

TYPE EXAMINATION CERTIFICATE (MODULE B)

Certificate No:
MERB00002AU
Revision No:
0

This Certificate is issued by DNV UK Limited based on authorisation of the Maritime & Coast Guard Agency (MCA) as an UK Approved Body to undertake conformity assessments on marine equipment in accordance with the requirements of the Merchant Shipping (Marine Equipment) Regulations 2016 as amended.

This is to certify:

That the Radar equipment

with type designation(s)

FAR-2218, FAR-2218-BB, FAR-2228, FAR-2228-BB, FAR-2228-NXT, FAR-2228-NXT-BB, FAR-2238S, FAR-2238S-BB, FAR-2238S-NXT, FAR-2238S-NXT-BB, FAR-2318, FAR-2328, FAR-2328W, FAR-2328-NXT, FAR-2338-SW, FAR-2338S, FAR-2338S-NXT

Issued to

Furuno Electric Co., Ltd.
Nishinomiya, Japan

is found to comply with the requirements in the following Regulations/Standards:

Regulation **MSN 1874 Amendment 6,**

item No. UK/4.64 SOLAS 74 as amended, Reg. V/18, 19, X/3, IMO Res. MSC.36(63)-(1994 HSC Code) 13, IMO Res. MSC.97(73)-(2000 HSC Code) 13, IMO Res. A.278 (VIII), A.694(17), MSC.191(79), 192(79), 302(87), IMO MSC.1/Circ.1349, ITU-R M.1177-4 (04/11)

Further details of the equipment and conditions for certification are given overleaf.

This Certificate is valid until **2026-08-29**.

Issued at **London** on **2022-12-28**

DNV local unit:
Kobe



for **DNV UK Ltd.**

Approval Engineer:
Frederik Tore Elter

Approved Body No.: **0097**

Christine Mydlak-Röder
MER Service Responsible



**Maritime &
Coastguard
Agency**

UK Approved Body Authorised
by the MCA

The Mark of Conformity may only be affixed to the above type approved equipment and a Manufacturer's Declaration of Conformity issued when the production-control phase module (D, E or F) of Schedule 2 of the Merchant Shipping (Marine Equipment) Regulations 2016, as amended is fully complied with and controlled by a written inspection agreement with an approved body. The product liability rests with the manufacturer or his representative in accordance with the Merchant Shipping (Marine Equipment) Regulations 2016.

This certificate is valid for equipment, which is conform to the approved type. The manufacturer shall inform DNV UK Ltd. of any changes to the approved equipment. Should the specified regulations or standards be amended during the validity of this certificate, the product is to be re-approved before being placed on board a vessel to which the amended regulations or standards apply. This certificate remains valid unless suspended, withdrawn, re-called, or cancelled.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

The Radars FAR-2218, FAR-2218-BB, FAR-2228, FAR-2228-BB, FAR-2228-NXT, FAR-2228-NXT-BB, FAR-2238S, FAR-2238S-BB, FAR-2238S-NXT, FAR-2238S-NXT-BB and FAR-2318, FAR-2328, FAR-2328W, FAR-2328-NXT, FAR-2338-SW, FAR-2338S, FAR-2338S-NXT consist of the following units:

Unit	Location
Processor unit	Protected
Monitor (display) unit	Protected
Control unit (operation panel)	Protected
Data interface	Protected
Transceiver unit (Up-mast)	Exposed
or Transceiver unit (down-mast)	Protected
Antenna unit	Exposed

For details, see Appendix.

Application/Limitation

- The radar types FAR-23x8(-nn) is found to be in compliance with RADAR for ships and high-speed crafts; CAT 1, CAT 2, CAT 3, CAT 1H and CAT 2H (dependent of monitor installed, and antenna rpm).
- The radar types FAR-22x8(-nn) is found to be in compliance with RADAR for ships and high-speed crafts; CAT 2, CAT 3 and CAT 2H (dependent of monitor installed and antenna rpm).
- The radar types FAR-2xx8(-nn) CAT 1H/2H: -antenna rotation shall be setup to 42 rpm;
- The FAR-radar supports a DVI-I port and Ethernet port being in compliance with IEC61996-1 for interconnection with the VDR.
- The FAR-radar shall be installed and tested onboard in accordance with the pertinent Installation Manual (ref. appendix)

Type Examination documentation

- See Appendix.

Tests carried out

- IEC 62388 (2013)
- IEC 61162-1 (2016)
- IEC 61162-2 (1998)
- IEC 61162-450 (2018)
- IEC 62288 (2014)
- IEC 60945 (2002) incl. Corr.1 (2008)
- IEC 62923-1 (2018) and IEC 62923-2 (2018)

Marking of product

The type designation and name and contact address of the manufacturer shall be affixed visibly, legibly and indelibly to the product. In addition the product shall be marked with serial number, safe distance to magnetic compass, power consumption and/or supply voltage.

