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FCC SAR TEST REPORT

Report No: STS1711232H01

Issued for

Nuvestack Inc

299 South Main Street, Suite 1300, Salt Lake City, UT 84111,
USA

Product Name:	CloudLock
Brand Name:	Nuvestack
Model Name:	M133-N
Series Model:	060AA
FCC ID:	2AN9M-M133-N
Test Standard:	ANSI/IEEE Std. C95.1
	FCC 47 CFR Part 2 (2.1093)
	IEEE 1528: 2013
Max. Report SAR (1g):	Body: 1.413 W/kg

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Test Report Certification

Applicant's name: Nuvestack Inc

Address: 299 South Main Street, Suite 1300, Salt Lake City, UT 84111, USA

Manufacture's Name: ILIFE Technology (HK) Limited

Address: 3rd Floor, Bld.3, LiJinChen Industrial Park, The East of Gong Ye Road, Longhua, Shenzhen, China

Product description

Product name: CloudLock

Brand name: Nuvestack

Model name: M133-N

Series Model.....: 060AA

Standards: ANSI/IEEE Std. C95.1-1992
FCC 47 CFR Part 2 (2.1093)
IEEE 1528: 2013

The device was tested by Shenzhen STS Test Services Co., Ltd. in accordance with the measurement methods and procedures specified in KDB 865664 The test results in this report apply only to the tested sample of the stated device/equipment. Other similar device/equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of Test:

Date (s) of performance of tests: 07 Dec. 2017

Date of Issue: 08 Dec. 2017

Test Result.....: **Pass**

Testing Engineer :

Aaron Bu

(Aaron Bu)

Technical Manager :

John Zou

(John Zou)

Authorized Signatory :

Vita Li

(Vita Li)





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1. General Information

Environmental evaluation measurements of specific absorption rate (SAR) distributions in emulated human head and body tissues exposed to radio frequency (RF) radiation from wireless portable devices for compliance with the rules and regulations of the U.S. Federal Communications Commission (FCC).

1.1 EUT Description

Product Name	CloudLock		
Brand Name	Nuvestack		
Model Name.	M133-N		
Series Model	060AA		
FCC ID	2AN9M-M133-N		
Model Difference	Only different in model name		
Adapter	Input: AC 100-240V, 1000mA, 50-60 Hz Output: DC 12V, 2000mA		
Battery	Rated Voltage: 7.4V; Charge Limit: 8.4V; Capacity: 4600mAh		
Device Category	Portable		
Product stage	Production unit		
RF Exposure Environment	General Population / Uncontrolled		
Hardware Version	N/A		
Software Version	N/A		
Frequency Range	WLAN 802.11b/g/n(HT20/40):2412~2462MHz WLAN 802.11a/n/ac(HT20/40/80): 5150~5250 MHz; WLAN 802.11a/n/ac(HT20/40/80): 5725~5875 MHz; Bluetooth:2402~ 2480MHz		
Max. Reported SAR(1g): (Limit:1.6W/kg)	Band	Mode	Body Worn and Hotspot(W/kg)
	DTS	2.4G WLAN ANT B	0.620
	DTS	2.4G WLAN ANT B	0.512
	DTS	2.4G WLAN ANT A+B	1.413
	NII	5.2G WLAN ^{Note} ANT A	0.153
	NII	5.2G WLAN ^{Note} ANT B	0.192
	NII	5.2G WLAN ANT ^{Note} A+B	0.305
	NII	5.8G WLAN ^{Note} ANT A	0.203
	NII	5.8G WLAN ^{Note} ANT B	0.256
	NII	5.8G WLAN ^{Note} ANT A+B	0.361
	DTS	Bluetooth ^{Note}	0.105
FCC Equipment Class	Digital Transmission System (DTS)		
Operating Mode:	WLAN: 802.11 b/g/n(HT20/40) /a/ac20/ac40/ac80 Bluetooth: V4.2 + EDR (GFSK, π/4DQPSK, 8DPSK) ; BLE		
Antenna Specification:	BT,WLAN: PIFA Antenna		
Hotspot Mode:	Support		
DTM Mode:	Not Support		
Note: 1. Bluetooth 5.2G WLAN ANT A,B and 5.8G WLAN SAR was estimated 2. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power			



1.2 Test Environment

Ambient conditions in the SAR laboratory:

Items	Required
Temperature (°C)	18-25
Humidity (%RH)	30-70

1.3 Test Factory

Shenzhen STS Test Services Co., Ltd.

Add. : 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road,
Fuyong Street, Bao'an District, Shenzhen, Guangdong, China

CNAS Registration No.: L7649

FCC Registration No.: 625569;

IC Registration No.: 12108A

A2LA Certificate No.: 4338.01





2. Test Standards And Limits

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	ANSI/IEEE Std. C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
3	IEEE Std. 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
4	FCC KDB 447498 D01 v06	CloudLock and Portable Device RF Exposure Procedures and Equipment Authorization Policies
5	FCC KDB 865664 D01 v01r04	SAR Measurement 100 MHz to 6 GHz
6	FCC KDB 865664 D02 v01r02	RF Exposure Reporting
7	FCC KDB 648474 D04 v01r03	SAR Evaluation Considerations for Wireless Handsets
8	FCC KDB 248227 D01 Wi-Fi SAR v02r02	SAR Considerations for 802.11 Devices
9	FCC KDB 616217 D04	SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers

(A). Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

(B). Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

NOTE: Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

Population/Uncontrolled Environments:

are defined as locations where there is the exposure of individuals 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).

NOTE

GENERAL POPULATION/UNCONTROLLED EXPOSURE

PARTIAL BODY LIMIT

1.6 W/kg

3. SAR Measurement System

3.1 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 modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

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:

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

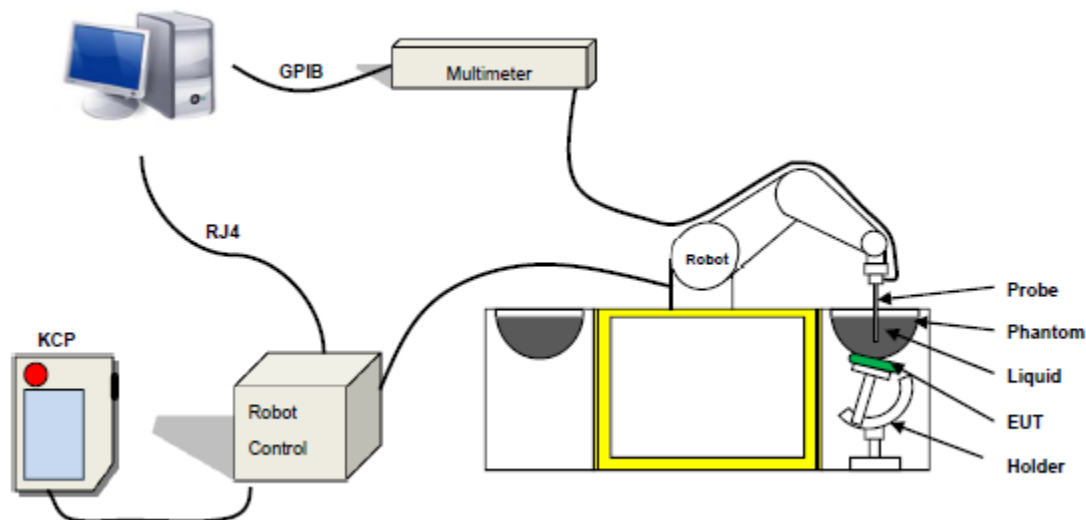
SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

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

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

3.2 SAR System

SATIMO SAR System Diagram:



Comosar is a system that is able to determine the SAR distribution inside a phantom of human being according to different standards. The Comosar system consists of the following items:

- Main computer to control all the system
- 6 axis robot
- Data acquisition system
- Miniature E-field probe
- Phone holder
- Head simulating tissue

The following figure shows the system.



The EUT under test operating at the maximum power level is placed in the phone holder, under the phantom, which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The OpenSAR software computes the results to give a SAR value in a 1g or 10g mass.

