

# ONET1131EC Evaluation Module

This document describes the main features and functionality of the evaluation module (EVM) board for the devices.

The ONET1131EC is a 11.7-Gbps transceiver with an integrated limiting amplifier and a modulator driver.

The EVM can be used to evaluate the performance of the parts in conjunction with an electroabsorptive modulated laser (EML) transmit optical subassembly (TOSA) and a receive optical subassembly (ROSA) in standard XMD-compliant packages.

The EVM is controlled with a graphical user interface (GUI).

Throughout this document, the images shown may represent the ONET1130Ex. Those images are representative of the boards and parts on the ONET1131EC.

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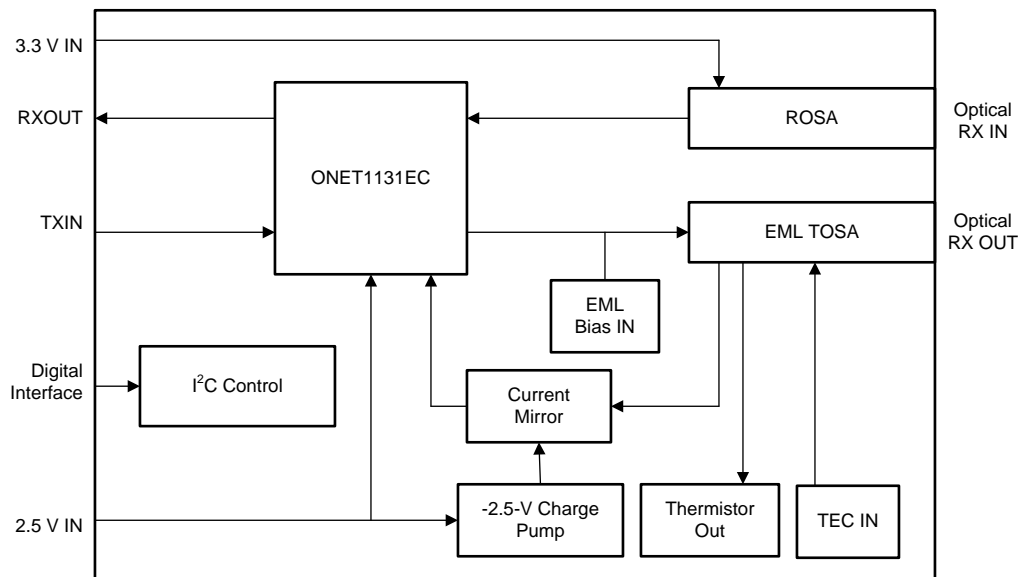
## 1 Hardware and Equipment

The following hardware and equipment are required to evaluate the EVM:

1. A ONET1131EC EVM
2. An XMD-compliant EML TOSA
3. A USB Dongle
4. A USB cable with standard-A to mini-B connector
5. A PC with USB A port
6. RF cables with SMA connectors
7. An external thermoelectric controller
8. Single-mode fiber patch cords
9. Electrical cables with banana jack connections

## 2 EVM Block Diagram

Figure 1 represents the block diagram of the ONET1131EC EVM. The board is designed to be powered from a 2.5-V supply using cables with banana jacks.

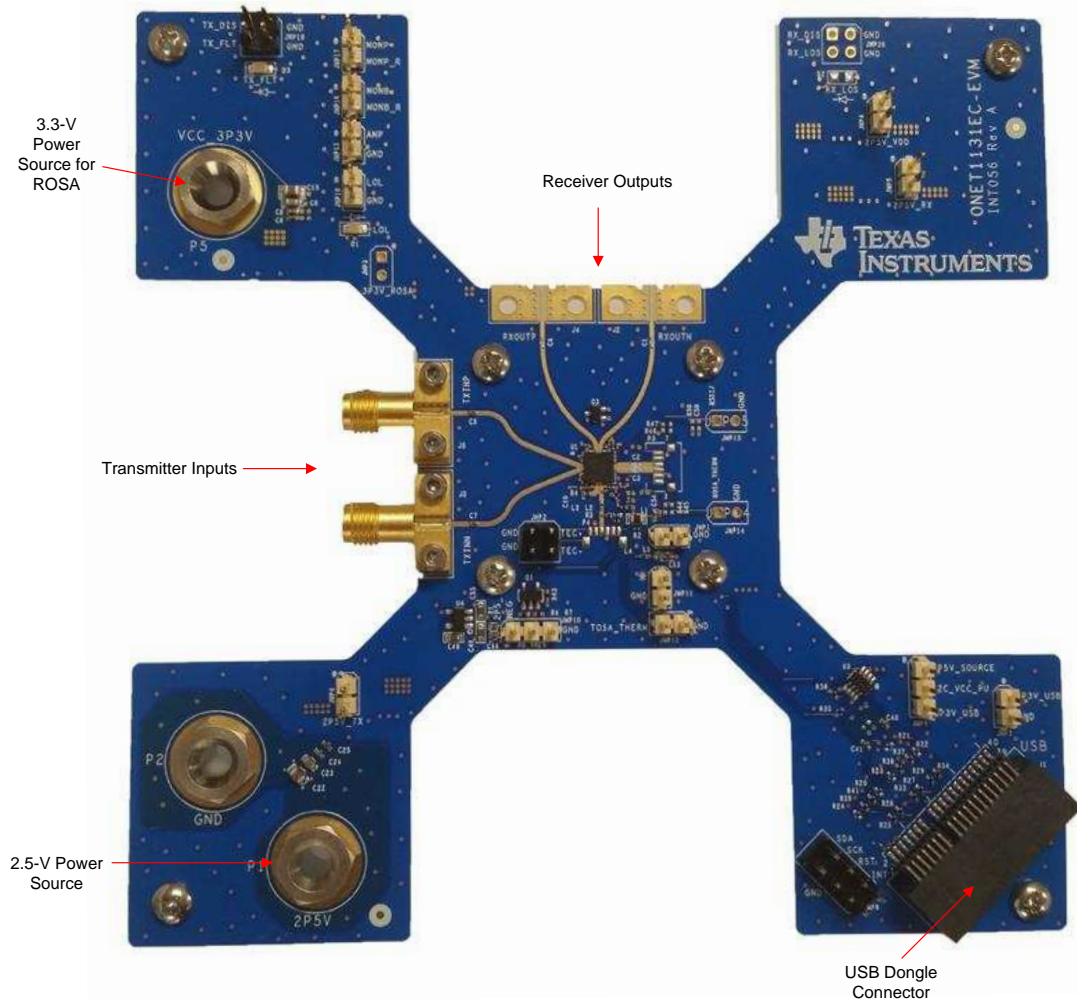


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Figure 1. ONET1131EC EVM Block Diagram

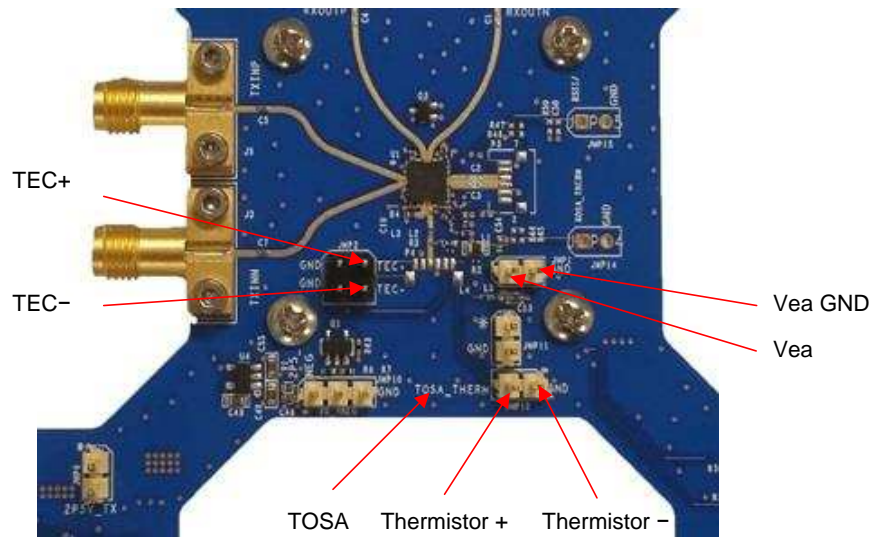
### 3 EVM Connections

Figure 2 shows the location of the major inputs and outputs on the EVM board.



