



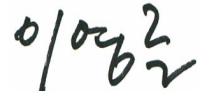
APPROVAL NO.		ISSUE	1.1
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APPROVAL SHEET

ITEM : **BLUETOOTH MODULE**
PART NO.: SBM2XA-05 1000AAA
APPROVAL NO. : _____
APPROVAL MODEL : _____

CONDITION :
1. _____
2. _____
3. _____
4. _____

상

customer	SECTION	DESIGNER	CHECKED	APPROVED
	Dept/Name			
	SIGN			
SUPPLIER	SECTION	DESIGNER	CHECKED	APPROVED
	Dept/Name	H.T.SHIN		Joseph, Lee
	SIGN			

SUPPLIER : SungJin Techwin Co.,Ltd.
ADDRESS : 256-8, In-Dong, Dong-Gu, Daejeon, Korea,300-828
042-271-1177(☎), 02-864-1091(R&D Center)

Signature :



APPROVAL SHEET CHANGE LIST

	DATE	ITEM	CONTENTS	EVIDENCE
ISSUE 1.0	2009.07.10		1st Draft	
From ISSUE 1.0 To 1.1	2009.08.21	Add certification	Bluetooth SIG Qualification Design (QDL) Certificate RoHS	
From ISSUE To				
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1. General Part

1.1 Overview

SBM2XA-05, This bluetooth handsfree module, provides a high quality, high integration, and cost effective solution for hands-free mobile communication such as Hands Free Car Kits or Telematics devices or luxury bluetooth Headset(mono, stereo) with noise&echo cancellation or portable bluetooth MP3 with RF tuning

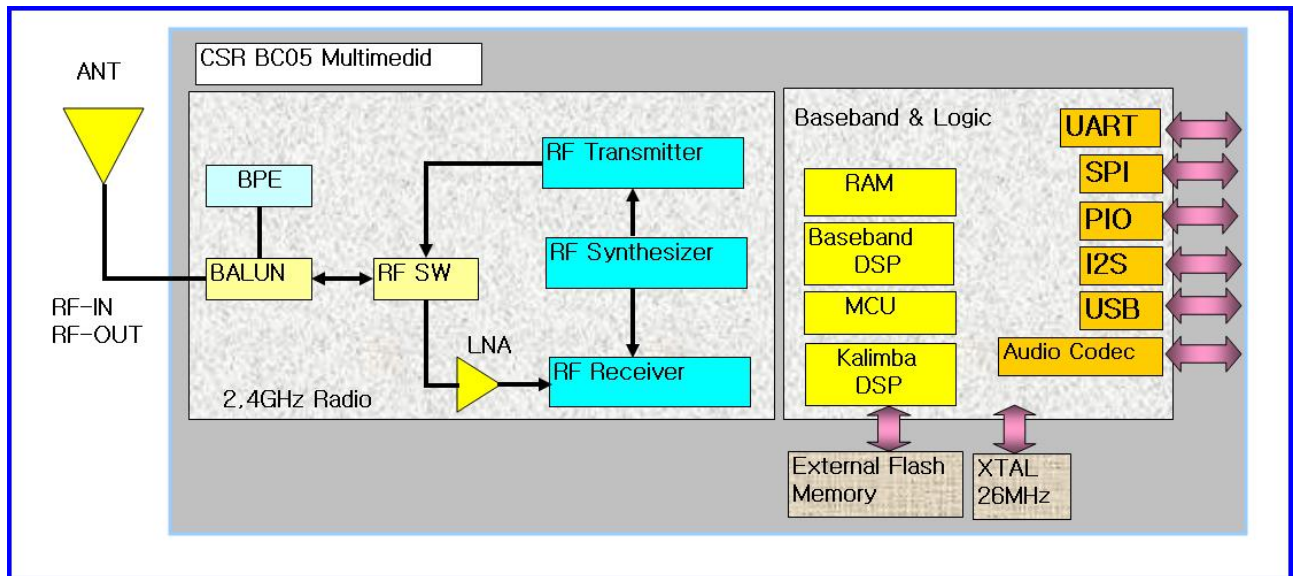
Further more, SungJin Techwin Co., Ltd. is doing customer full support as software porting or echo & noise tuning or bluetooth approval even production tooling.

This module deployed CSR's BC57E687B.

1.2 Major Features

- Fully Qualified Bluetooth v2.1 + EDR
- Specification System
- Best in Class Bluetooth Radio with 8dBm
- Class 2 Level Output Power Available (Max. +4dBm)
- Transmit Power and -87.5dBm Receive Sensitivity
- Internal DSP is involved
- 64MIPS Kalimba DSP Co-processor
- 16-bit Internal Stereo CODEC 95dB SNR for DAC
- Operation, 3.3V I/O
- Supply Voltage : 2.8~3.5V
- USB, I2C and UART with Dual-port Bypass Mode to 4Mbits/s
- Supports : 16Mbit of Flash Memory
- Multi-configurable I2S, PCM or SPDIF Interface
- Enhanced Audibility and Noise Cancellation
- Support for 802.11 Co-existence
- RoHS Compliant
- Competitive Size : 16.5mm x 16.5mm x 3mm $\pm$ 0.2mm
- Wide operating temperature range : -40°C to 85°C
- Support of all Bluetooth packet types(Voice and Data)
- Support profile : HSP, HFP, A2DP, AVRCP, OPP, PBAP, AT command for phonebook download
- TTS (Text to Speech) support

