



TEST REPORT NO: RU1142/6219
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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
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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
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FS 21805



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Notes:

- | | | | |
|----|--|-----|-------------------------------------|
| 1. | Component failure during test | YES | ☐ |
| | | NO | ☒ |
| 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 ☒

MODULATION METHOD: Amplitude ☐ Digital ☒ 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

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O = TRL Compliance Ltd
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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 ☒ No ☐
APPLICANT'S CATEGORY:	MANUFACTURER ☒ 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)	14 th January 2005 – 3 rd 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°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:**
- Results quoted are extrapolated as indicated
 - Emissions were searched to: (x) 1000MHz inclusive, as per Part 15.33a
 - Extrapolation factor 20dB from 0.3m to 3m, as per Part 15.31f
 - Measurements >1GHz @ 0.3m as per Part 15.31f(1)
 - Receiver detector <1GHz = CISPR, Quasi-Peak, 120kHz bandwidth
 - Receiver detector >1GHz = Average, 1MHz resolution bandwidth
 - Peak emissions are within 20 dB of the average limit
 - New batteries used for battery powered products.
 - (R) Indicates restricted bands, as per Part 15.205
 - Results not within 20 dB's of limit are not necessarily recorded
 - See annex D for scan data. Scan with Permanently Modulated Carrier
 - Unit has modified software to enable transmitting permanently modulated carrier during pre scan.
 - 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:**
- As per Radio – Noise Emissions, ANSI C63.4: 2003
 - Measuring distances as Notes 1 to 4 above
 - EUT 0.8 metre above ground plane
 - 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 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 = $20 \log (\text{Ton} / 100\text{ms})$ Where Ton is transmitter on time during a 100ms period

Duty Cycle Correction Factor = $20 \log (3.08\text{ms} / 100\text{ms})$

Duty Cycle Correction Factor = -30.22

Maximum allowable duty cycle correction factor = 20 dB

Notes:

- Results quoted are extrapolated as indicated
- Receiver detector @ fc = Quasi Peak 120kHz bandwidth
- When battery powered the EUT was powered with new batteries
- Unit has modified software to enable transmitting at a rate of once per 5.44 seconds, as per initial sequence. Measurement times adjusted accordingly.
- See Annex E for duty cycle plots

Test Method:

- As per Radio – Noise Emissions, ANSI C63.4: 2003
- Measuring distances 3m
- EUT 0.8 metre above ground plane
- 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 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

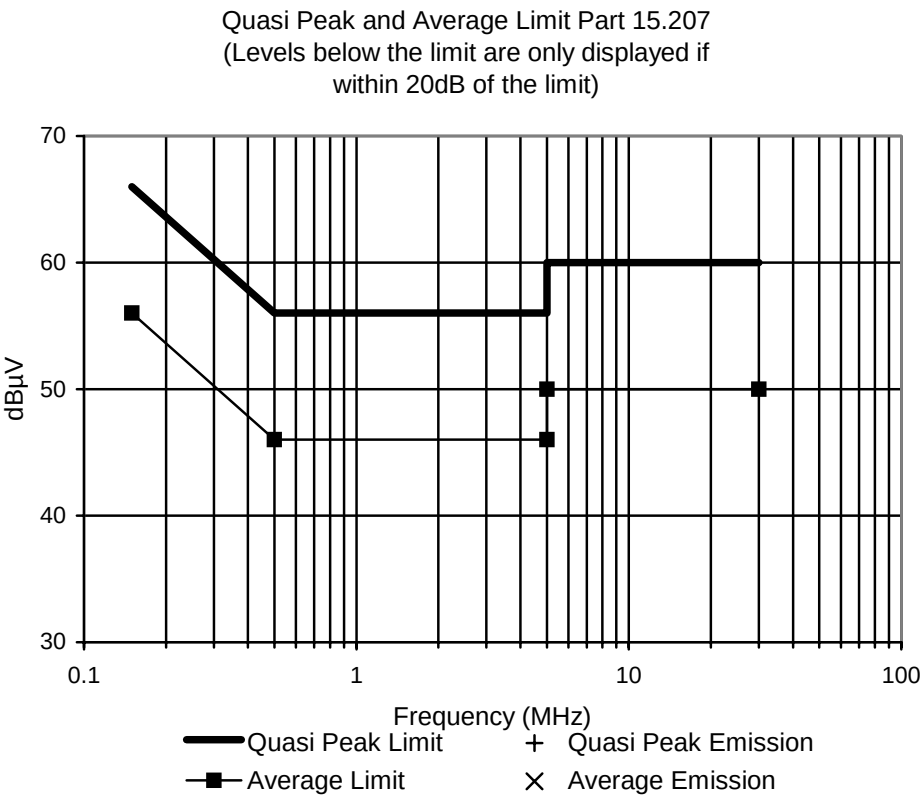
Test Method:

- 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



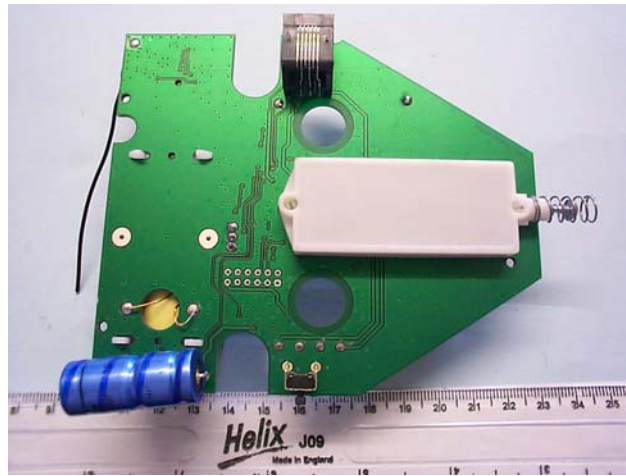
PHOTOGRAPH No. 4

TRANSMITTER REAR VIEW



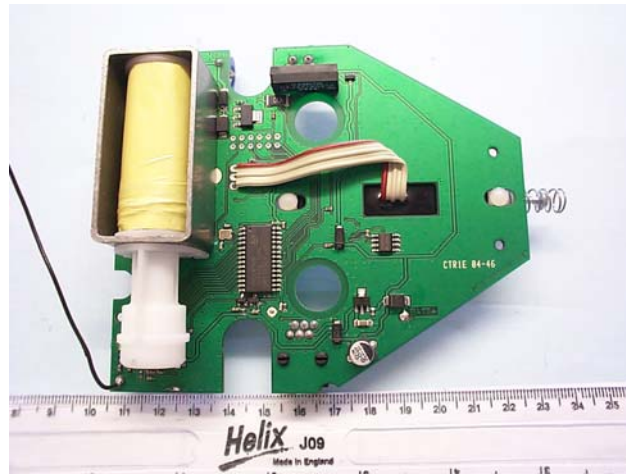
PHOTOGRAPH No. 5

TRANSMITTER PCB TRACK SIDE



PHOTOGRAPH No. 6

TRANSMITTER PCB COMPONENT SIDE



ANNEX B

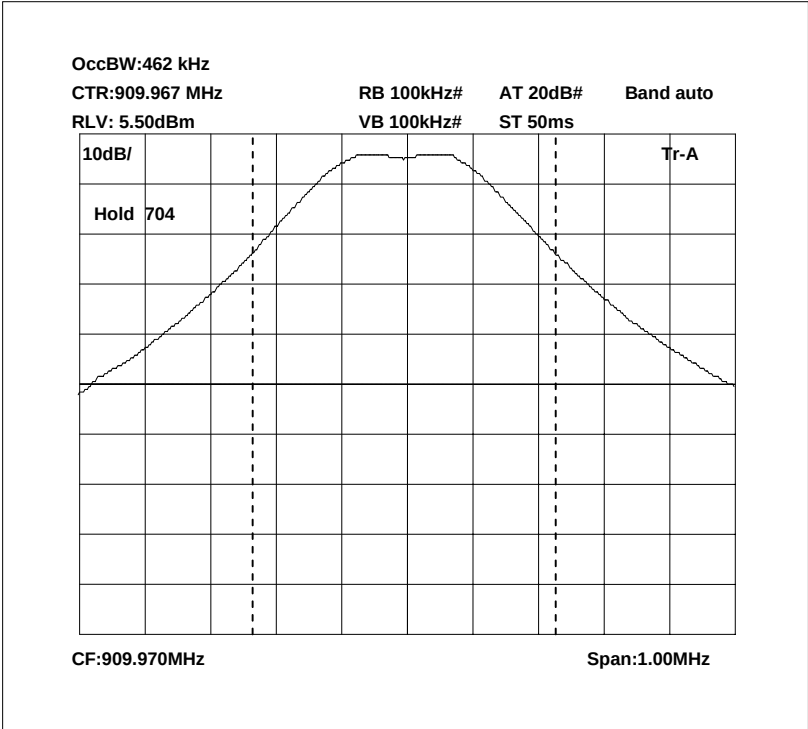
APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

