



SAR TEST REPORT

No. I18Z60967-SEM01

For

Lenovo PC HK Limited

Portable Tablet Computer

Model Name: Lenovo TB-7104I

With

Hardware Version: Lenovo Tablet TB-7104I

Software Version: TB-7104I_RF01_180711

FCC ID: O57TB7104I

Issued Date: 2018-7-4



Note:

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REPORT HISTORY

Report Number	Revision	Issue Date	Description
I18Z60967-SEM01	Rev.0	2018-6-26	Initial creation of test report
I18Z60967-SEM01	Rev.1	2018-7-4	Update the configuration of EUT on page9



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1 Test Laboratory

1.1 Testing Location

Company Name:	CTTL(Shouxiang)
Address:	No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China100191
(if applicable) SAR test lab number	12389A-1

1.2 Testing Environment

Temperature:	18°C~25 °C,
Relative humidity:	30%~ 70%
Ground system resistance:	< 0.5 Ω
Ambient noise & Reflection:	< 0.012 W/kg

1.3 Project Data

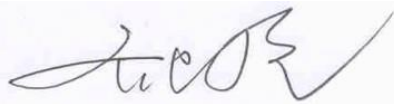
Project Leader:	Qi Dianyuan
Test Engineer:	Lin Xiaojun
Testing Start Date:	June 1, 2018
Testing End Date:	June 3, 2018

1.4 Signature



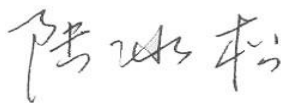
Lin Xiaojun

(Prepared this test report)



Qi Dianyuan

(Reviewed this test report)



Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

2 Statement of Compliance

The maximum results of SAR found during testing for Lenovo PC HK Limited Portable Tablet Computer Lenovo TB-7104I is as follows:

Table 2.1: Highest Reported SAR (1g)

Exposure Configuration	Technology Band	Highest Reported SAR 1g (W/Kg)	Equipment Class
Head	GSM850	0.31	PCE
	PCS1900	0.08	
	WCDMA1900-BII	0.31	
	WCDMA850-BV	0.23	
	WLAN 2.4 GHz	0.21	DTS
Hotspot Body	GSM850	0.90	PCE
	PCS1900	0.70	
	WCDMA1900-BII	1.16	
	WCDMA850-BV	0.73	
	WLAN 2.4 GHz	0.51	DTS

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1g tissue according to the ANSI C95.1-1992.

For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and which provides a minimum separation distance of 0 or 4 or 5 or 12mm between this device and the body of the user. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output.

The measurement together with the test system set-up is described in annex C of this test report. A detailed description of the equipment under test can be found in chapter 4 of this test report.

The highest reported SAR value is obtained at the case of **(Table 2.1)**, and the values are: **1.16 W/kg (1g)**.

Table 2.2: The sum of reported SAR values for main antenna and WiFi

	Position	Main antenna	WiFi	Sum
Highest reported SAR value for Head	Right hand, Touch cheek	0.31	0.21	0.52
Highest reported SAR value for Body	Rear 0mm	1.16	0.34	1.50

Table 2.3: The sum of reported SAR values for main antenna and BT

	Position	Main antenna	BT	Sum
Maximum reported SAR value for Head	Right hand, Touch cheek	0.31	0.15	0.46
Maximum reported SAR value for Body	Rear 0mm	1.16	0.07	1.23

[1] - Estimated SAR for Bluetooth (see the table 13.3)

According to the above tables, the highest sum of reported SAR values is **1.50 W/kg (1g)**. The detail for simultaneous transmission consideration is described in chapter 13.



3 Client Information

3.1 Applicant Information

Company Name:	Lenovo PC HK Limited
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3.2 Manufacturer Information

Company Name:	Lenovo PC HK Limited
Address /Post:	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong
Contact Person:	Spring Zhou
E-mail:	zhoucb1@lenovo.com
Telephone:	+86-21-50504500-8281
Fax:	/

