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#### REPORT ON ELECTROMAGNETIC COMPATIBILITY TESTS

Performed at: TWENTY PENCE TEST SITE

Twenty Pence Road, Cottenham, Cambridge U.K. CB24 8PS

on

Sureflap Ltd

Sureflap

dated

### 22nd December 2009

#### **Document History**

Issue	Date	Affected page(s)	Description of modifications	Revised by	Approved by
4	00/40/00	page(3)		Бу	
1	22/12/09		Initial release		

Based on report template: v090319

	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	2 of 43

Equipment Under	r Test (EUT):	Sureflap		
Test Commission	ned by:	Sureflap Ltd St John's Innovation Centre Cowley Road Cambridge Cambridgeshire CB4 OWS		
Representative:		Nick Hill		
Test Started:		3rd December 2009	•	
Test Completed:		22nd December 200	)9	
Test Engineer:		Dave Smith		
Date of Report:		22nd December 200	)9	
Written by:	Dave Smith	Checked by:	Derek Barlow	
Signature:	D. A. Smitt	Signature:	, Barlow	
Date:	22nd December 2009	Date: 22	2nD December 2009	

dB Technology can only report on the specific unit(s) tested at its site. The responsibility for extrapolating this data to a product line lies solely with the manufacturer.

# **Test Standards Applied**

CFR 47 : 2009 Code of Federal Regulations: Pt 15 Subpart C - Radio Frequency Devices - Intentional Radiators

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# **Emissions Test Results Summary**

CFR 47: 2009 PASS

OT R 47 . 2007					17100
Test	Port	Method	Limit	PASS/FAIL	Notes
Conducted Emissions	ac power	ANSI C63.4:2003	15.207	N/A	#1
Radiated Emissions		ANSI C63.4:2003	15.209	PASS	

specs\_fccv090511

<sup>#1</sup> This test was not applicable because the EUT was powered by an internal battery and has no means to connect to an ac power source.

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		Radiated Emissions - Sample B - 126kHz,80V - 9kHz to 150kHz	
		Radiated Emissions - Sample B - 126kHz,80V - 150kHz to 1.705MHz	
		Radiated Emissions - Sample B - 126kHz,80V - 1.705MHz to 30MHz	
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#### 1 EUT Details

#### 1.1 General

The EUT was cat flap with an RFID detector system. The EUT generates a magnetic field at one of two nominal frequencies: 126kHz or 132.8kHz. The driver output is set to one of two levels: 80V or 120V. Four samples were provided to constantly generate all four combinations of carrier level and frequency. A fifth sample was provided which continuously performed the normal read cycle which involves sequentially transmitting at all of the frequency/level combinations.

The EUT is powered from an internal battery and has no connecting cables.

The EUT was considered an intentional radiator under the rules of CFR 47 part 15 subpart C. The general limits for intentional radiators (section 15.209) were applied. The carrier frequencies do not fall within restricted bands of section 15.205.

Details of the EUT and associated peripherals used during the tests are listed below. Figure 1 shows the interconnections between the EUT and peripherals.

Item	Manufacturer	Model	Description	Serial No:	Notes
1	Sureflap Ltd	Sureflap	EUT sample A set at 126kHz, 120V		
2	Sureflap Ltd	Sureflap	EUT sample B set at 126kHz, 80V		
3	Sureflap Ltd	Sureflap	EUT sample C set at 132.8kHz, 120V		
4	Sureflap Ltd	Sureflap	EUT sample D set at 132.8kHz, 80V		
5	Sureflap Ltd	Sureflap	EUT sample E continously cycle through read modes		

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### 1.2 Modifications to EUT and Peripherals

Details of any modifications that were required to achieve compliance are listed below. The modification numbers are referred to in the results sections as appropriate.

Mod No:	Details	Implemented for
0	Original units with test firmware to provide suitable test frequencies and levels.	
1	Correction made to test firmware to set the 120V level correctly.	
2	C40 changed from 100pF to 47pF. This was to ensure that transients were not produced when the RF signal was switched on and off. It had no effect on continuous transmit levels or frequencies.	

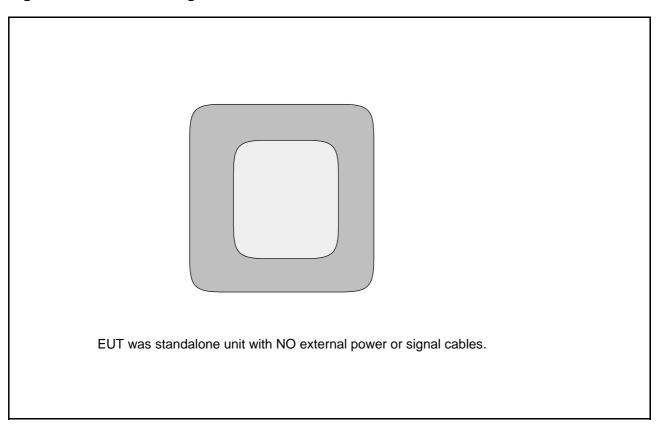
#### 1.3 EUT Operating Modes

The EUT was tested in the following operating mode or modes. Generally, operating modes are chosen that will exercise the functions of the EUT as fully as possible and in a manner likely to produce maximum emission levels or susceptibility. Individual test result sheets reference the operating mode of the EUT.

Operating Mode	Details
1	Transmitting constantly at a fixed frequency and level.  Normally the carrier is only activated when a cat enters the cat flap and so special test firmware was used to provide a constant transmission.
2	Running test firmware which continuously cycles trough the normal read cycle, turning the RF on and off at the normal frequencies and levels. This mode was used to check that no transients occurred when turning the RF on and off.

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Figure 1 General Arrangement of EUT



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Photograph 1 Arrangement of EUT - Front



Photograph 2 Arrangement of EUT - Back

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## 2 Test Equipment

The test equipment used during the tests was one or more of the items listed below. Individual test result sheets indicate which items were used.

Ref No:	Details	Serial Number	Calibration Due
A12	Chase Bilog CBL6111A	1012	17 Dec 2010
A5	Chase Bilog CBL6111A	1760	17 Dec 2010
A9	EMCO 6502 Loop	2139	14 Jan 2010
R7	R&S ESVD	841729/003	20 Nov 2010
R8	Agilent E7405A Spectrum Analyser	MY44212494	15 Sep 2010
R9	Agilent E7405A Spectrum Analyser  Agilent E7405A Spectrum Analyser	MY45110758	2 Nov 2010

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#### 3 Test Methods

#### 3.1 Radiated Emissions below 30MHz

This section describes the general method of performing this test. The specific method used and any deviations from this general method are listed in the appropriate results section.

Initial scans are performed in a semi-anechoic screened room at a distance of 3m. Scans are performed over the frequency range specified in the test standard with a loop antenna both co-axially and orthogonally orientated with respect to the EUT. During these scans the EUT and peripherals are rotated through 360°. Bench top EUTs are placed on a non-conducting bench at a height of 0.8m above the ground plane. Floor standing EUTs are placed 0.1m above the ground plane. The results of the scans are shown in the plots included at the end of the report.

Significant emissions identified by the scans are measured on an open area test site at the appropriate test distance using a CISPR16 quasi-peak receiver. Maximised readings are obtained by rotating the EUT through 360° with the antenna at a height of 1m. Measurements are made with the antenna both coaxially and orthogonally orientated with respect to the EUT and the results tabulated.

Tabulated results are obtained by adding the raw reading from the receiver (in dBuV) to the appropriate correction factors for the antenna and cables to give a reading in dBuV/m. For example:

Frequency Receiver reading Correction Factor Final level 126kHz 75.8 dBuV 8.0 dB/m 83.8 dBuV/m

Final reading = 75.8 + 8.0 = 83.8.

#### 3.2 Radiated Emissions above 30MHz

This section describes the general method of performing this test. The specific method used and any deviations from this general method are listed in the appropriate results section.

Initial scans are performed in a semi-anechoic screened room at a distance of 3m. Scans are performed over the frequency range specified in the test standard with the antenna both horizontally and vertically polarised. During these scans the EUT and peripherals are rotated through 360°. Bench top EUTs are placed on a non-conducting bench at a height of 0.8m above the ground plane. Floor standing EUTs are placed 0.1m above the ground plane. The results of the scans are shown in the plots included at the end of the report.

