FCC SAR TEST REPORT

Test File No : F690501-RF-SAR000264-A2

Equipment Under Test	Car Telematics Modem
Model Name	TM04ANNABM2
Applicant	LG Electronics Inc.
Address of Applicant	10, Magokjungang 10-ro, Gangseo-gu, Seoul, Korea
FCC ID	BEJTM04ANNABM2
Exposure Category	General Population/Uncontrolled Exposure
Standards	FCC 47 CFR Part 2 (2.1093) IEEE 1528, 2013
Receipt No.	GPRI2204000278SR, GPRI2211000723SR
Date of Receipt	2022-04-25, 2022-11-04
Date of Test(s)	2022-06-11 ~ 2022-08-11 2023-01-17 ~ 2023-01-26
Date of Issue	2023-02-07
Test Result	Refer to the Page 6

In the configuration tested, the EUT complied with the standards specified above.

This test report does not assure KOLAS accreditation.

Remarks:

1) The results of this test report are effective only to the items tested.
2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.

Report prepared by /
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Revision history

Revision	Date of issue	Revisions	Revised By
-	August 19, 2022	Initial issue	-
A1	September 01, 2022	Revision Update - Added statement for TDD Duty Factor	Jongho Park
A2	February 07, 2023	Revision Update - Retested SAR test cases for LTE Band 7 and 41, cutting the part of Antenna GDN Pattern to improve resonance for the frequency range between 2496 MHz to 2690 MHz.	Seongyeon Yu

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1 Testing Laboratory

Company Name	SGS Korea Co., Ltd. (Gunpo Laboratory)
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2 Details of Manufacturer

Applicant	LG Electronics Inc.
Address	10, Magokjungang 10-ro, Gangseo-gu, Seoul, Korea
Email	seungho.hur@lge.com
Phone No.	010-2468-2972

3 Description of EUT(s)

EUT Type	Car Telematics Modem
Model Name	TM04ANNABM2
Serial Number	N-128
Mode of Operation	GSM850 / GSM1900 / WCDMA II / WCDMA IV / WCDMA V / LTE Band 2 / LTE Band 4 / LTE Band 5 / LTE Band 7 / LTE Band 12 / LTE Band 13 / LTE Band 17 / LTE Band 25 / LTE Band 41 / LTE Band 66 / LTE Band 71
Tx Frequency Range	GSM850 : 824.0 ~ 849.0 MHz GSM1900 : 1850.0 ~ 1910.0 MHz WCDMA II : 1850.0 ~ 1910 MHz WCDMA IV : 1710.0 ~ 1755.0 MHz WCDMA V : 824.0 ~ 849.0 MHz LTE Band 2 : 1850.0 ~ 1910.0 MHz LTE Band 4 : 1710.0 ~ 1755.0 MHz LTE Band 5 : 824.0 ~ 849.0 MHz LTE Band 7 : 2500.0 ~ 2570.0 MHz LTE Band 12 : 699.0 ~ 716.0 MHz LTE Band 13 : 777.0 ~ 787.0 MHz LTE Band 17 : 704.0 ~ 716.0 MHz LTE Band 25 : 1850.0 ~ 1915.0 MHz LTE Band 41 : 2496.0 ~ 2690.0 MHz LTE Band 66 : 1710.0 ~ 1780.0 MHz LTE Band 71 :663.0 ~ 698.0 MHz

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4. The Highest Reported SAR Values

Equipment Class	Band	Highest Reported SAR 1g (W/kg)
PCE	GSM850	0.022
PCE	GSM1900	0.211
PCE	WCDMA II	**0.427**
PCE	WCDMA IV	0.414
PCE	WCDMA V	0.022
PCE	LTE Band 2	N/A
PCE	LTE Band 4	N/A
PCE	LTE Band 5	0.017
PCE	LTE Band 7	0.172
PCE	LTE Band 12	0.083
PCE	LTE Band 13	0.057
PCE	LTE Band 17	N/A
PCE	LTE Band 25	0.361
PCE	LTE Band 41	0.079
PCE	LTE Band 66	0.354
PCE	LTE Band 71	0.074

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5 Test Methodology

ANSI/IEEE C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. It specifies the maximum exposure limit of 1.6 W/kg as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

Test tests documented in this report were performed in accordance with IEEE Standard 1528-2013 and the following published KDB procedures.

In additions;

☒	**KDB 865664 D01v01r04**	**SAR Measurement Requirements for 100 MHz to 6 GHz**
☒	**KDB 865664 D02v01r02**	**RF Exposure Compliance Reporting and Documentation Considerations**
☒	**KDB 447498 D01v06**	**Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies**
☐	KDB 447498 D02v02r01	SAR Measurement Procedures for USB Dongle Transmitters
☐	KDB 248227 D01v02r02	SAR Guidance For IEEE 802.11 (Wi-Fi) Transmitters
☐	KDB 615223 D01v01r01	802.16e/WiMax SAR Measurement Guidance
☐	KDB 616217 D04v01r02	SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers
☐	KDB 643646 D01v01r03	SAR Test Considerations for Occupational PTT Radios
☐	KDB 648474 D03v01r04	Evaluation and Approval Considerations for Handsets with Specific Wireless Charging Battery Covers
☐	KDB 648474 D04v01r03	SAR Evaluation Considerations for Wireless Handsets
☐	KDB 680106 D01v03r01	RF Exposure Considerations for Low Power Consumer Wireless Power Transfer Applications
☒	**KDB 941225 D01v03r01**	**3G SAR Measurement Procedures**
☒	**KDB 941225 D05v02r05**	**SAR Evaluation Considerations for LTE Devices**
☐	KDB 941225 D06v02r01	SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities
☐	KDB 941225 D07v01r02	SAR Evaluation Procedures for UMPC Mini-Tablet Devices

6 Testing Environment

Ambient temperature	: 18°C ~ 25°C
Relative humidity	: 30% ~ 70%
Liquid temperature of during the test	: <± 2°C
Ambient noise & Reflection	: < 0.012 W/kg

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7 Specific Absorption Rate (SAR)

7.1 Introduction

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

7.2 SAR Definition

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

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

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

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

$$\mathbf{SAR} = \mathbf{C}\left(\frac{\boldsymbol{\delta}\mathbf{T}}{\boldsymbol{\delta}\mathbf{t}}\right)$$

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

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

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

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

7.3 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate ("SAR") in Section 4.2 of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 ㎑ to 300 ㎓," ANSI/IEEE C95.3–2003, Copyright 2003 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in "Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields," NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting

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source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 ㎑ to 6 ㎓. Portable devices that transmit at frequencies above 6 ㎓ are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 ㎓ should be made at a minimum distance of 5 cm from the radiating source.

(1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube). Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

(2) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Partial Peak SAR (Partial)	1.60 mW/g	8.00 mW/g
Partial Average SAR (Whole Body)	0.08 mW/g	0.40 mW/g
Partial Peak SAR (Hands/Feet/Ankle/Wrist)	4.00 mW/g	20.00 mW/g

1. The spatial Peak value of the SAR averaged over any 1g 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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8 The SAR Measurement System

A block diagram of the SAR measurement System is given in Fig. 1. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY system). The model EX3DV4 field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ ($|Ei|^2$)/ ρ where σ and ρ are the conductivity and mass density of the tissue-simulant.

The DASY system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Staubli TX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
- A dosimeter probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- Data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

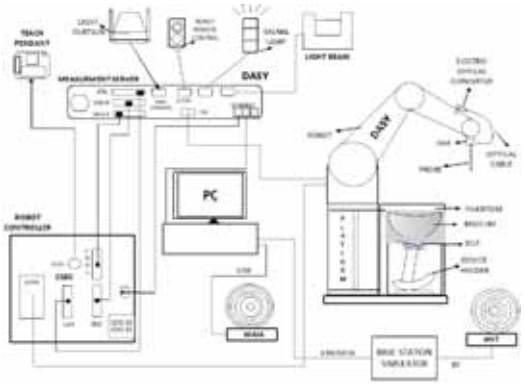

Fig a. The microwave circuit arrangement used for SAR system verification

- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows.
- DASY software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Verification dipole kits allowing to validate the proper functioning of the system.

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9 System Components

9.1 Probe

Construction : Symmetrical design with triangular core.
Built-in shielding against static charges.
PEEK enclosure material (resistant to organic solvents, e.g., DGBE)

Calibration : Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 835 and HSL1900.
Additional CF-Calibration for other liquids and frequencies upon request.

Frequency : 10 ㎒ to 6 ㎓; Linearity: ± 0.2 ㏈ (30 ㎒ to 6 ㎓)

Directivity : ± 0.3 ㏈ in HSL (rotation around probe axis)
± 0.5 ㏈ in tissue material (rotation normal to probe axis)

Dynamic Range : 10μW/g to > 100 m W/g;
Linearity: ± 0.2 ㏈(noise: typically < 1 μW/g)

Dimensions : Overall length: 337 ㎜ (Tip length: 20 ㎜)
Tip diameter: 2.5 ㎜ (Body diameter: 12 ㎜)
Distance from probe tip to dipole centers: 1 ㎜

Application : High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 ㎓ with precision of better 30%

EX3DV4 E-Field Probe

NOTE:

1. The Probe parameters have been calibrated by the SPEAG. Please reference “APPENDIX C” for the Calibration Certification Report.

9.2 ELI Phantom

Construction : Phantom for compliance testing of handheld and bodymounted wireless devices in the frequency range of 30 ㎒ to 6 ㎓. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

ELI V5.0 has the same shell geometry and is manufactured from the same material as ELI4, but has reinforced top structure

ELI Phantom

Shell Thickness : 2.0 ㎜ ± 0.1 ㎜

Dimensions : Major axis : 600 ㎜
Minor axis : 400 ㎜

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9.3 Device Holder

Construction: : In combination with the Twin SAM PhantomV4.0/V4.0C or Twin SAM, the Mounting Device (made from POM) enables the rotation of the mounted transmitter in spherical coordinates, whereby the rotation point is the ear opening. The devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Device Holder

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10 SAR Measurement Procedures

10.1 Normal SAR Measurement Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 1.4 ㎜. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2 and 3: Area Scan & Zoom Scan Procedures

The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. The extraction of the measured data (grid and values) from the Zoom Scan.
2. The calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. The generation of a high-resolution mesh within the measured volume
4. The interpolation of all measured values from the measurement grid to the high-resolution grid
5. The extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. The calculation of the averaged SAR within masses of 1 g and 10 g.

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1. SAR drift shall be kept within ± 5 % and if it without ± 5 %, SAR retest according to measurement procedure step 1~4.

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< Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04 >

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 mm ± 1 mm	½·δ·ln(2) mm ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB Publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

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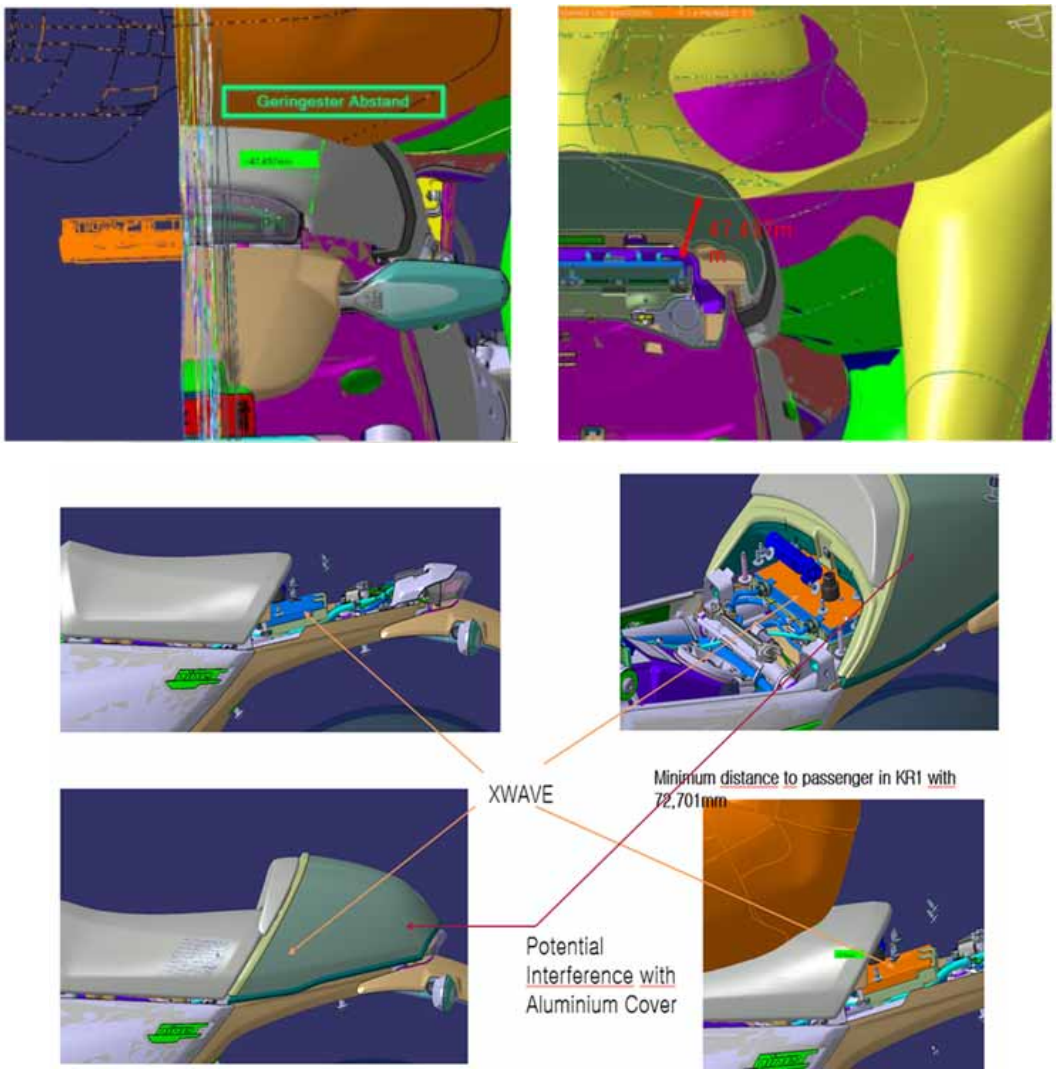
11 Definition of Reference

11.1 Other consumer electronic devices

The exposure conditions of transmitters and modules incorporated in certain consumer electronic devices, such as printers, cameras, and camcorders may vary according to the installation and operating configurations required by the host products. Details of the transmitter and antenna configurations, antenna to user test separation distance, device operating configurations, etc., are required to determine SAR test exclusion or SAR measurement requirements for each host product. When SAR tests are required, a KDB inquiry is recommended to confirm the test setup. Unless the transmitter is used in a specific/dedicated host device, the standalone and simultaneous transmission SAR procedures for transmitters and modules should be applied. These must be fully explained in the permissive change documentation or equipment approval filing, whichever is applicable. This device is mounted on the saddle of the vehicle, and the physical distance from the saddle is 47mm. By manufacturer declaration, the test distance is 45mm.



※ Photo of the device mounted on the vehicle

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12. SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig 1. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR values. These tests were done at 750 / 835 / 1800 / 1900 / 2600 ㎒. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1. (SAR values are normalized to 1W forward power delivered to the dipole). During the tests, the ambient temperature of the laboratory was in the range (22 ± 2) ° C, the relative humidity was in the range (55 ± 5) % R.H and the liquid depth above the ear reference points was ≥ 15 cm ± 5 mm (frequency ≤ 3 GHz) or ≥ 10 cm ± 5 mm (frequency > 3 G Hz)in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

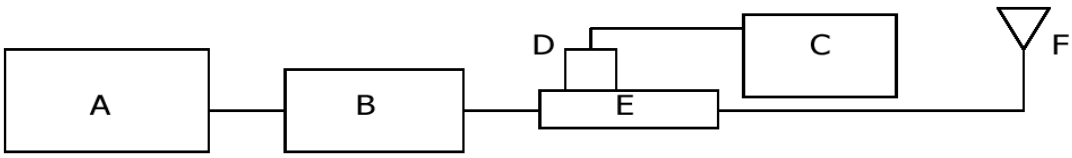

Fig 1. The microwave circuit arrangement used for SAR system verification

A. Signal Generator
B. RF Amplifier
C. Power Meter
D. Power Sensor
E. Dual Directional Coupler
F. Reference dipole Antenna

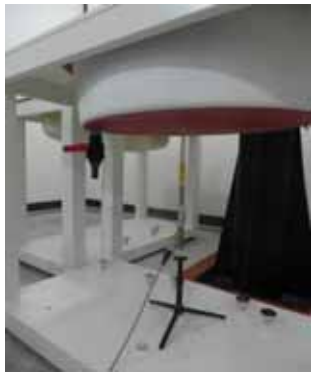

Photo of the dipole Antenna

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SAR System Verification

Verification Kit	Probe S/N	Tissue (MHz)	Target SAR 1 g from Standard (1 W)	Normalized SAR 1 g (1 W)	1g Deviation (%)	Date	Liquid Temp. (°C)
D750V3 SN:1085	7412	750	8.46	8.43	-0.35	2022-06-15	22.1
D750V3 SN:1085	7412	750	8.46	8.10	-4.26	2022-06-16	22.2
D750V3 SN:1085	7412	750	8.46	8.64	2.13	2022-06-17	22.3
D750V3 SN:1085	7412	750	8.46	8.61	1.77	2022-08-10	22.5
D835V2 SN:490	7412	835	9.60	9.44	-1.67	2022-06-27	22.3
D835V2 SN:490	7412	835	9.60	9.56	-0.42	2022-06-28	22.1
D835V2 SN:490	7412	835	9.60	9.42	-1.88	2022-07-07	22.3
D835V2 SN:490	7412	835	9.60	8.96	-6.67	2022-07-25	22.0
D835V2 SN:490	7412	835	9.60	9.18	-4.38	2022-08-10	22.5
D1800V2 SN:2d193	7412	1800	38.50	39.40	2.34	2022-07-01	22.3
D1800V2 SN:2d193	7412	1800	38.50	37.60	-2.34	2022-07-04	21.9
D1800V2 SN:2d074	7412	1800	39.00	41.00	5.13	2022-08-11	21.9
D1900V2 SN:5d158	7412	1900	41.00	41.60	1.46	2022-06-11	21.9
D1900V2 SN:5d033	7412	1900	39.30	38.00	-3.31	2022-07-11	22.1
D1900V2 SN:5d033	7412	1900	39.30	41.80	6.36	2022-07-25	22.1
D1900V2 SN:5d033	7412	1900	39.30	39.20	-0.25	2022-08-11	22.0
D2600V2 SN:1124	7412	2600	55.50	53.50	-3.60	2023-01-17	21.9
D2600V2 SN:1124	7412	2600	55.50	52.80	-4.86	2023-01-20	21.7
D2600V2 SN:1124	7412	2600	55.50	53.70	-3.24	2023-01-26	22.0

Table 1 Results system verification

(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

13 Tissue Simulant Fluid for the Frequency Band

The dielectric properties for this simulant fluid were measured by using the Speag Model DAK-3.5 Dielectric Probe in conjunction with Agilent E5071C Network Analyzer (300 ㎑ - 6 ㎓) by using a procedure detailed in Section V.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(℃)
750.0	Body	Measured, 2022-06-15	42.58	0.89	22.1
		Target Tissue	*41.90*	*0.89*	
		Deviation (%)	**1.62**	**0.00**	
704.0		Measured, 2022-06-15	43.47	0.86	
		Deviation (%)	**3.75**	**-3.37**	
782.0		Measured, 2022-06-15	42.38	0.93	
		Deviation (%)	1.15	4.49	
750.0	Body	Measured, 2022-06-16	42.48	0.87	22.2
		Target Tissue	*41.90*	*0.89*	
		Deviation (%)	**1.38**	**-2.25**	
782.0		Measured, 2022-06-16	42.07	0.90	
		Deviation (%)	**0.41**	**1.12**	
750.0	Body	Measured, 2022-06-17	42.29	0.93	22.3
		Target Tissue	*41.90*	*0.89*	
		Deviation (%)	**0.93**	**4.49**	
673.0		Measured, 2022-06-17	43.40	0.85	
		Deviation (%)	**3.58**	**-4.49**	
680.5		Measured, 2022-06-17	43.29	0.86	
		Deviation (%)	**3.32**	**-3.37**	
750.0	Body	Measured, 2022-08-10	41.96	0.92	22.5
		Target Tissue	*41.90*	*0.89*	
		Deviation (%)	**0.14**	**3.37**	
673.0		Measured, 2022-08-10	42.26	0.89	
		Deviation (%)	**0.86**	**0.00**	
782.0		Measured, 2022-08-10	41.84	0.93	
		Deviation (%)	**-0.14**	**4.49**	
835.0	Body	Measured, 2022-06-27	41.79	0.90	22.3
		Target Tissue	*41.50*	*0.90*	
		Deviation (%)	**0.70**	**0.00**	
844.0		Measured, 2022-06-27	41.70	0.91	
		Deviation (%)	**0.48**	**1.11**	
835.0	Body	Measured, 2022-06-28	41.47	0.89	22.1
		Target Tissue	*41.50*	*0.90*	
		Deviation (%)	**-0.07**	**-1.11**	
826.4		Measured, 2022-06-28	41.56	0.89	
		Deviation (%)	**0.14**	**-1.11**	
835.0	Body	Measured, 2022-07-07	42.17	0.91	22.3
		Target Tissue	*41.50*	*0.90*	
		Deviation (%)	**1.61**	**1.11**	
824.2		Measured, 2022-07-07	42.29	0.90	
		Deviation (%)	**1.90**	**0.00**	

