Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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F.A.M.
Flexible Absorbent Material

Features

Provide effective EMI suppression in a wide frequency range (10MHz to 18GHz)
Ultra thin and extremely flexible, can be freely arranged in space
Non-conductive adhesive backing (UL Recognized) available
Effective in preventing resonance and suppressing coupling
High surface resistance (10^6 -10^9 ohms)
Easy and fast to process
Can be cut any shape easily

Applications

Notebooks, PCs, workstations
LNBs for satellite systems
Mobile communications equipment
Base stations for mobile phones and PHS
Peripheral devices for computers
Wireless equipment
Mobile phones, PHS
High speed clocks
RFID (Radio Frequency Identification) systems
NFC (Near field communication)
Wireless charger

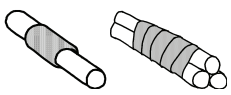
Applications for RFID

Besides the application of EMI, FAM can be a solution for RFID on metal also. It suitable for LF(125KHz) and HF(13.56MHz) bands. It can deal with the malfunction problems when RFID Reader/Writer or RFID tag attached on metal (recover maximum 80% efficiency of the original distance). By this way, you can save more space from RFID to metal.

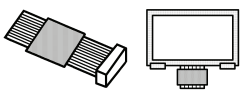
Material List

Property	Unit	FAM1	FAM2	FAM3	Test Method
Operating temperature	˚C	-20 to +80	-20 to +80	-20 to +80	-
Applicable frequency	GHz	0.01 to 8	0.1 to 18	0.01 to 18	-
Thickness range	mm	0.20 to 2.50	0.25 to 0.75	0.05 to 0.50	-
Max. dimension	mm	400 x 400	400 x 400	210 x 297 (A4)	-
Surface resistance	ohm	10^6	10^9	10^8	ASTM D257
Hardness	Shore A	90	95	50	ASTM D2240
Specific gravity	g/cm^3	3.6	4.8	2.7	ASTM D792
Elongation	%	10.4	51	2.5	ASTM D412
Tensile strength	Kgf/cm^2	25	101	30	ASTM D412
Thermal conductivity	W/mk	1.2	1.3	0.5	ASTM D5470
RoHS compliance 2002/95/EC -	-	Yes	Yes	Yes	-
Halogen-free	-	No	No	Yes	-
Flame retardant	-	UL94V-0	-	Equivalent to UL94V-0	-

Sheet Shape Examples

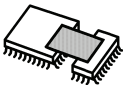


(ex1) Wrap around cable

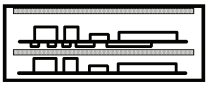


(ex2) Apply to flat cable

(ex3) Apply to IC top



(ex4) Apply between ICs



(ex5) Apply to case and between boards

Tel: +44 20 8133 2062 Email: sales@tglobaltechnology.com Web: www.tglobaltechnology.com Skype: tglobal.technology

