EK1HMC6350 User Guide
UG-1031

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Getting Started with the EK1HMC6350 Evaluation Kit and Software

FEATURES

60 GHz evaluation kit designed for quick evaluation of the HMC6300 and HMC6301 transmit/receive chipset
Demonstration platform allows easy integration of the HMC6300 and HMC6301 radio link with a baseband modem for over the air transmission

APPLICATIONS

Point to point millimeter wave radio development
Wireless Gigabyte Alliance/IEEE 802.11ad radio
60 GHz RF sniffing
60 GHz signal generator
Modem development
Radar/high resolution Imaging

EVALUATION KIT CONTENTS

1 HMC6300 Tx 60 GHz transmitter motherboard/module assembly with a MMPX interface
1 HMC6301 Rx 60 GHz receiver motherboard/module assembly with a MMPX interface
2 hand formable 2 inch coaxial cables with a male MMPX connector on one end and a 1.85 mm male connector on the other end
1 HMC6300 motherboard/TX module with crystal, USB interface, supply regulators, MCX connector and differential I/Q interface
1 HMC6301 motherboard/RX module with crystal, USB interface, supply regulators, MCX connector and differential I/Q interface
2 wall-mount power supplies
2 USB 2.0 male/male 6 foot cables
8 phase matched MCX to SMA cables for baseband interface on both motherboards
Evaluation software CD-ROM containing the HMC6300/HMC6301 Graphical User Interface software GUI

EQUIPMENT NEEDED

2 PCs, one designated for each motherboard for GUI control
Baseband source
Spectrum analyzer

DOCUMENTS NEEDED

HMC6300 data sheet
HMC6301 data sheet

GENERAL DESCRIPTION

The EK1HMC6350 evaluation kit allows users to set up a half-duplex, 60 GHz millimeter wave link using standard baseband analog interfaces. MMPX and 1.85 mm connectors are provided to interface with third party test equipment or millimeter wave antennas. The EK1HMC6350 evaluation kit includes a USB interface and graphical user interface (GUI) software, the HMC6300/HMC6301 Graphical User Interface, allowing the user to program the HMC6300 and HMC6301 by writing to the device registers.

There are two motherboards in the kit: an HMC6300 motherboard with the TX module location populated and the HMC6301 motherboard with the RX module location populated.

Full specifications on the HMC6300 and HMC6301 are available in the HMC6300 and HMC6301 data sheets, which should be consulted in conjunction with this user guide when working with the evaluation board.

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REVISION HISTORY

7/2016—Revision 0: Initial Version

EVALUATION BOARD HARDWARE SETUP

CONNECTING THE MMPX CABLE TO THE HMC6300 MOTHERBOARD/TX MODULE ASSEMBLY

Remove the HMC6300 motherboard/TX module assembly from the kit. Snap the MMPX semirigid cable into the HMC6300 TX module output connector, shown in Figure 1. The 1.85 mm connector at the other end of the cable can interface with test equipment or a WR-15 waveguide transition to connect with third party antennas.

ATTACHING THE BASEBAND CABLES

Attach the four phase-matched baseband cables supplied with the EK1HMC6350 evaluation kit to the Tx baseband inputs, and the baseband cables snap into place. Attach the other end of the baseband cables to the user selected baseband source.

The baseband source can be test equipment or a modem that generates a baseband tone or modulated I/Q signal. Connect the baseband inputs on the motherboard to the baseband I/Q source as follows:

- Motherboard BB_IP connects to the I positive baseband output
- Motherboard BB_IM connects to I negative baseband output
- Motherboard BB_QP connects to Q positive baseband output
- Motherboard BB_QM connects to Q negative baseband output

Locate the wall mounted power supply and USB connector supplied in the kit and connect them to the HMC6300 motherboard/TX module assembly, shown in Figure 1 and Figure 2.

