

# Compliance Labs Inc.

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An EMC/EMI Testing Company

Measured Radio Frequency Emissions  
From

## TCP Fluorescent Lamps ES Series

Report 1129  
August 9, 1999

For:  
Technical Consumer Products  
29401 Ambina Drive  
Solon OH 44139

**Summary:** The testing for compliance to FCC Regulations Part 18, Subpart C, dated 10/1/97, was performed on eight Technical Consumer Products, Inc. ES Series lamps. The devices are subject to FCC rules and regulations as a RF lighting device.

In the testing performed between June 26 and July 28, 1999, the samples of the lamps were found to meet the required FCC specifications for conducted emissions

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**R. Edward Koskie, President**

## **I. Introduction:**

Eight ES-Series lamps were tested for compliance with FCC Regulations, Part 18, Subpart C, Dated 10/1/97. The testing was done at Compliance Labs Inc., 16740 Peters Road, Middlefield OH 44062. Test procedures were as defined in FCC/OST MP-5 (1986) Methods of Measurement of Radio Noise Emission from Industrial, Scientific and Medical Equipment. Description of the Compliance Lab facility is on file with the FCC Laboratory, Colombia, Maryland (FCC file 31040/SIT, 1300F2).

This testing is a continuation of previous work reported by the University of Michigan and expands the range of lamps in the product family.

For reference, the model numbers on the original application were:

TCP Fluorescent Lamps: ES11, ES 15 and ES 18. The listed FCC authorization number was:

**FCC ID: NIR-10108**

## **II. Test Equipment Listing**

| <u>Instrument</u> | <u>Manufacturer</u>                           | <u>Calibration date</u> |
|-------------------|-----------------------------------------------|-------------------------|
| EMI Test System   | Dynamic Sciences DSI 2020                     | 12/21/98                |
| LISN              | Fisher Custom Communications<br>M 50/250-25-4 | 7/31/98                 |
| Cables            | Various                                       | N/A                     |

## **III. Configuration and Identification of Device under test**

The units are designed to be screwed into a standard light socket. They have a plastic case (adapter) containing an electronic ballast that is constructed on a PC board which is identical to those in the original U of M testing. The lamps are configured into a spiral whose length is a function of the wattage. The ballast is a switching power supply operating at 45kHz. At this frequency, conducted but not radiated emission tests are required.

The units are designed by Technical Consumer Products, Inc. 29401 Ambina Drive, Solon OH 44139, and manufactured by Shanghai Jensing Electron Electrical Equipment Co. 23 Kai Jiange Rd. E, Si Jing, Song Jiang, 201601 Shanghai, China.

The Lamps in this test are identified by Model as:

TCP Fluorescent Lamp,

ES 9

ES 11

ES 15

ES 18

ES 23

ES 26

The 11,15,18 and 26 in this test are all low power factor lamps and the label on the unit will designate this. Both a low and high power factor lamp were tested in the 9 and 23 units. The label on the lamp will identify the power factor.

**FCC ID: NIR-10108**

A standard table lamp socket with a 1.2M two-wire cord was prepared for powering the lamps. This length was selected to accommodate the requirement that no part of the EUT be closer than 0.8m from the LISN.

### **3.1 Modifications**

There were no modifications made on the lamps under test. However, TCP replaced some of the lamps that initially failed the test.

## **4. Emission limits**

The lamps were tested in accordance with Part 18, Subpart C, dated 10/1/97. The frequency of test and the limits are given in the following table.

### **4.1 Conducted Emission Limits**

Table 4.1 Conducted emission limits  
( Paragraph: 18.307; consumer equipment)

| Frequency, kHz | Consumer equipment |      |
|----------------|--------------------|------|
|                | μV                 | DBμV |
| 45-170.5       | 250                | 48.0 |
| 170.5-3000     | 250                | 48.0 |

## **5. Emission Tests and Results**

Power line conducted emission tests were measured with a FCC approved setup with the DUT on a table. The lamp cord was routed across the table and to the LISN. The conductive noise level was measured with a DSI measurement system that automatically plotted emission values in dB $\mu$ V from 450 kHz to 30 MHz for both the hot and neutral lines. The system was set to record those points that exceeded the limit line of 48dB.

