

MEASUREMENT/TECHNICAL REPORT

FCC Part 15 Sections 15.207-15.209-15.249

Datalogic

FCC ID: OMJ0006

June 23rd, 2003

This report concerns (check one): Original grant ☒ Class II change ☐	
Equipment type: RADIO MODEM (ex.: computer, printer, modem, etc.)	
Deferred grant request per 47 CFR 0.457(d)(1)(ii)? yes ☐ no ☒	
If yes, defer until: _____ date	
Company Name agrees to notify the Commission by _____ date	
of the intended date of announcement of the product so that the grant can be issued on that date.	
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1 GENERAL INFORMATION

1.1 Product Description

OPERATING DESCRIPTION of STAR-Modem™ RF910MHz
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The EUT is a Datalogic device which forms part of a cordless barcode reader system.

Particularly, STAR-Modem™ is a radio modem developed to provide wireless 910 MHz RF communication between any serial device (Host) and Datalogic RF devices or base stations.

The EUT has a single port for connection to a PC. This port may be configured for a different types of interface: "serial" and "wedge" interface (connects to PC keyboard port).

All the typical multistandard interface selections are valid (RS232, Wedge, Pen Emulation).

Normally, STAR-Modem™ functions in bi-directional communication to receive data via radio from Datalogic RF devices or transmit data via radio to Datalogic RF devices. The radio link operates at 910 MHz.

In first case the unit acts as a base station receiving data via radio link to a cordless bar code reader, in the second one the unit acts as a transmitter radio interface.

The device was therefore considered as an intentional radiator (CFR47 part 15 sub-section C – section 15.249) and also as a class B digital device.

The unit is powered by an external power ac adapter.

This report covers two versions of the STAR-Modem™.
They differs only for the external power ac adapter :

- 1) The **STAR-Modem™ RF910MHz (10-30 Vdc model)** version has to be supplied by an external power ac adapter among 10 and 30 Volt.
- 2) The **STAR-Modem™ RF910MHz (5 Vdc model)** version has to be supplied by an 5 Volt external power ac adapter.

1.2 Related Submittal(s)/Grant(s)

None.

1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

Model & Serial No.	FCC ID	Description	Cable Descriptions
STAR-Modem RF910MHz (1) s/n EMC03-193	OMJ0006	Radio modem	Shielded signal/supply cable permanently attached
Datalogic PG 220 S/n none	None	12V AC adapter for star-modem	Unshielded power cords
DVE DV-520 ARUP S/n none	None	5V AC adapter for star-modem	Unshielded power cords
GRYPHON M200 USA S/n none	OMJ0002	Gun	none
Dell Latitude Mod. PP01L S/n 06P823-48155- 244-2320	DoC	Notebook	Unshielded power cord Shielded signal cables
Dell AA20031 S/n CN-09364U- 16291-225-02X6	None	AC adapter for notebook	Unshielded power cords
DM 119 S/n 3031602	DYKDM119	Printer, parallel I/F	Unshielded power cord Shielded signal cable

(1) EUT submitted for grant.

1.4 Test Methodology

Both conducted and radiated testing were performed according to the ANSI C63.4-1992 test procedures . Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

TÜV QSL test site No. 3 – semi-anechoic chamber

The semi-anechoic chamber test site and conducted measurement facility used to collect the radiated data are located at Via Montalenghe 12, Scarmagno, Italy. This site has been fully described in a report dated May 14, 2003 submitted to your office, and accepted in a letter dated May 16, 2003 (registration Number: 90860)

1.6 Test equipment list:

Description	Model	serial No.	Cal due date
Test receiver	Rohde & Sch.ESH3	s/n 881364/012	10/03
Spectrum analyzer	HP 8568B+QP adapter	s/n 2601A02134	04/04
Spectrum analyzer	HP 8562A	s/n 3043A05627	10/03
LISN	Schwarzbeck NNLA8120	s/n 8120471A	02/04
Biconical antenna	Tensor 4104	s/n 2222	04/04
Log-periodic antenna	Electro-metrix LPA-25	s/n 1117	04/04
Double ridged guide horn antenna	EMCO 3115	s/n 3572	11/03

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2 PRODUCT LABELING

See exhibit

3 SYSTEM TEST CONFIGURATION

3.1 Justification

The EUT was configured for testing in a typical fashion (as a customer would normally use it).

