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CERTIFICATE OF COMPLIANCE
SAR EVALUATION

Quake Global, Inc.	Dates of Test:	August 21-31, 2022
4933 Paramount Dr.	Test Report Number:	SAR.20220814
San Diego, CA 92123		

Lab Designation Number: US1195

FCC ID:	PB5HPRO-4GV2
IC Certificate:	4650A-HPRO4GV2
HVIN/Model(s):	1193-5100 & 1193-5101
Product Market Number (PMN):	HPRO-4GV2
Contains Cellular Module:	Thales Model PLS63-W; FCC ID: QIPPLS63-W; IC: 7830A-PLS63W
Contains WiFi Module:	TI Model WL18MODGI; FCC ID: Z64-WL18DBMOD; IC: 451I-WL18DBMOD
Test Sample:	Engineering Unit Same as Production
Serial Number:	FC2222600079
Equipment Type:	Wireless Cellular Transmitter for in Vehicle
Classification:	Portable Transmitter Next to Body
TX Frequency Range:	699 – 716 MHz, 777 – 787 MHz, 814 – 849 MHz, 1710 – 1780 MHz, 1850 – 1910 MHz, 2300 – 2400 MHz, 2496 – 2690 MHz, 2412 – 2462 MHz, 5150 – 5350 MHz, 5500 – 5700 MHz, 5745 – 5825 MHz
Frequency Tolerance:	± 2.5 ppm
Maximum RF Output:	750 MHz (LTE) – 25.0 dBm, 850 MHz (GPRS) – 35.0 dBm, 850 MHz (WCDMA) – 25.0 dBm, 850 MHz (LTE) – 25.0 dBm, 1750 MHz (WCDMA) – 25.0 dBm, 1750 MHz (LTE) – 25.0 dBm, 1900 MHz (GPRS) – 32.0 dBm, 1900 MHz (WCDMA) – 25.0 dBm, 1900 MHz (LTE) – 25.0 dBm, 2300 MHz – 25.0 dBm, 2550 MHz (LTE) – 25.0 dBm, 2450 MHz (b) – 17.3 dBm, 2450 MHz (g) – 17.1 dBm, 2450 MHz (n) – 16.1 dBm, 5 GHz (a) – 18.0 dBm, 5 GHz (n) – 18.0 dBm Conducted
Signal Modulation:	WCDMA, GMSK, 8-PSK, QPSK, 16QAM, DSSS, OFDM
Antenna Type:	PIFA Antenna
Application Type:	Certification
FCC Rule Parts:	Part 2, 15C, 22, 24, 27, 90
KDB Test Methodology:	KDB 447498 D01 v07, KDB 248227 D01 v02r02, KDB 941225 D01 v03r01
Industry Canada:	RSS-102 Issue 5, Safety Code 6
Max. Stand Alone SAR Value:	0.40 W/kg Reported
Max. Simultaneous Value:	0.74 W/kg Reported
Separation Distance:	30 mm

This wireless mobile and/or portable device has been shown to be compliant for localized specific absorption rate (SAR) for uncontrolled environment/general exposure limits specified in ANSI/IEEE Std. C95.1-1992 and had been tested in accordance with the measurement procedures specified in IEEE 1528-2013 and IEC 62209-1528:2020 (See test report).

I attest to the accuracy of the data. All measurements were performed by myself or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

RF Exposure Lab, LLC certifies that no party to this application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

Jay M. Moulton
Vice President

ACCREDITED
Testing Cert. # 2387.01

Table of Contents

Comment/Revision	Date
Original Release	September 6, 2022

Note: The latest version supersedes all previous versions listed in the above table. The latest version shall be used.

1. Introduction

This measurement report shows compliance of the Quake Global, Inc. Model 1193-5100 & 1193-5101 FCC ID: PB5HPRO-4GV2 with FCC Part 2, 1093, ET Docket 93-62 Rules for mobile and portable devices and IC Certificate: 4650A-HPRO4GV2 with RSS102 Issue 5 & Safety Code 6. The FCC/ISED have adopted the guidelines for evaluating the environmental effects of radio frequency radiation to protect the public and workers from the potential hazards of RF emissions due to FCC/ISED regulated portable devices. [1], [6]

The test results recorded herein are based on a single type test of Quake Global Model 1193-5100 & 1193-5101 and therefore apply only to the tested sample.

The testing was conducted on the model 1193-5100. The only difference between the two models is the 1193-5100 has a memory backup battery and the model 1193-5101 does not have the battery backup.

The test procedures and limits, as described in ANSI C95.1 – 1999 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [2], ANSI C95.3 – 2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields [3], IEEE Std.1528 – 2013 Recommended Practice [4], and Industry Canada Safety Code 6 Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3kHz to 300 GHz were employed.

The following table indicates all the wireless technologies operating in the 1193-5100 & 1193-5101 Wireless Cellular Transmitter for in Vehicle. The table also shows the tolerance for the power level for each mode if applicable.

Band	Technology	Category/Class	3GPP Nominal Power dBm	Setpoint Nominal Power dBm	Tolerance dBm	Lower Tolerance dBm	Upper Tolerance dBm
Band 2	GSM	12	30.0	30.0	± 2.0	28.0	32.0
Band 2	EDGE	12	26.0	26.0	± 2.0	24.0	28.0
Band 5	GSM	12	33.0	33.0	± 2.0	31.0	35.0
Band 5	EDGE	12	29.0	29.0	± 2.0	27.0	31.0
Band 2	WCDMA	8	23.0	23.0	± 2.0	21.0	25.0
Band 4	WCDMA	8	23.0	23.0	± 2.0	21.0	25.0
Band 5	WCDMA	8	23.0	23.0	± 2.0	21.0	25.0
Band 2	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 4	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 5	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 7	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 12	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 13	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 26	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 66	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 38	LTE-TDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 40	LTE-TDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 41	LTE-TDD	1	23.0	23.0	± 2.0	21.0	25.0
2450 MHz	802.11b	N/A	N/A	N/A	N/A	N/A	17.3
2450 MHz	802.11g	N/A	N/A	N/A	N/A	N/A	17.1
2450 MHz	802.11n	N/A	N/A	N/A	N/A	N/A	16.1
5 GHz UNII Band I,IIA,IIC,III	802.11a	N/A	N/A	N/A	N/A	N/A	18.0
5 GHz UNII Band I,IIA,IIC,III	802.11n	N/A	N/A	N/A	N/A	N/A	18.0

SAR Definition [5]

Specific Absorption Rate is defined as 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).

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

SAR is expressed in units of watts per kilogram (W/kg). *SAR* can be related to the electric field at a point by

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

where:

σ = conductivity of the tissue (S/m)

ρ = mass density of the tissue (kg/m^3)

E = rms electric field strength (V/m)

2. SAR Measurement Setup

Robotic System

These measurements are performed using the DASY52 automated dosimetric assessment system. The DASY52 is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of high precision robotics system (Staubli), robot controller, Intel Core2 computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Fig. 2.1).

System Hardware

A cell controller system contains the power supply, robot controller teach pendant (Joystick), and a remote control used to drive the robot motors. The PC consists of the HP Intel Core2 computer with Windows XP system and SAR Measurement Software DASY52, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit that performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

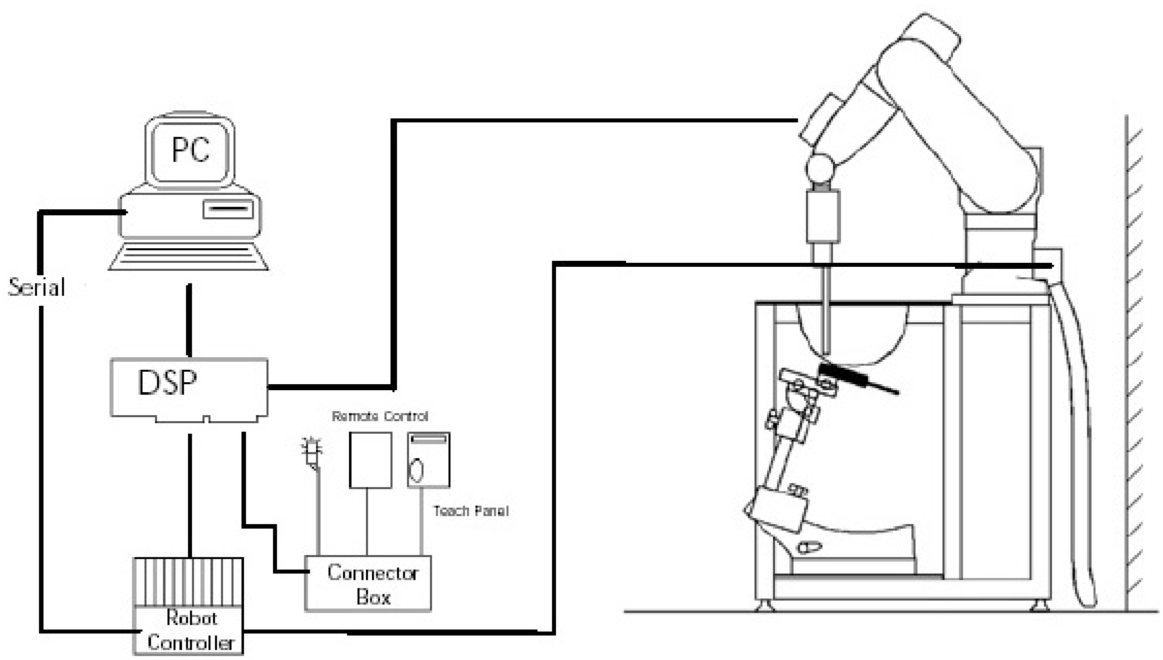


Figure 2.1 SAR Measurement System Setup

System Electronics

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in.

Probe Measurement System

The SAR measurements were conducted with the dosimetric probe EX3DV4, designed in the classical triangular configuration (see Fig. 2.2) 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 multi fiber line ending at the front of the probe tip. (see Fig. 2.3) 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 DASY52 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting. The approach is stopped at reaching the maximum.

DAE System

Probe Specifications

Calibration: In air from 10 MHz to 6.0 GHz
In brain and muscle simulating tissue at Frequencies of 450 MHz, 835 MHz, 1750 MHz, 1900 MHz, 2450 MHz, 2600 MHz, 3500 MHz, 5200 MHz, 5300 MHz, 5600 MHz, 5800 MHz

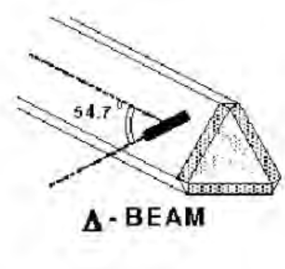


Figure 2.2 Triangular Probe Configurations

Frequency: 10 MHz to 6 GHz

Linearity: ±0.2dB (30 MHz to 6 GHz)

Dynamic: 10 mW/kg to 100 W/kg

Range: Linearity: ±0.2dB

Dimensions: Overall length: 330 mm

Tip length: 20 mm

Body diameter: 12 mm

Tip diameter: 2.5 mm

Distance from probe tip to sensor center: 1 mm


Figure 2.3 Probe Thick-Film Technique

Application: SAR Dosimetry Testing
Compliance tests of wireless device

Probe Calibration Process

Dosimetric Assessment Procedure

Each probe is calibrated according to a dosimetric assessment procedure described in with accuracy better than +/-10%. The spherical isotropy was evaluated with the procedure described in and found to be better than +/-0.25dB. The sensitivity parameters (Norm X, Norm Y, Norm Z), the diode compression parameter (DCP) and the conversion factor (Conv F) of the probe is tested.

Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies below 1 GHz, and in a waveguide above 1GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity 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.

Temperature Assessment *

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

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

where:

Δt = exposure time (30 seconds),

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

ΔT = temperature increase due to RF exposure.

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

where:

σ = simulated tissue conductivity,

ρ = Tissue density (1.25 g/cm^3 for brain tissue)

SAR is proportional to ΔT / Δt , the initial rate of tissue heating, before thermal diffusion takes place.
Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E- field;

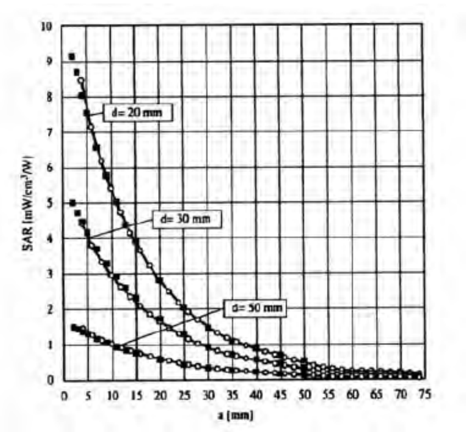


Figure 2.4 E-Field and Temperature Measurements at 900MHz

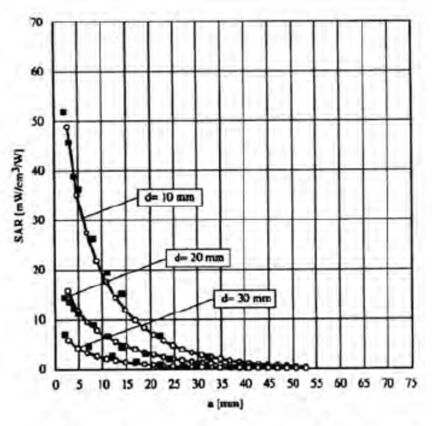


Figure 2.5 E-Field and Temperature Measurements at 1800MHz

Data Extrapolation

The DASY52 software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given like below;

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

with
V_i = compensated signal of channel i (i=x,y,z)
U_i = input signal of channel i (i=x,y,z)
cf = crest factor of exciting field (DASY parameter)
dcp_i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes:

$$E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

with
V_i = compensated signal of channel i (i = x,y,z)
$Norm_i$ = sensor sensitivity of channel i (i = x,y,z) $\mu V/(V/m)^2$ for E-field probes
ConvF = sensitivity of enhancement in solution
E_i = electric field strength of channel i in V/m

The RSS value of the field components gives the total field strength (Hermetian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}$$

with
SAR = local specific absorption rate in W/g
E_{tot} = total field strength in V/m
σ = conductivity in [mho/m] or [Siemens/m]
ρ = equivalent tissue density in g/cm^3

The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = \frac{E_{tot}^2}{3770}$$

with
P_{pwe} = equivalent power density of a plane wave in W/cm^2
E_{tot} = total electric field strength in V/m

Scanning procedure

- The DASY installation includes predefined files with recommended procedures for measurements and system check. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

- The „reference“ and „drift“ measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. +/- 5 %.

- The highest integrated SAR value is the main concern in compliance test applications. These values can mostly be found at the inner surface of the phantom and cannot be measured directly due to the sensor offset in the probe. To extrapolate the surface values, the measurement distances to the surface must be known accurately. A distance error of 0.5mm could produce SAR errors of 6% at 1800 MHz. Using predefined locations for measurements is not accurate enough. Any shift of the phantom (e.g., slight deformations after filling it with liquid) would produce high uncertainties. For an automatic and accurate detection of the phantom surface, the DASY5 system uses the mechanical surface detection. The detection is always at touch, but the probe will move backward from the surface the indicated distance before starting the measurement.

- The „area scan“ measures the SAR above the DUT or verification dipole on a parallel plane to the surface. It is used to locate the approximate location of the peak SAR with 2D spline interpolation. The robot performs a stepped movement along one grid axis while the local electrical field strength is measured by the probe. The probe is touching the surface of the SAM during acquisition of measurement values. The scan uses different grid spacings for different frequency measurements. Standard grid spacing for head measurements in frequency ranges ≤ 2GHz is 15 mm in x - and y- dimension. For higher frequencies a finer resolution is needed, thus for the grid spacing is reduced according the following table:

Area scan grid spacing for different frequency ranges	
Frequency range	Grid spacing
≤ 2 GHz	≤ 15 mm
2 – 4 GHz	≤ 12 mm
4 – 6 GHz	≤ 10 mm

Grid spacing and orientation have no influence on the SAR result. For special applications where the standard scan method does not find the peak SAR within the grid, e.g. mobile phones with flip cover, the grid can be adapted in orientation. Results of this coarse scan are shown in annex B.

- A „zoom scan” measures the field in a volume around the 2D peak SAR value acquired in the previous „coarse“ scan. It uses a fine meshed grid where the robot moves the probe in steps along all the 3 axis (x,y and z-axis) starting at the bottom of the Phantom. The grid spacing for the cube measurement is varied according to the measured frequency range, the dimensions are given in the following table:

Zoom scan grid spacing and volume for different frequency ranges			
Frequency range	Grid spacing for x, y axis	Grid spacing for z axis	Minimum zoom scan volume
≤ 2 GHz	≤ 8 mm	≤ 5 mm	≥ 30 mm
2 – 3 GHz	≤ 5 mm	≤ 5 mm	≥ 28 mm
3 – 4 GHz	≤ 5 mm	≤ 4 mm	≥ 28 mm
4 – 5 GHz	≤ 4 mm	≤ 3 mm	≥ 25 mm
5 – 6 GHz	≤ 4 mm	≤ 2 mm	≥ 22 mm

DASY is also able to perform repeated zoom scans if more than 1 peak is found during area scan. In this document, the evaluated peak 1g and 10g averaged SAR values are shown in the 2D-graphics in annex B. Test results relevant for the specified standard (see section 3) are shown in table form in section 7.

Spatial Peak SAR Evaluation

The spatial peak SAR - value for 1 and 10 g is evaluated after the Cube measurements have been done. The basis of the evaluation are the SAR values measured at the points of the fine cube grid consisting of all points in the three directions x, y and z. The algorithm that finds the maximal averaged volume is separated into three different stages.

- The data between the dipole center of the probe and the surface of the phantom are extrapolated. This data cannot be measured since the center of the dipole is 1 to 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is about 1 mm (see probe calibration sheet). The extrapolated data from a cube measurement can be visualized by selecting 'Graph Evaluated'.

- The maximum interpolated value is searched with a straight-forward algorithm. Around this maximum the SAR - values averaged over the spatial volumes (1g or 10 g) are computed using the 3d-spline interpolation algorithm. If the volume cannot be evaluated (i.e., if a part of the grid was cut off by the boundary of the measurement area) the evaluation will be started on the corners of the bottom plane of the cube.

- All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.

Extrapolation

The extrapolation is based on a least square algorithm [W. Gander, Computermathematik, p.168-180]. Through the points in the first 3 cm along the z-axis, polynomials of order four are calculated. These polynomials are then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1 mm from each other.

Interpolation

The interpolation of the points is done with a 3d-Spline. The 3d-Spline is composed of three one-dimensional splines with the "Not a knot"-condition [W. Gander, Computermathematik, p.141-150] (x, y and z -direction) [Numerical Recipes in C, Second Edition, p.123ff].

Volume Averaging

At First the size of the cube is calculated. Then the volume is integrated with the trapezoidal algorithm. 8000 points (20x20x20) are interpolated to calculate the average.

Advanced Extrapolation

DASY uses the advanced extrapolation option which is able to compensate boundary effects on E-field probes.

SAM PHANTOM

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. 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. (see Fig. 2.6)

Phantom Specification

Phantom: SAM Twin Phantom (V4.0)
Shell Material: Vivac Composite
Thickness: 2.0 ± 0.2 mm

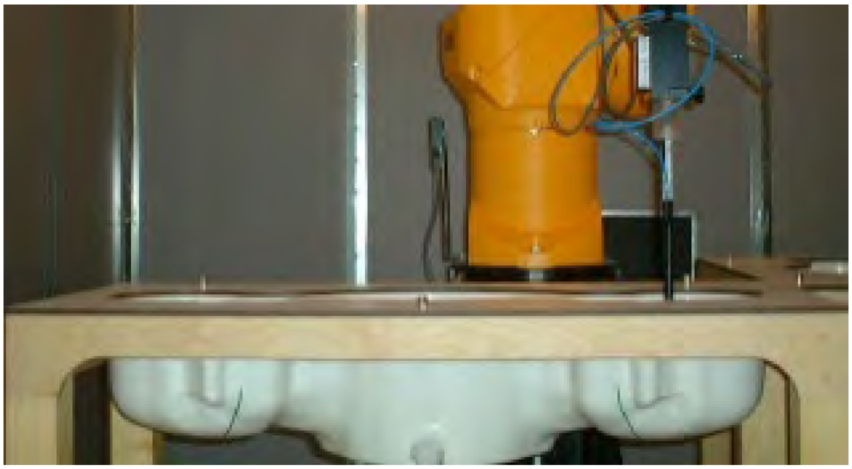


Figure 2.6 SAM Twin Phantom

Device Holder for Transmitters

In combination with the SAM Twin Phantom V4.0 the Mounting Device (see Fig. 2.7), enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation point is the ear opening. The devices can be easily, accurately, and repeat ably be positioned according to the FCC, CENELEC, IEC and IEEE specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Figure 2.7 Mounting Device

Note: A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produce infinite number of configurations. To produce the worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

3. Probe and Dipole Calibration

See Appendix D and E.

4. Phantom & Simulating Tissue Specifications

Head & Body Simulating Mixture Characterization

The head and body mixtures consist of the material based on the table listed below. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. Body tissue parameters that have not been specified in IEEE1528 – 2013 are derived from the issue dielectric parameters computed from the 4-Cole-Cole equations.

Table 4.1 Typical Composition of Ingredients for Tissue

Ingredients		Simulating Tissue					
		750 MHz Head	900 MHz Head	1750 MHz Head	1900 MHz Head	2300 MHz Head	2550 MHz Head
Mixing Percentage							
Water		Proprietary Purchased From Speag					
Sugar							
Salt							
HEC							
Bactericide							
DGBE							
Dielectric Constant	Target	41.94	41.50	40.08	40.00	39.47	39.07
Conductivity (S/m)	Target	0.89	0.97	1.37	1.40	1.67	1.91

Ingredients		Simulating Tissue
		2450 MHz Head
Mixing Percentage		
Water		Proprietary Purchased From Speag
Sugar		
Salt		
HEC		
Bactericide		
DGBE		
Dielectric Constant	Target	39.20
Conductivity (S/m)	Target	1.80

5. ANSI/IEEE C95.1 – 1992 RF Exposure Limits [2]

Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table 5.1 Human Exposure Limits

	UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)	CONTROLLED ENVIROMENT Professional Population (W/kg) or (mW/g)
SPATIAL PEAK SAR [1] Head	1.60	8.00
SPATIAL AVERAGE SAR [2] Whole Body	0.08	0.40
SPATIAL PEAK SAR [3] Hands, Feet, Ankles, Wrists	4.00	20.00

[1] The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
[2] The Spatial Average value of the SAR averaged over the whole body.
[3] The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

6. Measurement Uncertainty

Measurement uncertainty table is not required per KDB 865664 D01 v01 section 2.8.2 page 12. SAR measurement uncertainty analysis is required in the SAR report only when the highest measured SAR in a frequency band is ≥ 1.5 W/kg for 1-g SAR. The equivalent ratio (1.5/1.6) should be applied to extremity and occupational exposure conditions. The highest reported value is less than 1.5 W/kg. Therefore, the measurement uncertainty table is not required.

7. System Validation

Tissue Verification

Table 7.1 Measured Tissue Parameters

		750 MHz Head		900 MHz Head		1750 MHz Head	
Date(s)		Aug. 26, 2022		Aug. 24, 2022		Aug. 29, 2022	
Liquid Temperature (˚C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ε		41.94	41.46	41.50	41.34	40.08	39.24
Conductivity: σ		0.89	0.90	0.97	0.98	1.37	1.40
		1900 MHz Head		2300 MHz Head		2550 MHz Head	
Date(s)		Aug. 23, 2022		Aug. 26, 2022		Aug. 30, 2022	
Liquid Temperature (˚C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ε		40.00	39.87	39.47	38.18	39.07	38.95
Conductivity: σ		1.40	1.39	1.67	1.69	1.91	1.94
		2450 MHz Head					
Date(s)		Aug. 31, 2022					
Liquid Temperature (˚C)	20.0	Target	Measured				
Dielectric Constant: ε		39.20	38.34				
Conductivity: σ		1.80	1.81				

See Appendix A for data printout.

Test System Verification

Prior to assessment, the system is verified to the ±10% of the specifications at the test frequency by using the system kit. Power is normalized to 1 watt. (Graphic Plots Attached)

Table 7.2 System Dipole Validation Target & Measured

	Test Frequency	Targeted SAR_{1g} (W/kg)	Measure SAR_{1g} (W/kg)	Tissue Used for Verification	Deviation (%)	Plot Number
26-Aug-2022	750 MHz	8.57	8.58	Head	+ 0.12	1
24-Aug-2022	900 MHz	11.20	11.50	Head	+ 2.68	2
29-Aug-2022	1750 MHz	37.70	37.80	Head	+ 0.27	3
23-Aug-2022	1900 MHz	40.40	41.50	Head	+ 2.72	4
26-Aug-2022	2300 MHz	49.60	49.80	Head	+ 0.40	5
30-Aug-2022	2550 MHz	55.30	56.40	Head	+ 1.99	6
31-Aug-2022	2450 MHz	54.10	54.60	Head	+ 0.92	7

See Appendix A for data plots.

