TRLEMC

TEST REPORT NO: RL1023/284

COPY NO: 2

ISSUE NO: 1

REPORT ON THE
CERTIFICATION TESTING OF A
LOAD INSTRUMENTATION LTD
LOADWISE 315
SAFETY TELECOMMAND TRANSMITTER
WITH RESPECT TO
THE FCC 47CFR, Pt 15.231.a
INTENTIONAL RADIATOR
SPECIFICATION

TEST DATE: 15 - 17 MARCH 1999

TESTED BY: ..... R P I PARRY

APPROVED BY: ..... S P HAYES

ISSUE DATE: 21st April 1999

Distribution Copy No's:-

1 LOAD INSTRUMENTATION LTD

2 FCC EVALUATION LABORATORIES

3 TRL EMC Ltd

TRL EMC LTD
LONG GREEN FORTHAMPTON GLOUCESTER GL19 4QH UNITED KINGDOM

CONTENTS

Notes:-

1. Component failure during test — YES [ ] / NO [X]

2. If Yes, details of failure:-

3. All measurement uncertainty calculations detailed in this report are carried out in accordance with UKAS Publication NIS 81, Edition 1, May 1994, for a 95% confidence level.

4. The contents of the attached applicant's 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.

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	LOADWISE 315
EQUIPMENT TYPE:	SAFETY TELECOMMAND TRANSMITTER
SERIAL NUMBER OF EUT:	ENGINEERING SAMPLE
PURPOSE OF TEST:	FCC CERTIFICATION
TEST SPECIFICATION:	FCC 47CFR Pt 15.231.a
RESULT OF TEST:	COMPLIANT YES [X] NO [ ]
CATEGORY OF APPLICANT:	(a) MANUFACTURER [X] (b) IMPORTER [ ] (c) DISTRIBUTOR [X] (d) AGENT [ ]
APPLICANT'S ORDER NO:	003323
APPLICANT'S CONTACT PERSON:	IAN STIMPSON
APPLICANT:	LOAD INSTRUMENTATION LTD
ADDRESS:	31 IVANHOE ROAD HOGWOOD LANE INDUSTRIAL ESTATE FINCHAMPSTEAD BERKS RG40 4QQ TEL: +44 1189 328855 FAX: +44 1189 328920
MANUFACTURER:	LOAD INSTRUMENTATION LTD
ADDRESS:	31 IVANHOE ROAD HOGWOOD LANE INDUSTRIAL ESTATE FINCHAMPSTEAD BERKS RG40 4QQ TEL: +44 1189 328855 FAX: +44 1189 328920
EUT(s) COUNTRY OF ORIGIN:	UNITED KINGDOM
TEST LABORATORY:	TRL EMC LTD
UKAS ACCREDITATION NO:	0728
DATE OF TEST:	15 - 17 MARCH 1999
TEST REPORT No:	RL1023/284

TRLEMC

CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY:	OEF-LW315T5
PURPOSE OF TEST:	FCC Certification
TEST SPECIFICATION:	FCC 47CFR, Part 15.231.a
TEST RESULT:	Compliant to Specification
EQUIPMENT UNDER TEST:	LOADWISE 315
EQUIPMENT SERIAL No:	Engineering Sample
ITU EMISSION CODE:	37K0F1DAN
EQUIPMENT TYPE:	Safety Telecommand Transmitter
UTILISATION:	Crane Jib
CARRIER EMISSION:	+74.1 dBμV/m @ 3m
ANTENNA TYPE:	Fixed, or Integral
ALTERNATIVE AE:	None, as per Part 15.203
BAND OF OPERATION:	418MHz, ±100kHz
CHANNEL SPACING:	Wideband, not applicable
No. of CHANNELS:	One (1)
FREQUENCY GENERATION:	SAW Resonator [X] ; Crystal [ ] ; Synthesizer [ ]
MODULATION METHOD:	Amplitude [ ] ; Digital [ ] ; Angle [X]
PERIODIC OPERATION:	Tx ≤ 5 seconds
POWER SOURCE(s):	+4.5Vdc, alkaline cells
TEST DATE:	15 - 17 MARCH 1999
ORDER No:	003323
APPLICANT:	LOAD INSTRUMENTATION LTD 31 IVANHOE ROAD HOGWOOD LANE INDUSTRIAL ESTATE FINCHAMPSTEAD BERKS RG40 4QQ

TESTED BY: ..... R P I PARRY

APPROVED BY: ..... S P HAYES
EMC MANAGER

EQUIPMENT TEST CONDITIONS

1.

