

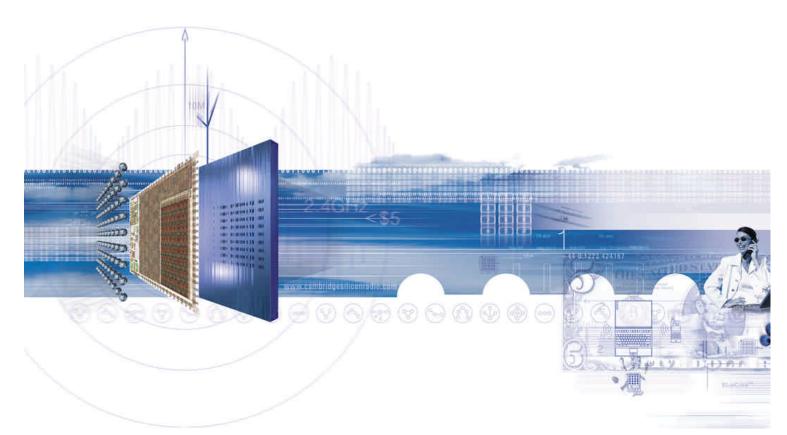
BlueCoreä01

Falcon / BTL040

BlueTest Instruction Manual

AN047

July 2001



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Bluetooth Qualified



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Introduction

BlueTest is a program that controls the on-chip built-in-self-test (BIST) software for RF testing. This document explains the facilities offered by the BIST. BlueTest does not execute any of these tests. It sends commands to **BlueCore01** and/or enables the on-chip BIST, then reports any results.

The tests fall into six categories:

- Simple RF tests; used for PCB de-bug and optimisation
- Quantitative tests for transmit and receive; used to establish the performance of the Bluetooth device.
- Loopback test modes; used for qualification and regulatory testing
- Configuration commands to set parameters for other tests
- Built-in self-test routines
- Miscellaneous test routines

Further details about commands, parameters and packet types are included in the appendices following the tests.

Running a Test

In a BlueTest dialog select the **Standard** button to display the entire test. This applies to all of the tests except for the BIT ERR1 and BIT ERR2 tests. Click on **Bit Error** to display these results in a column format.

When running the tests, the results display in a dialog box.

The default file name is logfile.txt. It is located in the current directory in which the program resides. Select **Browse for File** to create your own file name and path (using test examples provided).

To save test results to a file, tick Save to File.

Note: Some of these tests require two Bluetooth modules to function correctly. The PCM External Loopback test has notes specifically for use with CSR's Casira development kit. All of the following tests are designed to run with CSR's firmware versions Beta 10.4 and above.

Several tests include entries for **Related Test Spec Name**. These refer to tests in the Bluetooth Special Interest Group (SIG) Test Specification for RF document, rev. 0.9r, dated 31 January 2000.

S BlueTest	_ 🗆 🗵
RF Test Mode	
PAUSE A RADIO STATUS	Close
TXSTART TXDATA1	Execute
TXDATA2 TXDATA3 TXDATA4	Reset Chip
RXSTART1	PS
Test Results	
Save to File Browse for file Display: Standard	Bit Error
Nogfile.txt	
Opening com1. Transport active.	
Link active. BC01b (Hardware ID 64) firmware version 47.	
1	

BlueTest Example Display



Getting Started

Run Bluetest.exe.

Select a Protocol (Default **BCSP**).

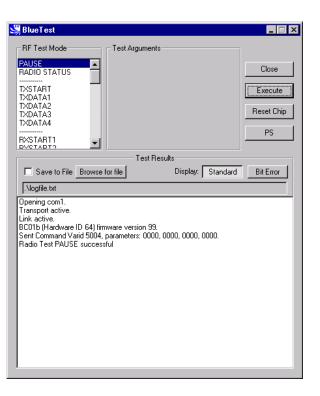
Select Port and Baud Rate (Default com1, 115200).

Choose a protocol	
Protocol © BCSP © H4 (UART) © USB	Port and Baud Rate

Simple Tests

RF Test Mode

Title	PAUSE
Summary	Halts the current test and stops any radio activity.
Test Arguments	None
Return Data	None
Exit	Click on Reset Chip or enter a new command.



BlueTest Instruction Manual

PAUSE Example Display





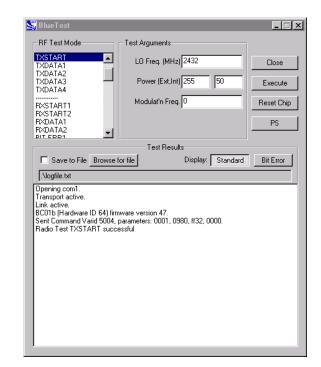
Title	RADIO STATUS	
Summary	Returns the values from the radio control registers.	
Test Arguments	None	
Return Data	Internal transmission level	
	External transmission level	
	Internal receiver gain	
	Internal receiver attenuation	
	Local oscillator level	
	IQ trim	
	Signal/image ratio for IQ trim	
Exit	Click on Reset Chip.	

RF Test Mode Test Argume RADIO STATUS TXSTART TXDATA1 TXDATA2	
TXDATA3 TXDATA4 mmm RXSTART1 RXSTART2	Reset Chip PS
	Besults
Save to File Browse for file	Display: Standard Bit Error
Nogfile.txt	
Opening com1. Transpot active. Link active. BC01b (Hardware ID 64) firmware version S Sent Command Varid 5004, parameters: 00 Radio Status Report: Internal transmission level: 0. External transmission level: 0. Internal receiver gain: 11. Internal receiver gain: 11. Internal receiver gain: 13. Local oscillator level: 13. IQ trim: 0x00e. Signal/image ratio for IQ trim: 32. Radio Test RADIO STATUS successful	

RADIO STATUS Example Display



ř.	
Title	TXSTART
Summary	Enables the transmitter in continuous transmission at a designated frequency (LO Freq) with a designated output Power (Ext, Int) and designated tone modulation frequency (Modulat'n Freq).
Test Arguments	LO Freq (Carrier Frequency in MHz) = 2402 to 2480 Power (Ext, Int) = gain of external amplifier (if present) and internal amplifier. Ext value is specific to the design and Int value is 0 to 63 (Default = 50) Modulat'n Freq = -32768 to 32767 in units of 1/4096MHz
	None
Return Data	Use RF Analyser to check carrier output.
Exit	Click on Reset Chip.



TXSTART Example Display



Title	RXSTART1
Summary	Enables the receiver in continuous reception at a designated frequency (LO Freq) with a choice of low or high side modulation (hi-side) and with a designated attenuation setting (RX Attenuation). Requires a second unit to be running TXSTART. Routes final IF to TEST_A pin.
Test Arguments	LO Freq (Carrier Frequency MHz)= 2402 to 2480
	hi-side (default = False) set 0 or 1
	RX Attenuation = 0 to 15 (Default = 0)
Return Data	None
Exit	Click on Reset Chip.

💐 BlueTest		_ 🗆 ×
RF Test Mode	Test Arguments	
RXSTART1	LO Freq. (MHz) 2432	Close
BXDATA1 BXDATA2	hi-side false	Execute
BIT ERR1	RX Attenuation 0	
LOOP BACK		Reset Chip
BX LOOP BACK BER LOOP BACK		PS
	Test Results]
Save to File Browse	for file Display: Standard	Bit Error
.\logfile.txt		
Opening com1. Transport active.		
Link active. BC01b (Hardware ID 64) firm	ware version 47	
	parameters: 0002, 0980, 0000, 0000.	
Thadio rescrizzor Arriesdo	CESSIG	

RXSTART1 Example Display



Title	RXSTART2
Summary	Enables the receiver in continuous reception, at a designated frequency (LO Freq), with a choice of low or high side modulation (hi-side) and with a designated attenuation setting (RX Attenuation). Digitises the RSSI and sends report regularly to host. Requires a second unit to be running TXSTART.
Test Arguments	LO Freq (Carrier Frequency MHz) = 2402 to 2480
	hi-side (default = false) set 0 or 1
	RX Attenuation = 0 to 15 (Default = 0)
Return Data	RSSI values, as a uint16, sent over BCSP channel 3 at a rate of about 10 per second. Can be saved to log file. H4 and USB use manufacturer's extensions.
Exit	Click on Reset Chip.

💐 BlueTest		_ 🗆 ×
RF Test Mode	Test Arguments	1
RXSTART2	LO Freq. (MHz) 2432	Close
BXDATA2 BIT ERR1 BIT EBB2	hi-side false	Execute
LOOP BACK RX LOOP BACK	RX Attenuation 0	Reset Chip
BER LOOP BACK		PS
	Test Besults	
Save to File Browse f		Bit Error
Opening com1. Transport active. Link active. BC01b (Hardware ID 64) firm Sent Command Varid 5004, j Radio Test RXSTART2 succ RSSI: 9. RSSI: 9. RSSI: 5. RSSI:	parameters: 0003, 0980, 0000, 0000.	