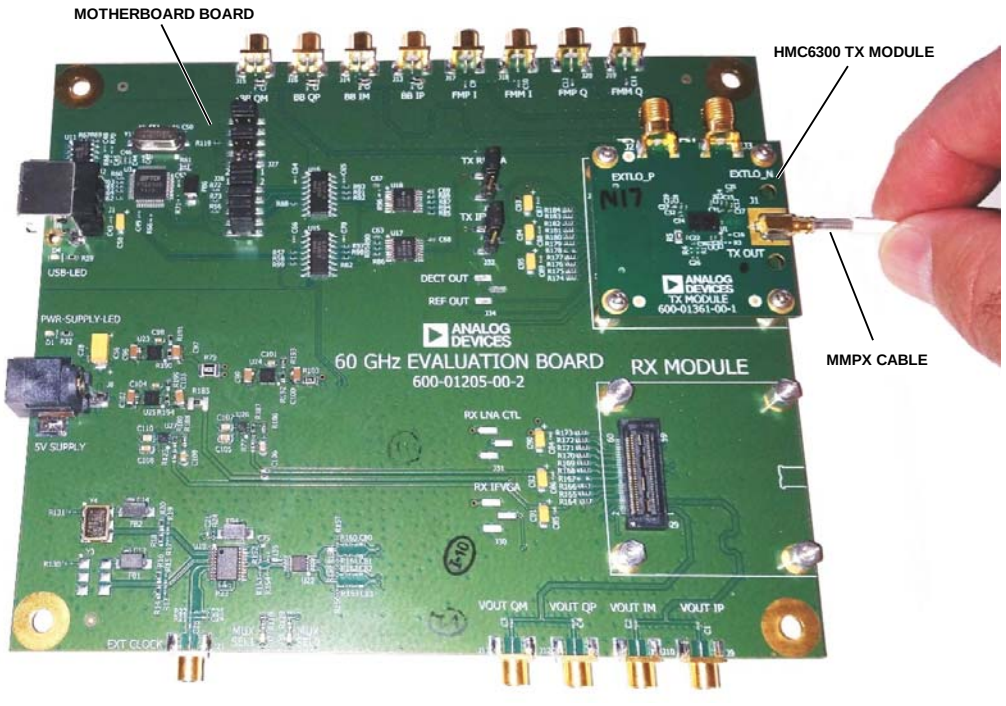

Figure 1. HMC6300 Assembly with the Motherboard Populated with the TX Module

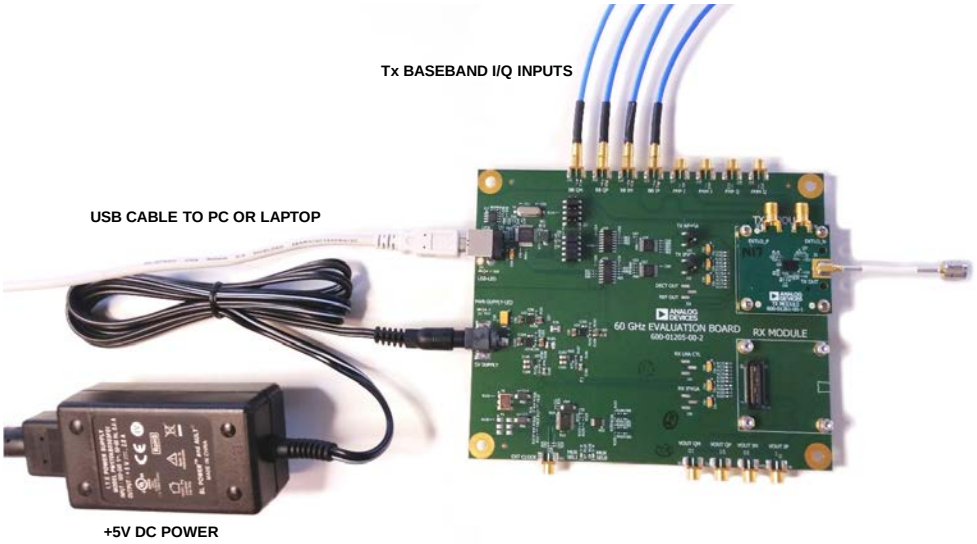

Figure 2. HMC6300 Motherboard/TX Module Assembly with USB, DC Power, and I/Q Cables Installed

