

TRL EMC Limited

TRL EMC Limited

Long Green, Forthampton
Gloucester GL19 4QH

Telephone 01684 833818

International +44 1684 833818

Fax 01684 833858

TEST REPORT NO: 7314/202

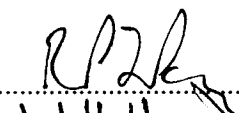
DATE: 28-2-96

COPY NO: 1

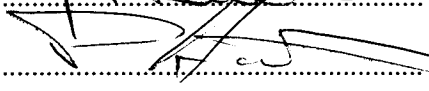
ISSUE NO: 1

REPORT ON THE
RADIO TYPE APPROVAL TESTING OF AN
ACR ELECTRONICS INC
MODEL RLB30 EPIRB TRANSMITTER
SAMPLE #5
WITH RESPECT TO
THE ETS 300.152 (DEC 1991) SPECIFICATION

TEST DATE: 4 - 14 DECEMBER 1995
24 JANUARY - 1 FEBRUARY 1996

TESTED BY:  R P I PARRY

CHECKED BY:  M H HEAVEN

APPROVED BY:  P G HARRIS

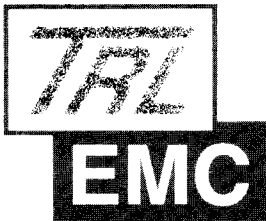


CONTENTS

	PAGE	
CONTENTS	2	
DISTRIBUTION LIST	3	
CERTIFICATE OF CONFORMITY	4	
APPLICANT'S SUMMARY	5	
EQUIPMENT SUMMARY	6	
EQUIPMENT TEST CONDITIONS	7	
TESTS REQUIRED	- SECTION 1 - PERFORMANCE	8
	- SECTION 2 - CHARACTERISTICS	9
TEST RESULTS	- SECTION 1 - PERFORMANCE	10-14
	- SECTION 2 - CHARACTERISTICS	15-26
PHOTOGRAPHS	ANNEX A	[X]
PHOTOGRAPH No 1: Tx, Front View, Test Jig & Battery	ANNEX A-1	
PHOTOGRAPH No 2: Tx, Top Panel	ANNEX A-2	
PHOTOGRAPH No 3: Tx, PCB, Top	ANNEX A-3	
PHOTOGRAPH No 4: Tx, PCB, Bottom	ANNEX A-4	
EXHIBIT No 1: Tx, Labels (Samples)	ANNEX A-5	
TEST EQUIPMENT LIST	ANNEX B	[X]
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST	ANNEX C	[X]
ZERO SPAN SPECTRUM ANALYSER GRAPHS	ANNEX D	[X]

Notes

1. By arrangement with the UK DTI Radiocommunications Agency all tests were carried out on non-interference frequency of 121.65MHz.
2. Refer to the Cape Environmental Engineering Ltd, Report No: 6239 for the environmental testing to paragraphs 3.8 & 4.9 of ETS 300.152 (DEC 1991).
- 3a. Component failure during test YES ☐
NO ☒
- 3b. If Yes, details of failure:-
- 4 All measurement uncertainty calculations detailed in this report are carried out in accordance with DEF STAN 00-26, Issue 2 for a 95% confidence level.



TRL EMC Limited

TRL EMC Limited

Long Green, Fordingham
Gloucester GL19 4QH

Telephone 01684 833818

International +44 1684 833818

Fax 01684 833858

ETS 300.152 (DEC 1991)
CERTIFICATE OF CONFORMITY/COMPLIANCE

PURPOSE OF TEST: RADIO TYPE APPROVAL

TEST SPECIFICATION: ETS 300.152 (DEC 1991)

EQUIPMENT TYPE: EPIRB (TRANSMITTER)

EQUIPMENT(S) UNDER TEST: MODEL RLB30

EQUIPMENT SERIAL NO: SAMPLE #5

EQUIPMENT TEST FREQUENCY: 121.650MHz

EQUIPMENT OPERATING FREQUENCY: 121.500MHz

TRANSMITTER Phom: -2dBW RADIATED PEP

TEST RESULT: COMPLIANT TO SPECIFICATION

APPLICANT: ACR ELECTRONICS INC
5757 RAVENSWOOD ROAD
FORT LAUDERDALE
FLORIDA
33312-6645
U.S.A

ORDER NO: P44-210-00

DATE OF TEST: 4 - 14 DECEMBER 1995
24 JANUARY - 1 FEBRUARY 1996

TESTED BY: R P I PARRY

APPROVED BY: M H HEAVEN
GENERAL MANAGER



APPLICANT'S SUMMARY

PURPOSE OF TEST: RADIO TYPE APPROVAL

TEST SPECIFICATION: ETS 300.152 (DEC 1991)

RESULT OF TEST: COMPLIANT YES ☒ [X]
NO ☐ []

CATEGORY OF APPLICANT: (a) MANUFACTURER ☒ [X]
(b) IMPORTER ☐ []
(c) DISTRIBUTOR ☐ []
(d) AGENT ☐ []

APPLICANT'S ORDER NO: P44-210-00

APPLICANT CONTACT PERSON: CAL HAVENS

APPLICANT:
ADDRESS: ACR ELECTRONICS LTD
5757 RAVENSWOOD ROAD
FORT LOUDERDALE
FLORIDA
33312

TEL: 001-305-981-3333, Extension:125

FAX: 001-305-983-5087

MANUFACTURER:
ADDRESS: ACR ELECTRONICS LTD
5757 RAVENSWOOD ROAD
FORT LOUDERDALE
FLORIDA
33312

TEL: 001-305-981-3333, x 125

FAX: 001-305-983-5087

EUT(S) COUNTRY OF ORIGIN: USA

TEST LABORATORY: TRL EMC LTD

NAMAS ACCREDITATION NO: 0728

DATE OF TEST: 4 - 14 DECEMBER 1995
24 JANUARY - 1 FEBRUARY 1996

TEST REPORT No: 7314/202

EQUIPMENT SUMMARY

EQUIPMENT(S) UNDER TEST (EUT):	RLB30	
EQUIPMENT TYPE(S):	EPIRB (TRANSMITTER)	
EUT ITU CLASS OF EMISSION:	3K20A3X	
EUT TEST FREQUENCY:	121.650MHz	
SERIAL NUMBER(S) OF EUT(S):	S/No: SAMPLE #5	
EUT CLASS:	LOCATING VESSELS	☒
	MAN OVERBOARD	☐
EUT ANTENNA TYPE:	FIXED	☐
	EXTENDABLE	☒
EUT OPERATING FREQUENCY:	121.5MHz	☒
	243.0MHz	☐
EUT FREQUENCY CATEGORY:	SINGLE FREQUENCY	☒
	TWO FREQUENCY	☐
EUT POWER SOURCE(S):	SUPPLY VOLTS = 6.0V	
	BATTERY TYPE = LITHIUM	
EUT TRANSMIT RF DUTY:	CYCLE = 52%	
	PERIOD = 2.14 seconds	
EUT RF OUTPUT:	CONTINUOUS	☐
	INTERMITTENT	☒
EUT AUDIO FREQUENCY SWEEP:	START = 1509Hz	
	STOP = 437Hz	
	RATE = 2.8Hz	
	MOD = 100%	
	CYCLE = 52%	
EUT SHIPS IDENTITY:	YES	☐
	NO	☒
EUT SHIPS ID AUTOMATIC:	YES	☐
	NO	☒
EUT TEST FACILITY:	YES	☐
	NO	☒

EQUIPMENT TEST CONDITIONS - CLAUSES 2.5 & 3

EQUIPMENT SERIAL/MODEL NUMBER	CHANNEL NUMBER	TX NOMINAL FREQUENCY (MHz)	TX NOMINAL FREQUENCY (MHz)	TESTS REQUIRED	REMARKS
RLB30 #5	1	121.650	n/a	Full	Single Frequency

2. Supply Voltages: (Tx) Vnom = +5.50VDC
Vmin = +4.92VDC
Vmax = +6.09VDC
3. Temperatures: Tnom = [See Test]
Tmin = -20° C []
= -10° C [X]
Tmax = +55° C [X]
4. Maximum Audio Frequency: Hz = 1509
5. Maximum Audio Sweep: Hz = 2.8
6. Battery: CAPACITY, 24Hrs [X]
CAPACITY, 6Hrs []
EXPIRY DATE [YES]
REVERSE SUPPLY
PROTECTION [YES]

THE FOLLOWING TESTS ARE REQUIRED.

