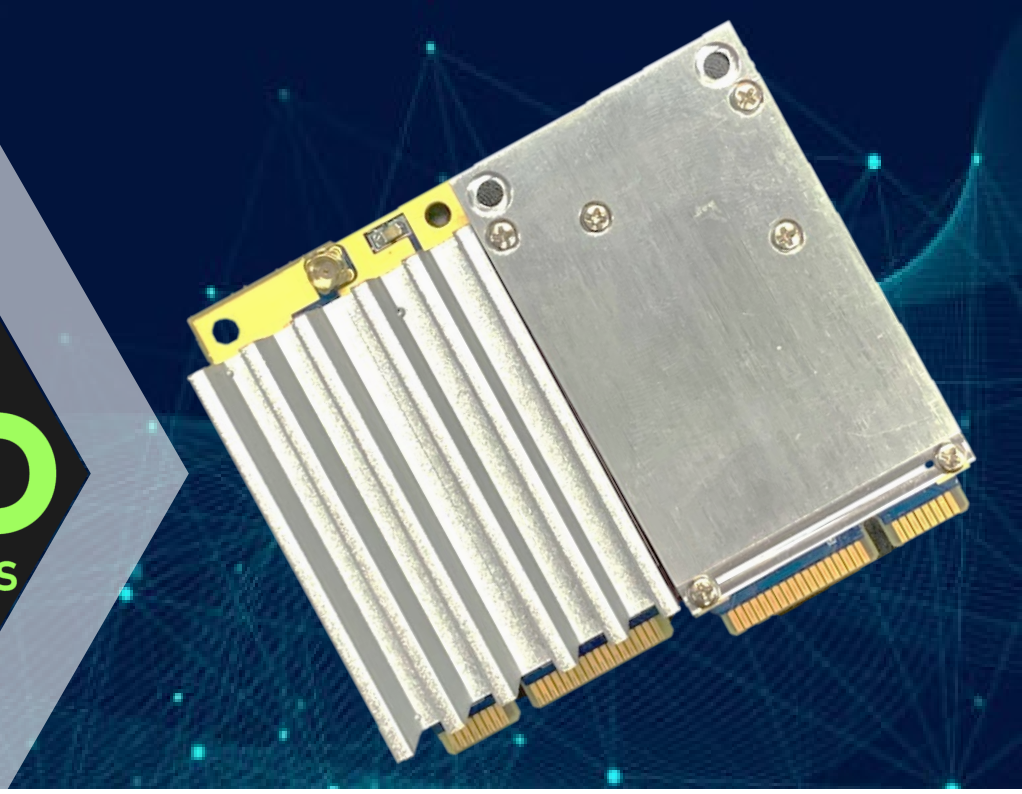
vizmo

FREEDOM FROM WIRES



DATASHEET

nE1-902

IEEE 802.11 b/g/n

High-Performance, SISO MiniPCIe Radio Module

Sub GHz ISM Band

902 MHz to 928 MHz operating Frequency in license-free Band, 5/10/20 MHz Channel Bandwidths

Industrial grade

-40 deg C to +85 deg C operation temperature

dun & bradstreet

Business Eminence Awards 2020 Singapore

VIZMONET PTE LTD

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HW REV# 02.00
Updated on Apr-28-24

