

# FCC Part 15C Measurement and Test Report

For

INS Global Pty Ltd

Suite 8, 166A The Entrance Rd, Erina NSW 2250

**FCC ID: 2ACDGS1-P**

Test Rule(s):	<u>FCC Part 15.209</u>
Product Description:	<u>125K proximity card reader</u>
Tested Model:	<u>S3-P</u>
Report No.:	<u>STR14058060I</u>
Tested Date:	<u>2014-05-08 to 2014-05-12</u>
Issued Date:	<u>2014-05-19</u>
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

**TABLE OF CONTENTS**

<b>1. GENERAL INFORMATION.....</b>	<b>3</b>
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	3
1.2 TEST STANDARDS.....	4
1.3 TEST METHODOLOGY.....	4
1.4 TEST FACILITY .....	4
1.5 EUT SETUP AND OPERATION MODE .....	5
<b>2. SUMMARY OF TEST RESULTS .....</b>	<b>6</b>
<b>3. §15.203 - ANTENNA REQUIREMENT.....</b>	<b>7</b>
3.1 STANDARD APPLICABLE.....	7
3.2 TEST RESULT.....	7
<b>4. RADIATED EMISSIONS.....</b>	<b>8</b>
4.1 MEASUREMENT UNCERTAINTY .....	8
4.2 TEST EQUIPMENT LIST AND DETAILS .....	8
4.3 TEST PROCEDURE.....	8
4.4 TEST RECEIVER SETUP .....	9
4.5 CORRECTED AMPLITUDE & MARGIN CALCULATION.....	9
4.6 ENVIRONMENTAL CONDITIONS .....	9
4.7 SUMMARY OF TEST RESULTS/PLOTS .....	9
<b>5. CONDUCTED EMISSIONS .....</b>	<b>13</b>
5.1 MEASUREMENT UNCERTAINTY .....	13
5.2 TEST EQUIPMENT LIST AND DETAILS .....	13
5.3 TEST PROCEDURE.....	13
5.4 BASIC TEST SETUP BLOCK DIAGRAM.....	13
5.5 ENVIRONMENTAL CONDITIONS .....	14
5.6 TEST RECEIVER SETUP .....	14
5.7 SUMMARY OF TEST RESULTS/PLOTS .....	14
5.8 CONDUCTED EMISSIONS TEST DATA.....	14


## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: INS Global Pty Ltd  
Address of applicant: Suite 8, 166A The Entrance Rd, Erina NSW 2250

Manufacturer: INS Global Pty Ltd  
Address of manufacturer: Suite 8, 166A The Entrance Rd, Erina NSW 2250

General Description of EUT	
Product Name:	125K proximity card reader
Trade Name:	
Model No.:	S3-P
Adding Model(s):	S1-P, S2-P, B1-P, F1-125, F1-P, F2-P
Rated Voltage:	DC 12V
Rated Current:	100mA
Rated Power:	1.2W
<i>Note: The test data is gathered from a production sample, provided by the manufacturer. The enclosure of others models listed in the report is different from main-test model S3-P, but the circuit and the electronic construction do not change, declared by the manufacturer.</i>	

Technical Characteristics of EUT	
Frequency Range:	125kHz
RF Output Power:	72.17dB $\mu$ V/m
Type of Modulation:	FM
Quantity of Channels:	1
Type of Antenna:	Integral Loop Antenna
Lowest Internal Frequency:	20MHz
Highest Internal Frequency:	20MHz

## 1.2 Test Standards

The following report is prepared on behalf of the INS Global Pty Ltd in accordance with Part 2, Subpart J, and FCC Part 15, Subpart B, Subpart C, and section 15.203, 15.205 and 15.209 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.205, 15.207, and 15.209 rules.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

## 1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, 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 40 GHz.

## 1.4 Test Facility

### **FCC – Registration No.: 934118**

Shenzhen SEM.Test 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 and the Registration is 934118.