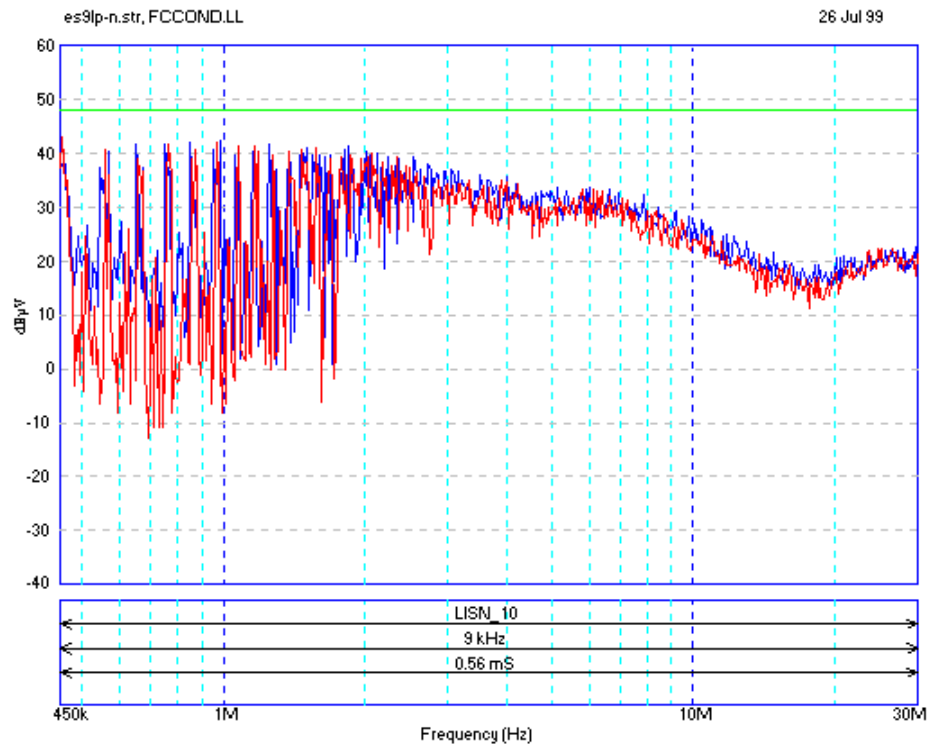
The tests were run as follows. An automatic scan using peak detection was completed over the specified frequency range. Peak detection was used because of the ability of the equipment to scan significantly faster than at quasi-peak. Since any quasi-peak measurement would be less than peak, where the scan showed reading at or less than limit the unit would obviously pass. For verification, where the scan indicated a value at or above the limit value, that frequency was examined with quasi-peak detection and a pass/fail judgement made.

### **5.1 Conducted Emission Results**

The results of the scans on each of the units are shown as Figure 1- 4. and Table 1-4. The red line is the hot line and the blue is the neutral line. Figure 1 shows two suspect frequencies in the peak scan. These were examined with a quasi-peak detector and found to meet limits. None of the other lamps had suspect frequencies. The data thus shows that the units meet the Consumer Equipment limits.

