



TEST REPORT NO: RU1179/6176
COPY NO: 2
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FCC ID: PJ5H6LLT

**REPORT ON THE CERTIFICATION TESTING OF A
RAY MARINE INC
H6 LIFELINE TRANSMITTER
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15.249 January 2005
INTENTIONAL RADIATOR SPECIFICATION
ON BEHALF OF
dB RESEARCH LIMITED**

TEST DATE: 31st March 2005 – 1st April 2005

TESTED BY: _____ D WINSTANLEY

APPROVED BY: _____ P GREEN
EMC PRODUCT
MANAGER

DATE: 12th September 2005

Distribution:

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Notes:

- | | | | |
|----|--|-----|-------------------------------------|
| 1. | Component failure during test | YES | <input type="checkbox"/> |
| | | NO | <input checked="" type="checkbox"/> |
| 2. | If Yes, details of failure: | | |
| 3. | The facilities used for the testing of the product contain in this report are FCC Listed. | | |
| 4. | The contents of the attached applicants declarations and other supplied information are not covered by the scope of this laboratory's UKAS or FCC accreditations' and is provided in good faith. | | |



CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY:	PJ5H6LLT
PURPOSE OF TEST:	Certification
TEST SPECIFICATION:	FCC RULES CFR 47, Part 15.249 January 2005
TEST RESULT:	Compliant to Specification
EQUIPMENT UNDER TEST:	H6 Lifeline Transmitter
EQUIPMENT SERIAL No:	Engineering Sample
ITU: EMISSION CODE:	419KF1D
EQUIPMENT TYPE:	Personnel Location
PRODUCT USE:	Distress Signalling
CARRIER EMISSION:	7852.35 μ V/m @ 3m
ANTENNA TYPE:	Integral
ALTERNATIVE ANTENNA:	Not applicable
FREQUENCY OF OPERATION:	914.45 MHz
CHANNEL SPACING:	Not applicable, Wideband
NUMBER OF CHANNELS:	Not applicable
FREQUENCY GENERATION:	SAW Resonator <input type="checkbox"/> Crystal <input type="checkbox"/> Synthesiser <input checked="" type="checkbox"/>
MODULATION METHOD:	Amplitude <input type="checkbox"/> Digital <input checked="" type="checkbox"/> Angle <input type="checkbox"/>
POWER SOURCE(s):	+3Vdc
TEST DATE(s):	31 st March 2005 – 1 st April 2005
ORDER No(s):	0170/RH1
APPLICANT:	dB Research Limited
ADDRESS:	Concept House 17 Merton Road Bootle Merseyside L20 3BG United Kingdom

TESTED BY: _____ D WINSTANLEY

APPROVED BY: _____ P GREEN
EMC PRODUCT
MANAGER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	H6 Lifeline Transmitter
EQUIPMENT TYPE:	Personnel Location
SERIAL NUMBER OF EUT:	Engineering Sample
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15.249 January 2005
TEST RESULT:	COMPLIANT Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
APPLICANT'S CATEGORY:	MANUFACTURER <input checked="" type="checkbox"/> IMPORTER <input type="checkbox"/> DISTRIBUTOR <input type="checkbox"/> TEST HOUSE <input type="checkbox"/> AGENT <input type="checkbox"/>
APPLICANT'S ORDER No(s):	0170/RH1
APPLICANT'S CONTACT PERSON(s):	Mr E Runciman
E-mail address:	ernie.runciman@dbresearch.co.uk
APPLICANT:	dB Research Limited
ADDRESS:	Concept House 17 Merton Road Bootle Merseyside L20 3BG United Kingdom
TEL:	+44 (0)151 330 0800
FAX:	+44 (0)151 330 0808
MANUFACTURER:	Raymarine UK Limited
ADDRESS:	21 Manchester Street Merrimack New Hampshire United States 03054
TEL:	+44 (0) 23 9269 3611
FAX:	+44 (0) 23 9269 4642
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRL EMC
UKAS ACCREDITATION No:	0728
TEST DATE(s)	31 st March 2005 – 1 st April 2005
TEST REPORT No:	RU1179/6176

