RF Exposure Lab

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CERTIFICATE OF COMPLIANCE
SAR EVALUATION

Dejero Labs Inc.		Dates of Test:	August 29 – September 8, 2022
412 Albert St., Suite 100		Test Report Number:	SAR.20220902
Waterloo, ON N2L 3V3			Revision A
Canada			Lab Designation Number: US1195

FCC ID:	Y99DEJEM91
IC Certificate:	12762A-DEJEM91
HVIN/Model(s):	EG3x
Contains Cellular Module:	Sierra Wireless Model EM9191
Contains WiFi Module:	Intel Corporation Model AX200NGW
Test Sample:	Engineering Unit Same as Production
Serial Number:	5300008 & 5300009
Equipment Type:	Wireless Video Transceiver
Classification:	Portable Transmitter Next to Body
TX Frequency Range:	663 – 698 MHz, 699 – 716 MHz, 824 – 849 MHz, 1710 – 1780 MHz, 1850 – 1915 MHz, 2300 – 2400 MHz, 2496 – 2690 MHz, 3550 – 3700 MHz, 3300 – 4200 MHz
Frequency Tolerance:	± 2.5 ppm
Maximum RF Output:	600 MHz (FR1) – 24.5 dBm, 750 MHz (FR1) – 24.5 dBm, 850 MHz (FR1) – 24.5 dBm, 1750 MHz (FR1) – 24.5 dBm, 1900 MHz (FR1) – 24.5 dBm, 2300 MHz (FR1) – 24.5 dBm, 2550 MHz (FR1) – 24.5 dBm, 3600 MHz (FR1) – 24.5 dBm, 3700 MHz (FR1) – 24.5 dBm Conducted
Signal Modulation:	DFT-s-OFDM/CP-OFDM, Pi2 BPSK
Antenna Type:	Internal
Application Type:	Certification
FCC Rule Parts:	Part 2, 22, 24, 27, 90
KDB Test Methodology:	KDB 447498 D01 v06, KDB 248227 v02r02, KDB 941225 D01 v03r01, D02 v02r01 & D05 v02r05
Industry Canada:	RSS-102 Issue 5, Safety Code 6
Max. Stand Alone SAR Value:	1.38 W/kg Reported
Max. Simultaneous Value:	0.04 Separation Ratio
Separation Distance:	10 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

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Comment/Revision	Date
Original Release	September 28, 2022
Revision A – Correct lab designation number and model number	September 30, 2022

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

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1. Introduction

This measurement report shows compliance of the Dejero Labs Inc. Model EG3x FCC ID: Y99DEJEM91 with FCC Part 2, 1093, ET Docket 93-62 Rules for mobile and portable devices and IC Certificate: 12762A-DEJEM91 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 Dejero Labs Inc. Model EG3x and therefore apply only to the tested sample.

The testing is this report was conducted on the two top transmit antennas. There are two additional transmit antennas on the bottom of the device. The top and bottom antennas are exact duplications of each other. Therefore, only one end was evaluated as it was determined that the other end would be the same values. The two ends of the device's antennas are 240 mm from each other.

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 EG3x Wireless Video Transceiver. The table also shows the tolerance for the power level for each mode.

Band	Technology	3GPP Nominal Power dBm	Calibrated Nominal Power dBm	Tolerance dBm	Lower Tolerance dBm	Upper Tolerance dBm
Band n2	FR1	23.7	23.7	+0.8/-2.2	21.5	24.5
Band n5	FR1	23.7	23.7	+0.8/-2.2	21.5	24.5
Band n7	FR1	23.0	23.0	+1.5/-1.5	21.5	24.5
Band n12	FR1	23.0	23.0	+1.5/-1.5	21.5	24.5
Band n25	FR1	23.0	23.0	+1.5/-1.5	21.5	24.5
Band n38	FR1	23.0	23.0	+1.5/-1.5	21.5	24.5
Band n40	FR1	23.0	23.0	+1.5/-1.5	21.5	24.5
Band n41	FR1	23.0	23.0	+1.5/-1.5	21.5	24.5
Band n48	FR1	23.7	23.7	+0.8/-2.2	21.5	24.5
Band n66	FR1	23.7	23.7	+0.8/-2.2	21.5	24.5
Band n71	FR1	23.0	23.0	+1.5/-1.5	21.5	24.5
Band n77	FR1	23.7	23.7	+0.8/-2.2	21.5	24.5
Band n78	FR1	23.0	23.0	+1.5/-1.5	21.5	24.5

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LTE UL CA Combinations (Aggregate Power)

Band UL 2CA Combination	Technology	Class	Nominal dBm	Tolerance dBm	Lower Tolerance dBm	Upper Tolerance dBm
12A-4A	LTE	23.0	23.0	+1.0/-1.0	22.0	24.0
12A-2A	LTE	23.0	23.0	+1.0/-1.0	22.0	24.0
13A-2A	LTE	23.0	23.0	+1.0/-1.0	22.0	24.0
13A-4A	LTE	23.0	23.0	+1.0/-1.0	22.0	24.0
5A-2A	LTE	23.0	23.0	+1.0/-1.0	22.0	24.0
5A-4A	LTE	23.0	23.0	+1.0/-1.0	22.0	24.0
66A-2A	LTE	23.0	23.0	+1.0/-1.0	22.0	24.0
66A-5A	LTE	23.0	23.0	+1.0/-1.0	22.0	24.0
7A-5A	LTE	23.0	23.0	+1.0/-1.0	22.0	24.0

FR1 NSA UL ENDC Combinations (Aggregate Power)

Band UL ENDC Combination	Technology	Class	Nominal dBm	Tolerance dBm	Lower Tolerance dBm	Upper Tolerance dBm
12A-n66A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
12A-n2A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
13A-n66A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
13A-n2A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
25A-n41A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
2A-n41A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
2A-n5A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
2A-n71A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
41A-n77A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
5A-n66A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
5A-n2A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
66A-n41A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
66A-n5A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
66A-n71A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
7A-n5A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5
7A-n71A	LTE+FR1	3	23.0	+1.5/-1.5	21.5	24.5

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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)

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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.

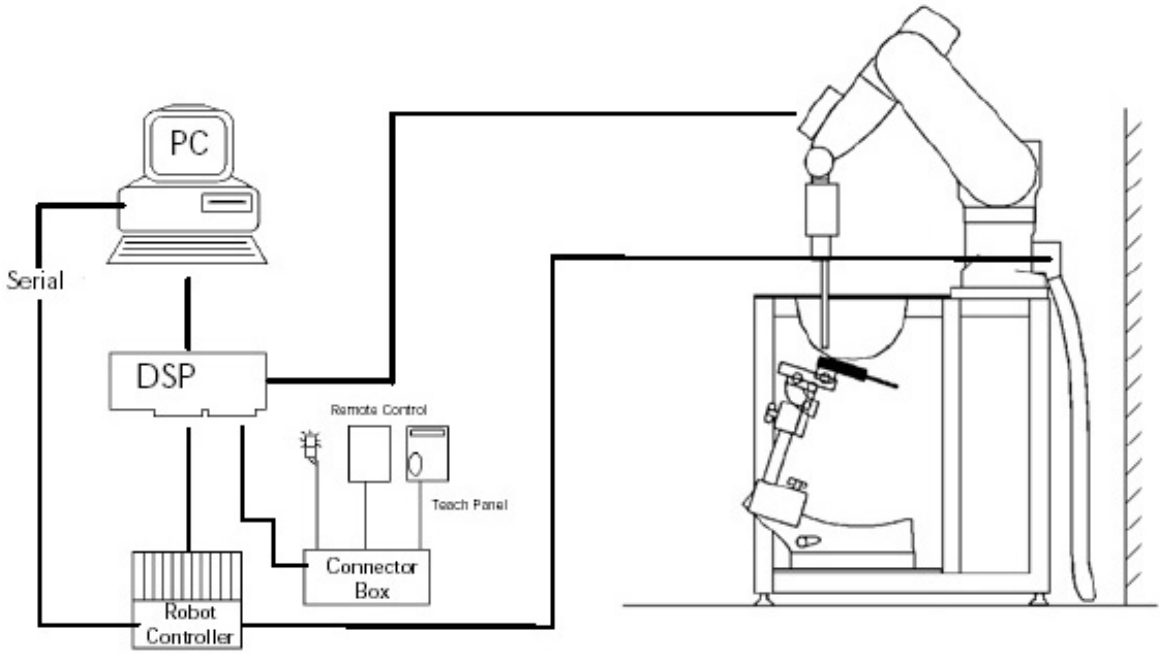

Figure 2.1 SAR Measurement System Setup

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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

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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

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

Application: SAR Dosimetry Testing
Compliance tests of wireless device

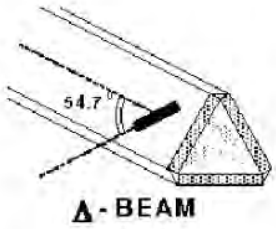

Figure 2.2 Triangular Probe Configurations

Figure 2.3 Probe Thick-Film Technique

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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

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

where:

Δt = exposure time (30 seconds),

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

ΔT = temperature increase due to RF exposure.

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

where:

σ = simulated tissue conductivity,

ρ = Tissue density (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;

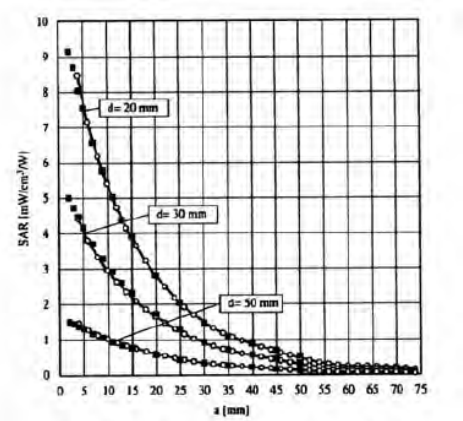

Figure 2.4 E-Field and Temperature Measurements at 900MHz

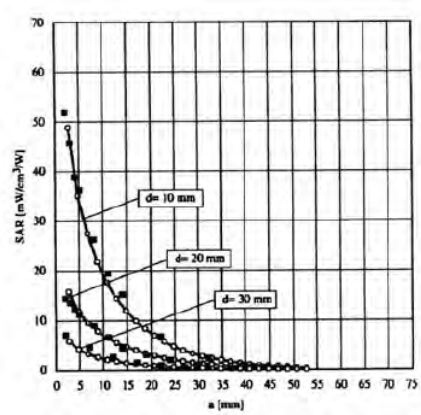

Figure 2.5 E-Field and Temperature Measurements at 1800MHz

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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

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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.

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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.

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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

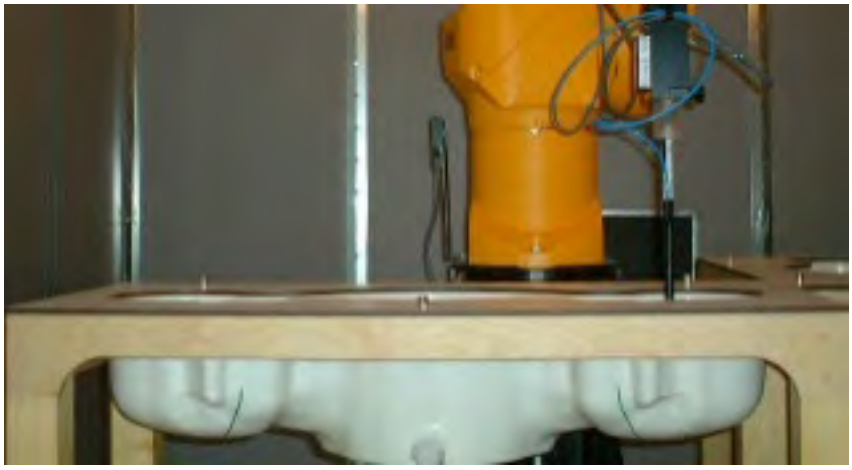

Figure 2.6 SAM Twin Phantom

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.

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3. Probe and Dipole Calibration

See Appendix D and E.

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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					
		600 MHz Head	750 MHz Head	900 MHz Head	1750 MHz Head	1900 MHz Head	2300 MHz Head
Mixing Percentage							
Water		Proprietary Purchased From Speag					
Sugar							
Salt							
HEC							
Bactericide							
DGBE							
Dielectric Constant	Target	42.72	41.94	41.50	40.08	40.00	39.47
Conductivity (S/m)	Target	0.88	0.89	0.97	1.37	1.40	1.67

Ingredients		Simulating Tissue					
		2550 MHz Head	3300 MHz Head	3500 MHz Head	3700 MHz Head	3900 MHz Head	4200 MHz Head
Mixing Percentage							
Water		Proprietary Purchased From Speag					
Sugar							
Salt							
HEC							
Bactericide							
DGBE							
Dielectric Constant	Target	39.07	38.16	37.93	37.70	37.47	36.55
Conductivity (S/m)	Target	1.91	2.70	2.91	3.12	3.34	3.68

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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.

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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.

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7. System Validation

Tissue Verification

Table 7.1 Measured Tissue Parameters

		600 MHz Head		750 MHz Head		900 MHz Head	
Date(s)		Sep. 1, 2022		Sep. 1, 2022		Aug. 31, 2022	
Liquid Temperature (˚C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ε		42.72	41.96	41.94	40.97	41.50	40.96
Conductivity: σ		0.88	0.90	0.89	0.93	0.97	1.01
		1750 MHz Head		1900 MHz Head		2300 MHz Head	
Date(s)		Aug. 30, 2022		Aug. 29, 2022		Aug. 31, 2022	
Liquid Temperature (˚C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ε		40.08	39.06	40.00	39.55	39.47	38.69
Conductivity: σ		1.37	1.39	1.40	1.42	1.67	1.70
		2550 MHz Head		3300 MHz Head		3500 MHz Head	
Date(s)		Sep. 6, 2022		Sep. 6, 2022		Sep. 6, 2022	
Liquid Temperature (˚C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ε		39.07	38.74	38.16	37.59	37.93	37.36
Conductivity: σ		1.91	1.92	2.70	2.73	2.91	2.94
		3700 MHz Head		3900 MHz Head		4200 MHz Head	
Date(s)		Sep. 6, 2022		Sep. 6, 2022		Sep. 6, 2022	
Liquid Temperature (˚C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ε		37.70	37.13	37.47	36.90	37.12	36.55
Conductivity: σ		3.12	3.15	3.34	3.37	3.65	3.68

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
01-Sep-2022	750 MHz	8.57	8.66	Head	+ 1.05	1
31-Aug-2022	900 MHz	11.20	11.60	Head	+ 3.57	2
30-Aug-2022	1750 MHz	37.70	38.10	Head	+ 1.06	3
29-Aug-2022	1900 MHz	40.40	41.20	Head	+ 1.98	4
31-Aug-2022	2300 MHz	49.60	50.10	Head	+ 1.01	5
06-Sep-2022	2550 MHz	55.30	56.60	Head	+ 2.35	6
06-Sep-2022	3300 MHz	64.90	65.90	Head	+ 1.54	7
06-Sep-2022	3500 MHz	67.00	68.20	Head	+ 1.79	8
06-Sep-2022	3700 MHz	68.30	69.80	Head	+ 2.20	9
06-Sep-2022	3900 MHz	69.90	70.90	Head	+ 1.43	10
06-Sep-2022	4200 MHz	66.30	67.40	Head	+ 1.66	11

See Appendix A for data plots.

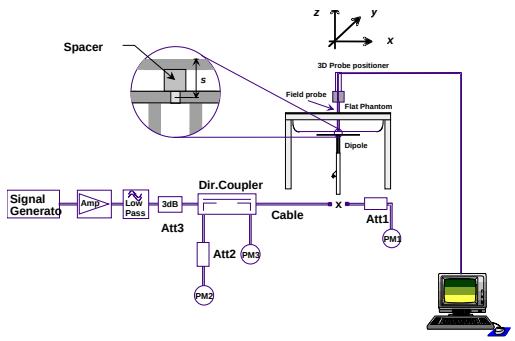

Figure 7.1 Dipole Validation Test Setup

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8. 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	Top	Back	Front	Left	Right	Bottom
Ant T7	Yes	Yes	No	No	Yes	No
Ant T3	Yes	No	Yes	Yes	No	No
Ant T2	Yes	Yes	Yes	Yes	No	No
Ant T6	Yes	Yes	Yes	No	Yes	No
WiFi T9	Yes	No	No	No	No	No
WiFi B9	No	No	No	No	No	Yes

All testing was conducted with a 10 mm gap. The 10 mm gap was used to simulate the case the device is carried in when in use by the user.

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FR1 Conducted Power

GENERAL NOTE:

1. NR implementation of n2, n5, n41, n66, n71 and n77 is limited to EN-DC operations only (NSA), with LTE Bands 2/5/7/12/13/25/66/41 acting as anchor bands, SAR tests for NR Bands and LTE Anchors Bands were performed separately due to limitations in SAR probe calibration factors. the detail EN-DC combination are included.
2. 5G NR support SCS 15KHz / 30KHz, DFT-s/CP-OFDM, PI/2 BPSK/QPSK/16QAM/64QAM/256QAM and supported Bandwidths
3. For 5G NR test procedure was following step similar FCC KDB 941225 D05:
   a. For DFT-s-OFDM and CP-OFDM output power measurement reduction, according to 38.101 maximum power reduction for power class 2 and 3, the CP-OFDM mode will not higher than DFT-s-OFDM mode, therefore, similar FCC KDB 941225 D05 procedure for other modulation output power for each RB allocation configuration is > not ½ dB higher than the same configuration in DFT-s-Pi/2 BPSK and the reported SAR for the DFT-s-Pi/2 BPSK configuration is ≤ 1.45 W/kg; CP-OFDM measurement is unnecessary.
   b. For DFT-s-OFDM output power measurement reduction, according to 38.101 maximum power reduction for power class 3, full measurement on Pi/2 BPSK/QPSK/16QAM/64QMA/256QAM with larger bandwidth, for smaller bandwidth output power also spot check 1RB 1offset configuration at Pi/2 BPSK to ensure output power will not ½ dB higher than largest supported bandwidth.
   c. SAR testing start with the largest channel bandwidth and measure SAR for PI/2 BPSK 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.
   d. 50% RB allocation for PI/2 BPSK SAR testing follows 1RB PI/2 BPSK allocation procedure
   e. PI/2 BPSK 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.
   f. QPSK/16QAM/64QAM/256QAM output powers are not ½ dB higher than the same configuration in PI/2 BPSK, also reported SAR for the PI/2 BPSK configuration is less than 1.45 W/kg, QPSK/16QAM/64QAM/256QAM SAR testing are not required.
   g. Smaller bandwidth output power for each RB allocation configuration for this device will 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, smaller bandwidth SAR testing is not required for this device.
4. FR1 band 2/38/78 SAR test was covered by Band 25/41/77; according to April 2015 TCB workshop, SAR test for overlapping FR1 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
5. Due to test setup limitations, SAR testing for NR was performed using Factory Test Mode software to establish the connection and perform SAR with 100% duty cycle. The Qualcomm QRCT program was used to establish the connection.

3GPP 38.101 MPR FOR EN-DC

Table 6.2.2-1 Maximum power reduction (MPR) for power class 3

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	Pi/2 BPSK	≤ 3.5[1]	≤ 1.2[1]	≤ 0.2[1]
		≤ 0.5[2]	≤ 0.5[2]	0[2]
	QPSK	≤ 1		0
	16 QAM	≤ 2		≤ 1
	64 QAM	≤ 2.5		
	256 QAM	≤ 4.5		
CP-OFDM	QPSK	≤ 3		≤ 1.5
	16 QAM	≤ 3		≤ 2
	64 QAM	≤ 3.5		
	256 QAM	≤ 6.5		

NOTE 1: Applicable for UE operating in TDD mode with Pi/2 BPSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and if the IE *powerBoostPi2BPSK* is set to 1 and 40 % or less slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79. The reference power of 0 dB MPR is 26 dBm.

NOTE 2: Applicable for UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79 with Pi/2 BPSK modulation and if the IE *powerBoostPi2BPSK* is set to 0 and if more than 40 % of slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79.

Table 6.2.2-2 Maximum power reduction (MPR) for power class 2

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	Pi/2 BPSK	≤ 3.5	≤ 0.5	0
	QPSK	≤ 3.5	≤ 1	0
	16 QAM	≤ 3.5	≤ 2	≤ 1
	64 QAM	≤ 3.5	≤ 2.5	
	256 QAM	≤ 4.5		
CP-OFDM	QPSK	≤ 3.5	≤ 3	≤ 1.5
	16 QAM	≤ 3.5	≤ 3	≤ 2
	64 QAM	≤ 3.5		
	256 QAM	≤ 6.5		

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Table 9.1 FR1 Full Power Measurements

<n2 Ant T7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				372000	376000	380000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1860	1880	1900		
20	PI/2 BPSK	1	1	24.29	24.46	24.43	24.5	0.0
20	PI/2 BPSK	1	53	24.03	24.41	24.04		
20	PI/2 BPSK	1	104	24.42	24.15	24.32		
20	PI/2 BPSK	50	0	23.38	23.40	23.35	23.5	1.0
20	PI/2 BPSK	50	28	23.24	23.27	23.07		
20	PI/2 BPSK	50	56	23.05	23.21	23.11		
20	PI/2 BPSK	100	0	23.18	23.06	23.19	23.5	1.0
20	QPSK	1	1	24.45	24.07	24.32	24.5	0.0
20	QPSK	1	53	24.03	24.00	24.25		
20	QPSK	1	104	24.43	24.39	24.20		
20	QPSK	50	0	23.44	23.28	23.19	23.5	1.0
20	QPSK	50	28	23.20	23.30	23.41		
20	QPSK	50	56	23.39	23.38	23.26		
20	QPSK	100	0	23.26	23.27	23.14	23.5	1.0
20	16QAM	1	1	24.45	24.34	24.17	24.5	0.0
20	16QAM	1	53	24.35	24.46	24.21		
20	16QAM	1	104	24.35	24.15	24.48		
20	16QAM	50	0	23.44	23.19	23.12	23.5	1.0
20	16QAM	50	28	23.41	23.02	23.33		
20	16QAM	50	56	23.19	23.43	23.36		
20	16QAM	100	0	23.10	23.39	23.22	23.5	1.0
20	64QAM	1	1	24.27	24.20	24.30	24.5	0.0
20	64QAM	1	53	24.03	24.00	24.32		
20	64QAM	1	104	24.00	24.06	24.37		
20	64QAM	50	0	23.47	23.37	23.09	23.5	1.0
20	64QAM	50	28	23.11	23.50	23.43		
20	64QAM	50	56	23.11	23.09	23.13		
20	64QAM	100	0	23.39	23.23	23.06	23.5	1.0
20	256QAM	1	1	24.31	24.12	24.19	24.5	0.0
20	256QAM	1	53	24.20	24.49	24.46		
20	256QAM	1	104	24.15	24.08	24.10		
20	256QAM	50	0	23.33	23.43	23.19	23.5	1.0
20	256QAM	50	28	23.29	23.03	23.15		
20	256QAM	50	56	23.05	23.46	23.33		
20	256QAM	100	0	23.42	23.15	23.22	23.5	1.0
Channel				371500	376000	380500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	PI/2 BPSK	1	1	24.46	24.25	24.38	24.5	0.0
Channel				371000	376000	381000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	PI/2 BPSK	1	1	24.49	24.14	24.08	24.5	0.0
Channel				370500	376000	381500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	PI/2 BPSK	1	1	24.18	24.09	24.06	24.5	0.0

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BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				372000	376000	380000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1860	1880	1900		
20	PI/2 BPSK	1	1	24.31	24.28	24.42	24.5	0.0
20	PI/2 BPSK	1	53	24.43	24.46	24.47		
20	PI/2 BPSK	1	104	24.40	24.01	24.42		
20	PI/2 BPSK	50	0	23.10	23.21	23.33	23.5	1.0
20	PI/2 BPSK	50	28	23.18	23.36	23.20		
20	PI/2 BPSK	50	56	23.14	23.22	23.04		
20	PI/2 BPSK	100	0	23.03	23.31	23.15	23.5	1.0
20	QPSK	1	1	24.08	24.14	24.11	24.5	0.0
20	QPSK	1	53	24.01	24.28	24.45		
20	QPSK	1	104	24.00	24.06	24.30		
20	QPSK	50	0	23.39	23.12	23.25	23.5	1.0
20	QPSK	50	28	23.05	23.09	23.06		
20	QPSK	50	56	23.08	23.28	23.10		
20	QPSK	100	0	23.22	23.29	23.08	23.5	1.0
20	16QAM	1	1	24.04	24.07	24.02	24.5	0.0
20	16QAM	1	53	24.23	24.40	24.49		
20	16QAM	1	104	24.42	24.41	24.07		
20	16QAM	50	0	23.12	23.37	23.48	23.5	1.0
20	16QAM	50	28	23.14	23.11	23.36		
20	16QAM	50	56	23.46	23.26	23.05		
20	16QAM	100	0	23.23	23.06	23.03	23.5	1.0
20	64QAM	1	1	24.35	24.14	24.00	24.5	0.0
20	64QAM	1	53	24.46	24.23	24.34		
20	64QAM	1	104	24.24	24.19	24.13		
20	64QAM	50	0	23.17	23.03	23.02	23.5	1.0
20	64QAM	50	28	23.33	23.17	23.18		
20	64QAM	50	56	23.43	23.09	23.26		
20	64QAM	100	0	23.02	23.06	23.22	23.5	1.0
20	256QAM	1	1	24.02	24.45	24.24	24.5	0.0
20	256QAM	1	53	24.04	24.44	24.34		
20	256QAM	1	104	24.43	24.33	24.23		
20	256QAM	50	0	23.02	23.17	23.06	23.5	1.0
20	256QAM	50	28	23.20	23.10	23.19		
20	256QAM	50	56	23.15	23.04	23.48		
20	256QAM	100	0	23.47	23.19	23.48	23.5	1.0
Channel				371500	376000	380500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	PI/2 BPSK	1	1	24.44	24.02	24.17	24.5	0.0
Channel				371000	376000	381000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	PI/2 BPSK	1	1	24.38	24.24	24.44	24.5	0.0
Channel				370500	376000	381500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	PI/2 BPSK	1	1	24.31	24.00	24.45	24.5	0.0

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BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				166800	167300	167300	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				834	836.5	839		
20	PI/2 BPSK	1	1	24.41	24.37	24.04	24.5	0.0
20	PI/2 BPSK	1	53	24.50	24.26	24.07		
20	PI/2 BPSK	1	104	24.17	24.09	24.04		
20	PI/2 BPSK	50	0	23.13	23.02	23.10	23.5	1.0
20	PI/2 BPSK	50	28	23.18	23.05	23.35		
20	PI/2 BPSK	50	56	23.03	23.48	23.38		
20	PI/2 BPSK	100	0	23.03	23.30	23.48	23.5	1.0
20	QPSK	1	1	24.03	24.45	24.32	24.5	0.0
20	QPSK	1	53	24.37	24.13	24.11		
20	QPSK	1	104	24.28	24.43	24.39		
20	QPSK	50	0	23.32	23.41	23.34	23.5	1.0
20	QPSK	50	28	23.32	23.19	23.25		
20	QPSK	50	56	23.00	23.04	23.07		
20	QPSK	100	0	23.09	23.22	23.17	23.5	1.0
20	16QAM	1	1	24.06	24.19	24.07	24.5	0.0
20	16QAM	1	53	24.17	24.30	24.12		
20	16QAM	1	104	24.15	24.06	24.36		
20	16QAM	50	0	23.31	23.46	23.05	23.5	1.0
20	16QAM	50	28	23.04	23.03	23.45		
20	16QAM	50	56	23.31	23.04	23.38		
20	16QAM	100	0	23.35	23.45	23.43	23.5	1.0
20	64QAM	1	1	24.02	24.19	24.37	24.5	0.0
20	64QAM	1	53	24.00	24.46	24.18		
20	64QAM	1	104	24.07	24.46	24.06		
20	64QAM	50	0	23.26	23.09	23.38	23.5	1.0
20	64QAM	50	28	23.11	23.09	23.05		
20	64QAM	50	56	23.13	23.49	23.15		
20	64QAM	100	0	23.36	23.48	23.47	23.5	1.0
20	256QAM	1	1	24.32	24.02	24.04	24.5	0.0
20	256QAM	1	53	24.17	24.30	24.14		
20	256QAM	1	104	24.31	24.32	24.42		
20	256QAM	50	0	23.40	23.20	23.15	23.5	1.0
20	256QAM	50	28	23.04	23.29	23.07		
20	256QAM	50	56	23.07	23.27	23.31		
20	256QAM	100	0	23.17	23.21	23.11	23.5	1.0
Channel				166300	167300	167800	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				831.5	836.5	841.5		
15	PI/2 BPSK	1	1	24.39	24.19	24.03	24.5	0.0
Channel				165800	167300	168200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				829	836.5	844		
10	PI/2 BPSK	1	1	24.16	24.42	24.14	24.5	0.0
Channel				165300	167300	168700	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	PI/2 BPSK	1	1	24.33	24.15	24.40	24.5	0.0

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<n5 Ant T3>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				166800	167300	167300	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				834	836.5	839		
20	PI/2 BPSK	1	1	24.41	24.13	24.04	24.5	0.0
20	PI/2 BPSK	1	53	24.06	24.42	24.19		
20	PI/2 BPSK	1	104	24.17	24.39	24.18		
20	PI/2 BPSK	50	0	23.05	23.36	23.35	23.5	1.0
20	PI/2 BPSK	50	28	23.10	23.42	23.24		
20	PI/2 BPSK	50	56	23.22	23.12	23.25		
20	PI/2 BPSK	100	0	23.30	23.01	23.28	23.5	1.0
20	QPSK	1	1	24.16	24.24	24.42	24.5	0.0
20	QPSK	1	53	24.07	24.43	24.47		
20	QPSK	1	104	24.40	24.21	24.06		
20	QPSK	50	0	23.36	23.07	23.01	23.5	1.0
20	QPSK	50	28	23.42	23.05	23.19		
20	QPSK	50	56	23.47	23.08	23.02		
20	QPSK	100	0	23.00	23.08	23.48	23.5	1.0
20	16QAM	1	1	24.50	24.46	24.02	24.5	0.0
20	16QAM	1	53	24.15	24.38	24.48		
20	16QAM	1	104	24.36	24.30	24.30		
20	16QAM	50	0	23.07	23.05	23.10	23.5	1.0
20	16QAM	50	28	23.26	23.11	23.45		
20	16QAM	50	56	23.11	23.38	23.28		
20	16QAM	100	0	23.35	23.47	23.02	23.5	1.0
20	64QAM	1	1	24.32	24.40	24.43	24.5	0.0
20	64QAM	1	53	24.31	24.19	24.30		
20	64QAM	1	104	24.03	24.03	24.25		
20	64QAM	50	0	23.32	23.25	23.26	23.5	1.0
20	64QAM	50	28	23.34	23.25	23.11		
20	64QAM	50	56	23.32	23.32	23.27		
20	64QAM	100	0	23.48	23.13	23.44	23.5	1.0
20	256QAM	1	1	24.28	24.20	24.32	24.5	0.0
20	256QAM	1	53	24.07	24.49	24.31		
20	256QAM	1	104	24.49	24.27	24.24		
20	256QAM	50	0	23.22	23.26	23.08	23.5	1.0
20	256QAM	50	28	23.24	23.35	23.19		
20	256QAM	50	56	23.02	23.45	23.11		
20	256QAM	100	0	23.07	23.02	23.19	23.5	1.0
Channel				166300	167300	167800	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				831.5	836.5	841.5		
15	PI/2 BPSK	1	1	24.05	24.34	24.27	24.5	0.0
Channel				165800	167300	168200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				829	836.5	844		
10	PI/2 BPSK	1	1	24.15	24.11	24.12	24.5	0.0
Channel				165300	167300	168700	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	PI/2 BPSK	1	1	24.12	24.35	24.23	24.5	0.0