4 Equipment Under Test (EUT) and Ancillary Equipment (AE)

4.1 About EUT

Description:	Portable Tablet Computer
Model name:	Lenovo TB-7104I
Operating mode(s):	GSM 850/900/1800/1900 WCDMA850/900/1900/2100, BT, WLAN
Tested Tx Frequency:	825 – 848.8 MHz (GSM 850)
	1850.2 – 1910 MHz (GSM 1900)
	826.4–846.6 MHz (WCDMA 850 Band V)
	1852.4–1907.6 MHz (WCDMA1900 Band II)
	2412 – 2462 MHz (Wi-Fi 2.4G)
GPRS/EGPRS Multislot Class:	12
Test device Production information:	Production unit
Device type:	Portable device
Antenna type:	Integrated antenna
Accessories/Body-worn configurations:	Headset
Hotspot mode:	Support
Product dimension	Long 193mm ;Wide 110.54mm ; Diagonal 222.41mm

4.2 Internal Identification of EUT used during the test

EUTID	IMEI	HW Version	SW Version
1	869719030027424	Lenovo Tablet TB-7104I	TB-7104I_RF01_180711
2	869719030026780	Lenovo Tablet TB-7104I	TB-7104I_RF01_180711
3	869719030028497	Lenovo Tablet TB-7104I	TB-7104I_RF01_180711
4	869719030028059	Lenovo Tablet TB-7104I	TB-7104I_RF01_180711

*EUT ID: is used to identify the test sample in the lab internally.

Note: It is performed to test SAR with the EUT1&2 and conducted power with the EUT3&4.

4.3 Internal Identification of AE used during the test

AE ID	Description	Model	SN	Manufactory
AE1	Battery	LI-LON	SB18C31688	ATL
AE2	Battery	LI-LON	SB18C31689	SCUD

*AE ID: is used to identify the test sample in the lab internally.

P98996CA1	P98996DA1
1+8G	1+16G
MT8321 A/D	MT8321 A/D
GSM: B2/3/5/8 UMTS: B1/2/5/8	GSM: B2/3/5/8 UMTS: B1/2/5/8
single Nano+TF	single Nano+TF
Android8.1	Android8.1
support	support
With the SAR sensor IC	With the SAR sensor IC
With the OVP	With the OVP

Note: The P98996CA1 is SKU1, the P98996DA1 is SKU2.

We'll perform the SAR measurement with SKU1 and retest on highest value point with SKU2.



5 TEST METHODOLOGY

5.1 Applicable Limit Regulations

ANSI C95.1–1992: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

5.2 Applicable Measurement Standards

IEEE 1528–2013: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

KDB447498 D01 General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

KDB616217 D04 SAR for laptop and tablets v01r02 SAR Evaluation Considerations for Laptop, Notebook, Notebook and Tablet Computers.

KDB648474 D04 Handset SAR v01r03: SAR Evaluation Considerations for Wireless Handsets.

KDB941225 D01 SAR test for 3G devices v03r01: SAR Measurement Procedures for 3G Devices

KDB248227 D01 802.11 Wi-Fi SAR v02r02: SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS

KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz.

KDB865664 D02 RF Exposure Reporting v01r02: RF Exposure Compliance Reporting and Documentation Considerations

6 Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

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

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

$$SAR = c \left(\frac{\delta T}{\delta t} \right)$$

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or 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 tissue and E is the RMS electrical field strength.

