

DATASHEET

nE2-902



IEEE 802.11 b/g/n, MIMO

High-Performance,
2x2 MIMO
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
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 -11b	1 Mbps, 2 Mbps, 5.5 Mbps, 11 Mbps
Data rate-11g	6Mbps, 9Mbps, 12Mbps, 24Mbps, 36Mbps, 48Mbps,54Mbps
Data rate-11n (MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7
Data rate-11n (MIMO)	MCS8.MCS9.MCS10,MCS11,MCS12,MCS13,MCS14,MCS15
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	x2 MMCX Female(Jack) connectors
ENVIRONMENTAL SPECIFICATIONS	
Operating Temperature Range	-40 deg C to +85 deg C
PHYSICAL SPECIFICATIONS	
Mechanical Dimension	(L) 51 mm x (W) 40 mm x (H) 15.9 mm
Weight	TBD
REGULATORY INFORMATION	
Compliance	TBD
PACKAGING INFORMATION	
No of units	TBD

ORDERING INFORMATION

nE2-902

Mini PCIe Radio Module, 2x2 MIMO, IEEE 802.11 b/g/n ,902 MHz, 29 dBm

RADIO SPECIFICATION

Sensitivity tested in ART Mode, PSR >=95%, Chain0+Chain1

TX Power (SISO) 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.

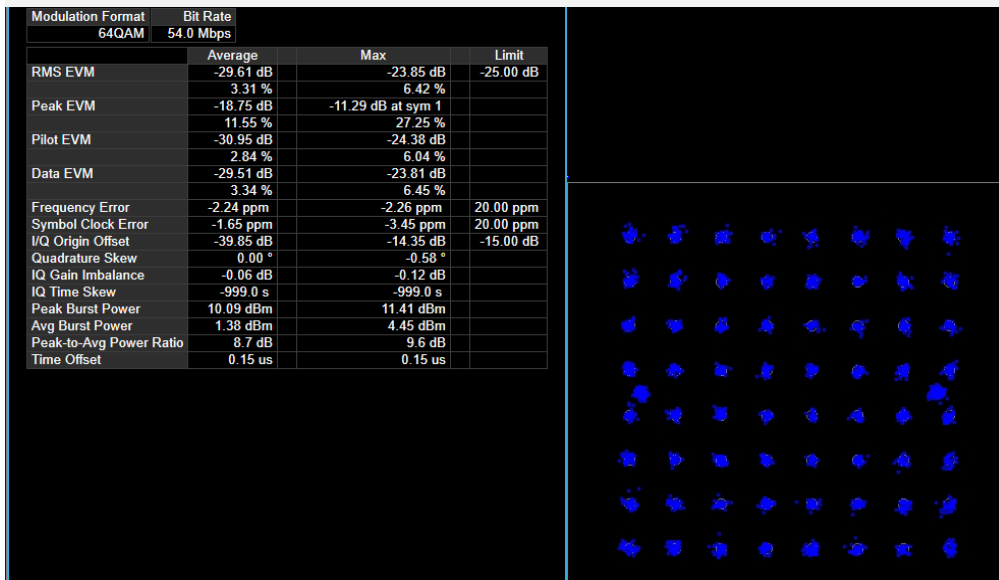
Data Rate	TX Power (dBm) (Per chain) (SISO)	DC Power Consumption at 24V (W)	RX Sensitivity (dBm)
11 Mbps	26	6.7	-88
5.5 Mbps	26	6.7	-93
2 Mbps	26	6.7	-95
1 Mbps	26	6.7	-96
54 Mbps	20	4.3	-77
48 Mbps	22	4.8	-80
36 Mbps	24	5.3	-82
24 Mbps	26	6.7	-85
18 Mbps	26	6.7	-87
12Mbps	26	6.7	-89
9 Mbps	26	6.7	-92
6 Mbps	26	6.7	-94
HT20-MCS15	20	4.3	-68
HT20-MCS14	21	4.5	-70
HT20-MCS13	21	4.5	-74
HT20-MCS12	24	5.3	-78
HT20-MCS11	26	6.7	-81
HT20-MCS10	26	6.7	-84
HT20-MCS9	26	6.7	-89
HT20-MCS8	26	6.7	-91

