MEASUREMENT/TECHNICAL REPORT

Company: Interflex N.A., Inc.
FRN: 0006-6303-47
Models
IF HDP611
IF HDP610
FCC ID: P8KHID

Description: This is a report to support a request for an original grant of equipment authorization.

Equipment Type: Low Power Communications Device Transmitter (DXX)

Report prepared for: Interflex, Inc.
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Introduction

This report is an application for Certification of a Transmitter operating pursuant to 47 CFR 15.209. The model numbers covered by this report are IF HDP611 and IF HDP610. This report is designed to demonstrate the compliance of these devices with the requirements outlined in 47 CFR Part 15 using the methods outlined in 47 CFR Part 2.

The IF HDP611 is considered to be representative of the IF HDP610. The IF HDP610 is equivalent to the IF HDP611 except for its lack of a keypad. Therefore, the IF HDP611 is the worst-case model. The transmitter circuitry and antennas are identical.

Statement of Conformity

The Interflex IF HDP611 has been found to conform with the following parts of the 47 CFR as detailed below:

Part 2	Part 15	Comments
	15.15(b)	The product contains no user accessible controls that increase transmission power above allowable levels.
2.925	15.19	The label is shown in the label exhibit.
	15.21	Information to the user is shown in the instruction manual exhibit.
	15.27	No special accessories are required for compliance.
	15.31(e)	Readings were taken at the fundamental frequency with the supply voltage varied 15% below the lowest nominal rated voltage and 15% above the highest nominal rated voltage.
	15.203	The antenna is printed directly on the transmitter board.
	15.205 15.209	The fundamental is not in a Restricted band and the spurious emissions in the Restricted bands comply with the general emission limits of 15.209.
	15.207	The unit is DC powered without the capability of being operated from the AC mains.

Test Methodology

Radiated emission testing was performed according to the procedures in ANSI C63.4 (1992). The testing was performed at an antenna to EUT distance of 3 or 1 meter(s) below 30MHz and a distance of 10 meters above 30MHz. The actual test distance used is noted in the test data sheets. The device's performance was investigated to 1GHz. The EUT was powered by a 24V DC power supply. Since the device is installed in one orientation, the emissions were maximized around the vertical axis and the maximum reading was recorded. The integrated antenna cannot be maximized separately.

All other performance tests were made in accordance with the procedures outlined in Part 15 of CFR 47. The applicable sections provided under Part 15 are provided in the measurement section of this report.

Test Facility

Curtis-Straus LLC
All testing for the range 9kHz–1000MHz was performed at Curtis-Straus (A2LA Certificate Number 1627-01). The open area test site used to collect the radiated data is located at 527 Great Road, Littleton, MA 01460. Sites “A” and “T” were used.

Test Equipment Used

SPECTRUM ANALYZERS					
x	**Analyzer**	**Model No.**	**Company**	**Serial No.**	**Calibration Due**
	GREEN 9kHz-26.5GHz	8593E	HP	3829A03618	04-OCT-2002
	BLACK 9kHz-12.8GHz	8596E	HP	3710A00944	29-JUN-2002
	ORANGE 9kHz-26.5GHz	E4407B	HP	US39440975	18-MAY-2002

OPEN AREA TEST SITES (OATS)					
x	**Site**	**FCC Code**	**IC Code**	**VCCI Code**	**Calibration Due**
	"T" Texas	93448	IC 2762-T	R-905/ C-480	09-SEP-2002
	"A" Alaska	93448	IC 2762-A	R-903/ C-480	23-JUN-2002

ANTENNAS					
x	**Antenna**	**Model No.**	**Company**	**Serial No.**	**Calibration Due**
	GREEN-WHITE Bilog: 30MHz-2GHz	CBL6112B	Chase	2574	28-JUN-2002
	LARGE LOOP Passive Loop: 20Hz-5MHz	6511	EMCO	9704-1154	05-NOV-2002
	SMALL LOOP Passive Loop: 9kHz-30MHz	PLA-130/A	ARA	1024	27-JAN-2003

PREAMPLIFIERS					
x	**Preamplifier**	**Model No.**	**Company**	**Serial No.**	**Calibration Due**
	BLUE 0.01-2000MHz	ZFL-1000-LN	MiniCircuits/ C-S	n/a	18-MAY-2002
	BLACK 0.01-2000MHz	ZFL-1000-LN	MiniCircuits/ C-S	n/a	22-MAR-2003

Unless otherwise noted the calibration interval is one year. All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Measurement Results

Operating Frequency

This device operates at 125kHz.

