

TEST REPORT NO: RU1125/6839
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FCC ID: QAM006

**REPORT ON THE CERTIFICATION TESTING OF A
PROMETHEAN Ltd
ACTIVote
WITH RESPECT TO
FCC RULES CFR 47, PART 15.249 September 2005
INTENTIONAL RADIATOR SPECIFICATION**

TEST DATE: 30th January – 3rd February 2006

TESTED BY: _____ D WINSTANLEY

APPROVED BY: _____ P GREEN
EMC PRODUCT
MANAGER

DATE: 14th February 2006

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TRL COMPLIANCE LTD EMC DIVISION

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@trl-emc.co.uk www.trlcompliance.com



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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: QAM006

PURPOSE OF TEST: Certification

TEST SPECIFICATION: FCC RULES CFR 47, PART 15.249 September 2005

TEST RESULT: Compliant to Specification

EQUIPMENT UNDER TEST: ACTIVote

EQUIPMENT SERIAL No: Engineering Sample

ITU: EMISSION CODE: 111kF1D

EQUIPMENT TYPE: Response Monitor

PRODUCT USE: Voting System

CARRIER EMISSION: 9.55 mV/m @ 3m

ANTENNA TYPE: Integral

ALTERNATIVE ANTENNA: Not applicable

FREQUENCIES OF OPERATION: 915.229 MHz, 915.716 MHz, 916.090 MHz

CHANNEL SPACING: Not applicable, No channel plan.

NUMBER OF CHANNELS: 3

FREQUENCY GENERATION: SAW Resonator ☐ Crystal ☐ Synthesiser ☒

MODULATION METHOD: Amplitude ☐ Digital ☒ Angle ☐

POWER SOURCE(s): +4.5Vdc

TEST DATE(s): 30th January – 3rd February 2006

ORDER No(s): PE1854

APPLICANT: Promethean Ltd

ADDRESS: TDS House
Lower Philips Road
Whitebirk Ind Estate
Blackburn
BB1 5TH

TESTED BY: _____ D WINSTANLEY

APPROVED BY: _____ P GREEN
EMC PRODUCT
MANAGER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	ACTIVote
EQUIPMENT TYPE:	Response Monitor
SERIAL NUMBER OF EUT:	Engineering Sample
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, PART 15.249 September 2005
TEST RESULT:	COMPLIANT Yes ☒ No ☐
APPLICANT'S CATEGORY:	MANUFACTURER ☒ IMPORTER ☐ DISTRIBUTOR ☐ TEST HOUSE ☐ AGENT ☐
APPLICANT'S ORDER No(s):	PE1854
APPLICANT'S CONTACT PERSON(s):	Mr B Lofthouse
E-mail address:	bryan.lofthouse@prometheanworld.com
APPLICANT:	Promethean Ltd
ADDRESS:	TDS House Lower Philips Road Whitebirk Ind Estate Blackburn BB1 5TH
TEL:	+44 (0) 1254 299 110
FAX:	+44 (0) 8702 412 176
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRL EMC
UKAS ACCREDITATION No:	0728
TEST DATE(s)	30 th January – 3 rd February 2006
TEST REPORT No:	RU1125/6839

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: Voting System
3. Emission Designator: 111kF1D
4. Duty Cycle: <100%
5. Transmitter bit or pulse rate and level: bps
6. Temperatures: Ambient (Tnom) 4.3°C
7. Supply Voltages: Vnom +4.5Vdc
- Note: Vnom voltages are as stated above unless otherwise shown on the test report page
8. Equipment Category: Single channel ☐
Two channel ☐
Multi-channel ☒
9. Channel spacing: Narrowband ☐
Wideband ☒

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 15.209

Ambient temperature	=	16 °C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	51% (<1GHz)	0.3m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 0.3m	[X]
Supply voltage	=	+4.5Vdc		
Channel number	=	1 & 3		

Emissions Channel 1	FREQ. (MHz)	MEAS. Rx. (dBμV)	CABLE LOSS (dB)	ANT FACTOR (dB/m)	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	2747.005(r)	34.92	1.85	29.50	66.27	20	205.83	500
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					

Emissions Channel 3	FREQ. (MHz)	MEAS. Rx. (dBμV)	CABLE LOSS (dB)	ANT FACTOR (dB/m)	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	2748.373(r)	35.59	1.85	29.50	66.94	20	222.31	500
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 = Peak Hold, 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 Unit transmitting a permanent unmodulated carrier.
- 11 Results reported for bottom and top operating frequencies.
- 12 Peak Emissions meet Average Limit.

