

Remote Implementation Example

for RWC5020x FW V1.320 or higher

LoRaWAN End Device RF Performance
Measurement for All Regions V1.0;
EU863-870

RedwoodComm



Initialization

CONFIGURATION - GENERAL

CONFIGURATION - PROTOCOL

CONFIGURATION - RF

Activation

TX Measurements

POWER MEASUREMENT – [Part 1] 3D Pattern for MaxEIRP

Method 1

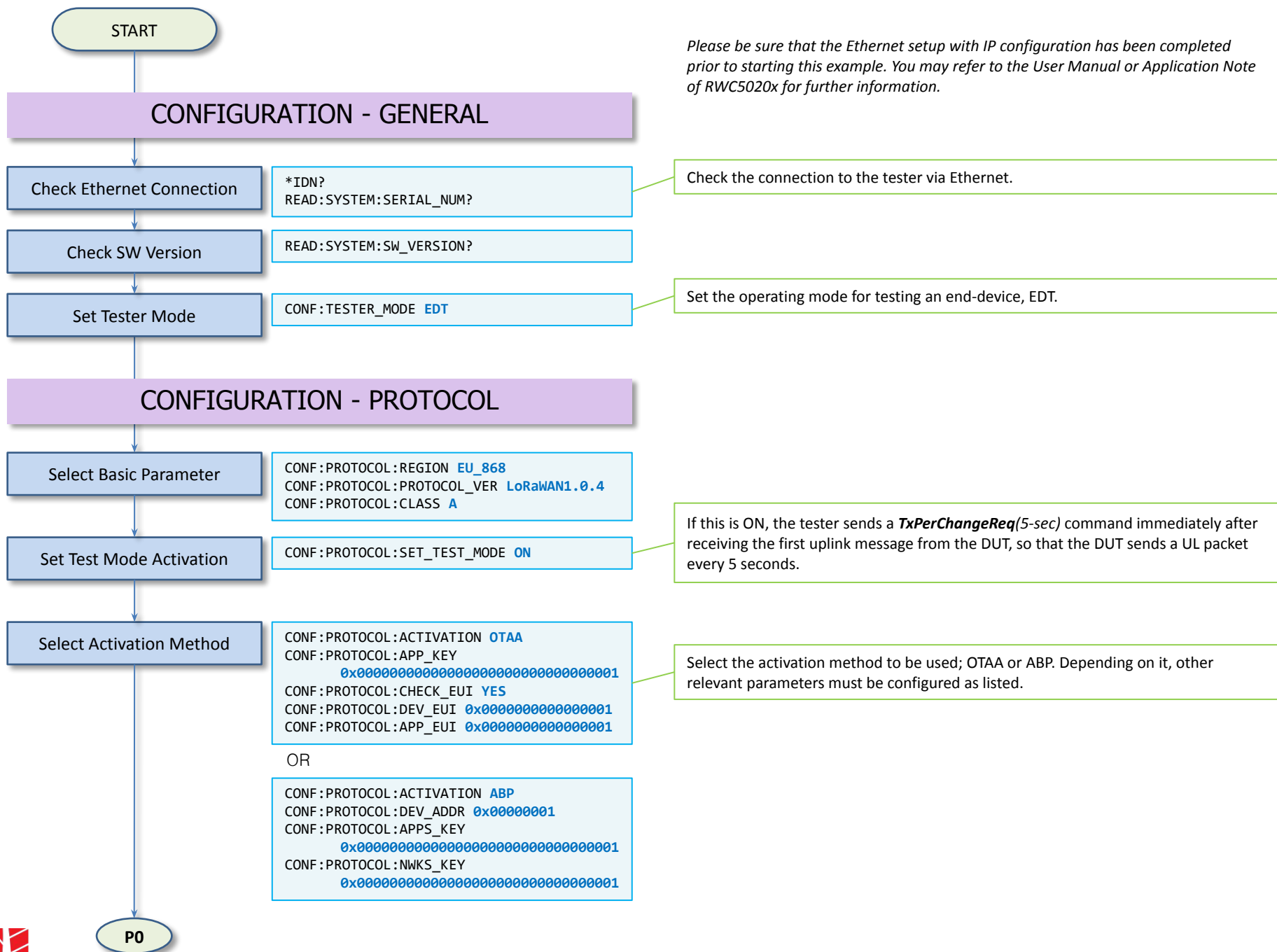
Method 2

