TEST REPORT NO: RU1142/6219

COPY NO: 2

ISSUE NO: 1

FCC ID: SSULD20D100

REPORT ON THE CERTIFICATION TESTING OF A
SOLUTIONS MADE EASY Ltd
LEAK TRACKER LD20-D DETECTOR VALVE
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15.249 January 2005
INTENTIONAL RADIATOR SPECIFICATION

TEST DATE: 14th January 2005 – 3rd March 2005

TESTED BY: Daniel Winstanley — Digitally signed by Daniel Winstanley DN: CN = Daniel Winstanley, C = GB, O = TRL Compliance Ltd Reason: I am the author of this document Date: 2005.12.05 14:04:06 Z — D WINSTANLEY

APPROVED BY: Peter Green — Digitally signed by Peter Green DN: CN = Peter Green, C = GB Reason: I am approving this document Date: 2005.12.05 14:17:47 Z — P GREEN, EMC PRODUCT MANAGER

DATE: 5th December 2005

Distribution:

Copy Nos:
1. SOLUTIONS MADE EASY Ltd
2. FCC EVALUATION LABORATORIES
3. TRL EMC

TRL COMPLIANCE SERVICES 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

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:	SSULD20D100					
PURPOSE OF TEST:	Certification					
TEST SPECIFICATION:	FCC RULES CFR 47, Part 15.249 January 2005					
TEST RESULT:	Compliant to Specification					
EQUIPMENT UNDER TEST:	LEAK TRACKER LD20-D DETECTOR VALVE					
EQUIPMENT SERIAL No:	Engineering Sample					
EQUIPMENT TYPE:	Detector & Controlled Shutoff Valve					
PRODUCT USE:	Prevention of Water Leakage					
CARRIER EMISSION:	8.42 mV/m @ 3m					
ANTENNA TYPE:	Integral					
ALTERNATIVE ANTENNA:	Not applicable					
FREQUENCY OF OPERATION:	910.0MHz					
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):	+110Vac or +6Vdc					
TEST DATE(s):	14th January 2005 – 3rd March 2005					
ORDER No(s):	800015					
APPLICANT:	Solutions Made Easy Ltd					
ADDRESS:	261 Bath Road Bawdrip Somerset TA7 8PW					

TESTED BY: Daniel Winstanley — Digitally signed by Daniel Winstanley, DN: CN = Daniel Winstanley, C = GB, O = TRL Compliance Ltd, Reason: I am the author of this document, Date: 2005.12.05 14:04:24 Z — D WINSTANLEY

APPROVED BY: Peter Green — Digitally signed by Peter Green, DN: CN = Peter Green, C = GB, Reason: I am approving this document, Date: 2005.12.05 14:17:59 Z — P GREEN, EMC PRODUCT MANAGER

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	LEAK TRACKER LD20-D DETECTOR VALVE
EQUIPMENT TYPE:	Detector & Controlled Shutoff Valve
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):	800015
APPLICANT'S CONTACT PERSON(s):	Mr M Lee
E-mail address:	mike@soleasy.co.uk
APPLICANT:	Solutions Made Easy Ltd
ADDRESS:	261 Bath Road Bawdrip Somerset TA7 8PW
TEL:	+44 (0) 1278 686160
FAX:	+44 (0) 1278 684077
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRL EMC
UKAS ACCREDITATION No:	0728
TEST DATE(s)	14th January 2005 – 3rd March 2005
TEST REPORT No:	RU1142/6219

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	Quasi Peak Average	YES
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: Prevention of Water Leakage

3. Emission Designator:

4. Duty Cycle: <100%

5. Transmitter bit or pulse rate and level: bps

6. Temperatures: Ambient (Tnom) 8^{o}C

7. Supply Voltages: Vnom +110Vac or +6Vdc

   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

Ambient temperature	=	8°C(<1GHz)	3m measurements <1GHz	[X]
Relative humidity	=	41% (<1GHz),	0.3m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 0.3m	[X]
Supply voltage	=	+110Vac or +6Vdc		
Channel number	=	1		