**Figure 1**

**Frequency scan of ES 9 (low power factor)**

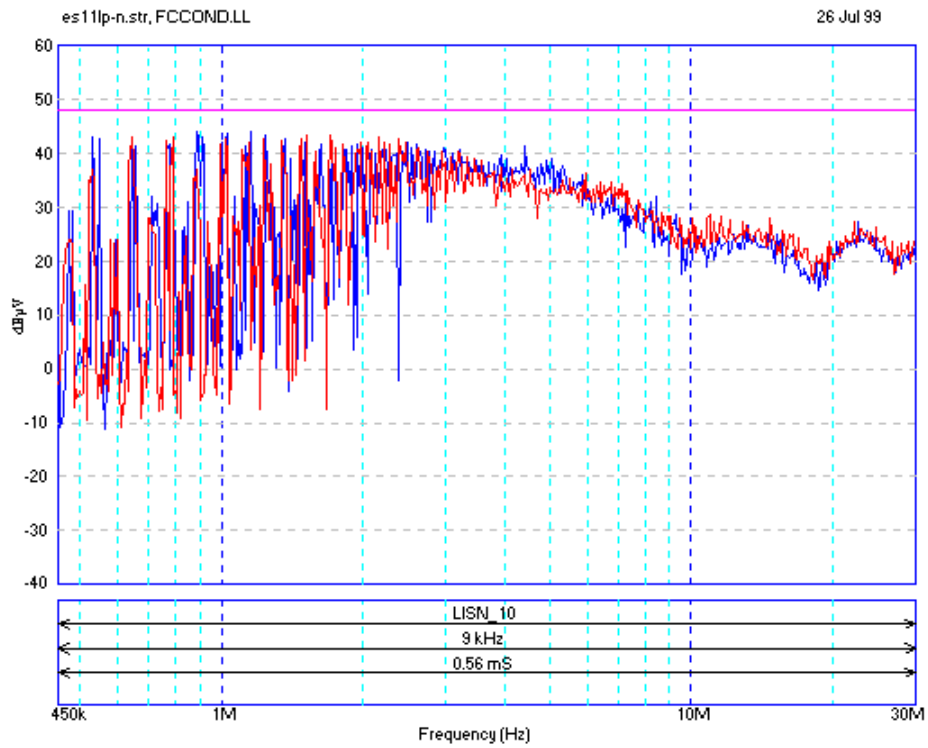


**Table 1**  
**Results of examining suspect frequencies**

There were no suspect frequencies

**Figure 2**

**Frequency scan of ES 11**



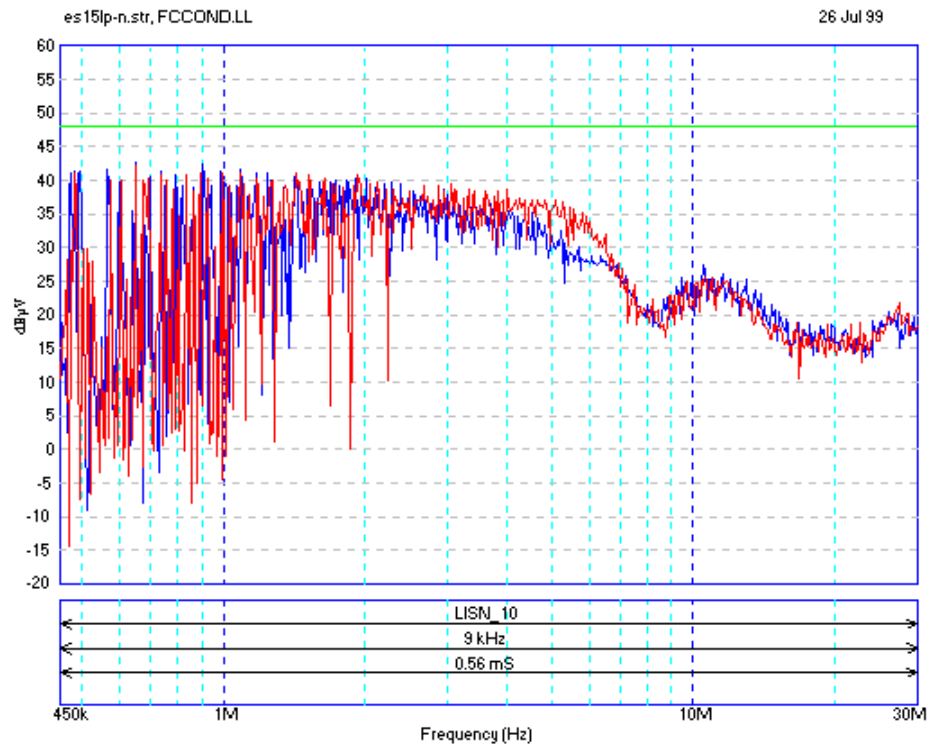
**Table 2**

**Results of examining suspect frequencies of medium position**

There were no suspect frequencies

**Figure 3**

**Frequency scan of ES 15**

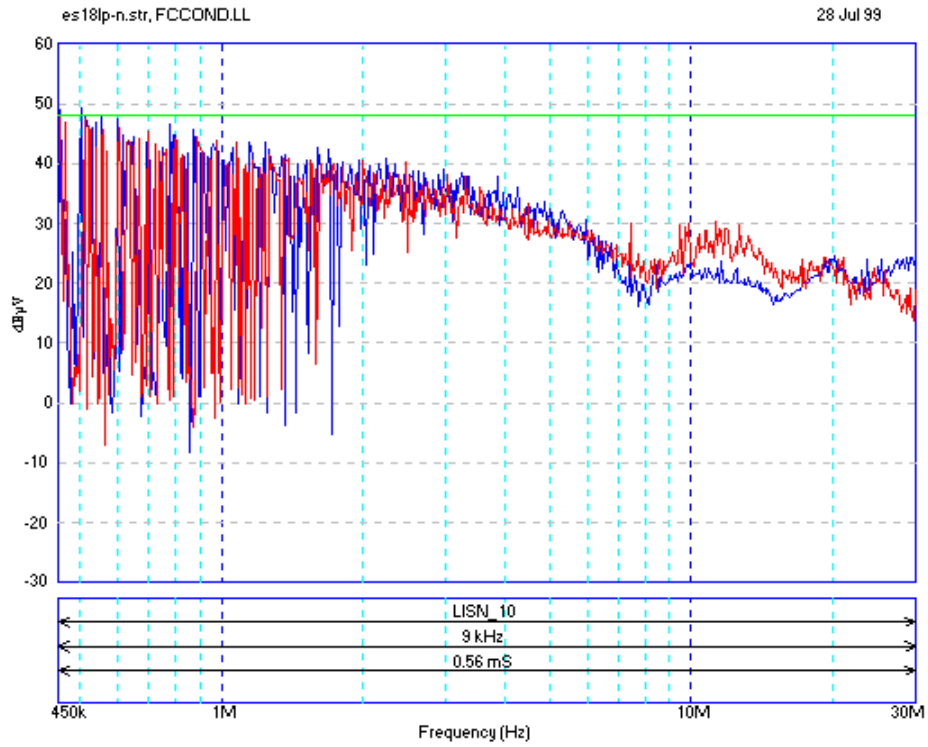


