
Dash Cam 2.4G Module

Model:BT530024

Product Specification

WLAN 11b/g/n SDIO MODULE

Version: 2.1

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1. General Description

IC-8189RM product Accord with FCC CE and is 150 wireless SDIO adapter which has lower power consumption, high linearity output power, accords with IEEE802.11B/G/N, and supports IEEE802.11i safety protocol, along with IEEE 802.11e standard service quality. It connects with other wireless device which accorded with these standards together, supports the new data encryption on 64/128 bit WEP and safety mechanism on WPA-PSK/WPA2-PSK, WPA/WPA2. Its wireless transmitting rate rises 150M, equivalent to 10 times of common 11b product. The inner AI high gain ceramics antenna adapts different kinds of work environment. It's easy and convenient to link to wireless network for the users using desktop, laptop and other device that needs connect to wireless network.

2. The range of applying

Dash camera

3. Features

Feature	Implementation
Power supply	VCC_3.3V +/-0.2V
Clock source	40MHz
Temperature range	Work temperature: -20°C---70°C Storage temperature -55°C ~ +125°C
Package	SMT 13 pins
WLAN features	
General features	☐ CMOS MAC, Baseband PHY, and RF in a single chip for IEEE 802.11b/g/n compatible WLAN ☐ Complete 802.11n solution for 2.4GHz band ☐ 72.2Mbps receive PHY rate and 72.2Mbps transmit PHY rate using 20MHz bandwidth ■ 150Mbps receive PHY rate and 150Mbps transmit PHY rate using 40MHz bandwidth ■ Compatible with 802.11n specification ■ Backward compatible with 802.11b/g devices while operating in 802.11n mode

Host Interface	Complies with SDIO 1.1/ 2.0/ 3.0; GSPI interface
Standards Supported	■ IEEE 802.11b/g/n compatible WLAN ■ IEEE 802.11e QoS Enhancement (WMM) ■ 802.11i (WPA, WPA2). Open, shared key, and pair-wise key authentication services
WLAN MAC Features	■ Frame aggregation for increased MAC efficiency (A-MSDU, A-MPDU) ■ Low latency immediate High-Throughput Block Acknowledgement (HT-BA) ■ PHY-level spoofing to enhance legacy compatibility ■ Power saving mechanism ■ Channel management and co-existence ■ Transmit Opportunity (TXOP) Short Inter-Frame Space (SIFS) bursting for higher multimedia bandwidth
WLAN PHY Features	■ IEEE 802.11n OFDM ■ One Transmit and one Receive path (1T1R) ■ 20MHz and 40MHz bandwidth transmission ■ Short Guard Interval (400ns) ■ DSSS with DBPSK and DQPSK, CCK modulation with long and short preamble ■ OFDM with BPSK, QPSK, 16QAM, and 64QAM modulation. Convolutional Coding Rate: 1/2, 2/3, 3/4, and 5/6 ■ Maximum data rate 54Mbps in 802.11g and 150Mbps in 802.11n ■ Switch diversity for DSSS/CCK ■ Hardware antenna diversity ■ Selectable receiver FIR filters ■ Programmable scaling in transmitter and receiver to trade quantization noise against increased probability of clipping Fast ■ receiver Automatic Gain Control (AGC) ■ On-chip ADC and DAC

4. DC Characteristics

Symbol	Parameter	Minimum	Typical	Maximum	Units
VD33A, VD33D	3.3V I/O Supply Voltage	3.135	3.3	3.465	v
VD12A, VD12D	1.2V Core Supply Voltage	1.10	1.2	1.32	v
VD15A, VD15D	1.5V Supply Voltage	1.425	1.5	1.575	v
IDD33	3.3V Rating Current	-	-	600	mA

