

TEST REPORT NO: RU1262/7146

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FCC ID: TVHRF500

**REPORT ON THE CERTIFICATION TESTING OF A
COMARK Ltd.
RF500 GATEWAY
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15.247 February 2006
INTENTIONAL RADIATOR SPECIFICATION**

TEST DATE: 18th – 25th July 2006

TESTED BY: _____ D WINSTANLEY

APPROVED BY: _____ p.p. P GREEN
EMC PRODUCT
MANAGER

DATE: 18th August 2006

Distribution:

- Copy Nos:
1. Comark Ltd.
 2. FCC EVALUATION LABORATORIES
 3. TRL Compliance Ltd

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TRL COMPLIANCE LTD

MOSS VIEW NIPE LANE UP HOLLAND WEST LANCASHIRE WN8 9PY UNITED KINGDOM

TELEPHONE +44 (0)1695 556666 FAX +44 (0)1695 557077

E-MAIL test@trlcompliance.com www.trlcompliance.com



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0728

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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: TVHRF500

PURPOSE OF TEST: Certification

TEST SPECIFICATION: FCC RULES CFR 47, Part 15.247 February 2006

TEST RESULT: Compliant to Specification

EQUIPMENT UNDER TEST: RF500 GATEWAY

EQUIPMENT SERIAL No: Engineering Sample

EQUIPMENT TYPE: Temperature Monitor System, Control Unit

CARRIER EMISSION: 0.00467 W e.i.r.p.

ANTENNA TYPE: Unique Antenna Connector

FREQUENCY OF OPERATION: 2405 MHz

CHANNEL SPACING: N/A Wideband

NUMBER OF CHANNELS: 1

FREQUENCY GENERATION: SAW Resonator ☐ Crystal ☐ Synthesiser ☒

MODULATION METHOD: Amplitude ☐ Digital ☒ Angle ☐

POWER SOURCE(s): +110Vac

TEST DATE(s): 18th – 25th July 2006

ORDER No(s): SO5315

APPLICANT: Comark Ltd.

ADDRESS: Comark House
Gunels Wood Park
Gunnels Wood Road
Stevenage
Hertfordshire
SG1 2TS
United kingdom

TESTED BY: _____ D WINSTANLEY

APPROVED BY: _____ p.p. P GREEN
EMC PRODUCT
MANAGER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	RF500 GATEWAY
EQUIPMENT TYPE:	Temperature Monitor System, Control Unit
SERIAL NUMBER OF EUT:	Engineering Sample
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15.247 February 2006
TEST RESULT:	COMPLIANT Yes ☒ No ☐
APPLICANT'S CATEGORY:	MANUFACTURER ☒ IMPORTER ☐ DISTRIBUTOR ☐ TEST HOUSE ☐ AGENT ☐
APPLICANT'S ORDER No(s):	SO5315
APPLICANT'S CONTACT PERSON(s):	Mr P Morrison
E-mail address:	paulmorrison@comarkltd.com
APPLICANT:	COMARK Ltd.
ADDRESS:	Comark House Gunels Wood Park Gunnels Wood Road Stevenage Hertfordshire SG1 2TS United kingdom
TEL:	+44 (0) 1483 367 367
FAX:	+44 (0) 1483 367 400
MANUFACTURER:	COMARK Ltd.
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRL Compliance Ltd
UKAS ACCREDITATION No:	0728
TEST DATE(s):	18 th – 25 th July 2006
TEST REPORT No:	RU1262/7146

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.	TEST/EXAMINATION	RULE PART	DETECTOR	APPLICABILITY
	Spurious Emissions – Powerline Conduction	15.207 15.107	Quasi Peak Average	Yes
	Spurious Emissions – Radiated <1000MHz:	15.109	Quasi Peak	Yes
	Spurious Emissions – Radiated >1000MHz:	15.109	Average	Yes

2.	Emission Designator:	1M59F1D		
3.	Duty Cycle:		<100%	
4.	Transmitter bit or pulse rate and level:		250kbps	
5.	Temperatures:	Ambient (Tnom)	22°C	
6.	Supply Voltages:	Vnom	+110Vac	
	Note: Vnom voltages are as stated above unless otherwise shown on the test report page			
7.	Equipment Category:	Single channel Two channel Multi-channel	[X] [] []	
8.	Channel Allocation:	Narrowband Wideband	[] [X]	

Description:

This report covers the RF500 for variations of internal and external power supplies. The original external power supply and original internal power supply are covered under TRL test report RU1228/6970. This test report covers a new external power supply, the original internal power and a new internal power supply.

