

FCC CFR 47 PART 15 C TEST REPORT  
On Behalf of

Beijing Intellectual Ark Co., Ltd.

125kHz Long Range Proximity Reader

Model No.: 5100

Prepared for : Beijing Intellectual Ark Co., Ltd.  
Address : Room 3A02, No.16 Zuojiashuang Road, Chaoyang District,  
Beijing, China

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.  
Address : 1F., Xingyuan Industrial Park, Tongda Road, Bao'an Blvd.,  
Bao'an District, Shenzhen, Guangdong, China

Date of receipt of test sample : December 27, 2011  
Number of tested samples : 1  
Serial number : Prototype  
Date of Test : December 28, 2011 - January 04, 2012  
Date of Report : January 04, 2012

**TEST REPORT**  
**FCC CFR 47 PART 15 SUBPART C****Report Reference No. .... : LCS1112273718F**

Date of issue ..... : January 04, 2012

**Testing Laboratory Name ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.**Address ..... : 1F., Xingyuan Industrial Park, Tongda Road, Bao'an Blvd.,  
Bao'an District, Shenzhen, Guangdong, ChinaTesting location/ procedure ..... : Full application of Harmonised standards ☒  
Partial application of Harmonised standards ☐  
Other standard testing method ☐**Applicant's name ..... : Beijing Intellectual Ark Co., Ltd.**Address ..... : Room 3A02, No.16 Zuojiashuang Road, Chaoyang District,  
Beijing, China**Test specification**

Standard ..... : FCC CFR 47 PART 15 Subpart C: 2011, ANSI C63.4-2009

**Test Report Form No. .... : LCSEMC-1.0**

TRF Originator ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF ..... : Dated 2011-03

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**Test item description..... : 125kHz Long Range Proximity Reader**

Trade Mark ..... : ideaReader

Manufacturer ..... : Beijing Intellectual Ark Co., Ltd.

Model/Type reference ..... : 5100

Ratings ..... : DC 12V

125kHz Long Range Proximity Reader With 125kHz as a Carrier

Result ..... : **Positive****Compiled by:**

Bobo Li/ File administrators

**Supervised by:**

Vito Cao/ Technique principal

**Approved by:**

Gavin Liang/ Manager

# TEST REPORT

**Test Report No. : LCS1112273718F**January 04, 2012

Date of issue

Type / Model..... : 5100

EUT..... : 125kHz Long Range Proximity Reader

**Applicant..... : Beijing Intellectual Ark Co., Ltd.**Address..... : Room 3A02, No.16 Zuojiashuang Road, Chaoyang District,  
Beijing, China

Telephone..... : /

Fax..... : /

Contact..... : /

**Manufacturer..... : Beijing Intellectual Ark Co., Ltd.**Address..... : Room 3A02, No.16 Zuojiashuang Road, Chaoyang District,  
Beijing, China

Telephone..... : /

Fax..... : /

Contact..... : /

**Factory..... : /**

Address..... : /

Telephone..... : /

Fax..... : /

Contact..... : /

**Test Result** according to the standards on page 5: **Positive**

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.

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# 1. SUMMARY OF STANDARDS AND RESULTS

## 1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION			
Description of Test Item	Standard	Standard Paragraph	Results
Conducted disturbance at mains terminals	FCC CFR 47 PART 15: 2011	Section 15.207	PASS
Radiated Emission	FCC CFR 47 PART 15: 2011	Section 15.209	PASS
N/A is an abbreviation for Not Applicable.			

## 2. GENERAL INFORMATION

### 2.1. Description of Device (EUT)

EUT	: 125kHz Long Range Proximity Reader
Model Number	: 5100
Power Supply	: DC 12V

### 2.2. Description of Test Facility

Site Description	
EMC Lab.	: Accredited by CNAS, June 04, 2010 The Certificate Registration Number. is L4595. Accredited by FCC, July 14, 2011 The Certificate Registration Number. is 899208. Accredited by Industry Canada, May. 02, 2011 The Certificate Registration Number. is 9642A-1
Name of Firm	: Shenzhen LCS Compliance Testing Laboratory Ltd.
Site Location	: 1F., Xingyuan Industrial Park, Tongda Road, Bao'an Blvd, Bao'an District, Shenzhen, Guangdong, China

### 2.3. 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 LCS 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.