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 – Part 15.209 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	X
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	YORK	CBL611/A	1618	UH191	X
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	X

TRANSMITTER TESTS

TRANSMITTER INTENTIONAL EMISSION – RADIATED – PART 15.249 September 2005

Ambient temperature	=	4.3°C(<1GHz)	3m measurements @ fc	[X]
Relative humidity	=	51%(<1GHz)	10m measurements @ fc	[]
Conditions	=	Open Area Test Site (OATS)	30m measurements @ fc	[]
Supply voltage	=	+4.5Vdc	30m extrapolated from 3m	[]
Channel number	=	1,2 & 3	30m extrapolated from 10m	[]

FREQ. (MHz)	MEASUREMENT Rx. READING (dBµV)	CABLE LOSS (dB)	ANT FACTOR (dB/m)	FIELD STRENGTH (dBµV/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (mV/m)
915.326	46.8	3.9	24.3	75.0	-	5.62
915.736	51.4	3.9	24.3	79.6	-	9.55
916.119	47.8	3.9	24.3	76.0	-	6.31
Limit value @ fc			50 (mV/m)			
Band occupancy of 915.736MHz @ -20dBc			f lower		f higher	
			915.6630 MHz		915.7740 MHz	

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 a permanent unmodulated carrier.

- 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 September 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	YORK	CBL611/A	1618	UH191	X
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	

RECEIVER TESTS

RECEIVER SPURIOUS EMISSIONS – RADIATED – PART 15.109

Ambient temperature	=	16 °C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	51% (<1GHz)	0.3m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 0.3m	[X]
Supply voltage	=	+4.5Vdc		
Channel number	=	1 & 3		

Emissions Channel 1	FREQ. (MHz)	MEAS. Rx. (dBµV)	CABLE LOSS (dB)	ANT FACTOR (dB/m)	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	915.1574	8.3	3.9	24.3	36.5	-	66.83	200
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				

Emissions Channel 3	FREQ. (MHz)	MEAS. Rx. (dBµV)	CABLE LOSS (dB)	ANT FACTOR (dB/m)	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	916.2464	8.8	3.9	24.3	37.0	-	70.79	200
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 = Peak Hold, 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 Unit operating in receive mode.
- 11 Results reported for bottom and top operating frequencies.
- 12 Peak Emissions meet Average Limit.

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 – Part 15.209 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	X
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	YORK	CBL611/A	1618	UH191	X
SPECTRUM ANALYSER	ANRITSU	MS2665C	MT26089	479	X