TESTS RESULTS – ORIGINAL INTERNAL PSU – NEW EXTERNAL PSU**CONDUCTED EMISSIONS – AC POWER LINE Parts 15.207 & 15.107**

Ambient temperature = 20°C(<1GHz)
Relative humidity = 47%(<1GHz)
Conditions = Power Line Laboratory
Supply voltage = +110V AC
Supply Frequency = 60Hz

SIGNIFICANT EMISSIONS

FREQUENCY (MHz)	MEASUREMENT RECEIVER READING (dBµV)	DETECTOR	CONDUCTOR (L or N)	LIMIT (dBµV)
0.185	35.70	Average	Live	54.26
0.245	34.38	Average	Live	51.92
1.160	27.82	Average	Neutral	46.00
1.220	28.20	Average	Live	46.00
1.465	30.79	Average	Neutral	46.00
1.525	31.33	Average	Live	46.00
1.830	33.52	Average	Live	46.00
1.890	33.37	Average	Neutral	46.00
2.070	32.70	Average	Neutral	46.00
2.009	37.49	Quasi Peak	Neutral	56.00
2.015	32.96	Average	Live	46.00
2.380	31.69	Average	Live	46.00
2.500	30.65	Average	Neutral	46.00
2.925	26.99	Average	Neutral	46.00
2.930	27.20	Average	Live	46.00
4.210	28.33	Average	Live	46.00
4.450	27.99	Average	Neutral	46.00
4.515	29.38	Average	Live	46.00
4.815	28.02	Average	Neutral	46.00
4.820	29.57	Average	Live	46.00

The test equipment used for the Transmitter Conducted Emissions – AC Power Line test are shown on page 7:

- Notes:**
- 1 See attached plots annex C (Worst Case Scan Live/Neutral).
 - 2 Only emissions within 20 dB of the limit are recorded.
 - 3 Emissions closest to the relevant limit are recorded in cases of duplicated frequencies using different detectors.

Test Method: 1 As per Radio – Noise Emissions, ANSI C63.4: 2003.

The test equipment used for the Transmitter Conducted Emissions – AC Power Line test was:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/01	UH03	X
LISN/AMN	ROHDE & SCHWARZ	ESH3-Z5	8407 31/015	UH195	X

TESTS RESULTS – ORIGINAL INTERNAL PSU – NEW EXTERNAL PSU

SPURIOUS EMISSIONS – RADIATED – PART 15.109

Ambient temperature = 7.5°C(<1GHz) 3m measurements <1GHz [X]
Relative humidity = 30% (<1GHz) 0.3m measurements >1GHz [X]
Conditions = Open Area Test Site (OATS) 3m extrapolated from 0.3m [X]
Supply voltage = +110Vac

	FREQ. (MHz)	MEAS. Rx. (dBµV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBµV/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (µV/m)	LIMIT (µV/m)
30MHz – 88MHz	57.85	26.35	0.85	5.40	32.6	-	42.66	100
	73.75	32.75	0.95	5.90	39.6	-	95.50	100
88MHz – 216MHz	147.45	29.90	1.40	10.70	42.0	-	125.89	150
	159.75	28.38	1.42	9.90	39.7	-	96.60	150
	166.75	29.54	1.51	9.35	40.4	-	104.71	150
	192.05	27.55	1.60	8.35	37.5	-	74.99	150
	208.90	19.36	1.64	8.10	29.1	-	28.51	150
216MHz – 960MHz	240.05	17.10	1.80	11.00	29.9	-	31.26	200
	307.20	20.64	2.06	13.30	36.0	-	63.10	200
	336.05	19.25	2.15	14.10	35.5	-	59.56	200
	356.35	26.83	2.22	14.55	43.6	-	151.36	200
	384.10	17.57	2.38	15.65	35.6	-	60.27	200
	400.15	19.50	2.40	16.10	38.0	-	79.43	200
	432.10	25.80	2.60	16.60	45.0	-	177.83	200
	465.85	20.60	2.70	17.30	40.6	-	107.15	200
	480.10	15.20	2.60	17.70	35.5	-	59.56	200
	528.10	19.30	2.80	18.50	40.6	-	107.15	200
	534.15	23.15	2.85	18.70	44.7	-	171.79	200
	566.45	15.70	3.00	20.30	39.0	-	89.13	200
	600.50	12.60	3.10	19.50	35.2	-	57.54	200
	624.15	11.95	3.15	20.50	35.6	-	60.26	200
	667.85	21.90	3.20	20.40	45.5	-	188.36	200
	720.15	10.40	3.30	21.90	35.6	-	60.26	200
	768.15	14.10	3.60	22.20	39.9	-	98.85	200
	797.75	16.30	3.60	23.20	43.1	-	142.89	200
	816.15	13.00	3.70	23.20	39.9	-	98.85	200
	912.20	11.20	3.90	24.20	39.3	-	92.26	200
	949.45	11.97	4.00	25.13	41.1	-	113.50	200
960MHz – 1.0GHz	note 6							
1GHz – 5.0GHz	note 6							
Limits	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 Emissions are not directly related to the transmitter.
- 2 Initial pre scans were performed see Annex D for plots <1GHz.
- 3 Emissions above 1GHz were measured with both a peak and average detectors.
- 4 Measurements <1GHz were performed at 3 meters.
- 5 Measurements >1GHz were initial performed at 0.3metres. This distance was increased if sensitivity of analyser allowed.
- 6 Only emissions within 20dB of limit are recorded.

