

# DWPCle83 Module: User Manual

<b>Product Name</b>	: half-size mini-PCle Digital Wireless Audio Module
<b>Brand Name</b>	: SMSC
<b>Model Name</b>	: DWPCle83

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## 1. Product Description

The DWPCle83 USB module is a wireless audio module (30x26.8mm) with a PCI Express interface based on the SMSC DARR83. This USB module can be used to build an uncompressed wireless digital audio transceiver operating in the 2.4GHz, 5.2GHz and 5.8GHz bands.

The wireless audio link supports up to four stereo audio streams and comes together with additional features such as: data encryption, pairing functionality, bi-directional control data messages, low power audio snooze mode, WLAN detection and Automatic Frequency Allocation.

The DARR83 chip itself provides the basic functions of Audio Processing and buffering, Data Link Layer and Physical Layer. The DWPCle83 USB module integrates all functionality for a wireless digital audio connection, comprising:

- DARR83 Wireless Audio Processor
- 2.4GHz/ 5.2GHz/ 5.8 GHz RF Transceiver
- Dual antenna connectors
- USB2.0 through a PCI Express Mini Card System Connector
- Built-in SPI interface Flash

## 2. DWPCle83 Module Usage Scenarios

### 2.1. Headset Mode

When the DWPCle83 Module is configured into the headset mode the DWPCle83 module is able to have an audio input and audio output at the same time. The DWPCle83 module can stream audio to a DARR-enabled headset and simultaneously receive the voice channel from this headset.

### 2.2. Multiple Stream Mode

In the multiple stream mode the DWPCle83 Module will act as a multi stereo stream device so that in Windows Vista and Windows 7 it is possible to play multiple audio sources (iTunes and medial player) to different speakers.

### 2.3. Surround Mode

When the DWPCle83 Module is configured in the surround mode it is possible to transfer 5.1/7.1 audio from a movie to wireless surround speakers.

## 2.4. Customer Specific Applications

An SDK for the DARR83 USB dongle is available at SMSC. For more information on the SDK, the features and support for application specific developments, please contact SMSC.

## 2.5. RF measurement

Conducted measurement is through IPEX connectors. For radiated measurements, suitable external antennas have to be connected to the IPEX connectors.

### 3. DWPCle83 Module Specifications

System Specifications				
ID	Parameter	Value	Unit	Remarks
<b>RF Characteristics</b>				
	RF frequency range <sup>1</sup>	2400 - 2483.5 5150 - 5250 5725 - 5875	MHz MHz MHz	
	Number of RF channels per band	3		
<b>Air framing</b>				
	Addressing	24	Bit	
	Data message size	32	Byte	Application dependent
	CRC	16, 24 and 32	Bit	Hybrid
<b>Control</b>				
	USB 2.0	480	Mbps	
<b>Data</b>				
	Data Bandwidth	100	Kbps	Bi-directional wireless data channel
	Data latency	5	ms	Minimum under good RF link conditions for applications that support the 100kbps data rate.
<b>Interference Robustness</b>				
	Fixed frequency devices (e.g. WLAN, microwave oven)			Fully coexistent <sup>2</sup>
	Frequency hopping devices (e.g. 5.8GHz cordless phones)			Fully coexistent <sup>2</sup>

<sup>1</sup> Country/ Region dependent, refer section 4.

<sup>2</sup> Laboratory tests have verified coexistence with interference sources collocated. Exact ranges are scenario dependent (function of latency, output power, audio compression, etc.). A mix of interference sources is allowed. Interference of fixed frequency devices may result in the loss of one useable RF channel.

Audio Interface				
	Available Interface Types	USB2.0		
	Number of stereo audio inputs or outputs	1, 2, 3 or 4		Bidirectional, incl. audio loop
Audio Quality				
	Sample rate	48	kspS	
	Sample width	16	bit	
	Latency	20	ms	Configurable from 10 to 23.6ms, depending on the application.
	Dynamic Range	TBD		16 bit 48kspS, A-weighted
	THD+N	TBD		16 bit 48kspS
	Frequency response	0	dB	20Hz...22kHz <sup>3</sup>
Dimensions				
	Board dimensions	30 x 26.8	mm	

### 3.1. Absolute Maximum Ratings

Symbol	Parameter	Min.	Typ	Max	Unit
VCC	Supply Voltage			3.8	V
T <sub>storage</sub>	Storage Temperature	-25	-	85	°C
VESD	ESD Contact Discharge	-2	-	+2	kV

### 3.2. Recommended Operating Conditions

Symbol	Parameter	Min.	Typ	Max	Unit
VCC	Supply Voltage		3.3		V
VCC Ripple	Peak to Peak Ripple (in circuit)	-	0	100	mV
T <sub>amb</sub>	Operating Temperature	0	25	60	°C

<sup>3</sup> In applications where Digital Clock Sync is not used.

