
	8RB_Middle	1908.5	19.14	19.03	19.02
		1880	18.98	18.87	18.83
		1851.5	19.03	18.90	18.86
	8RB_Low	1908.5	19.09	18.99	18.96
		1880	18.95	18.85	18.8
		1851.5	18.99	18.92	18.87
	15RB	1908.5	19.04	18.91	18.89
		1880	18.92	18.78	18.75

		1851.5	18.93	18.77	18.77
5 MHz	1RB_High	1907.5	18.94	19.02	18.95
		1880	18.84	18.91	18.81
		1852.5	18.82	18.93	18.81
	1RB_Middle	1907.5	19.02	19.06	19.23
		1880	19.10	19.02	19.22
		1852.5	19.10	19.01	19.19
	1RB_Low	1907.5	18.90	19.10	18.94
		1880	18.81	19.01	18.87
		1852.5	18.87	19.06	18.88
	12RB_High	1907.5	19.02	18.86	18.89
		1880	18.95	18.76	18.75
		1852.5	18.98	18.79	18.83
	12RB_Middle	1907.5	19.02	18.96	18.99
		1880	19.01	18.82	18.84
		1852.5	19.02	18.82	18.86
	12RB_Low	1907.5	19.01	18.92	18.95
		1880	18.96	18.78	18.81
		1852.5	18.94	18.75	18.78
	25RB	1907.5	19.07	18.91	18.9
		1880	18.98	18.79	18.82
		1852.5	18.96	18.81	18.8
10MHz	1RB_High	1905	18.93	19.04	18.87
		1880	18.78	19.00	18.89
		1855	18.70	18.85	18.94
	1RB_Middle	1905	18.97	19.02	19
		1880	18.88	18.95	19.05
		1855	18.92	19.01	19.06
	1RB_Low	1905	18.80	18.93	18.82
		1880	18.80	18.91	18.95
		1855	18.83	19.03	19.02
	25RB_High	1905	18.85	18.71	18.68
		1880	18.84	18.66	18.8
		1855	18.91	18.75	18.88
	25RB_Middle	1905	18.93	18.76	18.9
		1880	18.86	18.69	18.82
		1855	18.82	18.68	18.8
	25RB_Low	1905	18.99	18.82	18.94
		1880	18.91	18.75	18.88
		1855	18.84	18.68	18.8
	50RB	1905	18.91	18.71	18.89
		1880	18.89	18.73	18.85
		1855	18.86	18.69	18.8
15MHz	1RB_High	1902.5	18.89	19.07	18.93
		1880	18.73	18.94	18.78
		1857.5	18.62	18.88	18.71
	1RB_Middle	1902.5	18.84	19.00	18.91
		1880	18.83	18.83	18.79

		1857.5	18.79	18.89	18.81
	1RB_Low	1902.5	18.74	18.90	18.83
		1880	18.78	18.95	18.82
		1857.5	18.82	19.04	18.87
	36RB_High	1902.5	18.82	18.61	18.63
		1880	18.86	18.64	18.65
		1857.5	18.80	18.60	18.62
	36RB_Middle	1902.5	18.89	18.68	18.71
		1880	18.88	18.67	18.69
		1857.5	18.83	18.63	18.65
	36RB_Low	1902.5	18.86	18.62	18.68
		1880	18.90	18.68	18.7
		1857.5	18.81	18.60	18.61
	75RB	1902.5	18.86	18.66	18.65
		1880	18.89	18.70	18.7
		1857.5	18.80	18.64	18.62
20MHz	1RB_High	1900	19.02	19.11	19.09
		1880	18.87	19.04	18.91
		1860	18.78	18.92	18.84
	1RB_Middle	1900	19.06	19.28	19.09
		1880	19.11	19.11	19.02
		1860	19.06	19.28	19.05
	1RB_Low	1900	18.88	19.09	18.85
		1880	18.83	19.02	18.91
		1860	18.91	19.12	18.93
	50RB_High	1900	18.91	18.75	18.75
		1880	18.97	18.82	18.79
		1860	18.95	18.80	18.81
	50RB_Middle	1900	19.03	18.86	18.85
		1880	19.03	18.87	18.86
		1860	18.97	18.80	18.81
	50RB_Low	1900	18.93	18.75	18.75
		1880	19.09	18.94	18.94
		1860	18.85	18.67	18.69
	100RB	1900	18.96	18.75	18.77
		1880	19.06	18.87	18.85
		1860	18.95	18.76	18.79

DSI1

Band 5					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	QPSK	16QAM	64QAM
	RB offset (Start RB)		Actual output power (dBm)	Actual output power (dBm)	Actual output power (dBm)
1.4 MHz	1RB High (5)	848.3	21.62	21.61	21.53
		836.5	21.69	21.66	21.6
		824.7	21.64	21.69	21.57
	1RB Middle (3)	848.3	21.74	21.70	21.65
		836.5	21.51	21.71	21.72

		824.7	21.77	21.61	21.74
	1RB Low (0)	848.3	21.63	21.60	21.6
		836.5	21.68	21.76	21.65
		824.7	21.67	21.66	21.63
	3RB High (3)	848.3	21.68	21.43	21.52
		836.5	21.79	21.57	21.63
		824.7	21.77	21.51	21.59
	3RB Middle (1)	848.3	21.77	21.57	21.63
		836.5	21.64	21.56	21.7
		824.7	21.77	21.61	21.64
	3RB Low (0)	848.3	21.75	21.50	21.56
		836.5	21.77	21.57	21.68
		824.7	21.75	21.49	21.6
	6RB (0)	848.3	21.73	21.57	21.37
		836.5	21.78	21.68	21.48
		824.7	21.71	21.57	21.37
3 MHz	1RB High (14)	847.5	21.73	21.76	21.54
		836.5	21.76	21.75	21.77
		825.5	21.75	21.63	21.69
	1RB Middle (7)	847.5	21.64	21.75	21.74
		836.5	21.69	21.63	21.74
		825.5	21.62	21.64	21.81
	1RB Low (0)	847.5	21.76	21.76	21.74
		836.5	21.75	21.78	21.72
		825.5	21.72	21.76	21.69
	8RB High (7)	847.5	21.71	21.55	20.53
		836.5	21.78	21.60	21.4
		825.5	21.68	21.55	21.35
	8RB Middle (4)	847.5	21.77	21.59	21.39
		836.5	21.53	21.67	21.47
		825.5	21.73	21.60	21.4
	8RB Low (0)	847.5	21.73	21.58	21.38
		836.5	21.76	21.62	21.42
		825.5	21.73	21.58	21.38
	15RB (0)	847.5	21.72	21.52	21.32
		836.5	21.77	21.58	21.38
		825.5	21.71	21.48	21.28
5 MHz	1RB High (24)	846.5	21.60	21.65	21.45
		836.5	21.68	21.72	21.62
		826.5	21.66	21.78	21.58
	1RB Middle (12)	846.5	21.61	21.58	21.88
		836.5	21.65	21.75	21.79
		826.5	21.73	21.68	21.79
	1RB Low (0)	846.5	21.70	21.74	21.65
		836.5	21.69	21.63	21.68
		826.5	21.60	21.76	21.59
	12RB High (13)	846.5	21.76	21.51	21.31
		836.5	21.79	21.56	21.36

		826.5	21.74	21.51	21.31
	12RB Middle (6)	846.5	21.65	21.62	21.42
		836.5	21.53	21.66	21.46
		826.5	21.77	21.57	21.37
	12RB Low (0)	846.5	21.61	21.60	21.4
		836.5	21.74	21.52	21.32
		826.5	21.76	21.56	21.36
	25RB (0)	846.5	21.78	21.58	21.38
		836.5	21.72	21.61	21.41
		826.5	21.74	21.53	21.33
10 MHz	1RB High (49)	844.0	21.73	21.77	21.65
		836.5	21.80	21.90	21.75
		829.0	21.75	21.87	21.65
	1RB Middle (24)	844.0	21.96	21.91	21.91
		836.5	21.92	21.97	21.8
		829.0	21.91	21.83	21.93
	1RB Low (0)	844.0	21.85	21.98	21.79
		836.5	21.81	21.77	21.75
		829.0	21.78	21.91	21.76
	25RB High (25)	844.0	21.86	21.68	21.48
		836.5	21.85	21.71	21.51
		829.0	21.87	21.68	21.48
	25RB Middle (12)	844.0	21.87	21.75	21.55
		836.5	21.89	21.71	21.51
		829.0	21.88	21.67	21.47
	25RB Low (0)	844.0	21.89	21.74	21.54
		836.5	21.86	21.70	21.5
		829.0	21.92	21.72	21.52
	50RB (0)	844.0	21.93	21.74	21.54
		836.5	21.87	21.70	21.5
		829.0	21.85	21.67	21.47

DSI0/2

Band 5					
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK Actual output power (dBm)	16QAM Actual output power (dBm)	64QAM Actual output power (dBm)
1.4 MHz	1RB High (5)	848.3	23.45	22.72	21.75
		836.5	23.56	22.82	21.84
		824.7	23.51	22.76	21.75
	1RB Middle (3)	848.3	23.61	22.93	21.79
		836.5	23.68	22.96	21.97
		824.7	23.60	22.90	21.80
	1RB Low (0)	848.3	23.53	22.84	21.86
		836.5	23.55	22.85	21.82
		824.7	23.51	22.74	21.72
	3RB High (3)	848.3	23.60	22.57	21.72
		836.5	23.65	22.65	21.78

		824.7	23.59	22.64	21.77
	3RB Middle (1)	848.3	23.70	22.61	21.81
		836.5	23.69	22.75	21.84
		824.7	23.68	22.69	21.79
	3RB Low (0)	848.3	23.64	22.59	21.77
		836.5	23.64	22.60	21.77
		824.7	23.60	22.62	21.77
	6RB (0)	848.3	22.67	21.77	20.73
		836.5	22.68	21.85	20.73
		824.7	22.65	21.75	20.67
3 MHz	1RB High (14)	847.5	23.54	22.75	21.73
		836.5	23.59	22.84	21.84
		825.5	23.55	22.75	21.83
	1RB Middle (7)	847.5	23.72	22.93	21.88
		836.5	23.69	23.07	22.00
		825.5	23.70	22.99	21.90
	1RB Low (0)	847.5	23.61	23.10	21.83
		836.5	23.57	22.92	21.83
		825.5	23.56	22.86	21.80
	8RB High (7)	847.5	22.61	21.70	20.71
		836.5	22.64	21.73	20.70
		825.5	22.61	21.70	20.66
	8RB Middle (4)	847.5	22.67	21.75	20.74
		836.5	22.67	21.77	20.78
		825.5	22.63	21.72	20.72
	8RB Low (0)	847.5	22.64	21.75	20.76
		836.5	22.61	21.70	20.71
		825.5	22.62	21.72	20.69
	15RB (0)	847.5	22.64	21.68	20.68
		836.5	22.65	21.68	20.68
		825.5	22.63	21.66	20.63
5 MHz	1RB High (24)	846.5	23.42	22.62	21.62
		836.5	23.44	22.81	21.75
		826.5	23.47	22.75	21.67
	1RB Middle (12)	846.5	23.74	23.09	21.96
		836.5	23.69	23.06	22.05
		826.5	23.73	22.91	21.95
	1RB Low (0)	846.5	23.51	22.73	21.80
		836.5	23.47	22.74	21.75
		826.5	23.45	22.73	21.65
	12RB High (13)	846.5	22.61	21.65	20.69
		836.5	22.64	21.61	20.70
		826.5	22.63	21.65	20.69
	12RB Middle (6)	846.5	22.68	21.75	20.79
		836.5	22.67	21.67	20.75
		826.5	22.66	21.69	20.71
	12RB Low (0)	846.5	22.66	21.70	20.75
		836.5	22.62	21.63	20.69

		826.5	22.66	21.68	20.69
	25RB (0)	846.5	22.66	21.69	20.72
		836.5	22.64	21.71	20.71
		826.5	22.64	21.66	20.65
10 MHz	1RB High (49)	844.0	23.52	22.79	21.76
		836.5	23.62	22.89	21.83
		829.0	23.54	22.89	21.83
	1RB Middle (24)	844.0	23.71	23.09	22.06
		836.5	23.72	22.93	21.94
		829.0	23.68	23.01	21.99
	1RB Low (0)	844.0	23.62	22.86	21.88
		836.5	23.60	22.89	21.89
		829.0	23.57	22.91	21.79
	25RB High (25)	844.0	22.69	21.74	20.76
		836.5	22.71	21.76	20.77
		829.0	22.70	21.71	20.72
	25RB Middle (12)	844.0	22.74	21.80	20.81
		836.5	22.68	21.73	20.72
		829.0	22.70	21.70	20.73
	25RB Low (0)	844.0	22.72	21.82	20.85
		836.5	22.67	21.72	20.74
		829.0	22.72	21.75	20.77
	50RB (0)	844.0	22.75	21.79	20.80
		836.5	22.71	21.76	20.75
		829.0	22.72	21.75	20.73

DSI1

Band 12					
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK Actual output power (dBm)	16QAM Actual output power (dBm)	64QAM Actual output power (dBm)
1.4 MHz	1RB High (5)	715.3	23.12	22.36	21.36
		707.5	23.36	22.68	21.67
		699.7	23.29	22.50	21.53
	1RB Middle (3)	715.3	23.29	22.48	21.45
		707.5	23.45	22.68	21.70
		699.7	23.39	22.60	21.59
	1RB Low (0)	715.3	23.18	22.47	21.44
		707.5	23.33	22.51	21.61
		699.7	23.24	22.46	21.50
	3RB High (3)	715.3	23.25	22.17	21.33
		707.5	23.50	22.42	21.57
		699.7	23.40	22.36	21.51
	3RB Middle (1)	715.3	23.30	22.26	21.47
		707.5	23.49	22.50	21.58
		699.7	23.42	22.41	21.52

	3RB Low (0)	715.3	23.28	22.27	21.40
		707.5	23.45	22.44	21.57
		699.7	23.35	22.31	21.44
	6RB (0)	715.3	22.30	21.41	20.33
		707.5	22.53	21.62	20.60
		699.7	22.42	21.51	20.42
3 MHz	1RB High (14)	714.5	23.17	22.40	21.38
		707.5	23.45	22.71	21.75
		700.5	23.47	22.66	21.58
	1RB Middle (7)	714.5	23.50	22.71	21.62
		707.5	23.54	22.74	21.80
		700.5	23.56	22.80	21.77
	1RB Low (0)	714.5	23.34	22.55	21.57
		707.5	23.44	22.62	21.68
		700.5	23.33	22.58	21.57
	8RB High (7)	714.5	22.26	21.32	20.41
		707.5	22.48	21.61	20.64
		700.5	22.48	21.55	20.58
	8RB Middle (4)	714.5	22.35	21.42	20.44
		707.5	22.51	21.62	20.69
		700.5	22.47	21.54	20.62
	8RB Low (0)	714.5	22.37	21.45	20.47
		707.5	22.52	21.64	20.66
		700.5	22.39	21.48	20.53
	15RB (0)	714.5	22.33	21.35	20.39
		707.5	22.55	21.55	20.61
		700.5	22.47	21.47	20.51
5 MHz	1RB High (24)	713.5	23.09	22.24	21.32
		707.5	23.34	22.69	21.64
		701.5	23.37	22.59	21.55
	1RB Middle (12)	713.5	23.55	22.76	21.69
		707.5	23.56	22.90	21.79
		701.5	23.70	22.86	21.80
	1RB Low (0)	713.5	23.37	22.55	21.55
		707.5	23.41	22.52	21.63
		701.5	23.23	22.48	21.49
	12RB High (13)	713.5	22.28	21.32	20.40
		707.5	22.54	21.56	20.63
		701.5	22.50	21.48	20.56
	12RB Middle (6)	713.5	22.47	21.46	20.57
		707.5	22.57	21.57	20.65
		701.5	22.54	21.53	20.65
	12RB Low (0)	713.5	22.50	21.52	20.57
		707.5	22.55	21.55	20.61
		701.5	22.45	21.46	20.55
	25RB (0)	713.5	22.41	21.45	20.49
		707.5	22.55	21.60	20.60
		701.5	22.51	21.53	20.54

10 MHz	1RB High (49)	711	23.16	22.40	21.32
		707.5	23.37	22.65	21.55
		704	23.44	22.61	21.67
	1RB Middle (24)	711	23.53	22.78	21.80
		707.5	23.51	22.82	21.74
		704	23.55	22.74	21.70
	1RB Low (0)	711	23.47	22.73	21.68
		707.5	23.46	22.60	21.65
		704	23.36	22.57	21.60
	25RB High (25)	711	22.45	21.46	20.49
		707.5	22.62	21.61	20.68
		704	22.61	21.60	20.60
	25RB Middle (12)	711	22.55	21.57	20.60
		707.5	22.57	21.59	20.64
		704	22.64	21.61	20.65
	25RB Low (0)	711	22.58	21.55	20.62
		707.5	22.66	21.66	20.69
		704	22.64	21.61	20.67
	50RB (0)	711	22.52	21.52	20.55
		707.5	22.65	21.66	20.70
		704	22.67	21.64	20.67

DSI1

Band 12					
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK	16QAM	64QAM
			Actual output power (dBm)	Actual output power (dBm)	Actual output power (dBm)
1.4 MHz	1RB High (5)	715.3	21.30	21.56	21.41
		707.5	21.53	21.68	21.6
		699.7	21.52	21.73	21.69
	1RB Middle (3)	715.3	21.45	21.67	21.55
		707.5	21.62	21.87	21.8
		699.7	21.62	21.85	21.7
	1RB Low (0)	715.3	21.35	21.64	21.54
		707.5	21.53	21.80	21.62
		699.7	21.40	21.71	21.55
	3RB High (3)	715.3	21.41	21.28	21.47
		707.5	21.66	21.54	21.68
		699.7	21.59	21.51	21.62
	3RB Middle (1)	715.3	21.46	21.42	21.55
		707.5	21.65	21.67	21.7
		699.7	21.60	21.59	21.63
	3RB Low (0)	715.3	21.43	21.37	21.47
		707.5	21.65	21.62	21.7
		699.7	21.55	21.54	21.62
	6RB (0)	715.3	21.40	21.50	20.37
		707.5	21.64	21.72	20.63

		699.7	21.54	21.63	20.51
3 MHz	1RB High (14)	714.5	21.34	21.60	21.53
		707.5	21.56	21.81	21.69
		700.5	21.64	21.92	21.72
	1RB Middle (7)	714.5	21.60	21.67	21.72
		707.5	21.70	21.77	21.78
		700.5	21.71	21.75	21.83
	1RB Low (0)	714.5	21.50	21.74	21.6
		707.5	21.64	21.76	21.73
		700.5	21.50	21.72	21.69
	8RB High (7)	714.5	21.40	21.46	20.43
		707.5	21.59	21.64	20.66
		700.5	21.60	21.67	20.67
	8RB Middle (4)	714.5	21.49	21.52	20.5
		707.5	21.66	21.70	20.72
		700.5	21.63	21.70	20.71
	8RB Low (0)	714.5	21.49	21.53	20.57
		707.5	21.63	21.67	20.67
		700.5	21.54	21.56	20.6
	15RB (0)	714.5	21.45	21.47	20.45
		707.5	21.64	21.61	20.65
		700.5	21.59	21.59	20.63
5 MHz	1RB High (24)	713.5	21.24	21.45	21.37
		707.5	21.45	21.73	21.56
		701.5	21.50	21.76	21.58
	1RB Middle (12)	713.5	21.70	21.67	21.8
		707.5	21.76	21.68	21.66
		701.5	21.75	21.73	21.79
	1RB Low (0)	713.5	21.46	21.74	21.7
		707.5	21.53	21.81	21.65
		701.5	21.44	21.61	21.52
	12RB High (13)	713.5	21.40	21.37	20.44
		707.5	21.63	21.61	20.65
		701.5	21.66	21.62	20.69
	12RB Middle (6)	713.5	21.56	21.53	20.6
		707.5	21.66	21.66	20.7
		701.5	21.71	21.65	20.72
	12RB Low (0)	713.5	21.60	21.57	20.61
		707.5	21.64	21.58	20.66
		701.5	21.57	21.56	20.59
	25RB (0)	713.5	21.51	21.48	20.51
		707.5	21.63	21.63	20.65
		701.5	21.64	21.64	20.64
10 MHz	1RB High (49)	711	21.39	21.71	21.52
		707.5	21.50	21.86	21.64
		704	21.60	21.75	21.71
	1RB Middle	711	21.67	21.91	21.87
		707.5	21.70	21.98	21.91

	(24)	704	21.81	21.81	21.96
	1RB Low (0)	711	21.67	21.89	21.81
		707.5	21.73	21.82	21.87
		704	21.57	21.86	21.75
	25RB High (25)	711	21.56	21.56	20.55
		707.5	21.71	21.71	20.75
		704	21.74	21.74	20.79
	25RB Middle (12)	711	21.66	21.68	20.71
		707.5	21.73	21.74	20.76
		704	21.79	21.78	20.81
	25RB Low (0)	711	21.67	21.71	20.69
		707.5	21.76	21.78	20.8
		704	21.77	21.75	20.76
	50RB (0)	711	21.64	21.65	20.66
		707.5	21.75	21.75	20.77
		704	21.76	21.79	20.79

DSI0/2

Band 14					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	QPSK	16QAM	64QAM
	RB offset (Start RB)		Actual output power (dBm)	Actual output power (dBm)	Actual output power (dBm)
5 MHz	1RB High (24)	795.5	23.46	22.79	21.69
		793	23.40	22.78	21.70
		790.5	23.49	22.69	21.72
	1RB Middle (12)	795.5	23.71	22.91	21.91
		793	23.72	23.04	22.01
		790.5	23.72	22.99	21.93
	1RB Low (0)	795.5	23.46	22.78	21.69
		793	23.45	22.81	21.68
		790.5	23.41	22.75	21.71
	12RB High (13)	795.5	22.57	21.54	20.60
		793	22.62	21.63	20.63
		790.5	22.63	21.62	20.65
	12RB Middle (6)	795.5	22.66	21.68	20.68
		793	22.69	21.72	20.72
		790.5	22.70	21.70	20.72
	12RB Low (0)	795.5	22.62	21.61	20.62
		793	22.63	21.62	20.67
		790.5	22.58	21.61	20.60
	25RB (0)	795.5	22.61	21.63	20.62
		793	22.65	21.66	20.63
		790.5	22.63	21.66	20.63
10 MHz	1RB High (49)	793	23.56	22.78	21.79
	1RB Middle (24)	793	23.56	22.79	21.8

	1RB Low (0)	793	23.57	22.88	21.8
	25RB High (25)	793	23.73	22.99	21.94
	25RB Middle (12)	793	22.80	21.71	20.73
	25RB Low (0)	793	22.72	21.74	20.71
	50RB (0)	793	22.71	21.72	20.72

DSI1

Band 14					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	QPSK	16QAM	64QAM
	RB offset (Start RB)		Actual output power (dBm)	Actual output power (dBm)	Actual output power (dBm)
5 MHz	1RB High (24)	795.5	21.84	21.86	21.8
		793	21.83	21.88	21.84
		790.5	21.85	21.90	21.73
	1RB Middle (12)	795.5	21.92	21.91	21.99
		793	21.93	21.92	21.83
		790.5	21.91	21.94	21.89
	1RB Low (0)	795.5	21.87	21.90	21.87
		793	21.85	21.97	21.82
		790.5	21.79	21.98	21.76
	12RB High (13)	795.5	21.94	21.90	21.01
		793	21.98	21.95	21.05
		790.5	21.99	21.99	21.08
	12RB Middle (6)	795.5	21.91	21.96	21.04
		793	21.94	21.93	21.07
		790.5	21.90	21.92	21.12
	12RB Low (0)	795.5	21.96	21.93	21.02
		793	21.99	21.96	21.03
		790.5	21.93	21.87	21
	25RB (0)	795.5	21.96	21.97	21.01
		793	21.91	21.90	21.04
		790.5	21.95	21.96	21.05
10 MHz	1RB High (49)	793	22.01	21.92	21.92
	1RB Middle (24)	793	21.79	21.93	21.92
	1RB Low (0)	793	21.79	21.96	21.91
	25RB High (25)	793	21.79	21.95	21.93
	25RB Middle (12)	793	21.87	21.82	21.12

	25RB Low (0)	793	21.86	21.84	21.11
	50RB (0)	793	21.86	21.85	21.11

DSI0

Band 30					
Bandwidth (MHz)	RB allocation	Frequency (MHz)	QPSK	16QAM	64QAM
	RB offset (Start RB)		Actual output power (dBm)	Actual output power (dBm)	Actual output power (dBm)
5 MHz	1RB High (24)	2312.5	20.33	20.33	20.13
		2310	20.31	20.50	20.39
		2307.5	20.30	20.63	20.45
	1RB Middle (12)	2312.5	20.63	20.63	20.63
		2310	20.66	20.85	20.8
		2307.5	20.62	20.82	20.73
	1RB Low (0)	2312.5	20.32	20.69	20.47
		2310	20.30	20.69	20.48
		2307.5	20.28	20.64	20.45
	12RB High (13)	2312.5	20.41	20.29	20.24
		2310	20.40	20.41	20.42
		2307.5	20.37	20.40	20.42
	12RB Middle (6)	2312.5	20.55	20.45	20.45
		2310	20.54	20.57	20.56
		2307.5	20.45	20.49	20.5
	12RB Low (0)	2312.5	20.52	20.50	20.47
		2310	20.52	20.52	20.53
		2307.5	20.45	20.51	20.5
	25RB (0)	2312.5	20.53	20.45	20.45
		2310	20.49	20.52	20.49
		2307.5	20.48	20.51	20.48
10 MHz	1RB High (49)	2310	20.33	20.36	20.2
	1RB Middle (24)	2310	20.63	20.79	20.7
	1RB Low (0)	2310	20.51	20.74	20.61
	25RB High (25)	2310	20.55	20.44	20.45
	25RB Middle (12)	2310	20.66	20.62	20.61
	25RB Low (0)	2310	20.78	20.76	20.74
	50RB (0)	2310	20.65	20.65	20.65

DSI1

Band 30					
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK Actual output power (dBm)	16QAM Actual output power (dBm)	64QAM Actual output power (dBm)
5 MHz	1RB High (24)	2312.5	23.75	23.02	22.14
		2310	23.79	23.03	22.14
		2307.5	23.83	23.15	22.19
	1RB Middle (12)	2312.5	24.10	23.43	22.40
		2310	24.14	23.47	22.49
		2307.5	24.12	23.47	22.47
	1RB Low (0)	2312.5	23.86	23.10	22.18
		2310	23.84	23.09	22.14
		2307.5	23.89	23.20	22.21
	12RB High (13)	2312.5	22.91	22.08	21.20
		2310	23.00	22.14	21.22
		2307.5	23.03	22.18	21.24
	12RB Middle (6)	2312.5	23.02	22.19	21.25
		2310	23.09	22.30	21.31
		2307.5	23.05	22.24	21.28
	12RB Low (0)	2312.5	22.99	22.13	21.21
		2310	23.01	22.13	21.19
		2307.5	22.99	22.16	21.23
	25RB (0)	2312.5	23.01	22.17	21.20
		2310	23.04	22.21	21.24
		2307.5	23.04	22.20	21.23
10 MHz	1RB High (49)	2310	23.93	23.10	22.17
	1RB Middle (24)	2310	24.21	23.30	22.4
	1RB Low (0)	2310	24.11	23.27	22.33
	25RB High (25)	2310	23.16	22.16	21.19
	25RB Middle (12)	2310	23.20	22.21	21.25
	25RB Low (0)	2310	23.18	22.20	21.23
	50RB (0)	2310	23.19	22.19	21.24

DSI2

Band 30					
Bandwidth (MHz)	RB allocation RB offset (Start RB)	Frequency (MHz)	QPSK Actual output power (dBm)	16QAM Actual output power (dBm)	64QAM Actual output power (dBm)
5 MHz	1RB	2312.5	19.29	19.51	19.37

	High (24)	2310	19.28	19.52	19.4
		2307.5	19.32	19.59	19.42
	1RB Middle (12)	2312.5	19.54	19.71	19.68
		2310	19.67	19.91	19.72
		2307.5	19.62	19.79	19.75
	1RB Low (0)	2312.5	19.34	19.65	19.5
		2310	19.35	19.58	19.5
		2307.5	19.34	19.66	19.61
	12RB High (13)	2312.5	19.38	19.37	19.36
		2310	19.44	19.40	19.42
		2307.5	19.46	19.43	19.45
	12RB Middle (6)	2312.5	19.48	19.45	19.44
		2310	19.55	19.53	19.54
		2307.5	19.49	19.46	19.51
	12RB Low (0)	2312.5	19.41	19.40	19.43
		2310	19.44	19.39	19.44
		2307.5	19.42	19.42	19.43
	25RB (0)	2312.5	19.44	19.42	19.42
		2310	19.47	19.46	19.45
		2307.5	19.48	19.49	19.46
10 MHz	1RB High (49)	2310	19.51	19.34	19.2
	1RB Middle (24)	2310	19.62	19.67	19.56
	1RB Low (0)	2310	19.51	19.50	19.38
	25RB High (25)	2310	19.59	19.34	19.33
	25RB Middle (12)	2310	19.71	19.50	19.48
	25RB Low (0)	2310	19.80	19.63	19.61
	50RB (0)	2310	19.71	19.52	19.45

DSI0

Band 66					
BANDWIDTH	**Number of RBs**	**Frequency**	**QPSK**	**16QAM**	**64QAM**
1.4MHz	1RB-High (5)	1779.3 (132665)	22.19	22.20	22.06
		1745 (132322)	22.13	22.20	21.98
		1710.7 (131979)	22.16	22.21	22.14
	1RB-Middle (3)	1779.3 (132665)	22.21	22.26	22.18
		1745 (132322)	22.25	22.24	22.1
		1710.7 (131979)	22.29	22.22	22.19
	1RB-Low (0)	1779.3 (132665)	22.21	22.08	22.06
		1745 (132322)	22.13	22.14	22.04

		1710.7 (131979)	22.15	22.25	22.11
	3RB-High (3)	1779.3 (132665)	22.28	22.05	22.01
		1745 (132322)	22.22	21.93	22
		1710.7 (131979)	22.27	22.04	22.04
	3RB-Middle (1)	1779.3 (132665)	22.25	22.03	22.07
		1745 (132322)	22.26	21.99	22.13
		1710.7 (131979)	22.21	22.02	22.13
	3RB-Low (0)	1779.3 (132665)	22.22	21.97	22.06
		1745 (132322)	22.22	22.00	22.01
		1710.7 (131979)	22.27	22.04	22.07
	6RB (0)	1779.3 (132665)	22.22	22.01	21.06
		1745 (132322)	22.20	22.10	21
		1710.7 (131979)	22.25	22.14	21.04
3MHz	1RB-High (14)	1778.5 (132657)	22.18	22.19	22.09
		1745 (132322)	22.16	22.11	22.05
		1711.5 (131987)	22.14	22.24	22.09
	1RB-Middle (7)	1778.5 (132657)	22.40	22.21	22.26
		1745 (132322)	22.35	22.27	22.2
		1711.5 (131987)	22.38	22.27	22.28
	1RB-Low (0)	1778.5 (132657)	22.20	22.20	22.06
		1745 (132322)	22.15	22.24	22
		1711.5 (131987)	22.21	22.24	22.07
	8RB-High (7)	1778.5 (132657)	22.26	22.05	21.06
		1745 (132322)	22.21	21.99	20.98
		1711.5 (131987)	22.23	22.07	21.04
	8RB-Middle (4)	1778.5 (132657)	22.32	22.10	21.09
		1745 (132322)	22.23	22.05	21.03
		1711.5 (131987)	22.24	22.07	21.07
	8RB-Low (0)	1778.5 (132657)	22.29	22.05	21.1
		1745 (132322)	22.20	22.02	21
		1711.5 (131987)	22.22	22.07	21.07
	15RB (0)	1778.5 (132657)	22.29	22.05	21.04
		1745 (132322)	22.20	21.96	20.98
		1711.5 (131987)	22.22	22.01	21.02
5MHz	1RB-High (24)	1777.5 (132647)	22.10	22.04	22.01
		1745 (132322)	22.05	22.10	21.93
		1712.5 (131997)	22.07	22.08	22.06
	1RB-Middle (12)	1777.5 (132647)	22.34	22.20	22.16
		1745 (132322)	22.40	22.21	22.24
		1712.5 (131997)	22.35	22.25	22.23
	1RB-Low (0)	1777.5 (132647)	22.07	22.09	21.91
		1745 (132322)	22.05	22.09	21.91