EQUIPMENT SERIAL / MODEL IDENTITY	CHANNEL NUMBER	Tx NOMINAL FREQUENCY MHz	TESTS REQUIRED	REMARKS
315Tx	1	418.000	radiated	Pt.15.231.b
			bandwidth	Pt.15.231.c

2. Equipment category:

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

3. Supply voltages: Vnom = +4.5Vdc

Note:- Vnom voltages are as stated above unless otherwise shown on the test report page.

4. Temperatures: Tnom = [see test]

5. Maximum bit or pulse rate & level:

bps	=	1760
Level	=	internal

6. Channel spacing:

kHz	=	>25kHz
Narrowband		[ ]
Wideband		[X]

7. Frequency deviation or shift: kHz = 34.4 (35nom)

TESTS REQUIRED

TRANSMITTER TESTS

Transmitter Spurious Emissions - Powerline - Part 15.207	[n/a]
Transmitter Spurious Emissions - Radiated - Part 15.209.c - <30MHz	[X]
Transmitter Spurious Emissions - Radiated - Part 15.209.c - >30MHz	[n/a]
Transmitter Carrier Emission - Radiated - Part 15.231.b(2)	[X]
Transmitter Spurious Emissions - Radiated - Part 15.231.b(3)	[X]
Transmitter Carrier Bandwidth - Radiated - Part 15.231.c	[X]

Notes:-

1. Equipment tested for (mains ac) 110V powerline emissions.	[n/a]
2. Equipment tested as (fixed) integral antenna configuration.	[X]
3. All tests were carried out with new batteries, as per Part 15.31.e.	[X]
4. Equipment tested for radiated emissions as per Part 15.231.b(3) {15.209.c}.	[X]

SAMPLE CALCULATIONS

Part 15.207 - Powerline.

Frequency (MHz)	Rx (dBμV)	LISN Correction (dB)	Cable loss (dB)	Powerline (dBμV)
n/a				

Parts 15.209 & 15.231.b - Radiated.

Frequency (MHz)	Rx (dBμV)	3m Correction (dB)	Ae AF & Cable loss (dB/m & dB)	Field Strength @ 3m (dBμV/m)
1.000	-58.0	94	n/a	+36.0 *
417.975	+52.9	n/a	+21.2	+74.1
2089.875	+33.6	-9.5	+28.3	+52.4

* = Noise @ -6dB wrt this level (minimum).

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS - RADIATED - PART 15.209.c - <30MHz

Ambient temperature	=	+15°C	3m measurements <30MHz	[X]
Relative humidity	=	63%	300m extrapolated from 3m	[X]
Conditions	=	Open Area Test Site (OATS)	30m extrapolated from 3m	[X]
Supply voltage	=	Vnom		
Channel number	=	1		

Frequency & Level 9kHz to 490kHz	nil emissions	>10dB below limit
Frequency & Level 490kHz to 1705kHz	nil emissions	>10dB below limit
Frequency & Level 1705kHz to 30MHz	nil emissions	>10dB below limit
Limits: 9kHz to 490kHz	$20Log_{10}[2400/F(kHz)]dB\mu V/m$ @ 300m	
Limits: 490kHz to 1705kHz	$20Log_{10}[24000/F(kHz)]dB\mu V/m$ @ 30m	
Limits: 1705kHz to 30MHz	+29.5dBμV/m @ 30m	
Measurement Uncertainty	±4.2dB	

Notes:-
1. Results quoted are extrapolated as indicated.
2. Emissions were searched to:- (x) 4200MHz inclusive, as per Part 15.33a.
3. Extrapolation factor @ 40dB/decade from 300m to 30m, as per Part 15.31f.
4. Extrapolation factor @ graph values from 30m to 3m, as per Annex D.
5. Measurements <490kHz @ 3m, as per Part 15.31f (2).
6. Measurements <1705kHz @ 3m, as per Part 15.31f (2).
7. Measurements <30MHz @ 3m, as per Part 15.31f (2).
8. Receiver detector <30MHz = CISPR, Quasi-Peak, 10kHz bandwidth.
9. Sample calculation, see page 6.
10. Equipment tested in CW mode.
11. Nil emissions sensitivity of +36dBμV/m @ 3m.

