Israel Testing Laboratories

Cert. No. 1152.01
Electrical (EMC)

DATE: 28 October 2008

I.T.L. (PRODUCT TESTING) LTD.

FCC Radio Test Report

for

Next Play Ltd.

Equipment under test:

Voting Game Pad

VG-Pad 3000

Written by: _____
D. Shidlowsky, Documentation

Approved by: _____
A. Sharabi, Test Engineer

Approved by: _____
I. Raz, EMC Laboratory Manager

Measurement/Technical Report for
Next Play Ltd.

Equipment under test:

Voting Game Pad

FCC ID: WKT-VGP31

DATE: 28 October 2008

This report concerns: Original Grant: X
Class II Change:
Class I Change:

Equipment type:

Limits used:
47CFR15 Sub-part C

Measurement procedure used is ANSI C63.4-2003.

Application for Certification
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Applicant for this device:
(different from "prepared by")
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1. General Information

1.1 Administrative Information

Manufacturer:	Next Play Ltd.
Manufacturer's Address:	20 Tuval St. Ramat Gan 52522 Israel Tel: +972-3-575-3030 Fax: +972-3-575-8822
Manufacturer's Representative:	Amir Shavit
Equipment Under Test (E.U.T):	Voting Game Pad
Equipment Model Name:	VG-Pad 3000
Equipment Serial Number:	C11165
Date of Receipt of E.U.T:	15.07.08
Start of Test:	15.07.08
End of Test:	23.07.08
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Part 15, Subpart C

1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), File No. IC 4025.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 Product Description

The operating station contains 4 large and easy-to-operate keys enabling the majority of activities, and 12 additional function keys intended for various other activities, making the device extremely simple to operate by the nonprofessional user. The operating station is wireless and can be deployed and installed within a very short time.

Features and Capabilities:

Operation of thousands of operating stations in a single location or simultaneously in a number of locations.

Two-way communication to and from the operating station.

LCD screen for the display of the participant's personal details or messages.

Internal screen lighting.

Sending replies with one click.

Sending a multiple digit reply (up to 16 digits) that is displayed on the personal screen.

Internal menu from which the participant selects the desired orders.

Typing of personal password for user identification (ID, credit card, entry password).

Personally adjusted screen **saver** that can be changed at any time.

Beeper signal to prevent theft and to locate a lost device.

Changing RF channels according to the environment.

External battery loading.

Energy saving mechanism.

User battery status alert on the personal screen and on the central computer.

Antenna Gain: 0 dBi

1.4 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing August 22, 2006).
I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Radiated Emission

The Open Site complies with the ±4 dB Normalized Site Attenuation requirements of ANSI C63.4-2003. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

2. Product Labeling

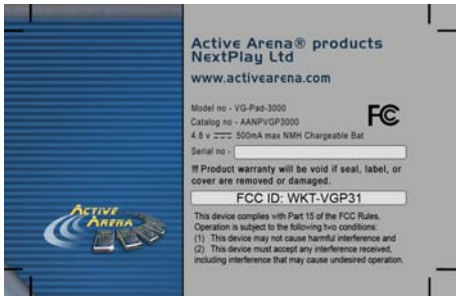

Figure 1. FCC Label

Figure 2. Label Location on EUT

3. System Test Configuration

3.1 Justification

The system includes two units, BASE and terminal. The terminal must receive base message in order to transmit data. The maximum data rate is 8mSec in 1 second, from both unit and base. There are no options or add ons to the units in the system but a PC must be connected to the base and send commands for proper operation. The units will continue to transfer keep alive messages without PC but data is useless.

The system supports 100 end units for each base. Each unit can send no more then 8 mSec of data.

The terminal is powered from internal rechargeable batteries while the base can be power from batteries or external 9V power adaptor.

During terminal charging all the communication disable.

Radiated emission screening was performed in 3 orthogonal orientations. The worst case orientation was the vertical position.

3.2 EUT Exercise Software

The Terminal embedded SW has the following routines:

Charging routine:

Disable communication, starts charging process. When charger disconnected – switch power to off.

Normal operation:

Communication: waits for base message, when get message – Transmit last keypad data or last data in the buffer or update display of the terminal.

Keypad monitoring: monitor keys entered by the user.

External power monitor: if power connected – switch to charging state.

3.3 Special Accessories

No special accessories were needed to achieve compliance.

3.4 Equipment Modifications

No modifications were necessary in order to achieve compliance.

3.5 Configuration of Tested System

The configuration of the tested system is described below.