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)

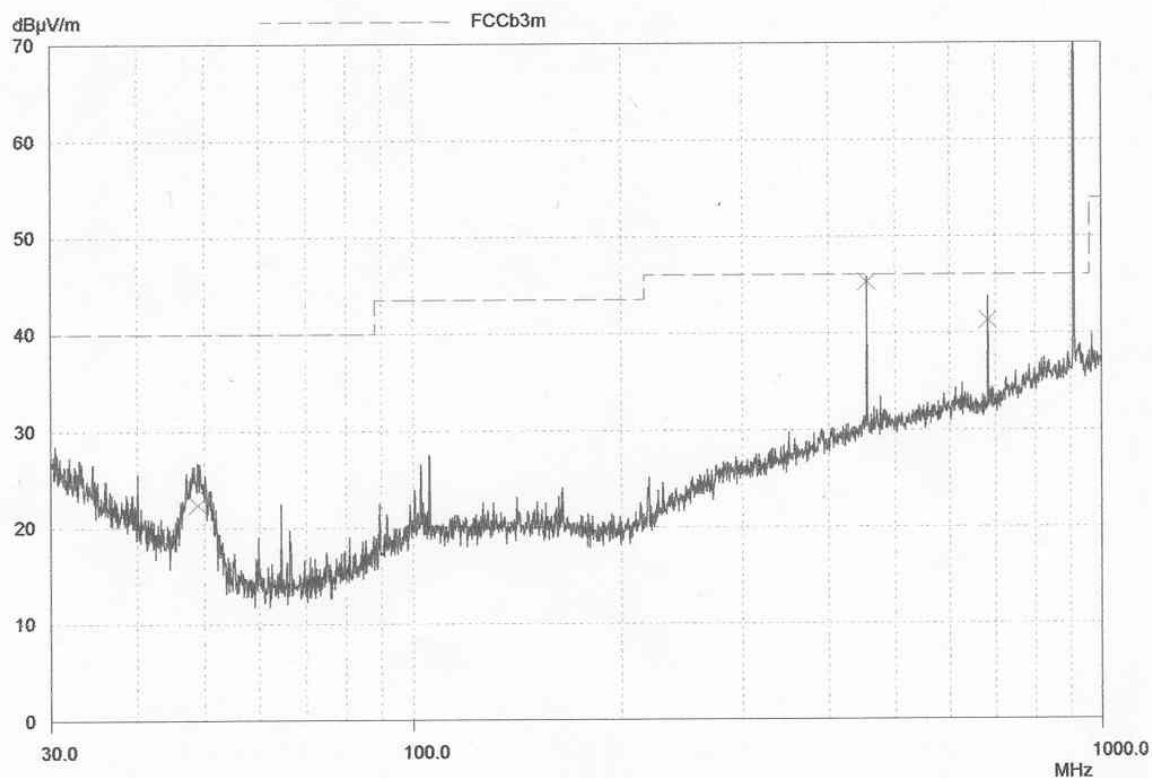
E-Field Radiation

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)		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



