Rec. ITU-R SF.675

Digital carrier with necessary bandwidth greater than reference bandwidth

The maximum power density per Hz is given by:

$$P_o = P_t / B$$

where:

Pt :	total power of the carrier (W)
B :	necessary bandwidth (Hz).

The maximum power density per 4 kHz

$P_{4\ kHz} = P_o * 4 \times 10^3$ (W/4 kHz)

The maximum power density per 1 MHz

$P_{1\ MHz} = P_o * 1 \times 10^6$ (W/MHz)

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Digital carrier with necessary bandwidth less than reference bandwidth

For cases with multiple identical carriers :

$$P_{4\ kHz} = (P_t * N) \quad (W/4\ kHz)$$

where:

P_t: total power of a single carrier (W)

N: maximum number of carriers, or portions of carriers, with a bandwidth less than 4 kHz to occupy any given 4 kHz band.

Or

$$P_{1\ MHz} = (P_t * N) \quad (W/MHz)$$

where:

N: maximum number of carriers, including portions of carriers, with a necessary bandwidth less than 1 MHz to occupy any given 1 MHz band.

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TT&C carrier

In most cases, only a single TT&C carrier will be transmitted in any given 1 MHz band.

As such, the maximum power density per 1 MHz for a TT&C carrier having a necessary bandwidth less than 1 MHz is given by:

$$P_t \quad \text{(W/MHz)}$$

where:

P_t: total power of the TT&C carrier (W).

Example

- Frequency above 15GHz
- Emission 107KG9D
- Pt = -5 dBW

- $P_{1\ \mathrm{MHz}} = (P_t * N)$ (W/MHz)

- No. of carriers within 1 MHz = 3

  $P_{1\ \mathrm{MHz}}$ = (-5 +10log(3)) = -0.2 dBW/MHz

  PD = -60.2 dBW/Hz
- No. of carriers within 1 MHz= 8

  $P_{1\ \mathrm{MHz}}$ = (-5 + 10log(8))= 4.0 dBW/MHz

  PD = -56.0 dBW/Hz