

I. Product introduction

This module (DBM) is the cloud intercom part of the traditional video intercom, video doorbell, building intercom and other devices. It solved the problem that traditional devices cannot be connected to the Internet. forming the interconnection and the network between smart mobile devices and household appliances. Via the App the client can receive messages, remotely talk, remotely unlock the door, With the microcontroller, the client can switch between [multi-household video](#) and multi-door contro so that it can apply to Both single-family model and multi-families model. DBM makes remote placement and surveillance possible and can achieve the functions of audio records, video recordings, snapshot, search, playback. Thanks to its intergrated multifunctions, DBM is suitable for different situation--buildings, villa's, video talk and so on. DBM can also be customized according to customer requirement:

(1) 32X32 module

(Picture to be updated)

II. Definition of the product function requirements

- 1) This section describes the definition of the requirement for cloud intercom equipment, mainly focusing on the requirements in the functions, performance, users and management requirements.
- 2) Priority is divided into 5 levels, 5 must, 4 necessary, 3 can, 2 optional, and 1 is not currently supported.
- 3) The version of requirement for the hardware, ✓ means support, 0 means some support, and ✗ Means unsupported.

Function of the hardwares

code of the functions	names	functions	note
VD-FR-001	start the device	1)connect to the power, the indication light turns red.	✓
		2)If wifi setting is required, connect to wifi, register on Cloud platform.	✓
		3)succeed in the connection, NTP timezone and the clock	✓
VD-FR-002	indication light	when indication light is on, it is red	✓
VD-FR-003	recover to the factory setting	long press reset button, after 3s, factory setting is recovered.	✓
		1) clear the arming time, and the linkage setting	✓
		2) clear wifi setting	✓
VD-FR-004	add equipement	1)Network via cable, connect to the network, search and add the device, register on platform.	✓
		2)Network with cable, long press reset button, enter AP mode, search on wifi reference and add, register on platform	
VD-FR-005	(Doorbell Call)	When doorbell rings, a 5s video record will be automatically upload and the video talk is ready. The talk finishes after hanging up the phone. There will be a sound alarm after 60s ring. 10 seconds after the alarm and the device is not picked up, the call stop and the device enters stand-by mode.	✓
VD-FR-006	(Doorbell Hangup)	when the doorbell hang up, the call finishes. For the indoor device DBM32 the doorbell can be hanged up from inside.	✓
VD-FR-007	(Doorbell Busy)	For the DBM32 module, when the analog video input is one-to-many and a video channel is busy, the OSD displays "VIDEO BUSY" on the default video.	✓
VD-FR-008	(Live View)	When de doorbell is actively or passively called and is picked up, there will be the real-time video displayed after being connected.	✓
		When answering the bell, the full-duplex intercom on the will be automatically on.	
		When calling the bell, the speaker on the is off by default. If the speaker can be turned on, if no other user has turned on the video connection. Otherwise the speaker cannot be turned on and BUSY will be displayed.	
VD-FR-009	control lock	Electronic lock controlled by the switch. Choice between one channel or two channels	✓

VD-FR-010	remotely unlock	After the doorbell cvideo interface is connected, there is the choice of remote unlocking. (temporarily no choice for the Unlocking And Return).	✓
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APP

