

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                         |                                                                                            |                                                                                                                                                  |                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>Prüfbericht-Nr.:</b><br><i>Test report no.:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>60386707 002</b>                                                                                                                                     | <b>Auftrags-Nr.:</b><br><i>Order no.:</i>                                                  | 168277807                                                                                                                                        | Seite 1 von 17<br><i>Page 1 of 17</i> |
| <b>Kunden-Referenz-Nr.:</b><br><i>Client reference no.:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                            | N/A                                                                                                                                                     | <b>Auftragsdatum:</b><br><i>Order date:</i>                                                | 2020-08-12                                                                                                                                       |                                       |
| <b>Auftraggeber:</b><br><i>Client:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>LEEDARSON LIGHTING CO., LTD.</b><br>Xingtai Industrial Zone, Economic Development Zone, Changtai County, Zhangzhou City, Fujian Province, P.R. China |                                                                                            |                                                                                                                                                  |                                       |
| <b>Prüfgegenstand:</b><br><i>Test item:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | LA02301 WI-FI and Bluetooth SMART (BLE) Combo Module                                                                                                    |                                                                                            |                                                                                                                                                  |                                       |
| <b>Bezeichnung / Typ-Nr.:</b><br><i>Identification / Type no.:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                     | LA02301<br>(Trademark: LEEDARSON)                                                                                                                       |                                                                                            |                                                                                                                                                  |                                       |
| <b>Auftrags-Inhalt:</b><br><i>Order content:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | FCC & IC approval                                                                                                                                       |                                                                                            |                                                                                                                                                  |                                       |
| <b>Prüfgrundlage:</b><br><i>Test specification:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CFR47 FCC Part 15: Subpart C Section 15.247<br>CFR47 FCC Part 15: Subpart C Section 15.207<br>CFR47 FCC Part 2: Section 2.1091                          |                                                                                            | RSS-247 Issue 2 February 2017<br>RSS-Gen Issue 5 March 2019<br>RSS-102 Issue 5 March 2015                                                        |                                       |
| <b>Wareneingangsdatum:</b><br><i>Date of sample receipt:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2020-08-13                                                                                                                                              | Please refer to photo documents                                                            |                                                                                                                                                  |                                       |
| <b>Prüfmuster-Nr.:</b><br><i>Test sample no.:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | A002887232-001                                                                                                                                          |                                                                                            |                                                                                                                                                  |                                       |
| <b>Prüfzeitraum:</b><br><i>Testing period:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2020-09-08 – 2020-09-14                                                                                                                                 |                                                                                            |                                                                                                                                                  |                                       |
| <b>Ort der Prüfung:</b><br><i>Place of testing:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TÜV Rheinland (Shenzhen) Co., Ltd.                                                                                                                      |                                                                                            |                                                                                                                                                  |                                       |
| <b>Prüflaboratorium:</b><br><i>Testing laboratory:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | TÜV Rheinland (Shenzhen) Co., Ltd.                                                                                                                      |                                                                                            |                                                                                                                                                  |                                       |
| <b>Prüfergebnis*:</b><br><i>Test result*:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Pass                                                                                                                                                    |                                                                                            |                                                                                                                                                  |                                       |
| <b>geprüft von:</b><br><i>tested by:</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>genehmigt von:</b><br><i>authorized by:</i>                                                                                                          |                                                                                            |                                                                                                                                                  |                                       |
| <b>Datum:</b><br><i>Date:</i> 2020-09-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                      |                                                                                            | <b>Ausstellungsdatum:</b><br><i>Issue date:</i> 2020-09-30  |                                       |
| <b>Stellung / Position</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Alex Lan / Senior Project Engineer                                                                                                                      |                                                                                            | <b>Stellung / Position</b> Winnie Hou / Technical Certifier                                                                                      |                                       |
| <b>Sonstiges / Other:</b><br><br>This test report is based on original 60386707 001 for alternative components.<br><br>FCC ID: 2AB2Q-LA02301<br>IC: 10256A-LA02301; HVIN: LA02301                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                         |                                                                                            |                                                                                                                                                  |                                       |
| <b>Zustand des Prüfgegenstandes bei Anlieferung:</b><br><i>Condition of the test item at delivery:</i>                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                         | <b>Prüfmuster vollständig und unbeschädigt</b><br><i>Test item complete and undamaged:</i> |                                                                                                                                                  |                                       |
| <p>* Legende: 1 = sehr gut      2 = gut      3 = befriedigend      4 = ausreichend      5 = mangelhaft<br/> P(ass) = entspricht o.g. Prüfgrundlage(n)      F(ail) = entspricht nicht o.g. Prüfgrundlage(n)      N/A = nicht anwendbar      N/T = nicht getestet<br/> Legend: 1 = very good      2 = good      3 = satisfactory      4 = sufficient      5 = poor<br/> P(ass) = passed a.m. test specifications(s)      F(ail) = failed a.m. test specifications(s)      N/A = not applicable      N/T = not tested</p> |                                                                                                                                                         |                                                                                            |                                                                                                                                                  |                                       |
| <p><b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b><br/> <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p>                                                    |                                                                                                                                                         |                                                                                            |                                                                                                                                                  |                                       |

V05

## ***Test Summary***

**5.1.1 ANTENNA REQUIREMENT**

*RESULT: Pass*

**5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER**

*RESULT: Pass*

**5.1.3 RADIATED SPURIOUS EMISSION**

*RESULT: Pass*

**6.1.1 ELECTROMAGNETIC FIELDS**

*RESULT: Pass*

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# 1 General Remarks

## 1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

Appendix B: Test Results of Radiated Testing and conducted emission on AC mains

# 2 Test Sites

## 2.1 Test Facilities

**TÜV Rheinland (Shenzhen) Co., Ltd. Testing Center**

No. 362 Huanguan Road Middle, Longhua District, Shenzhen 518110, People's Republic of China

FCC Registration No.: 694916

IC Registration No.: 25069

## 2.2 List of Test and Measurement Instruments

**Table 1: List of Test and Measurement Equipment**

| <b>Radio Spectrum Testing</b>                |                     |                   |                   |                   |
|----------------------------------------------|---------------------|-------------------|-------------------|-------------------|
| <b>Equipment</b>                             | <b>Manufacturer</b> | <b>Model No.</b>  | <b>Serial No.</b> | <b>Cal. Until</b> |
| Wireless Connectivity Tester                 | Rohde & Schwarz     | CMW270            | 101375            | 2021-08-30        |
| Signal Analyzer                              | Rohde & Schwarz     | FSV 40            | 101441            | 2021-08-30        |
| Vector Signal Generator                      | Rohde & Schwarz     | SMBV100A          | 263301            | 2021-08-30        |
| Signal Generator                             | Rohde & Schwarz     | SMB100A           | 115186            | 2021-08-30        |
| OSP                                          | Rohde & Schwarz     | OSP 150           | 101017            | 2020-12-20        |
| Control PC                                   | DELL                | OptiPlex 7050     | FTJZ9P2           | N/A               |
| Test Software                                | Rohde & Schwarz     | WMS32 (V10.40.10) | N/A               | N/A               |
| Power Meter                                  | Rohde & Schwarz     | NRP2              | 107105            | 2020-12-20        |
| <b>Unwanted Emission Testing</b>             |                     |                   |                   |                   |
| <b>Equipment</b>                             | <b>Manufacturer</b> | <b>Model No.</b>  | <b>Serial No.</b> | <b>Cal. Until</b> |
| Signal Generator                             | Rohde & Schwarz     | SMB100A           | 180840            | 2021-08-30        |
| Wideband Radio Communication Tester          | Rohde & Schwarz     | CMW500            | 165339            | 2021-08-30        |
| Signal Analyzer                              | Rohde & Schwarz     | FSV 40            | 101440            | 2021-08-30        |
| System Controller Interface                  | Rohde & Schwarz     | SCI-100           | S10010036         | N/A               |
| Filterbank                                   | Rohde & Schwarz     | CDMA              | 100751            | 2021-08-30        |
| Filterbank                                   | Rohde & Schwarz     | GSM               | 100811            | 2021-08-30        |
| OSP                                          | Rohde & Schwarz     | OSP 120           | 102041            | N/A               |
| OSP                                          | Rohde & Schwarz     | OSP 150           | 101385            | N/A               |
| Pre-amplifier                                | Rohde & Schwarz     | SCU08F1           | 08320030          | 2021-08-30        |
| Amplifier                                    | Rohde & Schwarz     | SCU-18F           | 180079            | 2021-08-30        |
| Amplifier                                    | Rohde & Schwarz     | SCU40A            | 100450            | 2021-09-03        |
| Trilog Broadband Antenna (30 MHz - 1 GHz)    | Schwarzbeck         | VULB9162          | 192               | 2021-09-02        |
| Double-Ridged Antenna (1 -18 GHz)            | ETS-LINDGREN        | 3117              | 00218719          | 2021-09-02        |
| Wideband Ridged Horn Antenna (12- 18 GHz)    | Steatite            | QMS-00208         | 18312             | 2021-09-02        |
| Wideband Ridged Horn Antenna (18- 40 GHz)    | Steatite            | QMS-00880         | 19066             | 2021-09-02        |
| Biconical Broadband Antenna (30 MHz - 1 GHz) | Schwarzbeck         | VUBA 9117         | 357               | 2021-09-02        |

## 2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

## 2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

## 2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

| Item                              |                         | Extended Uncertainty |
|-----------------------------------|-------------------------|----------------------|
| Conducted Emission                |                         | ± 2.74 dB            |
| Radiated Emission (30-1000MHz)    | Field strength (dBµV/m) | 4.27dB               |
| Radiated Emission (above 1000MHz) | Field strength (dBµV/m) | 4.46dB               |
| Radio Spectrum                    |                         | ± 1.5 dB             |

## 2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

## 2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Testing Center Test facility located at No. 362 Huanguan Road Middle, Longhua District, Shenzhen 518110, People's Republic of China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

### 3 General Product Information

#### 3.1 Product Function and Intended Use

The EUT is a LA02301 WI-FI and Bluetooth SMART (BLE) Combo Module, it supports Wi-Fi 802.11 b/g/n and Bluetooth Low Energy wireless technology.

Wi-Fi and Bluetooth Low Energy share one antenna and can't transmitting simultaneously.

This test report is based on original 60386707 001 for alternative components and this product has three configurations and details as below:

| Configuration: | Crystal   | Antenna   |
|----------------|-----------|-----------|
| 1              | Crystal 2 | Antenna 2 |
| 2              | Crystal 2 | Antenna 1 |
| 3              | Crystal 1 | Antenna 2 |

Manufacturer of Crystal 1: SIWARD CRYSTAL TECHNOLOGY CO.,LTD  
Manufacturer of Crystal 2: SEIKO EPSON CORPORATION

Antenna 1  
Manufacturer: LEEDARSON LIGHTING CO.,LTD  
Antenna Type: PCB Antenna  
Antenna Gain: 4 dBi

Antenna 2  
Manufacturer: Shenzhen Hongying Communication Technology Co., Ltd.  
Antenna Type: IPEX Antenna  
Antenna Gain: 3.7 dBi

The crystal 1 and antenna 1 are the original certified.

For details refer to the User Manual, Technical Description and Circuit Diagram.

#### 3.2 Ratings and System Details

Table 2: Technical Specification of EUT

| General Information of EUT | Value                                                |
|----------------------------|------------------------------------------------------|
| Kind of Equipment          | LA02301 WI-FI and Bluetooth SMART (BLE) Combo Module |
| Type Designation           | LA02301                                              |
| Trade Mark                 | LEEDARSON                                            |
| FCC ID                     | 2AB2Q-LA02301                                        |
| IC                         | 10256A-LA02301                                       |
| HVIN                       | LA02301                                              |
| Operating Voltage          | DC 5V via USB interface                              |
| Testing Voltage            | DC 5V via USB interface                              |

| <b>Technical Specification of Wi-Fi 802.11 b/g/n</b>   |                                                                                                  |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Operating Frequency                                    | 2412 - 2462 MHz for 802.11b/g/n(HT20)<br>2422 - 2452 MHz for 802.11n(HT40)                       |
| Type of Modulation                                     | DSSS(DBPSK/DQPSK/CCK)<br>OFDM(BPSK/QPSK/16QAM/64QAM)                                             |
| Data Rate                                              | 1/2/5.5/11 Mbps for 802.11b<br>6/9/12/18/24/36/48/54 Mbps for 802.11g<br>MCS0 ~ MCS7 for 802.11n |
| Channel Number                                         | 11 channels for 802.11b/g/n(HT20)<br>7 channels for 802.11n(HT40)                                |
| Channel Separation                                     | 5 MHz                                                                                            |
| <b>Technical Specification of Bluetooth Low Energy</b> |                                                                                                  |
| Operating Frequency                                    | 2402 – 2480 MHz                                                                                  |
| Bluetooth Core Version                                 | 4.2                                                                                              |
| Channel Number                                         | 40 channels                                                                                      |
| Channel separation                                     | 2MHz                                                                                             |
| Modulation                                             | GFSK                                                                                             |

**Table 3: RF Channel and Frequency of Wi-Fi 802.11 b/g/n**

| RF Channel | 802.11 b/g/n(HT20) | 802.11 n(HT40)  |
|------------|--------------------|-----------------|
|            | Frequency (MHz)    | Frequency (MHz) |
| <b>01</b>  | <b>2412</b>        | /               |
| 02         | 2417               | /               |
| <b>03</b>  | 2422               | <b>2422</b>     |
| 04         | 2427               | 2427            |
| 05         | 2432               | 2432            |
| <b>06</b>  | <b>2437</b>        | <b>2437</b>     |
| 07         | 2442               | 2442            |
| 08         | 2447               | 2447            |
| <b>09</b>  | 2452               | <b>2452</b>     |
| 10         | 2457               | /               |
| <b>11</b>  | <b>2462</b>        | /               |

Test frequencies are lowest channel: 2412 MHz, middle channel: 2437 MHz and highest channel: 2462 MHz for 802.11b/g/n(HT20)

Test frequencies are lowest channel: 2422 MHz, middle channel: 2437 MHz and highest channel: 2452 MHz for 802.11n(HT40)

**Table 4: RF Channel and Frequency of Bluetooth Low Energy**

| RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) |
|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| <b>00</b>  | <b>2402.00</b>  | 10         | 2422.00         | 20         | 2442.00         | 30         | 2462.00         |
| 01         | 2404.00         | 11         | 2424.00         | 21         | 2444.00         | 31         | 2464.00         |
| 02         | 2406.00         | 12         | 2426.00         | 22         | 2446.00         | 32         | 2466.00         |
| 03         | 2408.00         | 13         | 2428.00         | 23         | 2448.00         | 33         | 2468.00         |
| 04         | 2410.00         | 14         | 2430.00         | 24         | 2450.00         | 34         | 2470.00         |
| 05         | 2412.00         | 15         | 2432.00         | 25         | 2452.00         | 35         | 2472.00         |
| 06         | 2414.00         | 16         | 2434.00         | 26         | 2454.00         | 36         | 2474.00         |
| 07         | 2416.00         | 17         | 2436.00         | 27         | 2456.00         | 37         | 2476.00         |
| 08         | 2418.00         | 18         | 2438.00         | 28         | 2458.00         | 38         | 2478.00         |
| 09         | 2420.00         | <b>19</b>  | <b>2440.00</b>  | 29         | 2460.00         | <b>39</b>  | <b>2480.00</b>  |

### 3.3 Independent Operation Modes

The basic operation modes are:

- A. On, Wi-Fi 802.11 b/g/n wireless transmitting
  - 1. Low channel
  - 2. Middle channel
  - 3. High channel
- B. On, Bluetooth Low Energy wireless transmitting
  - 4. Low channel
  - 5. Middle channel
  - 6. High channel
- C. Off

### 3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

### 3.5 Submitted Documents

- Application Form
- Block Diagram
- FCC/IC Label and Location Info
- Operation Description
- Photo Document
- Schematics
- User Manual

## 4 Test Set-up and Operation Modes

### 4.1 Principle of Configuration Selection

**Radio Spectrum:** The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

### 4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, the Radiated Spurious Emissions were arranged retest with configuration 1 & 2, only the worst test data recorded for configuration 3.

### 4.3 Special Accessories and Auxiliary Equipment

Table 5: List of Accessories and Auxiliary Equipment

| Description | Manufacturer | Model         | S/N |
|-------------|--------------|---------------|-----|
| Notebook    | Lenovo       | ThinkPad X260 | N/A |

### 4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

## 4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

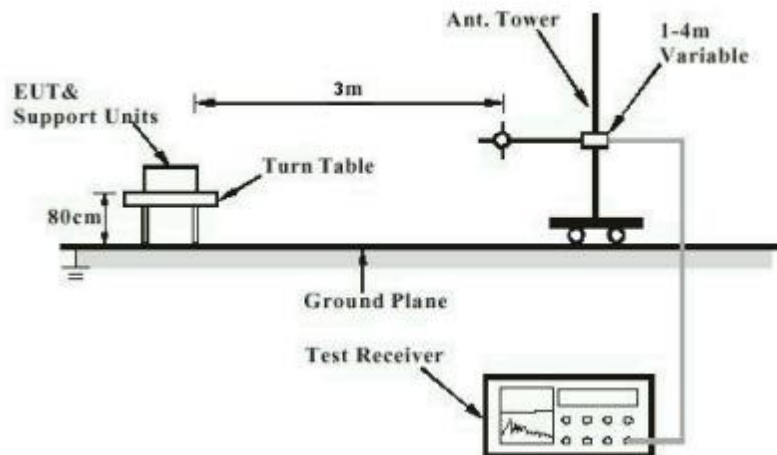


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

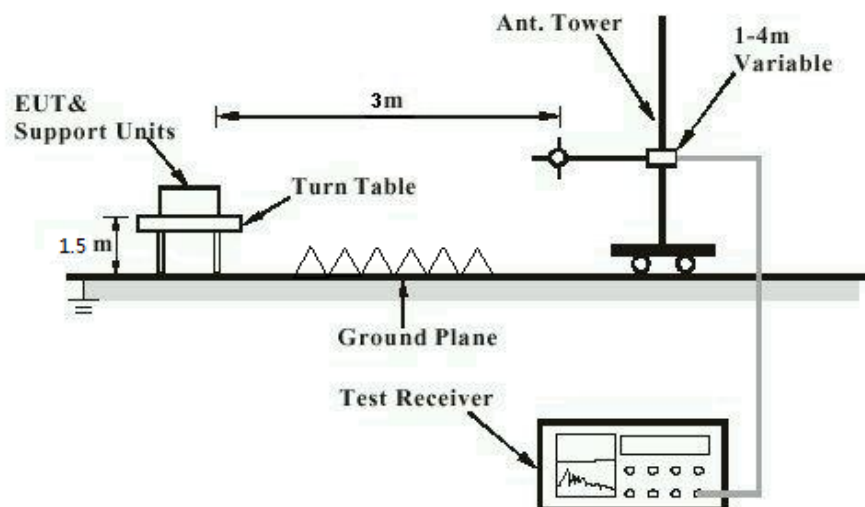
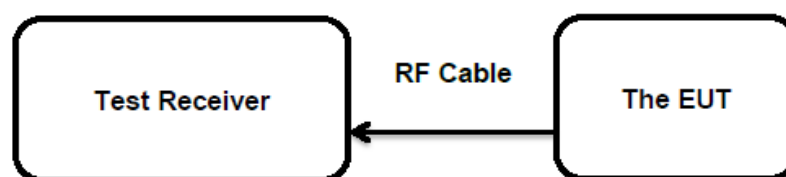


Diagram of Measurement Configuration for Conducted Transmitter Measurement



## 5 Test Results

### 5.1 Transmitter Requirement & Test Suites

#### 5.1.1 Antenna Requirement

**RESULT:****Pass****Test Specification**

|               |   |                                                                     |
|---------------|---|---------------------------------------------------------------------|
| Test standard | : | FCC Part 15.247(b)(4) and Part 15.203                               |
| Limit         | : | the use of antennas with directional gains that do not exceed 6 dBi |

According to the manufacturer declared, the EUT has a PCB antenna and a IPEX antenna, the directional gain of antenna is 4 dBi for PCB antenna and 3.7 dBi for IPEX antenna, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

## 5.1.2 Maximum Peak Conducted Output Power

**RESULT:**
**Pass**
**Test Specification**

|                   |                                           |
|-------------------|-------------------------------------------|
| Test standard     | : FCC Part 15.247(b)(3)                   |
|                   | : RSS-247 Clause 5.4(2)&(4)               |
| Basic standard    | : ANSI C63.10: 2013                       |
| Limits            | : < 1 Watt (Maximum Conducted Peak Power) |
|                   | : e.i.r.p. <4W                            |
| Kind of test site | : Shielded Room                           |

**Test Setup**

|                      |                           |
|----------------------|---------------------------|
| Date of testing      | : 08.09.2020 - 14.09.2020 |
| Input voltage        | : DC 5V                   |
| Operation mode       | : A, B                    |
| Test channel         | : Low / Middle / High     |
| Ambient temperature  | : 24°C                    |
| Relative humidity    | : 47 %                    |
| Atmospheric pressure | : 101 kPa                 |

For details refer to following test result.

**Table 6: Test Result of Maximum Peak Conducted Output Power, Wi-Fi 802.11 b/g/n**

| Mode              | 802.11b      |      |      | 802.11g       |      |      |
|-------------------|--------------|------|------|---------------|------|------|
| Data Rate         | 1Mbps        |      |      | 6Mbps         |      |      |
| Channel           | 1            | 6    | 11   | 1             | 6    | 11   |
| Frequency (MHz)   | 2412         | 2437 | 2462 | 2412          | 2437 | 2462 |
| Peak. Power (dBm) | 20.6         | 20.6 | 20.7 | 21.2          | 21.1 | 20.1 |
| Avg. Power (dBm)  | 19.8         | 19.3 | 19.4 | 18.7          | 18.7 | 16.9 |
| Mode              | 802.11n HT20 |      |      | 802.11n HT40  |      |      |
| Data Rate         | MCS0 6.5Mbps |      |      | MCS0 13.5Mbps |      |      |
| Channel           | 1            | 6    | 11   | 3             | 6    | 9    |
| Frequency(MHz)    | 2412         | 2437 | 2462 | 2422          | 2437 | 2452 |
| Peak. Power (dBm) | 20.6         | 21.6 | 19.4 | 16.4          | 20.3 | 13.8 |
| Avg. Power (dBm)  | 17.6         | 19.2 | 15.8 | 14.5          | 18.7 | 11.5 |

**Table 7: Test Result of Maximum Peak Conducted Output Power, Bluetooth Low Energy**

| Mode              | Bluetooth Low Energy |      |      |
|-------------------|----------------------|------|------|
| Channel           | 1                    | 19   | 39   |
| Frequency (MHz)   | 2402                 | 2440 | 2480 |
| Peak. Power (dBm) | 7.64                 | 8.53 | 8.93 |
| Avg. Power (dBm)  | 5.61                 | 6.42 | 6.81 |

Note: The cable loss is taken into account in results and the e.i.r.p. are 25.6 dBm (configuration 2) and 25.3 dBm ( configuration 1 & 3) less than 4W (36 dBm).