APPENDIX

Product description

The CAT 1/1H radars FAR-2318, FAR-2328, FAR-2328W, FAR-2328-NXT, FAR-2338-SW, FAR-2338S, FAR-2338S-NXT and the CAT 2/3/2H radars FAR-2218, FAR-2218-BB, FAR-2228, FAR-2228-BB, FAR-2228-NXT, FAR-2228-NXT-BB, FAR-2238S, FAR-2238S-BB, FAR-2238S-NXT, FAR-2238S-NXT-BB comprise combinations of the following components:

Unit	Model Name	Components		Remark
Processor Unit	RPU-025			
Data Interfaces (embedded)	03P9648	I/O board		IEC61162-2/
	03P9652			IEC61162-1
	Ethernet 100 Base-T	2 ports		IEC61162-450
	VDR-connection	DVI-I or Ethernet		LAN2 port
	HMC-200CE-A	LAN signal converter		option
Monitor Unit for CAT 1/2/3/1H/2H	MU-231 or MU-270W or HD26T21 MMD-MAX-FAGA ²⁾ or HD26T22 FUD-MAX-FxGx ²⁾ or HD27T22 FUD-MAX-FxGx ²⁾ or HD32T22 FUD-MAX-AxGx ³⁾ or HD55T22 FUD-xAx-xOxx ²⁾ or JH 23T14 FUD-xx1-xxxx ²⁾ or WA460-01-MON-01-xxFU ²⁾ or WA270-01-MON-01-xxFU ²⁾			<i>x=variable letter/number according to manufacturer's type number identification</i> ²⁾ DVI/VGA connection ³⁾ DVI connection
Optional monitor unit for CAT 2/3/2H	MU-190 or HD24T22 FUD-MAX-FxGx ²⁾ or HD24T21 MMD-MAX-Axxx ²⁾ or HD19T22 FUD-MAX-FxGx ²⁾ or JH 19T14 FUD-xx1-xxxx ³⁾ or JH 20T17 FUD-xx1-xxxA ³⁾			
Optional monitor unit for CAT 3	MU-152 ²⁾ or HD15T22 FUD-MAX-FxGx ²⁾ or JH 15T17 FUD-xx1-xxxx ²⁾			
Radar control units	RCU-014 or RCU-015 and RCU-016 ⁴⁾			⁴⁾ optional
X-band transceiver		<i>Transceiver</i>	<i>Antenna unit</i>	
	FAR-2318 FAR-2218(-BB)*	RTR-105	XN12CF-RSB-128 XN20CF-RSB-128 XN24CF-RSB-128	4 ft 6.5 ft *CAT 2/3/2H 8 ft
	FAR-2328 FAR-2228(-BB)*	RTR-106	XN12CF-RSB-128 XN20CF-RSB-128 XN24CF-RSB-128	
	FAR-2328W	RTR-108	XN20CF-RSB-130 XN24CF-RSB-130	

Unit	Model Name	Components		Remark
	FAR-2328-NXT FAR-2228-NXT(-BB)*	RTR-123	XN12CF-RSB128 XN20CF-RSB128 XN24CF-RSB128	<i>Solid State</i> <i>*CAT 2/3/2H</i>
S-band transceiver	FAR-2338S FAR-2238S(-BB)*	RTR-107	SN36CF-RSB-129	<i>12.5 ft *CAT 2/3/2H</i>
	FAR-2338SW	RTR-109	SN36CF-RSB-131	
	FAR-2338S-NXT FAR-2238S-NXT(-BB)*	RTR-111	SN36CF-RSB-133	<i>Solid State</i> <i>*CAT 2/3/2H</i>
Performance monitors	PM-32A PM-32B ⁵⁾ PM-52A PM-52B ⁵⁾	X-band X-band S-band S-band		⁵⁾ <i>Solid State</i>
LAN switching HUB	HUB-100			<i>Option – for proprietary LAN interface.</i>
LAN intelligent HUB	HUB-3000			<i>Option – for IEC 61162-450 external LAN interface.</i>
Junction Box	RJB-001			<i>Option</i>
Software	0359377-xx.xx	RPU-025 (main)		
	0359380-xx.xx	RPU-025 (sub)		