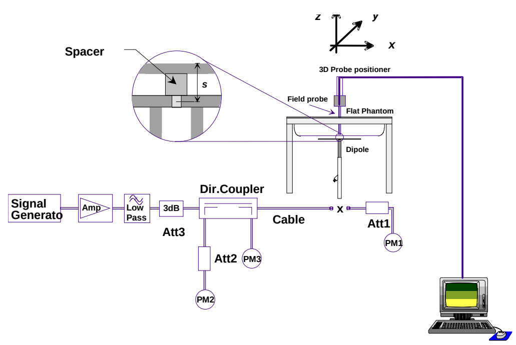


Figure 7.1 Dipole Validation Test Setup

8. LTE Document Checklist

1) Identify the operating frequency range of each LTE transmission band used by the device

LTE Operating Band	Uplink (transmit)	Downlink (Receive)	Duplex mode (FDD/TDD)
	Low - high	Low - high	
2	1850-1910	1930-1990	FDD
4	1710-1755	2110-2155	FDD
5	824-849	869-894	FDD
7	2500-2570	2620-2690	FDD
12	699-716	729-746	FDD
13	777-787	746-756	FDD
26	814-849	859-894	FDD
38	2570-2620	2570-2620	TDD
40	2300-2400	2300-2400	TDD
41	2496-2690	2496-2690	TDD
66	1710-1780	2110-2200	FDD

2) Identify the channel bandwidths used in each frequency band; 1.4, 3, 5, 10, 15, 20 MHz etc

LTE Band Class	Bandwidth (MHz)	Frequency or Freq. Band (MHz)
2	1.4, 3, 5, 10, 15, 20	1850-1910 MHz
4	1.4, 3, 5, 10, 15, 20	1710-1755 MHz
5	1.4, 3, 5, 10	824-849 MHz
7	5, 10, 15, 20	2500-2570 MHz
12	1.4, 3, 5, 10	699-716 MHz
13	5, 10	777-787 MHz
26	1.4, 3, 5, 10, 15	814-849 MHz
38	5, 10, 15, 20	2570-2620 MHz
40	5, 10, 15, 20	2300-2400 MHz
41	5, 10, 15, 20	2496-2690 MHz
66	1.4, 3, 5, 10, 15, 20	1710-1780 MHz

3) Identify the high, middle and low (H, M, L) channel numbers and frequencies in each LTE frequency band

LTE Band Class	Bandwidth (MHz)	Frequency (MHz)/Channel #					
		Low		Mid		High	
2	1.4	1850.7	18607	1880.0	18900	1909.3	19193
2	3	1851.5	18615	1880.0	18900	1908.5	19185
2	5	1852.5	18625	1880.0	18900	1907.5	19175
2	10	1855.0	18650	1880.0	18900	1905.0	19150
2	15	1857.5	18675	1880.0	18900	1902.5	19125
2	20	1860.0	18700	1880.0	18900	1900.0	19100
4	1.4	1710.7	19957	1732.5	20175	1754.3	20393
4	3	1711.5	19965	1732.5	20175	1753.5	20385
4	5	1712.5	19975	1732.5	20175	1752.5	20375
4	10	1715.0	20000	1732.5	20175	1750.0	20350
4	15	1717.5	20025	1732.5	20175	1747.5	20325
4	20	1720.0	20050	1732.5	20175	1745.0	20300
5	1.4	824.7	20407	836.5	20525	848.3	20643
5	3	825.5	20415	836.5	20525	847.5	20635
5	5	826.5	20425	836.5	20525	846.5	20625
5	10	829.0	20450	836.5	20525	844.0	20600
7	5	2502.5	20775	2535.0	21100	2567.5	21425
7	10	2505.0	20800	2535.0	21100	2565.0	21400
7	15	2507.5	20825	2535.0	21100	2562.5	21375
7	20	2510.0	20850	2535.0	21100	2560.0	21350
12	1.4	699.7	23017	707.5	23095	715.3	23173
12	3	700.5	23025	707.5	23095	714.5	23165
12	5	701.5	23035	707.5	23095	713.5	23155
12	10	704.0	23060	707.5	23095	711.0	23130
13	5	779.5	23205	782.0	23230	784.5	23225
13	10	-----	-----	782.0	23230	-----	-----
26	1.4	814.7	26697	831.5	26865	848.3	27033
26	3	815.5	26705	831.5	26865	847.5	27025
26	5	816.5	26715	831.5	26865	846.5	27015
26	10	819.0	26740	831.5	26865	844.0	26990
26	15	821.5	26765	831.5	26865	841.5	26995
38	5	2572.5	37775	2595.0	38000	2602.5	38075
38	10	2575.0	37800	2595.0	38000	2605.0	38100
38	15	2577.5	37825	2595.0	38000	2607.5	38125
38	20	2580.0	37850	2595.0	38000	2610.0	38150
40	5	2302.5	38675	2350.0	39150	2397.5	39625
40	10	2305.0	38700	2350.0	39150	2395.0	39600
40	15	2307.5	38725	2350.0	39150	2392.5	39575
40	20	2310.0	38750	2350.0	39150	2390.0	39550
41	5	2498.5	39675	2593	40620	2687.5	41565
41	10	2501.0	39700	2593	40620	2685.0	41540
41	15	2503.5	39725	2593	40620	2682.5	41515
41	20	2506.0	39750	2593	40620	2680.0	41490
66	1.4	1710.7	131979	1755.0	132422	1779.3	132665
66	3	1711.5	131987	1755.0	132422	1778.5	132657
66	5	1712.5	131997	1755.0	132422	1777.4	132646
66	10	1716.1	132033	1755.0	132422	1774.9	132621
66	15	1717.5	132047	1755.0	132422	1772.4	132596
66	20	1720.0	132072	1755.0	132422	1769.9	132571

4) Specify the UE category and uplink modulations used:
   - UE Category: 1
   - Uplink modulations: QPSK and 16QAM

5) Include descriptions of the LTE transmitter and antenna implementation; and also identify whether it is a standalone transmitter operating independently of other wireless transmitters in the device or sharing hardware components and/or antenna(s) with other transmitters etc

   The device has 4 antennas:
   - 1 – 2G, 3G, 4G (Transmit and Receive) Antennas
   - 1 – 2G 3G, 4G (Receive Only) Antennas
   - 2 – WiFi (Transmit and Receive) Antennas

6) Identify the LTE voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations, antenna locations, handset flip-cover or slide positions, antenna diversity conditions etc

   The device is a data only. Data mode was tested in each operating mode and exposure condition in the body configuration. See test setup photos to see all configurations tested.

7) Identify if Maximum Power Reduction (MPR) is optional or mandatory, i.e. built-in by design:

   a) Only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards

   MPR is mandatory, built-in by design on all production units. It was enabled during testing.

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

   b) A-MPR (additional MPR) must be disabled
   c) A-MPR was disabled during testing.

8) Include the maximum average conducted output power measured on the required test channels for each channel bandwidth and UL modulation used in each frequency band:

   The maximum average conducted output power measured for the testing is listed on pages 32-58 of this report. The below table shows the factory set point with the allowable tolerance.

Band	Technology	Category/Class	3GPP Nominal Power dBm	Setpoint Nominal Power dBm	Tolerance dBm	Lower Tolerance dBm	Upper Tolerance dBm
Band 2	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 4	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 5	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 7	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 12	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 13	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 26	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 66	LTE-FDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 38	LTE-TDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 40	LTE-TDD	1	23.0	23.0	± 2.0	21.0	25.0
Band 41	LTE-TDD	1	23.0	23.0	± 2.0	21.0	25.0

9) Identify all other U.S. wireless operating modes (3G, Wi-Fi, WiMax, Bluetooth etc), device/exposure configurations (head and body, antenna and handset flip-cover or slide positions, antenna diversity conditions etc.) and frequency bands used for these modes

Other wireless modes:

Band	Technology	Category/Class	3GPP Nominal Power dBm	Setpoint Nominal Power dBm	Tolerance dBm	Lower Tolerance dBm	Upper Tolerance dBm
Band 2	GSM	12	30.0	30.0	± 2.0	28.0	32.0
Band 2	EDGE	12	26.0	26.0	± 2.0	24.0	28.0
Band 5	GSM	12	33.0	33.0	± 2.0	31.0	35.0
Band 5	EDGE	12	29.0	29.0	± 2.0	27.0	31.0
Band 2	WCDMA	8	23.0	23.0	± 2.0	21.0	25.0
Band 4	WCDMA	8	23.0	23.0	± 2.0	21.0	25.0
Band 5	WCDMA	8	23.0	23.0	± 2.0	21.0	25.0
2450 MHz	802.11b	N/A	N/A	N/A	N/A	N/A	17.3
2450 MHz	802.11g	N/A	N/A	N/A	N/A	N/A	17.1
2450 MHz	802.11n	N/A	N/A	N/A	N/A	N/A	16.1
5 GHz UNII Band I,IIA,IIC,III	802.11a	N/A	N/A	N/A	N/A	N/A	18.0
5 GHz UNII Band I,IIA,IIC,III	802.11n	N/A	N/A	N/A	N/A	N/A	18.0

10) Include the maximum average conducted output power measured for the other wireless modes and frequency bands.

The maximum average conducted output power measured for the testing is listed on pages 24 and 28 of this report.

11) When power reduction is applied to certain wireless modes to satisfy SAR compliance for simultaneous transmission conditions, other equipment certification or operating requirements, include the maximum average conducted output power measured in each power reduction mode applicable to the simultaneous voice/data transmission configurations for such wireless configurations and frequency bands; and also include details of the power reduction implementation and measurement setup

Power reduction is not required to satisfy SAR compliance.

12) Include descriptions of the test equipment, test software, built-in test firmware etc. required to support testing the device when power reduction is applied to one or more transmitters/antennas for simultaneous voice/data transmission

Power reduction is not required to satisfy SAR compliance.

13) When appropriate, include a SAR test plan proposal with respect to the above

Not applicable.

14) If applicable, include preliminary SAR test data and/or supporting information in laboratory testing inquiries to address specific issues and concerns or for requesting further test reduction considerations appropriate for the device; for example, simultaneous transmission configurations.

Not applicable.

9. SAR Test Data Summary

See Measurement Result Data Pages

See Appendix B for SAR Test Data Plots.
See Appendix C for SAR Test Setup Photos.

Procedures Used To Establish Test Signal

The device was either placed into simulated transmit mode using the manufacturer's test codes or the actual transmission is activated through a base station simulator or similar equipment. See data pages for actual procedure used in measurement.

Device Test Condition

In order to verify that the device was tested at full power, conducted output power measurements were performed before and after each SAR measurement to confirm the output power unless otherwise noted. If a conducted power deviation of more than 5% occurred, the test was repeated. The power drift of each test is measured at the start of the test and again at the end of the test. The drift percentage is calculated by the formula ((end/start)-1)*100 and rounded to three decimal places. The drift percentage is calculated into the resultant SAR value on the data sheet for each test.

Required Test Positions						
Antenna	Front	Back	Left	Right	Top	Bottom
Main	Yes	No	No	Yes	Yes	No
Diversity	No	No	No	No	No	No
WiFi Tx0	Yes	Yes	Yes	No	No	Yes
WiFi Tx1	Yes	Yes	Yes	No	Yes	No

The EUT is mounted inside of a vehicle under the driver's seat. The closest distance the body can get to the device is determined by the thickness of the seat cushion. A conservative distance of 30 mm was used for the testing as no seat would be less than this thickness.

All measurements were conducted with the side of the device with a 30 mm gap from the phantom. All further test reductions are shown on page 59. See the photo in Appendix C for a pictorial of the setups, labeling of the sides tested and antenna location.

The device was on a minimum of 10 cm of Styrofoam during each test.

This device is capable of operating in 850/1900 GPRS/EDGE frequency bands. In GPRS mode, the device is in Class 12 for 850 MHz and 1900 MHz. The testing was conducted in the GPRS mode. The GPRS mode has 1-slot, 2-slot, 3-slot and 4-slot configurations. The power measured is peak power. The average power in all GPRS Slots calculated and the 2-slot had the highest average power. Therefore, the testing was conducted in 2-Slot. The EDGE mode is >4 dB lower than its equivalent slot configuration for GPRS. Therefore, the device was only tested in the highest power configuration which was 2-slot GPRS.

Configure the 8960 box to support GMSK and 8PSK call respectively, and set one timeslot and two timeslot transmission for GMSK GSM/GPRS and 8PSK EDGE. Measure and record power outputs for both modulations.

GPRS-GMSK/1 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	33.42	24.39
	190	33.32	24.29
	251	33.35	24.32
PCS	512	30.49	21.46
	661	30.35	21.32
	810	30.43	21.40

GPRS-GMSK/2 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	31.34	25.32
	190	31.59	25.57
	251	31.21	25.19
PCS	512	28.46	22.44
	661	28.29	22.27
	810	28.17	22.15

GPRS-GMSK/3 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	28.36	24.10
	190	28.05	23.79
	251	28.49	24.23
PCS	512	25.31	21.05
	661	25.13	20.87
	810	25.07	20.81

GPRS-GMSK/4 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	27.19	24.18
	190	27.04	24.03
	251	27.45	24.44
PCS	512	24.37	21.36
	661	24.36	21.35
	810	24.36	21.35

EDGE-8PSK/1 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	29.03	20.00
	190	29.15	20.12
	251	29.01	19.98
PCS	512	26.12	17.09
	661	26.23	17.20
	810	26.48	17.45

EDGE-8PSK/2 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	27.39	21.37
	190	27.39	21.37
	251	27.10	21.08
PCS	512	24.27	18.25
	661	24.15	18.13
	810	24.14	18.12

EDGE-8PSK/3 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	24.14	19.88
	190	24.27	20.01
	251	24.18	19.92
PCS	512	21.48	17.22
	661	21.19	16.93
	810	21.47	17.21

EDGE-8PSK/4 slot			
Band	Channel	Peak Power	Frame Average
Cellular	128	23.27	20.26
	190	23.12	20.11
	251	23.10	20.09
PCS	512	20.32	17.31
	661	20.12	17.11
	810	20.31	17.30

WCDMA Conducted Power

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
3. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

HSDPA SETUP CONFIGURATION:

a. The EUT was connected to Base Station Anritsu MT8820C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set Gain Factors (β_c and β_d) and parameters were set according to each
   ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
   iii. Set RMC 12.2Kbps + HSDPA mode.
   iv. Set Cell Power = -86 dBm
   v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
   vi. Select HSDPA Uplink Parameters
   vii. Set Delta ACK, Delta NACK and Delta CQI = 8
   viii. Set Ack-Nack Repetition Factor to 3
   ix. Set CQI Feedback Cycle (k) to 4 ms
   x. Set CQI Repetition Factor to 2
   xi. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

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

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with $\beta_{hs} = 30/15 * \beta_c$, and Δ_{CQI} = 24/15 with $\beta_{hs} = 24/15 * \beta_c$.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

SETUP CONFIGURATION

HSUPA SETUP CONFIGURATION:

a. The EUT was connected to Base Station Anritsu MT8820C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting * :
   i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
   ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
   iii. Set Cell Power = -86 dBm
   iv. Set Channel Type = 12.2k + HSPA
   v. Set UE Target Power
   vi. Power Ctrl Mode= Alternating bits
   vii. Set and observe the E-TFCI
   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed}1: 47/15 β_{ed}2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with β_{hs} = 5/15 * β_c.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.
Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

SETUP CONFIGURATION

DC-HSDPA 3GPP RELEASE 8 SETUP CONFIGURATION:

a. The EUT was connected to Base Station Anritsu MT8820C referred to the Setup Configuration below
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set RMC 12.2Kbps + HSDPA mode.
   ii. Set Cell Power = -25 dBm
   iii. Set HS-DSCH Configuration Type to FRC (H-set 12, QPSK)
   iv. Select HSDPA Uplink Parameters
   v. Set Gain Factors (β_c and β_d) and parameters were set according to each Specific sub-test in the following table,
   C10.1.4, quoted from the TS
   34.121 a). Subtest 1:
   β_c/β_d=2/15
   b). Subtest 2:
   β_c/β_d=12/15 c).
   Subtest 3: β_c/β_d=15/8
   d). Subtest 4:
   β_c/β_d=15/4
   vi. Set Delta ACK, Delta NACK and Delta CQI = 8
   vii. Set Ack-Nack Repetition Factor to 3
   viii. Set CQI Feedback Cycle (k) to 4 ms
   ix. Set CQI Repetition Factor to 2
   x. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

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

C.8.1.12 Fixed Reference Channel Definition H-Set 12

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

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

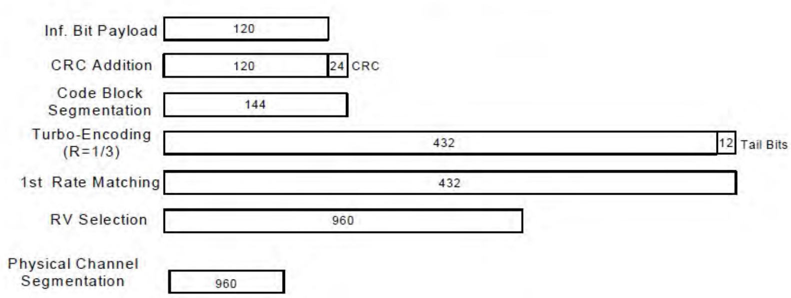


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

SETUP CONFIGURATION

<WCDMA Conducted Power>

GENERAL NOTE:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

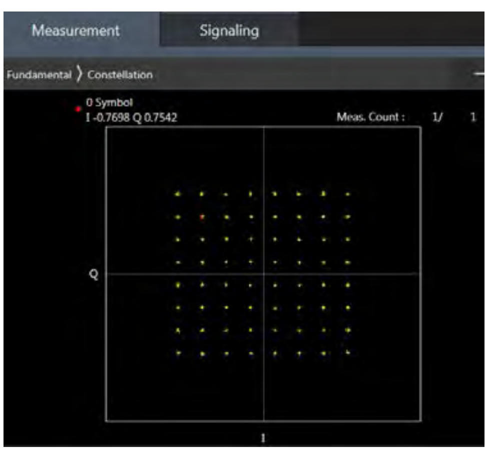
Full Power

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel		9662	9800	9938		1537	1638	1738		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	23.70	23.79	23.67	25.00	23.88	23.65	23.51	25.00	23.59	23.54	23.89	25.00
3GPP Rel 99	RMC 12.2Kbps	23.87	23.98	23.61	25.00	23.87	23.93	23.73	25.00	23.94	23.98	23.87	25.00
3GPP Rel 6	HSDPA Subtest-1	22.55	22.75	22.58	24.00	22.96	22.66	22.77	24.00	22.99	22.79	22.66	24.00
3GPP Rel 6	HSDPA Subtest-2	22.57	22.70	22.85	24.00	22.90	22.66	22.66	24.00	22.51	22.94	22.76	24.00
3GPP Rel 6	HSDPA Subtest-3	23.32	23.18	23.10	24.50	23.31	23.05	23.33	24.50	23.30	23.23	23.34	24.50
3GPP Rel 6	HSDPA Subtest-4	23.48	23.25	23.32	24.50	23.14	23.40	23.17	24.50	23.28	23.27	23.02	24.50
3GPP Rel 8	DC-HSDPA Subtest-1	22.74	22.80	22.77	24.00	22.76	22.90	22.90	24.00	22.73	22.67	22.85	24.00
3GPP Rel 8	DC-HSDPA Subtest-2	22.78	22.78	22.72	24.00	22.58	22.62	22.73	24.00	22.79	22.66	22.84	24.00
3GPP Rel 8	DC-HSDPA Subtest-3	23.37	23.08	23.25	24.50	23.23	23.04	23.45	24.50	23.30	23.48	23.30	24.50
3GPP Rel 8	DC-HSDPA Subtest-4	23.01	23.11	23.01	24.50	23.45	23.30	23.29	24.50	23.06	23.37	23.31	24.50
3GPP Rel 6	HSUPA Subtest-1	22.52	22.97	22.63	24.00	22.79	22.70	22.55	24.00	22.86	22.54	22.77	24.00
3GPP Rel 6	HSUPA Subtest-2	20.61	20.84	20.77	22.00	20.55	20.59	20.92	22.00	20.88	20.64	20.80	22.00
3GPP Rel 6	HSUPA Subtest-3	21.72	21.84	21.78	23.00	21.50	21.63	21.69	23.00	21.98	21.59	21.89	23.00
3GPP Rel 6	HSUPA Subtest-4	20.57	20.63	20.99	22.00	20.90	20.85	20.52	22.00	20.79	20.62	20.86	22.00
3GPP Rel 6	HSUPA Subtest-5	22.88	22.85	22.97	24.00	22.69	22.56	22.83	24.00	22.83	22.56	22.76	24.00

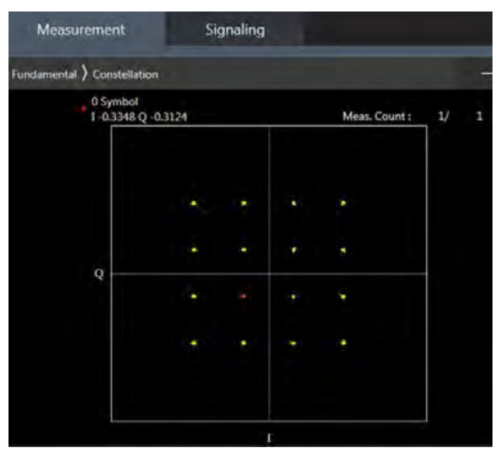
LTE Conducted Power

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. LTE band 4/5/38 SAR test was covered by Band 66/26/41; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
   b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band
9. According to 2017 TCB workshop, for 64 QAM and 16 QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8820C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



64QAM



16QAM

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement
SAR was tested with a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by 3GPP.

a. 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
b. “special subframe S” contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS
c. Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.

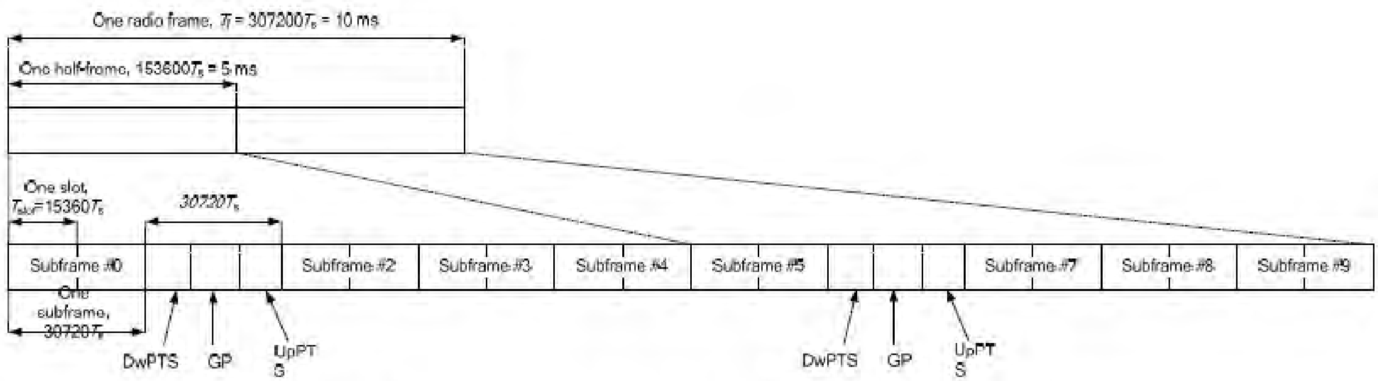


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

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

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

<table>
<tr><th rowspan="3">Special subframe configuration</th><th colspan="3">Normal cyclic prefix in downlink</th><th colspan="3">Extended cyclic prefix in downlink</th></tr>
<tr><th rowspan="2">DwPTS</th><th colspan="2">UpPTS</th><th rowspan="2">DwPTS</th><th colspan="2">UpPTS</th></tr>
<tr><th>Normal cyclic prefix in uplink</th><th>Extended cyclic prefix in uplink</th><th>Normal cyclic prefix in uplink</th><th>Extended cyclic prefix in uplink</th></tr>
<tr><td>0</td><td>$6592 \cdot T_s$</td><td rowspan="5">$2192 \cdot T_s$</td><td rowspan="5">$2560 \cdot T_s$</td><td>$7680 \cdot T_s$</td><td rowspan="4">$2192 \cdot T_s$</td><td rowspan="4">$2560 \cdot T_s$</td></tr>
<tr><td>1</td><td>$19760 \cdot T_s$</td><td>$20480 \cdot T_s$</td></tr>
<tr><td>2</td><td>$21952 \cdot T_s$</td><td>$23040 \cdot T_s$</td></tr>
<tr><td>3</td><td>$24144 \cdot T_s$</td><td>$25600 \cdot T_s$</td></tr>
<tr><td>4</td><td>$26336 \cdot T_s$</td><td>$7680 \cdot T_s$</td><td rowspan="4">$4384 \cdot T_s$</td><td rowspan="4">$5120 \cdot T_s$</td></tr>
<tr><td>5</td><td>$6592 \cdot T_s$</td><td rowspan="5">$4384 \cdot T_s$</td><td rowspan="5">$5120 \cdot T_s$</td><td>$20480 \cdot T_s$</td></tr>
<tr><td>6</td><td>$19760 \cdot T_s$</td><td>$23040 \cdot T_s$</td></tr>
<tr><td>7</td><td>$21952 \cdot T_s$</td><td>$12800 \cdot T_s$</td></tr>
<tr><td>8</td><td>$24144 \cdot T_s$</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>9</td><td>$13168 \cdot T_s$</td><td>-</td><td>-</td><td>-</td></tr>
</table>

Special subframe (30720·T_S): Normal cyclic prefix in downlink (UpPTS)			
Uplink duty factor in one special subframe	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
	0~4	7.13%	8.33%
	5~9	14.3%	16.7%

Special subframe(30720·T_S): Extended cyclic prefix in downlink (UpPTS)			
Uplink duty factor in one special subframe	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
	0~3	7.13%	8.33%
	4~7	14.3%	16.7%

The highest duty factor is resulted from:

i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subfames, uplink operation is in 3 uplink subframes and 1 special subframe.

ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink

iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.167)/5 = 63.3%

iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.143)/5 = 62.9%

v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

vi. The device supports Power Class 3 uplink-downlink configurations 0 and 6, and Power Class 2 uplink-downlink configurations 1 to 5 operations for LTE Band 38, 40, 41.

vii. The highest available duty cycle for Power Class 2 operation is 43.3% using UL-DL configuration 1, for Power Class 3 operation is 63.3% using UL-DL configuration 0. Per FCC Guidance, all SAR tests were performed using Power Class 3. SAR with Power Class 2 at the available duty factor was additionally performed for the Power Class 3 configuration with the highest SAR among all exposure condition.

Table 9.1 LTE Power Measurements

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
2	1.4 MHz	1	0	18607	1850.7	23.9	23.0
				18900	1880.0	24.2	22.9
				19193	1909.3	23.9	22.9
			3	18607	1850.7	24.2	23.4
				18900	1880.0	24.3	23.3
				19193	1909.3	24.2	23.4
			5	18607	1850.7	24.3	23.1
				18900	1880.0	24.2	23.3
				19193	1909.3	24.2	23.2
		3	0	18607	1850.7	24.2	23.2
				18900	1880.0	24.2	23.4
				19193	1909.3	24.2	22.9
			1	18607	1850.7	24.3	23.1
				18900	1880.0	24.4	23.1
				19193	1909.3	24.4	22.9
			3	18607	1850.7	23.9	23.2
				18900	1880.0	23.8	23.0
				19193	1909.3	24.3	22.9
		6	0	18607	1850.7	22.8	22.1
				18900	1880.0	23.0	22.2
				19193	1909.3	23.1	22.5
	3 MHz	1	0	18615	1851.5	24.3	23.1
				18900	1880.0	24.1	23.1
				19185	1908.5	24.0	23.2
			7	18615	1851.5	24.4	23.1
				18900	1880.0	23.8	22.9
				19185	1908.5	24.2	23.1
			14	18615	1851.5	24.3	23.0
				18900	1880.0	24.2	22.8
				19185	1908.5	24.4	23.1
		8	0	18615	1851.5	23.1	22.3
				18900	1880.0	22.9	21.9
				19185	1908.5	23.3	22.0
			7	18615	1851.5	23.4	22.1
				18900	1880.0	23.5	22.1
				19185	1908.5	23.0	22.3
			14	18615	1851.5	23.1	22.4
				18900	1880.0	23.0	22.2
				19185	1908.5	23.3	22.5
		15	0	18615	1851.5	23.2	22.2
				18900	1880.0	22.9	22.4
				19185	1908.5	22.8	21.9

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
2	5 MHz	1	0	18625	1852.5	23.5	22.8
				18900	1880.0	23.8	22.3
				19175	1907.5	23.3	22.7
			12	18625	1852.5	23.9	22.7
				18900	1880.0	23.4	23.0
				19175	1907.5	23.5	22.3
			24	18625	1852.5	23.9	22.7
				18900	1880.0	23.6	22.6
				19175	1907.5	23.6	22.4
		12	0	18625	1852.5	22.7	21.7
				18900	1880.0	22.4	21.6
				19175	1907.5	23.0	21.9
			6	18625	1852.5	22.9	21.9
				18900	1880.0	22.6	22.0
				19175	1907.5	22.6	21.7
			13	18625	1852.5	22.4	21.7
				18900	1880.0	22.8	21.7
				19175	1907.5	22.6	21.3
		25	0	18625	1852.5	22.6	21.6
				18900	1880.0	22.7	21.5
				19175	1907.5	22.6	21.7
	10 MHz	1	0	18650	1855.0	23.8	22.6
				18900	1880.0	23.4	22.8
				19150	1905.0	23.9	22.7
			24	18650	1855.0	23.6	22.8
				18900	1880.0	23.3	22.9
				19150	1905.0	23.8	22.4
			49	18650	1855.0	23.7	22.6
				18900	1880.0	23.5	22.8
				19150	1905.0	24.0	22.9
		25	0	18650	1855.0	22.5	21.5
				18900	1880.0	22.7	21.3
				19150	1905.0	22.4	21.6
			13	18650	1855.0	22.6	21.9
				18900	1880.0	22.3	21.5
				19150	1905.0	22.8	21.7
			25	18650	1855.0	22.8	21.8
				18900	1880.0	23.0	21.7
				19150	1905.0	22.4	21.7
		50	0	18650	1855.0	22.7	21.3
				18900	1880.0	22.7	21.5
				19150	1905.0	22.6	21.7

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
2	15 MHz	1	0	18675	1857.5	24.4	22.8
				18900	1880.0	23.9	23.3
				19125	1902.5	24.0	23.0
			37	18675	1857.5	24.2	22.9
				18900	1880.0	24.3	23.2
				19125	1902.5	24.0	23.0
			74	18675	1857.5	24.2	23.1
				18900	1880.0	24.2	23.4
				19125	1902.5	24.2	22.8
		36	0	18675	1857.5	22.9	22.5
				18900	1880.0	23.0	22.2
				19125	1902.5	23.0	21.9
			19	18675	1857.5	23.2	22.0
				18900	1880.0	23.1	21.8
				19125	1902.5	23.4	22.4
			39	18675	1857.5	23.1	21.8
				18900	1880.0	22.9	22.0
				19125	1902.5	23.2	22.2
		75	0	18675	1857.5	23.3	21.8
				18900	1880.0	23.5	22.3
				19125	1902.5	23.3	22.1
	20 MHz	1	0	18700	1860.0	24.0	22.9
				18900	1880.0	24.3	23.4
				19100	1900.0	24.4	23.1
			49	18700	1860.0	23.9	23.3
				18900	1880.0	24.2	23.3
				19100	1900.0	24.0	22.9
			99	18700	1860.0	24.4	23.4
				18900	1880.0	24.1	22.8
				19100	1900.0	23.9	23.3
		50	0	18700	1860.0	23.1	22.0
				18900	1880.0	23.0	22.3
				19100	1900.0	23.2	21.8
			24	18700	1860.0	23.1	21.9
				18900	1880.0	23.3	21.9
				19100	1900.0	23.2	22.1
			50	18700	1860.0	23.0	21.9
				18900	1880.0	23.0	22.4
				19100	1900.0	23.2	22.4
		100	0	18700	1860.0	23.1	21.9
				18900	1880.0	22.8	22.0
				19100	1900.0	23.3	21.9

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
4	1.4 MHz	1	0	19957	1710.7	24.1	23.4
				20175	1732.5	24.0	23.1
				20393	1754.3	24.0	23.4
			3	19957	1710.7	24.5	23.3
				20175	1732.5	24.3	23.4
				20393	1754.3	24.4	23.2
			5	19957	1710.7	24.4	22.9
				20175	1732.5	24.4	23.2
				20393	1754.3	24.5	22.8
		3	0	19957	1710.7	23.8	23.4
				20175	1732.5	24.5	23.4
				20393	1754.3	24.0	23.2
			1	19957	1710.7	24.2	23.3
				20175	1732.5	23.9	23.4
				20393	1754.3	23.9	23.4
			3	19957	1710.7	23.9	23.5
				20175	1732.5	24.0	23.5
				20393	1754.3	23.9	23.0
		6	0	19957	1710.7	22.9	21.9
				20175	1732.5	22.9	22.4
				20393	1754.3	23.4	21.9
	3 MHz	1	0	19965	1711.5	24.1	23.2
				20175	1732.5	23.8	23.4
				20385	1753.5	23.9	23.1
			7	19965	1711.5	24.1	23.4
				20175	1732.5	24.5	23.5
				20385	1753.5	23.8	23.3
			14	19965	1711.5	24.1	23.0
				20175	1732.5	24.4	22.9
				20385	1753.5	24.5	23.0
		8	0	19965	1711.5	23.2	21.9
				20175	1732.5	22.9	22.0
				20385	1753.5	23.2	22.3
			7	19965	1711.5	23.3	22.0
				20175	1732.5	23.5	22.4
				20385	1753.5	23.2	22.3
			14	19965	1711.5	23.5	22.2
				20175	1732.5	23.5	22.1
				20385	1753.5	22.9	21.9
		15	0	19965	1711.5	23.5	22.1
				20175	1732.5	23.1	22.1
				20385	1753.5	23.1	22.2

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
4	5 MHz	1	0	19975	1712.5	24.4	22.9
				20175	1732.5	24.3	23.3
				20375	1752.5	24.1	23.4
			12	19975	1712.5	24.4	23.3
				20175	1732.5	24.1	23.5
				20375	1752.5	24.0	23.1
			24	19975	1712.5	24.0	22.9
				20175	1732.5	24.4	23.2
				20375	1752.5	24.2	23.2
		12	0	19975	1712.5	23.1	22.5
				20175	1732.5	23.4	22.3
				20375	1752.5	23.4	21.9
			6	19975	1712.5	23.1	21.9
				20175	1732.5	23.0	22.1
				20375	1752.5	23.5	21.8
			13	19975	1712.5	22.8	22.0
				20175	1732.5	23.1	22.5
				20375	1752.5	23.1	22.5
		25	0	19975	1712.5	23.5	22.0
				20175	1732.5	23.3	22.1
				20375	1752.5	23.4	22.1
	10 MHz	1	0	20000	1715.0	24.4	22.8
				20175	1732.5	24.3	23.3
				20350	1750.0	24.5	23.2
			24	20000	1715.0	23.9	23.1
				20175	1732.5	23.9	23.0
				20350	1750.0	24.2	22.8
			49	20000	1715.0	24.1	22.9
				20175	1732.5	24.2	23.3
				20350	1750.0	23.9	23.4
		25	0	20000	1715.0	23.0	22.5
				20175	1732.5	22.9	21.8
				20350	1750.0	23.5	22.1
			13	20000	1715.0	23.5	21.9
				20175	1732.5	23.1	22.0
				20350	1750.0	23.2	22.4
			25	20000	1715.0	22.8	21.9
				20175	1732.5	23.2	21.8
				20350	1750.0	23.4	22.5
		50	0	20000	1715.0	23.1	22.0
				20175	1732.5	23.0	22.1
				20350	1750.0	23.2	22.2

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
4	15 MHz	1	0	20025	1717.5	24.4	23.3
				20175	1732.5	24.3	22.9
				20325	1747.5	23.8	23.4
			37	20025	1717.5	24.5	23.2
				20175	1732.5	24.1	23.1
				20325	1747.5	23.9	22.9
			74	20025	1717.5	24.4	23.4
				20175	1732.5	24.2	23.2
				20325	1747.5	24.2	22.9
		36	0	20025	1717.5	23.5	22.5
				20175	1732.5	23.2	22.3
				20325	1747.5	23.1	22.1
			19	20025	1717.5	23.3	22.3
				20175	1732.5	23.2	22.3
				20325	1747.5	23.4	21.8
			39	20025	1717.5	23.3	21.9
				20175	1732.5	23.5	22.2
				20325	1747.5	22.9	22.4
		75	0	20025	1717.5	22.9	22.3
				20175	1732.5	22.9	22.1
				20325	1747.5	23.5	22.5
	20 MHz	1	0	20050	1720.0	24.3	23.3
				20175	1732.5	24.2	23.1
				20300	1745.0	24.3	22.8
			49	20050	1720.0	24.2	23.2
				20175	1732.5	24.2	23.2
				20300	1745.0	24.0	22.8
			99	20050	1720.0	23.9	23.1
				20175	1732.5	24.0	23.2
				20300	1745.0	23.9	23.2
		50	0	20050	1720.0	23.4	22.1
				20175	1732.5	23.5	22.5
				20300	1745.0	23.4	22.2
			24	20050	1720.0	23.2	22.2
				20175	1732.5	22.8	22.5
				20300	1745.0	23.4	21.9
			50	20050	1720.0	22.8	21.9
				20175	1732.5	22.9	22.4
				20300	1745.0	22.9	22.3
		100	0	20050	1720.0	23.1	22.0
				20175	1732.5	23.1	21.9
				20300	1745.0	23.0	22.4

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
5	1.4 MHz	1	0	20407	824.7	23.4	23.0
				20525	836.5	23.9	22.8
				20643	848.3	23.9	22.9
			3	20407	824.7	23.9	22.5
				20525	836.5	23.7	22.8
				20643	848.3	23.4	22.7
			5	20407	824.7	23.8	22.9
				20525	836.5	23.5	22.5
				20643	848.3	23.4	22.6
		3	0	20407	824.7	23.7	22.7
				20525	836.5	23.6	22.4
				20643	848.3	23.7	22.9
			1	20407	824.7	23.6	22.9
				20525	836.5	23.3	22.5
				20643	848.3	23.8	22.8
			3	20407	824.7	23.5	22.6
				20525	836.5	23.7	22.4
				20643	848.3	23.6	22.9
		6	0	20407	824.7	22.4	21.6
				20525	836.5	22.9	21.7
				20643	848.3	22.9	21.4
	3 MHz	1	0	20415	825.5	23.4	22.4
				20525	836.5	23.7	22.7
				20635	847.5	23.5	22.6
			7	20415	825.5	23.8	22.7
				20525	836.5	23.7	22.5
				20635	847.5	23.8	22.9
			14	20415	825.5	23.5	22.8
				20525	836.5	23.9	22.4
				20635	847.5	23.9	22.6
		8	0	20415	825.5	22.9	21.8
				20525	836.5	22.7	22.0
				20635	847.5	22.4	21.4
			7	20415	825.5	22.4	21.4
				20525	836.5	22.6	21.7
				20635	847.5	22.5	21.6
			14	20415	825.5	22.7	21.6
				20525	836.5	22.9	22.0
				20635	847.5	22.5	21.4
		15	0	20415	825.5	22.5	21.7
				20525	836.5	22.4	21.8
				20635	847.5	22.6	21.5

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
5	5 MHz	1	0	20425	826.5	23.6	22.5
				20525	836.5	23.7	22.5
				20625	846.5	23.5	22.5
			12	20425	826.5	23.9	22.6
				20525	836.5	23.6	22.3
				20625	846.5	23.8	23.0
			24	20425	826.5	23.8	23.0
				20525	836.5	23.5	22.9
				20625	846.5	23.9	22.7
		12	0	20425	826.5	22.9	21.6
				20525	836.5	22.8	21.8
				20625	846.5	22.9	21.6
			6	20425	826.5	22.7	22.0
				20525	836.5	22.4	21.9
				20625	846.5	22.9	21.3
			13	20425	826.5	22.8	21.4
				20525	836.5	22.5	22.0
				20625	846.5	22.5	21.5
		25	0	20425	826.5	22.8	21.5
				20525	836.5	22.6	21.7
				20625	846.5	22.3	21.6
	10 MHz	1	0	20450	829.0	23.6	22.4
				20525	836.5	24.0	22.9
				20600	844.0	23.8	22.8
			24	20450	829.0	23.7	23.0
				20525	836.5	23.6	22.8
				20600	844.0	23.3	23.0
			49	20450	829.0	23.4	22.8
				20525	836.5	23.5	22.4
				20600	844.0	23.7	22.5
		25	0	20450	829.0	22.4	22.0
				20525	836.5	22.4	21.6
				20600	844.0	23.0	21.8
			13	20450	829.0	23.0	22.0
				20525	836.5	22.7	21.7
				20600	844.0	22.6	21.6
			25	20450	829.0	22.3	21.7
				20525	836.5	22.4	21.9
				20600	844.0	22.5	22.0
		50	0	20450	829.0	22.7	21.9
				20525	836.5	22.9	21.4
				20600	844.0	22.4	21.7

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
7	5 MHz	1	0	20775	2502.5	23.6	23.0
7	5 MHz	1	0	21100	2535.0	23.9	22.6
7	5 MHz	1	0	21425	2567.5	23.9	22.4
7	5 MHz	1	12	20775	2502.5	23.9	22.5
7	5 MHz	1	12	21100	2535.0	23.8	22.7
7	5 MHz	1	12	21425	2567.5	23.5	22.6
7	5 MHz	1	24	20775	2502.5	24.0	22.4
7	5 MHz	1	24	21100	2535.0	24.0	22.7
7	5 MHz	1	24	21425	2567.5	23.6	22.4
7	5 MHz	12	0	20775	2502.5	22.4	21.4
7	5 MHz	12	0	21100	2535.0	22.7	21.6
7	5 MHz	12	0	21425	2567.5	22.6	21.6
7	5 MHz	12	6	20775	2502.5	23.0	22.0
7	5 MHz	12	6	21100	2535.0	22.6	21.9
7	5 MHz	12	6	21425	2567.5	23.0	21.7
7	5 MHz	12	13	20775	2502.5	22.6	21.7
7	5 MHz	12	13	21100	2535.0	22.4	21.8
7	5 MHz	12	13	21425	2567.5	22.5	21.8
7	5 MHz	25	0	20775	2502.5	22.8	21.6
7	5 MHz	25	0	21100	2535.0	22.9	21.7
7	5 MHz	25	0	21425	2567.5	22.9	21.4
7	10 MHz	1	0	20800	2505.0	24.0	22.5
7	10 MHz	1	0	21100	2535.0	23.4	22.5
7	10 MHz	1	0	21400	2565.0	23.6	22.8
7	10 MHz	1	24	20800	2505.0	23.9	23.0
7	10 MHz	1	24	21100	2535.0	23.3	22.3
7	10 MHz	1	24	21400	2565.0	23.5	22.4
7	10 MHz	1	49	20800	2505.0	23.5	22.6
7	10 MHz	1	49	21100	2535.0	23.4	22.9
7	10 MHz	1	49	21400	2565.0	23.7	22.7
7	10 MHz	25	0	20800	2505.0	22.9	21.6
7	10 MHz	25	0	21100	2535.0	22.9	21.5
7	10 MHz	25	0	21400	2565.0	22.5	21.5
7	10 MHz	25	13	20800	2505.0	22.5	21.4
7	10 MHz	25	13	21100	2535.0	22.8	21.9
7	10 MHz	25	13	21400	2565.0	22.4	21.3
7	10 MHz	25	25	20800	2505.0	22.8	21.9
7	10 MHz	25	25	21100	2535.0	22.4	21.4
7	10 MHz	25	25	21400	2565.0	22.5	21.4
7	10 MHz	50	0	20800	2505.0	23.0	21.9
7	10 MHz	50	0	21100	2535.0	22.3	21.7
7	10 MHz	50	0	21400	2565.0	22.6	21.5

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
7	15 MHz	1	0	20825	2507.5	23.3	23.0
				21100	2535.0	23.8	22.3
				21375	2562.5	23.8	22.5
			37	20825	2507.5	23.4	22.8
				21100	2535.0	23.5	22.8
				21375	2562.5	23.9	22.7
			74	20825	2507.5	23.7	22.6
				21100	2535.0	23.8	22.5
				21375	2562.5	23.4	22.8
		36	0	20825	2507.5	22.8	21.8
				21100	2535.0	22.4	21.6
				21375	2562.5	22.9	21.3
			19	20825	2507.5	22.7	21.3
				21100	2535.0	22.7	21.9
				21375	2562.5	22.4	21.5
			39	20825	2507.5	22.5	22.0
				21100	2535.0	22.9	21.6
				21375	2562.5	22.3	21.8
		75	0	20825	2507.5	22.4	21.7
				21100	2535.0	22.3	21.6
				21375	2562.5	22.7	21.9
	20 MHz	1	0	20850	2510.0	23.8	22.8
				21100	2535.0	23.8	22.4
				21350	2560.0	23.8	22.3
			49	20850	2510.0	23.8	22.3
				21100	2535.0	23.7	22.4
				21350	2560.0	23.7	22.8
			99	20850	2510.0	23.5	22.6
				21100	2535.0	23.9	22.5
				21350	2560.0	23.5	22.6
		50	0	20850	2510.0	22.7	21.5
				21100	2535.0	22.8	21.5
				21350	2560.0	22.8	21.9
			24	20850	2510.0	22.9	22.0
				21100	2535.0	22.4	21.8
				21350	2560.0	22.4	21.3
			50	20850	2510.0	22.3	21.5
				21100	2535.0	22.5	21.4
				21350	2560.0	22.7	22.0
		100	0	20850	2510.0	22.8	21.8
				21100	2535.0	22.3	21.4
				21350	2560.0	22.4	21.4

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
12	1.4 MHz	1	0	23017	699.7	23.9	22.5
				23095	707.5	23.3	22.9
				23173	715.3	23.3	22.5
			3	23017	699.7	23.7	22.7
				23095	707.5	23.4	23.0
				23173	715.3	23.7	22.4
			5	23017	699.7	23.8	22.9
				23095	707.5	23.5	22.8
				23173	715.3	23.4	22.6
		3	0	23017	699.7	23.8	22.5
				23095	707.5	23.4	22.5
				23173	715.3	23.4	22.4
			1	23017	699.7	24.0	22.4
				23095	707.5	23.3	23.0
				23173	715.3	23.6	22.8
			3	23017	699.7	23.6	22.9
				23095	707.5	23.9	22.7
				23173	715.3	23.5	22.7
		6	0	23017	699.7	22.7	21.3
				23095	707.5	22.6	21.4
				23173	715.3	23.0	21.9
	3 MHz	1	0	23025	700.5	23.6	22.8
				23095	707.5	23.4	22.8
				23165	714.5	23.8	22.9
			7	23025	700.5	23.8	22.8
				23095	707.5	23.3	22.4
				23165	714.5	23.4	22.9
			14	23025	700.5	23.5	22.5
				23095	707.5	23.6	22.7
				23165	714.5	23.4	22.6
		8	0	23025	700.5	22.4	21.6
				23095	707.5	22.8	21.7
				23165	714.5	22.6	21.5
			7	23025	700.5	22.7	21.8
				23095	707.5	22.7	21.8
				23165	714.5	22.9	21.9
			14	23025	700.5	22.9	21.9
				23095	707.5	22.9	21.8
				23165	714.5	22.9	21.7
		15	0	23025	700.5	22.5	21.5
				23095	707.5	22.9	21.4
				23165	714.5	22.3	21.5

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
12	5 MHz	1	0	23035	701.5	24.0	22.5
				23095	707.5	23.9	22.8
				23155	713.5	23.3	23.0
			12	23035	701.5	23.6	22.7
				23095	707.5	23.6	22.6
				23155	713.5	23.4	22.6
			24	23035	701.5	23.6	22.4
				23095	707.5	23.8	22.7
				23155	713.5	23.5	22.7
		12	0	23035	701.5	23.0	21.6
				23095	707.5	22.4	21.9
				23155	713.5	22.3	21.7
			6	23035	701.5	22.7	21.8
				23095	707.5	22.7	21.9
				23155	713.5	23.0	21.4
			13	23035	701.5	22.6	21.6
				23095	707.5	22.8	21.6
				23155	713.5	22.6	21.9
		25	0	23035	701.5	22.4	21.6
				23095	707.5	22.5	21.6
				23155	713.5	22.5	21.5
	10 MHz	1	0	23060	704.0	23.7	22.4
				23095	707.5	23.7	22.9
				23130	711.0	23.9	22.3
			24	23060	704.0	23.5	22.7
				23095	707.5	23.7	22.4
				23130	711.0	23.9	22.9
			49	23060	704.0	23.8	22.4
				23095	707.5	23.4	22.4
				23130	711.0	23.5	22.3
		25	0	23060	704.0	22.7	21.4
				23095	707.5	22.7	21.9
				23130	711.0	22.9	21.8
			13	23060	704.0	22.5	21.9
				23095	707.5	22.6	21.9
				23130	711.0	22.8	21.6
			25	23060	704.0	22.6	21.3
				23095	707.5	22.5	21.4
				23130	711.0	22.3	21.3
		50	0	23060	704.0	23.0	21.7
				23095	707.5	22.9	21.6
				23130	711.0	22.5	22.0

