Bluetooth™ Qualification Process

- Bluetooth Wireless Technology made simple, efficient and reliable -

Document history

Revision	Date	Description
1.0	06/11/01	First release
1.1	08/30/01	§1.3.1: add demo/development tools §3 more developed (new §3.1, new §3.2.2) §4 more developed (new §4.1 + more details in others §) §3.2: modifications §3.3: BQB/BQTF update table + Emergence of BQTF §5.2: more on UnPlugFest
1.2	08/30/01	Add reference table §3.1 update of table
1.3	01/04/01	§3.3 BQB/BQTF new market study §3.2 quotations
1.4	01/07/01	Edition for public release

References

All of the following documents are available at http://www.bluetooth.com

	Name of the document	Revision	File name
[1]	Specification of the Bluetooth System - Core	v1.1 02/22/2001	Bluetooth_11_Specifications_Book.pdf
[2]	Test Case Reference List	07/05/2001	Test_TCRL-1_1-5Jul01.xls
[3]	Declaration of Compliance	03/29/2001	DoC_1-B-131-1_7.pdf
[4]	ICS/IXIT pro forma	July 2000	Test_ICS_Introduction_0_9.pdf
[5]	RF test specification	0.91	Test_Spec_PartA2_0_91.pdf
[6]	Baseband test specification	0.91	Test_Spec_PartB_BB_0_91.pdf
[7]	Blue Unit test specification	1.1 03/05/2000	Blue_Unit_Test_Cases_1_1_20_B_196-1_1_5Mar01.pdf

Legal notices

For selected STMicroelectronics sales offices fax: France +33 1 47407910; Germany +49 89 4605454; Italy +39 02 8250449; Japan +81 3 57838216; Singapore +65 4820240; Sweden +46 8 7504950; Switzerland +41 22 9292900; United Kingdom and Eire +44 1628 890391; USA +1 781 861 2678

Index

1 - Introduction

The goal of this paper is to detail the Bluetooth qualification process and to explain ST situation in this context. It is based on theory, but also gives useful information to help customers in their decisions. Regulatory requirements and governmental type approval requirements are outside the scope of this document.

1.1 General Overview

1.1.1 Main contacts

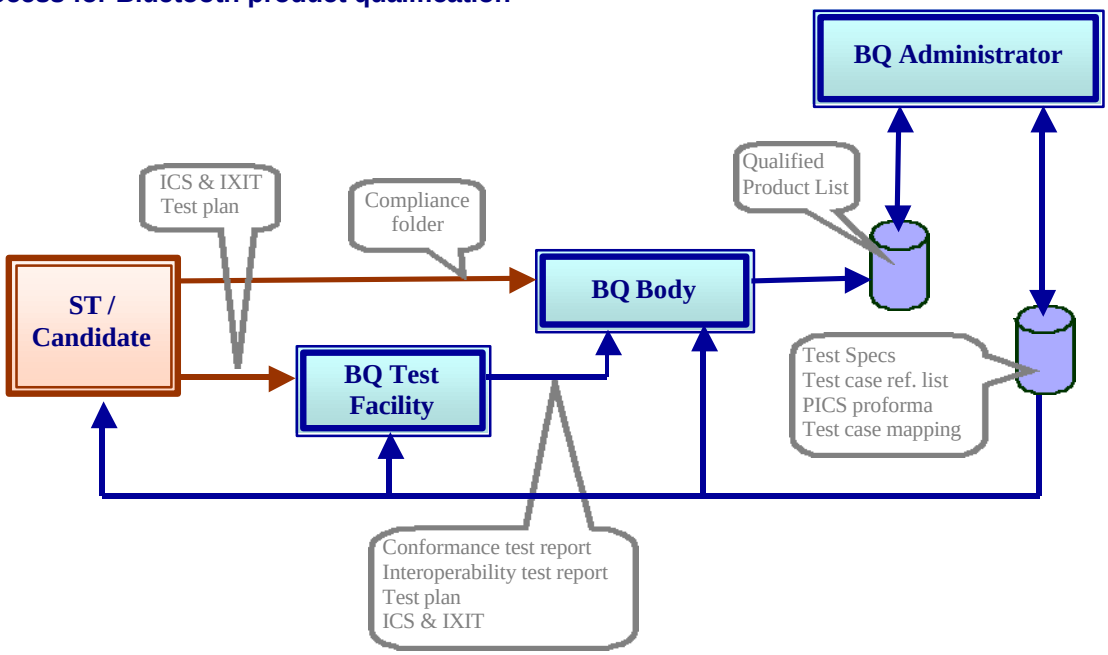
The BQB (a person) and the BQTF (a company) are the main contacts you will have with.

- **Bluetooth Qualification Body** (BQB)
  A person authorized to provide services to ST seeking Bluetooth product qualification. He is responsible for checking declarations and documents against requirements, reviewing product test reports, and listing products on the official database of Bluetooth qualified products.

- **Bluetooth Qualification Test Facility** (BQTF)
  A test facility that is accredited to test Bluetooth products.

- **Bluetooth Qualification Administrator** (BQA)
  Responsible for administering the Bluetooth Qualification Program.

1.1.2 Process for Bluetooth product qualification



ST or the candidate first has to select a BQB and then define together the test plan for the product features. The tests will be run either by ST or a BQTF. ST submits the compliance folder to the BQB. The BQB checks the reports and documents to verify if the product is Bluetooth compliant. If passed, the product is listed in the Bluetooth Qualified Product list.

