Bluetooth Baseband LSI

Panasonic PAN1026

Toshiba TC35661

LE MNG
Command Interface Document

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Revision History

Date	Modification	Note
24th-June-2013	1st Release Based on TC35661APL_ROM500_LE_GAP_MNG_E_12thJune2013 Added “Status” to the Parameters of “TCU_LE_ACCEPT”. Deleted “Status” from the Command Format of “TCU_LE_SYS_INVALID_COMMAND”. Added “Status” and “Note” to Parameters of “TCU_MNG_LE_READ_LOCAL_SUPPORTED_FEATURES_RESP”. And deleted “Note“ and “ bit positions table” from it. Added “Parameter Description” to Parameter “Random_Address” of “TCU_MNG_LE_SET_RAND_ADDRESS_REQ” Added “Status” to Parameters of “TCU_MNG_LE_SET_RAND_ADDRESS_RESP”. Added “Status” to Parameters of “TCU_MNG_LE_READ_WHITELIST_SIZE_RESP”. Added “Status” to Parameters of “TCU_MNG_LE_ADD_DEVICE_TO_WHITELIST_RESP”. Added “Status” to Parameters of “TCU_MNG_LE_DEL_WHITELIST_RESP”. Edited “Note” of “TCU_LE_START_ADVERTISE_REQ”. Edited “Parameter Description” of its Parameters table. Added “Status” to the Parameters of “ TCU_MNG_LE_START_ADVERTISE_RESP” Added “Status” to Parameters of “TCU_MNG_LE_SET_DISABLE_ADVERTISE_RESP”. Edited the Parameters table of “TCU_MNG_LE_CONNECTION_COMPLETE_EVENT” Edited “TCU_MNG_LE_CONNECTION_UPDATE_REQ”. Separated it to 2 cases whether “Device Role” is Slave or Master. Edited “TCU_MNG_LE_CONNECTION_UPDATE_REQ”. Separated it to 2 cases whether “Device Role” is Slave or Master. Changed “ TCU_MNG_LE_L2CAP_CONNECTION_UPDATE_RESP”’s “Status Value” of Parameters Added one more case to the “Note” of “TCU_MNG_LE_CONNECTION_UPDATE_EVENT”. Added Status to the Parameters. Added “Status” to the Parameters of “TCU_MNG_LE_SET_HOST_CHANNEDL_CHASSIFICATION_RESP” Added “Status” to the Parameters of “TCU_MNG_LE_READ_CHANNEL_MAP_RESP” Added “Status” to the Parameters of “TCU_MNG_LE_READ_SUPPORTED_STATES_RESP”. Edited its “LE_States”	

Date	Modification	Note
	Added “TCU_MNG_LE_ADV_REPORT_EVENT” Added “Parameter Description” to the Parameters of “TCU_MNG_LE_DISCONNECT_EVENT” Added “Status” to parameters of “TCU_MNG_LE_READ_TX_POW_LEVEL_RESP” Edited the “Parameter Description” of “TCU_MNG_LE_READ_RSSI_REQ” Edited the “Parameter Description” of “TCU_MNG_LE_READ_RSSI_RESP” Added “Status” to parameters of “TCU_MNG_LE_GEN_RESOLVABLE_BDADDR_RESP Added “Status” to parameters of “TCU_MNG_LE_RESOLVE_BDADDR_RESP” Added Parameters to “TCU_MNG_LE_READ_REMOTE_VERSION_RESPONSE” TCU_MNG_LE_READ_BUFFER_SIZE_REQ and TCU_MNG_LE_READ_BUFFER_SIZE_RESP are deleted. Always fixed value is returned.	
26th-July-2013	Updated Status fields for different error cases. Updated Local Device Name Maximum Size and Error Code for different Management Commands. Added “Note” of ”TCU_MNG_LE_CONNECTION_UPDATE_REQ” Deleted the description about the “Master” role of ”TCU_MNG_LE_CONNECTION_UPDATE_REQ”	
20th-November-2013	Added 1.17 TCU_MNG_LE_START_ADVERTISE_REQ Added note for the Advertise.	

Contents

1 Command Format For LE GAP Connection Management

1.1 TCU_LE_ACCEPT

This indicates that the processing of the command issued from the host application has started. It is used as Acknowledgement to the command processing.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte
Command_ServiceID	1 Byte
Command_OpCode	1 Byte

ServiceID 0xD1
OpCode 0xF1
Parameter Length 0x0003

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success The abnormalities in a parameter Device Is Not -Initialized Device Already Initialized MNG Processing in progress No ACL Link Device Role Slave LE_Error Max_Device_Already_Connected GATT Processing in Progress	 0x00 0x01 0x02 0x03 0x04 0x05 0x06 0x07 0x08 0x10
Command_ServiceID	The Service Id of the command which is being processed by the module.	0xD1(Connection Management) 0xD2 (GATT Client)
Command_OpCode	The OpCode of the command which is being processed by the module.	0x01-0xEF

1.2 TCU_LE_NOT_ACCEPT

This event is generated to notify that module rejects input command from Host CPU, because the other request is being processed.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Command_ServiceID	1 Byte
Command_OpCode	1 Byte

ServiceID 0xD1
OpCode 0xF2
Parameter Length 0x0002

Parameters:

Parameters	Parameter Description	Value
Command_ServiceID	The Service Id of the command which is being processed by the module.	0xD1(Connection Management) 0xD2 (GATT Client) 0xD3(GATT Server)
Command_OpCode	The OpCode of the command which is being processed by the module.	0x01-0xEF

1.3 TCU_LE_FATAL_ERROR

This error is indicated to host when some abnormalities occur in module which is not expected inside a module to occur and same cannot be recovered.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Error	1 Byte

ServiceID 0xD1
OpCode 0xFE
Parameter Length 0x0001

Parameters:

Parameters	Parameter Description	Value
Error	Error Code: Memory Underflow	 0x01

1.4 TCU_LE_SYS_INVALID_COMMAND

This event is generated to notify that command from Host CPU is invalid.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
ServiceID_Received	1 Byte
Command_OpCode_Received	1 Byte

ServiceID 0xD1
OpCode 0xFF
Parameter Length 0x0003

Parameters:

Parameters	Parameter Description	Value
ServiceID_Received	The Service Id of the command which is being processed by the module.	----
Command_OpCode_Received	The OpCode of the command which is being processed by the module.	0x01-0xEF

1.5 TCU_MNG_LE_INIT_REQ

"TCU_MNG_LE_INIT_REQ" command initializes the BT Low Energy device. The device is reset to a known state. The local supported features are read to check that low energy is supported on this Controller. Event mask and LE event mask are set to enable the events to generate to the Host. The commands are issued to check the availability of the buffers. Locally supported LE features are identified.
When this command processing is completed, device initialization response "TCU_MNG_LE_INIT_RESP" is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Length_of_Device_Name	1 Byte
Device_Name	124 Bytes (max)

ServiceID 0xD1
OpCode 0x01
Parameter Length 0x0001 - 0x007D

Parameters:

Parameters	Parameter Description	Value
Length_of_Device_Name	The length of the local device name.	0x00-0x7C
Device_Name	The device name of the local device. It is in UTF-8 format.	

