TEST REPORT NO: RU1179/6176

COPY NO: 2

ISSUE NO: 1

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: Daniel Winstanley — Digitally signed by Daniel Winstanley DN: CN = Daniel Winstanley, C = GB, O = TRL Compliance Services Reason: I am the author of this document Date: 2005.09.13 11:23:20 +01'00' — D WINSTANLEY

APPROVED BY: Peter Green — Digitally signed by Peter Green DN: CN = Peter Green, C = GB Reason: I am approving this document Date: 2005.09.15 05:05:28 +01'00' — P GREEN EMC PRODUCT MANAGER

DATE: 12th September 2005

Distribution:

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1. dB RESEARCH LIMITED
2. FCC EVALUATION LABORATORIES
3. TRL EMC

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FS 21805

0728

CONTENTS

Notes:

1. Component failure during test — YES [ ] NO [X]
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 µV/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	[ ]	Crystal	[ ]	Synthesiser	[X]
MODULATION METHOD:	Amplitude	[ ]	Digital	[X]	Angle	[ ]
POWER SOURCE(s):	+3Vdc					
TEST DATE(s):	31st March 2005 – 1st 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: Daniel Winstanley — Digitally signed by Daniel Winstanley DN: CN = Daniel Winstanley, C = GB, O = TRL Compliance Services Reason: I am the author of this document Date: 2005.09.13 11:23:39 +01'00' — D WINSTANLEY

APPROVED BY: Peter Green — Digitally signed by Peter Green DN: CN = Peter Green, C = GB Date: 2005.09.15 05:05:35 +01'00' — 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 [X] No [ ]
APPLICANT'S CATEGORY:	MANUFACTURER [X] IMPORTER [ ] DISTRIBUTOR [ ] TEST HOUSE [ ] AGENT [ ]
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)	31st March 2005 – 1st 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) $15^{o}C$

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 [X]
   Two channel [ ]
   Multi-channel [ ]

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:

1 Results quoted are extrapolated as indicated
2 Emissions were searched to: (**x**) 1000MHz inclusive, as per Part 15.33a
3 Extrapolation factor 20dB from 0.3m to 3m, as per Part 15.31f
4 Measurements >1GHz @ 0.3m as per Part 15.31f(1)
5 Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth
6 Receiver detector >1GHz = Average, 1MHz resolution bandwidth
7 New batteries used for battery powered products.
8 (R) Indicates restricted bands, as per Part 15.205
9 Results not within 10 dB's of limit are not necessarily recorded
10 See annex D for scan data
11 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 as Notes 1 to 4 above
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 orthagonal 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 orthagonal 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

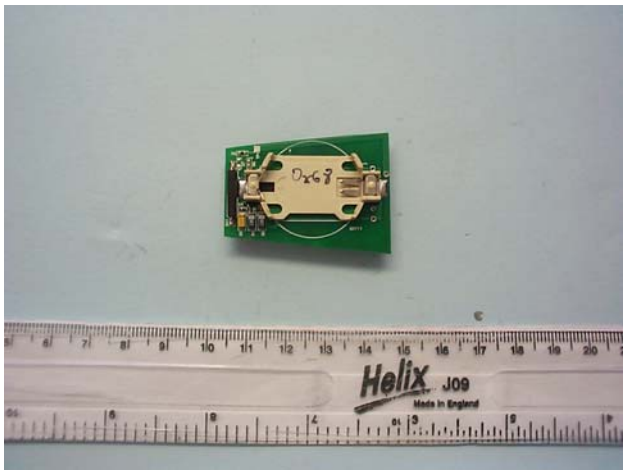
PHOTOGRAPHS

PHOTOGRAPH No. 1 **TEST SETUP**

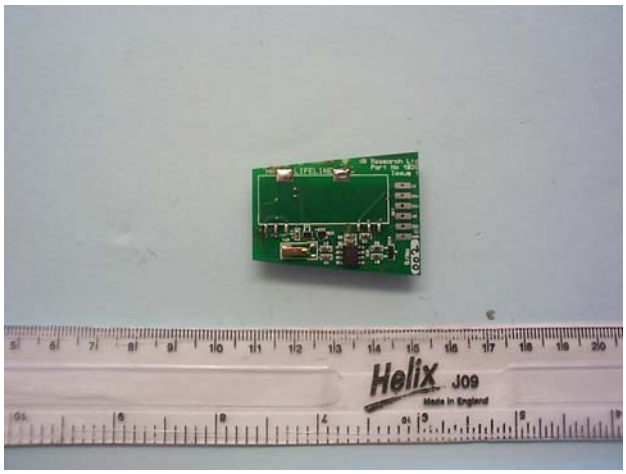
PHOTOGRAPH No. 2 **TRANSMITTER FRONT VIEW**

