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**Case Report on Anomalous Electro-Magnetic Signals:
Research of "Poltergeist" Incident in Gifu, Japan**

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Abstract:

In Tomika-cho, Gifu Prefecture, Japan in 2000, many families living in an apartment building claimed that poltergeist phenomena had occurred repeatedly; for example, strange sounds, the apparition of ghosts, movement of things, and electric tools working without a power supply. The residents' association of the apartments asked the Tomika-cho government to take measures for the strange phenomena, but they did not receive satisfaction. A few families left the apartments temporarily. Residents considered that their experiences were caused by the work of ghosts, and they asked a medium to do a religious ritual. After the ritual, strange phenomena decreased in the east apartments (101 - 402). However, phenomena did not completely stop, and their focus area moved to the middle and upper rooms. The investigation was conducted from November 15th to 17th, 2000. The social dynamics in the apartment building, and frequencies/kinds of experiences were investigated. A preliminary survey for background radiation was done by a portable radiation spectrometer. Magnetic fields were measured by two magnetometers of the Hall sensor type (10nT, DC-10 kHz) and the flux-gate type (1 nT, DC-20 Hz). The outputs of the magnetometers were recorded by a DAT tape recorder at 2.5 kHz, and then the outputs of the DAT recorder were recorded by a computer at 200 Hz through a universal interface unit and an AD converter. The results of the three-day investigation showed no anomalous magnetic signals. Background radiation anomaly was not detected. However, two strange electric signals in the circuit were observed during measurements at Apartment 305 on November 15, 2000. Although the reasons of these electric signals were not identified, it is suggested that some claims of residents corresponded to real phenomena.

Keywords:

Japan, Gifu prefecture, Tomika-cho, poltergeist, electric signal

1. Introduction

In Tomika-cho (Tomika town), Gifu Prefecture, Japan in 2000, many families living in an apartment building claimed that enigmatic phenomena had occurred repeatedly; for example, strange sounds, the apparition of a ghost movement of things and electric tools working without a power supply (**Table 1, Fig. 1**). This incident was reported by newspapers, magazines and TV programs after October 2000 as a poltergeist case. The authors searched reports of media and contacted TV staff members. It was considered that anomalous electromagnetic phenomena had occurred at the apartment building. Therefore the authors planned to measure any magnetic fields, and they formed a research team with collaborators including a psychologist.

2. Background

2-1. Geography: Tomika-cho is a typical rural town. Tomika-cho is located in the middle of Japan. The east longitude is 136 degrees 58 minutes 52 seconds, and north latitude is 35 degrees 28 minutes 55 seconds. It is 75 meters above sea level. Nashiwari Mountain (278m above sea level) is in the north area and plains are in the south area. The town has an area of 16.82 km² which consists of farms (25.3%), forest (25.1%), housing (7.6%) and others. There is a local train line on the southern edge. Maximum temperature in 2000 was 36.0 degrees Celsius (September), minimum was -6.8 degrees C. (January), and mean was 15.9 degrees C. The precipitation in 2001 was 1828 mm. Population (2000) was 5835 persons (1582 families). Many people have lived here from old times because 1119 individual names are listed in an official family record done in 702 AD.

2-2. Apartment Building: The apartment building was located in the southern part of Tomika-cho. It was built by the town government in March 1999, and 24 families lived there in 2000. It is a typical four floor apartment building (**Fig. 1**). The Nagarakawa Line (local train line) was to the north about 250m away from the building. Trains run infrequently and are stopped at night. There was a stream nearby on the south side of the buildings. There was a factory on the south side in a woods. The distance between the factory and apartments was about 200m. The factory was in operation only during the daytime on weekdays. Around the apartments, there were rice paddies, woods and houses, but no high buildings. A parabola antenna tower of a communication company could be seen to the south by anyone standing on the 4th floor veranda of the apartment building. But antennas were set perpendicular to the direction toward the apartments, and they did not face the apartments.

2-3. Reactions: Residents sensed that something was strange just after their moving into their apartments. Some residents had not lived in apartments until that time, and they were also perplexed by noises of their neighbors. Therefore, time was needed for the residents to be sure that their experiences were not normal noises or acts of close living to neighbors. The residents' association of the apartments asked the Tomika-cho government to take measures for the strange phenomena, but they did not receive satisfaction. A few families left the apartments temporarily. Residents considered that their experiences were caused by the work of ghosts, and they asked a medium to do a religious ritual. After the ritual, strange phenomena decreased in the east apartments (101 - 402).

