

# User Manual for LUXASTR01

Revision	Description of changes	Note
1.0	Created	10 September. 2019

## Table of Content

1. Introduction.....	3
2. Specifications.....	3
Quick overview of Specification. ....	3
Technical Specification.....	3
3. Mechanical overview.....	4
Mechanical Dimension.....	4
4. I/O specification.....	5
Pin Configurations .....	5
5. WiFi RF Specification.....	6
2.4G.....	6
5.0G.....	10
6. FCC & IC Statement.....	14
7. Antenna List.....	18
Appendix - Module Functional Block Diagram .....	188

# 1 Introduction

WiFi module LUXASTR01 is a single board WiFi solution based on Amlogic A113D Audio Precessor and Embedded Wireless LAN controller SOC(Which integrates quad-core ARM Cortex A53) and Ampak AP6398S RF module(Which integrates Broadcom BCM43598 single-chip IEEE802.11TM b/g/n /ac MAC/Baseband/Radio device).

# 2 Specifications

Quick overview of Specification.

MCU	A113D ARM Cortex-A53 Frequency 1500MHZ
Memory Capacity	512Mbyte external Nand Flash. 512Mbyte external DDR4 SDRAM
RF chip	BCM43598 WiFi chip(on chip 896KB SRAM and 896KB ROM)
Debug interface support	JTAG/Uart
Frequency Band	2.4GHz and 5GHz
Network Standard	802.11b, 802.11g, 802.11n ,802.11ac
Modulation Modes	CCK and OFDM with BPSK, QPSK, 16 QAM, 64QAM,256QAM
Hardware Encryption	WEP, WPA / WPA2
Supported Data Rates	IEEE 802.11b 1-11Mbps IEEE 802.11g 6-54Mbps IEEE 802.11n( 2.4GHz/5GHz) MbpsIEEE 802.11ac( 2.4GHz/5GHz) up to 867Mbps
Advanced 2x2 802.11ac features	Support 802.11ac/n beamforming Advanced Bluetooth /WLAN Coexistence
Two Antenna configurations	Supported antenna diversity, MIMO and SISO mode
Ethernet Interface	Build in 10/100/1000MHZ PHY
Operating Temperature	-40 ~ 85deg

## Technical Specification

Parameter	Min	Max	Units		
Power Supply Voltage 5V	0	5.5	V		
Voltage Ripple	Max.Value not exceeding Operating voltage				
Parameter	Min	Max	Units		
Operating Temperature	0	75	deg		
Tj	<85 deg				
Humidity	Max 95%				
Parameter	Min	Type	Max	Units	
Power Supply Voltage	4.5	5	5.25	V	
Power Consumption			1.0rms 1.5peak	A	
Logic Input Low Voltage (V <sub>IL</sub> )	-	-	0.8	V	
Logic Input High Voltage(V <sub>IH</sub> )	Only for 3.3V logic		2.0	-	V
Logic output Low Voltage (V <sub>OL</sub> )	-	-	0.4	V	
Logic output High Voltage (V <sub>OH</sub> )	Only for 3.3V logic		2.4	-	V

