*Full*

# TEST REPORT

## No. I18D00006-SRD02

*For*

**Client : Lenovo(Shanghai) Electronics Technology Co., Ltd.**

**Production : Portable Tablet Computer**

**Model Name : Lenovo TB-8504X**

**FCC ID: O57TB8504X**

**Hardware Version: Lenovo Tablet TB-8504X**

**Software Version: TB-8504X_RF01_170520**

**Issued date: 2018-01-25**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

**Test Laboratory:**

ECIT Shanghai, East China Institute of Telecommunications

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**Revision Version**

| Report Number | Revision | Date | Memo |
|---|---|---|---|
| I18D00006-SRD02 | 00 | 2018-01-25 | Initial creation of test report |

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# 1. Test Laboratory

## 1.1. Testing Location

| | |
|---|---|
| Company Name: | ECIT Shanghai, East China Institute of Telecommunications |
| Address: | 7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China |
| Postal Code: | 200001 |
| Telephone: | (+86)-021-63843300 |
| Fax: | (+86)-021-63843301 |

## 1.2. Testing Environment

| | |
|---|---|
| Normal Temperature: | 15-35℃ |
| Extreme Temperature: | -10/+55℃ |
| Relative Humidity: | 20-75% |

## 1.3. Project data

| | |
|---|---|
| Project Leader: | Xu Yuting |
| Testing Start Date: | 2018-01-12 |
| Testing End Date: | 2018-01-12 |

## 1.4. Signature

**Chen Lei**
**(Prepared this test report)**

**Ding Li**
**(Reviewed this test report)**

**Zheng Zhongbin**
**Director of the laboratory**
**(Approved this test report)**

# 2. Client Information

## 2.1. Applicant Information

| | |
|---|---|
| Company Name: | Lenovo(Shanghai) Electronics Technology Co., Ltd. |
| Address: | NO.68 BUILDING, 199 FENJU RD, China (Shanghai) Pilot Free Trade Zone, 200131, CHINA |
| Postcode: | / |
| Telephone: | 18116117205 |

## 2.2. Manufacturer Information

| | |
|---|---|
| Company Name: | Lenovo PC HK Limited |
| Address: | 23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong |
| Postcode: | / |
| Telephone: | 18116117205 |

# 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

## 3.1. About EUT

| | |
|---|---|
| EUT Description | Portable Tablet Computer |
| Model name | Lenovo TB-8504X |
| Bluetooth Frequency | 2402MHz-2480Mhz |
| Bluetooth Channel | Channel0-Channel39 |
| Bluetooth Modulation | GFSK; |
| Extreme Temperature | -10/+55℃ |
| Nominal Voltage | 3.85V |
| Extreme High Voltage | 4.4V |
| Extreme Low Voltage | 3.65V |

Note: Photographs of EUT are shown in ANNEX A of this test report.

## 3.2. Internal Identification of EUT used during the test

| EUT ID* | SN or IMEI | HW Version | SW Version | Date of receipt |
|---|---|---|---|---|
| N13 | / | Lenovo Tablet TB-8504X | TB-8504X_RF01_170520 | 2018-01-08 |

*EUT ID: is used to identify the test sample in the lab internally.

## 3.3. Internal Identification of AE used during the test

| AE ID* | Description | SN |
|---|---|---|
| AE1 | RF cable | --- |
| AE2 | --- | --- |

*AE ID: is used to identify the test sample in the lab internally.

# 4. Reference Documents

## 4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

| Reference | Title | Version |
|---|---|---|
| FCC Part15 | FCC CFR 47, Part 15,Subpart C:<br>15.205 Restricted bands of operation;<br>15.209 Radiated emission limits, general requirements;<br>15.247 Operation within the bands 902-928MHz,<br>2400-2483.5MHz, and 5725-5850MHz. | Jun,2016 Edition |
| ANSI C63.10 | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices | 2013 |

# 5. Summary of Test Results

A brief summary of the tests carried out is shown as following.

| Measurement Items | Sub-clause of Part15C | Sub-clause of IC | Verdict |
|---|---|---|---|
| Maximum Peak Output Power | 15.247(b) | / | P |
| Peak Power Spectral Density | 15.247(e) | / | P |
| 6dB Occupied Bandwidth | 15.247(a) | / | P |
| Band Edges Compliance | 15.247(d) | / | P |
| Transmitter Spurious Emission-Conducted | 15.247 | / | P |
| Transmitter Spurious Emission-Radiated | 15.247 | / | P |
| AC Powerline Conducted Emission | 15.107,15.207 | / | P |

Please refer to part 5 for detail.