However, phenomena did not completely stop, and their focus area moved to the middle and upper rooms.

A newspaper reported these strange incidents, and many journalists came to the apartments. Seven weekly magazines reported details of the incidents. Some TV production staff members brought mediums to the apartments and let them try to do clairvoyance or exorcise ghosts, and others asked researchers to make scientific investigations. The apartments became a kind of tourist attraction, and many spectators came to see there. Additionally, mediums or religious persons came from all over Japan. They visited residents, or did rituals without permission of residents, or walked around late at night. For example, during the authors' investigation, a cult group came suddenly in three cars in the middle of the night and began doing their own rituals here and there.

2-4. End of Fever: The last night of the authors' investigation, a religious ritual "Joh-rei" (spiritual purification) was done by Buddhist monks at an assembly hall of the residents' association of the apartments. This ritual was based on requests from the residents' association, and the Buddhist monks were high ranking monks. An important aim of "Joh-rei" is to give peace and happiness to ghosts and let them leave to the other world. Almost all residents attended this ritual, except a child who became feverish suddenly that night and several residents who were absent because they had left their apartments. Residents seemed to be satisfied by this ritual. This study's collaborators often have visited or contacted them since the investigation. One resident, who lived in the focus area, said that the strange phenomena decreased gradually after the ritual and the resident was able to enjoy life without discomfort or disturbance. Also the president of the residents' association agreed that the residents' claims decreased. Tomika-cho incident finished apparently after November 2000.

3. Investigations

The investigation was conducted from November 15th to 17th, 2000 by agreement of the residents and the residents' association. A preliminary survey was done by a portable radiation spectrometer. The results showed no anomalies of background radiation. Frequencies and kinds of experiences were investigated. In addition, the social dynamics in the apartment building was investigated. However, the details of the social dynamics are not described in the present paper because the residents are still living there now.

4. Apparatuses

Magnetometers were of the Hall sensor type (10 nT, DC-10 kHz, Model 9200, F.W. Bell) and the 3-dimensional rectangular flux-gate type (1 nT, DC-20 Hz, TRM-200S-OP1, Tokin). The outputs of the magnetometers were recorded by a DAT recorder (PC216Ax, Sony) at 2 kHz, and then the outputs of the DAT recorder were recorded by a computer (VAIO Note 505, Sony) at 200 Hz through a universal interface unit (UIM100A, Bio-Pack Systems) and an AD converter (MP100WSW, Bio-Pack Systems) (**Fig. 2**). This was a double-recording method in which one detector and two recorders were connected in series. Temperature and humidity were measured by an apparatus (temperature; 0.1 degree, range 0-50 degree, humidity; 1%, range

10-95%RH, Ondotori RH TR-72S, T & D) at a 5- second interval.

5. Measurements

The results of the three-day investigation showed no anomalous magnetic signals. However, two strange electric signals in the circuit were observed during measurements in Apt. 305 on November 15, 2000. That day, a resident of Apt. 305 claimed that something invisible tried to turn the doorknob of the entrance door and passed across the passageway and the child's room from the entrance to the veranda. The flux-gate magnetometer was set in the child's room, especially on the line along which something had possibly passed (**Figs. 3 and 4**). The Y sensor of the magnetometer was faced toward the "exit" (south direction approximately) claimed by the resident. The Hall sensor magnetometer was not used at that time. One-hour preliminary measurement showed no anomalous magnetic signals. There were no urban noises and outputs of the magnetometer were very stable: South (Y) was -2.02×10^4 nT; West (X) was -0.53×10^4 nT; Vertical (Z) was -2.44×10^4 nT. An official measurement started at 22:24 o'clock on November 15, 2000 (Japan local time). The first electric signal was observed at 22:30 o'clock on the Y graph corresponding to the Y sensor which faced toward the north-south direction (**Fig. 5**). Then, the second electric signals (A & B) were observed at 23:10 o'clock on the Y graph again (**Fig. 6**).