		1712.5 (131997)	22.10	22.08	21.99
	12RB-High (13)	1777.5 (132647)	22.23	21.95	21
		1745 (132322)	22.17	21.95	20.99
		1712.5 (131997)	22.19	21.95	21
	12RB-Middle (6)	1777.5 (132647)	22.29	22.02	21.07
		1745 (132322)	22.23	21.98	21.04
		1712.5 (131997)	22.26	22.01	21.07
	12RB-Low (0)	1777.5 (132647)	22.27	21.96	21.04
		1745 (132322)	22.18	21.91	20.98
		1712.5 (131997)	22.21	21.97	21
	25RB (0)	1777.5 (132647)	22.27	22.00	21.03
		1745 (132322)	22.20	21.99	20.98
		1712.5 (131997)	22.21	21.99	21.03
10MHz	1RB-High (49)	1775 (132622)	22.16	22.09	22.06
		1745 (132322)	22.07	22.00	21.98
		1715 (132022)	22.03	22.09	22
	1RB-Middle (24)	1775 (132622)	22.30	22.23	22.13
		1745 (132322)	22.26	22.21	22.21
		1715 (132022)	22.25	22.21	22.22
	1RB-Low (0)	1775 (132622)	22.08	22.09	22.04
		1745 (132322)	22.16	22.20	22.03
		1715 (132022)	22.16	22.29	22.11
	25RB-High (25)	1775 (132622)	22.24	21.98	21.01
		1745 (132322)	22.22	21.96	20.98
		1715 (132022)	22.17	22.01	20.98
	25RB-Middle (12)	1775 (132622)	22.28	22.02	21.06
		1745 (132322)	22.27	22.05	21.02
		1715 (132022)	22.20	22.01	21.01
	25RB-Low (0)	1775 (132622)	22.32	22.05	21.07
		1745 (132322)	22.28	22.03	21.04
		1715 (132022)	22.23	22.02	21.04
	50RB (0)	1775 (132622)	22.29	22.04	21.04
		1745 (132322)	22.25	22.02	21.03
		1715 (132022)	22.20	22.01	20.98
15MHz	1RB-High (74)	1772.5 (132597)	22.16	22.16	21.99
		1745 (132322)	21.98	22.00	21.86
		1717.5 (132047)	21.98	22.16	22
	1RB-Middle (37)	1772.5 (132597)	22.18	22.19	22.06
		1745 (132322)	22.18	22.15	22.16
		1717.5 (132047)	22.15	22.15	22.08
	1RB-Low (0)	1772.5 (132597)	22.01	21.99	21.89
		1745 (132322)	22.15	22.20	22.06

		1717.5 (132047)	22.13	22.23	22.06
	36RB-High (38)	1772.5 (132597)	22.26	21.96	20.99
		1745 (132322)	22.16	21.91	20.94
		1717.5 (132047)	22.18	21.96	20.97
	36RB-Middle (19)	1772.5 (132597)	22.27	22.00	21.01
		1745 (132322)	22.28	21.98	21.03
		1717.5 (132047)	22.19	21.94	20.98
	36RB-Low (0)	1772.5 (132597)	22.27	21.99	21.01
		1745 (132322)	22.27	21.99	21.05
		1717.5 (132047)	22.22	21.99	21
	75RB (0)	1772.5 (132597)	22.25	21.99	20.98
		1745 (132322)	22.21	21.96	20.97
		1717.5 (132047)	22.18	21.95	20.96
20MHz	1RB-High (99)	1770 (132572)	22.20	22.22	22.07
		1745 (132322)	21.99	21.91	21.93
		1720 (132072)	22.08	22.16	22
	1RB-Middle (50)	1770 (132572)	22.32	22.27	22.11
		1745 (132322)	22.36	22.30	22.16
		1720 (132072)	22.29	22.33	22.35
	1RB-Low (0)	1770 (132572)	22.03	22.07	21.97
		1745 (132322)	22.15	22.21	22.07
		1720 (132072)	22.15	22.18	22.05
	50RB-High (50)	1770 (132572)	22.26	21.99	21
		1745 (132322)	22.18	21.93	20.95
		1720 (132072)	22.26	22.07	21.03
	50RB-Middle (25)	1770 (132572)	22.34	22.08	21.09
		1745 (132322)	22.35	22.11	21.12
		1720 (132072)	22.29	22.06	21.05
	50RB-Low (0)	1770 (132572)	22.33	22.06	21.07
		1745 (132322)	22.32	22.11	21.1
		1720 (132072)	22.26	22.05	21.05
	100RB (0)	1770 (132572)	22.28	22.01	21.04
		1745 (132322)	22.26	21.97	21
		1720 (132072)	22.23	22.00	21.01

DSI1

Band 66					
BANDWIDTH	**Number of RBs**	**Frequency**	**QPSK**	**16QAM**	**64QAM**
1.4MHz	1RB-High (5)	1779.3 (132665)	23.96	23.10	22.10
		1745 (132322)	23.88	23.00	22.04
		1710.7 (131979)	23.90	23.18	22.14

	1RB-Middle (3)	1779.3 (132665)	24.05	23.13	22.13
		1745 (132322)	23.97	23.10	22.10
		1710.7 (131979)	23.98	23.26	22.18
	1RB-Low (0)	1779.3 (132665)	23.96	23.08	22.11
		1745 (132322)	23.85	23.02	21.98
		1710.7 (131979)	23.90	23.19	22.12
	3RB-High (3)	1779.3 (132665)	24.06	22.97	22.11
		1745 (132322)	24.00	22.84	22.03
		1710.7 (131979)	24.02	23.02	22.15
	3RB-Middle (1)	1779.3 (132665)	24.14	23.04	22.12
		1745 (132322)	24.04	22.99	22.06
		1710.7 (131979)	24.05	23.07	22.18
	3RB-Low (0)	1779.3 (132665)	24.07	22.98	22.11
		1745 (132322)	23.97	22.92	22.02
		1710.7 (131979)	24.01	22.96	22.08
	6RB (0)	1779.3 (132665)	23.13	22.18	21.05
		1745 (132322)	23.02	22.04	20.95
		1710.7 (131979)	23.09	22.10	20.97
3MHz	1RB-High (14)	1778.5 (132657)	24.00	23.14	22.12
		1745 (132322)	23.93	23.10	22.11
		1711.5 (131987)	23.93	23.26	22.11
	1RB-Middle (7)	1778.5 (132657)	23.98	22.99	22.10
		1745 (132322)	23.98	23.04	22.02
		1711.5 (131987)	23.94	23.17	22.07
	1RB-Low (0)	1778.5 (132657)	23.80	23.01	21.93
		1745 (132322)	23.96	23.17	22.07
		1711.5 (131987)	23.97	23.17	22.17
	8RB-High (7)	1778.5 (132657)	23.11	22.11	21.15
		1745 (132322)	23.01	22.01	21.03
		1711.5 (131987)	23.02	22.05	21.04
	8RB-Middle (4)	1778.5 (132657)	23.14	22.08	21.16
		1745 (132322)	23.07	22.07	21.06
		1711.5 (131987)	23.06	22.10	21.09
	8RB-Low (0)	1778.5 (132657)	23.08	22.11	21.10
		1745 (132322)	23.04	22.08	21.06
		1711.5 (131987)	23.06	22.09	21.07
	15RB (0)	1778.5 (132657)	23.16	22.09	21.13
		1745 (132322)	23.06	22.02	21.05
		1711.5 (131987)	23.04	22.03	21.02
5MHz	1RB-High (24)	1777.5 (132647)	23.89	23.01	22.09
		1745 (132322)	23.79	22.99	22.07
		1712.5 (131997)	23.78	23.07	22.00

	1RB-Middle (12)	1777.5 (132647)	23.98	23.04	22.14
		1745 (132322)	23.91	23.06	22.05
		1712.5 (131997)	23.92	23.14	22.07
	1RB-Low (0)	1777.5 (132647)	23.87	23.08	22.06
		1745 (132322)	23.87	23.09	21.98
		1712.5 (131997)	23.85	23.03	22.06
	12RB-High (13)	1777.5 (132647)	23.09	22.06	21.10
		1745 (132322)	23.01	21.93	21.03
		1712.5 (131997)	23.02	21.99	21.03
	12RB-Middle (6)	1777.5 (132647)	23.17	22.08	21.13
		1745 (132322)	23.11	22.04	21.09
		1712.5 (131997)	23.08	22.04	21.07
	12RB-Low (0)	1777.5 (132647)	23.10	22.03	21.10
		1745 (132322)	23.06	21.96	21.04
		1712.5 (131997)	22.99	21.96	20.99
	25RB (0)	1777.5 (132647)	23.13	22.09	21.11
		1745 (132322)	23.06	22.04	21.03
		1712.5 (131997)	23.04	22.01	21.01
10MHz	1RB-High (49)	1775 (132622)	23.97	23.00	21.92
		1745 (132322)	23.85	22.84	21.78
		1715 (132022)	23.85	22.87	21.86
	1RB-Middle (24)	1775 (132622)	24.11	23.05	22.01
		1745 (132322)	24.09	23.05	21.98
		1715 (132022)	24.03	23.06	22.05
	1RB-Low (0)	1775 (132622)	23.87	22.86	21.87
		1745 (132322)	23.94	22.92	21.85
		1715 (132022)	23.95	22.98	21.86
	25RB-High (25)	1775 (132622)	23.15	22.09	21.11
		1745 (132322)	23.05	22.01	20.98
		1715 (132022)	23.05	22.03	20.98
	25RB-Middle (12)	1775 (132622)	23.08	22.10	21.11
		1745 (132322)	23.14	22.06	21.05
		1715 (132022)	23.07	22.03	21.01
	25RB-Low (0)	1775 (132622)	23.09	22.12	21.11
		1745 (132322)	23.11	22.04	21.06
		1715 (132022)	23.05	22.03	20.98
	50RB (0)	1775 (132622)	23.16	22.11	21.15
		1745 (132322)	23.09	22.00	21.00
		1715 (132022)	23.07	22.02	21.02
15MHz	1RB-High (74)	1772.5 (132597)	23.84	23.03	22.05
		1745 (132322)	23.73	22.89	21.88
		1717.5 (132047)	23.73	23.06	22.00

	1RB-Middle (37)	1772.5 (132597)	23.89	23.07	22.16
		1745 (132322)	23.97	23.08	22.09
		1717.5 (132047)	23.89	23.12	22.08
	1RB-Low (0)	1772.5 (132597)	23.76	23.08	21.89
		1745 (132322)	23.85	23.06	22.00
		1717.5 (132047)	23.89	23.09	22.07
	36RB-High (38)	1772.5 (132597)	23.04	22.01	21.01
		1745 (132322)	22.95	21.89	20.93
		1717.5 (132047)	23.00	21.92	20.96
	36RB-Middle (19)	1772.5 (132597)	23.06	22.03	21.02
		1745 (132322)	23.07	22.02	21.05
		1717.5 (132047)	23.01	21.95	20.95
	36RB-Low (0)	1772.5 (132597)	23.01	21.98	20.99
		1745 (132322)	23.05	21.99	21.04
		1717.5 (132047)	23.02	21.98	20.96
	75RB (0)	1772.5 (132597)	23.04	21.99	20.97
		1745 (132322)	23.02	21.97	20.98
		1717.5 (132047)	23.01	21.96	20.91
20MHz	1RB-High (99)	1770 (132572)	24.11	23.31	22.22
		1745 (132322)	23.98	23.13	22.06
		1720 (132072)	24.04	23.34	22.22
	1RB-Middle (50)	1770 (132572)	24.25	23.32	22.32
		1745 (132322)	24.21	23.45	22.45
		1720 (132072)	24.24	23.42	22.38
	1RB-Low (0)	1770 (132572)	23.95	23.22	22.14
		1745 (132322)	24.12	23.24	22.20
		1720 (132072)	24.11	23.39	22.25
	50RB-High (50)	1770 (132572)	23.23	22.21	21.19
		1745 (132322)	23.23	22.20	21.15
		1720 (132072)	23.28	22.27	21.22
	50RB-Middle (25)	1770 (132572)	23.32	22.27	21.29
		1745 (132322)	23.35	22.29	21.30
		1720 (132072)	23.26	22.25	21.20
	50RB-Low (0)	1770 (132572)	23.32	22.26	21.26
		1745 (132322)	23.37	22.32	21.28
		1720 (132072)	23.25	22.22	21.17
	100RB (0)	1770 (132572)	23.28	22.22	21.16
		1745 (132322)	23.30	22.22	21.22
		1720 (132072)	23.27	22.24	21.20

DSI2

Band 66

BANDWIDTH	Number of RBs	Frequency	QPSK	16QAM	64QAM
1.4MHz	1RB-High (5)	1779.3 (132665)	19.40	19.61	19.51
		1745 (132322)	19.32	19.54	19.48
		1710.7 (131979)	19.38	19.59	19.52
	1RB-Middle (3)	1779.3 (132665)	19.54	19.77	19.57
		1745 (132322)	19.46	19.74	19.48
		1710.7 (131979)	19.45	19.79	19.62
	1RB-Low (0)	1779.3 (132665)	19.38	19.67	19.51
		1745 (132322)	19.34	19.62	19.56
		1710.7 (131979)	19.36	19.57	19.5
	3RB-High (3)	1779.3 (132665)	19.47	19.41	19.52
		1745 (132322)	19.44	19.43	19.49
		1710.7 (131979)	19.46	19.44	19.52
	3RB-Middle (1)	1779.3 (132665)	19.53	19.45	19.55
		1745 (132322)	19.50	19.40	19.48
		1710.7 (131979)	19.53	19.46	19.56
	3RB-Low (0)	1779.3 (132665)	19.51	19.44	19.53
		1745 (132322)	19.43	19.40	19.45
		1710.7 (131979)	19.48	19.43	19.57
	6RB (0)	1779.3 (132665)	19.52	19.58	19.48
		1745 (132322)	19.45	19.55	19.37
		1710.7 (131979)	19.49	19.53	19.47
3MHz	1RB-High (14)	1778.5 (132657)	19.41	19.55	19.53
		1745 (132322)	19.36	19.66	19.56
		1711.5 (131987)	19.35	19.72	19.56
	1RB-Middle (7)	1778.5 (132657)	19.58	19.83	19.64
		1745 (132322)	19.56	19.67	19.64
		1711.5 (131987)	19.61	19.93	19.69
	1RB-Low (0)	1778.5 (132657)	19.37	19.62	19.48
		1745 (132322)	19.35	19.61	19.46
		1711.5 (131987)	19.40	19.73	19.6
	8RB-High (7)	1778.5 (132657)	19.43	19.48	19.46
		1745 (132322)	19.40	19.46	19.4
		1711.5 (131987)	19.41	19.48	19.44
	8RB-Middle (4)	1778.5 (132657)	19.49	19.49	19.47
		1745 (132322)	19.43	19.48	19.41
		1711.5 (131987)	19.45	19.51	19.45
	8RB-Low (0)	1778.5 (132657)	19.48	19.49	19.45
		1745 (132322)	19.38	19.44	19.41
		1711.5 (131987)	19.42	19.45	19.42
	15RB (0)	1778.5 (132657)	19.47	19.45	19.45

		1745 (132322)	19.41	19.43	19.37
		1711.5 (131987)	19.40	19.42	19.41
5MHz	1RB-High (24)	1777.5 (132647)	19.29	19.47	19.39
		1745 (132322)	19.23	19.57	19.41
		1712.5 (131997)	19.23	19.54	19.52
	1RB-Middle (12)	1777.5 (132647)	19.57	19.72	19.63
		1745 (132322)	19.48	19.75	19.65
		1712.5 (131997)	19.53	19.83	19.73
	1RB-Low (0)	1777.5 (132647)	19.26	19.50	19.4
		1745 (132322)	19.26	19.50	19.41
		1712.5 (131997)	19.27	19.53	19.4
	12RB-High (13)	1777.5 (132647)	19.40	19.39	19.38
		1745 (132322)	19.36	19.35	19.38
		1712.5 (131997)	19.40	19.38	19.43
	12RB-Middle (6)	1777.5 (132647)	19.50	19.46	19.44
		1745 (132322)	19.44	19.41	19.43
		1712.5 (131997)	19.46	19.45	19.46
	12RB-Low (0)	1777.5 (132647)	19.42	19.42	19.43
		1745 (132322)	19.37	19.33	19.35
		1712.5 (131997)	19.38	19.39	19.41
	25RB (0)	1777.5 (132647)	19.45	19.43	19.38
		1745 (132322)	19.39	19.38	19.36
		1712.5 (131997)	19.43	19.43	19.42
10MHz	1RB-High (49)	1775 (132622)	19.37	19.60	19.51
		1745 (132322)	19.25	19.50	19.42
		1715 (132022)	19.24	19.62	19.44
	1RB-Middle (24)	1775 (132622)	19.46	19.65	19.54
		1745 (132322)	19.46	19.70	19.56
		1715 (132022)	19.46	19.75	19.7
	1RB-Low (0)	1775 (132622)	19.30	19.61	19.39
		1745 (132322)	19.36	19.64	19.46
		1715 (132022)	19.34	19.60	19.56
	25RB-High (25)	1775 (132622)	19.44	19.44	19.38
		1745 (132322)	19.37	19.39	19.34
		1715 (132022)	19.37	19.39	19.36
	25RB-Middle (12)	1775 (132622)	19.46	19.43	19.43
		1745 (132322)	19.46	19.42	19.42
		1715 (132022)	19.40	19.40	19.4
	25RB-Low (0)	1775 (132622)	19.49	19.42	19.44
		1745 (132322)	19.45	19.43	19.42
		1715 (132022)	19.42	19.42	19.41
	50RB (0)	1775 (132622)	19.49	19.45	19.44

		1745 (132322)	19.44	19.44	19.42
		1715 (132022)	19.37	19.40	19.38
15MHz	1RB-High (74)	1772.5 (132597)	19.33	19.62	19.42
		1745 (132322)	19.18	19.46	19.25
		1717.5 (132047)	19.23	19.48	19.44
	1RB-Middle (37)	1772.5 (132597)	19.37	19.57	19.52
		1745 (132322)	19.42	19.67	19.53
		1717.5 (132047)	19.33	19.58	19.54
	1RB-Low (0)	1772.5 (132597)	19.21	19.47	19.33
		1745 (132322)	19.34	19.60	19.48
		1717.5 (132047)	19.35	19.53	19.51
	36RB-High (38)	1772.5 (132597)	19.44	19.39	19.4
		1745 (132322)	19.36	19.31	19.3
		1717.5 (132047)	19.38	19.35	19.38
	36RB-Middle (19)	1772.5 (132597)	19.45	19.42	19.42
		1745 (132322)	19.47	19.41	19.43
		1717.5 (132047)	19.41	19.39	19.39
	36RB-Low (0)	1772.5 (132597)	19.44	19.39	19.39
		1745 (132322)	19.45	19.42	19.44
		1717.5 (132047)	19.44	19.38	19.39
	75RB (0)	1772.5 (132597)	19.43	19.41	19.36
		1745 (132322)	19.39	19.39	19.36
		1717.5 (132047)	19.36	19.37	19.36
20MHz	1RB-High (99)	1770 (132572)	19.40	19.68	19.49
		1745 (132322)	19.20	19.36	19.31
		1720 (132072)	19.31	19.60	19.52
	1RB-Middle (50)	1770 (132572)	19.53	19.66	19.67
		1745 (132322)	19.51	19.75	19.66
		1720 (132072)	19.46	19.81	19.68
	1RB-Low (0)	1770 (132572)	19.24	19.52	19.34
		1745 (132322)	19.37	19.66	19.56
		1720 (132072)	19.35	19.66	19.48
	50RB-High (50)	1770 (132572)	19.44	19.42	19.4
		1745 (132322)	19.40	19.36	19.34
		1720 (132072)	19.47	19.47	19.47
	50RB-Middle (25)	1770 (132572)	19.53	19.48	19.48
		1745 (132322)	19.52	19.50	19.5
		1720 (132072)	19.45	19.46	19.46
	50RB-Low (0)	1770 (132572)	19.52	19.47	19.44
		1745 (132322)	19.52	19.52	19.48
		1720 (132072)	19.45	19.45	19.45
	100RB (0)	1770 (132572)	19.47	19.41	19.41

		1745 (132322)	19.43	19.39	19.38
		1720 (132072)	19.41	19.41	19.42

The conducted power measurement results of downlink LTE CA Conduted Power are as below:

DSI0											
DL LTE CA Class	SCC1					SCC2				Power	
	PCC Bandwidth	UL channel	DL channel	UL RB	UL RB OFFSET	SCC Bandwidth	DL channel	RB	RB OFFSET	tune up	conducted power（dBm）
12A-30A	10M	23095	5095	1	24	10M	9820	1	24	24.5	23.4
30A-12A	10M	27710	9820	1	24	10M	5095	1	24	20	19.58
2A-12A	20M	18900	900	1	50	10M	5095	1	24	22.5	21.86
12A-2A	10M	23095	5095	1	24	10M	900	1	50	24.5	23.45
2A-5A	20M	18900	900	1	50	10M	2525	1	24	22.5	21.89
5A-2A	10M	20525	2525	1	24	10M	900	1	50	24.5	23.7
5A-30A	10M	20525	2525	1	24	10M	9820	1	24	24.5	23.71
30A-5A	10M	27710	9820	1	24	10M	2525	1	24	20	19.57
2A-14A	20M	18900	900	1	50	10M	5330	1	24	22.5	21.91
14A-2A	10M	23330	5330	1	0	10M	900	1	50	24.5	23.52
14A-30A	10M	23330	5330	1	0	10M	9820	1	24	24.5	23.5
30A-14A	10M	27710	9820	1	24	10M	5330	1	24	20	19.59
DSI1											
DL LTE CA Class	SCC1					SCC2				Power	
	PCC Bandwidth	UL channel	DL channel	UL RB	UL RB OFFSET	SCC Bandwidth	DL channel	RB	RB OFFSET	tune up	conducted power（dBm）
12A-30A	10M	23060	5060	1	49	10M	9820	1	24	23	21.52
30A-12A	10M	27710	9820	1	24	10M	5095	1	24	24.5	24.17
2A-12A	20M	18900	900	1	50	10M	5095	1	24	24.5	23.74
12A-2A	10M	23060	5060	1	49	10M	900	1	50	23	21.52
2A-5A	20M	18900	900	1	50	10M	2525	1	24	24.5	23.71
5A-2A	10M	20525	2525	1	24	10M	900	1	50	23	21.83
5A-30A	10M	20525	2525	1	24	10M	9820	1	24	23	21.88
30A-5A	10M	27710	9820	1	24	10M	2525	1	24	24.5	24.17
2A-14A	20M	18900	900	1	50	10M	5330	1	49	24.5	23.69
14A-2A	10M	23330	5330	1	49	10M	900	1	50	22.5	21.94
14A-30A	10M	23330	5330	1	49	10M	9820	1	24	22.5	21.97
30A-14A	10M	27710	9820	1	24	10M	5330	1	49	24.5	23.17
DSI2											
DL LTE CA Class	SCC1					SCC2				Power	
	PCC Bandwidth	UL channel	DL channel	UL RB	UL RB OFFSET	SCC Bandwidth	DL channel	RB	RB OFFSET	tune up	conducted power（dBm）
12A-30A	10M	23095	5095	1	24	10M	9820	1	24	24.5	23.46
30A-12A	10M	27710	9820	1	24	10M	5095	1	24	21	20.47
2A-12A	20M	18900	900	1	50	10M	5095	1	24	20	19.03
12A-2A	10M	23095	5095	1	24	10M	900	1	50	24.5	23.46
5A-30A	10M	20525	2525	1	24	10M	9820	1	24	23	21.85
30A-5A	10M	27710	9820	1	24	10M	2525	1	24	20	19.56
14A-30A	10M	23330	5330	1	49	10M	9820	1	24	24.5	23.5
30A-14A	10M	27710	9820	1	24	10M	2525	1	24	20	19.57

LTEB4 frequency range is included in LTEB66, so LTEB4 does not need to be tested.

11.4 Wi-Fi and BT Measurement result

The maximum output power of BT is 10.05dBm.

The maximum tune up of BT is 10.5dBm.

The conducted output power for WLAN 2.4 GHz（Wifi only) power is as following

802.11b	Channel\data rate	1Mbps
WLAN2450	11(2462MHz)	18.36
	6(2437(MHz)	18.66
	1(2412MHz)	18.54
		19.00
802.11g	Channel\data rate	6Mbps
WLAN2450	11(2462MHz)	16.10

	6(2437(MHz)	16.26
	1(2412MHz)	16.50
		17.00
802.11n-20MHz	Channel\data rate	MCS0
WLAN2450	11(2462MHz)	15.46
	6(2437(MHz)	15.49
	1(2412MHz)	15.94
		16.00
802.11n-40MHz	Channel\data rate	MCS0
WLAN2450	9(2452MHz)	14.86
	6(2437MHz)	14.83
	3(2422MHz)	14.77
		15.00

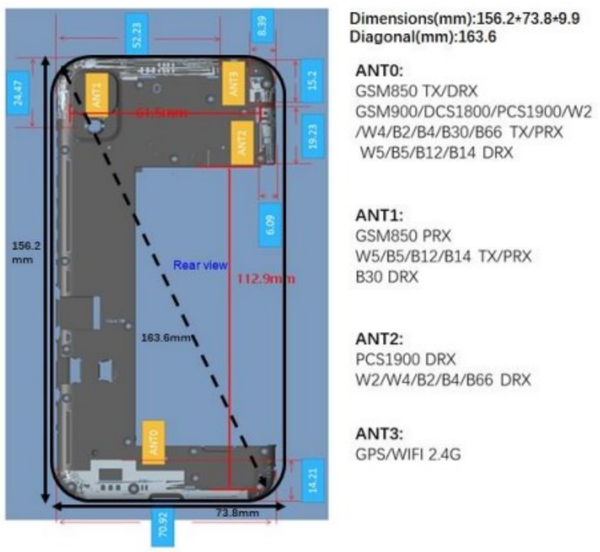
The conducted output power for WLAN 2.4 GHz（Wifi+cellular）power is as following

802.11b	Channel\data rate	1Mbps
WLAN2450	11(2462MHz)	16.47
	6(2437(MHz)	16.89
	1(2412MHz)	16.83
	tuneup	17.00
802.11g	Channel\data rate	6Mbps
WLAN2450	11(2462MHz)	14.02
	6(2437(MHz)	14.39
	1(2412MHz)	14.68
	tuneup	15.00
802.11n-20MHz	Channel\data rate	MCS0
WLAN2450	11(2462MHz)	13.63
	6(2437(MHz)	13.77
	1(2412MHz)	13.96
	tuneup	14.00
802.11n-40MHz	Channel\data rate	MCS0
WLAN2450	9(2452MHz)	12.99
	6(2437MHz)	12.97
	3(2422MHz)	12.96
	tuneup	13.00

12 Simultaneous TX SAR Considerations

12.1 Transmit Antenna Separation Distances

The location of the antennas inside mobile phone is shown below:



Antenna Gain for 4188R

Antenna	Pattern	Gain(dBi)			
GSM	PIFA	GSM 850	GSM 900	DCS1800	PCS1900
		-3.49	-5.91	-1.76	-1.54
WCDMA		Band II	Band IV	Band V	
		-1.54	-2.26	-3.49	
		FDD B2	FDD B4	FDD B5	FDD B12
		-1.54	-2.26	-3.49	-2.4
		FDD B14	FDD B30	FDD B66	
		-2.62	-1.48	-2.26	
GPS	PIFA	-4.5			
WIFI&BT	PIFA	-3.1			

Picture 12.1 Antenna Locations

12.2 SAR Measurement Positions

According to the KDB941225 D06 Hot Spot SAR v01, the edges with less than 2.5 cm distance to the antennas need to be tested for SAR.

SAR measurement positions						
Mode	Front	Rear	Left edge	Right edge	Top edge	Bottom edge
ANT0	Yes	Yes	Yes	Yes	No	Yes
ANT1	Yes	Yes	Yes	Yes	Yes	No
ANT3	Yes	Yes	Yes	No	Yes	No

12.3 Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.
The 1-g SAR test exclusion threshold for 100 MHz to 6 GHz at test separation distances≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

Table 12.1: Standalone SAR test exclusion considerations

Band/Mode	F(GHz)	Position	SAR test exclusion threshold(mW)	RF output power		SAR test exclusion
				dBm	mW	
Bluetooth	2.441	Head	9.60	10.5	11.2	YES
		Body	19.20	10.5	11.2	No
2.4GHz WLAN	2.45	Head	9.58	17	50.1	No
		Body	19.17	17	50.1	No

13 Evaluation of Simultaneous

Table 13.1: The sum of reported SAR values for Main antenna and WiFi+BT

	Position	Cellular antenna	WiFi	BT	Sum
Highest reported SAR value for Head	Right hand, Cheek (LTE Band5)	0.35	0.25	<0.01	**0.60**
Maximum reported SAR value for Body	Rear 10mm (WCDMA1700)	1.00	0.11	<0.01	**1.11**
	Bottom 10mm (WCDMA1700)	1.35	/	/	**1.35**

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance,mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm;
where x = 7.5 for 1-g SAR.
When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

Conclusion:
According to the above tables, the sum of reported SAR values is<1.6W/kg. So the simultaneous transmission SAR with volume scans is not required.

14 SAR Test Result

It is determined by user manual for the distance between the EUT and the phantom bottom. The distance is 10 mm or 15mm and just applied to the condition of body worn accessory.

It is performed for all SAR measurements with area scan based 1-g SAR estimation (Fast SAR). A zoom scan measurement is added when the estimated 1-gSAR is the highest measured SAR in each exposure configuration, wireless mode and frequency band combination or more than 1.2W/kg.

The calculated SAR is obtained by the following formula:

$$\text{Reported SAR} = \text{Measured SAR} \times 10^{(P_{\text{Target}} - P_{\text{Measured}})/10}$$

Where P_{Target} is the power of manufacturing upper limit;

$P_{Measured}$ is the measured power in chapter 11.

