



APPENDIX

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

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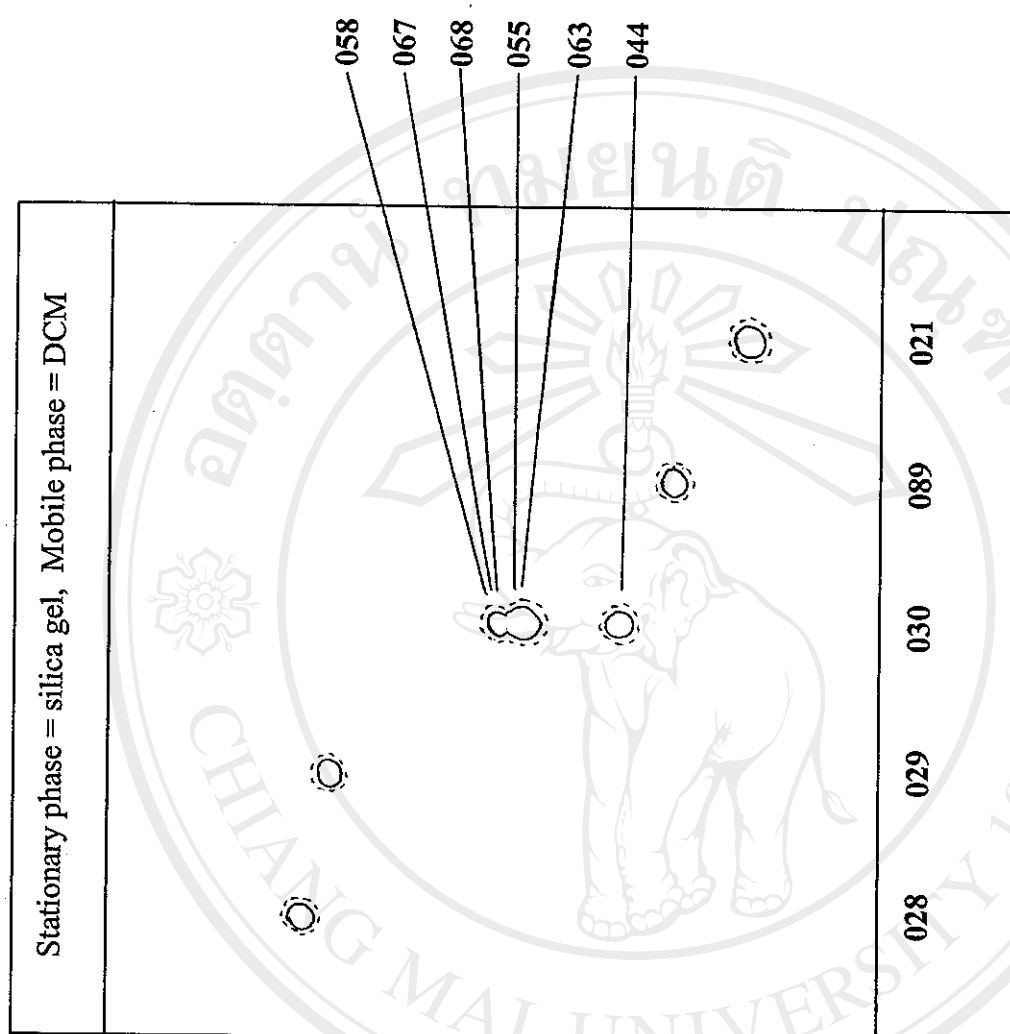


Figure 24. TLC chromatogram of the isolated compounds from fraction EU9M002

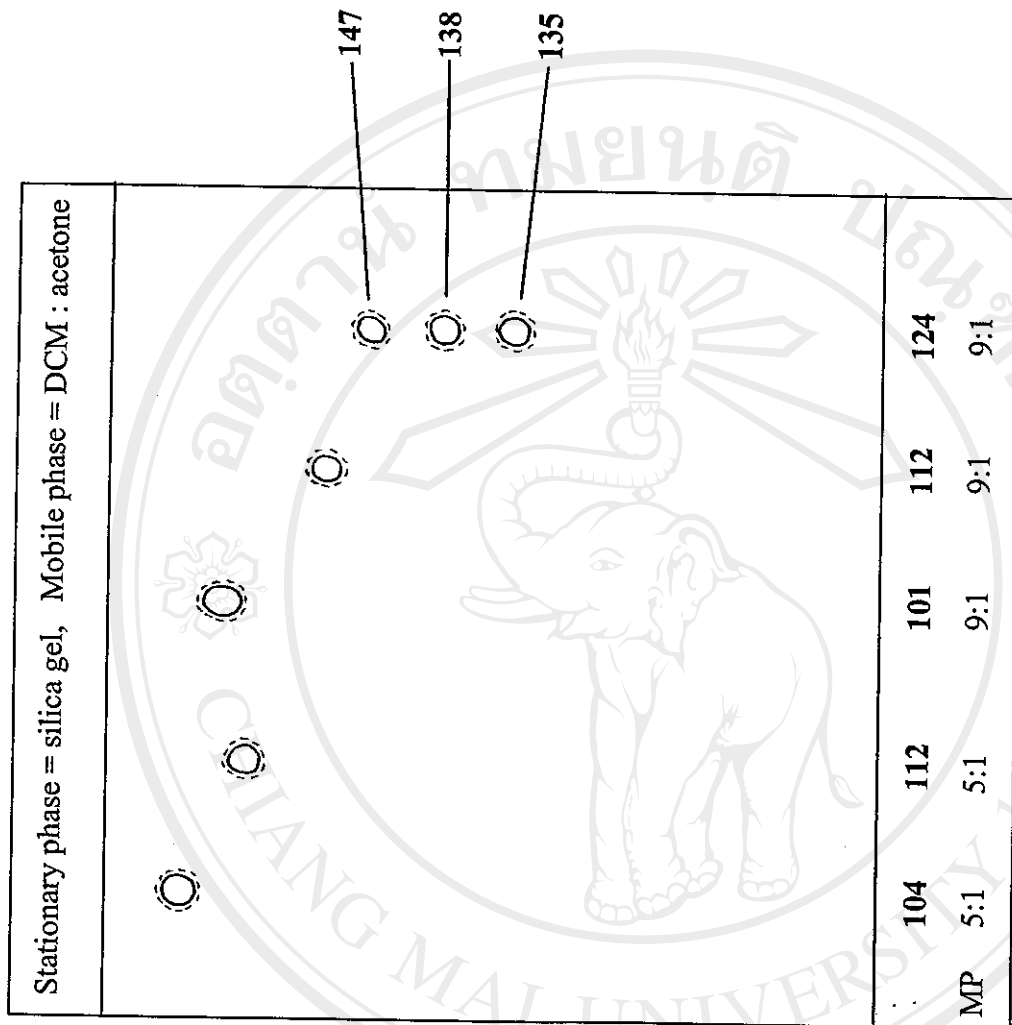


Figure 25. TLC chromatogram of the isolated compounds from fraction EU9M003

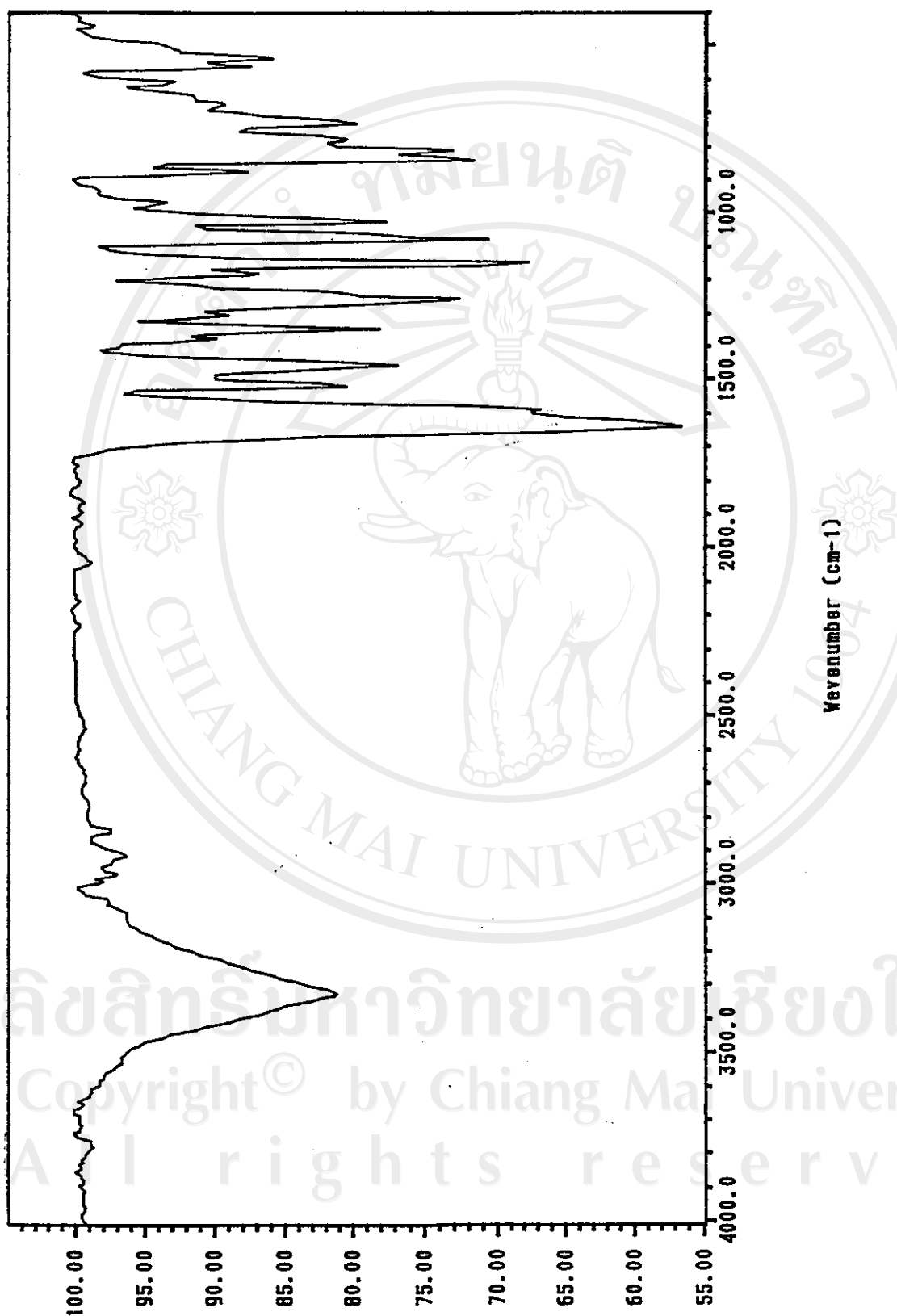


Figure 26. The IR spectrum of compound EU9M021

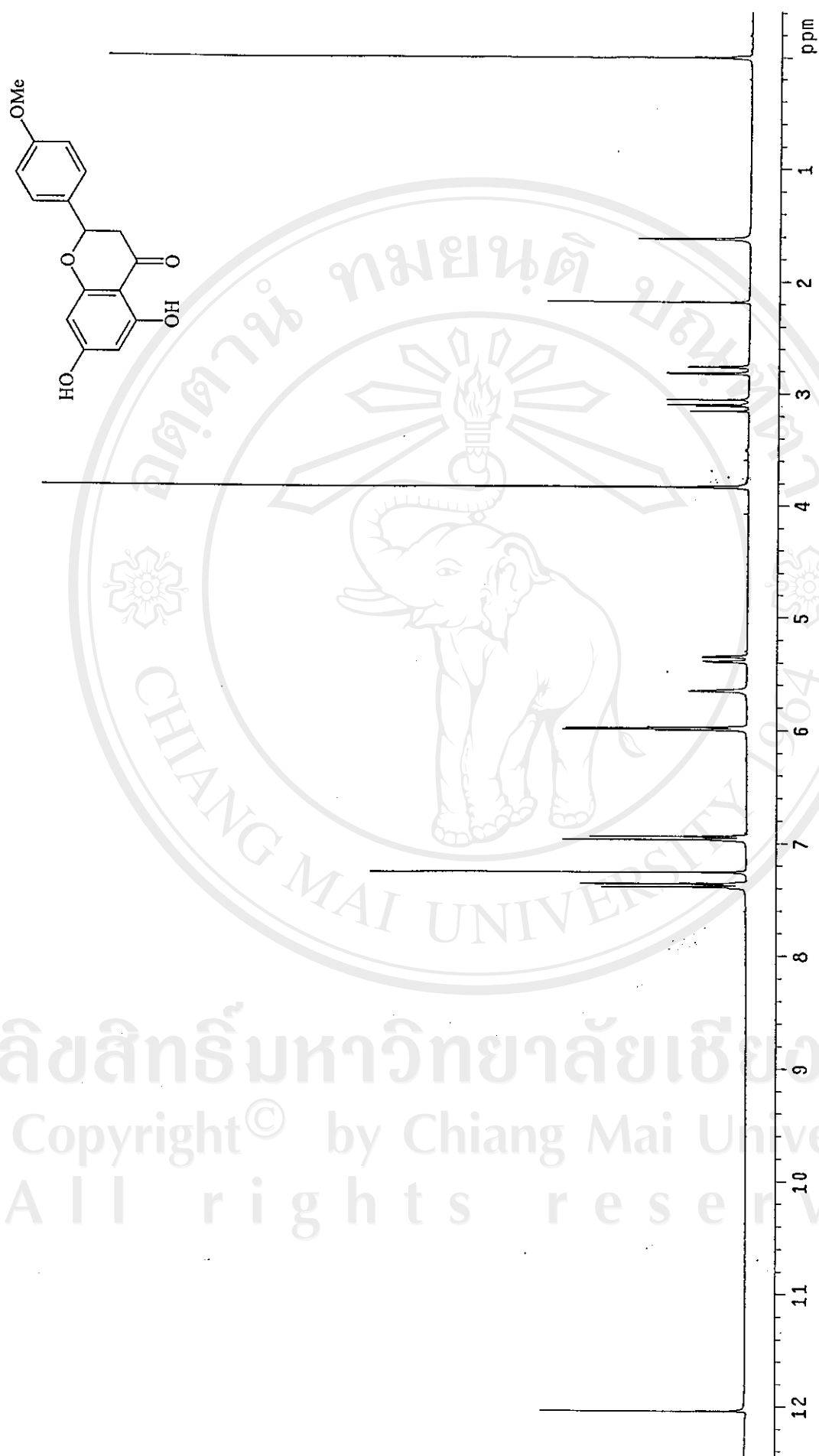


Figure 27. The 300 MHz $^1\text{H-NMR}$ spectrum of compound EU9M021 (in CDCl_3)

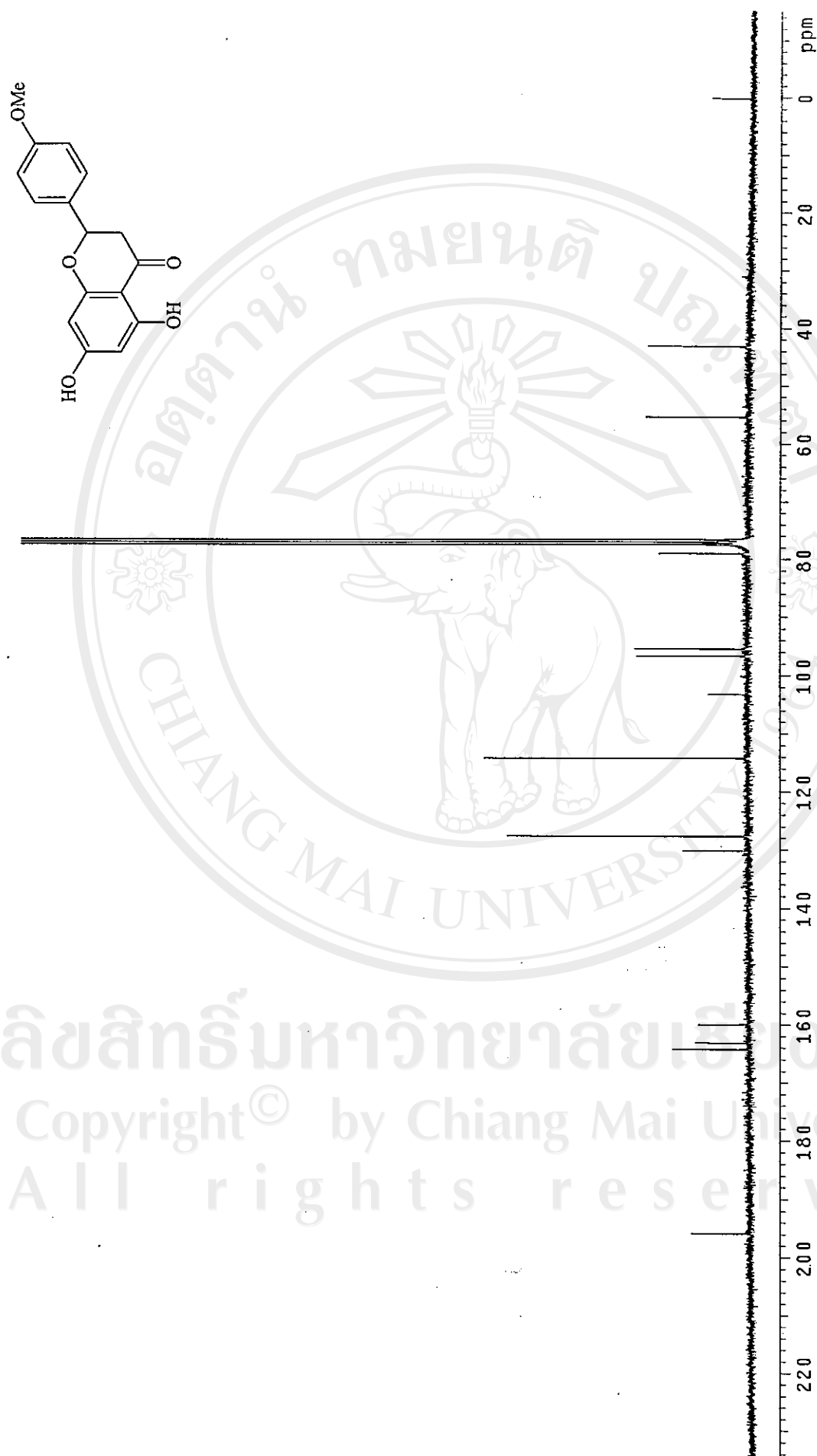


Figure 28. The 75 MHz ¹³C-NMR spectrum of compound EU9M021 (in CDCl₃)

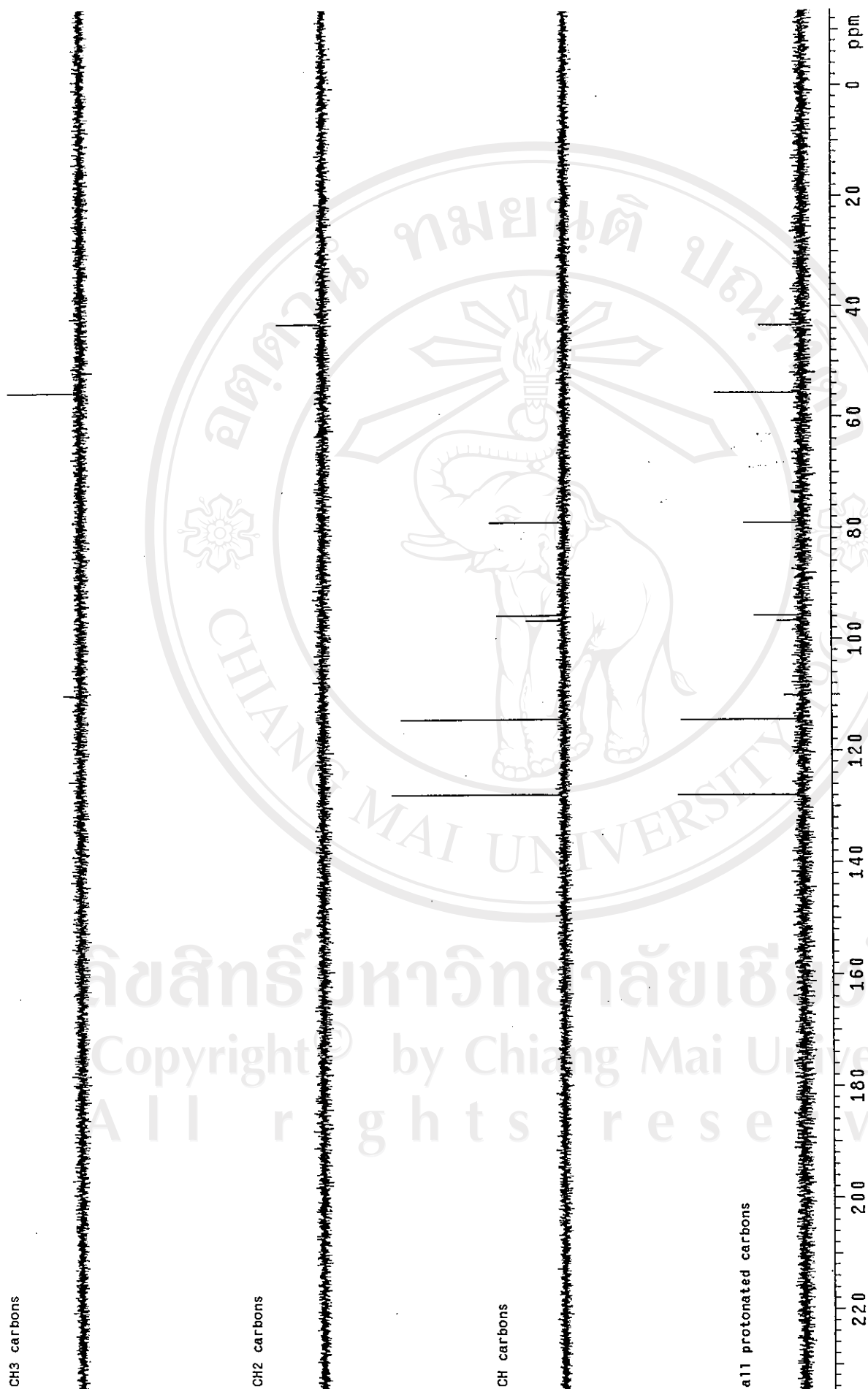


Figure 29. The 75 MHz DEPT spectrum of compound EU9M021 (in CDCl₃)

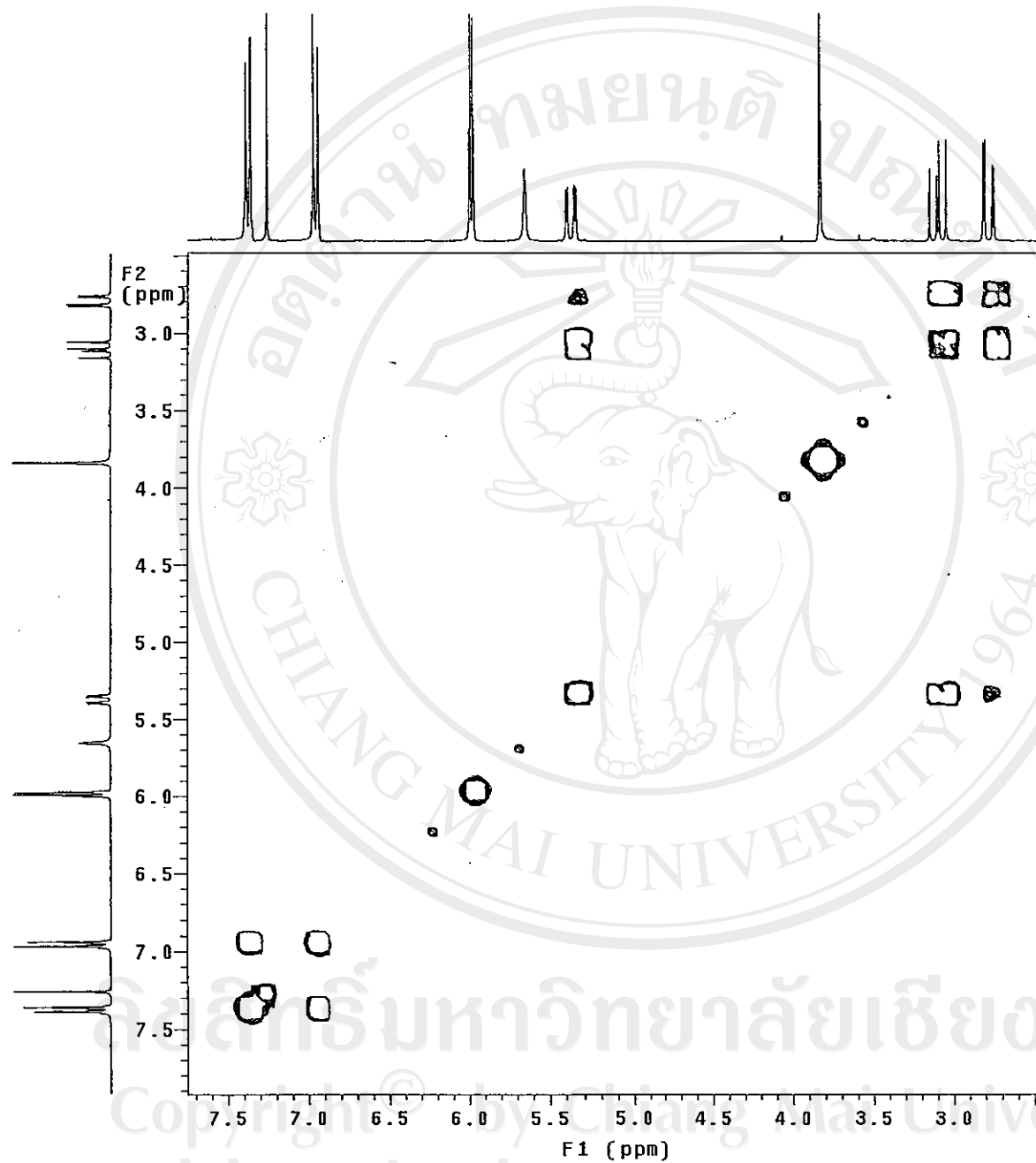


Figure 30. The 300 MHz ^1H - ^1H COSY spectrum of compound EU9M021 (in CDCl_3)

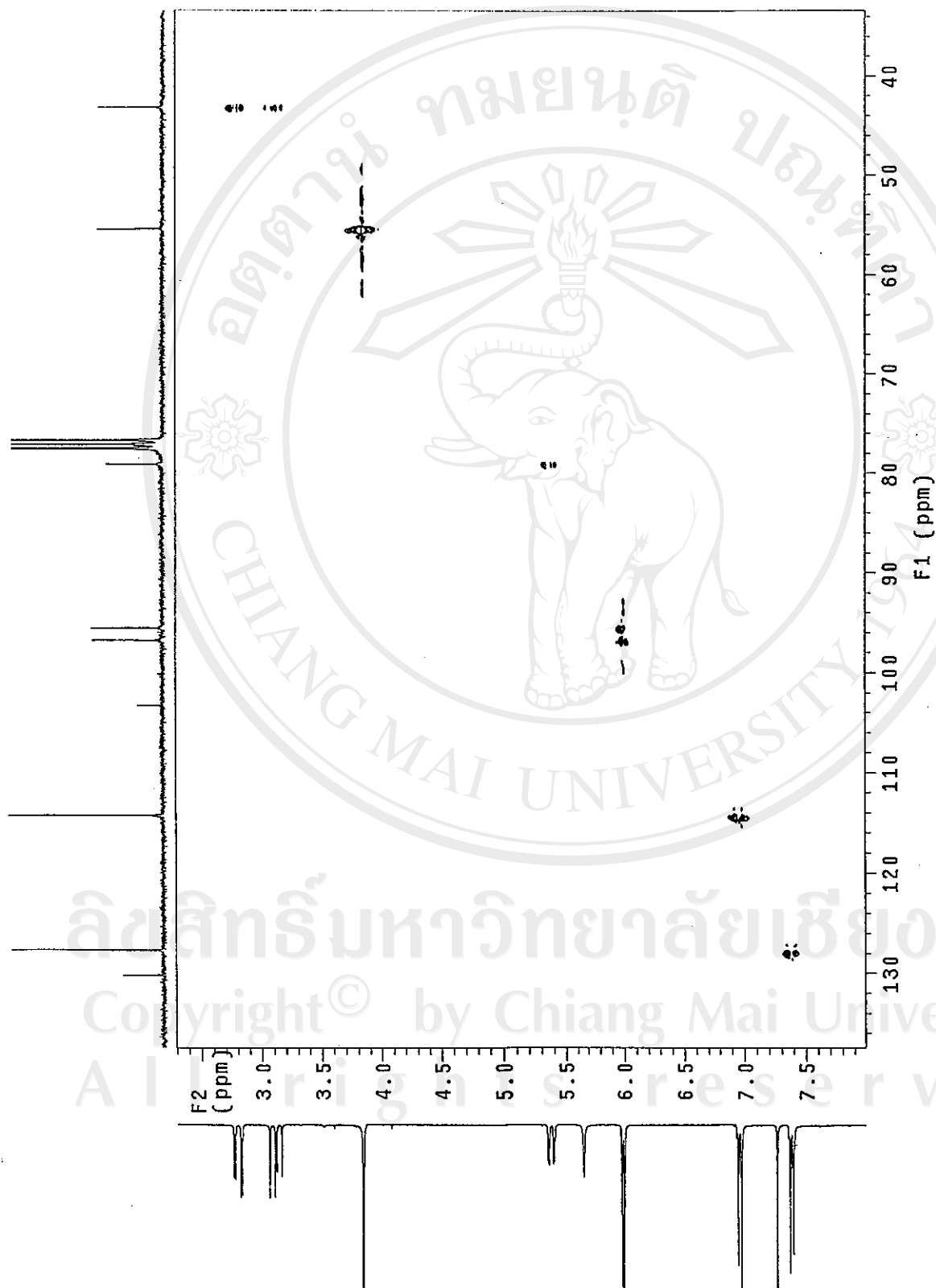


Figure 31. The 300 MHz HSQC spectrum of compound EU9M021 (in CDCl_3)

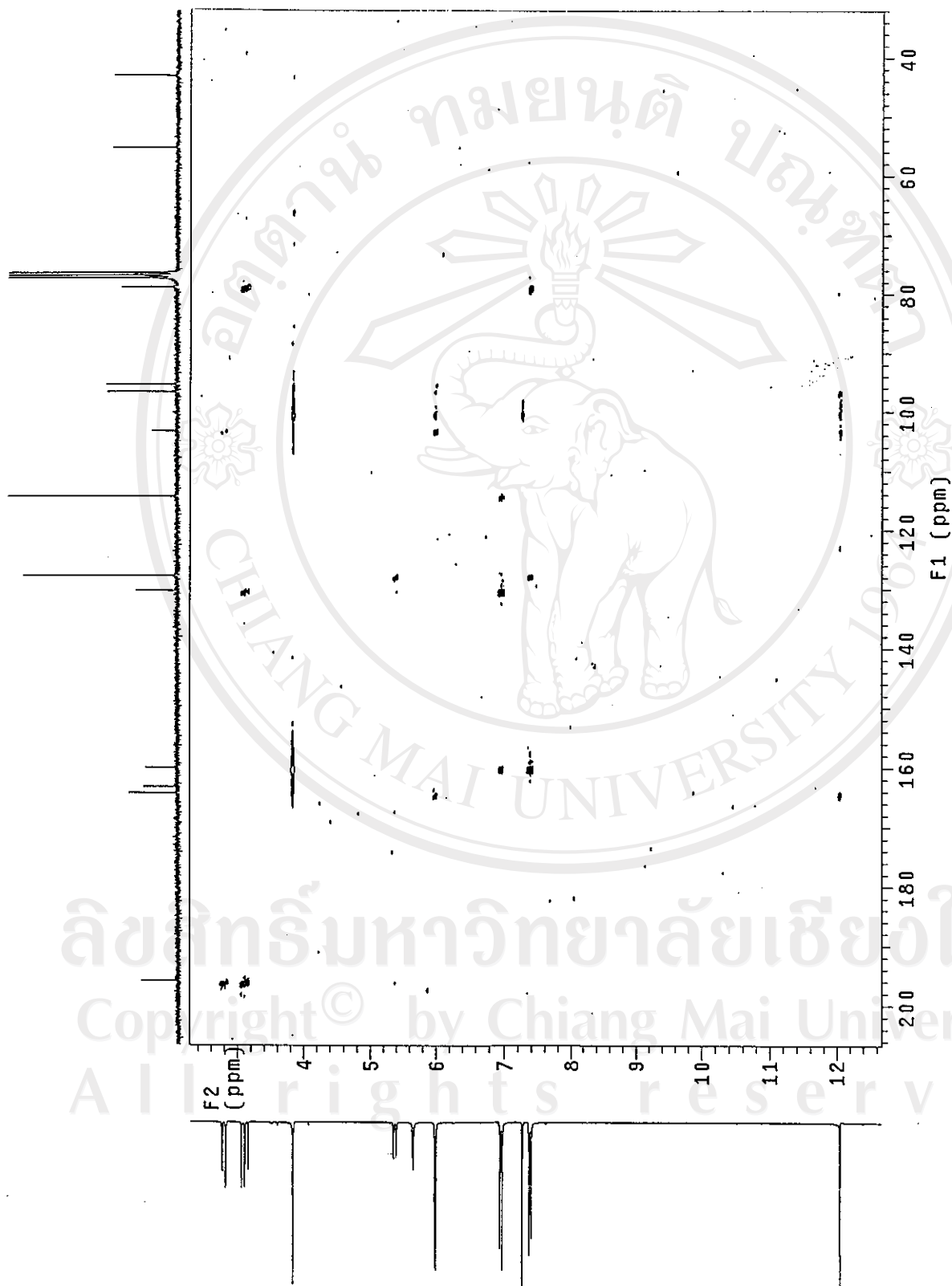


Figure 32. The 300 MHz HMBC spectrum of compound EU9M021 (in CDCl_3)

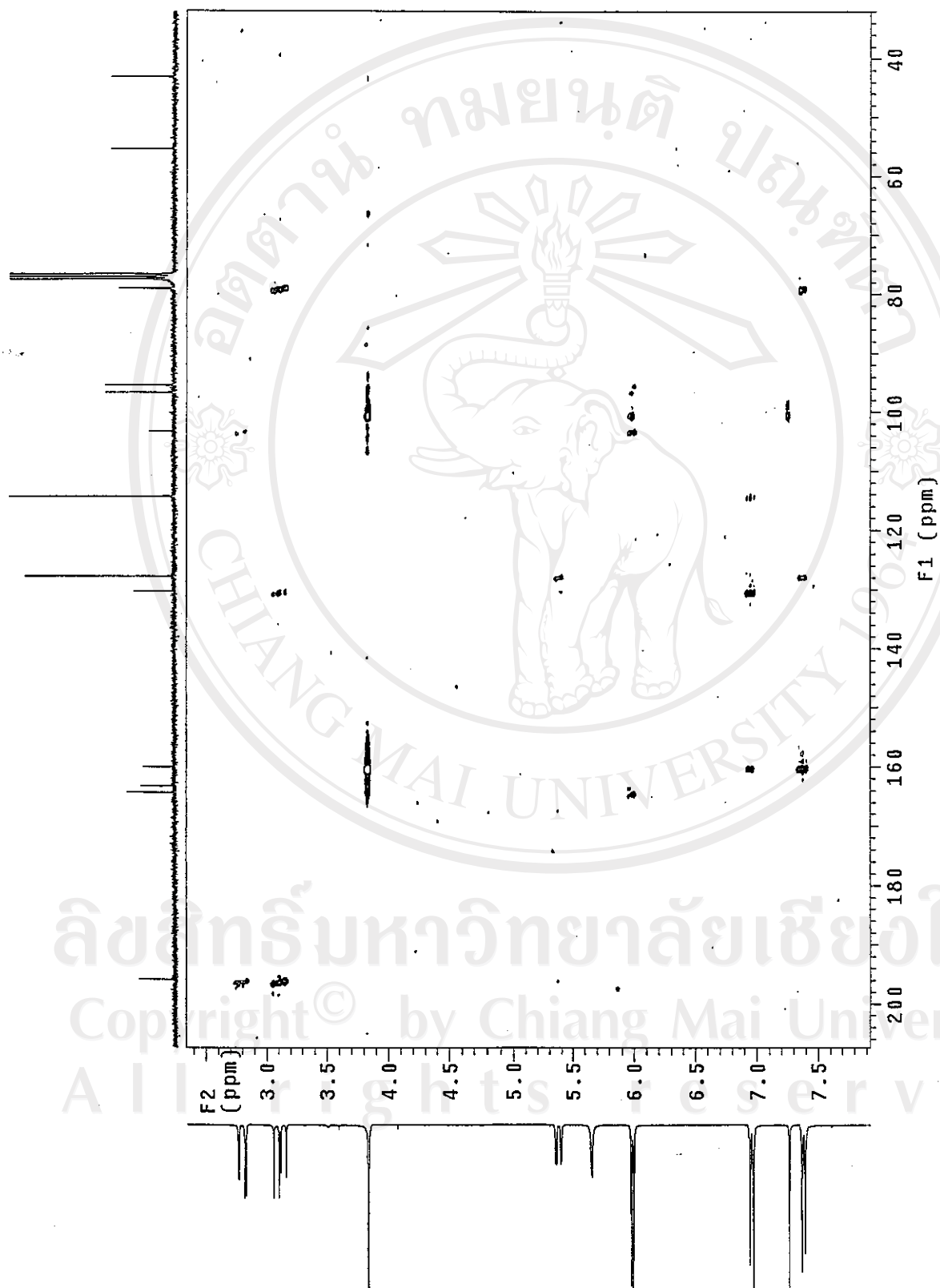


Figure 33. The 300 MHz HMBC spectrum of compound EU9M021 (in CDCl₃) (expanded)

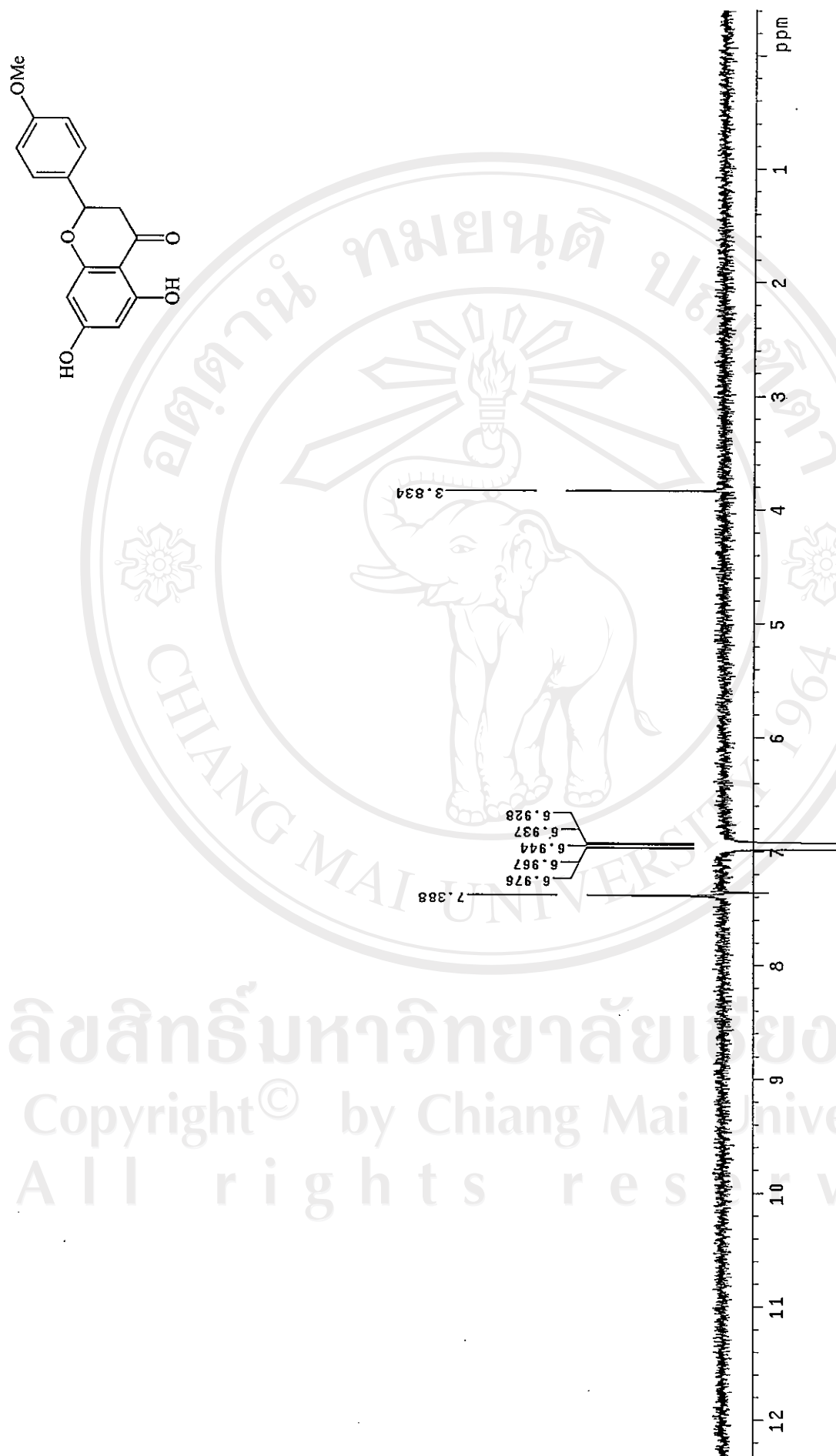


Figure 34. The 300 MHz NOE difference spectrum of compound EU9M021 (in CDCl₃) irradiation at 6.95 ppm (H-3')

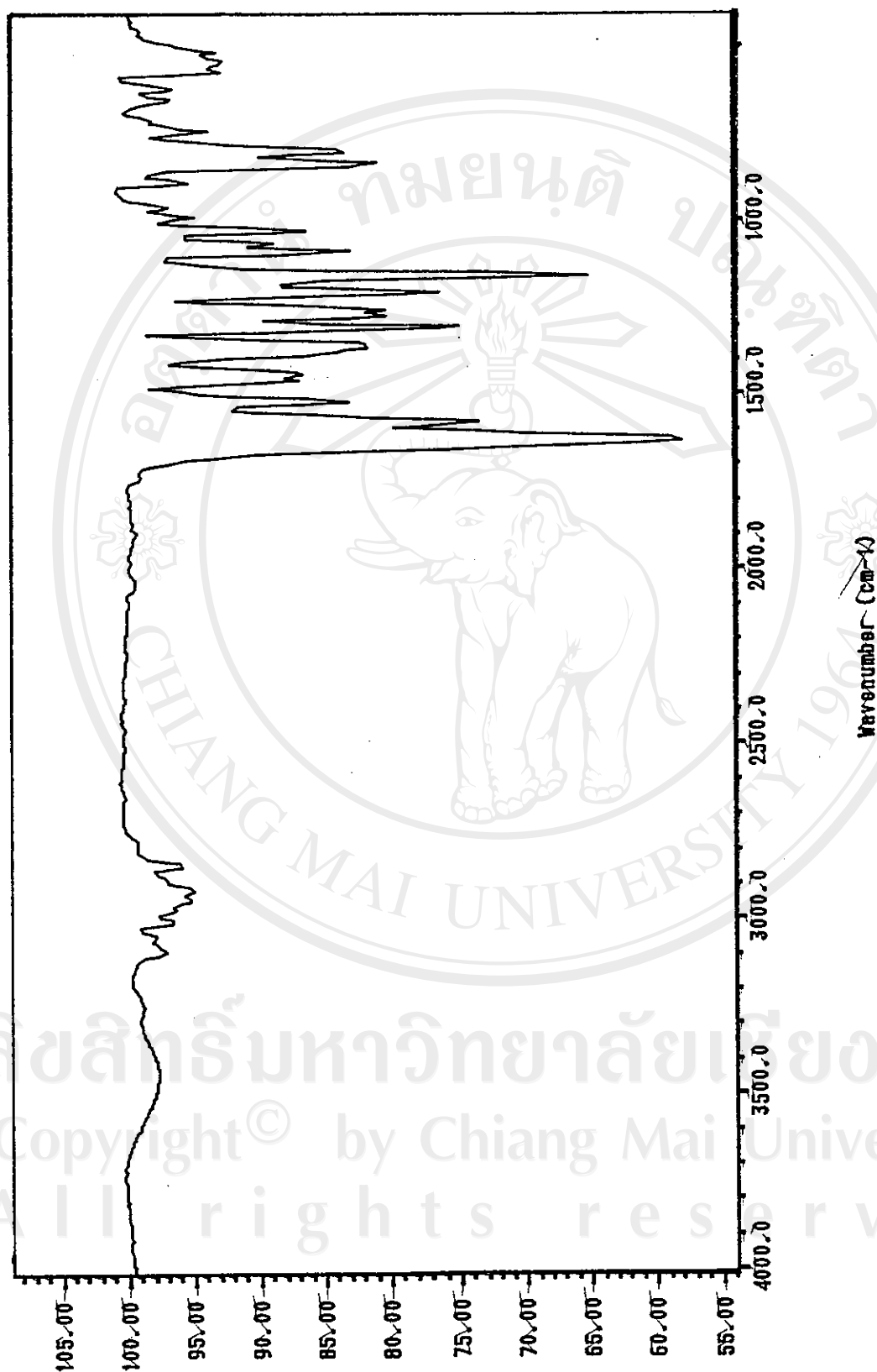


Figure 35. The IR spectrum of compound EU9M028

Figure 36. The 300 MHz ¹H-NMR spectrum of compound EU9M028 (in CDCl₃)

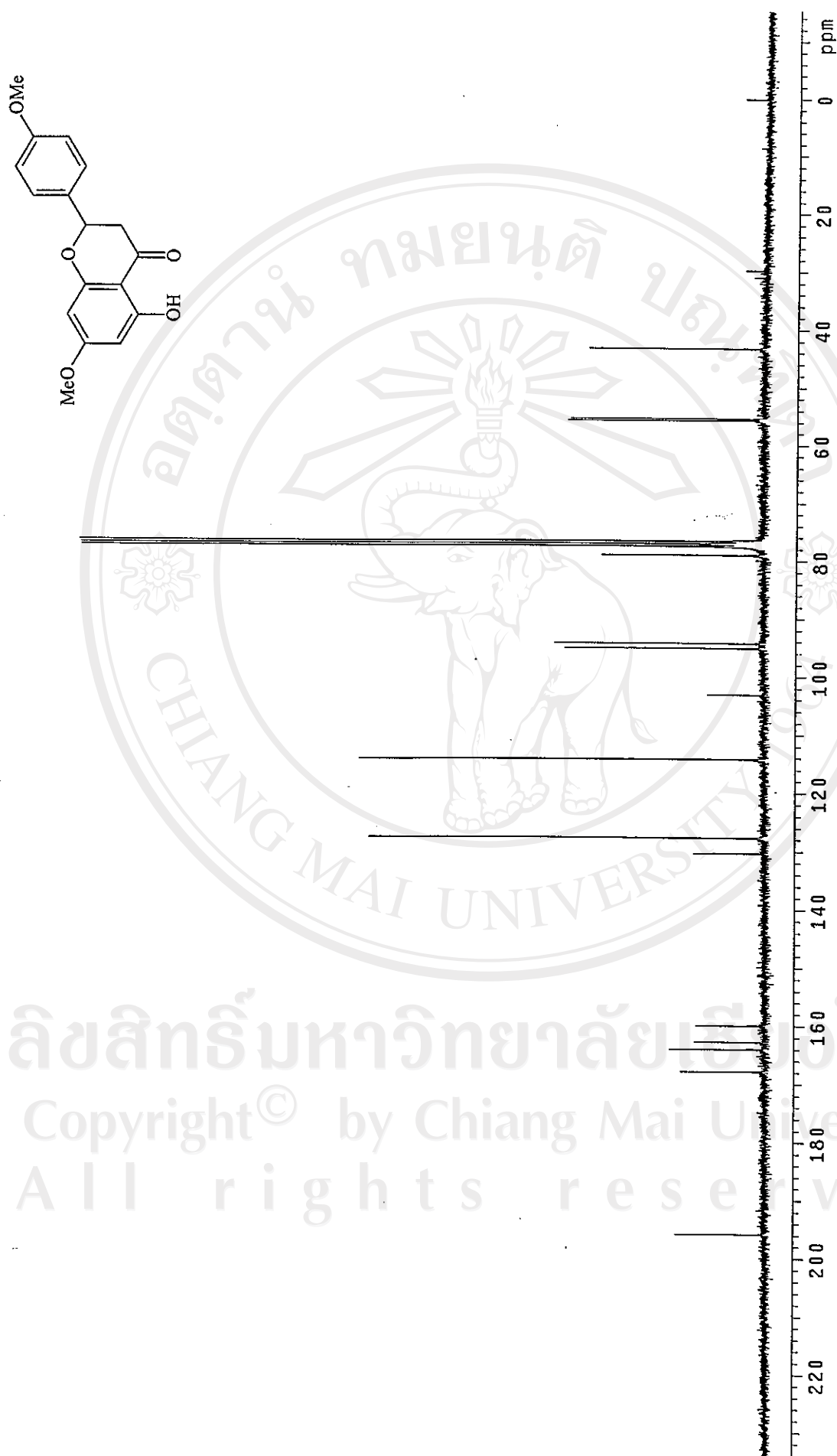
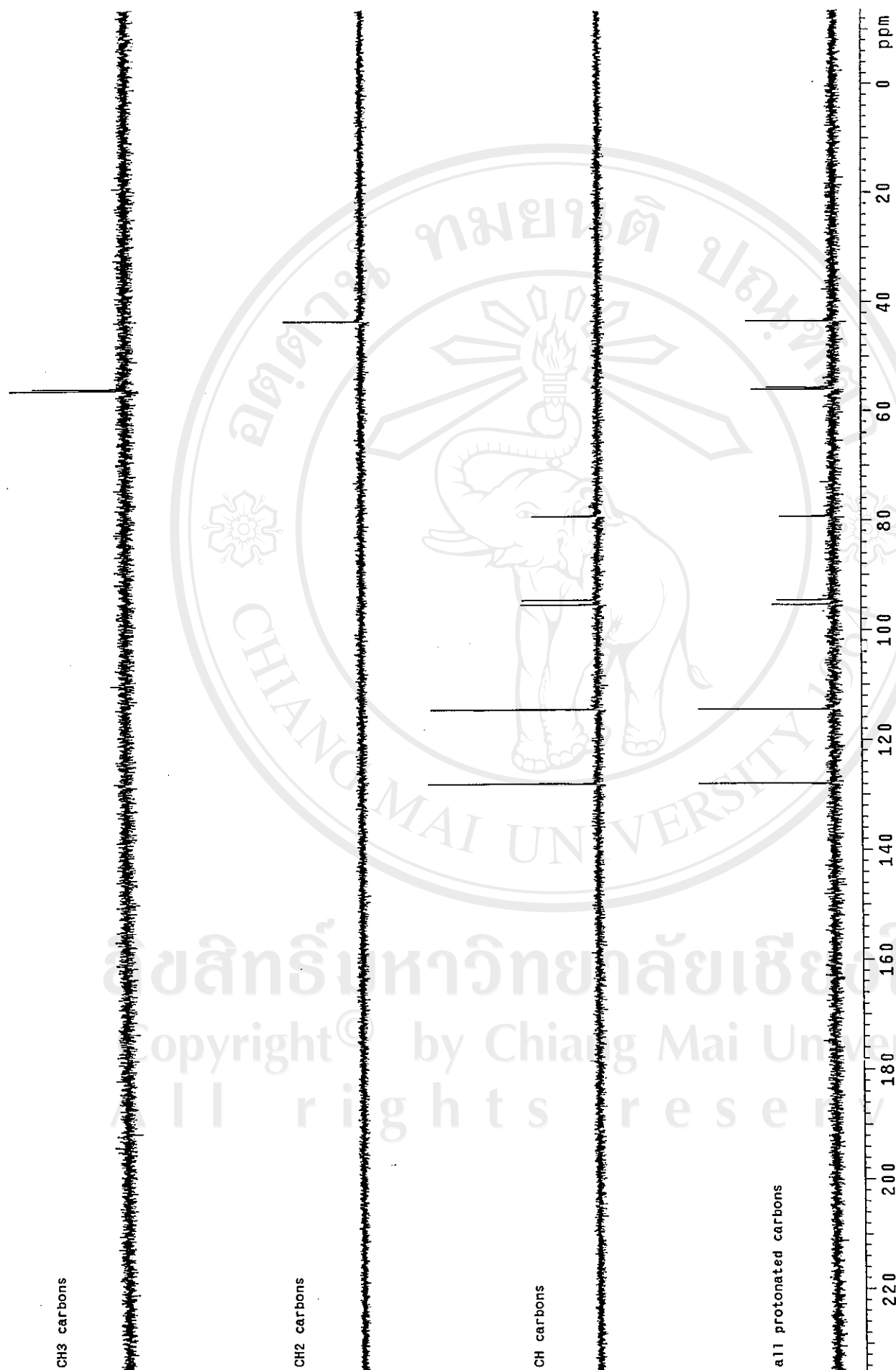


Figure 37. The 75 MHz ¹³C-NMR spectrum of compound EU9M028 (in CDCl₃)



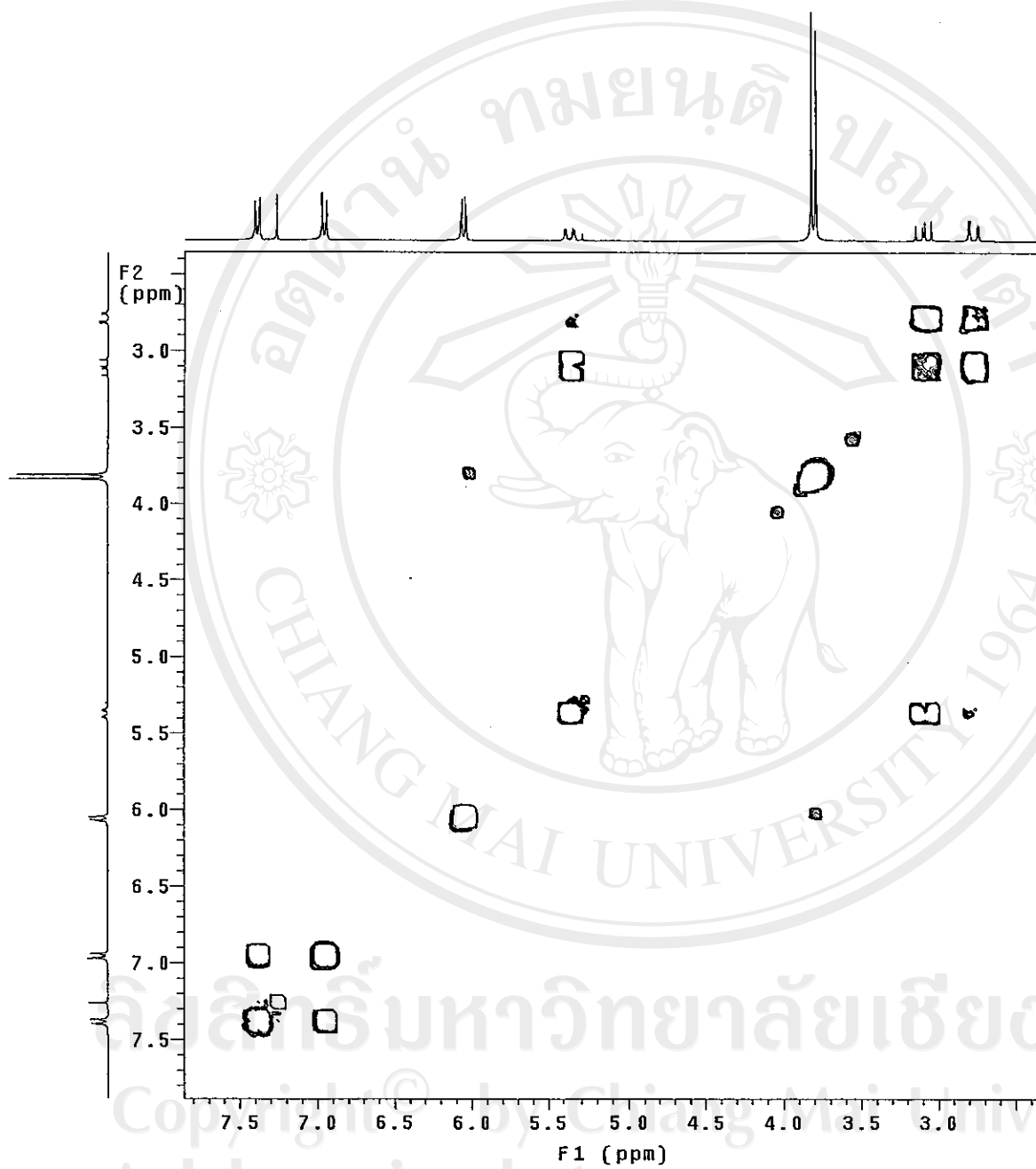


Figure 39. The 300 MHz ^1H - ^1H COSY spectrum of compound EU9M028 (in CDCl_3)

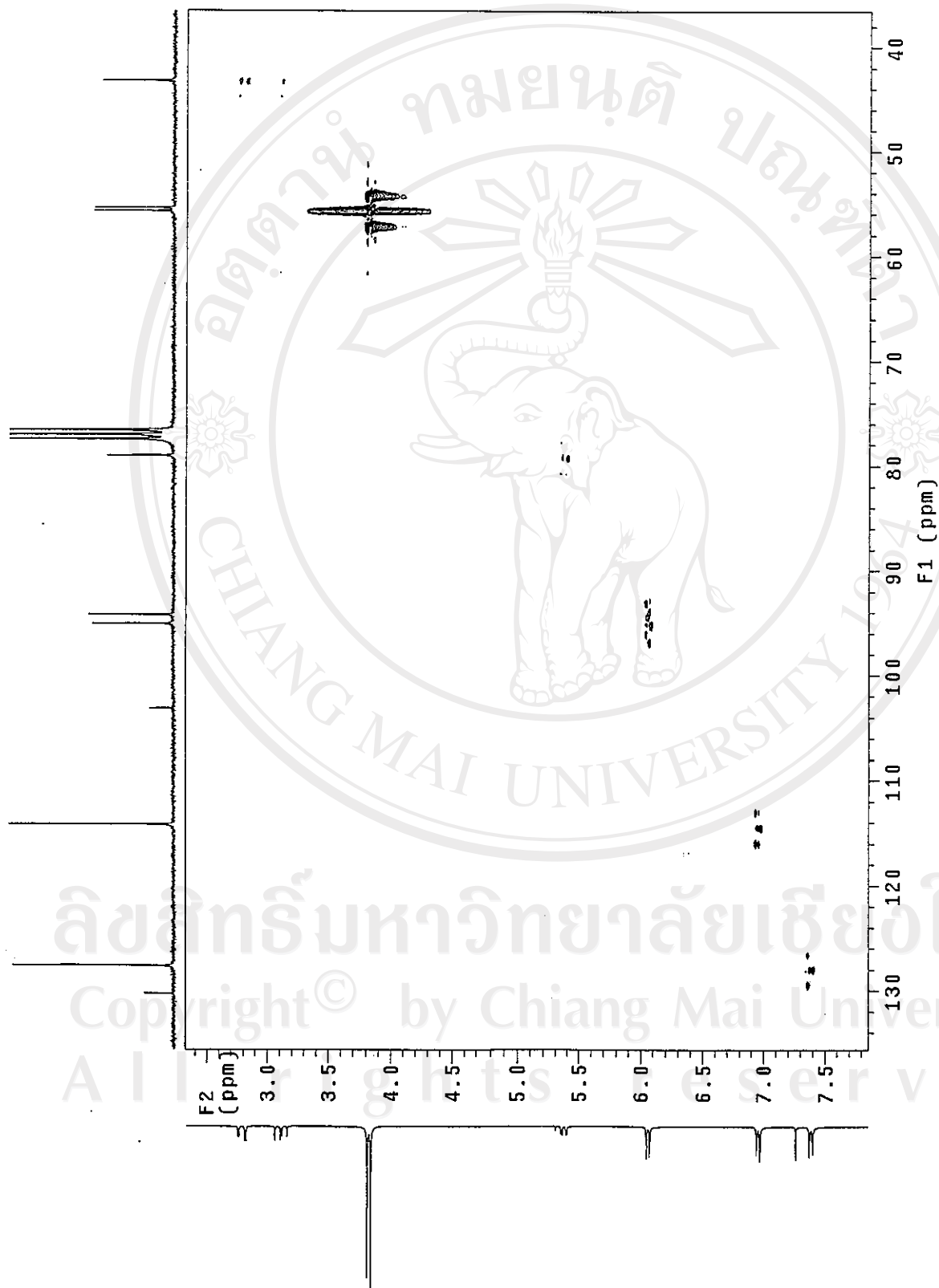


Figure 40. The 300 MHz HSQC spectrum of compound EU9M028 (in CDCl₃)

