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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

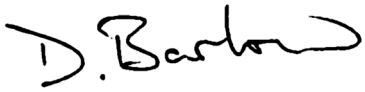
Document History

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

Based on report template:
v090319

Equipment Under Test (EUT):	**Sureflap**
Test Commissioned by:	**Sureflap Ltd** **St John's Innovation Centre** **Cowley Road** **Cambridge** **Cambridgeshire** **CB4 0WS**
Representative:	**Nick Hill**
Test Started:	**3rd December 2009**
Test Completed:	**22nd December 2009**
Test Engineer:	**Dave Smith**
Date of Report:	**22nd December 2009**

Written by: Dave Smith ..... **Checked by:** Derek Barlow .....

Signature:  **Signature:** 

Date: 22nd December 2009 ..... **Date:** 22nD 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***

Emissions Test Results Summary

CFR 47 : 2009 **PASS**

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

#1 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.

Contents

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		

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.

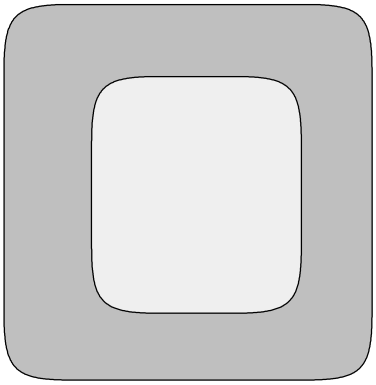
Mod No:	Details	Implemented for
0	Original units with test firmware to provide suitable test frequencies and levels.	
1	Correction made to test firmware to set the 120V level correctly.	
2	C40 changed from 100pF to 47pF. This was to ensure that transients were not produced when the RF signal was switched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

Figure 1 General Arrangement of EUT



EUT was standalone unit with NO external power or signal cables.

Photograph 1 Arrangement of EUT - Front

Photograph 2 Arrangement of EUT - Back

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	MY45110758	2 Nov 2010

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.

4.1 Radiated Emissions Results - Carrier

Factor Set 1:	A9_HI_V_09C	-	-	CSET005_07A	25 m cable
Factor Set 2:	-	-	-	-	
Factor Set 3:	-	-	-	-	
Test Equipment:	R8 A9 CSET005				

Radiated_Emissions

Company:	Sureflap Ltd	*Product:*	Sureflap
Date:	03/12/2009	*Test Eng:*	Dave Smith
Ports:			
Test:	ANSI C63.4:2003 using limits of	15.209	
Ports:			
Test:	using limits of		

Plot	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor dB/m	Corr'n Factor dB	Total Level dBuV/m	Limit 15.209 dBuV/m	Margin 15.209 dB	Notes
	126kHz 80V												
4	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
	126kHz 120V												
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
	132.8kHz 80V												
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
	132.8kHz 120V												
7	1	1	10	1	0.133	Par	79.0	8.1		87.1	113.8	26.7	#1
7	1	1	10	1	0.133	Per	74.4	8.1		82.5	113.8	31.3	#1

Results	Minimum Margin	26.7 dB	
	PASS/FAIL	PASS	

Notes	Comments and Observations
	Results of scans shown in plots 1, 4, 7 and 10.
#1	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.

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

Factor Set 1:	A9_HI_V_09C	-	-	CSET005_07A	25 m cable
Factor Set 2:	-	-	-	-	
Factor Set 3:	-	-	-	-	
Test Equipment:	R8 A9 CSET005				

Radiated_Emissions

Company:	Sureflap Ltd	*Product:*	Sureflap
Date:	03/12/2009 & 10/12/2009	*Test Eng:*	Dave Smith
Ports:			
Test:	ANSI C63.4:2003 using limits of	15.209	
Ports:			
Test:	using limits of		

Plot	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor dB/m	Corr'n Factor dB	Total Level dBuV/m	Limit 15.209 dBuV/m	Margin 15.209 dB	Notes
	126kHz 80V												
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
5	1	0	3	1	0.504	Par	65.1	9.5		74.6	93.6	19.0	#1
5	1	0	3	1	0.504	Per	58.6	9.5		68.1	93.6	25.5	#1
5	1	0	3	1	0.630	Par	63.6	9.7		73.3	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
	126kHz 120V												
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	3	1	0.378	Par	73.5	9.1		82.6	136.1	53.5	#1
2	1	1	3	1	0.378	Per	53.4	9.1		62.5	136.1	73.5	#1
2	1	1	3	1	0.504	Par	55.9	9.5		65.4	93.6	28.2	#1
2	1	1	3	1	0.504	Per	57.7	9.5		67.2	93.6	26.3	#1
2	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
Results							Minimum Margin PASS/FAIL				18.0 PASS	dB	

Notes	Comments and Observations
#1	Results of scans shown in plots 2,3,5 and 6. Limit based on extrapolation of 60dB/decade. Results section 4.4 of this document shows a measurement justifying this assumption. Measurements made with peak detector.

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

Factor Set 1:	A9_HI_V_09C	-	-	CSET005_07A	25 m cable
Factor Set 2:	-	-	-	-	
Factor Set 3:	-	-	-	-	
Test Equipment:	R8 A9 CSET005				

Radiated_Emissions

Company:	Sureflap Ltd	*Product:*	Sureflap
Date:	03/12/2009 & 10/12/2009	*Test Eng:*	Dave Smith
Ports:			
Test:	ANSI C63.4:2003 using limits of	15.209	
Ports:			
Test:	using limits of		

Plot	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor 1/m	Corr'n Factor dB	Total Level dBuV/m	Limit FCC_B dBuV/m	Margin FCC_B dB	Notes
	132.8kHz 80V												
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
	132.8kHz 120V												
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
8	1	1	3	1	0.399	Par	65.6	9.2		74.7	135.6	60.9	#1
8	1	1	3	1	0.399	Per	63.0	9.2		72.2	135.6	63.4	#1
8	1	1	3	1	0.531	Par	65.0	9.6		74.6	93.1	18.5	#1
8	1	1	3	1	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

Results	Minimum Margin	18.5 dB	
	PASS/FAIL	PASS	

Notes	Comments and Observations
#1	Results of scans shown in plots 8,9,11 and 12. Limit based on extrapolation of 60dB/decade. Results section 4.4 of this document shows a measurement justifying this assumption. Measurements made with peak detector.

4.4 Radiated Emissions Results - Distance Extrapolation

Factor Set 1:	A9_HI_V_09C	-	-	CSET005_07A	25 m cable
Factor Set 2:	-	-	-	-	
Factor Set 3:	-	-	-	-	
Test Equipment:	R8 A9 CSET005				

Radiated_Emissions

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	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor 1/m	Corr'n Factor dB	Total Level dBuV/m	Difference Betweem 10m & 3m	Measured Extrapolation per Decade	Notes
	126kHz 80V - 3m												
	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	
	126kHz 80V - 10m												
	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			
	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.

4.5 Radiated Emissions Results - Above 30MHz

Factor Set 1:	A5_FS_09A	-	-	CSET005_07A	25 m cable
Factor Set 2:	-	-	-	-	
Factor Set 3:	-	-	-	-	
Test Equipment:	R7 A5 CSET005				

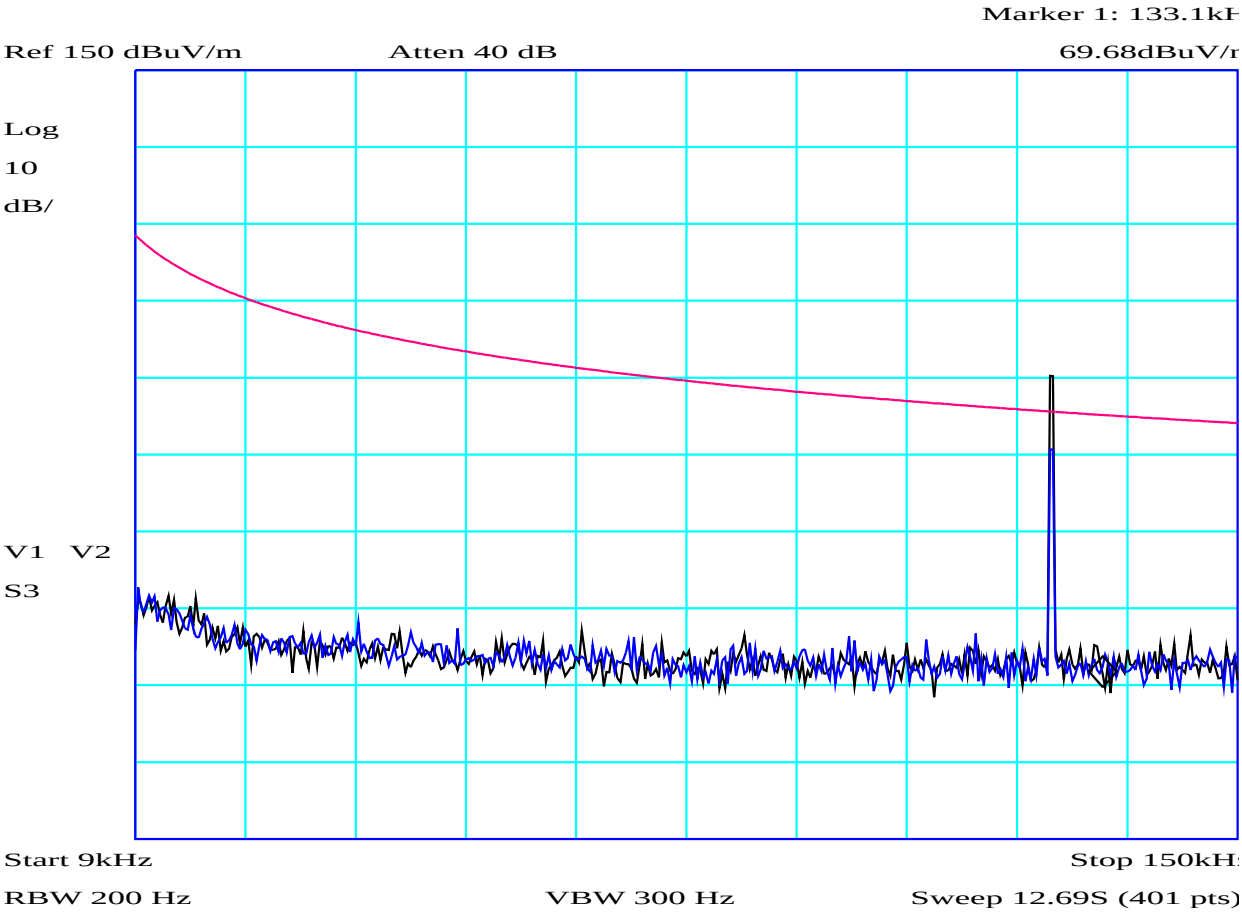
Radiated_Emissions

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
Ports:			
Test:	using limits of		

Plot	Op Mode	Mod State	Dist m	Fact Set	Freq. MHz	Ant Pol	Rec. Level dBuV	Corr'n Factor dB/m	Corr'n Factor dB	Total Level dBuV/m	Limit FCC_B dBuV/m	Margin FCC_B dB	Notes
24	2	2	3	1	30.000	V	-3.5	19.0		15.5	40.0	24.5	
24	2	2	3	1	30.000	H	-4.8	19.0		14.2	40.0	25.8	
24	2	2	3	1	160.000	V	4.6	12.3		16.9	43.5	26.6	
24	2	2	3	1	160.000	H	5.9	12.3		18.2	43.5	25.3	

Results	Minimum Margin	24.5	dB
	PASS/FAIL	PASS	

Notes	Comments and Observations
	Results of scans shown in plots 16 to 25. Measurements made with quasi-peak detector.



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

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

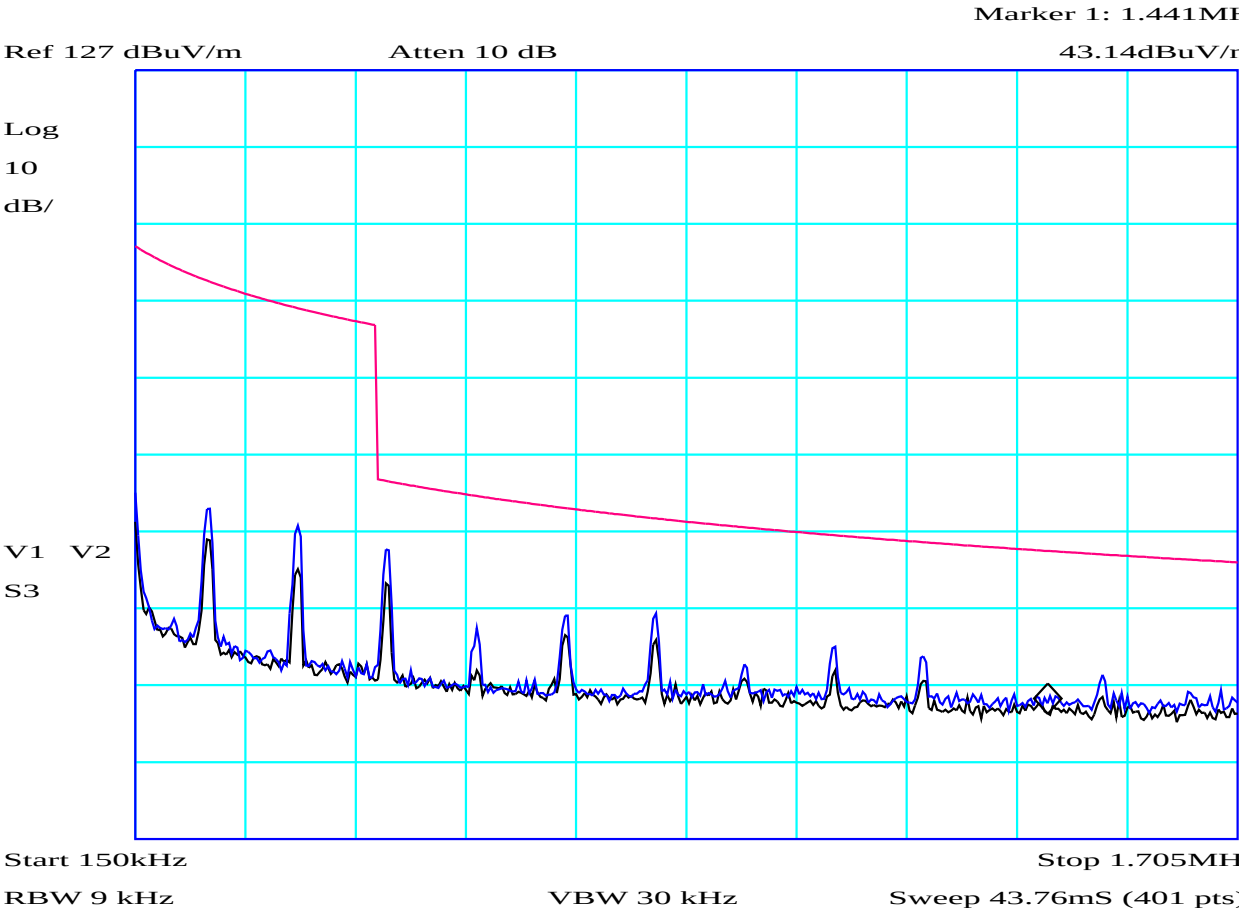
Company:	Sureflap Ltd	Product:	Sureflap
Date:	10/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC_subpartC_@3m (spurious)	Limit2:	
Limit3:		Limit4:	