TECHNICAL SPECIFICATION

RADIO MODULE – GENERAL INFO	
Chipset	AR 9592-AR1B
EEPROM	EEPROM, SERIAL 32KBIT
Operating System	Linux, OPENWRT, supports open source ath9K Linux driver
Security	128-bit AES, WEP, TKIP and WAPI hardware encryption Support for IEEE 802.11d, e, h, i standards Small packet size (96 Bytes) in AES encryption at full packet rate Loopback mode to assist FIPS AES certification
Operating frequency (11b/g/n)	902 MHz to 928 MHz
Data rate - 1S, SISO Data rate - 2S, MIMO	1 Mbps, 2 Mbps, 5.5Mbps, 111 Mbps (11b) 6Mbps, 9Mbps, 12Mbps, 24Mbps, 36Mbps, 48Mbps,54Mbps (11g) MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7 (11n, 1S,SISO) MCS8, MCS9, MCS10, MCS11, MCS12, MCS13, MCS14, MCS15 (11n,2S,MIMO)
Channel BW	5 MHz/10 MHz/20 MHz – 907 MHz, 912 MHz, 917 MHz, 922 MHz 5 MHz/10 MHz – 907 MHz, 922 MHz
Compliance	RoHS, MIL-STD-810G Shock & Vibration
INTERFACE SPECIFICATIONS	
Operating Voltage	3.3V DC
RF Antenna connector	x1 MMCX Female (Jack) connector
ENVIRONMENTAL SPECIFICATIONS	
Operating Temperature Range	-40 deg C to +85 deg C
PHYSICAL SPECIFICATIONS	
Mechanical Dimension	(L) 51 mm x (W) 30 mm x (W) 21 mm
Weight	TBD
REGULATORY INFORMATION	
Compliance	TBD
PACKAGING INFORMATION	
No of units	TBD

ORDERING INFORMATION	
nE1-902	Mini PCIe Radio Module, 1x1 SISO, IEEE 802.11 b/g/n ,902 MHz, 29 dBm

RADIO SPECIFICATION

Sensitivity tested in ART Mode, PSR >=95%, Chain0+Chain1
TX Power and Sensitivity Tolerance = +/- 2 dBm
Current consumption is measured at the input of the SBC with the mini-PCIe radio module connected to it. The current consumption figures are then adjusted so that they only include extra current drawn by the mini-PCIe radio module.

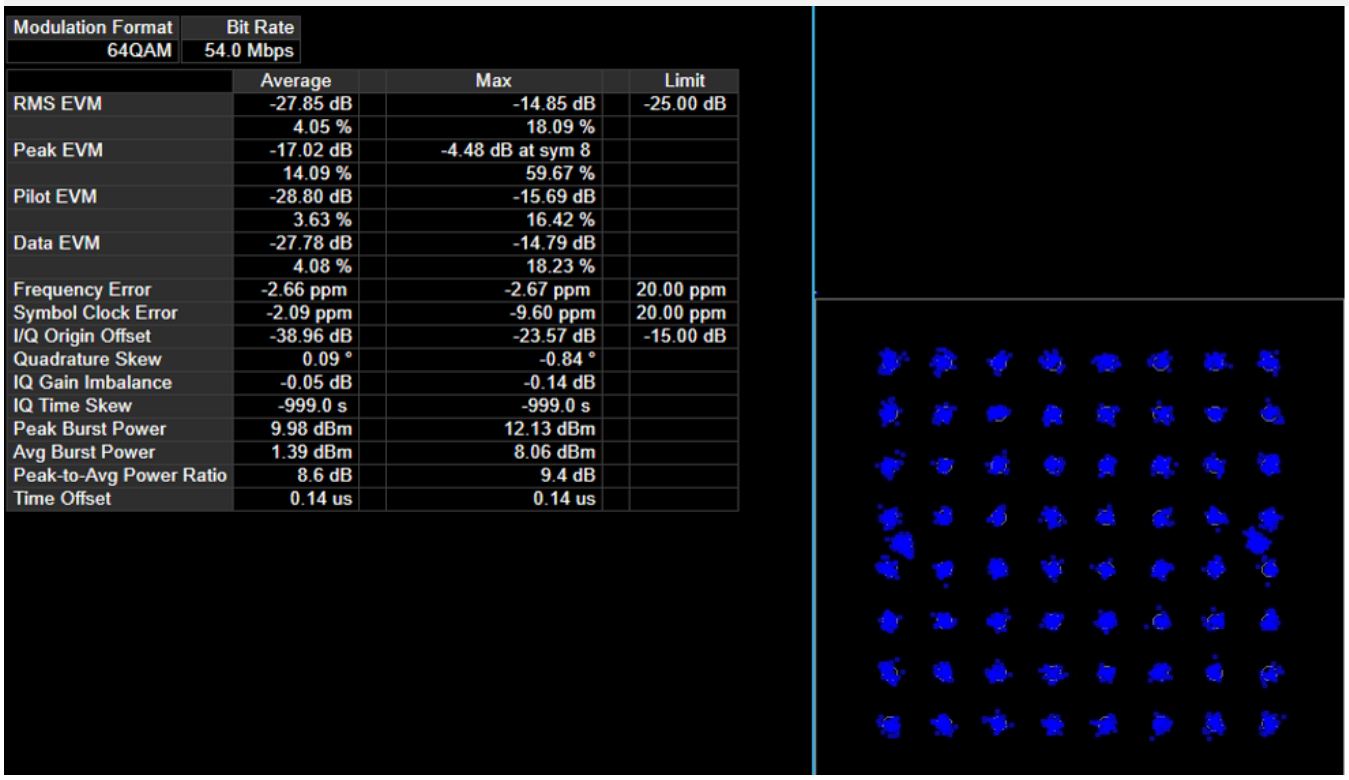
Data Rate	TX Power (dBm)	DC Power Consumption at 24V (W)	RX Sensitivity (dBm)
11 Mbps	29	4.3	-85
5.5 Mbps	29	4.3	-90
2 Mbps	29	4.3	-92
1 Mbps	29	4.3	-93
54 Mbps	20	2.2	-74
48 Mbps	22	2.4	-77
36 Mbps	24	2.6	-79
24 Mbps	26	2.9	-82
18 Mbps	26	2.9	-84
12Mbps	26	2.9	-86
9 Mbps	26	2.9	-89
6 Mbps	26	2.9	-91
HT20-MCS7	20	2.2	-65
HT20-MCS6	21	2.3	-67
HT20-MCS5	21	2.3	-71
HT20-MCS4	24	2.6	-75
HT20-MCS3	26	2.9	-78
HT20-MCS2	26	2.9	-81
HT20-MCS1	26	2.9	-86
HT20-MCS0	29	4.3	-88