CONNECTING THE MMPX CABLE TO THE HMC6301 MOTHERBOARD/RX MODULE ASSEMBLY

Locate the motherboard with the HMC6301 Rx receiver module installed. Snap the MMPX semirigid cable into the HMC6301 RX module output connector, shown in Figure 1. The 1.85 mm connector at the other end of the cable can interface with a test equipment or a WR-15 waveguide transition to connect with third party antennas.

Attach the four phase-matched baseband cables supplied with the EK1HMC6350 evaluation kit to the Rx baseband outputs, the baseband cables snap into place.

Attach the other end of the baseband cables to baseband test equipment or a modem that processes a baseband tone or modulated I/Q signal. Connect the baseband inputs on the motherboard to the baseband I/Q source as follows:

- Motherboard VOUT_IP connects to I positive baseband input
- Motherboard VOUT_IM connects to I negative baseband input
- Motherboard VOUT_QP connects to Q positive baseband input
- Motherboard VOUT_QM connects to Q negative baseband input

Locate the wall-mounted power supply and USB connector supplied in the EK1HMC6350 evaluation kit and connect them to the HMC6301 motherboard/RX module assembly, shown in Figure 3.

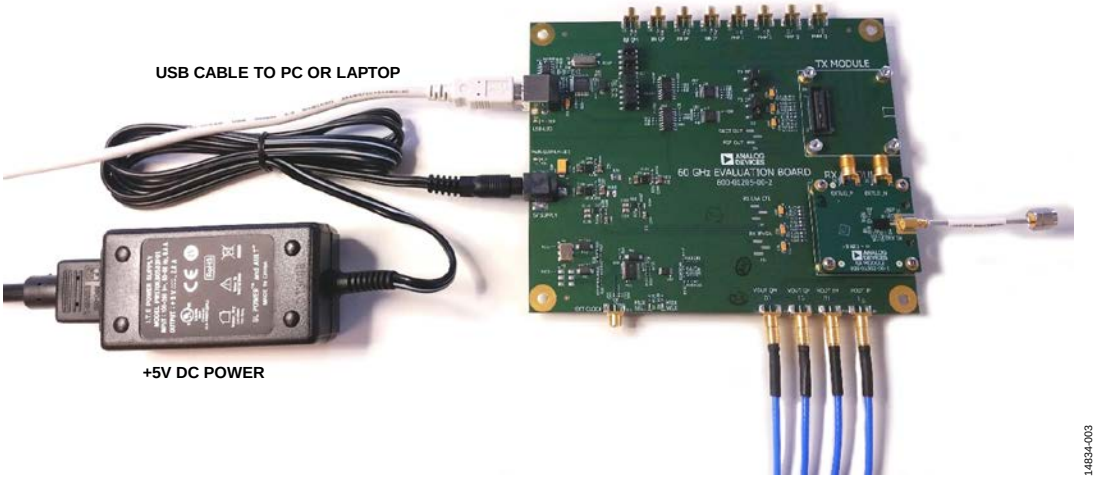

Figure 3. HMC6301 Assembly with the Motherboard Populated with the RX Module

EVALUATION BOARD SOFTWARE QUICK START PROCEDURES

PROGRAMMING THE HMC6300 TX MODULE

Install the HMC6300/HMC6301 Graphical User Interface software on the primary PC and plug in the USB cable connected to the HMC6300 motherboard assembly.

Open the **SoC 60 GHz Tx Control Panel** window by going to the **ADI Directory** in **Program Files** under the Windows® Start menu. When the **SoC 60 GHz Tx Control Panel** window opens, click the **Advanced** button (see Figure 4).

