TEST REPORT

Report No. .... :	**CHTEW18120433** Report virificaiton:
Project No. .... :	**SQ201811044402EW**
FCC ID .... :	**2ALAVU800B**
Applicant's name .... :	**Haier International Business Corporation Limited**
Address...:	Room 1602, 16th Floor, Tower A, No. 1 Ke Yuan Wei Yi Road, Lao Shan District, Qingdao, Shandong, China
Manufacturer.....................................:	Haier International Business Corporation Limited
Address..:	Room 1602, 16th Floor, Tower A, No. 1 Ke Yuan Wei Yi Road, Lao Shan District, Qingdao, Shandong, China
Test item description .... :	**Tablet PC**
Trade Mark ....:	Ceibal
Model/Type reference.......................:	U800B
Listed Model(s) ....:	-
Standard .... :	**FCC 47 CFR Part2.1093** **IEEE Std C95.1, 1999 Edition** **IEEE 1528: 2013**
Date of receipt of test sample……....:	Dec. 04, 2018
Date of testing………………………..:	Dec. 06, 2018- Dec. 20, 2018
Date of issue………………………....:	Dec. 25, 2018
Result.................. ……………………..:	**PASS**

Compiled by (position+printedname+signature)...:	File administrators:Xiaodong Zhao	Xiaodong Zhao
Supervised by (position+printedname+signature)...:	Test Engineer: Xiaodong Zhao	Xiaodong Zhao
Approved by (position+printedname+signature)...:	Manager: Hans Hu	Hans Hu

Testing Laboratory Name .... :	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address...:	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

The test report merely correspond to the test sample.

Contents

1. Test Standards and Report version

1.1. Test Standards

The tests were performed according to following standards:

FCC 47 Part 2.1093: Radiofrequency Radiation Exposure Evaluation:Portable Devices
IEEE Std C95.1, 1999 Edition: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
IEEE Std 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.
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
KDB 447498 D01 General RF Exposure Guidance v06: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
KDB 248227 D01 802 11 Wi-Fi SAR v02r02: SAR Measurement Proceduresfor802.11 a/b/g Transmitters
KDB 616217 D04 SAR for laptop and tablets v01r02: SAR Evaluation Requirements for Laptop, Notebook, Netbook and Tablet Computers

1.2. Report version

Revision No.	Date of issue	Description
N/A	2018-12-25	Original

2. Summary

2.1. Client Information

Applicant:	Haier International Business Corporation Limited
Address:	Room 1602, 16th Floor, Tower A, No. 1 Ke Yuan Wei Yi Road, Lao Shan District, Qingdao, Shandong, China
Manufacturer:	Haier International Business Corporation Limited
Address:	Room 1602, 16th Floor, Tower A, No. 1 Ke Yuan Wei Yi Road, Lao Shan District, Qingdao, Shandong, China

2.2. Product Description

Name of EUT:	Tablet PC
Trade Mark:	Ceibal
Model No.:	U800B
Listed Model(s):	-
Power supply:	DC 3.7V
Device Category:	Portable
Product stage:	Production unit
RF Exposure Environment:	General Population / Uncontrolled
Hardware version:	EM_T8880A_V6.0 M3/U800_8160_V1.2
Software version:	Ceibal.PadU800B.GM20181122.SV1.0
Device Dimension:	Overall (Length x Width x Thickness):209 x 120 x 9mm
Maximum SAR Value	
Separation Distance:	Body: 0mm
Max Report SAR Value (1g):	Body: 1.176 W/kg
WIFI 2.4G	
Supported type:	802.11b/802.11g/802.11n(HT20)/802.11n(HT40)
Modulation:	DSSS for 802.11b OFDM for 802.11g/802.11n(HT20)/802.11n(HT40)
Operation frequency:	2412MHz~2462MHz for 802.11b/802.11g/802.11n(HT20) 2422MHz~2452MHz for 802.11n(HT40)
Channel number:	11 for 802.11b/802.11g/802.11n(HT20) 7 for 802.11n(HT40)
Channel separation:	5MHz
Antenna type:	FTP

WIFI 5G	
Supported type:	802.11a/802.11n(HT20)/802.11n(HT40)
Modulation:	BPSK, QPSK, 16QAM, 64QAM
Operation frequency:	U-NII-1:5150MHz~5250MHz U-NII-2A:5250MHz~5350MHz U-NII-2C:5470MHz~5725MHz U-NII-3: 5725MHz~5850MHz
Supported Bandwidth:	20MHz: 802.11n, 802.11a 40MHz: 802.11n
Antenna type:	FTP
Bluetooth	
Version:	Supported BT4.0+EDR
Modulation:	GFSK, π/4DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	FTP
Bluetooth	
Version:	Supported BT4.0+BLE
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	FTP
Remark: *1. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power*	

3. Test Environment

3.1. Test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., Ltd.
Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

3.2. Test Facility

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 3902.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 762235

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 762235.

IC-Registration No.: 5377B-1

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B-1.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Ambient temperature	18 °C to 25 °C
Ambient humidity	30%RH to 70%RH
Air Pressure	950-1050mbar

4. Equipments Used during the Test

Used	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date (YY-MM-DD)	Due date (YY-MM-DD)
●	Data Acquisition Electronics DAEx	SPEAG	DAE4	1549	2018/04/25	2019/04/24
●	E-field Probe	SPEAG	EX3DV4	7494	2018/02/26	2019/02/25
○	Universal Radio Communication Tester	R&S	CMW500	137681	2018/07/11	2019/07/10
● Tissue-equivalent liquids Validation						
●	Dielectric Assessment Kit	SPEAG	DAK-3.5	1267	2018/03/01	2019/02/28
○	Dielectric Assessment Kit	SPEAG	DAK-12	1130	2018/03/01	2019/02/28
●	Network analyzer	Keysight	E5071C	MY46733048	2018/09/19	2019/09/18
● System Validation						
○	System Validation Antenna	SPEAG	CLA-150	4024	2018/02/21	2021/02/20
○	System Validation Dipole	SPEAG	D450V3	1102	2018/02/23	2021/02/22
○	System Validation Dipole	SPEAG	D750V3	1180	2018/02/07	2021/02/06
○	System Validation Dipole	SPEAG	D835V2	4d238	2018/02/19	2021/02/18
○	System Validation Dipole	SPEAG	D1750V2	1164	2018/02/06	2021/02/05
○	System Validation Dipole	SPEAG	D1900V2	5d226	2018/02/22	2021/02/21
●	System Validation Dipole	SPEAG	D2450V2	1009	2018/02/05	2021/02/04
○	System Validation Dipole	SPEAG	D2600V2	1150	2018/02/05	2021/02/04
●	System Validation Dipole	SPEAG	D5GHzV2	1273	2018/02/21	2021/02/20
●	Signal Generator	R&S	SMB100A	114360	2018/08/21	2019/08/20
●	Power Viewer for Windows	R&S	N/A	N/A	N/A	N/A
●	Power sensor	R&S	NRP18A	101010	2018/08/21	2019/08/20
●	Power sensor	R&S	NRP18A	101011	2018/08/21	2019/08/20
●	Power Amplifier	BONN	BLWA 0160-2M	1811887	2018/11/15	2018/11/14
●	Dual Directional Coupler	Mini-Circuits	ZHDC-10-62-S+	F975001814	2018/11/15	2018/11/14
●	Attenuator	Mini-Circuits	VAT-3W2+	1819	2018/11/15	2018/11/14
●	Attenuator	Mini-Circuits	VAT-10W2+	1741	2018/11/15	2018/11/14

Note:

1. *The DAE ,Probe and Dipole calibration reference to the Appendix B and C.*
2. *Referring to KDB865664 D01, the dipole calibration interval can be extended to 3 years with justifcatio. The dipole are also not physically damaged or repaired during the interval.*

5. Measurement Uncertainty

Per KDB 865664 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 expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met,extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

6. SAR Measurements System Configuration

6.1. SAR Measurement Set-up

The DASY5 system for performing compliance tests consists of the following items:

A standard high precision 6-axis robot (Stäubli RX 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. The probe is equipped with an optical surface detector system.

