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# TEST REPORT

## FCC PART 15C

Report Reference No. ....: **CTL1703068021-WF02**

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Tested by: ( position+printed name+signature)	Nice Nong (Test Engineer)	<i>Nice Nong</i>
Approved by: ( position+printed name+signature)	Ivan Xie (Manager)	<i>Ivan Xie</i>

<b>Product Name</b> .....	RFID card reader S3-P, S3-M, S3-D, S3-MP, S3-DT, S2-P, S2-M, S2-D, S2-MP, S2-DT, S1-P, S1-M, S1-D, S1-MP, S1-DT, B1-P, B1-M, B1-D, B1-MP, B1-DT, F1-P, F1-M, F1-D, F1-MP, F1-DT, F1G-P, F1G-M, F1G-D, F1G-MP, F1G-DT, F2-P, F2-M, F2-D, F2-MP, F2-DT, F2G-P, F2G-M, F2G-D, F2G-MP, F2G-DT
<b>Model/Type reference</b> .....	
<b>Trade Mark</b> .....	INS
<b>FCC ID</b> .....	2ACDGS3-P
<b>Applicant's name</b> .....	<b>INS Global Pty Ltd</b>
<b>Address of applicant</b> .....	Suite 8,166A The Entrance Rd, Erina NSW 2250, Australia
<b>Test Firm</b> .....	<b>Shenzhen CTL Testing Technology Co., Ltd.</b>
<b>Address of Test Firm</b> .....	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
<b>Test specification</b> .....	
Standard.....	<b>FCC Part 15C</b>
TRF Originator .....	Shenzhen CTL Testing Technology Co., Ltd.
Master TRF .....	Dated 2011-01
<b>Date of Receipt</b> .....	Mar. 06, 2017
<b>Date of Test Date</b> .....	Mar. 06, 2017–Apr. 20, 2017
<b>Date of Issue</b> .....	Apr. 20, 2017
<b>Result</b> .....	Pass

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# TEST REPORT

<b>Test Report No. :</b>	<b>CTL1703068021-WF02</b>	<b>Apr. 20, 2017</b>
		<b>Date of issue</b>

Equipment under Test : RFID card reader

Model /Type : S3-P, S3-M, S3-D, S3-MP, S3-DT, S2-P, S2-M, S2-D, S2-MP, S2-DT, S1-P, S1-M, S1-D, S1-MP, S1-DT, B1-P, B1-M, B1-D, B1-MP, B1-DT, F1-P, F1-M, F1-D, F1-MP, F1-DT, F1G-P, F1G-M, F1G-D, F1G-MP, F1G-DT, F2-P, F2-M, F2-D, F2-MP, F2-DT, F2G-P, F2G-M, F2G-D, F2G-MP, F2G-DT

**Applicant** : **INS Global Pty Ltd**

Address : Suite 8,166A The Entrance Rd, Erina NSW 2250, Australia

**Manufacturer** : **JAT Enterprise Co.,Limited**

Address : 6F, ChuangCheng Building #2, TaiWan Industrial Area, ShiYan, BaoAn, ShenZhen, China

<b>Test result</b>	<b>Pass *</b>
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\* In the configuration tested, the EUT complied with the standards specified page 5.

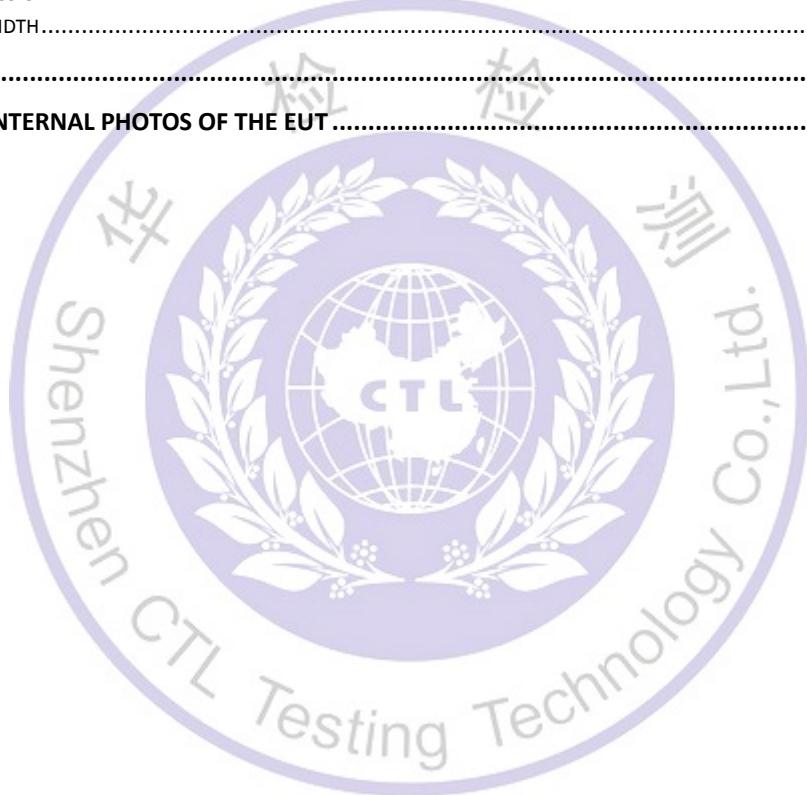
The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

