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

Date: March 12, 2003

Federal Communications Commission
Via Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Japan Radio Co., Ltd.
Equipment: JHS-180
FCC ID: CKEJHS-180
FCC Rules: 80

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,

Morton Flom, P. Eng.

enclosure(s)
cc: Applicant
MF/cva

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

APPLICANT: Japan Radio Co., Ltd.

FCC ID: CKEJHS-180

BY APPLICANT:

1. LETTER OF AUTHORIZATION x

2. IDENTIFICATION DRAWINGS, 2.1033(c)(11)
   - x LABEL
   - x LOCATION OF LABEL
   - x COMPLIANCE STATEMENT
   - x LOCATION OF COMPLIANCE STATEMENT

3. PHOTOGRAPHS, 2.1033(c)(12) x

4. DOCUMENTATION: 2.1033(c)
   - (3) USER MANUAL x
   - (9) TUNE-UP/ALIGNMENT PROCEDURE x
   - (10) SCHEMATIC DIAGRAM x
   - (10) OPERATIONAL DESCRIPTION x
   - BLOCK DIAGRAM x
   - PARTS LIST x

5. MPE REPORT x

BY M.F.A. INC.

A. TESTIMONIAL & STATEMENT OF CERTIFICATION

B. STATEMENT OF QUALIFICATIONS

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

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

of

FCC ID: CKEJHS-180
MODEL: JHS-180

to

FEDERAL COMMUNICATIONS COMMISSION

Rule Part(s) 80

DATE OF REPORT: March 12, 2003

ON THE BEHALF OF THE APPLICANT:

Japan Radio Co., Ltd.

AT THE REQUEST OF: P.O. FLOM0001

Japan Radio Co. Ltd
Seattle Branch
1011 SW Klickitat Way
Bldg. B, Suite 100
Seattle, WA 98134

Attention of: Shunichi Hasama, General Manager
(206) 654-5644; FAX: -7030
Eric D'Ancicco, High Seas Product Support
ericd@jrcamerica.com

SUPERVISED BY: Morton Flom, P. Eng.

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.

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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: d0330021

d) Client: Japan Radio Co. Ltd
Seattle Branch
1011 SW Klickitat Way
Bldg. B, Suite 100
Seattle, WA 98134

e) Identification: JHS-180
FCC ID: CKEJHS-180
Description: Automatic Identification System "AIS" (Transponder)

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: March 12, 2003

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:

Morton Flom, P. Eng.

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.

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LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATION

IN ACCORDANCE WITH FCC RULES AND REGULATIONS,
VOLUME II, PART 2 AND TO

80

Sub-part 2.1033

(c)(1): NAME AND ADDRESS OF APPLICANT:

Japan Radio Co., Ltd.
Nittochi Nishi-Shinjyuku
10-1 Nishi-Shinjyuku
6 chome Shinjyuku-ku 160-0023
Japan

MANUFACTURER:

Applicant

(c)(2): FCC ID: CKEJHS-180

MODEL NO: JHS-180

(c)(3): INSTRUCTION MANUAL(S):

PLEASE SEE ATTACHED EXHIBITS

(c)(4): TYPE OF EMISSION: 16K0G1D, 12K5G2B

(c)(5): FREQUENCY RANGE, MHz: 156 to 163

(c)(6): POWER RATING, Watts: 2 to 12.5
___ Switchable x Variable ___ N/A

FCC GRANT NOTE: BE – The output power is continuously variable from the value listed in this entry to 15%-20% of the value listed.

(c)(7): MAXIMUM POWER RATING, Watts: 25

PAGE NO. 3 of 31.

Subpart 2.1033 (continued)

(c)(8): VOLTAGES & CURRENTS IN ALL ELEMENTS IN FINAL R. F. STAGE, INCLUDING FINAL TRANSISTOR OR SOLID STATE DEVICE:

COLLECTOR CURRENT, A	=	4.5
COLLECTOR VOLTAGE, Vdc	=	12/24
SUPPLY VOLTAGE, Vdc	=	12/24

(c)(9): TUNE-UP PROCEDURE:

PLEASE SEE ATTACHED EXHIBITS

(c)(10): CIRCUIT DIAGRAM/CIRCUIT DESCRIPTION:
Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.

PLEASE SEE ATTACHED EXHIBITS

(c)(11): LABEL INFORMATION:

PLEASE SEE ATTACHED EXHIBITS

(c)(12): PHOTOGRAPHS:

PLEASE SEE ATTACHED EXHIBITS

(c)(13): DIGITAL MODULATION DESCRIPTION:

___ ATTACHED EXHIBITS
_x_ N/A

(c)(14): TEST AND MEASUREMENT DATA:

FOLLOWS

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

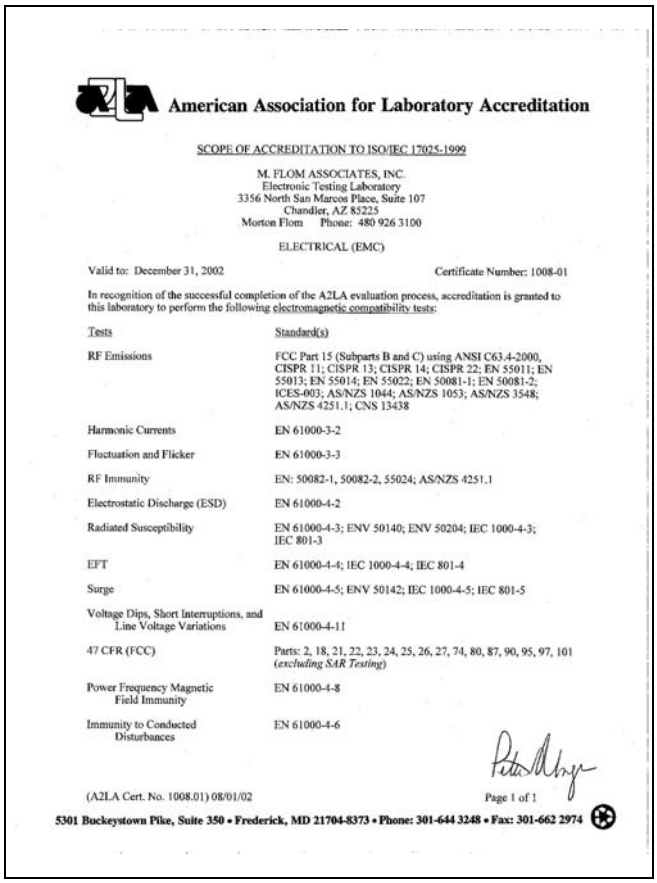
Electrical (EMC) Testing

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 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002.

Presented this 2nd day of March, 2001.