5.The main performance of product

Item	Description
The supported protocol and standard	IEEE 802.11n, IEEE 802.11g, IEEE 802.11b
Interface type	SDIO 1.1/ 2.0/ 3.0
The range of frequency	2.4-2.484GHZ
The amount of working Channel	1-11 (America, Canada) ;1-13 (China, Europe) ;1-14 (Japan)
Data Modulation	OFDM/DBPSK/DQPSK/CCK
Working Mode	Infrastructure, Ad-Hoc
The transmitting rate	135/54/48/36/24/18/12/9/6 /1M (self-adapting)
Spread spectrum	DSSS
Sensitivity @PER	54/135M:-74dBm@10%PER, 11M:-85dBm@8%PER 6M: -88dBm@10%PER , 1M: -90dBm@8%PER
RF Power	135M:15dBm, 54M:15dBm, 11M:19dBm
Throughput	90Mbps(external 2dbi antenna ,damping 40dbm in Shielding box)
The connect type of Antenna	Connect to the external antenna through the half hole
LED indicator	status indicator
The transmit distance	Indoor 100M, Outdoor 300M, according the local environment
Working Power consumption	180MA
MENS(L*W*H)	14.1MM*12.5*0.8MM
The chipset model	RTL8189ES-CG

6. DC/RF characteristics

Terms	Contents			
Specification : IEEE802.11b				
Mode	DSSS / CCK			
Frequency	2412 – 2484MHz			
Data rate	1, 2, 5.5, 11Mbps			
DC Characteristics	min	Typ.	max.	unit
TX mode	305	309	311	mA
Rx mode	175	180	181	mA
Standby mode	140	145	146	uA
Specification : IEEE802.11g				
Mode	OFDM			
Frequency	2412 - 2484MHz			
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps			
DC Characteristics	min	Typ.	max.	unit
TX mode	244	245	245	mA
Rx mode	182	185	186	mA
Standby mode	143	145	146	uA
Specification : IEEE802.11n				
Mode	OFDM			
Frequency	2412 - 2484MHz			
Data rate	6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps			
DC Characteristics	min	Typ.	max.	unit
TX mode	240	242	244	mA
Rx mode	189	190	191	mA
Standby mode	144	145	146	uA

7.The block diagram of product principle

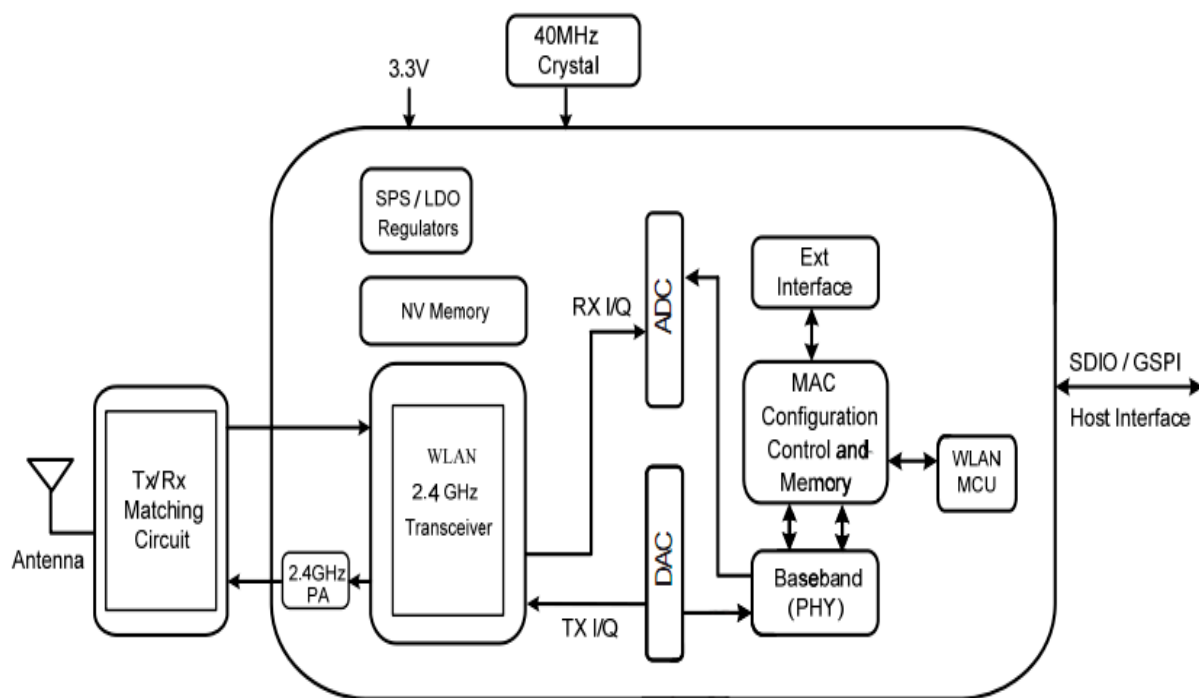
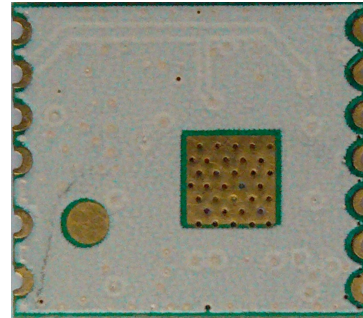
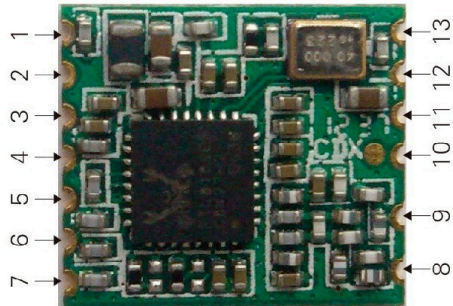


