

Wi-Fi 6E DATASHEET axE2-6000



Wi-Fi 6E

IEEE 802.11 a/n/ac/ax
2x2 MU-MIMO
MiniPCIe Radio Module



High Performance

30 dBm TX Power
6 GHz to 7 GHz



Industrial grade

-40 deg C to +85 deg C
operation temperature



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HW REV# axE26000.0100
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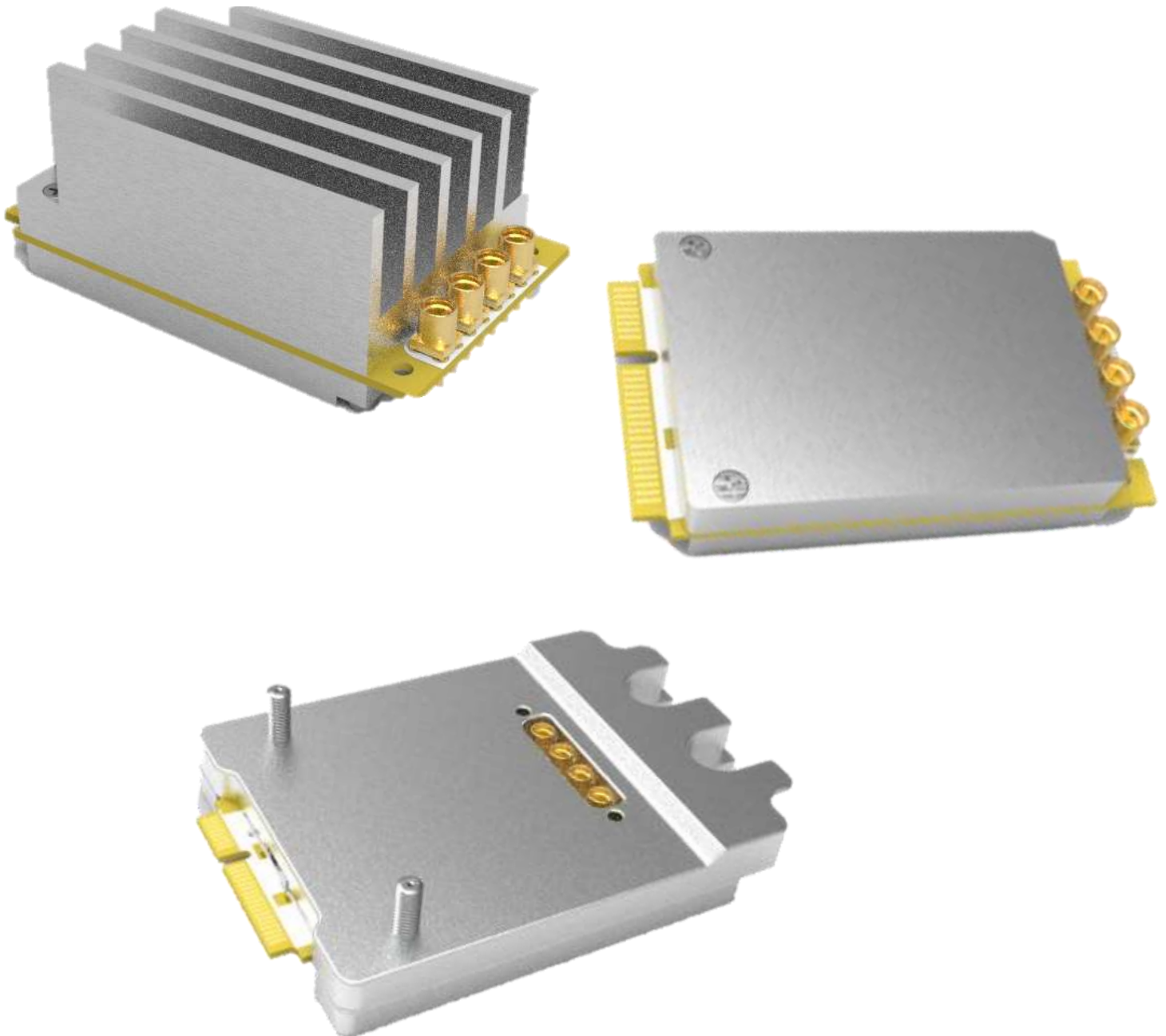
CUSTOM DESIGN (Options)