ANNEX A
PHOTOGRAPHS



PHOTOGRAPH No. 2

TRANSMITTER FRONT VIEW



PHOTOGRAPH No. 3

TRANSMITTER REAR VIEW

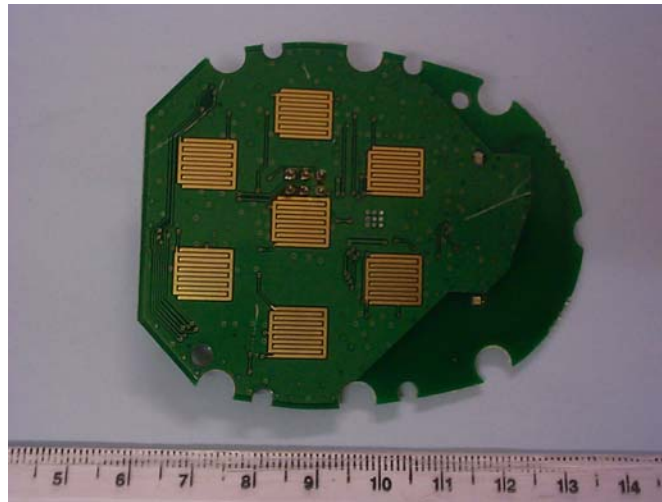


PHOTOGRAPH No. 3 REAR VIEW BATTERY COMPARTMENT REMOVED



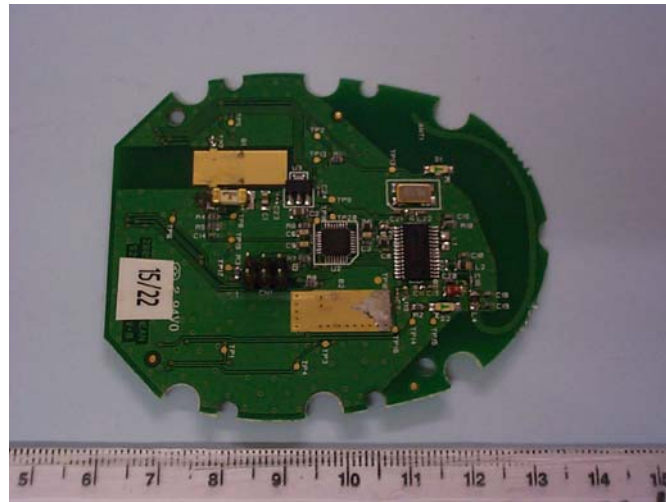
PHOTOGRAPH No. 5

TRANSMITTER PCB TRACK SIDE



PHOTOGRAPH No. 6

TRANSMITTER PCB COMPONENT SIDE



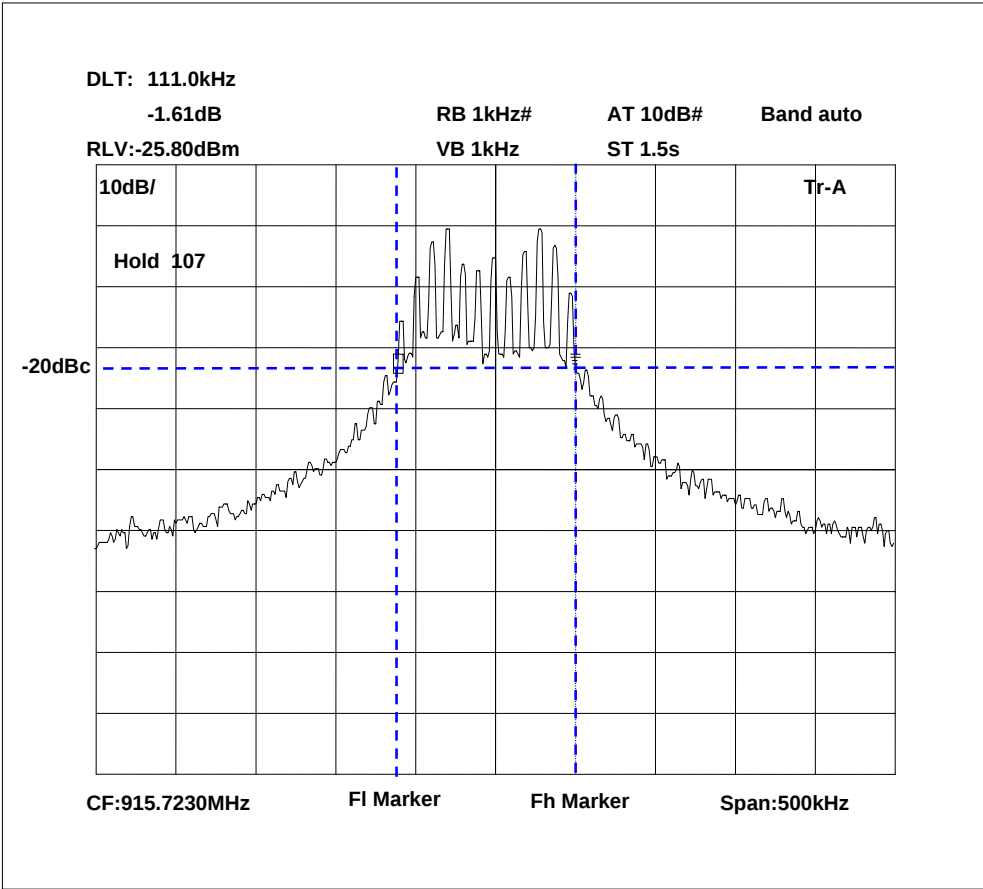
ANNEX B
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