1.3 Module Block & Interface



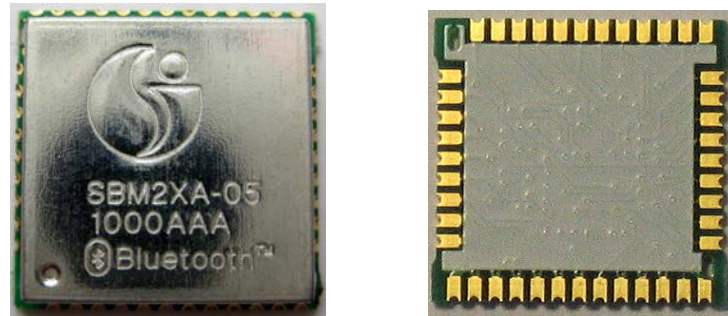
1.4 Marking and External Appearance

1.4.1 Marking

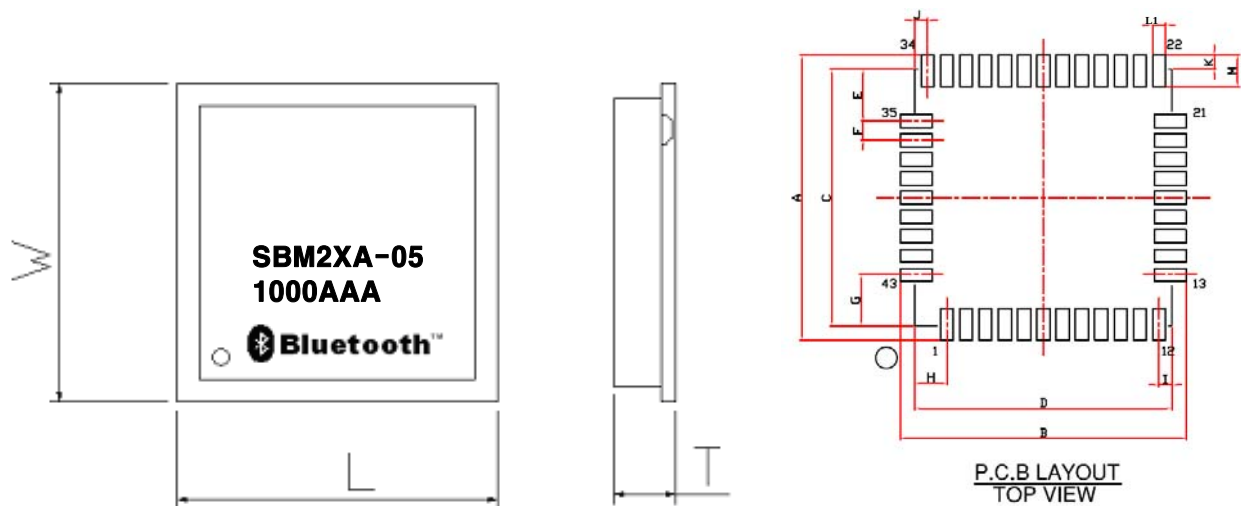
①
S B M 2 X A - 05
 ② ③ ④ ⑤ ⑥ ⑦
10 00 A A A
 (a) (b) (c) (d) (e)

No	Index	No	Index
①	Manufacturer	(a)	IO Vout 10 : VDD, 26MHz
②	Module' s Abbreviation (SB : SUNGJIN Bluetooth)	(b)	Manufactured Month
③	Application/Interface M : MM/ E : External Memory	(c)	Manufactured Line
④	Class : (1 : Class 1) (2 : Class 2)	(d)	Manufactured Factory
⑤	Customer	(e)	History
⑥	PCB revision		
⑦	CSR version (BC05)		

1.4.2 External Appearance



1.4.3 Physical Dimension



Mark	Dimension	Mark	Dimension	Mark	Dimension
L	16.5±0.2	W	16.5±0.2	T	3±0.2
A	17.8±0.1	B	17.8±0.1	C	16.0±0.1
D	16.0±0.1	E	3.2±0.1	F	1.2±0.1
G	3.2±0.1	H	2.0±0.1	I	0.8±0.1
J	0.8±0.1	K	0.9±0.1	L1	0.8±0.1
M	2.0±0.1		-		-