## \*\* Modified History \*\*



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## 1. SUMMARY

### 1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 15C](#)

[ANSI C63.10:2013](#) : American National Standard for Testing Unlicensed Wireless Devices

[ANSI C63.4: 2014](#): –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz

### 1.2. Test Description

FCC PART 15C		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.209	Radiated Emission	PASS
FCC Part 15.215	20dB Bandwidth	PASS

Remark: The measurement uncertainty is not included in the test result.



## 1.3. Test Facility

### 1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

### 1.3.2 Laboratory accreditation

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

#### IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

#### FCC-Registration No.: 970318

Shenzhen CTL Testing Technology 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 970318, December 19, 2013.

## 1.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)
Conducted Disturbance0.15~30MHz	±3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 2. GENERAL INFORMATION

### 2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

### 2.2. General Description of EUT

Product Name:	RFID card reader
Model/Type reference:	S3-P
Power supply:	DC 12V from battery
<b>13.56MHz</b>	
Operation frequency:	13.56MHz
Modulation :	ASK
No. of Channel :	1
Antenna type:	PCB Antenna
Antenna gain:	0 dBi
<b>125.62KHz</b>	
Operation frequency:	125.62KHz
Modulation :	ASK
No. of Channel :	1
Antenna type:	LOOP Antenna
Antenna gain:	0 dBi

Note: This report is only for 125.62 KHz.

For more details, please refer to the user's manual of the EUT.

### 2.3. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.12	2016/06/02	2017/06/01
LISN	R&S	ESH2-Z5	860014/010	2016/06/02	2017/06/01
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2016/06/02	2017/06/01
EMI Test Receiver	R&S	ESCI	103710	2016/06/02	2017/06/01
Spectrum Analyzer	Agilent	N9020	US46220290	2017/01/17	2018/01/16
Controller	EM Electronics	Controller EM 1000	N/A	2016/05/21	2017/05/20

Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2016/05/19	2017/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2016/05/19	2017/05/18
Amplifier	Agilent	8349B	3008A02306	2016/05/19	2017/05/18
Amplifier	Agilent	8447D	2944A10176	2016/05/19	2017/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2016/05/20	2017/05/19
High-Pass Filter	K&L	9SH10-2700/X1 2750-O/O	N/A	2016/05/20	2017/05/19
High-Pass Filter	K&L	41H10-1375/U1 2750-O/O	N/A	2016/05/20	2017/05/19
Programmable constant temperature and humidity test chamber	Bolie	BL-225TH-40A	2022041015	2016/06/02	2017/06/01
DC source	QJE	QJ6003S	023457	2016/06/02	2017/06/01
Coaxial Cables	HUBER+SUHN ER	SUCOFLEX 104PEA-10M	10m	2016/06/02	2017/06/01
Coaxial Cables	HUBER+SUHN ER	SUCOFLEX 104PEA-3M	3m	2016/06/02	2017/06/01
Coaxial Cables	HUBER+SUHN ER	SUCOFLEX 104PEA-3M	3m	2016/06/02	2017/06/01
RF Cable	Megalon	RF-A303	N/A	2016/06/02	2017/06/01

The calibration interval was one year

## 2.4. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2ACDGS3-P filing to comply with Section 15.225 of the FCC Part 15, Subpart C Rules.

## 2.5. Modifications

No modifications were implemented to meet testing criteria.

