FCC ID: HYQBTA01A

Additional information in accordance with requirements of FCC 15.247 and FCC Public Notice DA 00-705

1. Frequencies tested

Frequencies for the test are 2402 MHz, 2441 MHz and 2480 MHz as specified in 15.31(m).

2. Antenna requirement

The Bluetooth transceivers are used for data transmission between handy phone and navigator system. The antenna is a chip antenna and is permanently mounted on a printed electronic circuit board of this module. In addition, since the module is installed in the display of navigator system by OEM's' (professional installers), it is impossible for end user to replace it. This antenna configuration complies with the requirement of FCC 15.203.

The gain of antenna used is –5 dBi or more (less than 6 dBi).

3. AC conducted noise

N/A (DC Operation)

4. Carrier frequency separation

The measurement is carried out in accordance with FCC Public Notice DA 00-705 and the compliance is reported in the test report.

5. Hopping frequency requirements

The number of hopping frequencies is measured in accordance with FCC Public Notice DA 00-705 and reported the compliance in the test report.

On pseudorandom frequency hopping sequence the following is an example of a 79 hopping sequence in **data transmission mode**:

52, 35, 50, 20, 54, 67, 56, 37, 60, 39, 58, 69, 62, 71, 64, 25, 68, 27, 66, 57, 70, 59, 72, 29, 76, 31, 74, 61, 78, 63, 01, 41, 05, 43, 03, 73, 07, 75, 09, 45, 13, 47, 11, 77, 15, 00, 16, 49, 28, 22, 34, 02, 19, 06, 17, 51, 32, 36, 14, 04, 12, 26, 18, 24, 38, 08, 30, 65, 10,40, 21, 44, 23, 42, 53, 46, 55, 48, 33

Example of a hopping sequence in **inquiry mode**:

55, 59, 10, 73, 65, 69, 43, 27, 00, 77, 04, 67, 37, 06, 31, 75, 33, 39, 51, 29, 40, 14, 35, 49, 47, 08, 71, 63, 57, 02, 61, 45

Example of a hopping sequence in **paging mode**:

61, 44, 46, 63, 14, 50, 48, 16, 65, 52, 54, 67, 18, 58, 56, 20, 53, 60, 62, 55, 06, 66, 64, 08, 57, 68, 70, 51, 02, 42, 40, 04

The requirement of **equal hopping frequency use** is met by a unique generation of the hopping sequence specified in the Bluetooth Standard as follows;

The generation of the hopping sequence in connection mode depends essentially on two input values:

1. LAP/UAP of the master of the connection

2. Internal master clock

The LAP (lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24 MSB's of the 48 BD_ADDRESS.

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For synchronization with other units only offset are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5 us. The clock has a cycle of about one day (23 hours and half). In most case it is implemented as 28 bits counter. For the deriving of the hopping sequence the entire LAP (24 bits), 4 LSB's (4 bits) (Input 1) and the 27 MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions and XOR-operations) are performed to generate the sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behavior;

The first connection between the two devices is established, a hopping sequence was generated. For transmitting the wanted data the complete hopping sequence was not used. The connection ended. The second connection is established. A new hopping sequence is generated. Due to the fact that the Bluetooth clock has a different value, because the period between the two transmission is longer than the minimum resolution of the clock (312.5 us). The hopping sequence always differs from the first one.

For the generation of the inquiry and page hop sequences the same procedures as described above, but this time with different input vectors.

For the inquiry hop sequence, a predefined fixed address is always used. This results on the same 32 frequencies used by all devices doing an inquiry but every time with a different start frequency and phase in this sequence.

For the page hop sequence, the device address of the paged unit is used as input vector. This results in the use of a subset of 32 frequencies which is specific for that initial state of the connection establishment between the two units. A page to different devices would result in a different subset of 32 frequencies.

6. Dwell time

Dwell times are measured in accordance with FCC Public Notice DA 00-705 and reported in the test report.

7. 20 dB bandwidth

The 20 dB bandwidth is measured in accordance with FCC Public Notice DA 00-705 and reported the compliance in the test report.

8. Receiver input bandwidth and hopping capability

The input bandwidth of the receiver is limited to 1 MHz by a bandpass filter at the IF stage. It complies with the transmitter bandwidth at each hopping frequency.

In every connection one Bluetooth device is the master and the other one is the slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master.

Additionally the type of connection is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection uses these settings.

Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection is followed in any case. That means, a repeated packet is not sent on the same frequency, it is sent on the next frequency of the hopping sequence.

9. Peak output power

The peak output power is measured in accordance with FCC Public Notice DA 00-705 and reported the compliance in the test report.

10. Defact EIRP limit

The gain of antenna used in BTA-01A is –5 dBi or more (less than 6 dBi). There is no necessity to consider the defact EIRP limit.

11. RF exposure compliance

The transmitting power of BTA-01A is low. Since BTA-01A is normally used in navigation system in automobile, it falls under a category of mobile equipment. The RF exposure statement is submitted as separate Exhibit.

12. Band-edge, RF conducted and radiated spurious emissions compliance

These compliance measurements are carried out in accordance with FCC Public Notice DA 00-705 and reported the compliance in the test report.

13. Requirements of 15.247 (g) and (h)

The compliance with 15.247 (g) and (h) was described in above section 5.