Heatsink, Shield Cover and Mechanical Parts

Talk to our experts



enquiry@vizmonet.com



TECHNICAL SPECIFICATION

RADIO MODULE – GENERAL INFO	
Chipset	QUALCOMM QCN-9072-1
EEPROM	2-Mbit serial I ² C bus EEPROM
Host Interface	Mini PCIe interface with PCIe 3.0
Operating System	Linux, supports open source ath11K Linux driver
Security	AES-CCMP at 128/256 bits AES-GCMP at 128/256 bits WEP, TKIP hardware encryption WAPI-2 hardware encryption WPA/WPA2-Personal/WPA2-Enterprise and WPA3 Personal
Operating frequency (11b/g/n)	6000 MHz to 7125 MHz
Data rate-11a	6Mbps, 9Mbps, 12Mbps, 18 Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps
Data rate-11n	MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7
Data rate-11ac	MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7, MCS8, MCS9, MCS10, MCS11
Data rate-11ax	MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7, MCS8, MCS9, MCS10, MCS11, MCS12, MCS13
Channel BW	5 MHz/10 MHz/20 MHz/40 MHz/80 MHz/160 MHz
Compliance	RoHS, MIL-STD-810G Shock & Vibration
MAC ID	74E277 Series
INTERFACE SPECIFICATIONS	
Operating Voltage	3.3V DC / 5V DC (through miniPCI pins 45,47,49,51 for PA)
Total DC Power Consumption	7 Watts in 2x2 MIMO mode
RF Antenna connector	x2 MMCX Female(Jack), Straight connectors
ENVIRONMENTAL SPECIFICATIONS	
Operating Temperature Range	-40 deg C to +85 deg C
PHYSICAL SPECIFICATIONS	
Mechanical Dimension	(L) 51 mm x (W) 30 mm x (H) 21mm
Weight (grams)	46
REGULATORY INFORMATION	
Compliance	Work in Progress
PACKAGING INFORMATION	
No of units	100, Shipping Carton Dimension (52 cm x 23 cm x 13 cm)

ORDERING INFORMATION

axE2-6000

Mini PCIe Radio Module, 2x2 MU-MIMO, IEEE 802.11 a/n/ac/ax, 6 GHz 30 dBm

RADIO SPECIFICATION**TX/RX Specification (11a) – 6000 MHz to 7125 MHz**TX Power per chain (SISO mode), ± 2 dBm.

DC power consumption is the total dc power drawn only by the miniPCIe module in 2x2 MIMO mode and it excludes the dc power drawn by the main board to which the module is connected.

RX Sensitivity per chain (SISO mode) , ± 2 dBm.

Data Rate	Modulation	TX Power (dBm)	DC Power Consumption (Watts)	RX Sensitivity (dBm)
6 Mbps	BPSK	27	7	-94
9 Mbps	BPSK	27	7	-92
12 Mbps	QPSK	27	7	-91
18 Mbps	QPSK	27	7	-90
24 Mbps	16-QAM	25	6	-85
36 Mbps	16-QAM	23	5.5	-82
48 Mbps	64-QAM	22	5.2	-77
54 Mbps	64-QAM	21	5.2	-76

TX/RX Specification (11n) – 6000 MHz to 7125 MHz

TX Power per chain (SISO mode), ± 2 dBm.

DC power consumption is the total dc power drawn only by the miniPCIe module in 2x2 MIMO mode and it excludes the dc power drawn by the main board to which the module is connected.

RX Sensitivity per chain (SISO mode), ± 2 dBm.

Data Rate	Modulation	TX Power (dBm)	DC Power Consumption (Watts)	RX Sensitivity (dBm)
HT20-MCS0	BPSK	27	7	-92
HT20-MCS1	QPSK	27	7	-89
HT20-MCS2	QPSK	27	7	-87
HT20-MCS3	16-QAM	25	6	-83
HT20-MCS4	16-QAM	25	6	-80
HT20-MCS5	64-QAM	23	5.5	-76
HT20-MCS6	64-QAM	22	5.2	-74
HT20-MCS7	64-QAM	21	5.2	-73
HT40-MCS0	BPSK	27	7	-89
HT40-MCS1	QPSK	27	7	-86
HT40-MCS2	QPSK	26	6.5	-84
HT40-MCS3	16-QAM	23	5.5	-80
HT40-MCS4	16-QAM	23	5.5	-77
HT40-MCS5	64-QAM	22	5.2	-73
HT40-MCS6	64-QAM	21	5.2	-71
HT40-MCS7	64-QAM	21	5.2	-70

TX/RX Specification (11ac) – 6000 MHz to 7125 MHz

TX Power per chain (SISO mode), ± 2 dBm.

