

Radio Equipment Device- Health
For
Shandong USR IOT Technology Limited

4G Router

Model No.: USR-G800, USR-G801, USR-G802, USR-G803, USR-G804,
USR-G805, USR-G806, USR-G807, USR-G808, USR-G809

Prepared for : Shandong USR IOT Technology Limited
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Report No. : R011608860H-M1
Date of Test : Aug. 24~ Sept. 08, 2016
Date of Report : Sept. 09, 2016

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TEST REPORT DESCRIPTION

Applicant : Shandong USR IOT Technology Limited
Manufacturer : Shandong USR IOT Technology Limited
EUT : 4G Router
Model No. : USR-G800, USR-G801, USR-G802, USR-G803, USR-G804,
USR-G805, USR-G806, USR-G807, USR-G808, USR-G809
Serial No. : N.A.
Trade Mark : 
Rating : DC 9~16V, 600~800mA

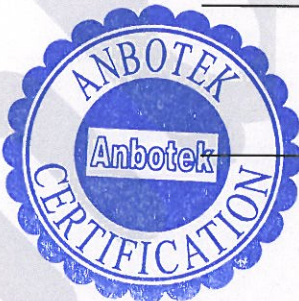
Test Procedure Used:
EN 62311: 2008

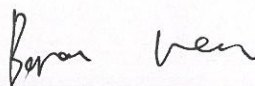
The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. This report shows the EUT to be technically compliant with the EN 62311:2008 requirements. The test results are contained in this report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full responsibility for the accuracy and completeness of these tests.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited..

Date of Test : Aug. 24~ Sept. 08, 2016

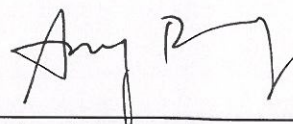
Prepared by :





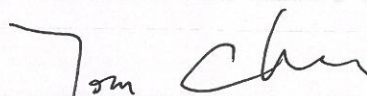
(Engineer / Baron Wen)

Reviewer :



(Project Manager/Amy Ding)

Approved & Authorized Signer :



(Manager/Tom Chen)

1. GENERAL INFORMATION

1.1 Description of Device (EUT)

EUT	: 4G Router
Model Number	: USR-G800, USR-G801, USR-G802, USR-G803, USR-G804, USR-G805, USR-G806, USR-G807, USR-G808, USR-G809 (Note: All samples are the same except the model number and colour, so we prepare “USR-G800” for test only.)
Test Power Supply	: AC 230V, 50Hz for adapter
Adapter	: Model No.: DQS151-120100-16312C Input: AC 100-240V, 50/60Hz, 0.4A Max Output: DC 12V, 1.0A
Frequency	: WiFi: 2412 ~ 2472MHz (13 channels) GSM: 900/1800 WCDMA: 900/2100 LTE:band 1;3
Antenna Gain	: WiFi: 3 dBi GSM: 5 dBi WCDMA: 5 dBi LTE: 5 dBi
Applicant Address	: Shandong USR IOT Technology Limited : Floor 11, Building 1, No. 1166 Xinluo Street, Gaoxin Qu, 250101, Jinan, Shandong, China
Manufacturer Address	: Shandong USR IOT Technology Limited : Floor 11, Building 1, No. 1166 Xinluo Street, Gaoxin Qu, 250101, Jinan, Shandong, China
Factory Address	: Shandong USR IOT Technology Limited : Floor 11, Building 1, No. 1166 Xinluo Street, Gaoxin Qu, 250101, Jinan, Shandong, China
Date of receipt	: Aug. 24, 2016
Date of Test	: Aug. 24~ Sept. 08, 2016
Remark	: Once the new report takes into force, the original report withdraw. This report is based on original report R011608860H. Both reports are the same except updated the product name.

1.2 Description of Test Facility

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

FCC-Registration No.: 752021

Shenzhen Anbotek Compliance Laboratory Limited, 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 752021, July 06, 2016.

IC-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A, Jun. 13, 2016.

Test Location

All Emissions tests were performed
Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC
Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong,
China

1.3 Measurement Uncertainty

Radiation Uncertainty : Ur = 4.1 dB (Horizontal)
Ur = 4.3 dB (Vertical)

Conduction Uncertainty : $U_c = 3.4 \text{ dB}$

2. GENERAL PRODUCT INFORMATION

2.1 Basic Restriction

The essential requirements of Directive 99/5/EC in the article 3.1(a) and the limits must be taken from Council Recommendation 99/519/EC for General Population or form the ICNIRP Guidelines for Occupational Exposure. EN 50371:2002 Generic standard to demonstrate the compliance of low power electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields. The average power of EUT is less than 20mW then comply with basic restriction (1999/519/EC) without test.

