

User Manual

D&M Part number: 18901010500AS

D&M Model: NETWORK MODULE (AiOS5.0V)

Arcadyan Model Name: WN9722BAC22-DM (AiOS5.0V)

	Arcadyan		D&M	
Title	Project manager	Sales	Purchasing	RD
Name	Jimmy Huang	Bruce Wu		
Signature				
Date				

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1 SUMMARY OF THIS PRODUCT

This product is AIOS-5.0. There are 4 types of different audio product, AIOS-5.0S/AIOS-5.0V/ AIOS-5.0R/ AIOS-5.0F

2 SPECIFICATION

2-1 Basic Specification

2. Item		Contents		
Manufacture		Arcadyan		
Shipment Name		D&M JP	AIOS-5.0X	
		TYM	AIOS-5.0X	
		ANAM	AIOS-5.0X	
Product Name		Wireless LAN Network Module		
Series Name		Lego module		
Model Name	JP	AIOS-5.0		
	US	-		
Chip		SOC		
		CPU		
		2.4GHz MAC/BB/RF		
		2.4GHz PA(Tx)		
		2.4GHz LNA(Rx)		
		2.4GHz BPF(Rx)		
		5GHz MAC/BB/RF		
		5GHz PA(Tx)		
		5GHz LNA(Rx)		
		5GHz BPF(Rx)		
		PHY	WAN	
			LAN	
OS				
Interface		Item	Link Rate	Number of ports
		LAN	10Mbps /100Mbps	1

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	HDMI	1.4	1
	USB	2.0	1
Supply Voltage	5V		
Power consumption	9W		
Weight	Under 78g		
Dimensions	87 x 74 x 1.6mm		
Operating Environment	Temperature	-10~70	degC
	Humidity	10~85	% (Non Condensing)
Storage Environment	Temperature	-10~85	degC
	Humidity	10~85	% (Non Condensing)
Design life time	5years at 25 degrees		
Made in	China		

2-2 Certification Requirement

EMC Requirements

Country	Regulation	Remarks
USA	FCC CFR47 Part15B	
Canada	ICES-003	
Europe	EN 301 489-1, EN 301 489-17	

RF Requirements

Country	Regulation	Remarks
USA	FCC CFR47 Part 15C, para 15.247 FCC CFR47 Part 15E, para 15.407 FCC Bulletin OET-65C	need FCC ID
Canada	IC RSS-102, IC RSS-247	need IC ID
Europe	EN 300 328, EN 301 893, EN 62311	
Japan	ARIB STD-T66, ARIB STD-T71 Telecommunication Business Act	need TELEC ID (R Number) need JATE ID (T Number)
China	SRRC (LMA application)	need CMIIT ID(LMA)
Australia	AS/NZS 4268, AS/NZS 2772.2	apply module cert.
Israel	MoC (Ministry of Communications)	apply module cert.
Taiwan	NCC (LMA application)	need NCC ID (LMA)
Korea	KCC (apply module certification)	need KCC ID

*The module must be labelled with required ID label.

3 Detail Specification

3-1 Product Specification

Items		Contents		
CPU				
	Operation frequency	2x1.2GHz		
RAM	Type	DDR3L		
	Width	16bit		
	Operation Freq	1866MHz		
	Capacity	512MB		
ROM	Type	NAND Flash		
	I/O speed	25ns		
	Capacity	8Gb		
Wired LAN	Number of port	1		
	Connector	Type	Color	
USB	-	Standard	USB2.0	-
	-			
HDMI	Chip			
	Standard	HDMI 1.4		

3-2 FW Product Specification

For detail, refer to FW Specification Requirement sheet

3-3 I/O Specification

3-3-1 Connector Specification

Items	Contents
Box header connector	Female 40x2p
FFC connector	Female 21p
	Female 9p

- VDD5_IN SPEC:

Item	Specification
Voltage input range	4.75 – 5.25 V
Nominal trimmed voltage [1]	5.0 V
Overshoot/Undershoot with 1A step	± 100 mV
Maximum AC RMS at 1A (20 MHz bandwidth)	80 mV
Power on rise time (90%)	3 – 10 ms
Power off quiescent discharge (80%)	2000 ms

[\[1\]](#) The nominal voltage may be trimmed between 5.0 and 5.1 volts to accommodate potential voltage droop in the main board USB supply. The voltage will still remain in the specified voltage range.