DC power consumption is the total dc power drawn only by the miniPCIe module in 2x2 MIMO mode and it excludes the dc power drawn by the main board to which the module is connected.

RX Sensitivity per chain (SISO mode), ± 2 dBm.

Data Rate	Modulation	TX Power (dBm)	DC Power Consumption (Watts)	RX Sensitivity (dBm)
VHT20-MCS0	BPSK	27	7	-95
VHT20-MCS1	QPSK	27	7	-93
VHT20-MCS2	QPSK	27	7	-91
VHT20-MCS3	16-QAM	25	6	-88
VHT20-MCS4	16-QAM	25	6	-84
VHT20-MCS5	64-QAM	23	5.5	-80
VHT20-MCS6	64-QAM	22	5.2	-79
VHT20-MCS7	64-QAM	21	5.2	-78
VHT20-MCS8	256-QAM	21	5.2	-73
VHT20-MCS9	256-QAM	21	5.2	-71
VHT20-MCS10	1024-QAM	21	5.2	-68
VHT20-MCS11	1024-QAM	21	5.2	-66
VHT40-MCS0	BPSK	27	7	-92
VHT40-MCS1	QPSK	27	7	-90
VHT40-MCS2	QPSK	26	6.5	-88
VHT40-MCS3	16-QAM	25	6	-85
VHT40-MCS4	16-QAM	23	5.5	-81
VHT40-MCS5	64-QAM	22	5.2	-77
VHT40-MCS6	64-QAM	21	5.2	-76
VHT40-MCS7	64-QAM	21	5.2	-75
VHT40-MCS8	256-QAM	21	5.2	-70
VHT40-MCS9	256-QAM	20	5	-68
VHT40-MCS10	1024-QAM	20	5	-65
VHT40-MCS11	1024-QAM	20	5	-63

TX/RX Specification (11ac) – 6000 MHz to 7125 MHz

TX Power per chain (SISO mode), ± 2 dBm.

DC power consumption is the total dc power drawn only by the miniPCIe module in 2x2 MIMO mode and it excludes the dc power drawn by the main board to which the module is connected.

RX Sensitivity per chain (SISO mode), ± 2 dBm.

Data Rate	Modulation	TX Power (dBm)	DC Power Consumption (Watts)	RX Sensitivity (dBm)
VHT80-MCS0	BPSK	27	7	-89
VHT80-MCS1	QPSK	26	6.5	-87
VHT80-MCS2	QPSK	25	6	-85
VHT80-MCS3	16-QAM	24	5.5	-82
VHT80-MCS4	16-QAM	23	5.5	-78
VHT80-MCS5	64-QAM	23	5.5	-74
VHT80-MCS6	64-QAM	22	5.2	-73
VHT80-MCS7	64-QAM	21	5.2	-72
VHT80-MCS8	256-QAM	21	5.2	-67
VHT80-MCS9	256-QAM	20	5	-65
VHT80-MCS10	1024-QAM	20	5	-62
VHT80-MCS11	1024-QAM	20	5	-60
VHT160-MCS0	BPSK	27	7	-86
VHT160-MCS1	QPSK	25	6	-84
VHT160-MCS2	QPSK	23	5.5	-82
VHT160-MCS3	16-QAM	22	5.2	-79
VHT160-MCS4	16-QAM	22	5.2	-75
VHT160-MCS5	64-QAM	22	5.2	-71
VHT160-MCS6	64-QAM	21	5.2	-70
VHT160-MCS7	64-QAM	21	5.2	-69
VHT160-MCS8	256-QAM	20	5	-64
VHT160-MCS9	256-QAM	20	5	-62
VHT160-MCS10	1024-QAM	20	5	-59
VHT160-MCS11	1024-QAM	19	5	-57

TX/RX Specification (11ax) – 6000 MHz to 7125 MHz

TX Power per chain (SISO mode), ± 2 dBm.

