Wireless CPU Q24 Series Differences with the WISMO Quik Q24xx series

Revision: 002

Date: September 2006

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Wireless CPU Q24 series

Differences with the WISMO Quik Q24xx series

Reference: **WM_PRJ_Q24NG_PTS_004**
Revision: **002**
Date: **September 2006**

The Wireless CPU Q24 Series is pin to pin compared to the previous WISMO QUIK Q24xx sub-series, and offers improvements such as:

- Wider RF connectivity
- Quad band
- Improved RF performances
- Reduced power consumption
- SIM 3V/1V8 supported
- Optional integrated SIM CARD connector
- Voltage regulator output available (up to 100mA)
- Back-up battery regulator available

Powered by the Wavecom Operating System and Open AT®

Cautions

This platform contains a modular transmitter. This device is used for wireless applications. Note that all electronics parts and elements are ESD sensitive.

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Web Site Support

General information about Wavecom and its range of products: www.wavecom.com

Specific support is available for the Q24 Classic, Plus, Extended and Auto Wireless CPU: www.wavecom.com/Q24Classic,

www.wavecom.com/Q24Plus,

www.wavecom.com/Q24Extended,

www.wavecom.com/Q24Auto

Carrier/Operator approvals: www.wavecom.com/approvals

Open AT® Introduction: www.wavecom.com/OpenAT

Developer support for software and hardware: www.wavecom.com/forum

Overview

This document summarizes the difference between the Wireless CPU Q24 series (available in four GSM/GPRS Class 10 quad-band versions) and the WISMO Quik Q24xx sub-series.

The Wireless CPU Q24 versions are:

- **Q24 Classic: EGSM 900/1800/850/1900** MHz version with **32** Mb of Flash memory and 16 Mb of PSRAM **(32/16)**, T° range **[-20°C / +55°C]**.

- **Q24 Plus: EGSM/GPRS 900/1800/850/1900** MHz version with **32** Mb of Flash memory and 16 Mb of PSRAM **(32/16),** T° range **[-20°C / +55°C]**.

- **Q24 Extended: EGSM/GPRS 900/1800/850/1900** MHz version with **32** Mb of Flash memory and 4 Mb of SRAM **(32/4),** Extended T° range.

- **Q24 Automotive: EGSM/GPRS 900/1800/850/1900** MHz version with **32** Mb of Flash memory and 4 Mb of SRAM **(32/4),** Extended T° range**.**

The WISMO Quik versions are:

- **Q2400A**: EGSM **900/1800** MHz version with **16** Mbits of Flash memory and 2 Mbits of SRAM (16/2).

- **Q2406A**: EGSM/GPRS **900/1800** MHz version with **16** Mbits of Flash memory and 2 Mbits of SRAM (16/2).

- **Q2406B: EGSM/GPRS 900/1800** MHz version with **32** Mbits of Flash memory and **4** Mbits of SRAM (32/4).

- **Q2426A: GSM/GPRS 850/1900** MHz version with **16** Mbits of Flash memory and **2** Mbits of SRAM (16/2).

- **Q2426B: GSM/GPRS 850/1900** MHz version with **32** Mbits of Flash memory and **4** Mbits of SRAM (32/4).

Document History

Revision	Date	List of revisions	
001	May 2006	Creation (Preliminary version)	
002	August 2006	Update GPC difference list Update mechanical drawings with new SIM holder	

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WM_PRJ_Q24NG_PTS_004-002   September 2006

1 References

1.1 Reference Documents

For more details, several reference documents may be consulted. The Wavecom reference documents are provided in the Wavecom documents package contrary to the general reference documents, which are not Wavecom owned.

1.1.1 Wavecom Reference Documents

[1] Automotive Environmental Control Plan for Wireless CPU Q24 series
     WM_PRJ_Q24NG_DCP_001

[2] Environmental Control Plan for Wireless CPU Q24 series
     WM_PRJ_Q24NG_DCP_002

[3] Wireless CPU Q24 series Customer Design Guidelines
     WM_PRJ_Q24NG_PTS_002

[4] Wireless CPU Q24 series Process Customer Guidelines
     WM_PRJ_Q24NG_PTS_003

[5] AT Commands Interface Guide for OS 6.57
     WM_ASW_OAT_UGD_0044

[6] AT Commands Interface Guide (Bluetooth)
     WM_ASW_BLU_UGD_001

[7] ADL User Guide for Open ATA® V3.12
     WM_ASW_OAT_UGD_006

[8] Wireless CPU Q24NG Product Technical Specification
     WM_PRJ_Q24NG_PTS_001

1.1.2 General Reference Documents

[9] "I²C Bus Specification", Version 2.0, Philips Semiconductor 1998

[10] ISO 7816-3 Standard

1.2 Abbreviations

Abbreviation	Description
3GPP	**Third** **G**eneration **P**artnership **P**roject
ADC	**A**nalog to **D**igital **C**onverter
A/D	**A**nalog to **D**igital conversion
AT	**AT**tention (prefix for modem commands)
AUX	**AUX**iliary
CBS	**C**ell **B**roadcast **S**ervice
CLK	**CL**oc**K**
CMOS	**C**omplementary **M**etal **O**xide **S**emiconductor
CODEC	**CO**der **DEC**oder
CPU	**C**entral **P**rocessing **U**nit
CTS	**C**lear **T**o **S**end
dB	**D**eci**b**el
DC	**D**irect **C**urrent
DCD	**D**ata **C**arrier **D**etect
DCS	**D**igital **C**ellular **S**ystem
DCXO	**D**igitally controlled crystal oscillator
DR	**D**ynamic **R**ange
DSR	**D**ata **S**et **R**eady
DTR	**D**ata **T**erminal **R**eady
EDGE	**E**nhanced **D**ata rates for **GSM** **E**volution
EGSM	**E**xtended **GSM**
EN	**EN**able
ESD	**E**lectro**S**tatic **D**ischarges
ETSI	**E**uropean **T**elecommunications **S**tandards **I**nstitute
FEM	**F**ront **E**nd **M**odule
FR	**F**ull **R**ate
GND	**G**rou**ND**
GPI	**G**eneral **P**urpose **I**nput
GPC	**G**eneral **P**urpose **C**onnector
GPIO	**G**eneral **P**urpose **I**nput **O**utput
GPO	**G**eneral **P**urpose **O**utput
GPRS	**G**eneral **P**acket **R**adio **S**ervice