1.5 PIN Description

Terminal No.	Terminal Name	Type	Description
(1)	SPK_R-	Analogue (output)	Speaker output negative(right Channel)
(2)	SPK_R+	Analogue (output)	Speaker output positive(right Channel)
(3)	AIO[0]	Bi-directional	Programmable input/output line
(4)	AIO[1]	Bi-directional	Programmable input/output line
(5)	VDD_USB	VDD (Input)	Positive supply for USB ports (3.3V)
(6)	USB_DN	Bi-directional	USB data minus
(7)	USB_DP	Bi-directional	USB data plus with selectable internal 1.5k Ω pull-up resistor
(8)	PIO[4]	Bi-directional with programmable strength internal pull-up/down	PIO or USB on (input senses when VBUS is high, wakes BlueCore3-Multimedia)
(9)	PIO[5]	Bi-directional with programmable strength internal pull-up/down	PIO line or chip detaches from USB when this input is high
(10)	PIO[6]	Bi-directional with programmable strength internal pull-up/down	PIO line or clock request output to enable external clock for external clock line
(11)	PIO[7]	Bi-directional with programmable strength	Programmable input/output line or programmable frequency clock output
(12)	GND	GND	GND
(13)	UART_TX	CMOS output, tri-state, with weak internal pull-up	UART data output
(14)	UART_RX	CMOS input with weak internal pull-down	UART data input
(15)	PCM_CLK	Bi-directional with weak internal pull-down	Synchronous data clock
(16)	PCM_IN	CMOS input with weak internal pull-down	Synchronous data input
(17)	MIC_L+	Analogue (Input)	Microphone Right channel input positive
(18)	PCM_SYNC	Bi-directional with weak internal pull-down	Synchronous data sync
(19)	PCM_OUT	CMOS output, tri-state, with weak internal pull-up	Synchronous data output
(20)	MIC_L-	Analogue (Input)	Microphone Right channel input negative
(21)	MIC_R+	Analogue (Input)	Microphone Left channel input positive
(22)	GND	GND	GND
(23)	MIC_R-	Analogue (Input)	Microphone Left channel input negative
(24)	SPI_MISO	CMOS input with weak internal pull-down	Serial Peripheral Interface data output
(25)	SPI_MOSI	CMOS input with weak internal pull-down	Serial Peripheral Interface data input
(26)	SPI_CSB	CMOS input with weak internal pull-up	Chip select for Synchronous Serial Interface, active low
(27)	SPI_CLK	CMOS input with weak internal pull-down	Serial Peripheral Interface clock

(28)	IMIC BIAS	Analogue	Microphone bias
(29)	PIO[11]	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
(30)	PIO[10]	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
(31)	PIO[9]	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
(32)	PIO[8]	Bi-directional with programmable strength internal pull-up/down	Programmable input/output line
(33)	ANT		For Antenna /50ohm
(34)	GND	GND	
(35)	PIO[3]	Bi-directional with programmable strength internal pull-up/down	PIO or output goes high to wake up PC when in USB mode or clock request input from host controller
(36)	PIO[2]	Bi-directional with programmable strength internal pull-up/down	PIO or external clock request
(37)	PIO[1]	Bi-directional with programmable strength internal pull-up/down	Control output for external PA(if fitted)
(38)	PIO[0]	Bi-directional with programmable strength internal pull-up/down	Control output for external TX/RX(if fitted)
(39)	VDD_1V8	1.8V Out	For Test
(40)	RESET	RESET (Active: Low)	
(41)	VDD	VDD	2.7V ~ 3.7V Voltage input
(42)	SPK_L-	Analogue (output)	Speaker output negative(left Channel)
(43)	SPK_L+	Analogue (output)	Speaker output positive(left Channel)

2. Specification

2.1 General Specification

No	Items	Specification
1	Supply Voltage	VCC : 2.7 ~ 3.7V
2	Carrier Frequency	2402MHz to 2480MHz (USA, Europe)
3	Modulation Method	GFSK, $\pi/4$ DQPSK, 8DPSK
4	Transmission Power	Max. 4dBm
5	Hopping	1600hpos/sec, 1MHz Channel space
6	Rx Sensitivity	Typ. -87.5dBm
7	Output Interface	UART, PIO, IIS, PCM
8	Compliant	Bluetooth v2.1 + EDR
9	Built in Memory	Flash memory(16Mbit)
10	Crystal	26MHz

2.2 Temperature Specification

No	Items	Specification
1	Operation Temperature	-30℃ ~ 80℃
2	Storate Temperature	-40℃ ~ 90℃

2.3 TX/RX Specifications

2.3.1 TX Radio Characteristics

Items		Condition	Min.	Typ.	Max	Unit	Remark
Output Power(Average)		N&ETC	-6	0	4	dBm	
Modulation characteristics	Delta-f1 avg	N&ETC	140	165	175	kHz	11110000
	Delta-f2 max	N&ETC	115	140		kHz	1010
Initial carrier-frequency tolerance		N&ETC		10	75	kHz	
Carrier frequency drift	DH1	N&ETC		12	25	kHz	
	DH3	N&ETC		12	40	kHz	
	DH5	N&ETC		15	40	kHz	
Drift rate	DH1	N&ETC		8	20	kHz/ 50us	
	DH3	N&ETC		10	20	kHz/ 50us	
	DH5	N&ETC		12	20	kHz/ 50us	
20dB bandwidth		N&ETC		900	100	kHz	
Adjacent channel power	M-N =2	N&ETC		-40	-20	dBm	
	M-N ≥ 3	N&ETC		-50	-40	dBm	
Out-of-band spurious emissions	30M-1G	N&ETC		-65	-36	dBm	
	1G- 12.75G	N&ETC		-55	-30	dBm	
	1.8G-1.9G	N&ETC		-75	-47	dBm	
	5.15G- 5.3G	N&ETC		-75	-47	dBm	

※ NTC:Normal Test Conditions +15 to +35℃, ETC:Extreme Test Conditions -40 to +85℃

