



ADR COMMUNICATION

SIM&T SDR Simulation & Testing Solution
Multi communication *sub-6GHz and mmWave*
5G NR *OpenAirInterface open source support*



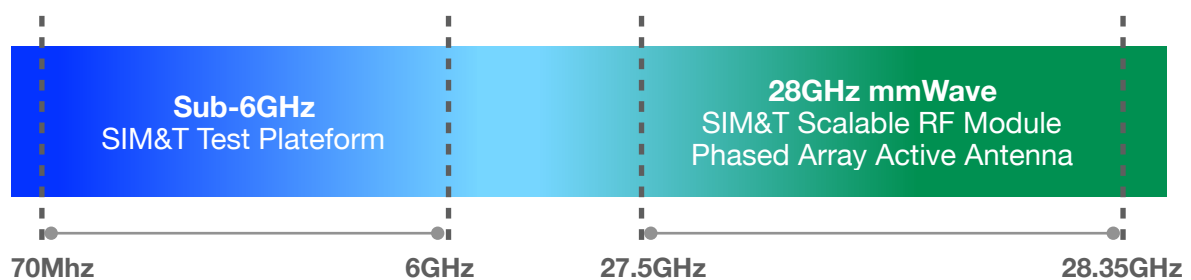
SIM&T SDR SOLUTION

RF sub-6GHz and mmWave

SIM&T SDR SIMULATION & TEST System

DESCRIPTION

SIM&T SDR is designed for 70MHz to 6 GHz and 28GHz mmWave, covering the wide ranges of major commercial frequency ranges. The test platform is a scalable physical-layer test solution supporting 8 x 100 MHz component carrier aggregation, tailored to verify the performance of Wideband communication standard .



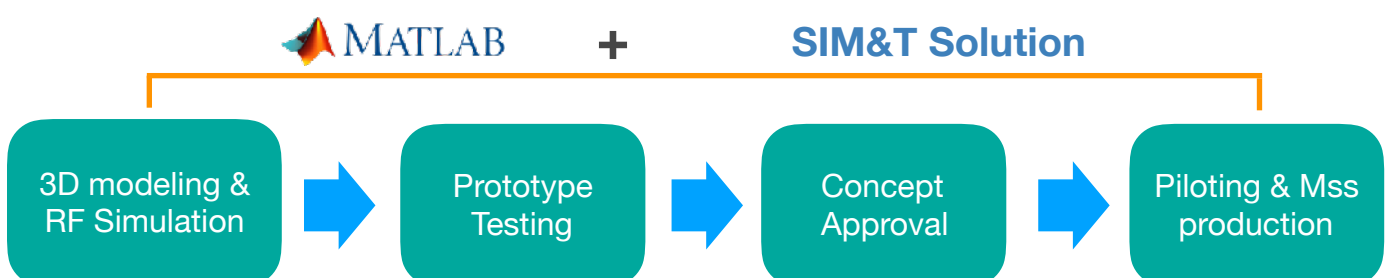
SIM&T Simulation & Test Platform is a compact test system to generate and analyze a variety of standards compliant and custom waveforms, including ,4G LTE & 5G NR* ,Wireless LAN, custom OFDM system, and custom IQ baseband model.

The simulation & test solution combines MATLAB and SIM&T Test Platform to provide a flexible function for R&D signal generation and signal analysis of the wireless communication, including 5G NR sub-6GHz. With SIM&T Phased Array Active Antenna, the test system can support 5G NR 28GHz mmWave.

SIM&T Scalable RF Module Phased Array Active Antenna is a standard commercial mmWave phased array antenna product. User can conduct with any signal generator to transmit in mmWave band, or further, integrate any baseband chip to develop into 5G mmWave commercial products like 5G NR mmWave CPE or 5G NR mmWave Radio Unit (RU).