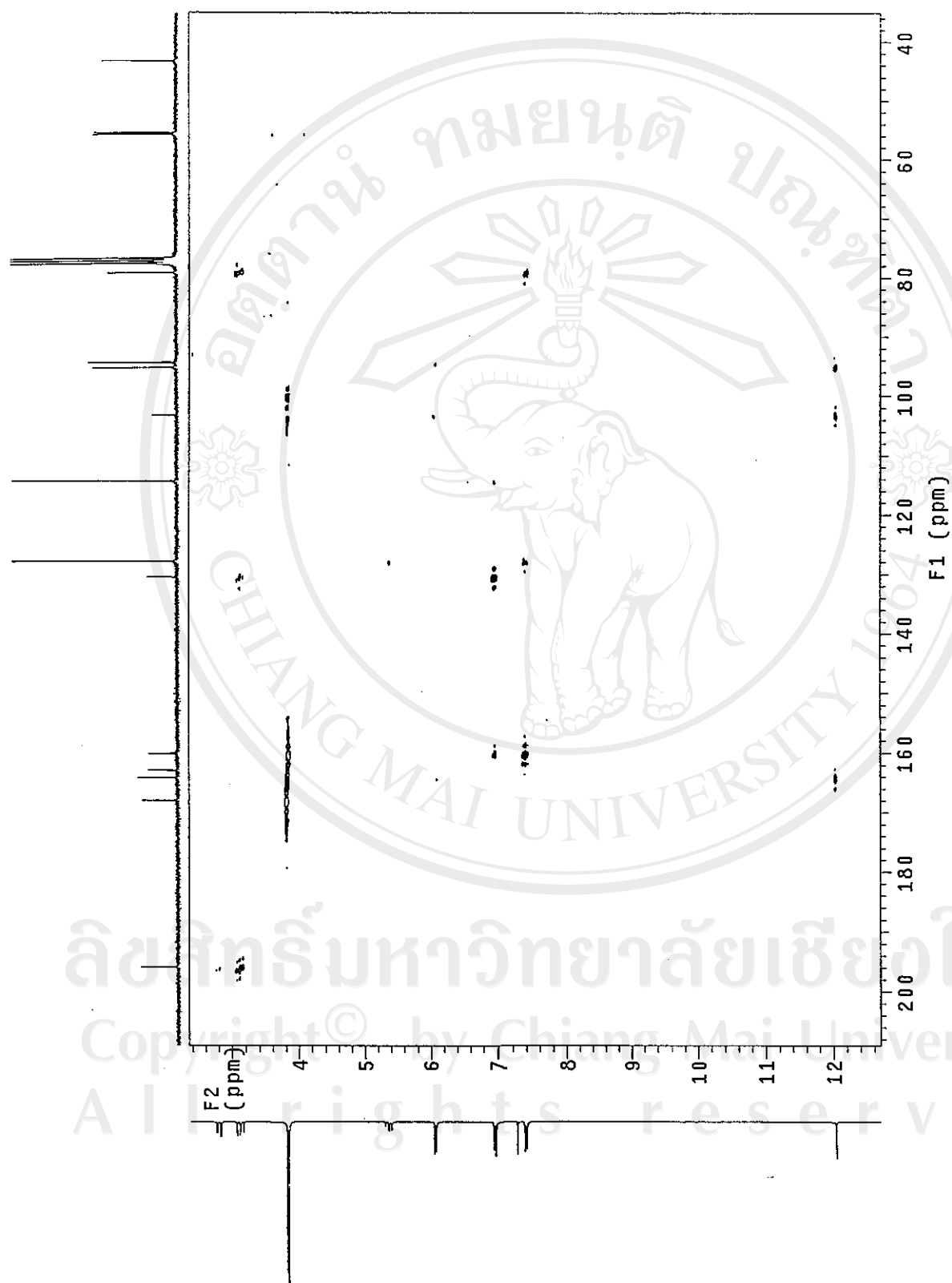


Figure 41. The 300 MHz HMBC spectrum of compound EU9M028 (in CDCl_3)

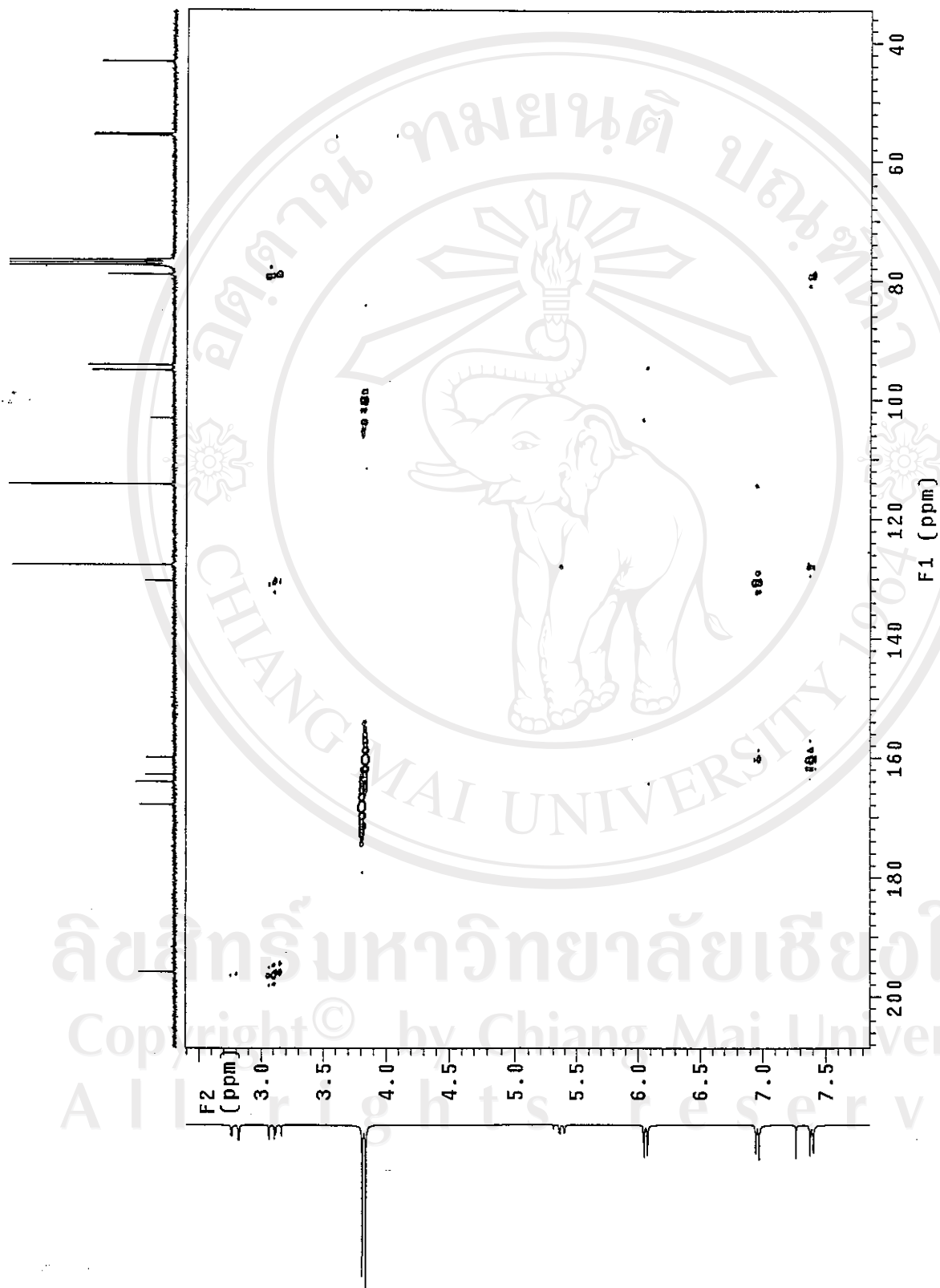


Figure 42. The 300 MHz HMBC spectrum of compound EU9M028 (in CDCl_3) (expanded)

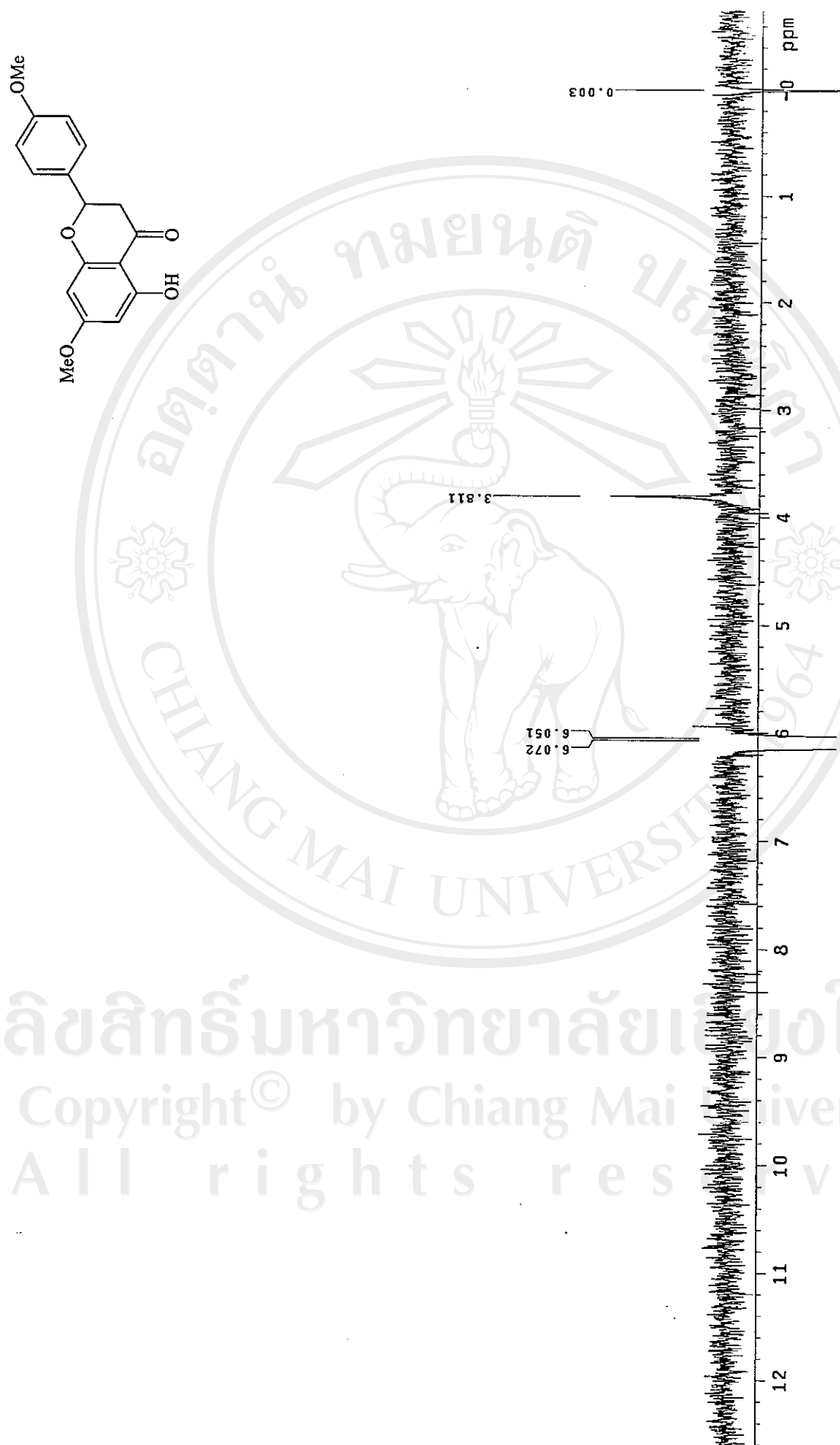


Figure 43. The 300 MHz NOE difference spectrum of compound EU9M028 (in CDCl₃) irradiation at 6.07 ppm (H-6)

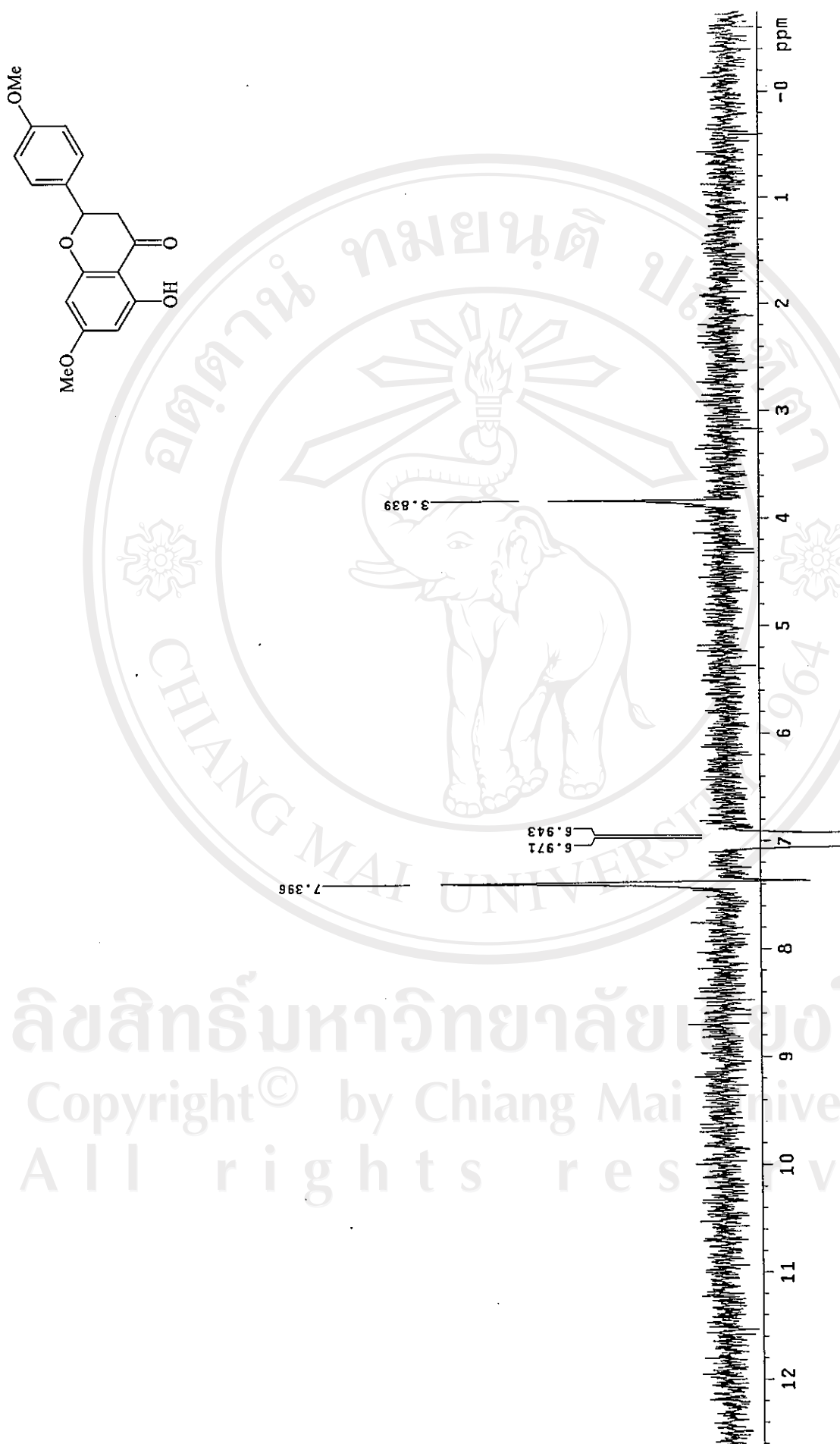


Figure 44. The 300 MHz NOE difference spectrum of compound EU9M028 (in CDCl_3) irradiation at 6.96 ppm (H-3')

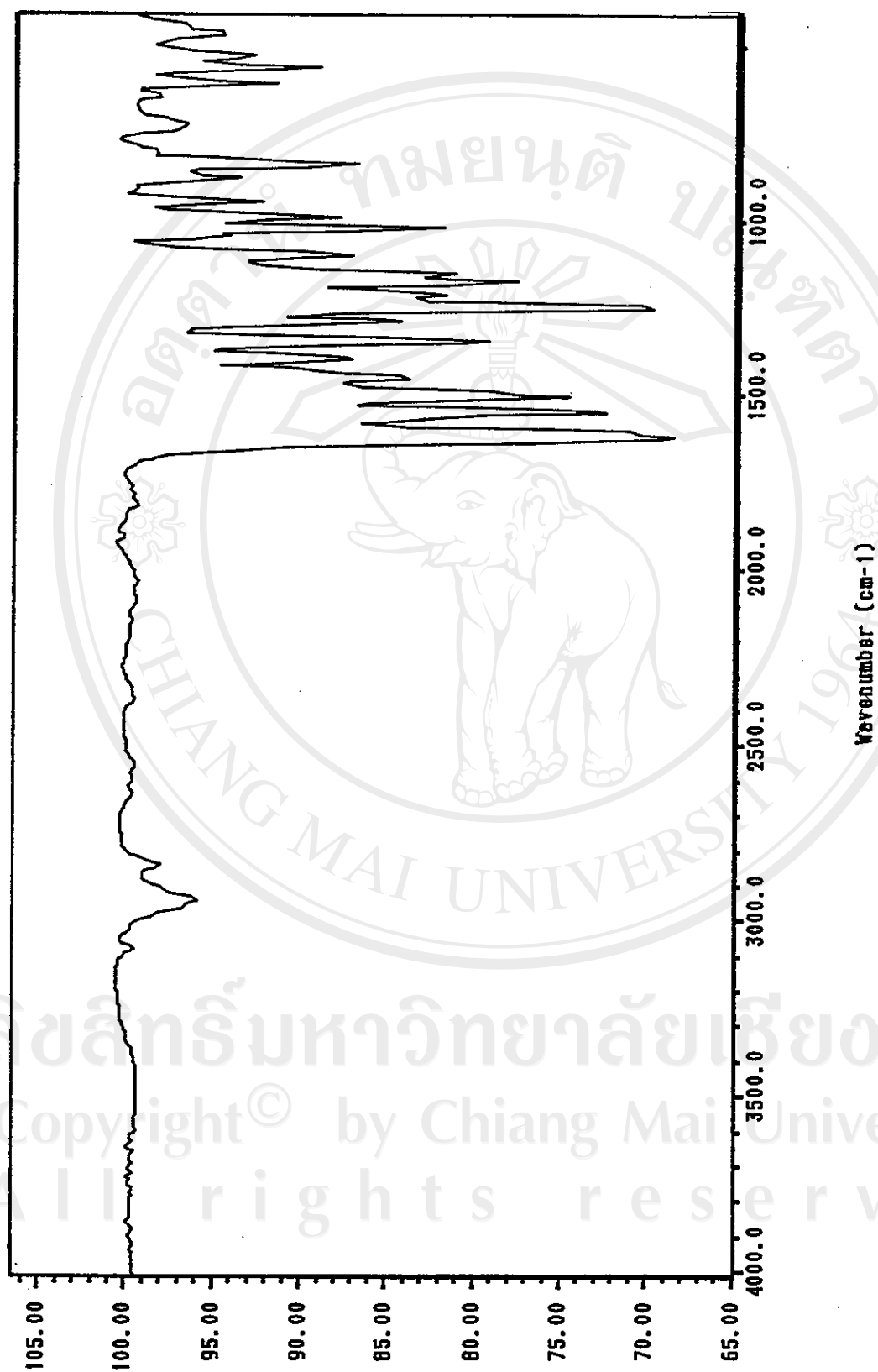


Figure 45. The IR spectrum of compound EU9M029



Figure 46. The 300 MHz ¹H-NMR spectrum of compound EU9M029 (in CDCl₃)

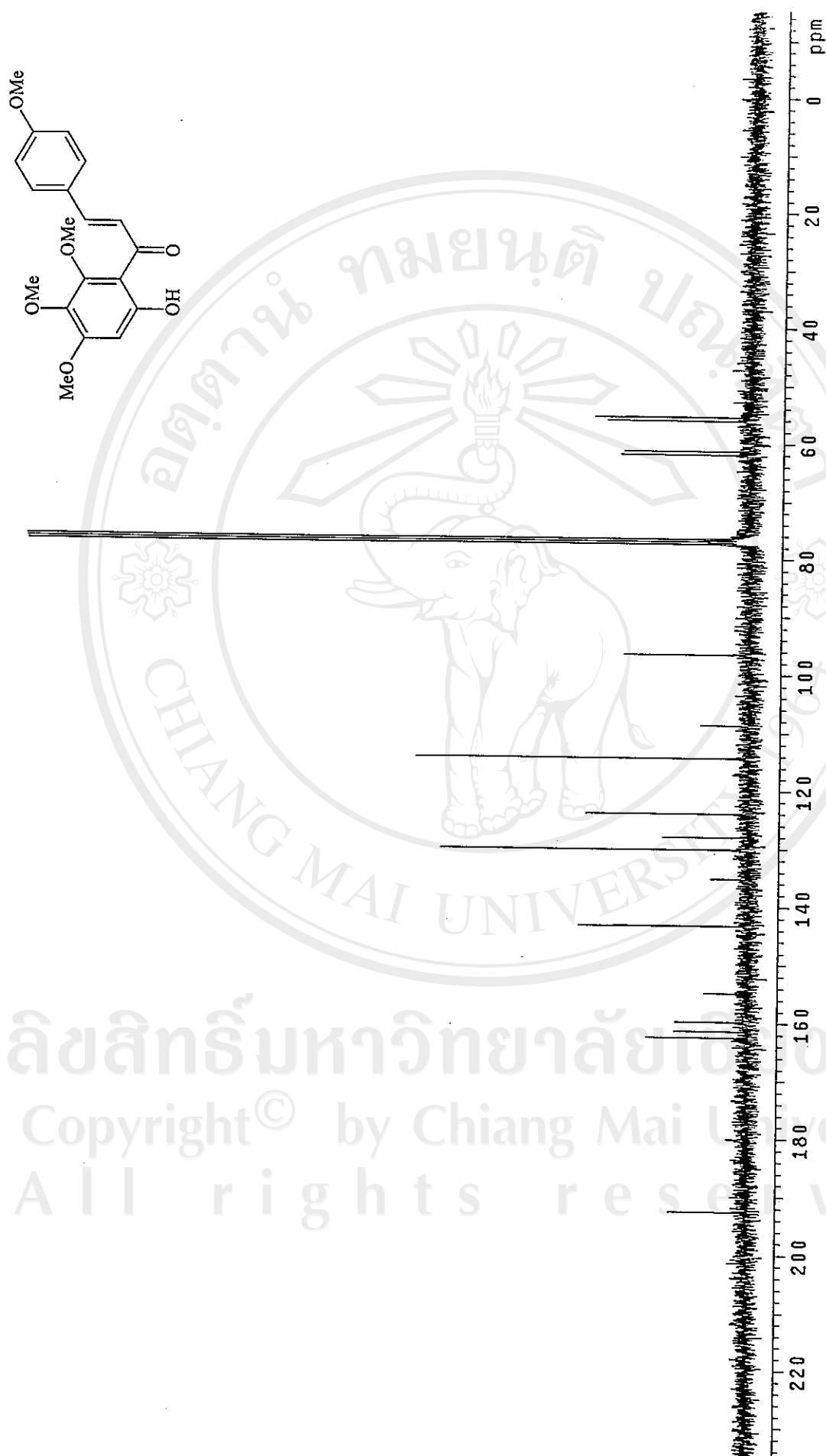


Figure 47. The 75 MHz ^{13}C -NMR spectrum of compound EU9M029 (in CDCl_3)

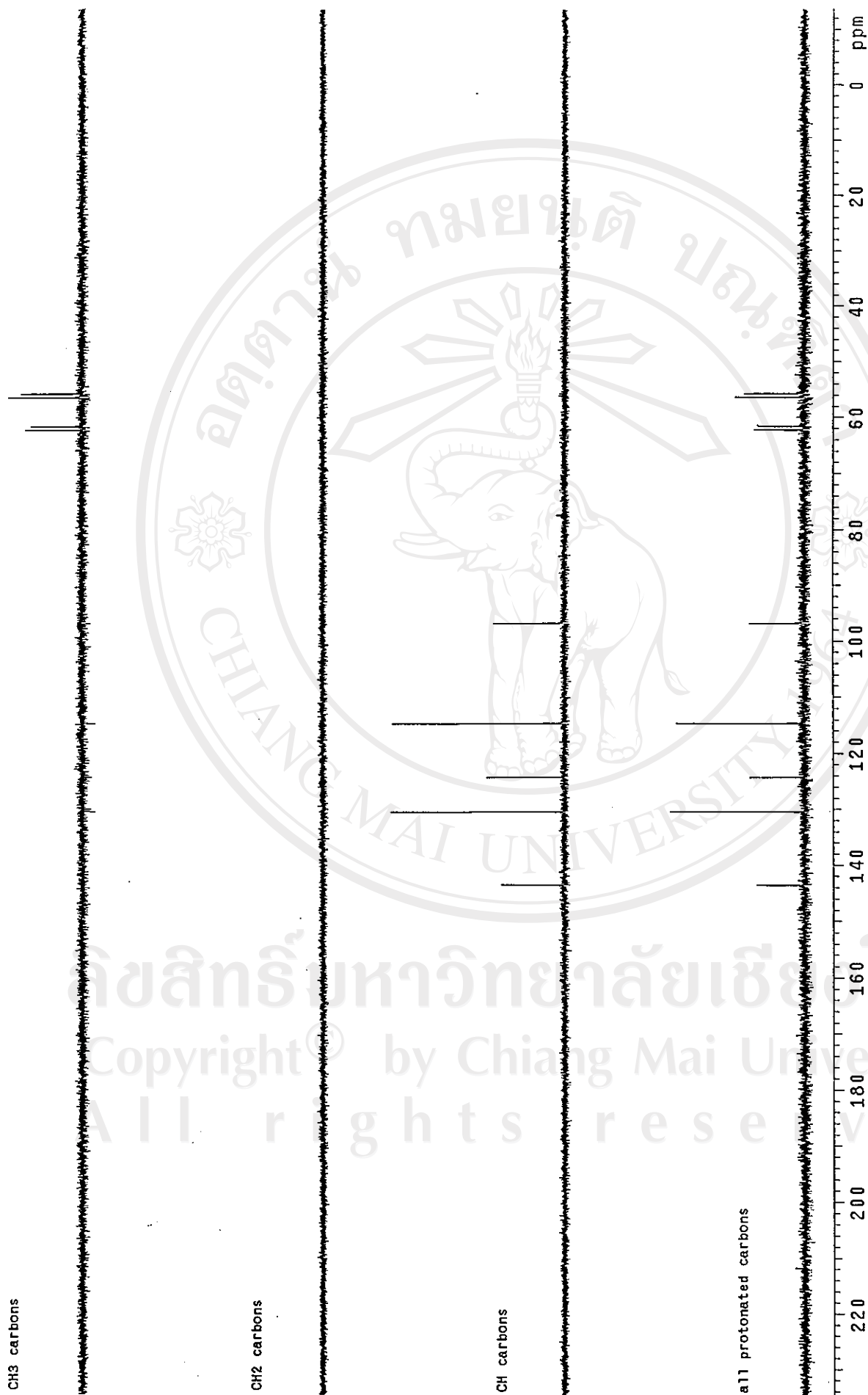


Figure 48. The 75 MHz DEPT spectrum of compound EU9M029 (in CDCl₃)

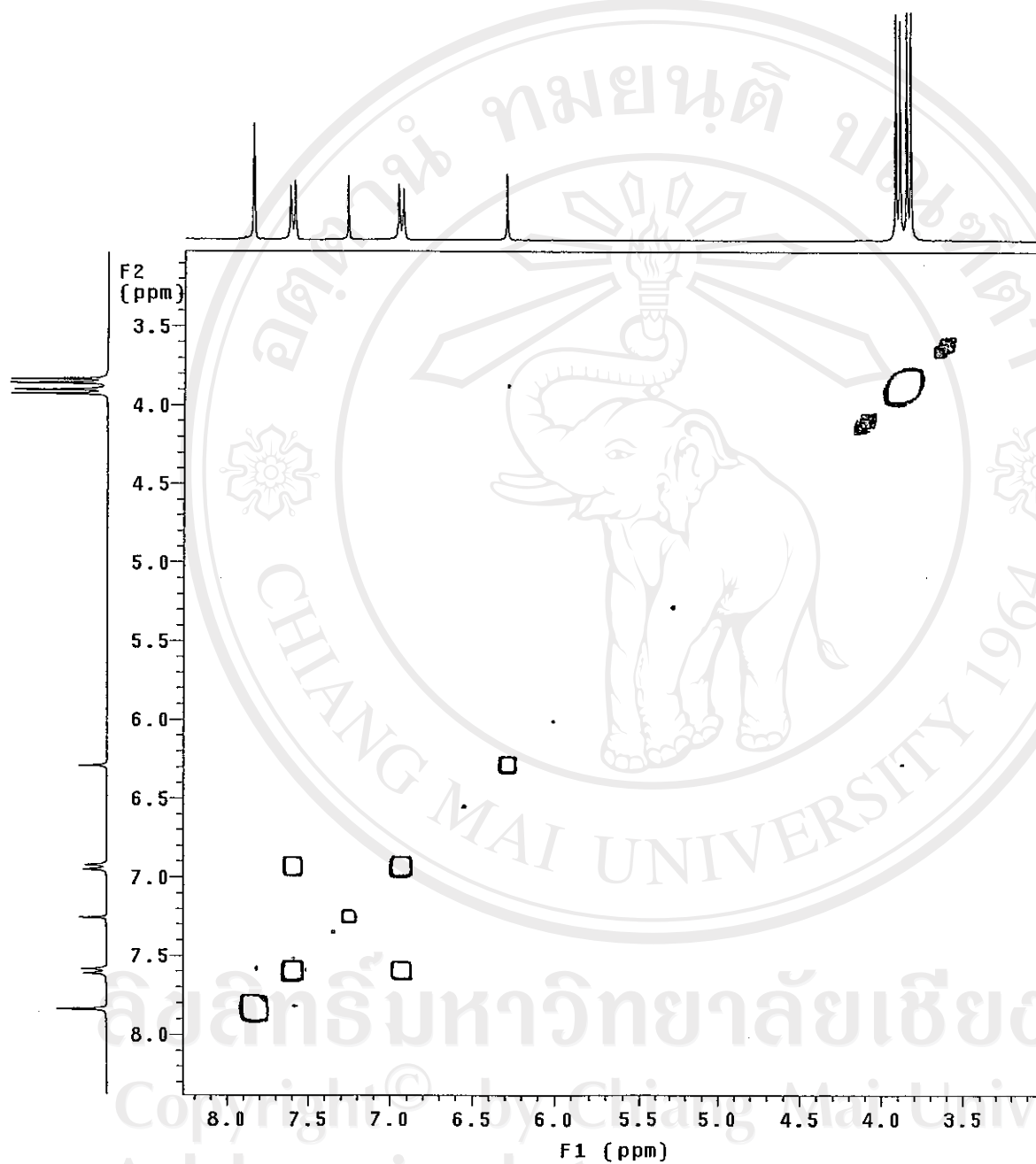


Figure 49. The 300 MHz ^1H - ^1H COSY spectrum of compound EU9M029 (in CDCl_3)

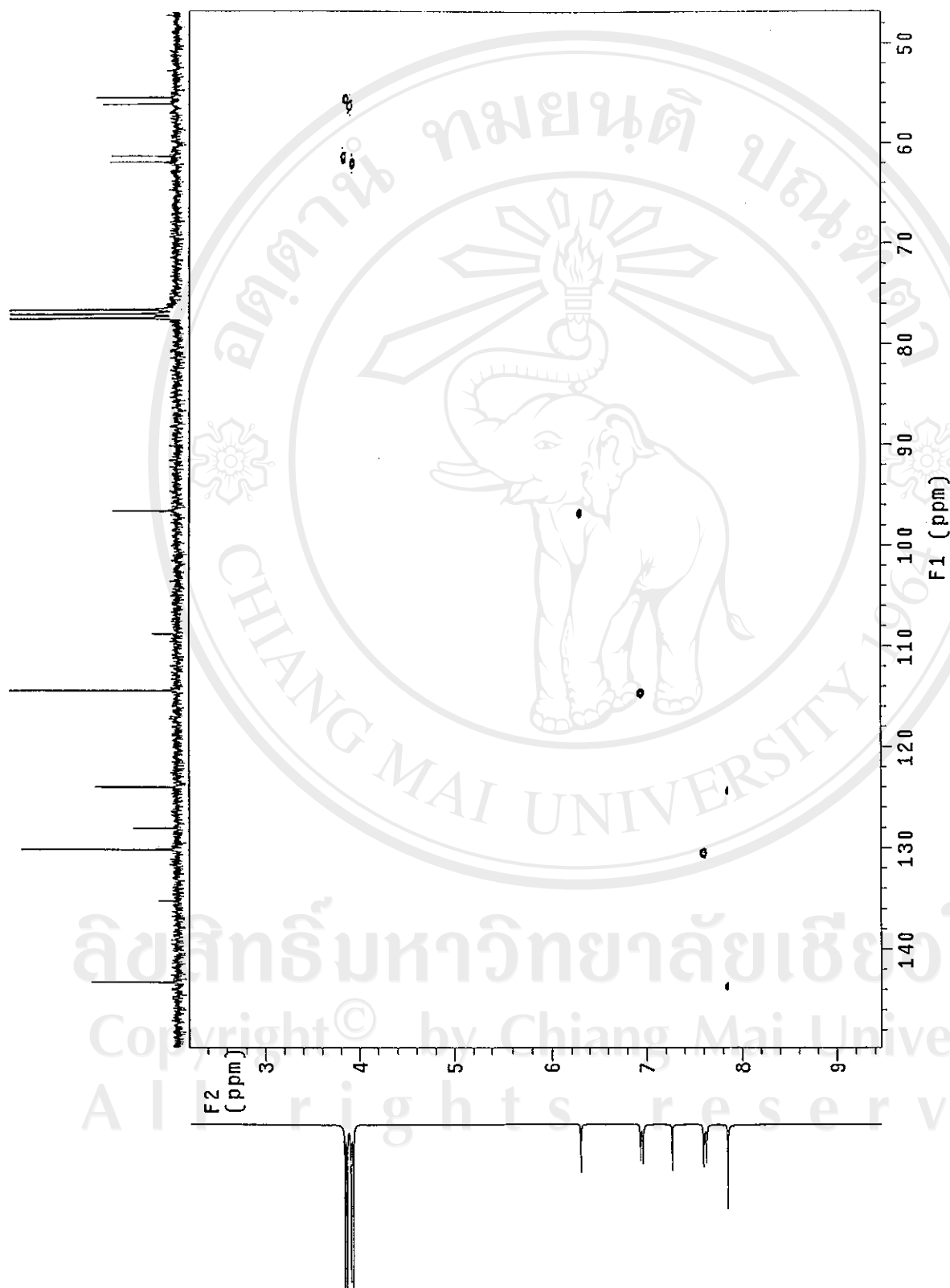


Figure 50. The 300 MHz HSQC spectrum of compound EU9M029 (in CDCl_3)

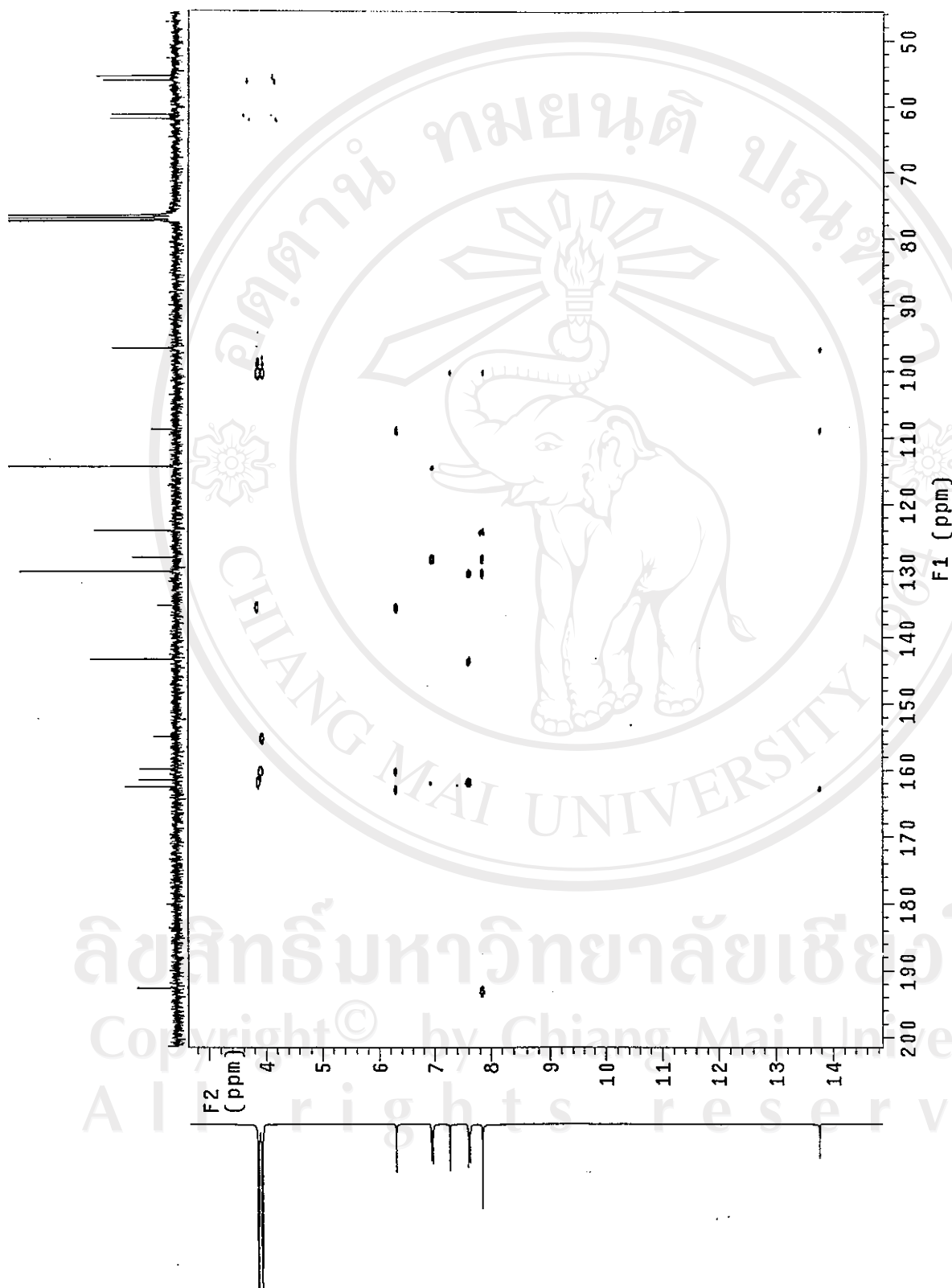


Figure 51. The 300 MHz HMB spectrum of compound EU9M029 (in CDCl_3)

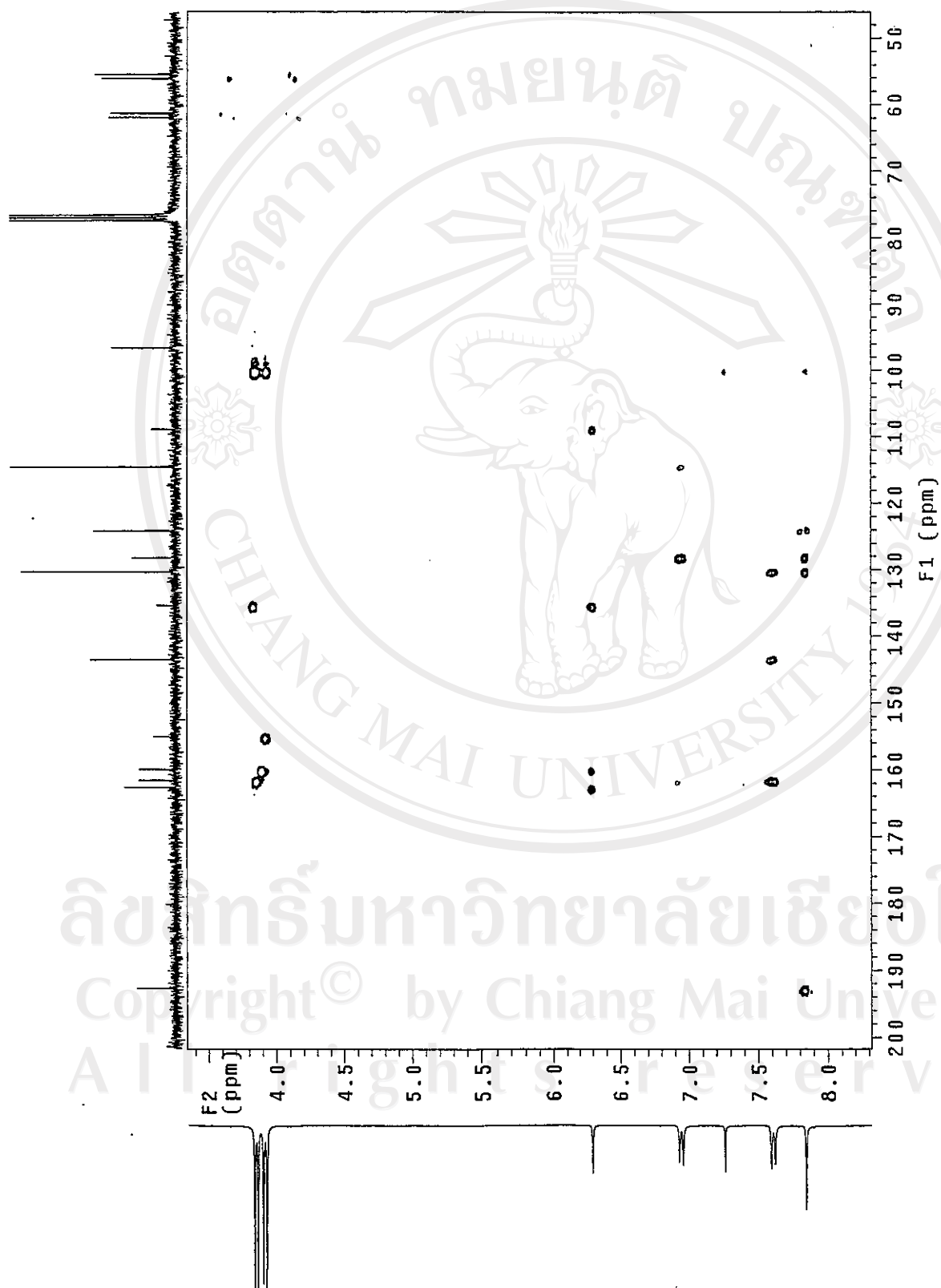


Figure 52. The 300 MHz HMBC spectrum of compound EU9M029 (in CDCl_3) (expanded)

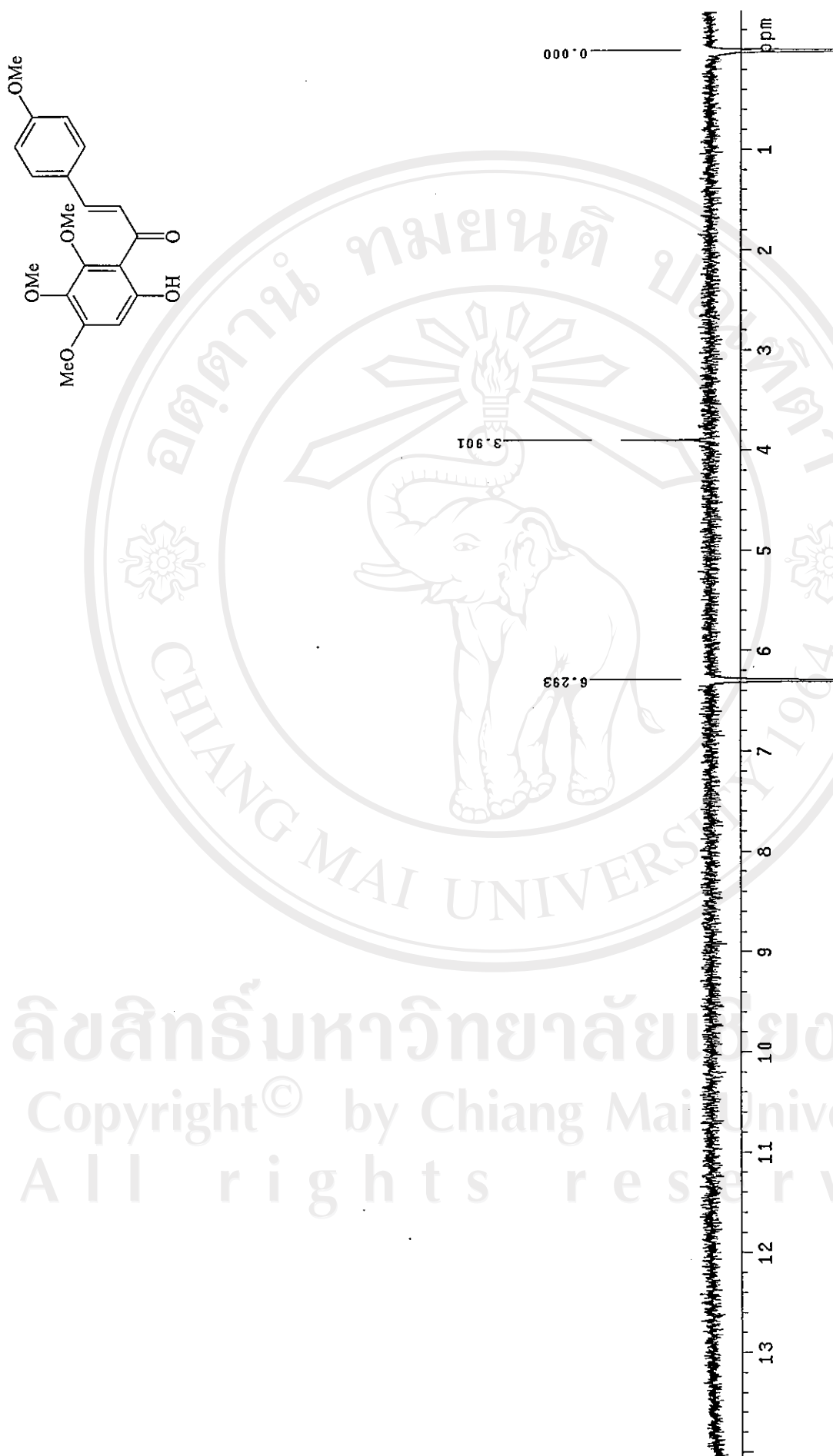


Figure 53. The 300 MHz NOE difference spectrum of compound EU9M029 (in CDCl_3) irradiation at 6.29 ppm (H-3')

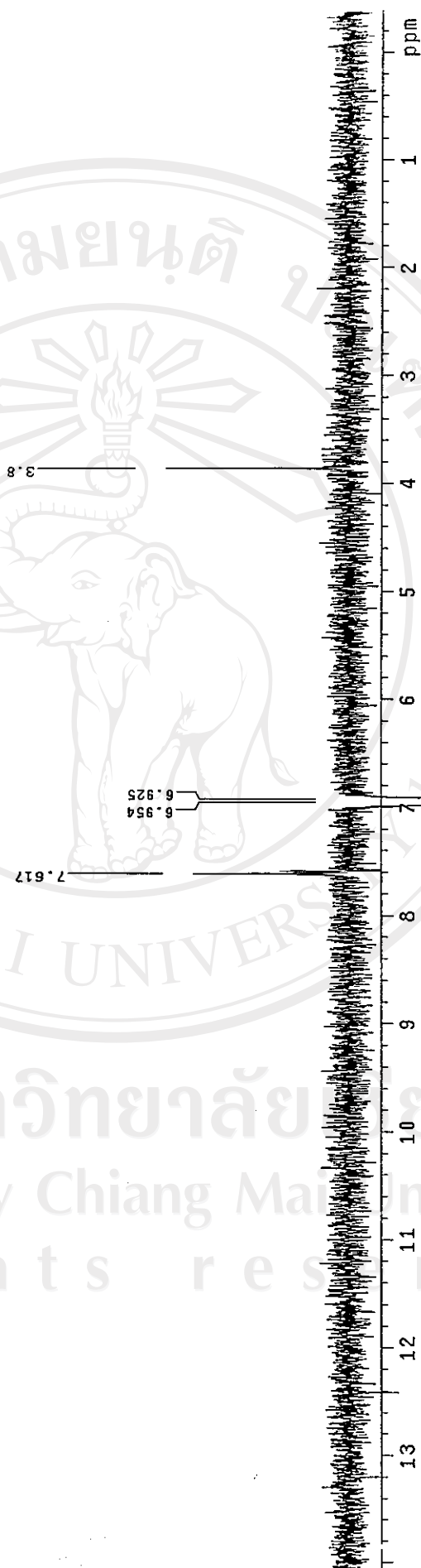
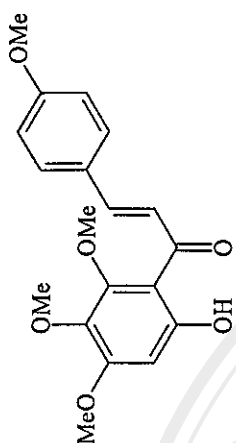
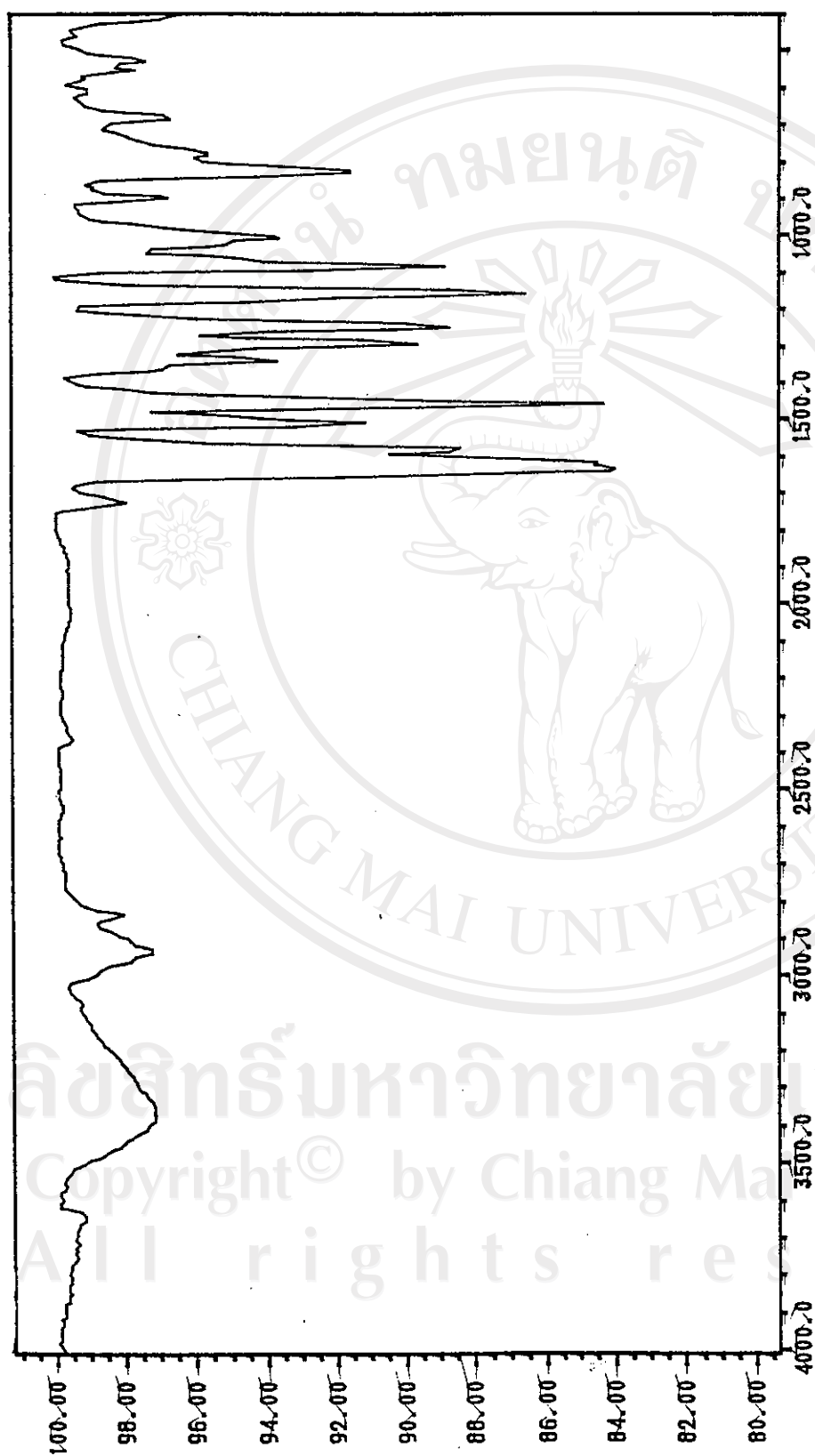


Figure 54. The 300 MHz NOE difference spectrum of compound EU9M029 (in CDCl_3) irradiation at 6.94 ppm (H-3)



Wavenumber (cm⁻¹)

Figure 55. The IR spectrum of compound EU9M044



Figure S6. The 300 MHz ¹H-NMR spectrum of compound EU9M044 (in CDCl₃)

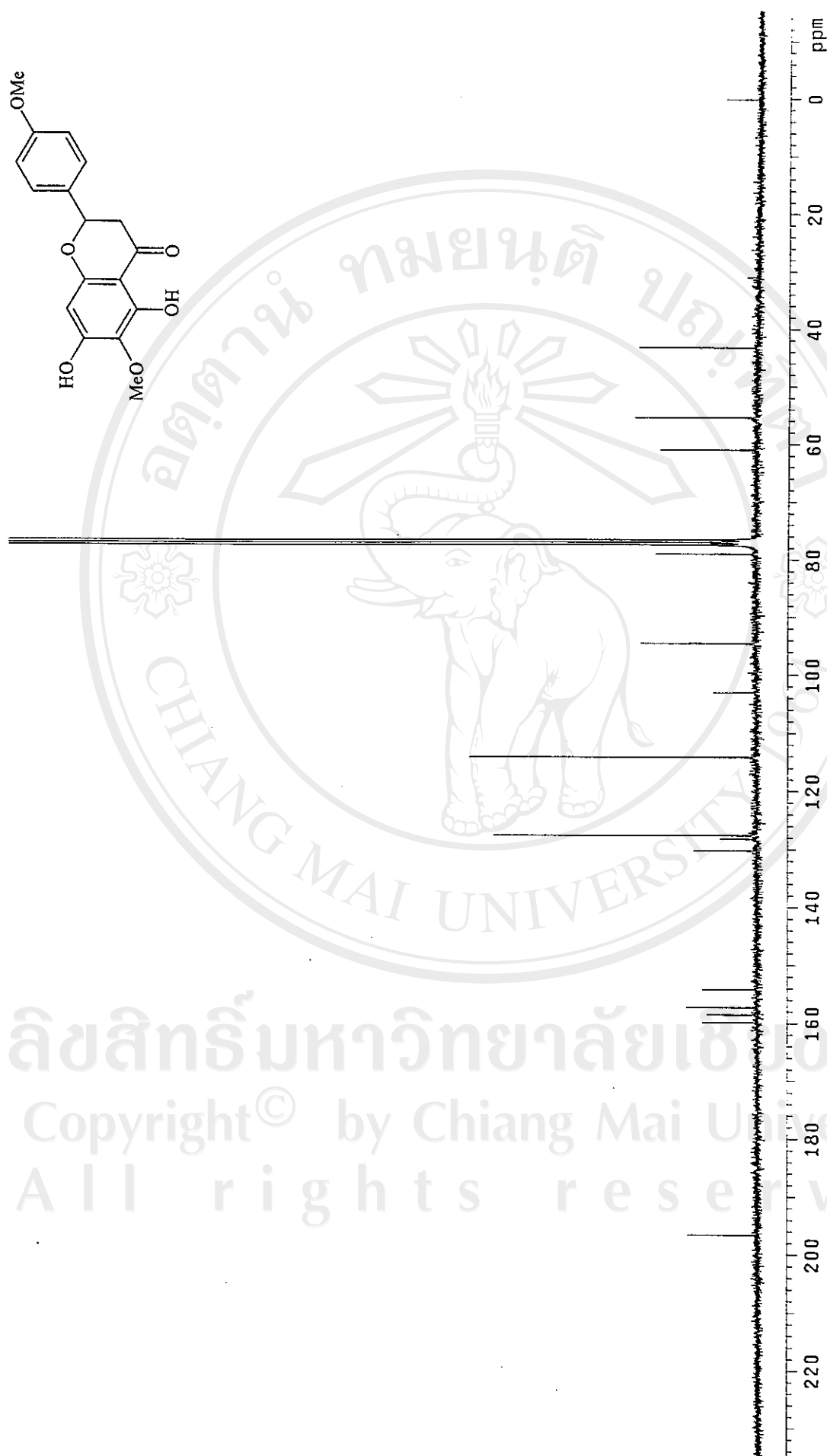


Figure 57. The 75 MHz ¹³C-NMR spectrum of compound EU9M044 (in CDCl₃)