3.2.1 Probe

For the measurements the Specific Dosimetric E-Field Probe SN 45/15 EPGO281 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter: 2.5 mm
- Length of Individual Dipoles: 2 mm
- Maximum external diameter: 8 mm
- Distance between dipole/probe extremity: 8 mm (repeatability better than +/- 1mm)
- Probe linearity: $0 \pm 2.60\%$ (0.11dB)
- Axial Isotropy: < 0.25 dB
- Spherical Isotropy: < 0.25 dB
- Calibration range: 450 MHz to 6 GHz for head & body simulating liquid.
- Angle between probe axis (evaluation axis) and surface normal line: less than 30°



Figure-MVG COMOSAR Dosimetric E field Dipole

3.2.2 Phantom

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2mm \pm 0.2mm. It enables the dosimetric evaluation of left and right phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.

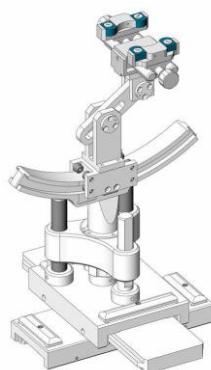


Figure-SN 32/14 SAM115



Figure-SN 32/14 SAM116

3.2.3 Device Holder



The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of \pm 0.5 mm would produce a SAR uncertainty of \pm 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.



4. Tissue Simulating Liquids

4.1 Simulating Liquids Parameter Check

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

Frequency (MHz)	Bactericide	DGBE	HEC	NaCl	Sucrose	1,2-Propanediol	X100	Water	Conductivity	Permittivity
	%	%	%	%	%	%	%	%	σ	ϵ_r
750	/	/	/	0.79	/	64.81	/	34.40	0.97	41.8
835	/	/	/	0.79	/	64.81	/	34.40	0.97	41.8
900	/	/	/	0.79	/	64.81	/	34.40	0.97	41.8
1800	/	13.84	/	0.35	/	/	30.45	55.36	1.38	41.0
1900	/	13.84	/	0.35	/	/	30.45	55.36	1.38	41.0
2000	/	7.99	/	0.16	/	/	19.97	71.88	1.55	41.1
2450	/	7.99	/	0.16	/	/	19.97	71.88	1.88	40.3
2600	/	7.99	/	0.16	/	/	19.97	71.88	1.88	40.3

Tissue dielectric parameters for head and body phantoms				
Frequency	ϵ_r		σ S/m	
	Head	Body	Head	Body
300	45.3	58.2	0.87	0.92
450	43.5	58.7	0.87	0.94
900	41.5	55.0	0.97	1.05
1450	40.5	54.0	1.20	1.30
1800	40.0	53.3	1.40	1.52
2450	39.2	52.7	1.80	1.95
3000	38.5	52.0	2.40	2.73
5800	35.3	48.2	5.27	6.00

**LIQUID MEASUREMENT RESULTS**

Date	Ambient condition		Body Simulating Liquid		Parameters	Target	Measured	Deviation [%]	Limited [%]
	Temp. [°C]	Humidity [%]	Frequency	Temp. [°C]					
2017-12-07	23.0	56	2450 MHz	22.7	Permittivity:	52.70	52.40	-0.56	± 5
					Conductivity	1.95	2.02	3.44	± 5

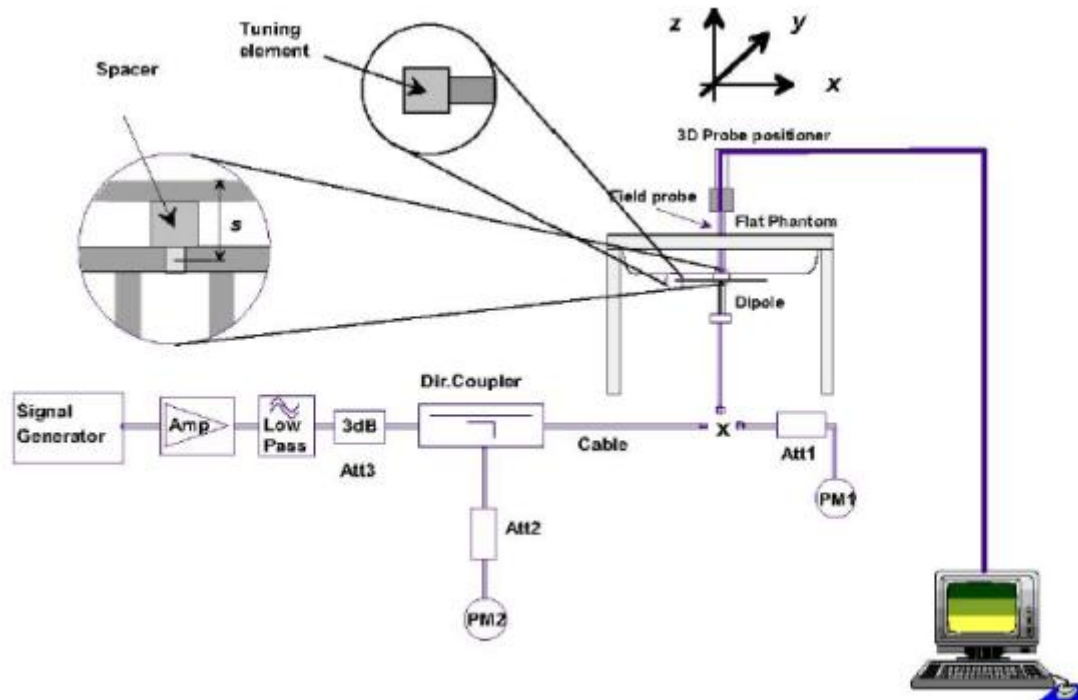


5. SAR System Validation

5.1 Validation System

Each SATIMO system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the SATIMO software, enable the user to conduct the system performance check and system validation. System kit includes a dipole, and dipole device holder.

The system check verifies that the system operates within its specifications. It's performed daily or before every SAR measurement. The system check uses normal SAR measurement in the flat section of the phantom with a matched dipole at a specified distance. The system validation setup is shown as below.



5.2 Validation Result

Comparing to the original SAR value provided by SATIMO, the validation data should be within its specification of 10 %.

Freq.(MHz)	Power(mW)	Tested Value (W/Kg)	Normalized SAR (W/kg)	Target(W/Kg)	Tolerance(%)	Date
2450 Body	100	5.148	51.48	52.4	-1.76	2017-12-07

Note: The tolerance limit of System validation $\pm 10\%$.



6. SAR Evaluation Procedures

The procedure for assessing the average SAR value consists of the following steps:

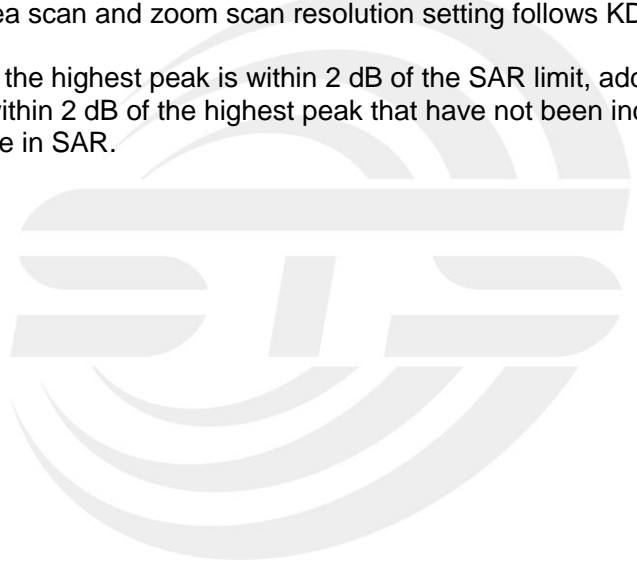
The following steps are used for each test position

- Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface
- Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
- Measurement of the SAR distribution with a grid of 8 to 16mm * 8 to 16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
- Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

Area Scan& Zoom Scan:

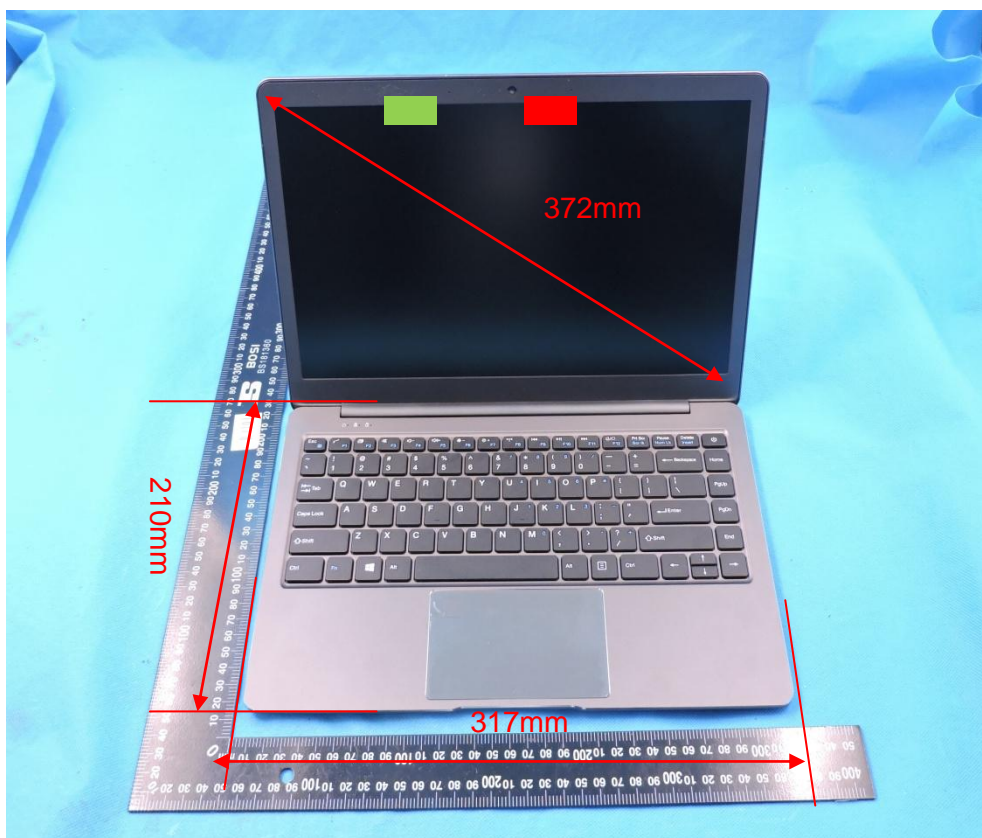
First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR -distribution over 10 g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r01 quoted below.

When the 1-g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.



7. EUT Antenna Location Sketch

It is a CloudLock, support WLAN/BT mode.



 WLAN/BT Antenna A

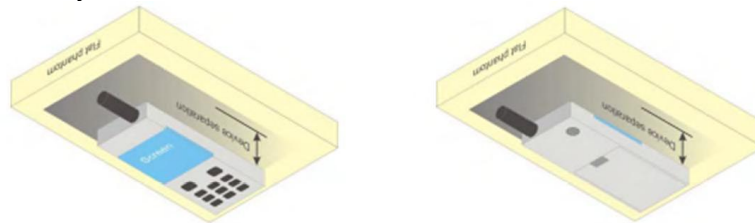
 WLAN Antenna B

8. EUT Test Position

This EUT was tested in Rear Face.

Body-worn Position Conditions:

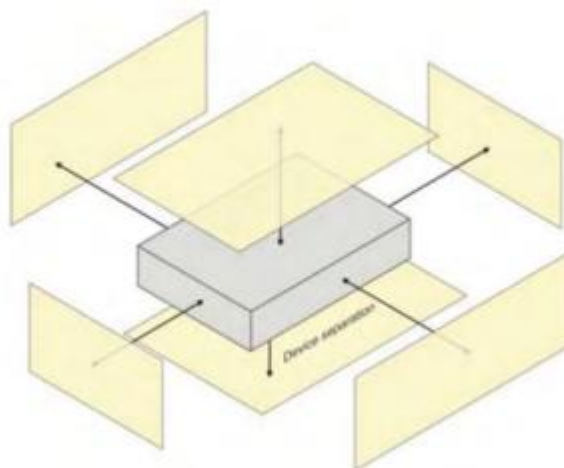
Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. When the same wireless transmission configuration is used for testing body-worn accessory and hotspot mode SAR, respectively, in voice and data mode, SAR results for the most conservative *test separation distance* configuration may be used to support both SAR conditions. When the *reported* SAR for a body-worn accessory, measured without a headset connected to the handset, is $> 1.2 \text{ W/kg}$, the highest *reported* SAR configuration for that wireless mode and frequency band should be repeated for the body-worn accessory with a headset attached to the handset.



8.1 Hotspot mode exposure position condition

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing function, the relevant hand and body exposure condition are tested according to the hotspot SAR procedures in KDB 941225. A test separation distance of 10 mm is required between the phantom and all surface and edges with a transmitting antenna located within 25 mm from that surface or edge.

When form factor of a handset is smaller than 9cm x 5cm, a test separation distance of 5mm (instead of 10mm) is required for testing hotspot mode. When the separate distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration(surface).





9. Uncertainty

9.1 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in IEEE 1528: 2013. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

NO	Source	Tol(%)	Prob. Dist.	Div. k	ci (1g)	ci (10g)	1gUi	10gUi	Veff
Measurement System <input type="checkbox"/>									
1	Probe calibration	5.8	N	1	1	1	5.8	5.8	∞
2	Axial isotropy	3.5	R	$\sqrt{3}$	$(1-cp)^{1/2}$	$(1-cp)^{1/2}$	1.43	1.43	∞
3	Hemispherical isotropy	5.9	R	$\sqrt{3}$	$\sqrt{C_p}$	$\sqrt{C_p}$	2.41	2.41	∞
4	Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
5	Linearity	4.7	R	$\sqrt{3}$	1	1	2.71	2.71	∞
6	System Detection limits	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
7	Readout electronics	0.5	N	1	1	1	0.50	0.50	∞
8	Response time	0	R	$\sqrt{3}$	1	1	0	0	∞
9	Integration time	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
10	Ambient noise	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
11	Ambient reflections	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
12	Probe positioner mech. restrictions	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
13	Probe positioning with respect to phantom shell	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
14	Max.SAR evaluation	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test sample related									



15	Device positioning	2.6	N	1	1	1	2.6	2.6	11
16	Device holder	3	N	1	1	1	3.0	3.0	7
17	Drift of output power	5.0	R	√3	1	1	2.89	2.89	∞
Phantom and set-up									
18	Phantom uncertainty	4.0	R	√3	1	1	2.31	2.31	∞
19	Liquid conductivity (target)	2.5	N	1	0.78	0.71	1.95	1.78	5
20	Liquid conductivity (meas)	4	N	1	0.23	0.26	0.92	1.04	5
21	Liquid Permittivity (target)	2.5	N	1	0.78	0.71	1.95	1.78	∞
22	Liquid Permittivity (meas)	5.0	N	1	0.23	0.26	1.15	1.30	∞
Combined standard			RSS	$U_c = \sqrt{\sum_{i=1}^n C_i^2 U_i^2}$			10.63%	10.54%	
Expanded uncertainty (P=95%)		$U = k U_c, k=2$					21.26%	21.08%	



9.2 System validation Uncertainty

NO	Source	Tol(%)	Prob. Dist.	Div. k	ci (1g)	ci (10g)	1gUi	10gUi	Veff
Measurement System <input type="checkbox"/>									
1	Probe calibration	5.8	N	1	1	1	5.8	5.8	∞
2	Axial isotropy	3.5	R	$\sqrt{3}$	$(1-c_p)^{1/2}$	$(1-c_p)^{1/2}$	1.43	1.43	∞
3	Hemispherical isotropy	5.9	R	$\sqrt{3}$	$\sqrt{C_p}$	$\sqrt{C_p}$	2.41	2.41	∞
4	Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
5	Linearity	4.7	R	$\sqrt{3}$	1	1	2.71	2.71	∞
6	System Detection limits	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
7	Modulation response	0	N	1	1	1	0	0	∞
8	Readout electronics	0.5	N	1	1	1	0.50	0.50	∞
9	Response time	0	R	$\sqrt{3}$	1	1	0	0	∞
10	Integration time	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
11	Ambient noise	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
12	Ambient reflections	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
13	Probe positioner mech. restrictions	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
14	Probe positioning with respect to phantom shell	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
15	Max.SAR evaluation	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Dipole									
16	Deviation of experimental source from	4	N	1	1	1	4.00	4.00	∞



