User's Guide
SLAU730A–June 2017–Revised April 2018

EVM430-FR6047 Hardware Guide

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ABSTRACT

This guide is intended to provide users of the EVM430-FR6047 with a quick reference to the different hardware options available. This includes power, header configurations and pinouts, and communication interfaces.

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Trademarks

1 Power

The EVM430-FR6047 can be supplied power through USB or an external supply (for example, a battery or bench supply). Jumper and switch configurations must be set appropriately for power to be properly routed to the MSP430FR6047 device.[1]

1.1 USB Power

When using USB as the power source, set the POW_SEL switch to the middle position (ezFET) (see Figure 1).

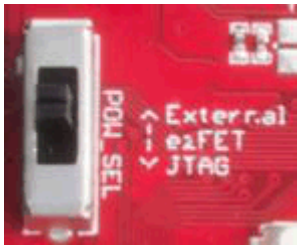

Figure 1. Power Selection

Set J1 and J3 as in Figure 2.

Figure 2. USB Power Jumper Configuration

1.2 External Power

When using external power, the POW_SEL switch should be set to the top position (External) (see Figure 3). External supply voltage should be applied to the EXT_POW header shown below. For lowest power consumption, all jumpers on J2, J3, and J4 should be open. If not using a regulator (optional), operational supply voltage range is 1.8 V to 3.6 V. GND on J3 and communication jumpers on J4 are required if communicating through USB.

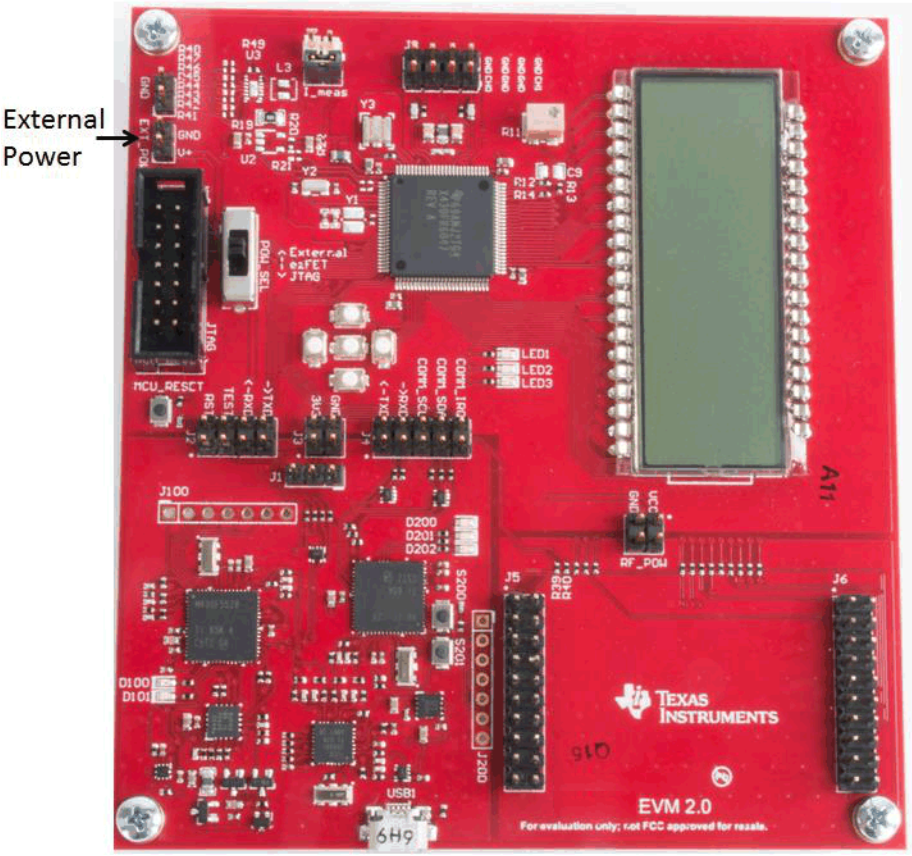

Figure 3. External Power

1.3 Using Voltage Regulators(optional)

Voltage regulators can be populated on the PCB if required. A switch mode regulator or LDO can be utilized. To use the TPS62740DSSR switch mode regulator, de-populate R19, and then populate U3 and surrounding components shown below. R41 to R48 should be set for the required output voltage. For more information, see the TPS62740 data sheet.[3]

