

# FCC PART 15.227

## EMI MEASUREMENT AND TEST REPORT

For

**Steelmate Co., Ltd.**

Renan Street, Dongfu Road, Dongfeng Town, Zhongshan, 528425, China

**FCC ID: Q6WBRM054**

November 14, 2005

<b>This Report Concerns:</b> <input checked="" type="checkbox"/> Original Report	<b>Equipment Type:</b> Wireless parking sensor system
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<b>Report No.:</b> RSZ05110301	
<b>Test Date:</b> November 8-14, 2005	
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**Note:** The test report is specially limited to the above company and this particular sample only.  
It may not be duplicated without prior written consent of Bay Area Compliance Lab Corp.  
(ShenZhen). This report must not be used by the client to claim product certification,  
approval, or endorsement by NVLAP, NIST or any agency of the US Government.

**TABLE OF CONTENTS**

<b>GENERAL INFORMATION.....</b>	<b>3</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	3
OBJECTIVE .....	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY .....	3
TEST FACILITY .....	3
EXTERNAL I/O CABLE .....	4
<b>SYSTEM TEST CONFIGURATION.....</b>	<b>5</b>
JUSTIFICATION .....	5
EQUIPMENT MODIFICATIONS .....	5
CONFIGURATION OF TEST SETUP .....	5
BLOCK DIAGRAM OF TEST SETUP .....	5
<b>SUMMARY OF TEST RESULTS .....</b>	<b>6</b>
<b>§15.203 - ANTENNA REQUIREMENT.....</b>	<b>7</b>
STANDARD APPLICABLE .....	7
<b>§15.205, §15.209, §15.227(A) - RADIATED EMISSIONS TEST .....</b>	<b>8</b>
MEASUREMENT UNCERTAINTY .....	8
EUT SETUP.....	8
EMI TEST RECEIVER SETUP .....	8
TEST EQUIPMENT LIST AND DETAILS.....	9
CORRECTED AMPLITUDE & MARGIN CALCULATION .....	9
TEST RESULTS SUMMARY .....	9
TEST DATA .....	10
PLOT(S) OF TEST DATA.....	10
<b>§15.227(B) - OUT OF BAND EMISSION .....</b>	<b>13</b>
TEST EQUIPMENT LIST AND DETAILS.....	13
TEST PROCEDURE .....	13
TEST DATA .....	13

## GENERAL INFORMATION

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

The *Steelmate Co., Ltd.*'s product, model number: PTS400Q-COM or the "EUT" as referred to in this report is a Wireless parking sensor system. The EUT is measured approximately 9.8 cm L x 6.5 cm W x 2.5 cm H. rated input voltage: DC 12V battery.

Battery:

Manufacturer: Hua yang, Model: 6-DZM-10.

*\* The test data gathered are from production sample, serial number: 110920, provided by the manufacturer, we received the EUT on 2005-11-3.*

### Objective

This Type approval report is prepared on behalf of *Steelmate Co., Ltd.* in accordance with Part 2, Subpart J, and Part 15, Subparts A , B and C of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules, sec 15.203, 15.205, 15.209 and sec 15.227.

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

No Related Submittals.

### 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.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Lab Corp. (ShenZhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Test Facility

The Test site used by Bay Area Compliance Lab Corp. (ShenZhen) to collect radiated and conducted emission measurement data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone, ShenZhen, Guangdong 518038, P.R.China.

Test site at Bay Area Compliance Lab Corp. (ShenZhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Lab Corp. (ShenZhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0). The current scope of accreditations can be found at  
<http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm>

### External I/O Cable

Cable Description	Length (M)	From/Port	To
Unshielded Undetachable DC Cable	2.40	EUT	Battery
Unshielded detachable Contact Cable	2.56	EUT	Contactor
Unshielded detachable Sensor Cable	0.32	Contactor	Sensor

## SYSTEM TEST CONFIGURATION

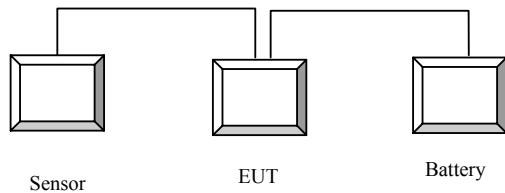
### Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