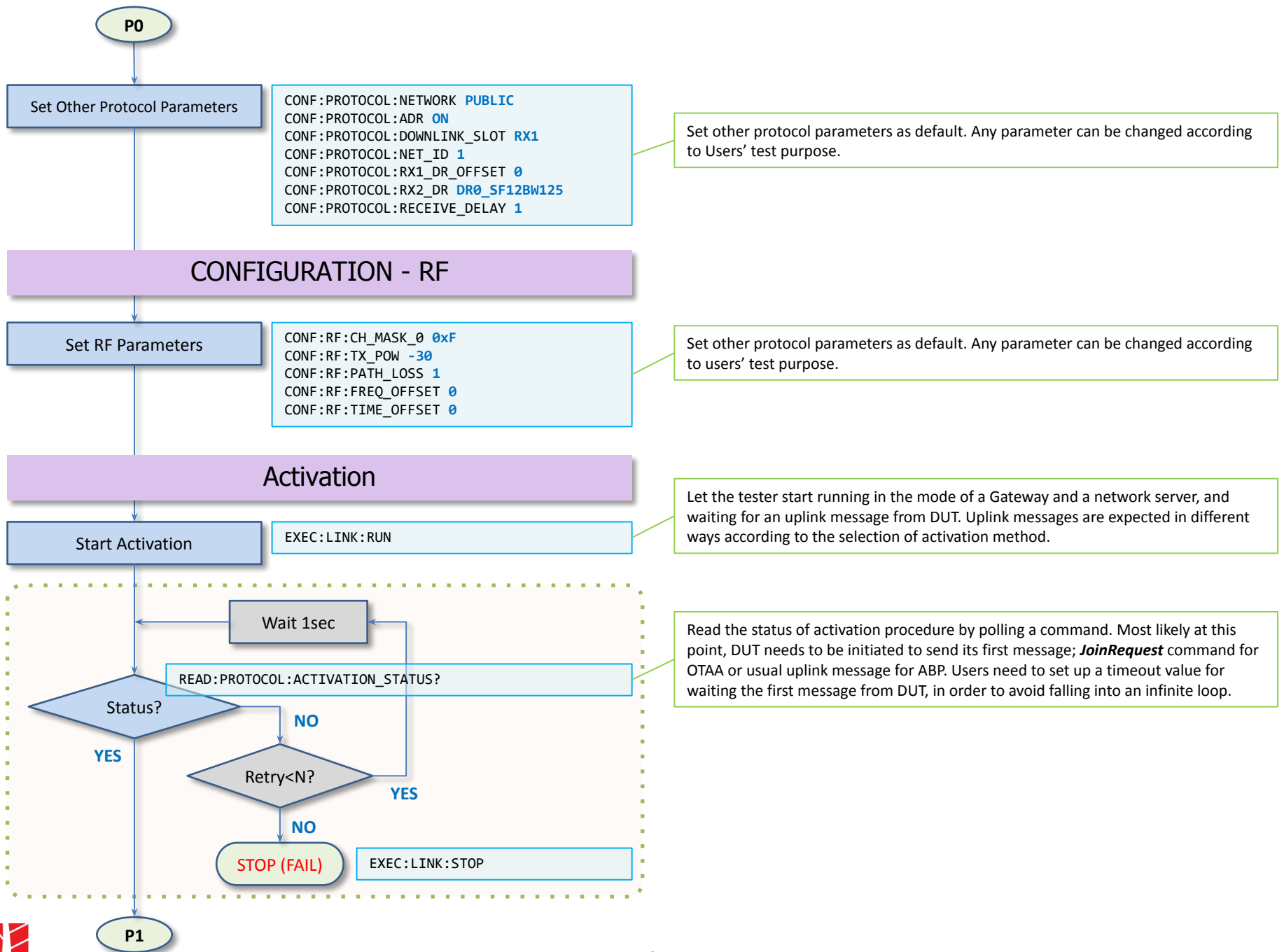
POWER MEASUREMENT – [Part 2] Meas. at Best Position for Non MaxEIRP

RX Measurements

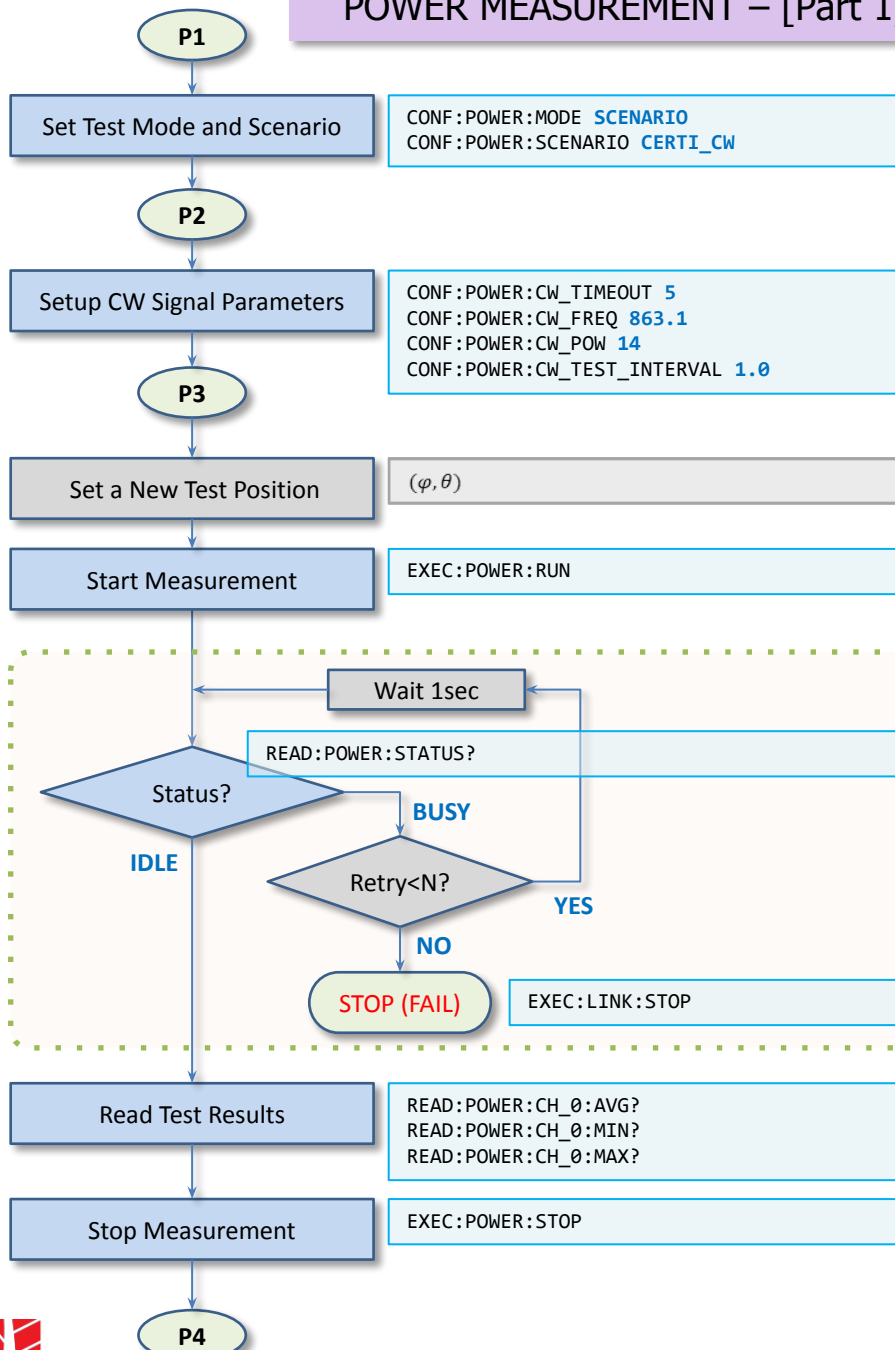
RX SENSITIVITY MEASUREMENT – RX1 Window

RX SENSITIVITY MEASUREMENT – RX2 Window





POWER MEASUREMENT – [Part 1] 3D Pattern for MaxEIRP : Method 1



We propose two different methods in implementing measurement of 3D pattern of TX power;

