W-LAN Module for Mobile Applications by LTCC Multilayer Technology

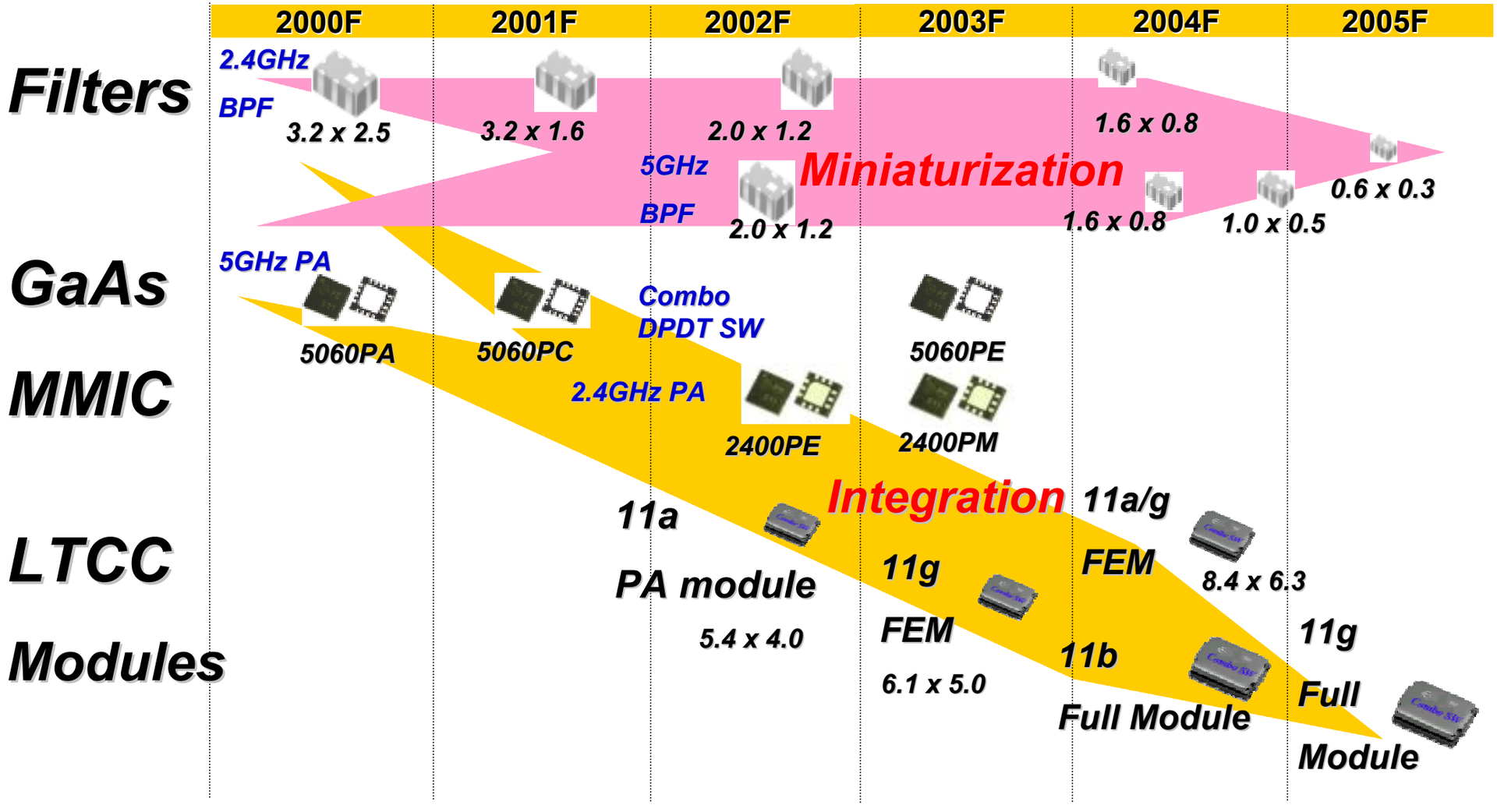
Introduction

- ✓Various Components for W-LAN Application
- ✓LTCC Front End Module for 802.11b/g Application
- ✓LTCC 802.11b/g Module for Mobile Application
- ✓To solve critical issues with Multilayer technology