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.

A unit to operate the optical surface detector which is connected 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 DASY5 measurement server.

The DASY5 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 2003.

DASY5 software and SEMCAD data evaluation software.

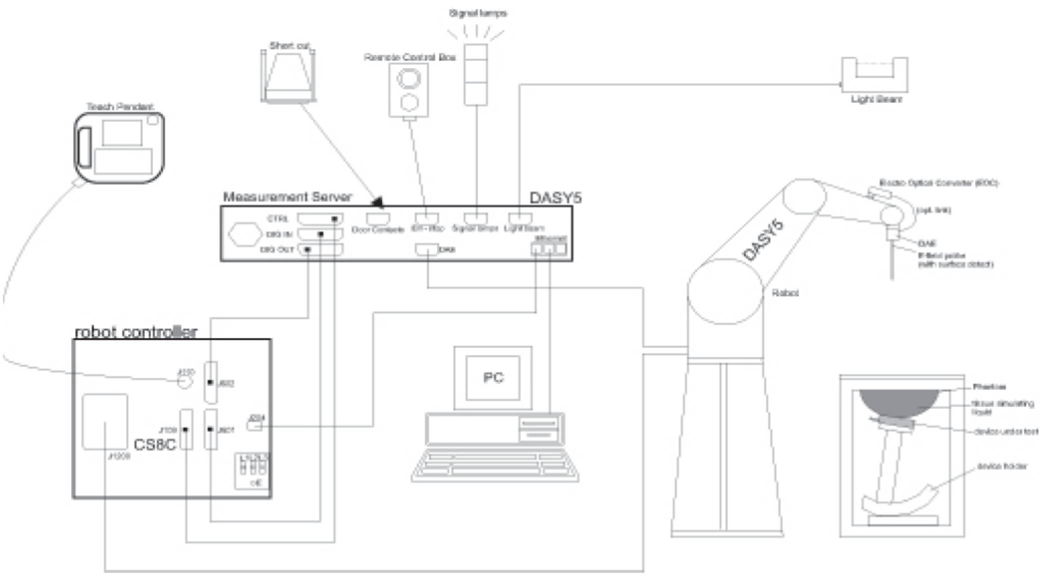
Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.

The generic twin phantom enabling the testing of left-hand and right-hand usage.

The device holder for handheld Mobile Phones.

Tissue simulating liquid mixed according to the given recipes.

System validation dipoles allowing to validate the proper functioning of the system.



6.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

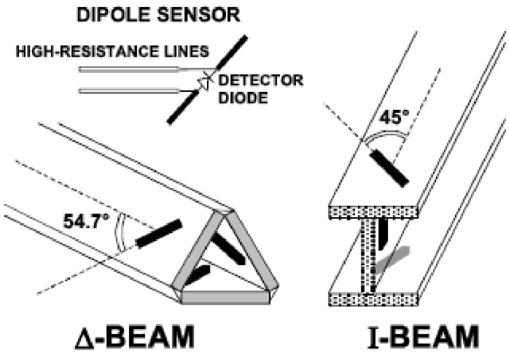
- **Probe Specification**

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	4 MHz to 10 GHz; Linearity: ± 0.2 dB (30 MHz to 10 GHz)
Directivity	± 0.1 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 W/kg; 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) Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 6 GHz Dosimetry in strong gradient fields Compliance tests of Mobile Phones
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

- **Isotropic E-Field Probe**

The isotropic E-Field probe has been fully calibrated and assessed for isotropicity, and boundary effect within a controlled environment. Depending on the frequency for which the probe is calibrated the method utilized for calibration will change.

The E-Field probe utilizes a triangular sensor arrangement as detailed in the diagram below:



6.3. Phantoms

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI isfully compatible with standard and all known tissuesimulating liquids. ELI has been optimized regarding its performance and can beintegrated into our standard phantom tables. A cover prevents evaporation ofthe liquid. Reference markings on the phantom allow installation of thecomplete setup, including all predefined phantom positions and measurementgrids, by teaching three points. The phantom is compatible with all SPEAGdosimetric probes and dipoles.

ELI4 Phantom

6.4. Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the DASY system.
The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

Device holder supplied by SPEAG

7. SAR Test Procedure

7.1. Scanning Procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. 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 “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot.Before starting the area scan a grid spacing of 15 mm x 15 mm is set. During the scan the distance of the probe to the phantom remains unchanged. After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

Zoom Scan

After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm.

Spatial Peak Detection

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses.The DASY5 system allows evaluations that combine measured data and robot positions, such as:

- maximum search
- extrapolation
- boundary correction
- peak search for averaged SAR

During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard’s method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.
Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space.
They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard’s method for extrapolation.

A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

Table 1: Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v04

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 mm ± 1 mm</td><td>½·δ·ln(2) mm ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$ mm</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">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.</td></tr>
</table>

7.2. Data Storage and Evaluation

Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors),s 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". 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], [W/kg], [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

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 DASY5 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:

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

Vi: compensated signal of channel (i = x, y, z)
Ui: input signal of channel (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:

$$\mathrm{E-fieldprobes:} \qquad E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

$$\mathrm{H-fieldprobes:} \qquad H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1}f + a_{i2}f^2}{f}$$

Vi: compensated signal of channel (i = x, y, z)
Normi: sensor sensitivity of channel (i = x, y, z), [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):

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

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

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1'000}$$

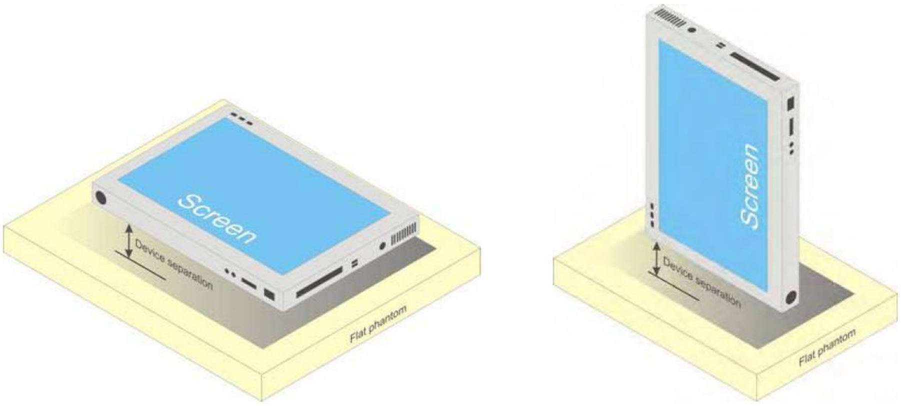
SAR: local specific absorption rate in W/kg
Etot: total field strength in V/m
σ: conductivity in [mho/m] or [Siemens/m]
ρ: equivalent tissue density in g/cm3

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.

8. Position of the wireless device in relation to the phantom

8.1. Body-supported device

Other devices that fall into this category include tablet type portable computers and credit card transaction authorisation terminals, point-of-sale and/or inventory terminals. Where these devices may be torso or limb-supported, the same principles for body-supported devices are applied.



b) Tablet form factor portable computer

9. System Check

9.1. Tissue Dielectric Parameters

The liquid has previously been proven to be suited for worst-case. It's satisfying the latest tissue dielectric parameters requirements proposed by the KDB865664.

