<table>
<thead>
<tr>
<th>Type</th>
<th>JMA-3807</th>
<th>Ser. No. LE59420</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scanner Unit</td>
<td>NKE-1062</td>
<td>Ser. No. LE39420</td>
</tr>
<tr>
<td>Display Unit</td>
<td>NCD-3860</td>
<td>Ser. No. LE29420</td>
</tr>
<tr>
<td>Ship's Main</td>
<td>DC24V</td>
<td></td>
</tr>
</tbody>
</table>

**Date**
MAR. 20. 1998

**Section Chief**
[Signature]

**Inspector**
[Signature]
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>RULE</th>
<th>DESCRIPTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.983</td>
<td>LIST OF GENERAL INFORMATION REQUIRED</td>
<td>2</td>
</tr>
<tr>
<td>2.984</td>
<td>SUMMARY OF CALCULATIONS</td>
<td>3</td>
</tr>
<tr>
<td>2.985(a)</td>
<td>TEST INSTRUMENTATION LIST</td>
<td>4</td>
</tr>
<tr>
<td>2.985(b)</td>
<td>R. P. POWER OUTPUT</td>
<td>9</td>
</tr>
<tr>
<td>80.215</td>
<td>MODULATION CHARACTERISTICS - MODULATION LIMITING</td>
<td>11</td>
</tr>
<tr>
<td>2.989(c)</td>
<td>OCCUPIED BANDWIDTH</td>
<td>12</td>
</tr>
<tr>
<td>80.205, 80.241</td>
<td>CALCULATION OF PEAK POWER</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PULSE WIDTH, PULSE REPETITION FREQUENCY SHORT PULSE</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>PULSE WIDTH, PULSE REPETITION FREQUENCY MEDIUM PULSE</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>PULSE WIDTH, PULSE REPETITION FREQUENCY LONG PULSE</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>SPURIOUS EMISSIONS AT ANTENNA TERMINALS</td>
<td>16</td>
</tr>
<tr>
<td>80.211</td>
<td>FIELD STRENGTH OF SPURIOUS RADIATION</td>
<td>66</td>
</tr>
<tr>
<td>2.993(a)</td>
<td>FREQUENCY STABILITY - TEMPERATURE VARIATION</td>
<td>67</td>
</tr>
<tr>
<td>80.209</td>
<td>FREQUENCY STABILITY - VOLTAGE VARIATION</td>
<td>67</td>
</tr>
<tr>
<td>80.217</td>
<td>RECEIVER RADIATION - ANTENNA CONDUCTED</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td></td>
<td>69</td>
</tr>
</tbody>
</table>
THE APPLICANT HAS BEEN CAUTIONED AS TO THE FOLLOWING:

3807 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.
Sub-part 2.983te): TEST AND MEASUREMENT DATA

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.981, 2.983, 2.985, 2.987, 2.989, 2.991, 2.993, 2.995, 2.997, 2.999 and the following individual Parts:

- 21 - Domestic Public Fixed Radio Services
- 22 - Public Mobile Services
- 22 Subpart H - Cellular Radiotelephone Service
- 22.901(d) - Alternative technologies and auxiliary services
- 23 - International Fixed Public Radio communication services
- 24 - Personal Communications Services
- 74 Subpart H - Low Power Auxiliary Stations
- 80 - Stations in the Maritime Services
- 80 Subpart E - General Technical Standards
- 80 Subpart F - Equipment Authorization for Compulsory Ships
- 80 Subpart K - Private Coast Stations and Marine Utility Stations
- 80 Subpart S - Compulsory Radiotelephone Installations for Small Passenger Boats
- 80 Subpart T - Radiotelephone Installation Required for Vessels on the Great Lakes
- 80 Subpart U - Radiotelephone Installations Required by the Bridge-to-Bridge Act
- 80 Subpart V - Emergency Position Indicating Radio beacons (EPIRB'S)
- 80 Subpart W - Global Maritime Distress and Safety System (GMDSS)
- 80 Subpart X - Voluntary Radio Installations
- 87 - Aviation Services
- 90 - Private Land Mobile Radio Services
- 94 - Private Operational-Fixed Microwave Service
- 95 Subpart A - General Mobile Radio Service (GMRS)
- 95 Subpart C - Radio Control (R/C) Radio Service
- 95 Subpart D - Citizens Band (CB) Radio Service
- 95 Subpart F - Interactive Video and Data Service (IVDS)
1 Mechanical Tests