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

7 Tissue Simulating Liquids

7.1 Targets for tissue simulating liquid

Table 7.1: Targets for tissue simulating liquid

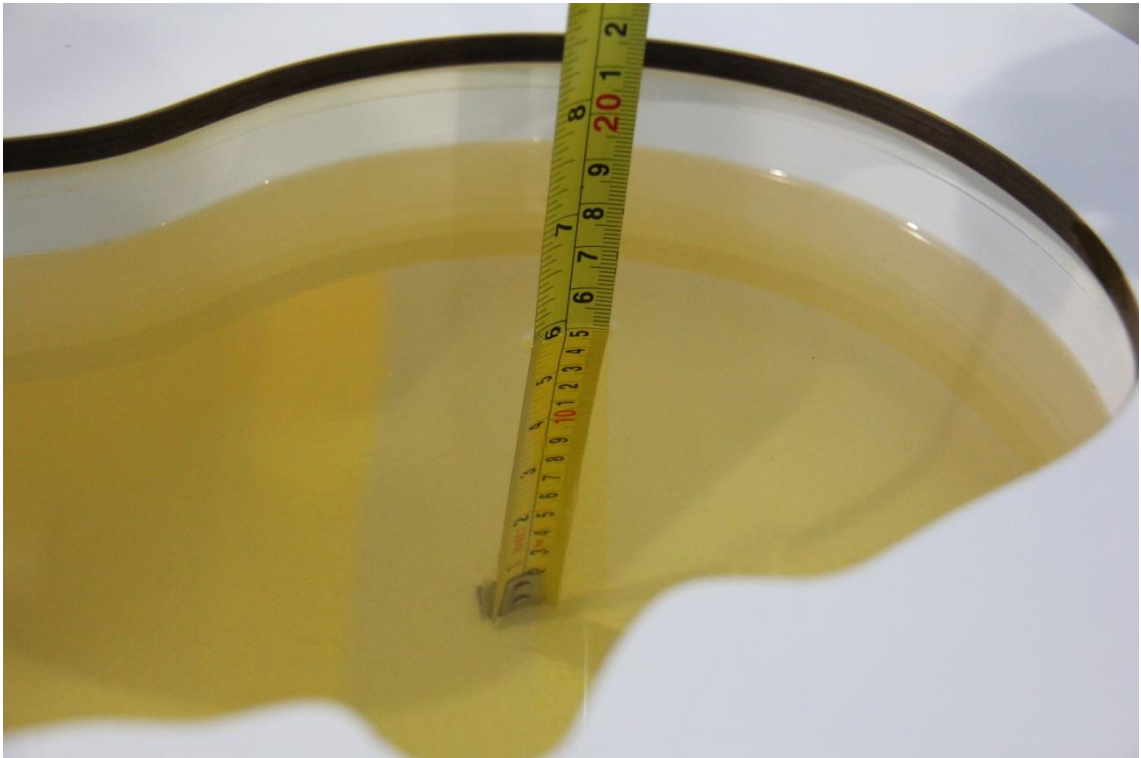
Frequency(MHz)	Liquid Type	Conductivity(σ)	$\pm 5\%$ Range	Permittivity(ϵ)	$\pm 5\%$ Range
835	Head	0.90	0.86~0.95	41.5	39.4~43.6
835	Body	0.97	0.92~1.02	55.2	52.4~58.0
1900	Head	1.40	1.33~1.47	40.0	38.0~42.0
1900	Body	1.52	1.44~1.60	53.3	50.6~56.0
2450	Head	1.80	1.71~1.89	39.2	37.2~41.2
2450	Body	1.95	1.85~2.05	52.7	50.1~55.3

7.2 Dielectric Performance

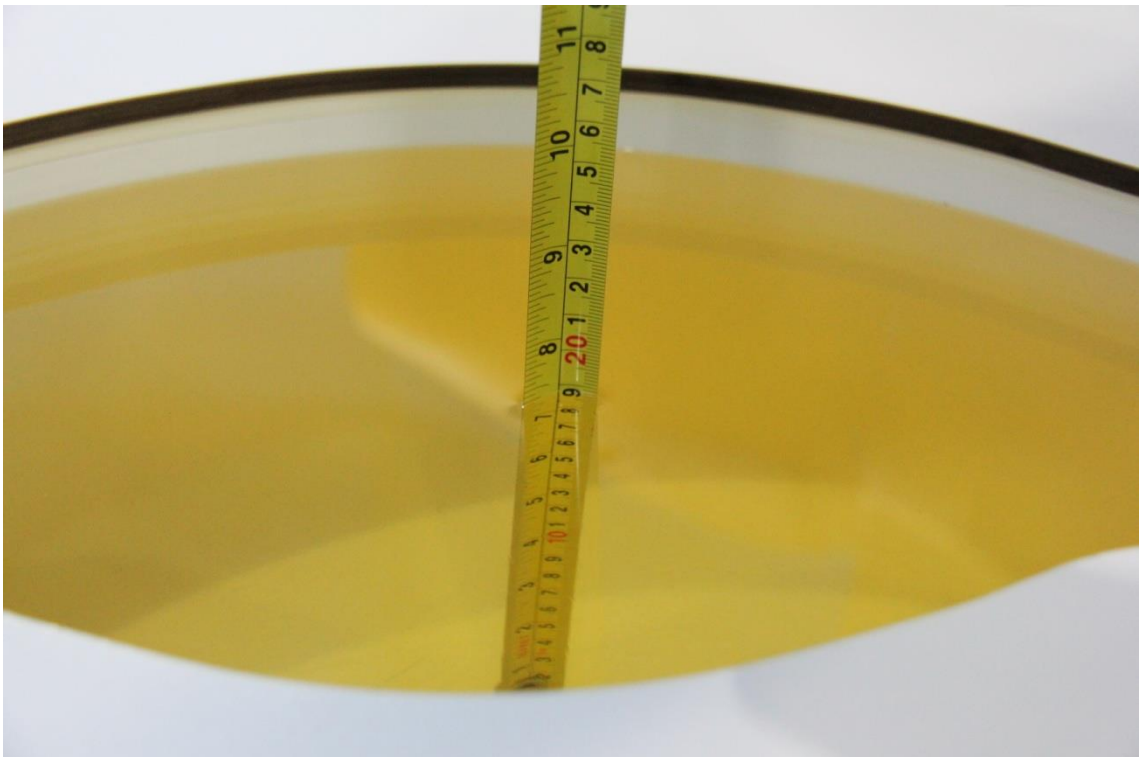
Table 7.2: Dielectric Performance of Tissue Simulating Liquid