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<n7 Ant T7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				502000	507000	512000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2510	2535	2560		
20	PI/2 BPSK	1	1	24.19	24.35	24.40	24.5	0.0
20	PI/2 BPSK	1	53	24.28	24.07	24.26		
20	PI/2 BPSK	1	104	24.45	24.24	24.24		
20	PI/2 BPSK	50	0	23.26	23.27	23.19	23.5	1.0
20	PI/2 BPSK	50	28	23.45	23.12	23.01		
20	PI/2 BPSK	50	56	23.12	23.12	23.13		
20	PI/2 BPSK	100	0	23.16	23.31	23.43	23.5	1.0
20	QPSK	1	1	24.24	24.15	24.47	24.5	0.0
20	QPSK	1	53	24.11	24.01	24.39		
20	QPSK	1	104	24.29	24.16	24.36		
20	QPSK	50	0	23.02	23.35	23.33	23.5	1.0
20	QPSK	50	28	23.37	23.08	23.24		
20	QPSK	50	56	23.48	23.08	23.26		
20	QPSK	100	0	23.29	23.43	23.17	23.5	1.0
20	16QAM	1	1	24.06	24.16	24.36	24.5	0.0
20	16QAM	1	53	24.04	24.24	24.07		
20	16QAM	1	104	24.05	24.03	24.26		
20	16QAM	50	0	23.06	23.06	23.43	23.5	1.0
20	16QAM	50	28	23.48	23.40	23.47		
20	16QAM	50	56	23.10	23.40	23.35		
20	16QAM	100	0	23.24	23.34	23.10	23.5	1.0
20	64QAM	1	1	24.26	24.23	24.40	24.5	0.0
20	64QAM	1	53	24.31	24.15	24.21		
20	64QAM	1	104	24.26	24.14	24.05		
20	64QAM	50	0	23.43	23.13	23.07	23.5	1.0
20	64QAM	50	28	23.45	23.12	23.19		
20	64QAM	50	56	23.23	23.33	23.10		
20	64QAM	100	0	23.46	23.23	23.23	23.5	1.0
20	256QAM	1	1	24.29	24.18	24.17	24.5	0.0
20	256QAM	1	53	24.32	24.37	24.37		
20	256QAM	1	104	24.02	24.06	24.21		
20	256QAM	50	0	23.19	23.38	23.12	23.5	1.0
20	256QAM	50	28	23.18	23.32	23.34		
20	256QAM	50	56	23.32	23.45	23.23		
20	256QAM	100	0	23.33	23.34	23.38	23.5	1.0
Channel				501500	507000	511500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	PI/2 BPSK	1	1	24.26	24.37	24.09	24.5	0.0
Channel				501000	507000	511000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	PI/2 BPSK	1	1	24.07	24.10	24.37	24.5	0.0
Channel				500500	507000	510500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	PI/2 BPSK	1	1	24.47	24.07	24.05	24.5	0.0

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<n7 Ant T3>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				502000	507000	512000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2510	2535	2560		
20	PI/2 BPSK	1	1	24.07	24.07	24.21	24.5	0.0
20	PI/2 BPSK	1	53	24.20	24.38	24.01		
20	PI/2 BPSK	1	104	24.43	24.17	24.23		
20	PI/2 BPSK	50	0	23.15	23.15	23.21	23.5	1.0
20	PI/2 BPSK	50	28	23.40	23.38	23.01		
20	PI/2 BPSK	50	56	23.07	23.13	23.11		
20	PI/2 BPSK	100	0	23.35	23.09	23.26	23.5	1.0
20	QPSK	1	1	24.48	24.08	24.27	24.5	0.0
20	QPSK	1	53	24.13	24.06	24.20		
20	QPSK	1	104	24.06	24.26	24.21		
20	QPSK	50	0	23.44	23.20	23.39	23.5	1.0
20	QPSK	50	28	23.42	23.31	23.22		
20	QPSK	50	56	23.15	23.28	23.23		
20	QPSK	100	0	23.15	23.26	23.33	23.5	1.0
20	16QAM	1	1	24.20	24.29	24.06	24.5	0.0
20	16QAM	1	53	24.33	24.49	24.07		
20	16QAM	1	104	24.41	24.38	24.21		
20	16QAM	50	0	23.03	23.04	23.29	23.5	1.0
20	16QAM	50	28	23.04	23.14	23.23		
20	16QAM	50	56	23.11	23.09	23.11		
20	16QAM	100	0	23.11	23.39	23.20	23.5	1.0
20	64QAM	1	1	24.10	24.30	24.28	24.5	0.0
20	64QAM	1	53	24.10	24.17	24.28		
20	64QAM	1	104	24.07	24.12	24.00		
20	64QAM	50	0	23.06	23.35	23.41	23.5	1.0
20	64QAM	50	28	23.29	23.24	23.34		
20	64QAM	50	56	23.47	23.47	23.13		
20	64QAM	100	0	23.31	23.33	23.47	23.5	1.0
20	256QAM	1	1	24.22	24.37	24.03	24.5	0.0
20	256QAM	1	53	24.10	24.47	24.43		
20	256QAM	1	104	24.32	24.48	24.13		
20	256QAM	50	0	23.30	23.39	23.20	23.5	1.0
20	256QAM	50	28	23.05	23.07	23.49		
20	256QAM	50	56	23.27	23.37	23.50		
20	256QAM	100	0	23.43	23.13	23.10	23.5	1.0
Channel				501500	507000	511500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	PI/2 BPSK	1	1	24.11	24.13	24.17	24.5	0.0
Channel				501000	507000	511000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	PI/2 BPSK	1	1	24.31	24.09	24.40	24.5	0.0
Channel				500500	507000	510500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	PI/2 BPSK	1	1	24.22	24.31	24.13	24.5	0.0

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<n12 Ant T7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				141300	141500	141700	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				706.5	707.5	708.5		
15	PI/2 BPSK	1	1	24.08	24.30	24.29	24.5	0.0
15	PI/2 BPSK	1	40	24.20	24.23	24.27		
15	PI/2 BPSK	1	78	24.45	24.03	24.48		
15	PI/2 BPSK	37	0	23.16	23.48	23.40	23.5	1.0
15	PI/2 BPSK	37	21	23.23	23.15	23.03		
15	PI/2 BPSK	37	42	23.02	23.03	23.22		
15	PI/2 BPSK	75	0	23.45	23.13	23.42	23.5	1.0
15	QPSK	1	1	24.42	24.46	24.12	24.5	0.0
15	QPSK	1	40	24.12	24.36	24.33		
15	QPSK	1	78	24.05	24.06	24.01		
15	QPSK	37	0	23.41	23.27	23.45	23.5	1.0
15	QPSK	37	21	23.37	23.16	23.06		
15	QPSK	37	42	23.14	23.27	23.31		
15	QPSK	75	0	23.32	23.14	23.33	23.5	1.0
15	16QAM	1	1	24.05	24.12	24.06	24.5	0.0
15	16QAM	1	40	24.43	24.16	24.38		
15	16QAM	1	78	24.47	24.22	24.44		
15	16QAM	37	0	23.05	23.42	23.44	23.5	1.0
15	16QAM	37	21	23.11	23.21	23.06		
15	16QAM	37	42	23.09	23.06	23.42		
15	16QAM	75	0	23.10	23.43	23.28	23.5	1.0
15	64QAM	1	1	24.29	24.08	24.12	24.5	0.0
15	64QAM	1	40	24.30	24.43	24.03		
15	64QAM	1	78	24.01	24.24	24.00		
15	64QAM	37	0	23.01	23.45	23.13	23.5	1.0
15	64QAM	37	21	23.36	23.02	23.12		
15	64QAM	37	42	23.17	23.09	23.16		
15	64QAM	75	0	23.28	23.44	23.28	23.5	1.0
15	256QAM	1	1	24.47	24.13	24.29	24.5	0.0
15	256QAM	1	40	24.18	24.27	24.36		
15	256QAM	1	78	24.27	24.33	24.26		
15	256QAM	37	0	23.10	23.46	23.37	23.5	1.0
15	256QAM	37	21	23.22	23.43	23.45		
15	256QAM	37	42	23.01	23.42	23.40		
15	256QAM	75	0	23.06	23.44	23.02	23.5	1.0
Channel				140920	141500	142080	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				704.6	707.5	710.4		
10	PI/2 BPSK	1	1	24.35	24.05	24.33	24.5	0.0
Channel				140560	141500	142440	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				702.8	707.5	712.2		
5	PI/2 BPSK	1	1	24.03	24.35	24.43	24.5	0.0

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<n12 Ant T3>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				141300	141500	141700	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				706.5	707.5	708.5		
15	PI/2 BPSK	1	1	24.47	24.16	24.37	24.5	0.0
15	PI/2 BPSK	1	40	24.28	24.22	24.40		
15	PI/2 BPSK	1	78	24.06	24.04	24.34		
15	PI/2 BPSK	37	0	23.13	23.49	23.24	23.5	1.0
15	PI/2 BPSK	37	21	23.04	23.36	23.03		
15	PI/2 BPSK	37	42	23.20	23.08	23.10		
15	PI/2 BPSK	75	0	23.46	23.15	23.30	23.5	1.0
15	QPSK	1	1	24.24	24.40	24.27	24.5	0.0
15	QPSK	1	40	24.07	24.22	24.19		
15	QPSK	1	78	24.26	24.22	24.18		
15	QPSK	37	0	23.44	23.07	23.41	23.5	1.0
15	QPSK	37	21	23.33	23.37	23.06		
15	QPSK	37	42	23.15	23.16	23.48		
15	QPSK	75	0	23.11	23.03	23.24	23.5	1.0
15	16QAM	1	1	24.43	24.24	24.22	24.5	0.0
15	16QAM	1	40	24.08	24.27	24.46		
15	16QAM	1	78	24.23	24.09	24.50		
15	16QAM	37	0	23.41	23.40	23.40	23.5	1.0
15	16QAM	37	21	23.40	23.35	23.16		
15	16QAM	37	42	23.19	23.22	23.44		
15	16QAM	75	0	23.36	23.09	23.07	23.5	1.0
15	64QAM	1	1	24.03	24.38	24.11	24.5	0.0
15	64QAM	1	40	24.23	24.11	24.14		
15	64QAM	1	78	24.15	24.12	24.32		
15	64QAM	37	0	23.01	23.01	23.33	23.5	1.0
15	64QAM	37	21	23.35	23.46	23.16		
15	64QAM	37	42	23.36	23.04	23.32		
15	64QAM	75	0	23.48	23.41	23.40	23.5	1.0
15	256QAM	1	1	24.08	24.37	24.26	24.5	0.0
15	256QAM	1	40	24.48	24.18	24.11		
15	256QAM	1	78	24.45	24.41	24.22		
15	256QAM	37	0	23.08	23.08	23.42	23.5	1.0
15	256QAM	37	21	23.27	23.20	23.43		
15	256QAM	37	42	23.18	23.45	23.43		
15	256QAM	75	0	23.07	23.10	23.30	23.5	1.0
Channel				140920	141500	142080	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				704.6	707.5	710.4		
10	PI/2 BPSK	1	1	24.40	24.35	24.26	24.5	0.0
Channel				140560	141500	142440	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				702.8	707.5	712.2		
5	PI/2 BPSK	1	1	24.46	24.31	24.47	24.5	0.0

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<n25 Ant T7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				372000	376500	381000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1860	1882.5	1905		
20	PI/2 BPSK	1	1	24.16	24.35	24.46	24.5	0.0
20	PI/2 BPSK	1	53	24.44	24.46	24.10		
20	PI/2 BPSK	1	104	24.12	24.40	24.09		
20	PI/2 BPSK	50	0	23.42	23.23	23.17	23.5	1.0
20	PI/2 BPSK	50	28	23.23	23.17	23.34		
20	PI/2 BPSK	50	56	23.28	23.10	23.05		
20	PI/2 BPSK	100	0	23.20	23.10	23.50	23.5	1.0
20	QPSK	1	1	24.17	24.16	24.21	24.5	0.0
20	QPSK	1	53	24.34	24.28	24.24		
20	QPSK	1	104	24.05	24.44	24.04		
20	QPSK	50	0	23.37	23.13	23.26	23.5	1.0
20	QPSK	50	28	23.38	23.42	23.43		
20	QPSK	50	56	23.42	23.33	23.24		
20	QPSK	100	0	23.39	23.44	23.21	23.5	1.0
20	16QAM	1	1	24.01	24.44	24.30	24.5	0.0
20	16QAM	1	53	24.24	24.30	24.43		
20	16QAM	1	104	24.10	24.32	24.45		
20	16QAM	50	0	23.05	23.15	23.22	23.5	1.0
20	16QAM	50	28	23.20	23.36	23.37		
20	16QAM	50	56	23.29	23.47	23.08		
20	16QAM	100	0	23.05	23.45	23.23	23.5	1.0
20	64QAM	1	1	24.33	24.17	24.17	24.5	0.0
20	64QAM	1	53	24.23	24.18	24.16		
20	64QAM	1	104	24.34	24.16	24.03		
20	64QAM	50	0	23.24	23.19	23.15	23.5	1.0
20	64QAM	50	28	23.02	23.09	23.41		
20	64QAM	50	56	23.06	23.48	23.00		
20	64QAM	100	0	23.28	23.20	23.49	23.5	1.0
20	256QAM	1	1	24.10	24.29	24.01	24.5	0.0
20	256QAM	1	53	24.24	24.04	24.24		
20	256QAM	1	104	24.07	24.39	24.03		
20	256QAM	50	0	23.26	23.47	23.05	23.5	1.0
20	256QAM	50	28	23.31	23.28	23.00		
20	256QAM	50	56	23.34	23.05	23.45		
20	256QAM	100	0	23.04	23.30	23.04	23.5	1.0
Channel				371500	376500	381500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1882.5	1907.5		
15	PI/2 BPSK	1	1	24.48	24.17	24.36	24.5	0.0
Channel				371000	376500	382000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1882.5	1910		
10	PI/2 BPSK	1	1	24.29	24.13	24.17	24.5	0.0
Channel				370500	376500	382500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1882.5	1912.5		
5	PI/2 BPSK	1	1	24.18	24.08	24.46	24.5	0.0

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<n25 Ant T3>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				372000	376500	381000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1860	1882.5	1905		
20	PI/2 BPSK	1	1	24.39	24.46	24.28	24.5	0.0
20	PI/2 BPSK	1	53	24.30	24.41	24.01		
20	PI/2 BPSK	1	104	24.20	24.03	24.24		
20	PI/2 BPSK	50	0	23.36	23.07	23.02	23.5	1.0
20	PI/2 BPSK	50	28	23.20	23.02	23.14		
20	PI/2 BPSK	50	56	23.09	23.37	23.06		
20	PI/2 BPSK	100	0	23.50	23.35	23.04	23.5	1.0
20	QPSK	1	1	24.27	24.46	24.30	24.5	0.0
20	QPSK	1	53	24.31	24.14	24.42		
20	QPSK	1	104	24.01	24.05	24.48		
20	QPSK	50	0	23.03	23.19	23.25	23.5	1.0
20	QPSK	50	28	23.44	23.40	23.50		
20	QPSK	50	56	23.41	23.45	23.37		
20	QPSK	100	0	23.44	23.36	23.26	23.5	1.0
20	16QAM	1	1	24.02	24.45	24.10	24.5	0.0
20	16QAM	1	53	24.46	24.06	24.39		
20	16QAM	1	104	24.41	24.31	24.03		
20	16QAM	50	0	23.48	23.03	23.39	23.5	1.0
20	16QAM	50	28	23.38	23.19	23.11		
20	16QAM	50	56	23.26	23.27	23.46		
20	16QAM	100	0	23.10	23.17	23.38	23.5	1.0
20	64QAM	1	1	24.19	24.37	24.22	24.5	0.0
20	64QAM	1	53	24.39	24.21	24.26		
20	64QAM	1	104	24.42	24.32	24.38		
20	64QAM	50	0	23.49	23.23	23.48	23.5	1.0
20	64QAM	50	28	23.41	23.39	23.28		
20	64QAM	50	56	23.38	23.31	23.42		
20	64QAM	100	0	23.17	23.38	23.06	23.5	1.0
20	256QAM	1	1	24.45	24.32	24.41	24.5	0.0
20	256QAM	1	53	24.19	24.24	24.39		
20	256QAM	1	104	24.14	24.38	24.40		
20	256QAM	50	0	23.22	23.22	23.44	23.5	1.0
20	256QAM	50	28	23.30	23.42	23.33		
20	256QAM	50	56	23.04	23.27	23.38		
20	256QAM	100	0	23.21	23.47	23.07	23.5	1.0
Channel				371500	376500	381500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1882.5	1907.5		
15	PI/2 BPSK	1	1	24.06	24.15	24.04	24.5	0.0
Channel				371000	376500	382000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1882.5	1910		
10	PI/2 BPSK	1	1	24.27	24.00	24.01	24.5	0.0
Channel				370500	376500	382500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1882.5	1912.5		
5	PI/2 BPSK	1	1	24.35	24.42	24.33	24.5	0.0

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<n38 Ant T7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				516000	519000	522000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2580	2595	2610		
20	PI/2 BPSK	1	1	24.01	24.09	24.24	24.5	0.0
20	PI/2 BPSK	1	53	24.33	24.40	24.38		
20	PI/2 BPSK	1	104	24.34	24.01	24.37		
20	PI/2 BPSK	50	0	23.23	23.25	23.28	23.5	1.0
20	PI/2 BPSK	50	28	23.20	23.18	23.18		
20	PI/2 BPSK	50	56	23.08	23.07	23.37		
20	PI/2 BPSK	100	0	23.16	23.36	23.43	23.5	1.0
20	QPSK	1	1	24.21	24.45	24.49	24.5	0.0
20	QPSK	1	53	24.18	24.09	24.17		
20	QPSK	1	104	24.04	24.05	24.29		
20	QPSK	50	0	23.19	23.05	23.25	23.5	1.0
20	QPSK	50	28	23.24	23.45	23.09		
20	QPSK	50	56	23.38	23.12	23.25		
20	QPSK	100	0	23.01	23.16	23.06	23.5	1.0
20	16QAM	1	1	24.13	24.19	24.15	24.5	0.0
20	16QAM	1	53	24.14	24.09	24.32		
20	16QAM	1	104	24.05	24.01	24.46		
20	16QAM	50	0	23.43	23.35	23.33	23.5	1.0
20	16QAM	50	28	23.25	23.27	23.48		
20	16QAM	50	56	23.12	23.35	23.31		
20	16QAM	100	0	23.34	23.35	23.34	23.5	1.0
20	64QAM	1	1	24.07	24.23	24.21	24.5	0.0
20	64QAM	1	53	24.01	24.07	24.13		
20	64QAM	1	104	24.49	24.27	24.10		
20	64QAM	50	0	23.44	23.18	23.49	23.5	1.0
20	64QAM	50	28	23.22	23.18	23.28		
20	64QAM	50	56	23.48	23.08	23.43		
20	64QAM	100	0	23.26	23.24	23.18	23.5	1.0
20	256QAM	1	1	24.26	24.07	24.48	24.5	0.0
20	256QAM	1	53	24.27	24.08	24.10		
20	256QAM	1	104	24.19	24.18	24.25		
20	256QAM	50	0	23.49	23.50	23.22	23.5	1.0
20	256QAM	50	28	23.29	23.49	23.49		
20	256QAM	50	56	23.27	23.10	23.01		
20	256QAM	100	0	23.18	23.04	23.29	23.5	1.0
Channel				515500	519000	522500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2577.5	2595	2612.5		
15	PI/2 BPSK	1	1	24.20	24.13	24.44	24.5	0.0
Channel				515000	519000	523000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	PI/2 BPSK	1	1	24.01	24.34	24.17	24.5	0.0
Channel				514500	519000	523500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	PI/2 BPSK	1	1	24.38	24.10	24.49	24.5	0.0

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<n38 Ant T3>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				516000	519000	522000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2580	2595	2610		
20	PI/2 BPSK	1	1	24.19	24.48	24.26	24.5	0.0
20	PI/2 BPSK	1	53	24.27	24.48	24.49		
20	PI/2 BPSK	1	104	24.33	24.22	24.13		
20	PI/2 BPSK	50	0	23.26	23.42	23.49	23.5	1.0
20	PI/2 BPSK	50	28	23.08	23.24	23.49		
20	PI/2 BPSK	50	56	23.01	23.42	23.42		
20	PI/2 BPSK	100	0	23.27	23.39	23.09	23.5	1.0
20	QPSK	1	1	24.23	24.09	24.30	24.5	0.0
20	QPSK	1	53	24.31	24.10	24.01		
20	QPSK	1	104	24.49	24.29	24.46		
20	QPSK	50	0	23.43	23.43	23.17	23.5	1.0
20	QPSK	50	28	23.32	23.43	23.31		
20	QPSK	50	56	23.33	23.06	23.10		
20	QPSK	100	0	23.10	23.43	23.32	23.5	1.0
20	16QAM	1	1	24.31	24.22	24.20	24.5	0.0
20	16QAM	1	53	24.44	24.13	24.44		
20	16QAM	1	104	24.23	24.37	24.07		
20	16QAM	50	0	23.31	23.38	23.34	23.5	1.0
20	16QAM	50	28	23.08	23.30	23.09		
20	16QAM	50	56	23.11	23.48	23.38		
20	16QAM	100	0	23.12	23.42	23.44	23.5	1.0
20	64QAM	1	1	24.35	24.32	24.02	24.5	0.0
20	64QAM	1	53	24.02	24.24	24.50		
20	64QAM	1	104	24.06	24.38	24.20		
20	64QAM	50	0	23.00	23.01	23.41	23.5	1.0
20	64QAM	50	28	23.41	23.14	23.25		
20	64QAM	50	56	23.04	23.32	23.13		
20	64QAM	100	0	23.34	23.49	23.15	23.5	1.0
20	256QAM	1	1	24.25	24.06	24.36	24.5	0.0
20	256QAM	1	53	24.05	24.39	24.36		
20	256QAM	1	104	24.15	24.40	24.36		
20	256QAM	50	0	23.46	23.13	23.38	23.5	1.0
20	256QAM	50	28	23.36	23.29	23.31		
20	256QAM	50	56	23.41	23.21	23.40		
20	256QAM	100	0	23.41	23.15	23.43	23.5	1.0
Channel				515500	519000	522500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2577.5	2595	2612.5		
15	PI/2 BPSK	1	1	24.49	24.23	24.24	24.5	0.0
Channel				515000	519000	523000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	PI/2 BPSK	1	1	24.23	24.30	24.06	24.5	0.0
Channel				514500	519000	523500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	PI/2 BPSK	1	1	24.43	24.31	24.25	24.5	0.0

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<n40 Ant T7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				462000	470000	478000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2310	2350	2390		
20	PI/2 BPSK	1	1	24.39	24.46	24.28	24.5	0.0
20	PI/2 BPSK	1	53	24.30	24.41	24.01		
20	PI/2 BPSK	1	104	24.20	24.03	24.24		
20	PI/2 BPSK	50	0	23.36	23.07	23.02	23.5	1.0
20	PI/2 BPSK	50	28	23.20	23.02	23.14		
20	PI/2 BPSK	50	56	23.09	23.37	23.06		
20	PI/2 BPSK	100	0	23.50	23.35	23.04	23.5	1.0
20	QPSK	1	1	24.27	24.46	24.30	24.5	0.0
20	QPSK	1	53	24.31	24.14	24.42		
20	QPSK	1	104	24.01	24.05	24.48		
20	QPSK	50	0	23.03	23.19	23.25	23.5	1.0
20	QPSK	50	28	23.44	23.40	23.50		
20	QPSK	50	56	23.41	23.45	23.37		
20	QPSK	100	0	23.44	23.36	23.26	23.5	1.0
20	16QAM	1	1	24.02	24.45	24.10	24.5	0.0
20	16QAM	1	53	24.46	24.06	24.39		
20	16QAM	1	104	24.41	24.31	24.03		
20	16QAM	50	0	23.48	23.03	23.39	23.5	1.0
20	16QAM	50	28	23.38	23.19	23.11		
20	16QAM	50	56	23.26	23.27	23.46		
20	16QAM	100	0	23.10	23.17	23.38	23.5	1.0
20	64QAM	1	1	24.19	24.37	24.22	24.5	0.0
20	64QAM	1	53	24.39	24.21	24.26		
20	64QAM	1	104	24.42	24.32	24.38		
20	64QAM	50	0	23.49	23.23	23.48	23.5	1.0
20	64QAM	50	28	23.41	23.39	23.28		
20	64QAM	50	56	23.38	23.31	23.42		
20	64QAM	100	0	23.17	23.38	23.06	23.5	1.0
20	256QAM	1	1	24.45	24.32	24.41	24.5	0.0
20	256QAM	1	53	24.19	24.24	24.39		
20	256QAM	1	104	24.14	24.38	24.40		
20	256QAM	50	0	23.22	23.22	23.44	23.5	1.0
20	256QAM	50	28	23.30	23.42	23.33		
20	256QAM	50	56	23.04	23.27	23.38		
20	256QAM	100	0	23.21	23.47	23.07	23.5	1.0
Channel				371500	376500	381500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1882.5	1907.5		
15	PI/2 BPSK	1	1	24.06	24.15	24.04	24.5	0.0
Channel				371000	376500	382000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1882.5	1910		
10	PI/2 BPSK	1	1	24.27	24.00	24.01	24.5	0.0
Channel				370500	376500	382500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1882.5	1912.5		
5	PI/2 BPSK	1	1	24.35	24.42	24.33	24.5	0.0

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<n40 Ant T3>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				462000	470000	478000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2310	2350	2390		
20	PI/2 BPSK	1	1	24.40	24.09	24.34	24.5	0.0
20	PI/2 BPSK	1	53	24.23	24.07	24.05		
20	PI/2 BPSK	1	104	24.33	24.22	24.38		
20	PI/2 BPSK	50	0	23.01	23.12	23.08	23.5	1.0
20	PI/2 BPSK	50	28	23.46	23.17	23.02		
20	PI/2 BPSK	50	56	23.23	23.26	23.40		
20	PI/2 BPSK	100	0	23.10	23.35	23.45	23.5	1.0
20	QPSK	1	1	24.08	24.19	24.35	24.5	0.0
20	QPSK	1	53	24.18	24.28	24.23		
20	QPSK	1	104	24.46	24.50	24.14		
20	QPSK	50	0	23.42	23.04	23.01	23.5	1.0
20	QPSK	50	28	23.27	23.00	23.15		
20	QPSK	50	56	23.33	23.04	23.41		
20	QPSK	100	0	23.50	23.41	23.35	23.5	1.0
20	16QAM	1	1	24.37	24.01	24.12	24.5	0.0
20	16QAM	1	53	24.08	24.39	24.37		
20	16QAM	1	104	24.12	24.25	24.16		
20	16QAM	50	0	23.23	23.06	23.16	23.5	1.0
20	16QAM	50	28	23.22	23.00	23.26		
20	16QAM	50	56	23.32	23.49	23.27		
20	16QAM	100	0	23.44	23.36	23.16	23.5	1.0
20	64QAM	1	1	24.23	24.09	24.24	24.5	0.0
20	64QAM	1	53	24.26	24.39	24.38		
20	64QAM	1	104	24.17	24.41	24.33		
20	64QAM	50	0	23.42	23.37	23.42	23.5	1.0
20	64QAM	50	28	23.30	23.29	23.49		
20	64QAM	50	56	23.33	23.44	23.33		
20	64QAM	100	0	23.50	23.26	23.31	23.5	1.0
20	256QAM	1	1	24.01	24.35	24.43	24.5	0.0
20	256QAM	1	53	24.19	24.36	24.21		
20	256QAM	1	104	24.20	24.37	24.30		
20	256QAM	50	0	23.27	23.21	23.10	23.5	1.0
20	256QAM	50	28	23.06	23.01	23.21		
20	256QAM	50	56	23.39	23.40	23.25		
20	256QAM	100	0	23.08	23.42	23.08	23.5	1.0
Channel				371500	376500	381500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1882.5	1907.5		
15	PI/2 BPSK	1	1	24.32	24.45	24.10	24.5	0.0
Channel				371000	376500	382000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1882.5	1910		
10	PI/2 BPSK	1	1	24.13	24.30	24.24	24.5	0.0
Channel				370500	376500	382500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1882.5	1912.5		
5	PI/2 BPSK	1	1	24.23	24.45	24.06	24.5	0.0

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<n41 Ant T7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				501200	518601	536000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2506	2593	2680		
20	PI/2 BPSK	1	1	24.50	24.35	24.34	24.5	0.0
20	PI/2 BPSK	1	53	24.21	24.26	24.00		
20	PI/2 BPSK	1	104	24.21	24.28	24.02		
20	PI/2 BPSK	50	0	23.13	23.27	23.38	23.5	1.0
20	PI/2 BPSK	50	28	23.17	23.29	23.15		
20	PI/2 BPSK	50	56	23.47	23.39	23.42		
20	PI/2 BPSK	100	0	23.26	23.10	23.18	23.5	1.0
20	QPSK	1	1	24.46	24.13	24.31	24.5	0.0
20	QPSK	1	53	24.20	24.04	24.19		
20	QPSK	1	104	24.32	24.08	24.30		
20	QPSK	50	0	23.03	23.35	23.09	23.5	1.0
20	QPSK	50	28	23.08	23.40	23.24		
20	QPSK	50	56	23.08	23.38	23.22		
20	QPSK	100	0	23.44	23.01	23.07	23.5	1.0
20	16QAM	1	1	24.39	24.00	24.24	24.5	0.0
20	16QAM	1	53	24.38	24.44	24.21		
20	16QAM	1	104	24.44	24.08	24.08		
20	16QAM	50	0	23.05	23.10	23.08	23.5	1.0
20	16QAM	50	28	23.10	23.42	23.31		
20	16QAM	50	56	23.39	23.18	23.25		
20	16QAM	100	0	23.14	23.03	23.47	23.5	1.0
20	64QAM	1	1	24.19	24.05	24.30	24.5	0.0
20	64QAM	1	53	24.14	24.15	24.20		
20	64QAM	1	104	24.39	24.37	24.13		
20	64QAM	50	0	23.29	23.21	23.03	23.5	1.0
20	64QAM	50	28	23.13	23.21	23.03		
20	64QAM	50	56	23.41	23.20	23.47		
20	64QAM	100	0	23.32	23.01	23.06	23.5	1.0
20	256QAM	1	1	24.34	24.30	24.29	24.5	0.0
20	256QAM	1	53	24.13	24.12	24.28		
20	256QAM	1	104	24.15	24.33	24.44		
20	256QAM	50	0	23.05	23.08	23.35	23.5	1.0
20	256QAM	50	28	23.38	23.40	23.36		
20	256QAM	50	56	23.40	23.24	23.20		
20	256QAM	100	0	23.22	23.27	23.22	23.5	1.0
Channel				500700	518601	536500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2593	2682.5		
15	PI/2 BPSK	1	1	24.21	24.09	24.43	24.5	0.0
Channel				500200	518601	537000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2593	2685		
10	PI/2 BPSK	1	1	24.36	24.47	24.41	24.5	0.0
Channel				499700	518601	537500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2593	2687.5		
5	PI/2 BPSK	1	1	24.00	24.31	24.43	24.5	0.0

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<n41 Ant T3>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				501200	518601	536000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2506	2593	2680		
20	PI/2 BPSK	1	1	24.14	24.39	24.17	24.5	0.0
20	PI/2 BPSK	1	53	24.12	24.34	24.30		
20	PI/2 BPSK	1	104	24.04	24.21	24.28		
20	PI/2 BPSK	50	0	23.22	23.08	23.03	23.5	1.0
20	PI/2 BPSK	50	28	23.27	23.08	23.01		
20	PI/2 BPSK	50	56	23.38	23.06	23.42		
20	PI/2 BPSK	100	0	23.11	23.34	23.33	23.5	1.0
20	QPSK	1	1	24.29	24.17	24.34	24.5	0.0
20	QPSK	1	53	24.15	24.17	24.26		
20	QPSK	1	104	24.07	24.01	24.31		
20	QPSK	50	0	23.00	23.24	23.48	23.5	1.0
20	QPSK	50	28	23.31	23.04	23.11		
20	QPSK	50	56	23.33	23.35	23.03		
20	QPSK	100	0	23.34	23.33	23.35	23.5	1.0
20	16QAM	1	1	24.42	24.37	24.10	24.5	0.0
20	16QAM	1	53	24.17	24.01	24.06		
20	16QAM	1	104	24.38	24.24	24.07		
20	16QAM	50	0	23.00	23.21	23.25	23.5	1.0
20	16QAM	50	28	23.01	23.20	23.02		
20	16QAM	50	56	23.48	23.29	23.25		
20	16QAM	100	0	23.43	23.44	23.42	23.5	1.0
20	64QAM	1	1	24.42	24.20	24.29	24.5	0.0
20	64QAM	1	53	24.05	24.28	24.35		
20	64QAM	1	104	24.48	24.15	24.11		
20	64QAM	50	0	23.10	23.08	23.21	23.5	1.0
20	64QAM	50	28	23.10	23.15	23.33		
20	64QAM	50	56	23.46	23.36	23.50		
20	64QAM	100	0	23.14	23.45	23.28	23.5	1.0
20	256QAM	1	1	24.47	24.06	24.12	24.5	0.0
20	256QAM	1	53	24.21	24.18	24.40		
20	256QAM	1	104	24.05	24.05	24.14		
20	256QAM	50	0	23.00	23.18	23.38	23.5	1.0
20	256QAM	50	28	23.19	23.31	23.03		
20	256QAM	50	56	23.12	23.03	23.26		
20	256QAM	100	0	23.26	23.45	23.17	23.5	1.0
Channel				500700	518601	536500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2593	2682.5		
15	PI/2 BPSK	1	1	24.33	24.16	24.06	24.5	0.0
Channel				500200	518601	537000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2593	2685		
10	PI/2 BPSK	1	1	24.49	24.50	24.12	24.5	0.0
Channel				499700	518601	537500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2593	2687.5		
5	PI/2 BPSK	1	1	24.38	24.08	24.16	24.5	0.0