Channel Mapping – 902 MHz to 928 MHz

BASE BAND (MHz)	OP FREQ (MHz)	CH BW (MHz)	STANDARD (11b/g/n)
2427	907	5/10	11g/n
2432	912	5/10/20	11b/g/n
2437	917	5/10/20	11b/g/n
2442	922	5/10	11g/n

TX EVM PERFORMANCE , 900 MHz

Frequency = 912 MHz, 802.11g, 54 Mbps



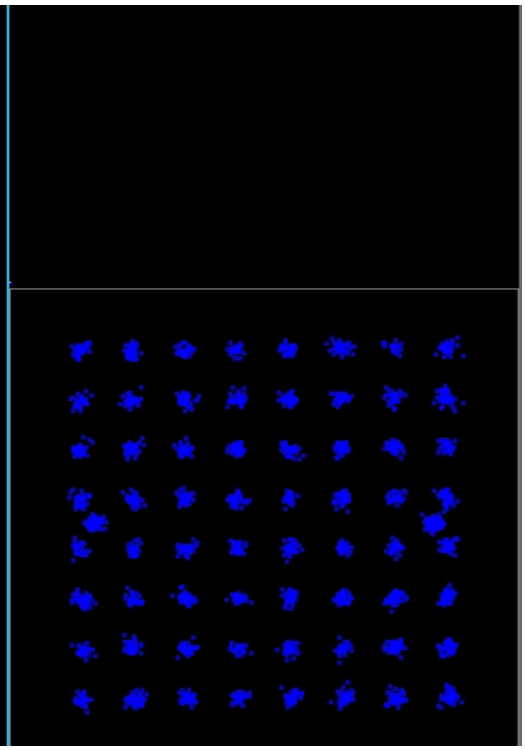
Modulation Format	Bit Rate
64QAM	54.0 Mbps