PHOTOGRAPH No. 3 **TRANSMITTER REAR VIEW**

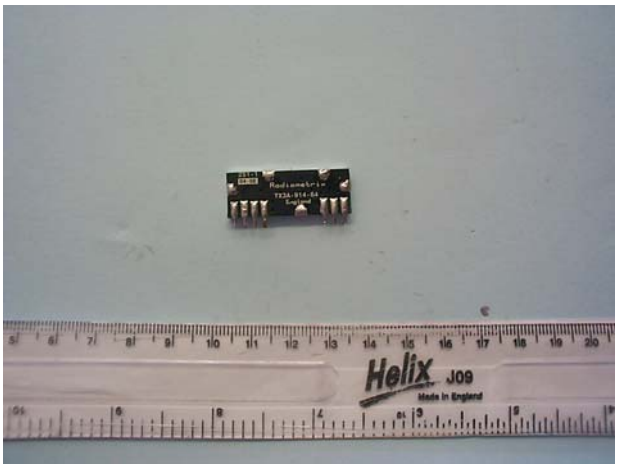
PHOTOGRAPH No. 4 **TRANSMITTER PCB TRACK SIDE**



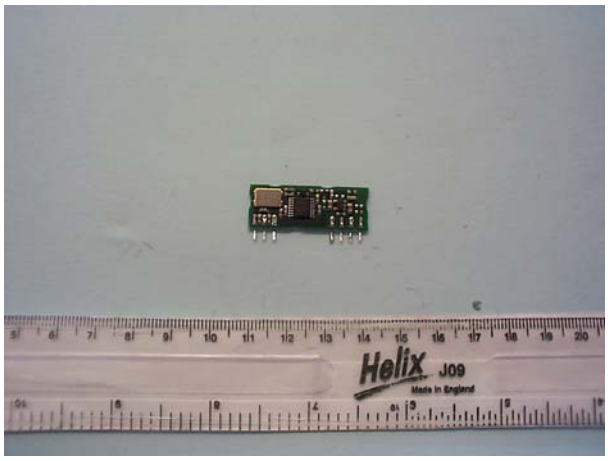
PHOTOGRAPH No. 5 **TRANSMITTER PCB COMPONENT SIDE**



PHOTOGRAPH No. 6 **RF MODULE TRACK SIDE**



PHOTOGRAPH No. 7 **RF MODULE COMPONENT SIDE**



ANNEX B

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

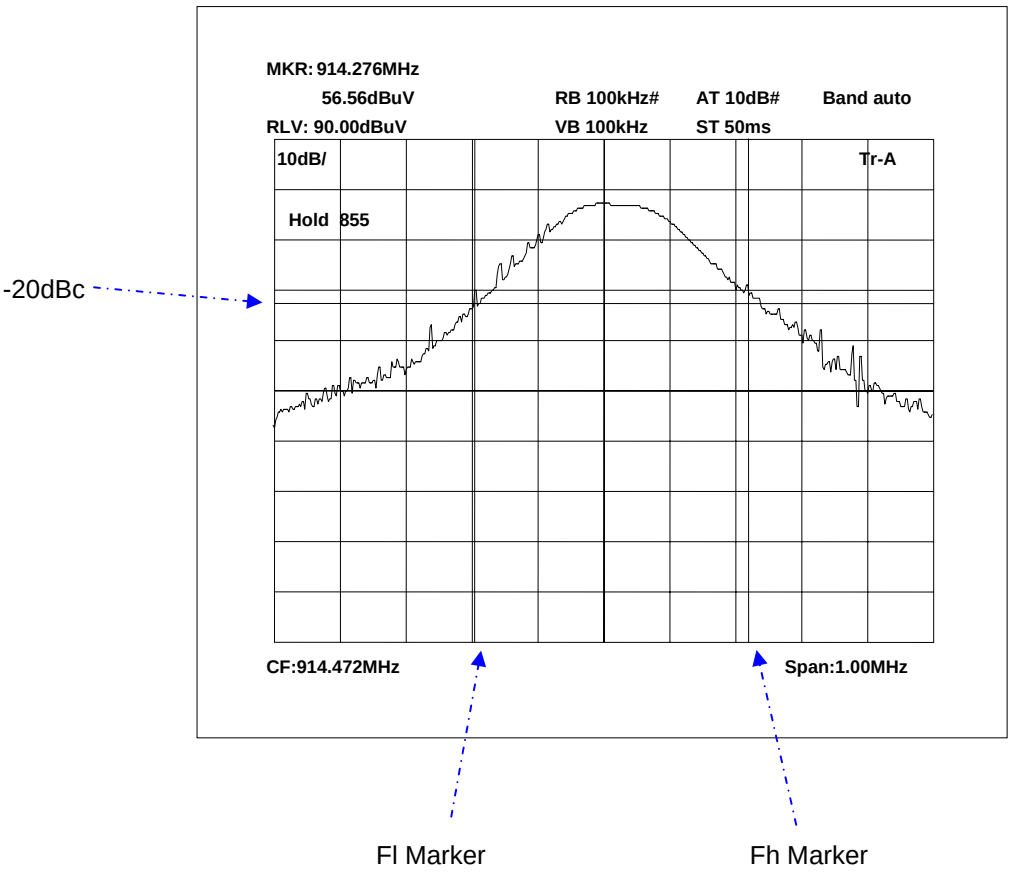
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

