

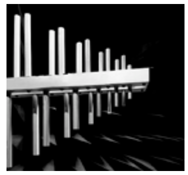
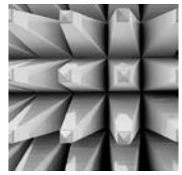

CETECOM™

FCC SAR Test Report

Test report no.: 18-1-0225601T20a

DAkkS Deutsche Akkreditierungsstelle D-PL-12047-01-03

Testing Laboratory

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Accredited Test Laboratory:

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 by the Deutsche Akkreditierungsstelle GmbH (DAkkS) The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12047-01-03

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Test Standard/s

FCC 47CFR §2.1093: Radiofrequency radiation exposure evaluation: portable devices.

For further applied test standards please refer to the test standards/ procedures references of this test report.

Test Item

Kind of test item:	Measurement equipment for corrosion market
Model name:	MMS Inspection DPM / DFT and SPG
FCC ID:	2ATFE-MMSINSPEC00
S/N serial number:	05098071119 / 00065 / 00073
Hardware status:	Revision C1.3 - 10142823
Firmware status:	n/a
Software status:	1.1.0-S
Frequency:	see technical details
Antenna:	integrated antenna
Battery option:	1,5V DC 2xAA fully charged battery
Device type:	portable device
Test sample status:	identical prototype
Exposure category:	general population / uncontrolled environment

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test Report authorized:

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Responsible for test section

Testing performed:

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Responsible for test report

Revision History

Version	Date	Comments	Revised By
V1	27/6/2019	Initial issue	Marc Schäfers

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1 Summary of Measurement Results

☒	**No deviations from the technical specifications ascertained**
☐	Deviations from the technical specifications ascertained
Maximum SAR value reported (W/kg)	
Frequency	Wi-Fi (2.4GHz)
Body	**0,001134**
Limbs	**0,0003069**

2 General information

2.1 Test Lab information

The test facility is recognized, certified, or accredited by the following organizations:

1	**VCCI:** CETECOM GmbH has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2666 C-2914, C2914, T-1967, and G-301 respectively.	Voluntary Controls for Electromagnetic Emissions Reg. No.: R-2666 C-2914, T-1967, G-301
2	**FCC:** CETECOM GmbH has been recognized as an accredited testing laboratory. Reg. Number: MRA US-EU0003	MRA US-EU 0003
3	**IC:** CETECOM GmbH has been recognized as an accredited testing laboratory. Reg. Number: 3462D-2, 3462D-3	Industry Canada Reg. No.: 3462D-2 Reg. No.: 3462D-3
4	**DAkkS:** CETECOM GmbH has been recognized as an accredited testing laboratory. Reg. Number: D-PL-12047-01-03	DAkkS Deutsche Akkreditierungsstelle D-PL-12047-01-03
5	**Wi-Fi:** CETECOM GmbH has been recognized as an accredited testing laboratory.	AUTHORIZED RF LABORATORY
6	**CTIA:** CETECOM GmbH has been recognized as an accredited testing laboratory. Lab Code: 20011130-00	Authorized™ Test Lab Lab Code: 20011130-00

2.2 Application details

Date of receipt of test item:	2019-1-29
Start of test:	2019-6-12
End of test:	2019-6-12
Date of report:	2019-6-27

Person(s) present during the test: Marc Schäfers

2.3 Test Environment

The DASY measurement system is placed in a laboratory room within an environment which avoids influence on SAR measurements by ambient electromagnetic fields and any reflection from the environment. The pictures at the beginning of the photo documentation show a complete view of the test environment. The system allows the measurement of SAR values larger than 0.005 mW/g.

Ambient temperature:	20 – 24 °C
Tissue Simulating liquid:	20 – 24 °C
Relative humidity content:	30 – 70 %
Air pressure:	not relevant for this kind of testing

Exact temperature values for each test are shown in the table(s) under 7.2 and/or on the measurement plots.

2.4 Notes and disclaimer

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory. The testing service provided by CETECOM GmbH has been rendered under the current "General Terms and Conditions for CETECOM GmbH". CETECOM GmbH will not be liable for any loss or damage resulting from false, inaccurate, inappropriate or incomplete product information provided by the customer. Under no circumstances does the CETECOM GmbH test report include any endorsement or warranty regarding the functionality, quality or performance of any other product or service provided. Under no circumstances does the CETECOM GmbH test report include or imply any product or service warranties from CETECOM GmbH, including, without limitation, any implied warranties of merchantability, fitness for purpose, or non-infringement, all of which are expressly disclaimed by CETECOM GmbH. All rights and remedies regarding vendor's products and services for which CETECOM GmbH has prepared this test report shall be provided by the party offering such products or services and not by CETECOM GmbH. In no case this test report can be considered as a Letter of Approval.