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.	TEST/EXAMINATION	RULE PART	DETECTOR	APPLICABILITY
	Intentional Emission Frequency:	15.249(a)	Quasi Peak	YES
	Intentional Emission Field Strength:	15.249(a)	Quasi Peak	YES
	Intentional Emission Band Occupancy:	15.215	Peak	YES
	Intentional Emission ERP (mW):	N/A	-	NO
	Spurious Emissions – Conducted:	15.207	-	NO
	Spurious Emissions – Radiated <1000MHz:	15.209	Quasi Peak	YES
	Spurious Emissions – Radiated >1000MHz:	15.209 15.249(a)	Average	YES
	Maximum Frequency of Search:	15.33	-	YES
	Antenna Arrangements Integral:	15.203	-	YES
	Antenna Arrangements External Connector:	15.204	-	YES
	Restricted Bands	15.205	-	YES
	Extrapolation Factor	15.31(f)	-	YES
2.	Product Use:	Distress signalling		
3.	Emission Designator:	419KF1D		
4.	Duty Cycle:		<100 %	
5.	Transmitter bit or pulse rate and level:		bps	
6.	Temperatures:	Ambient (Tnom)	15°C	
7.	Supply Voltages:	Vnom	+3Vdc	
	Note: Vnom voltages are as stated above unless otherwise shown on the test report page			
8.	Equipment Category:	Single channel Two channel Multi-channel	[X] [] []	
9.	Channel spacing:	Narrowband Wideband	[] [X]	

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 15.209 & 15.249(a)

Ambient temperature	=	15°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	44% (<1GHz),	0.3m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 0.3m	[X]
Supply voltage	=	+3Vdc		
Channel number	=	1		

	FREQ. (MHz)	MEAS. Rx. (dBµV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBµV/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (µV/m)	LIMIT (µV/m)
1.705MHz - 30MHz							Note 9	
30MHz - 88MHz							Note 9	
88MHz - 216MHz							Note 9	
216MHz - 960MHz							Note 9	
960MHz - 1GHz							Note 9	
1GHz - 5GHz							Note 9	
Limits	1.705MHz to 30MHz		30µV/m @ 30m					
	30MHz to 88MHz		100µV/m @ 3m					
	88MHz to 216MHz		150µV/m @ 3m					
	216MHz to 960MHz		200µV/m @ 3m					
	960MHz to 1GHz		500µV/m @ 3m					
	1GHz to 5GHz		500µV/m @ 3m					

Notes:

- Results quoted are extrapolated as indicated
- Emissions were searched to: (x) 1000MHz inclusive, as per Part 15.33a
- Extrapolation factor 20dB from 0.3m to 3m, as per Part 15.31f
- Measurements >1GHz @ 0.3m as per Part 15.31f(1)
- Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth
- Receiver detector >1GHz = Average, 1MHz resolution bandwidth
- New batteries used for battery powered products.
- (R) Indicates restricted bands, as per Part 15.205
- Results not within 10 dB's of limit are not necessarily recorded
- See annex D for scan data
- Unit transmitting at a rate of once per second. Measurement times adjusted accordingly.

Test Method:

- As per Radio – Noise Emissions, ANSI C63.4: 2003
- Measuring distances as Notes 1 to 4 above
- EUT 0.8 metre above ground plane
- Emissions maximised by rotation of EUT, on an automatic turntable.
Raising and lowering the receiver antenna between 1m & 4m.
Horizontal and vertical polarisations, of the receive antenna.
EUT orientation in three orthogonal planes.
Maximum results recorded.

The test equipment used for the Transmitter Spurious Emissions – Radiated – Part 15.209 tests are shown overleaf:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
HORN ANTENNA	EMCO	3115	9010-3580	138	X
HORN ANTENNA	EMCO	3115	9010-3581	139	
SPECTRUM ANALYSER	TEKTRONIX	2756P	B010109	164	
BICONE ANTENNA	CHASE	BBA9106	N/A	193	
ANTENNA, LOG PERIODIC 300MHz – 1GHz	CHASE	UPA6108	1061	203	
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
ANTENNA, BICONE 20MHz - 300MHz	CHASE	VBA6106A	1193	251	
BILOG ANTENNA	CHASE	CBL6112	2098	274	
RECEIVER	ROHDE & SCHWARZ	ESVS10	837948/003	317	
RECEIVER	ROHDE & SCHWARZ	ESVS10	844594/003	352	
RECEIVER	ROHDE & SCHWARZ	ESHS10	844077/019	353	
V / UHF RECEIVER 20MHz - 1GHz	ROHDE & SCHWARZ	ESVS 20	838804 / 005	415	
BILOG ANTENNA	SCHAFFNER	CBL6112B	2761	431	
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	X
RANGE 1	TRL	3 METRE	N/A	UH06	X
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	X
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	X