SECTION 1 - PERFORMANCE

<u>CLAUSE</u>	<u>PARAMETER</u>	<u>PAGE NUMBER</u>
3.8	Transmitter Environmental Checks	
	Frequency Error	[11]
	Carrier Power	[12]
	Modulation Depth	[13]
	Modulation Cycle	[14]
	<u>CEPT T/R 34-01, Annex VI</u>	
	Paragraph 4 Vibration	[1a]
	Paragraph 5.1 Dry Heat Cycle	[1b]
	Paragraph 6 Damp Heat Cycle	[1c]
	Paragraph 7.1 Low Temperature Cycle	[1d]
3.8	Immersion, Non-Operating	[1e]
3.8.1	Drop Immunity	[1e]

Notes:-

1. All performance and environmental tests were carried out with a Battery fitted.
2. Tmin and Tmax are as required in CEPT T/R 34-01, Annex VI.
3. During all tests the visual indicator lamp operated.
4. During all tests the demodulated audio signature heard from the monitoring test equipment (TRL 05) was the expected 2:1 RF, four cycle, falling audio sweep.
5. During all of the vibration tests the EUT was not suspended.
6. During all of the vibration tests the only marked resonance was noticed at the antenna tip.
7. There was no mechanical deterioration due to the vibration tests.
8. There was no mechanical damage, internal or external, or signs of water penetration on the completion of clause 3.8 environmental tests.

THE FOLLOWING TESTS ARE REQUIRED

SECTION 2 - CHARACTERISTICS

PAGE NUMBER

<u>CLAUSE</u>	<u>PARAMETER</u>	<u>Normal</u>	<u>Extreme</u>
2.5	Battery Capacity (24Hrs)	[16]	[17/18]
4.0	TRANSMITTER CHARACTERISTICS		
4.1	Transmitter Frequencies	[19]	
4.2	Transmitter Frequency Error	[20]	[20]
4.3	Transmitter Class of Emissions	[21]	
4.4	Transmitter Modulation	[22]	
4.5	Transmitter Radiated Polarisation	[23]	
4.6	Transmitter Radiated Peak Envelope Power	[24]	[24]
4.7	Transmitter Test Facility Radiation	[n/a]	
4.8	Transmitter Spurious Emissions (Radiated) - Operating	[25]	
4.9	Transmitter Protection (Immersion, Operating)	[26]	

Notes:-

1. Clause 4.7 is not applicable as this facility is not available on this equipment.
2. Tmin and Tmax are as stated on page 7.
3. Unless otherwise stated, voltages are as stated on page 7.

SECTION 1 - PERFORMANCE

3.8 TRANSMITTER ENVIRONMENTAL TESTS

TRANSMITTER FREQUENCY ERROR - CLAUSE 3.8

RHnom = 52% (1a)
= 42% (1e)

Method: RTP50 [X]
RTP70 []

Tnom = +19°C (1a)
= +20°C (1e)

Tx Pnom = -2dBW pep

Channel		1a	1b	1c	1d	1e
T _{nom}	V _{nom}	121.649500 MHz	n/a	n/a	n/a	121.648700 MHz
T _{min}	V _{nom}	n/a	n/a	n/a	121.648800 MHz	n/a
T _{max}	V _{nom}	n/a	121.649500 MHz	121.649300 MHz	n/a	n/a
Max Freq Error	Normal or Extreme	-500Hz	-500Hz	-700Hz	-1200Hz	-1300Hz
Limit Clause 4.2.3	Normal or Extreme	± 3500Hz				
Measurement Uncertainty		± 2.7 x 10 ⁻⁷ Hz [X]; ± 0.0002% ± 200Hz []				

Test Equipment Used

Full description at Annex B TRL05, TRL239, TRL191

Remarks

1. The ambient conditions during the drop test were, +16°C & 47%.
2. During and after the vibration tests (channel 1a) the frequency did not change from that recorded above.

TRANSMITTER CARRIER POWER (RADIATED) - CLAUSE 3.8

RHnom = 52% (1a)
= 42% (1e)

Method: RTP68 & 51

Tnom = +19° C (1a)
= +20° C (1e)

Tx Pnom = -2dBW pep

Channel		1a	1b	1c	1d	1e
T _{nom}	V _{nom}	* -8.5dBW	n/a	n/a	n/a	* -8.4dBW
T _{min}	V _{nom}	n/a	n/a	n/a	* -9.5dBW	n/a
T _{max}	V _{nom}	n/a	* -8.3dBW	Radiation Confirmed	n/a	n/a
Max Power	Normal or Extreme	+8.7dB	+8.9dB	Not Recorded	+7.7dB	+8.8dB
Limit Clause 4.6.3	Normal or Extreme	> -11.2dBW PEP > -17.2dBW MEAN *				
Measurement Uncertainty		± 4.2dB				

Test Equipment Used

Full description at Annex B TRL05, TRL239, TRL191

Remarks

1. The ambient conditions during the drop test were, +16° C & 47%.
2. The results where indicated are Mean Radiated Power (*).
3. Test "Channel 1c" was carried out as a close coupled indication and did not use the Conducted Power test jig facility. This was necessary as the equipment has to be sealed due to the condensation requirement, therefore not allowing any direct access to the EUT's PCB.
4. During and after the Vibration tests (channel 1a) the power did not change from that recorded above.

TRANSMITTER MODULATION DEPTH - CLAUSE 3.8

RH_{nom} = 52% (1a)
= 42% (1e)

Method: RTP52

T_{nom} = +19° C (1a)
= +20° C (1e)

Tx P_{nom} = -2dBW pep

Channel		1a	1b	1c	1d	1e
T _{nom}	V _{nom}	100%	n/a	n/a	n/a	100%
T _{min}	V _{nom}	n/a	n/a	n/a	100%	n/a
T _{max}	V _{nom}	n/a	100%	100%	n/a	n/a
Max Depth	Normal or Extreme	+15%	+15%	+15%	+15%	+15%
Limit Clause 4.4.4	Normal or Extreme	> 85%				
Measurement Uncertainty		± 6.2%				

Test Equipment Used

Full description at Annex B TRL05, TRL239, TRL191, TRL197

Remarks

1. The ambient conditions during the drop test were, +16° C & 47%.
2. During and after the Vibration tests (channel 1a) the modulation did not change from that recorded above.

TRANSMITTER MODULATION CYCLE - CLAUSE 3.8

RH_{nom} = 52% (1a)
= 42% (1e)

Method: RTP79

T_{nom} = +19° C (1a)
= +20° C (1e)

Tx P_{nom} = -2dBW pep

Channel		1a	1b	1c	1d	1e
T _{nom}	V _{nom}	51%	n/a	n/a	n/a	51%
T _{min}	V _{nom}	n/a	n/a	n/a	51%	n/a
T _{max}	V _{nom}	n/a	51%	51%	n/a	n/a
Limit Clause 4.4.4	Normal or Extreme	> 50% < 70%				
Measurement Uncertainty		± 5%				

Test Equipment Used

Full description at Annex B TRL05, TRL239, TRL191, TRL197

Remarks

1. The ambient conditions during the drop test were, +16° C & 47%.
2. During and after the Vibration tests (channel 1a) the modulation did not change from that recorded above.

SECTION 2 - CHARACTERISTICS

2.5 BATTERY CAPACITY (24HR)

4.0 TRANSMITTER CHARACTERISTICS

BATTERY CAPACITY (24HRS) - CLAUSE 2.5 (NORMAL TEMPERATURE)

Tnom = 24°C
RHnom = 30%

Method: RTP70
Channel = 1

Power	Start	-1.9dBW
	Finish	-2.1dBW
Frequency	Start	121.649500MHz
	Finish	121.649500MHz
Period On	Start	2.103 seconds
	Finish	2.111 seconds
Period Off	Start	1.032 seconds
	Finish	1.016 seconds
Period Ratio	Start	2.038: 1
	Finish	2.078: 1
Sweep	Start	2.864Hz
	Finish	2.864Hz
Supply Voltage	Start	+5.80V
	Finish	+5.62V

Limit Clauses 4.1 4.2.3 4.6.3	Power	> -11.2dBW pep (> 75mW pep)
	Frequency	± 3500Hz; wrt 121.65MHz
	Period	> 2 < 5 seconds (On)
	Ratio	> 2 : 1 (On/Off)
	Sweep	> 2 < 4Hz
Measurement Uncertainty		± 1.9dB; ± 0.0002%; ± 200Hz

Test Equipment Used

Full description at Annex B TRL164, TRL165, TRL166, TRL239, TRL191, TRL11

Remarks

BATTERY CAPACITY (24HRS) - CLAUSE 2.5 (LOW TEMPERATURE)

