Bluetooth[®] LE devices – complete RF characterization

The R&S[®]CMW wireless communication tester offers an elaborate parametric test concept, including all RF test cases up to Bluetooth[®]5, that makes this flexible test platform ideal for designing and verifying Bluetooth[®] Low Energy (LE) circuits and modules.



Your task

Short time to market, cost reduction and high performance are the perpetual goals for developers of Bluetooth[®] enabled products. The individual product requirements are typically the basis for the decision of whether to integrate a ready-to-use module or a chip and an appropriate antenna.

Bluetooth[®] enabled products need to comply with the standards and regulatory requirements in order to ensure compatibility with other Bluetooth[®] devices. Bluetooth[®] SIG and national certification bodies demand official certification from a test laboratory, accredited by Bluetooth SIG (BQTF) and the respective country, before a new product can be put on the market.

T&M solution

The R&S°CMW radio communication testers from Rohde&Schwarz are one-box instruments that support all the different stages – from development and precertification to production. Bluetooth[®] SIG has listed the R&S°CMW as a qualified product for RF testing.

The test setup is easy and straightforward. Using the direct test mode of Bluetooth[®] LE, the R&S[®]CMW simply configures the device to transmit and receive test packets. The multi-evaluation mode significantly reduces test time by using an identical sampling data set for parallel transmitter

measurements such as power, modulation, spectrum and others. This provides a more detailed overview of the transmitter functions since all measured parameters are correlated. For



even more detailed analysis, it is possible to zoom into one of these measurements. The R&S®CMW tester's very fast spectrum measurements help optimize development time.



R&S°CMW multi-evaluation mode significantly reduces test time.

The R&S[®]CMW also performs the BT RF test cases for prequalification purposes, including the in-band emissions test. Some test cases require an additional signal generator such as the R&S[®]SGS100A RF source. The R&S[®]CMWrun sequencer software tool can be used to fully automate the Bluetooth[®] LE prequalification tests.

The user-friendly R&S[®]CMW test setup efficiently performs all Bluetooth[®] measurements, from complex lab tests and prequalification tests to fast production line testing.



Application Card | Version 02.00

Its flexible and wide variety of hardware and software options ensure the best fit for every test and measurement requirement, for example additional testing of Bluetooth[®] classic signaling and non-signaling, WLAN and cellular standards such as LTE/LTE-A, WCDMA and GSM with one instrument.

Key features of R&S®CMW and R&S®CMWrun

- I Qualified by Bluetooth® SIG for RF measurements
- I Very fast spectrum measurements
- Bluetooth[®] 5 (PHY: LE 1M, LE 2M and LE coded), stable modulation index (SMI) support
- Support of all test cases of RF PHY Bluetooth[®] test specification, even the in-band emissions test
- I Future-ready platform solution

See also

www.rohde-schwarz.com/Bluetooth www.rohde-schwarz.com/product/CMW500 www.rohde-schwarz.com/product/SGS100A

Application Notes

Advanced Bluetooth® RF Tests with R&S®CMWrun www.rohde-schwarz.com/appnote/1MA261

The R&S[®]CMW500/290/270 and R&S[®]CMWrun support all Bluetooth[®] RF test cases

Bluetooth LE test cases								
	LE 1M 1 Ms/s	LE 2M 2 Ms/s	LE 1M 1 Ms/s SMI	LE 2M 2 Ms/s SMI	Coded 1 Ms/s S=2	Coded 1 Ms/s S=8	Coded 1 Ms/s SMI S=2	Coded 1 Ms/s SMI S=8
Transmitter Tests	TP/TRM-LE/CA/BV-xx-C							
Output power	01							
In-band emission	03	08						
Modulation characteristics	05	10	09	11		13		
Carrier frequency offset and drift	06	12				14		
Receiver Tests	TP/RCV-LE/CA/BV-xx-C							
Receiver sensitivity	01	08	14	20	26	27	32	33
C/I and receiver sensitivity	03	09	15	21	28	29	34	35
Blocking performance ¹⁾	04	10	16	22				
Intermodulation performance ¹⁾	05	11	17	23				
Maximum input signal level	06	12	18	24				
PER report integrity	07	13	19	25	30	31	36	37

¹⁾ Requires an additional signal generator.

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