	Freq (MHz)	Meas Rx. (dBµV)	Cable loss (dB)	Ant Factor	Field Strength (dBµV/m)	Extrap Fact	Field Strength (µV/m)	Limit (µV/m)
30MHz - 88MHz								
88MHz - 216MHz								
216MHz - 960MHz								
960MHz - 1GHz								
1GHz - 5GHz								

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. Peak emissions are within 20 dB of the average limit
8. New batteries used for battery powered products.
9. (R) Indicates restricted bands, as per Part 15.205
10. Results not within 20 dB's of limit are not necessarily recorded
11. See annex D for scan data. Scan with Permanently Modulated Carrier
12. Unit has modified software to enable transmitting permanently modulated carrier during pre scan.
13. Unit has modified software to enable transmitting a modulated carrier at a rate of once per 5.44 seconds, as per initial sequence, for measurement. See Annex E for duty cycle plots

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 test:

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	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 January 2005

Ambient temperature	=	8°C(<1GHz),	3m measurements @ fc	[X]
Relative humidity	=	41%(<1GHz),	10m measurements @ fc	[ ]
Conditions	=	Open Area Test Site (OATS)	30m measurements @ fc	[ ]
Supply voltage	=	+110Vac or +6Vdc	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)	DUTY CYCLE CORRECTION FACTOR (dB)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (mV/m)
910.0	73.7	3.9	20.9	98.5	-20	-	8.42

Limit value @ fc	**50 (mV/m)**	
Band occupancy @ -20dBc	**f lower**	**f higher**
	909.736 MHz	910.198 MHz

See spectrum analyser plot – Annex C

Duty Cycle Correction Factor = 20 Log (Ton / 100ms) Where Ton is transmitter on time during a 100ms period

Duty Cycle Correction Factor = 20 Log (3.08ms / 100ms)

Duty Cycle Correction Factor = -30.22

Maximum allowable duty cycle correction factor = 20 dB

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 has modified software to enable transmitting at a rate of once per 5.44 seconds, as per initial sequence. Measurement times adjusted accordingly.
5. See Annex E for duty cycle plots

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	

TRANSMITTER TESTS

TRANSMITTER CONDUCTED EMISSIONS – AC POWER LINE Part 15.207

Ambient temperature = 21°C(<1GHz),
Relative humidity = 41%(<1GHz),
Conditions = Power Line Laboratory
Supply voltage = 110V AC
Supply Frequency = 60Hz

SIGNIFICANT EMISSIONS

FREQUENCY (MHz)	DETECTOR	CONDUCTOR (L or N)	EMISSION (dBµV)	LIMIT (dBµV)
	No Significant emissions within 20 dB's of the limit			