2.3.2 RX Radio Characteristics

Items		Condition	Min.	Typ.	Max	Unit	Remark
Sensitivity (single slot packets)		N&ETC		-85	-78	dBm	BER <0.1%
C/I performance	Co-ch.	NTC		9	11	dB	
	1MHz	NTC		-2	0	dB	
	2MHz	NTC		-34	-30	dB	
	≥ 3MHz	NTC		-43	-40	dB	
	Image	NTC		-18	-9	dB	
	Image± 1MHz	NTC		-23	-20	dB	
Blocking performance	30-2000M	NTC	-10			dBm	
	800M- 1000M	NTC		10		dBm	
	1800M- 1900M	NTC		10		dBm	
	2000- 2399M	NTC	-27			dBm	
	2498- 3000M	NTC	-27			dBm	
	3G- 12.75G	NTC	-10			dBm	
Inter modulation performance		NTC	-39	-30		dBm	
Spurious emissions	30M-1G	N&ETC		-78	-57	dBm	
	1G- 12.75G	N&ETC		-55	-47	dBm	
Maximum input level		NTC	-20	2	5	dBm	

※ NTC:Normal Test Conditions +15 to +35℃, ETC:Extreme Test Conditions -40 to +85℃

2.4 Reliability Test Standard

Test Item	Conditions	Test No.
Reflow	Step1 :150~170℃,70~175sec	Test 1
	Step2 :230±5℃ (peak)	
Temperature Drift	25→0→-20→50→70℃, 2Hr/step	Test 2
High Temperature(Storage)	90℃, 120Hr	Test 3
Low Temperature(Storage)	-40℃, 120Hr	Test 4
High Humidity(Storage)	50℃, 95% RH, 120Hr	Test 5
High Temperature(Operating)	80℃, 120Hr	Test 6
Low Temperature(Operating)	-30℃, 120Hr	Test 7
High Humidity(Operating)	50℃, 95%RH, 120Hr	Test 8
Thermal Shock	-30℃/1Hr ↔ 80℃/1Hr	Test 9
	(50 cycle)	
Press Cooker Test	121℃, 100%RH, 2kf/cm square, 12Hr	Test 10
Vibration+Temperature & Humidity Cycle	Vibration Frequency : 20,80,350,2000Hz	Test 11
	Acceleration :6.98Grms(X,Y,Z each 50min,2cycle)	
	-20 ~ 50℃, 50~80%RH, 10Cycle	
Drop Test	Total(31 times) Dropping :152cm(19 times), 120cm (12times)	Test 12
	※ Test Conditions : Test after 32times dropping module which is embedded In test set jig.	Test 13
ESD Test	ANT and GND PIN : Contact discharge +/-2Kv 5 times(100pF, 1.5kohm)	Test 14