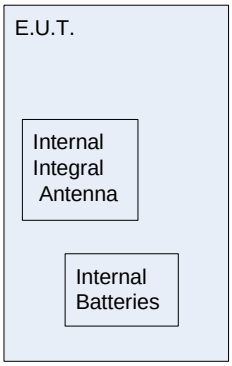

Figure 3. Configuration of Tested System

4. Field Strength of Fundamental

4.1 Test Specification

F.C.C., Part 15, Subpart C, Section 15.249(a)

4.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

The E.U.T. was placed on a non-conductive table, 0.8 meters above the O.A.T.S. ground plane.
The EMI receiver was set to the E.U.T. Fundamental Frequency and Peak Detection.
The turntable and antenna mast were adjusted for maximum level reading on the EMI receiver.
The measurement was performed for vertical and horizontal polarizations of the test antenna.

4.3 Measured Data

JUDGEMENT: Passed by 0.93 dB

The EUT met the FCC Part 15, Subpart C, Section 15.249(a) specification requirements.

The details of the highest emissions are given in *Figure 4*.

TEST PERSONNEL:

Tester Signature: _____ Date: 30.10.08

Typed/Printed Name: A. Sharabi

Field Strength of Fundamental

E.U.T Description	Voting Game Pad
Model Number	VG-Pad 3000
Serial Number:	C11165

Specification: F.C.C., Part 15, Subpart C 15.249(a)

Antenna Polarization: Horizontal/Vertical

Test Distance: 3 meters Detector: Peak

Freq. (MHz)	Pol. V/H	Peak Reading (*) (dBµV/m)	Specification (dBµV/m)	Margin (dB)
922.22	H	87.16	94.0	-6.84
922.22	V	93.07	94.0	-0.93

Figure 4. Field Strength of Fundamental. Antenna Polarization: HORIZONTAL/VERTICAL. Detector: Peak

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

* "Peak Amp." includes "Correction Factors.

"Correction Factors" = Antenna Correction Factor + Cable Loss.

Field Strength of Fundamental

E.U.T Description	Voting Game Pad
Model Number	VG-Pad 3000
Serial Number:	C11165

Specification: F.C.C., Part 15, Subpart C 15.249(a)

Antenna Polarization: Vertical

Test Distance: 3 meters Detector: Peak

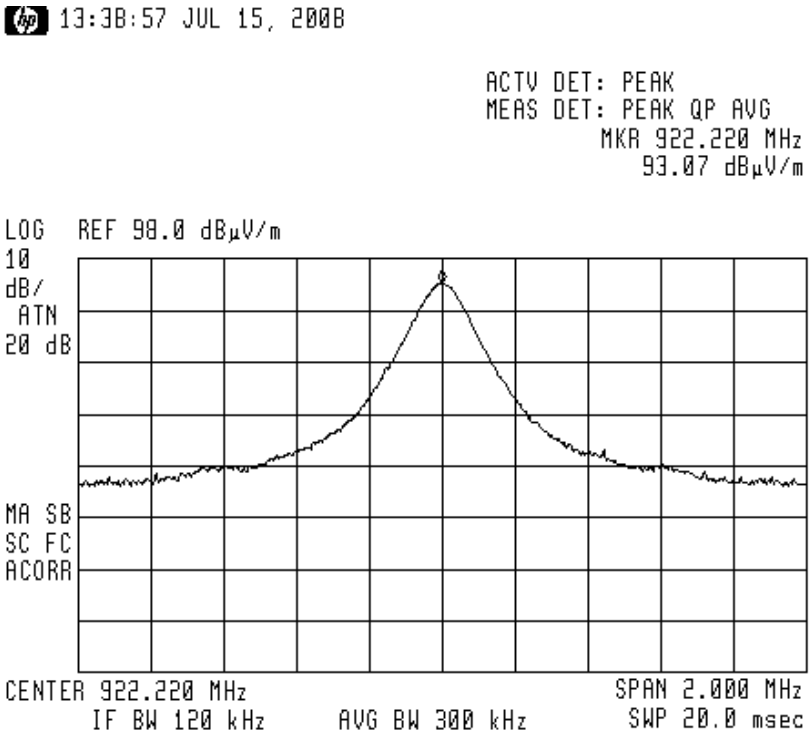

Figure 5. Field Strength of Fundamental. Antenna Polarization: VERTICAL. Detector: Peak

4.4 Test Instrumentation Used, Field Strength of Fundamental

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 12, 2007	1 year
RF Section	HP	85420E	3705A00248	November 12, 2007	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 22, 2007	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

5. Radiated Measurement Photos

Figure 6. Radiated Emission Test

6. Spurious Radiated Emission 9 kHz-1000 MHz

The E.U.T. operation mode and test set-up are as described in Section 3.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 3.