TRANSMITTER TESTS

TRANSMITTER INTENTIONAL EMISSION – RADIATED – Part 15.249(a) & 15.215

Ambient temperature	=	15°C(<1GHz),	3m measurements @ fc	[X]
Relative humidity	=	44%(<1GHz),	10m measurements @ fc	[]
Conditions	=	Open Area Test Site (OATS)	30m measurements @ fc	[]
Supply voltage	=	+3Vdc	30m extrapolated from 3m	[]
Channel number	=	1	30m extrapolated from 10m	[]

FREQ. (MHz)	MEASUREMENT Rx. READING (dBµV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBµV/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (mV/m)
914.45	49.9	3.6	24.4	77.9	-	7.852
Limit value @ fc			50 (mV/m)			
Band occupancy @ -20dBc			f lower		f higher	
			914.2760MHz		914.7120MHz	

See spectrum analyser plot – Annex C

- Notes:**
- 1 Results quoted are extrapolated as indicated
 - 2 Receiver detector @ fc = Quasi Peak, 120kHz bandwidth
 - 3 When battery powered the EUT was powered with new batteries
 - 4 Unit transmitting at a rate of once per second. Measurement times adjusted accordingly.

- Test Method:**
- 1 As per Radio – Noise Emissions, ANSI C63.4: 2003
 - 2 Measuring distances 3m
 - 3 EUT 0.8 metre above ground plane
 - 4 Emissions maximised by rotation of EUT, on an automatic turntable.
Raising and lowering the receiver antenna between 1m & 4m.
Horizontal and vertical polarisations, of the receive antenna.
EUT orientation in three orthogonal planes.
Maximum results recorded

The test equipment used for the Transmitter Intentional Emission – Radiated – Part 15.249 January 2005 tests is shown overleaf:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
HORN ANTENNA	EMCO	3115	9010-3580	138	
HORN ANTENNA	EMCO	3115	9010-3581	139	
SPECTRUM ANALYSER	TEKTRONIX	2756P	B010109	164	
BICONE ANTENNA	CHASE	BBA9106	N/A	193	
ANTENNA, LOG PERIODIC 300MHz – 1GHz	CHASE	UPA6108	1061	203	
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
ANTENNA, BICONE 20MHz - 300MHz	CHASE	VBA6106A	1193	251	
BILOG ANTENNA	CHASE	CBL6112	2098	274	
RECEIVER	ROHDE & SCHWARZ	ESVS10	837948/003	317	
RECEIVER	ROHDE & SCHWARZ	ESVS10	844594/003	352	
RECEIVER	ROHDE & SCHWARZ	ESHS10	844077/019	353	
V / UHF RECEIVER 20MHz - 1GHz	ROHDE & SCHWARZ	ESVS 20	838804 / 005	415	
BILOG ANTENNA	SCHAFFNER	CBL6112B	2761	431	
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	X
RANGE 1	TRL	3 METRE	N/A	UH06	X
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	X
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	

