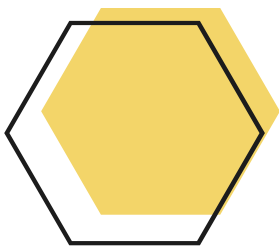




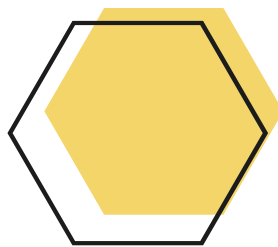
# DATASHEET

## nE1-902



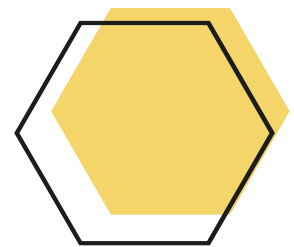
### IEEE 802.11 b/g/n

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



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HW REV# 02.00

# TECHNICAL SPECIFICATION

RADIO MODULE – GENERAL INFO	
Chipset	AR 9592-AR1B
EEPROM	EEPROM, SERIAL 32KBIT
Operating frequency (11b/g/n) Baseband Frequency Offset Operating Channel Mapping	902 MHz to 928 MHz 1520 MHz CH4(2427) = 902 MHz CH5(2432) CH6(2437) CH7(2442)
Data rate-11b Data rate-11g Data rate-11n (SISO)	1 Mbps, 2 Mbps, 5.5 Mbps, 11 Mbps 6Mbps, 9Mbps, 12Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7
Channel BW	5 MHz/10 MHz/20 MHz – 907 MHz, 912 MHz, 917 MHz, 922 MHz 5 MHz/10 MHz – 907 MHz, 922 MHz
RoHS Compliance	Compliant
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 (H) 21 mm
Weight	TBD
REGULATORY INFORMATION	
Compliance	TBD
PACKAGING INFORMATION	
No of units	TBD

## ORDERING INFORMATION

nE1-902

Mini PCIe Radio Module, SISO, IEEE 802.11 b/g/n ,902 MHz, 29 dBm

**RADIO SPECIFICATION**

Tolerance for TX Power and Sensitivity = +/- 2 dBm

Data Rate	TX Power (dBm)	Power Consumption (W)	RX Sensitivity (dBm)
11 Mbps	29	4.34	-87
5.5 Mbps	29	4.34	-90
2 Mbps	29	4.34	-91
1 Mbps	29	4.34	-94
54 Mbps	20	2.18	-74
48 Mbps	21	2.29	-76
36 Mbps	23	2.52	-81
24 Mbps	27	2.98	-82
18 Mbps	27	2.98	-85
12Mbps	27	2.98	-88
9 Mbps	27	2.98	-89
6 Mbps	27	2.98	-90
HT20-MCS7	19	2.07	-67
HT20-MCS6	20	2.52	-69
HT20-MCS5	22	2.41	-72
HT20-MCS4	25	2.76	-77
HT20-MCS3	26	2.87	-80
HT20-MCS2	26	2.87	-85
HT20-MCS1	26	2.87	-88
HT20-MCS0	26	2.87	-88

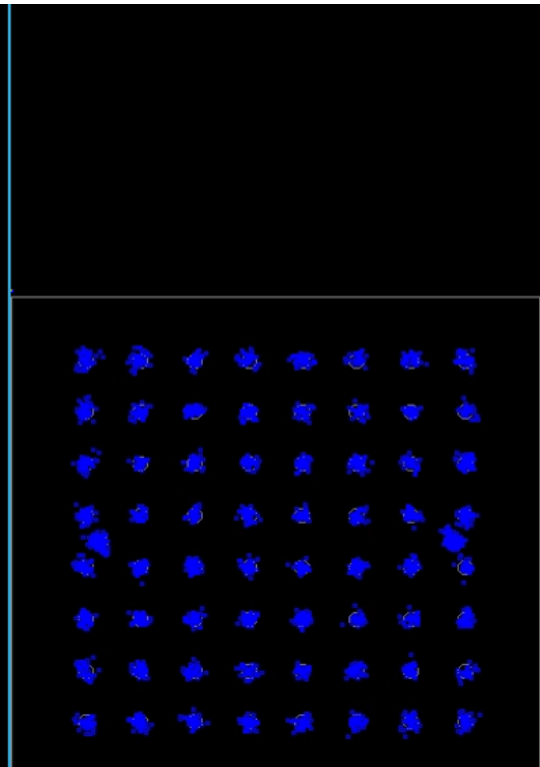
### Channel Mapping – 902 MHz to 928 MHz