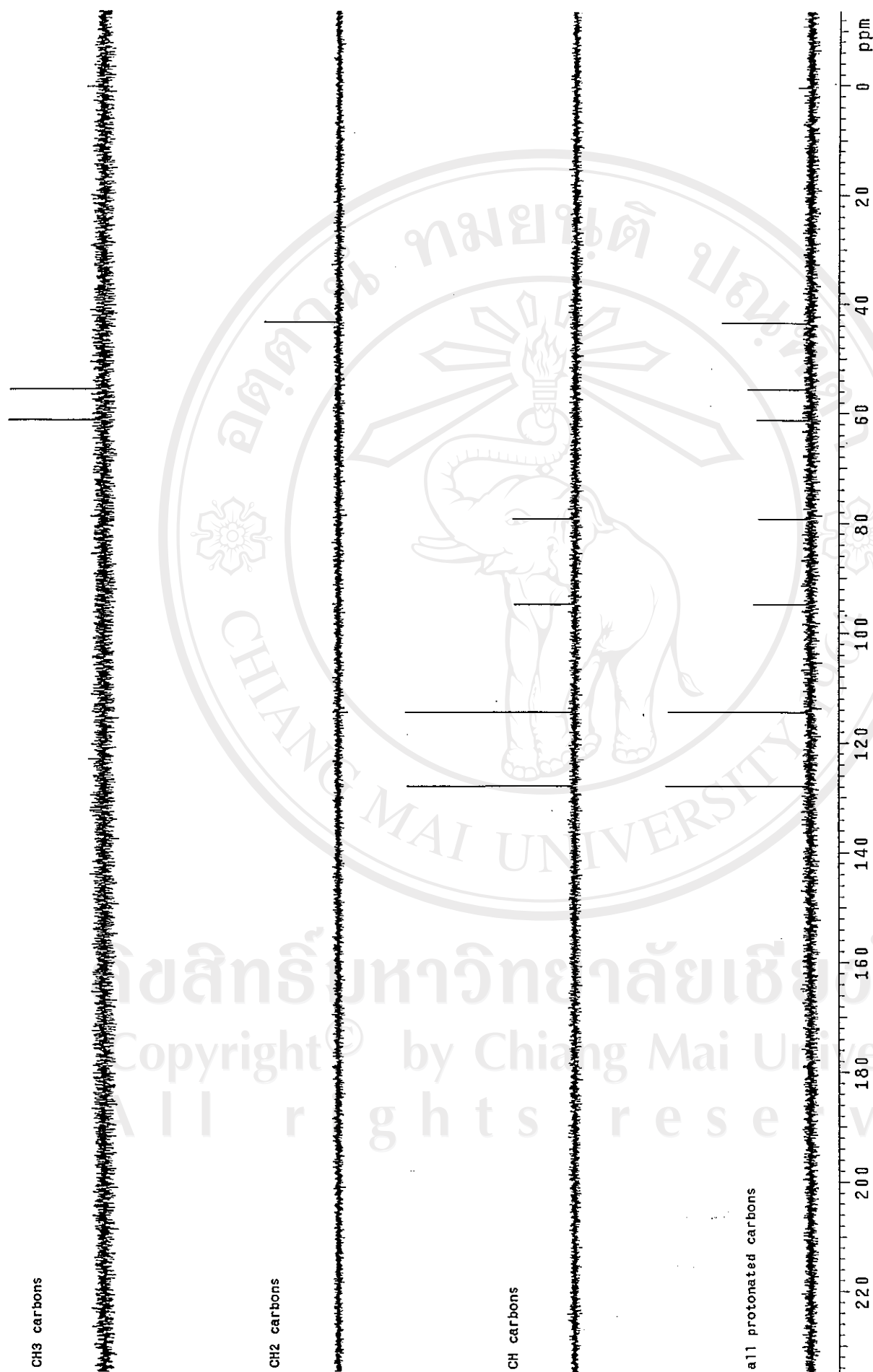


Figure 58. The 75 MHz DEPT spectrum of compound EU9M044 (in CDCl₃)

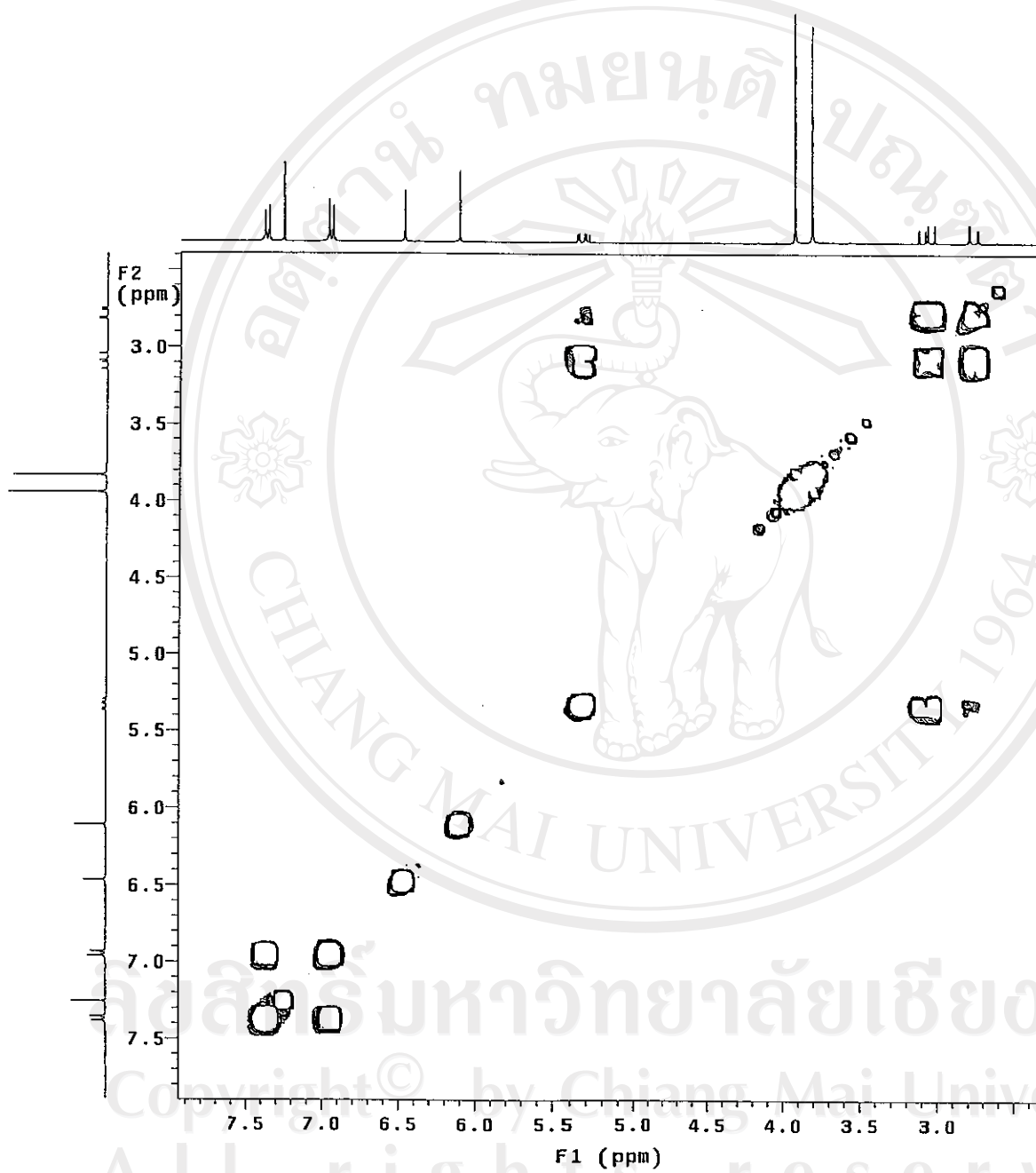


Figure S9. The 300 MHz ^1H - ^1H COSY spectrum of compound EU9M044 (in CDCl_3)

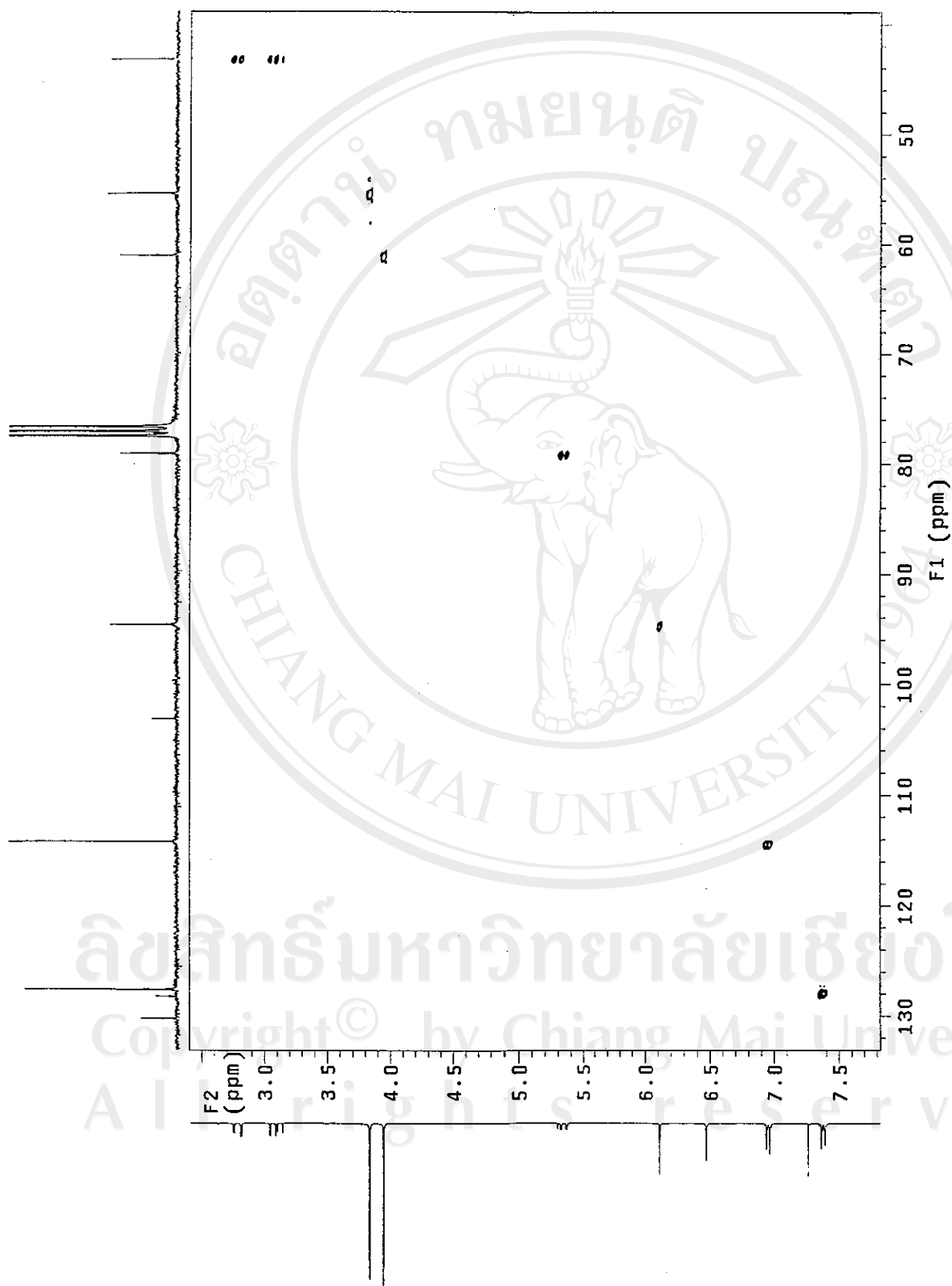


Figure 60. The 300 MHz HSQC spectrum of compound EU9M044 (in CDCl_3)

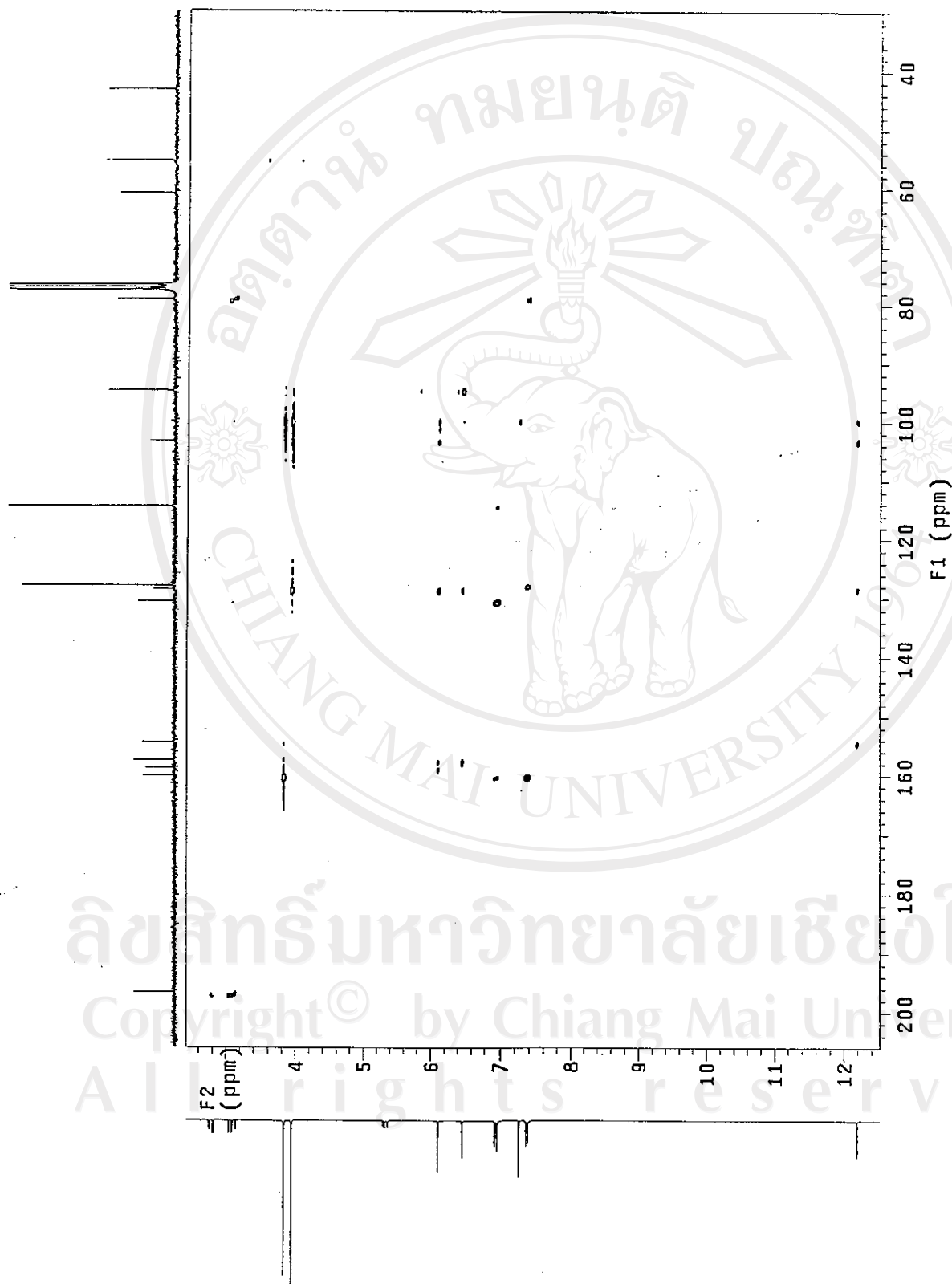


Figure 61. The 300 MHz HMBC spectrum of compound EU9M044 (in CDCl_3)

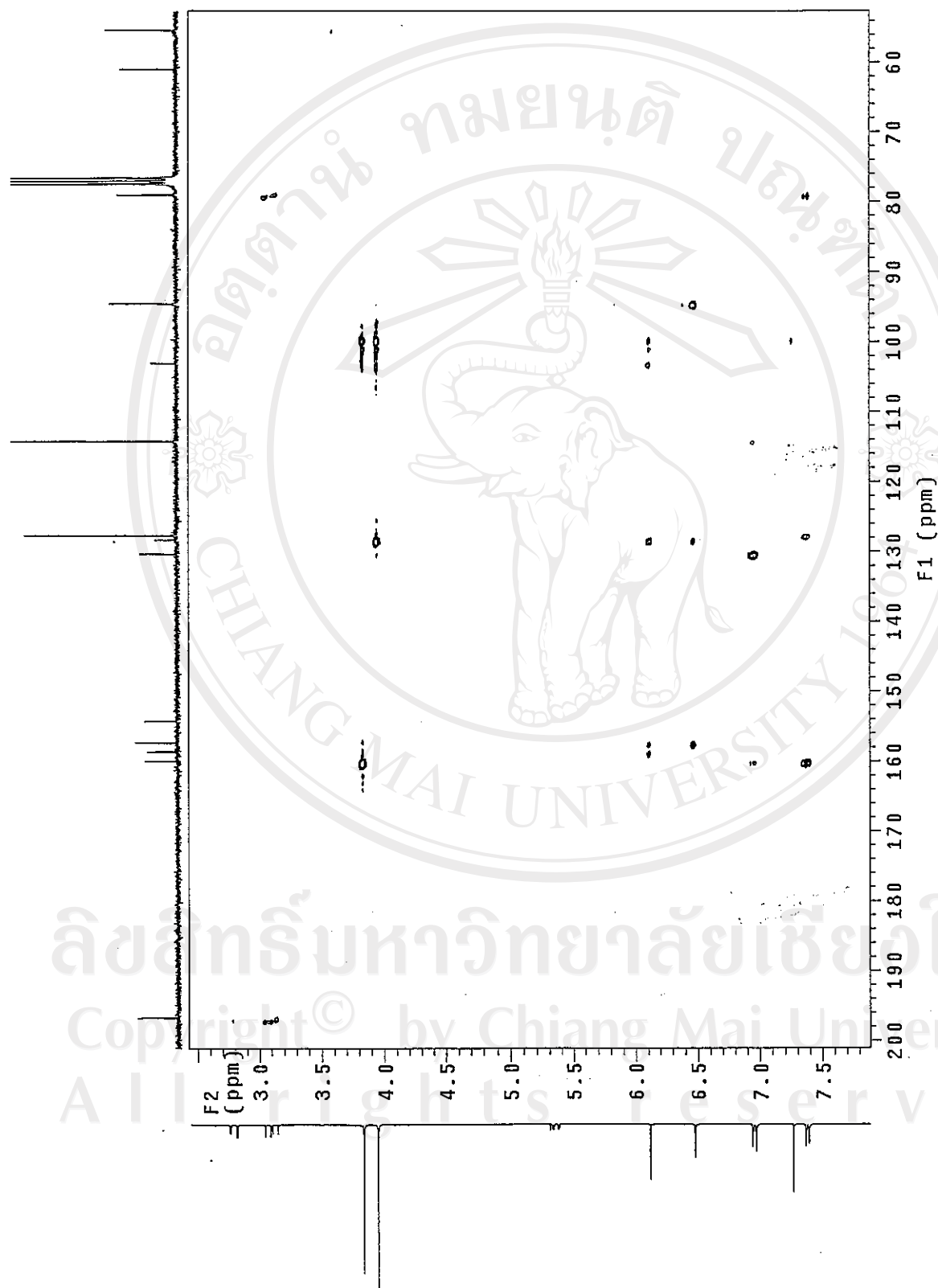


Figure 62. The 300 MHz HMBC spectrum of compound EU9M044 (in CDCl₃) (expanded)

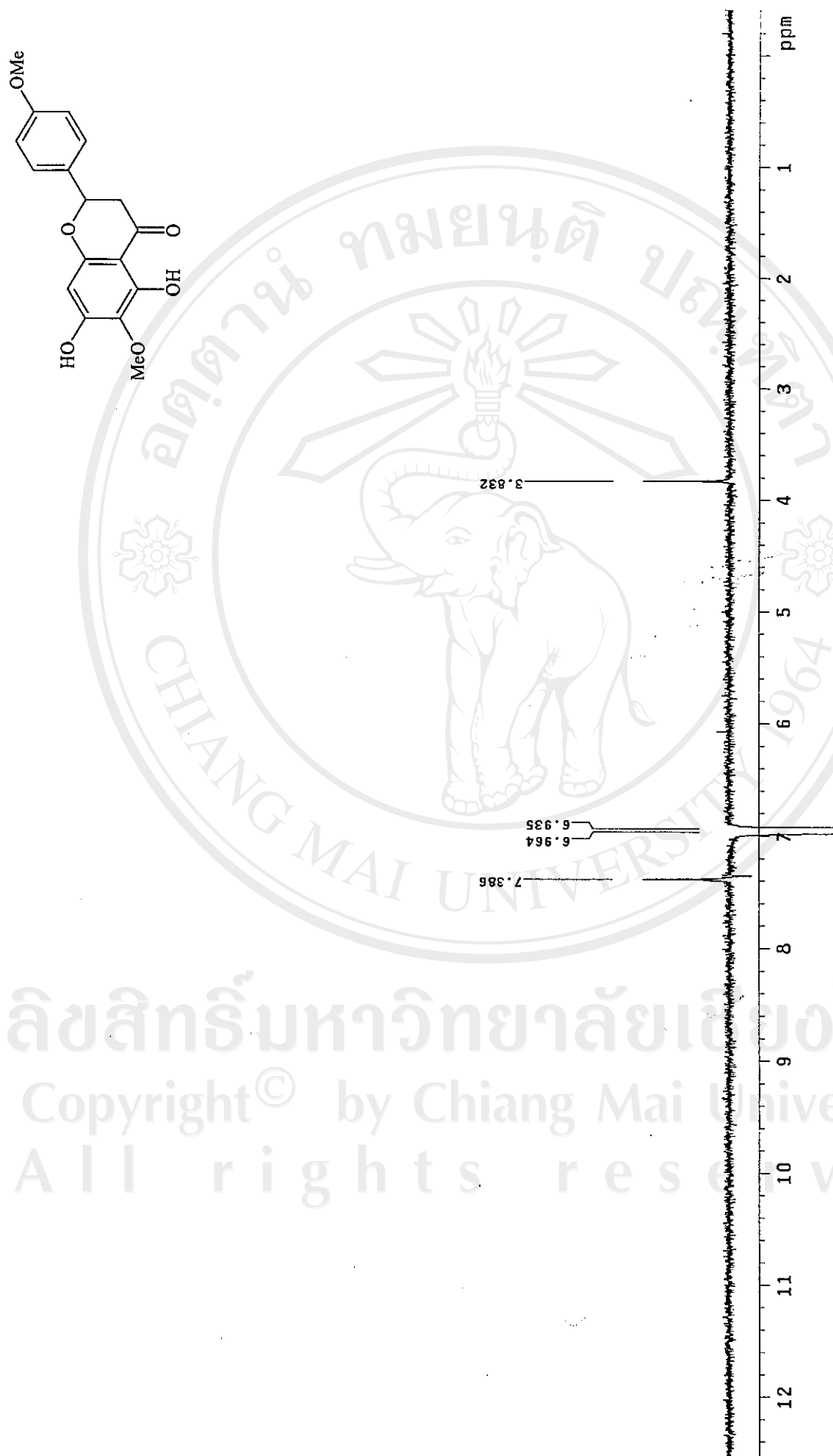


Figure 63. The 300 MHz NOE difference spectrum of compound EU9M044 (in CDCl_3) irradiation at 6.95 ppm (H-3')

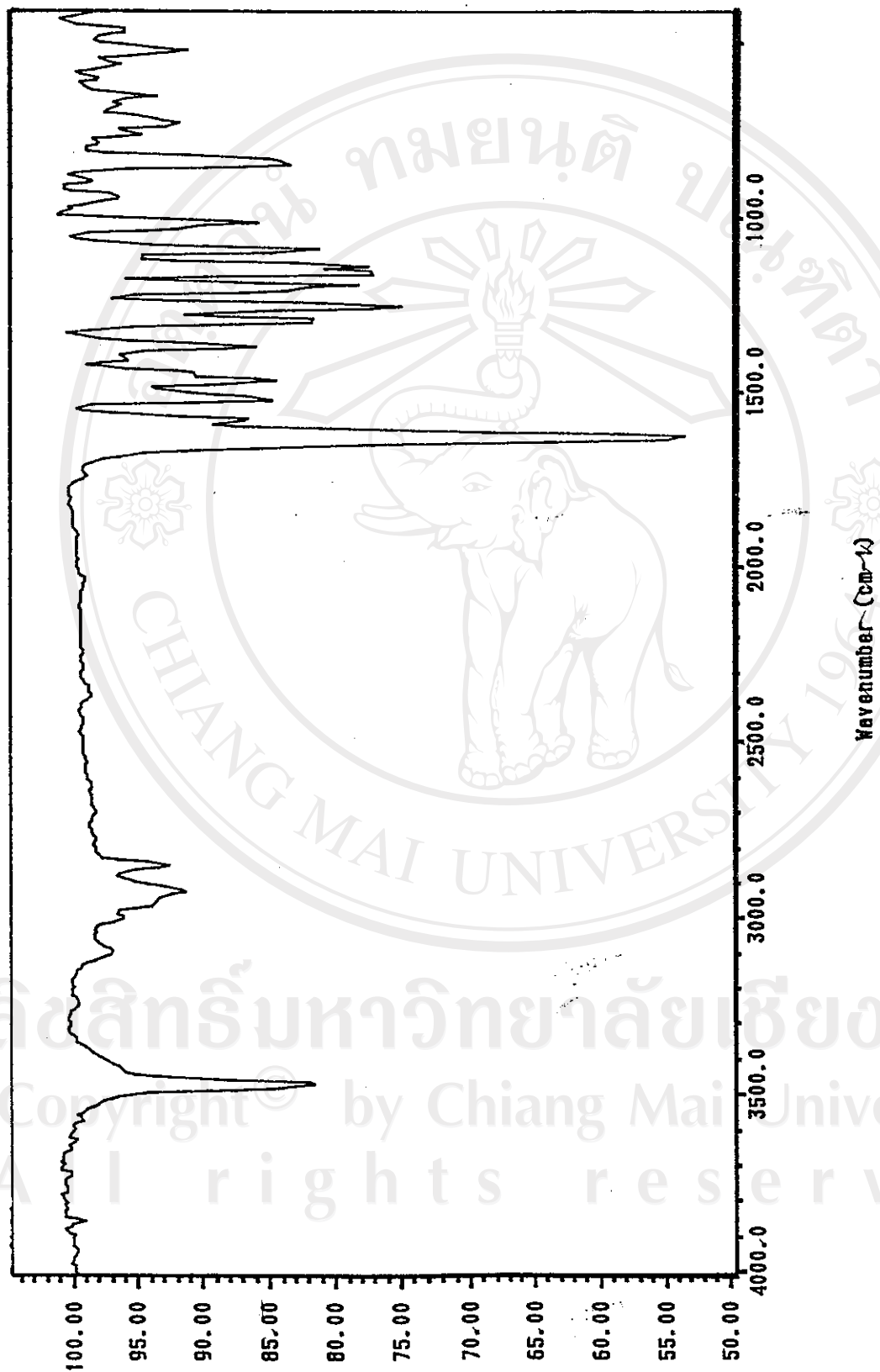


Figure 64. The IR spectrum of compound EU9M055



Figure 65. The 300 MHz ¹H-NMR spectrum of compound EU9M055 (in CDCl₃)

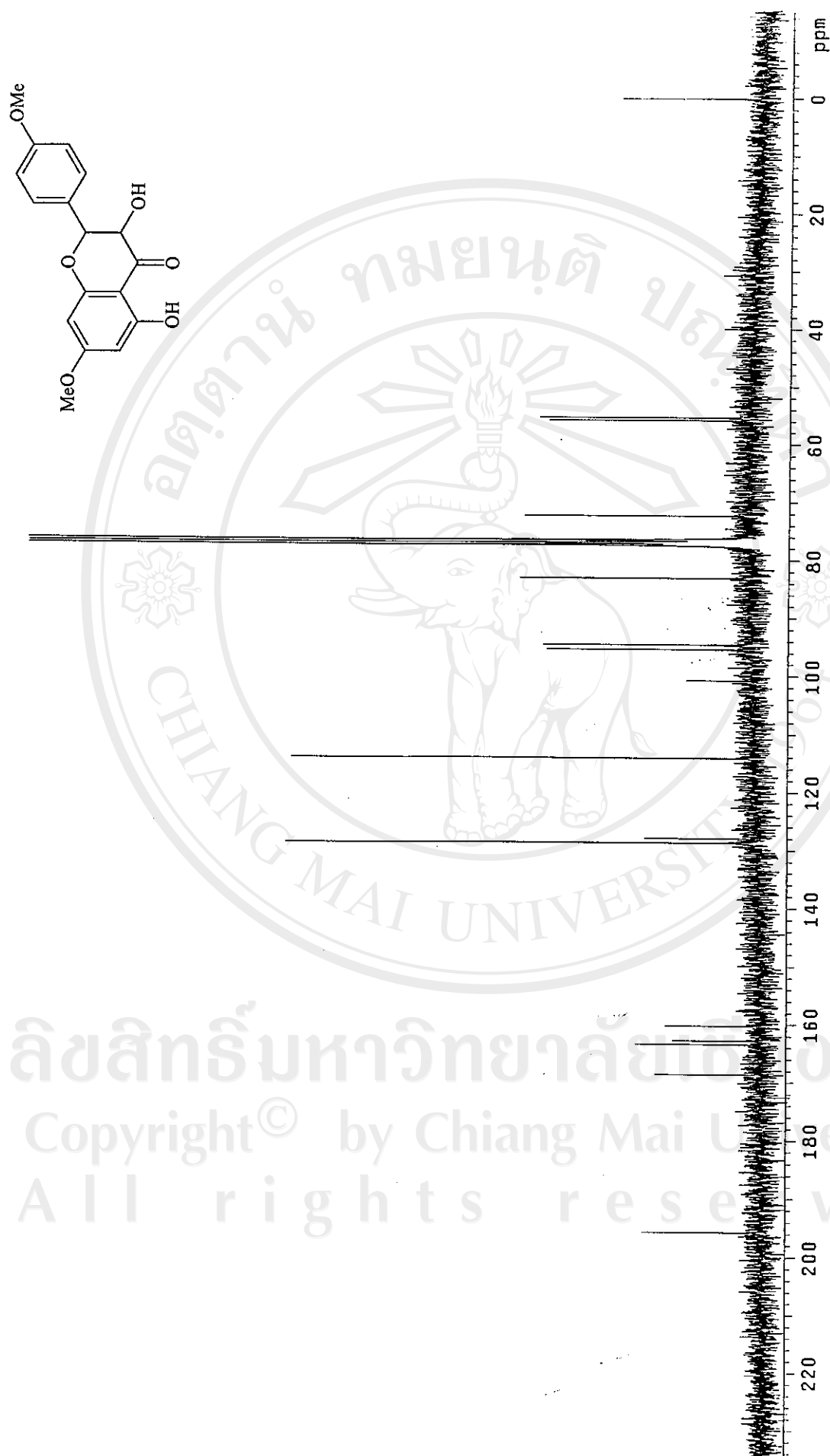


Figure 66. The 75 MHz ¹³C-NMR spectrum of compound EU9M055 (in CDCl₃)

CH3 carbons

CH2 carbons

CH carbons

all protonated carbons

ppm

Figure 67. The 75 MHz DEPT spectrum of compound EU9M055 (in CDCl₃)

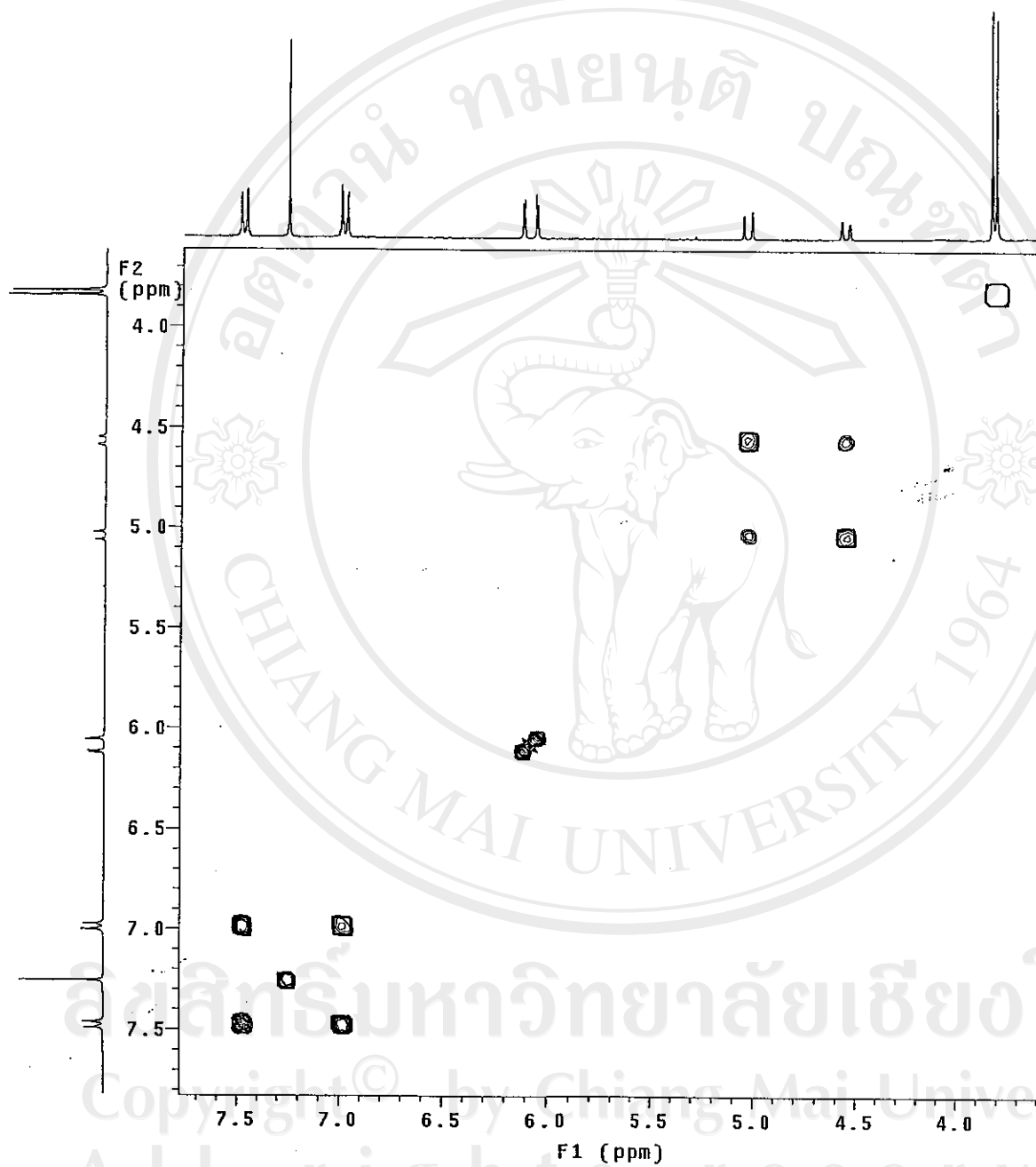


Figure 68. The 300 MHz ^1H - ^1H COSY spectrum of compound EU9M055 (in CDCl_3)

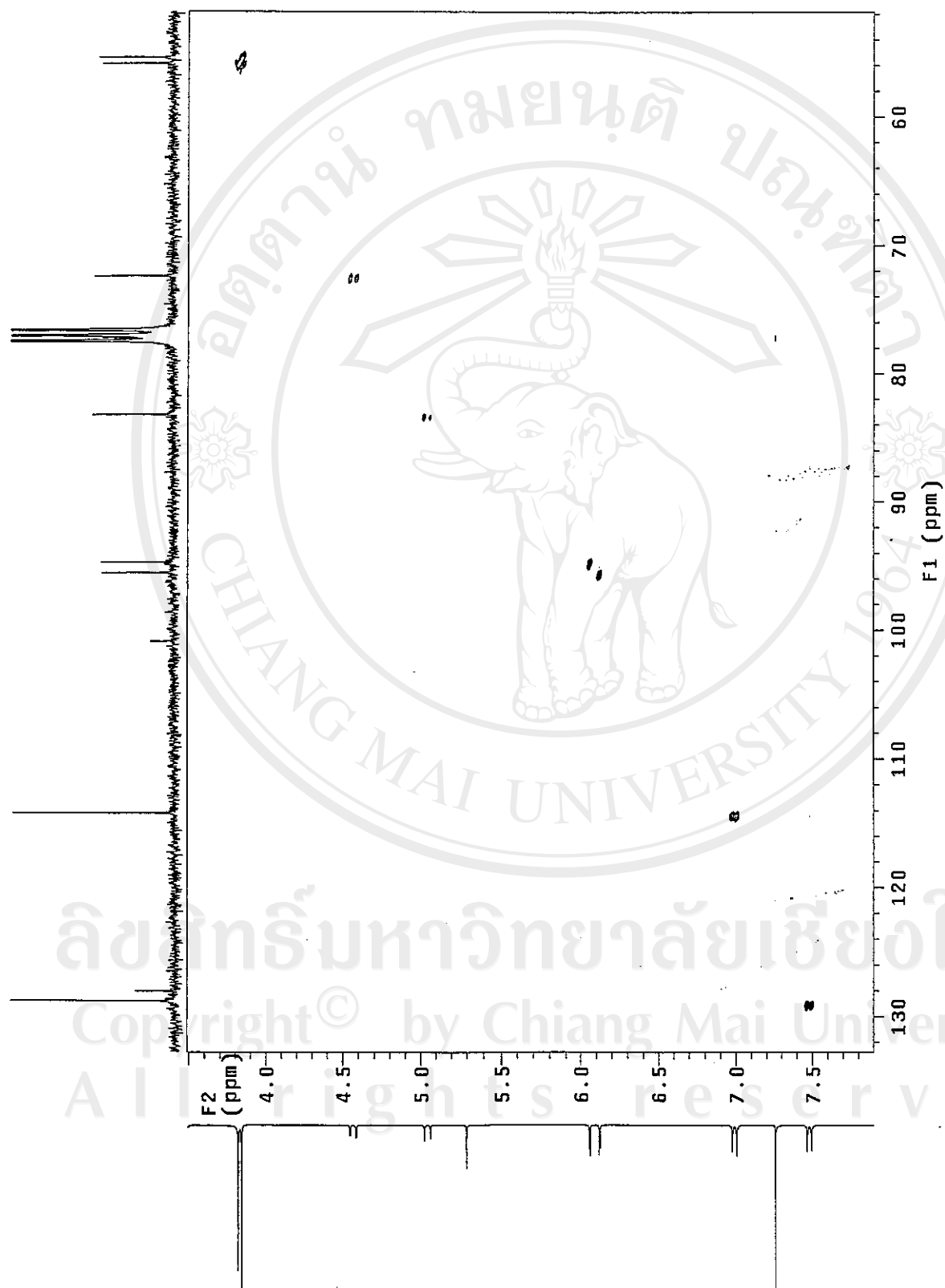


Figure 69. The 300 MHz HSQC spectrum of compound EU9M055 (in CDCl_3)

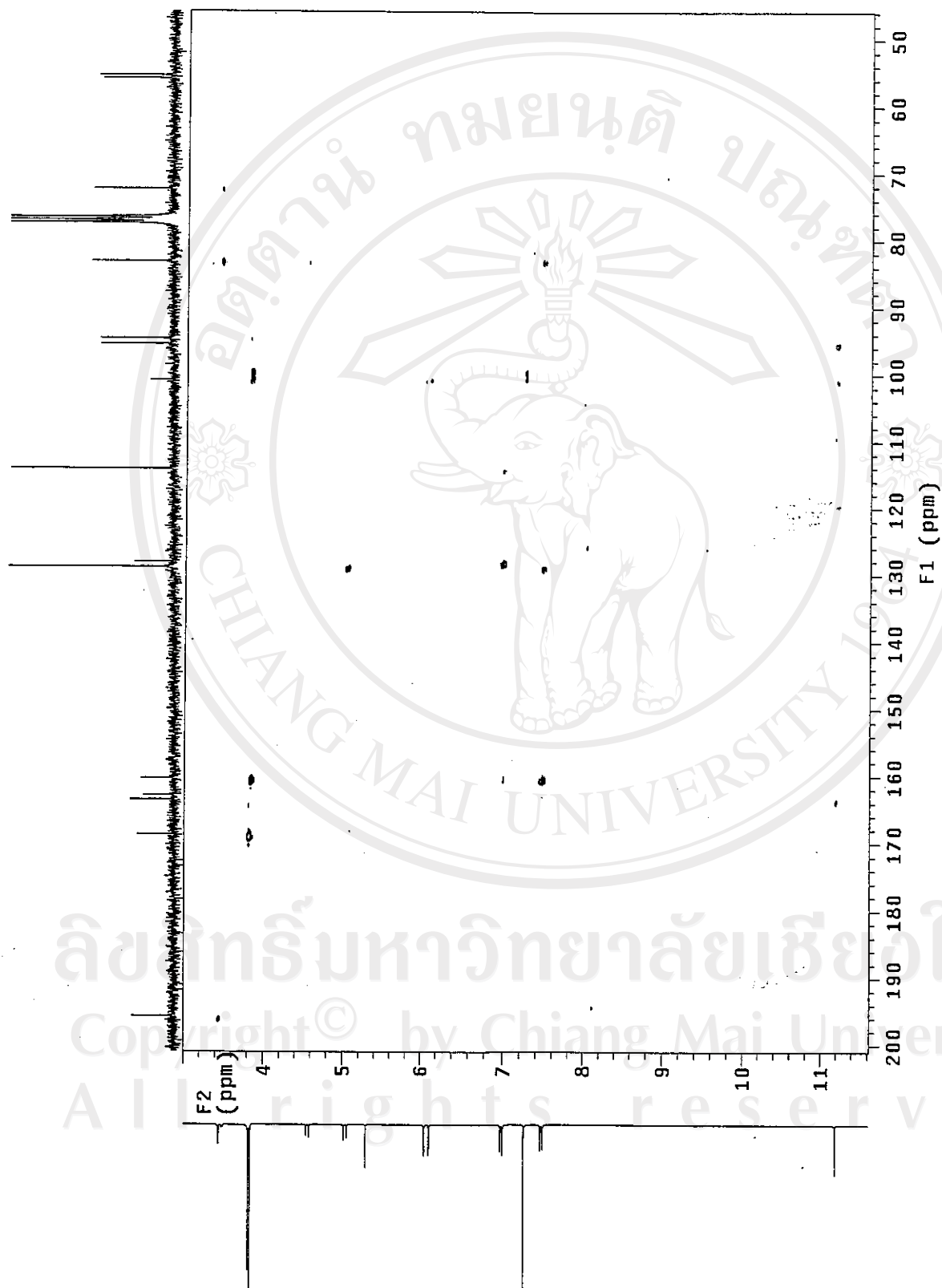


Figure 70. The 300 MHz HMBC spectrum of compound EU9M055 (in CDCl_3)

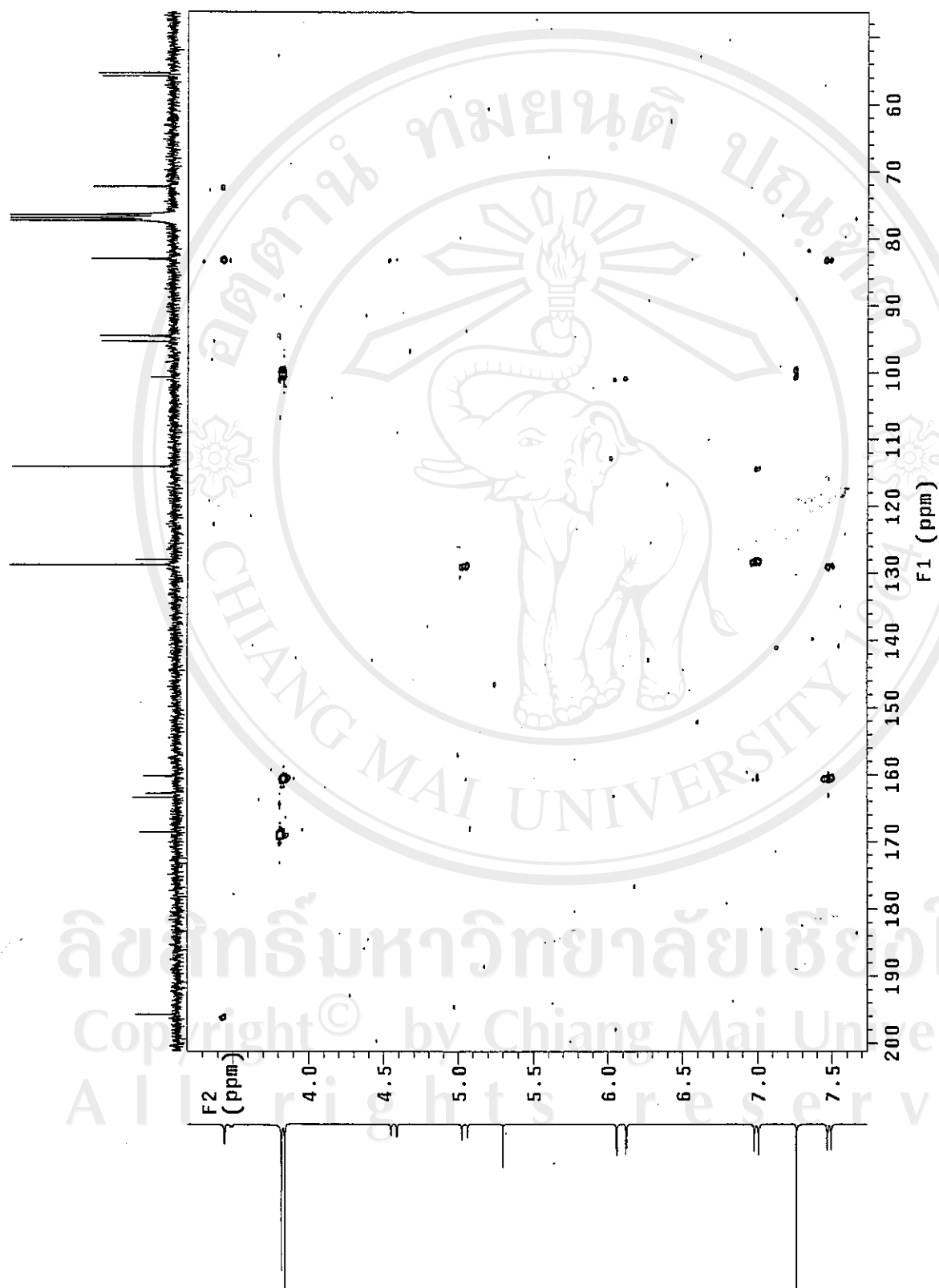


Figure 71. The 300 MHz HMBC spectrum of compound EU9M055 (in CDCl_3) (expanded)

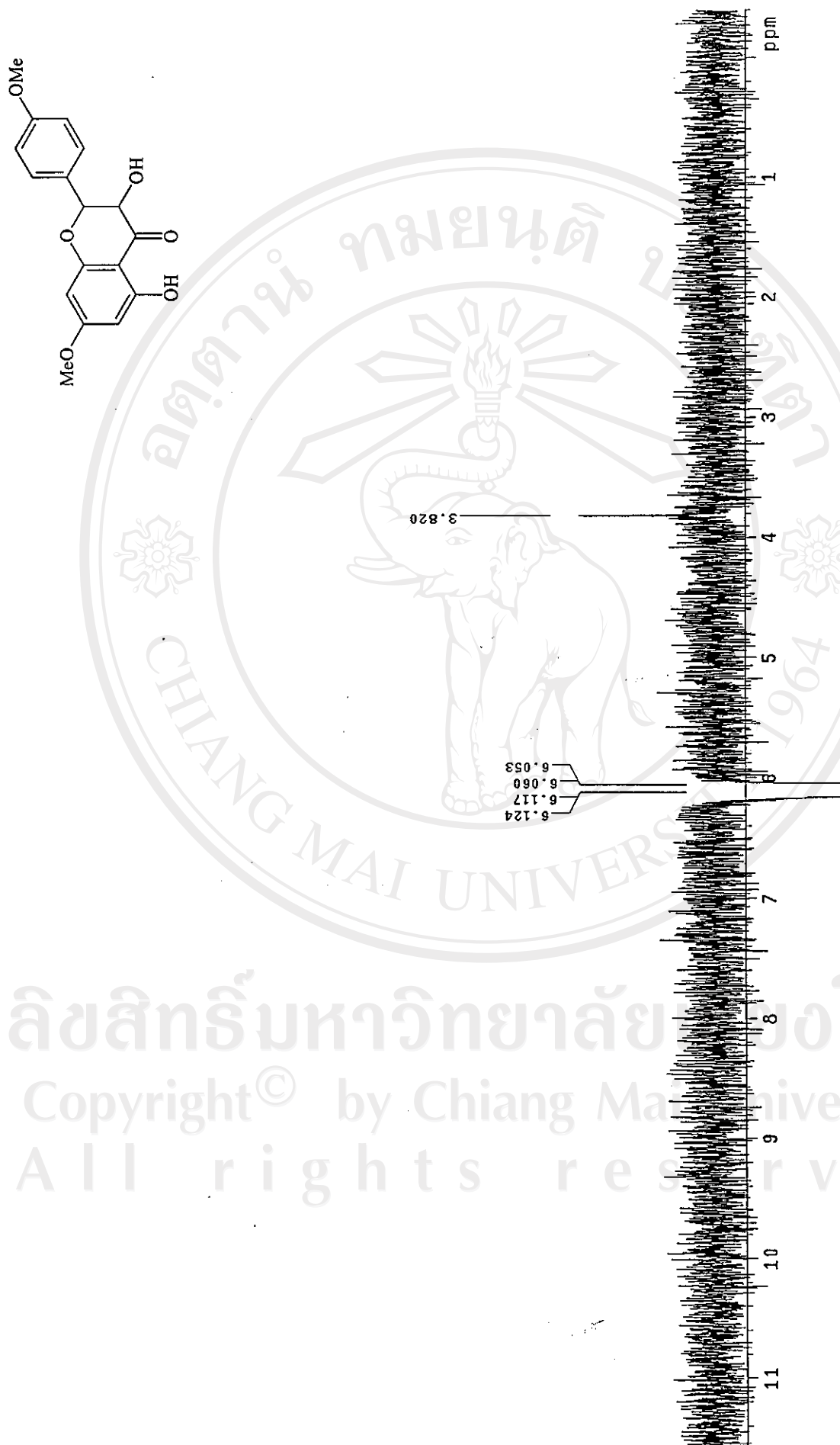


Figure 72. The 300 MHz NOE difference spectrum of compound EU9M055 (in CDCl_3) irradiation at 6.06 ppm (H-8)

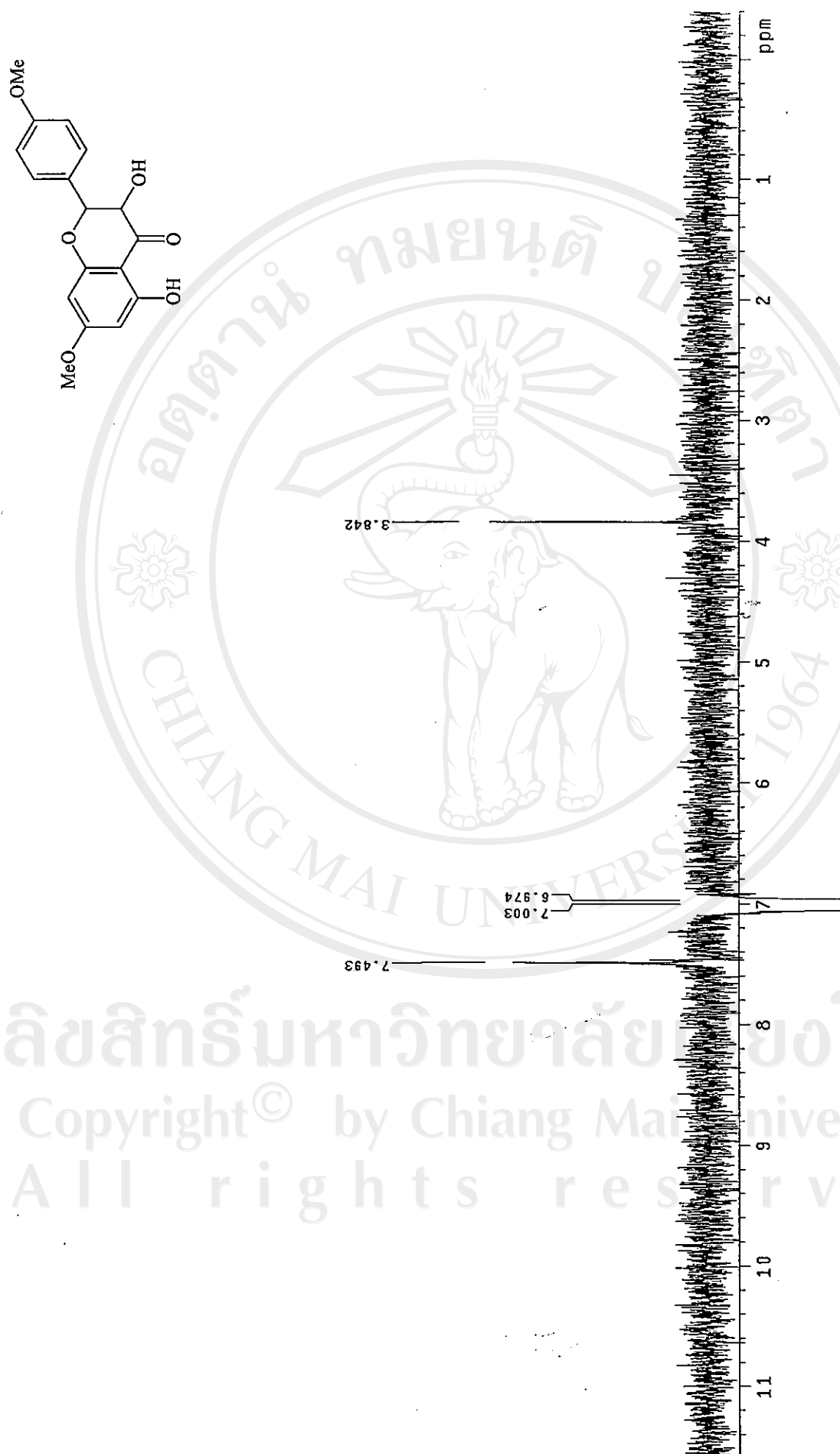


Figure 73. The 300 MHz NOE difference spectrum of compound EU9M055 (in CDCl_3) irradiation at 6.99 ppm (H-3')

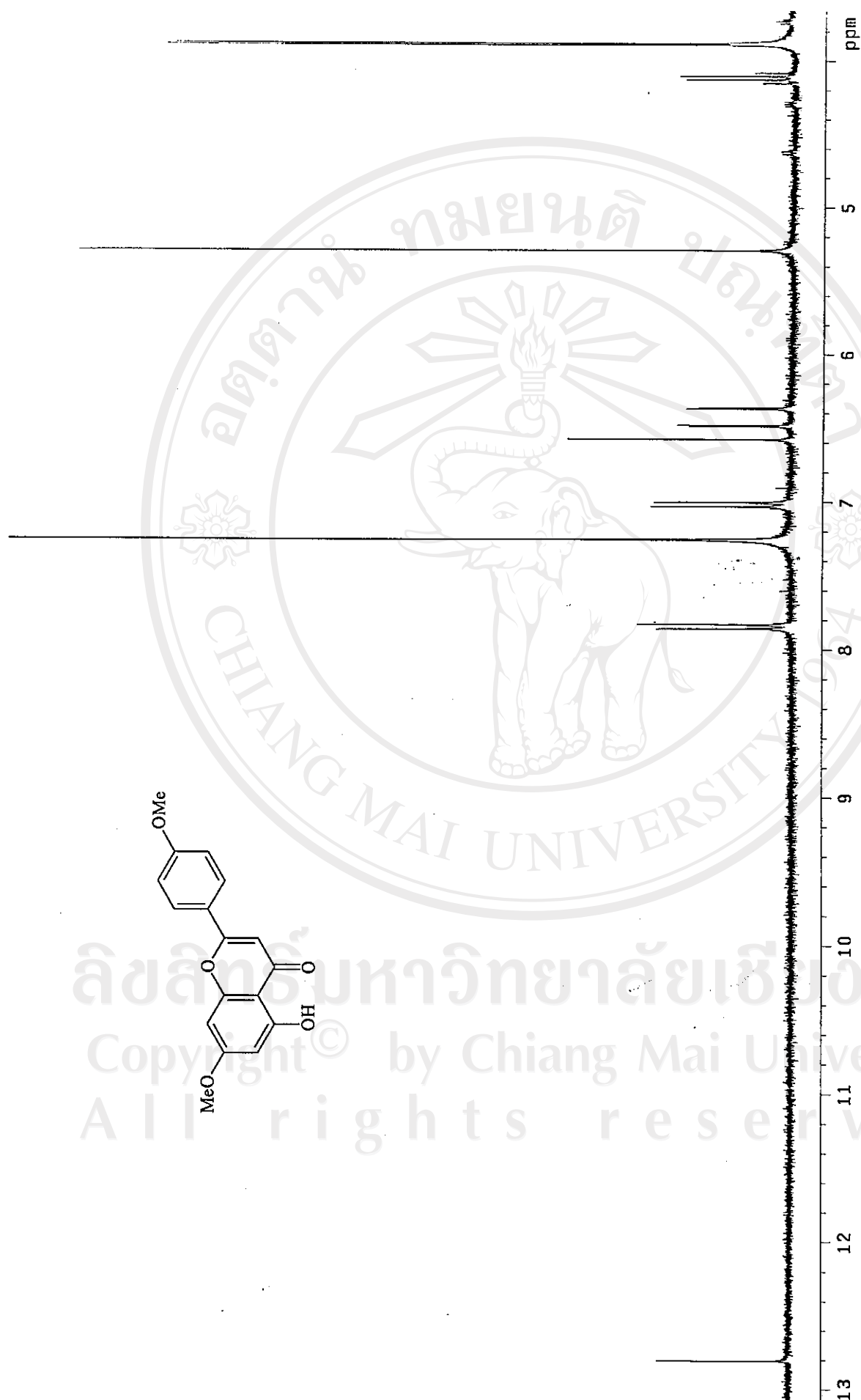


Figure 74. The 300 MHz ^1H -NMR spectrum of compound EU9M058 (in CDCl_3)