Appearance and Structure

Scanner Unit Good
Display Unit Good

2 Electrical Tests

2.1 Working of each operation unit

Scanner Unit Good
Display Unit Good
RANGE VOL Good
SEA VOL Good
RAIN VOL Good
GAIN VOL Good
TUNE VOL Good
RANGE Switch Good
EBL/VRM Switch Good
FEBL Switch Good
ZOOM Switch Good
OFFSET Switch Good
RR/SHM Switch Good
TM/RM Switch Good
HDG/MOOD Switch Good
BRIL Switch Good
DESIG Switch Good
M.O.B Switch Good
WINDOW Switch Good
GUARD Switch Good
ACQ/CNL Switch Good
MENU Switch Good
ENTER Switch Good
ST-BY / OFF Switch Good
X-MIT / OFF Switch Good
TRACK BALL Good

2.2 Scanner unit

<table>
<thead>
<tr>
<th>VSWR</th>
<th>frequency (MHz)</th>
<th>VSWR</th>
</tr>
</thead>
<tbody>
<tr>
<td>9415</td>
<td>1.35</td>
<td></td>
</tr>
<tr>
<td>9445</td>
<td>1.15</td>
<td></td>
</tr>
<tr>
<td>9475</td>
<td>1.40</td>
<td></td>
</tr>
</tbody>
</table>

Scanner Rotation Speed 24 rpm
2.3 Transmitter

<table>
<thead>
<tr>
<th>Magnetron Ser. No.</th>
<th>No. SF2B/C0096B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Frequency</td>
<td>9403 MHz</td>
</tr>
<tr>
<td>(at 0.25 n.m.)</td>
<td>9402 MHz</td>
</tr>
<tr>
<td>(at 3.0 n.m.)</td>
<td>9402 MHz</td>
</tr>
<tr>
<td>(at 6.0 n.m.)</td>
<td>9402 MHz</td>
</tr>
<tr>
<td>(at 48.0 n.m.)</td>
<td>9402 MHz</td>
</tr>
<tr>
<td>Peak Output Power</td>
<td>5.69 KW</td>
</tr>
<tr>
<td>(at 0.25 n.m.)</td>
<td>5.68 KW</td>
</tr>
<tr>
<td>(at 3.0 n.m.)</td>
<td>5.61 KW</td>
</tr>
<tr>
<td>(at 6.0 n.m.)</td>
<td>5.51 KW</td>
</tr>
<tr>
<td>(at 48.0 n.m.)</td>
<td>5.51 KW</td>
</tr>
<tr>
<td>Pulse Length</td>
<td>0.12 μS</td>
</tr>
<tr>
<td>(at 0.25 n.m.)</td>
<td>0.43 μS</td>
</tr>
<tr>
<td>(at 3.0 n.m.)</td>
<td>0.86 μS</td>
</tr>
<tr>
<td>(at 6.0 n.m.)</td>
<td>1.20 μS</td>
</tr>
<tr>
<td>(at 48.0 n.m.)</td>
<td>No. B0702A</td>
</tr>
</tbody>
</table>

2.4 Receiver

<table>
<thead>
<tr>
<th>MIC Frontend Ser. No.</th>
<th>No. D0618A</th>
</tr>
</thead>
<tbody>
<tr>
<td>IF Center Frequency</td>
<td>60 MHz</td>
</tr>
<tr>
<td>IF Band Width</td>
<td>20 MHz/ 6 MHz/ 3 MHz</td>
</tr>
</tbody>
</table>