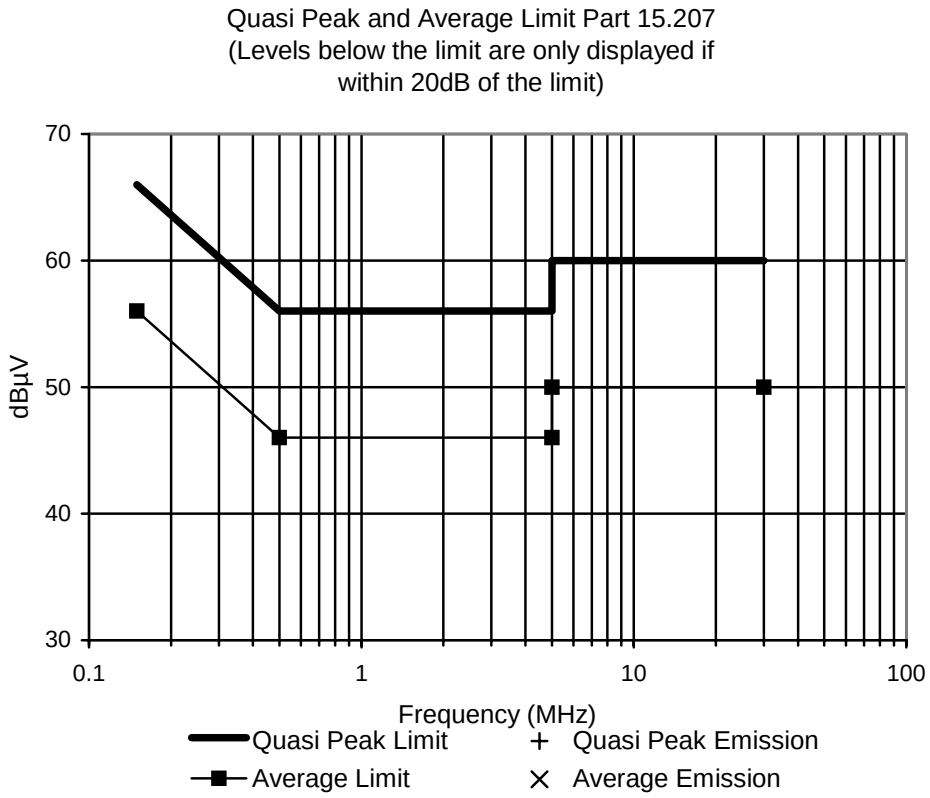
Notes: 1 See Annex D for plot
2 Unit has modified software to enable transmitting permanently modulated carrier

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

The test equipment used for the Transmitter Conducted Emissions – AC Power Line Part 15.207 test was:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
LISN / AMN	ROHDE & SCHWARZ	ESH3-Z5	83746/010	289	
RECEIVER	ROHDE & SCHWARZ	ESHS10	844077/019	353	
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	**X**
LISN/AMN	ROHDE & SCHWARZ	ESH3-Z5	840731/015	UH195	**X**
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	

POWER LINE CONDUCTION EMISSIONS



No Significant emissions within 20 dB's of the limit

ANNEX A

PHOTOGRAPHS

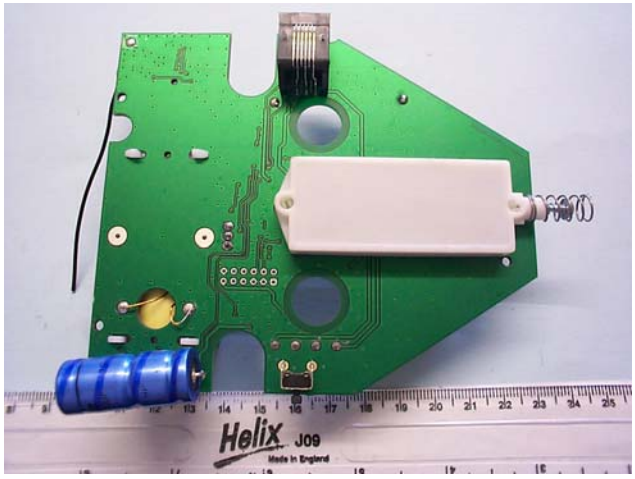
PHOTOGRAPH No. 1 **TEST SETUP**

PHOTOGRAPH No. 2 **TEST SETUP**

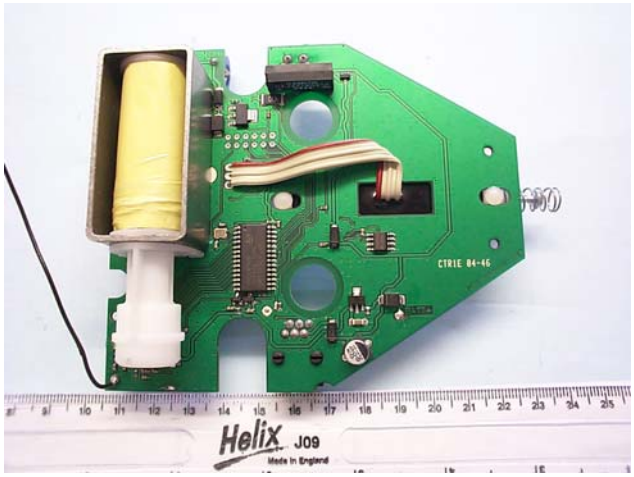
PHOTOGRAPH No. 3 **TRANSMITTER FRONT VIEW**