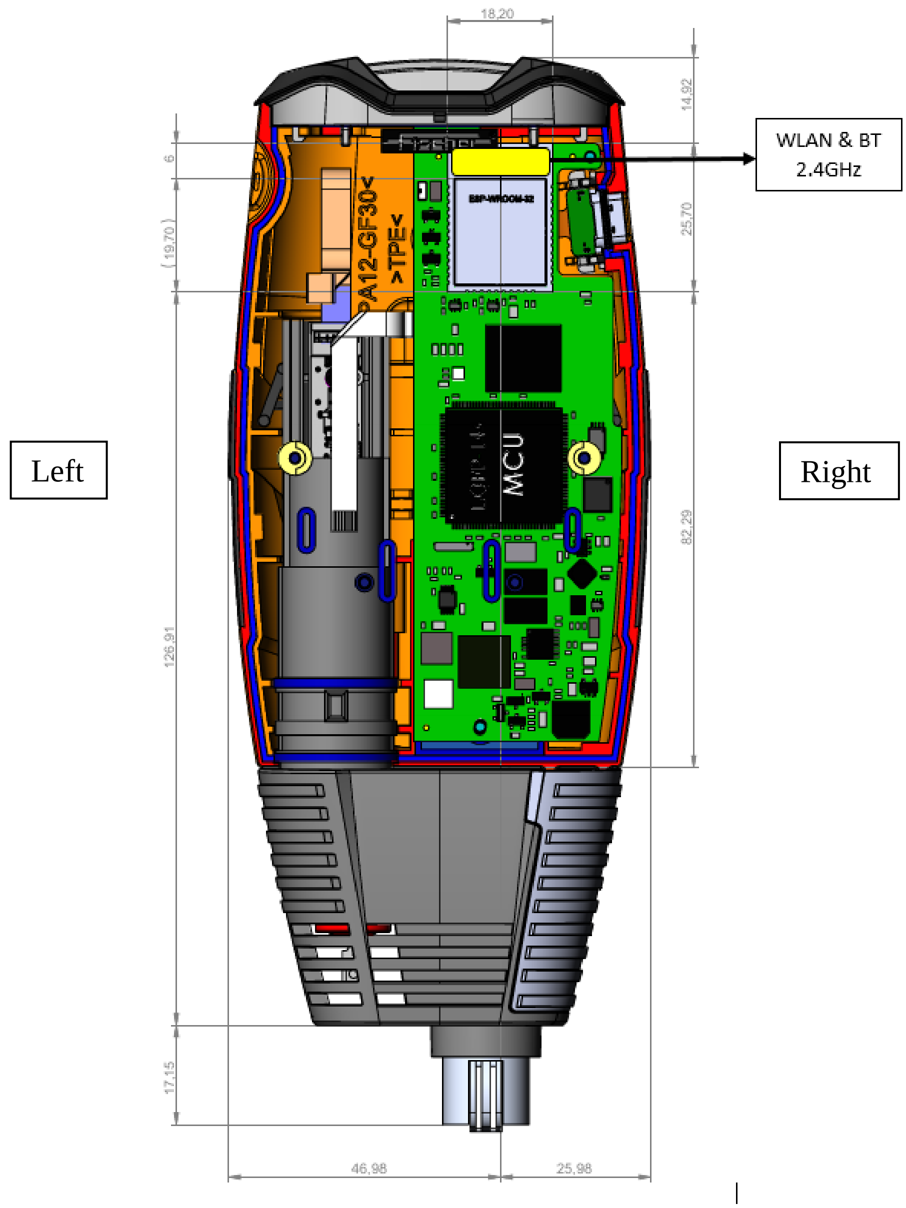
2.5 Statement of compliance

The SAR values found for the DUT are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1 g tissue according to the FCC rule §2.1093, the ANSI/IEEE C 95.1:1992, the NCRP Report Number 86 for uncontrolled environment for General Population/Uncontrolled exposure.

2.6 DUT Technical details

Device Type :	portable device		
Exposure Category:	uncontrolled environment / general population		
Product Name:	MMS Inspection DPM / DFT / SPG		
Model No.(EUT):	**Due Point Meter / Dry Film Thickness Measurement / Surface Profile Gauge**		
FCC ID:	2ATFE-MMSINSPEC00		
Product Phase:	identical prototype		
SN serial number:	05098071119 / 00065 / 00073		
Hardware Version:	Revision C1.3 - 10142823		
Software Version:	1.1.0-S		
Firmware Version:	n/a		
Antenna Details :	Integrated (ANT1)		
ANT1 Gain (Peak)	2 dBi (2.4GHz BT & WLAN) (According to Applicants Declaration)		
Device Operating Configurations :			
Modulation Mode:	WIFI: DSSS,OFDM; BT: GFSK, π/4DQPSK,8DPSK		
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)
	Bluetooth	2400-2483.5	2400-2483.5
	Wi-Fi 2.4G	2400-2483.5	2400-2483.5
Battery Information:	Model: AA battery		
	Rated capacity :2600mAh		
	Battery Type : Non rechargeable alkaline battery		