Material List

Item		0.9 GHz	1.8 GHz	2.4 GHz	Application Examples
FAM1	0.20mm	-0.22dB (4.9%)	-0.35dB (7.7%)	-0.50dB (10.9%)	[Shielding Box] [Power Supply] [Mobile Phone] [GPS] [Battery] [IC] [NB] [NFC] [RFID tag/reader] [Wireless Charger]
	0.25mm	-0.40dB (8.8%)	-0.63dB (13.5%)	-0.84dB (17.6%)	
	0.33mm	-0.90dB (18.7%)	-1.25dB (25.0%)	-1.56dB (30.2%)	
	0.60mm	-1.32dB (26.2%)	-1.49dB (28.9%)	-1.75dB (33.2%)	
	1.0mm	-1.70dB (32.7%)	-2.35dB (41.8%)	-3.04dB (50.3%)	
	1.5mm	-2.51dB (43.9%)	-3.32dB (53.4%)	-3.85dB (58.8%)	
	2.0mm	-3.31DB (53.3%)	-4.21DB (62.1%)	-4.66DB (65.8%)	
	2.5mm	-4.46dB (64.2%)	-5.79dB (73.6%)	-5.64dB (73.4%)	
FAM3	0.25mm	-0.25dB (5.6%)	-0.57dB (12.3%)	-0.90dB (18.7%)	[Mobile Phone] [NB] [RFID tag/reader] [NFC] [Wireless Charger]
	0.50mm	-0.46dB (9.9%)	-0.88dB (18.3%)	-1.32dB (26.2%)	
	0.75mm	-0.97dB (20.0%)	-1.42dB (27.9%)	-2.20dB (39.7%)	
FAM5	0.05mm	-0.21dB (4.7%)	-0.50dB (11.0%)	-0.84dB (17.8%)	[Shielding Box] [GPS] [Power Supply] [IC] [Mobile Phone] [NB] [Battery] [NFC] [RFID tag/reader] [Wireless Charger]
	0.10mm	-0.46dB (9.9%)	-0.88dB (18.3%)	-1.10dB (22.6%)	
	0.20mm	-0.62dB (13.4%)	-1.05dB (21.8%)	-1.40dB (27.4%)	
	0.30mm	-0.76dB (16.2%)	-1.20dB (24.2%)	-1.70dB (32.4%)	
	0.50mm	-1.10dB (22.6%)	-1.50dB (29.0%)	-2.30dB (40.9%)	

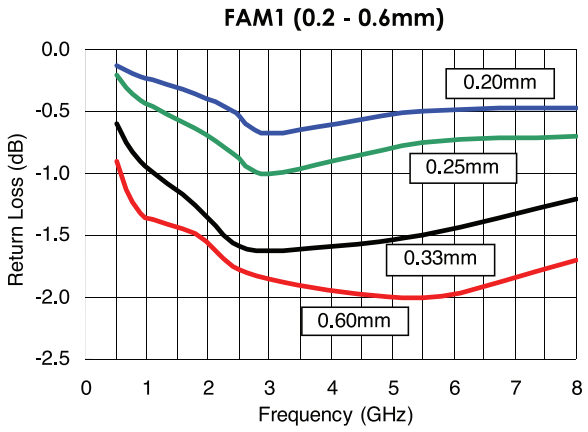
*Test results may vary from application to application

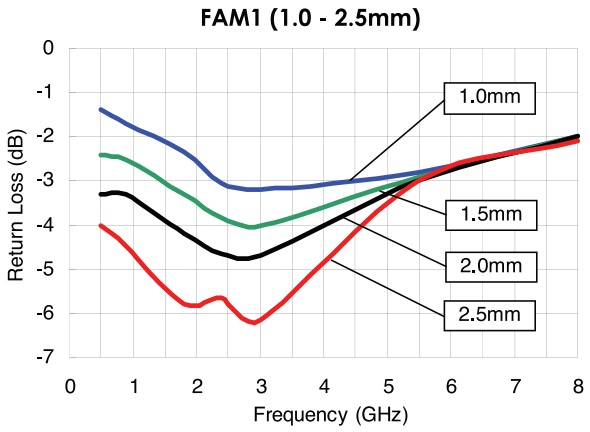
Tube Shape

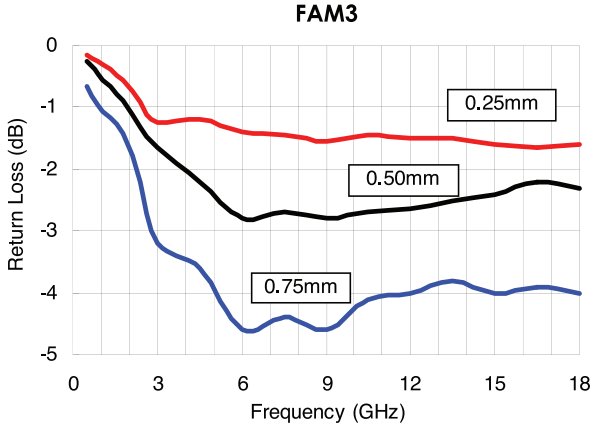
Item	FT0302	FT0504	FT0705	FT0906	FT1107	FT1309	FT1510
OD (mm)	3.0	5.0	7.0	9.0	11.0	13.0	15.0
ID (mm)	2.0	4.0	5.0	6.0	7.0	9.0	10.0