Significant emissions identified by the scans are measured on an open area test site at the appropriate test distance using a CISPR16 quasi-peak receiver. Maximised readings are obtained by rotating the EUT through 360° and adjusting the height of the antenna from 1m to 4m. Measurements are made with the antenna both horizontally and vertically polarised and the results tabulated.

Tabulated results are obtained by adding the raw reading from the receiver (in dBuV) to the appropriate correction factors for the antenna and cables to give a reading in dBuV/m. For example:

Frequency Receiver reading Correction Factor Final level 160MHz 5.9 dBuV 12.6 dB/m 16.4 dBuV/m

Final reading = 5.9 + 12.6 = 16.4

#### 4 Test Results

The following sections contain tabulated test results. Plots of various scans are included at the back of this section.

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### 4.1 Radiated Emissions Results - Carrier

Factor Set 3: - - -

Test Equipment: R8 A9 CSET005

Radiated Emissions

	Radiated_Emissions												
Con	npany:	Sure	flap	Ltd				Proa	<sup>uct:</sup> S	Sureflap			
Date	9 <i>:</i>	03/12	2/200	9				Test	Eng: D	ave Smitl	n		
Port.													
Test		ANSI	C63	4:200	03 using	limits	of	15	209				
Port.							•						
Test	:				using	limits	S OT						
Plot	Op Mode	Mod State											
	126	(Hz 80	)V										
4	1 1	0	10	1	0.126	Par	75.8	8.0		83.8	114.2	30.4	#1
4	1	0	10	1	0.126	Per	71.1	8.0		79.2	114.2	35.1	#1
	126	kHz 12											
1	1	1	10	1	0.126	Par	79.5	8.0		87.5	114.2	26.7	#1
1	1	1	10	1	0.126	Per	74.9	8.0		82.9	114.2	31.3	#1
		8kHz											
10	1	0	10	1	0.133	Par	75.5	8.1		83.6	113.8	30.2	#1
10	1	0	10	1	0.133	Per	71.0	8.1		79.1	113.8	34.7	#1
7	132.	8kHz 1	120V	1	0.133	Par	79.0	8.1		87.1	113.8	26.7	#1
7		1	10	1	0.133	Per	74.4	8.1		82.5	113.8	31.3	#1
′	'	•	10	'	0.133	101	74.4	0.1		02.5	113.0	31.3	" '
				I		I	l	l				I	
	Resul	ts					Minimu		jin		26.7	dB	
							PASS/F	AIL			PASS		
No	tes					Comr	nents aı	nd Obse	ervation	ns			
	·1				scans shov vas determ	•				v usina ar	n extrapolati	on of	
			The limit was determined at a distance of 10m by using an extrapolation of 60dB per decade. The source is a coil producing a magnetic field and so theoretically a decay of 60dB per decade would be expected. Results section 4.4 of this document shows a measurement justifying this assumption.										

Measurements made with peak detector.

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#### 4.2 Radiated Emissions Results - Below 30MHz Spurious - 126kHz operation

A9\_HI\_V\_09C CSET005\_07A 25 m cable Factor Set 1: Factor Set 2:

Factor Set 3:

Test Equipment: R8 A9 CSET005

	Test Equipment: R8 A9 CSET005 Padiated_Emissions												
								Droo	luot.				
Con	ірапу:	Sure	flap	Ltd				Proa	3	ureflap			
Date		03/12	2/200	9 & 1	0/12/2009	9		Test	Eng: D	ave Smith	1		
Port. Test		A NICI	0/1	4 200	20		- 6	45	200				
Port.		ANSI	C63	.4:200	03 using	limits	5 OT	15	209				
Test					usina	limits	of						
Plot	Ор	Mod	Dist	Fact	Freq.	Ant	Rec.	Corr'n	Corr'n	Total	Limit	Margin	Notes
	Mode	State	m	Set	MHz	Pol	Level	Factor	Factor	Level	15.209	15.209	
							dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
	126	kHz 80	V										
5	1	0	3	1	0.252	Par	72.3	8.6		80.9	139.6	58.6	#1
5	1	0	3	1	0.252	Per	67.0	8.6		75.7	139.6	63.9	#1
5	1	0	3	1	0.378	Par	68.7	9.1		77.8	136.1	58.2	#1
5	1	0	3	1	0.378	Per	62.6	9.1		71.7	136.1	64.4	#1 #1
5 5	1	0 0	3	1 1	0.504 0.504	Par Per	65.1 58.6	9.5 9.5		74.6 68.1	93.6 93.6	19.0 25.5	#1
5	1	0	3	1 1	0.630	Par	63.6	9.5		73.3	93.6 91.6	18.3	#1
5	1	0	3	1	0.630	Per	63.9	9.7		73.6	91.6	18.0	#1
5	1	0	3	1	0.756	Par	51.7	9.9		61.6	90.0	28.4	#1
5	1	0	3	1	0.756	Per	58.6	9.9		68.5	90.0	21.5	#1
	126	kHz 12	20V										
2	1	1	3	1	0.252	Par	70.2	8.6		78.9	139.6	60.7	#1
2	1	1	3	1	0.252	Per	65.7	8.6		74.4	139.6	65.2	#1
2	1	1 1	3	1	0.378	Par	73.5	9.1		82.6	136.1	53.5	#1
2	1 1	1 1	3 3	1 1	0.378 0.504	Per Par	53.4 55.9	9.1 9.5		62.5 65.4	136.1 93.6	73.5 28.2	#1 #1
2	'   1		3	1 1	0.504	Per	57.7	9.5		67.2	93.6	26.2	#1
2	1	1 1	3	1	0.630	Par	56.2	9.7		65.9	91.6	25.7	#1
2	1	1	3	1	0.630	Per	60.3	9.7		70.0	91.6	21.6	#1
2	1	1	3	1	0.756	Par	54.2	9.9		64.1	90.0	25.9	#1
2	1	1	3	1	0.756	Per	49.3	9.9		59.3	90.0	30.8	#1
	Resul	lte					Minimu	m Marc	ıin		18.0	dB	
	Resul						PASS/F		,		PASS	GD.	
No	tes					Comr	ments a	nd Obse	ervation	าร			
									,				
			Resul	its of s	scans shov	vn in p	piots 2,3	s,5 and	6.				
#	1				d on extrap								
			4.4 o	f this	document	show	s a mea	sureme	nt justi	fying this	assumption	•	
			Meas	surem	ents made	with	peak de	tector.					

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## 4.3 Radiated Emissions Results - Below 30MHz Spurious - 132.8kHz operation

Factor Set 1: A9\_HI\_V\_09C - - CSET005\_07A 25 m cable

Test Equipment: R8 A9 CSET005

	ted_En			7 03L									
Con	npany:	Sure	flap	Ltd	'			Prod	<sup>luct:</sup> S	ureflap			
Date					0/12/200	9		Test		ave Smith	า		
Port					07.127200								
Test	t:	ANSI	C63	4:200	03 using	, limits	s of	15	.209				
Port													
Test	<u>:</u>				using	limits	of						
Plot	Ор	Mod	Dist	Fact	Freq.	Ant	Rec.	Corrin	Corr'n	Total	Limit	Margin	Notes
1100		State	m	Set	MHz	Pol	Level	Factor	Factor	Level	FCC_B	FCC_B	Notes
			•••		2		dBuV	1/m	dB	dBuV/m	dBuV/m	dB	
	132	 .8kHz	ΩΛV										
11	1	0	3	1	0.266	Par	75.8	8.7		84.5	139.1	54.6	#1
11	1	0	3	1	0.266	Per	70.2	8.7		78.8	139.1	60.3	#1
11	1	0	3	1	0.399	Par	68.2	9.2		77.4	135.6	58.2	#1
11	1	0	3	1	0.399	Per	62.9	9.2		72.0	135.6	63.6	#1
11	1	0	3	1	0.531	Par	64.0	9.6		73.6	93.1	19.5	#1
11	1	0	3	1	0.531	Per	58.0	9.6		67.6	93.1	25.5	#1
11	1	0	3	1	0.664	Par	58.6	9.8		68.3	91.2	22.8	#1
11	1	0	3	1	0.664	Per	42.4	9.8		52.2	91.2	39.0	#1
11	1	0	3	1	0.797	Par	51.1	10.1		61.2	89.6	28.4	#1
11	1	0	3	1	0.797	Per	48.0	10.1		58.1	89.6	31.4	#1
_	1	.8kHz											
8	1	1	3	1	0.266	Par	77.2	8.7		85.9	139.1	53.3	#1
8	1	1	3	1	0.266	Per	72.6	8.7		81.2	139.1	57.9	#1 #1
8 8	1 1	1 1	3	1 1	0.399 0.399	Par Per	65.6	9.2 9.2		74.7 72.2	135.6 135.6	60.9 63.4	#1
8	1		3	1 1	0.399	Par	63.0 65.0	9.2		72.2 74.6	93.1	18.5	#1
8	'		3		0.531	Per	58.1	9.6		67.6	93.1	25.5	#1
8	'	1 1	3	1	0.664	Par	61.1	9.8		70.9	91.2	20.3	#1
8	1	1	3	1	0.664	Per	51.6	9.8		61.3	91.2	29.8	#1
8	1	1	3	1	0.797	Par	53.0	10.1		63.1	89.6	26.5	#1
8	1	1	3	1	0.797	Per	60.5	10.1		70.6	89.6	19.0	#1
	Resul	ts					Minimu	m Marc	uin		18.5	dB	+
	PASS/I								<b>,</b>		PASS	ub	
No	tes					Comr	ments a	nd Obse	ervation	ns			
			Resul	ts of	scans show	vn in r	olots 8.9	9.11 an	d 12.				
#	1		Limit	based	d on extrap	oolatio	n of 60	dB/deca	ide. Re	sults sect	ion		