2.5 DAC Audio Interface

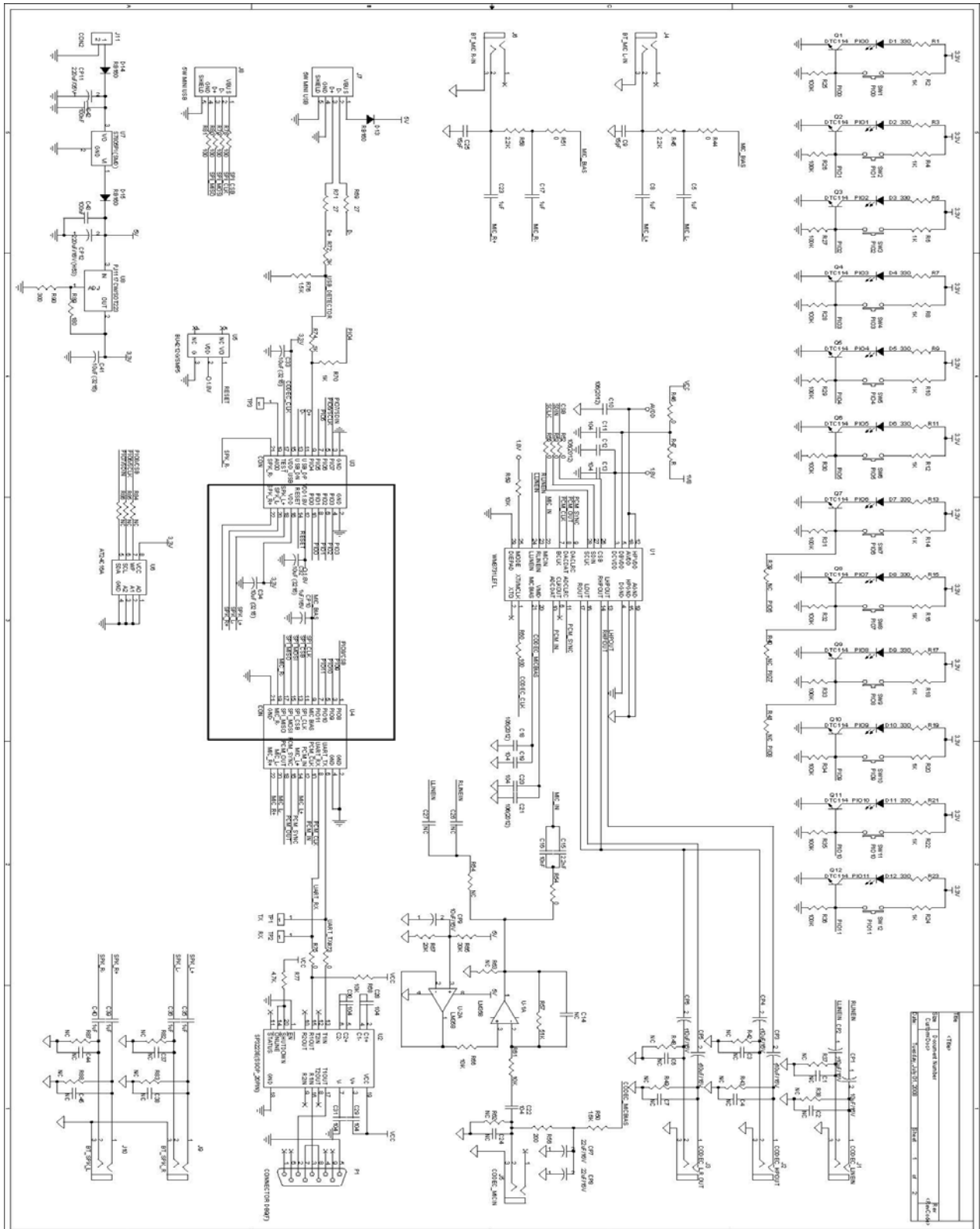


13.3.15 Stereo CODEC - Digital to Analogue Converter

Digital to Analogue Converter						
Parameter	Conditions		Min	Typ	Max	Unit
Resolution			-	-	16	Bits
Output Sample Rate, F_{sample}			8	-	48	kHz
Signal to Noise Ratio, SNR	$f_{\text{in}} = 1\text{kHz}$ B/W = 20Hz→20kHz A-Weighted THD+N < 0.01% 0dBFS signal Load = 100k Ω	F_{sample}				
		8kHz	-	95	-	dB
		11.025kHz	-	95	-	dB
		16kHz	-	95	-	dB
		22.050kHz	-	95	-	dB
		32kHz	-	95	-	dB
		44.1kHz	-	95	-	dB
		48kHz	-	95	-	dB
Digital Gain	Digital Gain Resolution = 1/32dB		-24	-	21.5	dB
Analogue Gain	Analogue Gain Resolution = 3dB		0	-	-21	dB
Output voltage full scale swing (differential)			-	750	-	mV rms
Allowed Load		Resistive	16(8)	-	OC	Ω
		Capacitive	-	-	500	pF
THD+N 100k Ω load			-	-	0.01	%
THD+N 16 Ω load			-	-	0.1	%
SNR (Load = 16 Ω , 0dBFS input relative to digital silence)			-	95	-	dB

3. Application Note

3.1 Application Schematic



4. Recommended Reflow Temperature

※ One Reflow Cycle is permissible

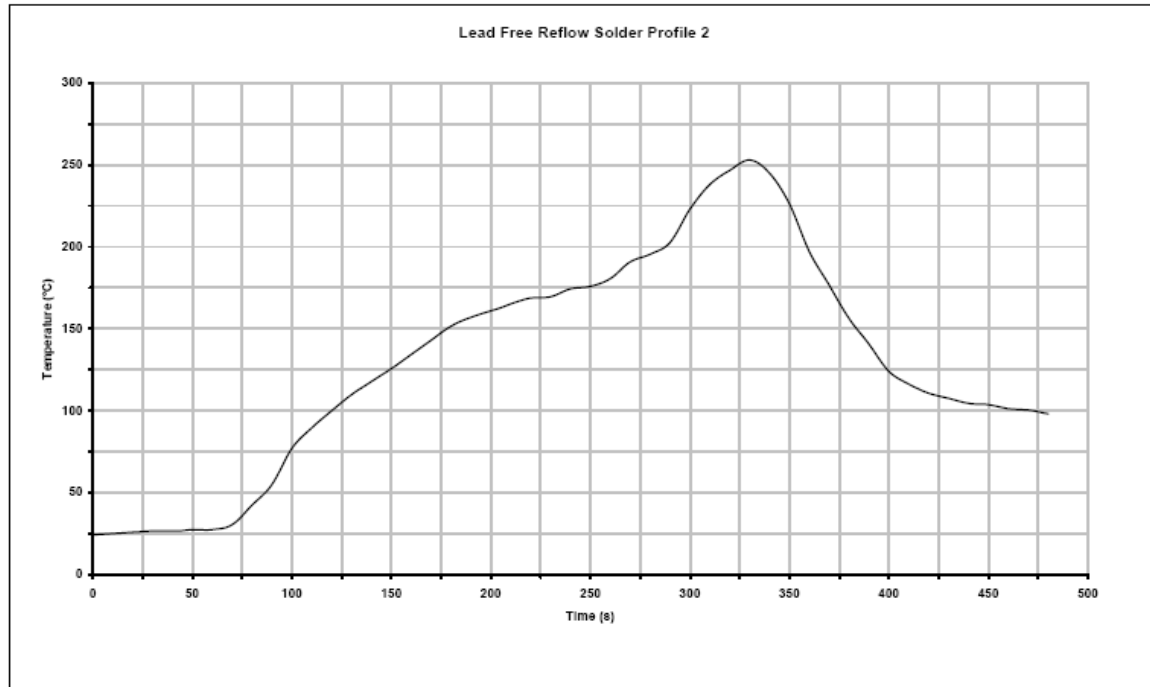


Figure 11.1: Typical Lead-Free Re-flow Solder Profile

Key features of the profile:

- Initial Ramp = 1-2.5°C/sec to 175°C±25°C equilibrium
- Equilibrium time = 60 to 180 seconds
- Ramp to Maximum temperature (250°C) = 3°C/sec max.
- Time above liquidus temperature (217°C): 45-90 seconds
- Device absolute maximum reflow temperature: 260°C

4.1 MS Level 3



1 Moisture Sensitivity Level

CSR classify all products under Moisture Sensitivity Level (MSL) according to Jedec Standards JESD22-A113 and IPC/Jedec J-STD-020 (latest versions).