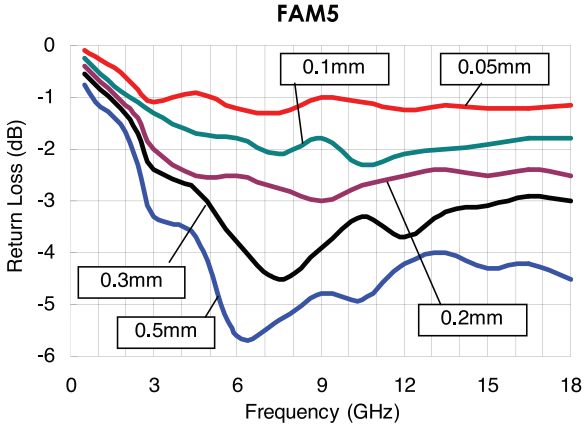
Return Loss – Frequency:

Return Loss (dB)	0.5	1	2	3	4	5	6	7	8	9	10	20	30
Absorb Rate (%)	11	21	37	50	60	69	75	80	86	89	90	99	99.9





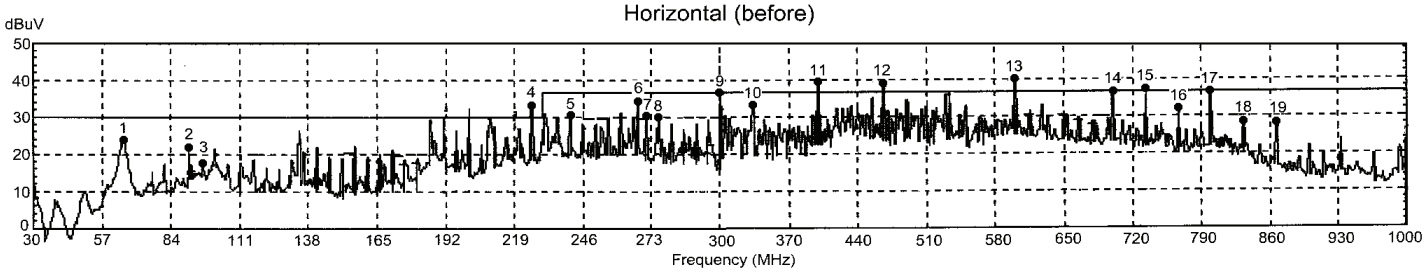




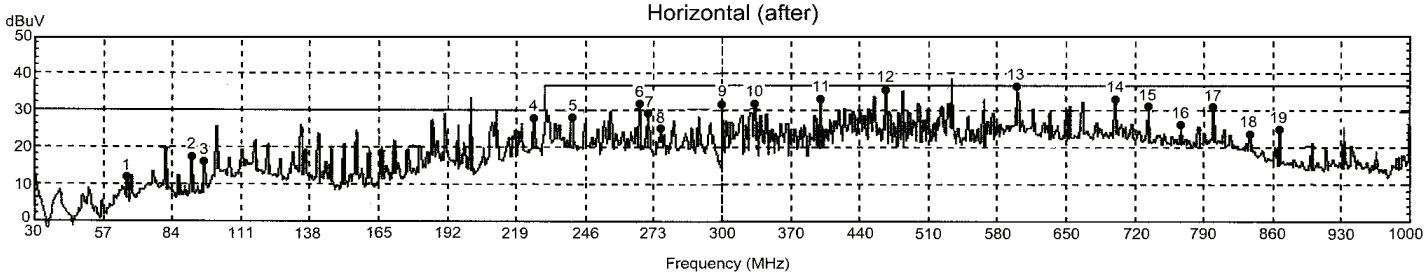
Test Example

Notebook = FAM (before & after)