President
For the Accreditation Council
Certificate Number 1008.01
Valid to December 31, 2002

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 17025-1999

M. FLOM ASSOCIATES, INC.
Electronic Testing Laboratory
3356 North San Marcos Place, Suite 107
Chandler, AZ 85225
Morton Flom Phone: 480 926 3100

ELECTRICAL (EMC)

Valid to: December 31, 2002 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 C63.4-2000, CISPR 11; CISPR 13; CISPR 14; CISPR 22; EN 55011; EN 55013; EN 55014; EN 55022; EN 50081-1; EN 50081-2; ICES-003; AS/NZS 1044; AS/NZS 1053; AS/NZS 3548; AS/NZS 4251.1; CNS 13438
Harmonic Currents	EN 61000-3-2
Fluctuation and Flicker	EN 61000-3-3
RF Immunity	EN: 50082-1, 50082-2, 55024; AS/NZS 4251.1
Electrostatic Discharge (ESD)	EN 61000-4-2
Radiated Susceptibility	EN 61000-4-3; ENV 50140; ENV 50204; IEC 1000-4-3; IEC 801-3
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
Voltage Dips, Short Interruptions, and Line Voltage Variations	EN 61000-4-11
47 CFR (FCC)	Parts: 2, 18, 21, 22, 23, 24, 25, 26, 27, 74, 80, 87, 90, 95, 97, 101 *(excluding SAR Testing)*
Power Frequency Magnetic Field Immunity	EN 61000-4-8
Immunity to Conducted Disturbances	EN 61000-4-6

(A2LA Cert. No. 1008.01) 08/01/02 Page 1 of 1

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • 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.

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Sub-part
2.1033(c)(14): 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 2.947, 2.1033(c), 2.1041, 2.1046, 2.1047, 2.1079, 2.1051, 2.1053, 2.1055, 2.1057 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 Radiocommunication services
____ 24 – Personal Communications Services
____ 74 Subpart H - Low Power Auxiliary Stations
_x_ 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 Radiobeacons (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 E - Family Radio Service
____ 95 Subpart F - Interactive Video and Data Service (IVDS)
____ 97 - Amateur Radio Service
____ 101 – Fixed Microwave Services

STANDARD TEST CONDITIONS and ENGINEERING PRACTICES

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSIC63.4-1992/2000 Draft, section 6.1.9, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst case measurements.

PAGE NO. 7 of 31.

NAME OF TEST: R.F. Power Output

SPECIFICATION: 47 CFR 2.1046(a), 80.215

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.1

MEASUREMENT RESULTS

MHz	R.F. Power, W
150.025	2/12.5
154.4125	2/12.5
160.6375	2/12.5
162.025	2/12.5

PAGE NO. 8 of 31.

NAME OF TEST: Spurious Emissions at Antenna Terminals

SPECIFICATION: 47 CFR 2.1051, 80.211(d) & (f)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.13

Modulation Rate = 1200BAUD/bps

Limit = 43 + 10_{log}(P) = -54 bps for 12.5 W

PAGE NO. 9 of 31.

NAME OF TEST: Spurious Emissions at Antenna Terminals

Ambient temperature +20°C Relative humidity 49%

SPURIOUS EMISSIONS FROM THE TRANSMITTER *IEC 61993-2, CLAUSE 15.5.2*

Transmitter operating on 156.025 MHz

FREQUENCY (MHz)	SPURIOUS EMISSION LEVEL (dBm)
83.0	-44.67
90.0	-44.67
133.0	-40.17
147.0	-39.50
150.0	-37.50
157.0	-43.83
160.0	-36.67
177.0	-44.67
312.05	-41.33
468.075	< -46.00
780.0	-45.67
Measurement uncertainty (dB)	±2.0

Results Required

Frequency Range	Limit
150 kHz to 1 GHz	-36 dBm (0.25 µW)
1 GHz to 2 GHz	-30 dBm (1 µW)

Remarks

No other emissions were detected at a level greater than 10 dB below the limit.

The EUT satisfied the requirements of this test.

Spurious Emissions ≤ -90.7

PAGE NO. 10 of 31.

NAME OF TEST: Unwanted Emissions

Ambient temperature +20°C Relative humidity 49%

SPURIOUS EMISSIONS FROM THE TRANSMITTER IEC 61993-2, CLAUSE 15.5.2

Transmitter operating on 157.4125 MHz

FREQUENCY (MHz)	SPURIOUS EMISSION LEVEL (dBm)
150.0	-37.67
163.0	-39.00
200.0	-45.33
314.825	-44.50
472.2375	< -46.00
787.0	-44.50
Measurement uncertainty (dB)	±2.0

Results Required

Frequency Range	Limit
150 kHz to 1 GHz	-36 dBm (0.25 µW)
1 GHz to 2 GHz	-30 dBm (1 µW)

Remarks

No other emissions were detected at a level greater than 10 dB below the limit.

The EUT satisfied the requirements of this test.

Spurious Emissions ≤ -90.7

PAGE NO. 11 of 31.

NAME OF TEST: Unwanted Emissions

Ambient temperature +20°C Relative humidity 49%

SPURIOUS EMISSIONS FROM THE TRANSMITTER IEC 61993-2, CLAUSE 15.5.2

Transmitter operating on 160.6375 MHz

FREQUENCY (MHz)	SPURIOUS EMISSION LEVEL (dBm)
93.0	-41.67
137.0	-44.67
153.0	-42.67
157.0	-43.67
167.0	-45.67
321.275	-39.83
481.9125	< -46.00
803.0	-44.33
Measurement uncertainty (dB)	±2.0

Results Required

Frequency Range	Limit
150 kHz to 1 GHz	-36 dBm (0.25 µW)
1 GHz to 2 GHz	-30 dBm (1 µW)

Remarks

No other emissions were detected at a level greater than 10 dB below the limit.

The EUT satisfied the requirements of this test.

Spurious Emissions ≤ -90.7

PAGE NO. 12 of 31.

NAME OF TEST: Unwanted Emissions

Ambient temperature +20°C Relative humidity 49%

SPURIOUS EMISSIONS FROM THE TRANSMITTER IEC 61993-2, CLAUSE 15.5.2

Transmitter operating on 162.025 MHz

FREQUENCY (MHz)	SPURIOUS EMISSION LEVEL (dBm)
97.0	-43.00
140.0	-41.50
150.0	-43.17
153.0	-40.00
157.0	-38.67
163.0	-39.67
167.0	-42.67
170.0	-42.33
324.05	-39.67
486.075	< -46.00
810.0	-44.50
Measurement uncertainty (dB)	±2.0

Results Required

Frequency Range	Limit
150 kHz to 1 GHz	-36 dBm (0.25 µW)
1 GHz to 2 GHz	-30 dBm (1 µW)

Remarks

No other emissions were detected at a level greater than 10 dB below the limit.

The EUT satisfied the requirements of this test.

Spurious Emissions ≤ -90.7

PAGE NO. 13 of 31.

NAME OF TEST: Field Strength of Spurious Radiation

SPECIFICATION: 47 CFR 2.1053(a)

GUIDE: ANSI/TIA/EIA-603-1992/2001, Paragraph 1.2.12 and Table 16, 47 CFR 22.917

TEST RESULTS

MHz	ERP, dBm	ERP, dbc
83.0	-46.5	≤-79.5
90.0	-46.5	≤-79.5
133.0	-42.0	≤-79.5
147.0	-41.3	≤-79.5
150.0	-39.3	≤-79.5
157.0	-45.6	≤-79.5
160.0	-38.5	≤-79.5
177.0	-46.1	≤-79.5
312.5	-43.1	≤-79.5
468.075	-47.8	≤-79.5
780.0	-47.7	≤-79.5

PAGE NO. 14 of 31.

