

AP72598V

User Manual

Revision

Revision	Date	Description	Revised By
0.0	2021/04/21	- Initial Released	Darren
0.1	2021/09/24	- Modify Block diagram - Modify Wi-Fi RF Specification	Darren
0.2	2021/10/29	- Modify Wi-Fi RF Specification - Modify Bluetooth Specification	Darren
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1. Introduction

1.1 Overview

AP72598V is an advanced application processor designed for smart audio and smart home applications. It integrates a powerful subsystem with Wi-Fi / BLE, advanced multi-format audio processing unit, a secured runtime environment and all major peripherals for versatile smart home applications.

It has rich advanced network and peripheral interfaces, including 10/100/1000M Ethernet MAC, USB 2.0 high-speed OTG port, MIPI panel interface, UARTs, I2Cs, high-speed SPIs, PWMs and low-speed 10-bit ADC. Built In 4Gb SPI-NAND FLASH and 4Gb DDR4 DRAM .

The wireless module complies with IEEE 802.11a/b/g/n/ac 2x2MIMO standard and it can achieve up to a speed of 867Mbps with dual stream in 802.11 to connect the wireless LAN.

With Bluetooth Class 1 or Class2 transmitter operation.

AP72598V_H is support Dolby & DTS audio.

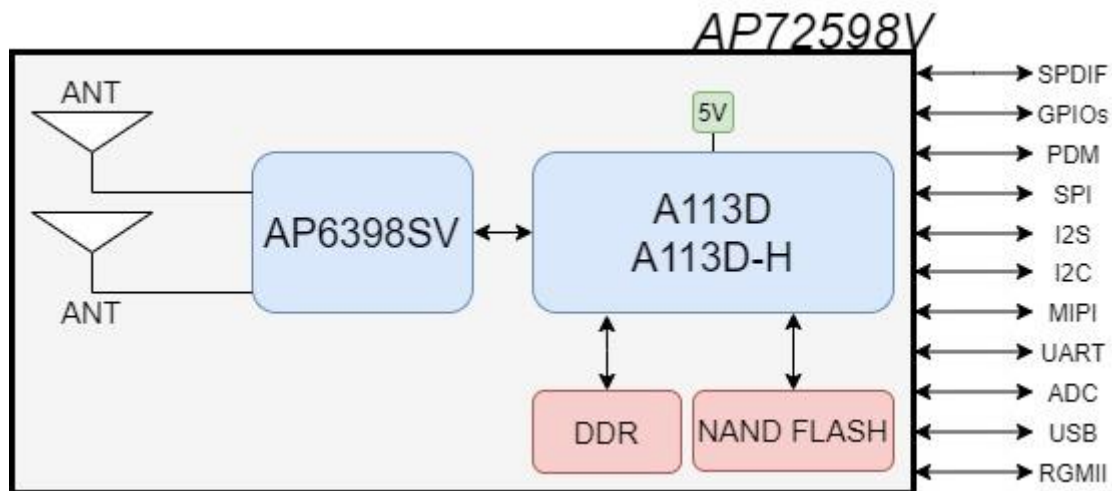


Figure 1-1 Block diagram



1.2 Product Features

- Lead Free design which is compliant with ROHS requirements.
- 802.11a/b/g/n/ac dual-band radio with virtual-simultaneous dual-band operation
- Dual-stream spatial multiplexing up to 867 Mbps data rate.
- Quad core ARM Cortex-A53 CPU up to 1.5GHz (DVFS)
- Audio Decoder and Input / Output
- Panel Output Interface
- Integrated IEEE 802.3 10/100/1000M Ethernet MAC with RGMII interface
- Integrated I/O Controllers and Interfaces
- Supports Transmit Power Control on the STA together with standard Bluetooth TPC to limit mutual interference and receiver desensitization. Support Bluetooth Low Energy (BLE).

2. General Specification

2.1 General Specification

Model Name	AP72598V
Product Description	Support Wi-Fi / BLE functionality
Dimension	L x W x H : 69.6(±0.15) x 50(±0.15) mm x 5.50(±0.2)mm
Operating temperature	-10°C to 65°C
Storage temperature	-40°C to 85°C
Humidity	Operating Humidity 10% to 95% Non-Condensing Storage Humidity 5% to 95% Non-Condensing

2.2 Recommended Operating Rating

	Min.	Typ.	Max.	Unit
Operating Temperature	-10	25	65	deg.C
VDD	4.5	5	5.5	V

2.3 Product current consumption

Item	Typ.
work mode: CPU load 80%, TX or RX throughput 20Mbps,	405mA
idle mode: CPU load 0%, keep connection to AP but no wifi stream,	93mA
EUP mode: the lowest power ,can wake up by Wifi and BLE.	30mA

3. Wi-Fi RF Specification

3.1 2.4GHzRF Specification

Conditions :VDDIO=3.3V ; Temp:25°C

Feature		Description			
WLAN Standard		IEEE 802.11 b/g/n WiFi compliant			
Frequency Range		2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band)			
Number of Channels		2.4GHz：Ch1 ~ Ch13			
Modulation		802.11b：DQPSK, DBPSK, CCK 802.11 g/n：OFDM /64-QAM,16-QAM, QPSK, BPSK			
Output Power , tolerance ± 1.5 dB					
The transmit EVM quality & spectrum mask are compliant with IEEE 802.11 standard					
802.11b	1Mbps	2Mbps	5.5Mbps	11Mbps	
	11.5	11.5	17.5	17.5	
802.11g	6、9Mbps	12、18Mbps	24Mbps	36Mbps	48Mbps
	10	17.5	17	17	16.5
	54Mbps				
	16.5				
802.11n	MCS0~2	MCS3	MCS4	MCS5	MCS6
	10	16.5	16	16	15.5
	MCS7				
	15.5				
Note:The specifications of RF output power are subject to change to fulfill the safety regulation and requirements in end-user product.					
Sensitivity,tolerance ± 2 dB					
CCK modulation PER ≤ 8%、OFDM modulation PER ≤ 10%					
802.11b	Data Rate	Spec.(dBm)			
	1Mbps	-99			
	2Mbps	-96			
	5.5Mbps	-92			
	11Mbps	-88			
802.11g SISO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)	
	6Mbps	-93	24Mbps	-86	
	9Mbps	-92	36Mbps	-82	

