

OPA2837DGK Evaluation Module

The OPA2837DGKEVM is an evaluation module for the dual-channel OPA837 amplifier in the DGK (VSSOP-8) package. This evaluation module is designed to quickly and easily demonstrate the functionality and versatility of the amplifier. The EVM is ready to connect to power, signal source, and test instruments through the use of onboard connectors. The EVM comes configured for easy connection with common 50- Ω laboratory equipment on its inputs and outputs. Each amplifier is configured for single-ended input with non-inverting signal gain of 1 V/V at the device output. The OPA2837DGKEVM has a total onboard load of 2 k Ω to each amplifier. The output resistor network converts the output to a 50- Ω impedance source. The evaluation module can be easily configured for other functions, gains, and single-ended or split-supply operation.

Contents

| | | |
|---|--|---|
| 1 | Features..... | 2 |
| 2 | EVM Specifications | 2 |
| 3 | Power Connections | 2 |
| | 3.1 Split-Supply Operation | 2 |
| | 3.2 Single-Supply Operation | 2 |
| 4 | Input and Output Connections | 2 |
| 5 | OPA2837DGKEVM Schematic, Layout, PCB 3D Render, and Bill of Materials..... | 3 |
| | 5.1 Schematic..... | 3 |
| | 5.2 OPA2837DGKEVM Layers | 4 |
| | 5.3 PCB 3D Render | 6 |
| | 5.4 Bill of Materials | 7 |

List of Figures

| | | |
|---|---------------------------------------|---|
| 1 | OPA2837DGKEVM Schematic | 3 |
| 2 | OPA2837DGKEVM Top Layer, Signal..... | 4 |
| 3 | OPA2837DGKEVM Layer 2 | 4 |
| 4 | OPA2837DGKEVM Layer 3 | 5 |
| 5 | OPA2837DGKEVM Bottom Layer..... | 5 |
| 6 | OPA2837DGKEVM 3D Render - Top..... | 6 |
| 7 | OPA2837DGKEVM 3D Render - Bottom..... | 6 |

List of Tables

| | | |
|---|--------------------------------------|---|
| 1 | EVM Specifications | 2 |
| 2 | OPA2837DGKEVM Bill of Materials..... | 7 |

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1 Features

This EVM supports the following features:

- Configured for split-supply operation and easily modified for single supply
- Default gain of 1-V/V configuration can be easily reconfigured for other gains
- Designed for easy connection to standard 50-Ω input and output impedance test equipment
- Simple interface to the inputs and outputs through the SMA connectors

2 EVM Specifications

Table 1 lists the EVM specifications.

Table 1. EVM Specifications

| Parameter | Value |
|---|---------------------------------|
| Single-supply voltage range ($V_- = \text{ground}$) | 2.7 to 5.4 V |
| $V_{S\pm}$ Split-supply voltage range | ± 1.35 to ± 2.7 V |
| $I_{O\pm}$ Supply current (no load) | 612 μA per amplifier |
| Input voltage | $V_{S\pm}, \text{Max}$ |
| I_{OUT} Linear output drive | ± 60 mA |

3 Power Connections

The OPA2837DGKEVM is equipped with test point connectors for easy connection of power. The positive supply input is red and is labeled V+. The negative supply input is yellow and is labeled V-. The ground is black and is labeled GND.

3.1 Split-Supply Operation

To operate as split supply, apply the positive-supply voltage to V+, negative-supply voltage to V-, and the ground reference from supply to GND.

3.2 Single-Supply Operation

To operate as single supply, connect both the V- connector and the GND connector to ground and apply the positive-supply voltage to V+. Inputs and outputs must be biased per the specifications listed in the data sheet for proper operation.

