

# FCC CERTIFICATION RADIO MEASUREMENT TECHNICAL REPORT

On Model Name: RFID Reader

Model Number: A741

Trademark: GAS N GO

Prepared for Petratec International., Ltd

FCC ID: U54-RDR04005221

According to FCC Part 15 (2006), Subpart C

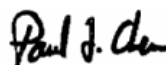
Test Report#: PET-0612-0856SH-FCC13.56M

Prepared by: Chris Huang

Reviewed by: Harry Zhao

QC Manager: Paul Chen

Test Report Released by:



Paul Chen

2007, May 28

Date

### ***Test Location***

*Tests performed at EMC Compliance Management Group (China) in a Certified ANSI Semi-Anechoic Chamber and Shielded Room performed testing.*

<b><i>Test Site Location:</i></b>	<i>Shanghai Institute of Process Automation Instrumentation (SIPAI) 103 Caobao Road, Shanghai, 200233</i>
<b><i>Tel:</i></b>	<i>86-21-64368180</i>
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<b><i>Registration Number:</i></b>	<i>96504</i>

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### **Administrative Data**

*Test Sample : RFID Reader*

*Model Name : A741*

*Brand Name : Gas N Go*

*Date Tested : 2007, February 7*

*Applicant : Petrateg International., Ltd  
12 Derech Ha' Sharon St. Kfar Saba, Israel*

*Telephone : 972-9-7466105*

*Fax : 972-9-7466150*

*Manufacturer : GRE -Golden Regent Electronics Industrial Ltd.  
Unit 2-5, 18/F, Millennium Trade Centre, No.56  
Kwai Cheong Road, Kwai Chung, N.T., Hong Kong.*

*Telephone : 852-35824907*

*Fax : 852-25263884*

### **EUT Description**

*Petrateg International., Ltd model name A741 (referred to as the EUT in this report) is a RFID reader. It has a 13.56MHz module to read a passive tag while it also has a 2.4GHz module to communicate with GSC. The 2.4GHz part is a transceiver and the 13.56MHz part is a RFID reader. In this report, only 13.56MHz part was tested and recorded.*

## **Test Summary**

*This report an application for Certification of a Transmitter operation pursuant to FCC 15.225, the product covered by this report is the Model: A741. This report is designed to demonstrate the compliance of this device with the requirements outlined in FCC Part 15.225 using the methods in FCC CFR 47 Part 2.*

<b>FCC Section</b>	<b>Requirements</b>	<b>Comments</b>	<b>Remark</b>
15.203	<i>The transmitter shall use a transmitting antenna that is an integral part of the device</i>	<i>Compliance</i>	<i>Attachment 1</i>
15.209/ 15.205	<i>Radiated emissions, general requirements</i>	<i>Compliance</i>	<i>Attachment 2</i>
15.225(a)(b)(c)(d)	<i>Transmitter radiated emissions-Fundamental, Harmonic and Spurious</i>	<i>Compliance</i>	<i>Attachment 3</i>
15.225(e)	<i>Frequency Stability vs Temperature</i>	<i>Compliance</i>	<i>Attachment 4</i>

### ***Test Mode Justification***

*The EUT exercise program was used during radiated testing and was designed to exercise the various system components in a manner similar to a typical use.*

*For emission testing, the unit was setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.*

### ***Equipment Modification***

*Any modifications installed previous to testing by Petrateg International., Ltd. will be incorporated in each production model sold or leased in United States.*