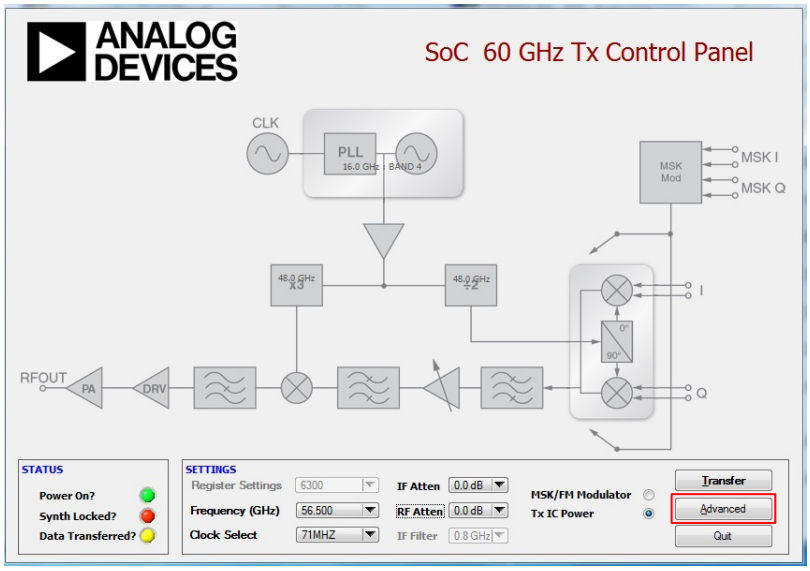

*Figure 4. **SoC 60 GHz Tx Control Panel** Window for the HMC6300 Tx GUI*

When the **SoC 60GHz Tx Advanced Control Panel** appears, perform the following steps (see Figure 5):

1. Select the carrier frequency desired from the **Frequency (GHz)** drop-down menu.
2. Click the **Transfer** button and the HMC6300 device programs and locks to the desired frequency.
3. If the HMC6300 device is successfully programed, the **R/W** LED under **PLL Settings** turns green, indicating the read/write operation is properly executed.
   If the device locks to the selected frequency, the **Locked?** LED under the **PLL Settings** turns green (see Figure 6).

Figure 6 shows a successful data transfer and synthesizer lock. The transmitter then functions at full power on the selected channel. The Tx IF and RF attenuators, under the **Filtering/ Attenuation Settings,** can be applied to reduce the Tx output power, if required.

