Application Notes AN6012

Level Self Adjustment for Model 875

Introduction

This application note describes the RF output level self adjustment feature for BNC's Vector Signal Generator (Model 875) devices.

Affected Devices

All Model 875 devices with serial number:

-**5***-xxxx   with xxxx between 0071 to 0085

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Output level self adjustment explained

The firmware update 1.0.5 includes various bugfixes and improvements. After the firmware update, some Model 875 devices (listed below) will exhibit errors in the output power level. The device must be re-calibrated using the method below.

The Model 875 comes with a factory calibration table ensuring that the output power level is within the specified tolerance. Changes in the new firm ware make it necessary that the factory calibration settings need to be converted to a new calibration table. To ensure that the new calibration table results in correct output power levels, the self adjustment will apply all calibration points at the RF output. During the sweep, the output power is measured internally, and small adjustments are made if necessary.

WARNING! During the self adjustment the Model 875 will apply frequency and power settings over the full range of the Model 875's capabilities (≥15 dBm, min to max frequency). <u>Disconnect any external circuitry connected to the RF output of the 875 that would be damaged if an undefined signal is applied.</u>

The self adjustment only has to be run once. The new settings are permanently saved and applied by default at every reboot. It is possible to delete or rerun the self adjustment. This can be used to achieve more accurate power levels e.g. in a different temperature environment. It is also possible to switch between the factory calibration and the new calibration at any given time (e.g. to compare to the factory calibration). The commands described below allow to temporarily revert to the factory calibration or permanently delete the self adjustment to change the startup behavior.

Performing the self adjustment

The self adjustment is performed using the following steps:

1. Update the firmware to version ≥1.0.5
2. Ensure that the Model 875 is at operating temperature
   (it is recommended to wait minimum 30 min after powering on the device)
3. **Disconnect any external RF hardware that could be damaged by undefined signals**
4. Terminate the RF output of the Model 875 with 50 Ω. If this is not done, the adjusted settings may lead to undefined output levels.
5. Use the Model 875 GUI (min. version 1.0.28) to perform the self adjustment
   OR
   Run the following SCPI commands for each channel separately:
   > SOUR:SEL <ch> for each channel of multi-channel devices
   > CAL:SELF:GEN 1 execute self adjustment procedure
   > CAL:SELF:APPLY 1 apply new calibration settings
6. Remove 50 Ω termination and continue normal operation

SCPI Commands

CALibration:SELF:GENerate
CALibration:SELF:GENerate?
CALibration:SELF:GENerate ON|OFF|1|0

This command creates or deletes a self adjustment calibration file.
When queried, it returns if a self adjustment is available from previously running
CAL:SELF:GEN 1.
> ON|1 Performs a self adjustment if the hardware supports it.
> This will overwrite any existing self adjustment that has been created before.
> This procedure may take up to 5 min.
> OFF|0 Deletes any previously generated self adjustment calibration table from non volatile memory.

*RST 1 if a self adjustment has been run previously, 0 otherwise.

CALibration:SELF:APPly
CALibration:SELF:APPLy?

CALibration:SELF:APPLy ON|OFF|1|0

This command applies either the factory calibration or the calibration from a self adjustment.

ON|1   Applies the self adjusted calibration table if a self adjusted calibration is present from a previous self adjustment run. This command takes up to 1min.

OFF|0   Applies the factory calibration run.

*RST   1 if a self adjustment has been run previously, 0 otherwise.

Appendix

Further Related Documentation

[1] Model 875 Datasheets

[2] BNC Manuals

AN6012 Changelog

AN version	FW version	Notes
V1_0	1.0.5	First release.