



CERTIFICATE OF TYPE APPROVAL

(EC Certificate of Type Examination - Module B)
(Marine Equipment Directive - 96/98/EC, as amended*1)

Applicant:-
Japan Radio Co., Ltd
C/O Amsterdam Branch
Cessnalaan 40-42
1119 NL Schiphol-Rijk
The Netherlands

Manufacturer:-
Japan Radio Co., Ltd
1-1 Shimorenjaku
5-chome, Mitaka-Shi
Tokyo 181-8510
JAPAN

This is to certify that the applicant has submitted details of a:-

Radar Equipment for high Speed Craft Applications (IEC 62388 Category 2H)
(COMMISSION DIRECTIVE 2009/26/EC – ITEM A.1/4.35 PLUS ITEM A.1/4.37, TO FORM CAT 2H RADAR)

Of system types known and designated as:-

- a) JMA-5312-4/6HS - 250mm Colour, X-Band HSC Radar System
- b) JMA-5322-6HS - 250mm Colour, S-Band HSC Radar System

(Comprising component parts and having technical characteristics shown in shedule 2 to 6)

and that these have been assessed, tested and when used in a combination of component parts as described in the attached schedules, is CERTIFIED as complying with the relevant parts of:

- IEC 62388 : 2008, "Marine Shipborne Radar Equipment"
- IEC 60945 : 2002, "General Requirements for Marine Navigation Equipment" (Inc. Crrg'dm1:2008)
- IEC 62288 : 2008 "Presentation of navigation-related information on shipborne navigational displays"
(being testing standards listed in column 5 of Annex A.1 of Directive 2009/26/EC for Item 4.35 & 4.37)

Note: The presentation standard of this equipment has been assessed against clauses in IEC 62388:2008 derived from IMO Resolution MSC.191(79) and which equate those published in IEC 62288:2008.

It is also RECOGNISED that the equipment conforms to performance standards not inferior to those adopted by the International Maritime Organisation, and which are contained in the relevant parts of Resolution MSC.191(79), Resolution MSC.192(79), Resolution A694(17) and legacy Resolution A.820(19).

SIGNED:

R A Sharp

Authorised Signatory

DATE of ISSUE: 11th November 2010

DATE of EXPIRY : 1st June 2014

Certificate Number: QQ-MED-04/08-02R2

EU/USCG Mutual Recognition Agreement
Council Decision 2004/425/EC

HSC Radar not at present included in EU/USCG MRA

This Certificate is Valid until expiry date shown, subject to the standard conditions of issue printed on page 8

Japan Radio Co. Ltd are Module D registered with QinetiQ in accord with standard condition 3, ref Certificate DQAS-01/01-JRC001R15

QinetiQ
Cody Technology Park
Ively Road, Farnborough
Hampshire. GU14 0LX



Maritime and Coastguard Agency
The MCA is an Executive Agency of
the Department for Transport

Under the terms of the United Kingdom Statutory Instrument, No 1957 : 1999, QinetiQ Ltd has been Notified to the European Commission by the Maritime and Coastguard Agency as a Body authorised to conduct Conformity Assessment procedures under the provisions of the European Council Directive 96/98/EC (as amended) on Marine Equipment and issue Certificates of Type Approval.

Schedule 1

Statement on New “Radar Systems” Standard IEC 62388

The International Maritime Organisation (IMO) adopted RESOLUTION MSC.192(79) on 6 December 2004 On the REVISED PERFORMANCE STANDARDS FOR RADAR EQUIPMENT. These standards are mandated to be implemented on or after 1st July 2008.

The Scope recognised that radar should provide the integration and display of radar video, target tracking information, positional data derived from own ships position (EPFS) and geo referenced data. The integration and display of AIS information should be provided to complement radar. The capability of displaying selected parts of Electronic Navigation Charts and other vector chart information may be provided to aid navigation and for position monitoring.

Contained within MSC.192(79) were details of the Differences in the performance requirements for various sizes/categories of ship/craft to which SOLAS applies, these were contained in TABLE 1.

	Cat 3	Cat 2	Cat 1
Size of ship/craft	<500 gt	500 gt to <10,000 gt and HSC<10,000 gt	All ships/craft ≥10,000 gt
Minimum operational display area diameter	180mm Dia.	250mm Dia	320mm Dia
Minimum display area	195 x 195 mm	270 x 270 mm	340 x 340 mm
Auto acquisition of targets	-	-	Yes
Minimum <i>acquired</i> radar target capacity	20	30	40
Minimum <i>activated</i> AIS target capacity	20	30	40
Minimum <i>sleeping</i> AIS target capacity	100	150	200
Trial Manoeuvre	-	-	Yes

In addition radar equipment can optionally conform to two other sets of performance criteria for High Speed Craft and/or for electronic chart display.