### 3. TEST CONDITIONS AND RESULTS

#### 3.1. Conducted Emission (AC Main)

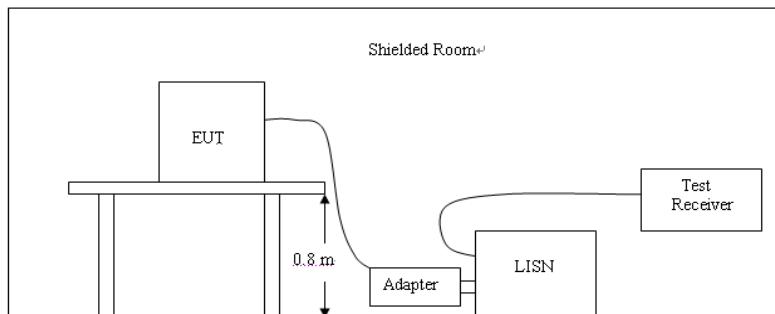
##### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

##### TEST CONFIGURATION

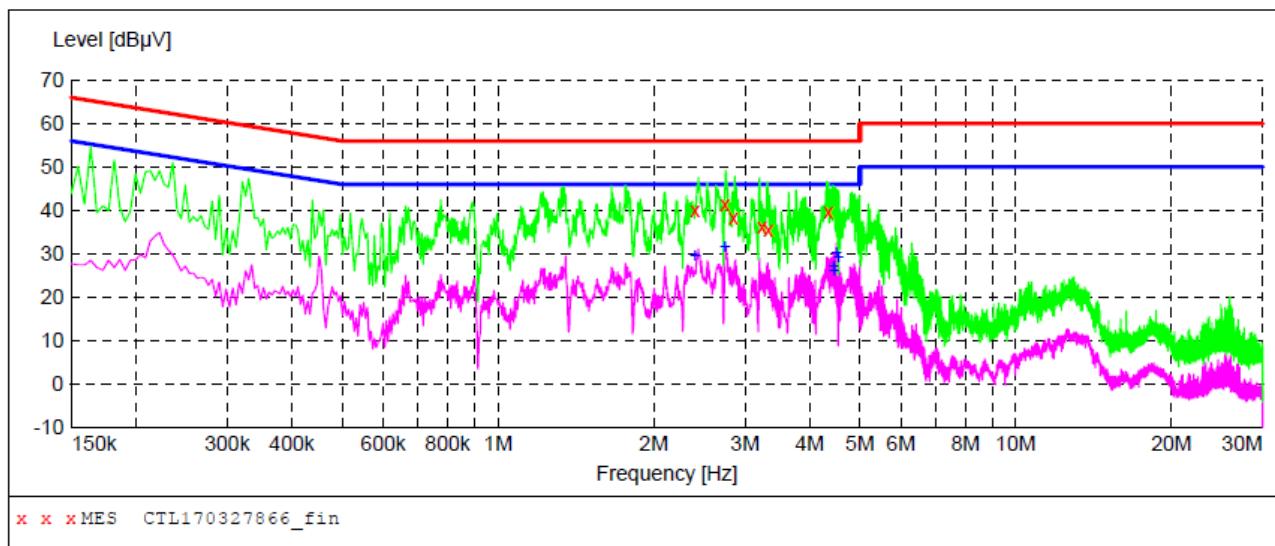


##### TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a flood stand system; a wooden table with a height of 0.1 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2. Support equipment, if needed, was placed as per ANSI C63.10-2013
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4. If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