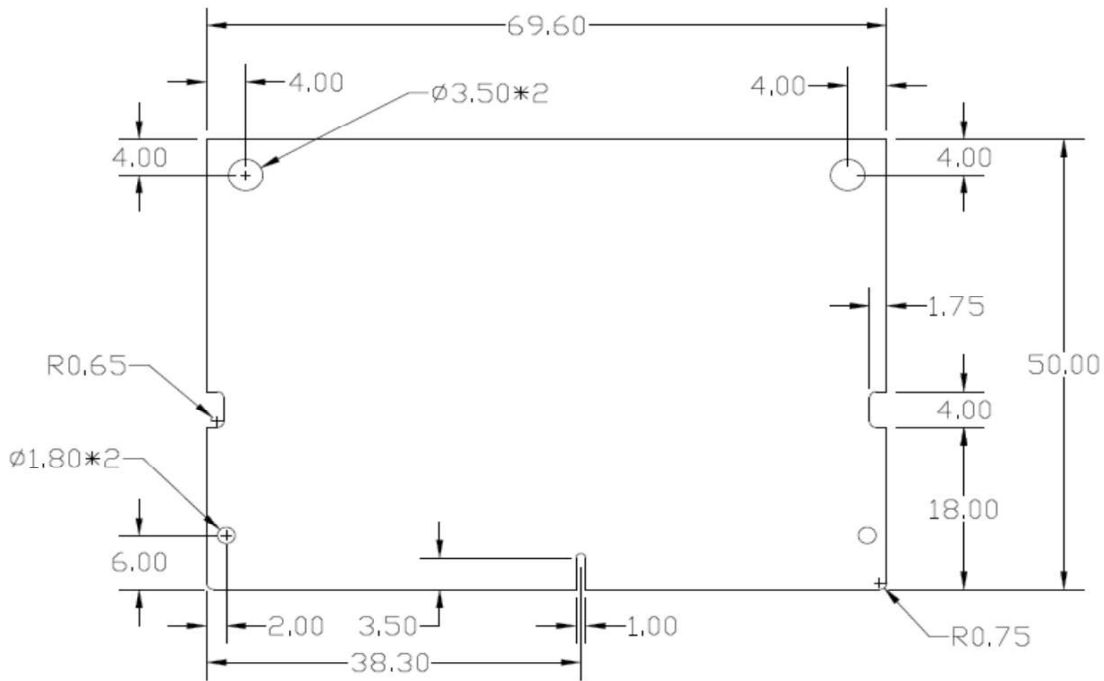
### 3 Mechanical overview

#### Mechanical Dimension

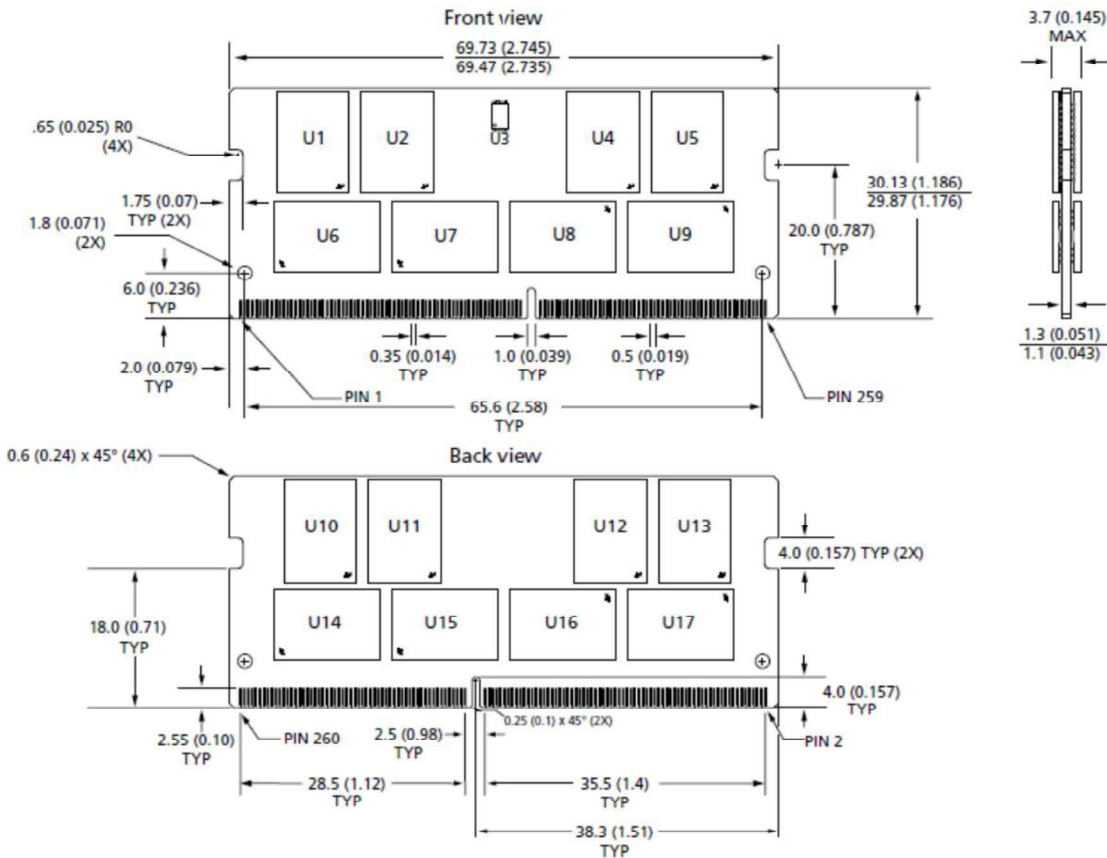
The maximum mechanical form factor of the module is shown below.