- 1) Method 1 – issue a **TxCwReq** command at each position of DUT and the tester measure the power.
- 2) Method 2 – issue a **TxCwReq** command once to force DUT to send CW signal for a long time until full 3D measurement completes and the tester will measure the power at each position.

Set the power measurement mode to SCENARIO and the SCENARIO to CERTI_CW, in which the tester will force DUT to transmit CW signal for specified timeout and measure the power of CW signal.

These are parameters for **TxCwReq** command. The power must be MaxEIRP for 3D pattern measurement.

Start the TX power measurement.

Wait until the TX power measurement finishes by checking its status. Users need to stop checking after CW timeout expires, in order to avoid falling into an infinite loop.

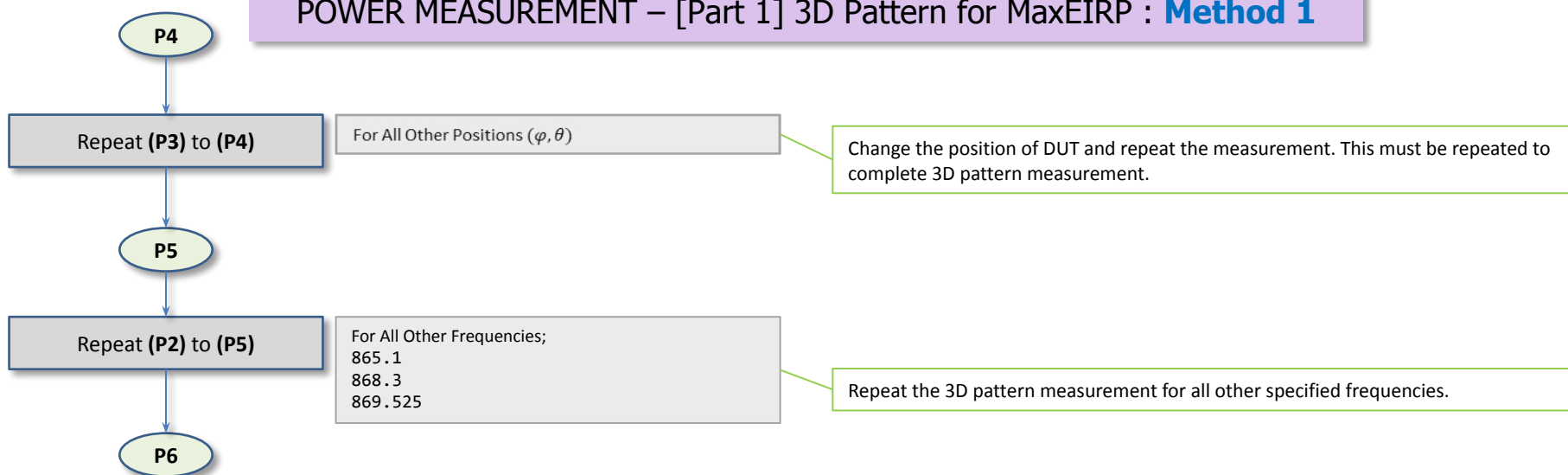
Read the result values for the current position.

Stop the TX power measurement.

3D Pattern for MaxEIRP – Method 1

Test	Configuration			Channels *			
	Data rate	Tx Power for FC plan devices	Tx Power for DC plan devices	Low freq channel	Mid freq channel	Default freq channel	High freq channel
TRP / 15° step	MinDR	Max output power	0 (MaxEIRP)	x	x	x	X
EIRP/ERP 1 measurement Best position	MinDR	Max output power	3 (MaxEIRP - 6 dB)	x	x	x	-
EIRP/ERP 1 measurement Best position	MinDR	Max output power	6 (MaxEIRP - 12 dB)	x	x	x	-

