

Pertinent HIRF Directives

This temporary license is required to conduct testing necessary to support airframe certification for induced lightning and high intensity radiated fields (HIRF). The test data will be used to validate low frequency HIRF and lightning models and assure compliance with HIRF and lightning requirements as specified by the following directives:

FAA issue paper SE-2, Boeing 777, "Lightning Grounding and Protection Requirements."

JAA document JAR25X899, Boeing 777, "Electrical Grounding and Protection against Lightning and Static Electricity."

FAA issue paper SE-1, Boeing 777, "Protection from High Intensity Radiated Fields (HIRF)."

JAA HIRF Certification Review Item D-5 - Stage 2, Boeing 777, "Special Condition Protection from External High Intensity Radiated Fields."

FAA Special Condition #25-ANM-25, Boeing 747-400 and 747-400F, "Boeing 747-400 Lightning and Radio Frequency Energy Protection."

JAA Special Condition AAB747-400F/02, Boeing 747-400F, "Lightning Protection Indirect Effects."

JAA Special Condition AAB747-400F/01, Boeing 747-400F, "High Intensity Radiated Fields (HIRF)."

Frequency Band Information									
Band	Frequency Band *	Power (B)	Power (C)	Power (D)	Emission (E)	Type Signal (F)	Necessary Bandwidth (G)	Step Increment (H)	
1	50.0 Hz to 100 MHz	25 W	N/A	MEAN	N0N	CW	N/A	1 KHz	
2	10.0 KHz to 1.0 MHz	1000 W	0.05 W	MEAN	N0N	CW	CW	1.25 KHz	
3	1.0 MHz to 50 MHz	100 W	1585 W	MEAN	N0N	CW	CW	62.5 KHz	
4	30 MHz to 200 MHz	10 W	18 W	MEAN	N0N	CW	CW	225 KHz	
5	200 MHz to 500 MHz	10 W	100 W	MEAN	N0N	CW	CW	375 KHz	
6	500 MHz to 1000 MHz	10 W	100 W	MEAN	N0N	CW	CW	625 KHz	
7	962 MHz to 970 MHz	25 W	25 W	MEAN	N0N	CW	CW	625 KHz	
8	972 MHz to 975 MHz	25 W	25 W	MEAN	N0N	CW	CW	625 KHz	
9	994 MHz to 1002 MHz	25 W	25 W	MEAN	N0N	CW	CW	625 KHz	
10	1.0 GHz to 2.0 GHz	20 W	200 W	MEAN	N0N	CW	CW	1.25 MHz	
11	1040 MHz to 1050 MHz	20 W	20 W	MEAN	N0N	CW	CW	1.25 MHz	
12	1100 MHz to 1154 MHz	20 W	20 W	MEAN	N0N	CW	CW	1.25 MHz	
13	1216 MHz to 1240 MHz	20 W	20 W	MEAN	N0N	CW	CW	1.25 MHz	
14	1260 MHz to 1300 MHz	20 W	20 W	MEAN	N0N	CW	CW	1.25 MHz	
15	1337 MHz to 1345 MHz	20 W	20 W	MEAN	N0N	CW	CW	1.25 MHz	
16	2.0 GHz to 4.0 GHz	20 W	200 W	MEAN	N0N	CW	CW	2.50 MHz	
17	4.0 GHz to 8.0 GHz	20 W	200 W	MEAN	N0N	CW	CW	5.00 MHz	
18	5.0 GHz to 5.250 GHz	20 W	20 W	MEAN	N0N	CW	CW	5.0 MHz	
19	8.0 GHz to 12.4 GHz	20 W	200 W	MEAN	N0N	CW	CW	5.50 MHz	
20	9.0 GHz to 9.055 GHz	20 W	20 W	MEAN	N0N	CW	CW	5.0 MHz	
21	9.125 GHz to 9.2 GHz	20 W	20 W	MEAN	N0N	CW	CW	5.0 MHz	
22	12.4 GHz to 18.0 GHz	20 W	200 W	MEAN	N0N	CW	CW	7.06 MHz	

* Specific portions of these bands can be blanked out and not used. Coordination with local FCC/FAA can be accomplished, as necessary. Key: (A) Frequency Band (B) Maximum RF output power at the transmitter (C) Maximum EIRP (D) MEAN or PEAK (E) type of emission (F) Appropriate Modulation (G) Necessary Bandwidth

High Intensity Radiated Field Testing Equipment Information

	Manufacturer	Frequency Band	Amplifier Type	Antenna Type	Units
1	RF Power Labs	50 Hz - 100 MHz	M125L	(note 1)	1
2	Kalmus	50 Hz - 100 MHz	520FC	(note 1)	1
3	IFI	50 Hz - 100 MHz	M5500	(note 1)	1
4	ENI	10 KHz - 1.0 MHz	1040L	QRA*	1
5	ENI	1.0 - 50 MHz	5100L	QRA*	1
6	IFI	30 - 200 MHz	M5500	Dipole	1
7	Kalmus	30 - 200 MHz	520FC	Dipole	1
8	IFI	200 - 500 MHz	M5500	Horn	1
9	Kalmus	200 - 500 MHz	520FC	Horn	1
10	IFI	500 - 1000 MHz	M5500	Horn	1
11	Kalmus	500 -1000 MHz	720FC	Horn	1
12	Hughes	1.0 - 2.0 GHz	8020HO9R	Horn	1
13	Hughes	2.0 - 4.0 GHz	8020HO9R	Horn	1
14	Hughes	4.0 - 8.0 GHz	8020HO9R	Horn	1
15	Hughes	8.0 - 12.4 GHz	8020HO9R	Horn	1
16	Hughes	12.4 - 18.0 GHz	8020HO9R	Horn	1

Note 1 This equipment is direct drive with no deliberate antenna.

* Quasi Rhombic Antenna (Bands 2 and 3 only)

Additional Test Equipment List for Frequency Stirring

	Manufacturer	Model	Description	Qty
1	Hewlett Packard	HP8757D	0.01 - 20 GHz Scalar Network Analyzer	1
2	Hewlett Packard	HP83620A	0.01 - 20 GHz Source	1
3	NoiseCom	UFX 7907	50 MHz Noise Generator with 5 filters (1,2,5,10, 25 MHz lowpass)	1
4	Mini-Circuits	ZFM-2000	100 MHz - 2 GHz Mixer	2
5	Merrimac	DML-2B	2 - 18 GHz Mixer	2