RF Exposure Evaluation Report

Application No.:	SZEM2007006550CR
Applicant:	UAB Teltonika Networks
Address of Applicant:	K. Barsausko st. 66, LT-51436, Kaunas, Lithuania
Manufacturer:	UAB Teltonika Networks
Address of Manufacturer:	K. Barsausko st. 66, LT-51436, Kaunas, Lithuania
Factory:	UAB Teltonika EMS
Address of Factory:	Liepkalnio st. 132A, LT-02121, Vilnius, Lithuania

Equipment Under Test (EUT):

Product Name:	LTE Router
Model No.:	RUT240
Trade Mark:	Teltonika
FCC ID:	2AET4RUT240G
Standards:	47 CFR Part 1.1307
	47 CFR Part 1.1310
	47 CFR Part 2.1091
Date of Receipt:	2020-07-15
Date of Test:	2020-07-19 to 2020-12-11
Date of Issue:	2020-12-21

Test Result :	**PASS***

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2020-12-21		Original

Authorized for issue by:				
		Calvin Weng		
		Calvin Weng/Project Engineer		
		Eric Fu		
		Eric Fu/Reviewer		

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

3 Contents

4 General Information

4.1 General Description of EUT

Power Supply:	DC9V by AC/DC Adapter Adapter M/N: SJ-09010033 Adapter input: 100-240VAC, 50/60Hz, 0.8A Adapter output: DC9V/1A
Cable:	Power cable: 2m unshielded without ferrite core RJ45 cable: 1.5m unshielded
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11
Channel Spacing:	5MHz
Antenna Type:	Dipole antenna
Antenna Gain:	5dBi
SN:	999999999
HVIN:	RUT240G
FVIN:	RUT2XX_R_AA.BB.CC

4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.3 Test Facility

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

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

None.

5 RF Exposure Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500	.....	.....	f/300	6
1500–100,000	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500	.....	.....	f/1500	30
1500–100,000	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: Pd = (Pout*G)/(4* Pi * R 2)

Where

Pd = power density in mW/cm2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd id the limit of MPE, 1 mW/cm2 . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.1.3 EUT RF Exposure Evaluation

WIFI:

Antenna Gain: 5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.16 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
Highest	2462	20	100	0.0629	1.0	PASS

Note: Refer to report No. SZEM200700655002 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

GSM/WCDMA and LTE:

Antenna Gain: 3dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.00 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Mode	Frequency (MHz)	Max Conducted Average Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
GSM850	824.2	25.81	381.0658	0.1513	1.0	PASS
GSM1900	1850.2	22.81	190.9853	0.0758	1.0	PASS
WCDMA B2	1852.4	25.00	316.2278	0.1255	1.0	PASS
WCDMA B4	1712.4	25.00	316.2278	0.1255	1.0	PASS
WCDMA B5	826.4	25.00	316.2278	0.1255	1.0	PASS
LTE B2	1850.7	25.00	316.2278	0.1255	1.0	PASS
LTE B4	1710.7	25.00	316.2278	0.1255	1.0	PASS
LTE B5	824.7	25.00	316.2278	0.1255	1.0	PASS
LTE B7	2502.5	25.00	316.2278	0.1255	1.0	PASS
LTE B12	699.7	25.00	316.2278	0.1255	1.0	PASS
LTE B13	779.5	25.00	316.2278	0.1255	1.0	PASS
LTE B25	1850.7	25.00	316.2278	0.1255	1.0	PASS
LTE B26 (814-824MHz)	814.7	25.00	316.2278	0.1255	1.0	PASS
LTE B26 (824-849MHz)	824.7	25.00	316.2278	0.1255	1.0	PASS
LTE B38	2572.5	25.00	316.2278	0.1255	1.0	PASS
LTE B41	2498.5	25.00	316.2278	0.1255	1.0	PASS

The WIFI can’t transmit simultanuously with GSM/WCDMA and LTE function.

- End of the Report -