Tissue dielectric parameters for head and body phantoms		
Target Frequency	Body	
(MHz)	εr	σ(s/m)
2450	52.7	1.95
5200	49.01	5.30
5300	48.90	5.42
5500	48.61	5.65
5600	48.47	5.77
5800	48.20	6.00

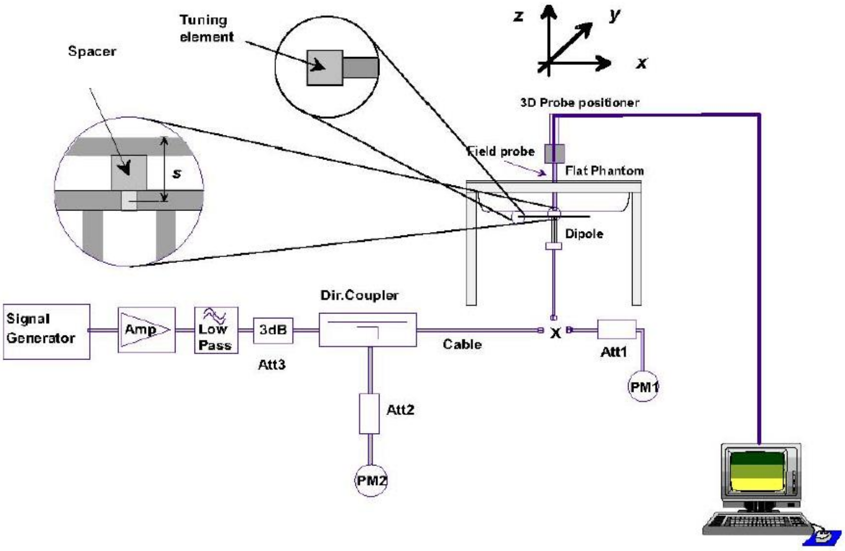
Check Result:

Dielectric performance of Body tissue simulating liquid									
Frequency (MHz)	εr		σ(s/m)		Delta (εr)	Delta (σ)	Limit	Temp (℃)	Date
	Target	Measured	Target	Measured					
2450	52.70	53.03	1.95	2.00	0.63%	2.56%	±5%	22	2018-12-20
5200	49.01	48.15	5.299	5.380	-1.75%	1.53%	±5%	22	2018-12-11
5300	48.90	47.94	5.420	5.515	-1.97%	1.75%	±5%	22	2018-12-11
5500	48.61	47.52	5.650	5.825	-2.25%	3.10%	±5%	22	2018-12-11
5600	48.47	47.35	5.766	5.963	-2.32%	3.42%	±5%	22	2018-12-11
5800	48.20	46.94	6.000	6.270	-2.61%	4.50%	±5%	22	2018-12-11

9.2. SAR System Check

The purpose of the system check is to verify that the system operates within its specifications at the decice test frequency.The system check is simple check of repeatability to make sure that the system works correctly at the time of the compliance test;

System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10%).
System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.



System Performance Check Setup

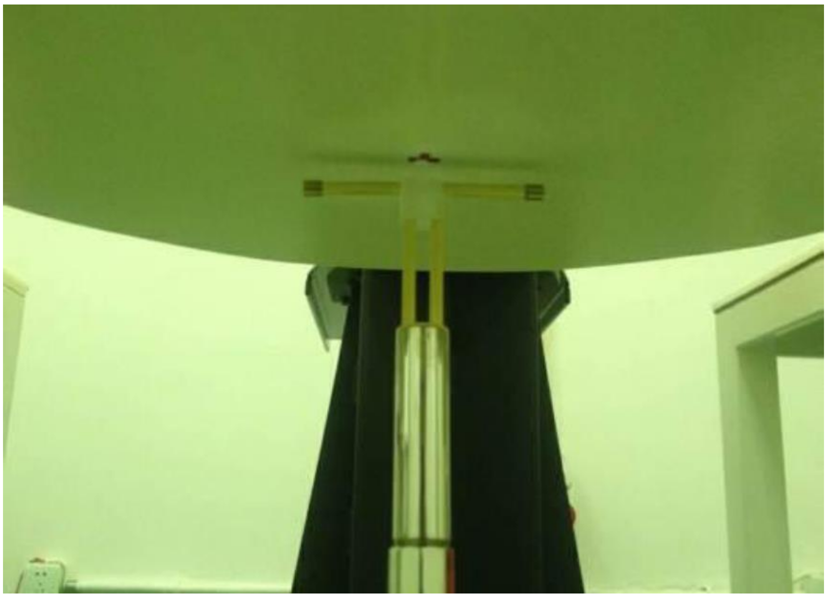


Photo of Dipole Setup

Check Result:

Bdoy											
Frequency (MHz)	1g SAR			10g SAR			Delta (1g)	Delta (10g)	Limit	Temp (℃)	Date
	Target 1W	Normalize to 1W	Measured 250mW	Target 1W	Normalize to 1W	Measured 250mW					
2450	49.40	50.00	12.50	23.30	23.32	5.83	1.21%	0.09%	±10%	22	2018-12-20

Bdoy											
Frequency (MHz)	1g SAR			10g SAR			Delta (1g)	Delta (10g)	Limit	Temp (℃)	Date
	Target 1W	Normalize to 1W	Measured 100mW	Target 1W	Normalize to 1W	Measured 100mW					
5200	73.60	70.70	7.07	20.40	20.00	2.00	-3.94%	-1.96%	±10%	22	2018-12-11
5300	75.60	73.70	7.37	21.10	20.70	2.07	-2.51%	-1.90%	±10%	22	2018-12-11
5500	80.30	75.90	7.59	22.10	21.20	2.12	-5.48%	-4.07%	±10%	22	2018-12-11
5600	79.40	78.00	7.80	22.10	21.60	2.16	-1.76%	-2.26%	±10%	22	2018-12-11
5800	76.50	72.80	7.28	21.10	20.20	2.02	-4.84%	-4.27%	±10%	22	2018-12-11

Plots of System Performance Check

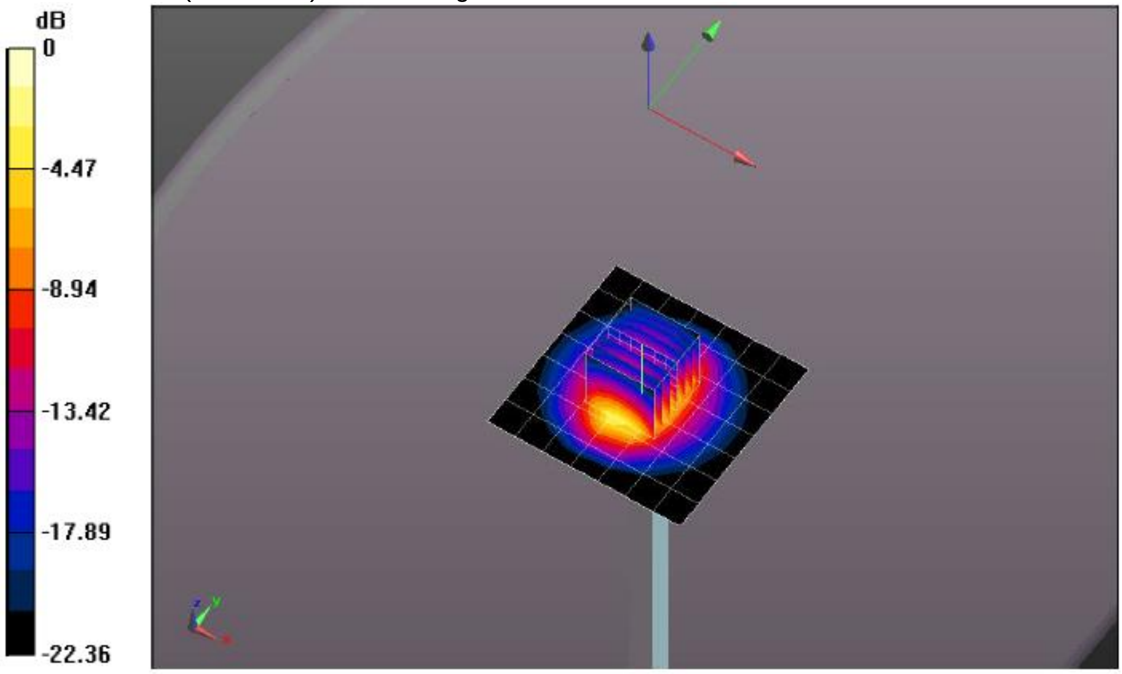
SystemPerformanceCheck-Body 2450MHz

DUT: D2450V2; Type: D2450V2; Serial: 1009
Date:2018-12-20
Communication System: UID 0, CW (0); Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.001 S/m; ε_r = 53.03; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(8.08, 8.08, 8.08); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1549; Calibrated: 4/25/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Body/d=10mm,Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 21.1 W/kg
Body/d=10mm,Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.6 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 25.7 W/kg
SAR(1 g) = 12.5 W/kg; SAR(10 g) = 5.83 W/kg
Maximum value of SAR (measured) = 20.7 W/kg