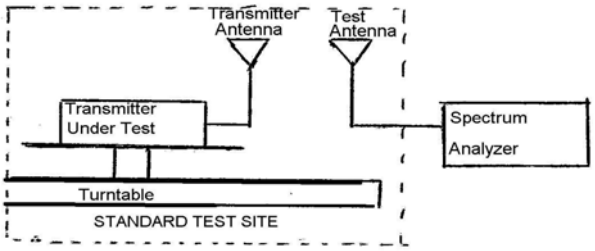
NAME OF TEST: ERP Carrier Power (Radiated)

SPECIFICATION: TIA/EIA 603A (Substitution Method)

2.2.17.1 Definition: The average radiated power of a licensed device is the equivalent power required, when delivered to a half-wave dipole or horn antenna, to produce at a distant point the same average received power as produced by the licensed device.

2.2.17.2 Method of Measurement:

a) Connect the equipment as illustrated. Place the transmitter to be tested on the turntable in the standard test site.



b) Raise and lower the test antenna from 1m to 6 m with the transmitter facing the antenna and record the highest received signal in dB as LVL.

c) Repeat step b) for seven additional readings at 45˚ interval positions of the turntable.

d) Replace the transmitter under test with a half-wave or horn vertically polarized antenna. The center of the antenna should be at the same location as the transmitter under test. Connect the antenna to a signal generator with a known output power and record the path loss in dB or LOSS.

e) Calculate the average radiated output power from the readings in step c) and d) by the following:

average radiated power = $10 \log_{10} \Sigma\, 10^{(LVL - LOSS)/10}$ (dBm)

RESULTS

	156.025 MHZ LVL, dbm	Path Loss, db
0˚	39	-1.8
45˚	37.2	-1.8
90˚	35.9	-1.8
135˚	36.3	-1.8
180˚	36.7	-1.8
225˚	36.1	-1.8
270˚	37.8	-1.8
315˚	37.9	-1.8

	156.025 MHz
Av. Radiated Power:	38.9 dbm

PAGE NO. 15 of 31.

NAME OF TEST: Emission Masks (Occupied Bandwidth)

SPECIFICATION: 47 CFR 2.1049(c)(1), 80.211(d)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.11

Modulation Rate = 1200 BAUD/bps

PAGE NO. 16 of 31.

NAME OF TEST: Emission Masks and Authorized Bandwidth

Ambient temperature +20°C Relative humidity 49%

MODULATION SPECTRUM IEC 61993-2. CLAUSE 15.1.3

25 kHz Channel Mode

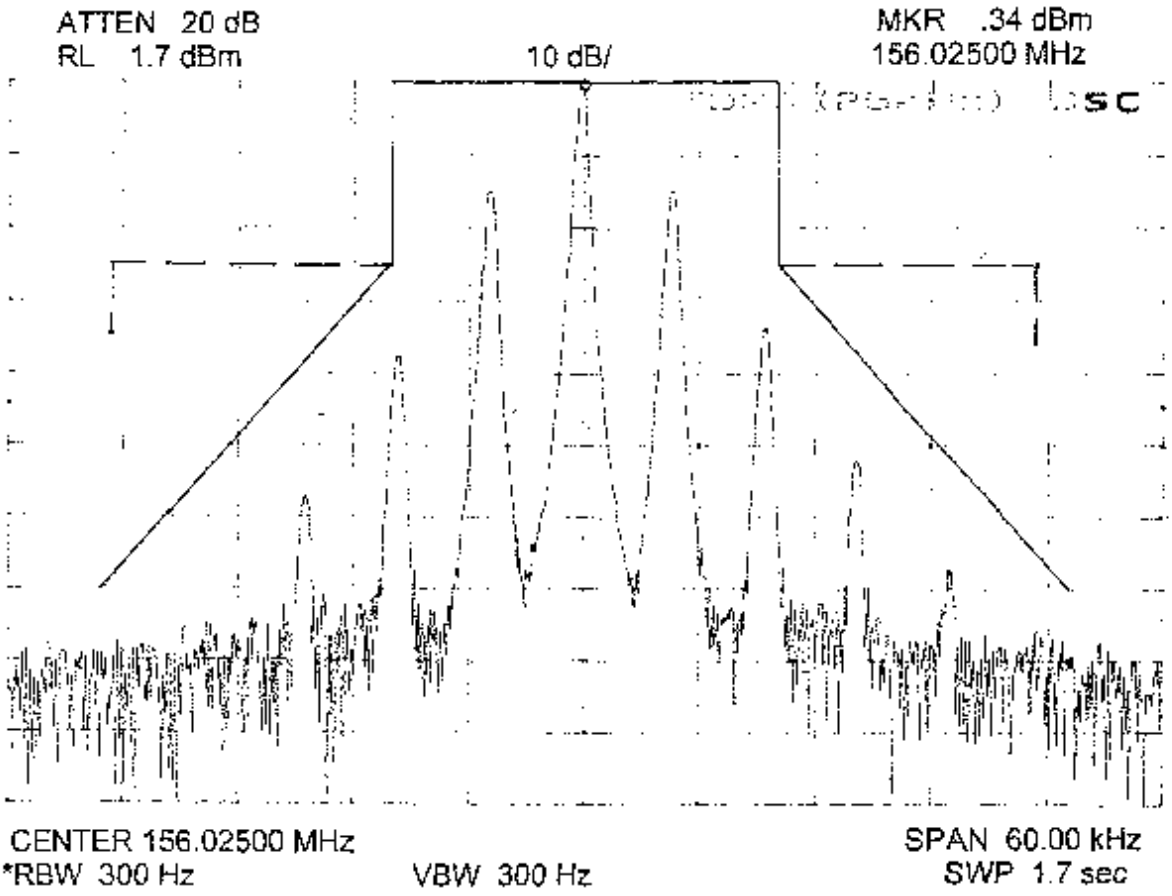


Figure x. Modulation Spectrum, EUT in 25 kHz mode, operating frequency 156.025 MHz, modulation: dot pattern 1010:010

PAGE NO. 17 of 31.

