



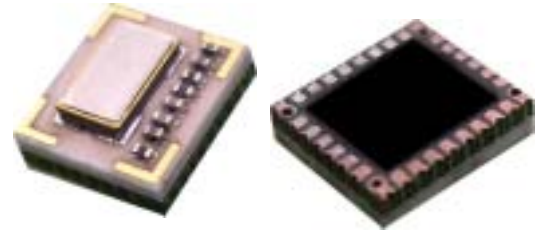
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## DLBM-CS220/CS221

### DLBM-CS220/DLBM-CS221

#### Bluetooth™ Module Class 2

**A Class 2 Bluetooth V1.2 HCI module  
Suitable for various applications.**



### 1.FEATURES:

- **Fully qualified Bluetooth V1.2 module includes RF & BB.**
- **Low cost solution suitable for Cellular, PDA & other high volume consumer products.**
- **Reducing size greatly by combining SOP & SIP technologies.**
- **Smallest size: 6.0\*5.5\*1.7mm(Build-in X'tal)  
/6.0\*5.5\*1.5mm(Without X'tal)**
- **Compliant to various interfaces: UART, USB, PCM, PIO...**
- **No shielding case needed.**
- **Wide operating temperature range: -30~+80 .**

### 2.Device diagram

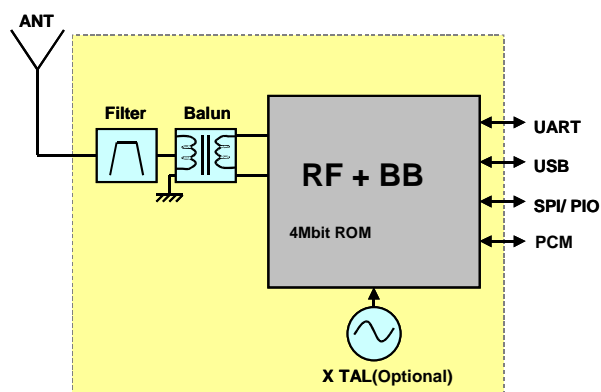


Figure 1. DLBM-CS220 Block Diagram



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## **DLBM-CS220/CS221**

### 3. General Specification

<b>Bluetooth™ Specification</b>	<b>Version 1.2</b>
<b>Frequency</b>	2402~2480MHz
<b>Modulation</b>	AFH/GFSK
<b>Transmission rate</b>	723.2kbps
<b>Receive sensitivity</b>	-80dBm
<b>Maximum output power</b>	+4dBm(Class 2)
<b>Operating Voltage</b>	2.2~3.6V core
<b>Operating temperature</b>	-30~+80
<b>Antenna Impedance</b>	50 ohm
<b>Package size</b>	6.0*5.5*1.7mm (With X'tal)
	6.0*5.5*1.5mm (Without X'tal)
<b>Operating range</b>	More than 10 meters

### 4. Rating

	<b>Min</b>	<b>Max</b>	<b>Unit</b>
<b>Storage Temperature</b>	-40	+85	
<b>VDD_1.8V</b>	-0.4	+2.2	V
<b>VREG_IN</b>	-0.4	+3.6	V



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### 5.Interface

Interface		Description
Antenna		External Antenna 50 ohm
PIO Interface		8 terminals
SPI Interface		For System debugging
PCM Interface		Pulse Code Modulation
UART Interface	DLBM-CS220	TX,RX,RTS,CTS
	DLBM-CS221	TX,RX
USB Interface	DLBM-CS220	None.
	DLBM-CS221	USB_DP,USB_DN

### 6.RF Characteristics

Operating Condition: +25 , VDD=3.0V

RF Characteristics	Min.	Typ.	Max.	Unit
1. Frequency Range	2400 ~ 2483.5			MHz
2. Output Power	-6	1.5	4	dBm
3. Sensitivity at 0.1% BER				
1) 2402MHz	-70	-80		dBm
2) 2441MHz	-70	-80		dBm
3) 2480MHz	-70	-80		dBm
4. Maximum Input Level (BER 0.1%)	-20	0		dBm
5. Adjacent channel selectivity				
1) C/I F=F <sub>0</sub> + 1MHz		-4	0	dB