1.2 - Bluetooth tests

It is critical to understand the test process (their hierarchy, description, classification).

1.2.1 Test specification document

Performed tests needs to follow the test specification document available on the Bluetooth web site (http://www.bluetooth.org). At the end of this document, a test case mapping table gives you all related tests to execute depending of the supported capabilities of the product described in the ICS/IXIT document. Each test specification document is tied up to a particular layer for conformance or interoperability requirement.

1.2.2 Test Case Reference List document

The **Test Case Reference List** - TCRL [2] is a summary list of all tests (tests described in test specification documents). It specifies conformance/interoperability test cases and identifies the category of each test case:

- **Category A:** The test case is mandatory and has to be performed at a recognized BQTF.
- **Category B:** The test case has to be performed with/without a BQTF. A declaration with evidence is required.
- **Category C:** The test case has to be performed but no evidence is required to be submitted to the BQB.
- **Category D:** A preliminary test case with no official qualification value. The purpose of this status is to inform any manufacturer about an upcoming test case.

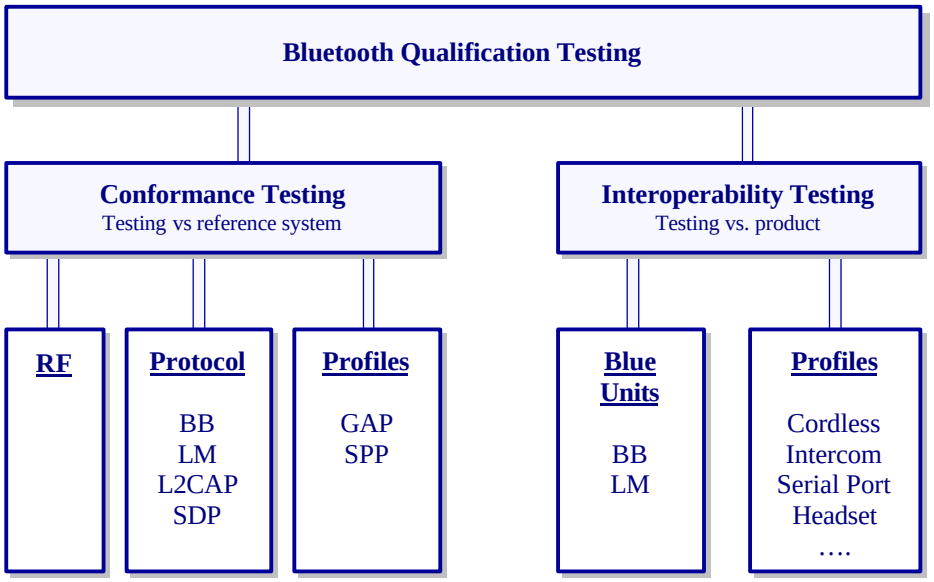
For each test, an active date gives the date when the test is available and is mandatory to be performed (this date is important when creating tests or changing the category of the test or modifying the test content).

A TCRL addendum file gives a list of test case errata. These test cases errata require immediate attention, can't wait the quarterly release TCRL document and underline test case problem or error. It shall never be used to increase the test case number.

1.2.3 Test case waiver

Bluetooth specification and tests are not finalized, they are still being written. Developers may faced up features that are not described. So they may deviate from the final specification. In order to allow developers to proceed, some waivers are granted by the SIG. Waivers might be described in the Declaration of Compliance document.

1.2.4 Type of Testing



Some documents deal with conformance tests other with interoperability tests.
Conformance testing proves that the product follows all Bluetooth System Specifications using a reference test system.
Interoperability testing determines if the product supports another product with the same profile. For lower layer, Blue Units products are used. DPITs (Designated Profile Interoperability Testers) are ones testing the upper layers and the profiles.

1.2.5 Way to test

- **Requirements for Radio + hardware part of the Baseband**

These 2 layers represent the hardware part of a Bluetooth product. Tests are important for conformance testing but also for regulatory approval. Tests are done between a tester and the device under test (DUT). The DUT is in a special mode, the test mode and not in normal mode (the mode where the user is always in). Tester and DUT form a piconet where the tester acts as a master and has full control over the test procedure. The DUT acts as slave. The control is done via the air interface using LMP commands and the DUT ignore commands not related to test mode functions. Some additional measurement equipment (like spectrum analyzer) may be useful.
More details in [1]: Part C for LMP commands (Test mode chapter), Part I:1 for test scenarios.

- **Protocol requirements**

Protocol test (conformance testing) allows testing of the lower layers. A standardized control interface is defined (TCI) to avoid the tester to adapt himself to each configuration of the Implementation Under Test (IUT). ST has to supply the IUT and the adapter (HW, SW or FW) that allows the IUT to communicate via the TCI with the tester.
The Test Control Interface is used when verifying conformance of the:

- Baseband layer (the software part),
- Link Manager Protocol (LMP)
- Logical Link Control and Adaptation Protocol (L2CAP),
- And if exists, the Host Control Interface (HCI).

Both the air interface of the IUT and the TCI are required for this type of verification.
More detail in [1]: Part I:3 (Test Control Interface part).

- **Profile requirements**

Testing product against a minimum of 2 DPITs proves its interoperability. DPITs implement one or more Bluetooth profiles and must be listed in the SIG web qualified product. As of today, there is no DPIT available, only Pre-PIT (first of the 3 stage process before being recognized by the BQRB, Bluetooth Qualification Review Board, as DPIT). For updated information, go on http://www.bluetooth.org (qualified products/Profile Interop Testers).