Test Method:-
1. As per Radio - Noise Emissions, ANSI C63.4: 1992.
2. Measuring distances as Notes 1 to 7 (inc) 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 in horizontal and vertical polarisations, with worst case results recorded.

Test Equipment Used:-
1. Full description at Annex B.
2. TRL190, TRL191, TRL08, TRL07, TRL237

TRANSMITTER TESTS

TRANSMITTER CARRIER EMISSION - RADIATED - PART 15.231.b(2)

Ambient temperature	=	+15°C	3m measurements <1GHz	[X]
Relative humidity	=	63%	1m measurements >1GHz	[ ]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 1m	[ ]
Supply voltage	=	Vnom		
Channel number	=	1		

Frequency & Level		417.975MHz	+74.1dBμV/m @ 3m
Limit	260MHz to 470MHz	+80.3dBμV/m @ 3m	
Measurement Uncertainty		±4.2dB	

Notes:-

1. Results quoted are extrapolated as indicated.
2. Extrapolation factor @ 9.5dB from 1m to 3m, as per Part 15.31f.
3. Measurements >1GHz @ 1m, as per Part 15.31f (1).
4. Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth.
5. Receiver detector >1GHz = Peak Hold, 1MHz resolution bandwidth.
6. Sample calculation, see page 6.
7. Equipment tested in CW mode.

Test Method:-

1. As per Radio - Noise Emissions, ANSI C63.4: 1992.
2. Measuring distances as Notes 1 to 7 (inc) 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 in horizontal and vertical polarisations, with worst case results recorded.

Test Equipment Used:-

1. Full description at Annex B.
2. TRL190, TRL191, TRL08, TRL317, TRL203.

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS - RADIATED - PART 15.231.b(3)

Ambient temperature	=	+15°C (<1GHz), +15°C (>1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	63% (<1GHz), 63% (>1GHz)	1m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 1m	[X]
Supply voltage	=	Vnom		
Channel number	=	1		

Frequency & Level 40.66MHz to 40.70MHz		nil emissions	>10dB below limit
Frequency & Level 70MHz to 130MHz		nil emissions	>10dB below limit
Frequency & Level 130MHz to 174MHz		nil emissions	>10dB below limit
Frequency & Level 174MHz to 260MHz		nil emissions	>10dB below limit
Frequency & Level 260MHz to 470MHz		nil emissions	>10dB below limit
Frequency & Level 470MHz to (x) MHz		2089.875MHz 2507.850MHz	+52.4dBμV/m @ 3m +52.1dBμV/m @ 3m
Limits	40.66MHz to 40.70MHz	+47.0dBμV/m @ 3m	
	70MHz to 130MHz	+41.9dBμV/m @ 3m	
	130MHz to 174MHz	+41.9dBμV/m to 51.5dBμV/m @ 3m (#)	
	174MHz to 260MHz	+51.5dBμV/m @ 3m	
	260MHz to 470MHz	+51.5dBμV/m to 61.9dBμV/m @ 3m (#)	
	470MHz to (x) MHz	+54.1dBμV/m @ 3m	
Measurement Uncertainty		±4.1dB	

Notes:-
1. Results quoted are extrapolated as indicated.
2. Emissions were searched to:- (x) 4200MHz inclusive, as per Part 15.33a.
3. Extrapolation factor @ 9.5dB from 1m to 3m, as per Part 15.31f.
4. Measurements >1GHz @ 1m, as per Part 15.31f (1).
5. Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth.
6. Receiver detector >1GHz = Peak Hold, 1MHz resolution bandwidth.
7. Linear interpolations between linear values where indicated (#).
8. Sample calculation, see page 6.
9. Equipment tested in CW mode.
10. Worst 2 (two) emissions quoted.

Test Method:-
1. As per Radio - Noise Emissions, ANSI C63.4: 1992.
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 in horizontal and vertical polarisations, with worst case results recorded.

Test Equipment Used:-
1. Full description at Annex B.
2. TRL190, TRL191, TRL08, TRL317, TRL164, TRL251, TRL203, TRL138.