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
13	5 MHz	1	0	23205	779.5	23.8	22.7
				23230	782.0	23.7	22.9
				23129	784.5	23.3	22.8
			12	23205	779.5	23.7	22.4
				23230	782.0	23.5	22.7
				23129	784.5	24.0	22.5
			24	23205	779.5	23.9	22.9
				23230	782.0	23.4	22.5
				23129	784.5	23.7	22.6
		12	0	23205	779.5	22.9	21.9
				23230	782.0	22.4	21.9
				23129	784.5	23.0	21.4
			6	23205	779.5	22.4	21.6
				23230	782.0	22.9	21.7
				23129	784.5	22.6	21.4
			13	23205	779.5	22.7	21.7
				23230	782.0	22.3	21.8
				23129	784.5	22.6	21.4
		25	0	23205	779.5	22.5	21.8
				23230	782.0	22.3	21.6
				23129	784.5	22.5	21.9
	10 MHz	1	0	23230	782.0	23.6	22.8
			24	23230	782.0	23.5	22.9
			49	23230	782.0	23.5	22.4
		25	0	23230	782.0	22.7	21.3
			13	23230	782.0	22.9	21.8
			25	23230	782.0	22.4	21.4
		50	0	23230	782.0	22.9	21.4

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
26	1.4 MHz	1	0	26697	814.7	23.7	22.9
				26865	831.5	23.6	22.3
				27033	848.3	23.7	22.7
			3	26697	814.7	23.4	22.3
				26865	831.5	23.5	22.5
				27033	848.3	23.7	22.9
			5	26697	814.7	23.9	22.8
				26865	831.5	23.8	22.8
				27033	848.3	23.8	22.4
		3	0	26697	814.7	23.7	22.8
				26865	831.5	23.9	22.9
				27033	848.3	23.5	22.9
			1	26697	814.7	23.9	23.0
				26865	831.5	23.5	22.4
				27033	848.3	23.7	22.9
			3	26697	814.7	23.8	23.0
				26865	831.5	23.8	22.4
				27033	848.3	24.0	22.7
		6	0	26697	814.7	22.6	21.9
				26865	831.5	22.7	21.9
				27033	848.3	22.9	21.9
	3 MHz	1	0	26705	815.5	23.4	22.4
				26865	831.5	23.7	22.6
				27025	847.5	23.8	22.5
			7	26705	815.5	23.4	22.6
				26865	831.5	23.5	22.9
				27025	847.5	23.8	22.8
			14	26705	815.5	23.8	22.4
				26865	831.5	23.8	22.8
				27025	847.5	23.4	22.9
		8	0	26705	815.5	22.4	21.9
				26865	831.5	22.7	21.8
				27025	847.5	23.0	21.8
			7	26705	815.5	22.4	21.5
				26865	831.5	22.3	21.9
				27025	847.5	22.9	21.5
			14	26705	815.5	22.7	21.5
				26865	831.5	22.5	21.9
				27025	847.5	22.4	21.4
		15	0	26705	815.5	23.0	21.8
				26865	831.5	22.3	21.8
				27025	847.5	22.9	21.6

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
26	5 MHz	1	0	26715	816.5	23.5	22.7
				26865	831.5	23.6	22.8
				27015	846.5	23.8	22.7
			12	26715	816.5	23.7	22.9
				26865	831.5	23.9	22.8
				27015	846.5	23.4	23.0
			24	26715	816.5	23.4	22.3
				26865	831.5	23.3	22.3
				27015	846.5	23.3	22.9
		12	0	26715	816.5	22.4	21.5
				26865	831.5	22.6	21.4
				27015	846.5	22.8	21.5
			6	26715	816.5	23.0	21.7
				26865	831.5	22.5	21.9
				27015	846.5	22.3	21.7
			13	26715	816.5	22.5	21.5
				26865	831.5	22.6	22.0
				27015	846.5	22.3	22.0
		25	0	26715	816.5	23.0	21.4
				26865	831.5	22.4	21.7
				27015	846.5	22.6	21.5
	10 MHz	1	0	26740	819.0	23.7	22.5
				26865	831.5	23.7	22.9
				26990	844.0	24.0	22.4
			24	26740	819.0	23.8	22.8
				26865	831.5	23.4	22.7
				26990	844.0	23.4	22.4
			49	26740	819.0	23.9	22.5
				26865	831.5	23.7	22.8
				26990	844.0	23.9	22.5
		25	0	26740	819.0	22.7	21.4
				26865	831.5	22.8	22.0
				26990	844.0	22.9	21.6
			13	26740	819.0	22.9	21.7
				26865	831.5	22.4	21.8
				26990	844.0	22.5	21.5
			25	26740	819.0	22.6	21.6
				26865	831.5	22.4	21.6
				26990	844.0	23.0	21.7
		50	0	26740	819.0	22.7	21.4
				26865	831.5	22.6	21.6
				26990	844.0	22.6	21.5

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
26	15 MHz	1	0	26765	821.5	23.9	22.8
				26865	831.5	23.5	22.7
				26965	841.5	23.9	22.3
			37	26765	821.5	23.3	22.5
				26865	831.5	23.7	22.9
				26965	841.5	23.6	22.8
			74	26765	821.5	23.8	22.5
				26865	831.5	23.4	22.6
				26965	841.5	23.4	23.0
		36	0	26765	821.5	22.9	21.4
				26865	831.5	22.6	21.3
				26965	841.5	23.0	21.3
			19	26765	821.5	22.7	21.7
				26865	831.5	22.7	21.7
				26965	841.5	22.8	21.5
			39	26765	821.5	22.7	21.3
				26865	831.5	22.8	21.6
				26965	841.5	22.8	21.7
		75	0	26765	821.5	22.6	21.6
				26865	831.5	22.6	21.9
				26965	841.5	22.5	21.7

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
38	5 MHz	1	0	37775	2572.5	23.9	22.9
				38000	2595.0	23.9	22.8
				38225	2617.5	23.8	22.7
			12	37775	2572.5	24.0	22.4
				38000	2595.0	23.6	22.8
				38225	2617.5	23.8	22.8
			24	37775	2572.5	23.4	22.9
				38000	2595.0	23.5	22.6
				38225	2617.5	23.4	22.6
		12	0	37775	2572.5	22.7	21.3
				38000	2595.0	22.3	21.3
				38225	2617.5	22.8	21.8
			6	37775	2572.5	22.7	21.7
				38000	2595.0	22.5	21.9
				38225	2617.5	22.9	21.4
			13	37775	2572.5	22.4	21.7
				38000	2595.0	22.7	21.5
				38225	2617.5	22.9	21.5
		25	0	37775	2572.5	23.0	21.9
				38000	2595.0	22.5	22.0
				38225	2617.5	22.7	21.7
	10 MHz	1	0	37800	2575.0	23.9	22.7
				38000	2595.0	23.5	22.7
				38200	2615.0	23.6	22.7
			24	37800	2575.0	23.4	22.7
				38000	2595.0	23.4	22.7
				38200	2615.0	23.6	22.5
			49	37800	2575.0	23.5	22.4
				38000	2595.0	23.6	22.8
				38200	2615.0	23.8	22.3
		25	0	37800	2575.0	23.0	21.9
				38000	2595.0	22.7	21.9
				38200	2615.0	23.0	21.7
			13	37800	2575.0	23.0	21.7
				38000	2595.0	22.4	21.6
				38200	2615.0	22.3	21.5
			25	37800	2575.0	22.6	22.0
				38000	2595.0	22.8	21.8
				38200	2615.0	22.4	21.5
		50	0	37800	2575.0	22.7	21.8
				38000	2595.0	22.6	21.7
				38200	2615.0	22.5	21.7

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
38	15 MHz	1	0	37825	2577.5	23.8	22.4
				38000	2595.0	23.4	22.5
				38175	2612.5	23.3	22.5
			37	37825	2577.5	23.4	22.3
				38000	2595.0	23.6	22.9
				38175	2612.5	23.5	22.5
			74	37825	2577.5	23.3	22.7
				38000	2595.0	23.3	22.3
				38175	2612.5	23.5	22.5
		36	0	37825	2577.5	23.0	21.9
				38000	2595.0	23.0	21.9
				38175	2612.5	22.4	21.4
			19	37825	2577.5	22.8	21.8
				38000	2595.0	22.5	21.8
				38175	2612.5	22.7	21.7
			39	37825	2577.5	22.5	21.7
				38000	2595.0	22.6	21.8
				38175	2612.5	22.7	21.6
		75	0	37825	2577.5	22.9	21.7
				38000	2595.0	22.9	21.5
				38175	2612.5	22.9	21.4
	20 MHz	1	0	37850	2580.0	23.7	22.8
				38000	2595.0	23.5	22.7
				38150	2610.0	23.3	22.9
			49	37850	2580.0	23.6	22.7
				38000	2595.0	23.4	22.3
				38150	2610.0	23.6	22.7
			99	37850	2580.0	23.3	22.4
				38000	2595.0	23.8	22.8
				38150	2610.0	23.7	22.7
		50	0	37850	2580.0	22.5	21.4
				38000	2595.0	22.3	21.3
				38150	2610.0	22.7	21.7
			24	37850	2580.0	22.6	21.4
				38000	2595.0	22.8	21.5
				38150	2610.0	22.6	21.4
			50	37850	2580.0	22.5	21.4
				38000	2595.0	22.4	21.8
				38150	2610.0	22.9	21.6
		100	0	37850	2580.0	22.6	21.8
				38000	2595.0	22.5	21.8
				38150	2610.0	22.8	21.5

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
40	5 MHz	1	0	38675	2302.5	23.1	22.5
				39150	2350.0	23.0	22.4
				39625	2397.5	23.1	22.5
			12	38675	2302.5	23.2	22.2
				39150	2350.0	23.5	22.6
				39625	2397.5	23.7	22.6
			24	38675	2302.5	23.1	22.6
				39150	2350.0	23.6	22.7
				39625	2397.5	23.2	22.1
		12	0	38675	2302.5	22.6	21.3
				39150	2350.0	22.1	21.2
				39625	2397.5	22.7	21.2
			6	38675	2302.5	22.5	21.3
				39150	2350.0	22.3	21.1
				39625	2397.5	22.4	21.2
			13	38675	2302.5	22.2	21.1
				39150	2350.0	22.2	21.0
				39625	2397.5	22.3	21.5
		25	0	38675	2302.5	22.5	21.7
				39150	2350.0	22.4	21.5
				39625	2397.5	22.7	21.0
	10 MHz	1	0	38700	2305.0	23.4	22.4
				39150	2350.0	23.0	22.5
				39600	2395.0	23.6	22.4
			24	38700	2305.0	23.6	22.6
				39150	2350.0	23.6	22.6
				39600	2395.0	23.3	22.3
			49	38700	2305.0	23.3	22.0
				39150	2350.0	23.3	22.4
				39600	2395.0	23.5	22.5
		25	0	38700	2305.0	22.4	21.6
				39150	2350.0	22.6	21.1
				39600	2395.0	22.4	21.5
			13	38700	2305.0	22.1	21.0
				39150	2350.0	22.4	21.3
				39600	2395.0	22.4	21.3
			25	38700	2305.0	22.5	21.4
				39150	2350.0	22.4	21.5
				39600	2395.0	22.1	21.5
		50	0	38700	2305.0	22.0	21.5
				39150	2350.0	22.3	21.1
				39600	2395.0	22.7	21.5

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
40	15 MHz	1	0	28725	2307.5	23.3	22.3
				39150	2350.0	23.2	22.0
				39575	2392.5	23.4	22.3
			37	28725	2307.5	23.7	22.0
				39150	2350.0	23.2	22.0
				39575	2392.5	23.1	22.4
			74	28725	2307.5	23.5	22.4
				39150	2350.0	23.6	22.7
				39575	2392.5	23.4	22.0
		36	0	28725	2307.5	22.3	21.3
				39150	2350.0	22.3	21.5
				39575	2392.5	22.1	21.5
			19	28725	2307.5	22.3	21.0
				39150	2350.0	22.0	21.3
				39575	2392.5	22.1	21.1
			39	28725	2307.5	22.5	21.5
				39150	2350.0	22.6	21.3
				39575	2392.5	22.3	21.4
		75	0	28725	2307.5	22.5	21.2
				39150	2350.0	22.1	21.6
				39575	2392.5	22.4	21.6
	20 MHz	1	0	38750	2310.0	23.1	22.1
				39150	2350.0	23.1	22.5
				39550	2390.0	23.3	22.2
			49	38750	2310.0	23.0	22.7
				39150	2350.0	23.6	22.2
				39550	2390.0	23.5	22.7
			99	38750	2310.0	23.4	22.5
				39150	2350.0	23.6	22.0
				39550	2390.0	23.5	22.3
		50	0	38750	2310.0	22.6	21.5
				39150	2350.0	22.0	21.2
				39550	2390.0	22.3	21.5
			24	38750	2310.0	22.7	21.7
				39150	2350.0	22.6	21.1
				39550	2390.0	22.6	21.2
			50	38750	2310.0	22.2	21.4
				39150	2350.0	22.2	21.1
				39550	2390.0	22.4	21.3
		100	0	38750	2310.0	22.3	21.0
				39150	2350.0	22.1	21.5
				39550	2390.0	22.2	21.1

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
41	5 MHz	1	0	39675	2498.5	24.1	23.3
				40148	2545.8	24.1	23.2
				40620	2593.0	24.3	22.9
				41093	2640.3	24.3	23.4
				41565	2687.5	24.0	23.3
			12	39675	2498.5	24.0	23.4
				40148	2545.8	24.4	22.9
				40620	2593.0	24.1	23.5
				41093	2640.3	24.0	22.9
				41565	2687.5	24.4	23.1
			24	39675	2498.5	24.1	23.4
				40148	2545.8	24.0	23.4
				40620	2593.0	24.0	22.9
				41093	2640.3	24.1	23.4
				41565	2687.5	24.0	23.2
		12	0	39675	2498.5	23.2	22.0
				40148	2545.8	23.4	22.0
				40620	2593.0	23.1	22.5
				41093	2640.3	23.0	22.0
				41565	2687.5	23.1	22.2
			6	39675	2498.5	22.8	21.9
				40148	2545.8	22.9	22.2
				40620	2593.0	22.9	22.0
				41093	2640.3	23.0	22.3
				41565	2687.5	23.2	21.8
			13	39675	2498.5	23.3	22.1
				40148	2545.8	23.1	22.5
				40620	2593.0	23.5	22.0
				41093	2640.3	23.2	22.2
				41565	2687.5	23.1	22.5
		25	0	39675	2498.5	23.4	21.8
				40148	2545.8	23.4	22.0
				40620	2593.0	23.4	21.9
				41093	2640.3	23.0	22.3
				41565	2687.5	23.5	21.9

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
41	10 MHz	1	0	39700	2501.0	24.0	23.2
				40160	2547.0	24.3	23.3
				40620	2593.0	24.1	23.2
				41080	2639.0	24.0	23.0
				41540	2685.0	24.2	23.0
			24	39700	2501.0	24.5	23.5
				40160	2547.0	24.3	23.0
				40620	2593.0	23.8	23.4
				41080	2639.0	24.1	22.8
				41540	2685.0	24.5	22.8
			49	39700	2501.0	24.4	23.3
				40160	2547.0	24.2	23.5
				40620	2593.0	24.1	23.3
				41080	2639.0	24.4	23.4
				41540	2685.0	24.3	23.2
		25	0	39700	2501.0	22.8	21.9
				40160	2547.0	23.3	22.3
				40620	2593.0	23.1	22.0
				41080	2639.0	23.2	22.2
				41540	2685.0	22.8	22.1
			13	39700	2501.0	22.9	21.8
				40160	2547.0	23.1	21.9
				40620	2593.0	22.8	22.5
				41080	2639.0	22.9	22.2
				41540	2685.0	23.2	22.1
			25	39700	2501.0	23.4	22.2
				40160	2547.0	23.0	22.5
				40620	2593.0	22.8	21.9
				41080	2639.0	23.3	22.3
				41540	2685.0	23.1	22.0
		50	0	39700	2501.0	22.8	22.5
				40160	2547.0	23.1	22.0
				40620	2593.0	22.9	22.3
				41080	2639.0	22.9	21.9
				41540	2685.0	22.9	22.3

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
41	15 MHz	1	0	39725	2503.5	23.9	22.9
				40173	2548.3	24.4	23.1
				40620	2593.0	23.9	22.8
				41068	2637.8	24.3	22.9
				41515	2682.5	24.2	23.4
			37	39725	2503.5	24.1	23.0
				40173	2548.3	24.2	23.3
				40620	2593.0	24.2	23.4
				41068	2637.8	24.5	23.1
				41515	2682.5	24.2	23.0
			74	39725	2503.5	24.3	23.5
				40173	2548.3	24.1	23.0
				40620	2593.0	23.9	23.2
				41068	2637.8	24.0	22.9
				41515	2682.5	24.0	23.0
		36	0	39725	2503.5	23.4	22.4
				40173	2548.3	23.4	22.1
				40620	2593.0	22.9	22.3
				41068	2637.8	23.3	22.0
				41515	2682.5	23.0	21.9
			19	39725	2503.5	23.4	22.0
				40173	2548.3	22.9	21.8
				40620	2593.0	23.0	22.3
				41068	2637.8	22.8	22.3
				41515	2682.5	22.9	22.1
			39	39725	2503.5	23.3	22.1
				40173	2548.3	23.5	21.9
				40620	2593.0	23.4	22.0
				41068	2637.8	23.5	22.3
				41515	2682.5	23.3	22.1
		75	0	39725	2503.5	23.1	21.8
				40173	2548.3	23.3	22.5
				40620	2593.0	23.2	22.0
				41068	2637.8	23.1	22.0
				41515	2682.5	22.9	22.3

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
41	20 MHz	1	0	39750	2506.0	24.3	23.0
				40185	2549.5	24.5	22.8
				40620	2593.0	24.4	23.2
				41055	2636.5	24.1	23.2
				41490	2680.0	24.2	23.1
			49	39750	2506.0	24.3	23.4
				40185	2549.5	24.5	23.0
				40620	2593.0	23.9	23.0
				41055	2636.5	24.5	23.4
				41490	2680.0	23.8	23.2
			99	39750	2506.0	24.1	23.2
				40185	2549.5	24.4	23.3
				40620	2593.0	24.0	23.3
				41055	2636.5	23.9	22.8
				41490	2680.0	24.4	23.3
		50	0	39750	2506.0	23.0	22.0
				40185	2549.5	23.5	22.1
				40620	2593.0	22.9	22.1
				41055	2636.5	22.9	22.4
				41490	2680.0	23.1	22.1
			24	39750	2506.0	22.9	22.3
				40185	2549.5	23.4	22.2
				40620	2593.0	23.0	22.1
				41055	2636.5	22.8	22.0
				41490	2680.0	23.4	22.2
			50	39750	2506.0	22.9	22.2
				40185	2549.5	23.1	22.3
				40620	2593.0	23.3	22.5
				41055	2636.5	22.9	22.3
				41490	2680.0	23.0	21.8
		100	0	39750	2506.0	23.0	22.0
				40185	2549.5	23.1	22.4
				40620	2593.0	22.8	22.2
				41055	2636.5	22.9	22.2
				41490	2680.0	23.2	22.3

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
66	1.4 MHz	1	0	131979	1710.7	24.1	22.8
				132322	1745.0	24.0	23.1
				132665	1779.3	24.3	23.4
			3	131979	1710.7	24.2	22.9
				132322	1745.0	24.1	23.4
				132665	1779.3	24.5	22.9
			5	131979	1710.7	24.3	23.3
				132322	1745.0	24.1	23.0
				132665	1779.3	24.2	23.5
		3	0	131979	1710.7	24.2	22.9
				132322	1745.0	23.9	23.3
				132665	1779.3	24.3	23.4
			1	131979	1710.7	23.9	23.1
				132322	1745.0	24.2	23.2
				132665	1779.3	23.8	23.4
			3	131979	1710.7	24.1	23.4
				132322	1745.0	24.3	23.3
				132665	1779.3	24.3	23.5
		6	0	131979	1710.7	23.3	22.2
				132322	1745.0	23.3	22.3
				132665	1779.3	23.4	22.3
	3 MHz	1	0	131987	1711.5	24.4	22.9
				132322	1745.0	24.1	23.5
				132657	1778.5	24.4	23.2
			7	131987	1711.5	23.9	23.2
				132322	1745.0	24.0	23.1
				132657	1778.5	24.2	23.3
			14	131987	1711.5	24.3	22.9
				132322	1745.0	24.1	23.1
				132657	1778.5	24.0	23.0
		8	0	131987	1711.5	23.5	22.0
				132322	1745.0	22.9	22.0
				132657	1778.5	23.2	22.2
			7	131987	1711.5	22.9	22.2
				132322	1745.0	22.8	22.3
				132657	1778.5	22.8	21.8
			14	131987	1711.5	23.4	22.0
				132322	1745.0	23.2	22.3
				132657	1778.5	23.4	21.8
		15	0	131987	1711.5	22.9	22.4
				132322	1745.0	23.1	22.1
				132657	1778.5	23.1	21.8

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
66	5 MHz	1	0	131997	1712.5	24.2	23.0
				132322	1745.0	24.4	23.0
				132646	1777.4	24.0	23.3
			12	131997	1712.5	24.3	23.4
				132322	1745.0	24.3	23.4
				132646	1777.4	23.8	23.4
			24	131997	1712.5	23.9	23.0
				132322	1745.0	24.0	23.2
				132646	1777.4	24.0	23.1
		12	0	131997	1712.5	23.4	21.8
				132322	1745.0	22.9	22.2
				132646	1777.4	23.4	21.9
			6	131997	1712.5	22.8	22.5
				132322	1745.0	23.1	22.3
				132646	1777.4	23.2	22.0
			13	131997	1712.5	22.9	22.1
				132322	1745.0	23.3	22.1
				132646	1777.4	23.0	22.1
		25	0	131997	1712.5	23.2	22.1
				132322	1745.0	23.1	22.0
				132646	1777.4	23.4	22.3
	10 MHz	1	0	132033	1716.1	24.4	23.1
				132322	1745.0	24.0	23.2
				132621	1774.9	24.3	23.4
			24	132033	1716.1	24.0	23.4
				132322	1745.0	24.4	23.4
				132621	1774.9	24.5	23.5
			49	132033	1716.1	24.3	23.2
				132322	1745.0	24.1	22.8
				132621	1774.9	24.5	23.5
		25	0	132033	1716.1	23.5	22.1
				132322	1745.0	23.1	21.9
				132621	1774.9	23.3	22.4
			13	132033	1716.1	23.1	22.3
				132322	1745.0	23.2	22.0
				132621	1774.9	22.9	22.5
			25	132033	1716.1	22.9	22.5
				132322	1745.0	22.8	22.0
				132621	1774.9	23.2	22.3
		50	0	132033	1716.1	23.0	22.5
				132322	1745.0	23.4	22.3
				132621	1774.9	23.4	21.9

Band	Bandwidth	RB Size	RB Offset	Channel	Frequency	QPSK	16QAM
66	15 MHz	1	0	132047	1717.5	24.4	23.0
				132322	1745.0	24.3	23.4
				132596	1772.4	23.9	23.4
			37	132047	1717.5	24.3	23.0
				132322	1745.0	24.4	23.2
				132596	1772.4	24.0	23.3
			74	132047	1717.5	24.1	23.4
				132322	1745.0	24.4	23.5
				132596	1772.4	24.3	23.5
		36	0	132047	1717.5	23.1	22.3
				132322	1745.0	22.9	22.0
				132596	1772.4	23.3	21.9
			19	132047	1717.5	23.1	22.2
				132322	1745.0	23.3	22.4
				132596	1772.4	22.9	22.0
			39	132047	1717.5	22.9	22.0
				132322	1745.0	23.4	21.8
				132596	1772.4	23.4	22.0
		75	0	132047	1717.5	23.0	22.0
				132322	1745.0	23.3	22.4
				132596	1772.4	22.9	21.8
	20 MHz	1	0	132072	1720.0	24.3	22.9
				132322	1745.0	23.9	23.1
				132571	1769.9	24.2	23.1
			49	132072	1720.0	24.1	23.5
				132322	1745.0	24.4	23.0
				132571	1769.9	24.0	22.8
			99	132072	1720.0	24.4	23.5
				132322	1745.0	24.4	23.4
				132571	1769.9	24.3	23.3
		50	0	132072	1720.0	23.1	22.2
				132322	1745.0	23.1	22.2
				132571	1769.9	23.4	22.1
			24	132072	1720.0	23.2	22.2
				132322	1745.0	23.3	22.1
				132571	1769.9	23.1	22.5
			50	132072	1720.0	23.0	22.3
				132322	1745.0	23.0	22.2
				132571	1769.9	23.1	22.4
		100	0	132072	1720.0	23.0	22.4
				132322	1745.0	23.4	22.3
				132571	1769.9	22.9	22.1

10. SAR Test Results

General Note:

1. Per KDB 447498 D01v07, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v07, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.