NAME OF TEST: Emission Masks and Authorized Bandwidth

Ambient temperature +20°C Relative humidity 49%

MODULATION SPECTRUM IEC 61993-2, CLAUSE 15.1.3

25 kHz Channel Mode

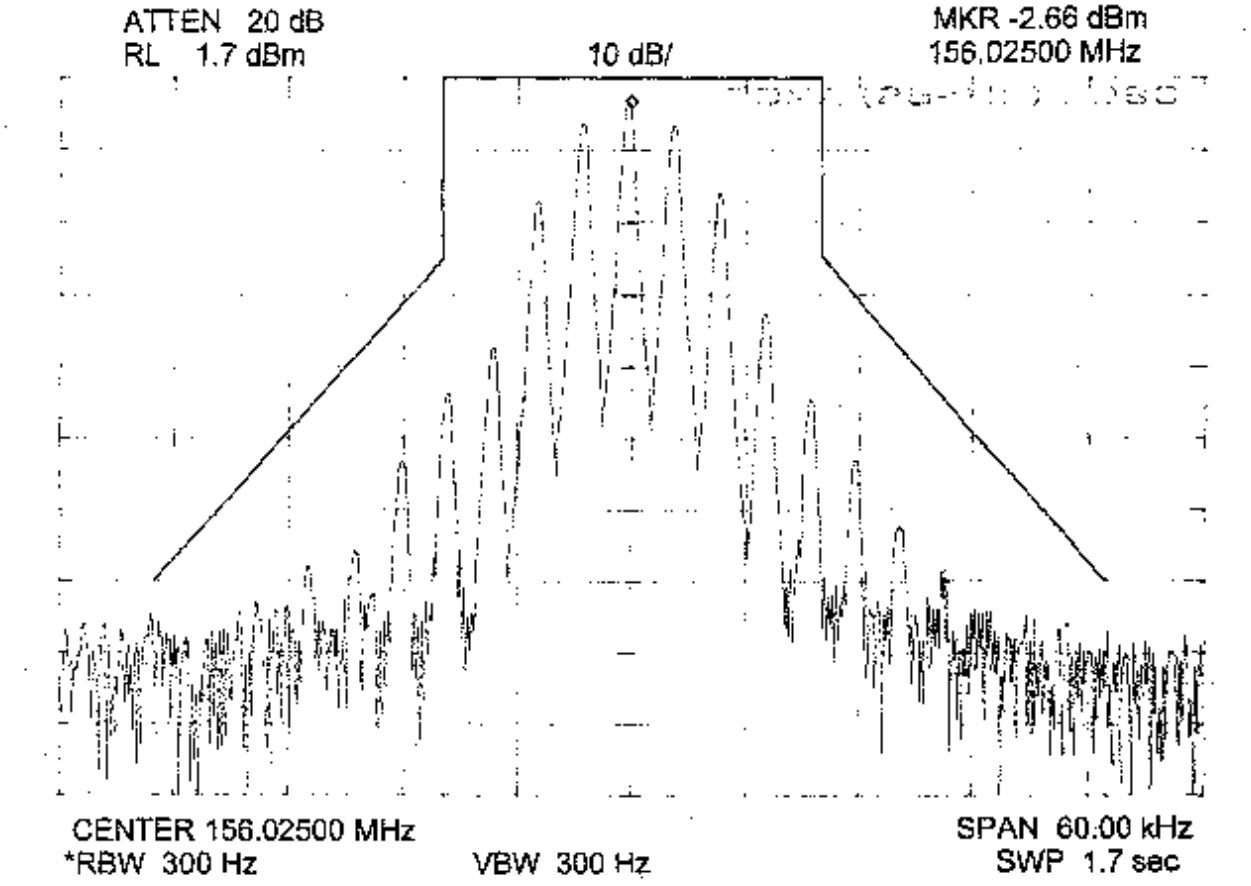


Figure x. Modulation Spectrum, EUT in 25 kHz mode, operating frequency 156.025 MHz, modulation: dot pattern 11001100

PAGE NO. 18 of 31.

NAME OF TEST: Emission Masks and Authorized Bandwidth

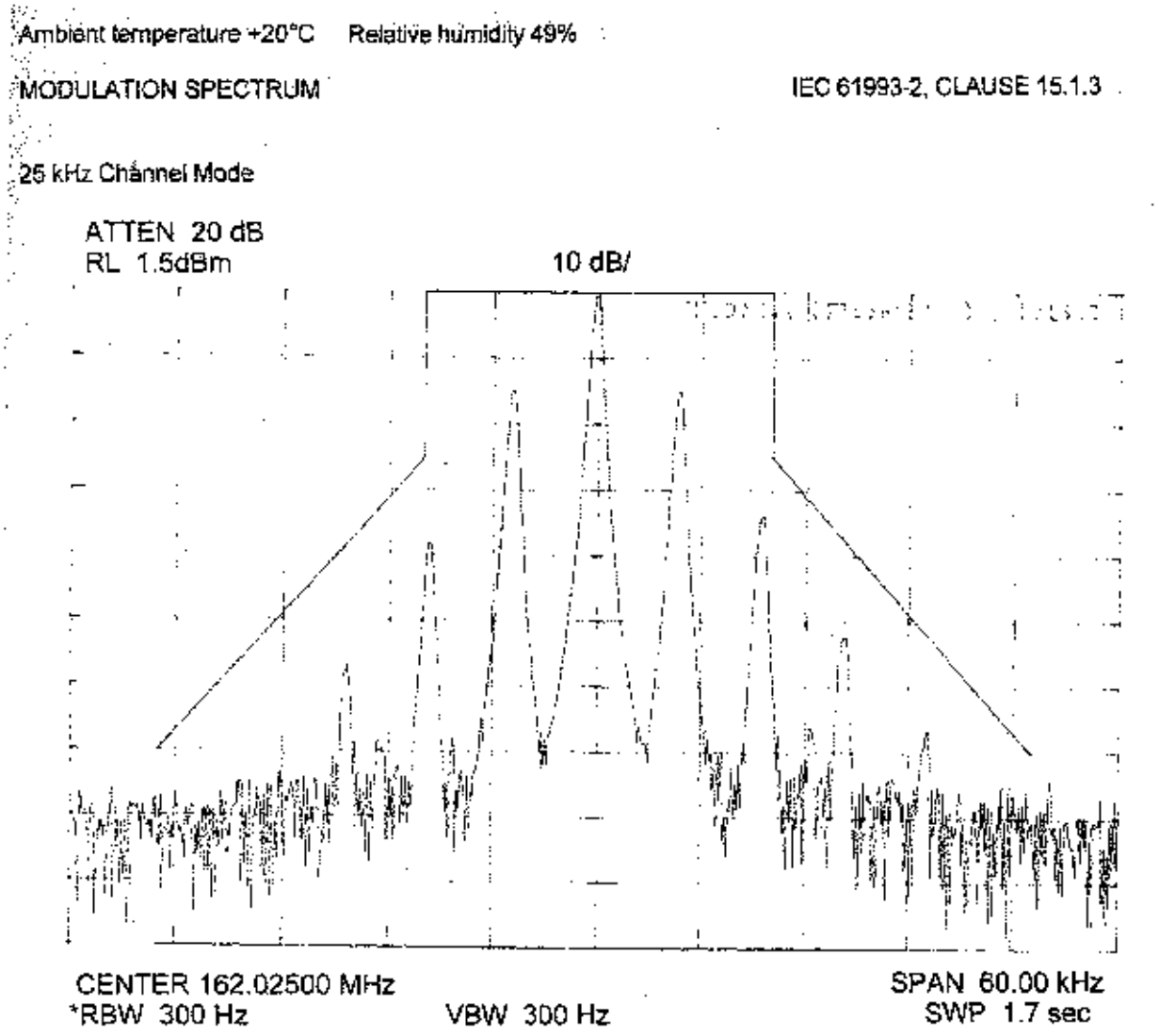


Figure x. Modulation Spectrum, EUT in 25 kHz mode, operating frequency 162.025 MHz, modulation: dot pattern 10101010

PAGE NO. 19 of 31.