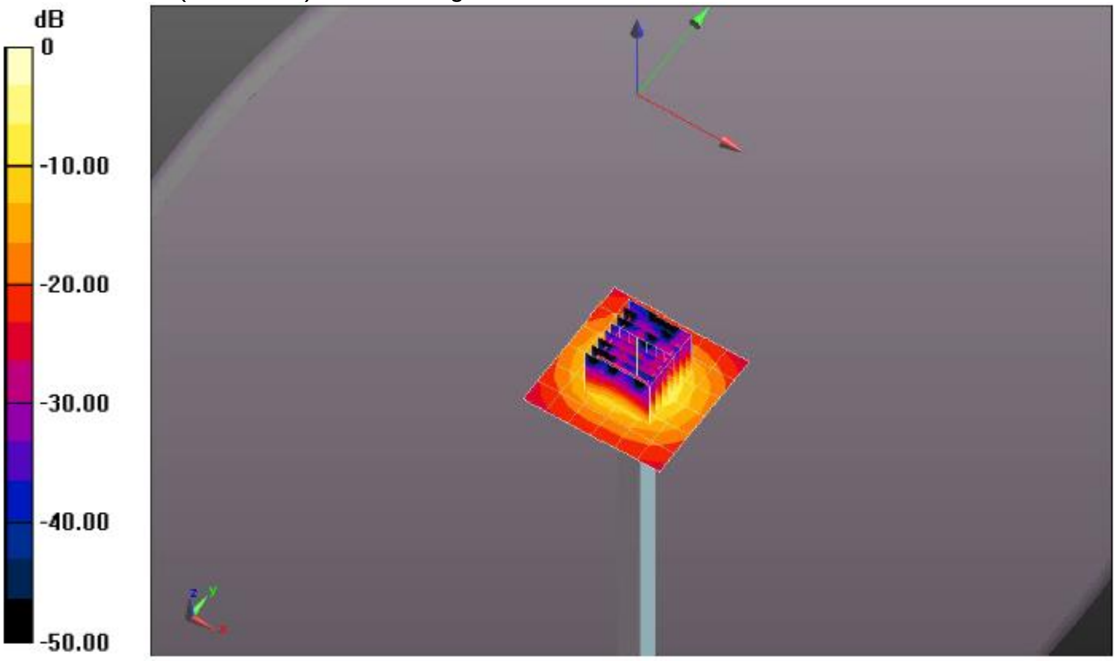
SystemPerformanceCheck-Body 5200MHz

DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date:2018-12-11
Communication System: UID 0, A-CW (0); Frequency: 5200 MHz
Medium parameters used: f = 5200 MHz; σ = 5.381 S/m; ε_r = 48.152; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(5.3, 5.3, 5.3); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0
- Electronics: DAE4 Sn1549; Calibrated: 4/25/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.0(1446); SEMCAD X 14.6.11(7437)

Body/d=10mm,Pin=100mW/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.4 W/kg
Body/d=10mm,Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.23 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 30.3 W/kg
SAR(1 g) = 7.07 W/kg; SAR(10 g) = 2 W/kg
Maximum value of SAR (measured) = 16.6 W/kg



SystemPerformanceCheck-Body 5300MHz

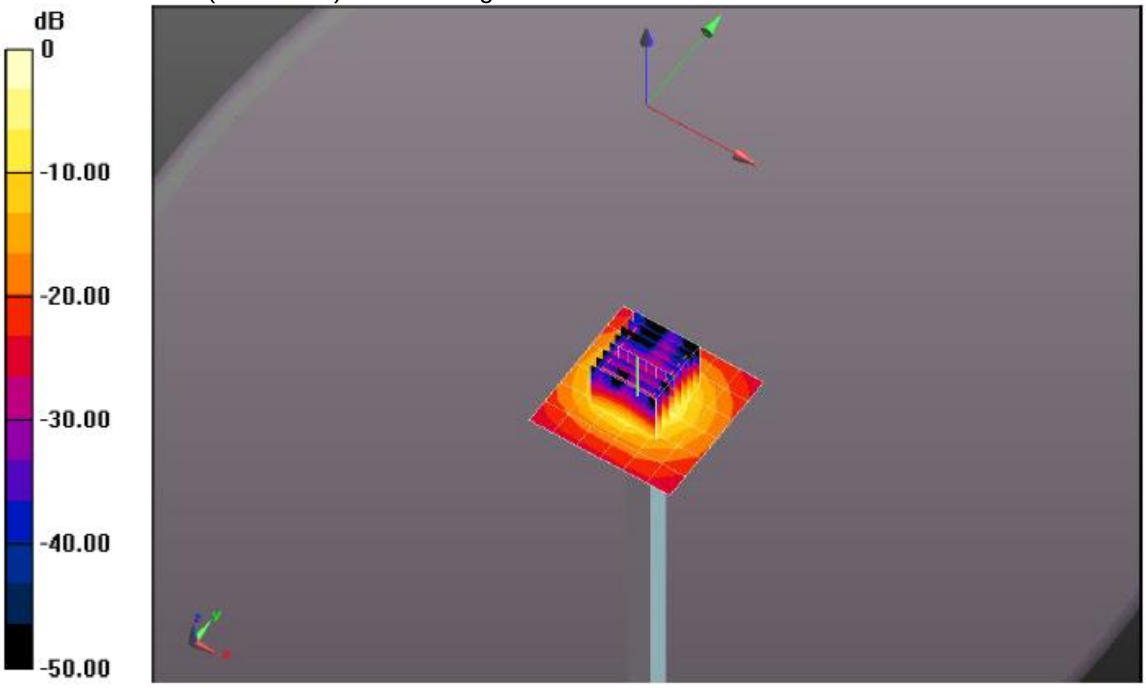
DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date:2018-12-11
Communication System: UID 0, A-CW (0); Frequency: 5300 MHz
Medium parameters used: f = 5300 MHz; σ = 5.515 S/m; ε_r = 47.936; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(4.97, 4.97, 4.97); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0
- Electronics: DAE4 Sn1549; Calibrated: 4/25/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.0(1446); SEMCAD X 14.6.11(7437)

Body/d=10mm,Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.3 W/kg

Body/d=10mm,Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.13 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 31.6 W/kg
SAR(1 g) = 7.37 W/kg; SAR(10 g) = 2.07 W/kg
Maximum value of SAR (measured) = 17.8 W/kg