Figure 1 Single-Band 11n (1x1) Solution

8.The supported platform

Operating System	CPU Framework	Driver
WIN2000/XP/VISTA/WIN7	X86 Platform	Enable
LINUX2.4/2.6	ARM, MIPSII	Enable
WINCE5.0/6.0	ARM ,MIPSII	Enable

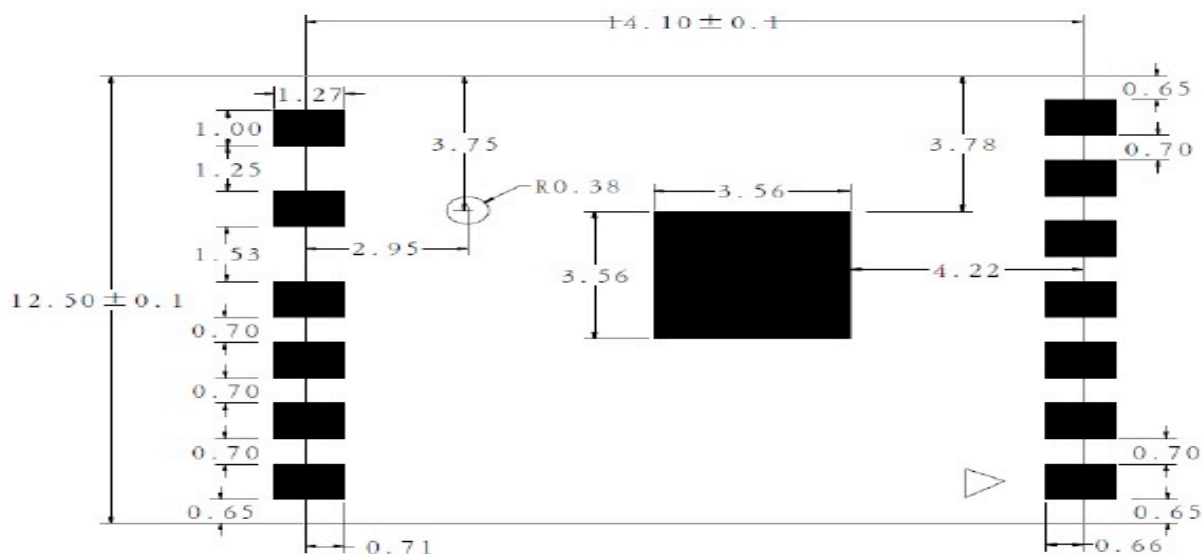
9.The definition of product Pin



Top and bottom view of IC-8189RM

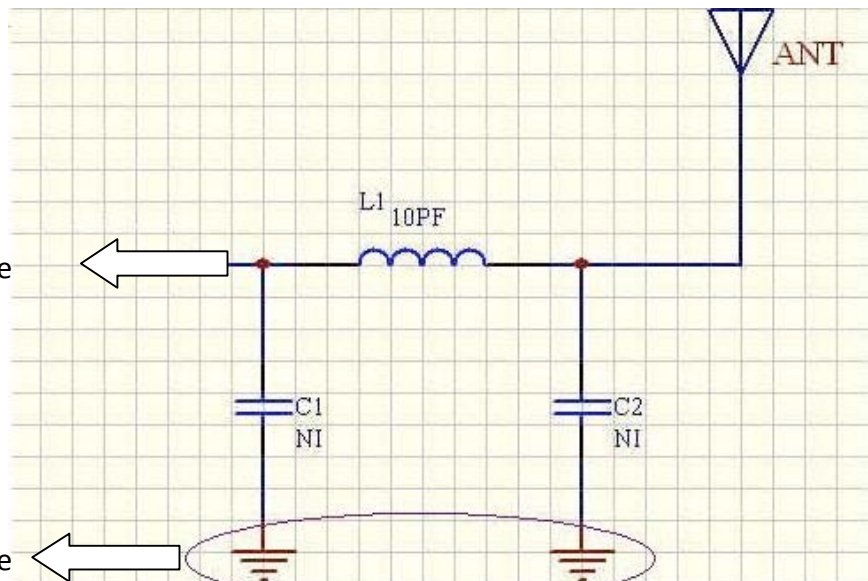
Pin No:	TYPE	Description
1	I/O	SDIO command/GSPI data input
2	I/O	SDIO data 3/GSPI chip select
3	I/O	SDIO data 2
4	I/O	SDIO data 1/GSPI data Out
5	I/O	SDIO data 0/GSPI data Output
6	I/O	SDIO clock/GSPI clock
7	P	GND
8	P	GND
9	P	Wlan_ANT
10	P	WLAN wake
11	P	Power supply for I/O (1.62-3.3V)
12	P	VCC_3V3(3.3V TYP)
13	P	Power down select