Abbreviation **Description**

Abbreviation	Description
GSM	Global System for Mobile communications
IF	Intermediate Frequency
INTR	INTeRrupt
I/O	Input / Output
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LNA	Low Noise Amplifier
LSB	Less Significant Bit
MAX	MAXimum
MIC	MICrophone
MIN	MINimum
MMS	Multimedia Message Service
MS	Mobile Station
NOM	NOMinal
NTC	Negative Temperature Coefficient
PA	Power Amplifier
PBB	PolyBrominated Biphenyl
PBDE	PolyBrominated Diphenyl Ethers
PCB	Printed Circuit Board
PCL	Power Control Level
PCS	Personal Communications Services
PLL	Phase Lock Loop
RAM	Random Access Memory
RF	Radio Frequency
RI	Ring Indicator
RoHS	Restriction of Hazardous Substances
RST	ReSeT
RTC	Real Time Clock
RTS	Request To Send
RX	Receive
SCL	Serial CLock
SDA	Serial DAta
SIM	Subscriber Identification Module
SMS	Short Message Service

Abbreviation	Description
SPI	**S**erial **P**eripheral **I**nterface
SPK	**SP**ea**K**er
SRAM	**S**tatic **RAM**
TDMA	**T**ime **D**ivision **M**ultiple **A**ccess
TU	**T**ypical **U**rban fading profile
TUHigh	**T**ypical **U**rban, **High** speed fading profile
TDMA	**T**ime **D**ivision **M**ultiple **A**ccess
TX	**T**ransmit
TYP	**TYP**ical
UART	**U**niversal **A**synchronous **R**eceiver-**T**ransmitter
VLSI	**V**ery **L**arge **S**cale **I**ntegration
VSWR	**V**oltage **S**tanding **W**ave **R**atio

2 General Description

2.1 General Information

The Wireless CPU Q24 series is offered in four different versions. The denomination used for WISMO Quik Q24xx series is no more applicable. The table below defines for each WISMO QUIK Q24XX series product the Wireless CPU version.

Q24 Classic	Q24 Plus	Q24 Extended	Q24 Automotive
Quad-band GSM 1 to 6 MIPS -20/+55°C Optional SIM Holder	Quad-band GSM / GPRS 9 to 13 MIPS -20/+55°C Numerous plug-ins Optional SIM Holder	Quad-band GSM / GPRS 9 to 13 MIPS -40/+85°C Numerous plug-ins Optional SIM Holder	Quad-band GSM / GPRS 9 to 13 MIPS -40/+85°C MMS connector Numerous plug-ins Automotive qualified Traceability
Replaces Q2400A	Replaces Q2406B, Q2426B		Replaces Q24-C

Figure 1: Product correspondence

The differences between the Wireless CPU Q24 series and WISMO Quik Q24xx sub-series are detailed below.

2.2 Functional Differences

2.2.1 RF Band

As per definition in the previous dual-band WISMO Quik Q24xx sub-series, the Wireless CPU Q24 series products are quad-band as described in the table below:

RF capabilities

Product reference	RF band
Q2400-A	EGSM 900/1800 MHz
Q24 Classic	EGSM 850/900/1800/1900 MHz
Q2406-B	EGSM/GPRS CL 10 900/1800 MHz
Q2426-B	EGSM/GPRS CL 10 850/1900 MHz
Q24 Plus	EGSM/GPRS CL 10 850/900/1800/1900 MHz
Q2406-C	EGSM/GPRS CL 10 900/1800 MHz
Q24 Automotive	EGSM/GPRS CL 10 850/900/1800/1900 MHz

2.2.2 T° Range

The Q24 Extended is an additional product offered with the Wireless CPU range, compared to the WISMO Quik range. The Q24 Extended is compliant with an Extended T° range as described in the table below:

T° range capabilities

Product reference	T°range
Q2400-A	-20°C + 55°C Class A
Q24 Classic	-20°C + 55°C Class A
Q2406-B	-20°C + 55°C Class A
Q2426-B	-20°C + 55°C Class A
Q24 Plus	-20°C + 55°C Class A
Q24 Extended	-20°C + 55°C Class A -30°C + 75°C Class B -40°C + 85°C Class C
Q2406-C	-20°C + 55°C Class A -30°C + 75°C Class B -40°C +85°C Class C
Q24 Automotive	-20°C + 55°C Class A -30°C + 75°C Class B -40°C +85°C Class C

2.2.3 RF Connection, Connector Type and Position

All the previous RF connections offered by the WISMO Quik Q24xx sub-series are also supported by the Wireless CPU Q24 series.

One of the key improvements of the Wireless CPU Q24 series range is the RF connection offered to customers.

In addition to the antenna pad (dedicated to coaxial cable), it is also possible to use UFL connector, MMS connector or an IMP connector for the antenna connection.

The connectors offered for each version of the Wireless CPU range compared to the WISMO Quik Q24xx sub-series are described in the table below:

Product reference	UFL on bottom side	UFL or MMS on top side	Antenna pad on top side	IMP on bottom side
Q2400 A			X	
Q24 Classic	X		X	X
Q2406-B			X	
Q2426-B			X	
Q24 Plus	X		X	X
Q24 Extended	X		X	X
Q2406-C		X	X	
Q24 Automotive		X	X	X

⚠️Caution:

The antenna pad and MMS connector positions are slightly different on the Wireless CPU Q24 series; the coaxial cable compatibility used on a WISMO Quik Q24xx sub-series must be carefully checked. This is also the case for the MMS connector position