After the second observation, the sensors of the 3-dimensional flux magnetometer were turned at 90 degrees horizontally and the X sensor was set toward the north-south direction. This was a test for problems with the Y-unit. However, no other signals were observed that night.

The sensor unit of temperature and humidity was set on one leg of the tripod on which the magnetosensors were set on top. Room temperature was stable at 22 degrees Celsius and humidity was stable at 72% during both the first and second observations. It was a rainy calm night.

5. Analyses

The DAT records of Tomika-cho were compared with those of the computer. However, the signals were recorded only by the computer, and not by the DAT recorder. Therefore, the strange signals were considered to be electric signals in the circuit, not magnetic signals. The measurement system was reconstructed for a test at the National Institute of Radiological Sciences (NIRS) in Chiba. Although 6-hour measurements were repeated twice, there were no similar results. Additional analyses were done for other independent data recorded by other computers in previous experiments at NIRS, but there was no signal.

Fig. 7 shows a result by FFT analysis for frequency of the first signal. Two moving peaks in the spectrum were considered as artifacts which had been caused by noise of a motor in DAT recorder (Kokubo, et al., 2003). Power spectrum of the first signal suggested that the gain of amplification increased suddenly at 22:30. However, in spite of various tests, the authors could not find the cause of signals in **Figs. 5 & 6**.

6. Discussion

In the three-day investigation, the authors could not detect anomalous magnetic fields nor anomalous background radiation. However, the magnetometers could detect signals only in low frequency. If Tomika-cho incident was caused by magnetic fields, the frequency of magnetic fields is expectedly larger than 20 Hz.

The authors obtained strange electric signals (**Fig. 5 & 6**) in a circuit corresponding to the direction which the resident claimed that something passed along. Those signals are possibly kinds of meaningful coincidence although they can not be explained at present. Either, there is a possibility that the location of the measurement was a specific electric focus. It is suggested that some claims of residents corresponded to real phenomena if the later is correct.

The authors considered that Tomika-cho incident possibly consisted of group psychological factors, physical disturbances, and others which include parapsychological factors and other events; for example, water-hammer effect.

7. Conclusion

In the three-day investigation at the apartment building in Tomika-cho, there were no magnetic anomaly in low frequency. Background radiation anomaly was not detected by the preliminary survey. However two strange electric signals were observed at a place where a resident claimed that enigmatic phenomena occurred. Although the reasons for these signals were not identified, some claims of residents seemed to correspond to real phenomena. The authors considered that Tomika-cho incident possibly consisted of group psychological factors, physical disturbances, and others which include parapsychological factors.

8. Additional Episode

The "poltergeist" phenomena are believed to be "purified" by monks in 2000. On December 14, 2003, Hirukawa, the last author visited the apartment buildings with a woman who claimed to be "sensitive". Hirukawa expected that she could feel something there. However, they couldn't approach the building within less than 20 meters and stayed there only for 20 minutes because the woman suddenly felt ill and backache.

During their short stay, physical entropy was measured by an Orion RNG (sampling rate was 200 bit/s) which was set in a car. The result was not significant. (Hit rate $(1/(0+1))$ was 0.5014 in 1027 seconds. $Z=1.244$ ($p=0.133$ (two-tailed)). Accumulation of (Z^2-1) was 57.12 ($p=0.105$. (one-tailed)). Resolution time is 1 sec.) (**Figs. 8 & 9**)

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Table 1 Examples of phenomena which were claimed by residents.

* Some claims were possible to explain by usual reasons. For example, some footstep-like sounds were made possibly by water-hammer effects.

