Test Lab
Cert 2951.01

RF EXPOSURE REPORT

Product:	Industrial Dual SIM Cellular VPN Router
Model Name:	R3000-L4L
FCC ID:	2AAJGR3KL
Applicant:	Guangzhou Robustel Technologies Co., Limited
Address:	3rd Floor, Building F, Kehui Park, No.95, Daguan Road, Tianhe District, Guangzhou 510660, China
Manufacturer:	Guangzhou Robustel Technologies Co., Limited
Address:	3rd Floor, Building F, Kehui Park, No.95, Daguan Road, Tianhe District, Guangzhou 510660, China
Prepared by:	Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch
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Report No.:	RF170607W003
Received Date:	Jun. 07, 2017
Test Date:	Jun. 08, 2017 ~ Jun. 20, 2017
Issued Date:	Jun. 21, 2017

This report should not be used by the client to claim product certification, approval, or endorsement by A2LA or any government agencies.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF170607W003	Original release	Jun. 21, 2017

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1 CERTIFICATION

PRODUCT:	Industrial Dual SIM Cellular VPN Router
BRAND NAME:	Robustel
MODEL NAME:	R3000-L4L
APPLICANT:	Guangzhou Robustel Technologies Co., Limited
TESTED:	Jun. 08, 2017 ~ Jun. 20, 2017
TEST SAMPLE:	Production Unit
STANDARDS:	**FCC Part 2 (Section 2.1091)**
	FCC OET Bulletin 65, Supplement C (01-01)
	KDB 447498 D01 General RF Exposure Guidance v06
	IEEE C95.1

The above equipment has been tested by **Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : _____ , **DATE:** Jun. 21, 2017

(Harry Li/ Engineer)

APPROVED BY : _____ , **DATE:** Jun. 21, 2017

(Sam Tung / Manager)

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Industrial Dual SIM Cellular VPN Router	
MODEL NAME	R3000-L4L	
ADDITIONAL MODELS	R3000-L3P, R3000-L3H	
POWER SUPPLY	DC 12V	
OPERATING TEMPERATURE RANGE	-40 ~ 85℃	
MODULATION TYPE	**LTE**	QPSK, 16QAM
OPERATING FREQUENCY	**LTE**	1710.7MHz ~ 1754.3MHz (FOR LTE Band4) 779.5MHZ ~ 784.5MHZ (FOR LTE Band13)
ANTENNA GAIN	Fixed External Antenna with 2.17dBi	
HW VERSION	V1.1.0	
SW VERSION	V2.9.1	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	N/A	

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. Additional models R3000-L3P, R3000-L3H are identical with the test model R3000-L4L except the model NO. for marketing purpose.
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3 RF EXPOSURE

3.1 LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

FREQUENCY RANGE (MHz)	ELECTRIC FIELD STRENGTH (V/m)	MAGNETIC FIELD STRENGTH (A/m)	POWER DENSITY (mW/cm^2)	AVERAGE TIME (minutes)
LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE				
300-1500	…	…	F/1500	30
1500-100,000	…	…	1.0	30

F = Frequency in MHz

3.2 MPE CALCULATION FORMULA

Pd = (Pout*G) / (4*pi*r2)

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

3.3 CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

3.4 CONDUCTED POWER

LTE BAND 4

LTE Band 4							
BW	Modulation	RB Size	RB Offset	Low CH 19957	Mid CH 20175	High CH 20393	MPR
				Frequency 1710.7 MHz	Frequency 1732.5 MHz	Frequency 1754.3 MHz	
1.4MHz	QPSK	1	0	22.63	22.66	22.86	0
		1	2	22.59	22.62	22.82	0
		1	5	22.56	22.59	22.79	0
		3	0	22.61	22.64	22.84	0
		3	1	22.57	22.60	22.80	0
		3	3	22.54	22.57	22.77	0
		6	0	21.73	21.76	21.96	1
	16QAM	1	0	21.88	21.91	22.11	1
		1	2	21.83	21.86	22.06	1
		1	5	21.78	21.81	22.01	1
		3	0	21.87	21.90	22.10	1
		3	1	21.82	21.85	22.05	1
		3	3	21.77	21.80	22.00	1
		6	0	20.69	20.72	20.92	2
BW	Modulation	RB Size	RB Offset	Low CH 19965	Mid CH 20175	High CH 20385	MPR
				Frequency 1711.5 MHz	Frequency 1732.5 MHz	Frequency 1753.5 MHz	
3 MHz	QPSK	1	0	22.64	22.67	22.87	0
		1	7	22.60	22.63	22.83	0
		1	14	22.57	22.60	22.80	0
		8	0	21.86	21.89	22.09	1
		8	3	21.82	21.85	22.05	1
		8	7	21.78	21.81	22.01	1
		15	0	21.74	21.77	21.97	1
	16QAM	1	0	21.89	21.92	22.12	1
		1	7	21.84	21.87	22.07	1
		1	14	21.79	21.82	22.02	1
		8	0	20.90	20.93	21.13	2
		8	3	20.84	20.87	21.07	2
		8	7	20.82	20.85	21.05	2
		15	0	20.70	20.73	20.93	2