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

### EVM PERFORMANCE

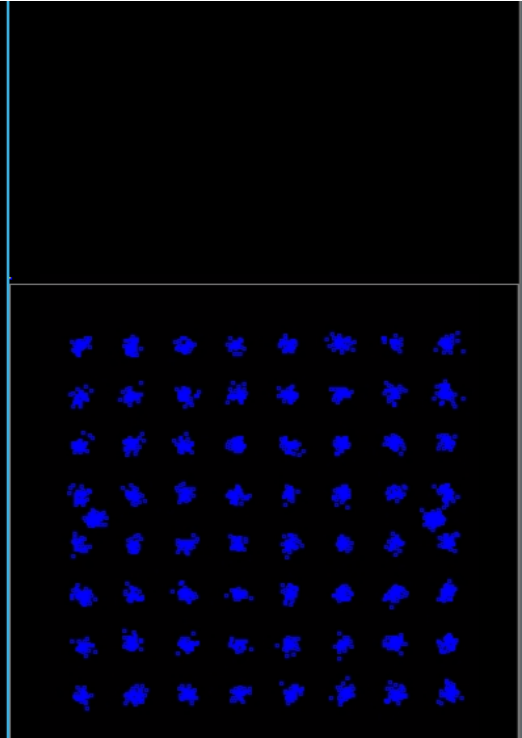
Frequency = 912 MHz, 802.11g, 54 Mbps

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	

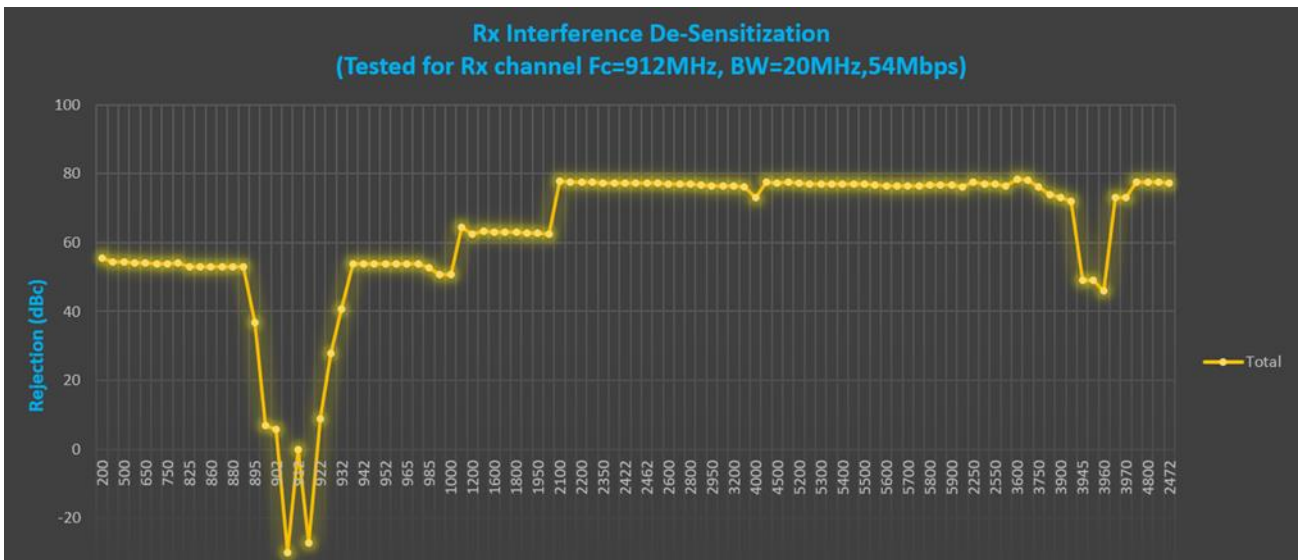


Frequency = 912 MHz, 802.11n, MCS0 (65Mbps)

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	



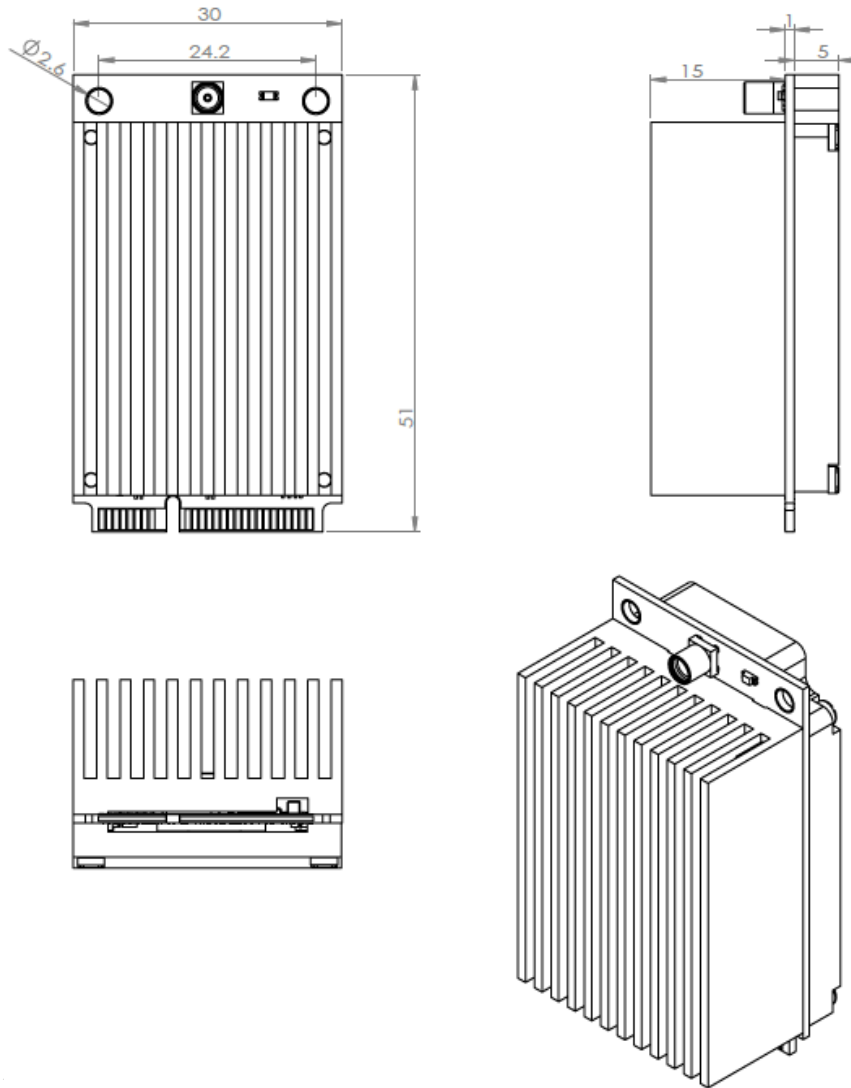
### Interference Desensitization



**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	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 (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

## MECHANICAL DIMENSIONS



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