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TITLE ：**CHIP ANTENNA MEASUREMENT AND PERFORMANCE REPORT**

REPORT CUSTOMER ：精冠

PRODUCT ：**BT Dongle**

SAMPLE NO. ：**920D07E15225013 & Printing Antenna**

DESCRIPTION ：**2.4GHz CHIP ANTENNA FOR BLUETOOTHBAND APPLICATION**

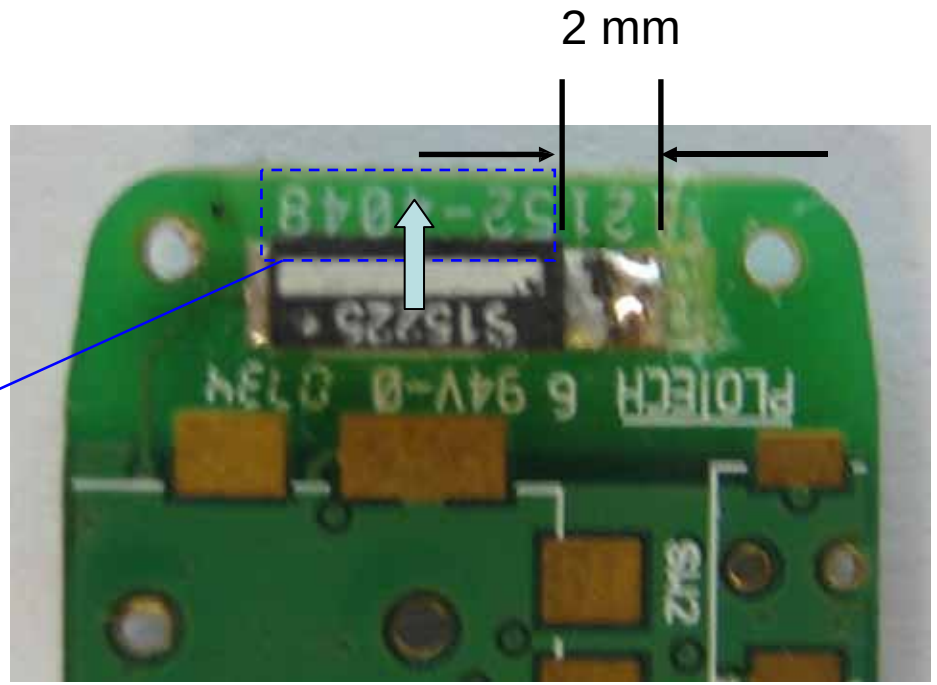
Outline

- **Summary**
- **Experiment Instrument & Equipment**
- **Product Feature & Matching Circuit**
- **S Parameter Measurement**
  - *Antenna Return Loss (S11)*
- **3D Gain Pattern Measurement**
- **Antenna Efficiency Summarization Table**

Summary

- 本次實驗量測，所得數據如報告中所示。**Bluetooth band**頻寬爲**70 MHz**，效率平均爲**34.96 %**。
- 原**Printing Antenna** 其**Return Loss**並不符合**Bluetooth band** 規範，效率平均爲**10.61 %**
- **Chip Antenna Solder Terminal**延伸出的銅箔修改爲**2mm**長**(Figure 1.)**，另外盡量將**chip antenna** 往板端平移，增加其淨空區，並將原**printing antenna**架構刪除 ，作爲完整的淨空區。
- 匹配電路元件請參考**Figure 2.** 串聯一**0.68 pF**電容；在重新設計時，傳輸 線及匹配電路請勿分支，這會造成訊號上的損失，影響了天線的特性。
- 此次實驗，使用空板作測試，如欲得到更實際的**performance**，請提供完 整的實機來作最後微調。