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<n66 Ant T7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				344000	349000	354000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1720	1745	1770		
20	PI/2 BPSK	1	1	24.42	24.49	24.32	24.5	0.0
20	PI/2 BPSK	1	53	24.13	24.37	24.33		
20	PI/2 BPSK	1	104	24.22	24.34	24.34		
20	PI/2 BPSK	50	0	23.14	23.14	23.42	23.5	1.0
20	PI/2 BPSK	50	28	23.25	23.05	23.40		
20	PI/2 BPSK	50	56	23.28	23.01	23.26		
20	PI/2 BPSK	100	0	23.34	23.49	23.32	23.5	1.0
20	QPSK	1	1	24.16	24.29	24.05	24.5	0.0
20	QPSK	1	53	24.27	24.46	24.08		
20	QPSK	1	104	24.04	24.26	24.17		
20	QPSK	50	0	23.47	23.13	23.14	23.5	1.0
20	QPSK	50	28	23.21	23.13	23.42		
20	QPSK	50	56	23.32	23.23	23.34		
20	QPSK	100	0	23.22	23.24	23.32	23.5	1.0
20	16QAM	1	1	24.45	24.31	24.04	24.5	0.0
20	16QAM	1	53	24.14	24.11	24.24		
20	16QAM	1	104	24.30	24.50	24.35		
20	16QAM	50	0	23.29	23.41	23.23	23.5	1.0
20	16QAM	50	28	23.01	23.08	23.46		
20	16QAM	50	56	23.21	23.30	23.02		
20	16QAM	100	0	23.37	23.47	23.12	23.5	1.0
20	64QAM	1	1	24.04	24.05	24.05	24.5	0.0
20	64QAM	1	53	24.41	24.44	24.48		
20	64QAM	1	104	24.01	24.39	24.46		
20	64QAM	50	0	23.13	23.34	23.14	23.5	1.0
20	64QAM	50	28	23.50	23.43	23.20		
20	64QAM	50	56	23.18	23.27	23.42		
20	64QAM	100	0	23.10	23.11	23.48	23.5	1.0
20	256QAM	1	1	24.26	24.01	24.18	24.5	0.0
20	256QAM	1	53	24.34	24.30	24.41		
20	256QAM	1	104	24.40	24.03	24.44		
20	256QAM	50	0	23.15	23.21	23.40	23.5	1.0
20	256QAM	50	28	23.29	23.08	23.05		
20	256QAM	50	56	23.32	23.01	23.28		
20	256QAM	100	0	23.25	23.47	23.00	23.5	1.0
Channel				343500	349000	354500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	PI/2 BPSK	1	1	24.14	24.14	24.36	24.5	0.0
Channel				343000	349000	355000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	PI/2 BPSK	1	1	24.19	24.38	24.27	24.5	0.0
Channel				342500	349000	355500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	PI/2 BPSK	1	1	24.44	24.40	24.02	24.5	0.0

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<n66 Ant T3>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				344000	349000	354000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1720	1745	1770		
20	PI/2 BPSK	1	1	24.19	24.16	24.11	24.5	0.0
20	PI/2 BPSK	1	53	24.06	24.06	24.22		
20	PI/2 BPSK	1	104	24.15	24.22	24.26		
20	PI/2 BPSK	50	0	23.01	23.15	23.10	23.5	1.0
20	PI/2 BPSK	50	28	23.05	23.15	23.11		
20	PI/2 BPSK	50	56	23.15	23.27	23.24		
20	PI/2 BPSK	100	0	23.14	23.35	23.27	23.5	1.0
20	QPSK	1	1	24.34	24.45	24.21	24.5	0.0
20	QPSK	1	53	24.22	24.18	24.22		
20	QPSK	1	104	24.42	24.12	24.19		
20	QPSK	50	0	23.40	23.30	23.30	23.5	1.0
20	QPSK	50	28	23.18	23.45	23.05		
20	QPSK	50	56	23.46	23.24	23.24		
20	QPSK	100	0	23.16	23.49	23.25	23.5	1.0
20	16QAM	1	1	24.23	24.21	24.26	24.5	0.0
20	16QAM	1	53	24.17	24.47	24.33		
20	16QAM	1	104	24.24	24.31	24.43		
20	16QAM	50	0	23.49	23.19	23.46	23.5	1.0
20	16QAM	50	28	23.05	23.32	23.47		
20	16QAM	50	56	23.14	23.39	23.31		
20	16QAM	100	0	23.48	23.08	23.47	23.5	1.0
20	64QAM	1	1	24.11	24.45	24.16	24.5	0.0
20	64QAM	1	53	24.24	24.11	24.14		
20	64QAM	1	104	24.25	24.19	24.03		
20	64QAM	50	0	23.31	23.22	23.48	23.5	1.0
20	64QAM	50	28	23.40	23.34	23.45		
20	64QAM	50	56	23.08	23.15	23.32		
20	64QAM	100	0	23.47	23.36	23.26	23.5	1.0
20	256QAM	1	1	24.21	24.06	24.02	24.5	0.0
20	256QAM	1	53	24.50	24.04	24.43		
20	256QAM	1	104	24.07	24.33	24.40		
20	256QAM	50	0	23.19	23.09	23.20	23.5	1.0
20	256QAM	50	28	23.29	23.46	23.45		
20	256QAM	50	56	23.02	23.10	23.34		
20	256QAM	100	0	23.36	23.28	23.18	23.5	1.0
Channel				343500	349000	354500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	PI/2 BPSK	1	1	24.20	24.29	24.49	24.5	0.0
Channel				343000	349000	355000	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	PI/2 BPSK	1	1	24.19	24.08	24.44	24.5	0.0
Channel				342500	349000	355500	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	PI/2 BPSK	1	1	24.14	24.35	24.48	24.5	0.0

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<n71 Ant T7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				134600	136100	137600	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				673	680.5	688		
20	PI/2 BPSK	1	1	24.39	24.24	24.50	24.5	0.0
20	PI/2 BPSK	1	53	24.31	24.10	24.37		
20	PI/2 BPSK	1	104	24.05	24.01	24.41		
20	PI/2 BPSK	50	0	23.32	23.43	23.09	23.5	1.0
20	PI/2 BPSK	50	28	23.38	23.06	23.23		
20	PI/2 BPSK	50	56	23.38	23.35	23.44		
20	PI/2 BPSK	100	0	23.28	23.19	23.12	23.5	1.0
20	QPSK	1	1	24.02	24.20	24.41	24.5	0.0
20	QPSK	1	53	24.07	24.47	24.23		
20	QPSK	1	104	24.35	24.40	24.12		
20	QPSK	50	0	23.43	23.28	23.49	23.5	1.0
20	QPSK	50	28	23.02	23.21	23.50		
20	QPSK	50	56	23.14	23.22	23.38		
20	QPSK	100	0	23.06	23.20	23.05	23.5	1.0
20	16QAM	1	1	24.30	24.02	24.40	24.5	0.0
20	16QAM	1	53	24.15	24.23	24.41		
20	16QAM	1	104	24.05	24.24	24.31		
20	16QAM	50	0	23.09	23.28	23.01	23.5	1.0
20	16QAM	50	28	23.11	23.50	23.44		
20	16QAM	50	56	23.01	23.28	23.49		
20	16QAM	100	0	23.39	23.36	23.03	23.5	1.0
20	64QAM	1	1	24.08	24.05	24.13	24.5	0.0
20	64QAM	1	53	24.44	24.30	24.37		
20	64QAM	1	104	24.22	24.04	24.20		
20	64QAM	50	0	23.07	23.30	23.07	23.5	1.0
20	64QAM	50	28	23.08	23.25	23.28		
20	64QAM	50	56	23.26	23.39	23.45		
20	64QAM	100	0	23.21	23.07	23.45	23.5	1.0
20	256QAM	1	1	24.37	24.04	24.05	24.5	0.0
20	256QAM	1	53	24.45	24.32	24.08		
20	256QAM	1	104	24.34	24.38	24.48		
20	256QAM	50	0	23.03	23.24	23.14	23.5	1.0
20	256QAM	50	28	23.18	23.12	23.10		
20	256QAM	50	56	23.39	23.21	23.06		
20	256QAM	100	0	23.03	23.23	23.44	23.5	1.0
Channel				134100	136100	138100	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				670.5	680.5	690.5		
15	PI/2 BPSK	1	1	24.16	24.08	24.49	24.5	0.0
Channel				133600	136100	138600	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				668	680.5	693		
10	PI/2 BPSK	1	1	24.20	24.06	24.49	24.5	0.0
Channel				133100	136100	139100	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				665.5	680.5	685.5		
5	PI/2 BPSK	1	1	24.33	24.37	24.45	24.5	0.0

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<n71 Ant T3>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				134600	136100	137600	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				673	680.5	688		
20	PI/2 BPSK	1	1	24.10	24.39	24.11	24.5	0.0
20	PI/2 BPSK	1	53	24.08	24.17	24.30		
20	PI/2 BPSK	1	104	24.03	24.39	24.30		
20	PI/2 BPSK	50	0	23.02	23.25	23.20	23.5	1.0
20	PI/2 BPSK	50	28	23.33	23.39	23.23		
20	PI/2 BPSK	50	56	23.11	23.34	23.05		
20	PI/2 BPSK	100	0	23.10	23.21	23.07	23.5	1.0
20	QPSK	1	1	24.32	24.30	24.49	24.5	0.0
20	QPSK	1	53	24.45	24.21	24.38		
20	QPSK	1	104	24.01	24.17	24.18		
20	QPSK	50	0	23.14	23.24	23.07	23.5	1.0
20	QPSK	50	28	23.35	23.37	23.40		
20	QPSK	50	56	23.22	23.39	23.07		
20	QPSK	100	0	23.17	23.00	23.48	23.5	1.0
20	16QAM	1	1	24.32	24.21	24.27	24.5	0.0
20	16QAM	1	53	24.02	24.37	24.11		
20	16QAM	1	104	24.36	24.46	24.48		
20	16QAM	50	0	23.27	23.17	23.23	23.5	1.0
20	16QAM	50	28	23.20	23.42	23.46		
20	16QAM	50	56	23.20	23.13	23.37		
20	16QAM	100	0	23.28	23.29	23.20	23.5	1.0
20	64QAM	1	1	24.46	24.04	24.48	24.5	0.0
20	64QAM	1	53	24.30	24.35	24.44		
20	64QAM	1	104	24.22	24.00	24.41		
20	64QAM	50	0	23.31	23.19	23.26	23.5	1.0
20	64QAM	50	28	23.44	23.36	23.16		
20	64QAM	50	56	23.35	23.50	23.35		
20	64QAM	100	0	23.02	23.16	23.16	23.5	1.0
20	256QAM	1	1	24.41	24.06	24.34	24.5	0.0
20	256QAM	1	53	24.44	24.46	24.49		
20	256QAM	1	104	24.44	24.20	24.46		
20	256QAM	50	0	23.13	23.39	23.31	23.5	1.0
20	256QAM	50	28	23.08	23.31	23.42		
20	256QAM	50	56	23.02	23.03	23.49		
20	256QAM	100	0	23.26	23.20	23.20	23.5	1.0
Channel				134100	136100	138100	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				670.5	680.5	690.5		
15	PI/2 BPSK	1	1	24.14	24.10	24.29	24.5	0.0
Channel				133600	136100	138600	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				668	680.5	693		
10	PI/2 BPSK	1	1	24.10	24.16	24.41	24.5	0.0
Channel				133100	136100	139100	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				665.5	680.5	685.5		
5	PI/2 BPSK	1	1	24.29	24.22	24.23	24.5	0.0

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<n77 Ant T7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				620666	646720	679333	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3310	3750	4190		
20	PI/2 BPSK	1	1	24.17	24.47	24.47	24.5	0.0
20	PI/2 BPSK	1	53	24.14	24.40	24.14		
20	PI/2 BPSK	1	104	24.27	24.14	24.44		
20	PI/2 BPSK	50	0	23.00	23.39	23.31	23.5	1.0
20	PI/2 BPSK	50	28	23.49	23.27	23.01		
20	PI/2 BPSK	50	56	23.12	23.04	23.34		
20	PI/2 BPSK	100	0	23.46	23.36	23.13	23.5	1.0
20	QPSK	1	1	24.21	24.37	24.30	24.5	0.0
20	QPSK	1	53	24.37	24.41	24.10		
20	QPSK	1	104	24.40	24.48	24.38		
20	QPSK	50	0	23.39	23.21	23.31	23.5	1.0
20	QPSK	50	28	23.14	23.13	23.18		
20	QPSK	50	56	23.17	23.27	23.45		
20	QPSK	100	0	23.19	23.49	23.36	23.5	1.0
20	16QAM	1	1	24.42	24.11	24.34	24.5	0.0
20	16QAM	1	53	24.28	24.18	24.15		
20	16QAM	1	104	24.09	24.09	24.33		
20	16QAM	50	0	23.33	23.09	23.14	23.5	1.0
20	16QAM	50	28	23.36	23.23	23.20		
20	16QAM	50	56	23.07	23.47	23.17		
20	16QAM	100	0	23.07	23.36	23.14	23.5	1.0
20	64QAM	1	1	24.04	24.26	24.39	24.5	0.0
20	64QAM	1	53	24.41	24.48	24.45		
20	64QAM	1	104	24.36	24.07	24.37		
20	64QAM	50	0	23.12	23.05	23.22	23.5	1.0
20	64QAM	50	28	23.14	23.16	23.49		
20	64QAM	50	56	23.20	23.50	23.48		
20	64QAM	100	0	23.20	23.23	23.36	23.5	1.0
20	256QAM	1	1	24.00	24.17	24.31	24.5	0.0
20	256QAM	1	53	24.40	24.03	24.08		
20	256QAM	1	104	24.30	24.05	24.16		
20	256QAM	50	0	23.40	23.47	23.34	23.5	1.0
20	256QAM	50	28	23.04	23.19	23.42		
20	256QAM	50	56	23.03	23.01	23.20		
20	256QAM	100	0	23.15	23.41	23.03	23.5	1.0
Channel				620166	646720	679833	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3307.5	3750	4192.5		
15	PI/2 BPSK	1	1	24.21	24.10	24.42	24.5	0.0
Channel				619666	646720	680333	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3305	3750	4195		
10	PI/2 BPSK	1	1	24.21	24.40	24.11	24.5	0.0
Channel				619166	646720	680833	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3302.5	3750	4197.5		
5	PI/2 BPSK	1	1	24.44	24.09	24.34	24.5	0.0

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<n77 Ant T3>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				620666	646720	679333	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3310	3750	4190		
20	PI/2 BPSK	1	1	24.08	24.33	24.40	24.5	0.0
20	PI/2 BPSK	1	53	24.43	24.39	24.15		
20	PI/2 BPSK	1	104	24.32	24.16	24.13		
20	PI/2 BPSK	50	0	23.06	23.39	23.39	23.5	1.0
20	PI/2 BPSK	50	28	23.06	23.12	23.36		
20	PI/2 BPSK	50	56	23.45	23.22	23.22		
20	PI/2 BPSK	100	0	23.27	23.15	23.12	23.5	1.0
20	QPSK	1	1	24.16	24.42	24.08	24.5	0.0
20	QPSK	1	53	24.19	24.45	24.43		
20	QPSK	1	104	24.27	24.11	24.11		
20	QPSK	50	0	23.14	23.01	23.23	23.5	1.0
20	QPSK	50	28	23.20	23.10	23.19		
20	QPSK	50	56	23.01	23.49	23.20		
20	QPSK	100	0	23.00	23.37	23.37	23.5	1.0
20	16QAM	1	1	24.41	24.28	24.46	24.5	0.0
20	16QAM	1	53	24.20	24.03	24.27		
20	16QAM	1	104	24.43	24.22	24.46		
20	16QAM	50	0	23.25	23.27	23.18	23.5	1.0
20	16QAM	50	28	23.30	23.31	23.03		
20	16QAM	50	56	23.20	23.20	23.29		
20	16QAM	100	0	23.14	23.22	23.47	23.5	1.0
20	64QAM	1	1	24.01	24.29	24.34	24.5	0.0
20	64QAM	1	53	24.32	24.27	24.10		
20	64QAM	1	104	24.47	24.01	24.04		
20	64QAM	50	0	23.10	23.41	23.41	23.5	1.0
20	64QAM	50	28	23.23	23.27	23.37		
20	64QAM	50	56	23.05	23.37	23.05		
20	64QAM	100	0	23.27	23.28	23.27	23.5	1.0
20	256QAM	1	1	24.32	24.48	24.22	24.5	0.0
20	256QAM	1	53	24.47	24.05	24.01		
20	256QAM	1	104	24.45	24.46	24.46		
20	256QAM	50	0	23.49	23.16	23.11	23.5	1.0
20	256QAM	50	28	23.00	23.05	23.25		
20	256QAM	50	56	23.13	23.38	23.02		
20	256QAM	100	0	23.38	23.00	23.20	23.5	1.0
Channel				620166	646720	679833	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3307.5	3750	4192.5		
15	PI/2 BPSK	1	1	24.50	24.40	24.25	24.5	0.0
Channel				619666	646720	680333	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3305	3750	4195		
10	PI/2 BPSK	1	1	24.07	24.27	24.01	24.5	0.0
Channel				619166	646720	680833	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3302.5	3750	4197.5		
5	PI/2 BPSK	1	1	24.12	24.48	24.22	24.5	0.0

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<n78 Ant T7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				620666	636667	652666	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3310	3550	3790		
20	PI/2 BPSK	1	1	24.34	24.48	24.37	24.5	0.0
20	PI/2 BPSK	1	53	24.38	24.28	24.49		
20	PI/2 BPSK	1	104	24.32	24.21	24.21		
20	PI/2 BPSK	50	0	23.46	23.22	23.00	23.5	1.0
20	PI/2 BPSK	50	28	23.42	23.19	23.40		
20	PI/2 BPSK	50	56	23.28	23.46	23.01		
20	PI/2 BPSK	100	0	23.06	23.32	23.48	23.5	1.0
20	QPSK	1	1	24.04	24.03	24.05	24.5	0.0
20	QPSK	1	53	24.27	24.13	24.37		
20	QPSK	1	104	24.38	24.08	24.14		
20	QPSK	50	0	23.35	23.32	23.18	23.5	1.0
20	QPSK	50	28	23.15	23.16	23.01		
20	QPSK	50	56	23.40	23.23	23.44		
20	QPSK	100	0	23.36	23.38	23.15	23.5	1.0
20	16QAM	1	1	24.48	24.36	24.47	24.5	0.0
20	16QAM	1	53	24.12	24.33	24.29		
20	16QAM	1	104	24.22	24.39	24.24		
20	16QAM	50	0	23.25	23.33	23.28	23.5	1.0
20	16QAM	50	28	23.05	23.44	23.29		
20	16QAM	50	56	23.03	23.06	23.15		
20	16QAM	100	0	23.44	23.35	23.36	23.5	1.0
20	64QAM	1	1	24.43	24.23	24.43	24.5	0.0
20	64QAM	1	53	24.39	24.24	24.13		
20	64QAM	1	104	24.40	24.45	24.28		
20	64QAM	50	0	23.36	23.16	23.16	23.5	1.0
20	64QAM	50	28	23.25	23.45	23.33		
20	64QAM	50	56	23.09	23.24	23.13		
20	64QAM	100	0	23.21	23.19	23.43	23.5	1.0
20	256QAM	1	1	24.43	24.43	24.19	24.5	0.0
20	256QAM	1	53	24.08	24.29	24.42		
20	256QAM	1	104	24.45	24.23	24.30		
20	256QAM	50	0	23.39	23.01	23.47	23.5	1.0
20	256QAM	50	28	23.35	23.49	23.46		
20	256QAM	50	56	23.48	23.34	23.36		
20	256QAM	100	0	23.12	23.20	23.15	23.5	1.0
Channel				620166	646720	679833	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3307.5	3750	4192.5		
15	PI/2 BPSK	1	1	24.24	24.20	24.26	24.5	0.0
Channel				619666	646720	680333	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3305	3750	4195		
10	PI/2 BPSK	1	1	24.06	24.03	24.15	24.5	0.0
Channel				619166	646720	680833	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3302.5	3750	4197.5		
5	PI/2 BPSK	1	1	24.40	24.25	24.19	24.5	0.0

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<n78 Ant T3>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				620666	636667	652666	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3310	3550	3790		
20	PI/2 BPSK	1	1	24.10	24.49	24.19	24.5	0.0
20	PI/2 BPSK	1	53	24.48	24.41	24.40		
20	PI/2 BPSK	1	104	24.11	24.24	24.25		
20	PI/2 BPSK	50	0	23.23	23.02	23.13	23.5	1.0
20	PI/2 BPSK	50	28	23.22	23.11	23.24		
20	PI/2 BPSK	50	56	23.15	23.43	23.48		
20	PI/2 BPSK	100	0	23.24	23.00	23.31	23.5	1.0
20	QPSK	1	1	24.07	24.14	24.37	24.5	0.0
20	QPSK	1	53	24.41	24.05	24.23		
20	QPSK	1	104	24.05	24.26	24.17		
20	QPSK	50	0	23.50	23.05	23.20	23.5	1.0
20	QPSK	50	28	23.47	23.18	23.33		
20	QPSK	50	56	23.34	23.05	23.20		
20	QPSK	100	0	23.45	23.05	23.18	23.5	1.0
20	16QAM	1	1	24.49	24.22	24.47	24.5	0.0
20	16QAM	1	53	24.44	24.46	24.47		
20	16QAM	1	104	24.42	24.18	24.29		
20	16QAM	50	0	23.23	23.26	23.24	23.5	1.0
20	16QAM	50	28	23.05	23.06	23.16		
20	16QAM	50	56	23.15	23.29	23.03		
20	16QAM	100	0	23.40	23.11	23.39	23.5	1.0
20	64QAM	1	1	24.32	24.35	24.40	24.5	0.0
20	64QAM	1	53	24.20	24.21	24.15		
20	64QAM	1	104	24.15	24.10	24.11		
20	64QAM	50	0	23.38	23.39	23.35	23.5	1.0
20	64QAM	50	28	23.48	23.43	23.26		
20	64QAM	50	56	23.14	23.28	23.10		
20	64QAM	100	0	23.18	23.35	23.22	23.5	1.0
20	256QAM	1	1	24.32	24.23	24.31	24.5	0.0
20	256QAM	1	53	24.21	24.47	24.19		
20	256QAM	1	104	24.16	24.41	24.23		
20	256QAM	50	0	23.11	23.05	23.42	23.5	1.0
20	256QAM	50	28	23.41	23.11	23.49		
20	256QAM	50	56	23.27	23.29	23.47		
20	256QAM	100	0	23.36	23.21	23.38	23.5	1.0
Channel				620166	646720	679833	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3307.5	3750	4192.5		
15	PI/2 BPSK	1	1	24.10	24.10	24.49	24.5	0.0
Channel				619666	646720	680333	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3305	3750	4195		
10	PI/2 BPSK	1	1	24.39	24.12	24.12	24.5	0.0
Channel				619166	646720	680833	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				3302.5	3750	4197.5		
5	PI/2 BPSK	1	1	24.31	24.45	24.10	24.5	0.0

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9. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, 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
2. Per KDB 447498 D01v06, 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.

FR1 Note:

1. For 5G NR test procedure was following step similar FCC KDB 941225 D05:
   a. SAR testing start with the largest channel bandwidth and measure SAR for PI/2 BPSK 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.
   b. 50% RB allocation for PI/2 BPSK SAR testing follows 1RB PI/2 BPSK allocation procedure
   c. PI/2 BPSK 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.
   d. QPSK/16QAM/64QAM/256QAM output powers are not ½ dB higher than the same configuration in PI/2 BPSK, also reported SAR for the PI/2 BPSK configuration is less than 1.45 W/kg, QPSK/16QAM/64QAM/256QAM SAR testing are not required.
   e. Smaller bandwidth output power for each RB allocation configuration for this device will 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, smaller bandwidth SAR testing is not required for this device
   f. For 5G FR1 n5/n12/n41/n71 the maximum bandwidth does not support three non-overlapping channels, 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.
2. Due to test setup limitations, SAR testing for NR was performed using Factory Test Mode software to establish the connection and perform SAR with 100% duty cycle. AT Commands were used to establish the connection.

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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)
	FR1 Band 2_Ant T7	20M	BPSK	1	53	Top	10mm	376000	1880	21.29	21.50	0.468	0.49
	FR1 Band 2_Ant T7	20M	BPSK	50	28		10mm	376000	1880	20.36	20.50	0.355	0.37
	FR1 Band 2_Ant T7	20M	BPSK	1	53	Back	10mm	376000	1880	21.29	21.50	0.492	0.52
	FR1 Band 2_Ant T7	20M	BPSK	50	28		10mm	376000	1880	20.36	20.50	0.405	0.42
	FR1 Band 2_Ant T7	20M	BPSK	1	53	Right	10mm	376000	1880	21.29	21.50	0.126	0.13
	FR1 Band 2_Ant T7	20M	BPSK	50	28		10mm	376000	1880	20.36	20.50	0.0957	0.10
	FR1 Band 2_Ant T3	20M	BPSK	1	53	Top	10mm	376000	1880	21.11	21.50	0.236	0.26
	FR1 Band 2_Ant T3	20M	BPSK	50	28		10mm	376000	1880	20.06	20.50	0.115	0.13
	FR1 Band 2_Ant T3	20M	BPSK	1	53	Front	10mm	376000	1880	21.11	21.50	0.627	0.69
	FR1 Band 2_Ant T3	20M	BPSK	50	28		10mm	376000	1880	20.06	20.50	0.534	0.59
	FR1 Band 2_Ant T3	20M	BPSK	1	53	Left	10mm	376000	1880	21.11	21.50	0.103	0.11
	FR1 Band 2_Ant T3	20M	BPSK	50	28		10mm	376000	1880	20.06	20.50	0.0562	0.06
	FR1 Band 5_Ant T7	10M	BPSK	1	53	Top	10mm	167300	836.5	24.26	24.50	0.117	0.12
	FR1 Band 5_Ant T7	10M	BPSK	50	28		10mm	167300	836.5	23.05	23.50	0.102	0.11
1	FR1 Band 5_Ant T7	10M	BPSK	1	53	Back	10mm	166800	834	24.50	24.50	0.933	0.93
	FR1 Band 5_Ant T7	10M	BPSK	1	53		10mm	167300	836.5	24.26	24.50	0.863	0.91
	FR1 Band 5_Ant T7	10M	BPSK	1	53		10mm	167800	839	24.07	24.50	0.821	0.91
	FR1 Band 5_Ant T7	10M	BPSK	50	28		10mm	167300	836.5	23.05	23.50	0.758	0.84
	FR1 Band 5_Ant T7	10M	BPSK	1	53	Right	10mm	167300	836.5	24.26	24.50	0.256	0.27
	FR1 Band 5_Ant T7	10M	BPSK	50	28		10mm	167300	836.5	23.05	23.50	0.155	0.17
	FR1 Band 5_Ant T3	10M	BPSK	1	53	Top	10mm	167300	836.5	24.42	24.50	0.124	0.13
	FR1 Band 5_Ant T3	10M	BPSK	50	28		10mm	167300	836.5	23.42	23.50	0.103	0.10
	FR1 Band 5_Ant T3	10M	BPSK	1	53	Front	10mm	167300	836.5	24.42	24.50	0.732	0.75
	FR1 Band 5_Ant T3	10M	BPSK	50	28		10mm	167300	836.5	23.42	23.50	0.699	0.71
	FR1 Band 5_Ant T3	10M	BPSK	1	53	Left	10mm	167300	836.5	24.42	24.50	0.273	0.28
	FR1 Band 5_Ant T3	10M	BPSK	50	28		10mm	167300	836.5	23.42	23.50	0.197	0.20
	FR1 Band 5_Ant T7	10M	BPSK	1	53	Top	10mm	167300	836.5	21.40	21.50	0.0821	0.08
	FR1 Band 5_Ant T7	10M	BPSK	1	53	Back	10mm	167300	836.5	21.40	21.50	0.411	0.42
	FR1 Band 5_Ant T7	10M	BPSK	1	53	Right	10mm	167300	836.5	21.40	21.50	0.102	0.10
	FR1 Band 5_Ant T3	10M	BPSK	1	53	Top	10mm	167300	836.5	21.40	21.50	0.0587	0.06
	FR1 Band 5_Ant T3	10M	BPSK	1	53	Front	10mm	167300	836.5	21.40	21.50	0.369	0.38
	FR1 Band 5_Ant T3	10M	BPSK	1	53	Left	10mm	167300	836.5	21.40	21.50	0.122	0.12
	FR1 Band 7_Ant T7	20M	BPSK	1	53	Top	10mm	502000	2510	24.28	24.50	1.16	1.22
	FR1 Band 7_Ant T7	20M	BPSK	1	53		10mm	507000	2535	24.07	24.50	1.10	1.21
	FR1 Band 7_Ant T7	20M	BPSK	1	53		10mm	512000	2560	24.26	24.50	0.981	1.04
	FR1 Band 7_Ant T7	20M	BPSK	50	28		10mm	507000	2535	23.12	23.50	0.885	0.97
	FR1 Band 7_Ant T7	20M	BPSK	1	53	Back	10mm	502000	2510	24.28	24.50	1.11	1.17
	FR1 Band 7_Ant T7	20M	BPSK	1	53		10mm	507000	2535	24.07	24.50	1.09	1.20
	FR1 Band 7_Ant T7	20M	BPSK	1	53		10mm	512000	2560	24.26	24.50	1.13	1.19
	FR1 Band 7_Ant T7	20M	BPSK	50	28		10mm	507000	2535	23.12	23.50	0.942	1.03
	FR1 Band 7_Ant T3	20M	BPSK	1	53	Right	10mm	507000	2535	24.07	24.50	0.270	0.30
	FR1 Band 7_Ant T3	20M	BPSK	50	28		10mm	507000	2535	23.12	23.50	0.201	0.22
	FR1 Band 7_Ant T3	20M	BPSK	1	53	Top	10mm	507000	2535	24.38	24.50	0.771	0.79
	FR1 Band 7_Ant T3	20M	BPSK	50	28		10mm	507000	2535	23.38	23.50	0.628	0.65
	FR1 Band 7_Ant T3	20M	BPSK	1	53	Front	10mm	502000	2510	24.20	24.50	1.10	1.18
2	FR1 Band 7_Ant T3	20M	BPSK	1	53		10mm	507000	2535	24.38	24.50	1.19	1.22
	FR1 Band 7_Ant T3	20M	BPSK	1	53		10mm	512000	2560	24.01	24.50	1.04	1.16
	FR1 Band 7_Ant T3	20M	BPSK	50	28		10mm	507000	2535	23.38	23.50	0.937	0.96
	FR1 Band 7_Ant T3	20M	BPSK	1	53	Left	10mm	507000	2535	24.38	24.50	0.338	0.35
	FR1 Band 7_Ant T3	20M	BPSK	50	28		10mm	507000	2535	23.38	23.50	0.257	0.26