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		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

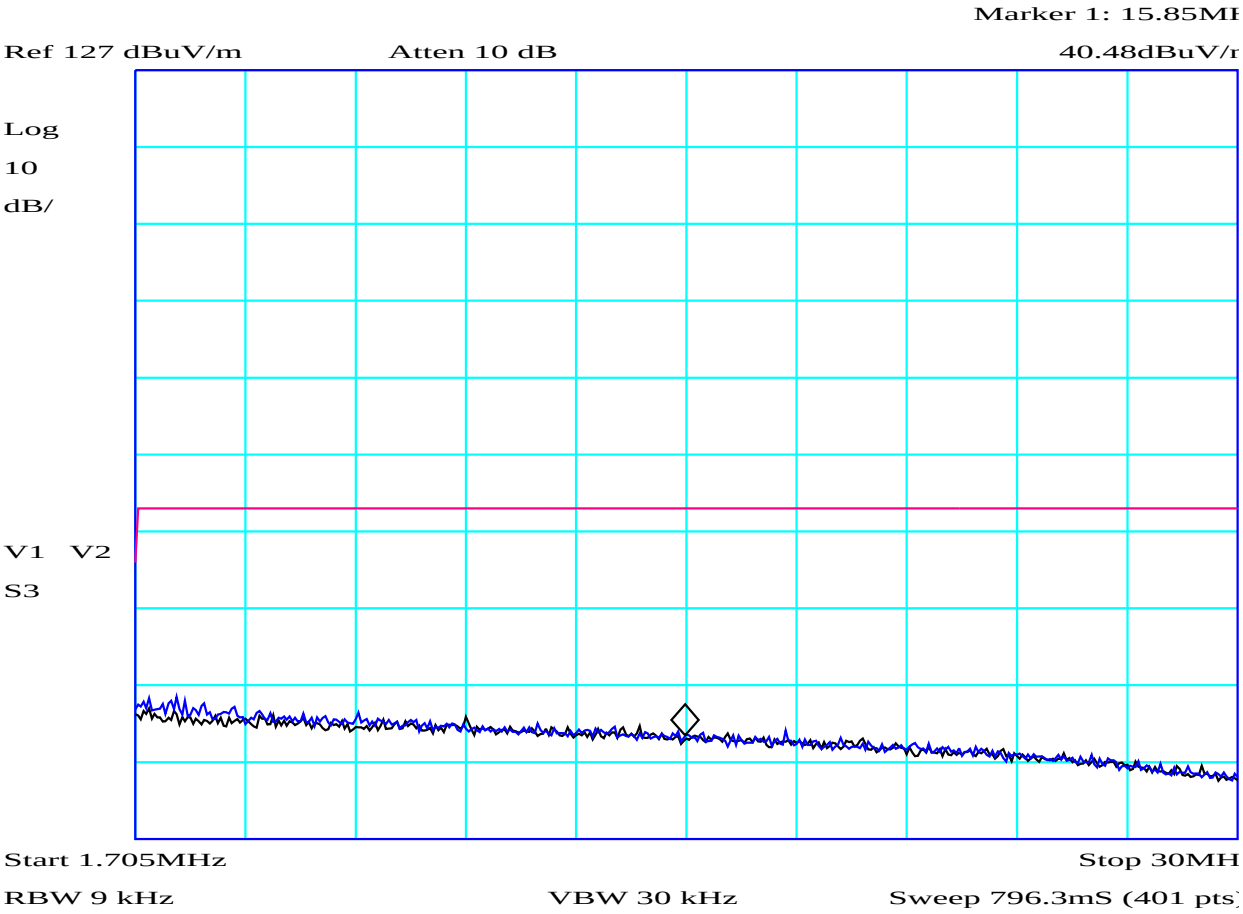
PLOT 2 Radiated Emissions - Sample A - 126kHz,120V - 150kHz to 1.705MHz

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



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

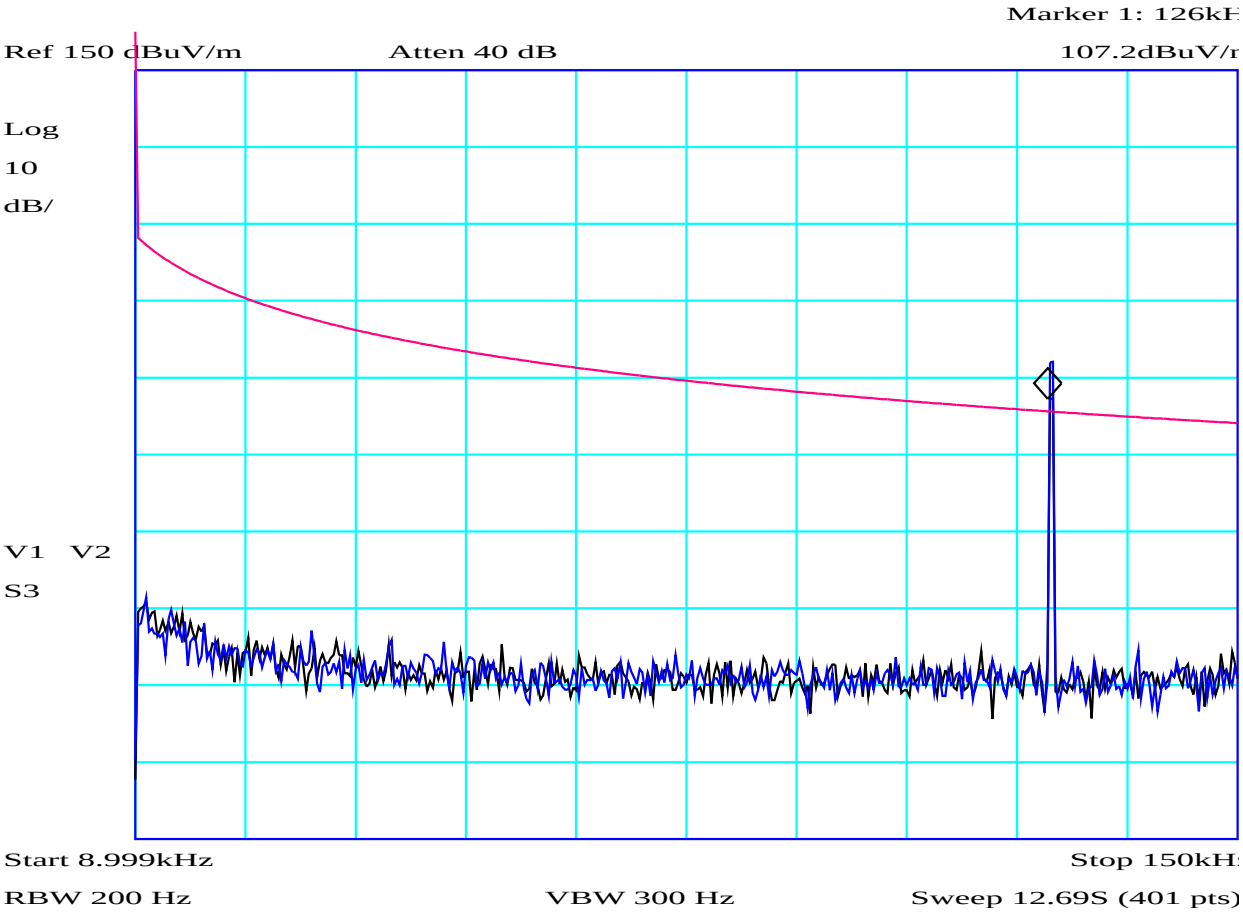
PLOT 3 Radiated Emissions - Sample A - 126kHz,120V - 1.705MHz to 30MHz

Company:	Sureflap Ltd	Product:	Sureflap
Date:	10/12/09	Test Eng:	Dave Smith
Method:	ANSI 63.4	Method:	
Limit1:(VIO)	FCC_subpartC_@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		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

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

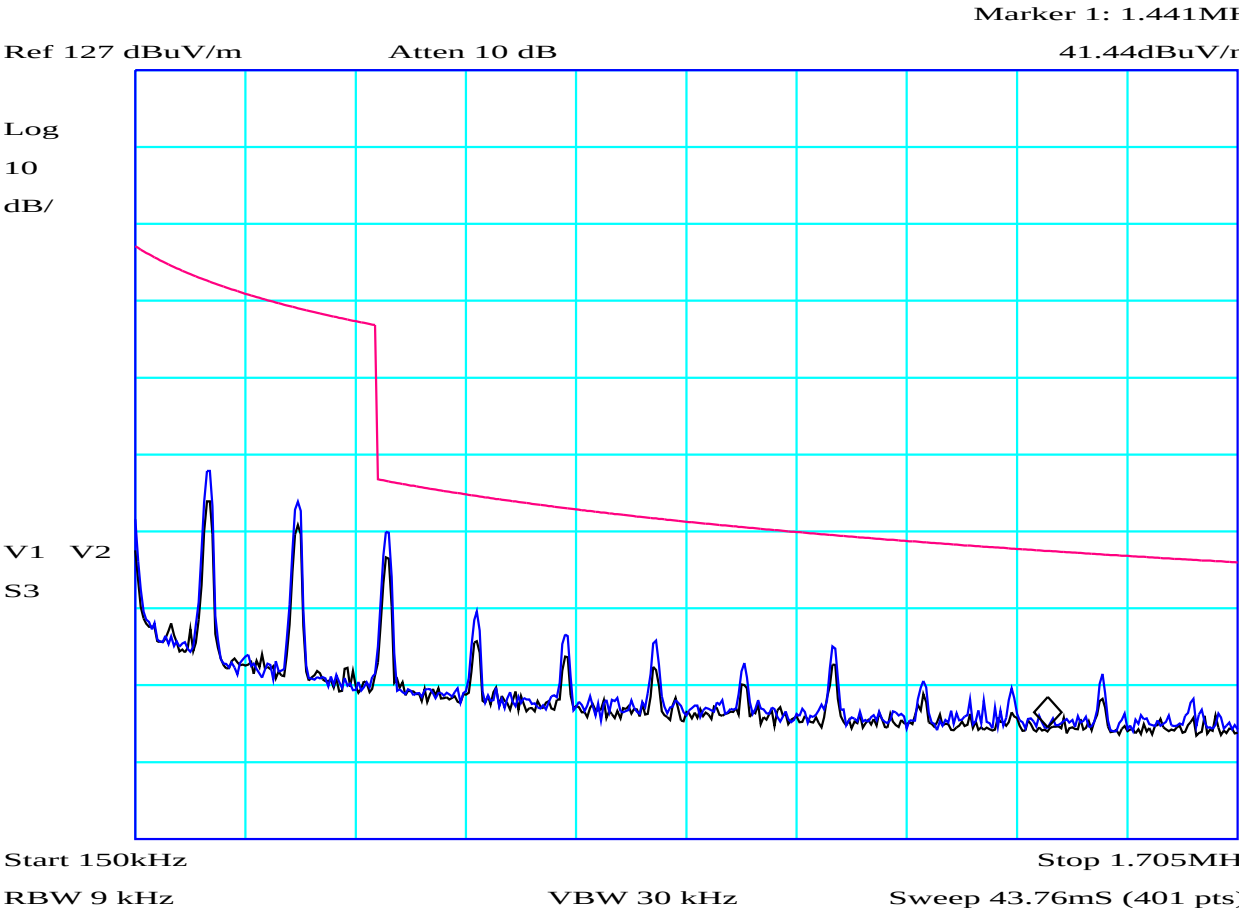
Company:	Sureflap Ltd	Product:	Sureflap
Date:	03/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC_subpartC_@3m (spurious)	Limit2:	
Limit3:		Limit4:	

Sample B 126kHz 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:	H9B03513		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