Tnom = -10°C
RHnom = 60% to 80%

Method: RTP70
Channel = 1

Power	Start	-1.3dBW
	Finish	-1.9dBW
Frequency	Start	121.649000MHz
	Finish	121.648873MHz
Period On	Start	2.095 seconds
	Finish	2.111 seconds
Period Off	Start	1.024 seconds
	Finish	1.016 seconds
Period Ratio	Start	2.046: 1
	Finish	2.078: 1
Sweep	Start	2.864Hz
	Finish	2.864Hz
Supply Voltage	Start	+5.50V
	Finish	+5.30V

Limit Clauses 4.1 4.2.3 4.6.3	Power	> -11.2dBW pep (> 75mW pep)
	Frequency	± 3500Hz; wrt 121.65MHz
	Period	> 2 < 5 seconds (On)
	Ratio	> 2 : 1 (On/Off)
	Sweep	> 2 < 4Hz
Measurement Uncertainty		± 1.9dB; ± 0.0002%; ± 200Hz

Test Equipment Used

Full description at Annex B TRL164, TRL165, TRL166, TRL239, TRL191, TRL11

Remarks

BATTERY CAPACITY (24HRS) - CLAUSE 2.5 (HIGH TEMPERATURE)

Tnom = +55°C
RHnom = <10%

Method: RTP70
Channel = 1

Power	Start	-1.1dBW
	Finish	-1.1dBW
Frequency	Start	121.649600MHz
	Finish	121.649537MHz
Period On	Start	2.111 seconds
	Finish	2.111 seconds
Period Off	Start	1.016 seconds
	Finish	1.016 seconds
Period Ratio	Start	2.078: 1
	Finish	2.078: 1
Sweep	Start	2.864Hz
	Finish	2.864Hz
Supply Voltage	Start	+6.00V
	Finish	+5.79V

Limit Clauses 4.1 4.2.3 4.6.3	Power	> -11.2dBW pep (> 75mW pep)
	Frequency	± 3500Hz; wrt 121.65MHz
	Period	> 2 < 5 seconds (On)
	Ratio	> 2 : 1 (On/Off)
	Sweep	> 2 < 4Hz
Measurement Uncertainty		± 1.9dB; ± 0.0002%; ± 200Hz

Test Equipment Used

Full description at Annex B TRL164, TRL165, TRL166, TRL239, TRL191, TRL11

Remarks

TRANSMITTER FREQUENCIES - CLAUSE 4.1

Tnom = +22°C
RHnom = 46%
Vnom = +5.5V

Method : RTP70
Tx Pnom = -2dBW pep
Channel = 1

Frequency		121.650MHz
Duty Cycle		2.11: 1
On Period		2.127 seconds
Off Period		1.008 seconds
Limit Clause 4.1	Duty Cycle	> 2:1
	On Period	> 2 < 5 seconds
Measurement Uncertainty		$\pm 0.0002\%$ $\pm 200\text{Hz}$

Test Equipment Used

Full description at Annex B TRL164, TRL165, TRL166, TRL239, TRL05, TRL176, TRL191

Remarks

See Annex D for Zero Span Spectrum Analyser Graphs.

TRANSMITTER FREQUENCY ERROR - CLAUSE 4.2

RHnom = 48%

Method: RTP50 [X]

RTP70 [X]

Tx Pnom = -2dBW pep

Channel		1				
T = nom +23°C	V nom	121.6490 MHz				
T min	V min	121.6485 MHz				
	V max	121.6509 MHz				
T max	V min	121.6486 MHz				
	V max	121.6492 MHz				
Max Freq Error	Normal	+ 1000Hz				
	Extreme	+ 900Hz - 1500Hz				
Limit Clause 4.2.3	Normal or Extreme	± 3500Hz				
Measurement Uncertainty		± 2.7 x 10 ⁻⁷ Hz [X]; ± 0.0002% ± 200Hz []				

Test Equipment Used

Full description at Annex B TRL05, TRL239, TRL191, TRL11, TRL164, TRL165,
TRL166, TRL176

Remarks

1. TRL05 used as a frequency standard.
2. +4°C (open area test site) and +23°C results are identical.

TRANSMITTER CLASS OF EMISSION - CLAUSE 4.3

Tnom = +22°C
RHnom = 49%
Vnom = +5.5V

Method : RTP70 & 79
Tx Pnom = -2dBW pep
Channel = 1

Emission Class		A3X
Audio Start		1509Hz #
Audio Stop		437Hz #
Sweep Range		1072Hz #
Sweep Rate		2.764 sps *
Ships Identity		No
Limit Clause 4.3	Start	< 1600Hz
	Stop	> 300Hz
	Range	> 700Hz
	Rate	> 2 < 4 per second
Measurement Uncertainty		$\pm 0.0002\%$ *
		$\pm 5\%$ #

Test Equipment Used

Full description at Annex B TRL164, TRL165, TRL166, TRL239, TRL05, TRL176, TRL191

Remarks

See Annex D for Zero Span Spectrum Analyser Graphs.

TRANSMITTER MODULATION - CLAUSE 4.4

Tnom = +22°C
RHnom = 49%
Vnom = +5.5V

Method : RTP88
Tx Pnom = -2dBW pep
Channel = 1

Modulation Depth		100%
Modulation Duty Cycle		50.88%
Limit Clause 4.4.4	Depth	> 85%
	Cycle	> 50% < 70%
Measurement Uncertainty		$\pm 5\%$

Test Equipment Used

Full description at Annex B TRL197, TRL191, TRL239

Remarks

1. A Sayrosa Modulation Meter, Model 252C, Serial No 1621, was used to provide an intermediate frequency of 420kHz input to the Digital Storage Oscilloscope (TRL197) in order to display the RF modulation envelope.

TRANSMITTER RADIATED POLARISATION - CLAUSE 4.5

Tnom = +4°C
RHnom = 92%
Vnom = +5.5V

Method : RTP68
Channel = 1

Power Output Vertical Polarisation		-1.9dBW
Power Output Horizontal Polarisation		-36.3dBW
Power Variation Vertical Polarisation		<0.5dB
Antenna Electrical Length		(0.64m) 0.2595λ
Limit Clause 4.5	Power	> -11.2dBW pep (erp)
	Polarisation	> 20dB (Vertical & Horizontal)
	Length	> 0.25 < 0.625λ
Measurement Uncertainty		± 4.2 dB

Test Equipment Used

Full description at Annex B TRL08, TRL176, TRL239, TRL191, TRL23

Remarks

TRANSMITTER RADIATED PEAK ENVELOPE POWER - CLAUSE 4.6

RHnom = 48%

Method : RTP68 & 70

Distance = 3m

Tx Pnom = -2dBW pep

Polarisation, Vertical ☒

Horizontal ☐

Channel		1				
T = nom +23°C	V nom	* -1.9dBW				
T min	V min	# -2.9dBW				
	V max	# -1.3dBW				
T max	V min	# -2.9dBW				
	V max	# -1.1dBW				
Max Power	Normal	+ 9.3dB				
	Extreme	+10.1dB				
Limit Clause 4.6.3	Normal or Extreme	> -11.2dBW pep (> 75mW pep)				
Measurement Uncertainty		± 4.2dB (*) ± 1.9dB (#)				

Test Equipment Used

Full description at Annex B TRL239, TRL23, TRL191, TRL11, TRL08, TRL176, TRL164, TRL165, TRL166

Remarks

1. All results in peak envelope power (pep).
2. +4°C (open area test site) and +23°C results are identical.

TRANSMITTER SPURIOUS EMISSIONS (RADIATED) - CLAUSE 4.8

Tnom = +4°C

Method: RTP71

RHnom = 92%

Tx Pnom = -2dBW pep

Vnom = +5.5V

Channel = 1

Distance = 3m

Spurious Frequency and Level 108-137MHz	108.225MHz 109.120MHz 110.910MHz 111.805MHz 112.700MHz 113.595MHz 114.490MHz 115.385MHz 116.280MHz 117.175MHz 118.070MHz 118.965MHz 122.545MHz 123.440MHz	-107.8dBW -105.8dBW - 86.5dBW - 94.3dBW - 95.1dBW - 98.9dBW - 88.7dBW - 94.5dBW - 98.3dBW - 94.1dBW - 83.9dBW - 85.2dBW - 80.9dBW - 90.3dBW
Spurious Frequency and Level 156-162MHz	nil	nil
Spurious Frequency and Level 406-406.1MHz	nil	nil
Spurious Frequency and Level 450-470MHz	nil	nil
Limit Clause 4.8.3	-46dBW	
Measurement Uncertainty	± 4.2dB	± 1.0kHz

Test Equipment Used

Full description at Annex B TRL239, TRL08, TRL191, TRL176, TRL23

Remarks

Sensitivities: >30MHz/<1GHz = -106dBW @ 3.0m.