Channel Mapping – 902 MHz to 928 MHz

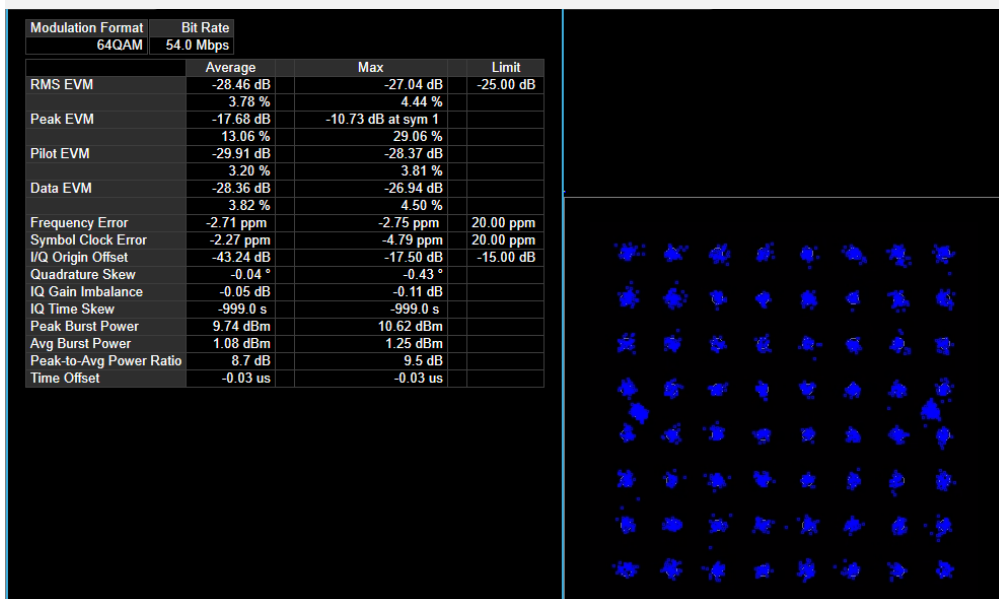
BASE BAND (MHz)	OP FREQ (MHz)	CH BW (MHz)	STANDARD (11b/g/n)
2427	907	5/10	11g/n
2432	912	5/10/20	11b/g/n
2437	917	5/10/20	11b/g/n
2442	922	5/10	11g/n

EVM PERFORMANCE

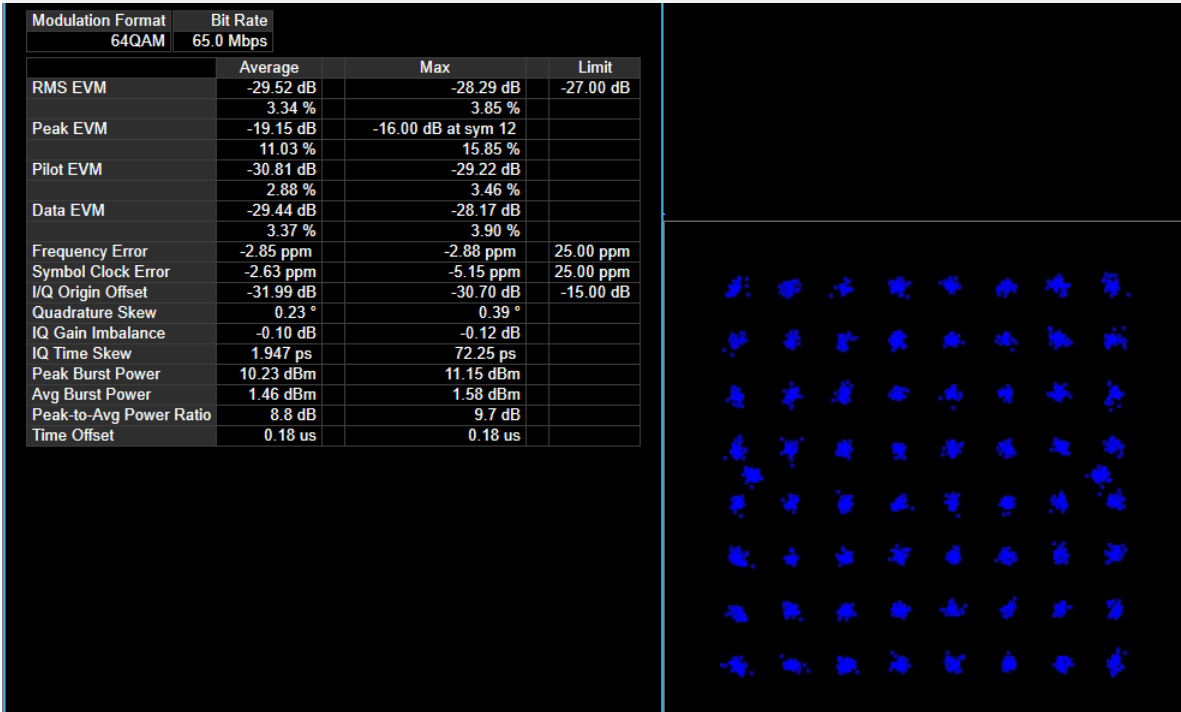
Frequency = 912 MHz, 802.11g, 54 Mbps, CH0