1st Topic

- ✓ ***Various Components for W-LAN Application***
- ✓ *LTCC Front End Module for 802.11b/g Application*
- ✓ *LTCC 802.11b/g Module for Mobile Application*
- ✓ *To solve critical issues with Multilayer technology*

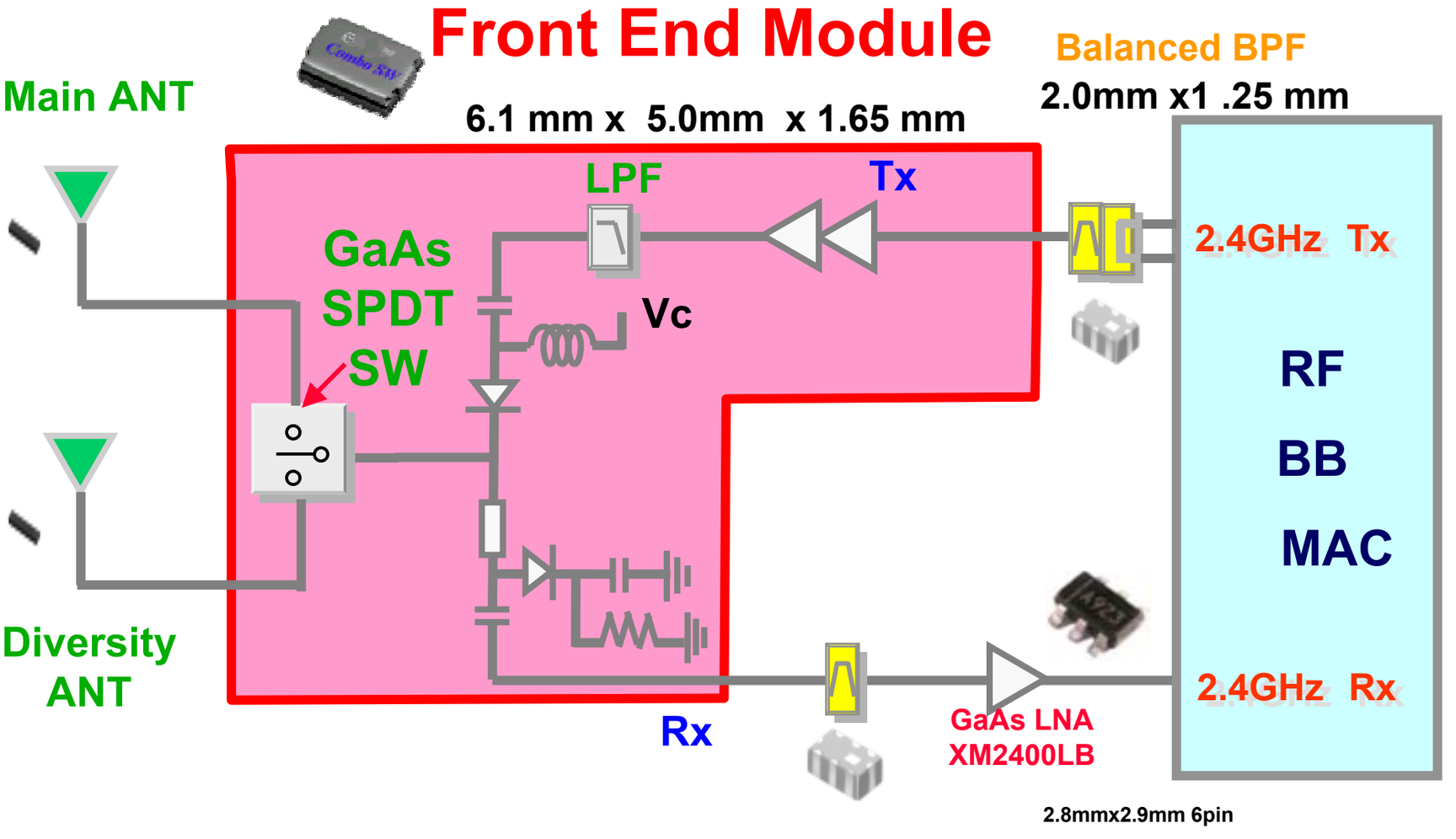
Various Devices for W-LAN



2nd Topic

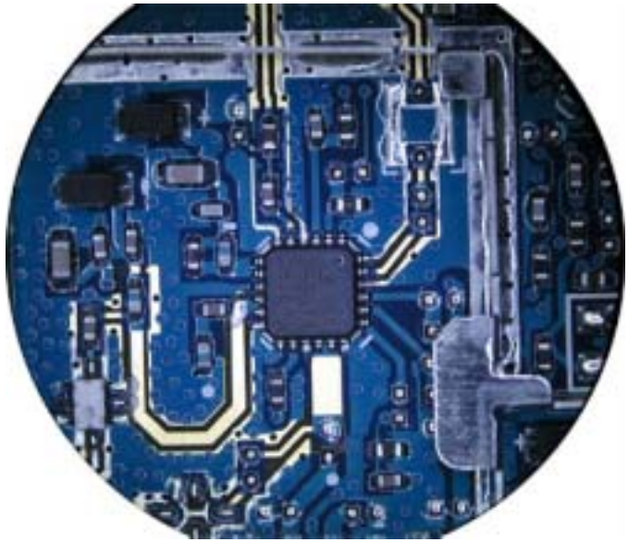
- ✓Various Components for W-LAN Application
- ✓**LTCC Front End Module for 802.11b/g Application**
- ✓LTCC 802.11b/g Module for Mobile Application