1.6 TCU_MNG_LE_INIT_RESP

This response is obtained for the device initialization request. When the processing of the command "TCU_MNG_LE_INIT_REQ" is completed, device initialization response is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte
BD_ADDR	6 Bytes

ServiceID 0xD1
OpCode 0x81
Parameter Length 0x0007

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success The abnormalities in a parameter Initialization Already Done	 0x00 0x86 0x89
BD_ADDR	Local device BD_ADDR. It is 0xFFFFFFFFFFFF when status is not success.	0xXXXXXXXXXXXX

1.7 TCU_MNG_LE_READ_LOCAL_SUPPORTED_FEATURES_REQ

This command is used to read the list of the supported LE features of a local device. When this command processing is completed, the response “TCU_MNG_LE_READ_LOCAL_SUPPORTED_FEATURES_RESP” is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes

ServiceID	0xD1
OpCode	0x02
Parameter Length	0x0000

Parameters: None.

1.8 TCU_MNG_LE_READ_LOCAL_SUPPORTED_FEATURES_RESP

This response is obtained when the request to read the list of supported LE features of a local device is processed. When the processing of the command “TCU_MNG_LE_READ_LOCAL_SUPPORTED_ FEATURES_REQ” is completed, device local supported features read response is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte
LE_Features	8 Bytes

ServiceID 0xD1
OpCode 0x82
Parameter Length 0x0009

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized Command in Progress For other errors, refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	0x00 0x86 0x81 0x82
LE_Features	Bit Masked list of used LE Features.	0xXXXXXXXXXXXXXXXX For more details refer core specification document “Core_V4.0.pdf”[Vol 6] Part B, Section 4.6.

1.9 TCU_MNG_LE_SET_RAND_ADDRESS_REQ

This command sets the random address for the local device. When this command processing is completed, set random address response “TCU_MNG_LE_SET_RAND_ADDRESS_RESP” is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Random_Address	6 Bytes

ServiceID 0xD1
OpCode 0x04
Parameter Length 0x0006

Parameters:

Parameters	Parameter Description	Value
Random_Address	Random Device Address to be set as defined in the core specification “Core_V4.0”,[Vol 6] Part B, Section 1.3	0xXXXXXXXXXXXX

1.10 TCU_MNG_LE_SET_RAND_ADDRESS_RESP

This response is obtained when the request to set the random address for the local device is processed. When the processing of the command “TCU_MNG_LE_SET_RAND_ADDRESS_REQ” is completed, set random address response is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte

ServiceID 0xD1
OpCode 0x84
Parameter Length 0x0001

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized Command in Progress For other errors, refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	 0x00 0x86 0x81 0x82

1.11 TCU_MNG_LE_READ_WHITELIST_SIZE_REQ

This command is used to read the total number of white list entries that can be stored in the Controller. When this command processing is completed, read white list size response “TCU_MNG_LE_READ_WHITELIST_ SIZE_RESP” is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes

ServiceID 0xD1
OpCode 0x05
Parameter Length 0x0000

Parameters: None.

1.12 TCU_MNG_LE_READ_WHITELIST_SIZE_RESP

This response is obtained when the request to read the total number of white list entries that can be stored in the Controller of a local device is processed. When the processing of the command “TCU_MNG_LE_READ _WHITELIST_SIZE_REQ**”** is completed, white list size read response is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte
White_List_Size	1 Byte

ServiceID 0xD1
OpCode 0x85
Parameter Length 0x0002

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized Command in Progress For other errors, refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	 0x00 0x86 0x81 0x82
White_List_Size	Total number of white list entries that can be stored in the Controller.(Note)	0x01-0xFF

(Note)
The value of White_List_Size =0x00 is reserved for future use.

1.13 TCU_MNG_LE_ADD_DEVICE_TO_WHITELIST_REQ

The command is used to add a device to the white list , which is stored in the Controller. When this command processing is completed, add device to the white list size response “TCU_MNG_LE_ADD_DEVICE_TO_ WHITELIST_ RESP” is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Address_Type	1 Byte
Address	6 Bytes

ServiceID 0xD1
OpCode 0x06
Parameter Length 0x0007

Parameters:

Parameters	Parameter Description	Value
Address_Type	Public Device Address Random Device Address	0x00 0x01
Address	Public Device Address or Random Device Address of the device to be added to the white list.(Note)	0xXXXXXXXXXXXX

(Note)
The value of Address_Type from 0x02-0xff is reserved for future use.

1.14 TCU_MNG_LE_ADD_DEVICE_TO_WHITELIST_RESP

This response is obtained when the request to add a device to the white list stored in the Controller. When the processing of the command “TCU_MNG_LE_ADD_DEVICE_TO_WHITELIST_ REQ**”** is completed, add device to the white list response is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte

ServiceID 0xD1
OpCode 0x86
Parameter Length 0x0001

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized Command in Progress For other errors, refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	 0x00 0x86 0x81 0x82

1.15 TCU_MNG_LE_DEL_WHITELIST_REQ

This command is used to clear the white list stored in the Controller and also to remove a single device from the white list stored in the Controller based on the parameters passed.

- Remove an entry from WhiteList: To remove an entry from the white list, the “Address_Type” and the “Address” parameters of the device to be removed are passed in the command.
- Clear WhiteList: The white list will be cleared (all entries in white list will be deleted) if no parameters are passed (i.e. Paremeter Length is only 2 bytes).

When this command processing is completed, white list response “TCU_MNG_LE_DEL_WHITELIST_RESP” is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Address_Type	1 Byte
Address	6 Bytes

ServiceID 0xD1
OpCode 0x07
Parameter Length 0x0000 or 0x0007

Parameters:

Parameters	Parameter Description	Value
Address_Type	Public Device Address Random Device Address	0x00 0x01
Address	Public Device Address or Random Device Address of the device to be removed from the white list.	0xXXXXXXXXXXXX

1.16 TCU_MNG_LE_DEL_WHITELIST_RESP

This response is obtained when the request to either clear the controller white list or to remove an entry from the controller whitelist is processed. When the processing of the command “TCU_MNG_LE_DEL_ WHITELIST_REQ” is completed, delete whitelist response is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte

ServiceID 0xD1
OpCode 0x87
Parameter Length 0x0001

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized Command in Progress For other errors, refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	 0x00 0x86 0x81 0x82

1.17 TCU_MNG_LE_START_ADVERTISE_REQ

This request when issued will carry below functionalities:

- Set the Advertising Parameters.
- Set the data used in Advertising Packets that have a data field.
- Set the data used in Scanning Packets that have a data field.
- Request the Controller to start advertising

When this command processing is completed, start advertise response “TCU_MNG_LE_ START_ ADVERTISE_RESP” is obtained.

