\Prüfbericht-Nr.: *Test report no.:*	**ULR-TC568820300000040F**	**Auftrags-Nr.:** *Order no.:*	**166203252 0030**	Seite 1 von 44 *Page 1 of 44*
Kunden-Referenz-Nr.: *Client reference no.:*	NA	**Auftragsdatum:** *Order date:*	2019-11-26	
Auftraggeber: *Client:*	Mistral Solutions Private Limited 60 Adarsh Regent, 100 feet ring road Domlur Extension, Bangalore-560071,India			
Prüfgegenstand: *Test item:*	SD820 Nano SOM with 2x2 802.11 a/b/g/n/ac WIFI+ Bluetooth Module			
Bezeichnung / Serien -Nr.: *Identification / Serial no.:*	SD820 Nano SOM Rev B			
Auftrags-Inhalt: *Order content:*	Testing & issue of test report and FCC Grant Certificate			
Prüfgrundlage: *Test specification:*	FCC 47 CFR Part 2 subpart 2.1093 RSS-102 Issue 5 IEEE Std 1528-2013 KDB 447498 D01 / KDB 248227 D01			
Wareneingangsdatum: *Date of sample receipt:*	2020-03-10			
Prüfmuster-Nr.: *Test sample no:*	A001073243-001 A001073243-002			
Prüfzeitraum: *Testing period:*	2020-09-01 - 2020-09-02			
Ort der Prüfung: *Place of testing:*	Wireless laboratory, Bangalore			
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (India) Pvt. Ltd. 27/B,2nd Cross, Electronic City Phase I, Bangalore – 560100, India			
Prüfergebnis*: *Test result*:*	Pass			

geprüft von: *tested by:*		**genehmigt von:** *authorized by:*	
Datum: *Date:* 2020-11-30		**Ausstellatum:** *Issue date:* 2020-11-30	
Stellung / *Position:*	**Madhu Karadekere Nagaraju** Senior Engineer	**Stellung** / *Position:*	**Mahammadgouse Kaladagi** Assistant Manager
Sonstiges / *Other:*	**ULR – TC568820300000040F** FCC ID: 2AVEC-QCNFA324 IC ID: 26058-QCNFA324		

Zustand des Prüfgegenstandes bei Anlieferung: **Prüfmuster vollständig und unbeschädigt**
Condition of the test item at delivery: ***Test item complete and undamaged***

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
* *Legend:*	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

TEST SUMMARY

Mode	Band	Body/head	Adjusted SAR Value (1g) W/kg		Limit 1g (W/kg)	Result
			Chain-0	Chain-1		
Wi-Fi IEEE 802.11 (b/g/n)	2.4 GHz	Body	0.701	0.144	1.6	PASS
IEEE 802.15.1 Bluetooth (GFSK, DH1)	2.4 GHz	Body	0.125	N/A	1.6	PASS
Wi-Fi IEEE 802.11 (a/n/ac)	UNII-5GHz	Body	0.867	0.577	1.6	PASS
Simultaneous Transmission Worst-case	UNII-5GHz & BT(EDR)	Body	1.444		1.6	PASS

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR Subpart 2.1093 and ANSI/IEEE C95.1-1999. Testing is performed with measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications

Discipline: Electronics Testing
Group: EMC Test Facility

REVISION HISTORY OF THIS REPORT

Report Number	Version	Description	Issue date
ULR-TC568820300000040F	01	Initial issue of report	07.10.2020
ULR-TC568820300000040F	02	Reviewer comments updated	30.11.2020

Table of Contents

1 GENERAL REMARKS

1.1 Attachments

All the attachments are integral part of this test report

1. TEST SETUP PHOTOS
2. APPENDIX A: PLOTS FOR SAR MEASUREMENT
3. APPENDIX B: PLOTS FOR SYSTEM VERIFICATION
4. APPENDIX C: CALIBRATION CERTIFICATE FOR PROBE AND DIPOLE

2 TEST SITES

2.1 Testing Facilities

TUV Rheinland (India) Private Limited
27/B, 2nd Cross Road,
Electronic City Phase 1,
Bangalore – 560 100.
India