- ✓To solve critical issues with Multilayer technology

LTCC Front End Module for .11b/g (1)

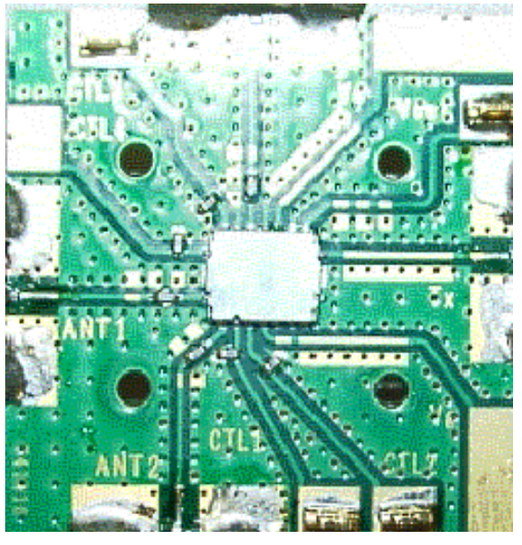


LTCC Front End Module for .11b/g (2)

Around PA



FEM (SW+PA+Filter)



Simple and Small

6.1 mm x 5mm x 1.65 mm

Benefit by LTCC Multilayer Technology

High performance with easy matching.

➲**Integrated Optimum Matching for PA**

Board real estate saving.

➲**Embedded Bare Chip IC, LPF, Matching**

LTCC Front End Module for .11b/g (3)