This new implementation is more flexible, in particular, the way in connecting the RF cable to the Wireless CPU Q24 series, offers **a wider angular position**.
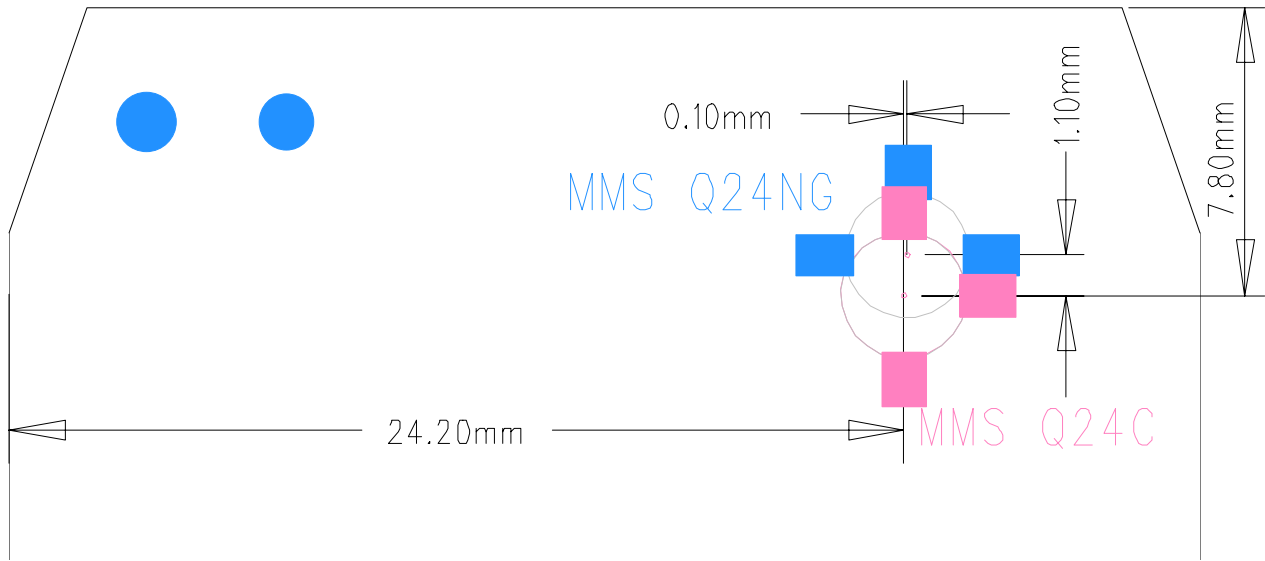
The figures below describe in detail the new antenna pad position and the new MMS connector position (see next pages)

Figure 2: The new antenna pad position

Figure 3: MMS connector position

3.70mm

27.90mm

2.54mm

3.10mm

4.9mm

Q24NG

2.46mm

Q24

0.86mm

DATE	20/03/2006	
VERSION	V1.0	**wavecom**
ENG	HTO/ FPA MLR	confidential ©

TITLE	Position Pointe RF	SCALE 0 2 4mm
PROJECT	Q24NG 4RF	FORMAT __

N° D'IDENTIFIANT   WM0600101-001-10

0.10mm

MMS Q24NG

1.10mm

7.80mm

24.20mm

MMS Q24C

2.3 General Purpose Connector Pin out Differences

Pin #	WISMO Quik Q24xx (all versions)			Wireless CPU Q24 series (all versions)		
	Signal Name	Function	Value	Signal Name	Function	Value
55 57 58 59 60	VBATT	Battery Input	3.3V to 4.5V	VBATT	Battery Input	3.2V to 4.5V
3	SIM-CLK	Clock for SIM interface	2.8V	SIM-CLK	Clock for SIM interface	2.9V or 1.8V
5	SIM-RST	Reset for SIM interface	2.8V	SIM-RST	Reset for SIM interface	2.9V or 1.8V
6	ON/OFF	Power ON/OFF control	Low logic=0 to 0.6V High logic =2.4V to VBATT +0.5V	ON/OFF	Power ON/OFF control	Low logic=0 to 0.6V High logic= 2.4V to 5V
7	SIM-DATA	I/O SIM interface	2.8V	SIM-DATA	I/O SIM interface	2.9V or 1.8V
9	SIM-VCC	SIM card supply	2.8V	SIM-VCC	SIM card supply	2.9V or 1.8V
40	VCC	2.8V digital supply output	2.8V /10mA	VCC-2.8V	2.8V digital supply output	2.8V /100mA
49	BUZZER	Buzzer output	80mA peak /Open collector	BUZZER	Buzzer output	100mA peak /Open drain

2.4 Power Supply Differences

A power supply designed for WISMO Quik Q24xx sub-series is fully usable for any product in the Wireless CPU Q24 series.

2.5 Power Consumption Differences

The table below aims to summarize the power consumption differences between the WISMO Quik Q24xx family and the Wireless CPU Q24 series, using the same Operating System (OS 6.57)

Operating mode	Parameters	INOM average		Difference	Unit
		New Q24	Q24xx	New Q24/Q24xx	
OFF Mode		16.5	7	9.5	μA
Alarm Mode		18.5	9	9.5	μA
Fast Idle Mode	Paging 9	10.5	9.5	1	mA
	Paging 2	13	12	1	mA
Slow Idle Mode 1	Paging 9	2.8	2.5	0.3	mA
	Paging 2	5.5	5.5	0	mA
Fast Standby	VBATT = 3.6V	9.5	8.5	1	mA
Slow Standby	VBATT = 3.6V	1.5	1.5	0	mA
Connected Mode	GSM850 PCL5	217	300	-83	mA
	EGSM900 PCL19	90	100	-10	mA

2.6 Mechanical Differences

2.6.1 RF Interfaces

Except for the position of Antenna pad and MMS connector (refer to section 2.2.3), the Wireless CPU Q24 series is compatible with the WISMO Quik Q24xx sub-series.

- The position of 60-pin GPC is exactly the same.

The shielding frame and cover has been updated for the Wireless CPU Q24 series, but is compatible for any application designed with a WISMO Quik Q24xx sub-series.

- The four legs positions remain the same.

RF connectors IMP/UFL and MMS were not offered with WISMO Quik Q24xx sub series.

