MEASUREMENT/TECHNICAL REPORT

Company: Interflex N.A., Inc.
FRN: 0006-6303-47
Models
IF P600
IF P603
FCC ID: P8KPXFB

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.
20 Dolphin Road
P.O. Box 9338
Forestville, CT 06011-9338
Phone: 860-582-8300
Fax: 860-582-8304

Report prepared by:

Evan D. Gould
Curtis-Straus LLC
527 Great Road
Littleton, MA 01460 USA
Phone: 978-486-8880
FAX: 978-486-8828

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 P600 and IF P603. Both of these devices contain the same transmitter (Philips HTRC110). 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.

Statement of Conformity

The Interflex IF P600, and IF P603 have been found to conform with the following parts of the 47 CFR as detailed below:

Part 2	Part 15	Comments
	15.15(b)	The products contain 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	A section in the installation manual details the use of special accessories that 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	An 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**
X	**GREEN** 9kHz-26.5GHz	8593E	HP	3829A03618	04-OCT-2002
X	**BLACK** 9kHz-12.8GHz	8596E	HP	3710A00944	29-JUN-2002
X	**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**
X	**"T"** Texas	93448	IC 2762-T	R-905/ C-480	09-SEP-2002
X	**"A"** Alaska	93448	IC 2762-A	R-903/ C-480	23-JUN-2002

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

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

These devices operate at 125kHz.

Electric Field Strength Radiation Measurements

Radiated Emissions Table — *Curtis-Straus LLC*

Date: 17-Dec-01 **Company:** Interflex **Table** 1
Engineer: Evan Gould **EUT Desc:** IF P600 **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	62.2	22.4	51.9	0.0	91.7	105.6	-13.9	Pass
0° (1m)	0.25	37.2	22.6	51.2	0.0	65.8	118.7	-52.9	Pass
0° (3m)	0.3753	34.2	22.6	50.8	0.0	62.4	96.1	-33.7	Pass
0° (1m)	0.5	28.4	22.6	50.6	0.0	56.4	92.7	-36.3	Pass
0° (1m)	0.625	47.1	22.6	50.5	0.0	75.0	90.7	-15.7	Pass
0° (1m)	0.75	26.0	22.6	50.3	0.0	53.7	89.1	-35.4	Pass
0° (1m)	0.8758	41.5	22.5	50.1	0.0	69.1	87.8	-18.7	Pass
0° (1m)	1.0	34.9	22.5	50.0	0.0	62.4	86.6	-24.2	Pass
0° (1m)	1.125	41.5	22.5	49.8	0.0	68.8	85.6	-16.8	Pass
0° (1m)	1.25	27.6	22.5	49.7	0.0	54.8	84.7	-29.9	Pass

Table Result: Pass by -13.9 dB ***Worst Freq:*** 0.1253 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 P600 **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)
Vbb	126.0	37.0	22.5	11.5	1.1	27.1	33.0	-5.9	Pass
V	135.1	42.5	22.5	10.9	1.1	32.0	33.0	-1.0	Pass
V	136.0	42.4	22.5	10.9	1.1	31.9	33.0	-1.1	Pass
V	143.9	43.3	22.5	10.3	1.2	32.3	33.0	-0.7	Pass
V	151.7	42.5	22.5	9.8	1.2	31.0	33.0	-2.0	Pass
V	151.9	37.7	22.5	9.8	1.2	26.2	33.0	-6.8	Pass
V	160.0	40.1	22.5	9.2	1.3	28.1	33.0	-4.9	Pass
V	168.0	39.8	22.5	8.9	1.3	27.5	33.0	-5.5	Pass
V	171.0	37.6	22.5	8.8	1.3	25.2	33.0	-7.8	Pass
V	179.0	40.0	22.5	8.4	1.4	27.3	33.0	-5.7	Pass
V	200.0	40.6	22.5	9.1	1.5	28.7	33.0	-4.3	Pass
H	225.0	41.3	22.5	10.6	1.7	31.1	35.5	-4.4	Pass
H	256.0	33.3	22.6	12.2	1.8	24.7	35.5	-10.8	Pass
H	279.1	35.7	22.6	12.7	1.9	27.7	35.5	-7.8	Pass
H	296.0	33.8	22.6	13.0	2.0	26.2	35.5	-9.3	Pass
H	300.0	37.0	22.6	13.1	2.0	29.5	35.5	-6.0	Pass
H	325.0	41.0	22.6	13.8	2.1	34.3	35.5	-1.2	Pass
H	375.0	35.4	22.5	15.2	2.3	30.4	35.5	-5.1	Pass
H	400.0	36.4	22.5	16.0	2.4	32.3	35.5	-3.2	Pass
H	450.0	36.1	22.5	16.4	2.6	32.6	35.5	-2.9	Pass
H	600.0	33.5	22.3	18.7	3.1	33.0	35.5	-2.5	Pass