3-3-2 Power Consumption

Test Environment: Broadcom Yocto GA3.1.2

Measurement Point: 80pin 5V rail

Baseboard: Arcadyan Test-JIG

USB: Memory Device connected (USB Model Name: Transcend JetFlash 500)

Ethernet Cable: Plugged

Active Mode

1. 80pin: 5V line and Ground,
2. Wi-Fi AP Mode ON and Client Join.
3. LAN Port IN
4. USB 2.0 Storage device

Network Standby Mode: LPM (Low Power Mode)

Run the command “./wol-suspend.cmd”

Name	Ethernet	Wireless
Condition-1	Plugged / Power Save	Power Off
Condition-2	Plugged / Power Off	Client mode, Connected to AP / Power Save Mode
Condition-3	Plugged / Power Save	Client mode, Connected to AP / Power Save Mode

Sleep Mode:

Description – only AON_GPIO, WoWL & WOW(magic package) active.

Run the command “echo mem > /sys/power/state”

Power off Mode:

Description – only AON_GPIO active, other interface would be shutdown.

Run the command “poweroff”

3-3-3 ESD Transient Specification

ESD Test SPEC : <1> Contact 4kV

<2> Air 8kV

3-4 Radio 0 Specification

Radio 0 include a dual band (2.4 GHz and 5 GHz) WIFI and Bluetooth.

3-4-1 WLAN0 Specification

Item	Specification	Remark
Interface	PCIe	
Frequency	2400~2483.5MHz(FCC, CE, JP) 2471~2497MHz(JP) 5150~5250MHz(W52, U-NII-1, Band 1) 5250~5350MHz(W53, U-NII-2A, Band 2) 5470~5725MHz(W56, U-NII-2C, Band 3) 5725~5850MHz(W58, U-NII-3, Band 4) DFS support	
Data Rate	IEEE 802.11b: 11, 5.5, 2, 1Mbps IEEE 802.11a 54, 48, 36, 24, 18, 12, 9, 6Mbps IEEE 802.11n HT20 Up to 144Mbps IEEE 802.11n HT40 Up to 300Mbps IEEE 802.11ac VHT80 Up to 866.7Mbps	
MIMO	2T2R	
Transmit Power &EVM	2.4GHz Band IEEE 802.11b 18dBm@all data rate IEEE 802.11g 15dBm, EVM<-5dB@6Mbps 15dBm, EVM<-25dB@54Mbps IEEE 802.11n HT20 13dBm, EVM<-5dB@MCS0 13dBm, EVM<-28dB@MCS7 IEEE 802.11n HT40 13dBm, EVM<-5dB@MCS0 13dBm, EVM<-28dB@MCS7 5GHz Band IEEE 802.11a 13dBm, EVM<-5dB@6Mbps 13dBm, EVM<-25dB@54Mbps IEEE 802.11n HT20 13dBm, EVM<-5dB@MCS0 13dBm, EVM<-28dB@MCS7 IEEE 802.11n HT40 13dBm, EVM<-5dB@MCS0 13dBm, EVM<-28dB@MCS7 IEEE 802.11ac VHT20 13dBm, EVM<-5dB@MCS0 13dBm, EVM<-30dB@MCS8 IEEE 802.11ac VHT40 13dBm, EVM<-5dB@MCS0 13dBm, EVM<-32dB@MCS9 IEEE 802.11ac VHT80 13dBm, EVM<-5dB@MCS0	This transmit power is board limit. Final transmit power need follow regulation limit. Tolerance is +/- 2.5dB for mass production.