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f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(°C)
835.0	Body	Measured, 2022-07-25	41.95	0.91	22.0
		Target Tissue	*41.50*	*0.90*	
		Deviation (%)	**1.08**	**1.11**	
824.2		Measured, 2022-07-25	42.09	0.90	
		Deviation (%)	**1.42**	**0.00**	
835.0	Body	Measured, 2022-08-10	39.90	0.91	22.5
		Target Tissue	*41.50*	*0.90*	
		Deviation (%)	**-3.86**	**1.11**	
824.2		Measured, 2022-08-10	39.95	0.91	
		Deviation (%)	**-3.73**	**1.11**	
844.0		Measured, 2022-08-10	39.87	0.91	
		Deviation (%)	**-3.93**	**1.11**	
1800.0	Body	Measured, 2022-07-01	39.56	1.46	22.3
		Target Tissue	*40.00*	*1.40*	
		Deviation (%)	**-1.10**	**4.29**	
1712.4		Measured, 2022-07-01	39.85	1.38	
		Deviation (%)	**-0.37**	**-1.43**	
1800.0	Body	Measured, 2022-07-04	38.76	1.42	21.9
		Target Tissue	*40.00*	*1.40*	
		Deviation (%)	**-3.10**	**1.43**	
1720.0		Measured, 2022-07-04	38.92	1.37	
		Deviation (%)	**-2.70**	**-2.14**	
1800.0	Body	Measured, 2022-08-11	39.15	1.46	21.9
		Target Tissue	*40.00*	*1.40*	
		Deviation (%)	**-2.13**	**4.29**	
1712.4		Measured, 2022-08-11	39.23	1.40	
		Deviation (%)	**-1.93**	**0.00**	
1720.0		Measured, 2022-08-11	39.22	1.41	
		Deviation (%)	**-1.95**	**0.71**	
1900.0	Body	Measured, 2022-06-11	39.93	1.39	21.9
		Target Tissue	*40.00*	*1.40*	
		Deviation (%)	**-0.18**	**-0.71**	
1880.0		Measured, 2022-06-11	40.00	1.37	
		Deviation (%)	**0.00**	**-2.14**	
1905.0		Measured, 2022-06-11	39.91	1.39	
		Deviation (%)	**-0.23**	**-0.71**	
1900.0	Body	Measured, 2022-07-11	39.36	1.40	22.1
		Target Tissue	*40.00*	*1.40*	
		Deviation (%)	**-1.60**	**0.00**	
1850.2		Measured, 2022-07-11	39.57	1.35	
		Deviation (%)	**-1.08**	**-3.57**	

(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(℃)
1900.0	Body	Measured, 2022-07-25	41.74	1.40	22.1
		Target Tissue	*40.00*	*1.40*	
		Deviation (%)	**4.35**	**0.00**	
1850.2		Measured, 2022-07-25	41.99	1.35	
		Deviation (%)	**4.98**	**-3.57**	
1900.0	Body	Measured, 2022-08-11	41.42	1.40	22.0
		Target Tissue	*40.00*	*1.40*	
		Deviation (%)	**3.55**	**0.00**	
1850.2		Measured, 2022-08-11	41.43	1.37	
		Deviation (%)	**3.58**	**-2.14**	
1905.0		Measured, 2022-08-11	41.41	1.40	
		Deviation (%)	**3.52**	**0.00**	
2600.0	Body	Measured, 2023-01-17	38.20	1.93	21.9
		Target Tissue	*39.00*	*1.96*	
		Deviation (%)	**-2.05**	**-1.53**	
2680.0		Measured, 2023-01-17	38.03	1.99	
		Deviation (%)	**-2.49**	**1.53**	
2600.0	Body	Measured, 2023-01-20	39.39	1.96	21.7
		Target Tissue	*39.00*	*1.96*	
		Deviation (%)	**1.00**	**0.00**	
2560.0		Measured, 2023-01-20	39.49	1.93	
		Deviation (%)	**1.26**	**-1.53**	
2600.0	Body	Measured, 2023-01-26	39.12	1.96	22.0
		Target Tissue	*39.00*	*1.96*	
		Deviation (%)	**0.31**	**0.00**	
2560.0		Measured, 2023-01-26	39.43	1.88	
		Deviation (%)	**1.10**	**-4.08**	

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The brain mixtures consist of a viscous gel using hydroxyethyl cellulose(HEC) gelling agent and saline solution. Preservation with a bactericide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation. The dielectric properties of the liquid material required to fill the phantom shell shall be target

Frequency (㎒)	**450**	**835**	**900**	**1800-2000**	**2450**	**2600**
Tissue Type	**Head & Body**					
Ingredient (% by weight)						
Water	38.91	40.29	40.29	55.24	45.0	45.0
Salt (NaCl)	3.79	1.38	1.38	0.31	0	0
Sugar	56.93	57.90	57.90	0	0	0
HEC	0.25	0.24	0.24	0	0	0
Bactericide	0.12	0.18	0.18	0	0	0
Triton X-100	0	0	0	0	0	0
DGBE	0	0	0	44.45	55.00	55.00
Tissue parameter target by IEEE 1528-2013						
Dielectric Constant	43.50	41.50	41.50	40.00	39.20	39.00
Conductivity (S/m)	0.87	0.90	0.97	1.40	1.80	1.96

Salt: 99+% Pure Sodium Chloride
Sucrose: 98+% Pure Sucrose
Water: De-ionized, 16 M + resistivity
HEC: Hydroxyethyl Cellulose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

14 Justification for Extended SAR Dipole Calibrations

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (< -20 ㏈, within 20 % of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB publication 865664 D01V01r04:

750V3 Head (SN : 1085)				
750 GHz				
Measurement Date	Return Loss (㏈)	Δ%	Impedance (Ω)	ΔΩ
2022-02-24	-29.42	6.10	51.53	-1.69

1800V2 Head (SN : 2d193)				
1800 GHz				
Measurement Date	Return Loss (㏈)	Δ%	Impedance (Ω)	ΔΩ
2021-08-09	-26.14	-10.90	47.54	0.89

1900V2 Head (SN : 5d158)				
1900 GHz				
Measurement Date	Return Loss (㏈)	Δ%	Impedance (Ω)	ΔΩ
2022-04-13	-24.74	14.13	55.46	3.17

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15 Instruments List

- F690501-RF-SAR00264 ~ F690501-RF-SAR00264-A1

Test Platform	SPEAG DASY System				
Manufacture	SPEAG				
Description	SAR Test System (Frequency range 300 MHz – 6 GHz)				
Software Reference	DASY52: 52.10.4(1527) SEMCAD X: 14.6.14(7483)				
Equipment	**Type**	**Serial Number**	**Cal Date**	**Cal Interval**	**Cal Due**
Phantom	ELI Phantom	TP-1244	N/A	N/A	N/A
Verification Dipole	D750V3	1085	2021-03-17	Biennial	2023-03-17
Verification Dipole	D835V2	490	2022-05-25	Biennial	2024-05-25
Verification Dipole	D1800V2	2d193	2020-08-20	Biennial	2022-08-20
Verification Dipole	D1800V2	2d074	2022-07-18	Biennial	2024-07-18
Verification Dipole	D1900V2	5d158	2021-04-22	Biennial	2023-04-22
Verification Dipole	D1900V2	5d033	2022-05-30	Biennial	2024-05-30
DAE	DAE4	1595	2022-01-24	Annual	2023-01-24
E-Field Probe	EX3DV4	7412	2022-04-29	Annual	2023-04-29
Dielectric Assessment Kit	DAK-3.5	1228	2021-11-23	Annual	2022-11-23
Network Analyzer	E5071C	MY46111535	2022-04-19	Annual	2023-04-19
Power Meter	E4419B	GB43311125	2022-04-20	Annual	2023-04-20
Power Meter	E4419B	GB43311715	2022-03-03	Annual	2023-03-03
Power Sensor	E9300H	MY41495307	2022-04-20	Annual	2023-04-20
Power Sensor	E9300H	MY41495314	2022-04-20	Annual	2023-04-20
Signal Generator	E8247C	MY43321024	2022-06-09	Annual	2023-06-09
RF Amplifier	AMP2027ADB	10001	2021-12-08	Annual	2022-12-08
Dual Directional Coupler	778D	MY52180497	2022-03-04	Annual	2023-03-04
Dual Directional Coupler	772D	MY52180226	2022-03-04	Annual	2023-03-04
LP Filter	LA-15N	LF02	2022-03-03	Annual	2023-03-03
LP Filter	LA-30N	LF03	2022-03-03	Annual	2023-03-03
Attenuator	05AS102-K03	A1	2021-12-06	Annual	2022-12-06
Attenuator	05AS102-K20	A4	2021-12-06	Annual	2022-12-06
Attenuator	RFHB1210NC2	A5	2022-06-09	Annual	2023-06-09
Hygro-Thermometer	BJ5478	12091382-1	2022-06-04	Annual	2023-06-04
Digital Thermometer	SDT25	19041500179	2021-09-17	Annual	2022-09-17
Radio Communication Analyzer	MT8821C	6261760829	2022-02-25	Annual	2023-02-25

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- F690501-RF-SAR00264-A2

Equipment	Type	Serial Number	Cal Date	Cal Interval	Cal Due
Phantom	ELI Phantom	TP-1244	N/A	N/A	N/A
Verification Dipole	D2600V2	1124	2022-07-15	Biennial	2024-07-15
DAE	DAE3	567	2022-02-28	Annual	2023-02-28
E-Field Probe	EX3DV4	7412	2022-04-29	Annual	2023-04-29
Dielectric Assessment Kit	DAK-3.5	1107	2022-05-30	Annual	2023-05-30
Network Analyzer	E5071C	MY46111535	2022-04-19	Annual	2023-04-19
Power Meter	E4419B	GB43311125	2022-04-20	Annual	2023-04-20
Power Meter	E4419B	GB43311715	2022-03-03	Annual	2023-03-03
Power Sensor	E9300H	MY41495307	2022-04-20	Annual	2023-04-20
Power Sensor	E9300H	MY41495314	2022-04-20	Annual	2023-04-20
Signal Generator	E8247C	MY43321024	2022-06-09	Annual	2023-06-09
RF Amplifier	AMP2027	10008	2022-03-04	Annual	2023-03-04
Dual Directional Coupler	777D	50128	2022-06-09	Annual	2023-06-09
LP Filter	LA-30N	LF03	2022-03-03	Annual	2023-03-03
Attenuator	18N-10	19	2022-12-02	Annual	2023-12-02
Attenuator	18N-20	22	2022-12-02	Annual	2023-12-02
Hygro-Thermometer	BJ5478	12091382-1	2022-06-04	Annual	2023-06-04
Digital Thermometer	SDT25	19041500179	2022-09-06	Annual	2023-09-06
Radio Communication Analyzer	MT8820C	6201074216	2022-12-07	Annual	2023-12-07

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16 FCC Power Measurement Procedures

The SAR measurement Software calculates a reference point at the start and end of the test to check for power drifts. If conducted power deviations of more than 5 % occurred, the tests were repeated.

17 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v06, When SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as reported SAR. Test highest reported SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

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18 Maximum Output Power Specifications

This device operates using the following maximum output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v06

GSM Maximum Power

Band	Maximum/ Normal	Maximum Output Power (dBm)				
		GSM Voice	GPRS		EGPRS	
			1Tx	2Tx	1Tx	2Tx
GSM 850	**Maximum**	**34.00**	**34.00**	**34.00**	**28.00**	**28.00**
	Normal	33.00	33.00	33.00	27.00	27.00
GSM 1900	**Maximum**	**30.50**	**30.50**	**30.50**	**26.50**	**26.50**
	Normal	30.00	30.00	30.00	26.00	26.00

WCDMA Maximum Power

Mode	Maximum/Normal	Maximum Output Power (dBm)			
		3GPP WCDMA AMR / RMC	3GPP HSDPA	3GPP HSUPA	3GPP DC-HSDPA
WCDMA II	**Maximum**	**25.00**	**24.00**	**24.00**	**23.00**
	Normal	24.00	23.00	23.00	22.00
WCDMA IV	**Maximum**	**25.00**	**24.00**	**24.00**	**23.00**
	Normal	24.00	23.00	23.00	22.00
WCDMA V	**Maximum**	**25.00**	**24.00**	**24.00**	**23.00**
	Normal	24.00	23.00	23.00	22.00

LTE Maximum Power

Mode / Band		Modulated Average
LTE Band 2	**Maximum**	**24.00**
	Nominal	23.00
LTE Band 4	**Maximum**	**24.00**
	Nominal	23.00
LTE Band 5	**Maximum**	**24.00**
	Nominal	23.00
LTE Band 7	**Maximum**	**24.00**
	Nominal	23.00
LTE Band 12	**Maximum**	**24.00**
	Nominal	23.00
LTE Band 13	**Maximum**	**24.00**
	Nominal	23.00
LTE Band 17	**Maximum**	**24.00**
	Nominal	23.00
LTE Band 25	**Maximum**	**24.00**
	Nominal	23.00
LTE Band 41	**Maximum**	**24.00**
	Nominal	23.00
LTE Band 66	**Maximum**	**24.00**
	Nominal	23.00
LTE Band 71	**Maximum**	**24.00**
	Nominal	23.00

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19 RF Conducted Power Measurement

19.1 GSM

The device in LTE was controlled by using a Communication tester. The EUT was set to maximum power level during all tests. The DASY system measures power drift during SAR testing by comparing e-field in the same location at the beginning and at the end of measurement.

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. The source-based frame-averaged output power was evaluated for 1Tx, 2Tx slot configurations. The configuration with the highest target frame averaged output power was evaluated for Car Telematics Modem SAR. When the maximum frame-averaged powers are equivalent across two or more slots (within 0.25 dB), the configuration with the most number of time slots were tested.
3. GPRS output powers were measured with coding scheme setting of 1(CS1) on the base station simulator. CS1 was configured to measure GPRS output power measurements and SAR to ensure GMSK modulation in the signal. Our investigation has shown that CS1 – CS4 settings do not have any impact on the output levels or modulations in the GPRS modes.
4. EGPRS output powers were measured with coding scheme setting of 5(CS5) on the base station simulator. CS5 was configured to measure EGPRS output power measurements and SAR to ensure 8PSK modulation in the signal. Our investigation has shown that CS5 – CS9 settings do not have any impact on the output levels or modulations in the GPRS modes.
5. For body SAR testing, the EUT was set in GPRS multi-slot class 12 with 2uplink slots for GSM850&GSM1900 due to maximum source-based time-averaged output power.

19.2 WCDMA

19.2.1 Output Power Verification

Maximum output power is measured on the High, Middle and Low channels for each applicable transmission band according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1s”.

19.2.2 Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all “1s”.

19.2.3 Procedures Used to Establish RF Signal for SAR HSDPA Data Devices

Body SAR is not required for handsets with HSDPA capabilities when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is ≤ 75 % of the SAR limit. Otherwise, SAR is Measured for HSDPA, using an

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FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA, on the maximum output channel with the body exposure configuration that results in the highest SAR in 12.2 kbps RMC for that RF channel.

Sub-Test 1 Setup for Release 5 HSDPA

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

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15.
Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

19.2.4 SAR Measurements for Conditions for HSUPA Data Devices

Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is ≤ 75 % of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.1 kbps RMC without HSPA. When VOIP is applicable for head exposure, SAR is not required when the maximum output of each RF channel with HSPA is less than ¼ dB higher than that measured using 12.2 kbps RMC; otherwise, the same HSPA configuration used for body measurement should be used to test for head exposure.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}(1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM(2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}: 47/15 β_{ed2}: 47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

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19.3 LTE

19.3.1 SAR measurement Conditions for LTE

LTE modes were tested according to FCC KDB 941225 D05v02r05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluation SAR. Anritsu MT8820C was used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

19.3.2 Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

19.3.3 MPR

MPR is permanently implemented for this device by the manufacture. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3.-1

19.3.4 A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

19.3.5 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05V02r05

a. Per Section 5.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
   i. The required channel and offset combination with the highest maximum output power is required for SAR.
   ii. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel
   iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.

b. Per Section 5.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 5.2.1.

c. Per Section 5.2.3, QPSK SAR is not required for the 100% allocation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.

d. Per Section 5.2.4 and 5.3, SAR tests for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Section 5.2.1, through 5.2.3 is less than or equal to 1/2 dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is < 1.45 W/kg.

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19.3.6 TDD

LTE TDD testing is performed using the SAR test guidance provided in FCC KDB 941225 D05V02r04.

TDD is tested at the highest duty factor using UL-DL configuration 0 with special subframe configuration 6 and applying the FDD LTE procedures in KDB 941225 D05v02r04. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211 Section 4.

