# APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
ILOGIC Technology Limited

Bluetooth 4.0 LE Module
Model No.:ILT254S, ILT254X

FCC ID: 2AAXH- ILT254

| | | |
|---|---|---|
| Prepared for | : | ILOGIC Technology Limited |
| Address | : | Unit 1202, International Trade Center, No.11 Sha Tsui Road, Tsuen Wan, Hong Kong. |
| Prepared by | : | ACCURATE TECHNOLOGY CO., LTD |
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| | | |
|---|---|---|
| Report Number | : | ATE20131888 |
| Date of Test | : | Aug 29-Sep 17, 2013 |
| Date of Report | : | Sep 17, 2013 |

# TABLE OF CONTENTS

Description Page

# Test Report Certification

Applicant : ILOGIC Technology Limited

Manufacturer : ILOGIC Technology Limited

EUT Description : Bluetooth 4.0 LE Module

(A) MODEL NO.: ILT254S, ILT254X

(B) TRADE NAME.: ILOGICTECH

(C) POWER SUPPLY: DC 3V

Measurement Procedure Used:

**FCC Rules and Regulations Part 15 Subpart C Section 15.247**
**ANSI C63.4: 2009**

The EUT was tested according to DTS test procedure of April 09, 2013 KDB558074 D01 DTS Meas Guidance v03 for compliance to FCC 47CFR 15.247 requirements

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : Aug 29-Sep 17, 2013

Prepared by : Tim Zhang

(Tim.zhang, Engineer)

Approved & Authorized Signer :

( Sean Liu, Manager)

# 1. GENERAL INFORMATION

## 1.1.Description of Device (EUT)

| | | |
|---|---|---|
| EUT | : | Bluetooth 4.0 LE Module |
| Model Number | : | ILT254S, ILT254X |
| Bluetooth version | : | Bluetooth V4.0 LE |
| Frequency Range | : | 2402MHz-2480MHz |
| Number of Channels | : | 40 |
| Antenna Gain | : | 0dBi |
| Antenna type | : | PCB Antenna |
| Power Supply | : | DC 3V |
| Modulation mode | : | O-QPSK |
| Applicant | : | ILOGIC Technology Limited |
| Address | : | Unit 1202, International Trade Center, No.11 Sha Tsui Road, Tsuen Wan, Hong Kong. |
| Manufacturer | : | ILOGIC Technology Limited |
| Address | : | Unit 1202, International Trade Center, No.11 Sha Tsui Road, Tsuen Wan, Hong Kong. |
| Date of sample received | : | Aug 29, 2013 |
| Date of Test | : | Aug 29-Sep 17, 2013 |

## 1.2.Carrier Frequency of Channels

| Channel | Frequceny (MHz) | Channel | Frequceny (MHz) | Channel | Frequceny (MHz) | Channe l | Frequceny (MHz) |
|---|---|---|---|---|---|---|---|
| 0 | 2402 | 10 | 2422 | 20 | 2442 | 30 | 2462 |
| 1 | 2404 | 11 | 2424 | 21 | 2444 | 31 | 2464 |
| 2 | 2406 | 12 | 2426 | 22 | 2446 | 32 | 2466 |
| 3 | 2408 | 13 | 2428 | 23 | 2448 | 33 | 2468 |
| 4 | 2410 | 14 | 2430 | 24 | 2450 | 34 | 2470 |
| 5 | 2412 | 15 | 2432 | 25 | 2452 | 35 | 2472 |
| 6 | 2414 | 16 | 2434 | 26 | 2454 | 36 | 2474 |
| 7 | 2416 | 17 | 2436 | 27 | 2456 | 37 | 2476 |
| 8 | 2418 | 18 | 2438 | 28 | 2458 | 38 | 2478 |
| 9 | 2420 | 19 | 2440 | 29 | 2460 | 39 | 2480 |

## 1.3.Special Accessory and Auxiliary Equipment

N/A

## 1.4.Description of Test Facility

| | | |
|---|---|---|
| EMC Lab | : | Accredited by TUV Rheinland Shenzhen<br><br>Listed by FCC<br>The Registration Number is 752051<br><br>Listed by Industry Canada<br>The Registration Number is 5077A-2<br><br>Accredited by China National Accreditation Committee for Laboratories<br>The Certificate Registration Number is L3193 |
| Name of Firm | : | ACCURATE TECHNOLOGY CO. LTD |
| Site Location | : | F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China |

## 1.5.Measurement Uncertainty

| | | |
|---|---|---|
| Conducted Emission Expanded Uncertainty | = | 2.23dB, k=2 |
| Radiated emission expanded uncertainty (9kHz-30MHz) | = | 3.08dB, k=2 |
| Radiated emission expanded uncertainty (30MHz-1000MHz) | = | 4.42dB, k=2 |
| Radiated emission expanded uncertainty (Above 1GHz) | = | 4.06dB, k=2 |

# 2. MEASURING DEVICE AND TEST EQUIPMENT

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

| Kind of equipment | Manufacturer | Type | S/N | Calibrated dates | Calibrated until |
|---|---|---|---|---|---|
| EMI Test Receiver | Rohde&Schwarz | ESCS30 | 100307 | Jan. 12, 2013 | Jan. 11, 2014 |
| EMI Test Receiver | Rohde&Schwarz | ESPI3 | 101526/003 | Jan. 12, 2013 | Jan. 11, 2014 |
| Spectrum Analyzer | Agilent | E7405A | MY45115511 | Jan. 12, 2013 | Jan. 11, 2014 |
| Pre-Amplifier | Rohde&Schwarz | CBLU1183540-01 | 3791 | Jan. 12, 2013 | Jan. 11, 2014 |
| Loop Antenna | Schwarzbeck | FMZB1516 | 1516131 | Feb. 6, 2013 | Feb. 5, 2014 |
| Bilog Antenna | Schwarzbeck | VULB9163 | 9163-323 | Feb. 6, 2013 | Feb. 5, 2014 |
| Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-655 | Feb. 6, 2013 | Feb. 5, 2014 |
| Horn Antenna | Schwarzbeck | BBHA9170 | 9170-359 | Feb. 6, 2013 | Feb. 5, 2014 |
| LISN | Rohde&Schwarz | ESH3-Z5 | 100305 | Jan. 12, 2013 | Jan. 11, 2014 |
| LISN | Schwarzbeck | NSLK8126 | 8126431 | Jan. 12, 2013 | Jan. 11, 2014 |
| Highpass Filter | Wainwright Instruments | WHKX3.6/18G-10SS | N/A | Jan. 12, 2013 | Jan. 11, 2014 |
| Band Reject Filter | Wainwright Instruments | WRCG2400/2485-2375/2510-60/11SS | N/A | Jan. 12, 2013 | Jan. 11, 2014 |

# 3. OPERATION OF EUT DURING TESTING

## 3.1.Operating Mode

The mode is used: **BLE Transmitting mode**
Low Channel: 2402MHz
Middle Channel: 2440MHz
High Channel: 2480MHz

## 3.2.Configuration and peripherals


Note:the module is powered by 2.8-3VDC

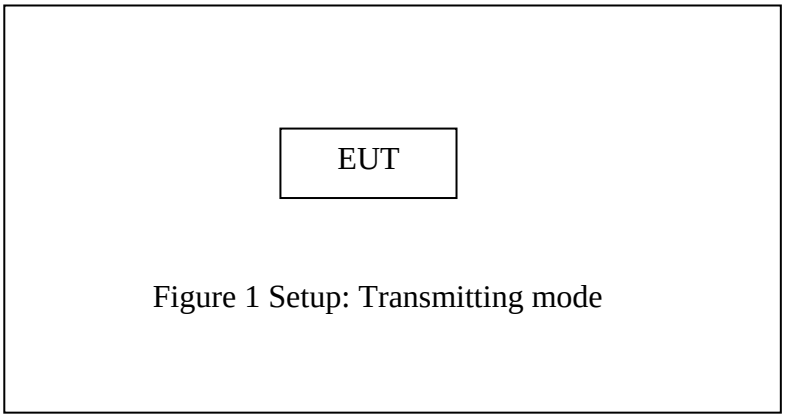


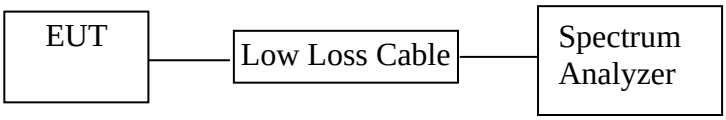

Figure 1 Setup: Transmitting mode

# 4. TEST PROCEDURES AND RESULTS

| FCC Rules | Description of Test | Result |
|---|---|---|
| Section 15.247(a)(2) | 6dB Bandwidth Test | Compliant |
| Section 15.247(e) | Power Spectral Density Test | Compliant |
| Section 15.247(b)(3) | Maximum Peak Output Power Test | Compliant |
| Section 15.247(d) | Band Edge Compliance Test | Compliant |
| Section 15.247(d)<br>Section 15.209 | Radiated Spurious Emission Test | Compliant |
| Section 15.247(d) | Conducted Spurious Emission Test | Compliant |
| Section 15.207 | AC Power Line Conducted Emission Test | N/A |
| Section 15.203 | Antenna Requirement | Compliant |

# 5. 6DB BANDWIDTH MEASUREMENT

## 5.1.Block Diagram of Test Setup




(EUT: Bluetooth 4.0 LE Module)

## 5.2.The Requirement For Section 15.247(a)(2)

Section 15.247(a)(2): Systems using digital modulation techniques may operate in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

## 5.3.EUT Configuration on Measurement

The equipment is installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

## 5.5.Test Procedure

5.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

5.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to300 kHz.

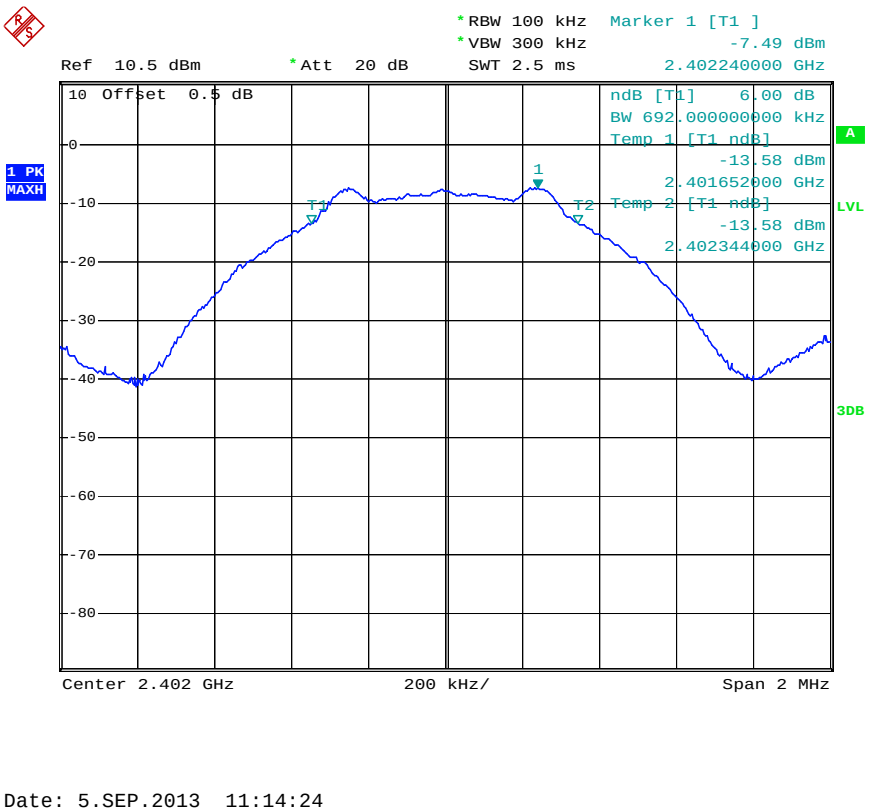
5.5.3.The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

## 5.6.Test Result

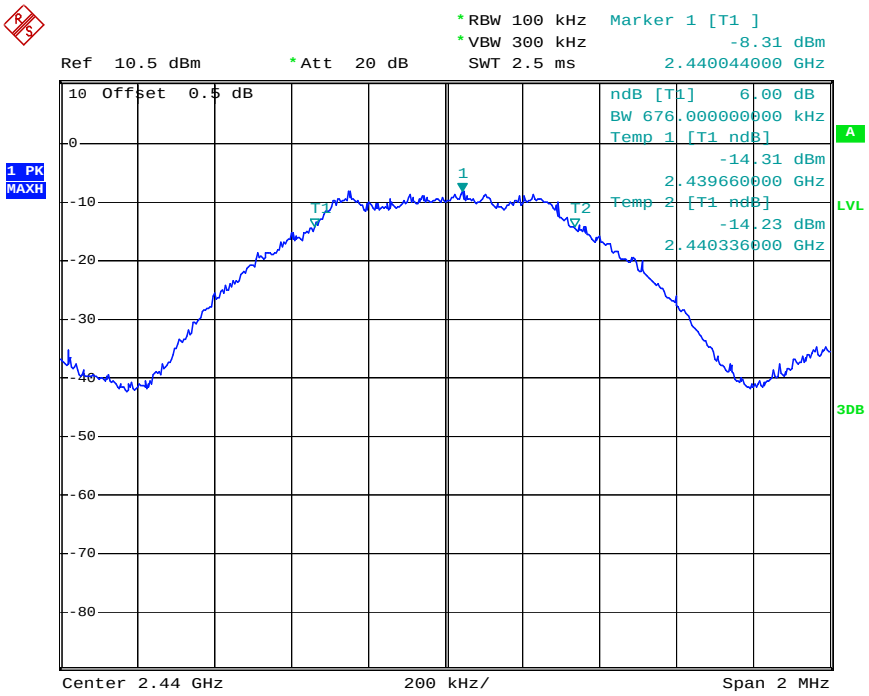
| Channel | Frequency (MHz) | 6 dB Bandwith (MHz) | Minimum Limit(MHz) | PASS/FAIL |
|---|---|---|---|---|
| 0 | 2402 | 0.692 | 0.5 | PASS |
| 19 | 2440 | 0.676 | 0.5 | PASS |
| 39 | 2480 | 0.672 | 0.5 | PASS |

The spectrum analyzer plots are attached as below.

*channel 0*

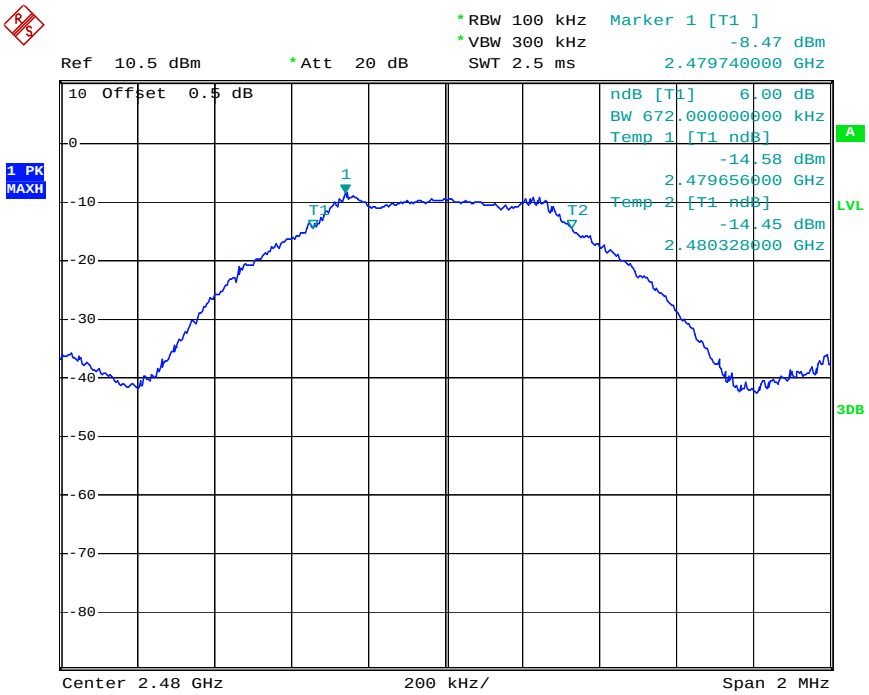


*channel 19*




Date: 5.SEP.2013 11:13:22

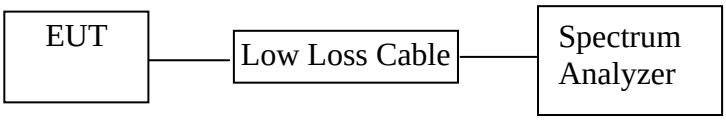
*channel 39*




Date: 5.SEP.2013 11:13:59

# 6. MAXIMUM PEAK OUTPUT POWER

## 6.1.Block Diagram of Test Setup




(EUT: Bluetooth 4.0 LE Module)

## 6.2.The Requirement For Section 15.247(b)(3)

Section 15.247(b)(3): For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands: 1 Watt.

## 6.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

## 6.5.Test Procedure

6.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.2.Test method is options 1 from KDB558074 D01 DTS Meas Guidance v03

6.5.3.Set RBW of spectrum analyzer to 1 MHz and VBW to 3 MHz.