Characteristics

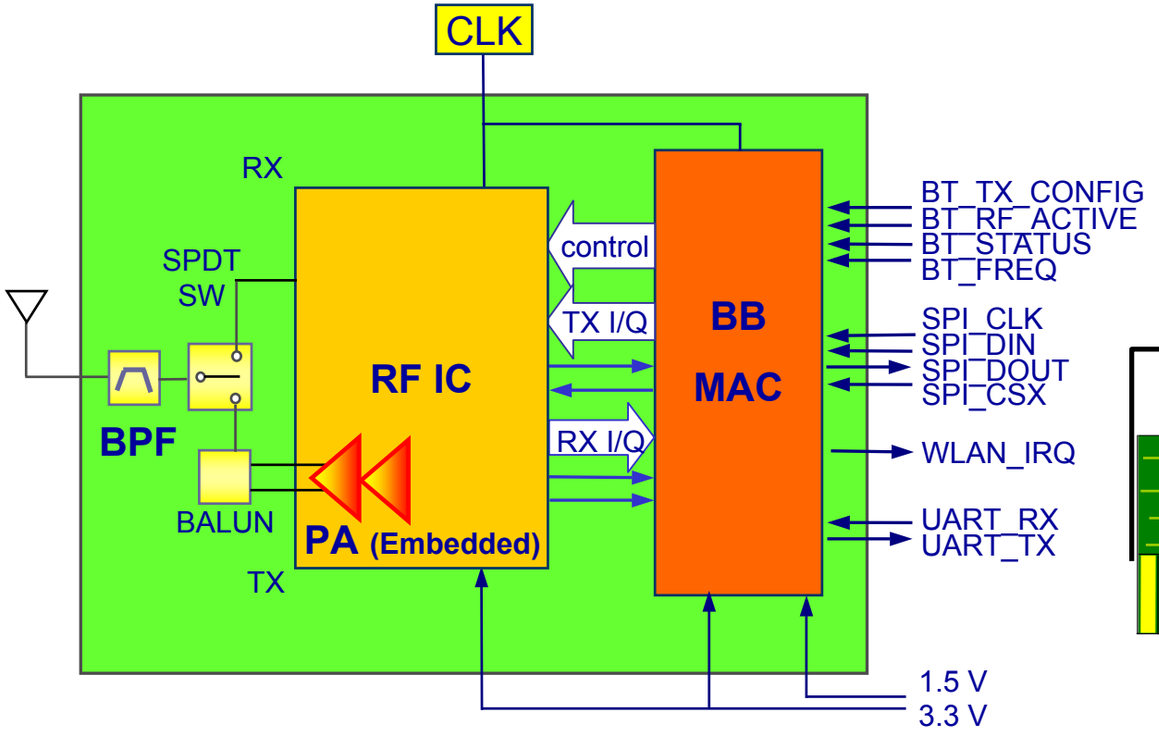
Parameter		Min.	Typ.	Max.	Unit	Condition
Small Signal [Ant -Rx]	IL	-	1.2	-	dB	f=2400 - 2500 MHz
	Input Return Loss	-	21	-	dB	f=2400 - 2500 MHz
	Output Return Loss	-	19	-	dB	f=2400 - 2500 MHz
Small Signal [Tx - Ant]	Gain	-	24	-	dB	f=2400 - 2500 MHz
	Gain Flattness	-	0.7	-	dB	f=2400 - 2500 MHz
	Input Return Loss	-	18	-	dB	f=2400 - 2500 MHz
	Output Return Loss	-	8	-	dB	f=2400 - 2500 MHz
	Current Consumption	-	130	-	mA	
Small Signal [Tx - Rx]	Isolation [PA: on]	-	2.3	-	dB	f=2400 - 2500 MHz
	1dB Compression Point	-	22.6	-	dBm	f=2450MHz
	Saturation Power	-	23.7	-	dBm	Pin= 7dBm, f=2450MHz
	Detector Output Voltage	-	0.2	-	V	Pout= 10dBm, f=2450MHz
	Detector Output Voltage	-	1.2	-	V	Pout= 20dBm, f=2450MHz
	Harmonic [2nd]	-	-66	-	dBc	Pout= 20dBm, f=4900MHz
	Harmonic [3rd]	-	-56	-	dBc	Pout= 20dBm, f=7350MHz
802.11b ACPR	Output Power	-	21	-	dBm	1st ACPR<-30dBc ,2nd ACPR<-50dBc ,f0=2447MHz
	Current Consumption	-	170	-	mA	1st ACPR<-30dBc ,2nd ACPR<-50dBc ,f0=2447MHz
OFDM [54Mbps, 64QAM]	Output Power	-	17	-	dBm	EVM = 5% ,f=2450MHz
	Current Consumption	-	139	-	mA	EVM = 5%

3rd Topic

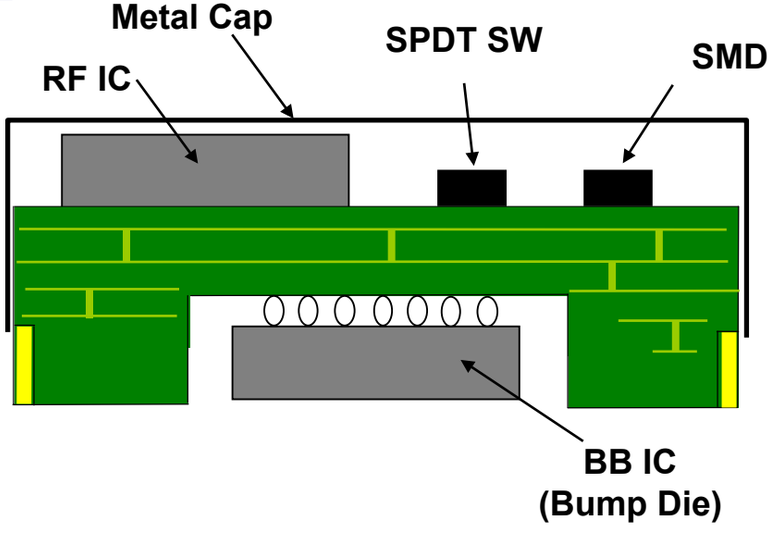
- ✓Various Components for W-LAN Application
- ✓LTCC Front End Module for 802.11b/g Application
- ✓**LTCC 802.11b/g Module for Mobile Application**
- ✓To solve critical issues with Multilayer technology