Physical Dimension Unit in mm

PCB thickness: 1.2mm +/- 0.05mm, gold finger > 3u" plating



unit : mm



- Notes: 1. All dimensions are in millimeters (inches); MAX/MIN or typical (TYP) where noted.  
2. The dimensional diagram is for reference only.

# 4 I/O specification

## Pin Configurations

Avatar WiFi module apply SODIMM4 260Pin(0.5mm pitch) gold finger connector interface to optimize the PCBA size as well as assemble feasibility.



## 5 WiFi RF Specification

### 2.4G

Features	Description	802.11 Standards ref.
WLAN Standards	IEEE 802 part 11b/g/n/ac	
Frequency Band	2.400~2.4835GHz	
Number of selectable Sub channels	14 channels	
Modulation	OFDM, DSSS( Direct Sequence Spread Spectrum), DBPSK, BPSK, QPSK , DQPSK, CCK,16QAM,64QAM	
Transmission Speed	1,2, 5.5, 11, 6,9, 12,18,24,36,48, 54Mbps & 802.11n MCS 0~7	
LO Leakage	<-35dBc	
TX/RX switch time	<5us(include TX ramp down)	
RX/TX switch time	<2us(include TX ramp up)	
802.11b RF Performance		
Features	Description	802.11 Standards ref.
Transmit Power levels	14~18dBm (TBC)	18.4.7.1
Transmit Spectral Mask	<-30dB for $F_c-22\text{MHz} < F < F_c-11\text{MHz}$ and $F_c+11\text{MHz} < F < F_c+22\text{MHz}$ <-50dB for $F < F_c-22\text{MHz}$ and $F > F_c+22\text{MHz}$	18.4.7.3
Transmit Center Frequency Tolerance	±20ppm	18.4.7.4
Chip Clock Tolerance	±20ppm	18.4.7.5
Transmit power on/power down ramp	<2usec (10%~90%)	18.4.7.6
RF Carrier Suppression	-15dB transmitting repetitive 01 data using DQPSK	18.4.7.7
Transmit modulation Accuracy	<-22dB @TX power 16dBm	18.4.7.8
RMS phase noise	<10 Deg	N/A
Receiver minimum input level sensitivity	-86dBm (with PER<8%@11Mbps 20Mhz BW) -95dBm (with PER<8%@1Mbps 20MHz BW)	18.4.8.1
Receiver maximum input level	-15dBm (with PER < 8%@11Mbps)	18.4.8.2
Receiver adjacent channel rejection	>35dB (with PER<8%, >25MHz separation)	18.4.8.3

The device operates strictly as a client in DFS channels. It does not support ad-hoc, Wi-Fi Direct Group Owner, Hotspot or any other peer-to-peer modes that may initiate a network in DFS channels.