### **Industry Canada (IC) Registration No.: 11464A**

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

### **CNAS Registration No.: L4062**

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2<sup>nd</sup> Road, Bao'an District, Shenzhen, P.R.C (518101).

## 1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark
TM1	Transmitting	/
TM2	/	/

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
/	/	/	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

## 2. SUMMARY OF TEST RESULTS

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FCC Rules	Description of Test Item	Result
§ 15.207 (a)	Conducted Emissions	Compliant
§ 15.209 (a)	Radiated Emissions	Compliant

N/A: not applicable

### **3. §15.203 - ANTENNA REQUIREMENT**

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#### **3.1 Standard Applicable**

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

#### **3.2 Test Result**

This product has an integral antenna, fulfill the requirement of this section.

## 4. Radiated Emissions

### 4.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is  $\pm 5.10$  dB.

### 4.2 Test Equipment List and Details

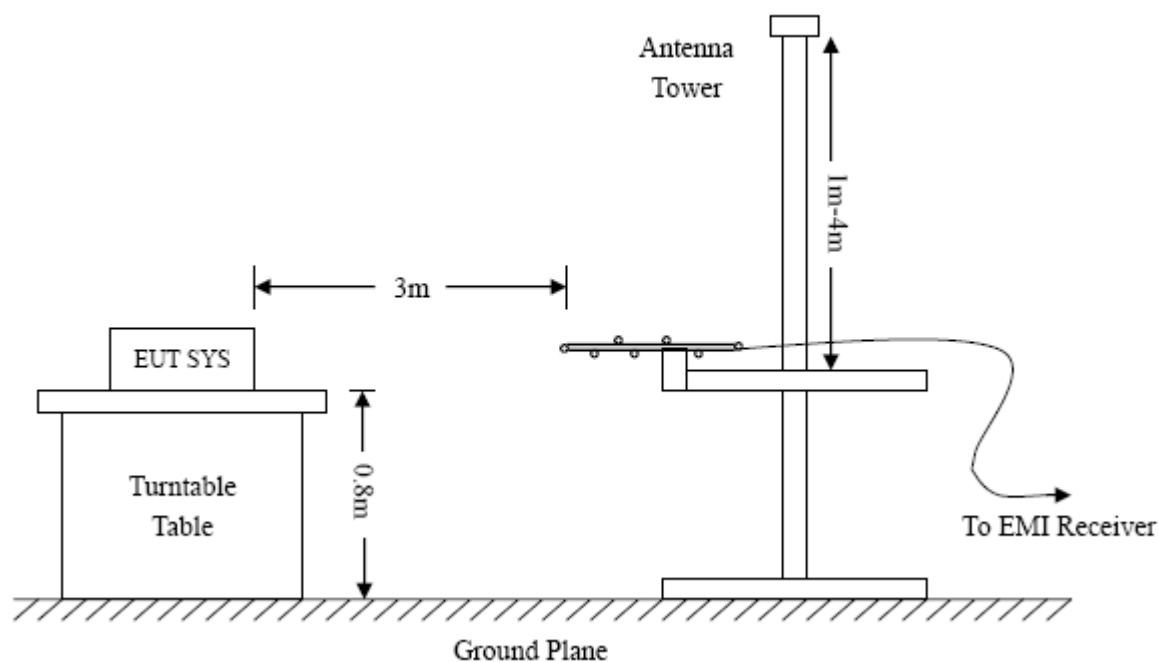
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-07	2015-05-06
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-07	2015-05-06
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-07	2015-05-06
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-07	2015-05-06
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-04-20	2015-04-19
Horn Antenna	ETS	3117	00086197	2014-04-20	2015-04-19
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2014-04-20	2015-04-19

### 4.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.





#### 4.4 Test Receiver Setup

Frequency :9kHz-30MHz

RBW=10KHz,

VBW =30KHz

Sweep time= Auto

Trace = max hold

Detector function = peak

Frequency :30MHz-1GHz

RBW=120KHz,

VBW=300KHz

Sweep time= Auto

Trace = max hold

Detector function = peak, QP

Frequency :Above 1GHz

RBW=1MHz,

VBW=3MHz(Peak), 10Hz(AV)