TRANSMITTER PROTECTION (IMMERSION, OPERATING) - CLAUSE 4.9

Tnom = +18°C
RHnom = 44%
Vnom = +5.5V

Method : RTP68/51/52/79
Tx Pnom = -2dBW pep
Channel = 1

Power		-2.4dBW pep, -8.4dBW Mean	
Frequency		121.648700MHz	
Modulation Depth Cycle Sweep		100% 51% 2.8Hz	
Limit Clauses 4.2 4.4 4.6	Power	> -11.2dBW pep > -17.2dBW Mean	
	Frequency	± 3500Hz; wrt 121.65MHz	
	Depth	> 85%	
	Cycle	> 50% <70%	
	Sweep	> 2 <4Hz	
Measurement Uncertainty		± 4.2dB; ± 2.7 x 10 ⁻⁷ Hz; ± 5%	

Test Equipment Used

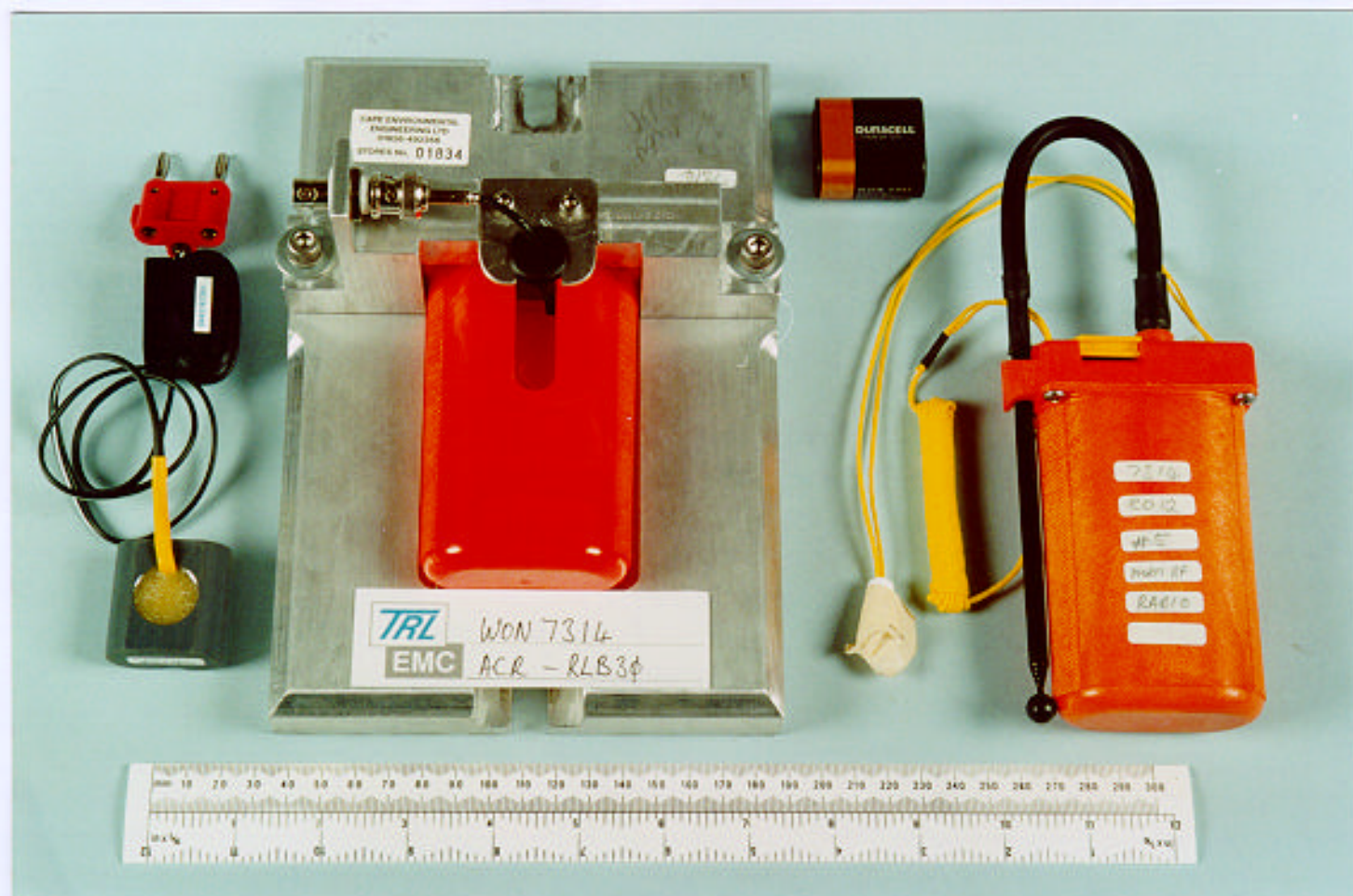
Full description at Annex B TRL05, TRL239, TRL191, TRL197

Remarks

1. Conducted power test jig facility used after immersion test..
2. The equipment operated normally upon the completion of all tests.

ANNEX A

PHOTOGRAPHS OF THE EQUIPMENT: (taken on completion of all tests)



Photograph No: Annex A-1
Title: Tx, Front View

ANNEX A

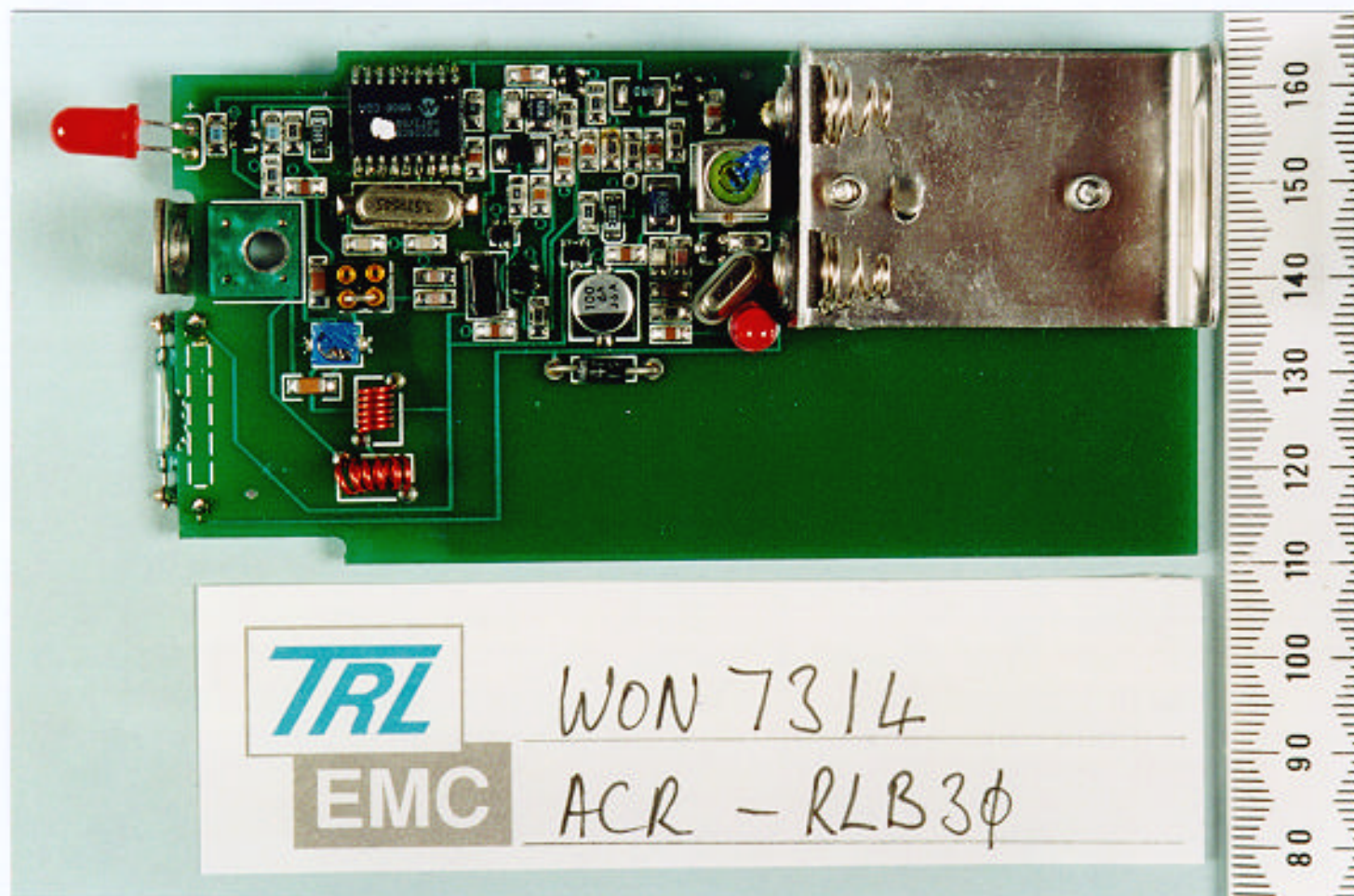
PHOTOGRAPHS OF THE EQUIPMENT:
(taken on completion of all tests)