GSM Conducted power

Mode		Burst-Conducted Average Power(dBm)				
		GSM	GPRS		EGPRS	
		Voice	1Tx	2Tx	1Tx	2Tx
GSM850	**Maximum**	**34.00**	**34.00**	**34.00**	**28.00**	**28.00**
	128	**33.18**	33.14	**33.16**	27.21	26.85
	190	33.08	33.12	33.10	26.76	26.21
	251	32.94	33.08	33.03	26.42	26.62
GSM1900	**Maximum**	**31.00**	**30.50**	**30.50**	**26.50**	**26.50**
	512	**29.86**	**29.81**	29.78	25.94	25.27
	661	29.85	29.79	29.70	25.89	25.44
	810	29.82	29.76	29.68	25.71	25.09
Mode		**Frame-Conducted Average Power(dBm)**				
		GSM	**GPRS**		**EGPRS**	
		Voice	**1Tx**	**2Tx**	**1Tx**	**2Tx**
GSM850	**Maximum**	**24.97**	**24.97**	**27.98**	**18.97**	**21.98**
	128	**24.15**	24.11	**27.14**	18.18	20.83
	190	24.05	24.09	27.08	17.73	20.19
	251	23.91	24.05	27.01	17.39	20.60
GSM1900	**Maximum**	**21.47**	**21.47**	**24.48**	**17.47**	**20.48**
	512	**20.83**	**20.78**	23.76	16.91	19.25
	661	20.82	20.76	23.68	16.86	19.42
	810	20.79	20.73	23.66	16.68	19.07

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WCDMA Conducted power

Mode	3GPP 34.121	Normal Power (dBm)		
Channel	**Subtest**	**9262**	**9400**	**9538**
WCDMA II	12.2 Kbps AMR	23.28	23.29	23.24
	12.2 Kbps RMC	23.06	**23.30**	23.01
HSDPA	Subtest 1	22.03	22.35	22.06
	Subtest 2	22.05	22.34	22.06
	Subtest 3	21.53	21.77	21.56
	Subtest 4	21.53	21.81	21.59
HSUPA	Subtest 1	22.11	22.39	22.14
	Subtest 2	20.13	20.36	20.14
	Subtest 3	21.11	21.36	21.14
	Subtest 4	20.12	20.38	20.17
	Subtest 5	22.11	22.43	22.14
DC-HSDPA	Subtest 1	22.28	22.31	22.02
	Subtest 2	22.28	22.29	22.02
	Subtest 3	21.68	21.78	21.11
	Subtest 4	21.70	21.80	21.07
Mode	**3GPP 34.121**	**Normal Power (dBm)**		
Channel	**Subtest**	**1312**	**1413**	**1513**
WCDMA IV	12.2 Kbps AMR	23.59	23.36	23.13
	12.2 Kbps RMC	**23.67**	23.44	23.32
HSDPA	Subtest 1	22.60	22.48	22.36
	Subtest 2	22.59	22.43	22.31
	Subtest 3	22.08	21.91	21.83
	Subtest 4	22.01	21.92	21.8
HSUPA	Subtest 1	22.55	22.64	22.62
	Subtest 2	20.51	20.58	20.55
	Subtest 3	21.52	21.55	21.51
	Subtest 4	20.56	20.63	20.52
	Subtest 5	22.41	22.39	22.41
DC-HSDPA	Subtest 1	21.03	21.11	21.01
	Subtest 2	21.12	21.23	21.03
	Subtest 3	20.54	20.61	20.52
	Subtest 4	20.59	20.69	20.58

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Mode	3GPP 34.121 Subtest	Normal Power (dBm)		
Channel		4132	4183	4233
WCDMA V	12.2 Kbps AMR	23.39	23.20	23.34
	12.2 Kbps RMC	**24.12**	23.97	23.85
HSDPA	Subtest 1	22.86	22.80	22.84
	Subtest 2	22.88	22.80	22.84
	Subtest 3	22.37	22.28	22.34
	Subtest 4	22.38	22.29	22.33
HSUPA	Subtest 1	22.88	22.93	22.89
	Subtest 2	21.03	20.90	20.94
	Subtest 3	21.97	21.92	21.95
	Subtest 4	21.04	20.96	20.98
	Subtest 5	23.00	22.98	22.95
DC-HSDPA	Subtest 1	21.92	21.85	22.02
	Subtest 2	21.98	21.84	22.01
	Subtest 3	21.42	21.35	21.49
	Subtest 4	21.40	21.31	21.62

Note

1. WCDMA SAR was tested under RMC 12.2 kbps with HSPA inactive per KDB Publication 941225 D02v01. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg

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LTE Conducted power

-LTE Band 2

LTE Band2 1.4MHz Bandwidth						
Modulation	**RB Size**	**RB Offset**	**Low Channel**	**Mid Channel**	**High Channel**	**MPR Allowed Per 3GPP[dB]**
			18607	**18900**	**19193**	
			(1 850.7 MHz)	**(1 880.0 MHz)**	**(1 909.3 MHz)**	
			Conducted Power			
			[dBm]	**[dBm]**	**[dBm]**	
QPSK	1	0	22.01	22.40	22.14	0
	1	2	22.07	22.50	22.26	
	1	5	22.12	22.41	22.15	
	3	0	22.17	22.45	22.19	
	3	2	22.19	22.47	22.22	
	3	3	22.18	22.41	22.16	
	6	0	21.12	21.41	21.13	0-1
16QAM	1	0	21.44	21.69	21.35	0-1
	1	2	21.62	21.77	21.46	
	1	5	21.39	21.72	21.42	
	3	0	21.26	21.55	21.27	
	3	2	21.35	21.58	21.25	
	3	3	21.25	21.55	21.26	
	6	0	20.21	20.48	20.19	0-2

LTE Band2 3MHz Bandwidth						
Modulation	**RB Size**	**RB Offset**	**Low Channel**	**Mid Channel**	**High Channel**	**MPR Allowed Per 3GPP[dB]**
			18615	**18900**	**19185**	
			(1 851.5 MHz)	**(1 880.0 MHz)**	**(1 908.5 MHz)**	
			Conducted Power			
			[dBm]	**[dBm]**	**[dBm]**	
QPSK	1	0	22.23	22.49	22.44	0
	1	7	22.27	22.54	22.50	
	1	14	22.23	22.45	22.37	
	8	0	21.21	21.48	21.40	0-1
	8	4	21.24	21.51	21.43	
	8	7	21.18	21.46	21.41	
	15	0	21.19	21.48	21.39	
16QAM	1	0	21.49	21.80	21.73	0-1
	1	7	21.63	21.85	21.78	
	1	14	21.50	21.67	21.85	
	8	0	20.30	20.54	20.55	0-2
	8	4	20.33	20.57	20.60	
	8	7	20.26	20.52	20.56	
	15	0	20.24	20.54	20.54	

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LTE Band2 5MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			18625	18900	19175	
			(1 852.5 MHz)	(1 880.0 MHz)	(1 907.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.28	22.51	22.38	0
	1	12	22.21	22.46	22.40	
	1	24	22.34	22.42	22.42	
	12	0	21.24	21.49	21.44	0-1
	12	6	21.23	21.53	21.44	
	12	13	21.20	21.52	21.42	
	25	0	21.22	21.52	21.50	
16QAM	1	0	21.58	21.80	21.76	0-1
	1	12	21.53	21.80	21.86	
	1	24	21.61	21.72	21.87	
	12	0	20.27	20.56	20.60	0-2
	12	6	20.26	20.58	20.57	
	12	13	20.29	20.57	20.58	
	25	0	20.25	20.57	20.55	

LTE Band2 10MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			18650	18900	19150	
			(1 855.0 MHz)	(1 880.0 MHz)	(1 905.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.53	22.76	22.50	0
	1	25	22.28	22.48	22.33	
	1	49	22.53	22.51	22.45	
	25	0	21.28	21.52	21.39	0-1
	25	12	21.39	21.55	21.35	
	25	25	21.34	21.44	21.46	
	50	0	21.37	21.53	21.46	
16QAM	1	0	21.75	22.04	21.81	0-1
	1	25	21.54	21.73	21.65	
	1	49	21.83	21.83	21.70	
	25	0	20.32	20.58	20.45	0-2
	25	12	20.39	20.61	20.45	
	25	25	20.39	20.45	20.44	
	50	0	20.42	20.58	20.46	

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LTE Band2 15MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			18675	18900	19125	
			(1 857.5 MHz)	(1 880.0 MHz)	(1 902.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.38	22.61	22.58	0
	1	36	22.30	22.47	22.33	
	1	74	22.35	22.34	22.48	
	36	0	21.39	21.55	21.51	0-1
	36	18	21.37	21.57	21.41	
	36	37	21.34	21.45	21.45	
	75	0	21.39	21.47	21.47	
16QAM	1	0	21.59	21.88	21.85	0-1
	1	36	21.58	21.79	21.60	
	1	74	21.69	21.64	21.76	
	36	0	20.45	20.62	20.57	0-2
	36	18	20.40	20.59	20.42	
	36	37	20.40	20.50	20.48	
	75	0	20.40	20.47	20.50	

LTE Band2 20MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			18700	18900	19100	
			(1 860.0 MHz)	(1 880.0 MHz)	(1 900.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.58	22.73	22.59	0
	1	50	22.29	22.45	22.44	
	1	99	22.47	22.50	22.47	
	50	0	21.42	21.58	21.53	0-1
	50	25	21.39	21.58	21.46	
	50	13	21.35	21.46	21.45	
	100	0	21.40	21.47	21.52	
16QAM	1	0	21.78	22.14	21.92	0-1
	1	50	21.58	21.75	21.75	
	1	99	21.70	21.72	21.77	
	50	0	20.46	20.66	20.55	0-2
	50	25	20.43	20.59	20.49	
	50	50	20.39	20.50	20.45	
	100	0	20.40	20.49	20.55	

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-LTE Band 4

LTE Band4 1.4MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			19957	20175	20393	
			(1 710.7 MHz)	(1 732.5 MHz)	(1 754.3 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.45	22.40	22.27	0
	1	2	22.65	22.49	22.31	
	1	5	22.47	22.42	22.27	
	3	0	22.54	22.41	22.25	
	3	2	22.60	22.43	22.34	
	3	3	22.56	22.42	22.27	
	6	0	21.51	21.38	21.27	0-1
16QAM	1	0	21.75	21.71	21.54	0-1
	1	2	21.92	21.71	21.64	
	1	5	21.83	21.62	21.51	
	3	0	21.65	21.51	21.38	
	3	2	21.67	21.59	21.38	
	3	3	21.64	21.54	21.38	
	6	0	20.56	20.48	20.33	0-2

LTE Band4 3MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			19965	20175	20385	
			(1 711.5 MHz)	(1 732.5 MHz)	(1 753.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.61	22.48	22.24	0
	1	7	22.57	22.59	22.40	
	1	14	22.52	22.51	22.32	
	8	0	21.59	21.50	21.25	0-1
	8	4	21.53	21.51	21.35	
	8	7	21.48	21.48	21.34	
	15	0	21.47	21.45	21.30	
16QAM	1	0	21.86	21.75	21.54	0-1
	1	7	21.80	21.88	21.70	
	1	14	21.73	21.67	21.63	
	8	0	20.64	20.53	20.30	0-2
	8	4	20.59	20.57	20.40	
	8	7	20.54	20.55	20.37	
	15	0	20.52	20.50	20.39	

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LTE Band4 5MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			19975	20175	20375	
			(1 712.5 MHz)	(1 732.5 MHz)	(1 752.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.67	22.52	22.45	0
	1	12	22.51	22.51	22.50	
	1	24	22.47	22.48	22.45	
	12	0	21.61	21.48	21.52	0-1
	12	6	21.54	21.51	21.50	
	12	13	21.49	21.50	21.48	
	25	0	21.50	21.49	21.51	
16QAM	1	0	21.91	21.80	21.68	0-1
	1	12	21.66	21.72	21.76	
	1	24	21.80	21.80	21.71	
	12	0	20.64	20.53	20.55	0-2
	12	6	20.62	20.58	20.56	
	12	13	20.54	20.53	20.54	
	25	0	20.54	20.51	20.56	

LTE Band4 10MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			20000	20175	20350	
			(1 715.0 MHz)	(1 732.5 MHz)	(1 750.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.66	22.57	22.44	0
	1	25	22.49	22.52	22.32	
	1	49	22.47	22.46	22.36	
	25	0	21.55	21.53	21.49	0-1
	25	12	21.54	21.55	21.35	
	25	25	21.51	21.50	21.27	
	50	0	21.53	21.52	21.34	
16QAM	1	0	21.99	21.80	21.69	0-1
	1	25	21.72	21.81	21.64	
	1	49	21.78	21.63	21.64	
	25	0	20.58	20.53	20.52	0-2
	25	12	20.54	20.54	20.43	
	25	25	20.51	20.52	20.32	
	50	0	20.56	20.53	20.41	

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LTE Band4 15MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			20025	20175	20325	
			(1 717.5 MHz)	(1 732.5 MHz)	(1 747.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.77	22.61	22.58	0
	1	36	22.46	22.53	22.31	
	1	74	22.42	22.51	22.43	
	36	0	21.57	21.58	21.41	0-1
	36	18	21.53	21.57	21.38	
	36	37	21.42	21.42	21.38	
	75	0	21.54	21.54	21.40	
16QAM	1	0	21.98	21.88	21.90	0-1
	1	36	21.77	21.80	21.63	
	1	74	21.70	21.75	21.65	
	36	0	20.57	20.59	20.46	0-2
	36	18	20.56	20.59	20.44	
	36	37	20.45	20.47	20.44	
	75	0	20.56	20.57	20.45	

LTE Band4 20MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			20050	20175	20300	
			(1 720.0 MHz)	(1 732.5 MHz)	(1 745.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.83	22.55	22.45	0
	1	50	22.90	22.59	22.56	
	1	99	22.66	22.50	22.46	
	50	0	22.79	22.54	22.50	0-1
	50	25	22.67	22.59	22.49	
	50	13	22.62	22.59	22.48	
	100	0	22.80	22.56	21.47	
16QAM	1	0	22.02	21.87	21.77	0-1
	1	50	22.11	21.95	21.86	
	1	99	21.88	21.83	21.80	
	50	0	21.93	21.63	21.58	0-2
	50	25	21.86	21.67	21.54	
	50	50	21.77	21.63	21.55	
	100	0	21.82	21.62	20.49	

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-LTE Band 5

LTE Band5 1.4MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			20407	20525	20643	
			(824.7 MHz)	(836.5 MHz)	(848.3 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.57	22.80	22.59	0
	1	2	22.63	22.86	22.65	
	1	5	22.64	22.76	22.72	
	3	0	22.53	22.78	22.63	
	3	2	22.59	22.83	22.64	
	3	3	22.68	22.78	22.69	
	6	0	21.61	21.76	21.58	0-1
16QAM	1	0	21.93	22.09	22.03	0-1
	1	2	22.01	22.23	22.11	
	1	5	21.96	22.05	22.04	
	3	0	21.81	21.88	21.83	
	3	2	21.81	21.94	21.89	
	3	3	21.85	21.92	21.87	
	6	0	20.73	20.80	20.76	0-2

LTE Band5 3MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			20415	20525	20635	
			(825.5 MHz)	(836.5 MHz)	(847.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.72	22.88	23.00	0
	1	7	22.82	22.93	22.84	
	1	14	22.79	22.83	22.71	
	8	0	21.83	21.85	21.81	0-1
	8	4	21.86	21.87	21.82	
	8	7	21.82	21.81	21.80	
	15	0	21.82	21.82	21.83	
16QAM	1	0	22.05	22.12	22.07	0-1
	1	7	22.25	22.25	22.21	
	1	14	22.06	22.12	22.02	
	8	0	20.92	20.88	22.87	0-2
	8	4	20.93	20.90	22.92	
	8	7	20.87	20.87	20.81	
	15	0	20.84	20.85	20.84	

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LTE Band5 5MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			20425	20525	20625	
			(826.5 MHz)	(836.5 MHz)	(846.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.66	22.86	22.71	0
	1	12	22.79	22.84	22.82	
	1	24	22.77	22.84	22.83	
	12	0	21.85	21.83	21.84	0-1
	12	6	21.84	21.86	21.86	
	12	13	21.81	21.80	21.80	
	25	0	21.81	21.84	21.79	
16QAM	1	0	22.12	22.16	22.10	0-1
	1	12	22.14	22.05	22.13	
	1	24	22.01	22.10	22.08	
	12	0	20.89	20.91	20.90	0-2
	12	6	20.90	20.84	20.85	
	12	13	20.84	20.88	20.86	
	25	0	20.81	20.88	20.87	

LTE Band5 10MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			20450	20525	20600	
			(829.0 MHz)	(836.5 MHz)	(844.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.72	22.84	22.89	0
	1	25	22.78	22.82	**22.94**	
	1	49	22.89	22.87	22.86	
	25	0	22.72	22.84	22.92	0-1
	25	12	22.79	22.87	**22.95**	
	25	25	22.85	22.85	22.92	
	50	0	22.80	21.83	21.88	
16QAM	1	0	22.03	22.17	22.34	0-1
	1	25	22.10	22.20	22.27	
	1	49	22.17	22.16	22.12	
	25	0	21.78	21.90	21.96	0-2
	25	12	21.95	21.92	21.95	
	25	25	21.96	21.91	21.95	
	50	0	21.90	20.87	20.95	

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-LTE Band 7

LTE Band7 5MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			20775	21100	21425	
			(2 502.5 MHz)	(2 535.0 MHz)	(2 567.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	23.61	23.13	23.31	0
	1	12	23.60	23.22	23.17	
	1	24	23.54	23.14	23.19	
	12	0	22.37	22.26	22.30	0-1
	12	6	22.41	22.29	22.34	
	12	13	22.45	22.22	22.37	
	25	0	21.34	22.24	22.29	
16QAM	1	0	23.17	22.45	22.60	0-1
	1	12	23.08	22.56	21.81	
	1	24	22.86	22.50	21.44	
	12	0	21.77	21.31	21.44	0-2
	12	6	21.80	21.34	21.36	
	12	13	21.58	21.30	21.32	
	25	0	21.27	21.27	21.33	

LTE Band7 10MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			20800	21100	21400	
			(2 505.0 MHz)	(2 535.0 MHz)	(2 565.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	23.48	23.24	23.26	0
	1	25	23.22	23.21	23.22	
	1	49	23.17	23.09	23.20	
	25	0	22.27	22.23	22.34	0-1
	25	12	22.29	22.30	22.34	
	25	25	22.23	22.23	22.28	
	50	0	22.24	22.19	22.29	
16QAM	1	0	22.80	22.50	22.61	0-1
	1	25	22.54	22.54	22.69	
	1	49	22.51	22.41	22.51	
	25	0	21.31	21.25	21.35	0-2
	25	12	21.33	21.34	21.34	
	25	25	21.26	21.27	21.40	
	50	0	21.28	21.22	21.45	

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LTE Band7 15MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			20825	21100	21375	
			(2 507.5 MHz)	(2 535.0 MHz)	(2 562.5 MHz)	
			Conducted Output Power			
			(dB m)	(dB m)	(dB m)	
QPSK	1	0	23.31	23.28	23.17	0
	1	36	23.17	23.24	23.16	
	1	74	23.07	23.06	23.17	
	36	0	22.30	22.42	22.17	0-1
	36	18	22.25	22.32	22.22	
	36	37	22.17	22.15	22.23	
	75	0	22.23	22.20	22.20	
16QAM	1	0	22.83	22.68	22.53	0-1
	1	36	22.51	22.54	22.58	
	1	74	22.45	22.41	22.46	
	36	0	21.28	21.25	21.18	0-2
	36	18	21.26	21.42	21.24	
	36	37	21.20	21.17	21.26	
	75	0	21.24	21.20	21.20	

LTE Band7 20MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			20850	21100	21350	
			(2 510.0 MHz)	(2 535.0 MHz)	(2 560.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	23.62	23.51	**23.68**	0
	1	50	23.51	23.40	23.41	
	1	99	23.44	23.00	23.20	
	50	0	22.39	22.34	**22.46**	0-1
	50	25	22.21	22.26	22.28	
	50	13	22.33	22.29	22.20	
	100	0	22.94	22.26	22.18	
16QAM	1	0	21.63	22.69	22.68	0-1
	1	50	22.52	22.58	22.63	
	1	99	22.50	22.51	22.38	
	50	0	21.40	21.34	21.36	0-2
	50	25	21.22	21.20	21.21	
	50	50	21.22	21.11	21.22	
	100	0	21.22	21.29	21.28	

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-LTE Band 12

LTE Band12 1.4MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			23017	23095	23173	
			(699.7 MHz)	(707.5 MHz)	(715.3 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.82	22.91	22.83	0
	1	2	23.00	22.96	22.83	
	1	5	22.92	22.87	22.62	
	3	0	22.88	22.93	22.78	0-1
	3	2	22.99	22.93	22.75	
	3	3	22.91	22.88	22.69	
	6	0	21.95	21.89	21.76	
16QAM	1	0	22.08	22.17	22.15	0-1
	1	2	22.30	22.23	22.10	
	1	5	22.19	22.12	21.99	
	3	0	21.96	22.03	21.90	0-2
	3	2	22.10	22.03	21.85	
	3	3	22.13	21.97	21.79	
	6	0	21.08	20.95	20.89	

LTE Band12 3MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			23025	23095	23655	
			(700.5 MHz)	(707.5 MHz)	(714.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.88	22.92	22.91	0
	1	7	23.24	23.02	23.12	
	1	14	22.96	22.91	22.95	
	8	0	22.09	22.00	22.05	0-1
	8	4	22.15	22.00	22.13	
	8	7	22.02	21.97	21.98	
	15	0	22.03	21.98	22.01	
16QAM	1	0	22.30	22.22	22.26	0-1
	1	7	22.49	22.30	22.42	
	1	14	22.24	22.24	22.22	
	8	0	21.19	21.09	21.16	0-2
	8	4	21.21	21.08	21.19	
	8	7	21.05	21.00	21.03	
	15	0	21.05	21.05	21.04	

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LTE Band12 5MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			23035	23095	23155	
			(701.5 MHz)	(707.5 MHz)	(713.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.83	22.91	22.89	0
	1	12	23.21	23.03	23.13	
	1	24	22.95	22.92	22.94	
	12	0	22.10	21.98	22.04	0-1
	12	6	22.13	22.06	22.12	
	12	13	22.00	21.96	21.97	
	25	0	22.04	21.98	22.00	
16QAM	1	0	22.29	22.24	22.22	0-1
	1	12	22.48	22.25	22.39	
	1	24	22.31	22.21	22.18	
	12	0	21.21	21.05	21.11	0-2
	12	6	21.18	21.07	21.17	
	12	13	21.06	20.98	21.02	
	25	0	21.02	21.05	21.01	

LTE Band12 10MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			23060	23095	23130	
			(704.0 MHz)	(707.5 MHz)	(711.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	23.01	22.92	22.88	0
	1	25	**23.19**	23.04	23.11	
	1	49	22.96	22.93	22.96	
	25	0	22.08	21.95	22.03	0-1
	25	12	22.11	22.05	**22.13**	
	25	25	22.04	21.94	21.95	
	50	0	22.03	21.95	22.04	
16QAM	1	0	22.28	22.26	22.21	0-1
	1	25	22.47	22.24	22.35	
	1	49	22.29	22.25	22.15	
	25	0	21.22	21.01	21.13	0-2
	25	12	21.14	22.05	21.14	
	25	25	21.05	20.95	21.05	
	50	0	21.03	21.04	21.03	

