



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:-

Shipborne Radar Equipment (IEC 62388 Cat 1)
(COMMISSION DIRECTIVE 2009/26/EC – ITEM A.1/4.34)

Of system types known and designated as:-

- | | |
|--------------------|--------------------------------------|
| a) JMA-9132-SA | - 320mm Display, S-Band Radar System |
| b) JMA-9133-SA/SAA | - 320mm Display, S-Band Radar System |
| c) JMA-9110-6XA | - 320mm Display, X-Band Radar System |
| d) JMA-9122-6/9XA | - 320mm Display, X-Band Radar System |
| e) JMA-9123-7/9XA, | - 320mm Display, X-Band Radar System |
- (Comprising component parts and having technical characteristics shown in schedules 2 to 4)

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"
- 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 4.34)

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) and Resolution A694(17).

SIGNED:



P J Goddard Authorised Signatory
for and on behalf of QinetiQ Ltd

DATE of ISSUE: 13th August 2010

DATE of EXPIRY: 1st June 2014

Certificate Number: QQ-MED-12/09-01R3

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

USCG Approval Number (part): 165.120/EC0191/1209-01
(Item A.1/4.34 ARPA (Tracking CAT1), display and function only)

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

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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.

Size of ship/craft	Cat 3 < 500 gt	Cat 2 500 gt to <10,000 gt and HSC <10,000 gt	Cat 1 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 (EPA no longer accepted)	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 (HSC Radar with ATA No longer used)	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.

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Certificate Number QQ-MED-12/09-01R3

Schedule 2 –Category 1 Radar

JMA-9132-SA - 320mm Display, S-Band, 30kW Radar System

JMA-9133-SA or SAA - 320mm Display, S-Band, 30kW Radar System

The applicant declared that the following units comprise the radar equipment of the system designations a) & 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:-

Radar Display Unit (23.1" Colour LCD Deck mount) incorporating TT & AIS Processor Unit and Operation Unit (Keyboard)	NCD-4990	*1
30kW, Transceiver/Turning Unit c/w 12ft antenna or 30kW, Bulkhead mount Transceiver and Turning Unit c/w 12ft antenna or Turning Unit c/w 12ft antenna	NKE-1130# NTG-3230 NKE-1139# NKE-1139A#	*2,4 *3,4 *3,4
SFTWARE:- Radar Processor (NCD-4990)	Version 01.00 or 01.01	*5
MTR (Transceiver)	Version 01.00	*5
----- End of List -----		

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

* NOTES:-

- 1 Also available as a "Desktop" type (NCD-4990T) consisting of the three component assemblies; Monitor (NWZ-170), Radar Processor (NDC-1399-9) and Operation Unit (NCE-5163) supplied separately to enable Desktop mounting.
- 2 JMA-9132-SA "Two unit" system scanner incorporates S-Band performance monitor unit NJU-84.
- 3 JMA-9133-SA /SAA "Three unit" system Scanner incorporates S-Band performance monitor unit NJU-84.
- 4 Suffix (#) is used to indicate the operating voltage, 1 or 3 phase and De-icing heater options, as follows:
"1" = 100V AC operation, "2" = 230V, AC operation, "F" = 30 operation "D" = De-icing heater.
- 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-12/09-01R2 issued on 13 July 2010..

Technical Characteristics

FREQUENCY OF OPERATION	3.050 GHz	±20MHz
PULSE REPETITION FREQUENCY	2250, 1900, 1400, 750, 650 & 510Hz	(PRF)
PULSE LENGTHS	0.07, 0.2, 0.3, 0.4µs, 0.8, 1.0 & 1.2µs	Automatically changes with range selection Operator selection on 0.75 to 24nm ranges
EMISSION CODE	3M00PONAN	
POWER CHARACTERISTIC	30kW	(PEP)
RADAR DISPLAY CIRCLE	≥320mm	Effective Diameter
RADAR TARGET CAPACITY ACQUIRED	100 targets	40 minimum for Cat 1
AUTO ACQUISITION OF TARGETS	Yes	Required for Cat 1
TRIAL MANOEUVRE	Yes	Required for Cat 1
AIS TARGET CAPACITY ACTIVATED SLEEPING	100 200 (300 max)	40 minimum for Cat 1 200 minimum for Cat 1
IEC 61162-1 SERIAL (NMEA) PORTS	Listener - 5 Talker - 5	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	100-115 or 220-240V AC, 50/60Hz	