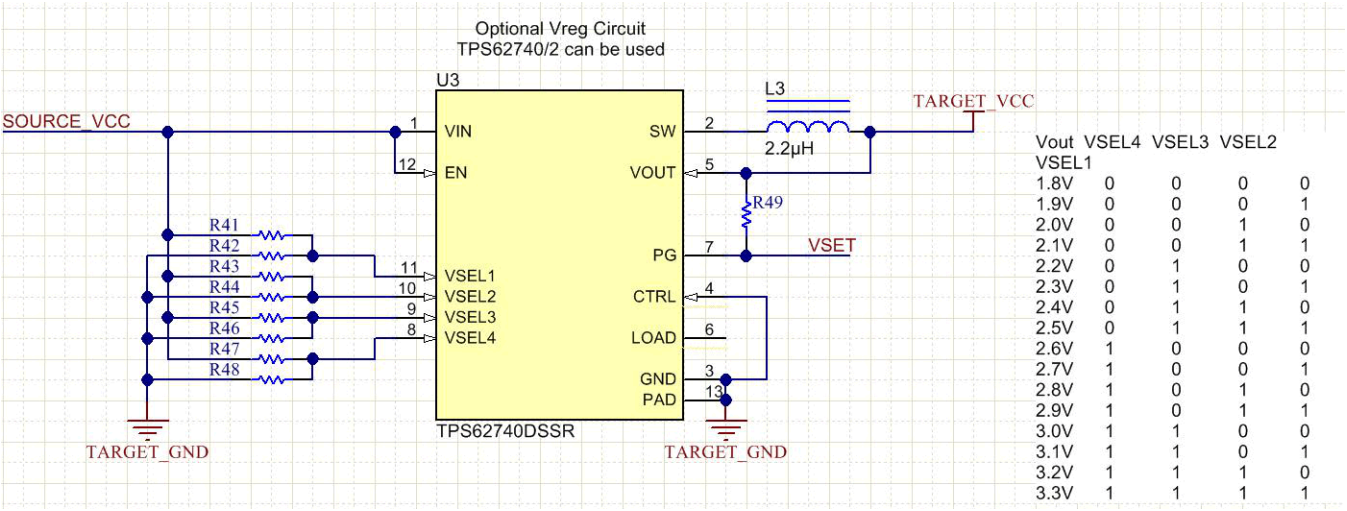

Figure 4. TPS62740 Schematic

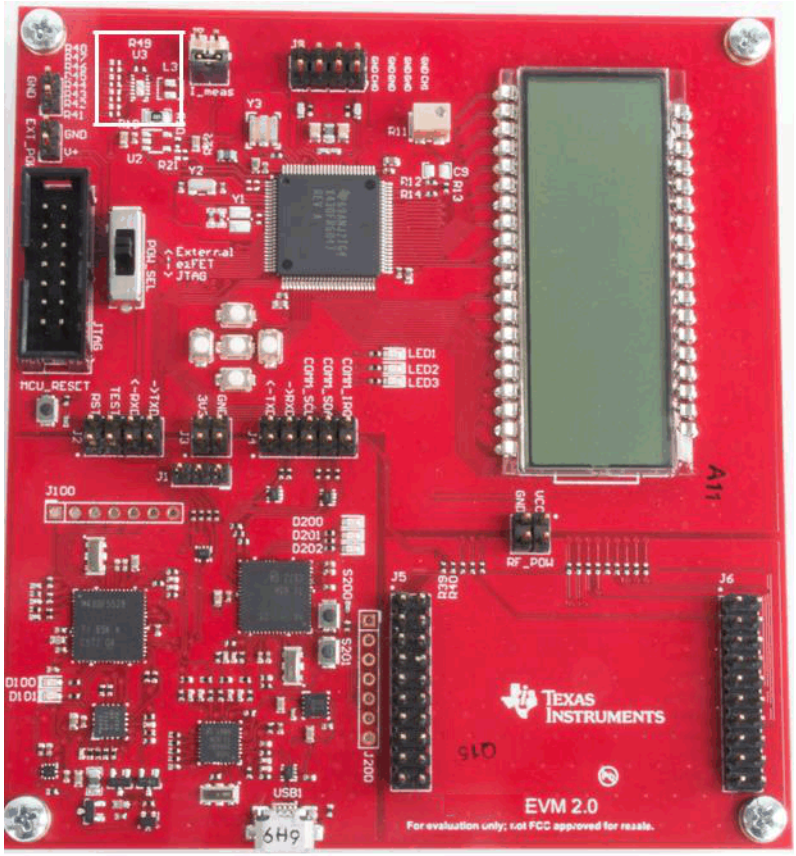

Figure 5. U3 Board Location

To use the TPS78001DDCR LDO regulator, remove R19, and then populate U2 and surrounding components shown below. R20 and R21 should be set for required output voltage. This can be calculated using Equation 1. For more information, see the TPS78001 data sheet.[2]