Measurement Date yyyy/mm/dd	Frequency	Type	Permittivity ϵ	Drift (%)	Conductivity σ (S/m)	Drift (%)
2018/6/1	835 MHz	Head	41.49	-0.02	0.918	2.00
		Body	55.01	-0.34	0.964	-0.62
2018/6/2	1900 MHz	Head	39.78	-0.55	1.385	-1.07
		Body	54.1	1.50	1.525	0.33
2018/6/3	2450 MHz	Head	39.25	0.13	1.767	-1.83
		Body	52.83	0.25	1.967	0.87

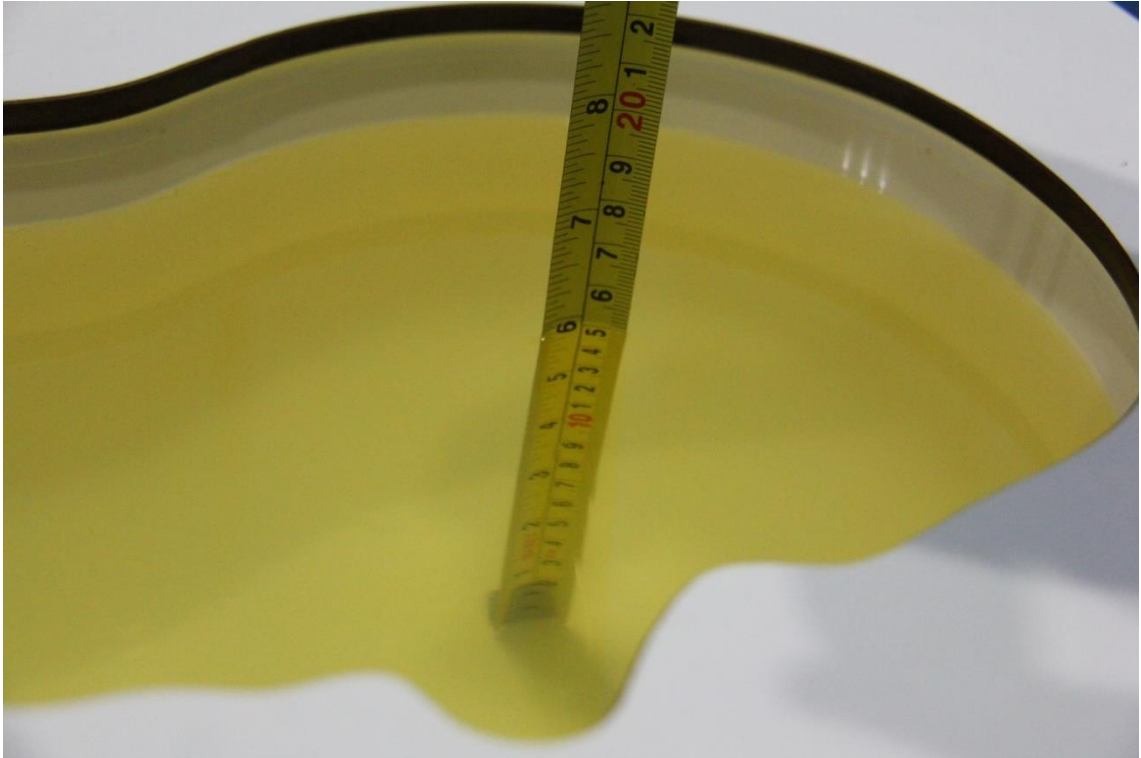
Note: The liquid temperature is 22.0 °C



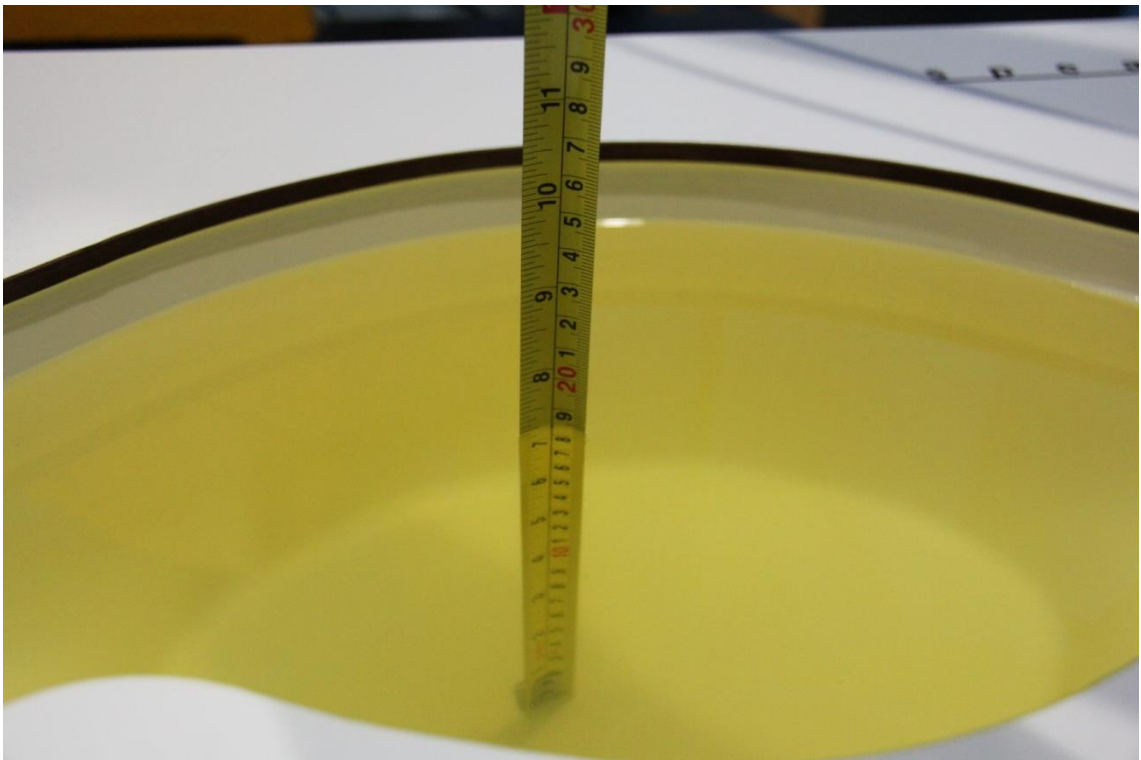
Picture 7-1 Liquid depth in the Head Phantom (835MHz)



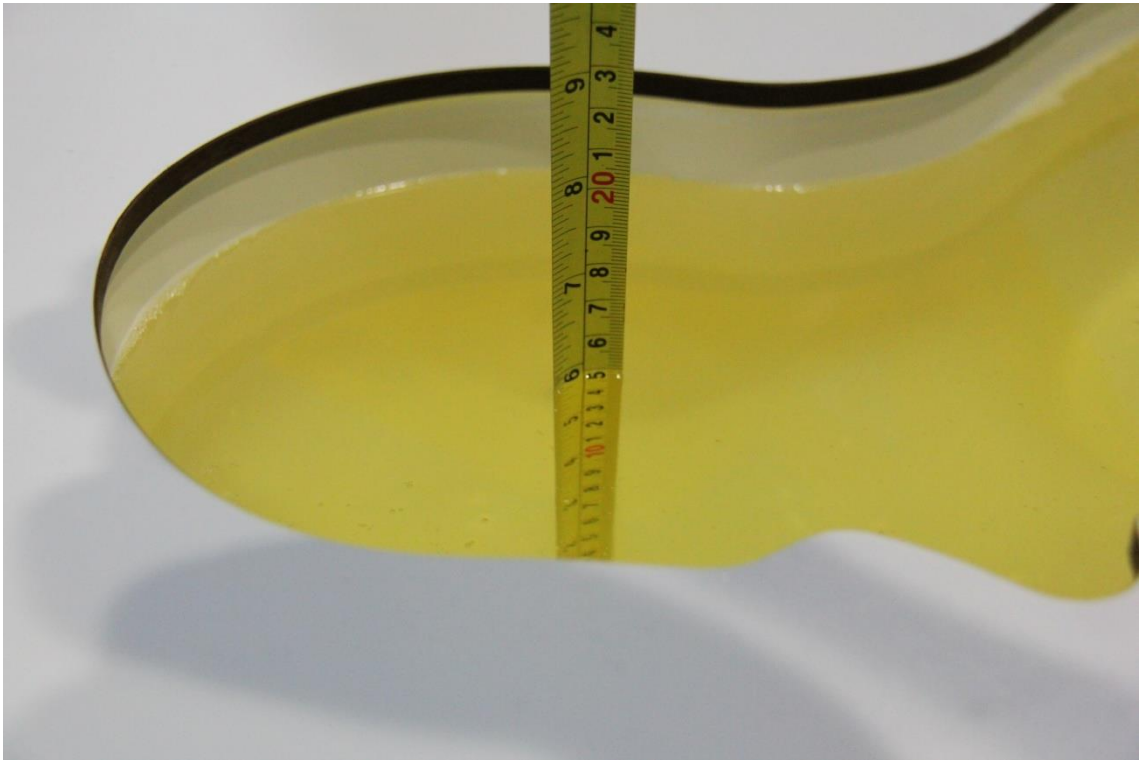
Picture 7-2 Liquid depth in the Flat Phantom (835MHz)