2.2 List of Test and Measurement Instruments

Table 1: Test and measurement instruments used

Equipment	Manufacturer	Model Name	Serial Number	Firmware Versions	Calibration Due Date	Periodicity	Test Facility
System Validation Dipole	Schmid & Partner Engineering AG	D2450V2	902	-	10.02.2021	Yearly	System Performance Check
System Validation Dipole	Schmid & Partner Engineering AG	D5GHzV2	1110	-	11.10.2020	Yearly	
Power Sensor	Agilent	E4412A	MY50360055	-	01.08.2021	Yearly	
Power Meter	Agilent	N1913A	MY50000459	A1.01.15	01.08.2021	Yearly	
USB Peak Power Sensor	AIMIL Ltd	55006	10231	3.0.12.0	09.01.2021	Yearly	
RF and microwave Signal Generator	Rohde & Schwarz	SMB100A	108788	3.01.203.32	30.12.2020	Yearly	
Isotropic E-Field	Schmid & Partner Engineering AG	EX3DV4	7374	-	28.10.2020	Yearly	SAR Measurement
Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE4	640	-	11.10.2020	Yearly	
SAR Chamber	Lindgren RF Enclosures	-	-	-	-	-	
DAK-3.5	Schmid & Partner Engineering AG	SMDAK 040 CA	1100	-	13.02.2021	Yearly	Liquid Validation
Network Analyzer	Rohde & Schwarz	ZVL-6	102433	3.32	15.02.2021	Yearly	

Table 2: Instrument application Software versions

Sl. No	Test Type	Application software	Version
1	SAR Measurement	cDSY6	6.10

3 GENERAL PRODUCT INFORMATION

3.1 Product Function and Intended Use

The 820 Nano SOM from Mistral is an easy to use, ultra-compact, light-weight System on Module providing very high processing power. The SOM is based on Qualcomm Snapdragon 820 and is ideal for advanced, next-gen embedded applications. With a PCB size of just 51mm x 26mm, this is one of the smallest Snapdragon based SOMs available in the market currently. Equipped with powerful specifications and features, the 820 Nano SOM is ideal for designs requiring 4K Ultra HD HEVC (H.265) video and graphics processing, wireless connectivity, low power consumption and advanced processing power. The feature-rich 820 Nano SOM supports latest features like Type-C functionality, 4K Encode/Decode and integrated 9-axis MEMS on a very small footprint, making it ideal for several powerful applications. The 820 Nano SOM is ideal for designing products like wearable computers, camera solutions, media gateways, Infotainment, drones, assistive devices and other smart gadgets requiring small package and high processing power.

3.2 Ratings and System Details of Equipment under Test

Table 3: Ratings and System Details as declared by client*

Radio Protocol	Wi-Fi 2.4GHz	Bluetooth-EDR & LE	WI-FI-5GHz
Operating Frequency Range	2412MHz to 2462MHz	2402MHz to 2480MHz	UNII-1, UNII-2a, UNII-2c & UNII-3
No. of Channels	11 (Refer Table 5)	79 (Refer Table 6) & 40 (Refer Table 7)	17 (Refer Table 8)
Channel Spacing	5MHz	1 & 2MHz	5MHz
Maximum Measured Power (e.i.r.p)	21.75 dBm (1Mbps 2437MHz)	11.79 dBm(1Mbps 2440MHz) & 4.55 dBm(1Mbps 2480MHz)	802.11b: CCK, DQPSK, DBPSK 802.11a/g: 64QAM,16QAM, QPSK, BPSK 802.11n: 64QAM,16QAM, QPSK, BPSK 802.11ac: 256QAM,64QAM,16QAM, QPSK, BPSK
Modulation	802.11b: CCK, DQPSK, DBPSK 802.11a/g: 64QAM,16QAM, QPSK, BPSK 802.11n: 64QAM,16QAM, QPSK, BPSK VHT20 & VHT40	FHSS, GFSK & 8DPSK	802.11b: CCK, DQPSK, DBPSK 802.11a/g: 64QAM,16QAM, QPSK, BPSK 802.11n: 64QAM,16QAM, QPSK, BPSK 802.11ac: 256QAM,64QAM,16QAM, QPSK, BPSK
Number of antennas	2	1	2
Antenna Gain	Peak gain(2.0dBi) Average gain(-0.5dBi)		Peak gain(3.0dBi) Average gain(-2.5dBi)
Antenna Type & Part No	SMD Type, SR42W001		
Supply Voltage to Product	4.2 V DC Supply		
Environmental conditions	0°C to +70°C Relative Humidity <95%		
EUT Dimension	51 x 26 x 1.63 mm (LxWxH)		

***Disclaimer:**
The information/data is supplied by the clinet and the same is considered to arrive at the final value.
Any changes made apart from the specified specification, can directly impact on the tests results. Refer the products user manual for more details.

