

SIEMENS

MPCIE-R1-ABGN-U3 PCIe WLAN Radio Card

Preliminary Data Sheet V0.1

FCC-ID: LYHMPCIE1V1

IC-ID: 267AA-MPCIE1V1

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1 Overview

- The Siemens MPCIE-R1-ABGN-U3 PCI-e Minicard is an Dual-Band (2.4GHz and 5GHz) PCI-e Minicard, based on the Atheros AR9390 chipset. It supports 3x3 MiMo technology, which provides an maximum data rate up to 450Mbps.

1.1 Feature List

- **802.11a/b/g/n PCI-e Minicard Featurset**

RoHS compliant	
FCC-ID	FCC-ID: LYHMPCIE1V1
IC-ID	IC-ID: 267AA-MPCIE1V1

2 Specifications

- **Standard** 802.11a/b/g/n

FCC-ID	FCC-ID: LYHMPCIE1V1
IC-ID	IC-ID: 267AA-MPCIE1V1
RoHS compliance	fulfilled

- **Chipset**

Atheros AR9390

- **Host Interface**

PCI Express, PCI-e Minicard

- **Radio**

Antenna	3 U.FL (Ultra-miniature coaxial) connectors
Operating Frequency	11b/g/n ISM band: 2.392GHz to 2482GHz 11a ISM Band: 5.170GHz to 5835GHz
Modulation	802.11a: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11b: DSSS (BDSK, DQPSK, CCK) 802.11g: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
Output Power	802.11a: 16dBm – 15dBm @36Mbps 802.11a: 13dBm – 11dBm @54Mbps 802.11b/g: 19dBm @36Mbps 802.11b/g: 17dBm– 16dBm @54Mbps 802.11n: 18dBm @120Mbps (2,4GHz band) 802.11n: 12dBm @450Mbps (2,4GHz band) Transmit Power tolerance ± 1.5 dBm For further details refer to the transmit power in chapter Electrical Specifications.
Receive Sensitivity	802.11a: -81dBm @54Mbps 802.11b: -90dBm @11Mbps 802.11g: -80dBm @54Mbps 802.11n HT20: -93dBm @19,5Mbps (2,4GHz band) 802.11n HT40: -89dBm @45Mbps (2,4GHz band) Receive Sensitivity tolerance ± 2.0 dBm For further details refer to the receiver sensitivity in chapter Electrical Specifications.

▪ Power consumption

Continuous TX	max. 3.0W
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▪ Operating voltage

DC 3.3V ± 5%	max. 3.0W
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▪ Environmental operating conditions

Storage Temperature Range	-40°C to 105°C
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Operating Temperature Range:	-20°C to 85°C
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Storage Humidity	
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Operating Humidity:	5% to 95%
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▪ Physical Specifications

Dimensions	50.8mm x 30.0mm x 3.2mm
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Weight	7g ±0.5g
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▪ Software

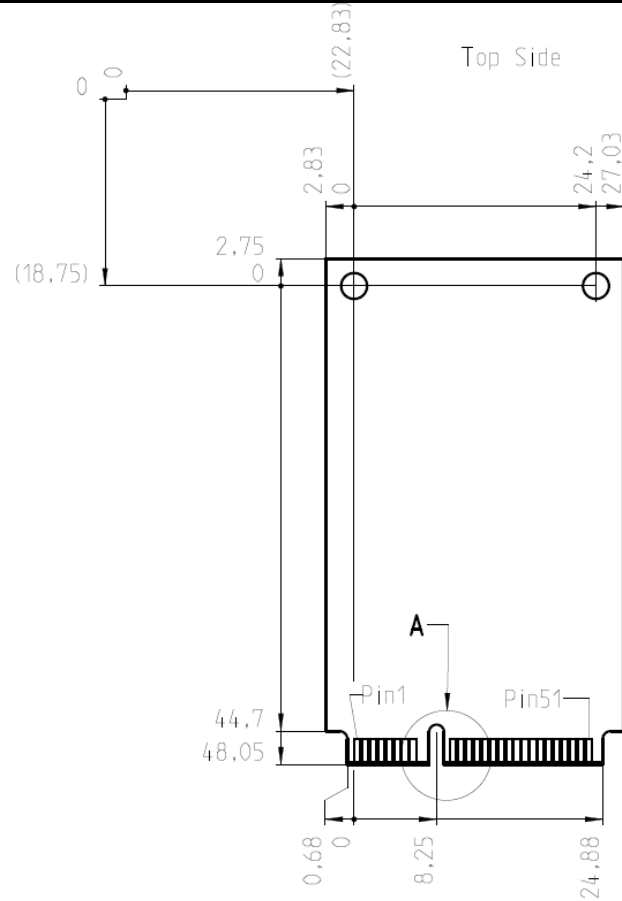
Driver	Windows XP/ Vista, Windows 7, Linux
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Security	64/128-bit WEP, WPA, WPA2
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2.1 Mechanical Specifications