RXSTART2 Example Display

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Transmitter Only

Title	TXDATA1
	Enables the transmitter, with a designated frequency (LO Freq) and output Power (Ext, Int).
	Payload is PRBS9 data.
Summary	Receiver is not operating.
	Packet type and duty cycle can be configured. Refer to Configuration Commands section.
Related Test Spec Name	TRM/CA/03/C (power control), TRM/CA/04/C (Tx output spectrum – frequency range), TRM/CA/05/C (Tx output spectrum – 20dB bandwidth), TRM/CA/06/C (Adjacent channel power), TRM/CA/08/C (Initial carrier frequency tolerance), TRC/CA/01/C (Out-of-band spurious emissions).
	LO Freq (Carrier Frequency MHz) = 2402 to 2480
Test Arguments	Power (Ext, Int) = gain of external amplifier (if present) and internal amplifier. Ext value is specific to the design and Int value is 0 to 63 (Default = 50).
Return Data	None
	Use an RF Analyser to check carrier output.
Exit	Click on Reset Chip or select another TXDATA command.

Note: TXDATA and **RXDATA** require the same Bluetooth address in each module for **RXDATA** to receive data transmitted by **TXDATA**. Use **CFG_UAP_LAP** to set the address used by the BIST.

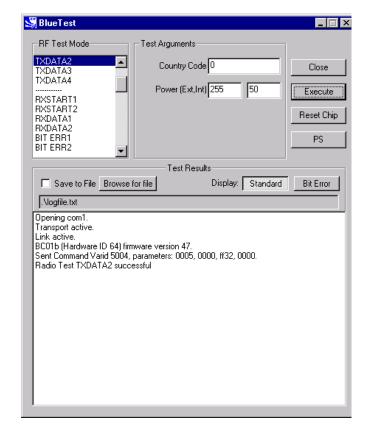
🕌 BlueTest		
- RF Test Mode	Test Arguments	
TXDATA1	LO Freq. (MHz) 2432	Close
TXDATA2 TXDATA3		
TXDATA4	Power (Ext,Int) 255 50	Execute
RXSTART1		Reset Chip
RXSTART2 RXDATA1		
RXDATA2 BIT EBB1		PS
	Test Results	
Save to File Browse	for file Display: Standard	Bit Error
.\logfile.txt		
Opening com1.		
Transport active. Link active.		
BC01b (Hardware ID 64) firm	nware version 47. parameters: 0004, 0980, ff32, 0000.	
Radio Test TXDATA1 succe		

TXDATA1 Example Display





Title	TXDATA2	
	Enables the transmitter, with a simplified hop sequence designated by Country Code and sets output Power (Ext, Int) .	
Summany	Payload is PRBS9 data (Default DH1).	
Summary	Receiver is not operating.	
	Packet type and duty cycle can be configured. Refer to Configuration Commands section.	
Related Test Spec Name	TRM/CA/01/C (output power), TRM/CA/02/C (power density)	
Test Arguments	Country Code = 0 to 3 (Default = 0)	
Return Data	None	
	Use RF Analyser to check carrier output.	
Exit	Click on Reset Chip or select another TXDATA command.	



TXDATA2 Example Display



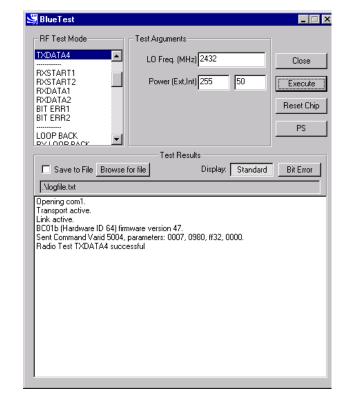
Title	TXDATA3
	Enables the transmitter, with a designated frequency (LO Freq) and output Power (Ext, Int).
Summary	Payload is sequence 101010
Summary	Receiver is not operating.
	Packet type and duty cycle can be configured. Refer to Configuration Commands section.
Related Test Spec Name	TRM/CA/07/C (modulation characteristic), TRM/CA/09/C (carrier frequency drift)
	LO Freq (Carrier Frequency MHz)= 2402 to 2480
Test Arguments	Power (Ext, Int) = gain of external amplifier (if present) and internal amplifier. Ext value is specific to the design and Int value is 0 to 63 (Default = 50).
Return Data	None
Return Data	Use RF Analyser to check out carrier
Exit	Click on Reset Chip or select another TXDATA command.

🖁 BlueTest		
RF Test Mode	Test Arguments	_
TXDATA3 TXDATA4	LO Freq. (MHz) 2432	Close
RXSTART1	Power (Ext,Int) 255 50	Execute
RXDATA1 RXDATA2		Reset Chip
BIT ERR1 BIT ERR2		PS
	Test Results	
Save to File Browse f		ard Bit Error
Mogfile.txt		
Opening com1. Transport active. Link active. BC01b (Hardware ID 64) firmware version 47. Sent Command Varid 5004, parameters: 0006, 0980, ff32, 0000. Radio Test TXDATA3 successful		

TXDATA3 Example Display



Title	TXDATA4
	Enables the transmitter with a designated frequency (LO Freq) and output Power (Ext, Int).
Summany	Payload is sequence 1111000011110000
Summary	Receiver is not operating.
	Packet type and duty cycle can be configured. Refer to Configuration Commands section.
Related Test Spec Name	TRM/CA/07/C (modulation characteristic), TRM/CA/09/C (carrier frequency drift)
Test Arguments	LO Freq (Carrier Frequency MHz) = 2402 to 2480
	Power (Ext, Int) = gain of external amplifier (if present) and internal amplifier. Ext value is specific to the design and Int value is 0 to 63 (Default = 50).
Return Data	None
	Use an RF Analyser to check out carrier.
Exit	Click on Reset Chip or select another TXDATA command.



TXDATA4 Example Display



Receiver Only

Title	RXDATA1
Summary	Enables the receiver, at a designated frequency (LO Freq) with a choice of low or high side modulation (hi-side), and with a designated attenuation setting (RX Attenuation).
	The software counts the number of received packet and the number of payloads with correctable errors.
	The payload itself is thrown away. The time between receive slots and report frequency can be set. Refer to Configuration Commands section.
Test Arguments	LO Freq (Carrier Frequency MHz)= 2402 to 2480
	hi-side = 0 or 1 (default = 0)
	RX Attenuation = 0 to 15 (default = 0)
Return data	NP = number of packets
	NP = number of good packets,
	NCP = number of corrected packets
	RSSI = value as shown
	True = RSSI is reliable, otherwise false
	The numbers wrap, rather than being reset to 0.
Exit	Click on Reset Chip .

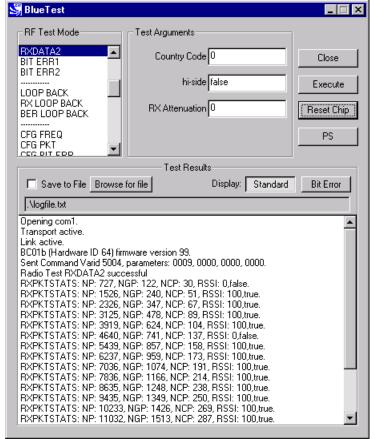
Note: TXDATA and **RXDATA** require the same Bluetooth address in each module for **RXDATA** to receive data transmitted by **TXDATA**. Use **CFG_UAP_LAP** to set the address used by the BIST.

💐 BlueTest		
RF Test Mode	Test Arguments	
RXDATA1 RXDATA2 BIT ERR1 BIT ERR2	LO Freq. (MHz) 2432 hi-side false	Close Execute
LOOP BACK RX LOOP BACK BER LOOP BACK	RX Attenuation 0	Reset Chip
CFG FREQ		PS
	Test Results	
Save to File Browse fi	or file Display: S	tandard Bit Error
Radio Test RXDATA1 succe RXPKTSTATS: NP: 1538. N RXPKTSTATS: NP: 1538. N RXPKTSTATS: NP: 2398. N RXPKTSTATS: NP: 3198. N RXPKTSTATS: NP: 3396. N RXPKTSTATS: NP: 5596. N RXPKTSTATS: NP: 6396. N RXPKTSTATS: NP: 7396. N RXPKTSTATS: NP: 7396. N RXPKTSTATS: NP: 7396. N RXPKTSTATS: NP: 9596. N RXPKTSTATS: NP: 9596. N RXPKTSTATS: NP: 10396.	oarameters: 0008, 0980, 0000, 000	e, ue, ue, ue, ue, ue, ue, ue, ue, ue,

RXDATA1 example display



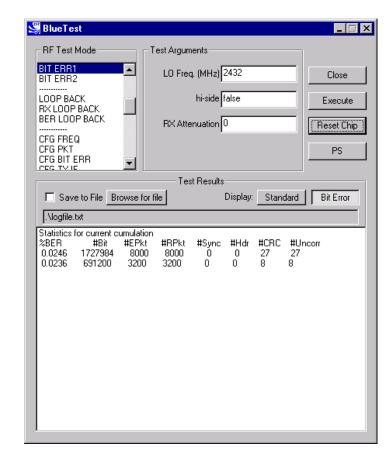
Title	RXDATA2
	Enables the receiver with a simplified hop sequence designated by Country Code , with a choice of low or high side modulation (hi-side) and with a designated attenuation setting (RX Attenuation).
Summary	The software counts the number of received packets and the number of payloads with correctable errors.
	The payload itself is thrown away. The time between receive slots and report frequency can be set. Refer to Configuration Commands Section.
Related Test Spec Name	Standby mode spurious emissions (FCC test)
	Country Code = 0 to 3 (default = 0)
Test Arguments	hi-side = 0 or 1 (default = 0)
	RX Attenuation = 0 to 15 (default = 0)
	NP = number of packets
Return Data	NG = number of good packets
	NCP = number of corrected packets
	RSSI = value as shown
	True = RSSI is reliable, otherwise false
	The numbers wrap, rather than being reset to 0.
Exit	Click on Reset Chip.