### 2.4. Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	30MHz~200MHz	$\pm 2.96\text{dB}$	(1)
	:	200MHz~1000MHz	$\pm 3.10\text{dB}$	(1)
Conduction Uncertainty	:	150kHz~30MHz	$\pm 1.63\text{dB}$	(1)
Power disturbance	:	30MHz~300MHz	$\pm 1.60\text{dB}$	(1)

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

### 3. MEASURING DEVICE AND TEST EQUIPMENT

#### 3.1. Conducted Disturbance

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	101142	2011/06	2012/06
2	EMI Test Receiver	ROHDE & SCHWARZ	ESPI	101840	2011/06	2012/06
3	Artificial Mains	ROHDE & SCHWARZ	ENV216	3560.6550.12	2011/06	2012/06
4	EMI Test Software	AUDIX	E3	N/A	2011/06	2012/06

#### 3.2. Radiated Electromagnetic Disturbance

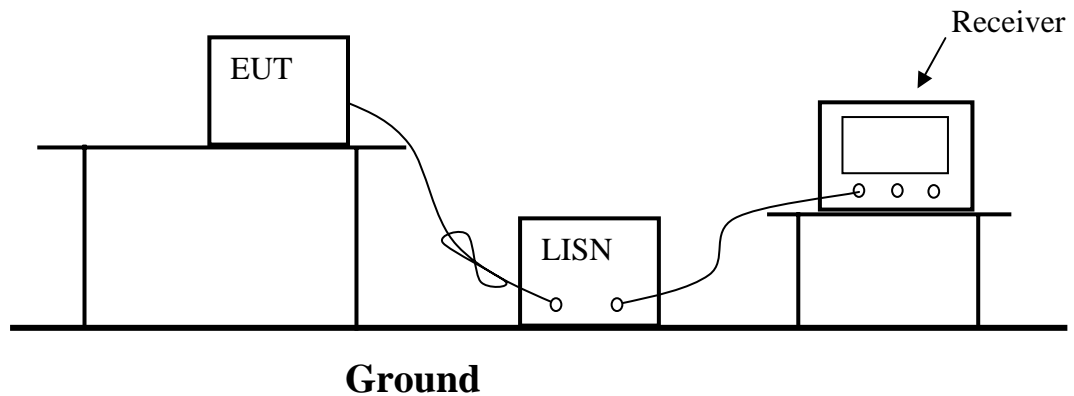
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	101142	2011/06	2012/06
2	EMI Test Receiver	ROHDE & SCHWARZ	ESPI	101840	2011/06	2012/06
3	Log per Antenna	ROHDE & SCHWARZ	VULB9163	9163-470	2011/06	2012/06
4	Amplifier	SCHWARZBECK	PAP-0001	21002	2011/06	2012/06
5	EMI Test Software	AUDIX	E3	N/A	2011/06	2012/06
6	Horn Antenna	ROHDE & SCHWARZ	HF906	100095	2011/06	2012/06
7	Spectrum Analyzer	ROHDE & SCHWARZ	FSP30	100324	2011/06	2012/06
8	0.1-1300 MHz Pre-Amplifier	HP	8447D OPT 010	2944A06252	2011/06	2012/06
9	1-26.5 GHz Pre-Amplifier	AGILENT	8449B	3008A01649	2011/06	2012/06
10	310N Amplifier	SONAMA	310N	272683	2011/06	2012/06
11	Active Loop Antenna	EMCO	6502	0042963	2011/06	2012/06

## 4. POWER LINE CONDUCTED MEASUREMENT

### 4.1. Test Equipment

Refer to section 3.1 for details

### 4.2. Block Diagram of Test Setup



### 4.3. Power Line Conducted Emission Measurement Limits (Class B)

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 ~ 0.50	66 to 56*	56 to 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. \*Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