*There were no modifications installed by EMC Compliance Management Group.*

## Test System Details

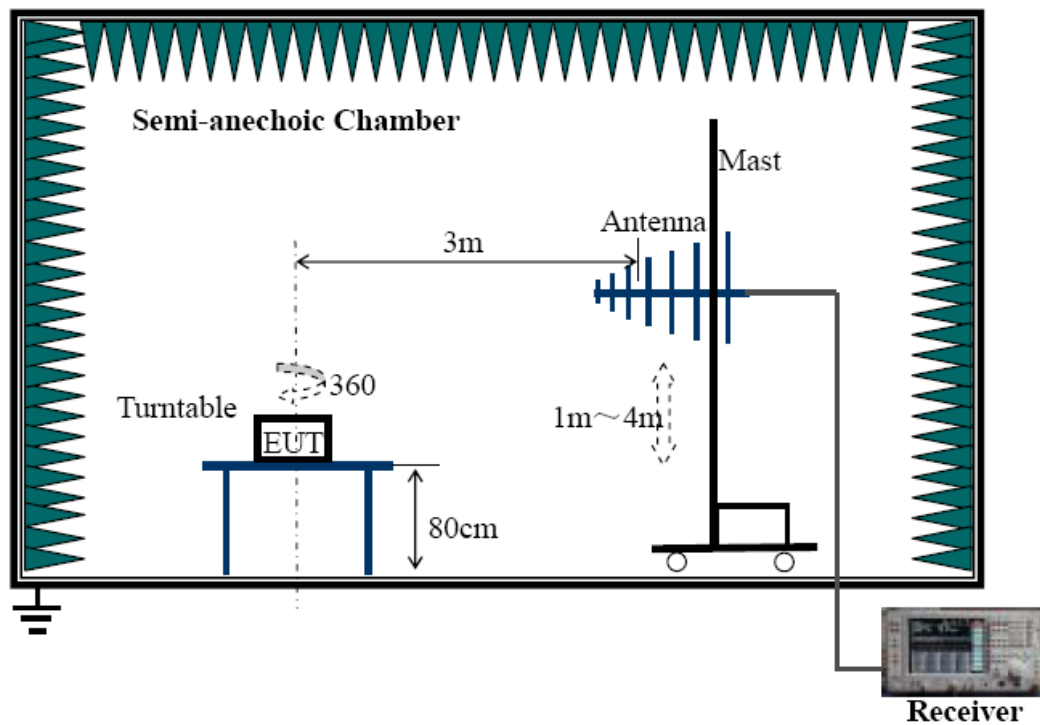
EUT				
Model Name:		A741		
Description:		RFID Reader		
Manufacturer:		Petrattec International., Ltd.		
Input Voltage:		3.6V DC		
Operating Frequency:		13.56MHz, 2.4GHz		
EUT Power Supply				
N/A				
Support Equipment				
Description	Model Number	Serial Number	Manufacturer	Power Cable Description
PC	M4800C	M0633038677	Lenovo	1.8m Unshielded
Monitor	LXM-ML-19BH	6M01876618	Lenovo	1.8m Unshielded
Keyboard	SK-8110	C4739-60101	Lenovo	N/A
Mouse	M-UAE96	LZ6360E0EG	Logitech	N/A

Continue on to the next page...



<i>Cable Description</i>					
<i>Description</i>	<i>From</i>	<i>To</i>	<i>Length (Meters)</i>	<i>Shielded (Y/N)</i>	<i>Ferrite Loaded (Y/N)</i>
<i>Ethernet Cable</i>	<i>EUT</i>	<i>PC</i>	<i>2.0</i>	<i>N</i>	<i>N</i>
<i>VGA Cable</i>	<i>Monitor</i>	<i>PC</i>	<i>1.5</i>	<i>Y</i>	<i>Y (x2)</i>
<i>Keyboard Cable</i>	<i>Keyboard</i>	<i>PC</i>	<i>1.8</i>	<i>N</i>	<i>N</i>
<i>Mouse Cable</i>	<i>Mouse</i>	<i>PC</i>	<i>1.8</i>	<i>N</i>	<i>N</i>

### *Configuration of Tested System*



**ATTACHMENT 1 - ANTENNA REQUIREMENT**

<b>CLIENT:</b>	Petrattec International., Ltd	<b>TEST STANDARD:</b>	FCC Part 15.203
<b>MODEL TESTED:</b>	A741	<b>PRODUCT:</b>	RFID Reader
<b>SERIAL NO.:</b>	Engineering Sample	<b>EUT DESIGNATION:</b>	RF Equipment
<b>TEMPERATURE:</b>	25°C	<b>HUMIDITY:</b>	55%RH
<b>ATM PRESSURE:</b>	101.7 kPa	<b>GROUNDING:</b>	No Grounding
<b>TESTED BY:</b>	Sulz	<b>DATE OF TEST:</b>	2007, February 7
<b>SETUP METHOD:</b>	N/A		
<b>ANTENNA REQUIREMENT:</b>	An intentional radiator shall be designed to ensure that no antenna other than 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.		
<b>TEST VOLTAGE:</b>	3.6V DC		
<b>TEST STATUS:</b>	Normal Operation As Usual		
<b>RESULTS:</b>	The EUT meets the Antenna requirement. The test results relate only to the equipment under test provided by client.		
<b>CHANGES OR MODIFICATIONS:</b>	There were no modifications installed by EMC Compliance Management Group (China) test personnel.		
<b>M. UNCERTAINTY:</b>	N/A		