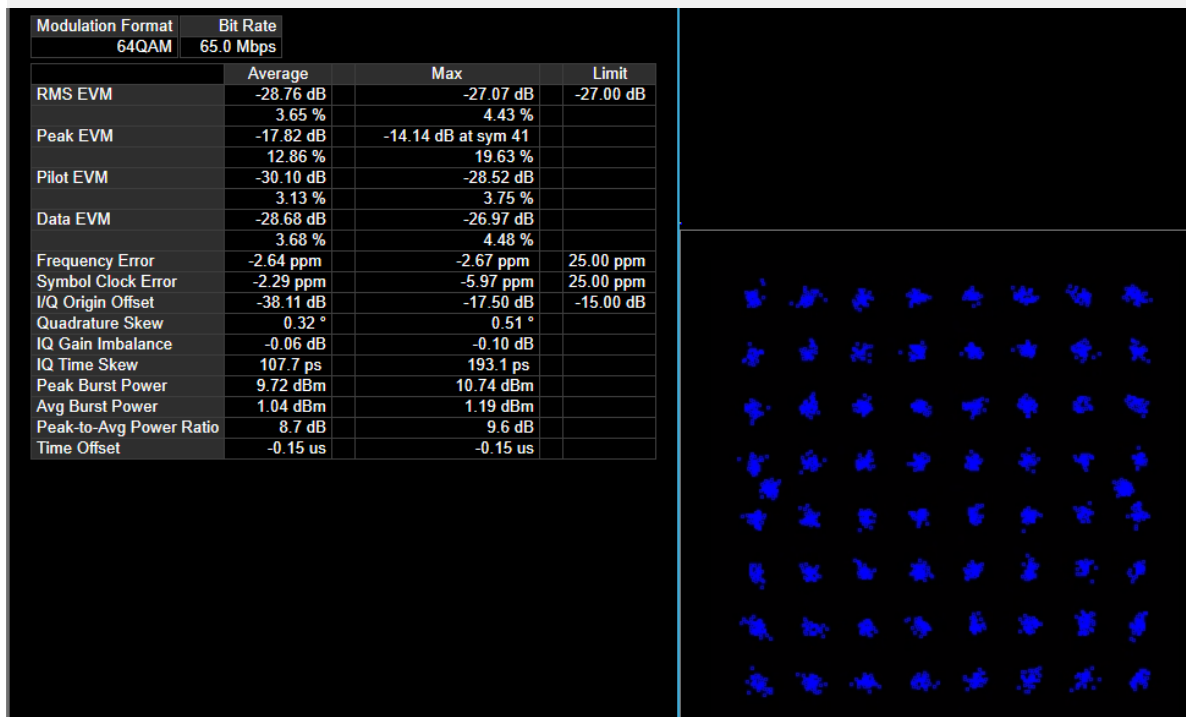
Frequency = 912 MHz, 802.11g, 54 Mbps, CH1