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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)
	FR1 Band 12_Ant T7	15M	BPSK	1	40	Top	10mm	141500	707.5	24.23	24.50	0.160	0.17
	FR1 Band 12_Ant T7	15M	BPSK	37	21		10mm	141500	707.5	23.15	23.50	0.104	0.11
3	FR1 Band 12_Ant T7	15M	BPSK	1	40	Back	10mm	141500	707.5	24.23	24.50	0.748	0.80
	FR1 Band 12_Ant T7	15M	BPSK	37	21		10mm	141500	707.5	23.15	23.50	0.657	0.71
	FR1 Band 12_Ant T7	15M	BPSK	1	40	Right	10mm	141500	707.5	24.23	24.50	0.216	0.23
	FR1 Band 12_Ant T7	15M	BPSK	37	21		10mm	141500	707.5	23.15	23.50	0.138	0.15
	FR1 Band 12_Ant T7	15M	BPSK	1	40	Top	10mm	141500	707.5	24.22	24.50	0.145	0.16
	FR1 Band 12_Ant T7	15M	BPSK	37	21		10mm	141500	707.5	23.36	23.50	0.113	0.12
	FR1 Band 12_Ant T7	15M	BPSK	1	40	Front	10mm	141500	707.5	24.22	24.50	0.658	0.70
	FR1 Band 12_Ant T7	15M	BPSK	37	21		10mm	141500	707.5	23.36	23.50	0.521	0.54
	FR1 Band 12_Ant T7	15M	BPSK	1	40	Left	10mm	141500	707.5	24.22	24.50	0.230	0.25
	FR1 Band 12_Ant T7	15M	BPSK	37	21		10mm	141500	707.5	23.36	23.50	0.187	0.19
	FR1 Band 25_Ant T7	20M	QPSK	1	53	Top	10mm	372000	1860	24.44	24.50	1.16	1.18
	FR1 Band 25_Ant T7	20M	QPSK	1	53		10mm	376500	1882.5	24.46	24.50	1.05	1.06
	FR1 Band 25_Ant T7	20M	QPSK	1	53		10mm	381000	1905	24.10	24.50	0.942	1.03
	FR1 Band 25_Ant T7	20M	QPSK	50	28		10mm	376500	1882.5	23.17	23.50	0.856	0.92
	FR1 Band 25_Ant T7	20M	QPSK	1	53	Back	10mm	372000	1860	24.44	24.50	1.18	1.20
	FR1 Band 25_Ant T7	20M	QPSK	1	53		10mm	376500	1882.5	24.46	24.50	1.11	1.12
	FR1 Band 25_Ant T7	20M	QPSK	1	53		10mm	381000	1905	24.10	24.50	1.12	1.23
	FR1 Band 25_Ant T7	20M	QPSK	50	28		10mm	376500	1882.5	23.17	23.50	0.911	0.98
	FR1 Band 25_Ant T7	20M	QPSK	1	53	Right	10mm	376500	1882.5	24.46	24.50	0.295	0.30
	FR1 Band 25_Ant T7	20M	QPSK	50	28		10mm	376500	1882.5	23.17	23.50	0.209	0.23
	FR1 Band 25_Ant T3	20M	QPSK	1	53	Top	10mm	372000	1860	24.30	24.50	0.985	1.03
	FR1 Band 25_Ant T3	20M	QPSK	1	53		10mm	376500	1882.5	24.41	24.50	0.967	0.99
	FR1 Band 25_Ant T3	20M	QPSK	1	53		10mm	381000	1905	24.01	24.50	0.955	1.07
	FR1 Band 25_Ant T3	20M	QPSK	50	28		10mm	376500	1882.5	23.02	23.50	0.812	0.91
	FR1 Band 25_Ant T3	20M	QPSK	1	53	Front	10mm	372000	1860	24.30	24.50	1.12	1.17
4	FR1 Band 25_Ant T3	20M	QPSK	1	53		10mm	376500	1882.5	24.41	24.50	1.28	1.31
	FR1 Band 25_Ant T3	20M	QPSK	1	53		10mm	381000	1905	24.01	24.50	1.15	1.29
	FR1 Band 25_Ant T3	20M	QPSK	50	28		10mm	376500	1882.5	23.02	23.50	0.967	1.08
	FR1 Band 25_Ant T3	20M	QPSK	1	53	Left	10mm	376500	1882.5	24.41	24.50	0.226	0.23
	FR1 Band 25_Ant T3	20M	QPSK	50	28		10mm	376500	1882.5	23.02	23.50	0.158	0.18
	FR1 Band 40_Ant T7	20M	BPSK	1	53	Top	10mm	462000	2310	24.30	24.50	1.17	1.23
	FR1 Band 40_Ant T7	20M	BPSK	1	53		10mm	470000	2350	24.41	24.50	1.07	1.09
	FR1 Band 40_Ant T7	20M	BPSK	1	53		10mm	478000	2390	24.01	24.50	1.17	1.31
	FR1 Band 40_Ant T7	20M	BPSK	50	28		10mm	470000	2350	23.02	23.50	0.922	1.03
5	FR1 Band 40_Ant T7	20M	BPSK	1	53	Back	10mm	462000	2310	24.30	24.50	1.25	1.31
	FR1 Band 40_Ant T7	20M	BPSK	1	53		10mm	470000	2350	24.41	24.50	1.23	1.26
	FR1 Band 40_Ant T7	20M	BPSK	1	53		10mm	478000	2390	24.01	24.50	1.15	1.29
	FR1 Band 40_Ant T7	20M	BPSK	50	28		10mm	470000	2350	23.02	23.50	0.967	1.08
	FR1 Band 40_Ant T7	20M	BPSK	1	53	Right	10mm	470000	2350	24.41	24.50	0.253	0.26
	FR1 Band 40_Ant T7	20M	BPSK	50	28		10mm	470000	2350	23.02	23.50	0.185	0.21
	FR1 Band 40_Ant T3	20M	BPSK	1	53	Top	10mm	462000	2310	24.23	24.50	1.09	1.16
	FR1 Band 40_Ant T3	20M	BPSK	1	53		10mm	470000	2350	24.07	24.50	1.14	1.26
	FR1 Band 40_Ant T3	20M	BPSK	1	53		10mm	478000	2390	24.05	24.50	1.11	1.23
	FR1 Band 40_Ant T3	20M	BPSK	50	28		10mm	470000	2350	23.17	23.50	0.897	0.97
	FR1 Band 40_Ant T3	20M	BPSK	1	53	Front	10mm	462000	2310	24.23	24.50	1.20	1.28
	FR1 Band 40_Ant T3	20M	BPSK	1	53		10mm	470000	2350	24.07	24.50	1.11	1.23
	FR1 Band 40_Ant T3	20M	BPSK	1	53		10mm	478000	2390	24.05	24.50	1.17	1.30
	FR1 Band 40_Ant T3	20M	BPSK	50	28		10mm	470000	2350	23.17	23.50	0.958	1.03
	FR1 Band 40_Ant T3	20M	BPSK	1	53	Left	10mm	470000	2350	24.07	24.50	0.255	0.28
	FR1 Band 40_Ant T3	20M	BPSK	50	28		10mm	470000	2350	23.17	23.50	0.138	0.15

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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)
	FR1 Band 41_Ant T7	20M	BPSK	1	53	Top	10mm	518601	2593	24.26	24.50	0.578	0.61
	FR1 Band 41_Ant T7	20M	BPSK	50	28		10mm	518601	2593	23.29	23.50	0.458	0.48
	FR1 Band 41_Ant T7	20M	BPSK	1	53	Front	10mm	518601	2593	24.26	24.50	0.0986	0.10
	FR1 Band 41_Ant T7	20M	BPSK	50	28		10mm	518601	2593	23.29	23.50	0.0769	0.08
	FR1 Band 41_Ant T7	20M	BPSK	1	53	Back	10mm	518601	2593	24.26	24.50	0.301	0.32
	FR1 Band 41_Ant T7	20M	BPSK	50	28		10mm	518601	2593	23.29	23.50	0.247	0.26
	FR1 Band 41_Ant T7	20M	BPSK	1	53	Right	10mm	501200	2506	24.21	24.50	1.08	1.16
	FR1 Band 41_Ant T7	20M	BPSK	1	53		10mm	518601	2593	24.26	24.50	1.01	1.07
	FR1 Band 41_Ant T7	20M	BPSK	1	53		10mm	536000	2680	24.00	24.50	1.01	1.13
	FR1 Band 41_Ant T7	20M	BPSK	50	28		10mm	518601	2593	23.29	23.50	0.921	0.97
	FR1 Band 41_Ant T3	20M	BPSK	1	53	Top	10mm	518601	2593	24.34	24.50	0.522	0.54
	FR1 Band 41_Ant T3	20M	BPSK	50	28		10mm	518601	2593	23.08	23.50	0.468	0.52
	FR1 Band 41_Ant T3	20M	BPSK	1	53	Front	10mm	518601	2593	24.34	24.50	0.124	0.13
	FR1 Band 41_Ant T3	20M	BPSK	50	28		10mm	518601	2593	23.08	23.50	0.101	0.11
	FR1 Band 41_Ant T3	20M	BPSK	1	53	Back	10mm	518601	2593	24.34	24.50	0.323	0.34
	FR1 Band 41_Ant T3	20M	BPSK	50	28		10mm	518601	2593	23.08	23.50	0.264	0.29
	FR1 Band 41_Ant T3	20M	BPSK	1	53	Left	10mm	501200	2506	24.12	24.50	0.904	0.99
6	FR1 Band 41_Ant T3	20M	BPSK	1	53		10mm	518601	2593	24.34	24.50	1.12	1.16
	FR1 Band 41_Ant T3	20M	BPSK	1	53		10mm	536000	2680	24.30	24.50	1.09	1.14
	FR1 Band 41_Ant T3	20M	BPSK	50	28		10mm	518601	2593	23.08	23.50	0.826	0.91
	FR1 Band 41_Ant T7	20M	BPSK	1	53	Top	10mm	518601	2593	21.35	21.50	0.221	0.23
	FR1 Band 41_Ant T7	20M	BPSK	1	53	Front	10mm	518601	2593	21.35	21.50	0.0367	0.04
	FR1 Band 41_Ant T7	20M	BPSK	1	53	Back	10mm	518601	2593	21.35	21.50	0.121	0.13
	FR1 Band 41_Ant T7	20M	BPSK	1	53	Right	10mm	518601	2593	21.35	21.50	0.467	0.48
	FR1 Band 41_Ant T3	20M	BPSK	1	53	Top	10mm	518601	2593	21.35	21.50	0.206	0.21
	FR1 Band 41_Ant T3	20M	BPSK	1	53	Front	10mm	518601	2593	21.35	21.50	0.0423	0.04
	FR1 Band 41_Ant T3	20M	BPSK	1	53	Back	10mm	518601	2593	21.35	21.50	0.146	0.15
	FR1 Band 41_Ant T3	20M	BPSK	1	53	Left	10mm	518601	2593	21.35	21.50	0.487	0.50
	FR1 Band 66_Ant T7	20M	BPSK	1	53	Top	10mm	344000	1720	24.13	24.50	0.859	0.94
	FR1 Band 66_Ant T7	20M	BPSK	1	53		10mm	349000	1745	24.37	24.50	0.983	1.01
	FR1 Band 66_Ant T7	20M	BPSK	1	53		10mm	354000	1770	24.33	24.50	0.838	0.87
	FR1 Band 66_Ant T7	20M	BPSK	50	28		10mm	349000	1745	23.05	23.50	0.758	0.84
7	FR1 Band 66_Ant T7	20M	BPSK	1	53	Back	10mm	344000	1720	24.13	24.50	1.27	1.38
	FR1 Band 66_Ant T7	20M	BPSK	1	53		10mm	349000	1745	24.37	24.50	1.22	1.26
	FR1 Band 66_Ant T7	20M	BPSK	1	53		10mm	354000	1770	24.33	24.50	1.21	1.26
	FR1 Band 66_Ant T7	20M	BPSK	50	28		10mm	349000	1745	23.05	23.50	0.921	1.02
	FR1 Band 66_Ant T7	20M	BPSK	1	53	Right	10mm	349000	1745	24.37	24.50	0.315	0.32
	FR1 Band 66_Ant T7	20M	BPSK	50	28		10mm	349000	1745	23.05	23.50	0.241	0.27
	FR1 Band 66_Ant T3	20M	BPSK	1	53	Top	10mm	344000	1720	24.06	24.50	0.869	0.96
	FR1 Band 66_Ant T3	20M	BPSK	1	53		10mm	349000	1745	24.06	24.50	1.06	1.17
	FR1 Band 66_Ant T3	20M	BPSK	1	53		10mm	354000	1770	24.22	24.50	1.09	1.16
	FR1 Band 66_Ant T3	20M	BPSK	50	28		10mm	349000	1745	23.15	23.50	0.895	0.97
	FR1 Band 66_Ant T3	20M	BPSK	1	53	Front	10mm	344000	1720	24.06	24.50	1.18	1.31
	FR1 Band 66_Ant T3	20M	BPSK	1	53		10mm	349000	1745	24.06	24.50	1.14	1.26
	FR1 Band 66_Ant T3	20M	BPSK	1	53		10mm	354000	1770	24.22	24.50	1.10	1.17
	FR1 Band 66_Ant T3	20M	BPSK	50	28		10mm	349000	1745	23.15	23.50	0.926	1.00
	FR1 Band 66_Ant T3	20M	BPSK	1	53	Left	20mm	349000	1745	24.06	24.50	0.317	0.35
	FR1 Band 66_Ant T3	20M	BPSK	50	28		10mm	349000	1745	23.15	23.50	0.253	0.27
	FR1 Band 66_Ant T7	20M	BPSK	1	53	Top	10mm	349000	1745	21.42	21.50	0.405	0.41
	FR1 Band 66_Ant T7	20M	BPSK	1	53	Back	10mm	349000	1745	21.42	21.50	0.591	0.60
	FR1 Band 66_Ant T7	20M	BPSK	1	53	Right	10mm	349000	1745	21.42	21.50	0.139	0.14
	FR1 Band 66_Ant T3	20M	BPSK	1	53	Top	10mm	349000	1745	21.42	21.50	0.446	0.45
	FR1 Band 66_Ant T3	20M	BPSK	1	53	Front	10mm	349000	1745	21.42	21.50	0.503	0.51
	FR1 Band 66_Ant T3	20M	BPSK	1	53	Left	10mm	349000	1745	21.42	21.50	0.127	0.13

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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)
	FR1 Band 71_Ant T7	20M	BPSK	1	53	Top	10mm	136100	680.5	24.10	24.50	0.145	0.16
	FR1 Band 71_Ant T7	20M	BPSK	50	28		10mm	136100	680.5	23.06	23.50	0.102	0.11
8	FR1 Band 71_Ant T7	20M	BPSK	1	53	Back	10mm	136100	680.5	24.10	24.50	0.786	0.86
	FR1 Band 71_Ant T7	20M	BPSK	50	28		10mm	136100	680.5	23.06	23.50	0.625	0.69
	FR1 Band 71_Ant T7	20M	BPSK	1	53	Right	10mm	136100	680.5	24.10	24.50	0.229	0.25
	FR1 Band 71_Ant T7	20M	BPSK	50	28		10mm	136100	680.5	23.06	23.50	0.136	0.15
	FR1 Band 71_Ant T3	20M	BPSK	1	53	Top	10mm	136100	680.5	24.17	24.50	0.130	0.14
	FR1 Band 71_Ant T3	20M	BPSK	50	28		10mm	136100	680.5	23.39	23.50	0.0987	0.10
	FR1 Band 71_Ant T3	20M	BPSK	1	53	Front	10mm	136100	680.5	24.17	24.50	0.658	0.71
	FR1 Band 71_Ant T3	20M	BPSK	50	28		10mm	136100	680.5	23.39	23.50	0.521	0.53
	FR1 Band 71_Ant T3	20M	BPSK	1	53	Left	10mm	136100	680.5	24.17	24.50	0.219	0.24
	FR1 Band 71_Ant T3	20M	BPSK	50	28		10mm	136100	680.5	23.39	23.50	0.151	0.15
	FR1 Band 71_Ant T7	20M	BPSK	1	53	Top	10mm	136100	680.5	21.38	21.50	0.0624	0.06
	FR1 Band 71_Ant T7	20M	BPSK	1	53	Back	10mm	136100	680.5	21.38	21.50	0.386	0.40
	FR1 Band 71_Ant T7	20M	BPSK	1	53	Right	10mm	136100	680.5	21.38	21.50	0.105	0.11
	FR1 Band 71_Ant T3	20M	BPSK	1	53	Top	10mm	136100	680.5	21.38	21.50	0.0597	0.06
	FR1 Band 71_Ant T3	20M	BPSK	1	53	Front	10mm	136100	680.5	21.38	21.50	0.322	0.33
	FR1 Band 71_Ant T3	20M	BPSK	1	53	Left	10mm	136100	680.5	21.38	21.50	0.106	0.11
	FR1 Band 77_Ant T7	20M	BPSK	1	53	Top	10mm	650000	3750	24.40	24.50	0.513	0.52
	FR1 Band 77_Ant T7	20M	BPSK	50	28		10mm	650000	3750	23.27	23.50	0.421	0.44
	FR1 Band 77_Ant T7	20M	BPSK	1	53	Back	10mm	620667	3310	24.14	24.50	0.945	1.03
9	FR1 Band 77_Ant T7	20M	BPSK	1	53		10mm	650000	3750	24.40	24.50	1.18	1.21
	FR1 Band 77_Ant T7	20M	BPSK	1	53		10mm	679333	4190	24.14	24.50	1.06	1.15
	FR1 Band 77_Ant T7	20M	BPSK	50	28		10mm	650000	3750	23.27	23.50	0.864	0.91
	FR1 Band 77_Ant T7	20M	BPSK	1	53	Right	10mm	650000	3750	24.40	24.50	0.443	0.45
	FR1 Band 77_Ant T7	20M	BPSK	50	28		10mm	650000	3750	23.27	23.50	0.328	0.35
	FR1 Band 77_Ant T3	20M	BPSK	1	53	Top	10mm	650000	3750	24.39	24.50	0.617	0.63
	FR1 Band 77_Ant T3	20M	BPSK	50	28		10mm	650000	3750	23.12	23.50	0.537	0.59
	FR1 Band 77_Ant T3	20M	BPSK	1	53	Front	10mm	620667	3310	24.43	24.50	0.910	0.92
	FR1 Band 77_Ant T3	20M	BPSK	1	53		10mm	650000	3750	24.39	24.50	1.10	1.13
	FR1 Band 77_Ant T3	20M	BPSK	1	53		10mm	679333	4190	24.15	24.50	1.11	1.20
	FR1 Band 77_Ant T3	20M	BPSK	50	28		10mm	650000	3750	23.12	23.50	0.867	0.95
	FR1 Band 77_Ant T3	20M	BPSK	1	53	Left	10mm	650000	3750	24.39	24.50	0.506	0.52
	FR1 Band 77_Ant T3	20M	BPSK	50	28		10mm	650000	3750	23.12	23.50	0.426	0.46
	FR1 Band 77_Ant T7	20M	BPSK	1	53		10mm	650000	3750	21.29	21.50	0.201	0.21
	FR1 Band 77_Ant T7	20M	BPSK	1	53		10mm	650000	3750	21.29	21.50	0.569	0.60
	FR1 Band 77_Ant T7	20M	BPSK	1	53		10mm	650000	3750	21.29	21.50	0.213	0.22
	FR1 Band 77_Ant T3	20M	BPSK	1	53		10mm	650000	3750	21.29	21.50	0.297	0.31
	FR1 Band 77_Ant T3	20M	BPSK	1	53		10mm	650000	3750	21.29	21.50	0.589	0.62
	FR1 Band 77_Ant T3	20M	BPSK	1	53		10mm	650000	3750	21.29	21.50	0.237	0.25

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10. Simultaneous Transmission Analysis

The 3G/4G/WiFi data is located in report number SAR.20220901. The data listed in the tables below was extracted from the report filed with this report.

Sim-Tx configuration

No.	Simultaneous Transmission Configuration	Exposure Positions
		Body
1	UMTS + 2.4 GHz Wifi T9 + 2.4 GHz WiFi B9	Yes
2	UMTS + 5 GHz Wifi T9 + 5 GHz WiFi B9	Yes
3	LTE + 2.4 GHz Wifi T9 + 2.4 GHz WiFi B9	Yes
4	LTE + 5 GHz Wifi T9 + 5 GHz WiFi B9	Yes
5	FR1 + 2.4 GHz Wifi T9 + 2.4 GHz WiFi B9	Yes
6	FR1 + 5 GHz Wifi T9 + 5 GHz WiFi B9	Yes

General Note:

1. The worst case WLAN reported SAR for each configuration was used for SAR summation, regardless of whether the WLAN channel has Hotspot capability. Therefore, the following summations represent the absolute worst cases for simultaneous transmission with WLAN.
2. The Scaled SAR summation is calculated based on the same configuration and test position.

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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 T9	2.4GHz Wi-Fi B9	5GHz Wi-Fi T9	5GHz Wi-Fi B9		
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
WCDMA II Ant T7	Top	1.02	0.58	0.42	0.75	0.82	2.02	2.59
	Front						0.00	0.00
	Back	1.05					1.05	1.05
	Left						0.00	0.00
	Right	0.94					0.94	0.94
	Bottom						0.00	0.00
WCDMA II Ant T3	Top	1.00	0.58	0.42	0.75	0.82	2.00	2.57
	Front	0.97					0.97	0.97
	Back						0.00	0.00
	Left	0.74					0.74	0.74
	Right						0.00	0.00
	Bottom						0.00	0.00
WCDMA IV Ant T7	Top	0.49	0.58	0.42	0.75	0.82	1.49	2.06
	Front						0.00	0.00
	Back	0.74					0.74	0.74
	Left						0.00	0.00
	Right	0.86					0.86	0.86
	Bottom						0.00	0.00
WCDMA IV Ant T3	Top	0.56	0.58	0.42	0.75	0.82	1.56	2.13
	Front	1.01					1.01	1.01
	Back						0.00	0.00
	Left	0.92					0.92	0.92
	Right						0.00	0.00
	Bottom						0.00	0.00
WCDMA V Ant T7	Top	0.11	0.58	0.42	0.75	0.82	1.11	1.68
	Front						0.00	0.00
	Back	0.36					0.36	0.36
	Left						0.00	0.00
	Right	0.64					0.64	0.64
	Bottom						0.00	0.00
WCDMA V Ant T3	Top	0.03	0.58	0.42	0.75	0.82	1.03	1.60
	Front	0.34					0.34	0.34
	Back						0.00	0.00
	Left	0.52					0.52	0.52
	Right						0.00	0.00
	Bottom						0.00	0.00
LTE Band 7 Ant T7	Top	0.71	0.58	0.42	0.75	0.82	1.71	2.28
	Front						0.00	0.00
	Back	1.21					1.21	1.21
	Left						0.00	0.00
	Right	0.97					0.97	0.97
	Bottom						0.00	0.00
LTE Band 7 T3	Top	1.27	0.58	0.42	0.75	0.82	2.27	2.84
	Front	1.17					1.17	1.17
	Back						0.00	0.00
	Left	0.55					0.55	0.55
	Right						0.00	0.00
	Bottom						0.00	0.00

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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)		
LTE Band 12 Ant T7	Top	0.03	0.58	0.42	0.75	0.82	1.03	1.60
	Front						0.00	0.00
	Back	0.75					0.75	0.75
	Left						0.00	0.00
	Right	0.19					0.19	0.19
	Bottom						0.00	0.00
LTE Band 12 Ant T3	Top	0.03	0.58	0.42	0.75	0.82	1.03	1.60
	Front	0.56					0.56	0.56
	Back						0.00	0.00
	Left	0.21					0.21	0.21
	Right						0.00	0.00
	Bottom						0.00	0.00
LTE Band 13 Ant T7	Top	0.13	0.58	0.42	0.75	0.82	1.13	1.70
	Front						0.00	0.00
	Back	0.93					0.93	0.93
	Left						0.00	0.00
	Right	0.25					0.25	0.25
	Bottom						0.00	0.00
LTE Band 13 Ant T3	Top	0.09	0.58	0.42	0.75	0.82	1.09	1.66
	Front	0.88					0.88	0.88
	Back						0.00	0.00
	Left	0.55					0.55	0.55
	Right						0.00	0.00
	Bottom						0.00	0.00
LTE Band 14 Ant T7	Top	0.13	0.58	0.42	0.75	0.82	1.13	1.70
	Front						0.00	0.00
	Back	0.95					0.95	0.95
	Left						0.00	0.00
	Right	0.61					0.61	0.61
	Bottom						0.00	0.00
LTE Band 14 Ant T3	Top	0.03	0.58	0.42	0.75	0.82	1.03	1.60
	Front	0.98					0.98	0.98
	Back						0.00	0.00
	Left	0.55					0.55	0.55
	Right						0.00	0.00
	Bottom						0.00	0.00
LTE Band 25 Ant T7	Top	1.19	0.58	0.42	0.75	0.82	2.19	2.76
	Front						0.00	0.00
	Back	1.30					1.30	1.30
	Left						0.00	0.00
	Right	1.16					1.16	1.16
	Bottom						0.00	0.00
LTE Band 25 Ant T3	Top	1.17	0.58	0.42	0.75	0.82	2.17	2.74
	Front	1.29					1.29	1.29
	Back						0.00	0.00
	Left	0.87					0.87	0.87
	Right						0.00	0.00
	Bottom						0.00	0.00

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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)		
LTE Band 26 Ant T7	Top	0.11	0.58	0.42	0.75	0.82	1.11	1.68
	Front						0.00	0.00
	Back	0.43					0.43	0.43
	Left						0.00	0.00
	Right	0.62					0.62	0.62
	Bottom						0.00	0.00
LTE Band 26 Ant T3	Top	0.03	0.58	0.42	0.75	0.82	1.03	1.60
	Front	0.39					0.39	0.39
	Back						0.00	0.00
	Left	0.56					0.56	0.56
	Right						0.00	0.00
	Bottom						0.00	0.00
LTE Band 40 Ant T7	Top	0.54	0.58	0.42	0.75	0.82	1.54	2.11
	Front						0.00	0.00
	Back	1.36					1.36	1.36
	Left						0.00	0.00
	Right	0.17					0.17	0.17
	Bottom						0.00	0.00
LTE Band 40 Ant T3	Top	0.80	0.58	0.42	0.75	0.82	1.80	2.37
	Front	1.45					1.45	1.45
	Back						0.00	0.00
	Left	0.21					0.21	0.21
	Right						0.00	0.00
	Bottom						0.00	0.00
LTE Band 41 Ant T7	Top	0.32	0.58	0.42	0.75	0.82	1.32	1.89
	Front						0.00	0.00
	Back	0.84					0.84	0.84
	Left						0.00	0.00
	Right	0.68					0.68	0.68
	Bottom						0.00	0.00
LTE Band 41 Ant T3	Top	0.59	0.58	0.42	0.75	0.82	1.59	2.16
	Front	0.88					0.88	0.88
	Back						0.00	0.00
	Left	0.20					0.20	0.20
	Right						0.00	0.00
	Bottom						0.00	0.00
LTE Band 48 Ant T7	Top	0.39	0.58	0.42	0.75	0.82	1.39	1.96
	Front						0.00	0.00
	Back	1.17					1.17	1.17
	Left						0.00	0.00
	Right	0.80					0.80	0.80
	Bottom						0.00	0.00
LTE Band 48 Ant T3	Top	0.56	0.58	0.42	0.75	0.82	1.56	2.13
	Front	1.18					1.18	1.18
	Back						0.00	0.00
	Left	0.54					0.54	0.54
	Right						0.00	0.00
	Bottom						0.00	0.00

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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)		
LTE Band 66 Ant T7	Top	0.60	0.58	0.42	0.75	0.82	1.60	2.17
	Front						0.00	0.00
	Back	0.90					0.90	0.90
	Left						0.00	0.00
	Right	0.99					0.99	0.99
	Bottom						0.00	0.00
LTE Band 66 Ant T3	Top	0.62	0.58	0.42	0.75	0.82	1.62	2.19
	Front	1.11					1.11	1.11
	Back						0.00	0.00
	Left	0.97					0.97	0.97
	Right						0.00	0.00
	Bottom						0.00	0.00
LTE Band 71 Ant T7	Top	0.03	0.58	0.42	0.75	0.82	1.03	1.60
	Front						0.00	0.00
	Back	0.82					0.82	0.82
	Left						0.00	0.00
	Right	0.44					0.44	0.44
	Bottom						0.00	0.00
LTE Band 71 Ant T3	Top	0.05	0.58	0.42	0.75	0.82	1.05	1.62
	Front	0.55					0.55	0.55
	Back						0.00	0.00
	Left	0.50					0.50	0.50
	Right						0.00	0.00
	Bottom						0.00	0.00

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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)		
FR1 Band 2 Ant T7	Top	0.49	0.58	0.42	0.75	0.82	1.49	2.06
	Front						0.00	0.00
	Back	0.52					0.52	0.52
	Left						0.00	0.00
	Right	0.13					0.13	0.13
	Bottom						0.00	0.00
FR1 Band 2 Ant T3	Top	0.26	0.58	0.42	0.75	0.82	1.26	1.83
	Front	0.69					0.69	0.69
	Back						0.00	0.00
	Left	0.11					0.11	0.11
	Right						0.00	0.00
	Bottom						0.00	0.00
FR1 Band 5 Ant T7	Top	0.12	0.58	0.42	0.75	0.82	1.12	1.69
	Front						0.00	0.00
	Back	0.93					0.93	0.93
	Left						0.00	0.00
	Right	0.27					0.27	0.27
	Bottom						0.00	0.00
FR1 Band 5 Ant T3	Top	0.13	0.58	0.42	0.75	0.82	1.13	1.70
	Front	0.75					0.75	0.75
	Back						0.00	0.00
	Left	0.28					0.28	0.28
	Right						0.00	0.00
	Bottom						0.00	0.00
FR1 Band 7 Ant T7	Top	1.22	0.58	0.42	0.75	0.82	2.22	2.79
	Front						0.00	0.00
	Back	1.20					1.20	1.20
	Left						0.00	0.00
	Right	0.30					0.30	0.30
	Bottom						0.00	0.00
FR1 Band 7 Ant T3	Top	0.79	0.58	0.42	0.75	0.82	1.79	2.36
	Front	1.22					1.22	1.22
	Back						0.00	0.00
	Left	0.35					0.35	0.35
	Right						0.00	0.00
	Bottom						0.00	0.00
FR1 Band 12 Ant T7	Top	0.17	0.58	0.42	0.75	0.82	1.17	1.74
	Front						0.00	0.00
	Back	0.80					0.80	0.80
	Left						0.00	0.00
	Right	0.23					0.23	0.23
	Bottom						0.00	0.00
FR1 Band 12 Ant T3	Top	0.16	0.58	0.42	0.75	0.82	1.16	1.73
	Front	0.70					0.70	0.70
	Back						0.00	0.00
	Left	0.25					0.25	0.25
	Right						0.00	0.00
	Bottom						0.00	0.00

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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)		
FR1 Band 25 Ant T7	Top	1.18	0.58	0.42	0.75	0.82	2.18	2.75
	Front						0.00	0.00
	Back	1.23					1.23	1.23
	Left						0.00	0.00
	Right	0.30					0.30	0.30
	Bottom						0.00	0.00
FR1 Band 25 Ant T3	Top	1.07	0.58	0.42	0.75	0.82	2.07	2.64
	Front	1.31					1.31	1.31
	Back						0.00	0.00
	Left	0.23					0.23	0.23
	Right						0.00	0.00
	Bottom						0.00	0.00
FR1 Band 40 Ant T7	Top	1.31	0.58	0.42	0.75	0.82	2.31	2.88
	Front						0.00	0.00
	Back	1.31					1.31	1.31
	Left						0.00	0.00
	Right	0.26					0.26	0.26
	Bottom						0.00	0.00
FR1 Band 40 Ant T3	Top	1.26	0.58	0.42	0.75	0.82	2.26	2.83
	Front	1.30					1.30	1.30
	Back						0.00	0.00
	Left	0.28					0.28	0.28
	Right						0.00	0.00
	Bottom						0.00	0.00
FR1 Band 41 Ant T7	Top	0.61	0.58	0.42	0.75	0.82	1.61	2.18
	Front	0.10					0.10	0.10
	Back	0.32					0.32	0.32
	Left						0.00	0.00
	Right	1.16					1.16	1.16
	Bottom						0.00	0.00
FR1 Band 41 Ant T3	Top	0.54	0.58	0.42	0.75	0.82	1.54	2.11
	Front	0.13					0.13	0.13
	Back	0.34					0.34	0.34
	Left	1.16					1.16	1.16
	Right						0.00	0.00
	Bottom						0.00	0.00
FR1 Band 66 Ant T7	Top	1.01	0.58	0.42	0.75	0.82	2.01	2.58
	Front						0.00	0.00
	Back	1.38					1.38	1.38
	Left						0.00	0.00
	Right	0.32					0.32	0.32
	Bottom						0.00	0.00
FR1 Band 66 Ant T3	Top	1.17	0.58	0.42	0.75	0.82	2.17	2.74
	Front	1.31					1.31	1.31
	Back						0.00	0.00
	Left	0.35					0.35	0.35
	Right						0.00	0.00
	Bottom						0.00	0.00

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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)		
FR1 Band 71 Ant T7	Top	0.16	0.58	0.42	0.75	0.82	1.16	1.73
	Front						0.00	0.00
	Back	0.86					0.86	0.86
	Left						0.00	0.00
	Right	0.25					0.25	0.25
	Bottom						0.00	0.00
FR1 Band 71 Ant T3	Top	0.14	0.58	0.42	0.75	0.82	1.14	1.71
	Front	0.71					0.71	0.71
	Back						0.00	0.00
	Left	0.24					0.24	0.24
	Right						0.00	0.00
	Bottom						0.00	0.00
FR1 Band 77 Ant T7	Top	0.52	0.58	0.42	0.75	0.82	1.52	2.09
	Front						0.00	0.00
	Back	1.21					1.21	1.21
	Left						0.00	0.00
	Right	0.45					0.45	0.45
	Bottom						0.00	0.00
FR1 Band 77 Ant T3	Top	0.63	0.58	0.42	0.75	0.82	1.63	2.20
	Front	1.20					1.20	1.20
	Back						0.00	0.00
	Left	0.52					0.52	0.52
	Right						0.00	0.00
	Bottom						0.00	0.00

The separation ratio is calculated below.