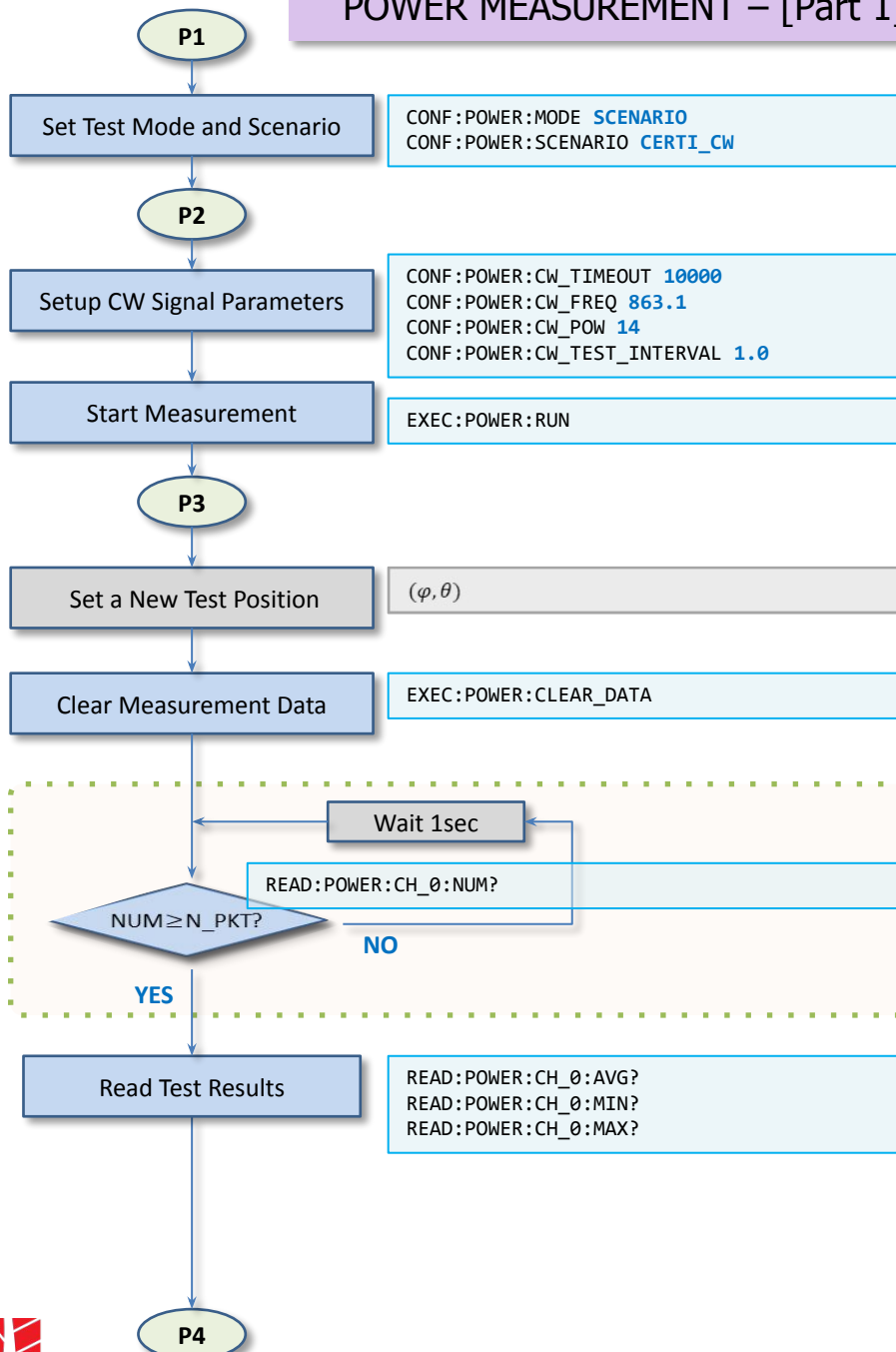
POWER MEASUREMENT – [Part 1] 3D Pattern for MaxEIRP : **Method 1**



3D Pattern for MaxEIRP – Method 1

Test	Configuration			Channels *			
	Data rate	Tx Power for FC plan devices	Tx Power for DC plan devices	Low freq channel	Mid freq channel	Default freq channel	High freq channel
TRP / 15° step	MinDR	Max output power	0 (MaxEIRP)	x	x	x	X
EIRP/ERP 1 measurement Best position	MinDR	Max output power	3 (MaxEIRP - 6 dB)	x	x	x	-
EIRP/ERP 1 measurement Best position	MinDR	Max output power	6 (MaxEIRP - 12 dB)	x	x	x	-

POWER MEASUREMENT – [Part 1] 3D Pattern for MaxEIRP : Method 2



We propose two different methods in implementing measurement of 3D pattern of TX power;

- 1) Method 1 – issue a **TxCwReq** command at each position of DUT and the tester measure the power.
- 2) Method 2 – issue a **TxCwReq** command once to force DUT to send CW signal for a long time until full 3D measurement completes and the tester will measure the power at each position.

Set the power measurement mode to SCENARIO and the SCENARIO to CERTI_CW, in which the tester will force DUT to transmit CW signal for specified timeout and measure the power of CW signal.

These are parameters for **TxCwReq** command. The CW TIMEOUT value must be estimated properly to consider the time required for measurement of all test positions. The power must be MaxEIRP for 3D pattern measurement.

Start the TX power measurement.

Clear the previous data for the next measurement.

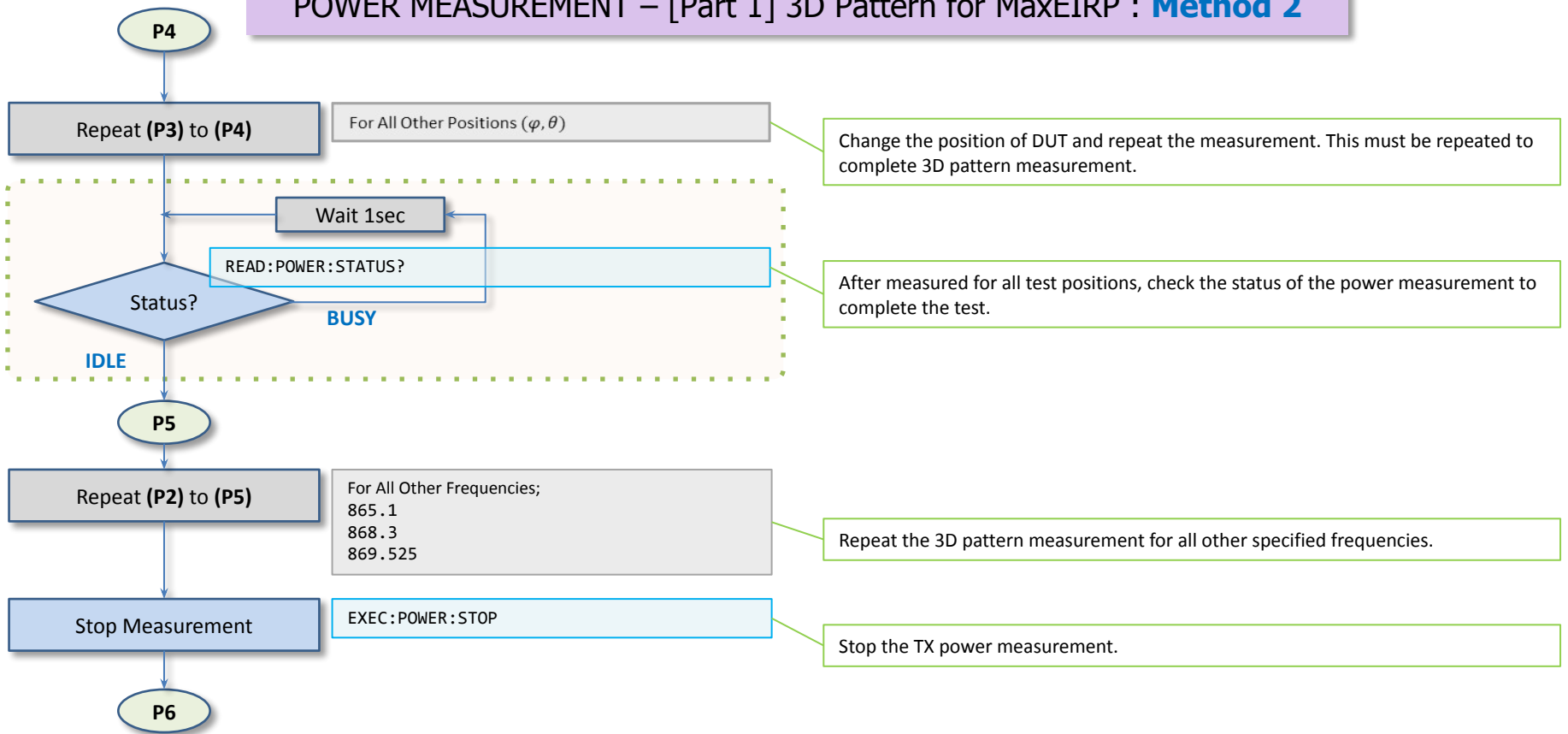
Check if the measurement data is ready for reading; read the number of packets received and compare with N_PKT, which means how many times the power will be measured at the current position, defined by users.