Sweep time= Auto

Trace = max hold

Detector function = peak, AV

#### 4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB $\mu$ V means the emission is 6dB $\mu$ V below the maximum limit for a Class C device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.209(a) Limit}$$

#### 4.6 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	55 %
ATM Pressure:	1011 mbar

#### 4.7 Summary of Test Results/Plots

According to the data, the EUT complied with the FCC Part 15.209(a) rule, and had the worst margin of:

**-3.14 dB at 100.2286 MHz in the Horizontal polarization, 9 kHz to 1 GHz, 3Meters**

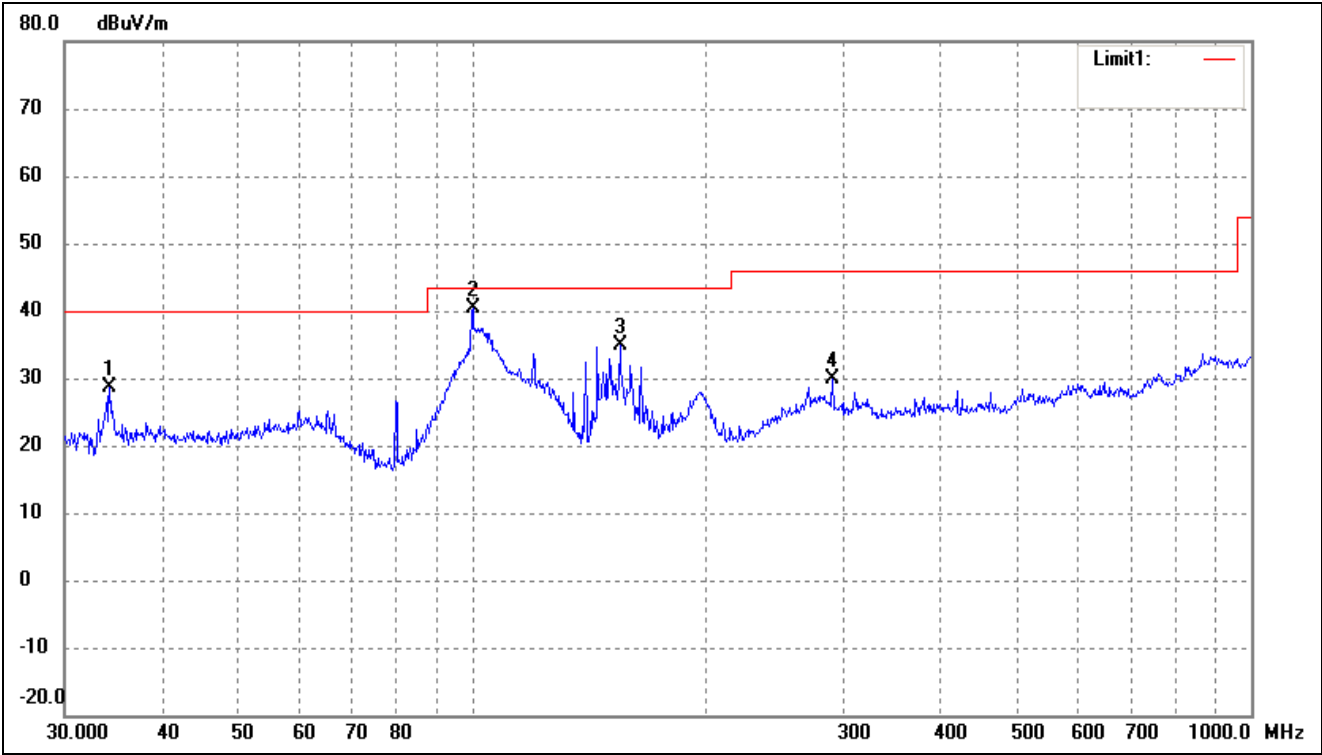
**Plot of Radiated Emissions Test Data (Below 30MHz)***EUT:* 125K proximity card reader*Tested Model:* S3-P*Operating Condition:* Transmitting*Comment:* DC 12V*Test Specification:* Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	0.0313	23.24	20.05	43.29	117.69	-74.40	105	100	peak
2	0.0468	23.90	20.06	43.96	114.20	-70.24	96	100	peak
3	0.0625	21.12	20.08	41.20	111.69	-70.49	125	100	peak
4	0.1250	52.06	20.11	72.17	105.67	-33.50	360	100	peak
5	12.1240	-11.62	23.65	12.03	69.54	-57.51	158	100	peak

