
TECHNICAL NOTE TN-1034

Configuring TB8100 UHF 400-520MHz Rx AGC

21 June 2005

Applicability TB8100 UHF 400–520MHz Reciters

1. Introduction

This Technical Note has been issued in response to questions about the implementation and effects of AGC on the UHF (400 to 520MHz) "H" band TB8100 Reciters.

2. AGC

Automatic Gain Control The AGC provides enhanced high signal handling capabilities and receiver intermodulation protection; however when high signals are present the minimum sensitivity may be degraded.

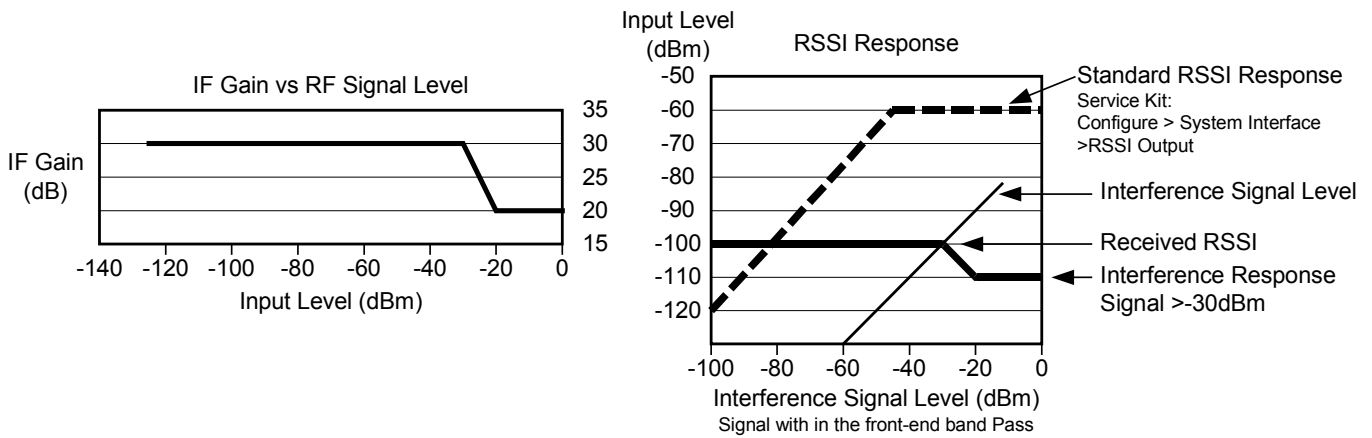
The AGC should normally be enabled, however it is recommended that the AGC is disabled when:

1. The anticipated receive signal strength is $<-107\text{dBm}$ (1 μV) and a strong **singular** (interfering) signal $>-30\text{dBm}$ (7.07mV) within the front-end pass band is anticipated at the receiver input.
2. The Telecommunications Industry Association/ Electronic Industries Alliance (TIA/EIA 603B) or Australian Standards (AS-4295) test methods are being used, and Tait TB8100 performance level (as per the specifications document MBA_00001_06) is required.

3. OPERATIONAL ISSUES.

- If the TB8100 Base Station is to be subjected to EIA type performance testing, the AGC needs to be disabled on channels where this is to take place.
- When the TB8100 Base Station is used in duplex mode, the duplexer isolation needs to be in excess of 80 dB (for a 100 W Base Station). If the isolation is less than 80dB, either the AGC must be disabled, or a degree of desensitisation must be accepted. If the AGC is disabled, intermodulation performance, as measured using the European Telecommunications Standards Institute (ETS) test method, will be degraded
- When deciding whether to enable or disable the AGC, the RF environment at the particular site in question, must be taken into account. Ironically, although the requirement to pass a very tight adjacent channel selectivity specification was a prime motivator for including the AGC system, this parameter is of little consequence in the real world. In practice, the susceptibility of the Base Station to adjacent channel signals, will depend on the transmitted Adjacent Channel Power (ACP) of the interferer, NOT on the performance of the receiver.
- Intermodulation Distortion (IMD) performance at real sites may be a different matter. At sites where there can be **multiple** signals within the front-end receive band, and the sources of these signals are in close proximity to the TB8100 Base Station, it will probably be advisable to enable the AGC. At sites in rural areas, where interferers are few and far between, it should be left disabled.

- With the AGC enabled detected Received Signal Strength Indicator (RSSI) level is reduced by up to 10dB when unwanted signals of >-30dBm are present at the receiver input. This could impact RSSI mute and is dependant on detected signal strengths. To maximise RSSI accuracy the AGC should be disabled, noting the increased exposure to high signal interference.



A constant received signal of -100dBm is affected by an increasing unwanted signal. This signal is within the front-end band width and when it is larger than -30dBm it causes the ACG to operate. When the signal reaches -20dBm the full ACG attenuation of 10dB is applied.

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Distribution Level

Associate

Document History

Original Release 21 June 2005 SMQ

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