10.The Structure and Size of product



11: The 6th Pin connect to antenna, please refer to design demand

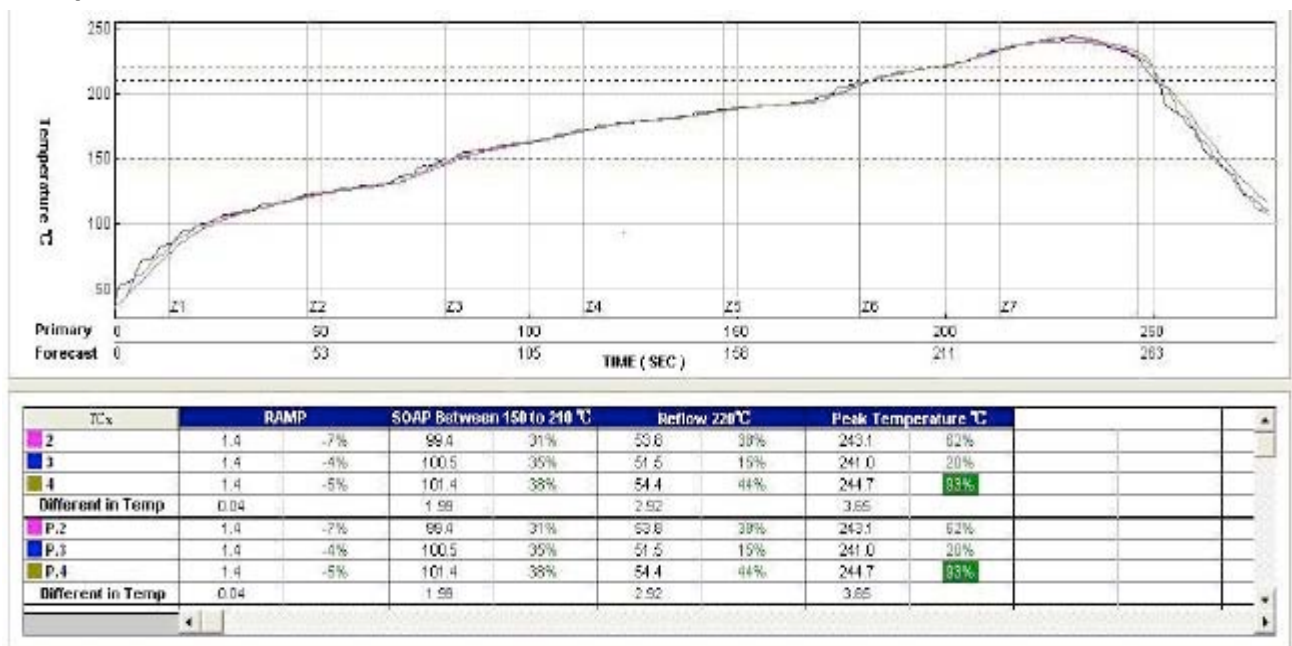
Connect to the 9th pin of Module



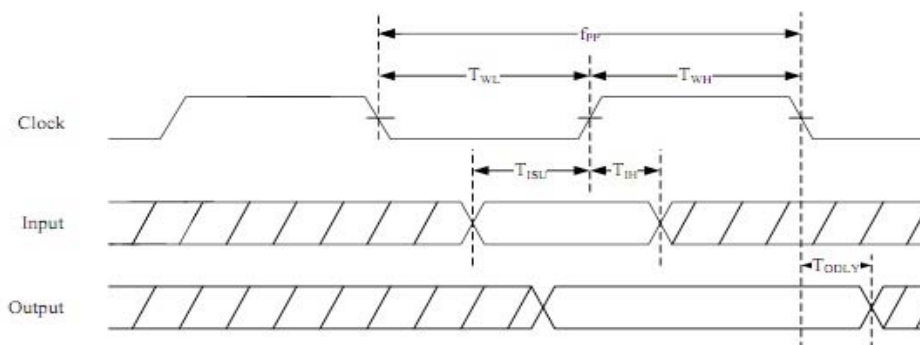
Connect to the 8th pin of Module

- The current of 3.3V power supply must be >300mA, its ripple wave must be <30mV. The GND pins of module and external antenna need to be an incorporated part. The ground plane should be larger, module and antenna should keep far away from interference source.
- The sixth pin is 2.4G high frequency output, coplanar impedance of layout line between this pin to antenna interface should be $50\ \Omega$, we suggest use arc line or straight line, and beside the line there will be ground plane that its length as shout as possible, the longest length is no more than 50mm.
- L1, C1, C2 constitute a π -type network that we preset, please make it close to antenna interface, this π -type network is used to match the antenna parameters and control the radiation. It should be adjusted according to the real condition when being used. Normally you can only mount L1 that its parameters are: 10pF, NP0 material. No need C1 and C2