##### TEST RESULTS

**SCAN TABLE: "Voltage (9K-30M) FIN"**  
 Short Description: 150K-30M Voltage



**MEASUREMENT RESULT: "CTL170327866\_fin"**

3/27/2017 11:23AM

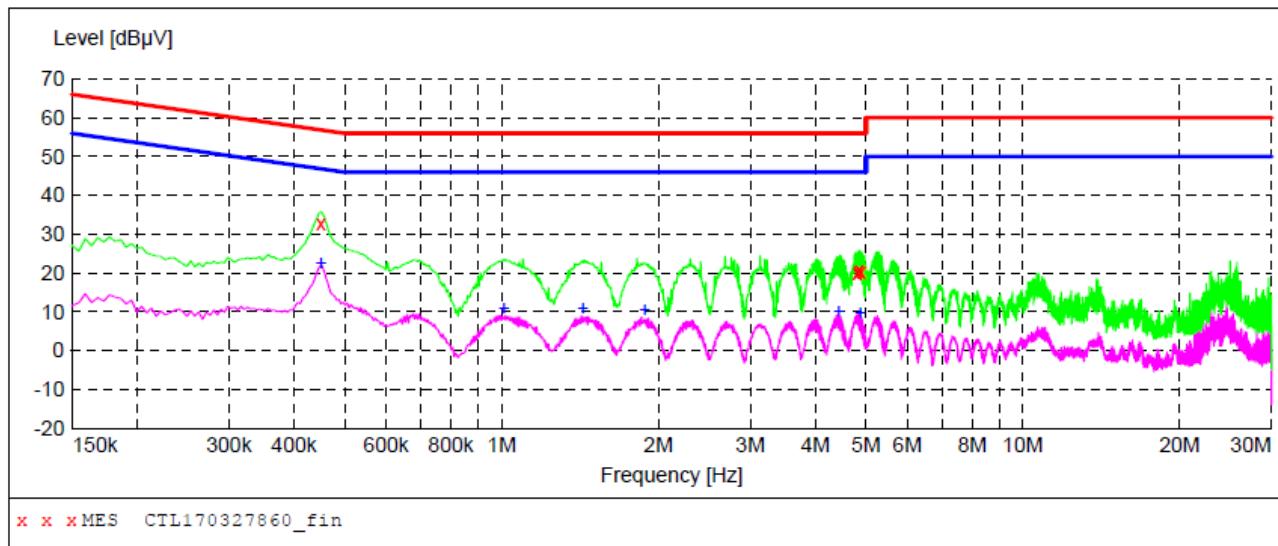
Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
2.402000	39.90	10.4	56	16.1	QP	L1	GND
2.744000	41.30	10.4	56	14.7	QP	L1	GND
2.852000	38.20	10.4	56	17.8	QP	L1	GND
3.236000	36.20	10.4	56	19.8	QP	L1	GND
3.326000	35.50	10.4	56	20.5	QP	L1	GND
4.346000	39.60	10.4	56	16.4	QP	L1	GND

**MEASUREMENT RESULT: "CTL170327866\_fin2"**

3/27/2017 11:23AM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
2.402000	29.50	10.4	46	16.5	AV	L1	GND
2.744000	31.80	10.4	46	14.2	AV	L1	GND
4.442000	27.30	10.4	46	18.7	AV	L1	GND
4.454000	26.20	10.4	46	19.8	AV	L1	GND
4.502000	30.40	10.4	46	15.6	AV	L1	GND
4.544000	29.20	10.4	46	16.8	AV	L1	GND

**SCAN TABLE: "Voltage (9K-30M) FIN"**  
 Short Description: 150K-30M Voltage



**MEASUREMENT RESULT: "CTL170327860\_fin"**

3/27/2017 11:06AM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.450000	32.90	10.2	57	24.0	QP	N	GND
4.808000	20.10	10.4	56	35.9	QP	N	GND
4.826000	20.40	10.4	56	35.6	QP	N	GND
4.856000	20.90	10.4	56	35.1	QP	N	GND
4.904000	20.50	10.4	56	35.5	QP	N	GND

**MEASUREMENT RESULT: "CTL170327860\_fin2"**

3/27/2017 11:06AM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.450000	22.70	10.2	47	24.2	AV	N	GND
1.010000	11.20	10.3	46	34.8	AV	N	GND
1.430000	10.90	10.3	46	35.1	AV	N	GND
1.880000	10.60	10.3	46	35.4	AV	N	GND
4.436000	10.20	10.4	46	35.8	AV	N	GND
4.874000	10.00	10.4	46	36.0	AV	N	GND

## 3.2. Radiated Emission

### Limit

For intentional device, according to §15.209(a), except as provided elsewhere in this Subpart, the emission from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ( $\mu$ V/m)	Distance (Meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

### **Restricted Bands of Operation**

Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.15
0.495 - 0.505 **	16.69475 - 16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425 - 16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475 - 156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3360-4400	Above 38.6
13.36-13.41			

### **Test Procedure**

1. The EUT was placed on 80cm wooden desk above ground plane which on a turn table.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

