SAMSUNG ELECTRONICS

User manual

ITEM	USB Embedded Module
MODEL NAME	WIDT10 B
DESCRIPTION	IEEE 802.11n 2x2 WiFi Mode
SOLUTION	Broadcom: BCM43236
SAMSUNG P/N	BN59-01130A
WNC P/N	

Green Procurement

Vendor Code			
Registration Date			
DRAWING	CHECK	AGREEMENT	APPROVAL
A TERM OF VALIDITY	**OVER AT LEAST 15-YEARS FROM ISSUED DATE**		

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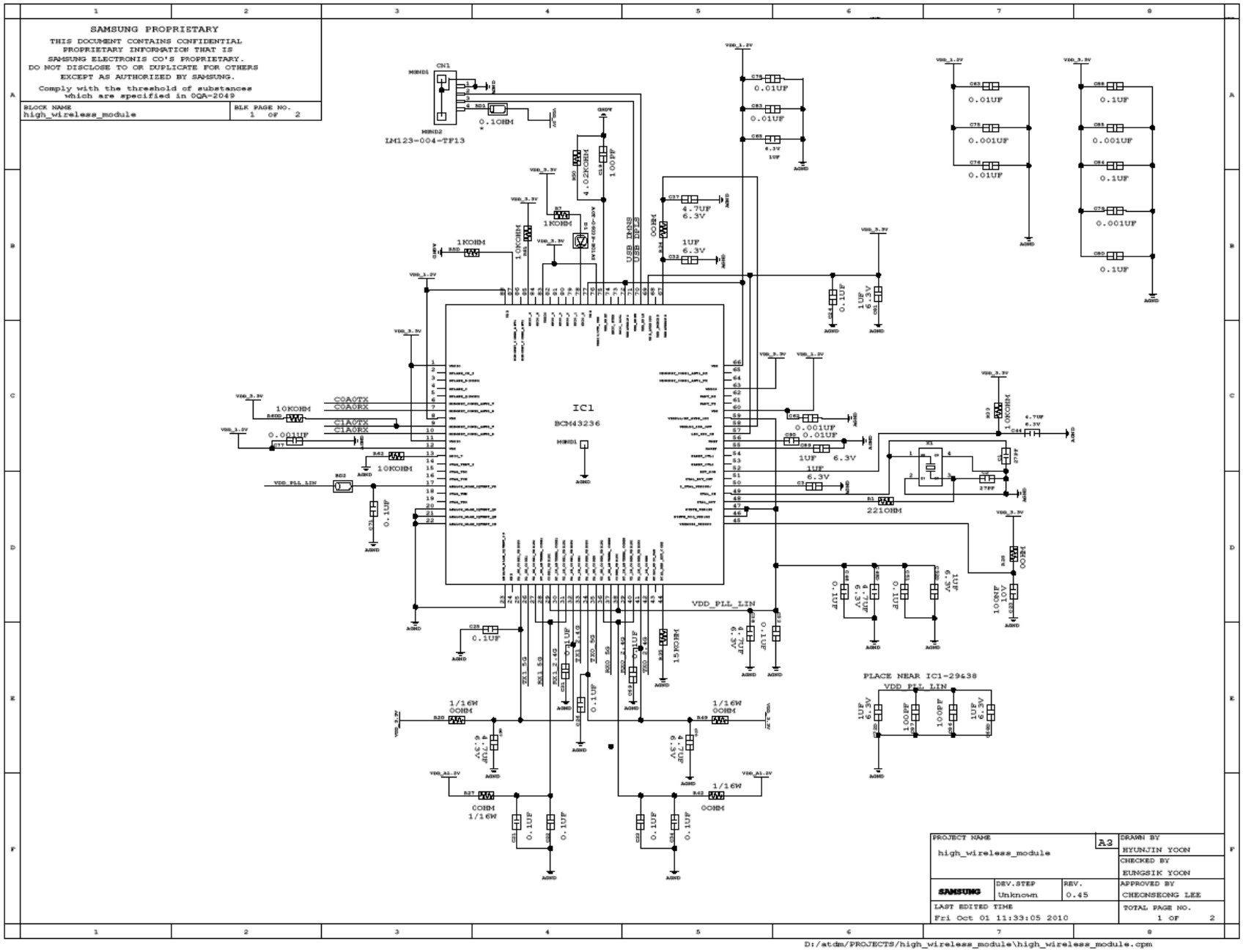
1. Revision History

Edition #	Reason for revision	Issue date
V0.1	Initial Draft Document base on Samsung V0.2 HDK	2010/09/10
V0.2	Initial Draft Document base on Samsung V0.41 HDK (2010/10/06 version)	2010/10/15