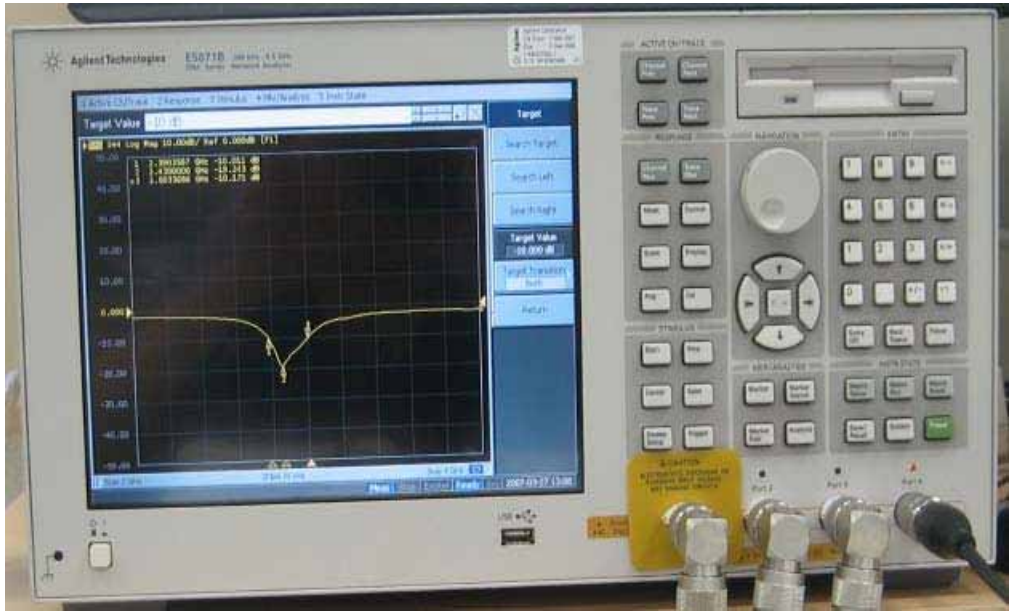
Summary

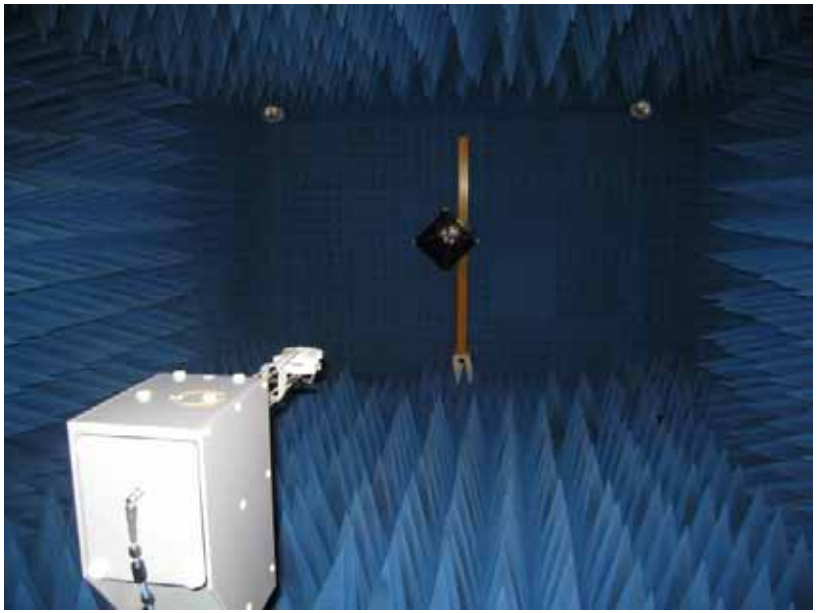


天線往板端平移，
增加其淨空區。

Figure 1.