PHOTOGRAPH No. 4 **TRANSMITTER REAR VIEW**

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



PHOTOGRAPH No. 6 **TRANSMITTER PCB COMPONENT SIDE**



ANNEX B

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

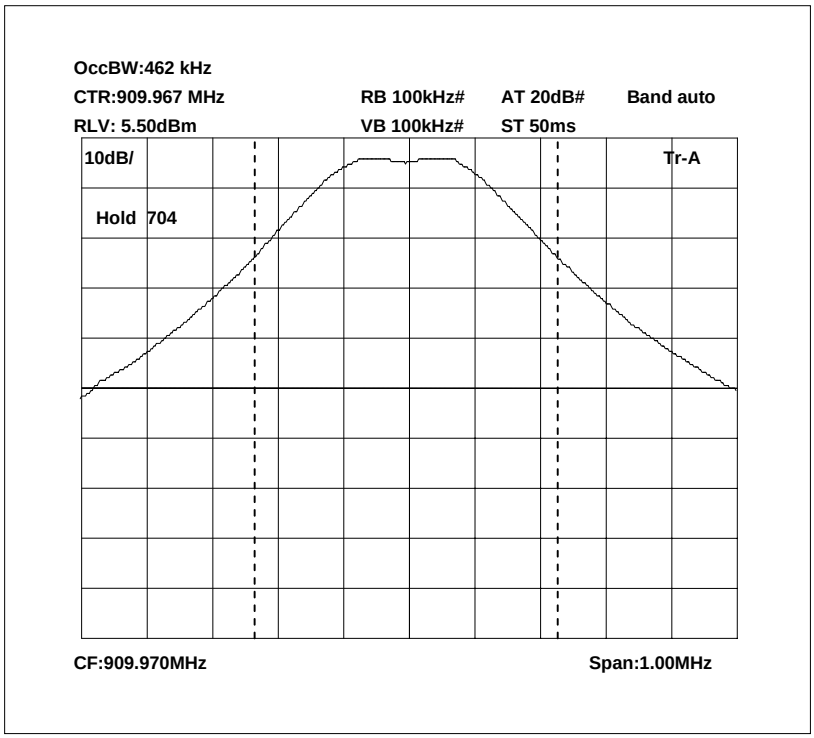
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

a.	TCB	-	APPLICATION	[X]
		-	FEE	[X]
b.	AGENT'S LETTER OF AUTHORISATION	-		[X]
c.	MODEL(s) vs IDENTITY	-		[X]
d.	ALTERNATIVE TRADE P GREEN DECLARATION(s)	-		[ ]
e.	LABELLING	-	PHOTOGRAPHS	[X]
		-	DECLARATION	[X]
		-	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	=	909.736 MHz
fh	=	910.198 MHz
Occupied Bandwidth	=	462 kHz

ANNEX D

SCAN PLOT(s)