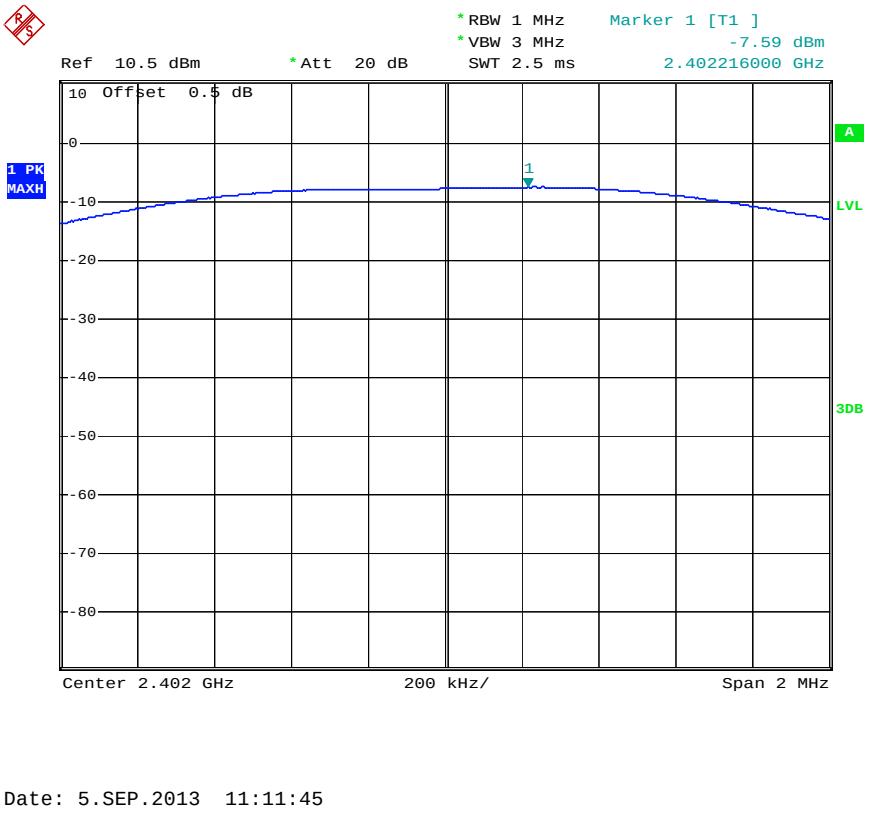
6.5.4.Measurement the maximum peak output power.

## 6.6.Test Result

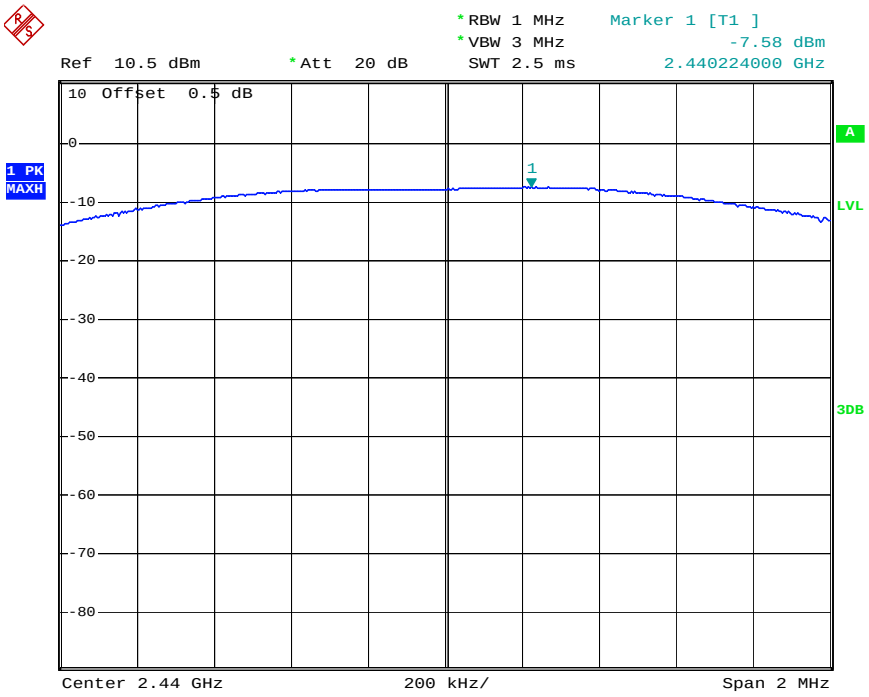
| Channel | Frequency (MHz) | Peak Power Output (dBm) | Peak Power Limit (dBm) | Pass / Fail |
|---|---|---|---|---|
| 0 | 2402 | -7.59 | 30 | PASS |
| 19 | 2440 | -7.58 | 30 | PASS |
| 39 | 2480 | -7.63 | 30 | PASS |

The spectrum analyzer plots are attached as below.

*channel 0*

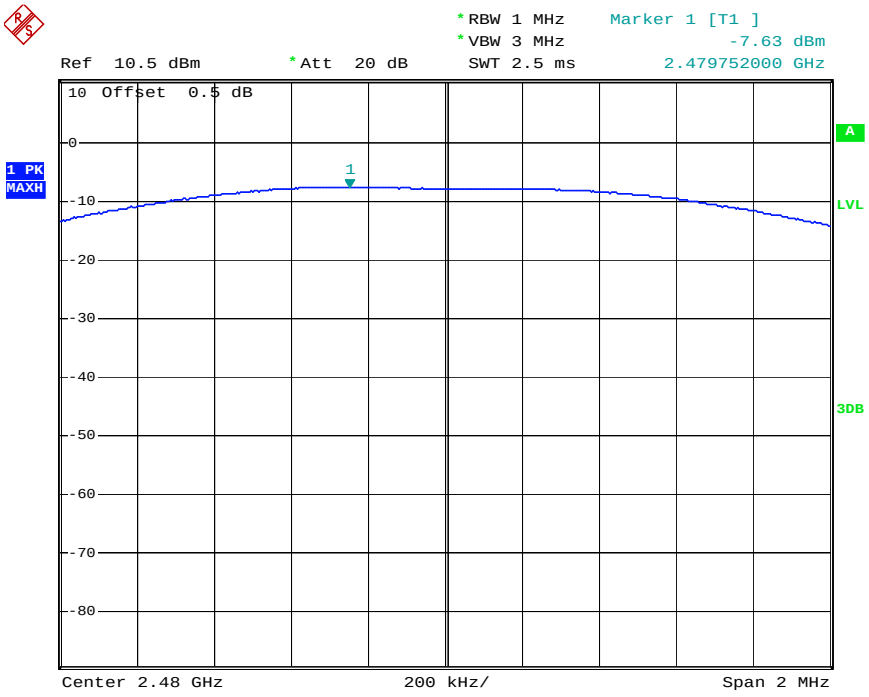


*channel 19*




Date: 5.SEP.2013 11:12:07

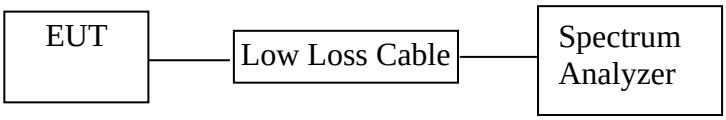
*channel 39*




Date: 5.SEP.2013 11:10:43

# 7. POWER SPECTRAL DENSITY MEASUREMENT

## 7.1.Block Diagram of Test Setup




(EUT: Bluetooth 4.0 LE Module)

## 7.2.The Requirement For Section 15.247(e)

Section 15.247(e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

## 7.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

## 7.5.Test Procedure

7.5.1.The EUT was tested according to DTS test procedure of April 09, 2013 KDB558074 D01 DTS Meas Guidance v03 for compliance to FCC 47CFR 15.247 requirements.

7.5.2.The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.3.Measurement Procedure PKPSD:

This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW to: 3 kHz $\leqslant$ RBW $\leqslant$ 100 kHz.
4. Set the VBW $\geqslant$ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

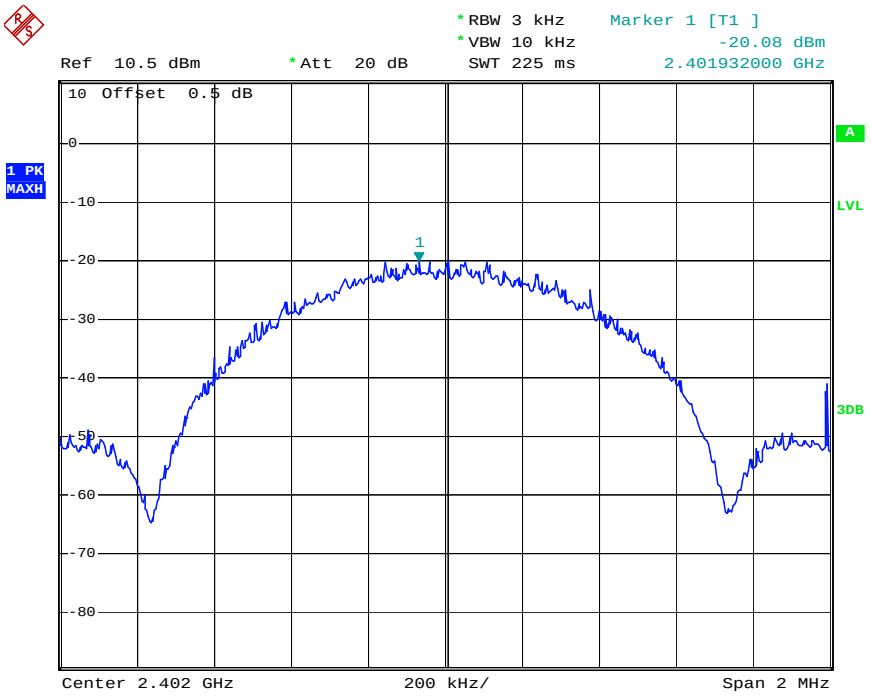
7.5.4.Measurement the maximum power spectral density.

## 7.6.Test Result

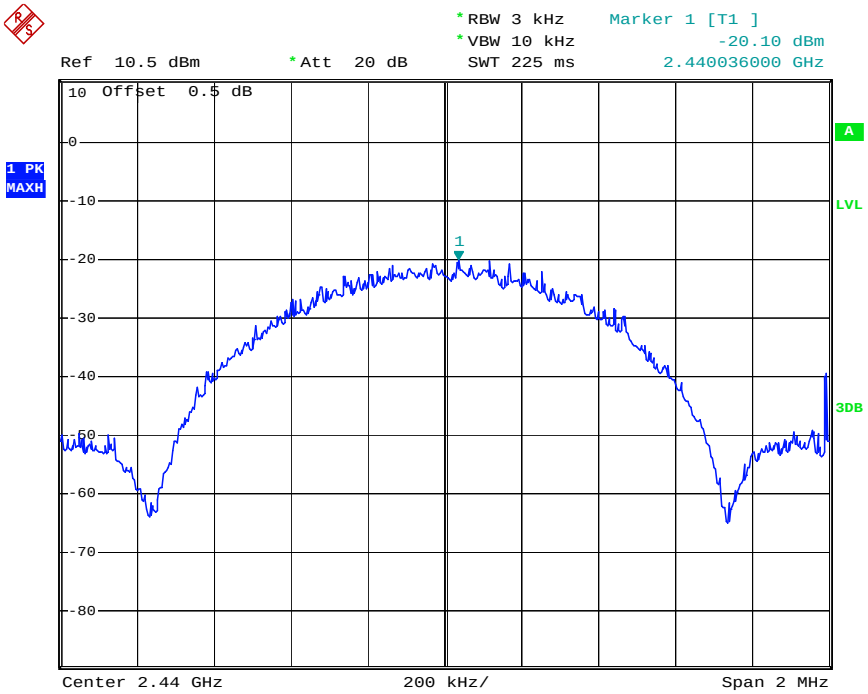
| CHANNEL NUMBER | FREQUENCY (MHz ) | PSD (dBm/3KHz) | LIMIT (dBm/3KHz) | PASS/FAIL |
|---|---|---|---|---|
| 0 | 2402 | -20.08 | 8 | PASS |
| 19 | 2440 | -20.10 | 8 | PASS |
| 39 | 2480 | -20.37 | 8 | PASS |

The spectrum analyzer plots are attached as below.

*channel 0*

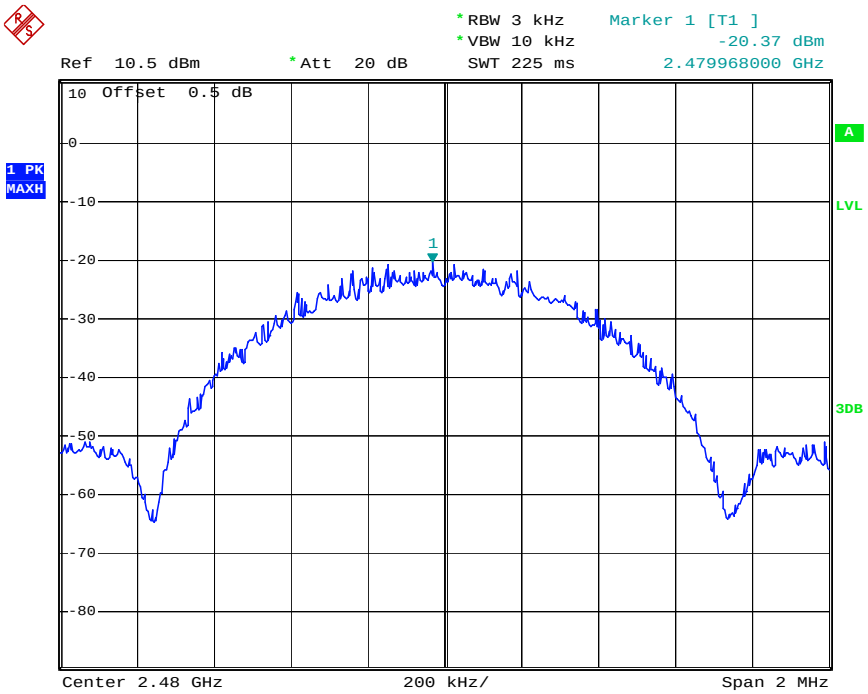


*channel 19*




Date: 5.SEP.2013 11:21:40

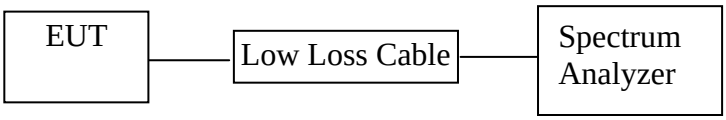
*channel 39*




Date: 5.SEP.2013 11:22:10

# 8. BAND EDGE COMPLIANCE TEST

## 8.1.Block Diagram of Test Setup




(EUT: Bluetooth 4.0 LE Module)

## 8.2.The Requirement For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

## 8.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 8.4.Operating Condition of EUT

8.4.1.Setup the EUT and simulator as shown as Section 8.1.

8.4.2.Turn on the power of all equipment.

8.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

## 8.5.Test Procedure

Conducted Band Edge:

8.5.1. The transmitter output was connected to the spectrum analyzer via a low loss cable.

8.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

Radiate Band Edge:

8.5.3. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.

8.5.4. The turntable was rotated for 360 degrees to determine the position of maximum emission level.

8.5.5. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

8.5.6. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

RBW=1MHz, VBW=1MHz

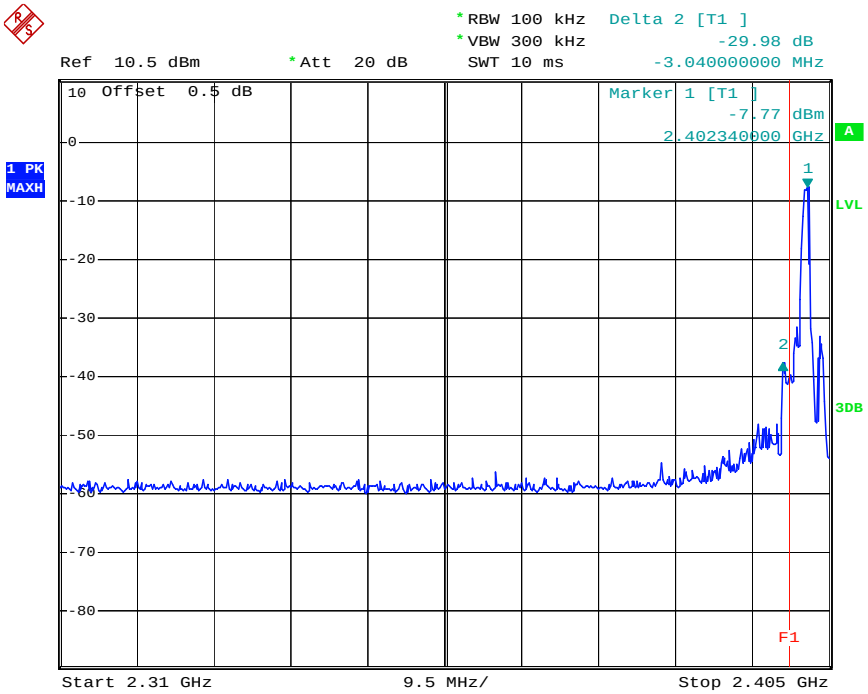
8.5.7.The band edges was measured and recorded.