Table Result: Pass by -0.7 dB ***Worst Freq:*** 143.9 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 P600

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

Table: 3
Note: Reading at nominal voltage: 91.7dBµV/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)
8.925VDC			---	---	---	---
0deg	0.125	61.9	22.4	52.0	0.0	91.5
43.7VDC			---	---	---	---
0deg	0.125	62.0	22.4	52.0	0.0	91.6

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

Radiated Emissions Table

Curtis-Straus LLC

Date: 17-Dec-01 **Company:** Interflex **Table** 4
Engineer: Evan Gould **EUT Desc:** IF P603 **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	60.2	22.4	51.9	0.0	89.7	105.6	-15.9	Pass
0° (1m)	0.25	32.9	22.6	51.2	0.0	61.5	118.7	-57.2	Pass
0° (3m)	0.3753	33.8	22.6	50.8	0.0	62.0	96.1	-34.1	Pass
0° (1m)	0.5	27.5	22.6	50.6	0.0	55.5	92.7	-37.2	Pass
0° (1m)	0.625	45.4	22.6	50.5	0.0	73.3	90.7	-17.4	Pass
0° (1m)	0.75	21.8	22.6	50.3	0.0	49.5	89.1	-39.6	Pass
0° (1m)	0.8758	40.2	22.5	50.1	0.0	67.8	87.8	-20.0	Pass
0° (1m)	1.0	34.4	22.5	50.0	0.0	61.9	86.6	-24.7	Pass
0° (1m)	1.125	40.5	22.5	49.8	0.0	67.8	85.6	-17.8	Pass
0° (1m)	1.25	29.7	22.5	49.7	0.0	56.9	84.7	-27.8	Pass

Table Result: Pass by -15.9 dB ***Worst Freq:*** 0.1253 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** 5
Engineer: Evan Gould **EUT Desc:** IF P603 **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)
Vbb	126.0	37.0	22.5	11.5	1.1	27.1	33.0	-5.9	Pass
V	135.2	38.8	22.5	10.9	1.1	28.3	33.0	-4.7	Pass
V	136.0	42.0	22.5	10.9	1.1	31.5	33.0	-1.5	Pass
V	144.0	43.2	22.5	10.3	1.2	32.2	33.0	-0.8	Pass
V	151.7	42.5	22.5	9.8	1.2	31.0	33.0	-2.0	Pass
V	151.9	37.7	22.5	9.8	1.2	26.2	33.0	-6.8	Pass
V	160.0	40.1	22.5	9.2	1.3	28.1	33.0	-4.9	Pass
V	168.0	39.8	22.5	8.9	1.3	27.5	33.0	-5.5	Pass
V	171.0	37.6	22.5	8.8	1.3	25.2	33.0	-7.8	Pass
V	179.0	40.0	22.5	8.4	1.4	27.3	33.0	-5.7	Pass
V	200.0	40.6	22.5	9.1	1.5	28.7	33.0	-4.3	Pass
H	225.0	41.3	22.5	10.6	1.7	31.1	35.5	-4.4	Pass
H	256.0	33.3	22.6	12.2	1.8	24.7	35.5	-10.8	Pass
H	279.1	35.7	22.6	12.7	1.9	27.7	35.5	-7.8	Pass
H	296.0	33.8	22.6	13.0	2.0	26.2	35.5	-9.3	Pass
H	300.0	37.0	22.6	13.1	2.0	29.5	35.5	-6.0	Pass
H	325.0	41.0	22.6	13.8	2.1	34.3	35.5	-1.2	Pass
H	375.0	35.4	22.5	15.2	2.3	30.4	35.5	-5.1	Pass
H	400.0	36.4	22.5	16.0	2.4	32.3	35.5	-3.2	Pass
H	450.0	36.1	22.5	16.4	2.6	32.6	35.5	-2.9	Pass
H	600.0	33.5	22.3	18.7	3.1	33.0	35.5	-2.5	Pass

Table Result: Pass by -0.7 dB ***Worst Freq:*** 143.9 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 P603

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

Table: 6
Note: Reading at nominal voltage: 89.7dBµV/m (table Table 4)