1.3 Device qualification

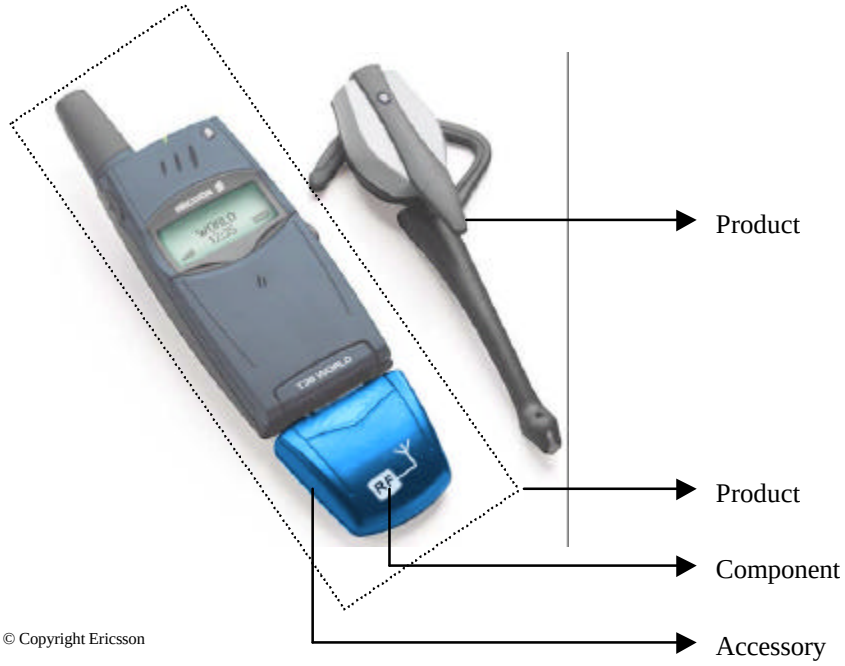
This section describes the typical product qualification procedure. But the process shall be different, depending on the type of device to qualify.

1.3.1 Type of device

- **Bluetooth products**
  A Bluetooth product is a stand-alone product. But also, it could be built of Bluetooth accessory or component. In these cases, it may not perform all the tests (see accessory and component definition).

- **Bluetooth accessory products**
  A Bluetooth accessory product is defined as "A product marketed to the end user, containing at least the hardware for the Bluetooth radio and baseband, yet not being a stand-alone Bluetooth product. After being installed in a host system, the product acts like a complete Bluetooth product"
  Examples: PC-Cards, serial port dongles, USB dongles.
  Accessory qualification is done like product qualification and manufacturers who use it on their own product don't have to do again the covered functionality tests of the accessory.

- **Bluetooth components**
  A Bluetooth component is defined as "a component product designed and marketed for the enabling of a complete Bluetooth product, which component product containing at least a subset of an existing Bluetooth Profile, yet not being able to function as a complete Bluetooth product".
  Examples: a Bluetooth component might be a complete module designed for integration on a PC board, or an integrated circuit implementing all Bluetooth baseband and protocol functions.



Note: The development tool and demo platform are considered as device type. They are so special that they are out of the scope of this document.

1.3.2 Device qualification

- **Product**
  Manufacturers have to demonstrate their product compliance. They have to follow the complete Bluetooth qualification. If the product integrates Bluetooth accessory or component, it may not perform all the tests. It's the responsibility of the BQB to decide which tests must be repeated.

- **Accessory**
  Accessories, like products, also have to pass the complete Bluetooth qualification process.

- **Component**
  Component manufacturers have the choice either to qualify their device or not. It depends on their wish to minimize their OEM customer's qualification testing requirement. And it's not mandatory as long as the end-user product is qualified. The tests are selected according the device-covered features. Components have to be considered as pre-qualified with a limited Bluetooth license. Tests are considered as pre-tests.

Note: In the rest of this document, the term "product" is to be considered in a generic way without doing any distinction between product, accessory or component.

2 – Qualification process

Now that you have in mind the main information, you need to go through the qualification process, let's see the steps to follow for qualification process.

2.1 Mandatory before any qualification

- Become an early adopter (allows you to have access to restricted SIG web site area on http://www.bluetooth.org). If it's not the case, you can find the adopter's agreement in the Bluetooth web site (http://www.bluetooth.com)
- If you want your own assigned numbers, submit them to the BQA (contact him at BQA@Bluetooth.com). For more information on the assigned numbers, go to http://www.bluetooth.org/assigned-numbers. The Bluetooth registration authority is the central co-coordinator for the assignment of unique parameter values for Bluetooth. It maintains a registry of the currently assigned values. It's under the responsibility of the BQA.
- Before going to qualification, you have to choose a way to perform category B tests (by your own means or by the BQTF means).
- Finally, before going to qualification, you need to supply 2 samples of your product (one for back-up). These samples will not be final product but test samples.

2.2 Choose your BQB

To help you in that decision, there is at the end of this document (§3.3) a table with some BQB/BQTF companies and useful information about them.

2.3 Choose how to test

You have two ways to perform the tests.
You can perform them in house (invest in tester equipment and elaborate test bench), or you can contact BQTF, which offers its services.

2.4 Documents

2.4.1 List of documents to provide

The goal is to understand which documents you need to work with, how to fill them and who ask for them. This list is not exhaustive as some BQB / BQTF might require more documentation. They may require reasonable additional information to determine whether a product meets all requirements of the Bluetooth Qualification Program.