Horizontal (before)

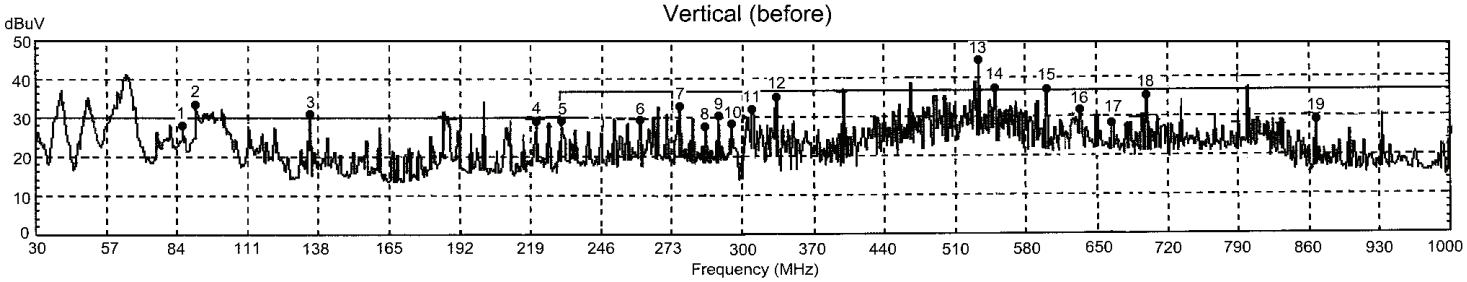


Horizontal (after)

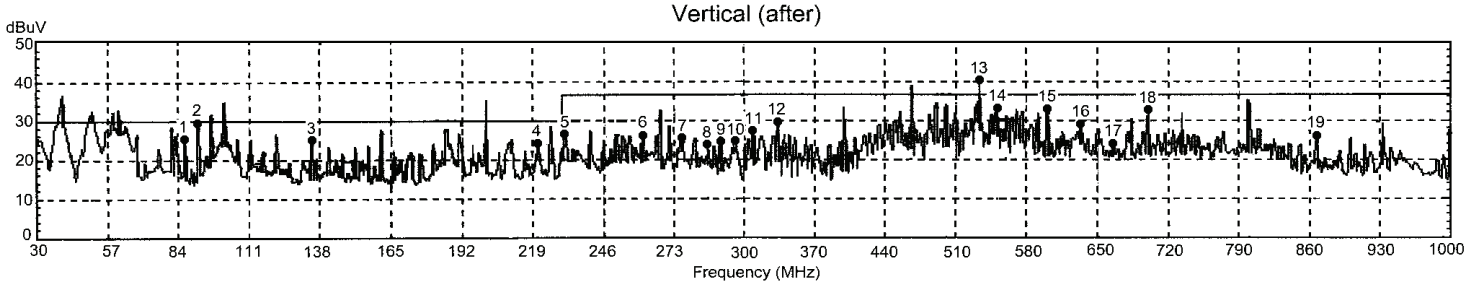


Horizontal	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Frequency(MHz)	65.1	91.7	96.3	225.6	241.0	267.2	270.7	275.7	300.0	334.0	399.0	466.0	600.0	700.0	733.0	767.0	800.0	833.0	867.0
Before (dBuV)	23.8	21.6	18.9	32.7	30.1	33.5	30.2	29.7	36.4	34.3	39.9	38.9	40.2	36.8	37.0	31.6	35.6	27.9	27.6
After (dBuV)	12.0	16.9	15.4	27.1	28.0	31.2	27.5	24.7	31.1	31.2	32.9	36.9	36.6	32.7	30.5	25.9	30.7	23.0	24.6
Attenuation (dBuV)	11.8	4.7	3.5	5.6	2.1	2.3	2.7	5.0	5.3	3.1	7.0	2.0	3.6	4.1	6.5	5.7	4.9	4.9	3.0