GPRS Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a slot configuration with the highest average power.
2. Per KDB 941225 D01v03r01, 2-slot setting is used to evaluate SAR in this report. The maximum output power and tune-up tolerance specified for production units in GPRS mode is > than EDGE. Therefore, EDGE testing is not required.

UMTS Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is ≤ ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is ≤ ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4/B5/B12/B17 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE band 4/5/38 SAR test was covered by Band 66//26/41; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. The maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion.
   b. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.

WiFi Note:

1. The WiFi module and antenna did not change from the original filing. Therefore, only the highest SAR value from the original filing was conducted to verify that the SAR did not change significantly with the change in cellular module.
2. Per KDB 248227 D01v02r02, for SAR testing is measured using the lowest mode and data rate.

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
1	GPRS 1900 MHz	2-Slot	Front	30 mm	661	1880	22.27	24.48	0.167	0.28
	GPRS 1900 MHz	2-Slot	Right	30 mm	661	1880	22.27	24.48	0.102	0.17
	GPRS 1900 MHz	2-Slot	Top	30 mm	661	1880	22.27	24.48	0.0913	0.15
	GPRS 850 MHz	2-Slot	Front	30 mm	190	836.6	25.57	27.48	0.0426	0.07
2	GPRS 850 MHz	2-Slot	Right	30 mm	190	836.6	25.57	27.48	0.0692	0.11
	GPRS 850 MHz	2-Slot	Top	30 mm	190	836.6	25.57	27.48	0.0142	0.02
3	WCDMA II	RMC 12.2Kbps	Front	30 mm	9400	1880	23.79	25.00	0.245	0.32
	WCDMA II	RMC 12.2Kbps	Right	30 mm	9400	1880	23.79	25.00	0.133	0.18
	WCDMA II	RMC 12.2Kbps	Top	30 mm	9400	1880	23.79	25.00	0.0116	0.02
4	WCDMA IV	RMC 12.2Kbps	Front	30 mm	1413	1732.6	23.65	25.00	0.229	0.31
	WCDMA IV	RMC 12.2Kbps	Right	30 mm	1413	1732.6	23.65	25.00	0.152	0.21
	WCDMA IV	RMC 12.2Kbps	Top	30 mm	1413	1732.6	23.65	25.00	0.0536	0.07
5	WCDMA V	RMC 12.2Kbps	Front	30 mm	4183	836.6	23.54	25.00	0.0840	0.12
	WCDMA V	RMC 12.2Kbps	Right	30 mm	4183	836.6	23.54	25.00	0.0253	0.04
	WCDMA V	RMC 12.2Kbps	Top	30 mm	4183	836.6	23.54	25.00	0.0200	0.03

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
6	LTE Band 2	20M	QPSK	1	49	Front	30mm	18900	1880	24.2	25.00	0.214	0.26
	LTE Band 2	20M	QPSK	50	24		30mm	18900	1880	23.3	24.00	0.116	0.14
	LTE Band 2	20M	QPSK	1	49	Right	30mm	18900	1880	24.2	25.00	0.0987	0.12
	LTE Band 2	20M	QPSK	50	24		30mm	18900	1880	23.3	24.00	0.0523	0.06
	LTE Band 2	20M	QPSK	1	49	Top	30mm	18900	1880	24.2	25.00	0.0102	0.01
	LTE Band 2	20M	QPSK	50	24		30mm	18900	1880	23.3	24.00	0.00975	0.01
	LTE Band 7	20M	QPSK	1	49	Front	30mm	20850	2510	23.8	25.00	0.281	0.37
7	LTE Band 7	20M	QPSK	1	49		30mm	21100	2535	23.7	25.00	0.293	0.40
	LTE Band 7	20M	QPSK	1	49		30mm	21350	2560	23.7	25.00	0.277	0.37
	LTE Band 7	20M	QPSK	50	24		30mm	21100	2535	22.4	24.00	0.159	0.23
	LTE Band 7	20M	QPSK	1	49	Right	30mm	21100	2535	23.7	25.00	0.268	0.36
	LTE Band 7	20M	QPSK	50	24		30mm	21100	2535	22.4	24.00	0.103	0.15
	LTE Band 7	20M	QPSK	1	49	Top	30mm	21100	2535	23.7	25.00	0.0202	0.03
	LTE Band 7	20M	QPSK	50	24		30mm	21100	2535	22.4	24.00	0.0111	0.02
8	LTE Band 12	10M	QPSK	1	24	Front	30mm	23095	707.5	23.7	25.00	0.0887	0.12
	LTE Band 12	10M	QPSK	25	12		30mm	23095	707.5	22.6	24.00	0.0723	0.10
	LTE Band 12	10M	QPSK	1	24	Right	30mm	23095	707.5	23.7	25.00	0.0145	0.02
	LTE Band 12	10M	QPSK	25	12		30mm	23095	707.5	22.6	24.00	0.0102	0.01
	LTE Band 12	10M	QPSK	1	24	Top	30mm	23095	707.5	23.7	25.00	0.0168	0.02
	LTE Band 12	10M	QPSK	25	12		30mm	23095	707.5	22.6	24.00	0.0113	0.02
9	LTE Band 13	10M	QPSK	1	24	Front	30mm	23230	782	23.5	25.00	0.0801	0.11
	LTE Band 13	10M	QPSK	25	12		30mm	23230	782	22.9	24.00	0.0741	0.10
	LTE Band 13	10M	QPSK	1	24	Right	30mm	23230	782	23.5	25.00	0.0335	0.05
	LTE Band 13	10M	QPSK	25	12		30mm	23230	782	22.9	24.00	0.0264	0.03
	LTE Band 13	10M	QPSK	1	24	Top	30mm	23230	782	23.5	25.00	0.0106	0.01
	LTE Band 13	10M	QPSK	25	12		30mm	23230	782	22.9	24.00	0.00952	0.01
10	LTE Band 26	10M	QPSK	1	24	Front	30mm	26865	831.5	23.7	25.00	0.0662	0.09
	LTE Band 26	10M	QPSK	25	12		30mm	26865	831.5	22.7	24.00	0.0524	0.07
	LTE Band 26	10M	QPSK	1	24	Right	30mm	26865	831.5	23.7	25.00	0.0219	0.03
	LTE Band 26	10M	QPSK	25	12		30mm	26865	831.5	22.7	24.00	0.0134	0.02
	LTE Band 26	10M	QPSK	1	24	Top	30mm	26865	831.5	23.7	25.00	0.0124	0.02
	LTE Band 26	10M	QPSK	25	12		30mm	26865	831.5	22.7	24.00	0.0101	0.01
11	LTE Band 40	20M	QPSK	1	49	Front	30mm	27710	2310	23.6	25.00	0.111	0.15
	LTE Band 40	20M	QPSK	50	24		30mm	27710	2310	22.6	24.00	0.0987	0.14
	LTE Band 40	20M	QPSK	1	49	Right	30mm	27710	2310	23.6	25.00	0.0605	0.08
	LTE Band 40	20M	QPSK	50	24		30mm	27710	2310	22.6	24.00	0.0512	0.07
	LTE Band 40	20M	QPSK	1	49	Top	30mm	27710	2310	23.6	25.00	0.0105	0.01
	LTE Band 40	20M	QPSK	50	24		30mm	27710	2310	22.6	24.00	0.00869	0.01
12	LTE Band 41	20M	QPSK	1	49	Front	30mm	40620	2593	23.9	25.00	0.122	0.16
	LTE Band 41	20M	QPSK	50	24		30mm	40620	2593	23.0	24.00	0.102	0.13
	LTE Band 41	20M	QPSK	1	49	Right	30mm	40620	2593	23.9	25.00	0.0895	0.12
	LTE Band 41	20M	QPSK	50	24		30mm	40620	2593	23.0	24.00	0.0745	0.09
	LTE Band 41	20M	QPSK	1	49	Top	30mm	40620	2593	23.9	25.00	0.0325	0.04
	LTE Band 41	20M	QPSK	50	24		30mm	40620	2593	23.0	24.00	0.0195	0.02
13	LTE Band 66	20M	QPSK	1	49	Front	30mm	132322	1745	24.4	25.00	0.171	0.20
	LTE Band 66	20M	QPSK	50	24		30mm	132322	1745	23.3	24.00	0.114	0.13
	LTE Band 66	20M	QPSK	1	49	Right	30mm	132322	1745	24.4	25.00	0.0961	0.11
	LTE Band 66	20M	QPSK	50	24		30mm	132322	1745	23.3	24.00	0.0829	0.10
	LTE Band 66	20M	QPSK	1	49	Top	30mm	132322	1745	24.4	25.00	0.0287	0.03
	LTE Band 66	20M	QPSK	50	24		30mm	132322	1745	23.3	24.00	0.0125	0.01

Plot No.	Band	BW (MHz)	Modulation	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
14	2.45 GHz Ant 1	20M	CCK	Front	30mm	6	2437	17.86	18.00	0.175	0.18

11. Simultaneous Transmission Analysis

The WiFi data was taken from the original report number SAR.20210306. The data listed in the tables below was extracted from the reports filed with original report.

Sim-Tx configuration

No.	Simultaneous Transmission Configuration	Exposure Positions
		Body
1	GPRS + 2.4 GHz Wifi 0 + 2.4 GHz WiFi 1	Yes
2	GPRS + 5 GHz Wifi 0 + 5 GHz WiFi 1	Yes
3	UMTS + 2.4 GHz Wifi 0 + 2.4 GHz WiFi 1	Yes
4	UMTS + 5 GHz Wifi 0 + 5 GHz WiFi 1	Yes
5	LTE + 2.4 GHz Wifi 0 + 2.4 GHz WiFi 1	Yes
6	LTE + 5 GHz Wifi 0 + 5 GHz WiFi 1	Yes

General Note:

1. The following summations represent the absolute worst cases for simultaneous transmission with WWAN and WLAN.
2. The Scaled SAR summation is calculated based on the same configuration and test position.

Body Exposure Conditions

WWAN Band	Exposure Position	1	2	3	4	5	**1+2+3 Summed 1g SAR (W/kg)**	**1+4+5 Summed 1g SAR (W/kg)**
		WWAN	2.4GHz Wi-Fi 0	2.4GHz Wi-Fi 1	5GHz Wi-Fi 0	5GHz Wi-Fi 1		
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
GPRS 1900 MHz	Front	0.28	0.24	0.10	0.09	0.08	0.62	0.45
	Back		0.07	0.02	0.03	0.02	0.09	0.05
	Left		0.05	0.02	0.12	0.09	0.07	0.21
	Right	0.17					0.17	0.17
	Top	0.15	0.01	0.01	0.01	0.01	0.17	0.17
	Bottom							
GPRS 850 MHz	Front	0.07	0.24	0.10	0.09	0.08	0.41	0.24
	Back		0.07	0.02	0.03	0.02	0.09	0.05
	Left		0.05	0.02	0.12	0.09	0.07	0.21
	Right	0.11					0.11	0.11
	Top	0.02	0.01	0.01	0.01	0.01	0.04	0.04
	Bottom							
WCDMA II	Front	0.32	0.24	0.10	0.09	0.08	0.66	0.49
	Back		0.07	0.02	0.03	0.02	0.09	0.05
	Left		0.05	0.02	0.12	0.09	0.07	0.21
	Right	0.18					0.18	0.18
	Top	0.02	0.01	0.01	0.01	0.01	0.04	0.04
	Bottom							
WCDMA IV	Front	0.31	0.24	0.10	0.09	0.08	0.65	0.48
	Back		0.07	0.02	0.03	0.02	0.09	0.05
	Left		0.05	0.02	0.12	0.09	0.07	0.21
	Right	0.21					0.21	0.21
	Top	0.07	0.01	0.01	0.01	0.01	0.09	0.09
	Bottom							
WCDMA V	Front	0.12	0.24	0.10	0.09	0.08	0.46	0.29
	Back		0.07	0.02	0.03	0.02	0.09	0.05
	Left		0.05	0.02	0.12	0.09	0.07	0.21
	Right	0.04					0.04	0.04
	Top	0.03	0.01	0.01	0.01	0.01	0.05	0.05
	Bottom							
LTE Band 2	Front	0.26	0.24	0.10	0.09	0.08	0.60	0.43
	Back		0.07	0.02	0.03	0.02	0.09	0.05
	Left		0.05	0.02	0.12	0.09	0.07	0.21
	Right	0.12					0.12	0.12
	Top	0.01	0.01	0.01	0.01	0.01	0.03	0.03
	Bottom							
LTE Band 7	Front	0.40	0.24	0.10	0.09	0.08	0.74	0.57
	Back		0.07	0.02	0.03	0.02	0.09	0.05
	Left		0.05	0.02	0.12	0.09	0.07	0.21
	Right	0.36					0.36	0.36
	Top	0.03	0.01	0.01	0.01	0.01	0.05	0.05
	Bottom							
LTE Band 12	Front	0.12	0.24	0.10	0.09	0.08	0.46	0.29
	Back		0.07	0.02	0.03	0.02	0.09	0.05
	Left		0.05	0.02	0.12	0.09	0.07	0.21
	Right	0.02					0.02	0.02
	Top	0.02	0.01	0.01	0.01	0.01	0.04	0.04
	Bottom							
LTE Band 13	Front	0.11	0.24	0.10	0.09	0.08	0.45	0.28
	Back		0.07	0.02	0.03	0.02	0.09	0.05
	Left		0.05	0.02	0.12	0.09	0.07	0.21
	Right	0.05					0.05	0.05
	Top	0.03	0.01	0.01	0.01	0.01	0.05	0.05
	Bottom							

WWAN Band	Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz Wi-Fi 0 1g SAR (W/kg)	3 2.4GHz Wi-Fi 1 1g SAR (W/kg)	4 5GHz Wi-Fi 0 1g SAR (W/kg)	5 5GHz Wi-Fi 1 1g SAR (W/kg)	1+2+3 Summed 1g SAR (W/kg)	1+4+5 Summed 1g SAR (W/kg)
LTE Band 26	Front	0.09	0.24	0.10	0.09	0.08	0.43	0.26
	Back		0.07	0.02	0.03	0.02	0.09	0.05
	Left		0.05	0.02	0.12	0.09	0.07	0.21
	Right	0.03					0.03	0.03
	Top	0.01	0.01	0.01	0.01	0.01	0.03	0.03
	Bottom							
LTE Band 40	Front	0.15	0.24	0.10	0.09	0.08	0.49	0.32
	Back		0.07	0.02	0.03	0.02	0.09	0.05
	Left		0.05	0.02	0.12	0.09	0.07	0.21
	Right	0.08					0.08	0.08
	Top	0.01	0.01	0.01	0.01	0.01	0.03	0.03
	Bottom							
LTE Band 41	Front	0.16	0.24	0.10	0.09	0.08	0.50	0.33
	Back		0.07	0.02	0.03	0.02	0.09	0.05
	Left		0.05	0.02	0.12	0.09	0.07	0.21
	Right	0.12					0.12	0.12
	Top	0.04	0.01	0.01	0.01	0.01	0.06	0.06
	Bottom							
LTE Band 66	Front	0.20	0.24	0.10	0.09	0.08	0.54	0.37
	Back		0.07	0.02	0.03	0.02	0.09	0.05
	Left		0.05	0.02	0.12	0.09	0.07	0.21
	Right	0.11					0.11	0.11
	Top	0.03	0.01	0.01	0.01	0.01	0.05	0.05
	Bottom							

12. Test Equipment List

Table 11.1 Equipment Specifications

Type	Calibration Due Date	Calibration Done Date	Serial Number
Staubli Robot TX60L	N/A	N/A	F07/55M6A1/A/01
Measurement Controller CS8c	N/A	N/A	1012
ELI4 Flat Phantom	N/A	N/A	1065
Device Holder	N/A	N/A	N/A
Data Acquisition Electronics 4	01/12/2023	01/12/2022	1321
SPEAG E-Field Probe EX3DV4	04/12/2023	04/12/2022	7531
Speag Validation Dipole D750V2	06/04/2023	06/04/2021	1053
Speag Validation Dipole D900V2	06/04/2023	06/04/2021	1d128
Speag Validation Dipole D1750V2	06/03/2023	06/03/2021	1061
Speag Validation Dipole D1900V2	06/04/2023	06/04/2021	5d147
Speag Validation Dipole D2300V2	06/03/2023	06/03/2021	1060
Speag Validation Dipole D2550V2	06/03/2023	06/03/2021	1003
Speag Validation Dipole D2450V2	06/03/2023	06/03/2021	881
Agilent N1911A Power Meter	03/16/2023	03/16/2022	GB45100254
Agilent N1922A Power Sensor	03/17/2023	03/17/2022	MY45240464
Agilent (HP) 8561E Spectrum Analyzer	03/17/2023	03/17/2022	31720068
Agilent (HP) 83752A Synthesized Sweeper	03/17/2023	03/17/2022	3610A01048
Agilent (HP) 8753C Vector Network Analyzer	03/17/2023	03/17/2022	3135A01724
Agilent (HP) 85047A S-Parameter Test Set	03/16/2023	03/16/2022	2904A00595
Anritsu MT8820C	N/A	N/A	6201381721
Aprel Dielectric Probe Assembly	N/A	N/A	0011
Head Equivalent Matter (750 MHz)	N/A	N/A	N/A
Head Equivalent Matter (900 MHz)	N/A	N/A	N/A
Head Equivalent Matter (1750 MHz)	N/A	N/A	N/A
Head Equivalent Matter (1900 MHz)	N/A	N/A	N/A
Head Equivalent Matter (2300 MHz)	N/A	N/A	N/A
Head Equivalent Matter (2450 MHz)	N/A	N/A	N/A
Head Equivalent Matter (2550 MHz)	N/A	N/A	N/A

13. Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC/IC. These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The tested device complies with the requirements in respect to all parameters subject to the test. The test results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body is a very complex phenomena that depends on the mass, shape, and size of the body; the orientation of the body with respect to the field vectors; and, the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because innumerable factors may interact to determine the specific biological outcome of an exposure to electromagnetic fields, any protection guide shall consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

14. References

[1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radio Frequency Radiation, August 1996

[2] ANSI/IEEE C95.1 – 1992, American National Standard Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300kHz to 100GHz, New York: IEEE, 1992.

[3] ANSI/IEEE C95.3 – 1992, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave, New York: IEEE, 1992.

[4] International Electrotechnical Commission, IEC 62209-2 (Edition 1.0), Human Exposure to radio frequency fields from hand-held and body mounted wireless communication devices – Human models, instrumentation, and procedures – Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz), March 2010.

[5] IEEE Standard 1528 – 2013, IEEE Recommended Practice for Determining the Peak-Spatial Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communication Devices: Measurement Techniques, June 2013.

[6] Industry Canada, RSS – 102 Issue 5, Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands), March 2015.

[7] Health Canada, Safety Code 6, Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3kHz to 300 GHz, 2009.

Appendix A – System Validation Plots and Data

****

Test Result for UIM Dielectric Parameter
Fri 26/Aug/2022
Freq Frequency(GHz)
FCC_eH Limits for Head Epsilon
FCC_sH Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eH	FCC_sH	Test_e	Test_s
0.7000	42.20	0.89	41.76	0.86
0.7040	42.18	0.89	41.732	0.864*
0.7075	42.163	0.89	41.708	0.868*
0.7100	42.15	0.89	41.69	0.87
0.7110	42.145	0.89	41.685	0.871*
0.7130	42.135	0.89	41.675	0.873*
0.7200	42.10	0.89	41.64	0.88
0.7255	42.073	0.89	41.602	0.886*
0.7300	42.05	0.89	41.57	0.89
0.7400	41.99	0.89	41.51	0.89
0.7480	41.95	0.89	41.470	0.898*
0.7500	41.94	0.89	41.46	0.90
0.7600	41.89	0.89	41.40	0.91
0.7700	41.84	0.89	41.34	0.92
0.7800	41.79	0.90	41.28	0.92
0.7820	41.778	0.90	41.268	0.922*
0.7900	41.73	0.90	41.22	0.93
0.8000	41.68	0.90	41.18	0.93

* value interpolated

****
Test Result for UIM Dielectric Parameter
Wed 24/Aug/2022
Freq Frequency(GHz)
eH Limits for Head Epsilon
sH Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM
****

Freq	eH	sH	Test_e	Test_s
0.8000	41.68	0.90	41.52	0.89
0.8100	41.63	0.90	41.47	0.90
0.8200	41.58	0.90	41.41	0.91
0.8215	41.573	0.90	41.418	0.91*
0.8225	41.568	0.90	41.423	0.91*
0.8242	41.559	0.900	41.431	0.91*
0.8264	41.548	0.90	41.442	0.91*
0.8300	41.53	0.90	41.46	0.91
0.8315	41.526	0.902	41.456	0.912*
0.8324	41.523	0.902	41.453	0.912*
0.8350	41.515	0.905	41.445	0.915*
0.8365	41.511	0.907	41.441	0.917*
0.8366	41.51	0.907	41.44	0.917*
0.8375	41.508	0.908	41.438	0.918*
0.8376	41.507	0.908	41.437	0.918*
0.8400	41.50	0.91	41.43	0.92
0.8415	41.50	0.912	41.427	0.922*
0.8420	41.50	0.912	41.426	0.922*
0.8426	41.50	0.913	41.425	0.923*
0.8466	41.50	0.917	41.417	0.927*
0.8470	41.50	0.917	41.416	0.927*
0.8488	41.500	0.919	41.412	0.929*
0.8500	41.50	0.92	41.41	0.93
0.8520	41.50	0.922	41.406	0.932*
0.8600	41.50	0.93	41.39	0.94
0.8700	41.50	0.94	41.37	0.95
0.8800	41.50	0.95	41.36	0.96
0.8822	41.50	0.952	41.358	0.962*
0.8824	41.50	0.952	41.358	0.962*
0.8900	41.50	0.96	41.35	0.97
0.8975	41.50	0.968	41.343	0.978*
0.8976	41.50	0.968	41.342	0.978*
0.9000	41.50	0.97	41.34	0.98
0.9050	41.50	0.975	41.335	0.985*
0.9100	41.50	0.98	41.33	0.99
0.9126	41.497	0.98	41.327	0.99*
0.9148	41.495	0.98	41.325	0.99*
0.9200	41.49	0.98	41.32	0.99

* value interpolated

****
Test Result for UIM Dielectric Parameter
Mon 29/Aug/2022
Freq Frequency(GHz)
eH Limits for Head Epsilon
sH Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM
****

Freq	eH	sH	Test_e	Test_s
1.7000	40.16	1.34	39.34	1.36
1.7100	40.14	1.35	39.32	1.37
1.7102	40.14	1.35	39.32	1.37*
1.7124	40.138	1.35	39.315	1.372*
1.7200	40.13	1.35	39.30	1.38
1.7300	40.11	1.36	39.28	1.38
1.7326	40.105	1.363	39.275	1.383*
1.7400	40.09	1.37	39.26	1.39
1.7450	40.085	1.37	39.25	1.395*
1.7475	40.083	1.37	39.245	1.398*
1.7476	40.082	1.37	39.245	1.398*
1.7480	40.082	1.37	39.244	1.398*
1.7500	40.08	1.37	39.24	1.40
1.7526	40.075	1.373	39.235	1.403*
1.7600	40.06	1.38	39.22	1.41
1.7700	40.05	1.38	39.20	1.42
1.7800	40.03	1.39	39.18	1.42
1.7826	40.027	1.39	39.175	1.423*
1.7848	40.025	1.39	39.17	1.425*
1.7900	40.02	1.39	39.16	1.43

* value interpolated

****
Test Result for UIM Dielectric Parameter
Tue 23/Aug/2022
Freq Frequency(GHz)
eH Limits for Head Epsilon
sH Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM
****