17	Input power and SAR drit measurement	5	R	√3	1	1	2.89	2.89	∞
18	Dipole Axis to liquid Distance	2	R	√3	1	1			∞
Phantom and set-up									
19	Phantom uncertainty	4.0	R	√3	1	1	2.31	2.31	∞
20	Uncertainty in SAR correction for deviation(in	2.0	N	1	1	0.84	2	1.68	∞
21	Liquid conductivity (target)	2	N	1	1	0.84	2.00	1.68	∞
22	Liquid conductivity (temperature uncertainty)	2.5	N	1	0.78	0.71	1.95	1.78	5
23	Liquid conductivity (meas)	4	N	1	0.23	0.26	0.92	1.04	5
24	Liquid Permittivity (target)	2.5	N	1	0.78	0.71	1.95	1.78	∞
25	Liquid Permittivity (temperature uncertainty)	2.5	N	1	0.78	0.71	1.95	1.78	5
26	Liquid Permittivity (meas)	5.0	N	1	0.23	0.26	1.15	1.30	∞
Combined standard			RSS	$U_c = \sqrt{\sum_{i=1}^n C_i^2 U_i^2}$			10.15%	10.05%	
Expanded uncertainty (P=95%)		$U = k U_c, k=2$					20.29%	20.10%	



10. Conducted Power Measurement

WLAN (2.4Gband)

Mode	Channel Number	Frequency (MHz)	Average Power (dBm)		
			Antenna A	Antenna B	Antenna A+B
802.11b	1	2412	16.13	16.04	N/A
	6	2437	16.04	15.73	N/A
	11	2462	16.08	15.62	N/A
802.11g	1	2412	15.94	15.81	N/A
	6	2437	15.98	15.63	N/A
	11	2462	15.87	15.52	N/A
802.11n(HT 20)	1	2412	15.43	15.32	18.39
	6	2437	15.34	15.07	18.22
	11	2462	15.17	14.98	18.09
802.11n(HT 40)	3	2422	15.17	15.15	18.17
	6	2437	15.13	14.93	18.04
	9	2452	15.04	14.85	17.96

WLAN (5.2Gband)

Mode	Channel Number	Frequency (MHz)	Average EIRP Power (dBm)		
			Antenna A	Antenna B	Antenna A+B
802.11a	36	5180	5.45	5.49	N/A
	40	5200	5.12	5.53	N/A
	48	5240	5.07	5.25	N/A
802.11 n-HT20	36	5180	3.90	4.02	6.97
	40	5200	3.89	4.01	6.96
	48	5240	3.75	4.08	6.93
802.11 n-HT40	38	5190	1.25	2.35	4.85
	46	5230	1.19	1.65	4.44
802.11ac(HT20)	36	5180	3.85	3.98	6.93
	40	5200	3.67	3.90	6.80
	48	5240	3.54	3.89	6.73
802.11ac(HT40)	38	5190	1.03	2.37	4.76
	46	5230	1.00	1.25	4.14
802.11ac(HT80)	42	5210	0.68	1.44	4.09

**WLAN (5.8Gband)**

Mode	Channel Number	Frequency (MHz)	Average EIRP Power (dBm)		
			Antenna A	Antenna B	Antenna A+B
802.11a	149	5745	3.62	4.95	N/A
	157	5785	4.45	5.28	N/A
	165	5825	3.26	4.70	N/A
802.11 n-HT20	149	5745	3.88	4.35	7.132
	157	5785	4.14	4.40	7.282
	165	5825	3.74	4.23	7.002
802.11 n-HT40	151	5755	3.41	4.69	7.107
	159	5795	2.98	4.29	6.695
802.11ac(HT20)	149	5745	3.93	4.37	7.166
	157	5785	3.90	4.92	7.450
	165	5825	3.35	4.59	7.024
802.11ac(HT40)	151	5755	2.93	3.91	6.458
	159	5795	3.05	3.81	6.457
802.11ac(HT80)	155	5775	3.54	4.24	6.914

Bluetooth

Mode	Channel Number	Frequency (MHz)	Average Power (dBm)
GFSK(1Mbps)	0	2402	2.75
	39	2441	2.57
	78	2480	1.83
$\pi/4$ -DQPSK(2Mbps)	0	2402	1.32
	39	2441	1.25
	78	2480	0.66
8DPSK(3Mbps)	0	2402	2.13
	39	2441	2.03
	78	2480	1.43

BLE

Mode	Channel Number	Frequency (MHz)	Average Power (dBm)
GFSK(1Mbps)	0	2402	3.24
	19	2440	3.05
	39	2480	2.61



10.1 Tune-up Power

Mode	WLAN(AVG)		
	Antenna A	Antenna B	Antenna A+B
IEEE 802.11b	15.2±1dBm	15.1±1dBm	N/A
IEEE 802.11g	15±1dBm	15±1dBm	N/A
IEEE 802.11n(HT 20)	15±1dBm	15±1dBm	17.4±1dBm
IEEE 802.11n(HT 40)	15±1dBm	15±1dBm	17.2±1dBm

5200 MHz	Mode	WLAN(AVG)		
		Antenna A	Antenna B	Antenna A+B
	802.11a	5±1dBm	5±1dBm	N/A
	802.11 n-HT20	3±1dBm	4±1dBm	6±1dBm
	802.11 n-HT40	1±1dBm	2±1dBm	4±1dBm
	802.11ac(HT20)	3±1dBm	3±1dBm	6±1dBm
	802.11ac(HT40)	1±1dBm	2±1dBm	4±1dBm
	802.11ac(HT80)	0±1dBm	1±1dBm	4±1dBm

5800 MHz	Mode	WLAN(AVG)		
		Antenna A	Antenna B	Antenna A+B
	802.11a	4±1dBm	5±1dBm	N/A
	802.11 n-HT20	4±1dBm	4±1dBm	6.3±1dBm
	802.11 n-HT40	3±1dBm	4±1dBm	6.2±1dBm
	802.11ac(HT20)	3±1dBm	4±1dBm	6.5±1dBm
	802.11ac(HT40)	3±1dBm	3±1dBm	6±1dBm
	802.11ac(HT80)	3±1dBm	4±1dBm	6±1dBm

Mode	BT(AVG)
GFSK	2±1dBm
$\pi/4$ -DQPSK	1±1dBm
8DPSK	2±1dBm

Mode	BLE(AVG)
GFSK	3±1dBm



10.2 SAR Test Exclusions Applied

Per FCC KDB 447498D01, the 1-g SAR and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where:

- $f(\text{GHz})$ 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

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

$$\frac{\text{Max Power of Channel (mW)}}{\text{Test Separation Dist (mm)}} * \sqrt{\text{Frequency (GHz)}} \leq 3.0$$

Based on the maximum conducted power of **Bluetooth Body** (rounded to the nearest mW) and the antenna to user separation distance,

Bluetooth Body SAR was not required; $[2.512/5] * \sqrt{2.480} = 0.79 < 3.0$.

Based on the maximum conducted power of **2.4 GHz WLAN Body** (rounded to the nearest mW) and the antenna to user separation distance,

2.4 GHz WLAN SAR was required; $[(69.183/5) * \sqrt{2.462}] = 21.71 > 3.0$.

Based on the maximum conducted power of **5.2 GHz WLAN ANT A+ B Body** (rounded to the nearest mW) and the antenna to user separation distance,

5.2 GHz WLAN ANT A+B SAR was not required; $[5.012/5] * \sqrt{5200} = 2.29 < 3.0$.

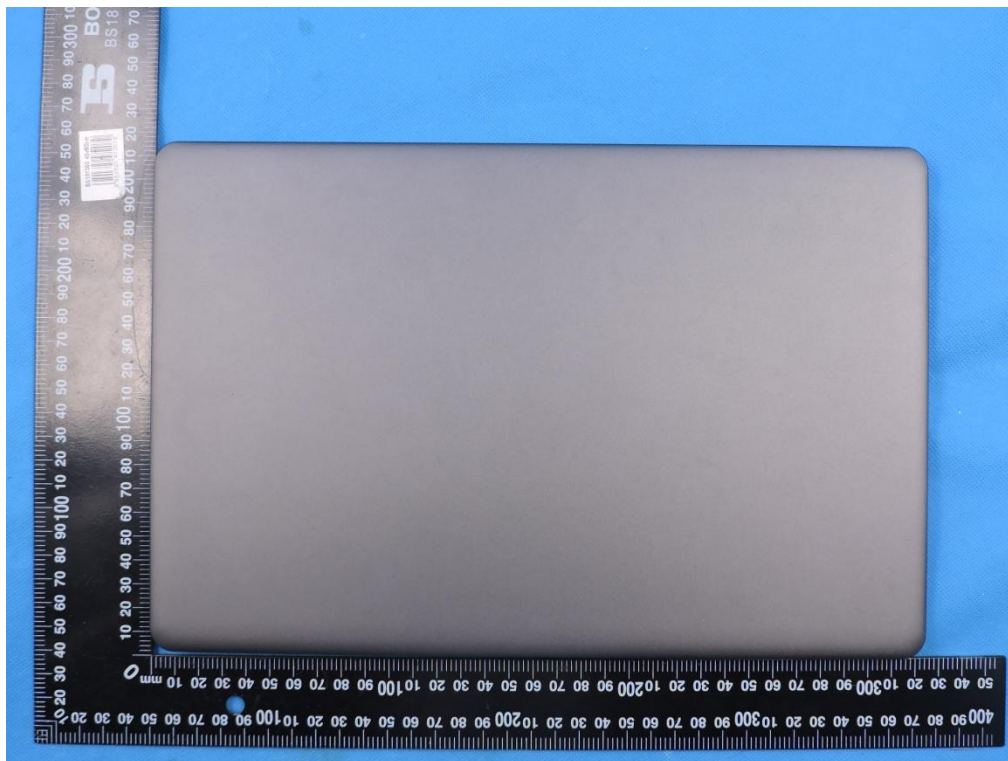
Based on the maximum conducted power of **5.8 GHz WLAN ANT A+ B Body** (rounded to the nearest mW) and the antenna to user separation distance,