<i>FCC Section</i>	<i>FCC Rules</i>	<i>Conclusion</i>
<b>15.203</b>	<p><i>Described how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT.</i></p> <p><i>The exception is in those cases where EUT must be professionally installed. In order to demonstrate that professional installation is required, the following 3 points must be addressed:</i></p> <ul style="list-style-type: none"> <li>● <i>The application (or intended use) of the EUT</i></li> <li>● <i>The installation requirements of the EUT</i></li> <li>● <i>The method by which the EUT will be marketed</i></li> </ul>	<i>The RF Device uses a permanent internal antenna.</i>

**Antenna Location**



Antenna  
Location

## ATTACHMENT 2 – GENERAL RADIATED EMISSIONS

<b>CLIENT:</b>	Petratrec International., Ltd	<b>TEST STANDARD:</b>	FCC Part 15.209, 15.205
<b>MODEL TESTED:</b>	A741	<b>PRODUCT:</b>	RFID Reader
<b>SERIAL NO.:</b>	Engineering Sample	<b>EUT DESIGNATION:</b>	RF Equipment
<b>TEMPERATURE:</b>	24°C	<b>HUMIDITY:</b>	55%RH
<b>ATM PRESSURE:</b>	101.7 kPa	<b>GROUNDING:</b>	No Grounding
<b>TESTED BY:</b>	Sulz	<b>DATE OF TEST:</b>	2007, February 7
<b>SETUP METHOD:</b>	ANSI C63.4 - 2003		
<b>TEST PROCEDURE:</b>	<p>The EUT is set up according to the guidelines of ANSI C63.4 for radiated emissions. The length of the antenna was adjusted to the maximum output level. An EMI receiver peak scan is made at the frequency measurement range (pre-scan) in an Anechoic chamber. Signal discrimination is then performed and the significant peaks marked. These peaks are then quasi-peaked for final test at an Open Site Test area. The frequency investigated is from 30MHz to 1GHz.</p> <p>The following data lists the significant emission frequencies, measured levels, correction factors (including cable and antenna correction factors), and the corrected readings against the limits. Explanation of the Correction Factor is given as follows:</p> <p>FS= RA + AF + CF - AG  Where: FS = Field Strength  RA = Receiver Amplitude  AF = Antenna Factor  CF = Cable Attenuation Factor  AG = Amplifier Gain</p>		
<b>TESTED RANGE:</b>	30MHz to 1,000MHz		
<b>TEST VOLTAGE:</b>	3.6V DC		
<b>RESULTS:</b>	<p>- The EUT meets the requirements of test reference for Radiated Emissions on vertical polarization by 1.4 dB at 32.8 MHz.</p> <p>The test results relate only to the equipment under test provided by client.</p>		
<b>CHANGES OR MODIFICATIONS:</b>	There were no modifications installed by EMC Compliance Management Group test personnel.		
<b>M. UNCERTAINTY:</b>	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp $\pm 2.6$ dB		

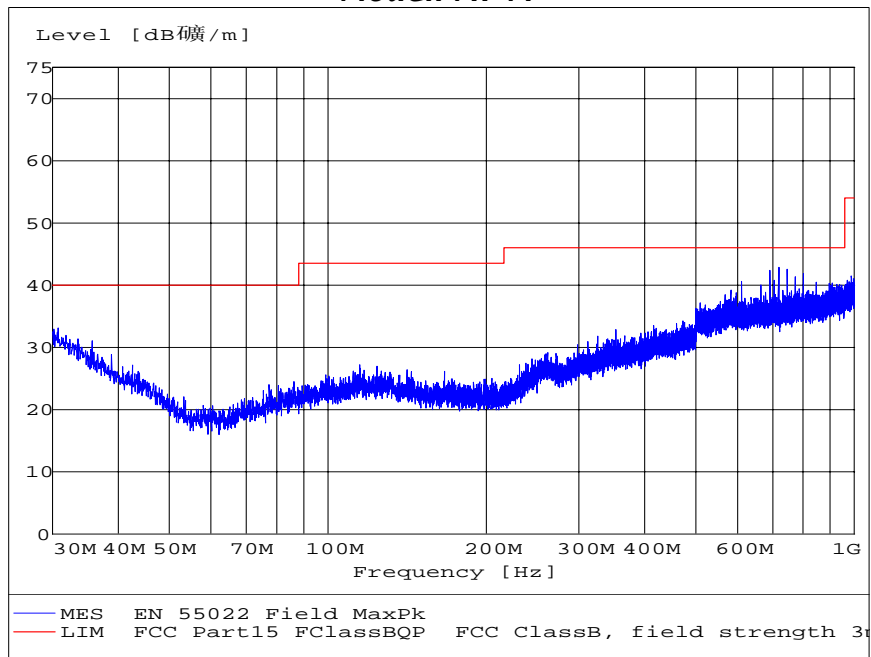
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
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	2690 - 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	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