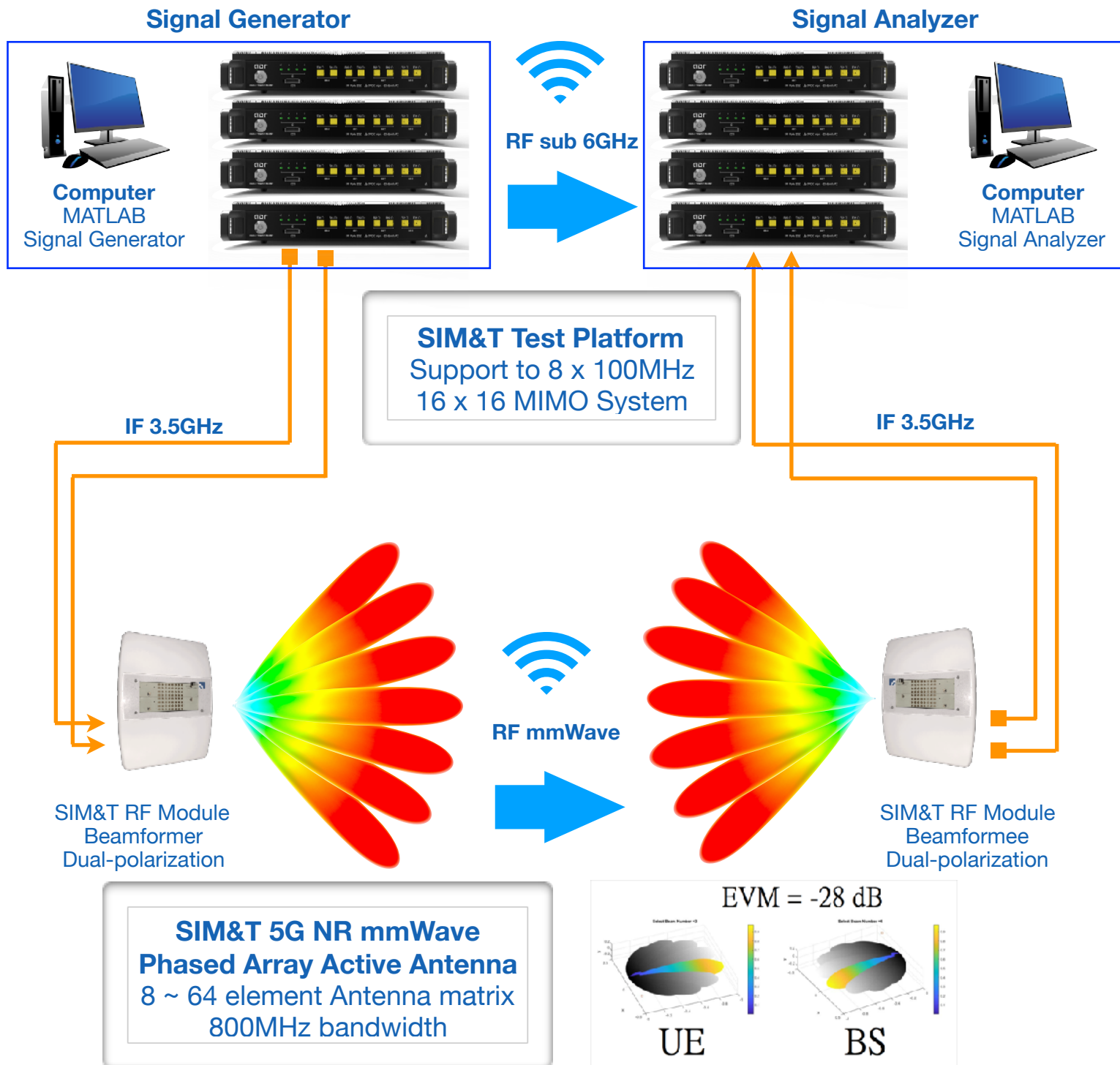
**4G LTE & 5G NR (OpenAirInterface™ Software Alliance code support)*

DESIGN FLOW



SIM&T SIMULATION & TEST SOLUTION

Block Diagram



SIM&T SDR is a user friendly simulation & test system, targeted for characterizing RF modules and end-products. Combining SIM&T RF Module Phased Array Active Antenna to perform 5G NR mmWave communication can be a cost effective, simple, and fast setup solution.

SIM&T SDR simulation

Matlab IQ code to REAL RF

TX()



- TX(xk,rep,time)

RX()



- rk=RX(N_RF_Chain, N_sample)
- rk=RX_DE(N_RF_Chain) → Listen mode, catch xk by trigger

TX_RX()