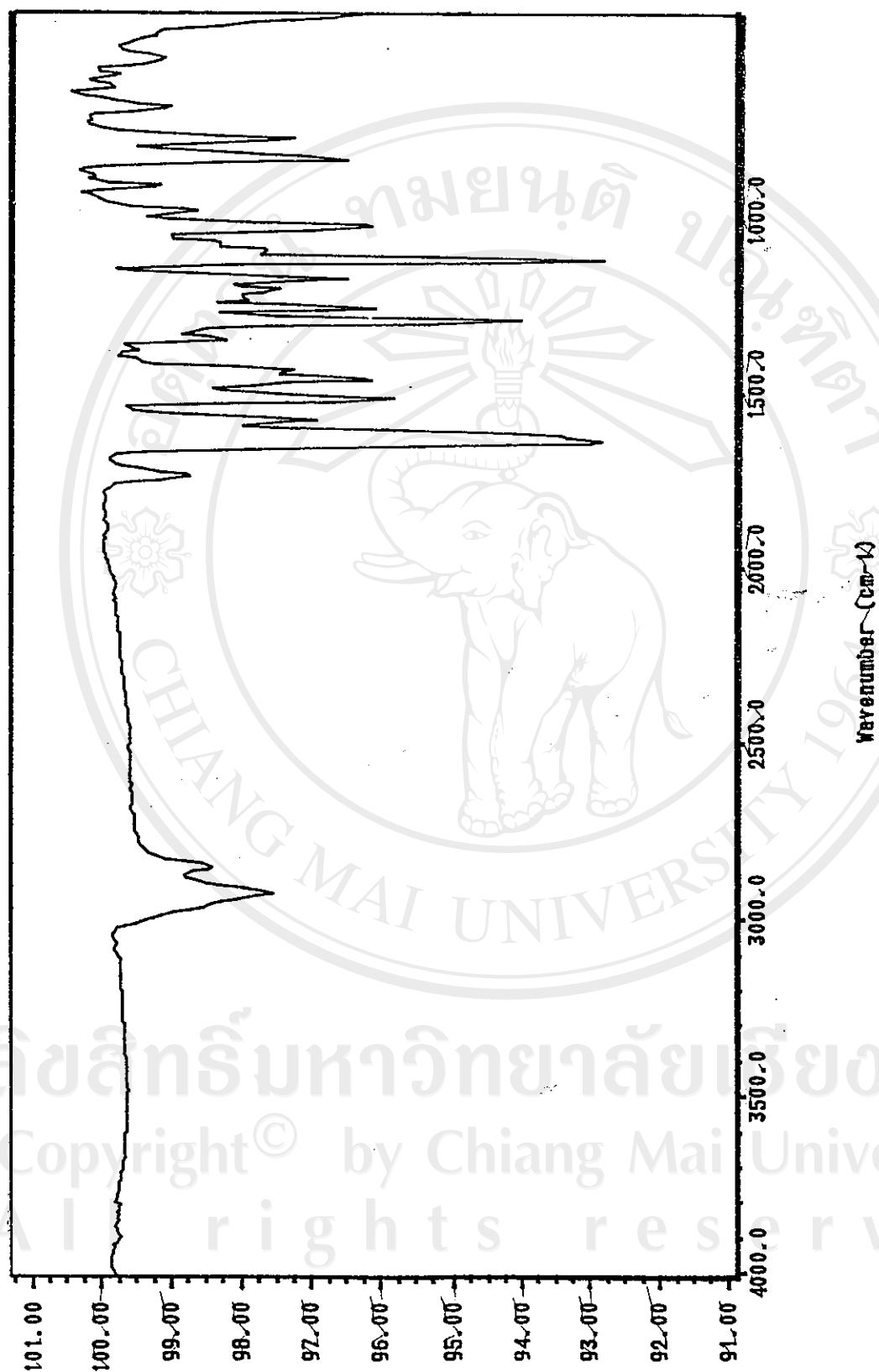


Figure 75. The IR spectrum of compound EU9M067

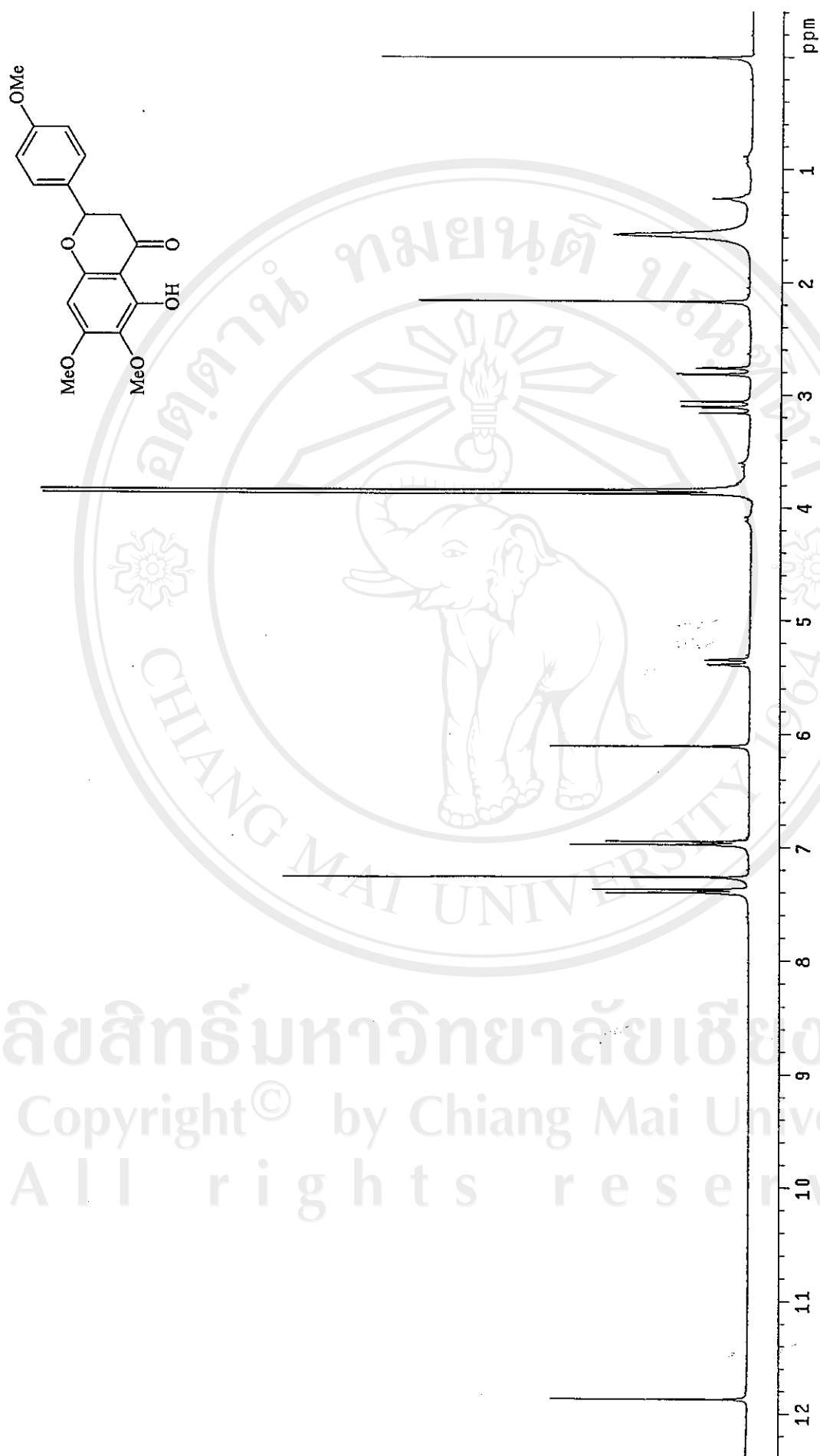


Figure 76. The 300 MHz ¹H-NMR spectrum of compound EU9M067 (in CDCl₃)

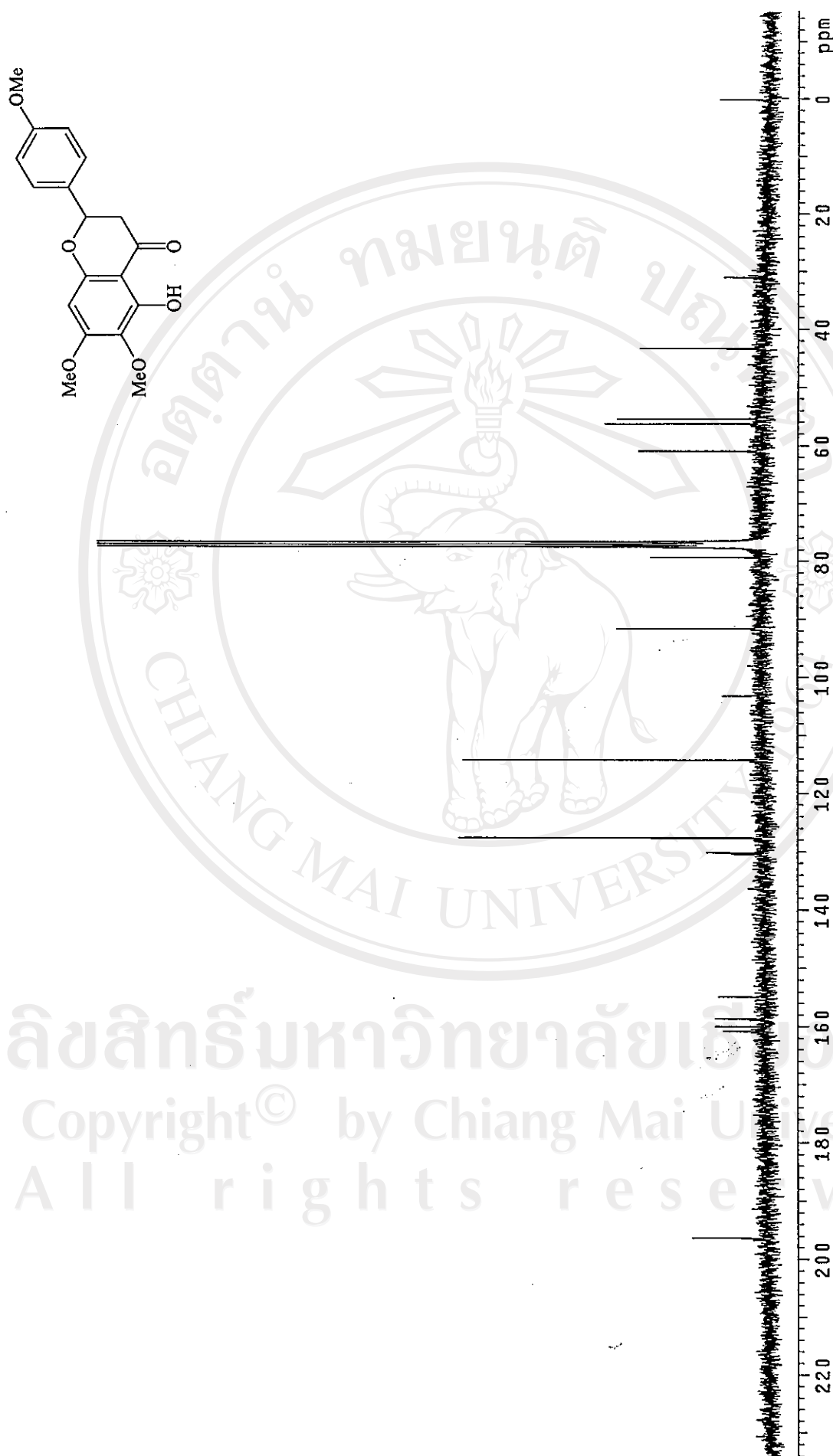


Figure 77. The 75 MHz ¹³C-NMR spectrum of compound EU9M067 (in CDCl₃)



Figure 78. The 75 MHz DEPT spectrum of compound EU9M067 (in CDCl₃)

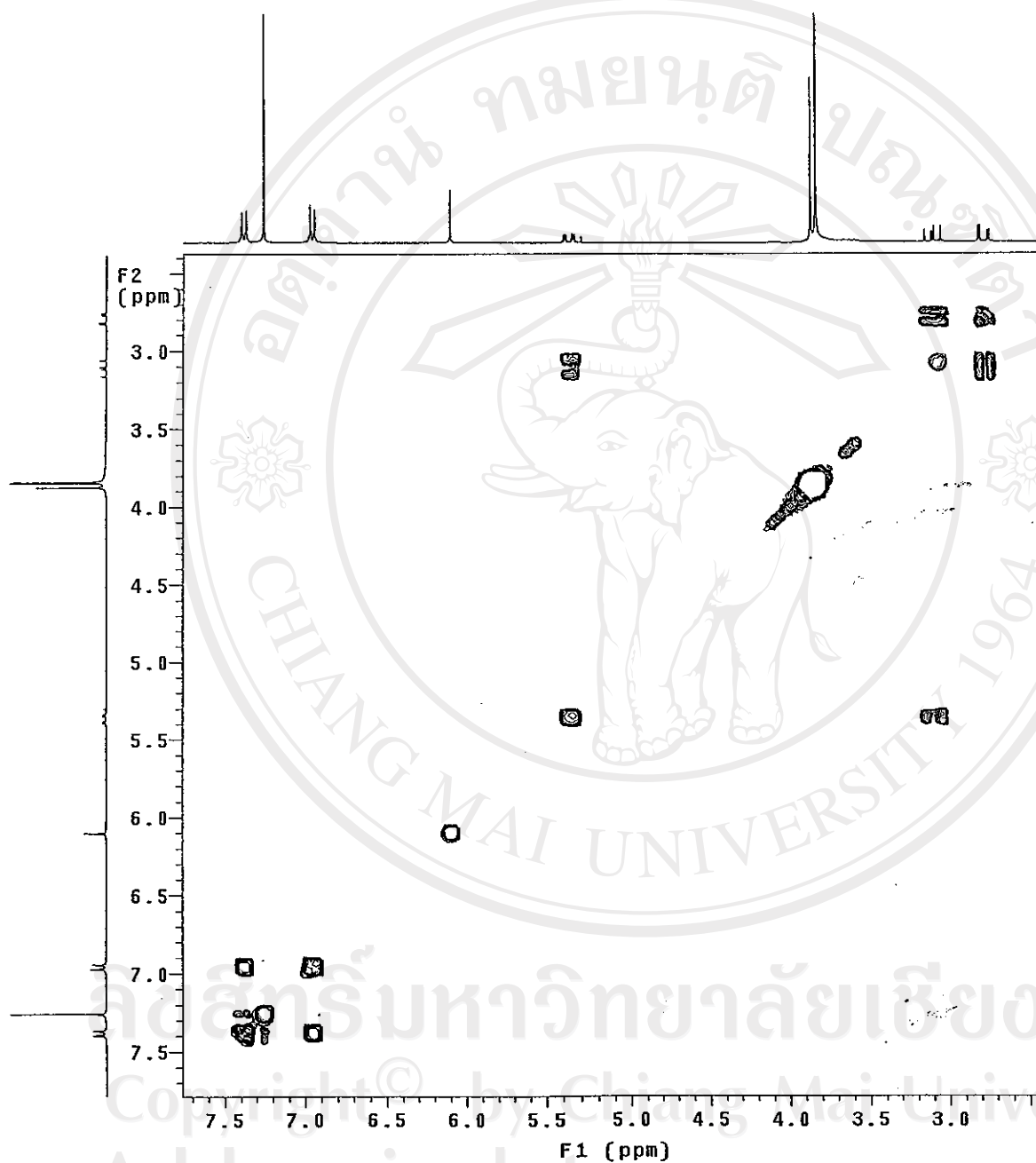


Figure 79. The 300 MHz ^1H - ^1H COSY spectrum of compound EU9M067 (in CDCl_3)

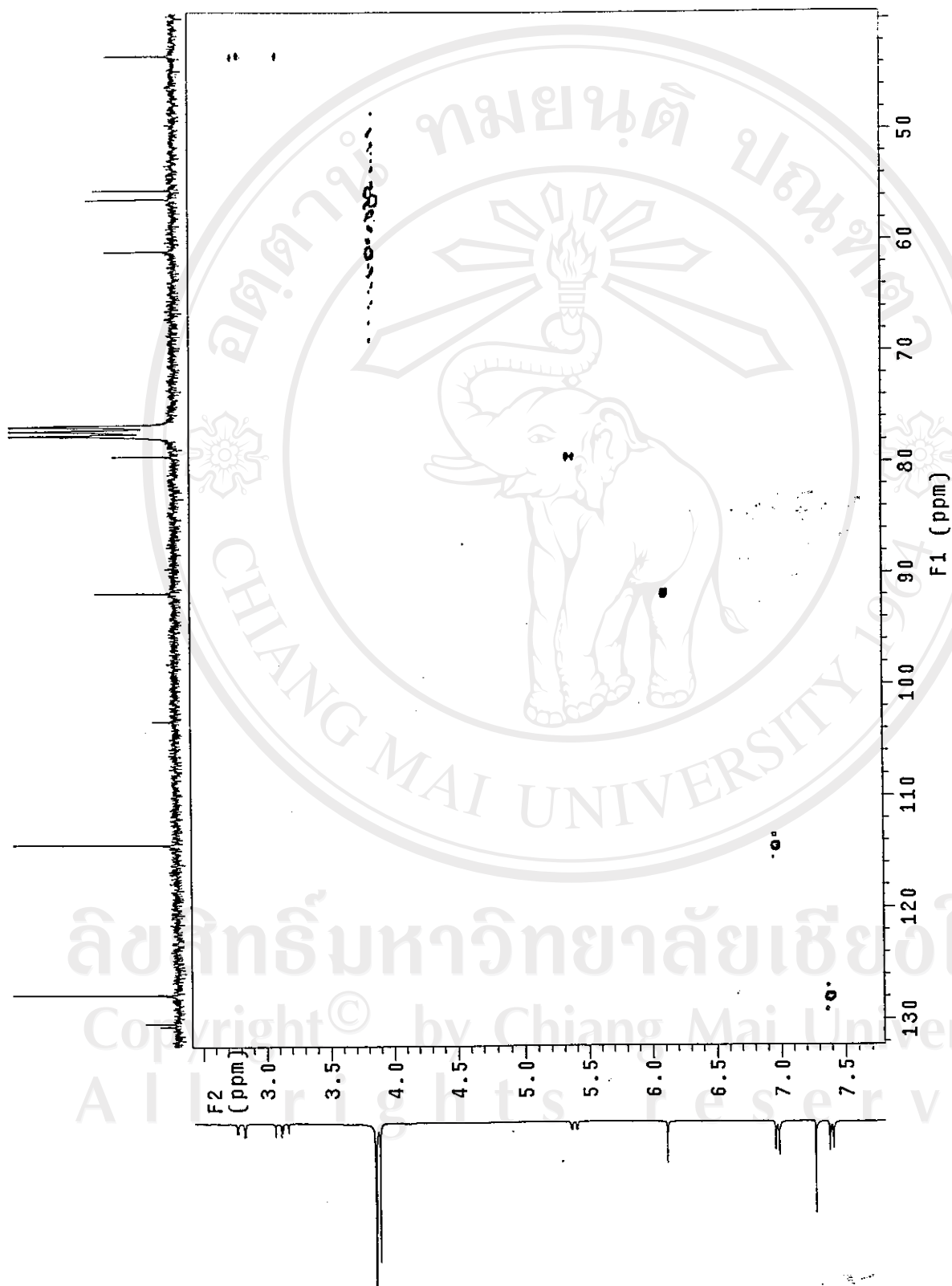


Figure 80. The 300 MHz HSQC spectrum of compound EU9M067 (in CDCl_3)

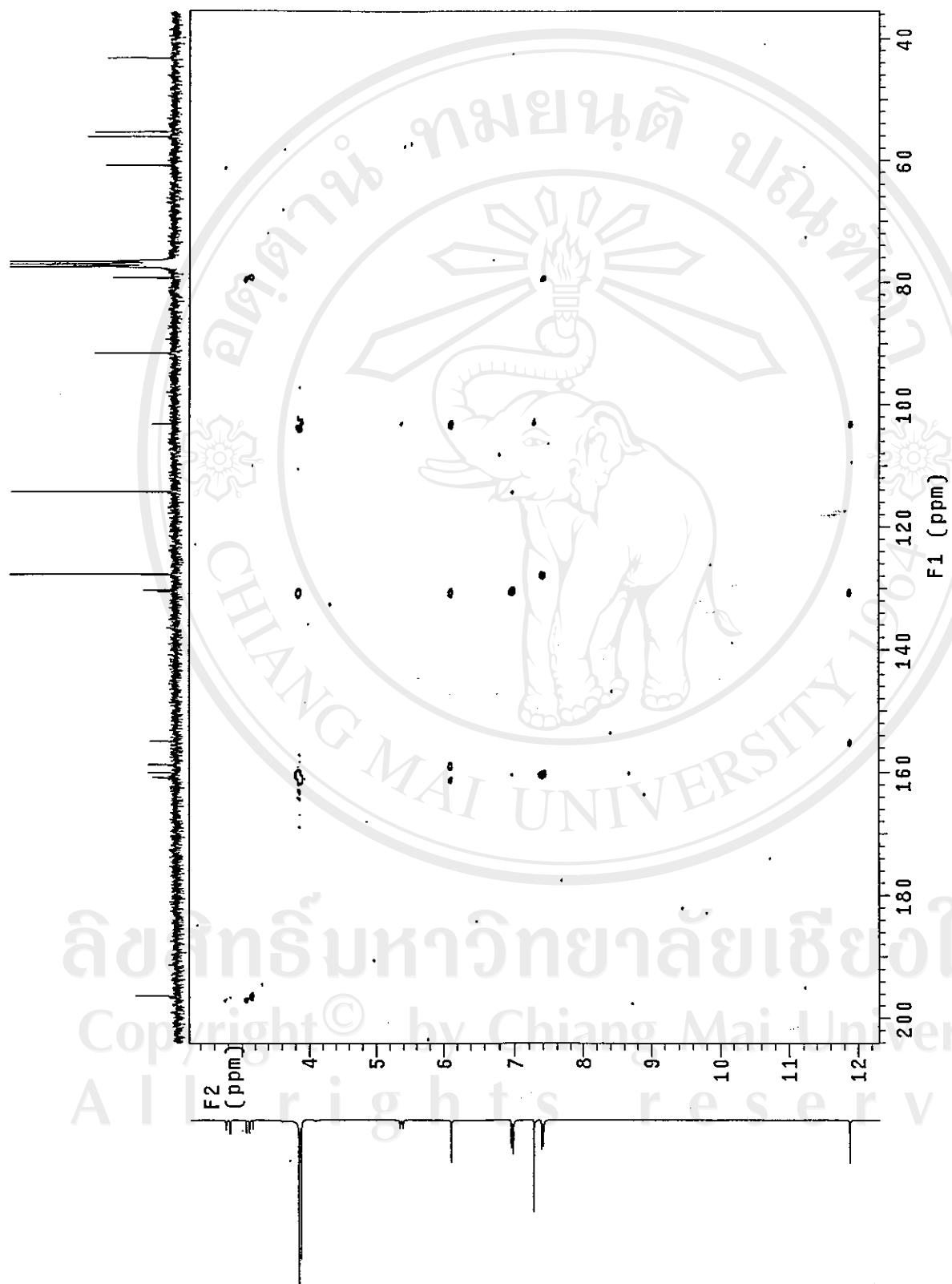


Figure 81. The 300 MHz HMBC spectrum of compound EU9M067 (in CDCl_3)

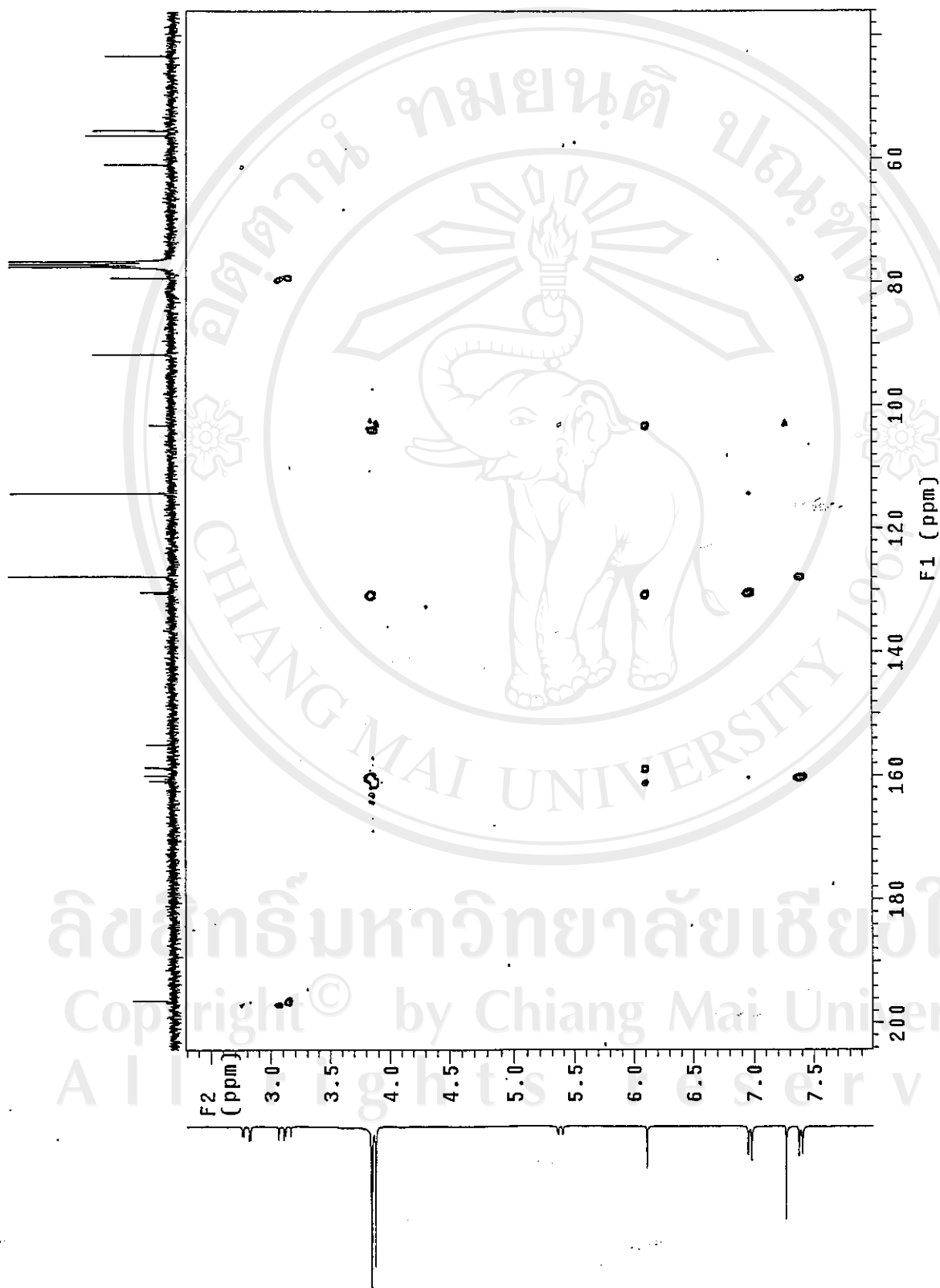


Figure 82. The 300 MHz HMBC spectrum of compound EU9M067 (in CDCl_3) (expanded)

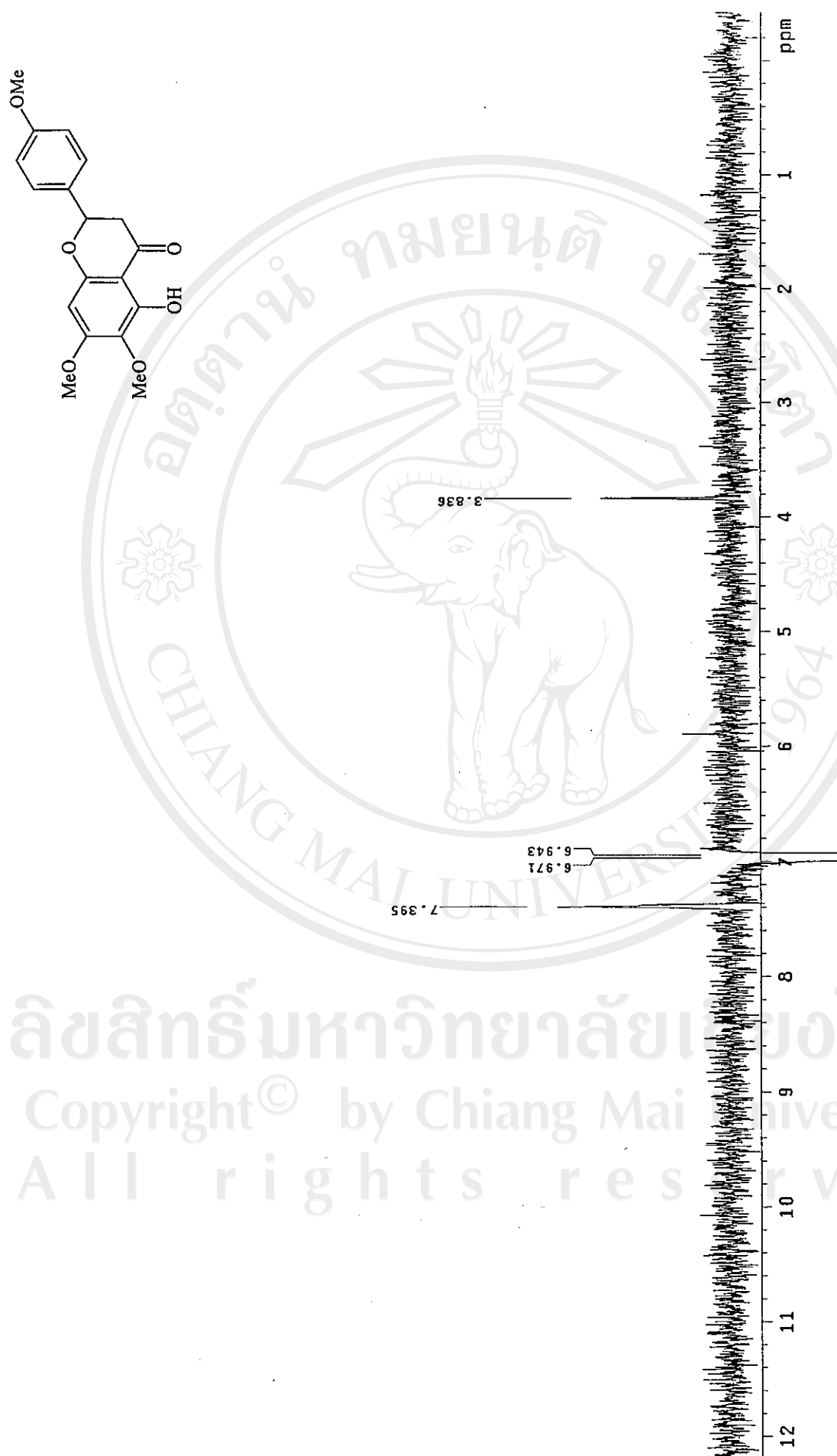


Figure 83. The 300 MHz NOE difference spectrum of compound EU9M067 (in CDCl₃) irradiation at 6.96 ppm (H-3')

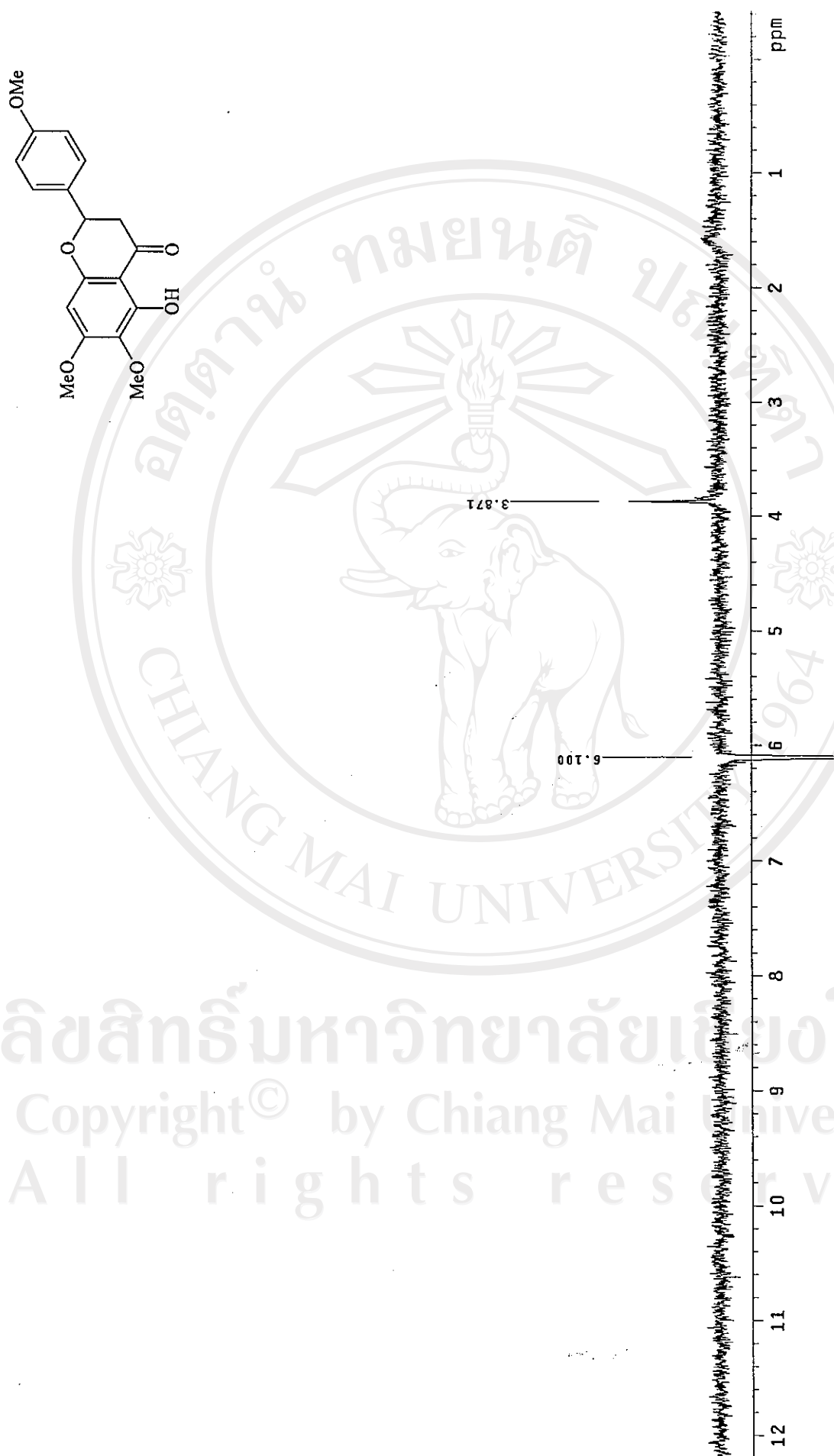


Figure 84. The 300 MHz NOE difference spectrum of compound EU9M067 (in CDCl_3) irradiated at 6.10 ppm (H-8)

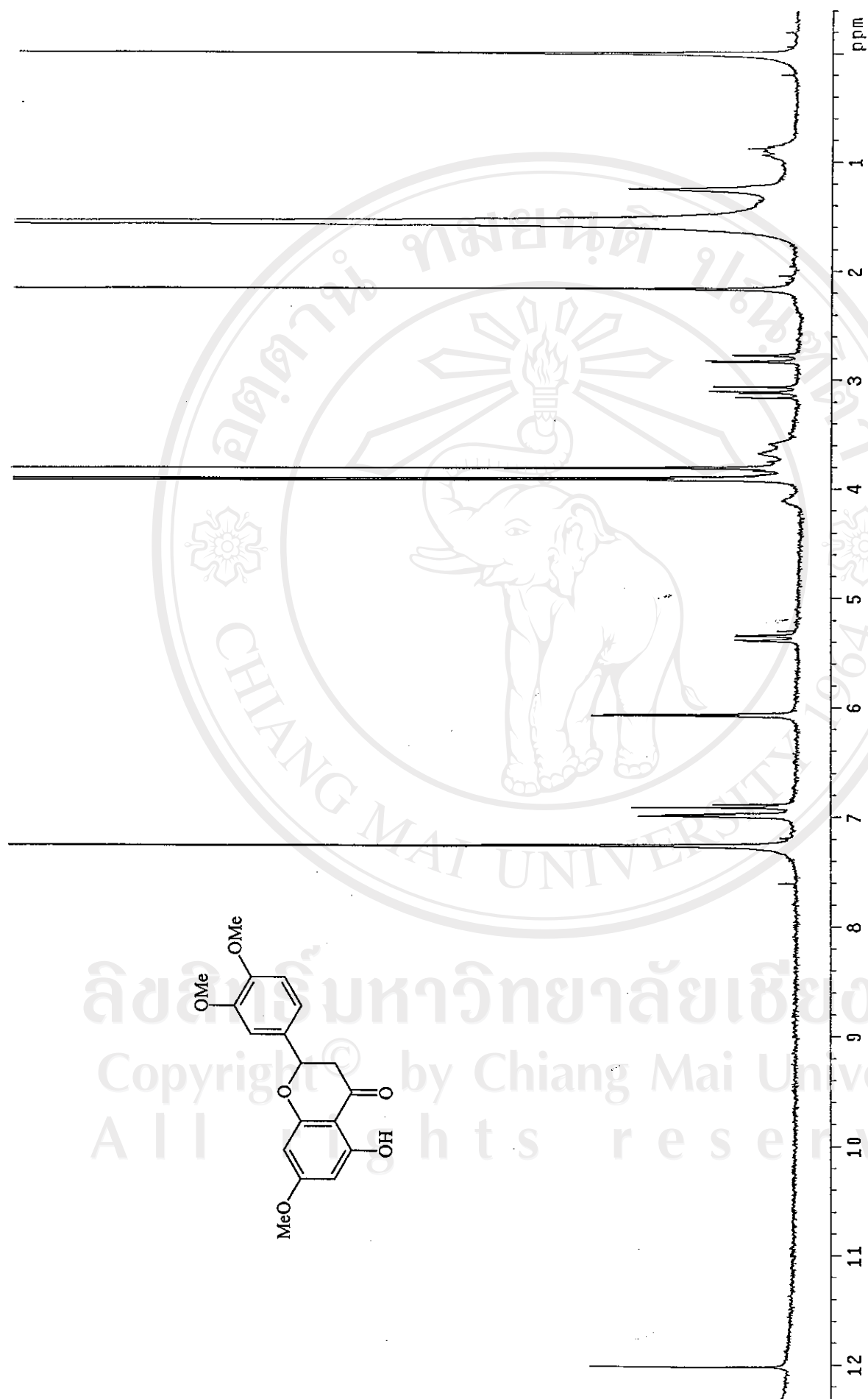


Figure 85. The 300 MHz ^1H -NMR spectrum of compound EU9M068 (in CDCl_3)

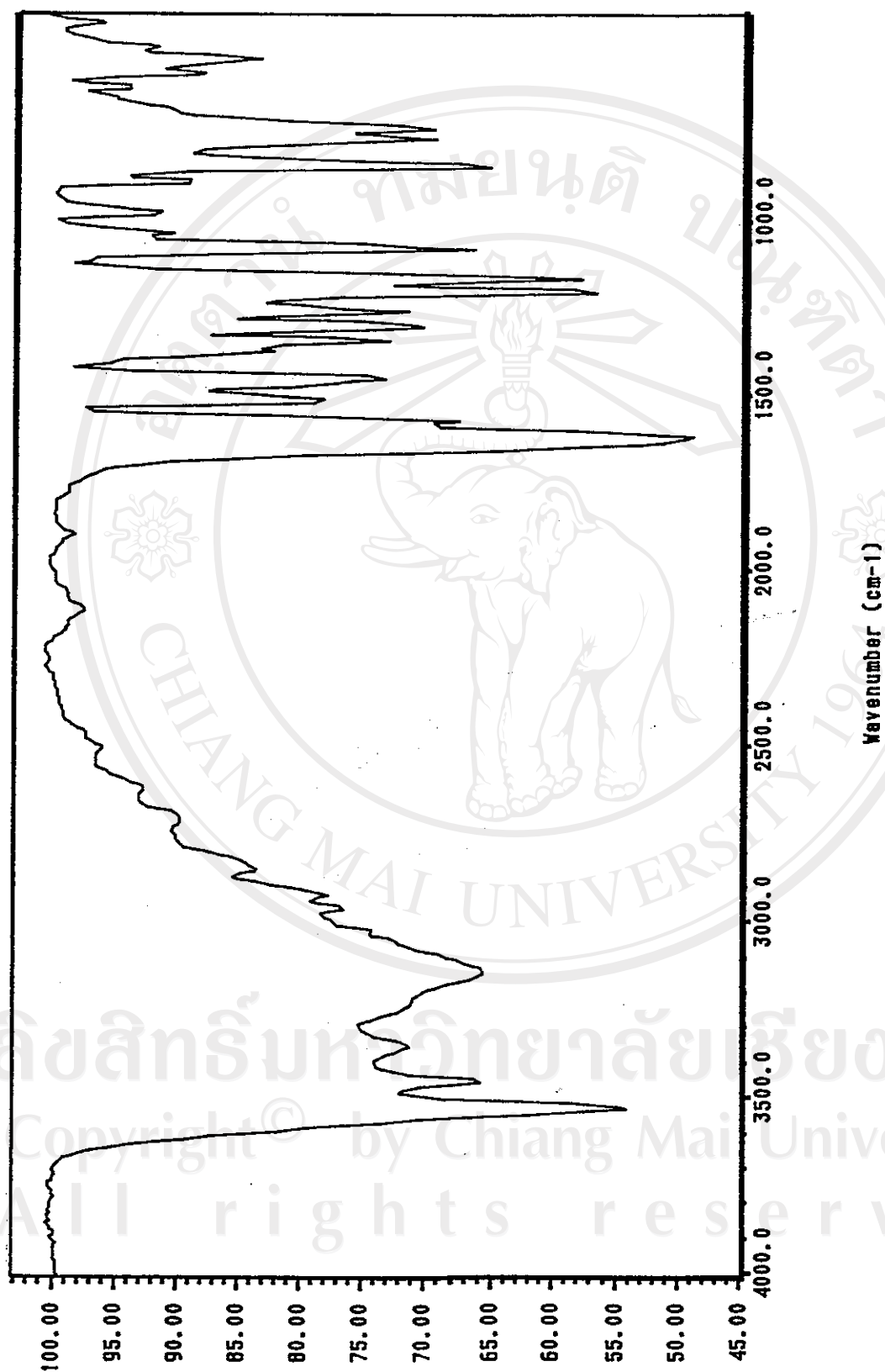


Figure 86. The IR spectrum of compound EU9M089

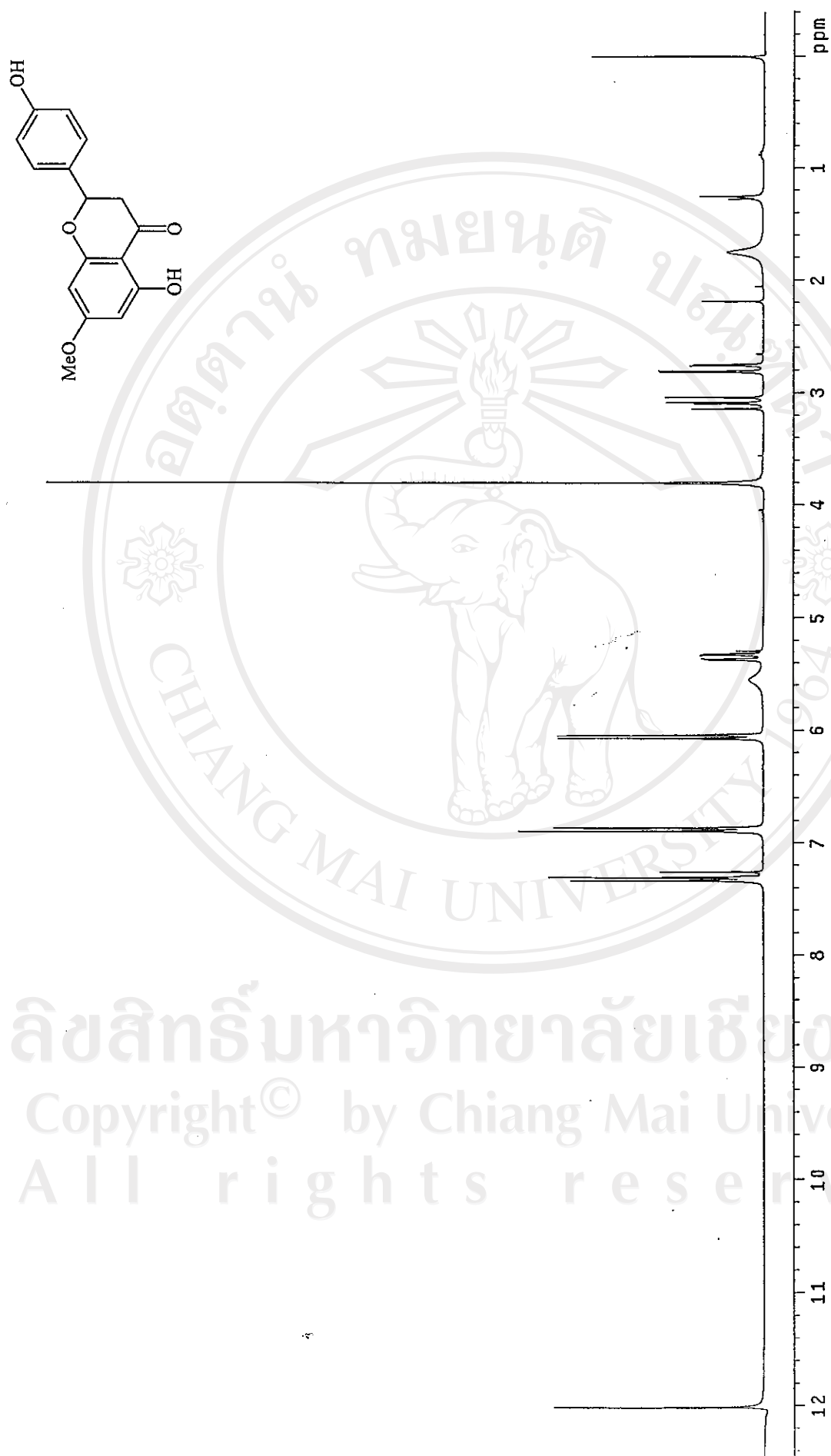


Figure 97. The 300 MHz ¹H-NMR spectrum of compound EU9M089 (in CDCl₃)

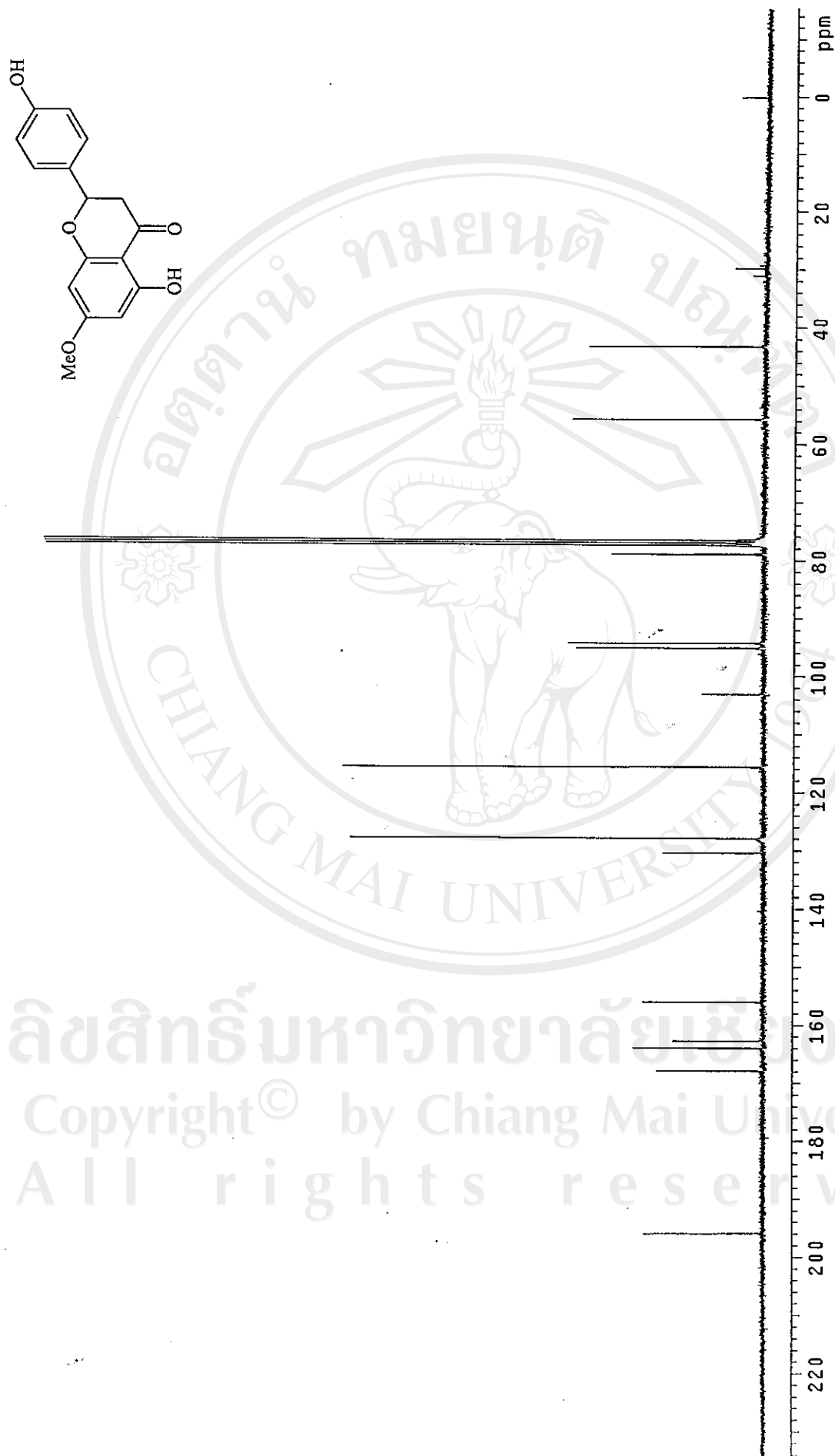


Figure 88. The 75 MHz ^{13}C -NMR spectrum of compound EU9M089 (in CDCl_3)

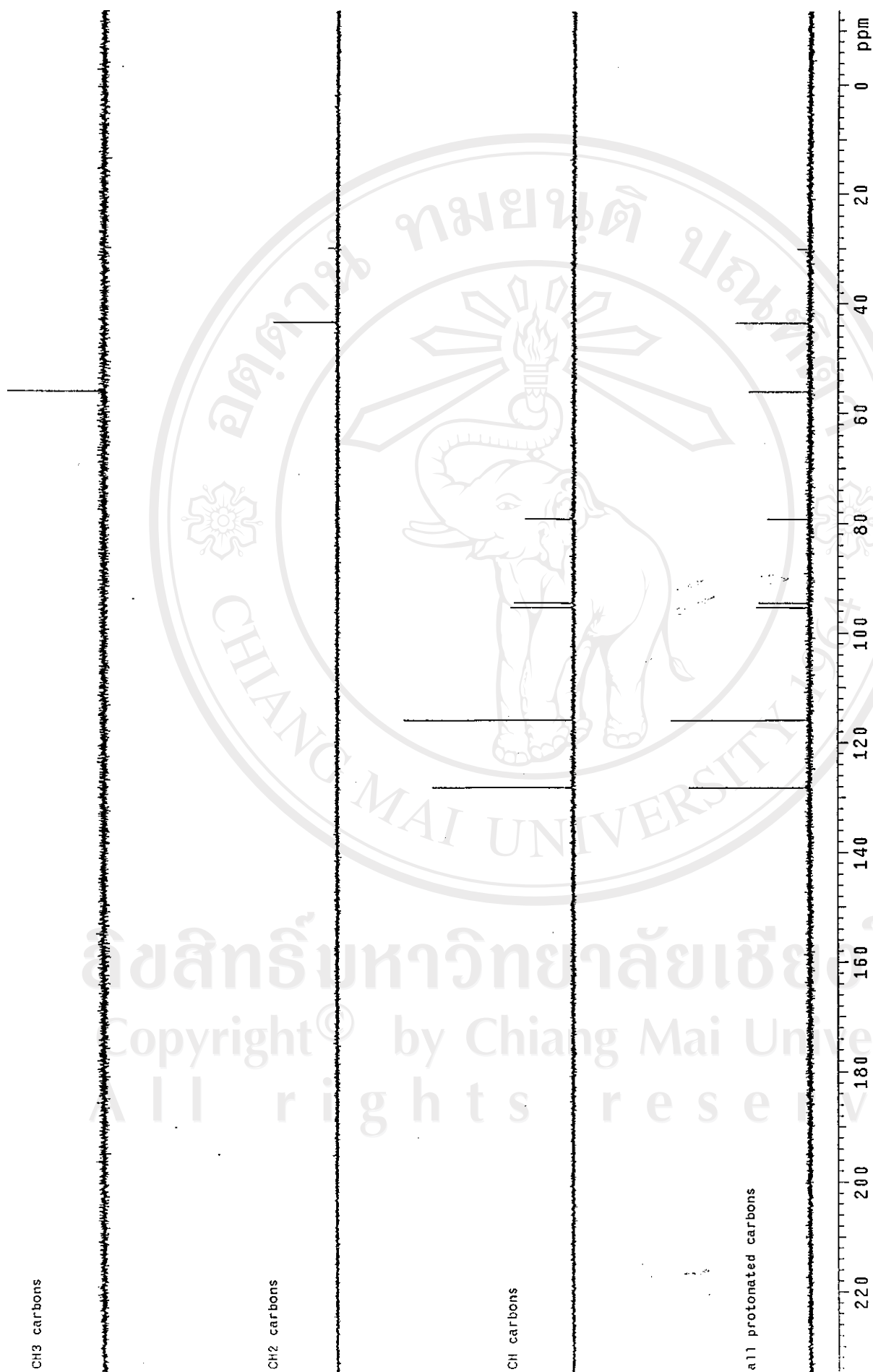


Figure 89. The 75 MHz DEPT spectrum of compound EU9M089 (in CDCl₃)

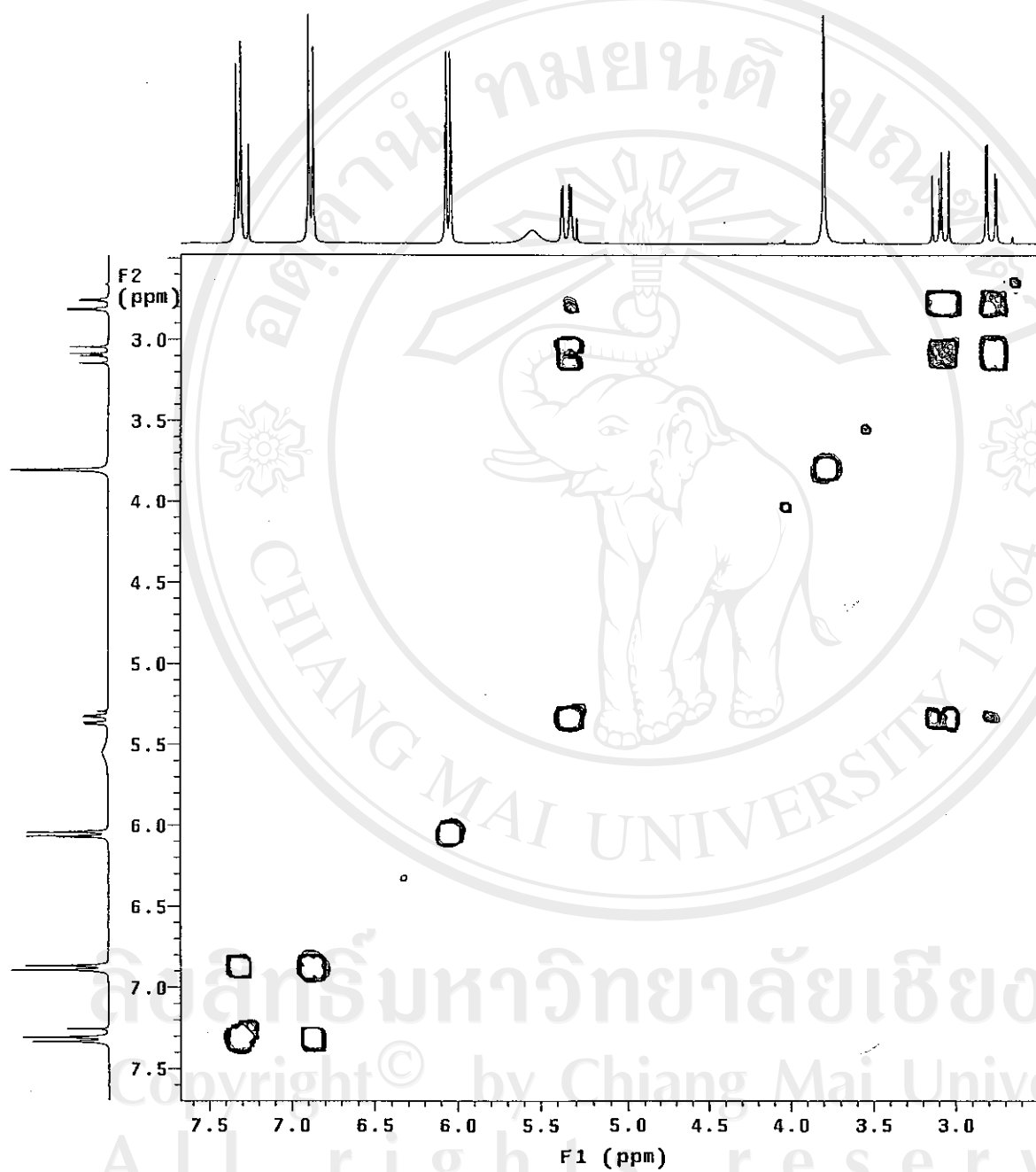


Figure 90. The 300 MHz ^1H - ^1H COSY spectrum of compound EU9M089 (in CDCl_3)

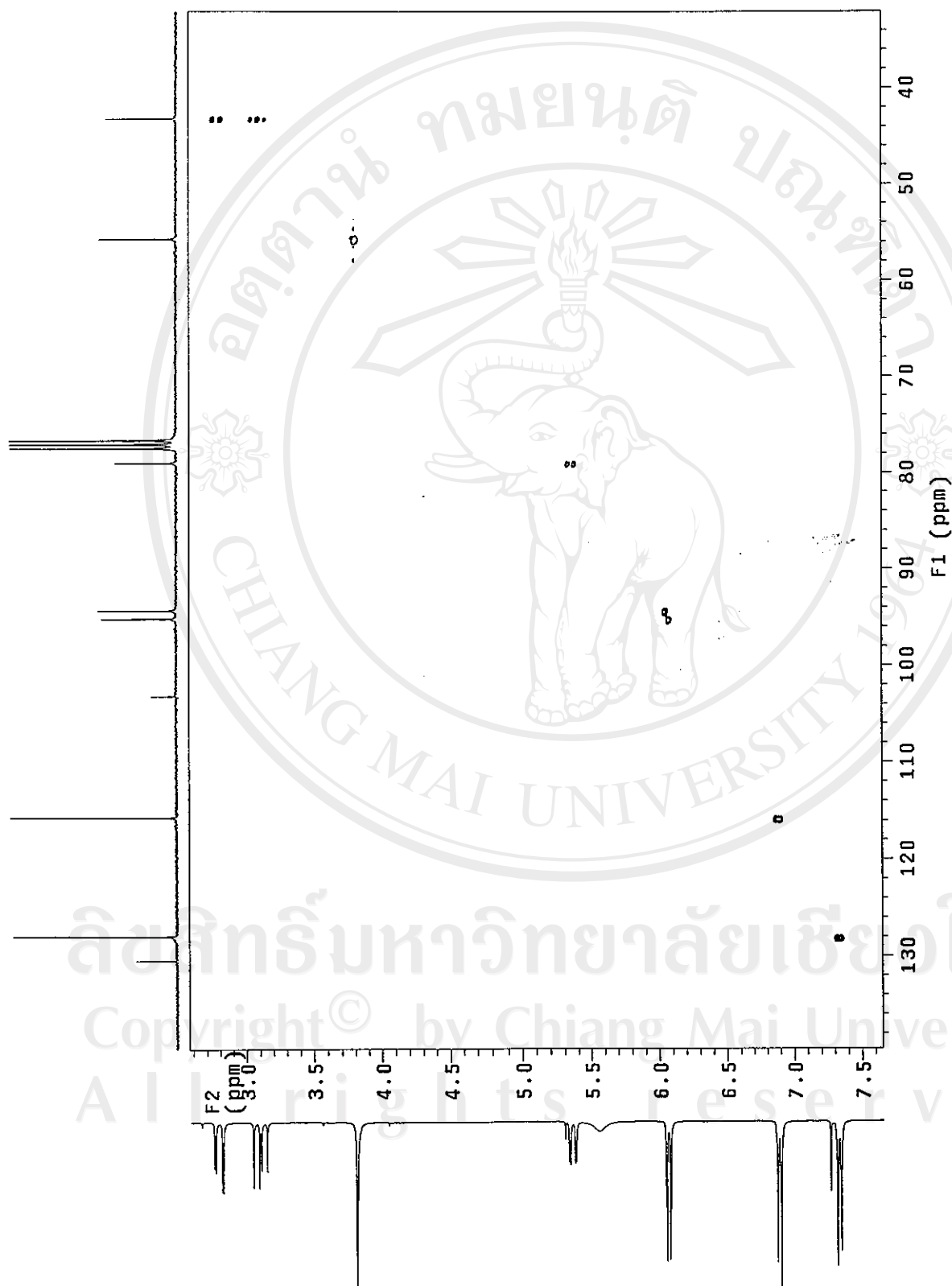


Figure 91. The 300 MHz HSQC spectrum of compound EU9M089 (in CDCl_3)