RXDATA2 Example Display



Title	BIT ERR1
	Enables the receiver at a designated frequency (LO Freq) with a choice of low or high side modulation (hi-side) and with a designated attenuation setting (RX Attenuation).
	Returns a set of reports to the host:
	 Number of data bits received (payload excluding FEC and CRC)
	 Number of data bits that were in error. Assumes PRBS9 data starting with 1FF in each packet
	 Number of packets received
	 Number of packets expected, based on txrx_freq (default 12500)
	 Number of packets with header errors as reported by hardware
Summary	 Number of packets with CRC errors
	 Number of packets with uncorrected errors (currently same as CRC errors)
	 Number of sync timeouts. Note that until a transmission is received a long timeout is used, so this does not reflect the number of packets expected
	Each report has two unint32 values. First is value since last report, second is summed over the last bits_count (default = 1.6Mbits).
	Reports are sent according to report_freq set (default = 1 second). The times between receive slots and report frequency can be set, and the count reset. Refer to Configuration Commands section.



BIT ERR1 Example Display



Title	BIT ERR1 (Continued)
Related Test Spec Name	RCV/CA/01/C and RCV/CA/02/C (sensitivity), RCV/CA/03/C (C/I performance), RCV/CA/04/C (blocking performance), RCV/CA/05/C (intermodulation performance), RCV/CA/06/C (maximum input level)
	LO Freq (Carrier Frequency MHz) = 2402 to 2480
Test Arguments	hi-side = 0 or 1 (default = 0)
	RX Attenuation = 0 to 15 (default = 0)
Note	With a second unit, execute CFG UAP/LAP to set the Bluetooth address. Execute TXDATA1 then execute CFG UAP/LAP to set the same Bluetooth address on the Equipment Under Test (EUT) before executing BIT ERR1 .
Return Data	Eight reports, each two uint32 values (refer to BIT ERR1 Summary).
Exit	Click on Reset Chip.



Title	BIT ERR2
Summary	Enables the receiver with simplified hopping defined by Country Code with a choice of low or high side modulation (hi-side), and with a designated attenuation setting (RX Attenuation) as for RXDATA2 .
	Returns information on bit errors to the host as those given for BIT ERR1 .
Related Test Spec Name	None, but note that this test allows (as in BIT ERR1) the tests RCV/CA/01/C and RCV/CA/02/C (sensitivity), RCV/CA/04/C (blocking performance) to be performed with hopping on. This is a more thorough test than that possible with the 7 Layers equipment.
	Country Code = 0 to 3 (default 0)
Test Arguments	hi-side = 0 or 1 (default = 0)
	RX Attenuation = 0 to 15 (default = 0)
Note	With a second unit, execute CFG UAP/LAP to set BT address then execute TXDATA2 , then execute CFG UAP/LAP to set the same BT address on the Equipment under Test (EUT) before executing BIT ERR2 .
Return Data	Nine reports, each two uint32 values as for BIT ERR1 .
Exit	Click on Reset Chip.

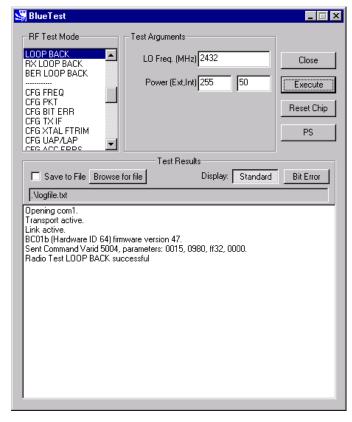
BlueTest		
RF Test Mode	Test Arguments	
BIT ERR2	Country Code	Close
LOOP BACK RX LOOP BACK BER LOOP BACK	hi-side false	Execute
CFG FREQ	RX Attenuation 0	Reset Chip
CFG PKT CFG BIT ERR CFG TX IF		PS
	Test Besults	
Save to File Browse		Standard Bit Error
Statistics for current cumula %BER #Bit #EPI 0.5726 1719272 799 0.7498 1379408 640	kt #RPkt #Sync #Hdr # 91 7966 10 0 3	

BIT ERR2 Example Display



Loopback Test Mode

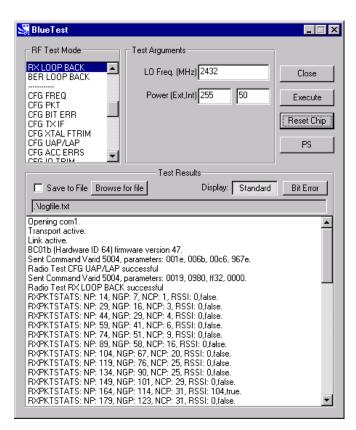
Title	LOOP BACK
Summary	Receives data on LO Frequency for data packets and then retransmits this data on the same channel at transmit level `lvl'. Highside reception is off and attenuation is set to 0. Expected reception frequency, txrx_freq (default = 12500 microsecs) with single slot packets returned lb_offs after receipt (default = 1875 microsecs). Defaults can be changed. See Configuration Commands section.
Related Test Spec Name	None, but note that this test RCV/CA/01/C to RCV/CA/06/C to be performed in loopback without using the LMP commanded loopback test mode. RCV/CA/01/C to RCV/CA/06/C to be performed in loopback, but without using the LMP commanded loopback test mode.
Test Arguments	LO Freq (Carrier Frequency MHz)= 2402 to 2480 (default = 2432) Power (Ext, Int) = gain of external amplifier (if present) and internal amplifier. Ext value is specific to the design and Int value is 0 to 63 (Default = 50).
Return Data	None
Exit	Click on Reset Chip.



LOOP BACK Example Display



Title	RX LOOP BACK
Summary	Transmit PRBS9 data on LO Frequency at transmit level and listen for transmissions in the next slot but one. Sends reports as RXDATA1 back to the host once per second (configurable). Highside reception is off and attenuation is set to 0. Default is single-slot packets (configurable with config_freq). This is designed to be used with a second unit in LOOP_BACK test mode.
Related Test Spec Name	None, but note that this test allows transmission to and reception from Implementation under Test (IUT) in LOOP_BACK test mode with RSSI and BER calculated from FEC.
Test Arguments	LO Freq (Carrier Frequency MHz)= 2402 to 2480
	Power (Ext, Int) = gain of external amplifier (if present) and internal amplifier. Ext value is specific to the design and Int value is 0 to 63 (Default = 50).
Note	With a second unit execute CFG UAP/LAP to set the Bluetooth address. Execute LOOP BACK then execute CFG UAP/LAP to set the same BT address on the Equipment under Test (EUT) before executing RX LOOP BACK .
Return Data	NP = Number of packets
	NGP = Number of good packets
	NCP = Number of corrected packets
	RSSI = Received Signal Strength Indication
	True = RSSI is reliable, otherwise false
Exit	Click on Reset Chip .



RX LOOP BACK Example Display



Title	BER LOOP BACK
Summary	Transmit PRBS9 data on LO Frequency at transmit level and listen for transmissions in the next slot but one. Sends reports as BIT ERR1 back to the host once per second (configurable). Highside reception is off and attenuation is set to zero Default is single slot packets (configurable with config_freq). Designed to be used with a second unit in loop_back test mode.
Related Test Spec Name	None, but note that this test allows transmission to and reception from IUT in loopback test mode, with calculation of BER to BT specification.
Called via	BCSP channel 2
	LO Freq (Carrier Frequency MHz)= 2402 to 2480
Test Arguments	Power (Ext, Int) = gain of external amplifier (if present) and internal amplifier. Ext value is specific to the design and Int value is 0 to 63 (Default = 50).
Note	With a second unit execute CFG UAP/LAP to set BT address then execute LOOP BACK , then execute CFG UAP/LAP to set the same BT address on the EUT before executing BER LOOP BACK .
Return Data	Nine reports as for BIT ERR1 .
Exit	Click on Reset Chip.