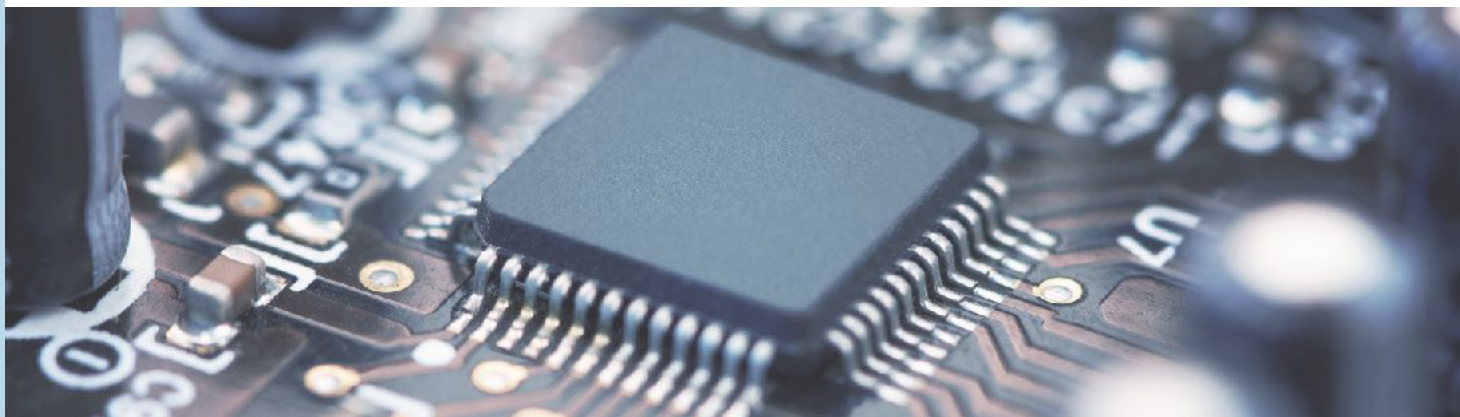


- rk=TX_RX(xk, TX_REP, RX_LEN, RX_delay, LB_mode)

RF Setting



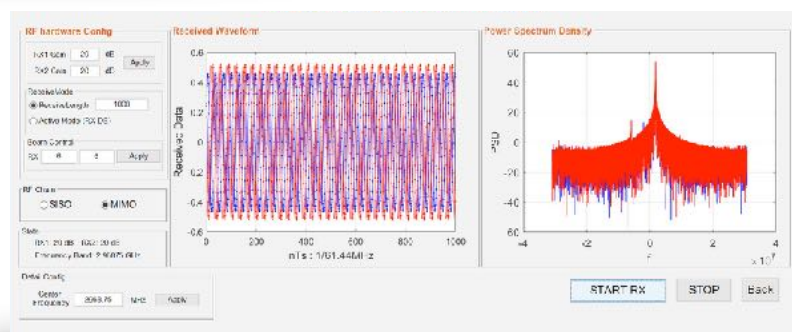
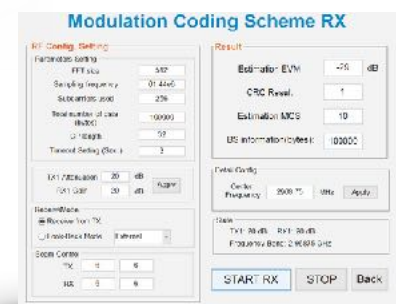
- Set Tx_gain, Rx_gain, change center frequency,



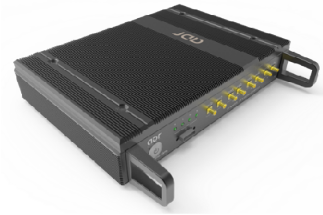
SIM&T Simulation & Test SDR Platform

FUNCTIONALITY

- ▶ Comprehensive physical layer test coverage of 4G LTE, 5G NR , WLAN standards and custom OFDM waveforms
- ▶ High performance configurations for R&D and Design Validation, and cost effective solutions for Manufacturing
- ▶ Supports Time Division Duplex (TDD) and Frequency Division Duplex (FDD) operation
- ▶ RF Bandwidth supports 8 x 100 MHz component carrier aggregation
- ▶ Support to 16 x 16 MIMO
- ▶ On-board clocking or external clock with multi- transceivers synchronization capability
- ▶ Flexible SDR platform “MATLAB & C++” - the system can be implemented to AWG, Spectrum Analyzer, Signal Generator , Signal Analyzer , Network Analyzer and realtime two-way radio transmission.