## 8.6.Test Result

**Pass**

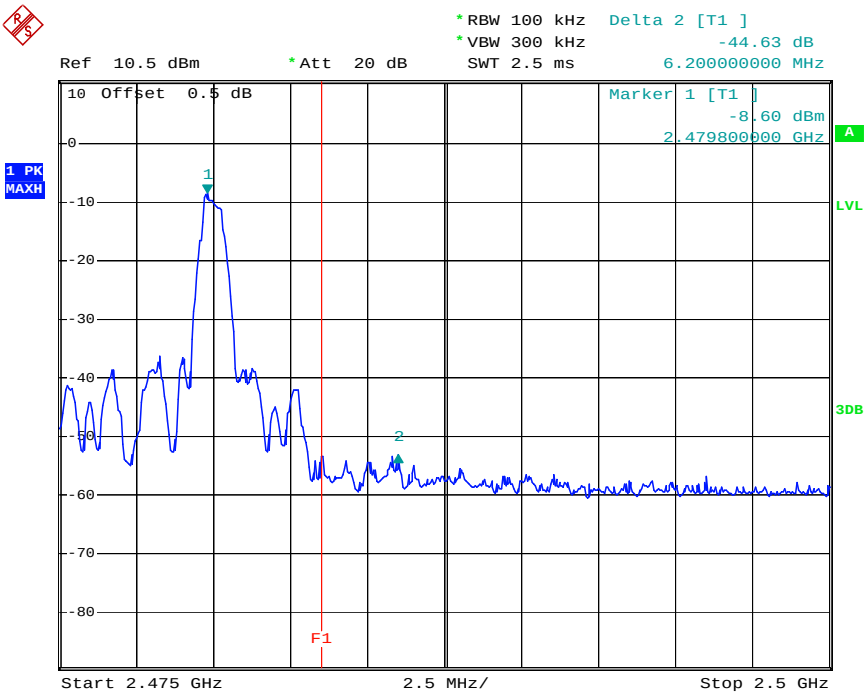
| Channel | Frequency | Delta peak to band emission | Limit(dBc) |
|---|---|---|---|
| 0 | 2399.3MHz | 29.98 | 20 |
| 39 | 2486.0MHz | 44.63 | 20 |

*channel 0*




Date: 5.SEP.2013 11:07:40

*channel 39*




Date: 5.SEP.2013 11:08:49

## Radiated Band Edge Result

| | | | |
|---|---|---|---|
| Date of Test: | Aug 31, 2013 | Temperature: | 25°C |
| EUT: | Bluetooth 4.0 LE Module | Humidity: | 50% |
| Model No.: | ILT254S | Power Supply: | DC 3V |
| Test Mode: | TX (2402MHz) GFSK | Test Engineer: | Alen |

| Frequency (MHz) | Reading(dBμV/m) | | Factor(dB) Corr. | Result(dBμV/m) | | Limit(dBμV/m) | | Margin(dB) | | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| | AV | PEAK | | AV | PEAK | AV | PEAK | AV | PEAK | |
| 2310.000 | 34.58 | 37.44 | -6.76 | 27.82 | 30.68 | 54.00 | 74.00 | -26.18 | -43.42 | Vertical |
| 2397.120 | 43.45 | 46.31 | -6.76 | 36.69 | 39.55 | 54.00 | 74.00 | -17.31 | -34.45 | Vertical |
| 2400.000 | 47.79 | 50.68 | -6.76 | 41.03 | 43.92 | 54.00 | 74.00 | -12.97 | -30.08 | Vertical |
| 2310.000 | 34.09 | 36.11 | -6.76 | 27.33 | 29.35 | 54.00 | 74.00 | -26.67 | -44.65 | Horizontal |
| 2396.900 | 43.87 | 46.75 | -6.76 | 37.11 | 39.99 | 54.00 | 74.00 | -16.89 | -34.01 | Horizontal |
| 2400.000 | 48.37 | 51.24 | -6.76 | 41.61 | 44.48 | 54.00 | 74.00 | -12.39 | -29.52 | Horizontal |

| | | | |
|---|---|---|---|
| Date of Test: | Aug 31, 2013 | Temperature: | 25°C |
| EUT: | Bluetooth 4.0 LE Module | Humidity: | 50% |
| Model No.: | ILT254S | Power Supply: | DC 3V |
| Test Mode: | TX (2480MHz) GFSK | Test Engineer: | Alen |

| Frequency (MHz) | Reading(dBμV/m) | | Factor(dB) Corr. | Result(dBμV/m) | | Limit(dBμV/m) | | Margin(dB) | | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| | AV | PEAK | | AV | PEAK | AV | PEAK | AV | PEAK | |
| 2483.500 | 44.57 | 47.35 | -6.54 | 38.03 | 40.81 | 54.00 | 74.00 | -15.97 | -33.19 | Vertical |
| 2485.720 | 45.71 | 48.57 | -6.54 | 39.17 | 42.03 | 54.00 | 74.00 | -14.83 | -31.97 | Vertical |
| 2500.000 | 33.40 | 36.26 | -6.54 | 26.86 | 29.72 | 54.00 | 74.00 | -24.28 | -44.28 | Vertical |
| 2483.500 | 44.56 | 47.39 | -6.54 | 38.02 | 40.85 | 54.00 | 74.00 | -15.98 | -33.15 | Horizontal |
| 2485.640 | 45.67 | 48.44 | -6.54 | 39.13 | 41.90 | 54.00 | 74.00 | -14.87 | -32.10 | Horizontal |
| 2500.000 | 34.45 | 37.31 | -6.54 | 27.91 | 30.77 | 54.00 | 74.00 | -26.09 | -43.23 | Horizontal |

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:
   Result = Reading + Corrected Factor
3. Display the measurement of peak values.

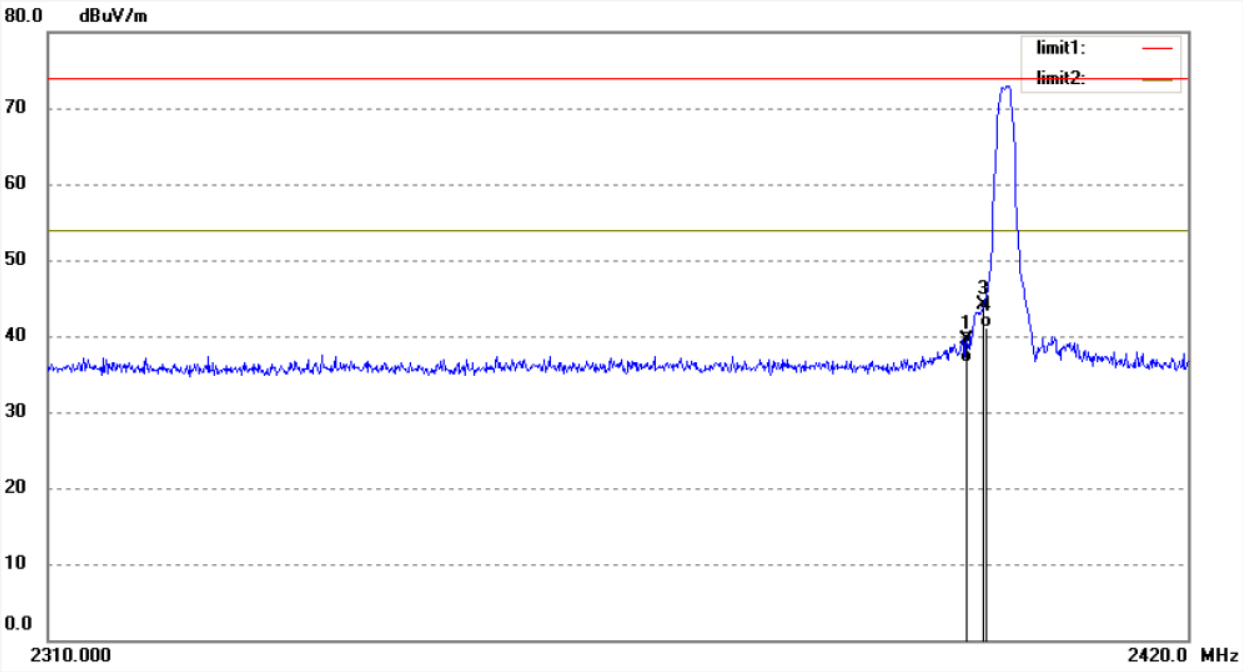
# Radiated Band Edge Result

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: alen #1502
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth 4.0 LE Module
Mode: TX 2402MHz
Model: ILT254s
Manufacturer: ILOGIC

Polarization: Vertical
Power Source: DC 3V
Date: 13/08/31/
Time: 8/50/23
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2398.330 | 46.23 | -6.75 | 39.48 | 74.00 | -34.52 | peak | | | |
| 2 | 2398.330 | 43.34 | -6.75 | 36.59 | 54.00 | -17.41 | AVG | | | |
| 3 | 2400.000 | 50.85 | -6.76 | 44.09 | 74.00 | -29.91 | peak | | | |
| 4 | 2400.000 | 47.95 | -6.76 | 41.19 | 54.00 | -12.81 | AVG | | | |

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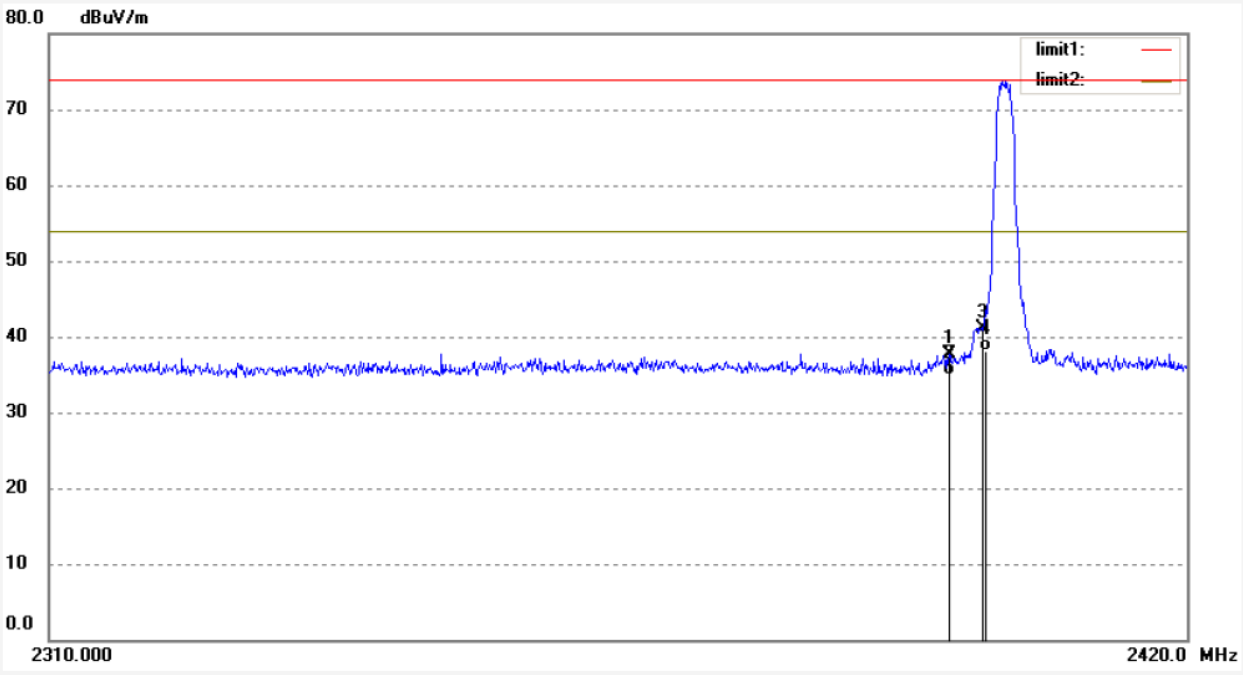
Job No.: alen #1503
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth 4.0 LE Module
Mode: TX 2402MHz
Model: ILT254s
Manufacturer: ILOGIC

Polarization: Horizontal
Power Source: DC 3V
Date: 13/08/31/
Time: 8/51/50
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2396.680 | 44.42 | -6.76 | 37.66 | 74.00 | -36.34 | peak | | | |
| 2 | 2396.680 | 41.67 | -6.76 | 34.91 | 54.00 | -19.09 | AVG | | | |
| 3 | 2400.000 | 47.81 | -6.76 | 41.05 | 74.00 | -32.95 | peak | | | |
| 4 | 2400.000 | 44.95 | -6.76 | 38.19 | 54.00 | -15.81 | AVG | | | |

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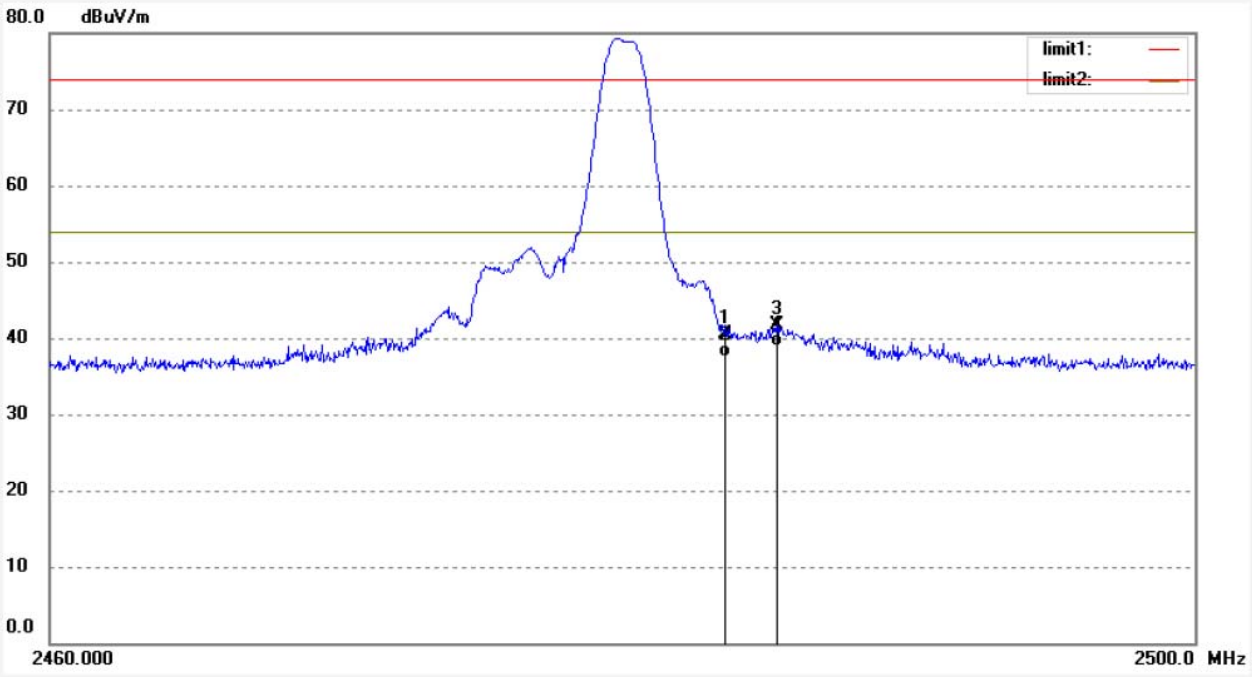
Job No.: alen #1504
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth 4.0 LE Module
Mode: TX 2480MHz
Model: ILT254s
Manufacturer: ILOGIC

Polarization: Horizontal
Power Source: DC 3V
Date: 13/08/31/
Time: 8/54/02
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.500 | 47.02 | -6.54 | 40.48 | 74.00 | -33.52 | peak | | | |
| 2 | 2483.500 | 44.12 | -6.54 | 37.58 | 54.00 | -16.42 | AVG | | | |
| 3 | 2485.360 | 48.26 | -6.54 | 41.72 | 74.00 | -32.28 | peak | | | |
| 4 | 2485.360 | 45.35 | -6.54 | 38.81 | 54.00 | -15.19 | AVG | | | |

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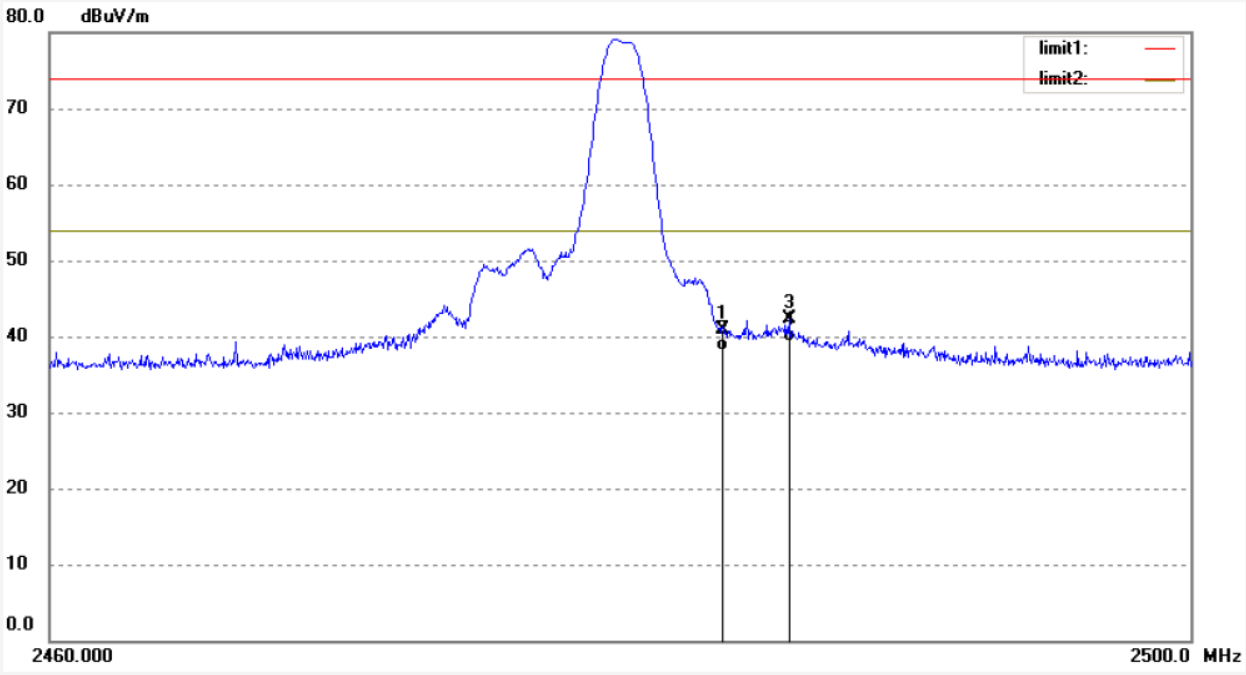
| | |
|---|---|
| Job No.: alen #1505 | Polarization: Vertical |
| Standard: FCC PK | Power Source: DC 3V |
| Test item: Radiation Test | Date: 13/08/31/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 8/55/09 |
| EUT: Bluetooth 4.0 LE Module | Engineer Signature: |
| Mode: TX 2480MHz | Distance: 3m |
| Model: ILT254s | |
| Manufacturer: ILOGIC | |