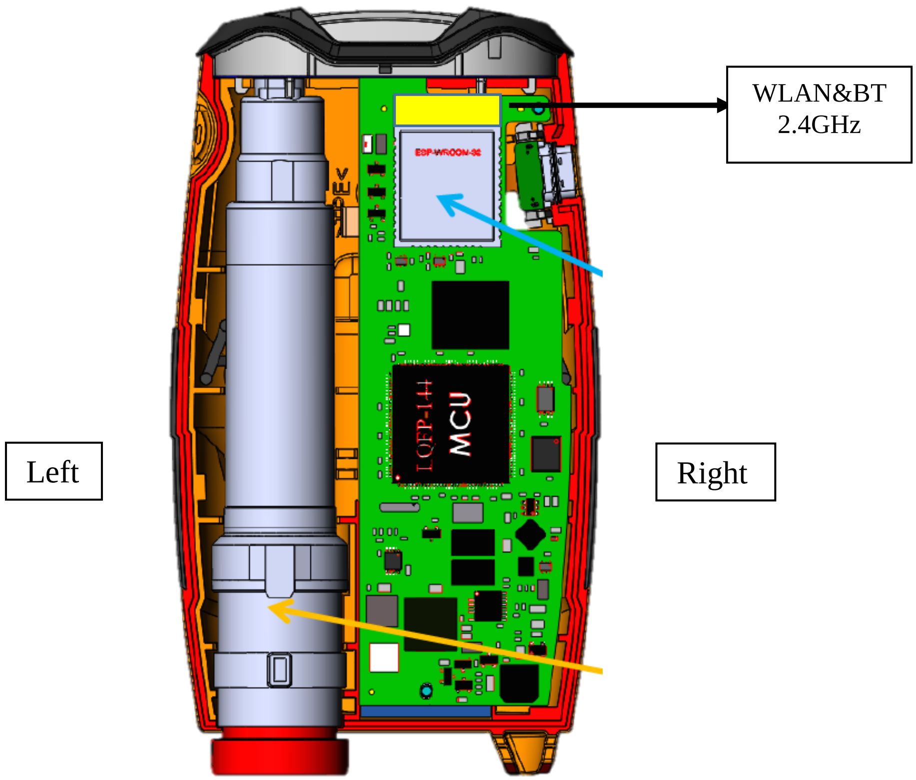
2.6.1 DUT Antenna(s) Location DPM



EUT Sides for SAR Testing (Main Antenna)						
Mode	Front	Back	Left	Right	Top	Bottom
Wi-Fi(2.4GHz)	Yes	Yes	Yes	Yes	Yes	No

Table 1： EUT Sides for SAR Testing
Note: Pictures and antenna positions are shown in the external Photo documentation

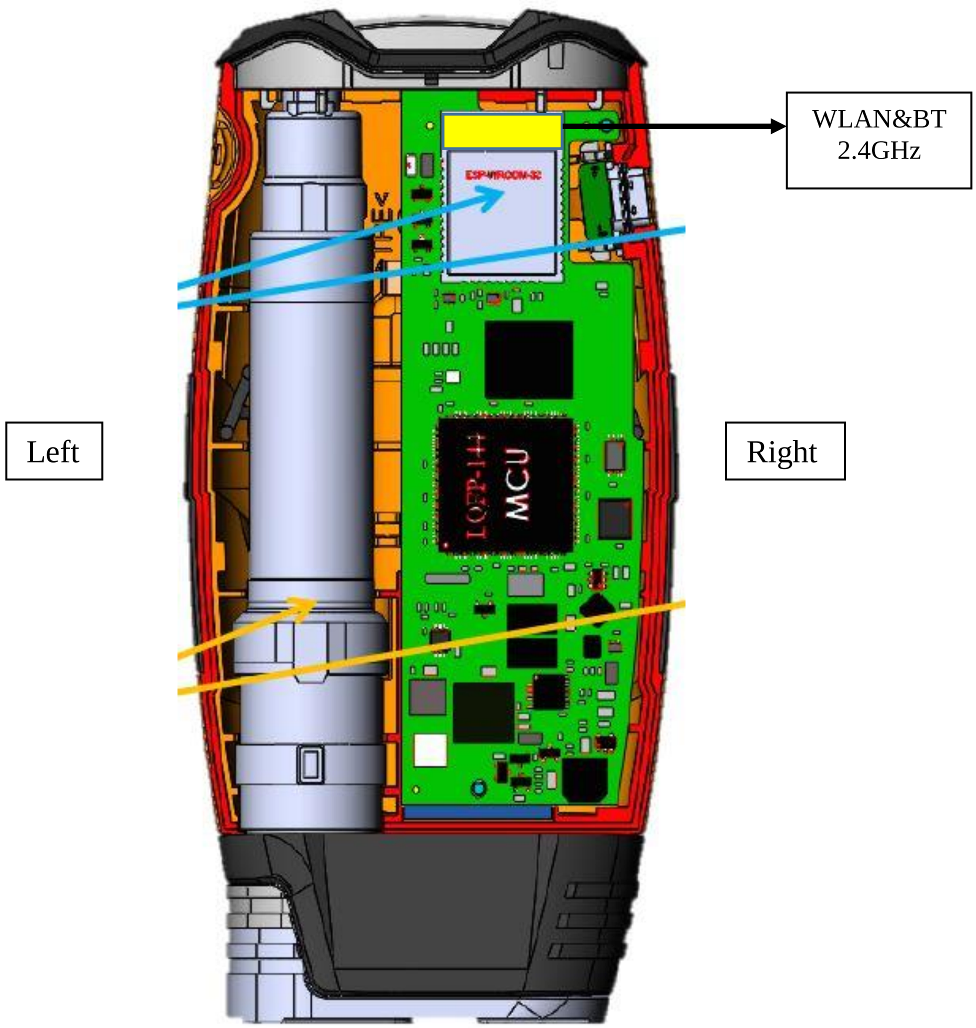
2.6.2 DUT Antenna(s) Location DFT



EUT Sides for SAR Testing (Main Antenna)						
Mode	Front	Back	Left	Right	Top	Bottom
Wi-Fi(2.4GHz)	Yes	Yes	Yes	Yes	Yes	No

Table 2： EUT Sides for SAR Testing
Note: Pictures and antenna positions are shown in the external Photo documentation

2.6.3 DUT Antenna(s) Location SPG



EUT Sides for SAR Testing (Main Antenna)						
Mode	Front	Back	Left	Right	Top	Bottom
Wi-Fi(2.4GHz)	Yes	Yes	Yes	Yes	Yes	No

