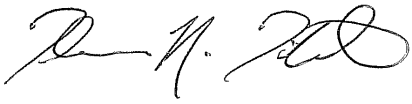
Nemko USA, Inc.
2210 Faraday Avenue, Suite 150
Carlsbad, CA 92008
Phone (760) 444-3500 Fax (760) 444-3005

CERTIFICATION TEST REPORT

Report Number:	2013 237011_REV1 EMC
Project Number:	237011
Nex Number:	237011
Applicant:	IPS GROUP, INC. 5601 OBELIN DRIVE San Diego, CA 92121
Equipment Under Test (EUT):	DEVICE CONTROLLER
Model:	M3
FCC ID:	SGWIPS2006SSPM
In Accordance With:	FCC Part 15 Subpart C, 15.225
Tested By:	Nemko USA Inc. 2210 Faraday Avenue, Suite 150 Carlsbad, CA 92008
Authorized By:	 Tom Tidwell, Reviewer
Date:	1 Sept 2012
Total Number of Pages:	19

1 Applicant Affirmation

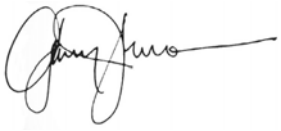
Gary Thomas representing IPS Group Inc. hereby affirms:

a) That he/she has reviewed and concurs that the test shown in this report are reflective of the operational characteristics of the device for which certification is sought;

b) That the device in this test report will be representative of production units;

c) That all changes (in hardware and software/firmware) to the subject device will be reviewed.

d) That any changes impacting the attributes, functionality or operational characteristics documented in this report will be communicated to the body responsible for approving (certifying) the subject equipment.



Gary Thomas
Printed name of official — Signature of official

5601 Obelin Drive — May 9, 2013
Address — Date

858-768-2401 x211 — gary.thomas@ipsgroupinc.com
Telephone number — Email address of official

NOTE—This affirmation must be signed by the responsible party before it is submitted to a regulatory body for approval.

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Section1: Summary of Test Results

General

All measurements are traceable to national standards

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15; Subpart C and IC RSS-210. Radiated tests were conducted is accordance with ANSI C63.4-2003. Radiated emissions are made in a 10m semi-anechoic chamber. A description of the test facility is on file with the FCC and IC.

The assessment summary is as follows:

Apparatus Assessed:	RFID Reader
Model:	M3
Specification:	FCC Part 15 Subpart C, 15.225
Date Received in Laboratory:	May 3, 2013
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None

1.1 Report Release History

REVISION	DATE	COMMENTS
-	May 3, 2013	Prepared By: MARK PHILLIPS
1	Sept 1, 2013	Initial Release: Alan Laudani

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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TESTED BY:  Date: 1-29 to 5-13, 2013
Mark Phillips, EMC Test Engineer

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Section 2: Equipment Under Test

2.1 Product Identification

The Equipment Under Test was identified as follows:

M3 RFID Reader

2.2 Samples Submitted for Assessment

The following sample of the apparatus has been submitted for type assessment:

Sample No.	Description	Serial No.
237011-1	M3 Parking Meter with RF ID Reader	NONE

2.3 Theory of Operation

The M3 is a Parking Meter with RFID Reader. Its function is for parking control and fee collection. The M3 version of the device contains only the RFID Reader.

The EUT's performance during test was evaluated against the performance criterion specified by applicable test standards. Performance results are detailed in the test results section of this report.

2.4 Technical Specifications of the EUT

Manufacturer:	IPS Group Inc.
Operating Frequency:	13.56 MHz (13.553 – 13.567 MHz)
Number of Operating Frequencies:	1
Rated Field Strength:	15,848 uV/m@30 meters (84 dBuV/m@30m or 103.1 dBuV/m@10m)
Modulation:	None
Antenna Type:	Integral
Antenna Connector:	None
Power Source:	7 Vdc

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Section 3: Test Conditions

3.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.225
Operation within the band 13.110 – 14.010 MHz

3.2 Deviations From Laboratory Test Procedures

No deviations from Laboratory Test Procedure

3.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	20-25 ºC
Humidity range	50-60%