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.500 | 47.45 | -6.54 | 40.91 | 74.00 | -33.09 | peak | | | |
| 2 | 2483.500 | 44.65 | -6.54 | 38.11 | 54.00 | -15.89 | AVG | | | |
| 3 | 2485.880 | 48.81 | -6.54 | 42.27 | 74.00 | -31.73 | peak | | | |
| 4 | 2485.880 | 45.94 | -6.54 | 39.40 | 54.00 | -14.60 | AVG | | | |

Note:

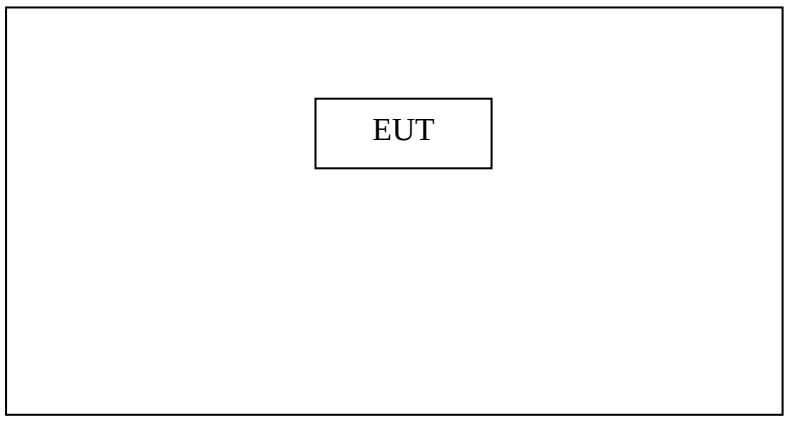
1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor
3. Display the measurement of peak values.

# 9. RADIATED SPURIOUS EMISSION TEST

## 9.1.Block Diagram of Test Setup

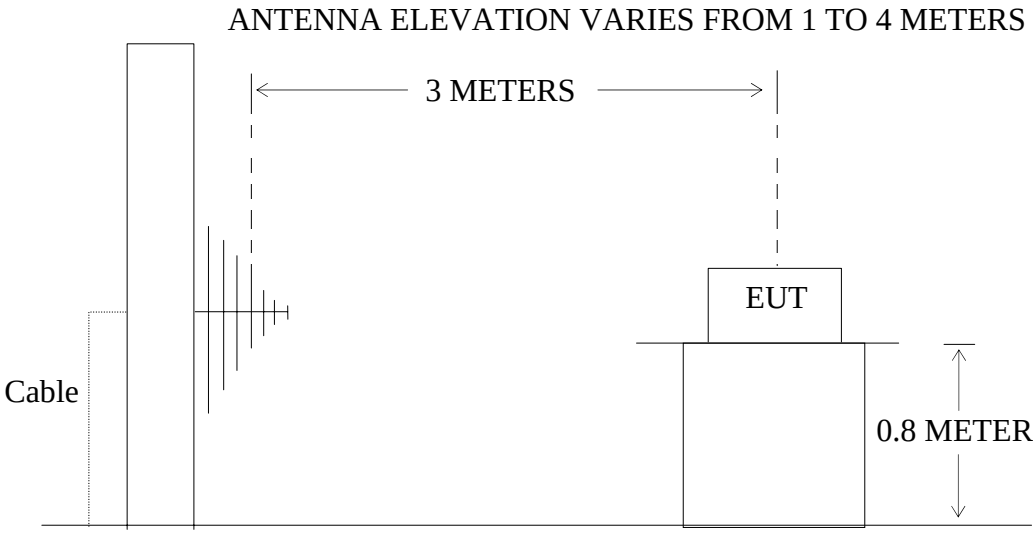
### 9.1.1.Block diagram of connection between the EUT and peripherals




Setup: Transmitting mode

(EUT: Bluetooth 4.0 LE Module)

### 9.1.2.Semi-Anechoic Chamber Test Setup Diagram




(EUT: Bluetooth 4.0 LE Module)

## 9.2.The Limit For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

## 9.3.Restricted bands of operation

### 9.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090-0.110 | 16.42-16.423 | 399.9-410 | 4.5-5.15 |
| [1]0.495-0.505 | 16.69475-16.69525 | 608-614 | 5.35-5.46 |
| 2.1735-2.1905 | 16.80425-16.80475 | 960-1240 | 7.25-7.75 |
| 4.125-4.128 | 25.5-25.67 | 1300-1427 | 8.025-8.5 |
| 4.17725-4.17775 | 37.5-38.25 | 1435-1626.5 | 9.0-9.2 |
| 4.20725-4.20775 | 73-74.6 | 1645.5-1646.5 | 9.3-9.5 |
| 6.215-6.218 | 74.8-75.2 | 1660-1710 | 10.6-12.7 |
| 6.26775-6.26825 | 108-121.94 | 1718.8-1722.2 | 13.25-13.4 |
| 6.31175-6.31225 | 123-138 | 2200-2300 | 14.47-14.5 |
| 8.291-8.294 | 149.9-150.05 | 2310-2390 | 15.35-16.2 |
| 8.362-8.366 | 156.52475-156.52525 | 2483.5-2500 | 17.7-21.4 |
| 8.37625-8.38675 | 156.7-156.9 | 2690-2900 | 22.01-23.12 |
| 8.41425-8.41475 | 162.0125-167.17 | 3260-3267 | 23.6-24.0 |
| 12.29-12.293 | 167.72-173.2 | 3332-3339 | 31.2-31.8 |
| 12.51975-12.52025 | 240-285 | 3345.8-3358 | 36.43-36.5 |
| 12.57675-12.57725 | 322-335.4 | 3600-4400 | ([2]) |
| 13.36-13.41 | | | |

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510
[2]Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

## 9.4. Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 9.5. Operating Condition of EUT

9.5.1. Setup the EUT and simulator as shown as Section 9.1.

9.5.2. Turn on the power of all equipment.

9.5.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

## 9.6. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2009 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The bandwidth of test receiver is set at 9 kHz in below 30MHz. and set at 120 kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The frequency range from 9 kHz to 25GHz is checked.
The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:
Result = Reading + Corrected Factor
Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

## 9.7.The Field Strength of Radiation Emission Measurement Results

**PASS.**

**For Below 30MHz**

| Frequency (MHz) | Reading (dBμV/m) | Factor(dB) Corr. | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Polarization |
|---|---|---|---|---|---|---|
| | QP | | QP | QP | QP | |
| - | - | - | - | - | - | X |
| - | - | - | - | - | - | Y |
| - | - | - | - | - | - | Z |

**For 30MHz-1000MHz**

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

| Frequency (MHz) | Reading (dBμV/m) | Factor Corr. (dB) | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Polarization |
|---|---|---|---|---|---|---|
| | QP | | QP | QP | QP | |
| --- | --- | --- | --- | --- | --- | Vertical |
| --- | --- | --- | --- | --- | --- | Vertical |
| --- | --- | --- | --- | --- | --- | Vertical |
| --- | --- | --- | --- | --- | --- | Horizontal |
| --- | --- | --- | --- | --- | --- | Horizontal |
| --- | --- | --- | --- | --- | --- | Horizontal |

**For 1GHz-25GHz**

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

| Frequency (MHz) | Reading(dBμV/m) | | Factor Corr. (dB) | Result(dBμV/m) | | Limit(dBμV/m) | | Margin(dBμV/m) | | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| | AV | PEAK | | AV | PEAK | AV | PEAK | AV | PEAK | |
| - | - | - | - | - | - | - | - | - | - | Vertical |
| - | - | - | - | - | - | - | - | - | - | Horizontal |

**Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.**

**2. *: Denotes restricted band of operation.**

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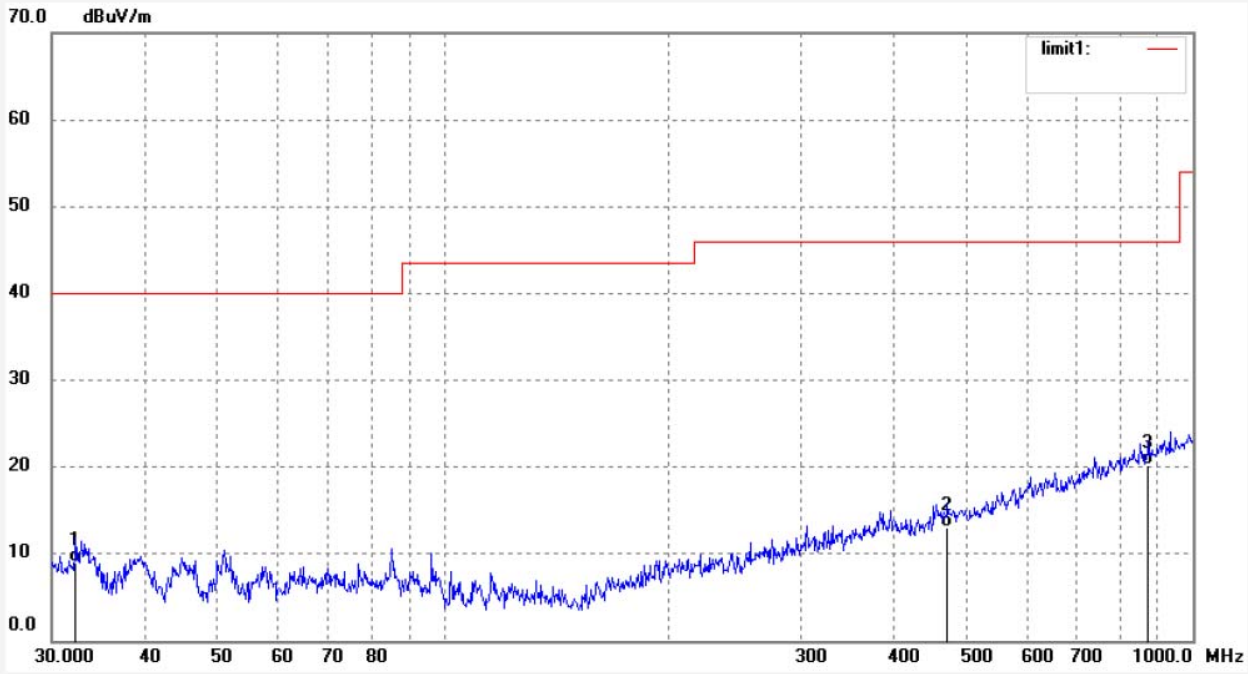
| | |
|---|---|
| Job No.: alen #1452 | Polarization: Vertical |
| Standard: FCC Class B 3M Radiated | Power Source: DC 3V |
| Test item: Radiation Test | Date: 13/08/30/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 10/06/10 |
| EUT: Bluetooth 4.0 LE Module | Engineer Signature: |
| Mode: TX 2402MHz | Distance: 3m |
| Model: ILT254s | |
| Manufacturer: ILOGIC | |

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 32.2924 | 27.54 | -18.59 | 8.95 | 40.00 | -31.05 | QP | | | |
| 2 | 470.5231 | 27.36 | -14.27 | 13.09 | 46.00 | -32.91 | QP | | | |
| 3 | 872.1832 | 26.75 | -6.59 | 20.16 | 46.00 | -25.84 | QP | | | |

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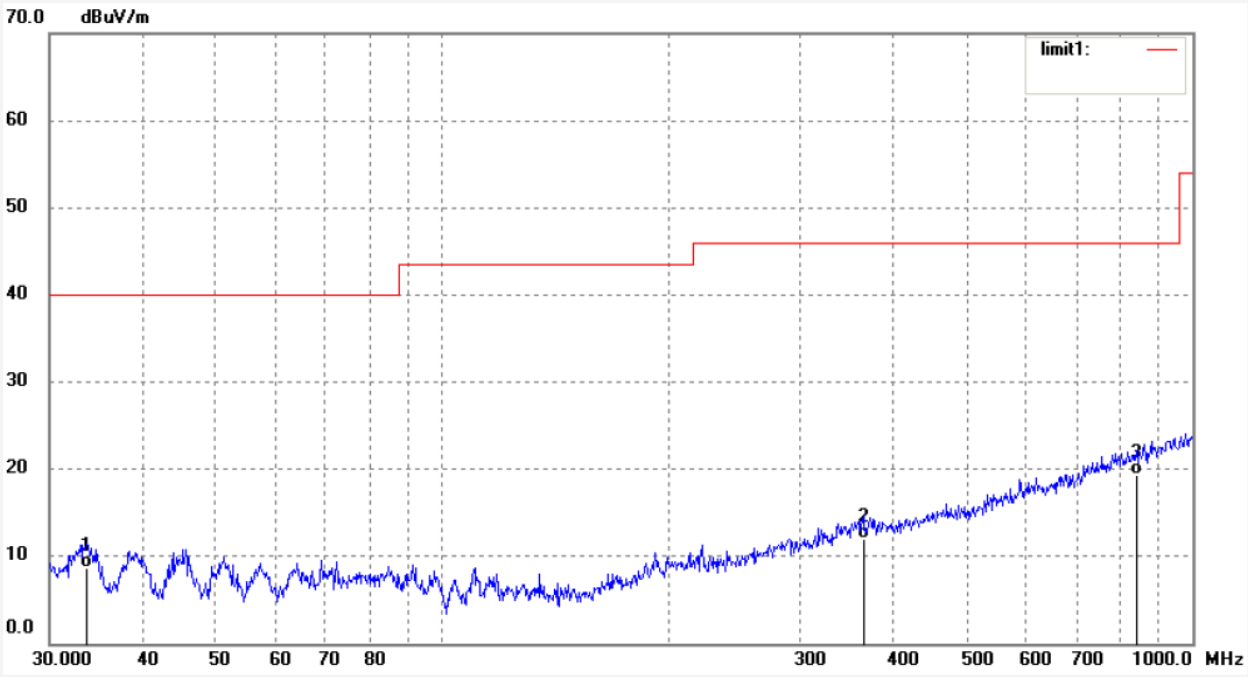
| | |
|---|---|
| Job No.: alen #1453 | Polarization: Horizontal |
| Standard: FCC Class B 3M Radiated | Power Source: DC 3V |
| Test item: Radiation Test | Date: 13/08/30/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 10/07/10 |
| EUT: Bluetooth 4.0 LE Module | Engineer Signature: |
| Mode: TX 2402MHz | Distance: 3m |
| Model: ILT254s | |
| Manufacturer: ILOGIC | |

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 33.5623 | 27.69 | -19.01 | 8.68 | 40.00 | -31.32 | QP | | | |
| 2 | 364.2595 | 27.86 | -15.88 | 11.98 | 46.00 | -34.02 | QP | | | |
| 3 | 842.1295 | 26.38 | -7.10 | 19.28 | 46.00 | -26.72 | QP | | | |

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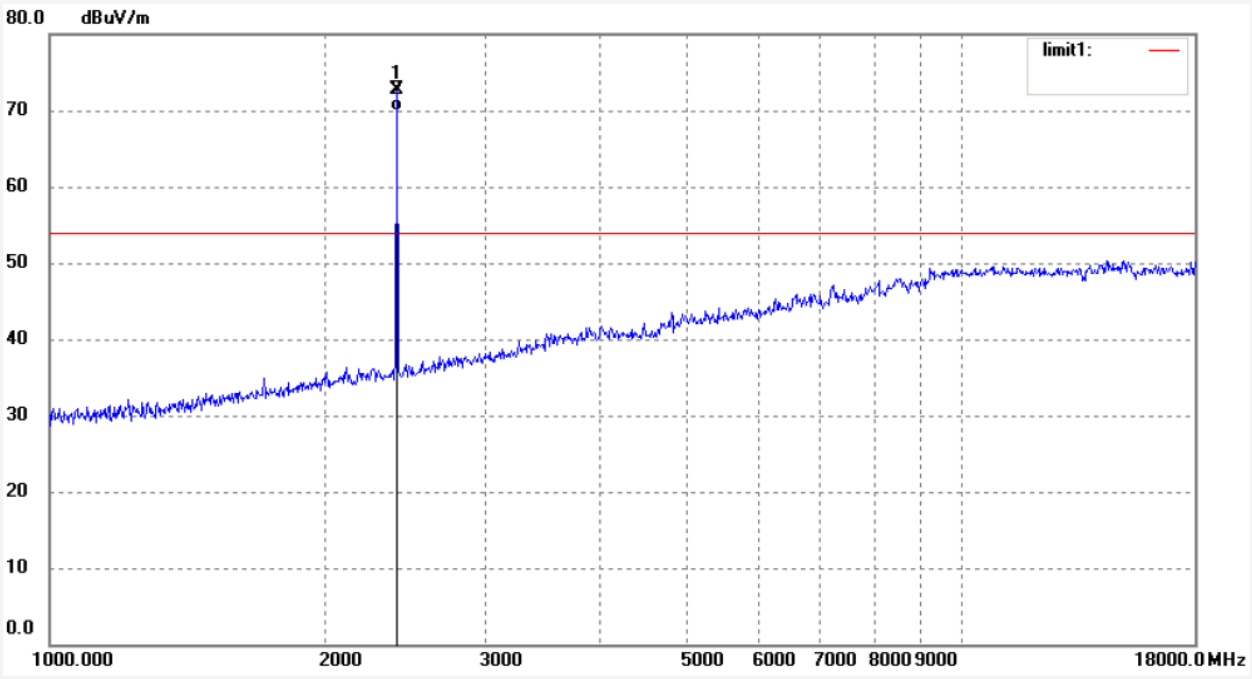
Job No.: alen #1496
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth 4.0 LE Module
Mode: TX 2402MHz
Model: ILT254s
Manufacturer: ILOGIC