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 = 915.6630 MHz
Fh = 915.7740 MHz
Occupied Bandwidth = 111.0 kHz

ANNEX D
SCAN PLOT(s)

Receive Mode

TRL Compliance Ltd

30 Jan 2006 14:40

E-Field Radiation (30MHz-1GHz)

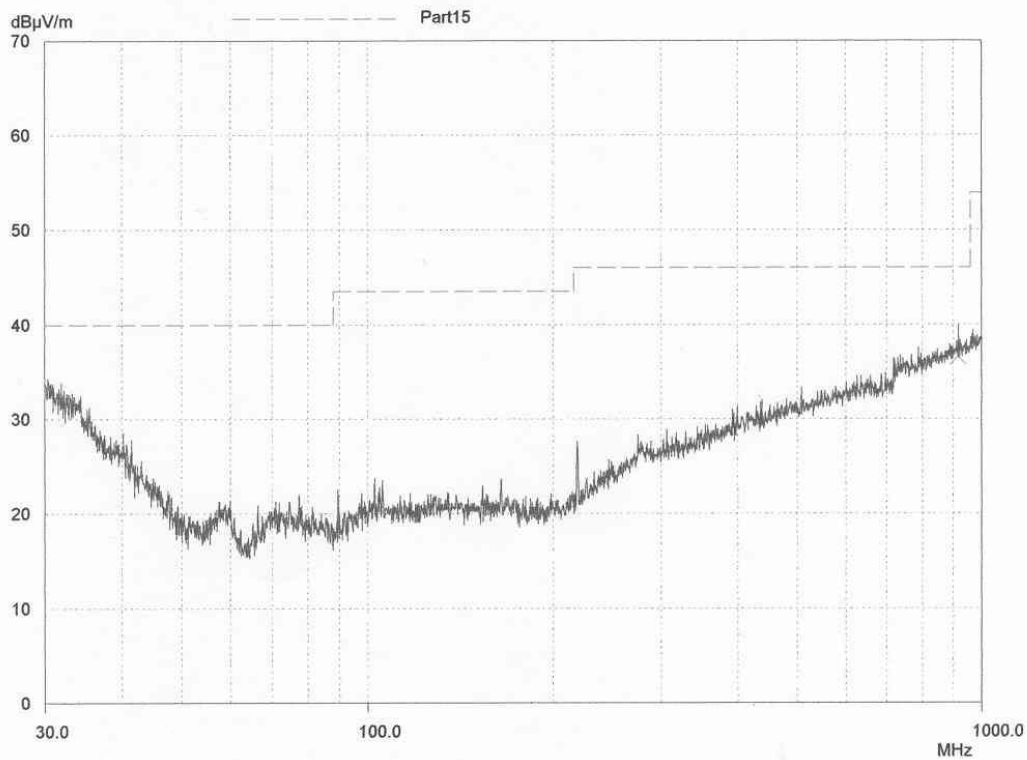
EUT: ACTIVote
 Manuf: Promethean
 Op Cond: Prescan 30MHz - 1000MHz
 Operator: D Winstanley
 Test Spec: Part15
 Comment: Unit On RX Buttons facing Antenna
 Rx Antenna Vertical

Scan Settings (1 Range)