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3.4 Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
911	Spectrum Analyzer	Agilent	E4440A	US41421266	10/15/2012	10/15/2013
110	Antenna, LPA	Electrometrics	LPA-25	1217	4/1/2011	4/1/2013
133	Antenna, Loop	Electrometrics	ALR-25M	678	7/18/2011	7/18/2013
128	Antenna, Bicon	EMCO	3104	2882	3/21/2011	3/21/2013
529	Antenna, DRWG	EMCO	3115	2505	10/31/2012	10/31/2014
901	Preamplifier	Sonoma	310 N	130607	10/15/2012	10/15/2013
E1013	Antenna	EMCO	3116	00119488	1/10/2012	1/10/2014
317	Preamplifier	HP	8449A	2749A00167	6/11/2012	6/11/2013
835	Spectrum Analyzer	R&S	FSEK	829058/005	9/6/2012	9/6/2013
E1041	Oscilloscope	LeCroy	WaveRunner	27167	6/12/2012	6/12/2013

Registration of the 10m Semi-anechoic chamber is on file with the Federal Communications Commission and with Industry Canada under Site Number 2040B-3.

Section 4: Observations

4.1 Modifications Performed During Assessment

No modifications were performed during assessment.

4.2 Record of Technical Judgements

No technical judgements were made during the assessment.

4.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

4.4 Test Deleted

None

4.5 Additional Observations

There were no additional observations made during this assessment.

Section 5: Results Summary

This section contains the following:

FCC Part 15 Subpart C: §15.225

The column headed "Required" indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N No: not applicable / not relevant
Y Yes: Mandatory i.e. the apparatus shall conform to these tests.
N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

5.1 Test Results

Part 15C	Test Description	Required	Result
15.207 (a)	Conducted Emission Limit	N	N/T
15.215(c)	Occupied Bandwidth	Y	Pass
15.225(a)	Field Strength of Emissions	Y	Pass
15.225(d) 15.209	Spurious Emissions Outside of the band	Y	Pass
15.225(e)	Frequency Stability	Y	Pass

*The device is battery powered.

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Appendix A: Test Results

Section 15.215(c) - Occupied Bandwidth

15.215(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in Sec. Sec. 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

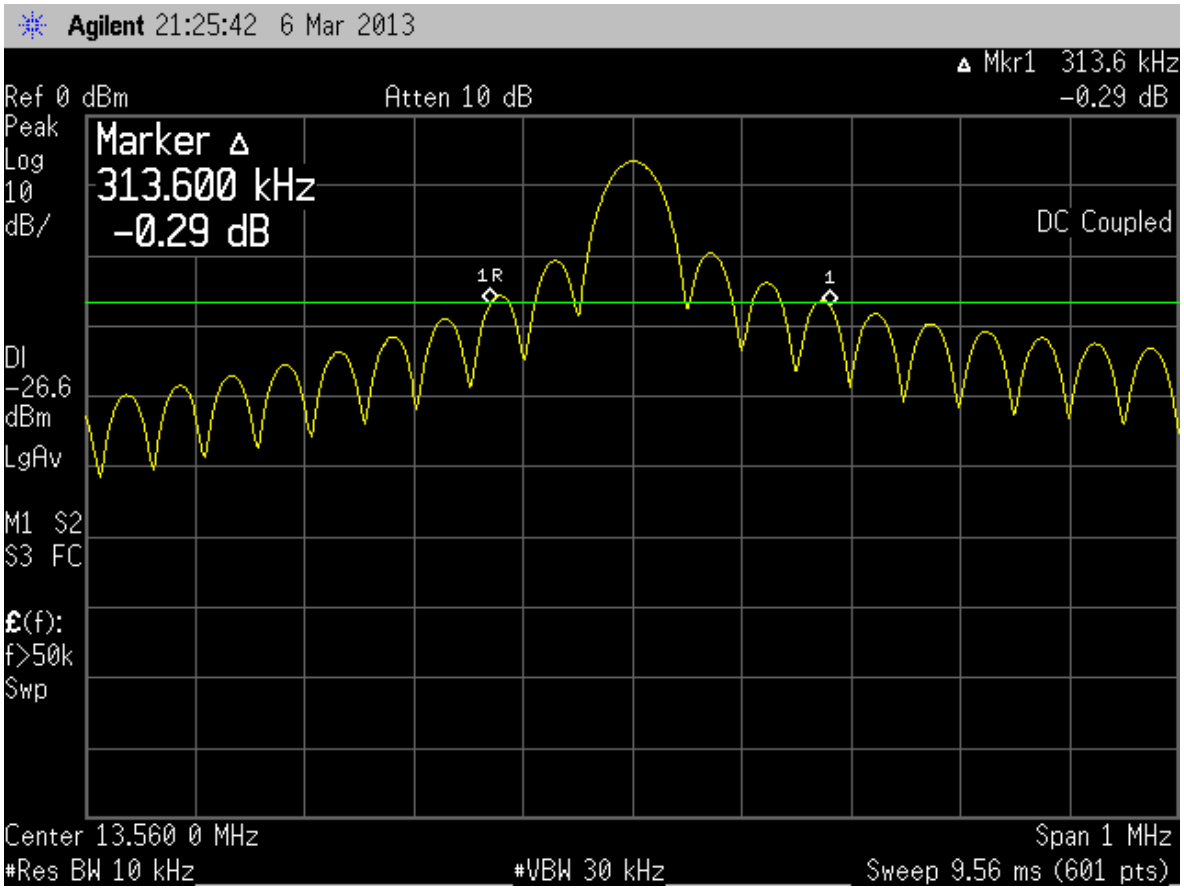
Test Conditions:

Client	IPS Group Inc	Temperature	19	°C
Nex #	237011	Relative Humidity	48	%
EUT Name	Parking Meter			
EUT Model	M3	Test Location	Enclosure 1	
Governing Doc	CFR 47, Part 15C	Test Engineer	Mark Phillips	
Basic Standard	Sec. 15.215 Occupied Bandwidth	Date of test	01-29-2013	

Test Results:
Measured Occupied Bandwidth:

Frequency	20 dB Bandwidth
13.56 MHz	313 kHz

Plots
20 dB bandwidth



Section 15.225(a) – Field Strength of Emissions

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

Test Conditions:

Sample Number:	M3	Temperature:	25°C
Date:	5/3/13	Humidity:	56%
Modification State:	As delivered	Tester:	Mark Phillips
		Laboratory:	

Additional Observations:

- All measurements were performed using a peak detector.
- RBW is 1MHz while VBW is 3MHz.
- Spectrum was investigated up to 30 MHz
- There are no emissions other than the fundamental

Sample Computation (Radiated Emissions Data Sheet):

Correction factor
@ 13.56 MHz = 35.1 dB/m
= Antenna factor + Cable loss – Preamp gain
= 35.1 + 0 - 0
Corrected reading = Max. reading + Correction factor
= 28.7 + 35.1
= 63.8 dBµV/m

Calculation of limit at 10m:
Limit at 30 m = 15,848 uV/m or 84 dBuV/m
Correction factor = 40 dB per decade of distance.
Measurement distance = 10 m
40 log(30/10) = 19.1 dB
84 dBuV/m + 19.1 dB = 103.1 dBuV/m@10m

Test Results:

Radiated Emissions Data

Job # :		Date :	5/3/2013	Page 1 of 1	
NEX #:		Time :	17:30		
		Staff :	mp		
Client Name :	IPS			EUT Voltage :	7.0VDC
EUT Name :	Parking Meter			EUT Frequency :	
EUT Model # :	M3			Phase:	
EUT Serial # :	None				
EUT Config. :	RFID Transmitting				
				Distance < 1000 MHz:	3 m
				Distance > 1000 MHz:	3 m
Specification :	FCC Part 15 Subpart C, 15.225 & 15.209				
Loop Ant. #:	133				
Bicon Ant.#:		Temp. (°C) :	21		
Log Ant.#:		Humidity (%) :	52		
DRG Ant. #		Spec Analyzer #:	911		
Cable LF#:	SAC_10m	Analyzer Display #:			
Cable HF#:		Quasi-Peak Detector #:			
Preamp LF#:	901	Duty Cycle (%):			
Preamp HF#					