2.5 Display

<table>
<thead>
<tr>
<th>Input Voltage and Current</th>
<th>24V 4.0A</th>
</tr>
</thead>
<tbody>
<tr>
<td>(at 0.25 n.m.)</td>
<td>24V 4.2A</td>
</tr>
<tr>
<td>(at 3.0 n.m.)</td>
<td>24V 4.2A</td>
</tr>
<tr>
<td>(at 6.0 n.m.)</td>
<td>24V 4.4A</td>
</tr>
<tr>
<td>(at 48.0 n.m.)</td>
<td></td>
</tr>
<tr>
<td>Repetition Frequency</td>
<td>1932 Hz</td>
</tr>
<tr>
<td>(at 0.25 n.m.)</td>
<td>1452 Hz</td>
</tr>
<tr>
<td>(at 3.0 n.m.)</td>
<td>726 Hz</td>
</tr>
<tr>
<td>(at 6.0 n.m.)</td>
<td>484 Hz</td>
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</tbody>
</table>

3 Overall Tests

<table>
<thead>
<tr>
<th>Working time of Timer</th>
<th>1 m 30 s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Variation (10.8 V dc - 48 V dc)</td>
<td>Good</td>
</tr>
<tr>
<td>Overall Sensitivity</td>
<td>Good</td>
</tr>
<tr>
<td>Minimum Range</td>
<td>Good</td>
</tr>
<tr>
<td>Bearing Accuracy</td>
<td>Good</td>
</tr>
<tr>
<td>Mechanical Noise</td>
<td>Good</td>
</tr>
</tbody>
</table>
(Sec.2.985) 1.0 RF Power Output
(Sec.2.989) 2.0 Occupied Bandwidth

1 Dummy Load
2 high power Dummy Load
3 Directional Coupler
   Coupling 30 dB
   Directivity 30 dB
4 Frequency Meter
5 Attenuator
6 Adaptor
7 Power Sensor
8 Power Meter
9 Crystal Detector
10 Oscilloscope
11 Coaxial Cable
12 Spectrum Analyzer
13 Frequency Counter

X910B HP
4D371A Shimada
5D351 Shimada
435A HP
423B HP
465B SONY / Tectronix
MI-04 Takeda Riken
8592A Hewlett Packard
5300A HP

Measurement Point ; Transmitter Output
FCC Submittal Material Data

1.0 RF Power Output

<table>
<thead>
<tr>
<th>1.1 Peak Power</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(at 0.25 n.m.)</td>
<td>5.69 KW</td>
</tr>
<tr>
<td></td>
<td>(at 3.0 n.m.)</td>
<td>5.68 KW</td>
</tr>
<tr>
<td></td>
<td>(at 6.0 n.m.)</td>
<td>5.61 KW</td>
</tr>
<tr>
<td></td>
<td>(at 48.0 n.m.)</td>
<td>5.51 KW</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1.2 Average Power</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(at 0.25 n.m.)</td>
<td>1.32 W</td>
</tr>
<tr>
<td></td>
<td>(at 3.0 n.m.)</td>
<td>3.55 W</td>
</tr>
<tr>
<td></td>
<td>(at 6.0 n.m.)</td>
<td>3.50 W</td>
</tr>
<tr>
<td></td>
<td>(at 48.0 n.m.)</td>
<td>3.20 W</td>
</tr>
</tbody>
</table>

1.3 Load Impedance

- VSWR 1.05 at 9.4 - 9.5 GHz
- Type 4D371A (Shimada co.)
NAME OF TEST: MODULATION CHARACTERISTICS - MODULATION LIMITING
PARAGRAPH: 47 CFR 2.987 (b)

GUIDE:

TEST CONDITIONS: N/A

TEST EQUIPMENT: N/A

PLEASE SEE SCHEMATIC, ATTACHED
2.0 Occupied Bandwidth

2.1 Short Pulse PRF 1932 Hz
Short Pulse Length 0.12 μS

RF Spectrum
Short Pulse

OBW = 38.7 MHz

Center Frequency 9403 MHz

Scale 40 MHz/Div

Detected RF Pulse

Scale 20mV/Div

→ 3dB

Scale 50nS/Div

Short Pulse
2.2 ShortMedium Pulse 

PRF: 1452 Hz 

Length: 0.43 μS 

RF Spectrum 
ShortMedium Pulse 

OBW=25.3 MHz 

Scale 10dB/Div 

Scale 40 MHz/Div 
Center Frequency 9402 MHz 

Scale 20mV/Div 

→ 3dB 

Detected RF 
Pulse 

ShortMedium Pulse 

Scale 100nS/Div
(Sec. 2.989) 2.2 Long Medium Pulse PRF 726 Hz
Long Medium Pulse Length 0.86 μS

