

# HCI Commands Specific to the Ericsson Module

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VERSION 1.0



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# HCI Commands Specific to the Ericsson Module

## 1. GENERAL

### 1.1. Introduction

This document describes the HCI commands and events that are specific for Ericsson and that are therefore not described in reference [1].

**Note:** It is not guaranteed that all commands and events described in this document are implemented at a particular point in time. This has to be described separately.

### 1.2. Acronyms

ASIC	Application Specific Integrated Circuit
BD	Bluetooth Device
bps	bits per second
BER	Bit Error Ratio
CID	Channel Identifier
DUT	Device Under Test
EBC	Ericsson Bluetooth Core
FIFO	First In First Out
HCI	Host Controller Interface

IF	InterFace
ISM	Industrial, Scientific, Medical
LMP	Link Manager Protocol
LPO	Low Power Oscillator
LSB	Least Significant Byte
MSB	Most Significant Byte
OCF	Opcode Command Field
OGF	Opcode Group Field
PCM	Pulse Code Modulation
PIN	Personal Identification Number
PRBS	Pseudo Random Bit Sequence
RF	Radio Frequency
RSSI	Received Signal Strength Indication
UART	Universal Asynchronous Receiver and Transmitter
USB	Universal Serial Bus
XO	Crystal Oscillator

## 2. DESCRIPTION OF HCI COMMANDS

In the following subsections, the HCI commands specific to the Ericsson module are described. Most of the HCI commands included are intended for testing, debugging, for settings made at production and for settings specific to Ericsson ASICs. For the Ericsson specific commands (as for vendor specific commands in general), the OGF is defined as 0x3F, see reference [1].

**Note 1:** After a command that is used to store settings in non-volatile memory has successfully finished, the command HCI\_Reset (see reference [1]) must be issued or a power reset must be made for the settings to take effect.

**Note 2:** For all of the commands in this document, a Command Complete event is returned when the actions associated with the command have finished, even if the command implies that LMP messages are exchanged. This is not the case in reference [1] where a Command Status event followed by an event associated with

the issued command are returned for commands for which LMP messages are exchanged.

## 2.1. Ericsson\_Read\_Memory

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Read_Memory	0x0001	Memory_Address	Status, Memory_Content

### Description:

This command is used to read the data stored at the address specified by the Memory\_Address parameter. The data is returned in the return parameter Memory\_Content.

### Command Parameters:

*Memory\_Address:*

*Size: 4 Bytes*

Value	Parameter Description
	Memory address to read from.

### Return Parameters:

*Status:*

*Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Read_Memory command succeeded.
0x01-0xFF	Ericsson_Read_Memory command failed. See reference [1] for list of error codes.

*Memory\_Content:*

*Size: 2 Bytes*

Value	Parameter Description
	Data read from specified memory address.

**Event(s) generated (unless masked away):**

When the Ericsson\_Read\_Memory command has completed, a Command Complete event will occur.

**2.2. Ericsson\_Write\_Memory**

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Write_Memory	0x0002	Memory_Address, Memory_Content	Status

**Description:**

This command is used to write the data in the Memory\_Content parameter to the address specified by the Memory\_Address parameter.

**Command Parameters:**

*Memory\_Address:*

*Size: 4 Bytes*

Value	Parameter Description
	Memory address to write to.

*Memory\_Content:*

*Size: 2 Bytes*

Value	Parameter Description
	Data to write to the specified memory address.

**Return Parameters:**

*Status:*

*Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Write_Memory command succeeded.
0x01-0xFF	Ericsson_Write_Memory command failed. See reference [1] for list of error codes.

**Event(s) generated (unless masked away):**

When the Ericsson\_Write\_Memory command has completed, a Command Complete event will occur.

Note: At hardware reset the default register values are loaded.

## 2.3. Ericsson\_Read\_HW\_Register

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Read_HW_Register	0x0003	Register_Number	Status, Register_Value

**Description:**

This command is used to read EBC hardware registers. The parameter Register\_Number specifies the register number that should be read. The Register\_Value return parameter contains the value that is stored in the specified register.

**Command Parameters:**

*Register\_Number:*

*Size: 2 Bytes*

Value	Parameter Description
	Register number to read in the EBC block. Allowed values: It is the diagnostics register that is read from.

**Return Parameters:**

*Status:*

*Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Read_HW_Register command succeeded.
0x01-0xFF	Ericsson_Read_HW_Register command failed. See reference [1] for list of error codes.