Table 14.1: Duty Cycle

Mode	**Duty Cycle**
GSM850&GSM1900	1:8.3
GPRS&EGPRS for GSM850	1:4
GPRS&EGPRS for GSM1900	1:2
WCDMA&LTE FDD	1:1

Note:

The **B1** is the battery of TLi028C7 by VEKEN

The **B2** is the battery of TLi028C1 by BYD

The **H** is the headset of CCB0049A12C1 by DALIN

14.1 SAR results for Fast SAR

RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test Position	Distance	Figure No./Note	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Head	GSM850	251	848.8	\	Left Cheek	0mm	Fig.A1	32.19	33.30	0.243	**0.31**	0.182	**0.24**	0.09
Head	GSM850	190	836.6	\	Left Cheek	0mm	\	32.16	33.30	0.225	**0.29**	0.170	**0.22**	-0.11
Head	GSM850	128	824.2	\	Left Cheek	0mm	\	32.10	33.30	0.186	**0.24**	0.140	**0.19**	-0.09
Head	GSM850	190	836.6	\	Left Tilt	0mm	\	32.16	33.30	0.127	**0.16**	0.100	**0.13**	0.00
Head	GSM850	190	836.6	\	Right Cheek	0mm	\	32.16	33.30	0.192	**0.25**	0.145	**0.19**	0.09
Head	GSM850	190	836.6	\	Right Tilt	0mm	\	32.16	33.30	0.110	**0.14**	0.089	**0.12**	-0.04
Head	GSM850	251	848.8	\	Left Cheek	0mm	\	32.19	33.30	0.223	**0.29**	0.170	**0.22**	-0.05
Body	GSM850	190	836.6	GPRS(2TX)	Front	10mm	\	29.88	30.50	0.220	**0.25**	0.163	**0.19**	-0.15
Body	GSM850	251	848.8	GPRS(2TX)	Rear	10mm	\	29.89	30.50	0.305	**0.35**	0.219	**0.25**	0.14
Body	GSM850	190	836.6	GPRS(2TX)	Rear	10mm	Fig.A2	29.88	30.50	0.324	**0.37**	0.237	**0.27**	-0.19
Body	GSM850	128	824.2	GPRS(2TX)	Rear	10mm	\	29.85	30.50	0.238	**0.28**	0.176	**0.20**	0.01
Body	GSM850	190	836.6	GPRS(2TX)	Left Edge	10mm	\	29.88	30.50	0.220	**0.25**	0.153	**0.18**	0.02
Body	GSM850	190	836.6	GPRS(2TX)	Right Edge	10mm	\	29.88	30.50	0.109	**0.13**	0.072	**0.08**	-0.08
Body	GSM850	190	836.6	GPRS(2TX)	Bottom Edge	10mm	\	29.88	30.50	0.085	**0.10**	0.045	**0.05**	-0.07
Body	GSM850	190	836.6	EGPRS(2TX)	Rear	10mm	\	29.91	30.50	0.311	**0.36**	0.230	**0.26**	-0.10
Body	GSM850	190	836.6	GPRS(2TX)	Rear	10mm	B2	29.88	30.50	0.317	**0.37**	0.229	**0.26**	0.13
Head	GSM1900	661	1880	\	Left Cheek	0mm	\	29.16	30.30	0.102	**0.13**	0.066	**0.09**	-0.07
Head	GSM1900	661	1880	\	Left Tilt	0mm	\	29.16	30.30	0.086	**0.11**	0.052	**0.07**	0.14
Head	GSM1900	810	1909.8	\	Right Cheek	0mm	\	29.13	30.30	0.108	**0.14**	0.070	**0.09**	0.02
Head	GSM1900	661	1880	\	Right Cheek	0mm	\	29.16	30.30	0.117	**0.15**	0.078	**0.10**	-0.15
Head	GSM1900	512	1850.2	\	Right Cheek	0mm	Fig.A3	29.39	30.30	0.130	**0.16**	0.083	**0.10**	0.16
Head	GSM1900	661	1880	\	Right Tilt	0mm	\	29.16	30.30	0.096	**0.13**	0.056	**0.07**	-0.05
Head	GSM1900	512	1850.2	\	Right Cheek	0mm	B2	29.39	30.30	0.119	**0.15**	0.081	**0.10**	0.14
Body	GSM1900	661	1880	GPRS(4TX)	Front	10mm	\	20.01	21.00	0.114	**0.14**	0.071	**0.09**	0.12
Body	GSM1900	661	1880	GPRS(4TX)	Rear	10mm	\	20.01	21.00	0.208	**0.26**	0.121	**0.15**	0.10
Body	GSM1900	661	1880	GPRS(4TX)	Left Edge	10mm	\	20.01	21.00	0.000	**0.00**	0.000	**0.00**	0.19
Body	GSM1900	661	1880	GPRS(4TX)	Right Edge	10mm	\	20.01	21.00	0.062	**0.08**	0.039	**0.05**	0.02
Body	GSM1900	810	1909.8	GPRS(4TX)	Bottom Edge	10mm	\	20.08	21.00	0.235	**0.29**	0.126	**0.16**	-0.13
Body	GSM1900	661	1880	GPRS(4TX)	Bottom Edge	10mm	\	20.01	21.00	0.243	**0.31**	0.134	**0.17**	-0.02
Body	GSM1900	512	1850.2	GPRS(4TX)	Bottom Edge	10mm	Fig.A4	20.09	21.00	0.319	**0.39**	0.172	**0.21**	-0.08
Body	GSM1900	512	1850.2	EGPRS(4TX)	Bottom Edge	10mm	\	20.09	21.00	0.291	**0.36**	0.165	**0.20**	0.11
Body	GSM1900	512	1850.2	GPRS(4TX)	Bottom Edge	10mm	B2	20.09	21.00	0.298	**0.37**	0.160	**0.20**	-0.11
Body	GSM1900	661	1880	GPRS(4TX)	Front	15mm	\	21.09	23.00	0.049	**0.08**	0.040	**0.06**	0.03
Body	GSM1900	661	1880	GPRS(4TX)	Rear	15mm	\	21.09	23.00	0.078	**0.12**	0.059	**0.09**	-0.12
Body	GSM1900	810	1909.8	GPRS(4TX)	Rear	15mm	\	21.08	23.00	0.061	**0.10**	0.041	**0.06**	-0.11
Body	GSM1900	512	1850.2	GPRS(4TX)	Rear	15mm	Fig.A5	21.06	23.00	0.115	**0.18**	0.067	**0.10**	0.00
Body	GSM1900	512	1850.2	EGPRS(4TX)	Rear	15mm	\	21.09	23.00	0.115	**0.18**	0.067	**0.10**	0.00
Body	GSM1900	512	1850.2	GPRS(4TX)	Rear	15mm	B2	21.06	23.00	0.102	**0.16**	0.061	**0.10**	0.05

RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test Position	Distance	Figure No./Note	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Head	WCDMA1900	9400	1880	RMC	Left Cheek	0mm	\	23.30	24.00	0.226	**0.27**	0.145	**0.17**	0.07
Head	WCDMA1900	9400	1880	RMC	Left Tilt	0mm	\	23.30	24.00	0.189	**0.22**	0.120	**0.14**	-0.16
Head	WCDMA1900	9538	1907.6	RMC	Right Cheek	0mm	Fig.A6	23.33	24.00	0.281	**0.33**	0.181	**0.21**	-0.18
Head	WCDMA1900	9400	1880	RMC	Right Cheek	0mm	\	23.30	24.00	0.276	**0.32**	0.178	**0.21**	0.04
Head	WCDMA1900	9262	1852.4	RMC	Right Cheek	0mm	\	23.35	24.00	0.269	**0.31**	0.174	**0.20**	-0.03
Head	WCDMA1900	9400	1880	RMC	Right Tilt	0mm	\	23.30	24.00	0.228	**0.27**	0.136	**0.16**	0.02
Head	WCDMA1900	9538	1907.6	RMC	Right Cheek	0mm	B2	23.33	24.00	0.264	**0.31**	0.170	**0.20**	-0.18
Body	WCDMA1900	9400	1880	RMC	Front	10mm	\	18.40	19.50	0.167	**0.22**	0.095	**0.12**	0.06
Body	WCDMA1900	9400	1880	RMC	Rear	10mm	\	18.40	19.50	0.293	**0.38**	0.161	**0.21**	0.06
Body	WCDMA1900	9400	1880	RMC	Left Edge	10mm	\	18.40	19.50	0.057	**0.07**	0.033	**0.04**	-0.15
Body	WCDMA1900	9400	1880	RMC	Right Edge	10mm	\	18.40	19.50	0.097	**0.13**	0.056	**0.07**	-0.06
Body	WCDMA1900	9538	1907.6	RMC	Bottom Edge	10mm	\	18.54	19.50	0.339	**0.42**	0.175	**0.22**	-0.15
Body	WCDMA1900	9400	1880	RMC	Bottom Edge	10mm	\	18.40	19.50	0.369	**0.48**	0.188	**0.24**	0.01
Body	WCDMA1900	9262	1852.4	RMC	Bottom Edge	10mm	Fig.A7	18.53	19.50	0.417	**0.52**	0.215	**0.27**	-0.07
Body	WCDMA1900	9262	1852.4	RMC	Bottom Edge	10mm	B2	18.53	19.50	0.381	**0.48**	0.192	**0.24**	0.16
Body	WCDMA1900	9400	1880	RMC	Front	15mm	\	21.42	22.50	0.131	**0.17**	0.081	**0.10**	0.00
Body	WCDMA1900	9538	1907.6	RMC	Rear	15mm	\	21.45	22.50	0.211	**0.27**	0.123	**0.16**	-0.01
Body	WCDMA1900	9400	1880	RMC	Rear	15mm	\	21.42	22.50	0.214	**0.27**	0.125	**0.16**	-0.14
Body	WCDMA1900	9262	1852.4	RMC	Rear	15mm	Fig.A8	21.43	22.50	0.240	**0.31**	0.143	**0.18**	-0.15
Body	WCDMA1900	9262	1852.4	RMC	Rear	15mm	B2	21.43	22.50	0.229	**0.29**	0.137	**0.18**	-0.19
Head	WCDMA1700	1412	1732.4	RMC	Left Cheek	0mm	\	23.46	24.50	0.178	**0.23**	0.120	**0.15**	-0.13
Head	WCDMA1700	1513	1752.6	RMC	Left Cheek	0mm	Fig.A9	23.65	24.50	0.211	**0.26**	0.140	**0.17**	0.06
Head	WCDMA1700	1312	1712.4	RMC	Left Cheek	0mm	\	23.80	24.50	0.166	**0.20**	0.110	**0.13**	0.19
Head	WCDMA1700	1412	1732.4	RMC	Left Tilt	0mm	\	23.46	24.50	0.121	**0.15**	0.082	**0.10**	-0.13
Head	WCDMA1700	1412	1732.4	RMC	Right Cheek	0mm	\	23.46	24.50	0.150	**0.19**	0.099	**0.13**	0.18
Head	WCDMA1700	1412	1732.4	RMC	Right Tilt	0mm	\	23.46	24.50	0.131	**0.17**	0.084	**0.11**	-0.14
Head	WCDMA1700	1513	1752.6	RMC	Left Cheek	0mm	B2	23.65	24.50	0.184	**0.22**	0.124	**0.15**	0.05
Body	WCDMA1700	1412	1732.5	RMC	Front	10mm	\	18.60	19.50	0.384	**0.47**	0.235	**0.29**	0.05
Body	WCDMA1700	1412	1732.5	RMC	Rear	10mm	\	18.60	19.50	0.811	**1.00**	0.388	**0.48**	0.18
Body	WCDMA1700	1412	1732.5	RMC	Left Edge	10mm	\	18.60	19.50	0.109	**0.13**	0.071	**0.09**	-0.07
Body	WCDMA1700	1412	1732.5	RMC	Right Edge	10mm	\	18.60	19.50	0.073	**0.09**	0.049	**0.06**	0.09
Body	WCDMA1700	1513	1752.6	RMC	Bottom Edge	10mm	\	18.83	19.50	0.972	**1.13**	0.564	**0.66**	-0.19
Body	WCDMA1700	1412	1732.5	RMC	Bottom Edge	10mm	Fig.A10	18.60	19.50	1.100	**1.35**	0.572	**0.70**	-0.03
Body	WCDMA1700	1312	1712.4	RMC	Bottom Edge	10mm	\	18.89	19.50	0.963	**1.11**	0.561	**0.65**	-0.11
Body	WCDMA1700	1513	1752.6	RMC	Rear	0mm	\	20.95	21.50	3.180	**3.61**	1.040	**1.18**	-0.14
Body	WCDMA1700	1412	1732.5	RMC	Rear	0mm	\	20.68	21.50	3.103	**3.75**	1.100	**1.33**	0.03
Body	WCDMA1700	1312	1712.4	RMC	Rear	0mm	\	20.97	21.50	3.26	**3.68**	1.19	**1.35**	0.15
Body	WCDMA1700	1513	1752.6	RMC	Bottom Edge	0mm	\	20.95	21.50	2.511	**2.85**	1.120	**1.27**	-0.13
Body	WCDMA1700	1412	1732.5	RMC	Bottom Edge	0mm	\	20.68	21.50	2.621	**3.17**	1.13	**1.36**	-0.17
Body	WCDMA1700	1312	1712.4	RMC	Bottom Edge	0mm	\	20.97	21.50	2.593	**2.93**	1.030	**1.16**	0.01
Body	WCDMA1700	1412	1732.5	RMC	Bottom Edge	10mm	B2	18.60	19.50	0.995	**1.22**	0.560	**0.69**	0.04
Body	WCDMA1700	1412	1732.5	RMC	Bottom Edge	10mm	H	18.60	19.50	0.990	**1.22**	0.555	**0.68**	0.14
Body	WCDMA1700	1412	1732.5	RMC	Front	15mm	\	20.68	21.50	0.087	**0.10**	0.049	**0.06**	-0.08
Body	WCDMA1700	1513	1752.6	RMC	Rear	15mm	\	20.95	21.50	0.189	**0.21**	0.115	**0.13**	0.09
Body	WCDMA1700	1412	1732.5	RMC	Rear	15mm	Fig.A11	20.68	21.50	0.198	**0.24**	0.120	**0.14**	-0.18
Body	WCDMA1700	1312	1712.4	RMC	Rear	15mm	\	20.97	21.50	0.20	**0.23**	0.121	**0.14**	-0.14
Body	WCDMA1700	1312	1712.4	RMC	Rear	15mm	B2	20.97	21.50	0.20	**0.22**	0.115	**0.13**	0.19
Head	WCDMA 850	4183	836.6	RMC	Left Cheek	0mm	\	22.18	23.00	0.061	**0.07**	0.035	**0.04**	-0.19
Head	WCDMA 850	4183	836.6	RMC	Left Tilt	0mm	\	22.18	23.00	0.064	**0.08**	0.035	**0.04**	0.08
Head	WCDMA 850	4132	826.4	RMC	Right Cheek	0mm	\	22.13	23.00	0.069	**0.08**	0.037	**0.05**	0.08
Head	WCDMA 850	4183	836.6	RMC	Right Cheek	0mm	Fig.A12	22.18	23.00	0.103	**0.12**	0.056	**0.07**	-0.18
Head	WCDMA 850	4233	846.6	RMC	Right Cheek	0mm	\	22.13	23.00	0.063	**0.08**	0.034	**0.04**	0.19
Head	WCDMA 850	4183	836.6	RMC	Right Tilt	0mm	\	22.18	23.00	0.063	**0.08**	0.032	**0.04**	-0.14
Head	WCDMA 850	4183	836.6	RMC	Right Cheek	0mm	B2	22.18	23.00	0.091	**0.11**	0.051	**0.06**	-0.03
Body	WCDMA 850	4183	836.6	RMC	Front	10mm	\	23.41	24.50	0.116	**0.15**	0.072	**0.09**	-0.10
Body	WCDMA 850	4233	846.6	RMC	Rear	10mm	\	23.43	24.50	0.352	**0.45**	0.198	**0.25**	0.19
Body	WCDMA 850	4183	836.6	RMC	Rear	10mm	\	23.41	24.50	0.343	**0.44**	0.198	**0.25**	-0.18
Body	WCDMA 850	4132	826.4	RMC	Rear	10mm	Fig.A13	23.46	24.50	0.390	**0.50**	0.220	**0.28**	0.08
Body	WCDMA 850	4183	836.6	RMC	Left Edge	10mm	\	23.41	24.50	0.010	**0.01**	0.003	**0.00**	-0.16
Body	WCDMA 850	4183	836.6	RMC	Right Edge	10mm	\	23.41	24.50	0.108	**0.14**	0.076	**0.10**	0.08
Body	WCDMA 850	4183	836.6	RMC	Top Edge	10mm	\	23.41	24.50	0.160	**0.21**	0.084	**0.11**	0.04
Body	WCDMA 850	4132	826.4	RMC	Rear	10mm	B2	23.46	24.50	0.372	**0.47**	0.206	**0.26**	-0.10

RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test Position	Distance	Figure No./Note	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Head	LTE Band2	19100	1900	1RB-Middle	Left Cheek	0mm	\	23.79	24.5	0.211	**0.25**	0.132	**0.16**	0.18
Head	LTE Band2	19100	1900	1RB-Middle	Left Tilt	0mm	\	23.79	24.5	0.192	**0.23**	0.122	**0.14**	0.14
Head	LTE Band2	19100	1900	1RB-Middle	Right Cheek	0mm	Fig.A14	23.79	24.5	0.281	**0.33**	0.183	**0.22**	0.01
Head	LTE Band2	19100	1900	1RB-Middle	Right Tilt	0mm	\	23.79	24.5	0.219	**0.26**	0.130	**0.15**	-0.15
Head	LTE Band2	18900	1880	50RB-Low	Left Cheek	0mm	\	22.84	23.50	0.191	**0.22**	0.123	**0.14**	-0.08
Head	LTE Band2	18900	1880	50RB-Low	Left Tilt	0mm	\	22.84	23.50	0.153	**0.18**	0.096	**0.11**	-0.13
Head	LTE Band2	18900	1880	50RB-Low	Right Cheek	0mm	\	22.84	23.50	0.222	**0.26**	0.144	**0.17**	-0.14
Head	LTE Band2	18900	1880	50RB-Low	Right Tilt	0mm	\	22.84	23.50	0.194	**0.23**	0.114	**0.13**	-0.04
Head	LTE Band2	19100	1900	1RB-Middle	Right Cheek	0mm	B2	23.79	24.5	0.266	**0.31**	0.174	**0.20**	-0.01
Body	LTE Band2	18900	1880	1RB-Middle	Front	10mm	\	19.11	20	0.181	**0.22**	0.108	**0.13**	0.03
Body	LTE Band2	18900	1880	1RB-Middle	Rear	10mm	\	19.11	20	0.322	**0.40**	0.183	**0.23**	0.09
Body	LTE Band2	18900	1880	1RB-Middle	Left Edge	10mm	\	19.11	20	0.000	**0.00**	0.000	**0.00**	-0.19
Body	LTE Band2	18900	1880	1RB-Middle	Right Edge	10mm	\	19.11	20	0.096	**0.12**	0.057	**0.07**	0.19
Body	LTE Band2	18900	1880	1RB-Middle	Bottom Edge	10mm	\	19.11	20	0.380	**0.47**	0.203	**0.25**	-0.01
Body	LTE Band2	18900	1880	50RB-Low	Front	10mm	\	19.09	20	0.179	**0.22**	0.108	**0.13**	0.09
Body	LTE Band2	18900	1880	50RB-Low	Rear	10mm	\	19.09	20	0.305	**0.38**	0.169	**0.21**	-0.08
Body	LTE Band2	18900	1880	50RB-Low	Left Edge	10mm	\	19.09	20	0.057	**0.07**	0.035	**0.04**	-0.18
Body	LTE Band2	18900	1880	50RB-Low	Right Edge	10mm	\	19.09	20	0.099	**0.12**	0.059	**0.07**	-0.08
Body	LTE Band2	18900	1880	50RB-Low	Bottom Edge	10mm	Fig.A15	19.09	20	0.410	**0.51**	0.219	**0.27**	-0.18
Body	LTE Band2	18900	1880	1RB-Middle	Bottom Edge	10mm	B2	19.09	20	0.385	**0.47**	0.190	**0.23**	0.07
Body	LTE Band2	19100	1900	1RB-Middle	Front	15mm	\	22.04	22.5	0.255	**0.28**	0.149	**0.17**	0.07
Body	LTE Band2	19100	1900	1RB-Middle	Rear	15mm	\	22.04	22.5	0.457	**0.51**	0.257	**0.29**	-0.10
Body	LTE Band2	18900	1880	50RB-Low	Front	15mm	\	22.08	22.5	0.292	**0.32**	0.168	**0.18**	0.03
Body	LTE Band2	18900	1880	50RB-Low	Rear	15mm	Fig.A16	22.08	22.5	0.476	**0.52**	0.264	**0.29**	0.01
Body	LTE Band2	18900	1880	50RB-Low	Rear	15mm	B2	22.08	22.5	0.460	**0.51**	0.241	**0.27**	-0.16
Head	LTE Band5	20600	844	1RB-Middle	Left Cheek	0mm	\	21.96	23	0.271	**0.34**	0.197	**0.25**	0.07
Head	LTE Band5	20600	844	1RB-Middle	Left Tilt	0mm	\	21.96	23	0.257	**0.33**	0.164	**0.21**	-0.13
Head	LTE Band5	20600	844	1RB-Middle	Right Cheek	0mm	\	21.96	23	0.272	**0.35**	0.179	**0.23**	-0.11
Head	LTE Band5	20600	844	1RB-Middle	Right Tilt	0mm	\	21.96	23	0.256	**0.33**	0.156	**0.20**	0.00
Head	LTE Band5	20600	844	25RB-Low	Left Cheek	0mm	Fig.A17	21.92	23	0.278	**0.36**	0.174	**0.22**	-0.12
Head	LTE Band5	20600	844	25RB-Low	Left Tilt	0mm	\	21.92	23	0.258	**0.33**	0.178	**0.23**	-0.17
Head	LTE Band5	20600	844	25RB-Low	Right Cheek	0mm	\	21.92	23	0.275	**0.35**	0.181	**0.23**	0.14
Head	LTE Band5	20600	844	25RB-Low	Right Tilt	0mm	\	21.92	23	0.257	**0.33**	0.157	**0.20**	0.02
Head	LTE Band5	20600	844	25RB-Low	Left Cheek	0mm	B2	21.92	23	0.251	**0.32**	0.169	**0.22**	-0.08
Body	LTE Band5	20525	836.5	1RB-Middle	Front	10mm	\	23.72	24.5	0.219	**0.26**	0.127	**0.15**	0.10
Body	LTE Band5	20525	836.5	1RB-Middle	Rear	10mm	Fig.A18	23.72	24.5	0.586	**0.70**	0.318	**0.38**	-0.14
Body	LTE Band5	20525	836.5	1RB-Middle	Left Edge	10mm	\	23.72	24.5	0.181	**0.22**	0.116	**0.14**	-0.14
Body	LTE Band5	20525	836.5	1RB-Middle	Right Edge	10mm	\	23.72	24.5	0.268	**0.32**	0.172	**0.21**	-0.17
Body	LTE Band5	20525	836.5	1RB-Middle	Top Edge	10mm	\	23.72	24.5	0.397	**0.48**	0.197	**0.24**	-0.13
Body	LTE Band5	20600	844	25RB-Middle	Front	10mm	\	22.74	23.50	0.166	**0.20**	0.098	**0.12**	0.05
Body	LTE Band5	20600	844	25RB-Middle	Rear	10mm	\	22.74	23.50	0.456	**0.54**	0.247	**0.29**	-0.17
Body	LTE Band5	20600	844	25RB-Middle	Left Edge	10mm	\	22.74	23.50	0.142	**0.17**	0.091	**0.11**	0.02
Body	LTE Band5	20600	844	25RB-Middle	Right Edge	10mm	\	22.74	23.50	0.320	**0.38**	0.203	**0.24**	0.17
Body	LTE Band5	20600	844	25RB-Middle	Top Edge	10mm	\	22.74	23.50	0.305	**0.36**	0.149	**0.18**	-0.08
Body	LTE Band5	20525	836.5	1RB-Middle	Rear	10mm	B2	23.72	24.5	0.576	**0.69**	0.285	**0.34**	-0.08
Head	LTE Band12	23060	704	1RB-Middle	Left Cheek	0mm	\	21.81	23	0.111	**0.15**	0.097	**0.13**	0.11
Head	LTE Band12	23060	704	1RB-Middle	Left Tilt	0mm	\	21.81	23	0.099	**0.13**	0.079	**0.10**	-0.04
Head	LTE Band12	23060	704	1RB-Middle	Right Cheek	0mm	\	21.81	23	0.121	**0.16**	0.110	**0.14**	0.10
Head	LTE Band12	23060	704	1RB-Middle	Right Tilt	0mm	\	21.81	23	0.116	**0.15**	0.090	**0.12**	0.08
Head	LTE Band12	23060	704	25RB-Low	Left Cheek	0mm	Fig.A19	21.79	23	0.259	**0.34**	0.166	**0.22**	0.13
Head	LTE Band12	23060	704	25RB-Low	Left Tilt	0mm	\	21.79	23	0.137	**0.18**	0.090	**0.12**	-0.01
Head	LTE Band12	23060	704	25RB-Low	Right Cheek	0mm	\	21.79	23	0.109	**0.14**	0.094	**0.12**	-0.07
Head	LTE Band12	23060	704	25RB-Low	Right Tilt	0mm	\	21.79	23	0.099	**0.13**	0.080	**0.11**	0.02
Head	LTE Band12	23060	704	25RB-Low	Left Cheek	0mm	B2	21.79	23	0.244	**0.32**	0.147	**0.19**	-0.15
Body	LTE Band12	23060	704	1RB-Middle	Front	10mm	\	23.55	24.5	0.257	**0.32**	0.194	**0.24**	0.09
Body	LTE Band12	23060	704	1RB-Middle	Rear	10mm	Fig.A20	23.55	24.5	0.479	**0.60**	0.360	**0.45**	-0.09
Body	LTE Band12	23060	704	1RB-Middle	Left Edge	10mm	\	23.55	24.5	0.207	**0.26**	0.145	**0.18**	-0.16
Body	LTE Band12	23060	704	1RB-Middle	Right Edge	10mm	\	23.55	24.5	0.258	**0.32**	0.183	**0.23**	-0.16
Body	LTE Band12	23060	704	1RB-Middle	Top Edge	10mm	\	23.55	24.5	0.214	**0.27**	0.124	**0.15**	0.14
Body	LTE Band12	23095	707.5	25RB-Low	Front	10mm	\	22.66	23.50	0.206	**0.25**	0.157	**0.19**	-0.16
Body	LTE Band12	23095	707.5	25RB-Low	Rear	10mm	\	22.66	23.50	0.342	**0.42**	0.254	**0.31**	0.19
Body	LTE Band12	23095	707.5	25RB-Low	Left Edge	10mm	\	22.66	23.50	0.183	**0.22**	0.129	**0.16**	0.10
Body	LTE Band12	23095	707.5	25RB-Low	Right Edge	10mm	\	22.66	23.50	0.200	**0.24**	0.141	**0.17**	0.16
Body	LTE Band12	23095	707.5	25RB-Low	Top Edge	10mm	\	22.66	23.50	0.164	**0.20**	0.094	**0.11**	0.10
Body	LTE Band12	23060	704	1RB-Middle	Rear	10mm	B2	23.55	24.5	0.456	**0.57**	0.341	**0.42**	0.18
Head	LTE Band14	23230	793	1RB-High	Left Cheek	0mm	Fig.A21	22.01	23	0.245	**0.31**	0.162	**0.20**	0.10
Head	LTE Band14	23230	793	1RB-High	Left Tilt	0mm	\	22.01	23	0.200	**0.25**	0.115	**0.15**	-0.01
Head	LTE Band14	23230	793	1RB-High	Right Cheek	0mm	\	22.01	23	0.241	**0.30**	0.149	**0.19**	-0.14
Head	LTE Band14	23230	793	1RB-High	Right Tilt	0mm	\	22.01	23	0.213	**0.27**	0.122	**0.15**	0.04
Head	LTE Band14	23230	793	25RB-Middle	Left Cheek	0mm	\	21.87	23	0.243	**0.32**	0.163	**0.21**	0.04
Head	LTE Band14	23230	793	25RB-Middle	Left Tilt	0mm	\	21.87	23	0.199	**0.26**	0.114	**0.15**	0.19
Head	LTE Band14	23230	793	25RB-Middle	Right Cheek	0mm	\	21.87	23	0.234	**0.30**	0.146	**0.19**	0.08
Head	LTE Band14	23230	793	25RB-Middle	Right Tilt	0mm	\	21.87	23	0.207	**0.27**	0.120	**0.16**	-0.09
Head	LTE Band14	23230	793	1RB-High	Left Cheek	0mm	B2	22.01	23	0.229	**0.29**	0.150	**0.19**	0.01
Body	LTE Band14	23330	793	1RB-Low	Front	10mm	\	23.57	24.5	0.227	**0.28**	0.127	**0.16**	0.03
Body	LTE Band14	23330	793	1RB-Low	Rear	10mm	Fig.A22	23.57	24.5	0.408	**0.51**	0.226	**0.28**	0.00
Body	LTE Band14	23330	793	1RB-Low	Left Edge	10mm	\	23.57	24.5	0.203	**0.25**	0.105	**0.13**	0.18
Body	LTE Band14	23330	793	1RB-Low	Right Edge	10mm	\	23.57	24.5	0.255	**0.32**	0.132	**0.16**	0.01
Body	LTE Band14	23330	793	1RB-Low	Top Edge	10mm	\	23.57	24.5	0.274	**0.34**	0.109	**0.13**	-0.13
Body	LTE Band14	23330	793	25RB-High	Front	10mm	\	22.97	23.50	0.186	**0.21**	0.104	**0.12**	-0.12
Body	LTE Band14	23330	793	25RB-High	Rear	10mm	\	22.97	23.50	0.288	**0.33**	0.157	**0.18**	-0.11
Body	LTE Band14	23330	793	25RB-High	Left Edge	10mm	\	22.97	23.50	0.212	**0.24**	0.109	**0.12**	0.06
Body	LTE Band14	23330	793	25RB-High	Right Edge	10mm	\	22.97	23.50	0.346	**0.39**	0.178	**0.20**	0.09
Body	LTE Band14	23330	793	25RB-High	Top Edge	10mm	\	22.97	23.50	0.215	**0.24**	0.085	**0.10**	0.08
Body	LTE Band14	23330	793	1RB-Low	Rear	10mm	B2	23.57	24.5	0.380	**0.47**	0.211	**0.26**	0.02

RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test Position	Distance	Figure No./Note	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Head	LTE Band30	27710	2310	1RB-Middle	Left Cheek	0mm	\	24.21	24.5	0.161	**0.17**	0.095	**0.10**	-0.08
Head	LTE Band30	27710	2310	1RB-Middle	Left Tilt	0mm	\	24.21	24.5	0.110	**0.12**	0.066	**0.07**	-0.07
Head	LTE Band30	27710	2310	1RB-Middle	Right Cheek	0mm	Fig.A23	24.21	24.5	0.216	**0.23**	0.130	**0.14**	-0.14
Head	LTE Band30	27710	2310	1RB-Middle	Right Tilt	0mm	\	24.21	24.5	0.178	**0.19**	0.098	**0.10**	0.04
Head	LTE Band30	27710	2310	25RB-Middle	Left Cheek	0mm	\	23.20	23.50	0.140	**0.15**	0.079	**0.08**	-0.03
Head	LTE Band30	27710	2310	25RB-Middle	Left Tilt	0mm	\	23.20	23.50	0.084	**0.09**	0.051	**0.05**	-0.17
Head	LTE Band30	27710	2310	25RB-Middle	Right Cheek	0mm	\	23.20	23.50	0.155	**0.17**	0.093	**0.10**	0.17
Head	LTE Band30	27710	2310	25RB-Middle	Right Tilt	0mm	\	23.20	23.50	0.132	**0.14**	0.073	**0.08**	0.02
Head	LTE Band30	27710	2310	1RB-Middle	Right Cheek	0mm	B2	24.21	24.5	0.210	**0.22**	0.121	**0.13**	0.11
Body	LTE Band30	27710	2310	1RB-Middle	Front	10mm	\	19.62	20	0.105	**0.11**	0.057	**0.06**	-0.04
Body	LTE Band30	27710	2310	1RB-Middle	Rear	10mm	Fig.A24	19.62	20	0.276	**0.30**	0.132	**0.14**	-0.03
Body	LTE Band30	27710	2310	1RB-Middle	Left Edge	10mm	\	19.62	20	0.031	**0.03**	0.019	**0.02**	-0.07
Body	LTE Band30	27710	2310	1RB-Middle	Right Edge	10mm	\	19.62	20	0.090	**0.10**	0.053	**0.06**	0.14
Body	LTE Band30	27710	2310	1RB-Middle	Bottom Edge	10mm	\	19.62	20	0.207	**0.23**	0.102	**0.11**	0.05
Body	LTE Band30	27710	2310	25RB-Low	Front	10mm	\	19.80	20	0.102	**0.11**	0.055	**0.06**	0.16
Body	LTE Band30	27710	2310	25RB-Low	Rear	10mm	\	19.80	20	0.238	**0.25**	0.119	**0.12**	0.13
Body	LTE Band30	27710	2310	25RB-Low	Left Edge	10mm	\	19.80	20	0.034	**0.04**	0.020	**0.02**	-0.10
Body	LTE Band30	27710	2310	25RB-Low	Right Edge	10mm	\	19.80	20	0.092	**0.10**	0.054	**0.06**	0.15
Body	LTE Band30	27710	2310	25RB-Low	Bottom Edge	10mm	\	19.80	20	0.190	**0.20**	0.095	**0.10**	-0.11
Body	LTE Band30	27710	2310	25RB-Low	Rear	10mm	B2	19.62	20	0.262	**0.29**	0.120	**0.13**	0.05
Body	LTE Band30	27710	2310	1RB-Middle	Front	15mm	\	20.63	21	0.069	**0.08**	0.044	**0.05**	-0.05
Body	LTE Band30	27710	2310	1RB-Middle	Rear	15mm	\	20.63	21	0.173	**0.19**	0.088	**0.10**	-0.02
Body	LTE Band30	27710	2310	25RB-Low	Front	15mm	\	20.78	21	0.073	**0.08**	0.042	**0.04**	-0.18
Body	LTE Band30	27710	2310	25RB-Low	Rear	15mm	Fig.A25	20.78	21	0.176	**0.19**	0.091	**0.10**	-0.16
Body	LTE Band30	27710	2310	25RB-Low	Rear	15mm	B2	20.78	21	0.176	**0.19**	0.091	**0.10**	0.06
Head	LTE Band66	132572	1770	1RB-Middle	Left Cheek	0mm	Fig.A26	24.25	24.5	0.226	**0.24**	0.149	**0.16**	-0.08
Head	LTE Band66	132572	1770	1RB-Middle	Left Tilt	0mm	\	24.25	24.5	0.149	**0.16**	0.097	**0.10**	-0.14
Head	LTE Band66	132572	1770	1RB-Middle	Right Cheek	0mm	\	24.25	24.5	0.199	**0.21**	0.136	**0.14**	-0.09
Head	LTE Band66	132572	1770	1RB-Middle	Right Tilt	0mm	\	24.25	24.5	0.193	**0.20**	0.120	**0.13**	0.13
Head	LTE Band66	132322	1745	50RB-Low	Left Cheek	0mm	\	23.37	23.50	0.174	**0.18**	0.115	**0.12**	-0.01
Head	LTE Band66	132322	1745	50RB-Low	Left Tilt	0mm	\	23.37	23.50	0.112	**0.12**	0.073	**0.08**	0.04
Head	LTE Band66	132322	1745	50RB-Low	Right Cheek	0mm	\	23.37	23.50	0.145	**0.15**	0.099	**0.10**	-0.07
Head	LTE Band66	132322	1745	50RB-Low	Right Tilt	0mm	\	23.37	23.50	0.141	**0.15**	0.089	**0.09**	-0.12
Head	LTE Band66	132572	1770	1RB-Middle	Left Cheek	0mm	B2	24.25	24.5	0.213	**0.23**	0.130	**0.14**	0.05
Body	LTE Band66	132572	1770	1RB-Middle	Front	10mm	\	19.53	20	0.190	**0.21**	0.109	**0.12**	-0.12
Body	LTE Band66	132572	1770	1RB-Middle	Rear	10mm	\	19.53	20	0.428	**0.48**	0.237	**0.26**	0.16
Body	LTE Band66	132572	1770	1RB-Middle	Left Edge	10mm	\	19.53	20	0.066	**0.07**	0.039	**0.04**	-0.12
Body	LTE Band66	132572	1770	1RB-Middle	Right Edge	10mm	\	19.53	20	0.053	**0.06**	0.032	**0.04**	-0.13
Body	LTE Band66	132572	1770	1RB-Middle	Bottom Edge	10mm	Fig.A27	19.53	20	0.474	**0.53**	0.255	**0.28**	-0.15
Body	LTE Band66	132572	1770	50RB-Middle	Front	10mm	\	19.53	20	0.194	**0.22**	0.109	**0.12**	-0.10
Body	LTE Band66	132572	1770	50RB-Middle	Rear	10mm	\	19.53	20	0.431	**0.48**	0.236	**0.26**	0.05
Body	LTE Band66	132572	1770	50RB-Middle	Left Edge	10mm	\	19.53	20	0.066	**0.07**	0.039	**0.04**	0.16
Body	LTE Band66	132572	1770	50RB-Middle	Right Edge	10mm	\	19.53	20	0.054	**0.06**	0.033	**0.04**	0.09
Body	LTE Band66	132572	1770	50RB-Middle	Bottom Edge	10mm	\	19.53	20	0.453	**0.50**	0.228	**0.25**	-0.06
Body	LTE Band66	132572	1770	50RB-Middle	Bottom Edge	10mm	B2	19.53	20	0.457	**0.51**	0.241	**0.27**	-0.09
Body	LTE Band66	132322	1745	1RB-Middle	Front	15mm	\	22.36	22.5	0.173	**0.18**	0.095	**0.10**	0.15
Body	LTE Band66	132322	1745	1RB-Middle	Rear	15mm	\	22.36	22.5	0.422	**0.44**	0.249	**0.26**	-0.06
Body	LTE Band66	132322	1745	50RB-Middle	Front	15mm	\	22.35	22.5	0.200	**0.21**	0.119	**0.12**	0.18
Body	LTE Band66	132322	1745	50RB-Middle	Rear	15mm	Fig.A28	22.35	22.5	0.431	**0.45**	0.250	**0.26**	0.09
Body	LTE Band66	132322	1745	50RB-Middle	Rear	15mm	B2	22.35	22.5	0.412	**0.43**	0.239	**0.25**	-0.03

14.2 SAR results for Standard procedure

There is zoom scan measurement to be added for the highest measured SAR in each exposure configuration/band.

RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test Position	Distance	Figure No./Note	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Head	GSM850	251	848.8	\	Left Cheek	0mm	Fig.A1	32.19	33.30	0.243	0.31	0.182	0.24	0.09
Body	GSM850	190	836.6	GPRS(2TX)	Rear	10mm	Fig.A2	29.88	30.50	0.324	0.37	0.237	0.27	-0.19
Head	GSM1900	512	1850.2	\	Right Cheek	0mm	Fig.A3	29.39	30.30	0.130	0.16	0.083	0.10	0.16
Body	GSM1900	512	1850.2	GPRS(4TX)	Bottom Edge	10mm	Fig.A4	20.09	21.00	0.319	0.39	0.172	0.21	-0.08
Body	GSM1900	512	1850.2	GPRS(4TX)	Rear	15mm	Fig.A5	21.06	23.00	0.115	0.18	0.067	0.10	0.00
Head	WCDMA1900	9538	1907.6	RMC	Right Cheek	0mm	Fig.A6	23.33	24.00	0.281	0.33	0.181	0.21	-0.18
Body	WCDMA1900	9262	1852.4	RMC	Bottom Edge	10mm	Fig.A7	18.53	19.50	0.417	0.52	0.215	0.27	-0.07
Body	WCDMA1900	9262	1852.4	RMC	Rear	15mm	Fig.A8	21.43	22.50	0.240	0.31	0.143	0.18	-0.15
Head	WCDMA1700	1513	1752.6	RMC	Left Cheek	0mm	Fig.A9	23.65	24.50	0.211	0.26	0.140	0.17	0.06
Body	WCDMA1700	1412	1732.5	RMC	Bottom Edge	10mm	Fig.A10	18.60	19.50	1.100	1.35	0.572	0.70	-0.03
Body	WCDMA1700	1412	1732.5	RMC	Rear	15mm	Fig.A11	20.68	21.50	0.198	0.24	0.120	0.14	-0.18
Head	WCDMA 850	4183	836.6	RMC	Right Cheek	0mm	Fig.A12	22.18	23.00	0.103	0.12	0.056	0.07	-0.18
Body	WCDMA 850	4132	826.4	RMC	Rear	10mm	Fig.A13	23.46	24.50	0.390	0.50	0.220	0.28	0.08
Head	LTE Band2	19100	1900	1RB-Middle	Right Cheek	0mm	Fig.A14	23.79	24.5	0.281	0.33	0.183	0.22	0.01
Body	LTE Band2	18900	1880	50RB-Low	Bottom Edge	10mm	Fig.A15	19.09	20	0.410	0.51	0.219	0.27	-0.18
Body	LTE Band2	18900	1880	50RB-Low	Rear	15mm	Fig.A16	22.08	22.5	0.476	0.52	0.264	0.29	0.01
Head	LTE Band5	20600	844	25RB-Low	Left Cheek	0mm	Fig.A17	21.92	23	0.278	0.36	0.174	0.22	-0.12
Body	LTE Band5	20525	836.5	1RB-Middle	Rear	10mm	Fig.A18	23.72	24.5	0.586	0.70	0.318	0.38	-0.14
Head	LTE Band12	23060	704	25RB-Low	Left Cheek	0mm	Fig.A19	21.79	23	0.259	0.34	0.166	0.22	0.13
Body	LTE Band12	23060	704	1RB-Middle	Rear	10mm	Fig.A20	23.55	24.5	0.479	0.60	0.360	0.45	-0.09
Head	LTE Band14	23230	793	1RB-High	Left Cheek	0mm	Fig.A21	22.01	23	0.245	0.31	0.162	0.20	0.10
Body	LTE Band14	23330	793	1RB-Low	Rear	10mm	Fig.A22	23.57	24.5	0.408	0.51	0.226	0.28	0.00
Head	LTE Band30	27710	2310	1RB-Middle	Right Cheek	0mm	Fig.A23	24.21	24.5	0.216	0.23	0.130	0.14	-0.14
Body	LTE Band30	27710	2310	1RB-Middle	Rear	10mm	Fig.A24	19.62	20	0.276	0.30	0.132	0.14	-0.03
Body	LTE Band30	27710	2310	25RB-Low	Rear	15mm	Fig.A25	20.78	21	0.176	0.19	0.091	0.10	-0.16
Head	LTE Band66	132572	1770	1RB-Middle	Left Cheek	0mm	Fig.A26	24.25	24.5	0.226	0.24	0.149	0.16	-0.08
Body	LTE Band66	132572	1770	1RB-Middle	Bottom Edge	10mm	Fig.A27	19.53	20	0.474	0.53	0.255	0.28	-0.15
Body	LTE Band66	132322	1745	50RB-Middle	Rear	15mm	Fig.A28	22.35	22.5	0.431	0.45	0.250	0.26	0.09
Head	WLAN	6	2437	802.11b 1M 19.5db	Right Cheek	0mm	Fig.A29	18.66	19.00	0.469	0.51	0.239	0.26	-0.02
Body	WLAN	6	2437	802.11b 1M 19.5db	Rear	10mm	Fig.A30	18.66	19.00	0.175	0.19	0.100	0.11	0.04
Head	WLAN	6	2437	802.11b 1M 17.5db	Right Cheek	0mm	Fig.A31	16.89	17.00	0.247	0.25	0.126	0.13	-0.02
Body	WLAN	6	2437	802.11b 1M 17.5db	Rear	10mm	Fig.A32	16.89	17.00	0.103	0.11	0.110	0.11	-0.11

14.3 WLAN Evaluation for 2.4G

According to the KDB248227 D01, SAR is measured for 2.4GHz 802.11b DSSS using the initial test position procedure.

Head Evaluation WLAN 2.4 GHz（Wifi only)

Table 14.3-1: SAR Values (WLAN - Head)– 802.11b (Fast SAR)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Power Drift (dB)
MHz	Ch.										
2437	6	Left	Cheek	/	18.66	19.00	0.227	**0.25**	0.134	**0.15**	0.07
2437	6	Left	Tilt	/	18.66	19.00	0.261	**0.28**	0.133	**0.14**	0.07
2437	6	Right	Cheek	/	18.66	19.00	0.460	**0.50**	0.227	**0.25**	-0.06
2437	6	Right	Tilt	/	18.66	19.00	0.287	**0.31**	0.148	**0.16**	0.08
2437	6	Right	Cheek	B2	18.66	19.00	0.450	**0.49**	0.219	**0.24**	0.01

As shown above table, the initial test position for head is “Right Cheek”. So the head SAR of WLAN is presented as below:

Table 14.3-2: SAR Values (WLAN - Head)– 802.11b (Full SAR)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C											
Frequency		Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Power Drift (dB)
MHz	Ch.										
2437	6	Right	Cheek	Fig.29	18.66	19.00	0.469	**0.51**	0.239	**0.26**	-0.02

Note1: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest estimated 1-g SAR conditions determined by area scans, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg.
Note2: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. The scaled reported SAR is presented as below.

Table 14.3-3: SAR Values (WLAN - Head) – 802.11b (Scaled Reported SAR)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C							
Frequency		Side	Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.						
2437	6	Right	Cheek	100%	100%	**0.51**	**0.51**

SAR is not required for OFDM because the 802.11b adjusted SAR ≤ 1.2 W/kg.

Body Evaluation WLAN 2.4 GHz（Wifi only)

Table 14.3-4: SAR Values (WLAN - Body)– 802.11b (Fast SAR)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C										
Frequency		Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Power Drift (dB)
MHz	Ch.									
2437	6	Front	/	18.66	19.00	0.083	**0.09**	0.054	**0.06**	0.03
2437	6	Rear	/	18.66	19.00	0.171	**0.18**	0.094	**0.10**	-0.04
2437	6	Left	/	18.66	19.00	0.120	**0.13**	0.070	**0.08**	0.09
2437	6	Top Edge	/	18.66	19.00	0.103	**0.11**	0.063	**0.07**	0.02
2437	6	Rear	B2	18.66	19.00	0.162	**0.18**	0.090	**0.10**	0.01

Note1: The distance between the EUT and the phantom bottom is 10mm.

As shown above table, the initial test position for body is “Rear ”. So the body SAR of WLAN is presented as below:

Table 14.3-5: SAR Values (WLAN - Body)– 802.11b (Full SAR)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C										
Frequency		Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
MHz	Ch.									
2437	6	Rear	Fig.34	18.66	19.00	0.175	**0.19**	0.100	**0.11**	0.04
Note1: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest estimated 1-g SAR conditions determined by area scans, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg.										

Note2: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. The scaled reported SAR is presented as below.

Table 14.3-6: SAR Values (WLAN - Body) – 802.11b (Scaled Reported SAR)

Ambient Temperature: 22.9 ℃ Liquid Temperature: 22.5℃						
Frequency		Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.					
2437	6	Rear	100%	100%	**0.19**	**0.19**

SAR is not required for OFDM because the 802.11b adjusted SAR ≤ 1.2 W/kg.

Head Evaluation WLAN 2.4 GHz（Wifi+cellular）

Table 14.3-7: SAR Values (WLAN - Head)– 802.11b (Fast SAR)-

Ambient Temperature: 22.9 ℃ Liquid Temperature: 22.5℃											
Frequency		Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Power Drift (dB)
MHz	Ch.										
2437	6	Left	Cheek	/	16.89	17.00	0.120	**0.12**	0.071	**0.07**	-0.14
2437	6	Left	Tilt	/	16.89	17.00	0.138	**0.14**	0.070	**0.07**	0.01
2437	6	Right	Cheek	/	16.89	17.00	0.235	**0.24**	0.120	**0.12**	0.02
2437	6	Right	Tilt	/	16.89	17.00	0.151	**0.16**	0.078	**0.08**	-0.02
2437	6	Right	Cheek	B2	16.89	17.00	0.221	**0.23**	0.112	**0.11**	0.02

As shown above table, the initial test position for head is “Right Cheek”. So the head SAR of WLAN is presented as below:

Table 14.3-8: SAR Values (WLAN - Head)– 802.11b (Full SAR)

Ambient Temperature: 22.9 ℃ Liquid Temperature: 22.5℃											
Frequency		Side	Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Power Drift (dB)
MHz	Ch.										
2437	6	Right	Cheek	Fig.29	16.89	17.00	0.247	**0.25**	0.126	**0.13**	-0.02
Note1: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest estimated 1-g SAR conditions determined by area scans, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg. Note2: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.											

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. The scaled reported SAR is presented as below.

Table 14.3-9: SAR Values (WLAN - Head) – 802.11b (Scaled Reported SAR)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C							
Frequency		Side	Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.						
2437	6	Right	Cheek	100%	100%	**0.25**	**0.25**

SAR is not required for OFDM because the 802.11b adjusted SAR ≤ 1.2 W/kg.

Body Evaluation WLAN 2.4 GHz（Wifi+cellular）

Table 14.3-10: SAR Values (WLAN - Body)– 802.11b (Fast SAR)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C										
Frequency		Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g)(W/kg)	Power Drift (dB)
MHz	Ch.									
2437	6	Front	/	16.89	17.00	0.049	**0.05**	0.060	**0.06**	-0.07
2437	6	Rear	/	16.89	17.00	0.101	**0.10**	0.102	**0.10**	-0.14
2437	6	Left Edge	/	16.89	17.00	0.071	**0.07**	0.077	**0.08**	0.16
2437	6	Top Edge	/	16.89	17.00	0.060	**0.06**	0.070	**0.07**	0.14
2437	6	Rear	B2	16.89	17.00	0.091	**0.09**	0.094	**0.10**	0.11
2437	6	Rear	0mm	16.89	17.00	1.450	**1.49**	0.517	**0.53**	0.15
2437	6	Front	15mm	16.89	17.00	0.027	**0.03**	0.024	**0.02**	-0.06
2437	6	Rear	15mm	16.89	17.00	0.061	**0.06**	0.036	**0.04**	-0.17

Note1: The distance between the EUT and the phantom bottom is 10mm.

As shown above table, the <u>initial test position</u> for body is "Rear ". So the body SAR of WLAN is presented as below:

Table 14.3-11: SAR Values (WLAN - Body)– 802.11b (Full SAR)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C										
Frequency		Test Position	Figure No./ Note	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Reported SAR(1g)(W/kg)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)
MHz	Ch.									
2437	6	Rear	Fig.34	16.89	17.00	0.103	**0.11**	0.091	**0.09**	-0.11

Note1: When the <u>reported</u> SAR of the <u>initial test position</u> is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the <u>initial test position</u> using subsequent highest estimated 1-g SAR conditions determined by area scans, on the highest maximum output power channel, until the <u>reported</u> SAR is ≤ 0.8 W/kg.

Note2: For all positions/configurations tested using the <u>initial test position</u> and subsequent test positions, when the <u>reported</u> SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the <u>reported</u> SAR is ≤ 1.2 W/kg or all required channels are tested.

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. The scaled reported SAR is presented as below.

Table 14.3-12: SAR Values (WLAN - Body) – 802.11b (Scaled Reported SAR)

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C						
Frequency		Test Position	Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
MHz	Ch.					
2437	6	Rear	100%	100%	**0.11**	**0.11**

SAR is not required for OFDM because the 802.11b adjusted SAR ≤ 1.2 W/kg.

14.4 SAR results for Fast BT

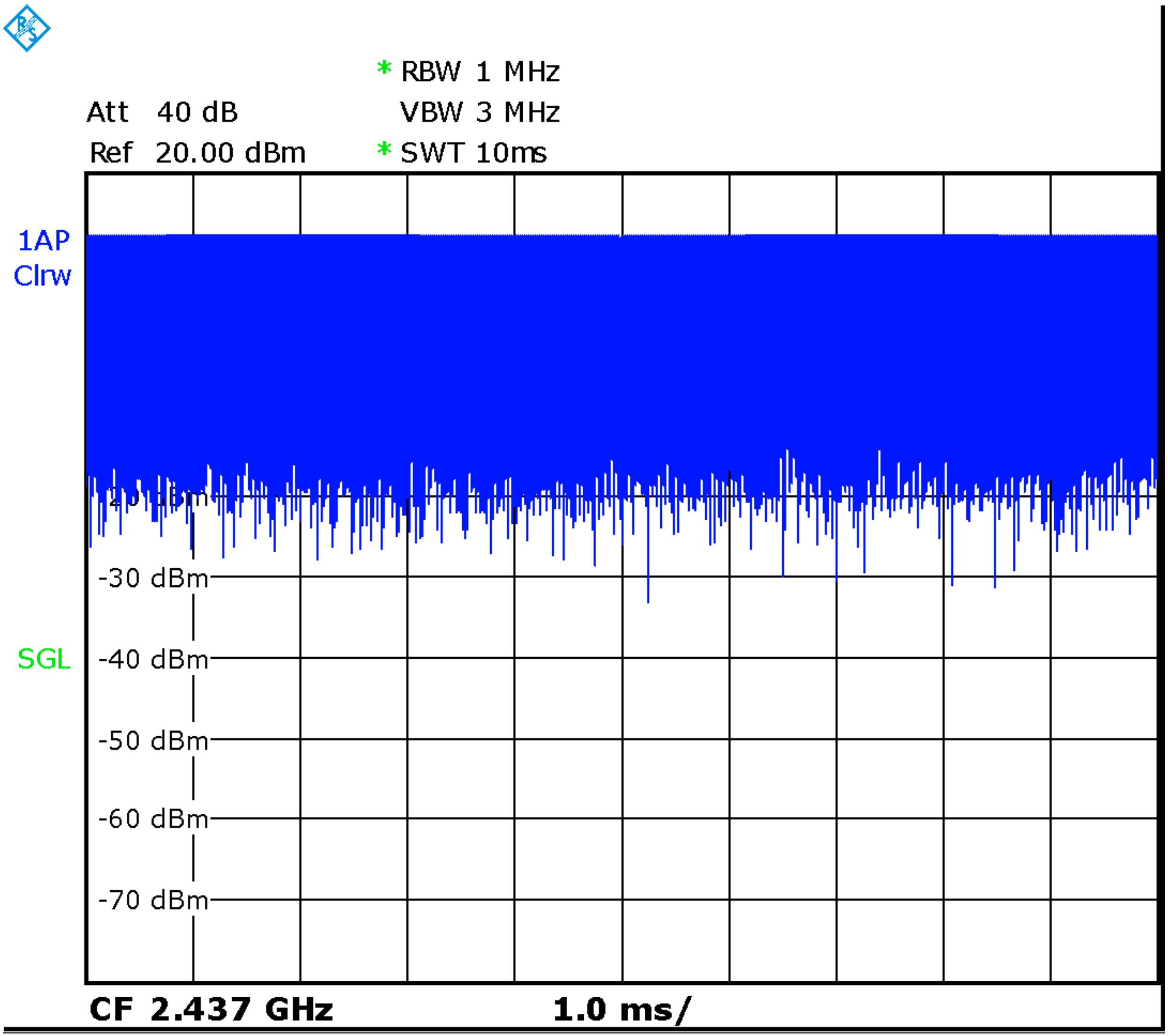
Table 14.4-1: SAR Values (Bluetooth - Head)

Frequency		Side	Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch.	MHz										
57	2459	Left	Touch	/	10.05	10.50	<0.01	**<0.01**	<0.01	**<0.01**	/
57	2459	Left	Tilt	/	10.05	10.50	<0.01	**<0.01**	<0.01	**<0.01**	/
57	2459	Right	Touch	/	10.05	10.50	<0.01	**<0.01**	<0.01	**<0.01**	/
57	2459	Right	Tilt	/	10.05	10.50	<0.01	**<0.01**	<0.01	**<0.01**	/

Table 14.4-2: SAR Values (Bluetooth - Body)

Ambient Temperature: 22.2 °C Liquid Temperature: 22 °C										
Frequency		Test Position	Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
Ch	MHz									
57	2459	Front	/	10.05	10.50	<0.01	**<0.01**	<0.01	**<0.01**	/
57	2459	Rear	/	10.05	10.50	0.004	**<0.01**	0.011	**<0.01**	/
57	2459	Left	/	10.05	10.50	<0.01	**<0.01**	<0.01	**<0.01**	/
57	2459	Top	/	10.05	10.50	<0.01	**<0.01**	<0.01	**<0.01**	/

Note1: The distance between the EUT and the phantom bottom is 10mm



Picture 14.1 Duty factor plot

14.5 SAR Evaluation for Phablet

According to the KDB648474 D04, for smart phones, with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, that can provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets and support voice calls next to the ear, unless it is confirmed otherwise through KDB inquiries, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless modes and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance.

1. The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied.
2. The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB Publication 865664 D01 to address interactive hand use exposure conditions. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold. The normal tablet procedures in KDB Publication 616217 are required when the overall diagonal dimension of the device is > 20.0 cm. Hotspot mode SAR is not required when normal tablet procedures are applied. Extremity 10-g SAR is also not required for the front (top) surface of larger form factor full size tablets. The more conservative normal tablet SAR results can be used to support phablet mode 10-g extremity SAR.
3. The simultaneous transmission operating configurations applicable to voice and data transmissions for both phone and mini-tablet modes must be taken into consideration separately for 1-g and 10-g SAR to determine the simultaneous transmission SAR test exclusion and measurement requirements for the relevant wireless modes and exposure conditions

For the device of this project, the overall diagonal dimension is 179.84 cm (> 16.0 cm), so this device is a phone as “phablet”.

Table 14.4-1: 10g extremity SAR determination

Frequency			Position	Conducted Power (dBm)	Hotspot off tune-up Power (dBm)	Measured SAR(1g) (W/kg)	Adjusted SAR(1g)(W/kg)
Band	Ch.	MHz					
WCDMA1700	1412	1732.5	Rear	18.60	21.50	0.811	**1.58**
WCDMA1700	1513	1752.6	Bottom Edge	18.83	21.50	0.972	**1.80**
WCDMA1700	1412	1732.5	Bottom Edge	18.60	21.50	1.100	**2.14**
WCDMA1700	1312	1712.4	Bottom Edge	18.89	21.50	0.963	**1.76**

According to the above table, the 10g extremity SAR is required for the WCDMA1700.

Table 14.4-2: SAR Values for 10g extremity SAR

Ambient Temperature: 22.9 °C Liquid Temperature: 22.5°C									
Frequency			Mode/ Figure No.	Conducted Power (dBm)	Max. tune-up Power (dBm)	Measured SAR(10g) (W/kg)	Reported SAR(10g) (W/kg)	Power Drift (dB)	Limited (W/kg)
Band	Ch.	MHz							
WCDMA1700	1513	1752.6	Rear	20.95	21.50	1.040	**1.18**	-0.14	4.0
WCDMA1700	1412	1732.5	Rear	20.68	21.50	1.100	**1.33**	0.03	4.0
WCDMA1700	1312	1712.4	Rear	20.97	21.50	1.19	**1.35**	0.15	4.0
WCDMA1700	1513	1752.6	Bottom Edge	20.95	21.50	1.120	**1.27**	-0.13	4.0
WCDMA1700	1412	1732.5	Bottom Edge	20.68	21.50	1.13	**1.36**	-0.17	4.0
WCDMA1700	1312	1712.4	Bottom Edge	20.97	21.50	1.030	**1.16**	0.01	4.0

Note1: The distance between the EUT and the phantom bottom is 0mm.

Table 14.4-3: The sum of SAR values for 10g extremity SAR

	Position	Main antenna	WiFi-2.4G	BT	Sum	Limited
10-g extremity SAR (Separation Distance 0mm)	Bottom Edge (WCDMA1700)	1.36	/	/	**1.36**	4.0
10-g extremity SAR (Separation Distance 0mm)	Rear (WCDMA1700)	1.35	0.53	/	**1.88**	4.0

15 SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps2) through 4) do not apply.

2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45W/kg (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Table 15.1: SAR Measurement Variability for Head W1700 (1g)

Frequency		Test Position	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
Ch.	MHz					
1412	1732.5	Rear	0.803	0.811	1.010	/
1513	1752.6	Bottom Edge	0.967	0.972	1.005	/
1412	1732.5	Bottom Edge	1.04	1.100	1.058	/
1312	1712.4	Bottom Edge	0.951	0.963	1.013	/

16 Measurement Uncertainty

16.1 Measurement Uncertainty for Normal SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.0	N	1	1	1	6.0	6.0	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	N	1	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞

8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						9.55	9.43	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						19.1	18.9	

16.2 Measurement Uncertainty for Normal SAR Tests (3~6GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.55	N	1	1	1	6.55	6.55	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞

5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
12	Probe positioning with respect to phantom shell	B	6.7	R	$\sqrt{3}$	1	1	3.9	3.9	∞
13	Post-processing	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c^{'}=\sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						10.7	10.6	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						21.4	21.1	

16.3 Measurement Uncertainty for Fast SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.0	N	1	1	1	6.0	6.0	∞

2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. Restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
14	Fast SAR z-Approximation	B	7.0	R	$\sqrt{3}$	1	1	4.0	4.0	∞
Test sample related										
15	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
16	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
17	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
18	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
19	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
20	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
21	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
22	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c^{'} = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						10.4	10.3	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						20.8	20.6	

16.4 Measurement Uncertainty for Fast SAR Tests (3~6GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.55	N	1	1	1	6.55	6.55	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. Restrictions	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
12	Probe positioning with respect to phantom shell	B	6.7	R	$\sqrt{3}$	1	1	3.9	3.9	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
14	Fast SAR z-Approximation	B	14.0	R	$\sqrt{3}$	1	1	8.1	8.1	∞
Test sample related										
15	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
16	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
17	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
18	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
19	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
20	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
21	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
22	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521

Combined standard uncertainty	$u_c^{'} = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$					13.5	13.4	257
Expanded uncertainty (confidence interval of 95 %)	$u_e = 2u_c$					27.0	26.8	

17 MAIN TEST INSTRUMENTS

Table 17.1: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	E5071C	MY46110673	January 14, 2021	One year
02	Power meter	NRP2	106277	September 23，2021	One year
03	Power sensor	NRP8S	104291		
04	Signal Generator	E4438C	MY49071430	February 1, 2021	One Year
05	Amplifier	60S1G4	0331848	No Calibration Requested	
06	BTS	CMW500	159890	January 25 2021	One year
07	BTS	CMW500	159889	January 13 2021	One year
08	E-field Probe	SPEAG EX3DV4	7517	February 03，2021	One year
09	DAE	SPEAG DAE4	1525	September 1, 2021	One year
10	Dipole Validation Kit	SPEAG D750V3	1017	July 12,2021	One year
11	Dipole Validation Kit	SPEAG D835V2	4d069	July 12,,2021	One year
12	Dipole Validation Kit	SPEAG D1750V2	1003	July 12,,2021	One year
13	Dipole Validation Kit	SPEAG D1900V2	5d101	July 15,2021	One year
14	Dipole Validation Kit	SPEAG D2450V2	853	July 26,2021	One year
15	Dipole Validation Kit	SPEAG D2300V2	1018	July 26,2021	One year

END OF REPORT BODY

ANNEX A Graph Results

GSM850_CH251 Left Cheek
Date: 12/12/2021
Electronics: DAE4 Sn1525
Medium: head 835 MHz
Medium parameters used: f = 848.8 MHz; σ = 0.921 mho/m; εr = 41.24; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: GSM850 848.8 MHz Duty Cycle: 1:8.3
Probe: EX3DV4 – SN7517 ConvF(9.40,9.40,9.40)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.303 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.44 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.314 W/kg
SAR(1 g) = 0.243 W/kg; SAR(10 g) = 0.182 W/kg
Maximum value of SAR (measured) = 0.289 W/kg

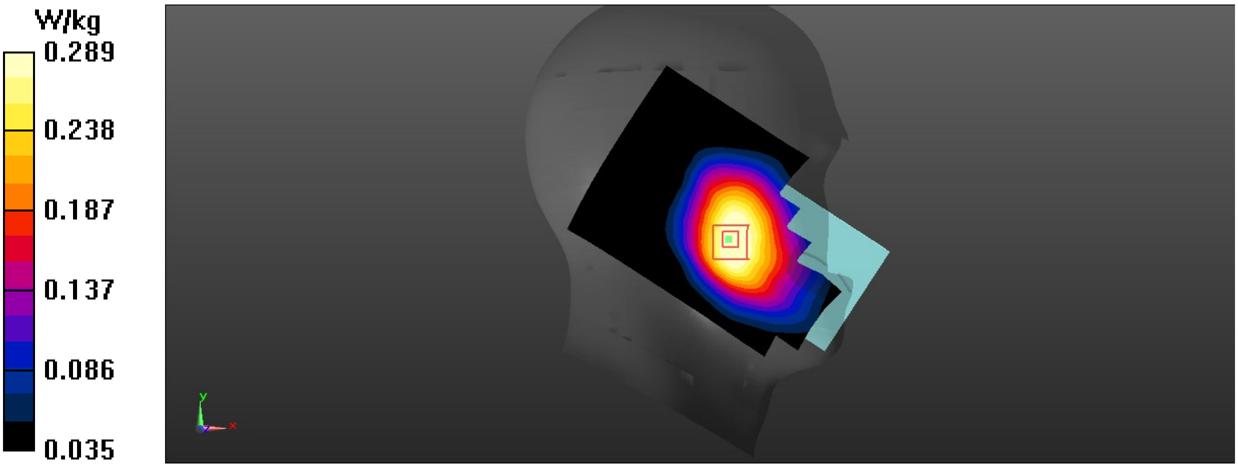


Fig A.1

GSM850_CH190 Rear GPRS(2TX) 10mm
Date: 12/12/2021
Electronics: DAE4 Sn1525
Medium: head 835 MHz
Medium parameters used: f = 836.6 MHz; σ = 0.894 mho/m; εr = 41.39; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: GSM850 836.6 MHz Duty Cycle: 1:2
Probe: EX3DV4 – SN7517 ConvF(9.40,9.40,9.40)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.386 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.4 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.435 W/kg
SAR(1 g) = 0.324 W/kg; SAR(10 g) = 0.237 W/kg
Maximum value of SAR (measured) = 0.399 W/kg

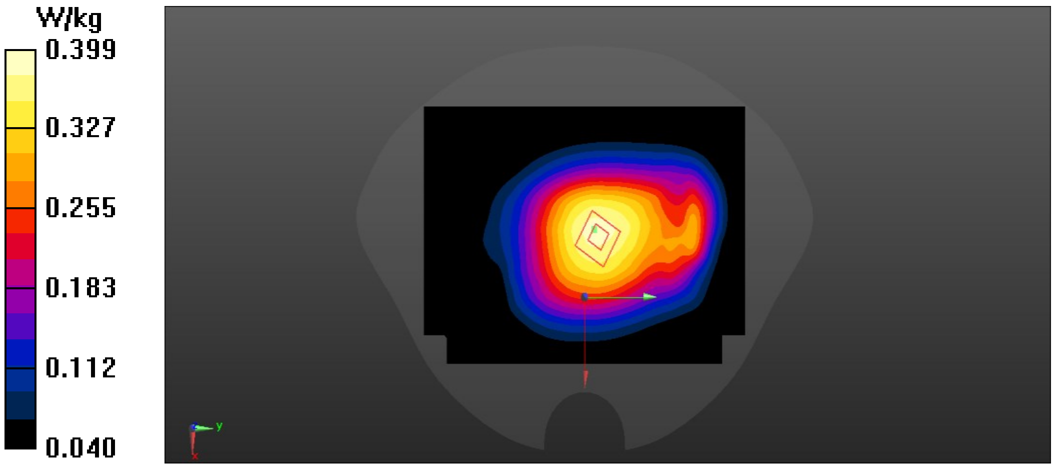


Fig A.2

PCS1900_CH512 Right Cheek
Date: 12/16/2021
Electronics: DAE4 Sn1525
Medium: head 1900 MHz
Medium parameters used: f = 1850.2 MHz; σ = 1.34 mho/m; εr = 39.91; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: PCS1900 1850.2 MHz Duty Cycle: 1:8.3
Probe: EX3DV4 – SN7517 ConvF(7.81,7.81,7.81)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.179 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.879 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.2 W/kg
SAR(1 g) = 0.130 W/kg; SAR(10 g) = 0.0829 W/kg
Maximum value of SAR (measured) = 0.174 W/kg

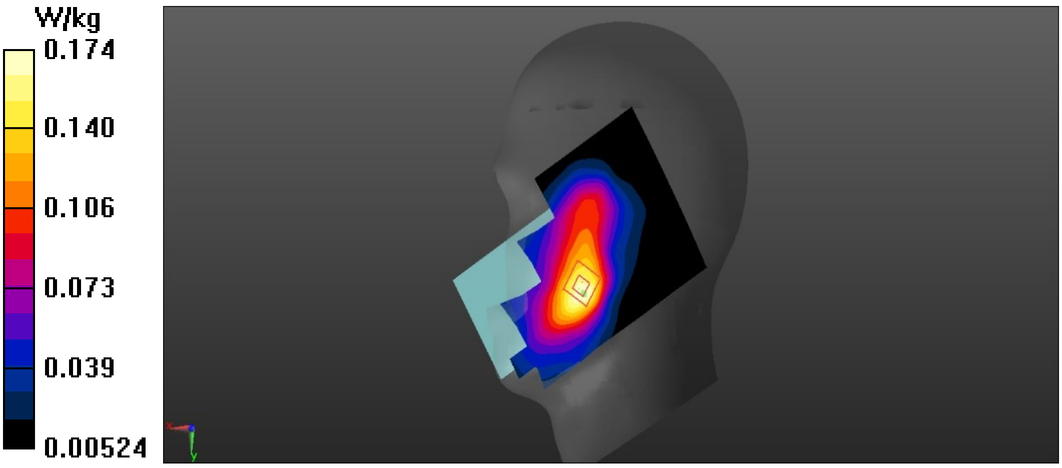


Fig A.3

PCS1900_CH512 Bottom Edge GPRS(4TX) 10mm
Date: 12/16/2021
Electronics: DAE4 Sn1525
Medium: head 1900 MHz
Medium parameters used: f = 1850.2 MHz; σ = 1.364 mho/m; εr = 40.56; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C,   Liquid Temperature: 22.3°C
Communication System: PCS1900 1850.2 MHz Duty Cycle: 1:2
Probe: EX3DV4 – SN7517 ConvF(7.81,7.81,7.81)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.483 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.87 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.574 W/kg
SAR(1 g) = 0.319 W/kg; SAR(10 g) = 0.172 W/kg
Maximum value of SAR (measured) = 0.477 W/kg