Type Examination documentation

DNV No.	Document No.	Rev.	Document Title
1	FLI 12-10-039		IEC62288 & IEC62388 test report for MU-190 and MU-231
2	BSH 6522/1114-8/2004		FAR-2xx7 radar Series: IEC61162 conformance test
3	BSH/4543/4342577/13-1		Marine Radar FAR-2xx7: IEC62388(2013)
5	LIC 12-16-012		IEC62288 ed.2.0: Monitor unit MU-270W
8	OSE-36520-C10		Operator's Guide FAR-2xx8 series
9	QINETIQ/MS/MAR/C R1303326/V1.2		Unwanted emission measurements of RTR-105/106/107/111 XN-12CF, XN-24CF, SN36CF
10	K03-17-2567		Result of TT and Association scenario test: FAR-2xx8
11	K03-17-2549		DNVGL type test report marine Radar FAR-2xx8
12	K03-17-1899	1	Performance in sea and rain clutter: FAR-3xx0
13	K03-17-1894	1	Performance in sea clutter: FAR-3xx0
14	K03-17-1888	1	Performance in sea and rain clutter: FAR-3210 with XN-20CF
15	K03-17-1869		Radar antenna radiation pattern data: FAR-3xxx series
16	K03-17-1815		DNV type approval report Marine Radar: FAR-3xx0
17	K03-17-1814		Result of TT and Association scenario test marine Radar: FAR-3xx0
18	K03-17-1759		Wind tunnel test report: Radiator/scanner SN36CF/RSB-129
19	K03-17-1758		Wind tunnel test report: Radiator & scanner XN12CF/XN20CF/XN24CF and RSB-128
20	K03-17-1538		DNV type approval testing report for pending items: FCR-2xx9 series
21	RET-17-009		The answer of DNVGL comment about FAR-2xx8 type approval

DNV No.	Document No.	Rev.	Document Title
23	Applica 20128	0	Performance testing of Radar FAR-3000 series
26	LIC 12-17-018		EMC IEC60945: FAR-2xx8
27	LIC 12-17-019		Temp. & vibration IEC60945: FAR-2xx8
28	LIC 12-17-020		IEC60945 others: FAR-2xx8
29	LIC 12-17-021		CSD IEC60945: FAR-2xx8
30	LIC 12-17-022		IEC61162-1/2 report: FAR-2xx8
31	LIC 12-17-023		IEC61162-450 report: FAR-2xx8
36	K03-17-2549	1.04	DNVGL type approval testing report
37	DOC102116-2		IEC62288: JH 20T17 MMD-AA1-AABA-HW06
38	DOC102116-3		IEC62288: JH 19T14 MMD-MA1-SABA-HW09
39	DOC102116-4		IEC62288: JH 15T17 MMD-AA1-AABR-HW09
41	2011-3494	1	IEC60945 test report: JH 15T17 MMD-AA1-AABA
42	2008-3324		IEC60945 technical report: JH 15T17 MMD-DA1-AOAA
43	2009-3442		IEC60945 technical report: JH 19T14 MMC-AA1-AABR
44	2008-3528		IEC60945 technical report: JH 19T14 MMD-AA1-AOAA
45	2013-3038		IEC60945 technical report: JH 19T14 MMD-MA1-AAAA
46	2008-3511		IEC60945 technical report: JH 20T17 MMD-AA1-AABA
48	doc102352-3		IEC62288: Conformance test report HD 26T22 MMD-MA1-FAGA-ES
49	doc205958-1	2	Minimum brightness test of GDCX Rev 5
50	doc205969-1	1	IEC62288 Flicker test report HD26T22 MMD
53	Applica 21008	0	HD 24T21 MMD: EMC and environmental testing
54	Applica 21009	0	HD 26T22 MMD: EMC and environmental testing
56	doc102352-2	2	IEC62288: Conformance test report 24T22 MMD
57	doc205958-1		minimum brightness test of GDCX rev 5
58	doc205967-1		Flicker test report HD24T22
59	Applica 20885	0	EMC and environmental testing of HD 27T22 MEC
60	Applica 20941	0	EMC and environmental testing of HD 27T22 MEC
62	doc206155-1	1	HD 27T22 MMD-MA1-FAGA-ES: IEC62288 and colour calibration
63	doc206156-1	1	HD 27T22 MMD - IEC62288 FLICKER TEST
64	doc205970-1		IEC62288 flicker test HD32T22
65	doc205992-1		IEC62288 conformance test report HD32T22
67	Nemko E16240.01		HD55T22 Vibration test
68	applica 20869	1	HD55T22 EMC and environmental testing
69	applica 21007	0	HD55T22 EMC and environmental testing (2)
70	doc205971-1		IEC62288: HD55T22 flicker test
71	doc205984-1		IEC62288: HD55T22 conformance test
73	TAA00000S1		DNVGL TA-certificate Wave series monitors
75	DOC100829-6		JH23T14-MMD-MA1-OBA Flicker test
76	DOC101909-1R3		Keypad P004511-1 minimum brightness test
77	DOC102116-1	1	JH23T14 MMD-MA1-AABA IEC62288 Conformance test report
79	DNV 2010-3124	2	JH23T14 MMD-MA1 -EMC and environmental testing
80	170703002T		HD19T22 MMD-MA1 -EMC-FHGA-ES-1: EMC & environmental testing
81	170421001T		HD19T22 MMD-MA1 -EMC-FAGP-ES: EMC & environmental testing
82	Applica 21089	0	HD19T22 MMD-MA1 -EMC-FAGP-ES: EMC testing
83	Applica 21122	0	HD19T22 MMD-MA1-FOGA-ES: EMC radiated emission
85	Applica 20588	0	HD19T21 MMC-M2D-MBAA: EMC & environmental testing
86	Applica 21121	0	HD15T22 MMD-MA1-FHGA-ES: EMC & environmental testing
87	Applica 21120	0	HD15T22 MMD-MA1-FOGA-ES: Radiated emission & compass safe distance
88	Applica 21009	0	HD26T22 MMD-MA1-FAGP-ES: EMC & environmental testing