*Register\_Value:**Size: 1 Byte*

Value	Parameter Description
	Register value for the specified EBC register number.

**Event(s) generated (unless masked away):**

When the Ericsson\_Read\_HW\_Register command has completed, a Command Complete event will occur.

**2.4. Ericsson\_Write\_HW\_Register**

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Write_HW_Register	0x0004	Hardware_Block, Register_Number, Register_Value	Status

**Description:**

This command is used to set RF and EBC hardware registers. The Hardware\_Block parameter specifies which block (RF or EBC) that should be written to. The parameter Register\_Number specifies the register number that should be written to in the specified block. The parameter Register\_Value is the value that should be written to the specified register number.

**Command Parameters:***Hardware\_Block:**Size: 1 Byte*

Value	Parameter Description
0x00	RF block
0x01	EBC block



*Register\_Number:**Size: 2 Bytes*

Value	Parameter Description
	Register number to write to. Allowed values: See the specification for the specified Hardware_Block. For the EBC block, it is in BASEBAND-B the shadow register that is written to.

*Register\_Value:**Size: 1 Byte*

Value	Parameter Description
	Register value to write. Allowed values: See the specification for the specified Hardware_Block and Register_Number.

**Return Parameters:***Status:**Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Write_HW_Register command succeeded.
0x01-0xFF	Ericsson_Write_HW_Register command failed. See reference [1] for list of error codes.

**Event(s) generated (unless masked away):**

When the Ericsson\_Write\_HW\_Register command has completed, a Command Complete event will occur.

Note: At hardware reset the default register values are loaded.

## 2.5. Ericsson\_Read\_I2C

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Read_I2C	0x0005	Chip_Id, Address	Status, Data

**Description:**

This command is used to read from a register in a chip on the I2C bus. The *Chip\_Id* parameter specifies the chip that should be read from. The parameter *Address* specifies the address of the register that should be read from in the specified chip. The data that is stored in the specified register is returned in the *Data* return parameter.

**Command Parameters:***Chip\_Id:**Size: 1 Byte*

Value	Parameter Description
	Identity of the chip to read from on the I2C bus.

*Address:**Size: 1 Byte*

Value	Parameter Description
	Address of the register to read from. Allowed range: See the specification for the specified <i>Chip_Id</i> .

**Return Parameters:***Status:**Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Read_I2C command succeeded.
0x01-0xFF	Ericsson_Read_I2C command failed. See reference [1] for list of error codes.

*Data:**Size: 1 Byte*

Value	Parameter Description
	Data read.

**Event(s) generated (unless masked away):**

When the Ericsson\_Read\_I2C command has completed, a Command Complete event will occur.

## 2.6. Ericsson\_Write\_I2C

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Write_I2C	0x0006	Chip_Id, Address, Data	Status

### Description:

This command is used to write to a register in a chip on the I2C bus. The Chip\_Id parameter specifies the chip that should be written to. The parameter Address specifies the address of the register that should be written to in the specified chip. The parameter Data contains the data that should be written to the specified register.

### Command Parameters:

*Chip\_Id:*

*Size: 1 Byte*

Value	Parameter Description
	Identity of the chip to write to on the I2C bus.

*Address:*

*Size: 1 Byte*

Value	Parameter Description
	Address of the register to write to. Allowed range: See the specification for the specified Chip_Id.

*Data:*

*Size: 1 Byte*

Value	Parameter Description
	Data to write. Allowed range: See the specification for the specified Chip_Id and Address.

**Return Parameters:***Status:**Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Write_I2C command succeeded.
0x01-0xFF	Ericsson_Write_I2C command failed. See reference [1] for list of error codes.

**Event(s) generated (unless masked away):**

When the Ericsson\_Write\_I2C command has completed, a Command Complete event will occur.

**2.7. Ericsson\_Write\_PCM\_Settings**

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Write_PCM_Settings	0x0007	PCM_Settings	Status

**Description:**

This command is used to set if the PCM IF should be master or slave and the PCM direction.

**Command Parameters:***PCM\_Settings:**Size: 1 Byte*

Value	Parameter Description
0x00	PCM IF is slave, external PCM clock and synchronization, PCM direction: port A receive, port B transmit.
0x01	PCM IF is slave, external PCM clock and synchronization, PCM direction: port A transmit, port B receive.
0x02	PCM IF is master, internal PCM clock and synchronization, PCM direction: port A receive, port B transmit.
0x03	PCM IF is master, internal PCM clock and synchronization, PCM direction: port A transmit, port B receive. <b>(Default)</b>

**Return Parameters:***Status:**Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Write_PCM_Settings command succeeded.
0x01-0xFF	Ericsson_Write_PCM_Settings command failed. See reference [1] for list of error codes

**Event(s) generated (unless masked away):**

When the Ericsson\_Write\_PCM\_Settings command has completed, a Command Complete event will occur.