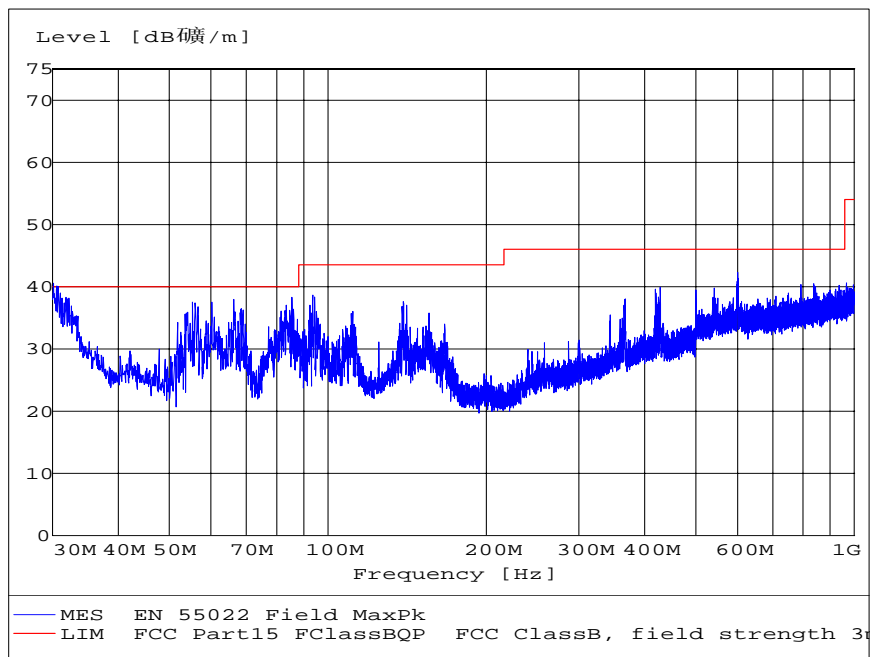
<sup>2</sup> Above 38.6

### Restricted band

### Model: A741



**Horizontal Radiated Emission Plot (Peak, Max Hold Mode)**



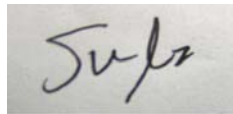
**Vertical Radiated Emission Plot (Peak, Max Hold Mode)**



30MHz - 1GHz								
Horizontal								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	32.8	16.1	0.3	30.1	40.0	-9.9	102	146
2	726.7	19.1	3.1	42.2	46.0	-3.8	83	183
3	755.8	19.4	3.3	41.8	46.0	-4.2	243	200
Vertical								
Signal	Frequency (MHz)	Antenna Factor (dB)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	32.8	16.1	0.3	38.6	40.0	-1.4	276	154
2	86.2	7.5	0.6	37.9	40.0	-2.1	320	120
3	606.1	18.5	2.5	43.4	46.0	-2.6	38	100
Comments: None								
Note: All readings are quasi-peak unless stated otherwise, using a QPA bandwidth of 120kHz, with a 30 ms sweep time. A video filter was not used.								

