

RF-30A – Stable Performance

RF-30A is an organic-ceramic laminate in Taconic's family of RF substrates. It is based on woven glass reinforcement. RF-30A is a result of Taconic's expertise in both ceramic filler and PTFE coating technology.

RF-30A is the best choice for low cost, high volume commercial microwave and radio frequency application.

RF-30A exhibits more stable electrical and mechanical properties than designers need. This low loss dielectric substrate with low profile copper foil leads to stable electrical properties with better PIMD levels and lower insertion loss over broad-band frequency range. More stable mechanical properties with lower CTE values, better dimensional stability, and harder rigidity can make RF components less affected by other factors. RF-30A's excellent peel strength for ½ ounce and 1 ounce RT copper shows a critical aspect whenever rework or repeated reflow process is required. Ultra low moisture absorption rate with stable loss tangent help minimized phase shift along the different temperature or humidity environments. Less dimensional movements also contribute to stable phase or impedance properties over broadband frequency range. Its low Z-CTE by optimized ceramic filler loading shows improved PTH reliability and multi-layer applicable characteristics. As results of the combination of above merits, circuits with RF-30A show more stable PIMD performance.

See "How to Order" on the back page for a complete product listing.

Features and Benefits:

- **Excellent PIM values in PCBs (measured at lower than -160 dBc*)**
- **Improved PTH quality**
- **Stable mechanical property**
- **Stable at high frequency**
- **Stable at high temperature**
- **Low moisture absorption**
- **Excellent peel strength**
- **Excellent price/performance ratio**

Applications :

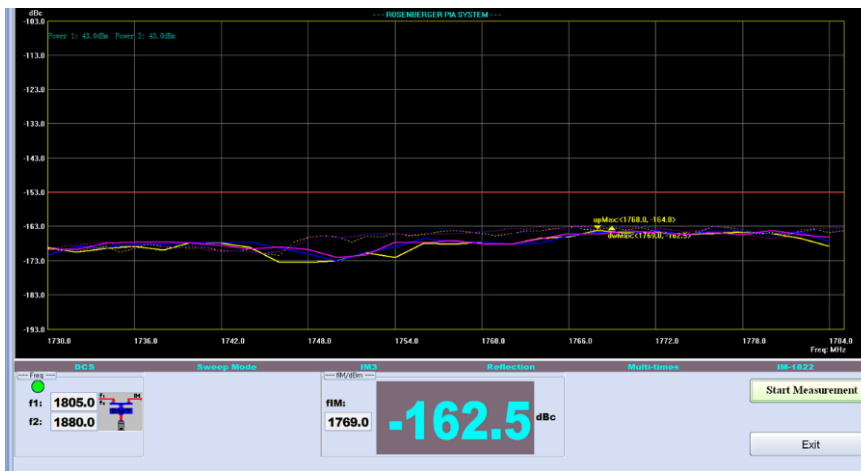
- **Antenna and subcomponent**
- **RF passive components**
- **PA**

*Measurement using manufactured PCB coupon with 20 watts per channel @ 800 and 1800 MHz.

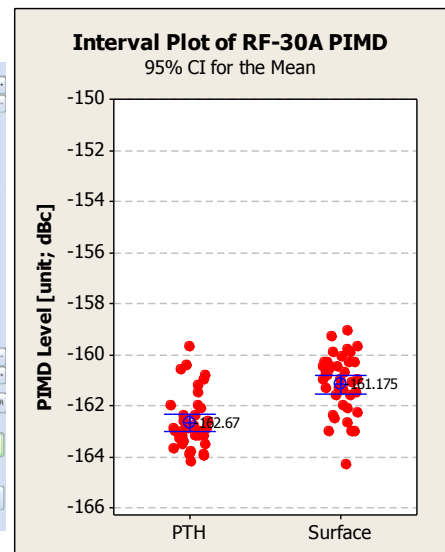
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- PIMD is Passive InterModulation Distortion in multi-frequency communication system. It is generally discussed that there are many factors to contribute on PIMD properties. Circuit design, power density distribution, connectors, cables, soldering, pcb processing, external circumstance and base material property are considered as its candidates. Among many factors, discontinuity on signal flow or improper signal cross-talking at complicate circuitry design is considered as major contribution. From time to time, laminates and pcbs are also discussed because the worst PIMD components can decide overall system PIMD levels. Generally PTFE based laminates with very low profile copper foil – whether reverse treatment foil or VLP copper – lead to best performance.
- In microstrip transmission line applications many additional factors can also contribute to its PIM levels. RF-30A exhibits very stable PIM performance and is less affected by other factors, as shown in examples of microstrip transmission PIM results with and without PTH.
- RF-30A exceeds PIM requirements in PCBs of -153 dBc (measured between 880 and 960 MHz, between 1710 and 1880 MHz and between 1920 and 2170 MHz at 20 W power) with CL1/CL1 cladding when processed with today's state-of-the-art processes and process parameters.