	13dBm, EVM<-32dB@MCS9	
Receiver Sensitivity	2.4GHz Band IEEE 802.11b: -95 dBm @1 Mbps -87 dBm @11 Mbps IEEE 802.11g -92 dBm @6 Mbps -73 dBm @54 Mbps IEEE 802.11n HT20 -90 dBm @MCS0 -72 dBm @MCS7 IEEE 802.11n HT40 -87 dBm @MCS0 -68 dBm @MCS7 5GHz band IEEE 802.11a -90 dBm @6 Mbps -72 dBm @54 Mbps IEEE 802.11n HT20 -89 dBm @MCS0 -71 dBm @MCS7 IEEE 802.11n HT40 -86 dBm @MCS0 -69 dBm @MCS7 IEEE 802.11ac VHT20 -89 dBm @MCS0 -71 dBm @MCS8 IEEE 802.11ac VHT40 -86 dBm @MCS0 -69 dBm @MCS9 IEEE 802.11ac VHT80 -85 dBm @MCS0 -59 dBm @MCS9	The value of each rate is the typical. Tolerance is +4/-6dB for mass-production.
Antenna Port	U.FL compatible connector	

3-4-2 Bluetooth Specification

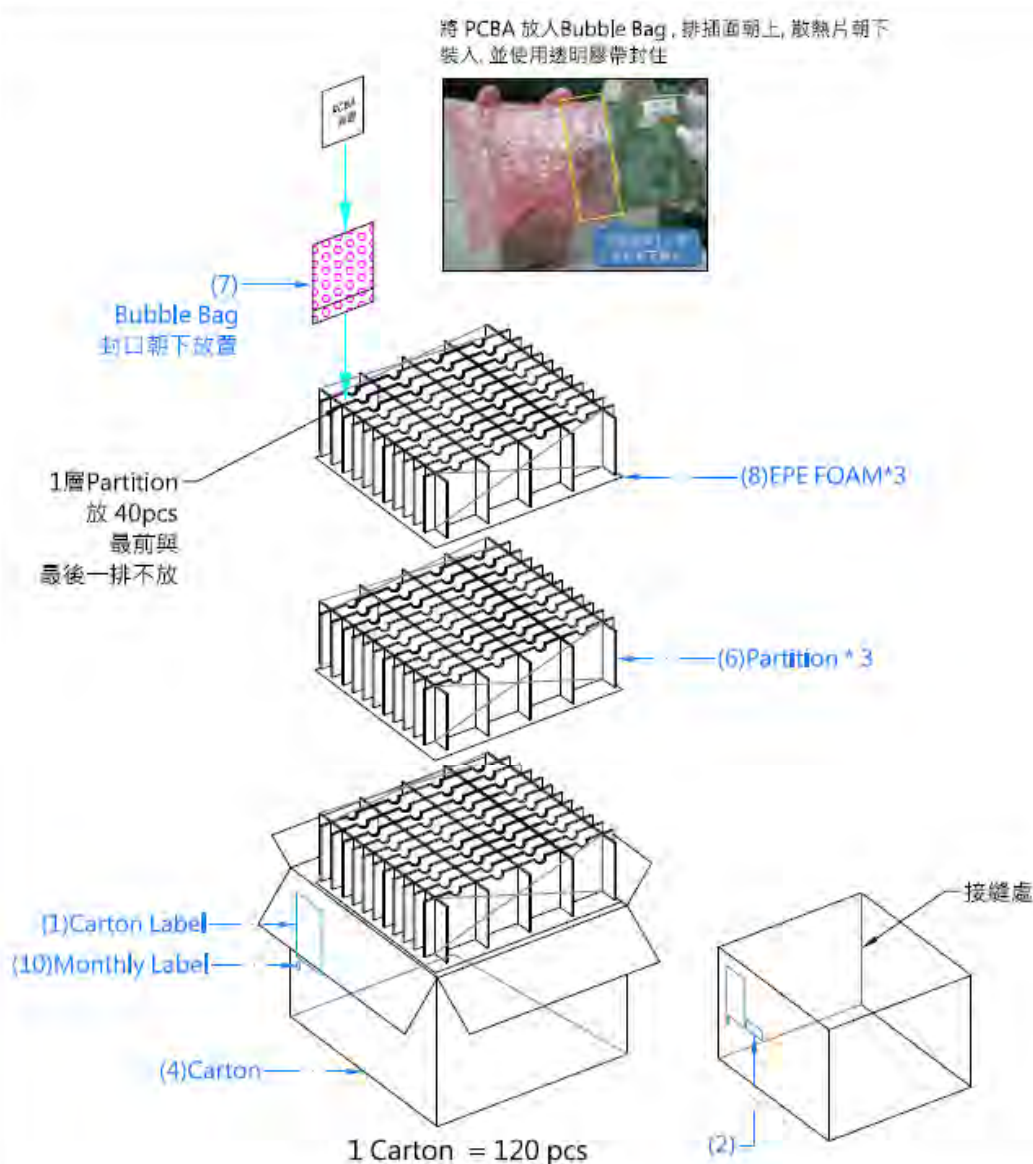
Table 34: Bluetooth Transmitter RF Specifications

