Manuals+ — User Manuals Simplified.

Vantron

**Vantron VOSM350
System on Module**

Vantron VOSM350 System on Module Owner's Manual

Contents

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Vantron VOSM350 System on Module

Product Brief

VOSM350 system-on-module is powered by MediaTek G350 chipset, which integrates a quad-core ARM Cortex-A53 processor, a Mali-G52 GPU, a VP6 APU for AI and computer vision algorithms, and a HiFi4 audio engine DSP to fit for edge AI applications that require voice and vision processing. Its support for Wi-Fi and Bluetooth wireless connectivity increases its versatility for IoT scenarios. The module features LGA packaging that allows for direct welding, eliminating the need for additional connectors. Additionally, it is Open Standard Module (OSM) V1.1 compliant, which enables seamless integration into various products. The module design conforms to industrial standards, ensuring an extended service life that meets the rigorous demands of industrial customers. Customers have the option to choose between two variants that offer advanced and compact configurations. The module is designed to cater to a vast of application scenarios including but not limited to handheld devices, smart home appliances, industrial IoT devices, and gym instruments.

Features and benefits

VOSM350

  Rich interfaces, robust system performance

  Internal DSP unit, low power design

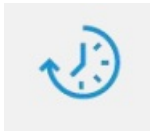 Wi-Fi & Bluetooth integrated, RF debug ready

  Android and Linux systems supported

  Compact size, LGA packaging

  Open Standard Module (OSM) V1.1 compliant

Extended service life (7+ years)

Application Scenarios

Robotics

AIDC (handheld)

Fitness Console

Home Appliance

Industrial IoT

Smart Retail

VOSM350 System-on-Module Datasheet

Specifications		
System	CPU	MTK MT8365 (G350), Quad-core ARM Cortex-A53 low-power processor, 2.0GHz (Max.)
	GPU	ARM Mali-G52 GPU, 600MHz
	APU	Cadence® Tensilica® VP6 processor, 700MHz at 0.825V
	Memory	4GB LPDDR4 (Optional: 2GB)
	Storage	32GB eMMC 5.1 (Optional: 16GB)
	EEPROM	2Kb (for hardware configuration information)
	PMIC	MT6390
Communication	Wi-Fi	802.11 a/b/g/n/ac
	Bluetooth	Bluetooth 5.2
Media	Video processing	1080p60, H.265/H.264/JPEG video encoder 1080p60, H.265/H.264/VP9 video decoder
	Audio DSP	Tensilica HiFi4
Power	Input	5V/1A DC input
Software	Operating system	Android 10+, Linux Yocto, Linux (Support by request)
	Device management	BlueSphere MDM (Optional for Android version)
Mechanical	Dimensions	45mm x 45mm x 3.97mm
Environment Condition	Temperature	Operating: -20℃ ~ +60℃ Storage: -30℃ ~ +70℃
	Humidity	≤95% RH (Non-condensing)

I/Os		
Display	1 x 4-lane MIPI DSI, up to 1920 x 1080 @60Hz	
MIPI CSI	1 x 4-lane MIPI CSI, 13MP @30fps	
ADC	2 x ADC	
RGMII (Ethernet)	1 x RMII/MII	
SPI	1 x SPI	
Debug UART	1 x UART for debugging (1.8V level)	
Communication UART	2 x UART (TTL)	
I^{2}S	1 x I^{2}S	
I^{2}C	2 x I^{2}C	
PWM	Supported	
USB	1 x USB 2.0 OTG	1 x USB 2.0 Host
GPIO	25 x GPIO (max.)	
SDIO	1 x SDIO	
JTAG	Supported	

Electrical Characteristics

Absolute Maximum Ratings

Voltage beyond absolute maximum ratings may cause permanent damage to the module. Operation of the module outside of recommended conditions may result in reduced lifetime and/or reliability problems even if the absolute maximum ratings are not exceeded.