LTCC .11b/g Module for Mobile Application

•Block Diagram



•Structure



9.6x9.6x1.8mm

Final Topic

- ✓Various Components for W-LAN Application
- ✓LTCC Front End Module for 802.11b/g Application
- ✓LTCC 802.11b/g Module for Mobile Application
- ✓**To solve critical issues with Multilayer technology**

To solve critical issues with Multilayer technology

Heat Dissipation

➲ Thermal Via

Blocking performance

➲ Integrated LC filter for Rx performance

Harmonics rejection

➲ Integrated LC filter for Tx performance

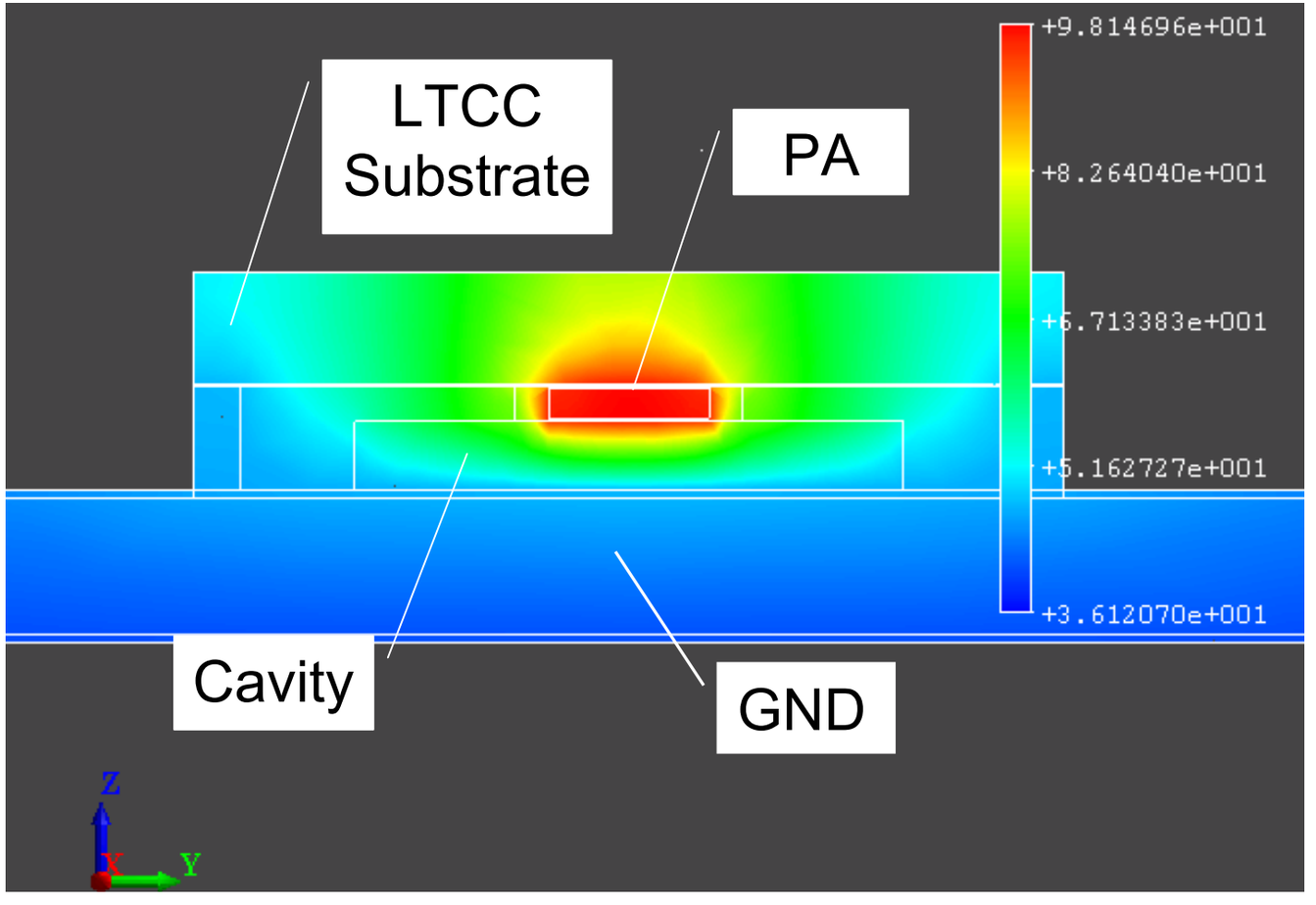