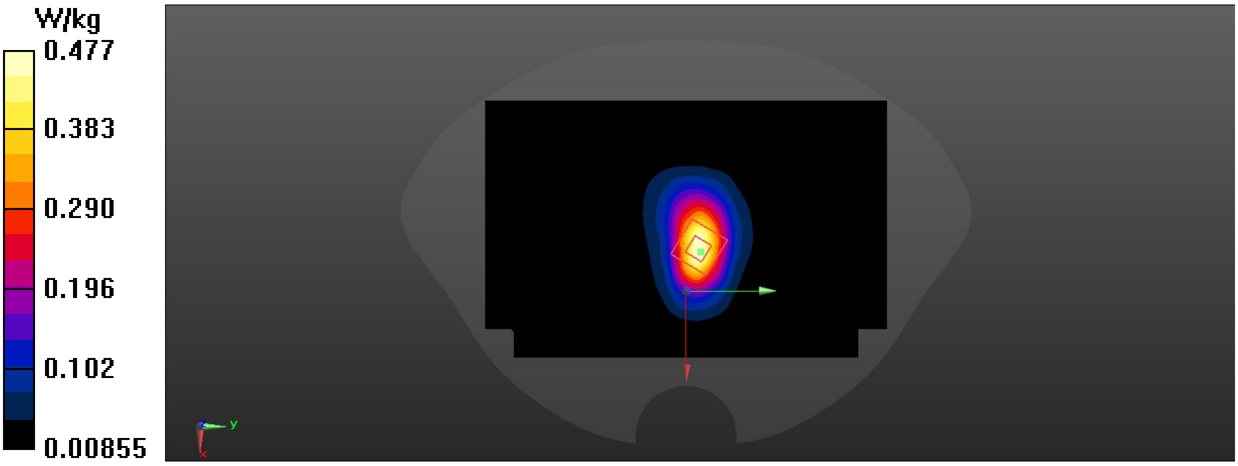


Fig A.4

PCS1900_CH512 Rear GPRS(4TX) 15mm
Date: 12/16/2021
Electronics: DAE4 Sn1525
Medium: head 1900 MHz
Medium parameters used: f = 1850.2 MHz; σ = 1.364 mho/m; εr = 40.56; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: PCS1900 1850.2 MHz Duty Cycle: 1:2
Probe: EX3DV4 – SN7517 ConvF(7.81,7.81,7.81)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.171 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.818 V/m; Power Drift = 0 dB
Peak SAR (extrapolated) = 0.199 W/kg
SAR(1 g) = 0.115 W/kg; SAR(10 g) = 0.067 W/kg
Maximum value of SAR (measured) = 0.168 W/kg

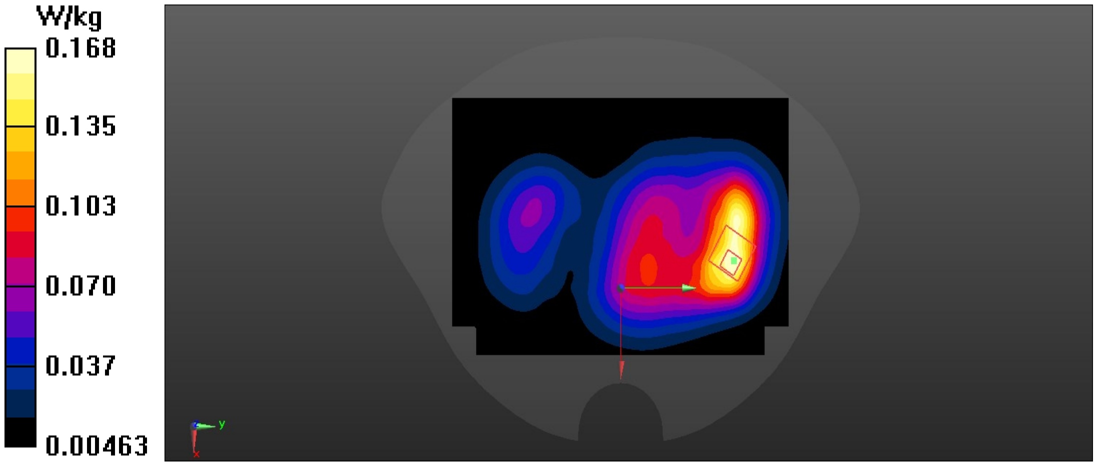


Fig A.5

WCDMA1900-BII_CH9538 Right Cheek RMC
Date: 12/16/2021
Electronics: DAE4 Sn1525
Medium: head 1900 MHz
Medium parameters used: f = 1907.6 MHz; σ = 1.396 mho/m; εr = 39.84; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: WCDMA1900-BII 1907.6 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.81,7.81,7.81)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.414 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.158 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.447 W/kg
SAR(1 g) = 0.281 W/kg; SAR(10 g) = 0.181 W/kg
Maximum value of SAR (measured) = 0.384 W/kg

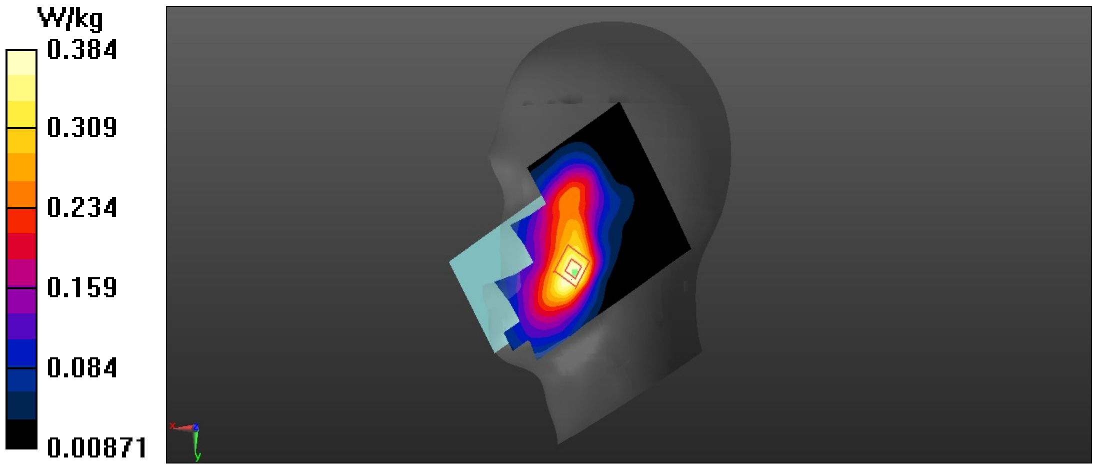


Fig A.6

WCDMA1900-BII_CH9262 Bottom Edge RMC 10mm
Date: 12/16/2021
Electronics: DAE4 Sn1525
Medium: head 1900 MHz
Medium parameters used: f = 1852.4 MHz; σ = 1.365 mho/m; εr = 40.56; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: WCDMA1900-BII 1852.4 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.81,7.81,7.81)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.638 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.52 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.8 W/kg
SAR(1 g) = 0.417 W/kg; SAR(10 g) = 0.215 W/kg
Maximum value of SAR (measured) = 0.646 W/kg

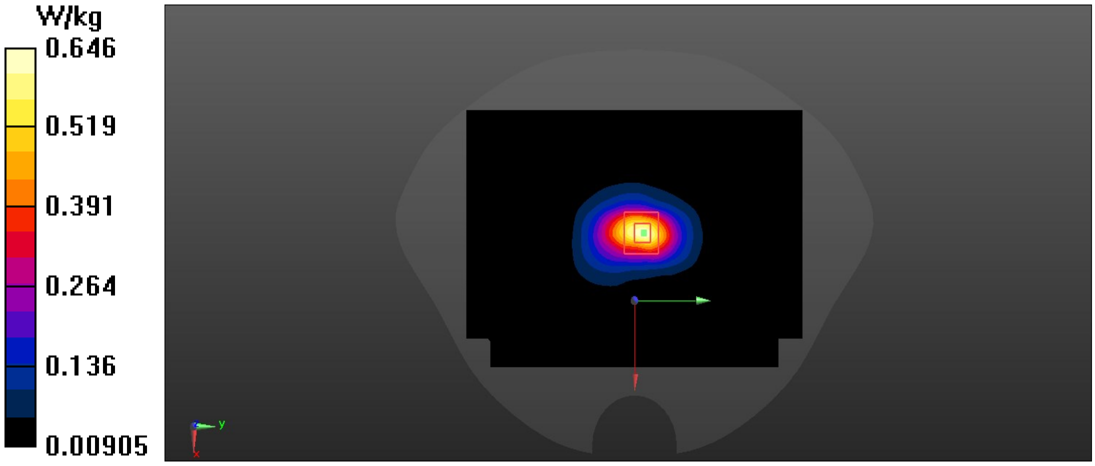


Fig A.7

WCDMA1900-BII_CH9262 Rear RMC 15mm
Date: 12/16/2021
Electronics: DAE4 Sn1525
Medium: head 1900 MHz
Medium parameters used: f = 1852.4 MHz; σ = 1.365 mho/m; εr = 40.56; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: WCDMA1900-BII 1852.4 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.81,7.81,7.81)

Area Scan (71x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.354 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.951 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.426 W/kg
SAR(1 g) = 0.24 W/kg; SAR(10 g) = 0.143 W/kg
Maximum value of SAR (measured) = 0.352 W/kg

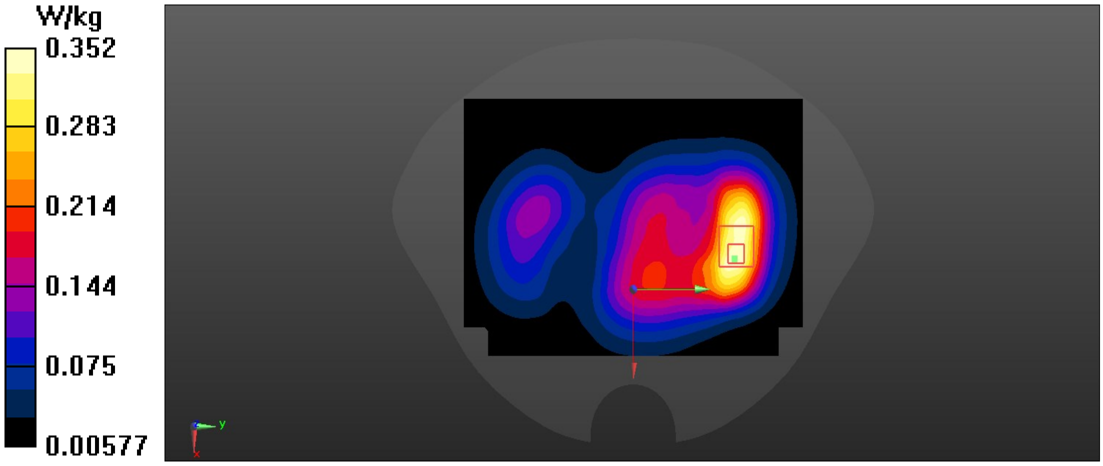


Fig A.8

WCDMA1700-BIV_CH1513 Left Cheek RMC
Date: 12/14/2021
Electronics: DAE4 Sn1525
Medium: head 1750 MHz
Medium parameters used: f = 1752.6 MHz; σ = 1.383 mho/m; εr = 40.68; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: WCDMA1700-BIV 1752.6 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(8.22,8.22,8.22)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.322 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.364 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.316 W/kg
SAR(1 g) = 0.211 W/kg; SAR(10 g) = 0.14 W/kg
Maximum value of SAR (measured) = 0.279 W/kg

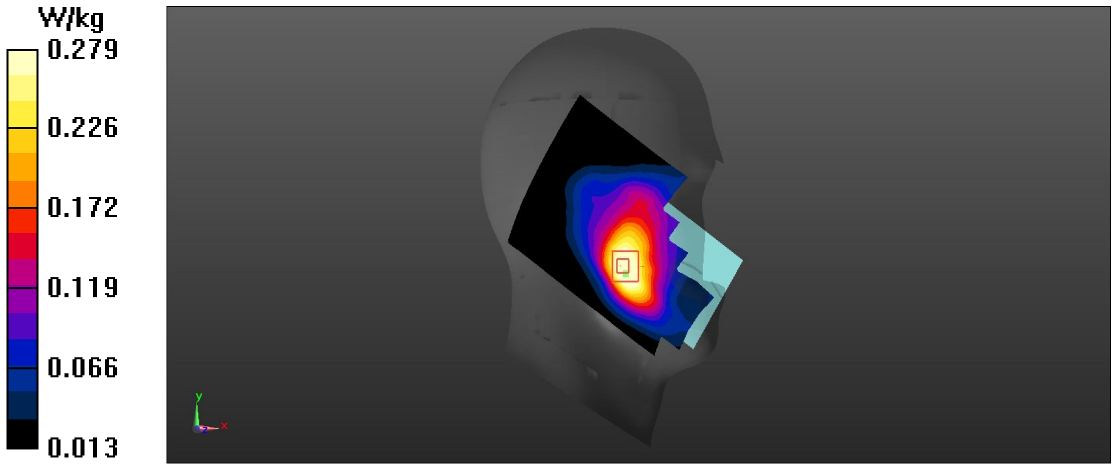


Fig A.9

WCDMA1700-BIV_CH1412 Bottom Edge RMC 10mm
Date: 12/14/2021
Electronics: DAE4 Sn1525
Medium: head 1750 MHz
Medium parameters used: f = 1732.5 MHz; σ = 1.375 mho/m; εr = 39.97; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: WCDMA1700-BIV 1732.5 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(8.22,8.22,8.22)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.8 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.87 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1 W/kg
SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.572 W/kg
Maximum value of SAR (measured) = 0.823 W/kg

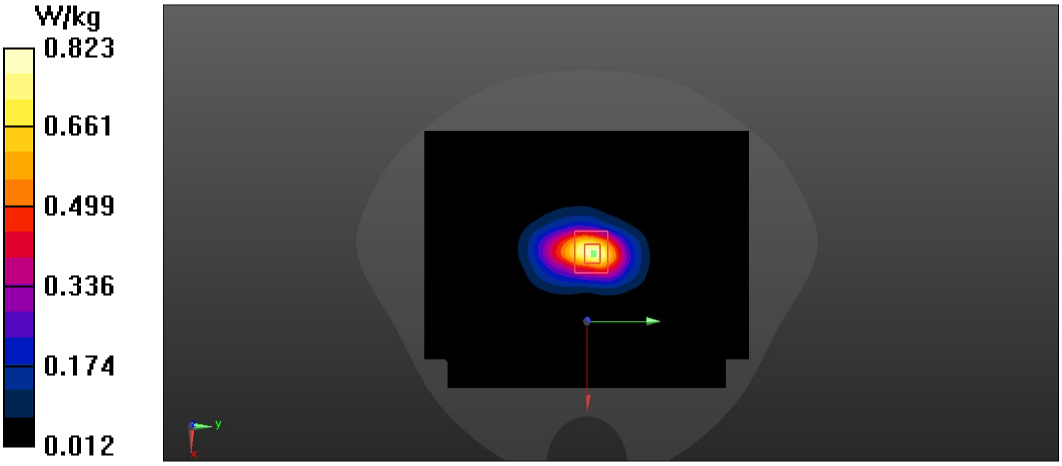


Fig A.10

WCDMA1700-BIV_CH1412 Rear RMC 15mm
Date: 12/14/2021
Electronics: DAE4 Sn1525
Medium: head 1750 MHz
Medium parameters used: f = 1732.5 MHz; σ = 1.375 mho/m; εr = 39.97; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: WCDMA1700-BIV 1732.5 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(8.22,8.22,8.22)

Area Scan (91x141x): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.667 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.808 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.794 W/kg
SAR(1 g) = 0.4543 W/kg; SAR(10 g) = 0.258 W/kg
Maximum value of SAR (measured) = 0.677 W/kg

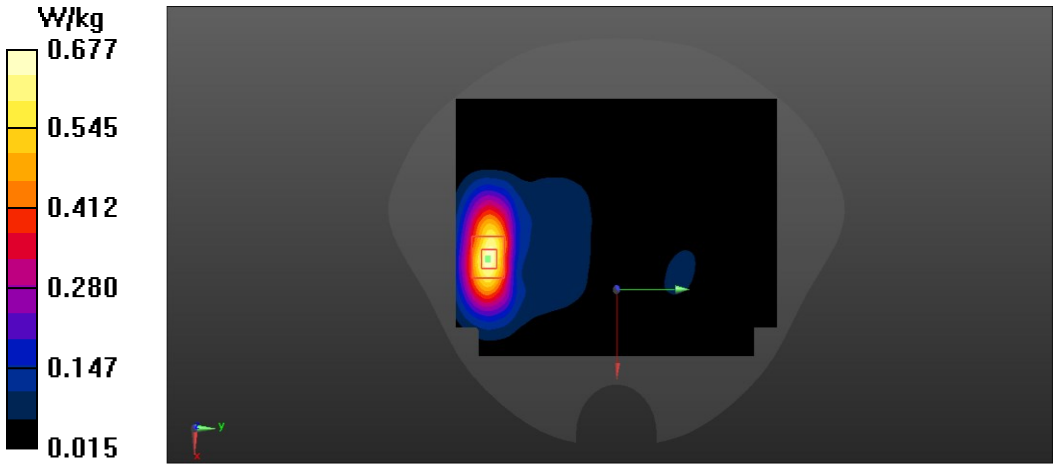


Fig A.11

WCDMA850-BV_CH4183 Right Cheek RMC
Date: 12/12/2021
Electronics: DAE4 Sn1525
Medium: head 835 MHz
Medium parameters used: f = 836.6 MHz; σ = 0.91 mho/m; εr = 41.26; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: WCDMA850-BV 836.6 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(9.40,9.40,9.40)

Area Scan (81x131x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.163 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.919 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.198 W/kg
SAR(1 g) = 0.103 W/kg; SAR(10 g) = 0.0561 W/kg
Maximum value of SAR (measured) = 0.164 W/kg

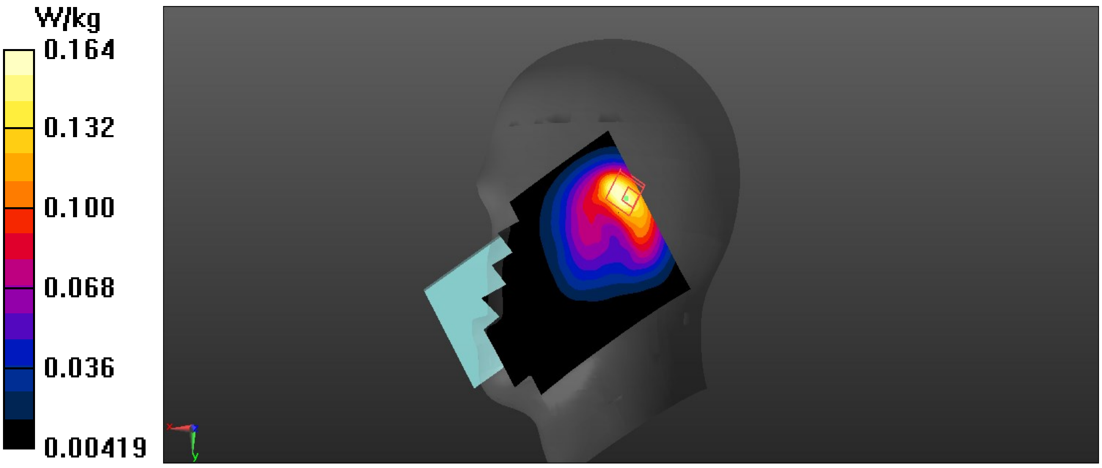


Fig A.12

WCDMA850-BV_CH4132 Rear RMC 10mm
Date: 12/12/2021
Electronics: DAE4 Sn1525
Medium: head 835 MHz
Medium parameters used: f = 826.4 MHz; σ = 0.883 mho/m; εr = 41.4; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: WCDMA850-BV 826.4 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(9.40,9.40,9.40)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.266 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.213 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.324 W/kg
SAR(1 g) = 0.390 W/kg; SAR(10 g) = 0.220 W/kg
Maximum value of SAR (measured) = 0.262 W/kg

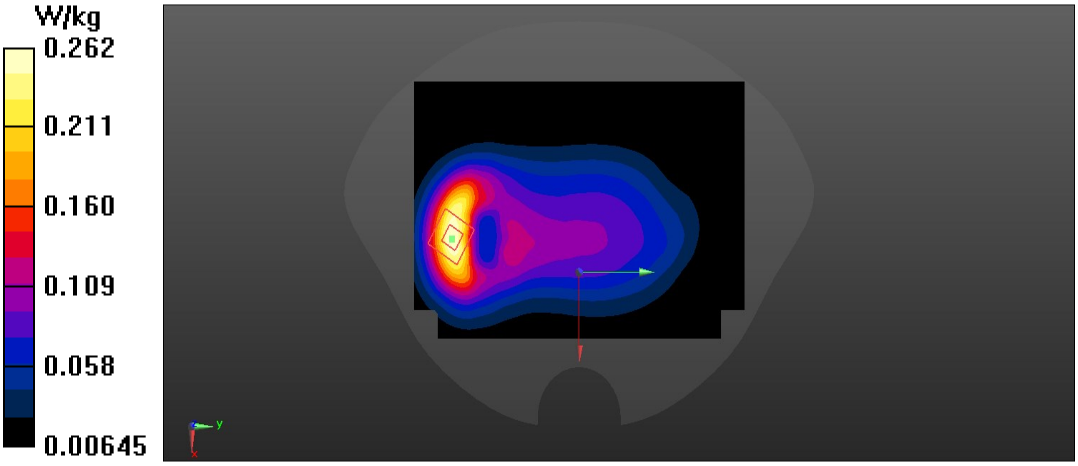


Fig A.13

LTE1900-FDD2_CH19100 Right Cheek RMC
Date: 12/17/2021
Electronics: DAE4 Sn1525
Medium: head 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.388 mho/m; εr = 39.85; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE1900-FDD2 1900 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.81,7.81,7.81)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.397 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.469 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.447 W/kg
SAR(1 g) = 0.281 W/kg; SAR(10 g) = 0.183 W/kg
Maximum value of SAR (measured) = 0.387 W/kg

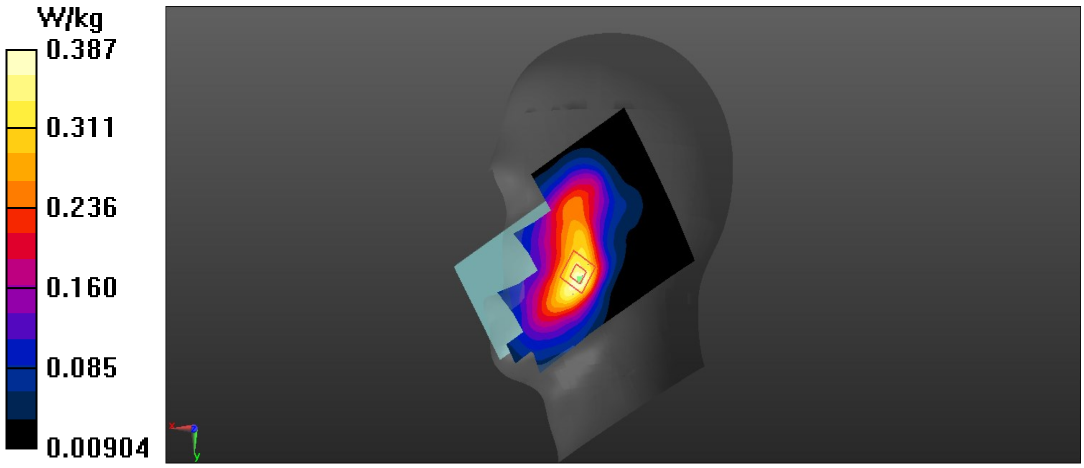


Fig A.14

LTE1900-FDD2_CH18900 Bottom Edge 50RB-Low 10mm
Date: 12/17/2021
Electronics: DAE4 Sn1525
Medium: head 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.392 mho/m; εr = 40.52; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE1900-FDD2 1880 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.81,7.81,7.81)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.666 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.81 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.747 W/kg
SAR(1 g) = 0.41 W/kg; SAR(10 g) = 0.219 W/kg
Maximum value of SAR (measured) = 0.605 W/kg

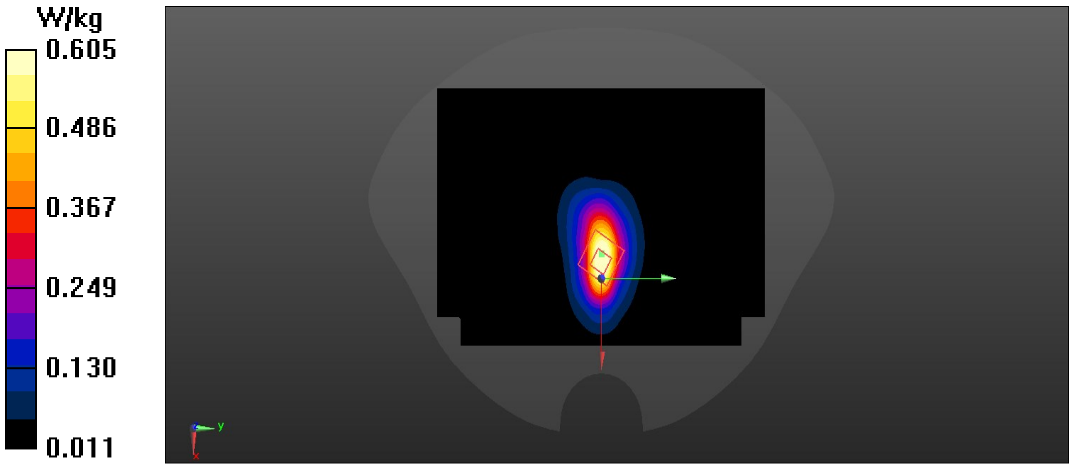


Fig A.15

LTE1900-FDD2_CH18900 Rear 50RB-Low 15mm
Date: 12/17/2021
Electronics: DAE4 Sn1525
Medium: head 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.392 mho/m; εr = 40.52; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE1900-FDD2 1880 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.81,7.81,7.81)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.766 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.059 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.878 W/kg
SAR(1 g) = 0.476 W/kg; SAR(10 g) = 0.264 W/kg
Maximum value of SAR (measured) = 0.720W/kg

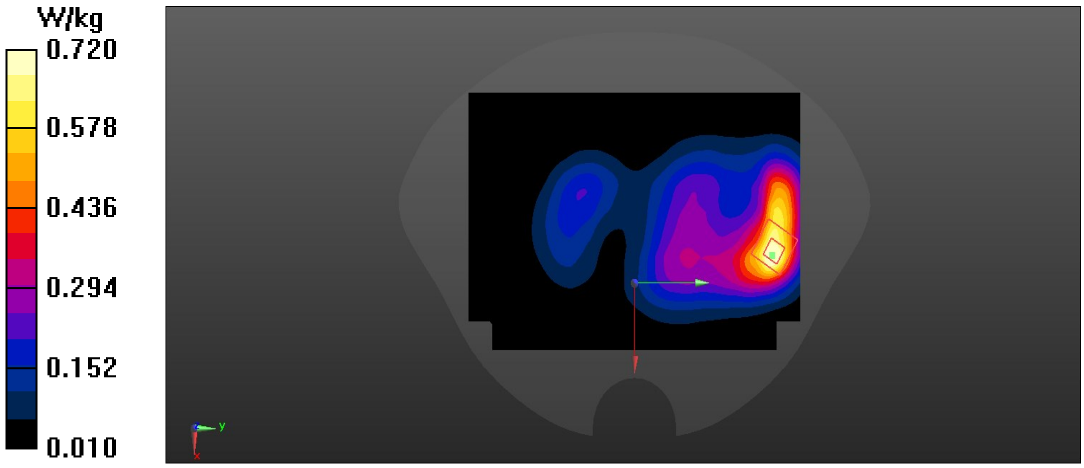


Fig A.16

LTE850-FDD5_CH20600 Left Cheek 25RB-Low
Date: 12/13/2021
Electronics: DAE4 Sn1525
Medium: head 835 MHz
Medium parameters used: f = 844 MHz; σ = 0.917 mho/m; εr = 41.25; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE850-FDD5 844 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(9.40,9.40,9.40)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.51 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.66 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.577 W/kg
SAR(1 g) = 0.278 W/kg; SAR(10 g) = 0.174 W/kg
Maximum value of SAR (measured) = 0.449 W/kg

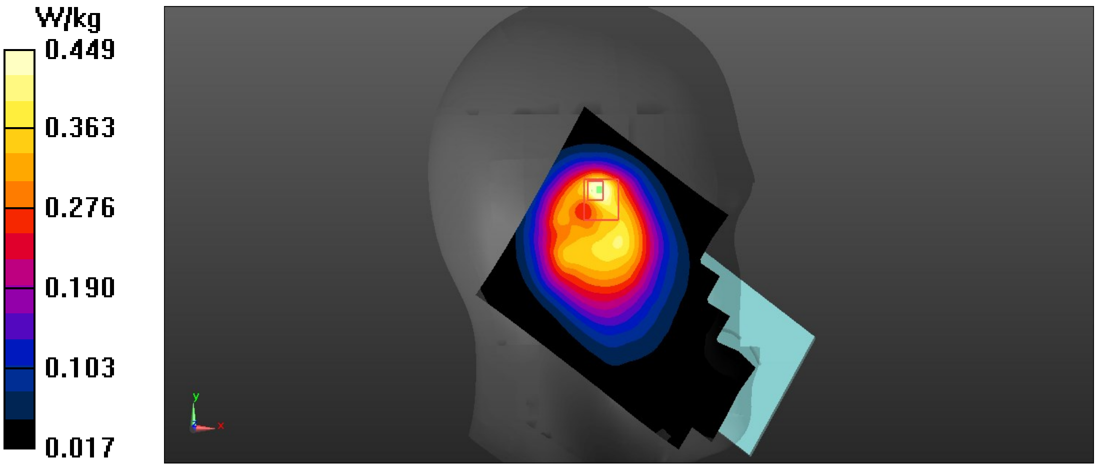


Fig A.17

LTE850-FDD5_CH20525 Rear 1RB-Middle 10mm
Date: 12/13/2021
Electronics: DAE4 Sn1525
Medium: head 835 MHz
Medium parameters used: f = 836.5 MHz; σ = 0.893 mho/m; εr = 41.39; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE850-FDD5 836.5 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(9.40,9.40,9.40)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.916 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.06 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.586 W/kg; SAR(10 g) = 0.318 W/kg
Maximum value of SAR (measured) = 0.923 W/kg

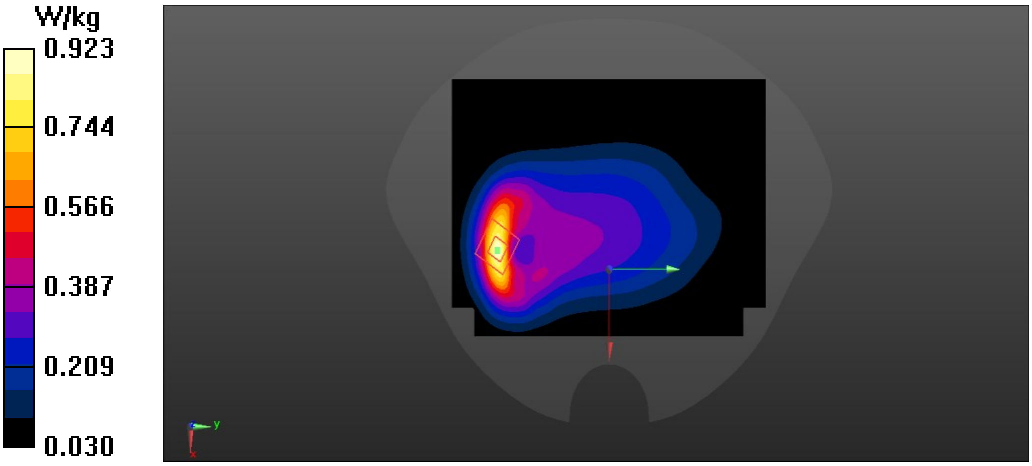


Fig A.18

LTE700-FDD12_CH23060 Left Cheek 25RB-Low
Date: 12/10/2021
Electronics: DAE4 Sn1525
Medium: head 750 MHz
Medium parameters used: f = 704 MHz; σ = 0.836 mho/m; εr = 41.77; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE700-FDD12 704 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(9.81,9.81,9.81)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.453 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.23 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.515 W/kg
SAR(1 g) = 0.259 W/kg; SAR(10 g) = 0.166 W/kg
Maximum value of SAR (measured) = 0.365 W/kg

