EMC TEST REPORT



Report No.: 15020210-FCC-E1

Supersede Report No.: N/A				
Applicant	Beijing InHand Networks Technology Co., Ltd.			
Product Name	Embedded Computer			
Model No.	InBOX300			
Serial Model No.	InBOX310、InBOX320、InBOX330、InBOX300S、InBOX310S、InBOX320S、 InBOX330S			
Test Standard	FCC Part 15 Subpart B Class B:2016 ANSI C63.4: 2014			
Test Date	December 22,2015 to January 04, 2016			
Issue Date	January 22, 2016			
Test Result Pass Fail				
Equipment complied	I with the specification			
Equipment did not o	omply with the specification			
Winnie Zhang David Hunny				
Winnie Zha Test Engin	eer David Huang Checked By			
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only				

Issued by: SIEMIC (SHENZHEN-CHINA) LABORATORIES

Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao'an District, Shenzhen, Guangdong China 518108 Phone: +86 0755 2601 4629801 Email: China@siemic.com.cn



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Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for comonnity Assessment			
Country/Region	Scope		
USA	EMC, RF/Wireless, SAR, Telecom		
Canada	EMC, RF/Wireless, SAR, Telecom		
Taiwan	EMC, RF, Telecom, SAR, Safety		
Hong Kong	RF/Wireless, SAR, Telecom		
Australia	EMC, RF, Telecom, SAR, Safety		
Korea	EMI, EMS, RF, SAR, Telecom, Safety		
Japan	EMI, RF/Wireless, SAR, Telecom		
Singapore	EMC, RF, SAR, Telecom		
Europe	EMC, RF, SAR, Telecom, Safety		

Accreditations for Conformity Assessment



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1. <u>Report Revision History</u>

Report No.	Report Version	Description	Issue Date
15020210-FCC-E1	NONE	Original	January 22, 2016

2. Customer information

Applicant Name	Beijing InHand Networks Technology Co., Ltd.
Applicant Add	101,West Wing,11th Floor,No.101,Lize central Park Wangjing,Chaoyang District,Beijing,100102,China
Manufacturer	Beijing InHand Networks Technology Co., Ltd.
Manufacturer Add	101,West Wing,11th Floor,No.101,Lize central Park Wangjing,Chaoyang District,Beijing,100102,China

3. <u>Test site information</u>

Lab parforming tooto	SIEMIC (Shanzhan China) I ABODATORIES
Lab performing tests	SIEMIC (SIEMZIEII-CHINA) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park
Lab Address	South Side of Zhoushi Road, Bao'an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	535293
IC Test Site No.	4842E-1
Test Software	EZ_EMC



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4. Equipment under Test (EUT) Information				
Description of EUT:	Embedded Computer			
Main Model:	InBOX300			
Serial Model:	InBOX310、 InBOX320、 InBOX330、 InBOX300S、 InBOX310S、 InBOX320S、 InBOX330S			
Date EUT received:	July 13,2015			
Test Date(s):	December 22,2015 to January 04, 2016			
Antenna Gain:	GSM850/PCS1900:1 dBi UMTS-FDD Band V /UMTS-FDD Band II :2.5 dBi WIFI:802.11b/g/n(20M/40M): 2dBi			
Type of Modulation:	GSM : GMSK UMTS-FDD: QPSK WIFI:802.11b/g/n(20M/40M): DSSS, OFDM			
RF Operating Frequency Band(s):	GSM850 TX: 824.2 ~ 848.8 MHz; RX: 869.2 ~ 893.8 MHz PCS1900 TX: 1850.2 ~ 1909.8 MHz; RX: 1930.2 ~ 1989.8 MHz UMTS-FDD Band V TX: 826.4 ~ 846.6 MHz; RX: 871.4 ~ 891.6 MHz UMTS-FDD Band II TX:1852.4 ~ 1907.6 MHz; RX: 1932.4 ~ 1987.6 MHz WIFI:802.11b/g/n(20M): 2412-2462 MHz (TX/RX) WIFI:802.11n(40M): 2422-2452 MHz (TX/RX)			
	GSM 850: 124CH、PCS1900: 299CH			
	UMTS-FDD Band V : 102CH			
Number of Channels:	UMTS-FDD Band II : 277CH			
	WIFI :802.11b/g/n(20M): 11CH			
	WIFI:802.11n(40M):/CH			
Port:	Speaker Port, MIC Port, ttyO3*2, ttyO5*2, LAN Port			
Input Dowor				
Input Power: Trade Name :	UC 9-24V			
HAUG NAING .	innano			
FCC ID:	2AANYBOX			