TRANSMITTER TESTS

TRANSMITTER CARRIER BANDWIDTH - RADIATED - PART 15.231.c

Ambient temperature	=	+21°C
Relative humidity	=	66%
Conditions	=	Indoors
Supply voltage	=	Vnom
Channel number	=	1

Bandwidth @ -20dBc	70.000kHz	0.017%
Limit	0.25% @ fc **[X]** ; 0.50% @ fc **[n/a]**	
Measurement Uncertainty	±1.9dB ±0.0002%	

Notes:-

1. Emission was measured in the frequency range >70MHz & <900MHz. **[X]**.
2. Emission was measured in the frequency range >900MHz. **[n/a]**.
3. Equipment carrier bandwidth graph @ Annex E. **[X]**.

Test Method:-

1. As per Radio - Noise Emissions, ANSI C63.4: 1992.
2. RF Spectrum Analyser set to:-
   - Res BW = 10kHz @ >30MHz.
   - Res BW = 100kHz @ >1GHz.
   - Video BW = as per Res BW.
   - Detector = Peak Hold.
   - Freq. Span = >5 x Res BW.
   - Res/Span = >5%.
   - Scan Rate = Auto.

Test Equipment Used:-

1. Full description at Annex B.
2. TRL190, TRL191, TRL165, TRL166, TRLUH120.

ANNEX B

TEST EQUIPMENT LIST

INSTRUMENT	SUPPLIER	TYPE No	SERIAL No	TRL EMC No
LF / HF RECEIVER, 9kHz - 30MHz	ROHDE&SCHWARZ	ESH2	879014 / 028	TRL 06
RF PULSE LIMITER	ROHDE&SCHWARZ	ESH3Z2	M494	TRL 06A
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE&SCHWARZ	HFH2	881058 - 53	TRL 07
RANGE 1 (3 - 30m)	TRL	N/A	N/A	TRL 08
VARIAC, 230V, 10A	ZENITH	100R	V265537	TRL 12
dc PSU, VARIABLE, 30v, 10A, 300W	TOPWARD ELECTRONIC	23010	899672	TRL 15
RF SIGNAL GEN, 10kHz - 1000MHz	MARCONI	2022	119022 / 205	TRL 17
LISN, ac MAINS	CHASE	MN2050	1431	TRL 25
HF RECEIVER, 150kHz - 30MHz	CHASE	HFR2000	2158	TRL 26
LF RECEIVER, 9kHz - 150kHz	CHASE	LFR1000	1020	TRL 27
HF RECEIVER, 150kHz - 30MHz	CHASE	HFR2000	2187	TRL 28
AE, DIPOLE, 20MHz - 300MHz	CHASE	VHA9103	7106	TRL 35
AE, DIPOLE, 20MHz - 300MHz	CHASE	VHA9103	7011	TRL 36
AE, DIPOLE, 300MHz - 1GHz	CHASE	VHA9105	7107	TRL 37
AE, DIPOLE, 300MHz - 1GHz	CHASE	VHA9105	N/A	TRL 38
ATU, RECEIVER, 9kHz - 30MHz	SCHWARZBECK	FMZL1514	1514338	TRL 42
COAX LOAD, 2W, N, 50Ω, dc - 4GHz	BIRD	8360NM	N/A	TRL 113
COAX LOAD, 2W, N, 50Ω, dc - 4GHz	BIRD	8360NM	N/A	TRL 114
COAX LOAD, 2W, BNC, 50Ω, dc - 4GHz	BIRD	8360B	N/A	TRL 115
COAX LOAD, 2W, BNC, 50Ω, dc - 4GHz	BIRD	8360B	N/A	TRL 116
COAX LOAD, 1W, BNC, 50Ω, dc - 1GHz (min)	SUHNER	65BNC - 50 - 0 - 1	N/A	TRL 117
AE, DRG HORN, 1GHz - 18GHz	EMCO	3115	9010 - 3580	TRL 138