802.11g RF Performance		
Features	Description	802.11 Standards ref.
Transmit Power levels	11~15dBm (TBC)	17.3.9.1
Transmit Spectral Mask	<-30dB @11MHz frequency offset <-28dB @20MHz frequency offset <-40dB @30MHz frequency offset	17.3.9.2
Transmit Center Frequency Tolerance	±20ppm	17.3.9.4
Chip Clock Tolerance	±20ppm	17.3.9.5
Transmitter center frequency leakage	Should not exceed -15dB relative to overall transmitted power.	17.3.9.6.1
Transmitter spectral flatness	±2dB maximum deviation for subcarrier 1 to 16, +2 to -4dB for subcarrier 17 to 26.	17.3.9.6.2
Transmitter constellation error (EVM)	<-28dB @ 54Mbps <-24dB @ 48Mbps <-28dB @ 36Mbps <-25dB @ 24Mbps <-27dB @ 18Mbps <-27dB @ 12Mbps <-26dB @ 9Mbps <-24dB @ 6Mbps	17.3.9.6.3
RMS phase noise	<10 Deg	N/A
Receiver minimum input level sensitivity	-71dBm (with PER<10%@54Mbps) -77dBm (with PER<10%@36Mbps) -83dBm (with PER<10%@18Mbps 20MHz BW) - -87dBm (with PER<10%@9Mbps 20MHz BW ) -88dBm (with PER<10%@6Mbps 20MHz BW)	17.3.10.1
Adjacent channel rejection	Not less than -1dB, PER<10%, 54Mbps Not less than 0dB, PER<10%, 48Mbps Not less than 4dB, PER<10%, 36Mbps Not less than 8dB, PER<10%, 24Mbps Not less than 11dB, PER<10%, 18Mbps Not less than 13dB, PER<10%, 12Mbps Not less than 15dB, PER<10%, 9Mbps Not less than 16dB, PER<10%, 6Mbps	17.3.10.2
Non-Adjacent channel rejection	Not less than 15dB, PER<10%, 54Mbps Not less than 16dB, PER<10%, 48Mbps Not less than 20dB, PER<10%, 36Mbps Not less than 24dB, PER<10%, 24Mbps Not less than 27dB, PER<10%, 18Mbps Not less than 29dB, PER<10%, 12Mbps Not less than 31dB, PER<10%, 9Mbps Not less than 32dB, PER<10%, 6Mbps	17.3.10.3
Receiver maximum input level	-20dBm (with PER < 10%@54Mbps)	17.3.10.4

802.11n RF Performance		
Features	Description	802.11 Standards ref.
<b>Transmit Spectral Mask</b>	<-45dB @30MHz frequency offset <-28dB @20MHz frequency offset <-20dB @11MHz frequency offset	20.3.21.1
<b>Spectral flatness</b>	±2dB maximum deviation for subcarrier 1 to 16, +2 to -4dB for subcarrier 17 to 28 (20MHz channel width).	20.3.21.2
<b>Transmit Power levels(HT20)</b>	10~14dBm (TBC)	20.3.21.3
<b>Transmit Power levels(HT40)</b>	9---13dBm(TBC)	20.3.21.3
<b>Transmit Center Frequency Tolerance</b>	±20ppm	20.3.21.4
<b>Symbol clock frequency tolerance</b>	±20ppm	20.3.21.6
<b>Transmitter center frequency leakage</b>	Should not exceed -15dB relative to overall transmitted power (20MHz channel width)	20.3.21.7.2
<b>Transmitter Constellation error (EVM rms)</b>	<-30dB@, 64QAM(5/6 coding rate) <-27dB@, 64QAM(3/4 coding rate) <-23dB@, 64QAM(2/3 coding rate) <-20dB @ 16QAM(3/4 coding rate) <-17dB @, 16QAM(1/2 coding rate) <-15dB @, QPSK (3/4 coding rate) <-13dB @, QPSK (1/2 coding rate) <-8dB @, BPSK (1/2 coding rate)  (20MHz channel width)	20.3.21.7.3
<b>Transmitter Constellation error (EVM rms)</b>	<-31dB@, 64QAM(5/6 coding rate) <-28dB@, 64QAM(3/4 coding rate) <-28dB@, 64QAM(2/3 coding rate) <-21dB @ 16QAM(3/4 coding rate) <-18dB @, 16QAM(1/2 coding rate) <-16dB @, QPSK (3/4 coding rate) <-14dB @, QPSK (1/2 coding rate) <-9dB @, BPSK (1/2 coding rate)  (40MHz channel width)	20.3.21.7.3
<b>RMS phase noise</b>	<10 Deg	N/A
<b>Receiver minimum input level sensitivity (20MHz BW)</b>	-68dBm (with PER<10%@64QAM(5/6 coding rate MCS7 20MHz BW ) -70dBm (with PER<10%@64QAM(3/4 coding rate MCS6 20MHz BW) -71dBm (with PER<10%@64QAM(2/3 coding rate MCS5 20MHz BW) -75dBm (with PER<10%@16QAM (3/4 coding rate MCS4 20MHz BW) -79dBm (with PER<10%@16QAM(1/2 coding rate MCS3 20MHz BW) -81dBm (with PER<10%@QPSK(3/4 coding rate MCS2 20MHz BW ) -82 dBm (with PER<10%@QPSK(1/2 coding rate MCS1 20MHz BW)	20.3.22.1



