



Fig. 12. The measured single channel (*Channel-1*) characteristics: (a) input and output matching, power gain, RMS gain error and output-to-input isolation characteristics for all 4-bit phase states. (b) 4-bit phase responses, RMS phase error (from ideal 4-bit phases) and averaged group delays for 0°, 22.5°, 45°, 67.5° and 90°-bit phase states.