RF Spectrum
Long Medium Pulse

OBW=10.7 MHz

Scale 40 MHz/Div
Center Frequency 9402 MHz

(Sec. 2.987)

Detected RF Pulse
Long Medium Pulse

Scale 200nS/Div
2.3 Long Pulse PRF 483 Hz
Long Pulse Length 1.2 μS

Scale 10dB/Div

RF Spectrum
Long Pulse

OBW=6.7 MHz

Scale 40 MHz/Div
Center Frequency 9402 MHz

(Sec. 2.987)

Scale 20mV/Div

Detected RF Pulse
Long Pulse

Scale 200 nS/Div
3.0 Spurious signals at antenna port

Condition 1: 0 to 20 GHz

1. Dummy Load
2. High power Dummy Load
3. Attenuator
4. Adaptor
5. Coaxial Cable
6. Spectrum Analyzer
7. Directional Coupler

Coupling 30 dB
Directivity 30 dB

* Attenuation 3 : 25 dB
* Measurement Point: Rotary Joint Output
Scale
↑ 10 dB/Div
→ 400 MHz /Div

Spurious Signals
Short Medium Pulse
0 to 3.6 GHz

Scale
↑ 10 dB/Div
→ 400 MHz /Div

Spurious Signals
Long Medium Pulse

Scale
↑ 10 dB/Div
→ 400 MHz /Div

Spurious Signals
Long Pulse
0 to 3.6 GHz
Spurious Signals
Short Medium Pulse
7.2 to 15.2 GHz

Spurious Signals
Long Medium Pulse
7.2 to 15.2 GHz

Spurious Signals
Long Pulse
7.2 to 15.2 GHz
3.0 Spurious signals at antenna port
Condition 2: 12.4 to 40 GHz

1 Dummy Load
2 High power Dummy Load
3 Directional Coupler
   Coupling 30 dB
   Directivity 30 dB
4 Attenuator
5 Tapered W/G
6 Tapered W/G
7 Tapered W/G
8 Tapered W/G
9 External Mixer
10 Coaxial Cable
11 Spectrum Analyzer

X910B HP
4D371A Shimada
R11421 Shimada
X382A HP
195-X KU AIRCOM
11818A HP
11519A HP
11520A HP
11517A HP
10503A HP
TR4133B Takeda Riken

★ Attenuation on ATT4 : 50dB
★ Measurement Point : Rotary Joint Output
Spurious Signals

Short Medium Pulse
10.9 to 20 GHz

Spurious Signals

Long Medium Pulse
10.9 to 20 GHz

Spurious Signals

Long Pulse
10.9 to 20 GHz
Spurious Signals

OFF

12.4 to 28 GHz

Spurious Signals

Stand-By

12.4 to 28 GHz

Spurious Signals

Short Pulse

12.4 to 28 GHz
Spurious Signals
Short Medium Pulse
12.4 to 28 GHz

Spurious Signals
Long Medium Pulse
12.4 to 28 GHz

Spurious Signals
Long Pulse
12.4 to 28 GHz
Spurious Signals

OFF

28 to 60 GHz

Spurious Signals

Stand-By

28 to 60 GHz

Spurious Signals

Short Pulse

28 to 60 GHz
Spurious Signals

Short Medium Pulse
28 to 60 GHz

Spurious Signals

Long Medium Pulse
28 to 60 GHz

Spurious Signals

Long Pulse
28 to 60 GHz
SECTION 5

TEST:
Spurious Emissions Field Strength

EQUIPMENT:
JMA-3807  S/N  LE 59420

FCC SPECIFICATION: Sections 2.993 and 80.211.

MINIMUM STANDARD: Mean power of emissions originating in equipment lowest generated frequency to at least 40 GHz shall be attenuated below the mean power of the transmitter by at least 43 plus 10 log (mean power in watts) decibels. Since transmitter mean power is 5.51 watts maximum (long pulse) or 37.41 dBm:

\[
\text{Emissions} \leq 37.41 \text{dBm} - (43 + 10 \log(5.51)) \text{ dBm} \\
\leq -13.0 \text{ dBm}
\]

TEST RESULTS: No spurious emissions observed above minimum standard.