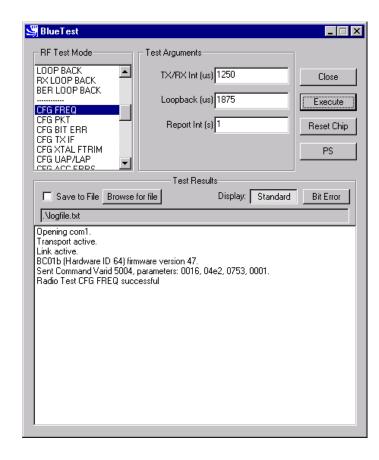
BlueTest			_ 🗆
RF Test Mode	Test Arguments		
BER LOOP BACK	LO Freq. (MHz) 24	432	Close
CFG FREQ CFG PKT	Power (Ext,Int) 25	55 50	Execute
CFG BIT ERR CFG TX IF			
CFG XTAL FTRIM			Reset Chip
CFG ACC ERRS			PS
			<u></u>
	Test Results-		
Save to File Browse	for file D	isplay: Standard	Bit Error
, -			
Opening com1. Transport active.			
Link active.			
BC01b (Hardware ID 64) firr			
Sent Command Varid 5004,		, 00c6, 967e.	
Radio Test CFG UAP/LAP: Sent Command Varid 5004,		#22 0000	
Radio Test BER LOOP BAC		, 1132, 0000.	
	eriod: 2960, Total:	2960.	
	eriod: 93, Total:	93.	
	eriod: 54, Total:	54.	
	eriod: 14, Total:	14.	
	eriod: 690, Total:	690.	
Packets w/ header error P Packets w/ CRC error P	eriod: 0, Total: 'eriod: 11, Total:	0. 11.	
Packets w/ uncorr errors P		11.	
	eriod: 1, Total:	1.	
% Bit Error for Last Period: 3			
2 8 Bit Error in Current Cumula	ation: 3.142		

BER LOOP BACK Example Display



Configuration Commands

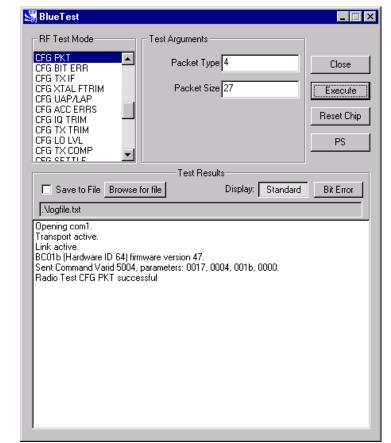
Title	CFG FREQ
	Sets three values used in deciding timing details of tests. Tx/Rx Int (txrx_freq) sets the period in microseconds between TX and RX events in RXDATA, TXDATA, BIT ERR and LOOP BACK test modes. Default is 1250 (20 slots), maximum 65536. If passed as 0, current value unchanged.
Summary	Loopback (lb_offs) sets the offset in microseconds between a reception event and retransmission of the data in loopback. Default is 1875 (two slots later), must be less than TX/Rx Int (txrx_freq). If passed as zero current value unchanged.
	Report Int (report_freqs) sets the time in seconds between reports to host sent by RXDATA and BIT ERR functions. Default 1, if passed as 0 current value unchanged.
Related Test Spec Name	None
Test Arguments	TX/RX Int (μS) = 1 to 65535 (default = 1250) Loopback (μS) = 1 to 65535 (default = 1875) Report Int (S) = 1 to 65535 (default = 1)
Return Data	None.
Exit	Click on Reset Chip.



CFG FREQ Example Display



Title	CFG PKT
	Sets packet type and size for transmitter tests. It has no effect on RX or LOOP BACK tests.
Summary	Packet Type (pkt-type) is the standard Bluetooth packet type, 0-15 (12-13 not allowed). Any other number sets default: DM5 for TXDATA1/2 , DH5 for TXDATA3/4 .
Summary	Packet Size (pkt_size) is the size of data in packet, from one to maximum for type. If zero sets default: 20 bytes for TXDATA1/2 , 192 bytes for TXDATA3/4 .
	Since the two values are connected both values must be set – no default is inferred.
Related Test Spec Name	None
	Packet Type = 0 to 15 (default = 4) (see Appendix 5)
Test Arguments	Packet Size = 0 to 339 (default = 27)
Return data	None
Exit	Click on Reset Chip.



CFG PKT Example Display



Title	CFG BIT ERR
	Sets two values used in bit error measurements.
Summary	If Bits Count (bits_count) is non-zero, the target for total counters is set to this and total count resets at this value. If passed as 0 current value, unchanged.
	If Reset is not false and BIT ERR/2 is active, immediately resets the counters for the total statistics, but not over the last report period.
Related Test Spec Name	None
Test Annual	Bits Count = 1 to 4.2 x 109 (default = 1600000 Bit)
Test Arguments	<pre>Reset = false (0) or true (1) (default = false)</pre>
Return Data	None
Exit	Click on Reset Chip.

BlueTest				
RF Test Mode	- Test A	Arguments		
CFG BIT ERR CFG TX IF CFG XTAL FTRIM		Bits Count 1600000		Close
CFG UAP/LAP CFG ACC ERRS CFG IQ TRIM		Reset false		(Execute)
CFG TX TRIM				Reset Chip
CFG TX COMP CFG SETTLE	-			PS
		- Test Results		
Save to File	Browse for file	Display:	Standard	Bit Error
.Nogfile.txt				
Opening com1. Transport active. Link active.				
Transport active. Link active. BC01b (Hardware I	rid 5004, paramet	ers: 0018, 0018, 6a00, 00	000.	
Transport active. Link active. BC01b (Hardware I Sent Command Va	rid 5004, paramet	ers: 0018, 0018, 6a00, 00	000.	
Transport active. Link active. BC01b (Hardware I Sent Command Va	rid 5004, paramet	ers: 0018, 0018, 6a00, 00	000.	

CFG BIT ERR Example Display



Title	CFG TX IF
Summary	Sets the IF frequency used in transmit test modes. The target is zero, but the stack currently uses a default of -1MHz.
	Offset is a signed integer with a range from $+5$ to -5 , in units of 0.5MHz.
Related Test Spec Name	None
Test Arguments	IF Offset = -5 to $+5$ (default = 0)
Return data	None
Exit	Click on Reset Chip.

💐 BlueTest		
RF Test Mode	Test Arguments	1
CFG TX IF CFG XTAL FTRIM	IF Offset 0	Close
CFG UAP/LAP CFG ACC ERRS		Execute
		Reset Chip
CFG TX COMP		PS
	Test Results	
Save to File Browse	for file Display: Standard	Bit Error
Mogfile.txt		
Opening com1.		
Transport active. Link active.		
BC01b (Hardware ID 64) firm		
Sent Command Varid 5004, Radio Test CFG TX IF succ	parameters: 001b, 0000, 0000, 0000.	
	essiu	

CFG TX IF Example Display



Title	CFG XTAL FTRIM
Summary	Timing for BlueCore01 is controlled by a crystal. This requires trimming for new hardware. This command can be used to set a new trim value either before a radiotest command is started or while a test is already in operation; the change takes effect immediately. Crystal Trim (xtal_ftrim) is a number between 0 and 63
	inclusive. This is not a permanent change.
Related Test Spec Name	None
Test Arguments	Crystal Trim = 0 to 63 (typical = 27)
Note	With Crystal Trim set to 0, the current settings will not change.
Return data	None
Exit	Click on Reset Chip .

💐 BlueTest			_ 🗆 🗵
RF Test Mode	– Test Arguments – Crystal Trim (hex	18	Close Execute Reset Chip PS
	Test Resul	ts	
Save to File Browse I Nogfile.txt Opening com1. Transport active. Link active. BC01b (Hardware ID 64) firm Sent Command Varid 5004, Radio Test CFG XTAL FTRI	ior file ware version 47. parameters: 001d, 00	Display: Standard	Bit Error

CFG XTAL FTRIM Example Display



Title	CFG UAP/LAP
Summary	Sets the UAP and LAP to be used in tests. BlueCore01 usually uses its own Bluetooth Device address to determine the access sync code, as if it is master of a piconet. The UAP and LAP are the only parts used. This command allows a special UAP and LAP to be used only in the test modes.
Related Test Spec Name	None
	Bluetooth Address:
Test Arguments	UAP = 0 to FF (Default = 6b)
	LAP = 0 to FFFFFF (Default = c6967e)
Return Data	None
Exit	Click on Reset Chip.

💐 BlueTest		
RF Test Mode	Test Arguments UAP (hex) 6b LAP (hex) c6367e	Close Execute Reset Chip PS
	Test Results	
Save to File Browse f	or file Display: Standard	Bit Error
Nogfile.txt		
Opening cont1. Transport active. Link active. BC01b (Hardware ID 64) firm Sent Command Varid 5004, j Radio Test CFG UAP/LAP s	parameters: 001e, 006b, 00c6, 967e.	

CFG UAP/LAP Example Display

Title	CFG ACC ERRS
Summary	The receiver uses a sliding correlator to determine that it has matched the start of a packet. The receiver allows up to # of errors (n_errs) before a match is rejected.
Related Test Spec Name	None
Test Arguments	# of errors = 0 to 15 (default = 10)
Return Data	None
Exit	Click on Reset Chip.

💐 BlueTest		
RF Test Mode	Test Arguments	
CFG ACC ERRS CFG IQ TRIM CFG TX TRIM CFG LO LVL CFG TX COMP CFG SETTLE DEEP SLEEP PCM LB PCM EXT LB SETTLE	# of Errors 10	Close Execute Reset Chip PS
Save to File Browse for	or file Display:	Standard Bit Error
Mogfile.txt		
Opening com1. Transport active. Link active. BC01b (Hardware ID 64) firm Sent Command Varid 5004, p Radio Test CFG ACC ERRS)arameters: 001f, 000a, 0000, 0	000.

