

Report of Equipment Authorization
for the
HBC-Radiomatic, Inc.

Certified under the FCC Rules
contained in
Title 47 of the CFR, Part 15, Subpart C
Section 15.247
as an
Frequency Hopping System

MET REPORT EMC10971
November 20, 2001

PREPARED FOR:

HBC-Radiomatic, Inc.
4480 Lake Forest Drive, Suite 306
Cincinnati, OH 45242

PREPARED BY:

MET Laboratories, Inc.
914 West Patapsco Avenue
Baltimore, Maryland 21230-3432

November 20, 2001

HBC-Radiomatic, Inc.
4480 Lake Forest Drive
Suite 306
Cincinnati, OH 45242

Attention: Mr. Jason Looman

Regarding: Certification of the Ergonic under Part 15, Subpart C, Section 15.247 of the FCC Rules as a
Frequency Hopping System
MET Report: EMC10971

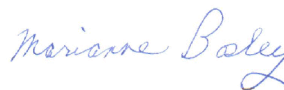
Dear Mr. Looman:

Enclosed is your report of compliance presented on behalf of HBC-Radiomatic, Inc. for the certification of their Model: Ergonic.

Based on these results, MET Laboratories, Inc. certifies that the Ergonic, tested as configured, meets the requirements and interference limitations contained in Section Part 15, Subpart C, Section 15.247, of Title 47 of the Code of Federal Regulations for an Frequency Hopping System.

If you have any questions concerning this report or your responsibilities as a manufacturer of Certified equipment, please contact us at your convenience. Thank you for using MET's testing services.

Sincerely,

A handwritten signature in blue ink that reads "Marianne Bosley". The signature is written in a cursive style with a large, stylized 'B'.

Marianne T. Bosley
EMC Administrator
MET Laboratories, Inc

Report of Equipment Authorization
for the
ERGONIC

Certified under the FCC Rules
contained in
Title 47 of the CFR, Part 15, Subpart C, Section 15.247
FCC ID: NO9PMNTUA

MET REPORT EMC10971
November 20, 2001

Prepared for:

HBC-Radiomatic, Inc.
4480 Lake Forest Drive, Suite 306
Cincinnati, OH 45242

Prepared by:

MET Laboratories
914 West Patapsco Avenue
Baltimore, Maryland 21230



Liming Xu
Project Engineer



Chris Harvey
EMC Lab Director

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LEGAL STATEMENT

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EXHIBIT 1

MANUFACTURER & PRODUCT INFORMATION

ENGINEERING STATEMENT

SUMMARY OF TEST RESULTS

FCC ID: NO9PMNTUA

MANUFACTURER & PRODUCT INFORMATION

TYPE OF AUTHORIZATION: Certification of Frequency Hopping System

FCC IDENTIFIER: FCC ID: NO9PMNTUA

APPLICABLE FCC RULES: 2.907; 15.209 ; 15.247

CLIENT: HBC-Radiomatic, Inc.
Haller Strasse 49-53
D-74564 Crailsheim
Germany

**MANUFACTURER'S
REPRESENTATIVE:** Mr. Jason Looman

EQUIPMENT: Ergonic Frequency Hopping System

TESTING DATE(S): July 13, August 2, and August 30, 2001

ENGINEERING STATEMENT

I ATTEST: the measurements shown in this report were made in accordance with the procedures indicated, and that the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

I FURTHER ATTEST: on the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 15, Subpart C, Section 15.247 of the FCC Rules under normal use and maintenance.



Liming Xu
Project Engineer

Summary of Test Results

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C, Section 15.247. All tests were conducted using measurement procedure ANSI C63.4-1992, and FHSS Test Procedure, Public Notice DA 00-705.

