1. Module : WB1NP9

This WB1NP9 Module can be easily designed into any embedded system for Bluetooth Spec 5.0 feature. It is based on QCC5125 with specific interface design to meet LG Electronics's needs.

2. Module Specification

Chips	QCC5125
Bluetooth Spec	Bluetooth 5.0
Frequency Band	2402 ~ 2480 MHz
Tx Power	2.51mW ~ 6.31mW (Bluetooth Power Class I)
Rx Sensitivity	< -70dBm (BER 0.1%)
Distance	< 100m (Open Space)
Power Voltage	3.3V
Dimension	23mm x 20mm x 3 mm
Environmental Range	Operation temperature : -30 ~ +70℃
Modulation	GFSK, π/4-DQPSK
Communication Method	FHSS

Conditions : VDD = 3.3V, Ta = 25 ℃, unless otherwise noted.

Absolute Maximum Ratings

Parameter	Min	Max	Unit
Power Supply Voltage : VDD	-0.4V	3.6V	DCV
Storage Temperature	-40	85	℃

Recommended Operating Conditions

Parameter	Min	Max	Unit
Power Supply Voltage	3.0V	3.6V	DCV
Operation Temperature	-30	70	℃

Current consumption

Parameter	Connection Type	Avg	Peak	Unit
Page scan, Time interval = 1.28s	-	<1	1	mA
Inquiry and Page scan, Time interval = 1.28s	-	<1	1	mA
ACL No data transfer	Master	1	1.1	mA
ACL data transfer	Master	10	11	mA

Input/Output Characteristics

Parameter	Min	Max	Unit
V_{IL} Input Voltage Low	-0.4	0.8	V
V_{IH} Input Voltage High	0.7*VDD	VDD+0.4	V
V_{OL} Output Voltage Low	-	0.2	V
V_{OH} Output Voltage High	VDD-0.2	-	V

General Performance					
Parameter	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Frequency Range	Normal	2402	-	2480	MHz
Transmitter Performance					
Parameter	**Condition**	**Min**	**Avg**	**Max**	**Unit**
Transmit Power	Normal	4	-	8	dBm
Parameter	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Power density	Normal	-	-	<20	dBm
20dB bandwidth	Normal			1000	KHz
Adjacent channel power (F_0 = 2441MHz)	$F=F_0 \pm 2MHz$	-	-	-20	dBm
	$F=F_0 \pm 3MHz$	-	-	-40	dBm
	$F=F_0 \pm 4MHz$	-	-	-40	dBm
Out-band Spurious Emission	30MHz ~ 1GHz	-	-	-36	dBm
	1GHz ~ 12.75GHz	-	-	-30	dBm
	1.8GHz ~ 1.9GHz	-	-	-47	dBm
	5.1GHz ~ 5.3GHz	-	-	-47	dBm
Modulation Characteristic	$\Delta F1_{avg}$	140	-	175	KHz
	$\Delta F2_{max}$	115	-	-	KHz
	$\Delta F2_{avg}$ / $\Delta F1_{avg}$	80	-	-	%
Initial Carrier Frequency Tolerance	DH1 packet	-75	-	75	KHz
Carrier Frequency Drift	DH5 packet	-25		25	KHz

Receiver Performance					
Parameter	**Condition**	**Min**	**Type**	**Max**	**Unit**
Sensitivity at 0.1% BER	Single slot (DH1 packet)	-	-	-70	dBm
Sensitivity at 0.1% BER	Multi slot (DH5 packet)	-	-	-70	dBm

Maximum received signal at 0.1% BER		-	-	-20	dBm
Maximum level of intermodulation interferers	f1-f2 = 5 MHz, Pwanted= -64 dBm	-	-	-39	dBm

FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference and
(2) This device must accept any interference received, including interference that may cause undesired operation of the device.
Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module.
This exterior label can use wording such as the following: "Contains FCC ID : BEJ-WB1NP9" any similar wording that expresses the same meaning may be used.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
This equipment should be installed and operated with a minimum distance of 20 cm between the antenna and your body. Users must follow the specific operating instructions for satisfying RF exposure compliance.

IC Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
(1) This device may not cause interference.
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) L'appareil ne doit pas produire de brouillage, et (2) L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Please notice that if the IC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains IC : 2703H-WB1NP9" any similar wording that expresses the same meaning may be used.

L'étiquette d'homologation d'un module d'Innovation, Sciences et Développement économique Canada devra être posée sur le produit hôte à un endroit bien en vue, en tout temps. En l'absence d'étiquette, le produit hôte doit porter une étiquette sur laquelle figure le numéro d'homologation du module d'Innovation, Sciences et Développement économique Canada, précédé du mot « contient », ou d'une formulation similaire allant dans le même sens et qui va comme suit : Contient IC : 2703H-WB1NP9 est le numéro d'homologation du module

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the antenna and your body.
NOTE: THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre l'antenne et votre corps.
REMARQUE: LE FABRICANT NE PEUT ÊTRE TENU RESPONSABLE DES INTERFÉRENCES RADIO OU TÉLÉVISÉES CAUSÉES PAR DES MODIFICATIONS NON AUTORISÉES DE CET APPAREIL. CES MODIFICATIONS PEUVENT ANNULER L'AUTORITE DE L'UTILISATEUR A FAIRE FONCTIONNER L'APPAREIL.

<Regulatory notice to host manufacturer according to KDB 996369 D03 OEM Manual v01>

2.2 List of applicable FCC rules
This module has been granted modular approval as below listed FCC rule parts.

- FCC Rule parts 15C(15.247)

2.3 Summarize the specific operational use conditions
- The OEM integrator should use equivalent antennas which is the same type and equal or less gain then an antenna listed in 2.7 in this instruction manual.

2.4 Limited module procedures
- N/A

2.5 Trace antenna designs
- N/A

2.6 RF exposure considerations
The module has been certified for integration into products only by OEM integrators under the following condition:

- The antenna(s) must be installed such that a minimum separation distance of at least 20 cm is maintained between the radiator (antenna) and all persons at all times.
- The transmitter module must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.
- Mobile use

As long as the three conditions above are met, further transmitter testing will not be required. OEM integrators should provide the minimum separation distance to end users in their end-product manuals.

2.7 Antennas list
This module is certified with the following integrated antenna.
- Type: PCB Pattern Anttena Peak gain (dBi): 3.78

Any new antenna type, higher gain than listed antenna should be met the requirements of FCC rule 15.203 and 2.1043 as permissive change procedure.

2.8 Label and compliance information

End Product Labeling

The module is labeled with its own FCC ID and IC Certification Number. If the FCC ID and IC Certification Number are not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. In that case, the final end product must be labeled in a visible area with the following:

“Contains FCC ID: BEJWB1NP9”

“Contains IC: 2703H-WB1NP9”

2.9 Information on test modes and additional testing requirements

- OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, additional transmitter in the host, etc.).

RF test mode in high/mid/low channels

Bluetooth Tester (TESCOM)

hopping or non-hopping mode

Bluetooth Tester (TESCOM)

what power level

Power Sensor (R&S)

Power level

2.5mw~6.31mw(Bluetooth Power Class 1)

2.10 Additional testing, Part 15 Subpart B disclaimer

- The final host product also requires Part 15 subpart B compliance testing with the modular transmitter installed to be properly authorized for operation as a Part 15 digital device.