	12Mbps	-91	48Mbps	-78
	18Mbps	-89	54Mbps	-76
802.11g MIMO	6Mbps	-94	24Mbps	-89
	9Mbps	-94	36Mbps	-85
	12Mbps	-94	48Mbps	-81
	18Mbps	-92	54Mbps	-79
802.11n HT20 SISO	MCS=0	-92	MCS=4	-82
	MCS=1	-91	MCS=5	-78
	MCS=2	-89	MCS=6	-76
	MCS=3	-85	MCS=7	-74
802.11n HT20 MIMO	MCS=0	-92	MCS=5	-76
	MCS=1	-91	MCS=6	-74
	MCS=2	-89	MCS=7	-73
	MCS=3	-86	MCS=8	-94
	MCS=4	-82	MCS=15	-75
Maximum Input Level		802.11b : -10		
		802.11g/n : -20		
Antenna Reference		Small antennas with 0~2 dBi peak gain		

3.2 5GHz RF Specification

Conditions : VDD=3.3V ; Temp:25°C

Feature		Description			
WLAN Standard		IEEE 802.11a /n / ac 2x2 &Wi-Fi compliant			
Frequency Range		4.900 GHz ~ 5.845 GHz (5.0GHz ISM Band)			
Number of Channels		5.0GHz：Please see the table ¹			
Modulation		802.11a: OFDM /64-QAM,16-QAM, QPSK, BPSK 802.11n：OFDM /64-QAM,16-QAM, QPSK, BPSK 802.11ac：OFDM /256-QAM			
Output Power , tolerance ± 1.5 dB					
The transmit EVM quality & spectrum mask are compliant with IEEE 802.11 standard					
802.11 a	6、9Mbps	12、18Mbps	24Mbps	36Mbps	48Mbps
	11	11	16	16	15.5
	54Mbps				
	15.5				
802.11n	MCS0~2	MCS3	MCS4	MCS5	MCS6
	11	15.5	15	15	14.5
	MCS7				
	14.5				
802.11 ac	MCS0~2	MCS3	MCS4	MCS5	MCS6
	12.5	15.5	15	15	14.5
	MCS7	MCS8	MCS9		
	14	12	11		
Note：The specifications of RF output power are subject to change to fulfill the safety regulation and requirements in end-user product.					
Sensitivity,tolerance ± 2 dB					
CCK modulation PER ≤ 8%、OFDM modulation PER ≤ 10%					
802.11a SISO	Data Rate	Spec.(dBm)	Data Rate	Spec.(dBm)	
	6Mbps	-91	24Mbps	-83	
	9Mbps	-90	36Mbps	-80	
	12Mbps	-89	48Mbps	-75	
	18Mbps	-86	54Mbps	-74	
802.11n HT20 SISO	MCS=0	-90	MCS=4	-79	
	MCS=1	-88	MCS=5	-75	
	MCS=2	-86	MCS=6	-74	

	MCS=3	-83	MCS=7	-72
802.11n HT20 MIMO	MCS=0	-89	MCS=5	-73
	MCS=1	-89	MCS=6	-71
	MCS=2	-86	MCS=7	-69
	MCS=3	-82	MCS=8	-91
	MCS=4	-79	MCS=15	-72
802.11n HT40 SISO	MCS=0	-89	MCS=4	-78
	MCS=1	-86	MCS=5	-73
	MCS=2	-84	MCS=6	-72
	MCS=3	-81	MCS=7	-70
802.11n HT40 MIMO	MCS=0	-86	MCS=5	-70
	MCS=1	-85	MCS=6	-68
	MCS=2	-83	MCS=7	-66
	MCS=3	-79	MCS=8	-88
	MCS=4	-76	MCS=15	-69
802.11 ac HT20 SISO	MCS=0,NSS1	-91	MCS=5,NSS1	-75
	MCS=1,NSS1	-89	MCS=6,NSS1	-73
	MCS=2,NSS1	-86	MCS=7,NSS1	-72
	MCS=3,NSS1	-83	MCS=8,NSS1	-67
	MCS=4,NSS1	-80		
802.11 ac HT20 MIMO	MCS=0,NSS1	-89	MCS=6,NSS1	-70
	MCS=1,NSS1	-88	MCS=7,NSS1	-69
	MCS=2,NSS1	-85	MCS=8,NSS1	-64
	MCS=3,NSS1	-82	MCS=0,NSS2	-91
	MCS=4,NSS1	-78	MCS=8,NSS2	-67
	MCS=5,NSS1	-72		
802.11 ac HT40 SISO	MCS=0,NSS1	-89	MCS=5,NSS1	-72
	MCS=1,NSS1	-86	MCS=6,NSS1	-71
	MCS=2,NSS1	-83	MCS=7,NSS1	-69
	MCS=3,NSS1	-80	MCS=8,NSS1	-65
	MCS=4,NSS1	-77	MCS=9,NSS1	-63
802.11 ac HT40 MIMO	MCS=0,NSS1	-86	MCS=6,NSS1	-68
	MCS=1,NSS1	-85	MCS=7,NSS1	-66
	MCS=2,NSS1	-83	MCS=8,NSS1	-62
	MCS=3,NSS1	-80	MCS=9,NSS1	-62
	MCS=4,NSS1	-76	MCS=0,NSS2	-89