Some others come from the SIG, they are reference documents: the TCRL (Test Case Reference List) and the Test Case Mapping Table. They are not described here but in section "Bluetooth tests".

Others don't need to be described because they are filled out by BQB or BQA (Qualified Product Notice).

- **Non-Disclosure Agreement document**

  Because your product is confidential, it's on your responsibility to establish non-disclosure agreements and contracts with the BQB, BQTF and BQA, if necessary.

- **Product description document**

  It may contain:
  Descriptive name,
  Exact model number,
  Hardware version number,
  Software version number,
  Bluetooth profiles supported,
  And also technical informations like:
  Preliminary user manual,
  Functional block diagram and technical description.

- **ICS/IXIT document**

  ICS (Implementation Conformance Statement) is a detailed list of questions reporting to the Bluetooth Core/profile Specification document. It allows to have a statement of capabilities and profiles, which has been implemented in the device.
  There are 3 sorts of ICS document:
  - The ICS, a summary describing the supported Bluetooth features
  - The PICS, for protocol description
  - The Profile ICS, for profile description.

  IXIT (Implementation Extra Information for Testing) provides information related to the Implementation Under Test (IUT) and its testing environment, which is required to be able to run the appropriate test suite (e.g. addressing information, upper tester interface).

  When required, the IXIT is included in the ICS document (for RF/BB/LM/L2CAP). It's why we use the name of ICS/IXIT document.

  With the BQB's help, you have to fill:
  - The ICS
  - And a PICS/Profile ICS per protocol or profile implemented in the device.

  Don't hesitate to work with the BQB because ICS & IXIT are the key documents defining the test suites to execute. A file [4] explains the way to fill ICS/IXIT documents.

- **Declaration of Compliance** [3]

  This document identifies the hardware and software version number of the product to be listed and also the version of the Bluetooth specification implemented.

- **Optional: Qualification documents**

  If you integrate components developed by another company (pre-qualified Bluetooth module), you probably have a final product where some parts have already been tested. So you have to provide qualification documents about this integrated component to avoid a complete set of test execution.

- **Test plan**

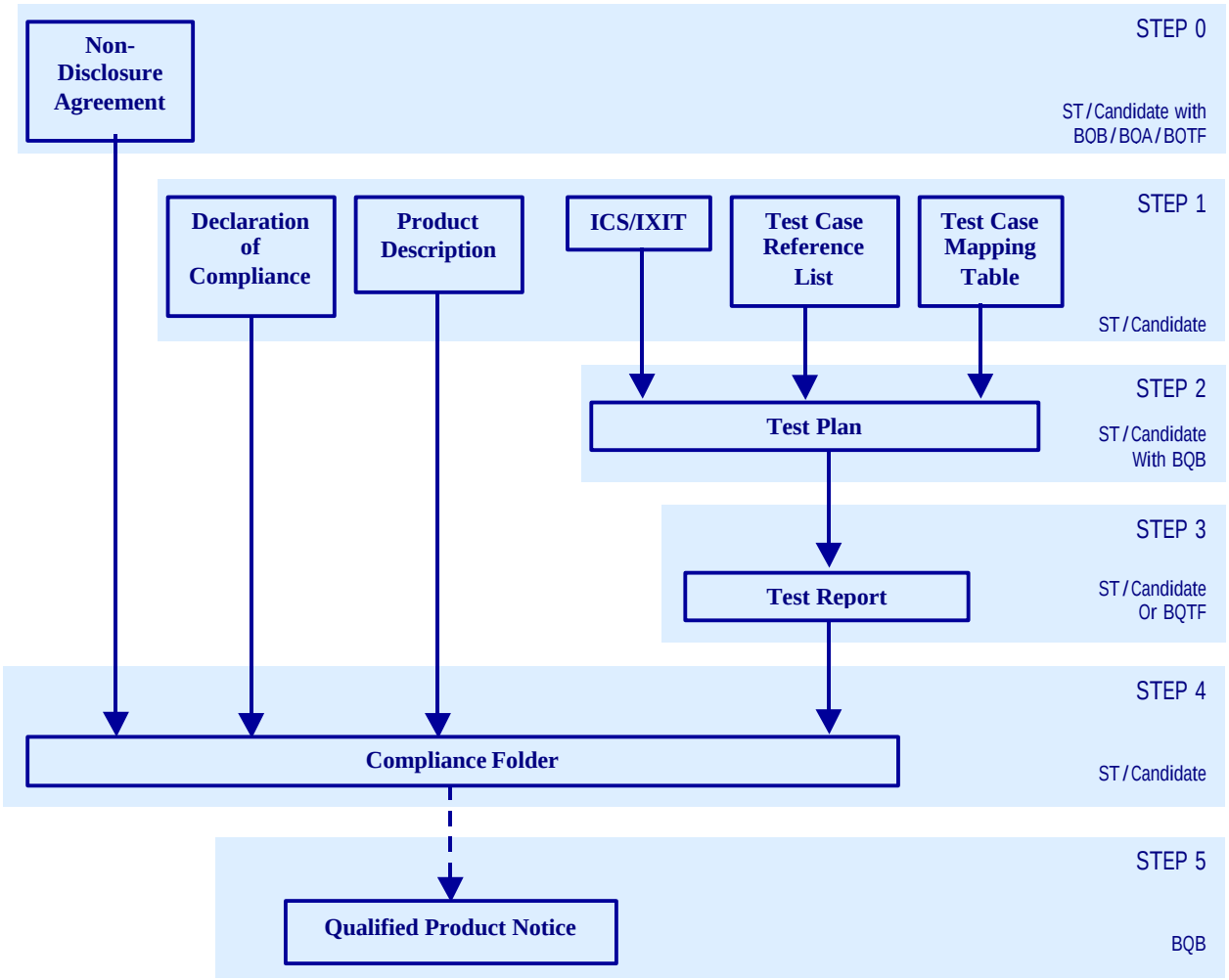
  The test plan is defined both with the BQB. It is based on 3 documents:
  - ICS / IXIT documents [5],
  - Test Case Reference List [2] (see §1.2: Bluetooth tests),
  - Test Case Mapping Table (see §1.2: Bluetooth tests).