SystemPerformanceCheck-Body 5500MHz

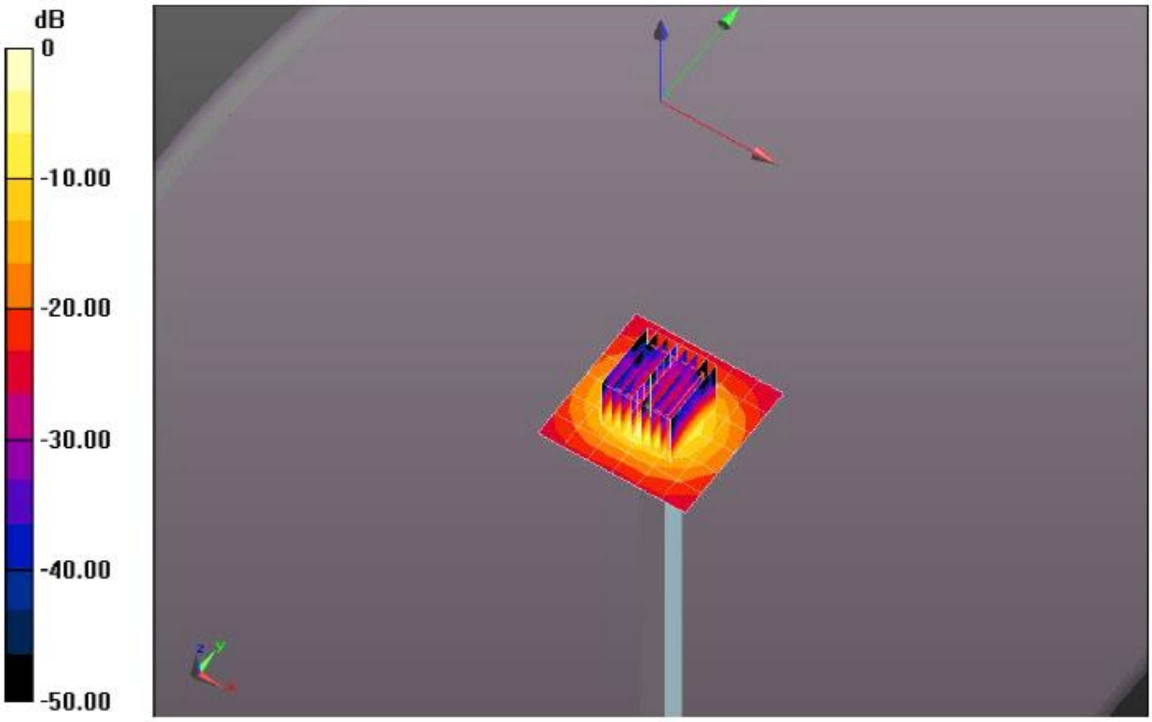
DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date:2018-12-11
Communication System: UID 0, A-CW (0); Frequency: 5500 MHz
Medium parameters used: f = 5500 MHz; σ = 5.825 S/m; ε_r = 47.515; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(4.62, 4.62, 4.62); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0
- Electronics: DAE4 Sn1549; Calibrated: 4/25/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.0(1446); SEMCAD X 14.6.11(7437)

Body/d=10mm,Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 18.1 W/kg

Body/d=10mm,Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.40 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 34.4 W/kg
SAR(1 g) = 7.59 W/kg; SAR(10 g) = 2.12 W/kg
Maximum value of SAR (measured) = 18.6 W/kg



SystemPerformanceCheck-Body 5600MHz

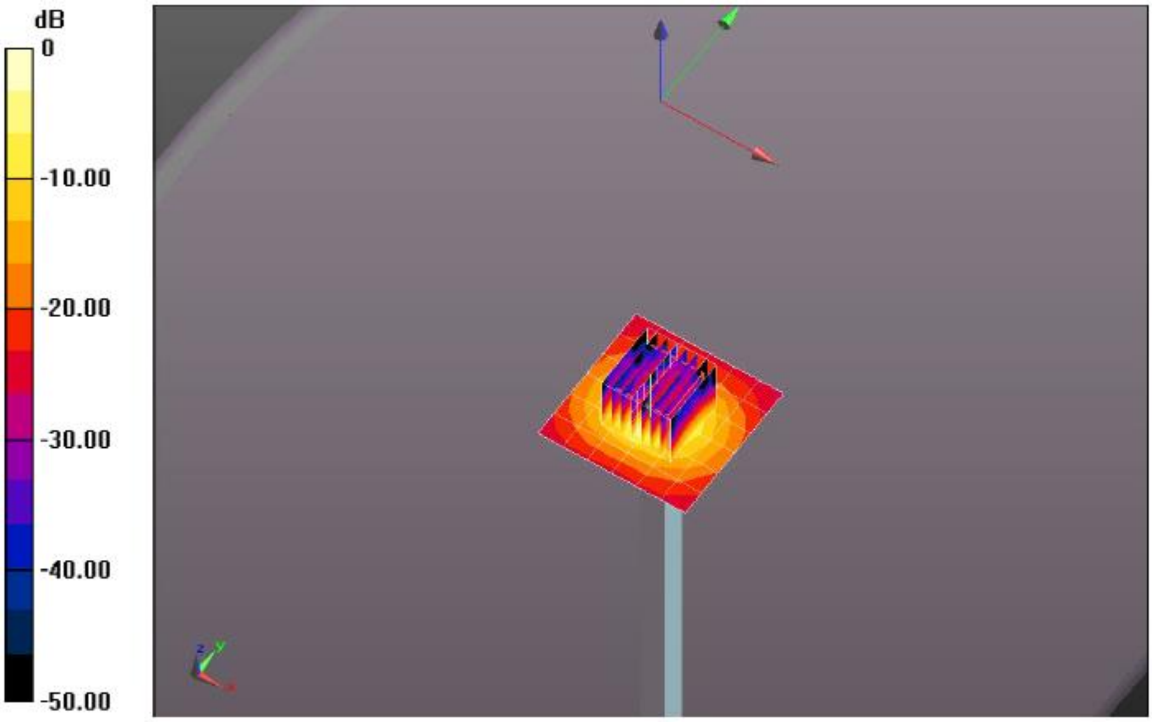
DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date:2018-12-11
Communication System: UID 0, A-CW (0); Frequency: 5600 MHz
Medium parameters used: f = 5600 MHz; σ = 5.963 S/m; ε_r = 47.347; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(4.51, 4.51, 4.51); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 29.0
- Electronics: DAE4 Sn1549; Calibrated: 4/25/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=10mm,Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.4 W/kg

Head/d=10mm,Pin=100mW/Zoom Scan(8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.10 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 36.9 W/kg
SAR(1 g) = 7.8 W/kg; SAR(10 g) = 2.16 W/kg
Maximum value of SAR (measured) = 19.7 W/kg