Parameter	Conditions	Minimum	Typical	Maximum	Unit
Note: The specifications in this table are measured at the Chip port output unless otherwise specified.					
General					
Frequency range		2402	–	2480	MHz
Basic rate (GFSK) TX power at Bluetooth		–	13.0	–	dBm
QPSK TX power at Bluetooth		–	10.0	–	dBm
8PSK TX power at Bluetooth		–	10.0	–	dBm
Power control step		2	4	8	dB
Note: Output power is with TCA and TSSI enabled.					

Table 33: Bluetooth Receiver RF Specifications

Parameter	Conditions	Minimum	Typical	Maximum	Unit
Note: The specifications in this table are measured at the chip port output unless otherwise specified.					
General					
Frequency range	–	2402	–	2480	MHz
RX sensitivity	GFSK, 0.1% BER, 1 Mbps	–	–93.5	–	dBm
	$\pi/4$ -DQPSK, 0.01% BER, 2 Mbps	–	–95.5	–	dBm
	8-DPSK, 0.01% BER, 3 Mbps	–	–89.5	–	dBm
Input IP3	–	–16	–	–	dBm
Maximum input at antenna	–	–	–	–20	dBm

6 Packaging



Arcadyan

Packling Drawing

Model No.	WN9722BAC22-DM XX
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Cust. No.	WN9722BAC22-DM XX
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Prod. P/N.	FISDM9722xxxJ
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SHIP KIT P/N.	P/BDM9722xxxxl
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Revision:	R01
ECN No.	--

DATE : 2019/12/17

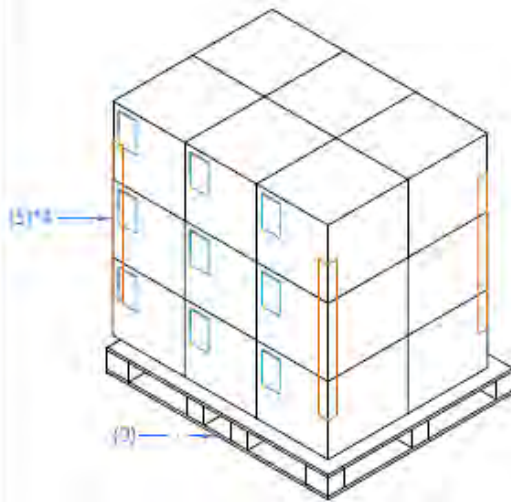
● : ECN Change Item

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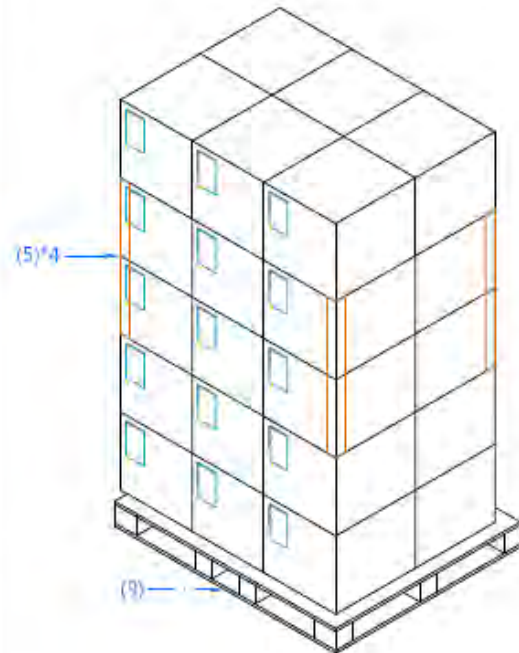
Creator: Rebecca Tseng

Page 1

<PALLET-Air>
FIBDM9722xxxJ
<PALLET-Air & Sea>
- For DLNA
1/120pcs/(2*3*3L)
 $(389 \times 3) + 120 = 1287\text{MM} < \text{Max } 1500\text{MM}$



<PALLET-Sea>
FIBDM9722xxxJ
1/120pcs/(2*3*5L)
 $(389 \times 5) + 120 = 2065\text{MM} < \text{Max } 2150\text{MM}$



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 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 is restricted for indoor use.