	MCS=5,NSS1	-69	MCS=9,NSS2	-65
802.11 ac HT80 SISO	MCS=0,NSS1	-86	MCS=5,NSS1	-69
	MCS=1,NSS1	-83	MCS=6,NSS1	-68
	MCS=2,NSS1	-80	MCS=7,NSS1	-66
	MCS=3,NSS1	-77	MCS=8,NSS1	-62
	MCS=4,NSS1	-73	MCS=9,NSS1	-60
802.11 ac HT80 MIMO	MCS=0,NSS1	-83	MCS=6,NSS1	-65
	MCS=1,NSS1	-82	MCS=7,NSS1	-63
	MCS=2,NSS1	-80	MCS=8,NSS1	-58
	MCS=3,NSS1	-77	MCS=9,NSS1	-58
	MCS=4,NSS1	-73	MCS=0,NSS2	-85
	MCS=5,NSS1	-66	MCS=9,NSS2	-62

Maximum Input Level	802.11a/n : -30
Antenna Reference	Small antennas with 0~2 dBi peak gain

5 GHz (20MHz) Channel table

Band (GHz)	Operating Channel Numbers	Channel center frequencies(MHz)
5.15GHz~5.25GHz	36	5180
	40	5200
	44	5220
	48	5240
5.25GHz~5.35GHz	52	5260
	56	5280
	60	5300
	64	5320
5.5GHz~5.7GHz	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
	144	5720
5.725GHz~5.825GHz	149	5745
	153	5765
	157	5785
	161	5805

4. BLE Specification

Conditions : VDD=3.3V ; Temp:25°C

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth V5.1 (BLE only)		
Antenna Reference	Small antennas with 0~2 dBi peak gain		
Frequency Band	2400 MHz ~ 2483.5 MHz		
Number of Channels	40 channels		
Modulation	GFSK		
RF Specification			
	Min.	Typical.	Max.
Output Power ¹	0		10
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-86 dBm	
Maximum Input Level	GFSK (1Mbps):-20dBm		
Note ¹ : Output power can be configured by HCD firmware.			

5. Pin Definition

5.1 Pin Outline

U12		SODIMM 260PIN	
1	GND	2	GND
3	GND	4	GND
5	GND	6	GND
7	GND	8	GND
9	GND	10	GND
11	GND	12	GND
13	GND	14	GND
15	GND	16	GND
17	GND	18	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND	26	GND
27	GND	28	GND
29	GND	30	GND
31	GND	32	GND
33	GND	34	GND
35	GND	36	GND
37	GND	38	GND
39	GND	40	GND
41	GND	42	GND
43	GND	44	GND
45	GND	46	GND
47	VDD	48	VDD
49	VDD	50	VDD
51	VDD	52	VDD
53	VDD	54	VDD
55	GND	56	GND
57	GND	58	GND
59	USB_DM	60	GND
61	USB_DP	62	GND
63	GND	64	GND
65	USB_ID	66	GND
67	USB_VBUS	68	GND
69	GND	70	GND
71	I2SC_LRCLK	72	GND
73	GND	74	GND
75	I2SC_SCLK	76	GND
77	GND	78	GND
79	I2SC_DOUT_DIN_0	I2SC_DOUT_DIN_2	80
81	I2SC_DOUT_DIN_1	I2SC_DOUT_DIN_3	82
83	GND	GND	84
85	I2S_MCLK_C	GND	86
87	GND	GND	88
89	I2S_MCLK_B	GND	90
91	GND	GND	92
93	I2SB_SCLK	GND	94
95	GND	GND	96
97	I2SB_LRCLK	GND	98
99	GND	GND	100
101	I2SB_DOUT_DIN_0	I2SB_DOUT_DIN_2	102
103	I2SB_DOUT_DIN_1	I2SB_DOUT_DIN_3	104
105	GND	GND	106
107	PDM_CLK	GND	108
109	GND	GND	110
111	PDM_DIN0	PDM_DIN2	112
113	PDM_DIN1	PDM_DIN3	114
115	GND	GND	116
117	MIPI_D3_N	GND	118
119	MIPI_D3_P	GND	120
121	GND	GND	122
123	MIPI_D2_N	GND	124
125	MIPI_D2_P	GND	126
127	GND	GND	128
129	MIPI_D1_N	SPDIF_OUT	130
	MIPI_D1_P	SPDIF_IN	

131			132
133	GND	GND	134
135	MIPI_D0_N	GND	136
137	MIPI_D0_P	ADC_CH3	138
139	GND	ADC_CH2	140
141	MIPI_CLK_N	ADC_CH0	142
143	MIPI_CLK_P	ADC_CH1	144
145	GND	GND	146
147	GND	GND	148
149	JTAG_TDO	GPIOZ_4	150
151	JTAG_TDI	GPIOZ_5	152
153	JTAG_TMS	GPIOZ_6	154
155	GND	GPIOZ_7	156
157	JTAG_CLK	I2C_SCK_B	158
159	GND	I2C_SDA_B	160
161	I2C_AO_SCK	GND	162
163	I2C_AO_SDA	GPIOZ_10	164
165	GND	GND	166
167	CPU_RST_M	RGMII_MDC	168
169	GND	RGMII_MDIO	170
171	GPIOAO_6	GND	172
173	GND	RGMII_RX_CLK	174
175	UART_RX_A	GND	176
177	UART_TX_A	RGMII_RXDV	178
179	GND	RGMII_RXD0	180
181	NC	RGMII_RXD1	182
183	GND	RGMII_RXD2	184
185	32K_IN	RGMII_RXD3	186
187	GND	GND	188
189	SPI_CLK_B	RGMII_TX_CLK	190
191	GND	GND	192
193	SPI_MISO_B	RGMII_TXEN	194
195	SPI_MOSI_B	RGMII_TXD0	196
197	SPI_CS_B	RGMII_TXD1	198
199	GND	RGMII_TXD2	200
201	SPI_SCLK_A	RGMII_TXD3	202
203	GND	GND	204
205	SPI_MISO_A	RGMII_INT	206
207	SPI_MOSI_A	RGMII_RST#	208
209	SPI_CS_A	GND	210
211	GND	NAND_D5_M	212
213	GND	GND	214
215	GND	Reserve	216
217	Reserve	Reserve	218
219	GND	GND	220
221	GND	GND	222
223	Reserve	Reserve	224
225	Reserve	Reserve	226
227	GND	GND	228
229	GND	Reserve	230
231	GND	Reserve	232
233	VDD	GND	234
235	VDD	GND	236
237	VDD	GND	238
239	VDD	VDD	240
241	GND	VDD	242
243	GND	VDD	244
245	GND	VDD	246
247	GND	GND	248
249	GND	GND	250
251	GND	GND	252
253	GND	GND	254
255	GND	GND	256
257	GND	GND	258
259	GND	GND	260