The frequency range 9kHz-1000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.
The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.
In the frequency range 9 kHz-30 MHz, the loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter.
In the frequency range 30-1000 MHz, the readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
Verification of the E.U.T emissions was based on the following methods:

Turning the E.U.T on and off.
Using a frequency span less than 10 MHz.
Observation of the signal level during turntable rotation. Background noise is not affected by the rotation of the E.U.T.

During this test the E.U.T. was operated in continuous transmission to enable better detection of signals.

6.1 Measured Data

JUDGEMENT: Passed

The signals in the band 9 kHz – 1000 MHz were 20dB below the specification limit.

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 15.249 specification.

TEST PERSONNEL:

Tester Signature: _____ Date: 30.10.08

Typed/Printed Name: A. Sharabi

6.2 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 12, 2007	1 year
RF Section	HP	85420E	3705A00248	November 12, 2007	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	March 23, 2008	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 15, 2007	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

6.3 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$[dB\mu v/m]\ FS = RA + AF + CF$$

FS: Field Strength [dBμv/m]
RA: Receiver Amplitude [dBμv]
AF: Receiving Antenna Correction Factor [dB/m]
CF: Cable Attenuation Factor [dB]

7. Spurious Radiated Emission Above 1 GHz

7.1 Spurious Radiated Emission Above 1 GHz

The E.U.T operation mode and test set-up are as described in Section 3.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 3.

The emission levels were compared to the requirement of Section 15.249.

In the frequency range 1-2.9 GHz, a computerized EMI receiver complying to CISPR 16 requirements was used. The test distance was 3 meters.

In the frequency range 2.9-9.2 GHz, a spectrum analyzer including a low noise amplifier was used. The test distance was 3 meters. During peak measurements, the I.F. bandwidth was 1 MHz, and video bandwidth 3 MHz. During average measurements, the I.F. bandwidth was 1 MHz and video bandwidth was 100 Hz.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.).

7.2 Test Data

JUDGEMENT: Passed by 6.0 dB

The margin between the emission level and the specification limit is 6.0 dB in the worst case at the frequency of 1844.10 MHz, horizontal and vertical polarization.

All other signals not included in the result tables are at least 20dB below the specification limit.

The EUT met the requirements of the F.C.C. Part 15, Subpart C Section 15.249, specification.

The details of the highest emissions are given in *Figure 7* to *Figure 8*.

TEST PERSONNEL:

Tester Signature: _____ Date: 30.10.08

Typed/Printed Name: A. Sharabi

Spurious Radiated Emission Above 1 GHz

E.U.T Description	Voting Game Pad
Model Number	VG-Pad 3000
Serial Number:	C11165

Specification: F.C.C., Part 15, Subpart C, 15.249

Antenna Polarization: Horizontal/Vertical

Frequency range: 1.0 GHz to 9.2 GHz

Test Distance: 3 meters

Detector: Peak

Freq. (MHz)	Peak Result* (dBµV/m)	Polarization (H/L)	Peak. Specification (dB µV/m)	Peak. Margin (dB)
1844.10	68.0	H	74.0	-6.0
1844.10	67.7	V	74.0	-6.3

Figure 7. Spurious Radiated Emission. Antenna Polarization: HORIZONTAL/Vertical. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

*"Peak Result" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss

Spurious Radiated Emission Above 1 GHz

E.U.T Description	Voting Game Pad
Model Number	VG-Pad 3000
Serial Number:	C11165

Specification: F.C.C., Part 15, Subpart C, 15.249

Antenna Polarization: Horizontal/Vertical

Frequency range: 1.0 GHz to 9.2 GHz

Test Distance: 3 meters

Detector: Average

Freq.	Average Result*	Polarization	Average Specification	Average Margin
(MHz)	(dBµV/m)	(H/L)	(dB µV/m)	(dB)
1844.10	48.0	H	54.0	-6.0
1844.10	47.7	V	54.0	-6.3

Figure 8. Spurious Radiated Emission. Antenna Polarization: HORIZONTAL/VERTICAL. Detector: Average

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

*"Average Result" includes correction factor.

"Correction Factor" = Antenna Factor + Cable Loss

7.3 Test Instrumentation Used, Spurious Radiated Measurements Above 1 GHz

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
Receiver	HP	85422E	3906A00276	November 12, 2007	1 year
RF Section	HP	85420E	3705A00248	November 12, 2007	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A
Antenna-Log Periodic	A.H.System	SAS-200/511	253	February 4, 2007	2 year
Spectrum Analyzer	HP	8592L	3926A01204	March 5, 2008	1 year

8. APPENDIX A - CORRECTION FACTORS

8.1 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.5
20.0	0.7
30.0	1.0
40.0	1.2
50.0	1.3
60.0	1.5
70.0	1.6
80.0	1.7
90.0	1.8
100.0	1.9
150.0	2.4
200.0	2.7
250.0	3.0
300.0	3.3
350.0	3.7
400.0	4.0
450.0	4.3
500.0	4.7
600.0	4.9
700.0	5.4
800.0	5.8
900.0	6.3
1000.0	6.7

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	7.5
1400.0	8.2
1600.0	9.0
1800.0	9.6
2000.0	10.7
2300.0	11.1
2600.0	11.8
2900.0	12.8

NOTES:

1. The cable type is RG-214.

2. The overall length of the cable is 27 meters.

3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".