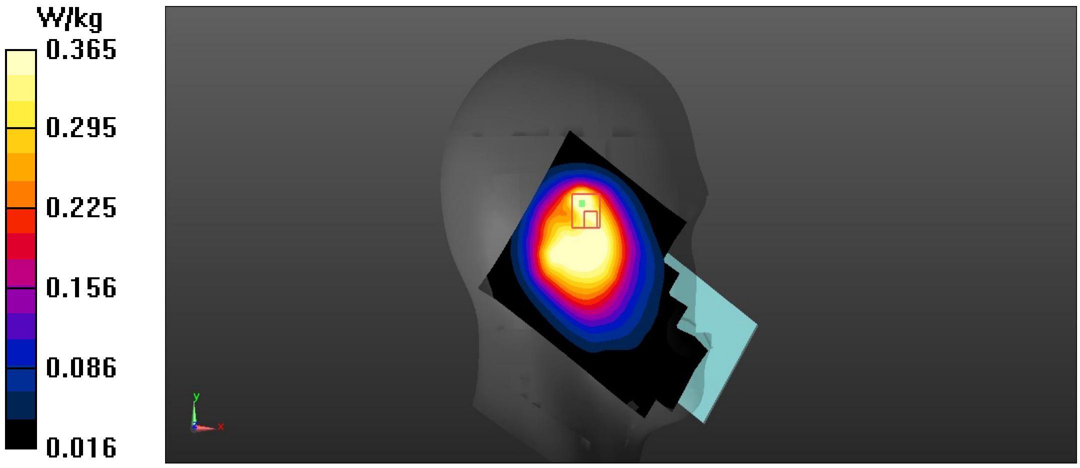


Fig A.19

LTE700-FDD12_CH23060 Rear 1RB-Middle 10mm
Date: 12/10/2021
Electronics: DAE4 Sn1525
Medium: head 750 MHz
Medium parameters used: f = 704 MHz; σ = 0.849 mho/m; εr = 42.63; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE700-FDD12 704 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(9.81,9.81,9.81)

Area Scan (71x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.621 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.22 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = W/kg
SAR(1 g) = 0.479 W/kg; SAR(10 g) = 0.36 W/kg
Maximum value of SAR (measured) = 0.576 W/kg

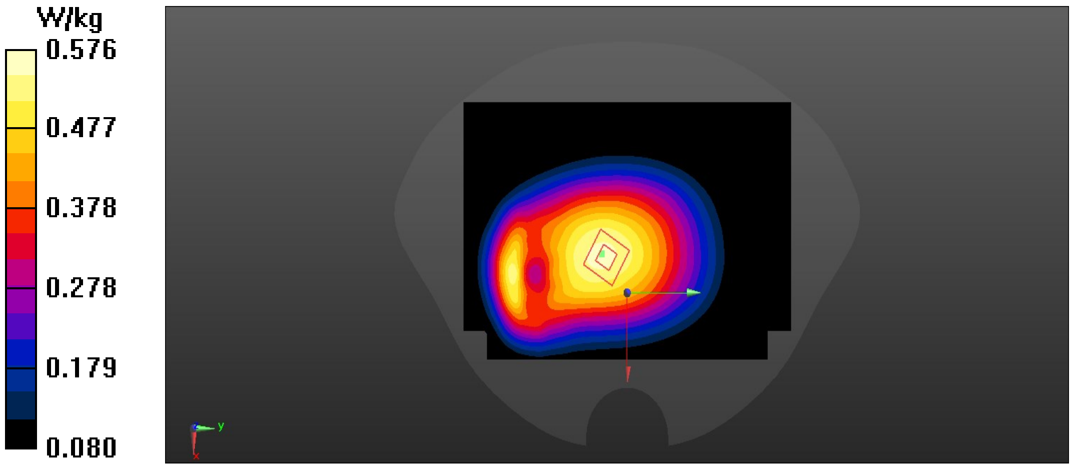


Fig A.20

LTE700-FDD14_CH23230 Left Cheek 25RB-Low
Date: 12/11/2021
Electronics: DAE4 Sn1525
Medium: head 750 MHz
Medium parameters used: f = 783 MHz; σ = 0.911 mho/m; εr = 41.67; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE700-FDD14 783 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(9.81,9.81,9.81)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.422 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.08 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 0.475 W/kg
SAR(1 g) = 0.245 W/kg; SAR(10 g) = 0.162 W/kg
Maximum value of SAR (measured) = 0.367 W/kg

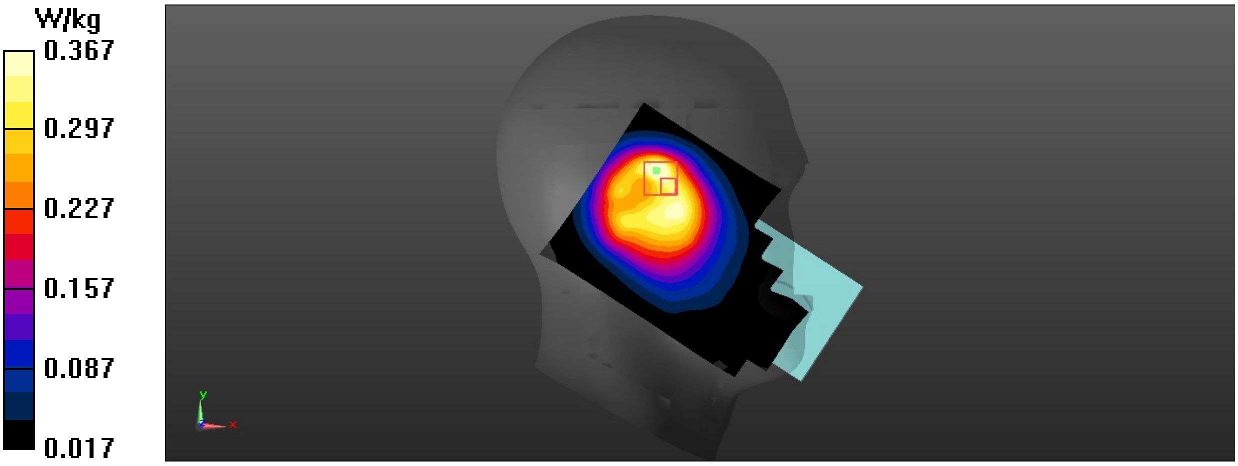


Fig A.21

LTE700-FDD14_CH23330 Rear 1RB-Low 10mm
Date: 12/11/2021
Electronics: DAE4 Sn1525
Medium: head 750 MHz
Medium parameters used: f = 793 MHz; σ = 0.934 mho/m; εr = 42.52; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE700-FDD14 793 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(9.81,9.81,9.81)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.611 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.18 V/m; Power Drift = 0 dB
Peak SAR (extrapolated) = 0.787 W/kg
SAR(1 g) = 0.408 W/kg; SAR(10 g) = 0.226 W/kg
Maximum value of SAR (measured) = 0.627 W/kg

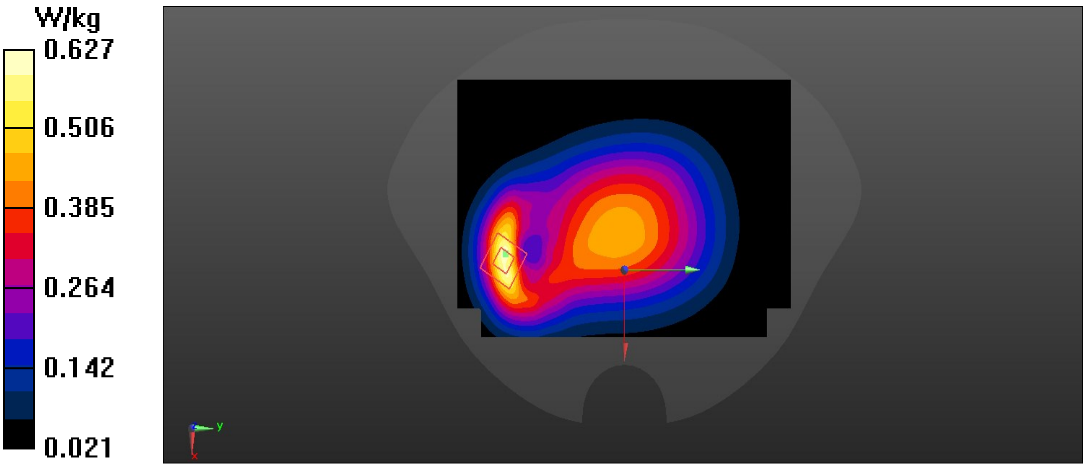


Fig A.22

LTE2300-FDD30_CH27710 Right Cheek 1RB-Middle
Date: 12/18/2021
Electronics: DAE4 Sn1525
Medium: head 2300 MHz
Medium parameters used: f = 2310 MHz; σ = 1.678 mho/m; εr = 40.02; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C,   Liquid Temperature: 22.3°C
Communication System: LTE2300-FDD30 2310 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.58,7.58,7.58)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.347 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.227 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.384 W/kg
SAR(1 g) = 0.216 W/kg; SAR(10 g) = 0.13 W/kg
Maximum value of SAR (measured) = 0.309 W/kg

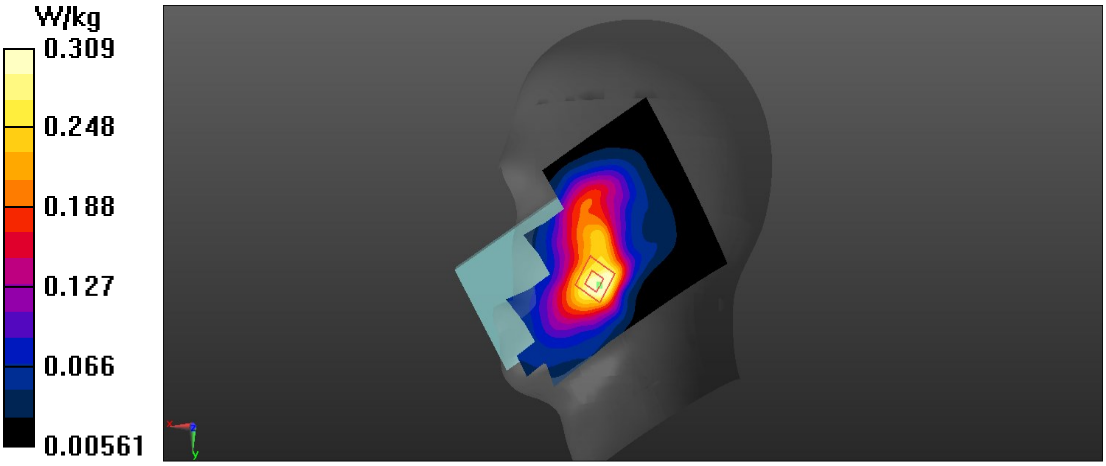


Fig A.23

LTE2300-FDD30_CH27710 Rear 1RB-Middle 10mm
Date: 12/18/2021
Electronics: DAE4 Sn1525
Medium: head 2300 MHz
Medium parameters used: f = 2310 MHz; σ = 1.698 mho/m; εr = 39.3; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE2300-FDD30 2310 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.58,7.58,7.58)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.414 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.441 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.551 W/kg
SAR(1 g) = 0.276 W/kg; SAR(10 g) = 0.132 W/kg
Maximum value of SAR (measured) = 0.444 W/kg

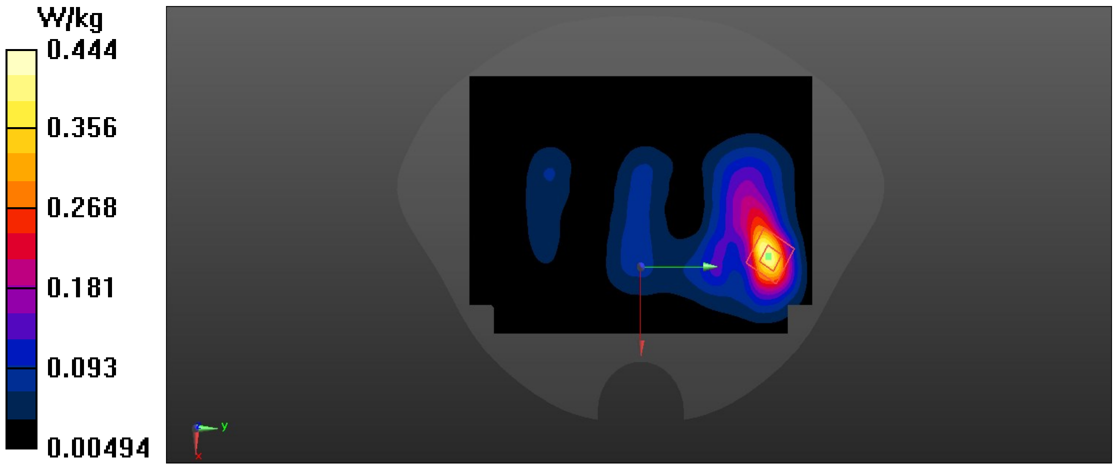


Fig A.24

LTE2300-FDD30_CH27710 Rear 25RB-Low 15mm
Date: 12/18/2021
Electronics: DAE4 Sn1525
Medium: head 2300 MHz
Medium parameters used: f = 2310 MHz; σ = 1.698 mho/m; εr = 39.3; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE2300-FDD30 2310 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.58,7.58,7.58)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.266 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.357 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.334 W/kg
SAR(1 g) = 0.176 W/kg; SAR(10 g) = 0.0913 W/kg
Maximum value of SAR (measured) = 0.269 W/kg

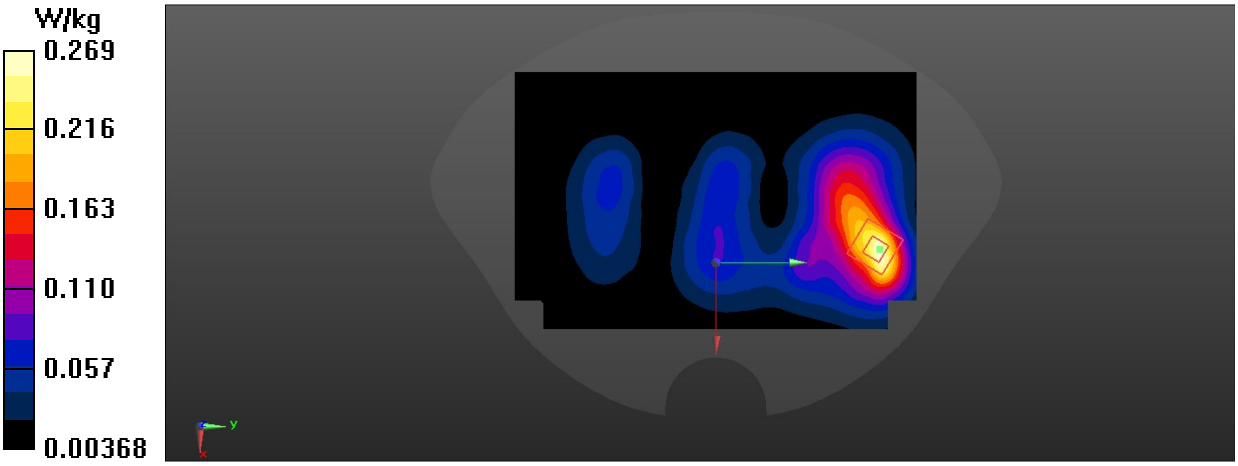


Fig A.25

LTE1700-FDD66_CH132572 Left Cheek 1RB-Middle
Date: 12/15/2021
Electronics: DAE4 Sn1525
Medium: head 1750 MHz
Medium parameters used: f = 2310 MHz; σ = 1.912 mho/m; εr = 40.01; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE1700-FDD66 1770 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(8.22,8.22,8.22)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.344 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.474 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.338 W/kg
SAR(1 g) = 0.226 W/kg; SAR(10 g) = 0.149 W/kg
Maximum value of SAR (measured) = 0.297 W/kg

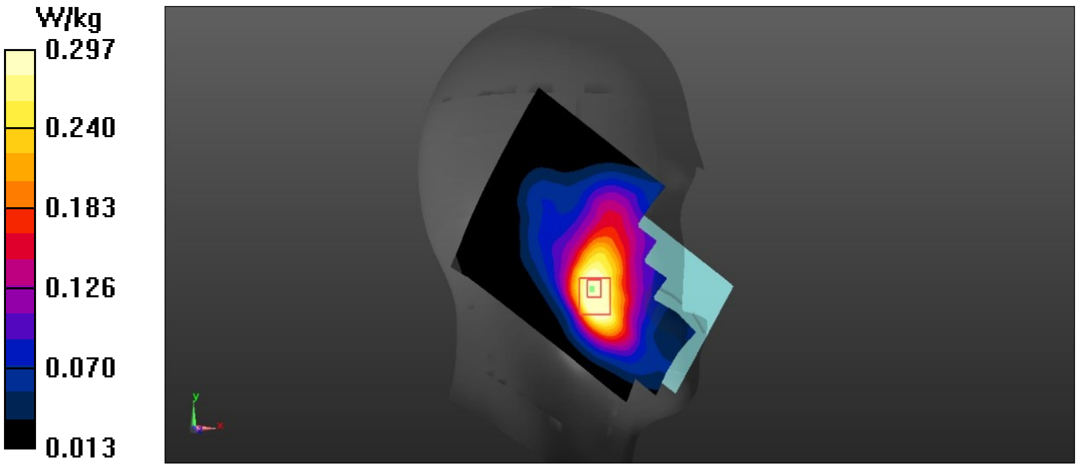


Fig A.26

LTE1700-FDD66_CH132572 Bottom Edge 1RB-Middle 10mm
Date: 12/15/2021
Electronics: DAE4 Sn1525
Medium: head 1750 MHz
Medium parameters used: f = 1770 MHz; σ = 1.924 mho/m; εr = 39.28; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: LTE1700-FDD66 1770 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(8.22,8.22,8.22)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.761 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.6 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.846 W/kg
SAR(1 g) = 0.474 W/kg; SAR(10 g) = 0.255 W/kg
Maximum value of SAR (measured) = 0.720 W/kg

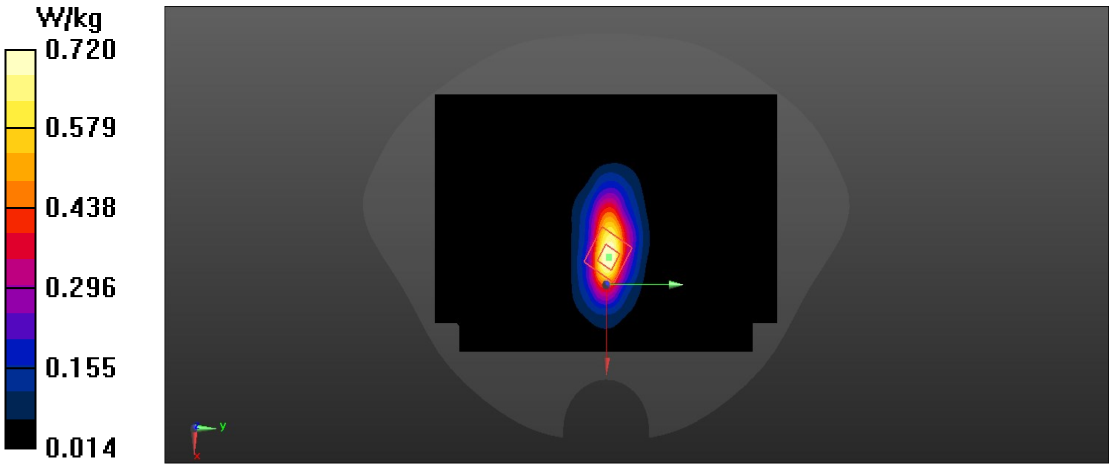


Fig A.27

LTE1700-FDD66_CH132322 Rear 50RB-Middle 15mm
Date: 12/15/2021
Electronics: DAE4 Sn1525
Medium: head 1750 MHz
Medium parameters used: f = 1770 MHz; σ = 1.924 mho/m; εr = 39.28; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC, Liquid Temperature: 22.3ºC
Communication System: LTE1700-FDD66 1745 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(8.22,8.22,8.22)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.618 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.885 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.73 W/kg
SAR(1 g) = 0.431 W/kg; SAR(10 g) = 0.250 W/kg
Maximum value of SAR (measured) = 0.621W/kg

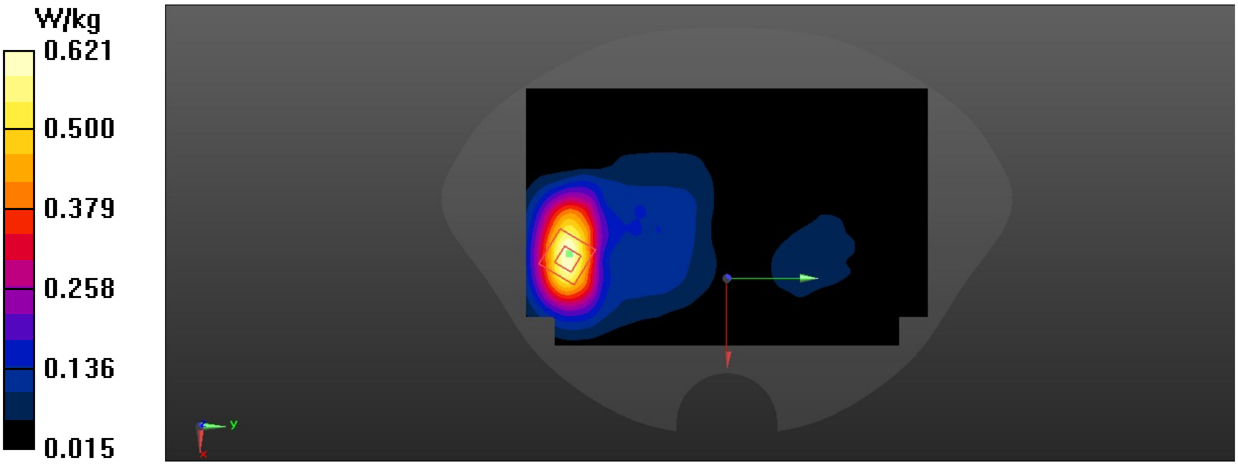


Fig A.28

WLAN2450_CH6 Right Cheek 802.11b 1M 19.5db
Date: 12/19/2021
Electronics: DAE4 Sn1525
Medium: head 2450 MHz
Medium parameters used: f = 2437 MHz; σ = 1.765 mho/m; εr = 38.45; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: WLAN2450 2437 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.34,7.34,7.34)

Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.809 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.935 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.94 W/kg
SAR(1 g) = 0.469 W/kg; SAR(10 g) = 0.239 W/kg
Maximum value of SAR (measured) = 0.738 W/kg

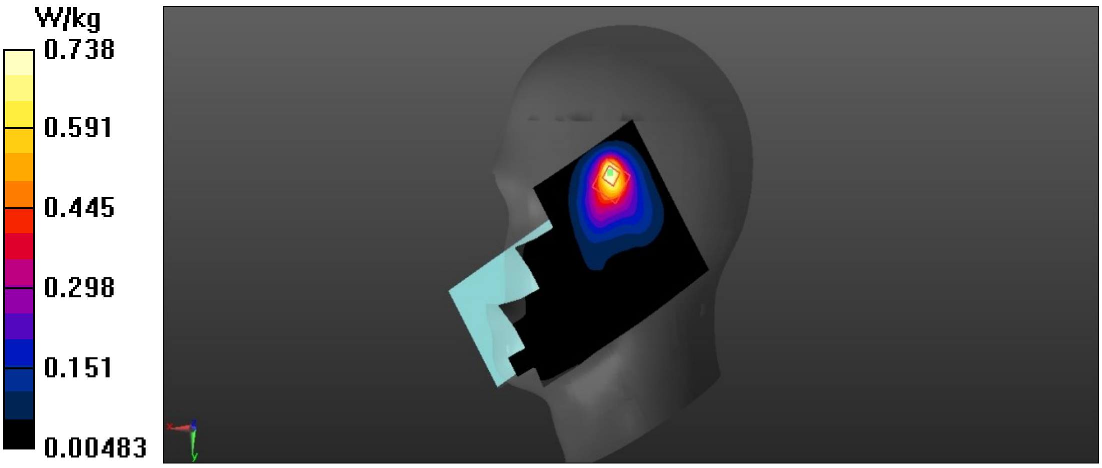


Fig A.29

WLAN2450_CH6 Rear 802.11b 1M 19.5db 10mm
Date: 12/19/2021
Electronics: DAE4 Sn1525
Medium: head 2450 MHz
Medium parameters used: f = 2437 MHz; σ = 1.76 mho/m; εr = 38.67; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: WLAN2450 2437 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.34,7.34,7.34)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.282 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.721 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.311 W/kg
SAR(1 g) = 0.175 W/kg; SAR(10 g) = 0.100 W/kg
Maximum value of SAR (measured) = 7.92 W/kg

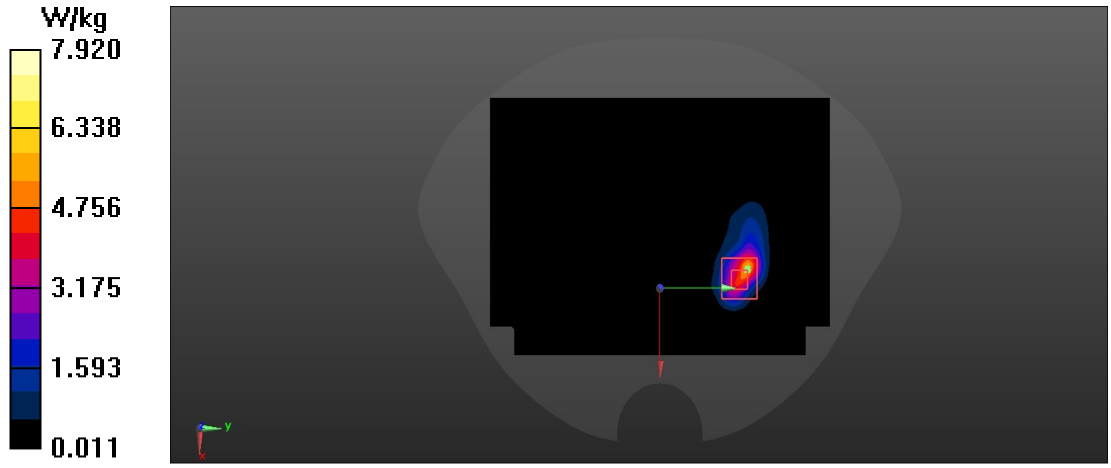


Fig A.30

WLAN2450_CH6 Right Cheek 802.11b 1M 17.5db
Date: 12/20/2021
Electronics: DAE4 Sn1525
Medium: head 2450 MHz
Medium parameters used: f = 2437 MHz; σ = 1.765 mho/m; εr = 38.45; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: WLAN2450 2437 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.34,7.34,7.34)

Area Scan (71x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.355 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.548 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.401 W/kg
SAR(1 g) = 0.247 W/kg; SAR(10 g) = 0.126 W/kg
Maximum value of SAR (measured) = 0.524 W/kg

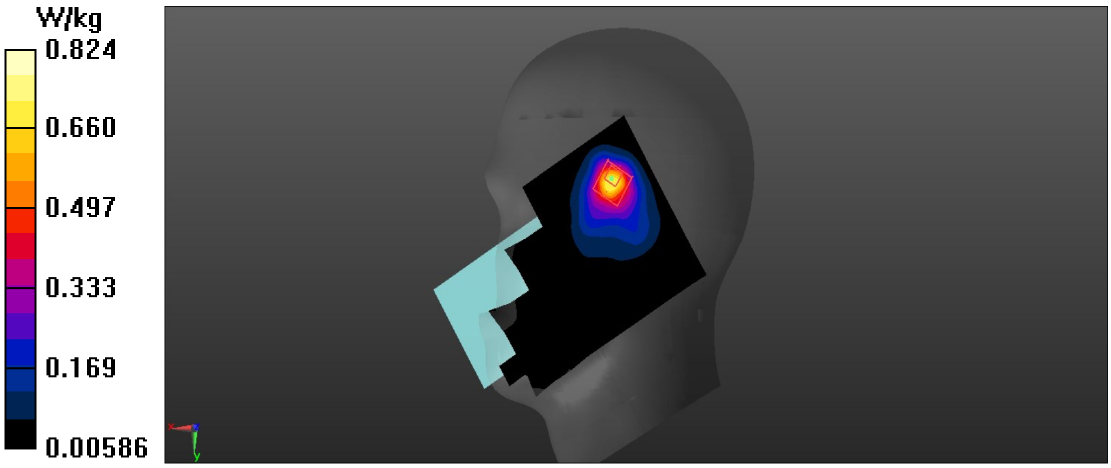


Fig A.31

WLAN2450_CH6 Rear 802.11b 1M 17.5db 10mm
Date: 12/20/2021
Electronics: DAE4 Sn1525
Medium: head 2450 MHz
Medium parameters used: f = 2437 MHz; σ = 1.76 mho/m; εr = 38.67; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C, Liquid Temperature: 22.3°C
Communication System: WLAN2450 2437 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.34,7.34,7.34)

Area Scan (91x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.382 W/kg

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.702 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.520 W/kg
SAR(1 g) = 0.103 W/kg; SAR(10 g) = 0.091 W/kg
Maximum value of SAR (measured) = 0.403 W/kg

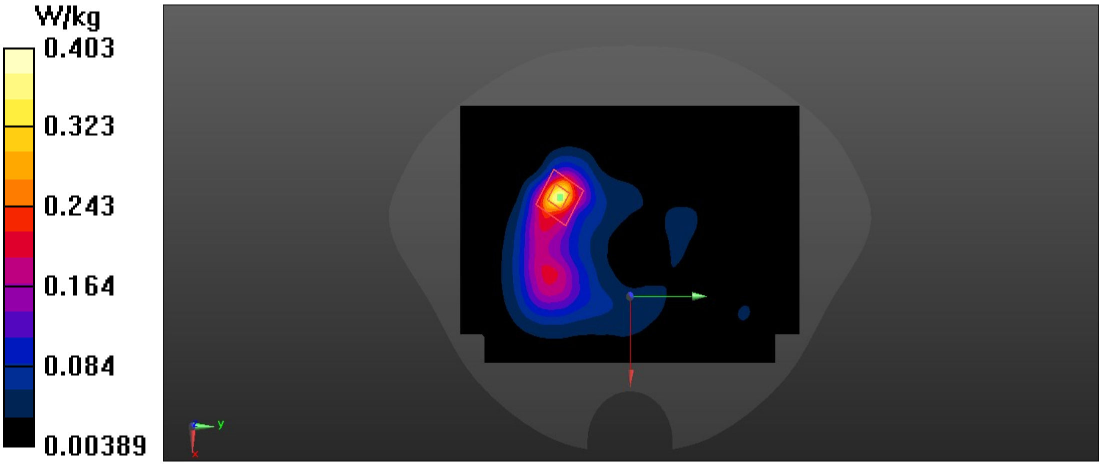


Fig A.32

Fig. 1-1 Z-Scan at power reference point (850 MHz)

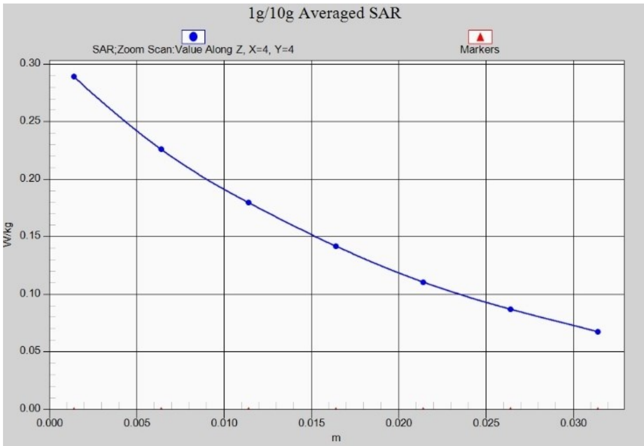


Fig. 1-2 Z-Scan at power reference point (850 MHz)

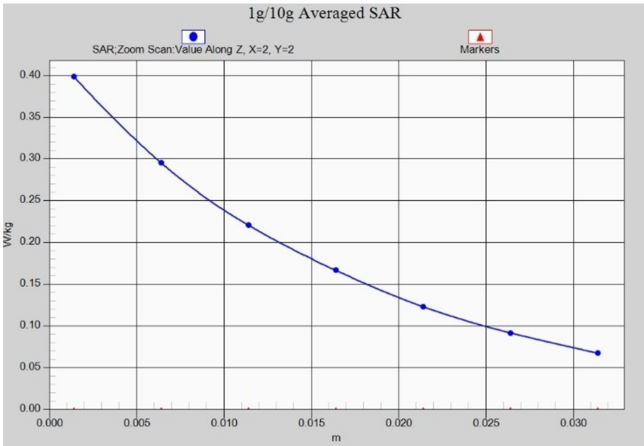


Fig. 1-3 Z-Scan at power reference point (1900 MHz)

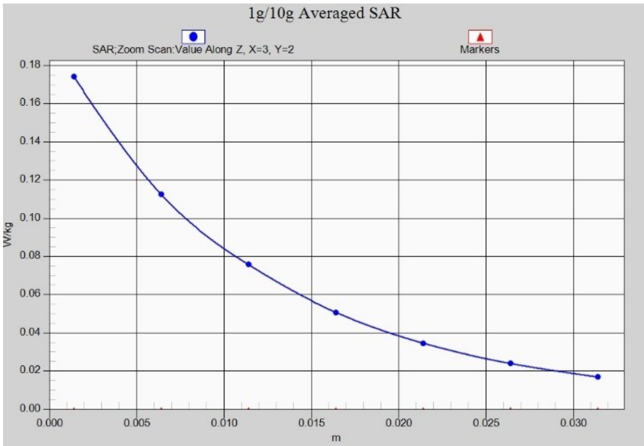


Fig. 1-4 Z-Scan at power reference point (1900 MHz)