Table 3： EUT Sides for SAR Testing
Note: Pictures and antenna positions are shown in the external Photo documentation

3 Test standards/ procedures references

3.1 Test standards

Test Standard	Test Standard Description
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
IEEE Std C95.1 – 1991	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
IEEE 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB 248227 D01 802.11 Wi-Fi SAR v02r02	SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS
KDB447498 D01 General RF Exposure Guidance v06	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies
KDB447498 D03 Supplement C Cross-Reference v01	OET Bulletin 65, Supplement C Cross-Reference
KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04	SAR Measurement Requirements for 100 MHz to 6 GHz
KDB 865664 D02 RF Exposure Reporting v01r02	RF Exposure Compliance Reporting and Documentation Considerations

3.2 RF exposure limits

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

Table 4： RF exposure limits

Notes:
* The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time
** The Spatial Average value of the SAR averaged over the whole body.
*** 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.
Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.
Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation.)

4 SAR measurement variability and uncertainty

4.1 SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.

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

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

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

The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

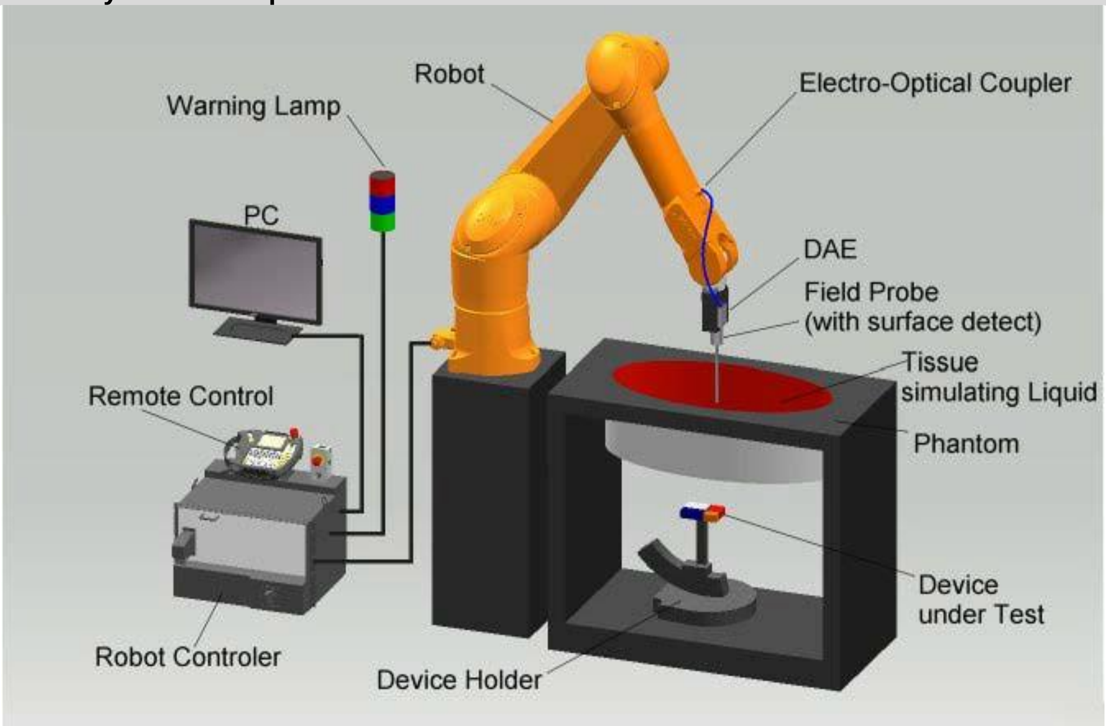
4.2 SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

5 Test Set-up

5.1 Measurement system

5.1.1 System Description



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

- A standard high precision 6-axis robot (Stäubli RX/TX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid.
- A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY measurement server.
- The DASY measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 7.
- DASY software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The triple flat and eli phantom for the testing of handheld and body-mounted wireless devices.
- The device holder for handheld mobile phones and mounting device adaptor for laptops
- Tissue simulating liquid mixed according to the given recipes.
- System check dipoles allowing to validate the proper functioning of the system.

5.1.2 Probe description

Isotropic E-Field Probe EX3DV4 for Dosimetric Measurements

	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

5.1.3 Data Acquisition Electronics (DAE) description

Model	DAE4
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY4/5 embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV,400mV)
Input Offset Voltage	< 5μV (with auto zero)
Input Bias Current	< 50 f A
Dimensions	60 x 60 x 68 mm

5.1.4 Phantom description

The phantom consists of a fiberglass shell integrated in a wooden table. It allows left-hand and right-hand head as well as body-worn measurements with a maximum liquid depth of 18 cm in head position and 22 cm in planar position (body measurements). The thickness of the Phantom shell is 2 mm +/- 0.1 mm.

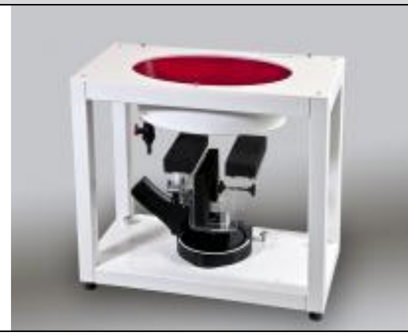
5.1.4.1 SAM Twin Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
Dimensions (incl. Wooden Support)	Length: 1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 liters
Wooden Support	SPEAG standard phantom table

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Twin SAM V5.0 has the same shell geometry and is manufactured from the same material as Twin SAM V4.0, but has reinforced top structure.

