



RF Exposure Evaluation Report

Application No.: SZEM2011012030CR
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: 2020-11-25
Date of Test: 2021-05-10 to 2021-05-22
Date of Issue: 2021-05-26

Test Result :	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu

Keny Xu
EMC Laboratory Manager



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

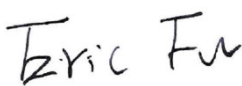
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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2021-05-26		Original

Authorized for issue by:				
				
		Edison Li /Project Engineer		
				
		Eric Fu/Reviewer		



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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



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.



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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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is 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.



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4.1.3 EUT RF Exposure Evaluation

For 2.4G 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
Middle	2437	15.42	34.83	0.0219	1.0	PASS

Note: Refer to report No. SZEM201101203002 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, the MPE limit of 1500MHz to 100000MHz is 1.0 mW/cm².

For WCDMA/LTE module:

The max tune-up tolerance power Into Antenna & RF Exposure Evaluation Distance:

Type	Test Freq. (MHz)	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R=20cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
WCDMA Band II	1852.4	3	2.00	25	316.23	0.0201	1	0.0201	PASS
WCDMA Band IV	1712.4	3	2.00	25	316.23	0.0201	1	0.0201	PASS
WCDMA Band V	826.4	3	2.00	25	316.23	0.0201	0.5509	0.0365	PASS
LTE Band2	1850.7	3	2.00	25	316.23	0.0201	1	0.0201	PASS
LTE Band4	1710.7	3	2.00	25	316.23	0.0201	1	0.0201	PASS
LTE Band5	824.7	3	2.00	25	316.23	0.0201	0.5498	0.0365	PASS
LTE Band12	699.7	3	2.00	25	316.23	0.0201	0.4665	0.0431	PASS
LTE Band13	779.5	3	2.00	25	316.23	0.0201	0.5197	0.0386	PASS
LTE Band14	790.5	3	2.00	25	316.23	0.0201	0.5270	0.0381	PASS
LTE Band66	1710.7	3	2.00	25	316.23	0.0201	1.0000	0.0201	PASS
LTE Band71	665.5	3	2.00	25	316.23	0.0201	0.4437	0.0453	PASS

Note: LTE module EC25-AF has been authorized under FCC ID: XMR201808EC25AF dated on 08/03/2018.



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Note: Refer to report No. R1806A0301 or EUT test Max Conducted Peak Output Power value.
The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement. the MPE limit of 300MHz to 1500MHz is $f/1500 \text{ mW/cm}^2$, the MPE limit of 1500MHz to 100000MHz is 1.0 mW/cm^2 .

The simultaneous transmission result between of WLAN and WCDMA/LTE module:

The SAR Exclusion Threshold Level:

$$= \text{CPD1} / \text{LPD1} + \text{CPD2} / \text{LPD2}$$

(CPD = Calculation power density, LPD = Limit of power density)

$$= (0.0219/1 + (0.0201/0.4437)) = 0.0672 < 1$$

Since the SAR Exclusion Threshold Level is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing.

- End of the Report -



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