Note: We use the main model to test and the main model configuration is the most complete Note: the difference between these models please refer to **Annex E. DECLARATION OF SIMILARITY.**



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5. Test Summary

The product was tested in accordance with the following specifications. All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.107; ANSI C63.4: 2014	AC Power Line Conducted Emissions	Compliance
§15.109; ANSI C63.4: 2014	Radiated Emissions	Compliance

Measurement Uncertainty

Emissions				
Test Item Description				
Band Edge and Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB		



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6. <u>Measurements, Examination And Derived Results</u>

6.1 AC Power Line Conducted Emissions

Temperature	27.9°C
Relative Humidity	61%
Atmospheric Pressure	1019mbar
Test date :	December 22, 2015
Tested By :	Winnie Zhang

Requirement(s):

Spec	ltem	Item Requirement Applicable			Applicable
47CFR§15.10 7	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 			2
Test Setup		Note: 1.Support u 2.Both of Li from othe	Inits were connected to se ISNs (AMN) are 80cm from r units and other metal pla	Test Receiver	
Procedure	-	The EUT and supporting of the standard on top of Annex B. The power supply for the filtered mains. The RF OUT of the EUT coaxial cable. All other supporting equi	g equipment were set up f a 1.5m x 1m x 0.8m hig e EUT was fed through a LISN was connected to pment were powered se	o in accordance with the r gh, non-metallic table, as a 50 [mu]H/50 EUT LISN o the EMI test receiver via eparately from another m	equirements shown in , connected to a a low-loss ain supply.
Remark					
Result	Pas	s 🗖 Fail			
Test Data Test Plot	✓ _{Yes} ✓ _{Yes}	(See below)			_



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Data sample

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)	QP	(dB}	(dBuV)	(dBuV)	(dB)	

P/L=Phase Line or Neutral

Frequency (MHz) = Emission frequency in MHz

Reading $(dB\mu V)$ = Receiver Reading Value

Detector=Quasi Peak Detector or Average Detector

Corrected (dB) = cable loss+ Insertion loss of LISN+ Insertion loss of transient limiter (The transient limiter included 10dB attenuation)

Result (dBµV) = Reading Value + Corrected Value

Limit (dB μ V) = Limit stated in standard

Calculation Formula:

Margin (dB) = Result (dB μ V) – limit (dB μ V)



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Phase Line Plot at 240Vac, 50Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)	
1	L1	0.1695	28.82	QP	10.03	38.85	64.98	-26.13	
2	L1	0.1695	9.93	AVG	10.03	19.96	54.98	-35.02	
3	L1	0.1812	29.54	QP	10.03	39.57	64.43	-24.86	
4	L1	0.1812	12.60	AVG	10.03	22.63	54.43	-31.80	
5	L1	0.2748	33.06	QP	10.03	43.09	60.97	-17.88	
6	L1	0.2748	25.87	AVG	10.03	35.90	50.97	-15.07	
7	L1	0.3489	39.11	QP	10.03	49.14	58.99	-9.85	
8	L1	0.3489	32.28	AVG	10.03	42.31	48.99	-6.68	
9	L1	3.1404	22.32	QP	10.06	32.38	56.00	-23.62	
10	L1	3.1404	14.46	AVG	10.06	24.52	46.00	-21.48	
11	L1	13.3272	21.59	QP	10.20	31.79	60.00	-28.21	
12	L1	13.3272	12.04	AVG	10.20	22.24	50.00	-27.76	



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Phase Neutral Plot at 240Vac, 50Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)	
1	Ν	0.1500	32.06	QP	10.02	42.08	66.00	-23.92	
2	Ν	0.1500	13.64	AVG	10.02	23.66	56.00	-32.34	
3	Ν	0.1929	31.57	QP	10.02	41.59	63.91	-22.32	
4	Ν	0.1929	13.67	AVG	10.02	23.69	53.91	-30.22	
5	Ν	0.2085	29.35	QP	10.02	39.37	63.26	-23.89	
6	Ν	0.2085	12.77	AVG	10.02	22.79	53.26	-30.47	
7	Ν	0.2748	32.73	QP	10.02	42.75	60.97	-18.22	
8	Ν	0.2748	25.51	AVG	10.02	35.53	50.97	-15.44	
9	Ν	0.3489	38.68	QP	10.02	48.70	58.99	-10.29	
10	Ν	0.3489	31.91	AVG	10.02	41.93	48.99	-7.06	
11	N	12.8943	22.80	QP	10.17	32.97	60.00	-27.03	
12	N	12.8943	12.18	AVG	10.17	22.35	50.00	-27.65	