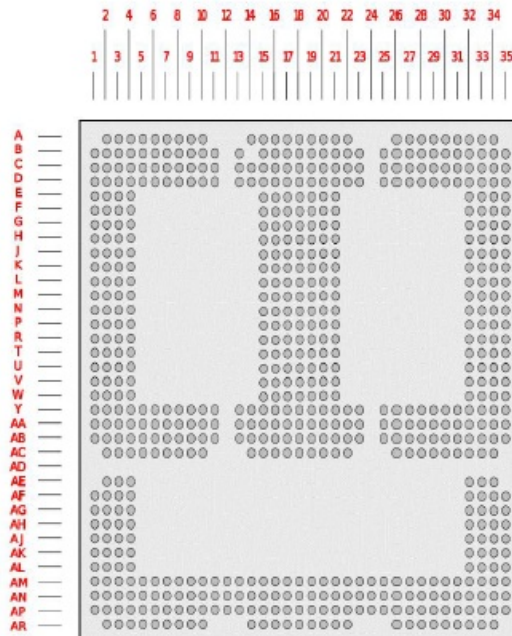| Parameter		Min.	Max.	Unit
Voltage of the SOM		0	5.25	V
Voltage on Wi-Fi/BT chip	AVDD18	-0.3	1.98	V
	AVDD33	-0.3	3.63	V
Voltage of LPDDR4	LPDDR4X VDD1	-0.4	2.3	V
	LPDDR4X VDD2	-0.4	1.6	V
	LPDDR4X VDDQ	-0.4	1.6	V
Storage temperature		-30	70	°C

Recommended Operating Conditions

You are recommended to operate the module in the following conditions to achieve optimized performance of the module.

Parameter		Min.	Typ.	Max.	Unit
Voltage of the SOM		2.6	3.7	5.25	V
Voltage of EMCP	eMMC VCC	2.7	3.3	3.6	V
	eMMC VCCQ	1.7	1.8	1.95	V
	LPDDR4 VDD1	1.7	1.8	1.95	V
	LPDDR4 VDD2	1.06	1.1	1.17	V
	LPDDR4 VDDQ	1.06	1.1	1.17	V

Parameter		Min.	Typ.	Max.	Unit
Voltage on Wi-Fi/BT chip	AVDD18	1.6	1.8	1.9	V
	AVDD33	NA	3.3	3.63	V
Voltage on CPU	Processor	0.81	0.9	0.99	V
	Processor SRAM	0.65	0.8	1.025	V
	Core	0.8	0.9	1.05	V
	Core logic	0.8	0.9	0.94	V
	DSI/CSI/USB/WBG/PLLGP	0.55	0.8V	0.84	V
	DSI/CSI/USB/WBG/PLLGP/AP	0.81	0.9	0.99	V
	IO/MSDC0/MSDC2	1.14	1.2	1.26	V
	IO/MSDC1/EEPROM	1.7	1.8	1.9	V
	VQPS	1.7	1.8	1.9	V
	EMI0	1.7	1.8	1.9	V
	EMI	1.7	1.8	1.9	V

Pinout

Pin	Name	Type	Description
19, R18,17, M19	NC		No connection
V17	EXT_EN	Passive	GPIO
T17	FORCE_RECOVERY#	Passive	To enter recovery mode if carrier board is at low level
AA9	PWR_BTN#	Passive	Power button input from carrier board. Carrier to float the line in in-active state.Active low, level sensitive. Should be de-bounced onthe module
U17	SYS_RST#	Passive	System reset input,active low
AB18	VCC_BAT	Power	Power input, battery voltage
AA18	VCC_BAT	Power	Power input, battery voltage

Pin	Name	Type	Description
, Y20, Y3, AA33, B29	NC		No connection
7, Y8, Y9	NC		No connection
Y11, AE4, F4, AG4	NC		No connection
25, Y26,27, Y28	VCC_IN_5V	Power	5V power input
, AH4, AJ3, AK4, Y19, U18	NC		No connection
E15, E21,, F20, J16	GND	GND	Ground
L18, M16, 20, P18	GND	GND	Ground
R20, V16, 20, Y18	GND	GND	Ground

Pin	Name	Type	Description
AA14, AA17, AA19, AA22, AB15, AB21	GND	GND	Ground
A4, A7, A10, B2, B5, B8, B9, C11, D1, D5	GND	GND	Ground
D8, E2, H2, H4, L2, L4, P2, P4, R1, U2	GND	GND	Ground