Polarization: Horizontal
Power Source: DC 3V
Date: 13/08/30/
Time: 11/18/57
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2402.000 | 79.50 | -6.76 | 72.74 | | | peak | | | |
| 2 | 2402.000 | 76.74 | -6.76 | 69.98 | | | AVG | | | |

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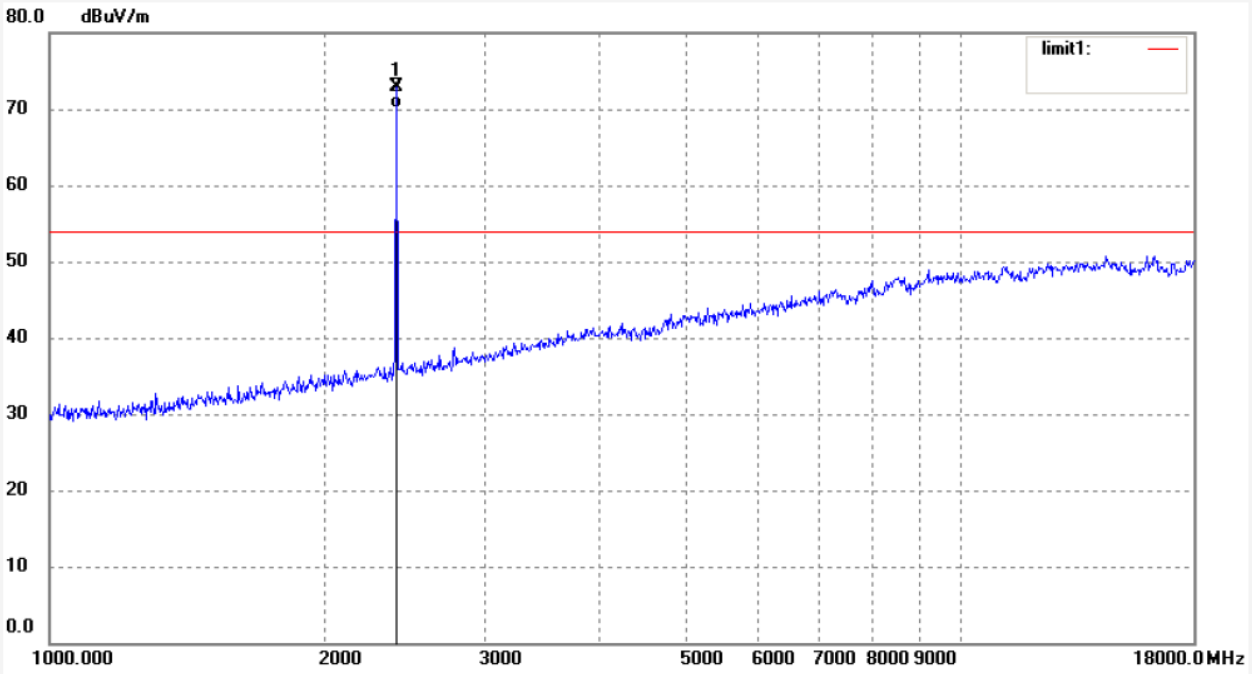
Job No.: alen #1497
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth 4.0 LE Module
Mode: TX 2402MHz
Model: ILT254s
Manufacturer: ILOGIC

Polarization: Vertical
Power Source: DC 3V
Date: 13/08/30/
Time: 11/19/52
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2402.000 | 79.74 | -6.76 | 72.98 | | | peak | | | |
| 2 | 2402.000 | 76.87 | -6.76 | 70.11 | | | AVG | | | |

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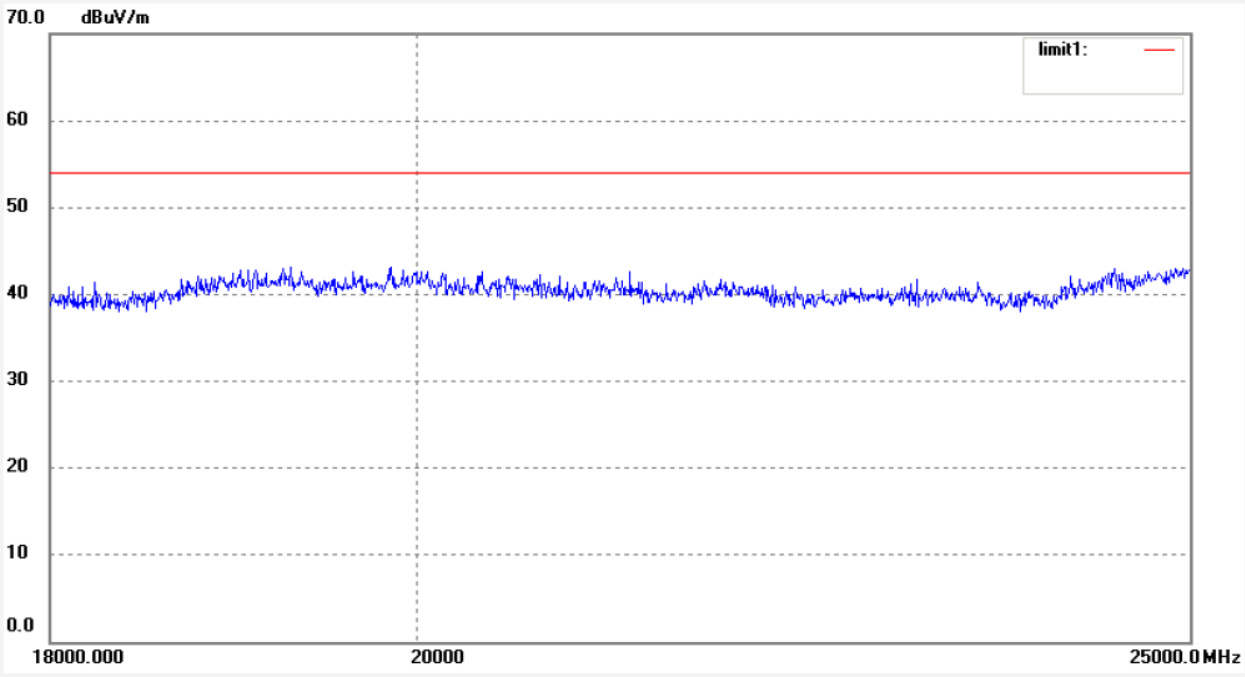
| | |
|---|---|
| Job No.: Alen #2539 | Polarization: Horizontal |
| Standard: FCC Class B 3M Radiated | Power Source: DC 3V |
| Test item: Radiation Test | Date: 13/08/29/ |
| Temp.( C)/Hum.(%) 23 C / 49 % | Time: 11/59/53 |
| EUT: Bluetooth 4.0 LE Module | Engineer Signature: |
| Mode: TX 2402MHz | Distance: 3m |
| Model: ILT254s | |
| Manufacturer: ILOGIC | |

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|

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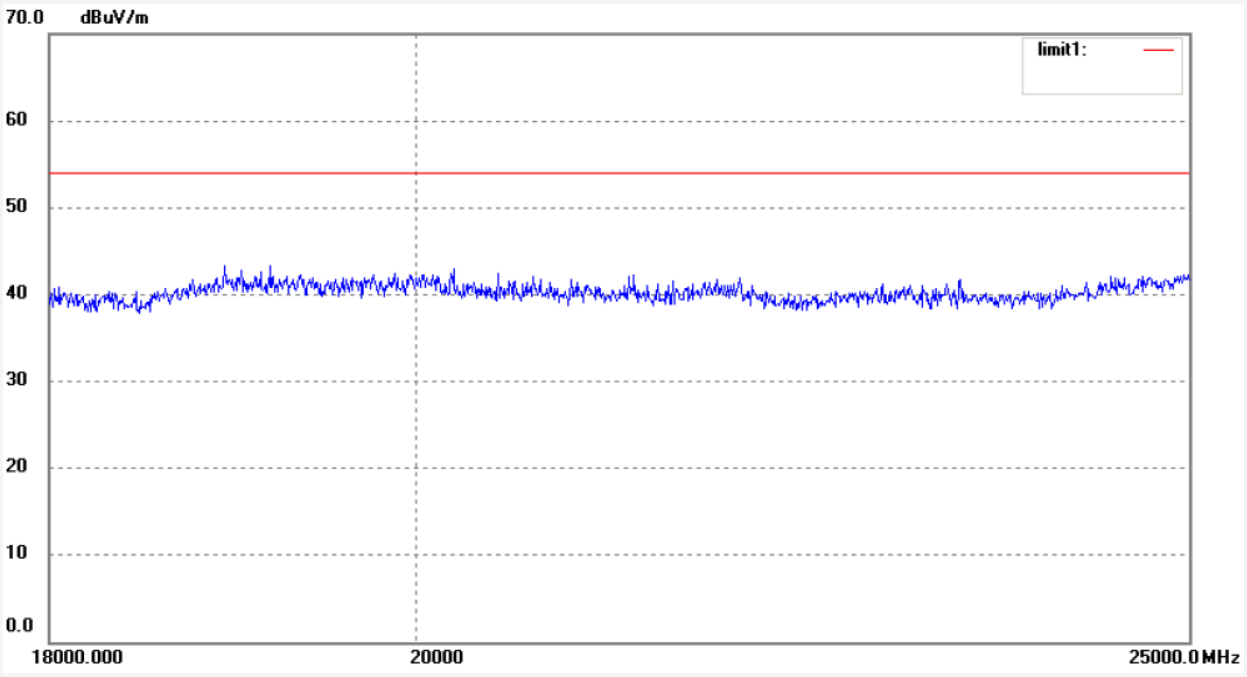
| | |
|---|---|
| Job No.: Alen #2540 | Polarization: Vertical |
| Standard: FCC Class B 3M Radiated | Power Source: DC 3V |
| Test item: Radiation Test | Date: 13/08/29/ |
| Temp.( C)/Hum.(%) 23 C / 49 % | Time: 12/04/12 |
| EUT: Bluetooth 4.0 LE Module | Engineer Signature: |
| Mode: TX 2402MHz | Distance: 3m |
| Model: ILT254s | |
| Manufacturer: ILOGIC | |

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|

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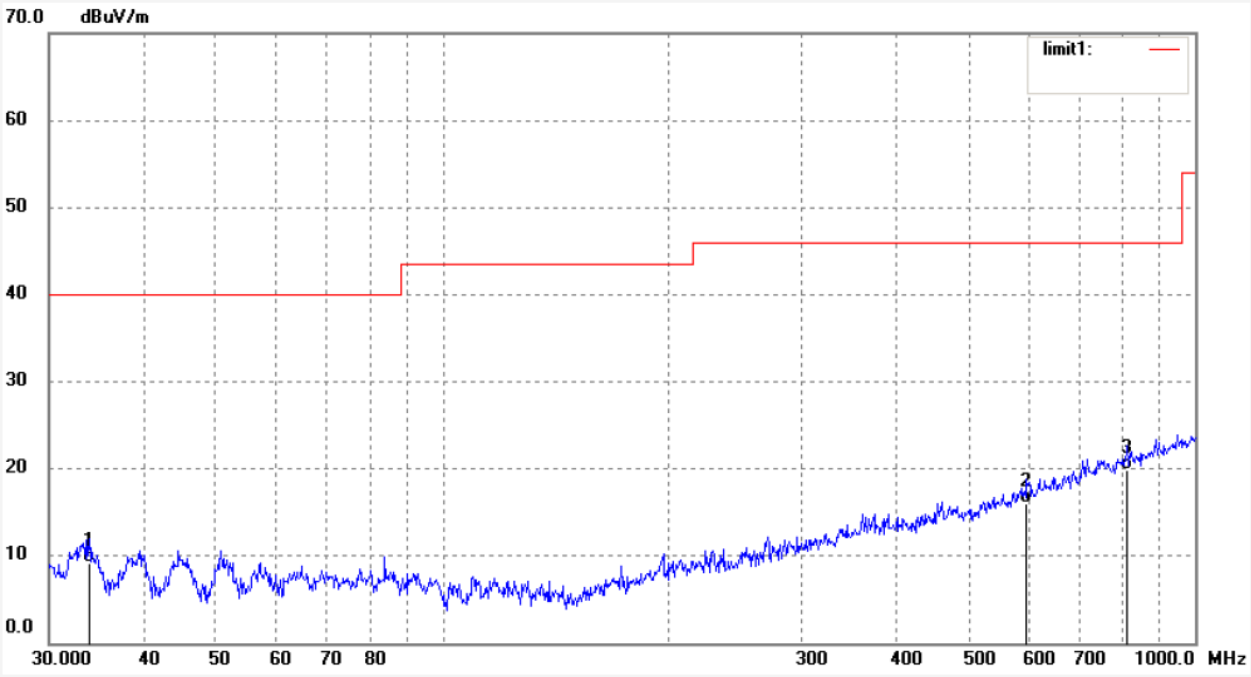
| | |
|---|---|
| Job No.: alen #1454 | Polarization: Horizontal |
| Standard: FCC Class B 3M Radiated | Power Source: DC 3V |
| Test item: Radiation Test | Date: 13/08/30/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 10/07/44 |
| EUT: Bluetooth 4.0 LE Module | Engineer Signature: |
| Mode: TX 2440MHz | Distance: 3m |
| Model: ILT254s | |
| Manufacturer: ILOGIC | |

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 33.9174 | 28.32 | -19.14 | 9.18 | 40.00 | -30.82 | QP | | | |
| 2 | 597.2233 | 27.68 | -11.73 | 15.95 | 46.00 | -30.05 | QP | | | |
| 3 | 813.1115 | 27.47 | -7.55 | 19.92 | 46.00 | -26.08 | QP | | | |

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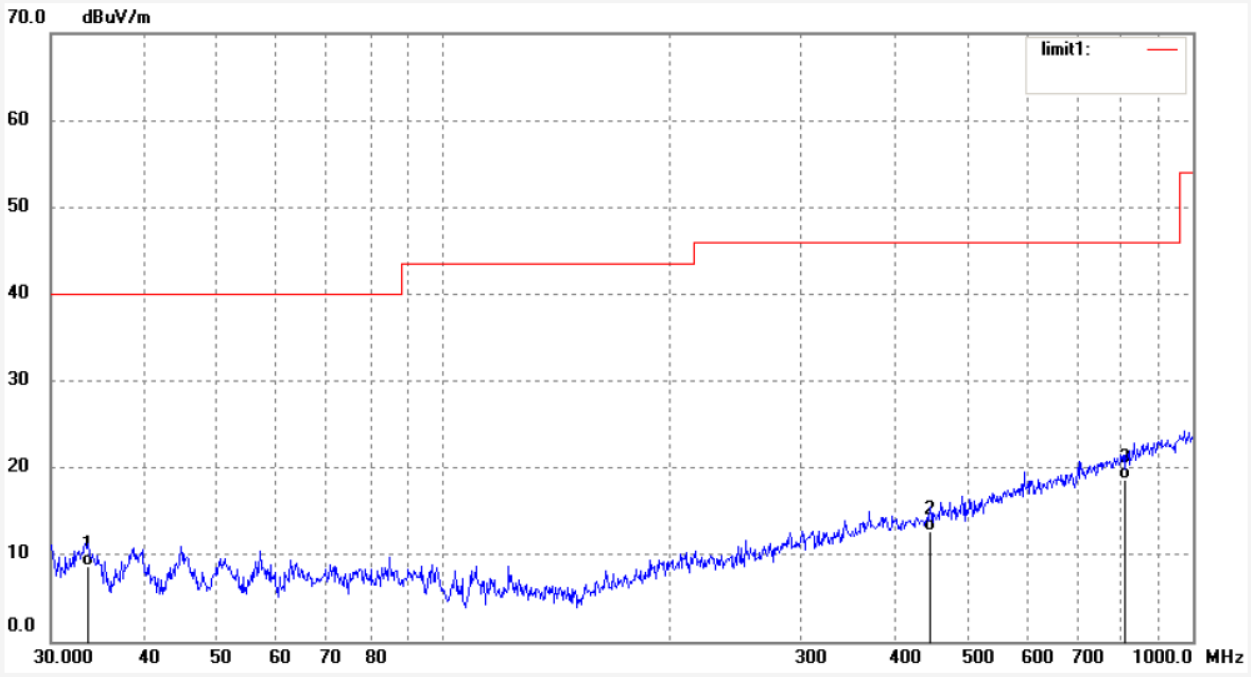
Job No.: alen #1455
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth 4.0 LE Module
Mode: TX 2440MHz
Model: ILT254s
Manufacturer: ILOGIC

