

6GHz Dual-Channel RF Signal Generator Evaluation Module User's Guide



Description

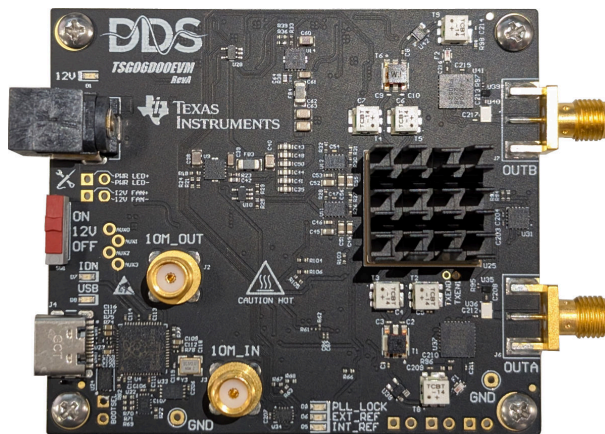
The TSG06D00EVM is a dual-channel 6GHz RF signal generator evaluation module from Texas Instruments designed for engineers who need a compact, USB-controlled RF source for lab bench use, system evaluation, and automated test applications. The device provides two semi-independent, coherent RF output channels with calibrated power output and a full SCPI command set accessible over USB-TMC.

Features

- Two semi-independent 10MHz to 6GHz outputs
 - Less than 1nHz frequency resolution
- Onboard clocking with optional 10MHz reference
- Optimized power tree from 12V input
- Integrated RF output power detection
- USB-C control with NI-VISA driver for SCPI

Get Started

1. Order the [TSG06D00EVM](#) from TI.com.
2. Download the latest software from [TSG06D00EVM-GUI](#).
3. Download the comprehensive references from the [TSG06D00EVM](#) tool page.
 - a. Hardware design files (schematic, layout, bill of materials)
 - b. Performance data and test report
 - c. Technical reference manual (SCPI commands, debug instructions)



TSG06D00EVM Hardware Board

1 Evaluation Module Overview

1.1 Introduction

The following EVM user's guide gives an in-depth overview on using the TSG06D00EVM evaluation board hardware as well as the software GUI, example commands and scripts to change, configure, and evaluate the signal generator in the various modes and features.

1.2 Kit Contents

- TSG06D00EVM
- USB Type-C® cable
- 12V DC power cable (5.5mm OD / 2.1mm ID, positive center)

See [Section 2.2](#) for additional equipment required for proper usage.

1.3 Device Information

The TSG06D00EVM uses the following devices from Texas Instruments.

Table 1-1. Device Information

Device	Description
DDS39RF12	16-bit, 2-channel, 24GSPS 12GHz RF direct digital synthesizer (DDS)
LMX2820	22.6GHz wideband RF synthesizer with phase synchronization, JESD and <5μs frequency calibration
LMK04828	Ultra-low-noise JESD204B compliant clock jitter cleaner with integrated 2370MHz to 2630MHz VCO
LMH2110	8GHz logarithmic RMS power detector with 45dB dynamic range
TPS259261	4.5V to 13.8V, 30mΩ, 2A to 5A eFuse
TPSM82916	17V VIN, 6A low-noise low-ripple buck module with integrated ferrite bead filter compensation
TPSM82822	5.5V input, 2A step-down module with integrated inductor in 2mm × 2.5mm × 1.1mm μSIP package
LM27762	Low-noise positive- and negative-output charge pump with integrated LDO
TPS7A9601	2A, ultra-low-noise ultra-high PSRR RF voltage regulator

2 Hardware

2.1 Board Overview

2.1.1 RF Signal Chain

The TSG06D00EVM has two semi-independent RF output channels each with an identical RF signal chain capable of outputting signals from 10MHz to 6GHz with <1nHz frequency resolution.

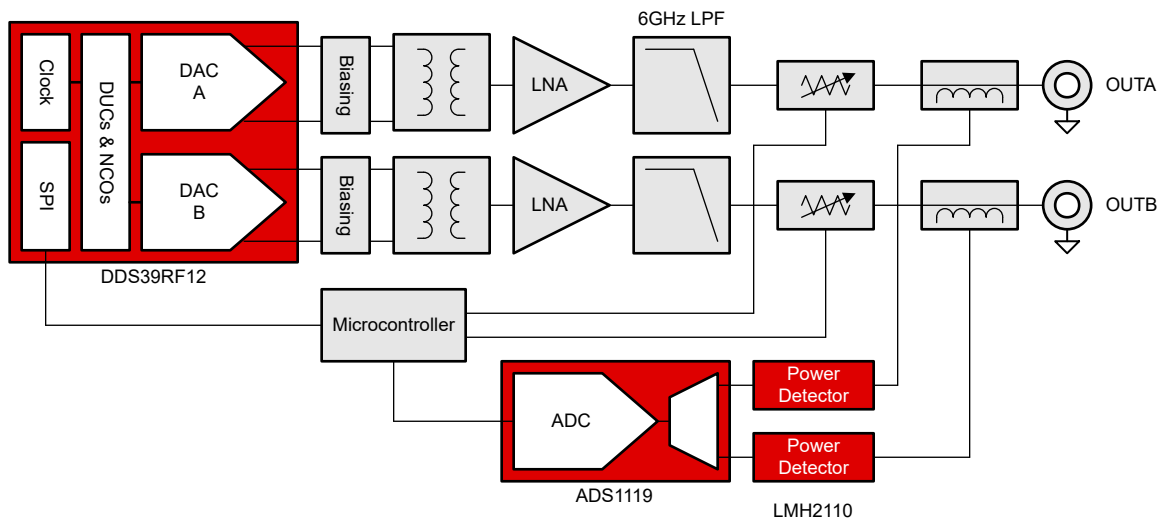


Figure 2-1. RF Output Block Diagram

The DDS39RF12 operates in two sample rate modes. Both channels share the same sample clock from the LM2820, so the mode in use affects both channels.