Experiment Instrument & Equipment





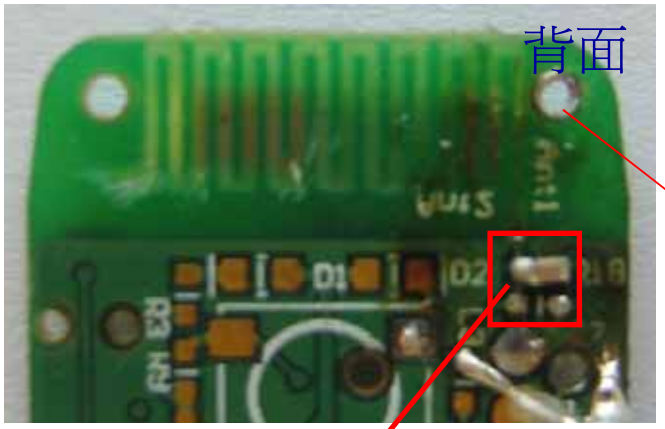
量測儀器

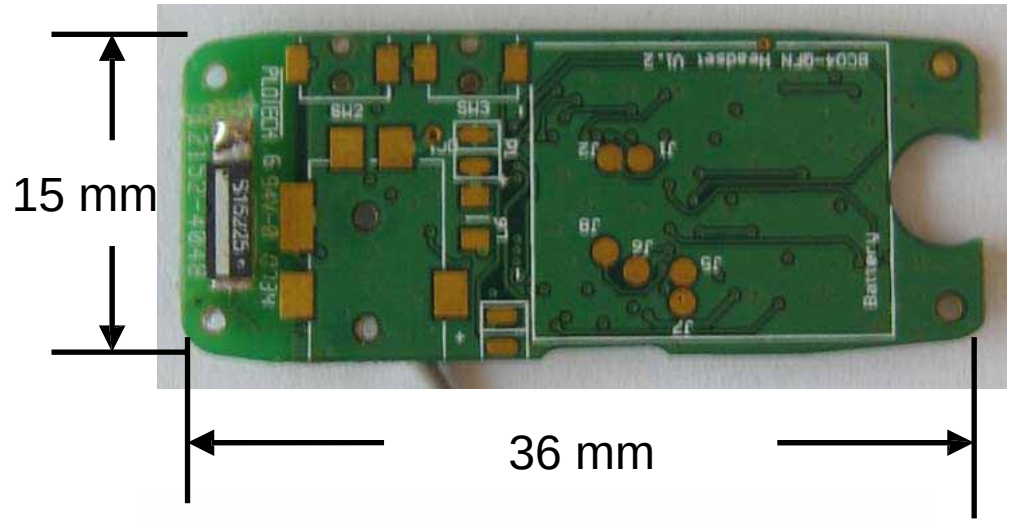
Vector Network Analyzer-Agilent ENA E5071B

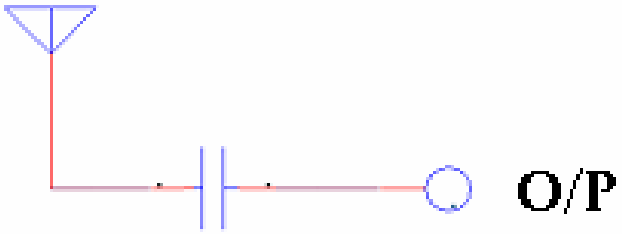
輻射場型量測設備

3D Far-Field Anechoic Chamber

Product Feature & Matching Circuit







C = 0.68 pF

Figure 2.