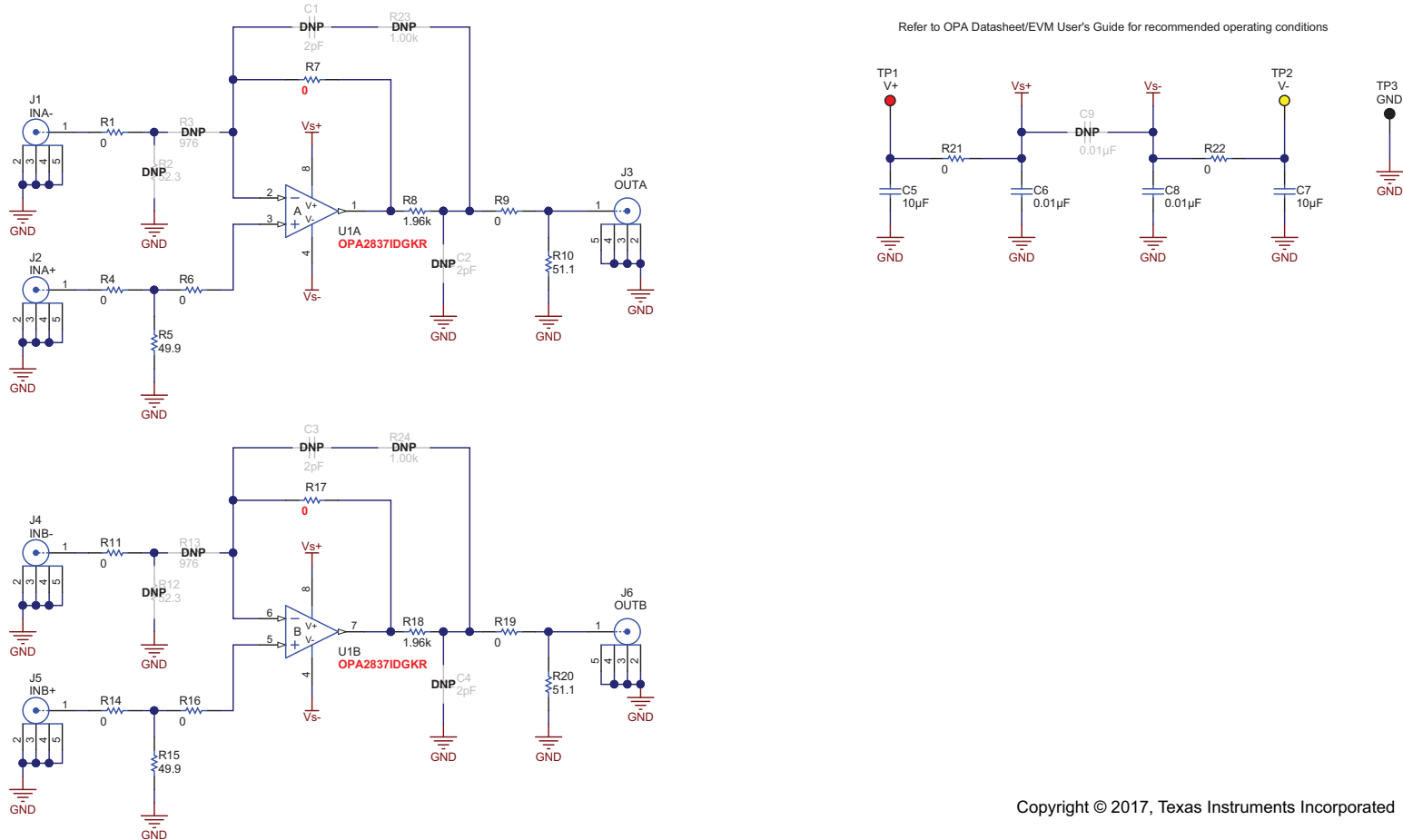
4 Input and Output Connections

The OPA2837DGKEVM is equipped with SMA connectors for easy connection to signal generators and analysis equipment. As shipped, the EVM is configured for a non-inverting gain of 1 V/V, split-supply operation, single-ended input and output with 50-Ω termination. For best results, signals must be routed to and from the EVM with cables having 50-Ω characteristic impedance. INA+ (J2) and INB+ (J5) must be used for single-ended input with 50-Ω source. OUTA (J3) and OUTB (J6) are the output connectors for amplifiers A and B, respectively. A resistor network (R8, R9, and R10 for amplifier A; R18, R19, and R20 for amplifier B) at the output of the amplifiers converts the output signal to 50-Ω single-ended source, and provides a 2-kΩ load to the amplifier when terminated with 50-Ω load at J3 and J6. A 50-Ω line-impedance match at OUTA (J3) and OUTB (J6) must be preserved. This results in an output measurement loss, and the overall attenuation is approximately 38 dB. See the applications section, schematics, and layouts in [OPA837 Low-Power, Precision, 105-MHz, Voltage-Feedback Op Amp](#), for details on how to reconfigure the EVM.

5 OPA2837DGKEVM Schematic, Layout, PCB 3D Render, and Bill of Materials

5.1 Schematic

Figure 1 illustrates the EVM schematic.



See the OPA2837 data sheet for recommended operating conditions.

Figure 1. OPA2837DGKEVM Schematic

5.2 OPA2837DGKEVM Layers

Figure 2 to Figure 5 show the OPA2837DGKEVM layers.