The measurements are according to ANSI C63.10.

Terms used in Verdict column

| | |
|---|---|
| P | Pass, the EUT complies with the essential requirements in the standard. |
| NP | Not Perform, the test was not performed by ECIT. |
| NA | Not Applicable, the test was not applicable. |
| F | Fail, the EUT does not comply with the essential requirements in the standard. |

Test Conditions

| | |
|---|---|
| Tnom | Normal Temperature |
| Tmin | Low Temperature |
| Tmax | High Temperature |
| Vnom | Normal Voltage |
| Vmin | Low Voltage |
| Vmax | High Voltage |
| Hnom | Norm Humidity |
| Anom | Norm Air Pressure |

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

| | | |
|---|---|---|
| Temperature | Tnom | 22℃ |
| Voltage | Vnom | 3.85V |
| Humidity | Hnom | 32% |
| Air Pressure | Anom | 1010hPa |

**Note:**

a. All the test data for each data were verified, but only the worst case was reported.
b. The GFSK was set in DH1.
c. The DC and low frequency voltages' measurement uncertainty is ±2%.

## 5.1. Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with section 3.

The test results of this test report relate exclusively to the item(s) tested as specified in section 5.

## 5.2. Statements

The Lenovo TB-8504X, supporting GSM/GPRS/EDGE/WCDMA/LTE/WLAN/BT/BLE/GPS, manufactured by Lenovo PC HK Limited, which is a new product for testing.

ECIT has verified that the compliance of the tested device specified in section 5 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 5 of this test report.

# 6. Test result

## 6.1. Peak Output Power-Conducted

### 6.1.1 Measurement Limit

| Standard | Limit (dBm) |
|---|---|
| FCC Part 15.247(b)(1) | < 30 |

### 6.1.2 Test Condition:

| Hopping Mode | RBW | VBW | Span | Sweeptime |
|---|---|---|---|---|
| Hopping OFF | 3MHz | 10MHz | 9MHz | Auto |

### 6.1.3 Test procedure

The measurement is according to ANSI C63.10 clause 7.8.5.

1. The output power of EUT was connected to the spectrum analyzer by cable. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Measure the conducted output power and record the results it.

### 6.1.4 Measurement Results:

**For GFSK**

| Channel | Ch0 2402 MHz | Ch19 2440 MHz | CH39 2480 MHz | Conclusion |
|---|---|---|---|---|
| Peak Conducted Output Power (dBm) | -1.44 | -0.47 | -3.25 | P |
| | Fig.1 | Fig.2 | Fig.3 | |