Type of Submission/Rule Part:	Original Filing /Part 15(C), Section 15.247
EUT:	HBC-Radiomatic Inc. / Model-Ergonic Production Unit
FCC ID:	NO9PMNTUA
Equipment Code:	DSS
Frequency Range (MHz):	908.4 - 920.0
Output Power:	0.016W (RF Conducted Level)
Frequency Stability:	N/A

Summary of Test Data

Name of Test	FCC Rule Part/Section	Results
Radiated Emissions	15.209	Complies
Bandwidth Measurements	15.247(a)	Complies
Output Power Measurements	15.247(b)	Complies
Out of Band Emissions Measurements	15.247(c)	Complies

EXHIBIT 2

INTRODUCTION

TEST SITE

MEASUREMENT PROCEDURES

INSTRUMENTATION

TEST CONFIGURATION

MODIFICATIONS STATEMENT

PHOTOGRAPHS

INTRODUCTION

An EMI evaluation to determine compliance of the HBC-Radiomatic, Inc. Transmitter with the requirements of Part 15, Subpart C, Section 15.247 for Frequency Hopping Spread Spectrum Intentional Radiators was conducted. (All references are to the most current version of Title 47 of the Code of Federal Regulations in effect). In accordance with §2.1033(b), the following data is presented in support of the certification of the HBC Transmitter. HBC-Radiomatic should retain a copy of this document to be kept on file for at least one year after the manufacturing of the EUT has been **permanently** discontinued, as per §2.938(c).

TEST SITE

All testing was conducted at MET Laboratories, Inc., 914 W. Patapsco Avenue, Baltimore, MD 21230. Radiated emissions measurements were performed in an anechoic chamber. In accordance with §2.948(a)(2), a complete site description is contained at the FCC Laboratory in Columbia, Maryland. In accordance with §2.948, MET Laboratories has been accredited by the National Voluntary Laboratory Accreditation Program (Lab Code: 100273-0)

MEASUREMENT PROCEDURES

As required by §15.209 of CFR 47, *radiated emissions measurements* were made in accordance with the general procedures of §2.947 and §15.31, and ANSI C63.4-1992 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz". The measurements were performed over the frequency range of 30MHz to the tenth harmonic of the carrier, and the EUT was tested in 3 orthogonal planes, using the following equipment:

Frequency Range	Input Transducer	Measurement Instrumentation
30 MHz to 300MHz	Biconical Antenna	Spectrum Analyzer
300 MHz to 1 GHz	Log-Periodic Antenna	Spectrum Analyzer
above 1 GHz	Double Ridged Guide Horn	Spectrum Analyzer

The measurements were made with the detector set for "quasi-peak" with a bandwidth of 120 kHz (for measurements made between 30 MHz and 1 GHz). In general, all radiated emissions measurements were made with the quasi-peak detector unless otherwise noted. For measurements above 1 GHz, a 1 MHz detector was used with either a "peak" detector or an "average" detector. In general, all radiated emissions above 1 GHz measurements were made with the peak detector unless otherwise noted. Additionally, it was verified that the peak levels of the emissions did not exceed the radiated emission limit by more than 20 dB (reference §15.35(b)).

As required by §15.247(a) of CFR 47, *bandwidth measurements* were made by placing a log periodic antenna 3m from the radiating source. The antenna was connected to a spectrum analyzer and the result was stored.

As required by §15.247(b) of CFR 47, *output power measurements* were performed. See plots for results.

As required by §15.247(c) of CFR 47 *out of band emissions measurements* for operation within the bands 902-928 MHz were performed. See technical specifications for results.

As required by §15.247(d) of CFR 47, *power density measurements* - Not Applicable

As required by §15.247(e) of CFR 47, *processing gain* - Not Applicable

As required by §15.247(f) of CFR 47, *processing gain for hybrid systems* - Not Applicable

As required by §15.247(g) and (h) of CFR 47, *See Attestation Statements*.

MODIFICATIONS STATEMENT

No modifications were made during testing.

INSTRUMENTATION

All measurements were made using the following equipment:

Nomenclature	Manufacturer	Model	MET #	Cal Date	Cal Due
EMC Receiver	Hewlett Packard	85462A	1T4302	8/23/01	8/23/02
Antenna	Schaffner	CBL6140B	1T4303	3/26/01	3/26/02
Horn Antenna	EMCO	3511	1T2511	6/24/01	6/24/02
Test Room	Chamber 1	N/A	1T4300	7/13/01	7/13/02

Description of EUT

The HBC Transmitter Unit is a remote control unit configured in accordance with the manufacturer's instructions and operated in a manner representative of the typical usage of the equipment. During all testing, system components were manipulated within the confines of typical usage to maximize each emission. The EUT is programmed in continuous transmitting mode monitored by a spectrum analyzer to verify signal from the transceiver unit.