ANNEX B

TEST EQUIPMENT LIST

INSTRUMENT	SUPPLIER	TYPE No	SERIAL No	TRL EMC No
AE, DRG HORN, 1GHz - 18GHz	EMCO	3115	9010 - 3581	TRL 139
RF ANALYSER, 10kHz - 60GHz	TEKTRONIX	2756P	B010109	TRL 164
MULTIMETER (mc) 20kΩ / V (sens)	AVO	MODEL 8, MK.V.	0545248	TRL 169
RF SIGNAL GEN, LOW NOISE -90dBc, 10kHz - 5.4GHz	MARCONI	2042	119388 / 080	TRL 176
RANGE 2 (3 - 10m)	TRL	N/A	N/A	TRL 182
VARIAC, 230V, 10A	VARATRAN	Z710R	N/A	TRL 186
ANTENNA MAST	CHASE	HM9104	N/A	TRL 189
MULTIMETER (dig)	ISOTECH	IDM91	00606606	TRL 190
THERMOMETER & HYGROMETER	RS	212 - 146	N/A	TRL 191
AE, BICONE, 20MHz - 300MHz	CHASE	BBA 9106	N/A	TRL 193
SCOPE, 20MHz, 2CH, DIG STORAGE	BECKMAN	9302	2090044	TRL 197
AE, LOG PERIODIC, 300MHz - 1GHz	CHASE	UPA6108	1061	TRL 203
ac PSU, VARIABLE, 300V, 5A, 1kVA, 45Hz - 440Hz	MAGNUS	MP500	1108	TRL 204
TRANSFORMER, ISOLATION, 240Vac	RS	209 - 099	N/A	TRL 205
TRANSFORMER, ISOLATION, 110Vac	RS	208 - 636	N/A	TRL 206
LISN, 3ph MAINS ac	SCHWARZBECK	NSKL8128	8128151	TRL 207
COAX LOAD, 5W, BNC, 50Ω, dc - 4GHz	BIRD	80BNCM	5866	TRL 223
dc PSU, VARIABLE, 15/30V, 2/1A, 30W	WIER	731	88829	TRL 224
VARIAC, 230V, 2A	REGULAC	RB3 - MT	N/A	TRL 225
VARIAC, 230V, 2A	REGULAC	RB3 - MT	N/A	TRL 226
THERMOMETER & HYGROMETER	RS	212 - 124	227	TRL 227
THERMOMETER & HYGROMETER	RS	212 - 124	228	TRL 228
THERMOMETER & HYGROMETER	RS	212 - 124	229	TRL 229

ANNEX B

TEST EQUIPMENT LIST

INSTRUMENT	SUPPLIER	TYPE No	SERIAL No	TRL EMC No
THERMOMETER & HYGROMETER	RS	212 - 124	230	TRL 230
THERMOMETER & HYGROMETER	RS	212 - 124	231	TRL 231
AE, LOG PERIODIC, 300MHz - 1GHz	EMCO	3146	N/A	TRL 233
dc PSU, VARIABLE, (2x) 32V, 3A, 100W	THURLBY THANDAR	PL330	046542	TRL 235
LF / HF RECEIVER, 9kHz - 30MHz	ROHDE&SCHWARZ	ESHS20	837960 / 003	TRL 237
LISN, ac MAINS	ROHDE&SCHWARZ	ESHS3 - Z5	839135 / 013	TRL 238
MULTIMETER, (dig)	ISOTECH	IDM97	32202147	TRL 239
THERMOMETER & BAROMETER	RS	216435	N/A	TRL 240
COAX CABLE, 50Ω, 18GHz, TNC, 1.25m	W L GORE	3390 / 265 / 1	8420202	TRL 249
COAX CABLE, 50Ω, 18GHz, TNC, 1.25m	W L GORE	3390 / 265 / 1	8420223	TRL 250
AE, BICONE, 20MHz - 300MHz	CHASE	VBA6106A	1193	TRL 251
AE, EASY 1, 30MHz - 1GHz	FARNELL	S30280	017	TRL 253
RF SIGNAL GEN, LOW NOISE -90dBc, 10kHz - 5.4GHz	MARCONI	2042	119562 / 021	TRL 254
SCOPE, 400MHz, 4CH, DIG STORAGE	TEKTRONIX	TDS460A	B020781	TRL 258
RF SIGNAL GEN, 10kHz - 1GHz	MARCONI	2022D	119224 - 023	TRL 264
MULTIMETER, (dig)	ISOTECH	IDM97 RMS	32202307	TRL 273
AE, BILOG, 20MHz - 2GHz	CHASE	CBL6112	2098	TRL 274
COAX ADAPTOR, 18GHz, TNC / N	ROSENBERGER	05S106 - K0053	N/A	TRL 275
COAX ADAPTOR, 18GHz, TNC / N	ROSENBERGER	05S106 - K0053	N/A	TRL 276
COAX ADAPTOR, 18GHz, TNC / N	ROSENBERGER	05S106 - K0053	N/A	TRL 277
COAX ADAPTOR, 18GHz, TNC / N	ROSENBERGER	05S106 - K0053	N/A	TRL 278
COAX CABLE, 18GHz, N, 0.5M	ROSENBERGER	RTK161 - GP - Nm90 - 50cms	N/A	TRL 279
COAX CABLE, 18GHz, N, 3.0M	ROSENBERGER	RTK161 - GP - Nm90 - 300cms	N/A	TRL 280