Detailed specifications of these connectors may be found below:

- The supplier for the IMP connector is Radiall (http://www.radiall.com) with the following reference:

  R107 064 900 or **R107 064 902**

- The supplier for the MMS connector is Radiall (http://www.radiall.com); detailed datasheet of this connector and associated cable is given below.
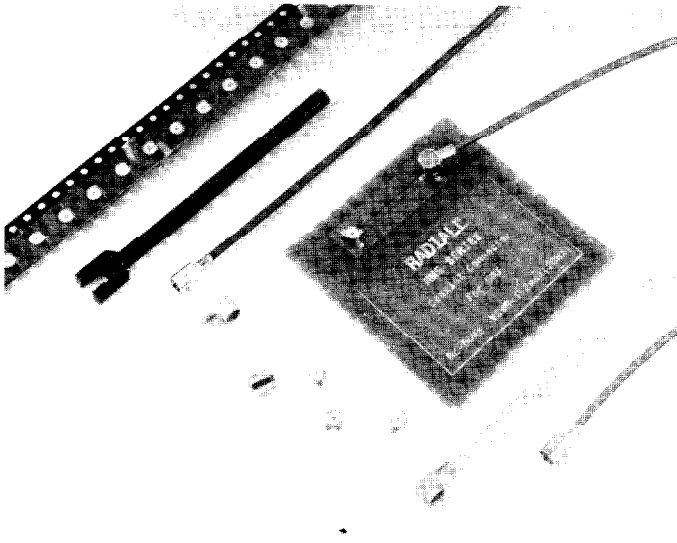
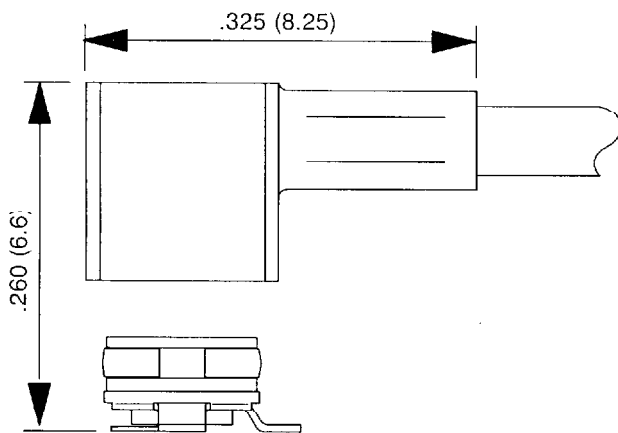| **50 Ω**	**DC - 6 GHz**
75 Ω	**DC - 1 GHz**

GENERAL

- Low profile coaxial connectors
- Surface-mount receptacle (SMT)
- Fully compatible with automated pick and place machines
- Snap-on mating
- High RF performance :
  - VSWR : 1.05 at 1 GHz / 1.15 at 2.5 GHz
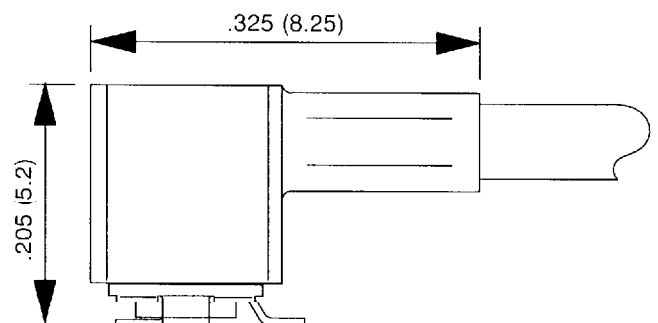 - RF leakage : –40 dB at 2 GHz
- Competitive pricing

APPLICATIONS

- Base stations and hand-sets for :
  - cellular telephones
  - cordless telephones
- Satellite reception terminals (GPS, . . .)
- Instrumentation
- Wireless datacom networks
- Automated payment systems
- Videocommunications
- Other general electronics

PROFILE

.325 (8.25)

.260 (6.6)

Unmated

.325 (8.25)

.205 (5.2)

Mated
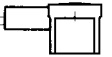
CHARACTERISTICS

	TEST STANDARD	RESULTS	

ELECTRICAL CHARACTERISTICS

		50 Ω	75 Ω
Impedance		50 Ω	75 Ω
Frequency range		DC-6 GHz	DC-1 GHz
V.S.W.R. (mated pair)	IEC 1169-1	1.05 at 1 GHz 1.15 at 2.5 GHz 1.35 at 6 GHz	
Insertion loss	IEC 1169-1	0.2 dB at 2 GHz	
RF leakage (mated pair)	MIL STD 1344 method 3008	–50 dB at 500 MHz –45 dB at 1 GHz –40 dB at 2 GHz	
Outer contact resistance	NF-C 93050 (I = 40 mA peak)	5m Ω max	
Center contact resistance	NF-C 93050 (I = 40 mA peak)	15m Ω max	
Insulation resistance	IEC 1169-1	500 MΩ min (under 250 V RMS)	
Working voltage		50 V RMS	
Testing voltage (V RMS)	IEC 1169-1	Ø 1 mm : 250 ; Ø 2 mm : 500	
Maximum admissible power		40 W at 1 GHz / 20°C / V.S.W.R. = 1	

MECHANICAL CHARACTERISTICS

Durability	IEC 1169-1	50 matings
Force to engage	IEC 1169-1	7 N avg
Force to disengage	IEC 1169-1	5.5 N avg
Shocks (drop test)	IEC 68-2-27	50 g/11 ms ; 3 shocks/axis/way
Random vibrations	Général Motors spec.	Sine waves 5 to 1000 Hz 3 to 30g – 1 H/axis
Bumps (mechanical shocks)	IEC 68-2-29	25 g/6 ms 1000 bumps/axis/way
Cable retention force	IEC 1169-1	Ø 1 mm : 20 N ; Ø 2 mm : 35 N
Solderability	IEC 68-2-54	Passed

ENVIRONMENTAL CHARACTERISTICS

Temperature range		-40°C / +90°C
Climatic cycles	GAM I 13	48 H at 70° C – 24 H at 40° C/93% –36 H at -25°C

MATERIALS

Bodies plugs / in series adapters		Die cast zinc / brass
Bodies receptacles		Phosphor bronze
Center contact	male	Brass
	female	Beryllium copper
Insulator		PTFE

PLATING

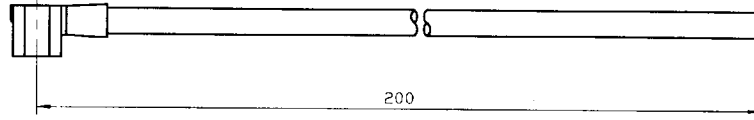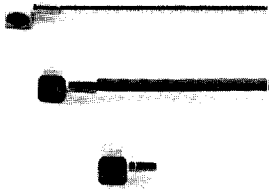|		
Bodies plugs, in series adapters		Nickel
Bodies receptacles		Gold
Center contact	male	Nickel
	female	Gold

POWER RATING

All dimensions are given in mm.