Item	Apartment Number	Description
Strange sounds were made repeatedly.	More than half the apartments	Some sounds were similar to noisy footsteps. Some seemed to be periodical. Hearing and recording them were easy. There were many claims for east apartments (101-402) and upper apartments (3rd and 4th floors).
	West stair	* Sounds, which were recorded by a TV station crew, were similar to the sonar sound of a submarine in movies.
Focus area moved to other areas after the religious ritual.	From east area to middle area	The residents' association of the apartments asked a medium to do a ritual because many residents considered this case was a psychic phenomena.
Flowers placed on verandas died easily.	304, 403, 405	
Apparition of ghosts.	403	A woman and man.
	404	* A resident of Apt. 304 saw a ghost stand outside Apt. 404 when the resident stand on the veranda of Apt. 304. * A resident of Apt. 303 had done a piping work in Apt. 404 in 1998 (October or November) during construction of this building house. He had seen a ghost here at that time.
	405	A man.
Spontaneous movements of things and working of machines.	101	The curtain at a window moved.
	304	A can flew into a room from an unknown place.
	305	A fan worked without power supply; a shower worked incorrectly.
	403	A doorknob turned; the door of a shoe cupboard opened.
	404	A rice bowl moved from a cupboard and became strange chipped form; the door of a cupboard opened; a television changed its channel automatically; a gas cooking stove turned itself on.
405	Machines often broke down; a hair dryer worked without a power supply; rotation of a magnetic compass was caused; cameras often did not act at certain places. * Journalists reported that they also experienced rotation of a magnetic compass and camera troubles.	



Fig. 1 Apartment Building in Tomika-cho

View from northeast. Apartment numbers run from 101 on the left to 106 on the far right. The house on the left is an assembly hall of the residents' association.