Electric Field Strength Radiation Measurements

Radiated Emissions Table — *Curtis-Straus LLC*

Date: 14-Dec-01 **Company:** Interflex **Table** 1
Engineer: Evan Gould **EUT Desc:** IF HDP611 **Work Order:** B1260

Frequency Range: 10kHz - 30MHz

Notes: Fundamental through tenth harmonic. **EUT Max Freq:** 16MHz
All measurements are peak readings. **Test Site:** "T"

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	47 CFR 15.209 Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
0° (3m)	0.1253	58.8	22.4	51.9	0.0	88.3	105.6	-17.3	Pass
0° (1m)	0.25	43.3	22.6	51.2	0.0	71.9	118.7	-46.8	Pass
0° (3m)	0.3753	34.0	22.6	50.8	0.0	62.2	96.1	-33.9	Pass
0° (1m)	0.5	28.2	22.6	50.6	0.0	56.2	92.7	-36.5	Pass
0° (1m)	0.625	47.6	22.6	50.5	0.0	75.5	90.7	-15.2	Pass
0° (1m)	0.75	21.6	22.6	50.3	0.0	49.3	89.1	-39.8	Pass
0° (1m)	0.8758	41.6	22.5	50.1	0.0	69.2	87.8	-18.6	Pass
0° (1m)	1.0	32.6	22.5	50.0	0.0	60.1	86.6	-26.5	Pass
0° (1m)	1.125	40.3	22.5	49.8	0.0	67.6	85.6	-18.0	Pass
0° (1m)	1.25	26.4	22.5	49.7	0.0	53.6	84.7	-31.1	Pass

Table Result: Pass by -15.2 dB ***Worst Freq:*** 0.625 MHz

10kHz-5MHz >>	**Pre-Amp:** Blue	**Cable:** 65 ft RG8A/U	**Analyzer:** Orange	**Antenna:** Lg Loop
5MHz-30MHz >>	**Pre-Amp:** N/A	**Cable:** 65 ft RG8A/U	**Analyzer:** Orange	**Antenna:** Sm Loop

Radiated Emissions Table

Curtis-Straus LLC

Date: 12-Dec-01 **Company:** Interflex **Table** 2
Engineer: Evan Gould **EUT Desc:** IF HDP611 **Work Order:** B1260

Frequency Range: 30-1000MHz **Measurement Distance:** 10 m

Notes: Spurious Emissions **EUT Max Freq:** 16MHz

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	47 CFR 15.209 Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
V	117.5	38.5	22.5	11.5	1.0	28.5	33.0	-4.5	Pass
Vbb	125.7	31.5	22.5	11.6	1.1	21.7	33.0	-11.3	Pass
V	137.1	39.8	22.5	10.8	1.1	29.2	33.0	-3.8	Pass
V	156.6	39.2	22.5	9.4	1.2	27.3	33.0	-5.7	Pass
Vbb	185.7	31.6	22.5	8.6	1.4	19.1	33.0	-13.9	Pass
Hbb	196.0	41.0	22.5	9.0	1.5	29.0	33.0	-4.0	Pass
V	224.0	39.2	22.5	10.5	1.6	28.8	35.5	-6.7	Pass
Hbb	225.1	39.0	22.5	10.6	1.7	28.8	35.5	-6.7	Pass
Hbb	237.4	38.8	22.5	11.3	1.7	29.3	35.5	-6.2	Pass
H	240.0	37.8	22.5	11.5	1.7	28.5	35.5	-7.0	Pass
H	250.0	37.2	22.6	12.1	1.8	28.5	35.5	-7.0	Pass
H	275.0	39.8	22.6	12.6	1.9	31.7	35.5	-3.8	Pass
H	279.1	35.1	22.6	12.7	1.9	27.1	35.5	-8.4	Pass
H	280.0	36.7	22.6	12.7	1.9	28.7	35.5	-6.8	Pass
H	300.0	39.0	22.6	13.1	2.0	31.5	35.5	-4.0	Pass
H	320.0	35.1	22.6	13.6	2.1	28.2	35.5	-7.3	Pass
H	325.0	36.1	22.6	13.8	2.1	29.4	35.5	-6.1	Pass
H	440.0	29.8	22.5	16.3	2.5	26.1	35.5	-9.4	Pass

Table Result: Pass by -3.8 dB ***Worst Freq:*** 137.1 MHz

Test Site: "T" **Pre-Amp:** Blue **Cable:** 65 ft RG8A/U **Analyzer:** Green **Antenna:** Grn-Wht

Voltage Variations

Date: 21-Dec-01 **Company:** Interflex
Engineer: Evan Gould **EUT Desc:** IF HDP611

Work Order: B1260 **Measurement Distance:** 3 m

Table: 3
Note: Reading at nominal voltage: 88.3dBµV/m (table Table 1)

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)
17.42VDC			---	---	---	---
0°	0.125	58.5	22.4	52.0	0.0	88.1
43.7VDC			---	---	---	---
0°	0.125	58.5	22.4	52.0	0.0	88.1

Test Site: "A" **Pre-Amp:** Black **Cable:** 65 ft RG8A/U
Analyzer: Black **Antenna:** Lg Loop

Emissions Plots

Fundamental