## 2.8. Ericsson\_Set\_UART\_Baud\_Rate

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Set_UART_Baud_Rate	0x0009	Baud_Rate	Status

**Description:**

This command is used to change the baud rate for the UART that the HCI interface is used over. The Command Complete event associated with the command will be returned with the old baud rate if the old baud rate is 9600 bps or higher. In order for this to work, there must not be any outstanding commands, when the HCI\_Ericsson\_Set\_UART\_Baud\_Rate command is issued. Furthermore, there should not be any connections when the command is issued. The Host should wait 15 ms after the Command Complete event has been received before assuming that the baud rate has changed. If the old baud rate is lower than 9600 bps, it is possible that the baud rate will change before all bytes belonging to the Command Complete event have been received by the Host. Therefore, the Host should not set the baud rate to a value lower than 9600 bps if the Host intends to change the baud rate again after this.

This command should not be issued when running the version of the HCI firmware that is implemented for USB. If it is, the command will have no effect, even though the Status return parameter will indicate that the command succeeded.

**Command Parameters:***Baud\_Rate:**Size: 1 Byte*

Value	Parameter Description
0x00	460.8 kbps
0x01	230.4 kbps
0x02	115.2 kbps
0x03	57.6 kbps
0x04	28.8 kbps
0x05	14.4 kbps
0x06	7200 bps
0x07	3600 bps
0x08	1800 bps
0x09	900 bps
0x10	153.6 kbps
0x11	76.8 kbps
0x12	38.4 kbps
0x13	19.2 kbps
0x14	9600 bps
0x15	4800 bps
0x16	2400 bps
0x17	1200 bps
0x18	600 bps
0x19	300 bps
	<b>Default baudrate 57.6kb/s</b>

**Return Parameters:***Status:**Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Set_UART_Baud_Rate command succeeded.
0x01-0xFF	Ericsson_Set_UART_Baud_Rate command failed. See reference [1] for list of error codes.

**Event(s) generated (unless masked away):**

When the Ericsson\_Set\_UART\_Baud\_Rate command has completed, a Command Complete event will occur.

Note: In P8A firmware and earlier releases a soft reset will reset to the default baud-rate.

## 2.9. Ericsson\_Write\_Country\_Code

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Write_Country_Code	0x000C	Country_Code	Status

**Description:**

This command is used to write the value of the Country\_Code parameter into non-volatile memory. The Country\_Code parameter defines which range of the ISM 2.4 GHz frequency band that will be used by the radio.

**Command Parameters:**

*Country\_Code:*

*Size: 1 Byte*

Value	Parameter Description
0x00	North America & Europe (except France and Spain)
0x01	France
0x02	Spain
0x03	Japan
0x04-0xFF	Reserved.

**Return Parameters:**

*Status:*

*Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Write_Country_Code command succeeded.
0x01-0xFF	Ericsson_Write_Country_Code command failed. See reference [1] for list of error codes.

**Event(s) generated (unless masked away):**



When the Ericsson\_Write\_Country\_Code command has completed, a Command Complete event will occur.

## 2.10. Ericsson\_Read\_Revision\_Information

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Read_Revision_Information	0x000F		Status, Revision_Info

### Description:

This command is used to return information about the time and the date when the flash load file was generated in the Revision\_Info return parameter. This information was stored by the GenLoadModule application, which is used to generate a flash load file. If a comment was written when the GenLoadModule application was run, this comment will also be returned in the Revision\_Info parameter. The Revision\_Info return parameter is a null (0x00) terminated ASCII string.

### Command Parameters:

None

### Return Parameters:

*Status:*

*Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Read_Revision_Information command succeeded.
0x01-0xFF	Ericsson_Read_Revision_Information command failed. See reference [1] for list of error codes.

*Revision\_Info:*

*Size: 101 Bytes*

Value	Parameter Description
	A null terminated (0x00) ASCII string. The string contains the time and date when the flash load file was created. The string also contains a comment if a comment was written when the GenLoadModule application was run.

**Event(s) generated (unless masked away):**

When the Ericsson\_Read\_Revision\_Information command has completed, a Command Complete event will occur.

