**Photograph 4.5.2**
**Radiated emissions measurement setup**

## 4.6 Unintentional radiated emissions (class B digital device) test according to §15.109

### 4.6.1 General

This test was performed to measure radiated emissions from the incorporated digital device of the EUT and also to verify the EUT full compliance with §15.109.

Radiated emission measurements specification limits are given in Table 4.6.1 below:

**Table 4.6.1**
**Limits for electric field strength, quasi-peak detector**

| Frequency, MHz | Class B equipment @3 meter distance, dB(mV/m) |
|---|---|
| 30 - 88 | 40 |
| 88 - 216 | 43.5 |
| 216 - 960 | 46 |
| 960 - 5000 | 54 |

### 4.6.2 Test procedure

The radiated emissions measurements of the EUT incorporated digital device and receiver were performed in the anechoic chamber at 3 meters measuring distance with biconilog and double ridged guide antennas. The measurements were performed in frequency range from 30 MHz to 5 GHz. The EUT was placed on the wooden table as shown in Figure 4.6.1 and Photographs 4.6.1, 4.6.2.
To find maximum radiation the turntable was rotated 360$^{o}$, the measuring antenna height changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

In frequency range from 30 to 1000 MHz the EMI receiver settings were: RBW = 120 kHz, quasi-peak detector.

The receiver radiated emission measurements from 1 GHz up to 5 GHz were performed with the spectrum analyzer settings: RBW=VBW=1 MHz, quasi peak detector was used.

The results of measurements were recorded into Table 4.6.2 and are shown in Plots 4.6.1 to 4.6.4.

**Reference numbers of test equipment used**

| | | | | | | |
|---|---|---|---|---|---|---|
| HL 0041 | HL 0465 | HL 0521 | HL 0589 | HL 0593 | HL 0604 | HL 1175 |

Full description is given in Appendix A.

**Table 4.6.2 Radiated emission measurements test results**
**frequency range 30 MHz – 5 GHz**

DATE: January 26, 2000
RELATIVE HUMIDITY: 61%
AMBIENT TEMPERATURE: 24°C

MEASUREMENTS PERFORMED AT 3 METRES DISTANCE

| Frequency, MHz | Antenna Type | Antenna Polarization | RBW, kHz | Radiated emissions, dB (μV/m) | Spec. limit, dB (μV/m) | Margin, dB | Pass/ Fail |
|---|---|---|---|---|---|---|---|
| 147.011 | BL | H | 120 | 29.76 | 43.5 | 13.74 | Pass |
| 384.025 | BL | V | 120 | 30.17 | 46.0 | 15.83 | Pass |
| 504.012 | BL | V | 120 | 34.40 | 46.0 | 11.6 | Pass |
| 2067.975 | DRG | V | 1000 | 43.61 | 54.0 | 10.39 | Pass |
| 2107.040 | DRG | V | 1000 | 43.08 | 54.0 | 10.92 | Pass |
| 2149.985 | DRG | V | 1000 | 51.80 | 54.0 | 2.2 | Pass |