4.4 of this document shows a measurement justifying this assumption.

Measurements made with peak detector.

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### 4.4 Radiated Emissions Results - Distance Extrapolation

Factor Set 3: - - - -

Test Equipment: R8 A9 CSET005

Radiated Emissions

Nadiated_En	1113310113			
Company:	Sureflap Ltd	·	Product:	Sureflap
Date:	03/12/2009		Test Eng:	Dave Smith
Ports:				
Test:	ANSI C63.4:2003	using limits of		

Ports:

Test: using limits of

Plot	Op Mode	Mod State		Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV		Corr'n Factor dB	Total Level dBuV/m	Difference Betweem 10m & 3m	Measured Extrapolation per Decade	Notes
	126	kHz 80	)V - 3ı	m									
	1	0	3	1	0.126	Par	108.2	8.0		116.2	32.4	62.0	
	1	0	3	1	0.378	Par	68.7	9.1		77.8	30.7	58.7	
	1	0	3	1	0.504	Par	65.1	9.5		74.6	32.2	61.7	
	1	kHz 80				_							
	1	0	10	1	0.126	Par	75.8	8.0		83.8			
	1	0	10	1	0.378	Par	38.0	9.1		47.1			
	1	0	10	1	0.504	Par	32.8	9.5		42.4			
	Resul	ts		•					·			•	

Results

Notes

Comments and Observations

Measurements were made at 10m and 3m to verify the expected 60dB/decade variation in field strength with distance.

Measurements were only possible at a few harmonics because of ambient and noise floor problems at 10m.

The results show that an extrapolation of 60dB/decade when adjusting for distance is justified.

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#### 4.5 Radiated Emissions Results - Above 30MHz

Factor Set 3: - - - -

Test Equipment: R7 A5 CSET005

Radiated Emissions

Naurateu_En	1113310113			
Company:	Sureflap Ltd		Product:	Sureflap
Date:	22/12/2009		Test Eng:	Dave Smith
Ports:				
Test:	ANSI C63.4:2003	using limits of	15.209	=FCC_B
<u> </u>				

Ports:

Test: using limits of

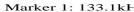
7031					using	minus	, 01						
Plot		Mod State		Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	1	Corr'n Factor dB	Total Level dBuV/m	Limit FCC_B dBuV/m	Margin FCC_B dB	Notes
24 24 24 24 24	2 2 2 2	2 2 2 2	3 3 3 3	1 1 1 1	30.000 30.000 160.000 160.000	V H V H	-3.5 -4.8 4.6 5.9	19.0 19.0 12.3 12.3		15.5 14.2 16.9 18.2	40.0 40.0 43.5 43.5	24.5 25.8 26.6 25.3	
	Resul	lts					Minimu PASS/F		gin		24.5 PASS	dB	

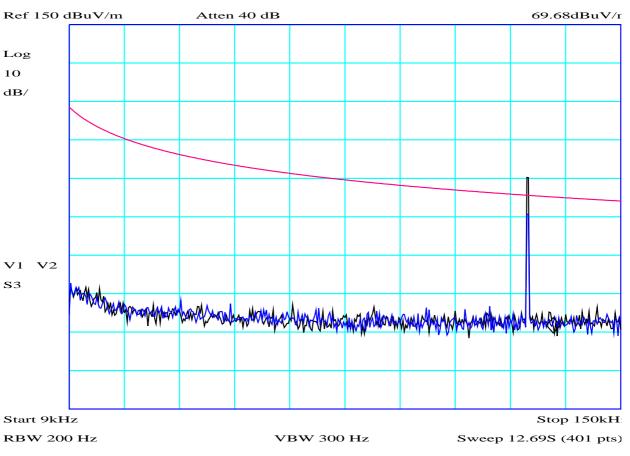
Notes Comments and Observations

Results of scans shown in plots 16 to 25.

Measurements made with quasi-peak detector.

	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
(dB)	Test No:	T3264	Test Report	Page:	16 of 43





### PLOT 1 Radiated Emissions - Sample A - 126kHz,120V - 9kHz to 150kHz

Company:	Sureflap Ltd	Product:	Sureflap
Date:	10/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC_subpartC_@3m (spurious)	Limit2:	
Limit3:		Limit4:	

Sample A: 126kHz 120V Black: loop parallel Blue: loop perpendicular

Spurious limit extrapolated using conservative 40dB/decade. For measurements on open area test site it was established that 60dB/decade was more appropriate - this would effectively increase the limit shown on this plot by 40dB.

NOTE: The limit for the carrier (shown on plot) is higher than the spurious limit shown.

Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation		Modification State:	1
Angle	0-360	File:	H9B107D8		

	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	17 of 43

Marker 1: 1.441MF
Ref 127 dBuV/m Atten 10 dB 43.14dBuV/r
Log
10
dB/

V1 V2
S3

Start 150kHz

Stop 1.705MH

RBW 9 kHz VBW 30 kHz Sweep 43.76mS (401 pts)

CF1:A9\_HI\_V\_090306 CF2:CBL002\_CBL003\_090306

### PLOT 2 Radiated Emissions - Sample A - 126kHz,120V - 150kHz to 1.705MHz

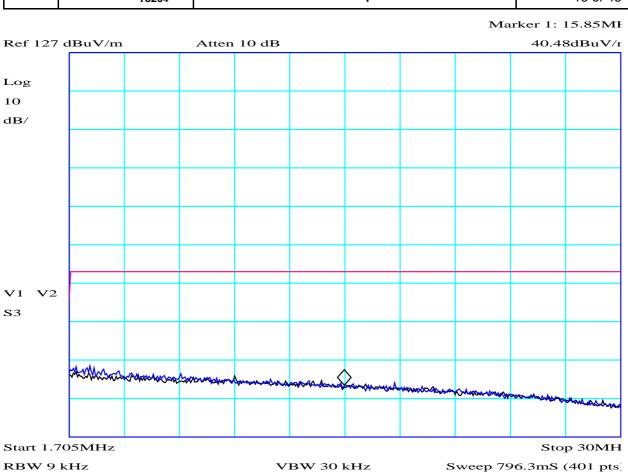
Product: Sureflap Company: Sureflap Ltd Dave Smith Date: 10/12/09 Test Eng: Method: **ANSI C63.4** Method: FCC\_subpartC\_@3m Limit2: Limit1:(VIO) Limit3: Limit4:

Sample A: 126kHz 120V Black: loop parallel Blue: loop perpendicular

Limit based on 40dB/decade extrapolation. In practice likely to be 60dB/decade in which case limit would be 40dB higher below 490kHz (as the original limit is specified at 300m) and 20dB higher above 490kHz (as the original limit for this frequency range is specified at 30m).