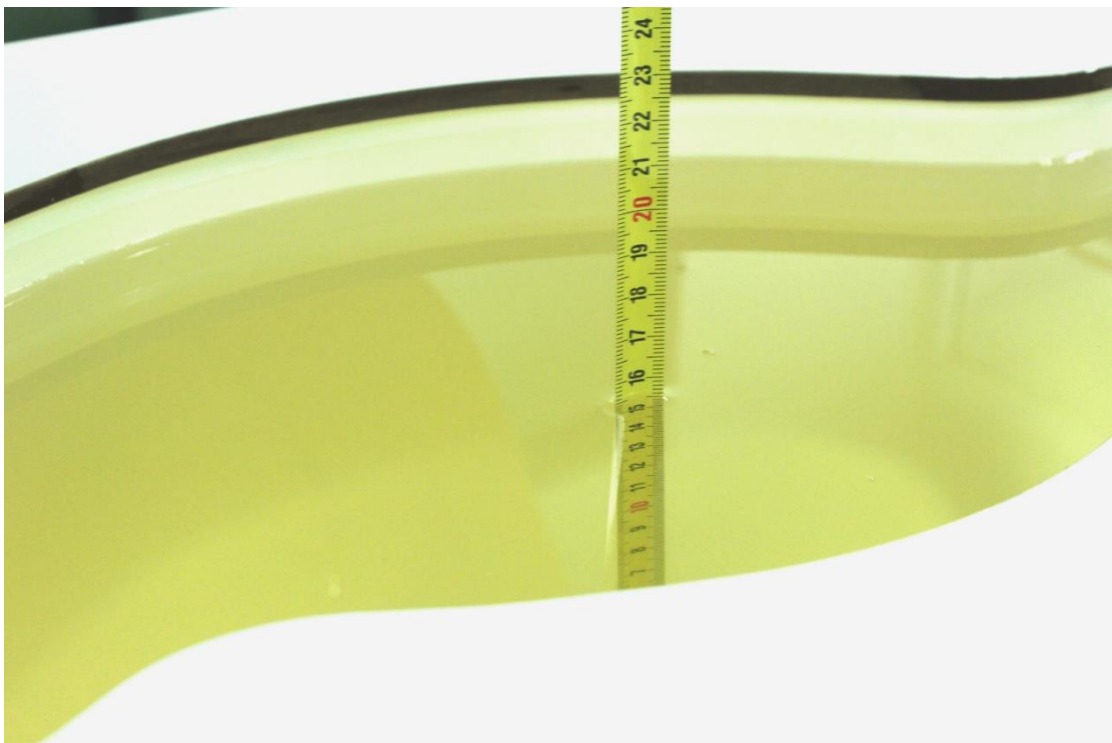
Picture 7-3 Liquid depth in the Head Phantom (1900 MHz)



Picture 7-4 Liquid depth in the Flat Phantom (1900MHz)



Picture 7-5 Liquid depth in the Head Phantom (2450MHz)



Picture 7-6 Liquid depth in the Flat Phantom (2450MHz)