U4, V1, W3, Y2, AA1, AA4, AA7, AA8, AB3	GND	GND	Ground
AA10, AA11, AB6, AB9, AC4, AC7, AC10	GND	GND	Ground
A26, A29, A32, B27, B28, B30, B33, C25	GND	GND	Ground
C32, C35, D28, D34, F33, F35, G34, H32	GND	GND	Ground
J33, J35, K34, M35, N34, T34, W34, AE2	GND	GND	Ground
AA25, AA26, AA27, AA28, AA32, AB28	GND	GND	Ground
AB31, AB34, AC27, AC30, AC33, AE34	GND	GND	Ground
AG3, AH2, AK3, AL2, AF35, AH34, AJ35	GND	GND	Ground
AL34, AM13, AM16, AM19, AM22, AM35	GND	GND	Ground
AN3, AN6, AN9, AP2, AN11, AN15, AN18	GND	GND	Ground
AN21, AN33, AP5, AP8, AP13, AP16	GND	GND	Ground
AP19, AP22, AP25, AP28, AP31, AP34	GND	GND	Ground
AR14, AR17, AR20, AR26, AR29, AR32	GND	GND	Ground

T18, T19, Y13, Y14, AA13, N2, AA2, J32	NC		No connection
K32, K33, L32, M32, M33, N32, P32, P34	NC		No connection
R32, R33, T32, T33, AB25, AB26, AE32	NC		No connection
AL3, AL4, AM3, AM4, AM5, AM6	NC		No connection
AM7, AM8, AM9, AM10, AM23, AM24	NC		No connection
AM25, AM26, AM27, AM28, AM29	NC		No connection
AM30, AM31, AN2, AN5, AN7, AN8	NC		No connection
AN24, AN25, AN26, AN27, AN28, AN29	NC		No connection

Pin	Name	Type	Description
AN30, AN31, AP10	NC		No connection
C2	MIPI_CSI_CLK/GPIO	Passive	Camera clock output/GPIO
G3	MIPI_CSI_PDN/GPIO	Passive	Camera power down signaloutput, high active/GPIO
G4	MIPI_CSI_RST/GPIO	Passive	Camera interrupt signal input/GPIO
B3	CSI0A_L2N	Passive	Channel input CSI0A lane 2 N
B4	CSI0A_L2P	Passive	Channel input CSI0A lane 2 P
C1	CSI0A_L1N	Passive	Channel input CSI0A lane 1 N
B1	CSI0A_L1P	Passive	Channel input CSI0A lane 1 P
A2	CSI0B_L0N	Passive	Channel input CSI0B lane 0 N
A3	CSI0B_L0P	Passive	Channel input CSI0B lane 0 P

A5	CSI0A_L0N	Passive	Channel input CSI0A lane 0 N
A6	CSI0A_L0P	Passive	Channel input CSI0A lane 0 P
B6	CSI0B_L1N	Passive	Channel input CSI0B lane 1 N
B7	CSI0B_L1P	Passive	Channel input CSI0B lane 1 P
C4	I2C3_SCL	Passive	I2C3 clock signal
C3	I2C3_SDA	Passive	I2C3 data signal
F4	MIPI_DSI_BL_EN /GPIO	Passive	MIPI_DSI 1V8 backlight enable signal output/GPIO
E18	MIPI_DSI_PWM	Passive	MIPI_DSI backlight PWM signal output
F3	MIPI_DSI_VDD_EN/ GPIO	Passive	MIPI_DSI 3V3 power enable signal output/GPIO
AB8	MIPI_TX_CLKN	Passive	MIPI_DSI differential clocklane –
AB7	MIPI_TX_CLKP	Passive	MIPI_DSI differential clocklane +
AB11	MIPI_TX_D0N	Passive	MIPI_DSI differential lane 0 –
AB10	MIPI_TX_D0P	Passive	MIPI_DSI differential lane 0 +
AC9	MIPI_TX_D1N	Passive	MIPI_DSI differential lane 1 –
AC8	MIPI_TX_D1P	Passive	MIPI_DSI differential lane 1 +
AC6	MIPI_TX_D2N	Passive	MIPI_DSI differential lane 2 –
AC5	MIPI_TX_D2P	Passive	MIPI_DSI differential lane 2 +
AB5	MIPI_TX_D3N	Passive	MIPI_DSI differential lane 3 –
AB4	MIPI_TX_D3P	Passive	MIPI_DSI differential lane 3 +
AA3	EXT_WOL	Passive	GPIO
M18	ADC_0	Passive	Analog-digital converter 0
N18	ADC_1	Passive	Analog-digital converter 1