$$V = V_{fb} \times (1 + R1 / R2) \quad (1)$$

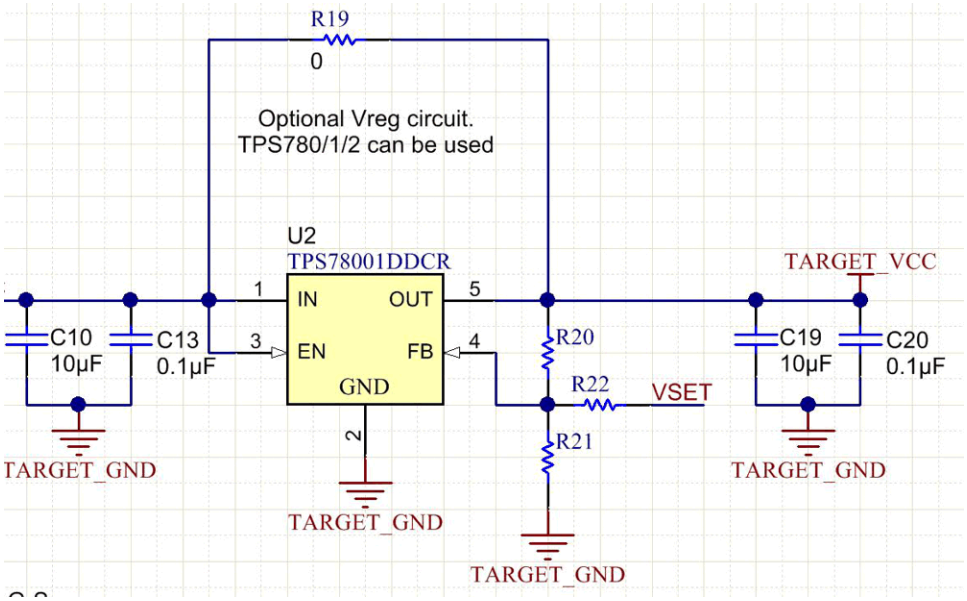

Figure 6. TPS78001 Schematic

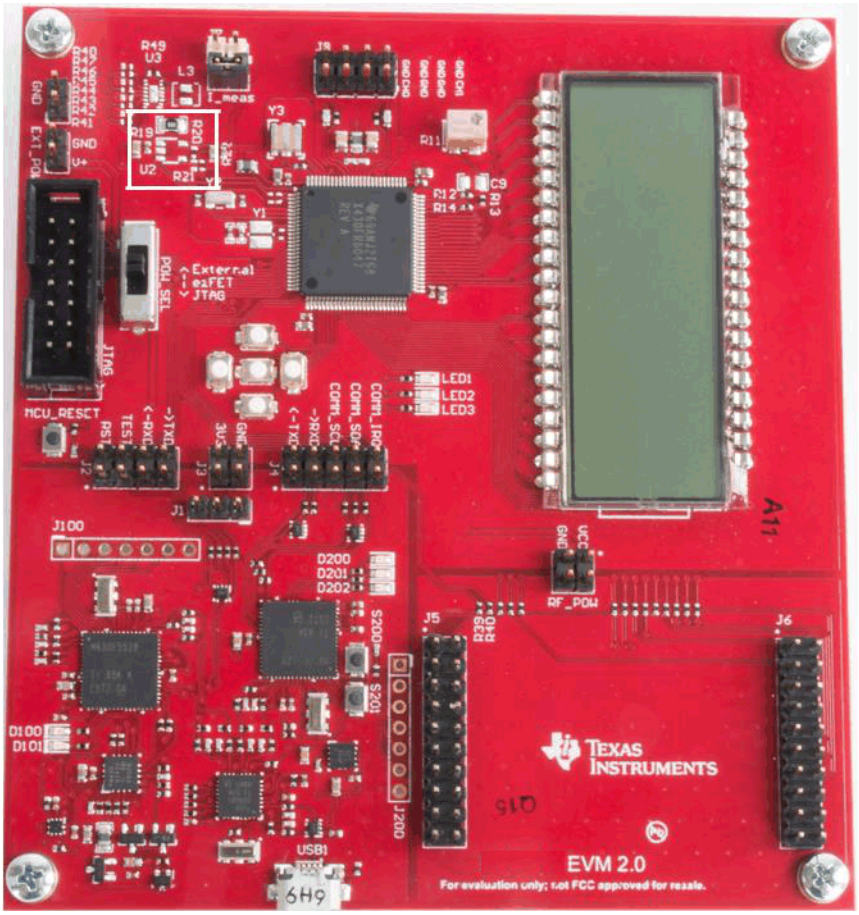

Figure 7. U2 Board Location

1.4 Measuring Current Consumption

Current consumption can be measured by removing the I_meas jumper and placing an ammeter across the header. When current measurements are not being performed, be sure this jumper is set.

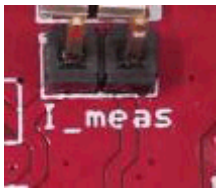

Figure 8. Current Measurement Header

2 Header Connections

2.1 Transducer Headers

Two transducers can be connected to the board through J8. Additional ground connections are available on this header to accommodate transducers which use 3 pins (1 signal pin and 2 ground pins). The transducers signal pins should be connected to CH0 and CH1 and ground pin(s) to GND.