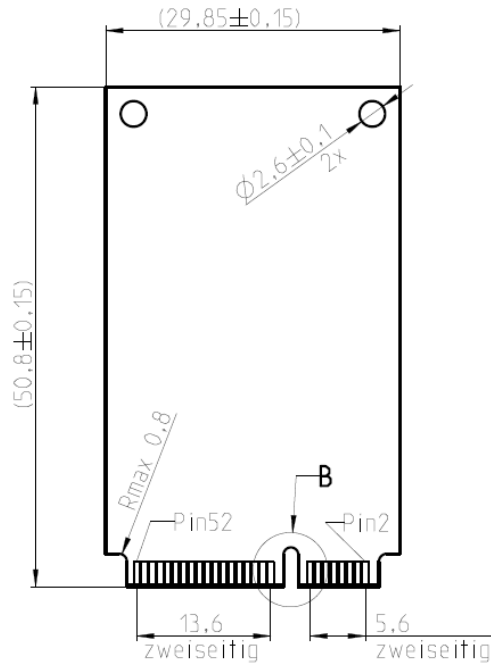
Full size PCI-e Minicard

▪ Top Side

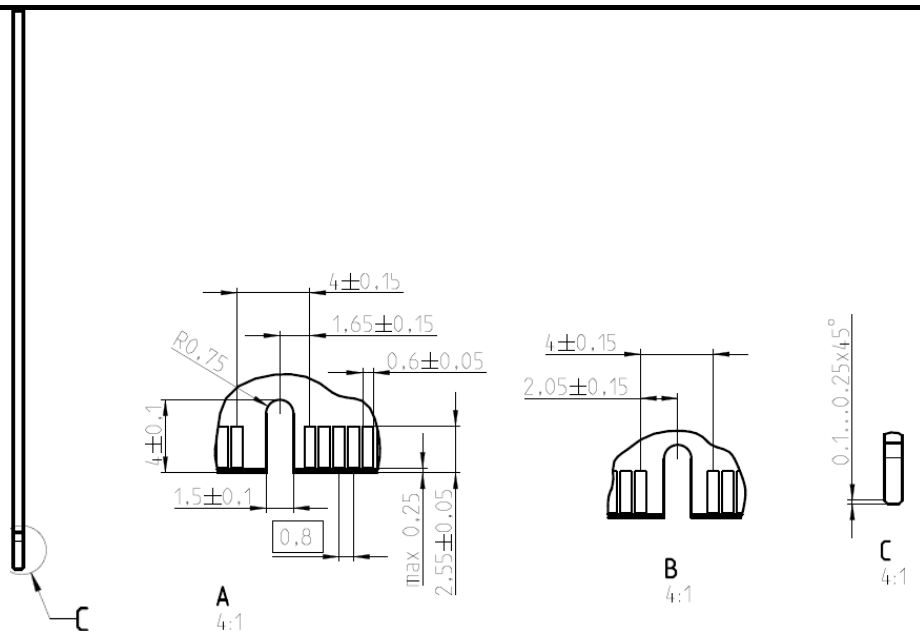


▪ Bottom Side

Bottom Side



▪ Details



2.2 Electrical Specifications

▪ **Data transfer rates** all modes support auto-fallback function

802.11b	11Mbps 5.5Mbps 2Mbps 1Mbps
802.11g	54Mbps 48Mbps 36Mbps 24Mbps 18Mbps 12Mbps 9Mbps 6Mbps
802.11g (Turbo mode)	108Mbps 96Mbps 72Mbps 48Mbps 36Mbps 24Mbps 18Mbps 12Mbps
802.11a	54Mbps 48Mbps 36Mbps 24Mbps 18Mbps 12Mbps 9Mbps 6Mbps
802.11a (Turbo mode)	108Mbps 96Mbps 72Mbps 48Mbps 36Mbps 24Mbps 18Mbps 12Mbps
802.11n	450Mbps – 6.5Mbps