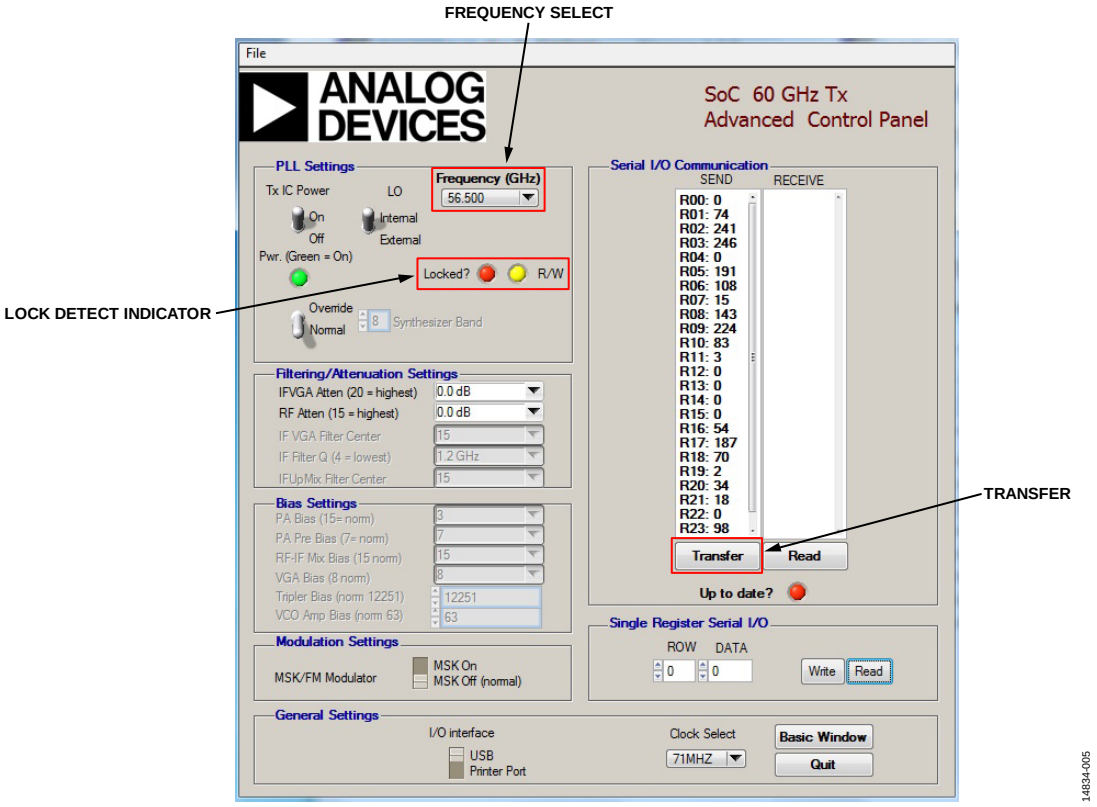

*Figure 5. **SoC 60GHz Tx Advanced Control Panel** Window for the HMC6300 Tx GUI*