Table 2-1. Frequency Ranges

Frequency Range	Both Channels Independent?	Notes
10MHz to 4.8GHz	Yes	Both channels can operate fully independently when both are in use in the same frequency range.
4.8GHz to 6GHz	Yes	
Mixed (one channel in each range)	With caveats	The instrument switches the DAC sample rate to accommodate the new channel frequency. The other channel continues to operate but due to aliasing, image frequencies can be present. The user is responsible for verifying output spectral purity in this configuration.

2.1.1.1 Output Power

The TSG06D00EVM can provide up to 14dBm output power at low frequency (10MHz) and up to 0dBm at high frequency (6GHz) with a roughly linear dropoff over the full frequency range.

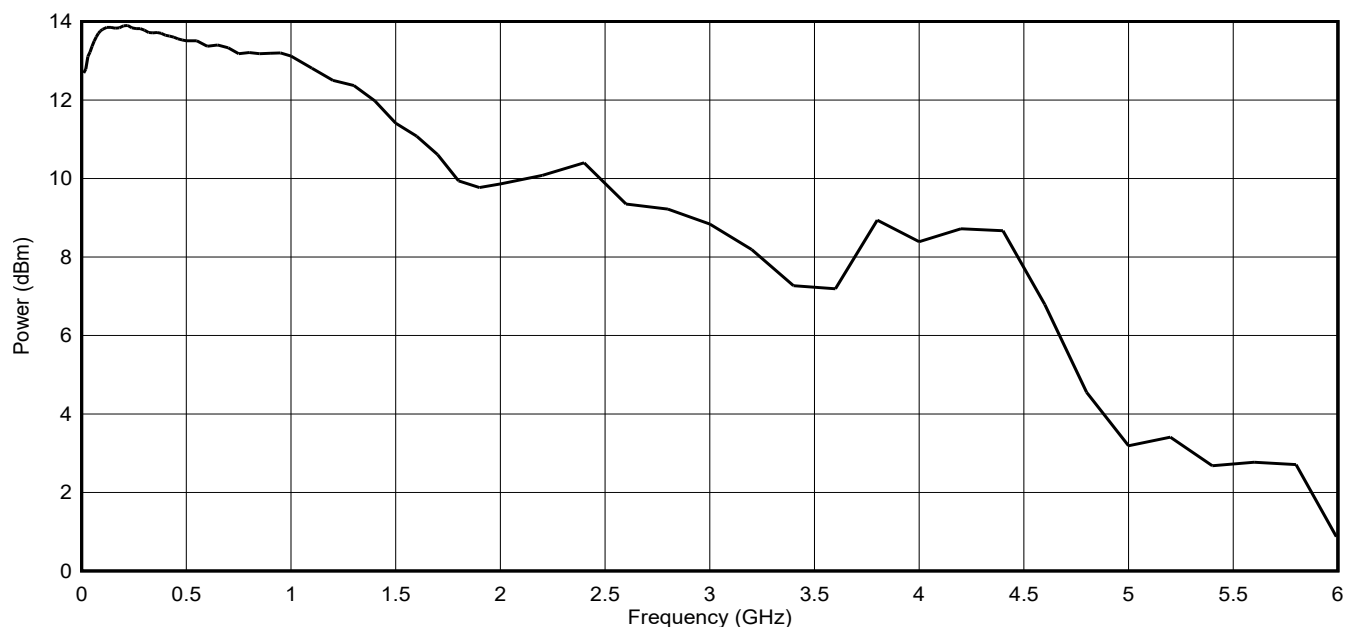


Figure 2-2. Output Power vs Output Frequency

2.1.2 Clocking

The board has on-board clocking using a 100MHz VCXO as a frequency reference to the LMK04828 jitter cleaner to condition the clock signal before being feed to the LMX2820 RF synthesizer to generate up to a 12GHz clock to the DDS39RF12 direct digital synthesizer.

An on-board 10MHz TCXO provides a low frequency clock for synchronization or an external 10MHz option is available. Both internal and external references are buffered and routed to a 10MHz output to provide a reference to another board or instrument.

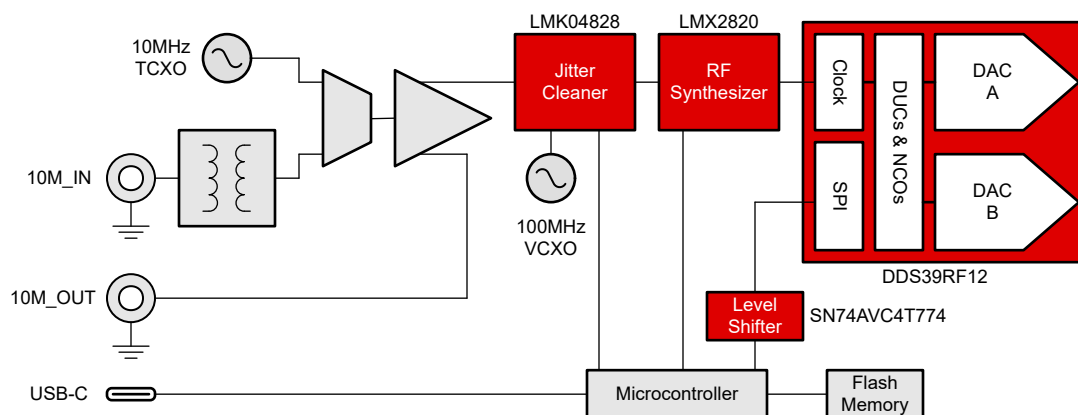


Figure 2-3. Clock Block Diagram

2.1.3 Power

The board runs off a 12V power supply and uses a selection of TI power components to provide the needed voltages to all of the components while minimizing introducing additional noise and distortion to the sensitive RF signal path.