5.2 Pin Assignment

NO	Name	Type	Description
TOP			
1	GND	—	Ground connections
3	GND	—	Ground connections
5	GND	—	Ground connections
7	GND	—	Ground connections
9	GND	—	Ground connections
11	GND	—	Ground connections
13	GND	—	Ground connections
15	GND	—	Ground connections
17	GND	—	Ground connections
19	GND	—	Ground connections
21	GND	—	Ground connections
23	GND	—	Ground connections
25	GND	—	Ground connections
27	GND	—	Ground connections
29	GND	—	Ground connections
31	GND	—	Ground connections
33	GND	—	Ground connections
35	GND	—	Ground connections
37	GND	—	Ground connections
39	GND	—	Ground connections
41	GND	—	Ground connections
43	GND	—	Ground connections
45	VDD	P	VDD 5V system power supply input
47	VDD	P	VDD 5V system power supply input
49	VDD	P	VDD 5V system power supply input
51	VDD	P	VDD 5V system power supply input
53	GND	—	Ground connections
55	GND	—	Ground connections
57	USB_DM	DIO	USB negative data signal
59	USB_DP	DIO	USB positive data signal
61	GND	—	Ground connections
63	USB_ID	DIO	USB mini-receptacle identifier
65	USB_VBUS	DIO	USB cable power detection (5V tolerance)

67	GND	—	Ground connections
69	I2SC_LRCLK	DIO	Word clock of I2S port C
71	GND	—	Ground connections
73	I2SC_SCLK	DIO	Bit clock input/output of I2S port C
75	GND	—	Ground connections
77	I2SC_DOUT_DIN_0	DIO	Data 0 input/output of I2S port C
79	I2SC_DOUT_DIN_1	DIO	Data 1 input/output of I2S port C
81	GND	—	Ground connections
83	I2S_MCLK_C	DO	Master clock output C, for I2S master mode
85	GND	—	Ground connections
87	I2S_MCLK_B	DO	Master clock output B, for I2S master mode
89	GND	—	Ground connections
91	I2SB_SCLK	DIO	Bit clock input/output of I2S port B
93	GND	—	Ground connections
95	I2SB_LRCLK	DIO	Word clock of I2S port B
97	GND	—	Ground connections
99	I2SB_DOUT_DIN_0	DIO	Data 0 input/output of I2S port B
101	I2SB_DOUT_DIN_1	DIO	Data 1 input/output of I2S port B
103	GND	—	Ground connections
105	PDM_CLK	DO	PDM output clock signal
107	GND	—	Ground connections
109	PDM_DIN0	DI	PDM input data 0 signal
111	PDM_DIN1	DI	PDM input data 1 signal
113	GND	—	Ground connections
115	MIPI_D3_N	DIO	MIPI negative signal data 3
117	MIPI_D3_P	DIO	MIPI positive signal data 3
119	GND	—	Ground connections
121	MIPI_D2_N	DIO	MIPI negative signal data 2
123	MIPI_D2_P	DIO	MIPI positive signal data 2
125	GND	—	Ground connections
127	MIPI_D1_N	DIO	MIPI negative signal data 1
129	MIPI_D1_P	DIO	MIPI positive signal data 1
131	GND	—	Ground connections
133	MIPI_D0_N	DIO	MIPI negative signal data 0
135	MIPI_D0_P	DIO	MIPI positive signal data 0
137	GND	—	Ground connections
139	MIPI_CLK_N	DIO	MIPI clock negative signal

141	MIPI_CLK_P	DIO	MIPI clock positive signal
143	GND	—	Ground connections
145	GND	—	Ground connections
147	JTAG_TDO	DO	JTAG data output
149	JTAG_TDI	DI	JTAG data input
151	JTAG_TMS	DI	JTAG Test mode select input
153	GND	—	Ground connections
155	JTAG_CLK	DI	JTAG Test clock input
157	GND	—	Ground connections
159	I2C_AO_SCK	DO	I2C port AO clock output, Master
161	I2C_AO_SDA	DIO	I2C port AO data, Master
163	GND	—	Ground connections
165	CPU_RST_M	DI	System reset input
167	GND	—	Ground connections
169	IR_IN	DI	IR_REMOTE_INPUT
171	GND	—	Ground connections
173	UART_RX_A	DI	UART Port AO A data input
175	UART_TX_A	DO	UART Port AO A data output
177	GND	—	Ground connections
179	NC	—	No connect
181	GND	—	Ground connections
183	32K_IN	DI	CLK_32K_IN
185	GND	—	Ground connections
187	SPI_CLK_B	DIO	SPI serial clock B, master output, slave input
189	GND	—	Ground connections
191	SPI_MISO_B	DIO	SPI DATA, master input, slave output B
193	SPI_MOSI_B	DIO	SPI DATA, master output, slave input B
195	SPI_CS_B	DIO	SPI slave select B, master output, slave input
197	GND	—	Ground connections
199	SPI_CLK_A		SPI serial clock A, master output, slave input
201	GND	—	Ground connections
203	SPI_MISO_A	DIO	SPI DATA, master input, slave output A
205	SPI_MOSI_A	DIO	SPI DATA, master output, slave input A
207	SPI_CS_A	DIO	SPI slave select A, master output, slave input
209	GND	—	Ground connections
211	GND	—	Ground connections
213	GND	—	Ground connections