**Conclusion: PASS**

**Test graphs an below**

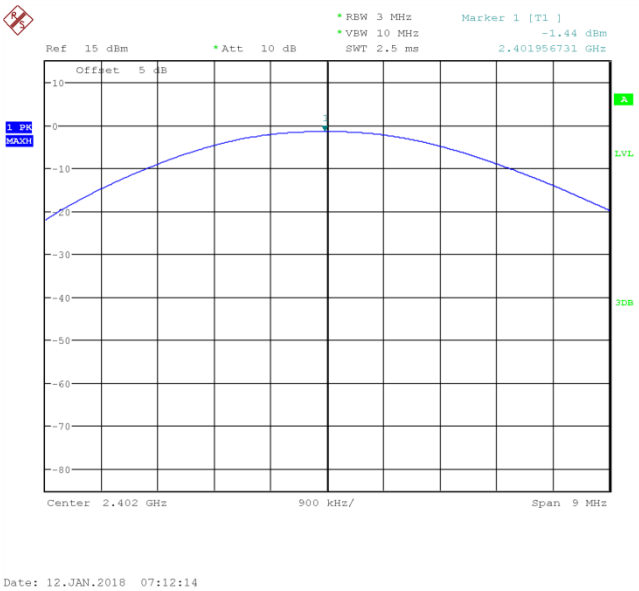



Fig.1 Peak Conducted Output Power CH0, DH1

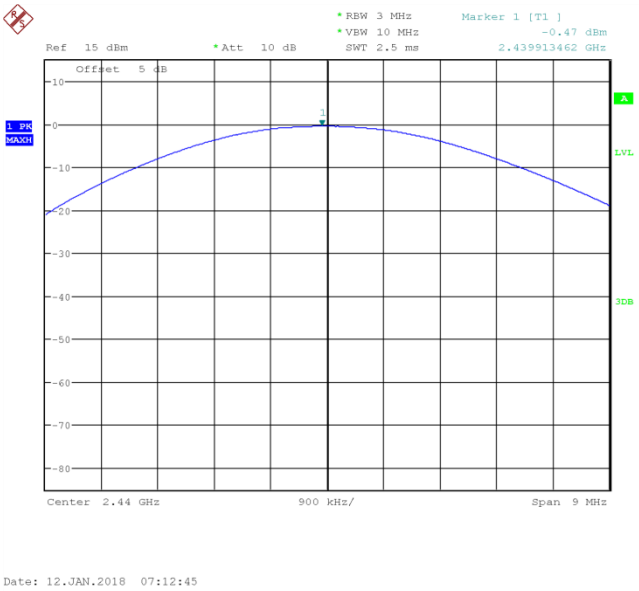



Fig.2 Peak Conducted Output Power CH19, DH1

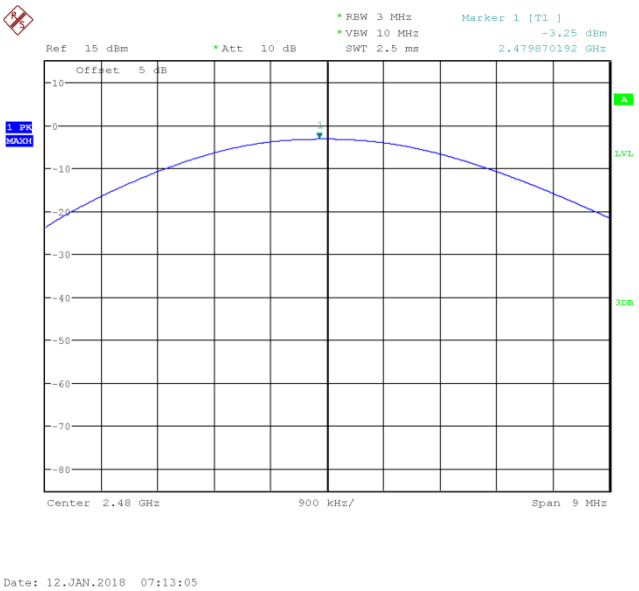



Fig.3 Peak Conducted Output Power CH39, DH1

## 6.2. Peak Power Spectral Density

### 6.2.1 Measurement Limit:

| Standard | Limit |
|---|---|
| FCC CFR Part 15.247(e) | < 8dBm/3 KHz |

### 6.2.2 Test procedures

The measurement is according to ANSI C63.10 clause 11.10.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set analyzer center frequency to DTS channel center frequency.
4. Set the span to 1.5 times the DTS bandwidth.
5. Set the RBW to 3 kHz ⩽ RBW ⩽ 100 kHz.
6. Set the VBW ⩾ [3 × RBW].
7. Detector = peak.
8. Sweep time = auto couple.
9. Trace mode = max hold.
10. Allow trace to fully stabilize.
11. Use the peak marker function to determine the maximum amplitude level within the RBW.
12. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

### 6.2.3 Measurement Uncertainty:

| | |
|---|---|
| Measurement Uncertainty | 0.75dB |

### 6.2.4 Measurement Results:

| Mode | Channel | Power Spectral Density(dBm/3kHz) | | Conclusion |
|---|---|---|---|---|
| BT-LE | 00 | Fig.4 | -17.40 | P |
| | 19 | Fig.5 | -16.51 | P |
| | 39 | Fig.6 | -19.02 | P |

Test figure as below:

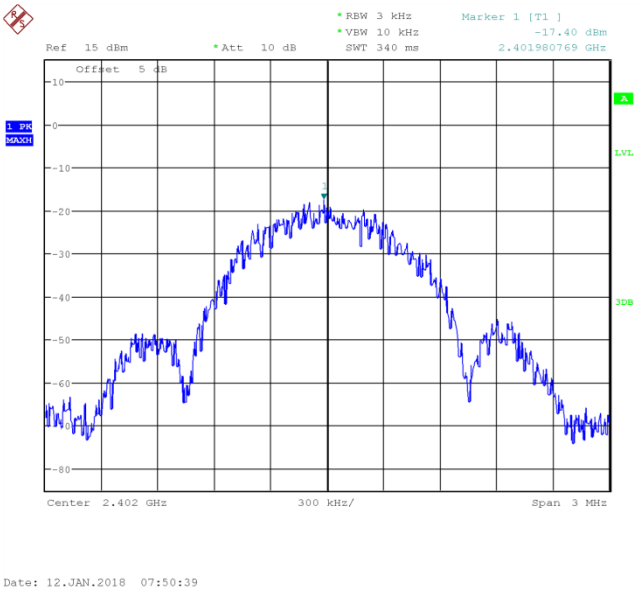



Fig.4 Power spectral density: CH0

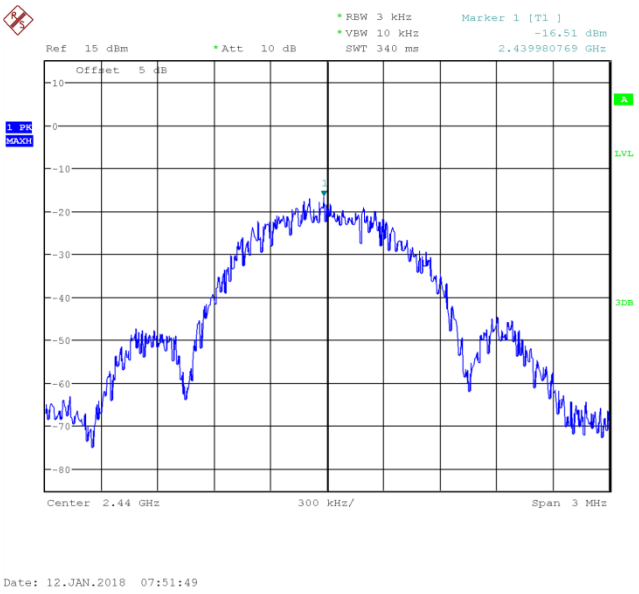



Fig.5 Power spectral density: CH19

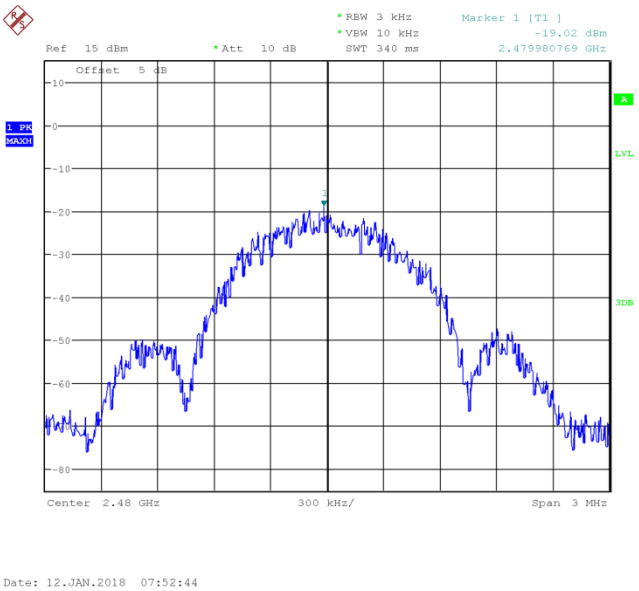



Fig.6 Power spectral density: CH39

## 6.3. 6dB Bandwidth

### 6.3.1 Measurement Limit:

| Standard | Limit |
|---|---|
| FCC 47 CFR Part 15.247 (a) (1) | ⩾500k |

### 6.3.2 Test procedures

The measurement is according to ANSI C63.10 clause 7.8.7

1. Connect the EUT through cable and divide with CBT32 and spectrum analyzer.
2. Enable the EUT transmit maximum power.
3. Set the spectrum analyzer as DTS channel center frequency.
4. Span: two or five times of OBW
5. RBW= 1% to 5% of the OBW; VBW⩾3RBW; Max Hold.
6. Select the max peak, and N DB DOWN=6dB.
7. Record the results.