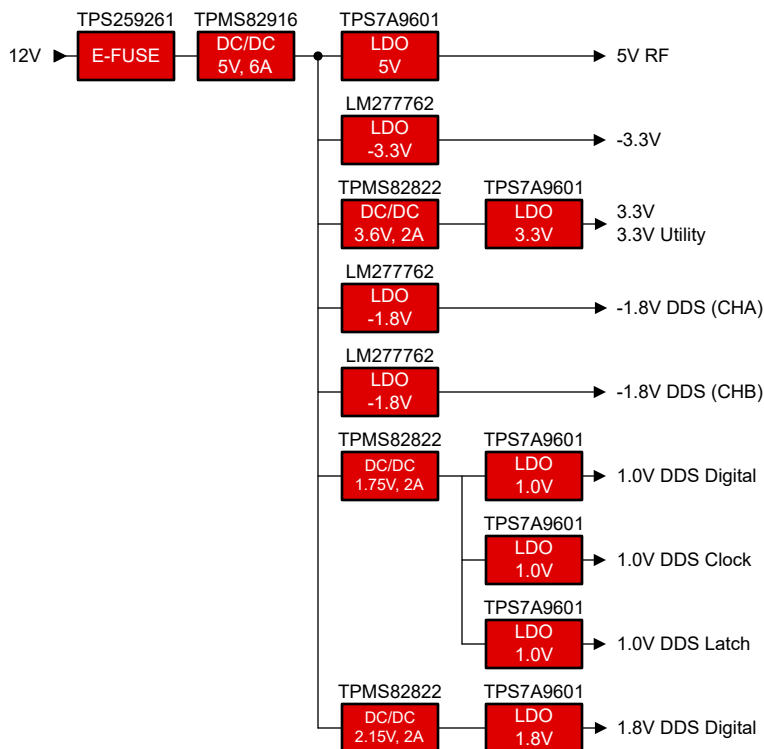


Figure 2-4. Power Block Diagram

2.2 Required Equipment

The following equipment is not included with the EVM kit but is required for proper usage.

- 12V power supply capable of supplying 1.5A. The EVM does include a DC barrel plug adapter (with 5.5mm OD / 2.1mm ID, positive center).
- Band-pass filters for the RF outputs. TI recommends using filters with a narrow pass band (within 5% to 15% of the desired bandwidth) and minimal insertion loss.
- SMA cables for the RF outputs and 10MHz reference input/output (if used for synchronization).
- Desk fan to cool off the EVM. This EVM runs very hot and needs an external cooling system for proper usage. If the EVM is not properly cooled and the device experiences overheating, the EVM shuts itself down until it cools down.

2.3 Hardware Setup

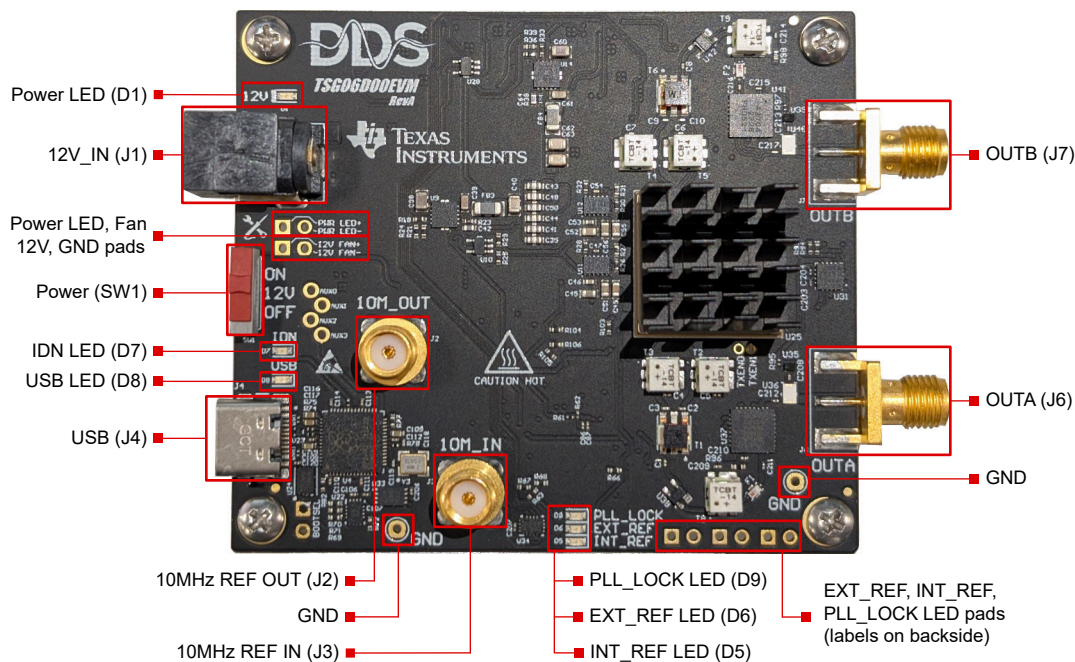


Figure 2-5. Board Connections, Indicators, and Controls

- Connect 12V DC power (J1)
 - Connect a 12V DC, 1.5A minimum supply to J1 (barrel jack, 5.5mm OD / 2.1mm ID, positive center).
 - Leave SW1 in the OFF position until all cables are connected.
- Connect RF outputs (OUT A, OUT B)
 - Connect 50Ω SMA cables from OUTA (J6) or OUTB (J7) to the instruments or device-under-test (DUT).
 - Install 50Ω SMA terminators on any port that is not used.
- Reference clock (optional)
 - Internal reference is selected by default; no cable needed.
 - For external 10MHz: connect a clean source to 10M_IN (J3), then send ROSC:SOUR EXT after power-on. The on-board TCXO is powered off automatically in external mode.
- Connect USB for SCPI (J4)
 - Connect a USB 2.0 cable from J4 (USB-C) to the host PC.
 - This carries SCPI commands only. The board does not draw power from USB.
- Enable board power (SW1)
 - Toggle SW1 to the ON position. Confirm the 12V power indicator LED illuminates.

