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Photograph 4.3.1
Set up for ERP measurement, substitution method

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4.4 Occupied bandwidth measurements according to FCC part 90 paragraph 209

4.4.1 General

According to paragraph 90.209 (5) the maximum authorized bandwidth shall be 11.25 kHz in 450 – 470 MHz frequency band.

4.4.2 Test procedure

The EUT was set up as shown in Photograph 4.4.1.

The measurements were performed using spectrum analyzer.

The occupied bandwidth was measured as a frequency band between points where power envelope of carrier, modulated with normal signal, drops 23 dB below unmodulated carrier.

The test results for 3 channels are shown in Plots 4.4.1 to 4.4.3.

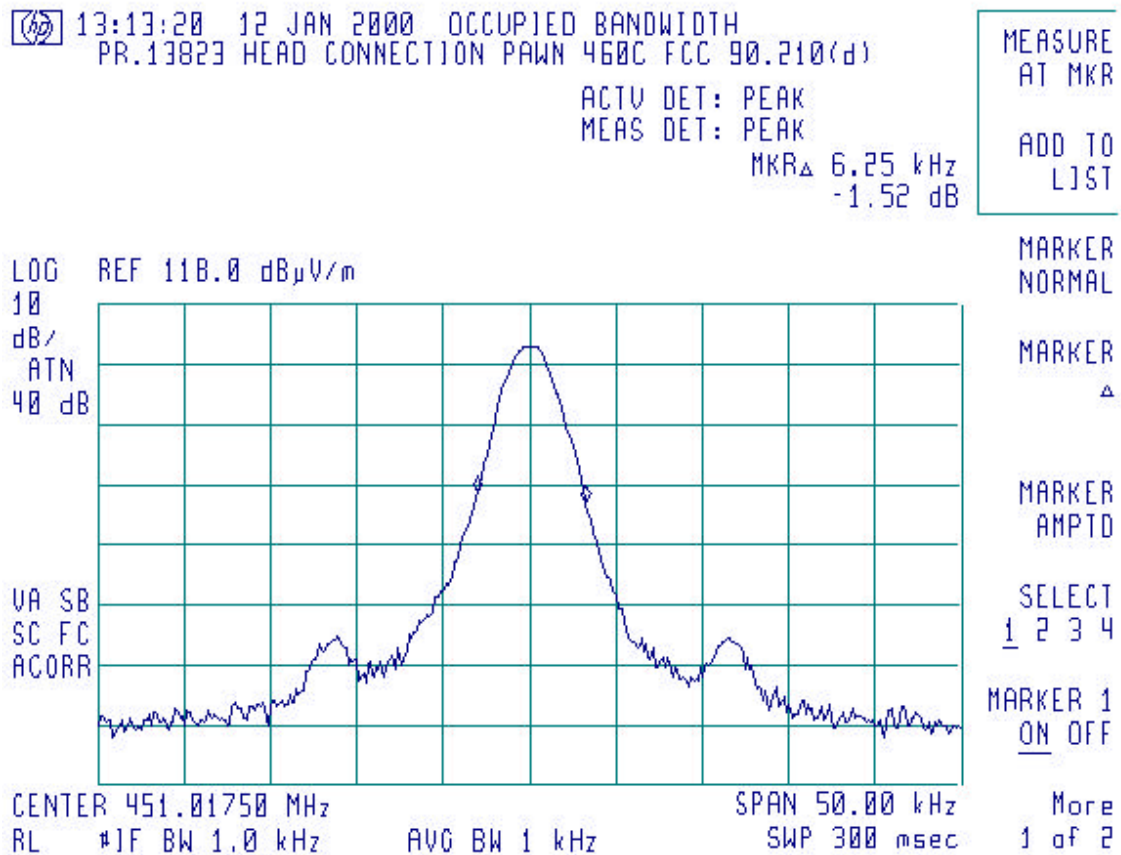**Reference numbers of test equipment used**

HL 0465	HL 0521	HL 0604

Full description is in Appendix A.

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Plot 4.4.1
Occupied bandwidth measurements test result
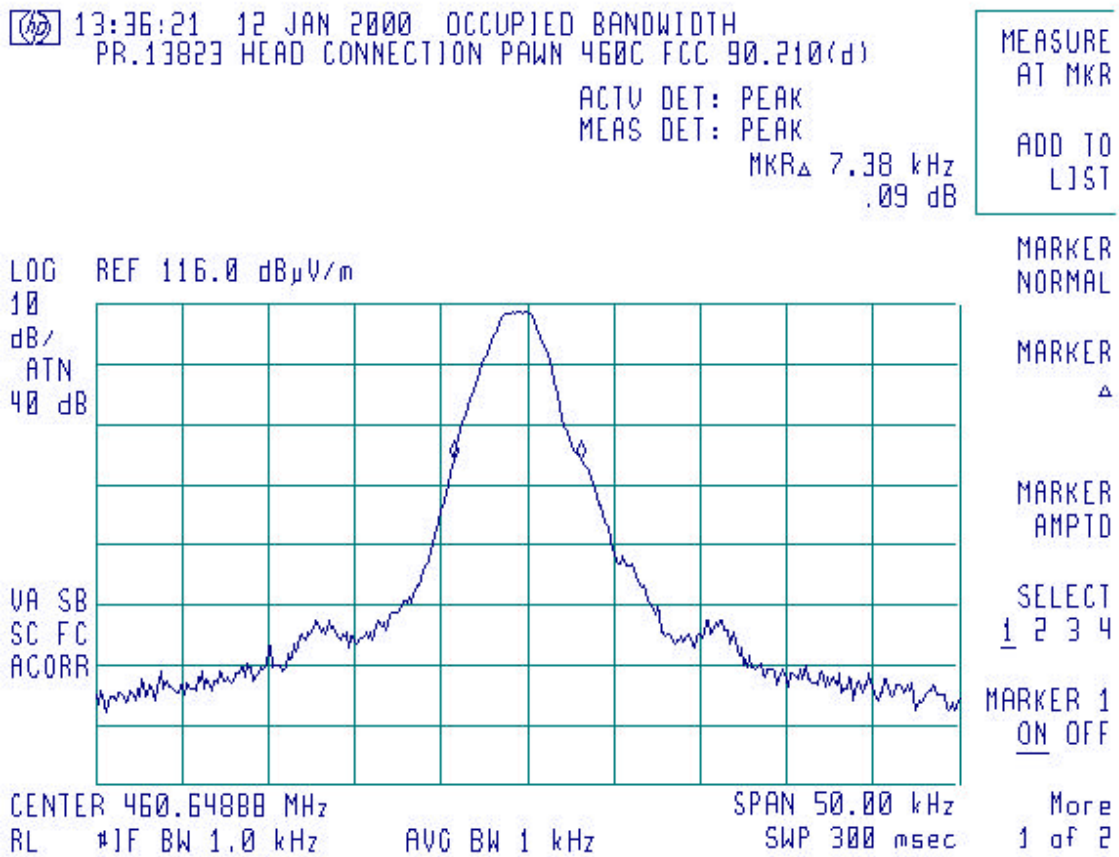**F = 451.0175 MHz**