(Note1)
TC35661 does not enable advertise automatically after LE disconnection,
even if advertise is enabled enaled before LE connection.
Advertise is always disabled after LE disconnection.
Host need to set advertise, if needed.

(Note2)
TC35661 recovery advertise setting after SPP connection and disconnection.
When advertise is enabled after SPP connection, TC35661 enable advertise automatically after SPP disconnection. Refer to MSC of SPP and LE simultaneous operation for discoverable.

(Note3)

1. The **Advertising_Type** is used to determine the packet type that is used for advertising when advertising is enabled.
   If the **Advertising_Type** is **“0x01”(ADV_DIRECT_IND)**
   i. The **Adv_Interval_Min** and **Adv_Interval_Max** parameters are not used and shall be ignored and hence can be set to zeros.
   ii. If directed advertising is performed, then the **Direct_Address_Type** and **Direct_Address** shall be valid, otherwise they shall be ignored by the Controller and not used and hence can be set to zeros.
2. The **Adv_Interval_Min** and **Adv_Interval_Max** shall not be set to less than **0x00A0(100ms)** if the **Advertising_Type** is set to **“0x02”(ADV_SCAN_IND)** or **“0x03”(ADV_NONCONN_IND).**
3. The **Advertising_Filter_Policy** parameter shall be ignored when directed advertising is enabled.
4. Adversing data and Scan Response data consists of a **significant part** and a **non-significant part.** The significant part contains a sequence of **AD structures.**

Each AD structure shall have a **Length field** of one octet, and a **Data field** of Length octets. The first octet of the Data field contains the **AD type field.**

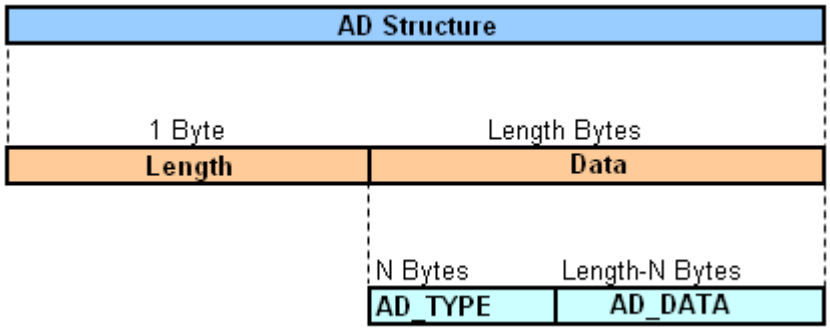

Figure: AD Structure Field

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Adv_Interval_Min	2 Bytes
Adv_Interval_Max	2 Bytes
Advertising_Type	1 Byte
Own_Address_Type	1 Byte
Direct_Address_Type	1 Byte
Direct_Address	6 Bytes
Adv_Channel_Map	1 Byte
Adv_Filter_Policy	1 Byte
Adv_Data_Length	1 Byte
Adv_Data	31 Bytes
Scan_Resp_Data_Len	1 Byte
Scan_Resp_Data	31 Bytes

ServiceID 0xD1
OpCode 0x08
Parameter Length 0x0052

Parameters:

Parameters	Parameter Description	Value
Adv_Interval_Min	Minimum advertising interval for non-directed advertising. Range: 0x0020 to 0x4000 Default: N = 0x0800 (1.28 second) Time = N * 0.625 msec Time Range: 20 ms to 10.24 sec **Advertising_Interval_Min shall be less than or equal to the Advertising_iInteraval_Max.** **Advertising_Interval_Min shall not be set to less than 0x00A0(100ms) if the Advertising_Type is set to 0x02 (DAV_SCAN_IND) or 0x03 (ADV_NONCONN_IND)**	0x0020 to 0x4000
Adv_Interval_Max	Maximum advertising interval for non-directed advertising. Range: 0x0020 to 0x4000 Default: N = 0x0800 (1.28 seconds) Time = N * 0.625 msec Time Range: 20 ms to 10.24 sec **Advertising_Interval_Max shall be greater than or equal to the Advertising_iInteraval_Min.** **Advertising_Interval_Max shall not be set to less than 0x00A0(100ms) if the Advertising_Type is set to 0x02 (DAV_SCAN_IND) or 0x03 (ADV_NONCONN_IND)**	0x0020 to 0x4000
Advertising_Type	Connectable undirected advertising (ADV_IND) (**default**) Connectable directed advertising (ADV_DIRECT_IND) Scannable undirected advertising (ADV_SCAN_IND) Non connectable undirected advertising (ADV_NONCONN_IND) Reserved for future use	0x00 0x01 0x02 0x03 0x04-0xFF
Own_Address_Type	Public Device Address Random Device Address Reserved for future use	0x00 0x01 0x02-0xFF
Direct_Address_Type	Public Device Address Random Device Address Reserved for future use	0x00 0x01 0x02-0xFF
Direct_Address	Public Device Address or Random Device Address of the device to be connected	0xXXXXXXXXXXXX
Adv_Channel_Map	It is a bit field that indicates the advertising channels that shall be used when transmitting advertising packets. At least one channel bit shall be set in the Adv_Channel_Map parameter.	For the details of values of this parameter refer core specification document “Core_V4.0.pdf”[Vol 2] Part E, Section 7.8.5

Adv_Filter_Policy	Allow Scan Request from Any, Allow Connect Request from Any (default). Allow Scan Request from White List Only, Allow Connect Request from Any. Allow Scan Request from Any, Allow Connect Request from White List Only. Allow Scan Request from White List Only, Allow Connect Request from White List Only. Reserved for future use.	0x00 0x01 0x02 0x03 0x04-0xFF
Adv_Data_Length	The number of significant octets in the Adv_Data.	0x00 – 0x1F
Adv_Data	31 octets of advertising data formatted as defined in “Core_V4.0.pdf” [Vol 3] Part C, Section 11. All octets zero (default).	
Scan_Resp_Data_Len	The number of significant octets in the Scan_Resp_Data.	0x00 – 0x1F
Scan_Resp_Data	31 octets of scan response data formatted as defined in “Core_V4.0.pdf” [Vol 3] Part C, Section 11. All octets zero (default).	