Distance between T7-T9 99 mm
Distance between T7-B9 248 mm
Distance between T3-T9 76 mm
Distance between T3-B9 202 mm
Distance between T7-T3 147 mm
Distance between T9-B9 240 mm

Simultaneous Separation Ratio Calculation is based on each antenna pair. The formula is listed below.

$(SAR_1 + SAR_2)^{1.5}/R_i \leq 0.04$ rounded to two digits

T7 Maximum power is 1.38 W/kg
T3 Maximum power is 1.45 W/kg
T9 Maximum power for WiFi is 0.75 W/kg
B9 Maximum power for WiFi is 0.82 W/kg

T7-T9 $(1.38+0.75)^{1.5}/99 = 0.03$
T7-B9 $(1.38+0.82)^{1.5}/248 = 0.02$
T3-T9 $(1.45+0.75)^{1.5}/76 = 0.04$
T3-B9 $(1.45+0.82)^{1.5}/202 = 0.02$
T9-B9 $(0.75+0.82)^{1.5}/240 = 0.01$
T7-T3 $(1.38+1.45)^{1.5}/147 = 0.03$

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LTE UL CA	Exposure Position	1 1ST UL 1g SAR (W/kg)	2 2nd UL 1g SAR (W/kg)	3 2.4GHz Wi-Fi 0 1g SAR (W/kg)	4 2.4GHz Wi-Fi 1 1g SAR (W/kg)	5 5GHz Wi-Fi 0 1g SAR (W/kg)	6 5GHz Wi-Fi 1 1g SAR (W/kg)	1+2+3+4 Summed 1g SAR (W/kg)	1+2+5+6 Summed 1g SAR (W/kg)
12A-4A T7	Top	0.01	0.25	0.58	0.42	0.75	0.82	1.26	1.83
	Front							0.00	0.00
	Back	0.34	0.41					0.75	0.75
	Left							0.00	0.00
	Right	0.10	0.46					0.56	0.56
	Bottom							0.00	0.00
12A-2A T7	Top	0.01	0.43	0.58	0.42	0.75	0.82	1.44	2.01
	Front							0.00	0.00
	Back	0.34	0.40					0.74	0.74
	Left							0.00	0.00
	Right	0.10	0.50					0.60	0.60
	Bottom							0.00	0.00
13A-2A T7	Top	0.07	0.43	0.58	0.42	0.75	0.82	1.50	2.07
	Front							0.00	0.00
	Back	0.46	0.40					0.86	0.86
	Left							0.00	0.00
	Right	0.12	0.50					0.62	0.62
	Bottom							0.00	0.00
13A-4A T7	Top	0.07	0.25	0.58	0.42	0.75	0.82	1.32	1.89
	Front							0.00	0.00
	Back	0.46	0.41					0.87	0.87
	Left							0.00	0.00
	Right	0.12	0.46					0.58	0.58
	Bottom							0.00	0.00
5A-2A T7	Top	0.06	0.43	0.58	0.42	0.75	0.82	1.49	2.06
	Front							0.00	0.00
	Back	0.22	0.40					0.62	0.62
	Left							0.00	0.00
	Right	0.34	0.50					0.84	0.84
	Bottom							0.00	0.00
5A-4A T7	Top	0.06	0.25	0.58	0.42	0.75	0.82	1.31	1.88
	Front							0.00	0.00
	Back	0.22	0.41					0.63	0.63
	Left							0.00	0.00
	Right	0.34	0.46					0.80	0.80
	Bottom							0.00	0.00
66A-2A T7	Top	0.22	0.43	0.58	0.42	0.75	0.82	1.65	2.22
	Front							0.00	0.00
	Back	0.42	0.40					0.82	0.82
	Left							0.00	0.00
	Right	0.46	0.50					0.96	0.96
	Bottom							0.00	0.00
66A-5A T7	Top	0.22	0.06	0.58	0.42	0.75	0.82	1.28	1.85
	Front							0.00	0.00
	Back	0.42	0.22					0.64	0.64
	Left							0.00	0.00
	Right	0.46	0.34					0.80	0.80
	Bottom							0.00	0.00
7A-5A T7	Top	0.33	0.06	0.58	0.42	0.75	0.82	1.39	1.96
	Front							0.00	0.00
	Back	0.54	0.22					0.76	0.76
	Left							0.00	0.00
	Right	0.45	0.34					0.79	0.79
	Bottom							0.00	0.00

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LTE UL CA	Exposure Position	1	2	3	4	5	6	1+2+3+4 Summed 1g SAR (W/kg)	1+2+5+6 Summed 1g SAR (W/kg)
		1ST UL	2nd UL	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)	1g SAR (W/kg)		
12A-4A T3	Top	0.02	0.33	0.58	0.42	0.75	0.82	1.35	1.92
	Front	0.23	0.52					0.75	0.75
	Back							0.00	0.00
	Left	0.11	0.45					0.56	0.56
	Right							0.00	0.00
	Bottom							0.00	0.00
12A-2A T3	Top	0.02	0.47	0.58	0.42	0.75	0.82	1.49	2.06
	Front	0.23	0.49					0.72	0.72
	Back							0.00	0.00
	Left	0.11	0.35					0.46	0.46
	Right							0.00	0.00
	Bottom							0.00	0.00
13A-2A T3	Top	0.04	0.47	0.58	0.42	0.75	0.82	1.51	2.08
	Front	0.44	0.49					0.93	0.93
	Back							0.00	0.00
	Left	0.26	0.35					0.61	0.61
	Right							0.00	0.00
	Bottom							0.00	0.00
13A-4A T3	Top	0.04	0.33	0.58	0.42	0.75	0.82	1.37	1.94
	Front	0.44	0.52					0.96	0.96
	Back							0.00	0.00
	Left	0.26	0.45					0.71	0.71
	Right							0.00	0.00
	Bottom							0.00	0.00
5A-2A T3	Top	0.01	0.47	0.58	0.42	0.75	0.82	1.48	2.05
	Front	0.19	0.49					0.68	0.68
	Back							0.00	0.00
	Left	0.28	0.35					0.63	0.63
	Right							0.00	0.00
	Bottom							0.00	0.00
5A-4A T3	Top	0.01	0.33	0.58	0.42	0.75	0.82	1.34	1.91
	Front	0.19	0.52					0.71	0.71
	Back							0.00	0.00
	Left	0.28	0.45					0.73	0.73
	Right							0.00	0.00
	Bottom							0.00	0.00
66A-2A T3	Top	0.31	0.47	0.58	0.42	0.75	0.82	1.78	2.35
	Front	0.52	0.49					1.01	1.01
	Back							0.00	0.00
	Left	0.49	0.35					0.84	0.84
	Right							0.00	0.00
	Bottom							0.00	0.00
66A-5A T3	Top	0.31	0.01	0.58	0.42	0.75	0.82	1.32	1.89
	Front	0.52	0.19					0.71	0.71
	Back							0.00	0.00
	Left	0.49	0.28					0.77	0.77
	Right							0.00	0.00
	Bottom							0.00	0.00
7A-5A T3	Top	0.64	0.01	0.58	0.42	0.75	0.82	1.65	2.22
	Front	0.54	0.19					0.73	0.73
	Back							0.00	0.00
	Left	0.25	0.28					0.53	0.53
	Right							0.00	0.00
	Bottom							0.00	0.00

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UL ENDC	Exposure Position	1	2	3	4	5	6	1+2+3+4 Summed 1g SAR (W/kg)	1+2+5+6 Summed 1g SAR (W/kg)
		1ST UL	2nd UL	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)	1g SAR (W/kg)		
12A-n66A T7	Top	0.01	0.41	0.58	0.42	0.75	0.82	1.42	1.99
	Front							0.00	0.00
	Back	0.34	0.60					0.94	0.94
	Left							0.00	0.00
	Right	0.10	0.14					0.24	0.24
	Bottom							0.00	0.00
12A-n2A T7	Top	0.01	0.49	0.58	0.42	0.75	0.82	1.50	2.07
	Front							0.00	0.00
	Back	0.34	0.52					0.86	0.86
	Left							0.00	0.00
	Right	0.10	0.13					0.23	0.23
	Bottom							0.00	0.00
13A-n66A T7	Top	0.07	0.41	0.58	0.42	0.75	0.82	1.48	2.05
	Front							0.00	0.00
	Back	0.46	0.60					1.06	1.06
	Left							0.00	0.00
	Right	0.12	0.14					0.26	0.26
	Bottom							0.00	0.00
13A-n2A T7	Top	0.07	0.49	0.58	0.42	0.75	0.82	1.56	2.13
	Front							0.00	0.00
	Back	0.46	0.52					0.98	0.98
	Left							0.00	0.00
	Right	0.12	0.13					0.25	0.25
	Bottom							0.00	0.00
25A-n41A T7/T6	Top	0.51	0.23	0.58	0.42	0.75	0.82	1.74	2.31
	Front		0.04					0.04	0.04
	Back	0.57	0.13					0.70	0.70
	Left							0.00	0.00
	Right	0.52	0.48					1.00	1.00
	Bottom							0.00	0.00
2A-n41A T7/T6	Top	0.43	0.23	0.58	0.42	0.75	0.82	1.66	2.23
	Front		0.04					0.04	0.04
	Back	0.40	0.13					0.53	0.53
	Left							0.00	0.00
	Right	0.50	0.48					0.98	0.98
	Bottom							0.00	0.00
2A-n5A T7	Top	0.43	0.08	0.58	0.42	0.75	0.82	1.51	2.08
	Front							0.00	0.00
	Back	0.40	0.42					0.82	0.82
	Left							0.00	0.00
	Right	0.50	0.10					0.60	0.60
	Bottom							0.00	0.00
2A-n71A T7	Top	0.43	0.06	0.58	0.42	0.75	0.82	1.49	2.06
	Front							0.00	0.00
	Back	0.40	0.40					0.80	0.80
	Left							0.00	0.00
	Right	0.50	0.11					0.61	0.61
	Bottom							0.00	0.00
41A-n77A T7	Top	0.06	0.21	0.58	0.42	0.75	0.82	1.27	1.84
	Front							0.00	0.00
	Back	0.23	0.60					0.83	0.83
	Left							0.00	0.00
	Right	0.12	0.22					0.34	0.34
	Bottom							0.00	0.00

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UL ENDC	Exposure Position	1	2	3	4	5	6	1+2+3+4 Summed 1g SAR (W/kg)	1+2+5+6 Summed 1g SAR (W/kg)
		1ST UL	2nd UL	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)	1g SAR (W/kg)		
5A-n66A T7	Top	0.06	0.41	0.58	0.42	0.75	0.82	1.47	2.04
	Front							0.00	0.00
	Back	0.22	0.60					0.82	0.82
	Left							0.00	0.00
	Right	0.34	0.14					0.48	0.48
	Bottom							0.00	0.00
5A-n2A T7	Top	0.06	0.49	0.58	0.42	0.75	0.82	1.55	2.12
	Front							0.00	0.00
	Back	0.22	0.52					0.74	0.74
	Left							0.00	0.00
	Right	0.34	0.13					0.47	0.47
	Bottom							0.00	0.00
66A-n41A T7/T6	Top	0.22	0.23	0.58	0.42	0.75	0.82	1.45	2.02
	Front		0.04					0.04	0.04
	Back	0.42	0.13					0.55	0.55
	Left							0.00	0.00
	Right	0.46	0.48					0.94	0.94
	Bottom							0.00	0.00
66A-n5A T7	Top	0.22	0.08	0.58	0.42	0.75	0.82	1.30	1.87
	Front							0.00	0.00
	Back	0.42	0.42					0.84	0.84
	Left							0.00	0.00
	Right	0.46	0.10					0.56	0.56
	Bottom							0.00	0.00
66A-n71A T7	Top	0.22	0.06	0.58	0.42	0.75	0.82	1.28	1.85
	Front							0.00	0.00
	Back	0.42	0.40					0.82	0.82
	Left							0.00	0.00
	Right	0.46	0.11					0.57	0.57
	Bottom							0.00	0.00
7A-n5A T7	Top	0.33	0.08	0.58	0.42	0.75	0.82	1.41	1.98
	Front							0.00	0.00
	Back	0.54	0.42					0.96	0.96
	Left							0.00	0.00
	Right	0.45	0.10					0.55	0.55
	Bottom							0.00	0.00
7A-n71A T7	Top	0.33	0.06	0.58	0.42	0.75	0.82	1.39	1.96
	Front							0.00	0.00
	Back	0.54	0.40					0.94	0.94
	Left							0.00	0.00
	Right	0.45	0.11					0.56	0.56
	Bottom							0.00	0.00

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UL ENDC	Exposure Position	1	2	3	4	5	6	1+2+3+4 Summed 1g SAR (W/kg)	1+2+5+6 Summed 1g SAR (W/kg)
		1ST UL	2nd UL	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)	1g SAR (W/kg)		
12A-n66A T3	Top	0.02	0.45	0.58	0.42	0.75	0.82	1.47	2.04
	Front	0.23	0.51					0.74	0.74
	Back							0.00	0.00
	Left	0.11	0.13					0.24	0.24
	Right							0.00	0.00
	Bottom							0.00	0.00
12A-n2A T3	Top	0.02	0.26	0.58	0.42	0.75	0.82	1.28	1.85
	Front	0.23	0.69					0.92	0.92
	Back							0.00	0.00
	Left	0.11	0.11					0.22	0.22
	Right							0.00	0.00
	Bottom							0.00	0.00
13A-n66A T3	Top	0.04	0.45	0.58	0.42	0.75	0.82	1.49	2.06
	Front	0.44	0.51					0.95	0.95
	Back							0.00	0.00
	Left	0.26	0.13					0.39	0.39
	Right							0.00	0.00
	Bottom							0.00	0.00
13A-n2A T3	Top	0.04	0.26	0.58	0.42	0.75	0.82	1.30	1.87
	Front	0.44	0.69					1.13	1.13
	Back							0.00	0.00
	Left	0.26	0.11					0.37	0.37
	Right							0.00	0.00
	Bottom							0.00	0.00
25A-n41A T3/T2	Top	0.50	0.21	0.58	0.42	0.75	0.82	1.71	2.28
	Front	0.54	0.04					0.58	0.58
	Back		0.15					0.15	0.15
	Left	0.43	0.50					0.93	0.93
	Right							0.00	0.00
	Bottom							0.00	0.00
2A-n41A T3/T2	Top	0.47	0.21	0.58	0.42	0.75	0.82	1.68	2.25
	Front	0.49	0.04					0.53	0.53
	Back		0.15					0.15	0.15
	Left	0.35	0.50					0.85	0.85
	Right							0.00	0.00
	Bottom							0.00	0.00
2A-n5A T3	Top	0.47	0.06	0.58	0.42	0.75	0.82	1.53	2.10
	Front	0.49	0.38					0.87	0.87
	Back							0.00	0.00
	Left	0.35	0.12					0.47	0.47
	Right							0.00	0.00
	Bottom							0.00	0.00
2A-n71A T3	Top	0.47	0.06	0.58	0.42	0.75	0.82	1.53	2.10
	Front	0.49	0.33					0.82	0.82
	Back							0.00	0.00
	Left	0.35	0.11					0.46	0.46
	Right							0.00	0.00
	Bottom							0.00	0.00
41A-n77A T3	Top	0.14	0.31	0.58	0.42	0.75	0.82	1.45	2.02
	Front	0.26	0.62					0.88	0.88
	Back							0.00	0.00
	Left	0.10	0.25					0.35	0.35
	Right							0.00	0.00
	Bottom							0.00	0.00

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UL ENDC	Exposure Position	1	2	3	4	5	6	1+2+3+4 Summed 1g SAR (W/kg)	1+2+5+6 Summed 1g SAR (W/kg)
		1ST UL	2nd UL	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)	1g SAR (W/kg)		
5A-n66A T3	Top	0.01	0.45	0.58	0.42	0.75	0.82	1.46	2.03
	Front	0.19	0.51					0.70	0.70
	Back							0.00	0.00
	Left	0.28	0.13					0.41	0.41
	Right							0.00	0.00
	Bottom							0.00	0.00
5A-n2A T3	Top	0.01	0.26	0.58	0.42	0.75	0.82	1.27	1.84
	Front	0.19	0.69					0.88	0.88
	Back							0.00	0.00
	Left	0.28	0.11					0.39	0.39
	Right							0.00	0.00
	Bottom							0.00	0.00
66A-n41A T3/T2	Top	0.31	0.21	0.58	0.42	0.75	0.82	1.52	2.09
	Front	0.52	0.04					0.56	0.56
	Back		0.15					0.15	0.15
	Left	0.49	0.50					0.99	0.99
	Right							0.00	0.00
	Bottom							0.00	0.00
66A-n5A T3	Top	0.31	0.06	0.58	0.42	0.75	0.82	1.37	1.94
	Front	0.52	0.38					0.90	0.90
	Back							0.00	0.00
	Left	0.49	0.12					0.61	0.61
	Right							0.00	0.00
	Bottom							0.00	0.00
66A-n71A T3	Top	0.31	0.06	0.58	0.42	0.75	0.82	1.37	1.94
	Front	0.52	0.33					0.85	0.85
	Back							0.00	0.00
	Left	0.49	0.11					0.60	0.60
	Right							0.00	0.00
	Bottom							0.00	0.00
7A-n5A T3	Top	0.64	0.06	0.58	0.42	0.75	0.82	1.70	2.27
	Front	0.54	0.38					0.92	0.92
	Back							0.00	0.00
	Left	0.25	0.12					0.37	0.37
	Right							0.00	0.00
	Bottom							0.00	0.00
7A-n71A T3	Top	0.64	0.06	0.58	0.42	0.75	0.82	1.70	2.27
	Front	0.54	0.33					0.87	0.87
	Back							0.00	0.00
	Left	0.25	0.11					0.36	0.36
	Right							0.00	0.00
	Bottom							0.00	0.00

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The separation ratio is calculated below.

Distance between T7-T9	99 mm
Distance between T7-B9	248 mm
Distance between T3-T9	76 mm
Distance between T3-B9	202 mm
Distance between T7-T3	147 mm
Distance between T9-B9	240 mm
Distance between T6-T7	62 mm
Distance between T6-T3	132 mm
Distance between T2-T7	132 mm
Distance between T2-T3	62 mm

Simultaneous Separation Ratio Calculation is based on each antenna pair. The formula is listed below.

$(SAR_1 + SAR_2)^{1.5}/R_i \leq 0.04$ rounded to two digits

T7 Maximum power is 0.60 W/kg
T3 Maximum power is 0.69 W/kg
T6 Maximum power is 0.48 W/kg
T2 Maximum power is 0.50 W/kg
T9 Maximum power for WiFi is 0.75 W/kg
B9 Maximum power for WiFi is 0.82 W/kg

T7-T9 $(0.60+0.75)^{1.5}/99 = 0.02$
T7-B9 $(0.60+0.82)^{1.5}/248 = 0.01$
T3-T9 $(0.69+0.75)^{1.5}/76 = 0.02$
T3-B9 $(0.69+0.82)^{1.5}/202 = 0.01$
T9-B9 $(0.75+0.82)^{1.5}/240 = 0.01$
T7-T3 $(0.60+0.69)^{1.5}/147 = 0.01$
T6-T7 $(0.48+0.60)^{1.5}/62 = 0.02$
T6-T3 $(0.48+0.69)^{1.5}/132 = 0.01$
T2-T7 $(0.50+0.60)^{1.5}/132 = 0.01$
T2-T3 $(0.50+0.69)^{1.5}/62 = 0.02$

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11. 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
ELI5 Flat Phantom	N/A	N/A	1251
Device Holder	N/A	N/A	N/A
Data Acquisition Electronics 4	03/24/2023	03/24/2022	1217
SPEAG E-Field Probe EX3DV4	01/14/2023	01/14/2022	7530
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 D3300V2	01/17/2023	01/17/2022	1032
Speag Validation Dipole D3500V2	04/13/2023	04/13/2021	1061
Speag Validation Dipole D3700V2	04/13/2023	04/13/2021	1024
Speag Validation Dipole D3900V2	01/13/2023	01/13/2022	1082
Speag Validation Dipole D4200V2	01/13/2023	01/13/2022	1025
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 MT8821C	N/A	N/A	6201381721
Aprel Dielectric Probe Assembly	N/A	N/A	0011
Head Equivalent Matter (600 MHz)	N/A	N/A	N/A
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
Head Equivalent Matter (3-6 GHz)	N/A	N/A	N/A

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12. 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.

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13. 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.

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Appendix A – System Validation Plots and Data

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************************************************************
Test Result for UIM Dielectric Parameter
Thu 01/Sep/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
0.5800        42.82  0.88   42.07  0.89
0.5900        42.77  0.88   42.01  0.90
0.6000        42.72  0.88   41.96  0.90
0.6100        42.67  0.88   41.91  0.91
0.6200        42.62  0.88   41.86  0.91
0.6300        42.56  0.88   41.79  0.91
0.6400        42.51  0.88   41.73  0.91
0.6500        42.46  0.88   41.67  0.91
0.6600        42.41  0.88   41.61  0.92
0.6700        42.36  0.89   41.55  0.92
0.6730        42.345 0.89   41.532 0.92*
0.6800        42.31  0.89   41.49  0.92
0.6805        42.307 0.89   41.487 0.921*
0.6880        42.262 0.89   41.442 0.928*
0.6900        42.25  0.89   41.43  0.93
0.7000        42.20  0.89   41.37  0.93

* value interpolated


************************************************************
Test Result for UIM Dielectric Parameter
Thu 01/Sep/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   41.27  0.89
0.7040        42.18  0.89   41.242 0.894*
0.7075        42.163 0.89   41.218 0.898*
0.7100        42.15  0.89   41.20  0.90
0.7110        42.145 0.89   41.195 0.901*
0.7130        42.135 0.89   41.185 0.903*
0.7200        42.10  0.89   41.15  0.91
0.7255        42.073 0.89   41.112 0.916*
0.7300        42.05  0.89   41.08  0.92
0.7380        42.002 0.89   41.032 0.92*
0.7400        41.99  0.89   41.02  0.92
0.7500        41.94  0.89   40.97  0.93
0.7600        41.89  0.89   40.91  0.94
0.7700        41.84  0.89   40.85  0.95
0.7800        41.79  0.90   40.79  0.95
0.7900        41.73  0.90   40.73  0.96
0.8000        41.68  0.90   40.69  0.96