In accordance with Section 15.203 of the FCC Rules, the antenna structure of the EUT is trace on pcb. The antenna in the transmitter is a dipole type antenna, and has a gain of -0.5 dBd.



Photograph of Test Setup

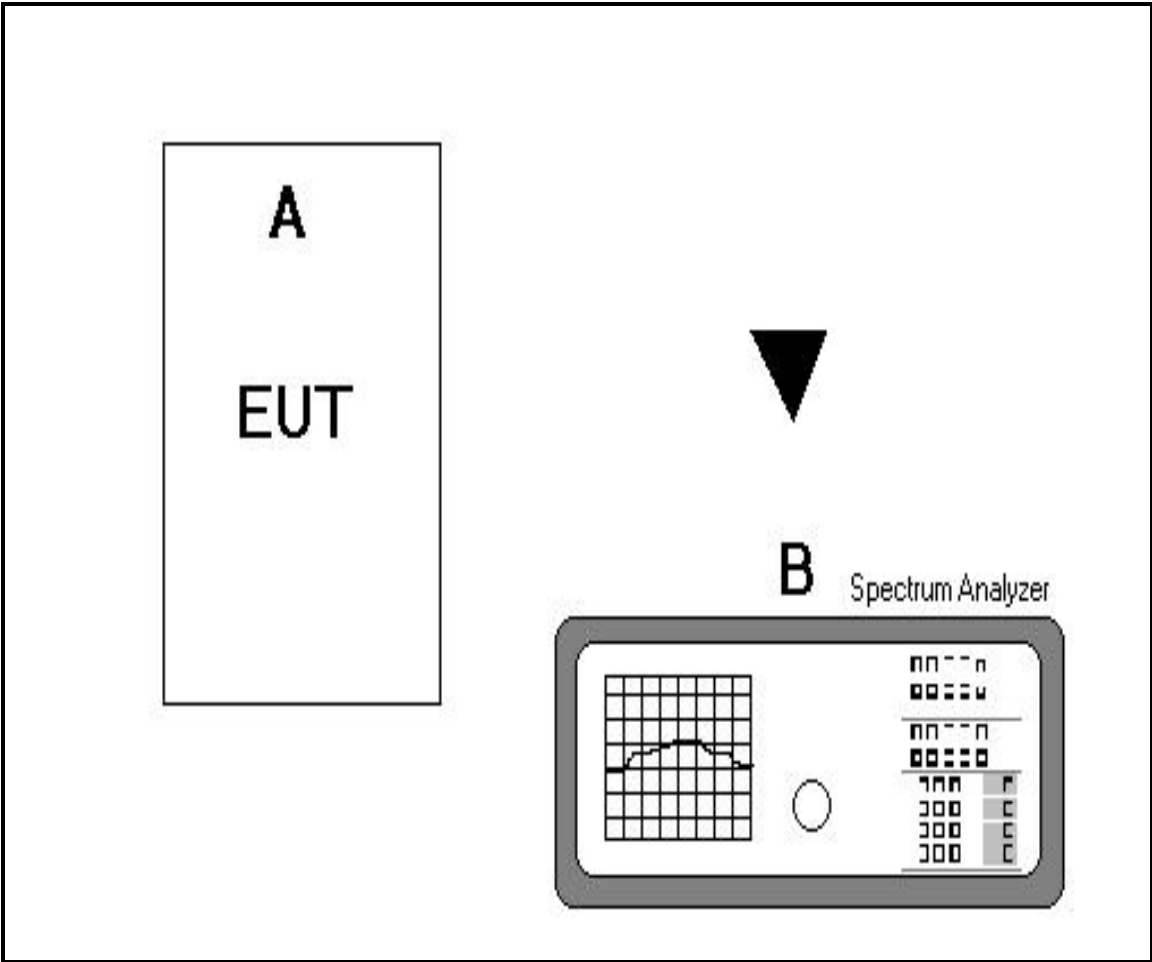


Figure 1. Test Configuration Block Diagram

DEVICE, PERIPHERALS, AND CABLES USED

Ref	Description	Manufacturer	Model#	Serial#
A	Transmitter	HBC	Radio Transmitter PM	N/A
B	Spectrum Analyzer	HP	8563-A	N/A