IMO resolution MSC.192(79) performance standard was taken by the International Electrotechnical Standards Organisation (IEC) and turned into the International Standard IEC 62388, first edition 2008.

IEC 62388 replaces 7 other standards that covered the various aspects of radar performance; these were IEC 60936-1, IEC 60936-2, IEC 60936-3, IEC 60936-5, IEC 60872-1, IEC 60872-2 and IEC 60872-3.

The Marine Equipment Directive (96/98/EC) details the European procedure for conformity assessment and approval for the range of IMO mandated marine equipment. The particular requirements for each equipment item is listed and the test requirement is detailed in the Equipment Annexes, Current version being contained in 5th Amending Directive, 2009/26/EC which contains the International Instruments and testing standards in their up-to-date version and allocated to existing MED equipment item numbers for radar equipment as detailed below.

MED Item.	Previous Description 4 th Amendment & earlier	IEC 62388 Category & 5 th Amendment listing	Radar Display area
A.1/4.34	Radar with ARPA	Cat 1	320mm Dia.
A.1/4.35	Radar with ATA	Cat 2	250mm Dia.
A.1/4.36	Radar with EPA	Cat 3 (<i>EPA no longer accepted</i>)	180mm Dia.
A.1/4.37	HSC with ARPA	Cat 1H	320mm Dia.
A.1/4.37	HSC with ARPA	Cat 2H	250mm Dia.
A.1/4.38	Chart Radar (<i>HSC Radar with ATA No longer used</i>)	Additional. Suffix 'C' on Cat 1, Cat 2, Cat1H or Cat 2H above	

Presentation Standard – IMO Resolution MSC.191(79) and IEC 62288

IEC 62388 was also written to include all the appropriate Presentation criteria and performance standards for a shipborne navigation displays as detailed in IMO Resolution MSC.191(79) and therefore any radar assessed by the QinetiQ Notified Body as compliant with IEC 62388 is also deemed to have presentation standards compliant with Resolution MSC.191(79) and is also recognised as compliant with identical standards for presentation of Radar equipment contained in IEC 62288:2008.

QinetiQ
Cody Technology Park
Ively Road, Farnborough
Hampshire. GU14 0LX

Certificate Number **QQ-MED-04/08-02R2**

Schedule 2 –Category 2H Radar

JMA-5312-4/6HS, - 250mm Colour, X-Band, 10kW HSC Radar System

The applicant declared that the following units comprise the radar equipment of the system designations

a) given on Page 1. These units have been assessed & tested, and satisfactory details of these units were included in the technical file.

SYSTEM comprising of:-

19" Colour LCD Monitor (Desktop mount) Unit	NWZ -173	*1
Radar Electronics Unit	NDC-1417	*1
incorporating TT Processor Unit	NCA-877A	*1,2
and AIS Processor Unit	NQA-2103	*1
Operation Unit (Keyboard)	NCE-5171	*1
10kW, Transceiver/Turning Unit c/w 4ft antenna	NKE-2103-4HS	*3
or 10kW, Transceiver/Turning Unit c/w 6ft antenna	NKE-2103-6HS	*3
SOFTWARE:- Radar Processor (NDC-1417)	Version 01.00 or 01.01	*4
MTR (Transceiver)	Version 01.00	*4

----- End of List -----

Systems may include single or combination of items from the optional items listed at schedule 5 on Page 6.

* NOTES:-

- 1 The combination of these units is also known as the NCD-4530 Display Unit.
- 2 Enhanced Target Tracking unit (100 target) also available, see ancillary list on Schedule 5 on page 6
- 3 NKE-2103-4/6HS is a "Two unit" scanner incorporating X-Band performance monitor unit NJU-85 with an antenna rotational speed of 48RPM.
- 4 This approval is valid for equipment including subsequent software versions only where written details of any modifications have been submitted to and accepted by QinetiQ. Version 01.01 is minor upgrade.
- 5 This certificate and schedule supersedes and replaces certificate QQ-MED-04/08-02R issued on 2 March 2010.