Photograph No: Annex A-2
Title: Tx, Top Panel

ANNEX A

PHOTOGRAPHS OF THE EQUIPMENT:
(taken on completion of all tests)

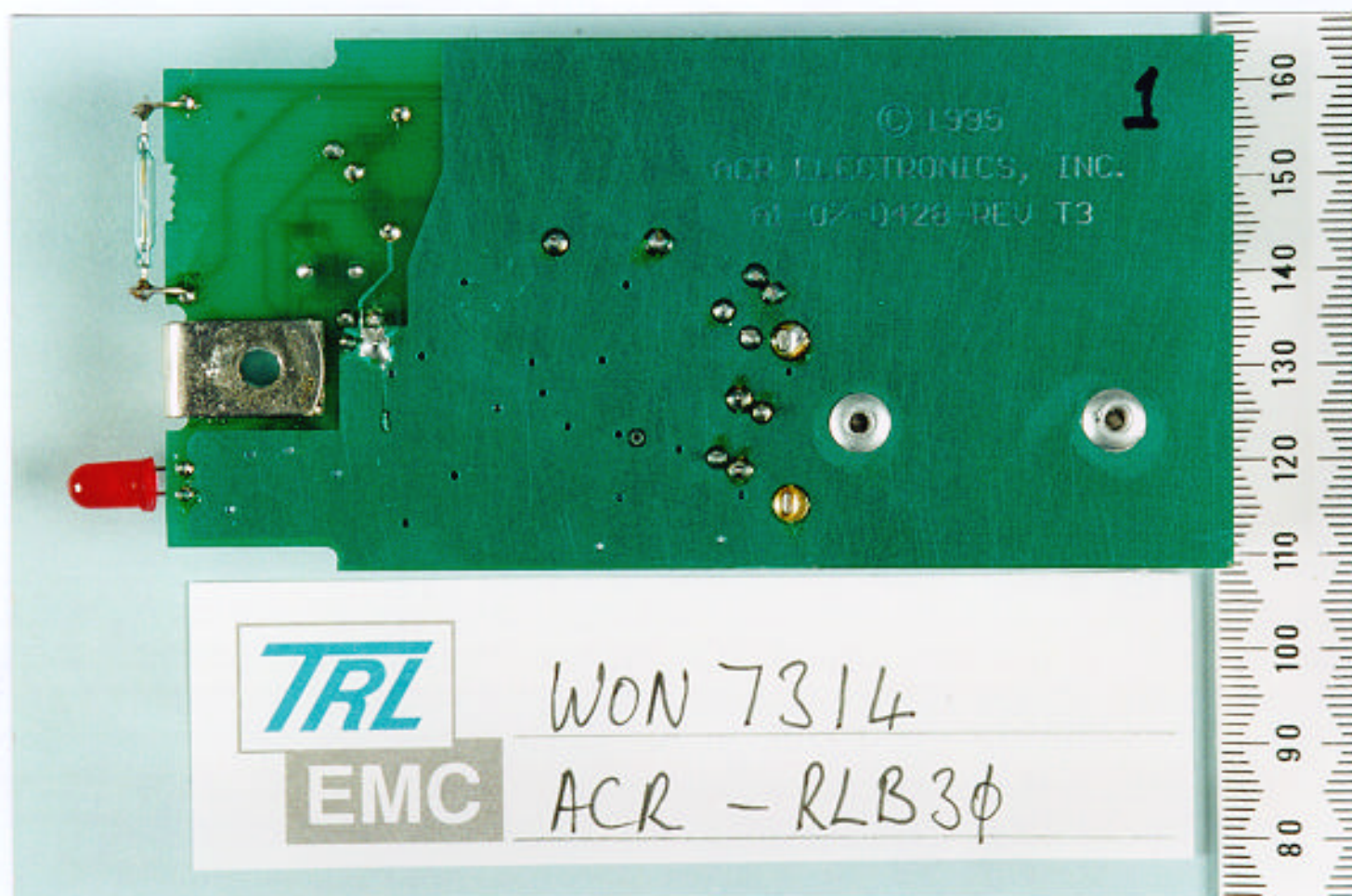


Photograph No: Annex A-3

Title: Tx, PCB, Top

ANNEX A

PHOTOGRAPHS OF THE EQUIPMENT:
(taken on completion of all tests)



Photograph No: Annex A-4
Title: Tx, PCB, Bottom

ANNEX A

EXHIBIT OF THE EQUIPMENT:



Exhibit No 1: Annex A-5
Title: Tx, Labels (Samples)

ANNEX B

TEST EQUIPMENT LIST

Instrument	Supplier	Type No	Serial No	EMC No
UHF RECEIVER 30MHz - 1GHz	CHASE	UHR4000	6014	TRL 01
AMPLIFIER	BNOS	DTX 01- 500-40	54117	TRL 02
LOG PERIODIC ANTENNA 300-1000MHz	CHASE	AK9513	9107.259	TRL 03
SPECTRUM ANALYSER 10kHz-1000MHz	TAKEDA RIKEN	TR4132	33950335	TRL 04
COMMUNICATION S ANALYSER	ROHDE AND SCHWARZ	CMTA 52	894715/003	TRL 05
LF/HF RECEIVER 9kHz-30MHz	ROHDE AND SCHWARZ	ESH2	879014/028	TRL 06
Z2 LOOP ANTENNA 9kHz-30MHz	ROHDE AND SCHWARZ	HFH2	881058-53	TRL 07
RANGE 1 (30m)	TRL	N/A	N/A	TRL 08
THERMOMETER	FLUKE	52	425255	TRL 09 TRL 1154
DIGITAL MULTIMETER	BECKMAN	3020	305223165	TRL 10
ENVIRONMENTAL CHAMBER	SHARETREE	TCC 125- 815P	CS 203	TRL 11
VARIABLE MAINS TRANSFORMER	ZENITH	100R	V265537	TRL 12
SPECTRUM ANALYSER	MARCONI	2383	152053 -042 152380-075	TRL 13 TRL 1157
FREQUENCY COUNTER	RACAL DANA	9905	9350	TRL 14 TRL 1022

ANNEX B

TEST EQUIPMENT LIST

Instrument	Supplier	Type No	Serial No	EMC No
POWER SUPPLY	TOPWARD ELECTRONIC	23010	899672	TRL 15
SIGNAL GENERATOR	ROHDE AND SCHWARZ	SMHU	883951/025	TRL 16
SIGNAL GENERATOR 10kHz-1000MHz	MARCONI	2022	119022/205	TRL 17
COAXIAL ATTNEUATOR	TENULINE	8343-200	2479	TRL 18
PLOTTER	GOULD	6320	WA1535	TRL 19
FREQUENCY COUNTER	RACAL DANA	9908	4119	TRL 20
UHF RECEIVER 30MHz - 1GHz	CHASE	UHR4000	6043	TRL 23
LISN	CHASE	MN2050	1535	TRL 24
LISN	CHASE	MN2050	1431	TRL 25
HF RECEIVER 150kHz-30MHz	CHASE	HFR2000	2158	TRL 26
LF RECEIVER 10kHz-150kHz	CHASE	LFR1000	1020	TRL 27
HF RECEIVER 150kHz - 30MHz	CHASE	HFR2000	2187	TRL 28
ABSORBING CLAMP	CHASE	MDS21	902008	TRL 30
POWER AMPLIFIER	ENI	603L	1240	TRL 31
VECTOR VOLTMETER 1MHz- 1GHz	HEWLETT PACKARD	8405A	838-02146	TRL 33
ANTENNA MAST	CHASE	HM9104	N/A	TRL 34