DC power consumption is the total dc power drawn only by the miniPCIe module in 2x2 MIMO mode and it excludes the dc power drawn by the main board to which the module is connected.

RX Sensitivity per chain (SISO mode), ± 2 dBm.

Data Rate	Modulation	TX Power (dBm)	DC Power Consumption (Watts)	RX Sensitivity (dBm)
HE20-MCS0	BPSK	27	7	-93
HE20-MCS1	QPSK	27	7	-92
HE20-MCS2	QPSK	26	6.5	-90
HE20-MCS3	16-QAM	24	5.5	-88
HE20-MCS4	16-QAM	24	5.5	-84
HE20-MCS5	64-QAM	23	5.5	-80
HE20-MCS6	64-QAM	21	5.2	-78
HE20-MCS7	64-QAM	21	5.2	-76
HE20-MCS8	256-QAM	20	5	-73
HE20-MCS9	256-QAM	20	5	-71
HE20-MCS10	1024-QAM	20	5	-68
HE20-MCS11	1024-QAM	20	5	-65
HE20-MCS12	4096-QAM	19	5	-64
HE20-MCS13	4096-QAM	19	5	-63
HE40-MCS0	BPSK	27	7	-90
HE40-MCS1	QPSK	27	7	-89
HE40-MCS2	QPSK	26	6.5	-87
HE40-MCS3	16-QAM	24	5.5	-85
HE40-MCS4	16-QAM	23	5.5	-81
HE40-MCS5	64-QAM	23	5.5	-77
HE40-MCS6	64-QAM	21	5.2	-75
HE40-MCS7	64-QAM	21	5.2	-73
HE40-MCS8	256-QAM	20	5	-70
HE40-MCS9	256-QAM	20	5	-68
HE40-MCS10	1024-QAM	19	5	-65
HE40-MCS11	1024-QAM	19	5	-62
HE40-MCS12	4096-QAM	19	5	-61
HE40-MCS13	4096-QAM	19	5	-60

TX/RX Specification (11ax) – 6000 MHz to 7125 MHz

TX Power per chain (SISO mode), ± 2 dBm.

DC power consumption is the total dc power drawn only by the miniPCIe module in 2x2 MIMO mode and it excludes the dc power drawn by the main board to which the module is connected.

RX Sensitivity per chain (SISO mode), ± 2 dBm.

Data Rate	Modulation	TX Power (dBm)	DC Power Consumption (Watts)	RX Sensitivity (dBm)
HE80-MCS0	BPSK	27	7	-87
HE80-MCS1	QPSK	26	7	-86
HE80-MCS2	QPSK	25	6	-84
HE80-MCS3	16-QAM	24	5.5	-82
HE80-MCS4	16-QAM	23	5.5	-78
HE80-MCS5	64-QAM	22	5.2	-74
HE80-MCS6	64-QAM	21	5.2	-72
HE80-MCS7	64-QAM	20	5	-70
HE80-MCS8	256-QAM	20	5	-67
HE80-MCS9	256-QAM	19	5	-65
HE80-MCS10	1024-QAM	19	5	-62
HE80-MCS11	1024-QAM	19	5	-59
HE80-MCS12	4096-QAM	18	5	-58
HE80-MCS13	4096-QAM	18	5	-57
HE160-MCS0	BPSK	27	7	-84
HE160-MCS1	QPSK	26	6.5	-83
HE160-MCS2	QPSK	24	5.5	-81
HE160-MCS3	16-QAM	23	5.5	-79
HE160-MCS4	16-QAM	22	5.2	-75
HE160-MCS5	64-QAM	22	5.2	-71
HE160-MCS6	64-QAM	21	5.2	-69
HE160-MCS7	64-QAM	21	5.2	-67
HE160-MCS8	256-QAM	20	5	-64
HE160-MCS9	256-QAM	20	5	-62
HE160-MCS10	1024-QAM	18	5	-59
HE160-MCS11	1024-QAM	18	5	-56
HE160-MCS12	4096-QAM	17	5	-55
HE160-MCS13	4096-QAM	17	5	-54