Read the result values for the current position.

3D Pattern for MaxEIRP – Method 2

Test	Configuration			Channels *			
	Data rate	Tx Power for FC plan devices	Tx Power for DC plan devices	Low freq channel	Mid freq channel	Default freq channel	High freq channel
TRP / 15° step	MinDR	Max output power	0 (MaxEIRP)	x	x	x	X
EIRP/ERP 1 measurement Best position	MinDR	Max output power	3 (MaxEIRP - 6 dB)	x	x	x	-
EIRP/ERP 1 measurement Best position	MinDR	Max output power	6 (MaxEIRP - 12 dB)	x	x	x	-

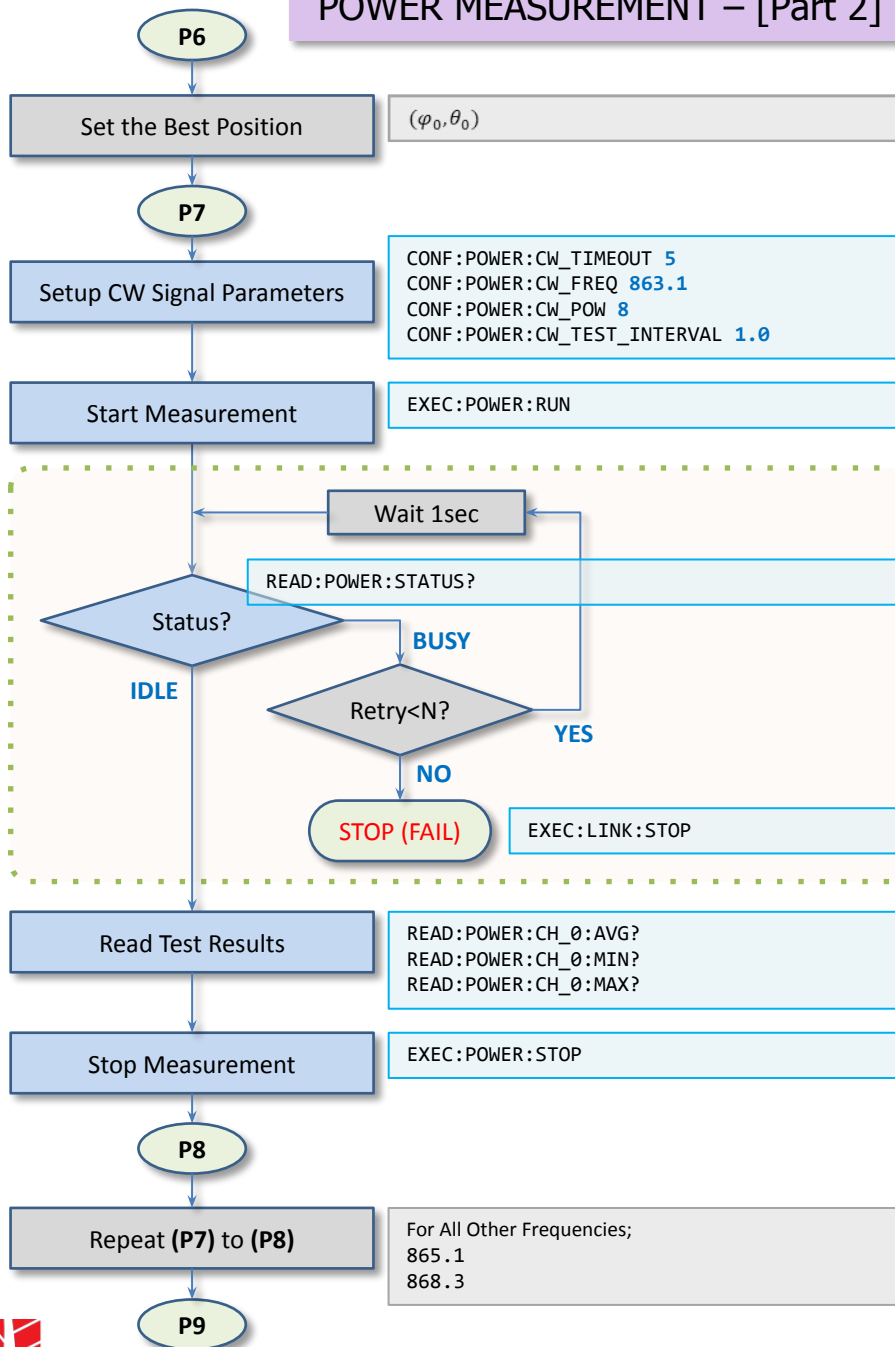
POWER MEASUREMENT – [Part 1] 3D Pattern for MaxEIRP : Method 2