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

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Certificate Number **QQ-MED-12/09-01R3**

Schedule 3 –Category 1 Radar

JMA-9110-6XA, - 320mm Display, X-Band, 10kW Radar System

The applicant declared that the following units comprise the radar equipment of the system designation c) 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:-

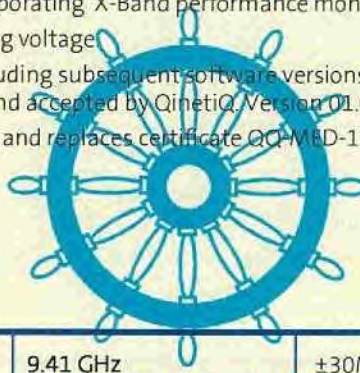
Radar Display Unit (23.1" Colour LCD Deck mount) incorporating TT & AIS Processor Unit and Operation Unit (Keyboard)	NCD-4990	*1
10kW, Transceiver/Turning Unit c/w 6ft antenna	NKE-2103-6#	*2,3
SOFTWARE:- Radar Processor (NCD-4990)	Version 01.00 or 01.01	*4
MTR (Transceiver)	Version 01.00	*4

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

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

* NOTES:-

- Also available as a "Desktop" type (NCD-4990T) consisting of the three component assemblies; Monitor (NWZ-170), Radar Processor (NDC-1399-9) and Operation Unit (NCE-5163) supplied separately to enable Desktop mounting.
- JMA-9110-6XA "Two unit" scanner incorporating X-Band performance monitor unit NJU-85.
- Suffix (#) is used to indicate the operating voltage.
- 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.
- This certificate and schedule supersedes and replaces certificate QQ-MED-12/09-02 issued on 2 June 2009.



Technical Characteristics

FREQUENCY OF OPERATION	9.41 GHz	±30MHz
PULSE REPETITION FREQUENCY	2250, 1700, 1200, 750, 650	(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 1.2nm ranges
EMISSION CODE	3M00PONAN	
POWER CHARACTERISTIC	10kW	(PEP)
RADAR DISPLAY CIRCLE	≥320mm	Effective Diameter
RADAR TARGET CAPACITY ACQUIRED	100 targets	40 minimum for Cat 1
AUTO ACQUISITION OF TARGETS	Yes	Required for Cat 1
TRIAL MANOEUVRE	Yes	Required for Cat 1
AIS TARGET CAPACITY ACTIVATED SLEEPING	100 200 (300 max)	40 minimum for Cat 1 200 minimum for Cat 1
IEC 61162-1 SERIAL (NMEA) PORTS	Listener - 5 Talker - 5	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	100-115 or 220-240V AC, 50/60Hz	

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

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Certificate Number **QQ-MED-12/09-01R3**

Schedule 4 –Category 1 Radar

JMA-9122-6/9XA - 320mm Display, X-Band, 25kW Radar System

JMA-9123-7/9XA - 320mm Display, X-Band, 25kW Radar System

The applicant declared that the following units comprise the radar equipment of the system designations d) & e) 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:-

Radar Display Unit (23.1" Colour LCD Deck mount) incorporating TT & AIS Processor Unit and Operation Unit (Keyboard)	NCD-4990	*1
25kW, Transceiver/Turning Unit c/w 6ft antenna	NKE-1125-6#	*2,4
or 25kW, Transceiver/Turning Unit c/w 9ft antenna	NKE-1125-9#	*2,4
or 25kW, Bulkhead mount Transceiver and Turning Unit c/w 7ft antenna	NTG-3225	
or Turning Unit c/w 9ft antenna	NKE-1129-7#	*3,4
	NKE-1129-9#	*3,4
SOFTWARE:- Radar Processor (NCD-4990)	Version 01.00 or 01.01	*5
MTR (Transceiver)	Version 01.00	*5
----- End of List -----		