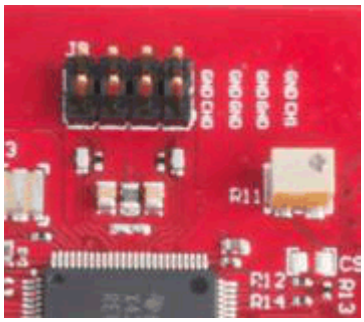

Figure 9. Transducer Header

Table 1. Transducer Connections

GND	GND	GND	GND
CH0	GND	GND	CH1

2.2 USSXT_BOUT

When enabled in software, the buffered output clock of USSXT is available on J7. This allows for monitoring of the USSXT signal. Ground is also provided on J7.

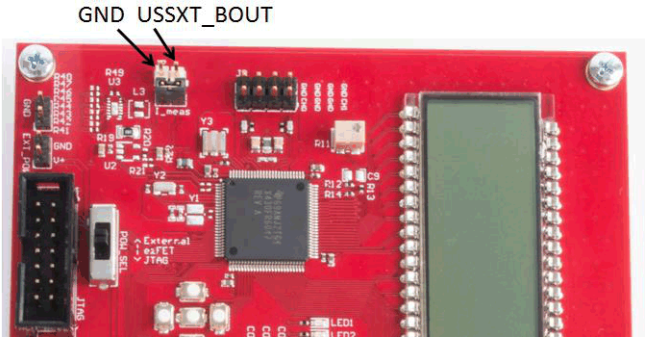

Figure 10. USSXT_BOUT Header

2.3 BoosterPack™ Plug-in Module Connectors

J5 and J6 allow for connection to BoosterPack™ plug-in module or other devices which offer functionality such as wireless connectivity. To power a BoosterPack plug-in module from the main power supply, set jumpers on the RF_POW header (see Figure 11 and Table 2).