EXHIBIT 3

TEST DATA

FCC ID: NO9PMNTUA

SUBJECT: Radiated Emissions
FCC Part 15 Subpart C
Section 15.209(a);15.247(c);15.205(a)
FHSS Intentional Radiator

MET REPORT: EMC 10971
MFG: HBC-Radiomatic, Inc.
TESTED BY: Liming Xu
TEST DATE: July 13, 2001

EUT: HBC-Radiomatic Inc. Ergonic Transmitter

TECHNICAL SPECIFICATION: 15.205(a); 15.209(a); 15.247(c)

Equipment meets the technical specifications.

CARRIER PEAK OUTPUT POWER LIMIT:

In 902-928 MHz band: 1 Watt (137 dBuV).

FREQ. (MHZ)	Azimuth (Degrees)	POL. (H/V)	Antenna Height (m)	RAW (dBuv)	A.C.F. (dB) (+)	Cable Loss (dB) (-)	Distance Corr. (dB) (-)	Corrected Amplitude (dBuv)	Limit (dBuv)	Pass /Fail	Margin (dB)
74.6	181	H	2	14.91	6.976	1.23964	0	23.12564	40	pass	-16.87436
74.6	104	V	2	16.26	7.6064	1.23964	0	25.10604	40	pass	-14.89396
119.1	181	H	2	14.47	6.045	1.71943	0	22.23443	43.5	pass	-21.26557
119.1	118	V	2	8.16	5.9346	1.71943	0	15.81403	43.5	pass	-27.68597
153.595	181	H	2	16.44	6.71322	1.9712435	0	25.1244635	43.5	pass	-18.37554
153.595	90	V	1	10.43	7.20719	1.9712435	0	19.6084335	43.5	pass	-23.89157
910	174	H	2	85.1	20.54	5.063	0	110.703	137	pass	-26.297
910	196	V	2.2	85.1	21.65	5.063	0	111.813	137	pass	-25.187
456.13	196	H	1.6	19.7	14.34616	3.67065	0	37.71681	46	pass	-8.28319
456.13	200	V	2.2	16.17	16.48006	3.67065	0	36.32071	46	pass	-9.67929
821.8	180	H	1.2	4.71	19.569	4.6581	0	28.9371	46	pass	-17.0629
821.8	200	V	2	3.5	20.6446	4.6581	0	28.8027	46	pass	-17.1973
857.5	178	H	2	3.5	20.115	4.81875	0	28.43375	46	pass	-17.56625
857.5	178	V	1	6.15	20.9875	4.81875	0	31.95625	46	pass	-14.04375

FREQ. (GHZ)	RAW (dBuv)	A.C.F. (dB) (+)	Preamp/Cable (dB) (-)	Distance Corr. (dB) (-)	Corrected Amplitude (dBuv)	Limit (dBuv)	Pass/Fail	Margin (dB)
1.8198	27.33	26.46296	29.26967	9.54	14.98329	53.98	pass	-38.99671
1.8198	26.83	26.22692	29.26967	9.54	14.24725	53.98	pass	-39.73275
4.5569	34.17	32.32518	23.449346	9.54	33.505834	53.98	pass	-20.47417
4.5569	31.5	32.30242	23.449346	9.54	30.813074	53.98	pass	-23.16693

FCC ID: NO9PMNTUA

SUBJECT:	Bandwidth Measurements FCC Part 15 Subpart C Section 15.247(a)(1) & (a)(1)(i) FHSS Intentional Radiator	MET REPORT:	EMC10971
		MFG:	HBC-Radiomatic, Inc.
		TESTED BY:	Liming Xu
		TEST DATE:	July 13, 2001