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

* NOTES:-

- 1 Also available as a "Desktop" type (NCD-4990T) consisting of the three component assemblies; Monitor (NWZ-170), Radar Processor (NDC-1399-9) and Operation Unit (NCE-5163) supplied separately to enable Desktop mounting.
- 2 JMA-9122-6/9XA "Two unit" system scanner incorporates X-Band performance monitor unit NJU-85.
- 3 JMA-9123-7/9XA "Three unit" system Scanner incorporates X-Band performance monitor unit NJU-85.
- 4 Suffix (#) is used to indicate the operating voltage, 1 or 3 phase and De-icing heater options, as follows:
"1" = 100V AC operation, "2" = 230V, AC operation, "E" = 3Ø operation "D" = De-icing heater.
- 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-12/09-02R2 issued on 13 July 2010

Technical Characteristics

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 24nm ranges
EMISSION CODE	3M00PONAN	
POWER CHARACTERISTIC	25kW	(PEP)
RADAR DISPLAY CIRCLE	≥320mm	Effective Diameter
RADAR TARGET CAPACITY ACQUIRED	100 targets	40 minimum for Cat 1
AUTO ACQUISITION OF TARGETS	Yes	Required for Cat 1
TRIAL MANOEUVRE	Yes	Required for Cat 1
AIS TARGET CAPACITY ACTIVATED SLEEPING	100 200 (300 max)	40 minimum for Cat 1 200 minimum for Cat 1
IEC 61162-1 SERIAL (NMEA) PORTS	Listener - 5 Talker - 5	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	100-115 or 220-240V AC, 50/60Hz	

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

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Certificate Number **QQ-MED-12/09-01R3**

Certificate of Type Approval - Schedule 5

JMA-91xx Radar Systems - Ancillary and Optional Units

The applicant declared that the following units may be added to the basic radar systems illustrated in schedules 1 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:-

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	*2
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	*2
Slave Colour LCD Monitor, 19 LCD "	Melford MRD19SP-DC or -AC	*1
Slave Colour LCD Monitor, 23 LCD "	Melford MRD23SP-DC or -AC	*2
Slave Colour LCD Monitor, 19 LCD "	Innoscan 1900MII	*1
Slave Colour LCD Monitor, 23 LCD "	Innoscan 2300MII	*2
Slave Colour LCD Monitor, 23.1 LCD "	Baytek BPM-723-DA-AC-BZ	*2

ANCILLARY UNITS:-

Power control Unit	NQE-3167	
AC/DC Converter Unit	NBA-5135	
Interswitch Unit (2 display x 2 transceiver, Internal)	NQE-3141-2A	*3
Interswitch Unit (4 display x 4 transceiver, External)	NQE-3141-4A	
Interswitch Unit (8 display x 8 transceiver, External)	NQE-3141-8A	

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

*** NOTES:-**

- 1 Colour Slave display, no operational controls apart from screen brilliance provided. Will present undersize radar picture for non navigational workstation use only.
- 2 Colour Slave display, no operational controls apart from screen brilliance provided. May be used as an alternative to the NWZ-170 Monitor of the NCD-4990T display assembly in situations where Panel mounting is acceptable.
- 3 Interswitch PCB is mounted internally to Radar Processor (NDC-1399-9) housing of the NCD-4990 Display.

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

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Certificate Number **QQ-MED-12/09-01R3**

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
30kW, S-Band,Transceiver, 12ft Antenna	NKE-1130	NMA-551	NJC3316	M1555

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

QinetiQ/EMEA/TS/CRO803478/2

The test results specifically apply to a build 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 and the NKE-1125 is also available with a 9ft antenna.

The Transceiver Modules contained in the above Transceiver/Turning units are also found in the following Bulkhead units. Since the applicable electronic circuitry and component parts are identical and the addition of the waveguide/helix feeder is known to have band limiting properties, a presumption of conformity can be applied by analogy to these systems.

Transceiver Bulkhead (25kW)	NTG-3225
and Scanner Unit (7ft Antenna)	NKE-1129-7
Or Scanner Unit (9ft Antenna)	NKE-1129-9
Transceiver Bulkhead (30kW)	NTG-3230
and Scanner Unit (12ft Antenna)	NKE-1139

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

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Certificate Number **QQ-MED-12/09-01R3**

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
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