ANNEX B

TEST EQUIPMENT LIST

Instruments	Supplier	Type No	Serial No	EMC No
DIPOLE AND BALUN 30-300MHz	CHASE	VHA9103	7106	TRL 35
DIPOLE AND BALUN 30-300MHz	CHASE	VHA9103	7011	TRL 36
DIPOLE AND BALUN 300MHz-1GHz	CHASE	VHA91050	7107	TRL 37
DIPOLE AND BALUN 300MHz- 1GHz	CHASE	UHA9105	N/A	TRL 38
RF AMPLIFIER 500MHz-1.1GHz	BNOS	DTX500- 110-40-10P	54108	TRL39
EQUIPMENT CONTROLLER	CHASE	ECS000	1003	TRL 40
SPECTRUM ANALYSER 10kHz- 1000MHz	ADVENTEST	TR4132	S3950218	TRL 41
AERIAL TUNING UNIT 10kHz- 30MHz	SCHWARZBECK	FMZL1514	1514338	TRL 42
OSCILLOSCOPE	FARNELL	DT12-S	PRE-PROD	TRL 50
HYGROMETER	WEST METERS	N/A	N/A	TRL 78
THERMOMETER	BRANNON	N/A	N/A	TRL 79
HIGH POWER 50ohm ATTENUATOR, 75W-20dB N TYPE	BIRD	8308-200 20DB	MFC70998	TRL 103
LOW POWER 50ohm ATTENUATOR, 2W-3dB, BNC	BIRD	8302-030	MFC70998	TRL 104
LOW POWER 50ohm ATTENUATOR, 2W-3dB, BNC	BIRD	8302	MCF70998	TRL 105
LOW POWER 50ohm ATTENUATOR, 2W-6dB, BNC	BIRD	8302-060	MCF70998	TRL 106

TEST EQUIPMENT LIST

Instrument	Supplier	Type No	Serial No	EMC No
LOW POWER 50ohm ATTEN. 2W-6dB, BNC	BIRD	8302-060	MFC70998	TRL 107
LOW POWER 50ohm ATTEN, 2W- 10dB, BNC	BIRD	8302-100	MFC70998	TRL 108
LOW POWER 50ohm ATTEN, 2W-10dB, BNC	BIRD	8302-100	MFC70998	TRL 109
LOW POWER 50ohm ATTENUATOR, 2W-10dB, BNC	BIRD	8302-200	MFC70998	TRL 110
LOW POWER 50ohm ATTENUATOR, 2W-20dB, BNC	BIRD	8302-200	MFC70998	TRL 111
HIGH POWER 50ohm ATTENUATOR, 75W-10dB, N TYPE	BIRD	8308-100 10dB	MFC70998	TRL 112
LOW POWER 50ohm DUMMY LOAD, 2W N TYPE	BIRD	8360NM	N/A	TRL 113
LOW POWER 50ohm DUMMY LOAD, 2W N TYPE	BIRD	8360NM	N/A	TRL 114
LOW POWER 50ohm DUMMY LOAD, 2W BNC	BIRD	8360B	N/A	TRL 115
LOW POWER 50ohm DUMMY LOAD,2W BNC	BIRD	8360B	N/A	TRL 116
LOW POWER 50ohm DUMMY LOAD, 1W BNC	SUHNER	65BNC-50 -0-1	N/A	TRL 117
LOW POWER 50ohm DUMMY LOAD, 0.5W-20dB	GREENPAR	G35098/50R	N/A	TRL 118

ANNEX B

TEST EQUIPMENT LIST

Instrument	Supplier	Type No	Serial No	EMC No
RESISTIVE COUPLER, 50ohm 3 PORT, DC/2GHz 0.5W 6dB ISOLATION	ELCOM	RC-3-50	N/A	TRL 119
FILTER, BAND STOPE BAND I VHF	TRL	N/A	N/A	TRL 120
FILTER, BAND STOP BAND III VHF	TRL	N/A	N/A	TRL 121
FILTER, BAND STOP BAND IV UHF	TRL	N/A	N/A	TRL 122
ATTENUATOR 50ohm-3dB, 2W N TYPE	SUHNER	6803.17.A	N/A	TRL 135
TRIPOD, HORN	IDEX	2500	N/A	TRL 137
1-18GHz HORN	EMCO	3115	9010-3580	TRL 138
1-18GHz HORN	EMCO	3115	9010-3581	TRL 139
COUPLING CLAMP	SCHAFFNER	SL400-071	140	TRL 140
INTERFERENCE TEST SYSTEM	SCHAFFNER	NSG600	248	TRL 141
FAST TRANSIENT SIMULATOR	SCHAFFNER	NSG625	201	TRL 142
LF AMPLIFIER	TRL	N/A	143	TRL 143
EN 55020 JIG	TRL	JIG A	147	TRL 147
EN55020 JIG	TRL	JIG L	148	TRL 148
EN55020 JIG	TRL	JIG M	149	TRL 149
EN55020 JIG	TRL	JIG SR	150	TRL 150
LISN	TRL	MSF	151	TRL 151

ANNEX B**TEST EQUIPMENT LIST**

Instrument	Supplier	Type No	Serial No	EMC No
ESD GUN AND CONTACT DISCHARGE ADAPTOR	SCHAFFNER	NSG432-15	838	TRL 152
UNIVERSAL BETWEEN SERIES KIT	TRANSRADIO	Q98088	N/A	TRL 158
CURRENT 10kHz PROBE 100MHz	EATON	91550-1	2822	TRL 159
HELMHOLTZ COILS	TRL	N/A	N/A	TRL 160
PRINTER	STAR	LC24-10	343110381465	TRL 161
PLOTTER	EPSON	HI-80	012427	TRL 162
PERSONAL COMPUTER AND MONITOR	ELONEX	PC286 M-1 20	060270	TRL 163
SPECTRUM ANALYSER	TEKTRONIX	2756P	B010109	TRL 164
PLOTTER	ROLAND	DXY1100	BC19385	TRL 165
DATA CONVERTOR	GREENWICH INST.	GA234	N/A	TRL 166
30dB DIRECTIONAL COUPLER	BIRD	4278-211-3	C212D/C8722	TRL 167
30dB DIRECTIONAL COUPLING	BIRD	4278-111-3	C110D/C8722	TRL 168
MULTIMETER	AVO	MODEL 8 MK.V.	0545248	TRL 169
RESISTIVE COUPLER 50ohm, 4 PORT D/C500MHz, 0.5W, 9dB ISOLATION	ELCOM	RC-4-50	N/A	TRL 170
TX ARTIFICIAL LOAD MPT 1322	TRL	MK1	171	TRL 171
LOW POWER 50ohm ATTENUATOR, 2W-10dB, BNC	BIRD	8302-100	MFC 70998	TRL 172

ANNEX B**TEST EQUIPMENT LIST**

Instrument	Supplier	Type No	Serial No	EMC No
LOW POWER 50ohm ATTENUATOR, 2W-10dB, BNC	BIRD	8302-100	MFC 70998	TRL 173
LOW POWER 50ohm ATTENUATOR, 2W-20dB, BNC	BIRD	8302-200	MFC 70998	TRL 174
LOW POWER 50ohm ATTENUATOR, 2W-20dB, BNC	BIRD	8302-200	MFC 70998	TRL 175
LOW NOISE SIGNAL GENERATOR 10kHz-5.4GHz	MARCONI	2042	119388/080	TRL 176
COMBINATION WAVE GENERATOR	HILOTEST	CWG4-104	911399	TRL 177
AUDIO AMPLIFIER	TRL	N/A	178	TRL 178
DATA PROCESSING/ INTERFERENCE UNIT	EMCO	7110	9006-1113	TRL 179
BROAD BAND PROBE	EMCO	7122	9104-1031	TRL 180
FUNCTION GENERATOR	THURLBY THANDAR	TG210	013344	TRL 181
RANGE 2 (10m)	TRL			TRL 182
DIGITAL STORAGE OSCILLOSCOPE AND GPIB	GOULD	4035	167	TRL 183 TRL 1043
FILTER BAND STOP 900MHz	TRL	N/A	N/A	TRL 184

ANNEX B**TEST EQUIPMENT LIST**

Instrument	Supplier	Type No	Serial No	EMC No
TX DUMMY LOAD MPT 1337	TRL	N/A	N/A	TRL 185
VARIABLE MAINS TRANSFORMER	VARATRA	Z710R	N/A	TRL 186
AC/DC LINE DROPOUT AND VARIATION SIMULATOR	SCHAFFNER	NSG603A	249	TRL 187
LF AMP	TRL	N/A	N/A	TRL 188
ANTENNA MAST	CHASE	HM9104	N/A	TRL 189
DIGITAL MULTIMETER	ISOTECH	IDM91	00606606	TRL 190
HYGROMETER / THERMOMETER	RS	212-146	N/A	TRL 191
TEMCELL	TRL	N/A	N/A	TRL 192
BALUN	CHASE	BBA 9106		TRL 193
Tx ARTIFICIAL LOAD MPT1322	TRL	MK2	194	TRL 194
LAPTOP P.C.	AMSTRAD	ALT-386SX	9131160A	TRL 195