5.8 GHz WLAN ANT A+B SAR was not required; $[(5.623/5) * \sqrt{5800}] = 2.71 < 3.0$

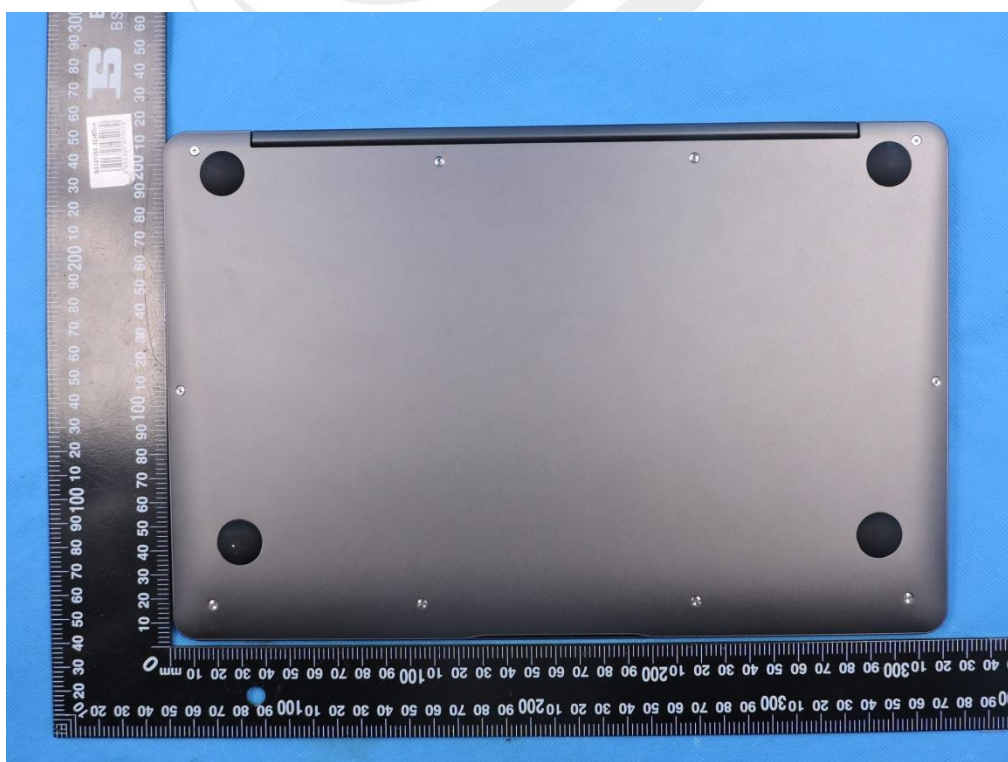
11. EUT And Test Setup Photo

11.1 EUT Photo

Front side



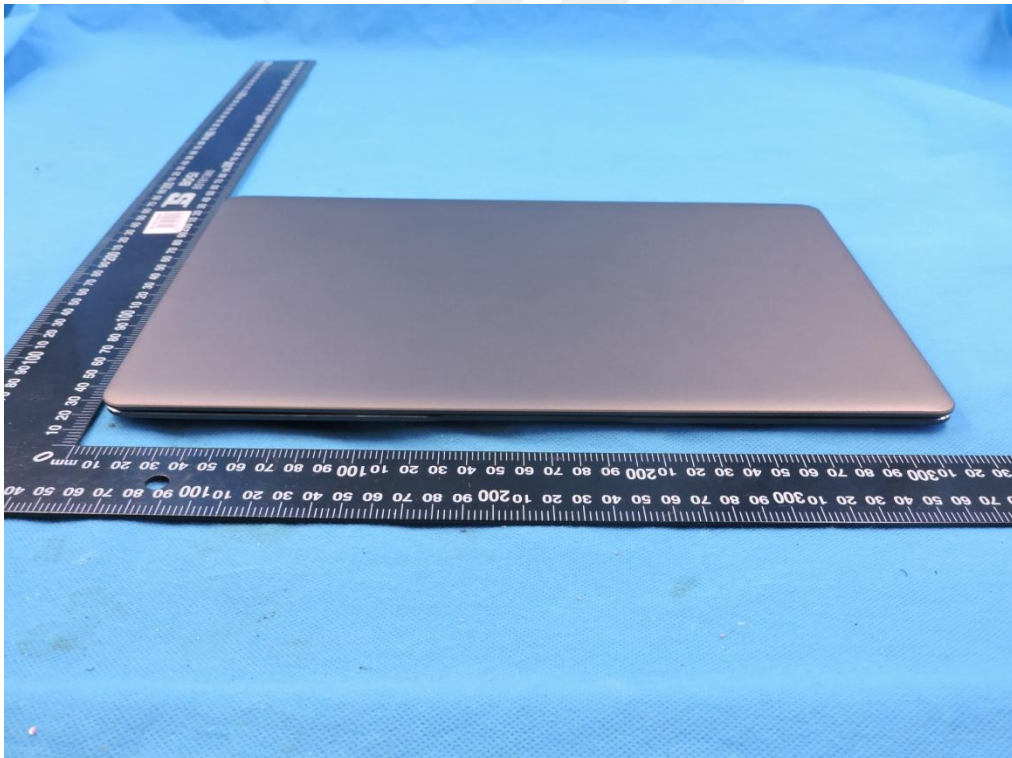
Back side



Top side



Bottom side



Left side



Right side



11.2 Setup Photo

Back Screen(separation distance is 0mm)



Liquid depth (15 cm)





12. SAR Result Summary

12.1 Body-worn and Hotspot SAR

802.11b (Antenna A)

Band	Mode	Test Position	Ch.	Result 1g (W/Kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Duty cycle(%)	Scaled SAR (W/Kg)	Meas. No.
WLAN 2.4G	802.11b	Back Screen	1	0.610	-2.31	16.2	16.13	100%	0.620	1

802.11b (Antenna B)

Band	Mode	Test Position	Ch.	Result 1g (W/Kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Duty cycle(%)	Scaled SAR (W/Kg)	Meas. No.
WLAN 2.4G	802.11b	Back Screen	1	0.505	0.67	16.1	16.04	100%	0.512	2

802.11n (Antenna A)

Band	Mode	Test Position	Ch.	Result 1g (W/Kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Duty cycle(%)	Scaled SAR (W/Kg)	Meas. No.
WLAN 2.4G	802.11n	Back Screen	1	0.741	1.22	18.4	18.39	100%	0.743	3

802.11n (Antenna B)

Band	Mode	Test Position	Ch.	Result 1g (W/Kg)	Power Drift(%)	Max.Turn-up Power(dBm)	Meas.Output Power(dBm)	Duty cycle(%)	Scaled SAR (W/Kg)	Meas. No.
WLAN 2.4G	802.11n	Back Screen	1	0.668	-1.53	18.4	18.39	100%	0.670	4

Scaled SAR (W/Kg)		A+B
Antenna A	0.743	1.413
Antenna B	0.670	

Note:

- The test separation of all above table is 0mm.
- Per KDB 447498 D01v05r01, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - For WWAN: Scaled SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
- When the user enables the personal Wireless router functions for the handsets, actual operations include simultaneous transmission of both the Wi-Fi transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. The "Portable Hotspot" feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.