### **Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

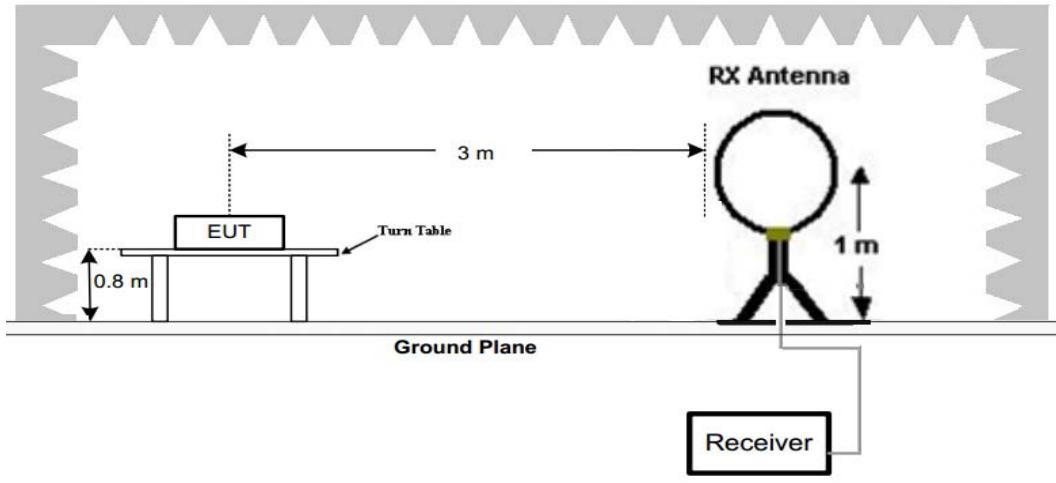
For example

Frequency (MHz)	FS (dBuV/m)	RA (dBuV/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
150.00	40	58.1	12.2	1.6	31.90	-18.1

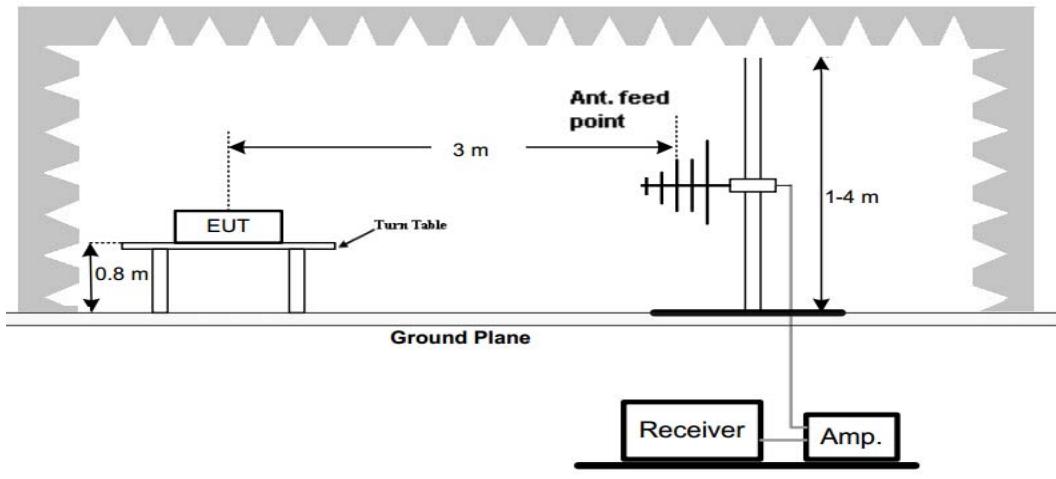
Transd=AF +CL-AG

### Test Configuration

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



**Test Results****Fundamental**

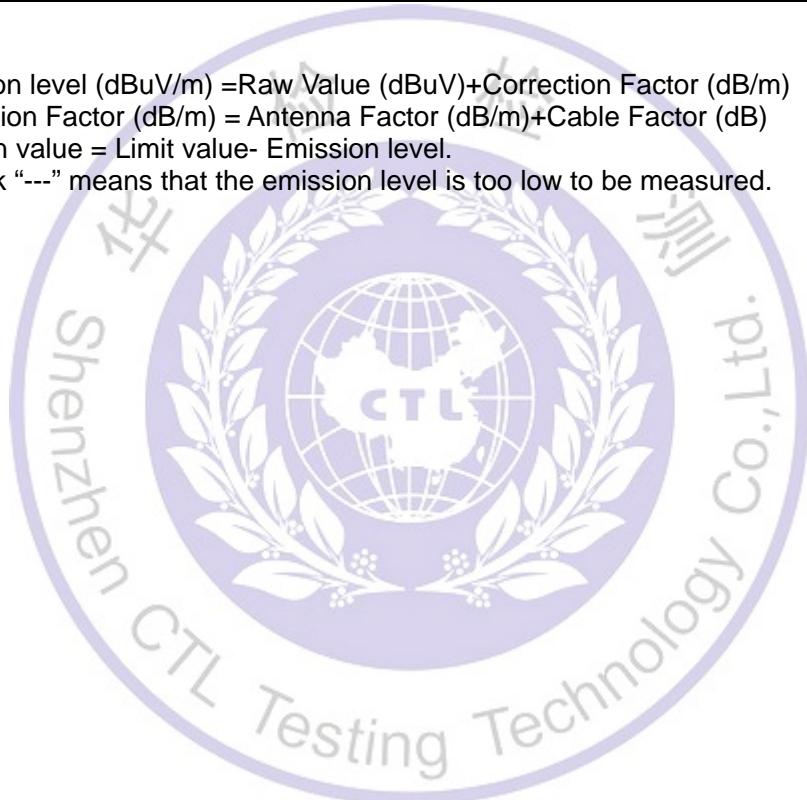
Frequency (KHz)	Emission Level (dBuV/m)	Detector	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Correction Factor (dB/m)
125.62	76.04	PK	125.62	49.58	52.59	23.44	0.01	23.45