TRL Compliance Services Ltd

17 Jan 2005 07:58

E-Field Radiation

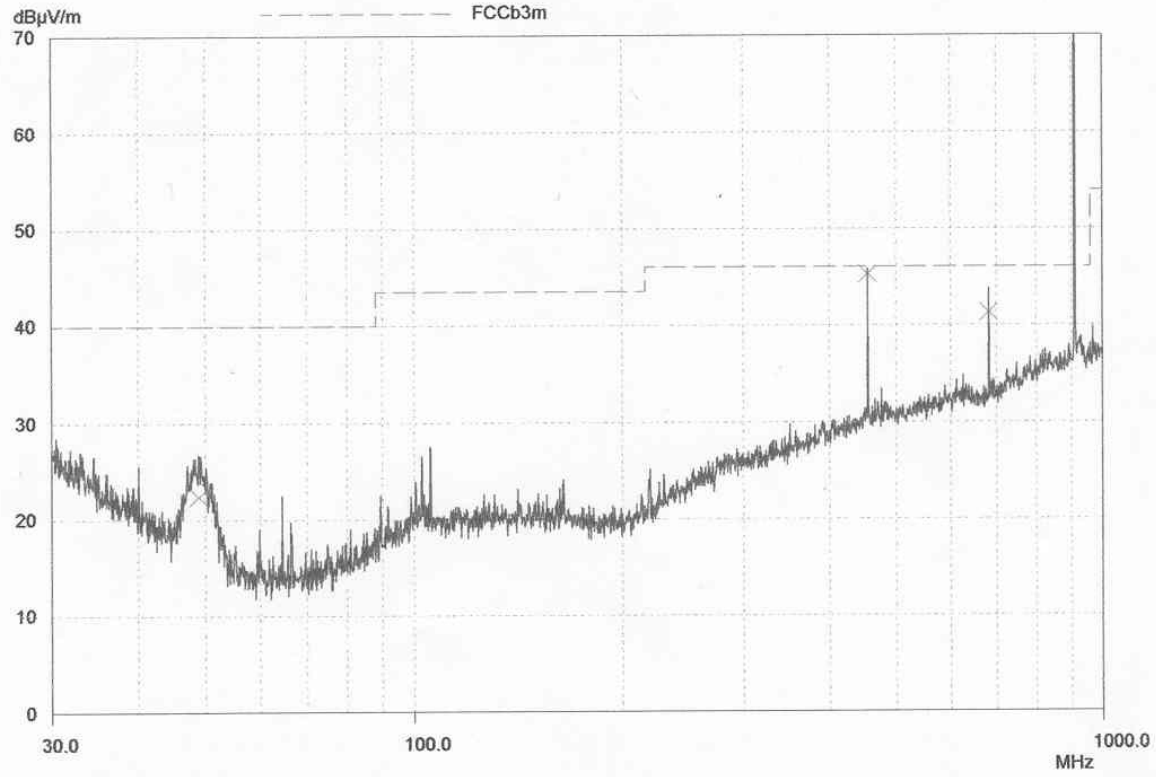
EUT:	Valve Unit
Manuf:	SME
Op Cond:	3m Indoor Prescan
Operator:	D Winstanley
Test Spec:	CFR47 FCC part 15.109 (Class B)
Comment:	Unit on Permanently modulated carrier
	Rx Antenna Vertical. Battery Powered

Scan Settings (1 Range)

Frequencies			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	15	30MHz	1000MHz	TRLUH72
	22	30MHz	1000MHz	UH93

Final Measurement:		
	Detector:	X QP
	Meas Time:	2sec
	Subranges:	50
	Acc Margin:	10 dB