TX Specification

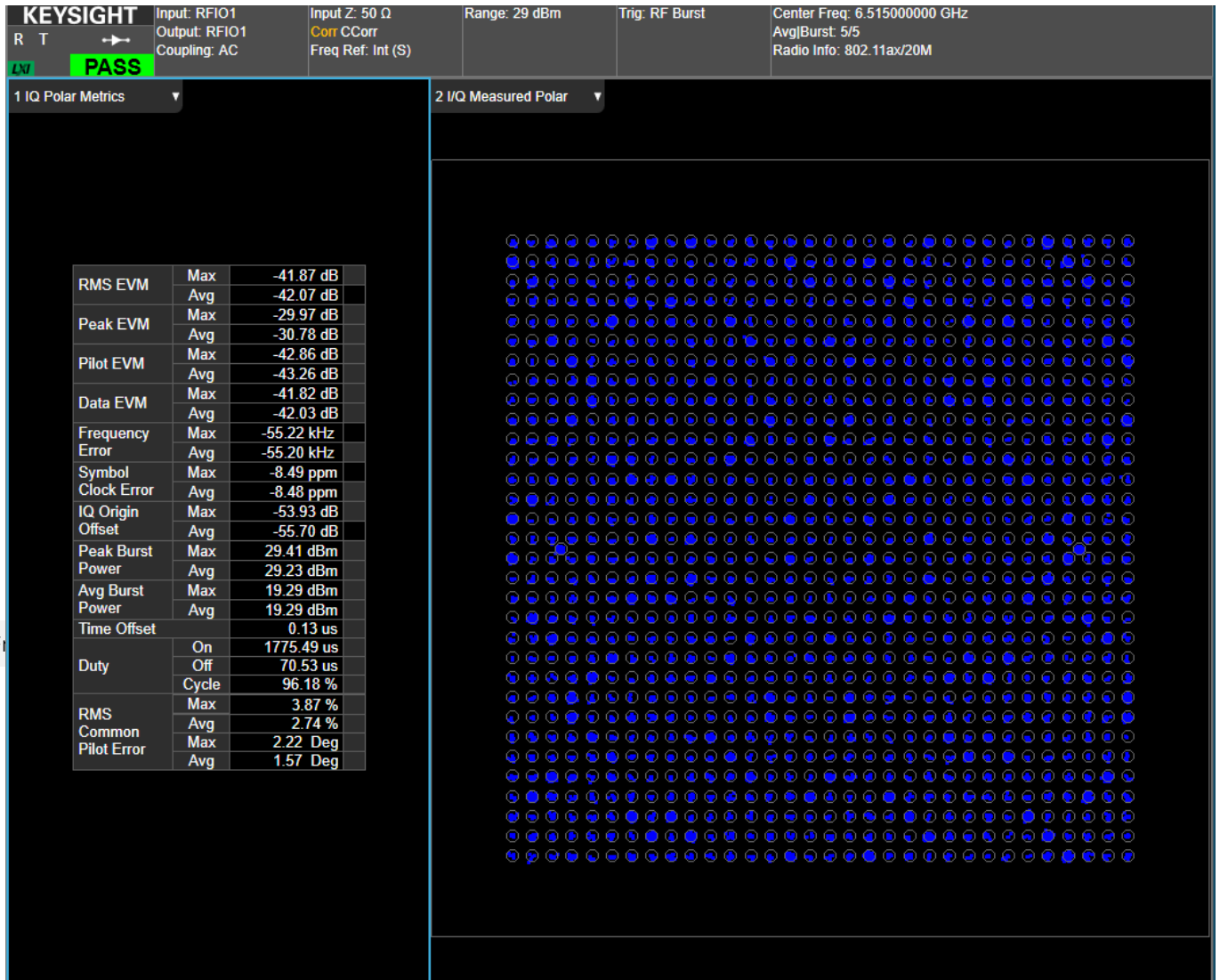
Parameter	Specification
RF Power control Step	0.5 dBm
Spectral Mask Compliance	Compliant with IEEE 802.11an/ac/ax Mask, with > 5 dB margin
EVM Compliance	Compliant with IEEE 802.11a/n/ac/ax EVM with > 5 dB margin
Second Harmonic Spurious Emission	-60 dBC
Third Harmonic Spurious Emission	-70 dBC
Transmitter Spurious Emission	FCC PART 15E COMPLIANT