3.3 Measurement Uncertainty:

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$

Table 4: Measurement Uncertainty

Worst-Case uncertainty budget for DASY6 assessed according to IEEE 1528, IEC 62209-1 & IEC 62209-2. The budget is valid for the frequency range 300MHz - 6GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerably smaller.

Error Description	Uncert. Value	Prob. Dist.	Div.	(ci) 1g	(ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)
Measurement System							
Probe Calibration	6.30%	N	2	1	1	3.2%	3.2%
Axial Isotropy	4.70%	R	SQRT(3)	0.7	0.7	1.9%	1.9%
Hemispherical Isotropy	9.60%	R	SQRT(3)	0.7	0.7	3.9%	3.9%
Boundary Effects	2.00%	R	SQRT(3)	1	1	1.2%	1.2%
Linearity	4.70%	R	SQRT(3)	1	1	2.7%	2.7%
System Detection Limits	1.00%	R	SQRT(3)	1	1	0.6%	0.6%
Modulation Response	2.40%	R	SQRT(3)	1	1	1.4%	1.4%
Readout Electronics	0.30%	N	1	1	1	0.3%	0.3%
Response Time	0.80%	R	SQRT(3)	1	1	0.5%	0.5%
Integration Time	2.60%	R	SQRT(3)	1	1	1.5%	1.5%
RF Ambient Noise	3.00%	R	SQRT(3)	1	1	1.7%	1.7%
RF Ambient Reflections	3.00%	R	SQRT(3)	1	1	1.7%	1.7%
Probe Positioner mechanical tolerance	0.04%	R	SQRT(3)	1	1	0.0%	0.0%
Probe Positioning with respect to phantom shell	0.80%	R	SQRT(3)	1	1	0.5%	0.5%
Max. SAR Eval.	4.00%	R	SQRT(3)	1	1	2.3%	2.3%
Test Sample Related							
Device Positioning	2.90%	N	1	1	1	2.9%	2.9%
Device Holder	3.60%	N	1	1	1	3.6%	3.6%
Power Drift	5.00%	R	SQRT(3)	1	1	2.9%	2.9%
Power Scaling	0%	R	SQRT(3)	1	1	0.0%	0.0%
Phantom and Setup							
Phantom Uncertainty	7.60%	R	SQRT(3)	1	1	4.4%	4.4%
SAR correction	1.90%	N	1	1	0.84	1.9%	1.6%
Liquid Conductivity (mea.)DAK	2.50%	N	1	0.78	0.71	2.0%	1.8%
Liquid Permittivity (mea.) DAK	2.50%	N	1	0.23	0.26	0.6%	0.7%
Temp. unc. - Conductivity	3.40%	R	SQRT(3)	0.78	0.71	1.5%	1.4%
Temp. unc. - Permittivity	0.40%	R	SQRT(3)	0.23	0.26	0.1%	0.1%
Combined Std. Uncertainty						10.6%	10.5%
Expanded STD Uncertainty						**21.2%**	**21.0%**

Note: The listed uncertainties are the worst case uncertainties for the entire range of measurements and are for the reporting purpose only and are not used in determining the PASS/FAIL of the results.

4 TEST SET-UP AND OPERATION MODE

4.1 Principle of Configuration Selection

Transmission enabled with highest possible duty cycle transmission on low, mid and high channel.

4.2 Test Operation and Test Software

Hardware Version:	RevB
Hardware Version Identification Number(s) (HVIN):	QCNFA324
Software Version:	Andr_oreo_8.0
Firmware Version Identification Number(s) (FVIN):	eeprom_ar6320_3p0_NFA324i_5.bin

4.3 Special Accessories and Auxiliary Equipment

- Test laptop and USB cable.

