

**MFA** **M. Flom Associates, Inc. - Global Compliance Center**  
 3356 North San Marcos Place, Suite 107, Chandler, Arizona 85225-7176  
 www.mflom.com general@mflom.com (480) 926-3100, FAX: 926-3598

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Date: December 28, 1999

Applicant: Yaesu Musen Co., Ltd.  
 20-2, Shimomaruko 1-chome  
 Ota-ku  
 Tokyo, Japan 146

Attention of: H. Edo, Export Manager

Mailing: Yaesu U.S.A.  
 17210 Edwards Rd.  
 Cerritos, CA 90703

Attention of: Mikio Maruya, Executive Vice President  
 (800) 255-9237; FAX: (800) 477-9237  
 (562) 404-2700, x280; FAX: -1210

Equipment: FT-1500M  
 FCC ID: K66FT-1500M  
 P.O. Number: UPS/FAX 12/23/99  
 FCC Rules: Part 15, Subpart B. RECEIVER CERTIFICATION

Gentlemen:

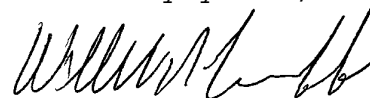
Enclosed herewith please find your copies of the Application Form, Test Data Report and covering letter to the FCC, the whole for approval of the reference equipment as shown.

Please allow from 6-8 weeks to hear from the Commission, who may request additional data or information, and even a sample for pre-grant audit testing. In the meantime, you are subject to the restrictions as listed on the attached summary.

If your equipment is still retained by us, it will be returned to you shortly via U.P.S. Our invoice for services has been directed to your Accounts Payable Department, with a copy included here for your file.

Should you have any questions, please do not hesitate to call.

Sincerely yours,



William H. Graff, Director  
 of Engineering

enclosure(s)  
 WHG/cvr

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SUMMARY OF RESTRICTIONS

1. All submissions to the FCC are subject to their Examiner's interpretation.
2. Please allow from 60 to 90 days before hearing from the FCC with regard to any submission.
3. The FCC can set aside any action; modify or set aside any action, within 30 days. (FCC Rule 1.108, 1.113).
4. Under Rule 2.803, if device is not certified then it must **NOT** be sold, leased, offered for sale, imported, shipped or distributed or advertised for sale.
5. FCC can revoke its certificates at any time if the equipment does not meet or **CONTINUE** to meet their Rules. (Rule Parts 2.927, 2.939).
6. FCC can request a sample at any time (2.936).

M. FLOM ASSOCIATES, INC.



William H. Graff, Director  
of Engineering

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Date: December 28, 1999

Federal Communications Commission  
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Yaesu Musen Co., Ltd.  
Equipment: FT-1500M  
FCC ID: K66FT-1500M  
FCC Rules: 15.109

Gentlemen:

On behalf of the Applicant, enclosed please find Application Form 731, Engineering Test Report and all pertinent documentation, the whole for approval of the referenced equipment as shown.

Filing fees are attached.

We trust the same is in order. Should you need any further information, kindly contact the writer who is authorized to act as agent.

Sincerely yours,



William H. Graff, Director  
of Engineering

enclosure(s)  
cc: Applicant  
WHG/cvr

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C E R T I F I C A T I O N

of

RECEIVER MODEL: FT-1500M

FCC ID: K66FT-1500M

to

FEDERAL COMMUNICATIONS COMMISSION

Part 15(B)  
(New)

DATE OF REPORT: December 28, 1999

ON THE BEHALF OF THE APPLICANT:

Yaesu Musen Co., Ltd.

AT THE REQUEST OF:

P.O. UPS/FAX 12/23/99

Yaesu U.S.A.  
17210 Edwards Rd.  
Cerritos, CA 90703

Attention of:

Mikio Maruya, Executive Vice President  
(800) 255-9237; FAX: (800) 477-9237  
(562) 404-2700, x280; FAX: -1210

SUPERVISED BY:




William H. Graff, Director  
of Engineering

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*Required information per ISO/IEC Guide 25-1990, paragraph 13.2:*

- a) TEST REPORT
- b) Laboratory: M. Flom Associates, Inc.  
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107  
(Canada: IC 2044) Chandler, AZ 85225
- c) Report Number: d99c0067
- d) Client: Yaesu U.S.A.  
17210 Edwards Rd.  
Cerritos, CA 90703
- e) Identification: FT-1500M  
FCC ID: K66FT-1500M  
Description: Amateur Scanning Receiver
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: December 28, 1999  
EUT Received: December 23, 1999
- h, j, k): As indicated in individual tests.
- i) Sampling method: No sampling procedure used.
- l) Uncertainty: In accordance with MFA internal quality manual.
- m) Supervised by:   
William H. Graff, Director  
of Engineering
- n) Results: The results presented in this report relate only to the item tested.
- o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

M. Flom Associates, Inc. is accredited by the American Association for Laboratory Association (A2LA) as shown in the scope below.



**THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION**

**ACCREDITED LABORATORY**

A2LA has accredited

**M. FLOM ASSOCIATES, INC.**  
Chandler, AZ

for technical competence in the field of

**Electrical (EMC) Testing**


The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC Guide 25-1990 "General Requirements for the Competence of Calibration and Testing Laboratories" (equivalent to relevant requirements of the ISO 9000 series of standards) and any additional program requirements in the identified field of testing.

Presented this 24<sup>th</sup> day of November, 1998.



*Peter Almy*  
President  
For the Accreditation Council  
Certificate Number 1008.01  
Valid to December 31, 2000

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical (EMC) Scope of Accreditation



**American Association for Laboratory Accreditation**

**SCOPE OF ACCREDITATION TO ISO/IEC GUIDE 25:1990 AND EN 45001**

M. FLOM ASSOCIATES, INC.  
Electronic Testing Laboratory  
3356 North San Marcos Place, Suite 107  
Chandler, AZ 85224-1571  
Morton Flom Phone: 602 926 3100

**ELECTRICAL (EMC)**

Valid to: December 31, 2000 Certificate Number: 1008-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following **electromagnetic compatibility tests**:

Tests	Standard(s)
RF Emissions	FCC Part 15 (Subparts B and C) using ANSI C63.4-1992; CISPR 11; CISPR 13; CISPR 14; CISPR 22; EN 55011; EN 55013; EN 55014; EN 55022; EN 50081-1; EN 50081-2; FCC Part 18; ICES-003; AS/NZS 1044; AS/NZS 1053; AS/NZS 3548; AS/NZS 4251.1
RF Immunity	EN 50082-1; EN 50082-2; AS/NZS 4251.1
Radiated Susceptibility	EN 61000-4-3; ENV 50140; ENV 50204; IEC 1000-4-3; IEC 801-3
ESD	EN 61000-4-2; IEC 1000-4-2; IEC 801-2
EFT	EN 61000-4-4; IEC 1000-4-4; IEC 801-4
Surge	EN 61000-4-5; ENV 50142; IEC 1000-4-5; IEC 801-5
47 CFR (FCC)	2, 21, 22, 23, 24, 74, 80, 87, 90, 95, 97

*Peter Almy*

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8307 • Phone: 301 644 3200 • Fax: 301 662 2974

"This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined in accordance with the laboratory's terms of accreditation unless stated otherwise in the report."

Should this report contain any data for tests for which we are not accredited, or which have been undertaken by a subcontractor that is not A2LA accredited, such data would not covered by this laboratory's A2LA accreditation.

PAGE NO.

3 of 10.

GENERAL INFORMATION

Part 2.948:

(a)(b) DESCRIPTION OF MEASUREMENT FACILITIES:  
FILE: 31040/SIT

A description of the measurement facilities was filed with the Commission and was found to be in compliance with the requirements of Section 2.948, by letter dated March 3, 1997. All pertinent changes will be reported to the Commission by up-date prior to March 2000.

(b)(4) SUPPORTING STRUCTURES:

SKETCH - ATTACHED EXHIBITS

(b)(5)(6) TEST INSTRUMENTATION:

LIST - SEE EXHIBITS

2.925: IDENTIFICATION OF AN AUTHORIZED DEVICE:

DRAWING - SEE EXHIBITS

LOCATION OF LABEL - SEE PHOTOS

NAME AND ADDRESS OF APPLICANT:

Yaesu Musen Co., Ltd.  
20-2, Shimomaruko 1-chome  
Ota-ku  
Tokyo, Japan 146



PAGE NO. 4 of 10.  
2.911:  
2.1033(b)(6)

TECHNICAL REPORT

MANUFACTURER:

Applicant

TRADE NAME:

Yaesu

FCC ID:

K66FT-1500M

MODEL NO:

FT-1500M

PHOTOGRAPHS:

SEE LIST OF EXHIBITS

15.31: MEASUREMENT STANDARD & PROCEDURE:

- IEEE STANDARD 187 WAS USED AS A GUIDE.
- FCC MEASUREMENT PROCEDURE MP-1
- x   FCC RULE PART 15(B) (NEW)

PAGE NO.