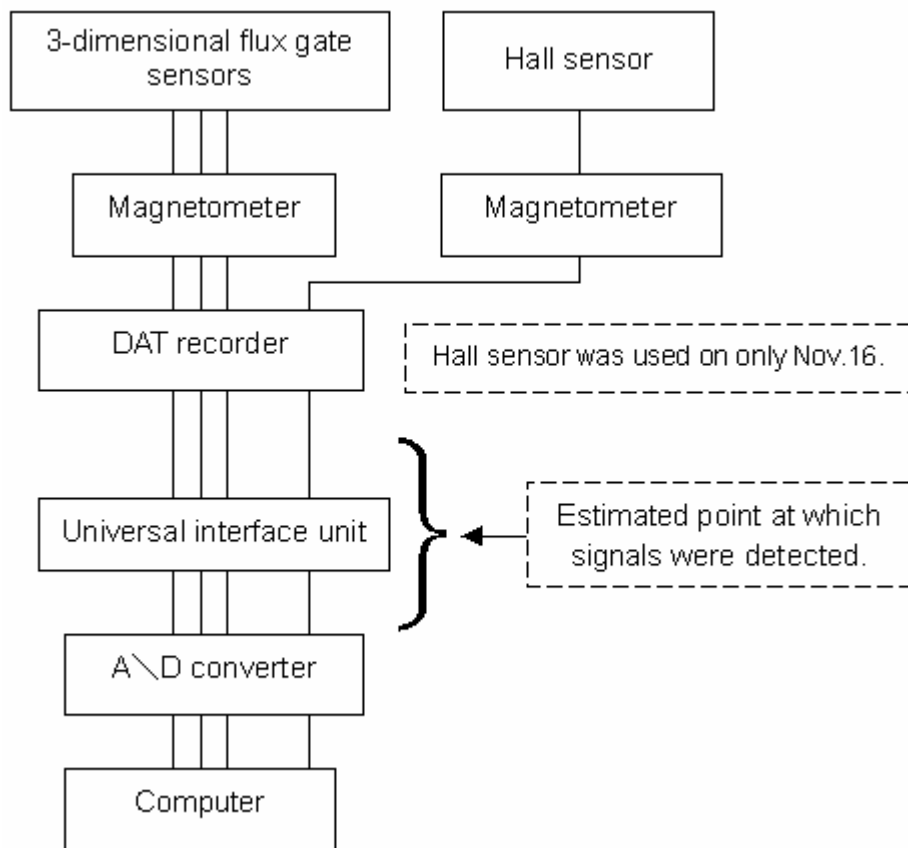


Fig. 2 Schema of Measurement System

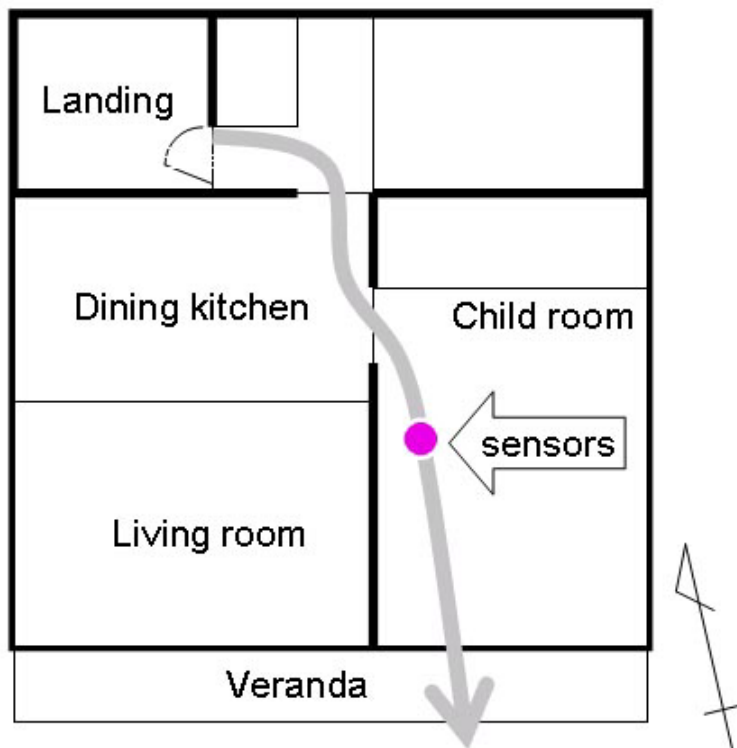
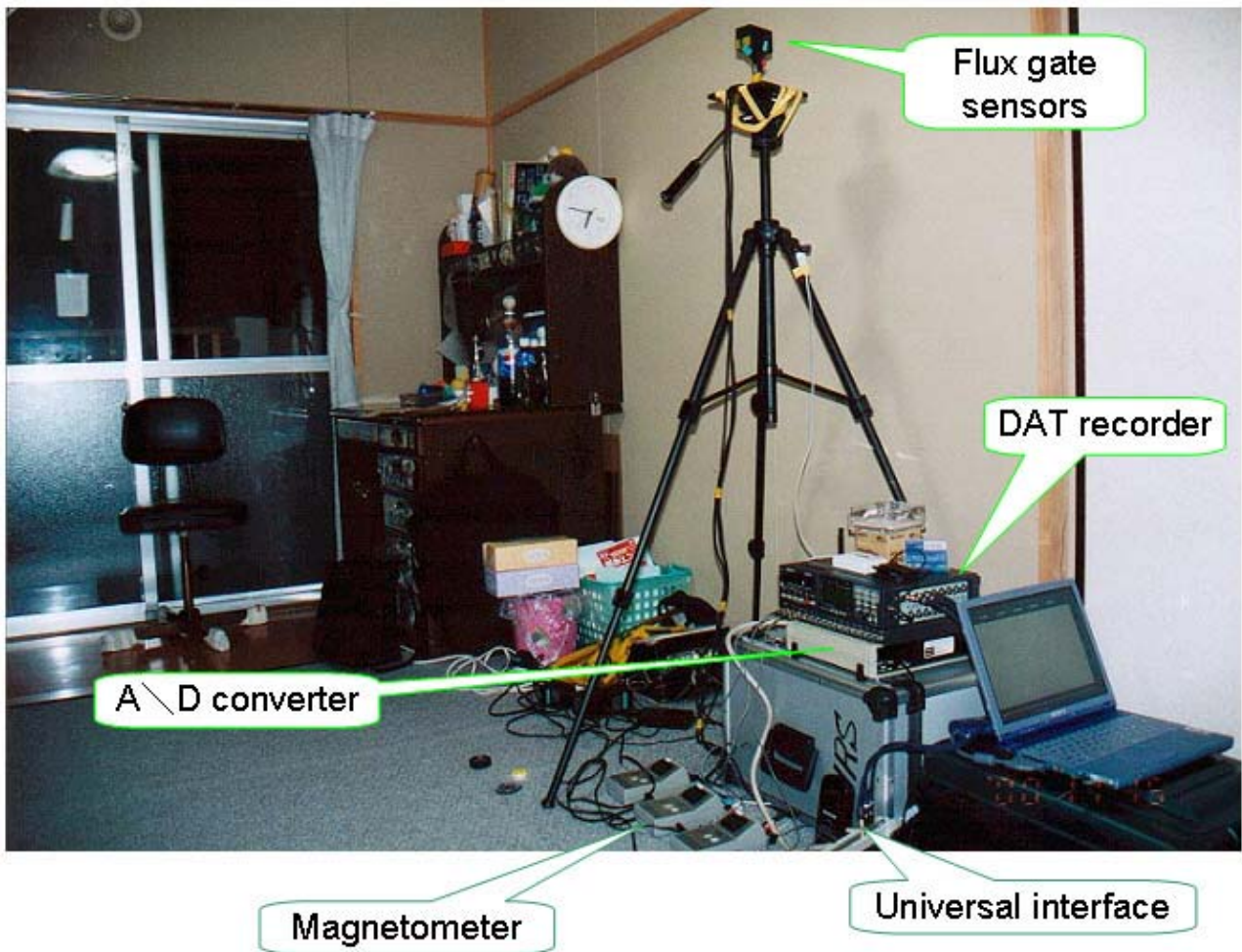