	-83dBm (with PER<10%@BPSK(1/2 coding rate MCS0 20MHZ BW)	
<b>Receiver minimum input level sensitivity (40MHz)</b>	-66dBm (with PER<10% MCS7 40MHz BW ) -67dBm (with PER<10% MCS6 40MHz BW) -69dBm (with PER<10% MCS5 40MHz BW) -72dBm (with PER<10% MCS4 40MHz BW) -77dBm (with PER<10% MCS3 40MHz BW) -77dBm (with PER<10% MCS2 40MHz BW) -80 dBm (with PER<10% MCS1 40MHz BW) -82dBm (with PER<10% MCS0 40MHZ BW)	20.3.22.1
<b>Adjacent channel rejection</b>	Not less than -2dB, PER<10%, 64-QAM(5/6coding rate) Not less than -1dB, PER<10%, 64-QAM(3/4coding rate) Not less than 0dB, PER<10%, 64-QAM(2/3coding rate) Not less than 4dB, PER<10%, 16-QAM(3/4coding rate) Not less than 8dB, PER<10%, 16-QAM(1/2coding rate) Not less than 11dB, PER<10%, QPSK(3/4coding rate) Not less than 13dB, PER<10%, QPSK(1/2coding rate) Not less than 16dB, PER<10%, BPSK(1/2coding rate)	20.3.22.2
<b>Non-Adjacent channel rejection</b>	Not less than 14dB, PER<10%, 64-QAM(5/6coding rate) Not less than 15dB, PER<10%, 64-QAM(3/4coding rate) Not less than 16dB, PER<10%, 64-QAM(2/3coding rate) Not less than 20dB, PER<10%, 16-QAM(3/4coding rate) Not less than 24dB, PER<10%, 16-QAM(1/2coding rate) Not less than 27dB, PER<10%, QPSK(3/4coding rate) Not less than 29dB, PER<10%, QPSK(1/2coding rate) Not less than 32dB, PER<10%, BPSK(1/2coding rate)	20.3.22.3
<b>Receiver maximum input level</b>	-20dBm (with PER < 10%@MSC0-MSC7)	20.3.22.4

## 5.0G

Features	Description	802.11 Standards ref.
<b>WLAN Standards</b>	IEEE 802 part 11n/ac	
<b>Frequency Band</b>	5.15~5.35GHz, 5.470~5.725GHz, 5.46~5.72GHz, 5.725~5.825GHz	
<b>Number of selectable Sub channels</b>	24 channels	
<b>Modulation</b>	OFDM, DSSS( Direct Sequence Spread Spectrum), DBPSK, DQPSK, CCK,16QAM,64QAM,256QAM	
<b>Transmission Speed</b>	6,9, 12,18,24,36,48, 54Mbps & HT20MCS 0~7~15, HT40MCS 0~7~15, VHT20 MCS 0~9, VHT40 MCS 0~9, VHT80 MCS 0~9	
802.11n RF Performance		
Features	Description	802.11 Standards ref.
<b>Transmit Spectral Mask</b>	<-45dB @30MHz frequency offset <-28dB @20MHz frequency offset <-20dB @11MHz frequency offset	20.3.21.1
<b>Spectral flatness</b>	±2dB maximum deviation for subcarrier 1 to 16, +2 to -4dB for subcarrier 17 to 28 (20MHz channel width).	20.3.21.2
<b>Transmit Power levels (HT20)</b>	10~14dBm (TBC)	20.3.21.3
<b>Transmit Power levels (HT40)</b>	9~13dBm (TBC)	20.3.21.3
<b>Transmit Center Frequency Tolerance</b>	±20ppm	20.3.21.4
<b>Symbol clock frequency tolerance</b>	±20ppm	20.3.21.6
<b>Transmitter center frequency leakage</b>	Should not exceed -15dB relative to overall transmitted power (20MHz channel width)	20.3.21.7.2
<b>Transmitter Constellation error (EVM rms)</b>	<-30dB @, 64QAM(5/6 coding rate) <-27dB @, 64QAM(3/4 coding rate) <-23dB @, 64QAM(2/3 coding rate) <-20dB @ 16QAM(3/4 coding rate) <-17dB @, 16QAM(1/2 coding rate) <-15dB @, QPSK (3/4 coding rate) <-13dB @, QPSK (1/2 coding rate) <-8dB @, BPSK (1/2 coding rate)  (20MHz channel width)	20.3.21.7.3
<b>RMS phase noise</b>	<10 Deg	N/A
<b>Receiver minimum input level sensitivity(20MHz channel spacing)</b>	-64dBm (with PER<10%@64QAM(5/6 coding rate MCS7) -69dBm (with PER<10%@64QAM(3/4 coding rate MCS6) -70dBm (with PER<10%@64QAM(2/3 coding rate MCS5) -76dBm (with PER<10%@16QAM (3/4 coding rate MCS4) -78dBm (with PER<10%@16QAM(1/2 coding rate MCS3)	20.3.22.1