Technical Characteristics

PARAMETER	PROVISION	COMMENT
PRESENTATION DISPLAY TYPE	19" Colour LCD	IEC 62288:2008 Category :- Full operational Radar display Dedicated Keyboard, Trackerball and on-screen controls allows quick & easy control functions and data entry.
RADAR DISPLAY CIRCLE	≥250mm	Effective Diameter
RADAR TARGET CAPACITY ACQUIRED	30 targets	30 minimum for Cat 2
AUTO ACQUISITION OF TARGETS	Yes	Optional for Cat 2
TRIAL MANOEUVRE	No	Not Required for Cat 2
AIS TARGET CAPACITY ACTIVATED SLEEPING	100 200 (300 max)	30 minimum for Cat 2 150 minimum for Cat 2
FREQUENCY OF OPERATION	9.41 GHz	±30MHz
PULSE REPETITION FREQUENCY	2250, 1700, 1200, 750, 650Hz	(PRF) Automatically changes to suit pulse length
PULSE LENGTHS	0.08µs, 0.25µs, 0.5µs, 0.8µs, 1.0µs	Automatically changes with range selection Operator selection on 0.75 to 12mn ranges
EMISSION CODE	3M00P0NAN	
POWER CHARACTERISTIC	10kW	(PEP)
IEC 61162-1 SERIAL (NMEA) PORTS	Listener - 4 Talker - 4	Conformity to IEC 61162-1:2000. NQA-2103 provides AIS IEC 61162-2 port.
TEMPERATURE RANGE & IEC 60945 CLASS	Exposed Protected	-- Turning Units & Antenna -- All other units
POWER SOURCE	24V DC	

Conditions of Issue of this certificate are printed on Page 8.

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Cody Technology Park
Ively Road, Farnborough
Hampshire. GU14 0LX

Certificate Number **QQ-MED-04/08-02R2**

Schedule 3 –Category 2H Radar

JMA-5322-6HS - 250mm Display, X-Band, 25kW HSC Radar System

The applicant declared that the following units comprise the radar equipment of the system designation b) given on Page 1. These units have been assessed & tested, and satisfactory details of these units were included in the technical file.

SYSTEM comprising of:-

19" Colour LCD Monitor (Desktop mount) Unit	NWZ -173	*1
Radar Electronics Unit	NDC-1417	*1
incorporating TT Processor Unit	NCA-877A	*1,2
and AIS Processor Unit	NQA-2103	*1
Operation Unit (Keyboard)	NCE-5171	*1
25kW, Transceiver/Turning Unit c/w 6ft antenna	NKE-2254-6HS	*3,4
SOFTWARE:- Radar Processor (NDC-1417)	Version 01.00 or 01.01	*5
MTR (Transceiver)	Version 01.00	*5

----- End of List -----

And which may include an item or combination of items from the list of optional items found in schedule 5 on Page 6.

* NOTES:-

- 1 The combination of these units is also known as the NCD-4530 Display Unit.
- 2 Enhanced Target Tracking unit (100 target) also available, see ancillary list on Schedule 5 on page 6
- 3 The NKE-2254-6HS transceiver is technically identical to the NKE-1125 used on the JMA7100/JMA-9100 radars except for a 6ft antenna with a rotational speed of 48RPM.
- 4 JMA-5322 "Two unit" scanner incorporating X-Band performance monitor unit NJU-85.
- 5 This approval is valid for equipment including subsequent software versions only where written details of any modifications have been submitted to and accepted by QinetiQ. Version 01.01 is minor upgrade.
- 6 This certificate and schedule supersedes and replaces certificate QQ-MED-04/08-02R issued on 2 March 2010

Technical Characteristics

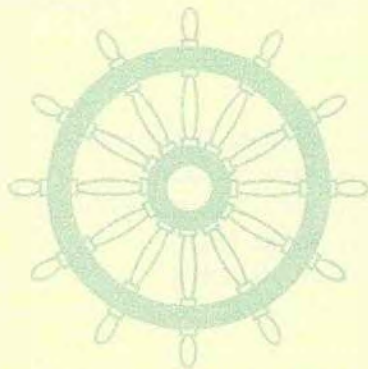
PARAMETER	PROVISION	COMMENT
PRESENTATION DISPLAY TYPE	19" Colour LCD	IEC 62288:2008 Category :- Full operational Radar display Dedicated Keyboard, Trackerball and on-screen controls allows quick & easy control functions and data entry.
RADAR DISPLAY CIRCLE	≥250mm	Effective Diameter
RADAR TARGET CAPACITY ACQUIRED	30 targets	30 minimum for Cat 2
AUTO ACQUISITION OF TARGETS	Yes	Optional for Cat 2
TRIAL MANOEUVRE	No	Not Required for Cat 2
AIS TARGET CAPACITY ACTIVATED SLEEPING	100 200 (300 max)	30 minimum for Cat 2 150 minimum for Cat 2
FREQUENCY OF OPERATION	9.41 GHz	±30MHz
PULSE REPETITION FREQUENCY	2250, 1900, 1400, 750, 650, 510Hz	(PRF) Automatically changes to suit pulse length
PULSE LENGTHS	0.07µs, 0.2µs, 0.3µs, 0.4µs, 0.8µs, 1.0µs, 1.2µs	Automatically changes with range selection Operator selection on 0.75 to 12mn ranges
EMISSION CODE	3M00P0NAN	
POWER CHARACTERISTIC	25kW	(PEP)
IEC 61162-1 SERIAL (NMEA) PORTS	Listener - 4 Talker - 4	Conformity to IEC 61162-1:2000. NQA-2103 provides AIS IEC 61162-2 port.
TEMPERATURE RANGE Exposed & IEC 60945 CLASS Protected	-25°C to +70°C -15°C to +55°C.	-- Turning Units & Antenna -- All other units
POWER SOURCE	24V DC	