CFG ACC ERRS Example Display



Title	CFG IQ TRIM
Summary	Sets the IQ Trim (trim) value overriding the value calculated by the internal calibration algorithm. This command is not executed in normal use.
Related Test Spec Name	None
Test Arguments	IQ Trim = 0 to 511 (default 149 (hex))
Return Data	None
Exit	Click on Reset Chip.

💐 BlueTest		_ 🗆 ×
RF Test Mode	Test Arguments	7
	IQ Trim (hex) 149	Close
CFG LO LVL CFG TX COMP		Execute
CFG SETTLE		Reset Chip
PCM LB		
SETTLE		
	Test Results	
Save to File Browse	for file Display: Standar	d Bit Error
Mogfile.txt		
Opening com1. Transport active. Link active. BC01b (Hardware ID 64) fim Sent Command Varid 5004, Radio Test CFG IQ TRIM su	parameters: 0020, 0149, 0000, 0000.	

CFG IQ TRIM Example Display



Title	CFG TX TRIM
Summary	Sets the Active Member Address (am_addr) for the device to be used in the header of all test transmissions to am_addr . If the transmitter and receiver are used for the same test, both devices will normally have to be set to the same am_addr .
Related Test Spec Name	None
Test Arguments	Trim (am_addr) = 0 to 7, Default = 7
Return Data	None
Exit	Click on Reset Chip.

BlueTest		_ 🗆 ×
RF Test Mode	Test Arguments	
CFG TX TRIM CFG LO LVL CFG TX COMP CFG SETTLE	Trim (0-7) 7	Close
DEEP SLEEP PCM LB PCM EXT LB SETTLE F RESP		Reset Chip PS
	Test Results	
Save to File Browse I		ay: Standard Bit Error
.\logfile.txt		
Transport active. Link active. BC01b (Hardware ID 64) fim Sent Command Varid 5004, Radio Test CFG TX TRIM sr	parameters: 0021, 0007, 000	10, 0000.

CFG TX TRIM Example Display



Title	CFG LO LVL
Summary	Sets the value of the Analogue Local Oscillator output level to LO level (lvl), overriding the value calculated by the internal calibration algorithm. This command is not executed in normal use.
Related Test Spec Name	None
Test Arguments	LO level = 0 to 15 (default = 13)
Return Data	None
Exit	Click on Reset Chip.

RF Test Mode	F Test Arguments -		
CFG LO LVL	LO level (0-15	13	Close
CFG SETTLE			Execute
DEEP SLEEP PCM LB			Reset Chip
PCM EXT LB			
			PS
	Test Resul	ts	
🔲 Save to File 🛛 Browse	for file	Display: Standard	Bit Error
Mogfile.txt			
BC01b (Hardware ID 64) firr Sent Command Varid 5004, Radio Test CFG LO LVL su	parameters: 0023, 00	10d, 0000, 0000.	

CFG LO LVL Example Display



Title	CFG TX COMP
Summary	Sets TX Offset (tx_offset) and LO Offset (lo_offset) for the firmware's algorithm, which sets the maximum power. Run TXSTART before executing CFG TX COMP , otherwise there is no transmit power to set.
Related Test Spec Name	None
Test Arguments	TX Offset, minimum = 0 (default = 7)
	LO Offset, minimum = 0 (default = 8)
Return Data	None
Exit	Click on Reset Chip.

🖑 BlueTest				
RF Test Mode	Test Arguments	1		
CFG TX COMP	TX Offset 7	Close		
DEEP SLEEP PCM LB	LO Offset 8	Execute		
PCM EXT LB SETTLE		Reset Chip		
IF RESP RF IQ MATCH IF IQ MATCH		PS		
	Test Results			
Save to File Browse I		Bit Error		
Opening com1. Transport active.				
Link active. BC015 (Hardware ID 64) firm				
Sent Command Varid 5004,	parameters: 0001, 0980, ff32, 0000.			
Radio Test TXSTART succe Sent Command Varid 5004,	parameters: 0024, 0007, 0008, 0000.			
Radio Test CFG TX COMP :	successful			
1				

CFG TX COMP Example Display



Title	CFG SETTLE	
Summary	Sets the period (radio_on_offset) in microseconds between turning the radio on and starting to transmit.	
Related Test Spec Name	None	
Test Arguments	Offset , minimum = 0 (default = 130)	
Return Data	None	
Exit	Click on Reset Chip.	

🔄 BlueTest	
RF Test Mode Test Arguments	
CFG SETTLE Offset 130	Close
DEEP SLEEP PCM LB	Execute
PCM EXT LB SETTLE	Reset Chip
	PS
Test Results	
Save to File Browse for file Display: Sta	andard Bit Error
Mogfile.txt	
Opening com1. Transport active.	
Link active. BC01b (Hardware ID 64) firmware version 99.	
Sent Command Varid 5004, parameters: 0025, 0082, 0000, 0000 Radio Test CFG SETTLE successful	

CFG SETTLE Example Display



Built-in-Self Test (BIST) Routines

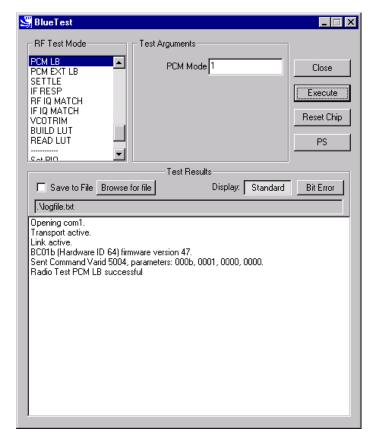
Title	Deep Sleep
Summary	Puts the chip into deep-sleep after a delay of half a second until woken by reset or any activity on USB or UART interface.
Return Data	None
Exit	Click on Reset Chip or another routine being called.

🗳 BlueTest			
RF Test Mode DEEP SLEEP PCM LB PCM LB PCM EXT LB SETTLE IF RESP RF IQ MATCH IF IQ MATCH IF IQ MATCH VCOTRIM	Close Execute Reset Chip		
BUILD LUT	PS		
Test Results			
Save to File Browse for file Display: Standard	Bit Error		
Opening com1. Transport active. Link active. BC01b (Hardware ID 64) firmware version 47. Sent Command Varid 5004, parameters: 000a, 0000, 0000, 0000. Radio Test Deep Sleep successful			

Deep Sleep Example Display



Title	PCM LB	
Summary	Sets the PCM into LOOP BACK mode, whereby the data read from the PCM input is output again on the PCM out pin. The LOOP BACK is via software and the buffers so there is a pipeline delay. The PCM port mode is selectable.	
	If PCM Mode = 0, BlueCore01 is slave in normal 4-wire configuration	
	If PCM Mode = 1, BlueCore01 is master in normal 4-wire configuration	
	If PCM Mode = 2, BlueCore01 is master in Manchester encoded, 2-wire configuration.	
Test Arguments	PCM Mode = 0 to 2 (default = 1)	
Return Data	None	
Exit	Click on Reset Chip or another routine being called.	



PCM LB Example Display



Title	PCM EXTERNAL LOOPBACK	
Summary	Sets the PCM into external LOOPBACK mode, whereby the data written to the PCM output is read again on the input pin. A check is made that the data read back is the same (up to usual codec transformations) as that written. The LOOP BACK consists of 512 bytes of random data.	
	The PCM port mode is selectable as PCM Mode (pcm_mode), which is the same as for PCM LB (radiotest_pcm_loop_back)	
	The external LOOP BACK may be a simple wire.	
Related Test Spec Name	None	
Note	On the Casira under test, set CN8 jumper to Codec BYP and on header CN12 link pins 10 and 11.	
Test Arguments	PCM Mode = 0 to 2 (default = 1)	
Return Data	None	
Exit	Click on Reset Chip.	

😽 BlueTest				_ 🗆 ×
RF Test Mode	- Test Arguments			
PCM EXT LB	PCM Mode	1		Close
RF IQ MATCH				Execute
VCOTRIM BUILD LUT				Reset Chip
READ LUT				PS
	Test Resul	te.		
Save to File Browse		_	Standard	Bit Error
.\logfile.txt				
Transport active. Link active. BC01b (Hardware ID 64) fir Sent Command Varid 5004, Radio Test PCM EXT LB su	parameters: 001c, 00	001, 0000, C	1000.	

PCM EXT LB Example Display



Title	SETTLE
Summary	Builds the LUT as normal, then does a step from Start Channel (chan1) to Finish Channel (chan2), while the synthesiser is running. It digitises the synthesiser (LO_TUNE) error voltage at intervals of $10 - 20\mu$ s over the next 200 μ s and writes the results to an array.
Test Arguments	Start Channel (chan1) = 0 to 78 (default 0)
	Finish Channel (chan2) = 0 to 78 (default 78)
Return Data	A sequence of ten reports of the synthesiser (LO_TUNE) error voltage over the next 200 μ s.
Exit	Click on Reset Chip or another routine being called.