### 4.4. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

#### 4.5. Operating Condition of EUT

4.5.1. Setup the EUT and simulator as shown as Section 4.2.

4.5.2. Turn on the power of all equipment.

4.5.3. Let the EUT work in test mode (ON) and measure it.

#### 4.6. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC/ANSI C63.4-2009 on Conducted Emission Measurement.

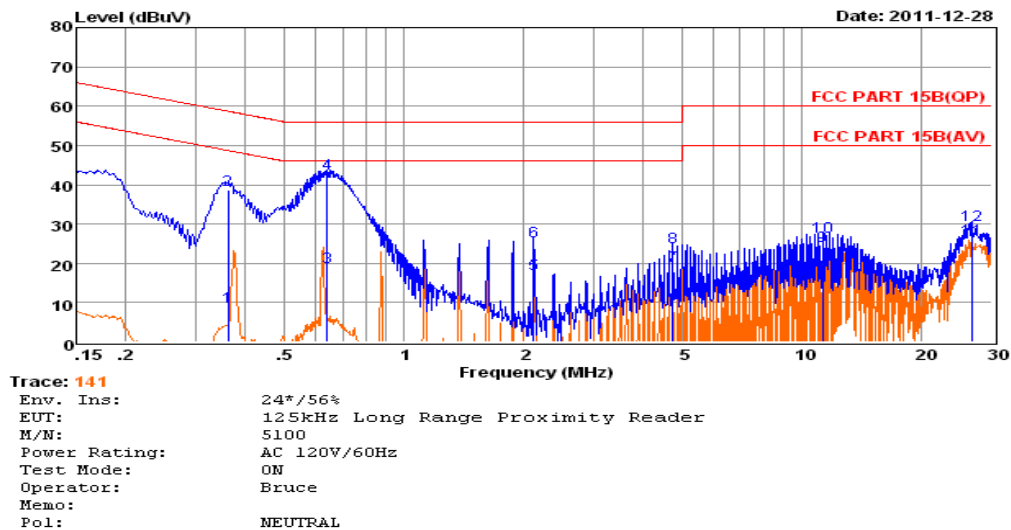
The bandwidth of test receiver is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

#### 4.7. Power Line Conducted Emission Measurement Results

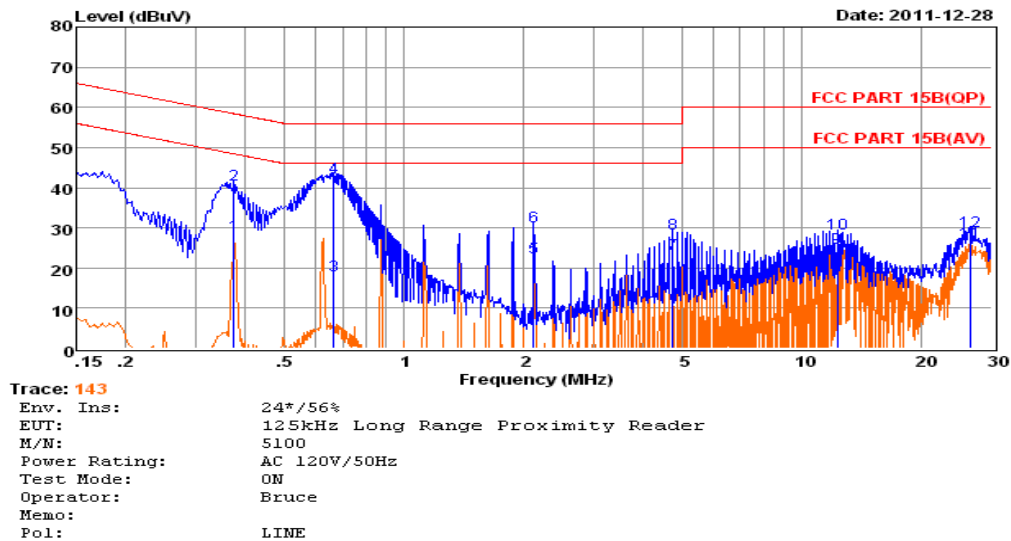
**PASS.**

All the scanning waveforms for Conducted Emission Measurement are refer to the next page.



	Freq	Reading	LisnFac	CabLos	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.36	-0.82	9.61	0.03	8.82	48.69	-39.87	Average
2	0.36	29.02	9.61	0.03	38.66	58.69	-20.03	QP
3	0.64	9.25	9.63	0.04	18.92	46.00	-27.08	Average
4	0.64	33.02	9.63	0.04	42.69	56.00	-13.31	QP
5	2.12	7.56	9.63	0.05	17.24	46.00	-28.76	Average
6	2.12	15.85	9.63	0.05	25.53	56.00	-30.47	QP
7	4.75	9.55	9.66	0.06	19.27	46.00	-26.73	Average
8	4.75	14.25	9.66	0.06	23.97	56.00	-32.03	QP
9	11.26	14.70	9.73	0.09	24.52	50.00	-25.48	Average
10	11.26	16.86	9.73	0.09	26.68	60.00	-33.32	QP
11	26.70	16.15	9.83	0.13	26.11	50.00	-23.89	Average
12	26.70	19.72	9.83	0.13	29.68	60.00	-30.32	QP

Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss.  
2. The emission levels that are 20dB below the official limit are not reported.