Conditions of Issue of this certificate are printed on Page 8.

QinetiQ
Cody Technology Park
Ively Road, Farnborough
Hampshire. GU14 0LX

Certificate Number **QQ-MED-04/08-02R2**

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Notified Body 0191

Certificate of Type Approval - Schedule 5

JMA-53x2 Radar Systems - Ancillary and Optional Units

The applicant declared that the following units may be added to the basic radar systems illustrated in schedules 2 to 4. These units have been assessed & tested in conjunction with JMA-5300, JMA-7100 and JMA-9100 series radar systems, and satisfactory details are included in the technical files.

ALTERNATE AND SLAVE DISPLAYS:-

Alternate Monitor (Desktop Mount), 18.1" LCD	JRC, NWZ -147	
Slave Colour LCD Monitor, 19.3 LCD "	JH-19T02 MMD or JH-19T03 BOBA	*1
Slave Colour LCD Monitor, 20.1 LCD "	JH-20T03 MMD or JH-20T06 MMD	*1
Slave Colour LCD Monitor, 23.1 LCD "	JH-23T02 MMD-A1	*1
Slave Colour LCD Monitor, 19 LCD "	JH-19T14 MMD-AA1-XXXX	*1
Slave Colour LCD Monitor, 20.1 LCD "	JH-20T17 MMD-AA1-XXXX	*1
Slave Colour LCD Monitor, 23.1 LCD "	JH-23T14 MMD-MA1-XXXX	*1
Slave Colour LCD Monitor, 19 LCD "	Melford MRD19SP-DC or -AC	*1
Slave Colour LCD Monitor, 23 LCD "	Melford MRD23SP-DC or -AC	*1
Slave Colour LCD Monitor, 19 LCD "	Innoscan 1900MII	*1
Slave Colour LCD Monitor, 23 LCD "	Innoscan 2300MII	*1
Slave Colour LCD Monitor, 23.1 LCD "	Baytek BPM-723-DA-AC-BZ	*1

ANCILLARY UNITS:-

Power control Unit	NQE-3167	
NSK Unit (Gyro Syncro interface)	NCT-59A	*2
Interswitch Unit (4 display x 4 transceiver, External)	NQE-3141-4A	
Interswitch Unit (8 display x 8 transceiver, External)	NQE-3141-8A	
Target Tracking Unit (100 targets with Trial Manoeuvre)	NCA-877WA	*2, 3
Power Supply (100V,110V,115V AC 50/60Hz) (220V,230V,240V AC 50/60Hz)	NBA-5111	*4

----- End of List -----

* NOTES:-

- 1 Colour Slave display, no operational controls apart from screen brilliance provided. May be used as an alternative to the NWZ-173 Monitor in situations where Panel mounting is acceptable.
Note the use of a 23.1" displays are not assessed for other than Category 2 use in this system.
- 2 This unit is a PCB assembly that is fitted internally to the NDC-1417 Radar Processor Unit
- 3 The NCA-877WA is a higher capacity target tracker unit as an alternative to the standard NCA-877A unit
- 4 The AC/DC power supply is link selectable for input voltage in the range shown. Output is 24V DC nominal.

Conditions of Issue of this certificate are printed on page 8.

