

## Transmitter Occupied Bandwidth and Emission Designator Determination

RULE PART NUMBER: 2.201, 2.202, 2.1049 (h), 90.543(c), 27.53(d)(4)

### Necessary Bandwidth Measurement (90.202(c)(4)) and Emission Designator

This radiomodem uses digital modulation signals, passing through a pulse shaping DSP implemented low-pass filter to an FM transceiver. The equations for the filter are Nyquist-based being driven by the data symbol rates, they are detailed in modulation source description paragraph, in next page. The necessary bandwidth calculation for this type of modulation is not covered by paragraphs (1), (2) or (3) from 2.202(c), the result exceeding by far the real necessary bandwidth obtained through simulations or measurement.

Therefore, the approach outlined in (2.202(c)(4)) is applicable in this case.

The results of 99% Occupied Bandwidth measurement are:

Bit rate	Deviation on 1kHz tone	Deviation on random data	Occupied Bandwidth
128 kbps	± 8.2 kHz	± 9.8 kHz	29000Hz
96 kbps	± 8.2 kHz	± 9.9 kHz	28670Hz
64 kbps	± 8.2 kHz	± 10.2 kHz	30000Hz

The value of the necessary bandwidth (and implicitly of the emission designator) doesn't exceed the authorized bandwidth of 50kHz (90.543(d)).

### Occupied Bandwidth Measurement (90.202(c)(4), 90.543(b))

The Occupied Bandwidth measurement option of the instrument (8563EC spectrum analyzer from Agilent) calculates and provides the values used above for the emission designator.

The percentage setting of the measurement has been set to 99% following the definition of the **Occupied Bandwidth** “the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission” (FCC 2.202)

The measurement has been performed using the Occupied Bandwidth Measurement Function of 8563EC the resulting value was recorded as Occupied Bandwidth.

UNIT UNDER TEST Prototype unit

TEST RESULTS: 30.00kHz

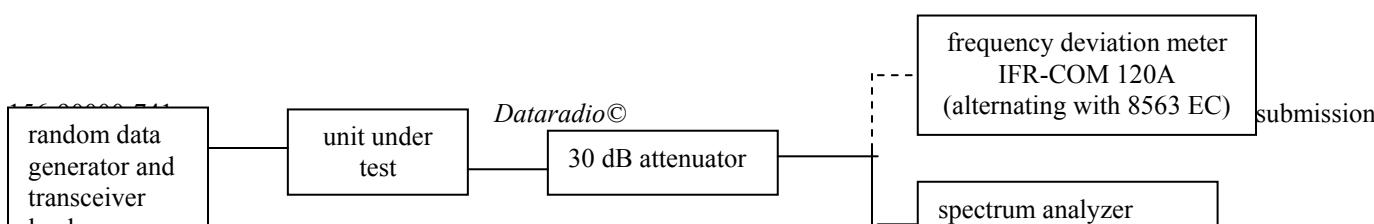
TEST CONDITIONS: Standard Test Conditions, 25 C

TEST EQUIPMENT: IFR COM-120B – communication analyzer used for deviation meter IF bandwidth 300kHz  
Spectrum Analyzer, Model HP 8563EC

*Constantin Pintilei*

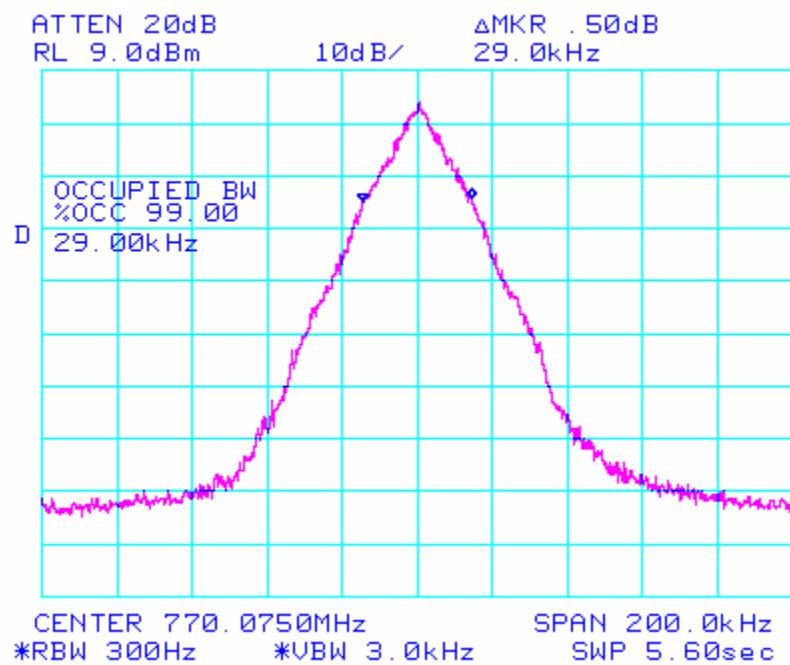
PERFORMED BY: \_\_\_\_\_ DATE: 05/25/04  
Constantin Pintilei

The measurement set-up is:

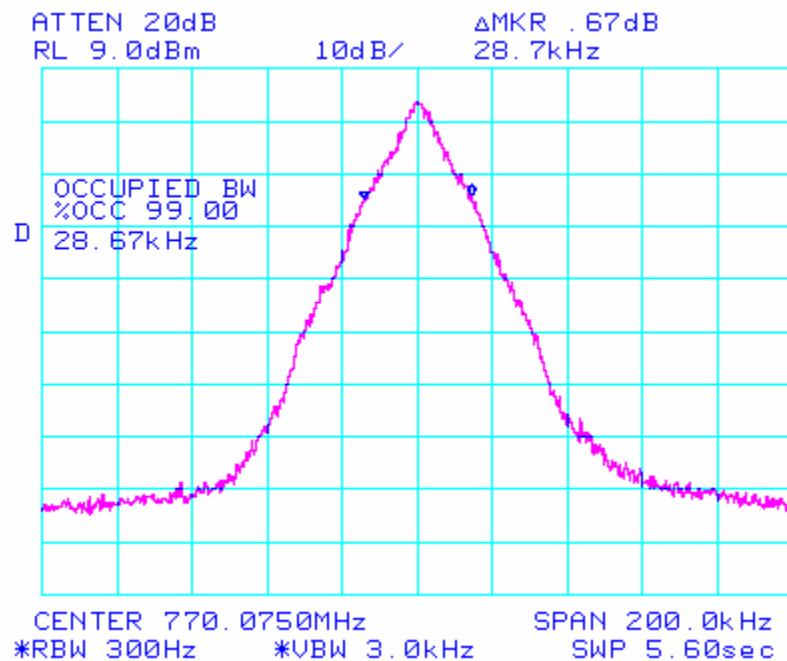


The plots acquired during the occupied bandwidth

128kbps



96kbps



64kbps