**Simultaneous Multi-band Transmission Evaluation:**

1. Bluetooth and 2.4GHz WLAN, 5.2GHz/5.8GHz can't simultaneous transmission at the same time.
2. For simultaneous transmission at head and body exposure position, 2 transmitters simultaneous transmission was the worst state.
3. Based upon KDB 447498 D01, BT SAR is excluded as below table.
4. If the test separation distance is <5mm, 5mm is used for excluded SAR calculation.
5. For minimum test separation distance $\leq 50\text{mm}$, Bluetooth standalone SAR is excluded according to $[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f} (\text{GHz}) / x] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
6. The reported SAR summation is calculated based on the same configuration and test position.
7. KDB 447498 / 4.3.2 (2) when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
 - a) $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f} (\text{GHz}) / x] \text{ W/kg}$ for test separation distances $\leq 50 \text{ mm}$; Where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
 - b) 0.4W/Kg for 1-g SAR and 1.0W/Kg for 10-g SAR, when the separation distance is $>50\text{mm}$.

Estimated SAR		Maximum Power		Antenna to user(mm)	Frequency(GHz)	Stand alone SAR(1g) [W/kg]
		dBm	mW			
BT	Back Screen	4	2.512	5	2.480	0.105
WLAN 5.2G A	Back Screen	4	3.981	5	5.200	0.153
WLAN 5.2G B	Back Screen	5	3.981	5	5.200	0.192
WLAN 5.2G A+B	Back Screen	7	5.012	5	5.200	0.305
WLAN 5.8G A	Back Screen	5	3.162	5	5.800	0.203
WLAN 5.8G B	Back Screen	6	3.981	5	5.800	0.256
WLAN 5.2G A+B	Back Screen	7.5	5.623	5	5.800	0.361



13. Equipment List

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
2450MHzDipole	SATIMO	SID2450	SN 30/14 DIP2G450-335	2017.08.15	2020.08.14
E-Field Probe	MVG	SSE2	SN 45/15 EPGO281	2017.02.04	2018.02.03
Dielectric Probe Kit	SATIMO	SCLMP	SN 32/14 OCPG67	2017.12.03	2018.12.02
Antenna	SATIMO	ANTA3	SN 07/13 ZNTA52	N/A	N/A
Phantom1	SATIMO	SAM	SN 32/14 SAM115	2014.09.01	N/A
Phantom2	SATIMO	SAM	SN 32/14 SAM116	2014.09.01	N/A
Phone holder	SATIMO	N/A	SN 32/14 MSH97	2014.09.01	N/A
Laptop holder	SATIMO	N/A	SN 32/14 LSH29	2014.09.01	N/A
Network Analyzer	Agilent	8753ES	US38432810	2017.03.16	2018.03.15
Multi Meter	Keithley	Multi Meter 2000	4050073	2017.10.15	2018.10.14
Signal Generator	Agilent	N5182A	MY50140530	2017.10.15	2018.10.14
Wireless Communication Test Set	Agilent	8960-E5515C	MY48360751	2017.10.15	2018.10.14
Power Amplifier	DESAY	ZHL-42W	9638	2017.10.15	2018.10.14
Power Meter	R&S	NRP	100510	2017.10.15	2018.10.14
Power Meter	Agilent	E4418B	GB43312526	2017.10.15	2018.10.14
Power Sensor	R&S	NRP-Z11	101919	2017.10.15	2018.10.14
Power Sensor	Agilent	E9301A	MY41497725	2017.10.15	2018.10.14
9dB Attenuator	Agilent	99899	DC-18GHz	2017.05.10	2018.05.09
11dB Attenuator	Agilent	8494B	DC-18GHz	2017.05.10	2018.05.09
110dB Attenuator	Agilent	8494B	DC-18GHz	2017.05.10	2018.05.09
Dual Directional Coupler	Agilent	SHWPD1- 1080S	N/A	2017.05.09	2018.05.08
Temperature & Humidity	MiEO	HH660	N/A	2017.10.18	2018.10.17



Appendix A. System Validation Plots

System Performance Check Data (2450MHz Body)

Type: Phone measurement (Complete)

Area scan resolution: dx=8mm,dy=8mm

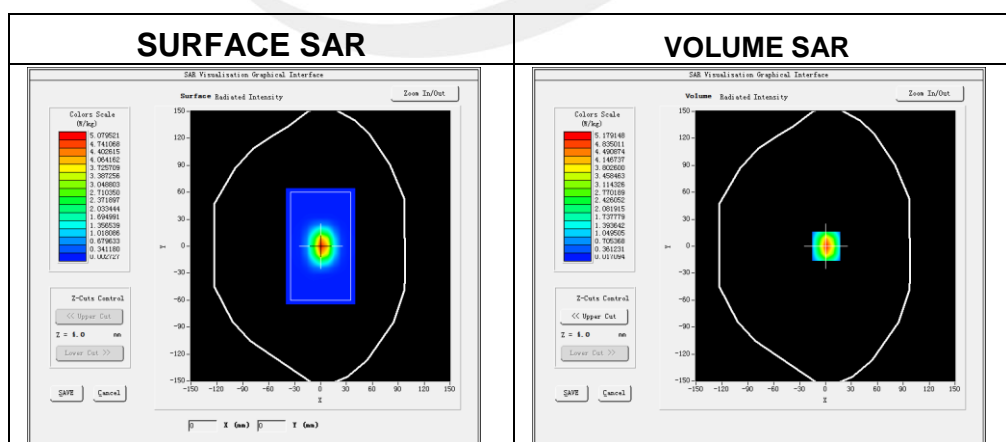
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm

Date of measurement: 2017-12-07

Measurement duration: 14 minutes 23 seconds

Experimental conditions.

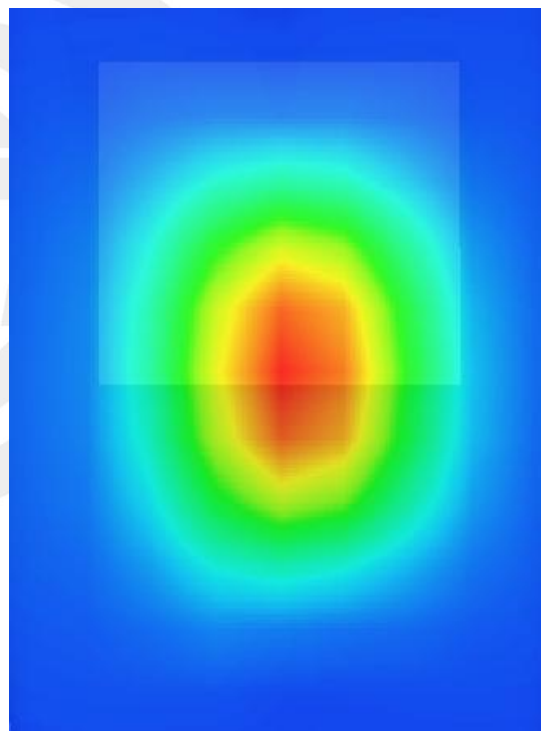
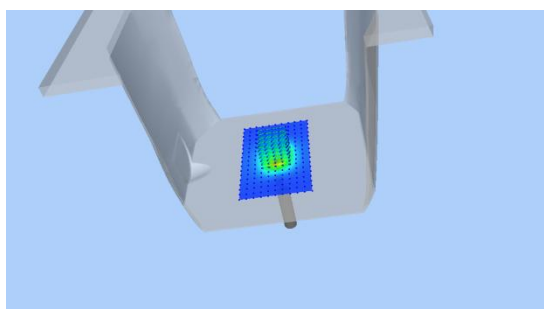
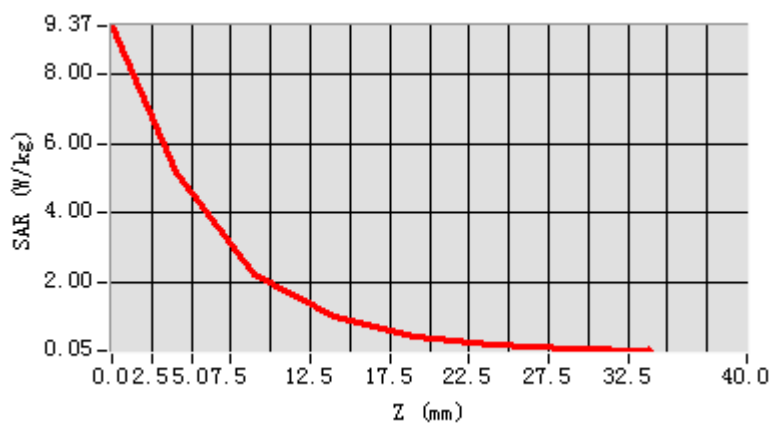
Device Position	Validation plane
Band	2450 MHz
Channels	-
Signal	CW
Frequency (MHz)	2450
Relative permittivity	52.40
Conductivity (S/m)	2.02
Power drift (%)	-0.07
Probe	SN 45/15 EPGO281
ConvF	2.28
Crest factor:	1:1