DNV No.	Document No.	Rev.	Document Title
89	DNV 2012-3177	0	HD15T21 MMD-FA1-FHGA: EMC & environmental testing
90	Applica 20589	0	HD15T21 MMC-M2N-PCAA: EMC & environmental testing
94	VS-TV-060720-04		Vibration test: HD 19T22 MMD-MA1-FHGA-ES-1
96	applica 21008	0	HD 24T22 MMD IEC60945 testing
98	LIC 12-17-070		MU-152 EMC test report
99	LIC 12-17-071		MU-152 IEC60945 test report
100	LIC 12-17-072		MU-152 IEC60945 others -test report
101	LIC 12-17-073		MU-152 IEC62288 -test report
102	LIC 12-17-074		MU-152 IEC62288 -CSD report
104	applica 3253		JH 20T17 MMD-DA1-AAAA Technical report 2010
105	applica 3421	1	JH 20T17 MMD-DA1-AAAR Technical report 2010
107	LIC 12-19-014	1	RPU-025. EMC test report
108	LIC 12-19-015	1	RPU-025: IEC60945 env. test report
109	LIC 12-19-016	1	RPU-025: IEC60945 CSD test report
110	LIC 12-19-019	1	RPU-025: IEC60945 other test report
57 ¹⁾	DELTA-L102798-475n (n=1,2,3)		Test of Flicker from 15, 19, 20 inch monitors for use as ECDIS monitor
1/5*	K03-17-2929	0	Performance in Sea and Clutter
2/5*	APPLICA TR-30215		Performance testing of X-band NXT antenna and transceiver
3/5*	LIC 12-20-002		Test report (ITU-R M.1177) for transceiver type RTR-123
4/5*	K03-17-2885	1.03	DNVGL type approval testing report FAR-2xx8-NXT
8/5*	LIC 12-19-152		IEC 60945, Furuno Marine Radar Type: FAR-2228-NXT/2228-NXT-BB/2328-NXT, FAR-3220-NXT/3220-NXT-BB/3320-NXT - dangerous voltage
9/5*	LIC 12-19-153		IEC 60945, Furuno Marine Radar Type: FAR-2228-NXT/2228-NXT-BB/2328-NXT, FAR-3220-NXT/3220-NXT-BB/3320-NXT - temperature
10/5*	LIC 12-19-154		IEC 60945, IEC62388 Furuno Marine Radar Type: FAR-2228-NXT/2228-NXT-BB/2328-NXT, FAR-3220-NXT/3220-NXT-BB/3320-NXT - vibration and shock
11/5*	LIC 12-19-155		IEC 60945, Furuno Marine Radar Type: FAR-2228-NXT/2228-NXT-BB/2328-NXT, FAR-3220-NXT/3220-NXT-BB/3320-NXT - CSD
12/5*	LIC 12-19-156		IEC 60945, Furuno Marine Radar Type: FAR-2228-NXT/2228-NXT-BB/2328-NXT, FAR-3220-NXT/3220-NXT-BB/3320-NXT - Electromagnetic RF radiation
13/5*	K03-17-2892		IEC 62388, Result of TT Marine Radar F A R 2x 2 8 NXT
14/5*	LIC 12-19-151		IEC 60945, ETSI EN 301 843-1, Furuno Marine Radar Type: FAR-2228-NXT/2228-NXT-BB/2328-NXT, FAR-3220-NXT/3220-NXT-BB/3320-NXT
19*	IME-36520-M13	M13	Manual: Installation Manual – MARINE RADAR Model FAR-2218(-BB)/2228(-BB/-NXT/-NXT-BB)/FAR-2318/2328(-NXT)/FAR-2238S(-BB/-NXT/-NXT-BB)/FAR-2338S(-NXT)/2328W/2338SW/2258(-BB)/2358
20*	OME-36520-H14	H14	Manual: Operators Manual - MARINE RADAR Model FAR-2218(-BB)/2228(-BB/-NXT/-NXT-BB)/FAR-2318/2328(-NXT)/FAR-2238S(-BB/-NXT/-NXT-BB)/FAR-2338S(-NXT)/2328W/2338SW/2258(-BB)/2358
21*	K03-17-3402	1.03	Report: Furuno IEC62923 - MARINE RADAR FAR 2xx8 series FAR 15x8 series
23*	LIC 01-20-047	28. Jan 2021	Report: Reference document for IEC 61162-450 test performed by LIC