The MSL identifies the classification of non-hermetic solid state surface mount devices (SMDs) that are sensitive to moisture-induced stress in order that they can be properly packaged, stored and handled so as to prevent any damage during assembly or any other operation. Products are classified into the MSL groups as shown in table 1 below.

Level	Floor Life		Soak Condition	
	Time	Use Conditions	Time	Condition
1	Unlimited	$\leq 30^{\circ}\text{C}$ / 85% RH	168 hrs (+5, -0)	85°C / 85% RH
2	1 year	$\leq 30^{\circ}\text{C}$ / 60% RH	168 hrs (+5, -0)	85°C / 60% RH
2a	4 weeks	$\leq 30^{\circ}\text{C}$ / 60% RH	696 hrs (+5, -0)	30°C / 60% RH
3	168 hours	$\leq 30^{\circ}\text{C}$ / 60% RH	192 hrs (+5, -0)	30°C / 60% RH
4	72 hours	$\leq 30^{\circ}\text{C}$ / 60% RH	96 hrs (+5, -0)	30°C / 60% RH
5	48 hours	$\leq 30^{\circ}\text{C}$ / 60% RH	72 hrs (+5, -0)	30°C / 60% RH
5a	24 hours	$\leq 30^{\circ}\text{C}$ / 60% RH	48 hrs (+5, -0)	30°C / 60% RH
6	Time on Label	$\leq 30^{\circ}\text{C}$ / 60% RH	Time on Label	30°C / 60% RH

Table 1: MSL classification

The MSL classification of a particular CSR product is specified on the product's outer packing.



2 Standard CSR's WLCSP and BGA

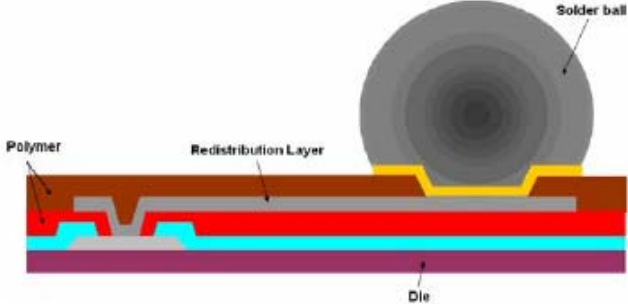
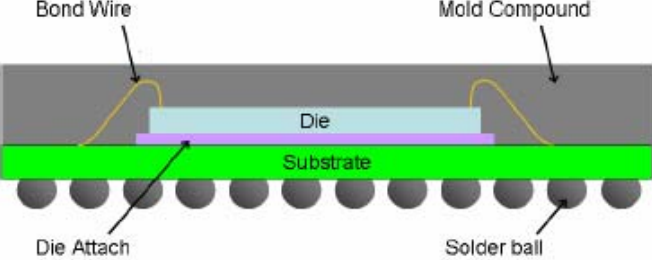
Wafer Level Chip Scale Package (WLCSP)	 Solder ball Polymer Redistribution Layer Die
Ball Grid Array (BGA package)	 Bond Wire Mold Compound Die Substrate Die Attach Solder ball

Table 2: CSR product packages

5. TEST REPORT

ITEM	SPEC	No	1	2	3	4
OUTPUT VOLTAGE	1.8V±0.1 (at 0mA)	MAKER				
		SUPPLIER				
Maximum received signal at 0.1% BER	BER < 0.100%	MAKER				
		SUPPLIER				
RF transmit Power	-6.00dBm < Pav < 4.00dBm	MAKER				
		SUPPLIER				
Initial carrier frequency tolerance	±75 KHz (max ≤ 75KHz)	MAKER				
		SUPPLIER				
drift_rate	≤ 20.0KHz/50 us	MAKER				
		SUPPLIER				
f1 avg maximum Modulation	140.0KHz ≤ df1_avg ≤ 175.0KHz,	MAKER				
		SUPPLIER				
f2avg/f1avgL	df2/df1 ≥ 0.80%	MAKER				
		SUPPLIER				
PIN CODE	0,0,0,0	MAKER				
		SUPPLIER				