**Harmonics**

No.	Frequency (KHz)	Emission Level (dBuV/m)	Detector	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Correction Factor (dB/m)
1	0.110	66.79	PK	106.78	39.99	43.91	22.85	0.03	22.88
2	0.251	48.35	PK	119.61	71.26	24.90	20.17	-0.21	19.96
3	0.377	---	PK	---	---	---	---	---	---
4	0.502	---	PK	---	---	---	---	---	---
5	0.628	---	PK	---	---	---	---	---	---
6	0.754	---	PK	---	---	---	---	---	---

**REMARKS:**

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)
3. Margin value = Limit value- Emission level.
4. Remark “---” means that the emission level is too low to be measured.



### 3.3. 20dB Bandwidth

#### Limit

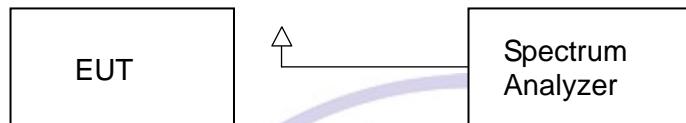
No limit for 20dB bandwidth.

#### Test Procedure

The 20dB bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.

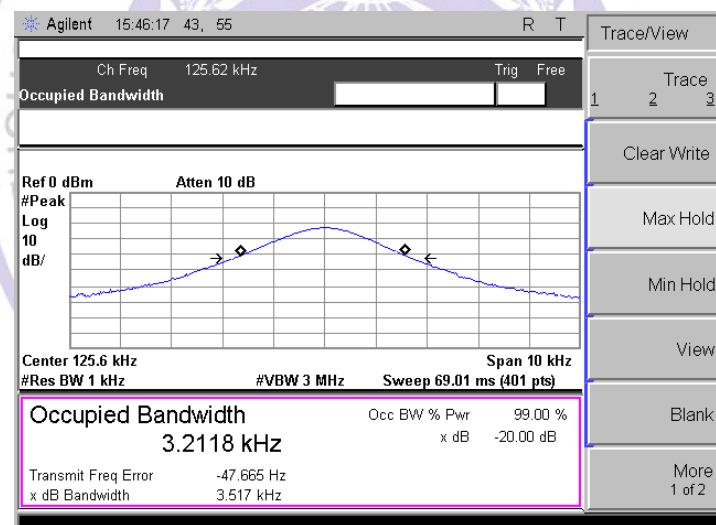
The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