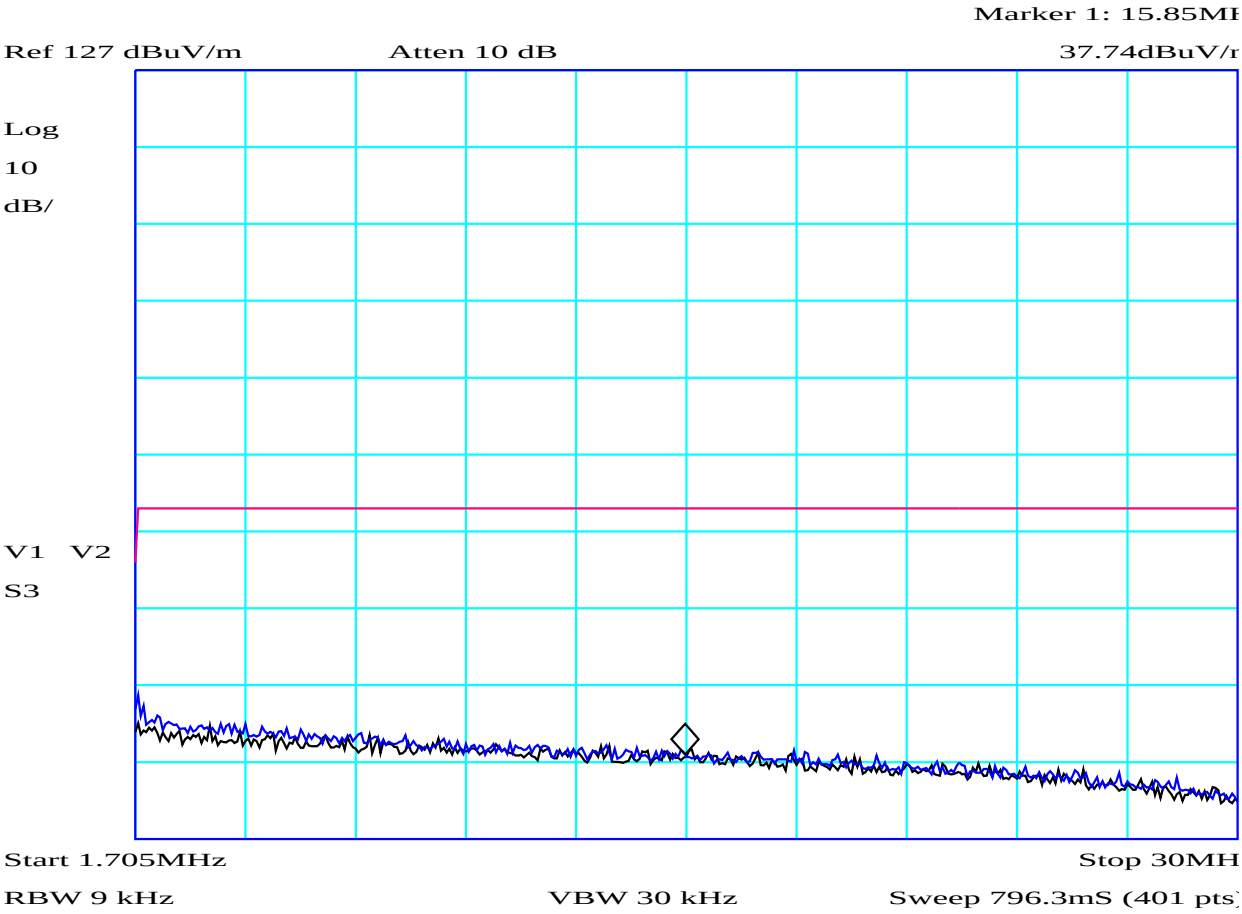
PLOT 5 Radiated Emissions - Sample B - 126kHz,80V - 150kHz to 1.705MHz

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		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

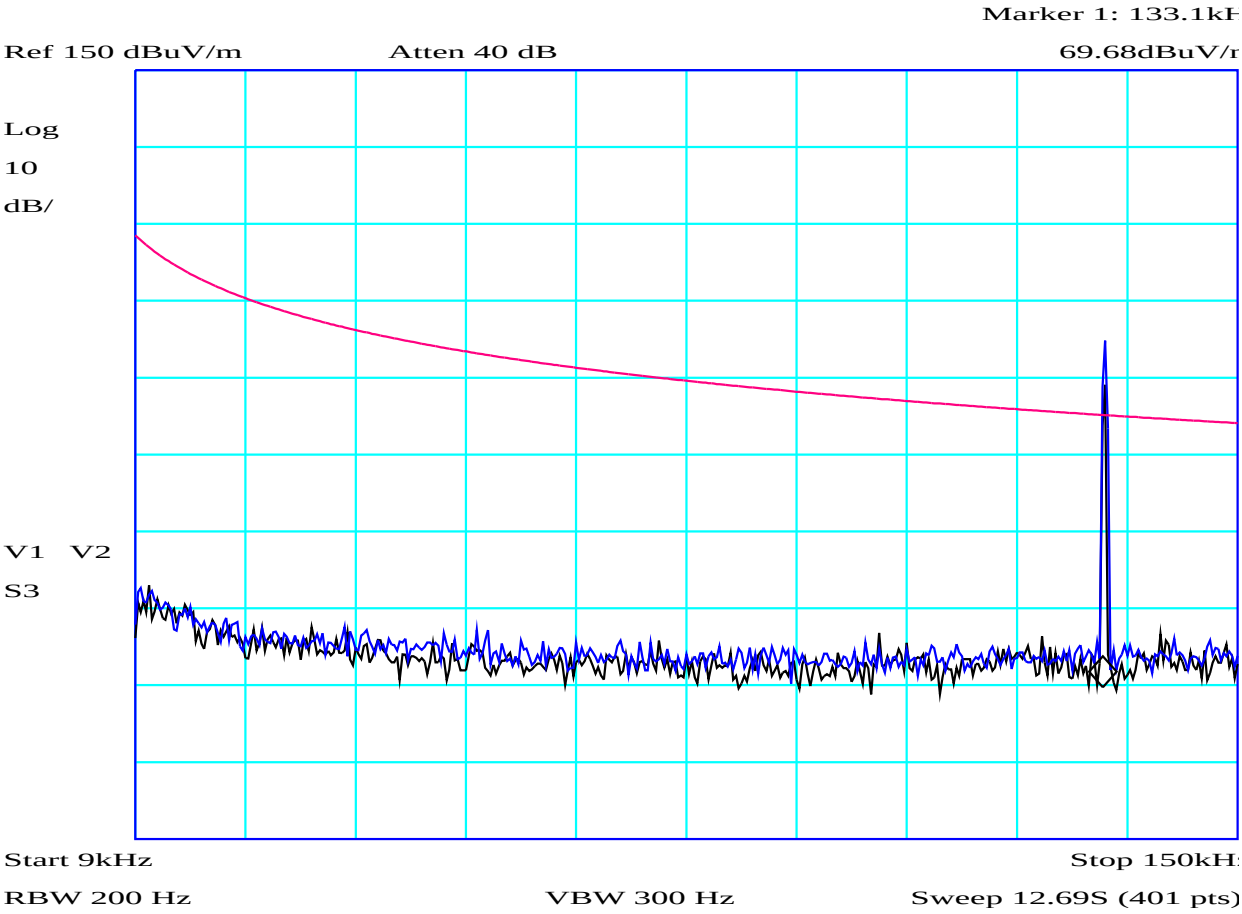
PLOT 6 Radiated Emissions - Sample B - 126kHz,80V - 1.705MHz to 30MHz

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.

Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation		Modification State:	0
Angle	0-360	File:	H9B03569		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

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

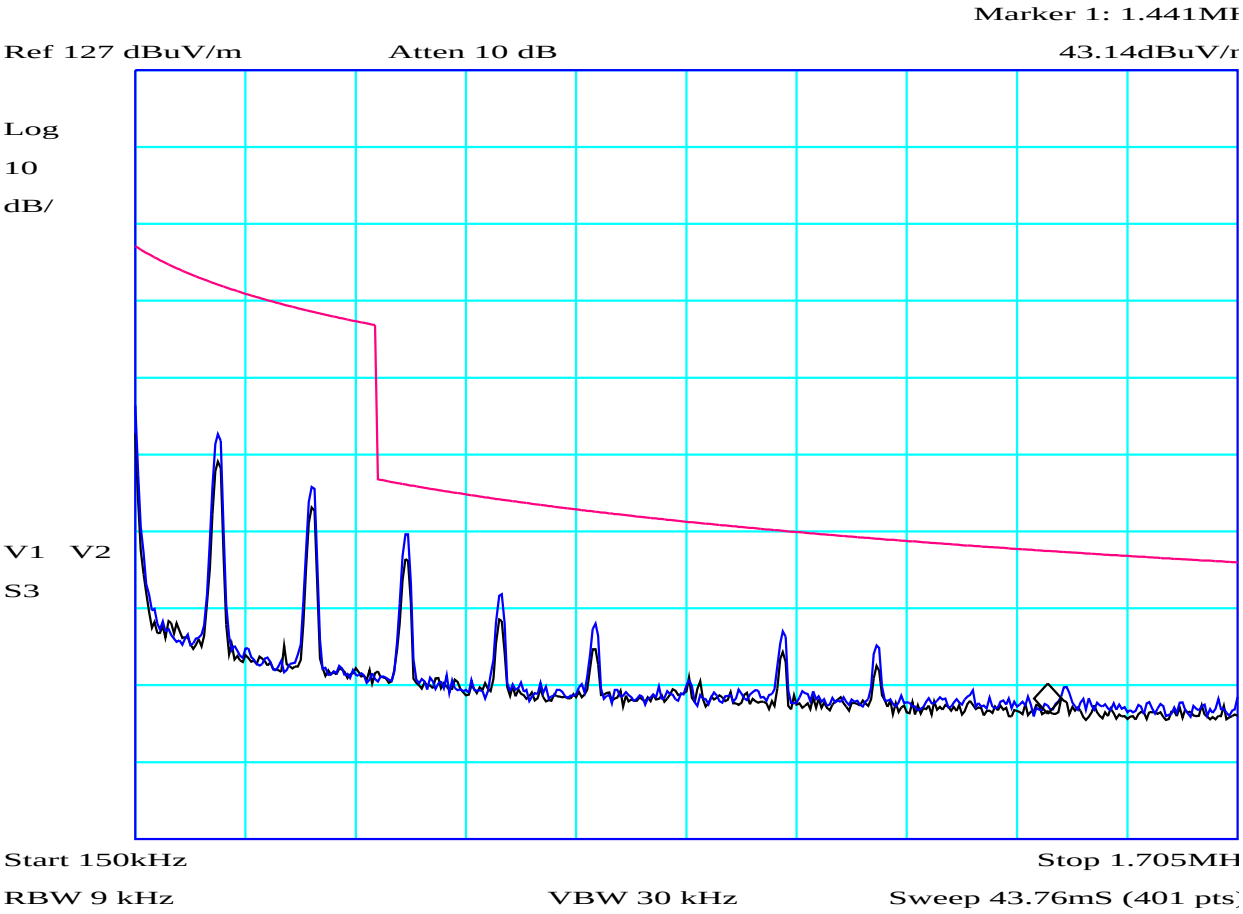
Company:	Sureflap Ltd	Product:	Sureflap
Date:	10/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC_subpartC_@3m (spurious)	Limit2:	
Limit3:		Limit4:	

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		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

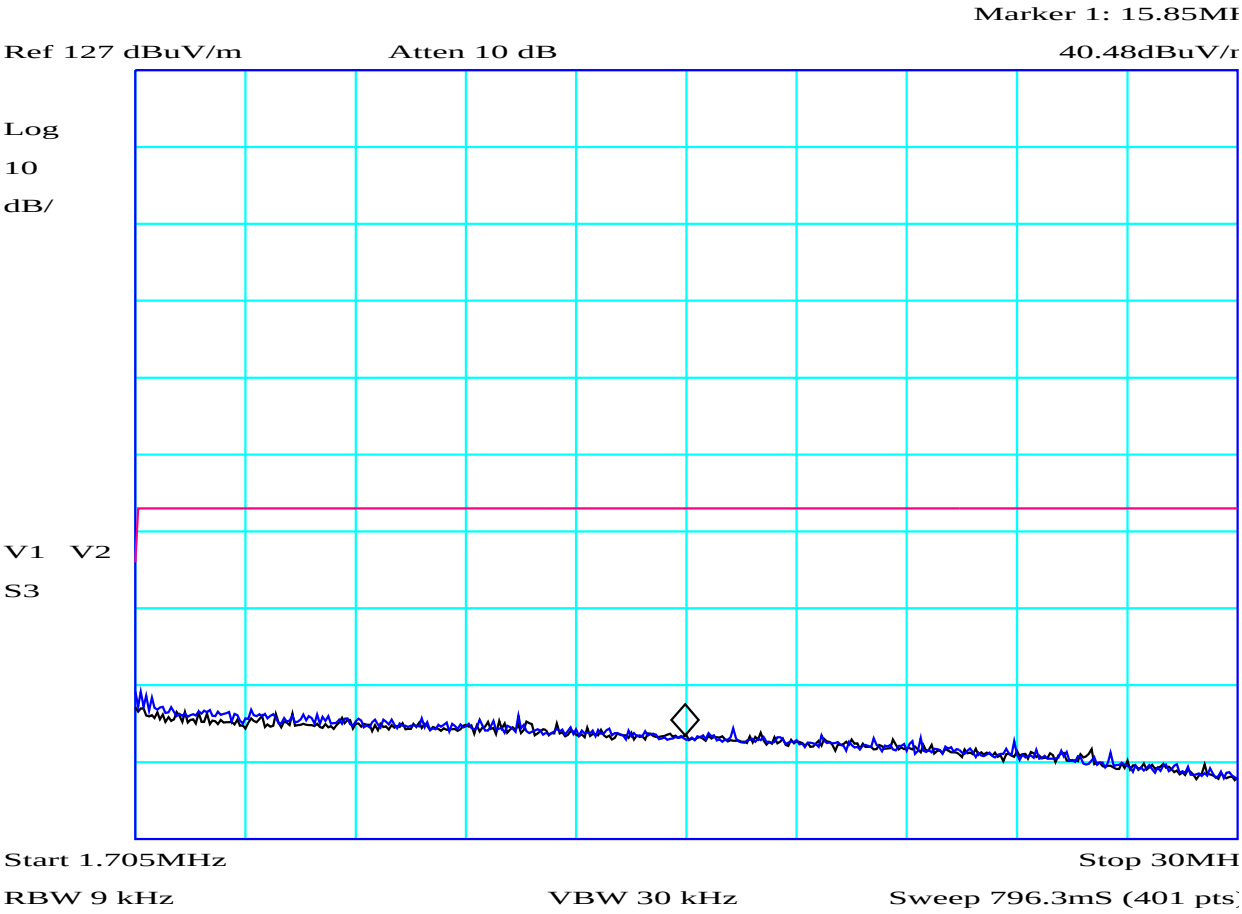
PLOT 8 Radiated Emissions - Sample C - 132.8kHz,120V - 150kHz to 1.705MHz

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

Sample C: 132.8kHz 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:	H9B107F5		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