8.2 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

1. The cable type is RG-8.

2. The overall length of the cable is 10 meters.

8.3 Correction factors for CABLE

from spectrum analyzer to test antenna above 2.9 GHz

FREQUENCY (GHz)	CORRECTION FACTOR (dB)	FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.9	14.0	9.1
2.0	2.7	15.0	9.5
3.0	3.5	16.0	9.9
4.0	4.2	17.0	10.2
5.0	4.9	18.0	10.4
6.0	5.5	19.0	10.7
7.0	6.0	20.0	10.9
8.0	6.5	21.0	11.2
9.0	7.0	22.0	11.6
10.0	7.5	23.0	11.9
11.0	7.9	24.0	12.3
12.0	8.3	25.0	12.6
13.0	8.7	26.0	13.0

NOTES:

1. The cable type is SUCOFLEX 104 E manufactured by SUHNER.

2. The cable is used for measurements above 2.9 GHz.

3. The overall length of the cable is 10 meters.

8.4 Correction factors for LOG PERIODIC ANTENNA

Type LPD 2010/A
at 3 and 10 meter ranges.

Distance of 3 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.1
250.0	10.2
300.0	11.4
400.0	14.5
500.0	15.2
600.0	17.3
700.0	19.0
850.0	20.1
1000.0	22.2

Distance of 10 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.0
250.0	10.1
300.0	11.2
400.0	14.4
500.0	15.2
600.0	17.2
700.0	19.0
850.0	20.1
1000.0	22.1

NOTES:

1. *Antenna serial number is 1038.*
2. *The above lists are located in file number 38M3O.ANT for a 3 meter range, and file number 38M100.ANT for a 10 meter range.*
3. *The files mentioned above are located on the disk marked "Radiated Emission Test EMI Receiver".*

8.5 Correction factors for LOG PERIODIC ANTENNA

Type SAS-200/511
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
1.0	24.9
1.5	27.8
2.0	29.9
2.5	31.2
3.0	32.8
3.5	33.6
4.0	34.3
4.5	35.2
5.0	36.2
5.5	36.7
6.0	37.2
6.5	38.1

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
7.0	38.6
7.5	39.2
8.0	39.9
8.5	40.4
9.0	40.8
9.5	41.1
10.0	41.7
10.5	42.4
11.0	42.5
11.5	43.1
12.0	43.4
12.5	44.4
13.0	44.6

NOTES:

1. *Antenna serial number is 253.*
2. *The above lists are located in file number SAS3M0.ANT for a 3 meter range.*
3. *The files mentioned above are located on the disk marked "Antenna Factors".*

8.6 Correction factors for BICONICAL ANTENNA

Type BCD-235/B, at 3 meter range

FREQUENCY (MHz)	AFE (dB/m)
20.0	19.4
30.0	14.8
40.0	11.9
50.0	10.2
60.0	9.1
70.0	8.5
80.0	8.9
90.0	9.6
100.0	10.3
110.0	11.0
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13.0
180.0	13.5
190.0	14.0
200.0	14.8
210.0	15.3
220.0	15.8
230.0	16.2
240.0	16.6
250.0	17.6
260.0	18.2
270.0	18.4
280.0	18.7
290.0	19.2
300.0	19.9
310	20.7
320	21.9
330	23.4
340	25.1
350	27.0

NOTES:

1. Antenna serial number is 1041.

2. The above list is located in file 19BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

8.7 Correction factors for ACTIVE LOOP ANTENNA

Model 6502
S/N 9506-2950

FREQUENCY (MHz)	Magnetic Antenna Factor (dB)	Electric Antenna Factor (dB)
.009	-35.1	16.4
.010	-35.7	15.8
.020	-38.5	13.0
.050	-39.6	11.9
.075	-39.8	11.8
.100	-40.0	11.6
.150	-40.0	11.5
.250	-40.0	11.6
.500	-40.0	11.5
.750	-40.1	11.5
1.000	-39.9	11.7
2.000	-39.5	12.0
3.000	-39.4	12.1
4.000	-39.7	11.9
5.000	-39.7	11.8
10.000	40.2	11.3
15.000	-40.7	10.8
20.000	-40.5	11.0
25.000	-41.3	10.2
30.000	42.3	9.2