Pin	Name	Type	Description
AC18, P19, C18, P16	NC		No connection
R19	JTRST	Passive	JTAG reset, active low, suggest not using
N17	JTCK	Passive	JTAG clock, suggest not using
P17	JTDI	Passive	JTAG data input, suggest not using
R17	JTDO	Passive	JTAG data output, suggest not using
N19	JTMS	Passive	JTAG mode select, suggest not using
B22	SPDIF_IN	Passive	SPDIF data input

C16	SPDIF_OUT	Passive	SPDIF data output
D6	ACCDET	Passive	Headphone hook data input on EVB
D7	HP_EINT	Passive	Headphone detect signal input
Y29	AU_VIN0_N	Passive	Microphone channel 0 negative input
Y30	AU_VIN1_N	Passive	Microphone channel 1 negative input
Y31	AU_LOLN	Passive	Line out negative output
AA29	AU_VIN0_P	Passive	Microphone channel 0 positive input
AA30	AU_VIN1_P	Passive	Microphone channel 1 positive input
AA31	AU_LOLP	Passive	Line out positive output
AK32	FCHR_ENB	Passive	Force charging enable
AK33	AU_HPL	Passive	Left channel output of the headphone
AL32	AU_HPR	Passive	Right channel output of the headphone
AL33	AU_REFN	Passive	Audio reference ground
AM32	CS_N	Passive	Fuel gauge ADC input negative
AM33	CS_P	Passive	Fuel gauge ADC input positive
F18	PWM_C	Passive	PWM_C signal output, LED control on EVB
G18, H18, J18, K18, AB17, AC17, AB19, AC19, C14, C13	NC		No connection
A14	URXD1	Passive	UART1 receive data
B13	UTXD1	Passive	UART1 transmit data
D16	NC		No connection
D15	NC		No connection
D14	URXD2	Passive	UART2 receive data
D13	UTXD2	Passive	UART2 transmit data

Pin	Name	Type	Description
A22	NC		No connection
B23	NC		No connection
D22	UART0_RX_M0_DEBUG/GPIO	Passive	UART0 receive data, for debugging (1.8V)/GPIO

D23	UART0_TX_M0_DEBUG/GPIO	Passive	UART0 transmit data, for debugging (1.8V)/GPIO
C22, C23, V21	NC		No connection
W21	I2S3_DO	Passive	I2S3 data 0 digital audio output
V19	NC		No connection
W19	NC		No connection
W20	I2S3_BCLK	Passive	I2S3 bit clock
W18	I2S3_LRCLK	Passive	I2S3 left-right channel synchronization clock
V18	I2S3_MCLK	Passive	I2S3 Master clock output to I2S codec
AB2, AB1, AC3, AC2, V2, M34	NC		No connection
L34, L35, K35, L33, W2, Y1, W1	NC		No connection
R2, T1, U1, T2	NC		No connection
D11	USB_DM_P0	Passive	USB differential data pairs for port A
D10	USB_DP_P0	Passive	USB differential data pairs for port A
C10	USB_DRVVBUS	Passive	GPIO
D9	IDDIG	Passive	USB OTG device detection
C8	USB_OC_P0	Passive	USB over-current for port A
C9	USB_VBUS	Passive	USB power detection for port A
B11, B10, A9, A8	NC		No connection
D26	USB_DM_P1	Passive	USB differential data pairs for port B
D25	USB_DP_P1	Passive	USB differential data pairs for port B
C26	DRV_VBUS_P1	Passive	GPIO
C28	USB_OC_P1	Passive	USB over current signal input for port B
D27, B26, B25,	NC		No connection
A28, A27, C27	NC		No connection
AA15	I2C2_SCL	Passive	I2C2 clock signal / GPIO
AA16	I2C2_SDA	Passive	I2C2 data signal / GPIO
AA20	I2C1_SCL	Passive	I2C1 clock signal / GPIO
AA21	I2C1_SDA	Passive	I2C1 data signal / GPIO