NAME OF TEST: Emission Masks and Authorized Bandwidth

Ambient temperature +20°C Relative humidity 49%

MODULATION SPECTRUM IEC 61993-2, CLAUSE 15.1.3

25 kHz Channel Mode

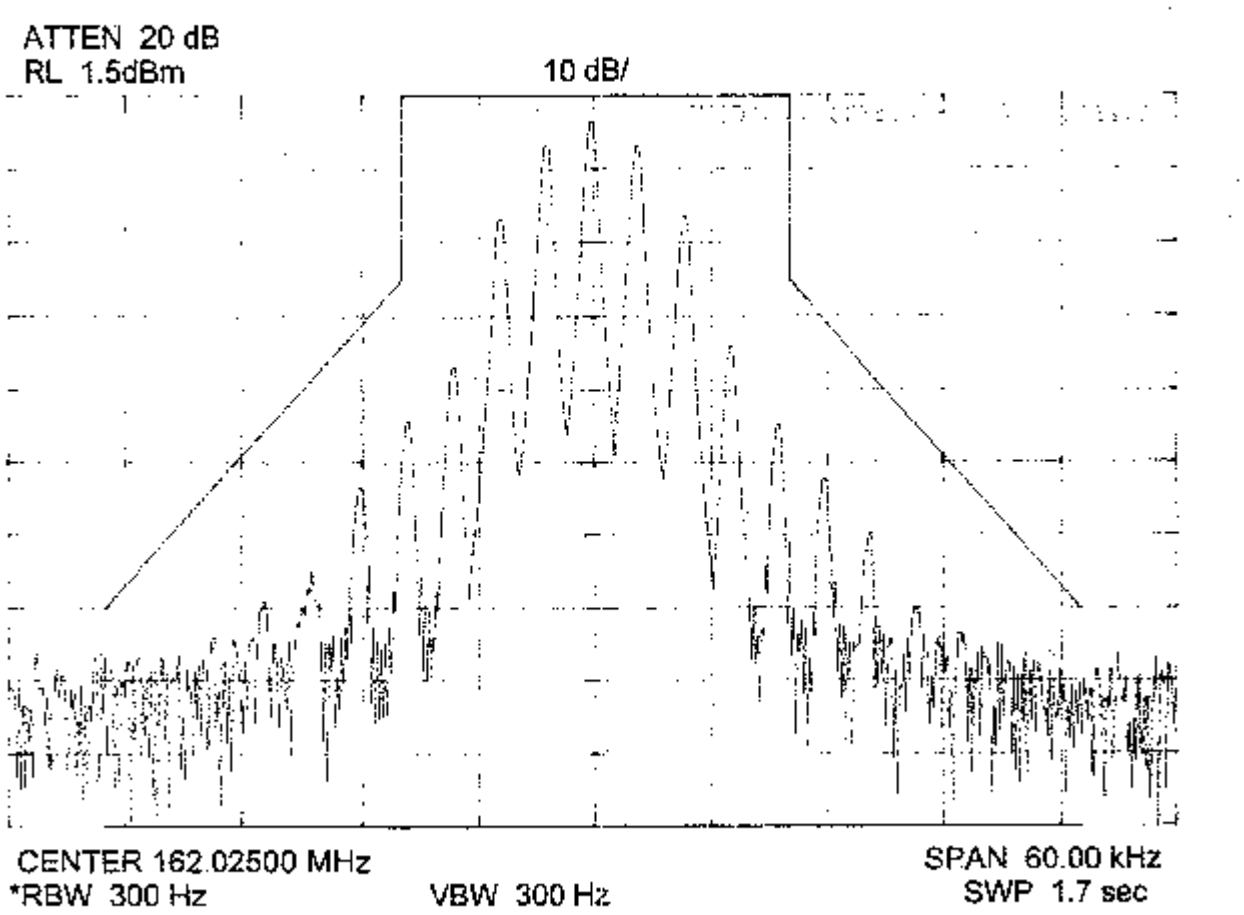


Figure x. Modulation Spectrum, EUT in 25 kHz mode, operating frequency 162.025 MHz, modulation: dot pattern 11001100

PAGE NO. 20 of 31.

NAME OF TEST: Emission Masks and Authorized Bandwidth

Ambient temperature +20°C Relative humidity 49%

MODULATION SPECTRUM IEC 61993-2, CLAUSE 15.1.3

25 kHz Channel Mode

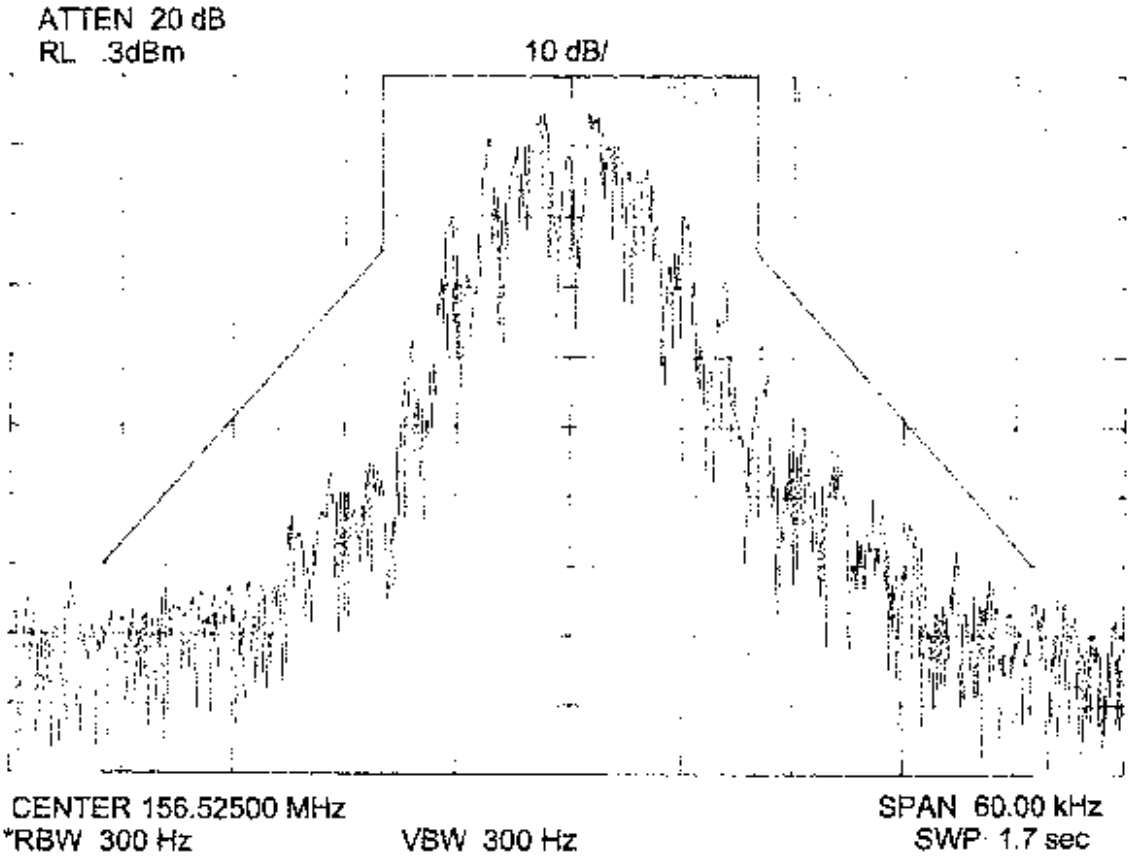


Figure x. Modulation Spectrum, EUT in 25 kHz mode (DSC), operating frequency 156.525 MHz, modulation: standard test signal No. 1

PAGE NO. 21 of 31.