In order to simulate a real application, its interface port has been connected to a Personal Computer (Notebook); different conditions have been scanned:

- EUT connected to the serial port of the PC (RS 232),
- EUT connected through "wedge" interface adpter to the keyboard port of a PC,
- EUT powered from a 12Vdc power supply and
- EUT powered from a 5 Vdc power supply

Worst case was RS 232 interface, and 12Vdc power supply; therefore final testing was performed in this way; EUT was placed in a vertical position since this position generates the highest emissions.

A cordless barcode reader (FCC ID: OMJ0002) has been placed in the chamber, at a convenient distance, in order to operate the EUT, but not to interfere with testing.

3.2 EUT Exercise Software

EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

Note:

- ✓ transmission frequency was fixed
- ✓ modulation was fixed

(no regulation are permitted by the operator or factory settings)

Software used:

- ✓ In normal operation, STARMODEM is waiting for a message from radio link.
- ✓ When a correct radio frame is received, cradle replay with an acknowledge message and send the data received via the output interface to a personal computer.

3.3 Special Accessories

None.

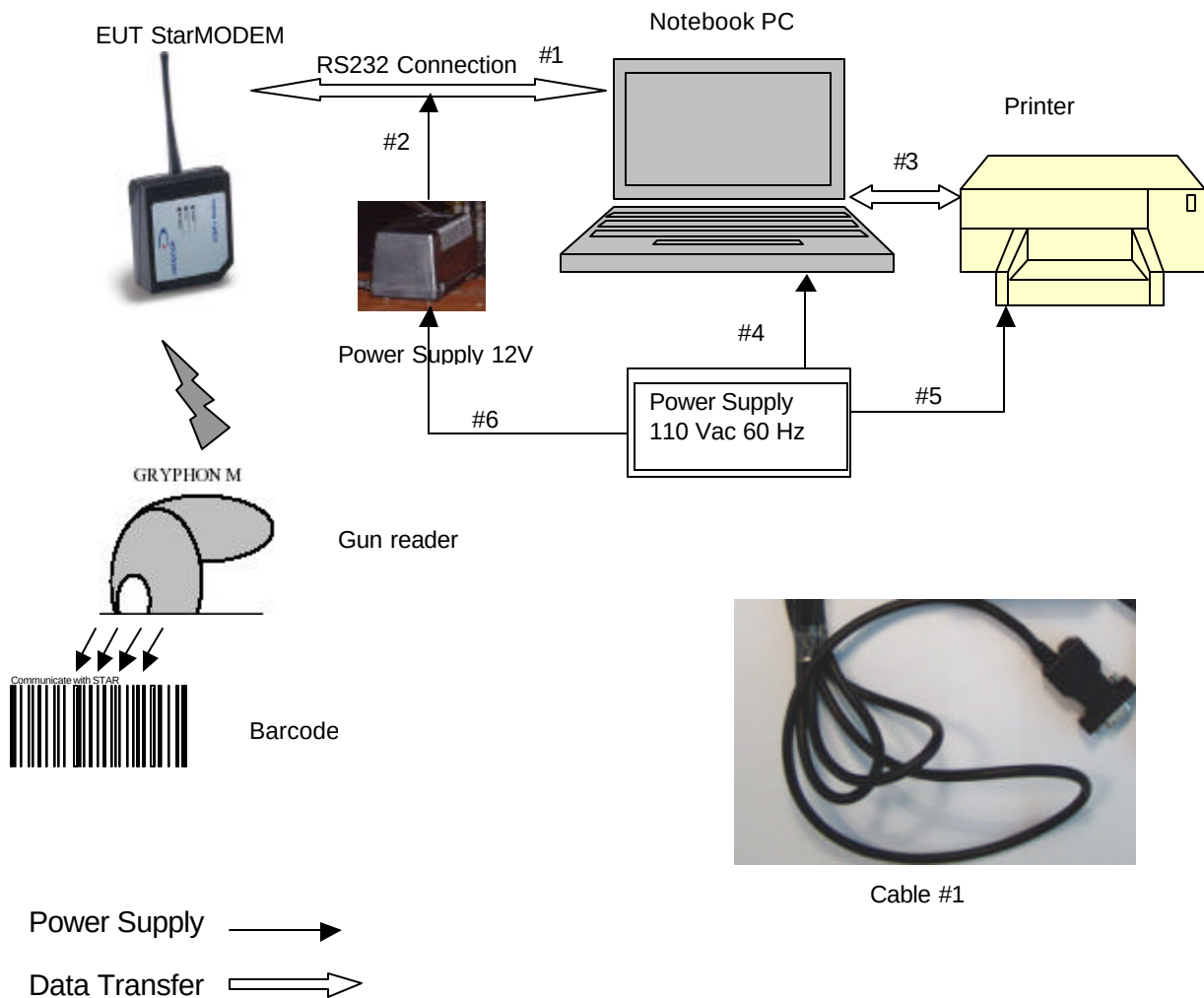
As shown in Figure 3.1 all interface cables used for compliance testing are shielded as normally supplied by Datalogic Company. These cable models and part numbers are marketed with the Datalogic peripherals to the end users, and appear on related product price lists supplied to customers.