Maximum location: X=1.00, Y=0.00

SAR 10g (W/Kg)	2.294841
SAR 1g (W/Kg)	5.148026

Z Axis Scan



Appendix B. SAR Test Plots

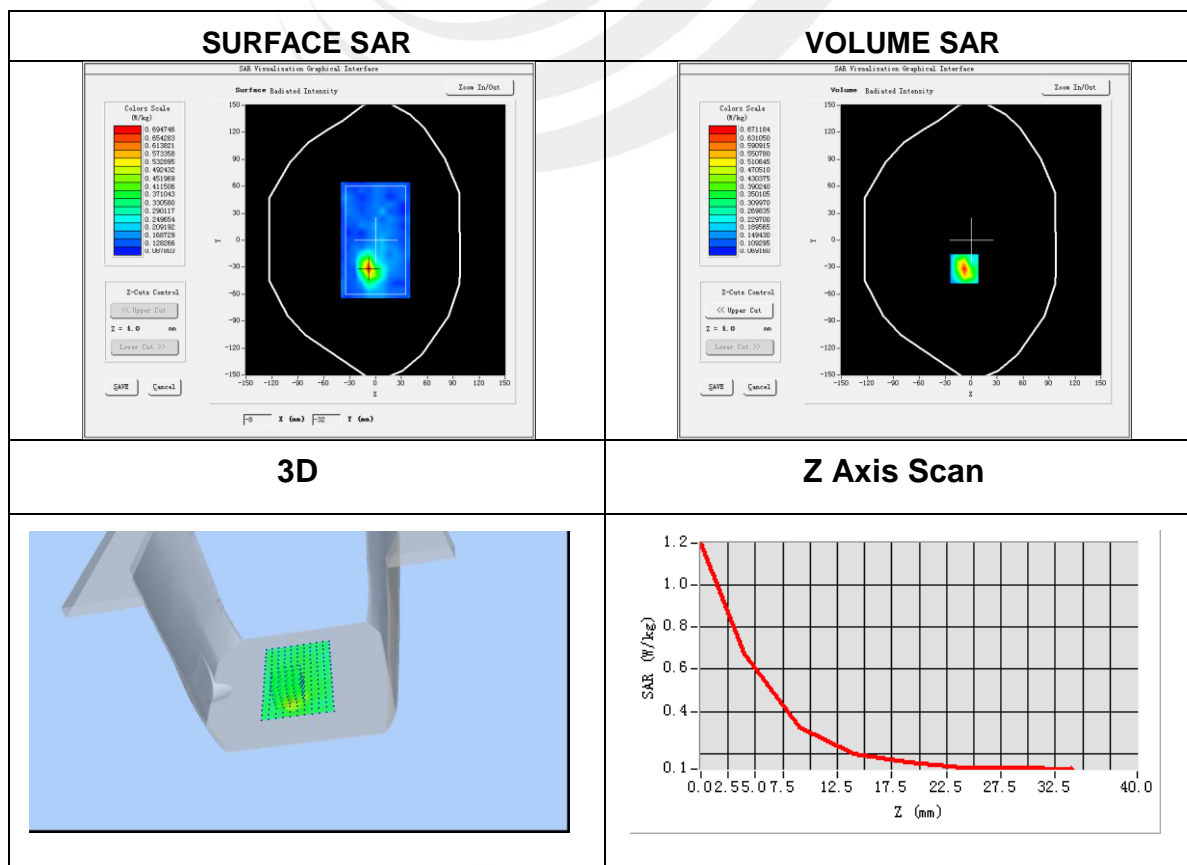
Plot 1: DUT: CloudLock; EUT Model: M133-N

Test Date	2017-12-07
Probe	SN 45/15 EPGO281
ConvF	2.28
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7, dx=8mm dy=8mm dz=5mm, Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Back Screen
Antenna	A
Band	IEEE 802.11b ISM
Channels	Low
Signal	IEEE802.b (Crest factor: 1.0)
Frequency (MHz)	2412
Relative permittivity (real part)	52.70
Conductivity (S/m)	1.95
Variation (%)	-2.31

Maximum location: X=-8.00, Y=-32.00

SAR Peak: 1.19 W/kg

SAR 10g (W/Kg)	0.296520
SAR 1g (W/Kg)	0.610140



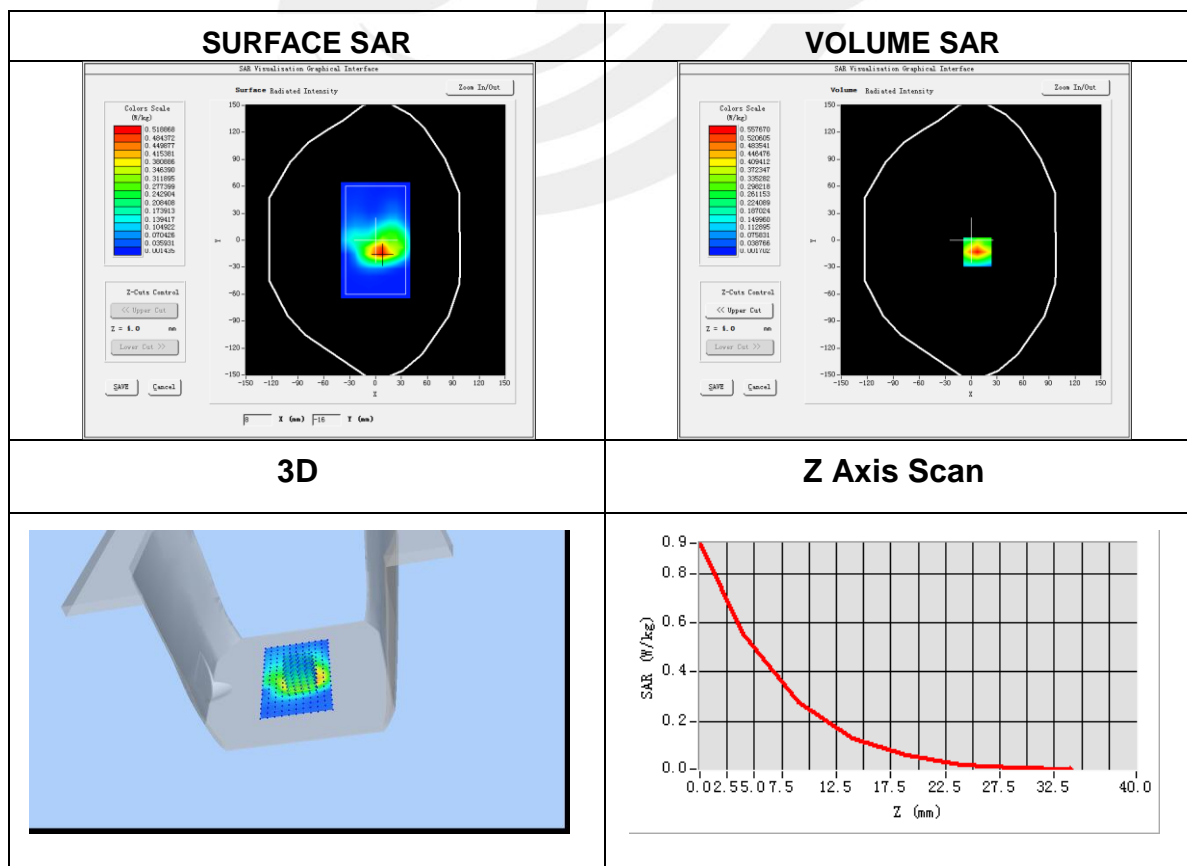
Plot 2: DUT: CloudLock; EUT Model: M133-N

Test Date	2017-12-07
Probe	SN 45/15 EPGO281
ConvF	2.28
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm, Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Back Screen
Antenna	B
Band	IEEE 802.11b ISM
Channels	Low
Signal	IEEE802.b (Crest factor: 1.0)
Frequency (MHz)	2412
Relative permittivity (real part)	52.70
Conductivity (S/m)	1.95
Variation (%)	0.67