Fig. 3 Apartment room 305

A resident claimed that a something invisible passed across rooms on November 15th, 2000



(1nT, 100 nT, DC-20 Hz, TRM-200S-OP1, Tokin)

Fig. 4 Measurement System in Apt. 305

The unit of 3-dimensional rectangular flux gate sensors was set on the top of the tripod.

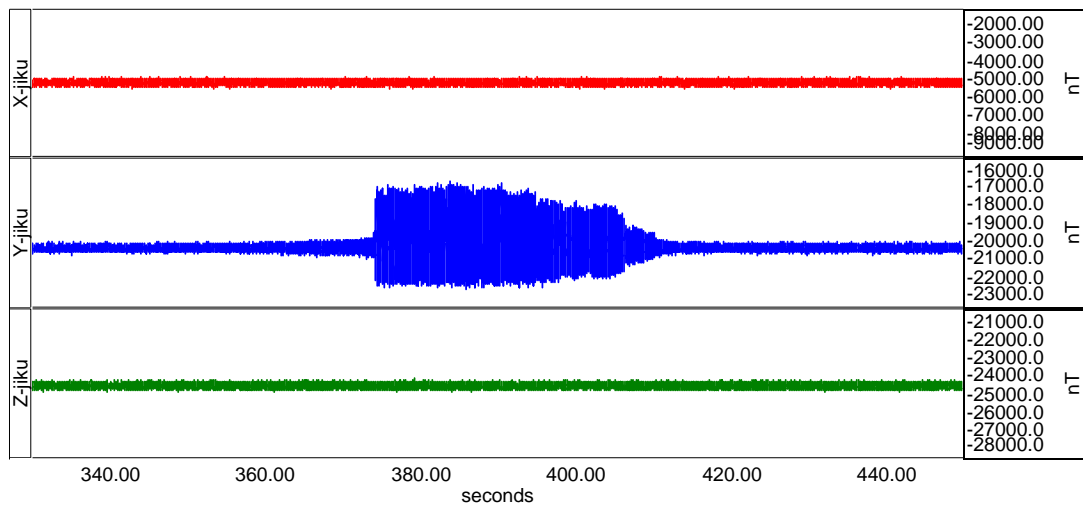


Fig. 5 First Signal

Sampling rate was 200Hz. The first signal were observed at 22:30 o'clock on November 15th in 2000 (Japan local time). It started at 374 seconds after the start of the first measurement.