Transmit Power (Output Power conducted)

802.11a 5,180GHz to 5,825GHz

data rate	transmit frequency			
	5,18GHz– 5,32GHz	5,50GHz– 5,60GHz	5,70GHz	5,745GHz– 5,825GHz
1MBit/s – 36MBit/s	16dBm	16dBm	16dBm	15dBm
48MBit/s	14dBm	13dBm	12dBm	12dBm
54MBit/s	13dBm	12dBm	11dBm	11dBm

802.11b/g 2.412GHz to 2.484GHz

data rate	transmit frequency		
	2,412GHz	2,442GHz	2,472GHz
1MBit/s – 24MBit/s	19dBm	19dBm	19dBm
36MBit/s	19dBm	19dBm	19dBm
48MBit/s	18dBm	18dBm	17dBm
54MBit/s	17dBm	17dBm	16dBm

802.11n
20MHz channel width
2.412GHz to 2.472GHz

modulation (data rate, steams)	transmit frequency		
	2,412GHz	2,442GHz	2,472GHz
MSC0 – MSC6 (6,5MBit/s – 65MBit/s, 1 stream)	18dBm	18dBm	18dBm
MCS7 (65MBit/s – 72,2MBit/s, 1 stream)	17dBm	17dBm	17dBm
MCS8 – MCS11 (13MBit/s – 57,8MBit/s, 2 streams)	18dBm	18dBm	18dBm
MCS12 (78MBit/s – 86,7MBit/s, 2 streams)	17dBm	18dBm	17dBm
MCS13 (104MBit/s – 115,6MBit/s, 2 streams)	16dBm	17dBm	16dBm
MCS14 (117MBit/s – 130MBit/s, 2 streams)	15dBm	16dBm	15dBm
MCS15 (130MBit/s – 144,4MBit/s, 2 streams)	14dBm	15dBm	14dBm
MCS16 – MCS19 (19,5MBit/s – 86,7MBit/s, 3 streams)	18dBm	18dBm	18dBm
MCS20 – MCS21 (117MBit/s – 173,3MBit/s, 3 streams)	14dBm	15dBm	14dBm
MCS22 (175,5MBit/s – 195MBit/s, 3 streams)	14dBm	14dBm	14dBm
MCS23 (195MBit/s – 216,7MBit/s, 3 streams)	13dBm	13dBm	13dBm

802.11n
20MHz channel width
5,180GHz to 5,825GHz

modulation (data rate, streams)	transmit frequency				
	5,18GHz– 5,32GHz	5,50GHz	5,60GHz	5,70GHz	5,745GHz– 5,825GHz
MSC0 – MSC5 (6,5MBit/s – 57,8MBit/s, 1 stream)	16dBm	16dBm	16dBm	16dBm	15dBm
MCS6 (58,5MBit/s – 65MBit/s, 1 stream)	14dBm	14dBm	14dBm	14dBm	14dBm
MCS7 (65MBit/s – 72,2MBit/s, 1 stream)	13dBm	13dBm	13dBm	13dBm	13dBm
MCS8 – MSC12 (13MBit/s – 86,7MBit/s, 2 streams)	16dBm	16dBm	16dBm	16dBm	15dBm
MCS13 (104MBit/s – 115,6MBit/s, 2 streams)	14dBm	13dBm	13dBm	12dBm	12dBm
MCS14 (117MBit/s – 130MBit/s, 2 streams)	13dBm	12dBm	12dBm	10dBm	10dBm
MCS15 (130MBit/s – 144,4MBit/s, 2 streams)	12dBm	11dBm	11dBm	8dBm	8dBm
MCS16 – MCS19 (19,5MBit/s– 86,7MBit/s, 3 streams)	16dBm	16dBm	16dBm	16dBm	15dBm
MCS20 (117MBit/s – 130,7MBit/s, 3 streams)	12dBm	11dBm	10dBm	9dBm	9dBm
MCS21 (156MBit/s – 173,3MBit/s, 3 streams)	12dBm	11dBm	9dBm	8dBm	8dBm
MCS22 – MSC23 (175,5MBit/s– 216,7MBit/s, 3 streams)	11dBm	10dBm	8dBm	7dBm	7dBm