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EXPOSITORY STATEMENT

1. NUMBER OF BANDS = 1
2. NUMBER OF CHANNELS = 120
3. TUNING RANGE, MHz = 137 to 174
4. OSCILLATOR RANGE, MHz = 115.3 to 152.3
5. I.F., MHz = 21.7
6. BLOCK DIAGRAM = ATTACHED
7. For cellular receiver only, the radio transceiver meets the requirements of FCC Bulletin OET 53 ("Cellular System Mobile Stations-Land-System Compatibility Specification."). See attached affidavit.

15.203: ANTENNA REQUIREMENT:

- The antenna is permanently attached to the EUT
- The antenna uses a unique coupling
- The EUT must be professionally installed
- The antenna requirement does not apply

SUPERVISED BY:



William H. Graff, Director  
of Engineering

PAGE NO. 6 of 10.

NAME OF TEST: Receiver Spurious Emissions (Radiated)

SPECIFICATION:

15.109: Radiated Interference Limits  
 15.33: Frequency Range of Radiated Measurements  
 80.217: Suppression of Interference Aboard Ships

GUIDE: See measurement procedure below

TEST CONDITIONS: Standard Temperature & Humidity

TEST EQUIPMENT: As per attached page

SEARCH ANTENNAS:

100 Hz - 50 MHz: Emco 3301B Active Rod  
 10 kHz - 32 MHz: Singer 94593-1 Loop  
 25 MHz - 300 MHz: Emco 3109 Biconical  
 200 MHz - 1 GHz: Aprel 2001 Log Periodic  
 1 GHz - 18 GHz: Emco 3115 Horn  
 10 GHz - 40 GHz: Emco 3116 Horn with HP11970A Mixer

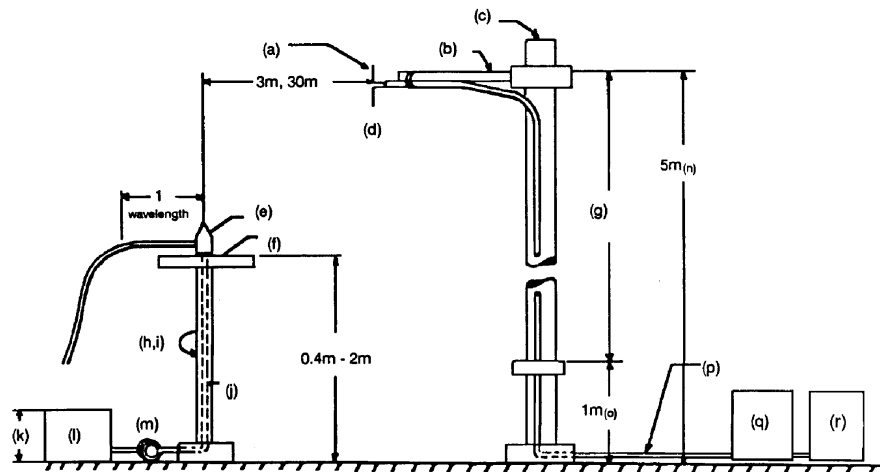
MEASUREMENT PROCEDURE

1. At first, bench tests were performed to locate the spurious emissions at the antenna terminals.
2. In the field, tests were conducted over the range shown, The test sample was set up on a wooden turntable above ground, and at a distance of three meters from the antenna connected tot he Spectrum Analyzer.
3. In order to obtain the maximum response at each frequency, the turntable was rotated, and the search antenna was raised and lowered. The EUT was also adjusted for maximum response. Tests were conducted in Horizontal & Vertical polarization modes.
4. The field strength was calculated from:

$$E \text{ } \mu\text{V/m @ 3 m} = \text{Log}_{10}^{-1} \left( \frac{\text{dB}\mu\text{V} + \text{A.F.} + \text{C.L.}}{20} \right)$$

5. MEASUREMENT RESULTS: Attached for "Worst Case" conditions.

RADIATED TEST SETUP



NOTES:

- (a) Search Antenna - Rotatable on boom
- (b) Non-metallic boom
- (c) Non-metallic mast
- (d) Adjustable horizontally
- (e) Equipment Under Test
- (f) Turntable
- (g) Boom adjustable in height.
- (h) External control cables routed horizontally at least one wavelength.
- (i) Rotatable
- (j) Cables routed through hollow turntable center
- (k) 30 cm or less
- (l) External power source
- (m) 10 cm diameter coil of excess cable
- (n) 25 cm (V), 1 m-7 m (V, H)
- (o) 25 cm from bottom end of 'V', 1m normally
- (p) Calibrated Cable at least 10m in length
- (q) Amplifier (optional)
- (r) Spectrum Analyzer