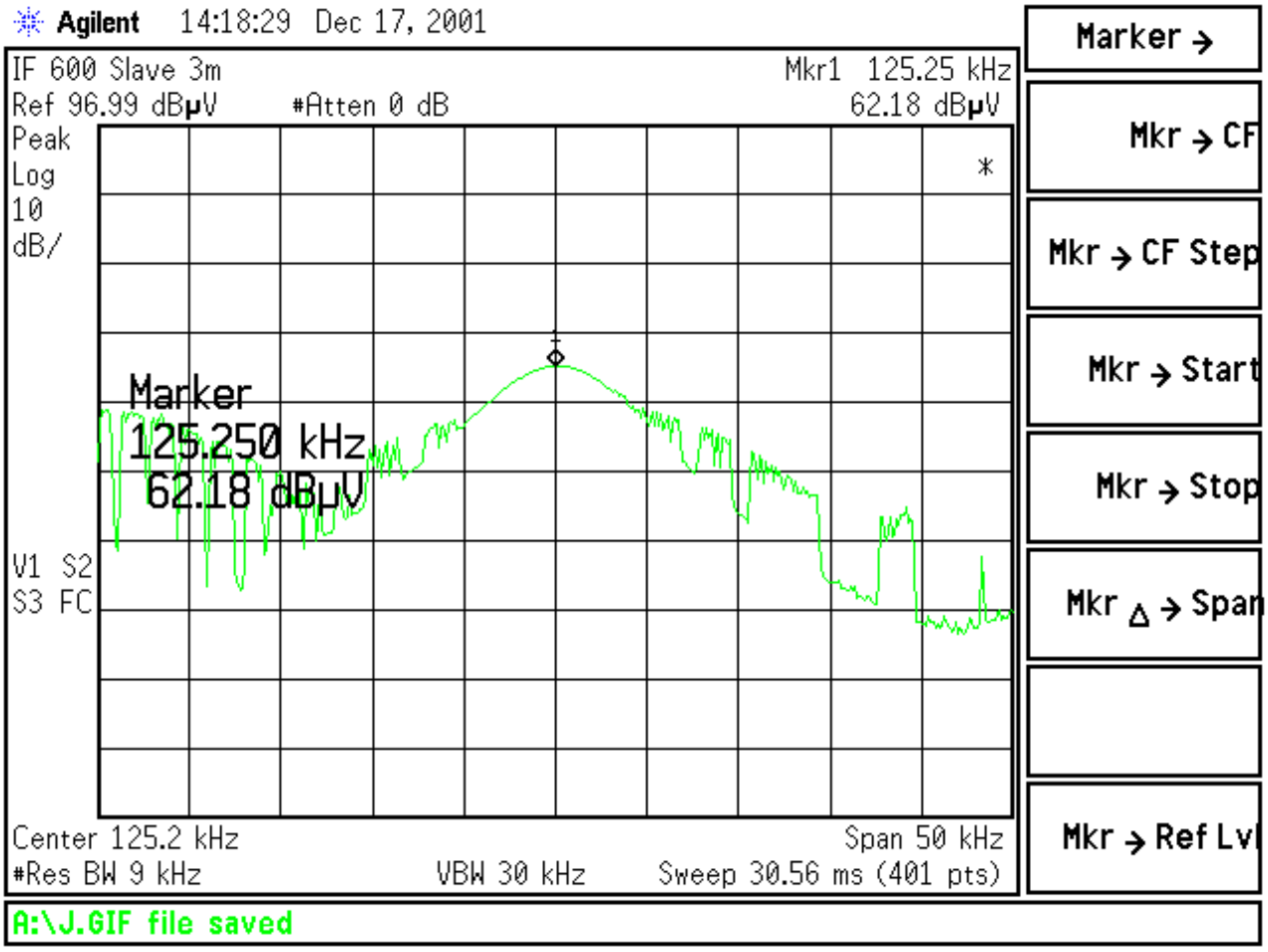
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)
8.925VDC			---	---	---	---
0deg	0.125	60.2	22.4	52.0	0.0	89.8
43.7VDC			---	---	---	---
0deg	0.125	60.2	22.4	52.0	0.0	89.8

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

Note: In order for the IF P600 and IF P603 to pass 47 CFR 15.209 limits, it is necessary to install a ferrite (Fair-Rite #0431164951; Interflex p/n: FRP0003) on the ribbon cable between the MPU board and the connector board.

Emissions Plots

IF P600 Fundamental



IF P603 Fundamental