Example : P = 23 W at F= 1.8 GHz, T = 40°C, V.S.W.R. = 1.1
For any further information about the power handled, please see our power application guide *(D1 033 DE)*.


RF Leakage (dB) vs Frequency (GHz) — Mated pair — MMS

V.S.W.R. vs Frequency (GHz) — Mated pair — MMS
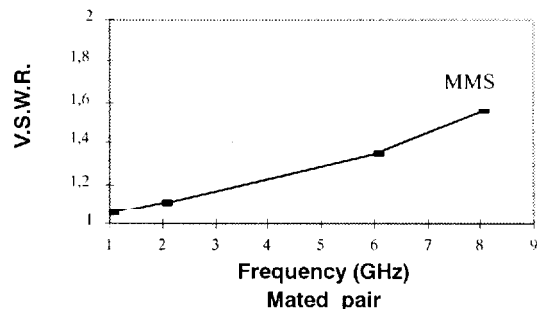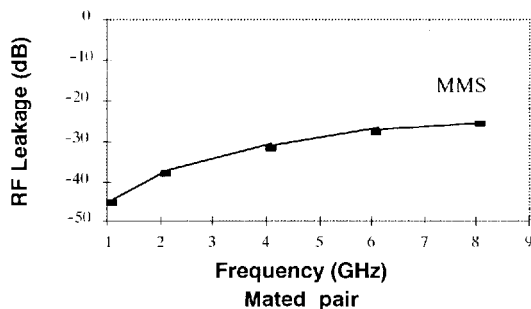
MMS PIGTAILS

cable group	part number	composition
1 /50/ S	R285 001 001	R209 351 020 + C291 050 066
2 /50/ S	R285 001 021	R209 353 000 + C291 145 060
2 /50/ D	R285 001 031	R209 355 000+ C291 146 087
2 /75/ S	R285 001 041	R209 353 000 + C291 305 000

MMS CABLE ASSEMBLIES

fig. 1

fig. 2

fig. 3
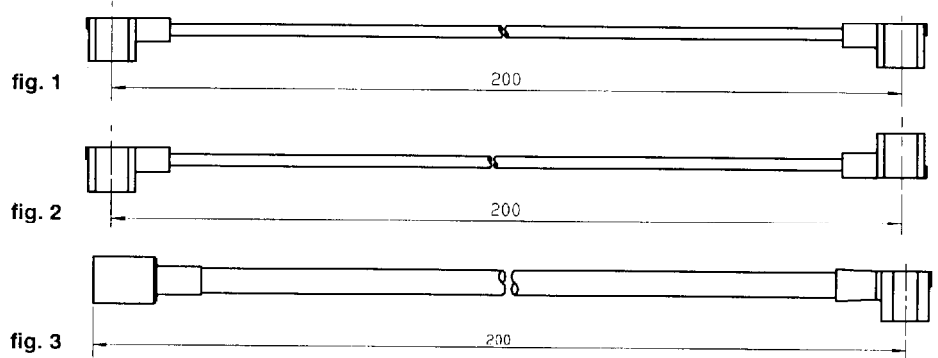
cable group	part number	fig.	composition
1 /50/ S	R285 004 001	1	R209 351 020 + C291 050 066 + R209 351 020
1 /50/ S	R285 005 001	2	R209 351 020 + C291 050 066 + R209 351 020
2 /50/ S	R285 004 221	1	R209 353 000 + C291 145 060 + R209 353 000
2 /50/ S	R285 005 221	2	R209 353 000 + C291 145 060 + R209 353 000
2 /50/ S	R285 003 221	3	R209 080 000 + C291 145 060 + R209 353 000

BETWEEN SERIES CABLE ASSEMBLIES

fig. 1

fig. 2
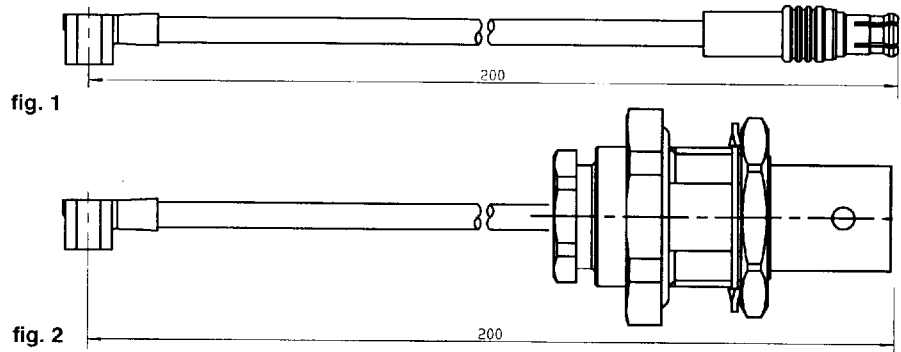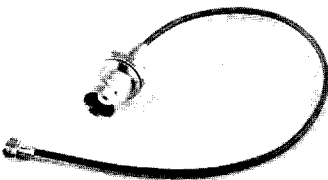
cable group	part number	fig.	composition	series
2 /50/ S	R285 017 221	1	R209 353 000 + C291 145 060 + R113 081 020	MMS/MCX
2 /50/ S	R285 031 221	2	R209 353 000 + C291 145 060 + R141 323 000	MMS/BNC

A wide variety of cables fitted with UF-L connectors are proposed by HIROSE:

- UF-L pigtails,

- UF-L cable assemblies,

- Between series cable assemblies.

2.6.2 SIM Interfaces

The Wireless CPU Q24 Classic and Plus are proposed with an additional SIM interface:

A SIM CARD holder may be equipped on the top of the Wireless CPU.

If a SIM CARD holder is used; the thickness of this connector must be taken into account.

The figures shown in the next pages are detailed mechanical drawing of the Wireless CPU Q24 series, with and without SIM CARD holder.