### 3.3. Pin out at PCI Express interface connector

The pin listing is shown here below:

Pin Number	Pin Name	I/O	Description
2, 24, 39, 41, 52	+3V3_PCIE	PWR	3.3V Regulated input from PCIe
4, 9, 15, 18, 21, 26, 27, 29, 34, 35, 37, 40, 43, 50	GND	GND	Ground
3	GPIO_12_COEX1	I/O	Configurable. Please refer to the DARR83 datasheet
5	GPIO_13_COEX2	I/O	Configurable. Please refer to the DARR83 datasheet
20	GPIO_5_W_DISABLEN	I/O	Configurable. Please refer to the DARR83 datasheet
22	NC		NOT CONNECTED
36	DM	ANA	USB D-
38	DP	ANA	USB D+
42	GPIO_7_LED_WWAN#	I/O	Configurable. Please refer to the DARR83 datasheet
46	GPIO_6_LED_WPAN#	I/O	Configurable. Please refer to the DARR83 datasheet
1, 6, 7, 8, 10, 11, 12, 13, 14, 16, 17, 19, 23, 25, 28, 30, 31, 32, 33, 44, 45, 47, 48, 49, 51	NC		NOT CONNECTED

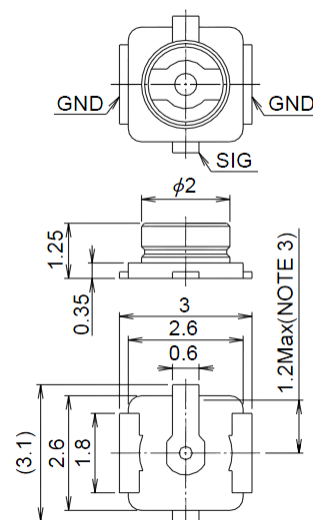
### 3.4. RF Connections

The module provides RF connectors (Hirose U.FL-R-SMT (CL No. 331-0471-0) or equivalent) for use with external antennas. RX and TX diversity antennas are used to avoid dropouts due to multipath fading.

- Antenna A (Main) RF Connector J1 on the module
- Antenna B (AUX) RF Connector J2 on the module

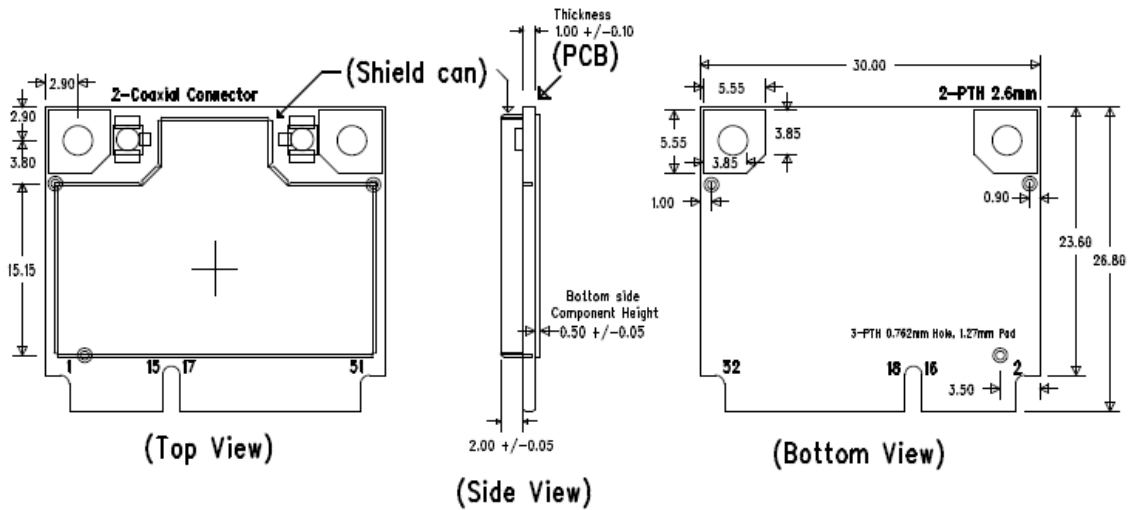
Only 'one' antenna is selected for use at any one time, through the on-board Transmit-Receive/ Diversity RF switch.

