

TABLE I. SUMMARY OF THE BEAMFORMER PERFORMANCE

Technology	0.18 μ m SiGe BiCMOS (Jazz SiGe120, 1P6M)
Frequency band	Q-Band (40-45 GHz)
Supply voltage	5 V (analog), 3.3 V (digital)
Current consumption	720 mA
Chip area	2.6x3.2 mm ²
Single Path Characteristics	
Input return loss	≤ -10 dB @ 36.6-50 GHz
Output return loss	≤ -10 dB @ 37.6-50 GHz
Channel power gain (<i>ave</i>)	12.5 dB @ 42.5 GHz (3-dB BW: 40-45 GHz)
Phase resolution	4-bit
Gain error	< 1.3 dB (RMS) @ 35-50 GHz
Phase error	$< 8.8^\circ$ (RMS) @ 35-50 GHz
Output P _{1dB}	-5 \pm 1.5 dBm @ 42.5 GHz
Maximum output power (P _{sat})	-2.5 \pm 1.5 dBm @ 42.5 GHz
Isolation (output-to-input)	≤ -55 dB @ 35-50 GHz
Array Characteristics	
Phase mismatch (RMS)	$\leq 7^\circ$ @ 40-50 GHz (between all channels)
Amplitude mismatch (RMS)	≤ 1.8 dB @ 40-50 GHz (between all channels)
Isolation (CH-to-CH)	≤ -30 dB @ 35-50 GHz
Array factor directivity	12 dB (16 elements)