MEASUREMENT/TECHNICAL REPORT

FCC Part 15 Sections 15-209 and 15-249

MARPOSS

FCC ID: NXIE86X

January 25th, 2002

This report concerns (check one): Original grant __X__ Class II change____

Equipment type: PROBE STATION (ex.: computer, printer, modem, etc.)

Deferred grant request per 47 CFR 0.457(d)(1)(ii)? yes _____ no __X__

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

E86 PROBE USA EXTENDED CHANNELS

The E86 touch system with radio transmission is a probing system designed to be used on large CNC milling machines, lathes and machining centers and for all applications on CNC machine tool machine that require non line of sight between transmitter and receiver.
It is a transceiver and it works in the 910.2 to 918.8 MHz frequency band.

The system is easy to use and allows low cost installation.
The touch system with radio transmission consists of three components: Probe Station, Base Station and Interface.
The Probe Station (or simply the Probe) is a transceiver supplied by a 9V battery ANSI 1604 format to be mechanically connected to a Marposs touch probe, which is substantially a switch with high repeatability features. This unit is designed to be assembled on a tool support and to be used by a tool machine (milling machine, lathe, machining center, etc.) like a normal tool. While the probe is operating it transmits to the Base Station a RF signal indicating the status of the touch and the charge level of the battery. By detecting the status change of the touch, the CNC of the tool machine calculates the dimensions of mechanical parts.

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
E86 PROBE USA EXTENDED CHANNELS s/n 1FN4077	**NXIE86X**	**Probe station**	**No cable provided**
Remotely operated by:			
E86 Base Station S/n 1FN4070	NXIE86B	Base Station	Shielded power and signal cable
E86 Interface S/n none	Verified	Interface	Shielded power and signal cable
CNC simulator S/n none	None	CNC simulator	Unshielded power cord Unshielded signal cables

(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 ITALIA test site No. 3 – semi-anechoich 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 12, 2000 submitted to your office, and accepted in a letter dated May 30, 2000 (registration Number: 90860)

1.6 Test equipment list:

Description	Model	serial No.	Cal due date
Spectrum analyzer	HP 8568B+QP adapter	s/n 2601A02134	04/02
Spectrum analyzer	HP 8562A	s/n 3043A05627	10/02
Biconical antenna	Tensor 4104	s/n 2222	03/02
Log-periodic antenna	Electro-metrix LPA-25	s/n 1117	03/02
Double r.g.horn ant.	EMCO 3115	s/n 3572	11/02

2 PRODUCT LABELING

Figure 2.1 FCC ID Label

See attached file: LabelContent.pdf

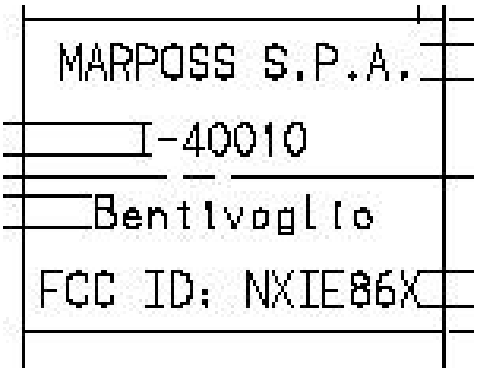


Figure 2.2 Location of the Label on EUT

See attached file: Label Photo.pdf

3 SYSTEM TEST CONFIGURATION

3.1 Justification

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

IT has been tested in stand alone mode; EUT is normally in receive mode, but when it receive a request to send, it become a transmitter and send the data stored in it

An E86 Base Station (FCC ID: NXIE86B) has been placed in the chamber, at a convenient distance, in order to operate the EUT, but not to interfere with testing.

Test conditions:

- a new battery has been installed
- during tests EUT has been rotate through the three ortogonal axes to determine which condition produces the highest emission with reference to the limits.
- modulation was fixed (no regulation are permitted by the operator or factory settings)
- frequency of transmission: it is possible by switches to vary the frequency of transmission from

CHANNEL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
FREQUENCY AMERICA "extended"	910.20	910.40	910.60	910.80	911.20	911.40	911.60	911.80	917.20	917.40	917.60	917.80	918.20	918.40	918.60	918.80

In fact, tests have been run at the two frequency band edges and near to the center.of the band.

3.2 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.
The EUT has been tested in continuous transmission of data in both direction from E86 probe to E86 base station and return, in order to activate respectively the transmit and the receive section of EUT.

3.3 Special Accessories

None.