4.4 Body / Head SAR applicability

- Head SAR is not applicable to this product considering the use case only Body SAR is performed

4.5 Countermeasures to achieve EMC Compliance

- None

4.6 List of Frequencies and Frequency bands

Frequency Band (MHz)	Channel No.	Channel Frequency (MHz)
2412 – 2462	1	**2412**
	2	2417
	3	2422
	4	2427
	5	2432
	6	**2437**
	7	2442
	8	2447
	9	2452
	10	2457
	11	**2462**

Table 5: List of Wi-Fi 2.4GHz center Frequencies

Channel used for Wi-Fi testing

Channel Bandwidth 20MHz

Channel low : 2412MHz

Channel mid : 2437MHz

Channel high : 2462MHz

Channel Bandwidth 40MHz

Channel low : 2422MHz

Channel mid : 2437MHz

Channel high : 2452MHz

Frequency Band (GHz)	Channel No.	Frequency (MHz)
BLE (2.4-2.4835)	**0**	**2402**
	1	2404
	2	2406
	3	2408
	:	:
	:	:
	18	2438
	19	**2440**
	20	2437
	:	:
	:	:
	36	2474
	37	2476
	38	2478
	39	**2480**

Table 6: List of BLE Center frequencies

Channel used for BLE testing

Channel low : 2402MHz

Channel mid : 2440MHz

Channel High : 2480MHz

Frequency Band (MHz)	Channel No.	Channel Frequency (MHz)
2400 – 2483.5 BT(BDR+EDR)	**0**	**2402**
	1	2403
	2	2404
	3	2405
	:	:
	:	:
	:	:
	37	2439
	38	**2440**
	39	2441
	40	2442
	:	:
	:	:
	:	:
	74	2476
	75	2477
	:	:
	:	:
	78	**2480**

Table 7: List of Bluetooth(BDR+EDR) center Frequencies

Channel used for Bluetooth testing

Channel low : 2402MHz

Channel mid : 2440MHz

Channel high : 2480MHz

Frequency Band (MHz)	Channel No.	Channel Frequency (MHz)
UNII 1 (5180 – 5250)	**36**	**5180**
	38	**5190**
	40	5200
	42	**5210**
	44	5220
	46	**5230**
	48	**5240**
UNII 2A (5250-5350)	**52**	**5260**
	54	**5270**
	56	5280
	58	**5290**
	60	5300
	62	**5310**
	64	**5320**

UNII 2C (5470-5725)	**100**	**5500**
	104	5520
	108	5540
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	**5700**
	144	5720
UNII-3 (5725MHz-5850MHz)	149	**5745**
	151	**5755**
	153	**5765**
	155	**5775**
	157	**5785**
	159	**5795**
	161	**5805**
	165	**5825**

Table 8: List of Wi-Fi 5GHz center Frequencies

4.7 TUV Sample Identification number

TUV Sample Identification number : A001073243-002 -Radiated & SAR test Sample
A001073243-001 – Conducted test Sample