EUT: HBC-Radiomatic Inc. Ergonic Transmitter

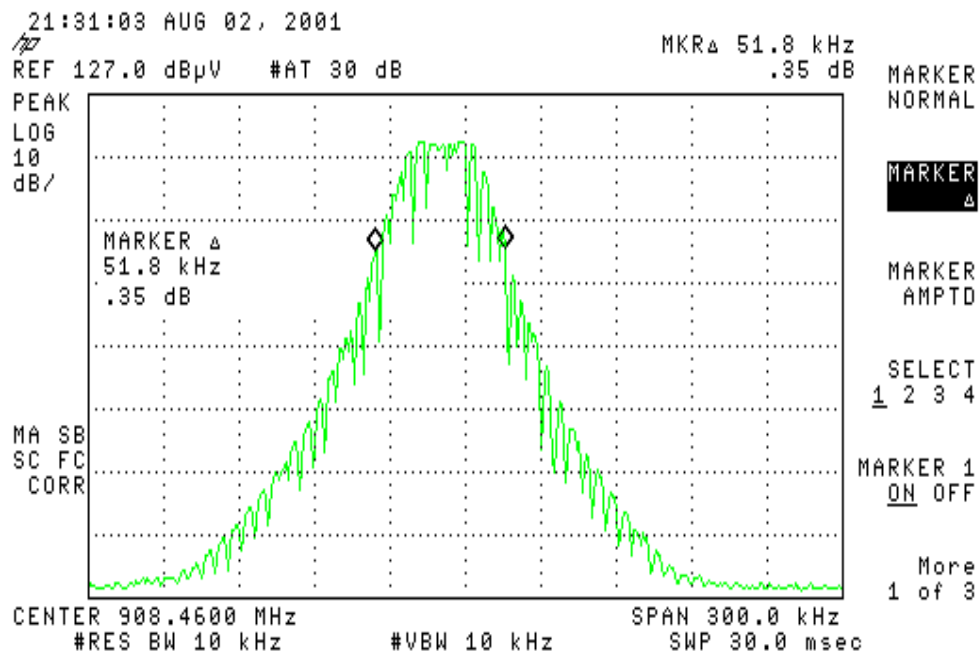
TECHNICAL SPECIFICATION: 15.247(a)(1),(a)(1)(i)

This device has the following technical specifications:

1. The radio hops through 64 frequencies.
2. The dwell time of each frequency is 135 micro-seconds.
3. The carrier frequency separation is 50kHz.
4. The hopping sequence is a random list that is unique for each system.

The 20dB bandwidth was determined from the following plot.

20 dB bandwidth Met10971



FCC ID: NO9PMNTUA

SUBJECT: Peak Output Power
FCC Part 15 Subpart C
Section 15.247(b)
FHSS Intentional Radiator

MET REPORT: EMC10971
MFG: HBC-Radiomatic, Inc.
TESTED BY: Liming Xu
TEST DATE: July 13, 2001

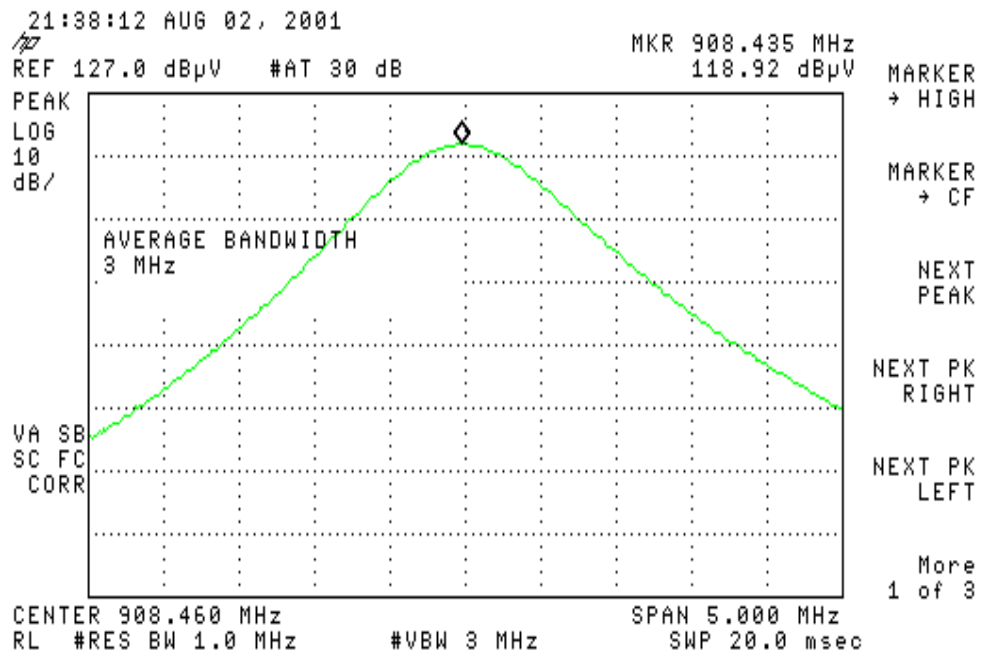
EUT: HBC-Radiomatic Inc. Ergonic Transmitter