	-80dBm (with PER<10%@QPSK(3/4 coding rateMCS2) -82 dBm (with PER<10%@QPSK(1/2 coding rate MCS1) -86dBm (with PER<10%@BPSK(1/2 coding rate MCS0)	
<b>Receiver minimum input level sensitivity(40MHz channel spacing)</b>	-66dBm (with PER<10%@64QAM(5/6 coding rate MCS7) -67dBm (with PER<10%@64QAM(3/4 coding rate MCS6) -68dBm (with PER<10%@64QAM(2/3 coding rate MCS5) -71dBm (with PER<10%@16QAM (3/4 coding rate MCS4) -76dBm (with PER<10%@16QAM(1/2 coding rate MCS3) -78dBm (with PER<10%@QPSK(3/4 coding rate MCS2) -80 dBm (with PER<10%@QPSK(1/2 coding rate MCS1) -83dBm (with PER<10%@BPSK(1/2 coding rate MCS0)	20.3.22.1
<b>Adjacent channel rejection</b>	Not less than -2dB, PER<10%, 64-QAM(5/6coding rate) Not less than -1dB, PER<10%, 64-QAM(3/4coding rate) Not less than 0dB, PER<10%, 64-QAM(2/3coding rate) Not less than 4dB, PER<10%, 16-QAM(3/4coding rate) Not less than 8dB, PER<10%, 16-QAM(1/2coding rate) Not less than 11dB, PER<10%, QPSK(3/4coding rate) Not less than 13dB, PER<10%, QPSK(1/2coding rate) Not less than 16dB, PER<10%, BPSK(1/2coding rate)	20.3.22.2
<b>Non-Adjacent channel rejection</b>	Not less than 14dB, PER<10%, 64-QAM(5/6coding rate) Not less than 15dB, PER<10%, 64-QAM(3/4coding rate) Not less than 16dB, PER<10%, 64-QAM(2/3coding rate) Not less than 20dB, PER<10%, 16-QAM(3/4coding rate) Not less than 24dB, PER<10%, 16-QAM(1/2coding rate) Not less than 27dB, PER<10%, QPSK(3/4coding rate) Not less than 29dB, PER<10%, QPSK(1/2coding rate) Not less than 32dB, PER<10%, BPSK(1/2coding rate)	20.3.22.3
<b>Receiver maximum input level</b>	-20dBm (with PER < 10%@MSC0-MSC7)	20.3.22.4