	Freq	Reading	LisnFac	CabLos	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.37	18.51	9.62	0.04	28.17	48.43	-20.26	Average
2	0.37	31.05	9.62	0.04	40.71	58.43	-17.72	QP
3	0.66	8.51	9.64	0.04	18.19	46.00	-27.81	Average
4	0.66	32.95	9.64	0.04	42.63	56.00	-13.37	QP
5	2.12	13.01	9.64	0.05	22.70	46.00	-23.30	Average
6	2.12	20.60	9.64	0.05	30.29	56.00	-25.71	QP
7	4.75	13.79	9.65	0.06	23.50	46.00	-22.50	Average
8	4.75	18.88	9.65	0.06	28.59	56.00	-27.41	QP
9	12.25	15.30	9.70	0.09	25.09	50.00	-24.91	Average
10	12.25	18.63	9.70	0.09	28.42	60.00	-31.58	QP
11	26.56	16.75	9.71	0.13	26.59	50.00	-23.41	Average
12	26.56	19.38	9.71	0.13	29.22	60.00	-30.78	QP

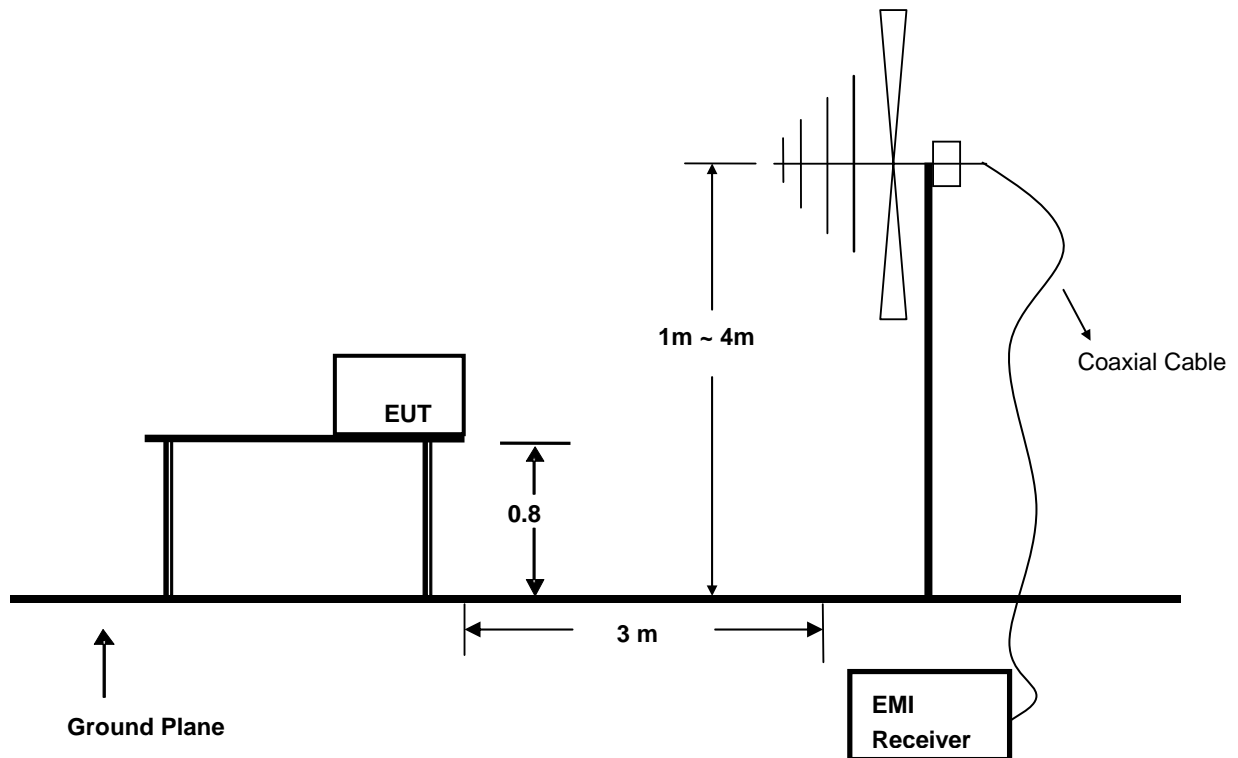
Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss.  
2. The emission levels that are 20dB below the official limit are not reported.