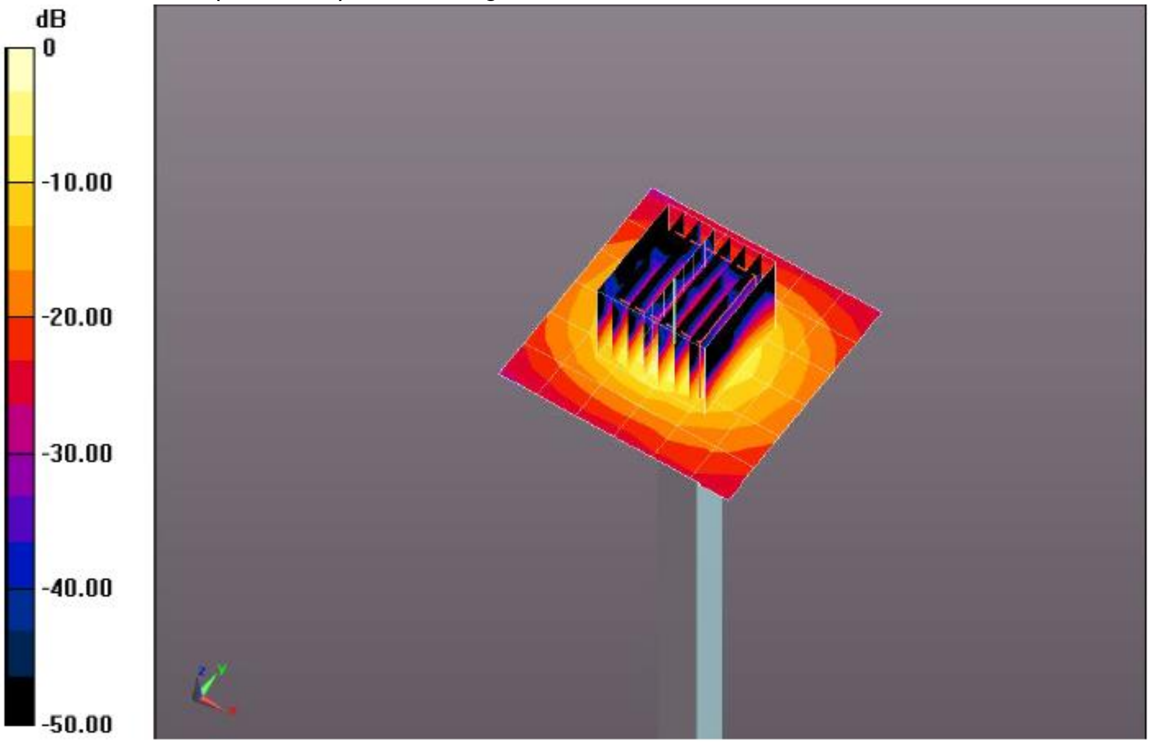
SystemPerformanceCheck-Body 5800MHz

DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date:2018-12-11
Communication System: UID 0, A-CW (0); Frequency: 5800 MHz
Medium parameters used: f = 5800 MHz; σ = 6.27 S/m; ε_r = 46.943; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(4.61, 4.61, 4.61); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0
- Electronics: DAE4 Sn1549; Calibrated: 4/25/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.0(1446); SEMCAD X 14.6.11(7437)

Body/d=10mm,Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.9 W/kg
Body/d=10mm,Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 62.07 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 36.2 W/kg
SAR(1 g) = 7.28 W/kg; SAR(10 g) = 2.02 W/kg
Maximum value of SAR (measured) = 18.8 W/kg



10. SAR Exposure Limits

SAR assessments have been made in line with the requirements of FCC 47 CFR § 2.1093.

Type Exposure	Limit (W/kg)	
	General Population / Uncontrolled Exposure Environment	Occupational / Controlled Exposure Environment
Spatial Average SAR (whole body)	0.08	0.4
Spatial Peak SAR (1g cube tissue for head and trunk)	1.6	8.0
Spatial Peak SAR (10g for limb)	4.0	20.0

Population/Uncontrolled Environments: are defined as locations where there is the exposure of individual who have no knowledge or control of their exposure.

Occupational/Controlled Environments: are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).

11. Conducted Power Measurement Results

WLAN Conducted Power

For 2.4GHz WLAN SAR testing, highest average RF output power channel for the lowest data rate for 802.11b were for SAR evaluation. 802.11g/n were not investigated since the average putput powers over all channels and data rates were not more than 0.25dB higher than the tested channel in the lowest data rate of 802.11b mode.

The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures

WIFI 2.4G				
Mode	Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Average Power (dBm)
802.11b 1Mbps	1	2412	17.50	15.22
	6	2437	17.16	14.98
	11	2462	17.12	14.91
802.11g 6Mbps	1	2412	18.94	14.84
	6	2437	18.46	14.87
	11	2462	18.54	14.66
802.11n (HT20) MCS0	1	2412	18.45	15.14
	6	2437	18.04	13.75
	11	2462	18.74	14.76
802.11n (HT40) MCS0	3	2422	18.27	13.95
	6	2437	17.81	14.01
	9	2452	17.77	14.05

WIFI 5G U-NII-1				
Bandwidth	Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)
20	802.11n (HT20)	36	5180	13.95
		40	5200	13.40
		48	5240	14.28
	802.11a	36	5180	13.33
		40	5200	12.95
		48	5240	13.06
40	802.11n (HT40)	38	5190	13.88
		46	5230	12.79

WIFI 5G U-NII-2A				
Bandwidth	Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)
20	802.11n (HT20)	52	5260	14.40
		56	5280	14.81
		64	5320	15.44
	802.11a	52	5260	15.21
		56	5280	15.22
		64	5320	15.18
40	802.11n (HT40)	54	5270	14.03
		62	5310	14.00

WIFI 5G U-NII-2C				
Bandwidth	Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)
20	802.11n (HT20)	100	5500	12.74
		120	5600	12.64
		140	5700	11.90
	802.11a	100	5500	12.52
		120	5600	12.46
		140	5700	12.02
40	802.11n (HT40)	102	5510	12.66
		118	5590	12.04
		134	5670	10.77

WIFI 5G U-NII-3				
Bandwidth	Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)
20	802.11n (HT20)	149	5745	10.19
		157	5785	10.74
		165	5825	10.53
	802.11a	149	5745	10.35
		157	5785	10.90
		165	5825	10.57
40	802.11n (HT40)	151	5755	10.84
		159	5795	11.18

Bluetooth Conducted Power

Bluetooth			
Mode	Channel	Frequency (MHz)	Conducted power (dBm)
GFSK	0	2402	3.08
	39	2441	3.26
	78	2480	3.36
π/4QPSK	0	2402	2.34
	39	2441	2.54
	78	2480	2.57
8DPSK	0	2402	2.47
	39	2441	2.70
	78	2480	2.73
GFSK(BLE)	0	2402	3.14
	19	2440	3.61
	39	2480	3.28

12. Maximum Tune-up Limit

WIFI 2.4G	
Mode	Maximum Tune-up (dBm) Burst Average Power
802.11b	15.50
802.11g	15.00
802.11n(HT20)	15.50
802.11n(HT40)	14.50

WIFI 5G U-NII-1	
Mode	Maximum Tune-up (dBm) Burst Average Power
802.11n(HT20)	14.50
802.11a	14.00
802.11n(HT40)	14.00

WIFI 5G U-NII-2A	
Mode	Maximum Tune-up (dBm) Burst Average Power
802.11n(HT20)	15.50
802.11a	15.50
802.11n(HT40)	14.50

WIFI 5G U-NII-2C	
Mode	Maximum Tune-up (dBm) Burst Average Power
802.11n(HT20)	13.00
802.11a	13.00
802.11n(HT40)	13.00

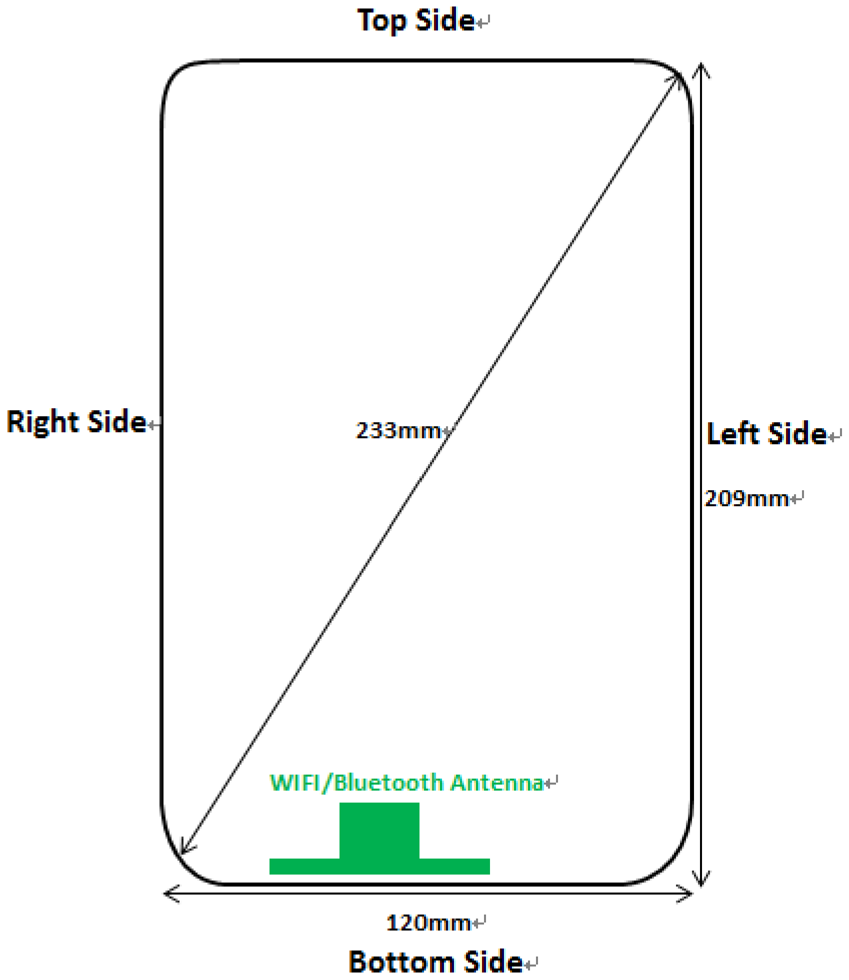
WIFI 5G U-NII-3	
Mode	Maximum Tune-up (dBm) Burst Average Power
802.11n(HT20)	11.50
802.11a	11.50
802.11n(HT40)	11.50