### 5.1.3 Radiated Spurious Emission

**RESULT:****Pass****Test Specification**

|                   |                                                                         |
|-------------------|-------------------------------------------------------------------------|
| Test standard     | : FCC Part 15.247(d) & FCC Part 15.205<br>RSS-247 Clause 3.3 & 5.5      |
| Basic standard    | : ANSI C63.10: 2013                                                     |
| Limits            | : Refer to 15.209(a) of FCC part 15.247(d)<br>RSS-Gen Table 4 & Table 5 |
| Kind of test site | : 3m Semi-anechoic Chamber                                              |

**Test Setup**

|                      |                           |
|----------------------|---------------------------|
| Date of testing      | : 08.09.2020 - 14.09.2020 |
| Input voltage        | : DC 5V                   |
| Operation mode       | : A, B                    |
| Test channel         | : Low / Middle / High     |
| Ambient temperature  | : 24°C                    |
| Relative humidity    | : 47 %                    |
| Atmospheric pressure | : 101 kPa                 |

**Remark:**

Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix B.

## 6 Safety Human Exposure

### 6.1 Radio Frequency Exposure Compliance

#### 6.1.1 Electromagnetic Fields

**RESULT:****Pass****Test Specification**

Test standard : CFR47 FCC Part 2: Section 2.1091  
CFR47 FCC Part 1: Section 1.1310  
FCC KDB Publication 447498 v06  
FCC KDB Publication 865664 D02 v01r02  
OET Bulletin 65 (Edition 97-01)  
RSS-102 Issue 5 March 2019

**FCC requirement:** Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

**MPE Calculation Method according to OET Bulletin 65**

Power Density:  $S_{(mW/cm^2)} = PG/4\pi R^2$  or  $EIRP/4\pi R^2$

Where:

S = power density (mW/cm<sup>2</sup>)

P = power input to the antenna (mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm)

**The nominal maximum conducted output power specified:**

802.11b/g/n: 22.00 dBm

BLuetooth Low Energy: 9.00 dBm

EUT with Antenna 1:

From the peak RF output power, the minimum mobile separation distance, d=20 cm, as well as the antenna gain (4.0 dBi 802.11b/g/n and Bluetooth Low Energy), the RF power density can be calculated as below:

For 802.11b/g/n:  $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.079 \text{ mW/cm}^2$

For BLuetooth Low Energy:  $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.004 \text{ mW/cm}^2$

**Limits for Maximum Permissible Exposure (MPE) according to FCC Part 1.1310: 1.0 mW/cm<sup>2</sup>**

EUT with Antenna 2:

From the peak RF output power, the minimum mobile separation distance,  $d=20$  cm, as well as the antenna gain (3.7 dBi 802.11b/g/n and Bluetooth Low Energy), the RF power density can be calculated as below:

For 802.11b/g/n:  $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.074$  mW/cm<sup>2</sup>

For BLuetooth Low Energy:  $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.004$  mW/cm<sup>2</sup>

**Limits for Maximum Permissible Exposure (MPE) according to FCC Part 1.1310:** 1.0 mW/cm<sup>2</sup>

➤ **IC requirements:** The EUT shall comply with the requirement of RSS-102 section 2.5.2.

#### **Exemption from Routine Evaluation Limits – RF Exposure Evaluation**

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;

- RF exposure evaluation exempted power for 2.4G DTS: 2.676 W

#### **The nominal maximum conducted output power specified:**

802.11b/g/n: 22.00 dBm

BLuetooth Low Energy: 9.00 dBm

EUT with Antenna 1:

Antenna Gain: 4.0 dBi 802.11b/g/n and Bluetooth Low Energy

The Max. e.i.r.p. for 802.11b/g/n: 26.0dBm = 0.398 W

The Max. e.i.r.p. for BLuetooth Low Energy: 13.0dBm = 0.020 W

EUT with Antenna 2:

Antenna Gain: 3.7 dBi 802.11b/g/n and Bluetooth Low Energy

The Max. e.i.r.p. for 802.11b/g/n: 25.7dBm = 0.372 W

The Max. e.i.r.p. for BLuetooth Low Energy: 12.7dBm = 0.019 W

Both e.i.r.p. for the 802.11b/g/n and BLuetooth Low Energy are less than the RF exposure evaluation exempted power. So RF exposure evaluation is not required.

**“RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.”**

## 7 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix A.

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## Appendix B: Test Results of Radiated Testing

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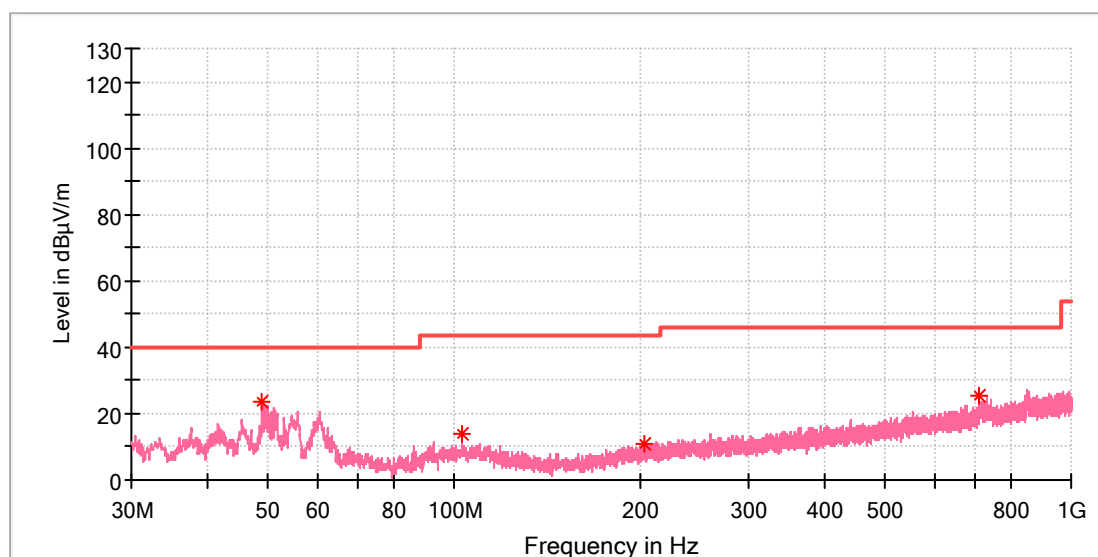
Note 1: Testing was carried out within frequency range 9 kHz to the tenth harmonics. The measurement results below 30MHz and above 18GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

## Appendix B.1: Test Results of Radiated Spurious Emissions, configuration 1

### Bluetooth Low Energy 30MHz - 1GHz

### EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_Low channel                                      |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 23 Humi:55%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

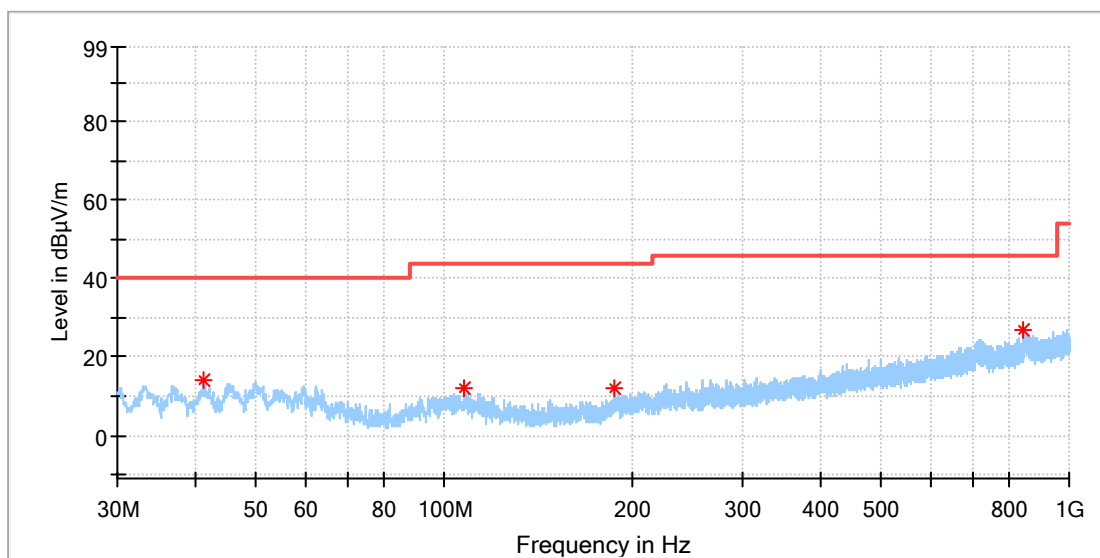


### Critical Freqs

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 48.866500       | 23.45            | ---              | 40.00          | 16.55       | 100.0       | V   | 288.0         | -18.6        |
| 103.089500      | 13.63            | ---              | 43.50          | 29.87       | 100.0       | V   | 355.0         | -19.2        |
| 204.066500      | 10.95            | ---              | 43.50          | 32.55       | 100.0       | V   | 129.0         | -19.3        |
| 709.824500      | 25.59            | ---              | 46.00          | 20.41       | 100.0       | V   | 49.0          | -8.3         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_Low channel                                      |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 23 Humi:55%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

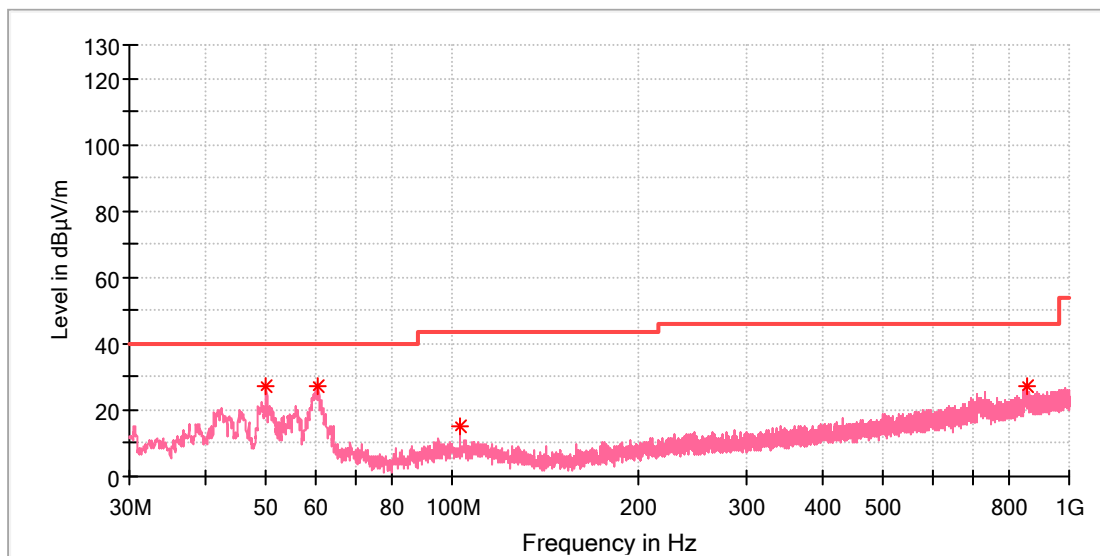


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 41.203500       | 14.08            | ---              | 40.00          | 25.92       | 100.0       | H   | 175.0         | -20.1        |
| 107.794000      | 12.26            | ---              | 43.50          | 31.24       | 100.0       | H   | 0.0           | -19.3        |
| 186.655000      | 11.84            | ---              | 43.50          | 31.66       | 100.0       | H   | 286.0         | -20.2        |
| 845.042500      | 26.95            | ---              | 46.00          | 19.05       | 100.0       | H   | 145.0         | -6.0         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_High channel                                     |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 23 Humi:55%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

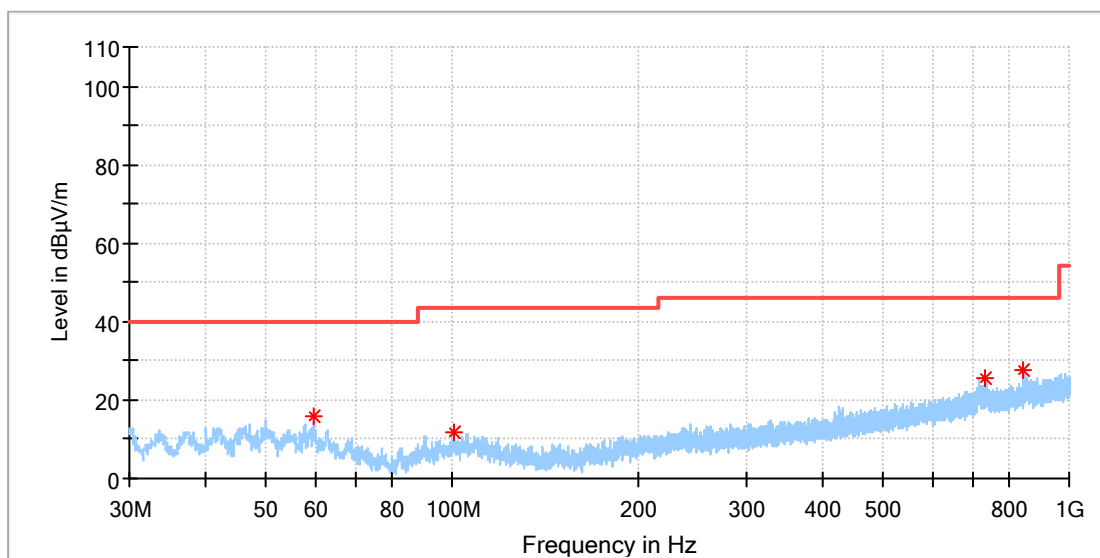


## Critical\_Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 49.982000       | 27.47            | ---              | 40.00          | 12.53       | 100.0       | V   | 271.0         | -18.6        |
| 60.797500       | 27.11            | ---              | 40.00          | 12.89       | 100.0       | V   | 169.0         | -19.5        |
| 103.089500      | 14.83            | ---              | 43.50          | 28.67       | 100.0       | V   | 328.0         | -19.2        |
| 854.500000      | 27.02            | ---              | 46.00          | 18.98       | 100.0       | V   | 85.0          | -5.9         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_High channel                                     |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 23 Humi:55%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

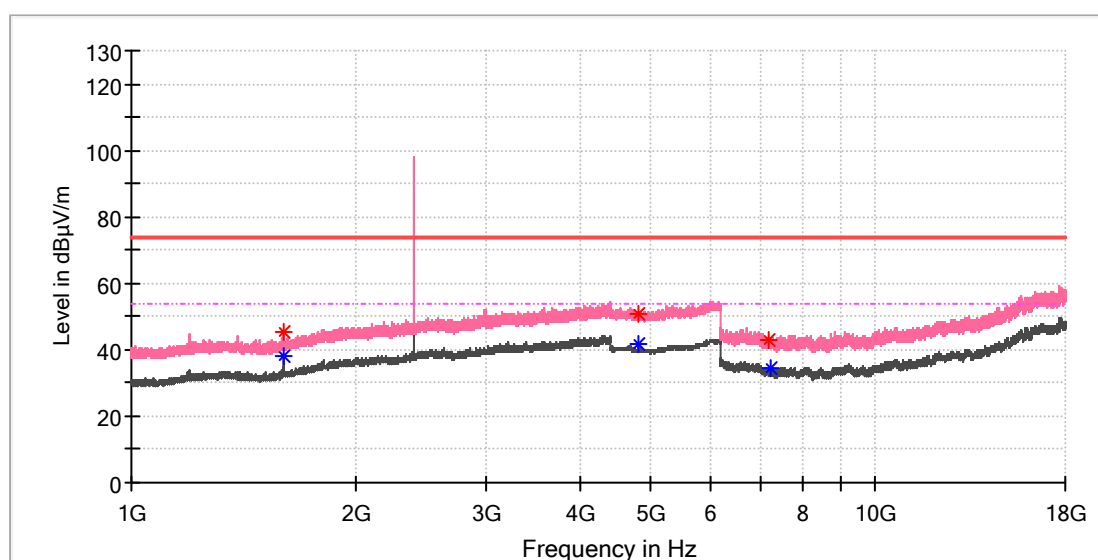


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 59.730500       | 15.61            | ---              | 40.00          | 24.39       | 100.0       | H   | 183.0         | -19.3        |
| 100.470500      | 11.68            | ---              | 43.50          | 31.82       | 100.0       | H   | 327.0         | -19.3        |
| 729.661000      | 25.51            | ---              | 46.00          | 20.49       | 100.0       | H   | 218.0         | -7.9         |
| 845.042500      | 27.38            | ---              | 46.00          | 18.62       | 100.0       | H   | 238.0         | -6.0         |

**1GHz - 18GHz****EUT Information**

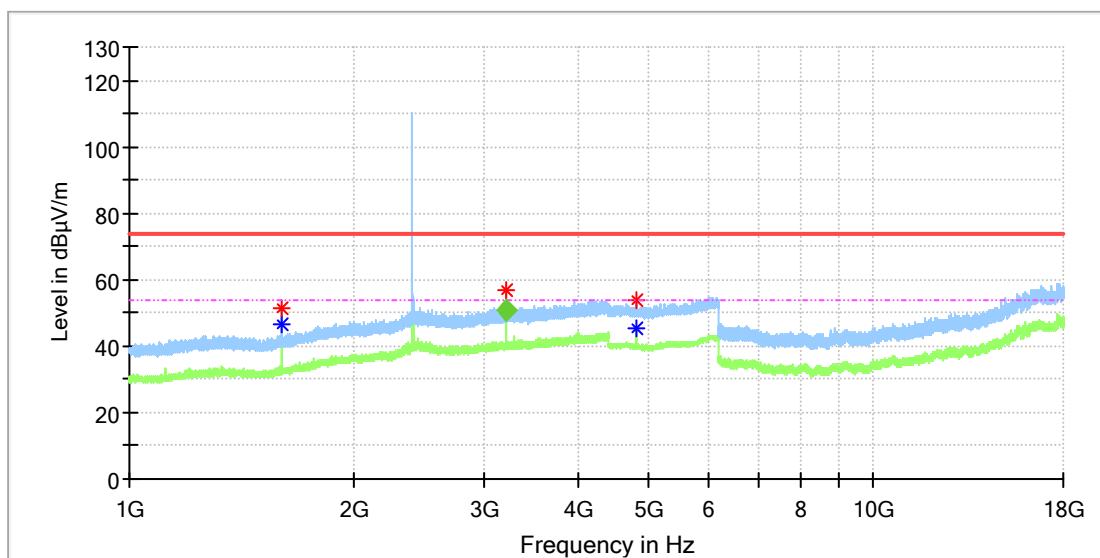
|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_Low channel                                      |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

**Critical\_Freqs**

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1598.400000     | 45.25            | ---              | 74.00          | 28.75       | 100.0       | V   | 352.0         | 2.1          |
| 1601.375000     | ---              | 38.22            | 54.00          | 15.78       | 100.0       | V   | 59.0          | 2.1          |
| 4803.500000     | ---              | 41.51            | 54.00          | 12.49       | 100.0       | V   | 52.0          | 13.6         |
| 4807.500000     | 50.63            | ---              | 74.00          | 23.37       | 100.0       | V   | 137.0         | 13.6         |
| 7209.883333     | 42.98            | ---              | 74.00          | 31.02       | 100.0       | V   | 216.0         | 8.7          |
| 7212.341667     | ---              | 34.25            | 54.00          | 19.75       | 100.0       | V   | 229.0         | 8.7          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_Low channel                                      |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

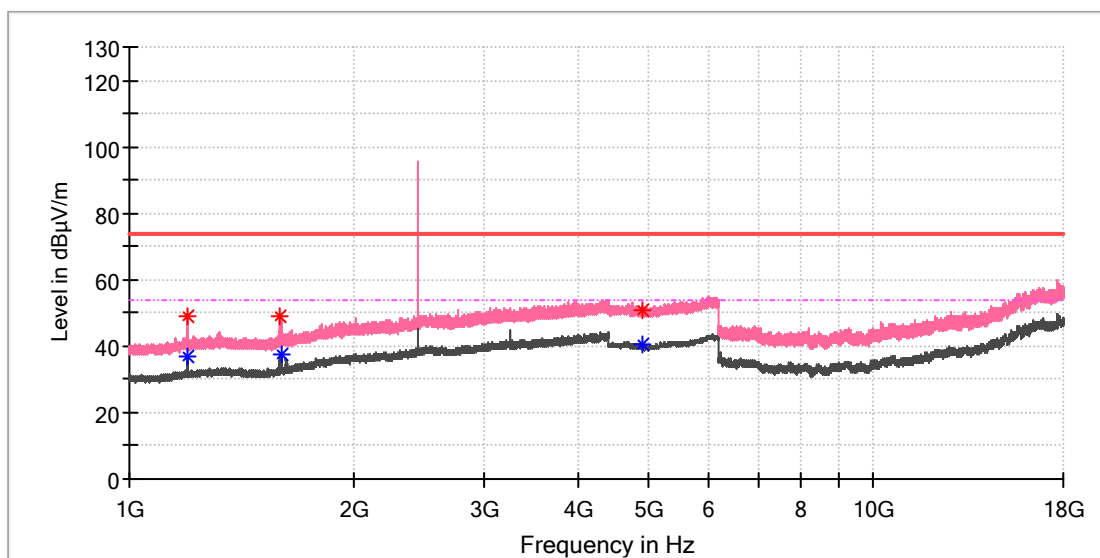


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1600.737500     | 51.21            | ---              | 74.00          | 22.79       | 100.0       | H   | 99.0          | 2.1          |
| 1601.587500     | ---              | 46.83            | 54.00          | 7.17        | 100.0       | H   | 99.0          | 2.1          |
| 3202.562500     | 56.83            | ---              | 74.00          | 17.17       | 100.0       | H   | 11.0          | 8.6          |
| 4803.500000     | ---              | 45.20            | 54.00          | 8.80        | 100.0       | H   | 147.0         | 13.6         |
| 4804.000000     | 53.56            | ---              | 74.00          | 20.44       | 100.0       | H   | 131.0         | 13.6         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_Mid channel                                      |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