3.4 Equipment Modifications

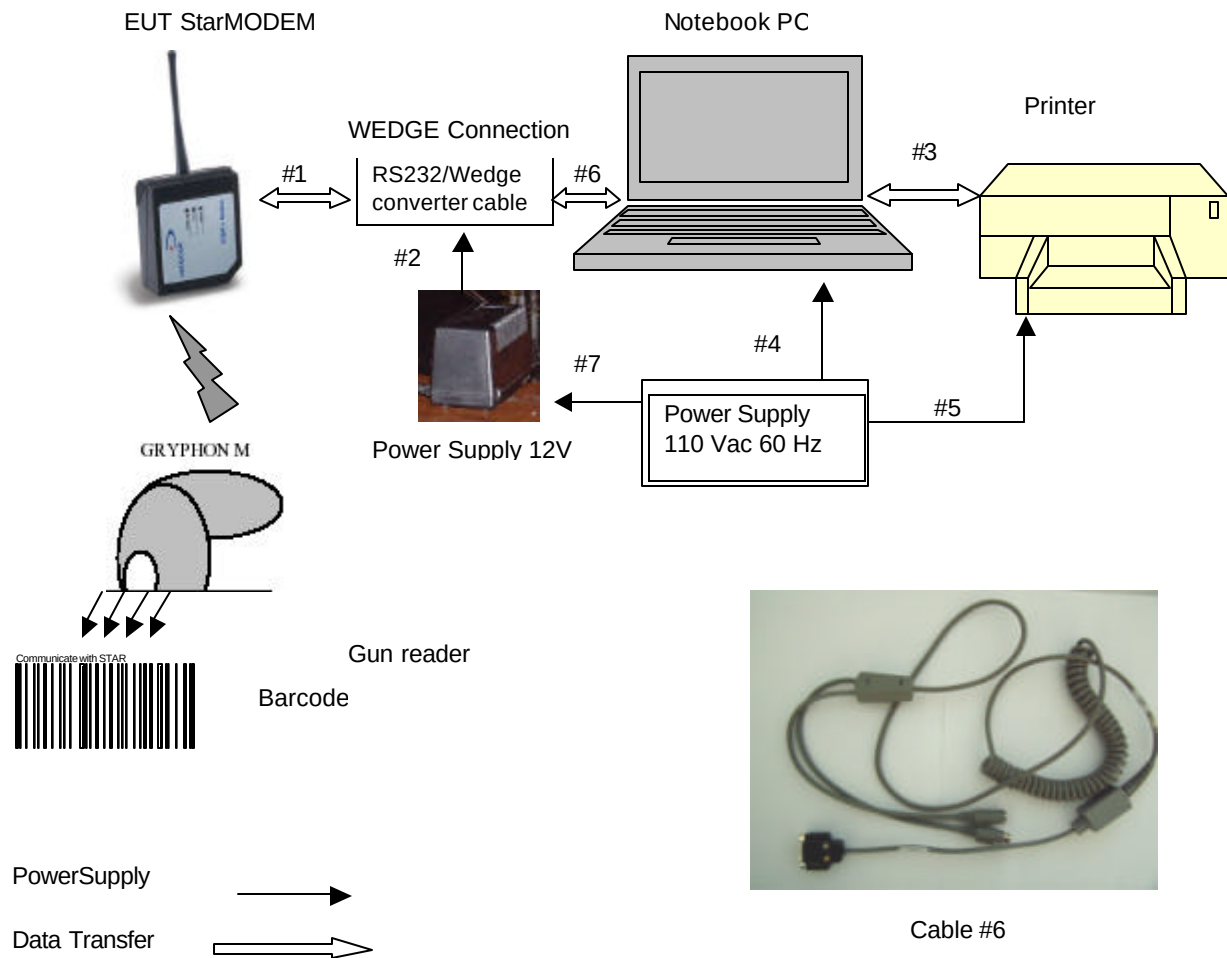
To achieve compliance to Class B levels, no changes were made during compliance testing.