3D Pattern for MaxEIRP – Method 2

Test	Configuration			Channels *			
	Data rate	Tx Power for FC plan devices	Tx Power for DC plan devices	Low freq channel	Mid freq channel	Default freq channel	High freq channel
TRP / 15° step	MinDR	Max output power	0 (MaxEIRP)	x	x	x	X
EIRP/ERP 1 measurement Best position	MinDR	Max output power	3 (MaxEIRP - 6 dB)	x	x	x	-
EIRP/ERP 1 measurement Best position	MinDR	Max output power	6 (MaxEIRP - 12 dB)	x	x	x	-

POWER MEASUREMENT – [Part 2] Meas. at Best Position for Non MaxEIRP



Set the best position of DUT.

These are parameters for **TxCwReq** command. The power must be MaxEIRP-6 for measurement at the best position.

Start the TX power measurement.

Wait until the TX power measurement finishes by checking its status. Users need to stop checking after CW timeout expires, in order to avoid falling into an infinite loop.

Read the result values for the current position.

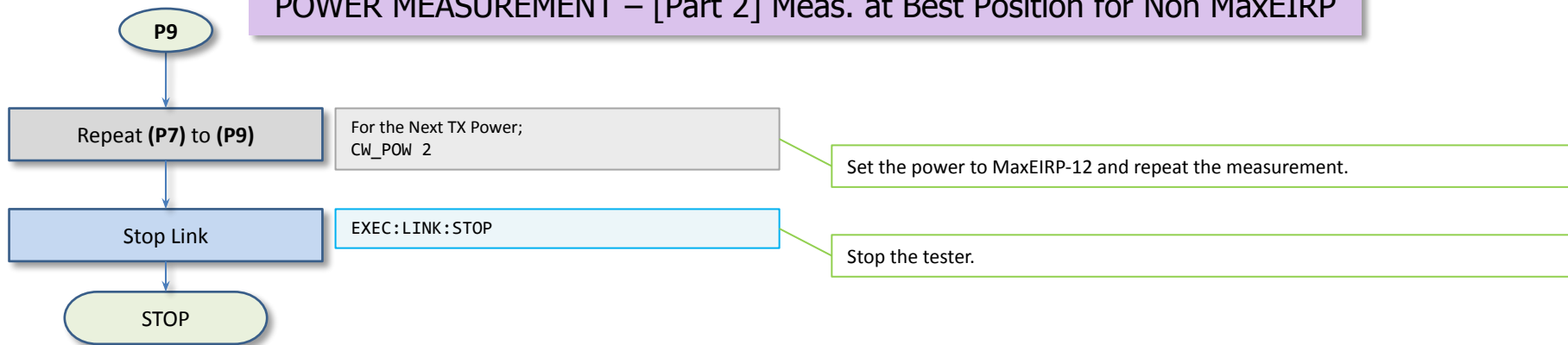
Stop the TX power measurement.

Repeat the power measurement for all other specified frequencies.

Best Position for Non MaxEIRP

Test	Configuration			Channels *			
	Data rate	Tx Power for FC plan devices	Tx Power for DC plan devices	Low freq channel	Mid freq channel	Default freq channel	High freq channel
TRP / 15° step	MinDR	Max output power	0 (MaxEIRP)	x	x	x	X
EIRP/ERP 1 measurement Best position	MinDR	Max output power	3 (MaxEIRP - 6 dB)	x	x	x	-
EIRP/ERP 1 measurement Best position	MinDR	Max output power	6 (MaxEIRP - 12 dB)	x	x	x	-