ANNEX B**TEST EQUIPMENT LIST**

HIGH POWER BICONE BALUN	SCHWARZBECK	VHBA912S	N/A	TRL 196
DIGITAL STORAGE SCOPE	BECKMAN	9302	2090044	TRL 197
50 WATT AMPLIFIER	A.R.	50A220A	12900	TRL198
15/1000NS 25/1000NS 35/3000NS SURGE GENERATOR	HAFELEY	N/A	N/A	TRL 199
COUPLING FILTER	HAFELEY	FP6/1-3	FP6-1/3- 080612-04-85	TRL 200
TEST SYSTEM CONTROL UNIT BURST TESTER	HAFELEY	PB1	PB-080743- 05-86	TRL 201
IMPULSE TESTER	HAFELEY	PU12	PU12-080599	TRL 202
LOG PERIODIC	CHASE	UPA6108	1061	TRL 203
VARIABLE PSU	MAGNUS	MP500	1108	TRL 204
240V ISOLATION TRANSFORMER	RS COMP.	209-099	N/A	TRL 205
110V ISOLATION TRANSFORMER	RS COMP.	208-636	N/A	TRL 206
3 PHASE	SCHWARZBECK	MSKL8128	N/A	TRL 207
POWER AMPLIFIER	A.R.	100W1000M1	13504	TRL 208
LOG PERIODIC	A.R.	AT1080CPA	13267	TRL 209
150ohm V NETWORK	TRL	150ohm V NETWORK	210	TRL 210
BALANCING TRANSFORMER	TRL	N/A	211	TRL 211
ESD PLUG IN	SCHAFFNER	402-568	9043	TRL 212
BAROMETER	N/A	N/A	N/A	TRL 213

ANNEX B**TEST EQUIPMENT LIST**

Instrument	Supplier	Type No	Serial No	EMC No
CS02 JIG	TRL	N/A	461CS2PS	TRL 214
5uH/50ohm LISN	TRL	N/A	215	TRL 215
5uH/50ohm LISN	TRL	N/A	216	TRL 216
NSG600 GROUND PLANE	N/A	N/A	217	TRL 217
SL400-71 GROUND PLANE	N/A	N/A	218	TRL 218
VERTICAL COUPLING PLANE	N/A	N/A	219	TRL 219
MEDIUM POWER 50ohm ATTENUATOR 10W,-30dB N TYPE	BIRD	8304-300-N	N/A	TRL 220
MEDIUM POWER 50ohm ATTENUATOR 10W,-20dB, N TYPE	BIRD	8304-200-N	N/A	TRL 221
MEDIUM POWER 50ohm ATTENUATOR 10W, - 10dB, N TYPE	BIRD	8304-100-N	N/A	TRL 222
LOW POWER 50ohm LOAD, 5W, BNC	BIRD	80BNCM	5866	TRL 223
30 WATT P.S.U. (dc)	WIER	731	88829	TRL 224
VARIABLE TRANSFORMER 0/27V AC, 2A	REGULAC	RB3-MT	N/A	TRL 225
VARIABLE TRANSFORMER 0/27V AC, 2A	REGULAC	RB3-MT	N/A	TRL 226

ANNEX B**TEST EQUIPMENT LIST**

Instrument	Supplier	Type No	Serial No	EMC No
MAX/MIN HYGROMETER + THERMOMETER	R.S	212-124	227	TRL 227
MAX/MIN HYGROMETER + THERMOMETER	R.S	212-124	228	TRL 228
MAX/MIN HYGROMETER + THERMOMETER	R.S	212-124	229	TRL 229
MAX/MIN HYGROMETER + THERMOMETER	R.S	212-124	230	TRL 230
MAX/MIN HYGROMETER + THERMOMETER	R.S	212-124	231	TRL31
CAMCORDER	PANASONIC	NVMCBOB	10HA00893 CAMERA	TRL 232 TRLUH 50
LPA		3146		TRL 233
INJECTION CLAMP	SOLAR	9144-1N	935708	TRL 234
D.C. PSU (3A)	THURLBY THANDAR	PL 330	046542	TRL 235
COUPLING NETWORK	OMIRAN	CDN 208	951826	TRL 236

ANNEX C

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

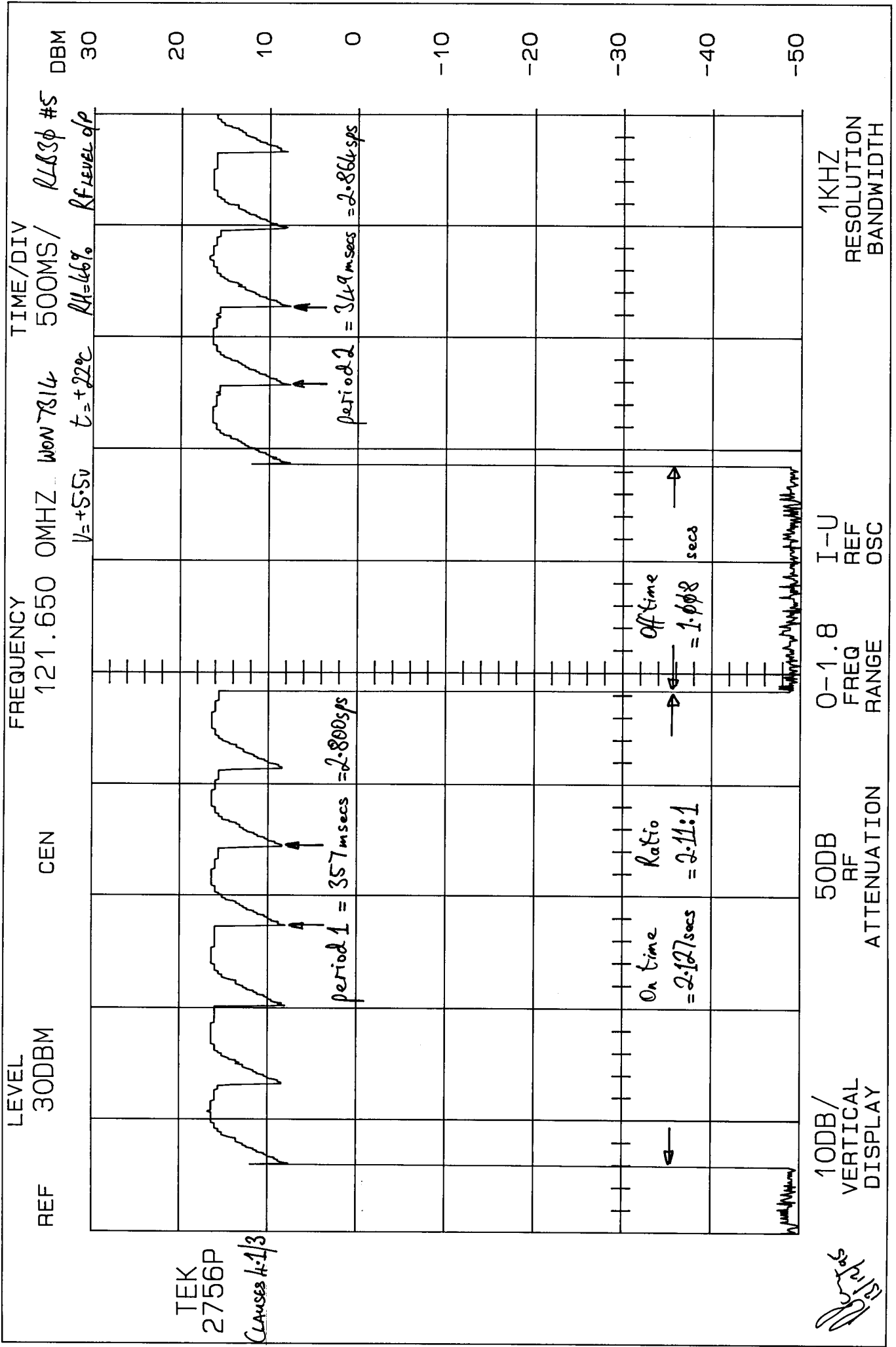
- | | | |
|-----|---|--------------------------|
| 1. | REGULATORY (NOTIFIED) BODY - APPLICATION
- FEE | [X]
[X] |
| 2. | QUESTIONNAIRE | [X] |
| 3. | LABELLING
- PHOTOGRAPHS
- DECLARATION
- DRAWINGS | []
[X]
[X] |
| 4. | TECHNICAL DESCRIPTION & JIG DETAILS | [X] |
| 5. | BLOCK DIAGRAMS
- Tx
- Rx
- PSU
- AUX | [X]
[]
[]
[] |
| 6. | CIRCUIT DIAGRAMS
- Tx
- Rx
- PSU
- AUX | [X]
[]
[]
[] |
| 7. | COMPONENT LOCATION
- Tx
- Rx
- PSU
- AUX | [X]
[]
[]
[] |
| 8. | PCB TRACK LAYOUT
- Tx
- Rx
- PSU
- AUX | [X]
[]
[]
[] |
| 9. | BILL OF MATERIALS
- Tx
- Rx
- PSU
- AUX | [X]
[]
[]
[] |
| 10. | USER INSTALLATION/OPERATING INSTRUCTIONS | [X] |

