

# RF Exposure Evaluation Report

**Product** : Intelligent Vehicle Network Gateway  
**Trade mark** : TN-IVS-8000  
**Model/Type reference** : TN-IVS-8000  
**Serial Number** : N/A  
**Report Number** : EED32I00216508  
**FCC ID** : 2AJDT-TNIVS8000  
**Date of Issue** : Sep. 28, 2016  
**Test Standards** : 47 CFR Part 1.1307(2015)  
47 CFR Part 1.1310(2015)  
KDB447498D01v06  
**Test result** : PASS

Prepared for:

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Sep. 28, 2016

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## 2 Version

Version No.	Date	Description
00	Sep. 28, 2016	Original

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## 4 General Information

### 4.1 Client Information

Applicant:	ZHEJIANG THIRD NET CO., LTD.
Address of Applicant:	6th FL Building A, The Intelligence e Valley, No. 482 Qianmo Road, Binjiang District, Hangzhou, Zhejiang, china
Manufacturer:	ZHEJIANG THIRD NET CO., LTD.
Address of Manufacturer:	6th FL Building A, The Intelligence e Valley, No. 482 Qianmo Road, Binjiang District, Hangzhou, Zhejiang, china

### 4.2 General Description of EUT

Product Name:	Intelligent Vehicle Network Gateway
Model No.(EUT):	TN-IVS-8000
Trade Mark:	TN-IVS-8000
EUT Supports Radios application	GPS: 1575.42MHz Wlan 2.4GHz 802.11b/g/n(HT20&HT40) UMTS: Band II(1900MHz), Band IV(1700MHz), Band V(850MHz) WCDMA LTE: Band 2, Band 4, Band 5, Band 17

### 4.3 Product Specification subjective to this standard

Operation Frequency:	Band	TX(MHz)
	Wlan 2.4GHz	2412-2462
	WCDMA Band V	826.40-846.60
	WCDMA Band II	1852.40-1907.60
	WCDMA Band IV	1712.4-1752.6
	LTE Band 2	1852.40-1907.60
	LTE Band 4	1710-1755
	LTE Band 5	824 -849
	LTE Band 17	704-716
Type of Modulation:	Wlan 2.4GHz: DSSS, OFDM; WCDMA: QPSK; LTE: QPSK,16QAM	
Sample Type:	Fixed production	
Antenna Type and Gain:	Temporary antenna	
Antenna Gain:	Wlan 2.4GHz: 3dBi, Wlan 2.4GHz MIMO: 6.01dBi, WCDMA Band II: 1.5dBi, WCDMA Band V: 1dBi, WCDMA Band IV: 1.5dBi , LTE Band 2: 1.5dBi, LTE Band 4: 1.5dBi, LTE Band 5: 1dBi, LTE Band 17: 1dBi	
Test Voltage:	DC 12V	
Sample Received Date:	Aug. 01, 2016	
Sample tested Date:	Aug. 01, 2016 to Sep. 27, 2016	
The tested samples and the sample information are provided by the client.		

### 4.4 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd.

Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China 518101

Telephone: +86 (0) 755 3368 3668 Fax: +86 (0) 755 3368 3385

No tests were sub-contracted.

## 4.5 Test Facility

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

### **CNAS-Lab Code: L1910**

Centre Testing International Group Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories..

### **A2LA-Lab Cert. No. 3061.01**

Centre Testing International Group Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

### **FCC-Registration No.: 886427**

Centre Testing International Group Co., Ltd. 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 886427.

### **IC-Registration No.: 7408A-2**

The 3m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408A-2 .

### **IC-Registration No.: 7408B-1**

The 10m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408B-1.

### **NEMKO-Aut. No.: ELA503**

Centre Testing International Group Co., Ltd. has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10.

### **VCCI**

The Radiation 3 & 10 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-4096.

Main Ports Conducted Interference Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-4563.

Telecommunication Ports Conducted Disturbance Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-2146.



The Radiation 3 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-758

#### **4.6 Deviation from Standards**

None.

#### **4.7 Abnormalities from Standard Conditions**

None.

#### **4.8 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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

A rough estimation of the expected exposure in power flux density on a given point can be made with the following equation:

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

Where:

S = power density

P = power input to the antenna

G = numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R= distance to the centre of radiation of the antenna

EIRP = P\*G

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user.

Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the user's manual. Therefore, the S of the device is calculated with R=20cm, and if it is below the limit S, then we can conclude the device complies with the rules.

#### 5.1.2 Test Procedure

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

### 5.1.3 EUT RF Exposure Evaluation

#### Antenna Gain:

Wlan 2.4GHz: 3dBi, Wlan 2.4GHz MIMO: 6.01dBi, WCDMA Band II: 1.5dBi, WCDMA Band V: 1dBi, WCDMA Band IV: 1.5dBi, LTE Band 2: 1.5dBi, LTE Band 4: 1.5dBi, LTE Band 5: 1dBi, LTE Band 17: 1dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

#### Wlan 2.4GHz

Antenna	Max Conducted Peak Output Power(dBm)	Gain (dBi)	EIRP* (dBm)	EIRP (mW)	R (cm)	S (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
Antenna 1	19.58	3	22.58	181.13	20	0.036	1.0	Pass
Antenna 2	19.48	3	22.48	177.01	20	0.035	1.0	Pass
MIMO	22.46	6.01	28.47	703.07	20	0.140	1.0	Pass

#### WCDMA

Band	Max Conducted Peak Output Power(dBm)	Gain (dBi)	EIRP* (dBm)	EIRP (mW)	R (cm)	S (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
WCDMA Band V	23.83	1	24.83	304.09	20	0.061	0.57	Pass
WCDMA Band IV	24.75	1.5	26.25	421.70	20	0.084	1	Pass
WCDMA Band II	24.76	1.5	26.26	422.67	20	0.084	1	Pass

#### LTE

Band	Max Conducted Peak Output Power(dBm)	Gain (dBi)	EIRP* (dBm)	EIRP (mW)	R (cm)	S (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
LTE Band 2	23.25	1.5	24.75	298.54	20	0.059	1	Pass
LTE Band 4	22.72	1.5	24.22	264.24	20	0.053	1	Pass
LTE Band 5	22.84	1	23.84	192.31	20	0.038	0.55	Pass
LTE Band 17	23.13	1	24.13	258.82	20	0.052	0.47	Pass

**Note:** Refer to report No. EED32I00216502, EED32I00216503, EED32I00216504, EED32I00216505, EED32I00216506, EED32I00216507 for EUT test Max Conducted Peak Output Power value.



## PHOTOGRAPHS OF EUT Constructional Details

Refer to Report No. EED32I00216501 for EUT external and internal photos.

\*\*\* End of Report \*\*\*

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