Quasi-Peak RBW: 120 kHz
Video Bandwidth 300 kHz
Peak RBW: 1 MHz
Video Bandwidth 3 MHz
Average = Peak + Duty Cycle Factor
DCF = 20 x log(duty cyle)

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side DEG	Ant. Height cm	Max. Reading (dB?V)	Corrected Reading (dB?V)	Spec. limit (dB?V)	CR/SL Diff. (dB)	Pass Fail	Comment
13.560	26.6	28.7	P	360.0	100.0	28.7	63.8	103.1	-39.3	Pass	NFC / RFID Output Power

No other emissions detected within 20 dB of the 15.225 limits.

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Section 15.225 (d) – Spurious Emissions Outside of the band

(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

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

Test Conditions:

Sample Number:	MK 3	Temperature:	25°C
Date:	5-3-13	Humidity:	56%
Modification State:	As delivered	Tester:	Mark Phillips
		Laboratory:	Nemko

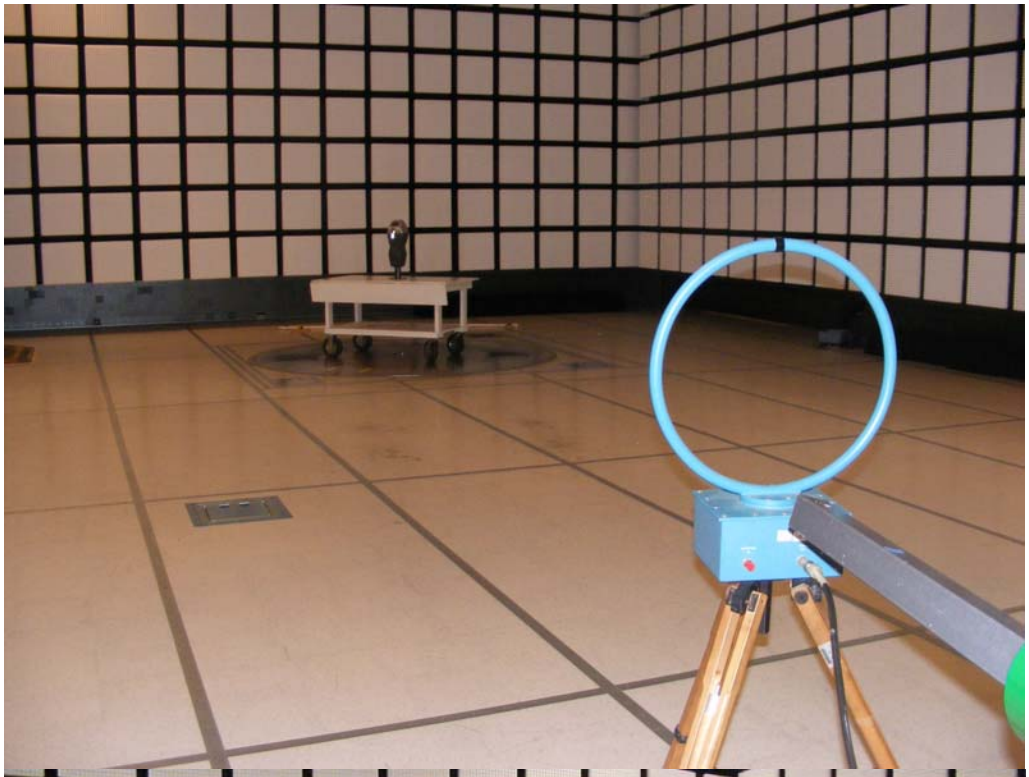
Test Results:

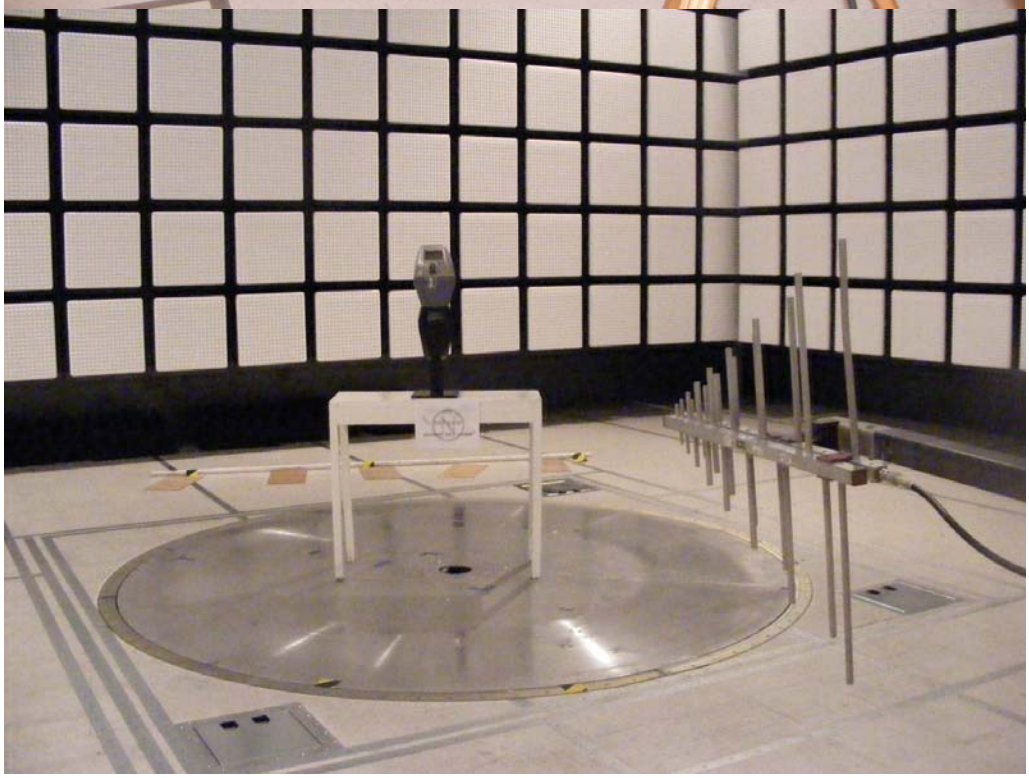
No emissions detected within 20 dB of the specification limit.