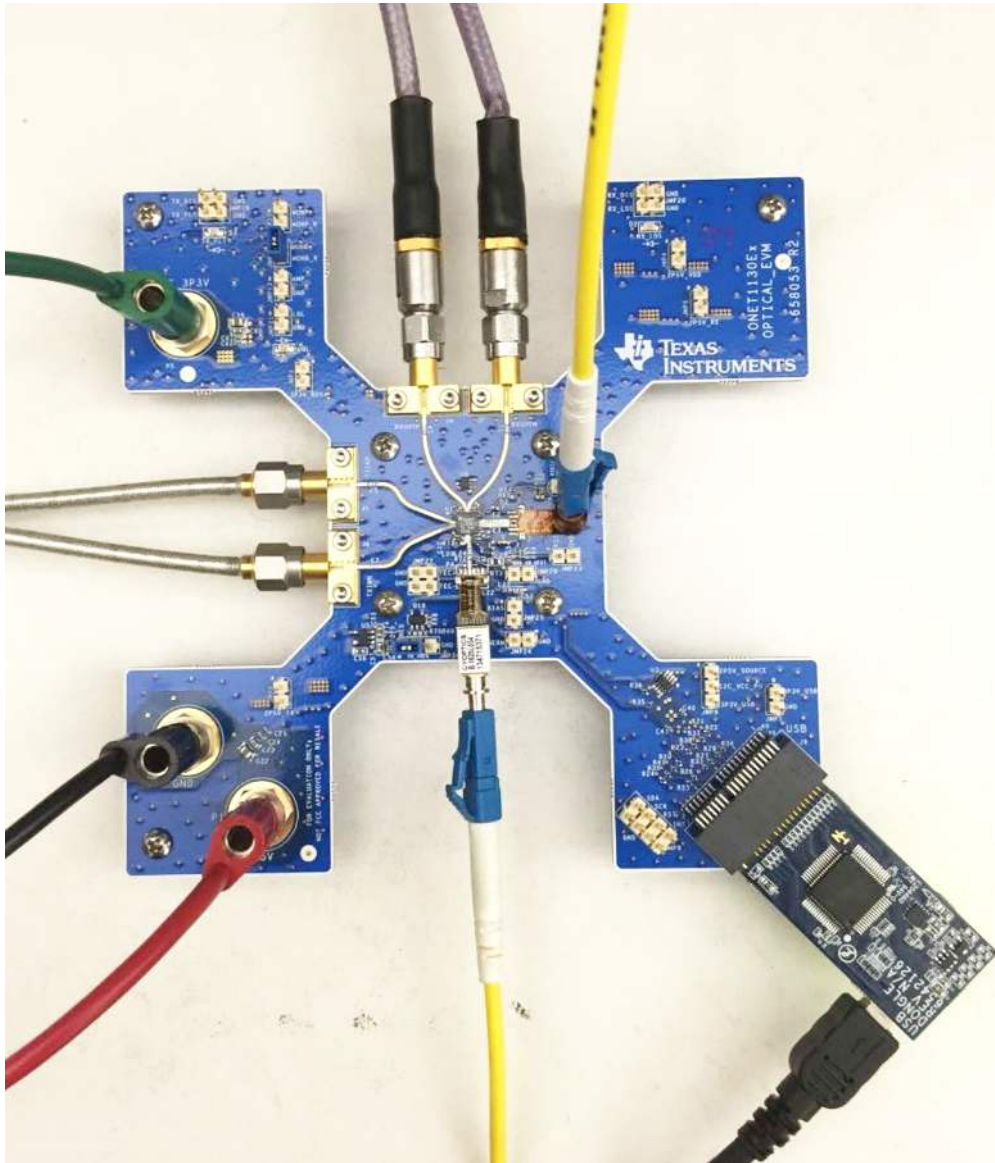
**Figure 2. ONET1131EC EVM Connections**

The customer must supply a ROSA and TOSA. In addition, connections for the EML bias voltage and TEC controller are also required. Figure 3 shows the locations for the ROSA and TOSA, EML bias voltage, TOSA thermistor, and the TEC+ and TEC- connections to the TEC controller.



**Figure 3. TOSA and EML Connections for TEC Controller**

Figure 4 shows the main connections except those for the EML bias and TEC controller.



ROSA and Receiver connections are not available on the ONET131EC-EVM.

**Figure 4. Main EVM Connections**

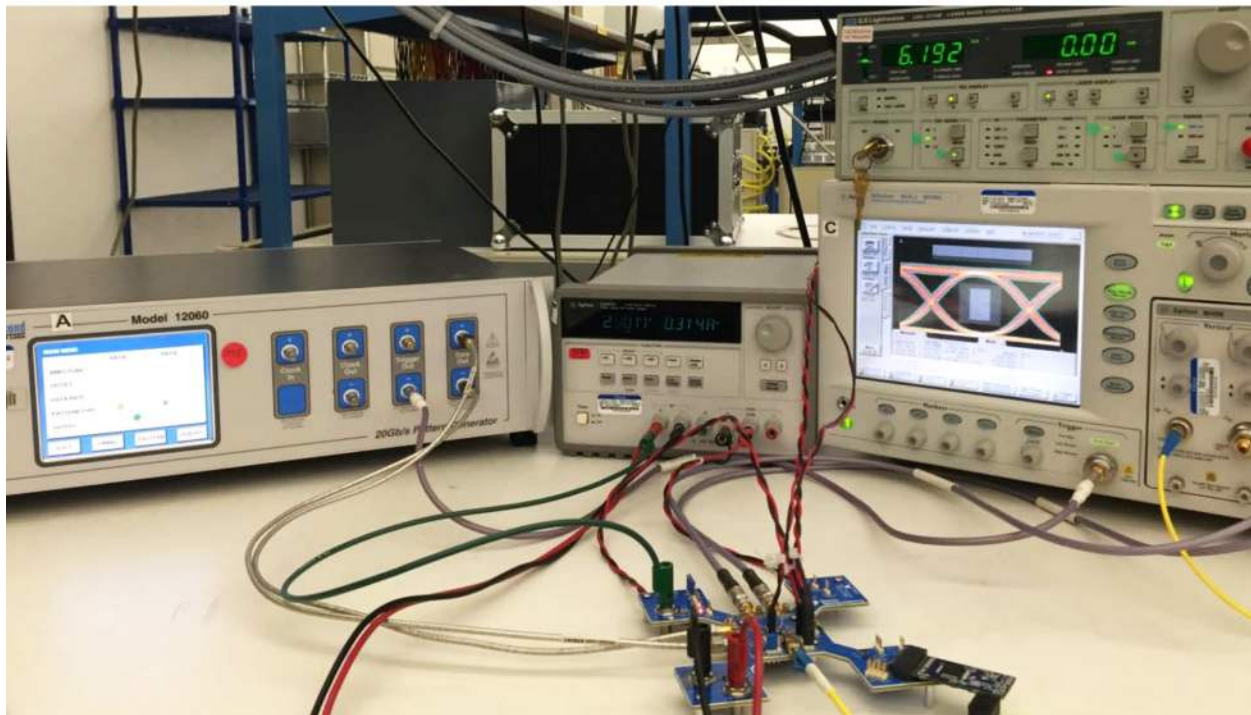


## 4 Measurement Setup

Follow this procedure to quickly set up to take measurements:

1. Install the ONET1130EC GUI onto the computer and follow the installation instructions.
2. Solder the TOSA onto the EVM.
3. Connect a differential data input signal source to the SMA connectors TXINP/TXINN through 50- $\Omega$  matched impedance cables. Set the data rate between 9.8 Gbps and 11.7 Gbps. Set the amplitude between 100 mVp-p differential and 1000 mVp-p differential.
4. Connect the USB dongle to the EVM and attach the interface cable from the USB port of the computer to the mini-B USB port of the dongle.
5. Apply a 2.5-V supply to the +2.5-V banana jack and the supply ground to the GND banana jack.
6. Apply a negative bias voltage in the range of  $-0.4$  V to  $-1.5$  V for the EML to JMP28. The required voltage is TOSA dependent.
7. Connect the TOSA thermistor at JMP24 to the TEC controller.
8. Connect the TEC+ and TEC- at JMP27 to the TEC controller.
9. Connect the TOSA to the optical input of a DCA through a single-mode fiber patch cord.

A typical setup is shown in [Figure 5](#).



**Figure 5. Typical Setup**

10. Run the GUI by clicking the ONET1130EC GUI shortcut icon on the desktop. The *Low Level Register Interface* page appears (Figure 6).