  The test plan defines the number of category A test cases under the responsibility of the BQTF. And category B tests cases to execute by ST/Partner or by the BQTF (following your own decision).

- **Test Report**

Affects category ‘A’ and ‘B’ test cases. The report demonstrates the product compliance with Bluetooth specifications. Content described in ANNEX A.

2.4.2 Process flow



2.5 Product listing

The BQB checks all documents and reports. If compliance and interoperability are demonstrated, the BQB issues a Qualified Product notice, lists the product on the Bluetooth Qualified Product List and made it available on the web (keeping confidential information out of view). ST or the candidate will pay fee to the BQB for the BQA registration.

3 - Today

3.1 Bluetooth standard version

Current Specification is “1.1 Bluetooth standard version”.
Previous revision was v1.0B, replaced on March 25th 2001.
Difference between these 2 versions is out of the scope of this document. For more information, please refer to the errata available on the Bluetooth members’ web (http://www.bluetooth.org).

If you want to enter in qualification, don’t forget to verify the version of your documents.

You can find below a description of the test number (sorted by layer) required for the 1.1 Bluetooth specification (as of January 2002):

			Number of tests in category			
Document name	Release date	Version	A	B	C	D
Conformance Test Specifications						
RF Provisional Part A-E	2 July 2001	0.91	-	16	-	-
RF Part A	2 July 2001	0.91	-	16	-	-
Baseband Part B	2 July 2001	0.91	-	58	7	15
Link Manager Part C	2 July 2001	0.91	-	102	1	1
L2CAP Part D	2 July 2001	0.81	-	16	-	15
SDP Part E	28 Aug 2001	0.92	-	52	-	-
Generic Access Profile Part K:1	2 July 2001	0.91	-	23	-	-
Serial Port Profile Part K:5	2 July 2001	0.91	-	31	-	-
Network Encapsulation Protocol (BNEP)	28 Aug 2001	0.95a	-	-	-	-
Profile Interoperability Test Specifications						
Service Discovery Application Profile Part K:2	2 July 2001	0.1	-	-	-	17
Cordless Telephony Part K:3	2 July 2001	1.1	-	36	-	-
Intercom Part K:4	2 July 2001	1.1	-	19	-	-
Headset Part K:6	2 July 2001	1.1	-	17	-	-
Dial-Up Networking Part K:7	2 July 2001	1.1	-	17	-	-
FAX Part K:8	2 July 2001	1.1	-	13	-	-
LAN Access Part K:9	2 July 2001	1.1	-	10	-	-
Object Push Part K:11	2 July 2001	1.1	-	29	-	-
File Transfer Profile Part K:12	2 July 2001	1.1	-	31	-	-
Synchronization Profile Part K:13	2 July 2001	1.1	-	23	-	-
ESDP for UPnP	31 Jan 2001	0.90a	-	-	-	-
Personal Area Network Profile	28 Aug 2001	0.95a	-	-	-	-

3.2 Quotation

This is only estimation. Quotation is difficult to define because of numerous parameters:
- Number of layer to test,
- Features supported by the product (define the number of test to cancel),
- Decision on where to test (in-house or on a BQTF),
- Quality of the product validation during the development phase (define the number of test session),
- Number of test in the specification is growing up (because Bluetooth is a young standard and not finalized).

The purpose is to give you an idea on the time and cost expense involved in this process.

3.2.1 Cost expense

We estimate that:

- RF certification is in the range of 30.000€
  55 hours testing, 15 hours in an anechoic chamber,
  10 hours for BQB services, Project handling, Listing fee

- Host Stack certification is in the range of 30 000€
  For GAP/SDP/SPP: 46 hours testing, 40 hours for BQB services,
  Project handling, Listing fee

Note: Between June 2001 and November 2001, RF hour count of tests increases from 40h to 55h minimum. This example illustrates that those figures are subject to changes because of the tests implementation.
Quotations on protocol/profile have not been updated since June 2001.

3.2.2 Time expense

If everything is running perfect (tests passed during the first test session),
If all the tests are perform in a BQTF (BQB has not to check reports written by their customer),
To be on the safe side, you should consider:
- 4 man days / layer for the test (except for RF, which needs 5 days),
- 1 man week for the BQB approval
- 1 man week for the test report writing / product listed in the SIG web site.

3.3 Choose your BQB / BQTF

For the moment, there are 5 compagnies recognized as BQTF on RF part (no BQTF recognized for other layers):

- Nokia,
- 7Layers,
- Cetecom,
- Hyper Corp,
- Tayo Yuden.

Other companies are only test houses.

Currently, it is not mandatory to perform your tests in test house or in BQTF because there is no category A tests.