2. Part list

3	6	C3,C28,C32,C65,C81,C89	1uF	CAP,CER,0402,1UF,10%,6.3V,X6S,X5R	MURATA SEM TDK YAGEO	GRM155R60J105KE19D CL05A105KQ5NNNC C1005X5R0J105K CC0402KRX5R5BB105
4	2	C13,C16	9pF	CAP,CER,0402,9PF,0.25PF,50V,NP0,C0G	SEM MURATA	CL05C090CB5ANNC GJM1555C1H9R0CB01J
5	2	C17,C27	4.7uF	CAP,CER,1206,4.7UF,20_80%,25V,Y5V	SEM TDK	CL31F475ZONE C3216Y5V1E475Z
6	1	C18	0.1uF	CAP,CER,0603,0.1UF,80_20%,50V,Y5V	MURATA	GRM188F51H104ZA01C
7	3	C19,C86,C87	100pF	CAP,CER,0201,100PF,5%,25V,X7R	MURATA	GRM0335C1E101J
8	19	C21,C22,C24,C25,C26,C31,C33,C34,C40,C43,C46,C51,C53,C69,C71,C80,C82,C84,C88	0.1uF	CAP,CER,0201,0.1UF,10%,6.3V,X5R	YAGEO SEM VENKEL	C0201KRX5R5BB104 CL03A104KQ3NNNC C0201X5R6R3-104KNP
9	2	C23,C30	0.1uF	CAP,CER,0402,0.1UF,10%,10V,X5R	SEM MURATA	CL05A104KP5NNNC GRM155R61A104KA01D
10	6	C37,C38,C44,C54,C67,C	4.7uF	CAP,CER,0603,4.7UF,20%,6.3V,X5R	TDK	C1608X5R0J475MT
11	1	C39	39pF	CAP,CER,0201,39PF,5%,16V,NP0,C0G	SEM TDK	CL03C390JA3ANNC C0603C0G1E390JT
12	2	C41,C58	10uF	CAP,CER,0805,10UF,10%,10V,X5R	SEM MURATA	CL21A106KPFNNNE GRM21BR61A106KE19L
13	1	C42	22pF	CAP,CER,0201,22PF,5%,25V,NP0,C0G	YAGEO SEM TDK	C0201JRNP08BN220 CL03C220JA3ANNC C0603C0G1E220JT
14	6	C62,C74,C75,C77,C79,C85	1000pF	CAP,CER,0201,1000PF,10%,25V,X7R	TDK YAGEO	C0603X7R1E102KT C0201KRX7R8BB102
15	5	C63,C76,C78,C83,C90	0.01uF	CAP,CER,0201,0.01UF,10%,6.3V,X5R	MURATA SEM TDK	GRM033R60J103K CL03A103KQ3NNNH C0603X5R0J103KT
16	1	CN1		BOX,4P,1R,1.25mm,SMD-A,Sn,2um min,NATURAL	YEONHO ADCOELECTRONICS FOOSUNG TECH JAEEUN ELECTRONICS JWT	12507WR-04L LM123-004-TF13 FW12501-04 JE204-B1.25-5T4 A1255WRO-4PS-HK IP125-L04B-C26
17	4	C120,C130,C140,C150	9pF	CAP,CER,0201,9PF,0.5PF,25V,NP0	MURATA	GRM0335C1E9R0DD01D
18	1	BD1		220ohm,2012,TP,80ohm/100MHz,200ohm/600MHz	SEM	CIC21P221NE
19	1	BD2		600ohm,0402, 300mA, 0.6ohm	MURATA	BLM15AG601SN1
20	2	L1,L2	2.2uH	2.2uH, ±20%, 0.158Ω 1.4A, 2.5X2mm	TDK	VLS252010T-2R2M
21	6	R20,R27,R42,R43,R49,R53	0	RES,THK,0402,0,5%,63MW 50V	MATSUSHITA YAGEO ABCO KOA	ERJ2GEJ000X RC0402JR-070R ACR0402T000J RK73Z1ETQTP
22	1	R1	221	RES,THK,0201,221,1%,50MW	KOA YAGEO	RK73H1HTQTB2210F RC0201FR-07221R
23	6	R16,R17,R18,R19,R28,R34	0	RES,THK,0201,0,5%,50MW	SEM KOA	RC0603J000CS RK73Z1HTQTB
24	1	R7	1K	RES,THK,0201,1K,5%,50MW	SEM KOA	RC0603J102CS RK73B1HL102J
25	1	R24	100K	RES,THK,0201,100K,5%,50MW	SEM KOA	RC0603J104CS RK73B1HL104J
26	1	R40	100K	RES,THK,0402,100K,5%,50MW	ABCO SEM	ACR0402T104J RC1005J104CS
27	1	R29	60.4K	RES,THK,0402,60.4K,1%,63MW	SEM KOA	RC1005F6042CS RK73H1ETTP6042F
28	2	R30,R32	59K	RES,THK,0402,59K,1%,63MW	MATSUE ,PSIND SEM ROHM KOA	ERJ2RKF5902X RC1005F5902CS MCR01MZPF5902 RK73H1ETTP5902F
29	1	R31	267K	RES,THK,0402,267K,1%,63MW	SEM YAGEO ROHM KOA	RC1005F2673CS RC0402FR-07267K MCR01MZPF2673 RK73H1ETTP2673F
30	3	R33,R61,R62	10K	RES,THK,0201,10K,5%,50MW	SEM KOA	RC0603J103CS RK73B1HL103J
31	1	R35	15K	RES,THK,0201,15K,1%,50MW	SEM KOA	RC0603F153CS RK73H1HTTB1502F
32	1	R50	4.02K	RES,THK,0201,4.02K,1%	SEM KOA	RC0603F4021CS RK73H1HTTB4021F
33	1	D1	LED	SMD,BLUE,1.6x0.8x0.4mm,470,1.6x0.8x0.4mm	AOT LITE-ON SEMICON SB1314E-V	AOT-0603P-B01AZ LIST-C193ZBKT-AC 광전자㈜
34	2	U3,U4		MOD,SMT,2.4-2.5/4.9-5.875GHZ,3.3V,3X3X1MM,SW/2DIPLEXER,802.11A/B/G FEM	TDK SiGe	ASM3053755T-5104 SE2577
35	1	IC5		IC,REG,WDFN12,ADJ_ADJ,1_1A,SW,1.5MHZ,BUCK,UVL,SCP	PAM AURA micro	PAM2306AYPAA AUR9707
36	1	X1	20MHz	XTL,FXD,SMT,20.000MHZ,10PPM,3.2X2.5X0.6MM,9PF,FUND	SEIKO EPSON	TSX-3225
	97		Rest BOM Total			
			PCB Shield Can	34x36mm, 4Layer, Through hole via, Au plating		
		A1	Antenna	Carrier type		
37	1	IC1	BCM43236KMLG	WLAN SINGLE CHIP 11N 2X2 -DUAL BAND	BROADCOM	IMP43236A0KMLG SMIC