Figure 4: Mechanical drawing of the Wireless CPU series

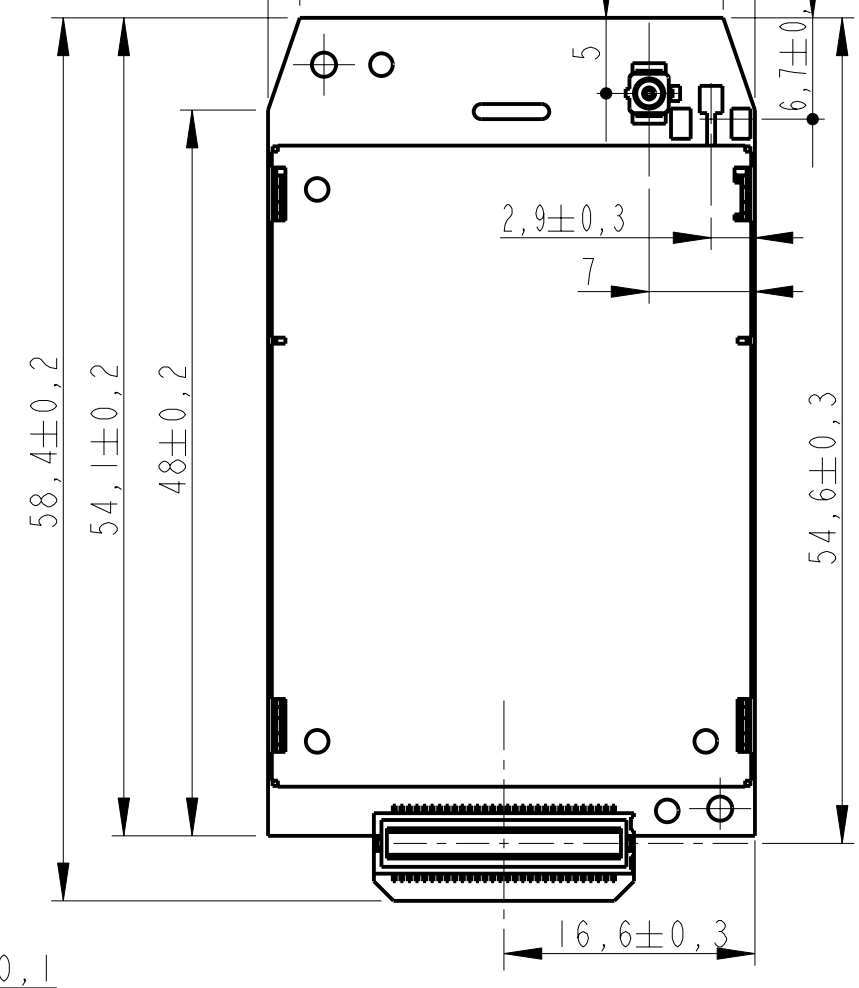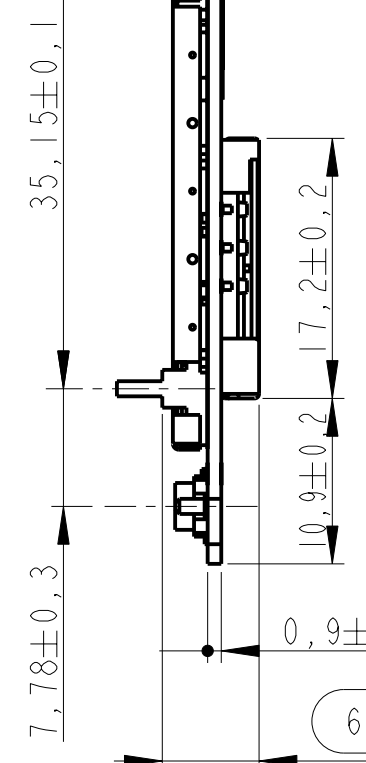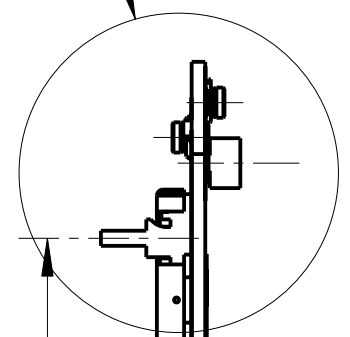Figure 5: Mechanical drawing of the Wireless CPU series +SIM CARD holder

⚠️Caution:

Customers are advised to verify that the SIM Card environmental specification used is compliant with the Wireless CPU Q24NG environmental specifications. Please refer to [8] Wireless CPU Q24NG Product Technical Specification WM_PRJ_Q24NG_PTS_001. Any application must be qualified by the customer with the SIM Card in storage, transportation, and operation.

SCALE 1,000

SIM card
connector
(optional)