#### Test Configuration

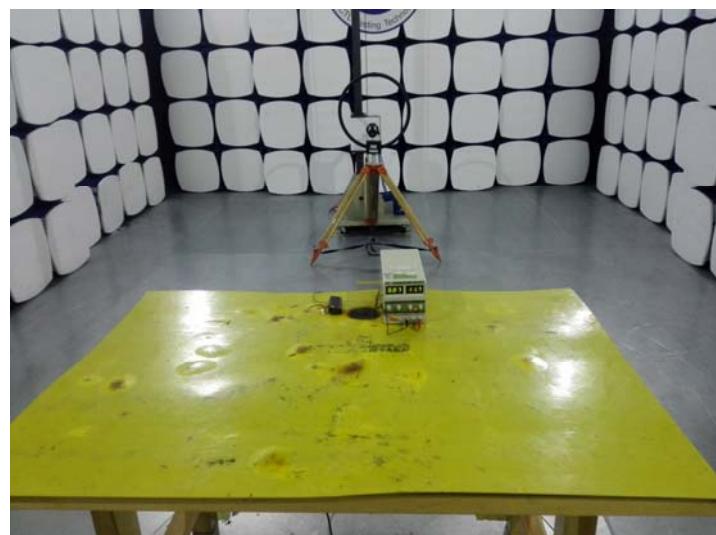


#### Test Results

Modulation	Frequency(KHz)	20dB bandwidth (KHz)	Result
ASK	125.62	3.517	Pass



#### 4. EUT TEST PHOTO



## 5. External and Internal Photos of the EUT

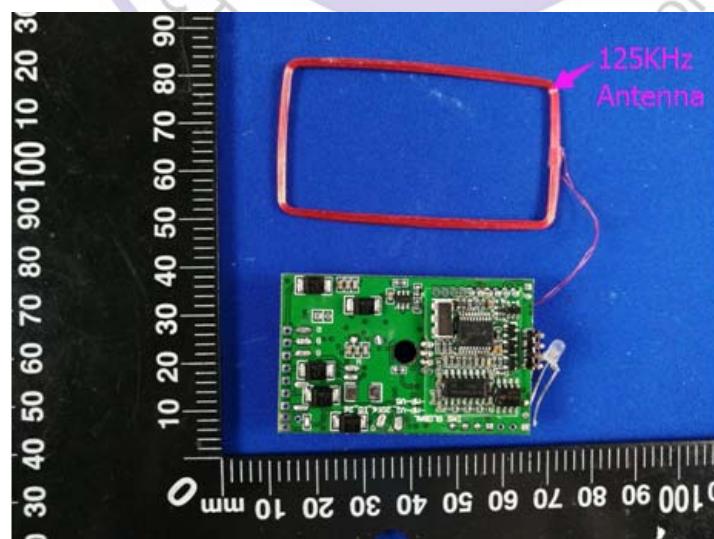
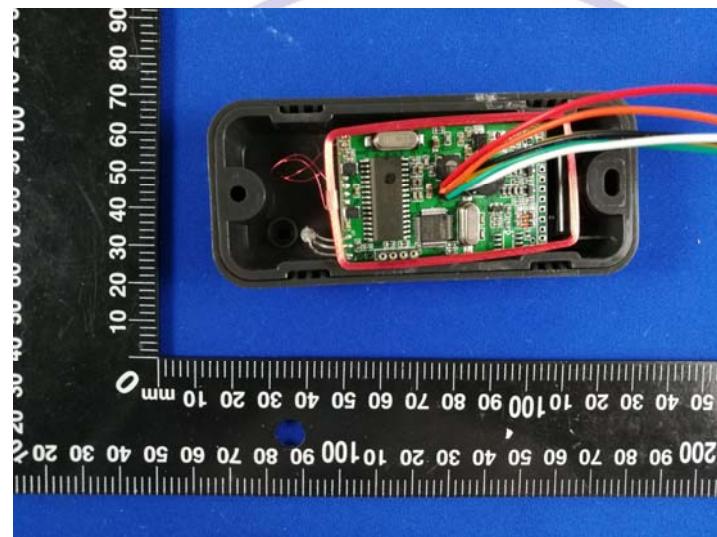
External Photos EUT

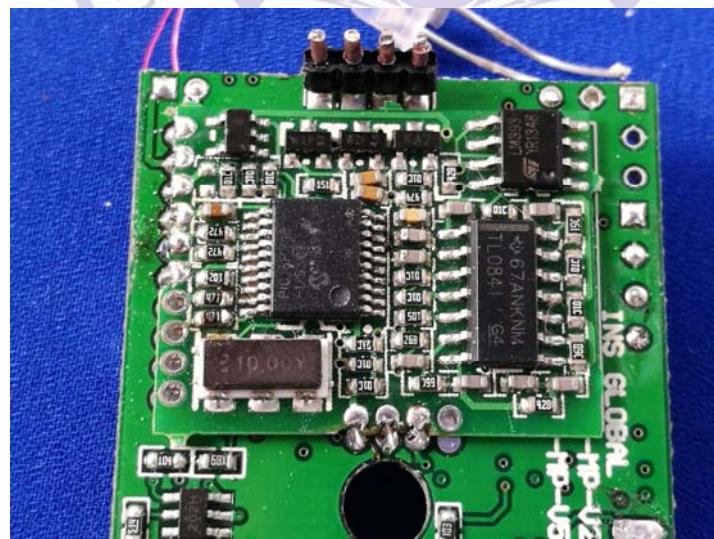
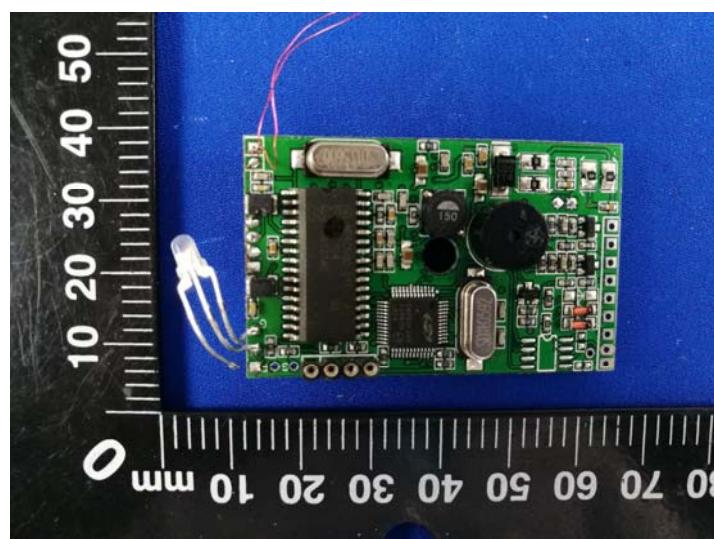
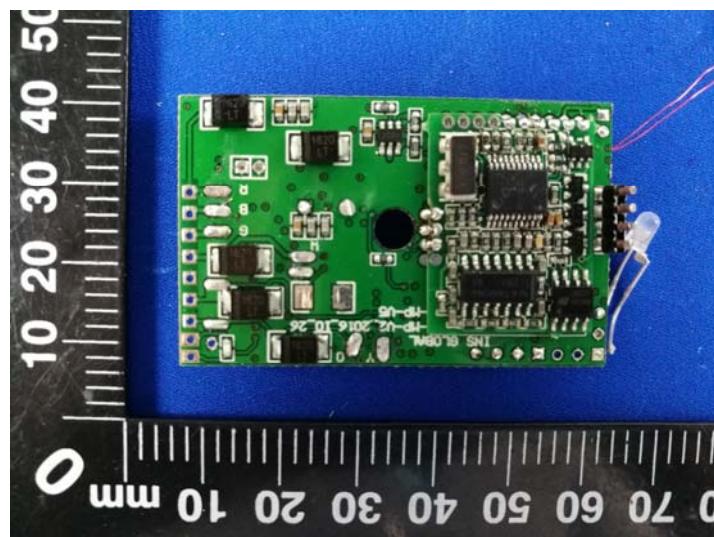