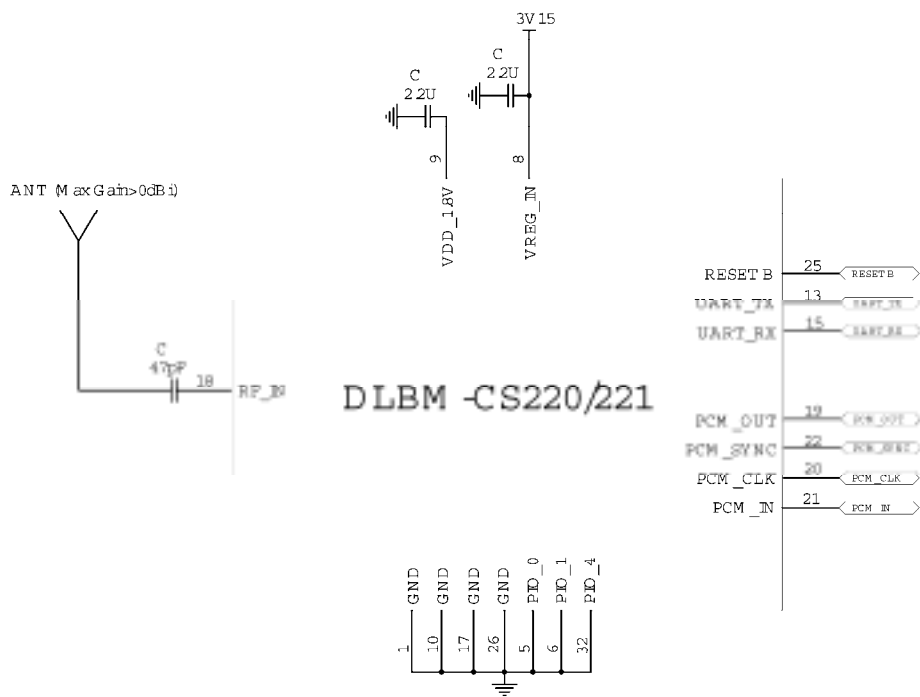


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**DLBM-CS220/CS221**

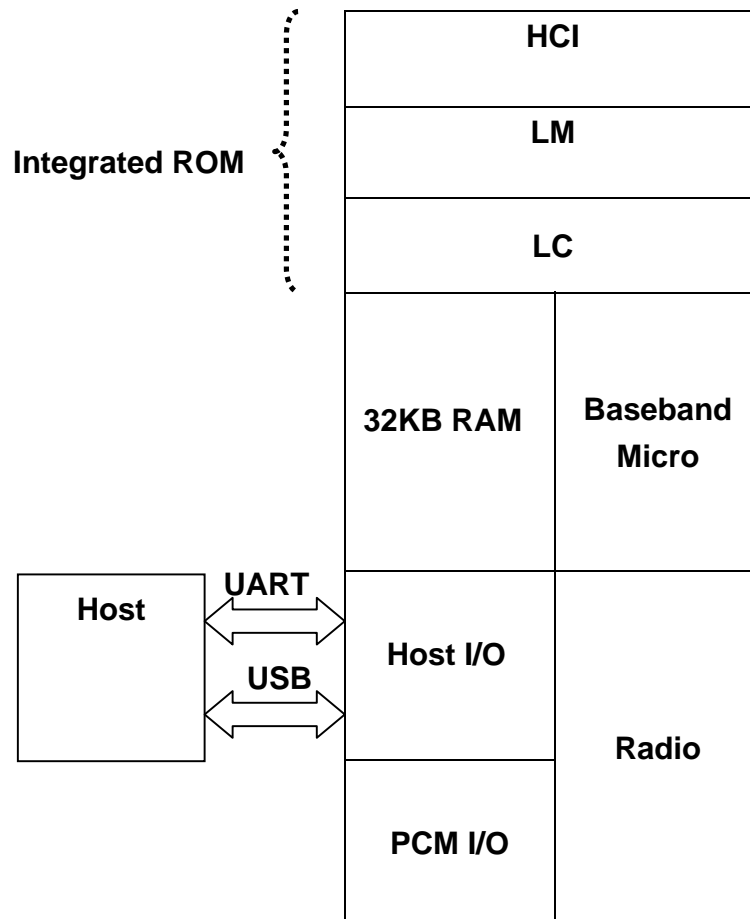
2) C/I F=F <sub>0</sub> - 1MHz		-4	0	dB
3) C/I F=F <sub>0</sub> + 2MHz		-35	-30	dB
4) C/I F=F <sub>0</sub> - 2MHz		-21	-20	dB
5) C/I F F <sub>0</sub> + 3MHz		-45	-40	dB
6) C/I F F <sub>0</sub> - 5MHz		-45	-40	dB
7) C/I F=F <sub>image</sub>		-18	-9	dB
<b>6. Adjacent channel transmit power</b>				
1) F=F <sub>0</sub> ± 2MHz		-35	-20	dBc
2) F=F <sub>0</sub> ± 3MHz		-45	-40	dBc
<b>7. Modulation Characteristics</b>				
1) Maximum modulation f <sub>1avg</sub>	140	165	175	kHz
2) Minimum modulation f <sub>2max</sub>	115	135		kHz
<b>8. Initial Carrier Frequency Tolerance</b>	-35	10	+35	KHz
<b>9. Carrier Frequency Drift</b>				
1) 1slot	-20	9	20	kHz
2) 5slot	-28	10	28	kHz
4) Drift rate	-20	9	20	KHz/50us
<b>10. 20dB Bandwidth for modulated carrier</b>		820	1000	KHz
<b>11.C/I co - channel</b>		9	11	dB