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 orthogonal planes.
Maximum results recorded.

The test equipment used for the Transmitter Spurious Emissions – Radiated – test is shown below:

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	X
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	X
RANGE 1	TRL	10 METRE	N/A	UH07	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

TESTS RESULTS – NEW INTERNAL PSU – NEW EXTERNAL PSU**CONDUCTED EMISSIONS – AC POWER LINE Parts 15.207 & 15.107**

Ambient temperature = 20°C(<1GHz)
Relative humidity = 47%(<1GHz)
Conditions = Power Line Laboratory
Supply voltage = +110V AC
Supply Frequency = 60Hz

SIGNIFICANT EMISSIONS

FREQUENCY (MHz)	MEASUREMENT RECEIVER READING (dBµV)	DETECTOR	CONDUCTOR (L or N)	LIMIT (dBµV)
0.185	35.85	Average	Live	54.26
0.245	34.29	Average	Live	51.92
1.160	27.73	Average	Neutral	46.00
1.220	28.20	Average	Live	46.00
1.400	29.40	Average	Live	46.00
1.460	29.40	Average	Neutral	46.00
1.465	30.59	Average	Neutral	46.00
1.890	33.32	Average	Neutral	46.00
1.950	37.09	Quasi Peak	Neutral	56.00
2.070	32.23	Average	Neutral	46.00
2.375	29.99	Average	Neutral	46.00
2.435	29.38	Average	Live	46.00
2.925	27.60	Average	Neutral	46.00
4.385	27.51	Average	Live	46.00
4.390	28.27	Average	Neutral	46.00
4.630	28.45	Average	Live	46.00
4.695	29.09	Average	Neutral	46.00
4.815	28.92	Average	Neutral	46.00
20.055	27.44	Average	Neutral	50.00

The test equipment used for the Transmitter Conducted Emissions – AC Power Line test are shown on page 11:

- Notes:**
- 1 See attached plots annex C (Worst Case Scan Live/Neutral).
 - 2 Only emissions within 20 dB of the limit are recorded.
 - 3 Emissions closest to the relevant limit are recorded in cases of duplicated frequencies using different detectors.

Test Method: 1 As per Radio – Noise Emissions, ANSI C63.4: 2003.

The test equipment used for the Transmitter Conducted Emissions – AC Power Line test was:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/01	UH03	X
LISN/AMN	ROHDE & SCHWARZ	ESH3-Z5.831.5	8407 31/015	UH195	X

TESTS RESULTS – NEW INTERNAL PSU – NEW EXTERNAL PSU

SPURIOUS EMISSIONS – RADIATED – PART 15.109

Ambient temperature	=	7.5°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	30% (<1GHz)	0.3m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 0.3m	[X]
Supply voltage	=	+110Vac		

	FREQ. (MHz)	MEAS. Rx. (dBµV)	CABLE LOSS (dB)	ANT FACTOR	FIELD STRENGTH (dBµV/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (µV/m)	LIMIT (µV/m)
30MHz – 88MHz	73.75	26.35	0.95	5.90	33.2	-	45.71	100 100
88MHz – 216MHz	147.45	19.60	1.40	10.70	31.7	-	38.50	150
	159.75	29.88	1.42	9.90	41.2	-	114.82	150
	166.75	23.64	1.51	9.35	34.5	-	53.08	150
	184.35	24.43	1.57	8.20	34.2	-	51.28	150
	192.05	21.65	1.60	8.35	31.6	-	38.02	150
	208.90	25.46	1.64	8.10	35.2	-	57.54	150
216MHz – 960MHz	233.50	24.73	1.77	10.00	36.5	-	66.83	200
	240.05	25.20	1.80	11.00	38.0	-	79.43	200
	307.20	27.14	2.06	13.30	42.5	-	133.35	200
	336.10	21.75	2.15	14.10	38.0	-	79.43	200
	356.35	20.73	2.22	14.55	37.5	-	74.98	200
	384.10	20.47	2.38	15.65	38.5	-	84.14	200
	400.15	21.20	2.40	16.10	39.7	-	96.61	200
	432.10	23.30	2.60	16.60	42.5	-	133.35	200
	466.50	9.55	2.75	17.30	29.6	-	30.20	200
	480.10	18.90	2.60	17.70	39.2	-	91.20	200
	501.10	9.20	2.80	18.00	30.0	-	31.62	200
	528.10	21.20	2.80	18.50	42.5	-	133.35	200
	534.15	14.05	2.85	18.70	35.6	-	60.25	200
	912.20	16.60	3.90	24.20	44.7	-	171.79	200
960MHz – 1.0GHz	note 6							
1GHz – 5.0GHz	note 6							
Limits	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 Emissions are not directly related to the transmitter.
- 2 Initial pre scans were performed see Annex D for plots <1GHz.
- 3 Emissions above 1GHz were measured with both a peak and average detectors.
- 4 Measurements <1GHz were performed at 3 meters.
- 5 Measurements >1GHz were initial performed at 0.3metres. This distance was increased if sensitivity of analyser allowed.
- 6 Only emissions with in 20dB of limit are recorded.