215	NC	—	No connect
217	GND	—	Ground connections
219	GND	—	Ground connections
221	NC	—	No connect
223	NC	—	No connect
225	GND	—	Ground connections
227	GND	—	Ground connections
229	GND	—	Ground connections
231	VDD	P	VDD 5V system power supply input
233	VDD	P	VDD 5V system power supply input
235	VDD	P	VDD 5V system power supply input
237	VDD	P	VDD 5V system power supply input
239	GND	—	Ground connections
241	GND	—	Ground connections
243	GND	—	Ground connections
245	GND	—	Ground connections
247	GND	—	Ground connections
249	GND	—	Ground connections
251	GND	—	Ground connections
253	GND	—	Ground connections
255	GND	—	Ground connections
257	GND	—	Ground connections
259	GND	—	Ground connections
BOTTOM			
2	GND	—	Ground connections
4	GND	—	Ground connections
6	GND	—	Ground connections
8	GND	—	Ground connections
10	GND	—	Ground connections
12	GND	—	Ground connections
14	GND	—	Ground connections
16	GND	—	Ground connections
18	GND	—	Ground connections
20	GND	—	Ground connections
22	GND	—	Ground connections
24	GND	—	Ground connections
26	GND	—	Ground connections

28	GND	—	Ground connections
30	GND	—	Ground connections
32	GND	—	Ground connections
34	GND	—	Ground connections
36	GND	—	Ground connections
38	GND	—	Ground connections
40	GND	—	Ground connections
42	GND	—	Ground connections
44	GND	—	Ground connections
46	VDD	P	VDD 5V system power supply input
48	VDD	P	VDD 5V system power supply input
50	VDD	P	VDD 5V system power supply input
52	VDD	P	VDD 5V system power supply input
54	GND	—	Ground connections
56	GND	—	Ground connections
58	GND	—	Ground connections
60	GND	—	Ground connections
62	GND	—	Ground connections
64	GND	—	Ground connections
66	GND	—	Ground connections
68	GND	—	Ground connections
70	GND	—	Ground connections
72	GND	—	Ground connections
74	GND	—	Ground connections
76	GND	—	Ground connections
78	I2SC_DOUT_DIN_2	DIO	Data 2 input/output of I2S port C
80	I2SC_DOUT_DIN_3	DIO	Data 3 input/output of I2S port C
82	GND	—	Ground connections
84	GND	—	Ground connections
86	GND	—	Ground connections
88	GND	—	Ground connections
90	GND	—	Ground connections
92	GND	—	Ground connections
94	GND	—	Ground connections
96	GND	—	Ground connections
98	GND	—	Ground connections
100	I2SB_DOUT_DIN_2	DIO	Data 2 input/output of I2S port B

102	I2SB_DOUT_DIN_3	DIO	Data 3 input/output of I2S port B
104	GND	—	Ground connections
106	GND	—	Ground connections
108	GND	—	Ground connections
110	PDM_DIN_2	DIO	PDM input data 2 signal
112	PDM_DIN_3	DIO	PDM input data 3 signal
114	GND	—	Ground connections
116	GND	—	Ground connections
118	GND	—	Ground connections
120	GND	—	Ground connections
122	GND	—	Ground connections
124	GND	—	Ground connections
126	GND	—	Ground connections
128	SPDIF_OUT	DO	SPDIF output signal
130	SPDIF_IN	DI	SPDIF input signal
132	GND	—	Ground connections
134	GND	—	Ground connections
136	ADC_CH3		ADC channel 3 input
138	ADC_CH2		ADC channel 2 input
140	ADC_CH1		ADC channel 1 input
142	ADC_CH0	I	ADC channel 0 input
144	GND	—	Ground connections
146	GND	—	Ground connections
148	GPIOZ_4	DIO	General purpose input/output signal
150	GPIOZ_5	DIO	General purpose input/output signal
152	GPIOZ_6	DIO	General purpose input/output signal
154	GPIOZ_7	DIO	General purpose input/output signal
156	I2C_SCK_B	DO	I2C port B clock output, Master
158	I2C_SDA_B	DIO	I2C port B data, Master
160	GND	—	Ground connections
162	GPIOZ_10	DIO	General purpose input/output signal
164	GND	—	Ground connections
166	RGMII_MDC	DO	Ethernet MDC signal
168	RGMII_MDIO	DIO	Ethernet MDIO signal
170	GND	—	Ground connections
172	RGMII_RX_CLK	DI	Ethernet RGMII input clock signal
174	GND	—	Ground connections