2.4 LED Indicators

The LEDs in the following table are available to quickly check the status of the board. Additional pads are designed on the PCB to solder external LEDs for use in a mounted application or enclosure.

Table 2-2. LED Indicators

Name	Designator	Function	Description
12V	D1	12V power indicator	Illuminates when 12V power is present and SW1 is ON. If this LED is off, the board has no power.
PWR LED+ PWR LED-	Pad	Power LED (external)	Pads to solder an external LED to indicate 12V power if mounted in an enclosure.

Table 2-2. LED Indicators (continued)

Name	Designator	Function	Description
INT_REF	D5	Internal reference lock	Indicates LMX2820 PLL lock status when the instrument is in internal reference mode. Steady = locked and operating normally.
EXT_REF	D6	External reference lock	Indicates LMX2820 PLL lock status when the instrument is in external reference mode. Steady = locked to the external 10MHz source.
IDN	D7	Identification	Illuminates when a *IDN? query is received. Useful for identifying which board on a bench is responding to USB commands.
USB	D8	USB	USB 5V power indicator
PLL_LOCK	D9	PLL lock indicator	Indicates LMX2820 PLL lock status. Steady = locked and operating normally.
PLL_LOCK LED+ PLL_LOCK LED-	Pad	PLL lock indicator (external)	Pads to solder an external LED for PLL_LOCK if mounted in an enclosure.
INT_REF LED+ INT_REF LED-	Pad	Internal reference lock (external)	Pads to solder an external LED for INT_REF if mounted in an enclosure.
EXT_REF LED+ EXT_REF LED-	Pad	External reference lock (external)	Pads to solder an external LED for EXT_REF if mounted in an enclosure.

2.5 Inputs, Outputs, and Controls

The inputs, outputs, and controls in [Table 2-3](#) are available on the board.

Table 2-3. Inputs, Outputs, and Controls

Name	Designator	Connector	Direction	Description
12V_IN	J1	Barrel jack	Input	12V DC board power. Positive center, 1.5A minimum. Power to the board is switched by SW1 after connecting the supply.
Fan (External)	12V FAN+ 12V FAN-	Pad	Output	12V DC and GND connectors to solder an external fan if mounted in an enclosure.
USB	J4	USB 2.0 Type-C	Control	SCPI command interface only. Enumerates as USB-TMC (VID 0x2E8A, PID 0x1107). Does not supply power to the board.
10M_OUT	J2	SMA female	Output	10MHz reference output. Buffered reference signal available for daisy-chaining or external instruments.
10M_IN	J3	SMA female	Input	External 10MHz reference input.
OUTA	J6	SMA female	Output	Channel A main RF output. Terminate if unused.
OUTB	J7	SMA female	Output	Channel B main RF output. Identical signal chain to Channel A. Terminate if unused.

CAUTION

An unterminated SMA output with power enabled is bad practice at high RF power levels - it can stress the output stage and radiate unintentionally. Fit a 50Ω SMA termination on any unused output or send the OUTP 0 command on that channel.

2.6 USB Interface

The TSG06D00EVM enumerates as a USB Test and Measurement Class (USBTMC) device. Any VISA-compatible software can detect the USBTMC automatically.

The following Python example reads back the vendor ID and product ID over USB.

```
# pip install pyvisa pyvisa-py
import pyvisa
```

```
import time

rm = pyvisa.ResourceManager()
# Filter by TI USB VID 0x2E8A, PID 0x1107
matches = [r for r in rm.list_resources() if '2E8A' in r]
if not matches:
    raise RuntimeError('TSG06D00EVM not found - check 12V power and USB cable')
sg = rm.open_resource(matches[0])
sg.timeout = 5000

print(sg.query('*IDN?'))
Texas\sInstruments,TSG06D00EVM,3xvhzkw5942P4x73,v0.9.2
```

Table 2-4. USB Parameters

Parameter	Value	Description
USB VID	0x2E8A	Vendor ID - Texas Instruments
USB PID	0x1107	Product ID - Texas Instruments USB-TMC SCPI interface
Device class	USB-TMC	USBTMC 488.2
Recommended timeout	5000ms	Calibration sweeps can take several seconds
Terminator	\n	Newline-terminated responses

3 Software

3.1 Required Software

The hardware can be controlled using the provided GUI or directly controlled through SCPI commands. Python is used as an example for scripted control. Download and install the latest GUI software through the TSG06D00EVM tool page on TI.com.