Powerline Conduction

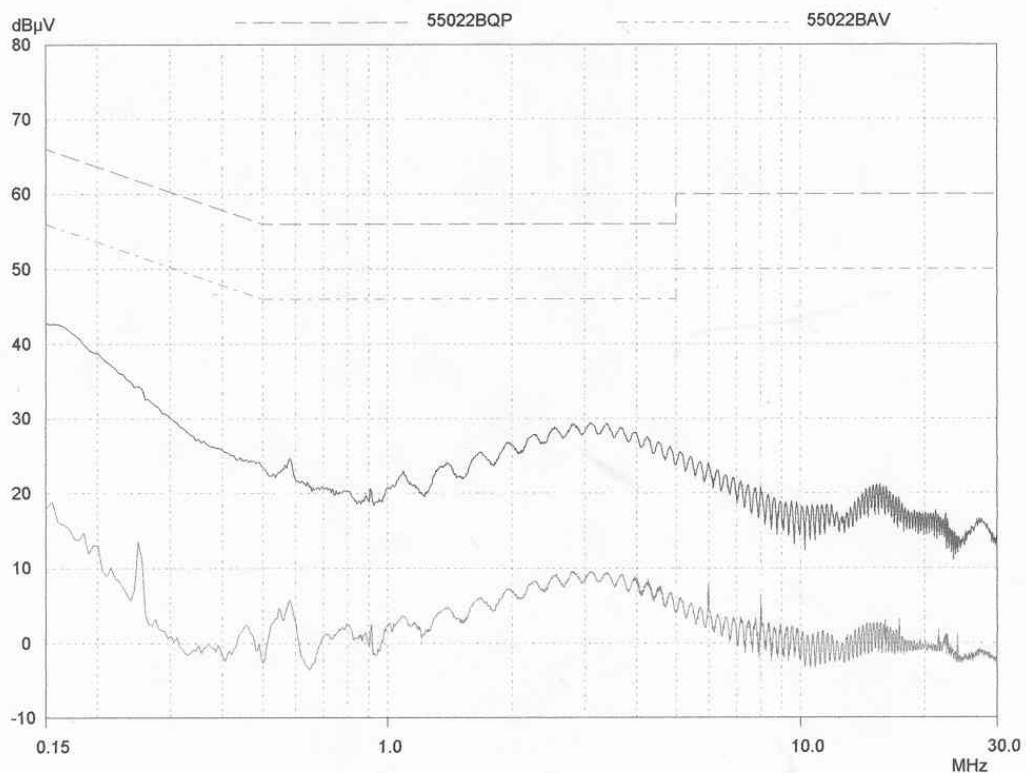
01 Feb 2005 15:37

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)			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