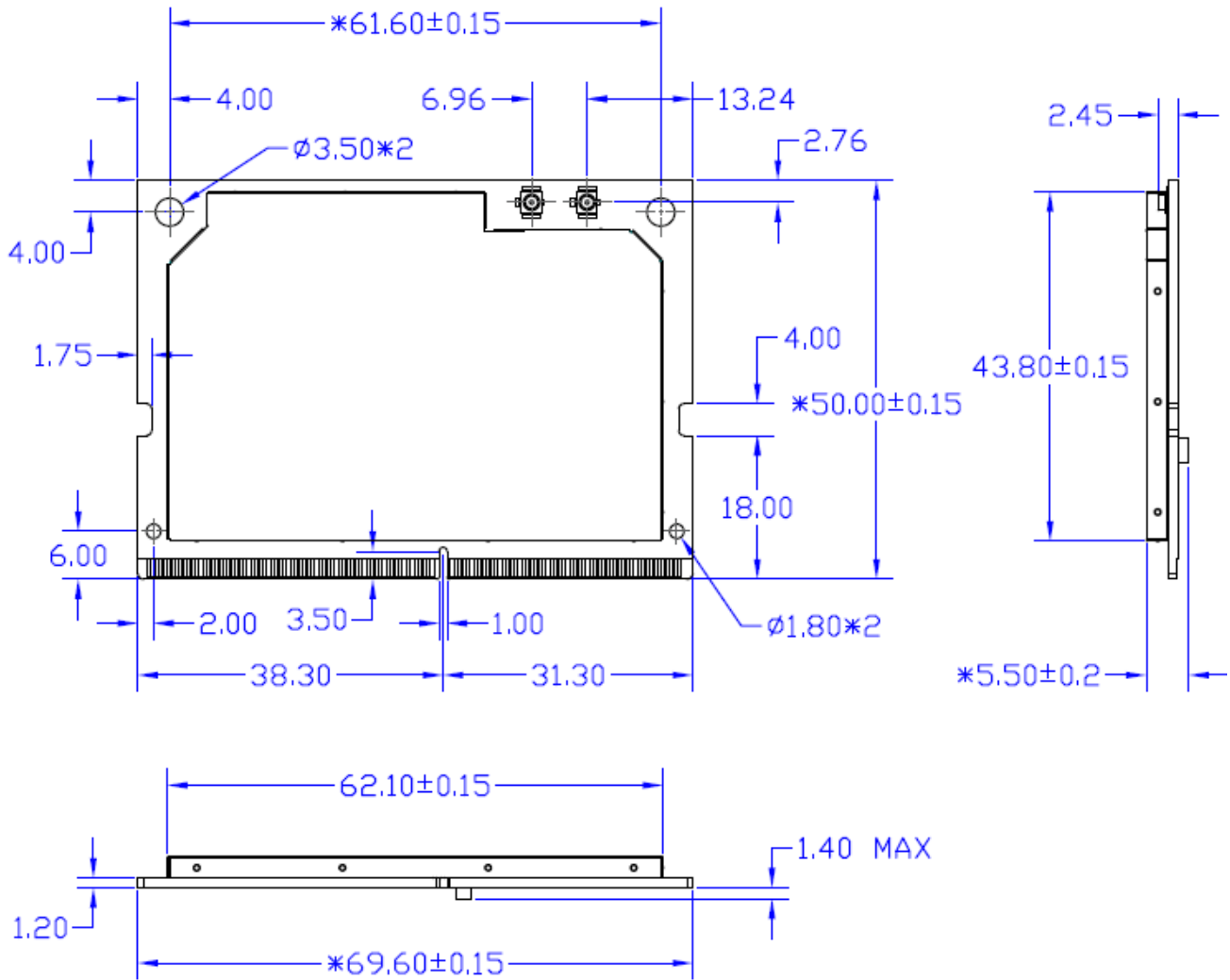
176	RGMII_RXDV	DI	Ethernet input data valid signal
178	RGMII_RXD0	DI	Ethernet input data 0 signal
180	RGMII_RXD1	DI	Ethernet input data 1 signal
182	RGMII_RXD2	DI	Ethernet input data 2 signal
184	RGMII_RXD3	DI	Ethernet input data 3 signal
186	GND	—	Ground connections
188	RGMII_TX_CLK	DO	Ethernet RGMII output clock signal
190	GND	—	Ground connections
192	RGMII_TXEN	DO	Ethernet output enable signal
194	RGMII_TXD0	DO	Ethernet output data 0 signal
196	RGMII_TXD1	DO	Ethernet output data 1 signal
198	RGMII_TXD2	DO	Ethernet output data 2 signal
200	RGMII_TXD3	DO	Ethernet output data 3 signal
202	GND	—	Ground connections
204	RGMII_INT	DI	Ethernet interrupt input
206	RGMII_RST#	DI	Ethernet reset input
208	GND	—	Ground connections
210	NAND_D5_M	DI	Boot input
212	GND	—	Ground connections
214	NC	—	No connect
216	NC	—	No connect
218	GND	—	Ground connections
220	GND	—	Ground connections
222	NC	—	No connect
224	NC	—	No connect
226	GND	—	Ground connections
228	NC	—	No connect
230	NC	—	No connect
232	GND	—	Ground connections
234	GND	—	Ground connections
236	GND	—	Ground connections
238	VDD	P	VDD 5V system power supply input
240	VDD	P	VDD 5V system power supply input
242	VDD	P	VDD 5V system power supply input
244	VDD	P	VDD 5V system power supply input
246	GND	—	Ground connections
248	GND	—	Ground connections



250	GND	—	Ground connections
252	GND	—	Ground connections
254	GND	—	Ground connections
256	GND	—	Ground connections
258	GND	—	Ground connections
260	GND	—	Ground connections