DNV No.	Document No.	Rev.	Document Title
24*	LIC 12-21-008	28 January 2021	Report: LABOTECH - Test Report (IEC 61162-450) Trade name: Furuno Model: MARINE RADAR Type: FAR-2218/2218-BB/2318/2228/2228-BB/2328/2228-NXT/2228-NXT-BB/2328-NXT/2328W/2238S/2238S-BB/2338S/2338SW/2238S-NXT/2238S-NXT-BB/2338S-NXT
27*	DOC205958-1	Rev. 5	Report: IEC 62288 Hatteland: Minimum brightness test of GDCX
28*	DOC206081-1	Rev. 03	Report: IEC 62288 Hatteland: Flicker test report_HD 19T22 MMD
29*	DOC206405-1	Rev. 02	Report: IEC 62288 Hatteland: Conformance test report HD 19T22 MMD-MA1-FOGP_HTB30-DVI-D
31*	DOC208044-1	Rev. 01	Report: IEC 62288 Hatteland: Minimum brightness test of PCA200865-1 keypad
32*	DOC208060-1	Rev. 01	Report: IEC 62288 Hatteland: Flicker test report JH 23T14 MMD-MR4-AABA
33*	DOC208070-1	Rev. 01	Report: IEC 62288 Hatteland: Conformance test report JH 23T14 MMD-MR4-AABA
34*	DOC208088-1	Rev. 01	Report: IEC 62288 Hatteland: Flicker test report JH 20T17 MMD-MR4-AABA
35*	DOC208089-1	Rev. 01	Report: IEC 62288 Hatteland: Conformance test report JH 20T17 MMD-MR4-AABA
36*	DOC208098-1	Rev. 01	Report: IEC 62288 Hatteland: Conformance test report_JH 19T14 MMD-AR4-AOBC
40*	MRA0000006	Rev. 2	Certificate: IEC 60945 Monitors
41*	MRA0000016	Rev. 3	Certificate: IEC 60945 Monitors
42*	MRA0000003	Rev. 4	Certificate: IEC 60945 Monitors
43*	K03-17-3209	17. SEP 2021	Report: Furuno FAR TA test procedure Monitor
44*	INB10036-4	Rev 00_01	Manual: User Manual Series 1 G2 - Maritime Multi Display Models
45*	CEBDLB-WTW-P21041117	May 04, 2021	Report: BV IEC60945, Radiated and Immunity - Partial IEC 60945 Test Report HD 24TT22 (representative report for HD 26T22 and HD 55T22 Power Module Change)
46*	DOC206446-1	Revision 01	Report: Hatteland, IEC62288 flicker test report_HD 15T22 MMD
47*	DOC208044-1	Revision 01	Report: Hatteland, IEC62288 Minimum brightness test of PCA200865-1 keypad
48*	DOC208880-1	Revision 01	Report: Hatteland, IEC62288 Ed. 2.0 Display Test_JH 15T17 FUD-MR1-AOAA
51*	210426002T	2021.07.15	Report: CAL-TECH IEC60945 HD 24T22 MEC-MP9-4AAH1A-ES3 Technical Report (representative report for HD 26T22 and HD 55T22 Power Module Change)
52*	VS-TV-100708-01	2021.07.08	Report: VST, IEC60945 Vibration, HD 24T22 MEC-MP9-4AAH1A-ES3 (representative report for HD 26T22 and HD 55T22 Power Module Change)

¹)Ref. archive 344.1-004741-3

*)Ref. NPS JOB archive 344.1-006649-5 /-6