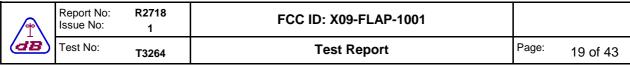
Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation		Modification State:	1
Angle	0-360	File:	H9B107E6		

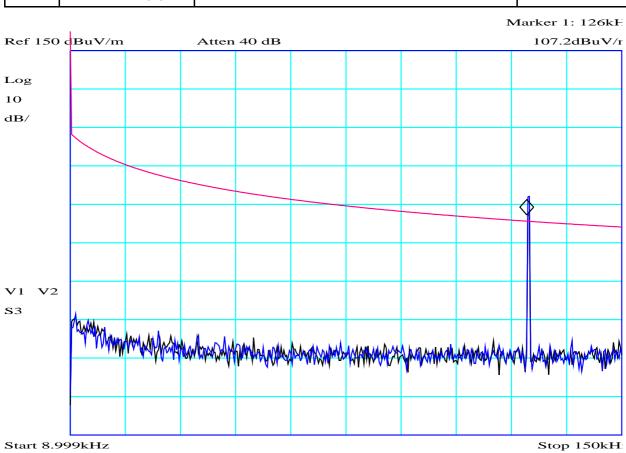
	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	18 of 43



## PLOT 3 Radiated Emissions - Sample A - 126kHz,120V - 1.705MHz to 30MHz

Company:	Sureflap L	td	Product:	Sureflap					
Date:	10/12/09		Test Eng:	Dave Smith					
Method:	ANSI 63.4		Method:						
Limit1:(VIO)	FCC_subp	oartC_@3m	Limit2:						
Limit3:			Limit4:						
Sample A: 126kHz 120V Black: loop parallel Blue: loop perpendicular Limit based on 40dB/decade extrapolation.									
Facility:	Anech_1	Height	1m	Mode:	1				
Distance	3m	Polarisation		Modification State:	1				
Angle	0-360	File:	H9B1081D						





#### PLOT 4 Radiated Emissions - Sample B - 126kHz,80V - 9kHz to 150kHz

Company: Sureflap Ltd Product: Sureflap 03/12/09 Test Eng: Dave Smith Date: Method: **ANSI C63.4** Method: FCC\_subpartC\_@3m (spurious) Limit1:(VIO) Limit2: Limit3: Limit4:

**VBW** 300 Hz

Sweep 12.69S (401 pts)

Sample B 126kHz 80V Black: loop parallel Blue: loop perpendicular

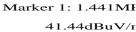
**RBW 200 Hz** 

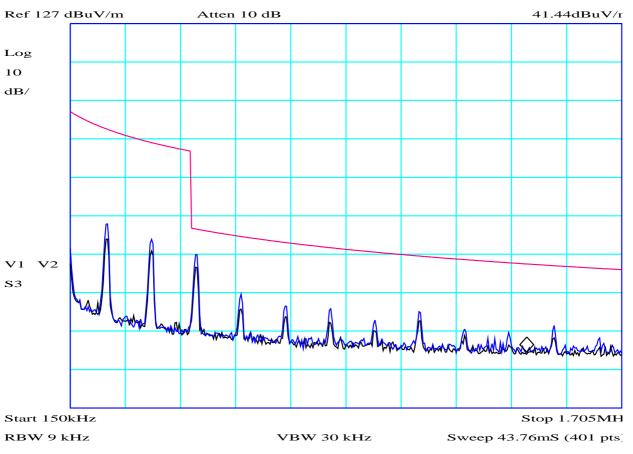
Spurious limit extrapolated using conservative 40dB/decade. For measurements on open area test site it was established that 60dB/decade was more appropriate - this would effectively increase the limit shown on this plot by 40dB.

NOTE: The limit for the carrier (shown on plot) is higher than the spurious limit shown.

Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation		Modification State:	0
Angle	0-360	File:	H9B03513		

	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	20 of 43





### PLOT 5 Radiated Emissions - Sample B - 126kHz,80V - 150kHz to 1.705MHz

Company:	Sureflap Ltd	Product:	Sureflap
Date:	03/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC_subpartC_@3m	Limit2:	
Limit3:		Limit4:	

Sample B 126kHz 80V Black: loop parallel Blue: loop perpendicular

Limit based on 40dB/decade extrapolation. In practice likely to be 60dB/decade in which case limit would be 40dB higher below 490kHz (as the original limit is specified at 300m) and 20dB higher above 490kHz (as the original limit for this frequency range is specified at 30m).

Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation		Modification State:	0
Angle	0-360	File:	H9B0354B		

	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	21 of 43

Marker 1: 15.85MI Ref 127 dBuV/m Atten 10 dB 37.74dBuV/r Log 10 dB/ V1 V2 S3Start 1.705MHz Stop 30MH

Sweep 796.3mS (401 pts) 

VBW 30 kHz

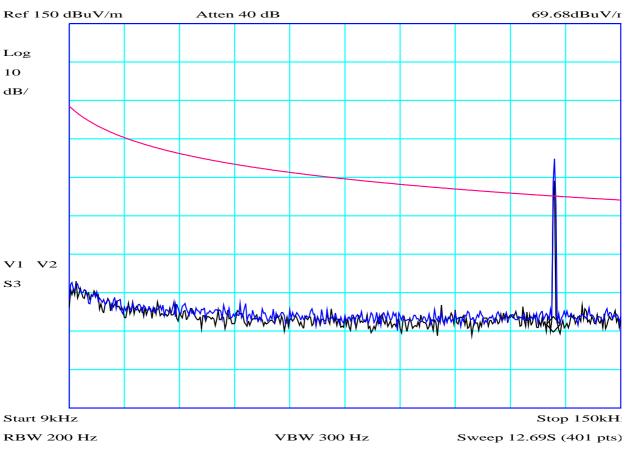
## PLOT 6 Radiated Emissions - Sample B - 126kHz,80V - 1.705MHz to 30MHz

RBW 9 kHz

Company:	Sureflap Ltd		Product:	Sureflap			
Date:	03/12/09		Test Eng:	Dave Smith			
Method:	ANSI C63.4		Method:				
Limit1:(VIO)	FCC_subpart0	C_@3m	Limit2:				
Limit3:			Limit4:				
Sample B 126kHz 80V Black: loop parallel Blue: loop perpendicular Limit based on 40dB/decade extrapolation.							
Facility:	Anech_1	Height	1m	Mode:	1		
Distance	3m	Polarisation		Modification State:	0		
Angle	0-360	File:	H9B03569				

	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	22 of 43

Marker 1: 133.1kF



### PLOT 7 Radiated Emissions - Sample C - 132.8kHz,120V - 9kHz to 150kHz

Company:	Sureflap Ltd	Product:	Sureflap
Date:	10/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC_subpartC_@3m (spurious)	Limit2:	
Limit3:		Limit4:	

Sample C: 132.8kHz 120V Black: loop parallel Blue: loop perpendicular

Spurious limit extrapolated using conservative 40dB/decade. For measurements on open area test site it was established that 60dB/decade was more appropriate - this would effectively increase the limit shown on this plot by 40dB.

NOTE: The limit for the carrier (shown on plot) is higher than the spurious limit shown.

Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation		Modification State:	1
Angle	0-360	File:	H9B107DC		

	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	23 of 43

Marker 1: 1.441MI
Ref 127 dBuV/m Atten 10 dB 43.14dBuV/r
Log
10
dB/

V1 V2
S3
Start 150kHz
Stop 1.705MH

VBW 30 kHz

Sweep 43.76mS (401 pts)

### PLOT 8 Radiated Emissions - Sample C - 132.8kHz,120V - 150kHz to 1.705MHz

Product: Sureflap Company: Sureflap Ltd Date: 10/12/09 Test Eng: Dave Smith Method: **ANSI C63.4** Method: FCC\_subpartC\_@3m Limit2: Limit1:(VIO) Limit3: Limit4:

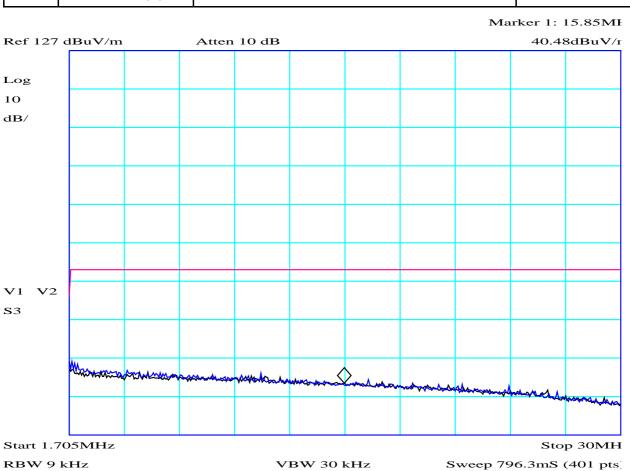
Sample C: 132.8kHz 120V Black: loop parallel Blue: loop perpendicular

RBW 9 kHz

Limit based on 40dB/decade extrapolation. In practice likely to be 60dB/decade in which case limit would be 40dB higher below 490kHz (as the original limit is specified at 300m) and 20dB higher above 490kHz (as the original limit for this frequency range is specified at 30m).

Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation		Modification State:	1
Angle	0-360	File:	H9B107F5		

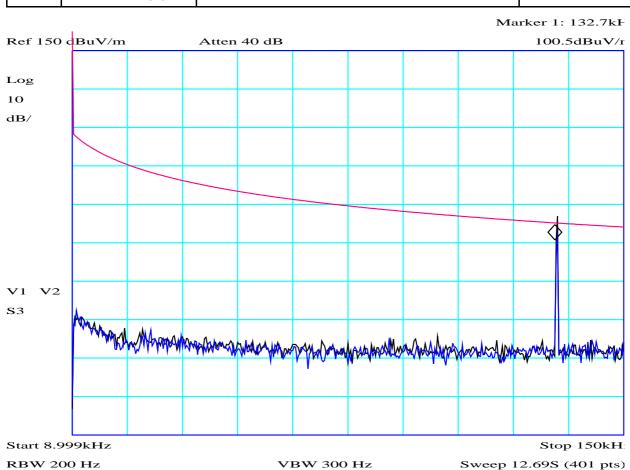
	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	24 of 43



## PLOT 9 Radiated Emissions - Sample C - 132.8kHz,120V - 1.705MHz to 30MHz

Company:	Sureflap L	td	Product:	Sureflap				
Date:	10/12/09		Test Eng:	Dave Smith				
Method:	ANSI C63.	4	Method:					
Limit1:(VIO)	FCC_subp	artC_@3m	Limit2:					
Limit3:			Limit4:					
Sample C: 132.8kHz 120V Black: loop parallel Blue: loop perpendicular Limit based on 40dB/decade extrapolation.								
Facility:	Anech_1	Height	1m	Mode:	1			
Distance	3m	Polarisation		Modification State:	1			
Angle	0-360	File:	H9B1080D					

	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
(dB)	Test No:	T3264	Test Report	Page:	25 of 43



### PLOT 10 Radiated Emissions - Sample D - 132.8kHz,80V - 9kHz to 150kHz

Company:	Sureflap Ltd	Product:	Sureflap
Date:	03/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC_subpartC_@3m (spurious)	Limit2:	
Limit3:		Limit4:	

Sample D 132.8kHz 80V Black: loop parallel Blue: loop perpendicular

Spurious limit extrapolated using conservative 40dB/decade. For measurements on open area test site it was established that 60dB/decade was more appropriate - this would effectively increase the limit shown on this plot by 40dB.

NOTE: The limit for the carrier (shown on plot) is higher than the spurious limit shown.

Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation		Modification State:	0
Angle	0-360	File:	H9B03507		

	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
(dB)	Test No:	T3264	Test Report	Page:	26 of 43

Marker 1: 1.441MF
Ref 127 dBuV/m Atten 10 dB 41.08dBuV/r

Log
10
dB/

RBW 9 kHz VBW 30 kHz Sweep 43.76mS (401 pts)

CF1:A9\_HI\_V\_090306 CF2:CBL002\_CBL003\_090306

Stop 1.705MH

### PLOT 11 Radiated Emissions - Sample D - 132.8kHz,80V - 150kHz to 1.705MHz

Company: Product: Sureflap Sureflap Ltd Date: 03/12/09 Test Eng: Dave Smith Method: **ANSI C63.4** Method: FCC\_subpartC\_@3m Limit2: Limit1:(VIO) Limit3: Limit4:

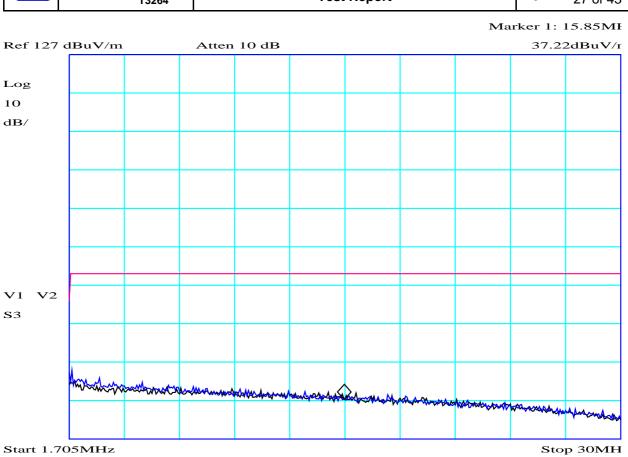
Sample D 132.8kHz 80V Black: loop parallel Blue: loop perpendicular

Start 150kHz

Limit based on 40dB/decade extrapolation. In practice likely to be 60dB/decade in which case limit would be 40dB higher below 490kHz (as the original limit is specified at 300m) and 20dB higher above 490kHz (as the original limit for this frequency range is specified at 30m).

Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation		Modification State:	0
Angle	0-360	File:	H9B03539		

	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	27 of 43



VBW 30 kHz

Sweep 796.3mS (401 pts)

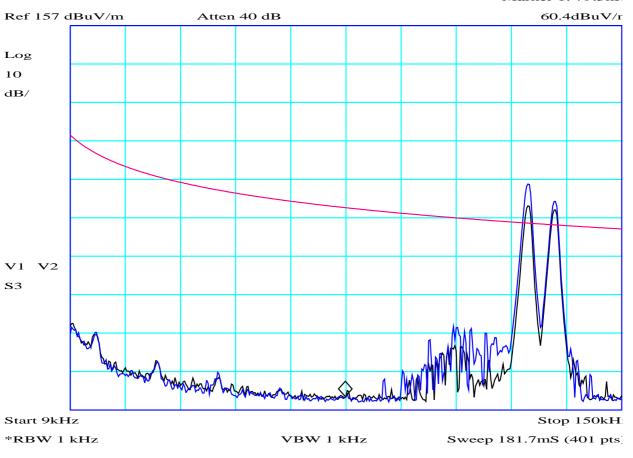
RBW 9 kHz

## PLOT 12 Radiated Emissions - Sample D - 132.8kHz,80V - 1.705MHz to 30MHz

Company:	Sureflap Ltd	1	Product:	Sureflap					
Date:	03/12/09		Test Eng:	Dave Smith					
Method:	ANSI C63.4		Method:						
Limit1:(VIO)	FCC_subpa	artC_@3m	Limit2:						
Limit3:			Limit4:						
Black: loop para Blue: loop perpe	Sample D 132.8kHz 80V Black: loop parallel Blue: loop perpendicular Limit based on 40dB/decade extrapolation.								
Facility:	Anech_1	Height	1m	Mode:	1				
Distance	3m	Polarisation		Modification State:	0				
Angle	0-360	File:	H9B0356F						

	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
(dB)	Test No:	T3264	Test Report	Page:	28 of 43

Marker 1: 79.5kF



### PLOT 13 Radiated Emissions - Sample E - All Read Modes - 9kHz to 150kHz

Company:	Sureflap Ltd	Product:	Sureflap
Date:	22/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC_subpartC_@3m (spurious)	Limit2:	
Limit3:		Limit4:	

Sample E. Continuously stepping through all read modes. ResBW set to 1kHz to identify any transients more easily.