5.1.4.2 ELI Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2.0 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	approx. 30 liters	
Wooden Support	SPEAG standard phantom table	

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. 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.

5.1.5 Device holder description

The DASY device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. This device holder is used for standard mobile phones or PDA's only. If necessary an additional support of polystyrene material is used.

Larger DUT's (e.g. notebooks) cannot be tested using this device holder. Instead a support of bigger polystyrene cubes and thin polystyrene plates is used to position the DUT in all relevant positions to find and measure spots with maximum SAR values. Therefore those devices are normally only tested at the flat part of the SAM.

5.1.6 Scanning procedure

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

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

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

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

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

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

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

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

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

5.1.7 Spatial Peak SAR Evaluation

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

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

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

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

Extrapolation

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

Interpolation

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

Volume Averaging

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

Advanced Extrapolation

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

5.1.8 Data Storage and Evaluation

Data Storage

The DASY software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DA4", ".DA5x". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	Normi, ai0, ai1, ai2
	- Conversion factor	ConvFi
	- Diode compression point	Dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.
If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

Vi = Ui + U 2 •cf/dcpi

With	Vi	= compensated signal of channel i	(i = x, y, z)
	Ui	= input signal of channel I	(i = x, y, z)
	Cf	= crest factor of exciting field	(DASY parameter)
	dcpi	= diode compression point	(DASY parameter)

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

E-field probes: Ei = (Vi / Normi • ConvF)$^{1/2}$

H-field probes: $Hi = (Vi)^{1/2} \cdot (a_{i0} + a_{i1}f + ai^2f^2)/f$

[mV/(V/m)2] for E-field Probes ConvF = sensitivity enhancement in solution
aij = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
Ei = electric field strength of channel i in V/m
Hi = magnetic field strength of channel i in A/m

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

$Etot = (E^2 + E^2 + E^2)^{1/2}$

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

$SAR = (E_{tot}^2 \cdot \sigma) / (\rho \cdot 1000)$

With SAR = local specific absorption rate in mW/g
Etot = total field strength in V/m
σ = conductivity in [mho/m] or [Siemens/m]
ρ = equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid.The power flow density is calculated assuming the excitation field to be a free space field.

$P_{pwe} = E_{tot}^2 / 3770$ or $P_{pwe} = H_{tot}^2 \cdot 37.7$

With P_{pwe} = equivalent power density of a plane wave in mW/cm2
E_{tot} = total electric field strength in V/m
H_{tot} = total magnetic field strength in A/m

5.2 Description of Test Position

5.2.1 EUT constructions

5.2.2 Body Exposure Condition

5.2.2.1 Body exposure conditions

The back surface and edges of the tablet should be tested for SAR compliance with the DUT touching the phantom. The SAR Exclusion Threshold in KDB 447498 D01 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent DUT edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

5.2.2.2 Extremity exposure conditions

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user’s body, SAR compliance for the body is also required. The 1-g body and 10-g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D01 should be applied to determine SAR test requirements.

5.3 System Verification

5.3.1 Tissue simulating liquids: dielectric properties

(Liquids used for tests are marked with☒)

☒HSL600-6000 MHz is composed of the following ingredients and provided by SPEAG： Water：50-65% Mineral oil：10-30% Emulsifiers：8-25% Sodium salt：0-1.5%
☐MSL600-6000 MHz is composed of the following ingredients and provided by SPEAG： Water：64-78% Mineral oil：11-18% Emulsifiers：9-15% Sodium salt：2-3%

Table 5： Head & Body tissue dielectric properties

Effective February 19, 2019, FCC has permitted the use of single head-tissue simulating liquid specified in IEC 62209-1 for all SAR tests

5.3.2 Tissue simulating liquids: parameters

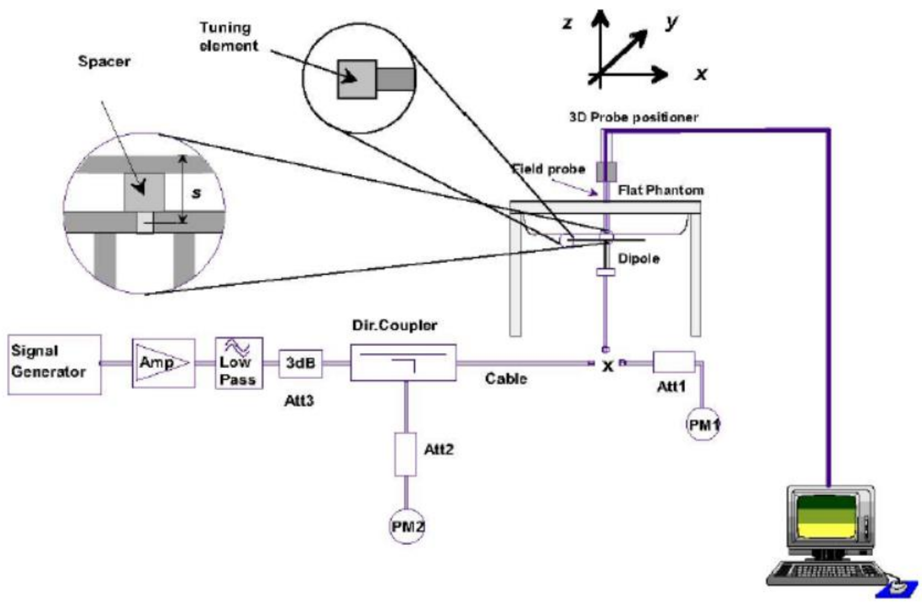
The dielectric properties for this Tissue Simulate Liquids were measured by using the DAK. The Conductivity (σ) and Permittivity (ρ) are listed in bellow Table .For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was 22±2° C.