## 5. RADIATED EMISSION MEASUREMENT

### 5.1. Test Equipment

Refer to section 3.2 for details

### 5.2. Block Diagram of Test Setup



### 5.3. Radiated Emission Limit (Class B)

FCC Part15 C (§ 15.209) Limits:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement 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

Remark : (1) Emission level (dB) $\mu$ V = 20 log Emission level  $\mu$ V/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

## 5.4.EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 5.5.Operating Condition of EUT

5.5.1.Setup the EUT as shown in Section 5.2.

5.5.2.Let the EUT work in test mode (on) and measure it.

## 5.6.Test Procedure

1) 9kHz to 30MHz emissions:

For testing performed with the loop antenna, testing was performed in accordance to ANSIC63.4:2009 section 8.2.1. The center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

2) 30MHz to 1GHz emissions:

EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated by-log antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2009 on radiated emission measurement.

The bandwidth of the EMI test receiver is set at 120kHz.

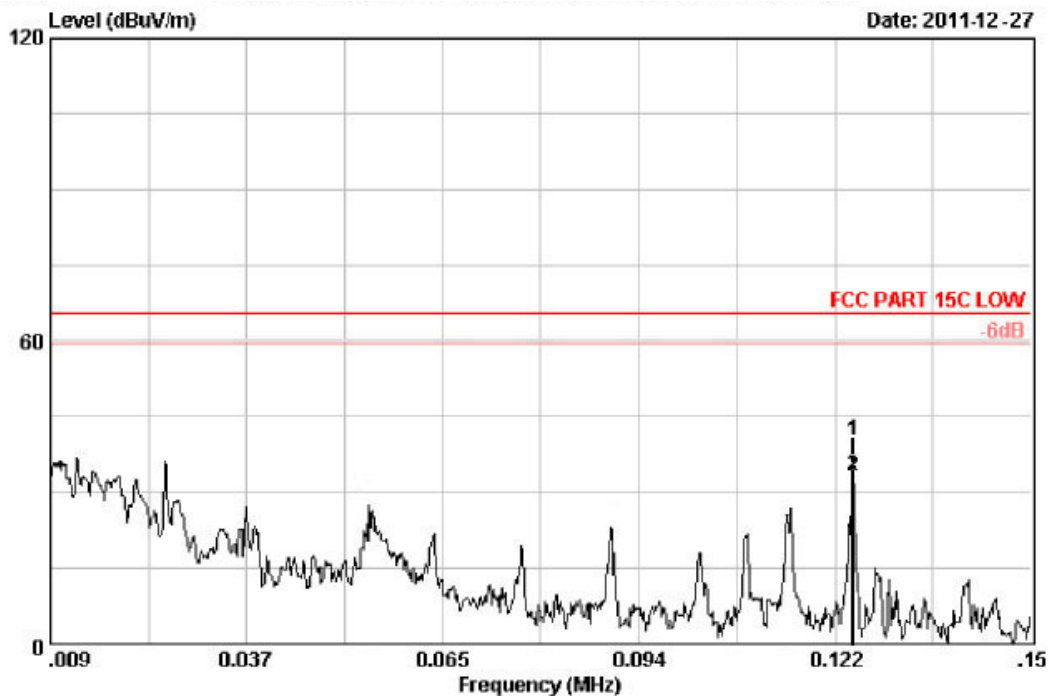
The frequency range from 30MHz to 1000MHz is checked.

## 5.7.Radiated Emission Noise Measurement Result

**PASS.**

The scanning waveforms please refer to the next page.