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



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

ANNEX D

SCAN PLOT(s)

TRL Compliance Services Ltd

E-Field Radiation

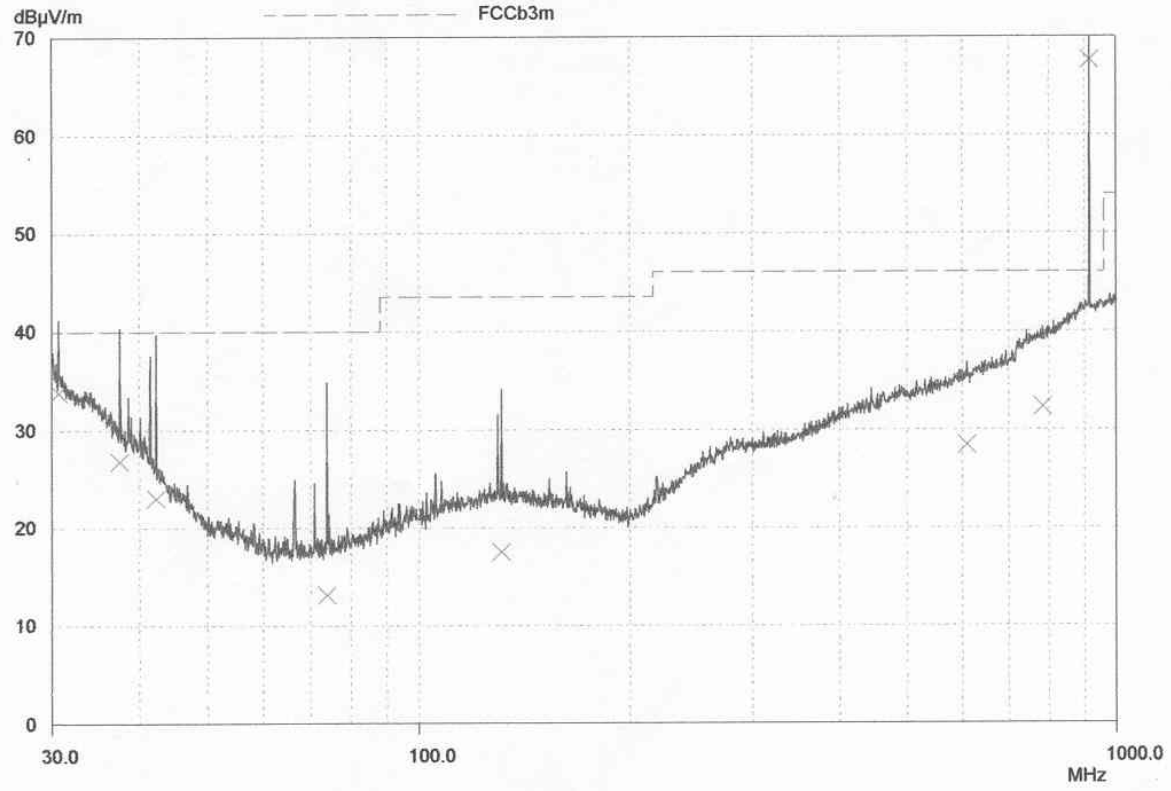
EUT:	Life Line TX
Manuf:	dB Research
Op Cond:	3m Indoor Prescan
Operator:	D Winstanley
Test Spec:	CFR47 FCC part 15.109 (Class B)
Comment:	Unit on TX every 1 second. Measure time adjusted. Unit face on.
	RX Antenna Vertical

Scan Settings (1 Range)

Frequencies			Receiver Settings					
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



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