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-LTE Band 13

LTE Band13 5MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			23205	23230	23255	
			(779.5 MHz)	(782.0 MHz)	(784.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	23.32	23.27	23.33	0
	1	12	23.31	23.29	23.30	
	1	24	23.17	23.27	23.31	
	12	0	22.31	22.25	22.50	0-1
	12	6	22.36	22.21	22.31	
	12	13	22.25	22.23	22.21	
	25	0	22.37	22.24	22.35	
16QAM	1	0	22.56	22.59	22.85	0-1
	1	12	22.58	22.59	22.51	
	1	24	22.44	22.60	22.55	
	12	0	21.34	21.27	21.32	0-2
	12	6	21.35	21.23	21.30	
	12	13	21.27	21.27	21.33	
	25	0	21.33	21.28	21.21	

LTE Band13 10MHz Bandwidth				
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed Per 3GPP[dB]
			23230	
			(782.0 MHz)	
			Conducted Power	
			[dBm]	
QPSK	1	0	**23.42**	0
	1	25	23.23	
	1	49	23.20	
	25	0	**22.44**	0-1
	25	12	22.24	
	25	25	22.18	
	50	0	22.26	
16QAM	1	0	22.59	0-1
	1	25	22.48	
	1	49	22.48	
	25	0	21.35	0-2
	25	12	21.31	
	25	25	21.21	
	50	0	21.23	

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-LTE Band 17

LTE Band17 5MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			23755	23790	23825	
			(706.5 MHz)	(710.0 MHz)	(713.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.77	22.90	22.44	0
	1	12	22.81	22.89	22.41	
	1	24	22.84	22.89	22.33	
	12	0	21.94	21.85	22.67	0-1
	12	6	21.95	21.86	22.40	
	12	13	21.87	21.82	22.52	
	25	0	21.82	21.82	22.42	
16QAM	1	0	22.05	22.19	22.62	0-1
	1	12	22.07	22.22	22.72	
	1	24	22.16	22.11	22.23	
	12	0	20.97	20.89	22.69	0-2
	12	6	20.98	20.93	22.63	
	12	13	20.91	20.85	22.63	
	25	0	20.94	20.86	22.59	

LTE Band17 10MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			23780	23790	23800	
			(709.0 MHz)	(710.0 MHz)	(711.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.88	22.97	22.78	0
	1	25	22.92	22.92	22.27	
	1	49	22.96	22.75	22.63	
	25	0	21.56	21.92	21.98	0-1
	25	12	21.48	21.86	22.36	
	25	25	21.38	21.79	22.60	
	50	0	21.93	21.85	22.71	
16QAM	1	0	22.14	22.24	22.35	0-1
	1	25	22.25	22.25	22.54	
	1	49	22.32	22.00	22.50	
	25	0	22.01	20.92	22.52	0-2
	25	12	21.99	20.91	22.77	
	25	25	21.98	20.79	22.42	
	50	0	20.95	20.85	22.11	

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-LTE Band 25

LTE Band25 1.4MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			26047	26365	26683	
			(1 850.7 MHz)	(1 882.5 MHz)	(1 914.3 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.56	22.97	22.79	0
	1	2	22.71	22.85	22.84	
	1	5	22.58	23.05	22.82	
	3	0	22.66	22.98	22.86	0-1
	3	2	22.71	23.06	22.93	
	3	3	22.67	22.97	22.91	
	6	0	21.70	23.02	22.80	
16QAM	1	0	21.85	22.20	22.09	0-1
	1	2	21.96	22.22	22.11	
	1	5	21.98	22.28	22.14	
	3	0	21.74	22.22	22.10	0-2
	3	2	21.80	22.20	22.18	
	3	3	21.81	22.40	22.09	
	6	0	20.70	22.16	22.00	

LTE Band25 3MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			26055	26365	26675	
			(1 851.5 MHz)	(1 882.5 MHz)	(1 913.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.87	22.81	22.82	0
	1	7	22.89	22.89	22.98	
	1	14	22.76	22.78	22.96	
	8	0	22.73	21.81	21.90	0-1
	8	4	22.75	21.80	21.77	
	8	7	22.80	21.80	21.78	
	15	0	21.70	21.79	21.78	
16QAM	1	0	21.90	22.03	22.10	0-1
	1	7	22.06	22.15	22.10	
	1	14	22.00	22.09	22.13	
	8	0	21.90	20.86	20.86	0-2
	8	4	21.92	20.89	20.84	
	8	7	21.92	20.86	20.82	
	15	0	20.80	20.84	20.84	

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LTE Band25 5MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			26065	26365	26665	
			(1 852.5 MHz)	(1 882.5 MHz)	(1 912.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.78	22.87	22.98	0
	1	12	22.93	22.88	22.93	
	1	24	22.88	22.90	22.86	
	12	0	22.75	22.79	21.83	0-1
	12	6	22.74	22.85	21.85	
	12	13	22.70	22.83	21.83	
	25	0	22.73	21.81	21.84	
16QAM	1	0	22.04	22.05	22.20	0-1
	1	12	22.03	22.07	22.05	
	1	24	22.04	22.09	22.13	
	12	0	21.79	21.87	20.86	0-2
	12	6	21.85	21.92	20.88	
	12	13	21.90	21.91	20.88	
	25	0	21.84	20.86	20.85	

LTE Band25 10MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			26090	26365	26640	
			(1 855.0 MHz)	(1 882.5 MHz)	(1 910.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.76	22.79	22.82	0
	1	25	22.68	22.83	22.74	
	1	49	22.87	22.89	22.90	
	25	0	22.78	22.84	22.82	0-1
	25	12	22.81	22.86	22.80	
	25	25	22.78	22.84	22.88	
	50	0	22.81	21.84	21.77	
16QAM	1	0	22.07	22.05	22.04	0-1
	1	25	21.95	21.99	22.02	
	1	49	22.26	22.03	22.08	
	25	0	21.87	21.89	21.84	0-2
	25	12	21.90	21.94	21.88	
	25	25	21.90	21.91	21.94	
	50	0	21.84	20.91	20.79	

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LTE Band25 15MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			26115	26365	26615	
			(1 857.5 MHz)	(1 882.5 MHz)	(1 907.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.93	22.89	23.10	0
	1	36	22.87	22.97	23.04	
	1	74	22.82	22.93	23.06	
	36	0	22.89	22.92	23.08	0-1
	36	18	22.83	22.89	23.05	
	36	37	22.81	22.89	22.97	
	75	0	22.85	22.86	22.06	
16QAM	1	0	21.98	22.17	22.36	0-1
	1	36	22.10	22.28	22.28	
	1	74	22.07	22.15	22.26	
	36	0	21.96	22.00	22.14	0-2
	36	18	21.98	21.99	22.12	
	36	37	21.90	21.95	22.02	
	75	0	22.00	21.93	21.05	

LTE Band25 20MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			26140	26365	26590	
			(1 860.0 MHz)	(1 882.5 MHz)	(1 905.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.92	22.87	**23.15**	0
	1	50	22.97	22.89	23.11	
	1	99	22.84	22.90	23.07	
	50	0	22.86	22.88	**22.98**	0-1
	50	25	22.88	22.91	22.90	
	50	13	22.81	22.89	22.87	
	100	0	22.81	22.93	22.10	
16QAM	1	0	22.12	22.15	22.42	0-1
	1	50	22.15	22.21	22.45	
	1	99	22.11	22.20	22.42	
	50	0	21.95	21.94	22.21	0-2
	50	25	21.96	22.01	22.15	
	50	50	21.96	22.03	22.14	
	100	0	21.92	21.95	21.12	

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-LTE Band 41

LTE Band41 5MHz Bandwidth								
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed Per 3GPP [dB]
			39675	40148	40620	41093	41565	
			(2 498.5 MHz)	(2 545.8 MHz)	(2 593.0 MHz)	(2 640.3 MHz)	(2 687.5 MHz)	
			Conducted Power					
			[dBm]	[dBm]	[dBm]	[dBm]	[dBm]	
QPSK	1	0	23.43	23.41	23.42	23.27	18.97	0
	1	12	23.06	23.09	23.09	23.30	23.20	
	1	24	23.31	23.25	23.18	23.29	23.42	
	12	0	21.66	22.28	21.73	17.22	23.43	0-1
	12	6	22.49	22.23	22.16	22.23	23.31	
	12	13	22.44	22.17	22.24	22.26	23.33	
	25	0	21.53	22.25	21.51	22.27	22.51	
16QAM	1	0	22.38	22.35	22.19	22.24	22.42	0-1
	1	12	22.42	22.34	22.27	22.21	22.41	
	1	24	22.28	22.06	22.19	22.24	22.25	
	12	0	21.43	21.06	21.24	21.28	22.41	0-2
	12	6	21.33	21.14	21.28	21.25	22.26	
	12	13	21.41	21.46	21.22	21.29	21.15	
	25	0	21.36	21.19	21.12	21.30	22.35	

LTE Band41 10MHz Bandwidth								
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed Per 3GPP [dB]
			39700	40160	40620	41080	41540	
			(2 501.0 MHz)	(2 547.0 MHz)	(2 593.0 MHz)	(2 639.0 MHz)	(2 685.0 MHz)	
			Conducted Power					
			[dBm]	[dBm]	[dBm]	[dBm]	[dBm]	
QPSK	1	0	23.55	23.51	23.52	23.40	23.44	0
	1	25	23.57	23.35	23.31	23.21	23.33	
	1	49	23.51	23.33	23.13	23.05	23.16	
	25	0	23.55	23.41	23.42	23.21	23.42	0-1
	25	12	23.56	23.27	23.15	23.21	23.23	
	25	25	23.35	23.40	23.33	23.31	23.51	
	50	0	22.54	22.24	22.21	22.21	22.46	
16QAM	1	0	22.57	22.41	22.41	22.44	22.50	0-1
	1	25	22.32	22.23	22.22	22.12	22.56	
	1	49	22.51	22.27	22.34	22.44	22.48	
	25	0	22.56	18.79	21.56	21.56	22.60	0-2
	25	12	22.49	22.39	22.61	22.55	22.61	
	25	25	22.52	22.42	22.61	22.65	22.61	
	50	0	21.53	21.26	21.55	21.54	21.61	

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LTE Band41 15MHz Bandwidth								
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed Per 3GPP [dB]
			39725	40173	40620	41068	41515	
			(2 503.5 MHz)	(2 548.3 MHz)	(2 593.0 MHz)	(2 637.8 MHz)	(2 682.5 MHz)	
			Conducted Power					
			[dBm]	[dBm]	[dBm]	[dBm]	[dBm]	
QPSK	1	0	23.33	23.25	23.50	23.32	23.23	0
	1	36	23.34	23.39	23.33	23.24	23.24	
	1	74	23.30	23.32	23.27	23.18	23.15	
	36	0	22.42	22.43	22.49	22.18	22.34	0-1
	36	18	22.29	22.40	22.46	22.30	22.33	
	36	37	22.36	22.35	22.42	22.19	22.27	
	75	0	22.16	22.42	22.48	21.29	22.28	
16QAM	1	0	22.46	22.40	22.65	22.17	22.30	0-1
	1	36	22.29	22.21	22.47	22.22	22.18	
	1	74	22.36	22.14	22.35	22.29	22.10	
	36	0	21.36	21.33	21.49	21.29	21.36	0-2
	36	18	21.43	21.35	21.49	21.23	21.30	
	36	37	21.29	21.30	21.38	21.26	21.28	
	75	0	21.22	21.30	21.47	21.21	21.37	

LTE Band41 20MHz Bandwidth								
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed Per 3GPP[dB]
			39750	40185	40620	41055	41490	
			(2 506.0 MHz)	(2 549.5 MHz)	(2 593.0 MHz)	(2 636.5 MHz)	(2 680.0 MHz)	
			Conducted Power					
			[dBm]	[dBm]	[dBm]	[dBm]	[dBm]	
QPSK	1	0	23.59	23.13	23.63	23.56	**23.84**	0
	1	50	23.36	23.02	23.08	23.40	23.66	
	1	99	23.58	23.68	23.62	23.51	23.81	
	50	0	22.42	22.70	22.17	22.51	**22.82**	0-1
	50	25	22.38	22.71	22.28	22.48	22.71	
	50	13	22.32	22.71	22.17	22.58	22.77	
	100	0	22.37	22.09	22.25	22.66	22.77	
16QAM	1	0	23.13	22.66	22.80	22.60	23.60	0-1
	1	50	22.53	22.21	22.54	22.22	22.49	
	1	99	22.24	22.05	22.64	22.50	23.50	
	50	0	21.45	21.76	21.75	21.46	21.74	0-2
	50	25	21.45	21.69	21.82	21.05	21.66	
	50	50	21.23	21.56	21.74	21.59	21.61	
	100	0	21.88	21.13	21.24	21.61	21.24	

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-LTE Band 66

LTE Band66 1.4MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			131979	132322	132665	
			(1 710.7 MHz)	(1 745.0 MHz)	(1 779.3 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.49	22.15	22.17	0
	1	2	22.51	22.19	22.21	
	1	5	22.47	22.20	22.18	
	3	0	22.46	22.16	22.20	0-1
	3	2	22.51	22.24	22.19	
	3	3	22.50	22.27	22.17	
	6	0	21.50	22.16	22.16	
16QAM	1	0	21.81	21.47	21.52	0-1
	1	2	21.81	21.41	21.52	
	1	5	21.77	21.43	21.55	
	3	0	21.57	21.47	21.53	0-2
	3	2	21.65	21.61	21.52	
	3	3	21.57	21.57	21.50	
	6	0	20.56	21.43	21.54	

LTE Band66 3MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			131987	132322	132657	
			(1 711.5 MHz)	(1 745.0 MHz)	(1 778.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.66	22.26	22.36	0
	1	7	22.77	22.30	22.42	
	1	14	22.73	22.24	22.45	
	8	0	22.65	21.27	21.33	0-1
	8	4	22.67	21.28	21.34	
	8	7	22.70	21.25	21.34	
	15	0	21.66	21.24	21.34	
16QAM	1	0	21.84	21.46	21.66	0-1
	1	7	21.99	21.66	21.76	
	1	14	21.98	21.47	21.76	
	8	0	21.75	20.35	20.38	0-2
	8	4	21.78	20.33	20.39	
	8	7	21.74	20.34	20.40	
	15	0	20.71	20.32	20.39	

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LTE Band66 5MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			131997	132322	132647	
			(1 712.5 MHz)	(1 745.0 MHz)	(1 777.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.68	22.30	22.61	0
	1	12	22.71	22.29	22.34	
	1	24	22.73	22.32	22.40	
	12	0	22.67	22.27	21.48	0-1
	12	6	22.65	22.27	21.40	
	12	13	22.63	22.26	21.37	
	25	0	22.65	21.25	21.38	
16QAM	1	0	21.97	21.55	21.77	0-1
	1	12	22.02	21.59	21.67	
	1	24	21.97	21.57	21.64	
	12	0	21.78	21.32	20.54	0-2
	12	6	21.78	21.34	20.44	
	12	13	21.78	21.34	20.44	
	25	0	21.75	20.30	20.44	

LTE Band66 10MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			132022	132322	132622	
			(1 715.0 MHz)	(1 745.0 MHz)	(1 775.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.75	22.31	22.56	0
	1	25	22.68	22.27	22.61	
	1	49	22.73	22.32	22.52	
	25	0	22.67	22.29	22.58	0-1
	25	12	22.70	22.44	22.57	
	25	25	22.72	22.29	22.51	
	50	0	22.68	21.29	21.53	
16QAM	1	0	21.92	21.51	21.84	0-1
	1	25	21.95	21.51	21.79	
	1	49	22.06	21.54	21.70	
	25	0	21.82	21.34	21.66	0-2
	25	12	21.78	21.42	21.66	
	25	25	21.81	21.33	21.58	
	50	0	21.78	20.33	20.56	

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LTE Band66 15MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			132047	132322	132597	
			(1 717.5 MHz)	(1 745.0 MHz)	(1 772.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	22.78	22.38	22.54	0
	1	36	22.78	22.54	22.54	
	1	74	22.75	22.45	22.65	
	36	0	22.78	22.47	22.55	0-1
	36	18	22.73	22.44	22.63	
	36	37	22.73	22.43	22.60	
	75	0	22.73	22.42	21.60	
16QAM	1	0	22.08	21.70	21.81	0-1
	1	36	22.10	21.87	21.92	
	1	74	21.98	21.80	21.88	
	36	0	21.89	21.54	21.56	0-2
	36	18	21.82	21.52	21.63	
	36	37	21.81	21.53	21.66	
	75	0	21.82	21.51	20.62	

LTE Band66 20MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			132072	132322	132572	
			(1 720.0 MHz)	(1 745.0 MHz)	(1 770.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	**22.87**	22.39	22.74	0
	1	50	22.76	22.72	22.53	
	1	99	22.74	22.28	22.47	
	50	0	**22.82**	22.33	22.57	0-1
	50	25	22.81	22.36	22.54	
	50	13	22.75	22.37	22.51	
	100	0	22.76	22.33	21.52	
16QAM	1	0	22.02	21.56	21.80	0-1
	1	50	22.11	21.68	21.87	
	1	99	21.99	21.58	21.86	
	50	0	21.87	21.41	21.58	0-2
	50	25	21.85	21.45	21.57	
	50	50	21.88	21.46	21.61	
	100	0	21.84	21.37	20.55	

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-LTE Band 71

LTE Band71 5MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			133147	133297	133447	
			(665.5 MHz)	(680.5 MHz)	(695.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	23.34	23.47	23.55	0
	1	12	23.31	23.57	23.60	
	1	24	23.42	23.49	23.58	
	12	0	22.31	22.45	23.59	0-1
	12	6	22.44	22.43	23.47	
	12	13	22.36	22.44	23.43	
	25	0	22.46	22.43	23.57	
16QAM	1	0	22.65	22.82	22.86	0-1
	1	12	22.67	22.81	22.87	
	1	24	22.79	22.82	22.80	
	12	0	21.44	21.49	22.87	0-2
	12	6	21.51	21.50	22.78	
	12	13	21.45	21.48	22.85	
	25	0	21.44	21.47	22.88	

LTE Band71 10MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			133172	133297	133422	
			(668.0 MHz)	(680.5 MHz)	(693.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	23.51	23.61	23.67	0
	1	25	23.46	23.53	23.51	
	1	49	23.53	23.45	23.50	
	25	0	23.51	22.54	22.53	0-1
	25	12	23.50	22.52	22.54	
	25	25	23.58	22.45	22.53	
	50	0	22.49	22.48	22.53	
16QAM	1	0	22.75	22.86	22.93	0-1
	1	25	22.73	22.76	22.75	
	1	49	22.78	22.75	22.81	
	25	0	22.55	21.57	21.57	0-2
	25	12	22.56	21.55	21.56	
	25	25	22.61	21.46	21.55	
	50	0	21.55	21.49	21.55	