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
EMI Receiver	R&S	ESCS30	828985/026	04/18/06	04/17/07
BiLog antenna	Chase	CBL 6112B	2532	03/22/06	03/21/07
3m semi-anechoic chamber	LINDGREN	07'x08'-4	15427-A	02/24/06	02/23/07
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY:



ENGINEER

REVIEWED BY:



SENIOR ENGINEER

**ATTACHMENT 3 - Transmitter radiated emissions-Fundamental,  
Harmonic and Spurious (9k-30MHz)**

<b>CLIENT:</b>	Petrattec International., Ltd	<b>TEST STANDARD:</b>	FCC Part 15.209, 15.205
<b>MODEL TESTED:</b>	A741	<b>PRODUCT:</b>	RFID Reader
<b>SERIAL NO.:</b>	Engineering Sample	<b>EUT DESIGNATION:</b>	RF Equipment
<b>TEMPERATURE:</b>	24°C	<b>HUMIDITY:</b>	55%RH
<b>ATM PRESSURE:</b>	101.7 kPa	<b>GROUNDING:</b>	No Grounding
<b>TESTED BY:</b>	Sulz	<b>DATE OF TEST:</b>	2007, February 7
<b>SETUP METHOD:</b>	ANSI C63.4 - 2003		
<b>FCC 15.225</b>	<p>(a) The field strength of any emissions within the band 13.553-13.567MHz shall not exceed 15,848 microvolts/meter at 30 meters.</p> <p>(b) Within the band 13.410-13.553MHz and 13.567-13.710MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.</p> <p>(c) Within the band 13.110-13.410MHz and 13.710-14.010MHz, the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.</p> <p>(d)The field strength of any emissions appearing outside of the 13.110-14.010MHz band shall not exceed the general radiated emission limit in 15.209.</p>		
<b>TEST PROCEDURE:</b>	<p>The EUT is set up according to the guidelines of ANSI C63.4 for radiated emissions. The length of the antenna was adjusted to the maximum output level. An EMI receiver employing average detector is used for the test. Peak scan was made at the frequency measurement range (pre-scan) in an Anechoic chamber, and then three significant points were investigated by peak detector and average detector. The frequency investigated is from 13.110MHz to 14.010MHz.</p> <p>The following data lists the significant emission frequencies, measured levels, and the corrected readings against the limits. Explanation of the Correction Factor is given as follows:</p> <p>FS= RA + AF + CF - AG  Where: FS = Field Strength  RA = Receiver Amplitude  AF = Antenna Factor  CF = Cable Attenuation Factor  AG = Amplifier Gain</p>		
<b>TESTED RANGE:</b>	9KHz-30MHz		
<b>TEST VOLTAGE:</b>	DC 3.6V		
<b>TEST STATUS:</b>	Keep Tx in continuous transmission mode, modulated		

<b>RESULTS:</b>	-The EUT meets the requirements of test reference for Radiated Emissions on vertical polarization by 0.7dB for QP reading at 27.122MHz The test results relate only to the equipment under test provided by client.
<b>CHANGES OR MODIFICATIONS:</b>	There were no modifications installed by EMC Compliance Management Group test personnel.
<b>M. UNCERTAINTY:</b>	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp $\pm 2.6$ dB

**Limit Description:**

<i>Fundamental Frequency</i>	<i>Field Strength of Fundamental uV/m</i>	<i>Field Strength of Fundamental dBuV/m</i>	<i>Measured Distance (meter)</i>
13.553-13.567	15,848	84	30

**FCC Part 15.225(a) Radiated emission limits:**

<i>Frequency (MHz)</i>	<i>Fundamental uV/m</i>	<i>Fundamental dBuV/m (30 m)</i>	<i>Fundamental dBuV/m (3 m)</i>
13.56	15,848	84	124

Note#1:  $\text{dBuV/m} = 20 \times \text{Log (uV/m)}$

$\text{dBuV/m} = 20 \times \text{log (15,848 uV/m)} = 84$

Note#2: According to FCC 15.31(2), at frequencies below 30MHz, we use square of an inverse linear distance extrapolation factor (40dB/decade).