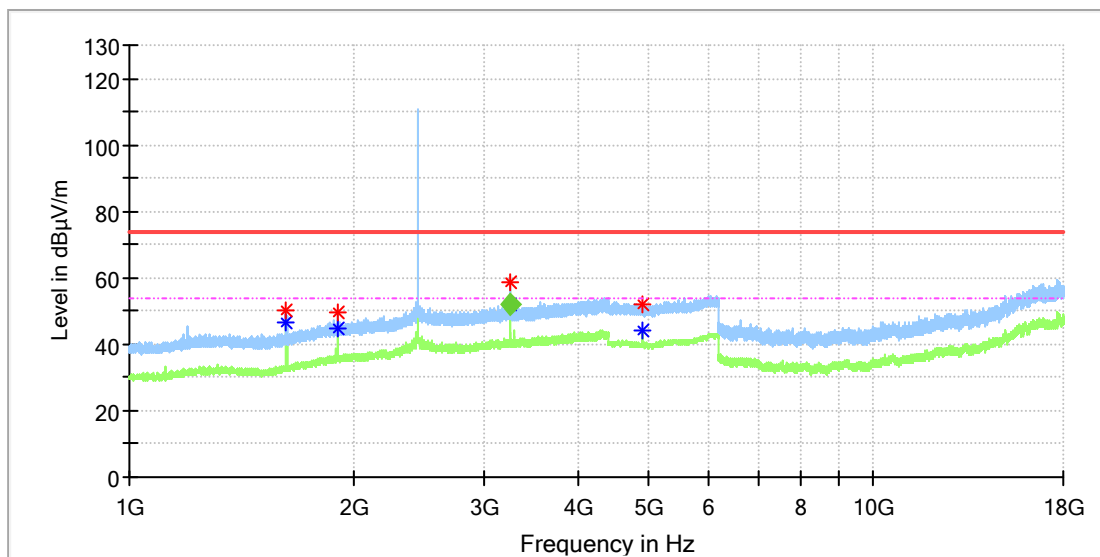


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1196.137500     | 49.01            | ---              | 74.00          | 24.99       | 100.0       | V   | 308.0         | 1.1          |
| 1199.750000     | ---              | 36.75            | 54.00          | 17.25       | 100.0       | V   | 308.0         | 1.1          |
| 1596.275000     | 49.13            | ---              | 74.00          | 24.87       | 100.0       | V   | 276.0         | 2.0          |
| 1598.612500     | ---              | 37.38            | 54.00          | 16.62       | 100.0       | V   | 236.0         | 2.1          |
| 4880.500000     | ---              | 40.73            | 54.00          | 13.27       | 100.0       | V   | 237.0         | 13.4         |
| 4882.000000     | 50.63            | ---              | 74.00          | 23.37       | 100.0       | V   | 143.0         | 13.4         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_Mid channel                                      |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

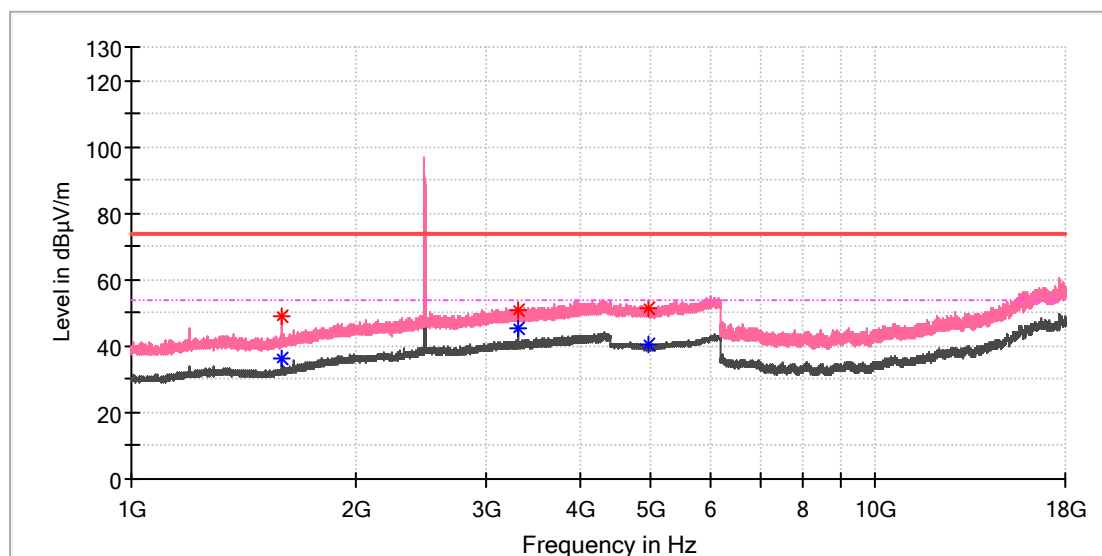


## Critical\_Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1626.662500     | ---              | 46.30            | 54.00          | 7.70        | 100.0       | H   | 97.0          | 2.4          |
| 1626.875000     | 50.22            | ---              | 74.00          | 23.78       | 100.0       | H   | 97.0          | 2.4          |
| 1900.787500     | ---              | 44.72            | 54.00          | 9.28        | 100.0       | H   | 85.0          | 5.6          |
| 1901.212500     | 49.81            | ---              | 74.00          | 24.19       | 100.0       | H   | 85.0          | 5.6          |
| 3253.250625     | 58.47            | ---              | 74.00          | 15.53       | 100.0       | H   | 202.0         | 8.5          |
| 3253.255000     | ---              | 51.93            | 54.00          | 2.07        | 100.0       | H   | 204.0         | 8.5          |
| 4879.500000     | 51.77            | ---              | 74.00          | 22.23       | 100.0       | H   | 68.0          | 13.4         |
| 4880.000000     | ---              | 43.87            | 54.00          | 10.13       | 100.0       | H   | 33.0          | 13.4         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_High channel                                     |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

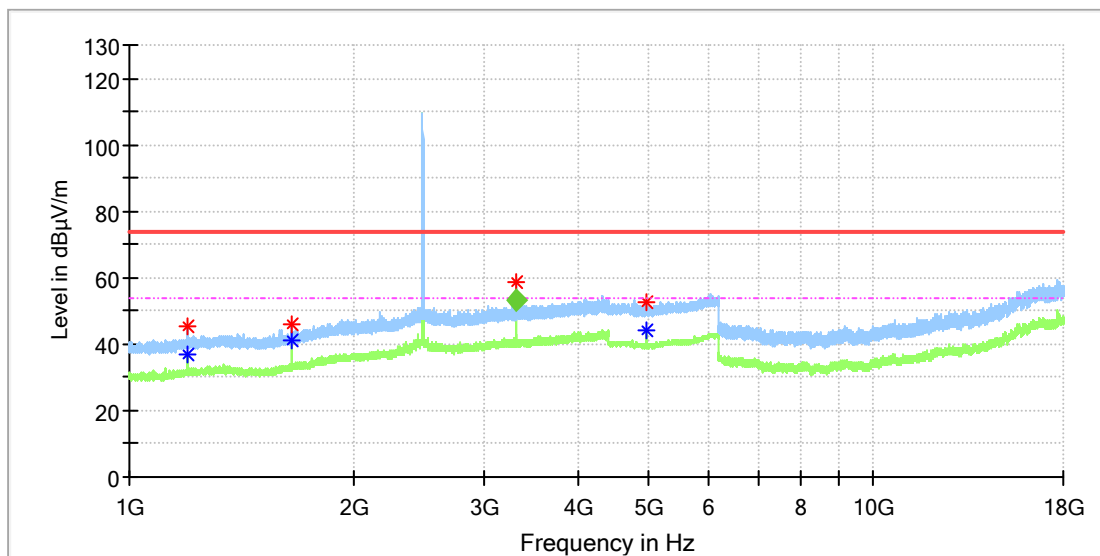


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1596.062500     | ---              | 36.10            | 54.00          | 17.90       | 100.0       | V   | 279.0         | 2.0          |
| 1596.062500     | 48.83            | ---              | 74.00          | 25.17       | 100.0       | V   | 279.0         | 2.0          |
| 3306.475000     | 50.98            | ---              | 74.00          | 23.02       | 100.0       | V   | 67.0          | 8.6          |
| 3306.475000     | ---              | 45.37            | 54.00          | 8.63        | 100.0       | V   | 67.0          | 8.6          |
| 4959.500000     | ---              | 40.72            | 54.00          | 13.28       | 100.0       | V   | 219.0         | 13.2         |
| 4964.000000     | 51.10            | ---              | 74.00          | 22.90       | 100.0       | V   | 359.0         | 13.2         |

## EUT Information

EUT Name: LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module  
 Model: LA02301  
 Test Mode: BLE\_High channel  
 Test Voltage:: DC 5V  
 Remark: Temp 24 Humi:47%  
 Test Standard: FCC 15.247  
 Tested By: Kei Zhang  
 Reviewed By: Terry Yin



## Critical Freqs

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1198.900000     | 45.26            | ---              | 74.00          | 28.74       | 100.0       | H   | 128.0         | 1.1          |
| 1198.900000     | ---              | 36.83            | 54.00          | 17.17       | 100.0       | H   | 128.0         | 1.1          |
| 1653.012500     | ---              | 40.84            | 54.00          | 13.16       | 100.0       | H   | 349.0         | 2.6          |
| 1653.862500     | 46.20            | ---              | 74.00          | 27.80       | 100.0       | H   | 349.0         | 2.6          |
| 3306.687500     | 58.80            | ---              | 74.00          | 15.20       | 100.0       | H   | 114.0         | 8.6          |
| 4954.500000     | 52.77            | ---              | 74.00          | 21.23       | 100.0       | H   | 55.0          | 13.2         |
| 4960.000000     | ---              | 44.05            | 54.00          | 9.95        | 100.0       | H   | 46.0          | 13.2         |

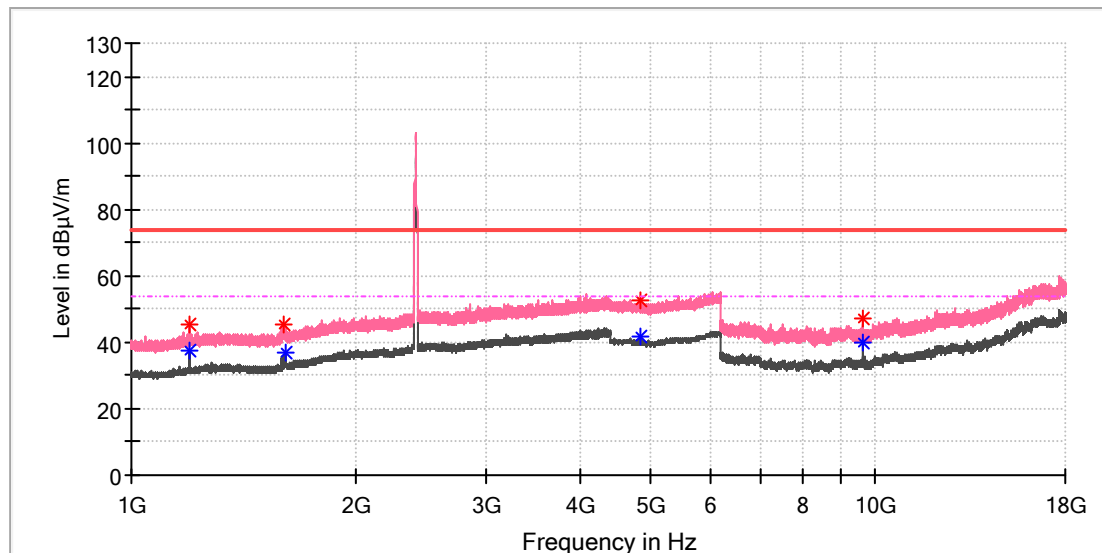
## Final Result

| Frequency (MHz) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 3306.625625     | 53.19            | 54.00          | 0.81        | 100.0       | H   | 123.0         | 8.6          |

## Wi-Fi 802.11 b mode, 1 Mbps 1GHz - 18GHz

### EUT Information

EUT Name: LA02301 Wi-Fi and Bluetooth SMART (BLE) Combo Module  
 Model: LA02301  
 Test Mode: WiFi 2.4G\_11b\_Low CH  
 Test Voltage:: DC 3.3V From USB  
 Remark: Temp 24 Humi:47%  
 Test Standard: FCC 15.247  
 Tested By: Kei Zhang  
 Reviewed By: Terry Yin

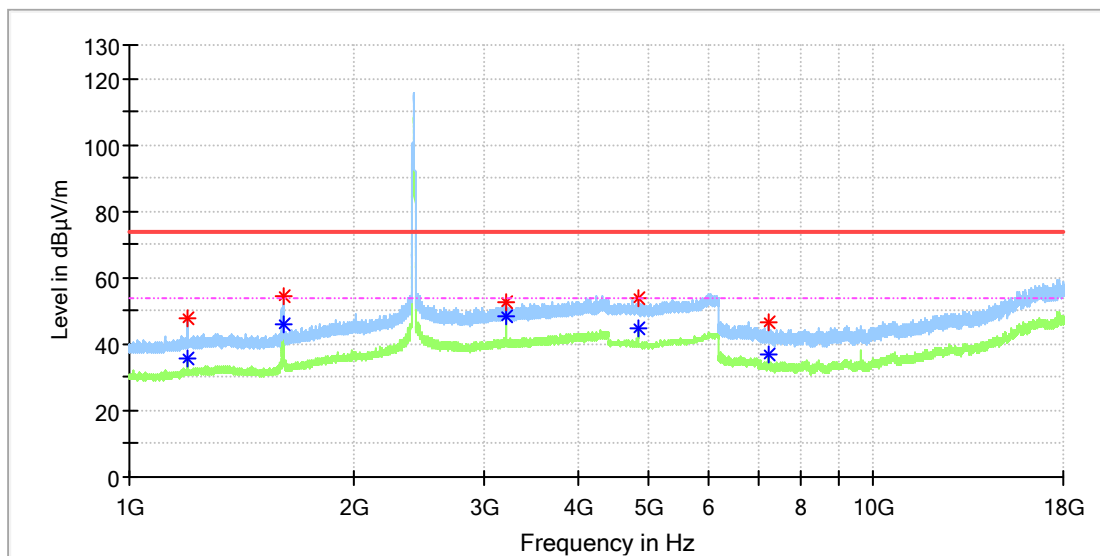


### Critical Freqs

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1198.900000     | ---              | 37.58            | 54.00          | 16.42       | 100.0       | V   | 314.0         | 1.1          |
| 1198.900000     | 45.46            | ---              | 74.00          | 28.54       | 100.0       | V   | 314.0         | 1.1          |
| 1605.837500     | 45.48            | ---              | 74.00          | 28.52       | 100.0       | V   | 260.0         | 2.2          |
| 1608.387500     | ---              | 37.10            | 54.00          | 16.90       | 100.0       | V   | 355.0         | 2.2          |
| 4824.500000     | ---              | 41.63            | 54.00          | 12.37       | 100.0       | V   | 239.0         | 13.5         |
| 4827.000000     | 52.73            | ---              | 74.00          | 21.27       | 100.0       | V   | 122.0         | 13.5         |
| 9647.566667     | ---              | 39.76            | 54.00          | 14.24       | 100.0       | V   | 171.0         | 10.4         |
| 9648.058333     | 47.03            | ---              | 74.00          | 26.97       | 100.0       | V   | 68.0          | 10.4         |

## EUT Information

EUT Name: LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module  
 Model: LA02301  
 Test Mode: WiFi 2.4G\_11b\_Low CH  
 Test Voltage:: DC 5V  
 Remark: Temp 24 Humi:47%  
 Test Standard: FCC 15.247  
 Tested By: Kei Zhang  
 Reviewed By: Terry Yin

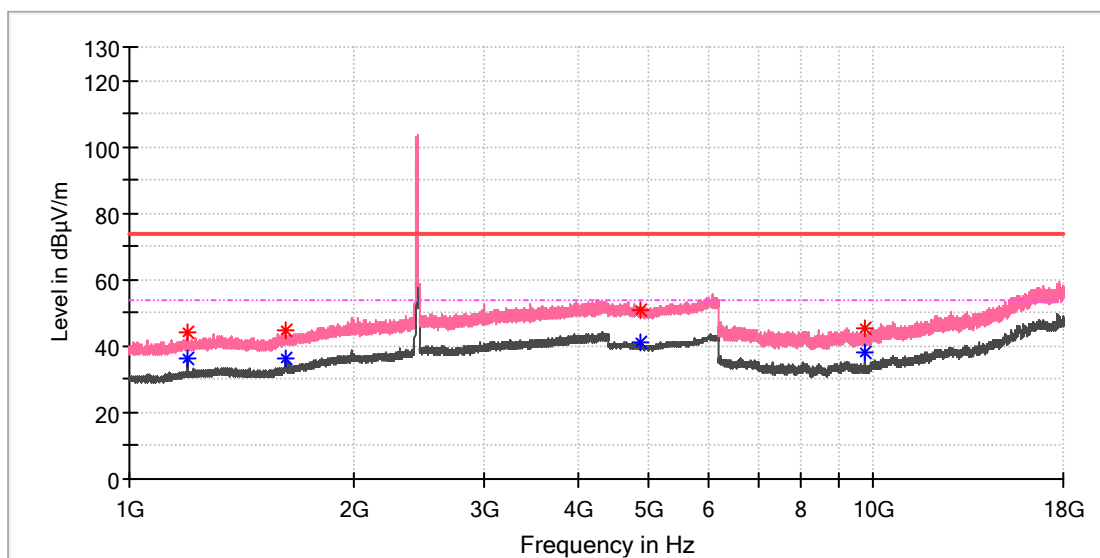


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1194.225000     | ---              | 35.91            | 54.00          | 18.09       | 100.0       | H   | 127.0         | 1.1          |
| 1194.225000     | 47.71            | ---              | 74.00          | 26.29       | 100.0       | H   | 127.0         | 1.1          |
| 1607.962500     | 54.41            | ---              | 74.00          | 19.59       | 100.0       | H   | 24.0          | 2.2          |
| 1608.600000     | ---              | 45.73            | 54.00          | 8.27        | 100.0       | H   | 24.0          | 2.2          |
| 3216.162500     | ---              | 48.51            | 54.00          | 5.49        | 100.0       | H   | 290.0         | 8.6          |
| 3216.162500     | 52.89            | ---              | 74.00          | 21.11       | 100.0       | H   | 290.0         | 8.6          |
| 4823.000000     | ---              | 44.61            | 54.00          | 9.39        | 100.0       | H   | 107.0         | 13.5         |
| 4823.500000     | 53.88            | ---              | 74.00          | 20.12       | 100.0       | H   | 107.0         | 13.5         |
| 7235.450000     | 46.40            | ---              | 74.00          | 27.60       | 100.0       | H   | 262.0         | 8.6          |
| 7235.450000     | ---              | 36.71            | 54.00          | 17.29       | 100.0       | H   | 262.0         | 8.6          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11b_Mid CH                                 |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

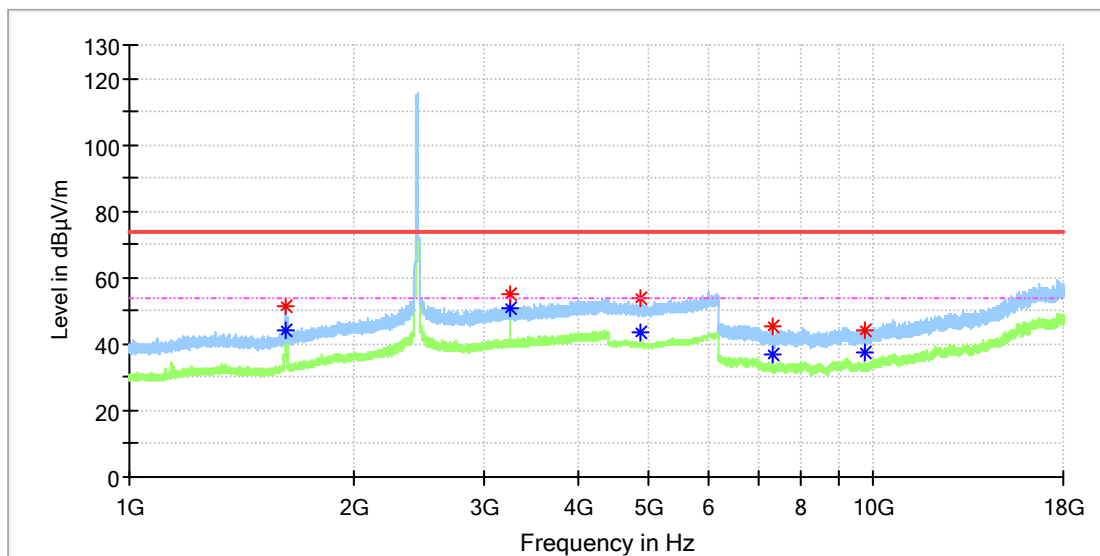


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1196.562500     | 43.93            | ---              | 74.00          | 30.07       | 100.0       | V   | 302.0         | 1.1          |
| 1198.050000     | ---              | 36.14            | 54.00          | 17.86       | 100.0       | V   | 302.0         | 1.1          |
| 1624.112500     | ---              | 36.08            | 54.00          | 17.92       | 100.0       | V   | 191.0         | 2.3          |
| 1624.750000     | 44.70            | ---              | 74.00          | 29.30       | 100.0       | V   | 66.0          | 2.3          |
| 4869.500000     | 51.05            | ---              | 74.00          | 22.95       | 100.0       | V   | 156.0         | 13.4         |
| 4873.500000     | ---              | 40.84            | 54.00          | 13.16       | 100.0       | V   | 247.0         | 13.4         |
| 9747.866667     | 45.08            | ---              | 74.00          | 28.92       | 100.0       | V   | 78.0          | 10.4         |
| 9747.866667     | ---              | 38.39            | 54.00          | 15.61       | 100.0       | V   | 78.0          | 10.4         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11b_Mid CH                                 |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