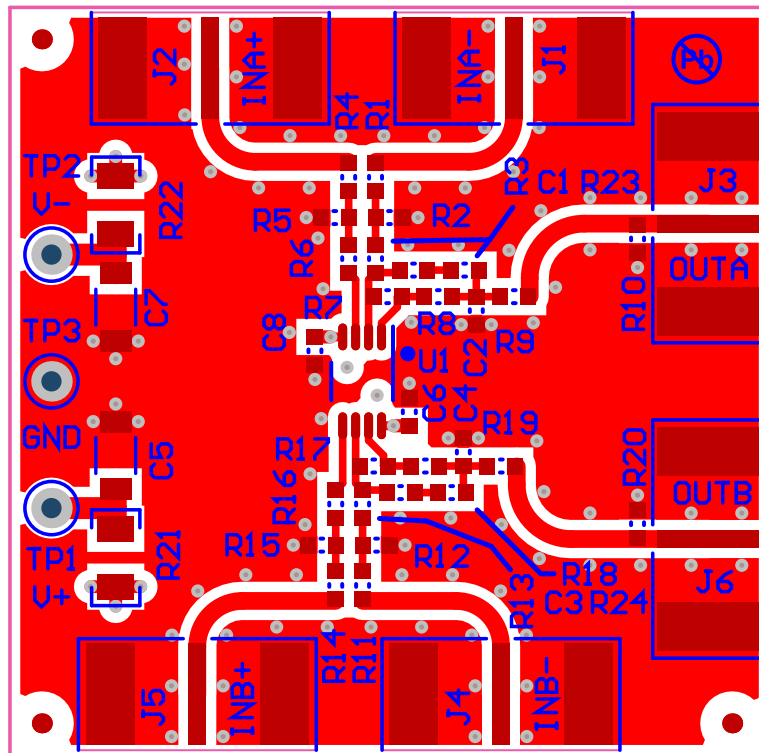


Figure 2. OPA2837DGKEVM Top Layer, Signal

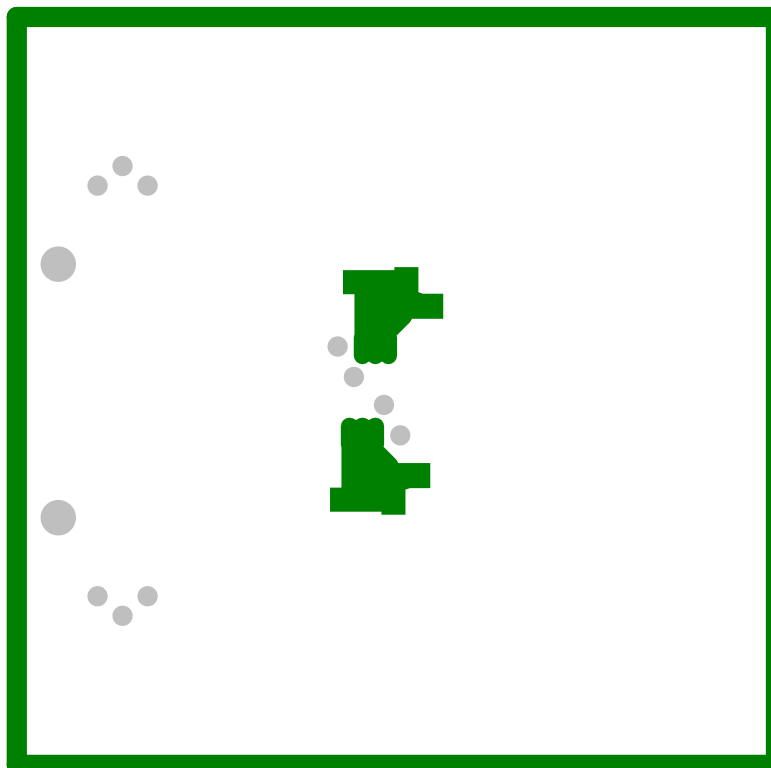


Figure 3. OPA2837DGKEVM Layer 2

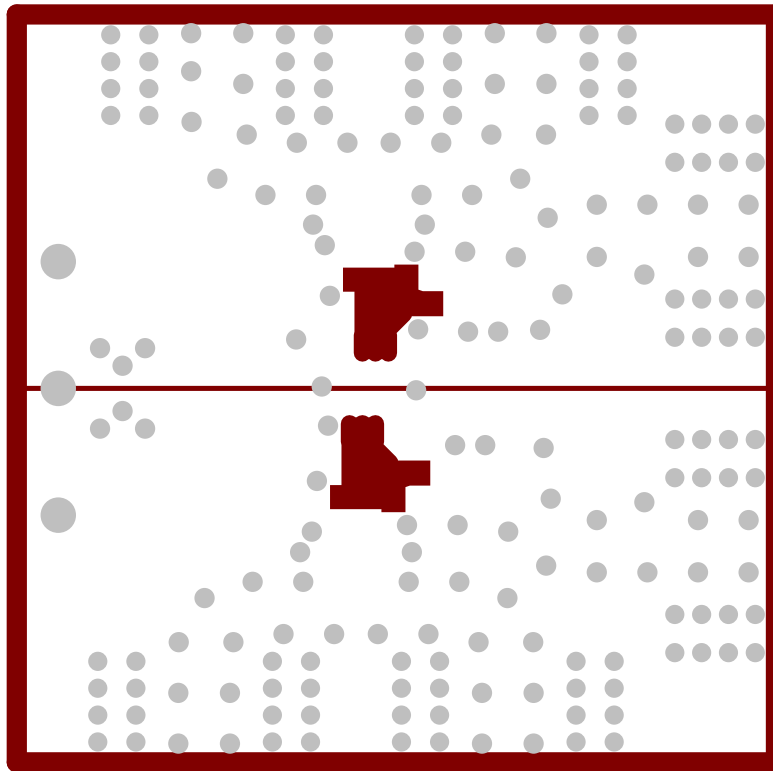