## 2.11. Ericsson\_Self\_Test

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Self_Test	0x0010	Self_Test_Bit_Mask	Status

**Description:**

This command is used to perform a self test of the local device. The Self\_Test\_Bit\_Mask parameter contains a bit mask used to specify what should be tested. The specified values can be OR'ed. After this command has been issued, zero or more Hardware Error events (see reference 1) will be sent to the Host, one for every hardware error that is detected. See section 4 for a description of the Ericsson specific HCI hardware error codes. This is followed by a Command Complete event, which will be sent to the Host when the self test has completed.

**Command Parameters:**

*Self\_Test\_Bit\_Mask:*

*Size: 1 Byte*

Value	Parameter Description
00000001 <sub>b</sub>	Check flash memory check sum.
Bits 1-7	Reserved.

**Return Parameters:**

*Status:*

*Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Self_Test command succeeded.

0x01-0xFF	Ericsson_Self_Test command failed. See reference [1] for list of error codes.
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### Event(s) generated (unless masked away):

For every hardware error that is detected, a Hardware Error event will be sent to the Host. This is followed by a Command Complete event, which will be sent to the Host when the self test has completed.

## 2.12. Ericsson\_Enter\_Test\_Mode

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Enter_Test_Mode	0x0011	Connection_Handle	Status

### Description:

This command is used to put the remote slave device identified by the Connection\_Handle parameter into test mode. The Connection\_Handle must be a Connection\_Handle for an ACL connection. The local device must be the master. The Host of the remote slave must before this command is issued have issued the command HCI\_Enable\_Device\_Under\_Test\_Mode (see reference [1]) to allow the master to put that device into test mode. The remote slave device will leave test mode when the connection to that device is terminated. The Host of the local device can also use the command HCI\_Ericsson\_Test\_Control to make the remote slave device leave test mode without a disconnection. See reference [2] for more information regarding Bluetooth test mode.

### Command Parameters:

*Connection\_Handle:*

*Size: 2 Bytes*

Value	Parameter Description
	Connection Handle to be used for transmitting and receiving voice or data. Returned from creating a connection. Allowed range: 0x0000-0x0EFF (0x0F00-0x0FFF Reserved)

**Return Parameters:***Status:**Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Enter_Test_Mode command succeeded.
0x01-0xFF	Ericsson_Enter_Test_Mode command failed. See reference [1] for list of error codes.

**Event(s) generated (unless masked away):**

When the Ericsson\_Enter\_Test\_Mode command has completed, a Command Complete event will occur.

## 2.13. Ericsson\_Test\_Control

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Test_Control	0x0012	Connection_Handle, Test_Scenario, Hopping_Mode, TX_Frequency, RX_Frequency, Power_Control_Mode, Poll_Period, Test_Packet_Type, Length_Of_Test_Data	Status

**Description:**

This command is used to start a specific test for the slave device identified by the Connection\_Handle parameter. The Connection\_Handle must be a Connection\_Handle for an ACL connection. The command can also be used to exit test mode. The local device must be the master. The remote slave must before this command is issued have entered test mode. (The command HCI\_Ericsson\_Enter\_Test\_Mode is used to put a remote slave into test mode.) The rest of the parameters are used to specify which test that should be performed and parameters associated with that test. See reference [2] for a description of these parameters.

**Command Parameters:***Connection\_Handle:**Size: 2 Bytes*

Value	Parameter Description
	Connection Handle to be used for transmitting and receiving voice or data. Returned from creating a connection. Allowed range: 0x0000-0x0EFF (0x0F00-0x0FFF Reserved)

*Test\_Scenario:**Size: 1 Byte*

Value	Parameter Description
	See description in reference [2] of this parameter.

*Hopping\_Mode:**Size: 1 Byte*

Value	Parameter Description
	See description in reference [2] of this parameter.

*TX\_Frequency:**Size: 1 Byte*

Value	Parameter Description
	See description in reference [2] of this parameter.

*RX\_Frequency:**Size: 1 Byte*

Value	Parameter Description
	See description in reference [2] of this parameter.

*Power\_Control\_Mode:**Size: 1 Byte*

Value	Parameter Description
	See description in reference [2] of this parameter.

*Poll\_Period:**Size: 1 Byte*

Value	Parameter Description
	See description in reference [2] of this parameter.

*Test\_Packet\_Type:**Size: 1 Byte*

Value	Parameter Description
	See description in reference [2] of this parameter (just called packet type in reference [2]).

*Length\_Of\_Test\_Data:**Size: 2 Bytes*

Value	Parameter Description
	See description in reference [2] of this parameter.