Pin	Name	Type	Description
AB13, AC14, AC16	NC		No connection
AB14, AC15, AB16	NC		No connection
AB23, AC22, AC20	NC		No connection
AB22, AC21, AB20	NC		No connection
J21	SD1_NCD	Passive	SD card detection
F21	SD1_CLK	Passive	SDIO clock
E20	SD1_CMD	Passive	SDIO command/response
G20	SD1_DATA0	Passive	SDIO data line, push-pull
G21	SD1_DATA1	Passive	SDIO data line, push-pull
H20	SD1_DATA2	Passive	SDIO data line, push-pull
H21	SD1_DATA3	Passive	SDIO data line, push-pull
C20	VMC_PMU	power	SDIO 1 voltage
D21	NC		No connection
D20	NC		No connection
T21	NC		No connection
K20	NC		No connection
K21	NC		No connection
L20	NC		No connection
L21	NC		No connection
M21	NC		No connection
N20	NC		No connection
T20	VIO18_PMU	power	SDIO 2 voltage
N21, P20, P21	NC		No connection
R21, U21, U20	NC		No connection

Pin	Name	Type	Description
D17	GPIOA0	Passive	GPIOA0 signal
E17	GPIOA1	Passive	GPIOA1 signal
F17	GPIOA2	Passive	GPIOA2 signal
G17	GPIOA3	Passive	GPIOA3 signal
H17	GPIOA4	Passive	GPIOA4 signal
J17	GPIOA5	Passive	GPIOA5 signal
D19	GPIOB0	Passive	GPIOB0 signal
E19	GPIOB1	Passive	GPIOB1 signal
F19	GPIOB2	Passive	GPIOB2 signal
G19	GPIOB3	Passive	GPIOB3 signal
H19	NC		No connection
J19	NC		No connection
K19	NC		No connection
L19	NC		No connection
D3	GPIOC0	Passive	GPIOC0 signal
D4	NC		No connection
E3	GPIOC2	Passive	GPIOC2 signal
E4	NC		No connection
U32	GPIOD0	Passive	GPIOD0 signal
U33	GPIOD1	Passive	GPIOD1 signal
V32	GPIOD2	Passive	GPIOD2 signal
V33	GPIOD3	Passive	GPIOD3 signal
W32	GPIOD4	Passive	GPIOD4 signal
W33	GPIOD5	Passive	GPIOD5 signal

Pin	Name	Type	Description
Y32	GPIOD6	Passive	GPIOD6 signal
AF32	GPIOE0	Passive	GPIOE0 signal
AF33	GPIOE1	Passive	GPIOE1 signal

AG32	GPIOE2	Passive	GPIOE2 signal
AG33	GPIOE3	Passive	GPIOE3 signal
AH32	GPIOE4	Passive	GPIOE4 signal
AH33	GPIOE5	Passive	GPIOE5 signal
AJ32	NC		No connection
AJ33	NC		No connection
W15	NC		No connection
W16	NC		No connection
Y15	SPI_CS	Passive	CONN_TEST_CK/SPI A master chip select 0
K17, AA23, L17	NC		No connection
U16	SPI_CLK_M1	Passive	SPI A serial data clock
U15	SPI_MISO_M1	Passive	SPI A serial data input
V15	SPI3_MOSI_M1	Passive	SPI A serial data output
Y21, Y22, Y23, C30	NC		No connection
Y33, D29, C29, D30	NC		No connection
F15	EXT_COL	Passive	Port A collision detection (half speed only)
E16	CRS_DV	Passive	Port A carrier sensing
R15	ENET_RMII_RXCLK	Passive	Port A receive clock

Pin	Name	Type	Description
M15	ENET_RMII_RXDV	Passive	Port A receive data validation

Pin	Name	Type	Description
L16	ENET_RMII_RXER	Passive	Port A receive error signal
N15	ENET_RMII_RXD2	Passive	Port A received data bit 2
P15	ENET_RMIII_RXD3	Passive	Port A received data bit 3
J15	ENET_RMII_TXCLK	Passive	Port A transmit clock
K16	ENET_RMII_TXEN	Passive	Port A transmit enable (Error)
K15	ENET_RMII_RXD0	Passive	Port A received data bit 0(receive first)
L15	ENET_RMII_RXD1	Passive	Port A received data bit 1
H15	ENET_RMII_TXD0	Passive	Port A transmit data bit 0 (transmit first)
G15	ENET_RMIII_TXD1	Passive	Port A transmit data bit 1
H16	ENET_RMII_TXD2	Passive	Port A transmit data bit 2
G16	ENET_RMII_TXD3	Passive	Port A transmit data bit 3
N16, E1, D2, P1, L1, K2, M1, N1, H1	NC		No connection
J2, J1, K1, G1, F1, G2, F2, C6, C7, M2	NC		No connection