Polarization: Vertical
Power Source: DC 3V
Date: 13/08/30/
Time: 10/08/33
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 33.5623 | 27.64 | -19.01 | 8.63 | 40.00 | -31.37 | QP | | | |
| 2 | 446.4141 | 27.38 | -14.75 | 12.63 | 46.00 | -33.37 | QP | | | |
| 3 | 807.4289 | 26.32 | -7.65 | 18.67 | 46.00 | -27.33 | QP | | | |

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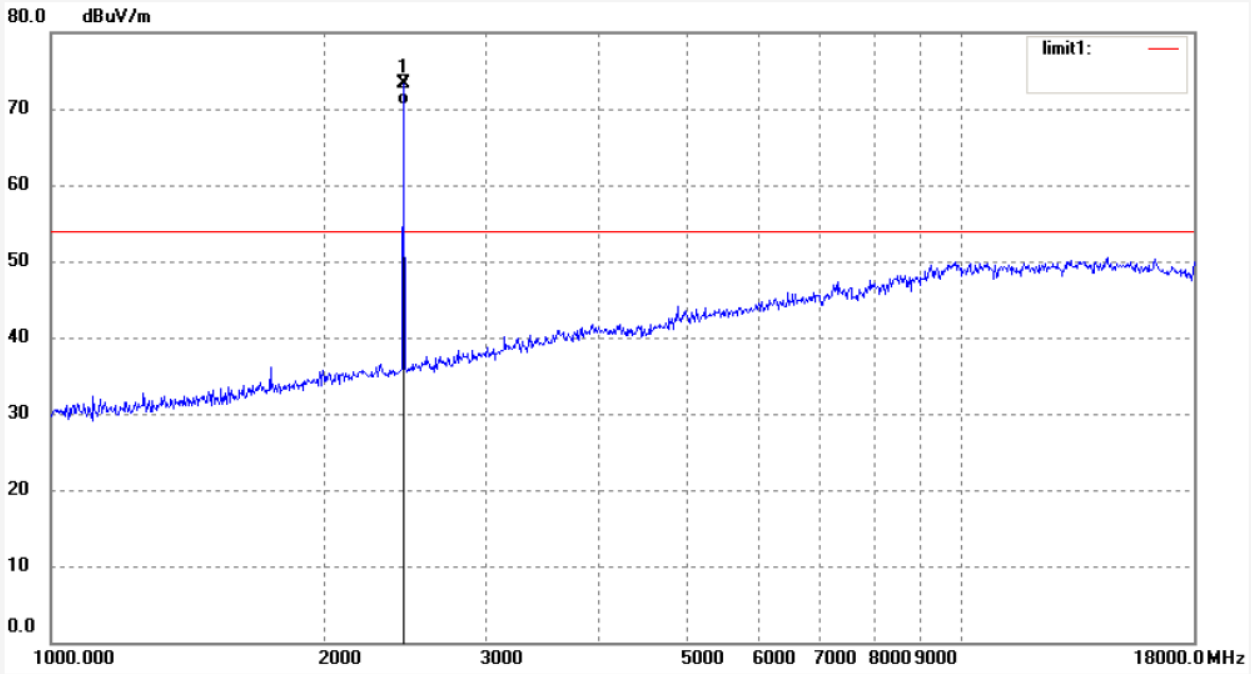
Job No.: alen #1498
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth 4.0 LE Module
Mode: TX 2440MHz
Model: ILT254s
Manufacturer: ILOGIC

Polarization: Vertical
Power Source: DC 3V
Date: 13/08/30/
Time: 11/22/38
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2440.000 | 79.89 | -6.67 | 73.22 | | | peak | | | |
| 2 | 2440.000 | 77.12 | -6.67 | 70.45 | | | AVG | | | |

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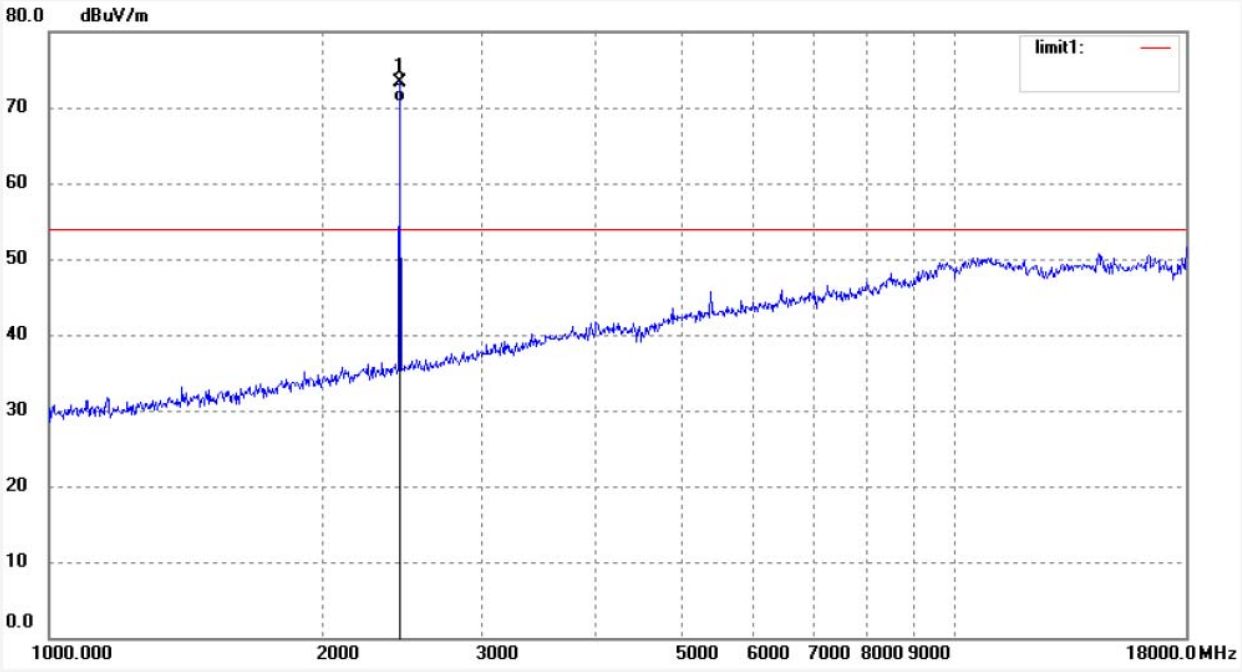
Job No.: alen #1499
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth 4.0 LE Module
Mode: TX 2440MHz
Model: ILT254s
Manufacturer: ILOGIC

Polarization: Horizontal
Power Source: DC 3V
Date: 13/08/30/
Time: 11/23/50
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2440.000 | 80.05 | -6.67 | 73.38 | | | peak | | | |
| 2 | 2440.000 | 77.32 | -6.67 | 70.65 | | | AVG | | | |

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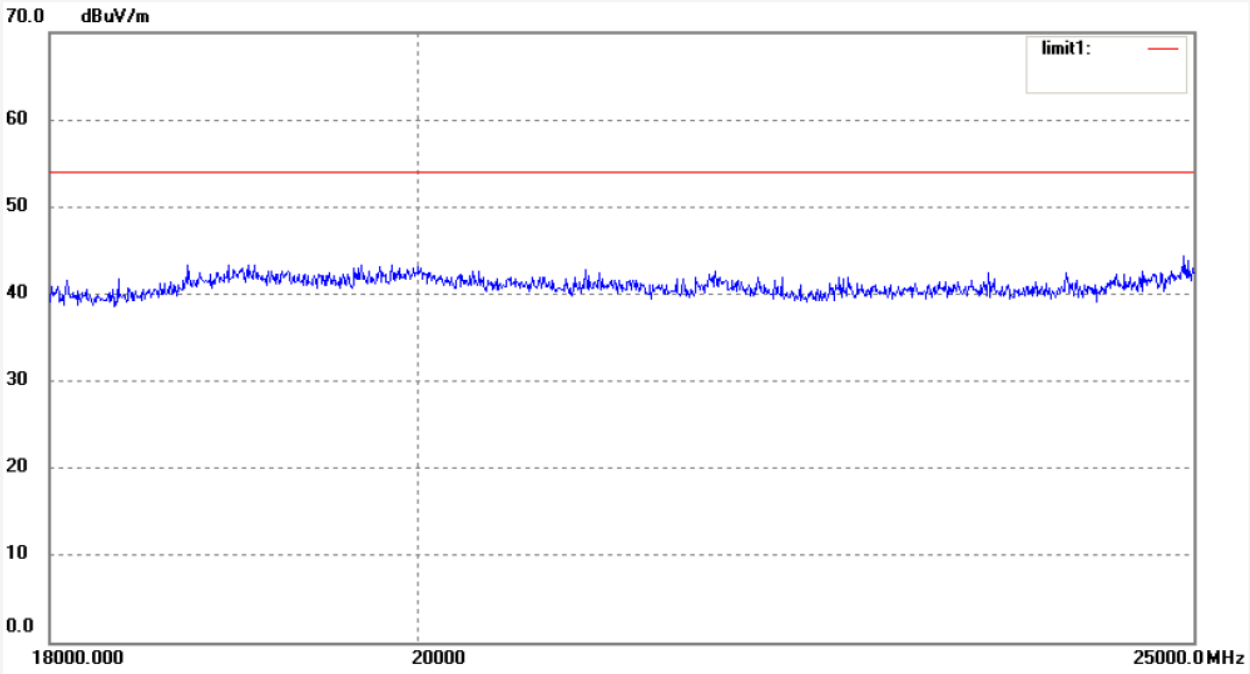
| | |
|---|---|
| Job No.: Alen #2541 | Polarization: Vertical |
| Standard: FCC Class B 3M Radiated | Power Source: DC 3V |
| Test item: Radiation Test | Date: 13/08/29/ |
| Temp.( C)/Hum.(%) 23 C / 49 % | Time: 12/09/07 |
| EUT: Bluetooth 4.0 LE Module | Engineer Signature: |
| Mode: TX 2440MHz | Distance: 3m |
| Model: ILT254s | |
| Manufacturer: ILOGIC | |

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|

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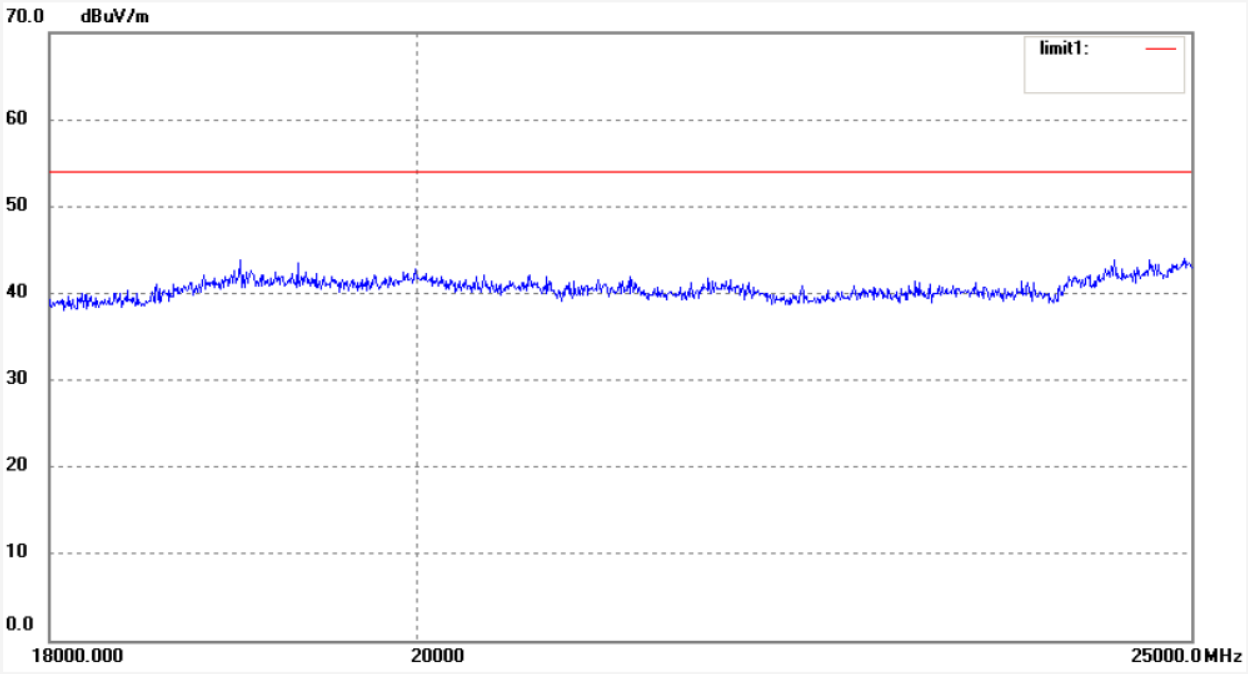
| | |
|---|---|
| Job No.: Alen #2542 | Polarization: Horizontal |
| Standard: FCC Class B 3M Radiated | Power Source: DC 3V |
| Test item: Radiation Test | Date: 13/08/29/ |
| Temp.( C)/Hum.(%) 23 C / 49 % | Time: 12/12/12 |
| EUT: Bluetooth 4.0 LE Module | Engineer Signature: |
| Mode: TX 2440MHz | Distance: 3m |
| Model: ILT254s | |
| Manufacturer: ILOGIC | |

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|

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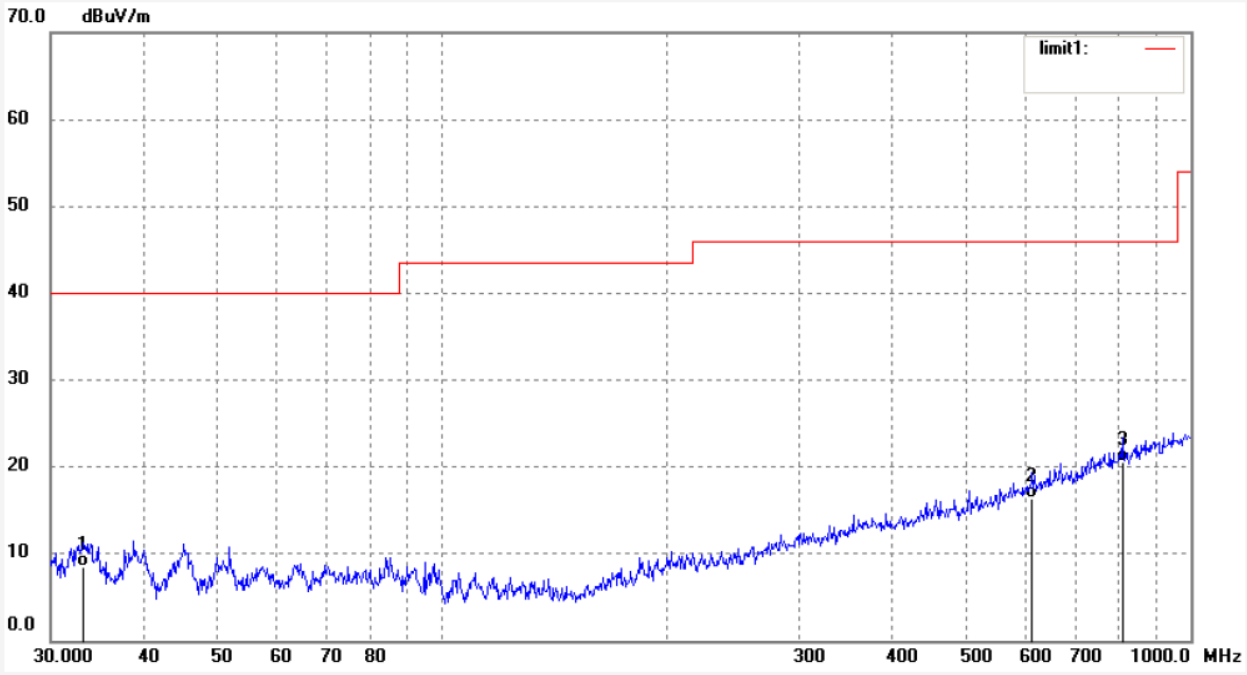
Job No.: alen #1456
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth 4.0 LE Module
Mode: TX 2480MHz
Model: ILT254s
Manufacturer: ILOGIC

Polarization: Vertical
Power Source: DC 3V
Date: 13/08/30/
Time: 10/09/25
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 33.2111 | 27.43 | -18.90 | 8.53 | 40.00 | -31.47 | QP | | | |
| 2 | 614.2142 | 27.78 | -11.38 | 16.40 | 46.00 | -29.60 | QP | | | |
| 3 | 810.2653 | 28.24 | -7.61 | 20.63 | 46.00 | -25.37 | QP | | | |