Note:
When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.

Bluetooth	
Mode	Maximum Tune-up (dBm)
GFSK	3.50
π/4QPSK	3.00
8DPSK	3.00
GFSK(BLE)	4.00

13. RF Exposure Conditions (Test Configurations)

13.1. Antenna Location



Rear View

13.2. Standalone SAR test exclusion considerations

KDB 447498 with KDB 616217:

a) For 100 MHz to 6 GHz and *test separation distances* ≤ 50 mm, the 1-g *SAR test exclusion thresholds* are determined by the following:

[(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR

When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according is applied to determine SAR test exclusion.

b) For 100 MHz to 6 GHz and *test separation distances* > 50 mm, the 1-g and 10-g *SAR test exclusion thresholds* are determined by the following :

1) {[Power allowed at *numeric threshold* for 50 mm in step a)] + [(test separation distance - 50 mm)·(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz

2) {[Power allowed at *numeric threshold* for 50 mm in step a)] + [(test separation distance - 50 mm)·10]} mW, for > 1500 MHz and ≤6 GHz

Antennas ≤ 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		separation distances (mm)					Calculated Threshold Value				
		dBm	mW	Rear	Left	Right	Top	Bottom	Rear	Left	Right	Top	Bottom
WIFI 2.4G	2437	15.50	35.5	5	50	20	178	5	11.1 MEASURE	1.1 EXEMPT	2.8 EXEMPT	> 50 mm	11.1 MEASURE
WIFI 5G U-NII-2A	5280	15.50	35.5	5	50	20	178	5	16.3 MEASURE	1.6 EXEMPT	4.1 MEASURE	> 50 mm	16.3 MEASURE
WIFI 5G U-NII-2C	5600	13.00	20.0	5	50	20	178	5	9.4 MEASURE	0.9 EXEMPT	2.4 EXEMPT	> 50 mm	9.4 MEASURE
WIFI 5G U-NII-3	5785	11.50	14.1	5	50	20	178	5	6.8 MEASURE	0.7 EXEMPT	1.7 EXEMPT	> 50 mm	6.8 MEASURE
Bluetooth	2441	4.00	2.5	5	50	20	178	5	0.8 EXEMPT	0.1 EXEMPT	0.2 EXEMPT	> 50 mm	0.8 EXEMPT

Antennas > 50mm to adjacent edges

Tx Interface	Frequency (MHz)	Output Power		separation distances (mm)					Calculated Threshold Value				
		dBm	mW	Rear	Left	Right	Top	Bottom	Rear	Left	Right	Top	Bottom
WIFI 2.4G	2437	15.50	35.5	5	50	20	178	5	≤ 50mm	≤ 50mm	≤ 50mm	1345 mW EXEMPT	≤ 50mm
WIFI 5G U-NII-2A	5280	15.50	35.5	5	50	20	178	5	≤ 50mm	≤ 50mm	≤ 50mm	1343 mW EXEMPT	≤ 50mm
WIFI 5G U-NII-2C	5600	13.00	20.0	5	50	20	178	5	≤ 50mm	≤ 50mm	≤ 50mm	1342 mW EXEMPT	≤ 50mm
WIFI 5G U-NII-3	5785	11.50	14.1	5	50	20	178	5	≤ 50mm	≤ 50mm	≤ 50mm	1376 mW EXEMPT	≤ 50mm
Bluetooth	2441	4.00	2.5	5	50	20	178	5	≤ 50mm	≤ 50mm	≤ 50mm	126 mW EXEMPT	≤ 50mm

13.3. Required Test Configurations

The table below identifies the standalone test configurations required for this device according to the findings in Section 13.2:

Test Configurations	Rear	Left	Right	Top	Bottom
WIFI 2.4G	Yes	No	No	No	Yes
WIFI 5G U-NII-2A	Yes	No	Yes	No	Yes
WIFI 5G U-NII-2C	Yes	No	No	No	Yes
WIFI 5G U-NII-3	Yes	No	No	No	Yes
Bluetooth	No	No	No	No	No

14. SAR Measurement Results

WIFI 2.4G										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz							
802.11b 1Mbps	Rear	6	2437	14.98	15.50	1.13	-0.10	0.414	0.467	1
	Left	6	2437	14.98	15.50	1.13	-	-	-	-
	Right	6	2437	14.98	15.50	1.13	-	-	-	-
	Top	6	2437	14.98	15.50	1.13	-	-	-	-
	Bottom	6	2437	14.98	15.50	1.13	-0.14	0.241	0.272	-

Note:

1. According to the above table, the initial test position for body is “Back”, and its reported SAR is≤ 0.4W/kg. Thus further SAR measurement is not required for the other (remaining) test positions. Because the reported SAR of the highest measured maximum output power channel for the exposureconfiguration is ≤ 0.8W/kg, no further SAR testing is required for 802.11b DSSS in that exposureconfiguration.
2. When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.
   a) When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.
   b) 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. the 802.11g/n is not required

WIFI 2.4G- Scaled Reported SAR							
Mode	Test Position	Frequency		Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
		CH	MHz				
802.11b 1Mbps	Rear	6	2437	100%	100%	0.467	0.467
	Bottom	6	2437	100%	100%	0.272	0.272

Note:

According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. A maximum transmission duty factor of 100% is achievable for WLAN in this project.

WIFI 5G U-NII-2A										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
U-NII-1 802.11a	Rear	52	5260	15.21	15.50	1.07	0.10	1.100	1.176	2
		56	5280	15.22	15.50	1.07	0.16	0.973	1.038	-
		64	5320	15.18	15.50	1.08	-0.11	1.040	1.120	-
	Left	56	5280	15.22	15.50	1.07	-	-	-	-
	Right	56	5280	15.22	15.50	1.07	-0.10	0.100	0.107	-
	Top	56	5280	15.22	15.50	1.07	-	-	-	-
	Bottom	56	5280	15.22	15.50	1.07	-0.16	0.294	0.314	-

Note:
When SAR measurement is required for 802.11 a/g/n/ac OFDM configurations, each standalone and aggregated frequency band is considered separately for SAR test reduction. When the same transmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction applies.

- When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements.19 If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.
- When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

WIFI 5G U-NII-2A- Scaled Reported SAR							
Mode	Test Position	Frequency		Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
		CH	MHz				
U-NII-2A 802.11a	Rear	52	5260	100%	100%	1.176	1.176
	Right	56	5280	100%	100%	0.107	0.107
	Bottom	56	5280	100%	100%	0.314	0.314

Note:
1. According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. A maximum transmission duty factor of 100% is achievable for WLAN in this project.