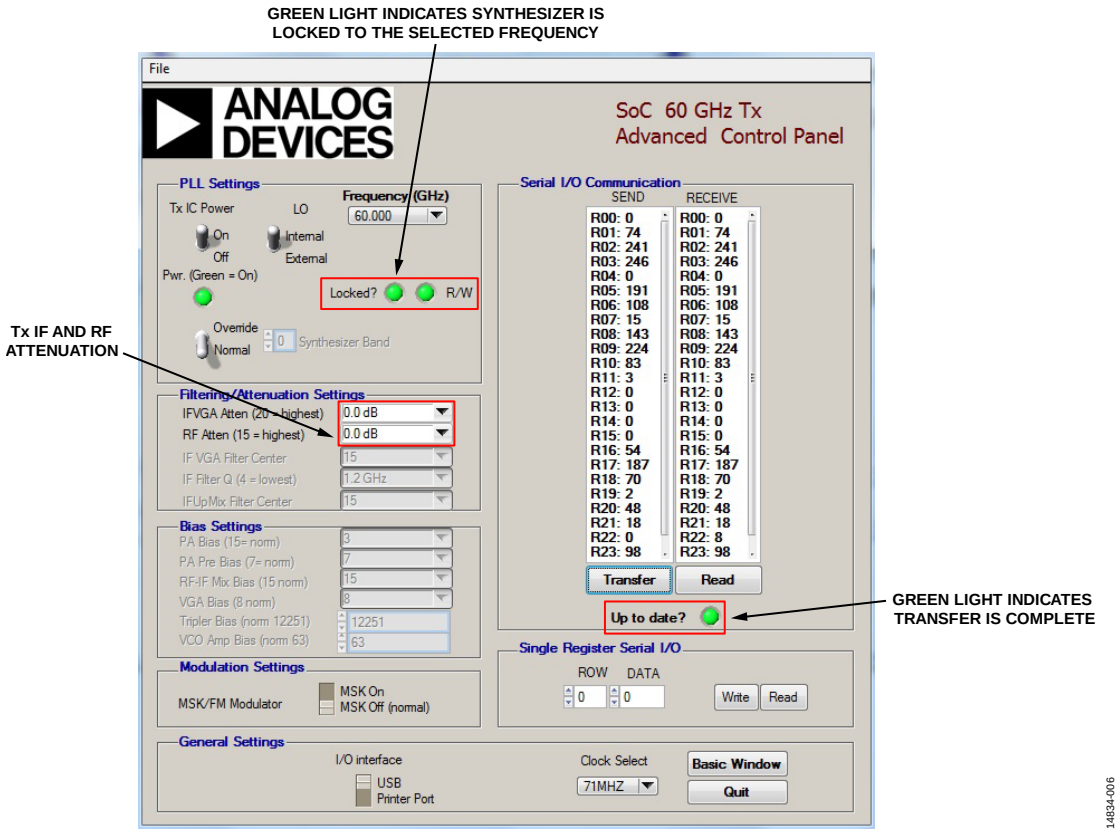

Figure 6. ***SoC 60GHz Tx Advanced Control Panel*** *Window for the HMC6300 Tx GUI After Successfully Programing the HMC6300 to 60 GHz*

PROGRAMMING THE HMC6301 RX MODULE

Install the HMC6300/HMC6301 Graphical User Interface software on the primary PC and plug in the USB cable connected to the HMC6301 motherboard assembly. Open the **SoC 60 GHz Rx Control Panel** window by going to the **ADI Directory** in **Program Files** under the Windows **Start** menu. When the **SoC 60 GHz Rx Control Panel** window opens, click the **Advanced** button (see Figure 7). When the **SoC 60 GHz Rx Advanced Control Panel** window appears, perform the following steps (see Figure 8):

1. Select the carrier frequency desired from the **Frequency (GHz)** drop-down menu.
2. Click the **Transfer** button and the HMC6301 device programs and locks to the desired frequency. If the HMC6301 device is successfully programed, the **R/W** LED under **PLL Settings** turns green, indicating the read/write operation is properly executed. If the device locks to the selected frequency, the **Locked?** LED under the **PLL Settings** also turns green (see Figure 9).

