

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:

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Report prepared by:

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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 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. All measurements are peak readings.						EUT Max Freq: 16MHz 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. All measurements are peak readings.						EUT Max Freq: 16MHz 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	

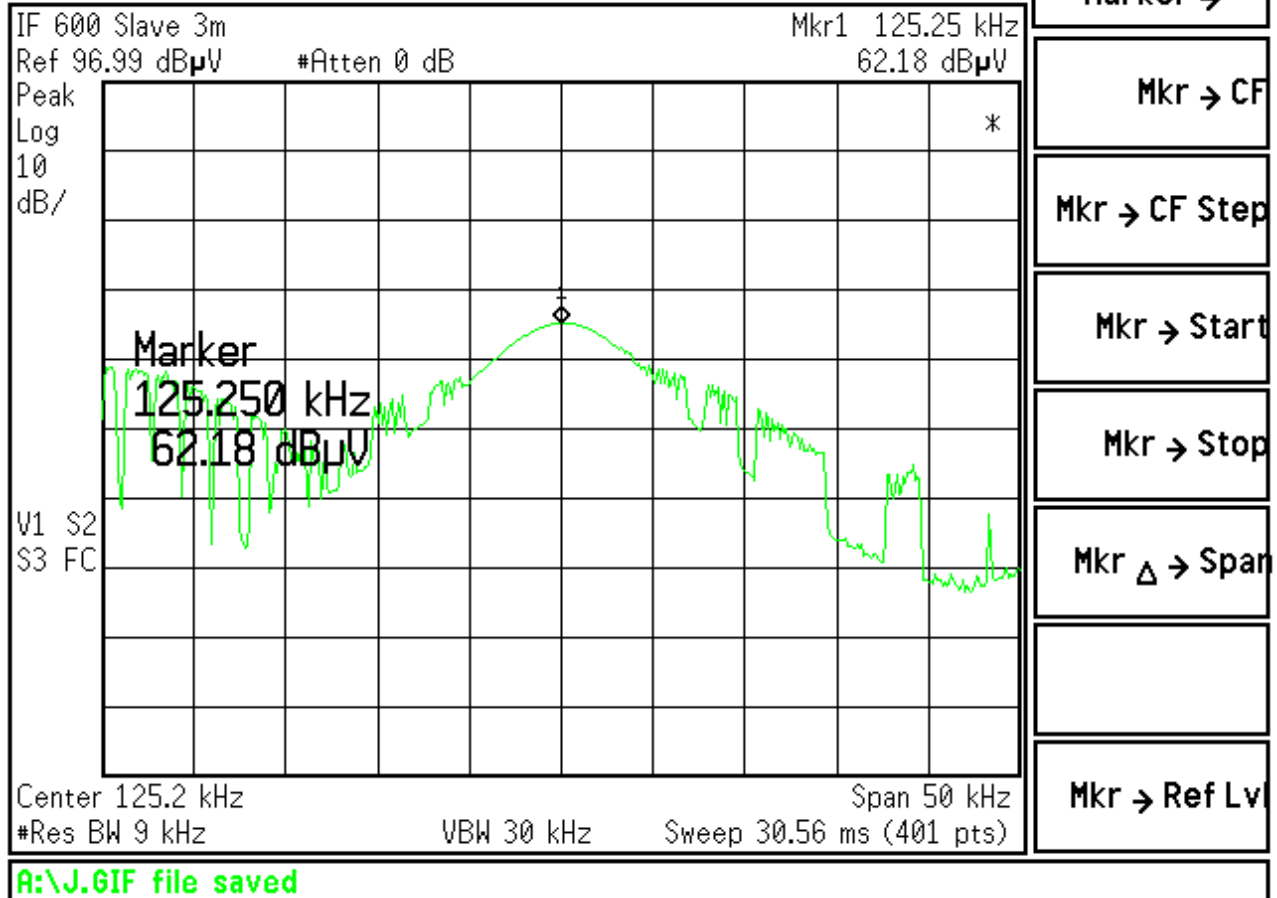
Voltage Variations						
Date: 21-Dec-01			Company: Interflex			
Engineer: Evan Gould			EUT Desc: IF P603			
Work Order: B1260			Measurement Distance: 3 m			
Table: 6						
Note: Reading at nominal voltage: 89.7dBμV/m (table Table 4)						
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)
8.925VDC 0deg	0.125	60.2	---	---	---	---
43.7VDC 0deg	0.125	60.2	22.4	52.0	0.0	89.8
			---	---	---	---
			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

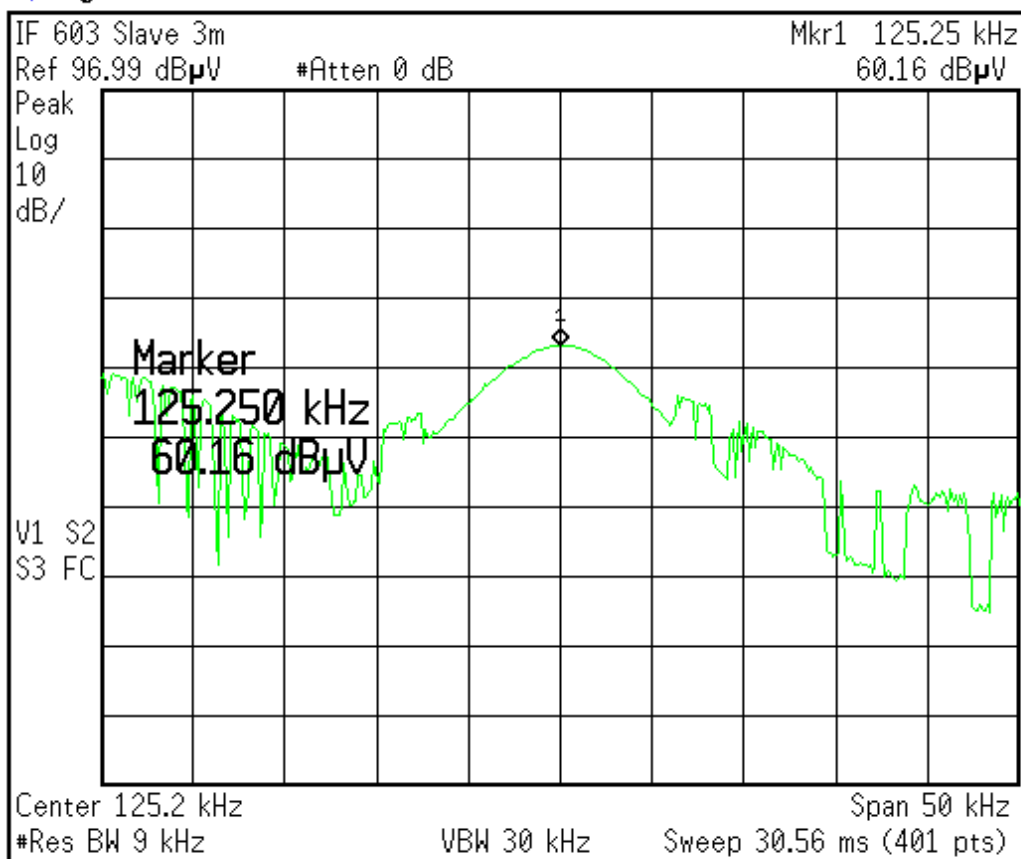
IF P600 Fundamental

* Agilent 14:18:29 Dec 17, 2001



IF P603 Fundamental

Agilent 16:01:58 Dec 17, 2001



Marker →

Mkr → CF

Mkr → CF Step

Mkr → Start

Mkr → Stop

Mkr Δ → Span

Mkr → Ref Lvl

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