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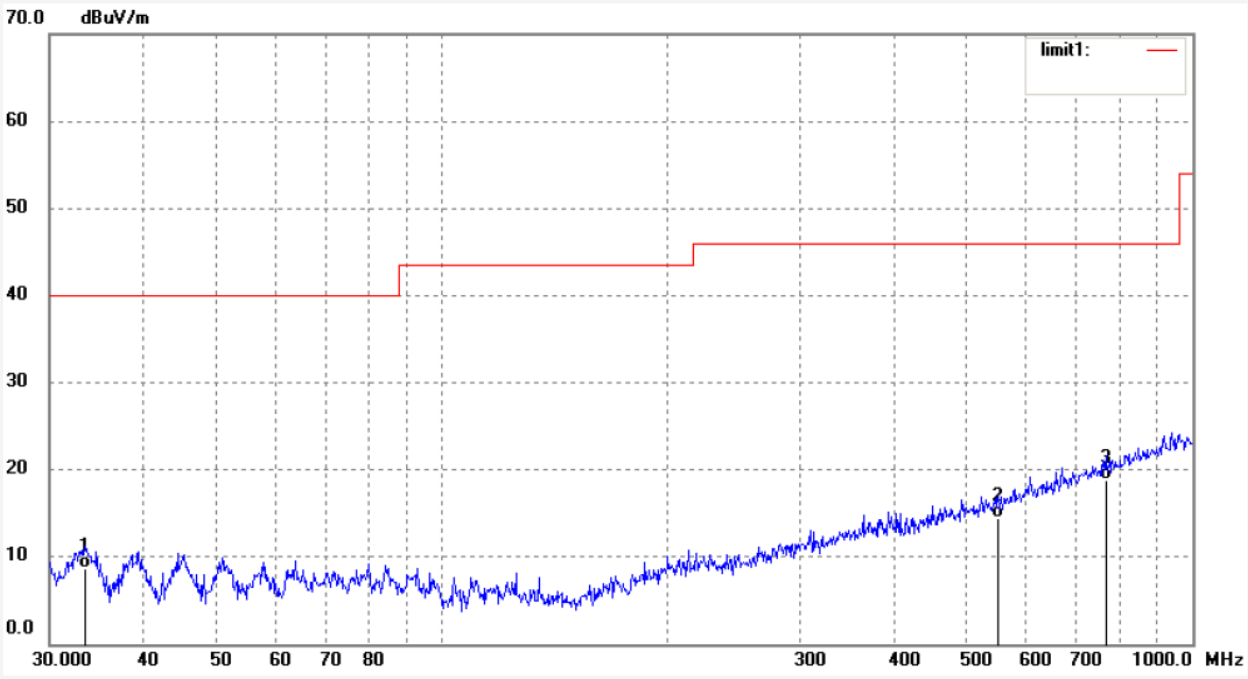
Job No.: alen #1457
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth 4.0 LE Module
Mode: TX 2480MHz
Model: ILT254s
Manufacturer: ILOGIC

Polarization: Horizontal
Power Source: DC 3V
Date: 13/08/30/
Time: 10/10/16
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 33.4448 | 27.55 | -18.97 | 8.58 | 40.00 | -31.42 | QP | | | |
| 2 | 550.9479 | 27.25 | -12.82 | 14.43 | 46.00 | -31.57 | QP | | | |
| 3 | 766.0571 | 27.21 | -8.32 | 18.89 | 46.00 | -27.11 | QP | | | |

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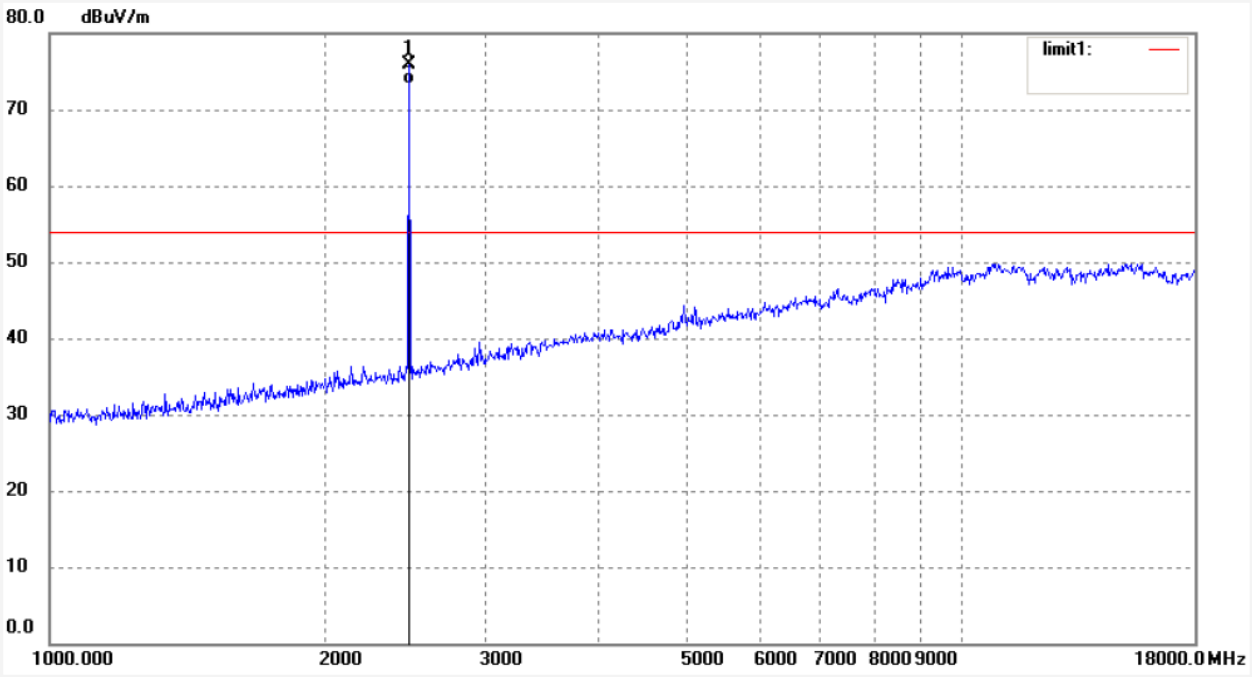
Job No.: alen #1500
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth 4.0 LE Module
Mode: TX 2480MHz
Model: ILT254s
Manufacturer: ILOGIC

Polarization: Horizontal
Power Source: DC 3V
Date: 13/08/30/
Time: 11/24/50
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2480.000 | 82.41 | -6.56 | 75.85 | | | peak | | | |
| 2 | 2480.000 | 79.78 | -6.56 | 73.22 | | | AVG | | | |

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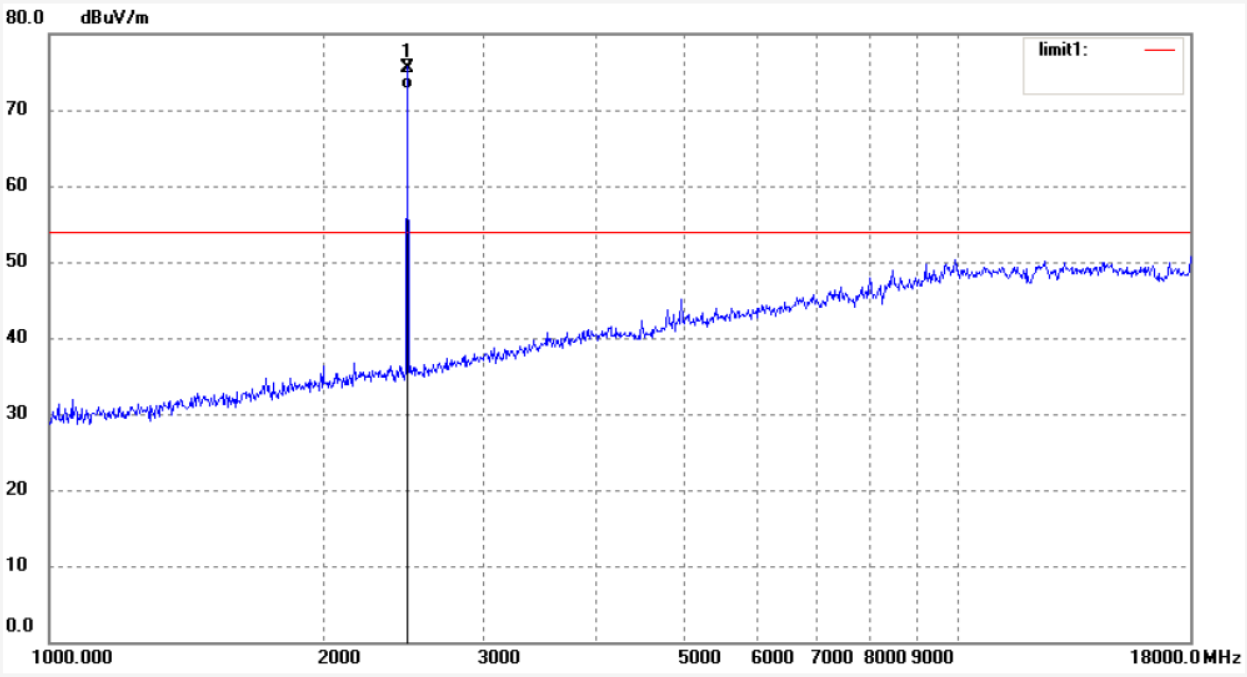
Job No.: alen #1501
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth 4.0 LE Module
Mode: TX 2480MHz
Model: ILT254s
Manufacturer: ILOGIC

Polarization: Vertical
Power Source: DC 3V
Date: 13/08/30/
Time: 11/25/28
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2480.000 | 82.16 | -6.56 | 75.60 | | | peak | | | |
| 2 | 2480.000 | 79.21 | -6.56 | 72.65 | | | AVG | | | |

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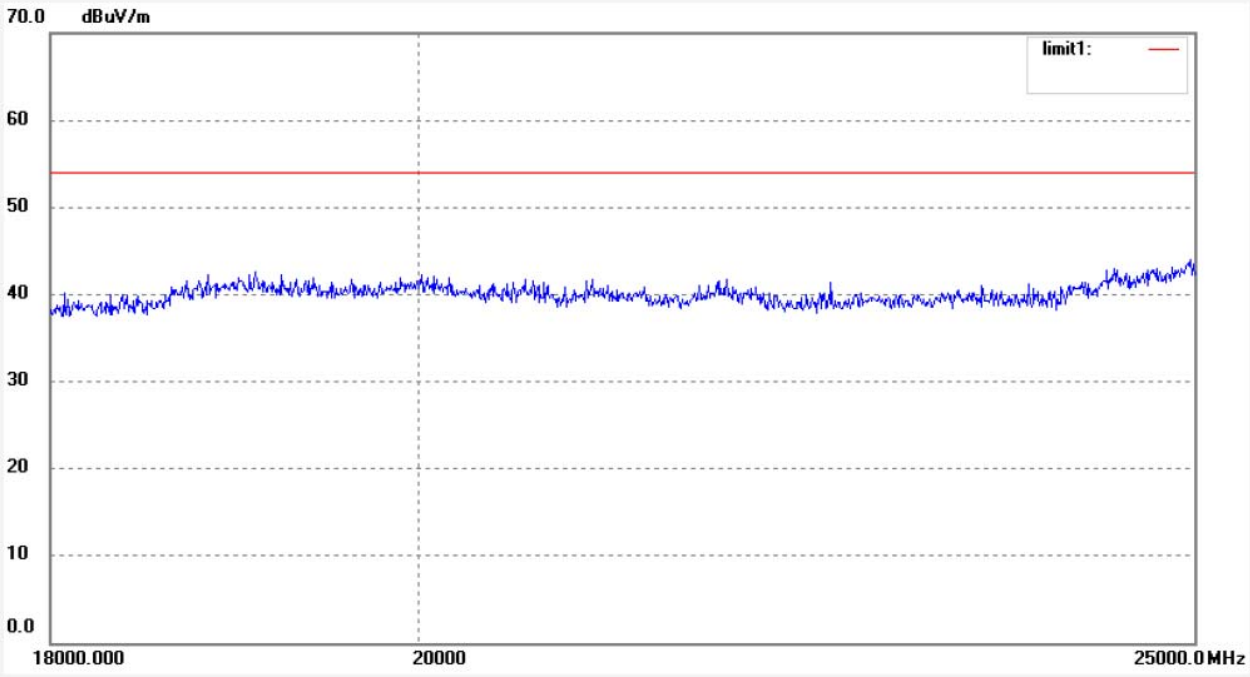
| | |
|---|---|
| Job No.: Alen #2543 | Polarization: Horizontal |
| Standard: FCC Class B 3M Radiated | Power Source: DC 3V |
| Test item: Radiation Test | Date: 13/08/29/ |
| Temp.( C)/Hum.(%) 23 C / 49 % | Time: 12/18/56 |
| EUT: Bluetooth 4.0 LE Module | Engineer Signature: |
| Mode: TX 2480MHz | Distance: 3m |
| Model: ILT254s | |
| Manufacturer: ILOGIC | |

Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|

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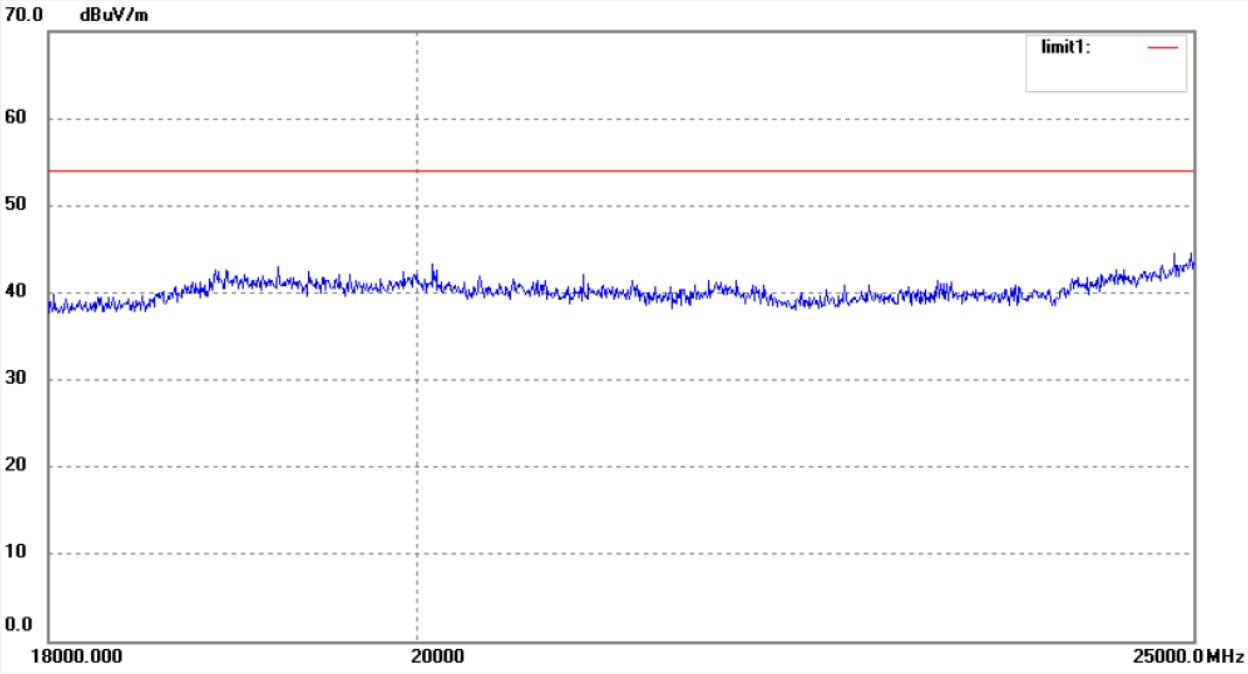
| | |
|---|---|
| Job No.: Alen #2544 | Polarization: Vertical |
| Standard: FCC Class B 3M Radiated | Power Source: DC 3V |
| Test item: Radiation Test | Date: 13/08/29/ |
| Temp.( C)/Hum.(%) 23 C / 49 % | Time: 12/21/48 |
| EUT: Bluetooth 4.0 LE Module | Engineer Signature: |
| Mode: TX 2480MHz | Distance: 3m |
| Model: ILT254s | |
| Manufacturer: ILOGIC | |

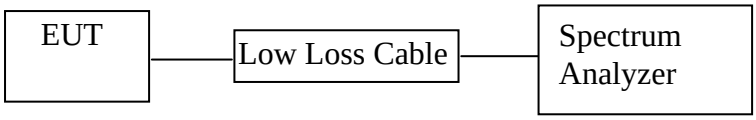
Note: Report No.:ATE20131888




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|

# 10. CONDUCTED SPURIOUS EMISSION COMPLIANCE TEST

## 10.1. Block Diagram of Test Setup




(EUT: Bluetooth 4.0 LE Module)

## 10.2. The Requirement For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

## 10.3. EUT Configuration on Measurement

The equipment is installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 10.4.Operating Condition of EUT

10.4.1.Setup the EUT and simulator as shown as Section 10.1.

10.4.2.Turn on the power of all equipment.