6. Test Procedure

6.1. OUTPUT VOLTAGE $1.8V \pm 0.1$ (at 0mA)

6.2. Maximum received signal at 0.1% BER(bit error rate) : $BER < 0.100\%$

6.3. RF transmit Power : $-6.00dBm < P_{av} < 4.00dBm$

6.4. Modulation Characteristics : ± 75 KHz (max ≤ 75 KHz)
:

6.5. Initial Carrier Frequency Tolerance (drift_rate) : $\leq 20.0KHz/50$ us

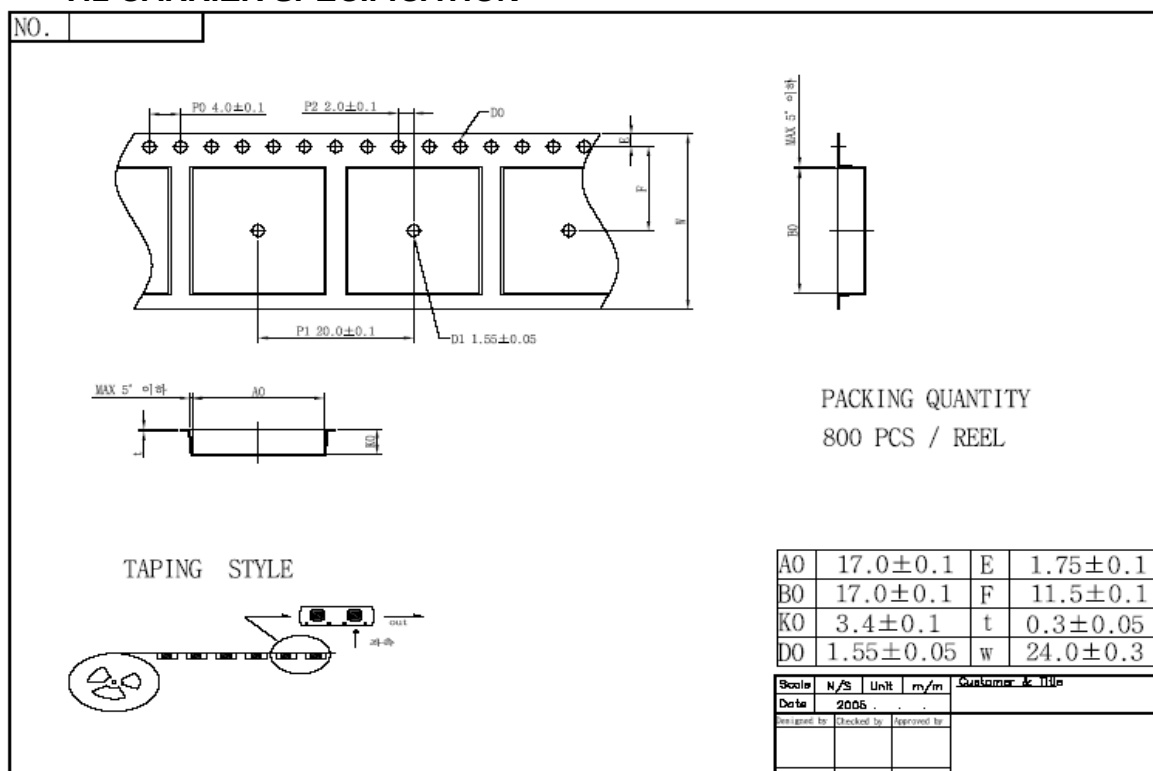
6.6. CarrierFrequency Drift (f1 avg maximum Modulation) : $140.0KHz \leq df1_avg \leq 175.0KHz$,

6.7. "CarrierFrequency Drift (f2avg/f1avgL) : $df2/df1 \geq 0.80\%$

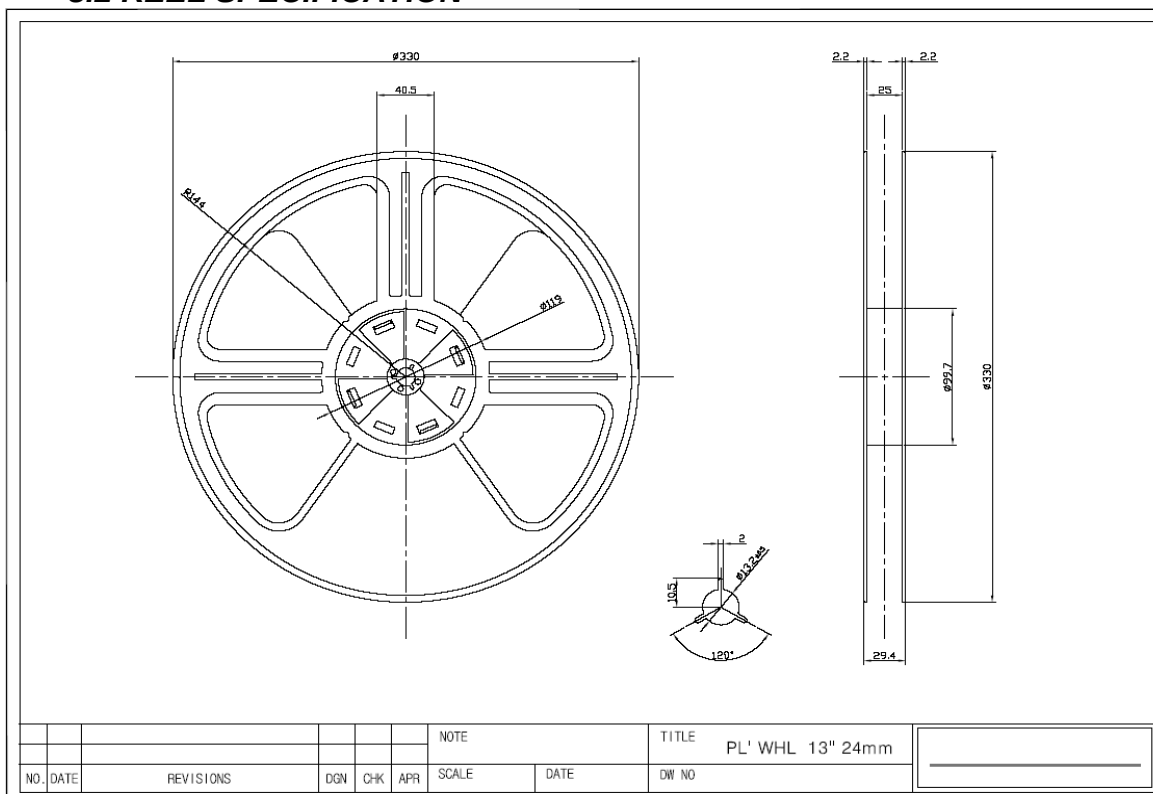
6.8. PIN CODE : [0,0,0,0]
: Security

7. PACKING INFORMATION

7.1 CARRIER SPECIFICATION



8.2 REEL SPECIFICATION



[illegible][illegible]