**Return Parameters:***Status:**Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Test_Control command succeeded.
0x01-0xFF	Ericsson_Test_Control command failed. See reference [1] for list of error codes.

**Event(s) generated (unless masked away):**

When the Ericsson\_Test\_Control command has completed, a Command Complete event will occur.

## 2.14. Ericsson\_AUX1

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_AUX1	0x0013	Connection_Handle, AUX1_Number, AUX1_Interval	Status

**Description:**

This command is used to send AUX1 packets with known data in order to make BER and FER measurements on the link that is identified by the Connection\_Handle parameter. The Connection\_Handle must be a Connection\_Handle for an ACL connection. If successful, the command results in that 100\*AUX1\_Number AUX1 packets will be automatically transmitted (if AUX1\_Number is equal to zero, it means that an unlimited number of packets will be transmitted). In the payload header, L\_CH=10 and there are 29 bytes in the payload body. The data in the payload body is the same in all AUX1 packets and has L2CAP format. The first two bytes contain the L2CAP length and have the values (0x19, 0x00). The following two bytes contain the L2CAP CID and have the values (0x00, 0x00). The 25 bytes thereafter all contain the value 0x30. Only one out of AUX1\_Interval frames is used to prevent overflow on the receiving side. Furthermore, the command HCI\_Ericsson\_AUX1 must only be sent on the master side, otherwise no packets will be sent. In addition to this, no SCO connections are allowed to exist when the command is issued.

**Command Parameters:***Connection\_Handle:**Size: 2 Bytes*

Value	Parameter Description
	Connection Handle to be used for transmitting and receiving voice or data. Returned from creating a connection. Allowed range: 0x0000-0x0EFF (0x0F00-0x0FFF Reserved)

*AUX1\_Number:**Size: 1 Byte*

Value	Parameter Description
0x00	An unlimited number of AUX1 packets will be sent.
0x01-0xFF	Number of AUX1 packets to be sent divided by 100.

*AUX1\_Interval:**Size: 1 Byte*

Value	Parameter Description
0x01-0xFF	This parameter specifies how often an AUX1 packet is to be sent. An AUX1 packet will be sent in one out of AUX1_Interval frames.

**Return Parameters:***Status:**Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_AUX1 command succeeded.
0x01-0xFF	Ericsson_AUX1 command failed. See reference [1] for list of error codes.

**Event(s) generated (unless masked away):**

When the Ericsson\_AUX1 command has completed, a Command Complete event will occur.

## 2.15. Ericsson\_BER

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_BER	0x0015	Connection_Handle, RX_On_Start, Synt_On_Start, TX_On_Start, Phd_Off_Start, BER_Hopping_Mode, TX_Channel_Master, TX_Channel_Slave, Whitening_Enable, Nbr_Of_Packets, BER_Packet_Type, Test_Data_Type, Test_Data	Status



**Description:**

This command is used to measure BER when fully loaded DH1, DH3 or DH5 packets are sent from master to slave on the link that is identified by the Connection\_Handle parameter. The Connection\_Handle must be a Connection\_Handle for an ACL connection. The slave will XOR each received octet with the expected value, so each bit that equals 1 in the data sent to the Host represents a transmission error. Packets where the length field in the payload header has been subjected to transmission errors will be discarded. Packets are sent about every 99th frame to prevent overflow on the receiving side. Furthermore, the command HCI\_Ericsson\_BER must only be sent on the master side, otherwise no packets will be sent. In addition to this, no SCO connections are allowed to exist when the command is issued.

**Command Parameters:***Connection\_Handle:**Size: 2 Bytes*

Value	Parameter Description
	Connection Handle to be used for transmitting and receiving voice or data. Returned from creating a connection. Allowed range: 0x0000-0x0EFF (0x0F00-0x0FFF Reserved)

*RX\_On\_Start:**Size: 1 Byte*

Value	Parameter Description
1xxxxxxx <sub>b</sub>	No change.
0xxxxxxx <sub>b</sub>	Use timing as indicated in bits 0:6. Unit is 2 $\mu$ s.

*Synt\_On\_Start:**Size: 1 Byte*

Value	Parameter Description
1xxxxxxx <sub>b</sub>	No change.
0xxxxxxx <sub>b</sub>	Use timing as indicated in bits 0:6. Unit is 2 $\mu$ s.

*TX\_On\_Start:**Size: 1 Byte*

Value	Parameter Description
-------	-----------------------

1xxxxxxx <sub>b</sub>	No change.
0xxxxxxx <sub>b</sub>	Use timing as indicated in bits 0:6. Unit is 2 $\mu$ s.