Figure 4. OPA2837DGKEVM Layer 3

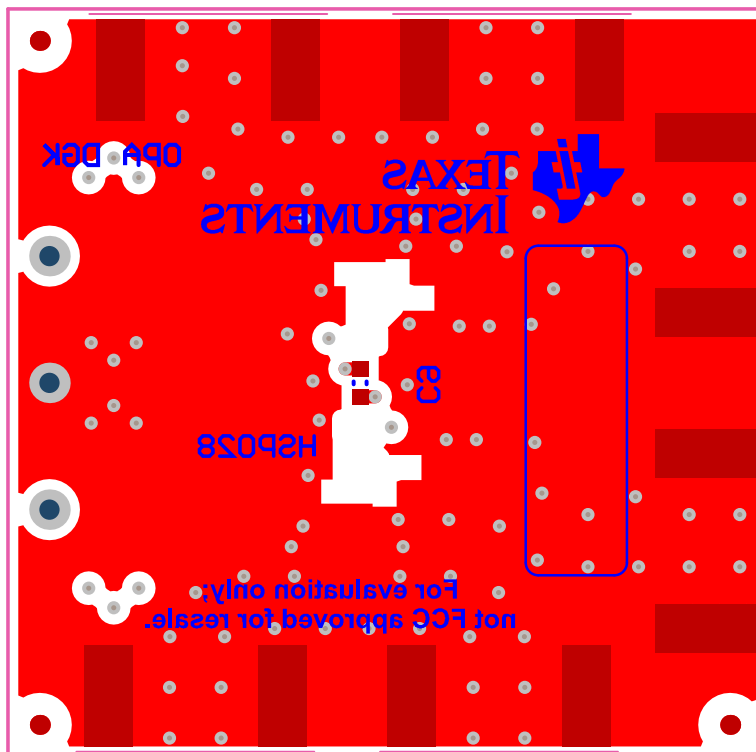


Figure 5. OPA2837DGKEVM Bottom Layer

5.3 PCB 3D Render

Figure 6 and Figure 7 show the 3D renders of the PCB.