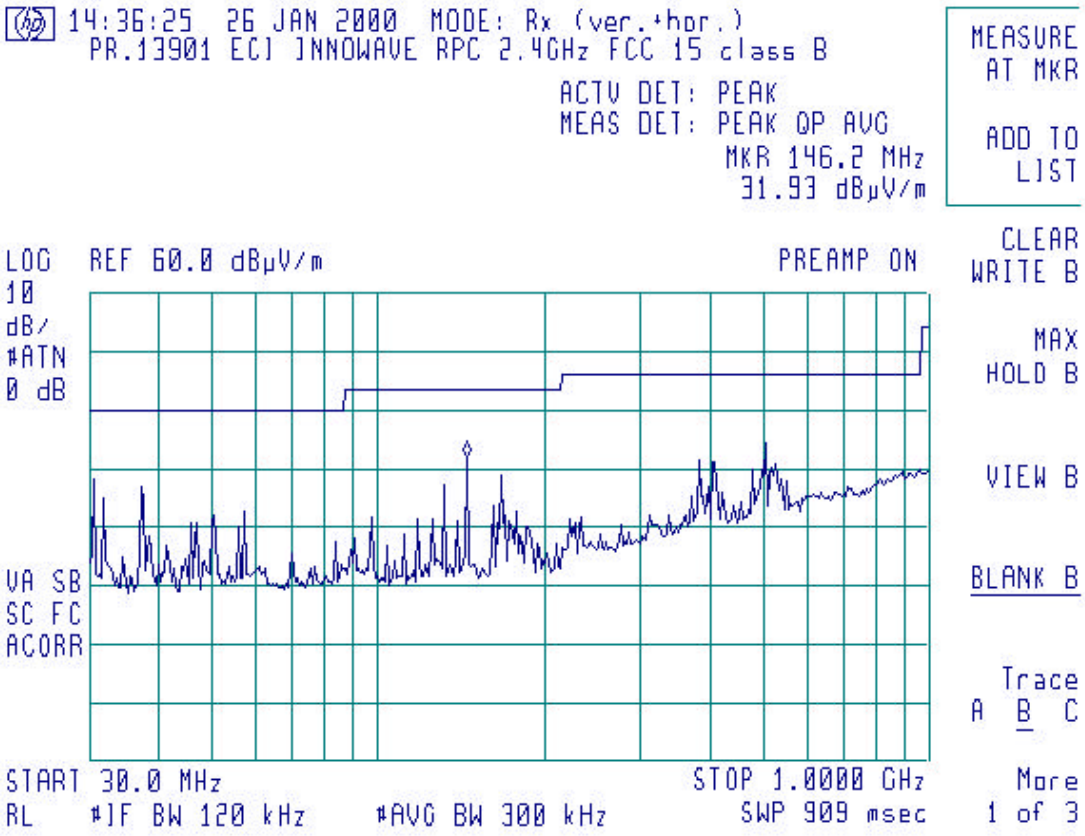
**Notes to table calculations:**

Measurements were performed with quasi-peak detector.

Antenna type: BL – biconilog, DRG – double ridged guide
Antenna polarization: H – horizontal, V – vertical
RBW – resolution bandwidth
Margin = dB below (negative if above) specification limit.

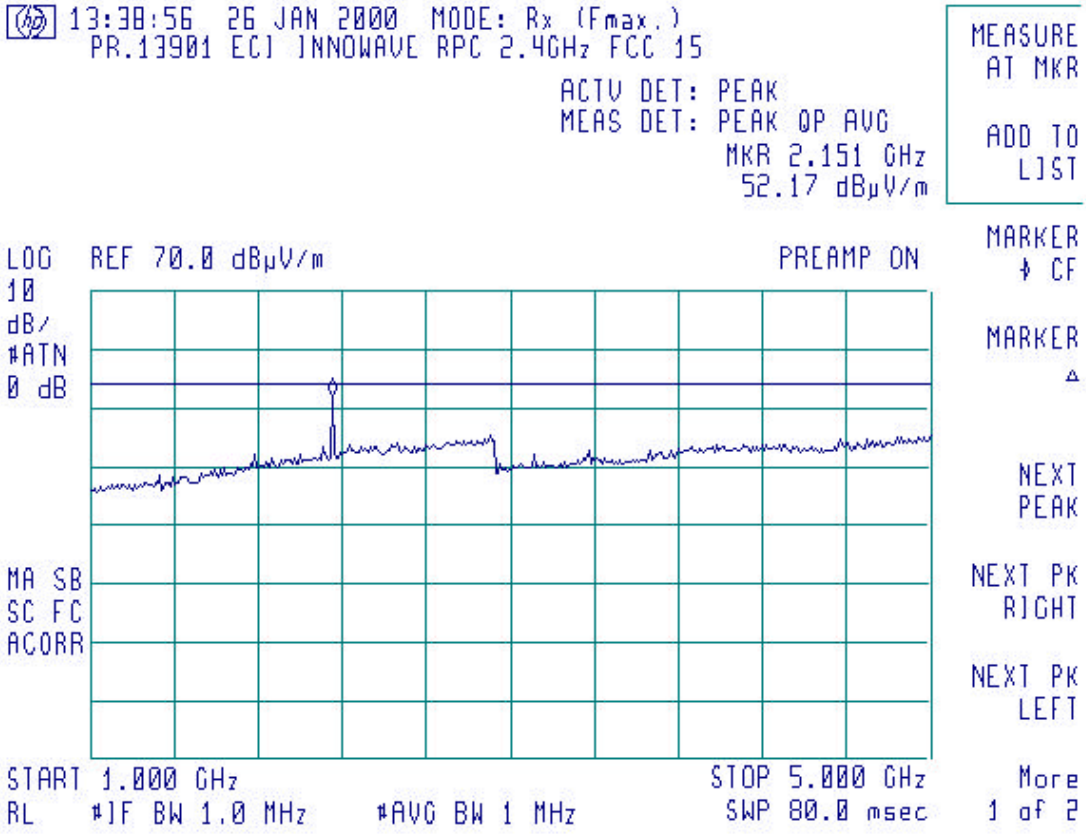
**Plot 4.6.1**

Test Specification: §15.109
Radiated emissions of receiver and digital incorporated device
Vertical and horizontal antenna polarization



**Plot 4.6.2**

Test Specification: §15.109
Radiated emissions of receiver and digital incorporated device
F max



**Plot 4.6.3**

Test Specification: §15.109
Radiated emissions of receiver and digital incorporated device
F min