APP functions	Names	function description	notes
APP-UR-101	album	show history pictures, offer the function of “Empty at one- <u>click</u> ”	✓
APP-UR-102	add equipment via AP hot spot	Scan AP SSID(URM_)with , Add equipment into the current account.	✓
APP-UR-103	manually add equipment	Input equipment ID, code, then add equipment into the current account.	✓
APP-UR-104	scan to add the equipment	add equipment via UID or QR.	✓
APP-UR-105	add known equipment	add known equipment in LAN	✓
APP-UR-106	offline signal	knowing the connection by the offline signal	✓
APP-UR-107	delete	Delete equipment. Relating video and snapshot will be deleted at the same time.	✓
APP-UR-108	sticky on top	place the equipment on the top of the list	✓
APP-UR-109	subscription	notice for the calls, hangup, answering alarm	✓
APP-UR-110	edit	rename, password setting	✓
APP-UR-111	password setting	change the password of the front-end equipment	✓
APP-UR-112	wireless setting	Switch WIFI SSID	✓
APP-UR-113	SD card setting	SD card info, format the SD card	✓
APP-UR-114	time setting	Time synchronization, time zone, daylight-saving time	✓
APP-UR-115	system setting	soft restart , defaut setting recover, factory setting recover	✓
APP-UR-116	door stations preview setting	switch the videos between two door stations	✓
APP-UR-117	cam preview setting	switch the videos between two outdoor cameras	✓
APP-UR-118	snapshot preview setting	snapshot	✓
APP-UR-119	video preview setting	real-time video record	✓
APP-UR-120	unlock preview setting	open gate	✓
APP-UR-121	open gate	open gate	✓
APP-UR-122	playback date	choose the date for playback, current time by default	✓
APP-UR-123	Playback snapshot	capture the picture from the video during playing back.	✓
APP-UR-124	Playback video	make video record by playing back	✓
APP-UR-125	Playback sound	play back the sound record	✓
APP-UR-126	Playback download	download the video and pictures to the from TF card from far end	✓

APP-UR-127	Playback calls	time record for the calls	✓
APP-UR-128	Playback answers	When background program from receives the doorbell call, the call interface automatically pops up, at the same time rings and vibrate following the setting. The user can perform the following operations:	✓
		Answer: Connect to the live video of the doorbell and perform video intercom;	
		refuse: the user refuses to answer.	
APP-UR-129	Handup the doorbell	The doorbell actively hangs up to end the call while ringing. The receives the message "Doorbell hangs up". The user can choose to call the doorbell to check.	✓
APP-UR-130	answered	The receives the message "answered" and the notice of "video busy" if other user has pick up the phone while ringing. The user can choose to call the doorbell to monitor.	✓
APP-UR-131	Call in	When the user actively calls the doorbell, connect to the live video of the doorbell and performs video intercom, the microphone is off by default, and only image and sound available.	✓
APP-UR-132	Vision talk	For a video intercom, with real-time video on site, the following operation can be performed.	✓
		handup: finish the video intercom	✓
		Snapshot: Take a screenshot of and save in the	✓
		Video: Capture live video clips and save in the	✓
		Mute/Speaker: Turn off or play the audio, display the phone volume	✓
		Turn on/off the microphone: turn on or off the downlink audio of the phone's microphone	✓
		Unlock: remotely open the electronic lock (choose the first channel or the second channel)	✓

III. Pin definition Doorbell 32 module

Pin number	Functions' names	Pin number	Functions' names
1	audio output (Single-ended power amplifier)	21	TF_data1
2	GND	22	TF_power_en (TF power enable)
3	audio input (external mic)	23	TF_data0

	possible)		
4	GND	24	TF_date2
5	LAN_RD- Differential routing	25	TF_CLK
6	LAN_RD+ Differential routing	26	TF_date3
7	LAN_TD- Differential routing	27	TF_CMD
8	LAN_TD+ Differential routing	28	TF_detect (examining)
9	GND	29	GND
10	LAN_LED Data indicator	30	Uart0_RX
11	power_EN	31	Uart0_TX
12	3.3V 1.5A input	32	NC
13	3.3V 1.5A input	33	LED_red
14	USB_D- Differential routing	34	LED_blue
15	USB_D+ Differential routing	35	reset_IO
16	GND	36	GPIO
17	NC	37	GPIO_CAY
18	GND	38	GPIO_CAY
19	CVBS_1 video input 1	39	Uart1_RX
20	GND	40	Uart1_TX

Hardware design specifications:

- 1) 11 feet: module power enable, high level effective
- 2) Module power supply requires independent power supply
- 3) The differential routing of the LAN data line should be as short as possible
- 4) The differential routing of the USB data cable should be as short as possible
- 5) TF card data parallel running line, the same length

III. Module specifications

Power supply	3.3V 1.5A
Reset IO	Short pressing enters the restart mode; long pressing restores the factory settings and clears wifi parameters and password
Indiction light IO	Red and blue lights flash alternately and slowly: No internet connected, waiting to configure WiFi (OEM possible)
	Constant red light: in the process of calling (OEM possible)
	Constant blue light: connected (OEM possible)
video input	CVBS video input
audio output	Call, ringing tone
	Timeout, prompt with sound notice when no one answer.
	Armed with a short beep
	Disarmed with two short beeps
audio input	Monitoring microphone, voice coding algorithm, full-duplex voice intercom (hardware echo cancellation not included)
	Support WiFi 802.11n wireless LAN or 4G LTE module (WiFi/4G module not included)
TF card	TF card interface, maximum support 128G card (slot not included)
Internet port	Ethernet PHY interface (Ethernet transformer not included)
UART0 master communication interface	Communication with the main control serial interface, the communication content includes:
	1、Doorbell call (master control 1 > module)
	2、hangup control (master control 1 > module)
	3、pick up (master control 1 > module)
	4、indoor device answer (master control 1 > module)
	5、start/stop mornitor (master control 1 > module)
	6、video occupied (master control 1 > module)
	7、unlock control (module 1 > master control)
size	32*32*7mm
package	Anti-static packaging

FCC WARNING

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.

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

15.105 Information to the user.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20

cm between the radiator and your body.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other

antenna or transmitter.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.

The firmware setting is not accessible by the end user.

The final end product must be labelled in a visible area with the following:

“Contains Transmitter Module “FCC ID:2BMVD-SKY98DC”

Requirement per KDB996369 D03

2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See also Section 2.10 below concerning the need to notify host manufacturers that further testing is required.³

Explanation: This module meets the requirements of FCC part 15C (15.247). It Specifically identified AC Power Line Conducted Emission, Radiated Spurious emissions, Band edge and RF Conducted Spurious Emissions, Conducted Peak Output Power, Bandwidth, Power Spectral Density, Antenna Requirement.

2.3 Summarize the specific operational use conditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: The product antenna uses an irreplaceable antenna with a gain of 2.16dBi

2.4 Single Modular

If a modular transmitter is approved as a "Single Modular," then the module manufacturer is responsible for approving the host environment that the Single Modular is used with. The manufacturer of a Single Modular must describe, both in the filing and in the installation instructions, the alternative means that the Single Modular manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A Single Modular manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited

module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.

This Single Modular procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited

module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.

Explanation: The module is a single module.

2.5 Trace antenna designs

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ – Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.

a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna); b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered); c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout; d) Appropriate parts by manufacturer and specifications; e) Test procedures for design verification; and f) Production test procedures for ensuring compliance

The module grantee shall provide a notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application

2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

Explanation: The module complies with FCC radiofrequency radiation exposure limits for uncontrolled environments. The device is installed and operated with a distance of more than 20 cm between the radiator and your body." This module follows FCC statement design, FCC ID :2BMVD-SKY98DC

2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an "omni-directional antenna" is not considered to be a specific "antenna type").

For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product.

The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: The product antenna uses an irreplaceable antenna with a gain of 2.16dBi

2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This

includes advising host product manufacturers that they need to provide a physical or e-label stating "Contains FCC ID" with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: 2BMVD-SKY98DC

2.9 Information on test modes and additional testing requirements5

Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer's determination that a module as installed in a host complies with FCC requirements.

Explanation: SHENZHEN CAY TECHNOLOGY CO., LTD can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

2.10 Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product

as being Part 15

Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Explanation: The module without unintentional-radiator digital circuitry, so the module does not require an evaluation by FCC Part 15 Subpart B. The host should be evaluated by the FCC Subpart B.