4.8 Report references

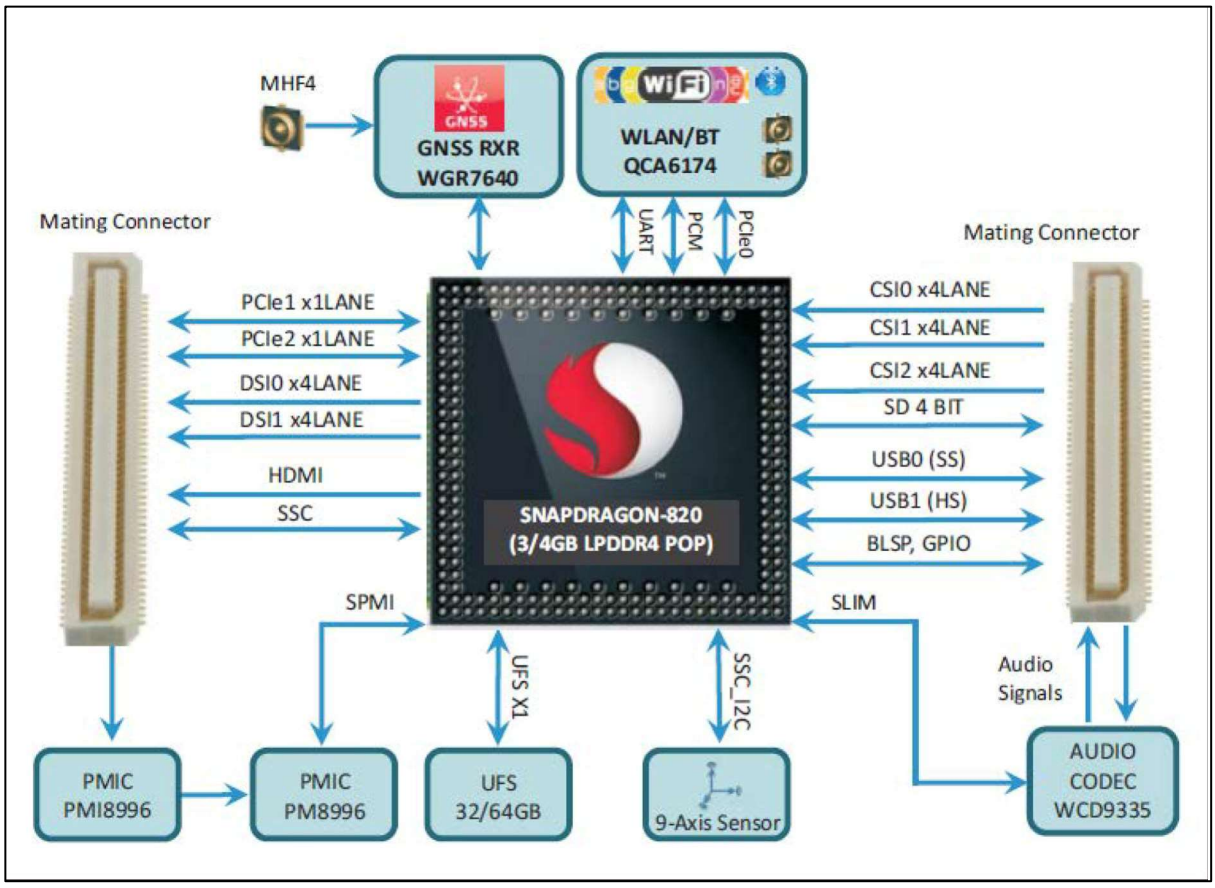
Note: Product SD820 Nano SOM- Wifi Module has multiple protocols. All the supported wireless protocols and their respective test results are issued in saparate test reports, following table lists the report numbers.

Radio Protocol	Report Number
RF test report for Wi-Fi (2.4GHz) & BLE (2.4GHz)	ULR-TC568820300000037F
RF test report for BT (2.4GHz)	ULR-TC568820300000038F
RF test report for Wi-Fi (5GHz)	ULR-TC568820300000039F
SAR test report for Wi-Fi (2.4 & 5GHz) & BT (2.4GHz) – (This report)	**ULR-TC568820300000040F**

5 Operational Description of the product

Based on a complete “System on Module” architecture, the 820 Nano SOM consists of ® ™ the 64-bit quad-core Qualcomm Kryo CPU, 2.2GHz capable of 4K Encode/Decode, 3/4GB LPDDR4, 32/64GB UFS and with major interfaces available via inter-board connectors. Application Development on the 820 Nano SOM is enabled with Android and Embedded Linux through a feature-rich carrier board that enables prototyping in record time. Optional Adaptor boards like LCD, Camera, Sensors and Battery Charger are also available for increased scope of development around the 820 Nano SOM.

