LP5912DRV EVM User Guide

1 Introduction

The Texas Instruments LP5912DRV EVM evaluation module (EVM) helps designers evaluate the operation and performance of the LP5912 LDO voltage regulator. The LP5912DRV EVM contains one LP5912 LDO voltage regulator in the WSON (DRV) package (see Table 1).

Table 1. Device Information

EVM ORDERABLE NUMBER	V_{OUT}	PART NAME	PACKAGE
LP5912DRV18EVM	1.8 V	LP5912-1.8DRVT	6-pin WSON / DRV
LP5912DRV33EVM	3.3 V	LP5912-3.3DRVT	

2 Setup

This section describes the jumpers and connectors on the EVM, as well and how to properly connect, set up and use the LP5912DRV EVM.

The device has been designed to work with 1-µF input and output ceramic capacitors down to 0603 component size.

2.1 Input/Output Connector Descriptions

VIN and **GNDIN** are the connection terminals for the input supply. The VIN terminal is the positive connection, and the GNDIN terminal is the negative (that is, ground) connection.

VOUT and **GNDOUT** are the connection terminals for the output load. The VOUT terminal is the positive connection, and the GNDOUT terminal is the negative (that is, ground) connection.

The **PG** test terminal is the connection used to monitor the status of the LP5912 Power Good) (PG) pin. The PG pin is an open drain connection which requires pull-up to some outside voltage, either V_{IN} or V_{OUT}, through a current limiting resistor. When the PG test terminal is a logic 'high' the output voltage is 'good'. When the PG test terminal is a logic 'low', the output voltage is 'not good'.

OUT_PG_IN is a 3-pin terminal strip used to select the PG (Power Good) pull-up bias source. The placement of a shunt allows either the input supply (VIN) or the LP5912 regulated output voltage (VOUT) to be used.

When the shunt is across the OUT_PG terminal pins the PG pin is connected through a 10-kΩ pull-up resistor to VOUT. When the shunt is across the PG_IN terminal pins the PG pin is connected through a 10-kΩ pull-up resistor to VIN.

The default, and recommended, shunt position is across the OUT_PG terminal pins to use VOUT for the pull-up bias.

PG pin pull-up to VOUT (preferred)

PG pin pull-up to VIN

Figure 1. Power Good (PG) Pullup Jumper Settings

GND_EN_IN is a 3-pin terminal strip used to enable, or disable, the LP5912.

When the shunt is across the EN_IN terminal pins the Enable (EN) pin is connected directly to VIN. The LP5912 will be enabled when VIN is applied. When the shunt is across the IN_GND terminal pins the Enable (EN) pin is connected directly to GND. The LP5912 will be disabled.

The shunt must be in place, or the EN terminal pin must be driven by an off board power supply, otherwise the LP5912 EN pin is floating, and the EN status may be undefined. The default, and recommended, shunt position is across the EN_IN terminal pins (enabled). When driving the EN terminal with an off-board supply or signal generator, the applied voltage must be kept between 0 V and 5.5 V.

EN pin to GND (Output disabled) *EN pin to VIN (Output enabled)*

Figure 2. EN Jumper Settings

2.2 Setup

The recommended operating input voltage range for the LP5912DRV EVM is V_{OUT} + 0.5 V (minimum) to 6.5 V (maximum).

A load should be applied between the VOUT terminal and the GNDOUT terminal for proper operation. Load current should be maintained between 1 mA and 500 mA.

A digital voltmeter can be connected to the PG test terminal to monitor the PG status.