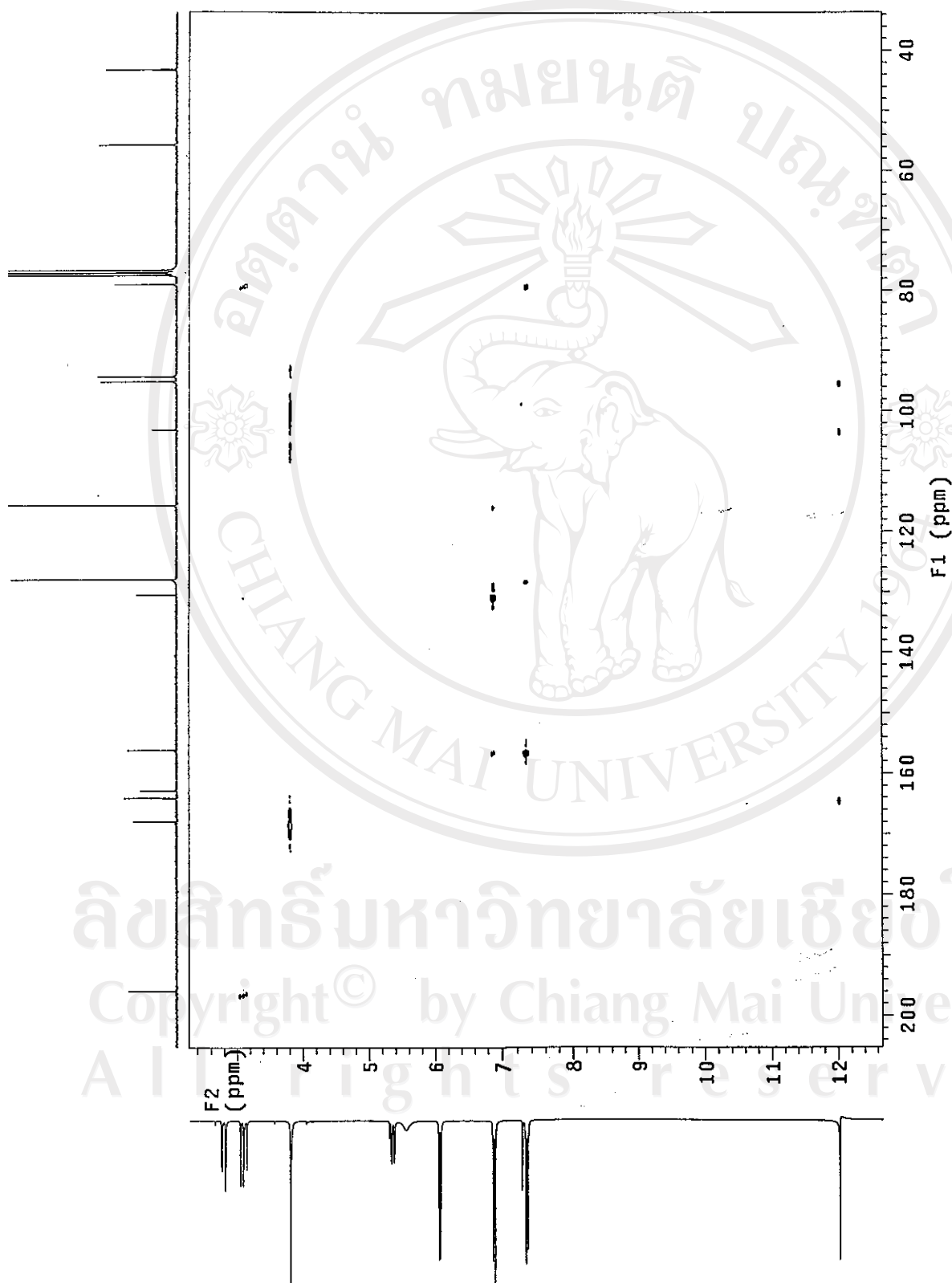


Figure 92. The 300 MHz HMBBC spectrum of compound EU9M089 (in CDCl_3)

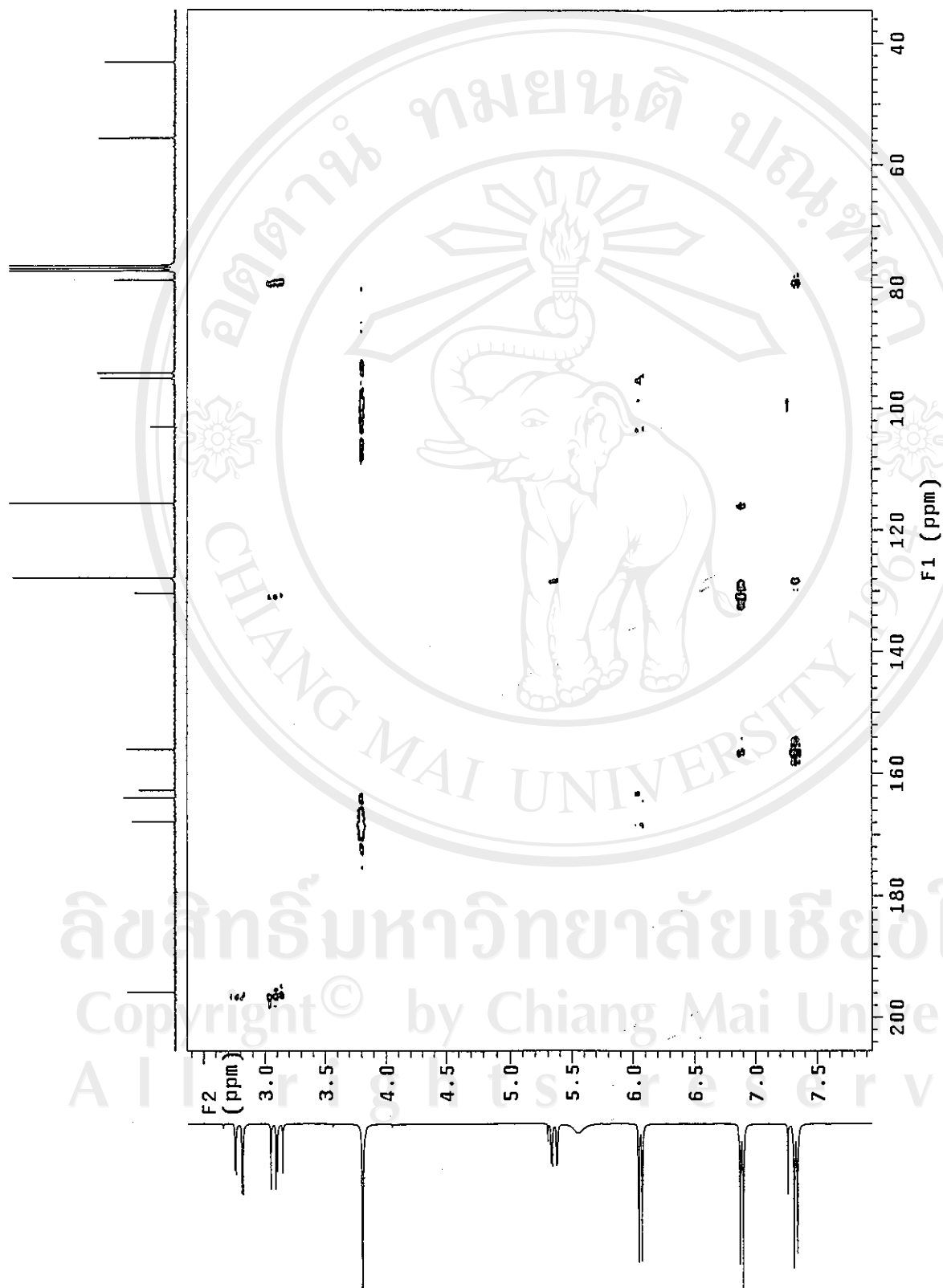


Figure 93. The 300 MHz HMBC spectrum of compound EU9M089 (in CDCl_3) (expanded)

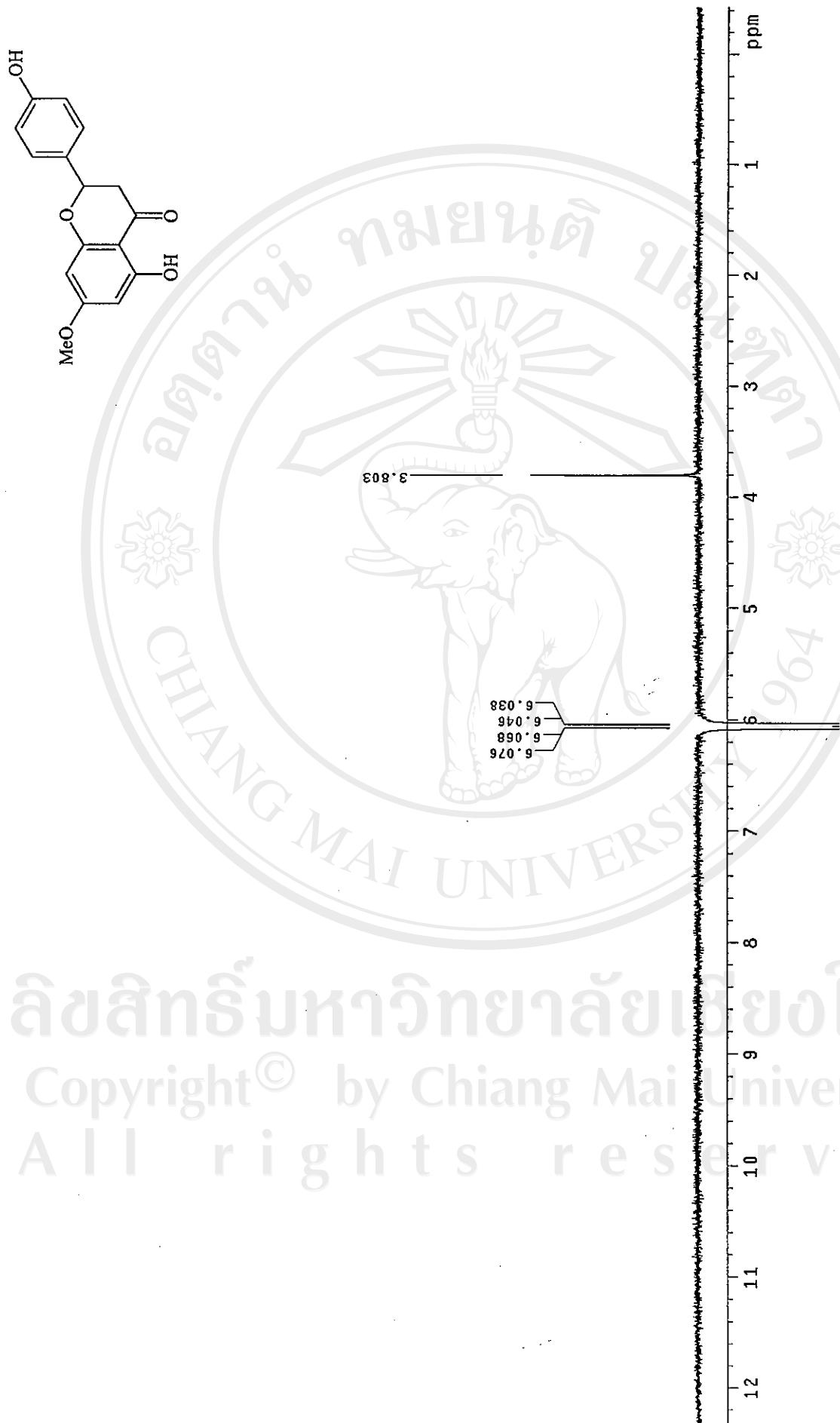


Figure 94. The 300 MHz NOE difference spectrum of compound EU9M089 (in CDCl_3) irradiation at 6.07 ppm (H-6)

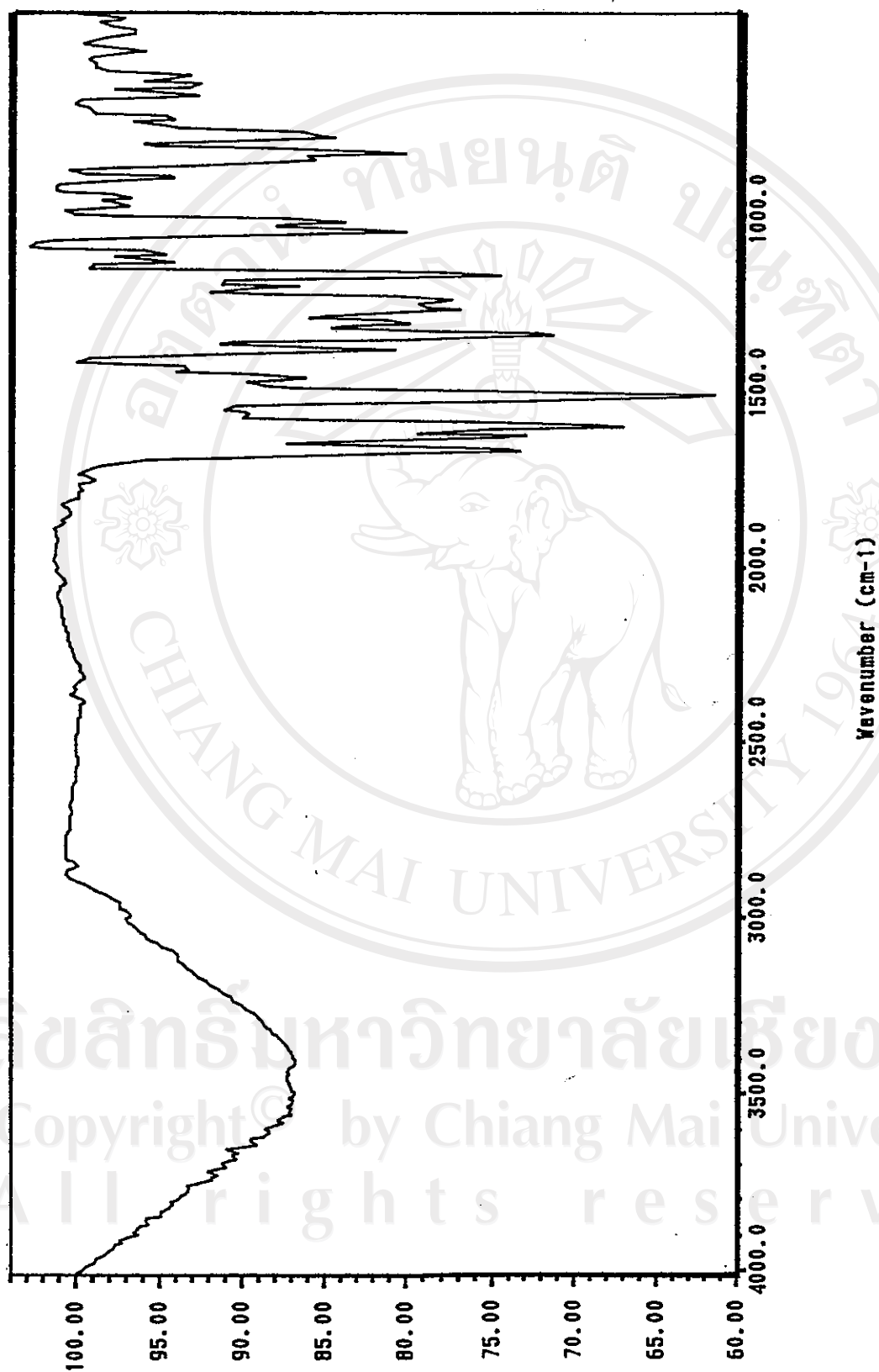


Figure 95. The IR spectrum of compound EU9M101



Figure 96. The 300 MHz $^1\text{H-NMR}$ spectrum of compound EU9M101 (in DMSO-d_6)

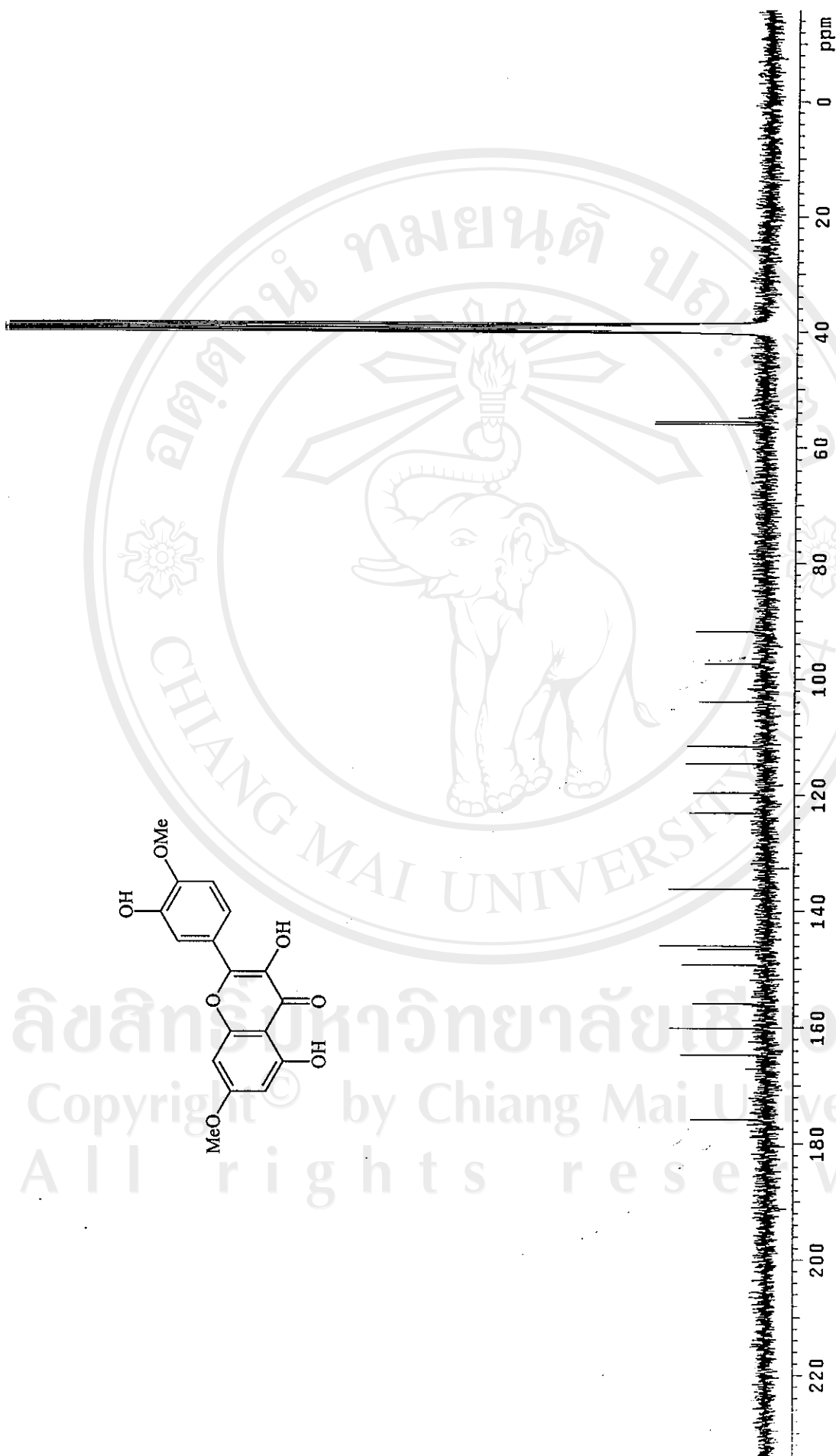


Figure 97. The 75 MHz ^{13}C -NMR spectrum of compound EU9MI01 (in DMSO-d_6)

CH3 carbons



CH2 carbons



CH carbons



all protonated carbons

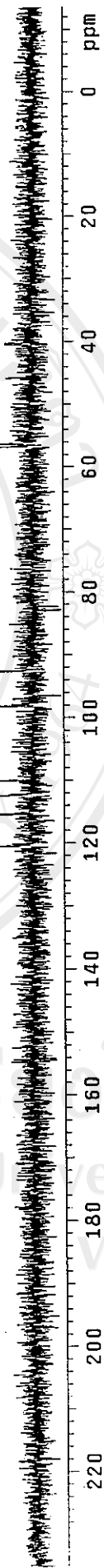


Figure 98. The 75 MHz DEPT spectrum of compound EU9M101 (in DMSO-d₆)

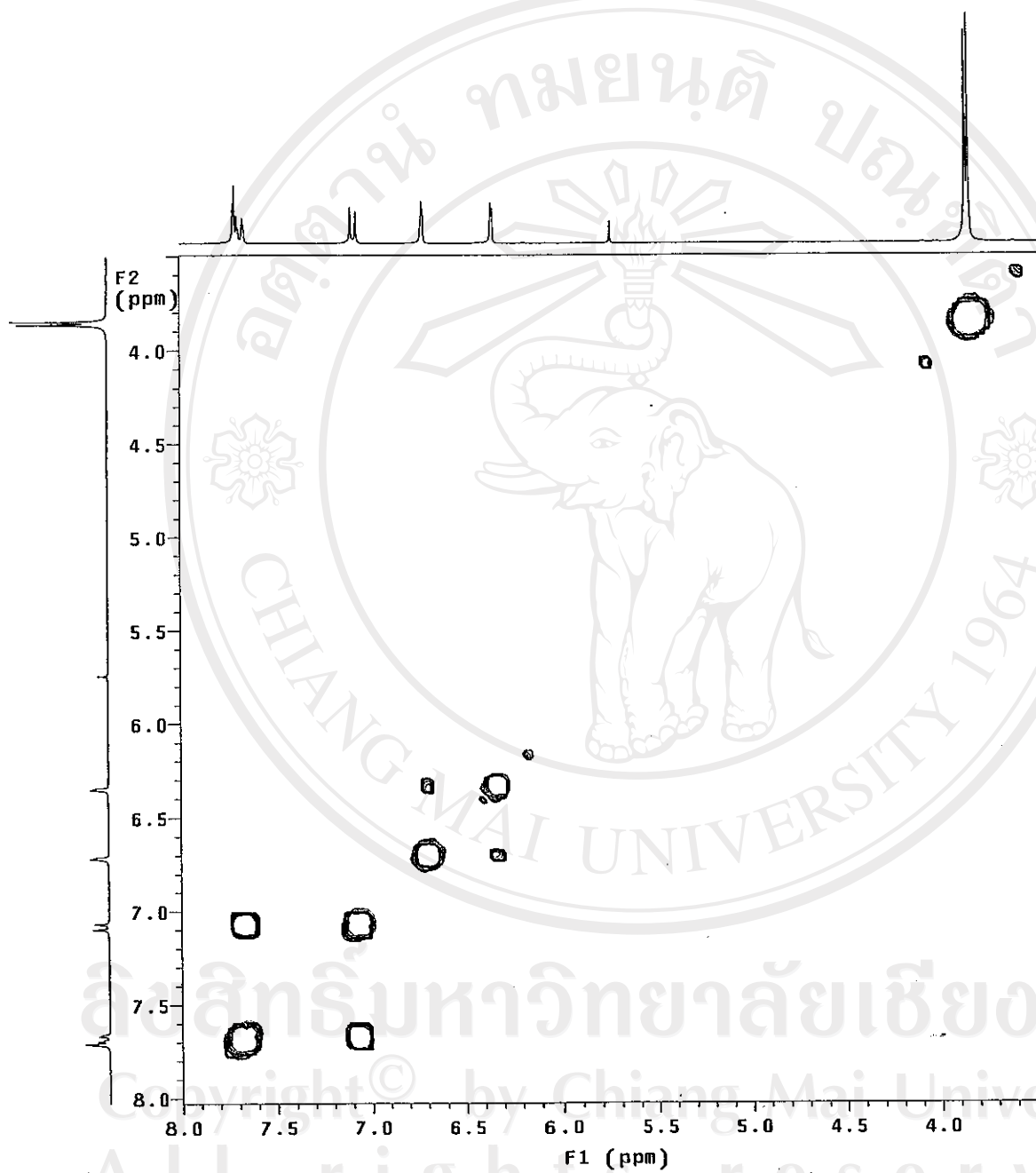


Figure 99. The 300 MHz ^1H - ^1H COSY spectrum of compound EU9M101 (in DMSO- d_6)

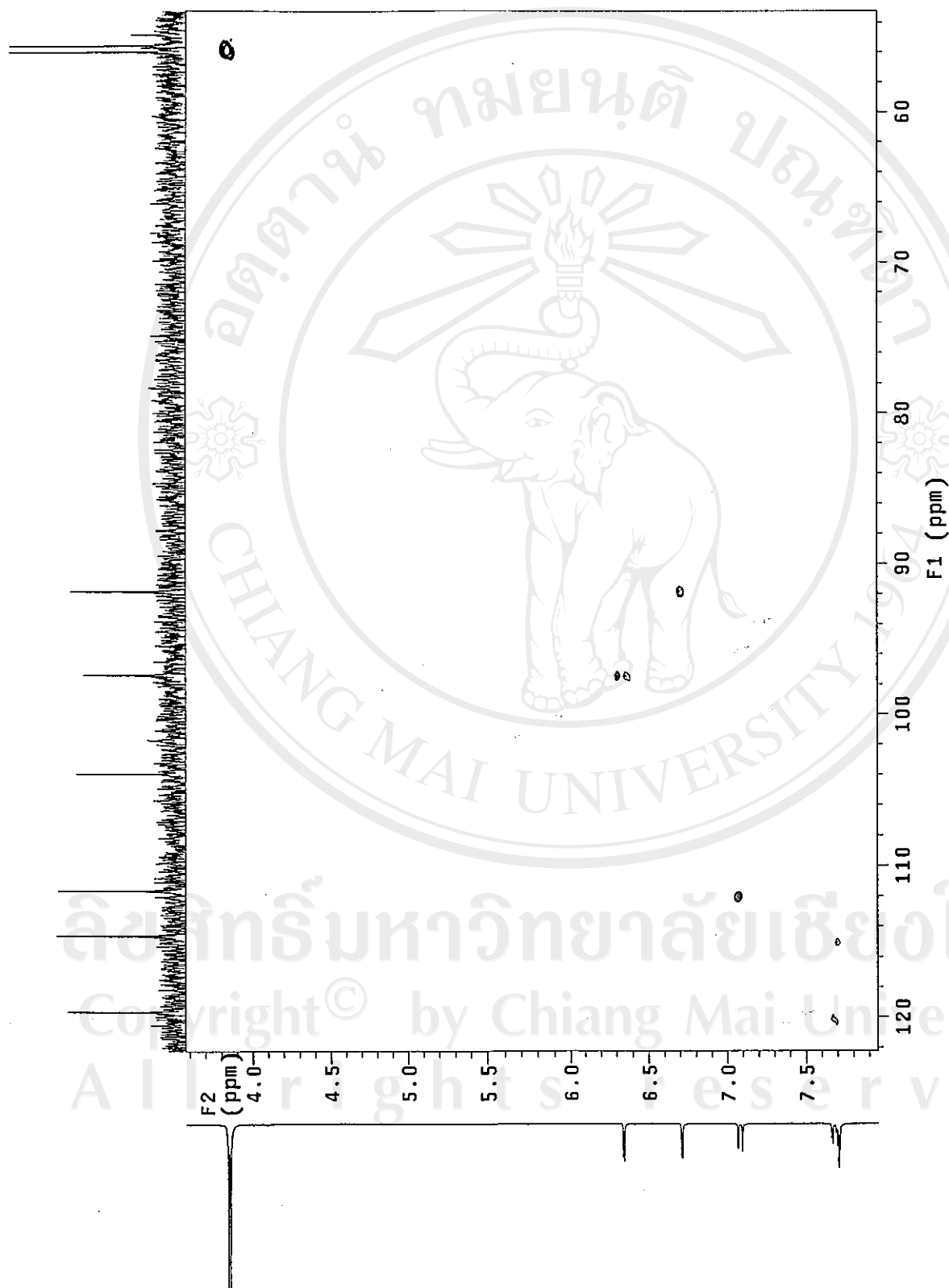


Figure 100. The 300 MHz HSQC spectrum of compound EU9M101 (in DMSO-d₆)

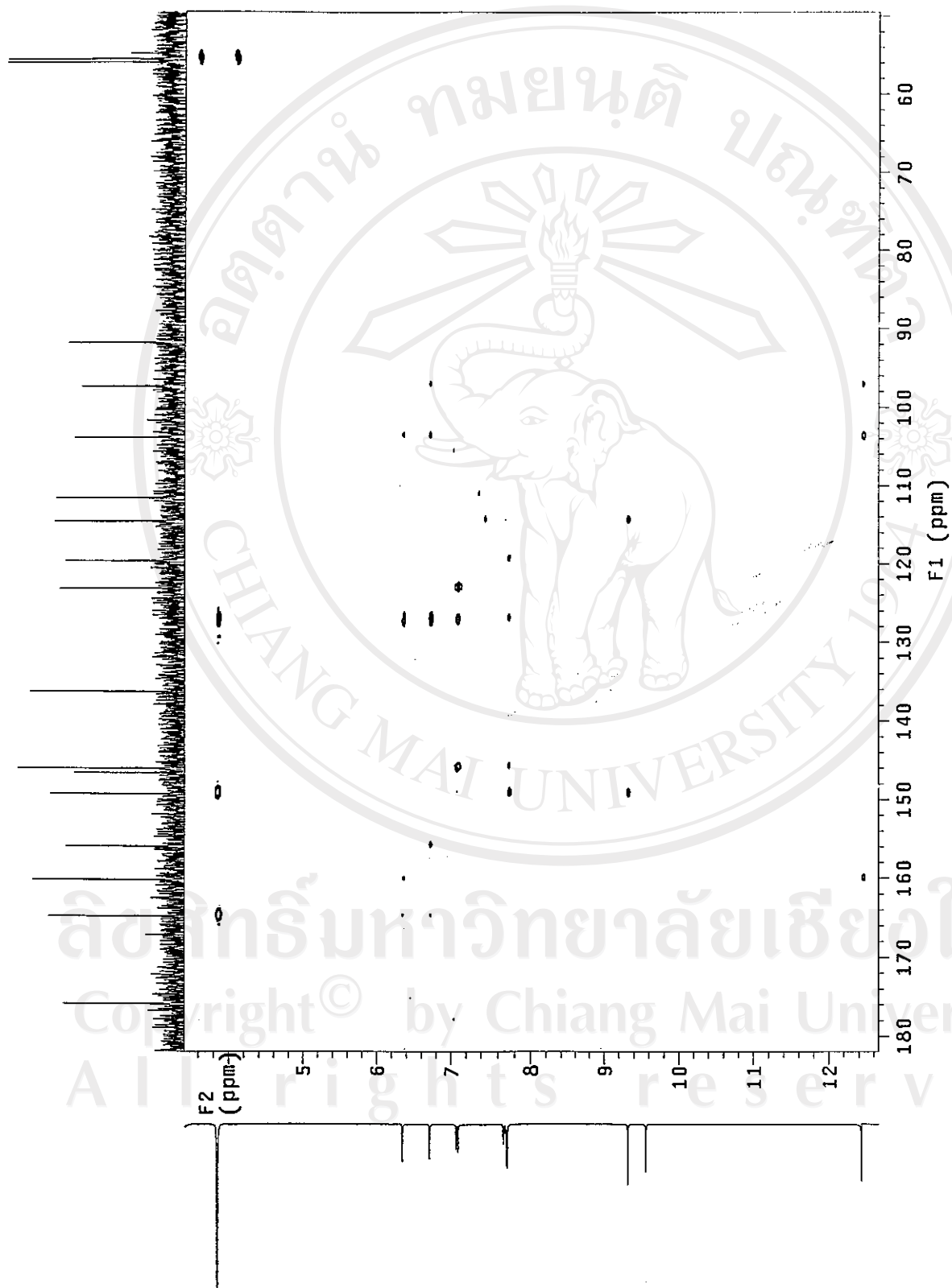


Figure 101. The 300 MHz HMBC spectrum of compound EU9M101 (in DMSO-d₆)

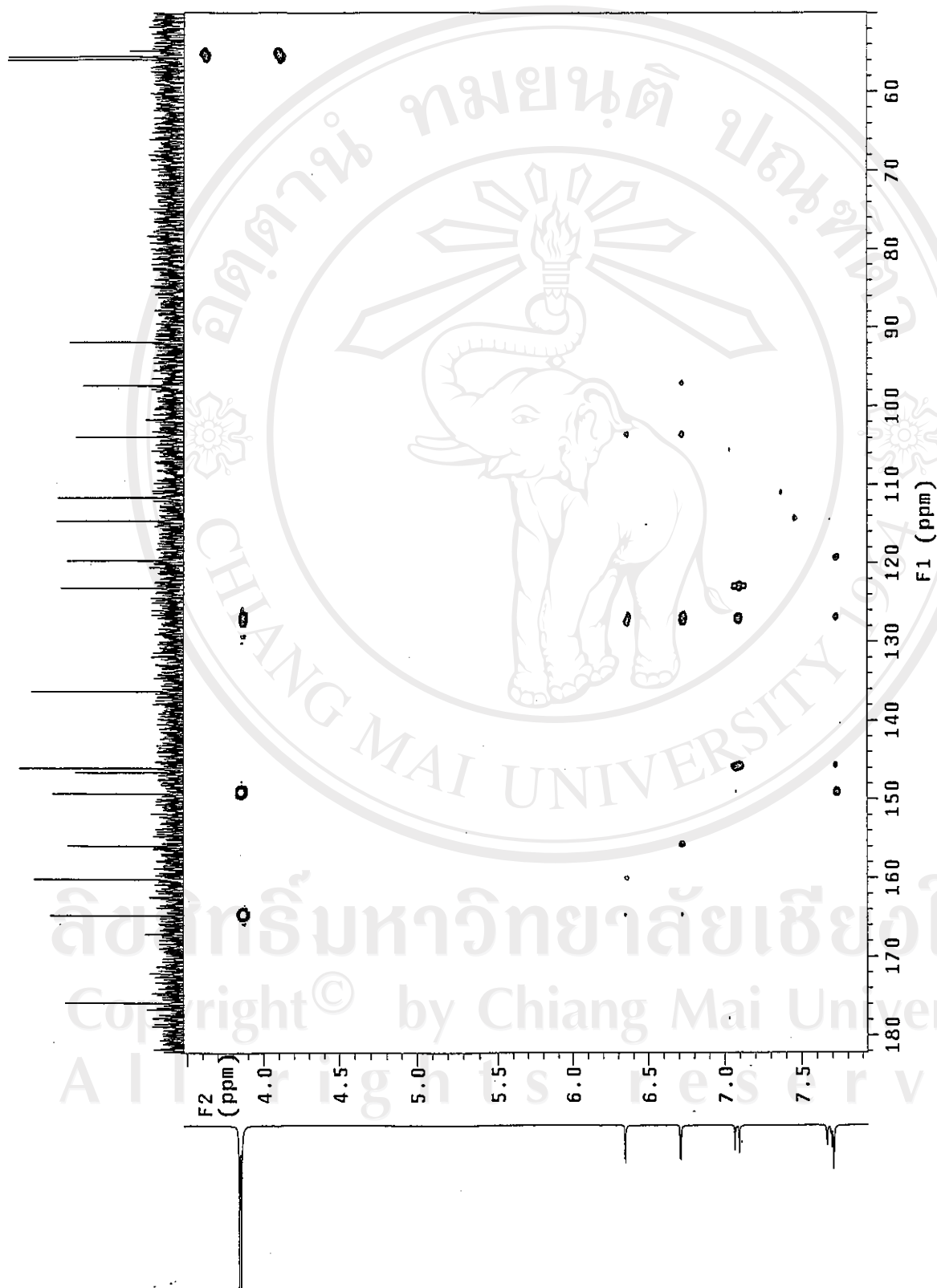


Figure 102. The 300 MHz HMBC spectrum of compound EU9M101 (in DMSO-d_6) (expanded)

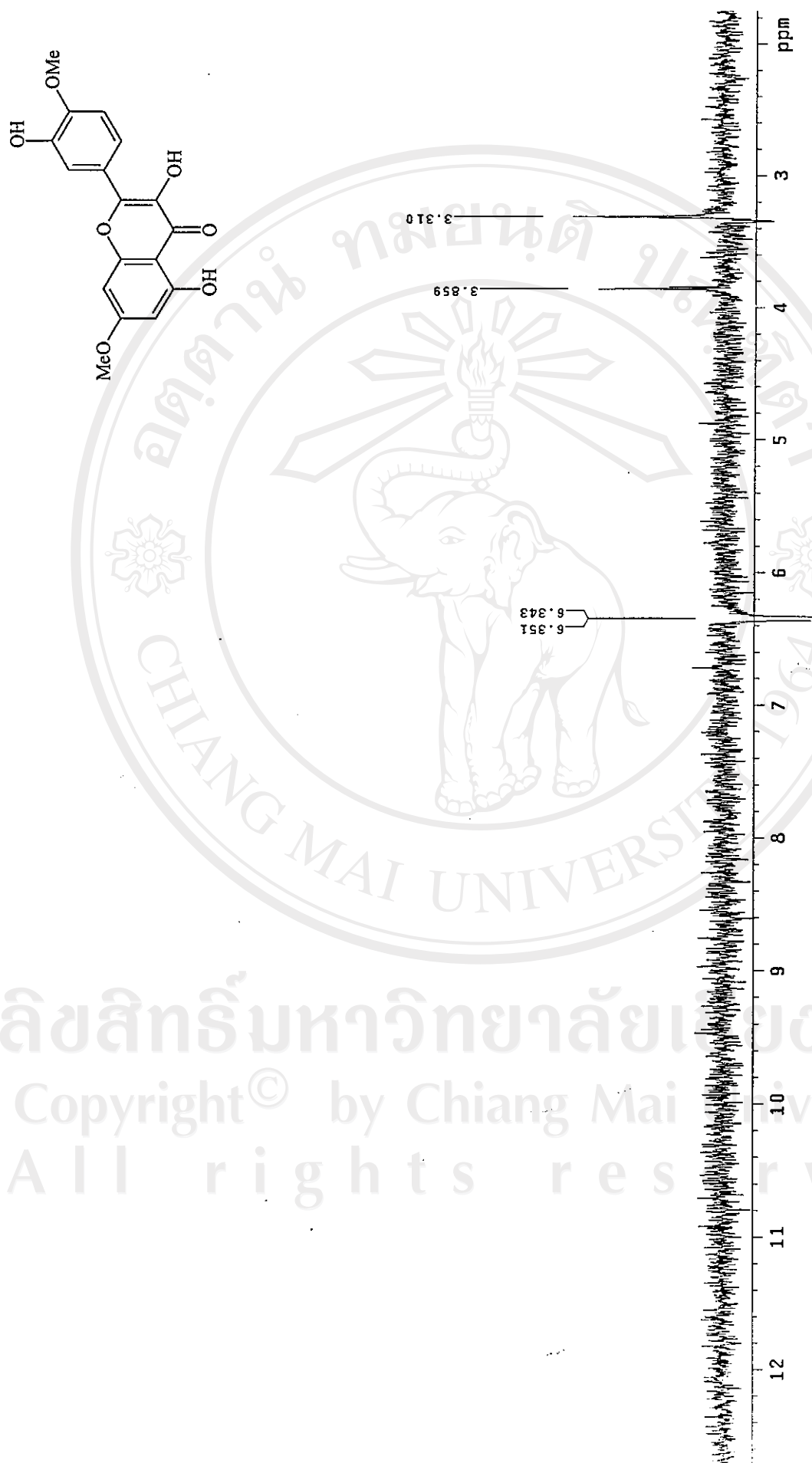


Figure 103. The 300 MHz NOE difference spectrum of compound EU9M101 (in DMSO-d₆) irradiation at 6.35 ppm (H-6)

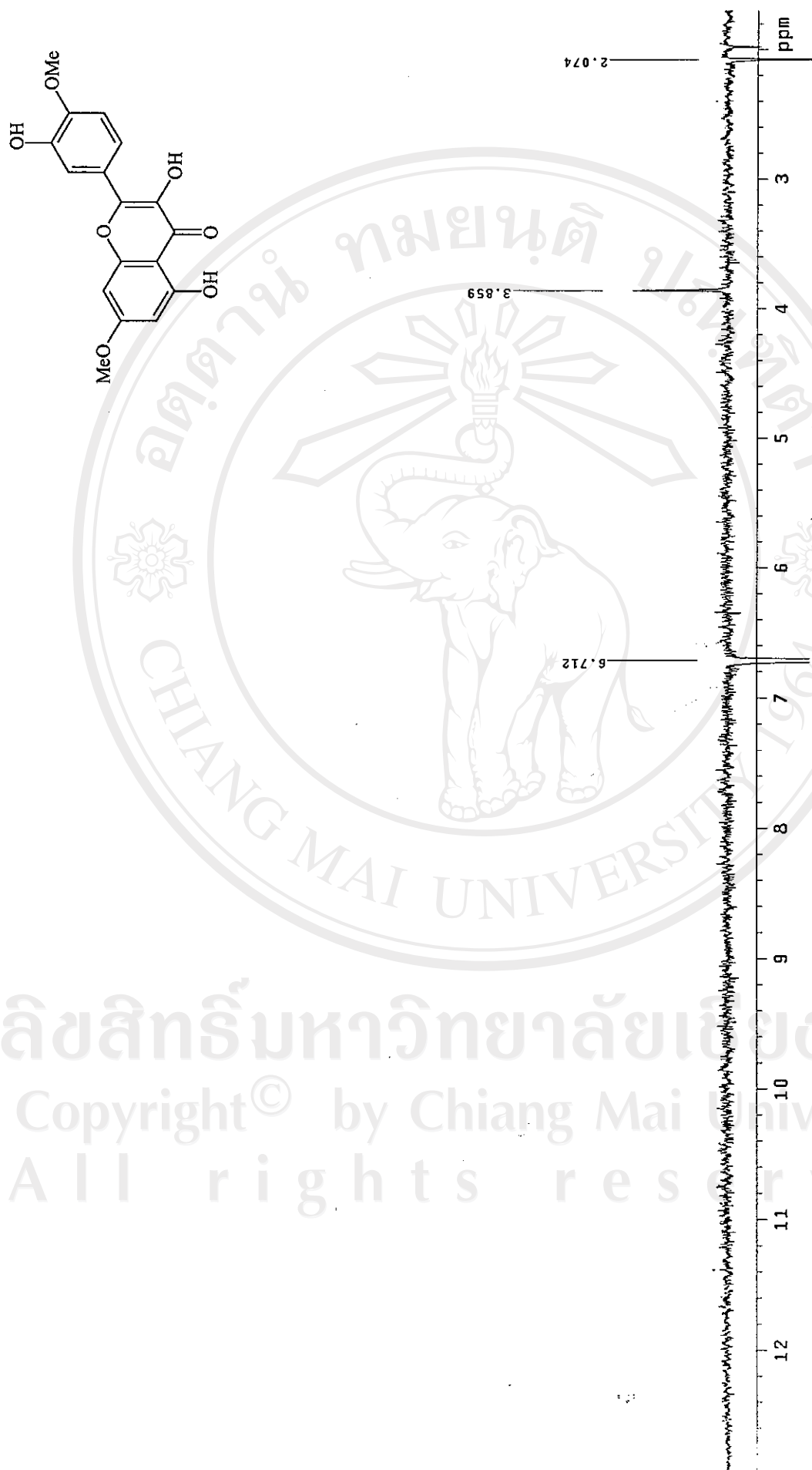


Figure 104. The 300 MHz NOE difference spectrum of compound EU9M101 (in DMSO-d₆) irradiation at 6.72 ppm (H-8)

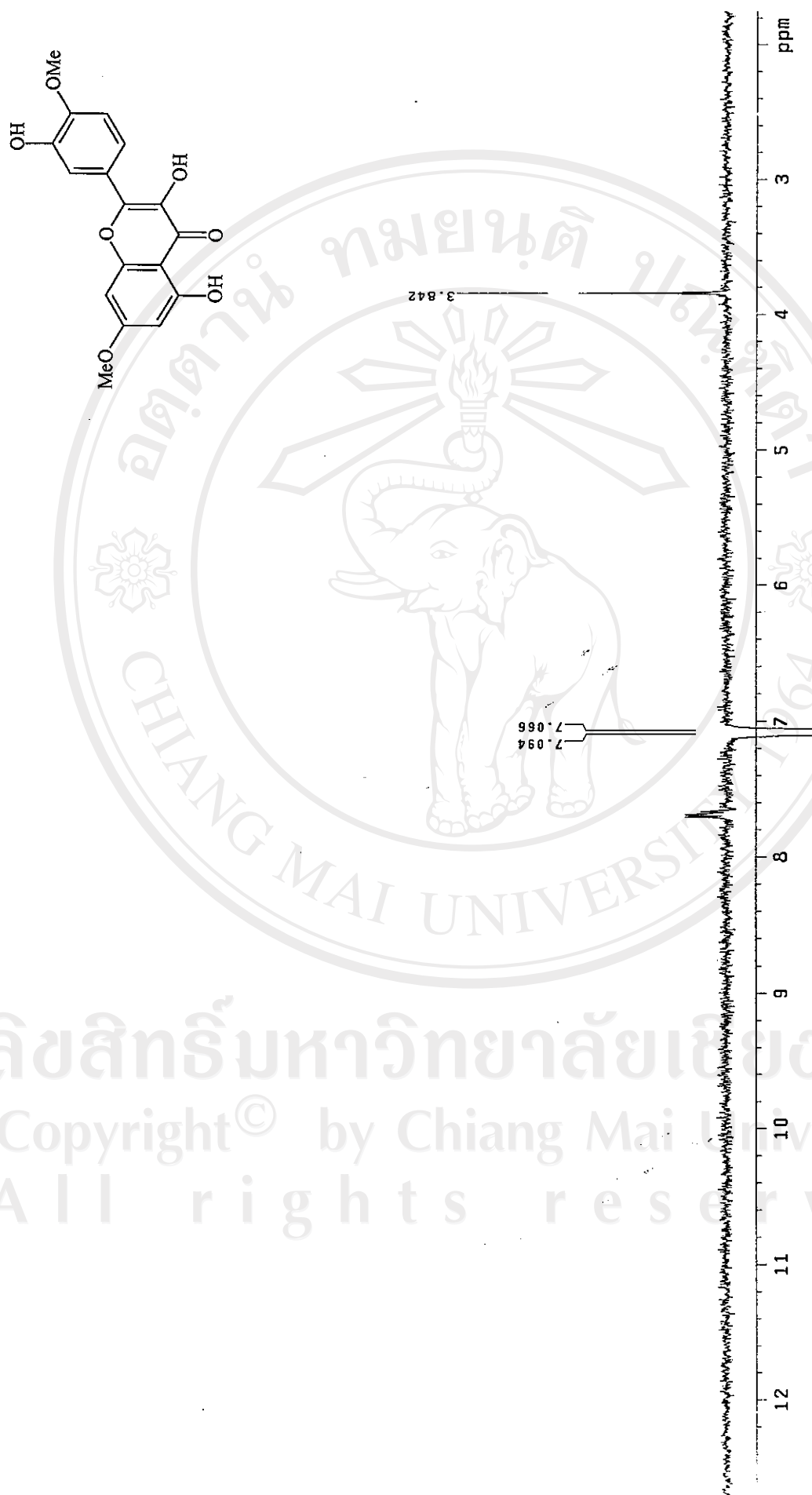


Figure 105. The 300 MHz NOE difference spectrum of compound EU9M101 (in DMSO-d₆) irradiation at 7.08 ppm (H-5')

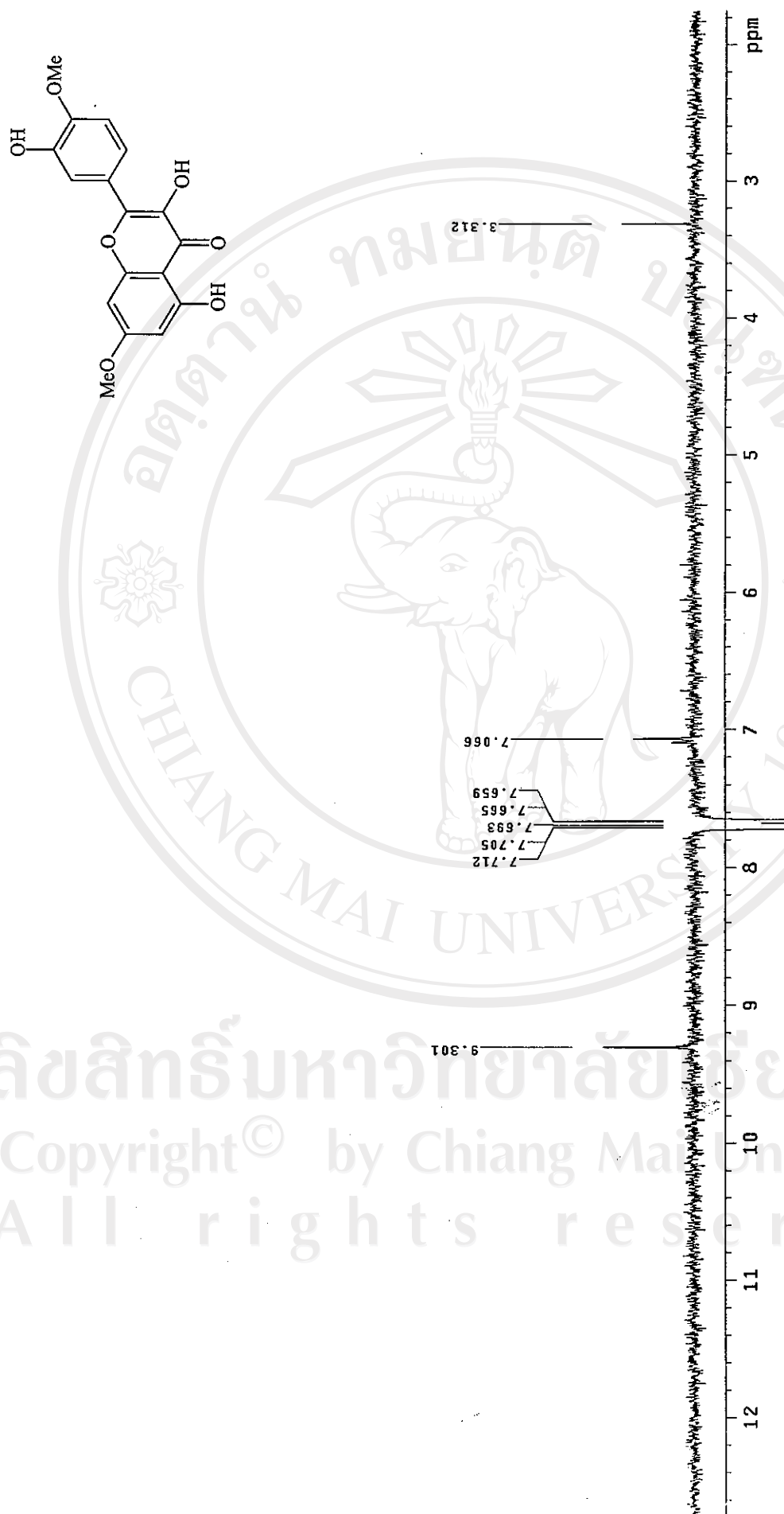


Figure 106. The 300 MHz NOE difference spectrum of compound EU9M101 (in DMSO-d₆)
irradiation at 7.68-7.71 ppm (H-2' and H-6')

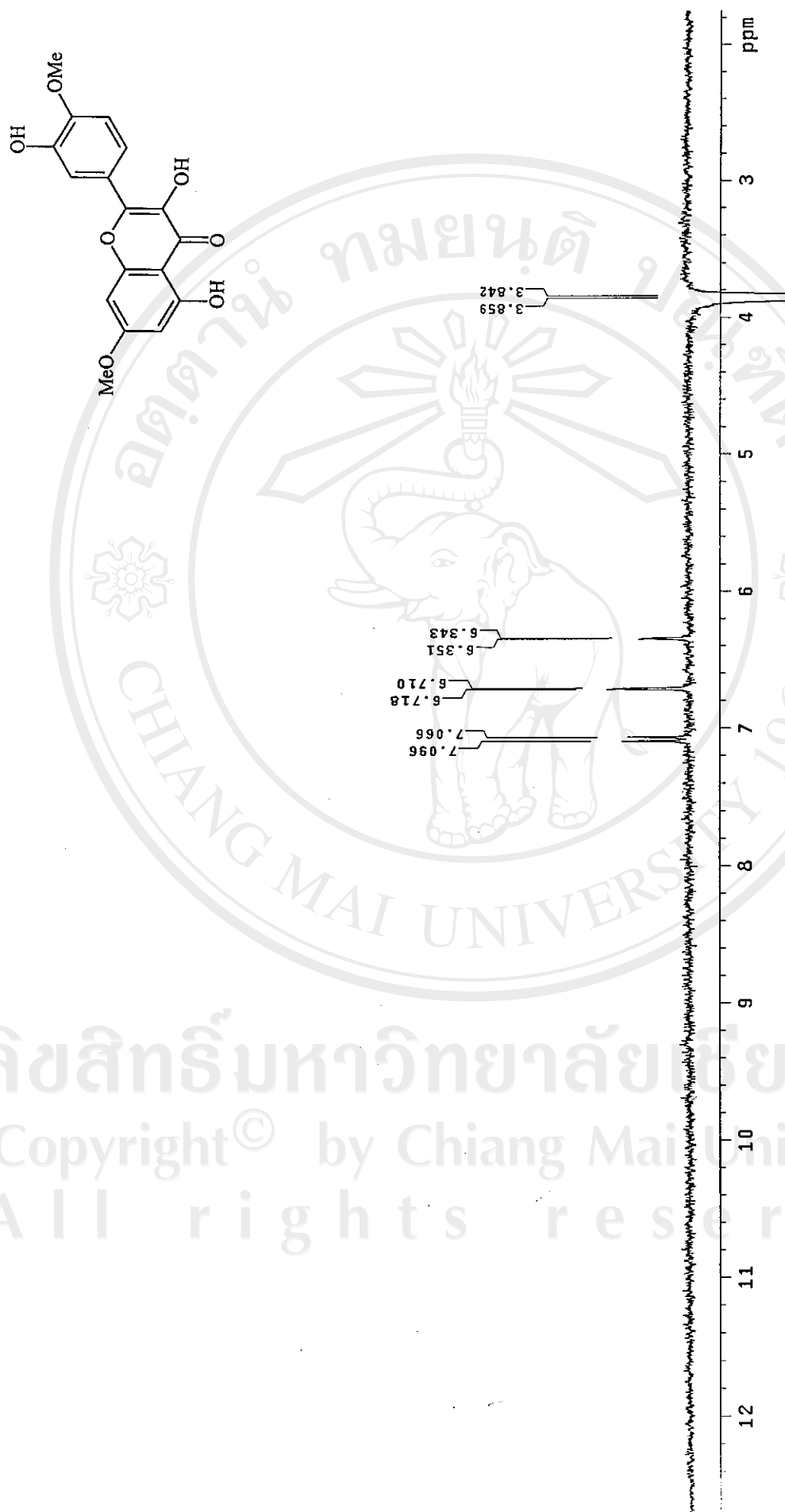


Figure 107. The 300 MHz NOE difference spectrum of compound EU9M101 (in DMSO-d₆)

irradiation at 3.84-3.86 ppm (7-OMe and 4'-OMe)

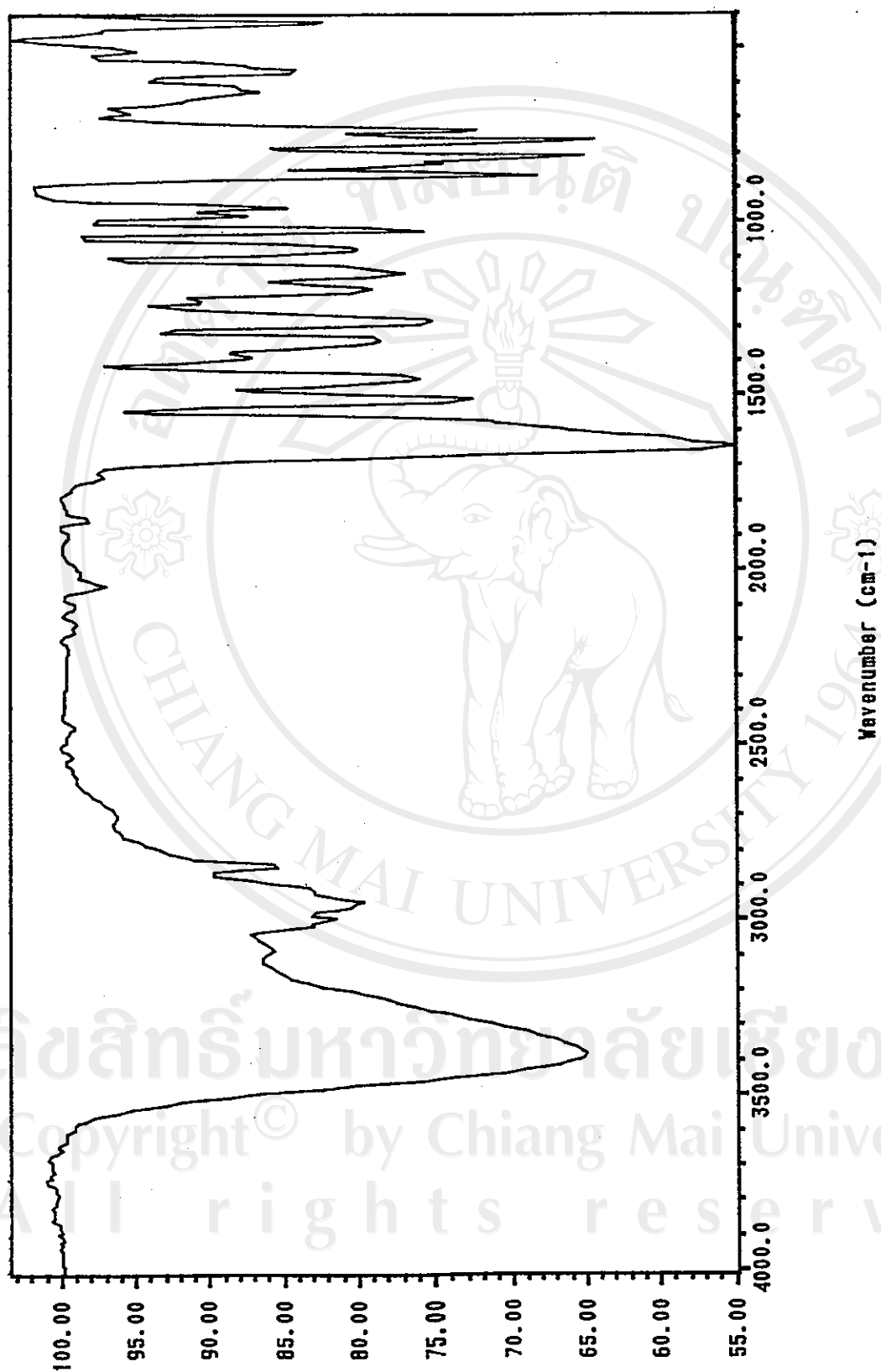


Figure 108. The IR spectrum of compound EU9M104

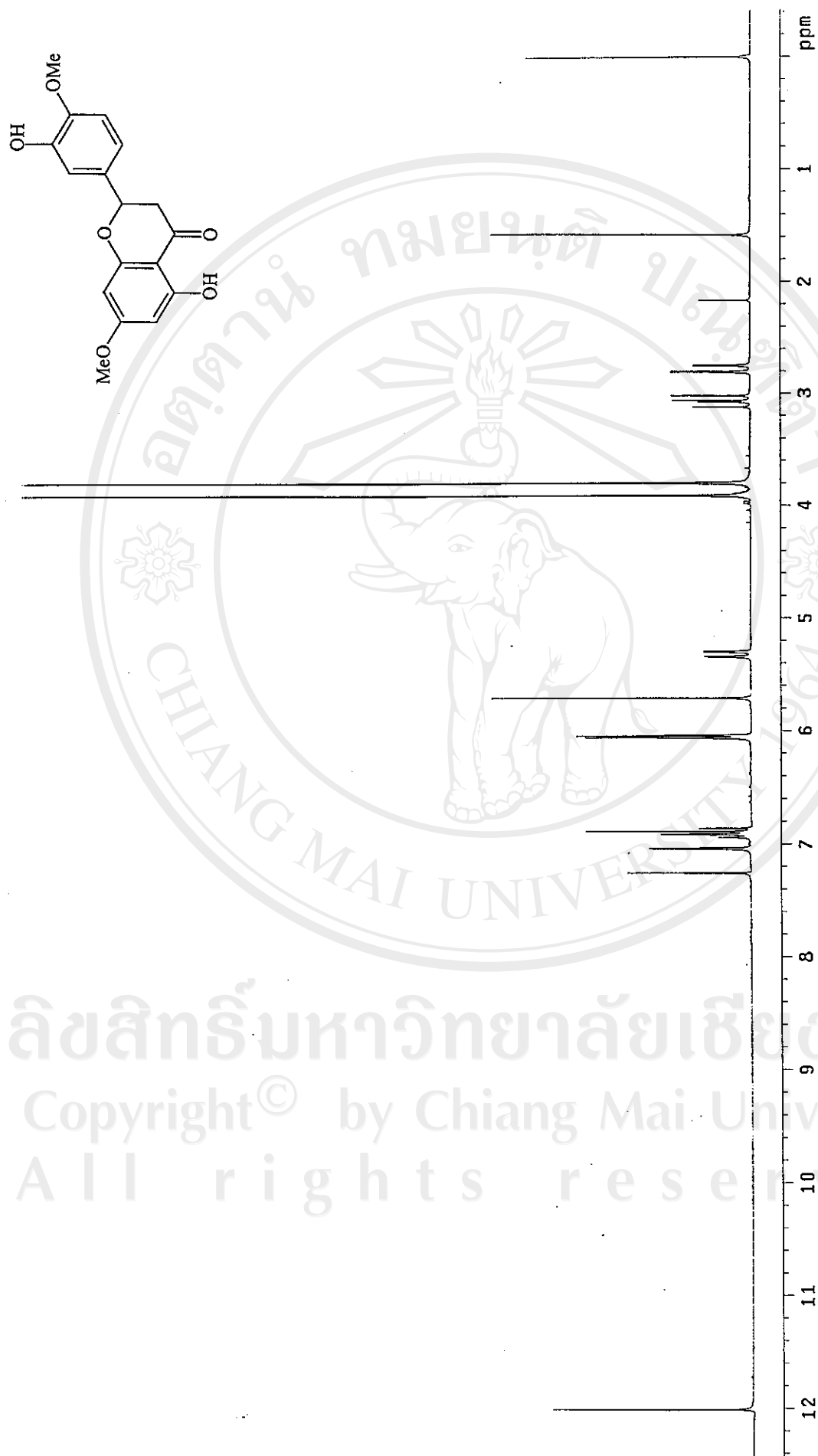


Figure 109. The 300 MHz ^1H -NMR spectrum of compound EU9M104 (in CDCl_3)