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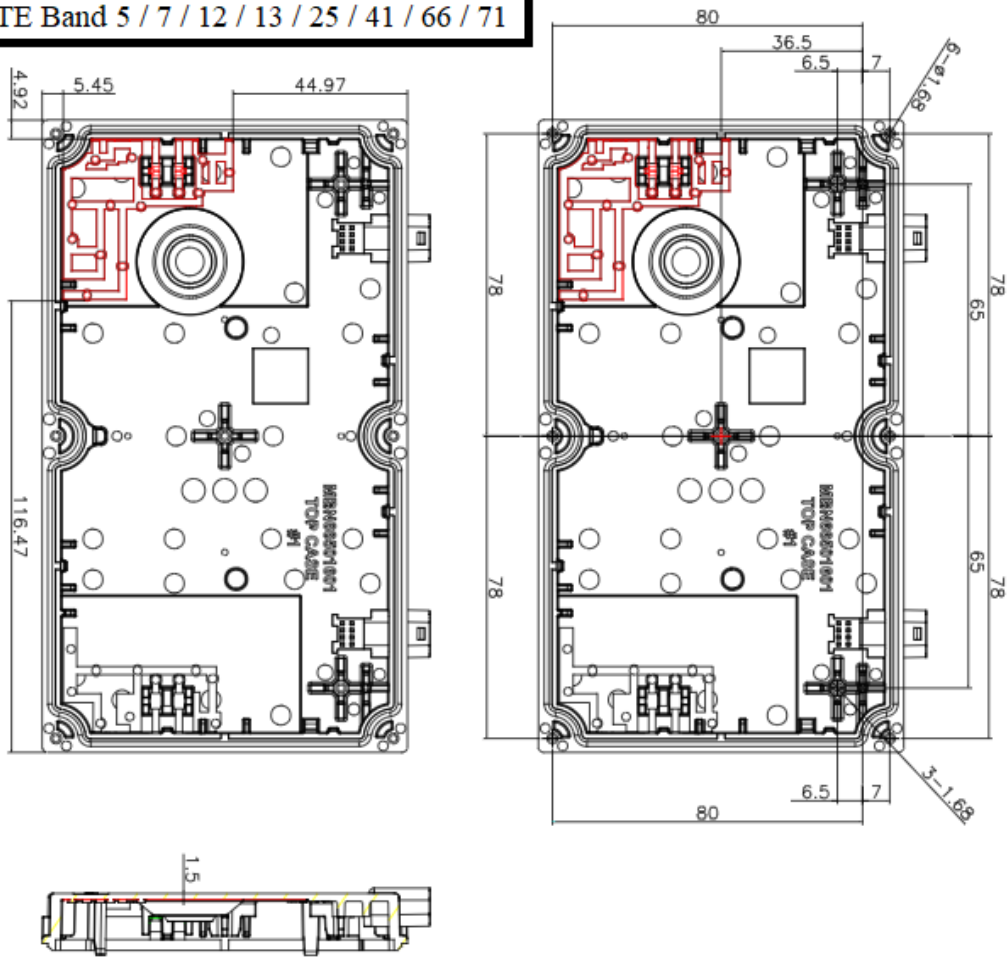
LTE Band71 15MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			133197	133297	133397	
			(670.5 MHz)	(680.5 MHz)	(690.5 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	23.73	23.59	23.69	0
	1	36	23.53	23.64	23.37	
	1	74	23.52	23.52	23.35	
	36	0	22.48	22.54	22.54	0-1
	36	18	23.55	22.57	22.43	
	36	37	23.65	22.48	22.44	
	75	0	22.55	22.58	22.44	
16QAM	1	0	22.87	22.96	23.01	0-1
	1	36	22.84	22.94	22.67	
	1	74	22.97	22.82	22.65	
	36	0	22.63	21.55	21.56	0-2
	36	18	22.60	21.60	21.47	
	36	37	22.68	21.53	21.50	
	75	0	21.59	21.60	21.49	

LTE Band71 20MHz Bandwidth						
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP[dB]
			133222	133297	133372	
			(673.0 MHz)	(680.5 MHz)	(688.0 MHz)	
			Conducted Power			
			[dBm]	[dBm]	[dBm]	
QPSK	1	0	23.54	**23.68**	23.68	0
	1	50	23.63	23.65	23.47	
	1	99	23.64	23.45	23.44	
	50	0	22.59	22.56	22.58	0-1
	50	25	22.55	22.54	22.55	
	50	13	**22.65**	22.59	22.48	
	100	0	22.60	22.62	22.55	
16QAM	1	0	22.86	22.95	22.89	0-1
	1	50	22.92	22.94	22.74	
	1	99	22.91	22.78	22.79	
	50	0	22.68	21.62	21.66	0-2
	50	25	22.65	21.61	21.60	
	50	50	22.76	21.61	21.47	
	100	0	21.63	21.68	21.60	

(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

20 DUT Antenna Locations

GSM 850 / 1900
WCDMA II / IV / V
LTE Band 5 / 7 / 12 / 13 / 25 / 41 / 66 / 71



<The Distance information of Antenna to Edges of Car Telematics Modem>

(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

21 SAR Test Exclusion Applied

Based on the maximum tune-up tolerance limit of FDD, TDD, and the antenna to use separation distance, Table "EXEMPT" SAR was not required and Table "Measure" SAR was required.

Frequency (MHz)	Output power		Separation distances (mm)						SAR Exemption					
	dBm	Mw	Front	Rear	Right Edge	Left Edge	Top	Bottom	Front	Rear	Right Edge	Left Edge	Top	Bottom
GSM Antenna														
824.2	34.00	2512	5	5	44.97	5.45	116.47	5	Measure	Measure	Measure	Measure	Measure	Measure
1850.2	31.00	1259	5	5	44.97	5.45	116.47	5	Measure	Measure	Measure	Measure	Measure	Measure
826.4	25.00	316	5	5	44.97	5.45	116.47	5	Measure	Measure	Measure	Measure	Exempt	Measure
1712.4	25.00	316	5	5	44.97	5.45	116.47	5	Measure	Measure	Measure	Measure	Exempt	Measure
1880.0	25.00	316	5	5	44.97	5.45	116.47	5	Measure	Measure	Measure	Measure	Exempt	Measure
LTE Antenna														
782.0	24.00	251	5	5	44.97	5.45	116.47	5	Measure	Measure	Measure	Measure	Exempt	Measure
844.0	24.00	251	5	5	44.97	5.45	116.47	5	Measure	Measure	Measure	Measure	Exempt	Measure
1720.0	24.00	251	5	5	44.97	5.45	116.47	5	Measure	Measure	Measure	Measure	Exempt	Measure
1905.0	24.00	251	5	5	44.97	5.45	116.47	5	Measure	Measure	Measure	Measure	Exempt	Measure
2560.0	24.00	251	5	5	44.97	5.45	116.47	5	Measure	Measure	Measure	Measure	Exempt	Measure

Note

1. Maximum power is the source-based time-average power and represents the maximum RF output power among production units.

2. For distances < 5mm, a distance of 5mm is used to determine SAR exclusion and estimated SAR value.

3. Output power is the maximum rated power (including tune-up or manufacturing tolerances).

4. If the antenna separation distance is > 50mm then the value listed is the output power threshold, above which SAR measurement is required. For separation ≤ 50mm the value is the KDB 447498 D01v06 calculated value and must be less than 7.5 for SAR exemption.

5. Formulas round separation distance to nearest mm and power to nearest mW before calculating thresholds or exemption values.

$$P_{\text{th}}\ (\text{mW}) = \begin{cases} ERP_{20\ \text{cm}}(d/20\ \text{cm})^x & d \le 20\ \text{cm} \\ ERP_{20\ \text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

22 SAR Data Summary

22.1 SAR data

GSM 850 Body SAR			
Ambient Temperature (°C)	22.7	23.0	23.2
Liquid Temperature (°C)	22.3	22.0	22.5
Date	2022-07-07	2022-07-25	2022-08-10

EUT Position	Mode	Traffic Channel		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
		Frequency (MHz)	Channel						
GPRS									
Front	GPRS 2Tx	824.20	128	45	33.16	0.013	34.00	1.213	0.016
Rear		824.20	128	45	33.16	0.007	34.00	1.213	0.008
Left Edge		824.20	128	45	33.16	0.007	34.00	1.213	0.008
Right Edge		824.20	128	45	33.16	0.006	34.00	1.213	0.007
Bottom		824.20	128	45	33.16	0.009	34.00	1.213	0.011
Top		824.20	128	45	33.16	0.006	34.00	1.213	0.007
GSM									
Front	GSM	824.20	128	45	33.18	0.018	34.00	1.208	**0.022**
Rear		824.20	128	45	33.18	0.016	34.00	1.208	0.019
Left Edge		824.20	128	45	33.18	0.010	34.00	1.208	0.012
Right Edge		824.20	128	45	33.18	0.002	34.00	1.208	0.002
Bottom		824.20	128	45	33.18	0.015	34.00	1.208	0.018
Top		824.20	128	45	33.18	0.003	34.00	1.208	0.004

GSM 1900 Body SAR			
Ambient Temperature (°C)	22.9	23.0	22.9
Liquid Temperature (°C)	22.1	22.1	22.0
Date	2022-07-11	2022-07-25	2022-08-11

EUT Position	Mode	Traffic Channel		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
		Frequency (MHz)	Channel						
GPRS									
Front	GPRS 1Tx	1850.20	512	45	29.81	0.172	30.50	1.172	0.202
Rear		1850.20	512	45	29.81	0.012	30.50	1.172	0.014
Left Edge		1850.20	512	45	29.81	0.026	30.50	1.172	0.030
Right Edge		1850.20	512	45	29.81	0.002	30.50	1.172	0.002
Bottom		1850.20	512	45	29.81	0.078	30.50	1.172	0.091
Top		1850.20	512	45	29.81	0.003	30.50	1.172	0.004
GSM									
Front	GSM	1850.20	512	45	29.86	0.182	30.50	1.159	**0.211**
Rear		1850.20	512	45	29.86	0.015	30.50	1.159	0.017
Left Edge		1850.20	512	45	29.86	0.032	30.50	1.159	0.037
Right Edge		1850.20	512	45	29.86	0.004	30.50	1.159	0.005
Bottom		1850.20	512	45	29.86	0.078	30.50	1.159	0.090
Top		1850.20	512	45	29.86	0.004	30.50	1.159	0.005

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WCDMA 2 Body SAR									
					Ambient Temperature (°C)			22.7	22.9
					Liquid Temperature (°C)			21.9	22.0
					Date			2022-06-11	2022-08-11
EUT Position	**Mode**	**Traffic Channel**		**Distance (㎜)**	**Measure Power (dBm)**	**Measure 1 g SAR (W/kg)**	**Tune-Up Limit (dBm)**	**Scaling Factor**	**Scaling SAR (W/kg)**
		Frequency (MHz)	**Channel**						
Front	RMC	1880.00	9400	45	23.30	0.289	25.00	1.479	**0.427**
Rear	RMC	1880.00	9400	45	23.30	0.032	25.00	1.479	0.047
Left Edge	RMC	1880.00	9400	45	23.30	0.056	25.00	1.479	0.083
Right Edge	RMC	1880.00	9400	45	23.30	N/A	25.00	1.479	N/A
Bottom	RMC	1880.00	9400	45	23.30	0.134	25.00	1.479	0.198

WCDMA 4 Body SAR									
					Ambient Temperature (°C)			23.1	22.9
					Liquid Temperature (°C)			22.3	21.9
					Date			2022-07-01	2022-08-11
EUT Position	**Modulation**	**Traffic Channel**		**Distance (㎜)**	**Measure Power (dBm)**	**Measure 1 g SAR (W/kg)**	**Tune-Up Limit (dBm)**	**Scaling Factor**	**Scaling SAR (W/kg)**
		Frequency (MHz)	**Channel**						
Front	RMC	1712.40	1312	45	23.67	0.305	25.00	1.358	**0.414**
Rear	RMC	1712.40	1312	45	23.67	0.020	25.00	1.358	0.027
Left Edge	RMC	1712.40	1312	45	23.67	0.048	25.00	1.358	0.065
Right Edge	RMC	1712.40	1312	45	23.67	0.003	25.00	1.358	0.004
Bottom	RMC	1712.40	1312	45	23.67	0.100	25.00	1.358	0.136

WCDMA 5 Body SAR									
					Ambient Temperature (°C)			22.7	23.2
					Liquid Temperature (°C)			22.1	22.5
					Date			2022-06-28	2022-08-10
EUT Position	**Modulation**	**Traffic Channel**		**Distance (㎜)**	**Measure Power (dBm)**	**Measure 1 g SAR (W/kg)**	**Tune-Up Limit (dBm)**	**Scaling Factor**	**Scaling SAR (W/kg)**
		Frequency (MHz)	**Channel**						
Front	RMC	826.40	4132	45	24.12	0.018	25.00	1.225	**0.022**
Rear	RMC	826.40	4132	45	24.12	0.010	25.00	1.225	0.012
Left Edge	RMC	826.40	4132	45	24.12	0.008	25.00	1.225	0.010
Right Edge	RMC	826.40	4132	45	24.12	0.0000354	25.00	1.225	0.0000434
Bottom	RMC	826.40	4132	45	24.12	0.011	25.00	1.225	0.013

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LTE Band 5 Body SAR	Ambient Temperature (°C)	22.8	23.2
	Liquid Temperature (°C)	22.3	22.5
	Date	2022-06-27	2022-08-10

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	10MHz	844.00	20600	1	25	45	22.94	0.013	24.00	1.276	**0.017**
Front	QPSK	10MHz	844.00	20600	25	12	45	22.95	0.010	23.00	1.012	0.010
Rear	QPSK	10MHz	844.00	20600	1	25	45	22.94	0.006	24.00	1.276	0.008
Rear	QPSK	10MHz	844.00	20600	25	12	45	22.95	0.004	23.00	1.012	0.004
Right Edge	QPSK	10MHz	844.00	20600	1	25	45	22.94	0.002	24.00	1.276	0.003
Right Edge	QPSK	10MHz	844.00	20600	25	12	45	22.95	0.000851	23.00	1.012	0.001
Left Edge	QPSK	10MHz	844.00	20600	1	25	45	22.94	0.006	24.00	1.276	0.008
Left Edge	QPSK	10MHz	844.00	20600	25	12	45	22.95	0.005	23.00	1.012	0.005
Bottom	QPSK	10MHz	844.00	20600	1	25	45	22.94	0.006	24.00	1.276	0.008
Bottom	QPSK	10MHz	844.00	20600	25	12	45	22.95	0.005	23.00	1.012	0.005

LTE Band 7 Body SAR	Ambient Temperature (°C)	22.2	22.6
	Liquid Temperature (°C)	21.7	22.0
	Date	2023-01-20	2023-01-26

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	20	2560.00	21350	1	0	45	23.68	0.160	24.00	1.076	**0.172**
Front	QPSK	20	2560.00	21350	50	0	45	22.46	0.122	23.00	1.132	0.138
Rear	QPSK	20	2560.00	21350	1	0	45	23.68	0.020	24.00	1.076	0.022
Rear	QPSK	20	2560.00	21350	50	0	45	22.46	0.016	23.00	1.132	0.018
Right Edge	QPSK	20	2560.00	21350	1	0	45	23.68	0.021	24.00	1.076	0.023
Right Edge	QPSK	20	2560.00	21350	50	0	45	22.46	0.011	23.00	1.132	0.012
Left Edge	QPSK	20	2560.00	21350	1	0	45	23.68	0.088	24.00	1.076	0.095
Left Edge	QPSK	20	2560.00	21350	50	0	45	22.46	0.066	23.00	1.132	0.075
Bottom	QPSK	20	2560.00	21350	1	0	45	23.68	0.039	24.00	1.076	0.042
Bottom	QPSK	20	2560.00	21350	50	0	45	22.46	0.034	23.00	1.132	0.038

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LTE Band 12 Body SAR	Ambient Temperature (°C)	23.6	23.2
	Liquid Temperature (°C)	22.1	22.5
	Date	2022-06-15	2022-08-10

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	10MHz	704.00	23060	1	25	45	23.19	0.069	24.00	1.205	**0.083**
Front	QPSK	10MHz	711.00	23130	25	12	45	22.13	0.058	23.00	1.222	0.071
Rear	QPSK	10MHz	704.00	23060	1	25	45	23.19	0.068	24.00	1.205	0.082
Rear	QPSK	10MHz	711.00	23130	25	12	45	22.13	0.056	23.00	1.222	0.068
Right Edge	QPSK	10MHz	704.00	23060	1	25	45	23.19	0.020	24.00	1.205	0.024
Right Edge	QPSK	10MHz	711.00	23130	25	12	45	22.13	0.016	23.00	1.222	0.020
Left Edge	QPSK	10MHz	704.00	23060	1	25	45	23.19	0.034	24.00	1.205	0.041
Left Edge	QPSK	10MHz	711.00	23130	25	12	45	22.13	0.027	23.00	1.222	0.033
Bottom	QPSK	10MHz	704.00	23060	1	25	45	23.19	0.021	24.00	1.205	0.025
Bottom	QPSK	10MHz	711.00	23130	25	12	45	22.13	0.019	23.00	1.222	0.023

LTE Band 13 Body SAR	Ambient Temperature (°C)	23.6	23.5	23.2
	Liquid Temperature (°C)	22.1	22.2	22.5
	Date	2022-06-15	2022-06-16	2022-08-10

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	10MHz	782.00	23230	1	0	45	23.42	0.050	24.00	1.143	**0.057**
Front	QPSK	10MHz	782.00	23230	25	0	45	22.44	0.036	23.00	1.138	0.041
Rear	QPSK	10MHz	782.00	23230	1	0	45	23.42	0.045	24.00	1.143	0.051
Rear	QPSK	10MHz	782.00	23230	25	0	45	22.44	0.031	23.00	1.138	0.035
Right Edge	QPSK	10MHz	782.00	23230	1	0	45	23.42	0.014	24.00	1.143	0.016
Right Edge	QPSK	10MHz	782.00	23230	25	0	45	22.44	0.010	23.00	1.138	0.011
Left Edge	QPSK	10MHz	782.00	23230	1	0	45	23.42	0.025	24.00	1.143	0.029
Left Edge	QPSK	10MHz	782.00	23230	25	0	45	22.44	0.020	23.00	1.138	0.023
Bottom	QPSK	10MHz	782.00	23230	1	0	45	23.42	0.022	24.00	1.143	0.025
Bottom	QPSK	10MHz	782.00	23230	25	0	45	22.44	0.016	23.00	1.138	0.018

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LTE Band 25 Body SAR			
	Ambient Temperature (°C)	22.7	22.9
	Liquid Temperature (°C)	21.9	22.0
	Date	2022-06-11	2022-08-11

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	20MHz	1905.00	26590	1	0	45	23.15	0.297	24.00	1.216	**0.361**
Front	QPSK	20MHz	1905.00	26590	50	0	45	22.98	0.232	23.00	1.005	0.233
Rear	QPSK	20MHz	1905.00	26590	1	0	45	23.15	0.030	24.00	1.216	0.036
Rear	QPSK	20MHz	1905.00	26590	50	0	45	22.98	0.022	23.00	1.005	0.022
Right Edge	QPSK	20MHz	1905.00	26590	1	0	45	23.15	0.010	24.00	1.216	0.012
Right Edge	QPSK	20MHz	1905.00	26590	50	0	45	22.98	0.007	23.00	1.005	0.007
Left Edge	QPSK	20MHz	1905.00	26590	1	0	45	23.15	0.045	24.00	1.216	0.055
Left Edge	QPSK	20MHz	1905.00	26590	50	0	45	22.98	0.033	23.00	1.005	0.033
Bottom	QPSK	20MHz	1905.00	26590	1	0	45	23.15	0.127	24.00	1.216	0.154
Bottom	QPSK	20MHz	1905.00	26590	50	0	45	22.98	0.100	23.00	1.005	0.101

LTE Band 41 Body SAR		
	Ambient Temperature (°C)	22.5
	Liquid Temperature (°C)	21.9
	Date	2023-01-17

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	20	2680.00	41490	1	0	45	23.84	0.059	24.00	1.038	0.061
Front	QPSK	20	2680.00	41490	50	0	45	22.82	0.034	23.00	1.042	0.035
Rear	QPSK	20	2680.00	41490	1	0	45	23.84	0.009	24.00	1.038	0.009
Rear	QPSK	20	2680.00	41490	50	0	45	22.82	0.005	23.00	1.042	0.005
Right Edge	QPSK	20	2680.00	41490	1	0	45	23.84	0.027	24.00	1.038	0.028
Right Edge	QPSK	20	2680.00	41490	50	0	45	22.82	0.025	23.00	1.042	0.026
Left Edge	QPSK	20	2680.00	41490	1	0	45	23.84	0.076	24.00	1.038	**0.079**
Left Edge	QPSK	20	2680.00	41490	50	0	45	22.82	0.050	23.00	1.042	0.052
Bottom	QPSK	20	2680.00	41490	1	0	45	23.84	0.045	24.00	1.038	0.047
Bottom	QPSK	20	2680.00	41490	50	0	45	22.82	0.030	23.00	1.042	0.031

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LTE Band 66 Body SAR			
	Ambient Temperature (°C)	22.9	22.9
	Liquid Temperature (°C)	21.9	21.9
	Date	2022-07-04	2022-08-11

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	20MHz	1720.00	132072	1	0	45	22.87	0.273	24.00	1.297	**0.354**
Front	QPSK	20MHz	1720.00	132072	50	0	45	22.82	0.210	23.00	1.042	0.219
Rear	QPSK	20MHz	1720.00	132072	1	0	45	22.87	0.018	24.00	1.297	0.023
Rear	QPSK	20MHz	1720.00	132072	50	0	45	22.82	0.013	23.00	1.042	0.014
Right Edge	QPSK	20MHz	1720.00	132072	1	0	45	22.87	0.003	24.00	1.297	0.004
Right Edge	QPSK	20MHz	1720.00	132072	50	0	45	22.82	0.002	23.00	1.042	0.002
Left Edge	QPSK	20MHz	1720.00	132072	1	0	45	22.87	0.045	24.00	1.297	0.058
Left Edge	QPSK	20MHz	1720.00	132072	50	0	45	22.82	0.034	23.00	1.042	0.035
Bottom	QPSK	20MHz	1720.00	132072	1	0	45	22.87	0.088	24.00	1.297	0.114
Bottom	QPSK	20MHz	1720.00	132072	50	0	45	22.82	0.068	23.00	1.042	0.071

LTE Band 71 Body SAR			
	Ambient Temperature (°C)	23.3	23.2
	Liquid Temperature (°C)	22.3	22.5
	Date	2022-06-17	2022-08-10

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	20MHz	680.50	133297	1	0	45	23.68	0.069	24.00	1.076	**0.074**
Front	QPSK	20MHz	673.00	133222	50	13	45	22.65	0.059	23.00	1.084	0.064
Rear	QPSK	20MHz	680.50	133297	1	0	45	23.68	0.066	24.00	1.076	0.071
Rear	QPSK	20MHz	673.00	133222	50	13	45	22.65	0.053	23.00	1.084	0.057
Right Edge	QPSK	20MHz	680.50	133297	1	0	45	23.68	0.014	24.00	1.076	0.015
Right Edge	QPSK	20MHz	673.00	133222	50	13	45	22.65	0.010	23.00	1.084	0.011
Left Edge	QPSK	20MHz	680.50	133297	1	0	45	23.68	0.040	24.00	1.076	0.043
Left Edge	QPSK	20MHz	673.00	133222	50	13	45	22.65	0.027	23.00	1.084	0.029
Bottom	QPSK	20MHz	680.50	133297	1	0	45	23.68	0.016	24.00	1.076	0.017
Bottom	QPSK	20MHz	673.00	133222	50	13	45	22.65	0.013	23.00	1.084	0.014

(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication 447498 D01v06.
2. Liquid tissue depth was at least 15 cm for all frequencies.
3. All modes of operation were investigated, and worst-case results are reported.
4. The EUT is tested 2nd hot-spot peak, if it is less than 2 dB below the highest peak.
5. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
6. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
7. Per FCC KDB 865664 D01V01r04, variability SAR tests were performed when the measured SAR results for a frequency band were greater than or equal to 0.8W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 23 for variability analysis.
8. This device is operating by connecting power supply therefore battery is not required

WCDMA Notes:

1. WCDMA mode in Body SAR was tested under RMC 12.2 kbps with HSPA inactive per KDB Publication 941225 D01v03r01. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.
2. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > 1/2 dB, instead of the middle channel, the highest output power channel must be used

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LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r05. The general test procedures used for testing can be found in Section 5.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3-6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator.
4. This device supports LTE capabilities with overlapping transmission frequency rages. When the supported frequency range of an LTE Band falls completely within an LTE band with a larger transmission frequency range, both LTE bands have the same target power (or the band with the larger transmission frequency range has a higher target power), and both LTE bands share the same transmission path and signal characteristics, SAR was only assessed for the band with larger transmission frequency range.