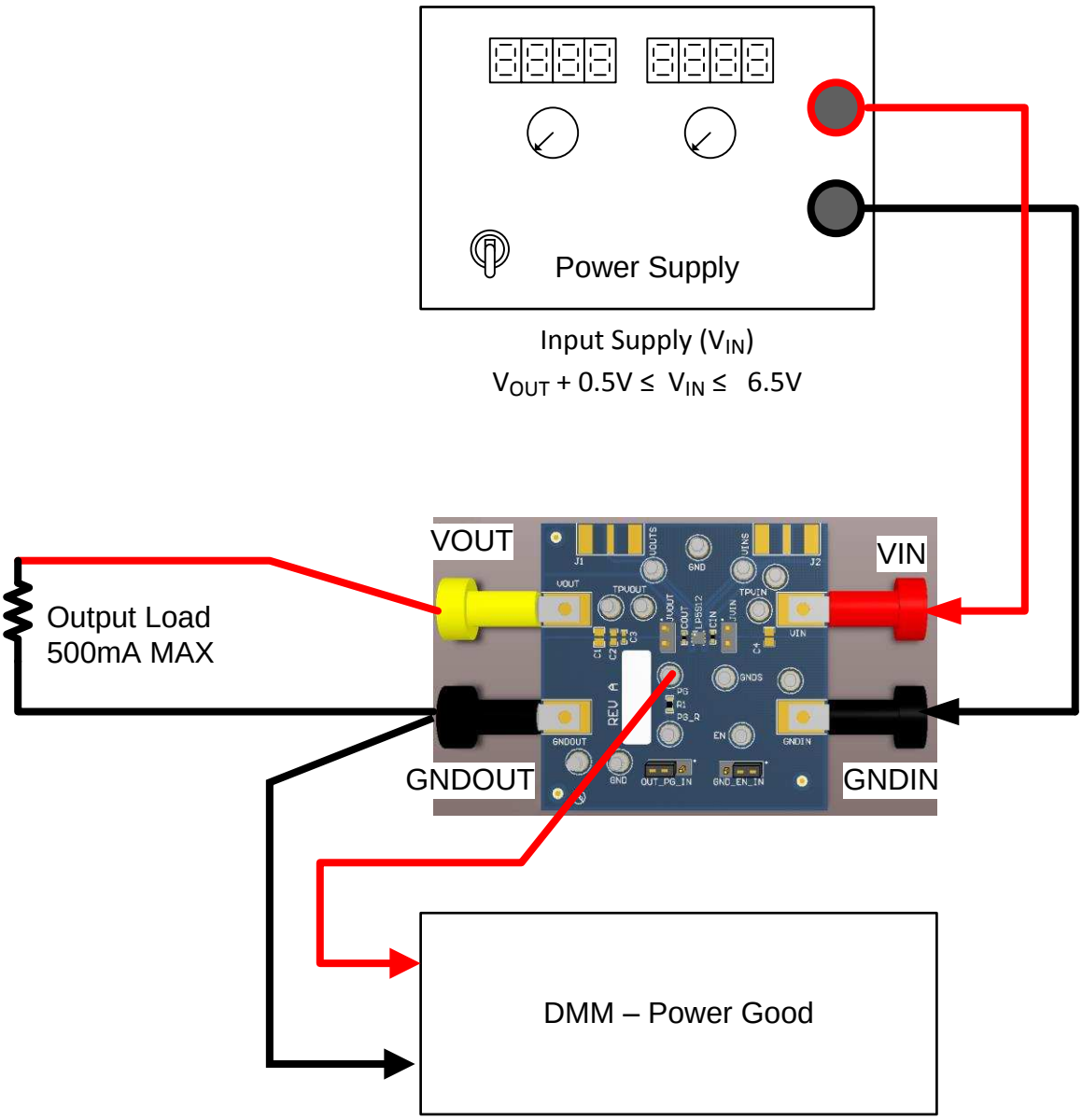


Figure 3. LP5912DRV EVM Setup

2.3 Operation

For proper operation of the LP5912DRV EVM, the two jumper terminals should be properly configured. The recommended jumper settings are:

Figure 4. Jumper Settings

OUT_PG_IN shunt across the OUT_PG pins.

GND_EN_IN shunt across the EN_IN pins.