**NOTE:** The ONET1130EC EVM GUI software works with the ONET1131EC EVM.

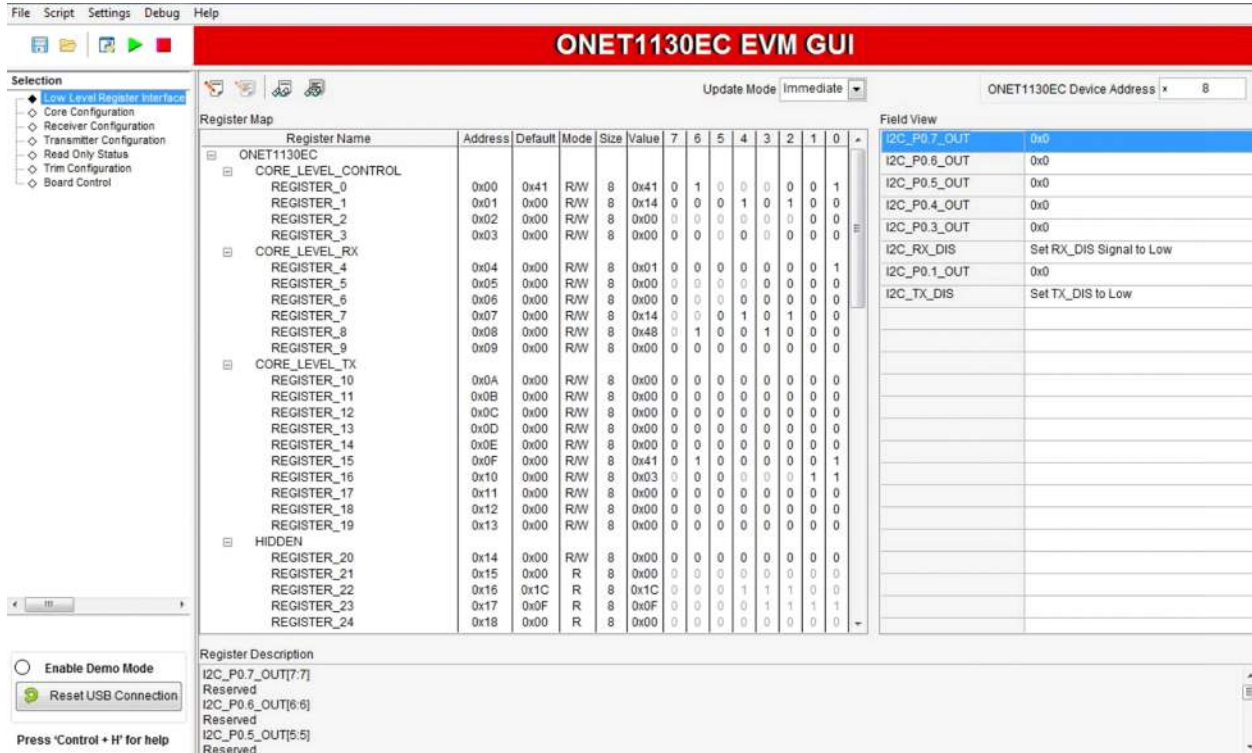


Figure 6. Low Level Register Interface Page

### 4.1 Open Loop Operation Without Fault Detection or Digital Monitoring

The following steps are provided for open loop operation without fault detection or digital monitoring:

1. TI recommends initially operating the TOSA in open loop mode with fault detection disabled.
2. Go to the *Core Configuration* page as shown in [Figure 7](#).

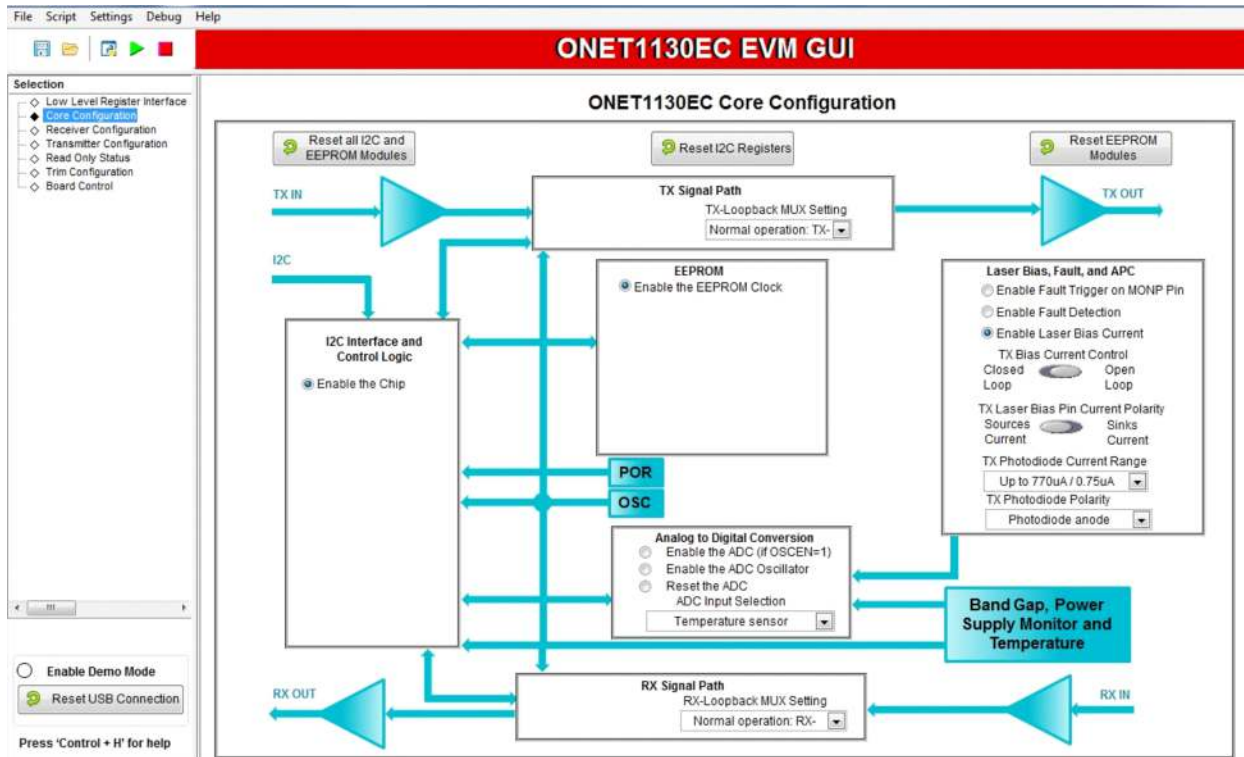


Figure 7. Core Configuration Page

3. Set the *TX Bias Current Control* to *Open Loop*.
4. Enable the *Laser Bias Current*.



5. Go to the *Transmitter Configuration* page as shown in Figure 8.

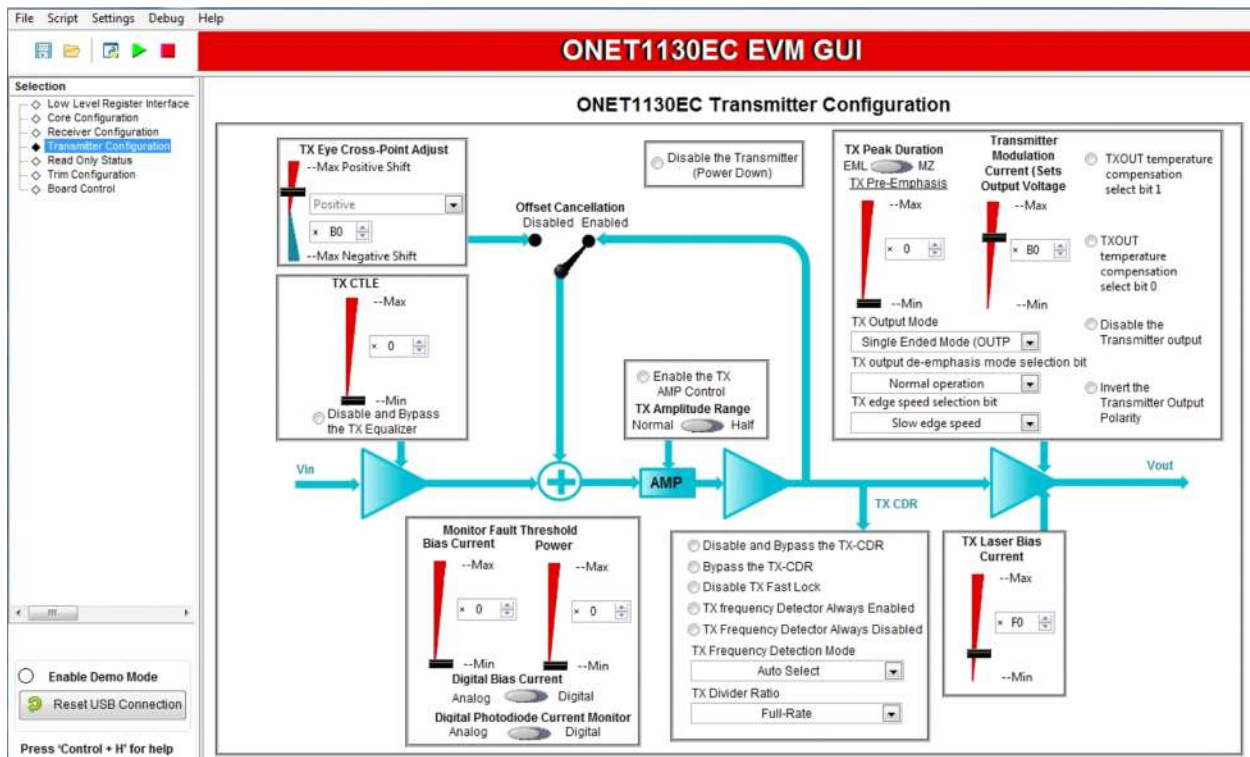


Figure 8. Transmitter Configuration Page

6. Set *TX Output Mode* to *Single Ended Mode (OUTP)* using the pull-down box.
7. Set the desired *TX Laser Bias Current* with the slider.
8. Set the desired *Transmitter Modulation Current* with the slider.
9. Adjust the *TX Cross Point* with the slider.
10. If the transmitter modulation current is less than approximately 0xC0, then TI recommends using the slow edge speed mode as selected with the *TX edge speed selection bit*. However, the need for using this mode is TOSA dependent.

## 4.2 Closed Loop Operation with Fault Detection and Digital Monitoring

The following steps are provided for closed loop operation with fault detection and digital monitoring:

1. To configure the part for automatic power control with digital monitoring and fault detection, place a jumper between pins 1 and 2 of JMP26 to supply  $-2.5\text{ V}$  to the photodiode current mirror.
2. Go to the *Core Configuration* page as shown in Figure 9.