		>
RF Test Mode	Test Arguments	
IF BESP	Start Channel	Close
RF IQ MATCH	Finish Channel 78	
VCOTRIM BUILD LUT		Execute
READ LUT		Reset Chip
Set PIO		PS
Read PIO		
	Test Results	
🔲 Save to File Brows	e for file Display: 🛐	Standard Bit Error
J -		
Opening com1. Transport active.		
Link active.		
BC01b (Hardware ID 64)		20
BC01b (Hardware ID 64) Sent Command Varid 500	firmware version 47. 4, parameters: 000c, 0000, 004e, 000	00.
BC01b (Hardware ID 64)	4, parameters: 000c, 0000, 004e, 000	DO.
BC01b (Hardware ID 64) Sent Command Varid 500 SYNTH SETTLE[0] = 79. Radio Test SETTLE succ SYNTH SETTLE[1] = 175	4, parameters: 000c, 0000, 004e, 001 :essful 5.	00.
BC01b (Hardware ID 64) Sent Command Varid 500 SYNTH SETTLE[0] = 79. Radio Test SETTLE SYNTH SETTLE[1] = 177 SYNTH SETTLE[2] = 197	4, parameters: 000c, 0000, 004e, 001 :essful 7.	00.
BC01b (Hardware ID 64) Sent Command Varid 500 SYNTH SETTLE[0] = 79, Radio Test SETTLE succ SYNTH SETTLE[1] = 175 SYNTH SETTLE[2] = 197 SYNTH SETTLE[2] = 197	4, parameters: 000c, 0000, 004e, 001 :essful 3. 7. 3.	30.
BC01b (Hardware ID 64) Sent Command Varid 500 SYNTH SETTLE[0] = 79. Radio Test SETTLE succ SYNTH SETTLE[1] = 175 SYNTH SETTLE[2] = 197 SYNTH SETTLE[3] = 206 SYNTH SETTLE[4] = 196 SYNTH SETTLE[4] = 196 SYNTH SETTLE[5] = 176	4, parameters: 000c, 0000, 004e, 000 xessful 3. 3. 3. 3.	30.
BC01b (Hardware ID 64) Sent Command Varid 500 SYNTH SETTLE[0] = 79. Radio Test SETTLE succ SYNTH SETTLE[1] = 17? SYNTH SETTLE[2] = 193 SYNTH SETTLE[3] = 203 SYNTH SETTLE[4] = 194 SYNTH SETTLE[5] = 176 SYNTH SETTLE[5] = 176 SYNTH SETTLE[5] = 156	4, parameters: 000c, 0000, 004e, 000 sessful 7, 3, 3, 3, 3, 3, 3, 3,	20.
BC01b (Hardware ID 64) Sent Command Varid 500 SYNTH SETTLE[0] = 79. Radio Test SETTLE succ SYNTH SETTLE[1] = 175 SYNTH SETTLE[2] = 137 SYNTH SETTLE[3] = 206 SYNTH SETTLE[5] = 176 SYNTH SETTLE[5] = 176 SYNTH SETTLE[5] = 176 SYNTH SETTLE[6] = 154	4, parameters: 000c, 0000, 004e, 000 5. 7. 8. 8. 8. 8. 9. 9.	20.
BC01b (Hardware ID 64) Sent Command Varid 500 SYNTH SETTLE[0] = 79. Radio Test SETTLE succ SYNTH SETTLE[1] = 17? SYNTH SETTLE[2] = 193 SYNTH SETTLE[3] = 203 SYNTH SETTLE[4] = 194 SYNTH SETTLE[5] = 176 SYNTH SETTLE[5] = 176 SYNTH SETTLE[5] = 156	4, parameters: 000c, 0000, 004e, 000 5. 7. 8. 8. 8. 8. 8. 8. 8.	00.
BC01b (Hardware ID 64) Sent Command Varid 500 SYNTH SETTLE[0] = 79. Radio Test SETTLE succ SYNTH SETTLE[1] = 179 SYNTH SETTLE[2] = 130 SYNTH SETTLE[3] = 208 SYNTH SETTLE[4] = 196 SYNTH SETTLE[5] = 176 SYNTH SETTLE[5] = 176 SYNTH SETTLE[5] = 145 SYNTH SETTLE[6] = 154 SYNTH SETTLE[8] = 154	4, parameters: 000c, 0000, 004e, 000 5. 7. 8. 8. 8. 8. 8. 8. 8.	00.
BC01b (Hardware ID 64) Sent Command Varid 500 SYNTH SETTLE[0] = 79. Radio Test SETTLE succ SYNTH SETTLE[1] = 179 SYNTH SETTLE[2] = 130 SYNTH SETTLE[3] = 208 SYNTH SETTLE[4] = 196 SYNTH SETTLE[5] = 176 SYNTH SETTLE[5] = 176 SYNTH SETTLE[5] = 145 SYNTH SETTLE[6] = 154 SYNTH SETTLE[8] = 154	4, parameters: 000c, 0000, 004e, 000 5. 7. 8. 8. 8. 8. 8. 8. 8.	30.
BC01b (Hardware ID 64) Sent Command Varid 500 SYNTH SETTLE[0] = 79. Radio Test SETTLE succ SYNTH SETTLE[1] = 179 SYNTH SETTLE[2] = 130 SYNTH SETTLE[3] = 208 SYNTH SETTLE[4] = 196 SYNTH SETTLE[5] = 176 SYNTH SETTLE[5] = 176 SYNTH SETTLE[5] = 145 SYNTH SETTLE[6] = 154	4, parameters: 000c, 0000, 004e, 000 5. 7. 8. 8. 8. 8. 8. 8. 8.	30.

SETTLE Example Display



Title	IF RESP
Summary	Sweeps transmit IF carrier frequency over designated number of samples (n_samples) within range (0-3MHz maximum) and measures RSSI. Returns table of RSSI value against frequency offset to characterise IF filter response.
Test Arguments	<pre>No. of Samples(n_samples) = 0 to 65535 (default = 10) Start (lo_offset) = 0 to 3MHz (default 0.001 MHz) Finish (hi_offset) = 0 to 3 MHz (default = 3.000 MHz. Must be greater than lo_offset)</pre>
Return Data	A sequence of reports of RSSI and frequency offset.
Exit	Click on Reset Chip.

RF Test Mode	Test Arguments	
	No. of Samples 10	Close
IF IQ MATCH VCOTRIM	Start (MHz) 0.001	Execute
BUILD LUT READ LUT		
Set PIO	Finish (MHz) 3.000	Reset Chip
Read PIO Provoke Fault		PS
Dood ohip yoraion	Test Besults	
Save to File Browse		Standard Bit Error
.\logfile.txt		
Link active. BC01b (Hardware ID 64) fim Sent Command Varid 5004, FILTER RESP: [0] = (4,3) Radio Test IF RESP succes FILTER RESP: [1] = (1368 FILTER RESP: [2] = (2732	parameters: 000d, 000a, 0004, :sful , 3).	3000.

IF RESP Example Display



Title	RF IQ MATCH
Summary	Measures RF IQ match by injecting test signal, sweeping IQ trim and measuring RSSI for on-channel and image. Returns array of IQ measurements against IQ trim.
Return Data	An array of 16 IQ measurements against IQ trim.
Exit	Click on Reset Chip.

S BlueTest	_ 🗆 ×
RF Test Mode Test Arguments	
	Close
BUILD LUT READ LUT	Execute
Set PIO Bead PIO	Reset Chip
Provoke Fault Read chip version	PS
Test Results	
Save to File Browse for file Display: Standard	Bit Error
Nogfile.txt	
Link active. BC01b (Hardware ID 64) firmware version 99.	
Sent Command Varid 5004, parameters: 000f, 0000, 0000, 0000. IQ MATCH: [0] = (0 , 8 , 7).	
Radio Test RF IQ MATCH successful	
IQ MATCH: [1] = (1, 7, 6). IQ MATCH: [2] = (2, 8, 7).	
IQ MATCH: [3] = (3 , 9 , 7). IQ MATCH: [4] = (4 , 10 , 9).	
IQ MATCH: [5] = (5 , 8 , 6).	
IQ MATCH: [6] = (6 , 6 , 7). IQ MATCH: [7] = (7 , 7 , 8).	
IQ MATCH: [8] = (8 , 7 , 8).	
IQ MATCH: [9] = (9 , 6 , 6). IQ MATCH: [10] = (10 , 7 , 5).	
IQ MATCH: [11] = (11,6,6).	
IQ MATCH: [12] = (12 , 7 , 7). IQ MATCH: [13] = (13 , 7 , 7).	
IQ MATCH: (14) = (14) 7, 5). IQ MATCH: (15) = (15, 7, 8).	_

RF IQ MATCH Example Display



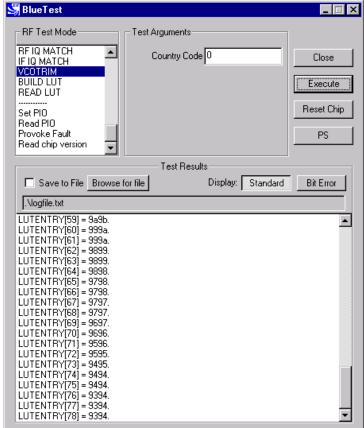
Title	IF IQ MATCH
Summary	Measures IF IQ match by injecting test signal, sweeping IQ trim and measuring RSSI for on-channel and image. Returns array of IQ measurements against IQ trim.
Return Data	An array of 16 IQ measurements against IQ trim.
Exit	Click on Reset Chip.