3. Circuit diagram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Comply with the threshold of substances which are specified in GQA-2049
BLOCK NAME high_wireless_module
BLK PAGE NO. 1 OF 2
LM123-004-TF13
0.1OHM
4.02KOHM
1KOHM
10KOHM
IC1
BCM43236
C0A0TX
C0A0RX
C1A0TX
C1A0RX
VDD_PLL_LIN
15KOHM
221OHM
PLACE NEAR IC1-29&38
VDD_PLL_LIN
PROJECT NAME high_wireless_module
A3
DRAWN BY HYUNJIN YOON
CHECKED BY EUNGSIK YOON
SAMSUNG
DEV.STEP Unknown
REV. 0.45
APPROVED BY CHEONSEONG LEE
LAST EDITED TIME Fri Oct 01 11:33:05 2010
TOTAL PAGE NO. 1 OF 2
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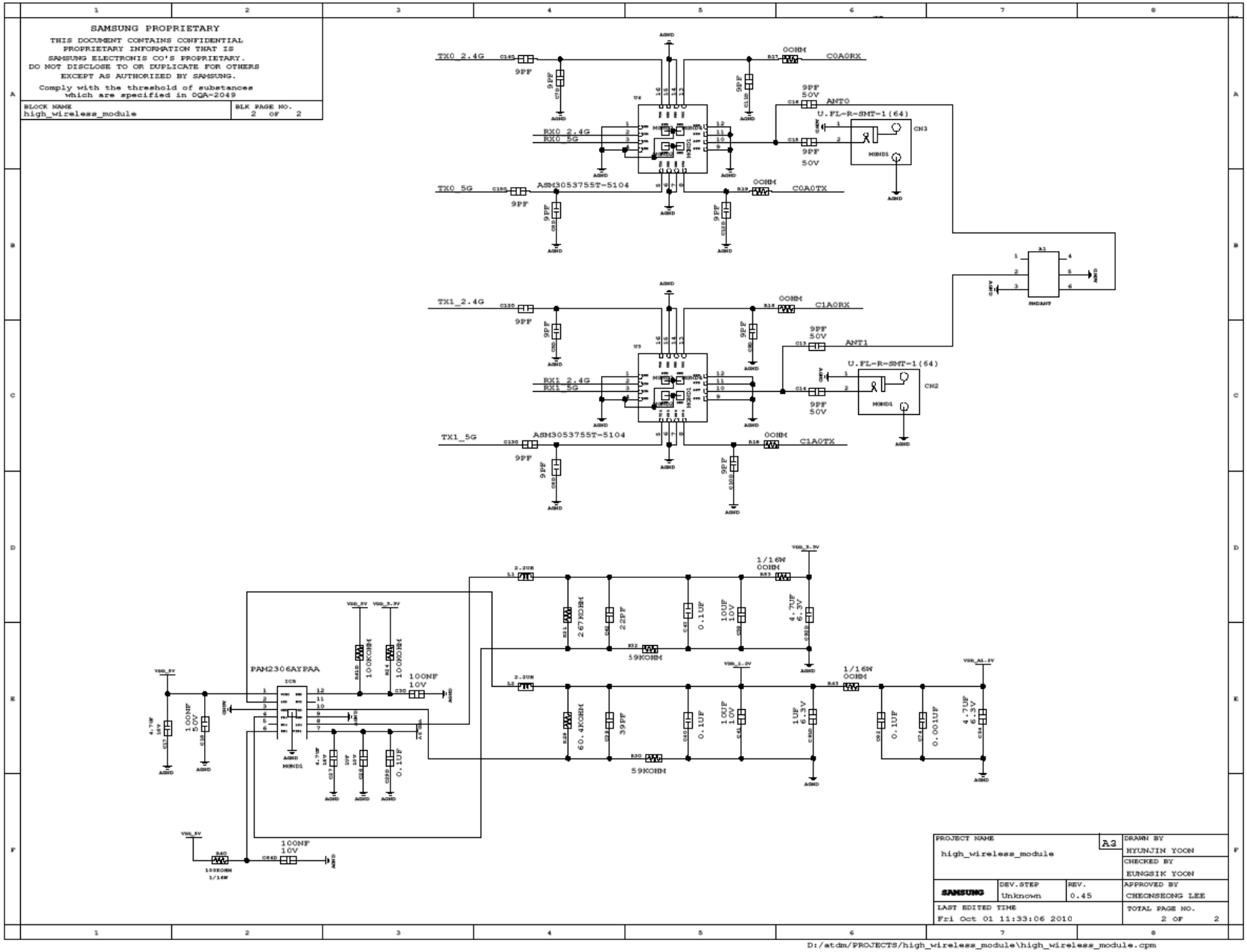
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Comply with the threshold of substances which are specified in 0GA-2049
BLOCK NAME high_wireless_module
BLK PAGE NO. 2 OF 2
TX0_2.4G
RX0_2.4G
RX0_5G
TX0_5G
ASM3053755T-5104
C0A0RX
C0A0TX
ANT0
U.FL-R-SMT-1(64)
TX1_2.4G
RX1_2.4G
RX1_5G
TX1_5G
C1A0RX
C1A0TX
ANT1
PAM2306AYPAA
PROJECT NAME high_wireless_module
A3
DRAWN BY HYUNJIN YOON
CHECKED BY EUNGSIK YOON
APPROVED BY CHEONSEONG LEE
SAMSUNG
DEV.STEP Unknown
REV. 0.45
LAST EDITED TIME Fri Oct 01 11:33:06 2010
TOTAL PAGE NO. 2 OF 2
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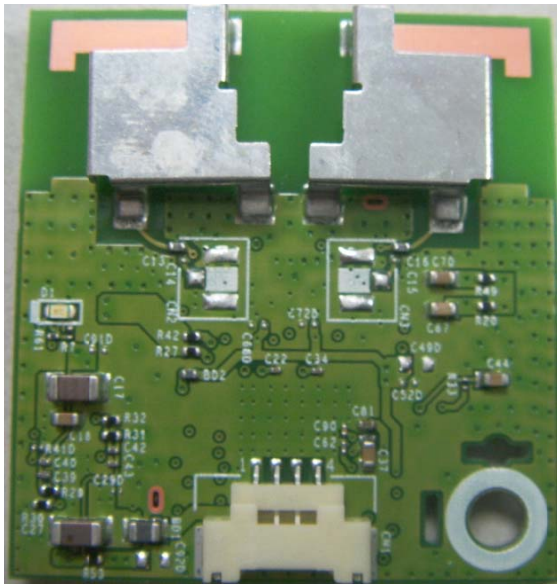
4. PCBA picture