802.11n
40MHz channel width
2,522GHz to 2,462GHz

modulation (data rate, steams)	transmit frequency		
	2,422GHz	2,447GHz	2,462GHz
MSC0 – MSC5 (13,5MBit/s – 120MBit/s, 1 stream)	18dBm	18dBm	18dBm
MCS6 (121,5MBit/s – 135MBit/s, 1 stream)	17dBm	17dBm	17dBm
MCS7 (135MBit/s – 150MBit/s, 1 stream)	16dBm	16dBm	16dBm
MCS8 – MCS11 (27MBit/s – 120MBit/s, 2 streams)	18dBm	18dBm	18dBm
MCS12 (162MBit/s – 180MBit/s, 2 streams)	16dBm	17dBm	16dBm
MCS13 (216MBit/s – 240MBit/s, 2 streams)	15dBm	16dBm	15dBm
MCS14 (143MBit/s – 270MBit/s, 2 streams)	14dBm	15dBm	14dBm
MCS15 (270MBit/s – 300MBit/s, 2 streams)	13dBm	14dBm	13dBm
MCS16 – MCS19 (40,5MBit/s – 180MBit/s, 3 streams)	18dBm	18dBm	18dBm
MCS20 – MCS21 (243MBit/s – 270MBit/s, 3 streams)	13dBm	14dBm	13dBm
MCS22 (364,5MBit/s – 405MBit/s, 3 streams)	13dBm	13dBm	13dBm
MCS23 (405MBit/s – 450MBit/s, 3 streams)	12dBm	12dBm	12dBm

802.11n		40MHz channel width 5,190GHz to 5,795GHz			
modulation (data rate, streams)	transmit frequency				
	5,19GHz– 5,31GHz	5,51GHz	5,59GHz	5,67GHz	5,755GHz– 5,795GHz
MSC0 – MSC4 (13,5MBit/s – 90MBit/s, 1 stream)	16dBm	16dBm	16dBm	16dBm	15dBm
MCS5 (108MBit/s – 120MBit/s, 1 stream)	15dBm	15dBm	15dBm	15dBm	15dBm
MCS6 (121,5MBit/s – 135MBit/s, 1 stream)	14dBm	14dBm	14dBm	14dBm	14dBm
MCS7 (135MBit/s – 150MBit/s, 1 stream)	13dBm	13dBm	13dBm	13dBm	13dBm
MCS8 – MSC12 (27MBit/s – 180MBit/s, 2 streams)	16dBm	16dBm	16dBm	16dBm	15dBm
MCS13 (216MBit/s – 240MBit/s, 2 streams)	14dBm	13dBm	13dBm	11dBm	11dBm
MCS14 (243MBit/s – 270MBit/s, 2 streams)	13dBm	12dBm	12dBm	10dBm	10dBm
MCS15 (270MBit/s – 300MBit/s, 2 streams)	12dBm	11dBm	11dBm	8dBm	8dBm
MCS16 – MCS19 (40,5MBit/s – 180MBit/s, 3 streams)	16dBm	16dBm	16dBm	16dBm	15dBm
MCS20 (243MBit/s – 270MBit/s, 3 streams)	12dBm	11dBm	10dBm	9dBm	9dBm
MCS21 (324MBit/s – 360MBit/s, 3 streams)	12dBm	11dBm	9dBm	8dBm	8dBm
MCS22 – MSC23 (364,5MBit/s – 450MBit/s, 3 streams)	11dBm	10dBm	8dBm	7dBm	7dBm

▪ **Receiver Sensitivity** PER (Packet Error Rate) <10% at PSDU length of 1000Bytes

802.11b

data rate	2,4GHz band (measurement at 2,442GHz)
1Mbps	-98dBm
2Mbps	-93dBm
5,5Mbps	-94dBm
11Mbps	-90dBm