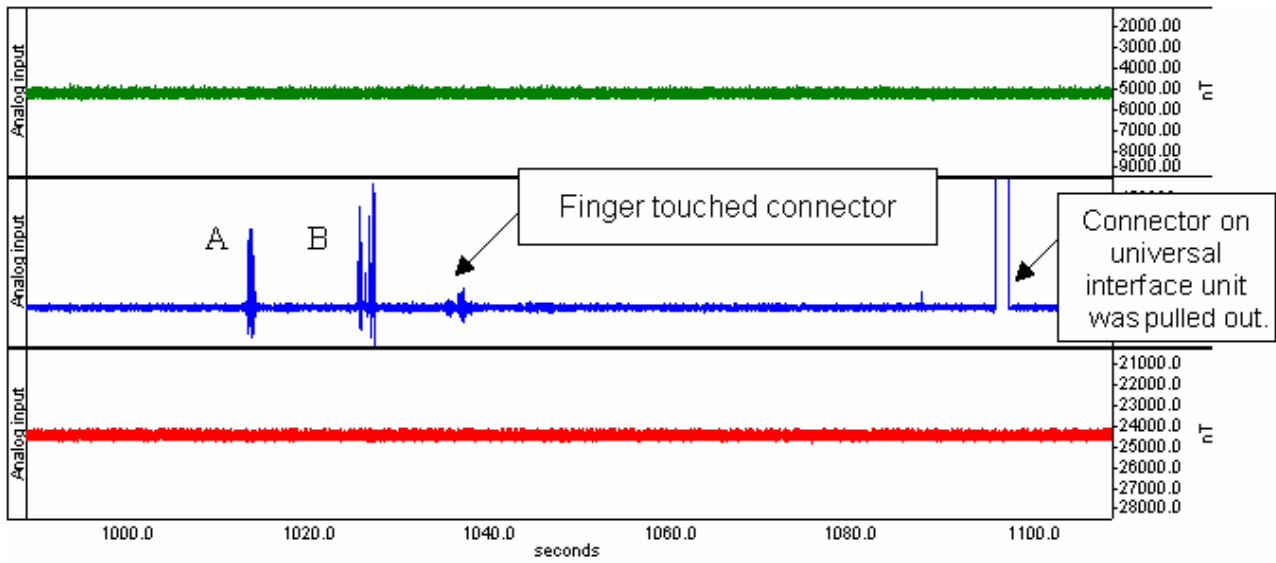


Fig. 6 Second Signals

Sampling rate was 200Hz. Both signals A and B were observed at 23:10 o'clock on November 15, 2000 (Japan local time). It was about 1020 seconds after the start of the second measurement. At that time, the authors were checking all connectors in sequence. When one of the author's tried to check the connectors on the universal interface unit, signal A occurred and surprised him. Next signal B occurred. He touched the metal body of Y connector with his fingers. (Usually there is no change of signals even if someone touches the connector). Moreover, he became afraid and then pulled out the Y connector. But he remembered the aim of measurements, and put the connector into the universal interface again.

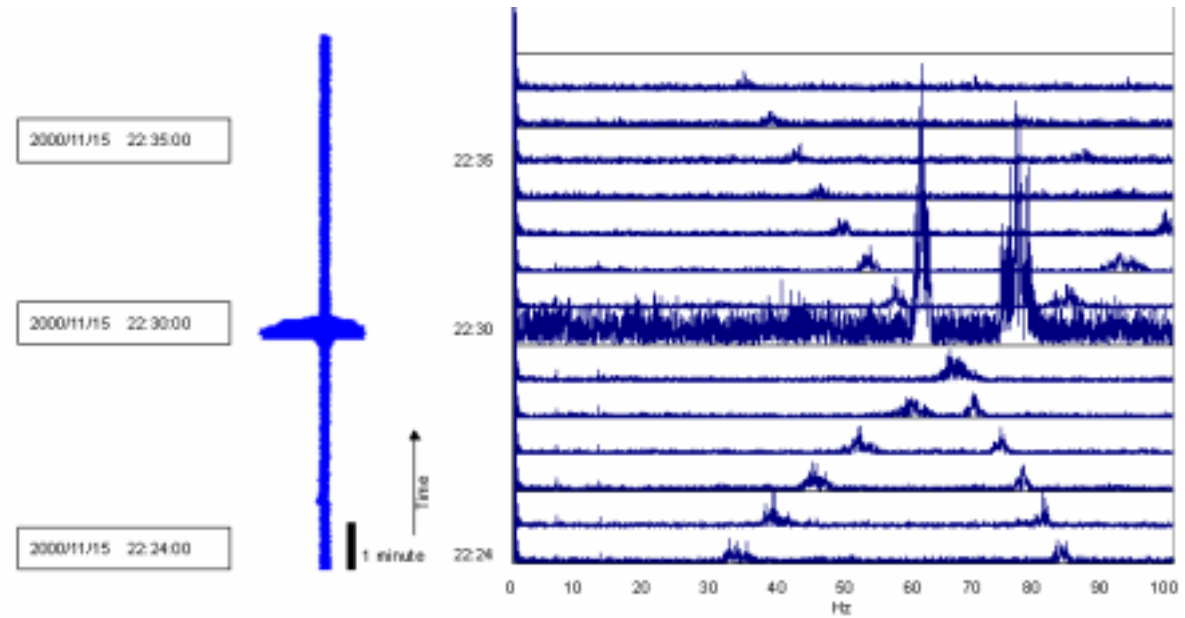


Fig. 7 First Signal and Its Frequency Spectrum

Power spectrum of the first signal (22:30) suggested that the gain of amplification increased suddenly at that time.