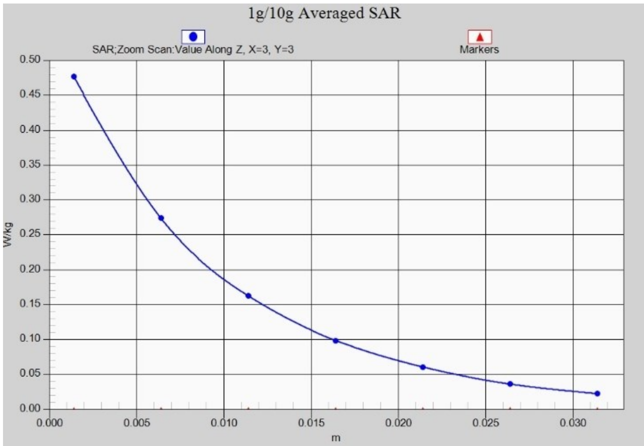


Fig. 1-5 Z-Scan at power reference point (1900 MHz)

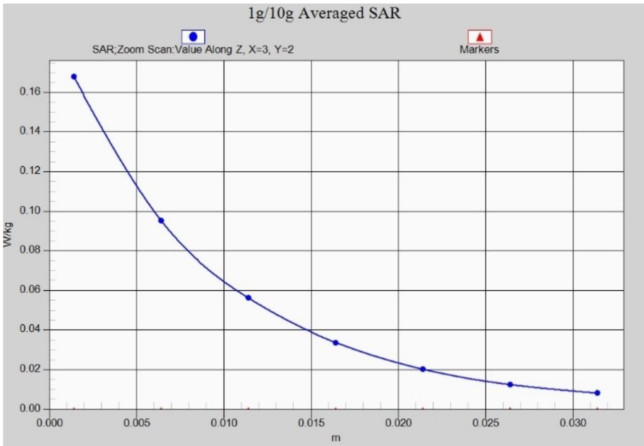


Fig. 1-6 Z-Scan at power reference point (WCDMA850)

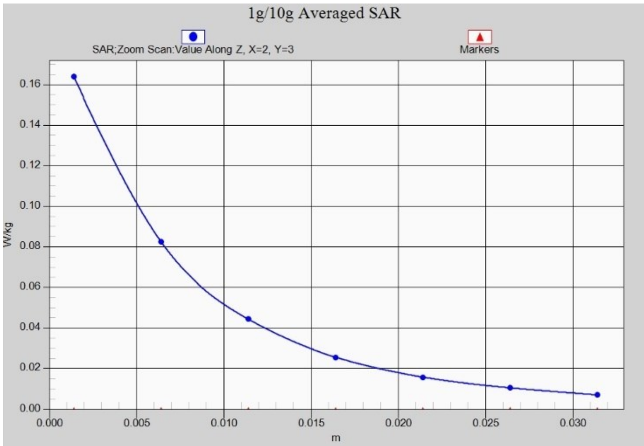


Fig. 1-7 Z-Scan at power reference point (WCDMA850)

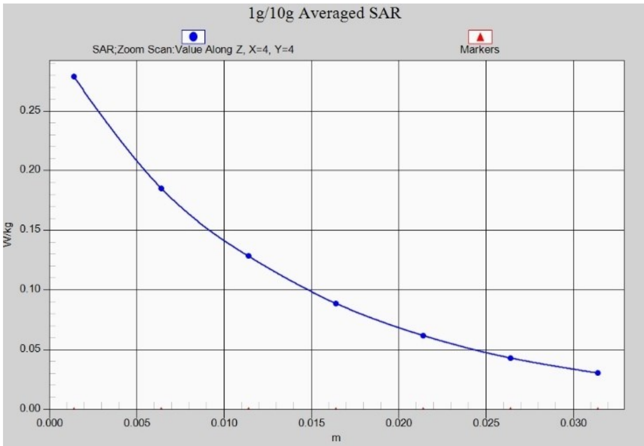


Fig. 1-8 Z-Scan at power reference point (WCDMA1700)

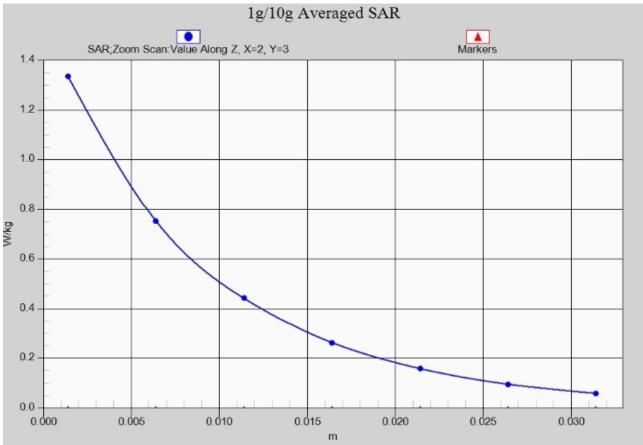


Fig. 1-9 Z-Scan at power reference point (WCDMA1700)

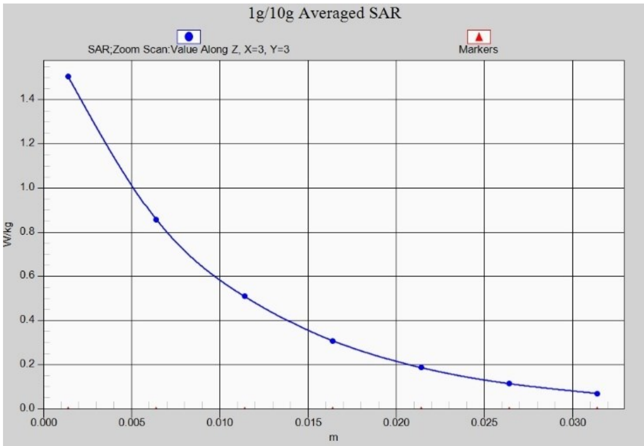


Fig. 1-10 Z-Scan at power reference point (WCDMA1700)

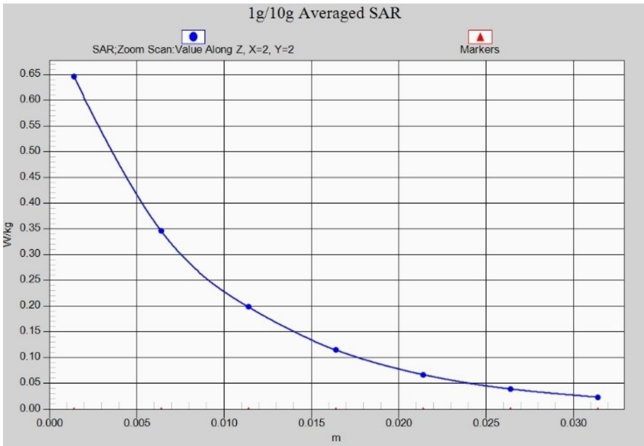


Fig. 1-11 Z-Scan at power reference point (WCDMA1900)

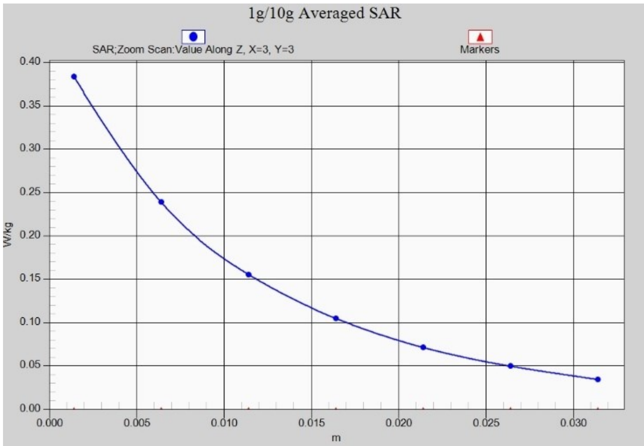


Fig. 1-12 Z-Scan at power reference point (WCDMA1900)

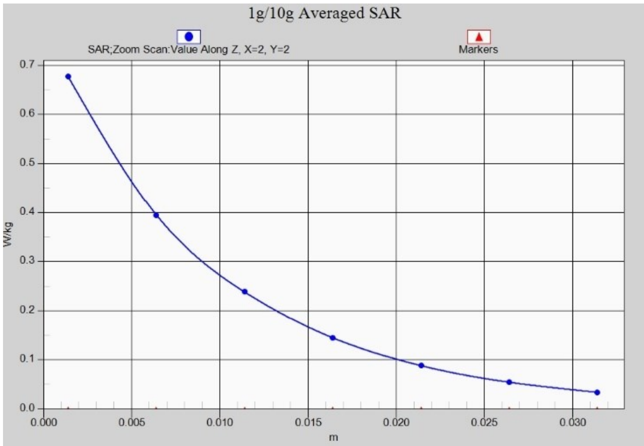


Fig. 1-13 Z-Scan at power reference point (WCDMA1900)

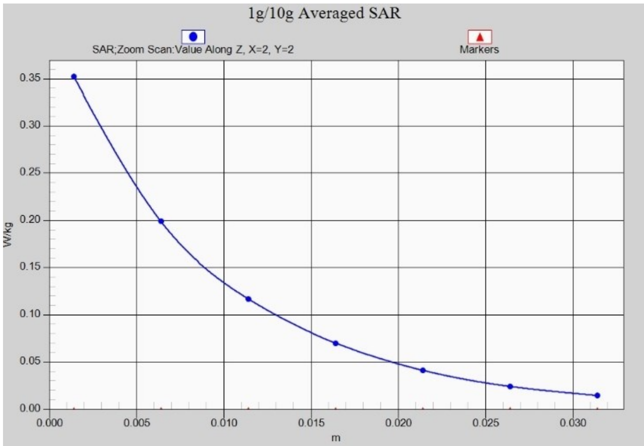


Fig. 1-14 Z-Scan at power reference point (LTE Band2)

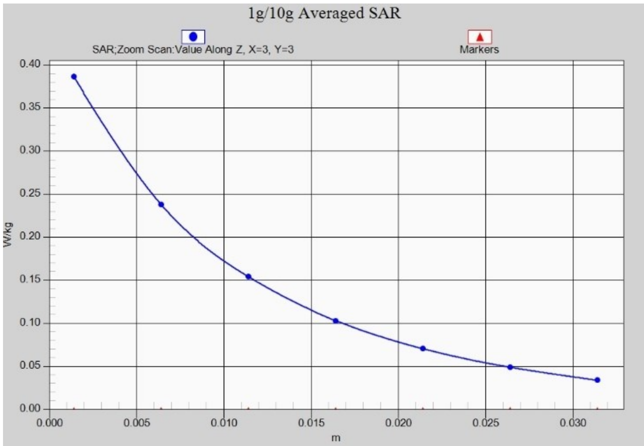


Fig. 1-15 Z-Scan at power reference point (LTE Band2)

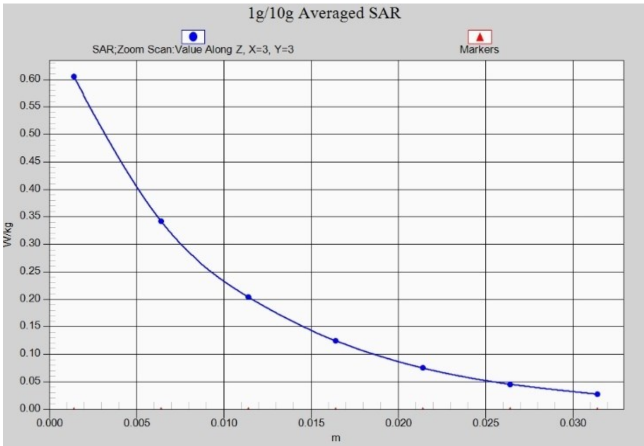


Fig. 1-16 Z-Scan at power reference point (LTE Band2)

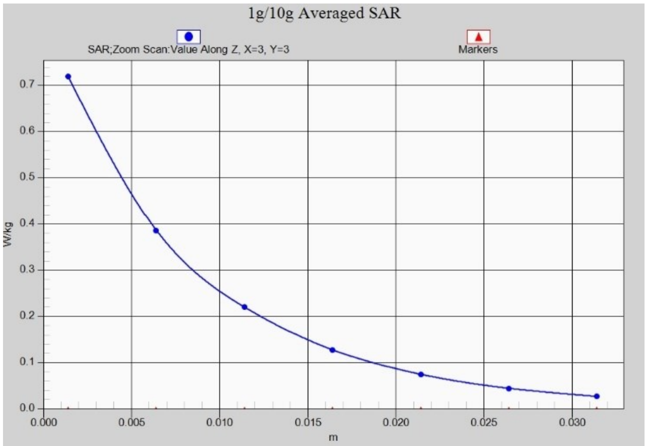


Fig. 1-17 Z-Scan at power reference point (LTE Band5)

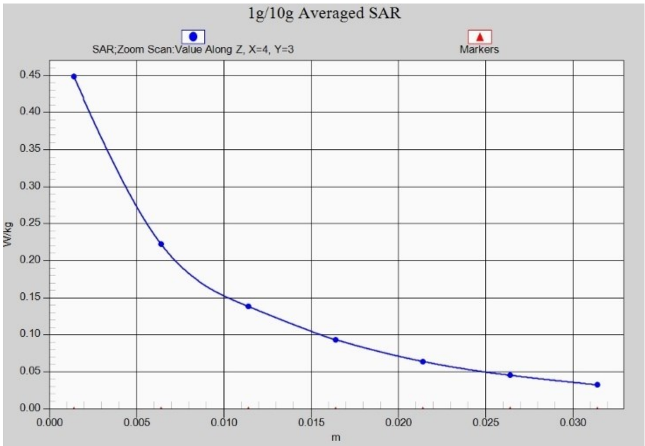


Fig. 1-18 Z-Scan at power reference point (LTE Band5)

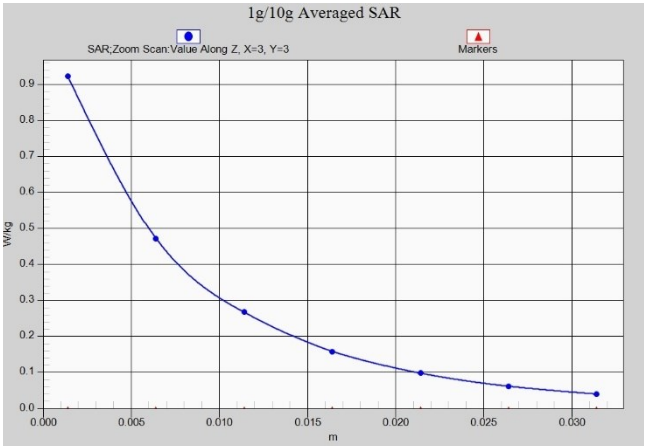


Fig. 1-19 Z-Scan at power reference point (LTE Band12)

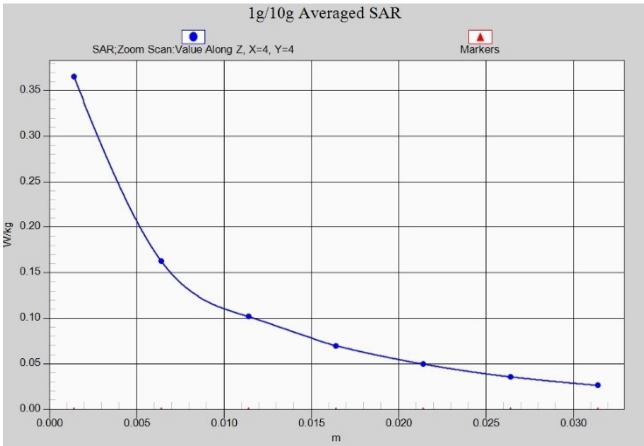


Fig. 1-20 Z-Scan at power reference point (LTE Band12)

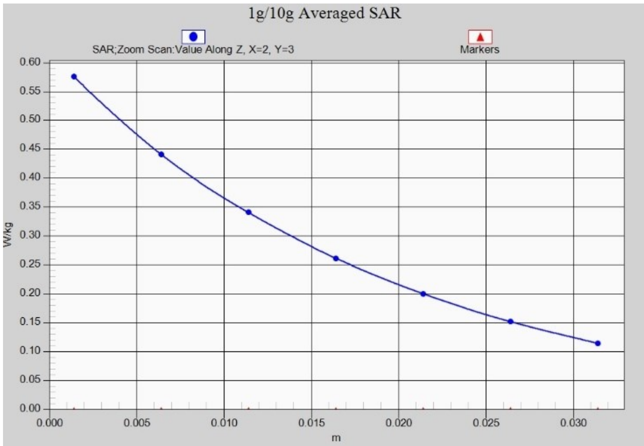


Fig. 1-21 Z-Scan at power reference point (LTE Band14)

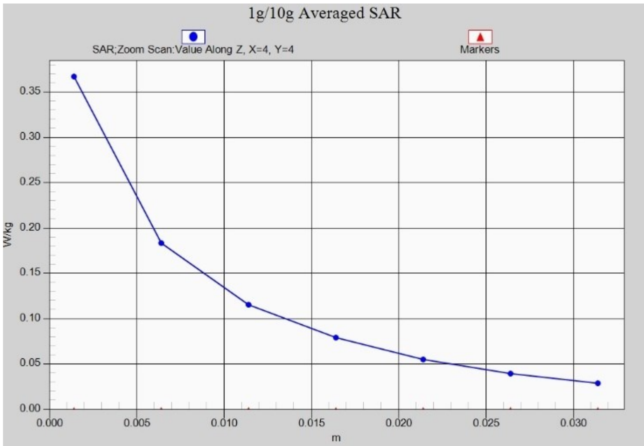


Fig. 1-22 Z-Scan at power reference point (LTE Band14)

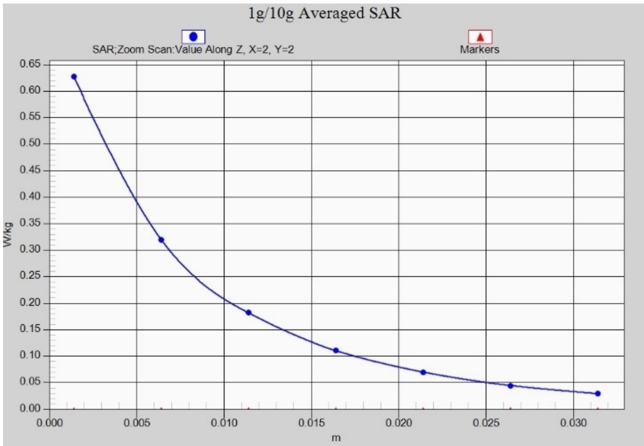


Fig. 1-23 Z-Scan at power reference point (LTE Band30)

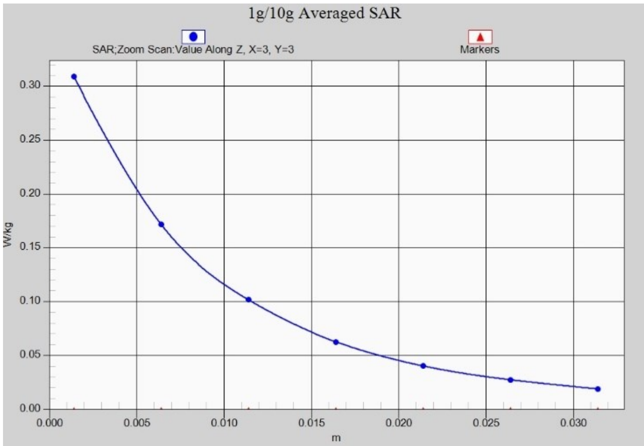


Fig. 1-24 Z-Scan at power reference point (LTE Band30)

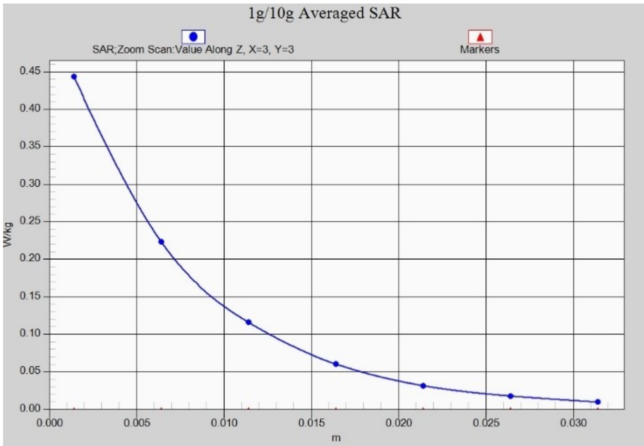


Fig. 1-25 Z-Scan at power reference point (LTE Band30)

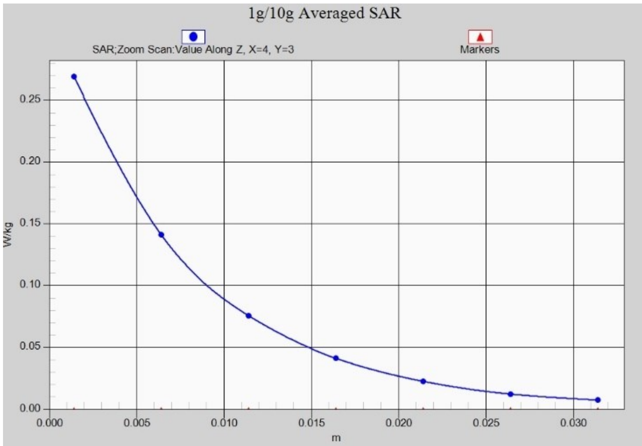


Fig. 1-26 Z-Scan at power reference point (LTE Band66)

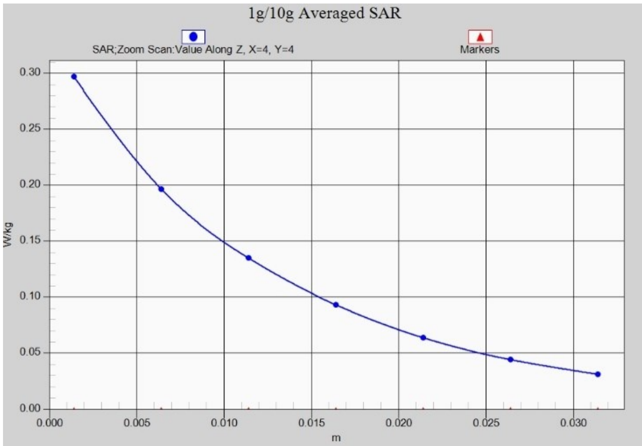


Fig. 1-27 Z-Scan at power reference point (LTE Band66)

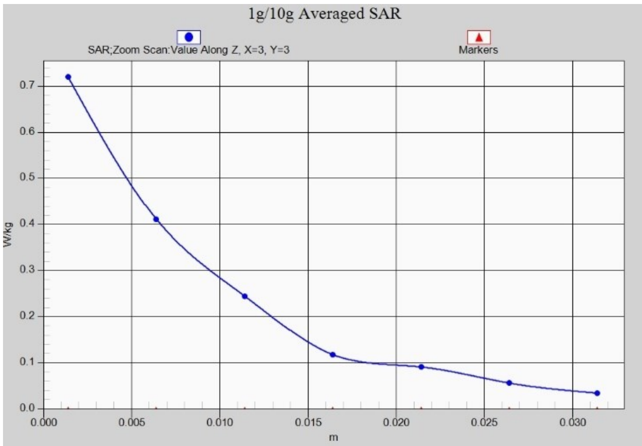


Fig. 1-28 Z-Scan at power reference point (LTE Band66)

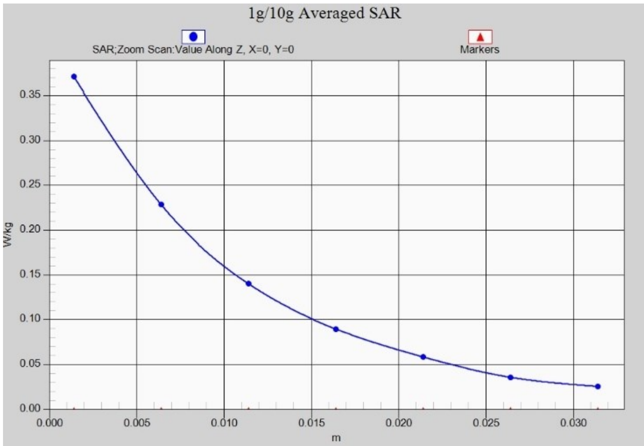


Fig. 1-29 Z-Scan at power reference point (wifi2450)

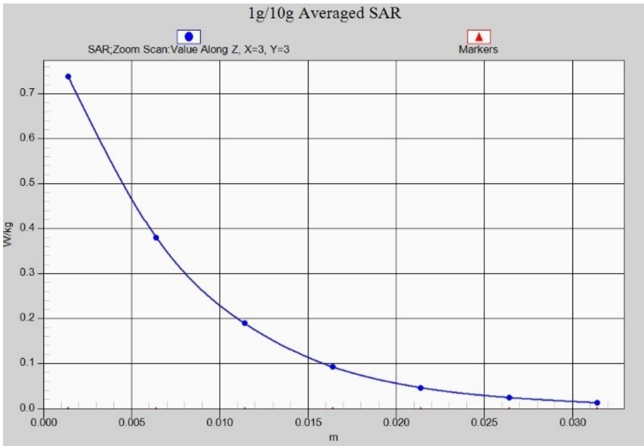


Fig. 1-30 Z-Scan at power reference point (wifi2450)

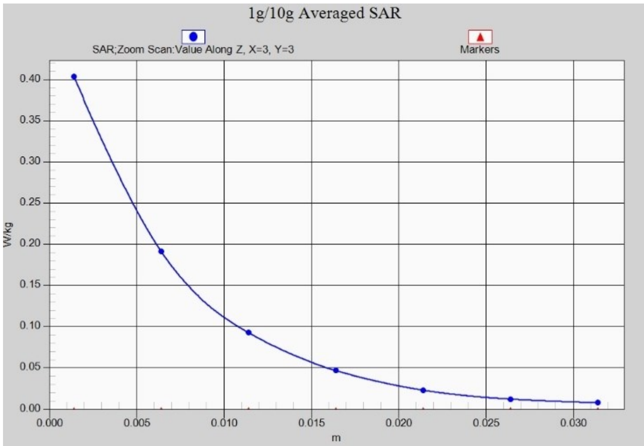


Fig. 1-31 Z-Scan at power reference point (wifi2450)

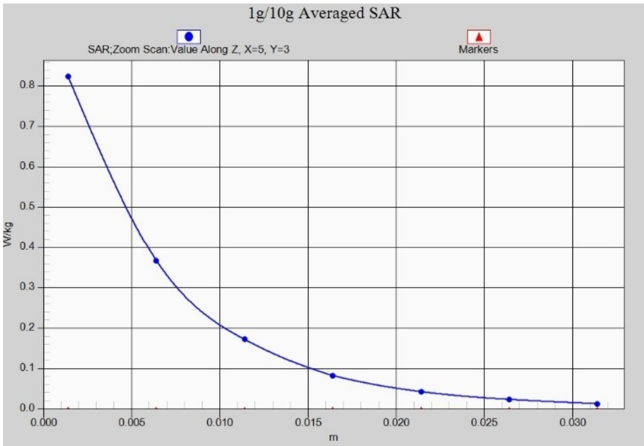
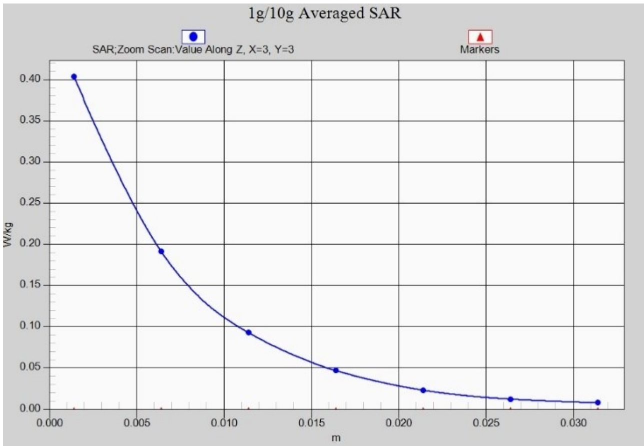


Fig. 1-32 Z-Scan at power reference point (wifi2450)



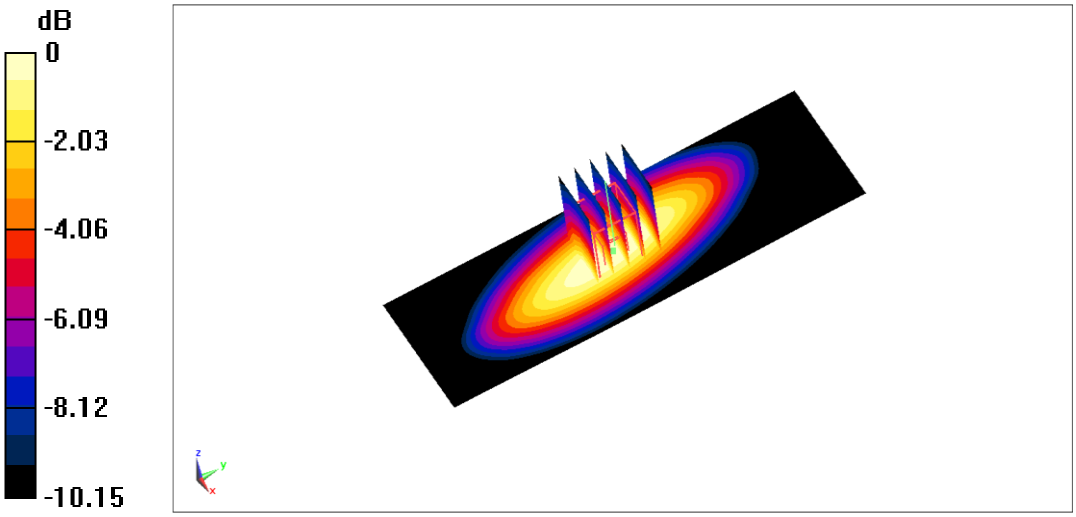
ANNEX B System Verification Results

750 MHz

Date: 12/10/2021
Electronics: DAE4 Sn1525
Medium: Head 750 MHz
Medium parameters used: f = 750 MHz; σ =0.897 mho/m; ε_r = 42.07; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC Liquid Temperature: 22.3ºC
Communication System: CW Frequency: 750 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(9.81,9.81,9.81)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Reference Value = 58.99 V/m; Power Drift = -0.1
Fast SAR: SAR(1 g) = 2.08 W/kg; SAR(10 g) = 1.4 W/kg
Maximum value of SAR (interpolated) = 2.81 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value =58.99 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 3.3 W/kg
SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.4 W/kg
Maximum value of SAR (measured) = 2.92 W/kg



0 dB = 2.92 W/kg = 4.65 dB W/kg

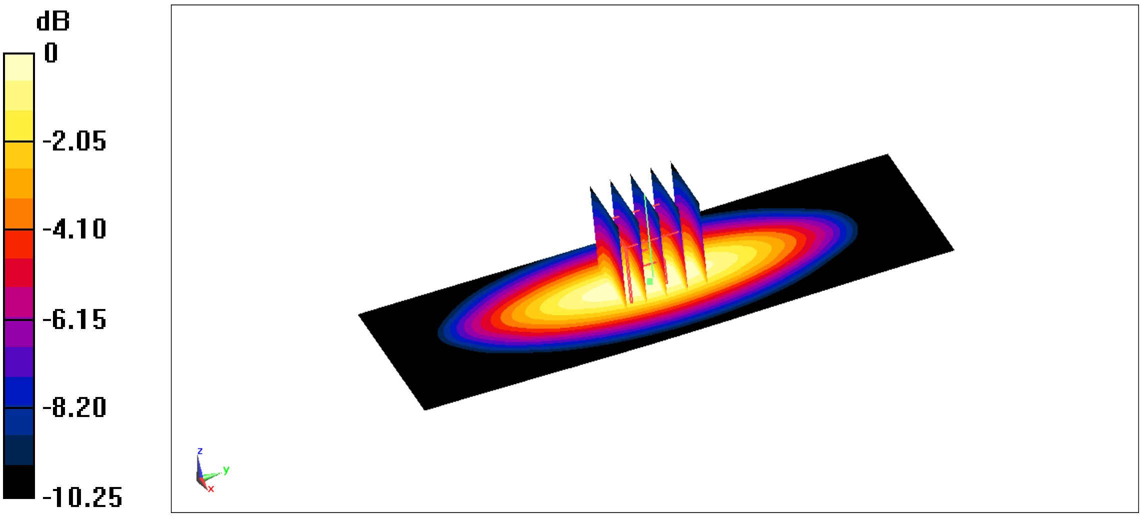
Fig.B.1 validation 750 MHz 250mW

750 MHz

Date: 12/11/2021
Electronics: DAE4 Sn1525
Medium: Head 750 MHz
Medium parameters used: f = 750 MHz; σ =0.874 mho/m; ε_r = 41.89; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC Liquid Temperature: 22.3ºC
Communication System: CW Frequency: 750 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(9.81,9.81,9.81)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Reference Value = 59.75 V/m; Power Drift = -0.05
Fast SAR: SAR(1 g) = 2.10 W/kg; SAR(10 g) = 1.41 W/kg
Maximum value of SAR (interpolated) = 2.83 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value =59.75 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 3.3 W/kg
SAR(1 g) = 2.13 W/kg; SAR(10 g) = 1.37 W/kg
Maximum value of SAR (measured) = 2.82 W/kg



