

1. General

One of the features of Global Maritime Distress/Safety System (GMDSS) is high reliability established by automatic and introduction of digital techniques.

The JSS-296 MF/HF Radio System is designed for medium-distance communication. It completely satisfies the requirements that SOLAS/GMDSS must meet.

The Radio System consists of MF/HF Radiotelephone, digital selective call (DSC) / narrow-band direct printing (NBDP) MODEM with a built-in watch-keeping receiver, DTE for NBDP, and Antenna Tuning unit. It uses digitized information suited to automatic processing for distress/safety as well as general purpose communications.

It features ease of handling and operation, and demands no special techniques. Further, the self-diagnosis and module design assures easy maintenance and inspection.

1.1 SCOPE AND PURPOSE

The following technical data on the JSS-296 Radio Equipment are submitted to the Federal Communications Commission for type acceptance under Part 2, Part15 and Part 80 of the Commission's rules and regulations.

1.2 JSS-296 Composition

The JSS-296 consists of the following units and attachments:

No.	Name	Model	Quantity	Remarks
1	MF/HF Radiotelephone	JSB-196GM	1	
2	DSC/NBDP Modem	NCT-196N	1	
3	Power Amplifier	NAH-692	1	
4	Antenna Tuner	NFC-296	1	
5	Data Terminal	NDZ-127J	1	
6	Keyboard	NDF-268	1	
7	Printer	NKG-800	1	
8	Hand Set	NQW-213	1	
9	Cable		1	
9-1	Radiotelephone Power Cable	7ZCJD0043A	1	
9-2	Modem Power Cable	7ZCJD0139	1	
9-3	DSC AF Cable	7ZCJD0073	1	
9-4	DSC Control Cable	7ZCJD0074	1	
9-5	DTE Power Cable	6ZCSC00582	1	
9-6	DTE Control Cable	7ZCJD0072	1	
9-7	Printer Cable	6JNKD00100A	1	
10	Spare parts	7ZXJD0030	1	
11	FDD Unit	NDH-265	1	Option
12	Instruction Manual	7ZPJD0124	1	

2. TYPE NUMBER

TYPE : MF/HF RADIO EQUIPMENT

MODEL : JSS-296

FCC ID : CKE JSS-296

3. SPECIFICATIONS

3.1 GENERAL

Frequency range:	Transmit: 1.6 to 27.5MHz (100Hz steps) Receive: 0.1 to 29.9999MHz (100Hz steps)
Frequency tolerance:	Within ± 10 Hz (after 1minute warm-up)
Emission mode:	J3E, A1A, F1B, H2B,H3E(Reception only)
User definable channels:	200ch (20ch X 10 Groups)
Preset ITU channels:	1722ch (TEL:283, DSC:29, TLX:891, CW:519)
Communication mode:	Simplex and semi-duplex
Power requirement:	90 ~ 132V/180 ~ 264V AC, Single-phase, 50/60Hz Tx: 2.0kVA max, Rx: 0.5kVA max 21.6 ~ 31.2V DC Tx: 30A max, Rx: 7A max
Operating temperature:	-30 to +55°C (-15°C to +55°C during normal operation)
Charging current:	20A (Ordinary charge) 10A (Equalizing charge)
Alarm function:	Charge /Low voltage/ High voltage alarm

3.2 TRANSCEIVER (JSB-196GM with NAH-692)

TRANSMITTER

Output power:	AC power source: 200Wpx (1.6 to 4MHz) , 250Wpx (4 to 27.5MHz) DC power source: 100Wpx (1.6 to 4MHz) , 150Wpx (4 to 27.5MHz)
Occupied bandwidth:	J3E 3 kHz or less F1B, A1A 0.5 kHz or less
Carrier suppression:	J3E 40dB or more
Unwanted emission:	J3E: 28dB or more at 1.5 to 4.5kHz 35dB or more at 4.5 to 7.5kHz 62dB or more at 7.5kHz or more F1B: 28dB or more at 0.25 to 0.5kHz 35dB or more at 0.5 to 1.25kHz 62dB or more at 1.25kHz or more
Spurious suppression:	60 dB or more
AF frequency response:	350 to 2700Hz (6dB bandwidth)
Microphone input:	600 ohms dynamic microphone (-40 dBm standard)
Line input:	0 dBm, 600 ohms (Balanced)