Two moving peaks in this spectrum are artifacts of a motor noise.

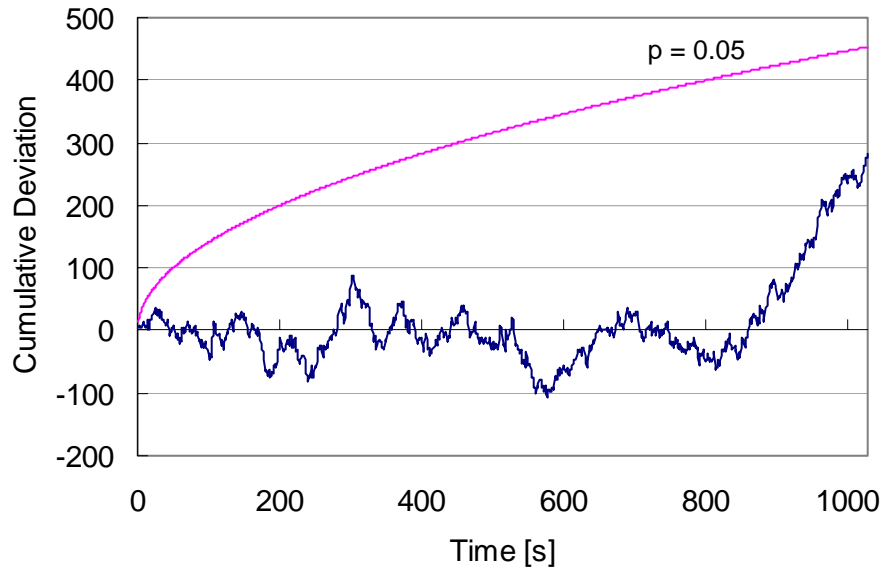


Fig. 8 Cumulative Deviation of Raw Data of RNG

RNG generated binary random numbers at 200 bits/s. A parabola curve shows $p=0.05$ (two-tailed).

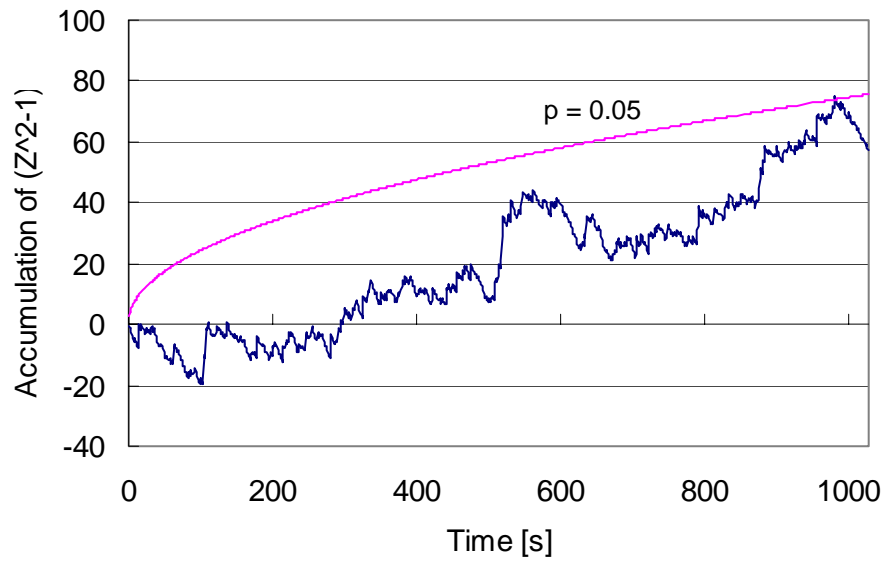


Fig. 9 Accumulation of (Z²-1)
A curve shows p=0.05 (one-tailed).