Vertical (before)



Vertical (after)



Vertical	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Frequency(MHz)	86.1	91.3	134.5	221.3	230.6	261.0	275.3	285.7	290.7	295.4	309.0	333.0	534.0	550.0	633.0	665.0	701.0	709.0	866.0
Before (dBuV)	28.0	33.1	30.4	28.2	28.8	28.8	32.3	27.3	30.2	28.4	31.7	24.5	43.8	36.7	36.3	30.9	28.0	34.9	38.7
After (dBuV)	25.1	29.0	24.9	22.8	26.2	25.8	25.3	23.9	25.8	24.7	26.8	29.6	40.6	33.3	32.7	27.8	24.1	32.4	25.9
Attenuation (dBuV)	2.9	4.1	5.5	5.4	2.6	3.0	7.0	3.4	4.4	3.7	4.9	4.9	3.2	3.4	3.6	3.1	3.9	2.5	2.8

LF/HF RFID on-metal application:

When RFID tag or RFID reader/writer attached on metal surface, the read distance will become much shorter than expect. The traditional design is to increase the space between RFID antenna and metal but cause the RFID device with a big thickness. FAM can be a solution to improve the read distance for LF (125/134.2KHz) and HF (13.56MHz) bands. After insert FAM between RFID antenna and metal surface, the read distance can recover maximum 80% efficiency than the original distance with no metal. Due to FAM with small thickness, a slight figure can be designed easily than before.

Frequently Asked Questions:

Q1: How to use FAM for an RFID tag?
A1: Attach FAM with antenna / inlay tightly and embed into any shape as you need. When the tag attached on metal surface, please use FAM side, not antenna side.

Q2 : How to use FAM for an RFID reader/writer?
A2 : Insert FAM between reader's antenna area and circuit board tightly to get a compact design. When use the reader/writer, please don't use antenna side to attach the metal surface.

Q3 : Can I use FAM for UHF RFID?
A3 : FAM is a kind of magnetic material so it works well in LF/HF RFID (Magnetic- field) but not works in UHF RFID (Electric-field).

Q4 : How to choose FAM thickness?
A4 : FAM has standard thickness as page 2. You can test different thickness with your RFID device directly to compare which thickness can get the best distance. It's a fast and easy function to evaluate FAM.

Q5 : Why I can't get a good read distance after using FAM?
A5 : When FAM close RFID device, the inductance in LC circuit will increase and the response frequency will become higher. If your tag's response frequency is far away reader's response frequency, the read range will become shorter than before. In such a case, re-design the antenna to adjust L and C to get a reasonable response frequency will be the best function.

Q6 : What FAM dimension should I use?
A6 : When FAM cover the whole RFID antenna area can get the best performance.

Q7 : How is the performance if I assemble small piece FAM to cover the whole RFID antenna?
A7 : The performance will the same the whole piece FAM.

Q8 : Is there any different for FAM two sides?
A8 : FAM is a well mixed material with one single layer design so the two sides are the same.

Read Distance (Reference):

ISO Card	No Metal	On Metal	FAM1								FAM3			FAM5				
			0.2 mm	0.25 mm	0.33 mm	0.6 mm	1.0 mm	1.5 mm	2.0 mm	2.5 mm	0.25 mm	0.50 mm	0.75 mm	0.05 mm	0.1 mm	0.2 mm	0.3 mm	0.5 mm
Icode2	11	0	5.5	6.5	6.5	8	7.5	7	7	7	6	6.5	7	4.5	8	7	6.5	6
TI 2048	14	0	4	5	5.5	9	7	7	6	6	4.5	8.5	9	5.5	7	7	5.5	5
EM4100	19	4.5	8	9	9.5	12	7.5	5	4	4	9.5	12	9	11	12	4	4	3

- The read distance unit is CM
- Different reader will cause different read distance