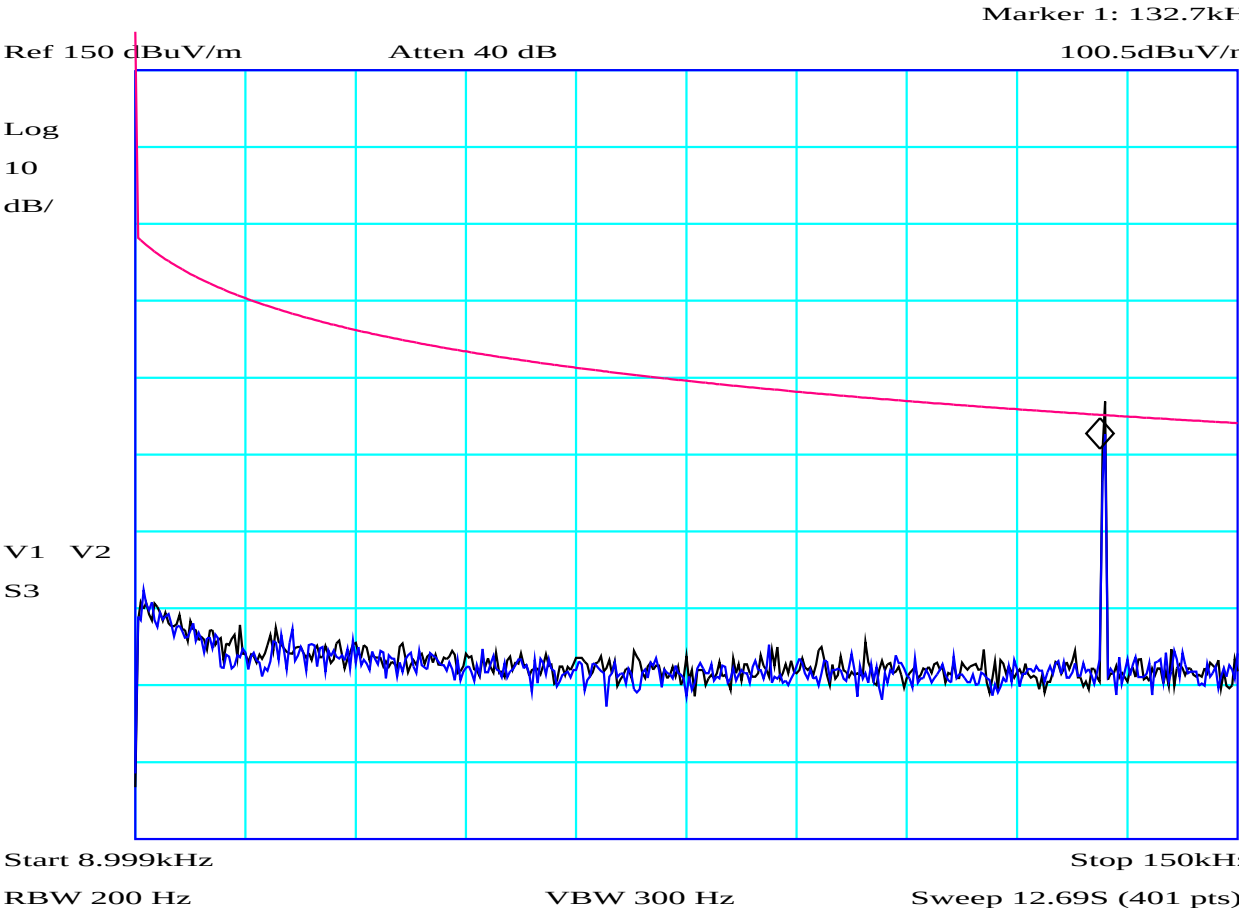
PLOT 9 Radiated Emissions - Sample C - 132.8kHz,120V - 1.705MHz to 30MHz

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



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

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

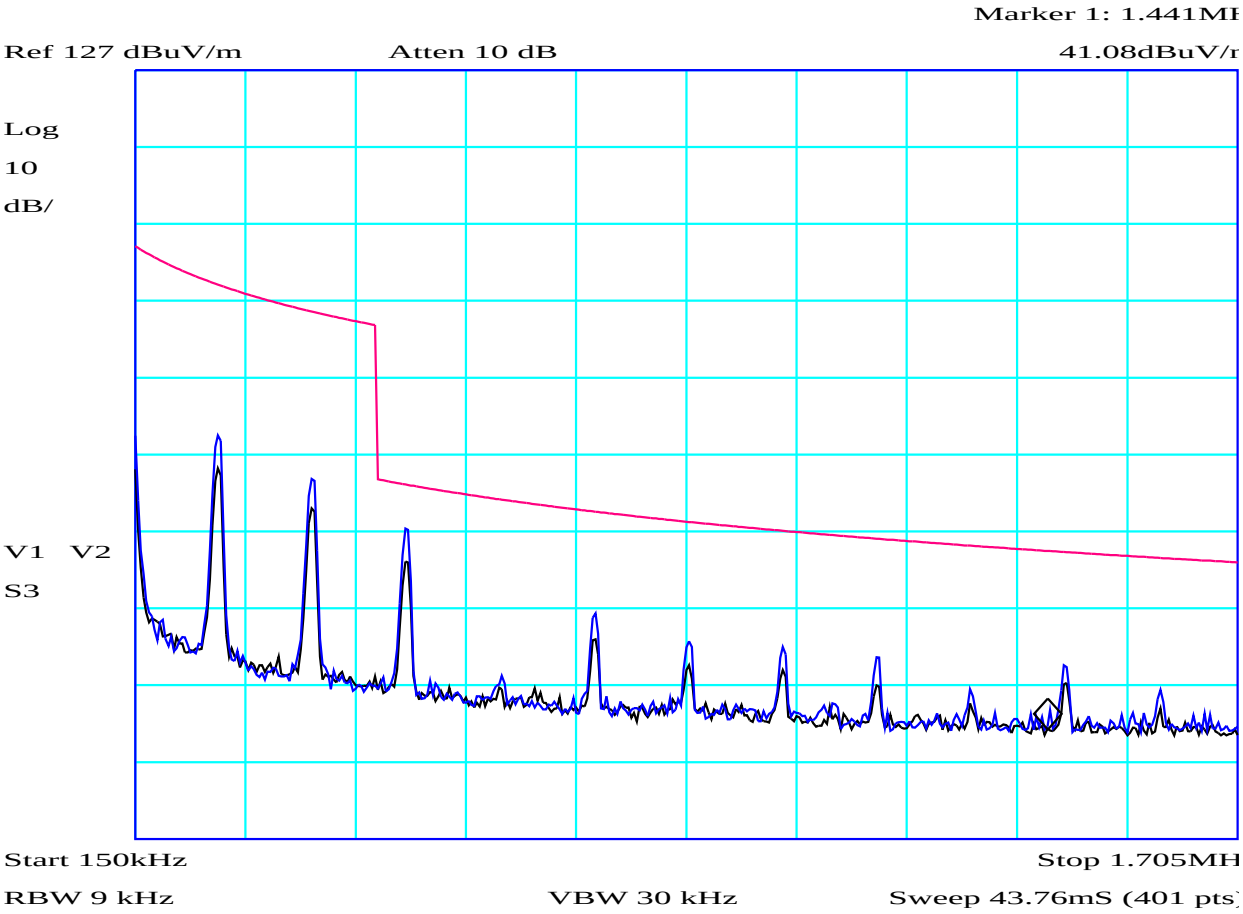
Company:	Sureflap Ltd	Product:	Sureflap
Date:	03/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC_subpartC_@3m (spurious)	Limit2:	
Limit3:		Limit4:	

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		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

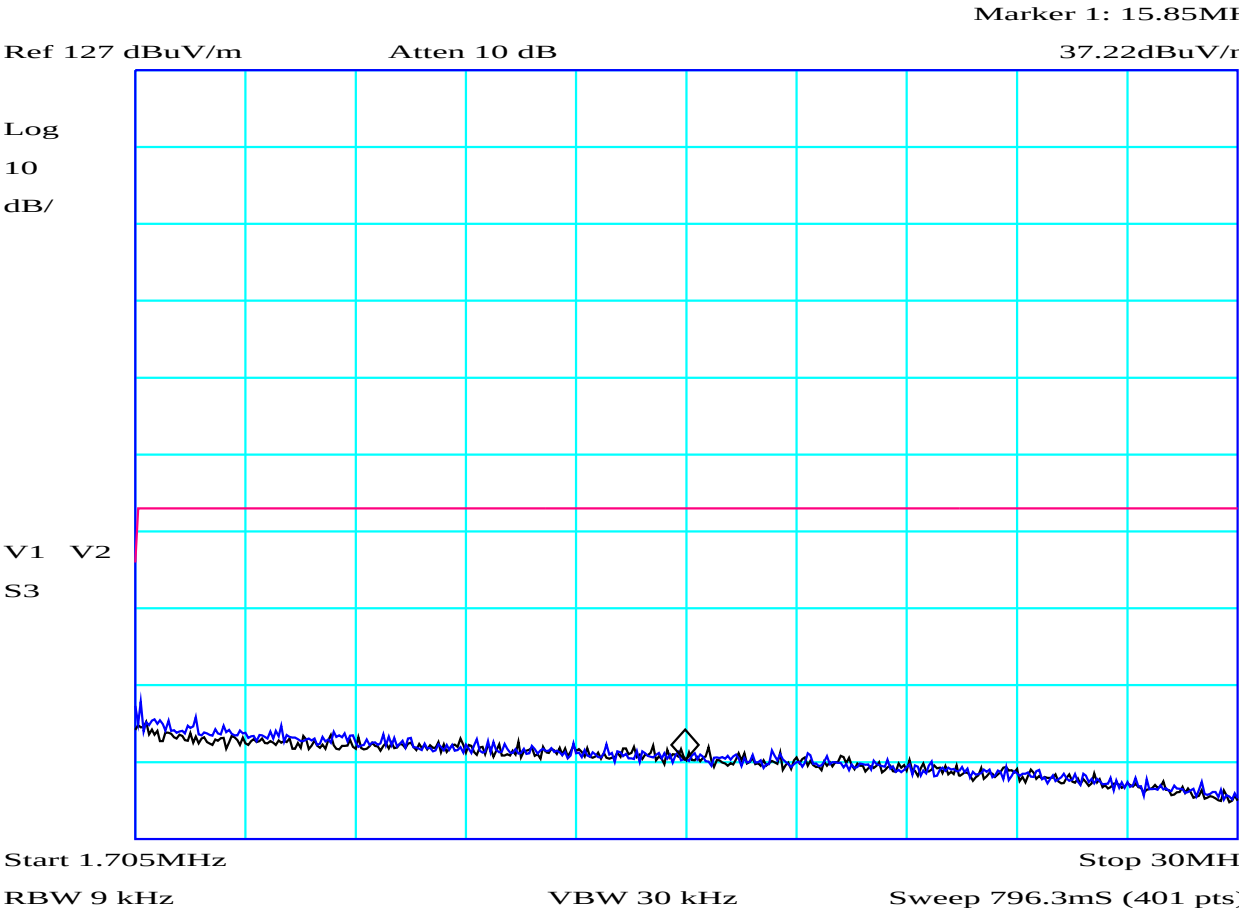
PLOT 11 Radiated Emissions - Sample D - 132.8kHz,80V - 150kHz to 1.705MHz

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 D 132.8kHz 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:	H9B03539		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

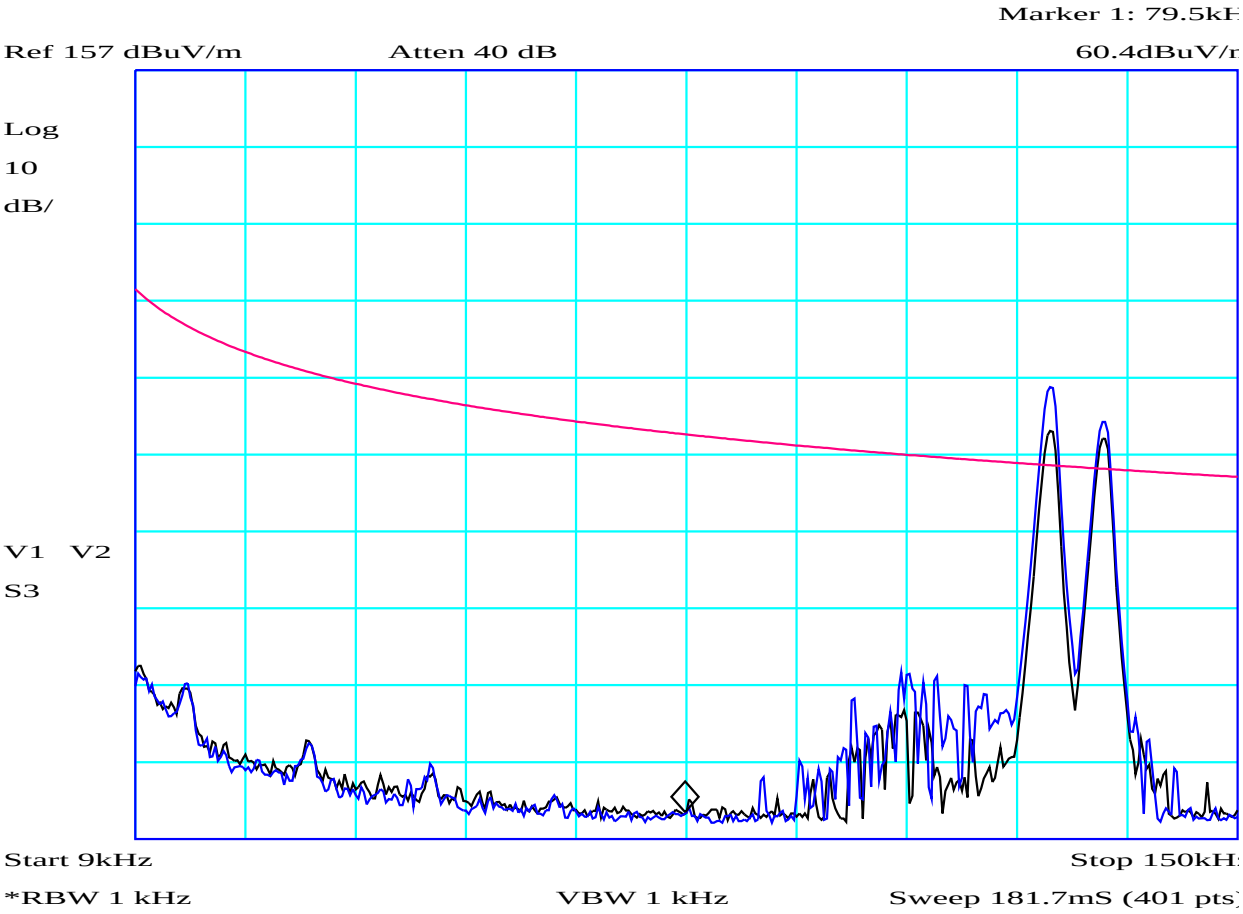
PLOT 12 Radiated Emissions - Sample D - 132.8kHz,80V - 1.705MHz to 30MHz

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 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		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