**Measurement Result:**

**For GFSK**

| Channel | 6dB Bandwidth (MHz) | | Conclusion |
|---|---|---|---|
| 0 | Fig.7 | 0.673 | P |
| 39 | Fig.8 | 0.673 | P |
| 78 | Fig.9 | 0.673 | P |

**Conclusion: PASS**

**Test graphs as below:**

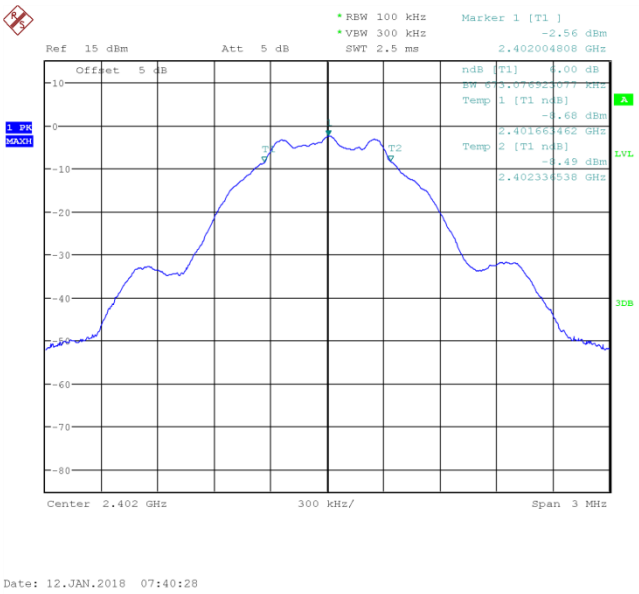



Fig.7 6dB Bandwidth: Ch0

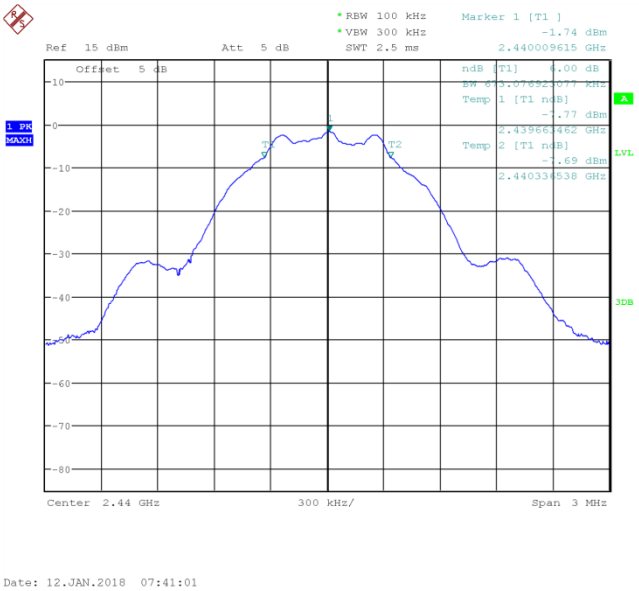



Fig.8 6dB Bandwidth: Ch19

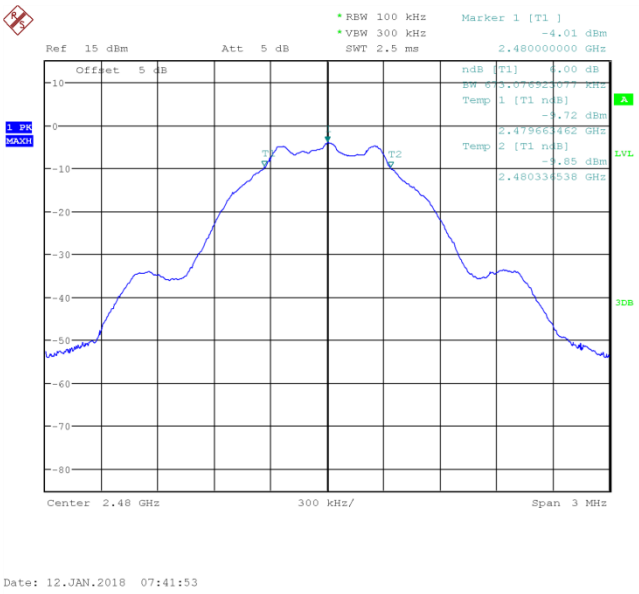



Fig.9 6dB Bandwidth: Ch39

## 6.4. Frequency Band Edges-Conducted

### 6.4.1 Measurement Limit:

| Standard | Limited(dBc) |
|---|---|
| FCC 47 CFR Part 15.247(d) | >20 |

### 6.4.2 Test procedure

The measurement is according to ANSI C63.10 clause 7.8.6.