12.Tpical Solder Reflow Profile



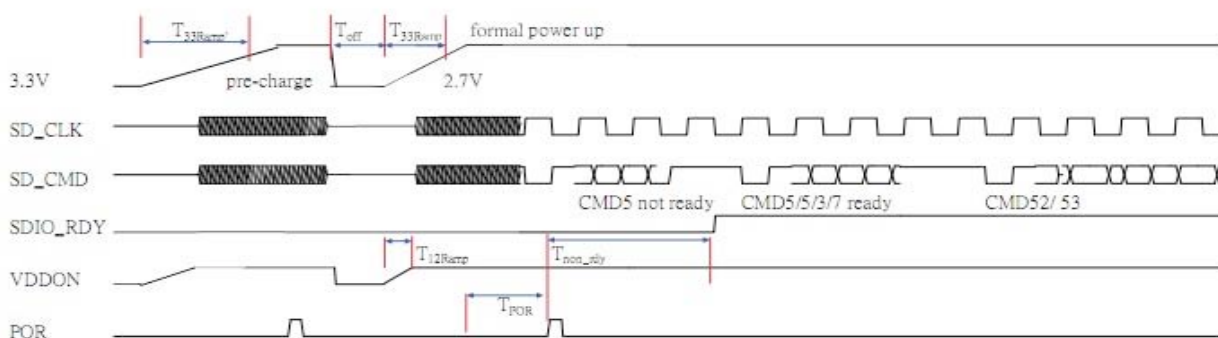
13. I/O Interface Characteristics



SDIO/GSPI Interface Characteristics

NO	Parameter	Mode	MIN	MAX	Unit
f_{PP}	Clock frequency	Default	0	25	MHz
		HS	0	50	MHz
T_{WL}	Clock low time	DEF	10		ns
		HS	7		ns
T_{WH}	Clock high time	DEF	10		ns
		HS	7		ns
T_{ISU}	Input setup time	DEF	5		ns
		HS	6		ns
T_{IH}	Input hold time	DEF	5		ns
		HS	2		ns
T_{ODLY}	Output delay time	DEF		14	ns
		HS		14	ns

The SDIO Interface Timing Parameters



SDIO Interface Characteristics

	Min	Typical	Max	Unit
T_{33ramp}^*	--	--	No Limit	ms
T_{off}	250	500	1000	ms
T_{33ramp}	0.1	0.5	2.5	ms
T_{12ramp}	0.1	0.5	1.5	ms
T_{por}	2	2	8	ms
$T_{non-rdy}$	1	2	10	ms

SDIO Interface Power On Timing Parameters

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.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: 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 or more 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.