TEST CONDITIONS: 
\[
\text{Tamb} = 20^\circ\text{C} \text{ to } 25^\circ\text{C} \quad \text{RHamb} = 40\% \sim 60\%
\]

\[
\text{EUT input} = 12 \text{ VDC}
\]

Stabilization: UUT energized for 10 minutes minimum.

TEST EQUIPMENT: JRC Original - Shielded Room
Other equipment - see test set-ups.

DATE: 9 -10 NOV. 1998

TEST ENGINEER: K. YUASA.
CALIBRATION OF TESTS 1~5 (0~1 GHz)

A signal source of known amplitude was used as a calibrating signal with identical antennas on the generator and the spectrum analyzer. From previous testing in the shielded room, the antenna factors are considered much greater than path loss. Hence half of the difference in signals Pg and Psa is due to each antenna.

The calibrating signal on the analyzer is therefore:

$$P_{cal} = P_{sa} - (P_{sa} - P_{g}) / 2 = (P_{sa} + P_{g}) / 2 \text{ dBm.}$$

The log ref level on the analyzer is adjusted so as to read other signals directly:

$$\text{LRL (adjusted)} = \text{LRL (set)} + P_{cal} - P_{sa} \text{ dBm.}$$

The calibrating signal used was selected on the basis of best average amplitude over the frequency range of interest.

<table>
<thead>
<tr>
<th>TEST</th>
<th>CAL sig</th>
<th>Psa</th>
<th>Pg</th>
<th>Pcal</th>
<th>LRL(set)</th>
<th>LRL(adj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>250 KHz</td>
<td>-66</td>
<td>0</td>
<td>-33.0</td>
<td>-10</td>
<td>23.0</td>
</tr>
<tr>
<td>2</td>
<td>2.5 MHz</td>
<td>-47</td>
<td>0</td>
<td>-23.5</td>
<td>-10</td>
<td>13.5</td>
</tr>
<tr>
<td>3</td>
<td>25 MHz</td>
<td>-41</td>
<td>0</td>
<td>-20.5</td>
<td>-10</td>
<td>10.5</td>
</tr>
<tr>
<td>4</td>
<td>250 MHz</td>
<td>-26</td>
<td>0</td>
<td>-13.0</td>
<td>-10</td>
<td>3.0</td>
</tr>
<tr>
<td>5</td>
<td>500 MHz</td>
<td>-33</td>
<td>0</td>
<td>-16.5</td>
<td>-10</td>
<td>6.5</td>
</tr>
</tbody>
</table>
RFI TEST

TEST SET-UP #1 (0~50MHz)

TEST #1 0~500 KHz
TEST #2 0~ 5 MHz
TEST #3 0~ 50 MHz

TEST EQUIPMENT

SPECTRUM ANALYZER

TR4122B
SPECTRUM ANALYZER

TR4511 ADVANTEC
SIGNAL GENERATOR

STANDARD SIGNAL GENERATOR TR4511 ADVANTEC

for CAL XMIT

POWER SUPPLY

7.5 m

4.45 m

to ANT

1 m

POWER SUPPLY

to ANT

DISPLAY UNIT

S. A.

XMIT

INTERUNIT CABLE (1 0 m)

CABLE

IR alters CHAMBER: SIDE VIEW

CABLE
# TEST SET UP #2 (50 MHz - 40 GHz)

![Diagram of test setup](image)

## TABLE OF TEST EQUIPMENT USED

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Test Antenna</th>
<th>Spectrum Analyzer</th>
<th>Signal Generator</th>
<th>Misc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1000 MHz</td>
<td>1/2 Coaxial (Untuned)</td>
<td>TAKEDA RIKEN TR4133B</td>
<td>ADVANTEST TR4511</td>
<td>-</td>
</tr>
<tr>
<td>1 - 18 GHz</td>
<td>AILTECH 94612-1 Log Peliodic</td>
<td>&quot;</td>
<td>NA</td>
<td>-</td>
</tr>
<tr>
<td>18 - 26 GHz</td>
<td>AILTECH 94626-1 HP-11519A</td>
<td>&quot;</td>
<td>NA</td>
<td>-</td>
</tr>
<tr>
<td>26 - 40 GHz</td>
<td>AILTECH 94627-1 HP-11519A</td>
<td>&quot;</td>
<td>NA</td>
<td>-</td>
</tr>
</tbody>
</table>
TEST #1