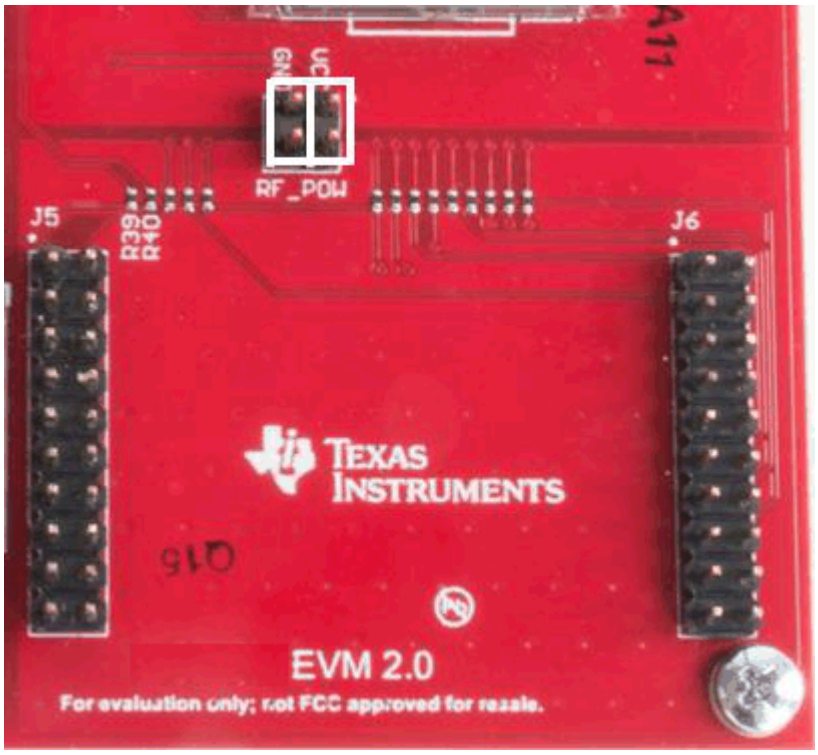

Figure 11. BoosterPack Plug-in Module Headers

Table 2. BoosterPack Plug-in Module Connections

J5		J6	
VCC	N.C.	N.C.	GND
	N.C.	N.C.	GPIO
RXD	N.C.	N.C.	SPI_CS
TXD	N.C.	N.C.	
CTS	N.C.	N.C.	
	N.C.	N.C.	SPI_MOSI
SPI_CLK	N.C.	N.C.	SPI_MISO
RTS	N.C.	N.C.	RESET
SCL	N.C.	N.C.	GPIO
SDA	N.C.	N.C.	GPIO

2.4 JTAG

A standard MSP430™ 14 pin JTAG header is available for programming and debug. When using JTAG for programming, the POW_SEL switch should be set to the bottom position(JTAG) when power will be supplied through JTAG. If external power will be used, the switch should be set to the top position (External).

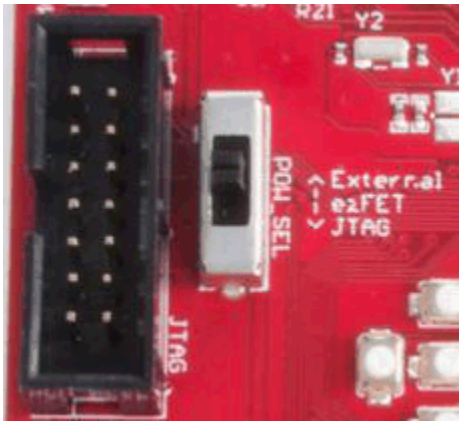

Figure 12. JTAG Header

2.5 Communications

UART, I^2C, and Spy-Bi-Wire interfaces are available.