- [TSG06D00EVM-GUI](#)
- [Python](#)

3.2 GUI Installation

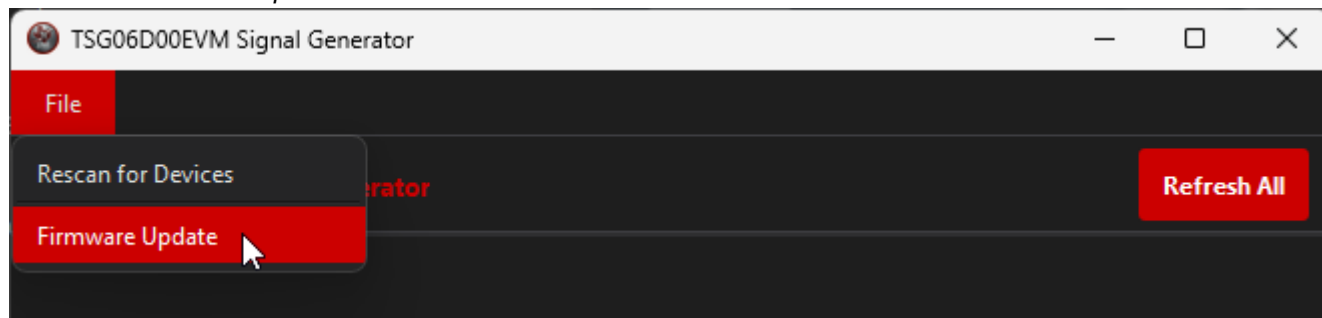
1. Download and install the latest GUI software.

Note

It is always recommended to have the newest firmware for this device. The latest version of the GUI can found on [ti.com](https://www.ti.com).

To update the firmware on a GUI already installed:

1. Select *File*.
2. Select *Firmware Update*.



3. Select *Board & Latest Firmware*.
4. Select *Update*.

4 Implementation Results

4.1 Evaluation Setup

1. Connect the hardware as specified in [Section 2.3](#).
2. Start the GUI software and the software auto-detects the connected hardware.
3. Use the GUI to control the output state, frequency, phase, and amplitude of the RF outputs, as well as whether to use the on-board or an external reference.
 - a. A command line interface is available to use the SCPI commands specified in the technical reference manual for advanced control of the hardware.

4.2 SCPI Control Example

Run these commands using a SCPI-compatible terminal after first power-on to verify the board is operational before going further. More commands are available in the technical reference manual.

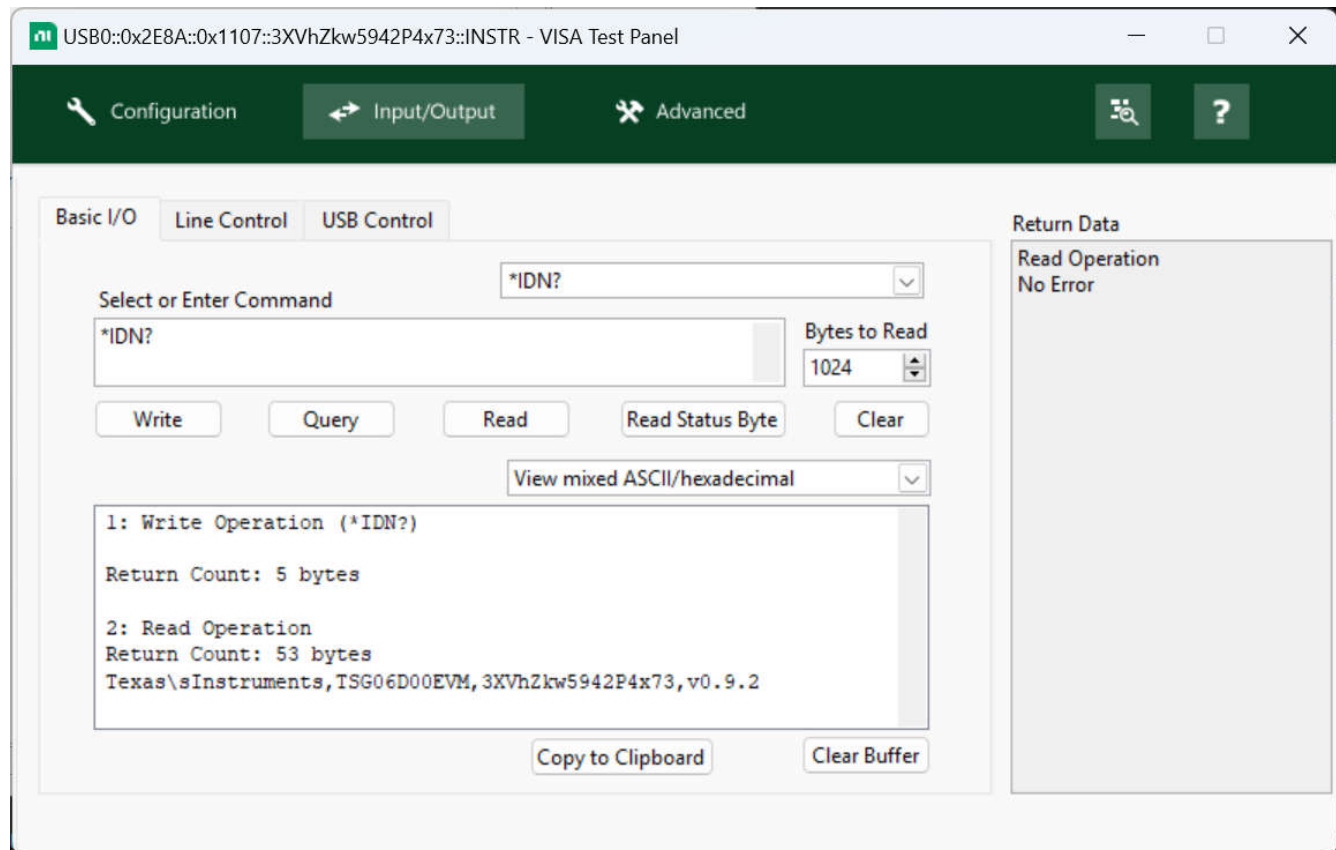


Figure 4-1. SCPI-Compatible Terminal

```

# 1. Identify the instrument
*IDN?
Texas\sinstruments,TSG06D00EVM,3XVhZkw5942P4x73,v0.9.2
# 2. Run built-in self-test
*TST?
PASS
# 3. Check error queue is empty
SYST:ERR:COUNT?
0
# 4. Select Channel A and set to 1GHz, -5dBm, 0deg phase
INST:NSEL 1
FREQ 1e9
POW -5.0
PHAS 0.0
# 5. Enable output and measure

```

```
OUTP 1
POW?
-5.23
# 6. Disable output when done
OUTP 0
```

Note

*TST? returns PASS and POW? returns a plausible dBm reading. If power reads as unexpected, run output calibration first.