PAGE 1

Powerline Conduction

01 Feb 2005 15:37

150kHz - 30MHz

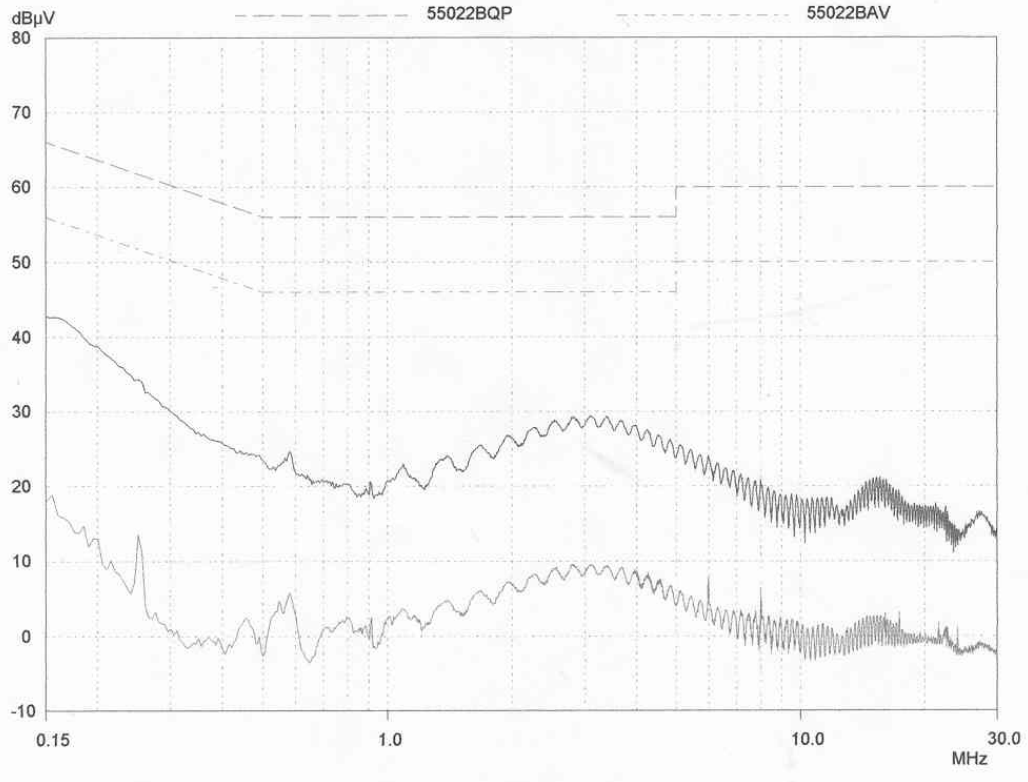
EUT:	Valve Unit
Manuf:	SME
Op Cond:	LISN UH195, cable UH21 & Receiver UH03
Operator:	D Winstanley
Test Spec:	EN55022 Class B (or Variant)
Comment:	Unit in TX
	110Vac Live line

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	5kHz	10kHz	PK+AV	50msec	Auto	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	UH21

Prescan Measurement:		
	Detectors:	X PK / + AV
	Meas Time:	see scan settings
	Subranges:	25
	Acc Margin:	20 dB