Frequency = 912 MHz, 802.11n, MCS7 (65Mbps), CH0

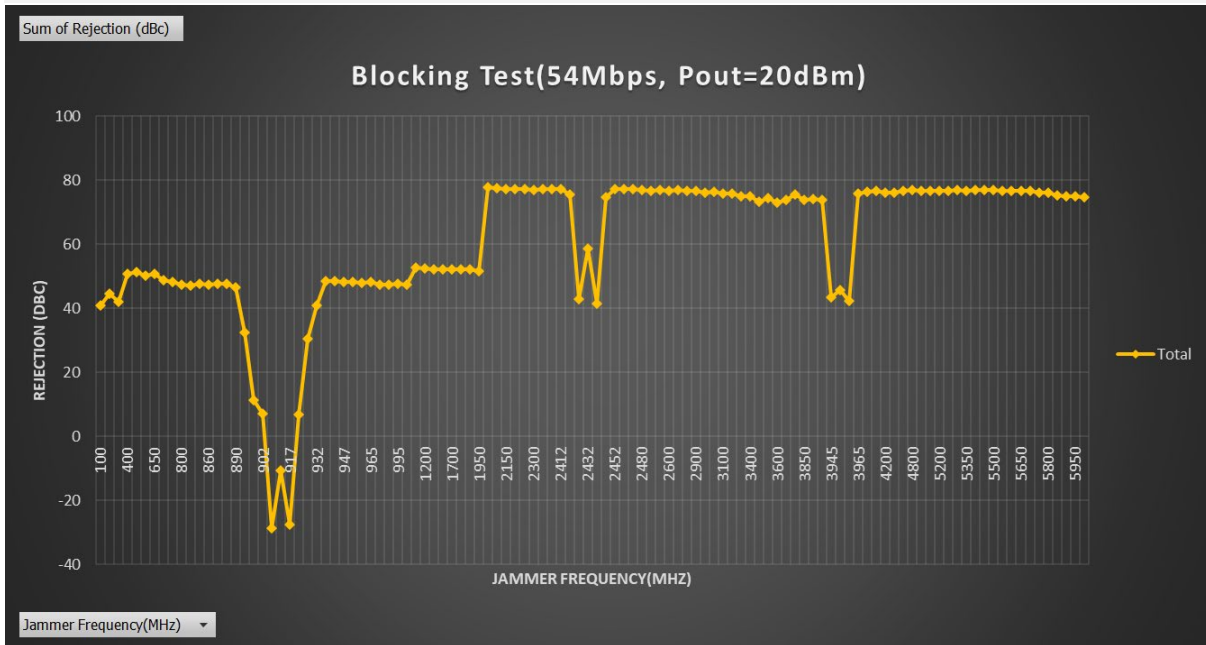


Frequency = 912 MHz, 802.11n, MCS7 (65Mbps), CH0



Interference Desensitization

Frequency = 912 MHz, 802.11g, 54 Mbps



Data rate vs Attenuation (MIMO) – with Mikrotik RBM33G

Frequency = 912 MHz, 802.11 b/g/n mode, MIMO

Att (dB)	BW (MHz)	WR (Mbps)	BW (MHz)	WR (Mbps)	BW (MHz)	WR (Mbps)
86	20	144.4	10	72.2	5	36.1
106	20	57.7	10	39	5	19.5
120	20	11	10	7.2	5	3.6