Tissue Type	Measured Frequency （MHz）	Target Tissue (±5%)		Measured Tissue		Liquid Temp. (℃)	Measured Date
		ε_r	σ(S/m)	ε_r	σ(S/m)		
600-6000 Head	2300	39.47 (37.49~41.44)	1.67 (1.58~1.75)	39.82	1.72	22.6	12/06/2019
	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	39.57	1.84	22.6	12/06/2019
	2600	39.0 (37.05~40.95)	1.96 (1.86~2.06)	39.31	1.95	22.6	12/06/2019

5.3.3 System check

5.3.3.1 System check procedure

The system check is performed by using a validation dipole which is positioned parallel to the planar part of the SAM phantom at the reference point. The distance of the dipole to the SAM phantom is determined by a plexiglass spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. To adjust this power a power meter is used. The power sensor is connected to the cable before the system check to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the validation to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test (result on plot). System check results have to be equal or near the values determined during dipole calibration (target SAR in table above) with the relevant liquids and test system.



F-1. the microwave circuit arrangement used for SAR system check

5.3.3.2 System check result(s)

Validation Kit		Measured SAR 250 mW 1 g (W/kg)	Measured SAR 250 mW 10 g (W/kg)	Measured SAR (normalized to 1W) 1 g (W/kg)	Measured SAR (normalized to 1 W) 10 g (W/kg)	Target SAR (normalized to 1 W) (±10%) 1-g (W/kg)	Target SAR (normalized to 1 W) (±10%) 10-g (W/kg)	Liquid Temp. (℃)	Measured Date
D2450V2	Head	13.5	6.41	54.0	25,64	52.2 (46.98~56.21)	24.5 (22,05~26,95)	22.6	12/06/2019

Table 6： SAR System Check Result.
Note：Detailed System Check Results please see Annex A

5.3.4 System validation

The system validation is performed in a similar way as a system check. It needs to be performed once a SAR measurement system has been established and allows an evaluation of the system accuracy with all components used together with the specified system. It has to be repeated at least once a year or when new system components are used (DAE, probe, phantom, dipole, liquid type). In addition to the procedure used during system check a system validation also includes checks of probe isotropy, probe modulation factor and RF signal.

5.3.5 Justification for Extended SAR Dipole Calibrations

1) Referring to KDB865664 D01 requirements for dipole calibration, instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remain stable according to the following requirements. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.
a) There is no physical damage on the dipole;
b) System check with specific dipole is within 10% of calibrated value;
c) Return-loss is within 10% of calibrated measurement;
d) Impedance is within 5Ω from the previous measurement.

2) DAK's probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

6 Technology Test Configuration

6.1 Operation Configurations

6.1.1 Wi-Fi Test Configuration

A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement.

6.1.1.1 Duty cycle*:*

1) 2.4GHz Wi-Fi 802.11b:
   Duty cycle=100%

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2437.000000	12.9	30.0	12.9	100.000	PASS

6.1.1.2 Initial Test Position SAR Test Reduction Procedure

To determine the test setup conducted output power was measured on following variants

- MMS Inspection DPM
- MMS Inspection DFT
- MMS Inspection SPG

Worst case setup was determined as MMS Inspection DPM.

DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.
The initial test position procedure is described in the following:

1）. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).
2）. When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.

For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested. a) Additional power measurements may be required for this step, which should be limited to those necessary for identifying the subsequent highest output power channels.

6.1.1.3 Initial Test Configuration Procedures

An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. SAR is measured using the highest measured maximum output power channel. For configurations with the same specified or measured maximum output power, additional transmission mode and test channel selection procedures are required. SAR test reduction for subsequent highest output test channels is determined according to *reported* SAR of the initial test configuration.
For next to the ear, hotspot mode and UMC mini-tablet exposure configurations where multiple test positions are required, the initial test position procedure is applied to minimize the number of test positions required for SAR measurement using the initial test configuration transmission mode. For fixed exposure conditions that do not have multiple SAR test positions, SAR is measured in the transmission mode determined by the initial test configuration.
When the *reported* SAR of the initial test configuration is > 0.8 W/kg, SAR measurement is required for subsequent next highest measured output power channel(s) in the initial test configuration until *reported* SAR is ≤ 1.2 W/kg or all required channels are tested.

6.1.1.4 Subsequent Test Configuration Procedures

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. The initial test position procedure is applied to next to the ear, UMPC mini-tablet and hotspot mode configurations. When the same maximum output power is specified for multiple transmission modes, additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. The subsequent test configuration and SAR measurement procedures are described in the following.

1）. When SAR test exclusion provisions of KDB Publication 447498 are applicable and SAR measurement is not required for the initial test configuration, SAR is also not required for the next highest maximum output power transmission mode subsequent test configuration(s) in that frequency band or aggregated band and exposure configuration.