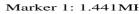
Black: loop parallel Blue: loop perpendicular

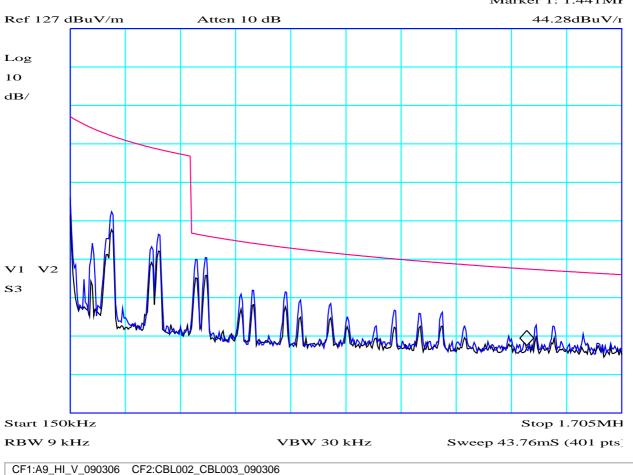
Spurious limit extrapolated using conservative 40dB/decade. For measurements on open area test site it was established that 60dB/decade was more appropriate - this would effectively increase the limit shown on this plot by 40dB.

NOTE: The limit for the carrier (shown on plot) is higher than the spurious limit shown.

Fac	cility:	Anech_1	Height	1m	Mode:	2
Dis	stance	3m	Polarisation	V+H	Modification State:	2
Ang	gle	0-360	File:	H9B223FE		

	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
(dB)	Test No:	T3264	Test Report	Page:	29 of 43





## PLOT 14 Radiated Emissions - Sample E - All Read Modes - 150kHz to 1.705MHz

Company:	Sureflap Ltd	Product:	Sureflap
Date:	22/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC_subpartC_@3m	Limit2:	
Limit3:		Limit4:	

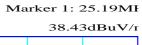
Sample E. Continuously stepping through all read modes.

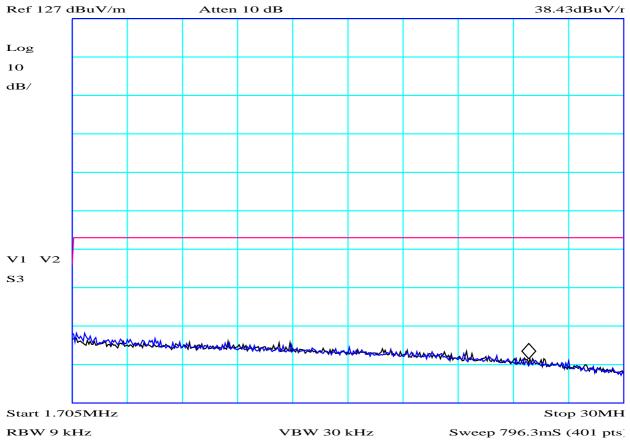
Black: loop parallel Blue: loop perpendicular

Limit based on 40dB/decade extrapolation. In practice likely to be 60dB/decade in which case limit would be 40dB higher below 490kHz (as the original limit is specified at 300m) and 20dB higher above 490kHz (as the original limit for this frequency range is specified at 30m).

Facility:	Anech_1	Height	1m	Mode:	2
Distance	3m	Polarisation	V+H	Modification State:	2
Angle	0-360	File:	H9B22413		

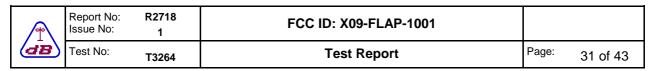
	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	30 of 43

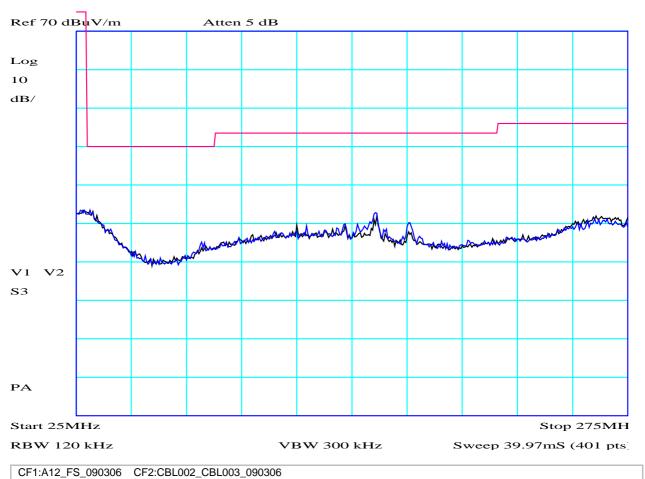




## PLOT 15 Radiated Emissions - Sample E - All Read Modes - 1.705MHz to 30MHz

Company:	Sureflap Ltd		Product:	Sureflap	
Date:	22/12/09		Test Eng:	Dave Smith	
Method:	ANSI C63.4		Method:		
Limit1:(VIO)	FCC_subpart	C_@3m	Limit2:		
Limit3:			Limit4:		
Sample E. Cont Black: loop para Blue: loop perpe Limit based on 4	llel endicular	ng through all read	d modes.		
Facility:	Anech_1	Height	1m	Mode:	2
Distance	3m	Polarisation	V+H	Modification State:	2
Angle	0-360	File:	H9B22417		

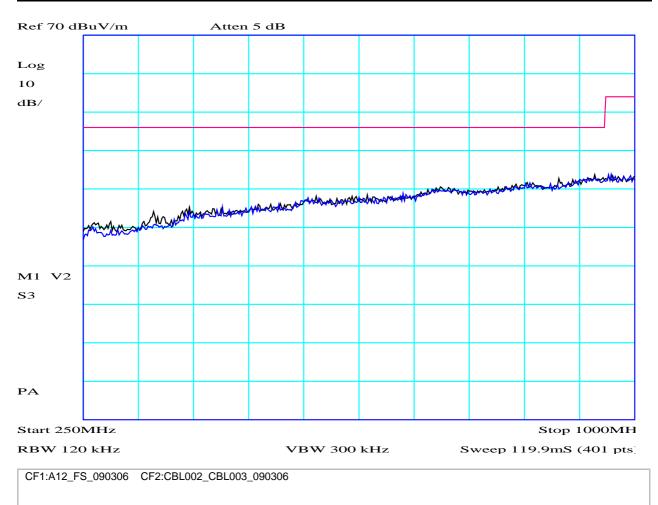




## PLOT 16 Radiated Emissions - Sample A - 126kHz,80V - 25MHz to 275MHz

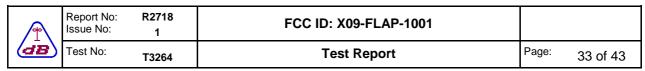
Company:	Sureflap Ltd		Product:	Sureflap	
Date:	22/12/09		Test Eng:	Dave Smith	
Method:	ANSI C63.4		Method:		
Limit1:(VIO)	FCC(B)@3m		Limit2:		
Limit3:			Limit4:		
126kHz 120V Black: vertical Blue: horizontal					
Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	2
Angle	0-360	File:	H9B223C4		

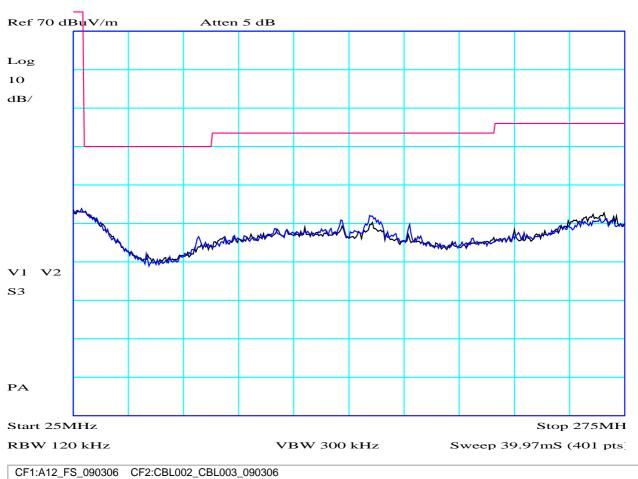
	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	32 of 43



## PLOT 17 Radiated Emissions - Sample A - 126kHz,80V - 250MHz to 1GHz

Company:	Sureflap Ltd		Product:	Sureflap	
Date:	22/12/09		Test Eng:	Dave Smith	
Method:	ANSI C63.4		Method:		
Limit1:(VIO)	FCC(B)@3m		Limit2:		
Limit3:			Limit4:		
126kHz 120V Black: vertical Blue: horizontal					
Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	2
Angle	0-360	File:	H9B223CB		