4.3 Python Scripting Example

Use the following example python script to directly control the board without the need for the GUI. More commands are available in the technical reference manual.

```
# pip install pyvisa pyvisa-py
import pyvisa
import time

rm = pyvisa.ResourceManager()
matches = [r for r in rm.list_resources() if '2E8A' in r]
if not matches:
    raise RuntimeError('TSG06D00EVM not found - check 12V power and USB cable')
sg = rm.open_resource(matches[0])
sg.timeout = 5000
print(sg.query('*IDN?'))
assert sg.query('*TST?').strip() == 'PASS', 'Self-test failed'
sg.write('SYST:ERR:CLEAR')

# Set 10MHz Reference to Internal
sg.write('ROSC:SOUR INT')
print(f"Reference Mode: {sg.query('ROSC:SOUR?')}")

# Configure CH A - 1GHz, -5dBm, 0° Phase
sg.write('INST:NSEL 1')
sg.write('FREQ 1e9')
sg.write('POW -5')
sg.write('PHAS 0.0')
sg.write('OUTP 1')
time.sleep(0.1)

# Readback State of CH A
freq_a = float(sg.query('FREQ?'))
power_a = float(sg.query('POW?'))
phase_a = float(sg.query('PHAS?'))
output_a = float(sg.query('OUTP?'))
print(f"Channel A:")
print(f" Frequency: {freq_a/1e9:.4f} GHz")
print(f" Power: {power_a:.2f} dBm")
print(f" Phase: {phase_a} deg")
print(f" Output: {'ON' if output_a else 'OFF'}")

# Configure CH B - 2.4GHz, -10dBm, +90° Phase
sg.write('INST:NSEL 2')
sg.write('FREQ 2.4e9')
sg.write('POW -10')
sg.write('PHAS 90.0')
sg.write('OUTP 1')
time.sleep(0.1)

# Readback State of CH B
freq_b = float(sg.query('FREQ?'))
power_b = float(sg.query('POW?'))
phase_b = float(sg.query('PHAS?'))
output_b = float(sg.query('OUTP?'))
print(f"Channel B:")
print(f" Frequency: {freq_b/1e9:.4f} GHz")
print(f" Power: {power_b:.2f} dBm")
print(f" Phase: {phase_b} deg")
print(f" Output: {'ON' if output_b else 'OFF'}")

# Check for Errors
if int(sg.query('SYST:ERR:COUNT?')) > 0:
    print('Error:', sg.query('SYST:ERR:NEXT?'))

# Uncomment lines below to disable both channels when done
# sg.write('INST:NSEL 1')
# sg.write('OUTP 0')
# sg.write('INST:NSEL 2')
# sg.write('OUTP 0')
# sg.close()
```

4.4 Power Combining

Both channels can be coherently combined to achieve approximately 6dB higher output power at one frequency. This requires that both channels be in the same operating range.

1. Connect OUT A and OUT B to the two input ports of a Wilkinson combiner, hybrid coupler, or equivalent 50Ω combiner. Use matched cable lengths to both ports. Connect a spectrum analyzer or power meter to the combiner output.
2. Turn both channels to the same frequency and enable both outputs.
3. Set Channel A phase to 0 degrees: INST:NSEL 1 then PHAS 0. Channel A is the reference.
4. Select Channel B (INST:NSEL 2) and sweep its phase while monitoring the combiner output power. The combined power peaks when the two signals arrive at the combiner in phase. Expect approximately 6dB above one channel. If the sweep too far, the signals begin to cancel and the power drops.

SCPI Commands:

```
# Channel A - reference, phase = 0
INST:NSEL 1
FREQ 1e9
POW 5.0
PHAS 0
OUTP 1
# Channel B - sweep phase until combined power peaks
INST:NSEL 2
FREQ 1e9
POW 5.0
OUTP 1
PHAS 0    # adjust until POW? peaks
```

Use POW? on Channel A to monitor the onboard coupled detector while adjusting phase on Channel B. For best accuracy, use an external power meter on the combiner output, as the onboard detector only sees one channel at a time.

5 Hardware Design Files

Hardware design files are available from the [TSG06D00EVM](#) tool page on TI.com.

5.1 Schematics

Schematics are available from the [TSG06D00EVM](#) tool page on TI.com.

5.2 PCB Layouts

PCB layout files are available from the [TSG06D00EVM](#) tool page on TI.com.

5.3 Bill of Materials (BOM)

Bill of materials is available from the [TSG06D00EVM](#) tool page on TI.com.

6 Additional Information

Trademarks

USB Type-C® is a registered trademark of USB Implementers Forum.
All trademarks are the property of their respective owners.