802.11a/g

802.11g

802.11a

data rate	2,4GHz band (measurement at 2,442GHz)	5GHz band (measurement at 5,500GHz)
6Mbps	-95dBm	-94dBm
9Mbps	-95dBm	-94dBm
12Mbps	-93dBm	-95dBm
18Mbps	-93dBm	-94dBm
24Mbps	-89dBm	-90dBm
36Mbps	-86dBm	-87dBm
48Mbps	-81dBm	-83dBm
54Mbps	-80dBm	-81dBm

802.11n

20MHz channel width

modulation (data rate)	2,4GHz band (measurement at 2,442GHz)	5GHz band (measurement at 5,500GHz)
MCS0 (6,5MBit/s)	-95dBm	-94dBm
MCS1 (13MBit/s)	-93dBm	-94dBm
MCS2 (19,5MBit/s)	-91dBm	-93dBm
MCS3 (26MBit/s)	-87dBm	-88dBm
MCS4 (39MBit/s)	-85dBm	-86dBm
MCS5 (52MBit/s)	-80dBm	-81dBm
MCS6 (58,5MBit/s)	-79dBm	-80dBm
MCS7 (65MBit/s)	-78dBm	-78dBm
MCS8 (13MBit/s)	-93dBm	-94dBm
MCS9 (26MBit/s)	-90dBm	-91dBm
MCS10 (39MBit/s)	-88dBm	-89dBm
MCS11 (52MBit/s)	-85dBm	-86dBm
MCS12 (78MBit/s)	-82dBm	-83dBm
MCS13 (104MBit/s)	-78dBm	-78dBm
MCS14 (117MBit/s)	-76dBm	-76dBm
MCS15 (130MBit/s)	-76dBm	-75dBm
MCS16 (19,5MBit/s)	-93dBm	-93dBm
MCS17 (39MBit/s)	-90dBm	-90dBm
MCS18 (58,5MBit/s)	-87dBm	-88dBm
MCS19 (78MBit/s)	-83dBm	-85dBm
MCS20 (117MBit/s)	-82dBm	-81dBm
MCS21 (156MBit/s)	-77dBm	-76dBm
MCS22 (175,5MBit/s)	-75dBm	-74dBm
MCS23 (195MBit/s)	-74dBm	-68dBm