The Dash Cam 2.4G Module is designed to comply with the FCC statement. FCC ID is WUI-BT530024. The host system using Dash Cam 2.4G Module Module, should have label indicated it contain modular's FCC ID: WUI-BT530024 . This radio module must not installed to colocate and operating simultaneously with other radios in host system additional testing and equipment authorization may be required to operating simultaneously with other radio.

The Dash Cam 2.4G Module is deaigned for a compact PCB design .It should be installed and operated with Dash Cam or other minimum distance of 20 centimeters between the radiator and your body." To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed 6dBi in the 2.4G band. The Dash Cam 2.4G Module and its antenna must not be co-located or operating in conjunction with any other transmitter or antenna within a host device.

The OEM can use metal antennas or FPC antennas, and the antenna gain is less than 6dBi for this module.

If difference antenna types or host are used, C2PC should be applied.

Notice to OEM integrator

The end user manual shall include all required regulatory information/warning as show in this manual. The OEM integrator is responsible for testing their end-product for any additional compliance requirements required with this module installed.

The device must be professionally installed

The intended use is generally not for the general public.It is generally for industry/commercial use. The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not nomally required, the user has no access to the connector.Installation must be controlled. Installation requires special training

RF warning for Mobile device:

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.

ISED 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.

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

The Dash Cam 2.4G Module is designed to comply with the ISED statement. IC is 7297A-BT530024. The host system using Dash Cam 2.4G Module, should have label indicated it contain modular's IC: 7297A-BT530024. This radio module must not be installed to collocate and operating simultaneously with other radios in host system additional testing and equipment authorization may be required to operating simultaneously with other radio.

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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.

Cet équipement doit être installé et utilisé à une distance minimale de 20 cm entre le radiateur et votre corps

Le module Dash Cam 2.4G est conçu pour se conformer à la déclaration ISDE. IC est 7297A-BT530024. Le système hôte utilisant le module de module Dash Cam 2.4G, devrait avoir une étiquette indiquant qu'il contient le CI modulaire: 7297A-BT530024. Ce module radio ne doit pas être installé pour co-implanter et fonctionner simultanément avec d'autres radios dans le système hôte. Des tests supplémentaires et une autorisation d'équipement peuvent être nécessaires pour fonctionner simultanément avec une autre radio. Le module Dash Cam 2.4G est conçu pour une conception compacte de PCB. Il doit être installé et utilisé avec Dash Cam ou une autre distance minimale de 20 centimètres entre le radiateur et votre corps. "Pour se conformer aux réglementations ISDE limitant à la fois la puissance de sortie RF maximale et l'exposition humaine au rayonnement RF, le gain d'antenne maximal, y compris la perte de câble dans une condition d'exposition uniquement mobile, ne doit pas dépasser 6 dBi dans la bande 2,4 G. Le module Dash Cam 2.4G et son antenne ne doivent pas être situés ou fonctionner conjointement avec tout autre émetteur ou antenne dans un appareil hôte.

Si différents types d'antenne ou hôte sont utilisés, C2PC doit être appliqué.

Avis à l'intégrateur OEM

Le manuel de l'utilisateur final doit inclure toutes les informations / avertissements réglementaires requis, comme indiqué dans ce manuel. L'intégrateur OEM est responsable de tester leur produit final pour toute exigence de conformité supplémentaire requise avec ce module installé.

L'appareil doit être installé par un professionnel

L'utilisation prévue n'est généralement pas destinée au grand public. Elle est généralement destinée à un usage industriel / commercial. Le connecteur se trouve dans le boîtier de l'émetteur et n'est accessible que par le démontage de l'émetteur qui n'est pas requis, l'utilisateur n'a pas accès au connecteur. L'installation doit être contrôlée. L'installation nécessite une formation spéciale.