JTAG TX and RX(UART) are available on J2. To use this interface with the on-board eZ-FET circuit, place jumpers on J2 TXD and RXD pins.

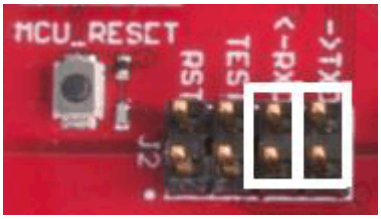

Figure 13. JTAG UART Jumpers

J2 also provides a connection for the Spy-Bi-Wire programming and debug interface. To use the on-board eZ-FET circuit, place jumpers on the J2 TEST and RST pins.

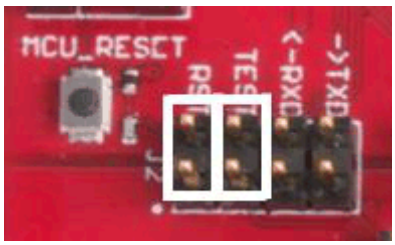

Figure 14. Spy-Bi-Wire Jumpers

J4 provides a connection between the MSP430FR6047 and the high speed USB HID interface. To enable I^2C, the J4 COMM_SDA, COMM_SCL, and COMM_IRQ jumpers should be populated. To enable UART on the USB HID interface, J4 TXD and RXD jumpers should be populated.

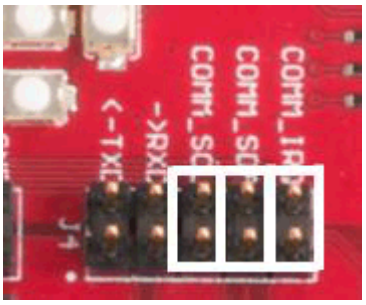

Figure 15. I²C Jumpers

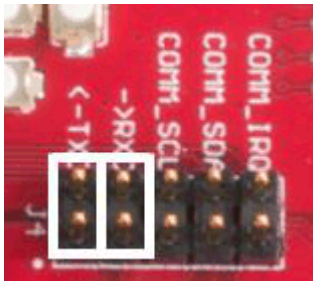

Figure 16. USB HID UART Jumpers

3 LCD

The LCD contrast can be adjusted with the R11 potentiometer. Use a small flathead screwdriver to adjust the resistance of R11 and monitor the contrast on the display.

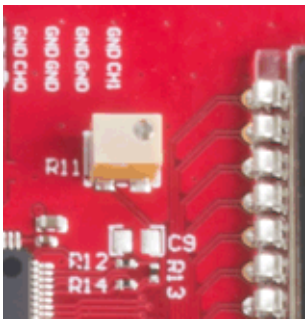

Figure 17. LCD Contrast Control

4 References

1. MSP430FR6047 Mixed-Signal Microcontroller
2. TPS780xx 150-mA Low-Dropout Regulator, Ultralow-Power, I_Q 500 nA With Pin-Selectable, Dual-Level Output Voltage
3. TPS6274x 360nA I_Q Step Down Converter For Low Power Applications

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Component Manufacturer	Component Part Number	SVHC Substance	SVHC CAS
Murata	CSTCR4M00G15L99-R0	Lead Titanium Zirconium Oxide	12626-81-2
Murata	CSTCR6M00G53Z-R0	Lead Titanium Zirconium Oxide	12626-81-2
Abracon	ABM3-8.000MHZ-D2Y-T	Diboron Trioxide	1303-86-2
Abracon	ABM3-8.000MHZ-D2Y-T	Lead Oxide	1317-36-8
Abracon	AWSCR-8.00CV-T	Boric Acid	10043-35-3
Abracon	AWSCR-8.00CV-T	Lead Oxide	1317-36-8

Revision History

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

Changes from June 2, 2017 to April 25, 2018 **Page**

- Added Section 5, *REACH Compliance* 10

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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.

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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.

FCC Interference Statement for Class B EVM devices

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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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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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