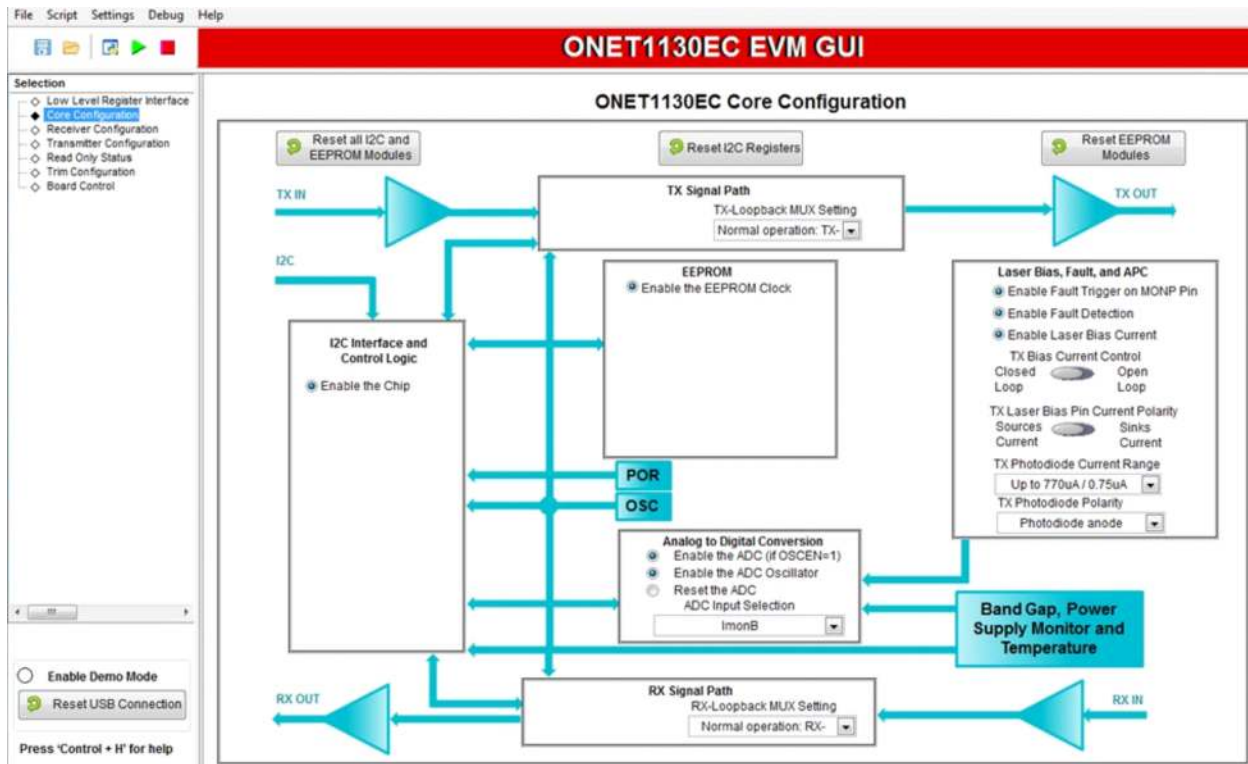


Figure 9. Core Configuration Page

3. Disable the laser bias current to prevent a fault from occurring when the *Fault Detection* is enabled.
4. Select *Enable Fault Detection* and *Enable the Fault Trigger on MONP Pin*.
5. Set the *TX Bias Current Control* to *Closed Loop* and initially use the default  $770\text{-}\mu\text{A}$  *TX Photodiode Current Range*.
6. Enable the laser bias current.
7. In the *Analog to Digital Conversion* box, enable the ADC and ADC oscillator and select the desired parameter to be monitored using the drop-down box.

8. Go to the *Transmitter Configuration* page as shown in Figure 10.

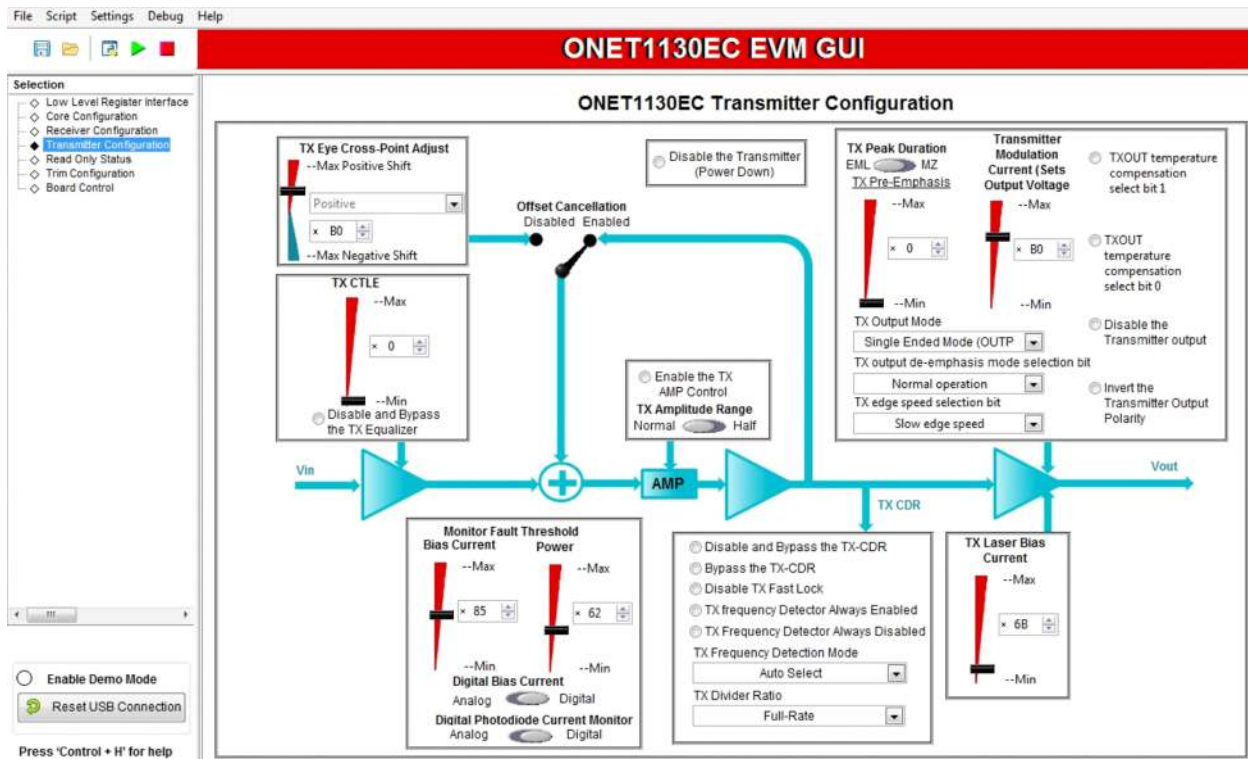


Figure 10. Transmitter Configuration Page

9. In the *Monitor Fault Threshold* box, set the *Bias Current* and *Power* sliders to their maximum value.
10. Set *Digital Bias Current* and *Digital Photodiode Current Monitor* in the *Monitor Fault Threshold* box.
11. Set the *TX Output Mode* to *Single Ended Mode (OUTP)*.
12. Set the desired *TX Laser Bias Current*, *Transmitter Modulation Current*, and *TX Cross Point (TX Eye Cross-Point Adjust)*.
13. In the *Monitor Fault Threshold* box, reduce the *Bias Current* fault threshold slider until a fault occurs. Increase the *Bias Current* fault threshold level at least by a value of 16.
14. Go to the *Core Configuration* page and toggle the *Enable Laser Bias Current* bit. This disables the fault and restores the transmitter output.
15. In the *Monitor Fault Threshold* box, reduce the *Power* fault threshold slider until a fault occurs. Increase the *Power* fault threshold level at least by a value of 16.
16. Go to the *Core Configuration* page and toggle the *Enable Laser Bias Current* bit. This disables the fault and restores the transmitter output.