Plot of Radiated Emissions Test Data (Above 30MHz)

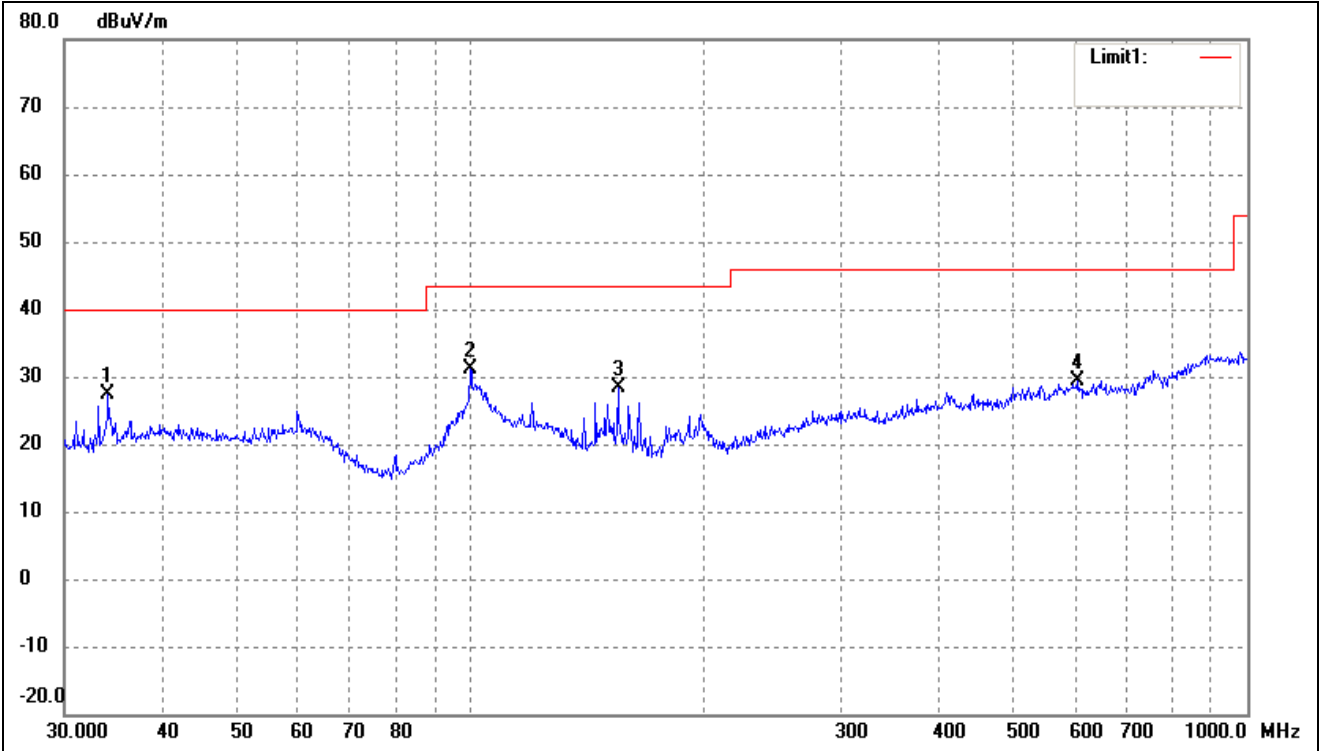
EUT: 125K proximity card reader  
Tested Model: S3-P  
Operating Condition: Transmitting  
Comment: DC 12V