3,4±0,2   0,3   30,8±0,2

1,3±0,2   1,3±0,2

13,6   5

7,9

4,3

3,55

6,7   2,7

4,85

9,2

4,7

5,1

1

3,1

SEE DETAIL A

32,2±0,2
28±0,2
SCALE 2,000

(2,1)   2,1

Optional
connectors

2,3±0,2

3   3±0,1

Q24 series

Label

26,1±0,5

003

6,7±0,3

2,9±0,3

5

7

49,2

35,15±0,1

17,2±0,2

10,9±0,2

58,4±0,2

54,1±0,2

48±0,2

54,6±0,3

Locating
2x Ø1,5

7,78±0,3

0,9±0,1

6,4 +0,3 -0,2

2,3   26,2

16,6±0,3
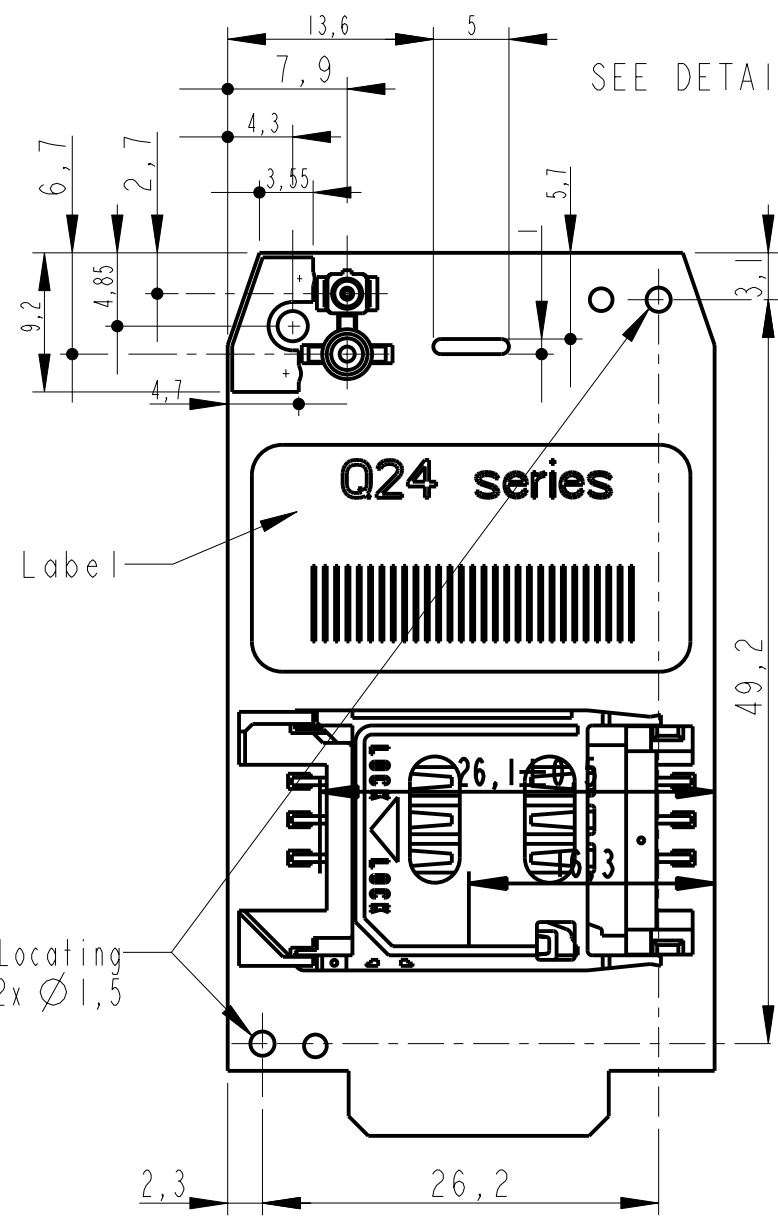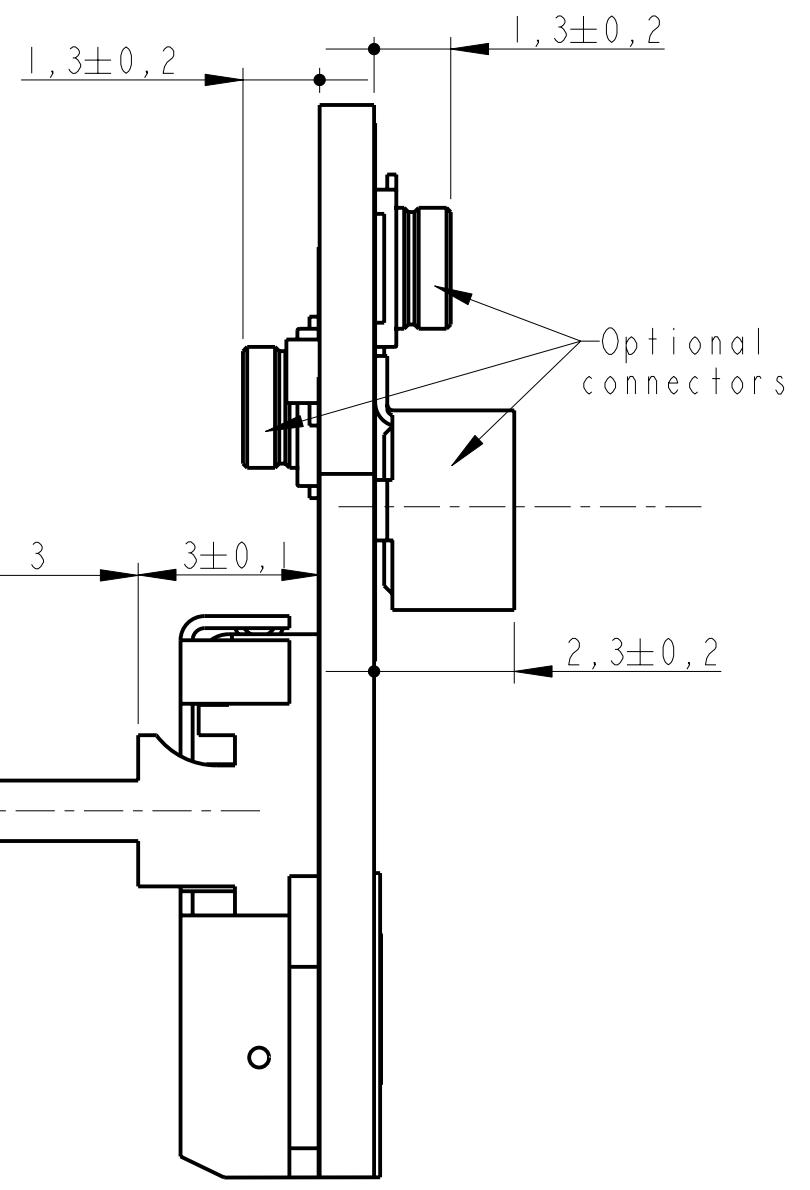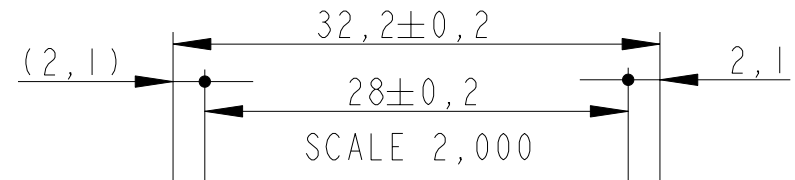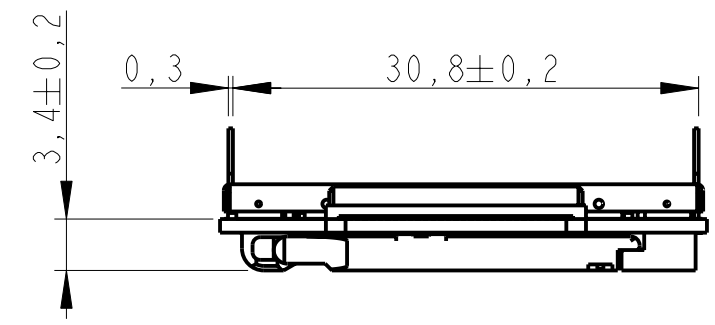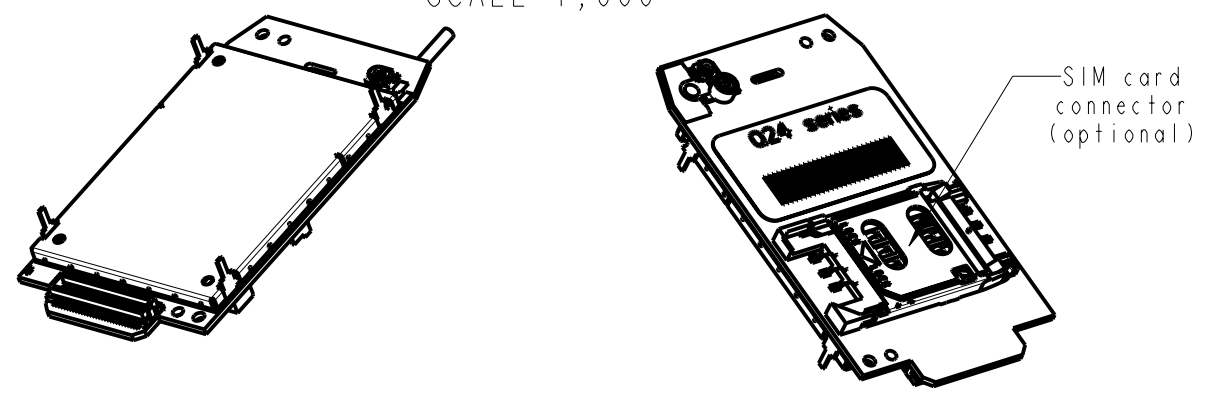
DETAIL A
SCALE 8,000