Frequency Band: 0~500 KHz Log Ref. Level: 23.0 dBm

Ambient

Stand-By

Short Pulse
TEST #1

Frequency Band: 0 ~ 500 KHz
Log Ref. Level: 23.0 dBm

Medium Short Pulse

Medium Long Pulse

Long Pulse
TEST #2

Frequency Band: 0 ~ 5 MHz

Log Ref. Level: 13.5 dBm

Ambient

Stand-By

Short Pulse
**TEST #2**

**Frequency Band:** 0～5 MHz

**Log Ref. Level:** 13.5 dBm

Medium Short Pulse

Medium Long Pulse

Long Pulse
TEST #3

Frequency Band: 0 ~ 50 MHz
Log Ref. Level: 10.5 dBm

Ambient

Stand-By

Short Pulse
TEST #3

Frequency Band: 0~50 MHz  
Log Ref. Level: 10.5 dBm

Medium Short Pulse

Medium Long Pulse

Long Pulse
TEST #4

Frequency Band: 0~500 MHz

Log Ref. Level: 3.0 dBm

Ambient

Stand-By

Short Pulse
TEST #4

Frequency Band: 0~500 MHz
Log Ref. Level: 3.0 dBm

Medium Short Pulse

Medium Long Pulse

Long Pulse
TEST #5

Frequency Band: 0~1 GHz  Log Ref. Level: 6.5 dBm

Ambient

Stand-By

Short Pulse
TEST #5

Frequency Band: 0~1 GHz  
Log Ref. Level: 6.5 dBm

Medium
Short Pulse

Medium
Pulse

Long Pulse
CALIBRATION OF TESTS 6 ~ 10 (1 ~ 40 GHz)

Instead of using a signal source of known amplitude to calibrate the receiving system, the path and antenna characteristics were computed.

A half wave dipole was assumed to be the transmitting antenna.

(FCC 2.993)

The power density at distance R is:

\[ P = \frac{1.64 \, P_t}{4\pi R^2} \]

Where \( P_t \) is power transmitted.

The power to the analyzer is:

\[ P_{sa} = P_{Ar} = \frac{P_G \lambda^2}{4\pi} \]

Where \( G \) is the receiving antenna gain and \( Ar \) is the effective area of the receiving antenna.

Hence \( P_{sa} = \frac{1.64 \, P_t}{4\pi R^2} \times \frac{P_G \lambda^2}{4\pi} = \frac{1.6 \, G \lambda^2}{16\pi^2} \times P_t \) at 1 meter

and \( P_t = \frac{16\pi^2 P_{sa}}{1.64 \, G \lambda^2} = \frac{96.3 \, P_{sa}}{G \lambda^2} \)

\[ = P_{sa} \, (dBm) + 19.8 \, (dB) - G \, (dB) - 20 \, \log \lambda \, (dB) \]
<table>
<thead>
<tr>
<th>TEST</th>
<th>HORN GAIN (AVG) dB</th>
<th>WAVELENGTH (dB)</th>
<th>Pt - Psa</th>
<th>LOG REF LEVEL</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>LOA</td>
<td>HI</td>
<td>LO</td>
<td>HI</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
<td>-10.5</td>
<td>-21.6</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>6</td>
<td>-21.3</td>
<td>-28.0</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>6</td>
<td>-27.6</td>
<td>-34.1</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>6</td>
<td>-31.2</td>
<td>-35.6</td>
</tr>
<tr>
<td>10</td>
<td>23.3</td>
<td>24.9</td>
<td>-35.6</td>
<td>-38.8</td>
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<tr>
<td>11</td>
<td>23.6</td>
<td>25.1</td>
<td>-39.4</td>
<td>-42.5</td>
</tr>
</tbody>
</table>
Figure 4-1. Antenna Correction Factor and Power Gain, Model 94612-1 Antenna
TEST #6

Frequency Band: 1～3.6 GHz
Log Ref. Level: 0 dBm
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6～11)