Pin	Name	Type	Description
M17	VIO18_PMU	Passive	1.8V IO power for all Ethernet interfaces
T16	EXT_MDC	Passive	Management bus clock signal for Ethernet
T15	EXT_MDIO	Passive	Management bus data signal for Ethernet
AR18	WIFI0_ANT	Passive	WIFI antenna
AR19, AR22, AP17, AP18, AP20, AP21	GND	GND	Ground
AR21	BT_ANT	Passive	BT antenna
AP26, AP27, AP29, AP30, AP14	NC		No connection
AR16	WIFI1_ANT	Passive	WIFI antenna
AR15, AP15	GND	GND	Ground
AB35, AC34, W35,T35, U34, R35, P35, N35, V34, V35, U35	NC		No connection

* Apart from those specified here, any pins not included in these sheets are not connected.

Ordering Information

Ordering No.	Chipset	Description	Operating system
VOSM350-AH	MT8365	4GB LPDDR4, 32GB eMMC, MIPI DSI, UART, USB, SPI, I^2C, GPIO	Android
VOSM350-YH	MT8365		Yocto
VOSM350-AL	MT8365	2GB LPDDR4, 16GB eMMC, MIPI DSI, UART, USB, SPI, I^2C, GPIO	Android
VOSM350-YL	MT8365		Yocto
VT-SBC-VOSM350-EVB-H	MT8365	VOSM350-H + carrier board, HDMI/MIPI DSI, UART, USB, SPI, I^2C, GPIO	Android (default), Linux optional
VT-SBC-VOSM350-EVB-L	MT8365	VOSM350-L + carrier board, HDMI/MIPI DSI, UART, USB, SPI, I^2C, GPIO	
* More variants are available, please contact the sales executive for details.			

Packing list		Optional accessories	
VOSM350 system-on-module	1	Adapter and power cord	1 kit
		Wi-Fi and BT antenna	1

Company Profile
Since its establishment in 2002 by two Silicon Valley entrepreneurs, Vantron Technology has been at the forefront of connected IoT devices and IoT platform solutions. Today, Vantron boasts a global customer base that includes many Fortune Global 500 companies. Its product lines cover edge intelligent hardware, IoT communication devices, industrial displays and BlueSphere cloud platforms.
With over 20 years of experience in R&D of intelligent edge hardware including SOMs, motherboards, and embedded industrial computers, Vantron has provided users with diverse embedded solutions featuring ARM and X86 architectures. Its offerings range from Linux, Android to Windows, from embedded level to desktop level, and from gateways to servers. In addition, it provides services such system trimming, driver transplantation and more to cater to the unique needs of its users.

ISED Warning:
"This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject 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."

"CAN ICES-3 (B)/NMB-3(B)"
"In order to comply with ISED RF Exposure requirements, this device must be installed to provide at least 20 cm separation from the human body at all times.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. This radio transmitter (ISED certification number: 31870-VOSM350) has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antenna Type	Frequency	Antenna Gain	Connector	Type d'antenne	fréquence	Antenna Gain	Connector
External Antenna	2412~2462 MHz	1.82	Male SMA Reverse	Antenne externe	2412~2462 MHz	1.82	Male SMA Reverse
External Antenna	5180~5240 MHz5745~5825MHz	3.49	Male SMA Reverse	Antenne externe	5180~5240 MHz5745~5825MHz	3.49	Male SMA Reverse
External Antenna	2402~2480 MHz	1.82	Male SMA Reverse	Antenne externe	2402~2480 MHz	1.82	Male SMA Reverse

- This device is intended only for OEM integrators under the following conditions:
- The transmitter module may not be co-located with any other transmitter or antenna.
- As long as the condition above is met, further transmitter test will not be required.
- However, the OEM integrator is still responsible for testing their end product for any additional compliance requirements required with this module installed.

Important Note:
In the event that these conditions cannot be met (for example certain laptop configurations or colocation with another transmitter), then the Canada authorization is no longer considered valid and the IC cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for reevaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

Note Importante:

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's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Caution:

1. The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
2. For devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the EIRP limits specified for point-to-point and non-point-to-point operation as appropriate.

FCC Warning:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. For all Class B Digital Devices, a statement like the following is needed:
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 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 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 for help.