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23 SAR Measurement Variability

23.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the power supply before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

1. When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2. A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3. A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4. Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

23.2 Measurement Uncertainty

The measured SAR was < 1.5 W/kg for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE 1528-2013 was not required.

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24 Spotcheck SAR data Summary

24.1 Spotcheck SAR data

GSM 850 Body SAR

EUT Position	Mode	Traffic Channel		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
		Frequency (MHz)	Channel						
GSM									
Front	GSM	824.20	128	45	33.18	0.014	34.00	1.208	**0.017**

GSM 1900 Body SAR

EUT Position	Mode	Traffic Channel		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
		Frequency (MHz)	Channel						
GSM									
Front	GSM	1850.20	512	45	29.86	0.092	30.50	1.159	**0.107**

WCDMA 2 Body SAR

EUT Position	Mode	Traffic Channel		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
		Frequency (MHz)	Channel						
Front	RMC	1880.00	9400	45	23.30	0.216	25.00	1.479	**0.319**

WCDMA 4 Body SAR

EUT Position	Modulation	Traffic Channel		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
		Frequency (MHz)	Channel						
Front	RMC	1712.40	1312	45	23.67	0.293	25.00	1.358	**0.398**

WCDMA 5 Body SAR

EUT Position	Modulation	Traffic Channel		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
		Frequency (MHz)	Channel						
Front	RMC	826.40	4132	45	24.12	0.015	25.00	1.225	**0.018**

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LTE Band 5 Body SAR

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	10MHz	844.00	20600	1	25	45	22.94	0.015	24.00	1.276	**0.019**

LTE Band 12 Body SAR

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	10MHz	704.00	23060	1	25	45	23.19	0.072	24.00	1.205	**0.087**

LTE Band 13 Body SAR

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	10MHz	782.00	23230	1	0	45	23.42	0.030	24.00	1.143	**0.034**

LTE Band 25 Body SAR

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	20MHz	1905.00	26590	1	0	45	23.15	0.297	24.00	1.216	**0.361**

LTE Band 66 Body SAR

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	20MHz	1720.00	132072	1	0	45	22.87	0.249	24.00	1.297	**0.323**

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LTE Band 71 Body SAR

EUT Position	Modulation	Bandwidth (MHz)	Traffic Channel		RB		Distance (㎜)	Measure Power (dBm)	Measure 1 g SAR (W/kg)	Tune-Up Limit (dBm)	Scaling Factor	Scaling SAR (W/kg)
			Frequency (MHz)	Channel	Size	Offset						
Front	QPSK	20MHz	680.50	133297	1	0	45	23.68	0.071	24.00	1.076	**0.076**

Notes : Spotcheck was conducted to confirm the similarity with the existing results.

(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

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(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.1 Verification Test Plots for 750MHz

Date: 2022-06-15

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 750MHz Verification 2022_06_15.da53:0

Input Power : 100 mW

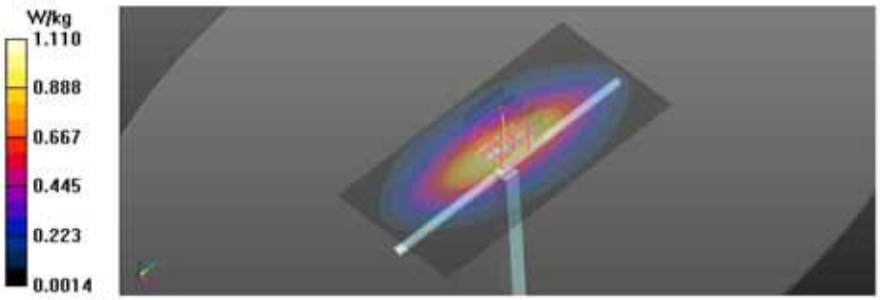
DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1085

Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.888 S/m; ε_r = 42.575; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(10.36, 10.36, 10.36) @ 750 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/750MHz Verification/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.11 W/kg

Verification/750MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.67 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 0.843 W/kg; SAR(10 g) = 0.556 W/kg
Smallest distance from peaks to all points 3 dB below = 17.2 mm
Ratio of SAR at M2 to SAR at M1 = 65.4%
Maximum value of SAR (measured) = 1.13 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Date: 2022-06-16

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 750MHz Verification 2022_06_16.da53:0

Input Power : 100 mW

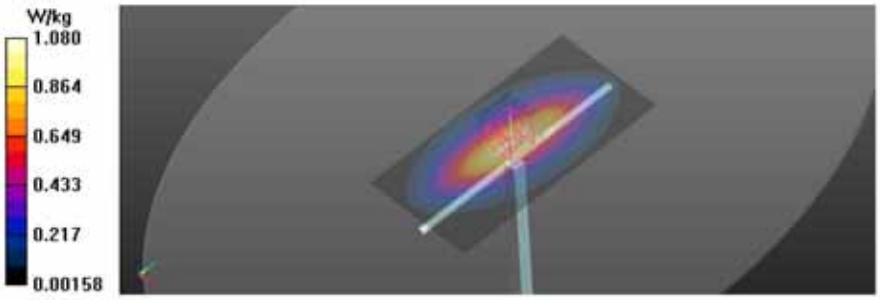
DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1085

Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.872 S/m; ε_r = 42.477; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(10.36, 10.36, 10.36) @ 750 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/750MHz Verification/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.08 W/kg

Verification/750MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.02 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.810 W/kg; SAR(10 g) = 0.534 W/kg
Smallest distance from peaks to all points 3 dB below = 17.2 mm
Ratio of SAR at M2 to SAR at M1 = 65.5%
Maximum value of SAR (measured) = 1.09 W/kg



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Date: 2022-06-17

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 750MHz Verification 2022_06_17.da53:0

Input Power : 100 mW

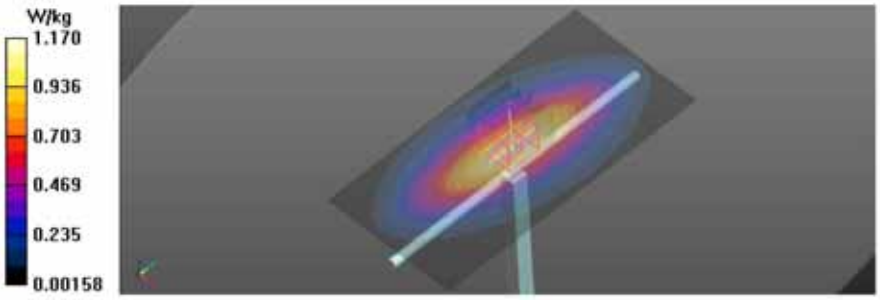
DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1085

Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.927 S/m; ε_r = 42.294; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(10.36, 10.36, 10.36) @ 750 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/750MHz Verification/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.17 W/kg

Verification/750MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.45 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.864 W/kg; SAR(10 g) = 0.570 W/kg
Smallest distance from peaks to all points 3 dB below = 17.2 mm
Ratio of SAR at M2 to SAR at M1 = 65.4%
Maximum value of SAR (measured) = 1.16 W/kg



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Date: 2022-08-10

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 750MHz Verification 2022_08_10.da53:0

Input Power : 100 mW

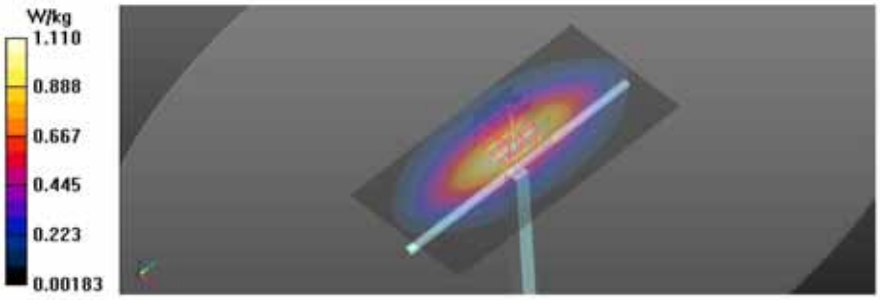
DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN:1085

Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.921 S/m; ε_r = 41.961; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(10.36, 10.36, 10.36) @ 750 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v4.0 Phamtom TP:1244; Type: ELI v4.0 Phamtom; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/750MHz Verification/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.11 W/kg

Verification/750MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.51 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.861 W/kg; SAR(10 g) = 0.563 W/kg
Smallest distance from peaks to all points 3 dB below = 17.6 mm
Ratio of SAR at M2 to SAR at M1 = 64.4%
Maximum value of SAR (measured) = 1.16 W/kg



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Appendix A.2 Verification Test Plots for 835MHz

Date: 2022-06-27

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 835MHz Verification 2022_06_27.da53:0

Input Power : 100 mW

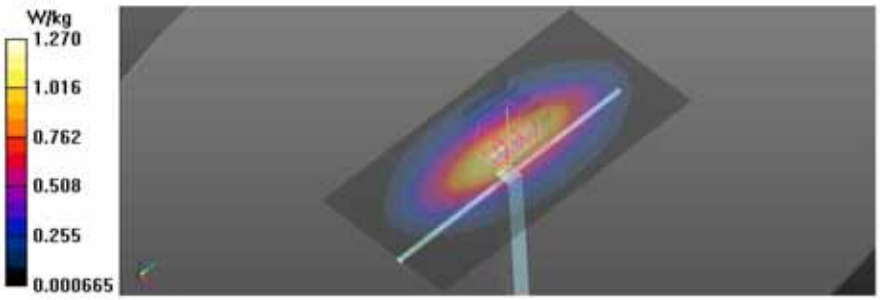
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:490

Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.902 S/m; ε_r = 41.791; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(9.86, 9.86, 9.86) @ 835 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/835MHz Verification/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.27 W/kg

Verification/835MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 39.30 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 0.944 W/kg; SAR(10 g) = 0.612 W/kg
Smallest distance from peaks to all points 3 dB below = 16 mm
Ratio of SAR at M2 to SAR at M1 = 64.2%
Maximum value of SAR (measured) = 1.29 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Date: 2022-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 835MHz Verification 2022_06_28.da53:0

Input Power : 100 mW

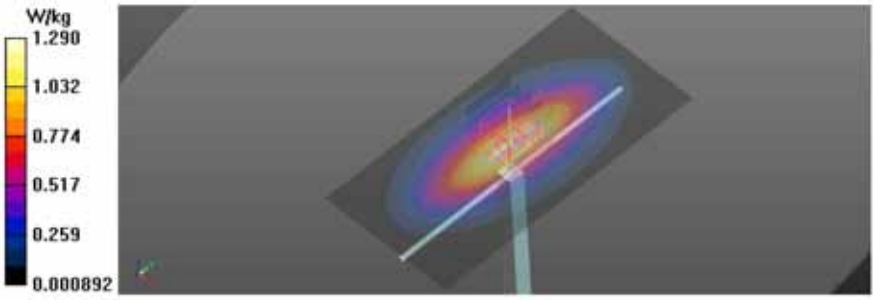
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:490

Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.894 S/m; ε_r = 41.471; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(9.86, 9.86, 9.86) @ 835 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/835MHz Verification/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.29 W/kg

Verification/835MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 39.30 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.49 W/kg
SAR(1 g) = 0.956 W/kg; SAR(10 g) = 0.621 W/kg
Smallest distance from peaks to all points 3 dB below = 16 mm
Ratio of SAR at M2 to SAR at M1 = 64.1%
Maximum value of SAR (measured) = 1.31 W/kg



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Date: 2022-07-07

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 835MHz Verification 2022_07_07.da53:0

Input Power: 100 mW

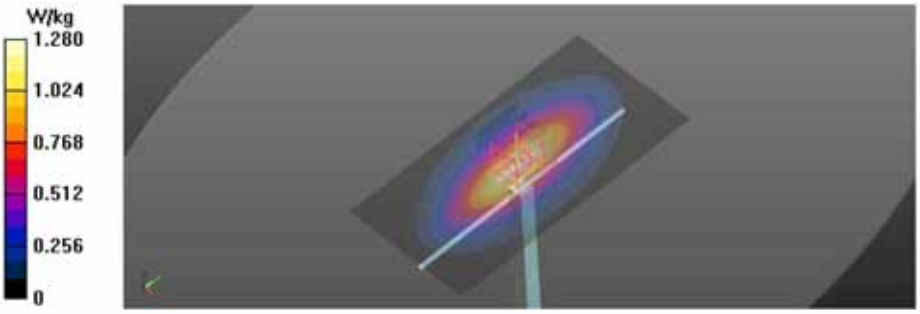
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:490

Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.913 S/m; ε_r = 42.167; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(9.86, 9.86, 9.86) @ 835 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/835MHz Verification/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.28 W/kg

Verification/835MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 39.92 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 1.46 W/kg
SAR(1 g) = 0.942 W/kg; SAR(10 g) = 0.611 W/kg
Smallest distance from peaks to all points 3 dB below = 16 mm
Ratio of SAR at M2 to SAR at M1 = 64.2%
Maximum value of SAR (measured) = 1.28 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Date: 2022-07-25

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 835MHz Verification 2022_07_25.da53:0

Input Power: 100 mW

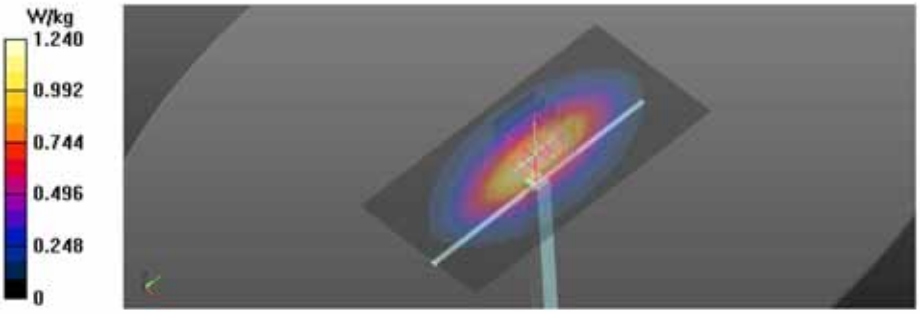
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:490

Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.911 S/m; ε_r = 41.953; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(9.86, 9.86, 9.86) @ 835 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v4.0 Phamtom TP:1244; Type: ELI v4.0 Phamtom; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/835MHz Verification/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.24 W/kg

Verification/835MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 39.16 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.896 W/kg; SAR(10 g) = 0.581 W/kg
Smallest distance from peaks to all points 3 dB below = 16 mm
Ratio of SAR at M2 to SAR at M1 = 64.5%
Maximum value of SAR (measured) = 1.22 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Date: 2022-08-10

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 835MHz Verification 2022_08_10.da53:0

Input Power : 100 mW

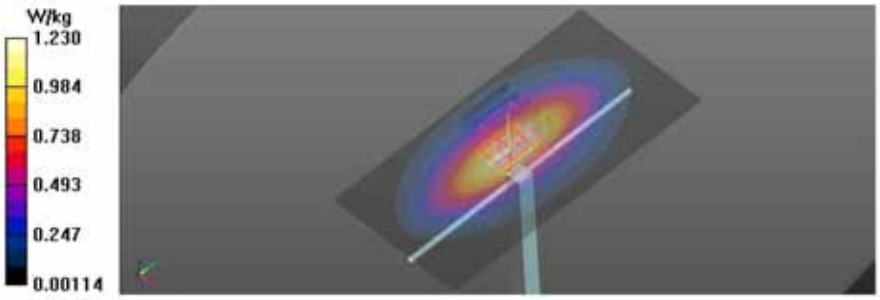
DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:490

Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.91 S/m; ε_r = 39.904; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(9.86, 9.86, 9.86) @ 835 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v4.0 Phamtom TP:1244; Type: ELI v4.0 Phamtom; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/835MHz Verification/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.23 W/kg

Verification/835MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 38.31 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.918 W/kg; SAR(10 g) = 0.594 W/kg
Smallest distance from peaks to all points 3 dB below = 16.3 mm
Ratio of SAR at M2 to SAR at M1 = 64.2%
Maximum value of SAR (measured) = 1.25 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.3 Verification Test Plots for 1800MHz

Date: 2022-07-01

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 1800MHz Verification 2022_07_01.da53:0

Input Power : 100 mW

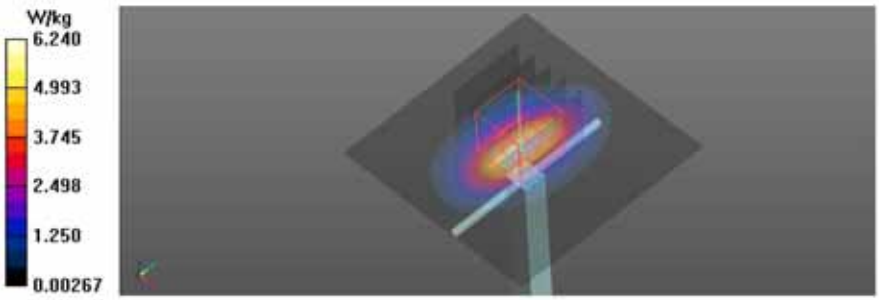
DUT: Dipole 1800 MHz D1800V2; Type: D1800V2; Serial: D1800V2 - SN:2d193

Communication System: UID 0, CW (0); Frequency: 1800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.462 S/m; ε_r = 39.558; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(8.6, 8.6, 8.6) @ 1800 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/1800MHz Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 6.24 W/kg

Verification/1800MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 66.77 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 7.54 W/kg
SAR(1 g) = 3.94 W/kg; SAR(10 g) = 2.04 W/kg
Smallest distance from peaks to all points 3 dB below = 9.6 mm
Ratio of SAR at M2 to SAR at M1 = 52.1%
Maximum value of SAR (measured) = 6.22 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Date: 2022-07-04

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 1800MHz Verification 2022_07_04.da53:0