2.2 Table for Filed Antenna

Ant.	Antenna Type	Gain (dBi)
1.	Integrated	1.02

3.TEST RESULT

3.1 EMF Exposure Measurement

3.1.1 Limit

Basic Restrictions

Council Recommendation 99/519/EC Annex II

Basic restrictions for electric, magnetic and electromagnetic fields (0 Hz to 300 GHz)

Frequency range	Magnetic flux density (mT)	Current density (mA/m ²) (rms)	Whole body average SAR (W/kg)	Localized SAR (head and trunk) (W/kg)	Localized SAR (limbs) (W/kg)	Power density, S (W/m ²)
0Hz	40	-	-	-	-	-
>0-1Hz	-	8	-	-	-	-
1-4Hz	-	8/f	-	-	-	-
4Hz-1000Hz	-	2	-	-	-	-
1000Hz-100kHz	-	f/500	-	-	-	-
100kHz-10MHz	-	f/500	0.08	2	4	-
10MHz-10GHz	-	-	0.08	2	4	-
10GHz-300GHz	-	-	-	-	-	10

Note:

1. f is the frequency in Hz.
2. The basic restriction on the current density is intended to protect against acute exposure effects on central nervous system tissues in the head and trunk of the body and includes a safety factor. The basic restrictions for ELF fields are based on established adverse effects on the central nervous system. Such acute effects are essentially instantaneous and there is no scientific justification to modify the basic restrictions for exposure of short duration. However, since the basic restriction refers to adverse effects on the central nervous system, this basic restriction may permit higher current densities in body tissues other than the central nervous system under the same exposure conditions.
3. Because of electrical inhomogeneity of the body, current densities should be averaged over a cross section of 1 cm² perpendicular to the current direction.
4. For frequencies up to 100kHz, peak current density values can be obtained by multiplying the rms value by $\sqrt{2}$ (=1.414). For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as $1/(2tp)$.

5. For frequencies up to 100kHz and for pulsed magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate basic restriction.
6. All SAR values are to be averaged over any six-minute period.
7. Localised SAR averaging Mass is any 10g of contiguous tissue; the maximum SAR so obtained should be the value used for the estimation of exposure. These 10g of tissue are intended to be a mass of contiguous tissue with nearly homogeneous electrical properties. In specifying a contiguous mass of tissue, it is recognized that this concept can be used in computational dissymmetry but may present difficulties for direct physical measurements. A simple geometry such as cubic tissue mass can be used provided that the calculated dissymmetric quantities have conservative values relative to the exposure guidelines.
8. For pulses of duration t_p the equivalent frequency to apply in the basic restrictions should be calculated as $f = 1/(2t_p)$. Additionally, for pulsed exposures, in the frequency range 0.3 to 10GHz and for localized exposure of the head, in order to limit and avoid auditory effects caused by thermoplastic expansion, an additional basic restriction is recommended. This is that the SA should not exceed 2mJ kg⁻¹ averaged over 10g of tissue.

Reference Levels

Council Recommendation 99/519/EC Annex III Reference levels for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density Seq (W/m ²)
0-1Hz	-	$3,2 \times 10^4$	4×10^4	-
1-8Hz	1000	$3,2 \times 10^4 / f^2$	$4 \times 10^4 / f^2$	-
8-25Hz	1000	$4000 / f$	$5000 / f$	-
0.025Hz-0,8kHz	$250 / f$	$4 / f$	$5 / f_{6,25}$	-
0,8-3kHz	$250 / f$	5	6,25	-
3-150kHz	87	5	6,25	-
0,15-1MHz	87	$0.73 / f$	$0.92 / f$	-
1-10MHz	$87 / f^{1/2}$	$0.73 / f$	$0.92 / f$	-
10-400MHz	28	0.073	0.092	2
400-2000MHz	$1,375 f^{1/2}$	$0,0037 f^{1/2}$	$0,0046 f^{1/2}$	$f / 200$
2-300GHz	61	0,16	0,20	10