SIM&T Platform



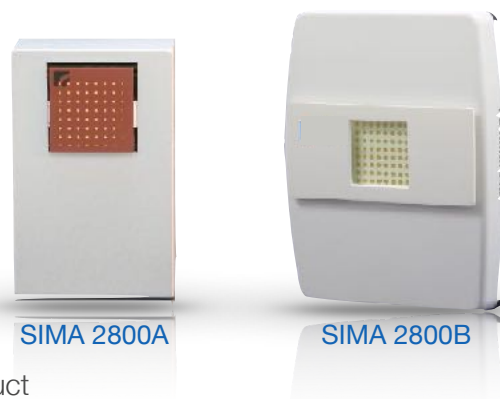
SPECIFICATION

	SIMT 6000	SIMT 6100	SIMT 7100	SIMT 7200
RF Ports	2 x 2 MIMO	4 x 4 MIMO	2 x 2 MIMO	4 x 4 MIMO
RF Bandwidth (max)	56 MHz	112 MHz	100 MHz	200 MHz
Frequency Range	70 MHz to 6.0 GHz		300 MHz to 6.0 GHz	
EVM	≤ −40 dB		≤ −45 dB	
TX noise floor	≤−157 dBm/Hz		≤−155 dBm/Hz	
MAX Output Power	+5 dBm		+4 dBm	
Output power step	0.25dB		0.25dB	
Phase Noise	0.13 °rms @ 800MHz 0.37 °rms @ 2400GHz 0.59 °rms @ 5500MHz		0.20 °rms @ 800MHz 0.49 °rms @ 2400GHz 0.75 °rms @ 5500MHz	
Noise Figure	2dB @ 800MHz 3dB @ 2400GHz 3.8dB @ 5500MHz		12dB @ 800MHz 13.5dB @ 2400GHz 18dB @ 5500MHz	
TX RF 1 to RF 2 isolation	50 dB @ 800MHz 50 dB @ 2400GHz 50 dB @ 5500MHz		65 dB @ 800MHz 60 dB @ 2400GHz 60 dB @ 5500MHz	
RX RF 1 to RF 2 isolation	55 dB @ 800MHz 50 dB @ 2400GHz 52 dB @ 5500MHz		60 dB @ 800MHz 60 dB @ 2400GHz 60 dB @ 5500MHz	
Interfaces	USB (JTAG), 1 Gb RJ45 , Ref CLK IN/OUT , SF SYNC IN/OUT , RF Digital Control Interface			
Power requirements	12V DC Jack, AC Power Adaptor 100 ~ 240V / 50 ~ 60Hz			
Operation temperature	0°C to +50°C			
Dimensions	333 x 209 x 35 mm			
Weight	2.1 Kgw			

SIM&T Scalable RF Module Phased Array Active Antenna

FUNCTIONALITY

- ▶ Point to Point or Point to Multipoint communication **Multi-user MIMO (MU-MIMO)**
- ▶ Up/Down-converter integrated
- ▶ 2D Beam Forming with FoV of 120°
- ▶ Dual-polarization for two layer transmission
- ▶ Scalable antenna modular based on applications
- ▶ Programmable beam pattern & adjustable beam width
- ▶ Perform the beamforming and beam tracking
- ▶ Standard commercial mmWave phased array antenna product



SPECIFICATION

	SIMA 2808A	SIMA 2816A	SIMA 2832B	SIMA 2864B
Antenna Element	2 x 4	4 x 4	4 x 8	8 x 8
H/V P1dB EIRP	29 / 26.5 dBm	35 / 32.5 dBm	47 / 47 dBm	53 / 53 dBm
TX mode power @12V	1.40 A	1.70 A	3.60 A	5.70 A
RX mode power @12V	1.20 A	1.45 A	2.55 A	3.60 A
Phase/Attenuation bits	5 / 5		6 / 5	
Beam switch rate	140 ns		200 ns	
Size	96 x 150 x 60 mm (W x H x D)		201 x 155 x 56 mm (W x H x D)	
Weight	725 g		1,030 g	
Operating band	27.50 ~ 28.35 GHz			
IF range	2.5 ~ 4.0 GHz			
Horizontal/Vertical FOV	120°			
Supported bandwidth	800 MHz			
Noise Figure(NF)	5 dB			
Duplexing mode	TDD			
Interfaces	IF TX Input SMA x 2 , IF RX Output SMA x2 , LO ref. CLK Input x1			
Power requirements	12V DC Jack, AC Power Adaptor 100 ~ 240V / 50 ~ 60Hz			
Operation temperature	0°C to +50°C			

Model Information

TYPE	MODEL	Description
<i>SIM&T Test Platform</i> <i>System can extend to</i> <i>16 x 16 MIMO , BW 800MHz</i>	SIMT 6000	2 x 2 MIMO , BW 56MHz , 70 MHz to 6.0 GHz
	SIMT 6100	4 x 4 MIMO , BW 112MHz , 70 MHz to 6.0 GHz
	SIMT 7100	2 x 2 MIMO , BW 100MHz ,300 MHz to 6.0 GHz
	SIMT 7200	4 x 4 MIMO , BW 200MHz ,300 MHz to 6.0 GHz
SIM&T RF Module Phased Array Active Antenna	SIMA 2808A	2 x 4 Antenna Element, BW 800 MHz , 27.50 ~ 28.35 GHz
	SIMA 2816A	4 x 4 Antenna Element, BW 800 MHz , 27.50 ~ 28.35 GHz
	SIMA 2832B	4 x 8 Antenna Element, BW 800 MHz , 27.50 ~ 28.35 GHz
	SIMA 2864B	8 x 8 Antenna Element, BW 800 MHz , 27.50 ~ 28.35 GHz

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