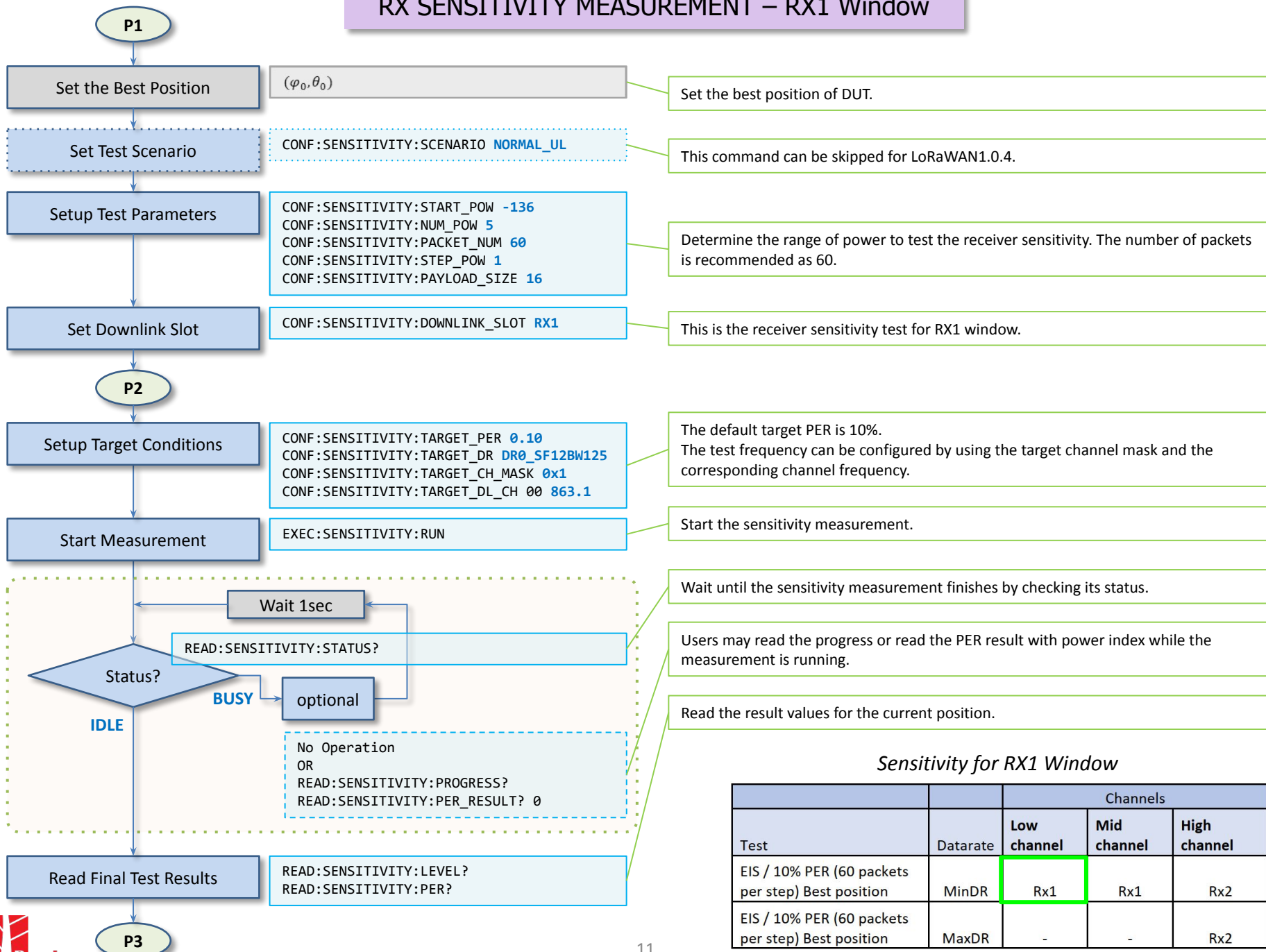
POWER MEASUREMENT – [Part 2] Meas. at Best Position for Non MaxEIRP



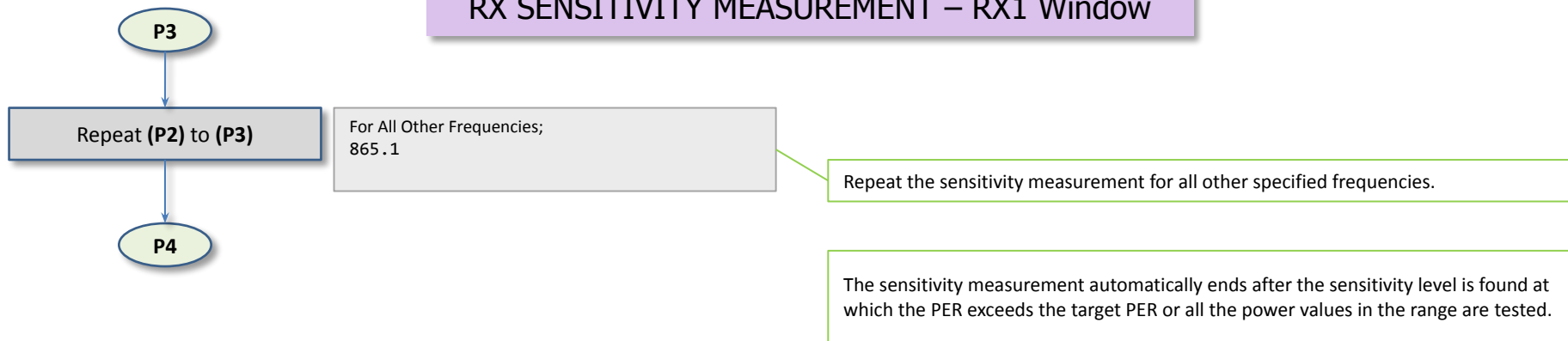
Best Position for Non MaxEIRP

Test	Configuration			Channels *			
	Data rate	Tx Power for FC plan devices	Tx Power for DC plan devices	Low freq channel	Mid freq channel	Default freq channel	High freq channel
TRP / 15° step	MinDR	Max output power	0 (MaxEIRP)	x	x	x	X
EIRP/ERP 1 measurement		Max output power					
Best position	MinDR	Max output power	3 (MaxEIRP - 6 dB)	x	x	x	-
EIRP/ERP 1 measurement		Max output power					
Best position	MinDR	Max output power	6 (MaxEIRP - 12 dB)	x	x	x	-