**Table 3**

**Results of examining suspect frequencies at high position**

There were no suspect frequencies

**Figure 4**  
**Frequency scan of ES 18**

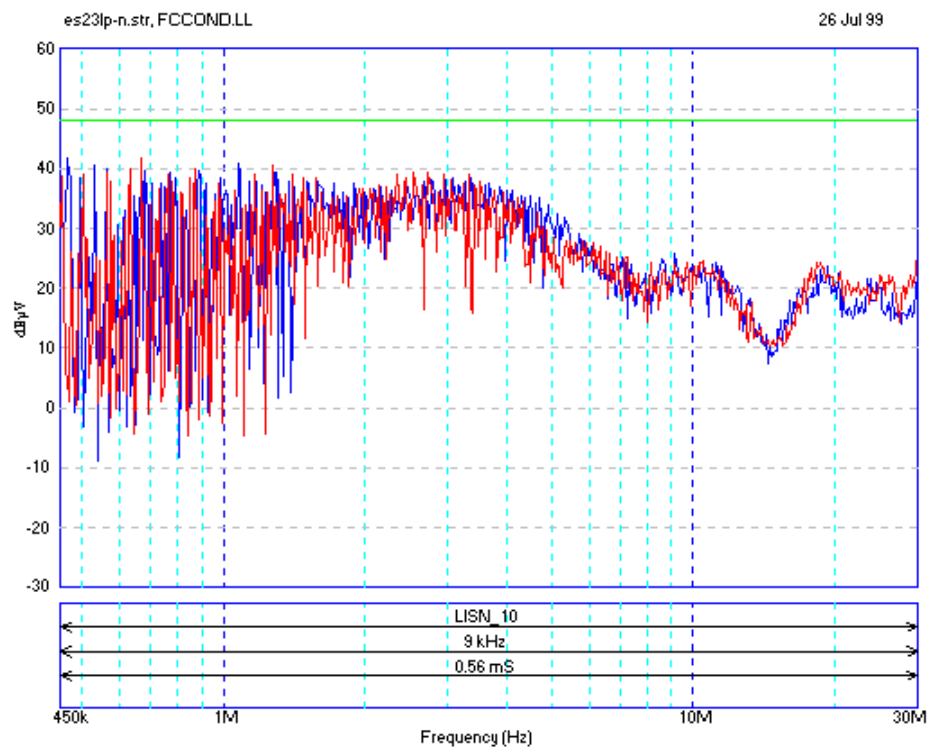


**Table 4**  
**Results of examining suspect frequencies at high position**

Datalog file: ES-18LPF.DL  
 Measurement Units: dBµV

| Num | Frequency   | Peak | QPeak | Date     | Time     |