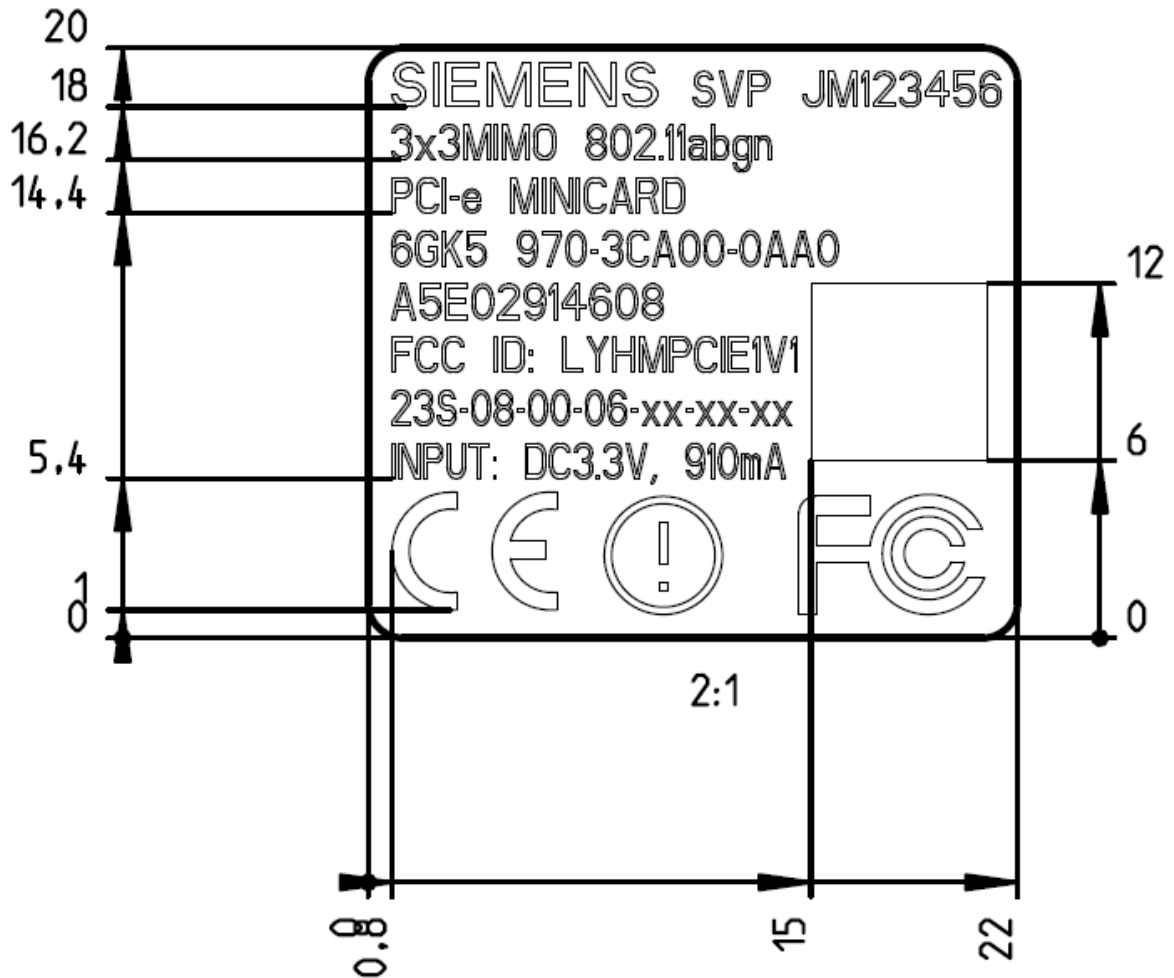
802.11n

40MHz channel width

modulation (data rate)	2,4GHz band (measurement at 2,447GHz)	5GHz band (measurement at 5,510GHz)
MCS0 (13,5MBit/s)	-89dBm	-91dBm
MCS1 (27MBit/s)	-90dBm	-90dBm
MCS2 (40,5MBit/s)	-89dBm	-89dBm
MCS3 (54MBit/s)	-85dBm	-85dBm
MCS4 (81MBit/s)	-82dBm	-83dBm
MCS5 (108MBit/s)	-78dBm	-78dBm
MCS6 (121,5MBit/s)	-77dBm	-76dBm
MCS7 (135MBit/s)	-75dBm	-74dBm
MCS8 (27MBit/s)	-90dBm	-90dBm
MCS9 (54MBit/s)	-88dBm	-88dBm
MCS10 (81MBit/s)	-86dBm	-86dBm
MCS11 (108MBit/s)	-82dBm	-83dBm
MCS12 (162MBit/s)	-79dBm	-79dBm
MCS13 (216MBit/s)	-75dBm	-74dBm
MCS14 (243MBit/s)	-74dBm	-72dBm
MCS15 (300MBit/s)	-72dBm	-69dBm
MCS16 (45MBit/s)	-89dBm	-90dBm
MCS17 (81MBit/s)	-87dBm	-88dBm
MCS18 (121,5MBit/s)	-84dBm	-85dBm
MCS19 (162MBit/s)	-81dBm	-81dBm
MCS20 (243MBit/s)	-76dBm	-72dBm
MCS21 (324MBit/s)	-74dBm	-71dBm
MCS22 (364,5MBit/s)	-72dBm	-66dBm
MCS23 (405MBit/s)	-70dBm	-63dBm

3 Label

The following figure shows the label of the MPCIE-R1-ABGN-U3



4 FCC and IC Notes

FCC-approval

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.

IEEE802.11b or g operation of this product in the USA is firmware-limited to channels 1 through 11.

Notice

Changes or modifications made to this equipment not expressly approved by SIEMENS may void the FCC authorization to operate this equipment.

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.

Notice

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Professional Installation Notice

To comply with FCC part 15 rules in the United States, the system must be professionally installed to ensure compliance with the Part 15 certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States. The use of the system in any other combination (such as co-located antennas transmitting the same information) is expressly forbidden.

RSS-210 of Industry Canada

"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."