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

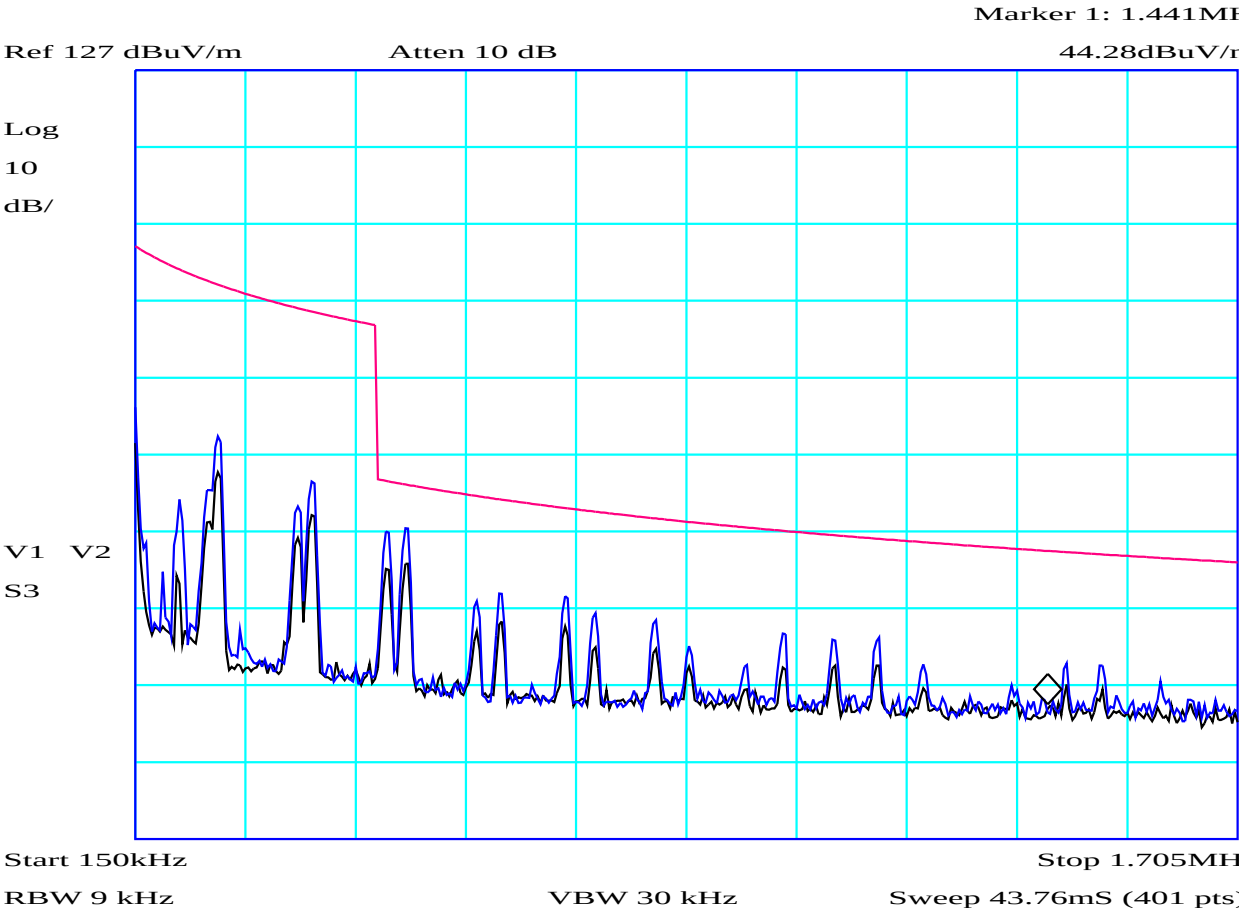
Company:	Sureflap Ltd	Product:	Sureflap
Date:	22/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC_subpartC_@3m (spurious)	Limit2:	
Limit3:		Limit4:	

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.

Facility:	Anech_1	Height	1m	Mode:	2
Distance	3m	Polarisation	V+H	Modification State:	2
Angle	0-360	File:	H9B223FE		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

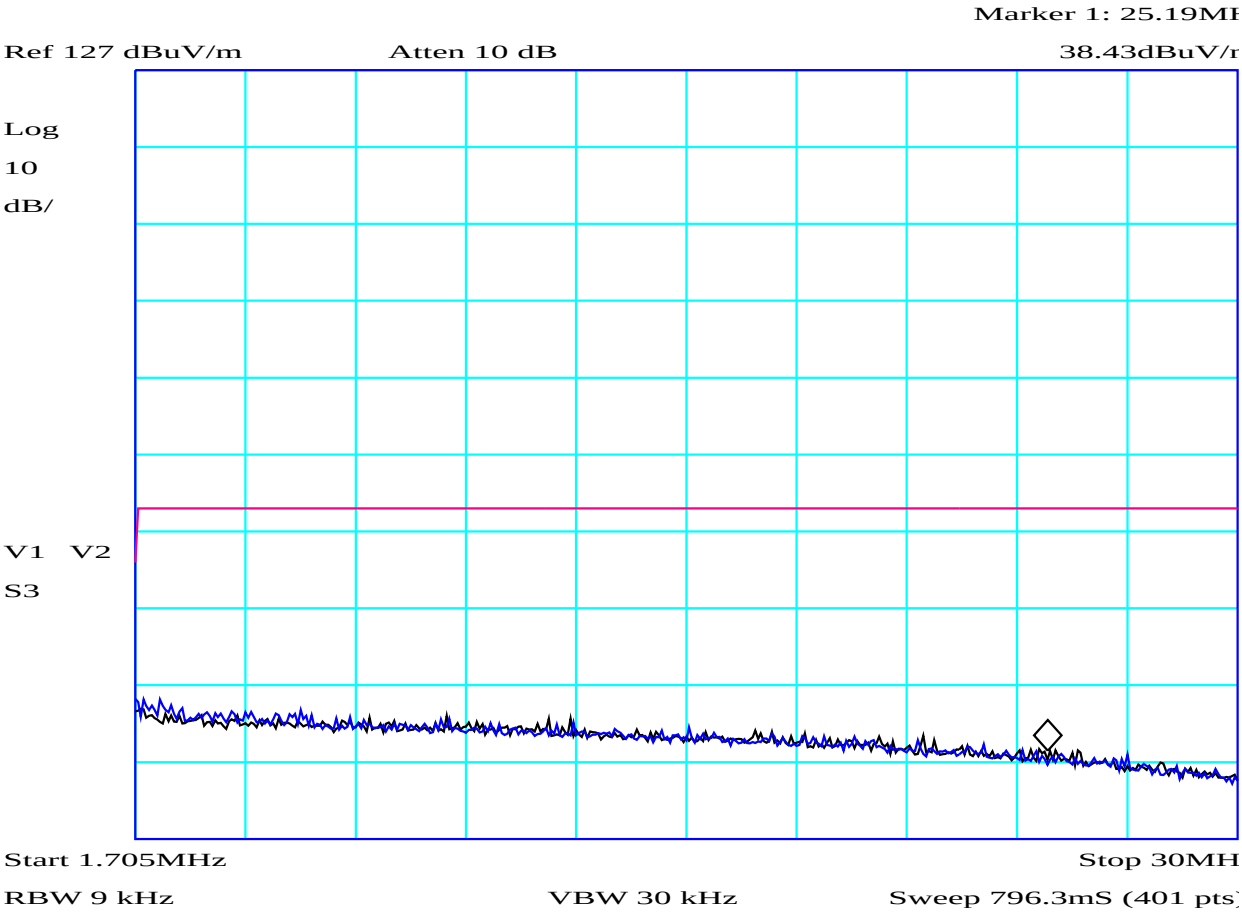
PLOT 14 Radiated Emissions - Sample E - All Read Modes - 150kHz to 1.705MHz

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		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

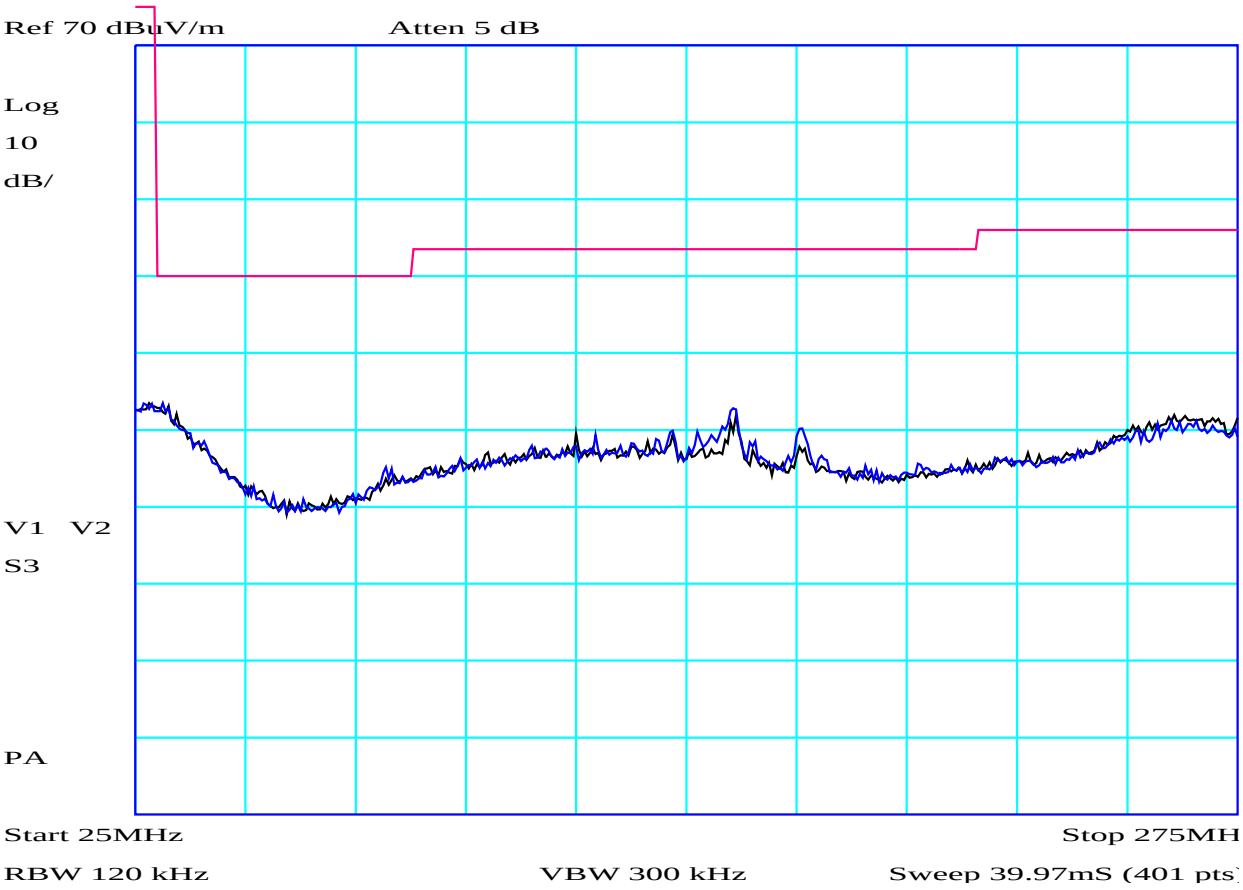
PLOT 15 Radiated Emissions - Sample E - All Read Modes - 1.705MHz to 30MHz

Company:	Sureflap Ltd	Product:	Sureflap
Date:	22/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:(VIO)	FCC_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.

Facility:	Anech_1	Height	1m	Mode:	2
Distance	3m	Polarisation	V+H	Modification State:	2
Angle	0-360	File:	H9B22417		



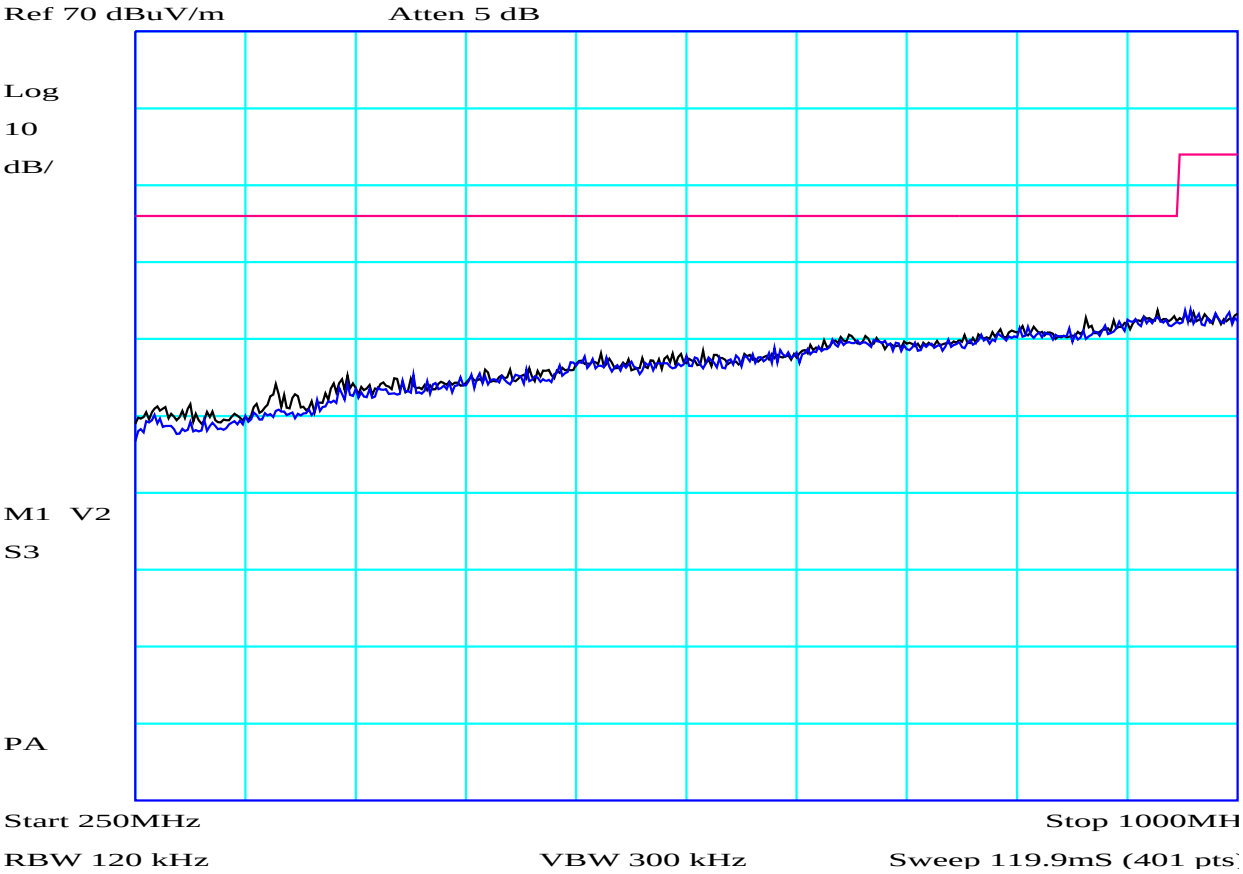
CF1:A12_FS_090306 CF2:CBL002_CBL003_090306