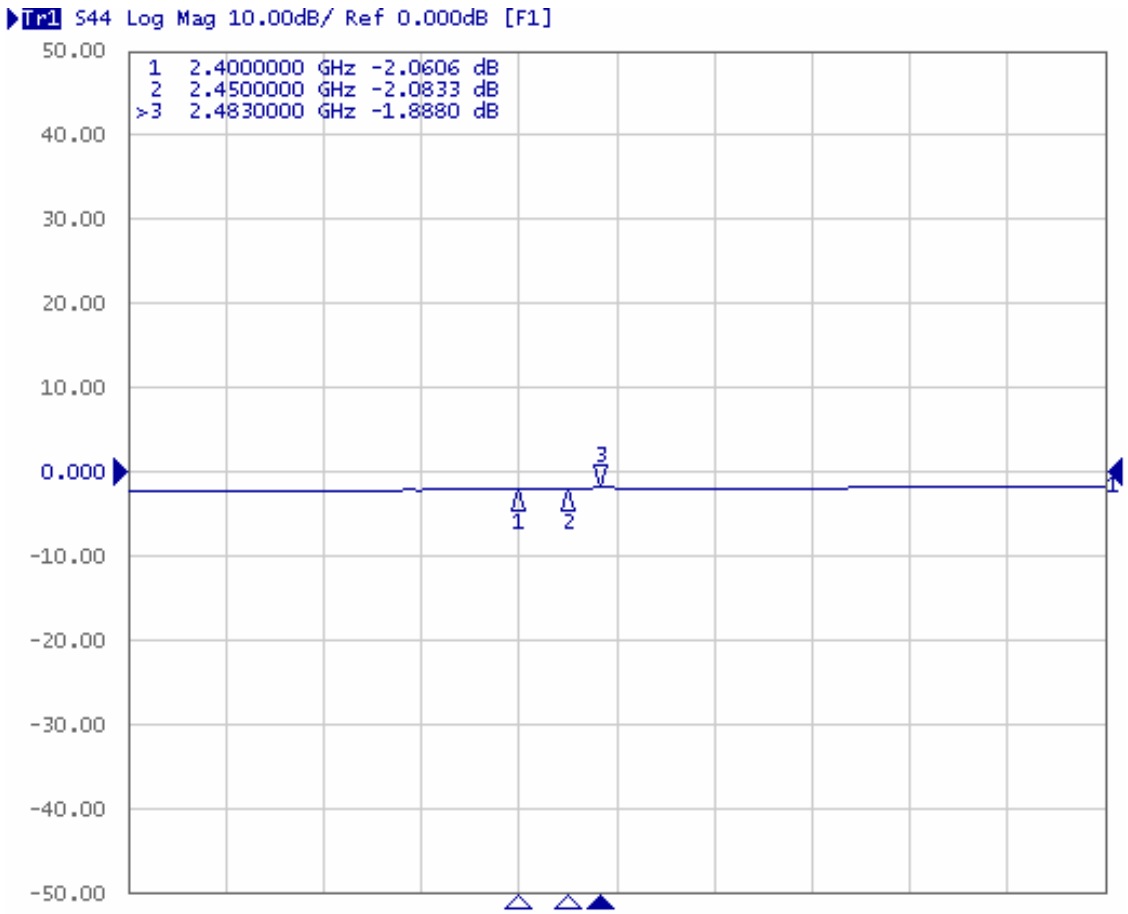
S Parameter Measurement

Return Loss (S11) Test Report for 2.4GHz Printing Antenna

Measurement Instrument	(Agilent E5071B ENA, 300KHz~8.5GHz)

ORIGINAL

PRINTING ANT.