*Phd\_Off\_Start:**Size: 1 Byte*

Value	Parameter Description
1xxxxxxx <sub>b</sub>	No change.
0xxxxxxx <sub>b</sub>	Use timing as indicated in bits 0:6. Unit is 2 $\mu$ s.

*BER\_Hopping\_Mode: Size: 1 Byte*

Value	Parameter Description
0x00	North America & Europe (except France and Spain)
0x01	Use fixed channels as determined by the parameters TX_Channel_Master and TX_Channel_Slave.
0x02-0xFF	Reserved.

*TX\_Channel\_Master:**Size: 1 Byte*

Value	Parameter Description
0x00-0x5D	(Master transmission frequency-2402) MHz.

*TX\_Channel\_Slave:**Size: 1 Byte*

Value	Parameter Description
0x00-0x5D	(Slave transmission frequency-2402) MHz.

*Whitening\_Enable:**Size: 1 Byte*

Value	Parameter Description
0x00	Whitening is disabled.
0x01	Whitening is enabled.
0x02-0xFF	Reserved.

*Nbr\_Of\_Packets:**Size: 2 Bytes*

Value	Parameter Description
0x0000	An unlimited number of baseband packets will be transmitted.
0x0001- 0xFFFF	Number of baseband packets that will be transmitted.

*BER\_Packet\_Type:**Size: 1 Byte*

Value	Parameter Description
0x00	DH1
0x01	DH3
0x02	DH5
0x03-0xFF	Reserved.

*Test\_Data\_Type:**Size: 1 Byte*

Value	Parameter Description
0x00	Send PRBS (same as in Bluetooth test mode).
0x01	Every octet that is sent equals Test_Data.
0x02-0xFF	Reserved.

*Test\_Data:**Size: 1 Byte*

Value	Parameter Description
	Data to send (all octets will be the same).

**Return Parameters:***Status:**Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_BER command succeeded.
0x01-0xFF	Ericsson_BER command failed. See reference [1] for list of error codes.

**Event(s) generated (unless masked away):**

When the Ericsson\_BER command has completed, a Command Complete event will occur.

## 2.16. Ericsson\_Periodic\_Page\_Mode

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Periodic_Page_Mode	0x0017	Max_Page_Period_Length, Min_Page_Period_Length, BD_ADDR, Packet_Type, Page_Scan_Repetition_Mode, Page_Scan_Mode, Clock_Offset, Allow_Role_Switch	Status

**Description:**

This command is an advanced form of the command HCI\_Create\_Connection (see reference 1). The difference lies in that if a page timeout occurs, no

Connection Complete event will be sent to the Host. Instead, a new connection attempt (a new page) will be made beginning a random time after the beginning of the previous page. This random time is uniformly distributed with `Min_Page_Period_Length` as the lower limit and `Max_Page_Period_Length` as the upper limit. If a page timeout occurs again, no Connection Complete event will be sent and a new page will be made after a new random time with the same distribution and limits. The Bluetooth module will continue to perform new pages with random time intervals as long as page timeouts occur. The module is during this time said to be in periodic page mode. If a connection attempt is successful or if an error other than a page timeout occurs, a Connection Complete event will be sent to the Host and the module will leave periodic page mode.

`Max_Page_Period_Length` must be larger than `Min_Page_Period_Length`. Furthermore, the time specified in `Min_Page_Period_Length` must be larger than the time specified in the `Page_Timeout` parameter of the command `HCI_Write_Page_Timeout` (see reference 1). Note that it is the times that should be compared and not the values of the parameters since the steps are different (1.28 s for `Max_Page_Period_Length` and `Min_Page_Period_Length` but 0.625 ms for `Page_Timeout`). The six last parameters of the `HCI_Ericsson_Periodic_Page_Mode` command are the same as the corresponding parameters in the `HCI_Create_Connection` command. See the description of the `HCI_Create_Connection` command in reference [1] for a description of these parameters. The only commands that are allowed in periodic page mode in the BASEBAND-B implementation are `HCI_Accept_Connection_Request`, `HCI_Reject_Connection_Request`, `HCI_Link_Key_Request_Reply`, `HCI_Link_Key_Request_Negative_Reply`, `HCI_PIN_Code_Request_Reply`, `HCI_PIN_Code_Request_Negative_Reply`, `HCI_Reset` and `HCI_Ericsson_Exit_Periodic_Page_Mode`. The two last of these commands can be used to exit periodic page mode. The other six commands are only allowed if an incoming connection, a link key or a PIN code has been requested by the Host Controller in an event. Furthermore, in the BASEBAND-B implementation, it is not possible to enter periodic page mode when the module is in periodic inquiry mode or if an inquiry is currently in progress.