AMBIENT

STANDBY
TEST #6

Frequency Band: 1～3.6 GHz  
Log Ref. Level: 0 dBm  
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6～11)

SHORT PULSE

MEDIUM
SHORT PULSE
TEST #6

Frequency Band: 1 ~ 3.5 GHz
Log Ref. Level: 0 dBm
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6 ~ 11)

MEDIUM LONG PULSE

LONG PULSE
TEST #7

Frequency Band: 3.5～7.5 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6～11)

![Ambient Diagram](image)

![Standby Diagram](image)
TEST #7

Frequency Band: 3.5~7.5 GHz
Log Ref. Level: 0 dBm
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6~11)

SHORT PULSE

MEDIUM SHORT PULSE
TEST #7

Frequency Band: 3.5 ~ 7.5 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6 ~ 11)

MEDIUM LONG PULSE

LONG PULSE
TEST #8

Frequency Band: 7~11 GHz
Log Ref. Level: 0 dBm
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6~11)

AMBIENT

STANDBY
TEST #8
Frequency Band: 7~11 GHz
Log Ref. Level: 0 dBm
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6~11)

SHORT PULSE

MEDIUM
SHORT PULSE
TEST #8

Frequency Band: 7～11 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6～11)

MEDIUM LONG PULSE

LONG PULSE
Frequency Band: 10.9 ~ 20 GHz
Log Ref. Level: 0 dBm
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6 ~ 11)

AMBIENT

STANDBY
TEST #9

Frequency Band: 10.9 ~ 20 GHz
Log Ref. Level: 0 dBm
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6 ~ 11)

SHORT PULSE

MEDIUM SHORT PULSE
TEST #9

Frequency Band: 10.9~20 GHz

Log Ref. Level: 0 dBm

Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6~11)

- MEDIUM
- LONG PULSE

- MEDIUM
- LONG PULSE
TEST #10

Frequency Band: 12.4~28 GHz
Log Ref. Level: 0 dBm
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6~11)

AMBIENT

STANDBY
TEST #10

Frequency Band: 12.4 ~ 28 GHz
Log Ref. Level: 0 dBm
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6 ~ 11)

SHORT PULSE

MEDIUM SHORT PULSE
TEST #10

Frequency Band: 12.4~28 GHz
Log Ref. Level: 0 dBm
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6~11)

MEDIUM LONG PULSE

LONG PULSE
TEST #11

Frequency Band: 28～60 GHz
Log Ref. Level: 0 dBm
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6～11)
TEST #11

Frequency Band: 28～80 GHz  
Log Ref. Level: 0 dBm  
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6～11)

SHORT PULSE

MEDIUM SHORT PULSE
TEST #11

Frequency Band: 28～60 GHz  
Log Ref. Level: 0 dBm  
Maximum Spurious Signal Observed: (See Calibration Procedure for Test 6～11)

MEDIUM  
LONG PULSE

LONG PULSE
(Sec. 2.995) 4.0 Frequency Stability

1 Dummy Load
2 High Power Dummy Load
3 Directional Coupler
4 Frequency Meter
5 Attenuator
6 Adapter
7 Power Sensor
8 Power Meter

Transmission Point: Antenna Pedestal Output

<table>
<thead>
<tr>
<th>Coupling</th>
<th>Unit</th>
<th>Directivity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 dB</td>
<td>dB</td>
<td>20 dB</td>
<td>dB</td>
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<table>
<thead>
<tr>
<th>X910B</th>
<th>HP</th>
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<tbody>
<tr>
<td>4D371A</td>
<td>Shimada</td>
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<tr>
<td>5D351</td>
<td>Shimada</td>
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</table>

<table>
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<th>HP</th>
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<td>X382A</td>
<td>HP</td>
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<tr>
<td>X281A</td>
<td>HP</td>
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<tr>
<td>8481A</td>
<td>HP</td>
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<tr>
<td>435A</td>
<td>HP</td>
</tr>
</tbody>
</table>

Temperature Chamber: Onishi Nettaku

Measurement Procedure
1 The antenna pedestal and display unit were set up in the temperature chamber and the measurement equipment were set outside the temperature chamber.
2 With power removed, the temperature was decreased to 30 and permitted to stabilize for three hours. Power was applied and measured warm up time. After 30 minutes place the radar in X MIT, measured frequency at 10.8V, 24V, 42V.
3 With power off, the temperature was raised in 10 steps. The sample was permitted to stabilize at each step for at least three hours. Power was applied and measured warm up time. After 30 minutes place the radar in X MIT, measured frequency at 10.8V, 24V, 42V.