RX SENSITIVITY MEASUREMENT – RX1 Window



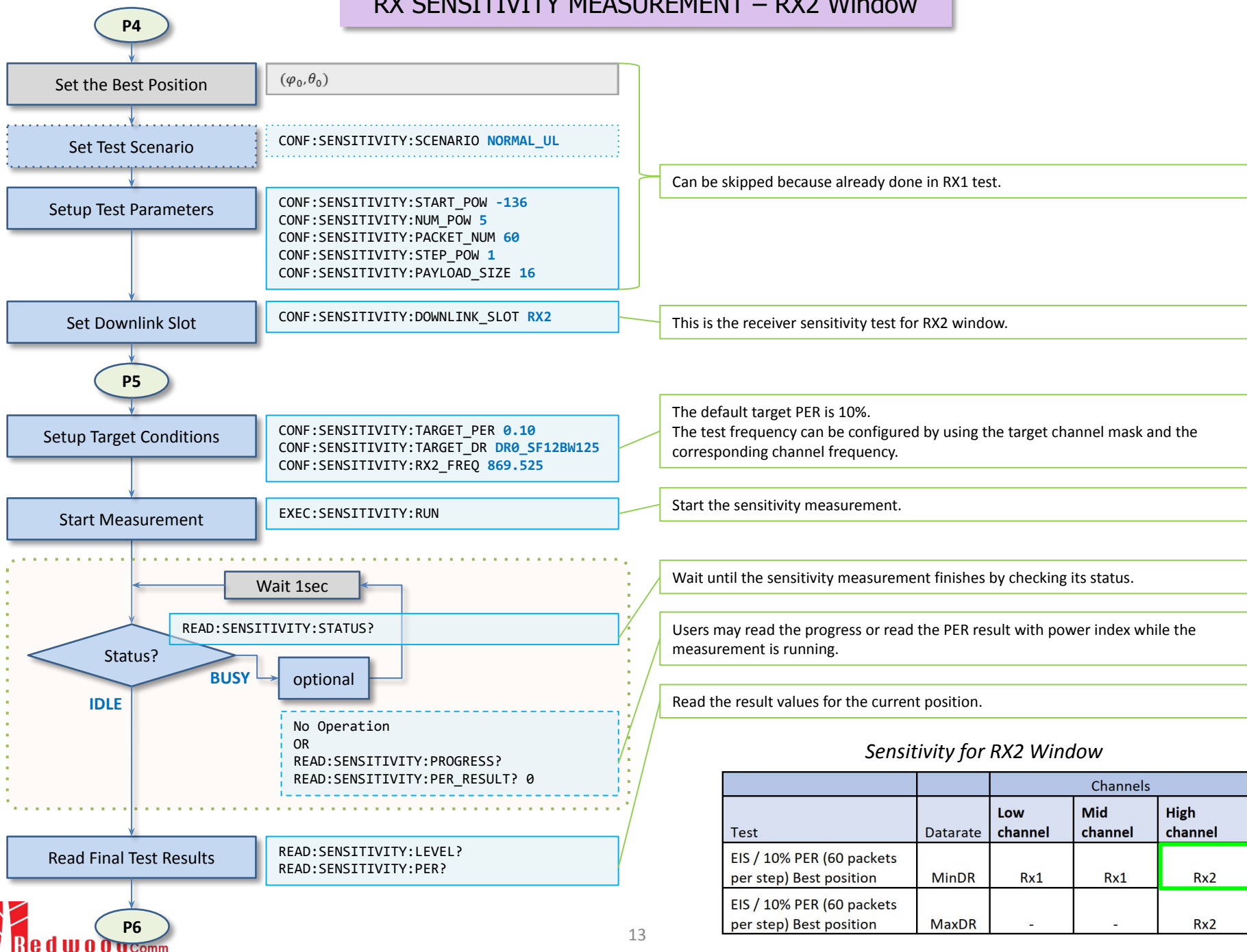
RX SENSITIVITY MEASUREMENT – RX1 Window



Sensitivity for RX1 Window

Test	Datarate	Channels		
		Low channel	Mid channel	High channel
EIS / 10% PER (60 packets per step) Best position	MinDR	Rx1	Rx1	Rx2
EIS / 10% PER (60 packets per step) Best position	MaxDR	-	-	Rx2

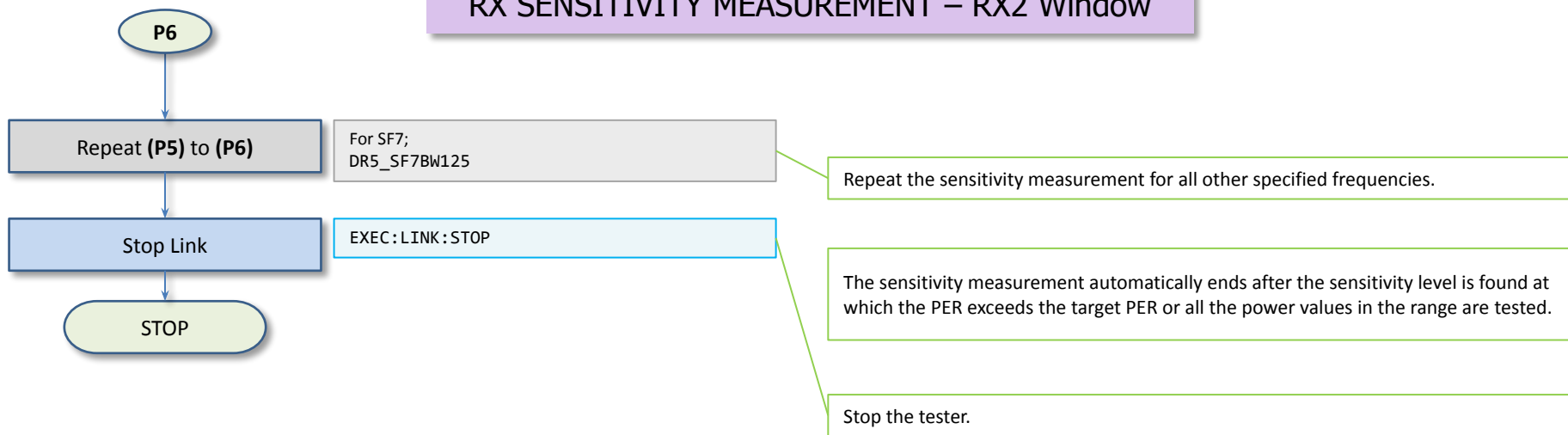
RX SENSITIVITY MEASUREMENT – RX2 Window



Sensitivity for RX2 Window

Test	Datarate	Channels		
		Low channel	Mid channel	High channel
EIS / 10% PER (60 packets per step) Best position	MinDR	Rx1	Rx1	Rx2
EIS / 10% PER (60 packets per step) Best position	MaxDR	-	-	Rx2

RX SENSITIVITY MEASUREMENT – RX2 Window



Sensitivity for RX2 Window

Test	Datarate	Channels		
		Low channel	Mid channel	High channel
EIS / 10% PER (60 packets per step) Best position	MinDR	Rx1	Rx1	Rx2
EIS / 10% PER (60 packets per step) Best position	MaxDR	-	-	Rx2