## 1) Below 30MHz Emissions:



Env. /Ins: 24°C/56%  
 EUT: 125kHz Long Range Proximity Reader  
 M/N: 5100  
 Power Rating: DC 12V  
 Test Mode: On  
 Operator: Willis  
 Memo:

Test Frequency (MHz)	Peak(dB $\mu$ V/m)	Limits	Margin(dB)
	Normal Position	(dB $\mu$ V/m)	Normal Position
0.125	43.2	85.6	42.4
Test Frequency (MHz)	Average(dB $\mu$ V/m)	Limits	Margin(dB)
	Normal Position	(dB $\mu$ V/m)	Normal Position
0.125	37.2	65.6	28.4

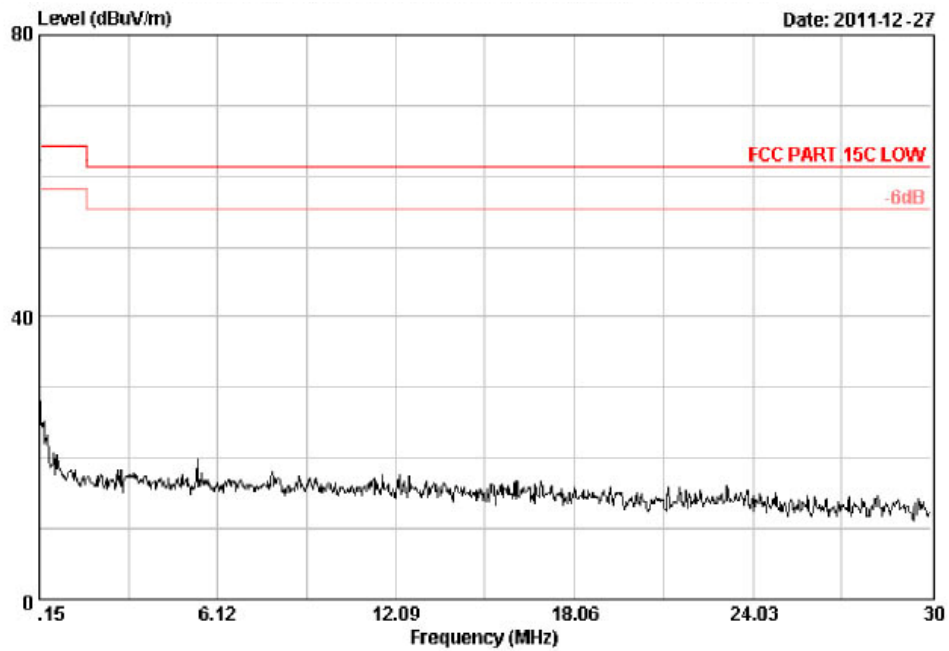
## Remark:

Y: EUT as Radiated Emission test setup photograph in section 7 of this report.

X: rotate EUT by 90° clockwise.

Z: rotate EUT by 90° vertically.

According to ANSI Standard C63.4-2009, the portable equipment shall be tested with X, Y, Z axis of the EUT to find the maximum emission. Other equipment shall be put in normal use status to find the maximum emissions.



Env. / Ins: 24°C/56%  
EUT: 125kHz Long Range Proximity Reader  
M/N: 5100  
Power Rating: DC 12V  
Test Mode: On  
Operator: Willis  
Memo:

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
2. The emission levels that are 20dB below the official limit are not reported.

## 2) other emissions

Remark: When an emission was found, the table was rotated to produce the maximum signal strength. Was performed in the 3m chamber using the spectrum analyser in peak detection mode. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. The worst case emissions were reported.

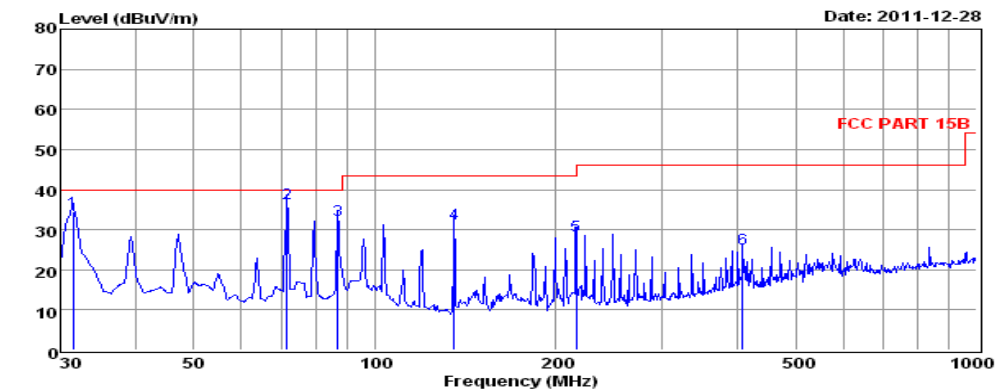
According to 15.35 (b) When average radiated emission measurements are specified in the regulations, including emission measurements below 1000 MHz, there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules, e.g., see Section 15.255.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Loss – Preamplifier Factor.