Top view



Bottom View

5. Box Package Specification

TBD

Part II_ Specification

1. Introduction

DNUB-S2 is a USB embedded module compliant with IEEE802.11n Draft 2.0 standard. The core chipset is from Broadcom, part number BCM43236.

2. Features

- 2x2 a/b/g/n MIMO technology
- Data rates up to 130Mbps for 20MHz channels and 300Mbps for 40MHz channels
- Designs meet Pb-free/RoHS worldwide requirements
- Integrated ARM® Cortex-M3™ CPU core plus 256KB ROM and 448KB RAM
- WPA™/WPA2™
- Full-rate AES engine in hardware
- Integrated 2.4/5 GHz Power Amplifier (BCM43236) provides path to lower solution cost for single-band designs
- Support for Windows® XP, Windows Vista®, and Linux® Operating Systems
- LED reserved for special application.

3. Hardware Architecture:

3.1 Main Chipset Information

Item	Vender	Part number
MAC/BBP/Radio Transceiver/PA	Broadcom	BCM43236

4. Label

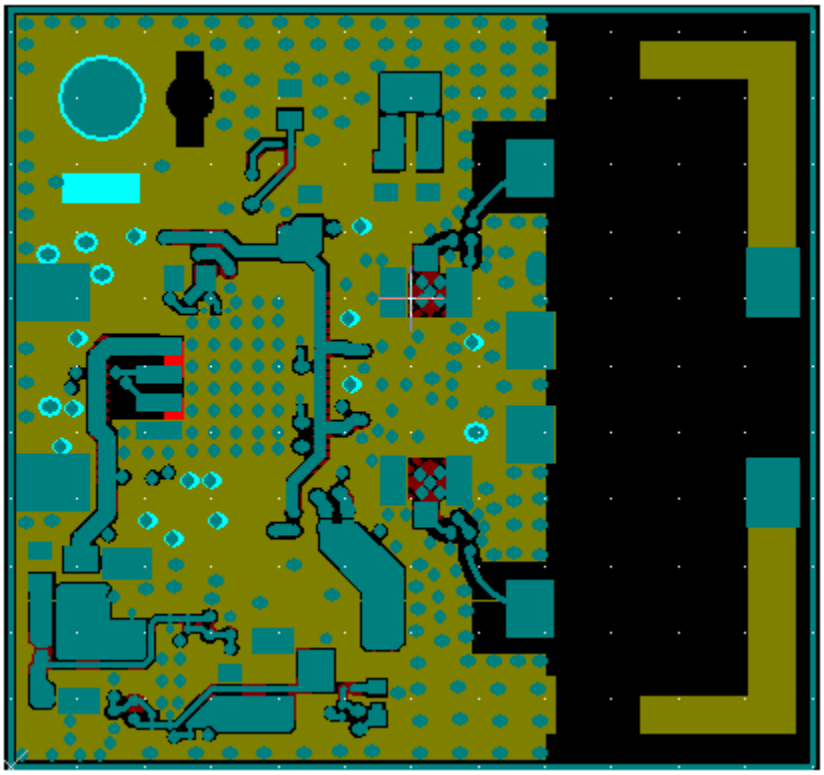
Color : White
Dimension : 30.7x9.3 mm

PS: This is for pilot run samples only, the final version waiting for Samsung's confirmation.