TECHNICAL SPECIFICATION: 15.247(b)

RESULTS:

Equipment meets the specifications of 15.247(b). Plots to support the results follow.

RF power output at antenna terminal Met10971



FCC ID: NO9PMNTUA

SUBJECT: Band-Edge Compliance of RF Conducted Emissions
FCC Part 15 Subpart C
Section 15.247(c)
FHSS Intentional Radiator

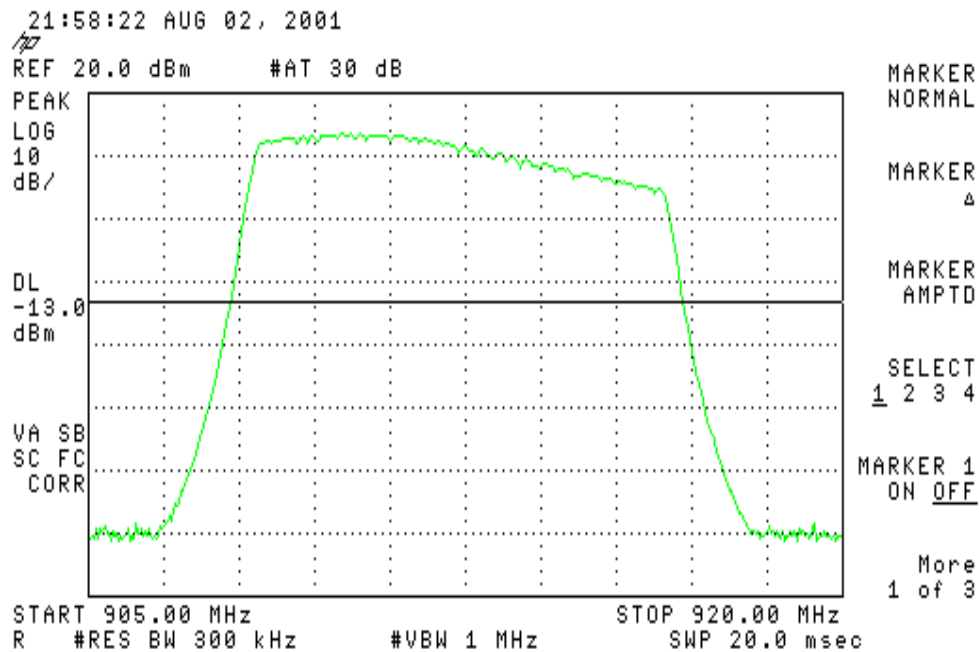
MET EMC10971
REPORT:
MFG: HBC-Radiomatic, Inc.
TESTED BY: Liming Xu
TEST DATE: August 30, 2001

EUT: HBC-Radiomatic, Inc. Ergonic Transmitter

TECHNICAL SPECIFICATION: 15.247(c)

RESULTS:

Equipment meets the specifications of 15.247(c). A plot to support the results follow.