On January 4th 2002, there were 29 BQBs. In order to get an updated BQB name list, you should refer to http://www.bluetooth.org (on the Qualification product item). Some BQBs are working in companies like Nokia, Sony, Motorola, Toshiba… Some others are working in test house / BQTF.

You will find below a summary of these test houses / BQTFs and the number of 1.1 products that they qualified (without counting the demo/development tool), starting from Mar. 25th to Nov. 1st 2001.

Company	# of **BQBs**	**BQB's name**	**Country Site**	**1.1 Qualified Product**
TÜV Rheinland	8	T. Berns, H-M Chen, U. Halstenbach, U-C Song J. Hayda, K. Jauernik, R. Meiranke, S. Wald	Germany, Taiwan, Japan, Korea Hong Kong	18
7 Layers	2	James Cunningham, Andreas Grünwaldt,	United States, Germany,	90
BABT	3	Leslie Rowland, Harry Ward Thomas Weise	United States, United Kingdom Germany	5
CETECOM	5	J.B. Polglase, Michael Klos, Lothar Schmidt, Nikolaus Wahl, L.Eriksson	Spain, Germany, United States	61
ETS Dr. Genz GmbH	1	Roland Becker	Germany	24
Hyper Corp	1	Kurt Fischer	United States	35
ETL SEMKO	1	Lars-Olov Johansson	Sweden	6
Radio Frequency Investigation	1	Robert Graham	United Kingdom	0
Telelaboratoriet	1	Sven Lundbech	Denmark	1

4 - ST product qualification

For some of the ST products, which don't integrate pre-tested components, the usual Bluetooth qualification process must be applied: all the tests have to be performed.

4.1 Product changes

4.1.1 Definition

(Rules for product changes are also available for pre-tested components)

Original Bluetooth Qualification of a product relates to a specific software and/or hardware version as originally noted in the qualified product list and in the DoC related to the product. Software or hardware changes relative to this original qualification ("Change") should be dealt with according to the following guidelines. It is the responsibility of the Member to maintain compliance to the Bluetooth System Specifications and Qualification Program as declared in the signed Declaration of Compliance.

For example, a personal computer (PC) with a different size hard disk but otherwise identical to the qualified product may be recognized as essentially the same qualified Bluetooth product and its variants will fall into class I (see below). Similarly, a mobile phone might be marketed in a variety of configurations, with different screens, menu structures or included accessories, with no material impact on Bluetooth functionality or performance, these cases also fall into class I (see below).

Typically, changes found in the Bluetooth antenna, Bluetooth component, Bluetooth driver and Bluetooth firmware within the product will be within class II or class III.

Product bug fixes in the Compliant Portion fall in to class II product changes. The qualification program should not impede the responsiveness, or deter a software manufacture from releasing bug fixes for their code.

4.1.2 Guidelines for handling of product changes:

Any change related to qualified product falls into three classes relative to the potential impact of the change and amount of re-qualification required.

Class I:
A class I change is a software or hardware change that does not affect the Compliant Portion, and has no potential impact on Bluetooth functionality or performance.
Necessary documentation is limited to changes in product identification (e.g. version numbers or description).

Class II:
A class II change is a software or hardware change that can be shown by inspection or by design analysis to have no negative material impact on Bluetooth functionality or performance.
Necessary documentation shall be filed by the Member with the BQB and shall include change description, and sufficient technical details to support the Member's claim that the change has no material impact on Bluetooth functionality. The BQB may request additional information within ten (10) days to determine if any re-testing is required.

Class III:
A class III change is a software or hardware change that may impact Bluetooth functionality. This includes changes to protocol software, changes to active components which process the Bluetooth signal, and Bluetooth functionality enhancement (for example when an additional profile is added to the product).
Necessary documentation shall be reviewed by a BQB to decide the amount of re-testing required. The Member shall provide the BQB with detailed design change information (including relevant hardware layout, component changes and software changes and estimated impact). The Member may add a proposal on the scope of required re-testing. The BQB will identify any Bluetooth test requirements, which may be impacted by the changes, and the Member will submit test reports for the new product version according to the BQB assessment report. The BQB may request additional information as necessary to determine what tests might be affected by the planned change.

4.1.3 Qualified Product Notice

The Qualified Product Notice is the first document you should refer to for the tests to take again if needed. You can find this document easily on the Bluetooth web site (http://www.bluetooth.org), on the qualified product list. It contains:

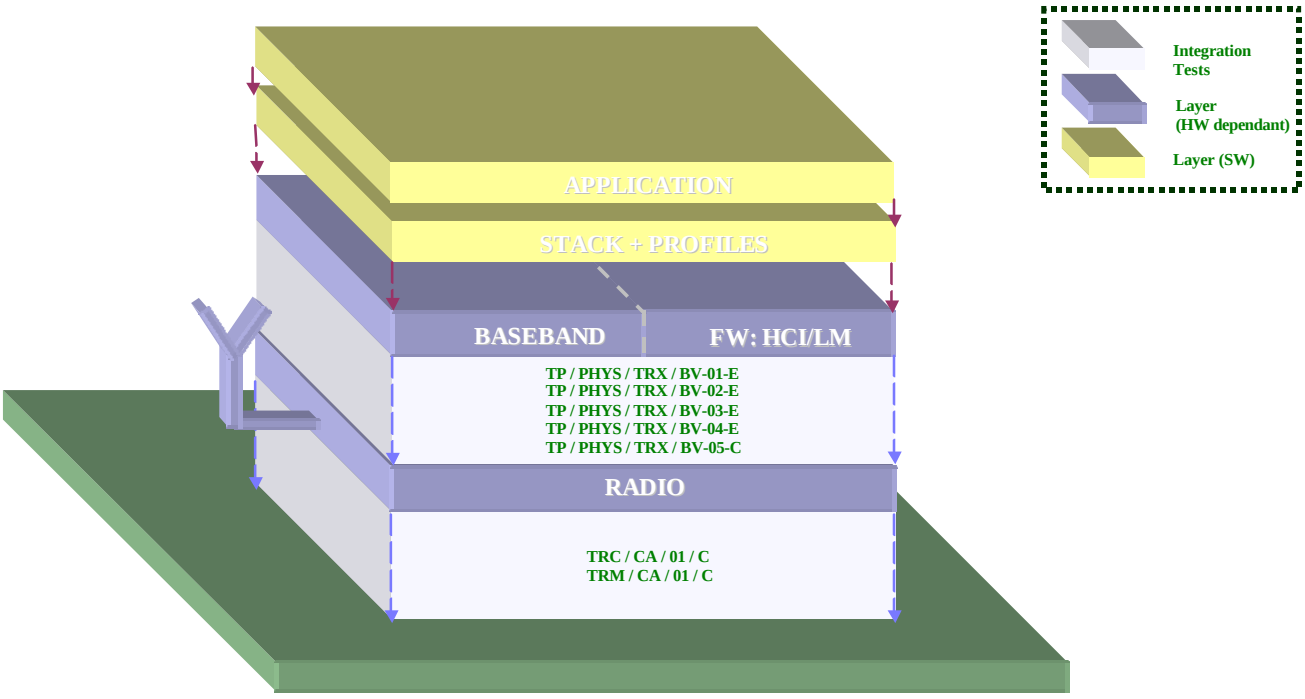
- A list of tests passed per layer,
- Supported features,
- Description of tests (if needed) to perform again if the component is integrated in an end-user product.

These tests are tests of class II or III, established with the agreement of the BQB.
Sometimes, instructions for customer to be under Class I are given in the Reference Design Application document. If available, you can download it on the same place you find the Qualified Product Notice.

Sometimes, you can find guidelines in the reference design application notice. It allows you to restrict your modifications to class I, and therefore avoid additional tests that could belong to class II or III.

4.2 Pre-tested components

If you follow advises from the manufacturer of the pre-tested component you use, tests you have to perform again can be sum up like this:



4.3 Radio integration

For end products, radiated spurious emissions have to be renewed and for antennas with more than +1.9 dBi antenna gain RF power out have to be rechecked.

Test to repeat for spurious emissions:
TRC/CA/01/C (Out-of-Band Spurious Emissions)

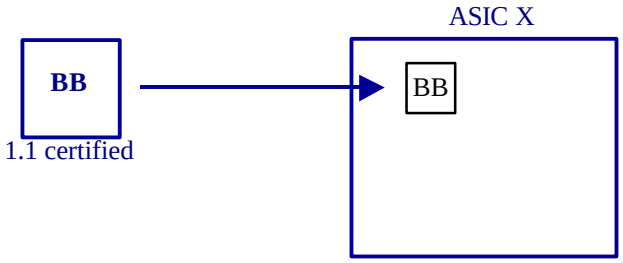
Test to repeat for antennas > 1.9dBi:
TRM/CA/01/C (Output Power)

4.4 Baseband/HCI-LM integration

4.4.1 Presentation

In most cases, some layers are interdependent: you cannot find a baseband without its LM.
This is why we associate these two layers on a single qualification and then, on a “one chip” to integrate.

For BB/HCI-LM which are designed for implementation into ASICs or FPGAs:



Tests to repeat are under extreme conditions (extreme temperatures, extreme power source voltages defined in RF tests specification chapter 6.4) and some of them also cover timing issues that might be affected by the hardware.

Here is the **minimum list of these tests** (find the whole description in [6]).

4.4.2 Tests to be performed under extreme conditions:

These include extreme temperatures conditions and extreme power source voltages conditions (see details in [5] §6.4).

- TP/PHYS/TRX/BV-01-E (Master Tx timing)
  Goal: Verify that the IUT as master keeps an exact timing interval of Mx1250 µs during the existence of a piconet

- TP/PHYS/TRX/BV-05-C (Symbol rate)
  Goal: Verify that the IUT uses the correct symbol rate of 1 Ms/s ±20 ppm (the IUT is in test mode TX test)

4.4.3 Tests covering timing issues:

- TP/PHYS/TRX/BV-01-E (Master Tx timing) -> see explanations above
- TP/PHYS/TRX/BV-05-C (Symbol rate) -> see explanations above

- TP/PHYS/TRX/BV-02-E (Slave Tx timing)
  Goal: Verify that the slave's transmission starts N x 625µs after its RX burst (only for IUTs acting as slave)

- TP/PHYS/TRX/BV-03-E (Master Rx/ Tx timing)
  Goal: Verify that the master's RX timing is based on its TX timing with a shift of N x 625 µs. Verify that the master uses a ±10 µs uncertainty window in the RX slot to allow for the slave misalignments. (Only for IUTs acting as master)

- TP/PHYS/TRX/BV-04-E (Slave Rx window)
  Goal: Verify that the IUT as slave uses a ±10 µs uncertainty window to adjust its RX timing to compensate for a timing mismatch.