#### Coaxial Antenna Connector dimensions



### 3.5. DWPCle83 Module Dimensions

PCB-size: 30 x 26.8 mm ( $\pm 0.15$ )



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## 4. Regulatory Statements for DWPCle83

### USA-Federal Communications Commission (FCC)

This equipment 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.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of 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. If not installed and used in accordance with the instructions, it 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 tuning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

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

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### Caution: Exposure to Radio Frequency Radiation.

To comply with FCC RF exposure compliance requirements, for mobile configurations, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons. This device must not be co-located or operating in conjunction with any other antenna or transmitter.

### CAUTION (this is only applicable to UNII device)

This device is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range. FCC requires this product to be used indoors for frequency range 5.15 to 5.25 GHz to reduce the potential for harmful interference to co-channel Mobile Satellite systems.

Host product must be labeled with "**Contains FCC ID: ZQO-DWPCIE83**".

### Canada – Industry Canada (IC)

This Device complies with RSS-210 of the IC Rules; Operation is subject to the following two conditions:

- (1). This device may not cause interference and
- (2). This device must accept any interference received,, including interference that may cause undesired operation.

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.

### Caution - Exposure 部分 :

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS102 and users can obtain Canadian information on RF exposure and compliance.

Le dispositif répond à l'exemption des limites d'évaluation de routine dans la section 2.5 de RSS102 et les utilisateurs peuvent obtenir des renseignements canadiens sur l'exposition aux RF et le respect.



This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Cet équipement doit être installé et utilisé avec une distance minimale de 20 centimètres entre le radiateur et votre corps.

**Caution: (this is only applicable to LE-LAN device)**


This device is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range. Industry Canada requires this product to be used indoors for frequency range 5.15 to 5.25 GHz to reduce the potential for harmful interference to co-channel Mobile Satellite systems.


Ce dispositif est limité à une utilisation en intérieur à cause de son fonctionnement dans la gamme 5.15 à 5.25 GHz. Industrie Canada exige que ce produit est utilisé à l'intérieur pour la gamme de fréquence de 5,15 à 5,25 GHz pour réduire les risques d'interférence nuisible à la co-canal systèmes mobiles par satellite.

Host product must be labeled with "**Contains IC: 2581A-DWPCIE83**".

**Europe—EU Declaration of Conformity and Restrictions**

Hereby, Standard Microsystems Corporation, declares that this equipment complies with the essential requirements and other relevant provisions of Directive 1999/5/EC.

This equipment needs to be marked with the symbol  and can be used throughout the European community.

Marking by the symbol  indicates that usage restrictions apply.

France - 2.4GHz for Metropolitan France :

In all Metropolitan departments, wireless LAN frequencies can be used under the following conditions, either for public or private use:

- Indoor use: maximum power (EIRP\*) of 100 mW for the entire 2400-2483.5 MHz frequency band
- Outdoor use: maximum power (EIRP\*) of 100 mW for the 2400-2454 MHz band and with maximum power (EIRP\*) of 10 mW for the 2454-2483 MHz band

This device is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range.

To ensure compliance with local regulations, be sure to select the country in which the end product is used.

**Caution: Exposure to Radio Frequency Radiation.**

To comply with RF exposure compliance requirements, for mobile configurations, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons. This device must not be co-located or operating in conjunction with any other antenna or transmitter.

**Taiwan - NCC Statement**

根據交通部低功率管理辦法規定：

第十二條

經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條

低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。

前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

### Korea

Include the following statement either on the label or in the User Guide.

“해당 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없음”

(Translation: the service related to human safety is not allowed because this device may have the possibility of the radio interference.)

### Japan

This device operation in the 5.15 to 5.25 GHz frequency range is restricted to indoor use. Final product shall be labelled "For Indoor use only".