17. To read the value from the ADC, go to the *Read Only Status* page as shown in Figure 11.

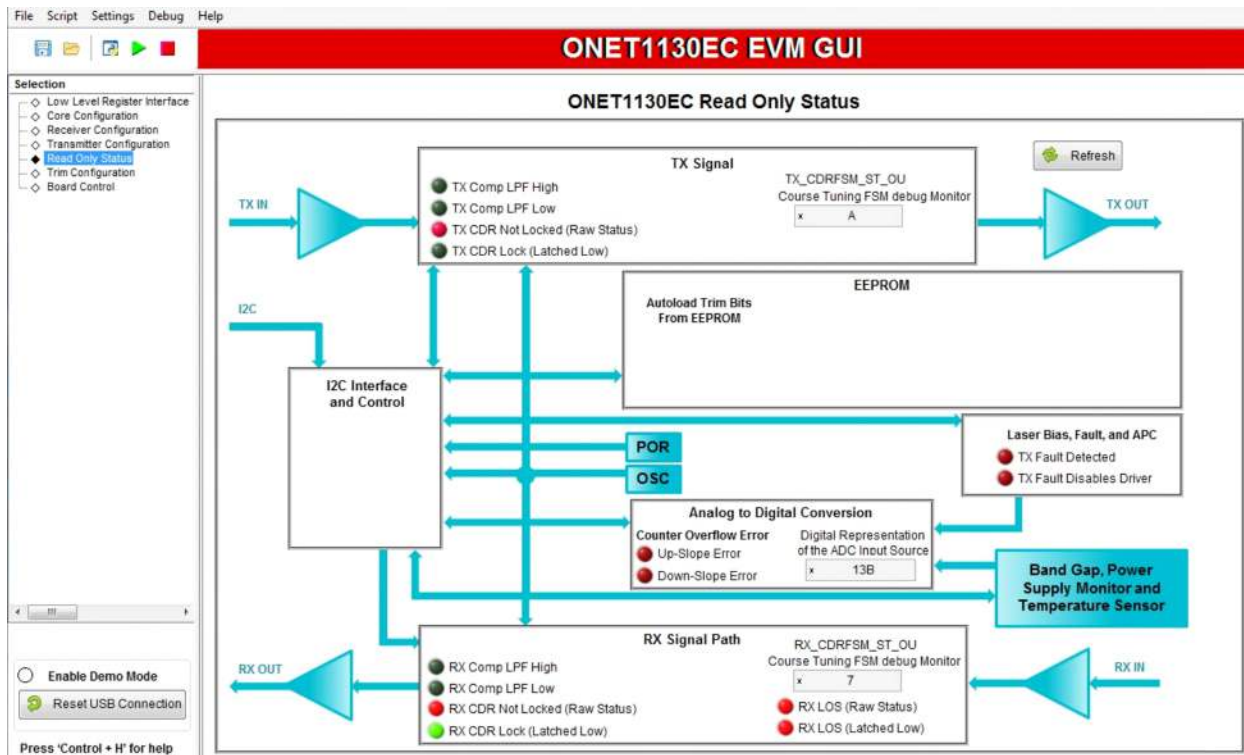


Figure 11. Read Only Status Page

18. Click the **Refresh** button and read the value of the *Output Representation* of the *ADC Input Source*.

## 5 LED Indicators

Table 1 shows the meaning of the 2 LEDs on the EVM.

Table 1. LED Indicators

LED	LED Color	Default State	Indication When On
D1	Red	On	The transmit CDR or the receive CDR has indicated Loss of Lock (LOL).

## 6 Typical Performance Results

A typical set of conditions for operating the EVM are as follows:

- 10.71 Gbps, PRBS31 Pattern
- Transmitter Single-Ended Mode of Operation
- TOSA Temperature = 37°C
- $V_{ea} = -0.65$  V
- Laser Bias Current = 0xF0 (approximately 53 mA)
- Transmitter Modulation Current = 0xB0
- Transmitter Cross Point = 0xB0
- TX and RX CDRs Enabled

A typical unfiltered eye diagram is shown in Figure 12.

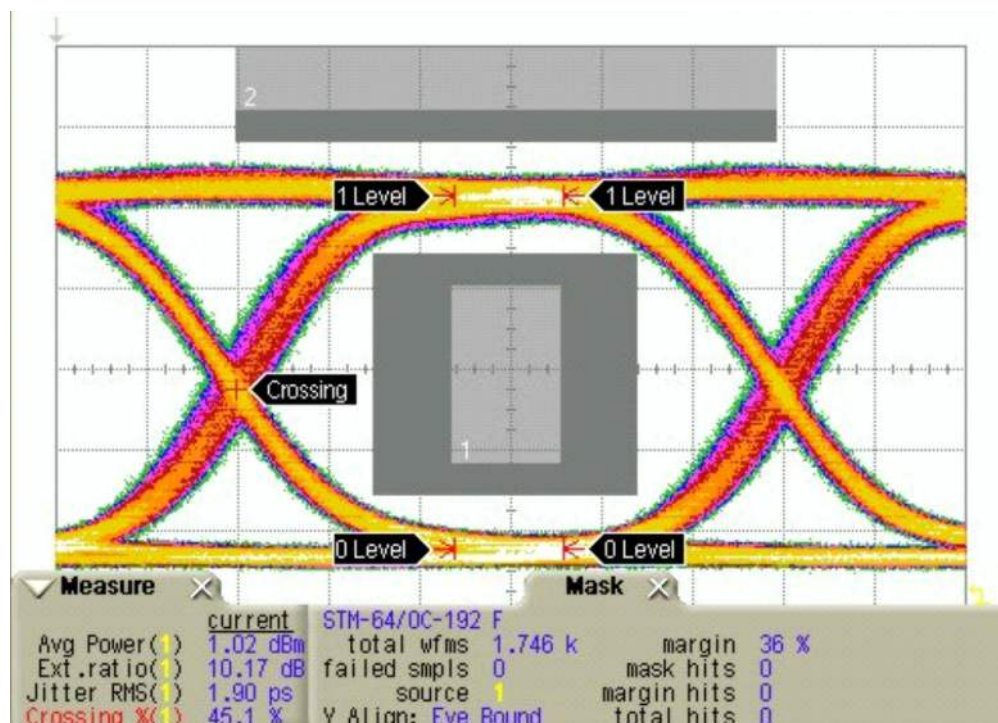


Figure 12. Unfiltered Transmitter Eye Diagram



A typical filtered eye diagram is shown in Figure 13.

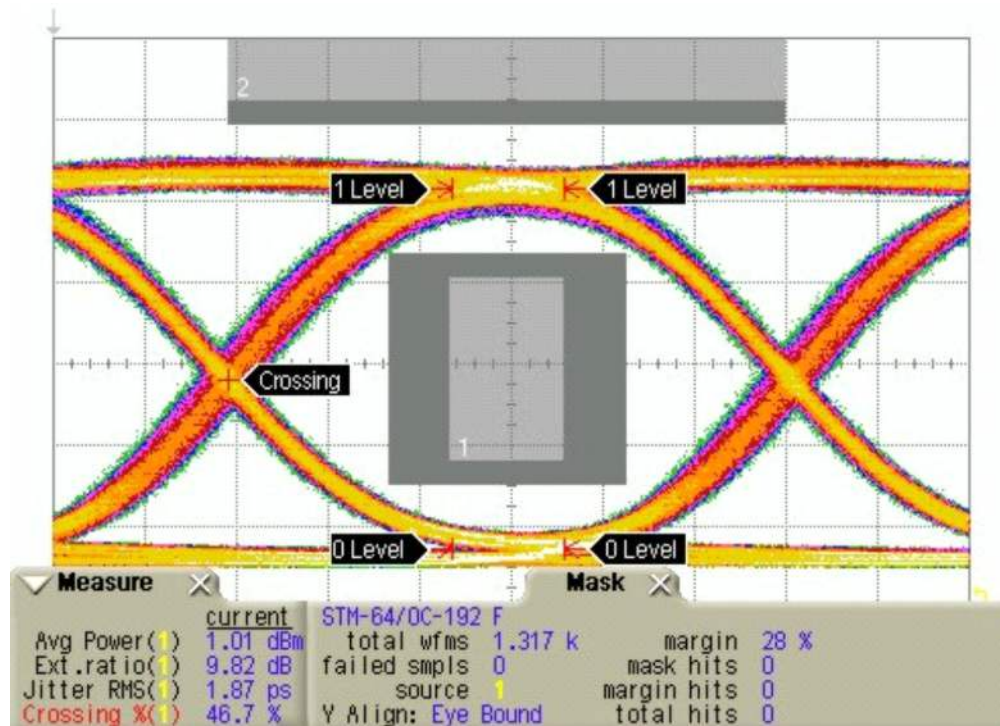


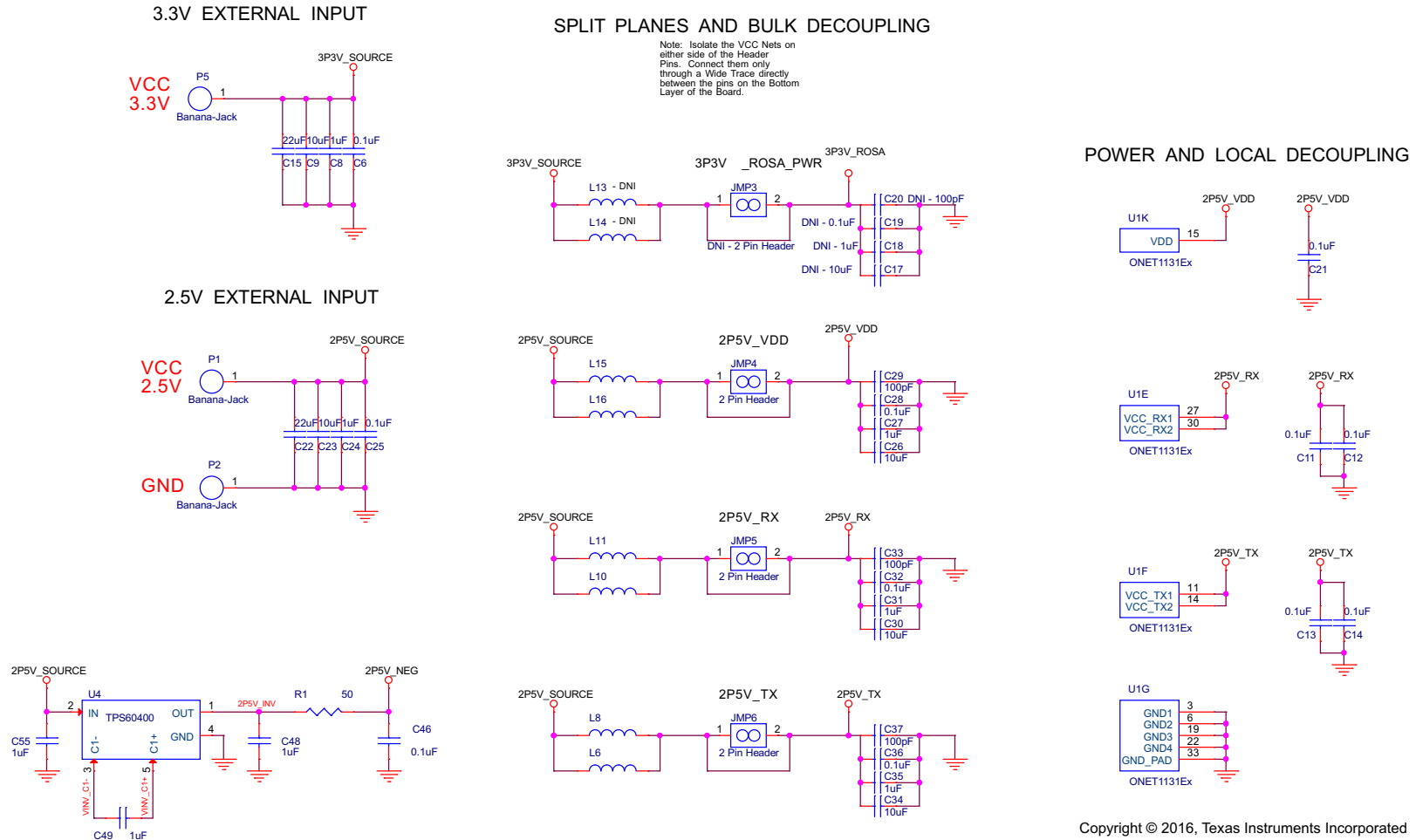
Figure 13. Filtered Transmitter Eye Diagram