	Average	Max	Limit
RMS EVM	-27.85 dB	-14.85 dB	-25.00 dB
	4.05 %	18.09 %	
Peak EVM	-17.02 dB	-4.48 dB at sym 8	
	14.09 %	59.67 %	
Pilot EVM	-28.80 dB	-15.69 dB	
	3.63 %	16.42 %	
Data EVM	-27.78 dB	-14.79 dB	
	4.08 %	18.23 %	
Frequency Error	-2.66 ppm	-2.67 ppm	20.00 ppm
Symbol Clock Error	-2.09 ppm	-9.60 ppm	20.00 ppm
I/Q Origin Offset	-38.96 dB	-23.57 dB	-15.00 dB
Quadrature Skew	0.09 °	-0.84 °	
IQ Gain Imbalance	-0.05 dB	-0.14 dB	
IQ Time Skew	-999.0 s	-999.0 s	
Peak Burst Power	9.98 dBm	12.13 dBm	
Avg Burst Power	1.39 dBm	8.06 dBm	
Peak-to-Avg Power Ratio	8.6 dB	9.4 dB	
Time Offset	0.14 us	0.14 us	

Frequency = 912 MHz, 802.11n, MCS7 (65Mbps)

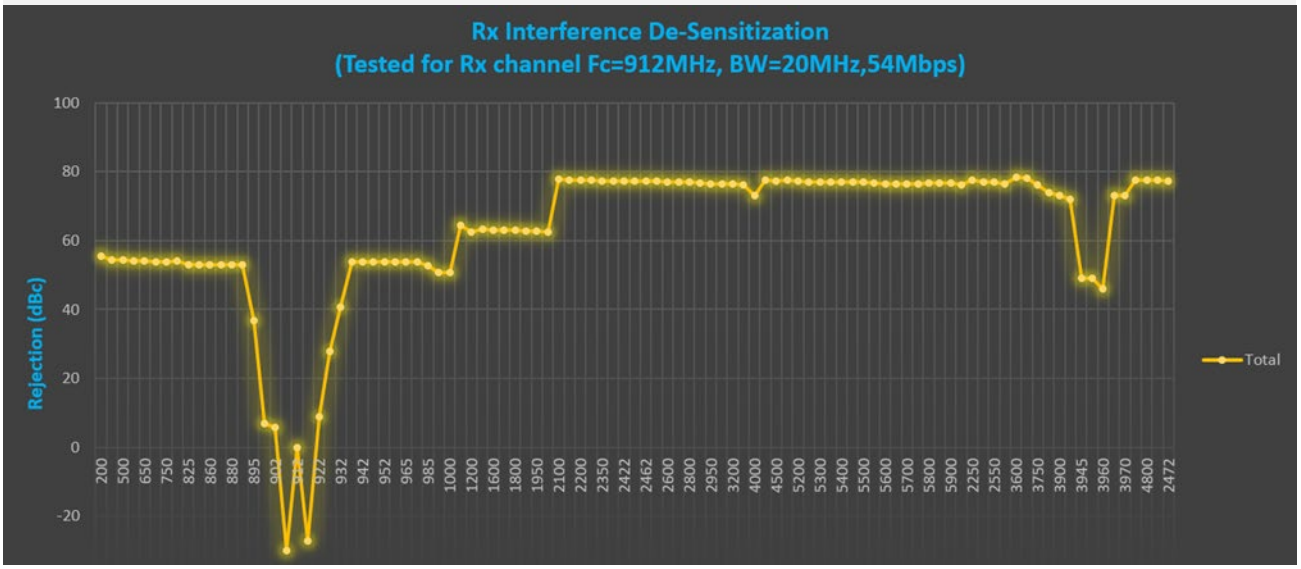
Modulation Format	Bit Rate
64QAM	65.0 Mbps