This device has been designed to operate with the antenna listed below, and having a peak gain of 3.65dBi @ 2.4GHz, 4.8dBi @ 5.2GHz and 5.21dBi @ 5.8GHz. Antennas not of the same type and having a higher gain specified above are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

- Model: WNC\_ANT\_WIMAX\_3D-2\_2300-5850MHz, PIFA Antenna, Vendor: WNC
- Model: 81.EDG15.GCP, PIFA Antenna, Vendor: WNC
- Model: 81.EDG15.GCN, PIFA Antenna, Vendor: WNC
- Model: 81.EDG15.GCU, PIFA Antenna, Vendor: WNC
- Model: 81.EDG15.GCT, PIFA Antenna, Vendor: WNC
- Model: 81.EDG15.GCW, PIFA Antenna, Vendor: WNC
- Model: 81.EDG15.GCV, PIFA Antenna, Vendor: WNC
- Model: CAN43131LMVT05631, PIFA Antenna, Vendor: Yageo
- Model: CAN43131LMVT05632, PIFA Antenna, Vendor: Yageo
- Model: CAN43131WLVT05643, PIFA Antenna, Vendor: Yageo
- Model: CAN43131WLVT05644, PIFA Antenna, Vendor: Yageo
- Model: CAN43131WLQU05831 Tx1, PIFA Antenna, Vendor: Yageo
- Model: CAN43131WLQU05831 Tx2, PIFA Antenna, Vendor: Yageo
- Model: SE-EQSTA-003 Tx1/Rx1, PIFA Antenna, Vendor: Smart Approach
- Model: SE-EQSTA-003 Tx2/Rx2, PIFA Antenna, Vendor: Smart Approach

### Frequency Band Information

<b>Country/Region</b>	<b>Frequency Band Usable</b>
USA, Brazil, Argentina, Canada, Hong Kong, Thailand, Singapore	2400-2483.5MHz, 5150-5250MHz, 5725-5850MHz
Korea, Indonesia	2400-2483.5MHz, 5725-5825MHz
Taiwan, Mexico, Australia, New Zealand	2400-2483.5MHz, 5725-5850MHz
Europe, Saudi Arabia	2400-2483.5MHz, 5150-5250MHz, 5725-5875MHz
India	2400-2483.5MHz, 5150-5250MHz, 5725-5825MHz
China	2400-2483.5MHz
Japan, Russia, South Africa	2400-2483.5MHz, 5150-5250MHz

**Note: Range of channels is limited by firmware.**

## 5. Installation Requirements

The DWPCle83 must be installed in a device that contains a 52-pin PCIE slot for mini-PCie cards.

The DWPCle83 has FCC single modular approval, which can eliminate the need for you to obtain FCC Part 15 Subpart C and E (intentional radiation) approvals for your device. In order to use this FCC/IC single modular approval for the DWPCle83, OEM integrators must:

1. include “Contains FCC ID: ZQO-DWPCIE83, IC: 2581A-DWPCIE83” on the exterior label of your device.
2. ensure that its “END” product is electrically identical to the SMSC reference designs
3. use an antenna as approved with the DWPCle83 module or an equivalent type antenna with equal or lower gain and provide antenna reports to SMSC.
4. include all required statements in your final product user’s manual and final product labeling as required by the applicable law in all respects. Refer to FCC/IC Information in previous chapter (for illustration purposes only).
5. not provide Instructions on how to remove or install the DWPCle83 module to your end users.
6. provide regulated +3.3 VDC power to the DWPCle83 module.

### Additional items (CE):

1. the module is tested to comply with the requirement of the R&TTE Directive. System integrators are responsible for compliance of the final device with the R&TTE Directive.
2. Packaging: CE Marking must also be on the outer packaging of the product. The outer packaging must also provide an indication as to where the device is intended to be used and OR conversely, where there may be restrictions to use.

### IMPORTANT NOTE:

In the event that these conditions cannot be met (for example co-location with another transmitter), then the FCC authorization is no longer considered valid and FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

### Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user manual of the end product which integrates this module. The end user manual shall include all required regulatory information/ warning as shown in this manual (for illustration purpose only).

This module installed in Netbook/Notebook/laptop/tablet platform. The SAR value for this composite filing in this configuration is 0.387 W/kg with 10mm antenna to body separation distance with peak antenna gain of 3.65dBi @ 2.4GHz, 4.8dBi @ 5.2GHz and 5.21dBi @ 5.8GHz (Model: WNC\_ANT\_WIMAX\_3D-2\_2300-5850MHz, PIFA Antenna, Vendor: WNC).

## 6. Revision History

Revision	Author	Date	Detail
0.0	SM	22-08-2011	First Release
0.1	SM	26-08-2011	Antenna Updates
0.2	SM	30-08-2011	IC and Frequency Band Updates
0.3	SM	02-09-2011	Antenna Updates
0.4	PC	06-09-2011	Antenna Updates
0.5	PC	08-09-2011	Antenna Updates
0.6	SM/PC	22-11-2011	SAR test Updates