2）. When the highest *reported* SAR for the initial test configuration (when applicable, include subsequent highest output channels), according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

3）. The number of channels in the initial test configuration and subsequent test configuration can be different due to differences in channel bandwidth. When SAR measurement is required for a subsequent test configuration and the channel bandwidth is smaller than that in the initial test configuration, all channels in the subsequent test configuration that overlap with the larger bandwidth channel tested in the initial test configuration should be used to determine the highest maximum output power channel. This step requires additional power measurement to identify the highest maximum output power channel in the subsequent test configuration to determine SAR test reduction.

   a) SAR should first be measured for the channel with highest measured output power in the subsequent test configuration.
   b) SAR for subsequent highest measured maximum output power channels in the subsequent test configuration is required only when the *reported* SAR of the preceding higher maximum output power channel(s) in the subsequent test configuration is > 1.2 W/kg or until all required channels are tested. i) For channels with the same measured maximum output power, SAR should be measured using the channel closest to the center frequency of the larger channel bandwidth channel in the initial test configuration.

4）. SAR measurements for the remaining highest specified maximum output power OFDM transmission mode configurations that have not been tested in the initial test configuration (highest maximum output) or subsequent test configuration(s) (subsequent next highest maximum output power) is determined by recursively applying the subsequent test configuration procedures in this section to the remaining configurations according to the following:

   a) replace “subsequent test configuration” with “next subsequent test configuration” (i.e., subsequent next highest specified maximum output power configuration)
   b) replace “initial test configuration” with “all tested higher output power configurations”

6.1.1.5 2.4 GHz Wi-Fi SAR Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions. When SAR measurement is required for an OFDM configuration, the initial test configuration, subsequent test configuration and initial test position procedures are applied. The SAR test exclusion requirements for 802.11g/n OFDM configurations are described in following.

- **802.11b DSSS SAR Test Requirements**

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1）. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

2）. When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

- **2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements**

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied (section 5.3, including sub-sections). SAR is not required for the following 2.4 GHz OFDM conditions.

1）. When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.

2）. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

- **SAR Test Requirements for OFDM configurations**

When SAR measurement is required for 802.11 g/n OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

7 Detailed Test Results

7.1 Conducted power measurements

7.1.1 Conducted Power of Wi-Fi

Mode	Antenna Port	Channel	Frequency(MHz)	Data Rate(Mbps)	Tune up	Average Power (dBm)	SAR Test
802.11b	Main Antenna Port	1	2412	1	16.80	**15.49**	Yes
		6	2437		15.97	12.93	Yes
		11	2462		15.50	13.26	Yes
802.11g	Main Antenna Port	1	2412	6	15.13	14.61	NO
		6	2437		14.23	12.12	NO
		11	2462		14.60	12.39	NO
802.11n HT20 SISO	Main Antenna Port	1	2412	6.5	15.27	15.26	NO
		6	2437		14.37	14.23	NO
		11	2462		13.83	13.19	NO
802.11n HT40 SISO	Main Antenna Port	1	2412	6.5	15.23	13.71	NO
		6	2437		14.77	13.12	NO
		11	2462		14.33	12.40	NO

Table 7： Conducted Power Of WIFI

Note:

a) Power must be measured at each transmit antenna port according to the DSSS and OFDM transmission configurations in each standalone and aggregated frequency band.

b) Power measurement is required for the transmission mode configuration with the highest maximum output power specified for production units.

1) When the same highest maximum output power specification applies to multiple transmission modes, the largest channel bandwidth configuration with the lowest order modulation and lowest data rate is measured.

2) When the same highest maximum output power is specified for multiple largest channel bandwidth configurations with the same lowest order modulation or lowest order modulation and lowest data rate, power measurement is required for all equivalent 802.11 configurations with the same maximum output power.

c) For each transmission mode configuration, power must be measured for the highest and lowest channels; and at the mid-band channel(s) when there are at least 3 channels. For configurations with multiple mid-band channels, due to an even number of channels, both channels should be measured.

7.1.2 Conducted Power of BT

BT		Tune-up (dBm)	Average Power(dBm)
Modulation	Channel		
GFSK	0	6,07	3,8
	39	6,13	3,8
	78	5,97	**3,9**
π/4DQPSK	0	6,07	3,7
	39	6,13	3,8
	78	5,97	3,7
8DPSK	0	6,07	3,4
	39	6,13	3,7
	78	5,97	3,5
BLE		Tune-up (dBm)	Average Power(dBm)
Modulation	Channel		
GFSK	0	6,07	**3.1**
	19	6,13	2.2
	39	5,97	1.3

Table 8： Conducted Power Of BT

7.2 SAR test results

7.2.1 Stand-alone SAR test evaluation

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition is satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

Freq. Band	Frequency (GHz)	Position	Tune Up		Test Separation (mm)	Calculate Value	Exclusion Threshold	Exclusion (Y/N)
			dBm	mW				
Wi-Fi	2.450	Body	16.8	47.9	0	15.0	3.0	N
		Limbs	16.8	47.9	0	15.0	7.5	N
Bluetooth	2.450	Body	6.1	4.1	0	1.3	3.0	Y
		Limbs	6.1	4.1	0	1.3	7.5	Y

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
• f(GHz) is the RF channel transmit frequency in GHz
• Power and distance are rounded to the nearest mW and mm before calculation
• The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

7.2.2 Results overview of 2.4 GHz Wi-Fi

Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp.
Body Test data (Separate 0mm)											
Front	802.11b	1/2437	100%	1.0	0*	--	15.49	16.8	1.35	0	22.6
Back	802.11b	1/2437	100%	1.0	0*	--	15.49	16.8	1.35	0	22.6
Left	802.11b	1/2437	100%	1.0	0*	--	15.49	16.8	1.35	0	22.6
Right	802.11b	1/2437	100%	1.0	0.000112	0.19	15.49	16.8	1.35	0.000151	22.6
Top	802.11b	1/2437	100%	1.0	**0.000839**	0.05	15.49	16.8	1.35	**0.001134**	22.6
Top*	802.11b	1/2437	100%	1.0	0.000006	-0.18	15.49	16.8	1.35	0.000008	22.6
Top**	802.11b	1/2437	100%	1.0	0.000114	0.13	15.49	16.8	1.35	0.000154	22.6
Front, Back and Left side: Measurement aborted after Area Scan - Measured SAR 0W/kg - no maxima found											
Top* MMS Inspection DFT / Top** MMS Inspection SPG											

Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 10-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp.
Limbs Test data (Separate 0mm)											
Front	802.11b	1/2437	100%	1.0	0*	--	15.49	16.8	1.35	0	22.6
Back	802.11b	1/2437	100%	1.0	0*	--	15.49	16.8	1.35	0	22.6
Left	802.11b	1/2437	100%	1.0	0*	--	15.49	16.8	1.35	0	22.6
Right	802.11b	1/2437	100%	1.0	0.0000146	0.19	15.49	16.8	1.35	0.0000197	22.6
Top	802.11b	1/2437	100%	1.0	**0.0002270**	0.05	15.49	16.8	1.35	**0.0003069**	22.6
Top*	802.11b	1/2437	100%	1.0	0.0000008	-0.18	15.49	16.8	1.35	0.0000011	22.6
Top**	802.11b	1/2437	100%	1.0	0.0000339	0.13	15.49	16.8	1.35	0.0000458	22.6
Front, Back and Left side: Measurement aborted after Area Scan - Measured SAR 0W/kg - no maxima found											
Top* MMS Inspection DFT / Top** MMS Inspection SPG											

Table 9： SAR of 2.4GHz for Head, Body and Limbs.
Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B
2) Per FCC KDB Publication 447498 D01, 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).

7.2.3 Simultaneous Transmission SAR Analysis

When the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR to peak location separation ratio (SPLSR). The simultaneously transmitting antennas in each operating mode and exposure condition combination must be considered one pair at a time to determine the SAR to peak location separation ratio to qualify for test exclusion. The ratio is determined by $(SAR_1 + SAR_2)^{1.5}/Ri$, rounded to two decimal digits, and must be $\leqslant 0.04$ for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion. When 10-g SAR applies, the ratio must be $\leqslant 0.10$. SAR_1 and SAR_2 are the highest *reported* or estimated SAR values for each antenna in the pair, and R_i is the separation distance in mm between the peak SAR locations for the antenna pair. The antennas in all antenna pairs that do not qualify for simultaneous transmission SAR test exclusion must be tested for SAR compliance, according to the enlarged zoom scan and volume scan post-processing procedures in KDB Publication 865664 D01.

7.2.3.1 Simultaneous Transmission condition

NO.	Simultaneous Transmission Configuration	Body	Limbs
1	BT+ 2.4 GHz Wi-Fi SISO	No	No

Note:
1) Wi-Fi 2.4G and Bluetooth share the same TX antenna and can’t transmit simultaneously.

8 Test equipment and ancillaries used for tests

To simplify the identification of the test equipment and/or ancillaries which were used, the reporting of the relevant test cases only refer to the test item number as specified in the table below.

Equipment	Type	Manufacturer	Serial No.	Last Calibration	Frequency (months)
Dosimetric E-Field Probe	EX3DV4	Schmid & Partner Engineering AG	3739	2018.6.15	12
2450 MHz System Validation Dipole	D2450V2	Schmid & Partner Engineering AG	993	2017.3.23	36
5 GHz System Validation Dipole	D5GHzV2	Schmid & Partner Engineering AG	1193	2017.3.23	36
Data acquisition electronics	DAE4	Schmid & Partner Engineering AG	1233	2019.4.12	24
Software	DASY52 52.8.8	Schmid & Partner Engineering AG	---	N/A	--
Flat Phantom	QD OVA 002 Ax	Schmid & Partner Engineering AG	1125	N/A	--
SAM Twin Phantom V5.0	QD 000 P40 CD	Schmid & Partner Engineering AG	1639	N/A	--
Vector Reflectometer	DAKS_VNA R40	Schmid & Partner Engineering AG	0150616	2018.8.23	24
Dielectric Probe Kit	DAKS-3.5	Schmid & Partner Engineering AG	1081	2018.8.23	24
Signal Generator	SMR 20	Rohde & Schwarz	832033/011	2017.5.18	36
Amplifier	TLV204400 61-2	Telemeter Electronic	14061801A	N/A	--
Power Meter	NRVD	Rohde & Schwarz	101700	2019.5.21	12
Power Meter Sensor	NRV-Z4	Rohde & Schwarz	100399	2019.5.21	12
Power Meter Sensor	NRV-Z1	Rohde & Schwarz	829894/001	2019.5.22	24
Directional Coupler	1851	KRYTAR	109891	N/A	--

)*: DAK's probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

9 Observations

No observations exceeding those reported with the single test cases have been made.

10 Calibration parameters

Please see Annex C

11 Photo documentation

Please see Annex D

Annex A: System performance check

Annex B: DASY5 measurement results

Annex C: Calibration parameters

Annex D: Photo documentation

Glossary

DTS	-	Distributed Transmission System
DUT	-	Device under Test
EUT	-	Equipment under Test
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
N/A	-	not applicable
SAR	-	Specific Absorption Rate
S/N	-	Serial Number
SW	-	Software
UNII	-	Unlicensed National Information Infrastructure

End of the report