ANNEX A
PHOTOGRAPHS



PHOTOGRAPH No. 2

TRANSMITTER FRONT VIEW



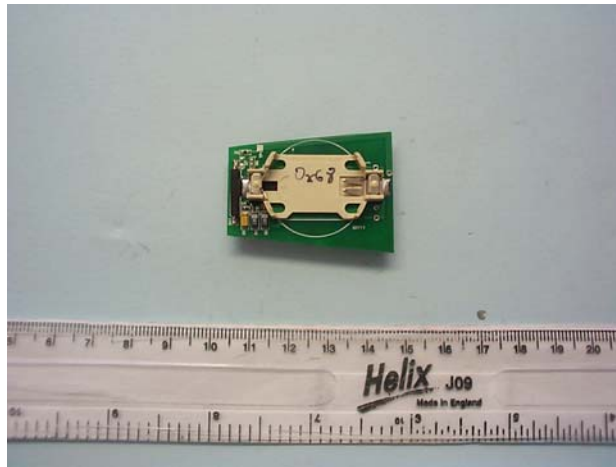
PHOTOGRAPH No. 3

TRANSMITTER REAR VIEW



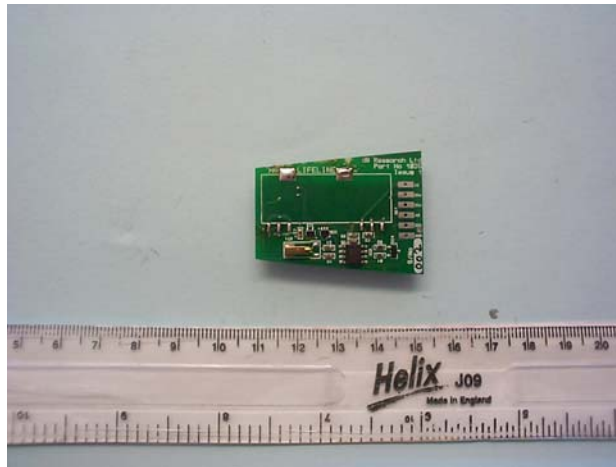
PHOTOGRAPH No. 4

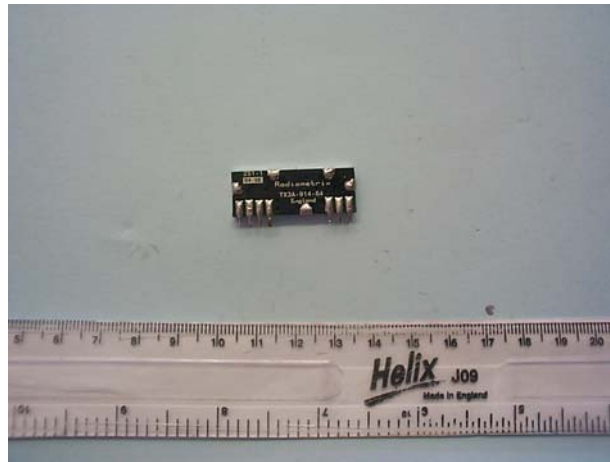
TRANSMITTER PCB TRACK SIDE



PHOTOGRAPH No. 5

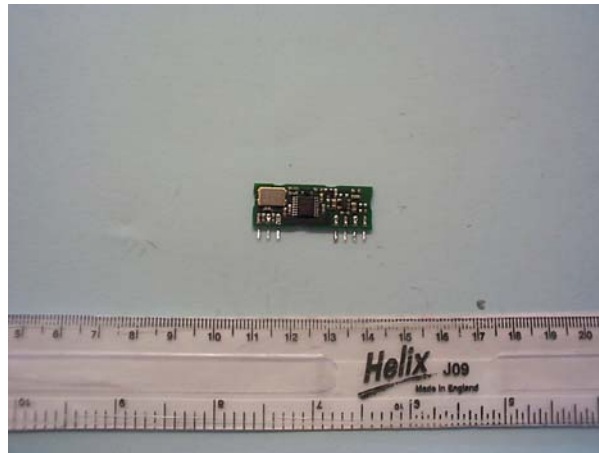
TRANSMITTER PCB COMPONENT SIDE





PHOTOGRAPH No. 7

RF MODULE COMPONENT SIDE



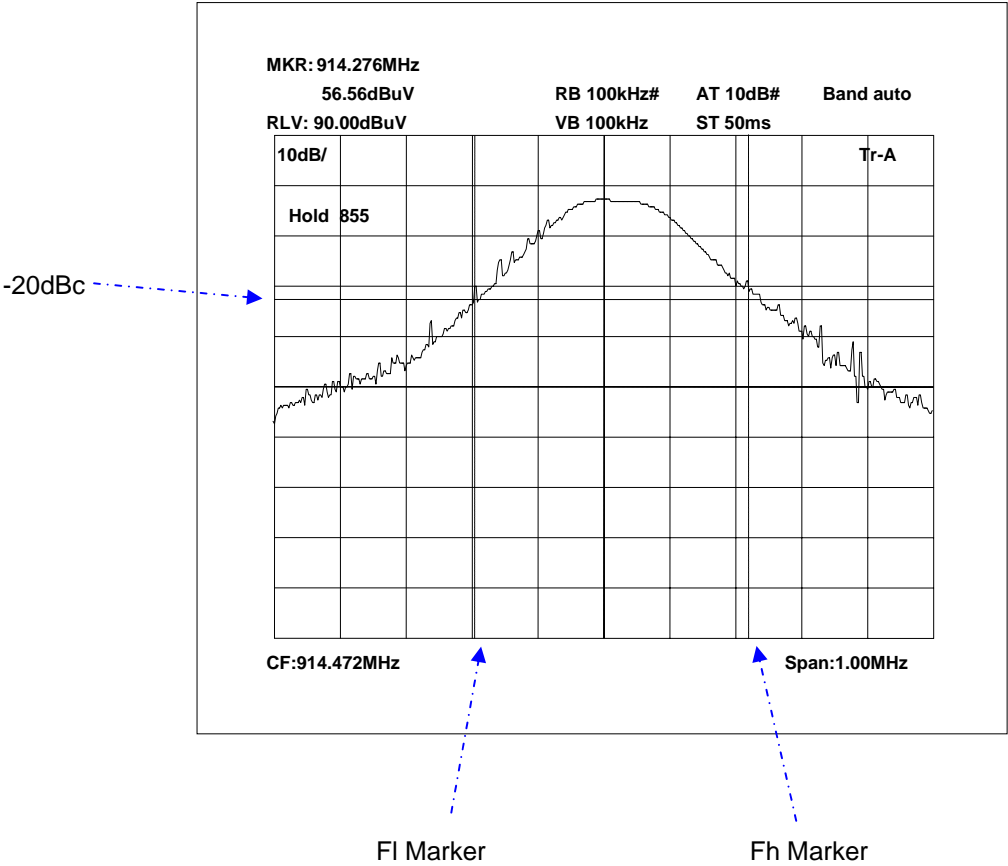
ANNEX B
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

a.	TCB	-	APPLICATION	[X]
		-	FEE	[X]
b.	AGENT'S LETTER OF AUTHORISATION	-		[X]
c.	MODEL(s) vs IDENTITY	-		[]
d.	ALTERNATIVE TRADE NAME DECLARATION(s)	-		[]
e.	LABELLING	-	PHOTOGRAPHS	[]
		-	DECLARATION	[]
		-	DRAWINGS	[X]
f.	TECHNICAL DESCRIPTION	-		[X]
g.	BLOCK DIAGRAMS	-	Tx	[X]
		-	Rx	[]
		-	PSU	[]
		-	AUX	[]
h.	CIRCUIT DIAGRAMS	-	Tx	[X]
		-	Rx	[]
		-	PSU	[]
		-	AUX	[]
i.	COMPONENT LOCATION	-	Tx	[X]
		-	Rx	[]
		-	PSU	[]