0 dB = 2.82 W/kg = 4.5 dB W/kg

Fig.B.2 validation 750 MHz 250mW

835 MHz

Date: 12/12/2021
Electronics: DAE4 Sn1525
Medium: Head 835 MHz
Medium parameters used: f = 835 MHz; σ =0.903 mho/m; ε_r = 40.84; ρ = 1000 kg/m^3
Ambient Temperature: 22.5°C Liquid Temperature: 22.3°C
Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(9.40,9.40,9.40)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Reference Value = 62.6 V/m; Power Drift = -0.04

Fast SAR: SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.55 W/kg

Maximum value of SAR (interpolated) = 3.2 W/kg

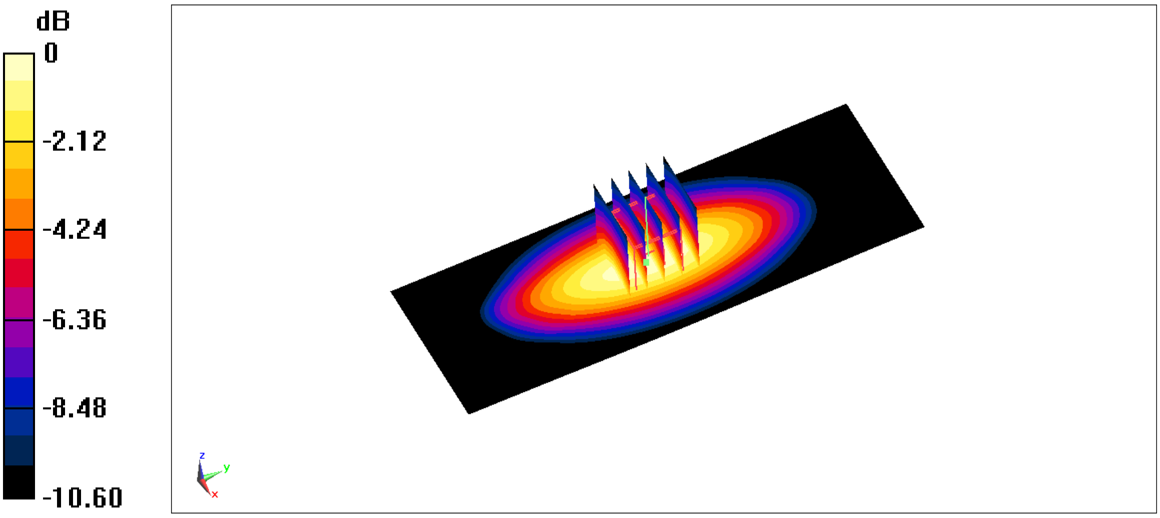
System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value =62.6 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 3.62 W/kg

SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.56 W/kg

Maximum value of SAR (measured) = 3.29 W/kg



0 dB = 3.29 W/kg = 5.17 dB W/kg

Fig.B.3 validation 835 MHz 250mW

835 MHz

Date: 12/13/2021
Electronics: DAE4 Sn1525
Medium: Head 835 MHz
Medium parameters used: f = 835 MHz; σ =0.889 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC Liquid Temperature: 22.3ºC
Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(9.40,9.40,9.40)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Reference Value = 64.16 V/m; Power Drift = 0.06

Fast SAR: SAR(1 g) = 2.40 W/kg; SAR(10 g) = 1.56 W/kg

Maximum value of SAR (interpolated) = 3.23 W/kg

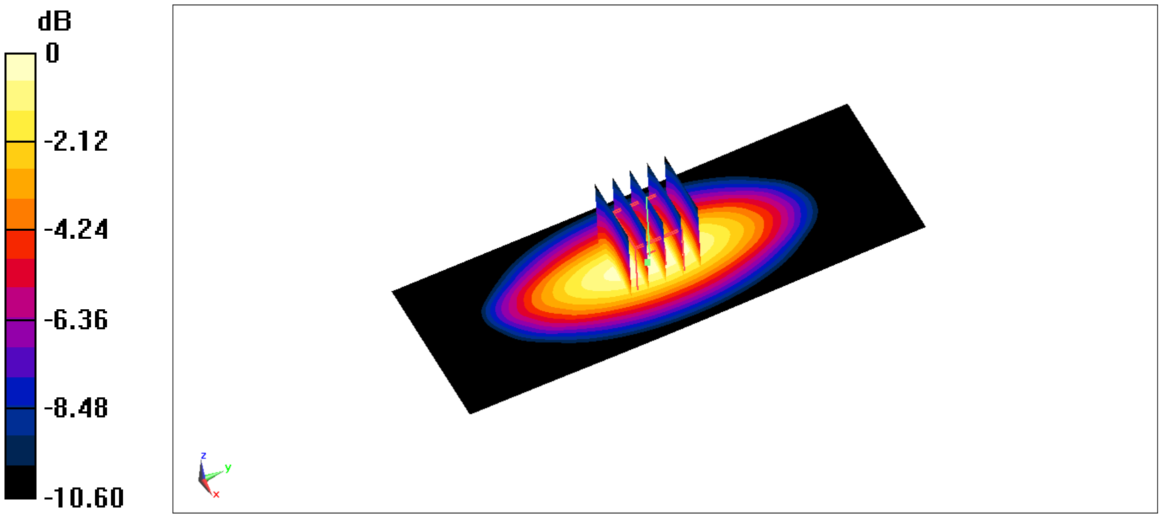
System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value =64.16 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 3.62 W/kg

SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.59 W/kg

Maximum value of SAR (measured) = 3.2 W/kg



0 dB = 3.2 W/kg = 5.05 dB W/kg

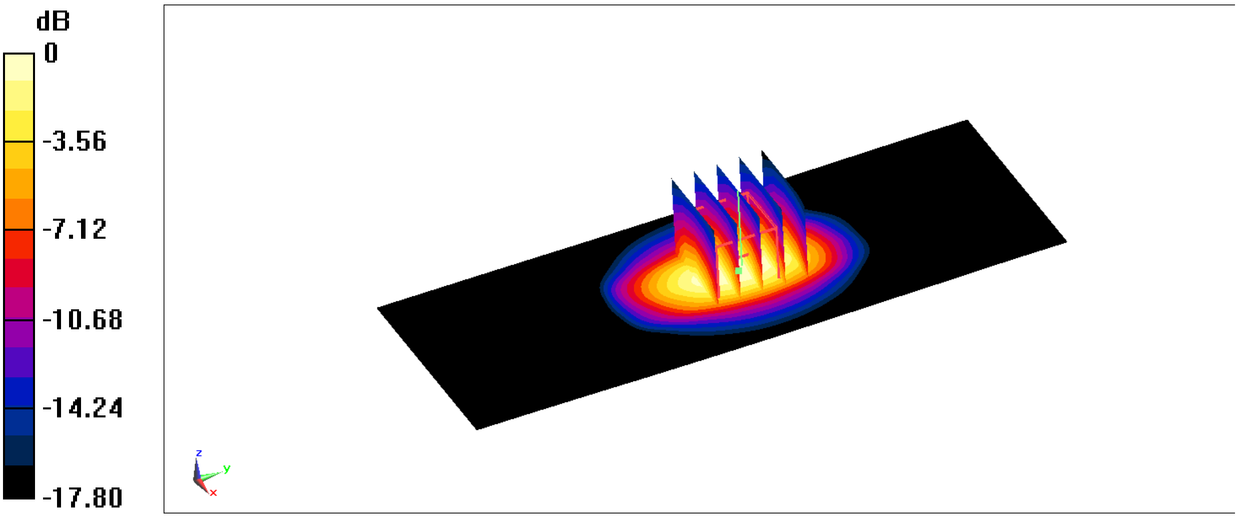
Fig.B.4 validation 835 MHz 250mW

1750 MHz

Date: 12/14/2021
Electronics: DAE4 Sn1525
Medium: Head 1750 MHz
Medium parameters used: f = 1750 MHz; σ =1.38 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC Liquid Temperature: 22.3ºC
Communication System: CW Frequency: 1750 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(8.22,8.22,8.22)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Reference Value = 105.48 V/m; Power Drift = -0.05
Fast SAR: SAR(1 g) = 8.96 W/kg; SAR(10 g) = 4.75 W/kg
Maximum value of SAR (interpolated) = 14.3 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value =105.48 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 16.63 W/kg
SAR(1 g) = 9 W/kg; SAR(10 g) = 4.73 W/kg
Maximum value of SAR (measured) = 14.12 W/kg



0 dB = 14.12 W/kg = 11.5 dB W/kg

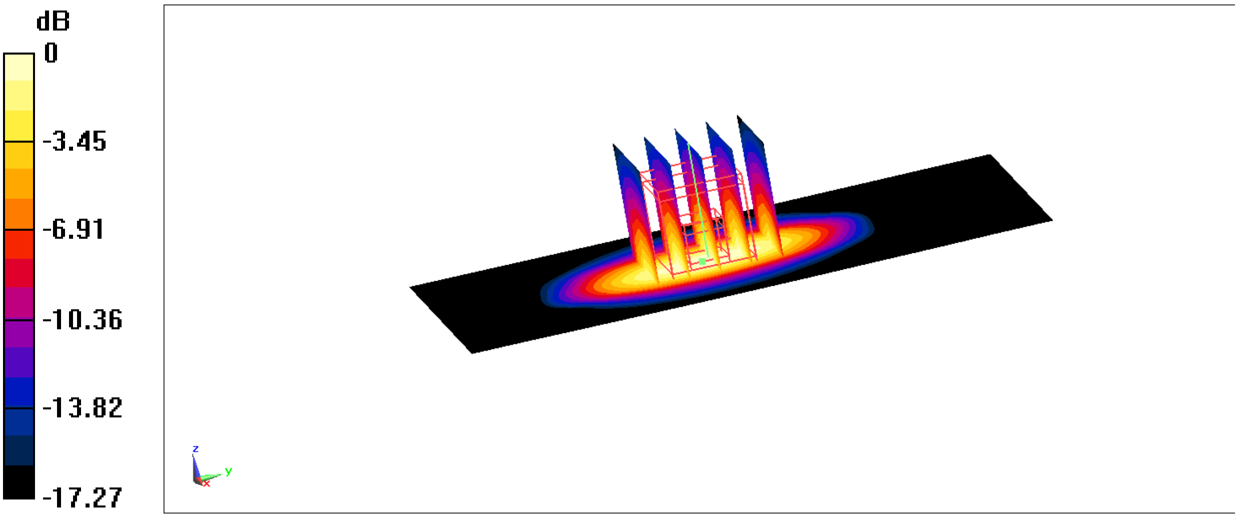
Fig.B.5 validation 1750 MHz 250mW

1750 MHz

Date: 12/15/2021
Electronics: DAE4 Sn1525
Medium: Head 1750 MHz
Medium parameters used: f = 1750 MHz; σ =1.37 mho/m; ε_r = 39.45; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC Liquid Temperature: 22.3ºC
Communication System: CW Frequency: 1750 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(8.22,8.22,8.22)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Reference Value = 105.93 V/m; Power Drift = 0.02
Fast SAR: SAR(1 g) = 8.97 W/kg; SAR(10 g) = 4.74 W/kg
Maximum value of SAR (interpolated) = 13.88 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value =105.93 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 16.48 W/kg
SAR(1 g) = 8.94 W/kg; SAR(10 g) = 4.8 W/kg
Maximum value of SAR (measured) = 14.28 W/kg



0 dB = 14.28 W/kg = 11.55 dB W/kg

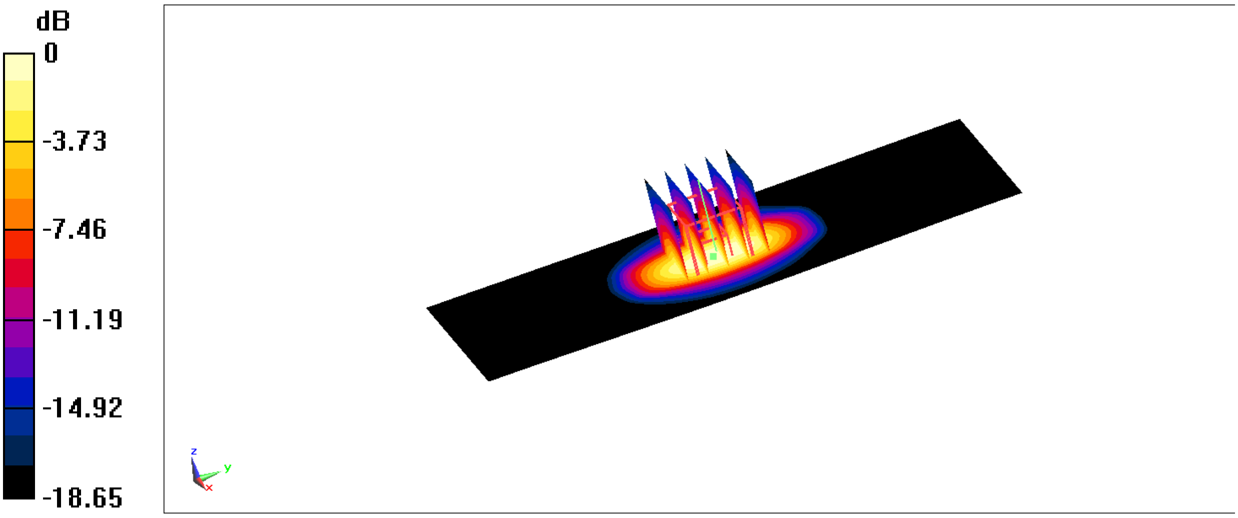
Fig.B.6 validation 1750 MHz 250mW

1900 MHz

Date: 12/16/2021
Electronics: DAE4 Sn1525
Medium: Head 1900 MHz
Medium parameters used: f = 1900 MHz; σ =1.397 mho/m; ε_r = 39.44; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC Liquid Temperature: 22.3ºC
Communication System: CW Frequency: 1900 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.81,7.81,7.81)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Reference Value = 110.77 V/m; Power Drift = -0.08
Fast SAR: SAR(1 g) = 9.9 W/kg; SAR(10 g) = 5.11 W/kg
Maximum value of SAR (interpolated) = 15.39 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value =110.77 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 18.13 W/kg
SAR(1 g) = 9.94 W/kg; SAR(10 g) = 5.24 W/kg
Maximum value of SAR (measured) = 15.17 W/kg



0 dB = 15.17 W/kg = 11.81 dB W/kg

Fig.B.7 validation 1900 MHz 250mW

1900 MHz

Date: 12/17/2021
Electronics: DAE4 Sn1525
Medium: Head 1900 MHz
Medium parameters used: f = 1900 MHz; σ =1.387 mho/m; ε_r = 39.61; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC Liquid Temperature: 22.3ºC
Communication System: CW Frequency: 1900 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.81,7.81,7.81)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Reference Value = 106.86 V/m; Power Drift = 0.06

Fast SAR: SAR(1 g) = 9.8 W/kg; SAR(10 g) = 5.06 W/kg

Maximum value of SAR (interpolated) = 15.19 W/kg

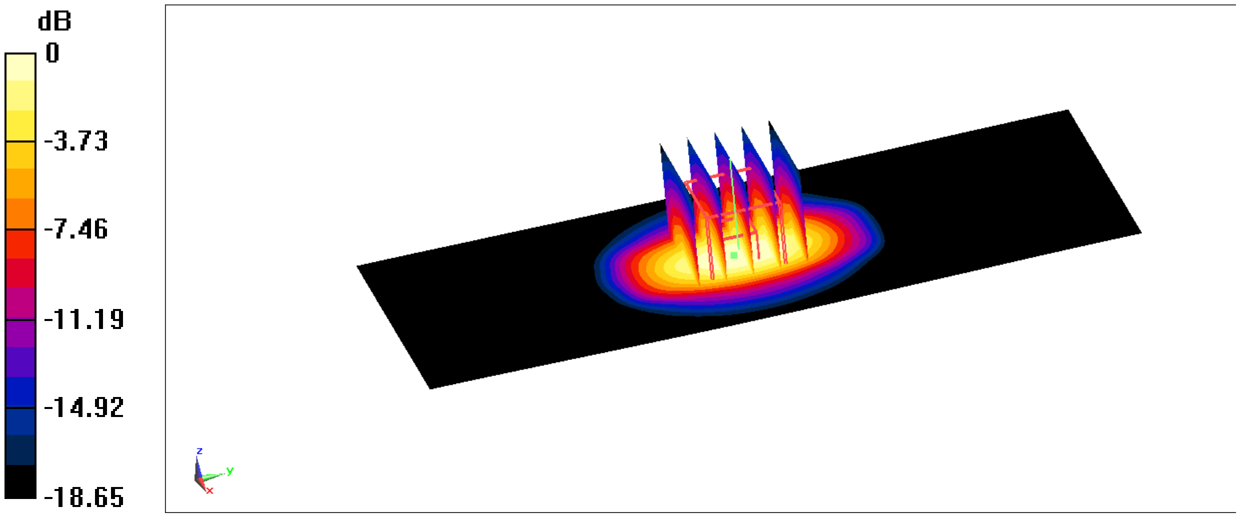
System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value =106.86 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 18.01 W/kg

SAR(1 g) = 9.78 W/kg; SAR(10 g) = 5.17 W/kg

Maximum value of SAR (measured) = 15.46 W/kg



0 dB = 15.46 W/kg = 11.89 dB W/kg

Fig.B.8 validation 1900 MHz 250mW

2300 MHz

Date: 12/18/2021
Electronics: DAE4 Sn1525
Medium: Head 2300 MHz
Medium parameters used: f = 2300 MHz; σ =1.679 mho/m; $ε_r$ = 40.23; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC Liquid Temperature: 22.3ºC
Communication System: CW Frequency: 2300 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.58,7.58,7.58)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Reference Value = 119.69 V/m; Power Drift = -0.03

Fast SAR: SAR(1 g) = 12.67 W/kg; SAR(10 g) = 5.84 W/kg

Maximum value of SAR (interpolated) = 20.15 W/kg

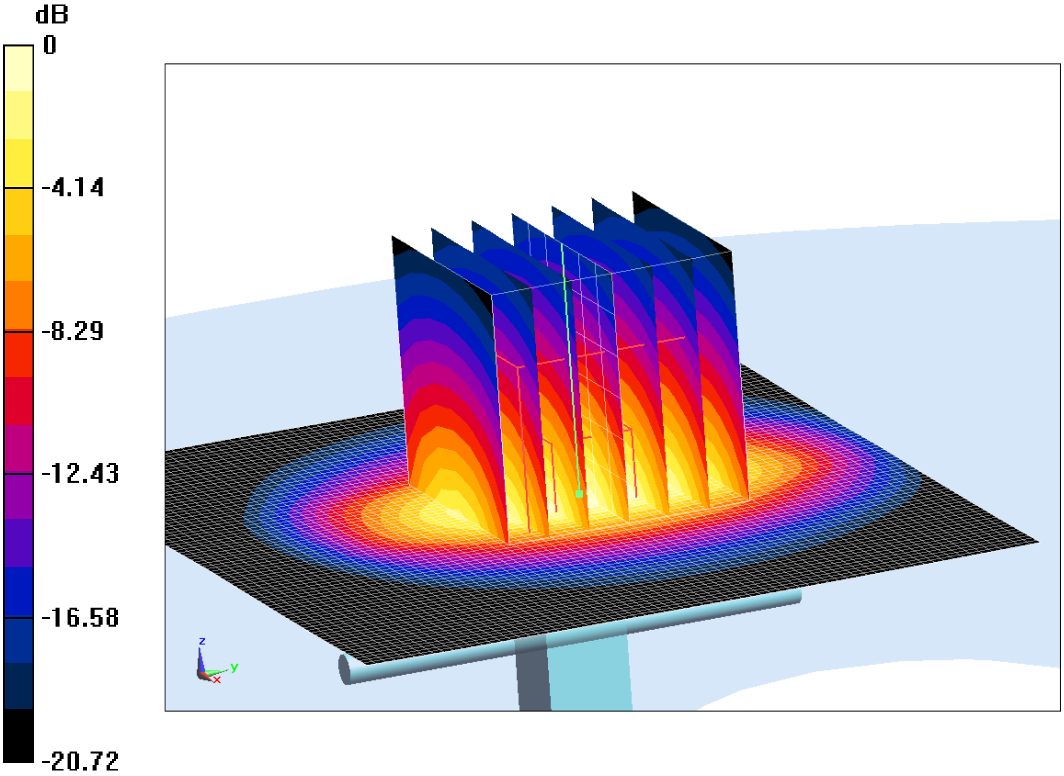
System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value =119.69 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 23.78 W/kg

SAR(1 g) = 12.45 W/kg; SAR(10 g) = 5.96 W/kg

Maximum value of SAR (measured) = 20.28 W/kg



0 dB = 20.28 W/kg = 13.07 dB W/kg

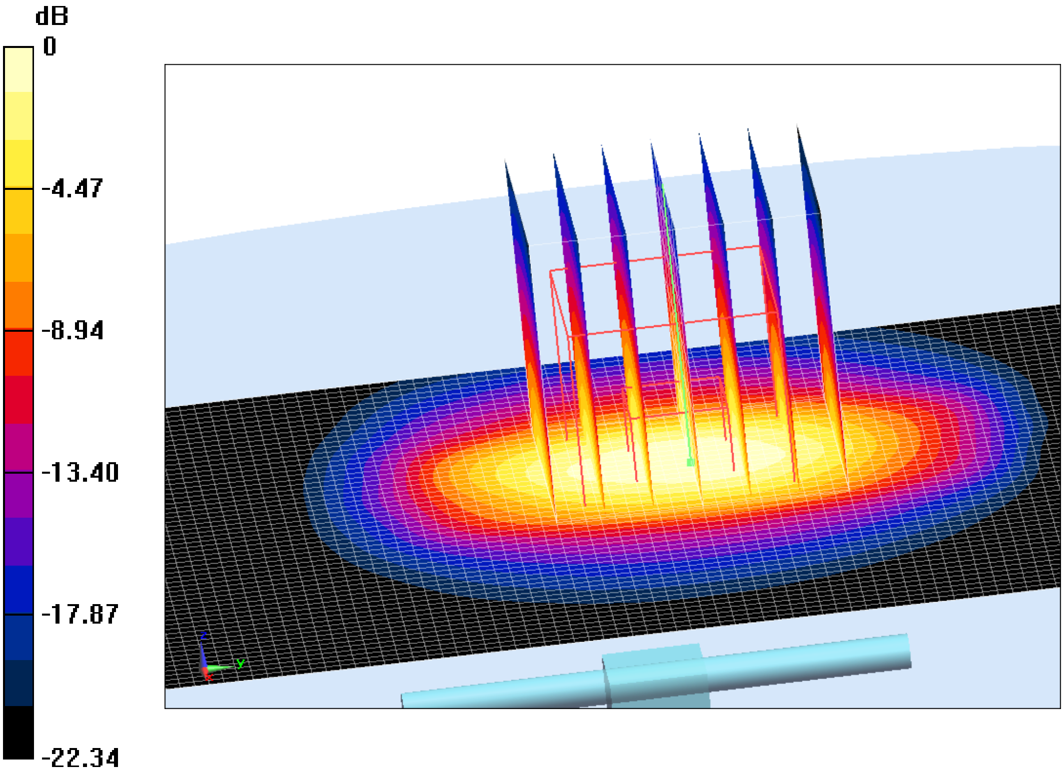
Fig.B.9 validation 2300 MHz 250mW

2450 MHz

Date: 12/19/2021
Electronics: DAE4 Sn1525
Medium: Head 2450 MHz
Medium parameters used: f = 2450 MHz; σ =1.836 mho/m; ε_r = 39.19; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC Liquid Temperature: 22.3ºC
Communication System: CW Frequency: 2450 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.34,7.34,7.34)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Reference Value = 119.12 V/m; Power Drift = -0.02
Fast SAR: SAR(1 g) = 13.09 W/kg; SAR(10 g) = 6.06 W/kg
Maximum value of SAR (interpolated) = 21.41 W/kg

System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value =119.12 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 26.53 W/kg
SAR(1 g) = 13.12 W/kg; SAR(10 g) = 6.22 W/kg
Maximum value of SAR (measured) = 21.63 W/kg



0 dB = 21.63 W/kg = 13.35 dB W/kg

Fig.B.10 validation 2450 MHz 250mW

2450 MHz

Date: 12/20/2021
Electronics: DAE4 Sn1525
Medium: Head 2450 MHz
Medium parameters used: f = 2450 MHz; σ =1.787 mho/m; ε_r = 39.36; ρ = 1000 kg/m^3
Ambient Temperature: 22.5ºC Liquid Temperature: 22.3ºC
Communication System: CW Frequency: 2450 MHz Duty Cycle: 1:1
Probe: EX3DV4 – SN7517 ConvF(7.34,7.34,7.34)

System Validation /Area Scan (81x191x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Reference Value = 117.8 V/m; Power Drift = -0.09

Fast SAR: SAR(1 g) = 13.01 W/kg; SAR(10 g) = 6.13 W/kg

Maximum value of SAR (interpolated) = 21.75 W/kg

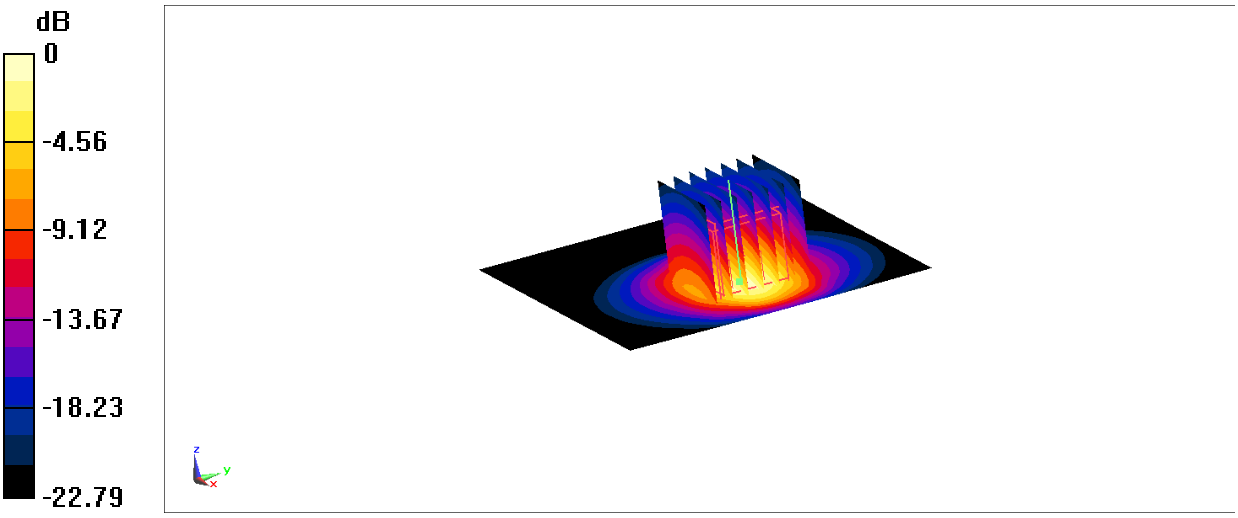
System Validation /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value =117.8 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 26.13 W/kg

SAR(1 g) = 13.13 W/kg; SAR(10 g) = 6.07 W/kg

Maximum value of SAR (measured) = 21.92 W/kg



0 dB = 21.92 W/kg = 13.41 dB W/kg

Fig.B.11 validation 2450 MHz 250mW

The SAR system verification must be required that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR.

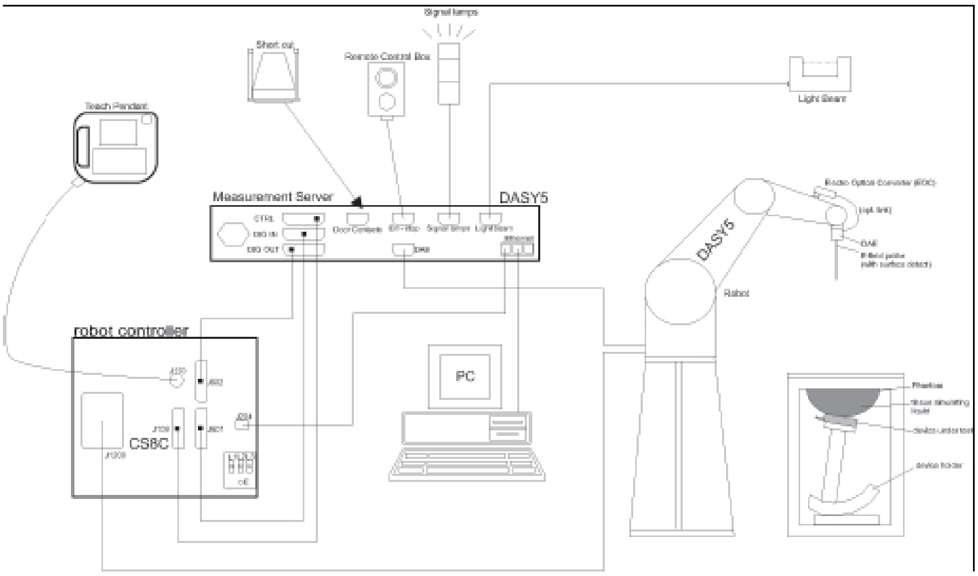
Table B.1 Comparison between area scan and zoom scan for system verification

Date	Band	Position	Area scan (1g)	Zoom scan (1g)	Drift (%)
2021/12/10	750 MHz	Head	2.08	2.11	1.44%
2021/12/11	750 MHz	Head	2.13	2.10	-1.41%
2021/12/12	835 MHz	Head	2.45	2.39	-2.45%
2021/12/13	835 MHz	Head	2.41	2.4	-0.41%
2021/12/14	1750 MHz	Head	8.96	9.0	0.45%
2021/12/15	1750 MHz	Head	8.97	8.94	-0.33%
2021/12/16	1900 MHz	Head	9.9	9.94	0.40%
2021/12/17	1900 MHz	Head	9.8	9.78	-0.20%
2021/12/18	2300 MHz	Head	12.67	12.45	-1.74%
2021/12/19	2450 MHz	Head	13.09	13.12	0.23%
2021/12/20	2450 MHz	Head	13.01	13.13	0.92%

ANNEX C SAR Measurement Setup

C.1 Measurement Set-up

The Dasy5 or DASY6 system for performing compliance tests is illustrated above graphically. This system consists of the following items:



Picture C.1SAR Lab Test Measurement Set-up

- A standard high precision 6-axis robot (StäubliTX=RX family) 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 and the DASY5 or DASY6 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.

C.2 Dasy5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY5 or DASY6 software reads the reflection durning a software approach and looks for the maximum using 2nd ord curve fitting. The approach is stopped at reaching the maximum.

Picture C.2Near-field Probe

Probe Specifications:

Model: ES3DV3, EX3DV4

Frequency Range: 10MHz — 6.0GHz(EX3DV4)
10MHz — 4GHz(ES3DV3)

Calibration: In head and body simulating tissue at Frequencies from 835 up to 5800MHz

Linearity: ± 0.2 dB(30 MHz to 6 GHz) for EX3DV4
± 0.2 dB(30 MHz to 4 GHz) for ES3DV3

DynamicRange: 10 mW/kg — 100W/kg

Probe Length: 330 mm

Probe Tip Length: 20 mm

Body Diameter: 12 mm

Tip Diameter: 2.5 mm (3.9 mm for ES3DV3)

Tip-Center: 1 mm (2.0mm for ES3DV3)

Application:SAR Dosimetry Testing
Compliance tests ofmobile phones
Dosimetry in strong gradient fields

Picture C.3E-field Probe

C.3 E-field Probe Calibration

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm^2) using an RF Signal generator, TEM cell, and RF Power Meter.

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and inn a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/cm^2.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C\frac{\Delta T}{\Delta t}$$

Where:

Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

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

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m^3).

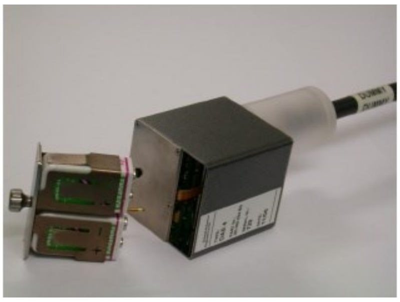
C.4 Other Test Equipment

C.4.1 Data Acquisition Electronics(DAE)

The data acquisition electronics consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



PictureC.4: DAE

C.4.2 Robot

The SPEAG DASY system uses the high precision robots (DASY5: RX160L) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchron motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

Picture C.5 DASY 5

C.4.3 Measurement Server

The Measurement server is based on a PC/104 CPU broad with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5: 128MB), RAM DASY5: 128MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O broad, which is directly connected to the PC/104 bus of the CPU broad.

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

Picture C.6 Server for DASY 5

C.4.4 Device Holder for Phantom

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

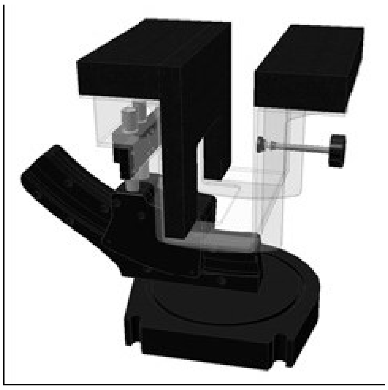
The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity ε =3 and loss tangent δ =0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin-SAM and ELI phantoms.

Picture C7-1: Device Holder



Picture C.7-2: Laptop Extension Kit

C.4.5 Phantom

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to

Represent the 90th percentile of the population. The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

Shell Thickness: 2±0. 2 mm

Filling Volume: Approx. 25 liters

Dimensions: 810 x l000 x 500 mm (H x L x W)

Available: Special

Picture C.8: SAM Twin Phantom