3.5 Configuration of the Tested System

Figure 1. RS232 Connection



- #1 3 m. screened RS232 connection cable from StarModem to Host serial port
- #2 Power unscreened StarModem serial cable
- #3 Screened printer cable
- #4 Power unscreened PC cable
- #5 Power unscreened printer cable
- #6 unscreened Power supply cable



- #1 3 m. screened RS232 connection cable from StarModem to Host serial port
- #2 Power unscreened StarModem serial cable
- #3 Screened printer cable
- #4 Power unscreened PC cable
- #5 Power unscreened printer cable
- #6 Screened wedge converter cable from RS232 to PS/2
- #7 Unscreened Power supply cable

4 BLOCK DIAGRAM(S) OF THE EUT

See exhibit

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5 CONDUCTED AND RADIATED MEASUREMENT PHOTOS

See exhibit

6 CONDUCTED EMISSION DATA – section 15.207

6.1 Tests of the worst case configuration.

The conducted tests are performed with a receiver in quasi-peak mode.

	Frequency (MHz)	Measured* (dBμV)	QP limit (dBμV)	AV Limit (dBμV)
Neutral	0.18	49	64.4	54.4
	0.23	49	62.6	52.6
	0.25	48	61.8	51.8
	0.51	41	56	46
	6.67	41	60	50
	8.13	48	60	50
Line	0.18	50	64.4	54.4
	0.23	49	62.6	52.6
	0.25	49	61.8	51.8
	0.51	42	56	46
	6.67	42	60	50
	8.13	47	60	50

* All readings are quasi-peak

Test Personnel:

Tester Signature  Date May 28, 2003

Typed/Printed Name Giuseppe MECCHIA

7 RADIATED EMISSION DATA – sections 15.209 and 15.249
- frequency range 30 MHz – 10 GHz (10th Harmonic of highest fundamental frequency generated).

7.1 Tests of the worst case configuration

The following data list the significant emission frequencies, measured levels, correction factors (including cable and antenna corrections), the corrected reading, plus the limit. Field strength calculation is given in paragraph 7.2.

Judgement: Passed by 0.8 dB

Spurious emissions (limits according to section 15.209).

Frequency (MHz)	Polarity (V/H)	Receiver* Reading (dBμV)	Correction Factor (dB/m)	Corrected Reading (dBμV/m)	3 Meter Limit (dBμV/m)
64.7	V	22.8	9.2	32	40
130	V	17.8	13.8	31.6	43.5
144.9	V	17.6	14.8	32.4	43.5
300	H	18.9	17.9	36.8	46
398	H	17.4	18.9	36.3	46
931.2	H	5.2	30.6	35.8	46
1298	H	12	27.9	39.9	54

Fundamental and harmonics (limits according to section 15.249).

910	V	62.8	30.4	93.2	94
1820	V	11.1	30	41.1	54

* below 1 GHz readings are quasi-peak, with an IF bandwidth of 120 kHz,
above 1 GHz are peak with an IF bandwidth of 1 MHz.

Test Personnel:

Tester Signature  Date May 27, 2003

Typed/Printed Name Giuseppe MECCHIA

7.2 Field Strength Calculation

7.2.1 The field strength is calculated by adding the Antenna and Cable Factor to the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

where

FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 22.8 dB μ V is obtained. The Antenna and Cable Factor of 9.2 is added, giving a field strength of 32 dB μ V/m. The 32 dB μ V/m value was mathematically converted to its corresponding level in μ V/m.

$$FS = 22.8 + 9.2 = 32 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm} [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

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8 PHOTOS OF TESTED EUT

See exhibit

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User Manual

See exhibit