Asset Description (as applicable)	s/n	Cycle	Last Cal
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Per ANSI C63.4-1992, 10.1.4

TRANSDUCER

i00088	EMCO 3109-B 25MHz-300MHz	2336	12 mo.	Sep-99
i00089	Aprel 2001 200MHz-1GHz	001500	12 mo.	Sep-99
i00103	EMCO 3115 1GHz-18GHz	9208-3925	12 mo.	Sep-99
i00065	EMCO 3301-B Active Monopole	2635	12 mo.	Sep-99

AMPLIFIER

i00028	HP 8449A	2749A00121	12 mo.	Mar-99
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SPECTRUM ANALYZER

i00029	HP 8563E	3213A00104	12 mo.	Aug-99
i00033	HP 85462A	3625A00357	12 mo.	May-99
i00048	HP 8566B	2511AD1467	6 mo.	May-99

PAGE NO. 8 of 10.

NAME OF TEST: Receiver Spurious Emissions (Radiated)

MEASUREMENT DETAILS

SITE REFERENCE = 31040/SIT  
 SPECTRUM SEARCHED = 0 to 10 x F<sub>R</sub>  
 WORST CASE = V  
 LIMITS = 15.109(a) (Attached)  
 ALL OTHER EMISSIONS = 20 dB OR MORE BELOW LIMIT

TESTS WERE CONDUCTED WITH:

- a. All controls and switches operated.
- b. Half-wave dipole antenna or manufacturer/applicant supplied antenna.

SAMPLE CALCULATION:

EMISSION FREQUENCY, MHz = 115.324980  
 LEVEL =  $\text{Log}_{10}^{-1} \left( \frac{-7.5 + 13.84}{20} \right)$   
 LEVEL,  $\mu\text{V/m}$  @ 3m = 11.67

MEASUREMENT RESULTS = ATTACHED

NOTE: WORST CASE OF SCAN AND NON-SCAN MODES REPORTED.

NAME OF TEST: Receiver Spurious Emissions (Radiated)  
 g99c0304: 1999-Dec-23 Thu 11:23:00  
 STATE: 0:General

All other emissions in the required measurement range were more than 20 dB below the required limits.

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBuV	@ m	C.F., dB	$\mu\text{V/m}$ @ m
137.02500	115.324980	7.5	3	13.84	11.67 3
155.52500	133.824960	10.2	3	14.89	17.97 3
173.97500	152.274920	15.5	3	15.35	34.87 3
137.02500	230.650000	2.9	3	17.15	10.06 3
155.52500	267.649580	9.2	3	17.86	22.54 3
173.97500	304.549870	10	3	18.5	26.61 3

PAGE NO. 9 of 10.

NAME OF TEST: Scanning Receivers and Frequency Converters Used With Scanning Receivers

SPECIFICATION: FCC: 47 CFR 15.121(b)

GUIDE: See Measurement Procedure Below

TEST CONDITIONS: S. T. & H.

TEST EQUIPMENT: As per attached page

GUIDE: 47 CFR 15.121(b): Except as provided in paragraph (c) of this section, scanning receivers shall reject any signals from Cellular Radiotelephone Service frequency bands that are 38 dB or higher based upon a 12 dB SINAD measurement, which is considered the threshold where a signal can be clearly discerned from any interference that may be present.

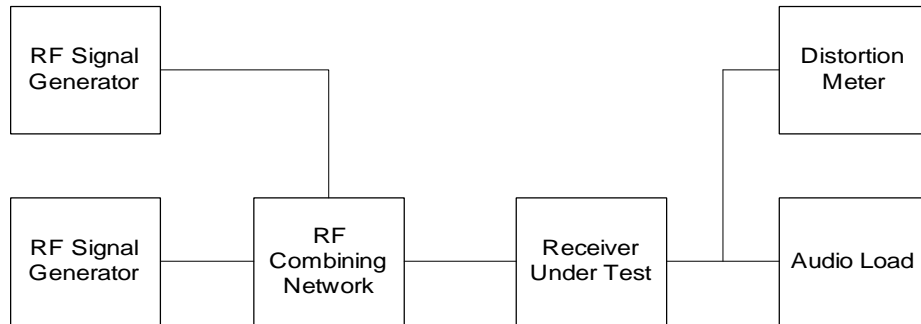
WARNING: MODIFICATION OF THIS DEVICE TO RECEIVE CELLULAR RADIOTELEPHONE SERVICE SIGNALS IS PROHIBITED UNDER FCC RULES AND FEDERAL LAW.