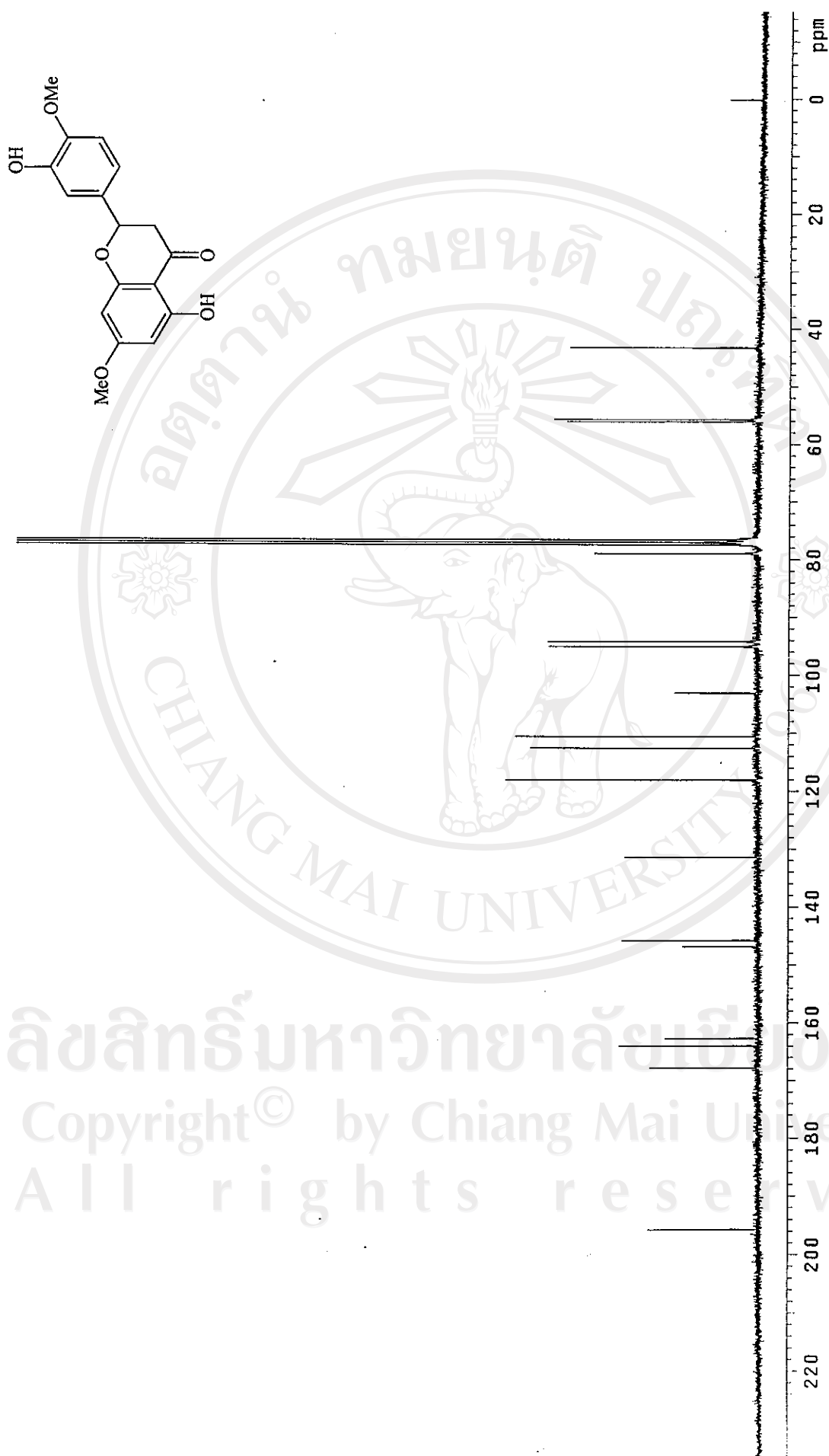


Figure 110. The 75 MHz ¹³C-NMR spectrum of compound EU9M104 (in CDCl₃)

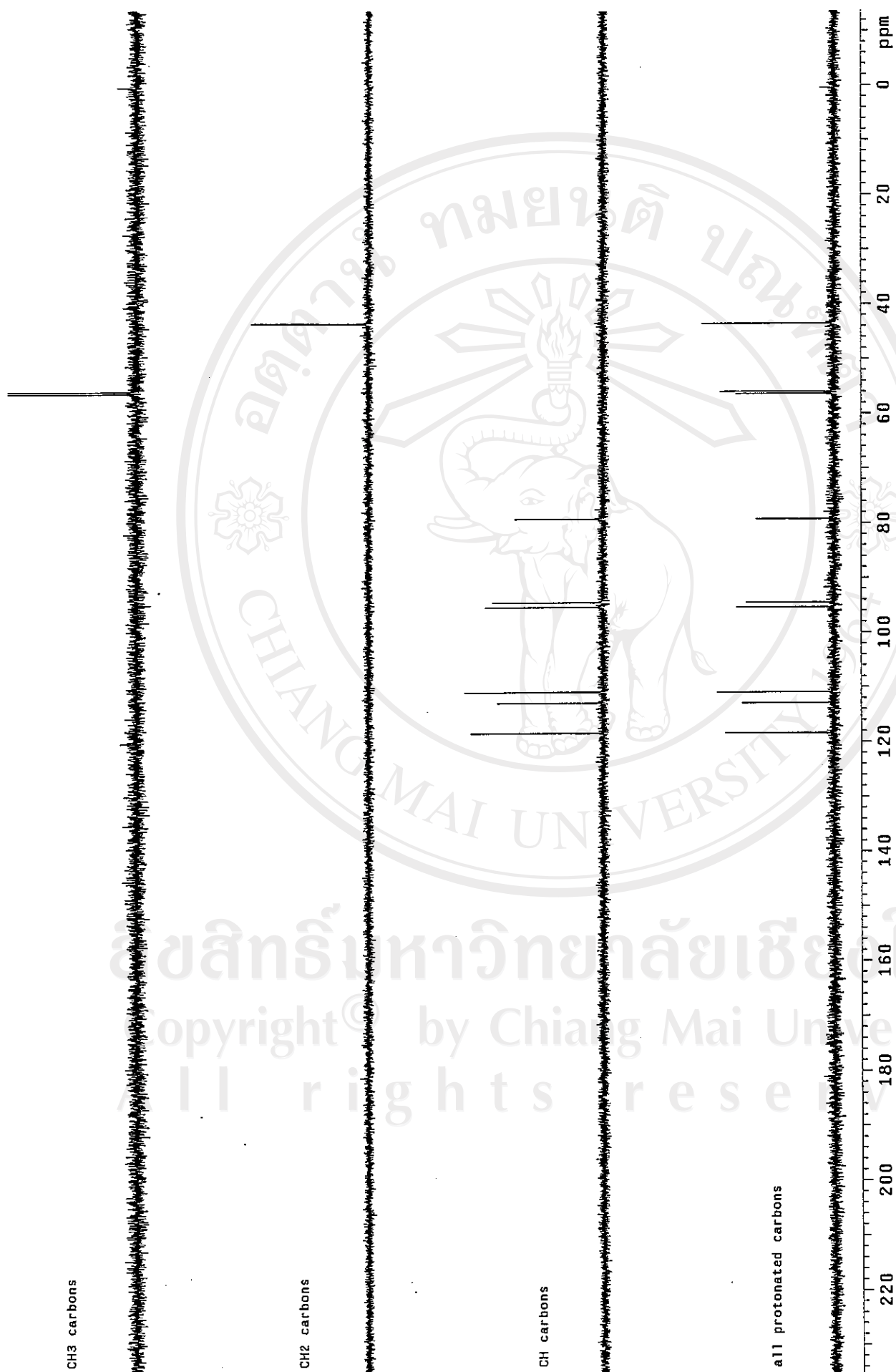


Figure 111. The 75 MHz DEPT spectrum of compound EU9M104 (in CDCl₃)

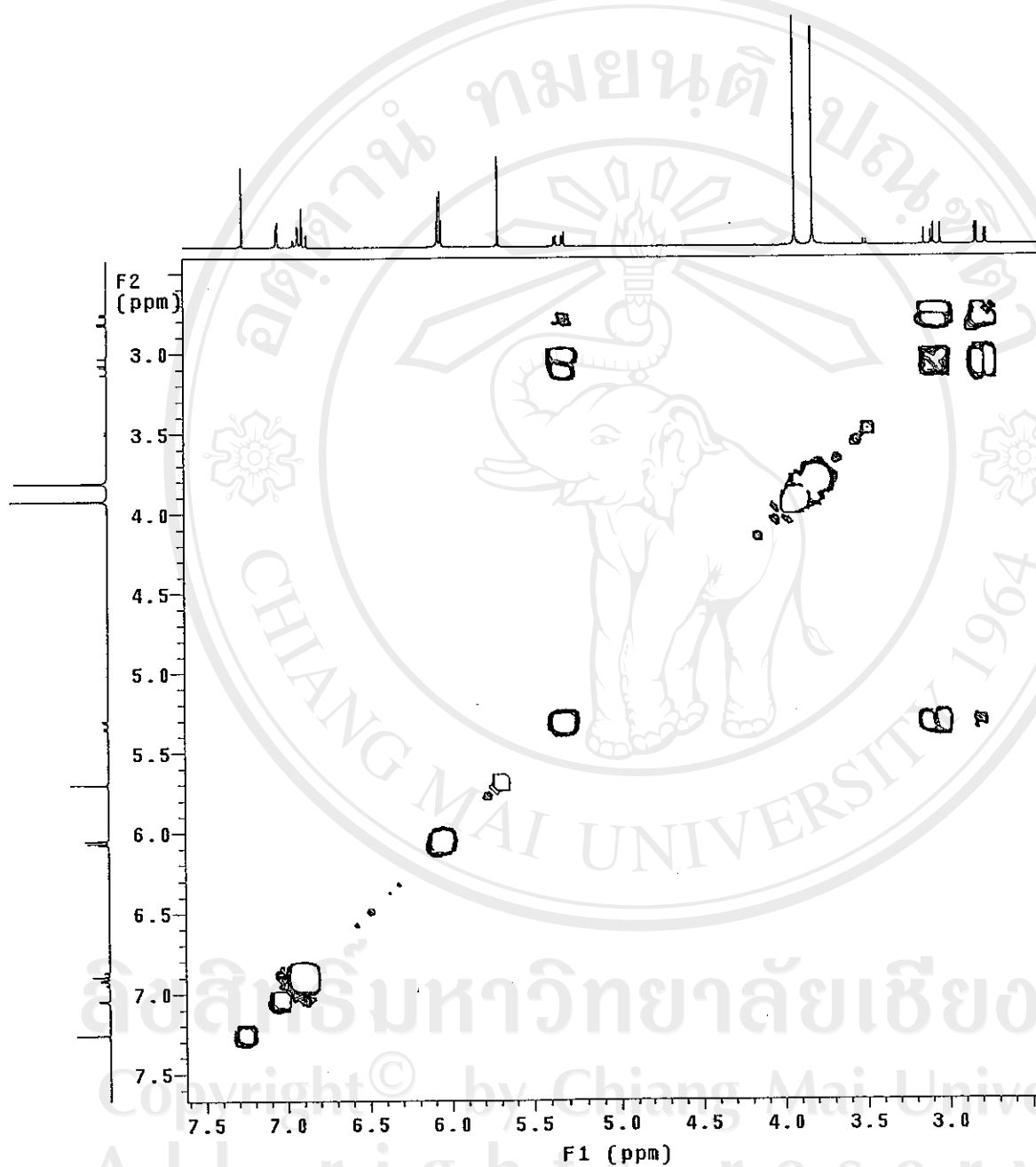


Figure 112. The 300 MHz ¹H-¹H COSY spectrum of compound EU9M104 (in CDCl₃)

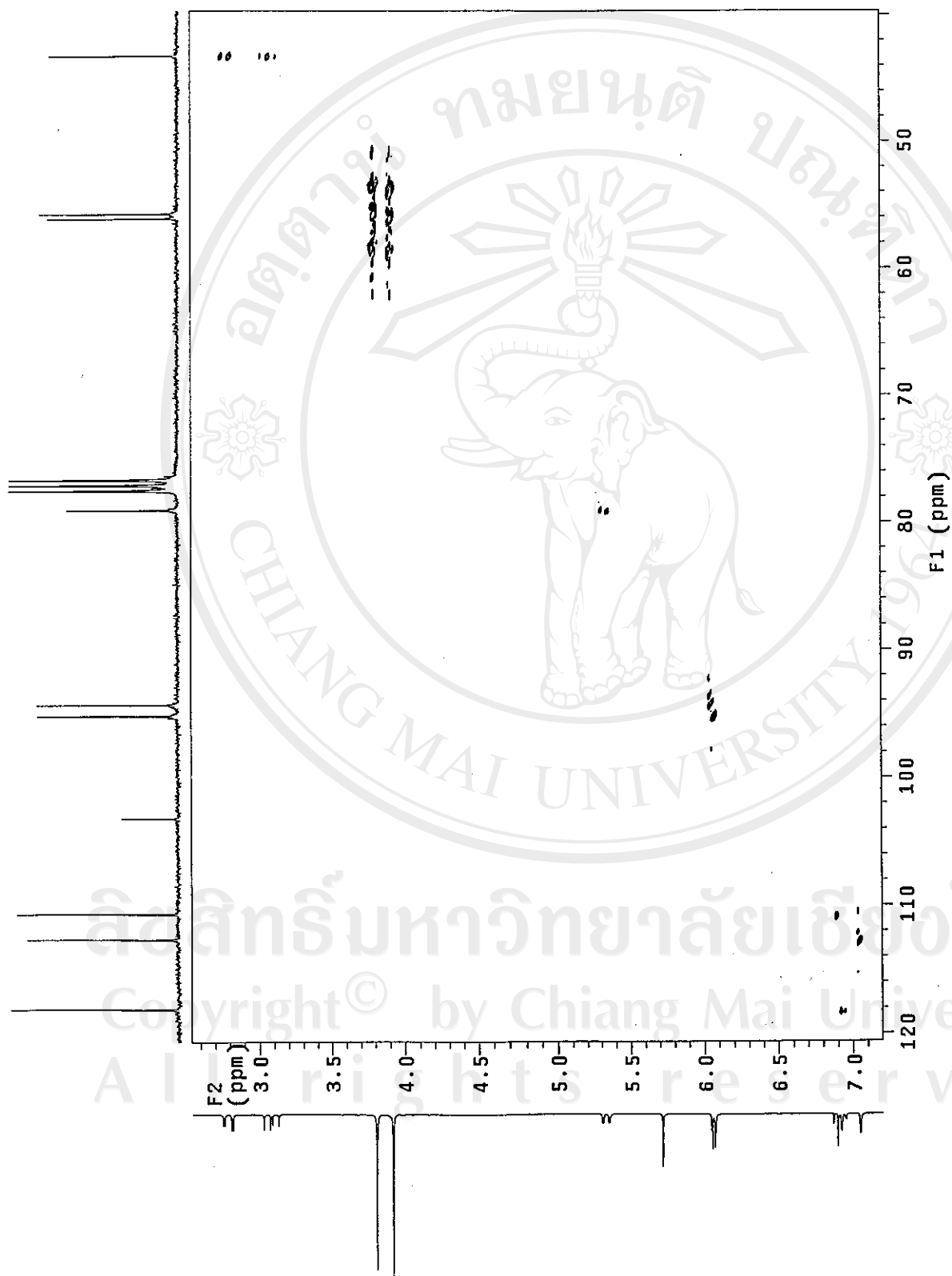


Figure 113. The 300 MHz HSQC spectrum of compound EU9M104 (in CDCl_3)

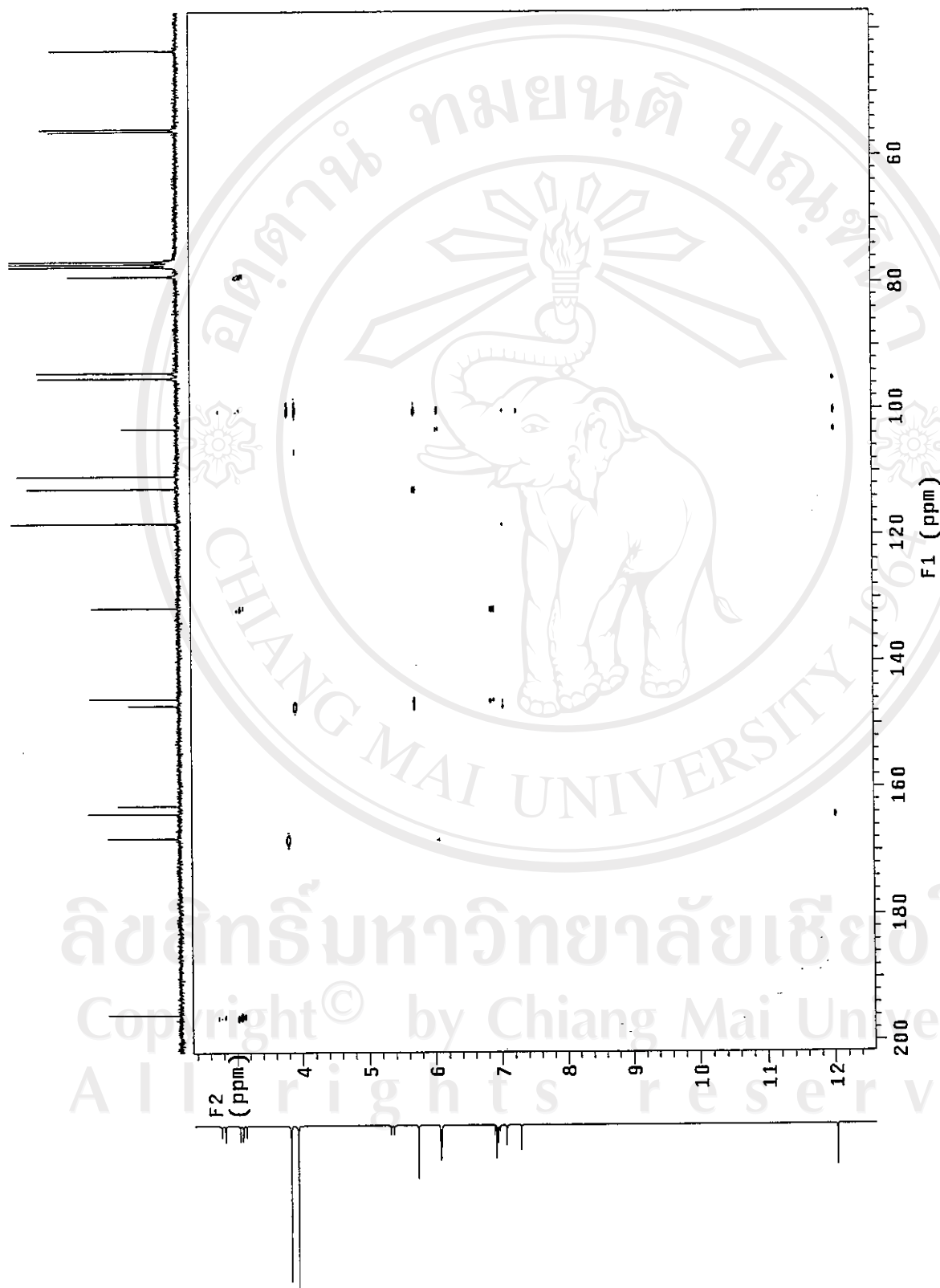


Figure 114. The 300 MHz HMBC spectrum of compound EU9M104 (in CDCl_3)

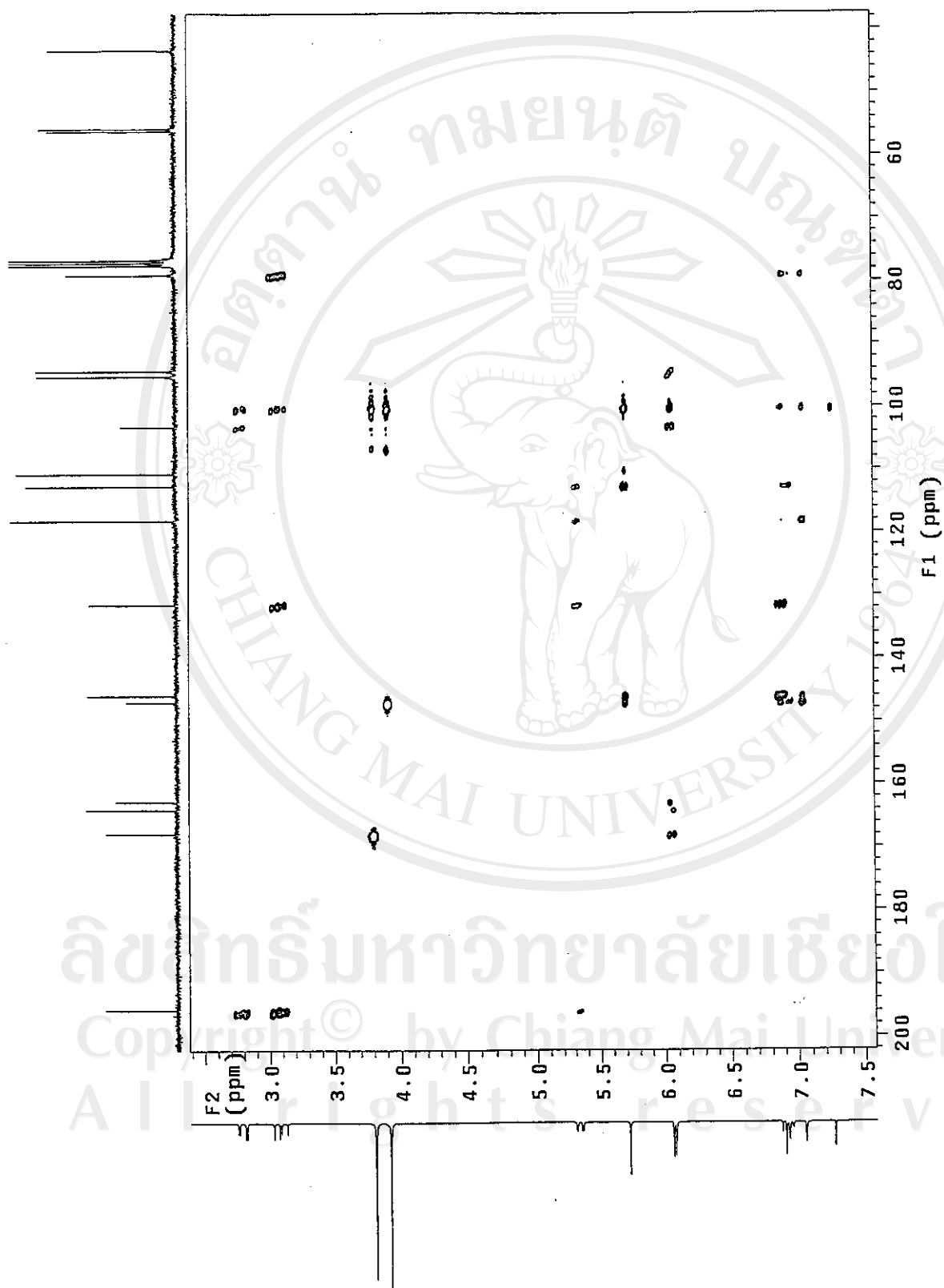


Figure 115. The 300 MHz HMBC spectrum of compound EU9M104 (in CDCl_3) (expanded)

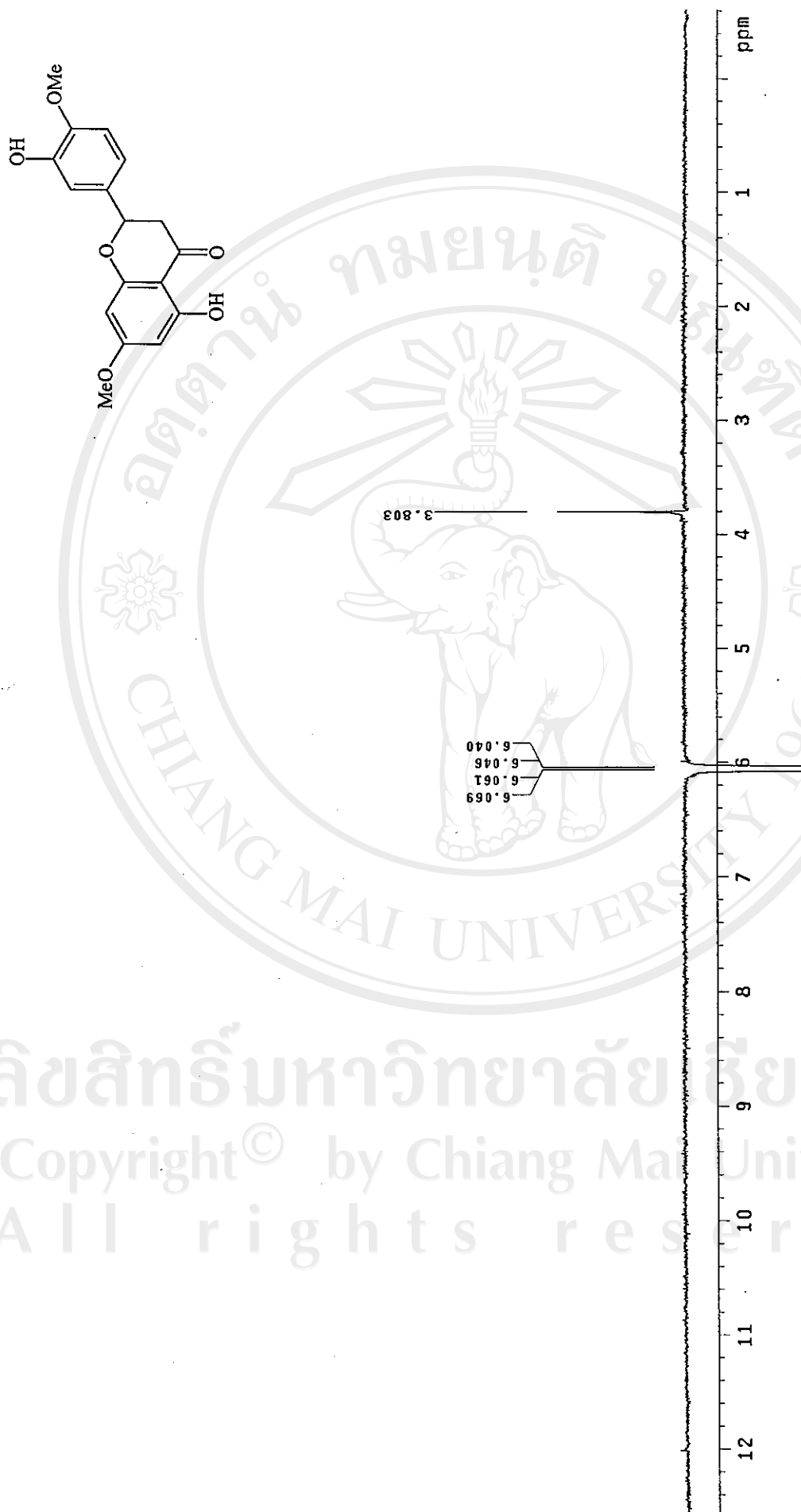


Figure 116. The 300 MHz NOE difference spectrum of compound EU9M104 (in CDCl₃)
irradiation at 6.04-6.07 ppm (H-6 and H-8)

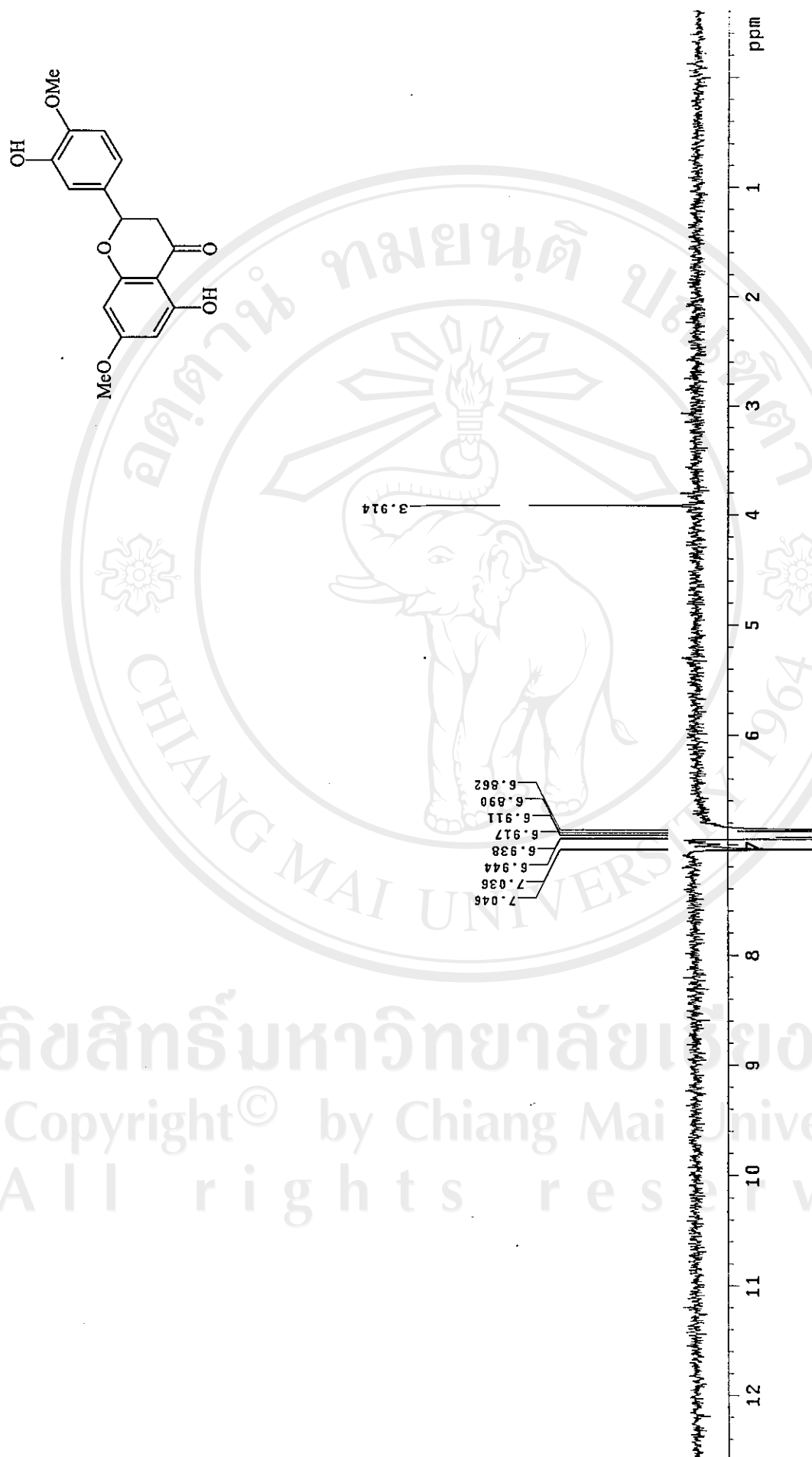


Figure 117. The 300 MHz NOE difference spectrum of compound EU9M104 (in CDCl_3) irradiation at 6.88 ppm (H-5')

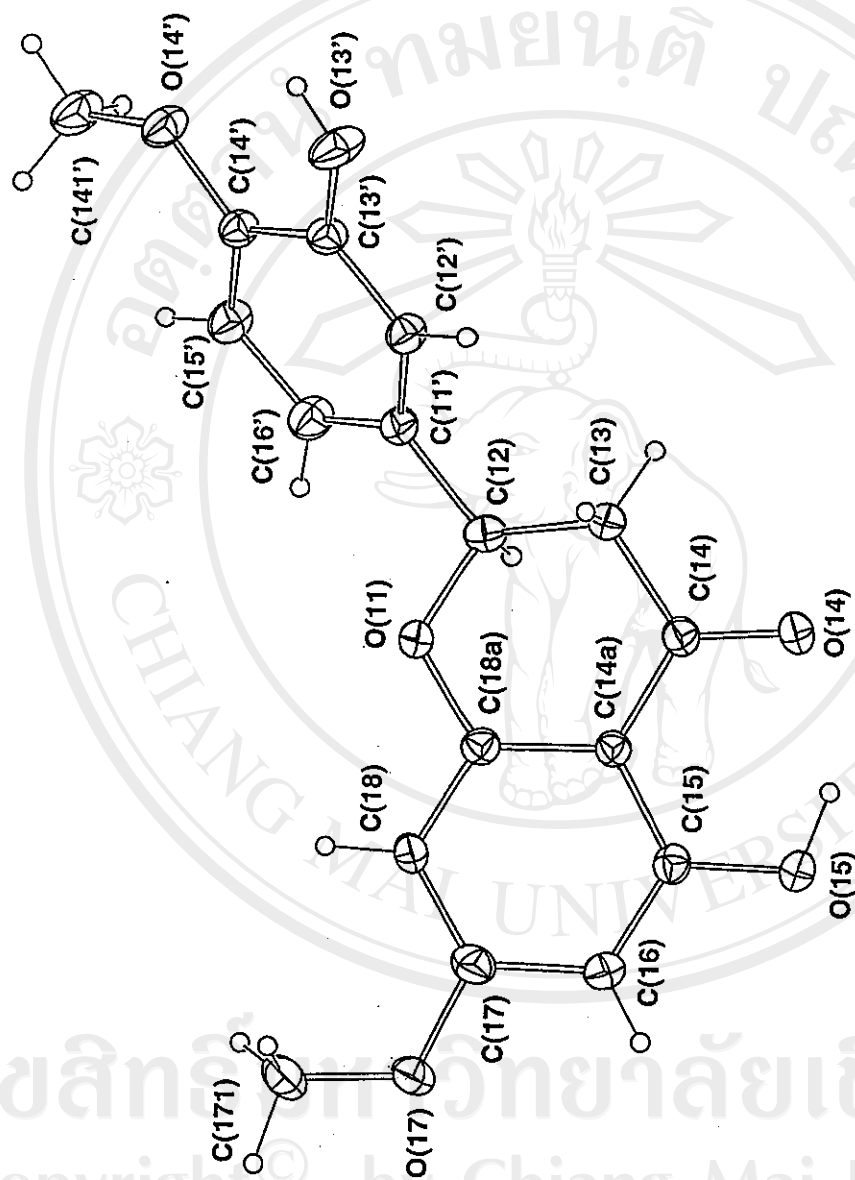


Figure 118. The crystal structure of compound EU9M104

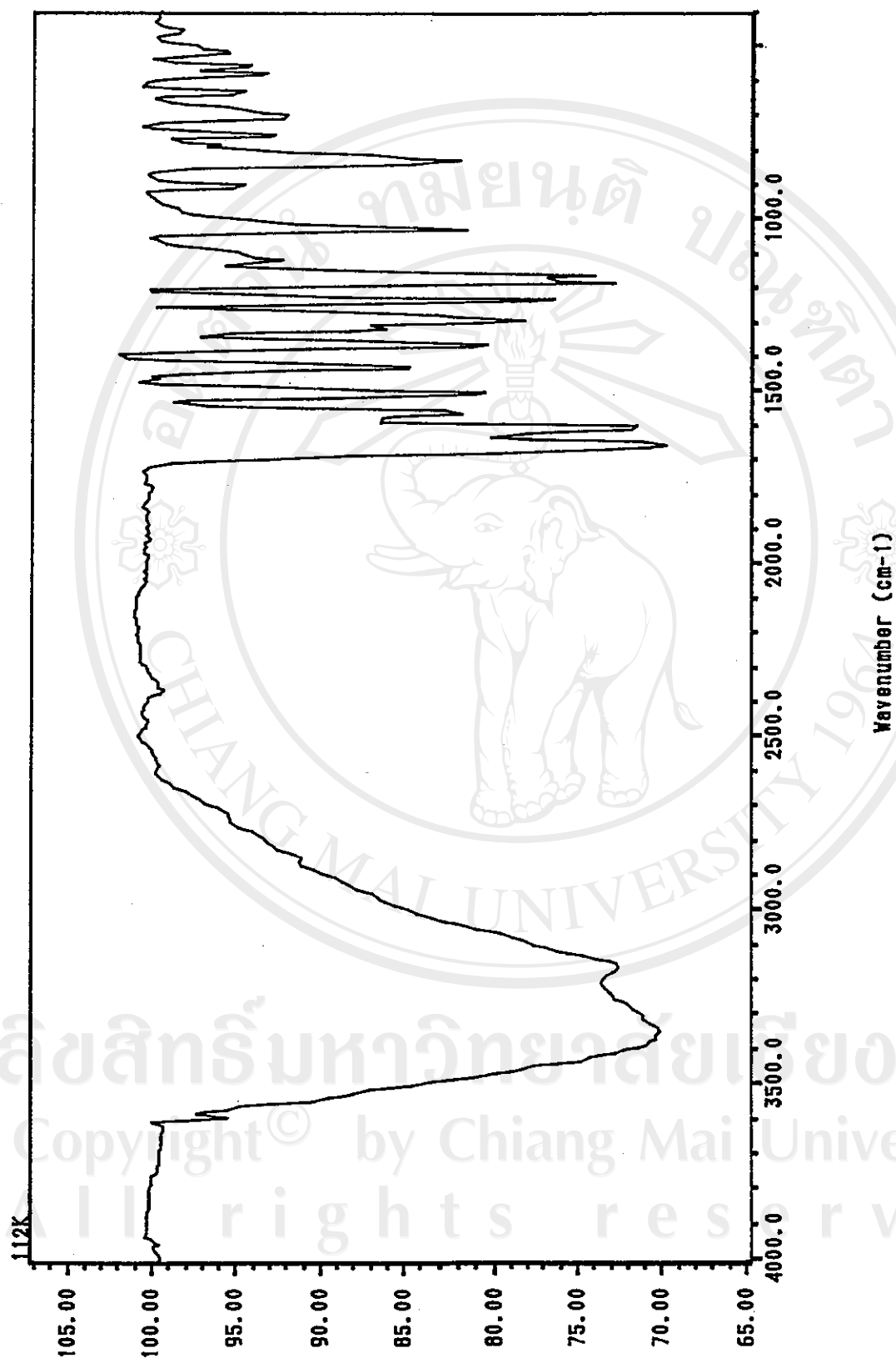


Figure 119. The IR spectrum of compound EU9M112

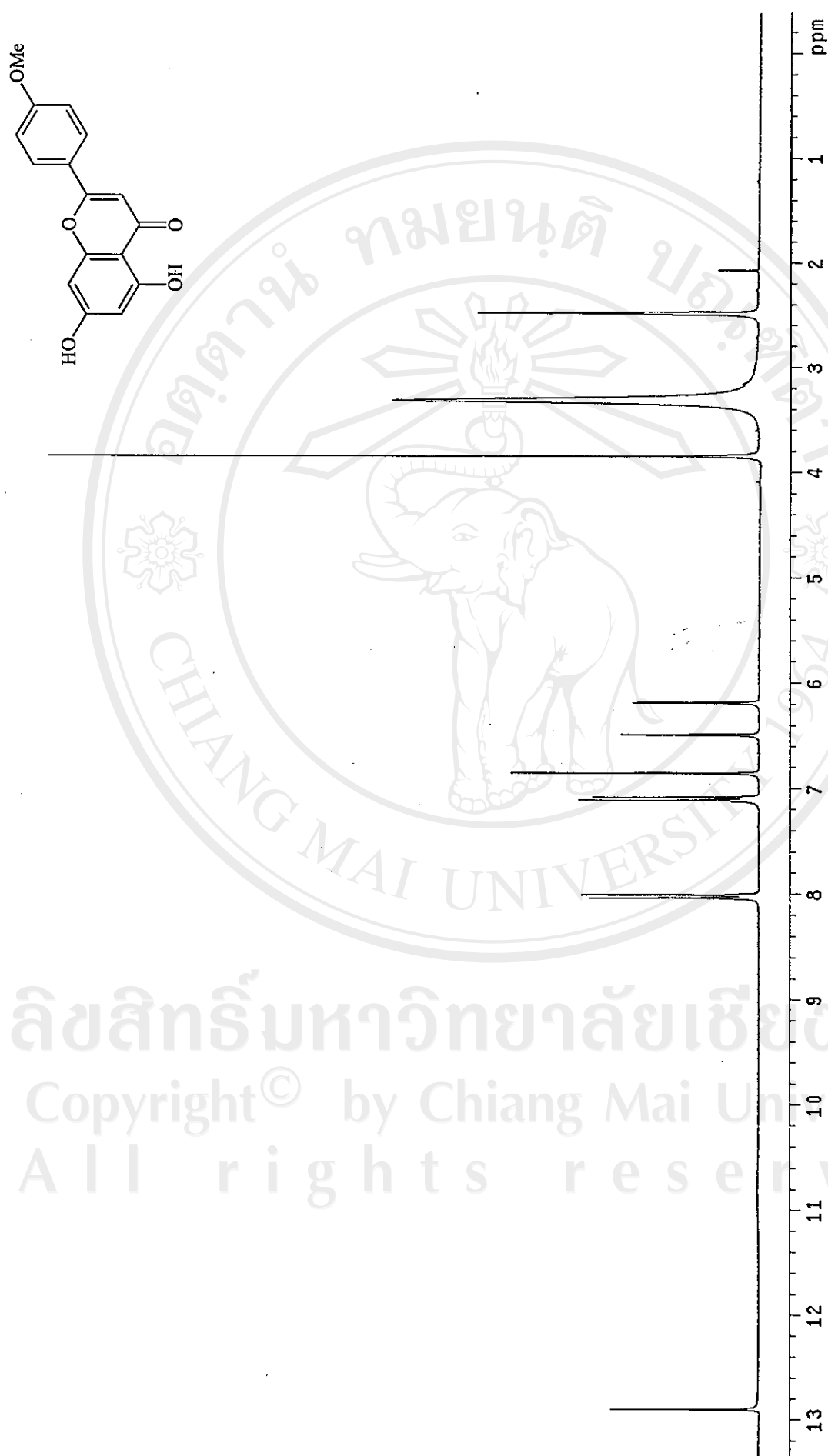


Figure 120. The 300 MHz $^1\text{H-NMR}$ spectrum of compound EU9M112 (in DMSO-d_6)

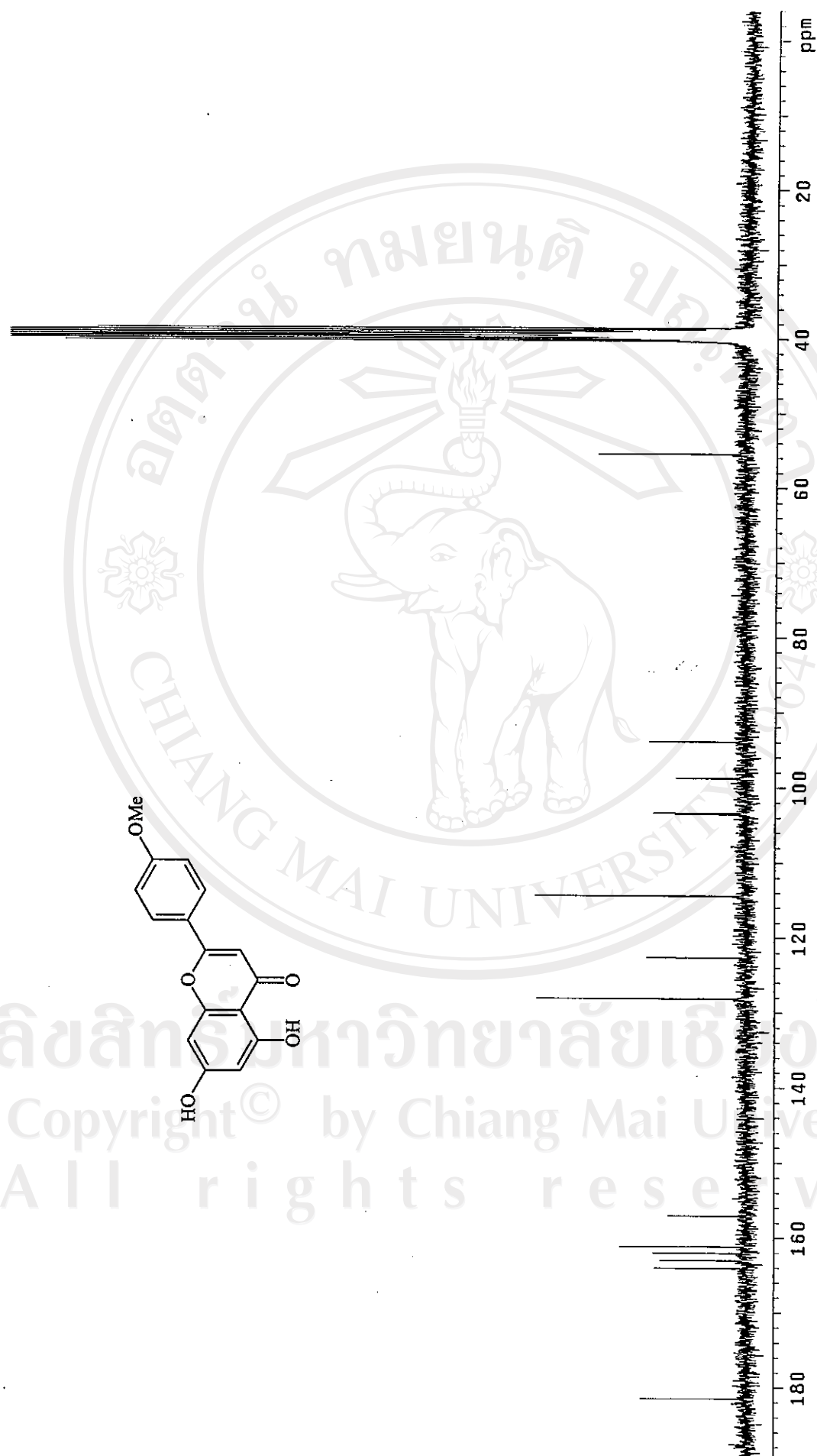


Figure 121. The 75 MHz ^{13}C -NMR spectrum of compound EU9M112 (in DMSO-d_6)

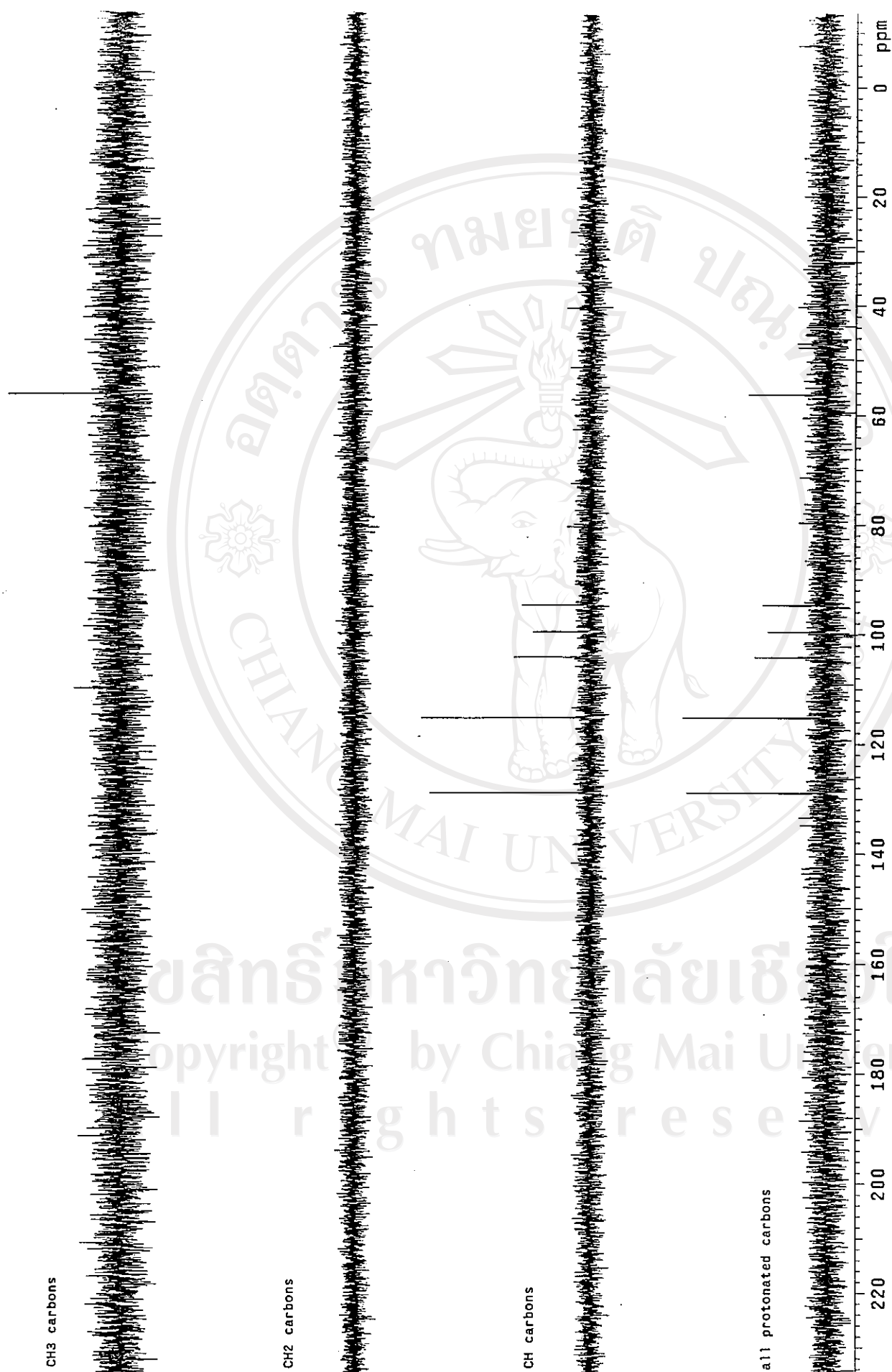


Figure 122. The 75 MHz DEPT spectrum of compound EU9M112 (in DMSO-d₆)

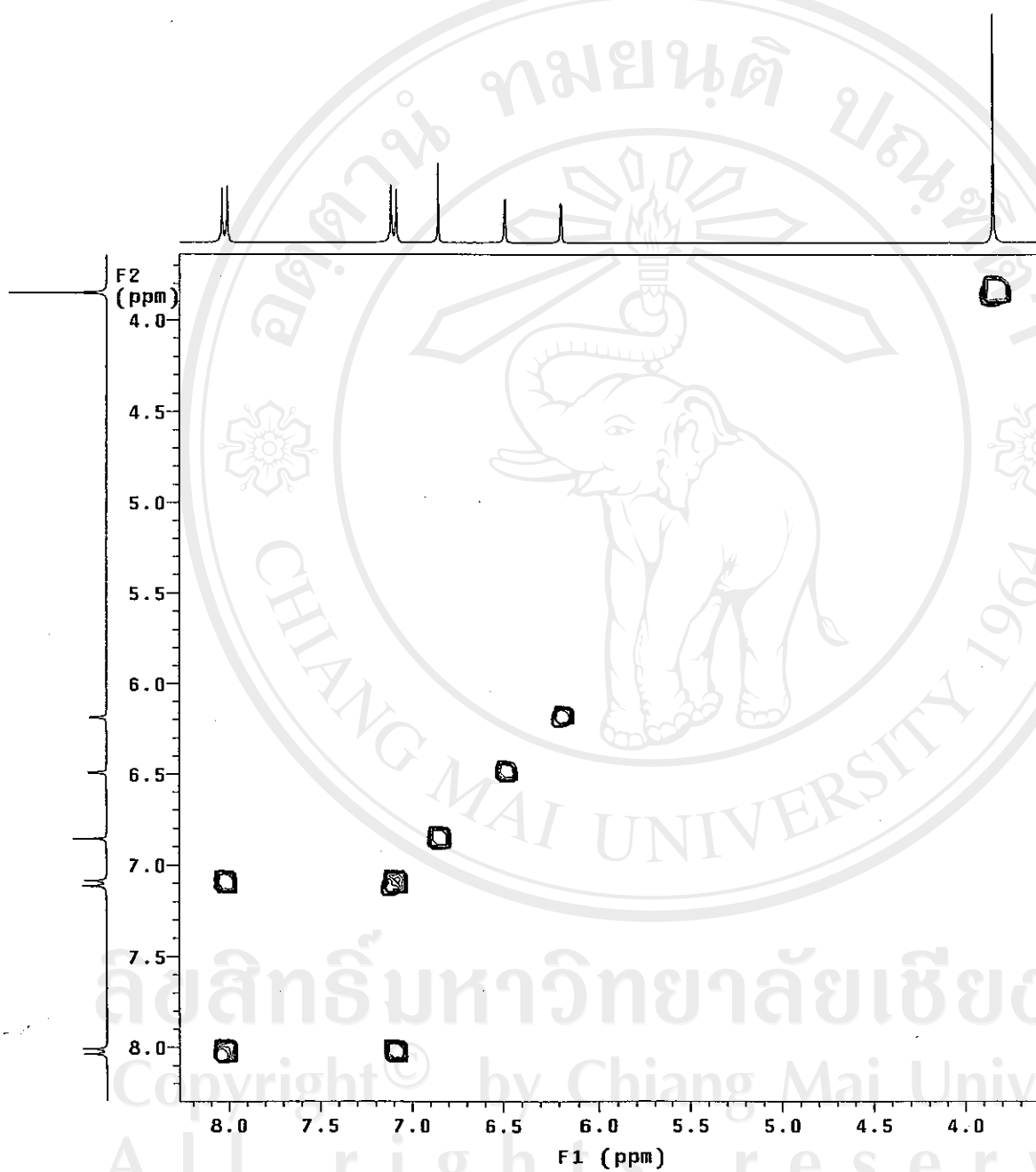


Figure 123. The 300 MHz ^1H - ^1H COSY spectrum of compound EU9M112 (in DMSO- d_6)

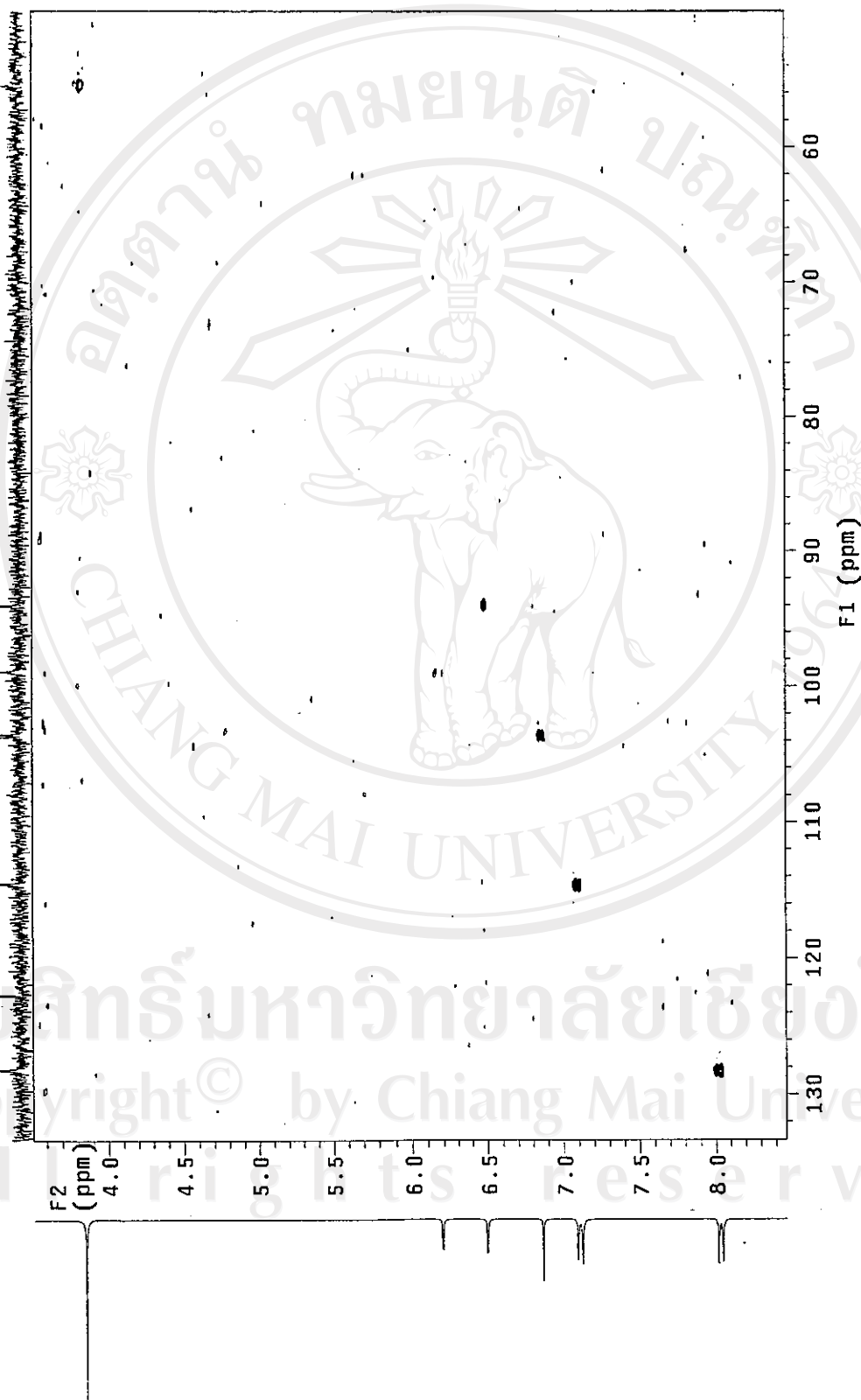


Figure 124. The 300 MHz HSQC spectrum of compound EU9M112 (in DMSO-d_6)