1.18 TCU_MNG_LE_START_ADVERTISE_RESP

This response is obtained when the request to start the advertising mode is processed.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte

ServiceID 0xD1
OpCode 0x88
Parameter Length 0x0001

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized Command in Progress Device Already Advertising For other errors, refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	 0x00 0x86 0x81 0x82 0xA4

1.19 TCU_MNG_LE_DISABLE_ADVERTISE_REQ

This request is issued to disable the advertising mode in the local device. When this command processing is started TCU_LE_ACCEPT is generated. After the completion of this command processing, **"**TCU_MNG_LE_DISABLE_ADVERTISE_RESP**"** is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes

ServiceID	0xD1
OpCode	0x09
Parameter Length	0x0000

1.20 TCU_MNG_LE_DISABLE_ADVERTISE_RESP

This response is obtained when the request to disable the advertising mode is processed

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte

ServiceID 0xD1
OpCode 0x89
Parameter Length 0x0001

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized Command in Progress For other errors, refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	 0x00 0x86 0x81 0x82

1.21 TCU_MNG_LE_CONNECTION_COMPLETE_EVENT

This response indicates to both of the Hosts (i.e. **to both Central and Preipheral Device**)entering the connection that connection has been established. When the processing of the command "TCU_MNG_LE_CREATE_CONNECTION_REQ**"** is completed and a new connection is established, the LE Connection Complete event is obtained.

(Note)
Upon the creation of the connection a Connection_Handle shall be assigned by the Controller, and passed to the Host in this event.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Bytes
Conn_Handle	2 Bytes
Role	1 Byte
Peer_Address_Type	1 Byte
Peer_Address	6 Bytes
Conn_Interval	2 Bytes
Conn_Latency	2 Bytes
Supervision_Timeout	2 Bytes
Master_Clock_Accuracy	1 Byte

ServiceID 0xD1
OpCode 0x4C
Parameter Length 0x0012

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success For more details refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	0x00
Conn_Handle	Connection_Handle to be used to identify a connection between two Bluetooth devices. The Connection_Handle is used as an identifier for transmitting and receiving data. Range: 0x0000-0x0EFF (0x0F00 - 0x0FFF Reserved for future use)	0x0000-0x0EFF
Role	Connection is master Connection is slave Reserved for future use	0x00 0x01 0x02-0xFF
Peer_Address_Type	Public Device Address Random Device Address Reserved for future use	0x00 0x01 0x02-0xFF
Peer_Address	Public Device Address or Random Device Address of the device to be connected	0xXXXXXXXXXXXX
Conn_Interval	Connection interval used on this connection. Range: 0x0006 to 0x0C80 Time = N * 1.25 msec Time Range: 7.5 msec to 4000 msec.	0x0006 to 0x0C80
Conn_Latency	Slave latency for the connection in number of connection events. Range: 0x0000 to 0x03E8 Reserved for future use 0x03E9 – 0xFFFF.	0x0000 to 0x03E8
Supervision_Timeout	Supervision timeout for the LE Link. Range: 0x000A to 0x0C80 Mandatory Range: 0x000A to 0x0C80 Time = N * 10 msec Time Range: 100 msec to 32 seconds Reserved for future use	N = 0x000A to 0x0C80 0x0000-0x0005 and 0x0C81-0xFFFF
Master_Clock_Accuracy	Clock accuracy in terms of ppm. For more details refer core specification document “Core_V4.0.pdf” [Vol 2] Part E, Section 7.7.65.1	0xXX

1.22 TCU_MNG_LE_CONNECTION_UPDATE_REQ

This command is used by the device in Slave Role to change the Link Layer connection parameters of a connection.

The sequence of command exchange during the execution phase :

i. When this command processing is started TCU_LE_ACCEPT is generated.
ii. Once the request is sent to the GAP Module of the Slave device,it is posted to L2CAP Module.
iii. Further,the L2CAP Connection Update Request is sent to the Master device.
iv. The L2CAP Module of the Master device receives the L2CAP Connection Update Request sent by the Slave device and posts the request to the GAP Module.
v. Once it receives the Connection Update Request from L2CAP Module,the GAP Module sends the TCU_ MNG_LE_UPDATE_CONN_REQ_EVENT to the Application.
vi. The User on the Master Device analyses the TCU_ MNG_LE_UPDATE_CONN_REQ_EVENT request event.As a response to this request event, it sends the TCU_MNG_LE_CON_UPDATE_ACCEPT_REQ to the GAP module.
vii. After receiving TCU_MNG_LE_CON_UPDATE_ACCEPT_REQ ,the TCU_MNG_LE_CON_UPDATE_ACCEPT_RESP is sent to the Application on the Master side.
viii. If the Connection Update Request was accepted, the L2CAP Connection Update Response is sent by the Master to the Slave device.Thus indicating that the Connection Update Request was accepted by the Master device.
ix. The GAP Module sends the Connection Update Request to the Controller and. Once the processing of the command is complete “TCU_MNG_LE_CONNECTION_UPDATE_EVENT**”** is obtained on both Master and Slave device.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Conn_Handle	2 Bytes
Conn_Int_Min	2 Bytes
Conn_Int_Max	2 Bytes
Conn_Latency	2 Bytes
Supervision_Timeout	2 Bytes
Min_CE_Length	2 Bytes
Max_CE_Length	2 Bytes

ServiceID: 0xD1
OpCode: 0x0E
Parameter Length: 0x000E

Parameters:

Parameters	Parameter Description	Value
Conn_Handle	Connection_Handle to be used to identify a connection. Range 0x0000-0x0EFF (0x0F00 – 0x0FFF Reserved for future use)	0x0000-0x0EFF
Conn_Int_Min	Minimum value for the connection event interval. This shall be less than or equal to Conn_Interval_Max. Range: 0x0006 to 0x0C80 Time = N * 1.25 msec Time Range: 7.5 msec to 4 seconds.	0x0006 to 0x0C80
Conn_Int_Max	Maximum value for the connection event interval. This shall be greater than or equal to Conn_Interval_Min. Range: 0x0006 to 0x0C80 Time = N * 1.25 msec Time Range: 7.5 msec to 4 seconds.	0x0006 to 0x0C80
Conn_Latency	Slave latency for the connection in number of connection events. Range: 0x0000 to 0x03E8 Reserved for future use 0x03E9 – 0xFFFF.	0x0000 to 0x03E8
Supervision_Timeout	Supervision timeout for the LE Link. Range: 0x000A to 0x0C80 Mandatory Range: 0x000A to 0x0C80 Time = N * 10 msec Time Range: 100 msec to 32 seconds	0x000A to 0x0C80

Min_CE_Length	Information parameter about the minimum length of connection needed for this LE connection. How this value is used is outside the scope of this specification. Range: 0x0000 – 0xFFFF Time = N * 0.625 msec.	0x0000 – 0xFFFF
Max_CE_Length	Information parameter about the maximum length of connection needed for this LE connection. How this value is used is outside the scope of this specification. Range: 0x0000 – 0xFFFF Time = N * 0.625 msec.	0x0000 – 0xFFFF

(Note)

The Min_CE_Length and Max_CE_Length are information parameters providing the Controller with a hint about the expected minimum and maximum length of the connection events. The Min_CE_Length shall be less than or equal th the Max_CE_Length.