Freq	eH	sH	Test_e	Test_s
1.8500	40.00	1.40	39.97	1.37
1.8502	40.00	1.40	39.97	1.37*
1.8524	40.00	1.40	39.65	1.372*
1.8600	40.00	1.40	39.95	1.38
1.8700	40.00	1.40	39.93	1.38
1.8800	40.00	1.40	39.91	1.39
1.8825	40.00	1.40	39.905	1.39*
1.8900	40.00	1.40	39.89	1.39
1.9000	40.00	1.40	39.87	1.39
1.9050	40.00	1.40	39.86	1.395*
1.9076	40.00	1.40	39.855	1.398*
1.9098	40.00	1.40	39.85	1.40*
1.9100	40.00	1.40	39.85	1.40
1.9200	40.00	1.40	39.84	1.41
1.9224	40.00	1.40	39.84	1.412*
1.9300	40.00	1.40	39.84	1.42
1.9400	40.00	1.40	39.83	1.42
1.9500	40.00	1.40	39.83	1.43
1.9600	40.00	1.40	39.82	1.43
1.9700	40.00	1.40	39.82	1.44
1.9776	40.00	1.40	39.815	1.44*
1.9800	40.00	1.40	39.81	1.44
1.9900	40.00	1.40	39.80	1.45

* value interpolated

****
Test Result for UIM Dielectric Parameter
Fri 26/Aug/2022
Freq Frequency(GHz)
FCC_eH Limits for Head Epsilon
FCC_sH Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM
****

Freq	FCC_eH	FCC_sH	Test_e	Test_s
2.2900	39.48	1.66	38.2	1.68
2.3000	39.47	1.67	38.18	1.69
2.3100	39.45	1.68	38.16	1.70
2.3200	39.43	1.68	38.14	1.71
2.3300	39.41	1.69	38.12	1.72
2.3400	39.40	1.70	38.10	1.73
2.3500	39.38	1.71	38.08	1.74
2.3600	39.36	1.72	38.06	1.75
2.3700	39.34	1.73	38.05	1.76
2.3800	39.32	1.74	38.03	1.77
2.3900	39.31	1.75	38.01	1.78
2.4000	39.29	1.76	37.99	1.79
2.4100	39.27	1.76	37.98	1.80

* value interpolated

****
Test Result for UIM Dielectric Parameter
Tue 30/Aug/2022
Freq Frequency(GHz)
FCC_eH Limits for Head Epsilon
FCC_sH Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM
****

Freq	FCC_eH	FCC_sH	Test_e	Test_s
2.4900	39.15	1.84	39.09	1.86
2.5000	39.14	1.85	39.07	1.87
2.5060	39.128	1.862	39.052	1.876*
2.5100	39.12	1.87	39.04	1.88
2.5200	39.11	1.88	39.02	1.90
2.5300	39.10	1.89	39.00	1.91
2.5350	39.095	1.895	38.985	1.915*
2.5400	39.09	1.90	38.97	1.92
2.5445	39.081	1.905	38.961	1.929*
2.5500	39.07	1.91	38.95	1.94
2.5600	39.06	1.92	38.93	1.95
2.5700	39.05	1.93	38.90	1.96
2.5800	39.03	1.94	38.88	1.98
2.5900	39.02	1.95	38.85	1.99
2.5930	39.017	1.953	38.853	1.99*
2.6000	39.01	1.96	38.86	1.99
2.6100	39.00	1.97	38.84	2.00
2.6200	38.98	1.99	38.83	2.01
2.6300	38.97	2.00	38.81	2.02
2.6400	38.96	2.01	38.79	2.03
2.6415	38.959	2.012	38.787	2.032*
2.6500	38.95	2.02	38.77	2.04
2.6600	38.93	2.03	38.76	2.05
2.6700	38.92	2.04	38.74	2.06
2.6800	38.91	2.05	38.72	2.07
2.6900	38.89	2.06	38.70	2.08
2.7000	38.88	2.07	38.69	2.09

* value interpolated

****
Test Result for UIM Dielectric Parameter
Wed 31/Aug/2022
Freq Frequency(GHz)
FCC_eH Limits for Head Epsilon
FCC_sH Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM
****

Freq	FCC_eH	FCC_sH	Test_e	Test_s
2.4100	39.26	1.76	38.44	1.76
2.4120	39.258	1.762	38.436	1.762*
2.4200	39.25	1.77	38.42	1.77
2.4300	39.24	1.78	38.40	1.78
2.4370	39.226	1.787	38.393	1.794*
2.4400	39.22	1.79	38.39	1.80
2.4500	39.20	1.80	38.34	1.81
2.4600	39.19	1.81	38.34	1.82
2.4620	39.186	1.812	38.336	1.822*
2.4700	39.17	1.82	38.32	1.83
2.4800	39.16	1.83	38.30	1.86

* value interpolated

RF Exposure Lab

Plot 1

DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN 1053

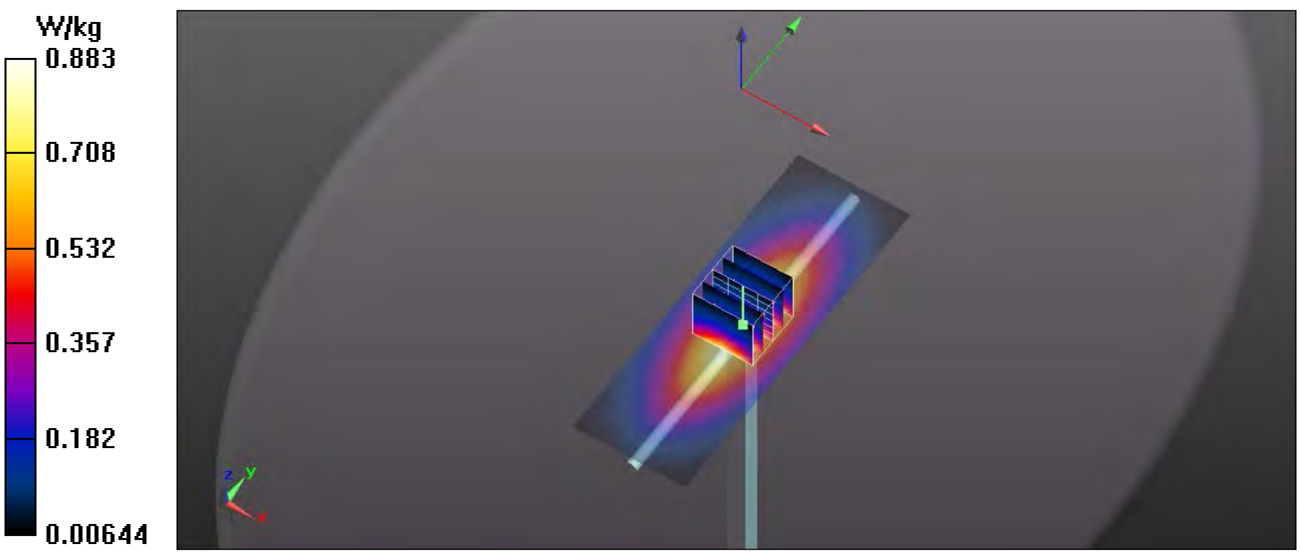
Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: HSL750; Medium parameters used (interpolated): f = 750 MHz; σ = 0.9 S/m; ε_r = 41.46; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/26/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 – SN7531; ConvF(10.75, 10.75, 10.75); Calibrated: 4/12/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

750 MHz Head/Verification/Area Scan (41x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.883 W/kg

750 MHz Head/Verification /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.949 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.691 mW/g
P_{in}= 100 mW
SAR(1 g) = 0.858 mW/g; SAR(10 g) = 0.552 mW/g
Maximum value of SAR (measured) = 0.888 W/kg



RF Exposure Lab

Plot 2

DUT: Dipole 900 MHz D900V2; Type: D900V2; Serial: D900V2 - SN:1d128

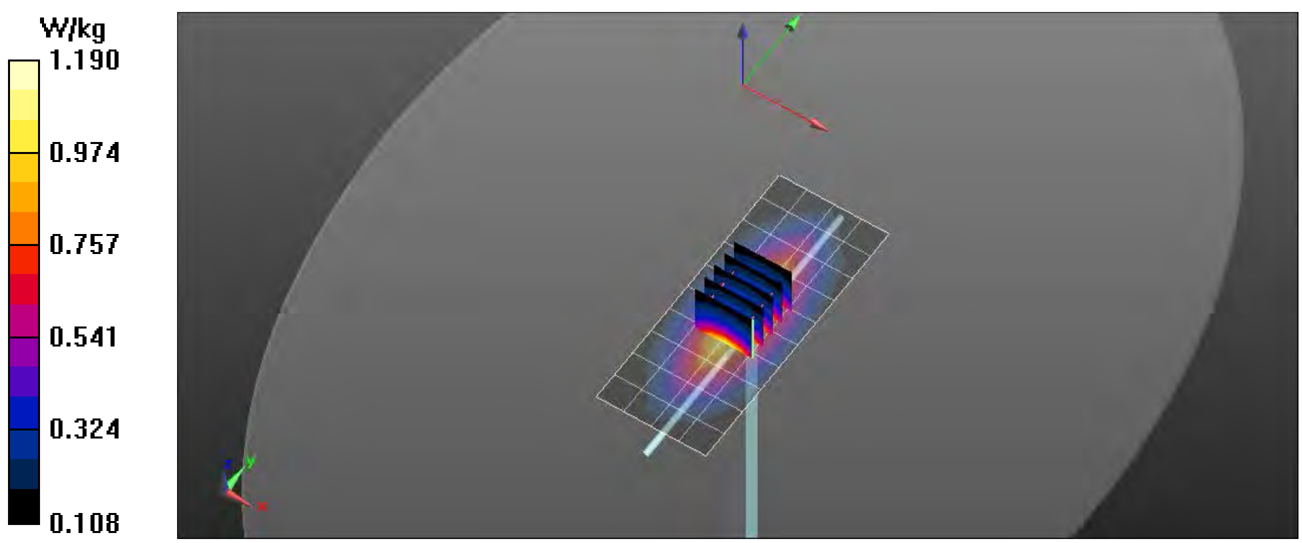
Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Medium: HSL900; Medium parameters used: f = 900 MHz; σ = 0.98 S/m; ε_r = 41.34; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/24/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 - SN7531; ConvF(10.33, 10.33, 10.33); Calibrated: 4/12/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

900 MHz Head/Verification/Area Scan (5x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.19 W/kg

900 MHz Head/Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.568 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.43 W/kg
P_{in}= 100 mW
SAR(1 g) = 1.15 W/kg; SAR(10 g) = 0.712 W/kg
Maximum value of SAR (measured) = 1.2 W/kg



RF Exposure Lab

Plot 3

DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: D1750V2 - SN:1061

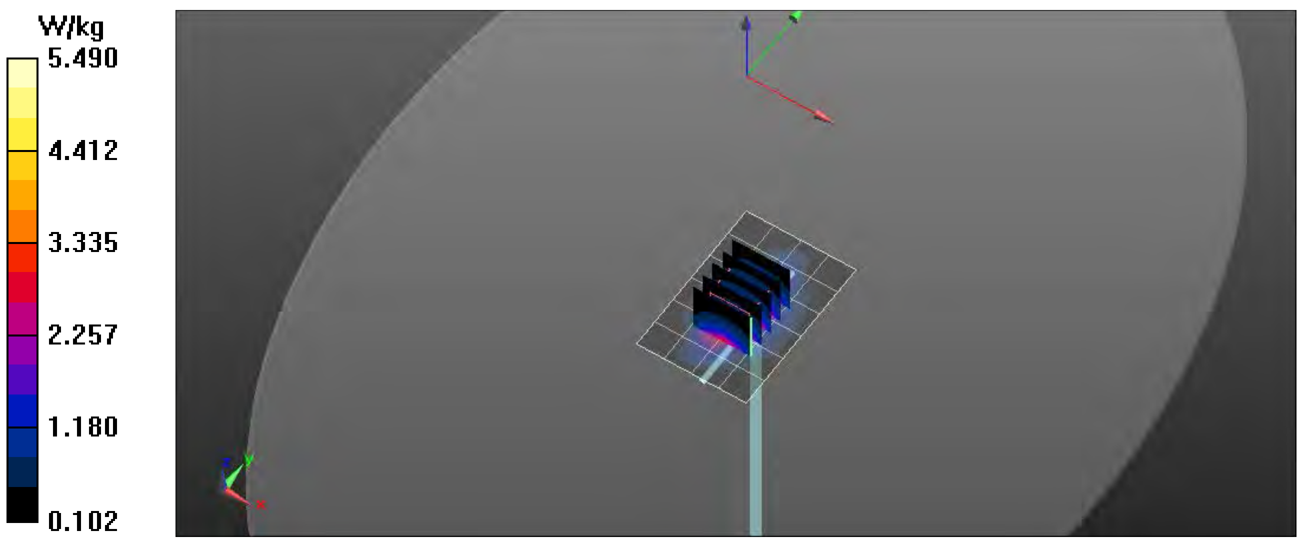
Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: HSL1750; Medium parameters used: f = 1750 MHz; σ = 1.4 S/m; ε_r = 39.24; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/29/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 - SN7531; ConvF(8.62, 8.62, 8.62); Calibrated: 4/12/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

1750 MHz Head/Verification/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 5.38 W/kg

1750 MHz Head/Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.639 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 6.87 W/kg
P_{in}= 100 mW
SAR(1 g) = 3.78 W/kg; SAR(10 g) = 1.97 W/kg
Maximum value of SAR (measured) = 5.47 W/kg



RF Exposure Lab

Plot 4

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN: 5d147

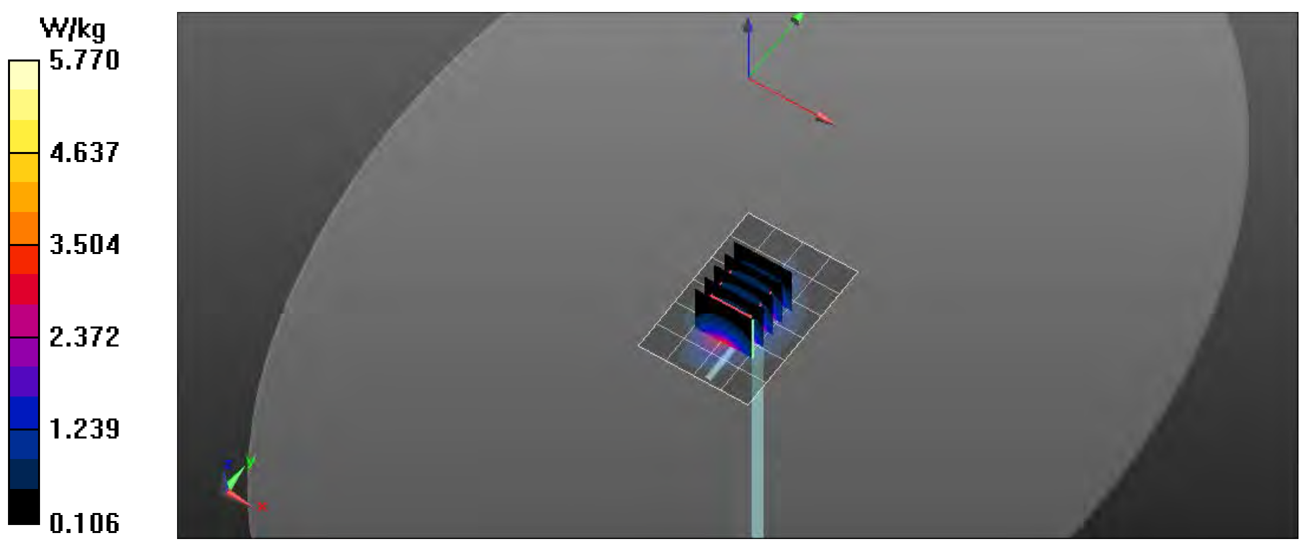
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900; Medium parameters used: f = 1900 MHz; σ = 1.39 S/m; ε_r = 39.87; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/23/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 - SN7531; ConvF(8.26, 8.26, 8.26); Calibrated: 4/12/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

1900 MHz Head/Verification/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 5.52 W/kg

1900 MHz Head/Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.186 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 7.25 W/kg
P_{in}= 100 mW
SAR(1 g) = 4.15 W/kg; SAR(10 g) = 2.16 W/kg
Maximum value of SAR (measured) = 5.79 W/kg



RF Exposure Lab

Plot 5

DUT: Dipole 2300 MHz D2300V2; Type: D2300V2; Serial: D2300V2 - SN: 1060

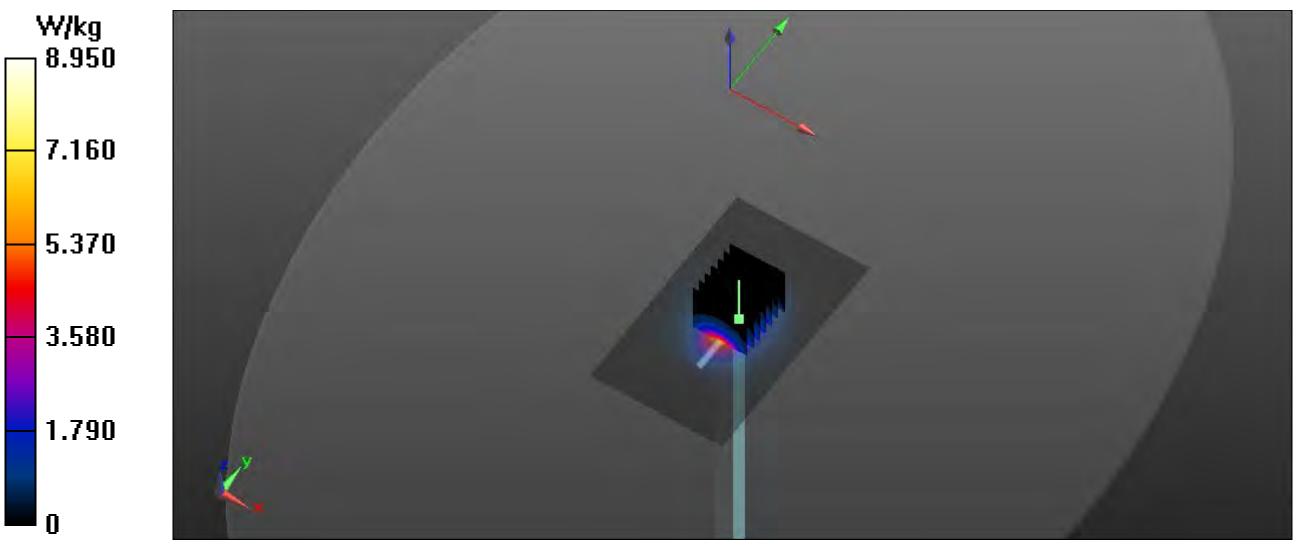
Communication System: CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: HSL2300; Medium parameters used: f = 2300 MHz; σ = 1.69 S/m; ε_r = 38.18; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/26/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 – SN7531; ConvF(7.98, 7.98, 7.98); Calibrated: 4/12/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

2300 MHz Head/Verification/Area Scan (61x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 7.83 W/kg

2300 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.297 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 11.06 W/kg
P_{in}= 100 mW
SAR(1 g) = 4.98 W/kg; SAR(10 g) = 2.42 W/kg
Maximum value of SAR (measured) = 8.93 W/kg



RF Exposure Lab

Plot 6

DUT: Dipole 2550 MHz D2550V2; Type: D2550V2; Serial: D2550V2 - SN:1003

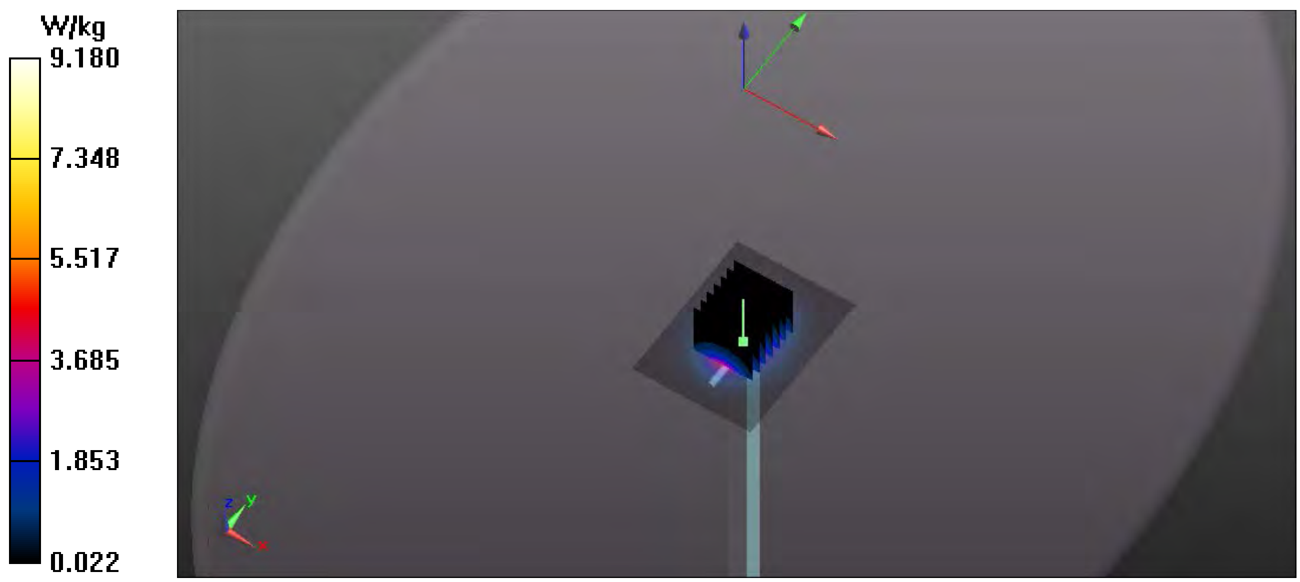
Communication System: CW; Frequency: 2550 MHz; Duty Cycle: 1:1
Medium: HSL2550; Medium parameters used: f = 2550 MHz; σ = 1.94 S/m; ε_r = 38.95; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/30/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 - SN7531; ConvF(7.42, 7.42, 7.42); Calibrated: 4/12/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

2550 MHz Head/Verification/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 9.18 W/kg

2550 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.541 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 11.5 W/kg
P_{in}= 100 mW
SAR(1 g) = 5.64 W/kg; SAR(10 g) = 2.48 W/kg
Maximum value of SAR (measured) = 8.98 W/kg



RF Exposure Lab

Plot 7

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN: 881

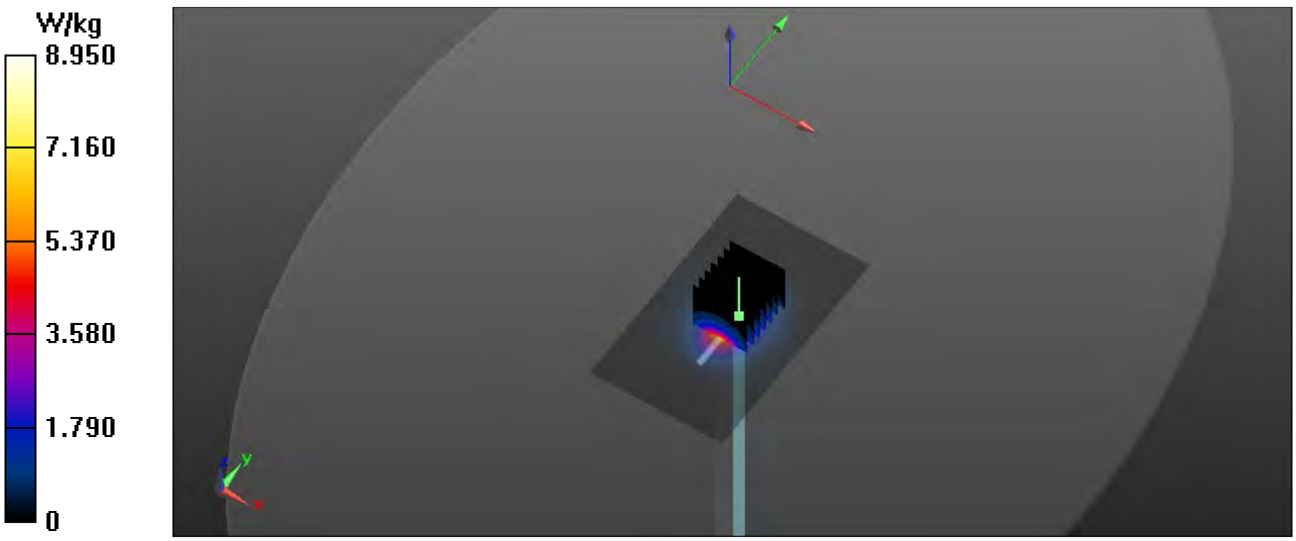
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL2450; Medium parameters used: f = 2450 MHz; σ = 1.81 S/m; ε_r = 38.34; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/31/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 – SN7531; ConvF(7.68, 7.68, 7.68); Calibrated: 4/12/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