<Example of PIMD results with/without PTH coupons>



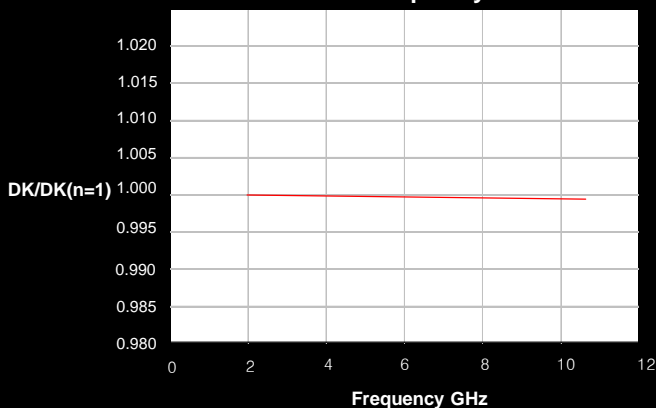
※ Condition; 20Watt(43dBm) source near 1800MHz, frequency sweep x5



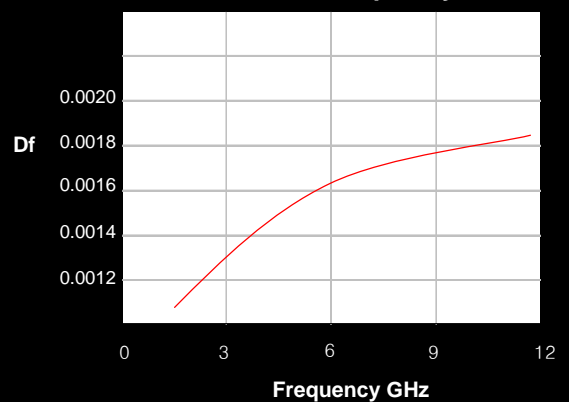
RF-30A TYPICAL VALUES

Property	Test Method	Units	Value	Units	Value
Dielectric Constant @ 1.9 GHz	IPC-TM 650 2.5.5.5.1 Mod	-	2.97±0.05	-	2.97±0.05
Dissipation Factor @ 1.9 GHz	IPC-TM 650 2.5.5.5.1 Mod	-	0.0013	-	0.0013
Dissipation Factor @ 10 GHz	IPC-TM 650 2.5.5.5.1 Mod	-	0.0020	-	0.0020
Water absorption	IPC-TM 650 2.6.2.1	%	0.05	%	0.05
Peel Strength (1 oz. copper)	IPC-TM 650 2.4.8	Lbs./linear inch	12	N/mm	2.1
Volume Resistivity	IPC-TM 650 2.5.17.1	Mohm-cm	3.0 x 10 ⁹	Mohm-cm	3.0 x 10 ⁹
Surface Resistivity	IPC-TM 650 2.5.17.1	Mohm	2.0 x 10 ⁸	Mohm	2.0 x 10 ⁸
Flexural Strength Lengthwise	IPC-TM 650 2.4.4	psi	18,000	N/mm ²	126.5
Flexural Strength Crosswise	IPC-TM 650 2.4.4	psi	17,000	N/mm ²	119.5
Tensile Strength (MD)	IPC-TM-650 2.4.18.3	psi	19,000	N/mm ²	133.6
Tensile Strength (TD)	IPC-TM-650 2.4.19	psi	15,000	N/mm ²	105.5
Dimensional Stability (MD)	IPC-TM-650 2.4.39 (Etch)	% (30mil)	0.049	% (60mil)	0.025
Dimensional Stability (TD)	IPC-TM-650 2.4.39 (Etch)	% (30mil)	0.041	% (60mil)	0.026
Dimensional Stability (MD)	IPC-TM-650 2.4.39 (Stress)	% (30mil)	0.049	% (60mil)	0.019
Dimensional Stability (TD)	IPC-TM-650 2.4.39 (Stress)	% (30mil)	0.031	% (60mil)	0.011
Density	IPC-TM-650 2,3,5	g/cm ³	2.16	g/cm ³	2.16
Specific Heat	IPC-TM-650 2.4.50	J/g°C	0.95	J/g°C	0.95
Thermal Conductivity	IPC-TM-650 2.4.50	W/m/K	0.42	W/m/K	0.42
x-y CTE (50 ~ 150°C)	IPC-TM 650 2.4.41	ppm/°C	8-11	ppm/°C	8-11
z CTE (50 ~ 150°C)	IPC-TM 650 2.4.41	ppm/°C	60	ppm/°C	60
Flammability	Internal		V-0		V-0

DK Versus Frequency



Df Versus Frequency



All reported values are typical and should not be used for specification purposes. In all instances, the user shall determine suitability in any given application.

Designation	Dielectric Constant	Typical Thickness ¹		Typical Panel Size ²	
		Inches	mm		
RF-30A	2.97 +/- 0.05	0.020"	0.51	12"x18"	305mmx457mm
		0.030"	0.76	16"x18"	406mmx457mm
		0.040"	1.02	18"x24"	457mmx610mm
		0.060"	1.52	36"x48"	914mmx1220mm

¹ Standard RF-30A series can be manufactured in increments of 0.010" and minimum thickness is 0.0020". Please call for availability of additional thicknesses.

² Our Standard sheet size is 36"x48"(914mm X 1220mm). Please contact our customer service department for availability of other sizes.

Available Copper Cladding						
Designation	Weight	Copper Thickness		R _{ms} Treated Side		Description
CVH (CH)	½ oz./sq. ft.	~ .0007"	~ 18µm	19µin	0.48µm	Very low profile / Electrodeposited
CV1 (C1)	1 oz./sq. ft.	~ .0014"	~ 35µm	25µin	0.64µm	Very low profile / Electrodeposited
CLH	½ oz./sq. ft.	~ .0007"	~ 18µm	18µin	0.46µm	Reverse Treated / Electrodeposited
CL1	1 oz./sq. ft.	~ .0014"	~ 35µm	16µin	0.41µm	Reverse Treated / Electrodeposited
C2	2 oz./sq. ft.	~ .0028"	~ 70µm	27µin	0.69µm	Electrodeposited

**An example of a 30mil material with 1 oz. RTF Copper on both sides is part# :
RF-30A-0300-CL1/CL1-18" x 24"(RF-30A-0300-CL1/CL1-457mm x 610mm)**



An ISO 9001:2008 Registered Company

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