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	34.2760	23.04	5.71	28.75	40.00	-11.25	51	100	peak
2*	100.2286	34.26	6.10	40.36	43.50	-3.14	308	100	peak
3	154.8205	32.30	2.55	34.85	43.50	-8.65	120	100	peak
4	290.0172	21.12	8.79	29.91	46.00	-16.09	359	100	peak

Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	34.1561	19.21	8.26	27.47	40.00	-12.53	147	100	peak
2*	99.8777	24.92	6.10	31.02	43.50	-12.48	360	100	peak
3	154.8205	25.93	2.55	28.48	43.50	-15.02	25	100	peak
4	605.6592	16.42	12.92	29.34	46.00	-16.66	147	100	peak

## 5. Conducted Emissions

### 5.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is  $\pm 2.88$  dB.

### 5.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2014-05-07	2015-05-06
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2014-05-07	2015-05-06
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2014-05-07	2015-05-06

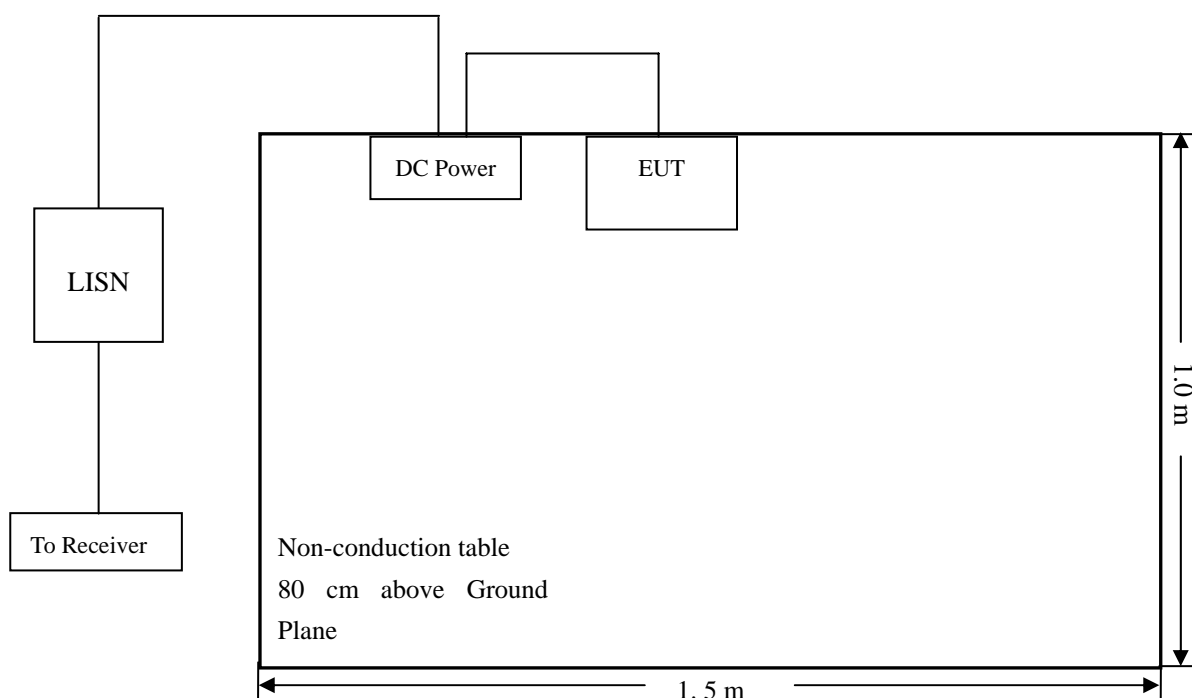
### 5.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

### 5.4 Basic Test Setup Block Diagram



5.5 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

5.6 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency ..... 150 kHz  
Stop Frequency..... 30 MHz  
Sweep Speed ..... Auto  
IF Bandwidth..... 10 kHz  
Quasi-Peak Adapter Bandwidth ..... 9 kHz  
Quasi-Peak Adapter Mode ..... Normal