1.23 TCU_MNG_LE_UPDATE_CONN_REQ_EVENT

This request event is received by the Master device when the Slave device sends the TCU_MNG_LE_CONNECTION_UPDATE_REQ request to change the Link Layer connection parameters of a connection.When the processing of the command.is completed, TCU_MNG_LE_CON_UPDATE_ACCEPT_REQ is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Conn_Handle	2 Bytes
Conn_Int_Min	2 Bytes
Conn_Int_Max	2 Bytes
Conn_Latency	2 Bytes
Supervision_Timeout	2 Bytes

ServiceID: 0xD1
OpCode: 0x52
Parameter Length: 0x000a

Parameters

Parameters	Parameter Description	Value
Conn_Handle	Connection_Handle to be used to identify a connection. Range 0x0000-0x0EFF (0x0F00 – 0x0FFF Reserved for future use)	0xXXXX
Conn_Int_Min	Minimum value for the connection event interval. This shall be less than or equal to Conn_Interval_Max. Range: 0x0006 to 0x0C80 Time = N * 1.25 msec Time Range: 7.5 msec to 4 seconds.	0x0006 to 0x0C80
Conn_Int_Max	Maximum value for the connection event interval. This shall be greater than or equal to Conn_Interval_Min. Range: 0x0006 to 0x0C80 Time = N * 1.25 msec Time Range: 7.5 msec to 4 seconds.	0x0006 to 0x0C80
Conn_Latency	Connection latency for this connection. Range: 0x0006 to 0x0C80 Time = N * 1.25 msec Time Range: 7.5 msec to 4000 msec.	0xXXXX
Supervision_Timeout	Supervision timeout for this connection. Range: 0x0006 to 0x000A Time = N * 10 msec Time Range: 100 msec to 32 msec.	0xXXXX

1.24 TCU_MNG_LE_CON_UPDATE_ACCEPT_REQ

This command is used to indicate that the Master Device has accepted or rejected the Connection Update Request sent by the Slave Device. When the processing of the command. is completed, “TCU_MNG_LE_ CON_UPDATE_ACCEPT_RESP” is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Conn_Handle	2 Bytes
Status	1 Byte

ServiceID 0xD1
OpCode 0x16
Parameter Length 0x0003

Parameters

Parameters	Parameter Description	Value
Status	ResultCode: Accepted Rejected	 0x00 0x01
Conn_Handle	Connection_Handle to be used to identify a connection. Range 0x0000-0x0EFF (0x0F00 – 0x0FFF Reserved for future use)	0xXXXX

1.25 TCU_MNG_LE_CON_UPDATE_ACCEPT_RESP

This command is sent as a response to “TCU_MNG_LE_CON_UPDATE_ACCEPT_REQ” request.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte
Conn_Handle	2 Bytes

ServiceID 0xD1
OpCode 0x51
Parameter Length 0x0003

Parameters

Parameters	Parameter Description	Value
Status	Success Parameter Error Device Not Initialised Command Under Process Device Role Slave	0x00 0x86 0x81 0x82 0xA0
Conn_Handle	Connection_Handle to be used to identify a connection. Range 0x0000-0x0EFF (0x0F00 – 0x0FFF Reserved for future use)	0xXXXX

1.26 TCU_MNG_LE_L2CAP_CONNECTION_UPDATE_RESP

This response is used to indicate that the Master Device has accepted the Connection Update Request obtained by the Slave Device.When the TCU_MNG_LE_CONNECTION_UPDATE_REQ is sent TCU_LE_ACCEPT is generated.Once the Master accepts this Connection Update request TCU_MNG_LE_ L2CAP_CONNECTION_UPDATE_RESP is sent to Slave Device.
After the updation of the parameters of the link, TCU_MNG_LE_CONNECTION_UPDATE_ EVENT is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Conn_Handle	2 Bytes
Status	1 Byte

ServiceID 0xD1
OpCode 0x50
Parameter Length 0x0004

Parameters

Parameters	Parameter Description	Value
Conn_Handle	Connection_Handle to be used to identify a connection. Range 0x0000-0x0EFF (0x0F00 – 0x0FFF Reserved for future use)	0xXXXX
Status	Accepted Rejected L2CAP timeout Disconnect Error	0x0000 0x0001 0xEEEE 0x0084

1.27 TCU_MNG_LE_CONNECTION_UPDATE_EVENT

This response is used to indicate that the Controller process to update the connection has completed. When the processing of the command. “TCU_MNG_LE_CONNECTION_UPDATE_REQ” is completed, LE connection update event is obtained.

(Note)
1. On a slave, if no connection parameters are updated, then this event shall not be issued.
2. On a master, this event shall be issued if the LE Connection Update command was sent.
3. This event can be issued autonomously by the Master’s Controller if it decides to change the connection interval based on the range of allowable connection intervals for that connection.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte
Conn_Handle	2 Bytes
Conn_Interval	2 Bytes
Conn_Latency	2 Bytes
Supervision_Timeout	2 Bytes

ServiceID	0xD1
OpCode	0x4E
Parameter Length	0x0009

Parameters

Parameters	Parameter Description	Value
Status	Result Code: Success For more details refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	0x00
Conn_Handle	Connection_Handle to be used to identify a connection. Range 0x0000-0x0EFF (0x0F00 – 0x0FFF Reserved for future use)	0xXXXX
Conn_Interval	Connection interval used on this connection. Range: 0x0006 to 0x0C80 Time = N * 1.25 msec Time Range: 7.5 msec to 4000 msec.	0xXXXX
Conn_Latency	Connection latency for this connection. Range: 0x0006 to 0x0C80 Time = N * 1.25 msec Time Range: 7.5 msec to 4000 msec.	0xXXXX
Supervision_Timeout	Supervision timeout for this connection. Range: 0x0006 to 0x000A Time = N * 10 msec Time Range: 100 msec to 32 msec.	0xXXXX