"This device has been designed to operate with the antennas listed below, and having a maximum gain of 14,2 dBi including the antenna cable. Antennas not included in this list or having a gain greater 14,2 dBi (including the antenna cable) are strictly prohibited for use with this device. The required antenna impedance is 50 ohms."

"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 permitted for successful communication."

"That the device for the band 5150-5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems."

"Users should also be cautioned to take note that high power radars are allocated as primary users (meaning they have priority) of 5250-5350 MHz and 5650-5850 MHz and these radars could cause interference and/or damage to LE-LAN devices."

Antenna List

Type	Properties	Order number
ANT792-6MN	Omni antenna, mast/wall mounting, 6 dBi 2.4 GHz, N-Connect female	6GK5 792-6MN00-0AA6
ANT793-6MN	Omni antenna, mast/wall mounting, 5 dBi 5 GHz, N-Connect female	6GK5 793-6MN00-0AA6
ANT792-8DN	Directional antenna, mast/wall mounting, 14 dBi 2.4 GHz, N-Connect female	6GK5 792-8DN00-0AA6
ANT793-8DJ	Directional antenna, mast/wall mounting, 18 dBi 5 GHz, 2 x N-Connect female	6GK5 793-8DJ00-0AA0
ANT793-8DK	Directional antenna, mast/wall mounting, 23 dBi 5 GHz, 2 x N-Connect female	6GK5 793-8DK00-0AA0
ANT793-6DT	Wide angle antenna (MIMO), mast/wall mounting, 8 dBi 5 GHz, 3 x QMA connector female	6GK5 793-6DT00-0AA0
ANT795-6DC	Wide angle antenna, mast/ wall mounting, 9 dBi 2.4 GHz and 5 GHz, N-Connect female	6GK5 795-6DC00-0AA0
ANT793-6DG	Wide angle antenna, mast/ wall mounting, 9 dBi 5 GHz, 2 x N-Connect female	6GK5 793-6DG00-0AA0
ANT795-6MN	Omni antenna, mounted on roof/vehicle, 6/8 dBi 2.4 GHz and 5 GHz, N-Connect female	6GK5 795-6MN10-0AA6
ANT795-6MT	Omni antenna (MIMO), mounted on roof/vehicle/ceiling, 5/7 dBi 2.4 GHz and 5 GHz, 3 x QMA connector female	6GK5 795-6MT00-0AA0
ANT795-4MC	Omnidirectional antenna, 3/5 dBi, 2.4 GHz and 5 GHz, IP65, N-Connect male for direct installation on the device, straight connector, set of 3 antennas.	6GK5 795-4MC00-0AA3
ANT795-4MD	Omnidirectional antenna, 3/5 dBi, 2.4 GHz and 5 GHz, IP65,	6GK5 795-4MD00-

	N-Connect male for direct installation on the device, 90° connector, set of 3 antennas.	0AA3
ANT795-4MA	Omni antenna, mounted directly on the device, 3/5 dBi 2.4 GHz and 5 GHz, IP30, R-SMA connector male for direct mounting on the device, connector angle adjustable 0° to 180°, set of 3 antennas.	6GK5 795-4MA00-0AA3
ANT792-4DN	RCoax helical antenna, circular polarization, 4 dBi, 2.4 GHz, N-connect female.	6GK5 792-4DN00-0AA6
ANT793-4MN	RCoax $\lambda/8$ antenna with vertical polarization, 6 dBi, 5 GHz, N-connect female.	6GK5 793-4MN00-0AA6
IWLAN RCoax cable 2.4 GHz PE 1/2"	Omni antenna, 0 dBi 2.400 - 2.485 GHz, N-Connect female.	6XV1875-2A
IWLAN RCoax cable 5 GHz PE	Omni antenna, 0 dBi 5.150 - 5.875 GHz, N-Connect female.	6XV1875-2D

Notes:

The directed antenna ANT793-8DJ may be used only with minimum 5 m antenna cable, Type 6XV 1875-5CH50 with cable loss 4.4 dB at 5.7 GHz.

The directed antenna ANT793-8DK may be used only with minimum 10 m antenna cable, Type 6XV 1875-5CN10 with cable loss 8.8 dB at 5.7 GHz.

5 Ordering Information

- **MLFB**

6GK5795-2MP10-0AA0