**FCC Part 15.225(b)(c)(d) Field Strength limits:**

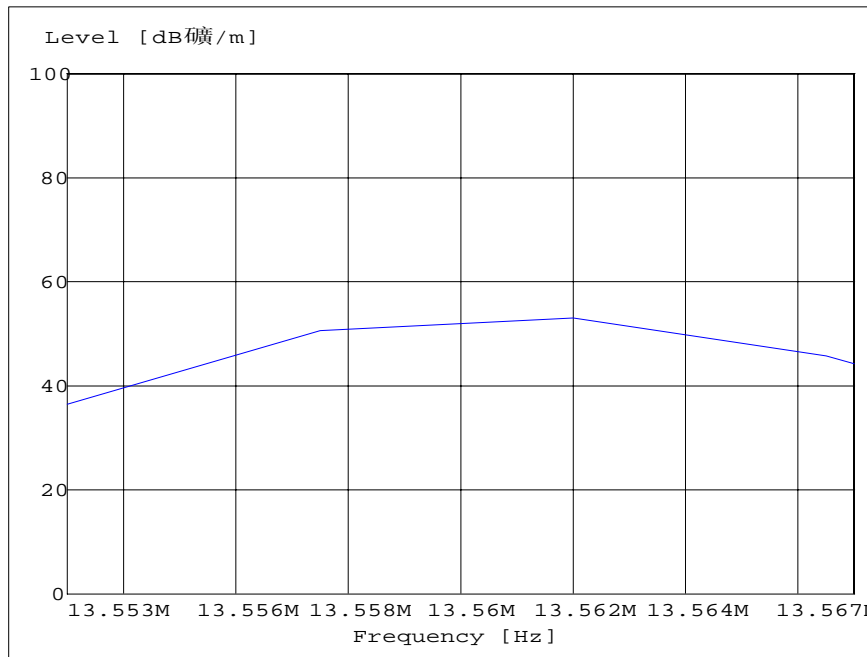
<i>Frequency (MHz)</i>	<i>Field Strength uV/m (30m)</i>	<i>Field Strength dBuV/m (30m)</i>	<i>Field Strength dBuV/m (3m)</i>	<i>Plot #</i>
13.410 - 13.553	334	50.4	90.4	In next page.
13.567 - 13.710	334	50.4	90.4	In next page
13.110 - 13.410	106	40.5	80.4	In next page
13.710 - 14.010	106	40.5	80.4	In next page
Outside of the 13.110 - 14.010	30	29.5	69.5	In next page

Note: Note#2: According to FCC 15.31(2), at frequencies below 30MHz, we use square of an inverse linear distance extrapolation factor (40dB/decade).

### Fundamental (13.110MHz-14.010MHz)

Frequency (MHz)	Polarity	Reading (dBuV)	Antenna Factor(dB/m)	Cable Loss(dB)	Corrected Level(3m)(dBuV/m)	Limit(3m) (dBuV/m)	Margin (dB)
13.56	H	52.4	19.8	0.3	72.5	124	-51.5
13.56	V	53.5	19.8	0.3	73.6	124	-50.4

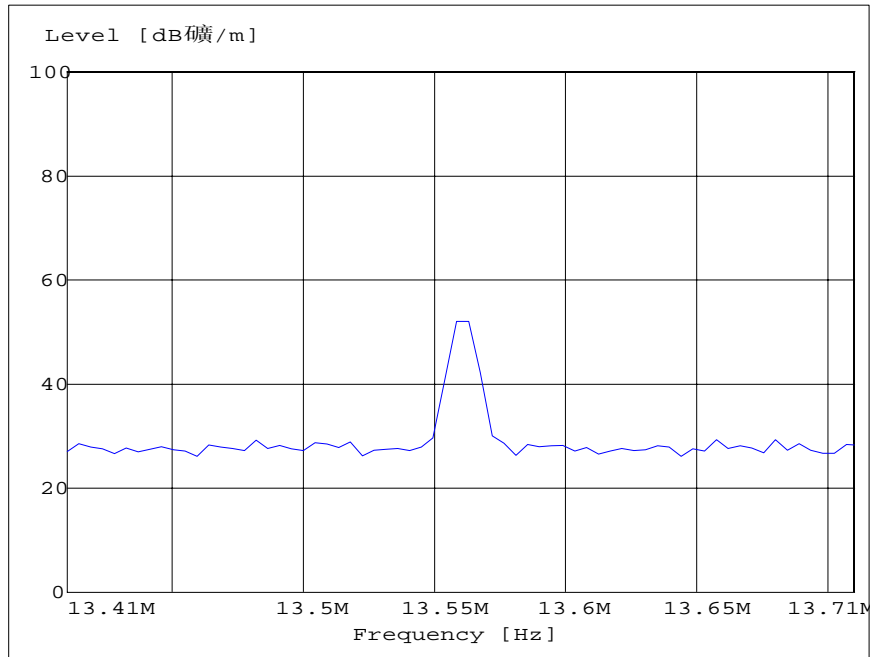
Note: Corrected level =Reading level+ Antenna Factor+ Cable Loss