ANNEX B

TEST EQUIPMENT LIST

INSTRUMENT	SUPPLIER	TYPE No	SERIAL No	TRL EMC No
COAX CABLE, 50Ω, 4GHz, N, 12m	TRL	WESTFLEX 103	N/A	TRL 286
COAX CABLE, 50Ω, 4GHz, N, 12m	TRL	WESTFLEX 103	N/A	TRL 287
LISN, ac MAINS	ROHDE&SCHWARZ	ESH3 - Z5	837469 / 010	TRL 289
AE, BILOG, 20MHz - 1GHz	CHASE	CBL6111B	1945	TRL 290
MULTIMETER (dig)	ISOTECH	IDM97 RMS	32202547	TRL 291
MULTIMETER (dig)	ISOTECH	IDM97 RMS	32202565	TRL 292
THERMOMETER & BAROMETER	RS	216435	N/A	TRL 293
COAX CABLE, 50Ω, 26.5GHz, SMA, 2m, c/w 3 ADAPTORS	GORE	145	MFR65474	TRL 308
V / UHF RECEIVER, 20MHz - 1GHz	ROHDE&SCHWARZ	ESVS10	837948 / 003	TRL 317
RF PULSE LIMITER	ROHDE&SCHWARZ	ESH3Z2	A400	TRL 318
RF SIGNAL GEN, 9kHz - 1.2GHz	MARCONI	2023	112224 / 036	TRL 320
AE, LOG PERIODIC, 300MHz - 1GHz	CHASE	UPA6108	1016	TRL 344
V / UHF RECEIVER, 20MHz - 1GHz	ROHDE&SCHWARZ	ESVS10	844594 / 0003	TRL 352
LF / HF RECEIVER, 9kHz - 30MHz	ROHDE&SCHWARZ	ESHS10	844077 / 019	TRL 353
COAX CABLE, 50Ω, 4GHz, N, 0.5m	TRL	NA	NA	TRL 358
COAX CABLE, 50Ω, 4GHz, N, 16m	TRL	NA	NA	TRL 359
COAX CABLE, 50Ω, 4GHz, N, 1m	TRL	NA	NA	TRL 360
THERMOMETER & HYGROMETER	RS	204 - 072	NA	TRL 363
THERMOMETER & HYGROMETER	RS	204 - 072	NA	TRL 364
THERMOMETER & HYGROMETER	RS	204 - 072	NA	TRL 365
THERMOMETER & HYGROMETER	RS	204 - 072	NA	TRL 366
V / UHF RECEIVER, 20MHz - 1GHz	ROHDE&SCHWARZ	ESVS20	838804 / 005	TRL 415
RF ANALYSER, 9kHz - 1GHz	WAYNE KERR	SSA1000A	9800001488	TRL 416

ANNEX B

TEST EQUIPMENT LIST

INSTRUMENT	SUPPLIER	TYPE No	SERIAL No	TRL EMC No
LF / HF RECEIVER, 9kHz - 30MHz	ROHDE&SCHWARZ	ESHS10	830051 / 001	TRLUH 03
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE&SCHWARZ	HFH - Z2	892246 / 023	TRLUH 23
RF ANALYSER, dc - 26.5GHz	MARCONI	2380	152089 / 009	TRLUH 120
		2386	152076 / 044	