6 Block Diagram of the product



7 TEST METHODOLOGY

The Specific Absorption Rate (SAR) measurement specifications, methods, and procedures for this device are in accordance with the following standards:

- IEEE 1528-2013 – IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
- FCC KDB 447498 D01 – General RF Exposure Guidance v06
- FCC KDB 248227 D01 – 802.11 Wi-Fi SAR v02r02
- FCC KDB 865664 D01 – SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 – RF Exposure Reporting v01r02

8 Statement of Compliance

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR Subpart 2.1093 and ANSI/IEEE C95.1-1999. Testing is performed with measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications

9 RF Exposure Limits

9.1 Uncontrolled Environment

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

9.2 Controlled Environment

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

Guideline /Standard	**Limits for Occupational/ Controlled Exposure**		**Limits for General Population/ Uncontrolled Exposure**	
	Head, trunk, arms, legs (W/kg)	**Hands, wrists, feet and ankles (W/kg)**	**Head, trunk, arms, legs (W/kg)**	**Hands, wrists, feet and ankles (W/kg)**
ANSI/IEEE C95.1-1999	8 (1g)	20 (10g)	1.6 (1g)	4 (10g)

10 SAR Measurement System

10.1 Definition of Specific Absorption Rate (SAR)

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 modelling. 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.