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		



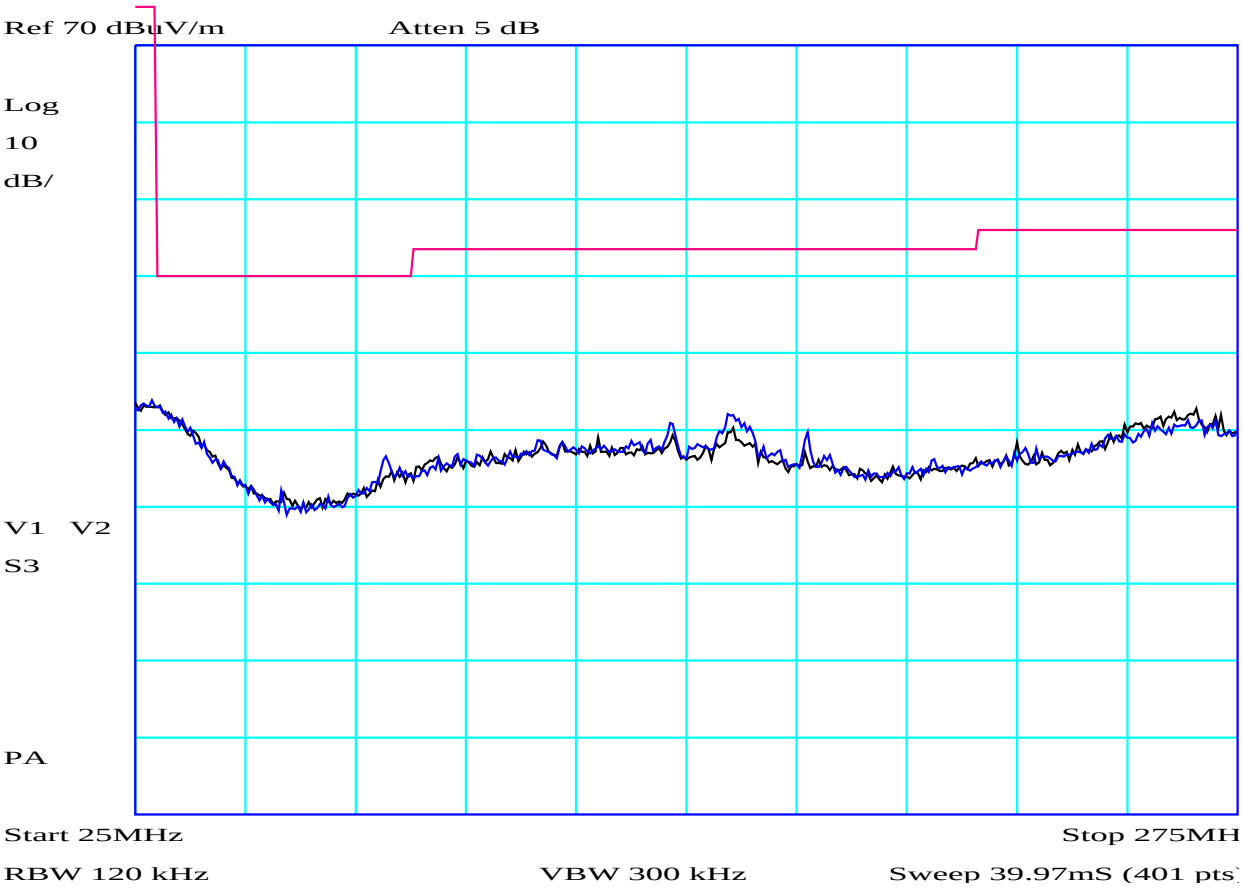
CF1:A12_FS_090306 CF2:CBL002_CBL003_090306

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		



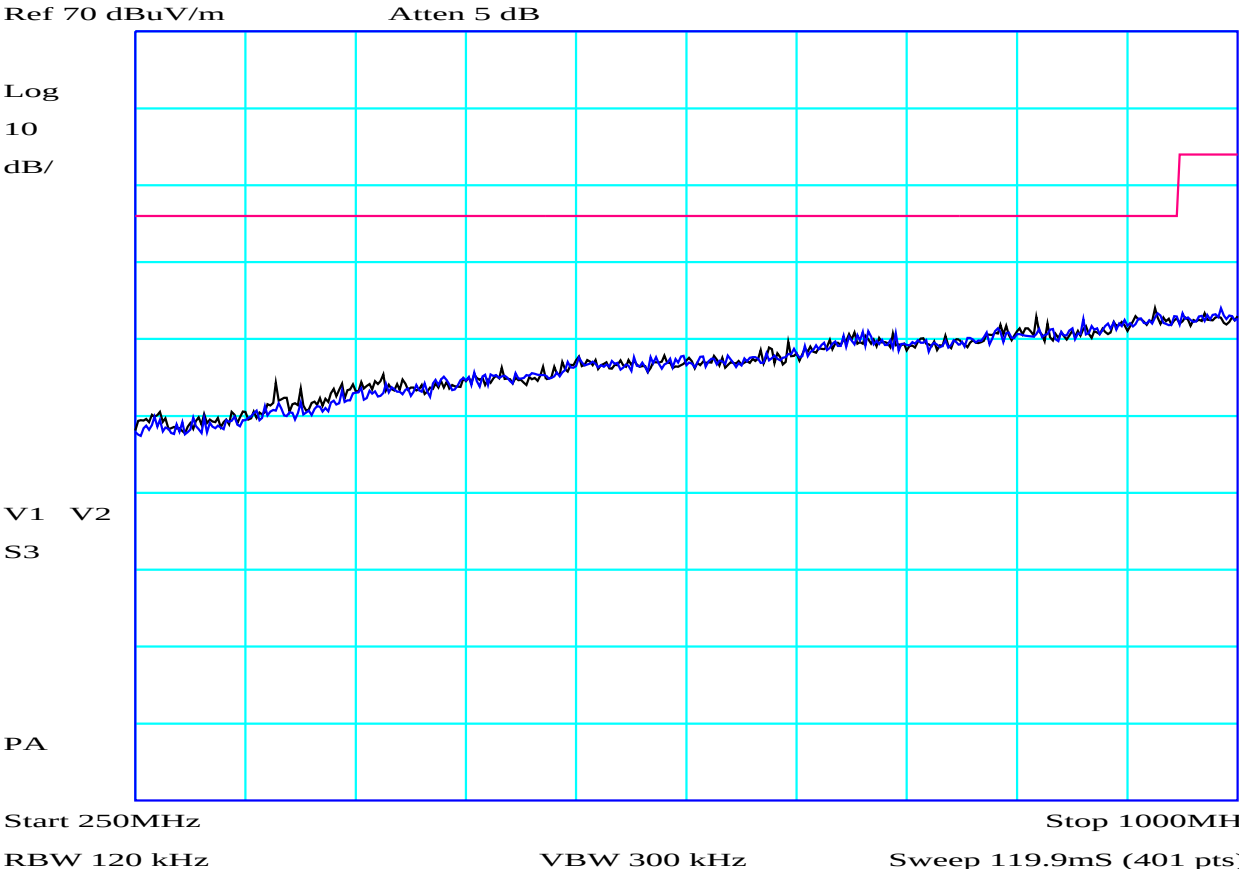
CF1:A12_FS_090306 CF2:CBL002_CBL003_090306

PLOT 18 Radiated Emissions - Sample B - 126kHz,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:	

126kHz 80V
Black: vertical
Blue: horizontal

Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H9B18713		



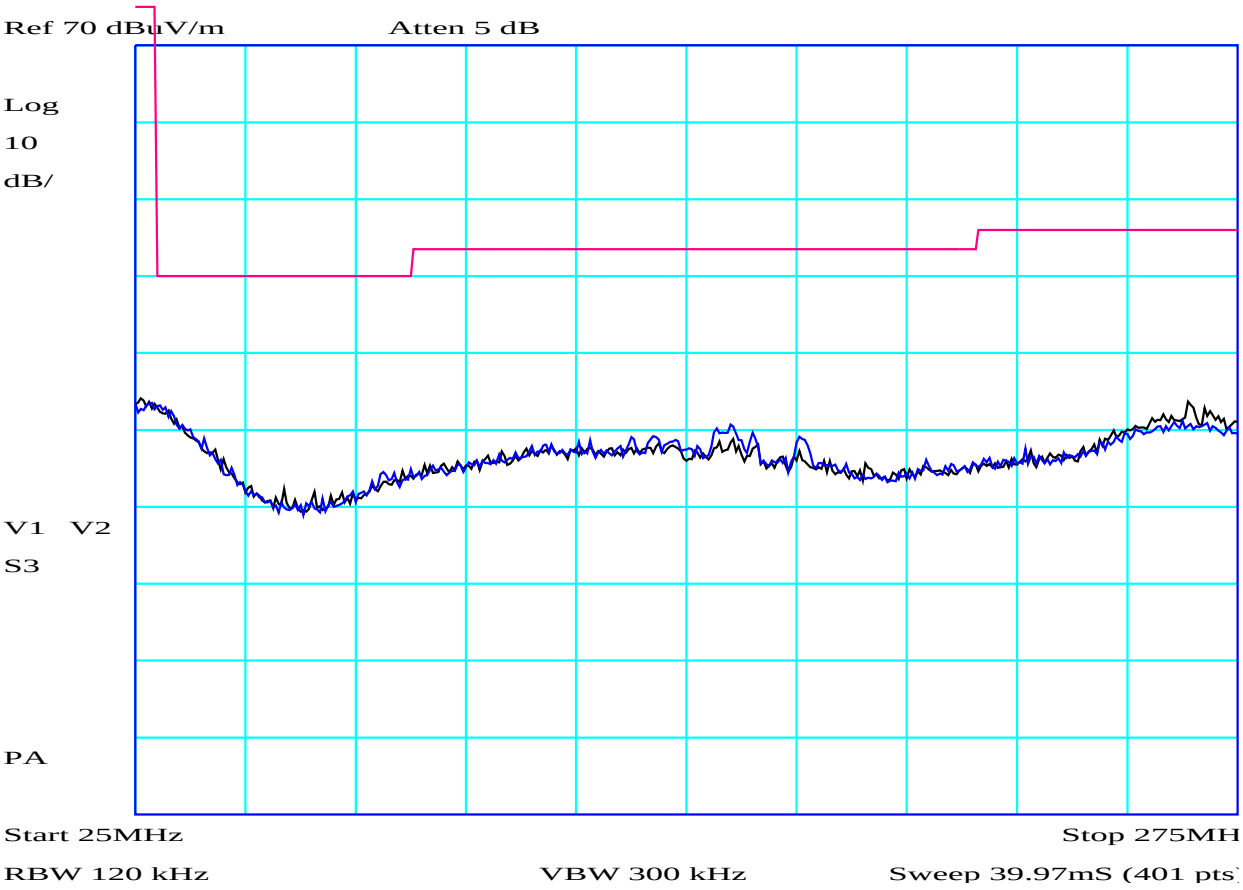
CF1:A12_FS_090306 CF2:CBL002_CBL003_090306

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	1m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H9B18717		



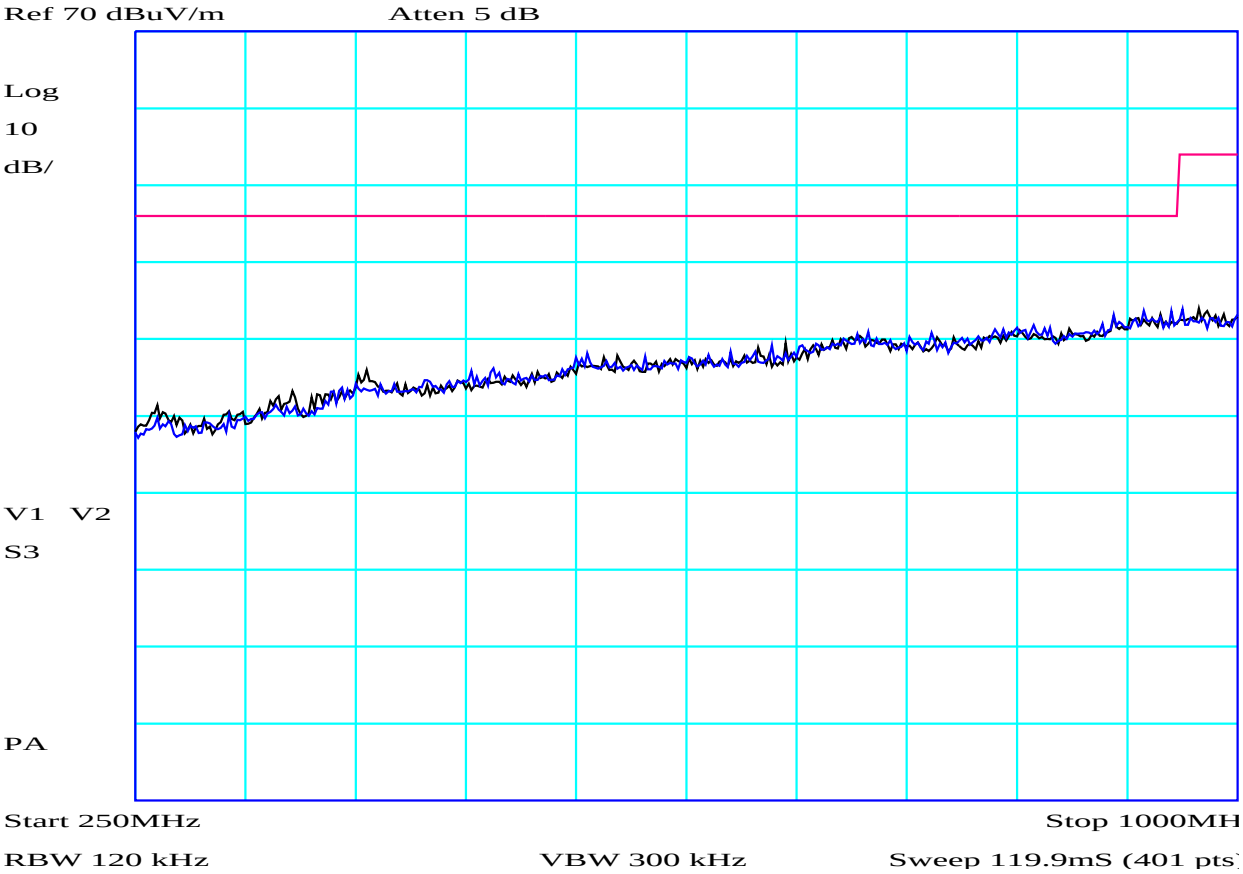
CF1:A12_FS_090306 CF2:CBL002_CBL003_090306