Height of Module

➲ Bumped Bare Chip IC

Drop Test

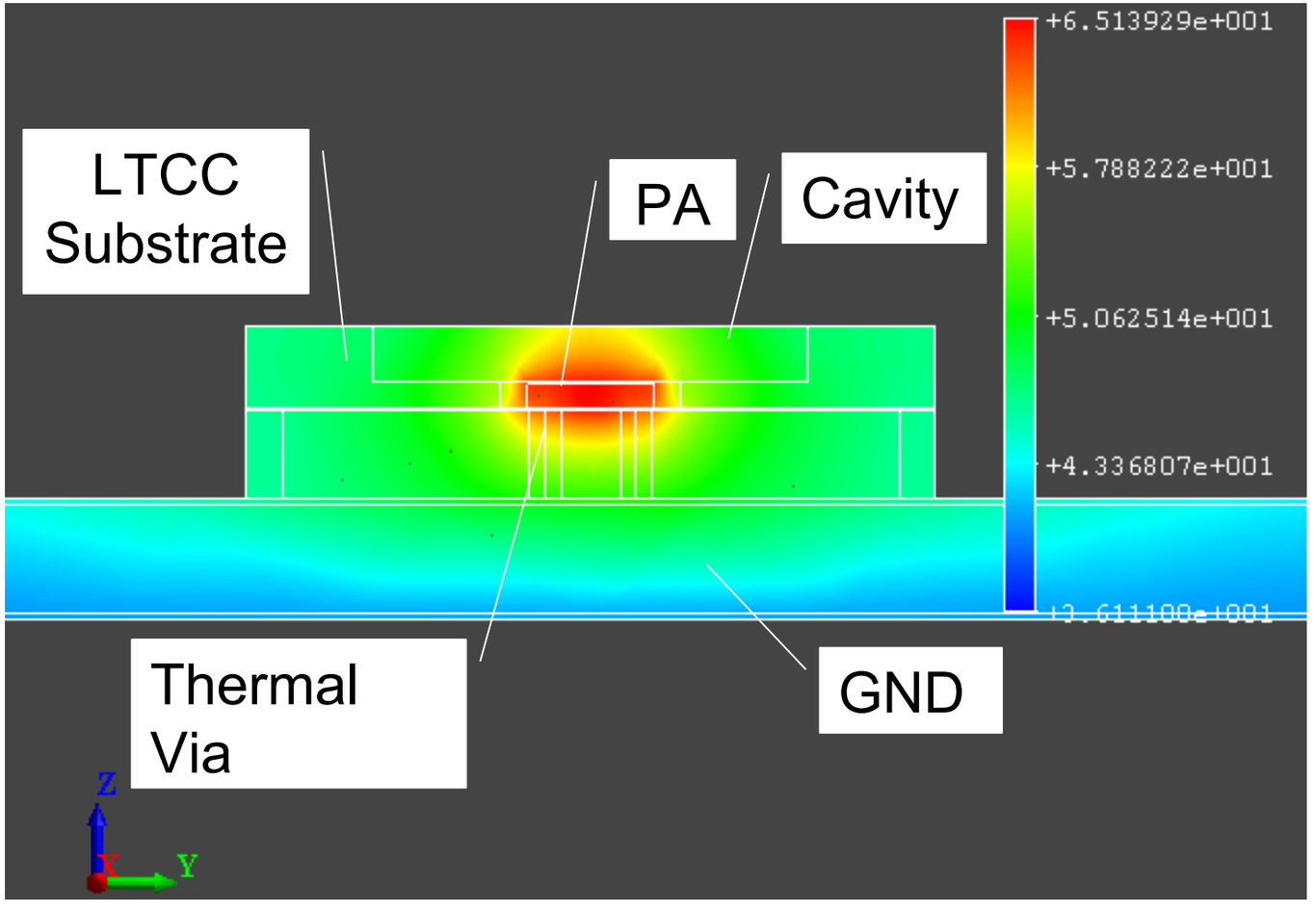
➲ Step up strength of Material

Thermal Simulation Result for Bottom Side Cavity



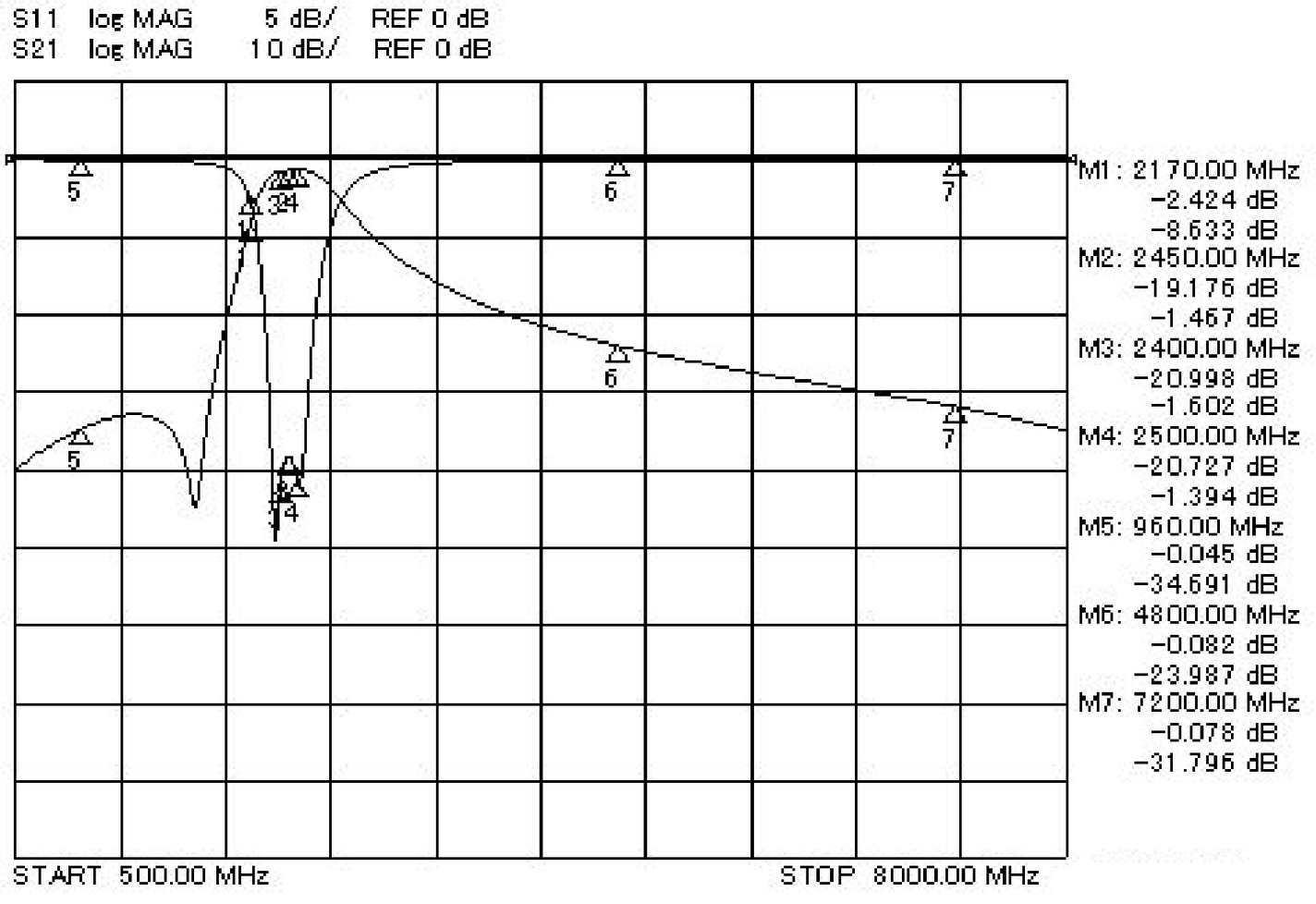
➢**The heat can't be escaped *without Thermal Via***