#### Command Parameters:

*Max\_Page\_Period\_Length:*

*Size: 2 Bytes*

Value	Parameter Description
	Maximum time interval between the beginning of a page and the beginning of the next page. Allowed range N: 0x0002-0xFFFF Time = N*1.28 sec

*Min\_Page\_Period\_Length:*

*Size: 2 Bytes*

Value	Parameter Description
	Minimum time interval between the beginning of a page and the beginning of the next page. Allowed range N: 0x0001-0xFFFE Time = N*1.28 sec

*BD\_ADDR**Size: 6 Bytes*

Value	Parameter Description
	See Create_Connection command in reference [1].

*Packet\_Type**Size: 2 Bytes*

Value	Parameter Description
	See Create_Connection command in reference [1].

*Page\_Scan\_Repetition\_Mode**Size: 1 Byte*

Value	Parameter Description
	See Create_Connection command in reference [1].

*Page\_Scan\_Mode**Size: 1 Byte*

Value	Parameter Description
	See Create_Connection command in reference [1].

*Clock\_Offset**Size: 2 Bytes*

Value	Parameter Description
	See Create_Connection command in reference [1].

*Allow\_Role\_Switch**Size: 1 Byte*

Value	Parameter Description
	See Create_Connection command in reference [1].

**Return Parameters:***Status:**Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Periodic_Page_Mode command succeeded.
0x01-0xFF	Ericsson_Periodic_Page_Mode command failed. See reference [1] for list of error codes.

**Event(s) generated (unless masked away):**

The periodic page mode begins when the Host Controller sends the Command Complete event for this command to the Host. A Connection Complete event may later on be sent to the Host as a result of this command. This will only be done if a connection is established to the specified device or an error other than a page timeout occurs at a connection attempt before periodic page mode is exited.

## 2.17. Ericsson\_Exit\_Periodic\_Page\_Mode

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_Exit_Periodic_Page_Mode	0x0018		Status

**Description:**

This command is used to exit periodic page mode when the Bluetooth module is currently in periodic page mode. No more periodic pages will be made after this command has successfully completed. If the module is currently in a page process, the page process will be stopped directly.

**Command Parameters:**

None.

**Return Parameters:***Status:**Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_Exit_Periodic_Page_Mode command succeeded.
0x01-0xFF	Ericsson_Exit_Periodic_Page_Mode command failed. See reference [1] for list of error codes.

**Event(s) generated (unless masked away):**

When the Bluetooth module no longer is in periodic page mode, a Command Complete event for this command will be sent to the Host.

## 2.18. Ericsson\_TX\_Test

Command	OCF	Command Parameters	Return Parameters
HCI_Ericsson_TX_Test	0x0019	RX_On_Start, Synt_On_Start, TX_On_Start, Phd_Off_Start, Test_Scenario, Hopping_Mode, TX_Frequency, RX_Frequency, TX_Test_Interval, Test_Packet_Type, Length_Of_Test_Data	Status

**Description:**



This command is used to measure the TX spectrum. It is similar to the transmitter tests in reference [2], but the DUT is master. The Host Controller will go into connection as master (without a slave) approximately 9 ms after the command has been received. The local device, which is the DUT, will then transmit packets without whitening according to the specified parameters. The local device is then said to be in TX test mode. When in TX test mode, the Host can send the command again to change the parameters or to end the test mode. After ending the test mode, LM will be in the same state as after a software reset.

### Command Parameters:

*RX\_On\_Start:*

*Size: 1 Byte*

Value	Parameter Description
1xxxxxxx <sub>b</sub>	No change.
0xxxxxxx <sub>b</sub>	Use timing as indicated in bits 0:6. Unit is 2 μs.

*Synt\_On\_Start:*

*Size: 1 Byte*

Value	Parameter Description
1xxxxxxx <sub>b</sub>	No change.
0xxxxxxx <sub>b</sub>	Use timing as indicated in bits 0:6. Unit is 2 μs.

*TX\_On\_Start:*

*Size: 1 Byte*

Value	Parameter Description
1xxxxxxx <sub>b</sub>	No change.
0xxxxxxx <sub>b</sub>	Use timing as indicated in bits 0:6. Unit is 2 μs.