2450 MHz Head/Verification/Area Scan (61x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 8.22 W/kg

2450 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.025 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 11.05 W/kg
P_{in}= 100 mW
SAR(1 g) = 5.46 W/kg; SAR(10 g) = 2.52 W/kg
Maximum value of SAR (measured) = 8.96 W/kg



Appendix B – SAR Test Data Plots

RF Exposure Lab

Plot 1

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: GPRS 2-Slot (GMSK); Frequency: 1880 MHz; Duty Cycle: 1:4.00037
Medium: HSL1900; Medium parameters used: f = 1880 MHz; σ = 1.39 S/m; ε_r = 39.91; ρ = 1000 kg/m^3
Phantom section: Flat Section

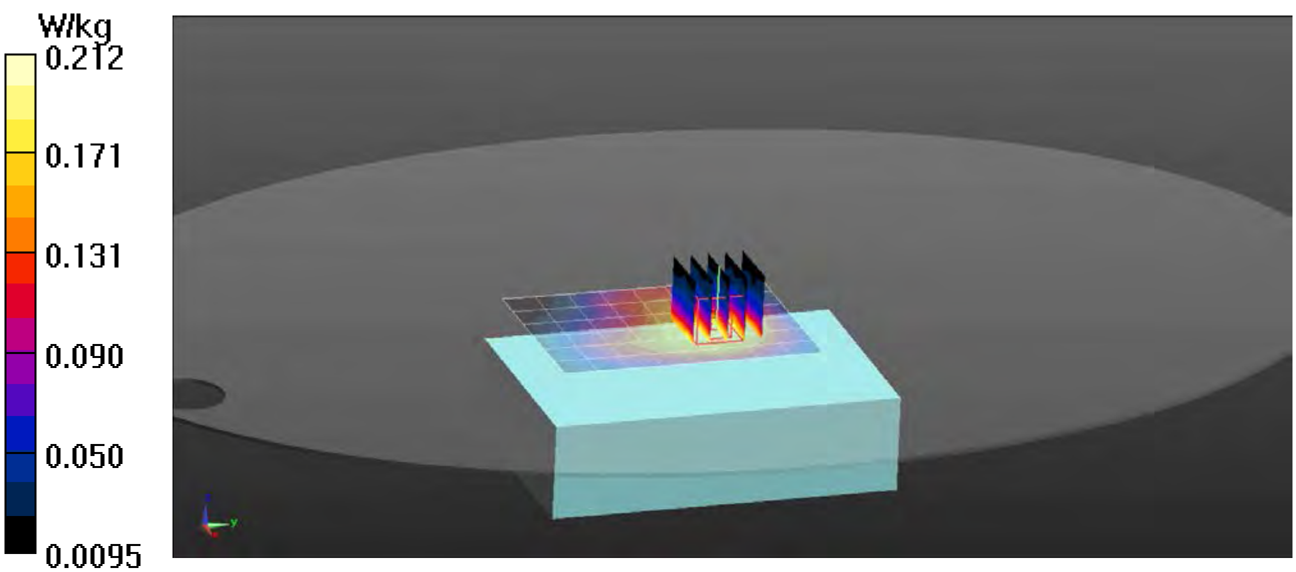
Test Date: Date: 8/23/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(8.26, 8.26, 8.26); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

B2 GPRS/Front Mid/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.209 W/kg

B2 GPRS/Front Mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.770 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.257 W/kg
SAR(1 g) = 0.167 W/kg; SAR(10 g) = 0.107 W/kg
Maximum value of SAR (measured) = 0.212 W/kg



RF Exposure Lab

Plot 2

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: GPRS 2-Slot (GMSK); Frequency: 836.6 MHz; Duty Cycle: 1:4.00037
Medium: HSL835; Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.917 S/m; ε_r = 41.44; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/25/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(10.33, 10.33, 10.33); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

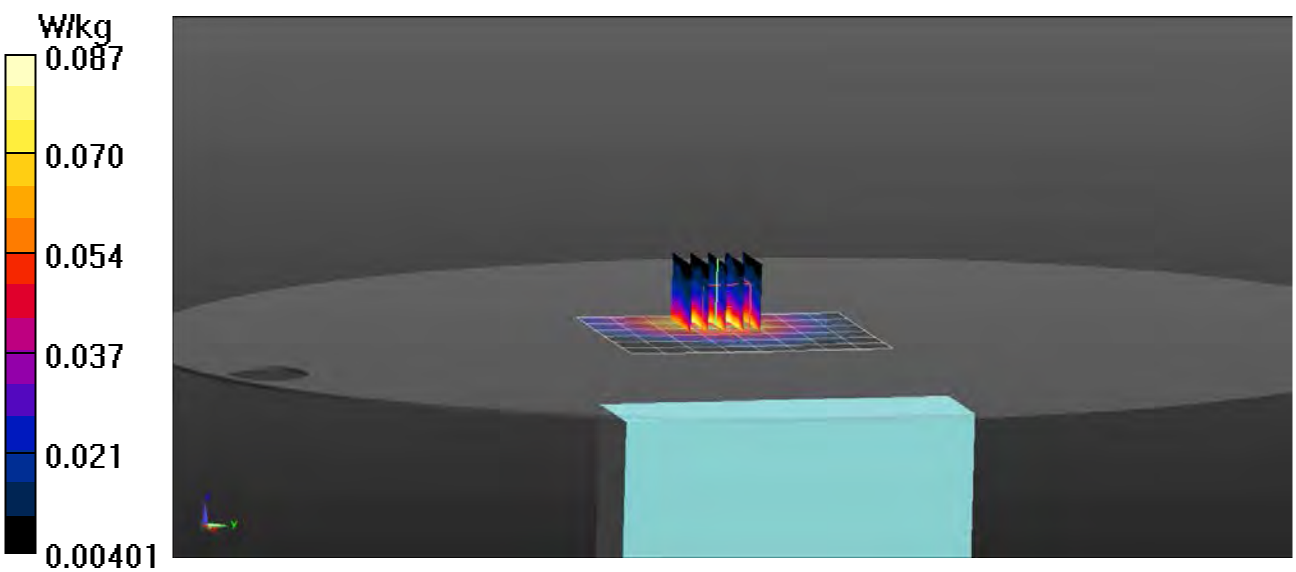
Procedure Notes:

B5 GPRS/Right Mid/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0868 W/kg

B5 GPRS/Right Mid/Zoom Scan (6x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.3570 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.106 W/kg
SAR(1 g) = 0.069 W/kg; SAR(10 g) = 0.044 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0866 W/kg



RF Exposure Lab

Plot 3

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: UMTS (WCDMA); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: HSL1900; Medium parameters used: f = 1880 MHz; σ = 1.39 S/m; ε_r = 39.91; ρ = 1000 kg/m^3
Phantom section: Flat Section

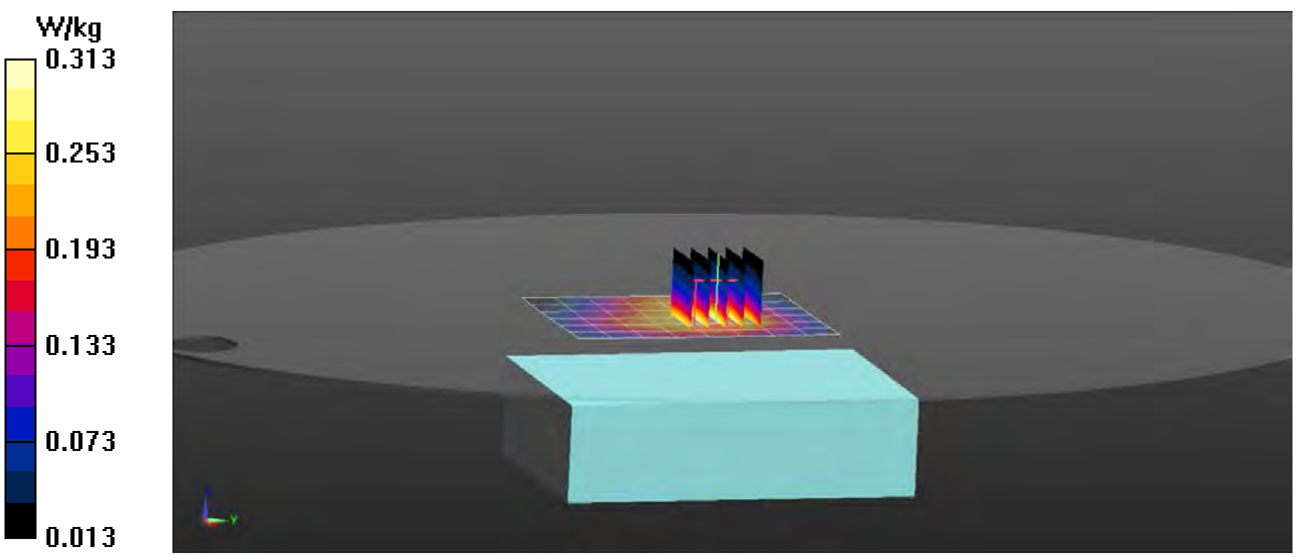
Test Date: Date: 8/23/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(8.26, 8.26, 8.26); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

B2 WCDMA/Front Mid/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.318 W/kg

B2 WCDMA/Front Mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.83 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.378 W/kg
SAR(1 g) = 0.245 W/kg; SAR(10 g) = 0.160 W/kg
Maximum value of SAR (measured) = 0.313 W/kg



RF Exposure Lab

Plot 4

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: UMTS (WCDMA); Frequency: 1732.6 MHz; Duty Cycle: 1:1
Medium: HSL1750; Medium parameters used (interpolated): f = 1732.6 MHz; σ = 1.383 S/m; ε_r = 39.275; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/29/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(8.62, 8.62, 8.62); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

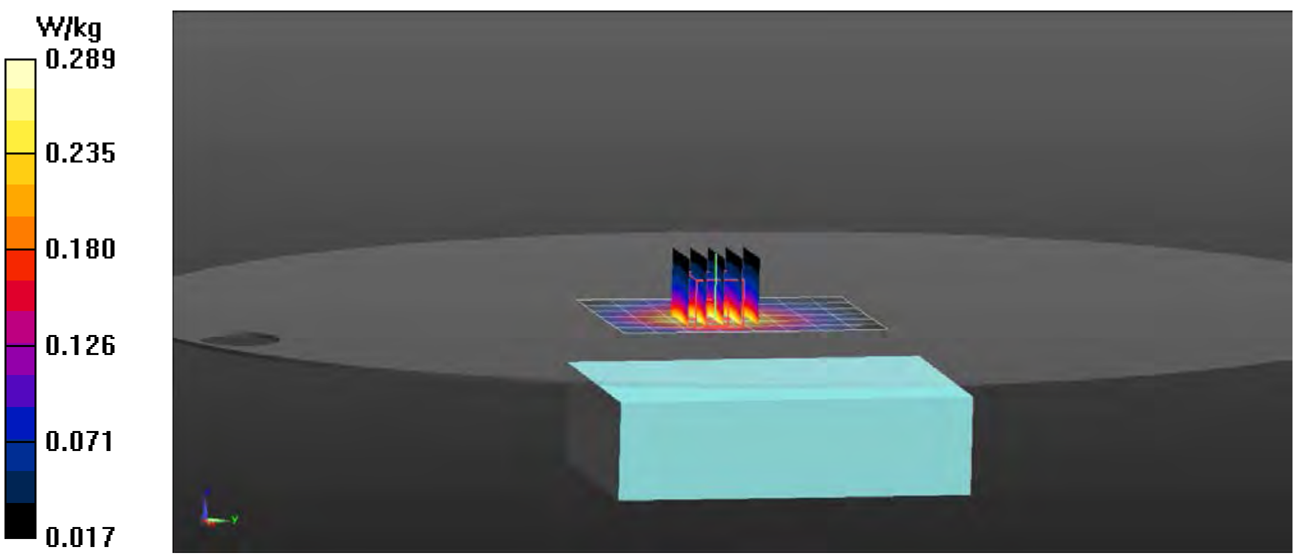
Procedure Notes:

B4 WCDMA/Front Mid/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.274 W/kg

B4 WCDMA/Front Mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.005 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.342 W/kg
SAR(1 g) = 0.229 W/kg; SAR(10 g) = 0.152 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.289 W/kg



RF Exposure Lab

Plot 5

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: UMTS (WCDMA); Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: HSL835; Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.917 S/m; ε_r = 41.44; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/24/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(10.33, 10.33, 10.33); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

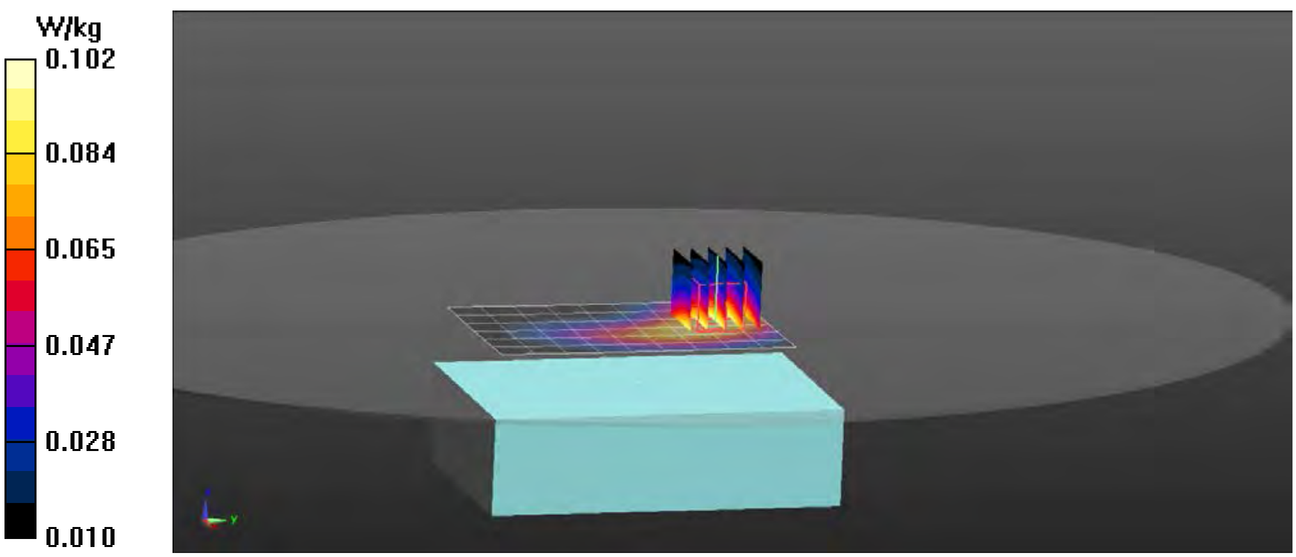
Procedure Notes:

B5 WCDMA/Front Mid/Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0983 W/kg

B5 WCDMA/Front Mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.294 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.116 W/kg
SAR(1 g) = 0.084 W/kg; SAR(10 g) = 0.060 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.102 W/kg



RF Exposure Lab

Plot 6

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: LTE (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: HSL1900; Medium parameters used: f = 1880 MHz; σ = 1.39 S/m; ε_r = 39.91; ρ = 1000 kg/m^3
Phantom section: Flat Section

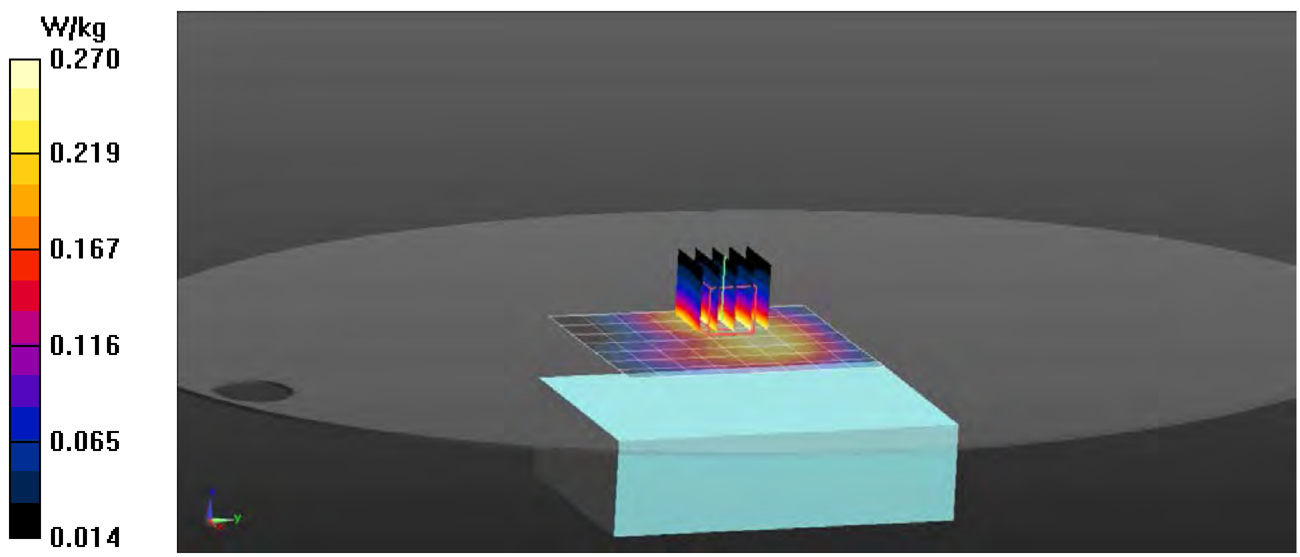
Test Date: Date: 8/24/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(8.26, 8.26, 8.26); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

B2 LTE/Front 1 RB 49 Offset Mid/Area Scan (8x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.266 W/kg

B2 LTE/Front 1 RB 49 Offset Mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.59 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.320 W/kg
SAR(1 g) = 0.214 W/kg; SAR(10 g) = 0.142 W/kg
Maximum value of SAR (measured) = 0.270 W/kg



RF Exposure Lab

Plot 7

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: LTE (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 2535 MHz; Duty Cycle: 1:1
Medium: HSL2550; Medium parameters used (interpolated): f = 2535 MHz; σ = 1.915 S/m; ε_r = 38.985; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/30/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(7.42, 7.42, 7.42); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

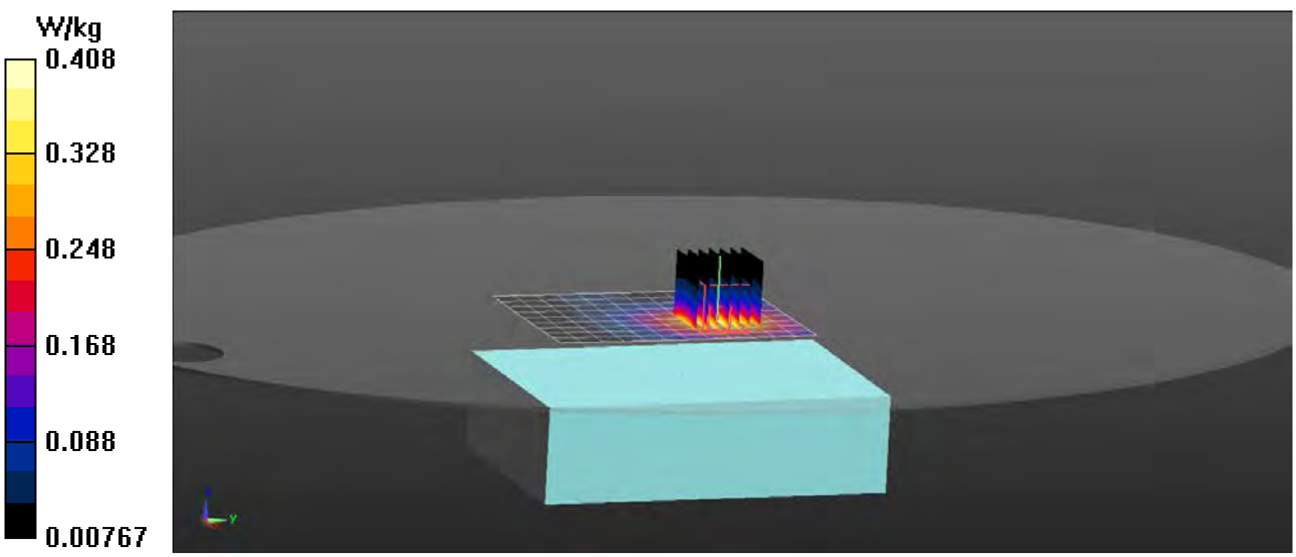
Procedure Notes:

B7 LTE/Front 1 RB 49 Offset Mid/Area Scan (10x13x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.394 W/kg

B7 LTE/Front 1 RB 49 Offset Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.610 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.522 W/kg
SAR(1 g) = 0.293 W/kg; SAR(10 g) = 0.171 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.408 W/kg



RF Exposure Lab

Plot 8

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: LTE (SC-FDMA, 1 RB, 10 MHz, QPSK); Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: HSL750; Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.868 S/m; ε_r = 41.708; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/26/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(10.75, 10.75, 10.75); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

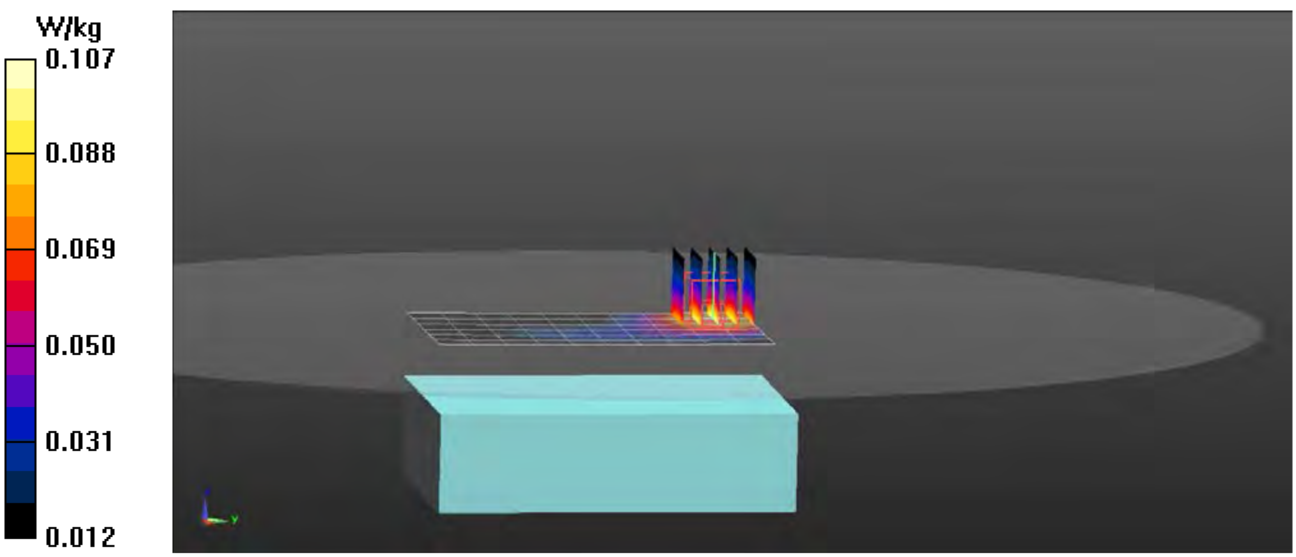
Procedure Notes:

B12 LTE/Front 1 RB 24 Offset Mid/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.105 W/kg

B12 LTE/Front 1 RB 24 Offset Mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.869 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.120 W/kg
SAR(1 g) = 0.089 W/kg; SAR(10 g) = 0.063 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.107 W/kg



RF Exposure Lab

Plot 9

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: LTE (SC-FDMA, 1 RB, 10 MHz, QPSK); Frequency: 782 MHz; Duty Cycle: 1:1
Medium: HSL750; Medium parameters used (interpolated): f = 782 MHz; σ = 0.922 S/m; ε_r = 41.268; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/26/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(10.75, 10.75, 10.75); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