NAME OF TEST: Emission Masks and Authorized Bandwidth

Ambient temperature +20°C Relative humidity 49%

MODULATION SPECTRUM IEC 61993-2, CLAUSE 15.1.4

12.5 kHz Channel Mode

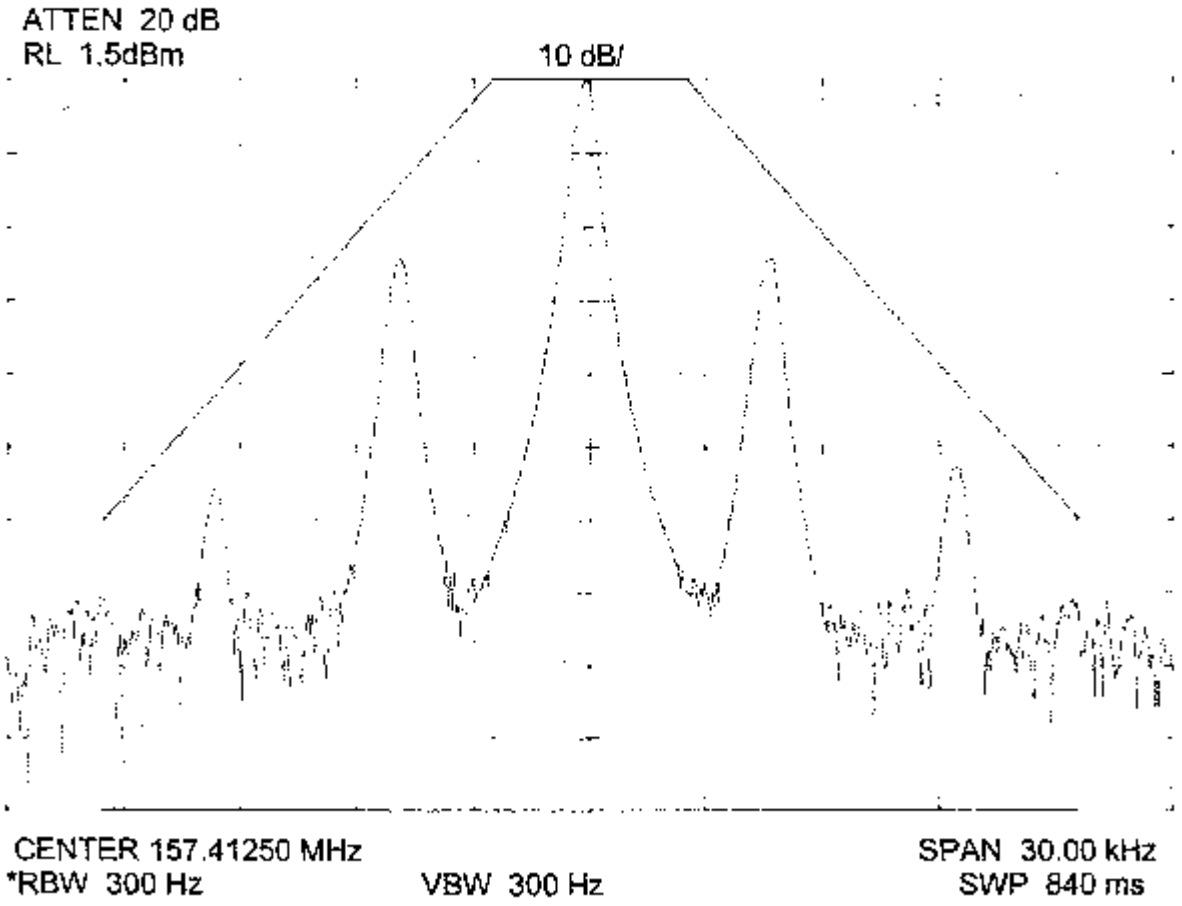


Figure x. Modulation Spectrum, EUT in 12.5 kHz mode, operating frequency 157.4125 MHz, modulation: dot pattern 10101010

PAGE NO. 22 of 31.

NAME OF TEST: Emission Masks and Authorized Bandwidth

Ambient temperature +20°C Relative humidity 49%

MODULATION SPECTRUM IEC 61993-2, CLAUSE 15.1.4

12.5 kHz Channel Mode

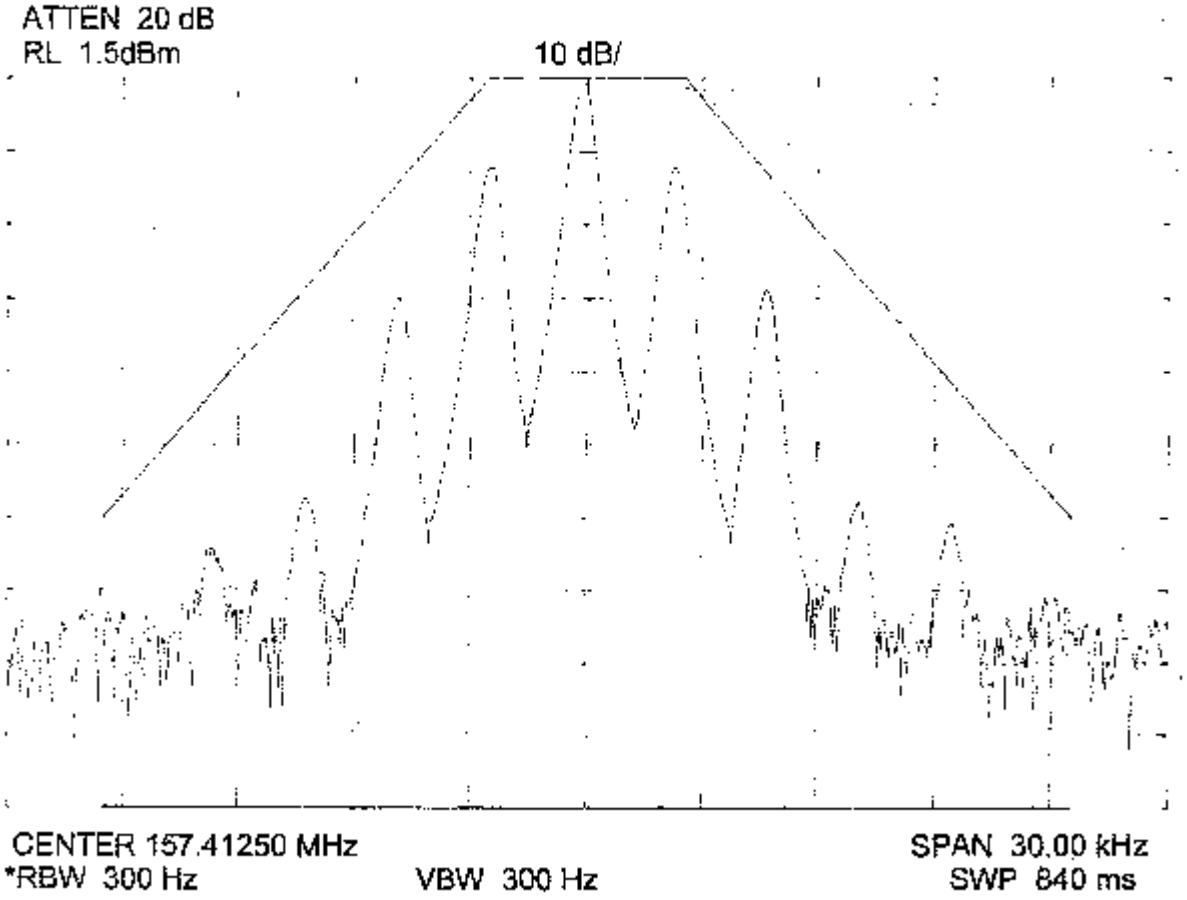


Figure x. Modulation Spectrum, EUT in 12.5 kHz mode, operating frequency 157.4125 MHz, modulation: dot pattern 11001100

PAGE NO. 23 of 31.