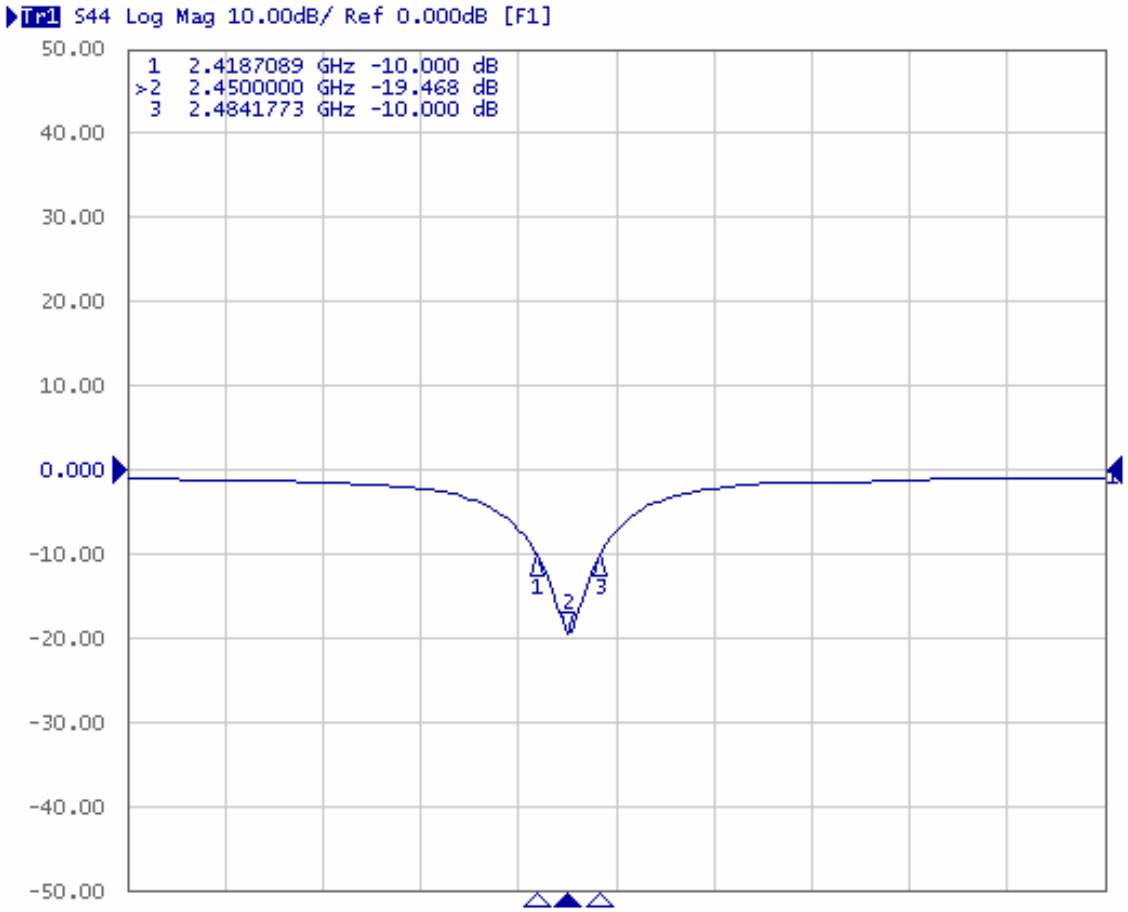
S Parameter Measurement

Return Loss (S11) Test Report for COXOC 2.4GHz Chip Antenna

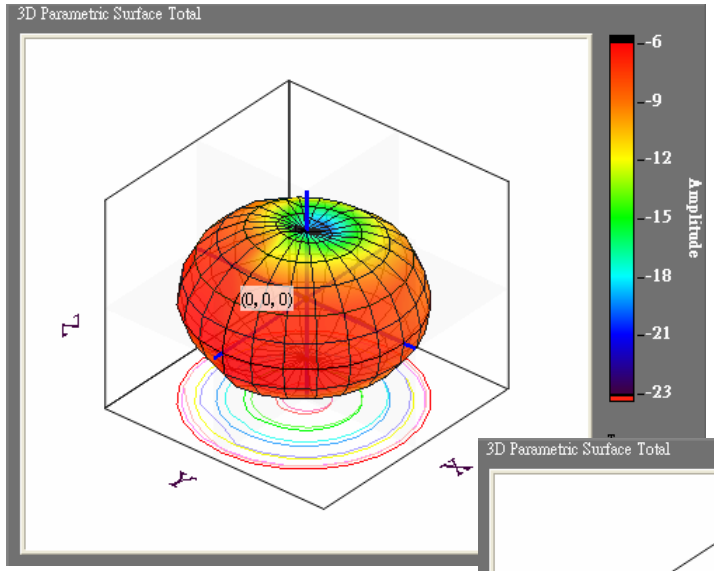
Measurement Instrument	(Agilent E5071B ENA, 300KHz~8.5GHz)

COXOC

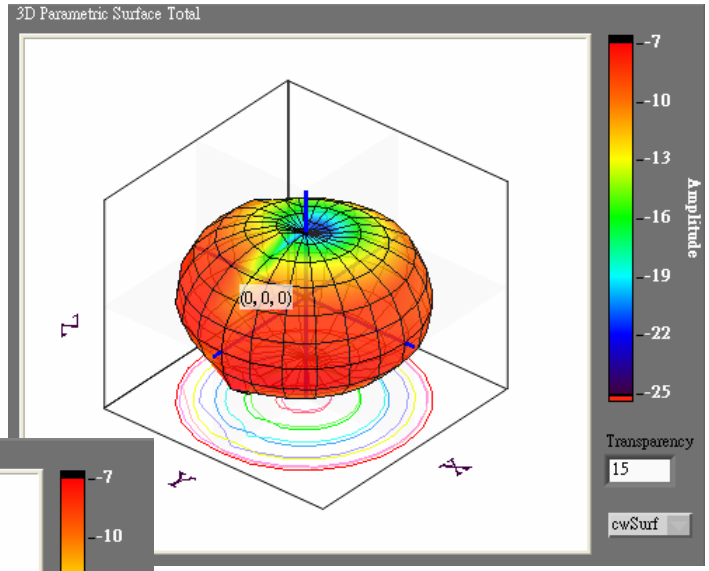
Chip ANT.