## 7. Application circuit



**Figure 3. Application circuit by using 26MHz crystal for UART BCSP interface.**

## 8. HCI Stack



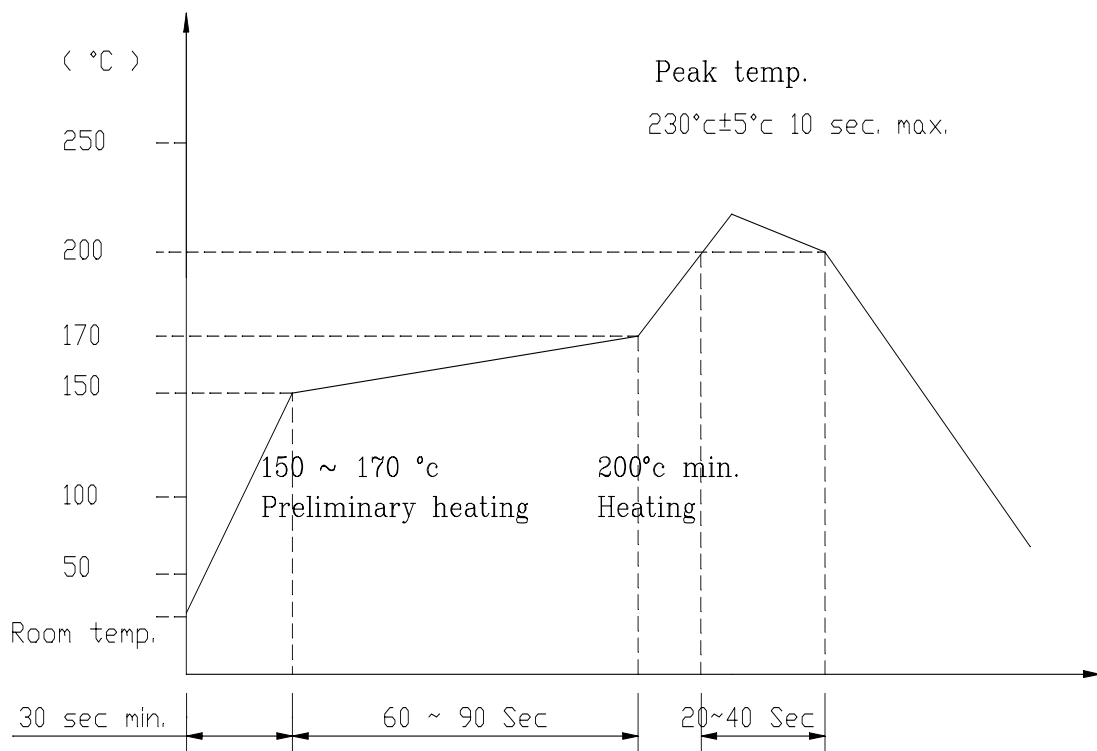
In the implementation the internal processor runs the Bluetooth stack up to the Host Controller Interface (HCI). The Host processor must provide all upper layers including the applications.

## 9. RECOMMENDED REFLOW PROFILE

The temperature rise to 150 for preliminary heating shall be made for 30 seconds or longer.

The preliminary heating shall be done at the temperature of 160  $\pm$ 10 for 60 ~ 90 seconds.