NAME OF TEST: Emission Masks and Authorized Bandwidth

Ambient temperature +20°C Relative humidity 49%

MODULATION SPECTRUM IEC 61993-2, CLAUSE 15.1.4

12.5 kHz Channel Mode

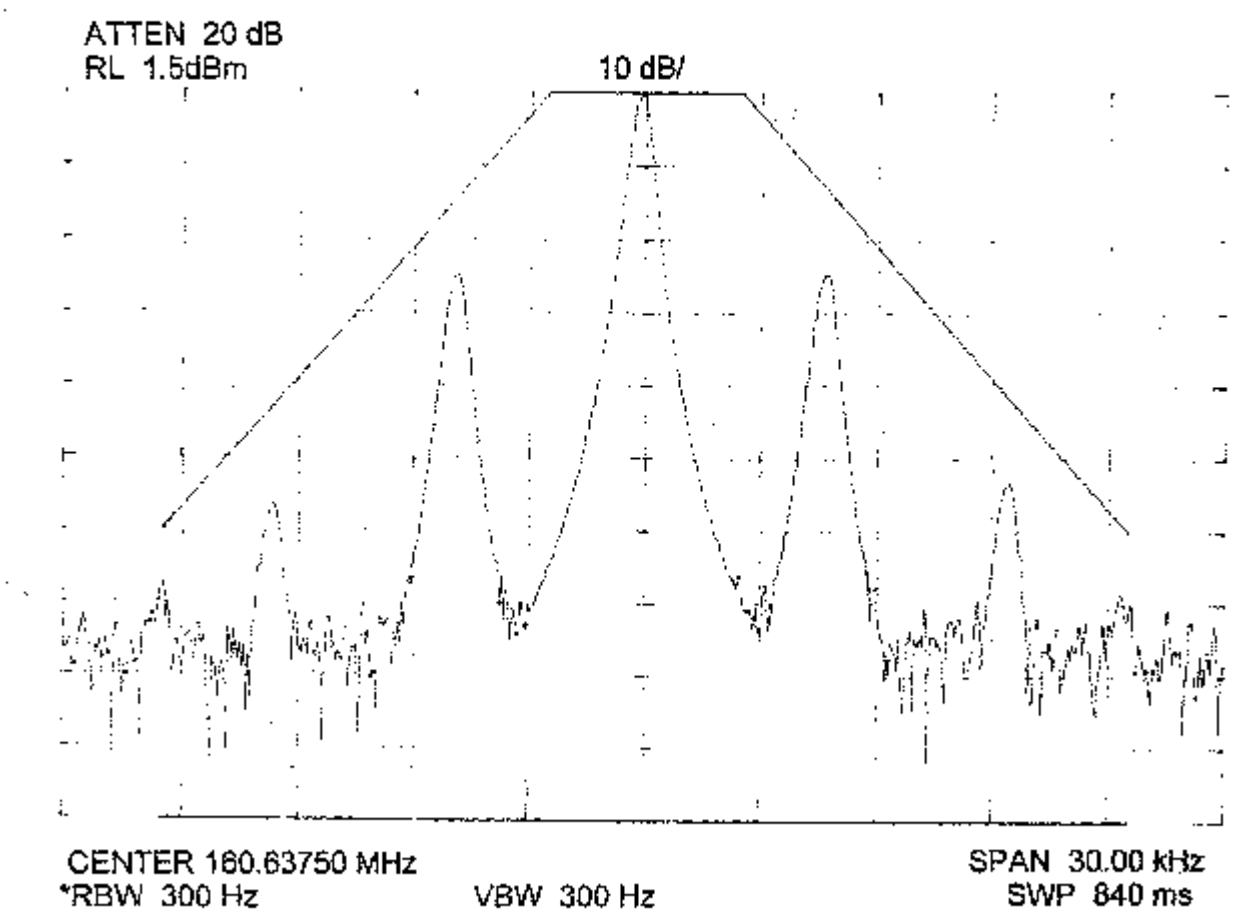


Figure x. Modulation Spectrum, EUT in 12.5 kHz mode, operating frequency 160.6375 MHz, modulation: dot pattern 10101010

PAGE NO. 24 of 31.