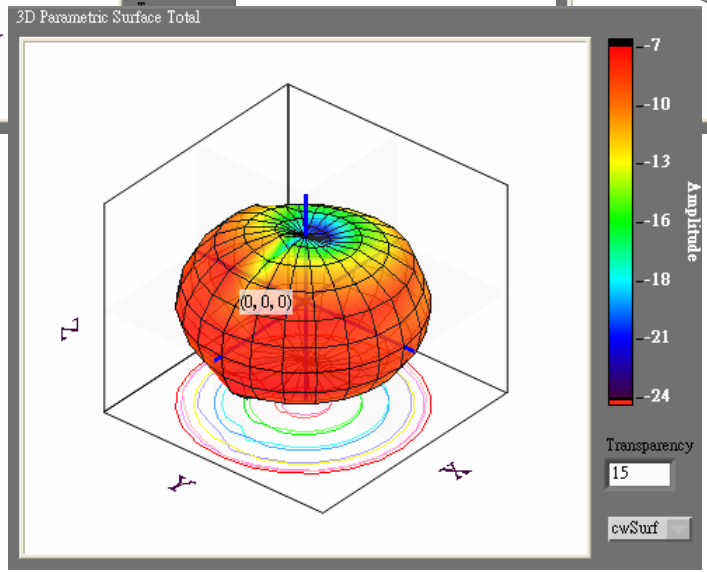
3D Gain Pattern Measurement



f = 2400 MHz

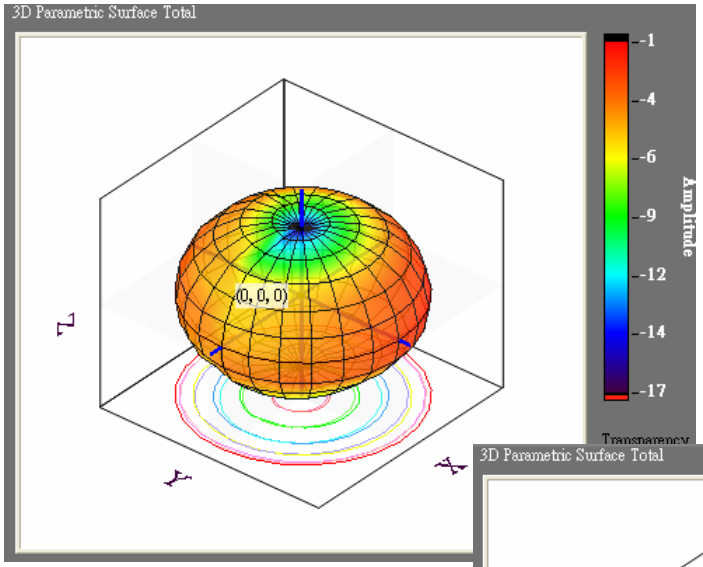


f = 2450 MHz

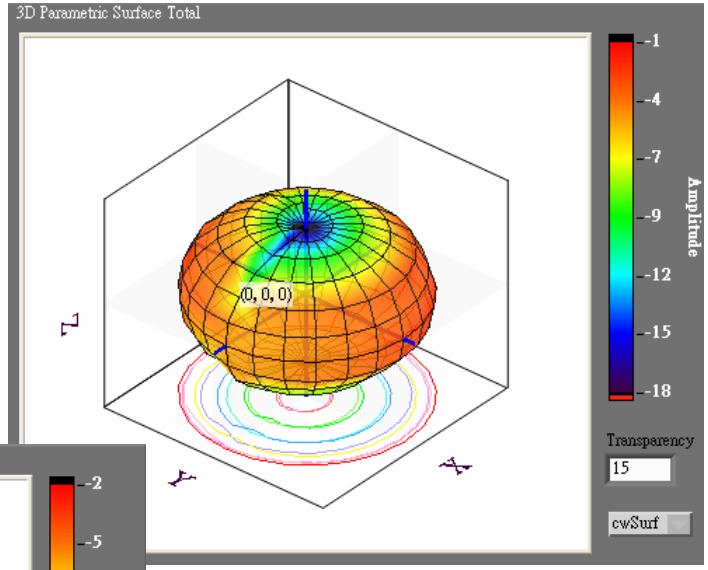


f = 2483 MHz

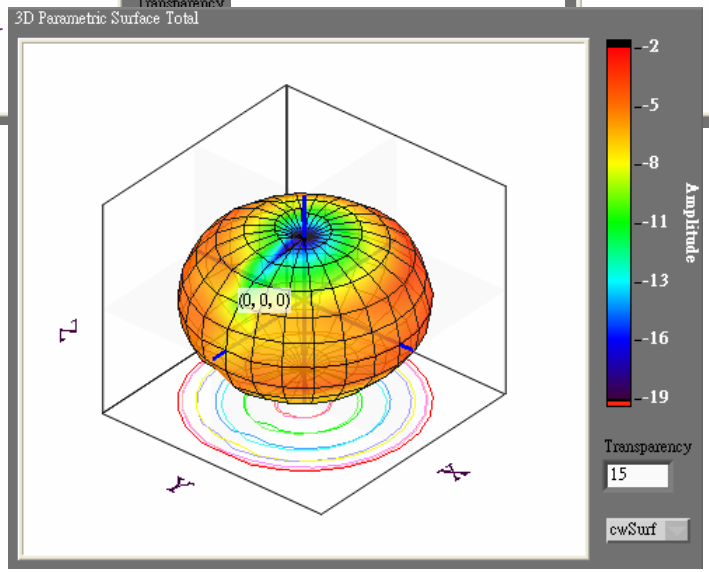
3D Gain Pattern Measurement



f = 2400 MHz



f = 2450 MHz



f = 2483 MHz

Chip Antenna

Antenna Efficiency Summarization Table

Printing Antenna

Frequency (MHz)	2400	2450	2483
Ant. Port Input Pwr. (dBm)	0	0	0
Tot. Rad. Pwr. (dBm)	-9.121	-9.985	-10.195
Peak EIRP (dBm)	-6.066	-6.602	-7.114
Directivity (dBi)	3.055	3.383	3.081
Efficiency (dB)	-9.121	-9.985	-10.195
Efficiency (%)	12.244	10.035	9.562
Gain (dBi)	-6.066	-6.602	-7.114
Boresight Phi (°)	0	15	15
Boresight Th. (°)	105	105	105
Maximum Power (dBm)	-6.066	-6.602	-7.114
Minimum Power (dBm)	-23.461	-25.023	-24.063
Average Power (dBm)	-9.784	-10.836	-10.637
Max/Min Ratio (dB)	17.395	18.421	16.95
Max/Avg Ratio (dB)	3.055	3.383	3.081
Min/Avg Ratio (dB)	-14.34	-15.038	-13.869