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Phase Line Plot at 120Vac, 50Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)	
1	L	0.2748	16.51	QP	10.02	26.53	60.97	-34.44	
2	L	0.2748	8.08	AVG	10.02	18.10	50.97	-32.87	
3	L	0.3489	16.14	QP	10.02	26.16	58.99	-32.83	
4	L	0.3489	5.30	AVG	10.02	15.32	48.99	-33.67	
5	L	0.6141	18.93	QP	10.02	28.95	56.00	-27.05	
6	L	0.6141	10.67	AVG	10.02	20.69	46.00	-25.31	
7	L	2.8845	20.18	QP	10.05	30.23	56.00	-25.77	
8	L	2.8845	11.56	AVG	10.05	21.61	46.00	-24.39	
9	L	13.5509	14.68	QP	10.18	24.86	60.00	-35.14	
10	L	13.5509	7.60	AVG	10.18	17.78	50.00	-32.22	
11	L	17.6952	16.34	QP	10.23	26.57	60.00	-33.43	
12	L	17.6952	9.64	AVG	10.23	19.87	50.00	-30.13	



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Phase Neutral Plot at 120Vac, 50Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Comment
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)	
1	Ν	0.2748	19.20	QP	10.02	29.22	60.97	-31.75	
2	Ν	0.2748	12.46	AVG	10.02	22.48	50.97	-28.49	
3	Ν	0.3489	18.16	QP	10.02	28.18	58.99	-30.81	
4	Ν	0.3489	11.16	AVG	10.02	21.18	48.99	-27.81	
5	Ν	2.9112	20.23	QP	10.05	30.28	56.00	-25.72	
6	Ν	2.9112	13.04	AVG	10.05	23.09	46.00	-22.91	
7	Ν	5.6988	17.30	QP	10.08	27.38	60.00	-32.62	
8	Ν	5.6988	6.47	AVG	10.08	16.55	50.00	-33.45	
9	Ν	13.4080	17.58	QP	10.18	27.76	60.00	-32.24	
10	Ν	13.4080	9.05	AVG	10.18	19.23	50.00	-30.77	
11	N	23.9781	13.27	QP	10.32	23.59	60.00	-36.41	
12	N	23.9781	8.45	AVG	10.32	18.77	50.00	-31.23	



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6.2 Radiated Emissions

Temperature	26°C
Relative Humidity	60%
Atmospheric Pressure	1019mbar
Test date :	January 04, 2016
Tested By :	Winnie Zhang

Requirement(s):							
Spec	Item	Requirement	Applicable				
47CFR§15.10 7(d)	(a) Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges $ \frac{Frequency range (MHz) Field Strength (\mu V/m)}{30 - 88} 100 $ $ \frac{88 - 216 150}{216 960 200} $ $ \frac{Frequency 60 500}{500} $						
Test Setup		Ant. Tower LIT& Support Units Turn Table Ground Plane Test Receiver	-				
Procedure	1. 2. 3. 4.	 The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT che Maximization of the emissions, was carried out by rotating the EUT, changing the apolarization, and adjusting the antenna height in the following manner: a. Vertical or horizontal polarisation (whichever gave the higher emission lever rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maxim. A Quasi-peak measurement was then made for that frequency point. 	n. naracterisation. intenna vel over a full mum emission. icy points were				
Remark							
Result	Pass	s Fail					
Test Data Test Plot	✓ _{Yes} ✓ _{Yes} (See below)					



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Data sample

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree	Comment
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	()	

P/L=Vertical or Horizontal of Receiver antenna

Frequency (MHz) = Emission frequency in MHz

Reading $(dB\mu V/m)$ = Receiver Reading Value

Detector= Peak Detector or Quasi Peak Detector

Corrected (dB) = Antenna factor + cable loss- antenna gain

Result ($dB\mu V/m$) = Reading Value + Corrected Value

Limit (dB μ V/m) = Limit stated in standard

Height (cm) = Height of Receiver antenna

Degree = Turn table degree

Calculation Formula:

Margin (dB) = Result (dB μ V/m) – limit (dB μ V/m)



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Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree	Comment
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	()	
1	V	40.5591	44.79	QP	-7.96	36.83	40.00	-3.17	100	32	
2	V	125.0066	48.86	QP	-7.62	41.24	43.50	-2.26	100	14	
3	V	297.2241	50.83	QP	-7.02	43.81	46.00	-2.19	100	200	
4	V	446.4141	47.10	QP	-3.17	43.93	46.00	-2.07	100	35	
5	V	668.1423	42.61	QP	1.02	43.63	46.00	-2.37	100	54	
6	V	744.8661	41.29	QP	2.31	43.60	46.00	-2.40	100	127	

Note: The data above 1 GHz which below 20 dB to the limit was not recorded.

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Test Data

Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree	Comment
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	()	
1	Н	41.7130	44.53	QP	-8.73	35.80	40.00	-4.20	100	316	
2	Н	148.4410	47.26	QP	-8.42	38.84	43.50	-4.66	100	119	
3	Н	330.1949	50.24	QP	-6.04	44.20	46.00	-1.80	100	116	
4	Н	413.2706	47.82	QP	-3.97	43.85	46.00	-2.15	100	247	
5	Н	595.1329	44.01	QP	-0.07	43.94	46.00	-2.06	100	302	
6	Н	744.8661	41.82	QP	2.31	44.13	46.00	-1.87	100	207	

Note: The data above 1 GHz which below 20 dB to the limit was not recorded.

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Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
EMI test receiver	ESCS30	8471241027	09/17/2015	09/16/2016	>
Line Impedance Stabilization Network	LI-125A	191106	09/25/2015	09/24/2016	V
Line Impedance Stabilization Network	LI-125A	191107	09/25/2015	09/24/2016	
LISN	ISN T800	34373	09/25/2015	09/24/2016	>
Transient Limiter	LIT-153	531118	09/01/2015	08/31/2016	\checkmark
Radiated Emissions					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	~
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/01/2015	08/31/2016	
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/25/2015	03/24/2016	V
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/21/2015	09/20/2016	•
Double Ridge Horn Antenna	AH-118	71259	09/24/2015	09/23/2016	V

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Annex B. EUT And Test Setup Photographs

Photograph: EUT External Photo Annex B.i.

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Annex B.ii. Photograph: EUT Internal Photo

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Annex B.iii. Photograph: Test Setup Photo

Radiated Spurious Emissions Test Setup Below 1GHz

Radiated Spurious Emissions Test Setup Above 1GHz

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Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.i. TEST SET UP BLOCK

Block Configuration Diagram for Conducted Emissions

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Block Configuration Diagram for Radiated Emissions

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Annex C. il. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Manufacturer	Equipment Description	Model	Calibration Date	Calibration Due Date
Lenovo	Lenovo Laptop	E40& 0579A52	N/A	N/A
HongXun	POS	8210	N/A	N/A
Sennheiser	Earphone	MX80	N/A	N/A
DELL	Mouse	E100	N/A	N/A
Mi	Adapter	DX-13250	N/A	N/A
BK PRECISION	DC Power Supply	1786B	N/A	N/A
Skyworth	TV	32X3	N/A	N/A

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	2m	JX120051274
RJ45 Cable	Un-shielding	No	2m	KX156327541
RS232 cable	Un-shielding	No	2m	127581031
Power Cable	Un-shielding	No	2m	Y1120224
Power Cable	Un-shielding	No	2m	Y1120149

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Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see Attachment

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Annex E. DECLARATION OF SIMILARITY

Beijing InHand Networks Technology Co., Ltd

To: SIEMIC (SHENZHEN-CHINA) LABORATORIES

Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao' an District Shenzhen, Guangdong, CHINA 518108

Dear Sir,

For our business issue and marketing requirement, we would like to list different models numbers reports, as following:

Model No.: InBOX300 InBOX300S

InBOX310S

InBOX310

InBOX320S

InBOX320

InBOX330 InBOX330S

The eight models are basically the same in appearance, hardware, PCB layout but they have different number of interfaces: USB, Serial port and different software functions. The software does not affect the RF parameters of the device.

Thank you!

Bèao Wang

Signature:

Printed name/title:Biao Wang/ EMC engineer Address: 101, West Wing, 11th Floor, No. 101, Lize central Park Wangjing, Chaoyang District, Beijing, 100102, China