RX Specification

Parameter	Specification
Receiver Maximum input level (10% PER)	
11a < 18 Mbps, 11n/11ac/11ax < MCS5	> 2 dBm
11a > 18 Mbps, 11n/11ac/11ax > MCS5	> -10 dBm
Frequency Accuracy	Within ± 10 PPM
Receiver Adjacent Channel Rejection (ACR)	
11n, 6 Mbps	> 25 dBC
11ac VHT40, 11ax HE80-MCS0	> 30 dBC
11ax, HE160-MCS11	> 11 dBC
Interference De-sensitization 11ax, HE20-MCS13	
400 MHz to 2350 MHz	> 70 dBC
2400 MHz to 3600 MHz	> 50 dBC
In Band Interference	> 30 dBC

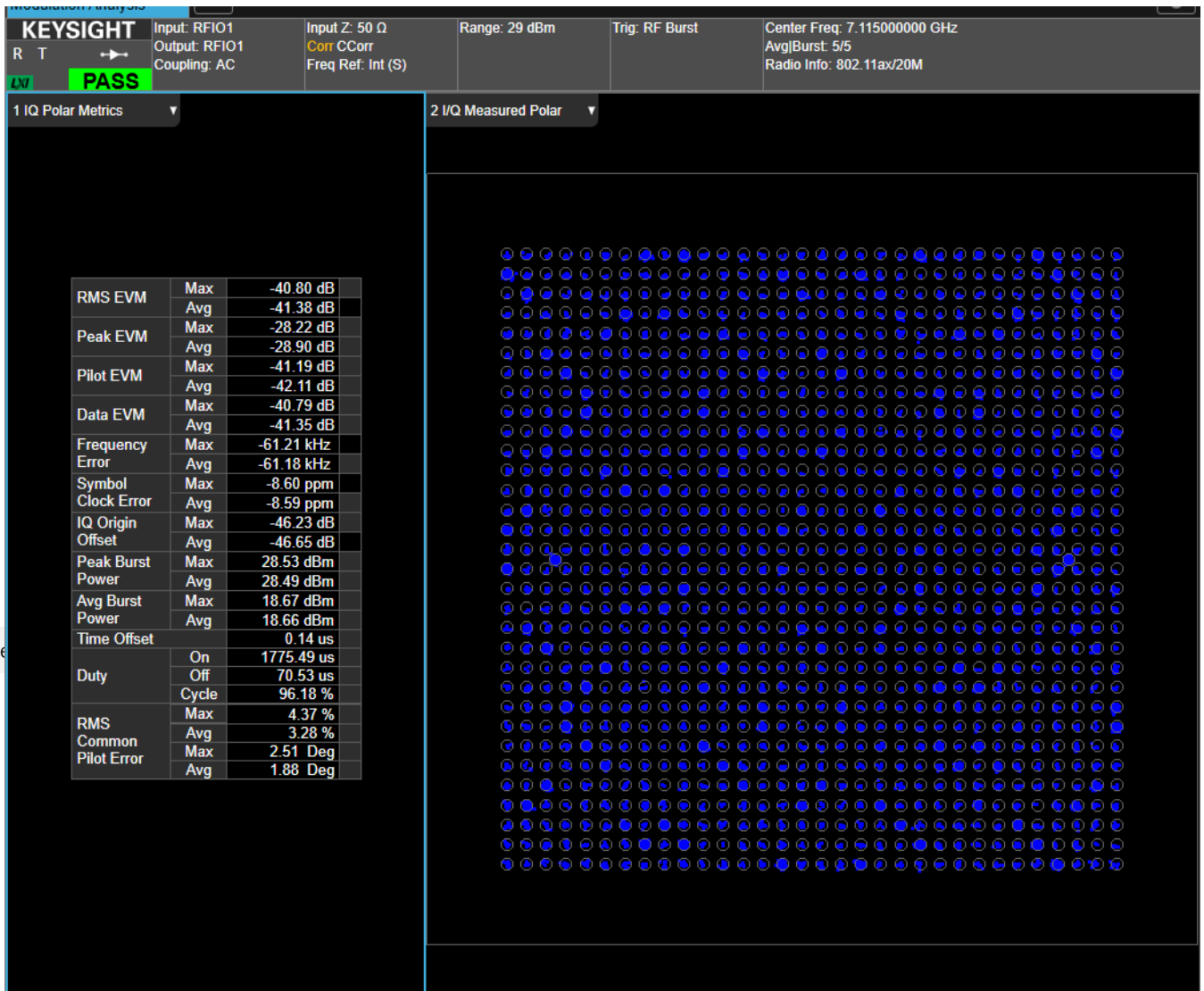
TX EVM PERFORMANCE