💐 BlueTest	_ 🗆 🗙
RF Test Mode	
	Close
BUILD LUT READ LUT	Execute
Set PIO	Reset Chip
Read PIO Provoke Fault Read chip version	PS
Test Besults	
Save to File Browse for file Display: Standard	Bit Error
Nogfile.txt	
Link active. BC01b (Hardware ID 64) firmware version 99.	_
Sent Command Varid 5004, parameters: 0010, 0000, 0000, 0000. IQ MATCH: [0] = (0 , 58 , 8).	
Radio Test IF IQ MATCH successful IQ MATCH: [1] = (1, 59, 6).	
IQ MATCH: [2] = (2 , 59 , 6).	
IQ MATCH: [3] = (3 , 59 , 6). IQ MATCH: [4] = (4 , 59 , 7).	
IQ MATCH: [5] = (5,59,7). IQ MATCH: [6] = (6,59,6).	
IQ MATCH: [7] = (7 , 59 , 7).	
IQ MATCH: [8] = (8 , 59 , 6). IQ MATCH: [9] = (9 , 59 , 6).	
IQ MATCH: [10] = (10, 59, 7). IQ MATCH: [11] = (11, 59, 7).	
IQ MATCH. [11] = (11, 03, 7).	
IQ MATCH: [12] = (12 , 59 , 7).	
IQ MATCH: [12] = (12,59,7). IQ MATCH: [13] = (13,59,7). IQ MATCH: [14] = (14,59,6).	

IF IQ MATCH Example Display



Title	
Summary	Produces look up table of VCO trim versus hop frequencies for a designated country hop sequence.
Test Arguments	Country Code $(cc) = 0$ to 3 (default = 0)
Return Data	An array of 79 values for VCO trim if Country Code is 0 otherwise 23 values.
Exit	Click on Reset Chip.



VCO TRIM Example Display



Miscellaneous Test Routines

Title	Set PIO
Summary	Enables designated PIO lines as outputs and sets them as desired. To be used with caution since it over-rides previous settings. Bit 0 corresponds to PIO[0], and a logic one enables it as an output.
	Mask (default = 11111111)
Test Arguments	Values (default = 00000000)
Return Data	None
Exit	Click on Reset Chip.

💐 BlueTest		_ 🗆 🗵
RF Test Mode RF IQ MATCH IF IQ MATCH VCOTRIM BUILD LUT READ LUT Set PIO Read PIO Provoke Fault Read chip version	Test Arguments Mask (binary) 11111111 Values (binary) 00000000	Close Execute Reset Chip PS
	Test Results	
Save to File Browse f Nogfile.txt Opening com1. Transport active. Link active. BC01b (Hardware ID 64) firm PIO Mask: 1111111 PIO Lines: 00000000		Bit Error

Set PIO Example Display



Title	Read PIO
Summary	Reads the logic state of the PIO pins. Valid whether they are inputs or outputs.
Return Data	PIO Lines (uint8) sent over BCSP channel 3, giving the logic level at each of the pins.
Exit	Click on Reset Chip.

- RF Test Mode	Test Argumen	ts	
RF IQ MATCH IF IQ MATCH	-		Close
VCOTRIM BUILD LUT			Execute
READ LUT			
Set PIO Read PIO			Reset Chip
Provoke Fault Read chip version	_		PS
	Test B	esults	
🔲 Save to File		Display: 9	itandard Bit Error
Nogfile.txt			
Transport active. Link active. BC01b (Hardware PIO Mask: 000000 PIO Lines: 000000			

READ PIO Example Display



Title	BUILD LUT
Summary	Builds the radio's channel LO_TRIM frequency look-up table then returns it to the host.
Return Data	A sequence of 79 uint16 numbers, containing the calibration data just generated.
Exit	Click on Reset Chip.

💐 BlueTest			
RF Test Mode PCM LB PCM EXT LB SETTLE IF RESP RF IQ MATCH IF IQ MATCH VCOTRIM BUILD LUT READ LUT Set PID	Test Argume	nts	Close Execute Reset Chip PS
	Test	Besults-	
Save to File Bro Nogfile.txt LUTENTRY[59] = 999, LUTENTRY[60] = 999, LUTENTRY[61] = 389; LUTENTRY[62] = 389; LUTENTRY[63] = 389; LUTENTRY[64] = 989; LUTENTRY[65] = 979; LUTENTRY[66] = 979; LUTENTRY[68] = 969; LUTENTRY[68] = 969; LUTENTRY[70] = 959; LUTENTRY[71] = 559; LUTENTRY[72] = 949; LUTENTRY[73] = 949; LUTENTRY[75] = 939; LUTENTRY[76] = 939; LUTENTRY[76] = 939; LUTENTRY[76] = 939; LUTENTRY[76] = 939; LUTENTRY[77] = 930; LUTENTRY[77] = 930;	a. a. 3. 3. 3. 3. 3. 3. 3. 3. 7. 7. 7. 7. 7. 5. 5. 5. 5. 5. 5. 4. 4. 4.	Display:	Standard Bit Error

BUILD LUT Example Display



Title	READ LUT
Summary	Reports the radio's channel LO_TRIM frequency look-up-table (LUT) to the host.
Return Data	A sequence of 79 (uint16) numbers containing the contents of the look up table (LUT) for Europe and North America or a sequence of 23 (uint16) numbers for other countries. The upper byte contains the transmitter trim and the lower byte contains the receiver trim.
Exit	Click on Reset Chip.

BlueTest	
RF Test Mode Test Argume	ents
RF IQ MATCH	
IF IQ MATCH	Close
VCOTRIM BUILD LUT	Execute
READ LUT	L'ABCUIE
Set PIO	Reset Chip
Read PIO	
Provoke Fault	PS
Read chip version	
Test	Results
Save to File Browse for file	Display: Standard Bit Error
Mogfile.txt	
LUTENTRY[59] = 9a9b.	
LUTENTRY[60] = 9a9b. LUTENTRY[61] = 999a.	
LUTENTRY[62] = 9999.	
LUTENTRY[63] = 9899.	
LUTENTRY[64] = 9898.	
LUTENTRY[65] = 9898. LUTENTRY[66] = 9798.	
LUTENTRY[67] = 9798.	
LUTENTRY[68] = 9797.	
LUTENTRY[69] = 9797.	
LUTENTRY[70] = 9697. LUTENTRY[71] = 9596.	
LUTENTRY[71] = 3536.	
LUTENTRY[73] = 9595.	
LUTENTRY[74] = 9595.	
LUTENTRY[75] = 9594.	
LUTENTRY[76] = 9594.	
LUTENTRY[77] = 9594.	
LUTENTRY[78] = 9593.	

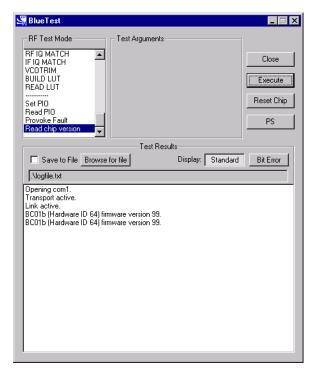
READ LUT Example Display

Title	PROVOKE FAULT
Summary Provokes a fault mode in the on-chip processor. Return Data None Test Arguments Fault (hex) = 0 to 2b (default = 0)	Provokes a fault mode in the on-chip processor.
Return Data	None
Toot Argumente	Fault (hex) = 0 to 2b (default = 0)
Test Arguments	Note: Contact CSR for more information about using fault modes.
Exit	Click on Reset Chip.

💐 Blue Test		
RF Test Mode	Test Arguments	
RF IQ MATCH	Fault (hex)	Close
VCOTRIM BUILD LUT READ LUT		Execute
Set PIO		Reset Chip
Read PIO Provoke Fault Read chip version		PS
	Test Results	
Save to File Browse I	or file Display: Sta	ndard Bit Error
Opening com1. Transport active. Link active. BC01b (Hardware ID 64) firm Provoked fault 0, successfu		

PROVOKE FAULT Example Display

Title	READ CHIP VERSION
Summary Reads the hardware ID and firmware version of device.	
Return data	Hardware ID and firmware version.



READ CHIP VERSION Example Display



Persistent Store Keys

Select **PS** from the main menu.

Enter a Key number.

To read a PS Key value, click on $\ensuremath{\textit{Read}}.$ The setting displays in the $\ensuremath{\textit{Value}}$ field.

To change a $\ensuremath{\text{PS}}$ key setting, enter a different value in the $\ensuremath{\text{Value}}$ field and click on $\ensuremath{\text{Set}}$.

To exit, click on **OK**.