In this configuration, the device will power up when power is applied at the VIN terminal, and VOUT will be used for the PG pin pull-up source.

2.4 Options

The LP5912DRV EVM has some assorted unpopulated footprints that some users may find useful:

- Footprint for and optional input capacitor at C4 (0805)
- Footprints for optional output capacitors at C1 (0603), C2 (0603), and C3 (0805)
- Footprints for optional SMA connectors (Emerson 142-0701-851, or eqivalent) at VIN (J2) and VOUT (J1) for noise or PSRR testing.

3 Board Layout

Figure 5 through Figure 10 show the board layout for the LP5912DRV EVM PCB. The EVM offers resistors, capacitors, and 3-pin terminals, to program the Enable pin status and to select the PG pin pull-up source.

The LP5912 will dissipate power. The WSON DRV 6-pin package offers an exposed thermal pad to enhance thermal performance. The exposed thermal pad must be soldered to the copper landing on the PCB for optimal thermal performance. The PCB provides 1 oz. (0.0014 inch) copper planes on all four layers to dissipate heat.

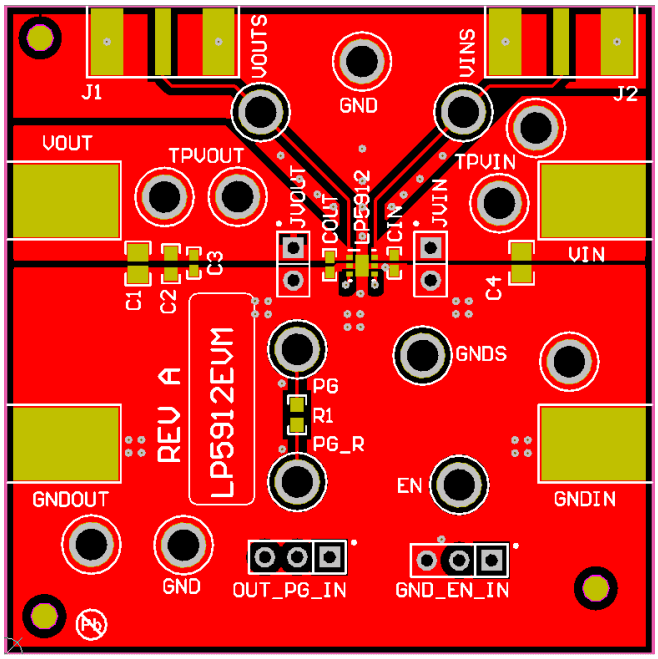


Figure 5. Top Assembly Layer and Silk-Screen

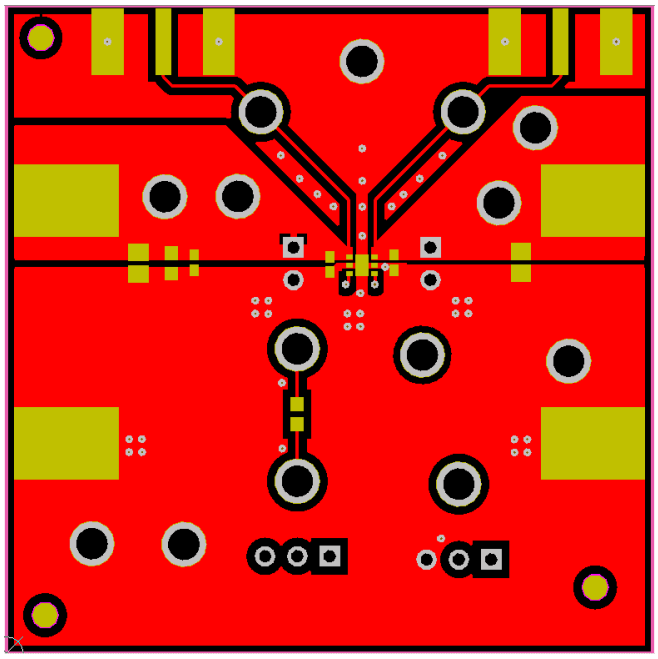


Figure 6. Top-Layer Routing

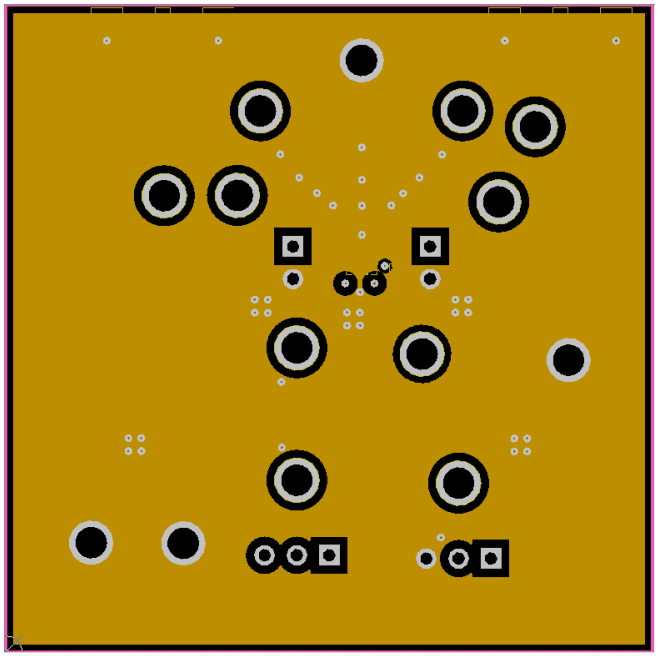


Figure 7. Layer 2: GND Plane

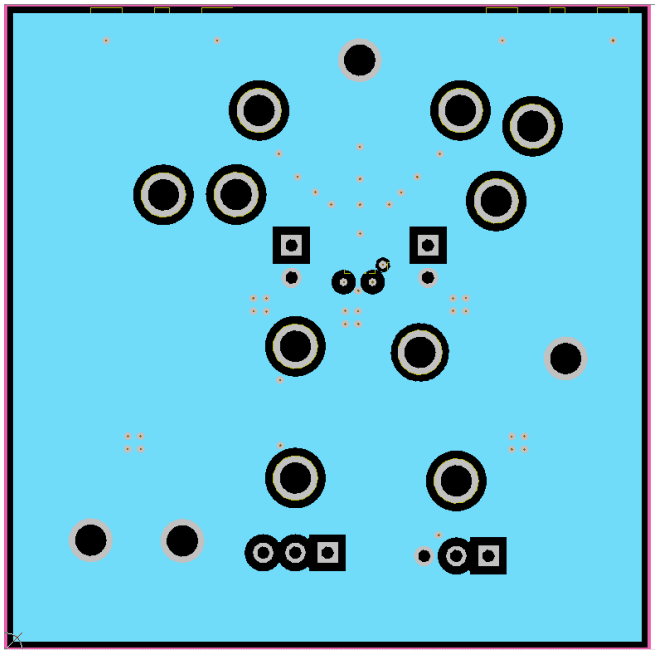


Figure 8. Layer 3: GND Plane

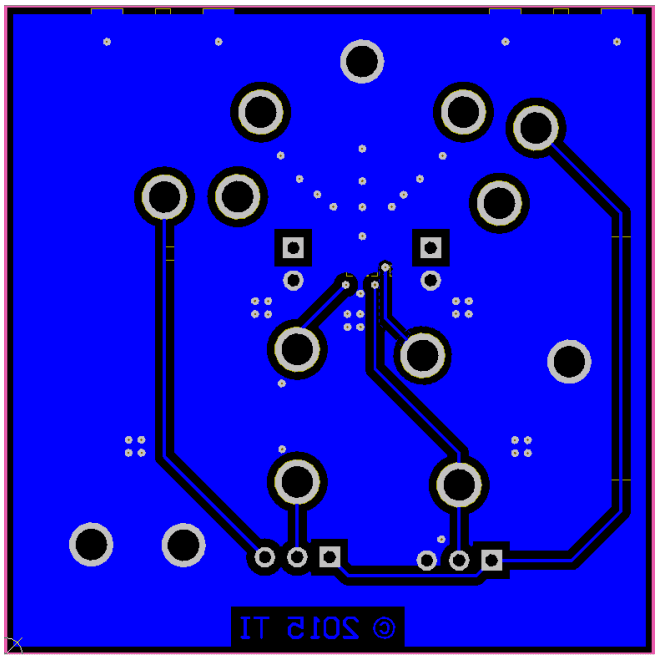


Figure 9. Bottom-Layer Routing

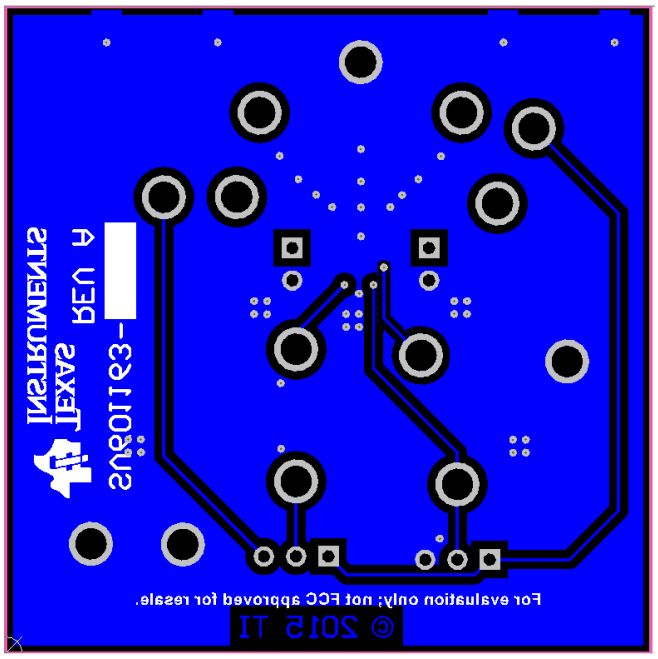
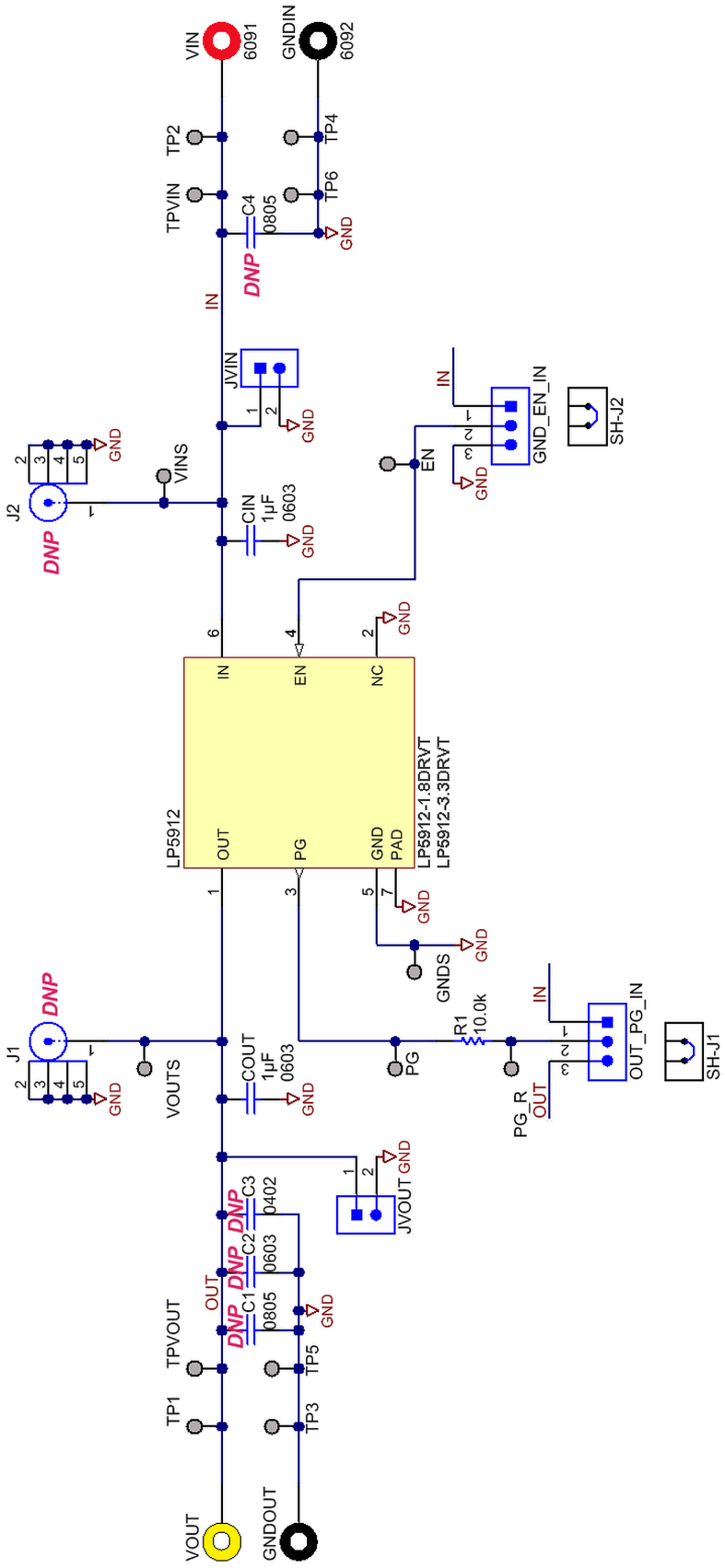