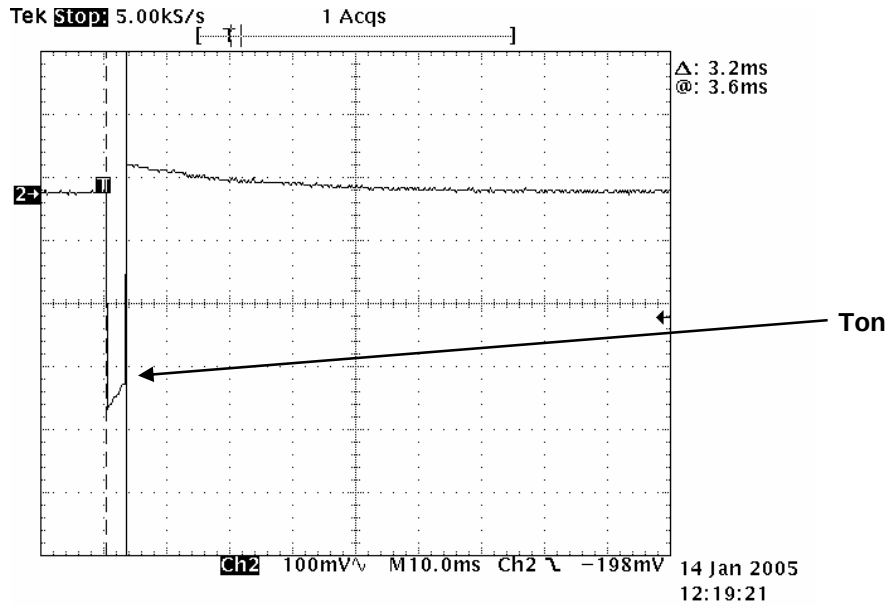


PAGE 1

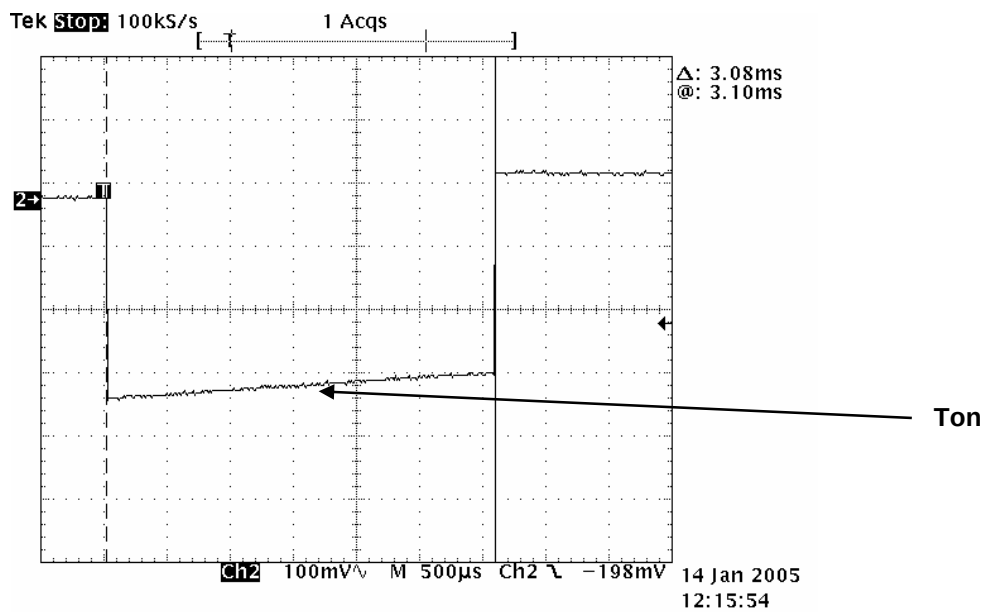
DUTY CYCLE PLOT(s)

DUTY CYCLE PLOT(s)

Ton During 100ms

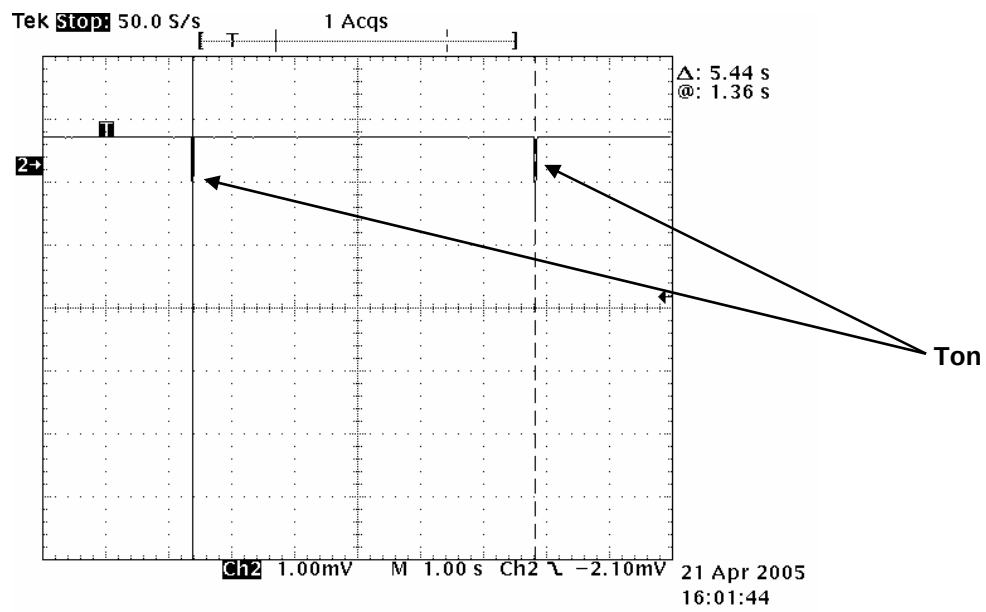


Close Up of Ton During 100ms



Ton = 3.29 ms

Pulse Repetition Frequency



PRF = 5.44 seconds

PRF = 1 / 5.44

PRF = 0.18Hz