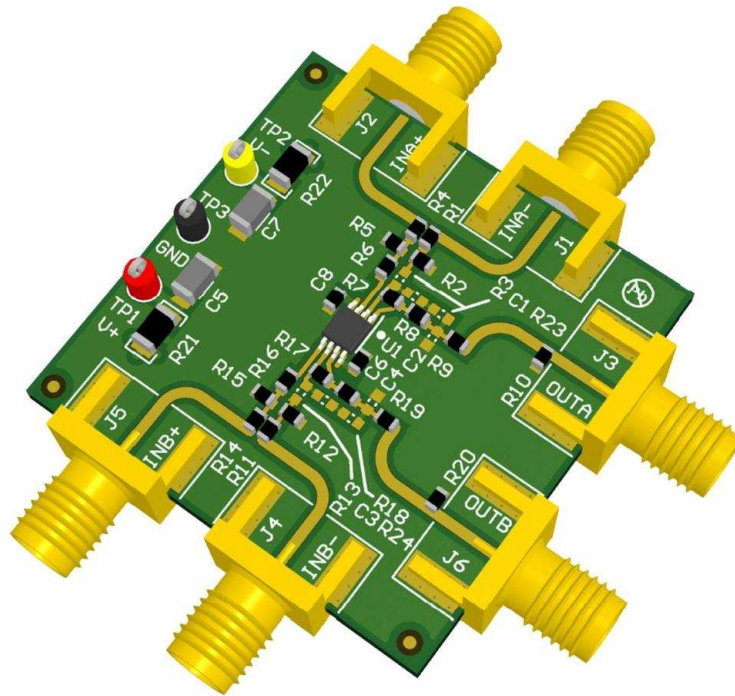


Figure 6. OPA2837DGKEVM 3D Render - Top

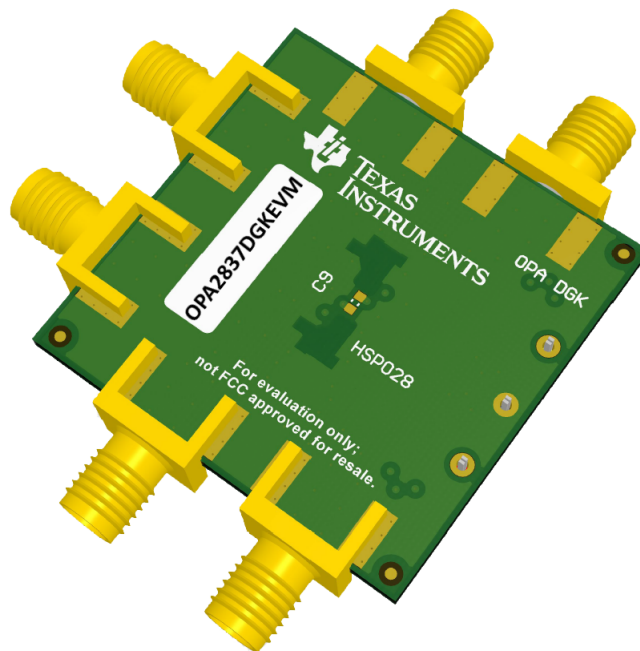


Figure 7. OPA2837DGKEVM 3D Render - Bottom

5.4 Bill of Materials

Table 2 lists the EVM bill of materials.

Table 2. OPA2837DGKEVM Bill of Materials

| Item | Part Reference | Quantity | Part Number | Manufacturer | Description |
|------|------------------------------------|----------|---------------------|-----------------------|---|
| 1 | C5, C7 | 2 | C3216X6S1V106K160AC | TDK | CAP, CERM, 10 μ F, 35 V, +/- 10%, X6S, 1206 |
| 2 | C6, C8 | 2 | 06031C103JAT2A | AVX | CAP, CERM, 0.01 μ F, 100 V, +/- 5%, X7R, 0603 |
| 3 | J1, J2, J3, J4, J5, J6 | 6 | 142-0701-851 | Emerson Network Power | Connector, End launch SMA, 50 ohm, SMT |
| 4 | R1, R4, R6, R9, R11, R14, R16, R19 | 8 | CRCW06030000Z0EA | Vishay-Dale | RES, 0, 5%, 0.1 W, 0603 |
| 5 | R2, R12 | 2 | RC0603FR-0752R3L | Yageo America | RES, 52.3, 1%, 0.1 W, 0603 |
| 6 | R5, R15 | 2 | RC0603FR-0749R9L | Yageo America | RES, 49.9, 1%, 0.1 W, 0603 |
| 7 | R7, R17 | 2 | RG1608P-4990-B-T5 | Susumu Co Ltd | RES, 499, 0.1%, 0.1 W, 0603 |
| 8 | R8, R18 | 2 | CRCW06031K96FKEA | Vishay-Dale | RES, 1.96 k, 1%, 0.1 W, 0603 |
| 9 | R10, R20 | 2 | CRCW060351R1FKEA | Vishay-Dale | RES, 51.1, 1%, 0.1 W, 0603 |
| 10 | R21, R22 | 2 | RC1206JR-070RL | Yageo America | RES, 0, 5%, 0.25 W, 1206 |
| 11 | TP1 | 1 | 5000 | Keystone | Test Point, Miniature, Red, TH |
| 12 | TP2 | 1 | 5004 | Keystone | Test Point, Miniature, Yellow, TH |
| 13 | TP3 | 1 | 5001 | Keystone | Test Point, Miniature, Black, TH |
| 14 | U1 | 1 | OPA2837IDGKR | Texas Instruments | Low Power, Precision, 105 MHz, dual-channel Voltage-Feedback Op Amp |

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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.

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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 instruction manual, 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.

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- 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

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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.

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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.

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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.

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