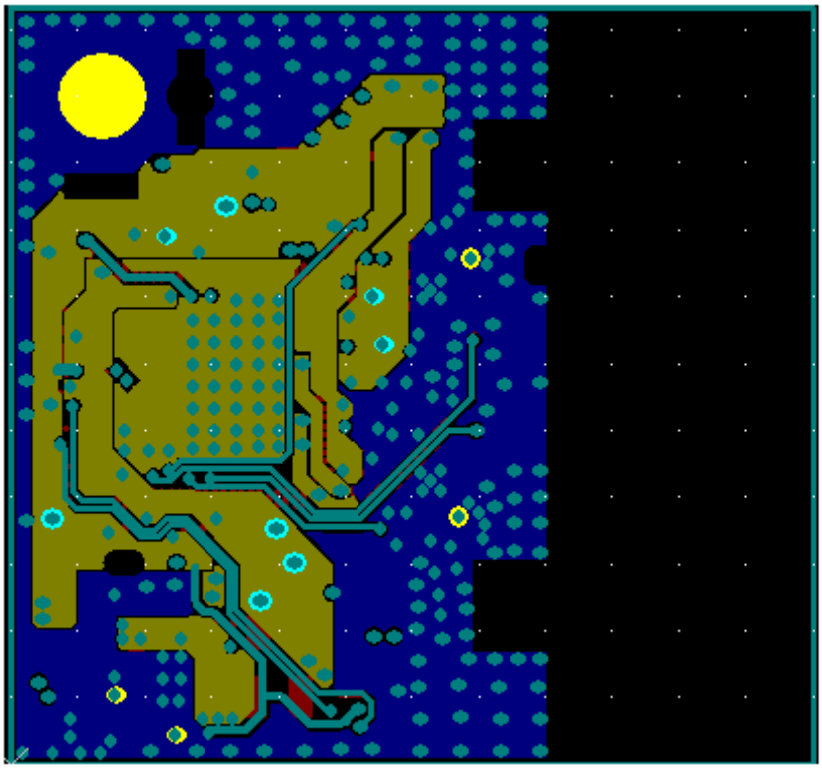
5. PCB

5.1 PCB Gerber

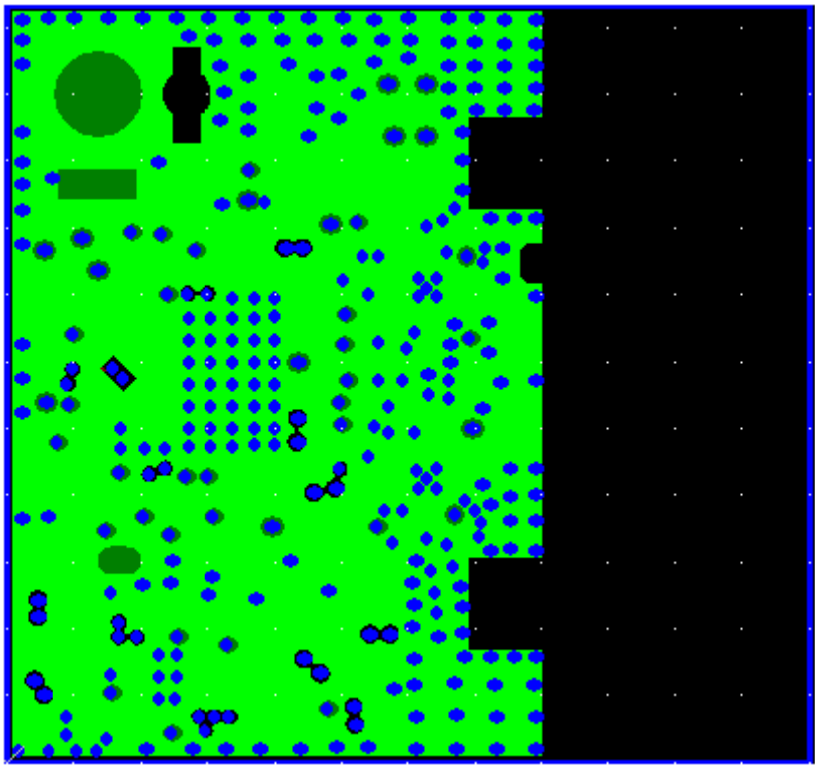
Top layer



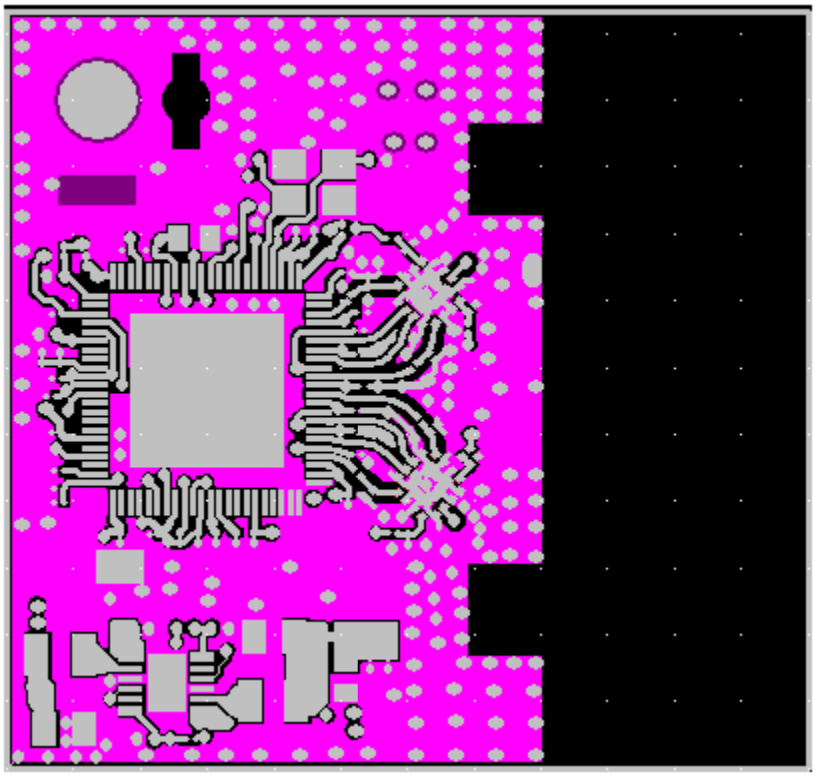
Layer 1



Layer 2



Bottom



6. Specifications:

6.1 Supply Voltage:

5V±5% DC

6.2 Current Consumttion

Condition	5V supply only	Unit
	Peak	
11b Cont. Tx	330	mA
11g Cont. Tx@ 6M	472	
11a Cont. Tx@ 6M	493	
11ng Cont. Tx@ HT20 MCS0	485	
11ng Cont. Tx@ HT40 MCS0	463	
11na Cont. TX@ HT20 MCS0	488	
11na Cont. TX@ HT40 MCS0	492	
11ng Cont. Tx@ HT20 MCS7	487	
11ng Cont. Tx@ HT40 MCS7	470	
11na Cont. Tx@ HT20 MCS7	486	
11na Cont. Tx@ HT40 MCS7	487	
11ng Cont. Tx@ HT20 MCS15	456	
11ng Cont. Tx@ HT40 MCS15	445	
11na Cont. Tx@ HT20 MCS15	467	
11na Cont. Tx@ HT40 MCS15	476	
11g Cont. RX	210	
11a Cont. RX	210	
Radio off	51	
Standby	51	