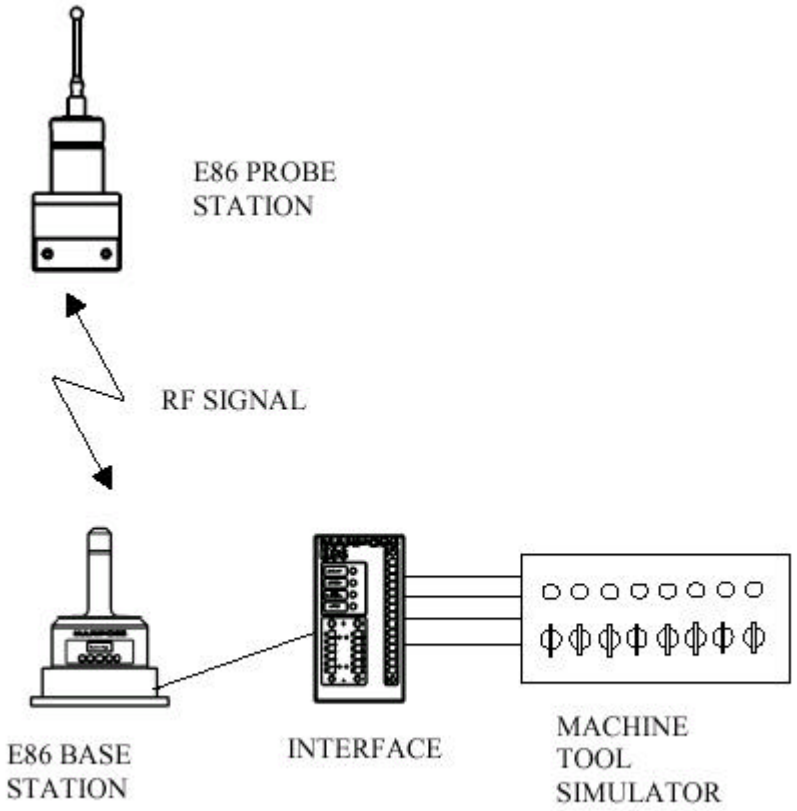
No interface cable is provided.

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 3.1 Configuration of the Tested System



4 BLOCK DIAGRAM(S) OF THE EUT

4.1 Block Diagram Description

Crystals and oscillators:

All frequencies are derived from a single crystal oscillator at **4 MH**z. Starting from this frequency and dividing and multiplying through a PLL circuit the following RF transmission frequencies are obtained:
910.2 MHz
910.4 MHz
910.6 MHz
910.8 MHz
911.2 MHz
911.4 MHz
911.6 MHz
911.8 MHz
917.2 MHz
917.4 MHz
917.6 MHz
917.8 MHz
918.2 MHz
918.4 MHz
918.6 MHz
918.8 MHz

RF suppression devices:

- None

Fig. 4.1 - Block Diagram of the EUT

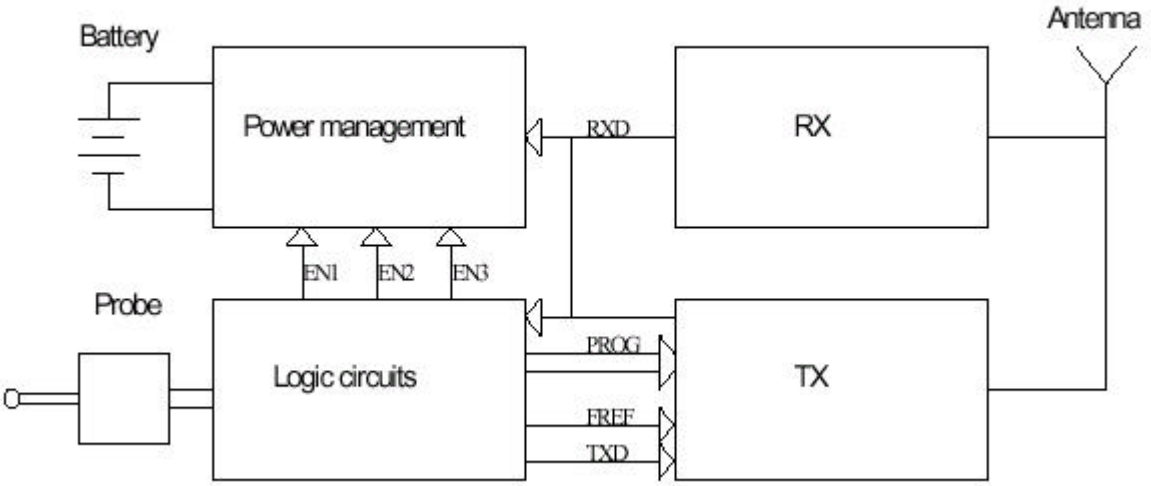


Fig. 4.2 – Schematics of Transceiver

See attached file: Schematics.pdf

5 CONDUCTED AND RADIATED MEASUREMENT PHOTOS

See attached files : TestSetup_photos

7 RADIATED EMISSION DATA

- 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 strenght calculation is given in paragraph 7.2.

Judgement: Passed by 3.4 dB

Spurious emissions (limits according to section 15.209).

No spurious emissions detected (stand by and receive mode)

Fundamental and harmonics (transmit mode) (limits according to section 15.249).

Frequency (MHz)	Polarity (V/H)	Receiver* Reading (dBµV)	Correction Factor (dB/m)	Corrected Reading (dBµV/m)	3 Meter Limit (dBµV/m)
910.2	H	57.6	30.6	88.2	94
911.8	H	59.9	30.6	90.5	94
917.2	H	56.9	30.6	87.5	94
918.8	H	59.9	30.6	90.6	94
1820.4	H	10.4	27.4	37.8	54
1823.6	H	10.6	27.4	38	54
1837.6	H	11.3	27.4	38.7	54

No other harmonics detected.

* 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 January 09, 2002

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 10.6 dBμV is obtained. The Antenna and Cable Factor of 27.4 is added, giving a field strength of 38 dBμV/m. The 38 dBμV/m value was mathematically converted to its corresponding level in μV/m.

FS = 10.6 + 27.4 = 38 dBμV/m

Level in μV/m = Common Antilogarithm [(38 dBμV/m)/20]= 79.4 μV/m

8 PHOTOS OF TESTED EUT

See attached files: Internal Photos.pdf and External Photos.pdf

User Manual

See attached file : User Manual.pdf