**13.533MHz-13.567MHz Plot**

Frequency (MHz)	Reading (dBuV)	Antenna Factor(dB/m)	Cable Loss(dB)	Corrected Level(3m)(dBuV/m)	Limit(3m) (dBuV/m)	Margin (dB)
13.553	37.8	19.8	0.3	57.9	90.4	-32.5
13.567	44.1	19.8	0.3	64.2	90.4	-26.2

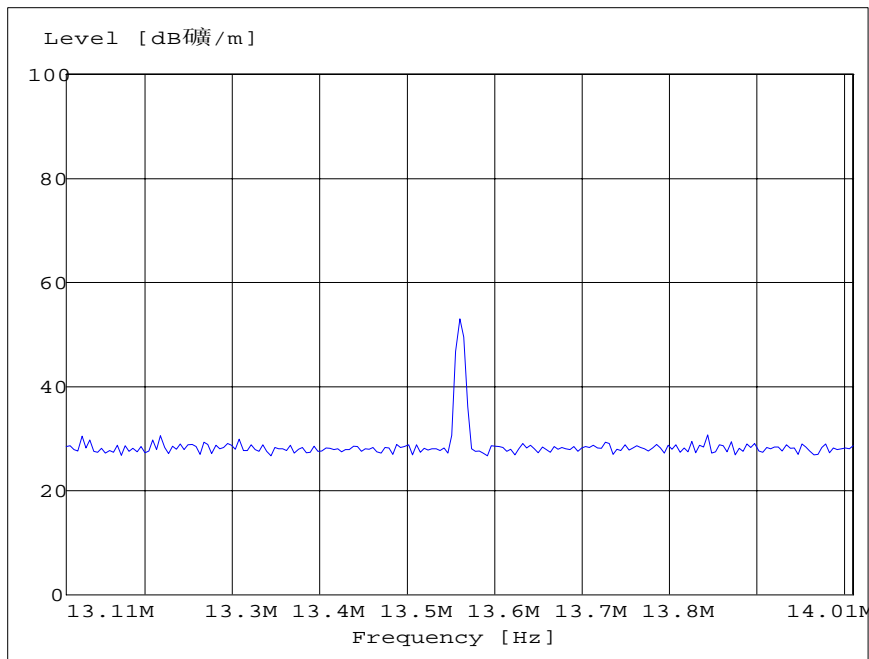
Note: Corrected level =Reading level+ Antenna Factor+ Cable Loss



**13.410MHz-13.710MHz Plot**

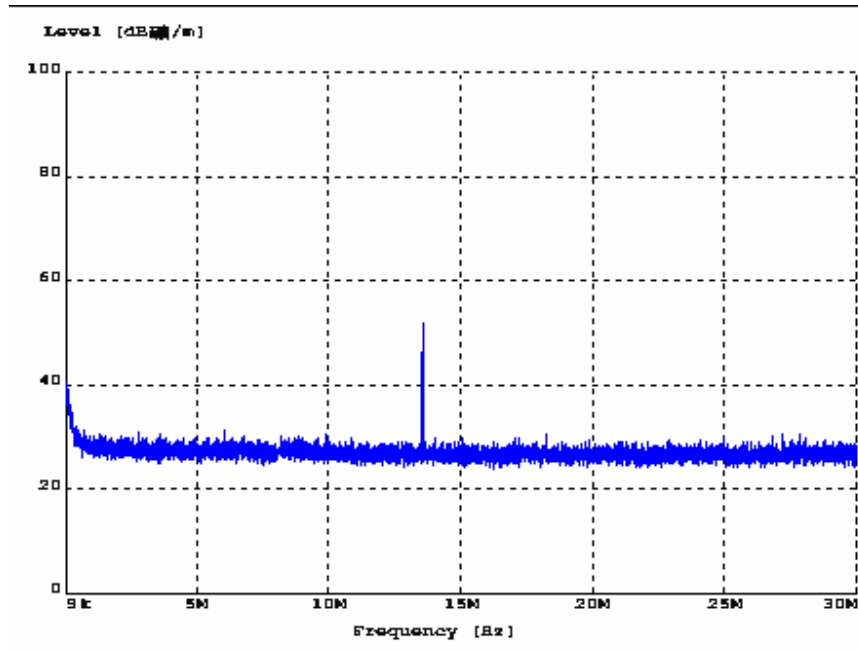
Frequency (MHz)	Reading (dBuV)	Antenna Factor(dB/m)	Cable Loss(dB)	Corrected Level(3m)(dBuV/m)	Limit(3m) (dBuV/m)	Margin (dB)
13.410	29.4	19.7	0.3	49.4	80.4	-31.0
13.710	30.5	19.9	0.3	50.7	80.4	-29.7