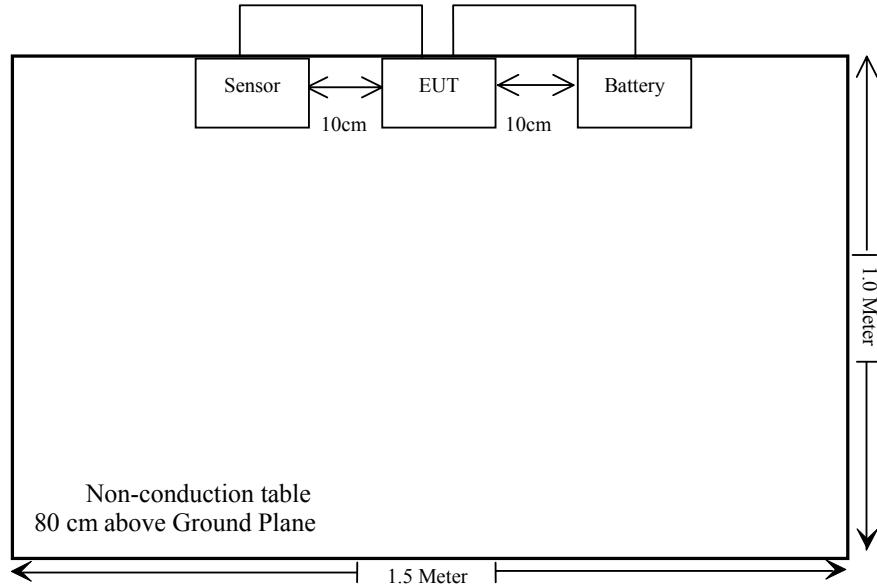
### Equipment Modifications

Bay Area Compliance Lab Corp. (ShenZhen) has not done any modification on the EUT.

### Configuration of Test Setup



### Block Diagram of Test Setup



## SUMMARY OF TEST RESULTS

Results reported relate only to the product tested.

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§15.209	Radiated Emission Limit	Compliant*
§15.227(a)	Field Strength	Compliant
§15.227(b)	Out of Band Emission	Compliant

Note: The highest clocks of the EUT was 27.045 MHz.

\* Within measurement uncertainty

## **§15.203 - ANTENNA REQUIREMENT**

### **Standard Applicable**

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.

This product has a permanent antenna, fulfill the requirement of this section.

Test Result: Pass

## **§15.205, §15.209, §15.227(a) - RADIATED EMISSIONS TEST**

### **Measurement Uncertainty**

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Lab Corp. (ShenZhen) is  $\pm 4.0$  dB.

The fundamental data was recorded in average detection mode: set the VBW AVE on, then record the data.

### **EUT Setup**

The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part 15.227 limits.

### **EMI Test Receiver Setup**

According to FCC Rules, 47 CFR 15.33, the EUT emissions were investigated from 27 to 1000 MHz.

During the radiated emission test, the EMI test Receiver was set with the following configurations:

<b><i>Frequency Range</i></b>	<b><i>RBW</i></b>	<b><i>Video B/W</i></b>
Below 30 MHz	10 kHz	30 kHz
30 – 1000 MHz	100 kHz	300 kHz

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447D	2944A09795	2005-8-17	2006-8-17
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2005-8-17	2006-8-17
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2005-4-28	2006-4-28

\* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

**Corrected Amplitude & Margin Calculation**

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

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

**Test Results Summary**

According to the data in the following table, the EUT complied with the [FCC Part 15.227](#), with the worst margin reading of:

**-3.20 dB at 865.440 MHz in the horizontal polarization.**

## Test Data

### Environmental Conditions

Temperature:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

The testing was performed by William Chan on 2005-11-8.