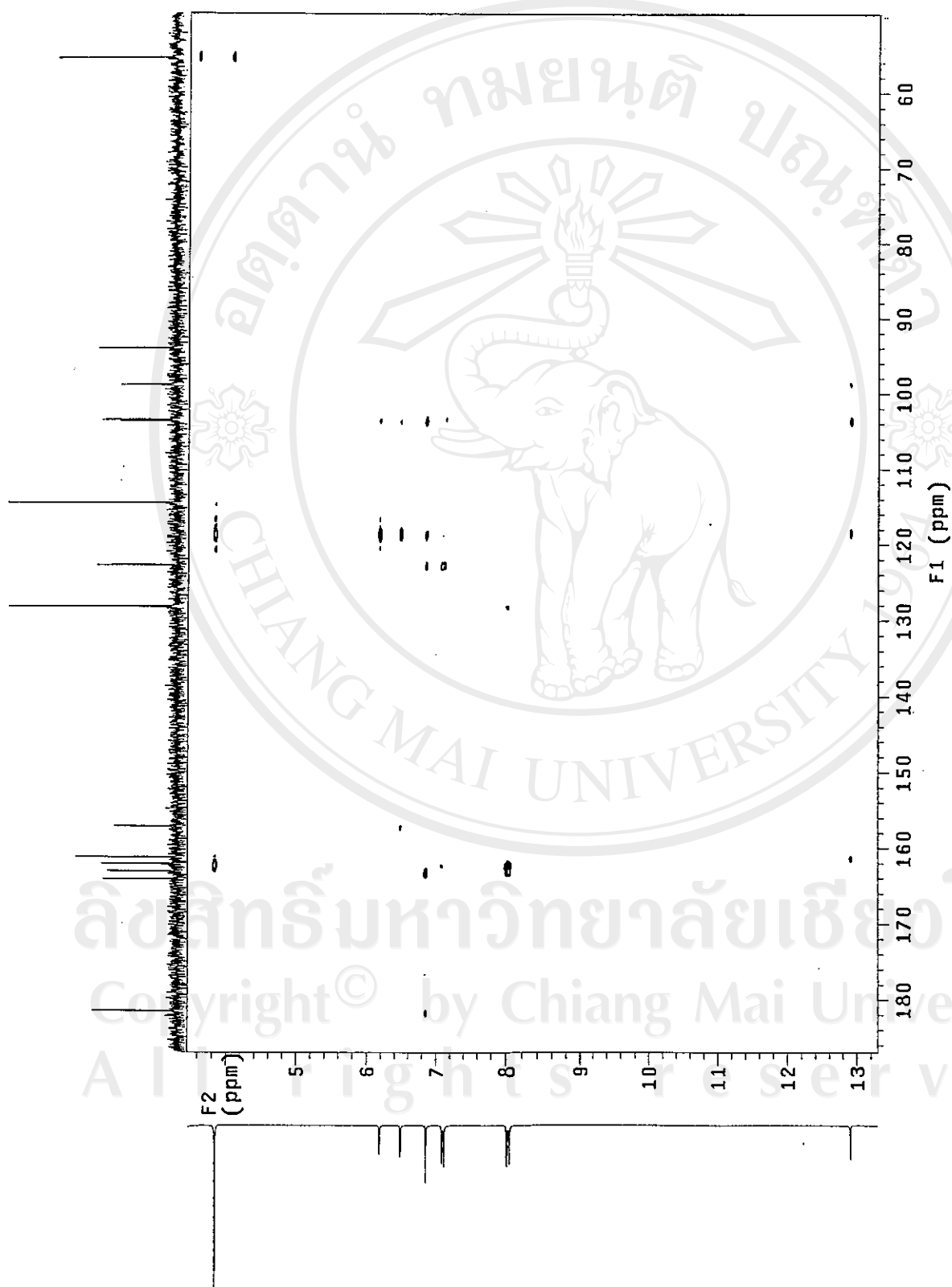


Figure 125. The 300 MHz HMBC spectrum of compound EU9M112 (in DMSO-d₆)

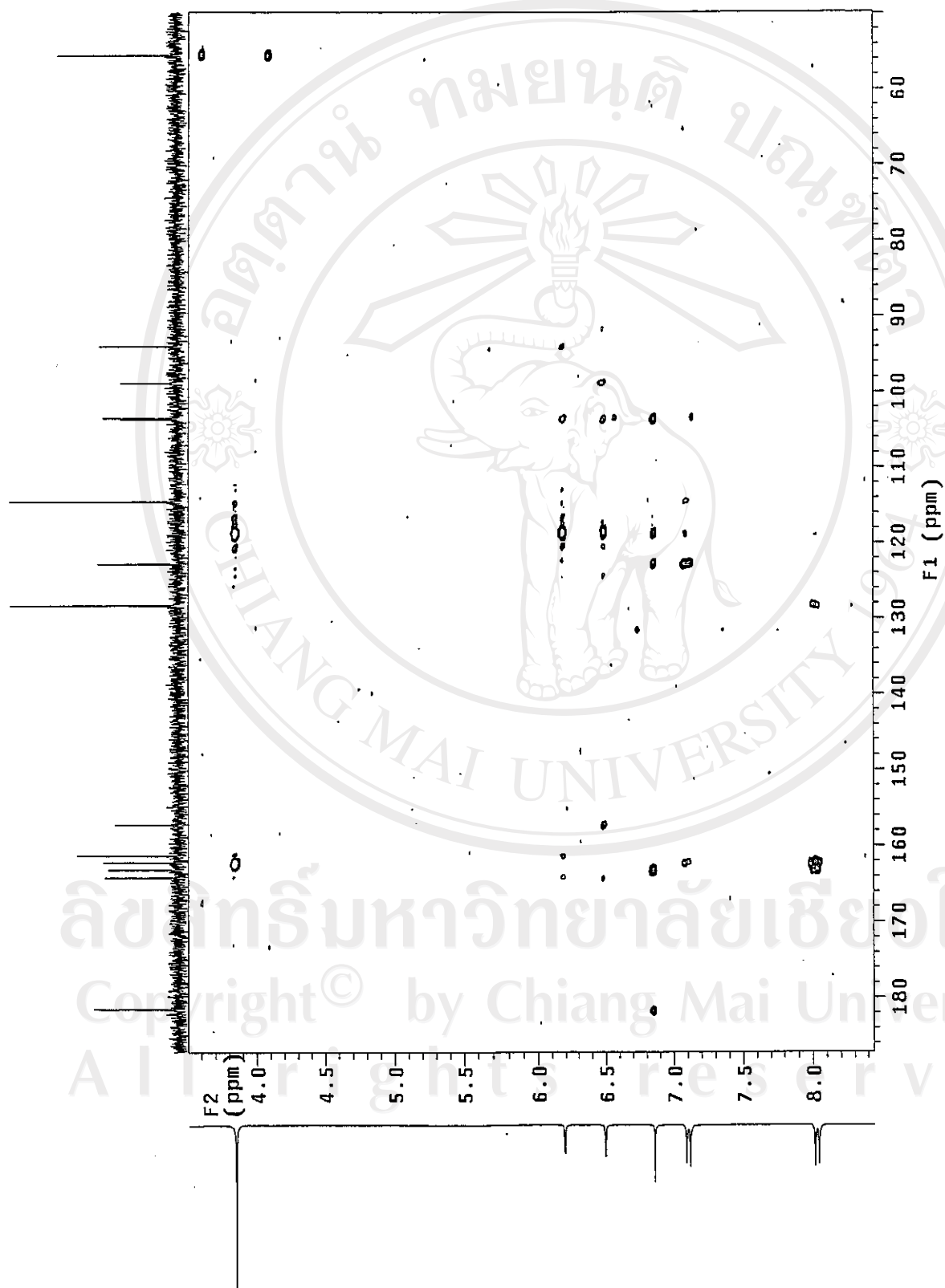


Figure 126. The 300 MHz HMBC spectrum of compound EU9M112 (in DMSO-d_6) (expanded)

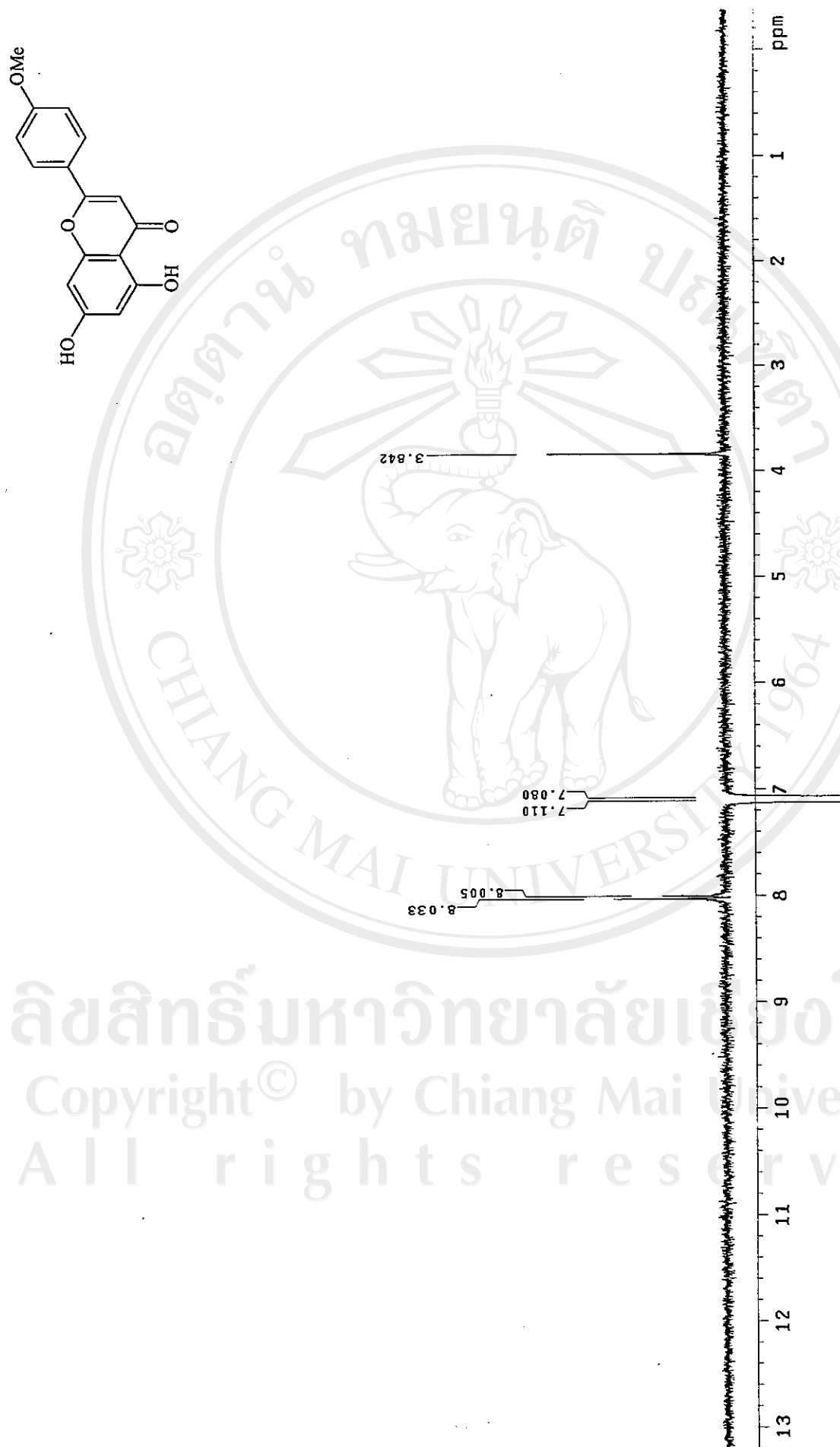


Figure 127. The 300 MHz NOE difference spectrum of compound EU9M112 (in DMSO-d₆) irradiation at 7.10 ppm (H-3')

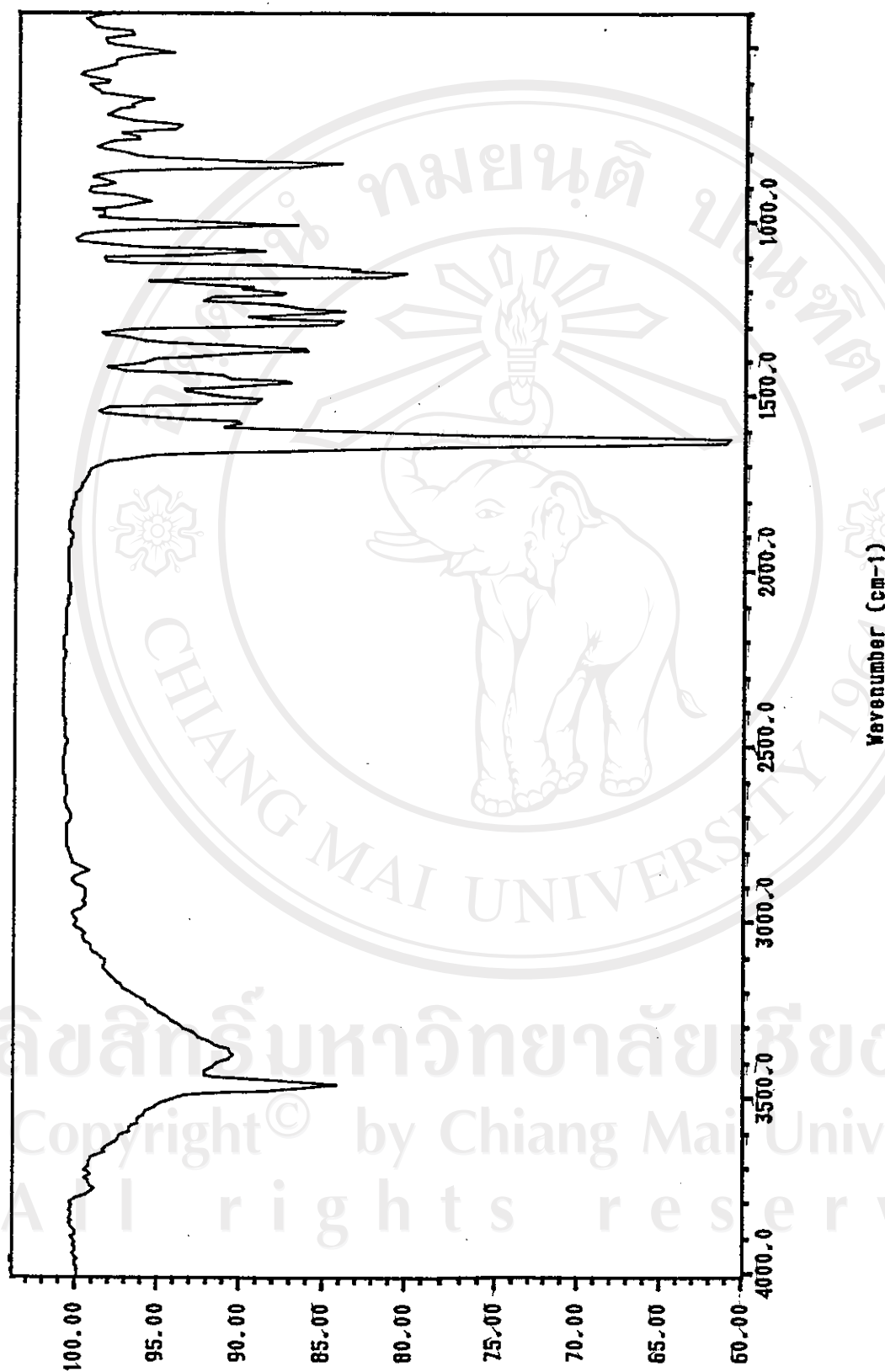


Figure 128. The IR spectrum of compound EU9M135



Figure 129. The 300 MHz ¹H-NMR spectrum of compound EU9MI35 (in acetone-d₆)

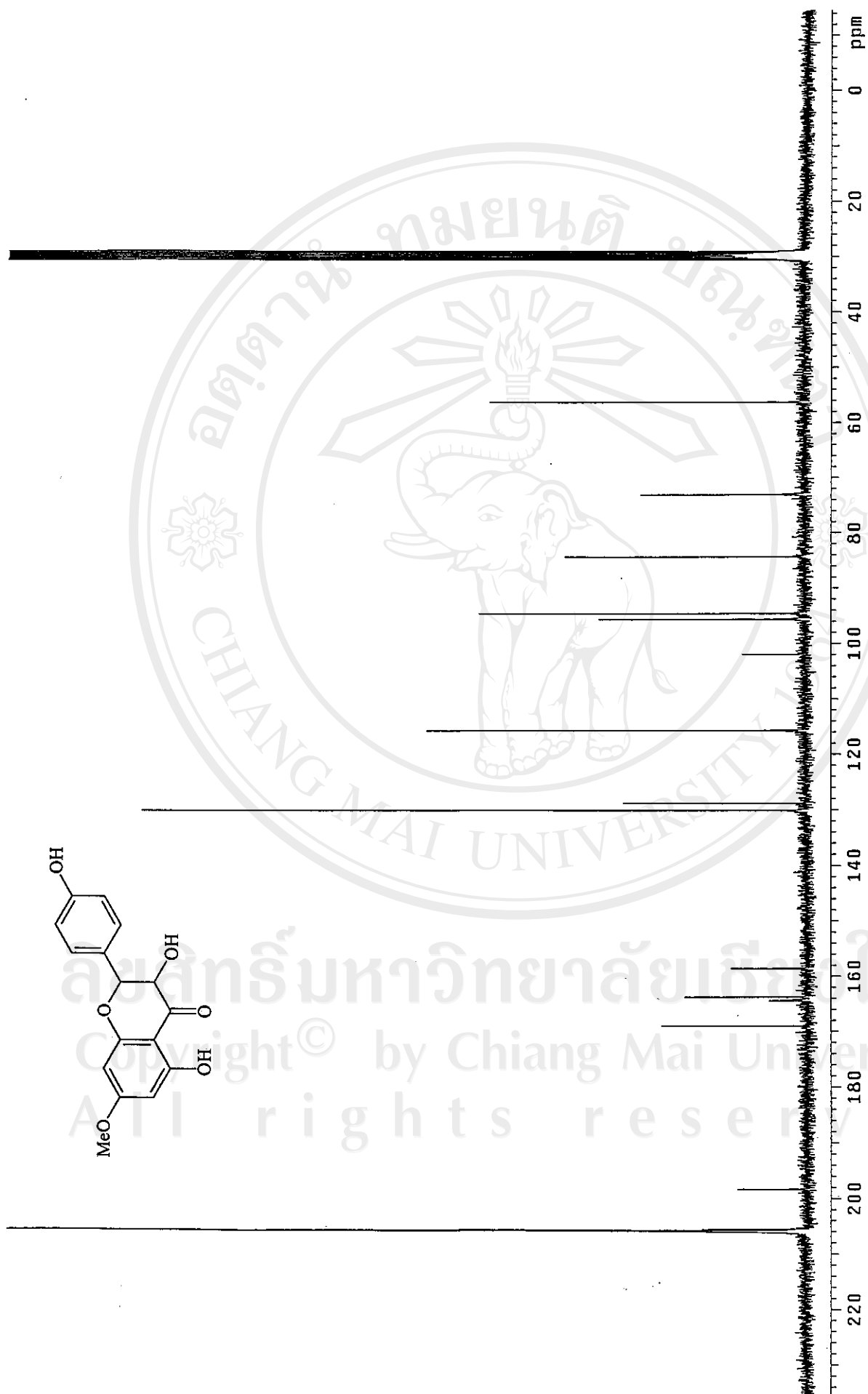


Figure 130. The 75 MHz ^{13}C -NMR spectrum of compound EU9M135 (in acetone- d_6)

CH3 carbons



CH2 carbons



CH carbons



all protonated carbons

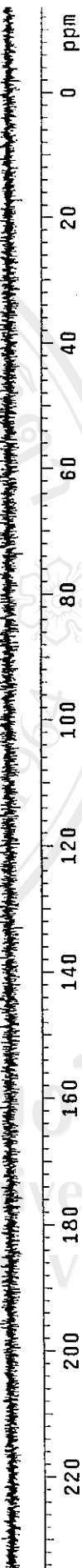


Figure 131. The 75 MHz DEPT spectrum of compound EU9M135 (in acetone-d₆)

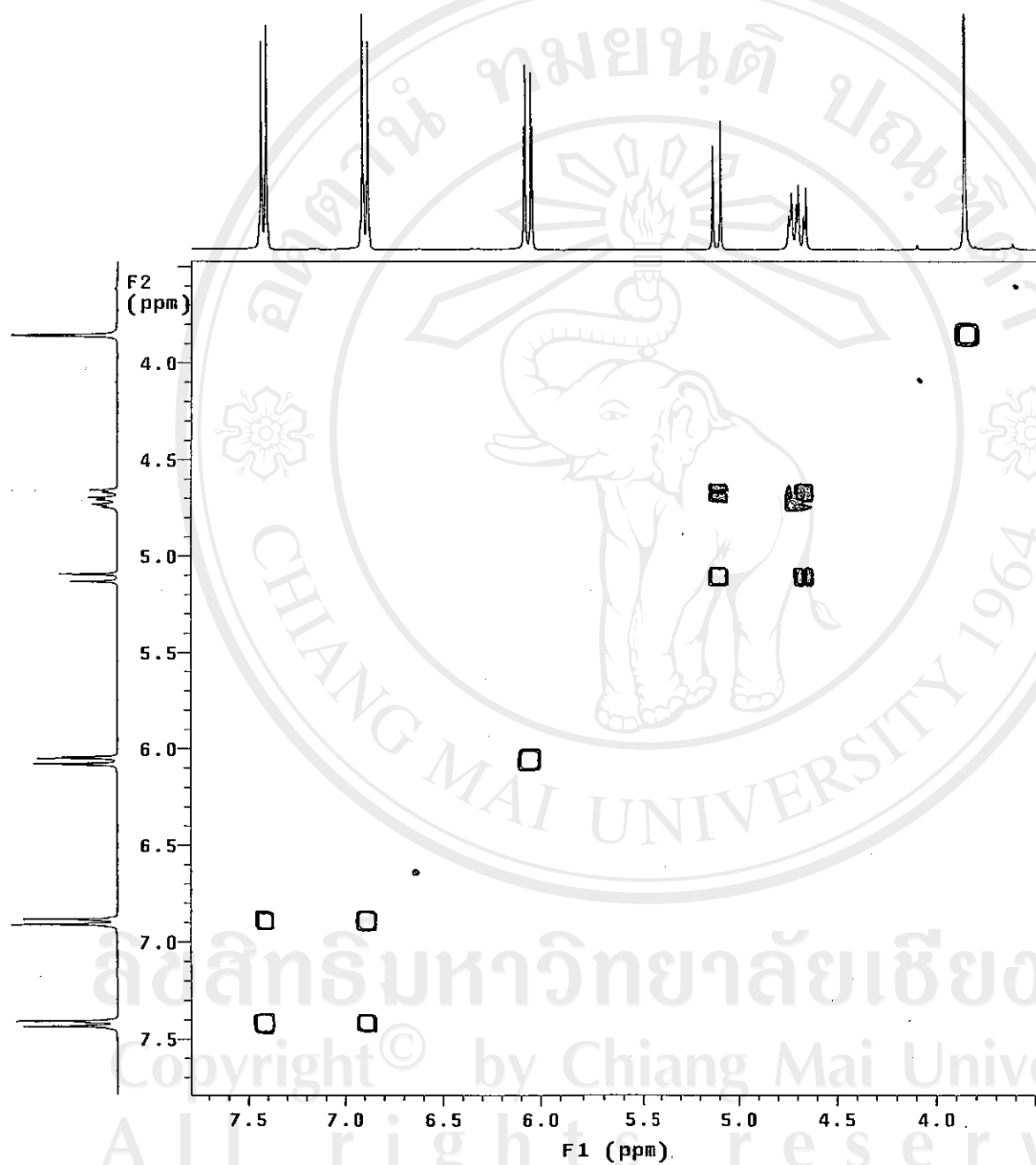


Figure 132. The 300 MHz ^1H - ^1H COSY spectrum of compound EU9M135 (in acetone- d_6)

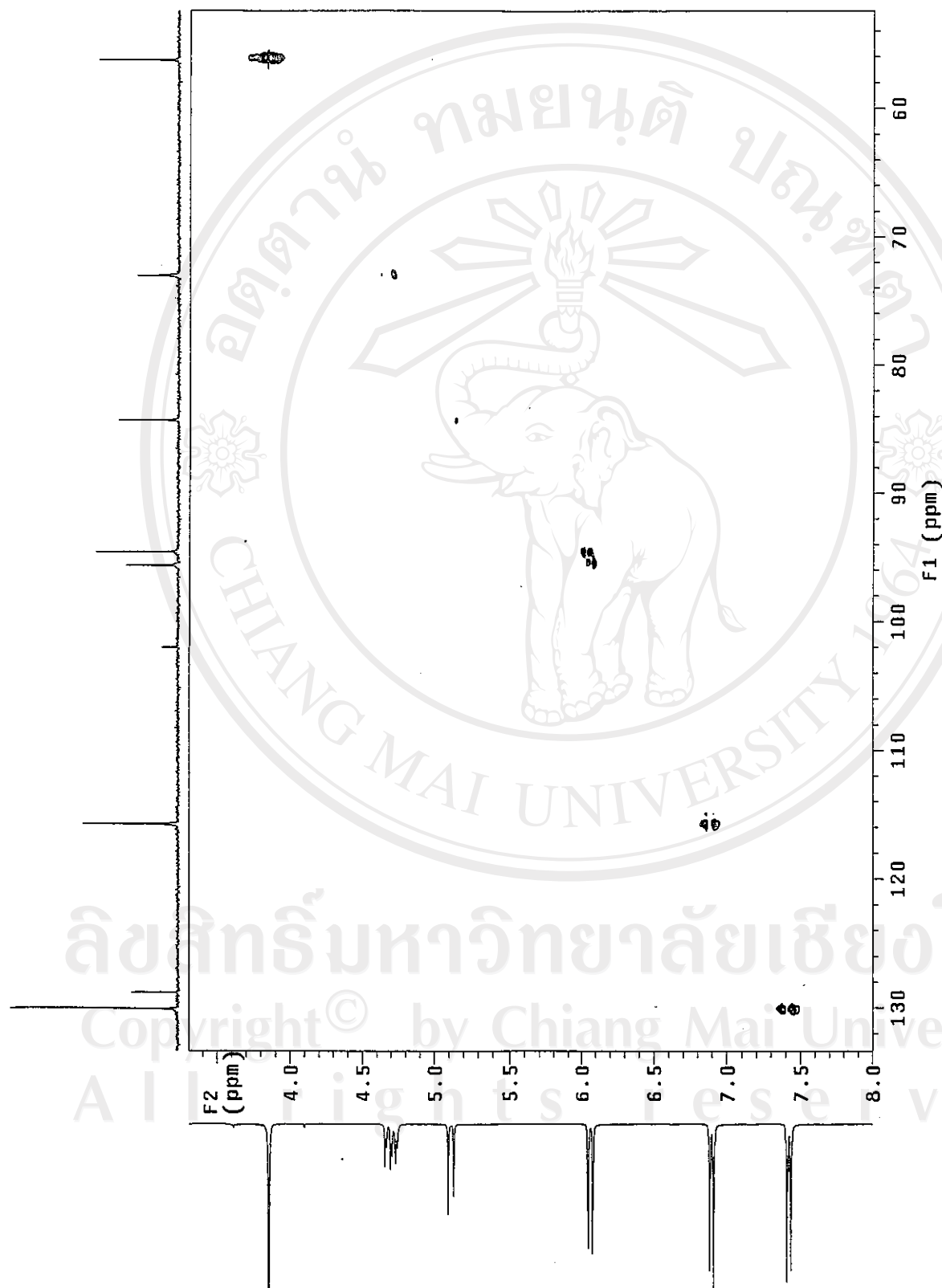


Figure 133. The 300 MHz HSQC spectrum of compound EU9M135 (in acetone- d_6)

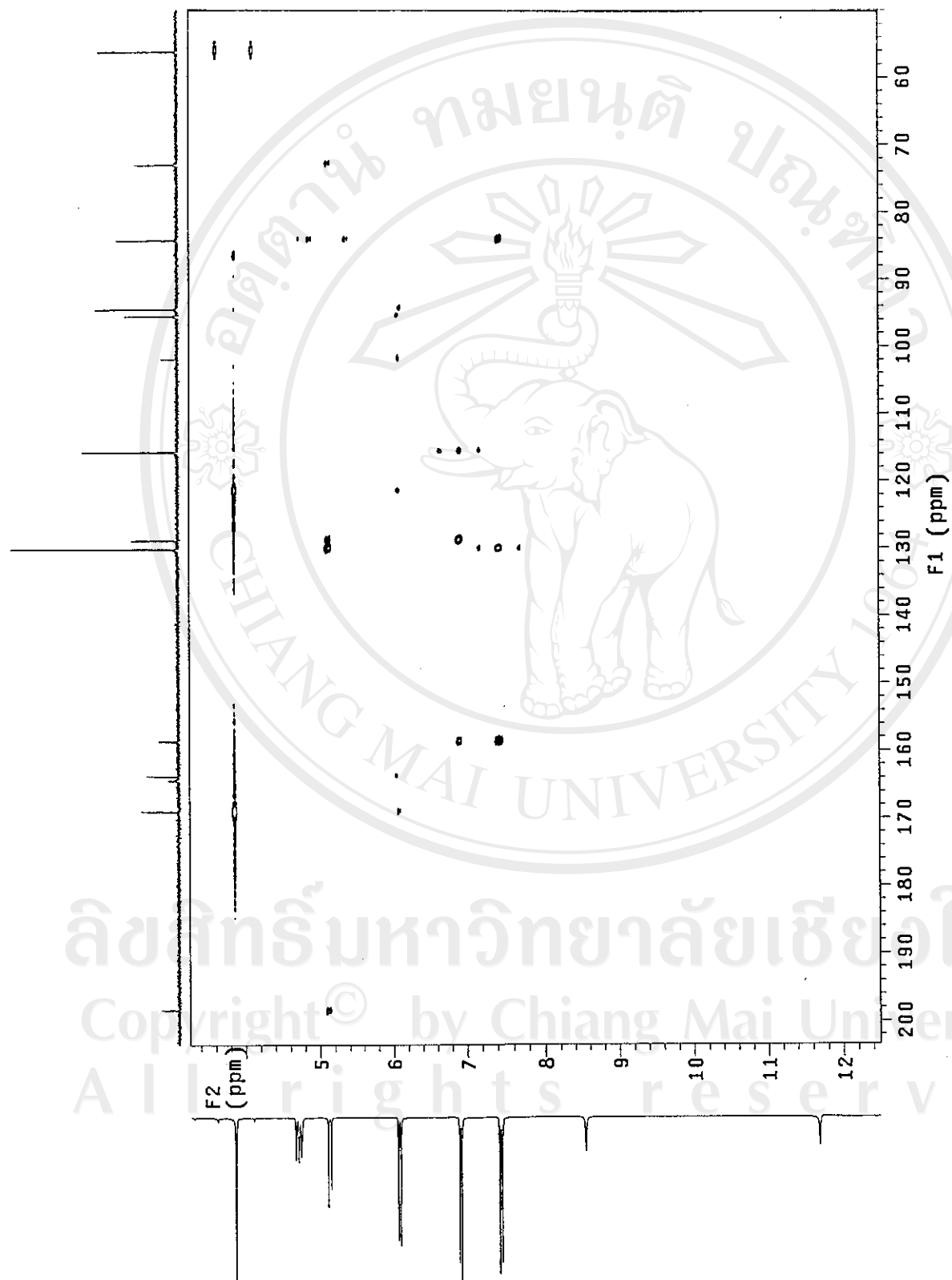


Figure 134. The 300 MHz HMBC spectrum of compound EU9M135 (in acetone- d_6)

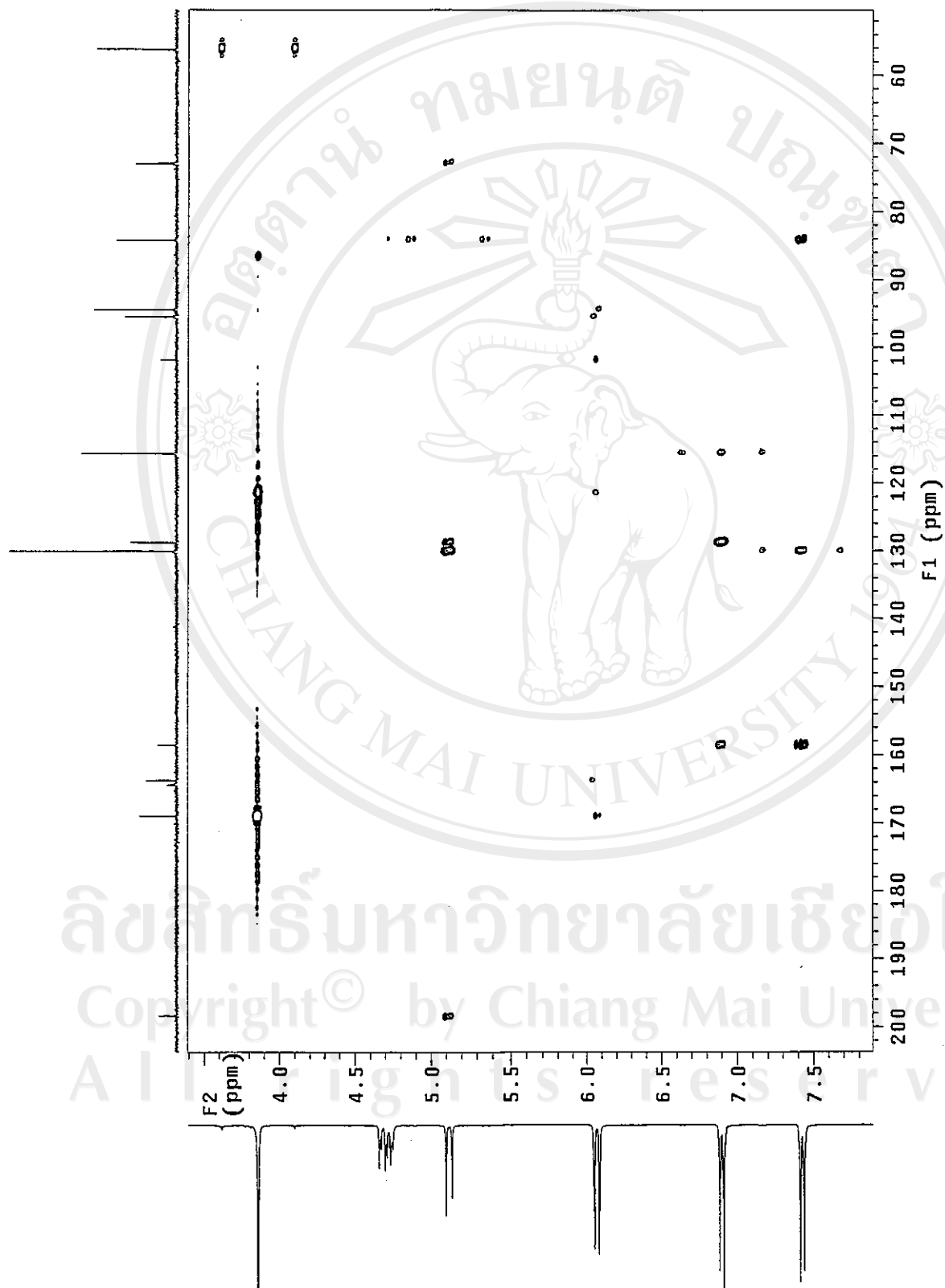


Figure 135. The 300 MHz HMBC spectrum of compound EU9M135 (in acetone-d₆) (expanded)

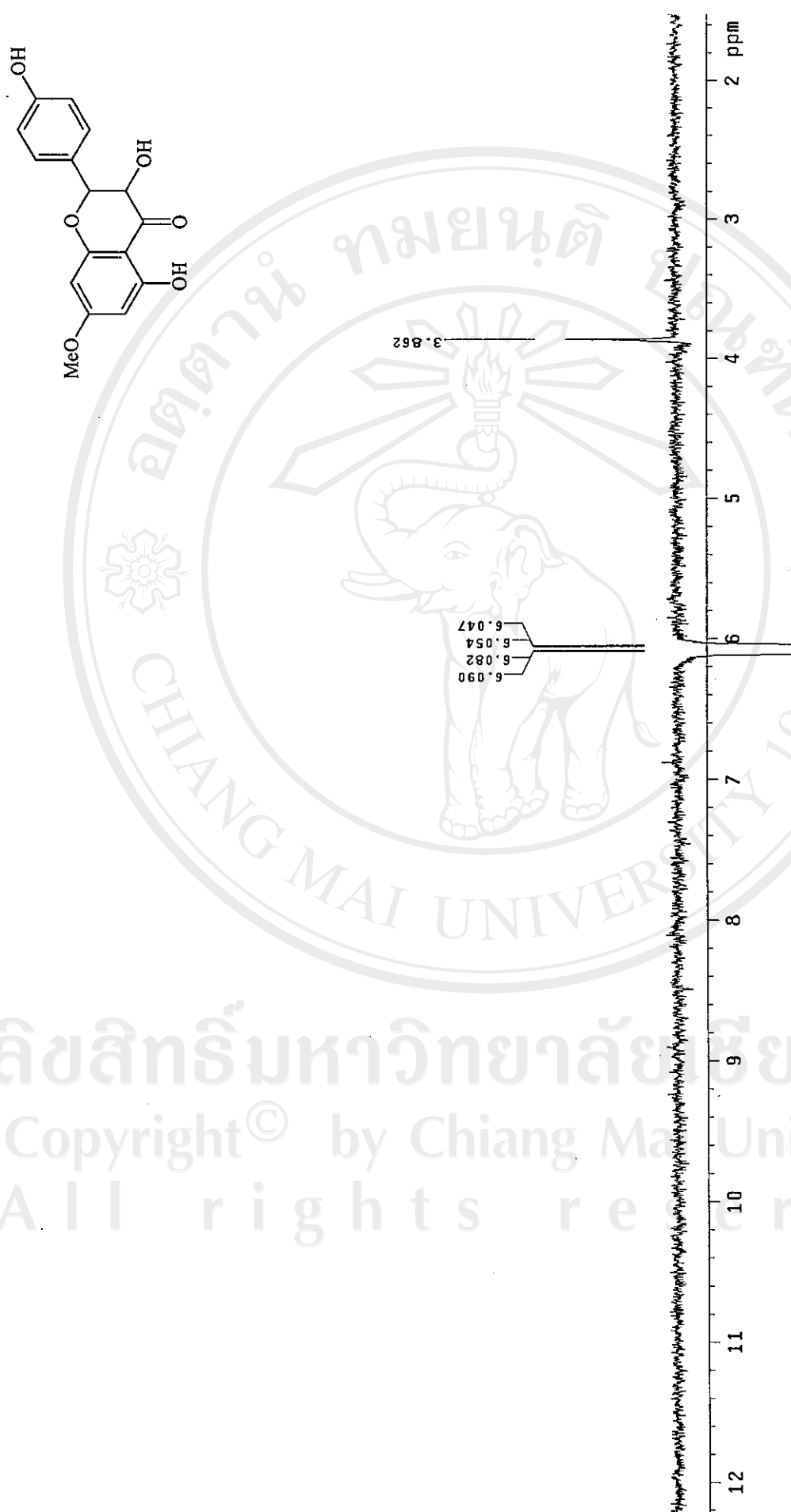


Figure 136. The 300 MHz NOE difference spectrum of compound EU9M135 (in acetone-d₆)
irradiation at 6.08 ppm (H-6)

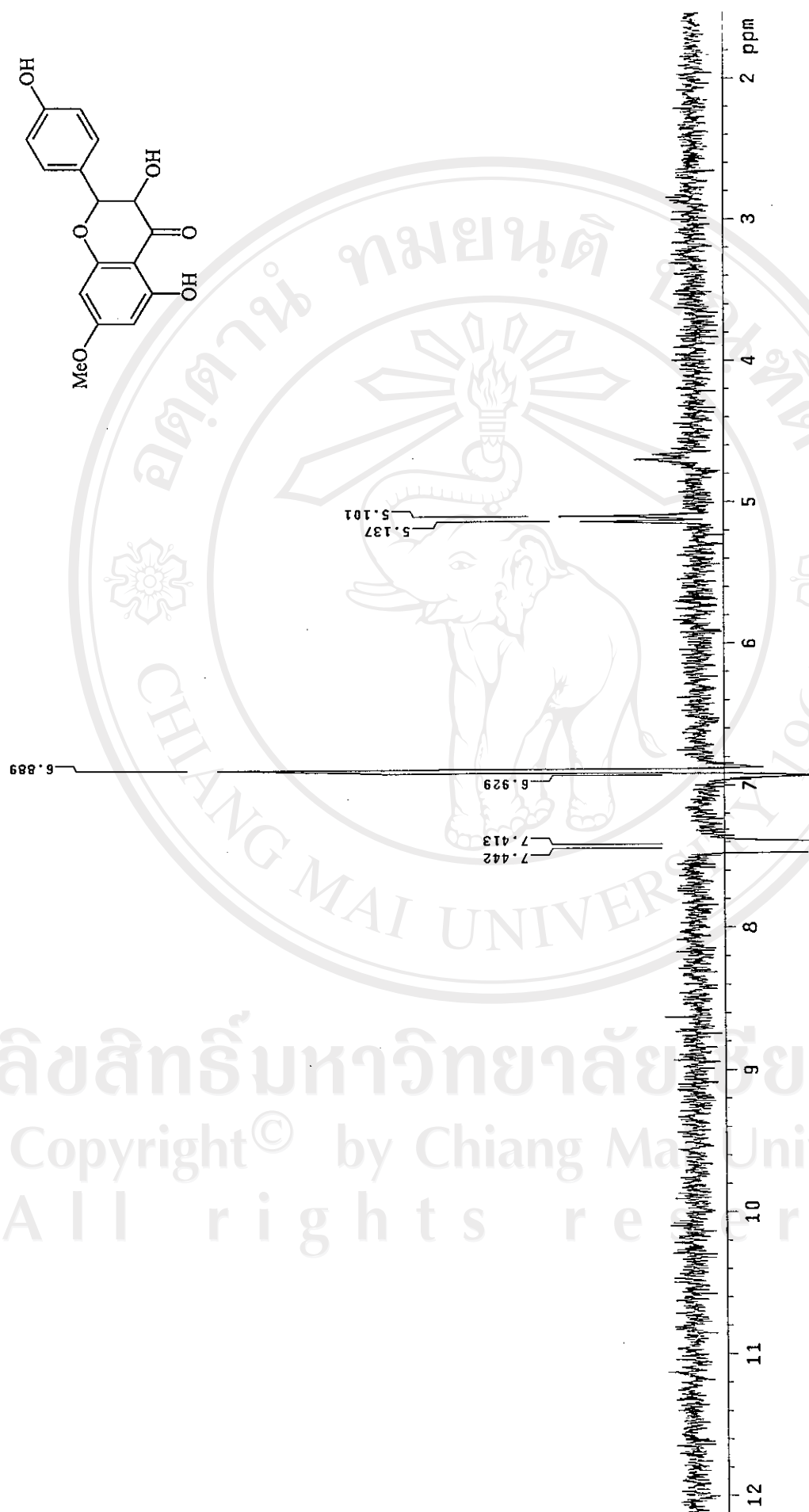


Figure 137. The 300 MHz NOE difference spectrum of compound EU9M135 (in acetone-d₆) irradiation at 7.42 ppm (H-2' and H-6')

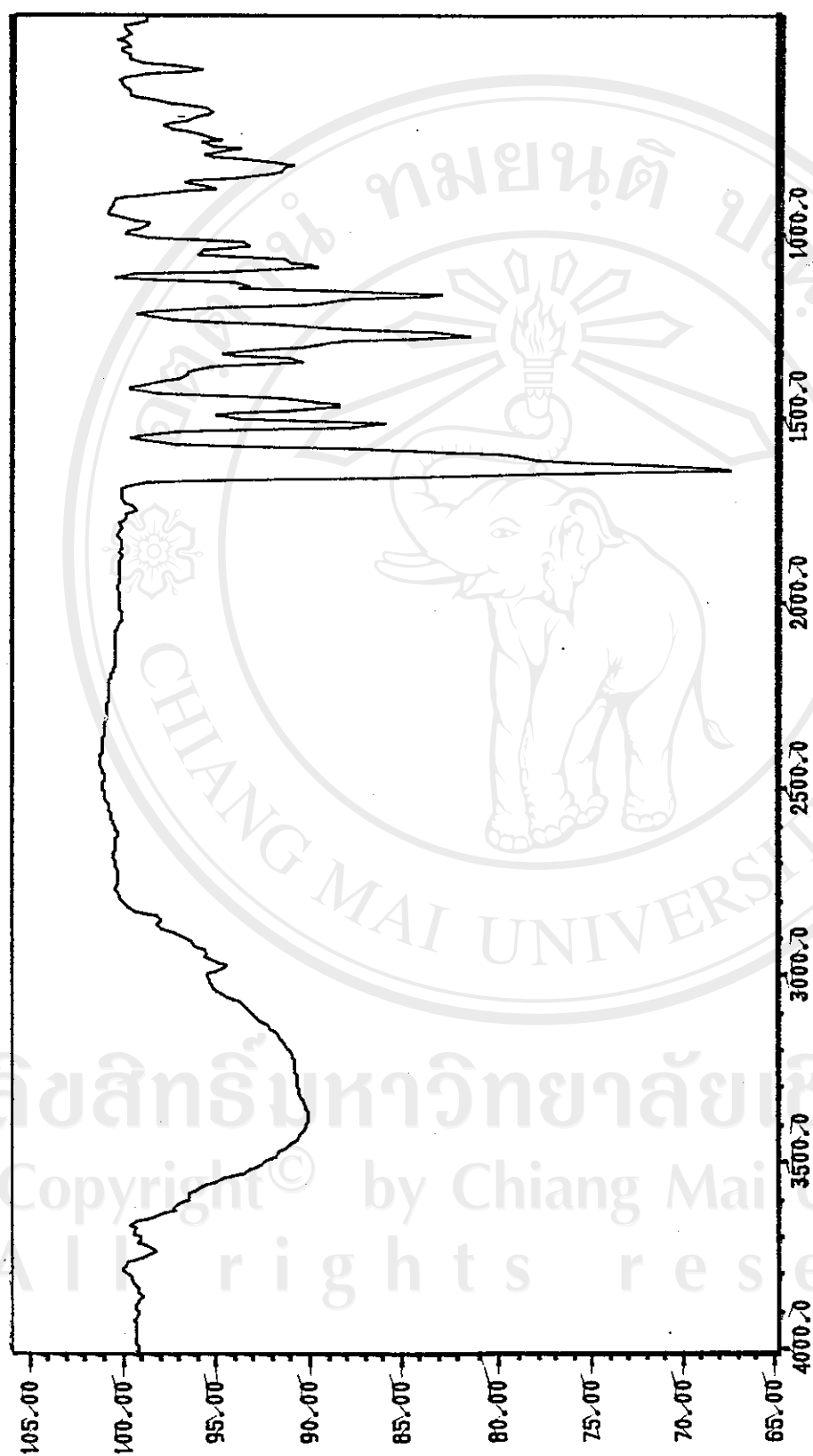


Figure 138. The IR spectrum of compound EU9M138

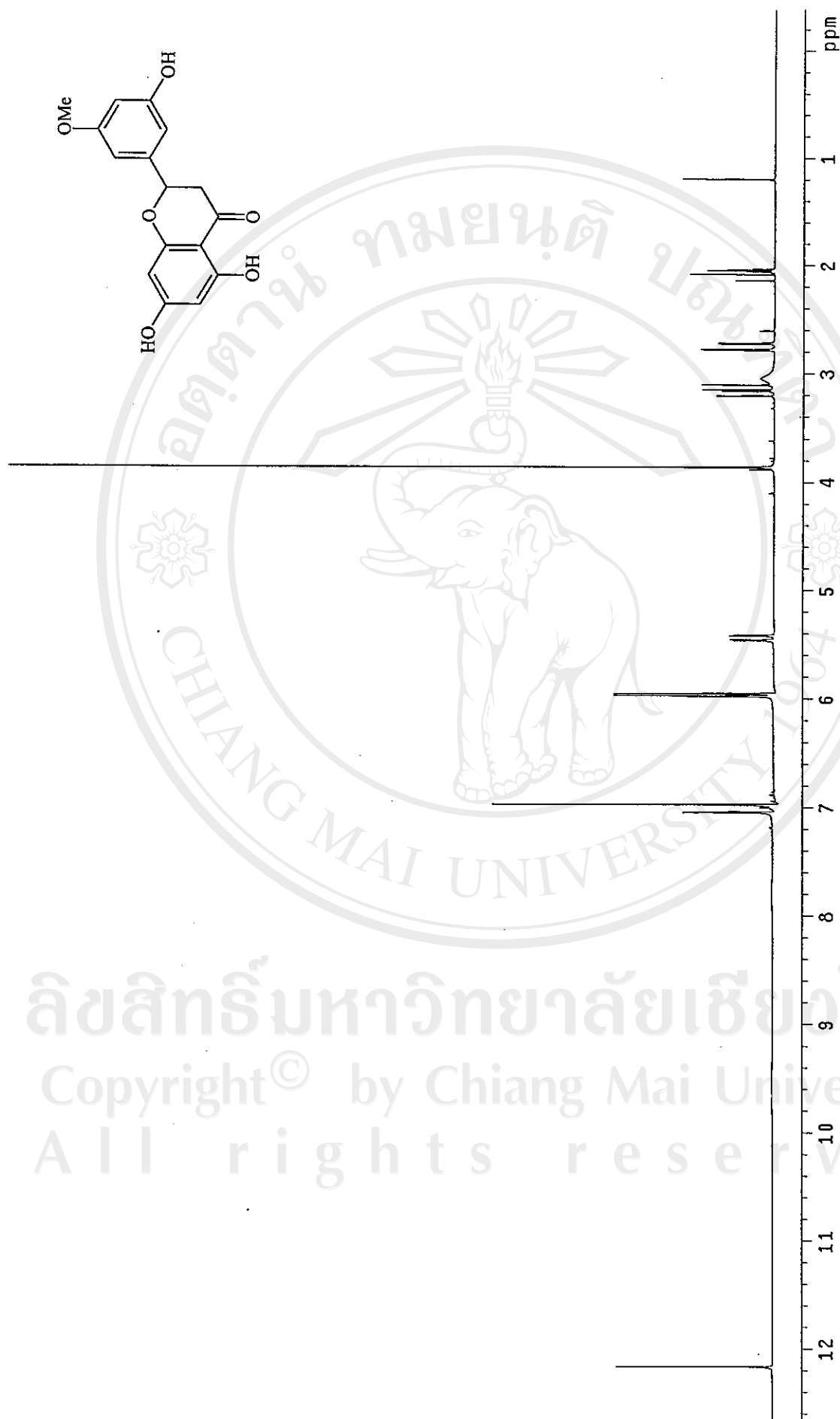


Figure 139. The 300 MHz $^1\text{H-NMR}$ spectrum of compound EU9M138 (in acetone-d_6)

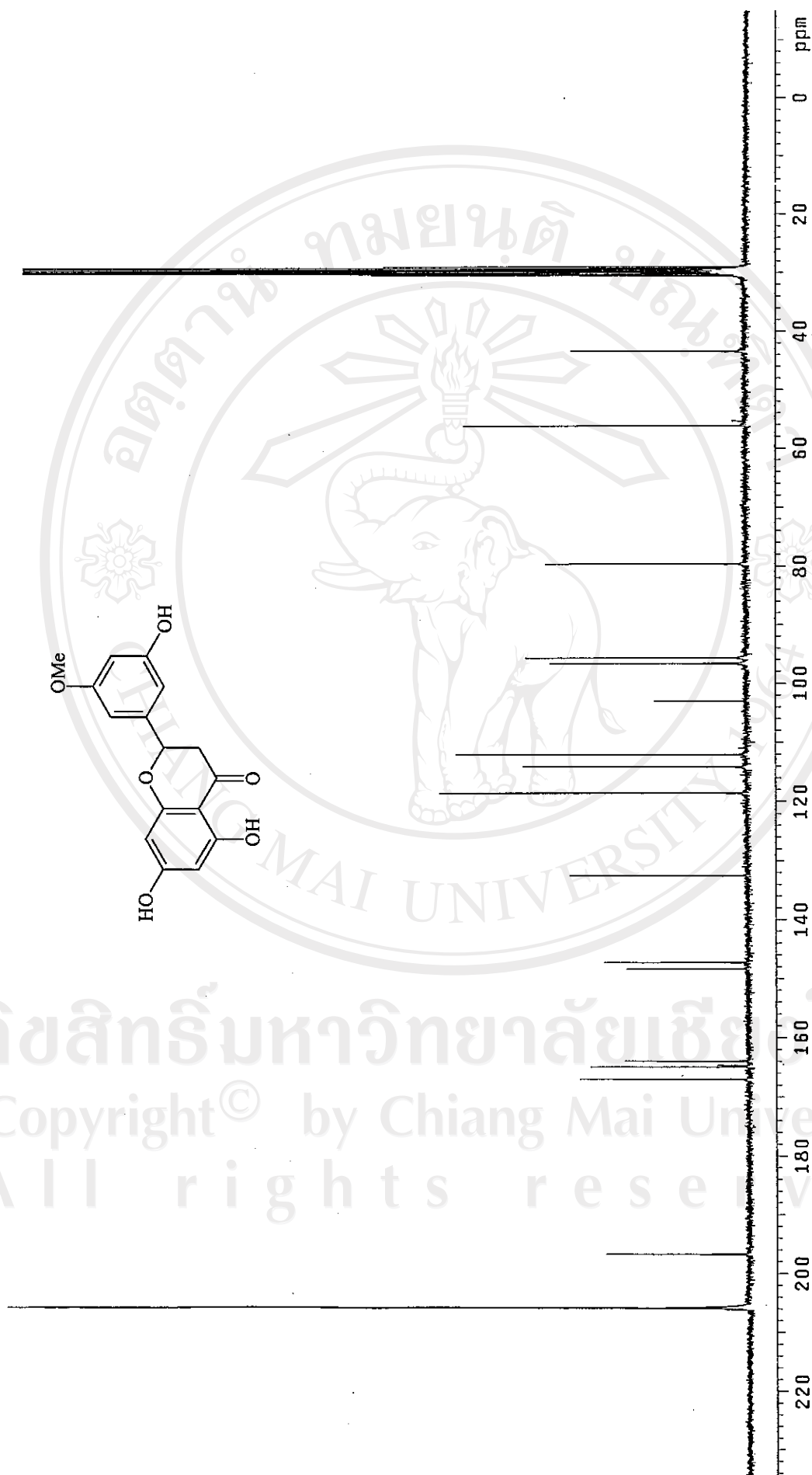


Figure 140. The 75 MHz ^{13}C -NMR spectrum of compound EU9M138 (in acetone-d_6)

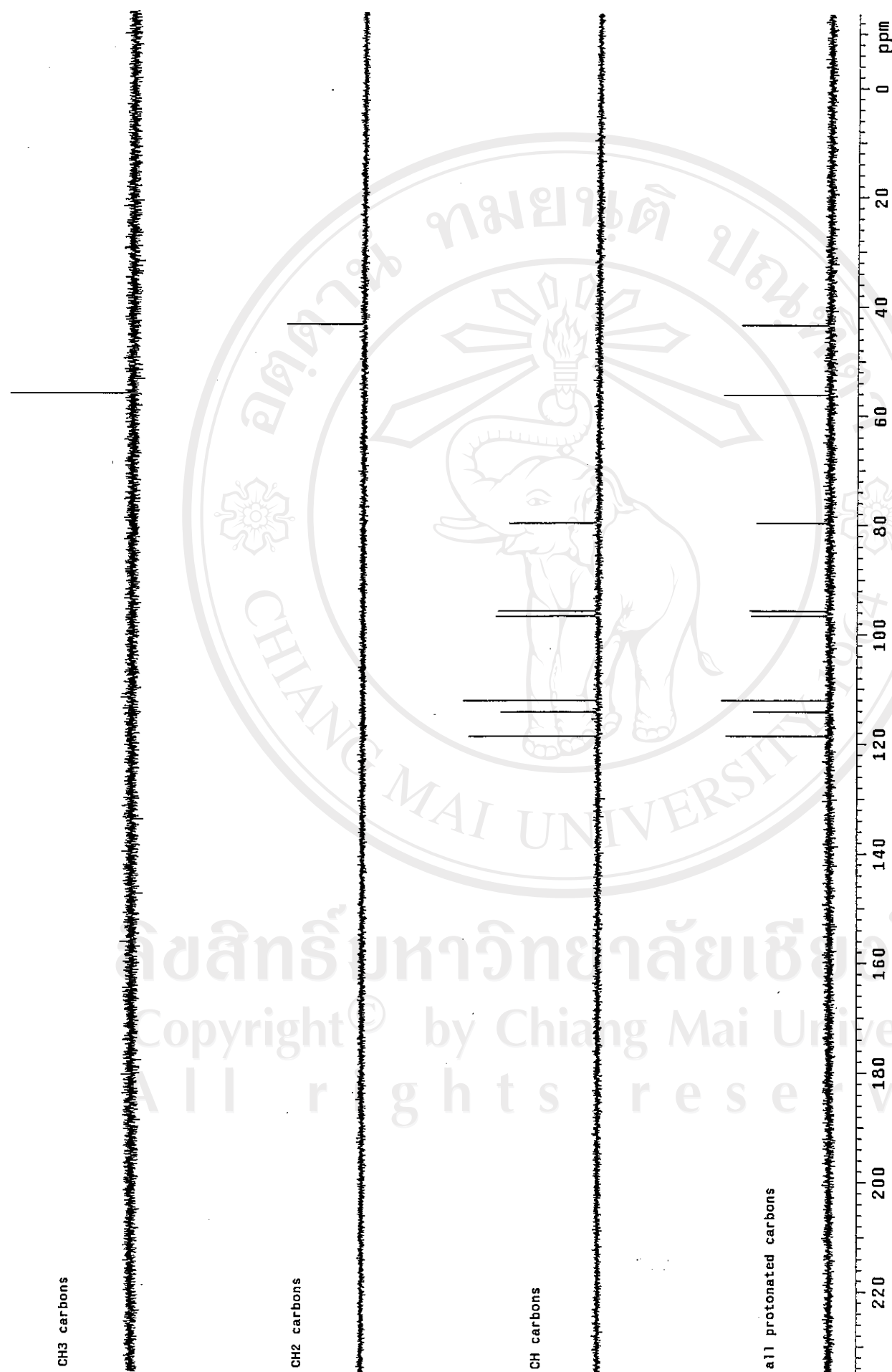


Figure 141. The 75 MHz DEPT spectrum of compound EU9M138 (in acetone-d₆)