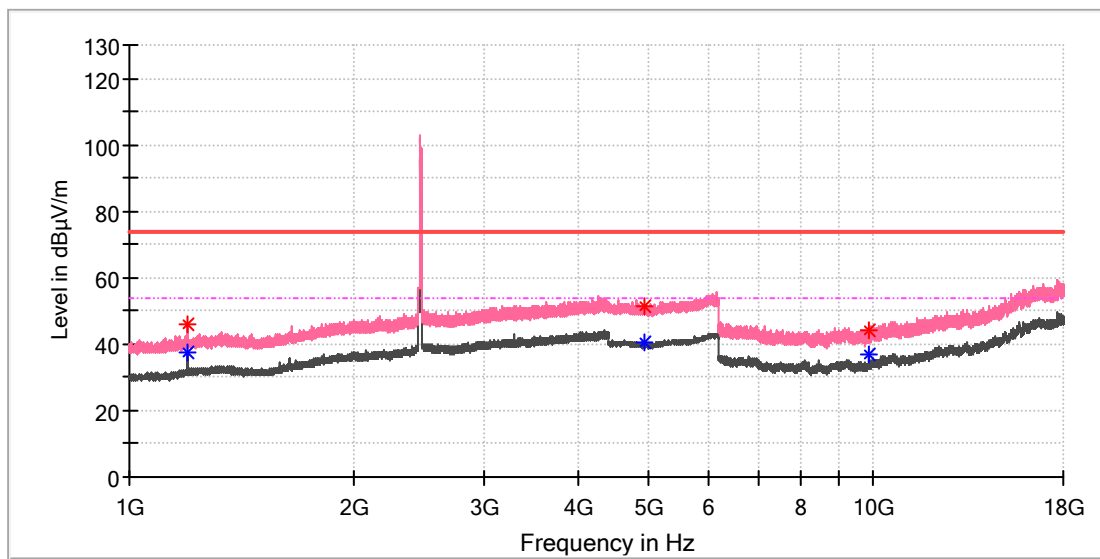


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1624.112500     | ---              | 44.21            | 54.00          | 9.79        | 100.0       | H   | 17.0          | 2.3          |
| 1624.750000     | 51.34            | ---              | 74.00          | 22.66       | 100.0       | H   | 17.0          | 2.3          |
| 3249.312500     | ---              | 50.66            | 54.00          | 3.34        | 100.0       | H   | 208.0         | 8.5          |
| 3249.312500     | 54.76            | ---              | 74.00          | 19.24       | 100.0       | H   | 208.0         | 8.5          |
| 4873.500000     | 53.70            | ---              | 74.00          | 20.30       | 100.0       | H   | 173.0         | 13.4         |
| 4874.500000     | ---              | 43.37            | 54.00          | 10.63       | 100.0       | H   | 173.0         | 13.4         |
| 7303.300000     | 45.35            | ---              | 74.00          | 28.65       | 100.0       | H   | 265.0         | 8.3          |
| 7309.200000     | ---              | 37.13            | 54.00          | 16.87       | 100.0       | H   | 265.0         | 8.2          |
| 9747.866667     | ---              | 37.34            | 54.00          | 16.66       | 100.0       | H   | 355.0         | 10.4         |
| 9748.358333     | 44.28            | ---              | 74.00          | 29.72       | 100.0       | H   | 228.0         | 10.4         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11b_High CH                                |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

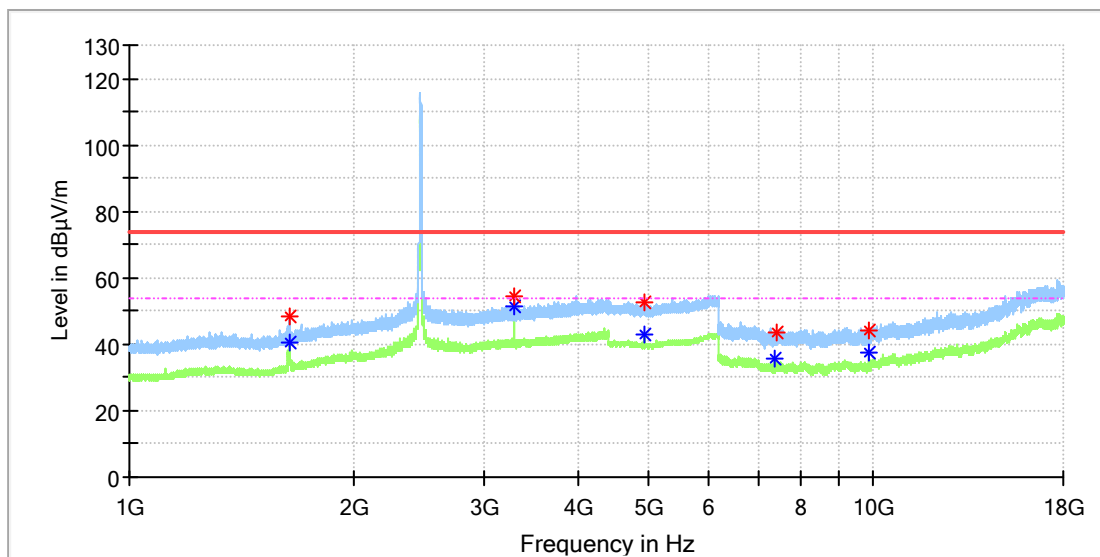


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1195.500000     | ---              | 37.48            | 54.00          | 16.52       | 100.0       | V   | 232.0         | 1.1          |
| 1195.500000     | 45.78            | ---              | 74.00          | 28.22       | 100.0       | V   | 232.0         | 1.1          |
| 4923.000000     | ---              | 40.70            | 54.00          | 13.30       | 100.0       | V   | 99.0          | 13.3         |
| 4929.500000     | 51.15            | ---              | 74.00          | 22.85       | 100.0       | V   | 38.0          | 13.3         |
| 9847.675000     | ---              | 37.08            | 54.00          | 16.92       | 100.0       | V   | 291.0         | 10.6         |
| 9848.166667     | 44.19            | ---              | 74.00          | 29.81       | 100.0       | V   | 86.0          | 10.6         |

## EUT Information

EUT Name: LA02301 Wi-Fi and Bluetooth SMART (BLE) Combo Module  
 Model: LA02301  
 Test Mode: WiFi 2.4G\_11b\_High CH  
 Test Voltage:: DC 5V  
 Remark: Temp 24 Humi:47%  
 Test Standard: FCC 15.247  
 Tested By: Kei Zhang  
 Reviewed By: Terry Yin



## Critical\_Freqs

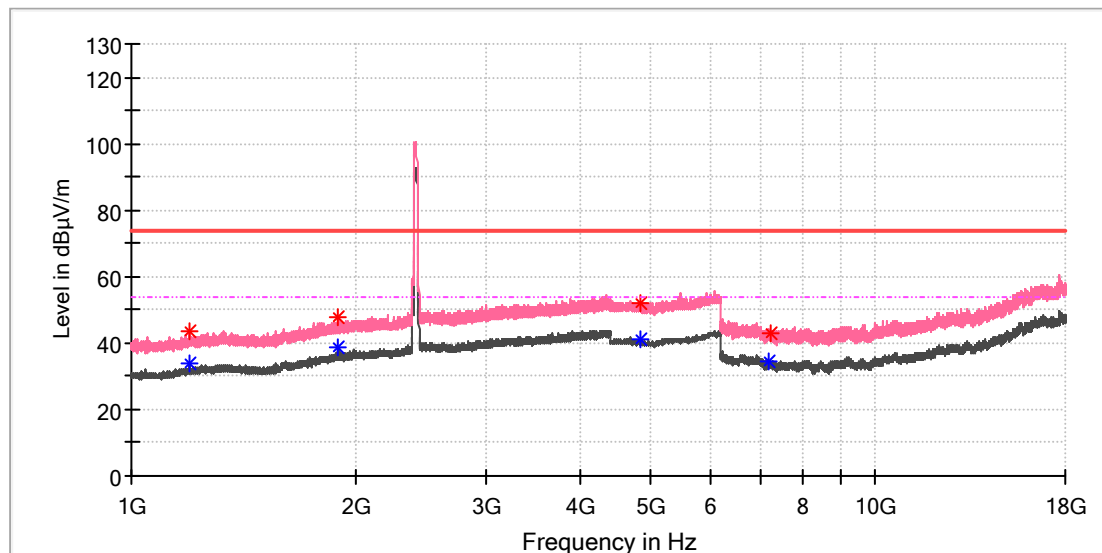
| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1640.687500     | ---              | 40.52            | 54.00          | 13.48       | 100.0       | H   | 29.0          | 2.5          |
| 1641.325000     | 48.67            | ---              | 74.00          | 25.33       | 100.0       | H   | 29.0          | 2.5          |
| 3282.462500     | 54.58            | ---              | 74.00          | 19.42       | 100.0       | H   | 124.0         | 8.5          |
| 3282.675000     | ---              | 51.42            | 54.00          | 2.58        | 100.0       | H   | 106.0         | 8.5          |
| 4923.000000     | ---              | 42.79            | 54.00          | 11.21       | 100.0       | H   | 268.0         | 13.3         |
| 4923.000000     | 52.76            | ---              | 74.00          | 21.24       | 100.0       | H   | 268.0         | 13.3         |
| 7384.425000     | ---              | 35.96            | 54.00          | 18.04       | 100.0       | H   | 4.0           | 8.2          |
| 7393.766667     | 43.82            | ---              | 74.00          | 30.18       | 100.0       | H   | 269.0         | 8.3          |
| 9847.675000     | 44.07            | ---              | 74.00          | 29.93       | 100.0       | H   | 37.0          | 10.6         |
| 9848.166667     | ---              | 37.61            | 54.00          | 16.39       | 100.0       | H   | 143.0         | 10.6         |

Produkte  
Products

Wi-Fi 802.11 g mode, 6Mbps  
1GHz - 18GHz

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11g_Low CH                                 |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

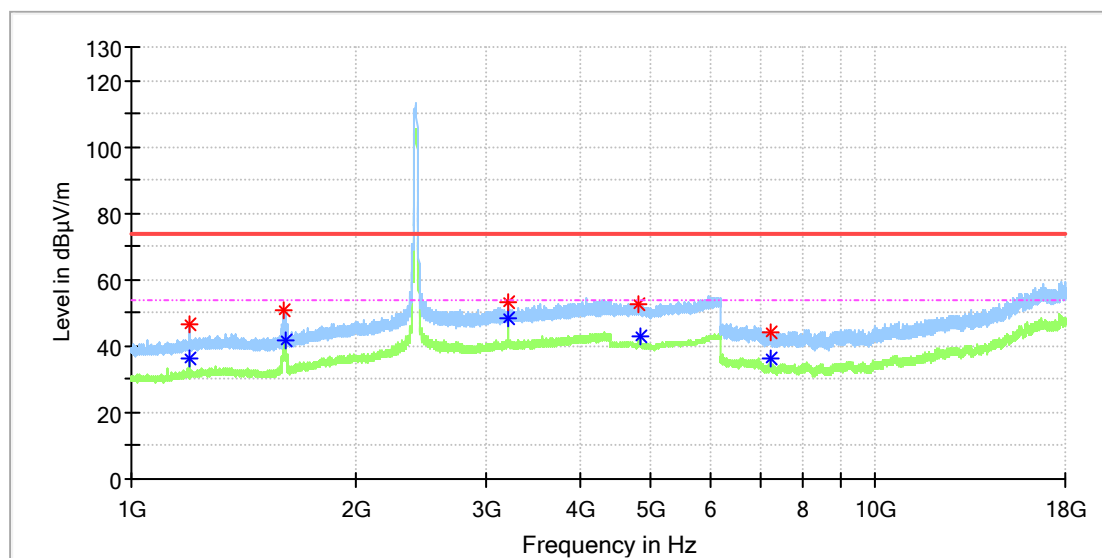


## Critical\_Freqs

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1194.862500     | 43.45            | ---              | 74.00          | 30.55       | 100.0       | V   | 324.0         | 1.1          |
| 1194.862500     | ---              | 33.91            | 54.00          | 20.09       | 100.0       | V   | 324.0         | 1.1          |
| 1900.150000     | ---              | 38.97            | 54.00          | 15.03       | 100.0       | V   | 303.0         | 5.6          |
| 1900.150000     | 48.04            | ---              | 74.00          | 25.96       | 100.0       | V   | 303.0         | 5.6          |
| 4820.500000     | ---              | 40.89            | 54.00          | 13.11       | 100.0       | V   | 231.0         | 13.5         |
| 4832.000000     | 52.16            | ---              | 74.00          | 21.84       | 100.0       | V   | 182.0         | 13.5         |
| 7208.900000     | ---              | 34.48            | 54.00          | 19.52       | 100.0       | V   | 142.0         | 8.8          |
| 7215.291667     | 42.87            | ---              | 74.00          | 31.13       | 100.0       | V   | 45.0          | 8.7          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11g_Low CH                                 |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

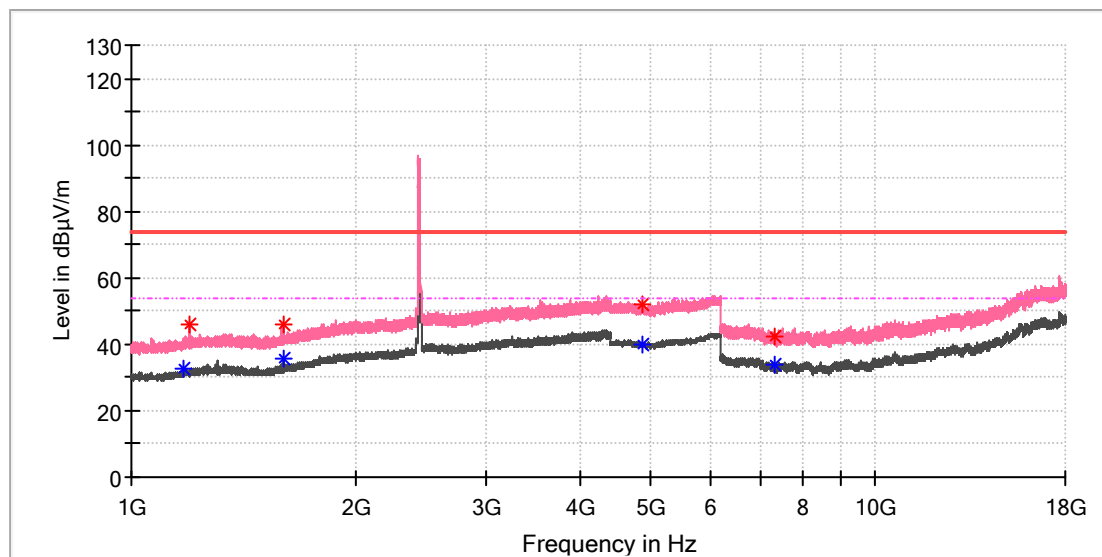


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1197.412500     | ---              | 36.18            | 54.00          | 17.82       | 100.0       | H   | 87.0          | 1.1          |
| 1197.412500     | 46.57            | ---              | 74.00          | 27.43       | 100.0       | H   | 87.0          | 1.1          |
| 1606.262500     | 50.49            | ---              | 74.00          | 23.51       | 100.0       | H   | 18.0          | 2.2          |
| 1609.450000     | ---              | 41.70            | 54.00          | 12.30       | 100.0       | H   | 18.0          | 2.2          |
| 3215.950000     | 53.10            | ---              | 74.00          | 20.90       | 100.0       | H   | 294.0         | 8.6          |
| 3215.950000     | ---              | 48.22            | 54.00          | 5.78        | 100.0       | H   | 294.0         | 8.6          |
| 4811.000000     | 52.90            | ---              | 74.00          | 21.10       | 100.0       | H   | 64.0          | 13.6         |
| 4819.500000     | ---              | 42.92            | 54.00          | 11.08       | 100.0       | H   | 107.0         | 13.5         |
| 7231.025000     | 44.14            | ---              | 74.00          | 29.86       | 100.0       | H   | 265.0         | 8.6          |
| 7237.908333     | ---              | 36.27            | 54.00          | 17.73       | 100.0       | H   | 248.0         | 8.6          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 Wi-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11g_Mid CH                                 |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

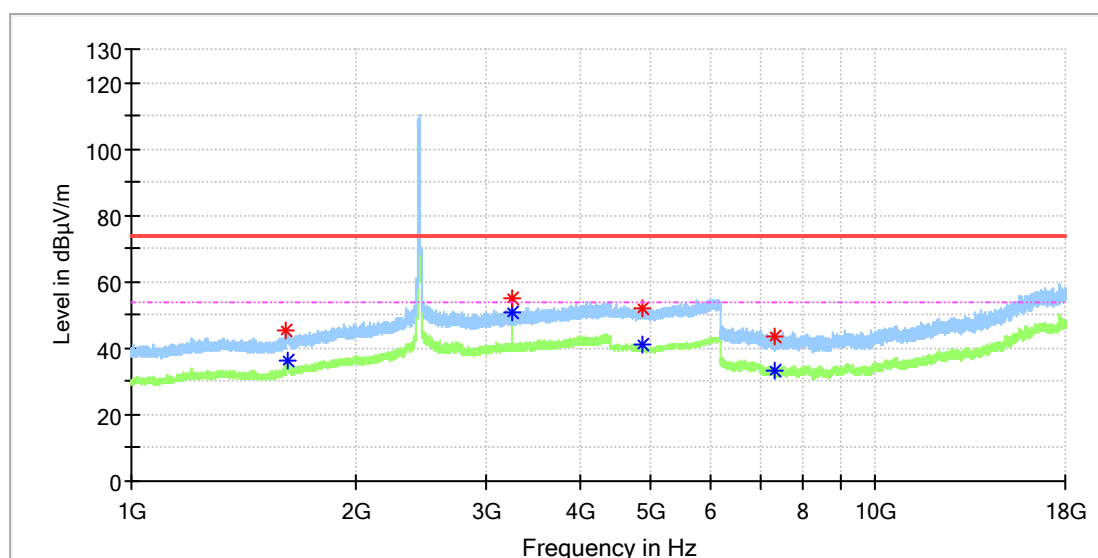


## Critical\_Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1176.587500     | ---              | 32.80            | 54.00          | 21.20       | 100.0       | V   | 256.0         | 1.0          |
| 1196.775000     | 45.77            | ---              | 74.00          | 28.23       | 100.0       | V   | 276.0         | 1.1          |
| 1598.612500     | ---              | 35.55            | 54.00          | 18.45       | 100.0       | V   | 194.0         | 2.1          |
| 1598.825000     | 45.74            | ---              | 74.00          | 28.26       | 100.0       | V   | 194.0         | 2.1          |
| 4871.000000     | ---              | 39.98            | 54.00          | 14.02       | 100.0       | V   | 218.0         | 13.4         |
| 4872.500000     | 51.72            | ---              | 74.00          | 22.28       | 100.0       | V   | 233.0         | 13.4         |
| 7306.250000     | ---              | 33.89            | 54.00          | 20.11       | 100.0       | V   | 115.0         | 8.3          |
| 7309.691667     | 42.56            | ---              | 74.00          | 31.44       | 100.0       | V   | 174.0         | 8.2          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 Wi-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11g_Mid CH                                 |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

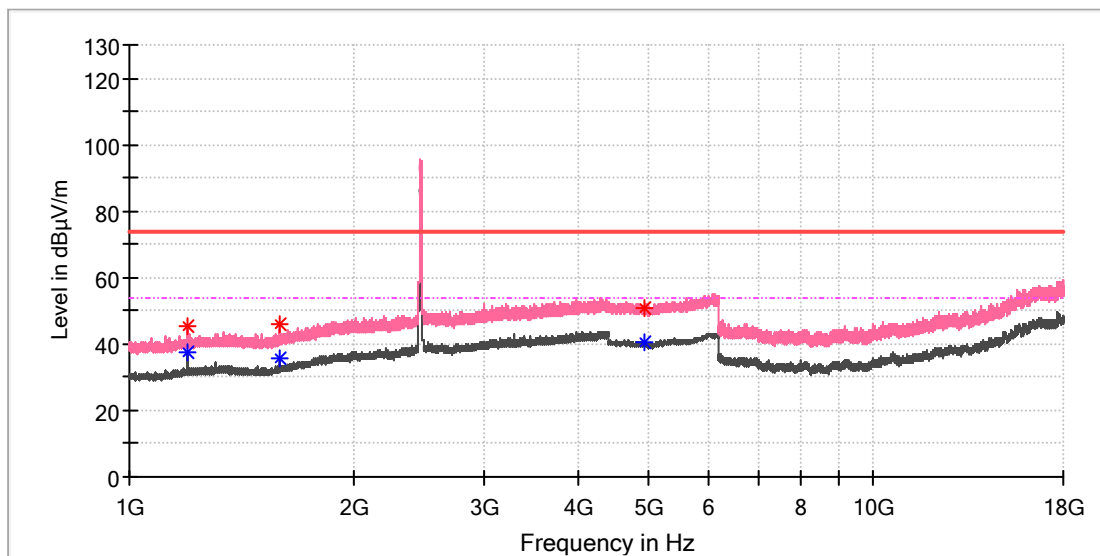


## Critical\_Freqs

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1615.825000     | 45.12            | ---              | 74.00          | 28.88       | 100.0       | H   | 56.0          | 2.3          |
| 1620.075000     | ---              | 36.42            | 54.00          | 17.58       | 100.0       | H   | 84.0          | 2.3          |
| 3249.312500     | 55.00            | ---              | 74.00          | 19.00       | 100.0       | H   | 314.0         | 8.5          |
| 3249.312500     | ---              | 50.95            | 54.00          | 3.05        | 100.0       | H   | 314.0         | 8.5          |
| 4866.000000     | 51.85            | ---              | 74.00          | 22.15       | 100.0       | H   | 96.0          | 13.4         |
| 4872.000000     | ---              | 40.85            | 54.00          | 13.15       | 100.0       | H   | 107.0         | 13.4         |
| 7312.641667     | 43.30            | ---              | 74.00          | 30.70       | 100.0       | H   | 305.0         | 8.2          |
| 7315.591667     | ---              | 33.55            | 54.00          | 20.45       | 100.0       | H   | 355.0         | 8.2          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11g_High CH                                |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

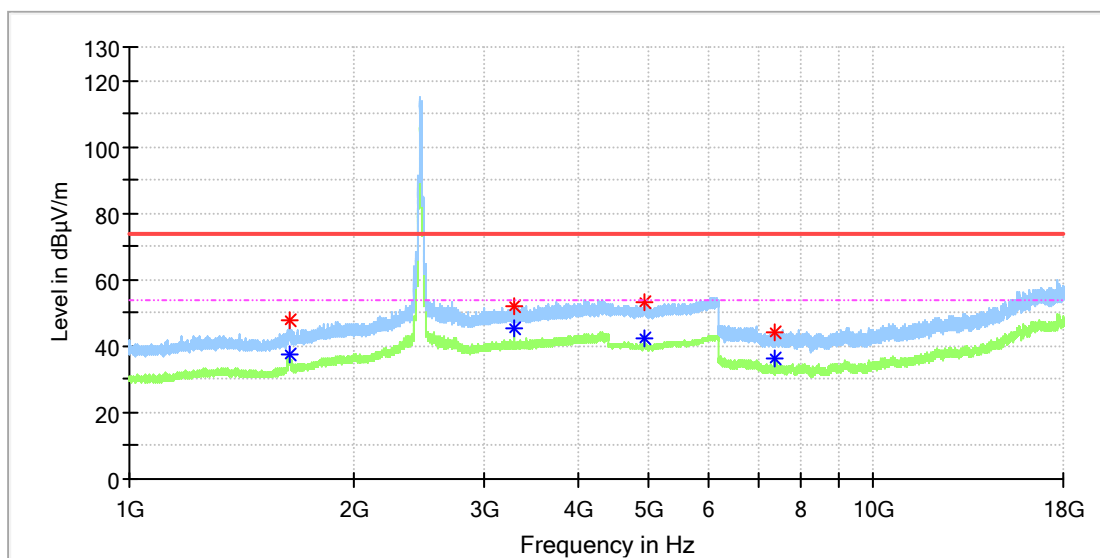


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1198.050000     | 45.58            | ---              | 74.00          | 28.42       | 100.0       | V   | 332.0         | 1.1          |
| 1198.050000     | ---              | 37.27            | 54.00          | 16.73       | 100.0       | V   | 332.0         | 1.1          |
| 1593.937500     | 46.16            | ---              | 74.00          | 27.84       | 100.0       | V   | 191.0         | 2.0          |
| 1593.937500     | ---              | 35.42            | 54.00          | 18.58       | 100.0       | V   | 191.0         | 2.0          |
| 4924.000000     | ---              | 40.29            | 54.00          | 13.71       | 100.0       | V   | 188.0         | 13.3         |
| 4924.500000     | 50.99            | ---              | 74.00          | 23.01       | 100.0       | V   | 146.0         | 13.3         |