	Average	Max	Limit
RMS EVM	-28.50 dB	-27.53 dB	-27.00 dB
	3.76 %	4.20 %	
Peak EVM	-17.67 dB	-15.36 dB at sym 36	
	13.08 %	17.06 %	
Pilot EVM	-29.55 dB	-28.16 dB	
	3.33 %	3.91 %	
Data EVM	-28.43 dB	-27.47 dB	
	3.79 %	4.23 %	
Frequency Error	-2.83 ppm	-2.85 ppm	25.00 ppm
Symbol Clock Error	-3.11 ppm	-5.86 ppm	25.00 ppm
I/Q Origin Offset	-48.50 dB	-44.45 dB	-15.00 dB
Quadrature Skew	0.47 °	0.63 °	
IQ Gain Imbalance	0.00 dB	-0.03 dB	
IQ Time Skew	43.67 ps	87.44 ps	
Peak Burst Power	9.90 dBm	10.85 dBm	
Avg Burst Power	1.10 dBm	1.19 dBm	
Peak-to-Avg Power Ratio	8.8 dB	9.8 dB	
Time Offset	0.15 us	0.15 us	



RX Interference Desensitization, 900 MHz

912 MHz, 802.11g, 54 Mbps

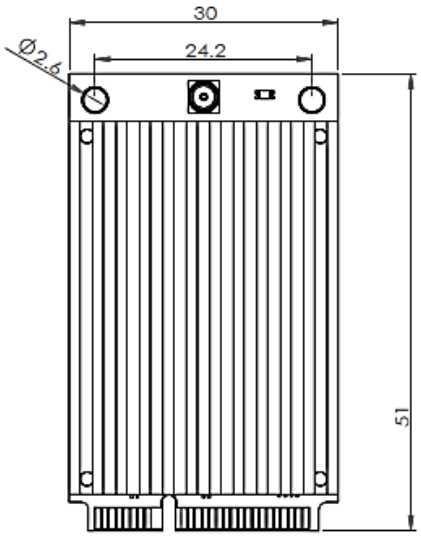


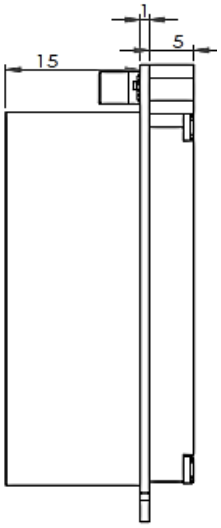
MINIPCIE (GOLD FINGER) PIN-OUT

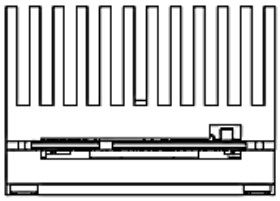
Pin#	Description
1	WAKE_L
2	3.3V
3	RESERVED (Connected to GPIO12)
5	RESERVED (NC)
6	1.5V (NC)
7	CLKREQ_L, connected to GND through a pull-down resistor of 0 Ohms.
8	UIM_PWR (NC)
10	UIM_DATA (NC)
11	REFCLK-
12	UIM-CLK (NC)
13	REFCLK+
14	UIM-RESET (NC)
16	UIM_VPP (NC)
17	UIM_C8 (NC)
19	UIM_C4 (NC)
20	W_DISABLE_L (Pulled up to 3.3V and connected to GPIO7 of AR9592)
22	RESET
23	PERN0
24	3.3VAUX (NC)
25	PERP0
28	1.5V (NC)
30	SMB_CLK (NC)
31	PETN0
32	SMB_DATA(NC)
33	PETP0
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 (Connected to GPIO10)
45	NC
46	LED_WPAN_L (NC)
47	NC
48	1.5V (NC)
49	NC
51	NC
52	3.3V
4,9,15,18,21,26,27,29,34,35,40,43,50	GND

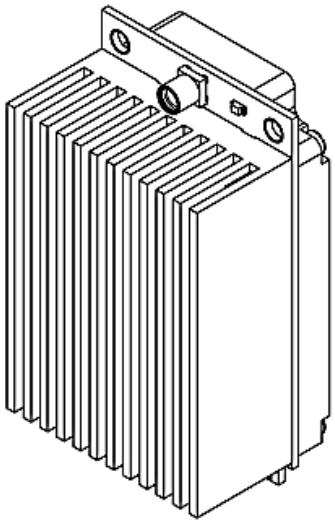
NC – No Connection

MECHANICAL DIMENSIONS









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