Average Gain (dB)	-9.121	-9.985	-10.195
Upper Hem. PRP (dBm)	-10.912	-11.736	-12.222
Lower Hem. PRP (dBm)	-12.721	-13.51	-13.519
Efficiency (%)	12.244	10.035	9.562

Antenna Efficiency Summarization Table

Chip Antenna

Frequency (MHz)	2400	2450	2483
Ant. Port Input Pwr. (dBm)	0	0	0
Tot. Rad. Pwr. (dBm)	-4.126	-4.334	-5.321
Peak EIRP (dBm)	-0.952	-0.784	-2.163
Directivity (dBi)	3.174	3.55	3.159
Efficiency (dB)	-4.126	-4.334	-5.321
Efficiency (%)	38.668	36.864	29.367
Gain (dBi)	-0.952	-0.784	-2.163
Boresight Phi (°)	180	195	195
Boresight Th. (°)	90	105	105
Maximum Power (dBm)	-0.952	-0.784	-2.163
Minimum Power (dBm)	-16.882	-18.052	-18.891
Average Power (dBm)	-5.445	-5.983	-6.471
Max/Min Ratio (dB)	15.93	17.268	16.729
Max/Avg Ratio (dB)	3.174	3.55	3.159
Min/Avg Ratio (dB)	-12.756	-13.718	-13.57
Average Gain (dB)	-4.126	-4.334	-5.321
Upper Hem. PRP (dBm)	-6.027	-6.189	-7.388
Lower Hem. PRP (dBm)	-7.479	-7.602	-8.467
Efficiency (%)	38.668	36.864	29.367