* value interpolated
```


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****
Test Result for UIM Dielectric Parameter
Wed 31/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	41.14	0.92
0.8100	41.63	0.90	41.09	0.93
0.8200	41.58	0.90	41.03	0.94
0.8290	41.535	0.90	41.075	0.94*
0.8300	41.53	0.90	41.08	0.94
0.8340	41.518	0.904	41.068	0.944*
0.8365	41.511	0.907	41.061	0.947*
0.8390	41.503	0.909	41.053	0.949*
0.8400	41.50	0.91	41.05	0.95
0.8420	41.50	0.912	41.046	0.952*
0.8440	41.50	0.914	41.042	0.954*
0.8470	41.50	0.917	41.036	0.957*
0.8500	41.50	0.92	41.03	0.96
0.8520	41.50	0.922	41.026	0.962*
0.8600	41.50	0.93	41.01	0.97
0.8700	41.50	0.94	40.99	0.98
0.8800	41.50	0.95	40.98	0.99
0.8900	41.50	0.96	40.97	1.00
0.8975	41.50	0.968	40.963	1.008*
0.9000	41.50	0.97	40.96	1.01
0.9050	41.50	0.975	40.955	1.015*
0.9100	41.50	0.98	40.95	1.02
0.9200	41.49	0.98	40.94	1.02

* value interpolated

****
Test Result for UIM Dielectric Parameter
Tue 30/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	39.16	1.35
1.7100	40.14	1.35	39.14	1.36
1.7200	40.13	1.35	39.12	1.37
1.7300	40.11	1.36	39.10	1.37
1.7400	40.09	1.37	39.08	1.38
1.7450	40.085	1.37	39.07	1.385*
1.7475	40.083	1.37	39.065	1.388*
1.7500	40.08	1.37	39.06	1.39
1.7600	40.06	1.38	39.04	1.40
1.7700	40.05	1.38	39.02	1.41
1.7750	40.04	1.385	39.01	1.41*
1.7800	40.03	1.39	39.00	1.41
1.7900	40.02	1.39	38.98	1.42

* value interpolated

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****
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
1.8500	40.00	1.40	39.65	1.40
1.8600	40.00	1.40	39.63	1.41
1.8700	40.00	1.40	39.61	1.41
1.8800	40.00	1.40	39.59	1.42
1.8825	40.00	1.40	39.585	1.42*
1.8900	40.00	1.40	39.57	1.42
1.9000	40.00	1.40	39.55	1.42
1.9050	40.00	1.40	39.54	1.425*
1.9100	40.00	1.40	39.53	1.43
1.9200	40.00	1.40	39.52	1.44
1.9300	40.00	1.40	39.51	1.44
1.9400	40.00	1.40	39.49	1.44
1.9500	40.00	1.40	39.48	1.45
1.9600	40.00	1.40	39.46	1.45
1.9700	40.00	1.40	39.45	1.46
1.9800	40.00	1.40	39.44	1.46
1.9900	40.00	1.40	39.42	1.47

* 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
2.2900	39.48	1.66	38.71	1.69
2.3000	39.47	1.67	38.69	1.70
2.3100	39.45	1.68	38.67	1.71
2.3200	39.43	1.68	38.65	1.72
2.3300	39.41	1.69	38.63	1.73
2.3400	39.40	1.70	38.61	1.74
2.3500	39.38	1.71	38.59	1.75
2.3600	39.36	1.72	38.57	1.76
2.3700	39.34	1.73	38.56	1.77
2.3800	39.32	1.74	38.54	1.78
2.3900	39.31	1.75	38.52	1.79
2.4000	39.29	1.76	38.50	1.80
2.4100	39.27	1.76	38.49	1.81

* value interpolated

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****
Test Result for UIM Dielectric Parameter
Tue 06/Sep/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	38.88	1.84
2.5000	39.14	1.85	38.86	1.85
2.5060	39.128	1.862	38.842	1.856*
2.5100	39.12	1.87	38.83	1.86
2.5200	39.11	1.88	38.81	1.88
2.5300	39.10	1.89	38.79	1.89
2.5350	39.095	1.895	38.775	1.895*
2.5400	39.09	1.90	38.76	1.90
2.5445	39.081	1.905	38.751	1.909*
2.5500	39.07	1.91	38.74	1.92
2.5600	39.06	1.92	38.72	1.93
2.5700	39.05	1.93	38.69	1.94
2.5800	39.03	1.94	38.67	1.96
2.5900	39.02	1.95	38.64	1.97
2.5930	39.017	1.953	38.643	1.97*
2.6000	39.01	1.96	38.65	1.97
2.6100	39.00	1.97	38.63	1.98
2.6200	38.98	1.99	38.62	1.99
2.6300	38.97	2.00	38.60	2.00
2.6400	38.96	2.01	38.58	2.01
2.6415	38.959	2.012	38.577	2.012*
2.6500	38.95	2.02	38.56	2.02
2.6600	38.93	2.03	38.55	2.03
2.6700	38.92	2.04	38.53	2.04
2.6800	38.91	2.05	38.51	2.05
2.6900	38.89	2.06	38.49	2.06
2.7000	38.88	2.07	38.48	2.07

* value interpolated

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****
Test Result for UIM Dielectric Parameter
Tue 06/Sep/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
3.3000	38.16	2.70	37.59	2.73
3.3100	38.15	2.71	37.58	2.74*
3.3200	38.14	2.72	37.57	2.75
3.3400	38.12	2.74	37.55	2.77
3.3600	38.09	2.76	37.52	2.79
3.3800	38.07	2.78	37.50	2.81
3.4000	38.05	2.80	37.48	2.83
3.4077	38.038	2.808	37.468	2.838*
3.4200	38.02	2.82	37.45	2.85
3.4400	38.00	2.85	37.43	2.88
3.4600	37.98	2.87	37.41	2.90
3.4800	37.95	2.89	37.38	2.92
3.5000	37.93	2.91	37.36	2.94
3.5054	37.925	2.915	37.355	2.945*
3.5200	37.91	2.93	37.34	2.96
3.5400	37.88	2.95	37.31	2.98
3.5600	37.86	2.97	37.29	3.00
3.5800	37.84	2.99	37.27	3.02
3.6000	37.81	3.02	37.24	3.05
3.6031	37.807	3.023	37.237	3.053*
3.6033	37.807	3.023	37.237	3.053*
3.6200	37.79	3.04	37.22	3.07
3.6250	37.785	3.045	37.215	3.075*
3.6400	37.77	3.06	37.20	3.09
3.6600	37.75	3.08	37.18	3.11
3.6800	37.72	3.10	37.15	3.13
3.7000	37.70	3.12	37.13	3.15
3.7008	37.699	3.121	37.129	3.151*
3.7200	37.68	3.14	37.11	3.17
3.7400	37.65	3.17	37.08	3.20
3.7500	37.64	3.18	37.07	3.21*
3.7600	37.63	3.19	37.06	3.22
3.7800	37.61	3.21	37.04	3.24
3.7985	37.582	3.229	37.012	3.259*
3.8000	37.58	3.23	37.01	3.26
3.8200	37.56	3.25	36.99	3.28
3.8400	37.54	3.27	36.97	3.30
3.8600	37.51	3.29	36.94	3.32
3.8800	37.49	3.31	36.92	3.34
3.8902	37.48	3.325	36.91	3.355*
3.9000	37.47	3.34	36.90	3.37
3.9200	37.44	3.36	36.87	3.39
3.9400	37.42	3.38	36.85	3.41
3.9600	37.40	3.40	36.83	3.43
3.9800	37.37	3.42	36.80	3.45
3.9939	37.356	3.434	36.786	3.464*
4.0000	37.35	3.44	36.78	3.47
4.0200	37.33	3.46	36.76	3.49
4.0400	37.30	3.48	36.73	3.51
4.0600	37.28	3.51	36.71	3.54
4.0800	37.26	3.53	36.69	3.56
4.0916	37.243	3.542	36.673	3.572*
4.1000	37.23	3.55	36.66	3.58
4.1200	37.21	3.57	36.64	3.60
4.1400	37.19	3.59	36.62	3.62
4.1600	37.16	3.61	36.59	3.64
4.1800	37.14	3.63	36.57	3.66
4.1900	37.13	3.64	36.56	3.67*
4.2000	37.12	3.65	36.55	3.68
4.2200	37.09	3.68	36.52	3.71
4.2400	37.07	3.70	36.50	3.73

* value interpolated

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Plot 1

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

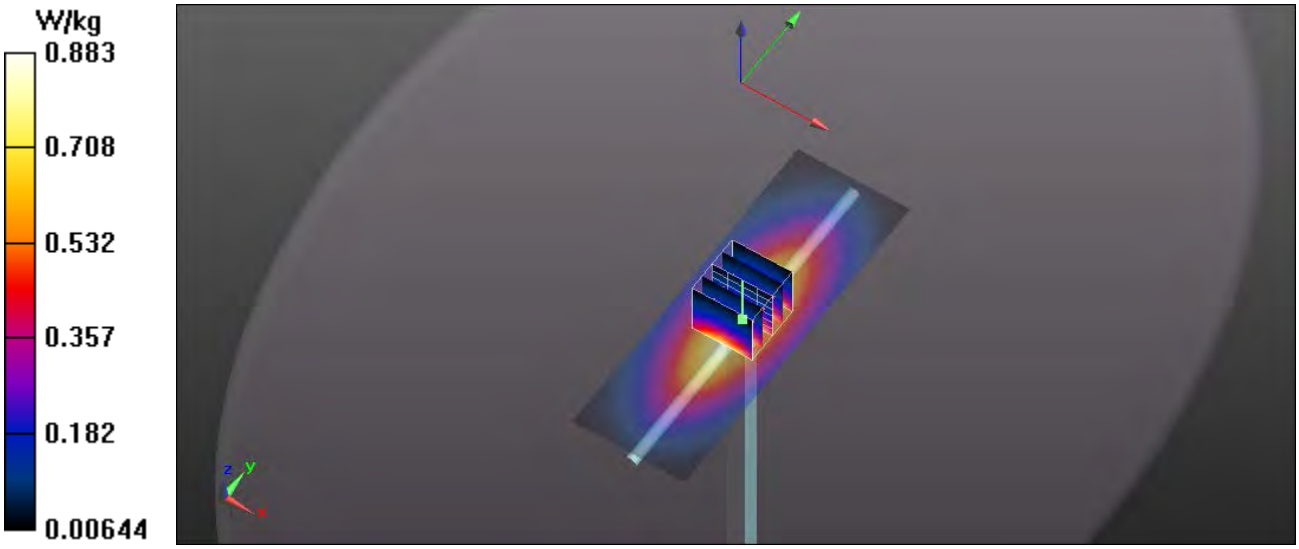
Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: HSL750; Medium parameters used (interpolated): f = 750 MHz; σ = 0.93 S/m; ε_r = 40.97; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 6/9/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 – SN7530; ConvF(10.44, 10.44, 10.44); Calibrated: 1/14/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
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) = 0.871 W/kg

750 MHz Head/Verification /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.452 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.76 mW/g
P_{in}= 100 mW
SAR(1 g) = 0.866 mW/g; SAR(10 g) = 0.559 mW/g
Maximum value of SAR (measured) = 0.883 W/kg



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Plot 2

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

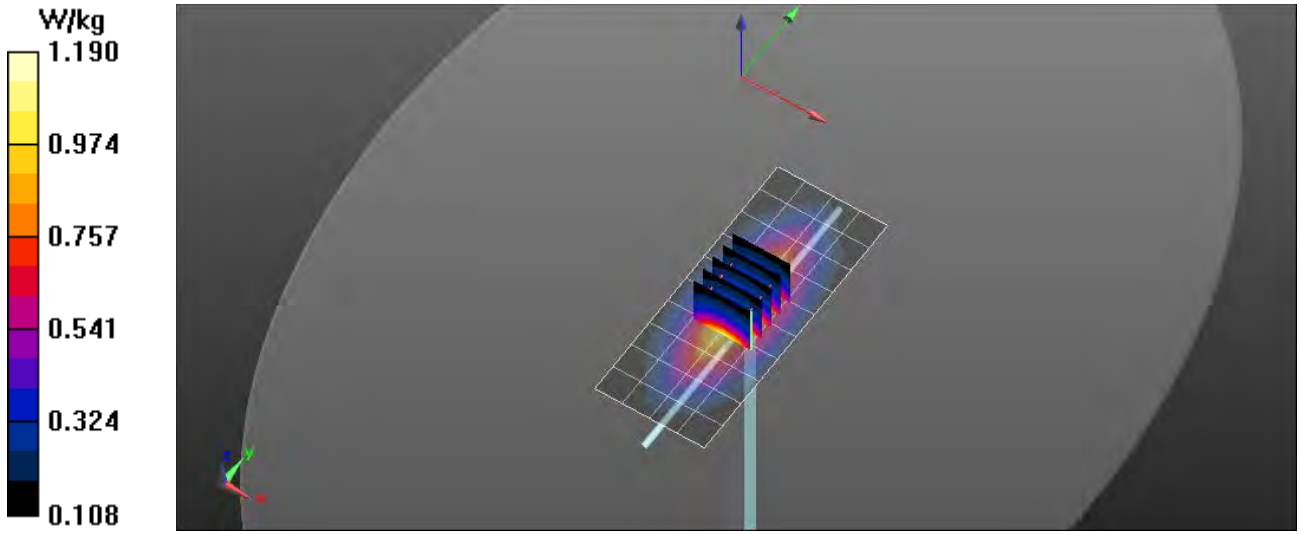
Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1
Medium: HSL900; Medium parameters used: f = 900 MHz; σ = 1.01 S/m; ε_r = 40.96; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 6/8/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 - SN7530; ConvF(9.98, 9.98, 9.98); Calibrated: 1/14/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
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) = 1.22 W/kg

900 MHz Head/Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.119 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.49 W/kg
P_{in}= 100 mW
SAR(1 g) = 1.16 W/kg; SAR(10 g) = 0.716 W/kg
Maximum value of SAR (measured) = 1.19 W/kg



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Plot 3

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

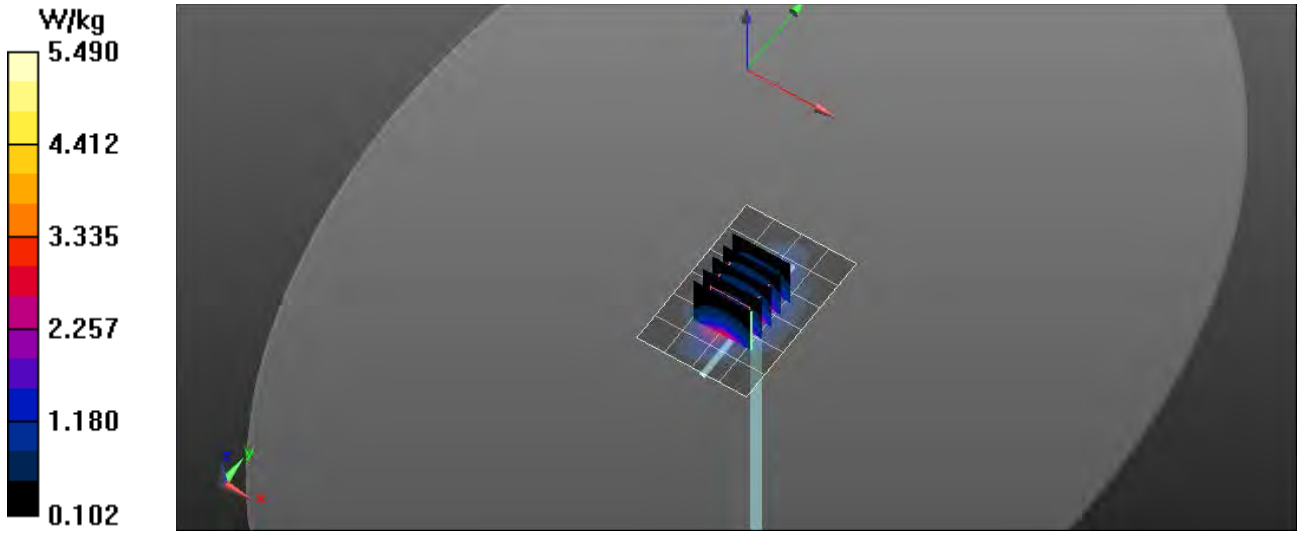
Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: HSL1750; Medium parameters used: f = 1750 MHz; σ = 1.39 S/m; ε_r = 39.06; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 5/31/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 - SN7530; ConvF(8.42, 8.42, 8.42); Calibrated: 1/14/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
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) = 5.46 W/kg

1750 MHz Head/Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.885 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 6.97 W/kg
P_{in}= 100 mW
SAR(1 g) = 3.81 W/kg; SAR(10 g) = 1.99 W/kg
Maximum value of SAR (measured) = 5.47 W/kg



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Plot 4

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

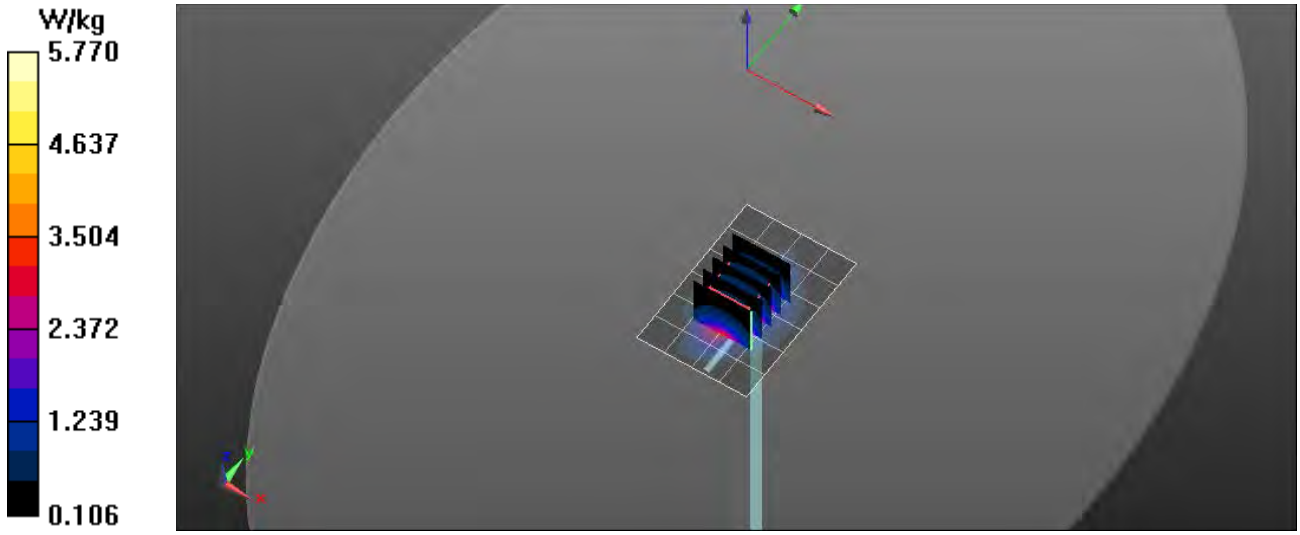
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900; Medium parameters used: f = 1900 MHz; σ = 1.42 S/m; ε_r = 39.55; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 5/27/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 - SN7530; ConvF(8.06, 8.06, 8.06); Calibrated: 1/14/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
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) = 5.68 W/kg

1900 MHz Head/Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.662 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 7.18 W/kg
P_{in}= 100 mW
SAR(1 g) = 4.12 W/kg; SAR(10 g) = 2.14 W/kg
Maximum value of SAR (measured) = 5.77 W/kg



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Plot 5

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

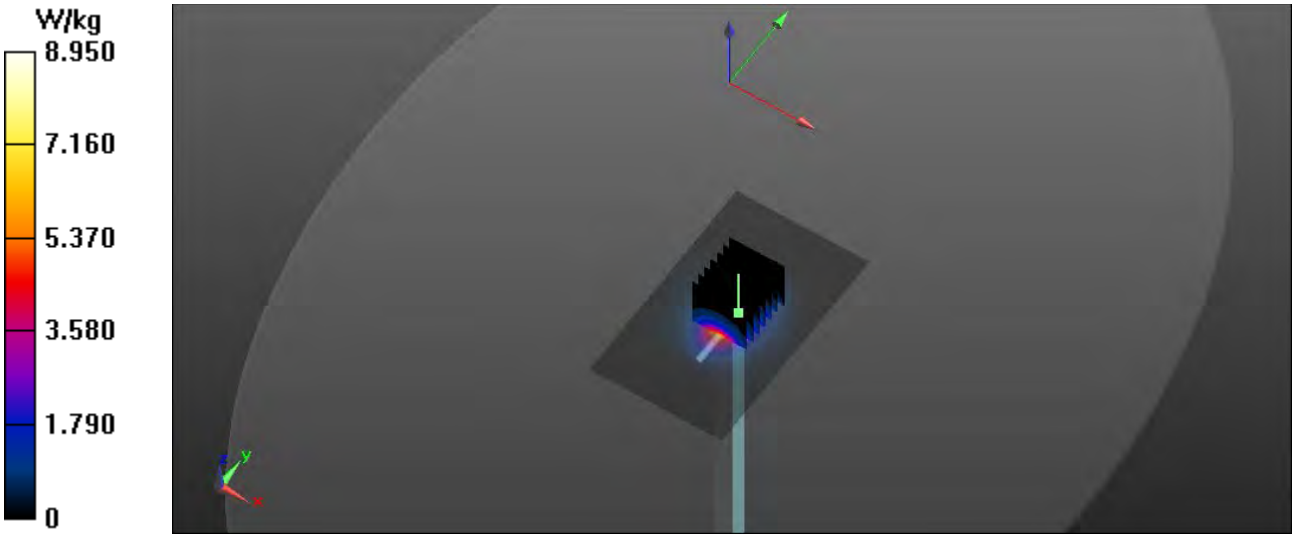
Communication System: CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: HSL2300; Medium parameters used: f = 2300 MHz; σ = 1.7 S/m; ε_r = 38.69; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 6/3/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 – SN7530; ConvF(7.85, 7.85, 7.85); Calibrated: 1/14/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
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) = 8.52 W/kg

2300 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.157 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 11.2 W/kg
P_{in}= 100 mW
SAR(1 g) = 5.01 W/kg; SAR(10 g) = 2.41 W/kg
Maximum value of SAR (measured) = 8.95 W/kg



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Plot 6

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

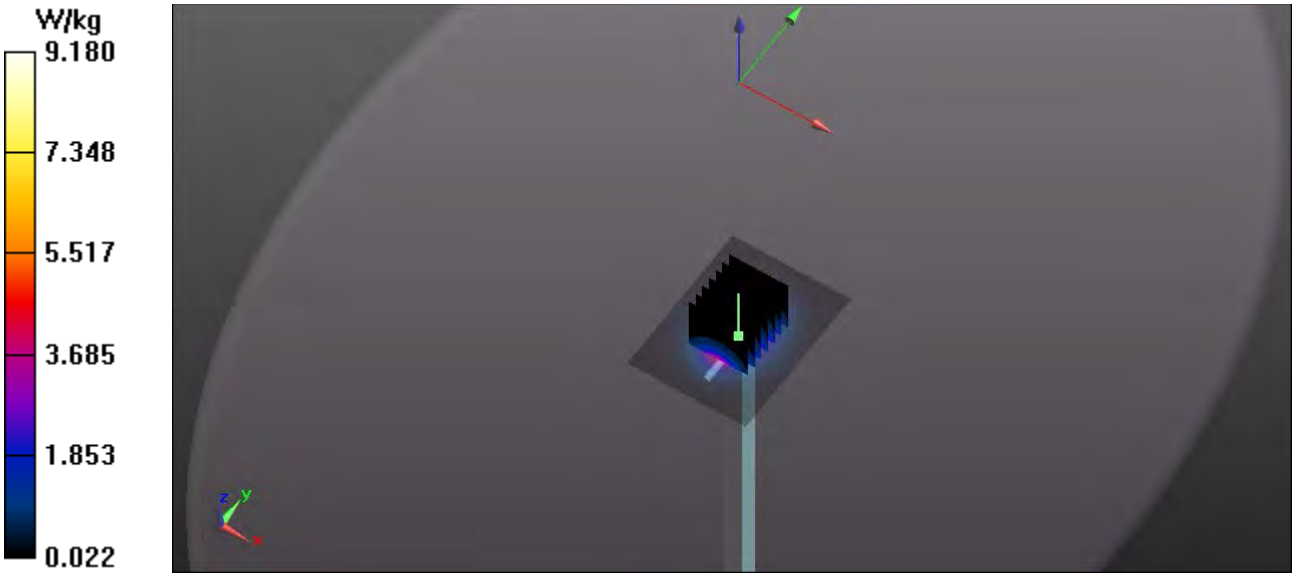
Communication System: CW; Frequency: 2550 MHz; Duty Cycle: 1:1
Medium: HSL2550; Medium parameters used: f = 2550 MHz; σ = 1.92 S/m; ε_r = 38.74; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 6/1/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 - SN7530; ConvF(7.42, 7.42, 7.42); Calibrated: 1/14/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
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) = 9.05 W/kg

2550 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.923 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 11.8 W/kg
P_{in}= 100 mW
SAR(1 g) = 5.66 W/kg; SAR(10 g) = 2.49 W/kg
Maximum value of SAR (measured) = 9.18 W/kg



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Plot 7

DUT: Dipole D3300V2; Type: D3300V2; Serial: D3300V2 - SN: 1032

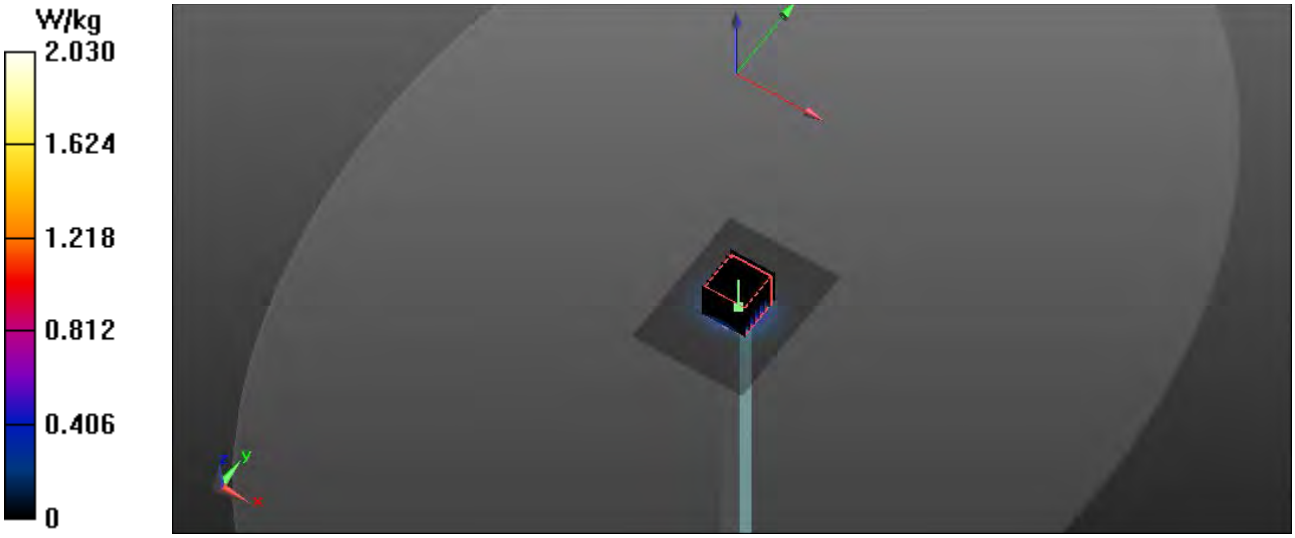
Communication System: CW; Frequency: 3300 MHz; Duty Cycle: 1:1
Medium: HSL 3-6 GHz; Medium parameters used: f = 3300 MHz; σ = 2.73 S/m; ε_r = 37.59; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 6/5/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 – SN7530; ConvF(7.12, 7.12, 7.12); Calibrated: 1/14/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

3300 MHz Head/Verification/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.81 W/kg

3300 MHz Head/Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 14.856 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.68 W/kg
Pin=10 mW
SAR(1 g) = 0.659 W/kg; SAR(10 g) = 0.253 W/kg
Maximum value of SAR (measured) = 2.03 W/kg



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Plot 8

DUT: Dipole D3500V2; Type: D3500V2; Serial: D3500V2 - SN: 1061

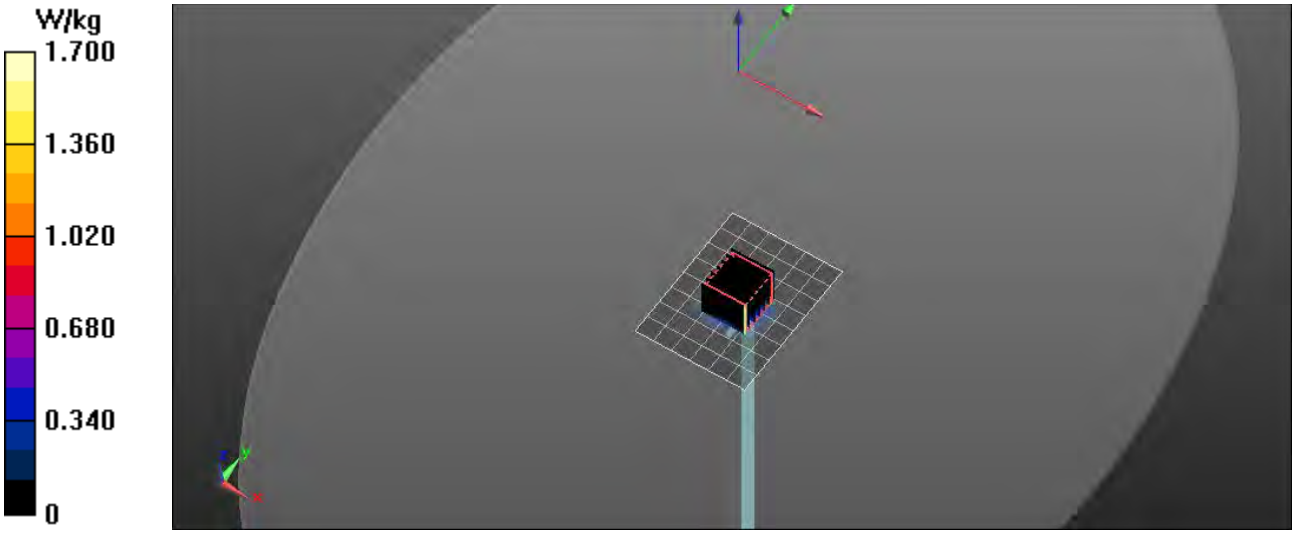
Communication System: CW; Frequency: 3500 MHz; Duty Cycle: 1:1
Medium: HSL 3-6 GHz; Medium parameters used: f = 3500 MHz; σ = 2.94 S/m; ε_r = 37.36; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 6/5/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 - SN7530; ConvF(7.1, 7.1, 7.1); Calibrated: 4/12/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

3500 MHz Head/Verification/Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.65 W/kg