5.7 Summary of Test Results/Plots

According to the data in section 12.8, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

**-6.49 dB at 0.170 MHz in the Line mode, peak detector, 0.15-30MHz**

5.8 Conducted Emissions Test Data

**Plot of Conducted Emissions Test Data**

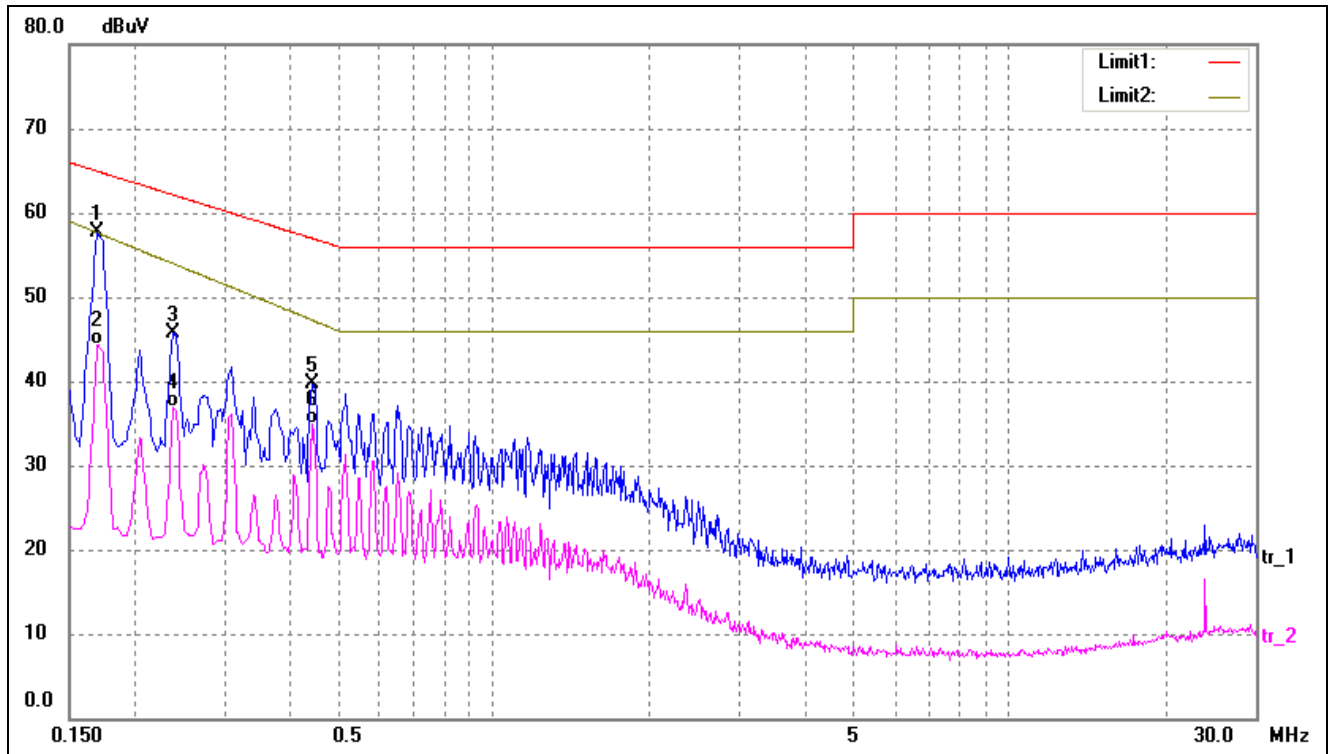
EUT: 125K proximity card reader

Tested Model: S3-P

Operating Condition: Transmitting

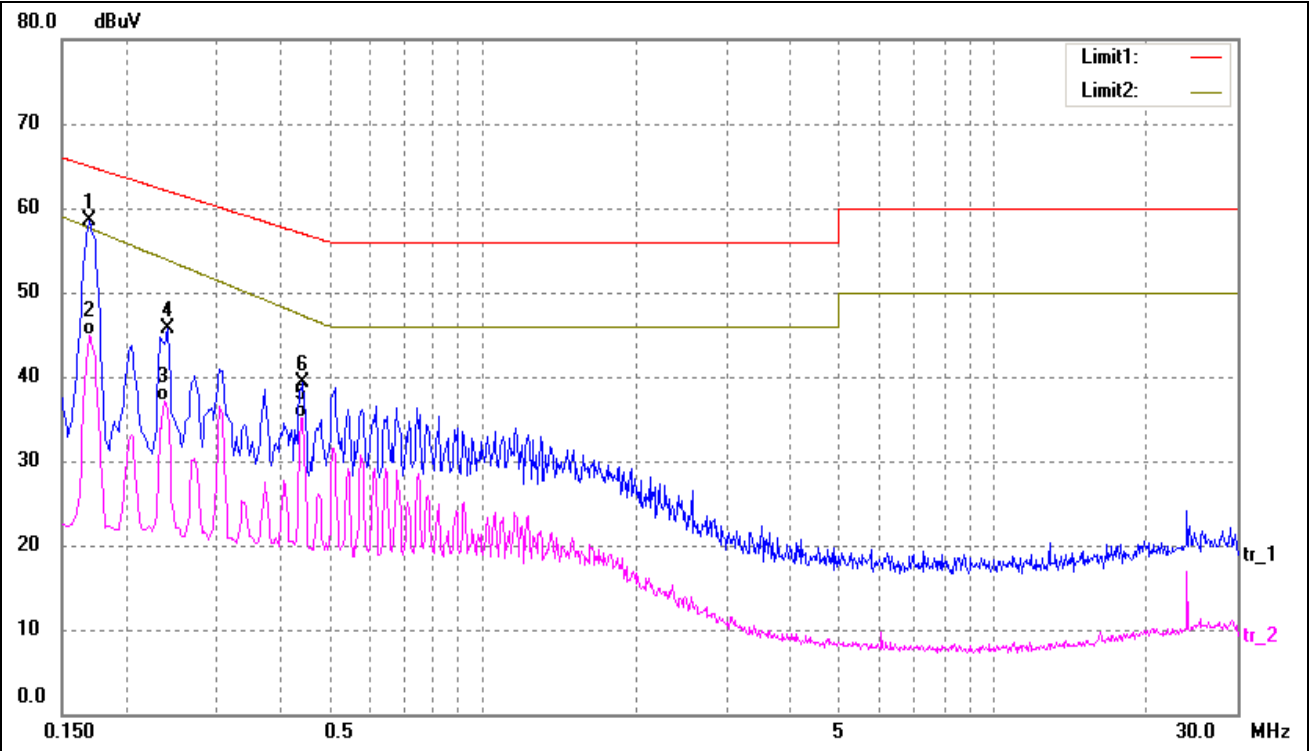
Comment: AC 120V/60Hz; DC 12V

Test Specification: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1*	0.1700	48.22	9.50	57.72	64.96	-7.24	peak
2	0.1700	34.89	9.50	44.39	57.65	-13.26	AVG
3	0.2380	36.17	9.50	45.67	62.17	-16.50	peak
4	0.2380	27.36	9.50	36.86	54.02	-17.16	AVG
5	0.4460	30.15	9.50	39.65	56.95	-17.30	peak
6	0.4460	25.39	9.50	34.89	47.23	-12.34	AVG

Test Specification: Line



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1*	0.1700	48.97	9.50	58.47	64.96	-6.49	peak
2	0.1700	35.39	9.50	44.89	57.65	-12.76	AVG
3	0.2380	27.56	9.50	37.06	54.02	-16.96	AVG
4	0.2420	36.25	9.50	45.75	62.03	-16.28	peak
5	0.4420	25.54	9.50	35.04	47.33	-12.29	AVG
6	0.4460	29.83	9.50	39.33	56.95	-17.62	peak

\*\*\*\*\* END OF REPORT \*\*\*\*\*