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 orthogonal planes.
Maximum results recorded.

The test equipment used for the Transmitter Spurious Emissions – Radiated –test is shown below:

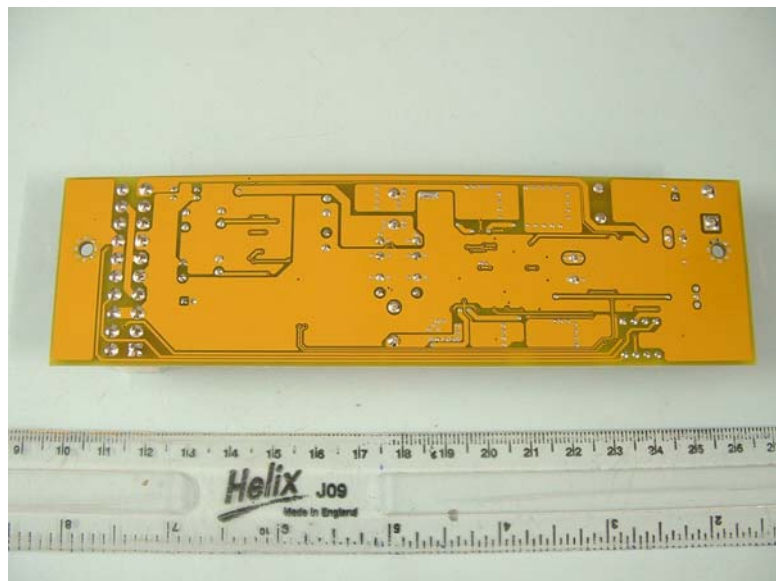
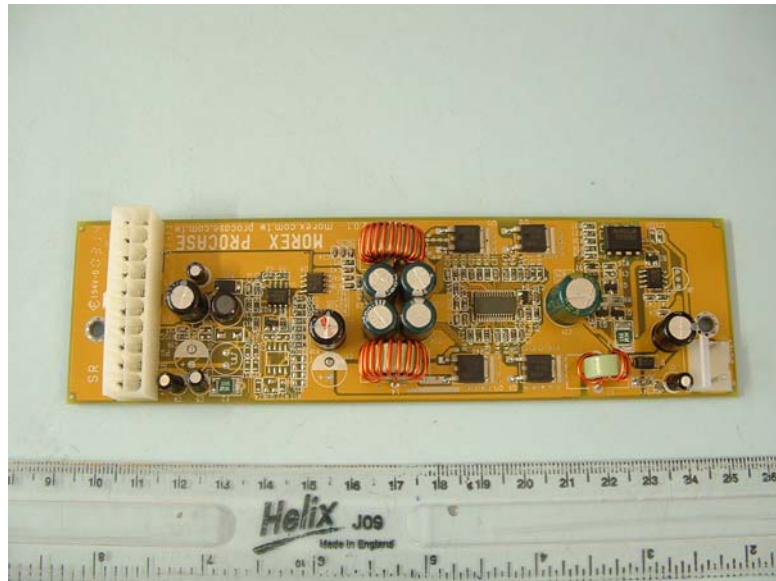
TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
HORN ANTENNA	EMCO	3115	9010-3580	138	
HORN ANTENNA	EMCO	3115	9010-3581	139	X
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	X
RANGE 1	TRL	10 METRE	N/A	UH07	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