10.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

## 10.5.Test Procedure

10.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

10.5.2.Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz

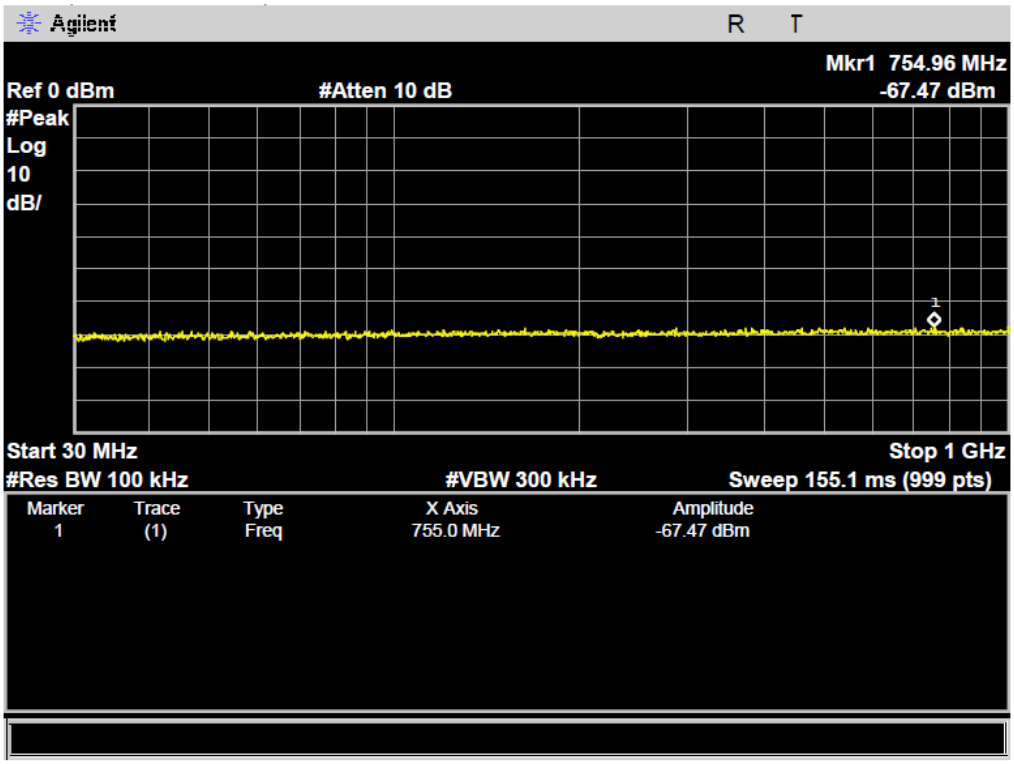
10.5.3.The Conducted Spurious Emission was measured and recorded.

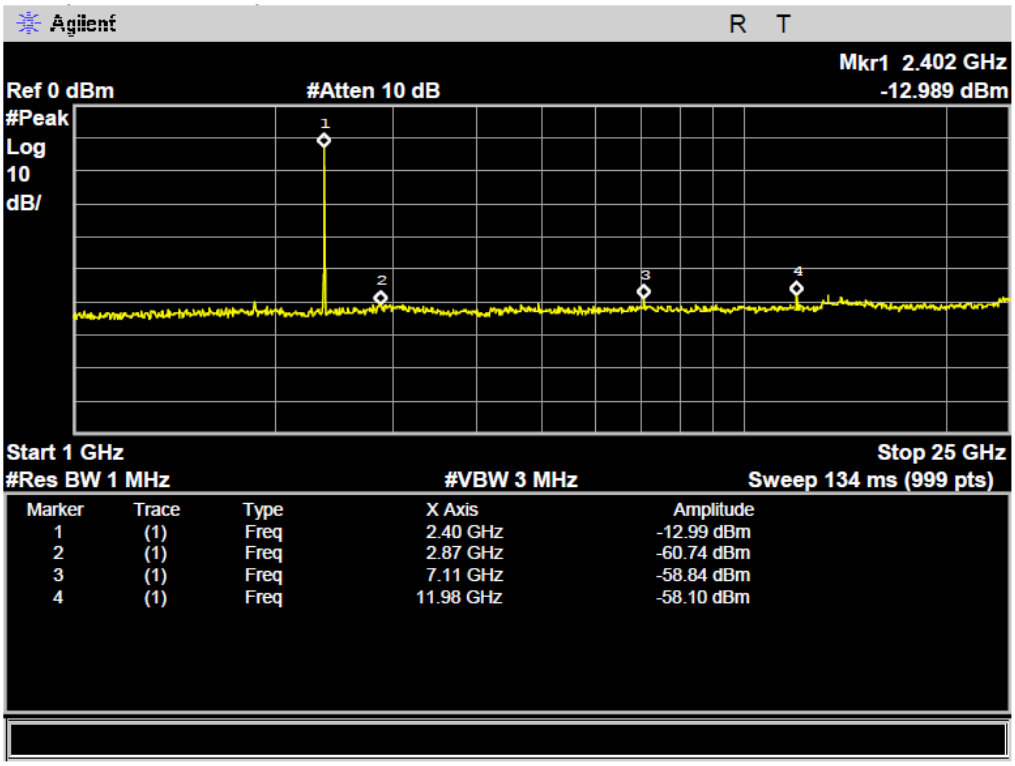
## 10.6.Test Result

**Pass.**

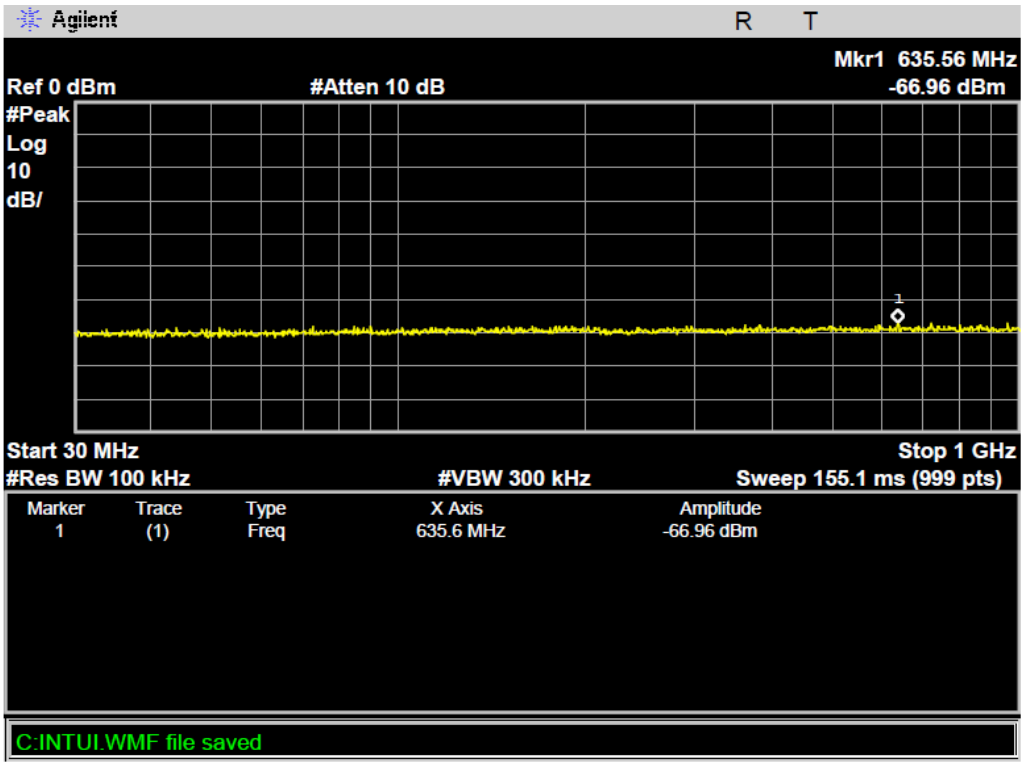
The spectrum analyzer plots are attached as below.

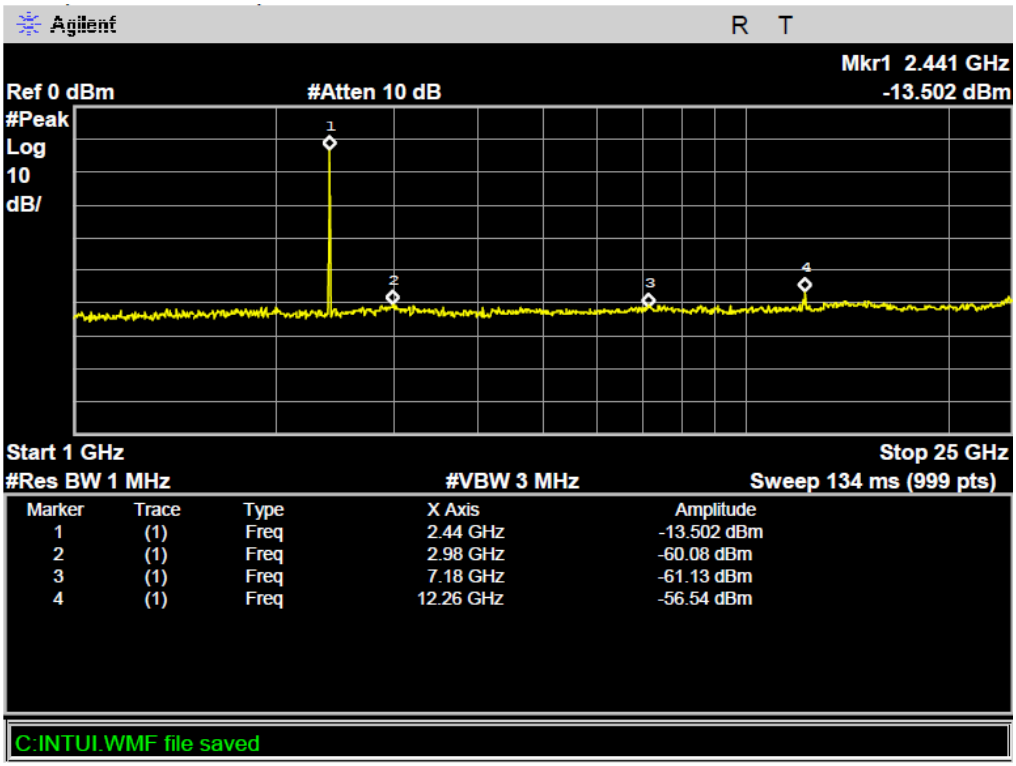
## BLE Channel Low 2402MHz



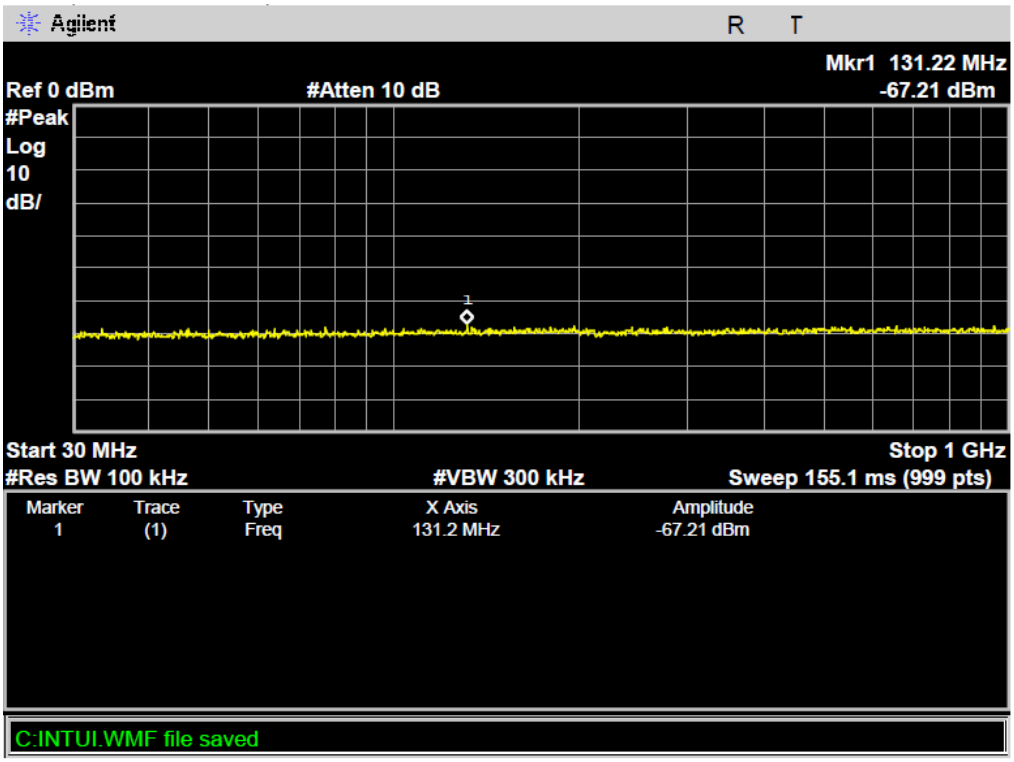



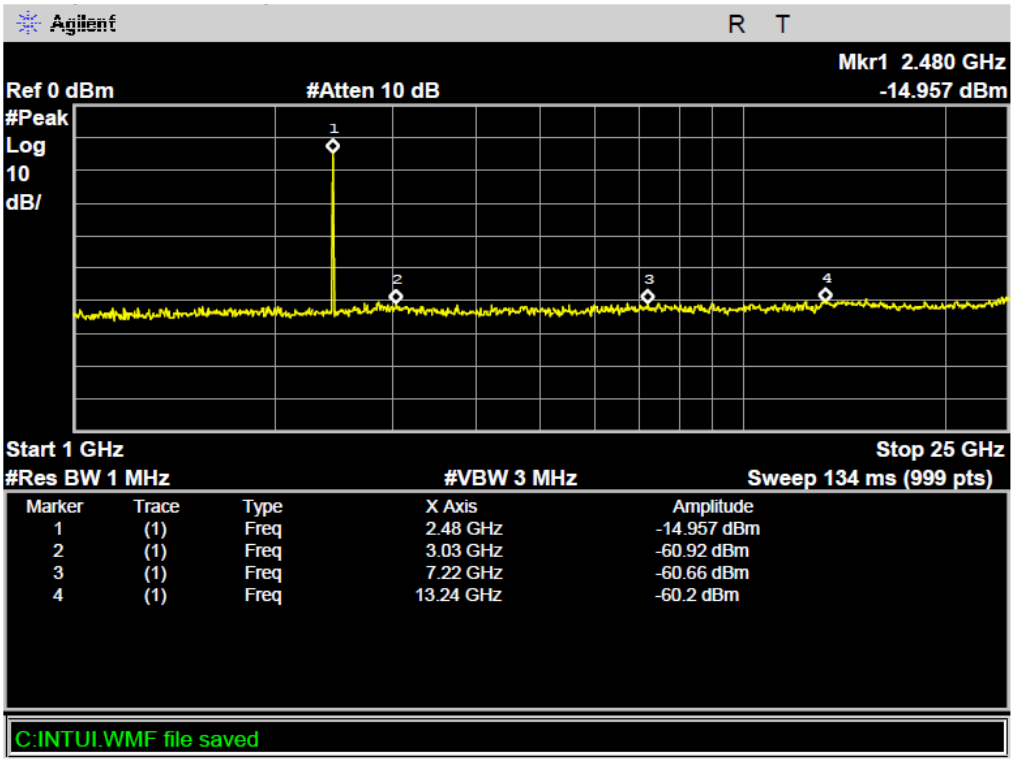
## BLE Channel Middle 2440MHz



## BLE Channel High 2480MHz



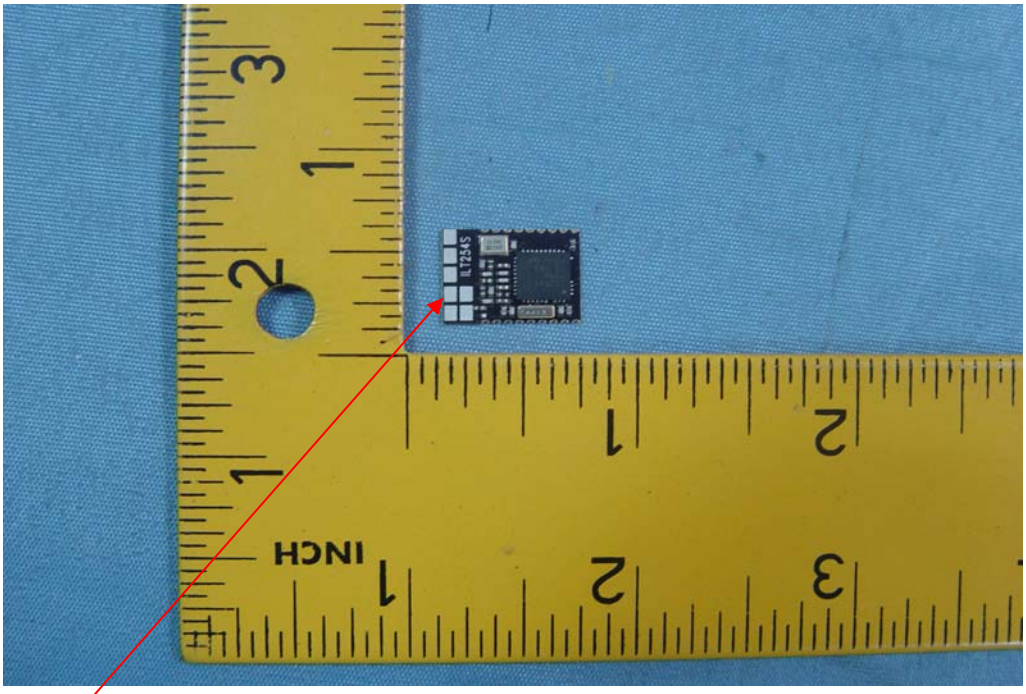
# 11. ANTENNA REQUIREMENT

## 11.1. The Requirement

According to Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

## 11.2. Antenna Construction

Device is equipped with unique antenna, which isn't displaced by other antenna. Therefore, the equipment complies with the antenna requirement of Section 15.203.




Antenna