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		



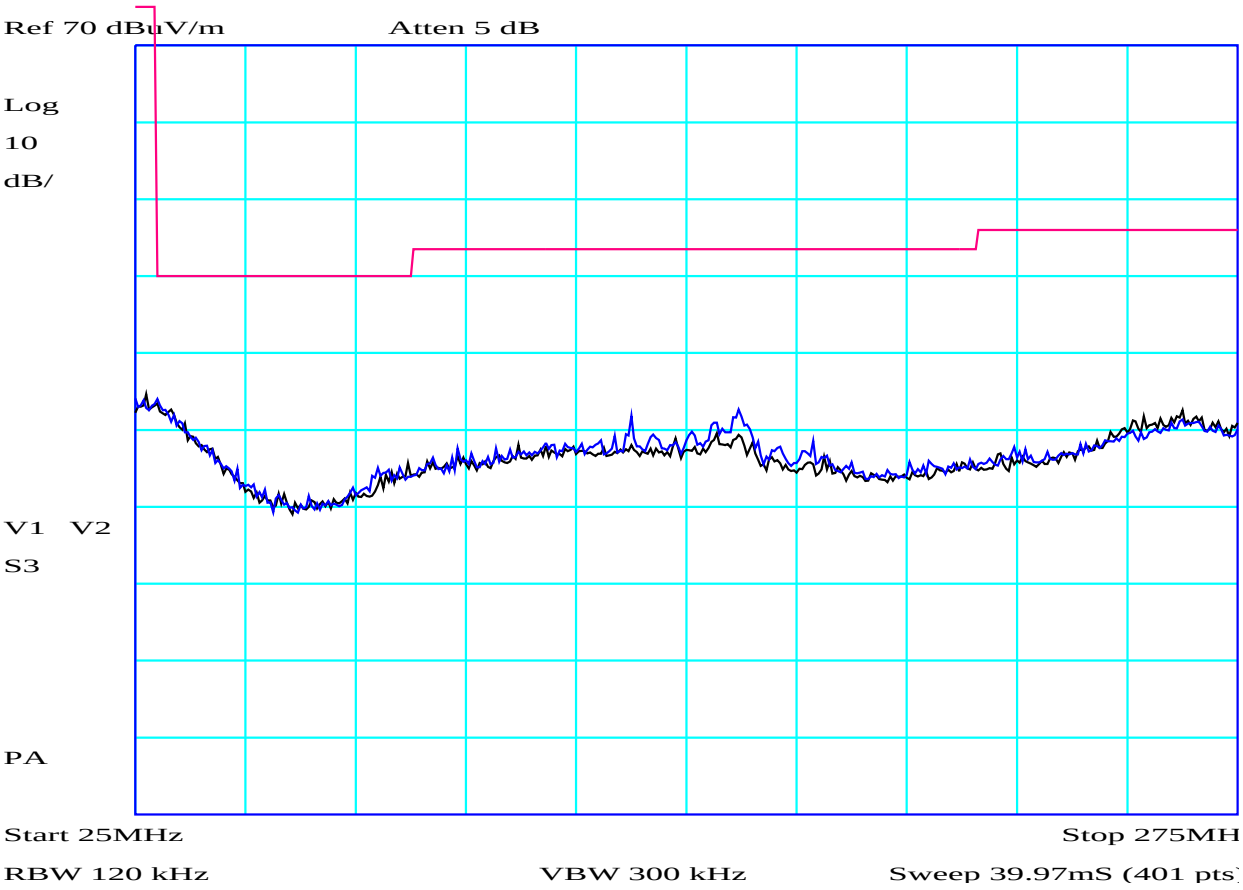
CF1:A12_FS_090306 CF2:CBL002_CBL003_090306

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		



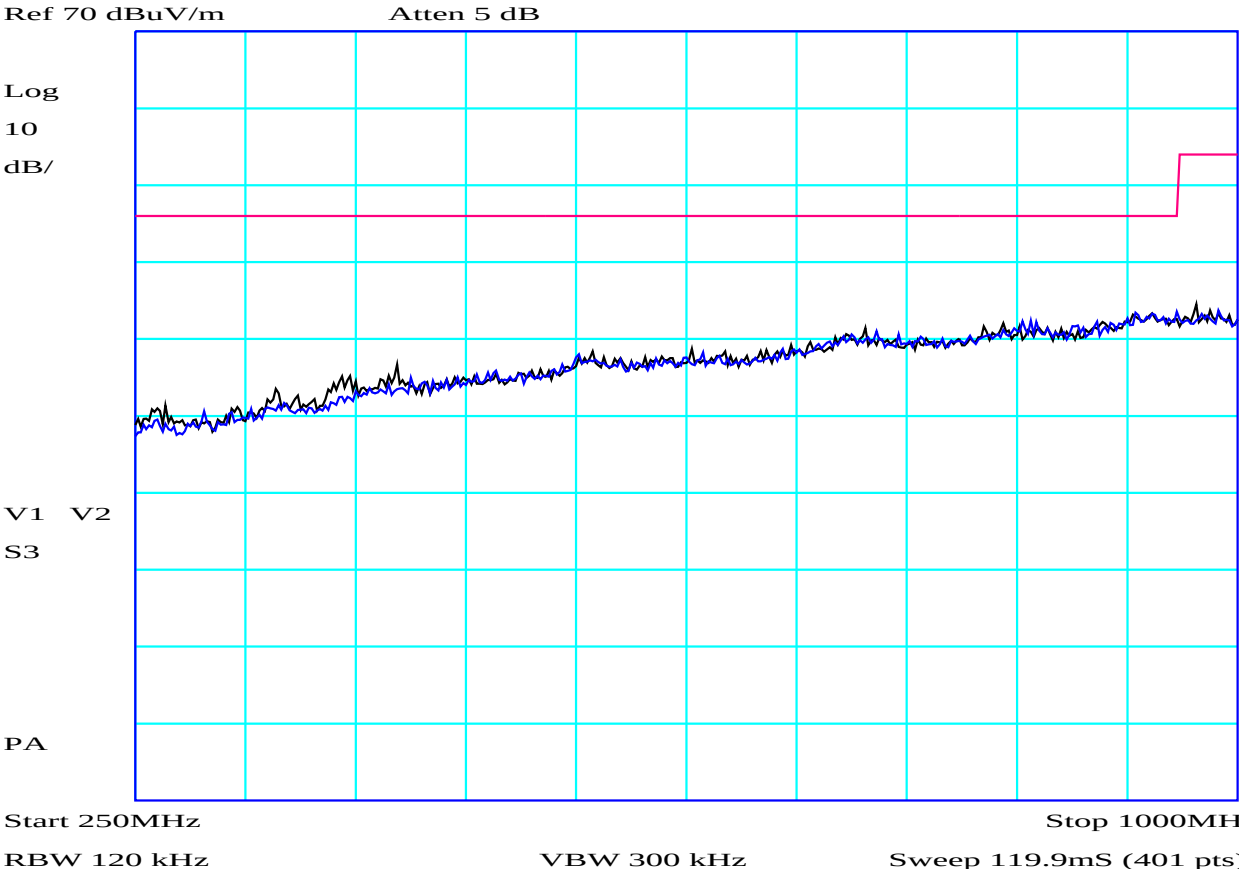
CF1:A12_FS_090306 CF2:CBL002_CBL003_090306

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	1m	Mode:	1
Distance	3m	Polarisation	V+H	Modification State:	0
Angle	0-360	File:	H9B1871D		



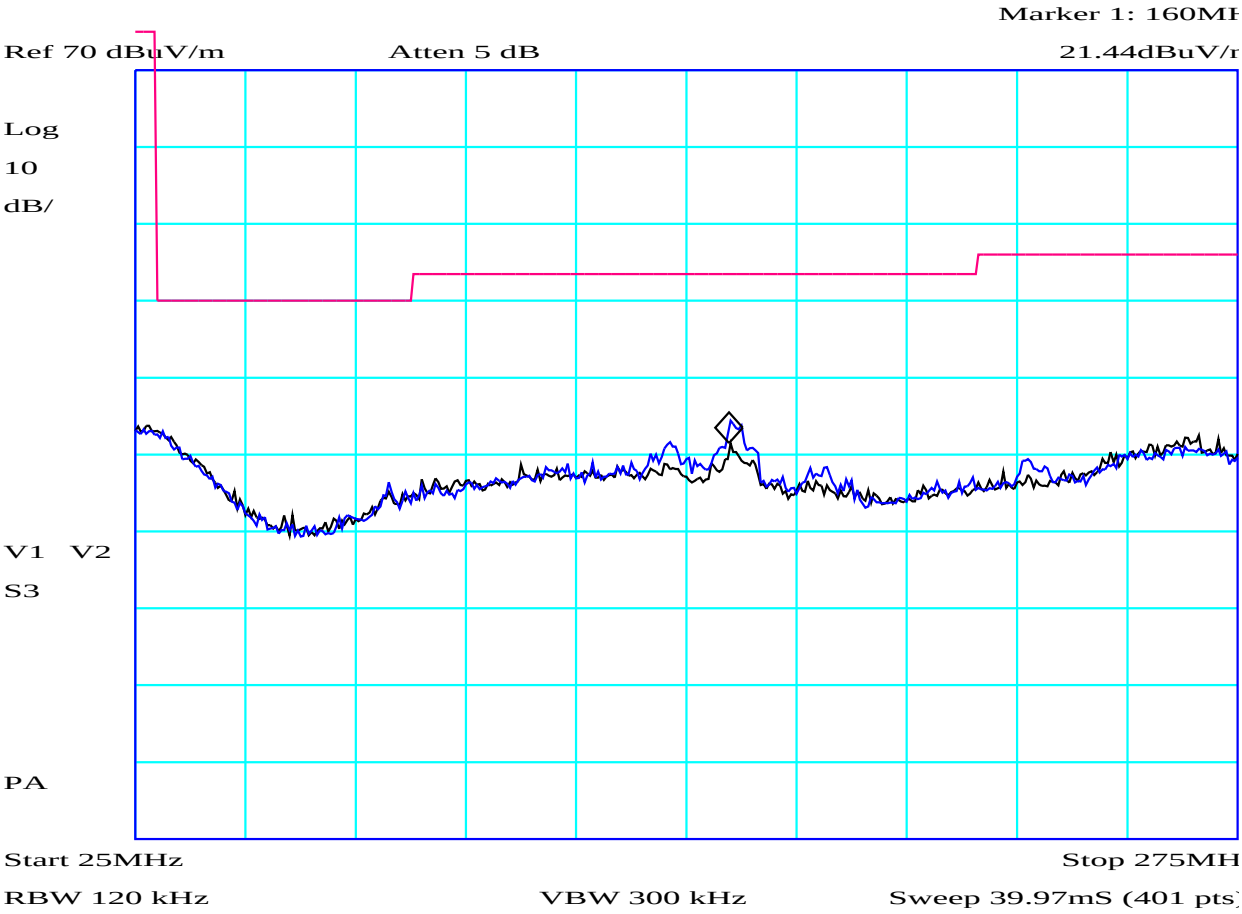
CF1:A12_FS_090306 CF2:CBL002_CBL003_090306

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		



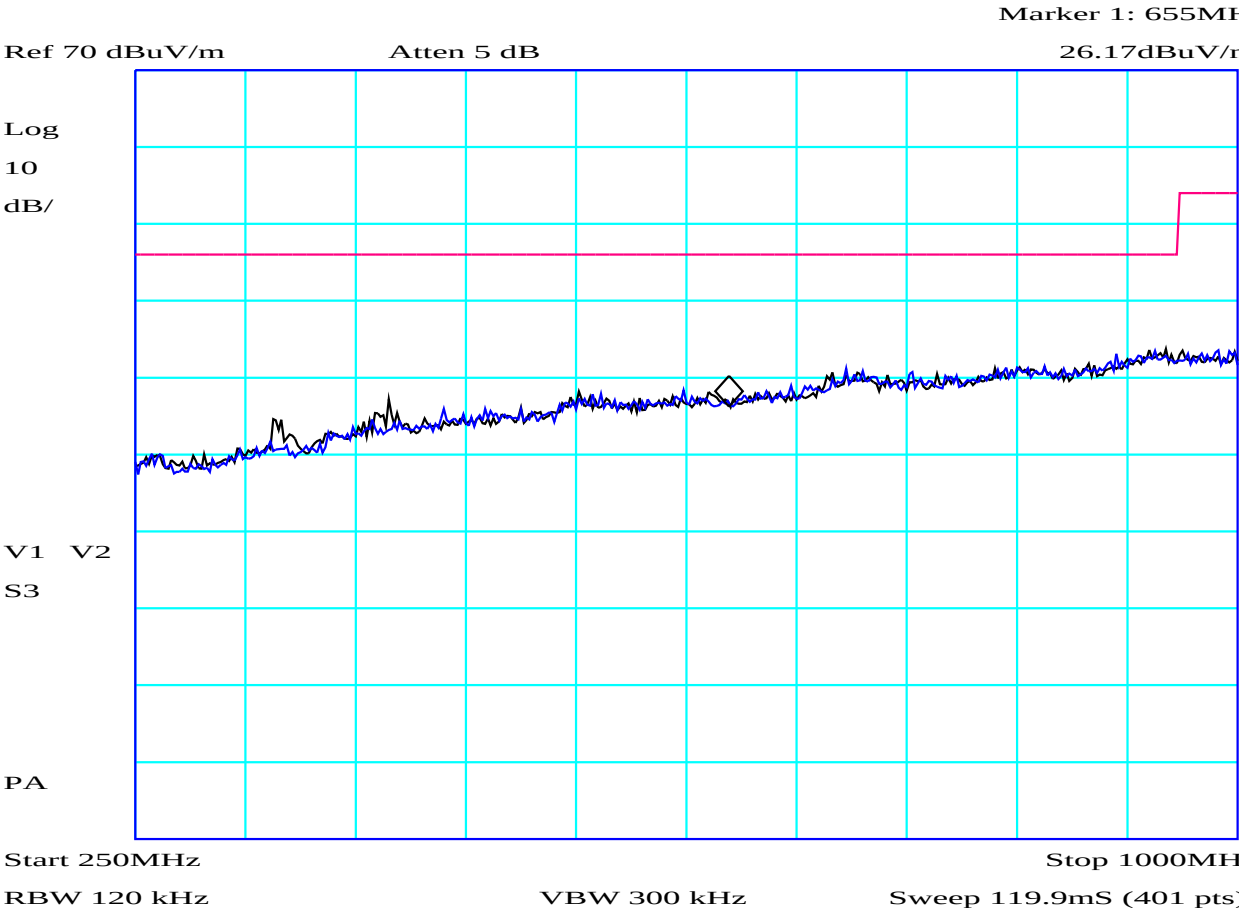
CF1:A12_FS_090306 CF2:CBL002_CBL003_090306