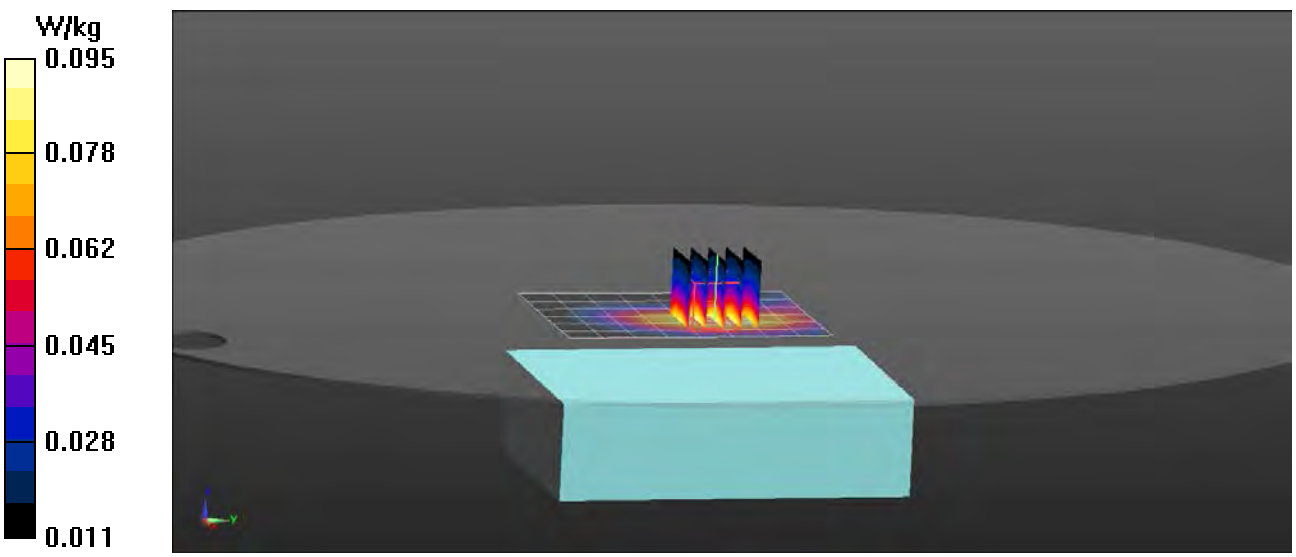
Procedure Notes:

B13 LTE/Front 1 RB 24 Offset Mid/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0955 W/kg

B13 LTE/Front 1 RB 24 Offset Mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.461 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.108 W/kg
SAR(1 g) = 0.080 W/kg; SAR(10 g) = 0.057 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0951 W/kg



RF Exposure Lab

Plot 10

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: LTE (SC-FDMA, 1 RB, 15 MHz, QPSK); Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: HSL835; Medium parameters used (interpolated): f = 831.5 MHz; σ = 0.912 S/m; ε_r = 41.456; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/24/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(10.33, 10.33, 10.33); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

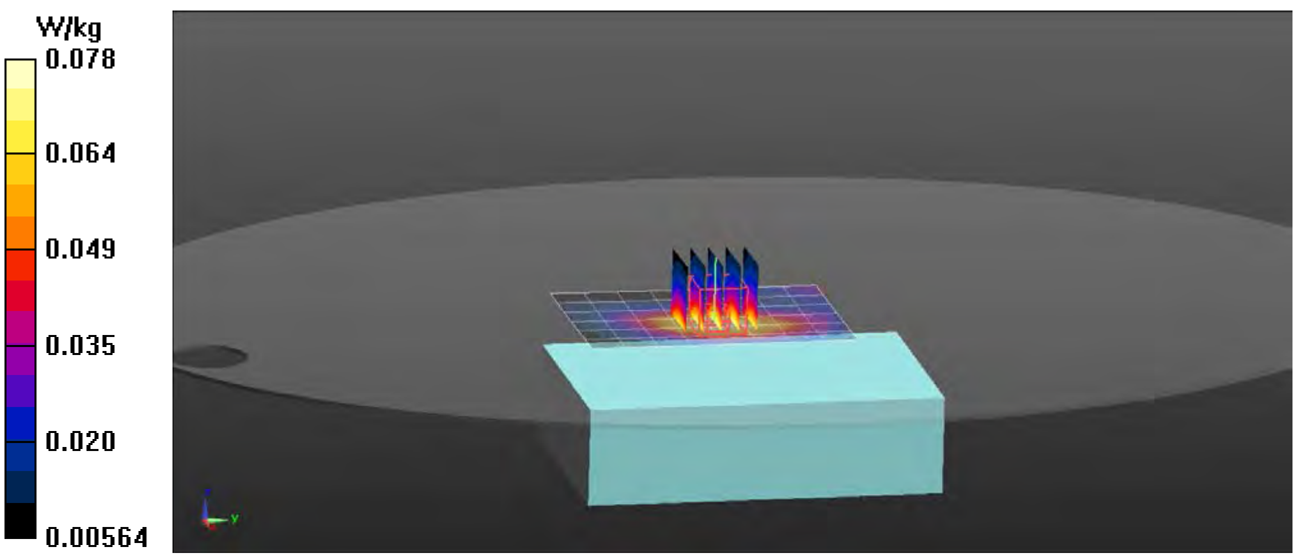
Procedure Notes:

B26 LTE/Front 1 RB 37 Offset Mid/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0769 W/kg

B26 LTE/Front 1 RB 37 Offset Mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.433 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.0890 W/kg
SAR(1 g) = 0.066 W/kg; SAR(10 g) = 0.047 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0784 W/kg



RF Exposure Lab

Plot 11

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: LTE (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 2350 MHz; Duty Cycle: 1:1
Medium: HSL2300; Medium parameters used: f = 2350 MHz; σ = 1.74 S/m; ε_r = 38.08; ρ = 1000 kg/m^3
Phantom section: Flat Section

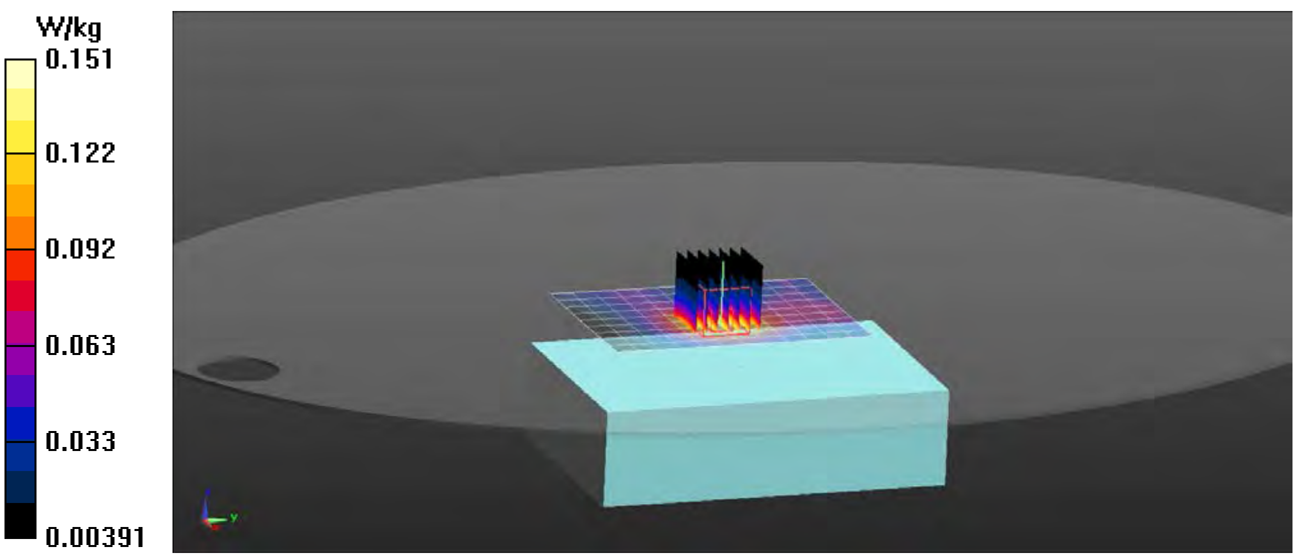
Test Date: Date: 8/26/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(7.98, 7.98, 7.98); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

B40 LTE/Front 1 RB 49 Offset Mid/Area Scan (10x13x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.149 W/kg

B40 LTE/Front 1 RB 49 Offset Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.378 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.192 W/kg
SAR(1 g) = 0.111 W/kg; SAR(10 g) = 0.066 W/kg
Maximum value of SAR (measured) = 0.151 W/kg



RF Exposure Lab

Plot 12

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: LTE (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 2593 MHz; Duty Cycle: 1:1
Medium: HSL2550; Medium parameters used (interpolated): f = 2593 MHz; σ = 1.99 S/m; ε_r = 38.853; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/30/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(7.42, 7.42, 7.42); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

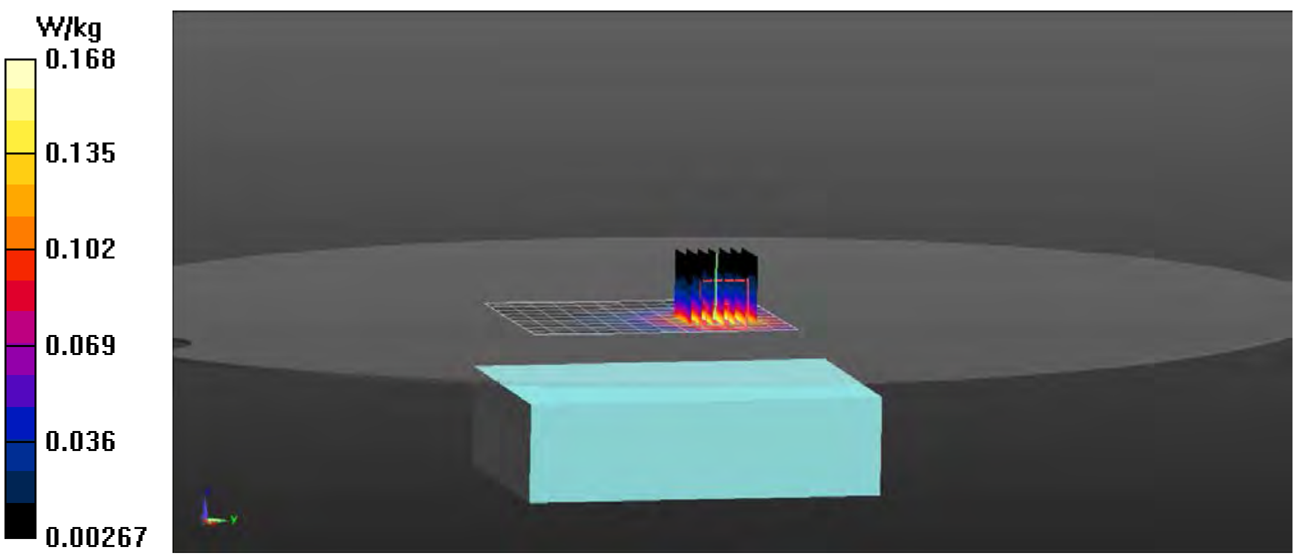
Procedure Notes:

B41 LTE/Front 1 RB 49 Offset Mid/Area Scan (10x13x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.170 W/kg

B41 LTE/Front 1 RB 49 Offset Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.145 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.216 W/kg
SAR(1 g) = 0.122 W/kg; SAR(10 g) = 0.071 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.168 W/kg



RF Exposure Lab

Plot 13

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: LTE (SC-FDMA, 1 RB, 20 MHz, QPSK); Frequency: 1745 MHz; Duty Cycle: 1:1
Medium: HSL1750; Medium parameters used (interpolated): f = 1745 MHz; σ = 1.395 S/m; ε_r = 39.25; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/29/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(8.62, 8.62, 8.62); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

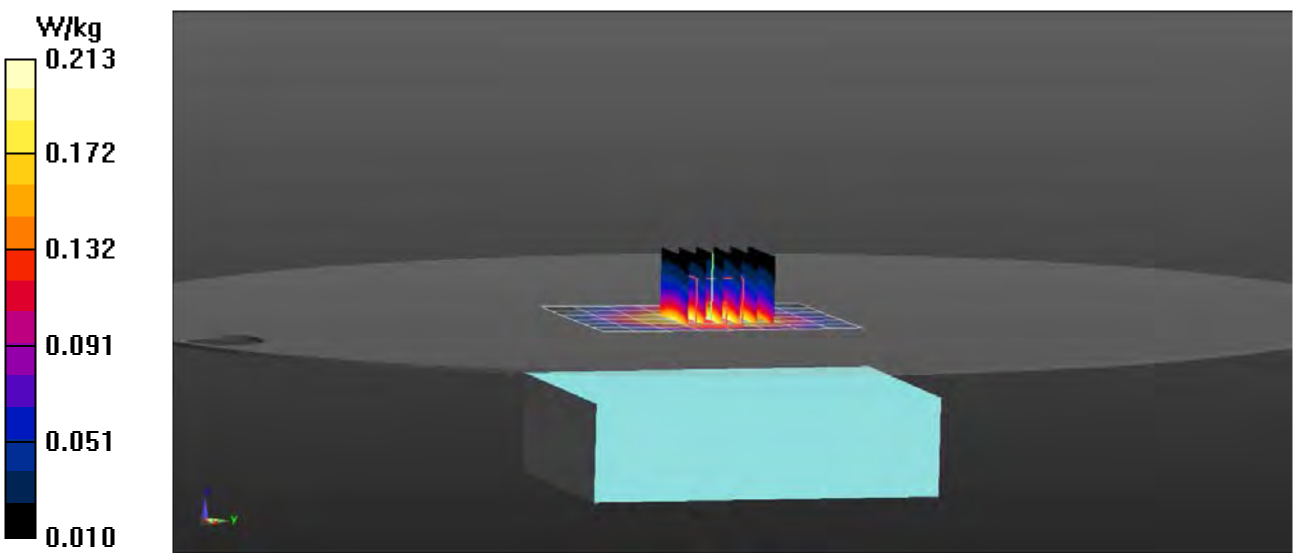
Procedure Notes:

B66 LTE/Front 1 RB 49 Offset Mid/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.224 W/kg

B66 LTE/Front 1 RB 49 Offset Mid/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.859 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.253 W/kg
SAR(1 g) = 0.171 W/kg; SAR(10 g) = 0.114 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.213 W/kg



RF Exposure Lab

Plot 14

DUT: HPRO Advanced; Type: Cellular Vehicle Device; Serial: FC2222600079

Communication System: WiFi 802.11b (DSSS, 1 Mbps); Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: HSL2450; Medium parameters used (interpolated): f = 2437 MHz; σ = 1.794 S/m; ε_r = 38.393; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 8/31/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7531; ConvF(7.68, 7.68, 7.68); Calibrated: 4/12/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1321; Calibrated: 3/16/2022
Phantom: ELI v4.0; Type: QDOVA001BB; Serial: 1065
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

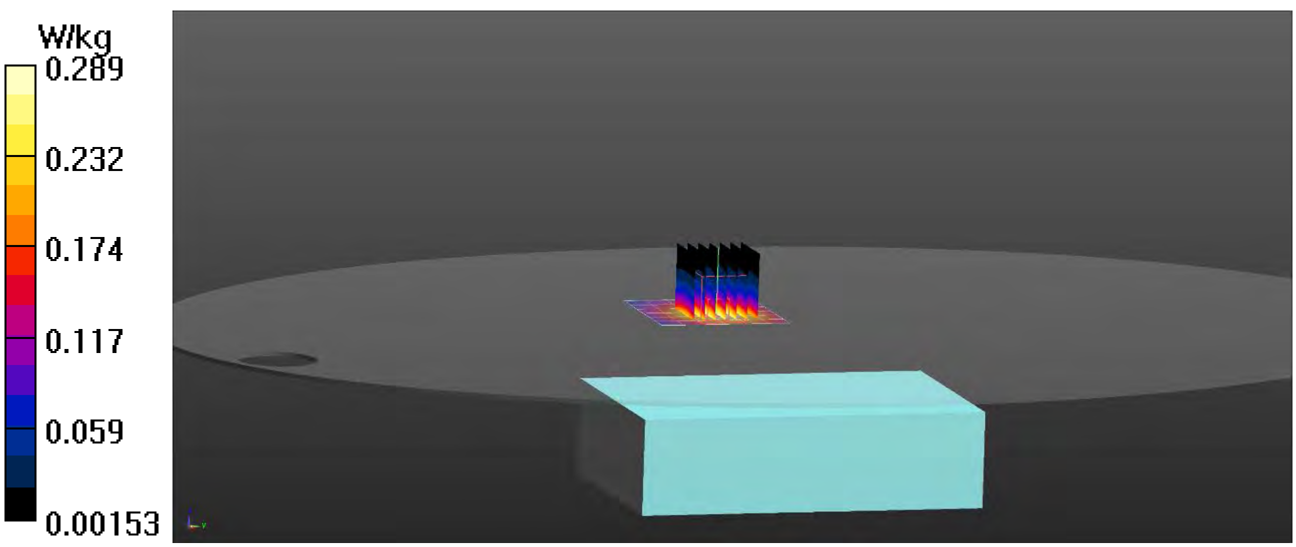
Procedure Notes:

2450 MHz/Front Tx1 Mid/Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.212 W/kg

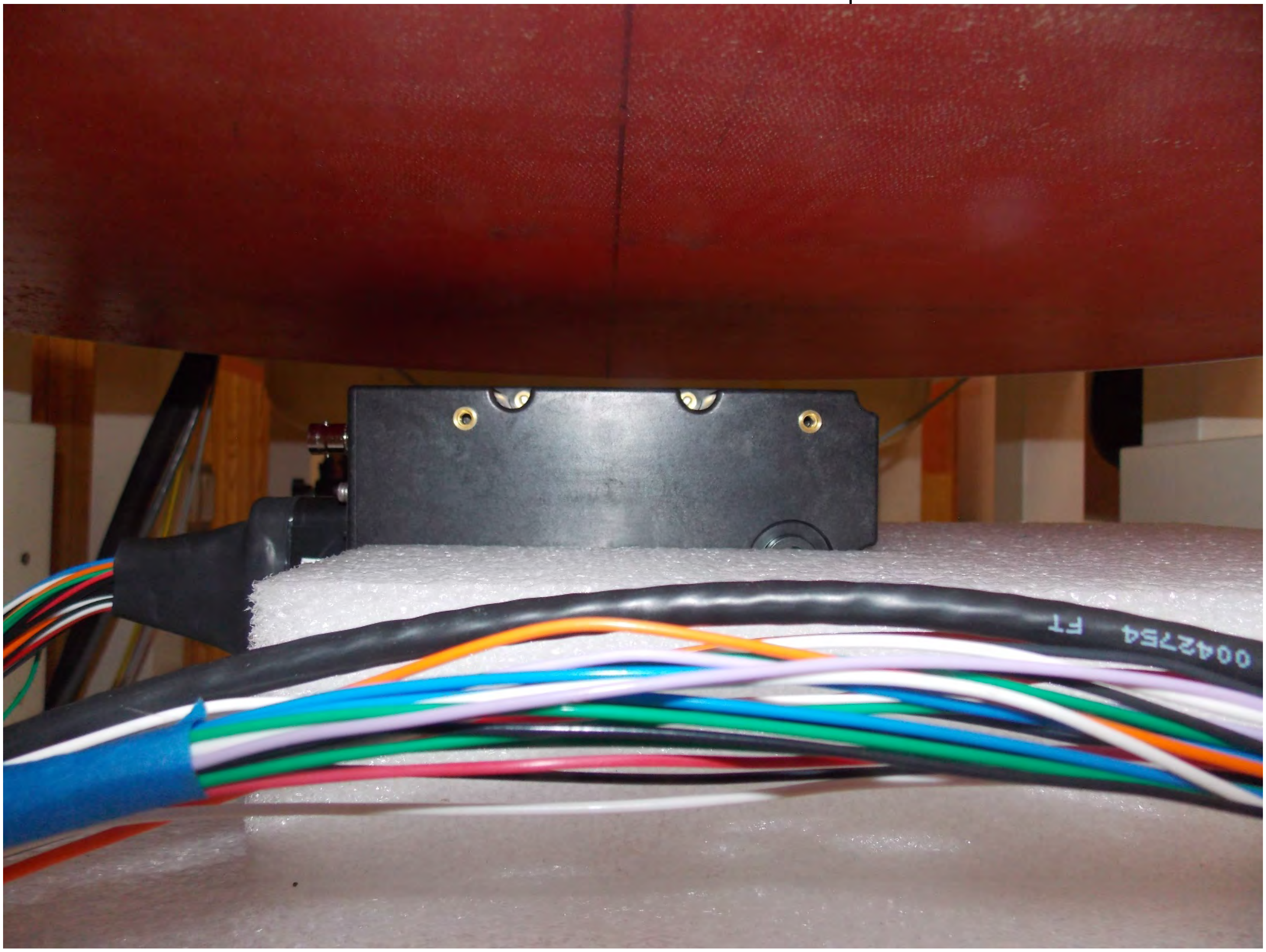
2450 MHz/Front Tx1 Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.452 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.442 W/kg
SAR(1 g) = 0.175 W/kg; SAR(10 g) = 0.101 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.289 W/kg



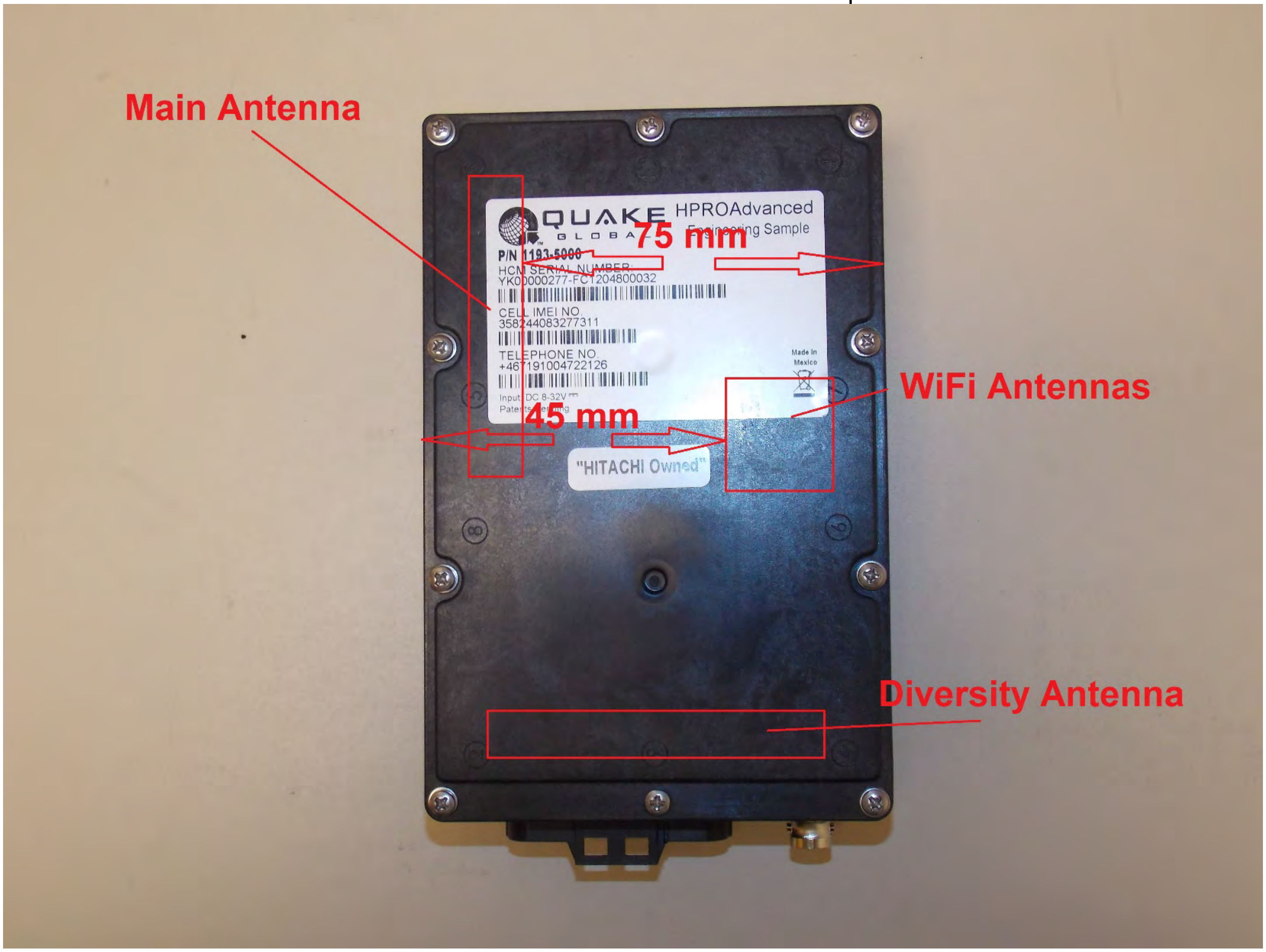
Appendix C – SAR Test Setup Photos

Test Position Front 30 mm Gap



Test Position Right 30 mm Gap

Test Position Top 30 mm Gap



Antenna Locations

Front of Device