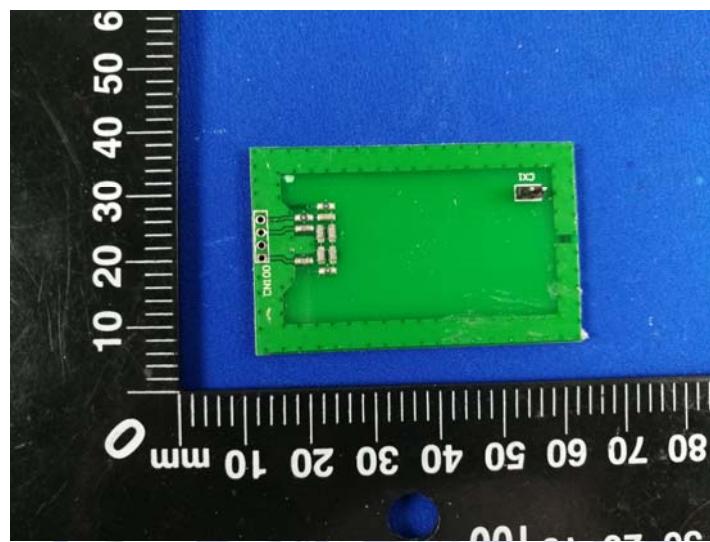
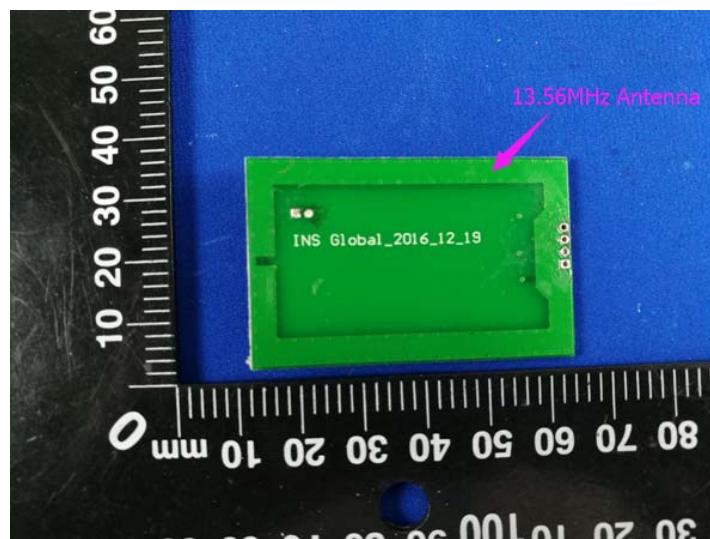




Internal Photos EUT







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