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. Continuously stepping through all read modes.
Black: vertical
Blue: horizontal

Facility:	Anech_1	Height	1m	Mode:	2
Distance	3m	Polarisation	V+H	Modification State:	2
Angle	0-360	File:	H9B223E1		



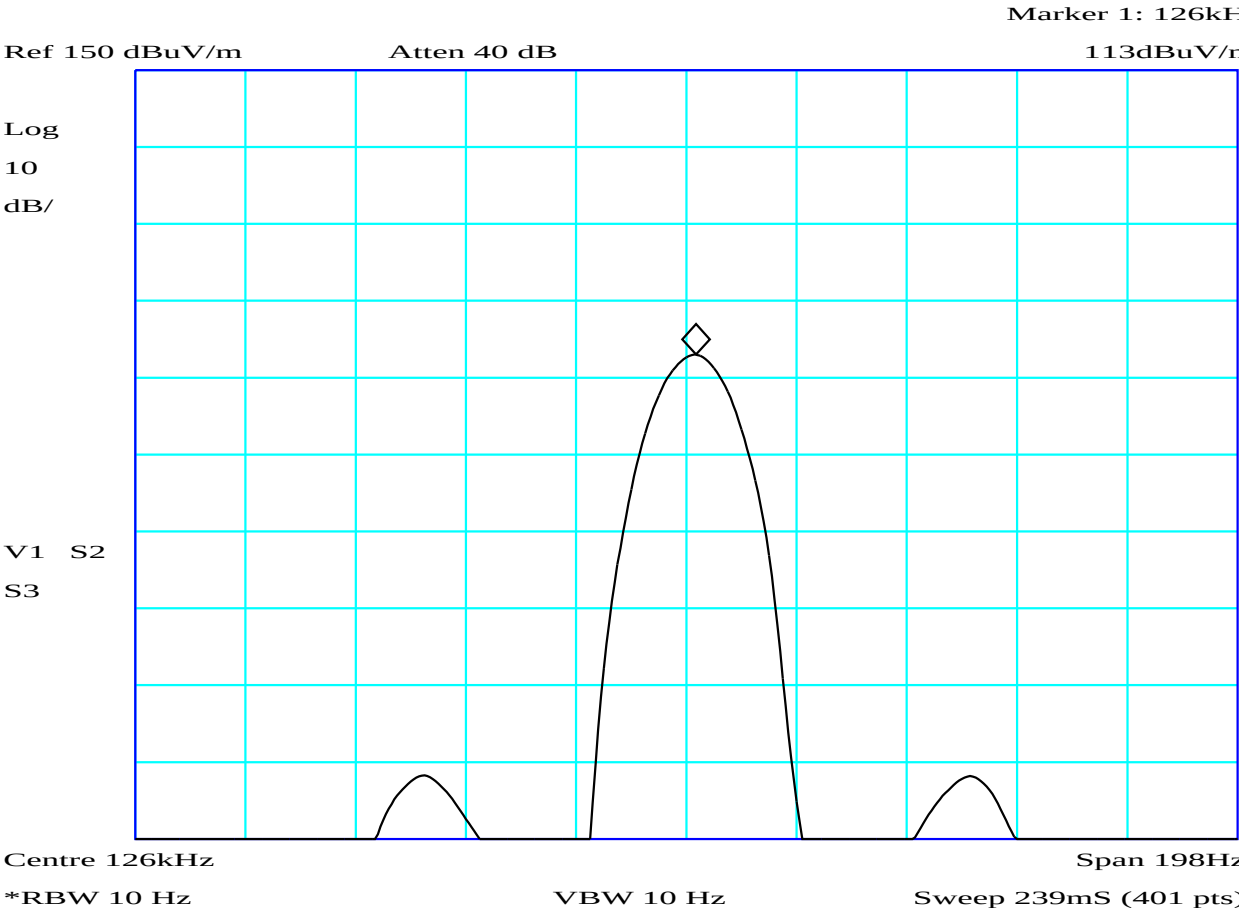
CF1:A12_FS_090306 CF2:CBL002_CBL003_090306

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. Continuously stepping through all read modes.
Black: vertical
Blue: horizontal

Facility:	Anech_1	Height	1m	Mode:	2
Distance	3m	Polarisation	V+H	Modification State:	2
Angle	0-360	File:	H9B223E7		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

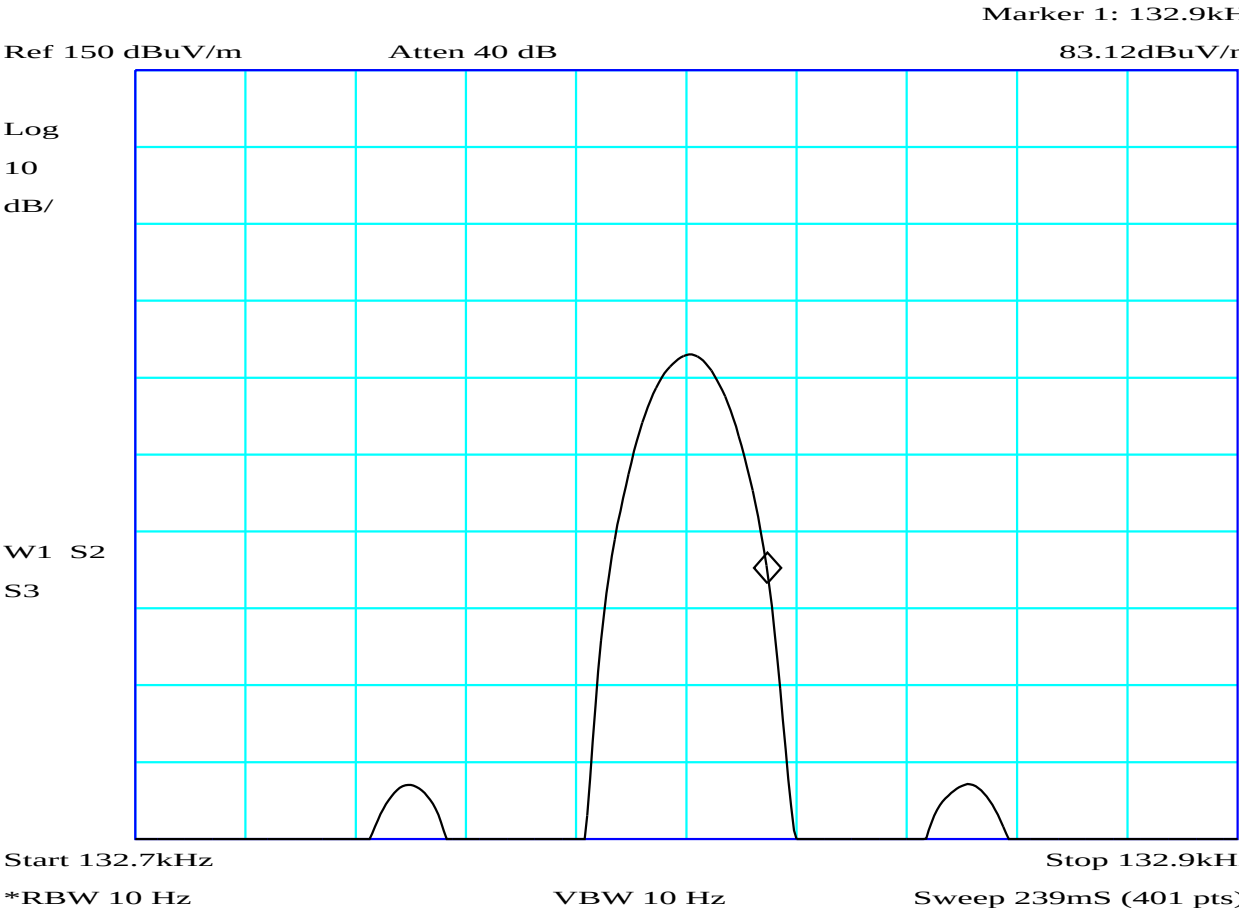
PLOT 26 Bandwidth - Sample A - 126kHz

Company:	Sureflap Ltd	Product:	Sureflap
Date:	03/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:		Limit2:	
Limit3:		Limit4:	

Sample A 126kHz 120V
Bandwidth measured as 29Hz (-30dBc points)

99%BW 21Hz

Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation		Modification State:	0
Angle	0-360	File:	H9B03589		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

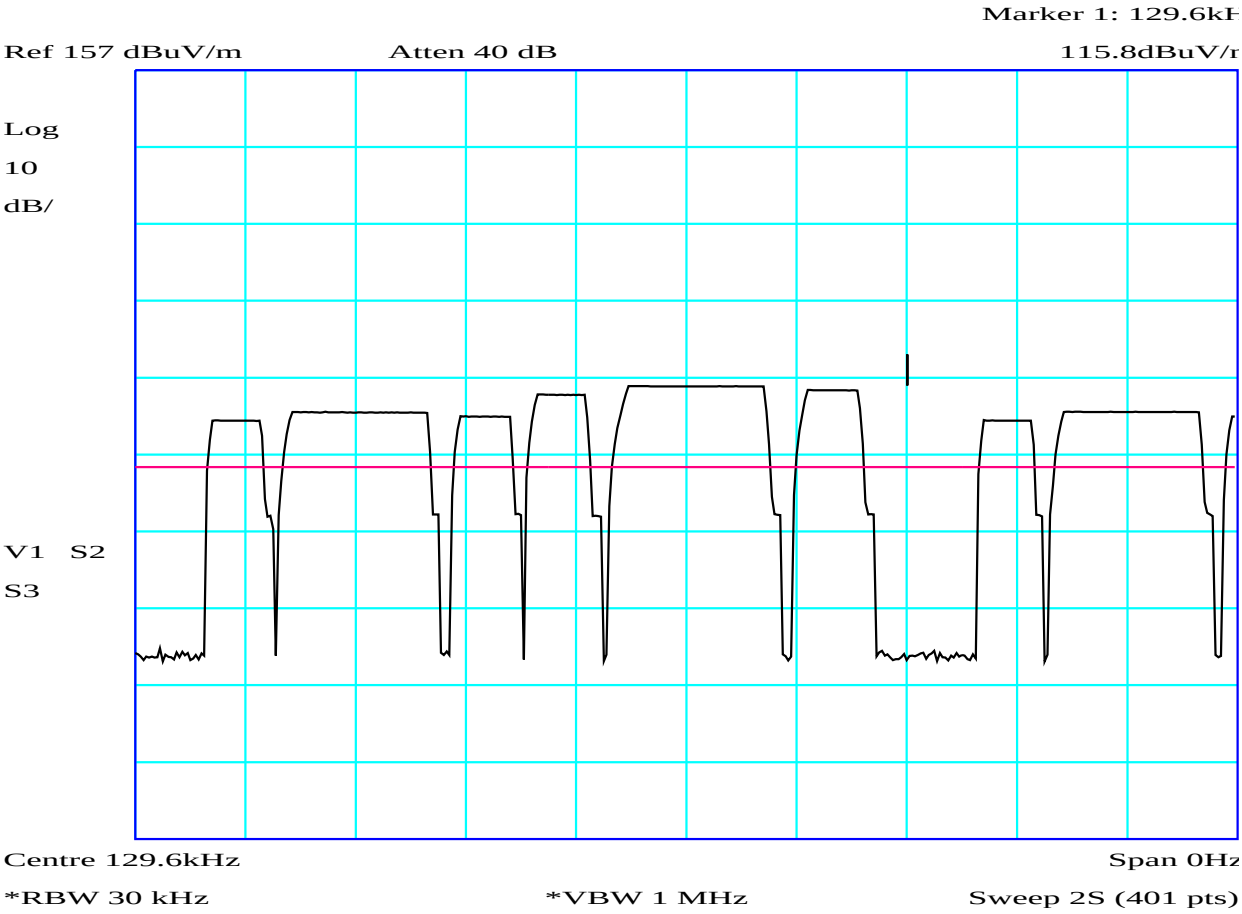
PLOT 27 Bandwidth - Sample C - 132.8kHz

Company:	Sureflap Ltd	Product:	Sureflap
Date:	03/12/09	Test Eng:	Dave Smith
Method:	ANSI C63.4	Method:	
Limit1:		Limit2:	
Limit3:		Limit4:	

Sample C 132.8kHz 120V
Bandwidth measured as 28Hz (-30dBc points)

99%BW 20Hz

Facility:	Anech_1	Height	1m	Mode:	1
Distance	3m	Polarisation		Modification State:	0
Angle	0-360	File:	H9B034FC		



CF1:A9_HI_V_090306 CF2:CBL002_CBL003_090306

PLOT 28 Radiated Emissions - Read Train Timings

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.
Timing.

Facility:	Anech_1	Height	1m	Mode:	2
Distance	3m	Polarisation	V	Modification State:	2
Angle	Front	File:	H9B22409		