6.3 RF power

(Typical 2 Stream power level: 2TX with +/- 2 dB tolerance) (unit:dBm)

20MHz BW	MHz		
	2412	2437	2472
1Mbps	19	19	19
2Mbps	19	19	19
5.5Mbps	19	19	19
11Mbps	19	19	19
6Mbps	18	18	18
9Mbps	18	18	18
12Mbps	18	18	18
18Mbps	18	18	18
24Mbps	18	18	18
36Mbps	18	18	18
48Mbps	18	18	18
54Mbps	18	18	18
HT20MCS0	18	18	18
HT20MCS1	18	18	18
HT20MCS2	18	18	18
HT20MCS3	18	18	18
HT20MCS4	18	18	18
HT20MCS5	18	18	18
HT20MCS6	18	18	18
HT20MCS7	18	18	18

40MHz BW	MHz		
	2422	2437	2462
HT40MCS0	16	16	16
HT40MCS1	16	16	16
HT40MCS2	16	16	16
HT40MCS3	16	16	16
HT40MCS4	16	16	16
HT40MCS5	16	16	16
HT40MCS6	16	16	16
HT40MCS7	16	16	16

(Typical 2 Stream power level: 2TX with +/- 2 dB tolerance) (unit:dBm)

20MHz BW	MHz		
	5180	5320	5825
6Mbps	16	16	16
9Mbps	16	16	16
12Mbps	16	16	16
18Mbps	16	16	16
24Mbps	16	16	16
36Mbps	16	16	16
48Mbps	16	16	16
54Mbps	16	16	16
HT20MCS0/8	16	16	16
HT20MCS1/9	16	16	16
HT20MCS2/10	16	16	16
HT20MCS3/11	16	16	16
HT20MCS4/12	16	16	16
HT20MCS5/13	16	16	16
HT20MCS6/14	16	16	16
HT20MCS7/15	16	16	16

40MHz BW	MHz		
	5190	5510	5795
HT40MCS0/8	16	16	16
HT40MCS1/9	16	16	16
HT40MCS2/10	16	16	16
HT40MCS3/11	16	16	16
HT40MCS4/12	16	16	16
HT40MCS5/13	16	16	16
HT40MCS6/14	16	16	16
HT40MCS7/15	16	16	16

6.4 RF Sensitivity

(Typical 1 stream sensitivity level, 1RX with +4/- 2 dB tolerance) (unit:dBm)

20MHz BW	MHz		
	2412	2442	2472
1Mbps	-94	-94	-94
2Mbps	-92	-92	-92
5.5Mbps	-91	-91	-91
11Mbps	-86	-86	-86
6Mbps	-91	-91	-91
9Mbps	-91	-91	-91
12Mbps	-90	-90	-90
18Mbps	-88	-88	-88
24Mbps	-84	-85	-84
36Mbps	-81	-81	-81
48Mbps	-78	-78	-78
54Mbps	-75	-75	-75
HT20 MCS0/8	-91	-92	-91
HT20 MCS1/9	-89	-90	-89
HT20 MCS2/10	-87	-87	-86
HT20 MCS3/11	-83	-83	-82
HT20 MCS4/12	-80	-80	-80
HT20 MCS5/13	-76	-76	-76
HT20 MCS6/14	-74	-74	-74
HT20 MCS7/15	-72	-72	-72

40MHz BW	MHz		
	2422	2437	2462
HT40 MCS0/8	-87	-88	-87
HT40 MCS1/9	-85	-85	-85
HT40 MCS2/10	-83	-83	-82
HT40 MCS3/11	-80	-80	-80
HT40 MCS4/12	-77	-77	-76
HT40 MCS5/13	-72	-72	-72
HT40 MCS6/14	-71	-71	-71
HT40 MCS7/15	-69	-69	-69

(Typical 1 stream sensitivity level, 1RX with +4/- 2 dB tolerance) (unit:dBm)

20MHz BW	MHz		
	5180	5320	5805
6Mbps	-91	-91	-91
9Mbps	-90	-90	-90
12Mbps	-89	-89	-89
18Mbps	-87	-87	-87
24Mbps	-84	-84	-84
36Mbps	-81	-81	-81
48Mbps	-75	-75	-75
54Mbps	-73	-73	-73
HT20 MCS0/8	-90	-90	-90
HT20 MCS1/9	-88	-88	-88
HT20 MCS2/10	-85	-85	-85
HT20 MCS3/11	-81	-81	-81
HT20 MCS4/12	-78	-78	-78
HT20 MCS5/13	-75	-75	-75
HT20 MCS6/14	-73	-73	-73
HT20 MCS7/15	-71	-71	-71