*Phd\_Off\_Start:*

*Size: 1 Byte*

Value	Parameter Description
1xxxxxxx <sub>b</sub>	No change.
0xxxxxxx <sub>b</sub>	Use timing as indicated in bits 0:6. Unit is 2 μs.

*Test\_Scenario:**Size: 1 Byte*

Value	Parameter Description
	See description in reference [2] of this parameter. Note: Only transmitter tests are allowed.

*Hopping\_Mode:**Size: 1 Byte*

Value	Parameter Description
	See description in reference [2] of this parameter.

*TX\_Frequency:**Size: 1 Byte*

Value	Parameter Description
0x00-0x5D	(DUT transmission frequency-2402) MHz.

*RX\_Frequency:**Size: 1 Byte*

Value	Parameter Description
0x00-0x5D	(DUT reception frequency-2402) MHz.

*TX\_Test\_Interval: Size: 1 Byte*

Value	Parameter Description
0x00-0xFF	Number of empty frames between subsequent transmissions.

*Test\_Packet\_Type:**Size: 1 Byte*

Value	Parameter Description
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	See description in reference [2] of this parameter (just called packet type in reference [2]). Note: Only DH1, DH3, DH5 or AUX1 is allowed.
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*Length\_Of\_Test\_Data:**Size: 2 Bytes*

Value	Parameter Description
	See description in reference [2] of this parameter.

**Return Parameters:***Status:**Size: 1 Byte*

Value	Parameter Description
0x00	Ericsson_TX_Test command succeeded.
0x01-0xFF	Ericsson_TX_Test command failed. See reference [1] for list of error codes.

**Event(s) generated (unless masked away):**

When the Ericsson\_TX\_Test command has completed, a Command Complete event will occur.

### 3. DESCRIPTION OF ERICSSON SPECIFIC HCI EVENTS

In the following subsections, the Ericsson specific HCI events are described. The Ericsson specific HCI events are intended for testing and debugging. For the Ericsson specific events (as for vendor specific events in general), the event code is defined as 0xFF, see reference [1]. The Event\_Id parameter is the first parameter of all Ericsson specific HCI events. This parameter indicates which Ericsson specific HCI event that is returned.

#### 3.1. Ericsson\_OSE\_Crash

Event	Event Code	Event_Id	Event Parameters
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HCI_Ericsson_ OSE_Crash	0xFF	0x01	Event_Id, OSE_Error_Code, OSE_Process_Id, OSE_PCB_Address, OSE_Stack_Pointer, OSE_User_Or_ OS_Error
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**Description:**

The Ericsson\_OSE\_Crash event indicates that the operating system (OSE) has crashed. The event parameters contain information about the crash. The hardware will reset within a few seconds after this event has been sent.

**Event Parameters:***Event\_Id:**Size: 1 Byte*

Value	Parameter Description
0x01 for HCI_Ericsson_OSE _Crash	Indicates which Ericsson specific HCI event that is returned.

*OSE\_Error\_Code:**Size: 1 Byte*

Value	Parameter Description
	See reference [3].

*OSE\_Process\_Id:**Size: 1 Byte*

Value	Parameter Description
	See reference [3].

*OSE\_PCB\_Address:**Size: 1 Byte*

Value	Parameter Description
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	See reference [3].
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*OSE\_Stack\_Pointer:**Size: 1 Byte*

Value	Parameter Description
	See reference [3].

*OSE\_User\_Or\_OS\_Error:**Size: 1 Byte*

Value	Parameter Description
0x00	OSE user, see reference [3].
0x01	OS error, see reference [3].

#### 4. DESCRIPTION OF ERICSSON SPECIFIC HCI HARDWARE ERROR CODES

In this section, Ericsson specific HCI hardware error codes, which are returned in the Hardware\_Code parameter of the Hardware Error event (see reference [1]), are listed.

Hardware_Code	Description
0x20	UART FIFO overflow error.
0x21	Flash memory check sum is incorrect.

Note: More hardware error codes will be added.

#### 5. REFERENCES

- [1] Kristoffer Fleming, “Bluetooth Host Controller Interface Functional Specification”, part of “Specification of the Bluetooth System - Core”, version 1.0 B
- [2] Thomas Müller, “Bluetooth Test Mode”, part of “Specification of the Bluetooth System - Core”, version 1.0 B
- [3] Enea OSE Systems AB, “OSE Basic Real Time Kernel OSARM Reference Manual”, ko420e/OSE-96:001 R2.2