5.3 Physical Dimensions



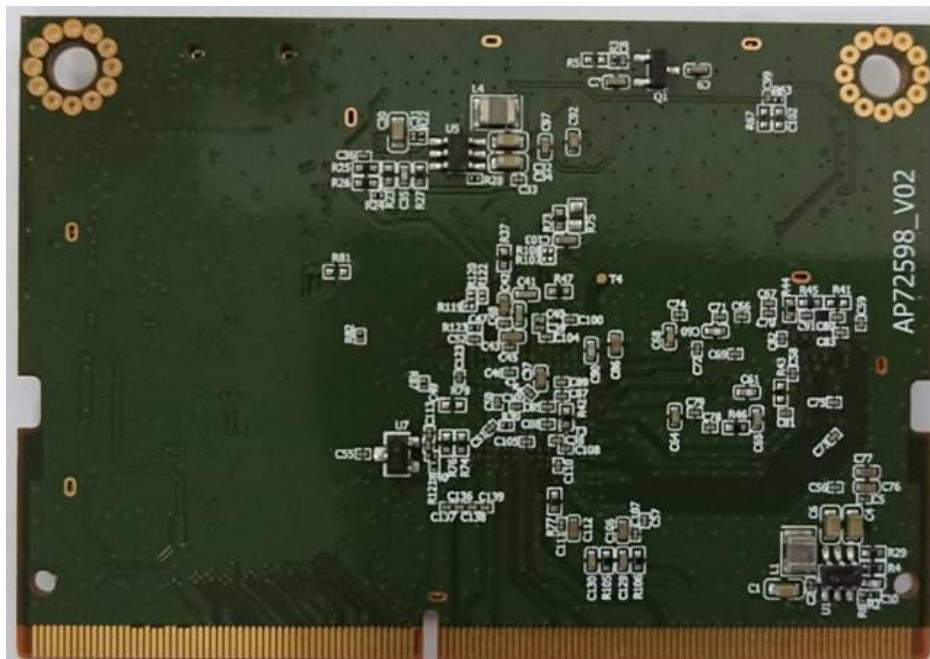
Tolerance $\pm 0.15\text{mm}$

5.4 Sample Picture

< TOP VIEW >



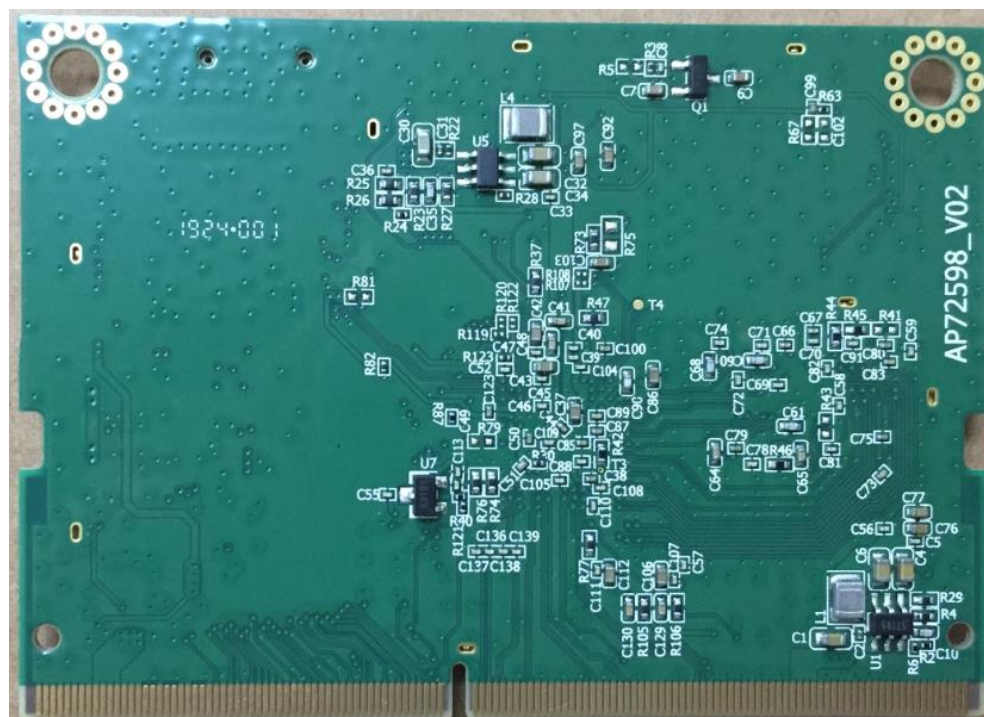
< BOT VIEW >



< TOP VIEW >

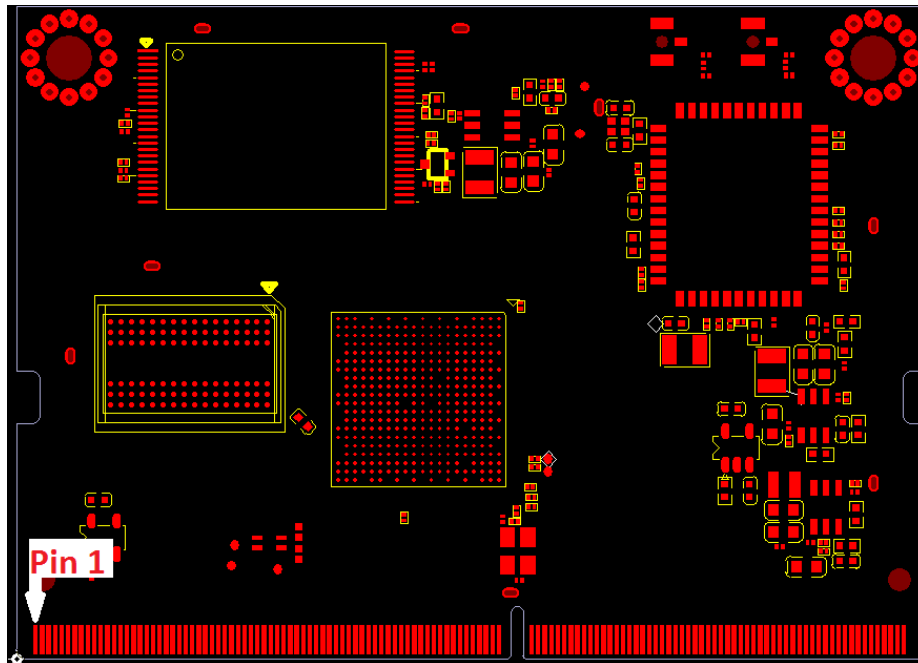


< BOT VIEW >

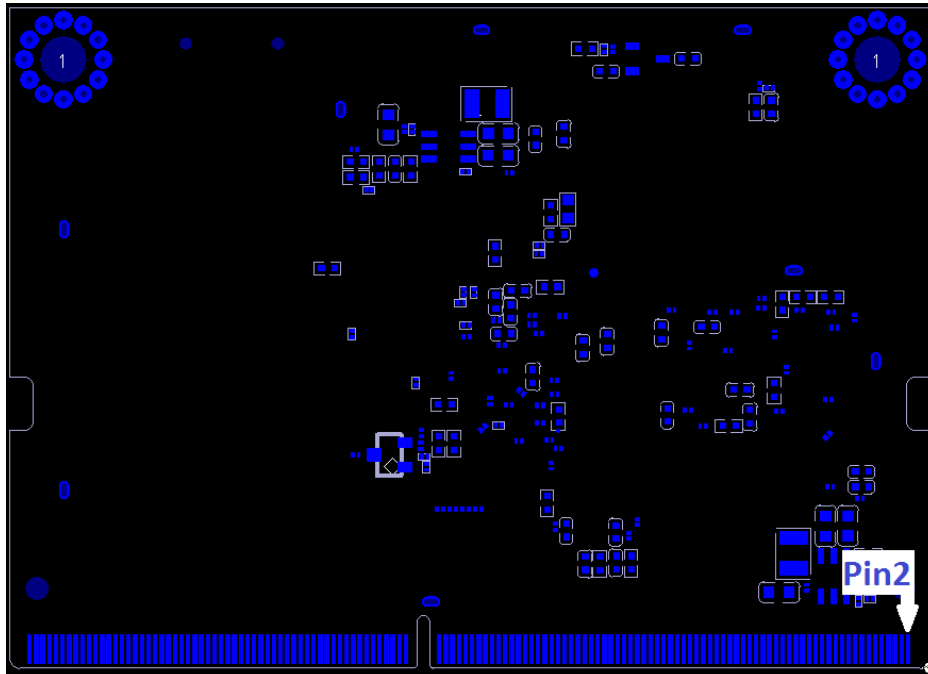


5.5 Pin position

< TOP VIEW >



< BOT VIEW >



5.6 Label Information



6. Package Information

6.1 Label A Inner box label

PKG S/N :	
AMK Device:	
Model:	 AP72598.WL_HN.T (HF)
P/N :	 99P-W02-0510R
Qty :	 100
Date Code :	 1836
Lot Code :	 G312804A
Made in Taiwan	



6.2 Label B Carton box label

AMPAK Technology Inc.	
PO :	
AMK DEVICE:	
Model Name:	 AP72598.WL_HN.T (HF)
Part No :	 99P-W02-0510R
Quantity:	 200
Lot D/C :	 G2125001
	 1831
Manufacture:	 2018/05/31
Made in Taiwan	



6.3 Package Manner

- 1 Tray : 10 PCS



10 Trays / 100PCS (cover with an empty tray)



Bound with packaging strap externally



- 1 Box : 100 PCS (cover with a foamed rubber)



- 1Carton : 2 Boxes
 - Surrounded with foamed rubber



- Covered with a foamed rubber



7. Note

AP72598V used DDR4 CON TYPE: ASAA826-E8SB0-7H (Foxconn) connects to EVB board

8 FCC & IC Statement

FCC ID : APIAP72598V

FCC Statement:

Federal Communication Commission Interference Statement

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 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the 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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antennas(s) must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

This device is restricted for indoor use.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

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 & your body.

USERS MANUAL OF THE END PRODUCT:

The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the device is small or for such use that it is not practicable to place the statement on the product, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains FCC ID : APIAP72598V". If the device is small or for such use that it is not practicable to place the statement on the product, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of 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.

IC Statement:

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

Pour les produits disponibles aux États-Unis / Canada du marché, seul le canal 1 à 11 peuvent être exploités. Sélection d'autres canaux n'est pas possible.

This device and it's antennas(s) must not be co-located or

operating in conjunction with any other antenna or transmitter except in accordance with IC multi-transmitter product procedures.

Cet appareil et son antenne (s) ne doit pas être co-localisés ou fonctionner en association avec une autre antenne ou transmetteur.