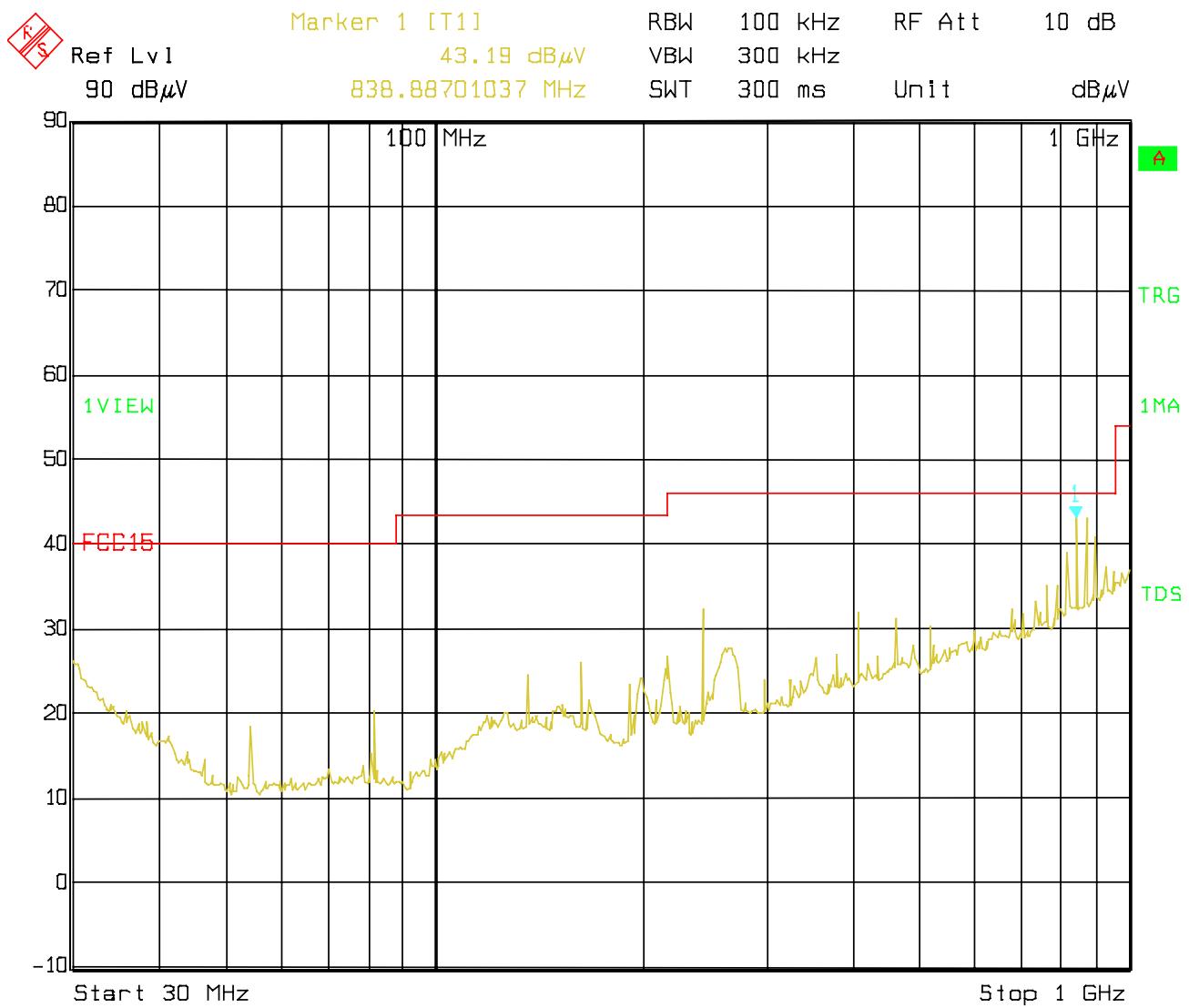
Test mode: Transmitting

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC PART 15.227			
Frequency	Meter Reading		Angle	Height	Polar	Antenna Loss	Cable Loss	Amp.	Corr. Ampl.	Limit	Margin	PK/AV/QP
MHz	dB $\mu$ V	Degree	Meter	H/V	dB	dB	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB		
865.440	41.0	90	1.2	H	22.2	6.3	26.7	42.8	46.0	-3.2*	PK (harmonic)	
892.485	40.0	45	1.0	V	22.6	6.5	26.7	42.4	46.0	-3.6*	PK (harmonic)	
838.395	39.5	45	1.0	V	22.2	6.2	26.7	41.2	46.0	-4.8	PK (harmonic)	
838.395	39.4	45	1.2	H	22.2	6.2	26.7	41.1	46.0	-4.9	QP (harmonic)	
865.440	39.0	180	1.2	V	22.2	6.3	26.7	40.8	46.0	-5.2	QP (harmonic)	
27.045	74.4	180	1.0	V	24.1	0.6	28.8	70.3	80.8	-10.5	AV (fundamental)	
243.405	43.0	35	1.0	H	12.3	2.9	26.0	32.1	46.0	-13.9	PK (harmonic)	
405.675	38.4	35	1.5	H	16.1	4.0	26.5	32.0	46.0	-14.0	PK (harmonic)	
27.045	67.2	120	1.0	H	24.1	0.6	28.8	63.1	80.8	-17.7	AV (fundamental)	
81.135	36.8	90	1.0	V	8.4	1.9	26.8	20.4	40.0	-19.7	PK (harmonic)	
81.135	36.7	60	1.0	H	8.4	1.9	26.8	20.2	40.0	-19.8	PK (harmonic)	
54.090	36.4	45	1.0	V	8.5	1.5	26.8	19.6	40.0	-20.4	PK (harmonic)	
162.270	34.6	60	1.0	V	12.7	2.1	26.6	22.8	43.5	-20.7	PK (harmonic)	
54.090	35.2	45	1.0	H	8.5	1.5	26.8	18.4	40.0	-21.6	PK (harmonic)	
27.045	74.8	45	1.2	V	24.1	0.6	28.8	70.7	100.8	-30.1	PK (fundamental)	
27.045	67.5	60	1.0	H	24.1	0.6	28.8	63.4	100.8	-37.4	PK (fundamental)	