Note: Corrected level =Reading level+ Antenna Factor+ Cable Loss



### **13.110MHz-14.010MHz Plot**

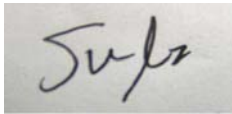
*Note: There are no other emissions during the frequency band 13.110-13.410MHz and 13.710-14.010MHz.*




**9kHz-30MHz Plot**

Note: There are no other emissions during the frequency band 13.110-13.410MHz and 13.710-14.010MHz.

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
EMI Receiver	R&S	ESCS30	828985/026	04/18/06	04/17/07
Loop Antenna	R&S	HFH2-Z2	82934/004	10/16/06	10/15/07
3m semi-anechoic chamber	LINDGREN	07'x08'-4	15427-A	02/24/06	02/23/07

SIGNED BY:   
ENGINEER

REVIEWED BY:   
SENIOR ENGINEER



**ATTACHMENT 4- Frequency Stability, Section 15.225 (e) & 2.1055**

<b>CLIENT:</b>	Petrattec International., Ltd	<b>TEST STANDARD:</b>	FCC Part 15.209, 15.205
<b>MODEL TESTED:</b>	A741	<b>PRODUCT:</b>	RFID Reader
<b>SERIAL NO.:</b>	Engineering Sample	<b>EUT DESIGNATION:</b>	RF Equipment
<b>TEMPERATURE:</b>	24°C	<b>HUMIDITY:</b>	55%RH
<b>ATM PRESSURE:</b>	101.7 kPa	<b>GROUNDING:</b>	No Grounding
<b>TESTED BY:</b>	Sulz	<b>DATE OF TEST:</b>	2007, February 7
<b>TESTED METHOD:</b>	FCC Part 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.		
<b>TEST PROCEDURE:</b>	Set the environmental temperature chamber to temperature of (-20°C to +50°C) wait the temperature of the chamber to stabilize.  While maintaining a constant temperature inside the environmental chamber, turn the EUT on and measure the EUT operating frequency at the start-up, 10 minutes, and 30 minutes after startup.		
<b>TEST VOLTAGE:</b>	3.6V DC		
<b>RESULTS:</b>	The EUT meets the reference requirement of Frequency stability under low voltage conditions at operating mode. The test results relate only to the equipment under test provided by client.		
<b>CHANGES OR MODIFICATIONS:</b>	There were no modifications installed by EMC Compliance Management Group test personnel.		
<b>M. UNCERTAINTY:</b>	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp $\pm 2.6$ dB		

**Frequency stability VS Temperature Measurement Data:**

Timing	-20℃	-10℃	0℃	+10℃	+20℃	+30℃	+40℃	+50℃
Start-up	13.560080	13.56080	13.56080	13.56080	13.56090	13.56090	13.56090	13.56090
10 Min.	13.560070	13.56080	13.56090	13.56090	13.56090	13.56090	13.56090	13.56090
30 Min.	13.560070	13.56080	13.56080	13.56090	13.56090	13.56090	13.56090	13.56090

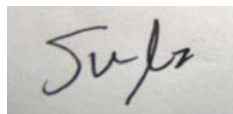
Note: The frequency is in the unit of MHz

Maximum frequency Drift	Limit	Result
+0.0010MHz	$13.5608 \times 0.01\% = 0.001356\text{MHz}$	Pass
-0.0010MHz		Pass

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
Spectrum	Advantest	R3162	001-33	11/10/06	11/09/07
Temperature Chamber	Weisstechnik	C06-306-WT	02-2005	03/15/06	03/14/07
Probe Set	R&S	HZ-14	825359/0009	10/16/06	10/15/07

Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.

SIGNED BY:



ENGINEER

REVIEWED BY:



SENIOR ENGINEER