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Operating Frequency MHz</th>
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<tbody>
<tr>
<td></td>
<td>Short Pulse</td>
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<tr>
<td></td>
<td>10.8V 24.0V 42.0V</td>
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<tr>
<td>-30</td>
<td>9410  9410  9410  9410  9410  9410  9409  9409  9409  9409</td>
</tr>
<tr>
<td>-20</td>
<td>9408  9409  9409  9409  9409  9409  9408  9408  9408  9408</td>
</tr>
<tr>
<td>-10</td>
<td>9408  9408  9408  9408  9408  9408  9408  9408  9408  9408</td>
</tr>
<tr>
<td>0</td>
<td>9407  9406  9406  9406  9406  9406  9406  9406  9406  9406</td>
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<tr>
<td>+10</td>
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<tr>
<td>+20</td>
<td>9404  9403  9403  9403  9403  9403  9403  9403  9403  9403</td>
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<tr>
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<tr>
<td>+40</td>
<td>9401  9401  9401  9401  9401  9401  9401  9401  9401  9401</td>
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<td>9400  9399  9399  9399  9399  9399  9399  9399  9399  9399</td>
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<tr>
<td>+55</td>
<td>9398  9398  9398  9398  9398  9398  9398  9398  9398  9398</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Warm Up Time</th>
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</thead>
<tbody>
<tr>
<td>1'30''</td>
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</table>
NAME OF TEST: RECEIVER RADIATED EMISSIONS

PARAGRAPHS:
15.109: RADIATION INTERFERENCE LIMITS
15.231(b): FIELD STRENGTH OF EMISSIONS FROM INTENTIONAL RADIATORS
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:
1GHz - 18 GHz: LOGPERIODIC ANTENNA 94612-1
18GHz - 26.5 GHz: HORN ANTENNA 94626-1
26.5GHz - 40 GHz: HORN ANTENNA 94627-1

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 to the Spectrum Analyzer.

3. In order to obtain the maximum response at each frequency, the turntable was rotated, and the search antennas were raised and lowered. The E.U.T. was also adjusted for maximum response. Tests conducted in Horizontal & Vertical polarization modes.

4. The field strength was calculated from:
   \[ E \text{ V/m} @ 3 \text{ m} = \log_{10}(10^{(\text{dBm} + 107 + \text{A.F.} + \text{C.L.})}) \]

5. MEASUREMENT RESULTS: ATTACHED FOR WORST CASE CONDITIONS.
MEASUREMENT RESULTS: RECEIVER RADIATED EMISSIONS

SPECTRUM SEARCHED
WORST CASE LIMITS
RESTRICTED BAND MEASUREMENTS
ALL OTHER EMISSIONS

= 0 to 10 x Fc
= V
= 15.109(a)
= 15.205
= ≥ 20 dB BELOW LIMIT

TESTS WERE CONDUCTED WITH:

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

SAMPLE CALCULATION:

EMISSION FREQUENCY, MHz = Less than noise level
LEVEL = \log_{10}(-48.5 + 10^7 + 45) 20
LEVEL, \; \cdot V/m @ 3 \; m = 188364.9
LEVEL, \; \cdot V/m @ 1 \; N.M. = 304.8

RESULTS

RADIATED RECEIVER SPURIOUS EMISSIONS

All other emissions in the range specified by rule 15.33 (b) were that 20dB below the limits of 15.109(a).

<table>
<thead>
<tr>
<th>TUNED, EMISSION, PEAK MHz</th>
<th>RBW, MHz</th>
<th>VBW, kHz</th>
<th>A.F.C.I. μ V/m</th>
<th>μ V/m @3m</th>
<th>μ V/m @1 N.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9404</td>
<td>9384</td>
<td>P</td>
<td>30.0</td>
<td>30.0</td>
<td>45</td>
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