|-----|-------------|------|-------|----------|----------|
| 1   | 455.000 kHz | 47.8 | 46.7  | 07/28/99 | 06:53:45 |
| 2   | 455.000 kHz | 48.2 | 45.5  | 07/28/99 | 06:44:20 |
| 3   | 504.500 kHz | 47.6 | 46.6  | 07/28/99 | 06:46:23 |
| 4   | 513.500 kHz | 47.0 | 45.7  | 07/28/99 | 06:43:58 |
| 5   | 554.000 kHz | 47.7 | 45.7  | 07/28/99 | 06:38:56 |

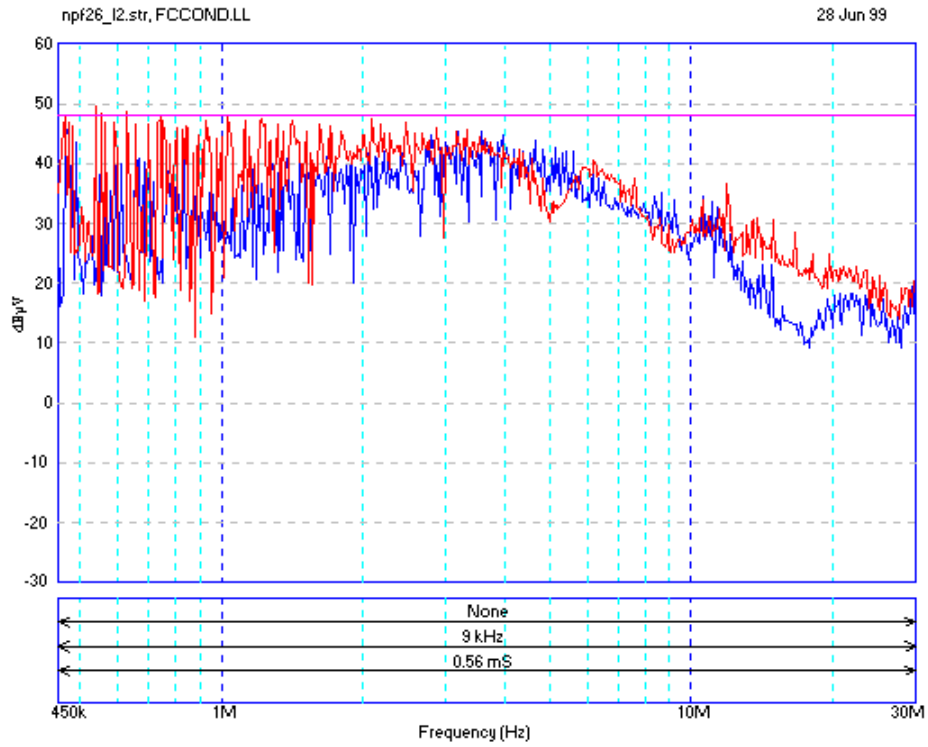
**Figure 5**  
**Frequency scan of ES 23 (low power factor)**