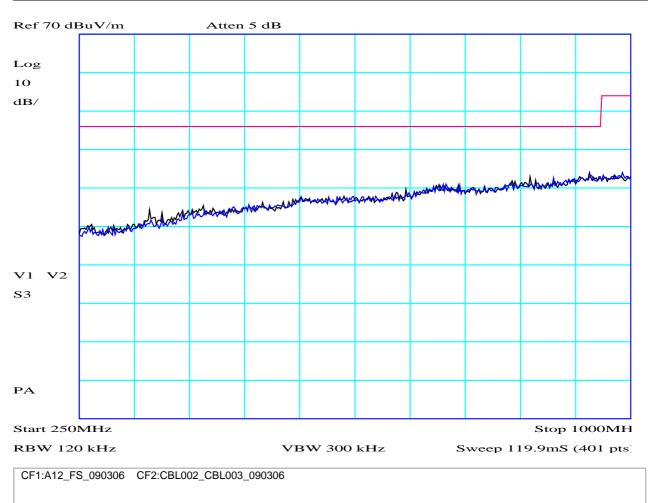




## PLOT 18 Radiated Emissions - Sample B - 126kHz,80V - 25MHz to 275MHz

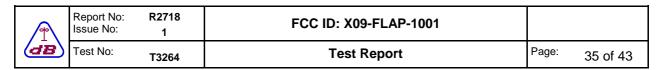
Method: AN	8/12/09 NSI C63.4 CC(B)@3m		Test Eng: Method: Limit2:	Dave Smith	
Limit1:(VIO) FO			Limit2:		
` '	CC(B)@3m				
Limit3:			Limait 4.		
			Limit4:		
126kHz 80V Black: vertical Blue: horizontal					
Facility: Anec	ech_1 l	Height 1m	Mo	ode:	1
Distance 3m	F	Polarisation V+I	H Mo	dification State:	0
Angle 0-36	60 F	File: H9I	B18713		

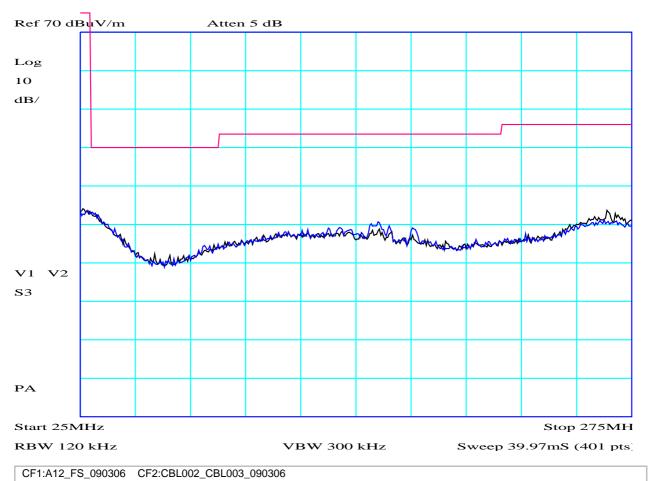
	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	34 of 43



## PLOT 19 Radiated Emissions - Sample B - 126kHz,80V - 250MHz to 1GHz

Company:	Sureflap Ltd		Product:	Sureflap	
Date:	18/12/09		Test Eng:	Dave Smith	
Method:	ANSI C63.4		Method:		
Limit1:(VIO)	FCC(B)@3m		Limit2:		
Limit3:			Limit4:		
126kHz 80V Black: vertical Blue: horizontal					
Facility:	Anech_1	Height 1	m	Mode:	1
Distance	3m	Polarisation \	/+H	Modification State:	0
Angle	0-360	File: H	H9B18717		

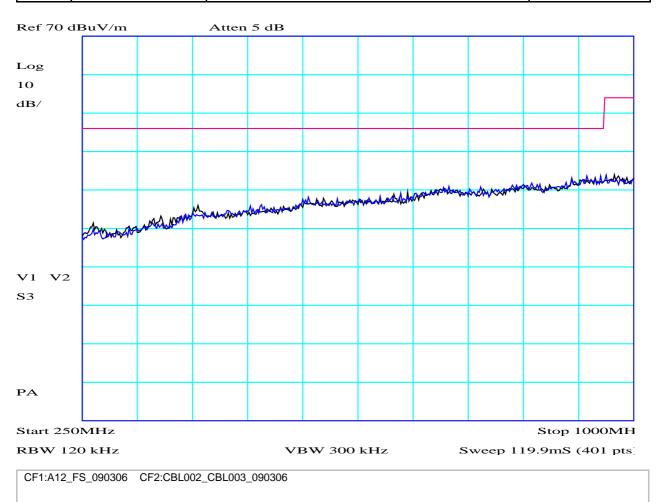




## PLOT 20 Radiated Emissions - Sample C - 132.8kHz,120V - 25MHz to 275MHz

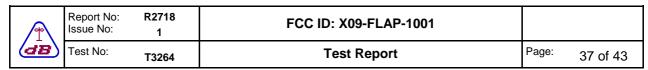
Company:	Sureflap Ltd		Product:	Sureflap	
Date:	22/12/09		Test Eng:	Dave Smith	
Method:	ANSI C63.4		Method:		
Limit1:(VIO)	FCC(B)@3m		Limit2:		
Limit3:			Limit4:		
132.8kHz 120V Black: vertical Blue: horizontal					
Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	2
Angle	0-360	File:	H9B223D3		

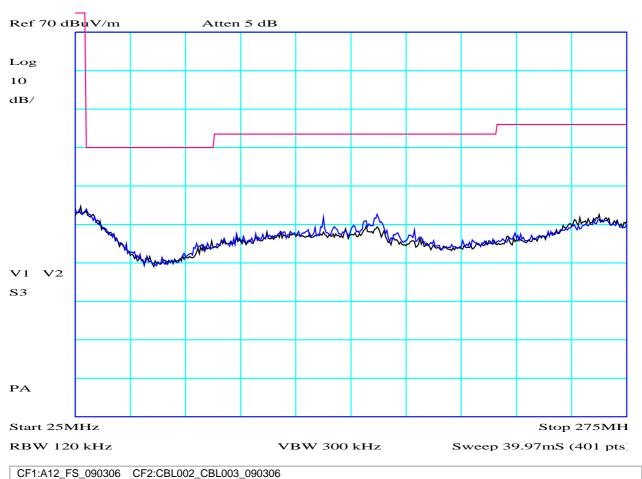
7	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	36 of 43



## PLOT 21 Radiated Emissions - Sample C - 132.8kHz,120V - 250MHz to 1GHz

Company:	Sureflap Ltd		Product:	Sureflap	
Date:	22/12/09		Test Eng:	Dave Smith	
Method:	ANSI C63.4		Method:		
Limit1:(VIO)	FCC(B)@3m		Limit2:		
Limit3:			Limit4:		
132.8kHz 120V Black: vertical Blue: horizontal					
Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	2
Angle	0-360	File:	H9B223D9		

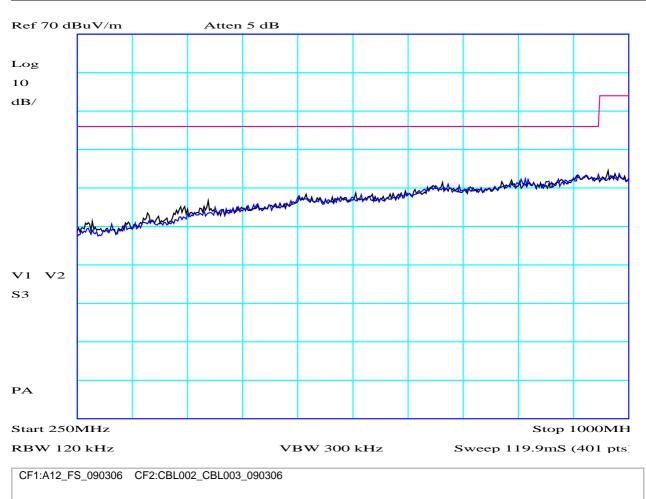




## PLOT 22 Radiated Emissions - Sample D - 132.8kHz,80V - 25MHz to 275MHz

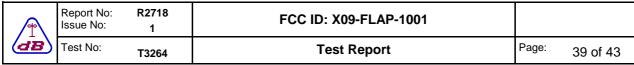
Company:	Sureflap Ltd		Product:	Sureflap	
Date:	18/12/09		Test Eng:	Dave Smith	
Method:	ANSI C63.4		Method:		
Limit1:(VIO)	FCC(B)@3m		Limit2:		
Limit3:			Limit4:		
132.8kHz 80V Black: vertical Blue: horizontal					
Facility:	Anech_1	Height 1	m	Mode:	1
Distance	3m	Polarisation \	/+H	Modification State:	0
Angle	0-360	File:	H9B1871D		