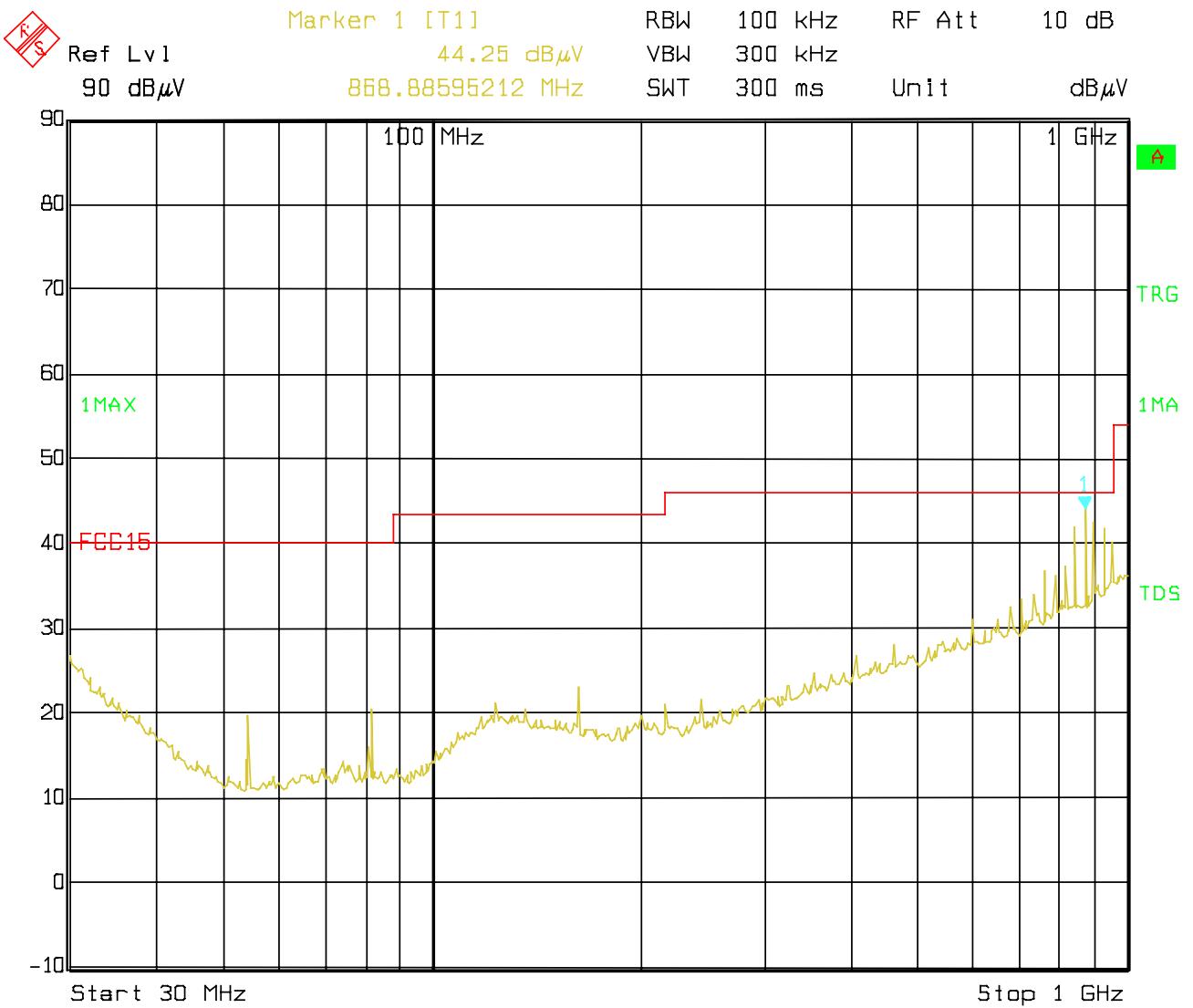
\* Within measurement uncertainty

### Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.