Input Power : 100 mW

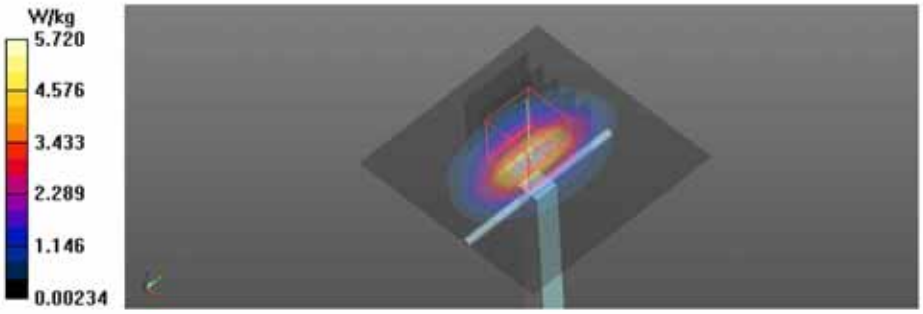
DUT: Dipole 1800 MHz D1800V2; Type: D1800V2; Serial: D1800V2 - SN:2d193

Communication System: UID 0, CW (0); Frequency: 1800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.422 S/m; ε_r = 38.761; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(8.6, 8.6, 8.6) @ 1800 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/1800MHz Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 5.72 W/kg

Verification/1800MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 64.09 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 7.40 W/kg
SAR(1 g) = 3.76 W/kg; SAR(10 g) = 1.93 W/kg
Smallest distance from peaks to all points 3 dB below = 9.6 mm
Ratio of SAR at M2 to SAR at M1 = 50.9%
Maximum value of SAR (measured) = 5.98 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Date: 2022-08-11

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 1800MHz Verification 2022_08_11.da53:0

Input Power : 100 mW

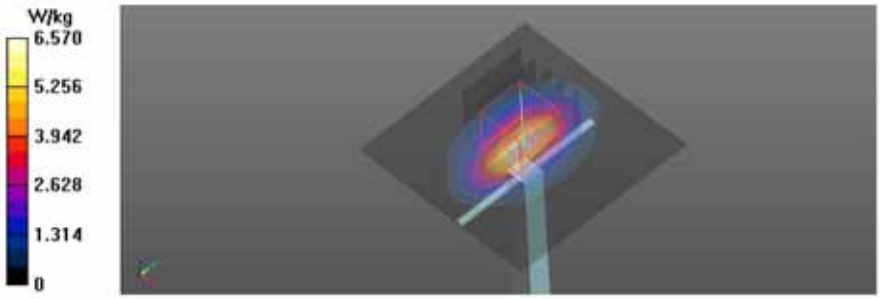
DUT: Dipole 1800 MHz D1800V2; Type: D1800V2; Serial: D1800V2 - SN:2d074

Communication System: UID 0, CW (0); Frequency: 1800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.457 S/m; ε_r = 39.153; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(8.6, 8.6, 8.6) @ 1800 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v4.0 Phamtom TP:1244; Type: ELI v4.0 Phamtom; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/1800MHz Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 6.57 W/kg

Verification/1800MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 68.73 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 7.81 W/kg
SAR(1 g) = 4.1 W/kg; SAR(10 g) = 2.14 W/kg
Smallest distance from peaks to all points 3 dB below = 9.6 mm
Ratio of SAR at M2 to SAR at M1 = 52.5%
Maximum value of SAR (measured) = 6.42 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.4 Verification Test Plots for 1900MHz

Date: 2022-06-11

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 1900MHz Verification_2022_06_11.da53:0

Input Power : 100 mW

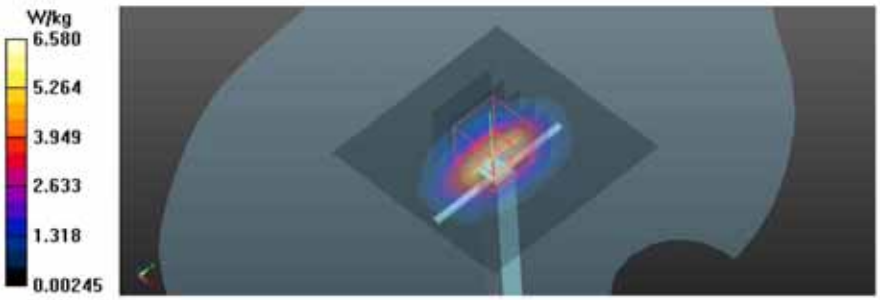
DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d158

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.388 S/m; ε_r = 39.926; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(8.22, 8.22, 8.22) @ 1900 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: SAM with CRP; Type: SAM; Serial: TP:1720
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/1900MHz Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 6.58 W/kg

Verification/1900MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 68.31 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 7.94 W/kg
SAR(1 g) = 4.16 W/kg; SAR(10 g) = 2.14 W/kg
Smallest distance from peaks to all points 3 dB below = 9.7 mm
Ratio of SAR at M2 to SAR at M1 = 52.2%
Maximum value of SAR (measured) = 6.62 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Date: 2022-07-11

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 1900MHz Verification_2022_07_11.da53:0

Input Power : 100 mW

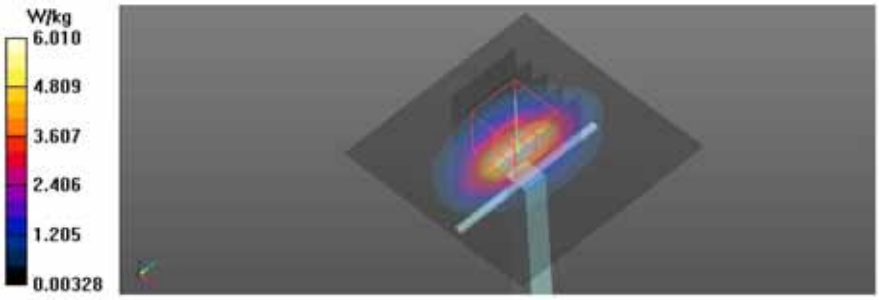
DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d033

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.398 S/m; ε_r = 39.362; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(8.22, 8.22, 8.22) @ 1900 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/1900MHz Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 6.01 W/kg

Verification/1900MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 67.22 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 7.14 W/kg
SAR(1 g) = 3.8 W/kg; SAR(10 g) = 1.98 W/kg
Smallest distance from peaks to all points 3 dB below = 9.6 mm
Ratio of SAR at M2 to SAR at M1 = 53.2%
Maximum value of SAR (measured) = 5.97 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Date: 2022-07-25

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 1900MHz Verification_2022_07_25.da53:0

Input Power : 100 mW

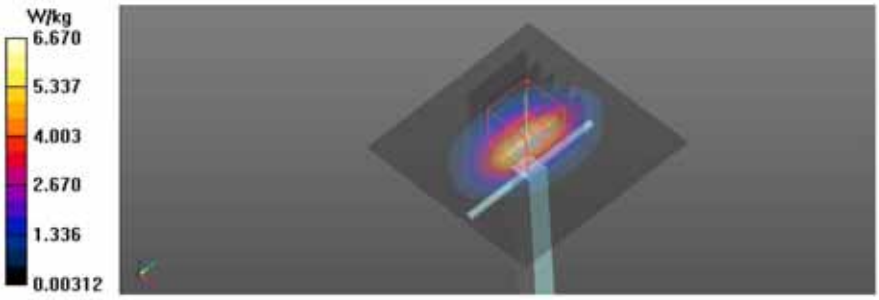
DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d033

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.397 S/m; ε_r = 41.74; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(8.22, 8.22, 8.22) @ 1900 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v4.0 Phamtom TP:1244; Type: ELI v4.0 Phamtom; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/1900MHz Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 6.67 W/kg

Verification/1900MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 69.69 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 7.97 W/kg
SAR(1 g) = 4.18 W/kg; SAR(10 g) = 2.17 W/kg
Smallest distance from peaks to all points 3 dB below = 10.1 mm
Ratio of SAR at M2 to SAR at M1 = 52.5%
Maximum value of SAR (measured) = 6.60 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Date: 2022-08-11

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: 1900MHz Verification_2022_08_11.da53:0

Input Power : 100 mW

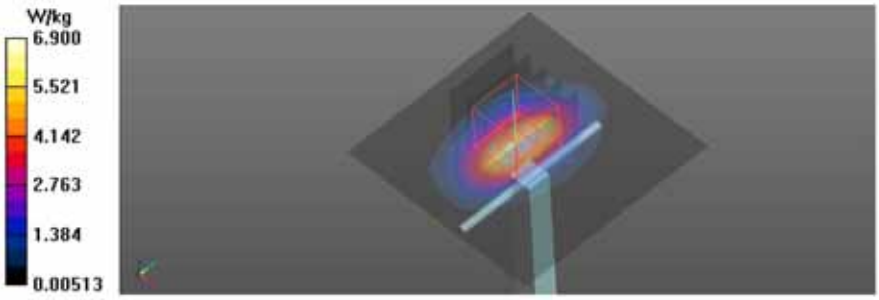
DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d033

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.4 S/m; ε_r = 41.416; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(8.22, 8.22, 8.22) @ 1900 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v4.0 Phamtom TP:1244; Type: ELI v4.0 Phamtom; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/1900MHz Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 6.90 W/kg

Verification/1900MHz Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 64.79 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 7.57 W/kg
SAR(1 g) = 3.92 W/kg; SAR(10 g) = 2.01 W/kg
Smallest distance from peaks to all points 3 dB below = 9.6 mm
Ratio of SAR at M2 to SAR at M1 = 51.7%
Maximum value of SAR (measured) = 6.27 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.5 Verification Test Plots for 2600MHz

Date: 2023-01-17

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: Verification 2600MHz_2022-01-17.da53:0

Input Power : 100 mW

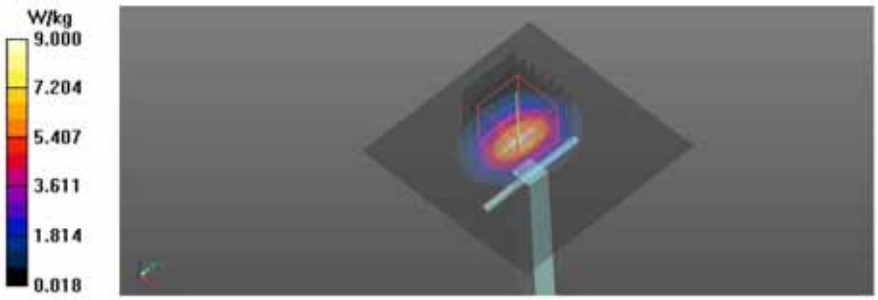
DUT: Dipole 2600 MHz D2600V2; Type: D2600V2; Serial: D2600V2 - SN:1124

Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 1.934 S/m; ε_r = 38.198; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(7.59, 7.59, 7.59) @ 2600 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2022-02-28
- Phantom: ELI v4.0 Phamtom TP:1244; Type: ELI v4.0 Phamtom; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/2600 MHz Verification/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 9.00 W/kg

Verification/2600 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.78 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 11.4 W/kg
SAR(1 g) = 5.35 W/kg; SAR(10 g) = 2.41 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 47.2%
Maximum value of SAR (measured) = 9.10 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Date: 2023-01-20

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: Verification 2600MHz_2022-01-20.da53:0

Input Power : 100 mW

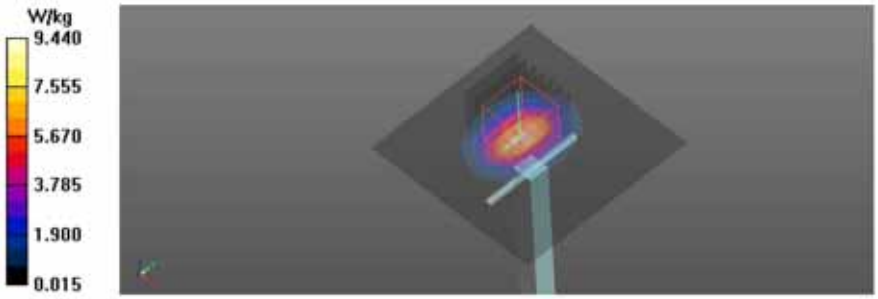
DUT: Dipole 2600 MHz D2600V2; Type: D2600V2; Serial: D2600V2 - SN:1124

Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 1.956 S/m; ε_r = 39.389; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(7.59, 7.59, 7.59) @ 2600 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2022-02-28
- Phantom: ELI v4.0 Phamtom TP:1244; Type: ELI v4.0 Phamtom; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/2600 MHz Verification/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 9.44 W/kg

Verification/2600 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 63.97 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 11.3 W/kg
SAR(1 g) = 5.28 W/kg; SAR(10 g) = 2.38 W/kg
Smallest distance from peaks to all points 3 dB below = 9 mm
Ratio of SAR at M2 to SAR at M1 = 47.1%
Maximum value of SAR (measured) = 9.01 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Date: 2023-01-26

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: Verification 2600MHz_2022-01-26.da53:0

Input Power : 100 mW

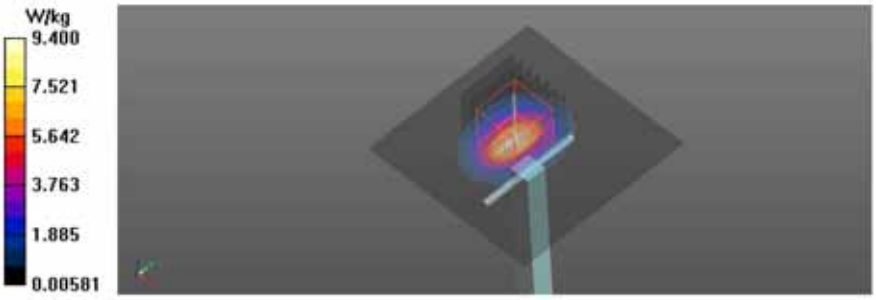
DUT: Dipole 2600 MHz D2600V2; Type: D2600V2; Serial: D2600V2 - SN:1124

Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 1.956 S/m; ε_r = 39.124; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(7.59, 7.59, 7.59) @ 2600 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2022-02-28
- Phantom: ELI v4.0 Phamtom TP:1244; Type: ELI v4.0 Phamtom; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Verification/2600 MHz Verification/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 9.40 W/kg

Verification/2600 MHz Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.84 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 11.4 W/kg
SAR(1 g) = 5.37 W/kg; SAR(10 g) = 2.42 W/kg
Smallest distance from peaks to all points 3 dB below = 8.9 mm
Ratio of SAR at M2 to SAR at M1 = 47.7%
Maximum value of SAR (measured) = 9.09 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.6 SAR Test Plots for GSM850

Date: 2022-07-25

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GSM 850_Front_CH128.da53:0

DUT: TM04ANNABM2; Type: Car Telematics Modem; Serial: N-128

Communication System: UID 0, GSM850 (0); Frequency: 824.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.899 S/m; ε_r = 42.086; ρ = 1000 kg/m^3
Phantom section: Flat Section

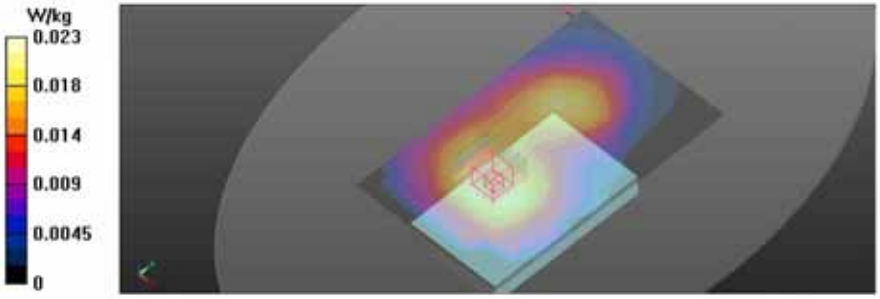
DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(9.86, 9.86, 9.86) @ 824.2 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v4.0 Phamtom TP:1244; Type: ELI v4.0 Phamtom; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Body/GSM 850_Front_CH128/Area Scan (101x161x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.0225 W/kg

Body/GSM 850_Front_CH128/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.159 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.0250 W/kg
SAR(1 g) = 0.018 W/kg; SAR(10 g) = 0.013 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 69.2%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0224 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.7 SAR Test Plots for GSM1900

Date: 2022-07-25

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: GSM 1900_Front_CH512.da53:0

DUT: TM04ANNABM2; Type: Car Telematics Modem; Serial: N-128

Communication System: UID 0, GSM1900 (0); Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.351 S/m; ε_r = 41.991; ρ = 1000 kg/m^3
Phantom section: Flat Section

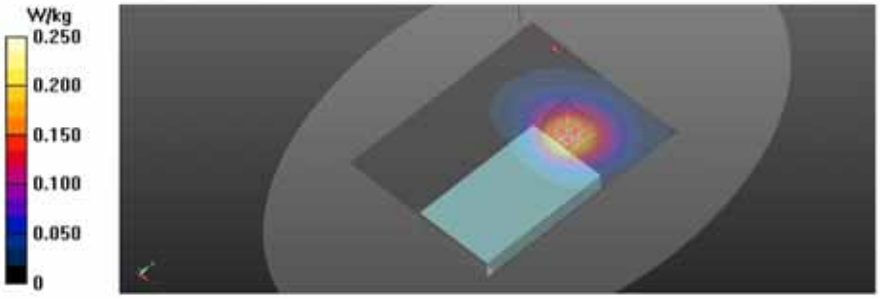
DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(8.22, 8.22, 8.22) @ 1850.2 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v4.0 Phamtom TP:1244; Type: ELI v4.0 Phamtom; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Body/GSM 1900_Front_CH512/Area Scan (131x161x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.250 W/kg

Body/GSM 1900_Front_CH512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.438 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.288 W/kg
SAR(1 g) = 0.182 W/kg; SAR(10 g) = 0.117 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 62.5%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.249 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.8 SAR Test Plots for WCDMA II

Date: 2022-06-11

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WCDMA FDD II_Front_CH9400.da53:0

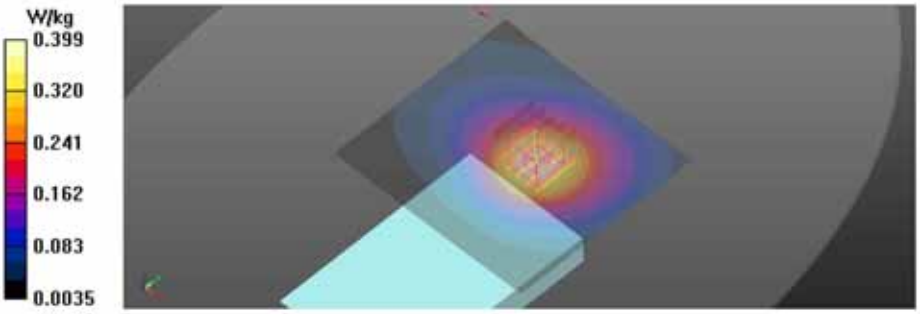
DUT: TM04ANNABM2; Type: Car Telematics Modem; Serial: N-128

Communication System: UID 0, WCDMA2 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.371 S/m; ε_r = 40.001; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(8.22, 8.22, 8.22) @ 1880 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Body/WCDMA FDD II_Front_CH9400/Area Scan (101x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.399 W/kg

Body/WCDMA FDD II_Front_CH9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.412 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.468 W/kg
SAR(1 g) = 0.289 W/kg; SAR(10 g) = 0.184 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 60.6%
Maximum value of SAR (measured) = 0.402 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.9 SAR Test Plots for WCDMA IV

Date: 2022-07-01

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WCDMA FDD IV_Front_CH1312.da53:0

DUT: TM04ANNABM2; Type: Car Telematics Modem; Serial: N-128

Communication System: UID 0, WCDMA4 (0); Frequency: 1712.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1712.4 MHz; σ = 1.376 S/m; ε_r = 39.849; ρ = 1000 kg/m^3
Phantom section: Flat Section

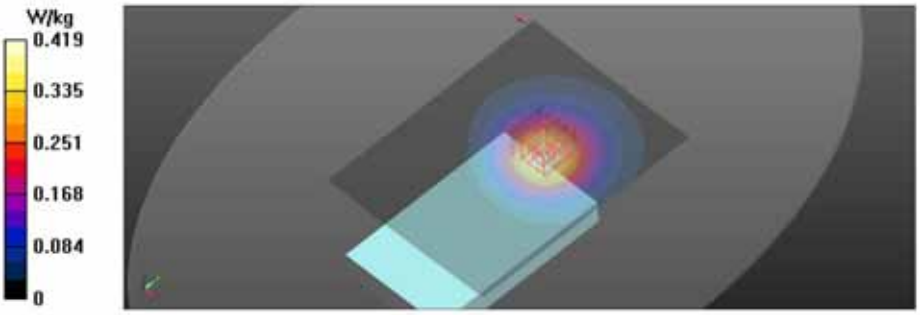
DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(8.6, 8.6, 8.6) @ 1712.4 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Body/WCDMA FDD IV_Front_CH1312/Area Scan (101x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.419 W/kg