ANNEX A
PHOTOGRAPHS



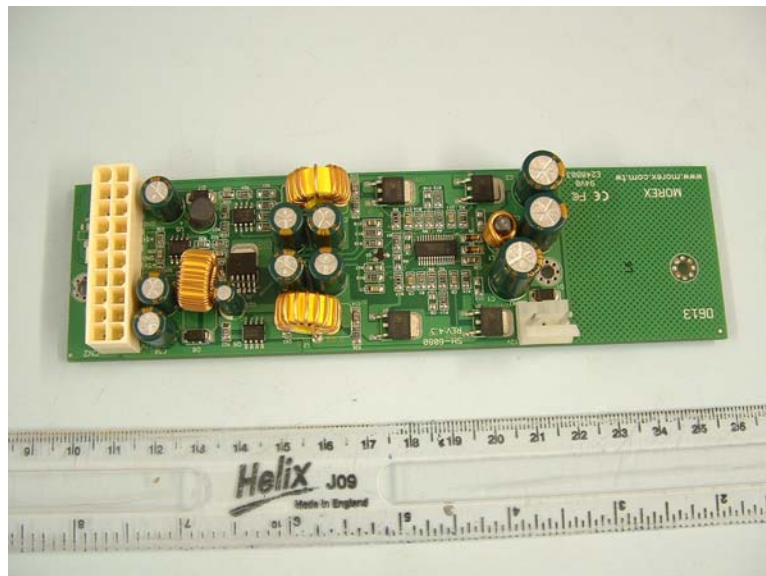
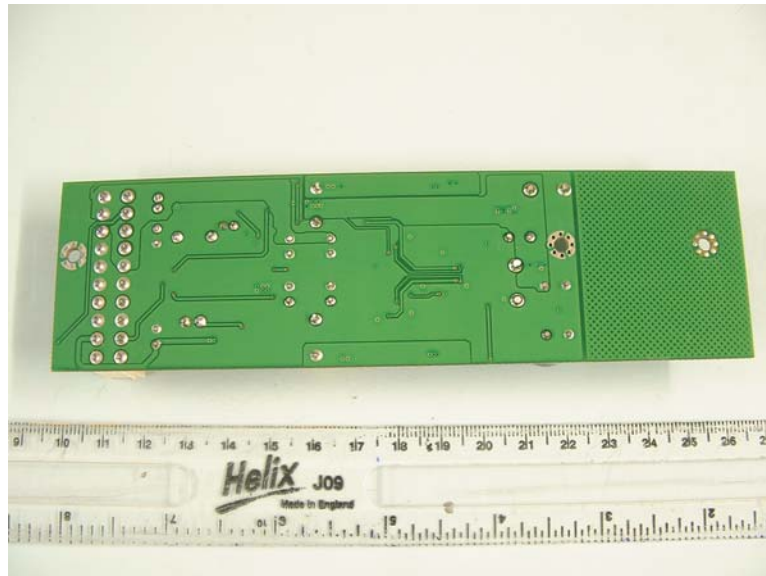


PHOTOGRAPH No. 3 **ORIGINAL INTERNAL POWER SUPPLY PCB**



PHOTOGRAPH No. 4

NEW INTERNAL POWER SUPPLY PCB





ANNEX B
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

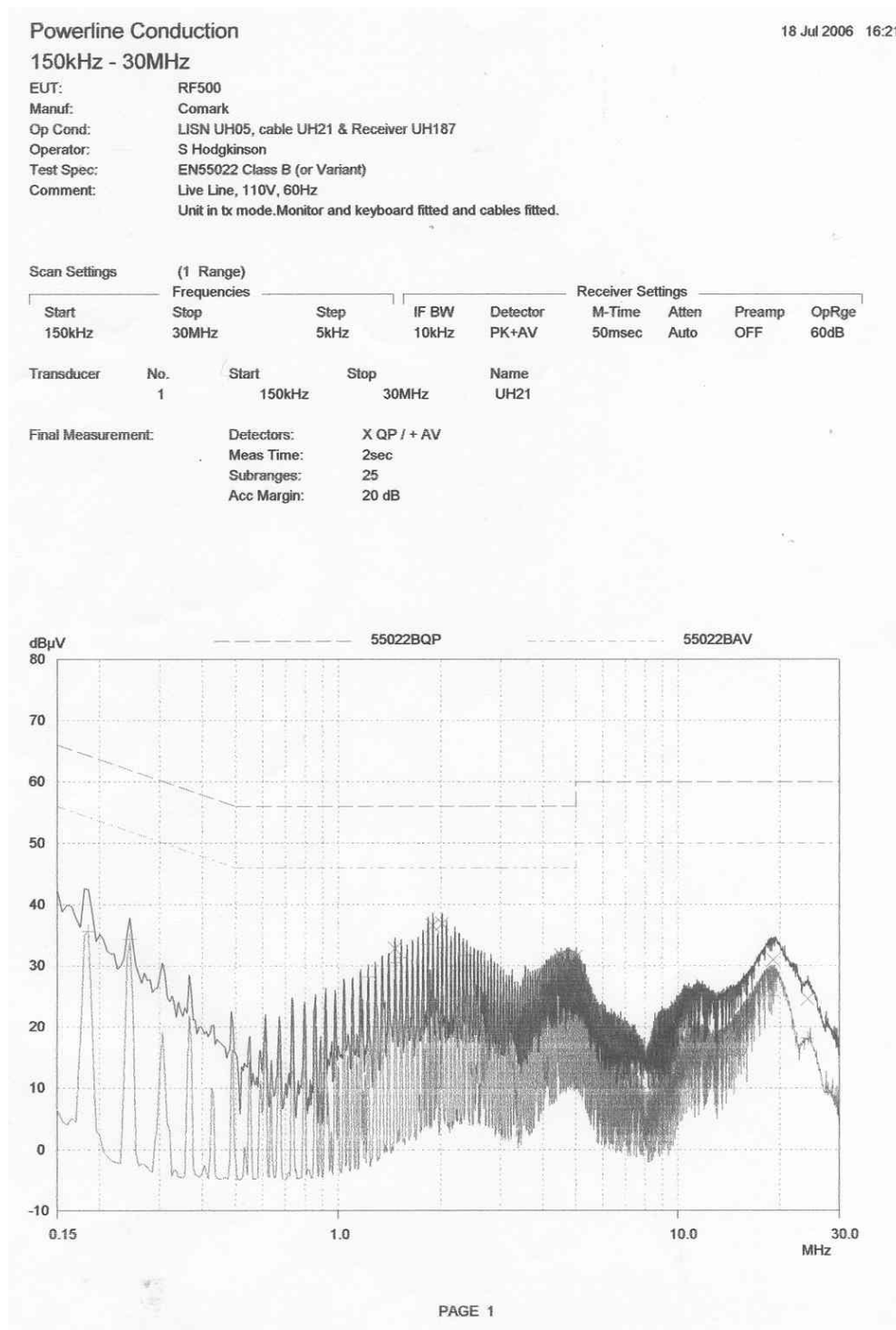
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