#### MEASUREMENT PROCEDURE

1. A search for all potential spurious responses was begun by setting a signal generator at a level of -47 dBm to each of three frequencies in the subscriber transmit and base transmit bands.
2. The EUT was then set to scan across it's entire receive band. The most sensitive of each spurious response was noted.
3. The equipment was connected as illustrated. A second radio frequency signal generator (unwanted signal source) was connected to the appropriate matching network.
4. In absence of the unwanted signal, the standard input signal was applied to the combining network. Its level was varied to obtain reference sensitivity. This level is  $P_{REF}$ .
5. The level of wanted input signal was increased by 3dB.
6. A high-level unwanted input signal, modulated with 400 Hz at 60% of the maximum permissible frequency deviation was connected to the combining network.
7. The unwanted signal frequency was varied over a range from 824-849 and 869-894 MHz, to search for degradation of the SINAD. When a response was found, the frequency of the unwanted signal was adjusted to maximize the degradation.
8. At the frequency of each spurious response the level of unwanted input signal was varied until the standard SINAD value obtained. The frequency of the unwanted signal and its level was recorded as  $P_{SPUR}$ .
9. Calculate the spurious response rejection for each frequency concerned as follows:  

$$\text{Spurious Response Rejection} = P_{SPUR} - P_{REF}$$

SCANNING RECEIVER :



TEST RESULTS :

DISPLAYED FREQUENCY	IMAGE FREQUENCY	P <sub>REF</sub> (dBm)	P <sub>SPUR</sub> (dBm)	REJECTION (dB)
151.34	824.04	-104	-5	-99
163.7	836.40	-104	-8	-96
154.57	848.97	-112	-5	-107
152.94	869.04	-110	-3	-107
165.30	881.4	-107	+10	-117
156.17	893.97	-105	+3	-108

SUPERVISED BY:

William H. Graff, Director  
of Engineering

THE APPLICANT HAS BEEN CAUTIONED AS TO THE FOLLOWING:

15.21 INFORMATION TO USER.

The users manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) SPECIAL ACCESSORIES.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.



LIMITS: RULE 15.109(a): RECEIVER RADIATED EMISSION LIMITS

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FREQUENCY, MHz	FIELD STRENGTH, $\mu$ V/m	DISTANCE, m
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

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LIMITS: RULE 15.111: RECEIVER CONDUCTED EMISSION LIMITS

The power at the antenna terminal at any frequency within the range of measurements shall not exceed 2.0 nanowatts.

STATEMENT OF COMPLIANCE
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THIS IS TO CERTIFY:

THAT, ON THE BASIS OF THE MEASUREMENTS MADE, THE  
EQUIPMENT TESTED IS CAPABLE OF COMPLYING WITH THE  
REQUIREMENTS OF

FCC RULE PART 15, SUBPART B   x  

FCC RULE PART 15, SUBPART C       

USING ANSI C63.4-1992 IN EFFECT AS OF THIS DATE, UNDER  
NORMAL OPERATION, WITH THE USUAL MAINTENANCE.

THAT THE DATA CONTAINED HEREIN IS A SUMMARY (WORST CASE)  
OF THAT OBTAINED ON SEVERAL RANDOMLY-SELECTED PRODUCTION  
SAMPLES.

THAT THE EQUIPMENT MEETS OR EXCEEDS THE REQUIREMENTS OF  
PART 15.

LIST OF EXHIBITS  
(FCC **CERTIFICATION** (RECEIVERS) - REVISED 9/28/98)

APPLICANT: Yaesu Musen Co., Ltd.

EQUIPMENT: FT-1500M  
K66FT-1500M

BY APPLICANT:

IF APPLICABLE: Subsection 2.1033

1. LETTER OF AUTHORIZATION
2. ATTESTATION
3. IDENTIFICATION LABEL DRAWING
  - LABEL
  - LOCATION OF LABEL
  - COMPLIANCE STATEMENT
  - LOCATION OF COMPLIANCE STATEMENT
4. DOCUMENTATION: 2.1033(b)
  - (3) USER MANUAL
  - (4) OPERATIONAL DESCRIPTION
  - (5) BLOCK DIAGRAM
  - (5) SCHEMATIC DIAGRAM
  - (7) PHOTOGRAPHS

BY M.F.A. INC.

- A. STATEMENT OF COMPLIANCE
- B. STATEMENT OF QUALIFICATIONS