Body/WCDMA FDD IV_Front_CH1312/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.755 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.491 W/kg
SAR(1 g) = 0.305 W/kg; SAR(10 g) = 0.195 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 61.7%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.422 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.10 SAR Test Plots for WCDMA V

Date: 2022-06-28

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: WCDMA FDD V_Front_CH4132.da53:0

DUT: TM04ANNABM2; Type: Car Telematics Modem; Serial: N-128

Communication System: UID 0, WCDMA5 (0); Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.885 S/m; ε_r = 41.555; ρ = 1000 kg/m^3
Phantom section: Flat Section

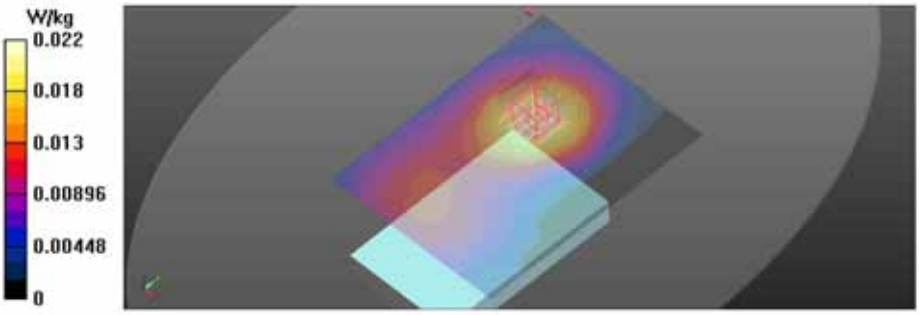
DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(9.86, 9.86, 9.86) @ 826.4 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Body/WCDMA FDD V_Front_CH4132/Area Scan (101x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.0224 W/kg

Body/WCDMA FDD V_Front_CH4132/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.121 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.0270 W/kg
SAR(1 g) = 0.018 W/kg; SAR(10 g) = 0.013 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 67.3%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0237 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.11 SAR Test Plots for LTE Band 5

Date: 2022-06-27

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE 5_10MHz_1@25_QPSK_Front_CH20600.da53:0

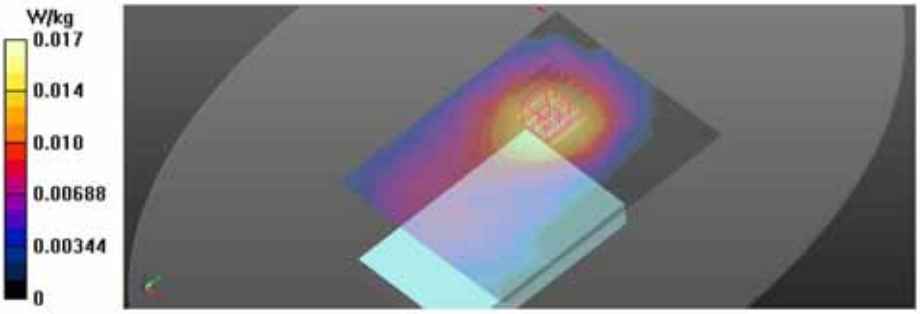
DUT: TM04ANNABM2; Type: Car Telematics Modem; Serial: N-128

Communication System: UID 0, LTE Band 5 (0); Frequency: 844 MHz;Duty Cycle: 1:1
Medium parameters used: f = 844 MHz; σ = 0.911 S/m; ε_r = 41.699; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(9.86, 9.86, 9.86) @ 844 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Body/LTE 5_10MHz_1@25_QPSK_Front_CH20600/Area Scan (101x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0172 W/kg

Body/LTE 5_10MHz_1@25_QPSK_Front_CH20600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.556 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 0.0200 W/kg
SAR(1 g) = 0.013 W/kg; SAR(10 g) = 0.009 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 64.1%
Maximum value of SAR (measured) = 0.0176 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.12 SAR Test Plots for LTE Band 7

Date: 2023-01-20

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE 7_20MHz_1@0_QPSK_Front_CH21350.da53:0

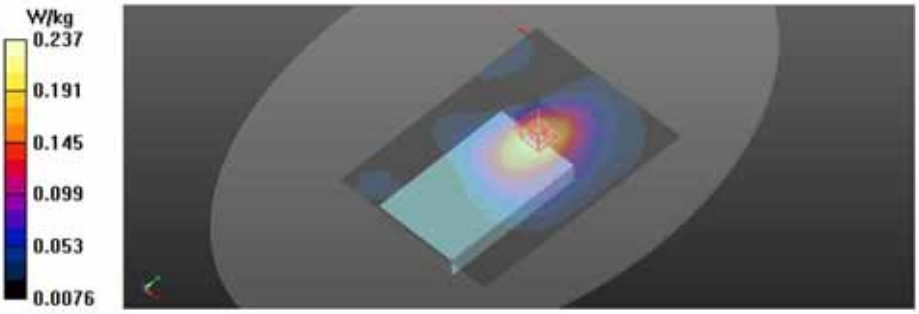
DUT: TM04ANNABM2; Type: Car Telematics Modem; Serial: N-128

Communication System: UID 0, LTE Band 7 (0); Frequency: 2560 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2560 MHz; σ = 1.925 S/m; ε_r = 39.488; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(7.59, 7.59, 7.59) @ 2560 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2022-02-28
- Phantom: ELI v4.0 Phamtom TP:1244; Type: ELI v4.0 Phamtom; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Body/LTE 7_20MHz_1@0_QPSK_Front_CH21350/Area Scan (181x241x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.237 W/kg

Body/LTE 7_20MHz_1@0_QPSK_Front_CH21350/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.279 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.291 W/kg
SAR(1 g) = 0.160 W/kg; SAR(10 g) = 0.098 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 54.1%
Maximum value of SAR (measured) = 0.239 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.13 SAR Test Plots for LTE Band 12

Date: 2022-06-15

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE 12_10MHz_1@25_QPSK_Front_CH23060.da53:0

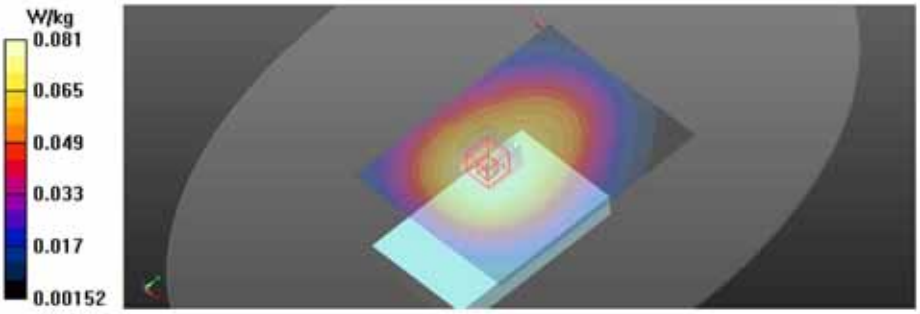
DUT: TM04ANNABM2; Type: Car Telematics Modem; Serial: N-128

Communication System: UID 0, LTE Band 12 (0); Frequency: 704 MHz;Duty Cycle: 1:1
Medium parameters used: f = 704 MHz; σ = 0.861 S/m; ε_r = 43.473; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(10.36, 10.36, 10.36) @ 704 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Body/LTE 12_10MHz_1@25_QPSK_Front_CH23060/Area Scan (101x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0814 W/kg

Body/LTE 12_10MHz_1@25_QPSK_Front_CH23060/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.949 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.0900 W/kg
SAR(1 g) = 0.069 W/kg; SAR(10 g) = 0.053 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 76.7%
Maximum value of SAR (measured) = 0.0822 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.14 SAR Test Plots for LTE Band 13

Date: 2022-06-15

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE 13_10MHz_1@0_QPSK_Front_CH23230.da53:0

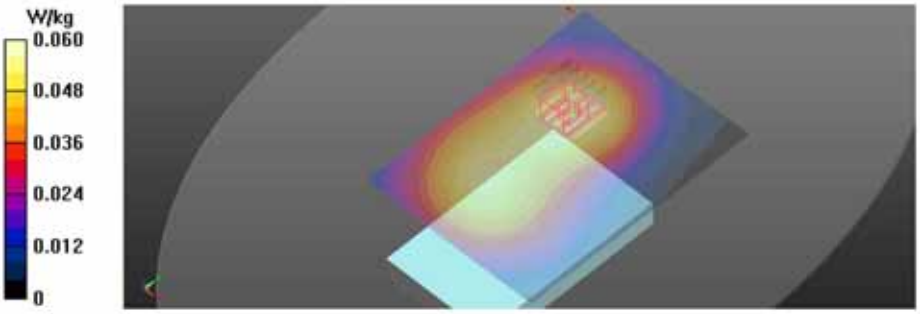
DUT: TM04ANNABM2; Type: Car Telematics Modem; Serial: N-128

Communication System: UID 0, LTE Band 13 (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium parameters used: f = 782 MHz; σ = 0.928 S/m; ε_r = 42.38; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(10.36, 10.36, 10.36) @ 782 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Body/LTE 13_10MHz_1@0_QPSK_Front_CH23230/Area Scan (101x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0598 W/kg

Body/LTE 13_10MHz_1@0_QPSK_Front_CH23230/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.762 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.0690 W/kg
SAR(1 g) = 0.050 W/kg; SAR(10 g) = 0.037 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 72.9%
Maximum value of SAR (measured) = 0.0625 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.15 SAR Test Plots for LTE Band 25

Date: 2022-06-11

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE 25_20MHz_1@0_QPSK_Front_CH26590.da53.0

DUT: TM04ANNABM2; Type: Car Telematics Modem; Serial: N-128

Communication System: UID 0, LTE Band 25 (0); Frequency: 1905 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1905 MHz; σ = 1.393 S/m; ε_r = 39.907; ρ = 1000 kg/m^3
Phantom section: Flat Section

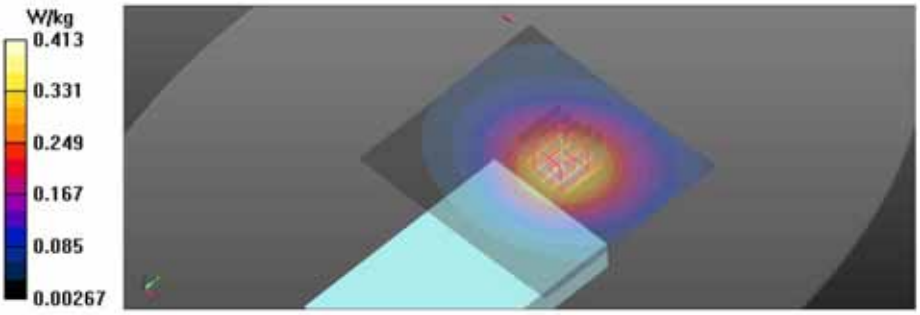
DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(8.22, 8.22, 8.22) @ 1905 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Body/LTE 25_20MHz_1@0_QPSK_Front_CH26590/Area Scan (101x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.413 W/kg

Body/LTE 25_20MHz_1@0_QPSK_Front_CH26590/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.016 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.484 W/kg
SAR(1 g) = 0.297 W/kg; SAR(10 g) = 0.188 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 60.3%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.414 W/kg



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Appendix A.16 SAR Test Plots for LTE Band 41

Date: 2023-01-17

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE 41_20MHz_1@0_QPSK_Left Edge_CH41490.da53:0

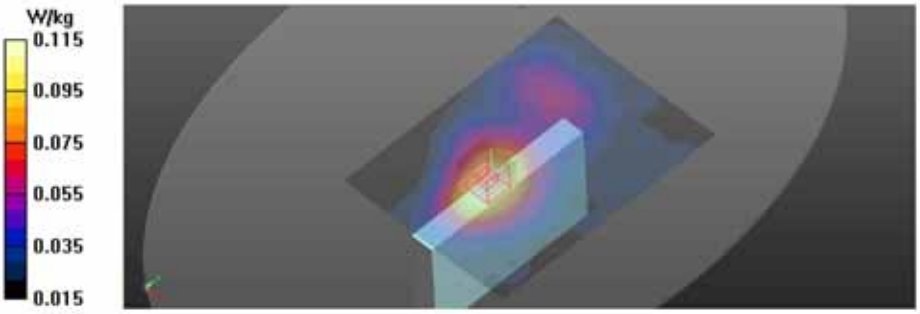
DUT: TM04ANNABM2; Type: Car Telematics Modem; Serial: N-128

Communication System: UID 0, LTE Band 41 (0); Frequency: 2680 MHz;Duty Cycle: 1:1.58016
Medium parameters used: f = 2680 MHz; σ = 1.987 S/m; ε_r = 38.032; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(7.59, 7.59, 7.59) @ 2680 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2022-02-28
- Phantom: ELI v4.0 Phamtom TP:1244; Type: ELI v4.0 Phamtom; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Body/LTE 41_20MHz_1@0_QPSK_Left Edge_CH41490/Area Scan (161x211x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.115 W/kg

Body/LTE 41_20MHz_1@0_QPSK_Left Edge_CH41490/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.975 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.134 W/kg
SAR(1 g) = 0.076 W/kg; SAR(10 g) = 0.051 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 56.1%
Maximum value of SAR (measured) = 0.110 W/kg



(All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.)

Appendix A.17 SAR Test Plots for LTE Band 66

Date: 2022-07-04

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE 66_20MHz_1@0_QPSK_Front_CH132072.da53:0

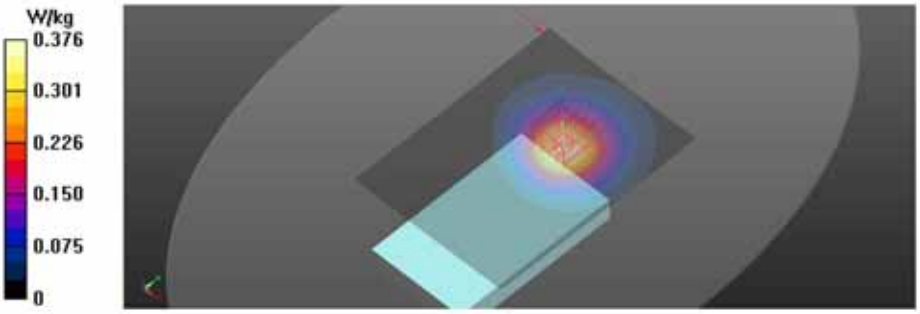
DUT: TM04ANNABM2; Type: Car Telematics Modem; Serial: N-128

Communication System: UID 0, LTE Band 66 (0); Frequency: 1720 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1720 MHz; σ = 1.371 S/m; ε_r = 38.92; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(8.6, 8.6, 8.6) @ 1720 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Body/LTE 66_20MHz_1@0_QPSK_Front_CH132072/Area Scan (101x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.376 W/kg

Body/LTE 66_20MHz_1@0_QPSK_Front_CH132072/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.684 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.441 W/kg
SAR(1 g) = 0.273 W/kg; SAR(10 g) = 0.174 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 61.6%
Maximum value of SAR (measured) = 0.377 W/kg



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Appendix A.18 SAR Test Plots for LTE Band 71

Date: 2022-06-17

Test Laboratory : SGS Korea (Gunpo Laboratory)
File Name: LTE 71_20MHz_1@0_QPSK_Front_CH133297.da53:0

DUT: TM04ANNABM2; Type: Car Telematics Modem; Serial: N-128

Communication System: UID 0, LTE Band 71 (0); Frequency: 680.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 680.5 MHz; σ = 0.858 S/m; ε_r = 43.293; ρ = 1000 kg/m^3
Phantom section: Flat Section

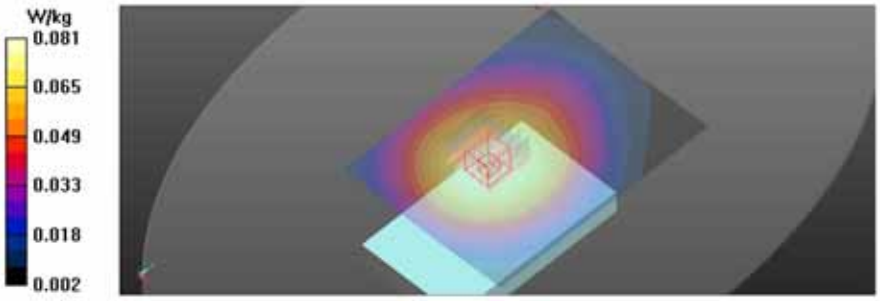
DASY52 Configuration:
- Probe: EX3DV4 - SN7412; ConvF(10.36, 10.36, 10.36) @ 680.5 MHz; Calibrated: 2022-04-29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1595; Calibrated: 2022-01-24
- Phantom: ELI v5.0 1244; Type: QDOVA002AA; Serial: TP:1244
- DASY52 52.10.4(1527)SEMCAD X 14.6.14(7483)

Body/LTE 71_20MHz_1@0_QPSK_Front_CH133297/Area Scan (101x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.0806 W/kg

Body/LTE 71_20MHz_1@0_QPSK_Front_CH133297/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.785 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.0890 W/kg
SAR(1 g) = 0.069 W/kg; SAR(10 g) = 0.053 W/kg
Smallest distance from peaks to all points 3 dB below: Larger than measurement grid
Ratio of SAR at M2 to SAR at M1 = 76.6%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0822 W/kg



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Appendix B.1 Uncertainty Analysis

a	c	d	e = f(d,k)	f	g	h = cxg/e	i = cxg/e	k
Uncertainty Component	Tol (%)	Prob . Dist.	Div.	Ci (1g)	Ci (10g)	1g ui (%)	10g ui (%)	Vi (Veff)
Probe calibration	6.55	N	1.00	1.00	1.00	6.55	6.55	∞
Axial Isotropy	4.70	R	1.73	0.71	0.71	1.92	1.92	∞
Hemispherical Isotropy	9.60	R	1.73	0.71	0.71	3.92	3.92	∞
Boundary Effects	2.00	R	1.73	1.00	1.00	1.15	1.15	∞
Linearity	4.70	R	1.73	1.00	1.00	2.71	2.71	∞
System Detection Limits	0.25	R	1.73	1.00	1.00	0.14	0.14	∞
Modulation Response	4.80	R	1.73	1.00	1.00	2.77	2.77	∞
Readout Electronics	0.30	N	1.00	1.00	1.00	0.30	0.30	∞
Response Time	0.80	R	1.73	1.00	1.00	0.46	0.46	∞
Integration Time	2.60	R	1.73	1.00	1.00	1.50	1.50	∞
RF Ambient Noise	3.00	R	1.73	1.00	1.00	1.73	1.73	∞
RF Ambient Reflections	3.00	R	1.73	1.00	1.00	1.73	1.73	∞
Probe Positioner mechanical tolerance	0.40	R	1.73	1.00	1.00	0.23	0.23	∞
Probe Positioning with respect to phantom shell	6.70	R	1.73	1.00	1.00	3.87	3.87	∞
Extrapolation, interpolation, and integration algorithms for max. SAR evaluation	4.00	R	1.73	1.00	1.00	2.31	2.31	∞
Test sample positioning	3.84/3.83	N	1.00	1.00	1.00	3.84	3.83	29
Device holder uncertainty	2.79/2.66	N	1.00	1.00	1.00	2.79	2.66	3
Output power variation - SAR drift measurement	5.00	R	1.73	1.00	1.00	2.89	2.89	∞
Phantom uncertainty	6.60	R	1.73	1.00	1.00	3.81	3.81	∞
Liquid conductivity– Target	5.00	N	1.00	0.78	0.71	3.90	3.55	∞
Liquid conductivity– measurement	3.55	N	1.00	0.78	0.71	2.77	2.52	5
Liquid permittivity– Target	5.00	N	1.00	0.23	0.26	1.15	1.30	∞
Liquid permittivity– measurement	3.40	N	1.00	0.23	0.26	0.78	0.88	7
Liquid conductivity-temperature	2.74	R	1.73	0.78	0.71	1.23	1.12	21
Liquid permittivity – temperature	1.94	R	1.73	0.23	0.26	0.26	0.29	21
Combined standard uncertainty			RSS			13.38	13.22	438
Expanded uncertainty (95% CONFIDENCE INTERVAL)			*k*=2			**26.76**	**26.44**	

-THE END-

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