## EUT Information

EUT Name: LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module  
 Model: LA02301  
 Test Mode: WiFi 2.4G\_11g\_High CH  
 Test Voltage:: DC 5V  
 Remark: Temp 24 Humi:47%  
 Test Standard: FCC 15.247  
 Tested By: Kei Zhang  
 Reviewed By: Terry Yin

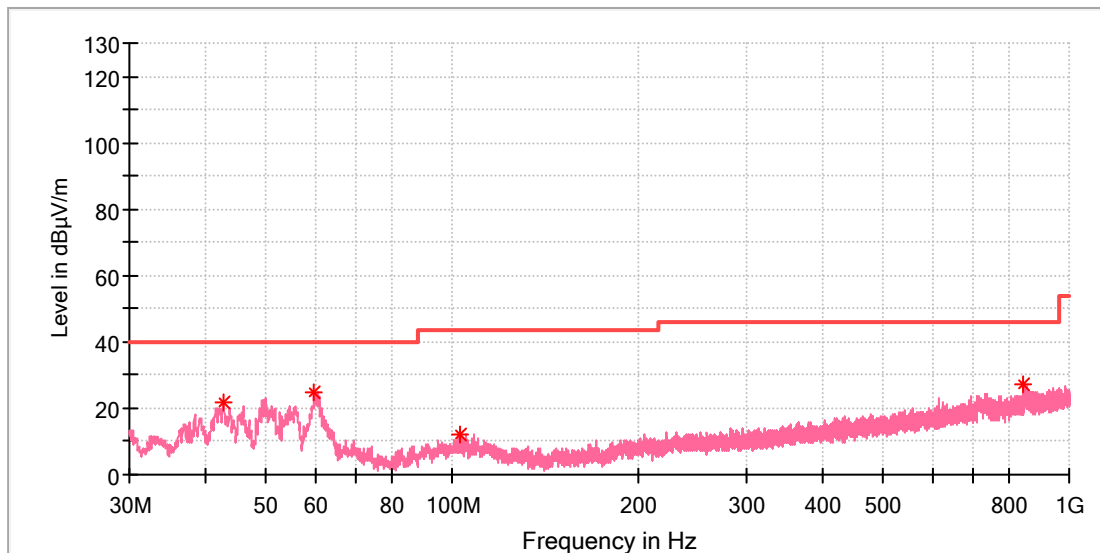


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1641.537500     | 47.57            | ---              | 74.00          | 26.43       | 100.0       | H   | 227.0         | 2.5          |
| 1644.300000     | ---              | 37.22            | 54.00          | 16.78       | 100.0       | H   | 138.0         | 2.5          |
| 3282.250000     | 51.73            | ---              | 74.00          | 22.27       | 100.0       | H   | 138.0         | 8.5          |
| 3282.462500     | ---              | 45.05            | 54.00          | 8.95        | 100.0       | H   | 153.0         | 8.5          |
| 4917.500000     | ---              | 42.47            | 54.00          | 11.53       | 100.0       | H   | 185.0         | 13.3         |
| 4925.000000     | 53.42            | ---              | 74.00          | 20.58       | 100.0       | H   | 185.0         | 13.3         |
| 7380.983333     | 44.35            | ---              | 74.00          | 29.65       | 100.0       | H   | 308.0         | 8.2          |
| 7381.966667     | ---              | 36.04            | 54.00          | 17.96       | 100.0       | H   | 289.0         | 8.2          |

**Wi-Fi 802.11 n(HT20) mode, MCS0**  
**30MHz - 1GHz**
**EUT Information**

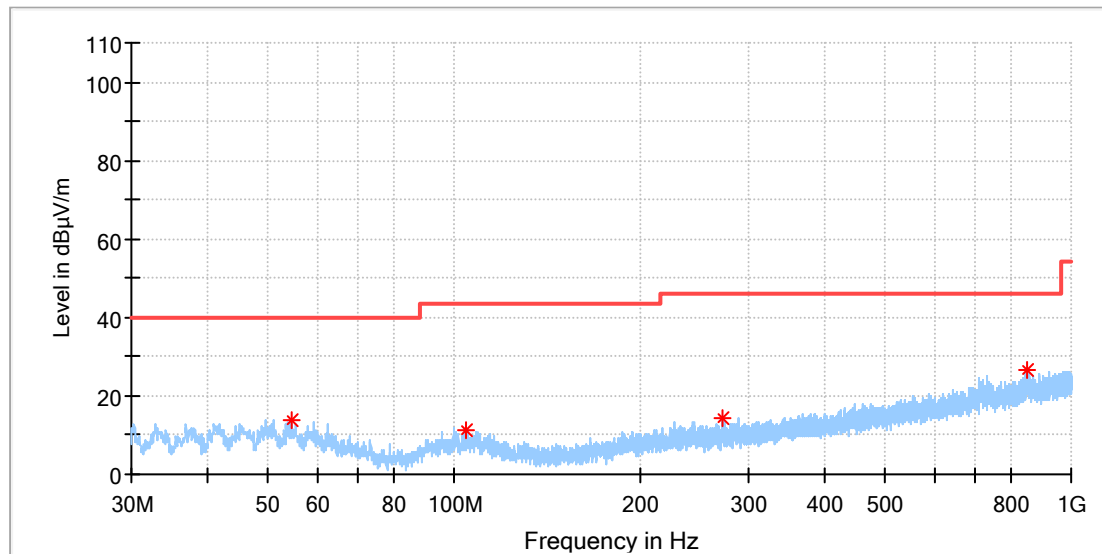
|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 Wi-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n 20M_Low CH                             |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 23 Humi:55%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |


**Critical\_Freqs**

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 42.561500       | 21.58            | ---              | 40.00          | 18.42       | 100.0       | V   | 146.0         | -19.7        |
| 59.827500       | 24.74            | ---              | 40.00          | 15.26       | 100.0       | V   | 53.0          | -19.3        |
| 103.089500      | 12.36            | ---              | 43.50          | 31.14       | 100.0       | V   | 256.0         | -19.2        |
| 844.848500      | 27.22            | ---              | 46.00          | 18.78       | 100.0       | V   | 0.0           | -6.0         |

## EUT Information

EUT Name: LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module  
 Model: LA02301  
 Test Mode: WiFi 2.4G\_11n 20M\_Low CH  
 Test Voltage:: DC 5V  
 Remark: Temp 23 Humi:55%  
 Test Standard: FCC 15.247  
 Tested By: Kei Zhang  
 Reviewed By: Terry Yin

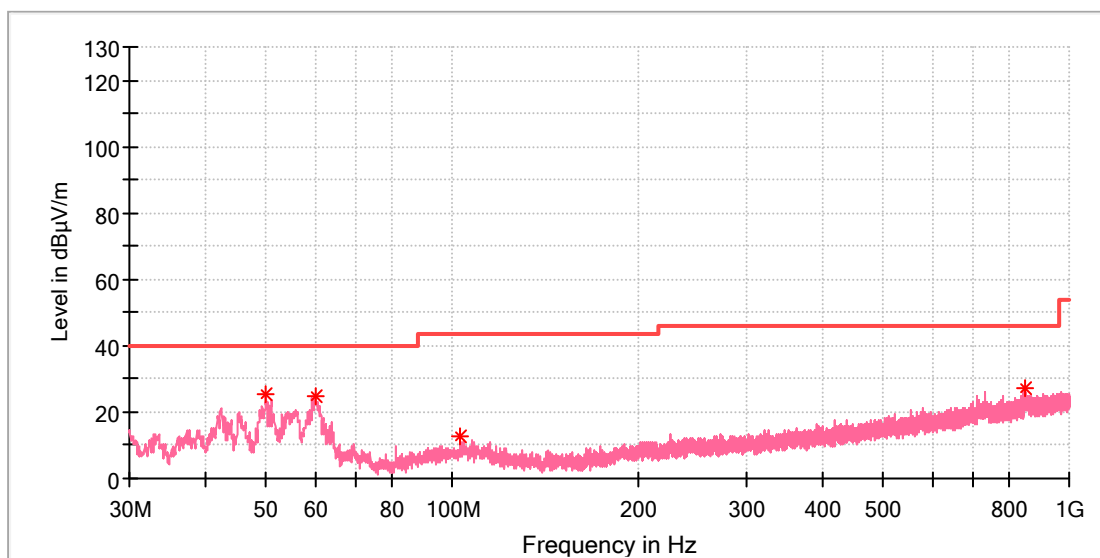


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 54.589500       | 13.94            | ---              | 40.00          | 26.06       | 100.0       | H   | 167.0         | -18.7        |
| 104.932500      | 11.42            | ---              | 43.50          | 32.08       | 100.0       | H   | 297.0         | -19.1        |
| 271.869500      | 14.54            | ---              | 46.00          | 31.46       | 100.0       | H   | 249.0         | -17.2        |
| 845.236500      | 26.55            | ---              | 46.00          | 19.45       | 100.0       | H   | 39.0          | -6.0         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n 20M_High CH                            |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 23 Humi:55%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

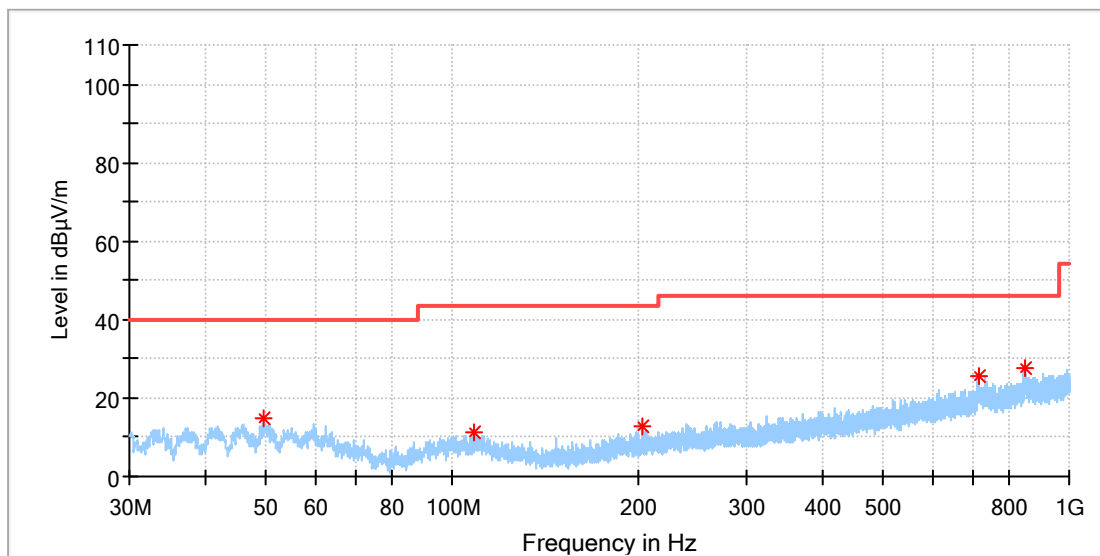


## Critical\_Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 49.982000       | 25.27            | ---              | 40.00          | 14.73       | 100.0       | V   | 327.0         | -18.6        |
| 59.973000       | 24.64            | ---              | 40.00          | 15.36       | 100.0       | V   | 347.0         | -19.3        |
| 103.089500      | 12.80            | ---              | 43.50          | 30.70       | 100.0       | V   | 0.0           | -19.2        |
| 848.971000      | 26.98            | ---              | 46.00          | 19.02       | 100.0       | V   | 274.0         | -5.9         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n 20M_High CH                            |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 23 Humi:55%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |



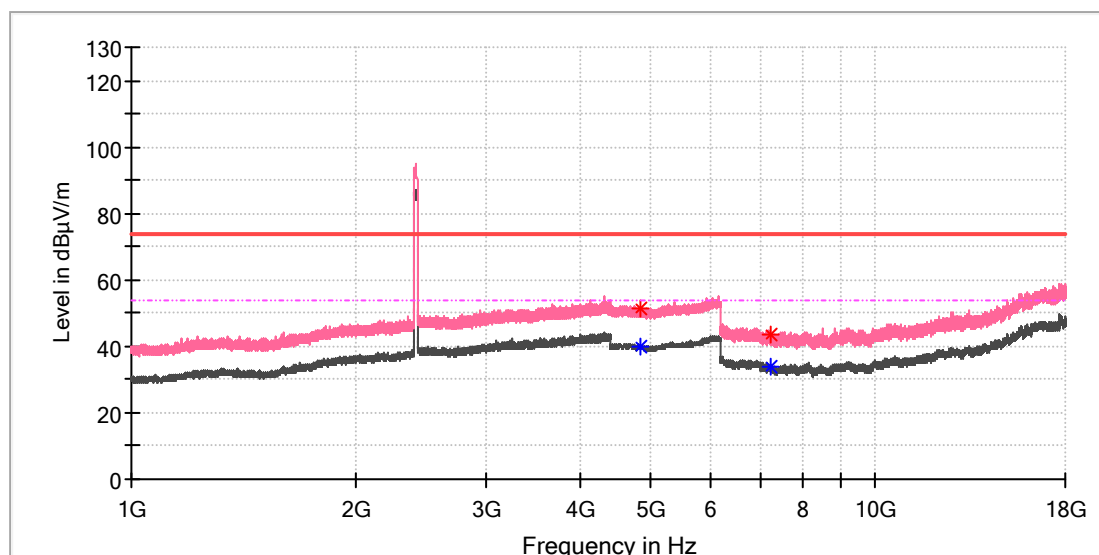
## Critical\_Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 49.642500       | 14.94            | ---              | 40.00          | 25.06       | 100.0       | H   | 119.0         | -18.6        |
| 108.473000      | 11.28            | ---              | 43.50          | 32.22       | 100.0       | H   | 110.0         | -19.3        |
| 203.727000      | 12.82            | ---              | 43.50          | 30.68       | 100.0       | H   | 110.0         | -19.3        |
| 713.268000      | 25.76            | ---              | 46.00          | 20.24       | 100.0       | H   | 188.0         | -8.2         |
| 847.516000      | 27.40            | ---              | 46.00          | 18.60       | 100.0       | H   | 188.0         | -6.0         |

1GHz - 18GHz

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-FI and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n 20M_Low CH                             |
| Test Voltage:  | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

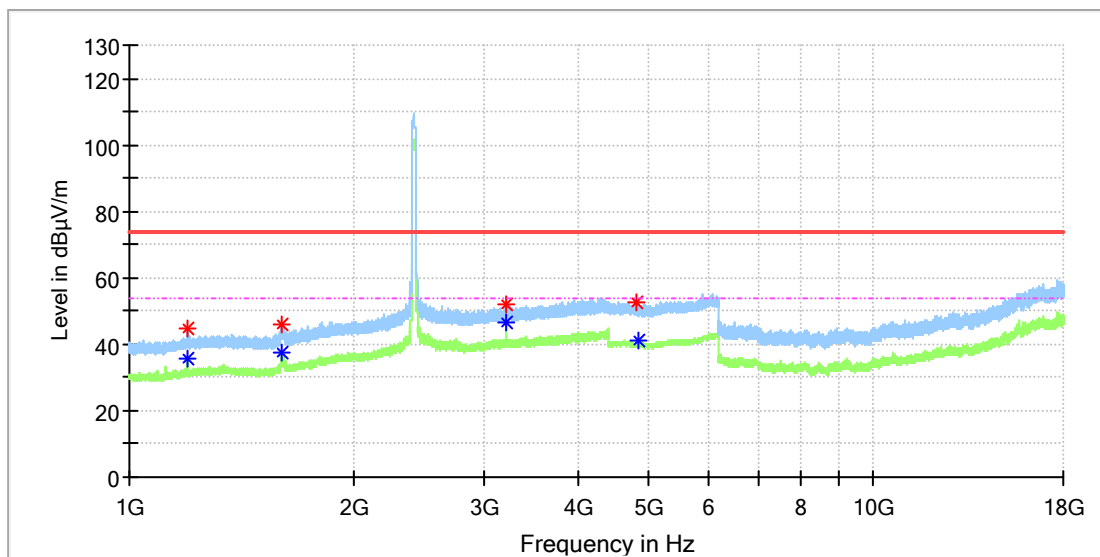


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 4819.000000     | 51.42            | ---              | 74.00          | 22.58       | 100.0       | V   | 352.0         | 13.5         |
| 4822.500000     | ---              | 40.10            | 54.00          | 13.90       | 100.0       | V   | 118.0         | 13.5         |
| 7236.925000     | 43.37            | ---              | 74.00          | 30.63       | 100.0       | V   | 224.0         | 8.6          |
| 7239.875000     | ---              | 33.93            | 54.00          | 20.07       | 100.0       | V   | 28.0          | 8.6          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 Wi-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n 20M_Low CH                             |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

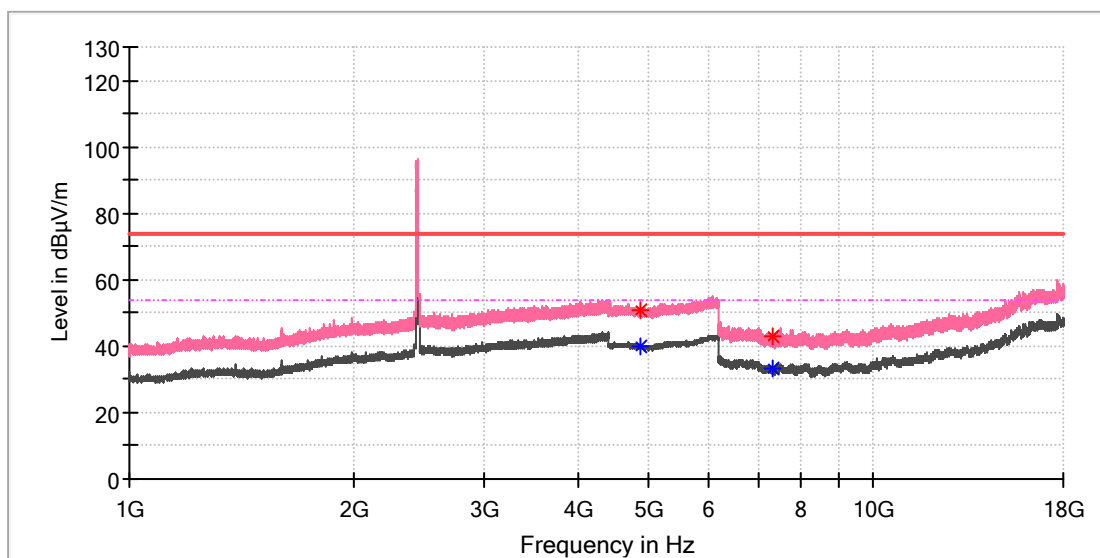


## Critical\_Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1198.475000     | 44.56            | ---              | 74.00          | 29.44       | 100.0       | H   | 155.0         | 1.1          |
| 1198.475000     | ---              | 35.52            | 54.00          | 18.48       | 100.0       | H   | 155.0         | 1.1          |
| 1605.837500     | 45.73            | ---              | 74.00          | 28.27       | 100.0       | H   | 31.0          | 2.2          |
| 1605.837500     | ---              | 37.41            | 54.00          | 16.59       | 100.0       | H   | 31.0          | 2.2          |
| 3215.950000     | ---              | 46.33            | 54.00          | 7.67        | 100.0       | H   | 320.0         | 8.6          |
| 3216.162500     | 51.99            | ---              | 74.00          | 22.01       | 100.0       | H   | 307.0         | 8.6          |
| 4815.000000     | 52.79            | ---              | 74.00          | 21.21       | 100.0       | H   | 110.0         | 13.5         |
| 4820.000000     | ---              | 41.41            | 54.00          | 12.59       | 100.0       | H   | 101.0         | 13.5         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n 20M_Mid CH                             |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

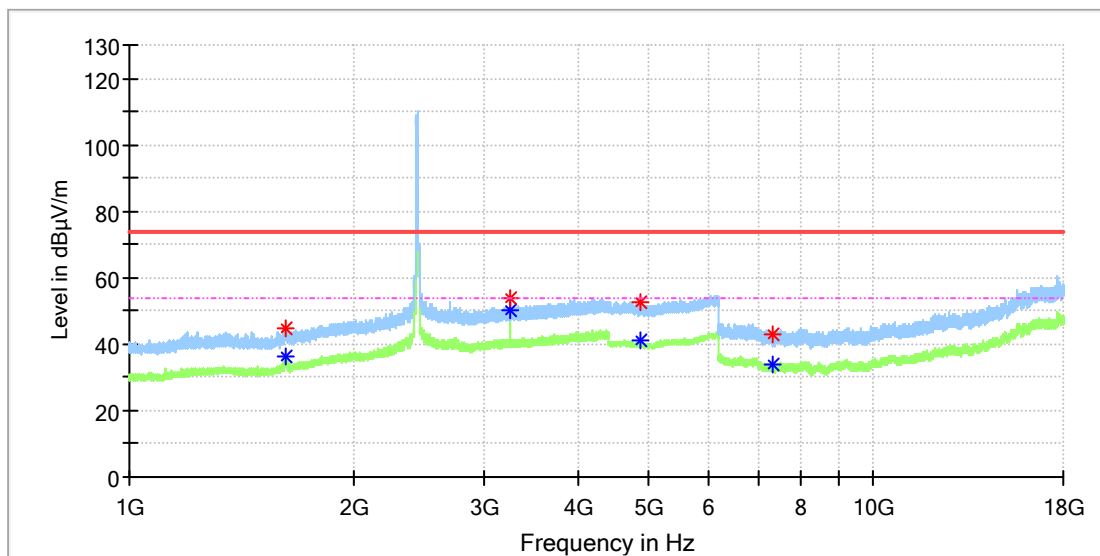


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 4873.500000     | ---              | 39.87            | 54.00          | 14.13       | 100.0       | V   | 279.0         | 13.4         |
| 4875.500000     | 51.00            | ---              | 74.00          | 23.00       | 100.0       | V   | 0.0           | 13.4         |
| 7310.183333     | 42.65            | ---              | 74.00          | 31.35       | 100.0       | V   | 306.0         | 8.2          |
| 7311.166667     | ---              | 33.47            | 54.00          | 20.53       | 100.0       | V   | 142.0         | 8.2          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n 20M_Mid CH                             |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