## 7 Schematics and Bill of Materials

This section contains the EVM schematics and BOM.

### 7.1 Schematics

Figure 14, Figure 15, and Figure 16 illustrate the EVM schematics.



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Figure 14. Schematic (1 of 3)

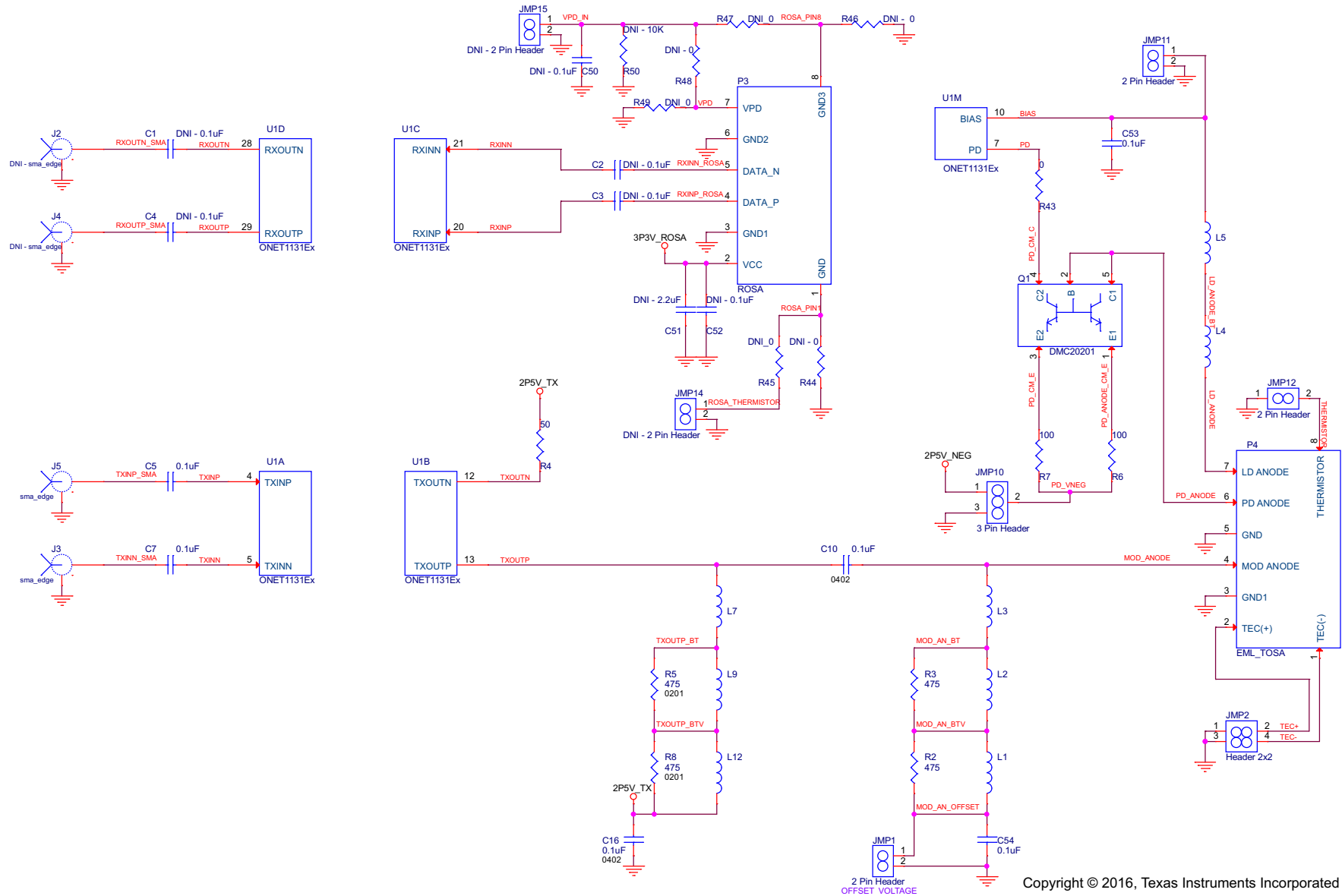


Figure 15. Schematic (2 of 3)

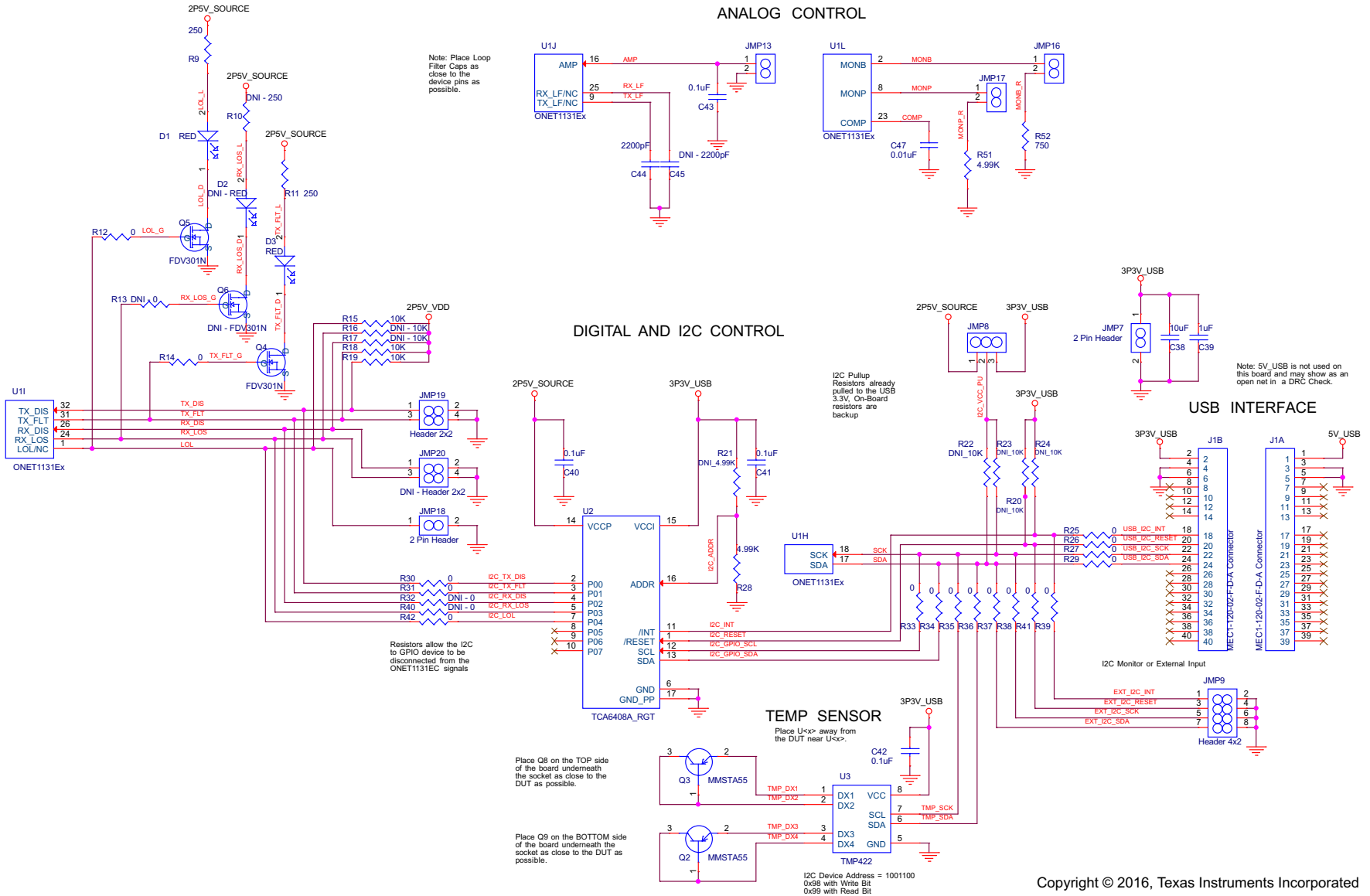


Figure 16. Schematic (3 of 3)

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## 7.2 Bill of Materials

Table 2 lists the ONET1131EC EVM BOM.