NAME OF TEST: Emission Masks and Authorized Bandwidth

Ambient temperature +20°C Relative humidity 49%

MODULATION SPECTRUM IEC 61993-2, CLAUSE 15.1.4

12.5 kHz Channel Mode

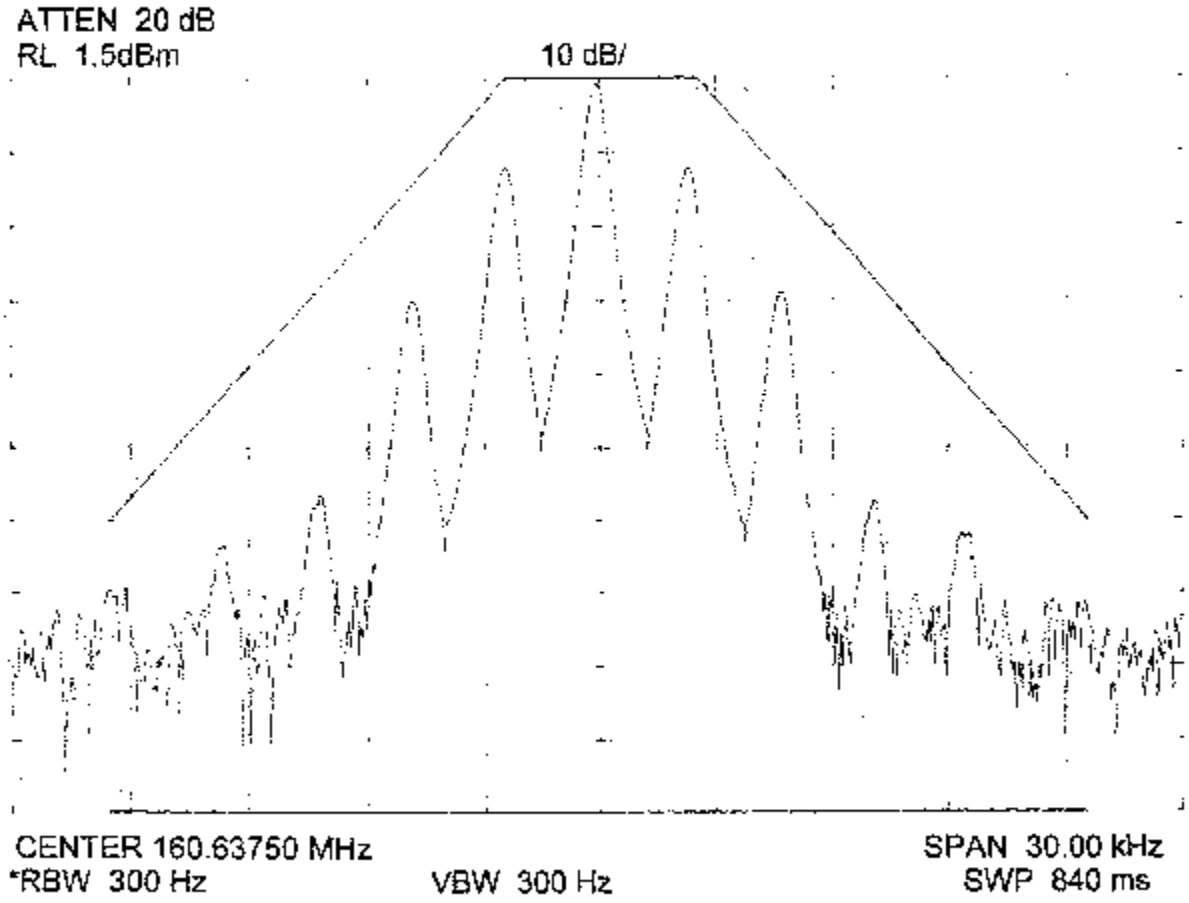


Figure x. Modulation Spectrum, EUT in 12.5 kHz mode, operating frequency 160.6375 MHz, modulation: dot pattern 11001100

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NAME OF TEST: Modulation Limiting

SPECIFICATION: 47 CFR 2.1047(b), 80.211, 80.213

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.3

DATA MODULATION = 1200 bps

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NAME OF TEST: Audio Frequency Response

SPECIFICATION: 47 CFR 2.1047(a)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.6

DATA MODULATION = 1200 bps

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NAME OF TEST: Audio Low Pass Filter (Voice Input)

SPECIFICATION: 47 CFR 2.1047(a)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.15

DATA MODULATION = 1200 bps

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NAME OF TEST: Frequency Stability (Temperature Variation)

SPECIFICATION: 47 CFR 2.1055(a)(2), 80.209, 80.359(DSC)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2

TEMP, °C	CHANGE, ppm
-20	-0.74
-10	-0.71
0	-0.34
10	0.09
20	0
30	0.08
40	-0.63
50	-0.75

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NAME OF TEST: Frequency Stability (Voltage Variation)

SPECIFICATION: 47 CFR 2.1055(d)(1)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2

TEST EQUIPMENT: As per previous page

Ambient temperature +20°C Relative humidity 49%

FREQUENCY ERROR

IEC 61993-2, CLAUSE 15.1.1
Extreme supply IEC 61993-2, CLAUSE 10.2.2

TEST CONDITIONS		TDMA Transmitter Frequency Error (kHz)			
		156.025 MHz	157.4125 MHz	160.6375 MHz	162.025 MHz
T_{nom}(+25°C)	V_{nom}(100 V, 50 Hz)	-0.027	-0.031	-0.033	-0.035
T_{min}(-25°C)	V_{min}(90 V, 47.5 Hz)	-0.006	-0.007	-0.01	-0.012
T_{max}(+55°C)	V_{max}(242 V, 63 Hz)	-0.111	-0.113	-0.116	-0.117
Maximum frequency error (kHz)		-0.111	-0.113	-0.116	-0.117
Measurement uncertainty (Hz)		±0.01			

Required results:

The frequency error shall not exceed ± 0.6 kHz under normal and ± 1 kHz under extreme test conditions.

Remarks

The EUT satisfied the requirements of this test.

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NAME OF TEST: Requirements for DSC

SPECIFICATION: 47 CFR 80.225

This section specifies the requirements for voluntary digital selective calling (DSC) equipment and selective calling equipment installed in ship and coast stations. Reference to any CCIR Recommendation in this section is to the most recent CCIR approved Recommendation that does not prevent the use of existing equipment. DSC equipment voluntarily installed in coast or ship stations must meet either the requirements of CCIR Recommendation 493 (including only equipment classes A, B, D, and E) or RTCM Paper 56-5/SC101-STD. DSC equipment must not be used with the sensors referred to in Sec. 80.179(e)(2). DSC equipment used on compulsorily fitted ships must meet the requirements contained in subpart W for GMDSS.

(b) Manufacturers of Class C DSC equipment to be used on United States vessels must affix a clearly discernible permanent plate or label visible from the operating controls containing the following:

Warning. This equipment is designed to generate digital maritime distress and safety signals to facilitate search and rescue. To be effective as a safety device, this equipment must be used only within communication range of a shore-based VHF marine channel 70 distress and safety watch system. The range of the signal may vary but under normal conditions should be approximately 20 nautical miles.

(c) Selective calling equipment, other than that designed in accordance with paragraph (a) of this section, is authorized as follows:

(1) Equipment used in conjunction with the Automated Maritime Telecommunications System (AMTS) in the band 216-220 MHz,

(2) Equipment used to perform a selective calling function during narrow-band direct-printing (NB-DP) operations in accordance with CCIR Recommendation 476 or 625, and

(3) Equipment functioning under the provisions of Sec. 80.207(a) includes the brief use of radiotelegraphy, including keying only the modulating audio frequency, tone signals, and other signaling devices to establish or maintain communications provided that:

(i) These signaling techniques are not used on frequencies designated for general purpose digital selective calling (DSC) and distress and safety DSC calling as listed in Sec. 80.359;

(ii) The authorized radiotelephone emission bandwidth is not exceeded;

(iii) Documentation of selective calling protocols must be available to the general public; and,

(iv) Harmful interference is not caused to stations operating in accordance with the International Radio Regulations.

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NAME OF TEST: Necessary Bandwidth and Emission Bandwidth

SPECIFICATION: 47 CFR 2.202(g)

MODULATION = 16K0G1D
NECESSARY BANDWIDTH CALCULATION:

MAXIMUM MODULATION (M), kHz	= 1.2
MAXIMUM DEVIATION (D), kHz	= 5.0
CONSTANT FACTOR (K)	= 1
NECESSARY BANDWIDTH (B_N), kHz	= (2xM)+(2xDxK)
	= 12.4

MODULATION = 12K5G2B
NECESSARY BANDWIDTH CALCULATION:

MAXIMUM MODULATION (M), kHz	= 1.2
MAXIMUM DEVIATION (D), kHz	= 2.5
CONSTANT FACTOR (K)	= 1
NECESSARY BANDWIDTH (B_N), kHz	= (2xM)+(2xDxK)
	= 7.4

SUPERVISED BY: Morton Flom, P. Eng.
END OF TEST REPORT

TESTIMONIAL AND STATEMENT OF CERTIFICATION

THIS IS TO CERTIFY THAT:

THAT the application was prepared either by, or under the direct supervision of, the undersigned.

THAT the technical data supplied with the application was taken under my direction and supervision.

THAT the data was obtained on representative units, randomly selected.

THAT, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

CERTIFYING ENGINEER: Morton Flom, P. Eng.