FCC Part 15 Clause 15.21 [Do not Modify warning]:
"Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment". FCC Part 15.19(a [interference compliance statement], unless the following statement is already provided on the device label: – "This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

Radiation Exposure Statement:

1. This equipment complies with FCC/IC 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.
2. The device has been evaluated to meet general RF exposure requirement

OEM integration instructions:

- This device is intended only for OEM integrators under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the external antenna(s) that has been originally tested and certified with this module.
- As long as the conditions above are met, further transmitter tests will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

Validity of using the module certification:

- In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Label and compliance information:
The module must be installed in the host equipment such that at least 20cm is maintained between the antenna and users' body. The device has been evaluated to meet general RF exposure requirements. Host product manufacturers need to provide a physical or e-label stating "Contains FCC ID: 2BEA6VOSM350 " with their finished product. Information that must be placed in the end user manual: The OEM integrator has to be a ware not provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

List of applicable FCC rules:

- FCC Part 15 Subpart C 15.247 & 15.209 &15.407.

Specific operational use conditions:

- The module is a BT module with 2.4G&5G functions.
- BT Operation Frequency: 2402~2480MHz.
- WiFi Operation Frequency: 2412~2462MHz; 5180~5240MHz; 5745~5825MHz.
- Type: External Antenna@BT; External Antenna@WiFi
- BT: maximum 1.82dBi
- WiFi ANT1:maximum 1.82dBi@2.4GHz; 3.49dBi@5GHz antenna gain
- WiFi ANT2:maximum 1.82dBi@2.4GHz; 3.49dBi@5GHz antenna gain

Limited module procedures:

- Not applicable, The module is a Single module and complies with the requirement of FCC Part 15 212.

Trace antenna designs:

- When the OSM modules is used. a -matching circuit needs to be reserved between the WL_ANT antenna connector of the modules and the antenna connector of baseboard, and the recommended antenna matching circuit and initial parameters are shown in the following figure.
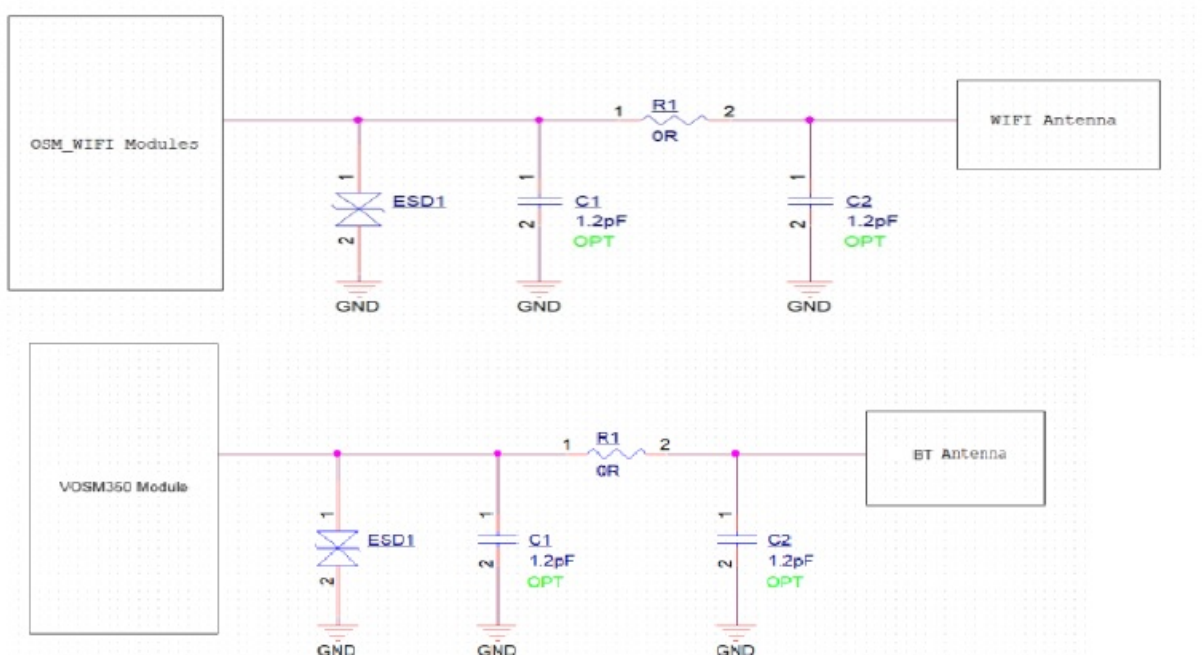
R1 default use 0 R resistor or 220pF capacitor, C1, C6 default, do match reserved. its final value according to the actual debugging results to determine.
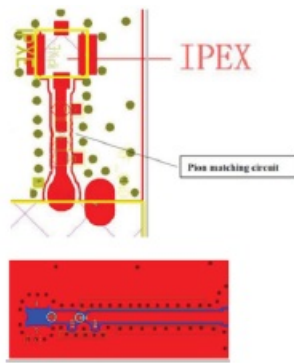
The RF line layout should be matched according to 50oh m. The line impedance is related to the plate, plate thickness, line width and copper spacing. Professional software can be used to calculate the line width. Note: for multilayer plates, the plate thickness should calculate the distance from RF routing layer to GND of the next layer. There are RF lines Layout principles :