Maximum location: X=7.00, Y=-13.00

SAR Peak: 0.91 W/kg

SAR 10g (W/Kg)	0.232029
SAR 1g (W/Kg)	0.504670



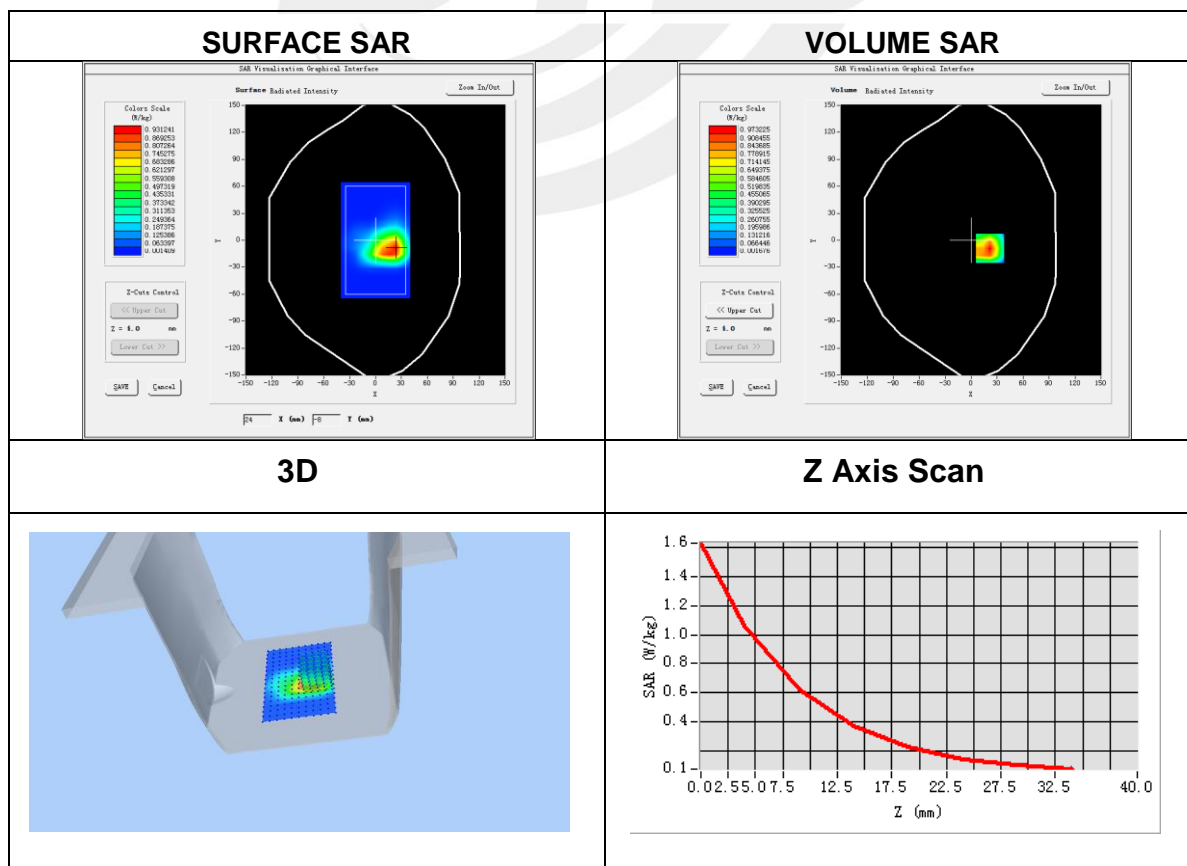
Plot 3: DUT: CloudLock; EUT Model: M133-N

Test Date	2017-12-07
Probe	SN 45/15 EPGO281
ConvF	2.28
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm, Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Back Screen
Antenna	A
Band	IEEE 802.11n ISM
Channels	Low
Signal	IEEE802.n (Crest factor: 1.0)
Frequency (MHz)	2412
Relative permittivity (real part)	52.70
Conductivity (S/m)	1.95
Variation (%)	1.22

Maximum location: X=22.00, Y=-9.00

SAR Peak: 1.56 W/kg

SAR 10g (W/Kg)	0.362824
SAR 1g (W/Kg)	0.740670



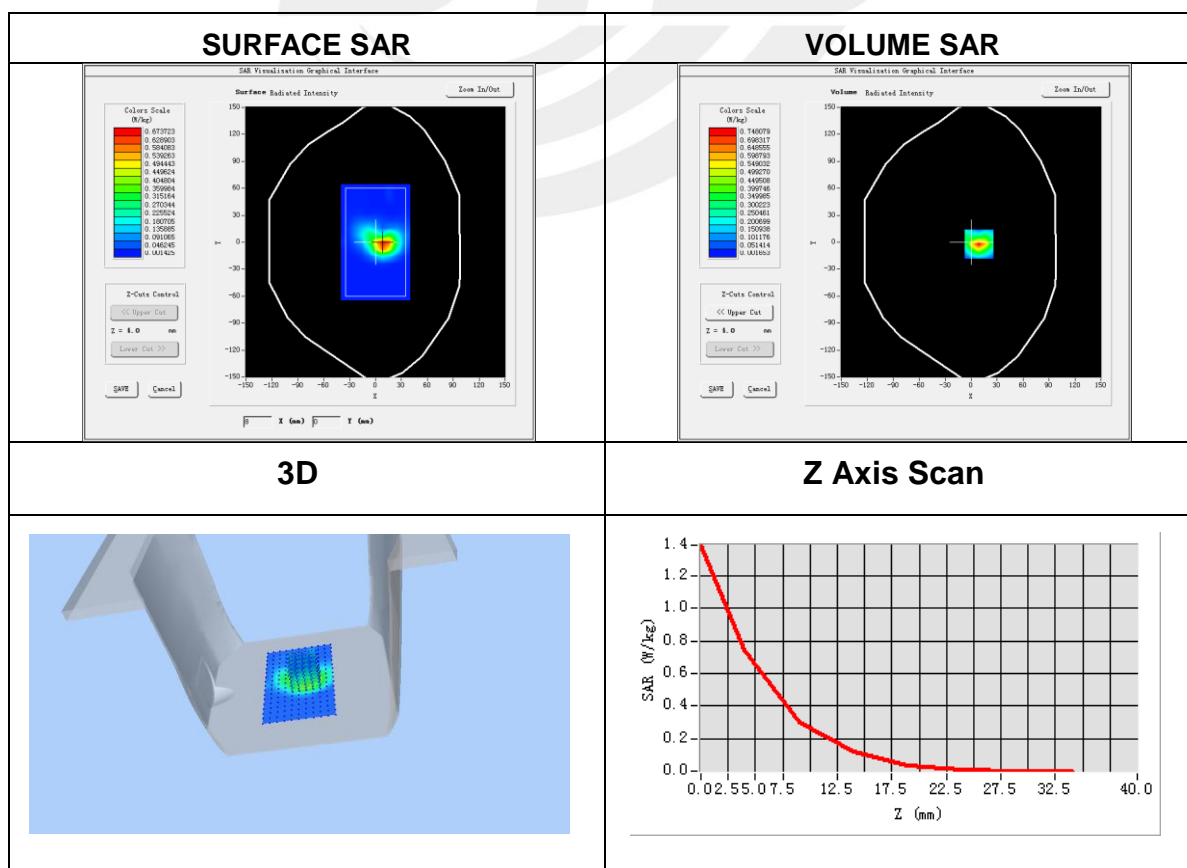
Plot 4: DUT: CloudLock; EUT Model: M133-N

Test Date	2017-12-07
Probe	SN 45/15 EPGO281
ConvF	2.28
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7, dx=8mm dy=8mm dz=5mm, Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Back Screen
Antenna	B
Band	IEEE 802.11n ISM
Channels	Low
Signal	IEEE802.n (Crest factor: 1.0)
Frequency (MHz)	2412
Relative permittivity (real part)	52.70
Conductivity (S/m)	1.95
Variation (%)	-1.53

Maximum location: X=9.00, Y=-2.00

SAR Peak: 1.38 W/kg

SAR 10g (W/Kg)	0.253439
SAR 1g (W/Kg)	0.668666





Appendix C. Probe Calibration And Dipole Calibration Report

Refer the appendix Calibration Report.

※※※※END OF THE REPORT※※※※