Frequency = 6515 MHz, TX Power=19.3 dBm, IEEE 802.11ax, HE20, MCS11



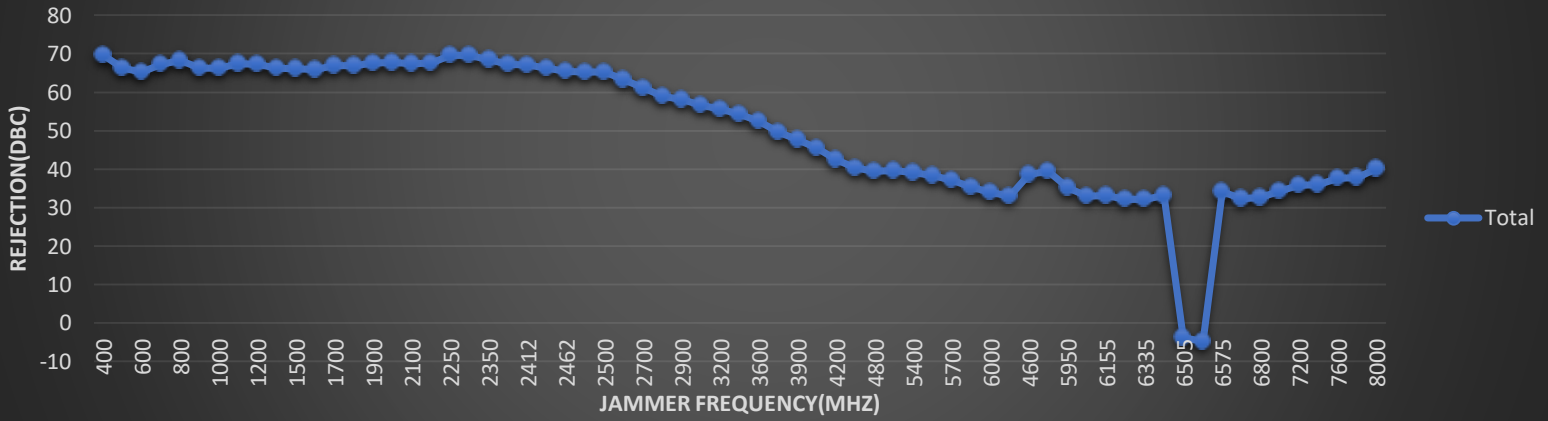
TX EVM PERFORMANCE

Frequency = 7115 MHz, TX Power = 18.7 dBm, IEEE 802.11ax, HE20, MCS11



Receiver Interference Desensitization

RX Interference De-Sensitization
6515MHz, 11ax-MCS13-HE20-SISO



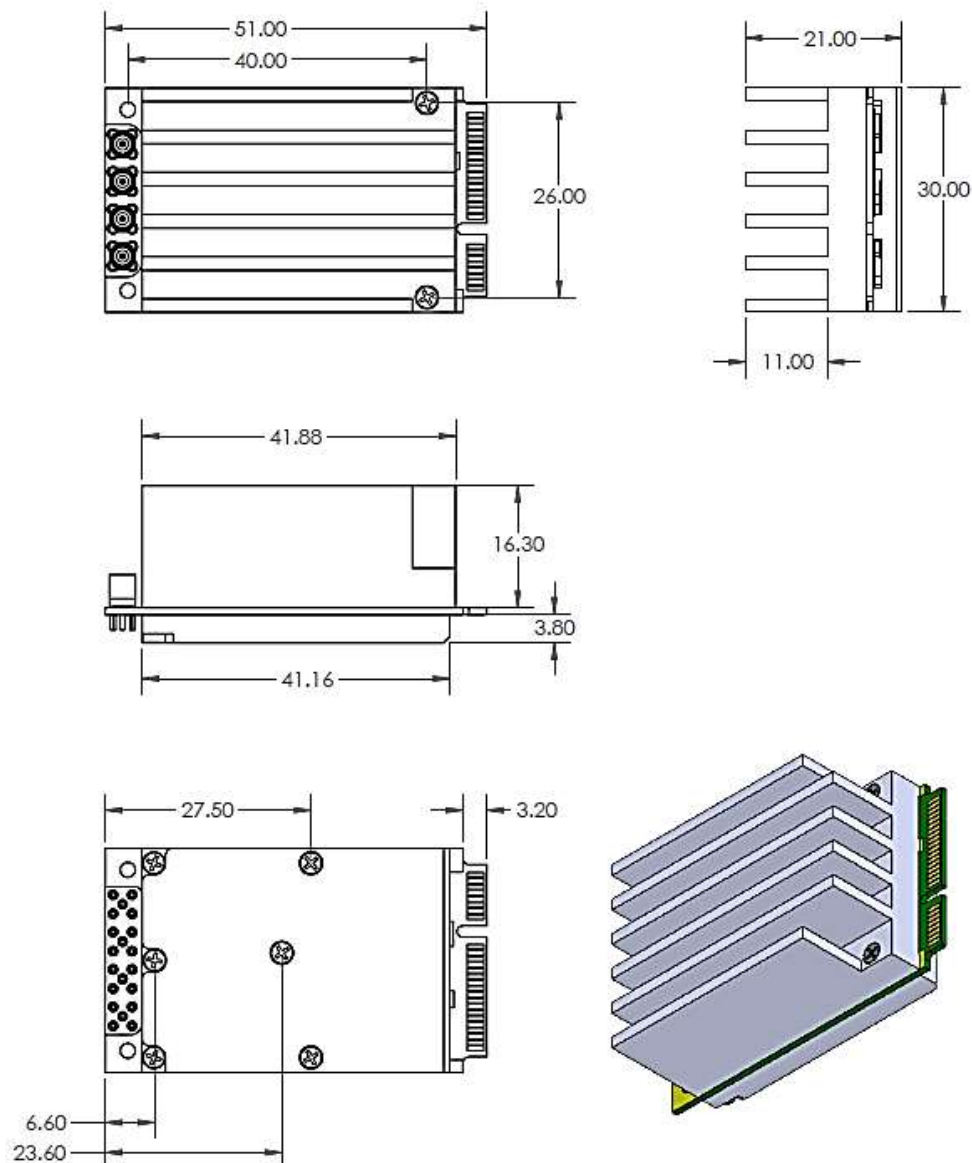
Receiver Dynamic Range



MINIPCIE (GOLD FINGER) PIN-OUT

Pin#	Description
1	WAKE_L
2	3.3V
3	RESERVED (NC)
5	RESERVED (NC)
6	1.5V (NC)
7	CLKREQ_L, connected to GND through a pull-down resistor of 0 Ohms.
8	UIM_PWR (NC)
10	UIM_DATA (NC)
11	REFCLK-
12	UIM-CLK (NC)
13	REFCLK+
14	UIM-RESET (NC)
16	UIM_VPP (NC)
17	UIM_C8 (NC)
19	UIM_C4 (NC)
20	W_DISABLE_L (Pulled up to 3.3V)
22	RESET
23	PERNO
24	3.3VAUX (NC)
25	PERPO
28	1.5V (NC)
30	SMB_CLK (NC)
31	PETNO
32	SMB_DATA(NC)
33	PETPO
36	USB_D- (NC)
37	RESERVED (NC)
38	USB_D+ (NC)
39	3.3V
41	3.3V
42	LED_WWAN_L (NC)
44	LED_WLAN_L (NC)
45	5V (FOR PA)
46	LED_WPAN_L (NC)
47	5V (FOR PA)
48	1.5V (NC)
49	5V (FOR PA)
51	5V (FOR PA)
52	3.3V
4,9,15,18,21,26,27,29,34,35,40,43,50	GND
NC- NO CONNECTION	

MECHANICAL DIMENSIONS



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