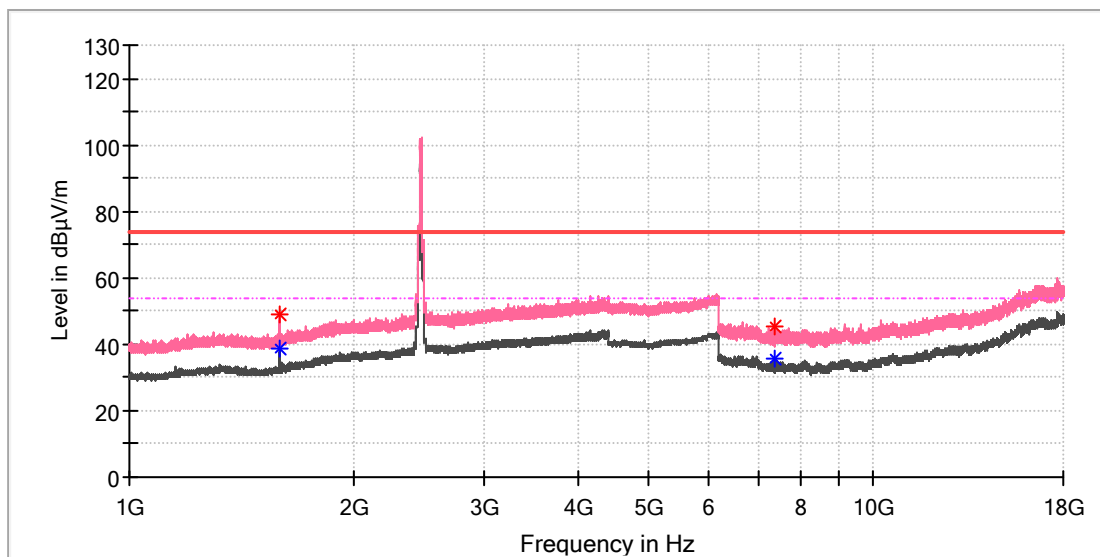


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1618.162500     | 45.03            | ---              | 74.00          | 28.97       | 100.0       | H   | 32.0          | 2.3          |
| 1622.625000     | ---              | 36.51            | 54.00          | 17.49       | 100.0       | H   | 235.0         | 2.3          |
| 3249.312500     | 53.69            | ---              | 74.00          | 20.31       | 100.0       | H   | 130.0         | 8.5          |
| 3249.312500     | ---              | 50.19            | 54.00          | 3.81        | 100.0       | H   | 130.0         | 8.5          |
| 4867.000000     | 52.40            | ---              | 74.00          | 21.60       | 100.0       | H   | 65.0          | 13.4         |
| 4868.500000     | ---              | 40.89            | 54.00          | 13.11       | 100.0       | H   | 248.0         | 13.4         |
| 7310.675000     | 42.90            | ---              | 74.00          | 31.10       | 100.0       | H   | 321.0         | 8.2          |
| 7322.475000     | ---              | 33.85            | 54.00          | 20.15       | 100.0       | H   | 286.0         | 8.2          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 Wi-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n20_High CH                              |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

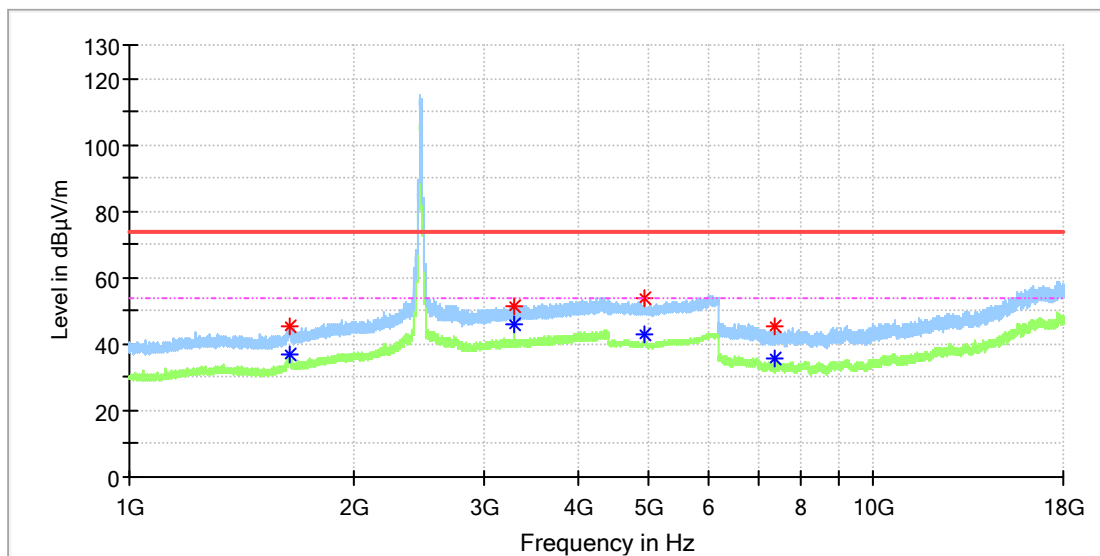


## Critical\_Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1593.512500     | 48.97            | ---              | 74.00          | 25.03       | 100.0       | V   | 249.0         | 2.0          |
| 1593.512500     | ---              | 38.99            | 54.00          | 15.01       | 100.0       | V   | 249.0         | 2.0          |
| 7385.900000     | ---              | 35.61            | 54.00          | 18.39       | 100.0       | V   | 179.0         | 8.2          |
| 7389.341667     | 45.53            | ---              | 74.00          | 28.47       | 100.0       | V   | 179.0         | 8.2          |

## EUT Information

EUT Name: LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module  
 Model: LA02301  
 Test Mode: WiFi 2.4G\_11n20\_High CH  
 Test Voltage:: DC 5V  
 Remark: Temp 24 Humi:47%  
 Test Standard: FCC 15.247  
 Tested By: Kei Zhang  
 Reviewed By: Terry Yin

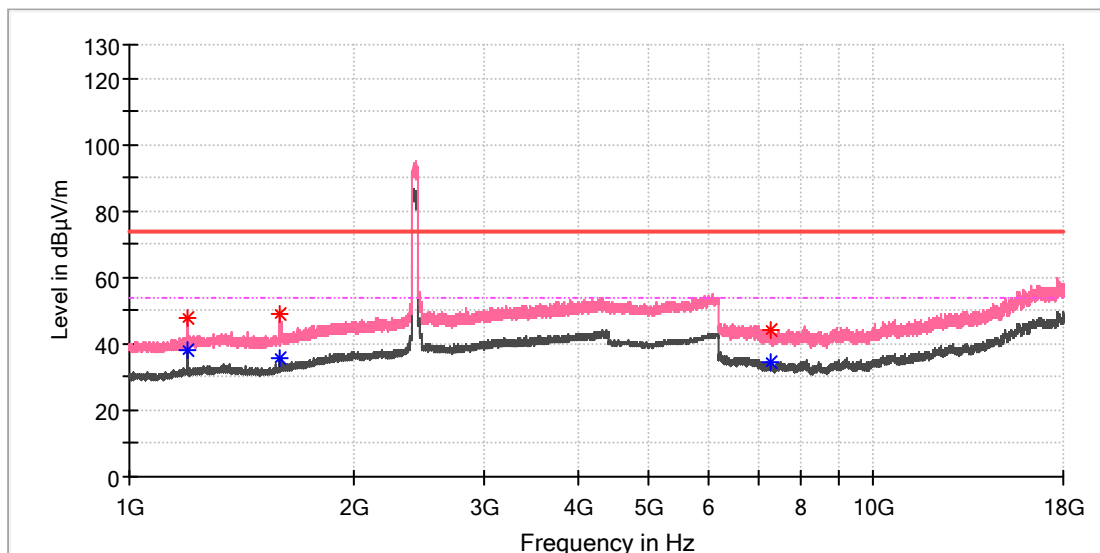


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1638.987500     | ---              | 36.69            | 54.00          | 17.31       | 100.0       | H   | 221.0         | 2.5          |
| 1644.937500     | 45.35            | ---              | 74.00          | 28.65       | 100.0       | H   | 262.0         | 2.5          |
| 3282.462500     | ---              | 45.76            | 54.00          | 8.24        | 100.0       | H   | 139.0         | 8.5          |
| 3282.675000     | 51.45            | ---              | 74.00          | 22.55       | 100.0       | H   | 152.0         | 8.5          |
| 4923.000000     | ---              | 42.99            | 54.00          | 11.01       | 100.0       | H   | 189.0         | 13.3         |
| 4927.000000     | 53.92            | ---              | 74.00          | 20.08       | 100.0       | H   | 189.0         | 13.3         |
| 7384.425000     | ---              | 35.73            | 54.00          | 18.27       | 100.0       | H   | 335.0         | 8.2          |
| 7386.391667     | 45.29            | ---              | 74.00          | 28.71       | 100.0       | H   | 335.0         | 8.2          |

**Wi-Fi 802.11 n(HT40) mode, MCS0**  
**1GHz - 18GHz**
**EUT Information**

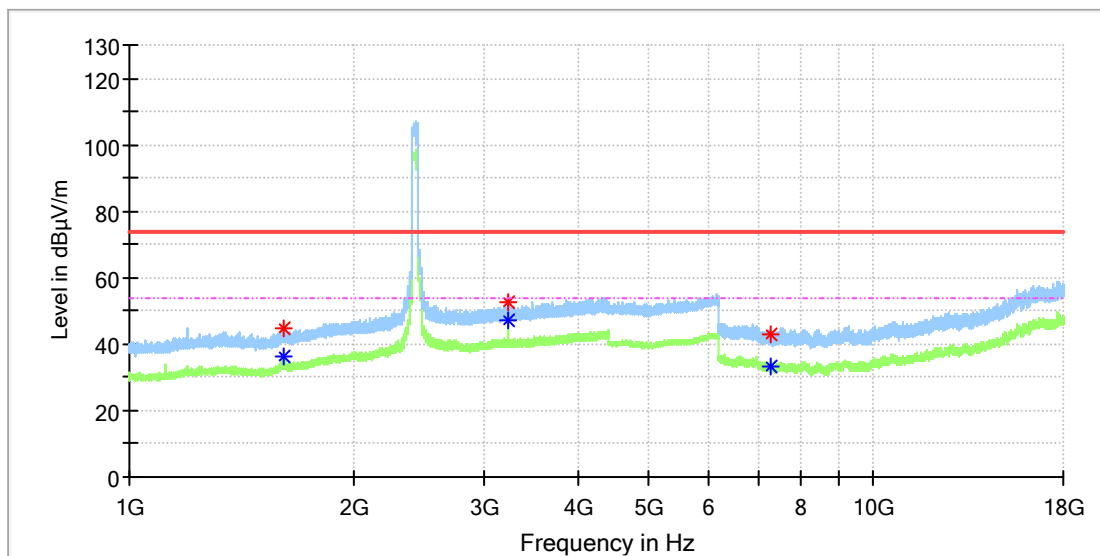
|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 Wi-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n 40M_Low CH                             |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |


**Critical\_Freqs**

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1195.287500     | 47.81            | ---              | 74.00          | 26.19       | 100.0       | V   | 345.0         | 1.1          |
| 1195.287500     | ---              | 37.87            | 54.00          | 16.13       | 100.0       | V   | 345.0         | 1.1          |
| 1593.087500     | ---              | 35.71            | 54.00          | 18.29       | 100.0       | V   | 233.0         | 2.0          |
| 1594.575000     | 48.93            | ---              | 74.00          | 25.07       | 100.0       | V   | 300.0         | 2.0          |
| 7262.000000     | 43.87            | ---              | 74.00          | 30.13       | 100.0       | V   | 166.0         | 8.5          |
| 7262.983333     | ---              | 34.39            | 54.00          | 19.61       | 100.0       | V   | 320.0         | 8.5          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n 40M_Low CH                             |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

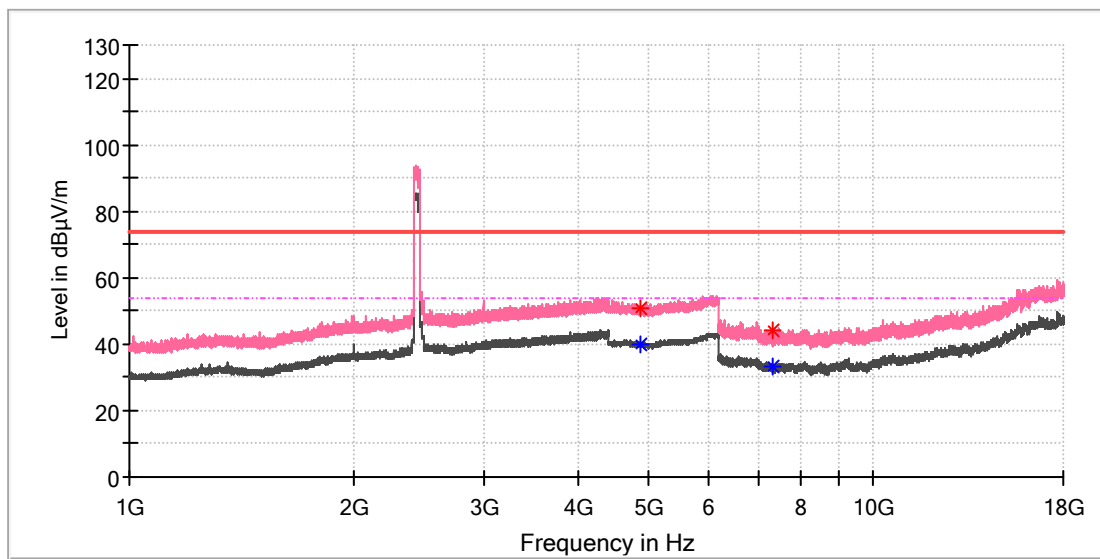


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1614.762500     | ---              | 36.36            | 54.00          | 17.64       | 100.0       | H   | 40.0          | 2.2          |
| 1614.762500     | 44.95            | ---              | 74.00          | 29.05       | 100.0       | H   | 40.0          | 2.2          |
| 3229.550000     | ---              | 47.03            | 54.00          | 6.97        | 100.0       | H   | 323.0         | 8.5          |
| 3229.762500     | 52.42            | ---              | 74.00          | 21.58       | 100.0       | H   | 253.0         | 8.5          |
| 7265.933333     | 43.06            | ---              | 74.00          | 30.94       | 100.0       | H   | 179.0         | 8.5          |
| 7266.425000     | ---              | 33.47            | 54.00          | 20.53       | 100.0       | H   | 104.0         | 8.5          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n 40M_Mid CH                             |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

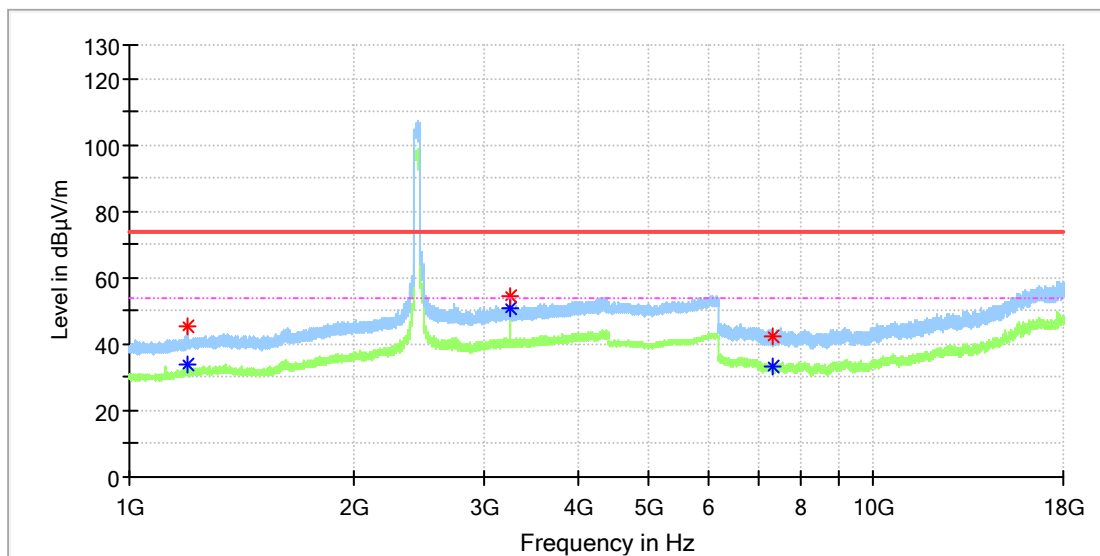


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 4873.500000     | ---              | 40.00            | 54.00          | 14.00       | 100.0       | V   | 120.0         | 13.4         |
| 4877.500000     | 50.66            | ---              | 74.00          | 23.34       | 100.0       | V   | 192.0         | 13.4         |
| 7309.200000     | ---              | 33.38            | 54.00          | 20.62       | 100.0       | V   | 95.0          | 8.2          |
| 7311.166667     | 44.24            | ---              | 74.00          | 29.76       | 100.0       | V   | 0.0           | 8.2          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n 40M_Mid CH                             |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

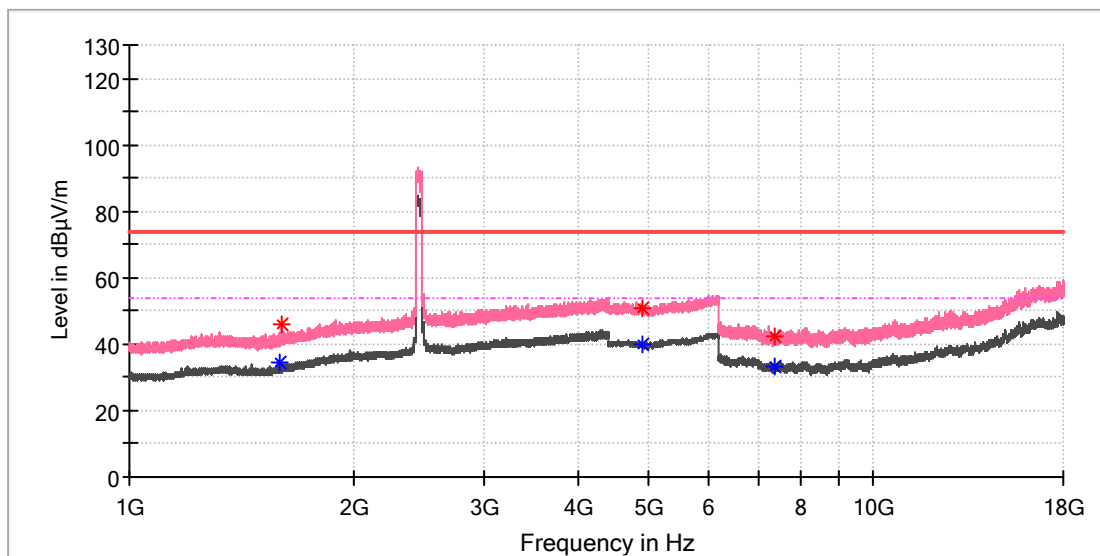


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1196.137500     | 45.43            | ---              | 74.00          | 28.57       | 100.0       | H   | 205.0         | 1.1          |
| 1196.137500     | ---              | 34.06            | 54.00          | 19.94       | 100.0       | H   | 205.0         | 1.1          |
| 3249.312500     | 54.12            | ---              | 74.00          | 19.88       | 100.0       | H   | 153.0         | 8.5          |
| 3249.312500     | ---              | 51.00            | 54.00          | 3.00        | 100.0       | H   | 153.0         | 8.5          |
| 7309.200000     | ---              | 33.51            | 54.00          | 20.49       | 100.0       | H   | 227.0         | 8.2          |
| 7313.625000     | 42.56            | ---              | 74.00          | 31.44       | 100.0       | H   | 170.0         | 8.2          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n 40M_High CH                            |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

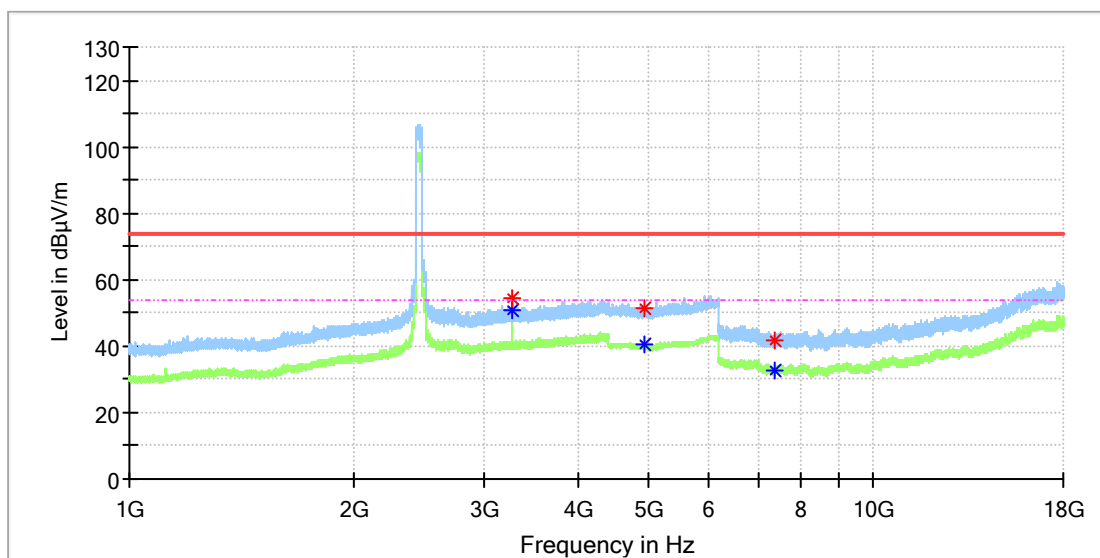


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1595.000000     | ---              | 34.74            | 54.00          | 19.26       | 100.0       | V   | 323.0         | 2.0          |
| 1598.612500     | 45.71            | ---              | 74.00          | 28.29       | 100.0       | V   | 343.0         | 2.1          |
| 4903.500000     | ---              | 40.20            | 54.00          | 13.80       | 100.0       | V   | 129.0         | 13.3         |
| 4906.000000     | 51.05            | ---              | 74.00          | 22.95       | 100.0       | V   | 250.0         | 13.3         |
| 7356.400000     | 42.44            | ---              | 74.00          | 31.56       | 100.0       | V   | 343.0         | 8.1          |
| 7359.841667     | ---              | 33.37            | 54.00          | 20.63       | 100.0       | V   | 101.0         | 8.1          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11n 40M_High CH                            |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |



## Critical Freqs

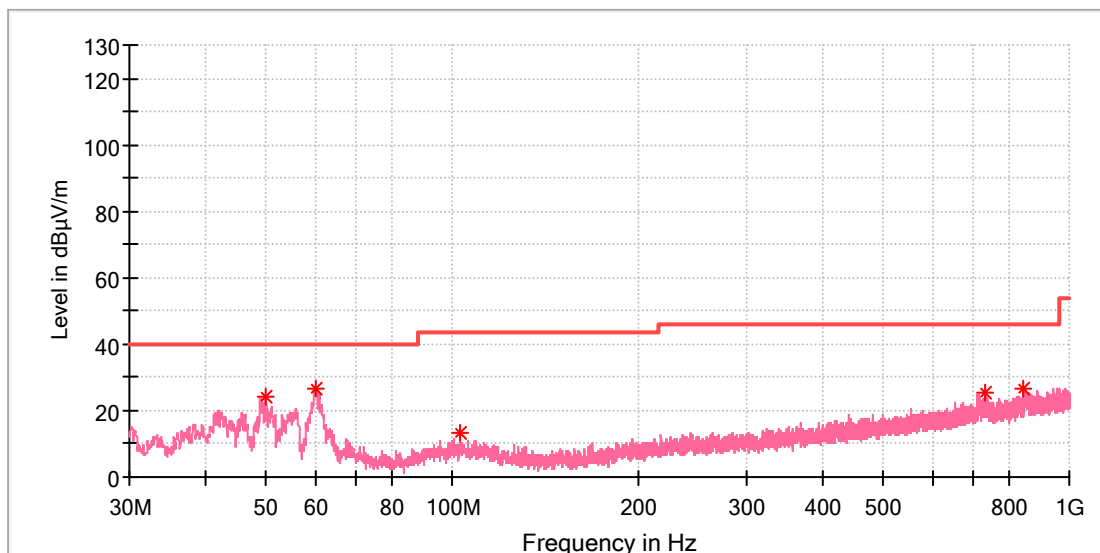
| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 3269.287500     | 54.27            | ---              | 74.00          | 19.73       | 100.0       | H   | 250.0         | 8.5          |
| 3269.287500     | ---              | 50.88            | 54.00          | 3.12        | 100.0       | H   | 250.0         | 8.5          |
| 4909.000000     | ---              | 40.42            | 54.00          | 13.58       | 100.0       | H   | 263.0         | 13.3         |
| 4909.500000     | 51.47            | ---              | 74.00          | 22.53       | 100.0       | H   | 357.0         | 13.3         |
| 7353.941667     | 41.53            | ---              | 74.00          | 32.47       | 100.0       | H   | 163.0         | 8.1          |
| 7354.433333     | ---              | 32.83            | 54.00          | 21.17       | 100.0       | H   | 55.0          | 8.1          |

## Appendix B.2: Test Results of Radiated Spurious Emissions, configuration 2

Bluetooth Low Energy  
30MHz - 1GHz

### EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-FI and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_Low channel                                      |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 23 Humi:55%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

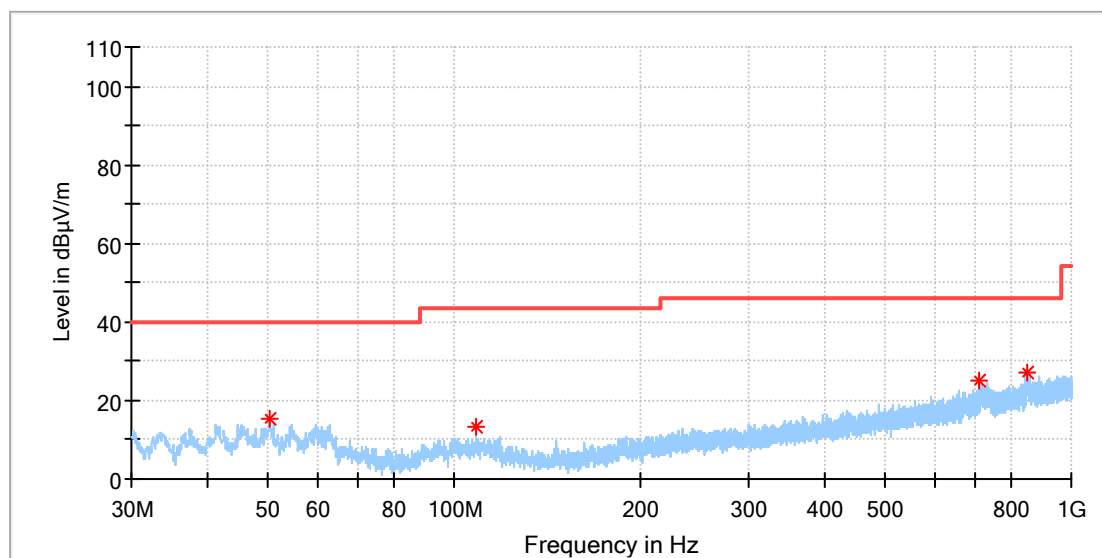


### Critical\_Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 49.982000       | 24.10            | ---              | 40.00          | 15.90       | 100.0       | V   | 223.0         | -18.6        |
| 60.312500       | 26.54            | ---              | 40.00          | 13.46       | 100.0       | V   | 20.0          | -19.4        |
| 103.089500      | 13.18            | ---              | 43.50          | 30.32       | 100.0       | V   | 281.0         | -19.2        |
| 728.497000      | 25.57            | ---              | 46.00          | 20.43       | 100.0       | V   | 111.0         | -7.9         |
| 844.848500      | 26.38            | ---              | 46.00          | 19.62       | 100.0       | V   | 252.0         | -6.0         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_Low channel                                      |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 23 Humi:55%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

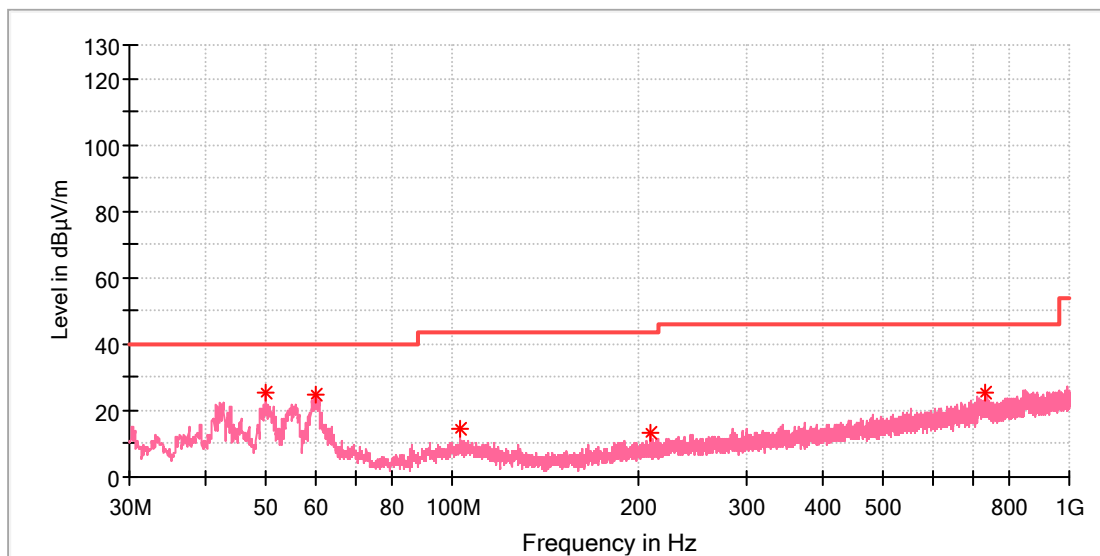


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 50.321500       | 15.25            | ---              | 40.00          | 24.75       | 100.0       | H   | 289.0         | -18.6        |
| 108.424500      | 13.10            | ---              | 43.50          | 30.40       | 100.0       | H   | 0.0           | -19.3        |
| 710.358000      | 24.82            | ---              | 46.00          | 21.18       | 100.0       | H   | 37.0          | -8.2         |
| 845.285000      | 27.03            | ---              | 46.00          | 18.97       | 100.0       | H   | 10.0          | -6.0         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_High channel                                     |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 23 Humi:55%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

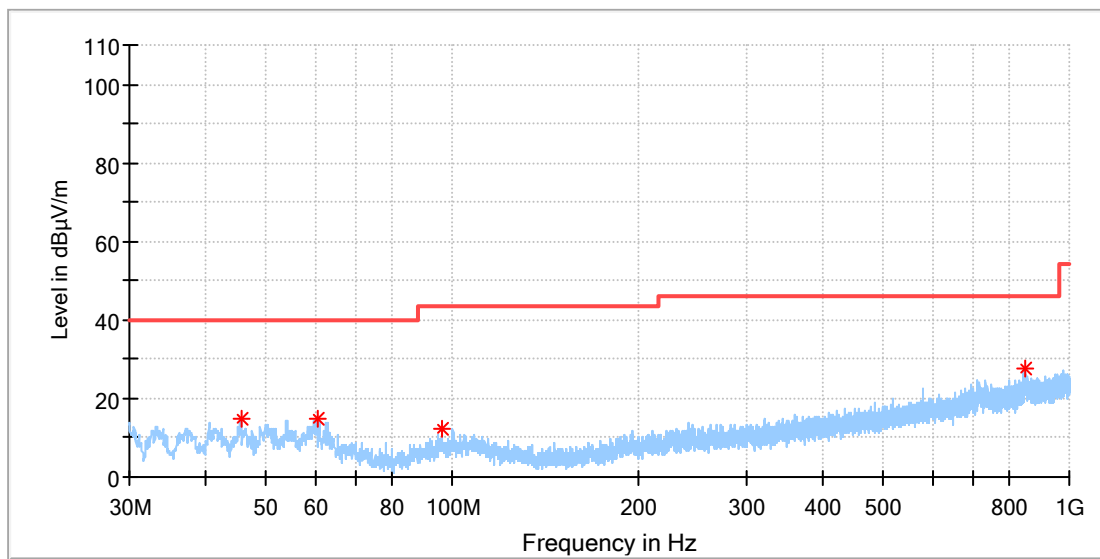


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 49.933500       | 25.43            | ---              | 40.00          | 14.57       | 100.0       | V   | 281.0         | -18.6        |
| 59.924500       | 24.68            | ---              | 40.00          | 15.32       | 100.0       | V   | 331.0         | -19.3        |
| 103.089500      | 14.22            | ---              | 43.50          | 29.28       | 100.0       | V   | 249.0         | -19.2        |
| 209.159000      | 13.13            | ---              | 43.50          | 30.37       | 100.0       | V   | 311.0         | -19.2        |
| 729.806500      | 25.13            | ---              | 46.00          | 20.87       | 100.0       | V   | 34.0          | -7.9         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_High channel                                     |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 23 Humi:55%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

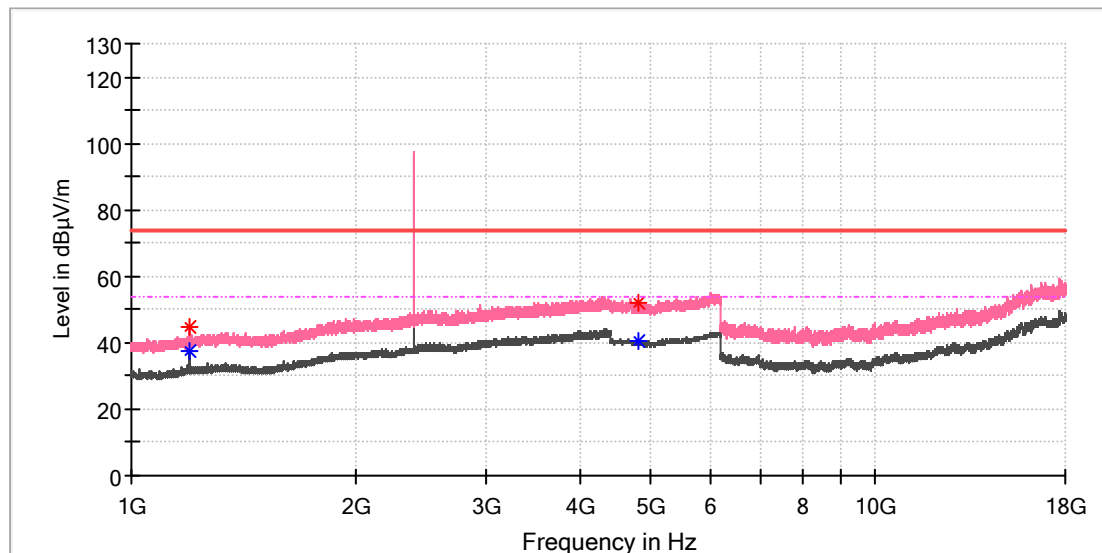


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 45.471500       | 15.00            | ---              | 40.00          | 25.00       | 100.0       | H   | 154.0         | -19.1        |
| 60.409500       | 15.02            | ---              | 40.00          | 24.98       | 100.0       | H   | 163.0         | -19.4        |
| 96.105500       | 12.20            | ---              | 43.50          | 31.30       | 100.0       | H   | 331.0         | -19.9        |
| 846.885500      | 27.41            | ---              | 46.00          | 18.59       | 100.0       | H   | 194.0         | -6.0         |

**1GHz - 18GHz****EUT Information**

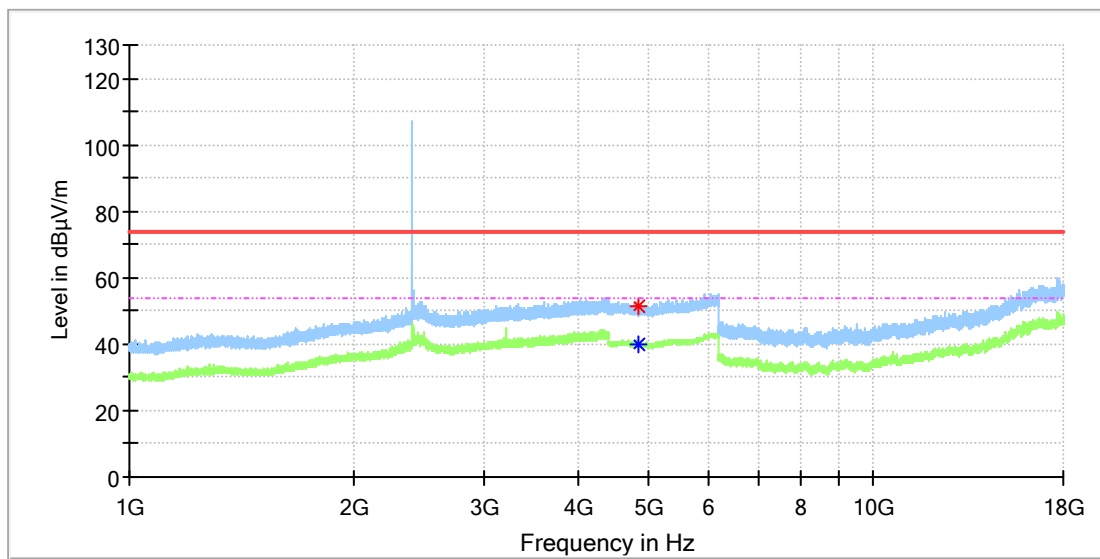
|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_Low channel                                      |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

**Critical\_Freqs**

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1198.900000     | 44.79            | ---              | 74.00          | 29.21       | 100.0       | V   | 262.0         | 1.1          |
| 1198.900000     | ---              | 37.70            | 54.00          | 16.30       | 100.0       | V   | 262.0         | 1.1          |
| 4805.000000     | 51.87            | ---              | 74.00          | 22.13       | 100.0       | V   | 71.0          | 13.6         |
| 4808.500000     | ---              | 40.58            | 54.00          | 13.42       | 100.0       | V   | 341.0         | 13.6         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_Low channel                                      |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

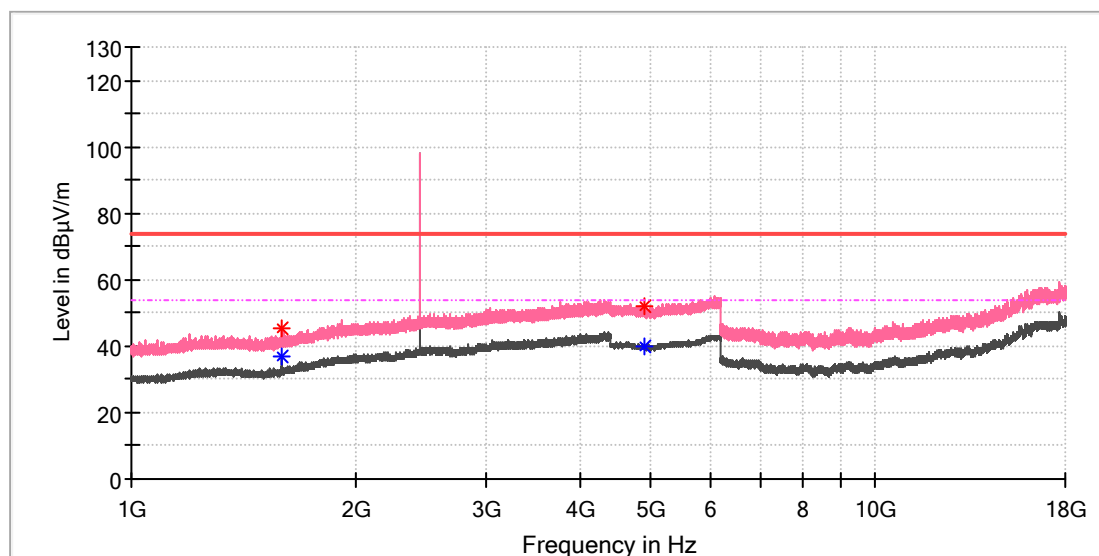


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 4804.000000     | 51.13            | ---              | 74.00          | 22.87       | 100.0       | H   | 290.0         | 13.5         |
| 4806.500000     | ---              | 39.74            | 54.00          | 14.26       | 100.0       | H   | 290.0         | 13.5         |

## EUT Information

EUT Name: LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module  
 Model: LA02301  
 Test Mode: BLE\_Mid channel  
 Test Voltage:: DC 5V  
 Remark: Temp 24 Humi:47%  
 Test Standard: FCC 15.247  
 Tested By: Kei Zhang  
 Reviewed By: Terry Yin

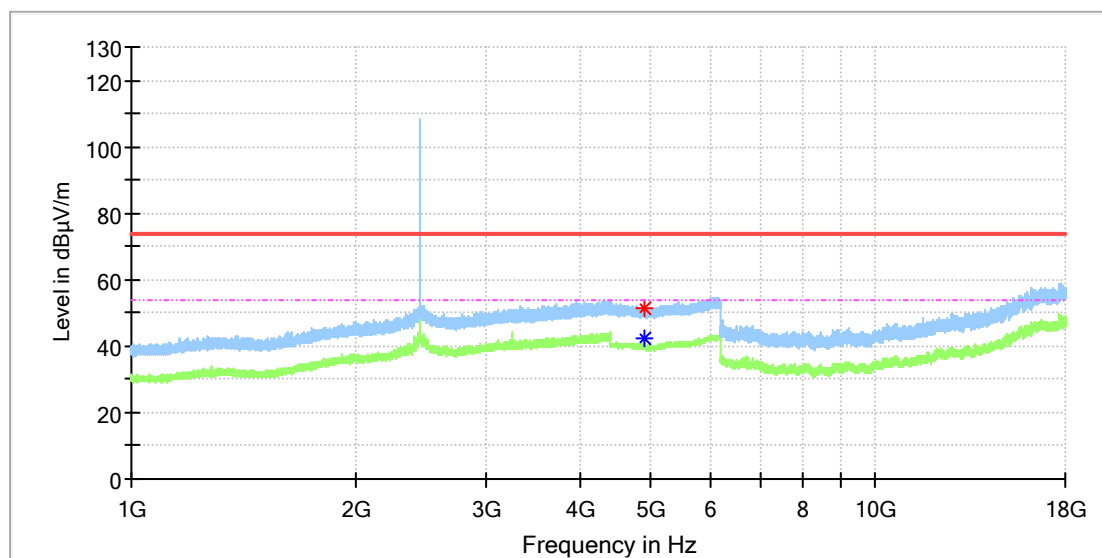


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1593.087500     | ---              | 36.70            | 54.00          | 17.30       | 100.0       | V   | 283.0         | 2.0          |
| 1593.087500     | 45.64            | ---              | 74.00          | 28.36       | 100.0       | V   | 283.0         | 2.0          |
| 4880.000000     | ---              | 39.91            | 54.00          | 14.09       | 100.0       | V   | 217.0         | 13.4         |
| 4880.500000     | 51.74            | ---              | 74.00          | 22.26       | 100.0       | V   | 217.0         | 13.4         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_Mid channel                                      |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

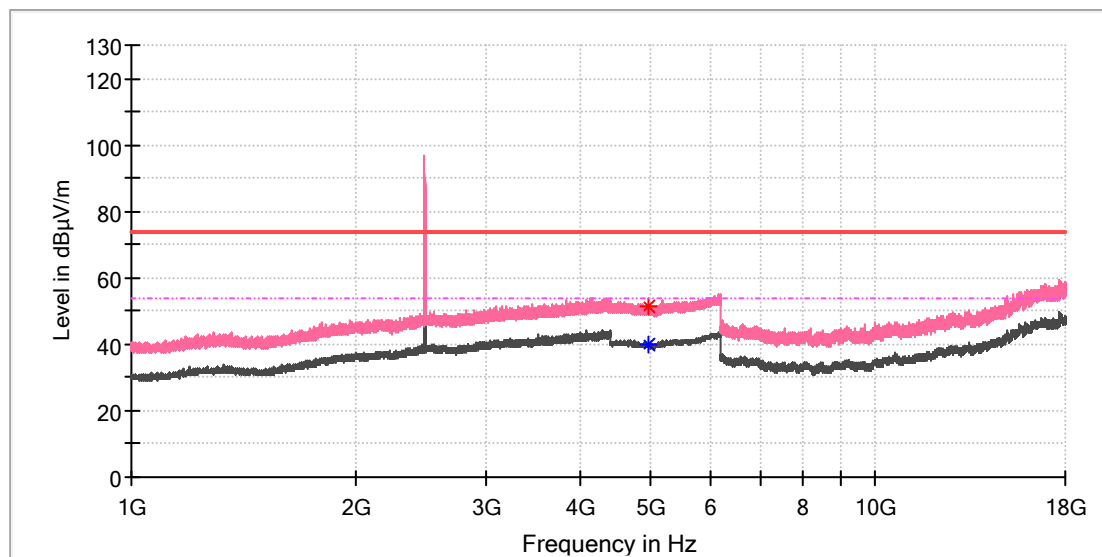


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 4879.500000     | ---              | 42.53            | 54.00          | 11.47       | 100.0       | H   | 80.0          | 13.4         |
| 4884.500000     | 51.58            | ---              | 74.00          | 22.42       | 100.0       | H   | 127.0         | 13.4         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 Wi-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_High channel                                     |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