FCC ID: NO9PMNTUA

SUBJECT: Spurious RF Conducted Emissions
FCC Part 15 Subpart C
Section 15.247(c)
FHSS Intentional Radiator

MET REPORT: EMC10971
MFG: HBC-Radiomatic, Inc.
TESTED BY: Liming Xu
TEST DATE: July 13, 2001

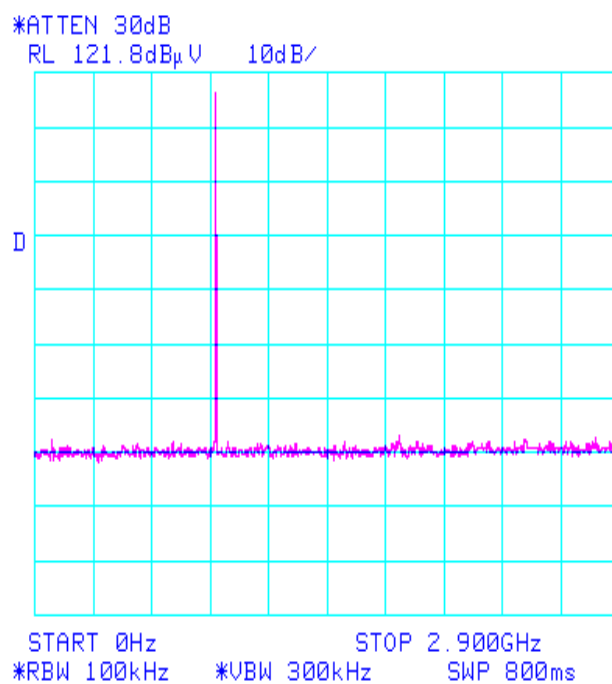
EUT: HBC-Radiomatic, Inc. Ergonic Transmitter

TECHNICAL SPECIFICATION: 15.247(c)

RESULTS:

Equipment meets the specifications of 15.247(c). Plots to support the results follow.

Spur emissions at antenna port Met10971

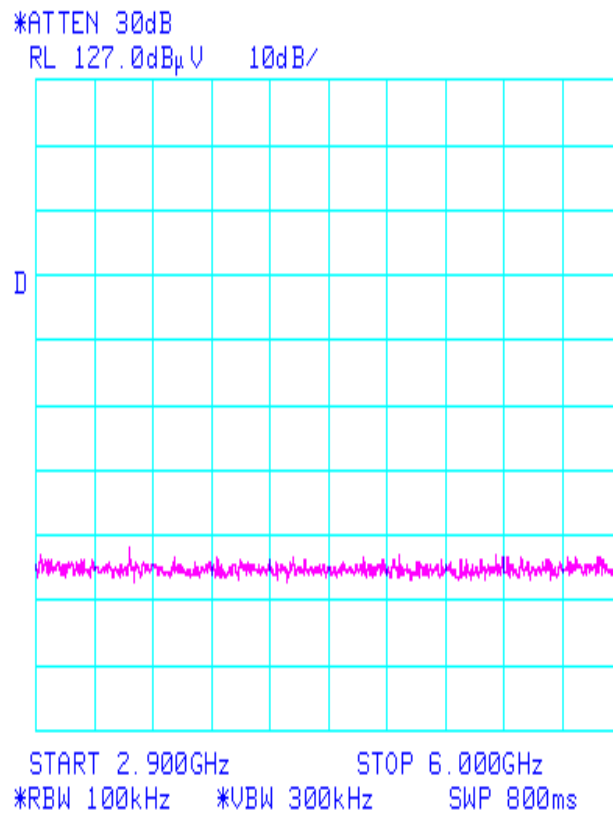


FCC ID: NO9PMNTUA

SUBJECT: Spurious RF Conducted Emissions
FCC Part 15 Subpart C
Section 15.247(c)
FHSS Intentional Radiator

MET REPORT: EMC10971
MFG: HBC-Radiomatic, Inc.
TESTED BY: Liming Xu
TEST DATE: July 13, 2001

Conducted spur emissions at antenna port Met10971



FCC ID: NO9PMNTUA

SUBJECT: Spurious RF Conducted Emissions
FCC Part 15 Subpart C
Section 15.247(c)
FHSS Intentional Radiator

MET REPORT: EMC10971
MFG: HBC-Radiomatic, Inc.
TESTED BY: Liming Xu
TEST DATE: July 13, 2001

Conducted spur emissions at antenna port Met10971