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

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

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

SAR measurement can be related to the electrical field in the tissue by

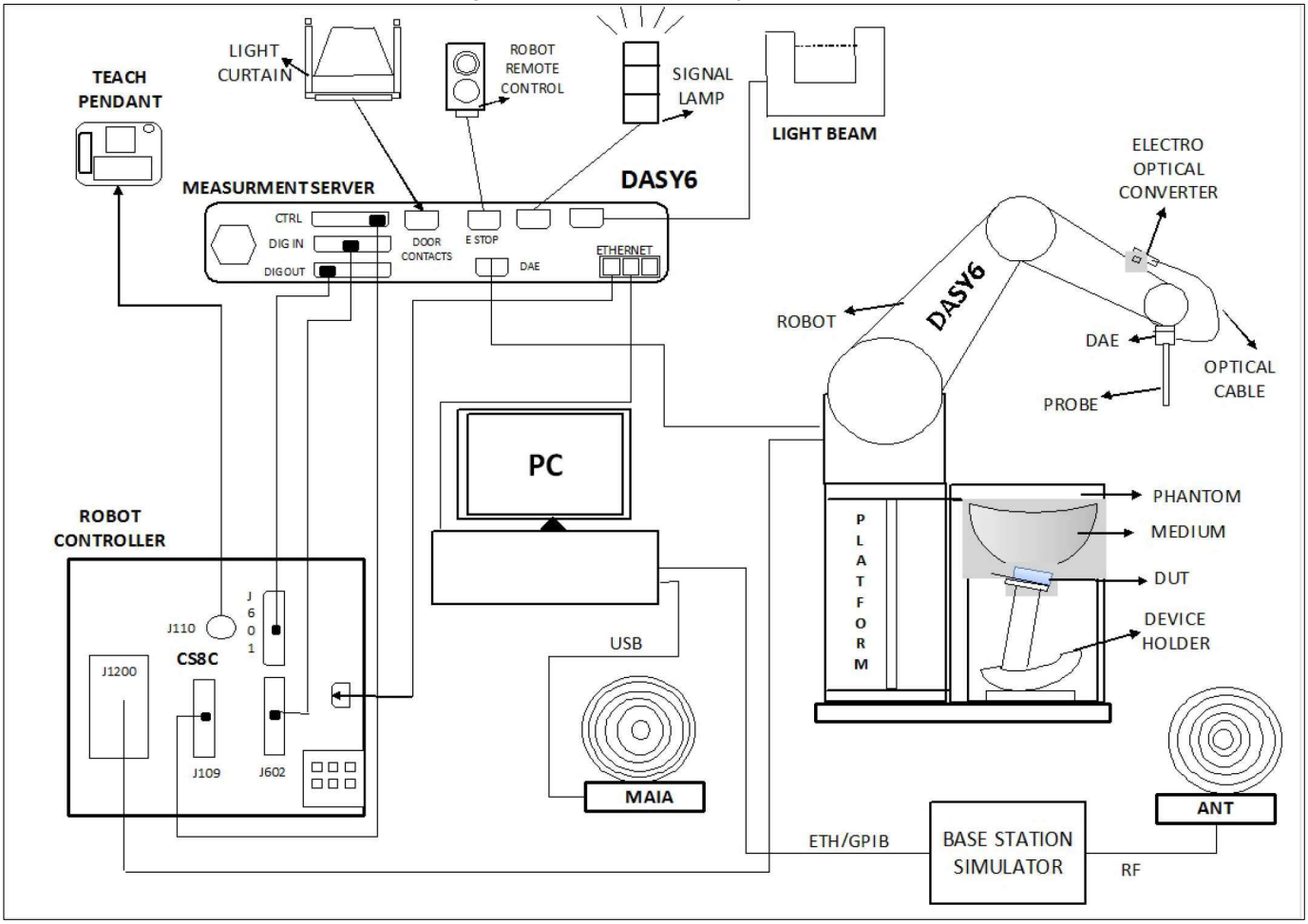
$$SAR = \frac{\sigma |E|^2}{\rho}$$

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

10.2 SPEAG DASY System

DASY system consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY6 software defined. The DASY software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.

Figure 1: SPEAG DASY6 System



Robot

The DASY system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY6: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

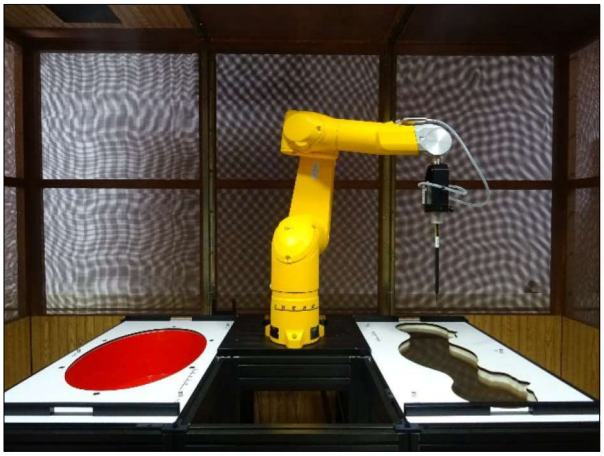
· High precision (repeatability ±0.02 mm)

· High reliability (industrial design)

· Jerk-free straight movements(brushless synchron motors, no stepper motors)

· Low ELF interference (motor control fields are shielded by the closed metallic construction)

Figure 2: SPEAG DASY6 Robot



Probes

The SAR measurement is conducted with the dosimetric probe. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

Figure 3: EX3DV4 Probe

Model	EX3DV4
Construction	Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
Frequency	4 MHz – 10 GHz Linearity: ±0.2 dB (30 MHz – 10 GHz)
Directivity	±0.1 dB in TSL (rotation around probe axis) ±0.3 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g – >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

Data Acquisition Electronics (DAE)

Figure 4: DAE4

Model	DAE4
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY 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 fA
Dimensions	60 x 60 x 68 mm

Phantoms

Figure 5: Twin SAM Phantom

Model	Twin SAM
Construction	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.
Material	Vinylester, glass fiber reinforced (VE-GF)
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 liters

Figure 6: ELI Phantom

Model	ELI
Construction	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.
Material	Vinylester, glass fiber reinforced (VE-GF)
Shell Thickness	2.0 ± 0.2 mm (bottom plate)
Dimensions	Major axis: 600 mm Minor axis: 400 mm
Filling Volume	approx. 30 liters

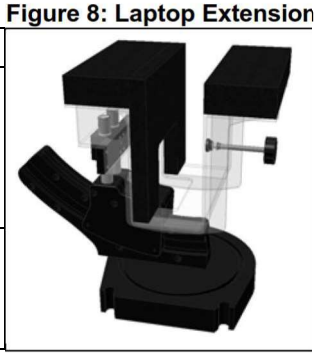
Device Holder

Figure 7: Mounting Device

Model	Mounting Device
Construction	In combination with the Twin SAM Phantom or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).
Material	POM

Figure 8: Laptop Extension

Model	Laptop Extensions Kit
Construction	Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.). It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner.
Material	POM, Acrylic glass, Foam



System Validation Dipoles

Figure 9: D-Serial Dipole

Model	D-Serial
Construction	Symmetrical dipole with λ/4 balun. Enables measurement of feed point impedance with NWA. Matched for use near flat phantoms filled with tissue simulating solutions.
Frequency	750 MHz to 5800 MHz
Return Loss	> 20 dB
Power Capability	> 100 W (f < 1GHz), > 40 W (f > 1GHz)