Figure 10. Bottom Assembly Layer and Silk-Screen

4 LP5912DRV EVM Schematic



5 Bill of Materials

COUNT	REF DES	DESCRIPTION	SIZE	MFR	PART NUMBER
2	CIN, COUT	Capacitor: Ceramic, 1 µF, 10%, 10 V, X7R	0603	Murata	GRM188R71A105KA61
14	EN, GNDS, PG, PG_R, TP1, TP2, TP3, TP4, TP5, TP6, TPVIN, TPVOUT, VINS, VOUTS	Terminal, Turret, TH, Double	2.29 mm	Keystone	1502-2
2	GNDIN, GNDOUT	Standard Banana Jack, Insulated, Black	-	Keystone	6092
1	VIN	Standard Banana Jack, Insulated, Red	-	Keystone	6091
1	VOUT	Standard Banana Jack, Insulated, Yellow	-	Cinch	108-0907-001
2	JVIN, JVOUT	Header, 2-pin, 100-mil spacing	0.100 × 2	Samtec	HTSW-102-07-G-S
2	OUT_PG_IN, GND_EN_IN	Header, 3-pin, 100-mil spacing	0.100 × 3	Samtec	HTSW-103-07-G-S
2	SH-J1, SH-J2	Shunt, 100 mil, Gold plated, Black	0.100 × 2	Samtec	SNT-100-BK-G
1	R1	Resistor, 10 kΩ, 1%, 0.1 W, 0603	0603	Vishay	CRCW060310K0FKEA
1	LP5912	IC LDO: 1.8 V IC LDO: 3.3 V	DVR006	TI	LP5912-1.8DRVT LP5912-3.3DRVT
1	LP5912DRV EVM PCB	PCB, 2 inch × 2 inch × 0.062	-	TI	SV601163

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      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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- *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.*

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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

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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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