7 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision * (June 2026) to Revision A (September 2026)	Page
• Added bullet point for desk fan to cool off the EVM in <i>Required Equipment</i> section.....	5
• Added content and figure to <i>GUI Installation</i> section.....	9

STANDARD TERMS FOR EVALUATION MODULES

1. *Delivery:* TI delivers TI evaluation boards, kits, or modules, including any accompanying demonstration software, components, and/or documentation which may be provided together or separately (collectively, an "EVM" or "EVMs") to the User ("User") in accordance with the terms set forth herein. User's acceptance of the EVM is expressly subject to the following terms.
 - 1.1 EVMs are intended solely for product or software developers for use in a research and development setting to facilitate feasibility evaluation, experimentation, or scientific analysis of TI semiconductors products. EVMs have no direct function and are not finished products. EVMs shall not be directly or indirectly assembled as a part or subassembly in any finished product. For clarification, any software or software tools provided with the EVM ("Software") shall not be subject to the terms and conditions set forth herein but rather shall be subject to the applicable terms that accompany such Software
 - 1.2 EVMs are not intended for consumer or household use. EVMs may not be sold, sublicensed, leased, rented, loaned, assigned, or otherwise distributed for commercial purposes by Users, in whole or in part, or used in any finished product or production system.
2. *Limited Warranty and Related Remedies/Disclaimers:*
 - 2.1 These terms do not apply to Software. The warranty, if any, for Software is covered in the applicable Software License Agreement.
 - 2.2 TI warrants that the TI EVM will conform to TI's published specifications for ninety (90) days after the date TI delivers such EVM to User. Notwithstanding the foregoing, TI shall not be liable for a nonconforming EVM if (a) the nonconformity was caused by neglect, misuse or mistreatment by an entity other than TI, including improper installation or testing, or for any EVMs that have been altered or modified in any way by an entity other than TI, (b) the nonconformity resulted from User's design, specifications or instructions for such EVMs or improper system design, or (c) User has not paid on time. Testing and other quality control techniques are used to the extent TI deems necessary. TI does not test all parameters of each EVM. User's claims against TI under this Section 2 are void if User fails to notify TI of any apparent defects in the EVMs within ten (10) business days after delivery, or of any hidden defects with ten (10) business days after the defect has been detected.
 - 2.3 TI's sole liability shall be at its option to repair or replace EVMs that fail to conform to the warranty set forth above, or credit User's account for such EVM. TI's liability under this warranty shall be limited to EVMs that are returned during the warranty period to the address designated by TI and that are determined by TI not to conform to such warranty. If TI elects to repair or replace such EVM, TI shall have a reasonable time to repair such EVM or provide replacements. Repaired EVMs shall be warranted for the remainder of the original warranty period. Replaced EVMs shall be warranted for a new full ninety (90) day warranty period.

WARNING

Evaluation Kits are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems.

User shall operate the Evaluation Kit within TI's recommended guidelines and any applicable legal or environmental requirements as well as reasonable and customary safeguards. Failure to set up and/or operate the Evaluation Kit within TI's recommended guidelines may result in personal injury or death or property damage. Proper set up entails following TI's instructions for electrical ratings of interface circuits such as input, output and electrical loads.

NOTE:

EXPOSURE TO ELECTROSTATIC DISCHARGE (ESD) MAY CAUSE DEGRADATION OR FAILURE OF THE EVALUATION KIT; TI RECOMMENDS STORAGE OF THE EVALUATION KIT IN A PROTECTIVE ESD BAG.

3 Regulatory Notices:

3.1 United States

3.1.1 Notice applicable to EVMs not FCC-Approved:

FCC NOTICE: This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

3.1.2 For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:

CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

3.2 Canada

3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

3.3 Japan

3.3.1 *Notice for EVMs delivered in Japan:* Please see http://www.tij.co.jp/sds/ti_ja/general/eStore/notice_01.page 日本国内に輸入される評価用キット、ボードについては、次のところをご覧ください。

<https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-delivered-in-japan.html>

3.3.2 *Notice for Users of EVMs Considered "Radio Frequency Products" in Japan:* EVMs entering Japan may not be certified by TI as conforming to Technical Regulations of Radio Law of Japan.

If User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required to follow the instructions set forth by Radio Law of Japan, which includes, but is not limited to, the instructions below with respect to EVMs (which for the avoidance of doubt are stated strictly for convenience and should be verified by User):

1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

【無線電波を送信する製品の開発キットをお使いになる際の注意事項】 開発キットの中には技術基準適合証明を受けていないものがあります。技術適合証明を受けていないもののご使用に際しては、電波法遵守のため、以下のいずれかの措置を取っていただく必要がありますのでご注意ください。

1. 電波法施行規則第6条第1項第1号に基づく平成18年3月28日総務省告示第173号で定められた電波暗室等の試験設備でご使用いただく。
2. 実験局の免許を取得後ご使用いただく。
3. 技術基準適合証明を取得後ご使用いただく。

なお、本製品は、上記の「ご使用にあたっての注意」を譲渡先、移転先に通知しない限り、譲渡、移転できないものとします。

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東京都新宿区西新宿 6 丁目 2 4 番 1 号
西新宿三井ビル

3.3.3 *Notice for EVMs for Power Line Communication:* Please see http://www.tij.co.jp/sds/ti_ja/general/eStore/notice_02.page

電力線搬送波通信についての開発キットをお使いになる際の注意事項については、次のところをご覧ください。<https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-for-power-line-communication.html>

3.4 European Union

3.4.1 *For EVMs subject to EU Directive 2014/30/EU (Electromagnetic Compatibility Directive):*

This is a class A product intended for use in environments other than domestic environments that are connected to a low-voltage power-supply network that supplies buildings used for domestic purposes. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

4 EVM Use Restrictions and Warnings:

4.1 EVMS ARE NOT FOR USE IN FUNCTIONAL SAFETY AND/OR SAFETY CRITICAL EVALUATIONS, INCLUDING BUT NOT LIMITED TO EVALUATIONS OF LIFE SUPPORT APPLICATIONS.