**Table 5**  
**Results of examining suspect frequencies at high position**

There were no suspect frequencies

**Figure 6**  
**Frequency scan of ES 26**



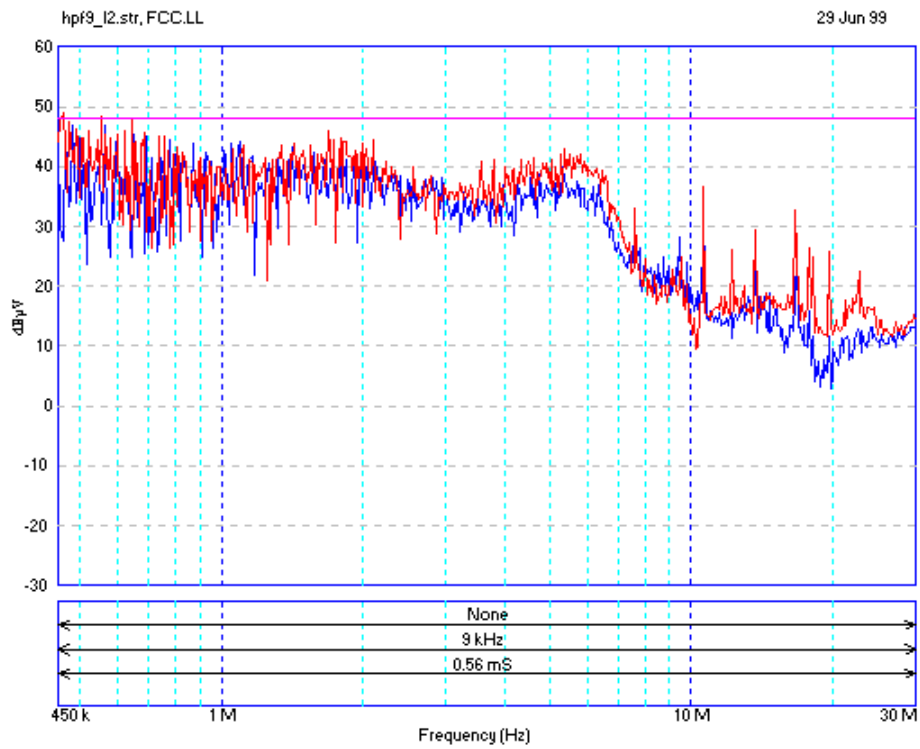
**Table 6**  
**Results of examining suspect frequencies**

Datalog file: NPH26\_L1.DL

Measurement Units: dBμV

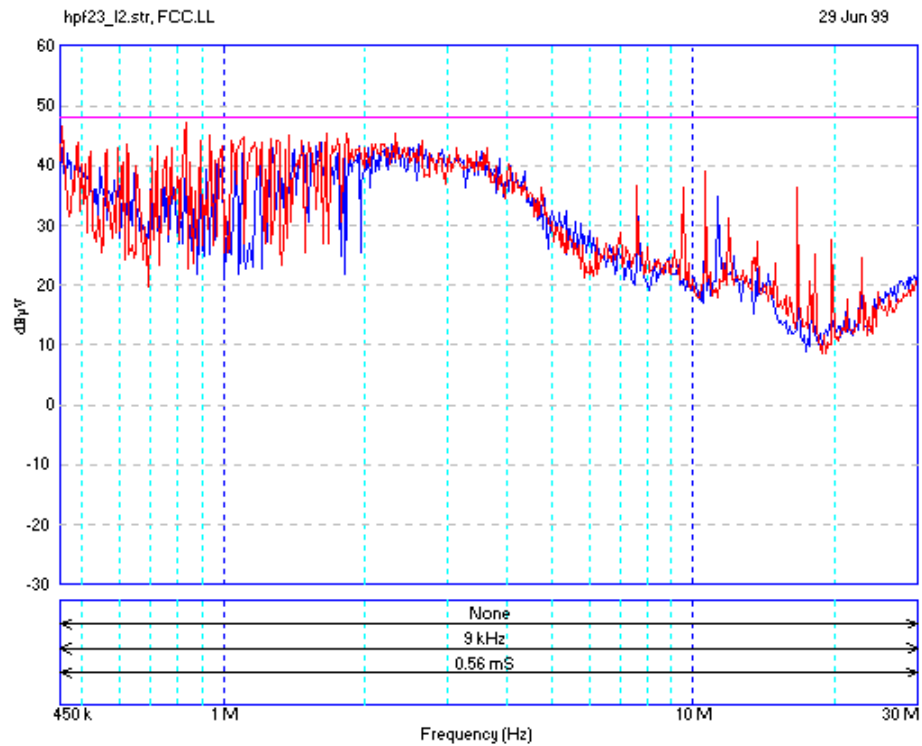
| Num | Frequency   | Bandwidth | Peak | QPeak | Date     |
|-----|-------------|-----------|------|-------|----------|
| 1   | 540.000 kHz | 9 kHz     | 49.7 | 47.9  | 06/28/99 |
| 2   | 630.000 kHz | 9 kHz     | 48.8 | 47.6  | 06/28/99 |
| 3   | 630.000 kHz | 9 kHz     | 48.6 | 47.6  | 06/28/99 |

**Figure 7**  
**Frequency scan of ES 9 (high power factor)**



**Table 7**  
**Results of examining suspect frequencies at high position**  
There were no suspect frequencies

**Figure 8**  
**Frequency scan of ES 23 (high power factor)**



**Table 8**  
**Results of examining suspect frequencies at high position**  
 There were no suspect frequencies