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

ANNEX C
AC POWERLINE CONDUCTION SCAN(s)

Live Line ☒
Neutral Line ☐

Original Internal Power Supply ☒
New Internal Power Supply ☐
New External Power Supply ☒



Live Line []
Neutral Line [X]

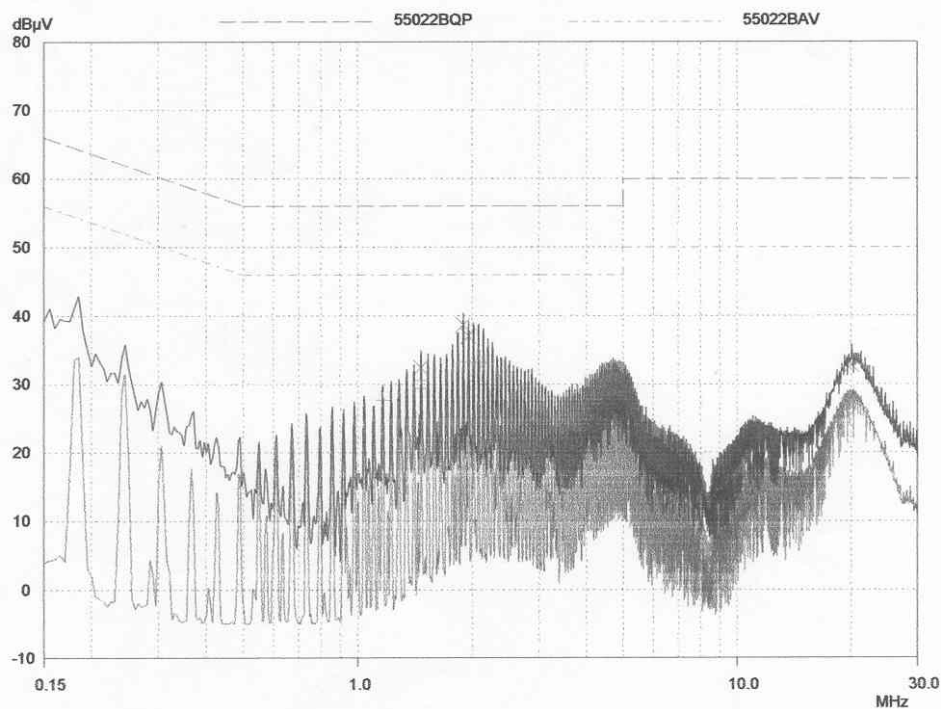
Original Internal Power Supply []
New Internal Power Supply [X]
New External Power Supply [X]

Powerline Conduction
150kHz - 30MHz

18 Jul 2006 15:19

EUT: RF500
Manuf: Comark
Op Cond: LISN UH05, cable UH21 & Receiver UH187
Operator: S Hodgkinson
Test Spec: EN55022 Class B (or Variant)
Comment: Neutral Line, 110V, 60Hz
Unit in tx mode. Monitor and keyboard fitted and cables fitted.