3500 MHz Head/Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=4mm
Reference Value = 21.367 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.71 W/kg
P_{in}= 10 mW
SAR(1 g) = 0.682 W/kg; SAR(10 g) = 0.254 W/kg
Maximum value of SAR (measured) = 1.7 W/kg



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RF Exposure Lab

Plot 9

DUT: Dipole D3700V2; Type: D3700V2; Serial: D3700V2 - SN:1024

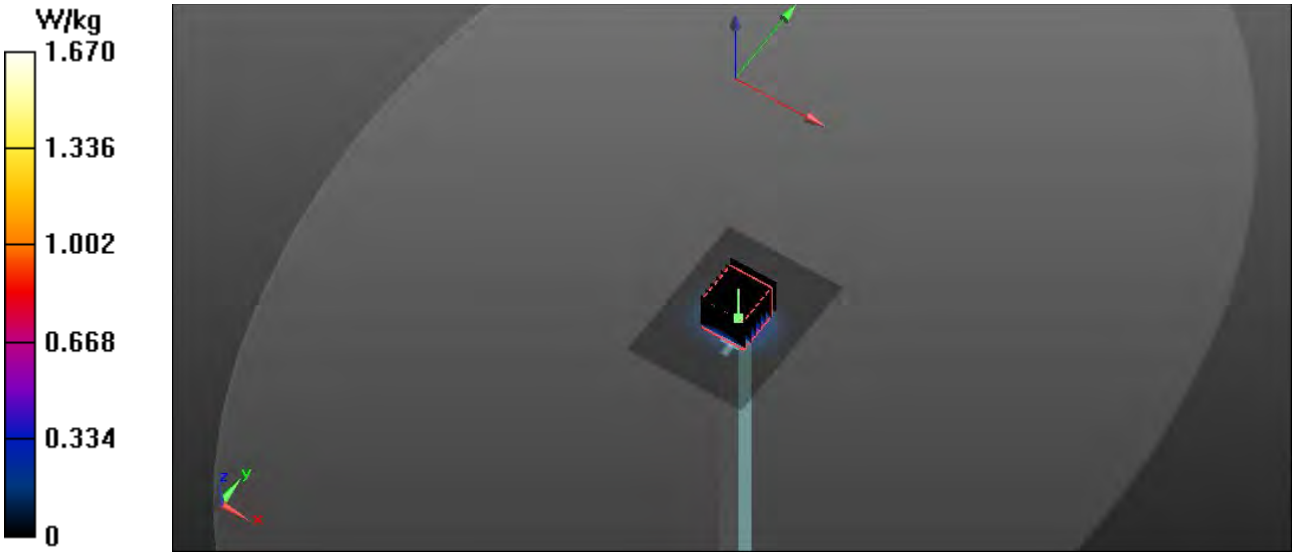
Communication System: CW; Frequency: 3700 MHz; Duty Cycle: 1:1
Medium: HSL 3-6 GHz; Medium parameters used: f = 3700 MHz; σ = 3.15 S/m; ε_r = 37.13; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 6/5/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 – SN7530; ConvF(6.9, 6.9, 6.9); Calibrated: 1/14/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

3700 MHz Head/Verification/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.65 W/kg

3700 MHz Head/Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 21.467 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.47 W/kg
P_{in}= 10 mW
SAR(1 g) = 0.698 W/kg; SAR(10 g) = 0.251 W/kg
Maximum value of SAR (measured) = 1.67 W/kg



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Plot 10

DUT: Dipole D3900V2; Type: D3900V2; Serial: D3900V2 - SN:1082

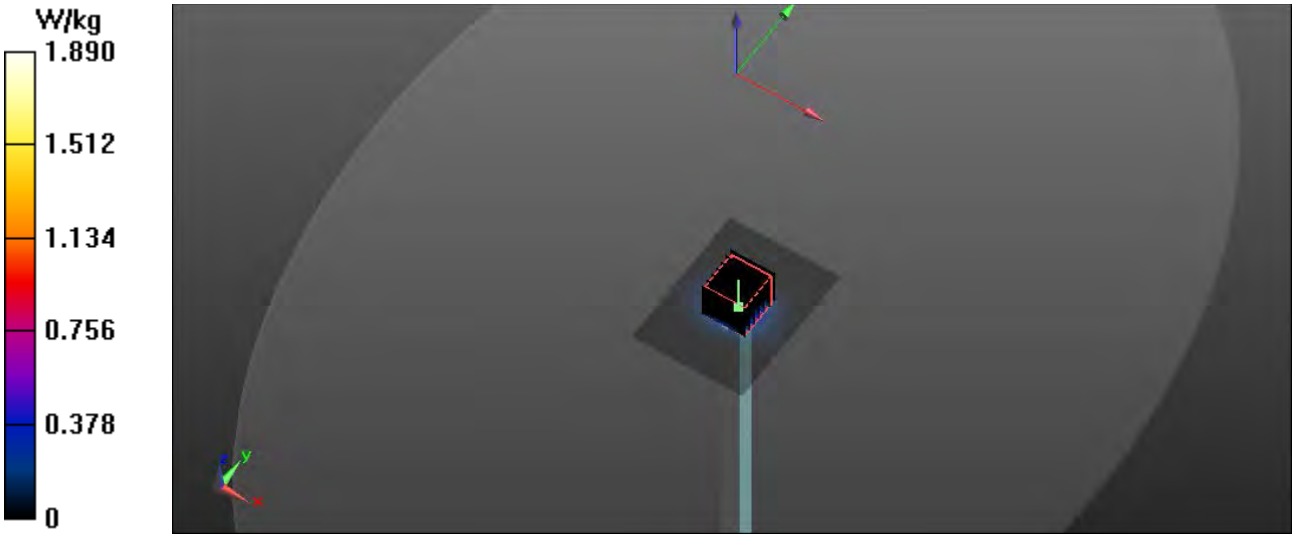
Communication System: CW; Frequency: 3900 MHz; Duty Cycle: 1:1
Medium: HSL 3-6 GHz; Medium parameters used: f = 3900 MHz; σ = 3.37 S/m; ε_r = 36.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 6/5/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 – SN7530; ConvF(4.9, 4.9, 4.9); Calibrated: 1/14/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

3900 MHz Head/Verification/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.47 W/kg

3900 MHz Head/Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 15.385 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.34 W/kg
Pin=10 mW
SAR(1 g) = 0.709 W/kg; SAR(10 g) = 0.248 W/kg
Maximum value of SAR (measured) = 1.89 W/kg



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RF Exposure Lab

Plot 11

DUT: Dipole D4200V2; Type: D4200V2; Serial: D4200V2 - SN:1025

Communication System: CW; Frequency: 4200 MHz; Duty Cycle: 1:1
Medium: HSL 3-6 GHz; Medium parameters used: f = 4200 MHz; σ = 3.68 S/m; ε_r = 36.55; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 6/5/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C
Probe: EX3DV4 – SN7530; ConvF(6.38, 6.38, 6.38); Calibrated: 1/14/2022;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

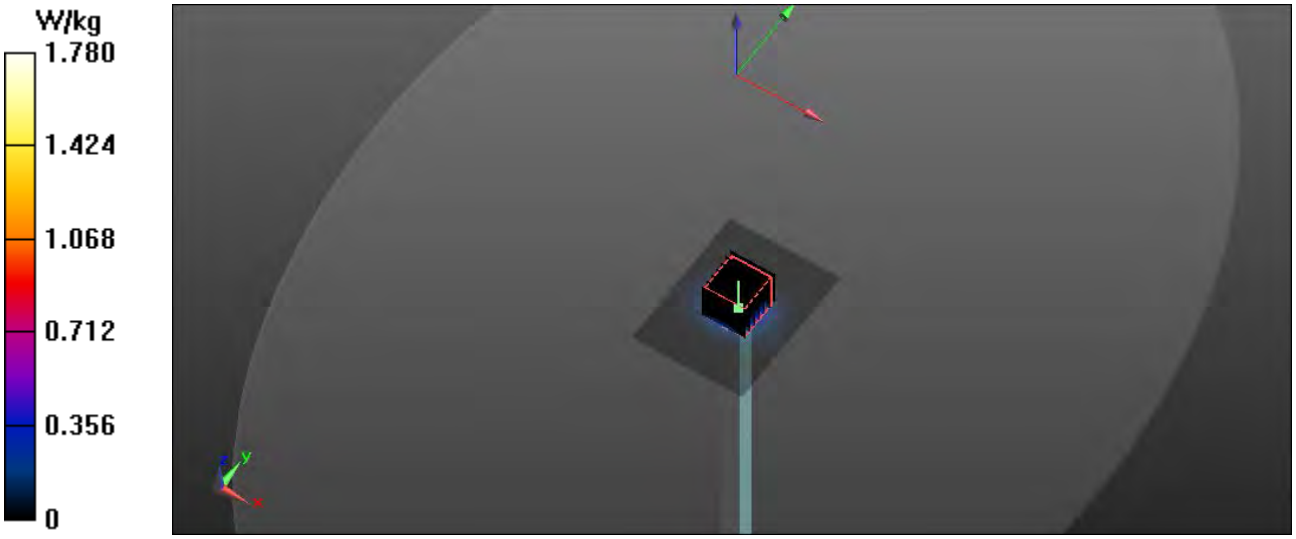
Procedure Notes:

4200 MHz Head/Verification/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.72 W/kg

4200 MHz Head/Verification/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 17.167 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 2.46 W/kg
Pin=10 mW
SAR(1 g) = 0.674 W/kg; SAR(10 g) = 0.228 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.77 W/kg



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Appendix B – SAR Test Data Plots

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RF Exposure Lab

Plot 1

DUT: EnGo; Type: Wireless TV Video Case; Serial: 5300008

Communication System: FR1 (NR, 1 RB, 20 MHz, BPSK); Frequency: 834 MHz; Duty Cycle: 1:1
Medium: HSL835; Medium parameters used (interpolated): f = 834 MHz; σ = 0.944 S/m; ε_r = 41.068; 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 - SN7530; ConvF(9.98, 9.98, 9.98); Calibrated: 1/14/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

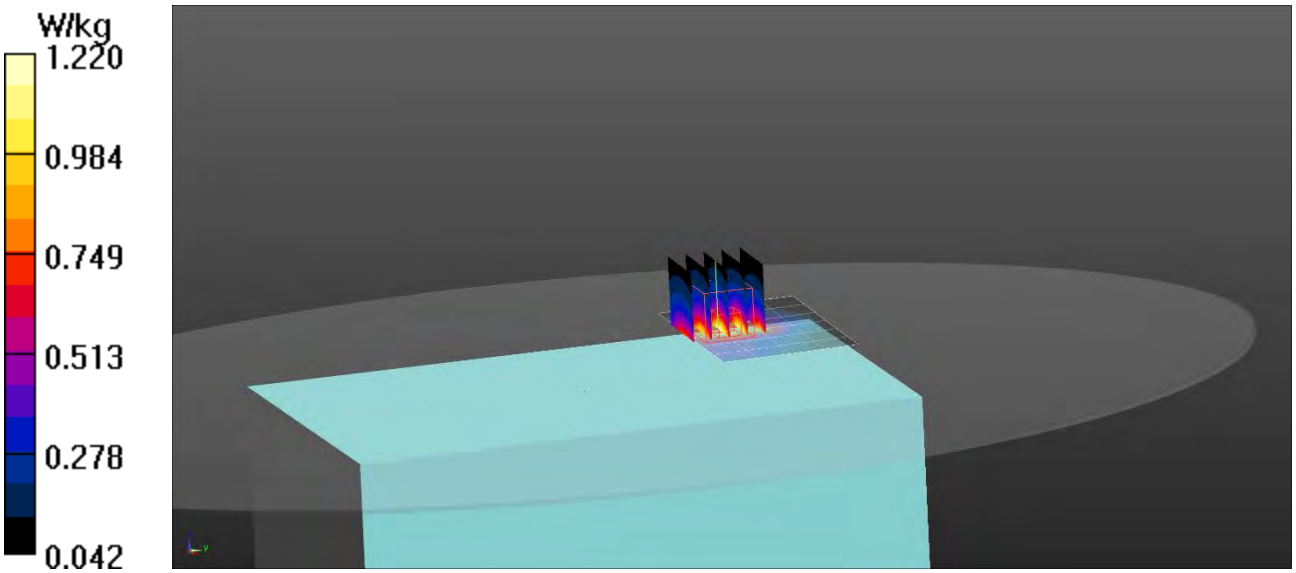
Procedure Notes:

n5 LTE/Ant T7 Back Low 1 RB 49 Offset/Area Scan (7x5x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.01 W/kg

n5 LTE/Ant T7 Back Low 1 RB 49 Offset/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.671 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.50 W/kg
SAR(1 g) = 0.933 W/kg; SAR(10 g) = 0.555 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.22 W/kg



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RF Exposure Lab

Plot 2

DUT: EnGo; Type: Wireless TV Video Case; Serial: 5300008

Communication System: FR1 (NR, 1 RB, 20 MHz, BPSK); Frequency: 2535 MHz; Duty Cycle: 1:1
Medium: HSL2550; Medium parameters used (interpolated): f = 2535 MHz; σ = 1.895 S/m; ε_r = 38.775; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 9/6/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7530; ConvF(7.42, 7.42, 7.42); Calibrated: 1/14/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

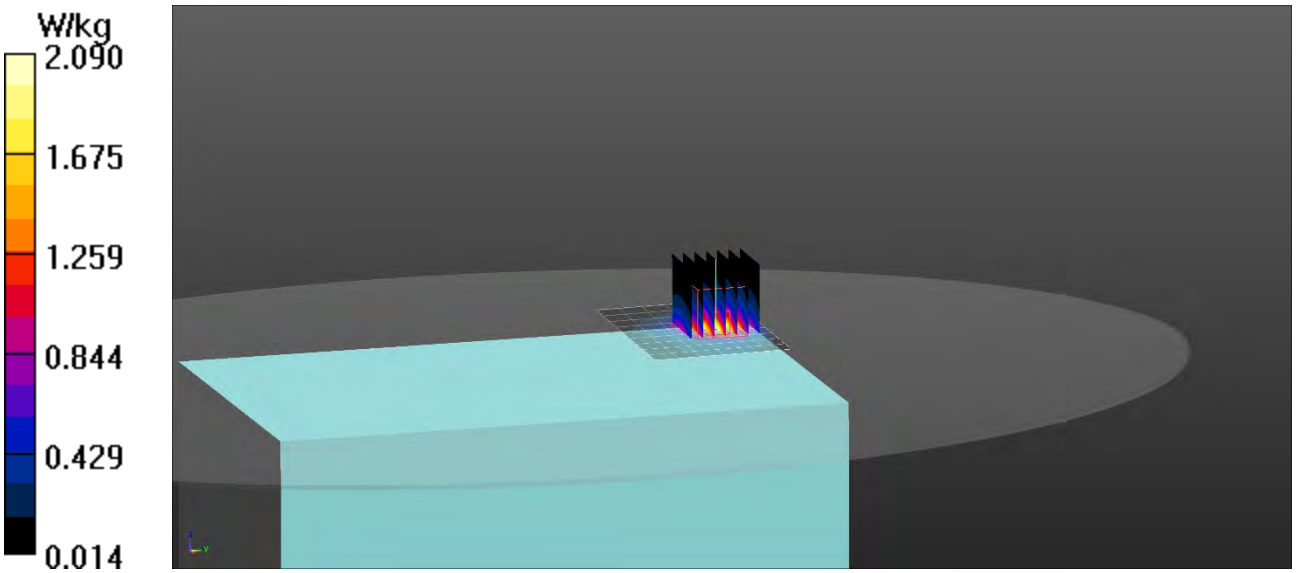
Procedure Notes:

n7 LTE/Ant T3 Front Mid 1 RB 49 Offset/Area Scan (10x7x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 2.00 W/kg

n7 LTE/Ant T3 Front Mid 1 RB 49 Offset/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.954 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 2.68 W/kg
SAR(1 g) = 1.19 W/kg; SAR(10 g) = 0.637 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 2.09 W/kg



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Plot 3

DUT: EnGo; Type: Wireless TV Video Case; Serial: 5300008

Communication System: FR1 (NR, 1 RB, 20 MHz, BPSK); Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: HSL750; Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.898 S/m; ε_r = 41.218; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 9/1/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7530; ConvF(10.44, 10.44, 10.44); Calibrated: 1/14/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

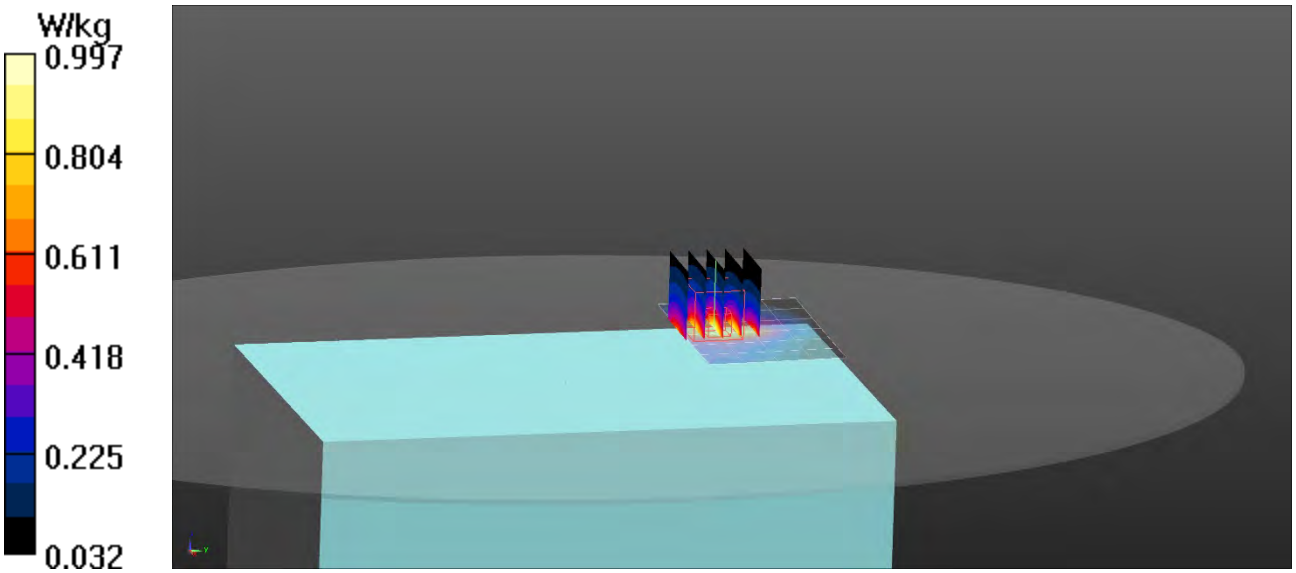
Procedure Notes:

n12 LTE/Ant T7 Back Mid 1 RB 37 Offset/Area Scan (7x5x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.878 W/kg

n12 LTE/Ant T7 Back Mid 1 RB 37 Offset/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.403 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.748 W/kg; SAR(10 g) = 0.451 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.997 W/kg



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Plot 4

DUT: EnGo; Type: Wireless TV Video Case; Serial: 5300008

Communication System: FR1 (NR, 1 RB, 20 MHz, BPSK); Frequency: 1882.5 MHz; Duty Cycle: 1:1
Medium: HSL1900; Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.42 S/m; ε_r = 39.585; 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 - SN7530; ConvF(8.06, 8.06, 8.06); Calibrated: 1/14/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

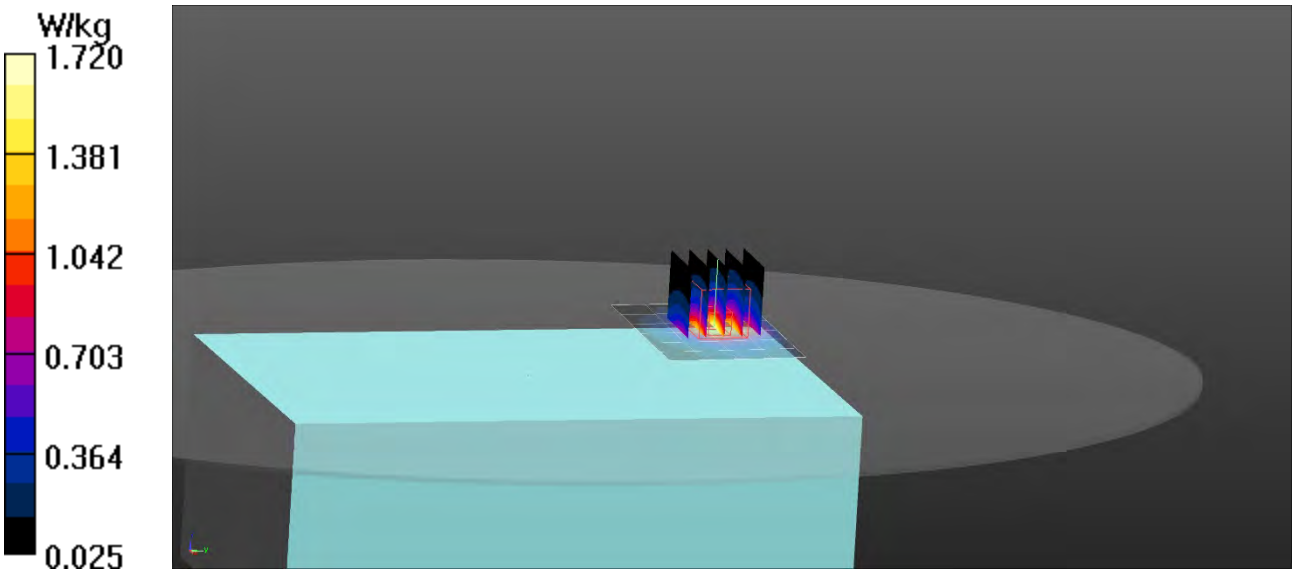
Procedure Notes:

n25 LTE/Ant T3 Front Mid 1 RB 49 Offset/Area Scan (7x5x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.45 W/kg

n25 LTE/Ant T3 Front Mid 1 RB 49 Offset/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.120 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 2.10 W/kg
SAR(1 g) = 1.28 W/kg; SAR(10 g) = 0.723 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.72 W/kg



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Plot 5

DUT: EnGo; Type: Wireless TV Video Case; Serial: 5300008

Communication System: FR1 (NR, 1 RB, 20 MHz, BPSK); Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: HSL2300; Medium parameters used: f = 2310 MHz; σ = 1.71 S/m; ε_r = 38.67; ρ = 1000 kg/m^3
Phantom section: Flat Section

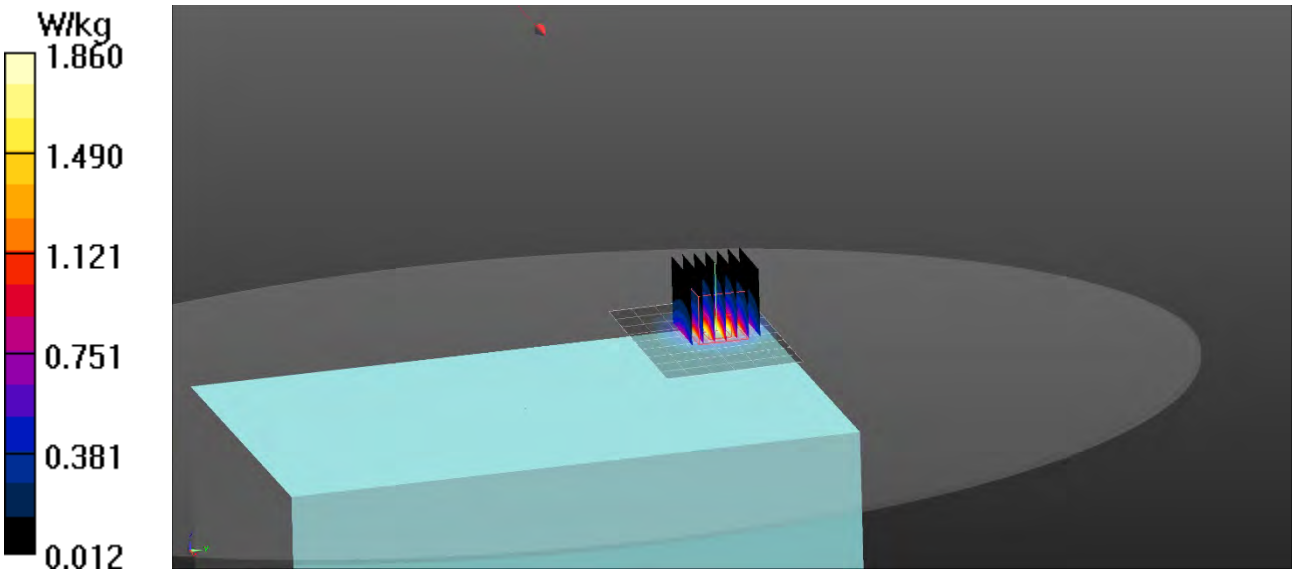
Test Date: Date: 8/31/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7530; ConvF(7.85, 7.85, 7.85); Calibrated: 1/14/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

n40 LTE/Ant T7 Back Low 1 RB 49 Offset/Area Scan (10x7x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.76 W/kg

n40 LTE/Ant T7 Back Low 1 RB 49 Offset/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.330 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 2.26 W/kg
SAR(1 g) = 1.25 W/kg; SAR(10 g) = 0.688 W/kg
Maximum value of SAR (measured) = 1.86 W/kg



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Plot 6

DUT: EnGo; Type: Wireless TV Video Case; Serial: 5300008

Communication System: FR1 (NR, 1 RB, 20 MHz, BPSK); Frequency: 2593 MHz; Duty Cycle: 1:1
Medium: HSL2550; Medium parameters used (interpolated): f = 2593 MHz; σ = 1.97 S/m; ε_r = 38.643; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 9/6/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7530; ConvF(7.42, 7.42, 7.42); Calibrated: 1/14/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

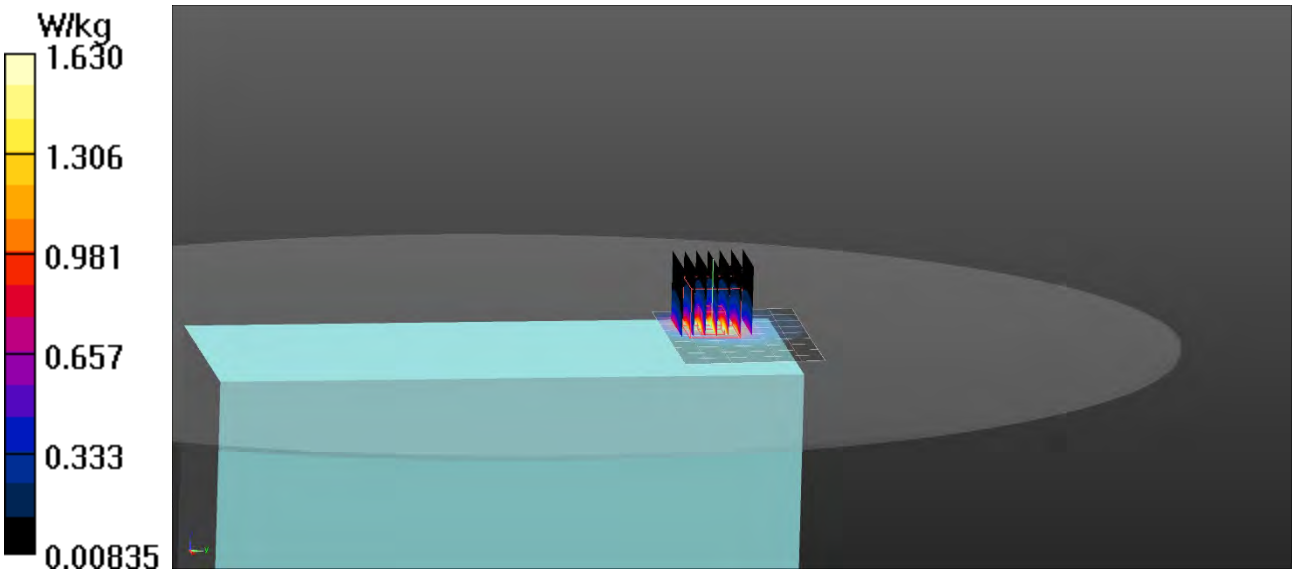
Procedure Notes:

n41 LTE/Ant T2 Left Mid 1 RB 49 Offset/Area Scan (10x7x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.59 W/kg

n41 LTE/Ant T2 Left Mid 1 RB 49 Offset/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.500 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 2.12 W/kg
SAR(1 g) = 1.12 W/kg; SAR(10 g) = 0.564 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.63 W/kg



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Plot 7

DUT: EnGo; Type: Wireless TV Video Case; Serial: 5300008

Communication System: FR1 (NR, 1 RB, 20 MHz, BPSK); Frequency: 1720 MHz; Duty Cycle: 1:1
Medium: HSL1750; Medium parameters used: f = 1720 MHz; σ = 1.37 S/m; ε_r = 39.12; ρ = 1000 kg/m^3
Phantom section: Flat Section

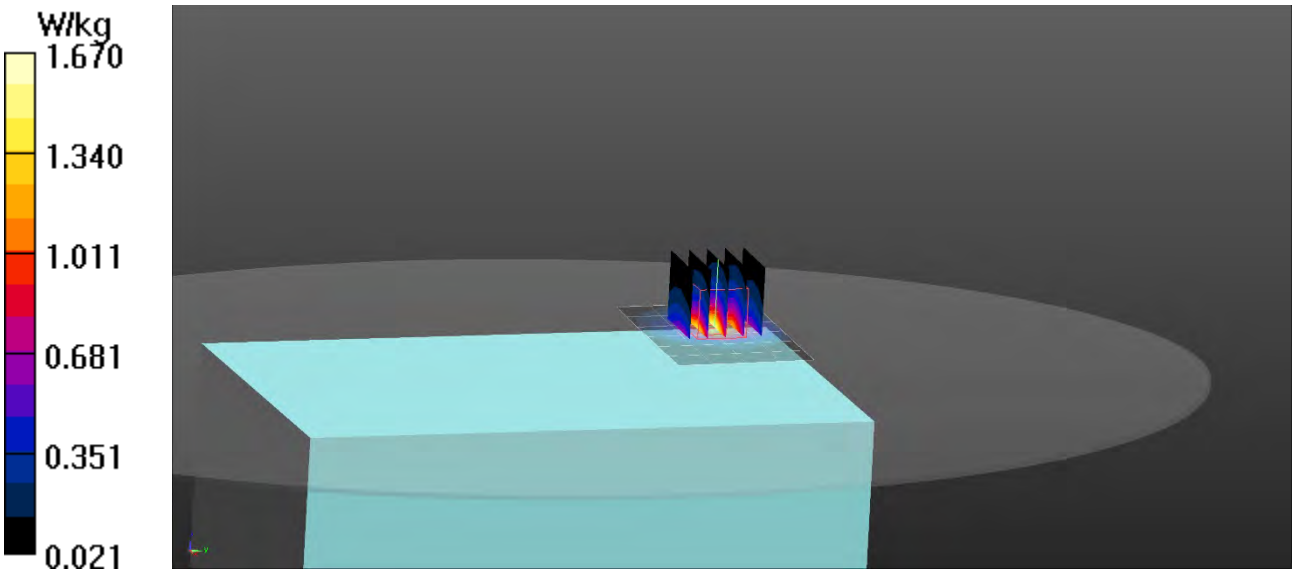
Test Date: Date: 8/30/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7530; ConvF(8.42, 8.42, 8.42); Calibrated: 1/14/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Procedure Notes:

n66 LTE/Ant T7 Back Low 1 RB 49 Offset/Area Scan (7x5x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.63 W/kg

n66 LTE/Ant T7 Back Low 1 RB 49 Offset/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.129 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.05 W/kg
SAR(1 g) = 1.27 W/kg; SAR(10 g) = 0.710 W/kg
Maximum value of SAR (measured) = 1.67 W/kg



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RF Exposure Lab

Plot 8

DUT: EnGo; Type: Wireless TV Video Case; Serial: 5300008

Communication System: FR1 (NR, 1 RB, 20 MHz, BPSK); Frequency: 680.5 MHz; Duty Cycle: 1:1
Medium: HSL600; Medium parameters used (interpolated): f = 680.5 MHz; σ = 0.921 S/m; ε_r = 41.487; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 9/1/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7530; ConvF(10.44, 10.44, 10.44); Calibrated: 1/14/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

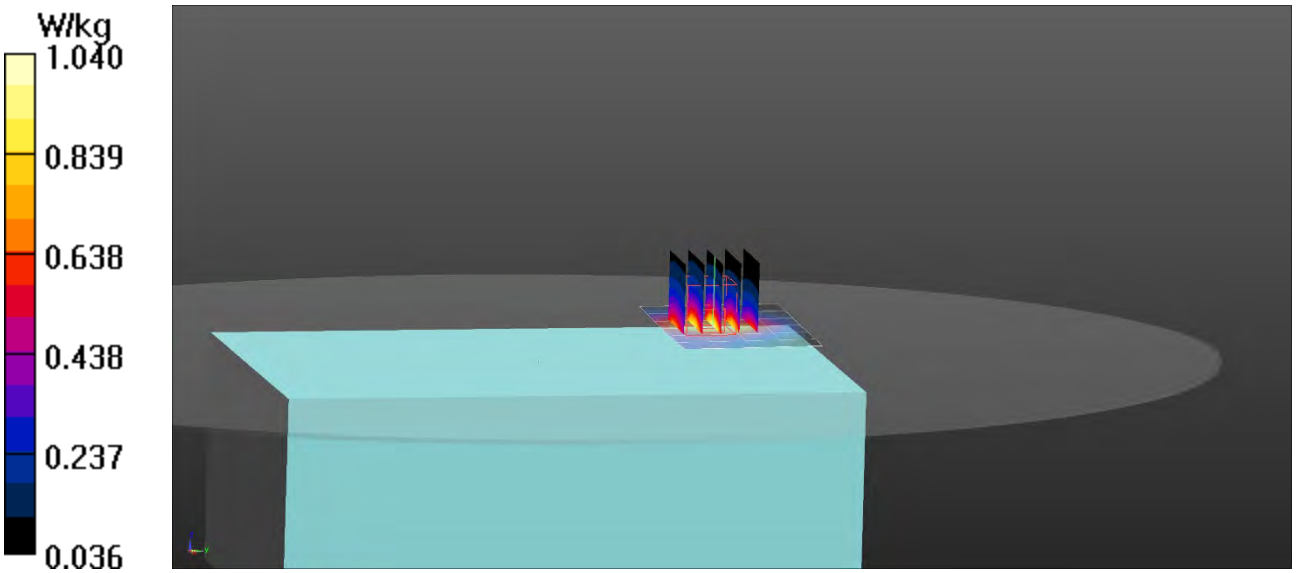
Procedure Notes:

n71 LTE/Ant T7 Back Mid 1 RB 49 Offset/Area Scan (7x5x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.920 W/kg

n71 LTE/Ant T7 Back Mid 1 RB 49 Offset/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.402 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.25 W/kg
SAR(1 g) = 0.786 W/kg; SAR(10 g) = 0.480 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.04 W/kg



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RF Exposure Lab

Plot 9

DUT: EnGo; Type: Wireless TV Video Case; Serial: 5300008

Communication System: FR1 (NR, 1 RB, 20 MHz, BPSK); Frequency: 3750 MHz; Duty Cycle: 1:1
Medium: HSL3-6GHz; Medium parameters used (interpolated): f = 3750 MHz; σ = 3.21 S/m; ε_r = 37.07; ρ = 1000 kg/m^3
Phantom section: Flat Section

Test Date: Date: 9/6/2022; Ambient Temp: 23 °C; Tissue Temp: 21 °C

Probe: EX3DV4 - SN7530; ConvF(6.9, 6.9, 6.9); Calibrated: 1/14/2022
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1217; Calibrated: 3/24/2022
Phantom: ELI v5.0; Type: QDOVA002AA; Serial: 1251
Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

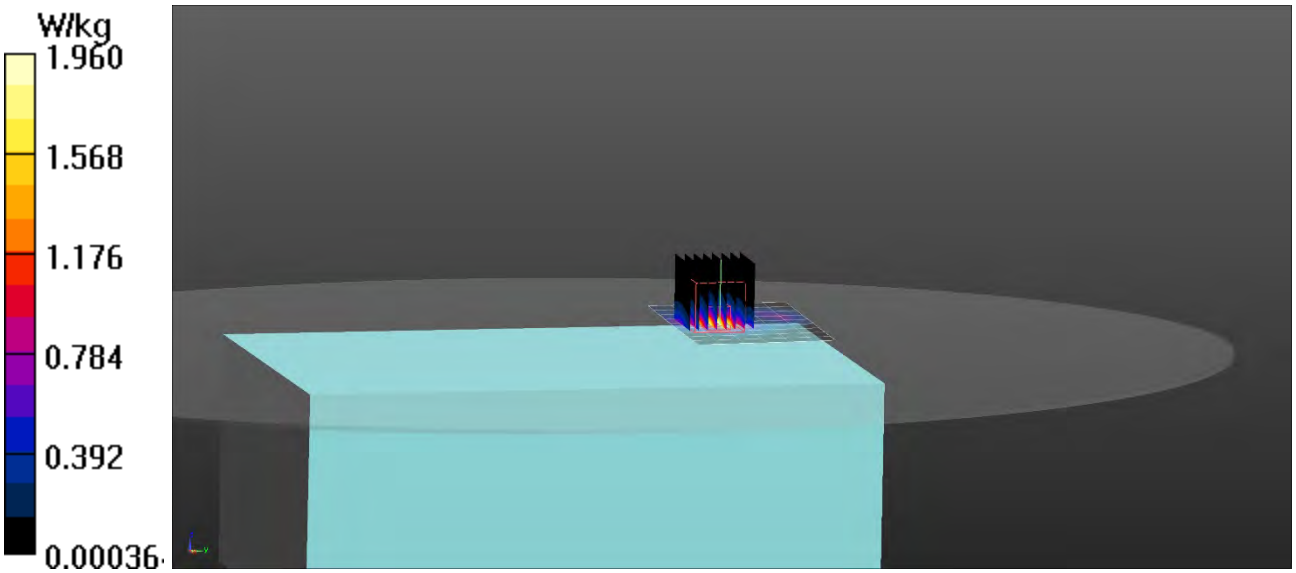
Procedure Notes:

n77 LTE/Ant T7 Back Mid 1 RB 99 Offset/Area Scan (10x7x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.84 W/kg

n77 LTE/Ant T7 Back Mid 1 RB 99 Offset/Zoom Scan (8x8x16)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.586 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 2.96 W/kg
SAR(1 g) = 1.18 W/kg; SAR(10 g) = 0.466 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.96 W/kg



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Appendix C – SAR Test Setup Photos

Test Position Top 10 mm Gap