#### 802.11ac RF Performance

Features	Description	802.11 Standards ref.
<b>Transmit Spectral Mask</b>	For 20MHz channel, 0dBr for bandwidth not exceeding 18MHz, -20dBr at 11MHz frequency offset, -28dBr at 20MHz frequency offset, -40dBr at 30MHz frequency offset and above For 40MHz channel, 0dBr for bandwidth not exceeding 38MHz, -20dBr at 21MHz frequency offset, -28dBr at 40MHz frequency	22.3.18.1



	offset, -40dB at 60MHz frequency offset and above For 80MHz channel, 0dB for bandwidth not exceeding 78MHz, -20dB at 41MHz frequency offset, -28dB at 80MHz frequency offset, -40dB at 120MHz frequency offset and above	
<b>Transmit Center Frequency and Symbol Clock Frequency Tolerance</b>	+/-20ppm	22.3.18.3
<b>Transmit Center Frequency Leakage</b>	No greater than -20dB relative to overall transmitted power	22.3.1.4.2
<b>Transmitter Spectral Flatness</b>	For 20MHz channel, +/-4dB maximum deviation from spectral line -16 to -1 and +1 to +16, +4 to -6dB for spectral line -28 to -17 and +17 to +28 For 40MHz channel, +/-4dB maximum deviation from spectral line -42 to -2 and +2 to +42, +4 to -6dB for spectral line -43 to -58 and +43 to +58 For 80MHz channel, +/-4dB maximum deviation from spectral line -84 to -2 and +2 to +84, +4 to -6dB for spectral line -85 to -122 and +85 to +122	22.3.18.2
<b>Transmitter Constellation Error (EVM rms)</b>	<-32dB@, 256QAM(5/6 coding rate) <-30dB@, 256QAM(3/4 coding rate) <-28dB@, 64QAM(5/6 coding rate) <-25dB@, 64QAM(3/4 coding rate) <-22dB@, 64QAM(2/3 coding rate) <-19dB @ 16QAM(3/4 coding rate) <-16dB @, 16QAM(1/2 coding rate) <-13dB @, QPSK (3/4 coding rate) <-10dB @, QPSK (1/2 coding rate) <-5dB @, BPSK (1/2 coding rate)	22.3.18.4.3
<b>Transmit Power levels(VHT20)</b>	9~13dBm (TBC)	
<b>Transmit Power levels(VHT40)</b>	8~12dBm (TBC)	
<b>Transmit Power levels(VHT80)</b>	7~11dBm (TBC)	
<b>Receiver minimum input level sensitivity</b>	Refer to below 5G ac Receiver minimum sensitivity table	22.3.19.1
<b>Adjacent channel rejection(20/40/80 channel spacing)</b>	Not less than -9dB, PER<10%, 256-QAM(5/6coding rate) Not less than -7dB, PER<10%, 256-QAM(3/4coding rate) Not less than -2dB, PER<10%, 64-QAM(5/6coding rate) Not less than -1dB, PER<10%, 64-QAM(3/4coding rate) Not less than 0dB, PER<10%, 64-QAM(2/3coding rate) Not less than 4dB, PER<10%, 16-QAM(3/4coding rate) Not less than 8dB, PER<10%, 16-QAM(1/2coding rate)	22.3.19.2

	Not less than 11dB, PER<10%, QPSK(3/4coding rate) Not less than 13dB, PER<10%, QPSK(1/2coding rate) Not less than 16dB, PER<10%, BPSK(1/2coding rate)	
<b>Non-Adjacent channel rejection(20/40/80 channel spacing)</b>	Not less than 7dB, PER<10%, 256-QAM(5/6coding rate) Not less than 9dB, PER<10%, 256-QAM(3/4coding rate) Not less than 14dB, PER<10%, 64-QAM(5/6coding rate) Not less than 15dB, PER<10%, 64-QAM(3/4coding rate) Not less than 16dB, PER<10%, 64-QAM(2/3coding rate) Not less than 20dB, PER<10%, 16-QAM(3/4coding rate) Not less than 24dB, PER<10%, 16-QAM(1/2coding rate) Not less than 27dB, PER<10%, QPSK(3/4coding rate) Not less than 29dB, PER<10%, QPSK(1/2coding rate) Not less than 32dB, PER<10%, BPSK(1/2coding rate)	22.3.19.3
<b>Receiver maximum input level</b>	-20dBm (with PER < 10%@MSC0-MSC7)	



## 6 FCC & IC Statement

FCC ID : APILUXASTR01

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 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.

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 : APILUXASTR01". 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 its 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 fonctionnement 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 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.

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., qu'ils 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- LUXASTR01](#)) 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- LUXASTR01](#)) 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- LUXASTR01](#) "

## 7. 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

## Appendix - Module Functional Block Diagram