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



PAGE 1

Transmit Mode

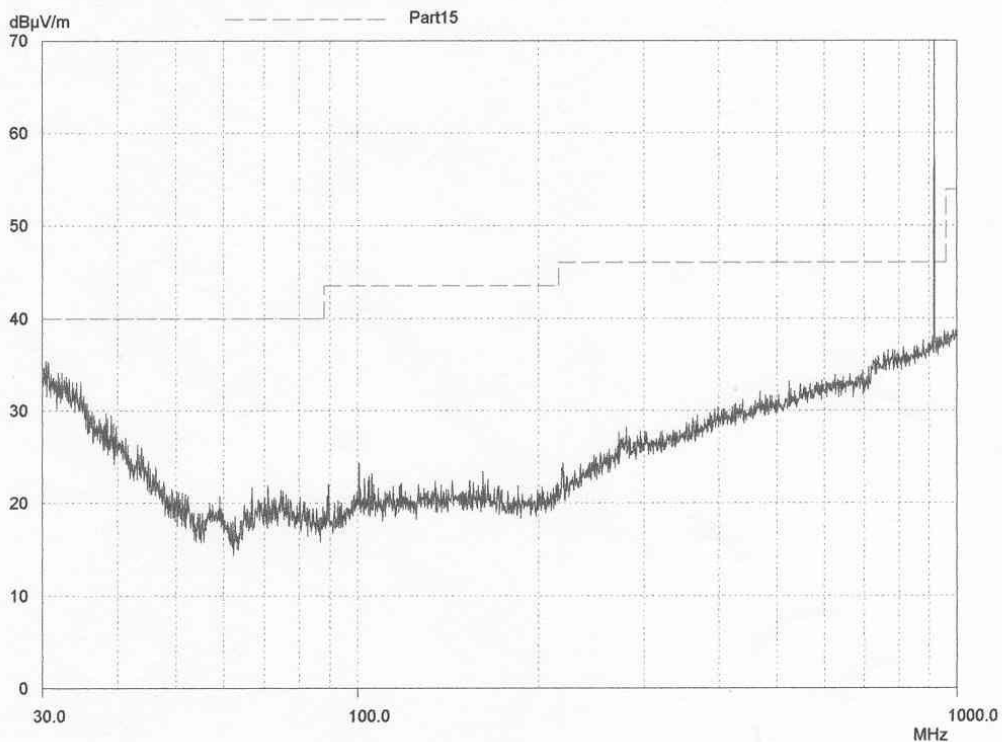
TRL Compliance Ltd

30 Jan 2006 13:56

E-Field Radiation (30MHz-1GHz)

EUT: ACTIVote
 Manuf: Promethean
 Op Cond: Prescan 30MHz - 1000MHz
 Operator: D Winstanley
 Test Spec: Part15
 Comment: Unit On. Permanent carrier. Buttons facing Antenna
 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					



PAGE 1

ANNEX E
EQUIPMENT CALIBRATION

TRL Number	Equipment Type	Manufacturer	Last Cal Calibration	Calibration Period	Due For Calibration
UH006	3m Range ERP CAL	TRL	06/01/2006	12	06/01/2007
UH028	Log Periodic Ant	Schwarbeck	28/04/2005	24	28/04/2007
UH029	Bicone Antenna	Schwarbeck	27/04/2005	24	27/04/2007
UH041	Multimeter	AVOmeter	20/12/2005	12	20/12/2006
UH120	Spectrum Analyser	Marconi	15/03/2005	12	15/03/2006
UH122	Oscilloscope	Tektronix	07/06/2005	24	07/06/2007
UH132	Power meter	Marconi	03/01/2006	12	03/01/2007
UH162	ERP Cable Cal	TRL	06/01/2006	12	06/01/2007
UH179	Power Sensor	Marconi	14/12/2004	12	14/12/2005
UH191	Bilog	York	16/04/2004	24	16/04/2006
UH228	Power Sensor	Marconi	03/01/2006	12	03/01/2007
UH253	1m Cable N type	TRL	05/01/2006	12	05/01/2007
UH254	1m Cable N type	TRL	05/01/2006	12	05/01/2007
UH265	Notch filer	Telonic	24/06/2005	12	24/06/2006
L005	CMTA	R&S	05/12/2005	12	05/12/2006
L007	Loop Antenna	R&S	29/03/2005	24	29/03/2007
L138	1-18GHz Horn	EMCO	15/04/2005	24	15/04/2007
L139	1-18GHz Horn	EMCO	03/05/2005	24	03/05/2007
L176	Signal Generator	Marconi	31/01/2005	12	31/01/2006
L193	Bicone Antenna	Chase	12/10/2003	24	12/10/2005
L203	Log Periodic Ant	Chase	21/10/2003	24	21/10/2005
L280	18GHz Cable	Rosenberger	05/01/2006	12	05/01/2007
L343	CCIR Noise Filter	TRL	07/06/2005	12	07/06/2006
L426	Temperature Indicator	Fluke	04/01/2006	12	04/01/2007
L479	Analyser	Anritsu	18/11/2005	12	18/11/2006
L552	Signal Generator	Agilent	25/04/2005	12	25/04/2006

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**