4.4.4 Blue Unit tests

If the product, submitted to the qualification, is a module and integrate a pre-tested radio or baseband, most of the time, these tests are mandatory.
However, if the product, submitted to the qualification, is an updated one (with a new radio or baseband version), you have to negotiate with the BQB the necessity to perform these tests.
For more information on Blue Unit tests, see [7] or go to §5: interoperability.

4.5 Host stack / Profiles

Bluetooth HOST Stack (or Core Stack) contains some of higher layers of the Bluetooth protocol stack (HCI Driver, L2CAP, SDP and RFCOMM), and can be equipped with a variety of additional layers (OBEX, TCS, etc.).
In an end-user product, the Host Stack will run in a wide variety of different environments, all depending on the customers design preferences. In order to provide for the customer's needs, Host Stack is designed to be independent of among other things the customer's operating system and hardware platform.

Today, like baseband with HCI/LM, pre-tested profile doesn't exist. Profiles are inside Host Stack deliveries and then inside Host Stack qualified component.

For Host Stack:
A natural question for customers of the Bluetooth Host Stack, as well as for BQB is: how to consider the changes made when porting relative to the Qualification Program and the existing Qualification made of the stack? In essence does the customer have to repeat testing or can he rely on what is already made, for the functionalities covered by the Bluetooth Host Stack?
First is to consider in which category of class, the customer component integration is in. See Guidelines for handling of product changes for Class I changes. In case of class II, complementary testing must be defined by the BQB and tested.

4.6 Applications

There is nothing to retest, as long as the application doesn't change the Bluetooth functionality.

5 - Interoperability

Obtaining the Bluetooth certification is great. But it doesn't prevent from all interoperability troubles. In practice, it's interesting to participate to UnPlugFest or to perform Blue Unit tests.

5.1 Blue Unit tests

Blue Unit tests are underline in the chapter because they represent the easiest and the fastest tests to perform. They are the first step to see if lower layers work fine against others Bluetooth products.
There are 13 test cases:

- Inquiry
- Inquiry Scan
- Paging – IUT as Master
- Paging – IUT as Slave
- ACL packet types
- Link supervision timeout – IUT as Slave
- Link supervision timeout – IUT as Master
- Authentication – IUT as Slave
- Authentication – IUT as Master
- Pairing
- Encryption – IUT as Slave
- Encryption – IUT as Master
- SCO packet types

More information in [7].

5.2 UnPlugFest

It's not mandatory to go to the UnPlugFest to get the Bluetooth certification. But performing the Bluetooth Specifications tests don't guarantee that your product will work fine with the others (even if the interoperability tests are passed).
The main reason is that manufacturers work ahead of Bluetooth standard and have to create proprietary functionalities to finalize their product.
UnPlugFest is the place where you have the occasion to run your product against competitor's one. It is recommended to attend the venue with a technician who will eventually debug on site. You must be Bluetooth member to participate. You have access to pre-registration and registration on http://www.bluetooth.org.

UnPlugFest lasts 1 week.

UnPlugFest makes the difference between:

- Category-1 for participants who want to test RF, BB, LM parts,
- Category-2 for participants testing L2CAP, SDP, RFCOMM, TCS parts
- And Category-3 for participants testing Application profiles.

The first day of the UnPlugFest is dedicated to registration and pre-testing.
Pre-testing: to enter the UnPlugFest session, each participant has to demonstrate basic functionalities. It will take about 15 minutes.

During the other days, you will test against different competitors, following the list of tests defined in the UnPlugFest test plan. This list is a starting point. Participants are free to follow the schedule or not. This list is derived from the qualification tests, shortens, and focused on interoperability aspects.

Testing sessions will be scheduled in blocks of:
. 2 hours for category 1,
. 90 minutes for category 2,
. 75 minutes for category 3.

Test and pre-test documents are delivered 1-2 months before the UnPlugFest in the http://www.bluetooth.org site.

5.3 Companies dedicated to interoperability troubles

The aim of some companies is to provide the wireless industry with a controlled environment to perform product and interoperability testing. In principle, this is based on the idea of the “UnPlugged Fest”.
One of the first companies offering this service is BlueLab from Wireless future company (http://www.thebluelabs.com)

6 - ANNEX A: Test Report

The test report should contain the following information.

General Information:
1 General
- 1.1 Administrative Data of Test Facility
  - Responsible person
  - Phone, fax, email
  - Date of testing
  - Signature
- 1.2 Administrative Data of Member Address
  - Responsible person
  - Phone, fax, email
- 1.3 Description of EUT Product name / product short cut
  - Product type
  - Product designation
  - Hardware status
  - Software status

2 Summary List of All Performed Test Cases
- 2.1 Table (TC identifier, description, verdict, date, comment)

Measurement depending Information:
1 RF Measurement Testing
- 1.1 Description of Test Set-up
- 1.2 List of Performed Test Cases
- 1.3 Referenced Documents
- 1.4 Additional Comments
- 1.5 List of Test Equipment

2 Protocol Testing
- 2.1 Description of Test Set-up
- 2.2 List of Performed Test Cases
- 2.3 Referenced Documents
- 2.4 Additional Comments
- 2.5 List of Test Equipment

3 Profile Interoperability Testing
- 3.1 Description of Test Set-up
- 3.2 List of Performed Test Cases
- 3.3 Referenced Documents
- 3.4 Additional Comments

Annex 1: ICS/IXIT
- Fulfilled and signed ICS/IXIT (signed copy)

Annex 2: Test plan

Annex 3: Technical Product Description
- Functional block diagram
- Schematics