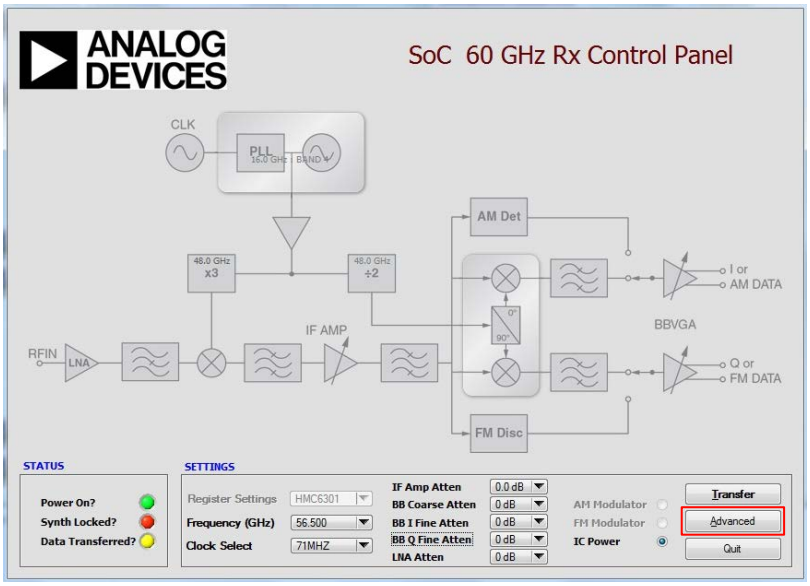

*Figure 7. **SoC 60 GHz Tx Control Panel** Window for the HMC6301 Rx GUI*

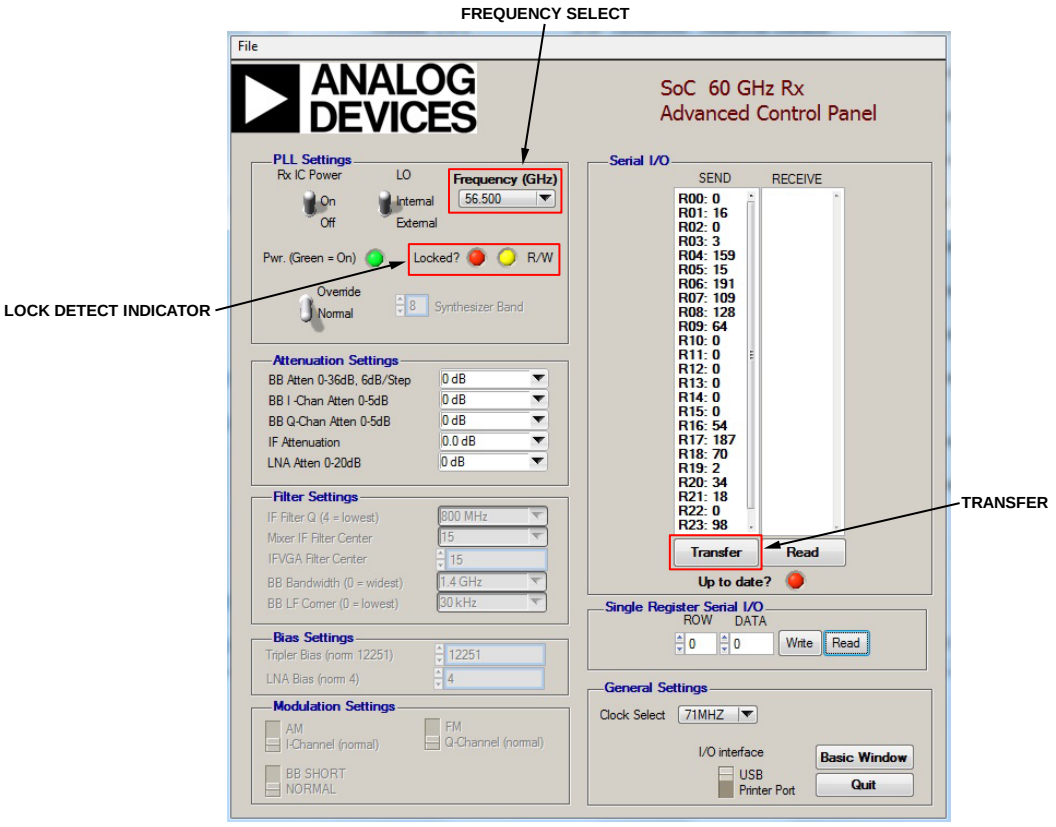

Figure 8. ***SoC 60GHz Tx Advanced Control Panel*** *for the HMC6301 Rx GUI.*

Figure 9 shows a successful data transfer and synthesizer lock. The receiver then functions on the selected channel. The Rx baseband, IF attenuation, and LNA attenuation, under the **Attenuation Settings**, must be adjusted to optimize the receiver gain to meet the signal-to-noise requirements at the Rx baseband output.