The heating shall be at the temperature of 200 or higher For 20 ~ 40 seconds and the peak temperature shall be 230  $\pm$ 5



**Figure 4. REFLOW PROFILE**



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## 10.Pin description

Pin No.	Name		Description
	DLBM-CS220	DLBM-CS221	
1	GND		
2	PIO_5		Programmable Input/Output Line
3	PIO_3		Programmable Input/Output Line
4	PIO_2		Programmable Input/Output Line
5	PIO_0		Programmable Input/Output Line
6	PIO_1		Programmable Input/Output Line
7	AIO_0		Programmable Input/Output Line
8	VREG_IN		Regulator Input
9	VDD_1.8		Positive Supply & 1.8V Regulated Output
10	GND		
11	XTAL_IN		External Clock Input /NC (Build-in XTAL)
12	XTAL_OUT		Drive for Crystal /NC (Build-in XTAL)
13	UART_TX		UART Data Output Active High
14	UART_CTS	USB_DP	UART Clear To Send Active Low /USB Data Plus



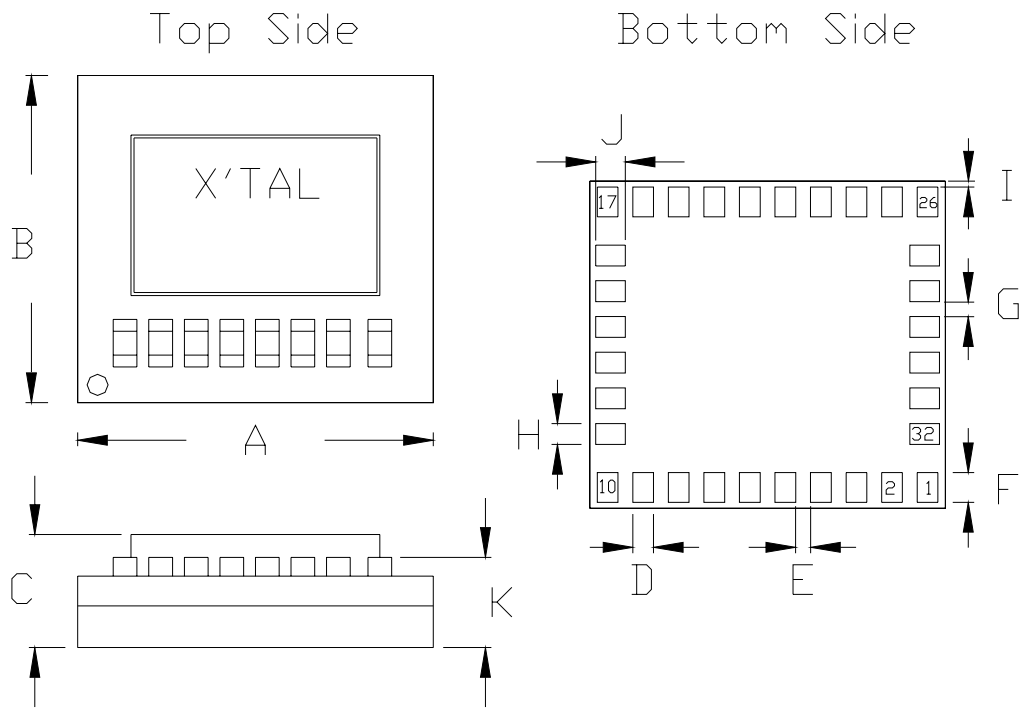


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<b>15</b>	UART_RX		UART Data Input Active High
<b>16</b>	UART_RTS	USB_DN	UART Request To Send Active Low /USB Data Minus
<b>17</b>	GND		
<b>18</b>	RF_IN		50 Ohm Antenna Input
<b>19</b>	PCM_OUT		Synchronous Data Output
<b>20</b>	PCM_CLK		Synchronous Data Clock
<b>21</b>	PCM_IN		Synchronous Data Input
<b>22</b>	PCM_SYNC		Synchronous Data Sync
<b>23</b>	PIO_7		Programmable Input/Output Line
<b>24</b>	PIO_6		Programmable Input/Output Line
<b>25</b>	Reset B		Reset If Low
<b>26</b>	GND		
<b>27</b>	SPI_MISO		Serial Peripheral Interface Data Output
<b>28</b>	SPI_CSB		Chip Select For Synchronous Serial Interface Active Low
<b>29</b>	SPI_CLK		Serial Peripheral Interface Clock
<b>30</b>	SPI_MOSI		Serial Peripheral Interface Data Input
<b>31</b>	TEST_EN		For Test Purposes Only (Leave Unconnected)
<b>32</b>	PIO_4		Programmable Input/Output Line

**11. Dimensions (mm)**



A	6.0 +/- 0.15	G	0.25
B	5.5 +/- 0.15	H	0.35
C	1.7 +/- 0.1	I	0.10
D	0.35	J	0.50
E	0.25	K	1.5 +/- 0.1
F	0.50		

**Figure 5. Output pin dimensions**



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