4.2 User must read and apply the user guide and other available documentation provided by TI regarding the EVM prior to handling or using the EVM, including without limitation any warning or restriction notices. The notices contain important safety information related to, for example, temperatures and voltages.

4.3 Safety-Related Warnings and Restrictions:

4.3.1 User shall operate the EVM within TI's recommended specifications and environmental considerations stated in the user guide, other available documentation provided by TI, and any other applicable requirements and employ reasonable and customary safeguards. Exceeding the specified performance ratings and specifications (including but not limited to input and output voltage, current, power, and environmental ranges) for the EVM may cause personal injury or death, or property damage. If there are questions concerning performance ratings and specifications, User should contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may also result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM user guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative. During normal operation, even with the inputs and outputs kept within the specified allowable ranges, some circuit components may have elevated case temperatures. These components include but are not limited to linear regulators, switching transistors, pass transistors, current sense resistors, and heat sinks, which can be identified using the information in the associated documentation. When working with the EVM, please be aware that the EVM may become very warm.

4.3.2 EVMs are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems. User assumes all responsibility and liability for proper and safe handling and use of the EVM by User or its employees, affiliates, contractors or designees. User assumes all responsibility and liability to ensure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard. User assumes all responsibility and liability for any improper or unsafe handling or use of the EVM by User or its employees, affiliates, contractors or designees.

4.4 User assumes all responsibility and liability to determine whether the EVM is subject to any applicable international, federal, state, or local laws and regulations related to User's handling and use of the EVM and, if applicable, User assumes all responsibility and liability for compliance in all respects with such laws and regulations. User assumes all responsibility and liability for proper disposal and recycling of the EVM consistent with all applicable international, federal, state, and local requirements.

5. *Accuracy of Information:* To the extent TI provides information on the availability and function of EVMs, TI attempts to be as accurate as possible. However, TI does not warrant the accuracy of EVM descriptions, EVM availability or other information on its websites as accurate, complete, reliable, current, or error-free.

6. Disclaimers:

6.1 EXCEPT AS SET FORTH ABOVE, EVMS AND ANY MATERIALS PROVIDED WITH THE EVM (INCLUDING, BUT NOT LIMITED TO, REFERENCE DESIGNS AND THE DESIGN OF THE EVM ITSELF) ARE PROVIDED "AS IS" AND "WITH ALL FAULTS." TI DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, REGARDING SUCH ITEMS, INCLUDING BUT NOT LIMITED TO ANY EPIDEMIC FAILURE WARRANTY OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF ANY THIRD PARTY PATENTS, COPYRIGHTS, TRADE SECRETS OR OTHER INTELLECTUAL PROPERTY RIGHTS.

6.2 EXCEPT FOR THE LIMITED RIGHT TO USE THE EVM SET FORTH HEREIN, NOTHING IN THESE TERMS SHALL BE CONSTRUED AS GRANTING OR CONFERRING ANY RIGHTS BY LICENSE, PATENT, OR ANY OTHER INDUSTRIAL OR INTELLECTUAL PROPERTY RIGHT OF TI, ITS SUPPLIERS/LICENSORS OR ANY OTHER THIRD PARTY, TO USE THE EVM IN ANY FINISHED END-USER OR READY-TO-USE FINAL PRODUCT, OR FOR ANY INVENTION, DISCOVERY OR IMPROVEMENT, REGARDLESS OF WHEN MADE, CONCEIVED OR ACQUIRED.

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8. *Limitations on Damages and Liability:*

8.1 *General Limitations.* IN NO EVENT SHALL TI BE LIABLE FOR ANY SPECIAL, COLLATERAL, INDIRECT, PUNITIVE, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES IN CONNECTION WITH OR ARISING OUT OF THESE TERMS OR THE USE OF THE EVMS , REGARDLESS OF WHETHER TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. EXCLUDED DAMAGES INCLUDE, BUT ARE NOT LIMITED TO, COST OF REMOVAL OR REINSTALLATION, ANCILLARY COSTS TO THE PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES, RETESTING, OUTSIDE COMPUTER TIME, LABOR COSTS, LOSS OF GOODWILL, LOSS OF PROFITS, LOSS OF SAVINGS, LOSS OF USE, LOSS OF DATA, OR BUSINESS INTERRUPTION. NO CLAIM, SUIT OR ACTION SHALL BE BROUGHT AGAINST TI MORE THAN TWELVE (12) MONTHS AFTER THE EVENT THAT GAVE RISE TO THE CAUSE OF ACTION HAS OCCURRED.

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9. *Return Policy.* Except as otherwise provided, TI does not offer any refunds, returns, or exchanges. Furthermore, no return of EVM(s) will be accepted if the package has been opened and no return of the EVM(s) will be accepted if they are damaged or otherwise not in a resalable condition. If User feels it has been incorrectly charged for the EVM(s) it ordered or that delivery violates the applicable order, User should contact TI. All refunds will be made in full within thirty (30) working days from the return of the components(s), excluding any postage or packaging costs.
10. *Governing Law:* These terms and conditions shall be governed by and interpreted in accordance with the laws of the State of Texas, without reference to conflict-of-laws principles. User agrees that non-exclusive jurisdiction for any dispute arising out of or relating to these terms and conditions lies within courts located in the State of Texas and consents to venue in Dallas County, Texas. Notwithstanding the foregoing, any judgment may be enforced in any United States or foreign court, and TI may seek injunctive relief in any United States or foreign court.

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