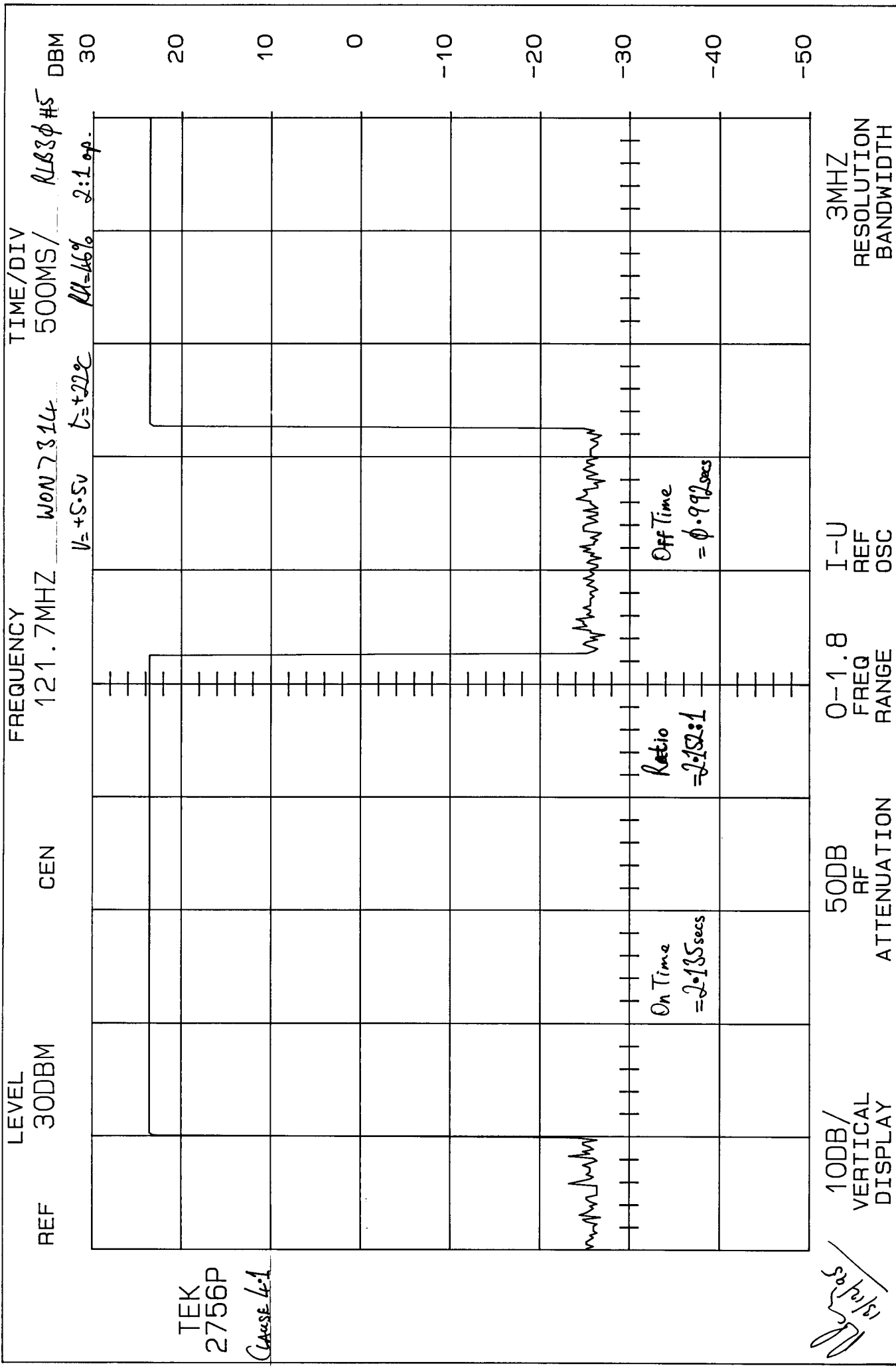
ANNEX D

ZERO SPAN SPECTRUM ANALYSER GRAPHS

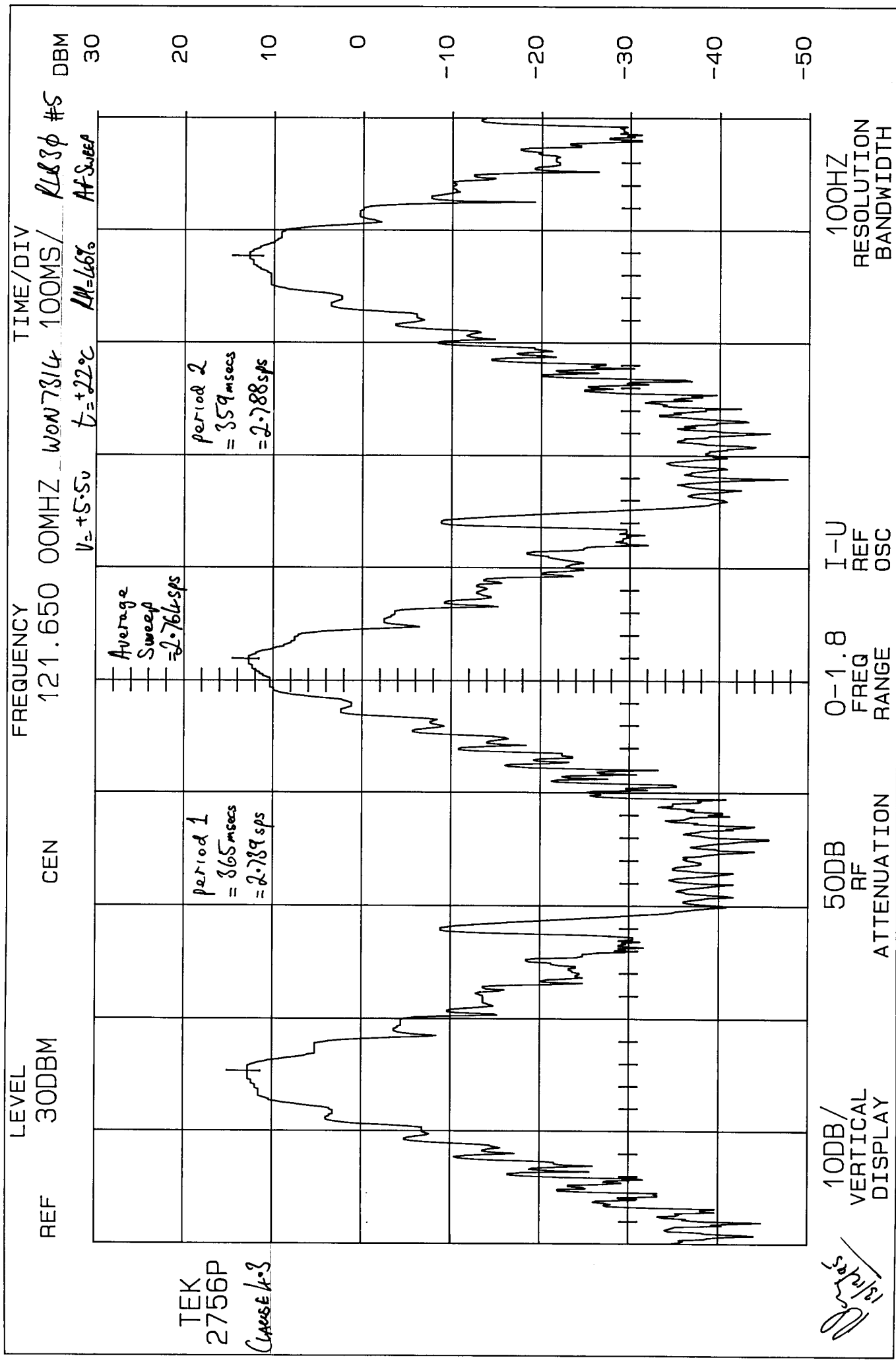
Clauses 4.1/3

12/12/20





13/12/05



12/1/83