		-	AUX	[]
j.	PCB TRACK LAYOUT	-	Tx	[X]
		-	Rx	[]
		-	PSU	[]
		-	AUX	[]
k.	BILL OF MATERIALS	-	Tx	[X]
		-	Rx	[]
		-	PSU	[]
		-	AUX	[]
l.	USER INSTALLATION / OPERATING INSTRUCTIONS	-		[X]

ANNEX C
BANDWIDTH PLOT

BANDWIDTH PLOT



FI = 914.2760 MHz
Fh = 914.7120 MHz
Occupied Bandwidth = 436 kHz

ANNEX D
SCAN PLOT(s)

TRL Compliance Services Ltd

E-Field Radiation

EUT: Life Line TX
 Manuf: dB Research
 Op Cond: 3m Indoor Prescan
 Operator: D Winstanley
 Test Spec: CFR47 FCC part 15.109 (Class B)
 Comment: Unit on TX every 1 second. Measure time adjusted. Unit face on.
 RX Antenna Vertical

Scan Settings					Receiver Settings			
(1 Range)								
Frequencies								
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30MHz	1000MHz	50kHz	120kHz	PK	500msec	Auto	ON	60dB

Transducer	No.	Start	Stop	Name
1	15	30MHz	1000MHz	TRLUH72
	20	30MHz	1000MHz	UH191

Final Measurement: Detector: X QP
 Meas Time: 2sec
 Subranges: 50
 Acc Margin: 10 dB

