

C/N measurement using the channel power

- ◇ Handheld spectrum analyzer enables easy C/N ratio measurement.
- ◇ Judgement of stable receiving of such as digital broadcasting is made easy.

Application

In communication by digital modulation such as digital broadcasting, the carrier power vs noise ratio (C / N ratio) is important for stable receiving. Because deterioration of C / N ratio causes a rapid deterioration of the bit error rate (BER). As a result, it becomes impossible to reproduce the transmitted data correctly. In our handheld spectrum analyzer MSA438, C / N ratio can be measured using "Channel power measurement" function.

- Precise measurement and evaluation by a full-fledged spectrum analyzer
- Writing report becomes easy by saving measurement result (screen, data) into USB memory.
- It is easy to use in the field because of small & lightweight equipment and 4 hours battery operation..

Solution

* C / N ratio is expressed by the following equation on condition of carrier power Pc and noise power Pn. So, both power values of a carrier in the specified band and a noise out of band are needed.

* On the other hand, the handheld spectrum analyzer MSA438 has a channel power measurement function. It is possible to determine the C / N ratio from the following calculation measuring each of the channel power (carrier) and noise power.

$$\text{Channel power (mW)} = 10^{\{Pc(dBm)/10\}}$$

$$\text{Noise power (mW)} = 10^{\{Pt(dBm)/10\}} - \text{Channel power(mW)}$$

Pc: channel power in specified band
Pt: total power in screen

$$\text{C/N ratio(dB)} = 10 * \text{Log}(\text{channel power/noise power})$$

*** How to measure C/N ratio**

1. Set Band measurement mode of channel power measurement.
[MEAS] key → select "BAND" with F1[MODE]
2. Set the frequency and band of carrier.
Adjust Band part to band of carrier by using encoder.
Start measurement.
The value at lower right of screen is carrier power Pc.
3. Set Total measurement mode of channel power measurement.
Select "Total" by F1[MODE].
Start measurement.
The value at lower right of screen is total power in screen Pt.
4. C/N ratio is calculated based on the equation shown above.

In example of screens shown right;
Pc=3.64dBm、Pt=3.72dBm
Therefore,
Channel power= 2.312mW, Noise power=2.355mW - 2.312mW = 0.043mW
C/N ratio= 10*Log(2.312/0.043) = 17.3dB

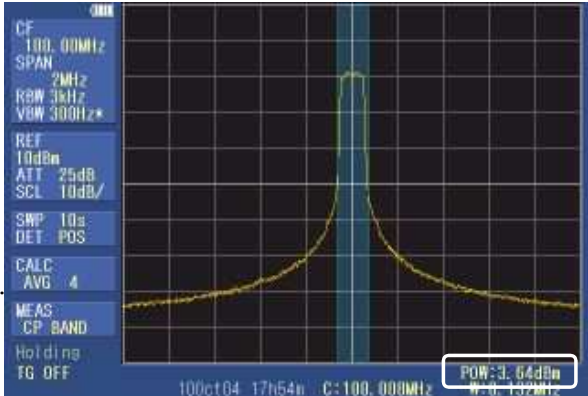
System configuration

- ① 3.3GHz spectrum analyzer (MSA438)
- ② Dedicated battery (MB400)



MSA438

1) Total power in specified band is measured.



2) Total power in screen is measured.