Title: Steelmate PTS400Q-COM Transmitting-Horizontal  
Date: 08.NOV.2005 21:35:46



Title: Steelmate PTS400Q-COM Transmitting-vertical  
Date: 08.NOV.2005 21:27:40

## §15.227(b) - Out of Band Emission

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2005-8-17	2006-8-17
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2005-4-28	2006-4-28

\* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

### Test Procedure

Reading the emission of 27.280 MHz and 26.960 MHz to ensure that the EUT complied with the FCC PART 15.227.

All data was recorded in the Peak detection mode.

### Test Data

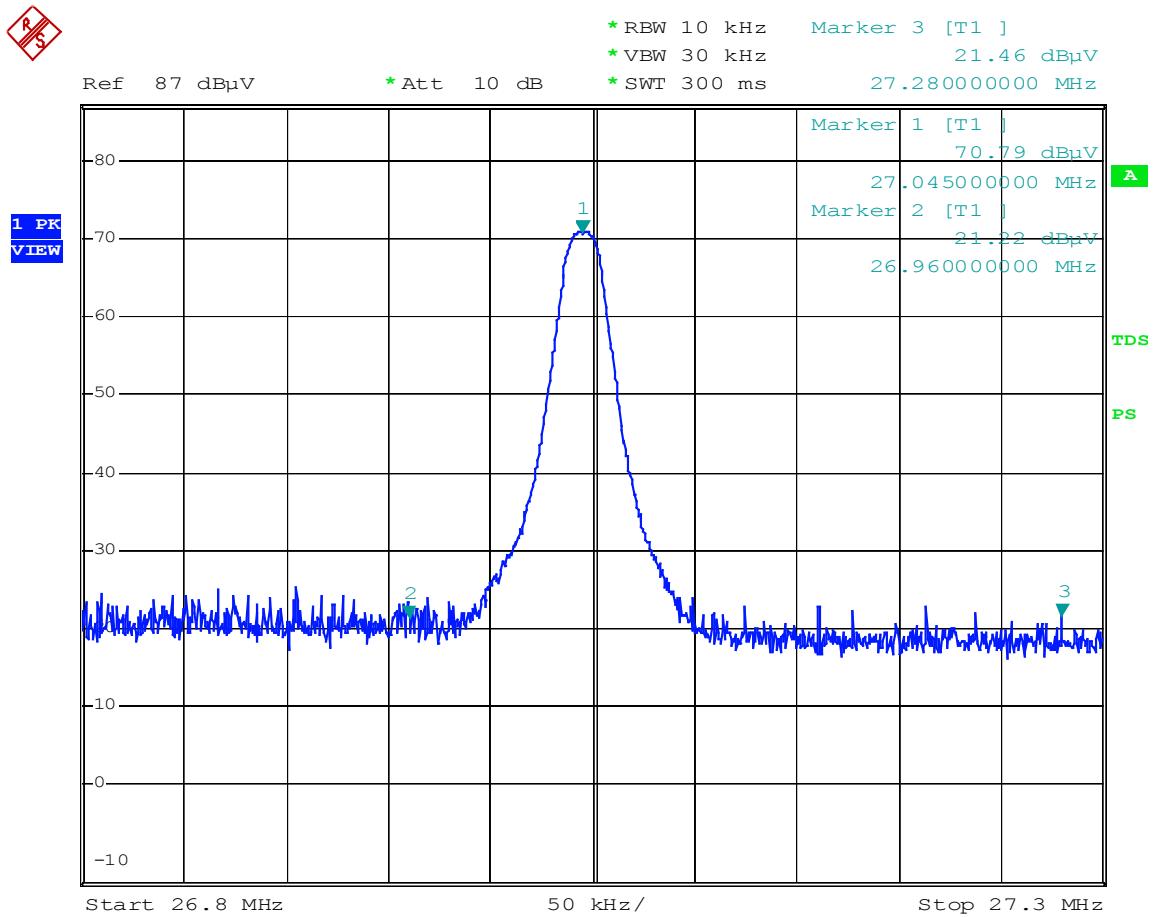
#### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	58 %
ATM Pressure:	998 mbar

*The testing was performed by Simon Mo on 2005-11-14.*

The result has been complied with the 15.227(b), see the following plot:

Frequency MHz	Emission dB $\mu$ V/m	Limit dB $\mu$ V/m
27.280	21.46	40
26.960	21.22	40



Steelmate Wireless Parking Sensor System M/N: PTS400Q-COM

Date: 14.NOV.2005 08:34:17