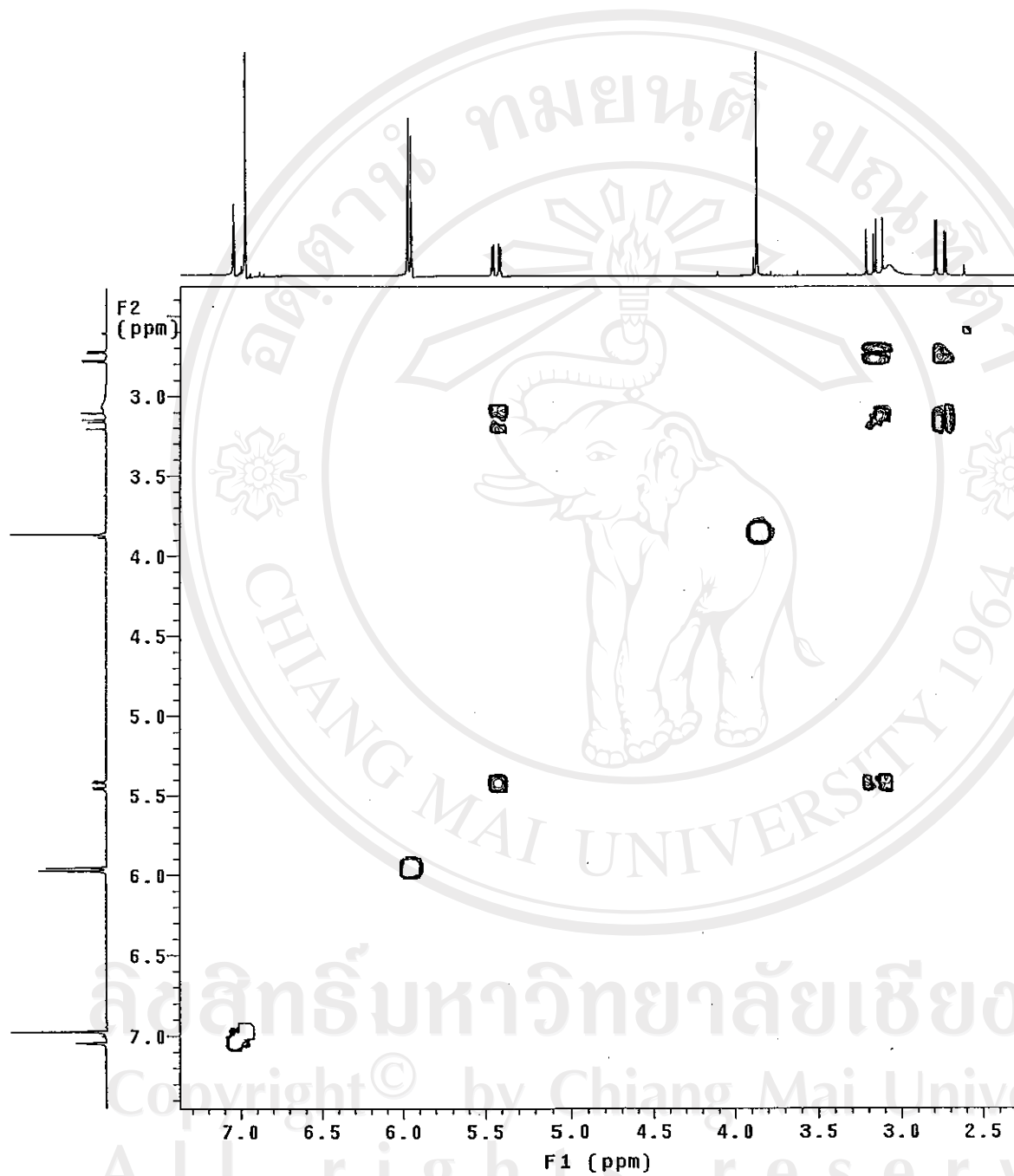


Figure 142. The 300 MHz ^1H - ^1H COSY spectrum of compound EU9M138 (in acetone- d_6)

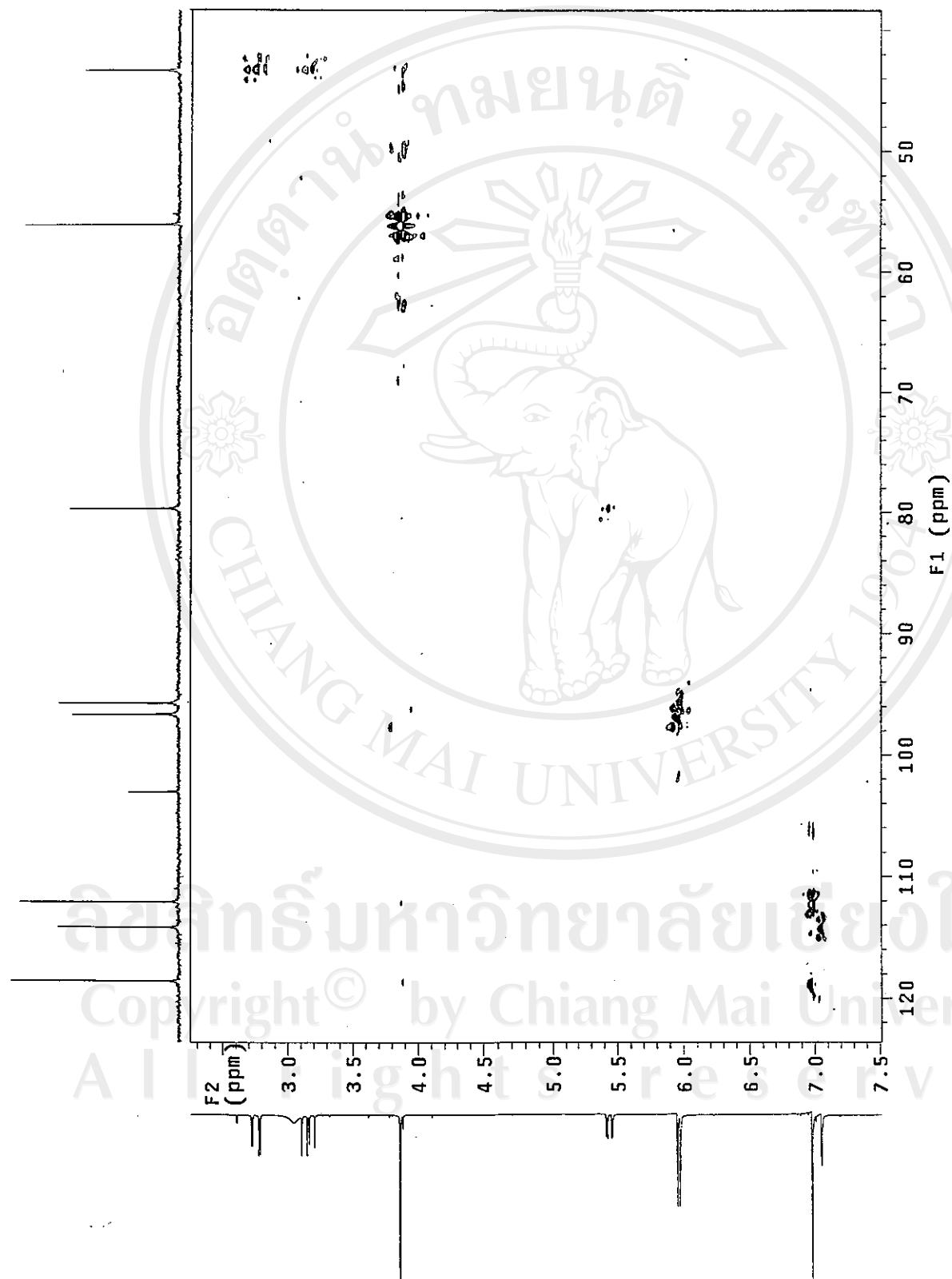


Figure 143. The 300 MHz HSQC spectrum of compound EU9M138 (in acetone- d_6)

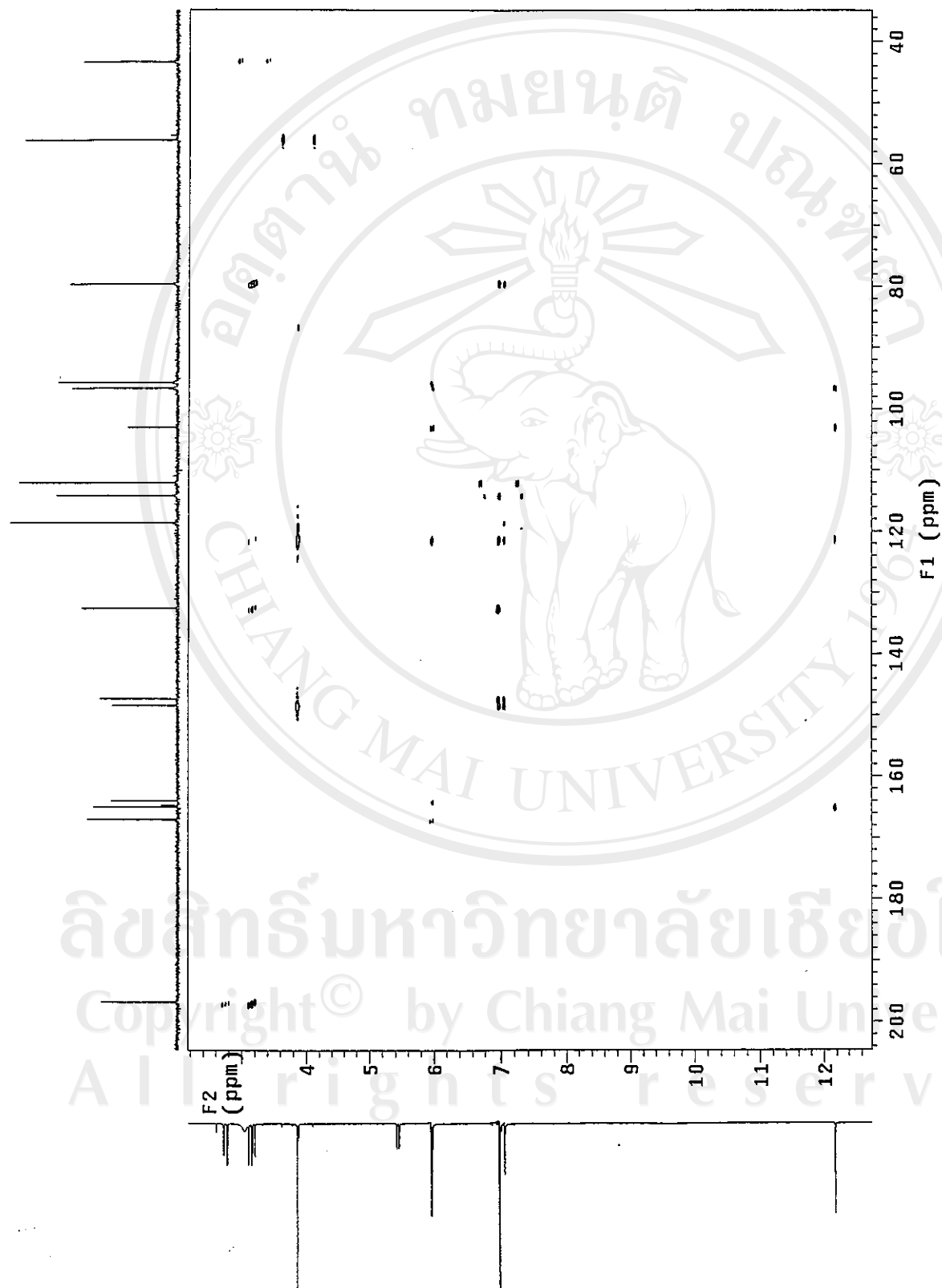


Figure 144. The 300 MHz HMBBC spectrum of compound EU9M138 (in acetone- d_6)

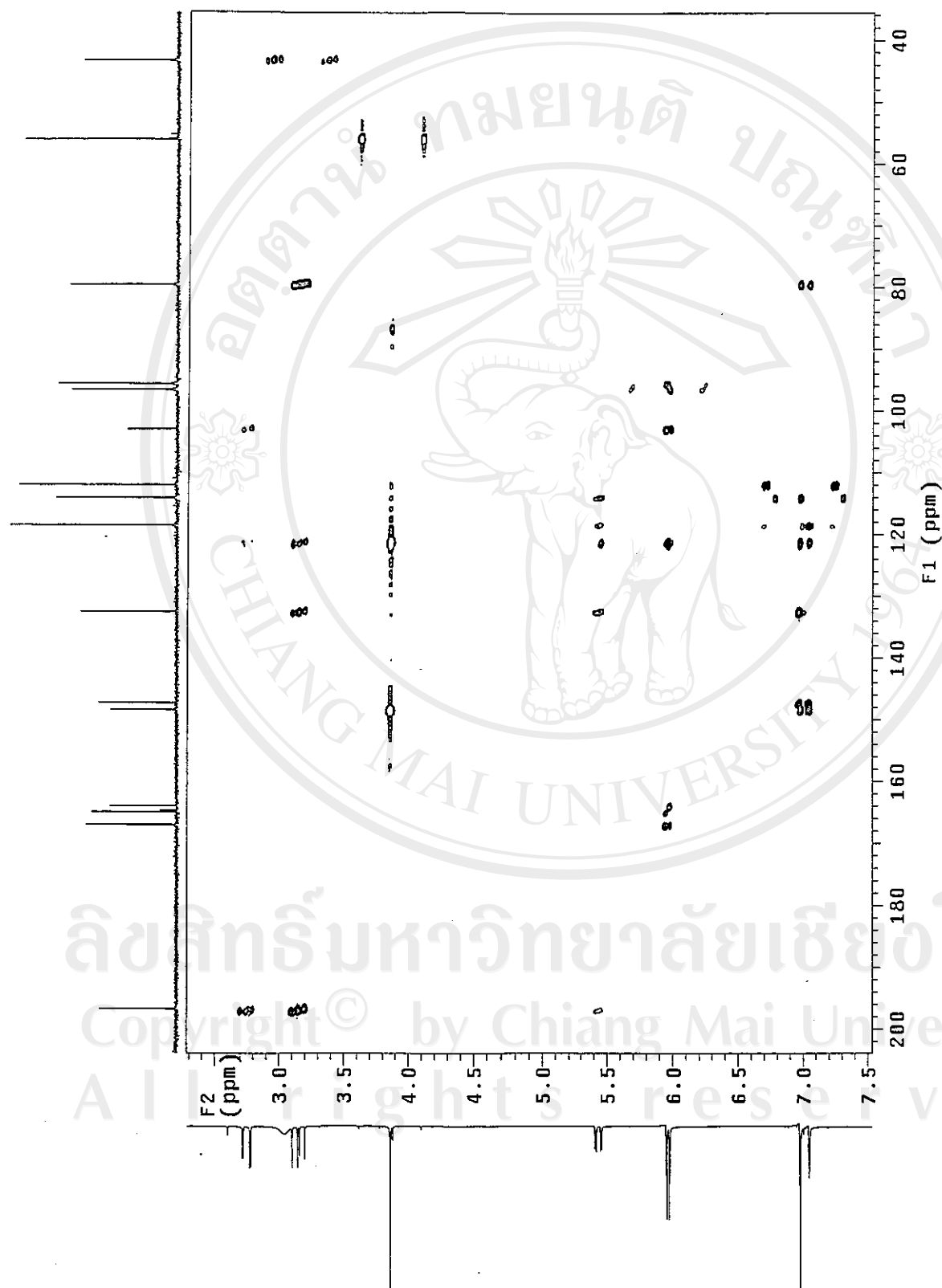


Figure 145. The 300 MHz HMBC spectrum of compound EU9M138 (in acetone- d_6) (expanded)

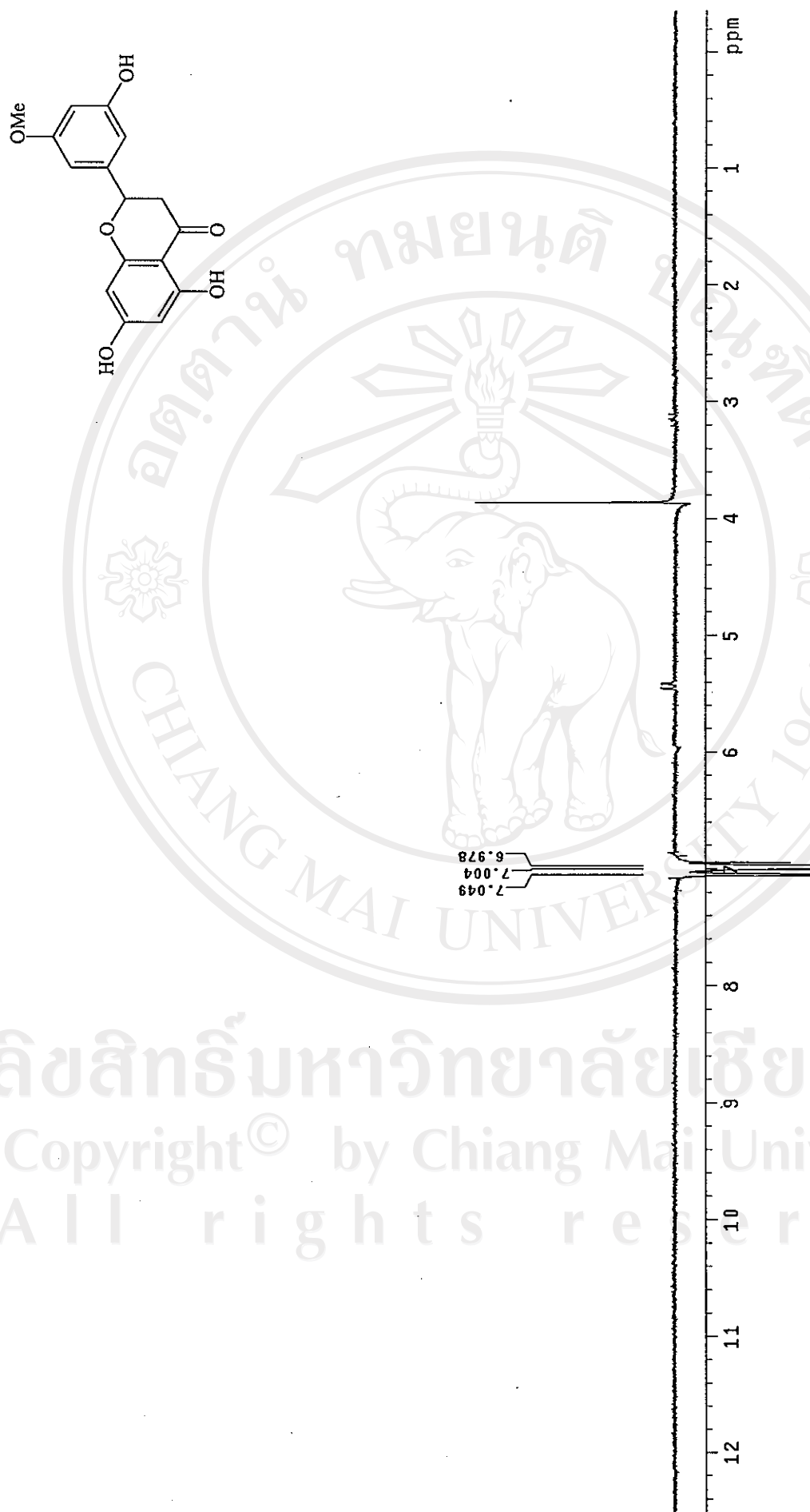


Figure 146. The 300 MHz NOE difference spectrum of compound EU9M138 (in acetone-d₆)
irradiation at 6.97-7.05 ppm (ring B protons)

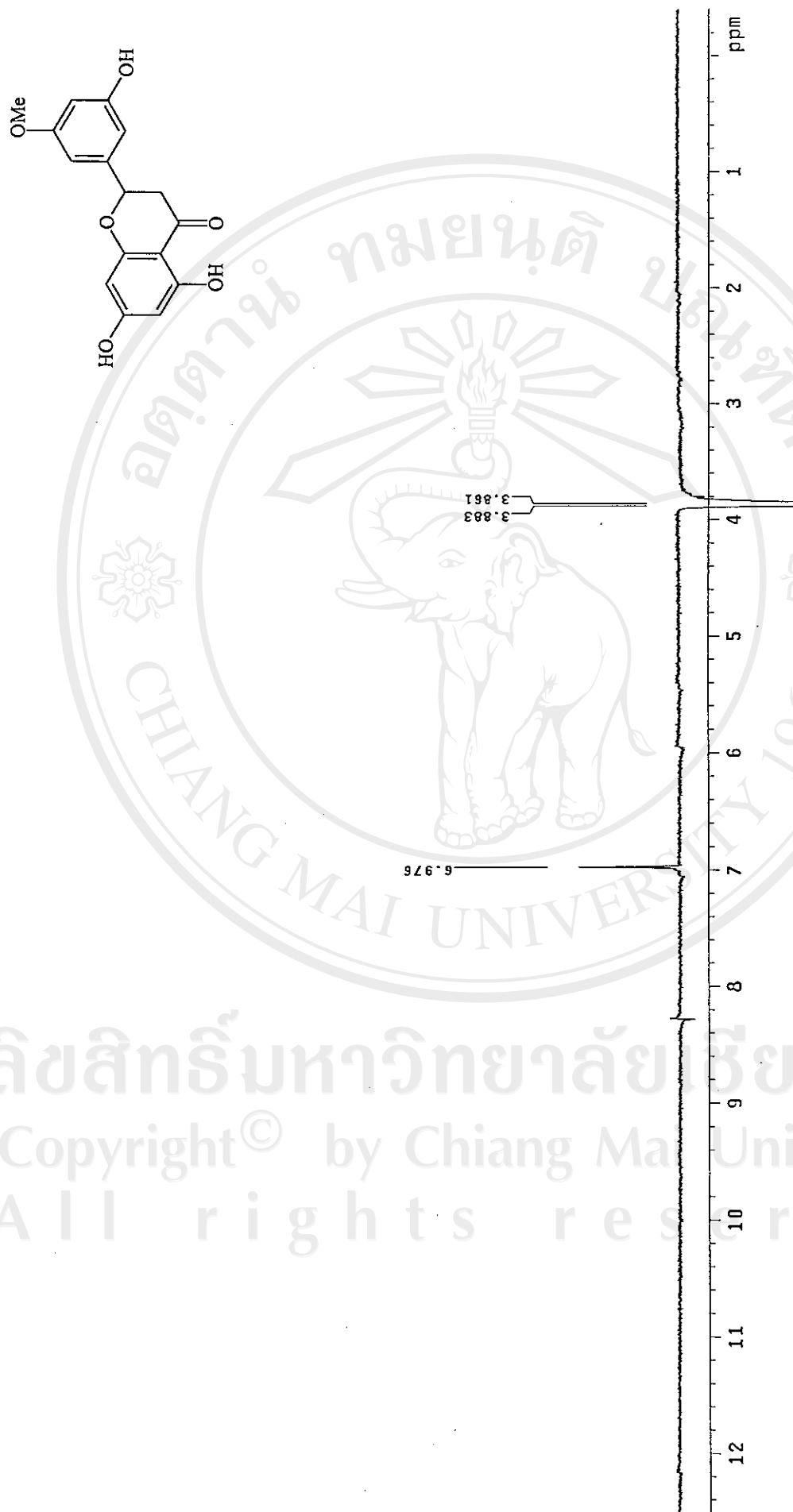


Figure 147. The 300 MHz NOE difference spectrum of compound EU9M138 (in acetone- d_6)

irradiation at 3.86 ppm (5'-OMe)

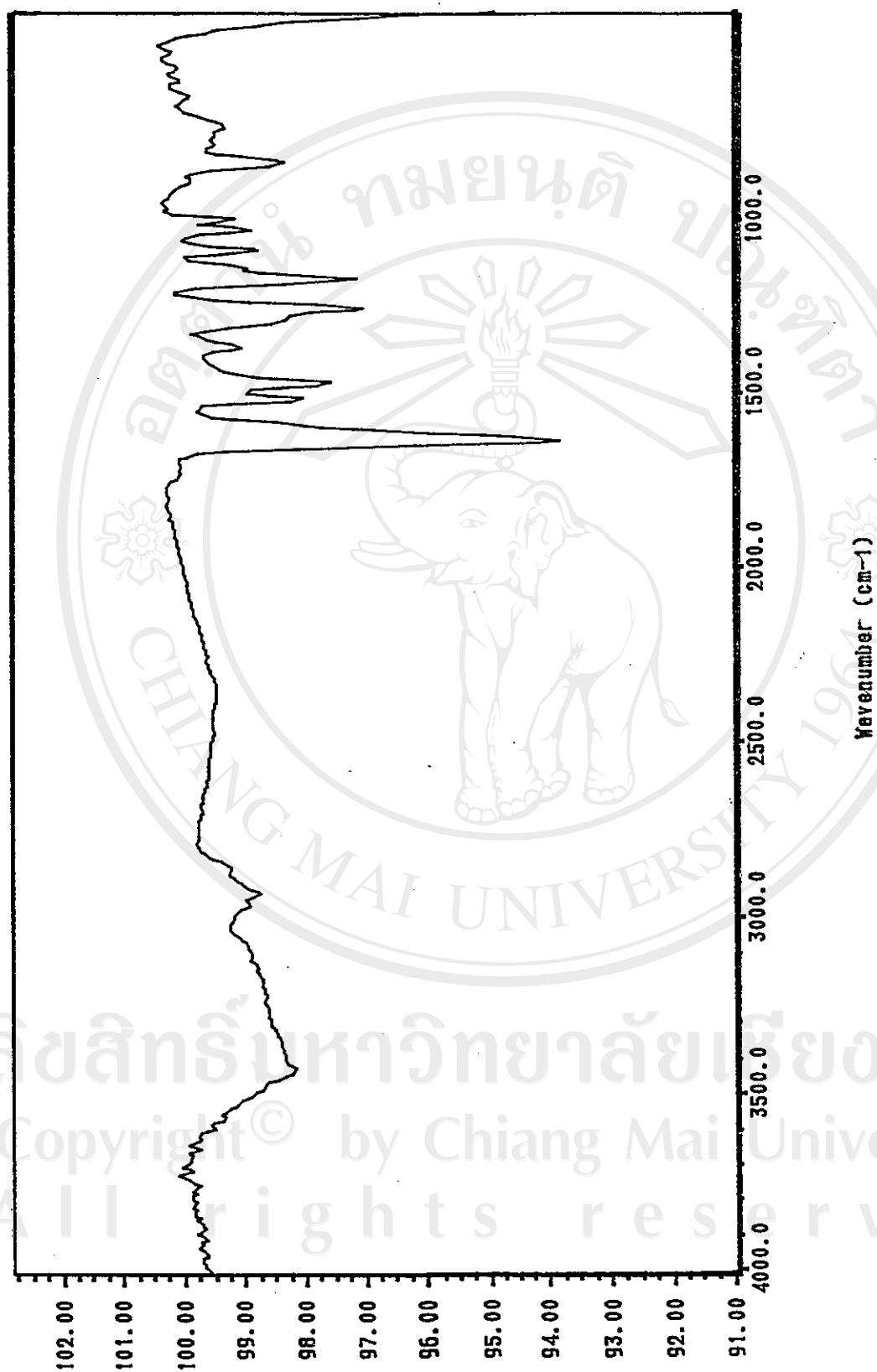


Figure 148. The IR spectrum of compound EU9M147

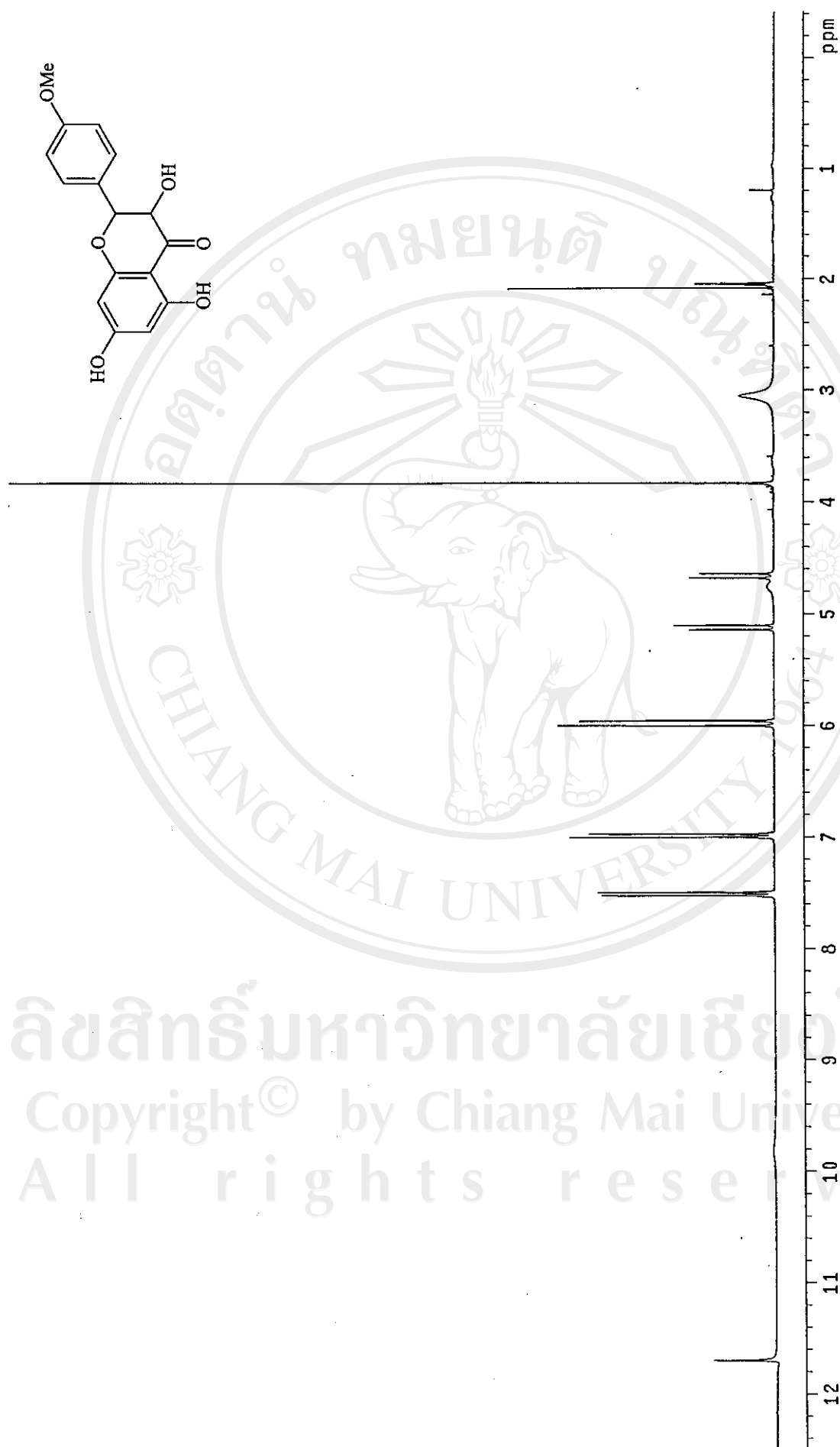


Figure 149. The 300 MHz ¹H-NMR spectrum of compound EU9M147 (in acetone-d₆)

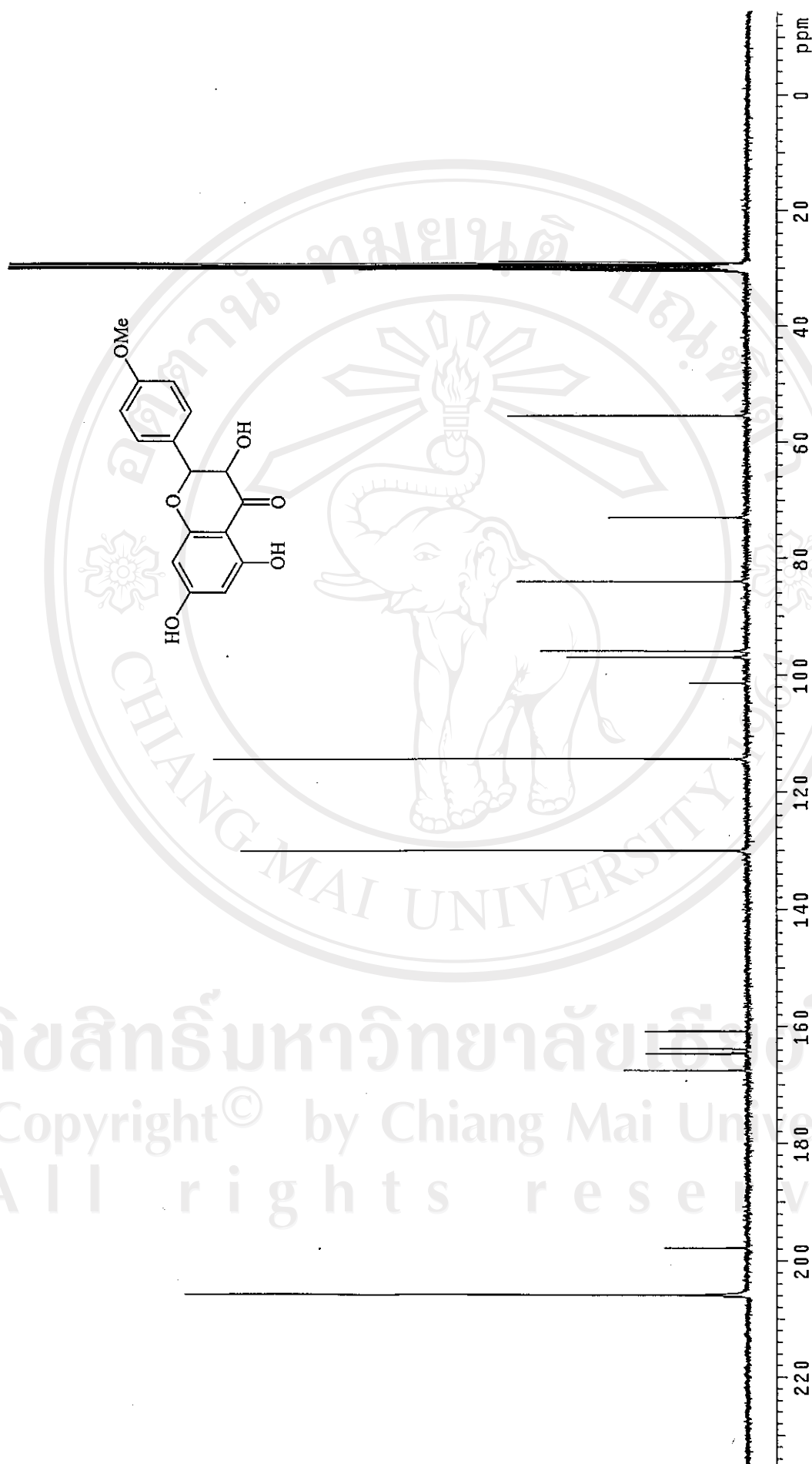


Figure 150. The 75 MHz ^{13}C -NMR spectrum of compound EU9M147 (in acetone- d_6)

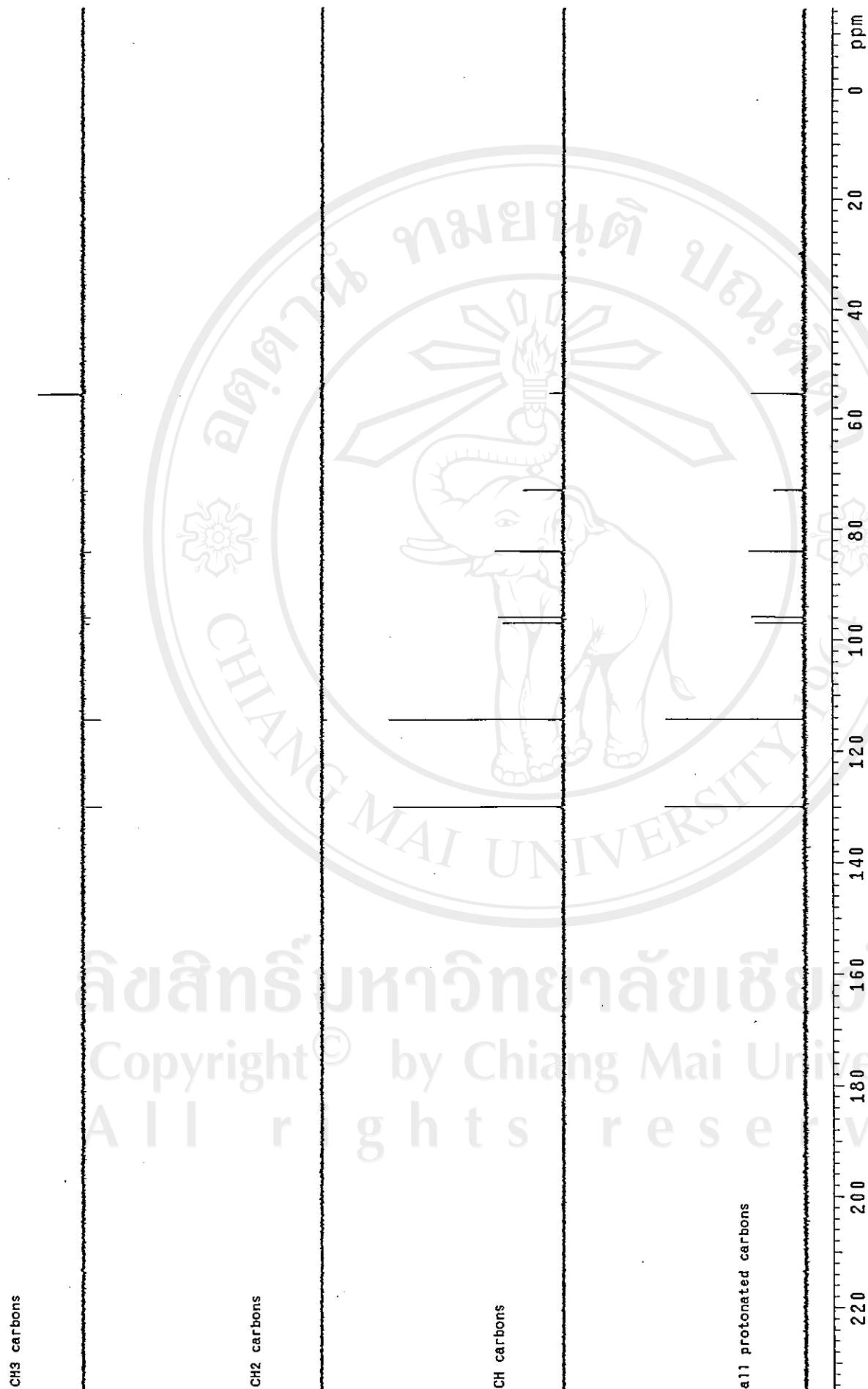


Figure 151. The 75 MHz DEPT spectrum of compound EU9M147 (in acetone-d₆)

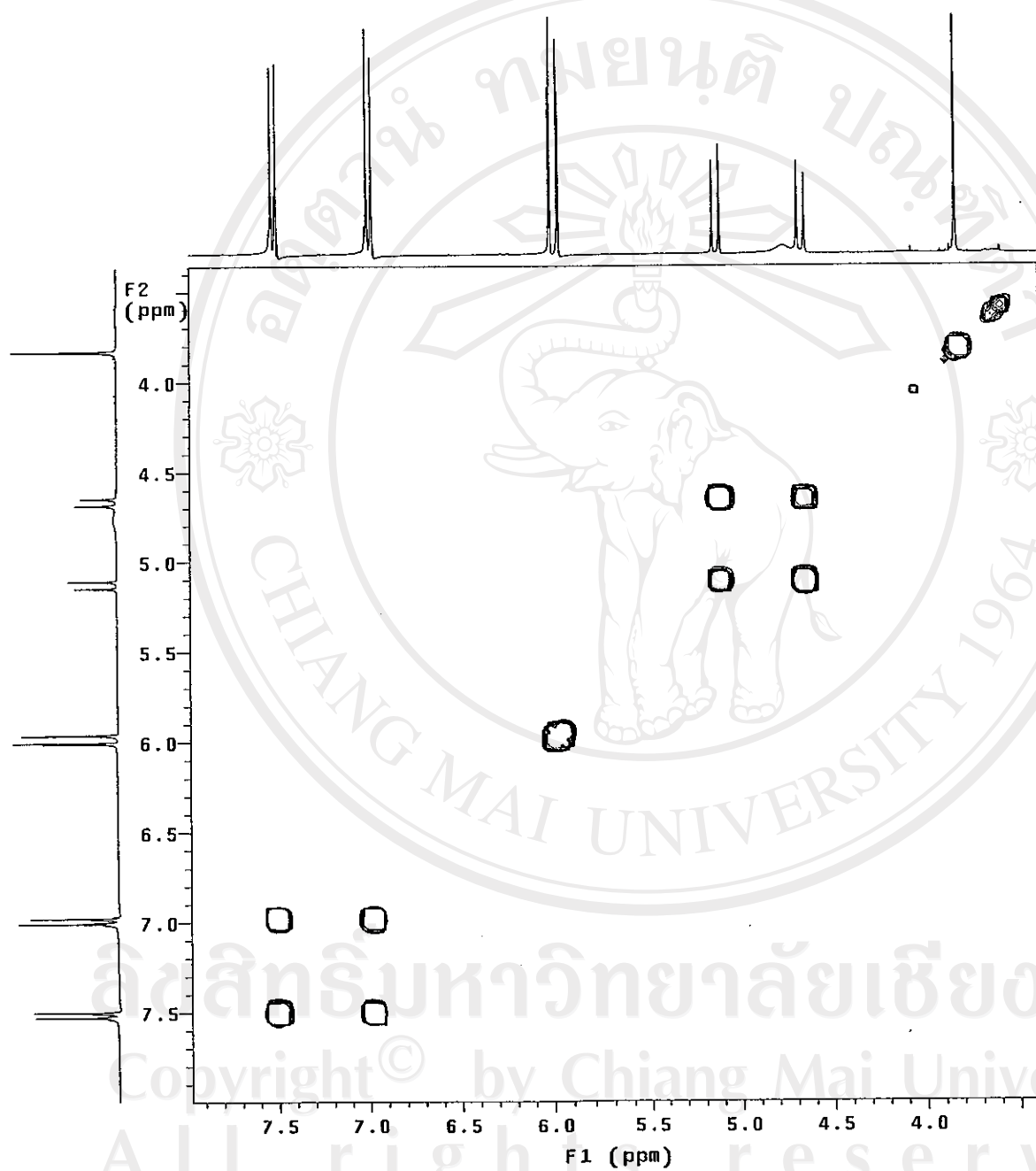


Figure 152. The 300 MHz ^1H - ^1H COSY spectrum of compound EU9M147 (in acetone- d_6)

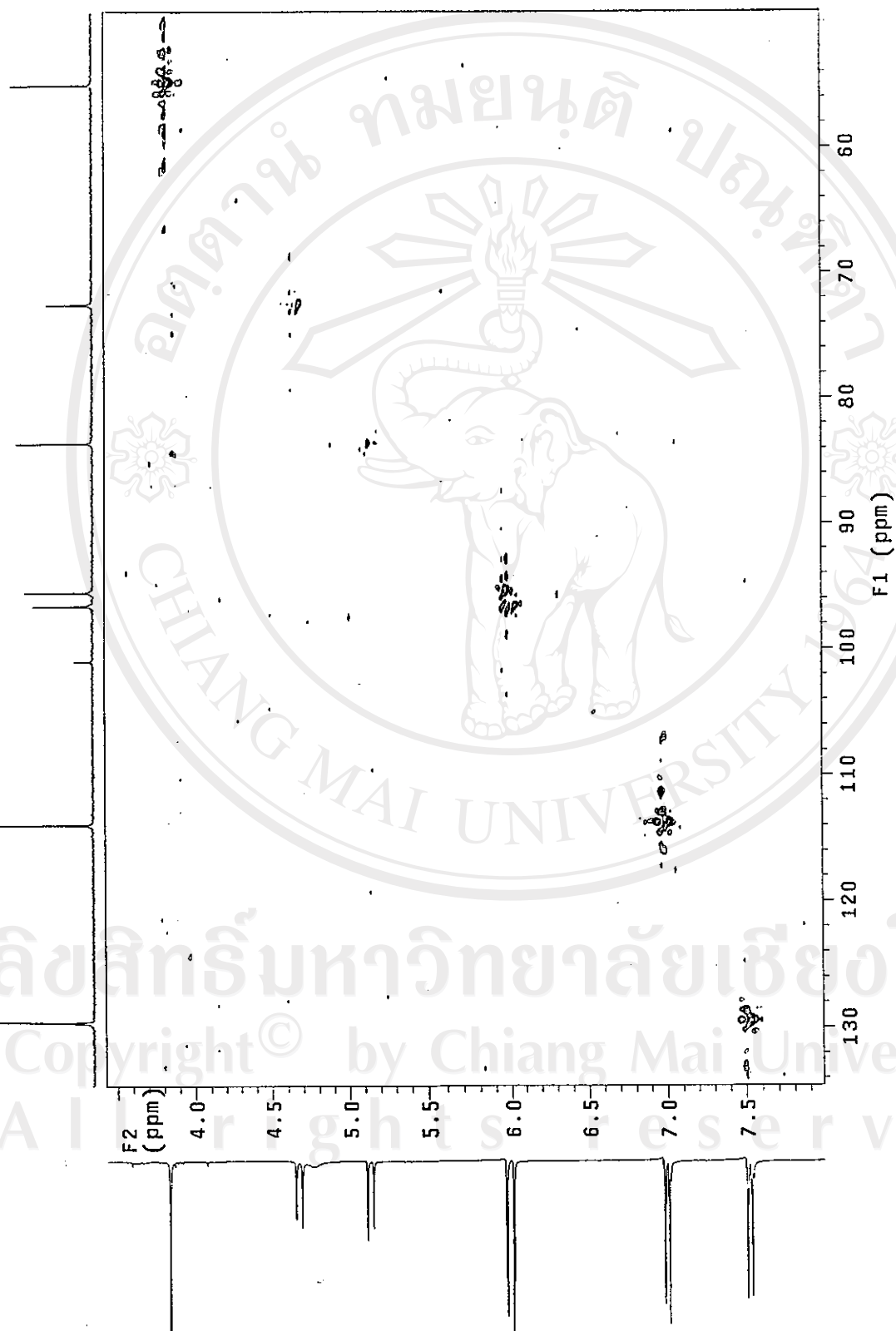


Figure 153. The 300 MHz HSQC spectrum of compound EU9M147 (in acetone- d_6)

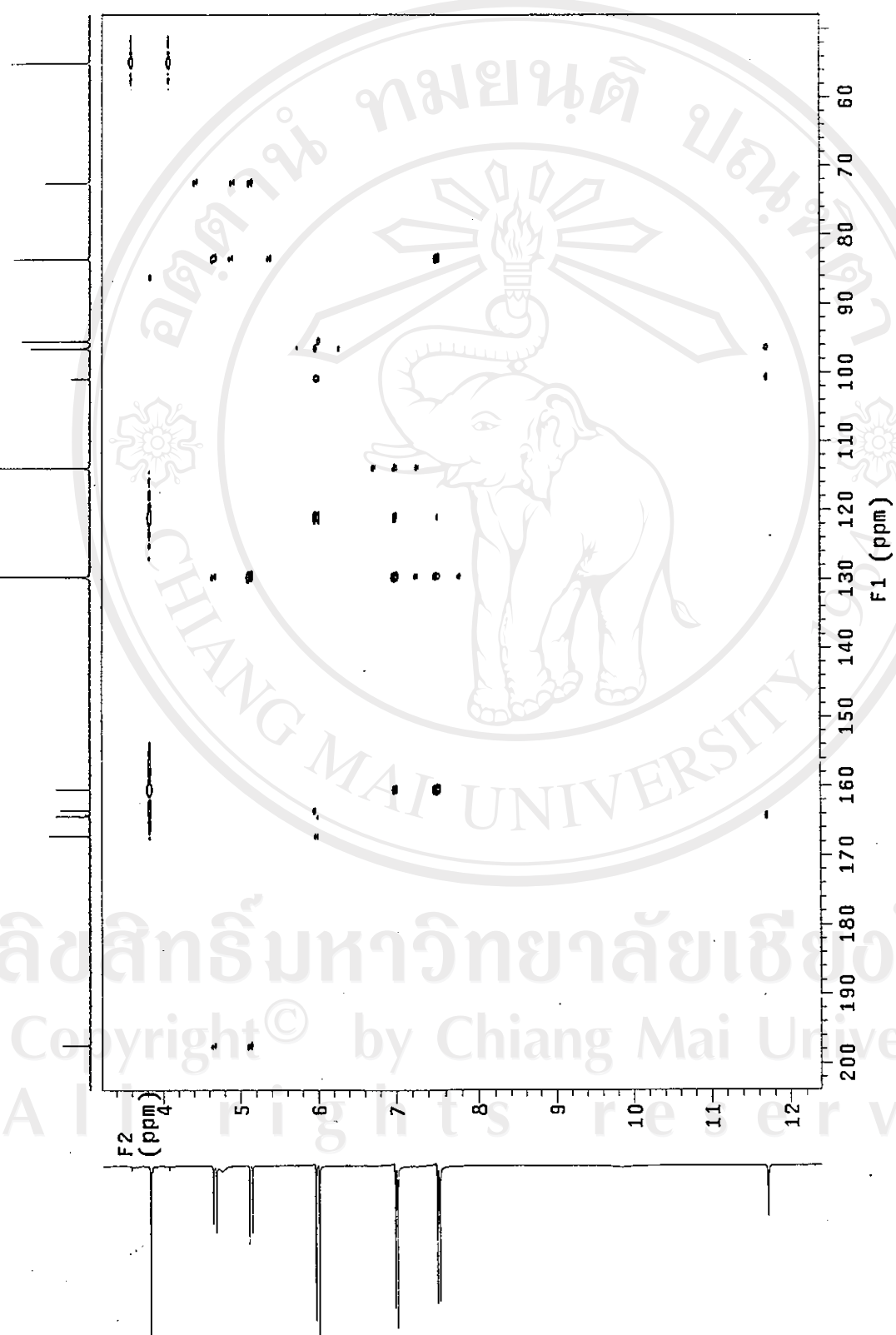


Figure 154. The 300 MHz HMBC spectrum of compound EU9M147 (in acetone-d₆)

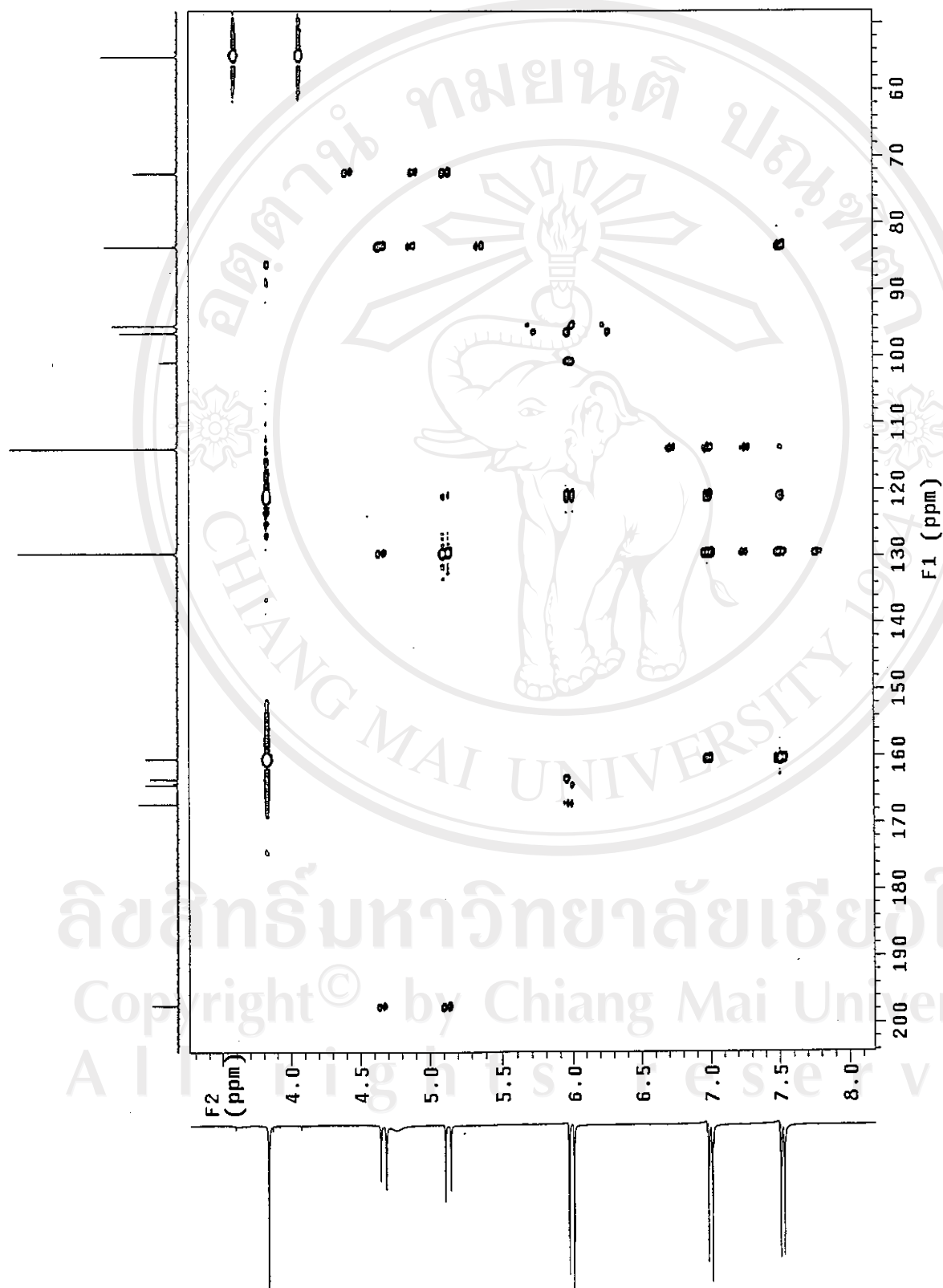


Figure 155. The 300 MHz HMBC spectrum of compound EU9M147 (in acetone- d_6) (expanded)

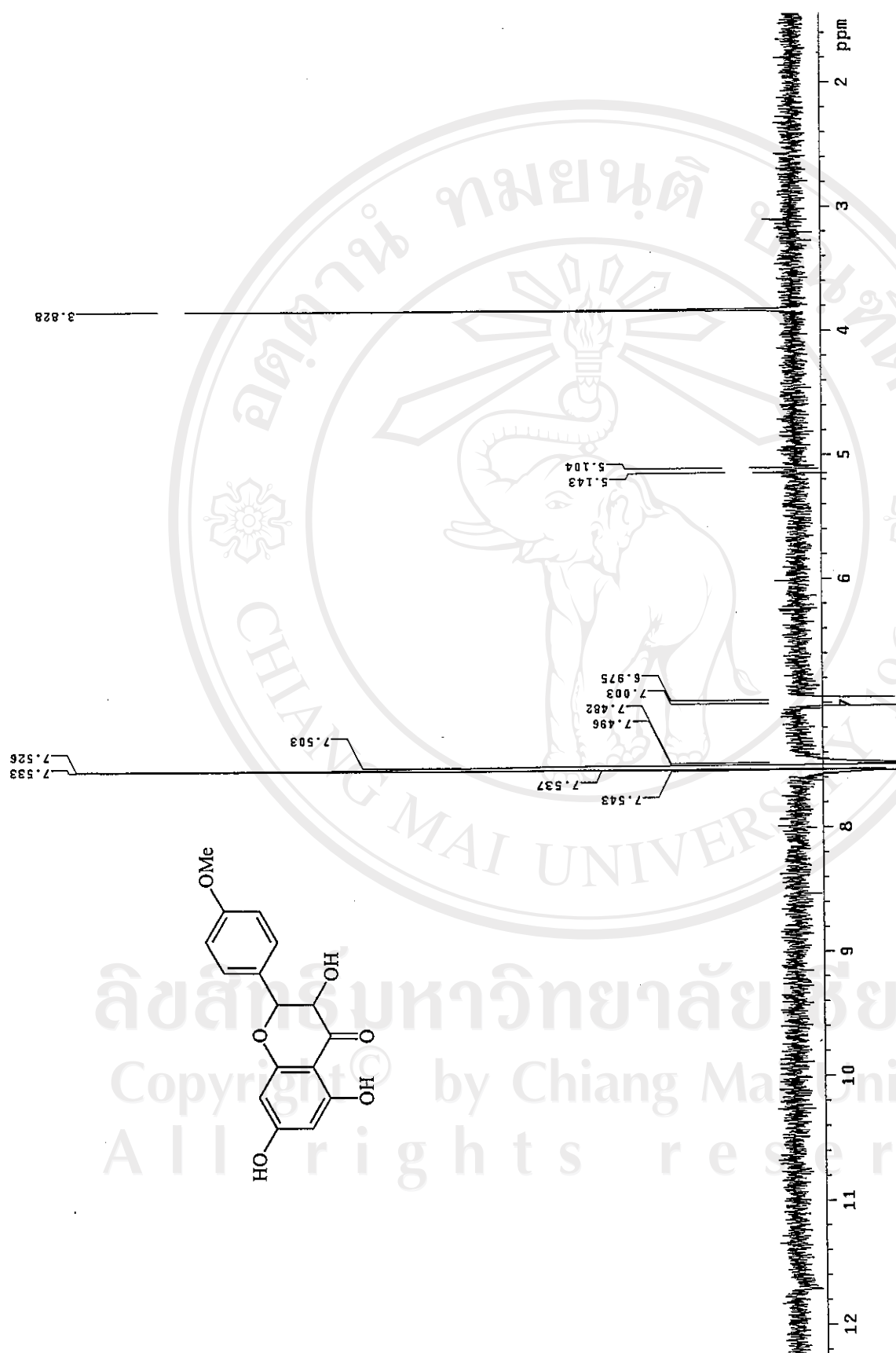


Figure 156. The 300 MHz NOE difference spectrum of compound EU9M147 (in acetone-d₆) irradiation at 6.99 ppm (H-3' and H-5')

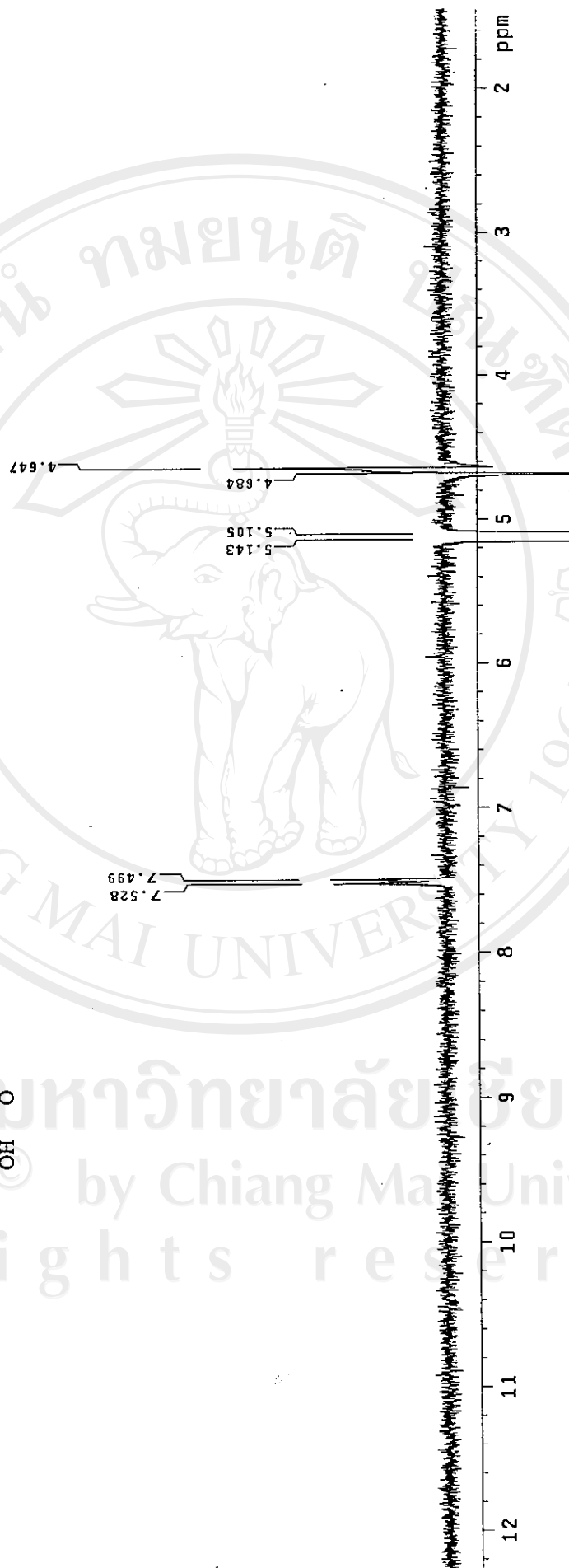
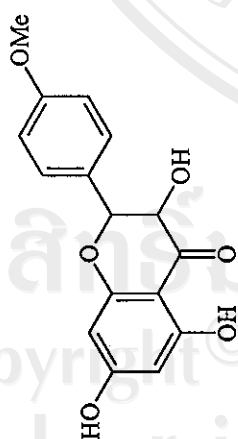


Figure 157. The 300 MHz NOE difference spectrum of compound EU9M147 (in acetone- d_6) irradiation at 5.12 ppm (H-2)

VITA

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