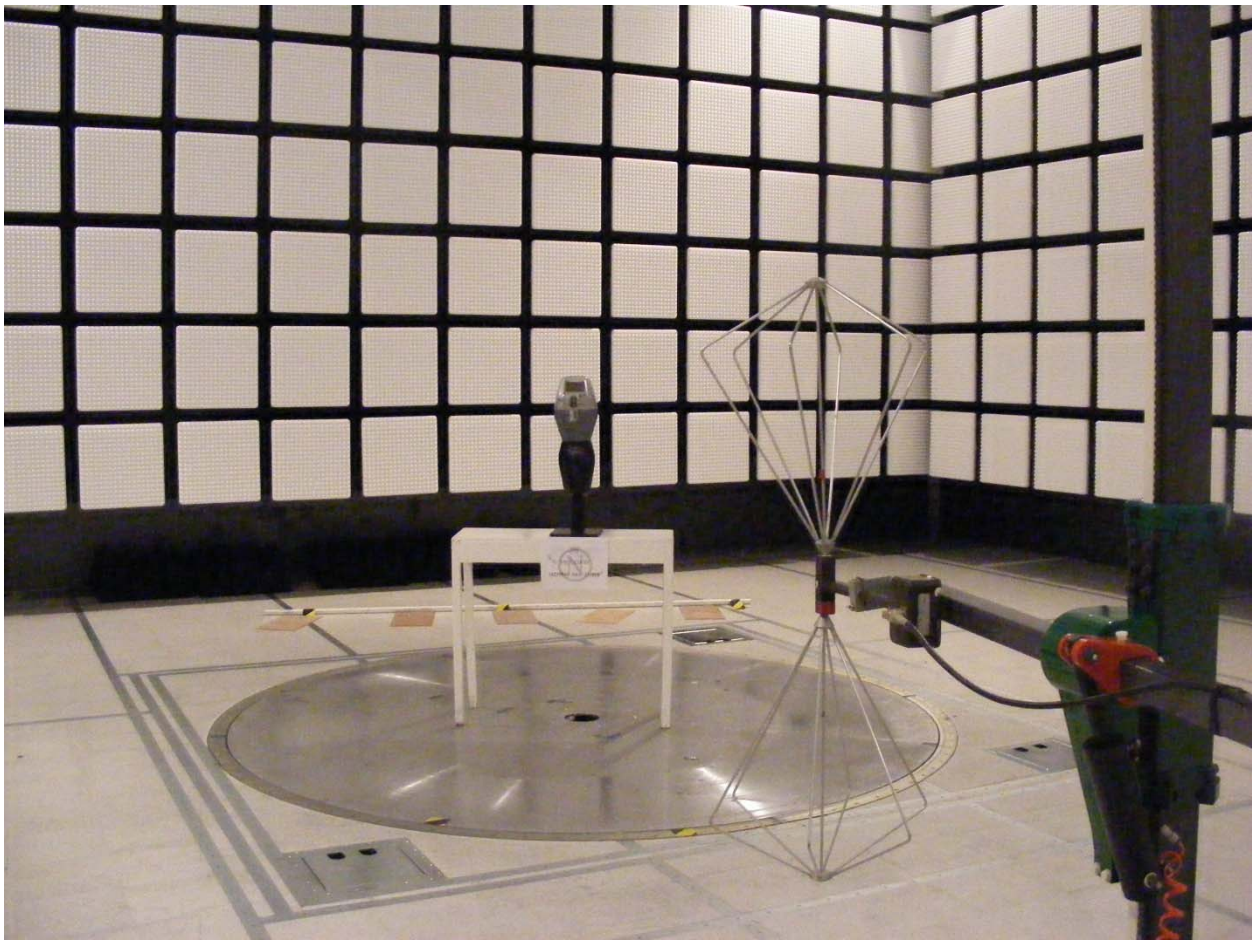
Additional Observations:

- All measurements below 1 GHz were performed at 3m employing a CISPR quasi-peak detector.
- The Spectrum was searched from 9 kHz to 1 GHz.
- Emissions were investigated in Transmit mode.
- There were no emissions found other than the fundamental (Section 15.225(a)).

Test Setup Photos







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Section 15.225(e) Frequency Stability

15.225(e) The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

15.231(d) For devices operating within the frequency band 40.66–40.70 MHz, the bandwidth of the emission shall be confined within the band edges and the frequency tolerance of the carrier shall be ±0.01%. This frequency tolerance shall be maintained for a temperature variation of −20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltages at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Test Conditions:

Client	IPS Group Inc	Temperature	25	°C
Nex #	237011	Relative Humidity	15	%
EUT Name	Parking Meter			
EUT Model	M3	Test Location	Environmental Chamber	
Governing Doc	CFR 47, Part 15C	Test Engineer	Mark Philips	
Basic Standard	15.225	Date of test	3-1-2013	

For 15.225: EUT complies:

Installed freshly charged battery.
±0.01% of the operating frequency = 1356 Hz

Temperature	Frequency	Frequency Drift		
Degrees C	MHz	Hz	ppm	%
-30	13.560751	+751	+55.38	-0.005538
-20	13.560322	+322	+23.74	-0.002374
-10	13,560049	+49	+3.61	+0.000361
0	13.560100	+100	+7.37	+0.000737
10	13.560100	+100	+7.37	+0.000737
20	13.560105	+105	+7.74	+0.000774
30	13.560088	+88	+6.48	+0.000648
40	13.559949	-510	-37.61	-0.003761
50	13.560455	+455	+33.55	+0.003355