1.28 TCU_MNG_LE_SET_HOST_CHANNEL_CLASSIFICATION_REQ

This command allows the Host to specify a channel classification for data channels based on its “local information”. This classification persists until overwritten with a subsequent LE Set Host Channel Classification command or until the Controller is reset using the Reset command. When this command processing is completed, set host channel classification response “TCU_MNG_LE_SET_HOST_CHANNEL_ CLASSIFICATION_RESP” is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
LE_Channel_Map	5 Bytes

ServiceID 0xD1
OpCode 0x10
Parameter Length 0x0005

Parameters:

Parameters	Parameter Description	Value
LE_Channel_Map	This parameter contains 37 1-bit fields. The nth such field (in the range 0 to 36) contains the value for the link layer channel index n. Channel n is bad = 0. Channel n is unknown = 1. The most significant bits are reserved and shall be set to 0. At least one channel shall be marked as unknown.	0xXXXXXXXXXX

1.29 TCU_MNG_LE_SET_HOST_CHANNEL_CLASSIFICATION_RESP

This response is obtained when the request to set host channel classification is sent. When the processing of the command “TCU_MNG_LE_SET_HOST_CHANNEL_CLASSIFICATION_REQ**”** is completed, LE Set Host Channel Classification response is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte

ServiceID 0xD1
OpCode 0x90
Parameter Length 0x0001

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized Command in Progress For other errors,refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	 0x00 0x86 0x81 0x82

1.30 TCU_MNG_LE_READ_CHANNEL_MAP_REQ

This command is used to get the current Channel_Map for the specified Connection_Handle. When this command processing is completed, read channel map response “TCU_MNG_LE_READ_CHANNEL_MAP_ RESP” is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Conn_Handle	2 Bytes

ServiceID 0xD1
OpCode 0x11
Parameter Length 0x0002

Parameters:

Parameters	Parameter Description	Value
Conn_Handle	The Connection_Handle for the Connection for which the Channel_Map is to be read. Range 0x0000-0x0EFF (0x0F00 – 0x0FFF Reserved for future use)	0xXXXX

1.31 TCU_MNG_LE_READ_CHANNEL_MAP_RESP

This response is obtained when the request to read channel map is sent. When the processing of the command “TCU_MNG_LE_READ_CHANNEL_MAP_REQ**”** is completed, LE Read Channel Map response is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte
Conn_Handle	2 Bytes
LE_Channel_Map	5 Bytes

ServiceID 0xD1
OpCode 0x91
Parameter Length 0x0008

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized Command in Progress No Acl Link For other errors,refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	 0x00 0x86 0x81 0x82 0xA1
Conn_Handle	Connection_Handle to be used to identify a connection. Range 0x0000-0x0EFF (0x0F00 –0x0FFF Reserved for future use)	0xXXXX
LE_Channel_Map	This parameter contains 37 1-bit fields. The nth such field (in the range 0 to 36) contains the value for the link layer channel index n. Channel n is bad = 0. Channel n is unknown = 1. The most significant bits are reserved and shall be set to 0. At least one channel shall be marked as unknown.	0xXXXXXXXXXX

1.32 TCU_MNG_LE_READ_SUPPORTED_STATES_REQ

This command reads the states and state combinations that the link layer supports. When this command processing is completed, read supported states response “TCU_MNG_LE_READ_SUPPORTED_STATES_RESP” is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes

ServiceID 0xD1
OpCode 0x12
Parameter Length 0x0000

Parameters: None.

1.33 TCU_MNG_LE_READ_SUPPORTED_STATES_RESP

This response is obtained when the request to read supported states is sent. When the processing of the command LE Read Supported States request "TCU_MNG_LE_READ_SUPPORTED_STATES_REQ" is completed, LE Read Supported States response is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte
LE_States	8 Bytes

ServiceID 0xD1
OpCode 0x92
Parameter Length 0x0009

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized Command in Progress For other errors,refer core specification document "Core_V4.0.pdf" Part D, Error Codes on page 339 for a list of error codes and descriptions.	 0x00 0x86 0x81 0x82
LE_States	LE_States is an 8-octet bit field. If a bit is set to 1 then this state or state combination is supported by the Controller. Multiple bits in LE_States may be set to 1 to indicate support for multiple state and state combinations.	0x0000000000000000 For more details of the supported states, refer core specification document "Core_V4.0.pdf" [Vol 2] Part E, Section 7.8.27

1.34 TCU_MNG_LE_DISCONNECT_REQ

The Disconnection command is used by the local device to terminate an existing connection.When this command processing is started TCU_LE_ACCEPT is generated. After the completion of this command, **“**TCU_MNG_LE_DISCONNECT_EVENT**”** is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
BD_Address	6 Bytes

ServiceID 0xD1
OpCode 0x13
Parameter Length 0x0008

Parameters:

Parameters	Parameter Description	Value
BD_ADDR	Remote device BD Address	0xXXXXXXXXXXXX

1.35 TCU_MNG_LE_DISCONNECT_EVENT

This response indicates to both of the devices that connection has been terminated. When the processing of the command “TCU_MNG_LE_DISCONNECT_REQ” is completed, the LE Disconnect event is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Connection Handle	2 Bytes
Status	1 Bytes
Reason	1 Bytes

ServiceID 0xD1
OpCode 0x93
Parameter Length 0x0004

Parameters:

Parameters	Parameter Description	Value
Connection Handle	Connection Handle of the Remote Device DisConnected.	0x0000 to 0x0EFF (0x0F00 to 0x0FFF Reserved for future use)
Status	Result Code: Success For more details refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	0x00
Reason	The reason for terminating the connection. Success For more details refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	0x00

1.36 TCU_MNG_LE_READ_TX_POW_LEVEL_REQ

This command reads the values for the Transmit_Power_Level parameter for the specified Connection_Handle.After the completion of this command, **"**TCU_MNG_LE_READ_TX_POW_LEVEL_RESP**"** is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Connection_Handle	2 Bytes
Type	1 Byte

ServiceID 0xD1
OpCode 0x14
Parameter Length 0x0003

Parameters:

Parameters	Parameter Description	Value
Connection_Handle	Specifies which Connection_Handle's Transmit Power Level setting to read.	0x0000 to 0x0EFF (0x0F00 to 0x0FFF Reserved for future use)
Type	Read Current Transmit Power Level Read Maximum Transmit Power Level..	0x00 0x01

1.37 TCU_MNG_LE_READ_TX_POW_LEVEL_RESP

When the processing of the command "TCU_MNG_LE_READ_TX_POW_LEVEL_REQ**"** is completed, LE Read Transmit Power Level response is obtained specifying the Transmit Power Level.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte
Connection_Handle	2 Bytes
Transmit_Pow_Level	1 Byte