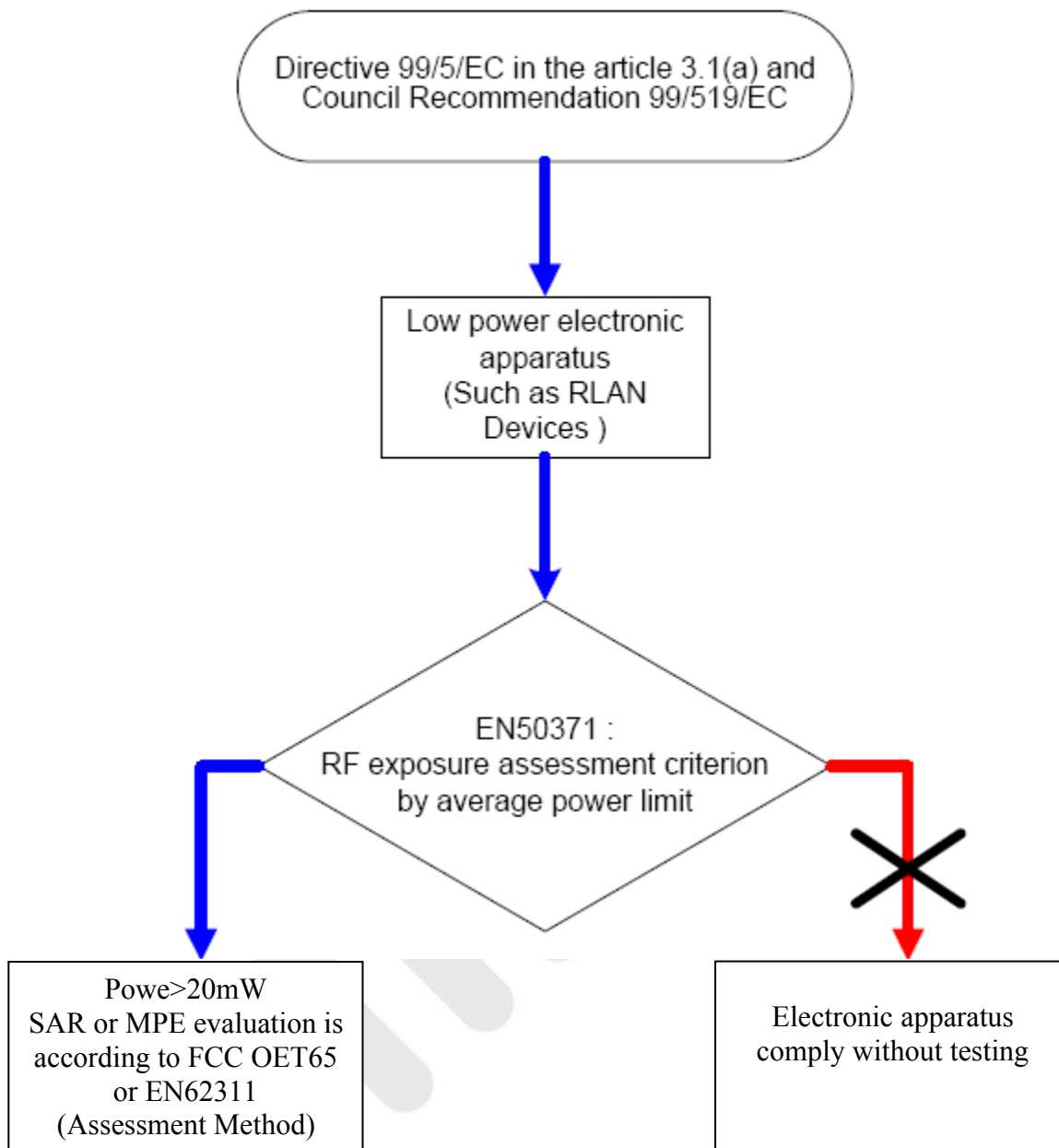
Note:

1. As indicated in the frequency range column.
 2. For frequencies between 100kHz and 10GHz, Seq, E2, H2 and B2 are to be averaged over any six-minute period.
 3. For frequencies exceeding 10GHz, Seq, E2, H2 and B2 are to be averaged over any 68/.1.05-minute period (.in GHz).
 4. No E-field value is provided for frequencies <1Hz, which are effectively static electric fields.
- For most people the annoying perception of surface electric charges will not occur at field strengths less than 20kV/m. Spark discharges causing stress or annoyance should be avoided.

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3.1.2. Evaluation Routine

Low Power Electronic Apparatus for RF exposure evaluation routine



3.2 Detailed results

3.2.1 MPE Evaluation

$$S = PG * \text{Duty factor} / 4\pi R^2$$

P = Peak Power Input to antenna (Watts)

G = Antenna Gain (numeric)

R = distance to the center of radiation of antenna (in meter) = 0.20 m

Note:

1) $P \text{ (Watts)} = (10^{(\text{dBm} / 10)}) / 1000$

2) $G \text{ (Antenna gain in numeric)} = 10^{(\text{Antenna gain in dBi} / 10)}$

3) Duty factor=1

4) $\pi = 3.142$

The maximum power density at a distance of 0.2 m for EUT is shown as below:

Frequency (MHz)	Antenna Gain(dBi)	Peak Output Power (dBm)	Peak Output Power (W)	Duty factor	Calculated RF Exposure (W/ m ²)	Limit (W/ m ²)
WiFi	3	19.72	0.094	1	0.37	10
GSM900	5	34.20	0.329	-9.03	2.07	4.5
GSM1800	5	30.50	0.140	-9.03	0.88	9
WCDMA 900	5	24.33	0.271	1	1.70	4.5
WCDMA 2100	5	22.95	0.197	1	1.24	9.725
LTE Band 1	5	21.85	0.153	1	0.96	9.725
LTE Band 3	5	21.51	0.142	1	0.89	8.725

3.2.2 Measurement Uncertainty

Extended Uncertainty (k=2) 95% 0.5dB