RECEIVER

Sensitivity (SINAD 20dB):	J3E 6.3 uV or less (1.6 to 4MHz) 3.5 uV or less (4 to 27.5MHz) F1B 1.8 uV or less (1.6 to 4MHz) 1.0 uV or less (4 to 27.5MHz)
Receiving system:	Triple superheterodyne
Intermediate frequencies:	70.455MHz, 455kHz, 20.217kHz
Selectivity:	J3E 6 dB bandwidth 2.4 to 3kHz, 66 dB bandwidth within ± 2.1 kHz F1B 6 dB bandwidth 270 to 300Hz, 60 dB bandwidth within ± 550 Hz
Spurious response:	70 dB or more
Clarifier range:	± 200 Hz (1Hz steps)
AF output:	5.0W max. 1W rated

3.3 DSC/NBDP MODEM (NCT-196N)

DSC

Protocol:	ITU-R Recommendations 493 and 541
Emission:	F1B/J2B 100 baud
Modulator frequency:	1,700Hz $\pm$ 85Hz
Output level:	+10dBm maximum at 600 ohms, balanced
Demodulator frequency:	1,700Hz $\pm$ 85Hz
Input level:	-20dBm to +10dBm at 600 ohms, balanced
Processor code:	10 units error detection specified by ITU-R Recommendation 493.
File Memories: (Battery backup RAM)	Call transmitting file: 11files General call receiving file: 20files Distress call receiving file: 20files

WATCH-KEEPING RECEIVER

Receiving frequencies:	2187.5, 4207.5, 6312, 8414.5, 12577, and 16804.5kHz
Scanning:	(a) Scanning within two seconds of any frequencies selected from the following: 2187.5, 4207.5, 6312, 8414.5, 12577, and 16804.5kHz (b) Scanning stops on detection of 100 baud dot pattern.
Receiving system:	Double super heterodyne with the up-conversion system using a phase-locked digital frequency synthesizer. 1st IF:40.455MHz 2nd IF:455kHz
Reception mode:	F1B/J2B

Sensitivity:	The symbol error rate is 1×10^{-2} or less. (RF input level = $1 \mu V$)
Selectivity:	6dB bandwidth: 270 to 300Hz 30dB bandwidth: within $\pm 330\text{Hz}$ 60dB bandwidth: within $\pm 550\text{Hz}$
Frequency stability:	Within $\pm 10\text{Hz}$
Interference rejection and Blocking immunity:	The symbol error rate is 1×10^{-2} or less. Wanted signal: input level = $10 \mu V$, Unwanted signal: input level = 31.6mV , no modulation, variation range 9kHz to 2GHz (except wanted channel and its adjacent channel ($\pm 750\text{Hz}$))
Adjacent channel selectivity:	The symbol error rate is 1×10^{-2} or less. Wanted signal: input level = $10 \mu V$ Unwanted signal: input level = 1mV , no modulation, offset frequency = $\pm 500\text{Hz}$)
Conducted spurious emission:	The power emitted from the antenna terminal is 1nW or less.
Antenna impedance:	50 ohms , unbalanced

NBDP

Communications protocol:	In conformity with ITU-RM.476, M.490, M.491, M.492, M.625 and ITU-T Rec. F130
Call codes	5- and 9-digit with dual ship ID-code for individual and group call
Code:	7-bit code 4B/3Y ratio constant mark signal
Clock:	Within $\pm 30\text{ppm}$
Modulation:	Phase continuous AFSK
Modulation speed:	100 baud (ARQ, FEC mode)
Mark frequency:	$1615 \pm 0.5\text{Hz}$
Space frequency:	$1785 \pm 0.5\text{Hz}$
Output level:	0dBm (-20 to $+10\text{dBm}$ variable/ 600 ohms balanced)
Input frequency :	$1700 \pm 85\text{Hz}$
Input level :	-25 to $+10\text{dBm}$ (600-ohm balanced load)

3.4 ANTENNA TUNER (NFC-296)

Frequency range:	1.6 to 30MHz
Power capability:	300 Wpep
SWR after tuning:	50ohms , $\text{SWR} < 2$
Tuning method:	Automatic tuning and preset tuning
Tuning time:	Automatic tuning: $1\text{sec} \sim 15\text{sec}$

	Preset tuning: 0.5sec ~ 1sec
Operating temperature:	-30 to +60°C

3.5 DTE (NDZ-127J)

Controlled item:	NBDP function (Control the DSC/NBDP Terminal)
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3.6 KEYBOARD (NDF-268)

Interface:	Matrix
Contact method:	Membrane sheet
Life:	5 million strokes

3.7 PRINTER (NKG-800)

Print method:	Serial impact dot matrix
Interface:	Centronics
Paper feed method:	Paper roll holder
Paper type:	209 to 216mm Roll paper