ServiceID 0xD1
OpCode 0x94
Parameter Length 0x0004

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized Command in Progress No Acl Link For other errors,refer core specification document "Core_V4.0.pdf" Part D, Error Codes on page 339 for a list of error codes and descriptions.	 0x00 0x86 0x81 0x82 0xA1
Connection_Handle	Specifies which Connection_Handle's Transmit Power Level setting to read.	0x0000 to 0x0EFF (0x0F00 to 0x0FFF Reserved for future use)
Transmit_Pow_Level	Indicates the transmit power level. Size: 1 Octet (signed integer) Units: dBm	N=0xXX Range: -30 <= N <= 20

1.38 TCU_MNG_LE_READ_RSSI_REQ

This command reads the Received Signal Strength Indication (RSSI) value from a Controller.After the completion of this command, **"**TCU_MNG_LE_READ_RSSI_RESP**"** is obtained.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Connection_Handle	2 Bytes

ServiceID 0xD1
OpCode 0x15
Parameter Length 0x0002

Parameters:

Parameters	Parameter Description	Value
Connection_Handle	The Handle for the connection for which the RSSI is to be read. The Handle is a Connection_Handle for a BR/EDR Controller and a Physical_Link_Handle for an AMP Controller.	0x0000 to 0x0EFF (0x0F00 to 0x0FFF Reserved for future use)

1.39 TCU_MNG_LE_READ_RSSI_RESP

When the processing of the command “TCU_MNG_LE_READ_RSSI_REQ**”** is completed, LE Read RSSI response is obtained specifying the RSSI Value.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte
Connection_Handle	2 Bytes
RSSI_Value	1 Byte

ServiceID 0xD1
OpCode 0x95
Parameter Length 0x0004

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized Command in Progress No Acl Link For other errors,refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	 0x00 0x86 0x81 0x82 0xA1
Connection_Handle	The Handle for the connection for which the RSSI has been read. The Handle is a Connection_Handle for a BR/EDR Controller and a Physical_Link_Handle for an AMP Controller	0x0000 to 0x0EFF (0x0F00 to 0x0FFF Reserved for future use)
RSSI_Value	Received Signal Strength Indication (RSSI) value. Units: dBm	N=0xXX Range: -127 to 20, 127 (signed integer)

1.40 TCU_MNG_LE_GEN_RESOLVABLE_BDADDR_REQ

This command requests the Host Device to Genarate Resolvable BD Address.The Host device generates the Resolvable BD Address using the Local IRK of the Device.After generating the Resolvable BD Address,the same will be sent to the application.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes

ServiceID 0xD1
OpCode 0x17
Parameter Length 0x0000

1.41 TCU_MNG_LE_GEN_RESOLVABLE_BDADDR_RESP

When the processing of the command “TCU_MNG_LE_GEN_RESOLVABLE_BDADDR_REQ**”** is completed, LE Generate Resolvable Address response is sent to the application.The response will have the Resolvable BD Address generated and the Local IRK as parametrs.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte
BD_Address	6 Bytes
Local_IRK	16 Bytes

ServiceID 0xD1
OpCode 0x54
Parameter Length 0x0001-0x0017

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized	 0x00 0x86 0x81
BD Address	Indicates the Address of the Remote Device connected.	0xXXXXXXXXXXXX
Local IRK	Identity Resolving Key of the Remote device	0xXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXX

1.42 TCU_MNG_LE_RESOLVE_BDADDR_REQ

This command requests the Host Device to Resolve the BD Address sent as a parameter in the request.Along with the Resolvable BD Address the list of available IRKs are sent to Resolve the BD Address.The Host device resolves the BD Address using all the available IRKs till the BD Address gets resolved.Once the BD Address is resolved,that particular IRK which resolved the BD Address is sent to the application.If the Host device fails to resolve the BD Address,no IRK is sent to the application.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
BD_Address	6 Bytes
Numbers of IRKs(N)	1 Byte
Remote_IRKs	N*16 Bytes

ServiceID 0xD1
OpCode 0x18
Parameter Length 0x0017-0x0067

Parameters:

Parameters	Parameter Description	Value
BD Address	Indicates the Address of the Remote Device connected.	0xXXXXXXXXXXXX
Number of IRKs(N)	Indicates the number of IRKs of the bonded devices to be used to resolve.	0xXX
Remote IRKs	The IRKs of the "N" previously Bonded Devices .	N*16 Bytes

1.43 TCU_MNG_LE_RESOLVE_BDADDR_RESP

When the processing of the command “TCU_MNG_LE_RESOLVE_BDADDR_REQ**”** is completed, LE Resolve BD Address Response is sent to the application. If the BD Address was resolved,along with the “Status” field the response will have the BD Address and the IRK which resolved this BD Address as parameters.If the BD Address was not resolved an error code will be sent in the “Statsu” field of the response to notify the same to the application.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte
BD_Address	6 Bytes
Local_IRK	16 Bytes

ServiceID 0xD1
OpCode 0x55
Parameter Length 0x0001-0x0017

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success Parameter Error Dev Not Initialized	 0x00 0x86 0x81
BD Address	Indicates the Address of the Remote Device connected.	0xXXXXXXXXXXXX
Local IRK	Identity Resolving Key of the Remote device	0xXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXX

1.44 TCU_MNG_LE_READ_REMOTE_VERSION_REQ

This command requests the controller details like version,manufacturer name and the sub version of the Remote Device. When this command processing is started TCU_LE_ACCEPT is generated. As a response, LE Read Remote Version Response “TCU_MNG_LE_READ_REMOTE_VERSION_RESP” is obtained.

(Note)
This command shall only be used when the local device’s role is Master.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Conn_Handle	2 Bytes

ServiceID 0xD1
OpCode 0x19
Parameter Length 0x0002

Parameters:

Parameters	Parameter Description	Value
Conn_Handle	Connection handle is the index for accessing the remote device.	0x0000 to 0x0EFF (0x0F00 to 0x0FFF Reserved for future use)

1.45 TCU_MNG_LE_READ_REMOTE_VERSION_RESPONSE

This response is used to indicate the completion of the process of the Controller obtaining the Controller details of the Remote Bluetooth device. After the processing of the command LE Read Remote Version request “TCU_MNG_LE_READ_REMOTE_VERSION_REQ**”**, LE Read Remote Version response is obtained.This response will have the Version,Manufacturer Name and the Sub Version details of the Remote Device.