**Table 2. ONET1131EC EVM Bill of Materials**

Item	Qty	Reference	Value	Part Number	Manufacturer	PCB Footprint	Notes
1	1	C44	2200pF	GRM033R61A222KA01D	Murata Electronics North America	0201	2200pF 10V Ceramic Capacitor X5R 0201 (0603 Metric) 0.024" L x 0.012" W (0.60mm x 0.30mm)
2	0	C45	DNI - 2200pF	GRM033R61A222KA01D	Murata Electronics North America	0201	2200pF 10V Ceramic Capacitor X5R 0201 (0603 Metric) 0.024" L x 0.012" W (0.60mm x 0.30mm)
3	1	C47	0.01uF	GRM033R71A103KA01D	Murata Electronics North America	0201	10000pF 10V Ceramic Capacitor X7R 0201 (0603 Metric) 0.024" L x 0.012" W (0.60mm x 0.30mm)
4	5	C11, C12, C13, C14, C21	0.1uF	GRM033R61A104KE15D	Murata Electronics North America	0201	0.10uF 10V Ceramic Capacitor X5R 0201 (0603 Metric) 0.024" L x 0.012" W (0.60mm x 0.30mm)
5	3	C29, C33, C37	100pF	885012205001	Würth Electronics Inc	0402	100pF 10V Ceramic Capacitor X7R 0402 (1005 Metric) 0.039" L x 0.020" W (1.00mm x 0.50mm)
6	0	C20	DNI - 100pF	885012205001	Würth Electronics Inc	0402	100pF 10V Ceramic Capacitor X7R 0402 (1005 Metric) 0.039" L x 0.020" W (1.00mm x 0.50mm)
7	3	C5, C7, C10	0.1uF	GRM155R71C104KA88J	Murata Electronics North America	0402	0.10uF 16V Ceramic Capacitor X7R 0402 (1005 Metric) 0.039" L x 0.020" W (1.00mm x 0.50mm)
8	0	C1, C2, C3, C4,	DNI - 0.1uF	GRM155R71C104KA88J	Murata Electronics North America	0402	0.10uF 16V Ceramic Capacitor X7R 0402 (1005 Metric) 0.039" L x 0.020" W (1.00mm x 0.50mm)
9	13	C16, C25, C28, C32, C36, C40, C41, C42, C43, C53, C54, C46, C6	0.1uF	GRM155R71C104KA88J	Murata Electronics North America	0402	0.10uF 16V Ceramic Capacitor X7R 0402 (1005 Metric) 0.039" L x 0.020" W (1.00mm x 0.50mm)
10	0	C19, C50, C52,	DNI - 0.1uF	GRM155R71C104KA88J	Murata Electronics North America	0402	0.10uF 16V Ceramic Capacitor X7R 0402 (1005 Metric) 0.039" L x 0.020" W (1.00mm x 0.50mm)
11	6	C24, C27, C31, C35, C39, C8	1uF	GRM155R61A105KE15D	Murata Electronics North America	0402	1uF 10V Ceramic Capacitor X5R 0402 (1005 Metric) 0.039" L x 0.020" W (1.00mm x 0.50mm)
12	0	C18	DNI - 1uF	GRM155R61A105KE15D	Murata Electronics North America	0402	1uF 10V Ceramic Capacitor X5R 0402 (1005 Metric) 0.039" L x 0.020" W (1.00mm x 0.50mm)
13	0	C51	DNI - 2.2uF	C0402C225M8PACTU	Kemet	0402	2.2uF 10V Ceramic Capacitor X5R 0402 (1005 Metric) 0.039" L x 0.020" W (1.00mm x 0.50mm)
14	3	C55, C49, C48	1uF	GRM188R61A105KA61D	Murata Electronics North America	0603	1uF 10V Ceramic Capacitor X5R 0603 (1608 Metric) 0.063" L x 0.031" W (1.60mm x 0.80mm)
15	7	C23, C26, C30, C34, C38, C9	10uF	GRM188C81A106MA73D	Murata Electronics North America	0603	10uF 10V Ceramic Capacitor X6S 0603 (1608 Metric) 0.063" L x 0.031" W (1.60mm x 0.80mm)
16	0	C17	DNI - 10uF	GRM188C81A106MA73D	Murata Electronics North America	0603	10uF 10V Ceramic Capacitor X6S 0603 (1608 Metric) 0.063" L x 0.031" W (1.60mm x 0.80mm)
17	2	C22, C15	22uF	GRM21BR61A226ME51L	Murata Electronics North America	0805	22uF 10V Ceramic Capacitor X5R 0805 (2012 Metric) 0.079" L x 0.049" W (2.00mm x 1.25mm)
18	4	R5, R8, R3, R2	475	ERJ-1GEF4750C	Panasonic Electronic Components	0201	RES SMD 475 OHM 1% 1/20W 0201
19	18	R12, R14, R25, R26, R27, R29, R30, R31, R33, R34, R35, R36, R37, R38, R39, R41, R42, R43	0	RC0402JR-070RL	Yageo	0402	RES SMD 0.0OHM JUMPER 1/16W 0402
20	0	R13, R32, R40, R48, R46, R44	DNI - 0	RC0402JR-070RL	Yageo	0402	RES SMD 0.0OHM JUMPER 1/16W 0402
21	0	R49, R47, R45	DNI_0	Any (1% Tolerance)	Any	0402	
22	2	R4, R1	50	504L50R0FTNCFT	American Technical Ceramics	0402	RES SMD 50 OHM 1% 1/8W 0402



**Table 2. ONET1131EC EVM Bill of Materials (continued)**

Item	Qty	Reference	Value	Part Number	Manufacturer	PCB Footprint	Notes
23	2	R7, R6	100	RC0402FR-07100RL	Yageo	0402	RES SMD 100 OHM 1% 1/16W 0402
24	3	R9, R11	249	RC0402FR-07249RL	Yageo	0402	RES SMD 249 OHM 1% 1/16W 0402
25	0	R10	DNI - 249	RC0402FR-07249RL	Yageo	0402	RES SMD 249 OHM 1% 1/16W 0402
26	1	R28	4.99K	ERJ-2RKF4991X	Panasonic Electronic Components	0402	RES SMD 4.99K OHM 1% 1/10W 0402
27	0	R21	DNI_4.99K	Any (1% Tolerance)	Any	0402	
28	6	R15, R18, R19	10K	RC0402JR-0710KRL	Yageo	0402	RES SMD 10K OHM 5% 1/16W 0402
29	0	R16, R17, R50	DNI - 10K	RC0402JR-0710KRL	Yageo	0402	RES SMD 10K OHM 5% 1/16W 0402
30	0	R20, R22, R23, R24	DNI_10K	Any (1% Tolerance)	Any	0402	
31	1	R52	750	RC0805JR-07750RL	Yageo	0805	RES SMD 750 OHM 5% 1/8W 0805
32	1	R51	4.99K	ERJ-6ENF4991V	Panasonic Electronic Components	0805	RES SMD 4.99K OHM 1% 1/8W 0805
33	3	D1, D3	RED	HSMS-C170	Avago Technologies Us Inc	LED_SM_HSMB_C170	Red 626nm LED Indication Discrete 2.1V Diffused White Lens 0805 (2012 Metric)
34	0	D2	DNI - RED	HSMS-C170	Avago Technologies Us Inc	LED_SM_HSMB_C170	Red 626nm LED Indication Discrete 2.1V Diffused White Lens 0805 (2012 Metric)
35	11	JMP4, JMP5, JMP6, JMP7, JMP13, JMP16, JMP17, JMP18, JMP12, JMP11, JMP1	0.1" Header (1x2)	TSW-150-08-G-S	Samtec	HDR_THVT_1x2_100	50 Positions Header, Unshrouded Connector 0.100" (2.54mm) Through Hole Gold
36	0	JMP3, JMP15, JMP14,	DNI - 0.1" Header (1x2)	TSW-150-08-G-S	Samtec	HDR_THVT_1x2_100	50 Positions Header, Unshrouded Connector 0.100" (2.54mm) Through Hole Gold
37	2	JMP8, JMP10	0.1" Header (1x3)	TSW-150-08-G-S	Samtec	HDR_THVT_1X3_100	50 Positions Header, Unshrouded Connector 0.100" (2.54mm) Through Hole Gold
38	2	JMP19, JMP2	0.1x0.1" Header (2x2)	67997-404HLF	Amphenol	HDR_THVT_2x2_100	4 Positions Header, Unshrouded Connector 0.100" (2.54mm) Through Hole Tin
39	0	JMP20	DNI - 0.1x0.1" Header (2x2)	67997-404HLF	Amphenol	HDR_THVT_2x2_100	4 Positions Header, Unshrouded Connector 0.100" (2.54mm) Through Hole Tin
40	1	JMP9	0.1x0.1" Header (2x4)	TSW-150-08-G-S	Samtec	HDR_THVT_2X4_100	50 Positions Header, Unshrouded Connector 0.100" (2.54mm) Through Hole Gold
41	2	J5, J3	Edge Launch SMA	32K243-40ML5	Rosenberger	CON_02K243-40M	RF Connectors / Coaxial Connectors R/A Jack PCB
42	0	J2, J4,	DNI - Edge Launch SMA	32K243-40ML5	Rosenberger	CON_02K243-40M	RF Connectors / Coaxial Connectors R/A Jack PCB
43	1	J1	MEC1-120-02-F-D-A Connector	MEC1-120-02-F-D-RA1-SL	Samtec	CON_SMRT_MEC1_40_F	CONN EDGE CARD DL 40POS SMD
44	2	L12, L1	Inductor 47uH, 35mA	GLFR1608T470M-LR	Taiyo Yuden	0603	47uH Shielded Wirewound Inductor 100mA 2.3 Ohm 0603 (1608 Metric)
45	3	L9, L5, L2	Ferrite Bead 1.8kohm, 200mA	BLM15HD182SN1D	Murata	0402_2020MIL	1.8 kOhm Impedance Ferrite Bead 0402 (1005 Metric) Surface Mount Signal Line 200mA 1 Lines 2.2 Ohm Max DCR -55°C ~ 125°C
46	3	L7, L4, L3	Ferrite Bead 1000ohm, 125mA	BLM03HG102SN1D	MuRata	0201	1 kOhm Impedance Ferrite Bead 0201 (0603 Metric) Surface Mount 125mA 1 Lines 2.6 Ohm Max DCR -55°C ~ 125°C
47	3	L15, L11, L8	CIC10P330	CIC10P330	Samsung	0603	33 Ohm Impedance Ferrite Bead 0603 (1608 Metric) Surface Mount Power Line 3A 1 Lines 25 mOhm Max DCR -55°C ~ 125°C
48	0	L13	DNI - CIC10P330	CIC10P330	Samsung	0603	33 Ohm Impedance Ferrite Bead 0603 (1608 Metric) Surface Mount Power Line 3A 1 Lines 25 mOhm Max DCR -55°C ~ 125°C
49	4	L16, L10, L6	DNI_CIC10P330	CIC10P330	Samsung	0603	33 Ohm Impedance Ferrite Bead 0603 (1608 Metric) Surface Mount Power Line 3A 1 Lines 25 mOhm Max DCR -55°C ~ 125°C
50	0	L14,	DNI_CIC10P330	CIC10P330	Samsung	0603	33 Ohm Impedance Ferrite Bead 0603 (1608 Metric) Surface Mount Power Line 3A 1 Lines 25 mOhm Max DCR -55°C ~ 125°C
51	3	P1, P2, P5	Solderless Banana Jack	108-0740-001	Emerson Network Power	JACK_THVT_BANANA_500dia	Banana Jack Connector Standard Banana Threaded, External (Nut)
52	0	P3	DNI_ROSA	DNI	DNI	MSA_XMD_ROSA_IN V	Note: TI will assemble the ROSA