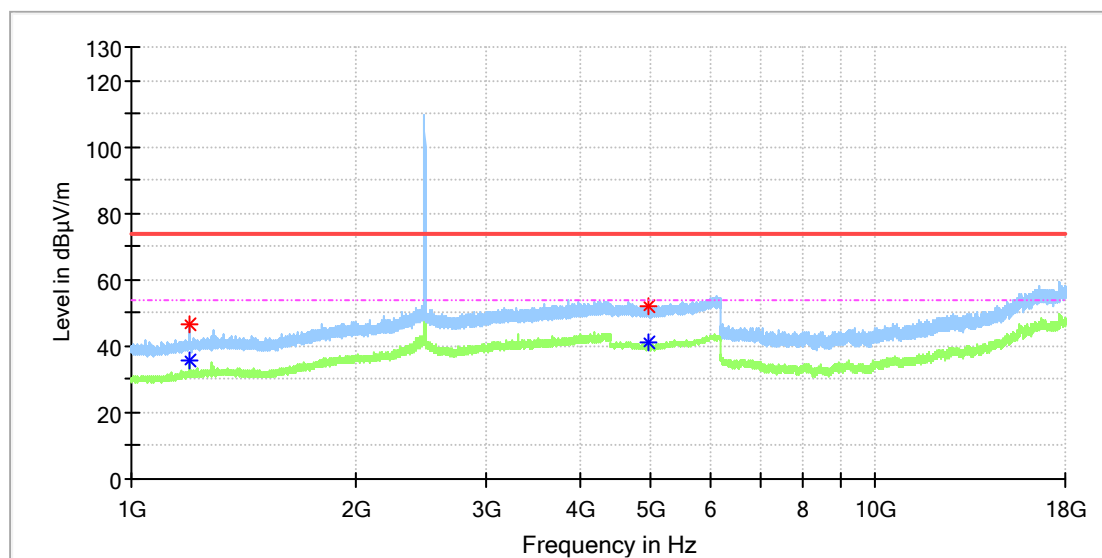


## Critical\_Freqs

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 4960.500000     | 51.28            | ---              | 74.00          | 22.72       | 100.0       | V   | 152.0         | 13.2         |
| 4964.500000     | ---              | 40.17            | 54.00          | 13.83       | 100.0       | V   | 310.0         | 13.2         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | BLE_High channel                                     |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

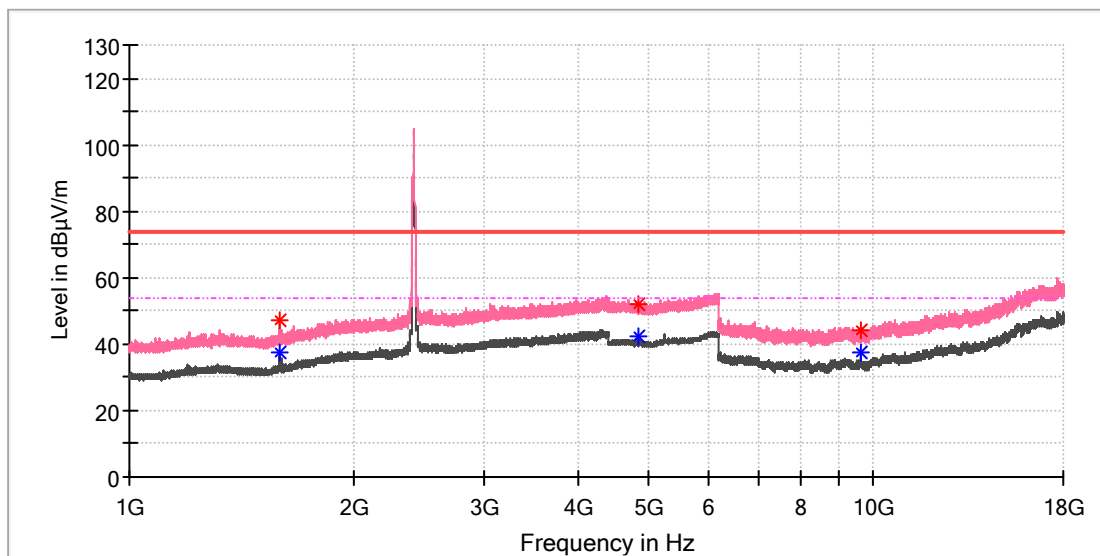


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1194.437500     | 46.72            | ---              | 74.00          | 27.28       | 100.0       | H   | 107.0         | 1.1          |
| 1196.137500     | ---              | 35.75            | 54.00          | 18.25       | 100.0       | H   | 172.0         | 1.1          |
| 4956.500000     | 51.75            | ---              | 74.00          | 22.25       | 100.0       | H   | 322.0         | 13.2         |
| 4960.000000     | ---              | 41.17            | 54.00          | 12.83       | 100.0       | H   | 65.0          | 13.2         |

**Wi-Fi 802.11 b mode, 1 Mbps**  
**1GHz - 18GHz**
**EUT Information**

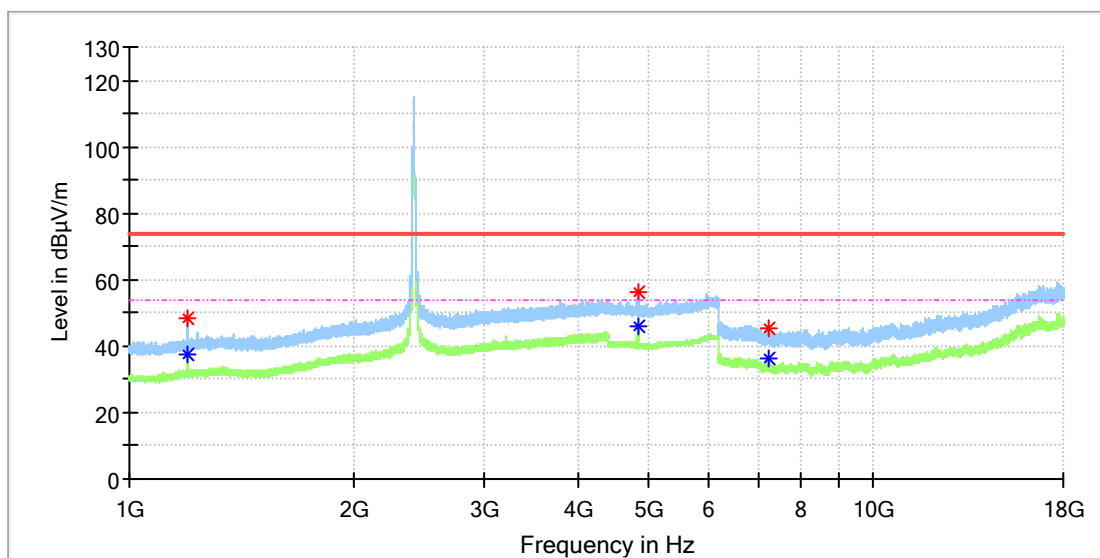
|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 Wi-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11b_Low CH                                 |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |


**Critical\_Freqs**

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1593.300000     | 47.24            | ---              | 74.00          | 26.76       | 100.0       | V   | 324.0         | 2.0          |
| 1593.725000     | ---              | 37.38            | 54.00          | 16.62       | 100.0       | V   | 150.0         | 2.0          |
| 4823.000000     | ---              | 42.38            | 54.00          | 11.62       | 100.0       | V   | 298.0         | 13.5         |
| 4824.000000     | 52.24            | ---              | 74.00          | 21.76       | 100.0       | V   | 123.0         | 13.5         |
| 9647.566667     | ---              | 37.64            | 54.00          | 16.36       | 100.0       | V   | 338.0         | 10.4         |
| 9648.550000     | 44.27            | ---              | 74.00          | 29.73       | 100.0       | V   | 297.0         | 10.4         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11b_Low CH                                 |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

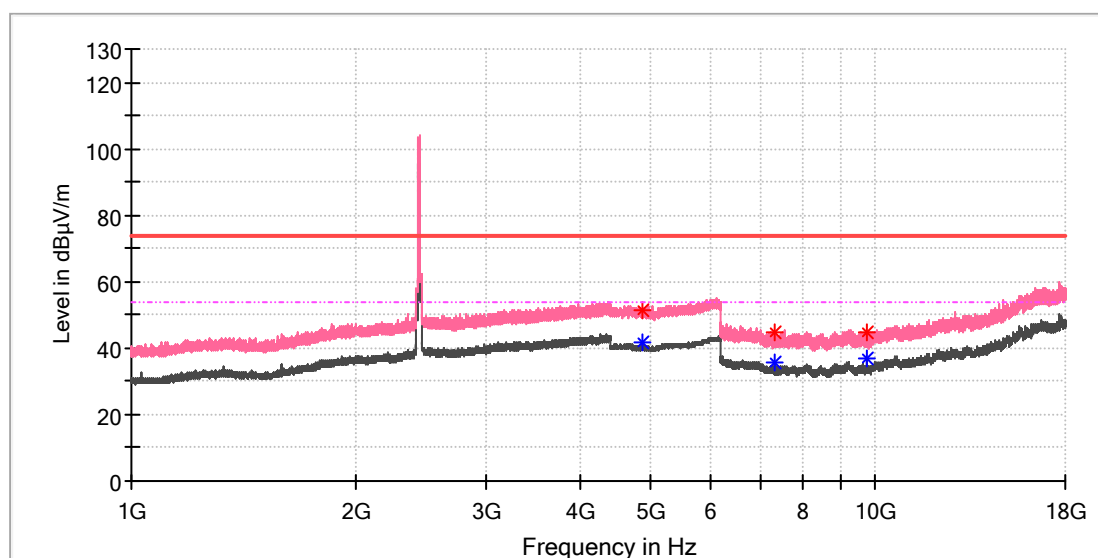


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1199.962500     | 48.31            | ---              | 74.00          | 25.69       | 100.0       | H   | 249.0         | 1.1          |
| 1199.962500     | ---              | 37.55            | 54.00          | 16.45       | 100.0       | H   | 249.0         | 1.1          |
| 4823.000000     | ---              | 46.20            | 54.00          | 7.80        | 100.0       | H   | 13.0          | 13.5         |
| 4824.000000     | 56.31            | ---              | 74.00          | 17.69       | 100.0       | H   | 13.0          | 13.5         |
| 7234.958333     | ---              | 36.00            | 54.00          | 18.00       | 100.0       | H   | 3.0           | 8.6          |
| 7236.925000     | 45.27            | ---              | 74.00          | 28.73       | 100.0       | H   | 3.0           | 8.6          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11b_Mid CH                                 |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

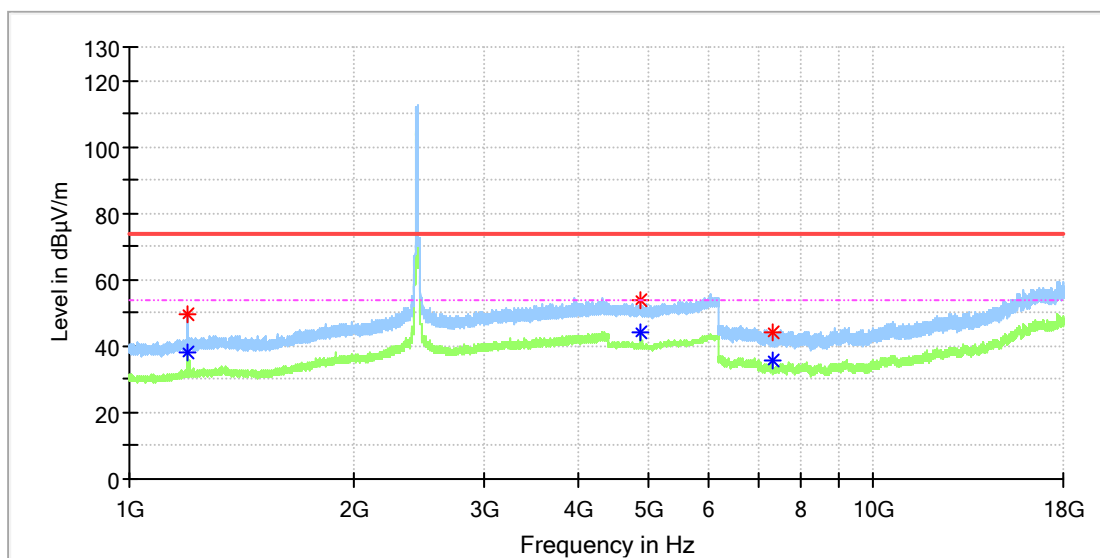


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 4873.000000     | 51.66            | ---              | 74.00          | 22.34       | 100.0       | V   | 116.0         | 13.4         |
| 4874.500000     | ---              | 41.77            | 54.00          | 12.23       | 100.0       | V   | 296.0         | 13.4         |
| 7307.233333     | 44.83            | ---              | 74.00          | 29.17       | 100.0       | V   | 319.0         | 8.3          |
| 7309.691667     | ---              | 35.45            | 54.00          | 18.55       | 100.0       | V   | 357.0         | 8.2          |
| 9744.916667     | 44.77            | ---              | 74.00          | 29.23       | 100.0       | V   | 162.0         | 10.4         |
| 9747.866667     | ---              | 37.09            | 54.00          | 16.91       | 100.0       | V   | 129.0         | 10.4         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11b_Mid CH                                 |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

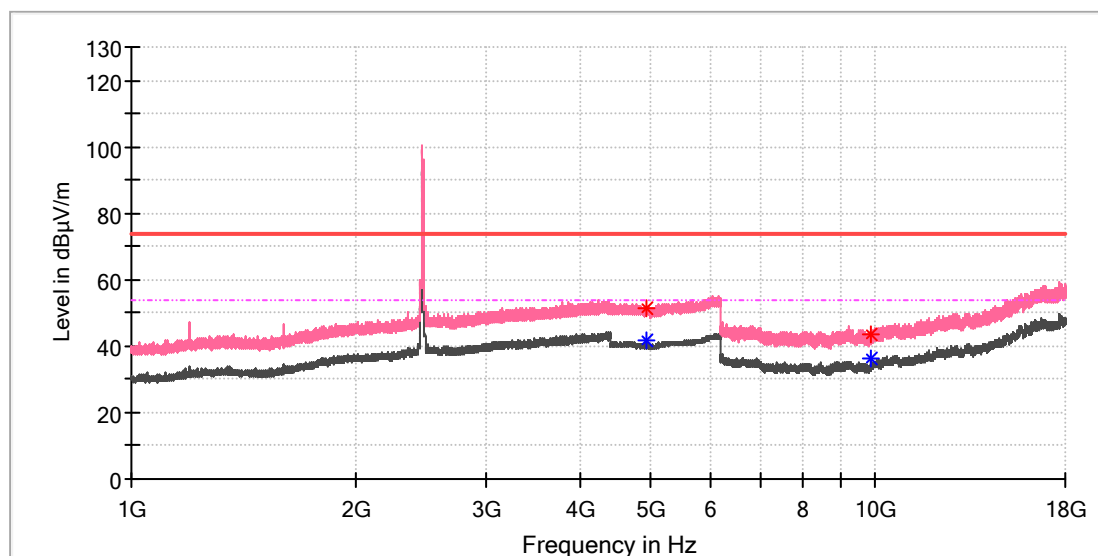


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 1196.987500     | 49.61            | ---              | 74.00          | 24.39       | 100.0       | H   | 171.0         | 1.1          |
| 1196.987500     | ---              | 38.07            | 54.00          | 15.93       | 100.0       | H   | 171.0         | 1.1          |
| 4873.500000     | 53.59            | ---              | 74.00          | 20.41       | 100.0       | H   | 13.0          | 13.4         |
| 4873.500000     | ---              | 44.43            | 54.00          | 9.57        | 100.0       | H   | 13.0          | 13.4         |
| 7308.708333     | ---              | 35.76            | 54.00          | 18.24       | 100.0       | H   | 6.0           | 8.2          |
| 7310.675000     | 44.31            | ---              | 74.00          | 29.69       | 100.0       | H   | 6.0           | 8.2          |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11b_High CH                                |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |

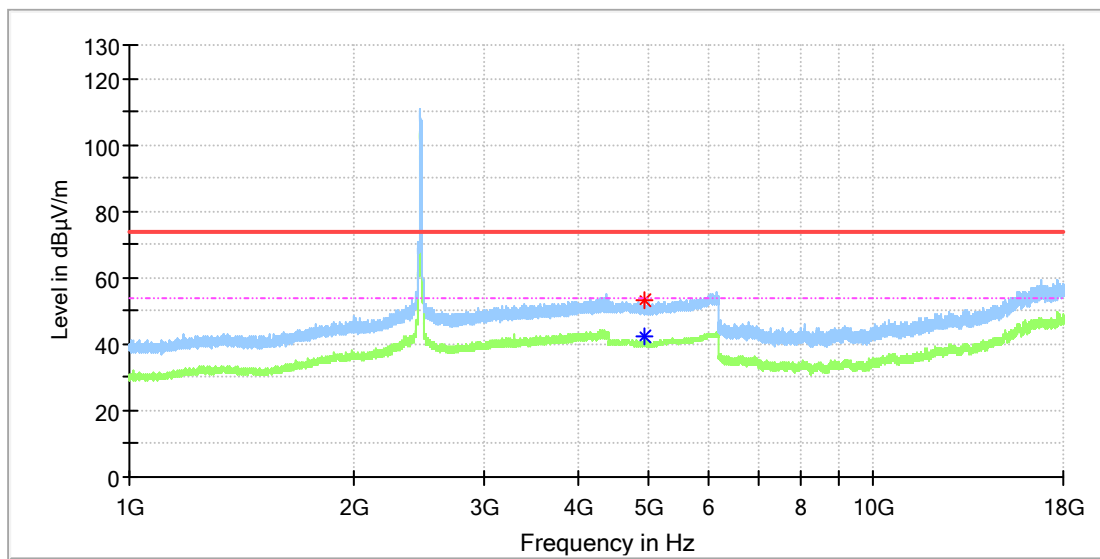


## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 4924.500000     | ---              | 41.42            | 54.00          | 12.58       | 100.0       | V   | 295.0         | 13.3         |
| 4925.000000     | 51.28            | ---              | 74.00          | 22.72       | 100.0       | V   | 309.0         | 13.3         |
| 9847.675000     | ---              | 36.10            | 54.00          | 17.90       | 100.0       | V   | 105.0         | 10.6         |
| 9848.166667     | 43.25            | ---              | 74.00          | 30.75       | 100.0       | V   | 134.0         | 10.6         |

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 WI-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11b_High CH                                |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |



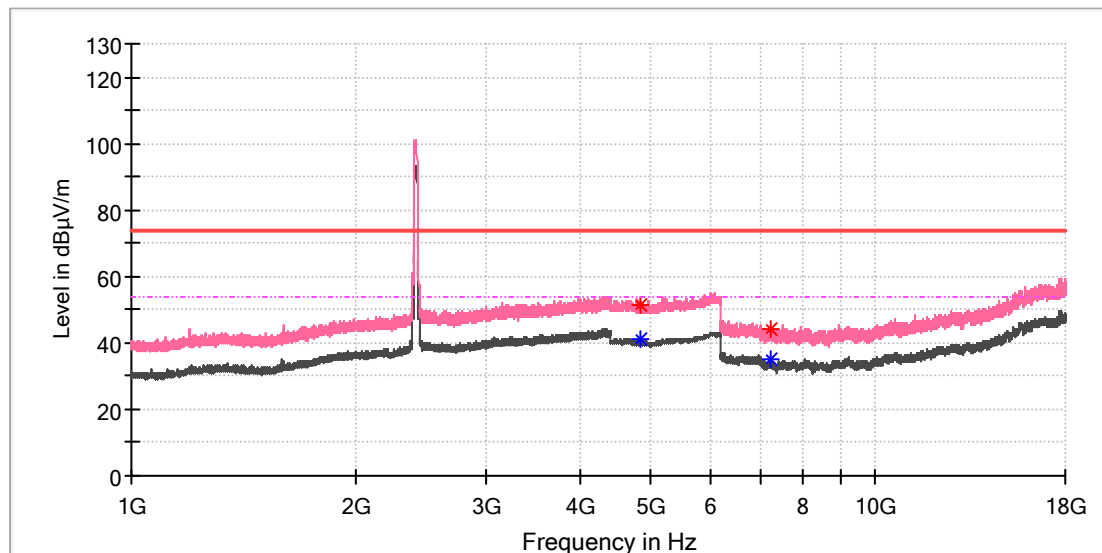
## Critical Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 4923.500000     | 53.24            | ---              | 74.00          | 20.76       | 100.0       | H   | 81.0          | 13.3         |
| 4923.500000     | ---              | 42.06            | 54.00          | 11.94       | 100.0       | H   | 81.0          | 13.3         |

**Wi-Fi 802.11 g mode, 6Mbps**  
**1GHz - 18GHz**

## EUT Information

|                |                                                      |
|----------------|------------------------------------------------------|
| EUT Name:      | LA02301 Wi-Fi and Bluetooth SMART (BLE) Combo Module |
| Model:         | LA02301                                              |
| Test Mode:     | WiFi 2.4G_11g_Low CH                                 |
| Test Voltage:: | DC 5V                                                |
| Remark:        | Temp 24 Humi:47%                                     |
| Test Standard: | FCC 15.247                                           |
| Tested By:     | Kei Zhang                                            |
| Reviewed By:   | Terry Yin                                            |



## Critical\_Freqs

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 4821.000000     | ---              | 41.11            | 54.00          | 12.89       | 100.0       | V   | 287.0         | 13.5         |
| 4824.500000     | 51.64            | ---              | 74.00          | 22.36       | 100.0       | V   | 295.0         | 13.5         |
| 7233.975000     | ---              | 35.06            | 54.00          | 18.94       | 100.0       | V   | 30.0          | 8.6          |
| 7235.450000     | 44.02            | ---              | 74.00          | 29.98       | 100.0       | V   | 231.0         | 8.6          |