Command Format:

ServiceID	1 Byte
OpCode	1 Byte
Parameter Length	2 Bytes
Status	1 Byte
Conn_Handle	2 Bytes
Version	1 Byte
Manufacturer_Name	2 Bytes
Sub_Version	2 Bytes

ServiceID 0xD1
OpCode 0x59
Parameter Length 0x0008

Parameters:

Parameters	Parameter Description	Value
Status	Result Code: Success For more details refer core specification document “Core_V4.0.pdf” Part D, Error Codes on page 339 for a list of error codes and descriptions.	0x00
Conn_Handle	Connection handle is the index for accessing the remote device.	0x0000 to 0x0EFF (0x0F00 to 0x0FFF Reserved for future use)
Version	Version of the Current LMP in the remote Controller.	0xXX
Manufacturer Name	Manufacturer Name of the remote Controller.	0xXXXX
Sub Version	Subversion of the LMP in the remote Controller	0xXXXX

2 HCI Command Error Code

Error Code	Name
0x00	Success
0x01	Unknown HCI Command
0x02	Unknown Connection Identifier
0x03	Hardware Failure
0x04	Page Timeout
0x05	Authentication Failure
0x06	PIN or Key Missing
0x07	Memory Capacity Exceeded
0x08	Connection Timeout
0x09	Connection Limit Exceeded
0x0A	Synchronous Connection Limit To A Device Exceeded
0x0B	ACL Connection Already Exists
0x0C	Command Disallowed
0x0D	Connection Rejected due to Limited Resources
0x0E	Connection Rejected due to Security Reasons
0x0F	Connection Rejected due to Unacceptable BD_ADDR
0x10	Connection Accept Timeout Exceeded
0x11	Unsupported Feature or Parameter Value
0x12	Invalid HCI Command Parameters
0x13	Remote User Terminated Connection
0x14	Remote Device Terminated Connection due to Low Resources
0x15	Remote Device Terminated Connection due to Power Off
0x16	Connection Terminated By Local Host
0x17	Repeated Attempts
0x18	Pairing Not Allowed
0x19	Unknown LMP PDU
0x1A	Unsupported Remote Feature / Unsupported LMP Feature
0x1B	SCO Offset Rejected
0x1C	SCO Interval Rejected
0x1D	SCO Air Mode Rejected
0x1E	Invalid LMP Parameters
0x1F	Unspecified Error
0x20	Unsupported LMP Parameter Value
0x21	Role Change Not Allowed
0x22	LMP Response Timeout / LL Response Timeout
0x23	LMP Error Transaction Collision
0x24	LMP PDU Not Allowed

0x25	Encryption Mode Not Acceptable
0x26	Link Key cannot be Changed
0x27	Requested QoS Not Supported
0x28	Instant Passed
0x29	Pairing With Unit Key Not Supported
0x2A	Different Transaction Collision
0x2B	Reserved
0x2C	QoS Unacceptable Parameter
0x2D	QoS Rejected
0x2E	Channel Classification Not Supported
0x2F	Insufficient Security
0x30	Parameter Out Of Mandatory Range
0x31	Reserved
0x32	Role Switch Pending
0x33	Reserved
0x34	Reserved Slot Violation
0x35	Role Switch Failed
0x36	Extended Inquiry Response Too Large
0x37	Secure Simple Pairing Not Supported By Host
0x38	Host busy – Pairing
0x39	Connection Rejected due to No Suitable Channel Found
0x3A	Controller Busy
0x3B	Unacceptable Connection Interval
0x3C	Directed Advertising Timeout
0x3D	Connection Terminated due to MIC Failure
0x3E	Connection Failed to be Established
0x3F	MAC Connection Failed

3 Maximum response time

3.1 Response time from command to response

Command	msec
TCU_MNG_LE_INIT_REQ	100
TCU_MNG_LE_READ_LOCAL_SUPPORTED_FEATURES_REQ	100
TCU_MNG_LE_SET_RAND_ADDRESS_REQ	100
TCU_MNG_LE_READ_WHITELIST_SIZE_REQ	100
TCU_MNG_LE_ADD_DEVICE_TO_WHITELIST_REQ	100
TCU_MNG_LE_DEL_WHITELIST_REQ	100
TCU_MNG_LE_START_ADVERTISE_REQ	100
TCU_MNG_LE_DISABLE_ADVERTISE_REQ	100
TCU_MNG_LE_CON_UPDATE_ACCEPT_REQ	100
TCU_MNG_LE_SET_HOST_CHANNEL_CLASSIFICATION_REQ	100
TCU_MNG_LE_READ_CHANNEL_MAP_REQ	100
TCU_MNG_LE_READ_SUPPORTED_STATES_REQ	100
TCU_MNG_LE_READ_TX_POW_LEVEL_REQ	100
TCU_MNG_LE_READ_RSSI_REQ	100

3.2 Response time from command to Event

Command (TCU_MNG_LE_***)	Description	Maximum respond time(s)
TCU_MNG_LE_ADV_REPORT_EVENT	Device Role is Master	30
TCU_MNG_LE_CREATE_CONNECTION_COMPLETE_EVENT	Device Role is Slave	30
TCU_MNG_LE_CONNECTION_UPDATE_REQ	Device Role is Master	5
TCU_MNG_LE_CONNECTION_UPDATE_EVENT	SUM	5
TCU_MNG_LE_CONNECTION_UPDATE_REQ	Device Role is Slave (Slave Device side)	5
TCU_MNG_LE_CONNECTION_UPDATE_EVENT	SUM	5
TCU_MNG_LE_UPDATE_CONN_REQ_EVENT	Device Role is Slave (Master Device side)	5
TCU_MNG_LE_CONNECTION_UPDATE_REQ		5
TCU_MNG_LE_CONNECTION_UPDATE_EVENT	SUM	5
TCU_MNG_LE_READ_REMOTE_USED_FEATURES_REQ	Device Role is Master	10
TCU_MNG_LE_READ_REMOTE_USED_FEATURES_EVENT	SUM	10
TCU_MNG_LE_DISCONNECT_REQ		60
TCU_MNG_LE_DISCONNECT_EVENT	SUM	60

3.3 Recommendation for HOST CPU

When TC35661 does not notify event within above time, TC35661 is under unusual operation.
Then HOST CPU should reset TC35661 with HW-RESET. It is recommended for HOST to consider extra time from above time.

4 Appendex

Acronyms and Definitions

Listed below are the acronyms used in this document:

SL. No	ACRONYM	DEFINITION
1	ADV	Advertisement
2	DEL	Delete
3	MNG	Manage
4	MSC	Message Sequence Chart
5	RAND	Random
6	REQ	Request
7	RESP	Response
8	RSSI	Received Signal Strength Indication

End of document.