ANNEX C

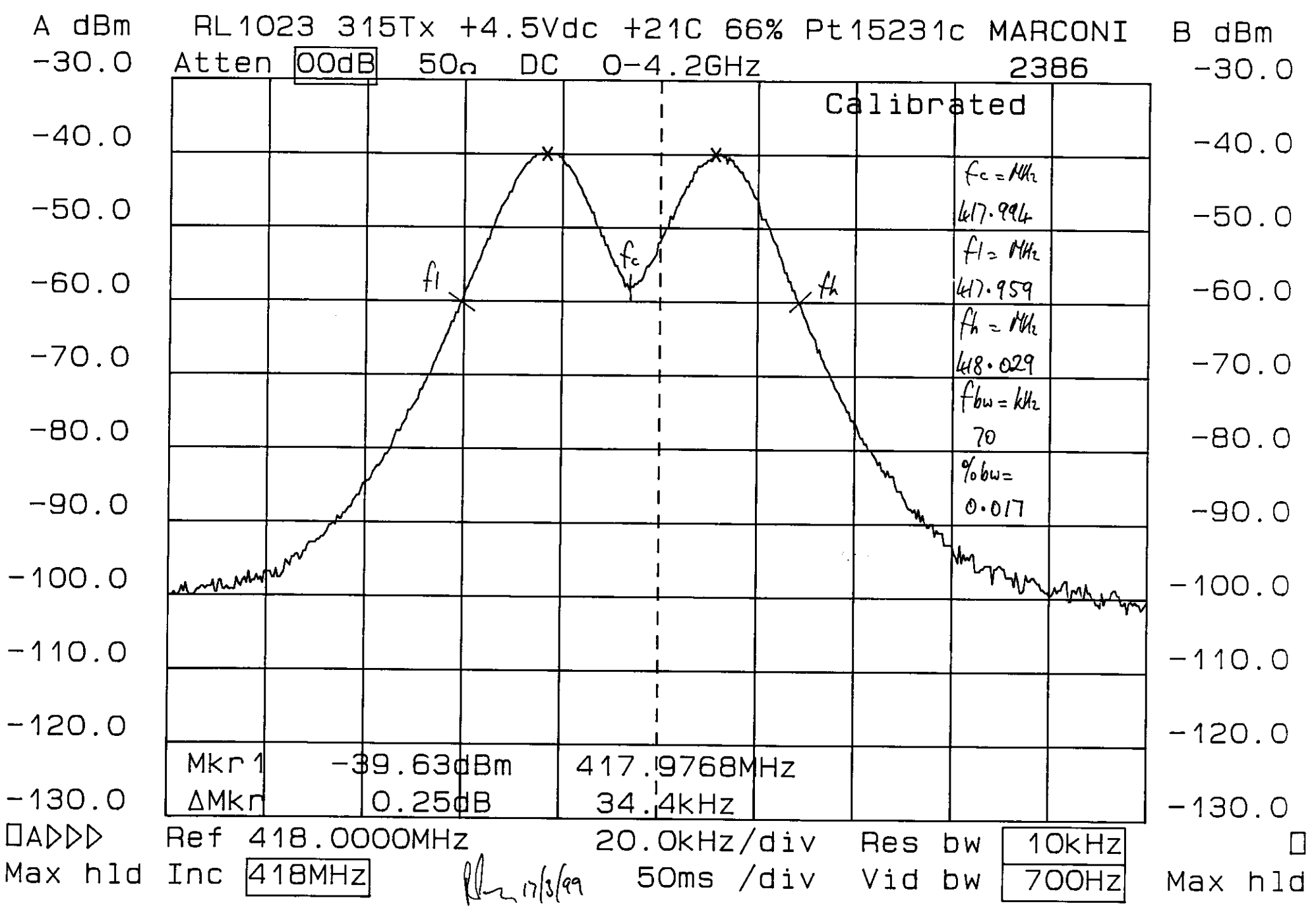
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

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

ANNEX E

TRANSMITTER CARRIER BANDWIDTH GRAPH(s)

Appended graphical page(s) follow(s)


A dBm
RL1023 315Tx +4.5Vdc +21C 66% Pt15231c MARCONI
B dBm
Atten 00dB 50Ω DC 0-4.2GHz
2386
Calibrated
fc = MHz
417.994
f1 = MHz
417.959
fh = MHz
418.029
fbw = kHz
70
%bw=
0.017
f1
fc
fh
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-100.0
-110.0
-120.0
-130.0
Mkr1 -39.63dBm 417.9768MHz
ΔMkr 0.25dB 34.4kHz
Ref 418.0000MHz
20.0kHz/div
Res bw 10kHz
Max hld
Inc 418MHz
17/3/99
50ms /div
Vid bw 700Hz
Max hld