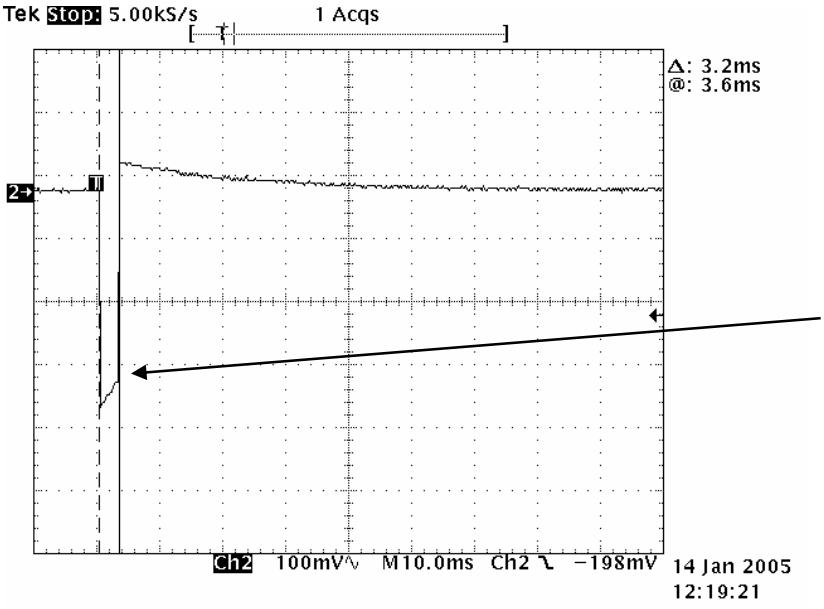


PAGE 1

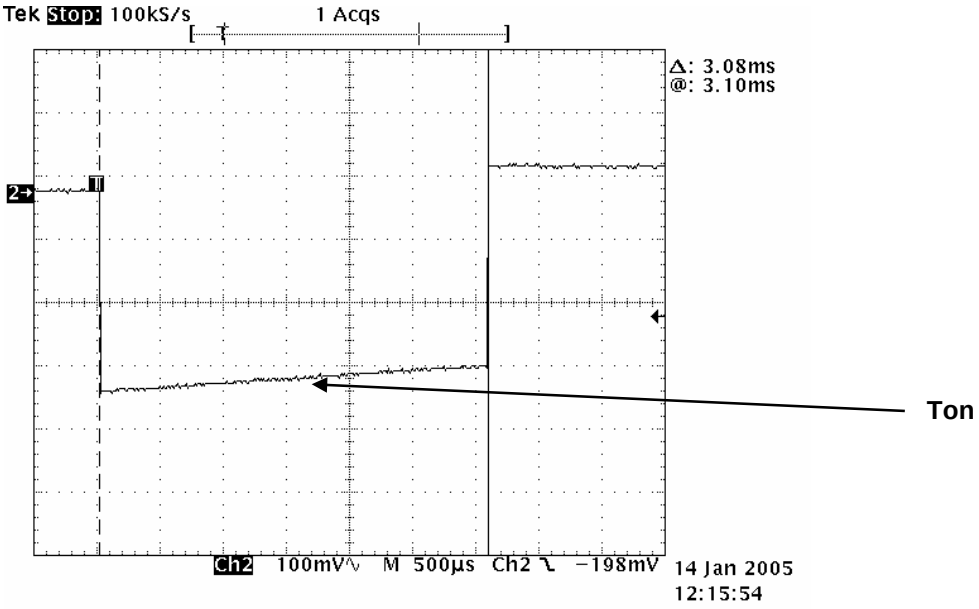
DUTY CYCLE PLOT(s)

DUTY CYCLE PLOT(s)

Ton During 100ms

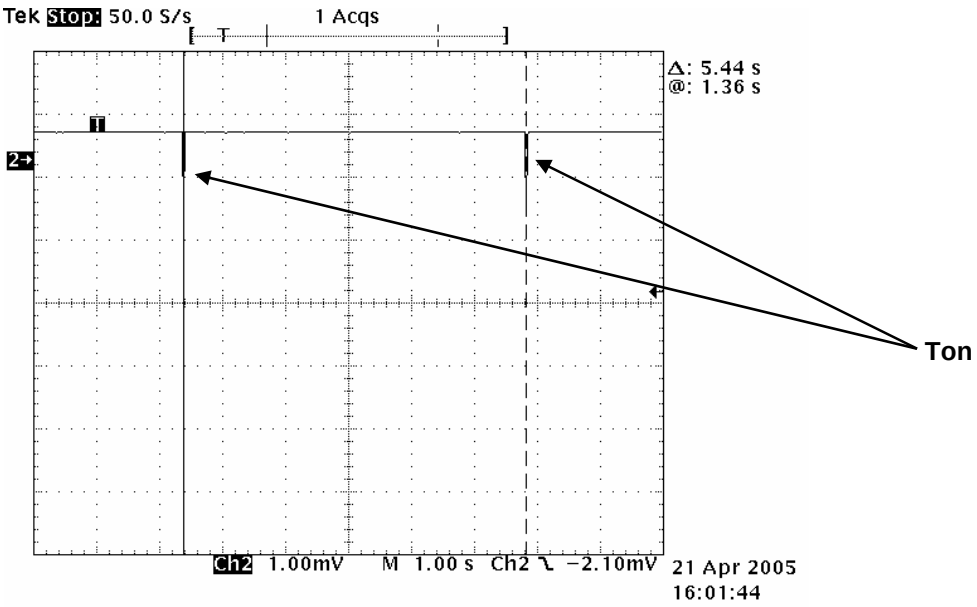


Close Up of Ton During 100ms



Ton = 3.29 ms

Pulse Repetition Frequency



PRF = 5.44 seconds

PRF = 1 / 5.44

PRF = 0.18Hz