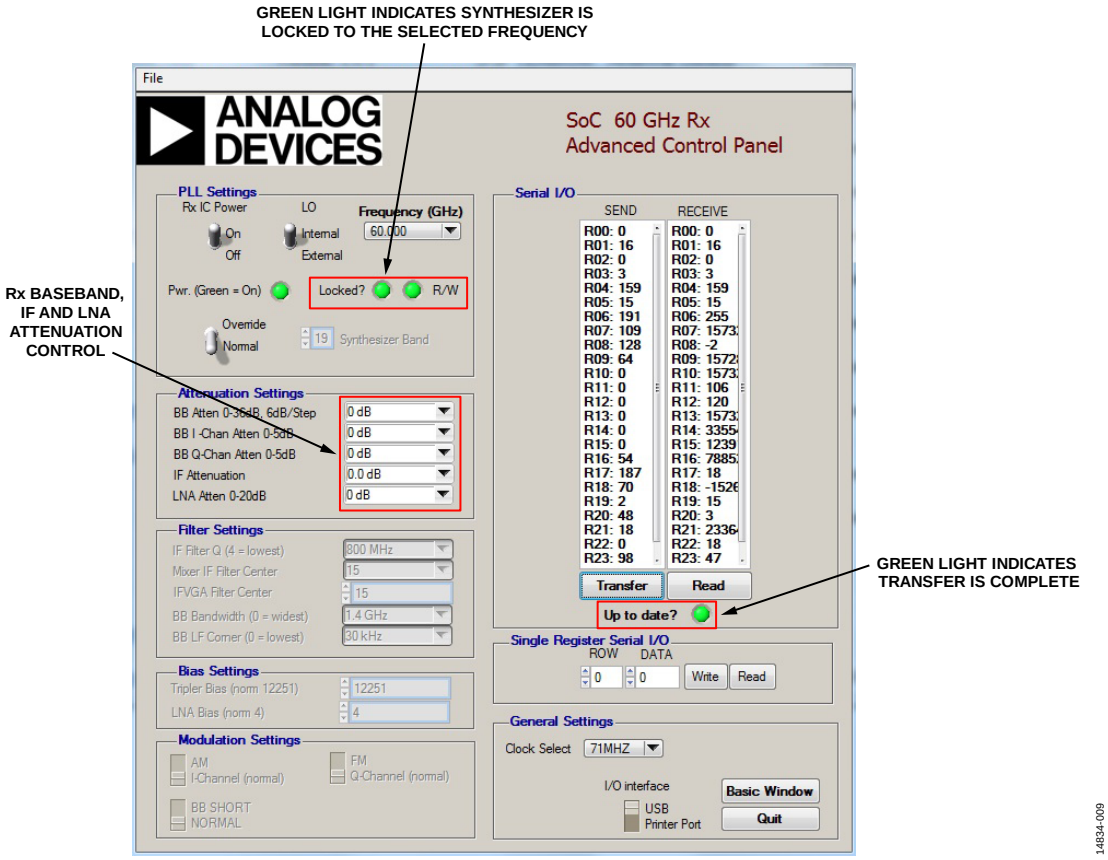

Figure 9. ***SoC 60GHz Tx Advanced Control Panel*** *Window for the HMC6301 Rx GUI After Successfully Programing the HMC6301 to 60 GHz*

60 GHZ WIRELESS RADIO LINK

Figure 10 shows a typical half-duplex, 60 GHz link integrated with horn antennas. The modem can connect to the Tx baseband inputs and the Rx baseband outputs.

This configuration is typically used for integration with a baseband modem for 60 GHz over air testing. This allows for testing and characterization of the HMC6300 and HMC6301 devices.

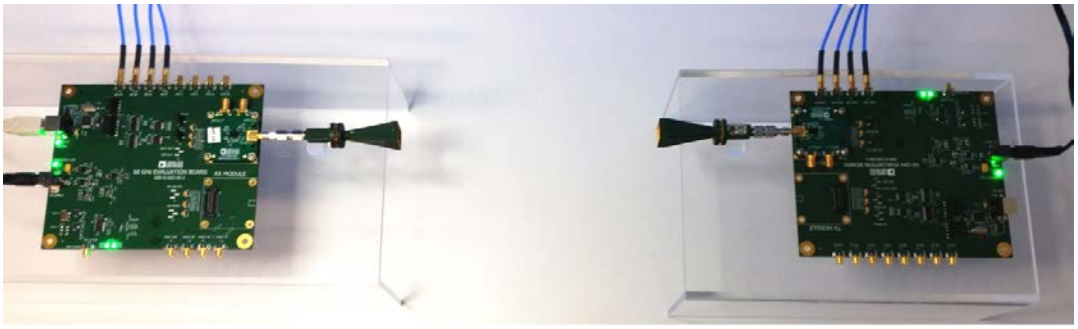

Figure 10. Typical HMC6300 and HMC6301 60 GHz Radio Link

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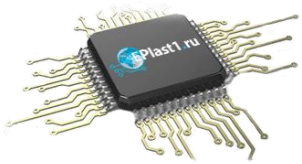
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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