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Test Position Front 20 mm Gap

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Test Position Back 10 mm Gap

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Test Position Left 10 mm Gap

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Test Position Right 20 mm Gap

This report shall not be reproduced except in full without the written approval of RF Exposure Lab, LLC.

Test Position Bottom 10 mm Gap

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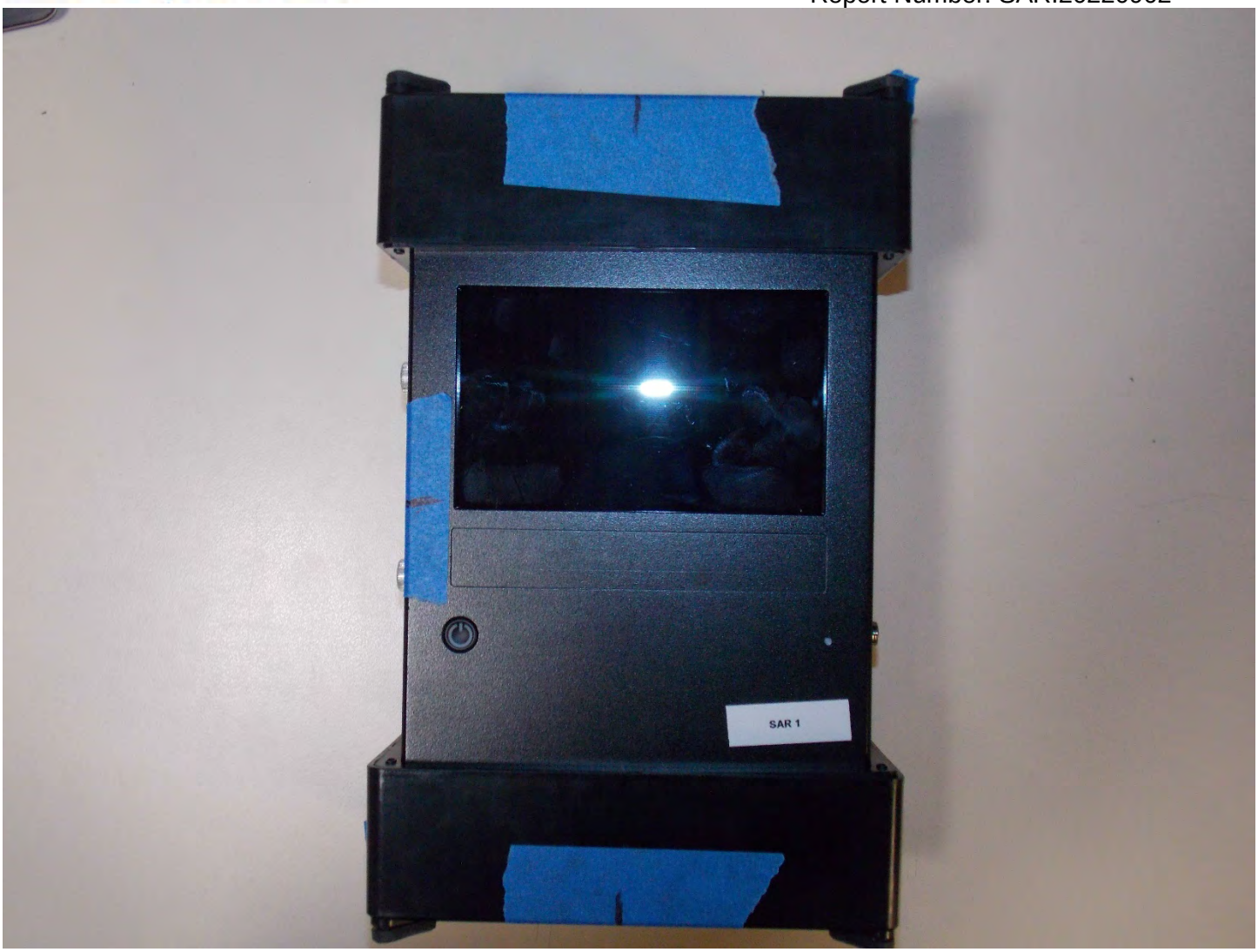

Front of Device

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Back of Device

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Appendix D – Probe Calibration Data Sheets

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Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client RF Exposure Lab

Certificate No: EX3-7530_Jan22

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:7530
Calibration procedure(s)	QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v6, QA CAL-23.v5, QA CAL-25.v7 Calibration procedure for dosimetric E-field probes
Calibration date:	January 14, 2022

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: CC2552 (20x)	09-Apr-21 (No. 217-03343)	Apr-22
DAE4	SN: 660	13-Oct-21 (No. DAE4-660_Oct21)	Oct-22
Reference Probe ES3DV2	SN: 3013	27-Dec-21 (No. ES3-3013_Dec21)	Dec-22
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-20)	In house check: Jun-22
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-20)	In house check: Jun-22
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Sven Kühn	Deputy Manager	

Issued: January 19, 2022

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.

b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7530

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.42	0.48	0.43	± 10.1 %
DCP (mV)[B]	99.3	99.7	98.7	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Max dev.	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	159.3	±2.2 %	± 4.7 %
		Y	0.0	0.0	1.0		142.4		
		Z	0.0	0.0	1.0		141.6		

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7530

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-141.7
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Note: Measurement distance from surface can be increased to 3-4 mm for an *Area Scan* job.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7530

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
13	55.0	0.75	19.61	19.61	19.61	0.00	1.00	± 13.3 %
30	55.0	0.75	17.99	17.99	17.99	0.00	1.00	± 13.3 %
750	41.9	0.89	10.44	10.44	10.44	0.56	0.80	± 12.0 %
900	41.5	0.97	9.98	9.98	9.98	0.48	0.80	± 12.0 %
1300	40.8	1.14	9.27	9.27	9.27	0.40	0.95	± 12.0 %
1750	40.1	1.37	8.42	8.42	8.42	0.30	0.86	± 12.0 %
1900	40.0	1.40	8.06	8.06	8.06	0.30	0.86	± 12.0 %
2300	39.5	1.67	7.85	7.85	7.85	0.34	0.90	± 12.0 %
2450	39.2	1.80	7.65	7.65	7.65	0.33	0.90	± 12.0 %
2600	39.0	1.96	7.42	7.42	7.42	0.35	0.90	± 12.0 %
3300	38.2	2.71	7.12	7.12	7.12	0.35	1.30	± 13.1 %
3500	37.9	2.91	7.10	7.10	7.10	0.35	1.30	± 13.1 %
3700	37.7	3.12	6.90	6.90	6.90	0.35	1.30	± 13.1 %
3900	37.5	3.32	6.83	6.83	6.83	0.40	1.60	± 13.1 %
4200	37.1	3.63	6.38	6.38	6.38	0.40	1.70	± 13.1 %
5250	35.9	4.71	5.45	5.45	5.45	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.80	4.80	4.80	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.98	4.98	4.98	0.40	1.80	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7530

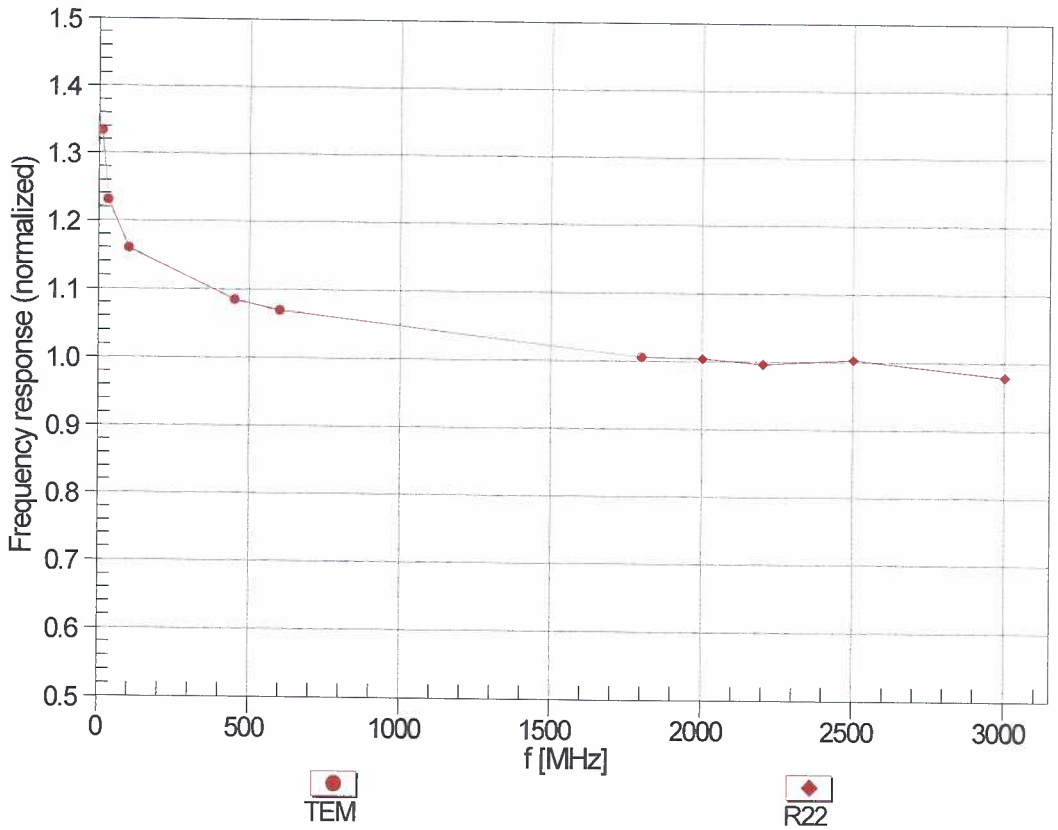
Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
6500	34.5	6.07	5.60	5.60	5.60	0.20	2.50	± 18.6 %

[C] Frequency validity above 6GHz is ± 700 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies 6-10 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz; below ± 2% for frequencies between 3-6 GHz; and below ± 4% for frequencies between 6-10 GHz at any distance larger than half the probe tip diameter from the boundary.

Frequency Response of E-Field

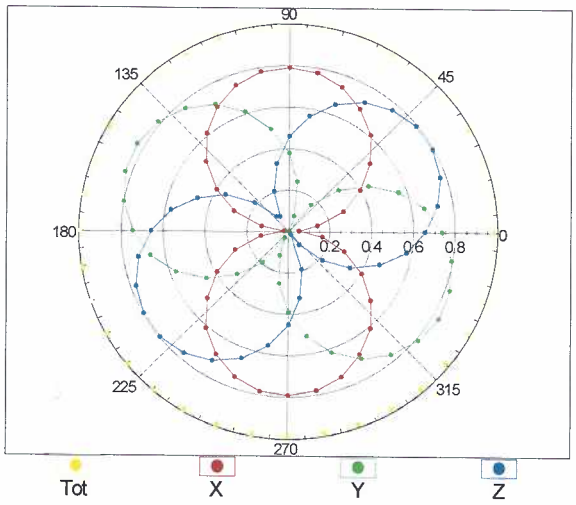
(TEM-Cell:ifi110 EXX, Waveguide: R22)



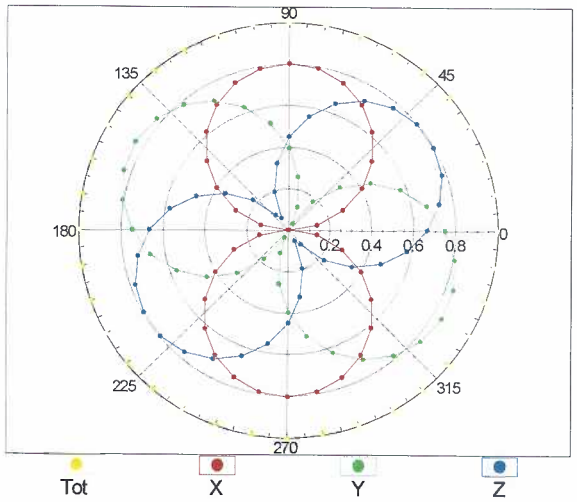
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

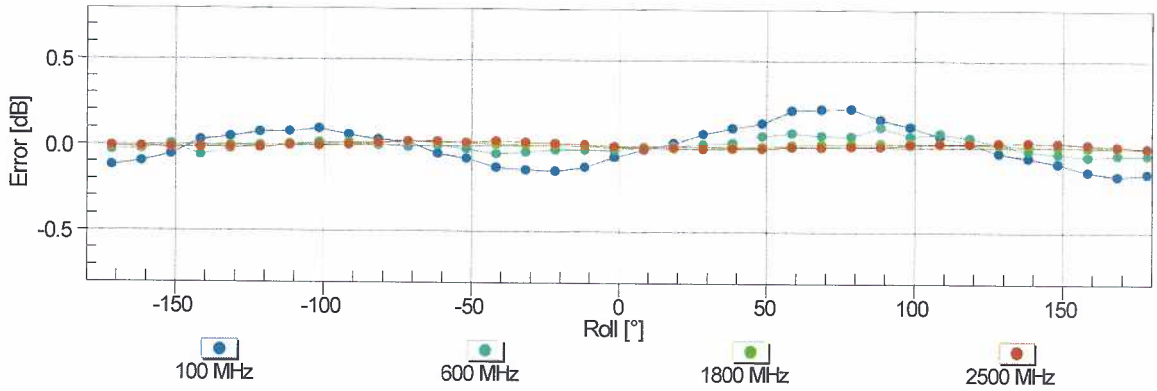
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

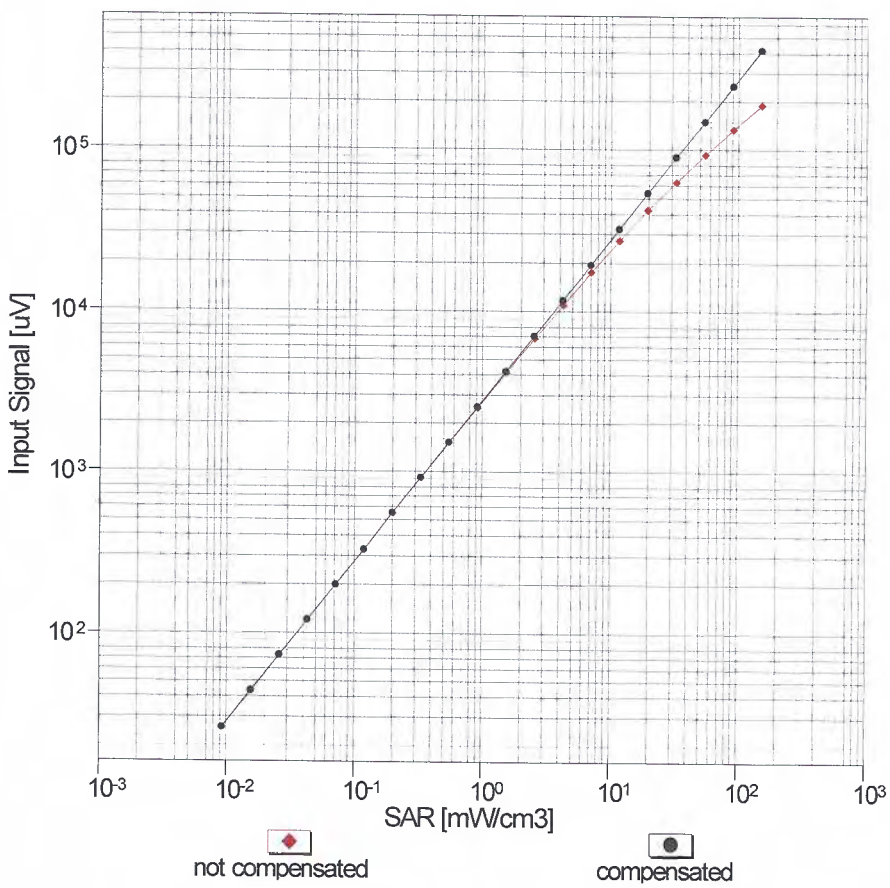


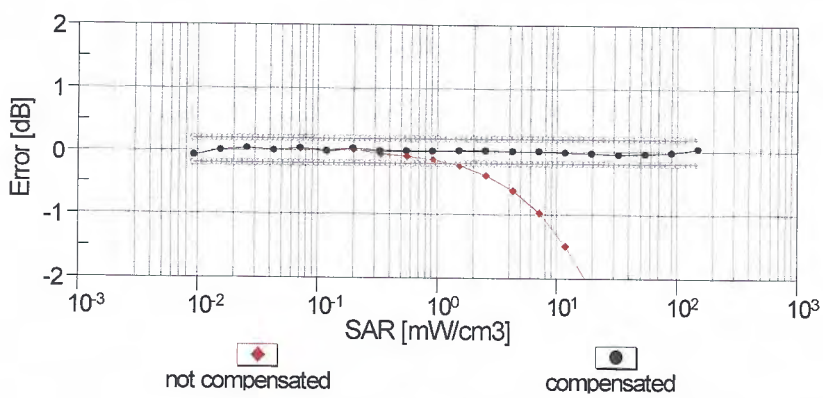


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

(TEM cell , f_{eval}= 1900 MHz)

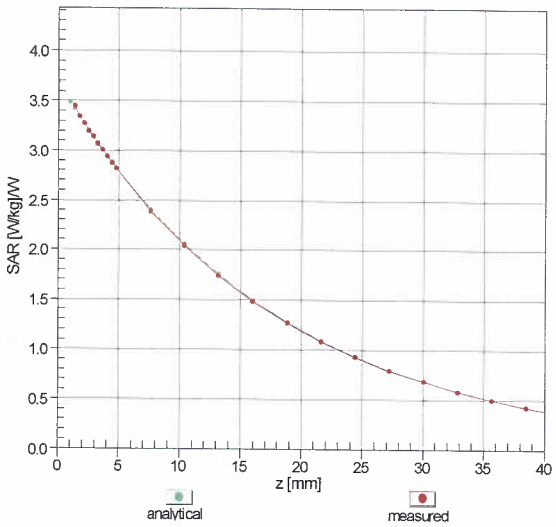




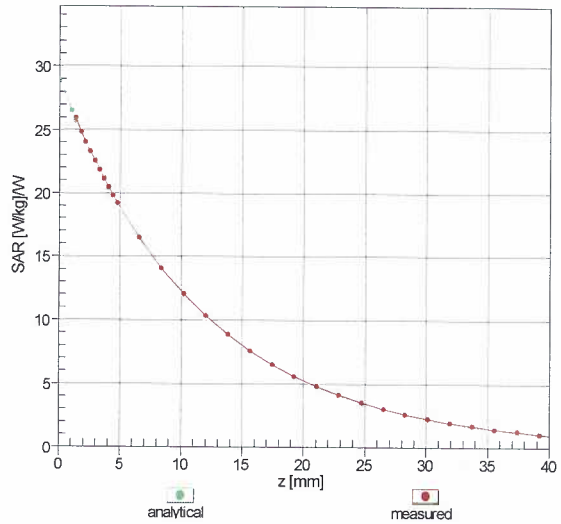
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

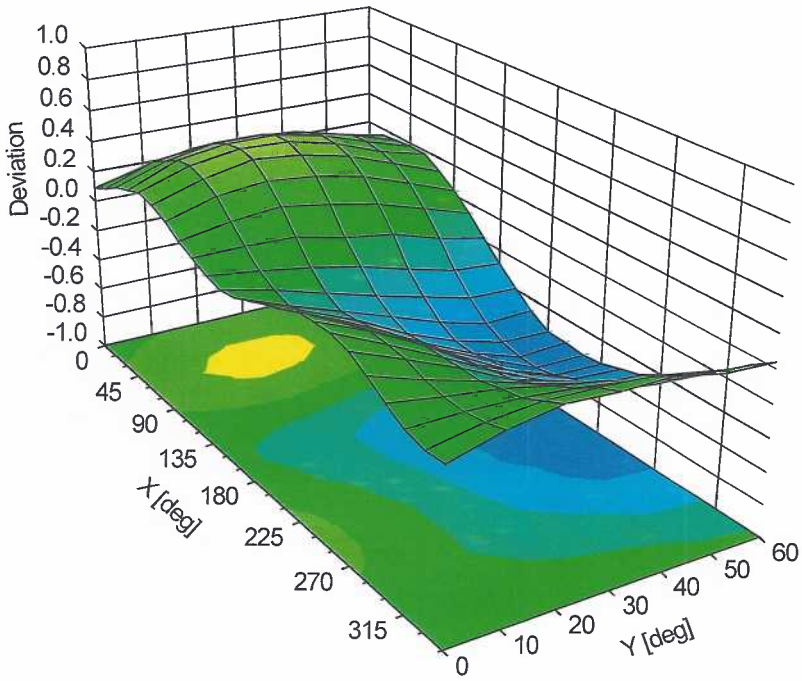


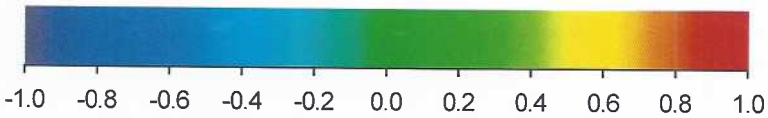
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Appendix E – Dipole Calibration Data Sheets

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Jm

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **RF Exposure Lab**

Certificate No: D750V3-1053_Jun21

CALIBRATION CERTIFICATE

Object	D750V3 - SN:1053
Calibration procedure(s)	QA CAL-05.v11 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz
Calibration date:	June 04, 2021

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: BH9394 (20k)	09-Apr-21 (No. 217-03343)	Apr-22
Type-N mismatch combination	SN: 310982 / 06327	09-Apr-21 (No. 217-03344)	Apr-22
Reference Probe EX3DV4	SN: 7349	28-Dec-20 (No. EX3-7349_Dec20)	Dec-21
DAE4	SN: 601	02-Nov-20 (No. DAE4-601_Nov20)	Nov-21

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-21

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 8, 2021

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "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
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.7 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.17 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.57 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.58 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	56.5 Ω + 0.1 jΩ
Return Loss	- 24.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.035 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

Extended Calibration
Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (<-20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01 v01r04.

D750V3 SN: 1053 - Head						
Date of Measurement	Return Loss (dB)	Δ%	Impedance Real (Ω)	ΔΩ	Impedance Imaginary (jΩ)	ΔΩ
6/4/2021	-24.3		56.5		0.1	
6/4/2022	-26.2	7.8	57.9	1.4	0.3	0.2

DASY5 Validation Report for Head TSL

Date: 04.06.2021

Test Laboratory: SPEAG, Zurich, Switzerland

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

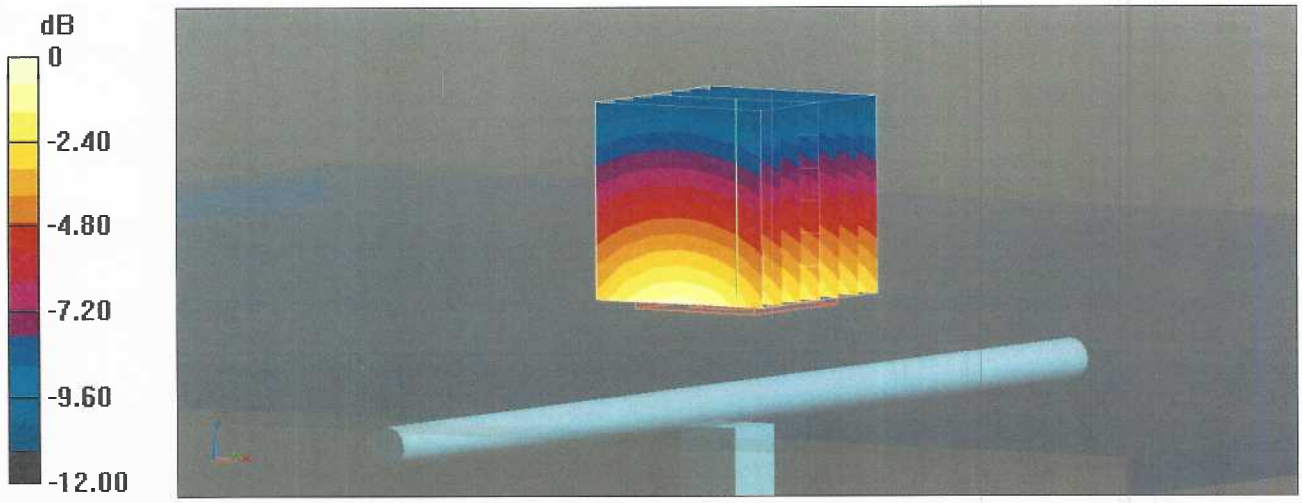
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.91 S/m; ε_r = 42.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.11, 10.11, 10.11) @ 750 MHz; Calibrated: 28.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

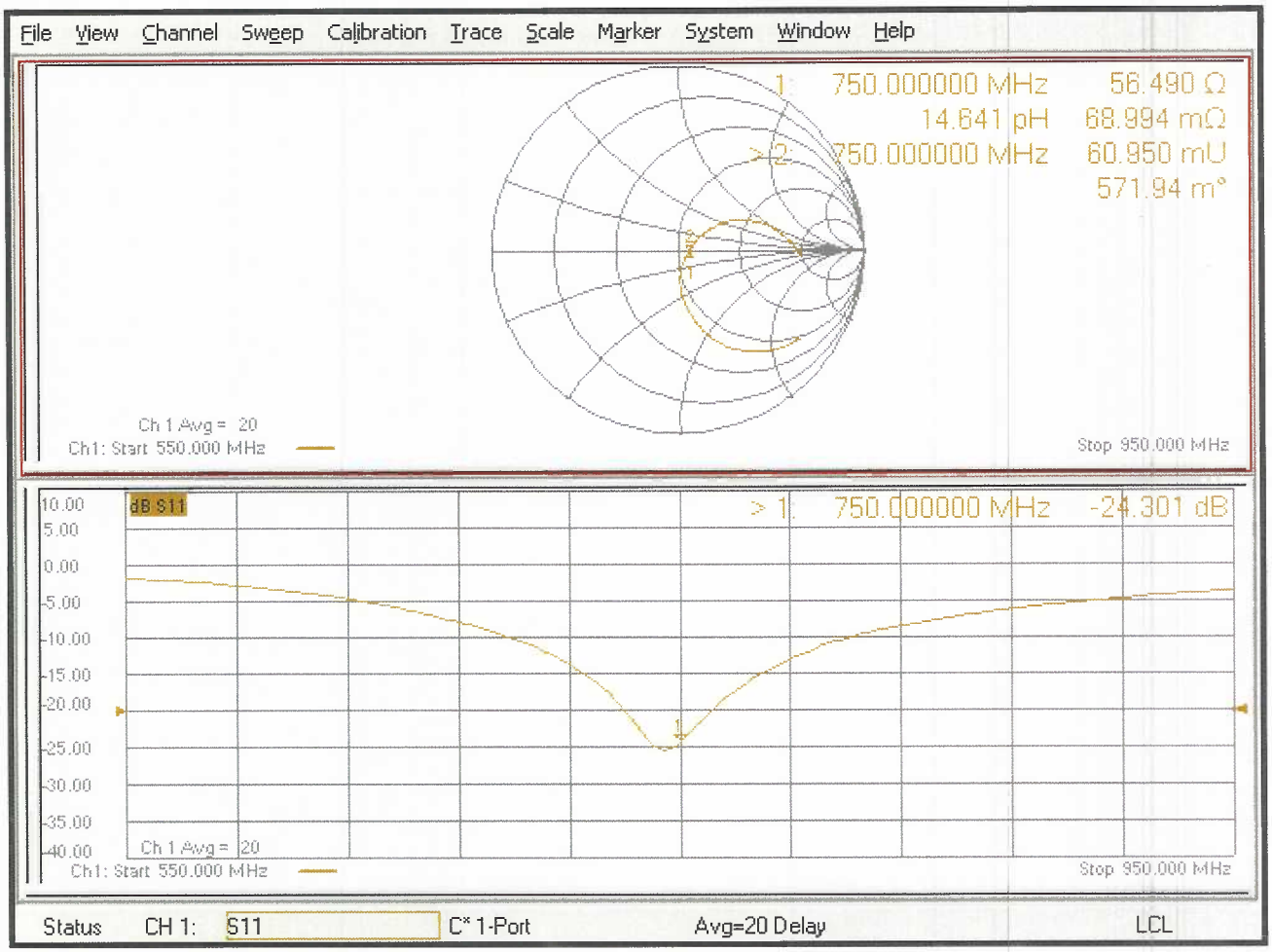
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.74 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.30 W/kg
SAR(1 g) = 2.17 W/kg; SAR(10 g) = 1.41 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid (> 30mm)
Ratio of SAR at M2 to SAR at M1 = 65.5%
Maximum value of SAR (measured) = 2.93 W/kg



0 dB = 2.93 W/kg = 4.67 dBW/kg

Impedance Measurement Plot for Head TSL



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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **RF Exposure Lab**

Certificate No: D900V2-1d128_Jun21

CALIBRATION CERTIFICATE

Object	D900V2 - SN:1d128
Calibration procedure(s)	QA CAL-05.v11 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz
Calibration date:	June 04, 2021

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: BH9394 (20k)	09-Apr-21 (No. 217-03343)	Apr-22
Type-N mismatch combination	SN: 310982 / 06327	09-Apr-21 (No. 217-03344)	Apr-22
Reference Probe EX3DV4	SN: 7349	28-Dec-20 (No. EX3-7349_Dec20)	Dec-21
DAE4	SN: 601	02-Nov-20 (No. DAE4-601_Nov20)	Nov-21

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-21

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 8, 2021

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "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
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.97 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.3 ± 6 %	0.96 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.76 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**11.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.77 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**7.14 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.0 Ω - 0.6 jΩ
Return Loss	- 38.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.412 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

Extended Calibration
Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (<-20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01 v01r04.

D900V2 SN: 1d128 - Head						
Date of Measurement	Return Loss (dB)	Δ%	Impedance Real (Ω)	ΔΩ	Impedance Imaginary (jΩ)	ΔΩ
6/4/2021	-38.5		51.0		-0.6	
6/4/2022	-37.2	-3.4	52.3	1.3	-0.8	-0.2

DASY5 Validation Report for Head TSL

Date: 04.06.2021

Test Laboratory: SPEAG, Zurich, Switzerland

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

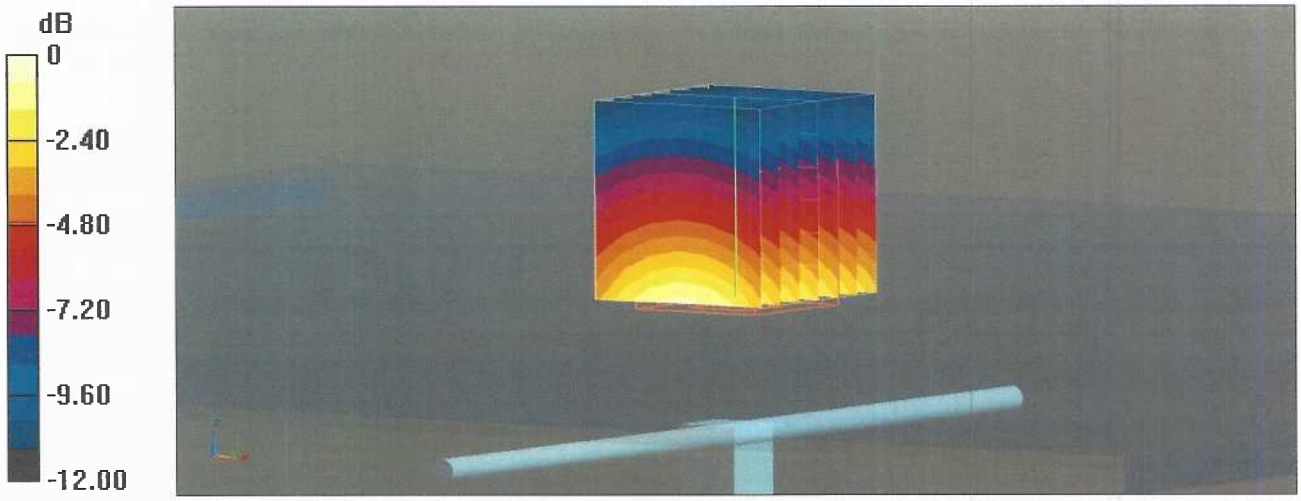
Communication System: UID 0 - CW; Frequency: 900 MHz
Medium parameters used: f = 900 MHz; σ = 0.96 S/m; ε_r = 42.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.62, 9.62, 9.62) @ 900 MHz; Calibrated: 28.12.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.11.2020
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

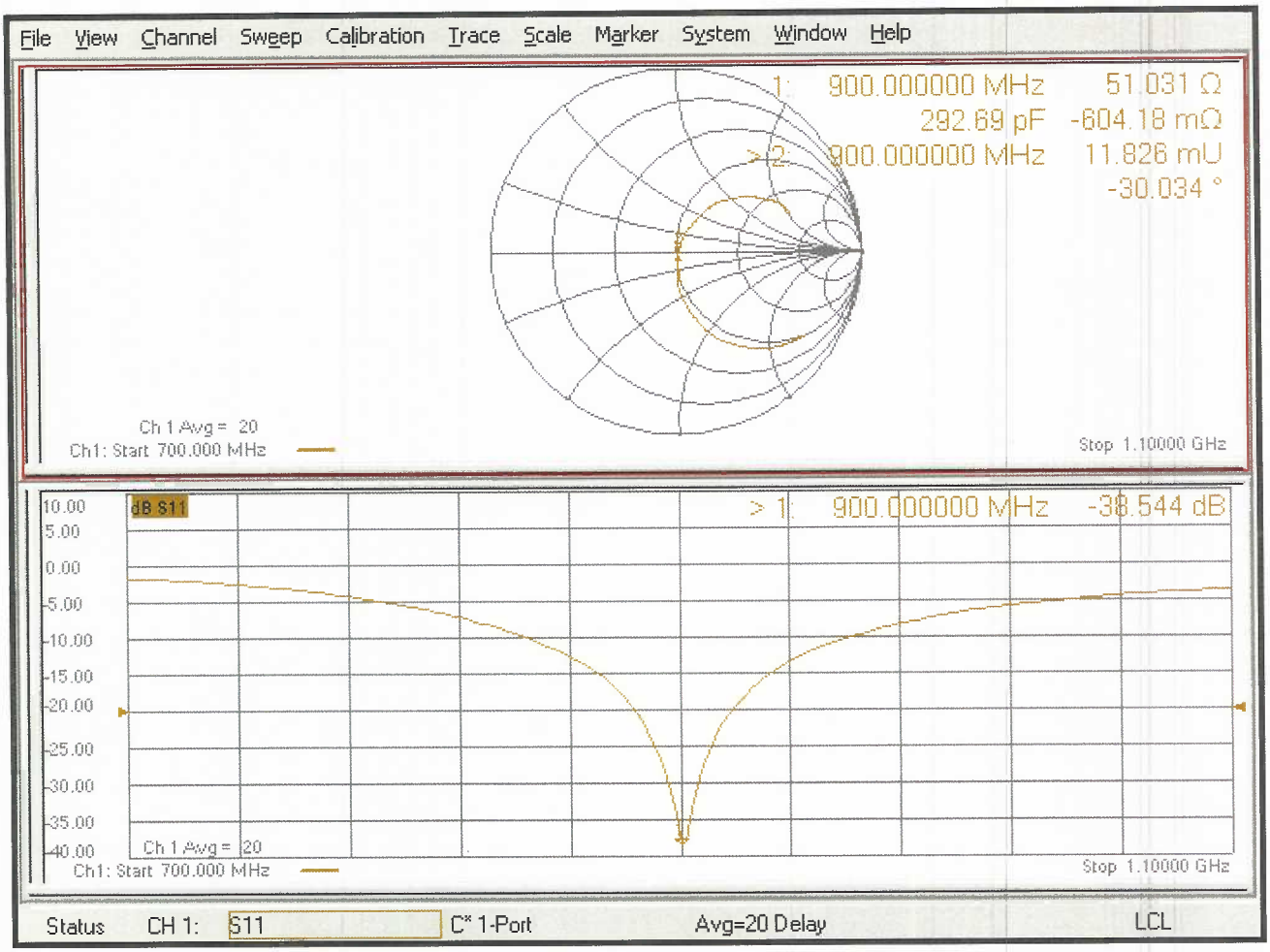
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 65.79 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 4.23 W/kg
SAR(1 g) = 2.76 W/kg; SAR(10 g) = 1.77 W/kg
Smallest distance from peaks to all points 3 dB below = 16 mm
Ratio of SAR at M2 to SAR at M1 = 65%
Maximum value of SAR (measured) = 3.74 W/kg



0 dB = 3.74 W/kg = 5.73 dBW/kg

Impedance Measurement Plot for Head TSL



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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client RF Exposure Lab

Certificate No: D1750V2-1061_Jun21

CALIBRATION CERTIFICATE

Object	D1750V2 - SN:1061
Calibration procedure(s)	QA CAL-05.v11 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz
Calibration date:	June 03, 2021

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	09-Apr-21 (No. 217-03291/03292)	Apr-22
Power sensor NRP-Z91	SN: 103244	09-Apr-21 (No. 217-03291)	Apr-22
Power sensor NRP-Z91	SN: 103245	09-Apr-21 (No. 217-03292)	Apr-22
Reference 20 dB Attenuator	SN: BH9394 (20k)	09-Apr-21 (No. 217-03343)	Apr-22
Type-N mismatch combination	SN: 310982 / 06327	09-Apr-21 (No. 217-03344)	Apr-22
Reference Probe EX3DV4	SN: 7349	28-Dec-20 (No. EX3-7349_Dec20)	Dec-21
DAE4	SN: 601	02-Nov-20 (No. DAE4-601_Nov20)	Nov-21

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-21

	Name	Function	Signature
Calibrated by:	Jeffrey Katzman	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 8, 2021

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "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
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
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- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.7 ± 6 %	1.37 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**37.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.93 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.8 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.4 Ω + 0.0 jΩ
Return Loss	- 44.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.221 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

Extended Calibration
Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (<-20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 865664 D01 v01r04.

D1750V2 SN: 1061 - Head						
Date of Measurement	Return Loss (dB)	Δ%	Impedance Real (Ω)	ΔΩ	Impedance Imaginary (jΩ)	ΔΩ
6/3/2021	-44.5		49.4		0.0	
6/4/2022	-42.3	-4.9	47.9	-1.5	-0.2	-0.2