LTE Band 4							
BW	Modulation	RB Size	RB Offset	Low CH 19975	Mid CH 20175	High CH 20375	MPR
				Frequency 1712.5 MHz	Frequency 1732.5 MHz	Frequency 1752.5 MHz	
5 MHz	QPSK	1	0	22.67	22.70	22.90	0
		1	12	22.63	22.66	22.86	0
		1	24	22.60	22.63	22.83	0
		12	0	21.89	21.92	22.12	1
		12	6	21.85	21.88	22.08	1
		12	13	21.81	21.84	22.04	1
		25	0	21.77	21.80	22.00	1
	16QAM	1	0	21.92	21.95	22.15	1
		1	12	21.87	21.90	22.10	1
		1	24	21.82	21.85	22.05	1
		12	0	20.93	20.96	21.16	2
		12	6	20.87	20.90	21.10	2
		12	13	20.85	20.88	21.08	2
		25	0	20.73	20.76	20.96	2
BW	Modulation	RB Size	RB Offset	Low CH 20000	Mid CH 20175	High CH 20350	MPR
				Frequency 1715 MHz	Frequency 1732.5 MHz	Frequency 1750 MHz	
10 MHz	QPSK	1	0	22.71	22.74	22.94	0
		1	24	22.67	22.70	22.90	0
		1	49	22.64	22.67	22.87	0
		25	0	21.93	21.96	22.16	1
		25	12	21.89	21.92	22.12	1
		25	25	21.85	21.88	22.08	1
		50	0	21.81	21.84	22.04	1
	16QAM	1	0	21.96	21.99	22.19	1
		1	24	21.91	21.94	22.14	1
		1	49	21.86	21.89	22.09	1
		25	0	20.97	21.00	21.20	2
		25	12	20.91	20.94	21.14	2
		25	25	20.89	20.92	21.12	2
		50	0	20.77	20.80	21.00	2

LTE Band 4							
BW	Modulation	RB Size	RB Offset	Low CH 20025	Mid CH 20175	High CH 20325	MPR
				Frequency 1717.5 MHz	Frequency 1732.5 MHz	Frequency 1747.5 MHz	
15 MHz	QPSK	1	0	22.77	22.80	23.00	0
		1	37	22.73	22.76	22.96	0
		1	74	22.70	22.73	22.93	0
		36	0	21.99	22.02	22.22	1
		36	19	21.95	21.98	22.18	1
		36	39	21.91	21.94	22.14	1
		75	0	21.87	21.90	22.10	1
	16QAM	1	0	22.02	22.05	22.25	1
		1	37	21.97	22.00	22.20	1
		1	74	21.92	21.95	22.15	1
		36	0	21.03	21.06	21.26	2
		36	19	20.97	21.00	21.20	2
		36	39	20.95	20.98	21.18	2
		75	0	20.83	20.86	21.06	2
BW	Modulation	RB Size	RB Offset	Low CH 20050	Mid CH 20175	High CH 20300	MPR
				Frequency 1720 MHz	Frequency 1732.5 MHz	Frequency 1745 MHz	
20MHz	QPSK	1	0	22.80	22.83	**23.03**	0
		1	50	22.76	22.79	22.99	0
		1	99	22.73	22.76	22.96	0
		50	0	22.02	22.05	22.25	1
		50	25	21.98	22.01	22.21	1
		50	50	21.94	21.97	22.17	1
		100	0	21.90	21.93	22.13	1
	16QAM	1	0	22.05	22.08	22.28	1
		1	50	22.00	22.03	22.23	1
		1	99	21.95	21.98	22.18	1
		50	0	21.06	21.09	21.29	2
		50	25	21.00	21.03	21.23	2
		50	50	20.98	21.01	21.21	2
		100	0	20.86	20.89	21.09	2

LTE BAND 13

LTE Band 13							
BW	Modulation	RB Size	RB Offset	Low CH 23205 Frequency 779.5 MHz	Mid CH 23230 Frequency 782.0 MHz	High CH 23255 Frequency 784.5 MHz	MPR
5 MHz	QPSK	1	0	22.44	22.54	22.42	0
		1	12	22.40	22.50	22.38	0
		1	24	22.37	22.47	22.35	0
		12	0	21.67	21.77	21.65	1
		12	6	21.63	21.73	21.61	1
		12	13	21.59	21.69	21.57	1
		25	0	21.55	21.65	21.53	1
	16QAM	1	0	21.70	21.80	21.68	1
		1	12	21.65	21.75	21.63	1
		1	24	21.60	21.70	21.58	1
		12	0	20.68	20.78	20.66	2
		12	6	20.66	20.76	20.64	2
		12	13	20.64	20.74	20.62	2
		25	0	20.53	20.63	20.51	2
BW	Modulation	RB Size	RB Offset	CH Frequency MHz	CH 23230 Frequency 782.0 MHz	CH Frequency MHz	MPR
10 MHz	QPSK	1	0	-	**22.56**	-	0
		1	24	-	22.52	-	0
		1	49	-	22.49	-	0
		25	0	-	21.79	-	1
		25	12	-	21.75	-	1
		25	25	-	21.71	-	1
		50	0	-	21.67	-	1
	16QAM	1	0	-	21.82	-	1
		1	24	-	21.77	-	1
		1	49	-	21.72	-	1
		25	0	-	20.80	-	2
		25	12	-	20.78	-	2
		25	25	-	20.76	-	2
		50	0	-	20.65	-	2

3.5 CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

LTE

Band	Frequency (MHz)	Operating Mode	Antenna Gain (dBi)	Tune-up Power (dBm)	E.I.R.P Power (mW)	Power Density (mW/cm^2)	limit (mW/cm^2)	PASS / FAIL
Band4	1745	QPSK	2.17	23.5	368.978	0.073	1.00	PASS
Band13	782.0	QPSK	2.17	23.0	328.852	0.065	0.52	PASS