Occupied bandwidth = 6.25 kHz

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Plot 4.4.1
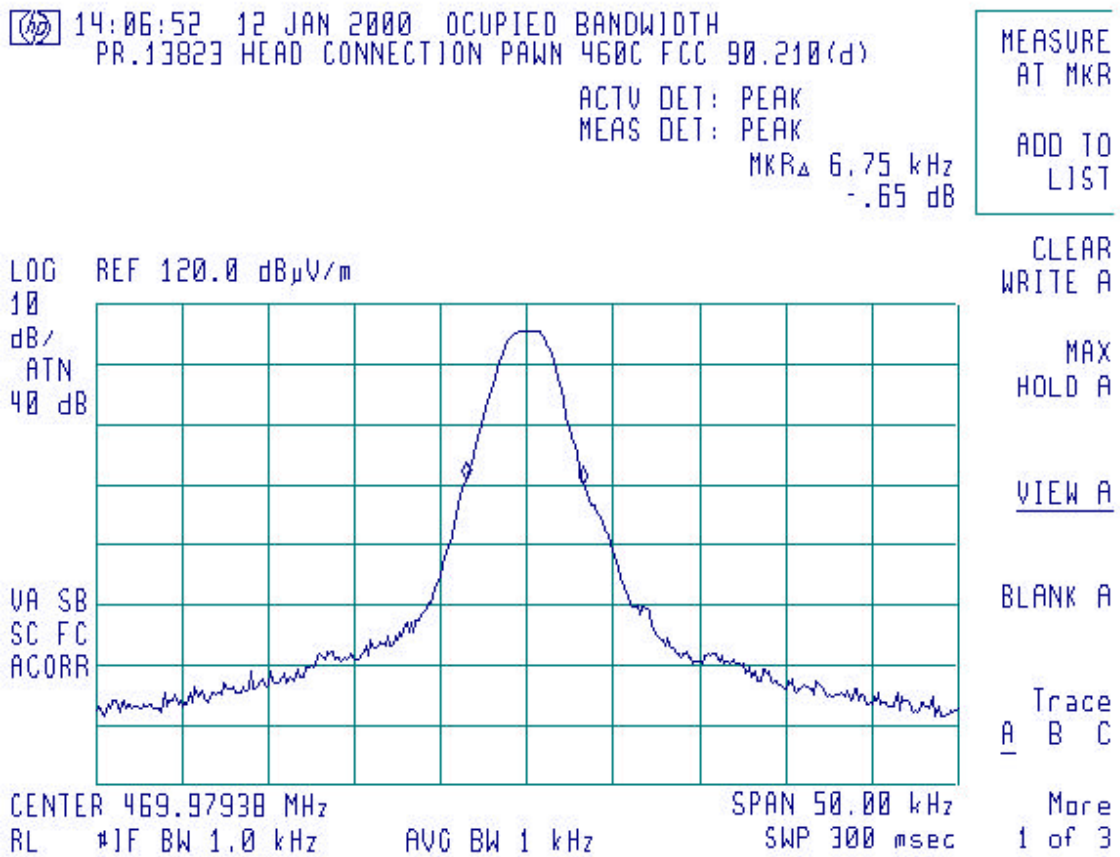**Occupied bandwidth measurements test result**
F = 460.65 MHz

```
[hp] 13:36:21  12 JAN 2000  OCCUPIED BANDWIDTH
     PR.13823 HEAD CONNECTION PAWN 460C FCC 90.210(d)
                              ACTV DET: PEAK
                              MEAS DET: PEAK
                                   MKRΔ 7.38 kHz
                                        .09 dB

LOG   REF 116.0 dBμV/m
10
dB/
 ATN
40 dB

VA SB
SC FC
ACORR

CENTER 460.64800 MHz              SPAN 50.00 kHz
RL   #IF BW 1.0 kHz    AVG BW 1 kHz   SWP 300 msec
```

MEASURE
AT MKR

ADD TO
LIST

MARKER
NORMAL

MARKER
Δ

MARKER
AMPTD

SELECT
1 2 3 4

MARKER 1
ON OFF

More
1 of 2

Occupied bandwidth = 7.38 kHz

![HL logo]

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Plot 4.4.1
Occupied bandwidth measurements test result
F = 469.98 MHz

Occupied bandwidth = 6.75 kHz

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**Photograph 4.4.1
Occupied bandwidth test setup**