Scan Settings		(1 Range)			Receiver Settings				
Frequencies		Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge	
Start	Stop	5kHz	10kHz	PK+AV	50msec	Auto	OFF	60dB	
150kHz	30MHz								
Transducer	No.	Start	Stop	Name					
	1	150kHz	30MHz	UH21					
Final Measurement:		Detectors:	X QP / + AV						
		Meas Time:	2sec						
		Subranges:	25						
		Acc Margin:	20 dB						



PAGE 1

ANNEX D
EMISSIONS GRAPH(s)

Vertical [X]
Horizontal []

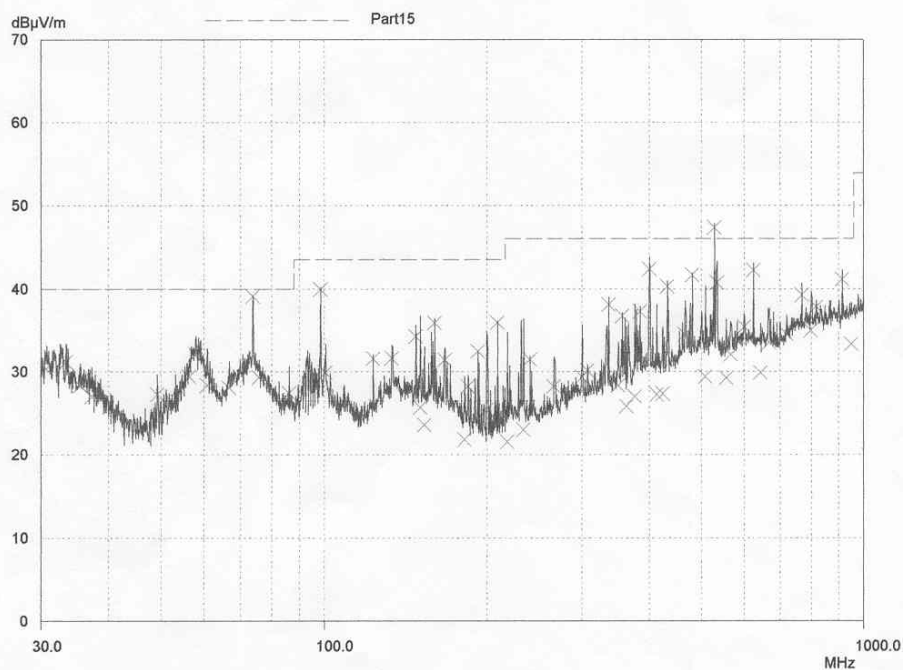
Original Internal Power Supply [X]
New Internal Power Supply []
New External Power Supply [X]

TRL Compliance Services Ltd
E-Field Radiation (30MHz-1GHz)

18 Jul 2006 10:12

EUT: RF 500
Manuf: Comark
Op Cond: Prescan 30MHz - 1000MHz
Operator: S Hodgkinson
Test Spec: Part15
Comment: Unit on Tx 1 per second. Monitor, Keyboard, Network cables connected. Antenna port terminated. Switch mode PSU Strontronics
Rx antenna Vertical

Scan Settings		(1 Range)			Receiver Settings					
Start		Stop		Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30MHz		1000MHz		50kHz	120kHz	PK	1msec	Auto	ON	60dB
Transducer	No.	Start	Stop	Name						
1	21	30MHz	1000MHz	UH72						
	22	30MHz	1000MHz	UH93						
Final Measurement:		Detector:		X QP						
		Meas Time:		2sec						
		Subranges:		50						
		Acc Margin:		10 dB						



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Vertical [X]
Horizontal []

Original Internal Power Supply []
New Internal Power Supply [X]
New External Power Supply [X]

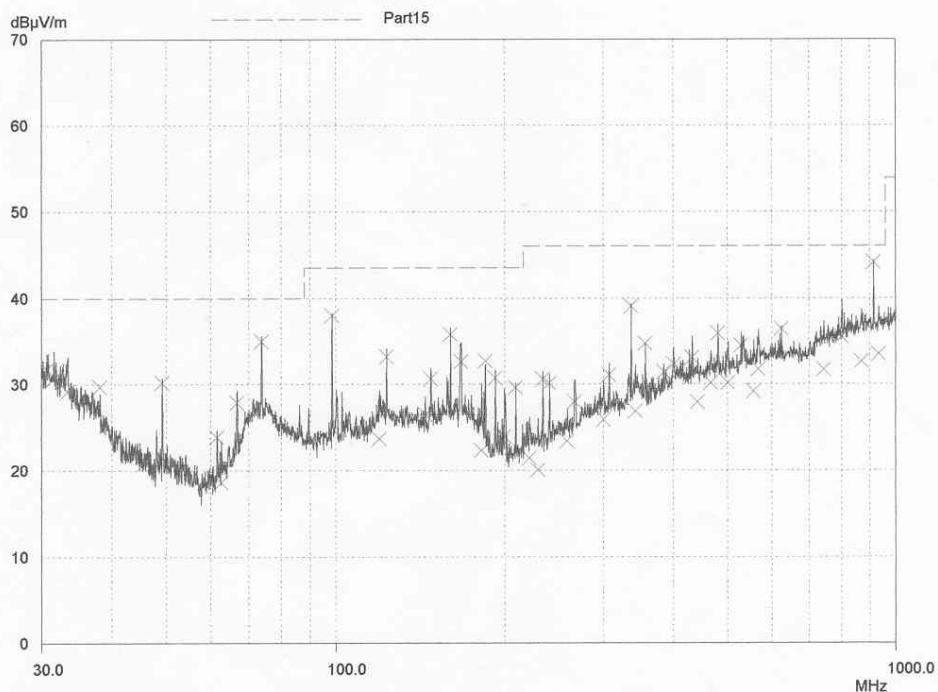
TRL Compliance Services Ltd

18 Jul 2006 11:55

E-Field Radiation (30MHz-1GHz)