40MHz BW	MHz		
	5190	5510	5795
HT40 MCS0/8	-88	-88	-88
HT40 MCS1/9	-85	-85	-85
HT40 MCS2/10	-83	-83	-83
HT40 MCS3/11	-79	-79	-79
HT40 MCS4/12	-76	-76	-76
HT40 MCS5/13	-73	-73	-73
HT40 MCS6/14	-70	-70	-70
HT40 MCS7/15	-68	-68	-68

6.5 Environmental Spec.

Operating Temperature Range:	0degree C~ 60degree C
Storage Temperature Range:	Temperature: -20～80℃ Humidity: 95％(MAX)
Operating Humidity Range:	10%～90％ (No dew condensation)

7. MFG test items

7.1 Test Environmental

7.2 Test Items

TX:

RX

9. IQ_VERIFY_RX_PER 13 HT20_MCS7 ANT0

PER@-64.0 0.000 % (0.0 ~ 10.0)
Test_Count = 1
Test_Time = 2.219 sec

10. IQ_VERIFY_RX_PER 13 HT20_MCS7 ANT1

PER@-64.0 0.100 % (0.0 ~ 10.0)
Test_Count = 1
Test_Time = 1.828 sec

11. IQ_VERIFY_RX_PER 36 HT20_MCS7 ANT0

PER@-64.0 1.200 % (0.0 ~ 10.0)
Test_Count = 1
Test_Time = 2.094 sec

12. IQ_VERIFY_RX_PER 36 HT20_MCS7 ANT1

PER@-64.0 8.400 % (0.0 ~ 10.0)
Test_Count = 1
Test_Time = 1.796 sec

13. IQ_VERIFY_RX_PER 64 HT20_MCS7 ANT0

PER@-64.0 0.100 % (0.0 ~ 10.0)
Test_Count = 1
Test_Time = 2.109 sec

14. IQ_VERIFY_RX_PER 64 HT20_MCS7 ANT1

PER@-64.0 0.500 % (0.0 ~ 10.0)
Test_Count = 1
Test_Time = 1.813 sec

15. IQ_VERIFY_RX_PER 165 HT20_MCS7 ANT0

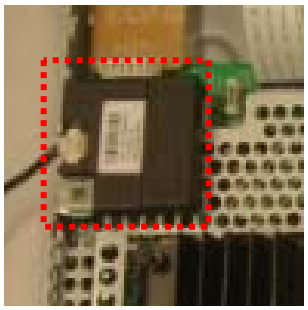
PER@-64.0 0.000 % (0.0 ~ 10.0)
Test_Count = 1
Test_Time = 2.062 sec

16. IQ_VERIFY_RX_PER 165 HT20_MCS7 ANT1

PER@-64.0 0.000 % (0.0 ~ 10.0)
Test_Count = 1
Test_Time = 1.828 sec

8. Installation Procedure

1. Be sure to use the proper antistatic handling techniques.
2. Insert the WIDT10B into the machine and fix it by screw.



9. Notice

FCC Statement

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

This device is going to be operated in 5.15~5.25GHz frequency range, it is restricted in indoor environment only.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

IMPORTANT NOTE:

This module is intended for OEM integrator. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: A3LWIDT10B ". If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of 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.

IC Statement

This Class B digital apparatus complies with Canadian ICES-003.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil numérique de la classe B est conforme á la norme NMB-003 du Canada.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

The device could automatically discontinue transmission in case of absence of information to transmit, or operational failure. Note that this is not intended to prohibit transmission of control or signaling information or the use of repetitive codes where required by the technology.

The device for the band 5150-5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems.

The maximum antenna gain permitted (for devices in the bands 5250-5350 MHz and 5470-5725 MHz) to comply with the e.i.r.p. limit.

The maximum antenna gain permitted (for devices in the band 5725-5825 MHz) to comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate, as stated in section A9.2(3).

High-power radars are allocated as primary users (meaning they have priority) of the bands 5250-5350 MHz and 5650-5850 MHz and these radars could cause interference and/or damage to LE-LAN devices.

IMPORTANT NOTE:

IC Radiation Exposure Statement:

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

IMPORTANT NOTE:

This module is intended for OEM integrator. The OEM integrator is still responsible for the IC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the IC RSS-102 radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the IC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. IC statement is required to be available in the users manual: This Class B digital apparatus complies with Canadian ICES-003. 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX IC : 649E-WIDT10B ".