8. Bluetooth SIG Qualification

페이지 1 / 1



Bluetooth SIG Qualification Design (QDL) Certificate

QDL Certificate: This certificate represents the Specifications declared by the Member as having passed the Bluetooth Qualification/Certification Process as specified within the Bluetooth Specifications and as required within the PRD.

Design Name:

Bluetooth Module (SBM2XA-05)

Certified



This Product Design has passed the Bluetooth Qualification Process!

Core Version: 2.1+EDR

Product Type: Component (Tested)

QDID: B015658

Declared Specifications: Baseband Conformance, Radio, Service Discovery Protocol, Logical Link Control and Adaption Protocol, Generic Access Profile, Link Manager, RFCOMM, Serial Port Profile, Host Controller Interface, Summary ICS, Product Type

Member Company:

SungJin Techwin Co., Ltd.
256-8 Indong, Donggu

Daejeon, 300-828
South Korea

BQE:
Jeongku Lee

Requirements:

1. Testing
2. Documentation
3. Assessment
4. Declaration
5. Listing
6. Marking
7. Compliance to Auditing and Enforcement

Project Dates:

Assessment Date:
July/15/2009

Listing Date:
July/15/2009

9. RoHS DATA

9.1 RoHS



Test Report No. F690501/LF-CTSA09-20462

Issued Date: July 17, 2009

Page 1 of 3

To: SUNGJIN TECHWIN CO., LTD.
256-8
in-dong
dong-gu
DAEJEON 300-828
Korea

The following merchandise was submitted and identified by the client as :

Product Name : Bluetooth Module
SGS File No. : AYAA09-20462
Received Date : July 14, 2009
Test Performing Date : July 15, 2009
Test Performed : SGS Testing Korea tested the sample(s) selected by applicant with following results
Test Results : For further details, please refer to following page(s)
Comments : By the applicant's specific request, the sampling and testing was performed only for the part indicated in the photo without disassembly.

Pluto Kim
Cindy Park
Jinee Song/ Testing Person

SGS Testing Korea Co. Ltd.

Jeff Jang / Chemical Lab Mgr

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F062 Version3

SGS Testing Korea Co., Ltd.

322, The C Valley, 555-6, Hoge-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea 431-280
T +82 (0)21 4938 000 F +82 (0)21 4938 022 <http://www.sgstest.co.kr> www.kr.sgs.com/greenlab

Member of the SGS Group (Société Générale de Surveillance)



Test Report No. F690501/LF-CTSAYAA09-20462

Issued Date: July 17, 2009

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Sample No. : AYAA09-20462.001

Sample Description : Bluetooth Module

Item No./Part No. : SBM2XA-05

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321:2008, ICP	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321:2008, ICP	5	626
Mercury (Hg)	mg/kg	With reference to IEC 62321:2008, ICP	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to IEC 62321:2008, UV-VIS	1	N.D.

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Dibromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tri bromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Hexabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Heptabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Octabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Nonabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Decabromobiphenyl	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tri bromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008, GC-MS	5	N.D.

NOTE: (1) N.D. = Not detected.(<MDL)
 (2) mg/kg = ppm
 (3) MDL = Method Detection Limit
 (4) - = No regulation
 (5) ** = Qualitative analysis (No Unit)
 (6) * = Boiling-water-extraction:
 Negative = Absence of CrVI coating
 Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm² sample surface area.

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Picture of Sample as Received:



*** End ***

- NOTE:
- (1) N.D. = Not detected.(<MDL)
 - (2) mg/kg = ppm
 - (3) MDL = Method Detection Limit
 - (4) - = No regulation
 - (5) ** = Qualitative analysis (No Unit)
 - (6) * = Boiling-water-extraction:
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9.2 Crystal Resonator DSX321G Certificate of Conformity RoHS



August 24, 2009

To: ALPHA COMPONENT Co., Ltd.

Certificate of Compliance [RoHS Directive]

We certify that the following part complies with the RoHS Directive (2002/95/EC) and show the concentration of the restricted substances in the part as below.

Product Name: Crystal Resonator DSX321G Series

Our P/N: 1C326000ZZ0F / 1C312000ZZ0E

Concentration of the Restricted Substances:

Substance name	Concentration* (ppm)	Application area	Purpose of use	Exemptions
Cadmium and its compounds	0			
Lead and its compounds	775,000	Sealing glass of Cap	Main material (Low melting)	Lead in glass of electronic components.
Mercury and its compounds	0			
Chromium (VI) and its compounds	0			
PBB	0			
PBDE	0			

* The above concentrations are theoretical values in each homogeneous material, which have been calculated based on the raw material suppliers' MSDS and composition list.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'A. Homma', is written over a horizontal line.

Akihiro Homma
Manager of Quality Assurance Div.
DAISHINKU CORP.