1. RF line layout needs to match 50 ohms. The line width can be calculated by professional software. (Note: If it is a multi-layer board, The board thickness should calculate the distance from the RF trace layer to the next ground layer.)
2. The RF line must be surrounded by ground copper and ground holes.
3. The PI-type matching circuit for adjusting the impedance of the module is placed close to the module. The PI-type matching circuit for matching the antenna is placed close to the antenna.

RF exposure considerations
The module must be installed in the host equipment such that at least 20cm is maintained between the antenna and users' body. The device has been evaluated to meet general RF exposure requirement. Host product manufacturers need to provide a physical or e-label stating "Contains FCC ID: 2BEA6VOSM350" with their finished product. The device can be used in portable exposure condition without restriction.

Antenna:

Type: External Antenna@BT; External Antenna@WiFi

Impedance: 50 Ohm

- Manufacturer: DONGGUAN YIJIA ELECTRONICS COMMUNICATION TECHNOLOGY CO., LTD
- Model: YAA003R142
- Antenna Directivity(mainly describes the degree of radiation concentration of the antenna in a specific direction relative to the isotropic antenna.):

BT: 4.42dBi;

- WiFi ANT1: 4.42dBi@2.4GHz; 6.19dBi@5GHz
- WiFi ANT2: 4.42dBi@2.4GHz; 6.19dBi@5GHz
- Form Factor: External Antenna@BT; External Antenna@WiFi
- Bandwidth: 90MHz@BT; 100MHz@2.4GWiFi; 700MHz@5GWiFi;
- Polarization: Linear Polarization

Antenna Gain:

- BT ANT: maximum 1.82dBi;
- WiFi ANT1:maximum 1.82dBi@2.4GHz; 3.49dBi@5GHz antenna gain
- WiFi ANT2:maximum 1.82dBi@2.4GHz; 3.49dBi@5GHz antenna gain
- After certification, adding a different antenna type requires a C2/3 PC.
- Information on test modes and additional testing requirements:
- Host manufacturer must perform test of radiated & conducted emission and spurious emission, e.t.c according to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product. Only when all the test results of test modes comply with FCC requirements, then the end product can be sold legally.

Additional testing, Part 15 Subpart B disclaimer:

- The host product manufacturer is responsible for compliance with any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing
- with the modular transmitter installed.

Note EMI Considerations:

- D04 Module Integration Guide has been considered as "best practice" for RF design engineering testing and evaluation of non-linear interactions which can generate additional non-compliant limits due to module placement to host components or properties. For standalone mode, D04 Module Integration Guide was referenced, and simultaneous mode considered for the host product to confirm compliance.

How to make changes:
Only the Grantee is permitted to make permissive changes.

Frequently Asked Questions (FAQ):

- **Q: What are the recommended operating conditions for the VOSM350 module?**
  A: The recommended operating voltage for the SOM is between 2.6V to 5.25V. Ensure that the eMMC VCC, eMMC VCCQ, and LPDDR4 voltages are within the specified ranges for stable operation.
- **Q: Can I use the VOSM350 module in industrial IoT devices?**
  A: Yes, the VOSM350 module is designed to cater to various application scenarios, including industrial IoT devices. Ensure proper environmental conditions and power supply for reliable operation.

Documents / Resources

Vantron VOSM350 System on Module [pdf] Owner's Manual
VOSM350, VOSM350 System on Module, System on Module, Module

References

- _{Vantron} [**Embedded Industrial IOT Solutions | The Best IOT Solution Provider | Vantron**](#)
- [**User Manual**](#)

[**Manuals+**](#), [**Privacy Policy**](#)

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