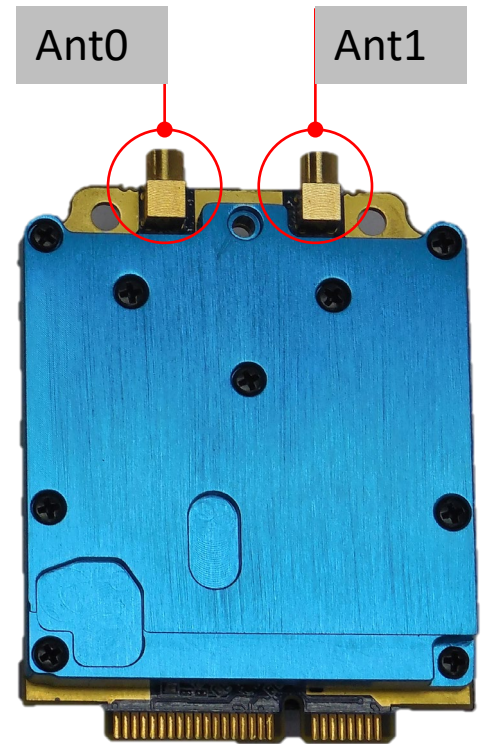
Legends

Att – RF Attenuation between Transmitter and Receiver
 BW – Channel Bandwidth
 WR – Working Rate

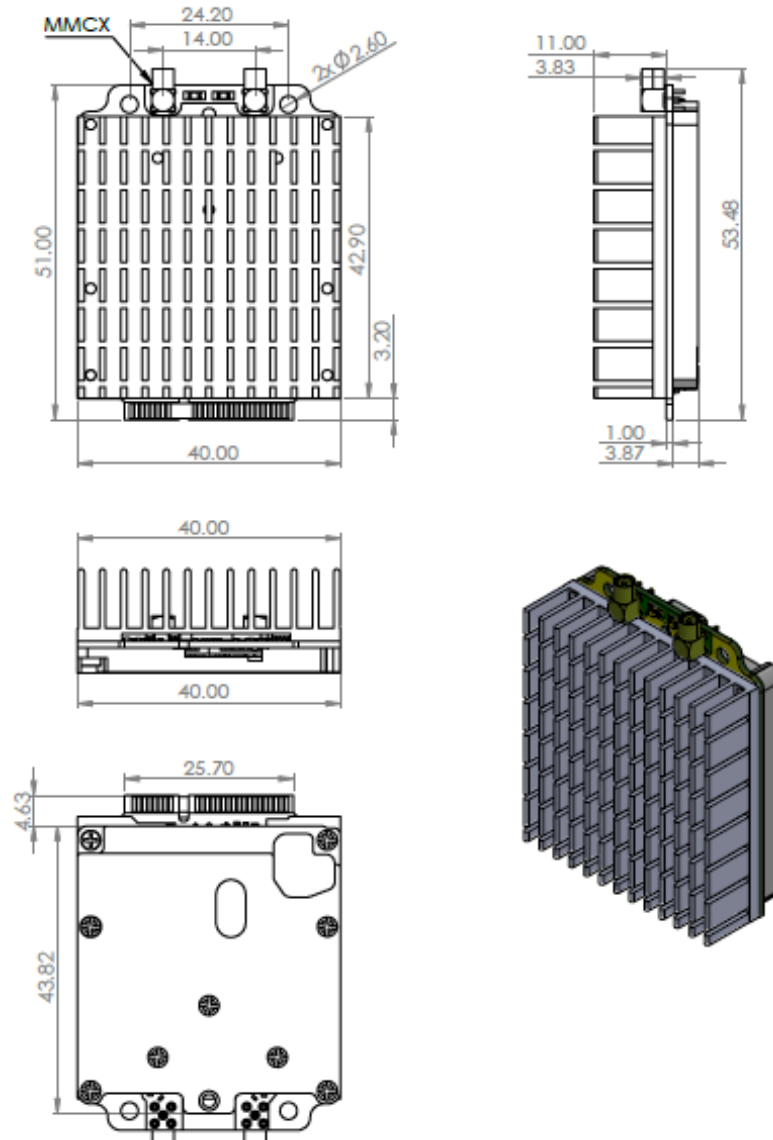
MINIPCIE (GOLD FINGER) PIN-OUT

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

NC – No Connection



MECHANICAL DIMENSIONS



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