Thermal Simulation Result for Top Side Cavity

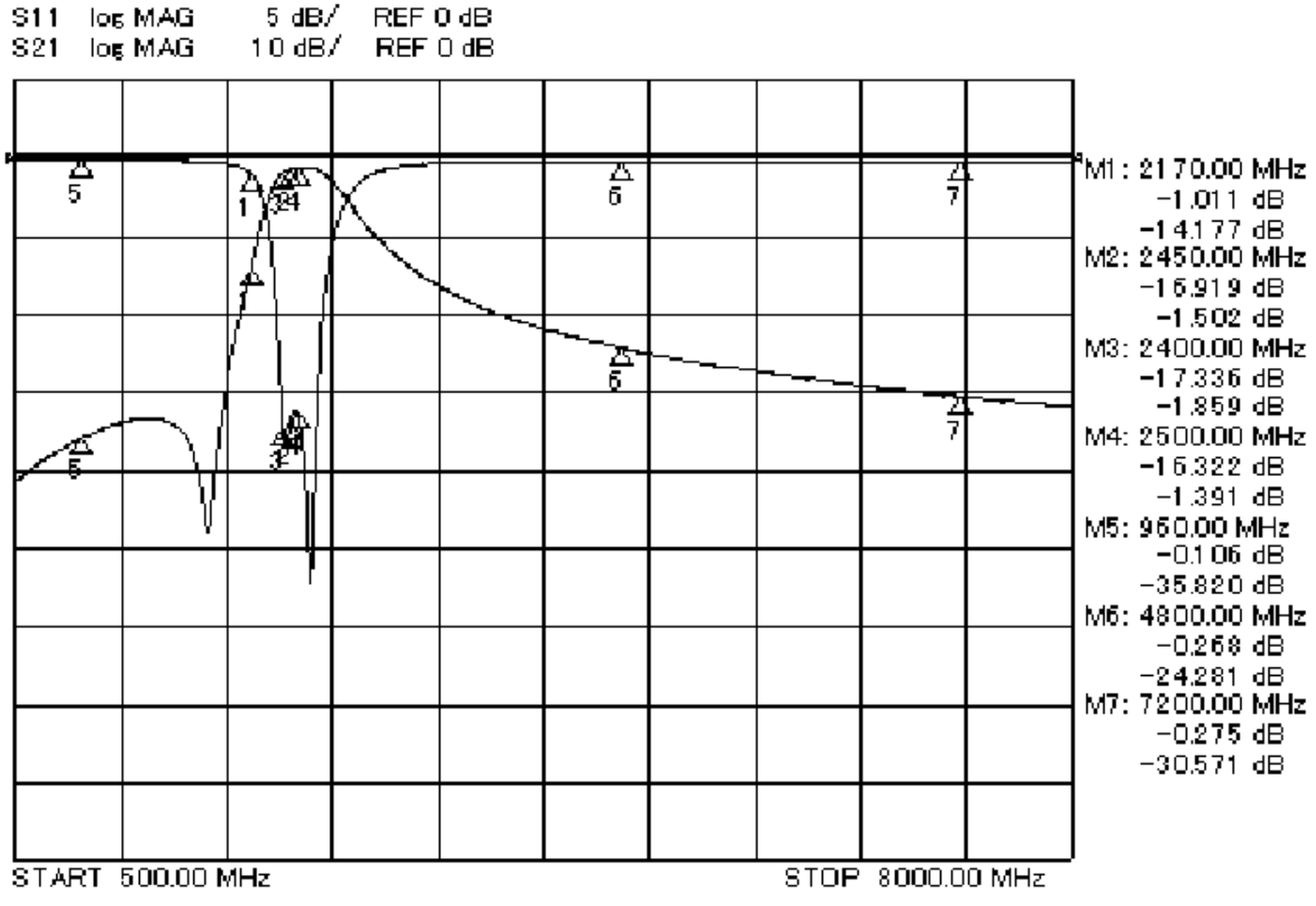


➢**The heat can be escaped *through Thermal Via***

Simulation Result of BPF performance



Actual performance is same



Benefit by using LTCC BPF

✓***Blocking Performance***

Rejection performance for Mobile Tx Frequency

✓***Adjustable the Harmonics Distortion***

Attenuation for High Frequency

✓***Size and Performance selectivity***

Optimized for each RFIC and application

Conclusion

➢ Small Size

Smallest module is come true by LTCC Multilayer Technology.
Passive components are built in LTCC substrate.

➢ Provision for Heat issue

Optimized the number of Via hole and the location is useful.

High Performance

Design of LTCC Multilayer BPF is very flexible.

LTCC Multilayer technology is very effective for smallest W-LAN module