Read/Set Persistent S	itore (HEX) 🛛 🔀
Key 209 💌	(Read) Set
Length 0001	OK
Value 0001	

PERSISTENT STORE KEY Example Display



Appendix 1

BIST Parameters

Name	Туре	Min	Max	Meaning
lo_freq	uint16	2402	2480	Bluetooth channel frequency in MHz
lxlvl	uint16	0	63	Internal amplifier power setting. Use 50 for maximum power
mod_freq	uint16	0	65535	Modulation frequency for modulated carrier transmit test in units of 1/4096 MHz
highside	bool	0	Non- zero	Receive IF setting, use false (0)
rx_attn	uint16	0	15	Initial attenuation setting, overwritten by AGC
country_code	uint16	0	3	Simplified hop sequence code, use country_code 0 for 79 hops
txrx_freq	uint16	1	65535	Period in microseconds between RX and TX events; default 12500 (20 slots)
lb_offs	uint16	1	65535	Offset in microseconds between receive and transmit in loopback
report_freq	uint16	1	65535	Time in seconds between reports to host, default 1
pkt_type	uint16	0	15	Standard Bluetooth packet type (12- 13 disallowed. 0, 1, 2 not useful)
pkt_size	uint16	0	339	Size of payload for packet type
bits_count	uint32	1	4.2 x 10 ⁹	Target for total bits used in BER measurement; default 1.6 M bit
Reset	bool	0	1	1 resets total count for BER measurement
offset_half_mhz	int16	-5	+5	Transmit IF offset; default -2
pcm_mode	uint16	0	2	PCM loopback mode; 0 = 4-wire slave, 1 = 4-wire master, 2 = 2-wire slave



Name	Туре	Min	Max	Meaning
chanl	uint16	0	78	Bluetooth channel number
chan2	uint16	0	78	Bluetooth channel number
n_samples	uint16	0	65535	Number of samples in range from min to max for IF filter response test
lo_offset	uint16	0	65535	Min offset in 1/4096MHz for IF filter response test
hi_offset	uint16	0	65535	Max offset in 1/4096MHz for IF filter response test
output_mask	Uint8	0	FF	Bit mask for PIO; 0=input, 1=output
output	Uint8	0	FF	Bit values for PIO output
xtal_trim	Uint16	0	63	Crystal trim value
uap	Uint16	0	FF	Bluetooth address; Upper Address Part
Lap		0	FFFFFF	Bluetooth address; Lower Address Part
Trim	Uint16	0	511	Value for configuring IQ trim
n_errs	Uint16	0	15	Number of errors
Lvl	Uint16	0	15	Local oscillator output level
tx_offset	Uint16	0		Transmitter offset
lo_offset	Uint16	0		Local oscillator offset
radio_on_offset	Uint16	0		Time between turning radio on and starting to transmit in microseconds



Appendix 2

Known Software Issue(s) in BlueTest Version 1.4

(a) Pressing the **Reset Chip** button on the GUI while data is being transmitted sends a hardware reset command to the chip and restarts the serial stack software.

Closing the GUI sends a hardware reset command to the chip.

If the link fails, the connection can only be recreated by manually resetting the chip (power off/on) and by clicking on **Reset Chip** or closing down and restarting the GUI (both of which will restart the serial stack software).

The above will not occur if no data is visibly scrolling in the window.

The tests concerned are:

- VCOTRIM
- BUILD LUT
- READ
- LUT
- (b) There is a race between command responses indicating that a test has started and the first data relating to that test. This does not affect the test results.
- (c) It is not possible to rouse the chip from Deep Sleep except by powering down the chip and restarting.



Appendix 3 Combining Tests Using a Second Unit

Several tests require a second **BlueCore01** unit to be operating to provide a test signal for the equipment under test. The following table provides a quick reference guide to tests that use a second unit.

SECOND LINIT	PAUSE	RADIO STATUS	TXSTART	TXDATA1	TXDATA2	TXDATA3	TXDATA4	RXSTART	RXSTART2	RXDATA1	RXDATA2	BIT ERR1	BIT ERR2	LOOP BACK	RX LOOP BACK	BER LOOP BACK	DEEP SLEEP	PCM LB	PCM EXT LB	SETTLE	IF RESP	RF IQ MATCH	IF IQ MATCH	VCO TRIM	BUILD LUT	READ LUT	SET PIO	READ PIO	PROVOKE FAULT	READ CHIP VERSION
EQUIPMENT UNDER																														
TEST																														
PAUSE		-																			_									
RADIO STATUS	⊢	-																												
TXSTART		-																			_									
TXDATA1	┢	+																												
TXDATA2																														
TXDATA3		-																												
TXDATA4																														
RXSTART1			Х																											
RXSTART2			Х																											
RXDATA1				Х																										
RXDATA2					Х																									
BIT ERR1				Х																										
BIT ERR2					Х																									
LOOP BACK																														
RX LOOP BACK														Х																
BER LOOP BACK														Х																
DEEP SLEEP																														
PCM LB																														
PCM EXT LB																														
SETTLE																														
IF RESP																														
RF IQ MATCH																														
IF IQ MATCH																														
VCO TRIM																														
BUILD LUT		-																			_									
READ LUT		-																												
SET PIO		-																			_									
READ PIO	╟	-																												
PROVOKE FAULT		-																			_									
READ CHIP VERSION																														



Appendix 4 Configuration Commands Available During Tests

Particular configuration commands are appropriate to use during certain tests. The following table is a quick reference guide to which configuration commands can be used during which tests.

EQUIPMENT UNDER TESTIIIIIIIIPAUSE RADIO STATUSIIIIIIIIIIITXSTART TXDATA1IXXXIII <tdi< th=""><th></th></tdi<>	
PAUSE Image: Sector of the	
RADIO STATUS Image: Status </td <td></td>	
TXSTART Image: Married M	
TXDATA1 X </td <td>_</td>	_
TXDATA2 X X X X X X X I I I TXDATA3 X X X X X X I I I I TXDATA3 X X X X X I I I I TXDATA4 X X X X I I I I RXSTART1 I I X X I I I I RXSTART2 I I I X I I I I	_
TXDATA3 X X X X X TXDATA4 X X X I I RXSTART1 I I X X I RXSTART2 I I X I I	_
TXDATA4 X X X X RXSTART1 Image: Constraint of the second sec	_
RXSTART1 X X RXSTART2 X X	_
RXSTART2	_
	_
RXDATA1 X X I I I I I I I I I I I I I I I I I	-
RXDATA2 X X	
BIT ERR1 X X X X X X X X X X	
BIT ERR2 X X X X X X	
LOOP BACK	
RX LOOP BACK I X X X I I I I I I I I I I I I I I I	
BER LOOP BACK IN THE AND A CONTRACT OF A CON	
DEEP SLEEP	
PCM LB	
PCM EXT LB	
SETTLE I I I I I I I I I I I I I I I I I I I	
IF RESP	
RF IQ MATCH	
IF IQ MATCH	_
BUILD LUT IN THE SECOND	_
SET PIO	
READ PIO	
PROVOKE FAULT	\neg



Appendix 5 Bluetooth Packet Types

Use the **CFG FREQ** command to set the frequency as appropriate to the size of the packet type being used in the test.

Segment	TYPE code ^Ե 3 ^Ե 2 ^Ե 1 ^Ե 0	Slot occupancy	SCO link	ACL link
	0000	1	NULL	NULL
	0001	1	POLL	POLL
1	0010	1	FHS	FHS
	0011	1	DM1	DM1
2	0100	1	undefined	DH1
	0101	1	HV1	undefined
	0110	1	HV2	undefined
	0111	1	HV3	undefined
	1000	1	DV	undefined
	1001	1	undefined	AUX1
3	1010	3	undefined	DM3
	1011	3	undefined	DH3
	1100	3	undefined	undefined
	1101	3	undefined	undefined
	1110	5	undefined	DM5
4	1111	5	undefined	DH5

Extracted from Packet Types section of Specification of the Bluetooth System, v1.1, dated 1 December 2000.



CSR's Life Support Policy and Use in Safety-Critical Applications

CSR's products are not authorised for use in life-support or safety-critical applications.

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Bluetooth and the Bluetooth logos are trademarks owned by Bluetooth SIG Inc, USA and licensed to CSR.

CSR reserves the right to make technical changes to its products as part of its development programme.

For further information, refer to the following document(s):

Document	Reference
Bluetooth (SIG) Test Specification - RF	Rev 0.9r, dated 31 January 2000
Specification of the Bluetooth System, v1.1	Rev 1.1, dated 01 December 2000



BlueCoreTM0[°]

Record of Changes

Date:	Revision:	Reason for Change:
13 SEP 00	а	Original publication of this document (CSR reference: bc01-an-047a).
16 JUL 01	b	Revision and addition of tests and appendices

BlueTest Instruction Manual

AN047

July 2001

• Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. To maintain compliance with FCC RF exposure compliance requirements, please follow operation instruction as documented in this manual.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device is intended only for OEM integrators under the following conditions:

1) The transmitter module may not be co-located with any other transmitter or antenna, As long as 1 condition above are met, further <u>transmitter</u> test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions <u>can not be met</u> (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID <u>can not</u> be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

The final end product must be labeled in a visible area with the following: "Contains FCC ID: O9NPB".

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Canadian Regulatory Wireless Notice

This device complies with RSS-210 of the Industry Canada Rules. Operation is subject to the following two conditions:

1) this device may not cause interference and

2) this device must accept any interference, including interference that may cause undesired operation of the device

IMPORTANT NOTE:

IC Radiation Exposure Statement:

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. To maintain compliance with IC RF exposure compliance requirements, please follow operation instruction as documented in this manual.