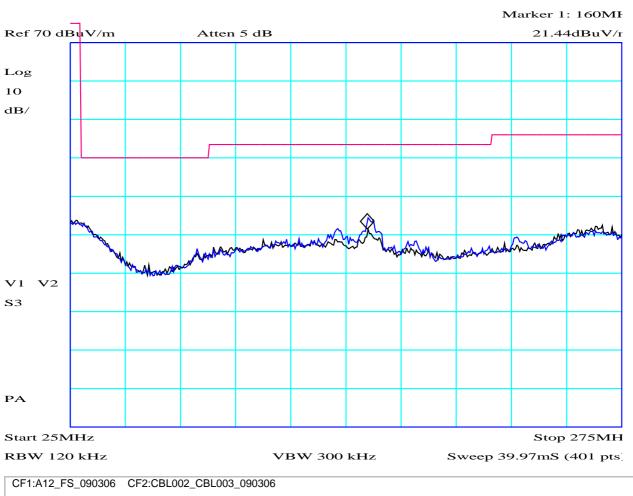
	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	38 of 43



## PLOT 23 Radiated Emissions - Sample D - 132.8kHz,80V - 250MHz to 1GHz

Company:	Sureflap Ltd		Product:	Sureflap	
Date:	18/12/09		Test Eng:	Dave Smith	
Method:	ANSI C63.4		Method:		
Limit1:(VIO)	FCC(B)@3m		Limit2:		
Limit3:			Limit4:		
132.8kHz 80V Black: vertical Blue: horizontal					
Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H9B18722		

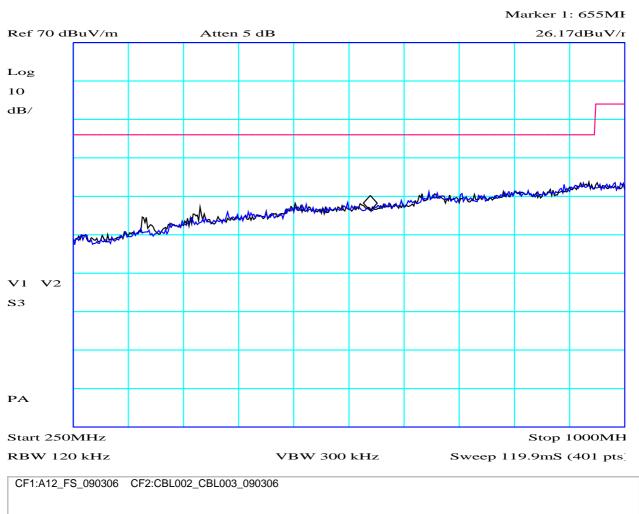




### PLOT 24 Radiated Emissions - Sample E - All Read Modes - 25MHz to 275MHz

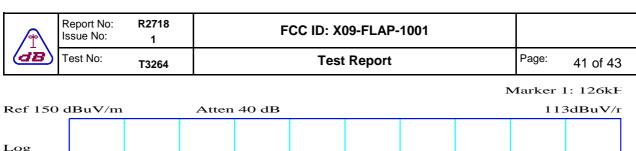
Company:	Sureflap Ltd		Product:	Sureflap	
Date:	22/12/09		Test Eng:	Dave Smith	
Method:	ANSI C63.4		Method:		
Limit1:(VIO)	FCC(B)@3m		Limit2:		
Limit3:			Limit4:		
Sample E. Cont Black: vertical Blue: horizontal	tinuously steppir	ng through all read	d modes.		
Facility:	Anech_1	Height	1m	Mode:	2
Distance	3m	Polarisation	V+H	Modification State:	2
Angle	0-360	File:	H9B223E1		

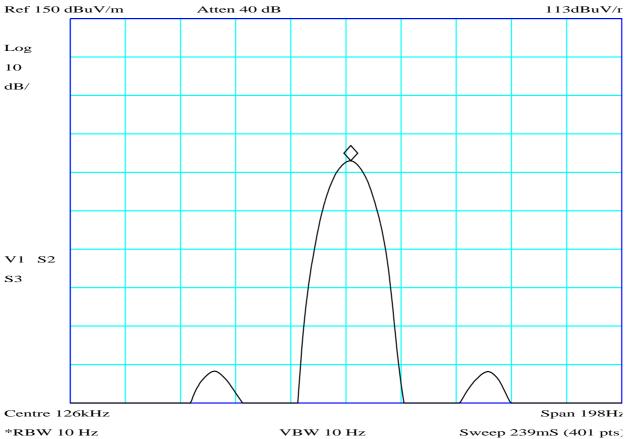
	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
(dB)	Test No:	T3264	Test Report	Page:	40 of 43



### PLOT 25 Radiated Emissions - Sample E - All Read Modes - 250MHz to 1GHz

Company:	Sureflap Ltd		Product:	Sureflap	
Date:	22/12/09		Test Eng:	Dave Smith	
Method:	ANSI C63.4		Method:		
Limit1:(VIO)	FCC(B)@3m		Limit2:		
Limit3:			Limit4:		
Sample E. Cont Black: vertical Blue: horizontal	inuously steppin	ng through all read	d modes.		
Facility:	Anech_1	Height	1m	Mode:	2
Distance	3m	Polarisation	V+H	Modification State:	2
Angle	0-360	File:	H9B223E7		





# PLOT 26 Bandwidth - Sample A - 126kHz

Company:	Sureflap Ltd		Product:	Sureflap	
Date:	03/12/09		Test Eng:	Dave Smith	
Method:	ANSI C63.4		Method:		
Limit1:			Limit2:		
Limit3:			Limit4:		
Sample A 126kl Bandwidth meas 99%BW 21Hz		30dBc points)			
Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation		Modification State:	0
Angle	0-360	File:	H9B03589		

	Report No: Issue No:	R2718 1	FCC ID: X09-FLAP-1001		
dB	Test No:	T3264	Test Report	Page:	42 of 43

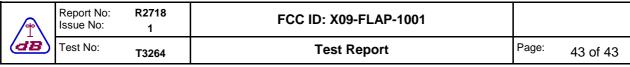
Marker 1: 132.9kF Ref 150 dBuV/m Atten 40 dB 83.12dBuV/r Log 10 dB/W1 S2  $s_3$ Start 132.7kHz Stop 132.9kH

VBW 10 Hz Sweep 239mS (401 pts) 

## PLOT 27 Bandwidth - Sample C - 132.8kHz

\*RBW 10 Hz

Company:	Sureflap Ltd		Product:	Sureflap	
Date:	03/12/09		Test Eng:	Dave Smith	
Method:	ANSI C63.4		Method:		
Limit1:			Limit2:		
Limit3:			Limit4:		
Sample C 132.8 Bandwidth meas 99%BW 20Hz		-30dBc points)			
Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation		Modification State:	0
Angle	0-360	File:	H9B034FC		



Marker 1: 129.6kF
Ref 157 dBuV/m Atten 40 dB 115.8dBuV/r
Log
10
dB/

V1 S2
S3
Centre 129.6kHz
Span 0Hz

\*VBW 1 MHz

Sweep 2S (401 pts)

## PLOT 28 Radiated Emissions - Read Train Timings

\*RBW 30 kHz

Company:	Sureflap Ltd		Product:	Sureflap	
Date:	22/12/09		Test Eng:	Dave Smith	
Method:	ANSI C63.4		Method:		
Limit1:(VIO)	FCC_subpart0	C_@3m	Limit2:		
Limit3:			Limit4:		
Sample E. Cont Timing.	inuously steppir	ng through all read	modes.		
Facility:	Anech_1	Height 1	1m	Mode:	2
Distance	3m	Polarisation \	V	Modification State:	2
Angle	Front	File: H	H9B22409		