Dynamic Frequency Selection (DFS) for devices operating in the bands 5250- 5350 MHz,

5470-5600 MHz and 5650-5725 MHz

Sélection dynamique de fréquences (DFS) pour les dispositifs fonctionnant dans les bandes 5250-5350 MHz, 5470-5600 MHz et 5650-5725 MHz

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.

les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

The maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit.

le gain maximal permis pour les dispositifs utilisant les bandes 5250-5350 MHz et 5470-5725 MHz doit se conformer à la limite de p.i.r.e.

The maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits specified for point-to-point and non-point-to-point operation as appropriate.

le gain maximal permis (pour les dispositifs utilisant la bande 5725-5850 MHz) doit se conformer à la limite de p.i.r.e. spécifiée pour point à point et non point à point, selon le cas.

Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

De plus, les utilisateurs devraient aussi être avisés que les

utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., ont la priorité) pour les bandes 5250-5350 MHz et 5650-5850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.

For indoor use only.

Pour une utilisation en intérieur uniquement.

IMPORTANT NOTE:

IC Radiation Exposure Statement:

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

This radio transmitter(IC No: 6132A-AP72598V) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type 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.

Le présent émetteur radio(IC No: 6132A-AP72598V) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the IC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or

modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the device is small or for such use that it is not practicable to place the statement on the product, then following IC statement is required to be available in the users manual: IC statement is required to be available in the users manual: This device complies with Industry Canada license-exempt RSS standard(s). This Class B digital apparatus complies with Canadian ICES-003. 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.

LABEL OF THE END PRODUCT:

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

" Contains IC : 6132A-AP72598V

9 Antenna list

No	Antenna P/N	Manufacturer	Peak Gain(dBi)	
			2.4GHz	5.0GHz
1	NDX-181025	SOUTH STAR TECHNOLOGY HONG KONG COMPANY LIMITED	1.55dBi	3.32dBi
2	N12-7722-R0A	SOUTH STAR TECHNOLOGY HONG KONG COMPANY LIMITED	3.19dBi	3.94dBi
3	N12-5672-R0A	SOUTH STAR TECHNOLOGY HONG KONG COMPANY LIMITED	2.53dBi	3.75dBi
4	CSA3A020Z	SUNG NAM ELECTRONICS	1.83dBi	2.79dBi