WIFI 5G U-NII-2C										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
U-NII-1 802.11a	Rear	100	5500	12.52	13.00	1.12	-0.10	0.378	0.422	3
	Left	100	5500	12.52	13.00	1.12	-	-	-	-
	Right	100	5500	12.52	13.00	1.12	-	-	-	-
	Top	100	5500	12.52	13.00	1.12	-	-	-	-
	Bottom	100	5500	12.52	13.00	1.12	-0.14	0.138	0.154	-

Note:
When SAR measurement is required for 802.11 a/g/n/ac OFDM configurations, each standalone and aggregated frequency band is considered separately for SAR test reduction. When the same transmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction applies.

- When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements.19 If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.
- When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

WIFI 5G U-NII-2C- Scaled Reported SAR							
Mode	Test Position	Frequency		Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
		CH	MHz				
U-NII-1 802.11a	Rear	100	5500	100%	100%	0.422	0.422
	Bottom	100	5500	100%	100%	0.154	0.154

Note:
According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. A maximum transmission duty factor of 100% is achievable for WLAN in this project.

WIFI 5G U-NII-3										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Test Plot
		CH	MHz							
U-NII-3 802.11a	Rear	157	5785	10.74	11.50	1.19	-0.17	0.599	0.714	4
	Left	157	5785	10.74	11.50	1.19	-	-	-	-
	Right	157	5785	10.74	11.50	1.19	-	-	-	-
	Top	157	5785	10.74	11.50	1.19	-	-	-	-
	Bottom	157	5785	10.74	11.50	1.19	0.10	0.282	0.336	-

Note:
When SAR measurement is required for 802.11 a/g/n/ac OFDM configurations, each standalone and aggregated frequency band is considered separately for SAR test reduction. When the same transmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction applies.

- When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements.19 If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.
- When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

WIFI 5G U-NII-3- Scaled Reported SAR							
Mode	Test Position	Frequency		Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
		CH	MHz				
U-NII-3 802.11a	Rear	157	5785	100%	100%	0.714	0.714
	Bottom	157	5785	100%	100%	0.336	0.336

Note:
According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. A maximum transmission duty factor of 100% is achievable for WLAN in this project.

SAR Test Data Plots to the Appendix A.

15. SAR Measurement Variability

In accordance with published RF Exposure KDB 865664 D01 SAR measurement 100 MHz to 6 GHz. These 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 <0.8 or 2 W/kg (1-g or 10-g respectively); steps 2) through 4) do not apply.

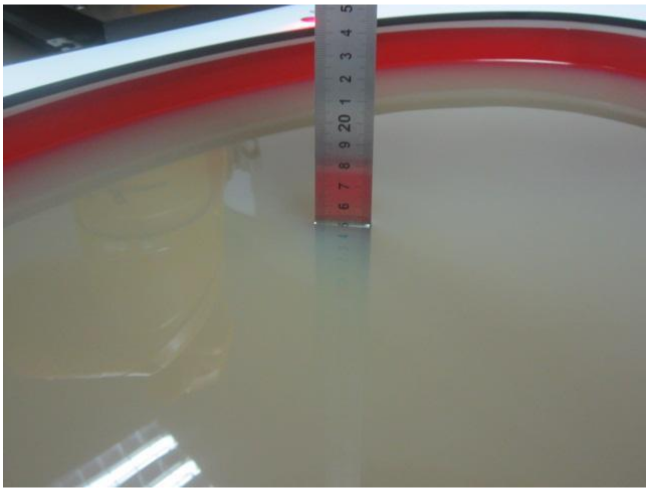
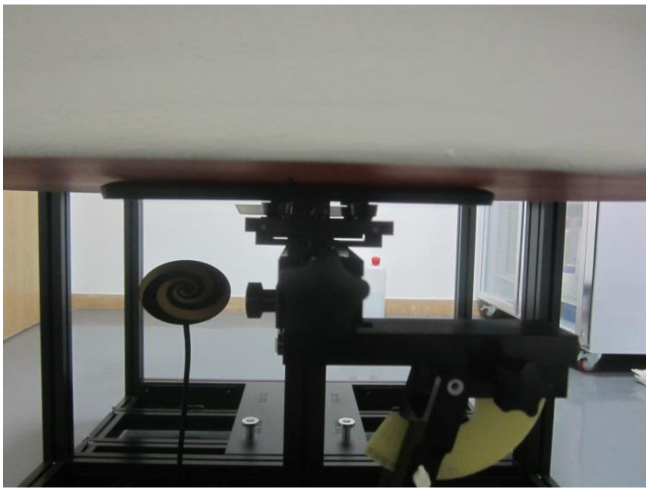
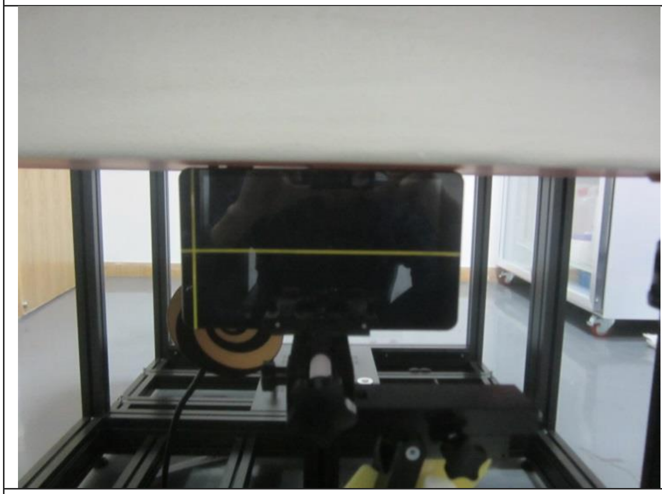
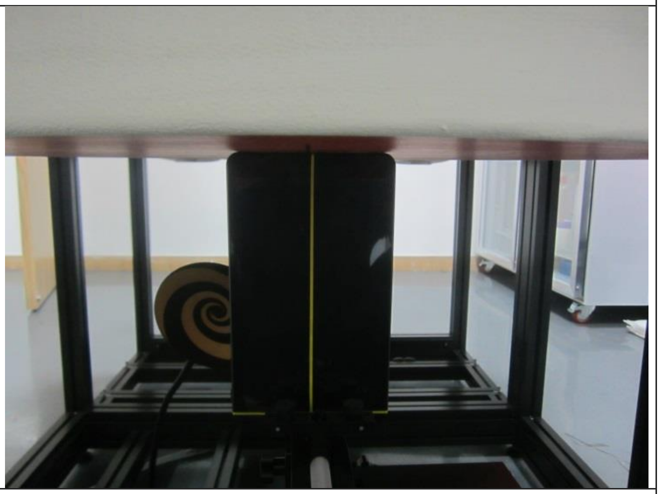
2) When the original highest measured SAR is ≥ 0.8 or 2 W/kg (1-g or 10-g respectively), repeat that measurement once.

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 or 3.6 W/kg (~ 10% from the 1-g or 10-g respective SAR limit).

4) Perform a third repeated measurement only if the original, first, or second repeated measurement is ≥ 1.5 or 3.75 W/kg (1-g or 10-g respectively) and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Band	Test Position	Frequency		Highest Measured SAR (W/kg)	First Repeated		Second Repeated	
		CH	MHz		Measured SAR(W/kg)	Largest to Smallest SAR Ratio	Measured SAR(W/kg)	Largest to Smallest SAR Ratio
WIFI U-NII-2A	Rear	52	5260	1.10	1.04	1.06	N/A	N/A

16. TestSetup Photos

	
Liquid depth in the Body phantom	Rear(0mm)
	
Right(0mm)	Bottom(0mm)

17. External and Internal Photos of the EUT

Please reference to the report No.: CHTEW18120058

---------End of Report----------