The following test results were performed on the EUT.

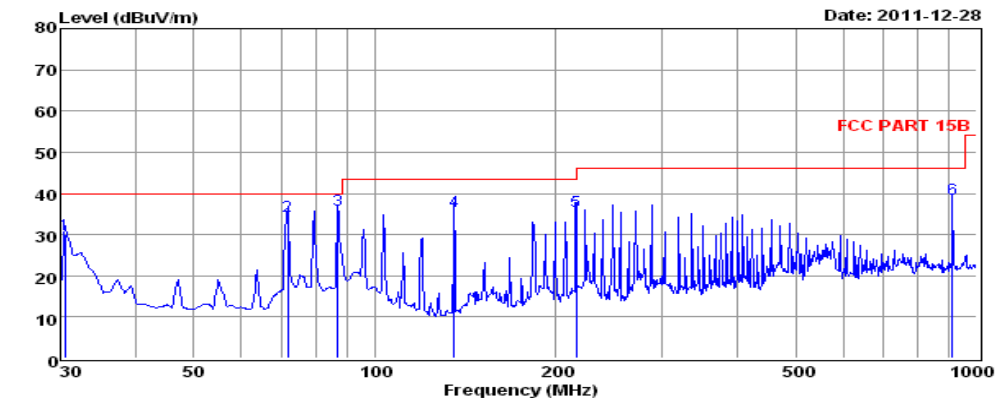
## 30MHz to 1GHz Emissions



Env. /Ins: 24°C/56%  
 EUT: 125kHz Long Range Proximity Reader  
 M/N: 5100  
 Power Rating: DC 12V  
 Test Mode: On  
 Operator: Willis  
 Memo:  
 pol: VERTICAL

	Freq.	Reading	CabLos	AntFac	PreFac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	31.51	52.02	0.37	12.32	30.12	34.59	40.00	-5.41	QP
2	71.33	57.77	0.55	8.42	30.17	36.57	40.00	-3.43	QP
3	86.81	51.36	0.47	10.88	30.19	32.52	40.00	-7.48	QP
4	135.51	52.63	0.70	8.52	30.20	31.65	43.50	-11.85	QP
5	216.02	46.79	0.88	11.07	30.19	28.55	46.00	-17.45	QP
6	408.95	38.83	1.28	15.24	30.10	25.25	46.00	-20.75	QP

Note: 1. All readings are Quasi-peak values.  
 2. Measured = Reading + Antenna Factor + Cable Loss - Amp Factor.  
 3. The emission levels that are 20dB below the official limit are not reported.



Env. /Ins: 24°C/56%  
 EUT: 125kHz Long Range Proximity Reader  
 M/N: 5100  
 Power Rating: DC 12V  
 Test Mode: On  
 Operator: Willis  
 Memo:  
 pol: HORIZONTAL

	Freq.	Reading	CabLos	AntFac	PreFac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dB	dBuV/m	dBuV/m	dB	
1	30.53	47.38	0.39	12.33	30.12	29.98	40.00	-10.02	QP
2	71.58	55.81	0.55	8.38	30.17	34.57	40.00	-5.43	QP
3	86.81	54.92	0.47	10.88	30.19	36.08	40.00	-3.92	QP
4	135.51	56.72	0.70	8.52	30.20	35.74	43.50	-7.76	QP
5	216.02	54.06	0.88	11.07	30.19	35.82	46.00	-10.18	QP
6	912.86	45.87	1.86	21.17	30.13	38.77	46.00	-7.23	QP

Note: 1. All readings are Quasi-peak values.  
 2. Measured = Reading + Antenna Factor + Cable Loss - Amp Factor.  
 3. The emission levels that are 20dB below the official limit are not reported.

## 6. MANUFACTURER/ APPROVAL HOLDER DECLARATION

The following identical model(s):

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Belong to the tested device:

Product description      :   125kHz Long Range Proximity Reader

Model name                :   5100

No additional models were tested.

-----THE END OF REPORT-----