**Table 2. ONET1131EC EVM Bill of Materials (continued)**

Item	Qty	Reference	Value	Part Number	Manufacturer	PCB Footprint	Notes
53	0	P4	DNI_EML_TOSA	DNI	DNI	162X_TOSA	Note: TI will assemble the TOSA
54	3	Q5, Q4	FDV301N	FDV301N	Fairchild	SOT23_3	MOSFET N-CH 25V 220MA SOT-23
55	0	Q6,	DNI - FDV301N	FDV301N	Fairchild	SOT23_3	MOSFET N-CH 25V 220MA SOT-23
56	2	Q3, Q2	MMSTA55	MMSTA55-7-F	Diodes Inc.	SOT_323-3	TRANS PNP 60V 0.5A SC70-3
57	1	Q1	DMC20201	DMC20201	Panasonic	SOT23_5	TRANS 2NPN 50V 0.1A MINI5
58	1	U1	ONET1131Ex	ONET1131ECSRMT	Texas Instruments	ONET1130Ex_QFN32	Note: TI will supply
59	1	U2	TCA6408A_RGT	TCA6408ARGTR	Texas Instruments	QFN_16_3MSQ	IC I/O EXPANDER I2C 8B 16QFN
60	1	U3	TMP422	TMP422AIDCNT	Texas Instruments	DCN_SOT23-8	SENSOR TEMPERATURE SMBUS SOT23-8
61	1	U4	TPS60400	TPS60400DBVT	Texas Instruments	SOT23-5	Charge Pump Switching Regulator IC Positive or Negative Fixed -Vin, 2Vin, Vin/2 1 Output 60mA SC-74A, SOT-753
62	8	Standoff	Round Threaded 0.5"	2204	Keystone Electronics		ROUND SPACER #4 NYLON 1/2"
63	8	Screws	Round 4-40/0.25"	PMS55 440 0025 PH	Building Fasteners		PMS55 440 0025 PH
64	1	PCB	ONET1131EC-EVM	INT056	ANY		PCB boards

## STANDARD TERMS AND CONDITIONS FOR EVALUATION MODULES

1. *Delivery:* TI delivers TI evaluation boards, kits, or modules, including any accompanying demonstration software, components, or documentation (collectively, an "EVM" or "EVMs") to the User ("User") in accordance with the terms and conditions set forth herein. Acceptance of the EVM is expressly subject to the following terms and conditions.
  - 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 and conditions 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 and conditions 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 any defects that are 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. Moreover, TI shall not be liable for any defects that result from User's design, specifications or instructions for such EVMs. Testing and other quality control techniques are used to the extent TI deems necessary or as mandated by government requirements. TI does not test all parameters of each EVM.
  - 2.3 If any EVM fails to conform to the warranty set forth above, TI's sole liability shall be at its option to repair or replace such EVM, 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.
3. *Regulatory Notices:*
  - 3.1 *United States*
    - 3.1.1 *Notice applicable to EVMs not FCC-Approved:*

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 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

*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

#### Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSS standard(s). 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/lstds/ti\\_ja/general/eStore/notice\\_01.page](http://www.tij.co.jp/lstds/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。  
[http://www.tij.co.jp/lstds/ti\\_ja/general/eStore/notice\\_01.page](http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_01.page)

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 by Radio Law of Japan to follow the instructions below with respect to EVMs:

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。

上記を遵守頂けない場合は、電波法の罰則が適用される可能性があることをご留意ください。日本テキサス・インスツルメンツ株式会社

東京都新宿区西新宿 6 丁目 2 4 番 1 号

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3.3.3 *Notice for EVMs for Power Line Communication:* Please see [http://www.tij.co.jp/llds/ti\\_ja/general/eStore/notice\\_02.page](http://www.tij.co.jp/llds/ti_ja/general/eStore/notice_02.page)

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#### 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 WRITTEN DESIGN MATERIALS PROVIDED WITH THE EVM (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 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 AND CONDITIONS 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 MADE, CONCEIVED OR ACQUIRED PRIOR TO OR AFTER DELIVERY OF THE EVM.
7. *USER'S INDEMNITY OBLIGATIONS AND REPRESENTATIONS.* USER WILL DEFEND, INDEMNIFY AND HOLD TI, ITS LICENSORS AND THEIR REPRESENTATIVES HARMLESS FROM AND AGAINST ANY AND ALL CLAIMS, DAMAGES, LOSSES, EXPENSES, COSTS AND LIABILITIES (COLLECTIVELY, "CLAIMS") ARISING OUT OF OR IN CONNECTION WITH ANY HANDLING OR USE OF THE EVM THAT IS NOT IN ACCORDANCE WITH THESE TERMS AND CONDITIONS. THIS OBLIGATION SHALL APPLY WHETHER CLAIMS ARISE UNDER STATUTE, REGULATION, OR THE LAW OF TORT, CONTRACT OR ANY OTHER LEGAL THEORY, AND EVEN IF THE EVM FAILS TO PERFORM AS DESCRIBED OR EXPECTED.
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 AND CONDITIONS OR THE USE OF THE EVMS PROVIDED HEREUNDER, 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 ONE YEAR AFTER THE RELATED CAUSE OF ACTION HAS OCCURRED.
- 8.2 *Specific Limitations.* IN NO EVENT SHALL TI'S AGGREGATE LIABILITY FROM ANY WARRANTY OR OTHER OBLIGATION ARISING OUT OF OR IN CONNECTION WITH THESE TERMS AND CONDITIONS, OR ANY USE OF ANY TI EVM PROVIDED HEREUNDER, EXCEED THE TOTAL AMOUNT PAID TO TI FOR THE PARTICULAR UNITS SOLD UNDER THESE TERMS AND CONDITIONS WITH RESPECT TO WHICH LOSSES OR DAMAGES ARE CLAIMED. THE EXISTENCE OF MORE THAN ONE CLAIM AGAINST THE PARTICULAR UNITS SOLD TO USER UNDER THESE TERMS AND CONDITIONS SHALL NOT ENLARGE OR EXTEND THIS LIMIT.
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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## 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 semiconductor 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.
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 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

*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/lstds/ti\\_ja/general/eStore/notice\\_01.page](http://www.tij.co.jp/lstds/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。  
[http://www.tij.co.jp/lstds/ti\\_ja/general/eStore/notice\\_01.page](http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_01.page)

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.

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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。

上記を遵守頂けない場合は、電波法の罰則が適用される可能性があることをご留意ください。日本テキサス・インスツルメンツ株式会社

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3.3.3 *Notice for EVMs for Power Line Communication:* Please see [http://www.tij.co.jp/llds/ti\\_ja/general/eStore/notice\\_02.page](http://www.tij.co.jp/llds/ti_ja/general/eStore/notice_02.page)  
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#### 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.

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