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Ively Road, Farnborough
Hampshire. GU14 0LX

Certificate Number **QQ-MED-04/08-02R2**

Certificate of Type Approval - Schedule 6

Statement on Spurious and Out of Band Emissions and the Boundary between these emissions

The following Radar Transceiver, represents part of the systems shown on earlier schedules, has been subject to a measurement procedure as detailed in IEC 60936-1, Annex D, as contained in Amendment 1, dated July 2002 and the guidelines contained in ITU-R Recommendation M.1177-3. This standard defines the test method and requirements for shipborne radar to meet in order to comply with Appendix S3 of the Radio Regulations and ITU-R Recommendations SM.1539-1 and SM.1541-1.

The results of the measurement procedure were satisfactory and provide sufficient evidence that these Radar Transceivers are compliant with the criteria contained in the stated standards.

The Transceivers Measured were:-

Description	Model No.	Modulator	Circulator	Magetron
10kW, X-Band,Transceiver, 4ft Antenna	NKE-2103-4HS	CME-363	FCX68R	MAF1565N
25kW, X-Band,Transceiver, 6ft Antenna	NKE-1125-6	NMA-550	NJC3901M	M1568BS

The test report detailing the tests and test results obtained is:-

QinetiQ/EMEA/TS/CRO803478/2

The test results specifically apply to abuild standard regarding items such as Antenna, waveguide, rotary joint and any filters fitted to the test unit and detailed in manufacturers drawings and declarations. The NKE-2103 turning unit is also available with a 6ft antenna.

The NKE-2254, 25kW, X-Band,Transceiver used in the JMA-5322-6HS system is technically identical to the NKE-1125 except for interfacing to the JMA-5300 Mk2 radar. A presumption of conformity is therefore applied to the NKE-2254 for spurious and OoB emissions by analogy.

Notified Body 0191

Conditions of Issue of this certificate are printed on Page 8.

QinetiQ
Cody Technology Park
Ively Road, Farnborough
Hampshire. GU14 0LX

Certificate Number **QQ-MED-04/08-02R2**

Certificates of Type Approval
Conditions of Issue

1. Each Certificate will be used in its entirety and not reproduced in part.
2. This certificate remains valid until the date shown (normally 5 years) unless cancelled or revoked, provided:-
 - i) the design and manufacture remain unmodified from the specimen tested and recorded in the Technical Construction File;
 - ii) any conditions contained in the schedule are complied with;
 - iii) Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply;
 - iv) and, the equipment remains satisfactory in service.
3. The mark of conformity may only be affixed to the equipment listed on this certificate and a manufacturer's Declaration of Conformity issued when the production Quality Assurance requirements laid down in Annex B, of the Directive (96/98/EC) is fully complied with and controlled by a written inspection agreement with a Notified Body.
The use of the QinetiQ Notified Body Number (0191) in combination with the Wheelmark implies that the manufacturer is registered with the QinetiQ Quality Assurance Scheme. A Certificate of Registration is issued to the manufacturer and should be made available on request. The manufacturer is responsible for ensuring that certification renewal and periodic surveillance are maintained.
4. USCG Approval Number, A Mutual Recognition Agreement (MRA) on marine equipment exists between the European Commission and the US Coastguard but only applies to equipment types included in the listing of marine equipment annexed to the MRA. For included equipment a USCG Approval number may be issued. This can be found under the MED certificate number on the first page and should be used on the main identity label of the equipment. Radio and Radar equipment continues to need separate or additional approval by the USA FCC.
5. This certificate does not confer any approval status to this equipment other than defined by, and tested according to the specifications listed on Page 1.
6. The labeling requirements of IMO Resolution A694(17) shall be met. Descriptions of each unit of apparatus forming part of the equipment will be as given on this Certificate. Each unit of equipment will be marked with the minimum safe distance at which it should be mounted from a standard and steering magnetic compass.
7. No unit of apparatus shall be advertised or labeled as "approved" or "certified" on behalf of the Maritime and Coastguard Agency, the Department of Transport or the QinetiQ Group in any sense other than that it is a type that has been assessed as satisfactory against the specification;
8. The manufacturer must advise QinetiQ of any intended changes to the design or production of the equipment which might affect the equipment performance.
9. Minor Modifications to the equipment will be considered on a case-by-case basis. QinetiQ will review any factory test results, in consultation if necessary, with the test facility that conducted the original Type Approval testing on the equipment. QinetiQ will advise the manufacturer if any further testing is required to maintain valid certification.
10. If an equipment manufacturer wishes to have the type approved equipment designated under alternative names (e.g. agent/distributor's name and model number), a separate application should be completed and sent to QinetiQ.

QinetiQ Ltd
Marine Approval and Testing Service
Cody Technology Park, Room 1005/A5
Ively Road, Farnborough
Hants, GU14 0LX
United Kingdom