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 20cm between the radiator & your body.

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.

Cet appareil contient des émetteurs / récepteurs exempts de licence qui sont conformes au (x) RSS (s) exemptés de licence d'Innovation, Sciences et Développement économique Canada.

L'opération est soumise aux deux conditions suivantes:

- (1) Cet appareil ne doit pas provoquer d'interférences.*
- (2) Cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil.*

This device and its antenna(s) must not be co-located with any other transmitters except in accordance with IC multi-transmitter product procedures.

Referring to the multi-transmitter policy, multiple-transmitter(s) and module(s) can be operated simultaneously without reassessment permissive change.

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

This radio transmitter 4711A-AIOS5V has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Le présent émetteur radio 4711A-AIOS5V a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal d'antenne. Les types d'antennes non inclus dans cette liste qui ont un gain supérieur au gain maximal indiqué pour tout type listé sont strictement interdits pour une utilisation avec cet appareil.

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

For indoor use only.

Pour une utilisation en intérieur uniquement.

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 20cm 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.

IMPORTANT NOTE:

This module is intended for OEM integrator. The OEM integrator is responsible for the compliance to all the rules that apply to the product into which this certified RF module is integrated.

Additional testing and certification may be necessary when multiple modules are used.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the IC RSS-102 radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

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. Operation is subject to the following two conditions: (1) this device may not cause harmful interference (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: 4711A-AIOS5V ".

The Host Model Number (HMN) must be indicated at any location on the exterior of the end product or product packaging or product literature which shall be available with the end product or online.

5GHz band (W52, W53): Indoor use only

Ant. List:

Set	Port	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	1, 2	Airgain	N2420DG3-T2L-PK1-G30U	PIFA Antenna	I-PEX	Note 1
2	1, 2	Airgain	N2420DG3-T2L-PK1-G100U	PIFA Antenna	I-PEX	
3	1, 2	Airgain	N2420DG3-T2L-PK1-G600U	PIFA Antenna	I-PEX	
4	1, 2	Airgain	N2425D-T2L-PK1-G30U	PIFA Antenna	I-PEX	
5	1, 2	Airgain	N2425D-T2R-PK1-G150U	PIFA Antenna	I-PEX	
6	1, 2	Airgain	N2425D-T2R-PK1-G30U	PIFA Antenna	I-PEX	
7	1, 2	Airgain	N2425D-T2R-PK1-G500U	PIFA Antenna	I-PEX	
8	1, 2	LITE	503021-0123-0BC	Dipole Antenna	I-PEX	
9	1, 2	LITE	501301-0019-1BC (300mm antenna cable: 510411-5210-24C)	Dipole Antenna	I-PEX	
10	1, 2	LITE	501301-0019-1BC (500mm antenna cable: 510411-5300-23C)	Dipole Antenna	I-PEX	

Note 1:

Set	Port	Antenna Gain (dBi)			Cable Loss (dB)			True Gain (dBi)		
		WLAN 2.4GHz	WLAN 5GHz	BT	WLAN 2.4GHz	WLAN 5GHz	BT	WLAN 2.4GHz	WLAN 5GHz	BT
1	1, 2	3.1	3.66	3.1	0.105	0.147	0.105	2.995	3.513	2.995
2	1, 2	3.1	3.66	-	0.35	0.49	-	2.75	3.17	2.75
3	1, 2	3.1	3.66	-	2.1	2.94	-	1	0.72	1
4	1, 2	1.9	3.5	-	0.105	0.147	-	1.795	3.353	1.795
5	1, 2	1.9	3.5	-	0.525	0.735	-	1.375	2.765	1.375
6	1, 2	1.9	3.5	-	0.105	0.147	-	1.795	3.353	1.795
7	1, 2	1.9	3.5	-	1.75	2.45	-	0.15	1.05	0.15
8	1, 2	-	-	-	-	-	-	2.55	2.35	2.55
9	1, 2	3.48	4.29	3.48	0.72	1.66	0.72	2.76	2.63	2.76
10	1, 2	3.48	4.29	3.48	1.49	1.7	1.49	1.99	2.59	1.99