EUT: RF 500
Manuf: Comark
Op Cond: Prescan 30MHz - 1000MHz
Operator: S Hodgkinson
Test Spec: Part15
Comment: Unit on Tx 1 per second. Monitor, Keyboard, Network cables connected. Antenna port terminated. Switch mode PSU Strontronics Rx antenna Vertical. New internal pwr supply board fitted.

Scan Settings		(1 Range)			Receiver Settings			
Frequencies								
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
30MHz	1000MHz	50kHz	120kHz	PK	1msec	Auto	ON	60dB
Transducer	No.	Start	Stop	Name				
1	21	30MHz	1000MHz	UH72				
	22	30MHz	1000MHz	UH93				
Final Measurement:		Detector:	X QP					
		Meas Time:	2sec					
		Subranges:	50					
		Acc Margin:	10 dB					



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ANNEX E
TEST EQUIPMENT CALIBRATION

TRL Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period	Due For Calibration
UH003	Receiver > 30MHz	R&S	24/07/2005	12	24/07/2006
UH006	3m Range ERP CAL	TRL	06/01/2006	12	06/01/2007
UH093	Bilog Antenna	CHASE	19/08/2004	24	19/08/2006
UH187	Receiver < 30MHz	R&S	01/02/2006	12	01/02/2007
UH195	LISN	R&S	22/12/2005	12	22/12/2006
L139	1-18GHz Horn	EMCO	15/04/2005	24	15/04/2007
L479	Analyser	Anritsu	18/11/2005	12	18/11/2006

ANNEX F
MEASUREMENT UNCERTAINTY

Radio Testing – General Uncertainty Schedule

All statements of uncertainty are expanded standard uncertainty using a coverage factor of 1.96 to give a 95% confidence where no required test level exists.

[1] Adjacent Channel Power

Uncertainty in test result = **1.86dB**

[2] Carrier Power

Uncertainty in test result (Equipment - TRLUH120) = **2.18dB**

Uncertainty in test result (Equipment – TRL05) = **1.08dB**

Uncertainty in test result (Equipment – TRL479) = **2.48dB**

[3] Effective Radiated Power

Uncertainty in test result = **4.71dB**

[4] Spurious Emissions

Uncertainty in test result = **4.75dB**

[5] Maximum frequency error

Uncertainty in test result (Equipment - TRLUH120) = **119ppm**

Uncertainty in test result (Equipment – TRL05) = **0.113ppm**

Uncertainty in test result (Equipment – TRL479) = **0.265ppm**

[6] Radiated Emissions, field strength OATS 14kHz-18GHz Electric Field

Uncertainty in test result (14kHz – 30MHz) = **4.8dB**, Uncertainty in test result (30MHz – 1GHz) = **4.6dB**, Uncertainty in test result (1GHz-18GHz) = **4.7dB**

[7] Frequency deviation

Uncertainty in test result = **3.2%**

[8] Magnetic Field Emissions

Uncertainty in test result = **2.3dB**

[9] Conducted Spurious

Uncertainty in test result (Equipment TRL479) Up to 8.1GHz = **3.31dB**

Uncertainty in test result (Equipment TRL479) 8.1GHz – 15.3GHz = **4.43dB**

Uncertainty in test result (Equipment TRL479) 15.3GHz – 21GHz = **5.34dB**

Uncertainty in test result (Equipment TRLUH120) Up to 26GHz = **3.14dB**

[10] Channel Bandwidth

Uncertainty in test result = **15.5%**

[11] Amplitude and Time Measurement – Oscilloscope

Uncertainty in overall test level = **2.1dB**, Uncertainty in time measurement = **0.59%**, Uncertainty in Amplitude measurement = **0.82%**

[11] Power Line Conduction

Uncertainty in test result = **3.4dB**

[12] Spectrum Mask Measurements

Uncertainty in test result = **2.59% (frequency)**
Uncertainty in test result = **1.32dB (amplitude)**

[13] Adjacent Sub Band Selectivity

Uncertainty in test result = **1.24dB**

[14] Receiver Blocking – Listen Mode, Radiated

Uncertainty in test result = **3.42dB**

[15] Receiver Blocking – Talk Mode, Radiated

Uncertainty in test result = **3.36dB**

[16] Receiver Blocking – Talk Mode, Conducted

Uncertainty in test result = **1.24dB**

[17] Receiver Threshold

Uncertainty in test result = **3.23dB**

[18] Transmission Time Measurement

Uncertainty in test result = **7.98%**