Q24 Series			GEN.TOL. : ±0,3		SCALE : 1,000
MODULE DIMENSIONS			DOC.	FOLIO: 1/1	FORMAT : A3
			WM-3-600101-V-003-A		

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Sim holder update	28/09/06	JPM	ASC	Production	B	AUTHOR : JPM
Creation	03/08/06	JPM	ASC	Production	A	RESPONS : ASC
MODIFICATION	DATE	AUTHOR	RESP.	STATUS	IND	B
PRO/ENGINEER	MODULE					IND.

SCALE 1,000
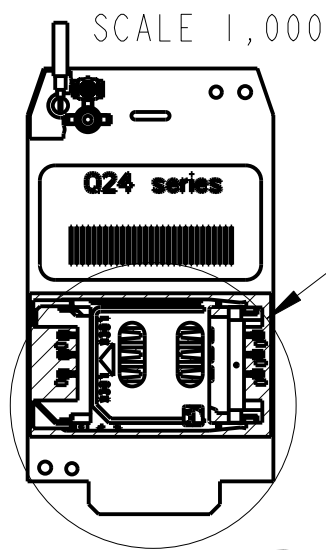
Q24 series

SEE DETAIL A

Area without components

ESD protectors

LOCK LOCK

18,8

10,1

DETAIL A
SCALE 4,000
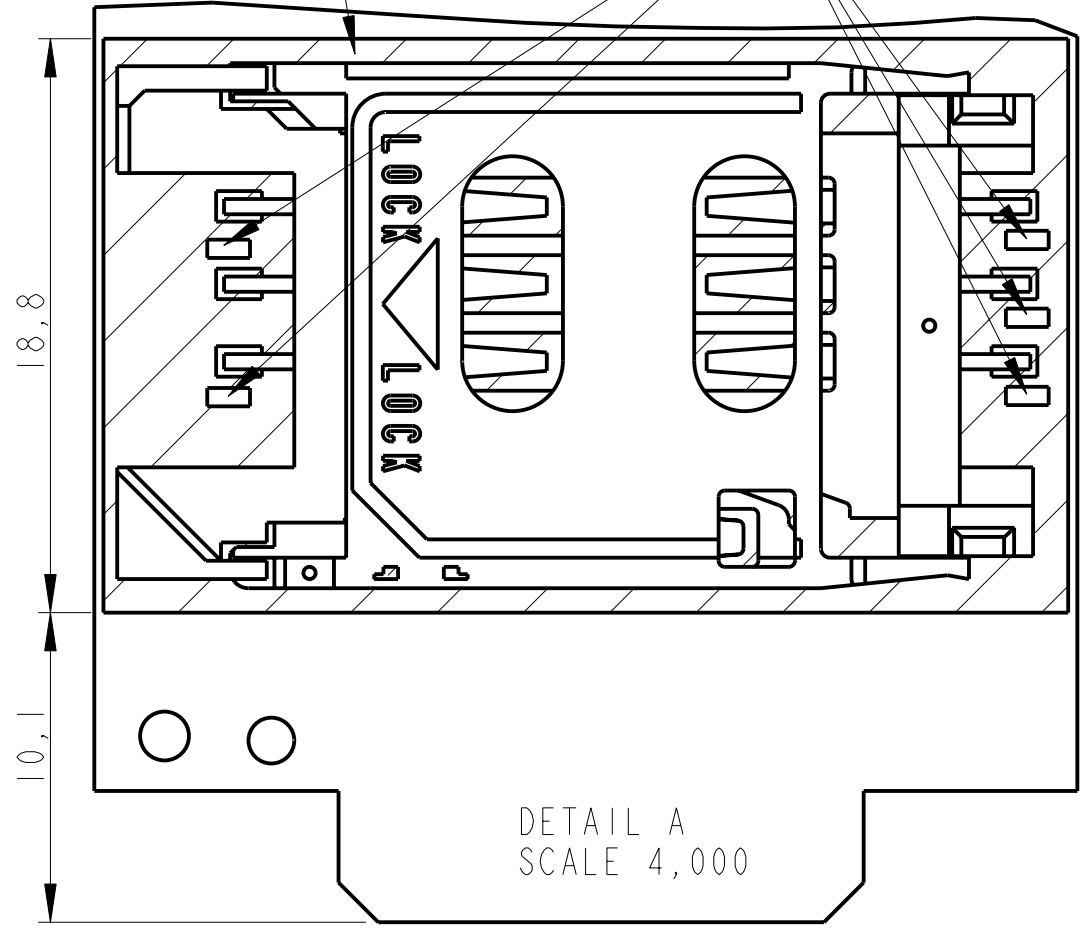
ESD PROTECTORS

Q24_SERIES

TOL.GEN.:±0,3

SCALE:1,000

FOLIO : 1/1

WM-4-600101-X-017-A

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PRO/ENGINEER

A

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