1. Connect the EUT to spectrum analyzer.
2. Set RBW=100KHz, VBW=300KHz, span more than 1.5 times channel bandwidth (2MHz).
3. Detector =peak, sweep time=auto couple, trace mode=max hold.
4. Allow sweep to continue until the trace stabilizes.

### 6.4.3 Measurement results

**For GFSK**

| Channel | Band Edge Power (dBc) | Conclusion |
|---|---|---|
| 00 | Fig.10 | P |
| 39 | Fig.11 | P |

**Conclusion: PASS**

**Test graphs an below**

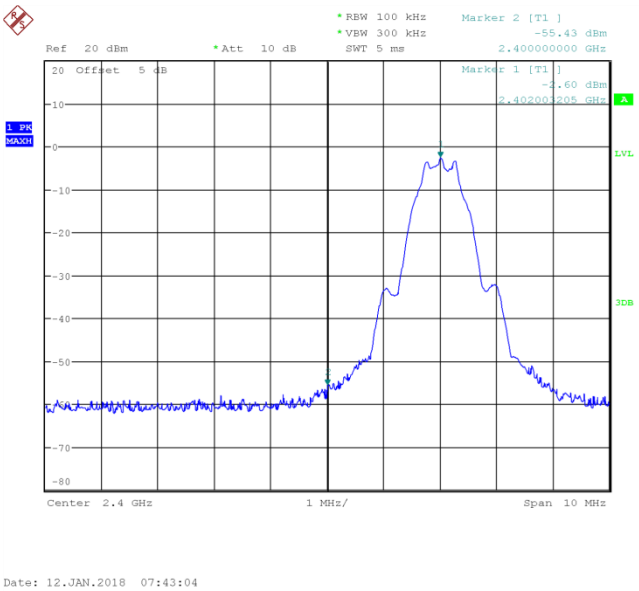



Fig.10 Frequency Band Edge: GFSK, Ch0, Hopping OFF

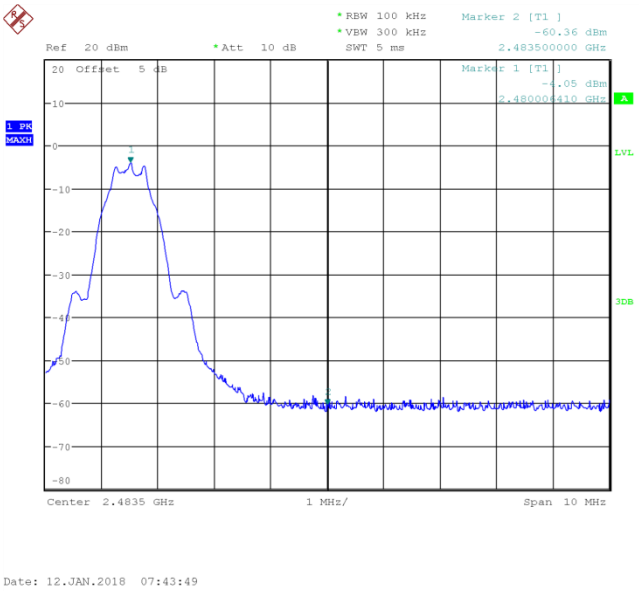



Fig.11 Frequency Band Edge: GFSK, Ch39, Hopping OFF

## 6.5. Conducted Emission

### 6.5.1 Measurement Limit:

| Standard | Limit |
|---|---|
| FCC 47 CFR Part15.247 (d) | 20dB below peak output power in 100KHz bandwidth |

### 6.5.2 Test procedures

The measurement is according to ANSI C63.10 clause 7.8.8.

1. Connect the EUT to spectrum analyzer.

2. Set RBW=100KHz, VBW=300KHz.
3. Detector =peak, sweep time=auto couple, trace mode=max hold.

### 6.5.3 Measurement Results:

| Channel | Frequency Range | Test Results | Conclusion |
|---|---|---|---|
| Ch0 2402MHz | Center Freq. | Fig.12 | P |
| | 30MHz~26GHz | Fig.13 | P |
| Ch19 2440MHz | Center Freq. | Fig.14 | P |
| | 30MHz~26GHz | Fig.15 | P |
| Ch39 2480MHz | Center Freq. | Fig.16 | P |
| | 30MHz~26GHz | Fig.17 | P |

**Conclusion: PASS**

**Test graphs as below**

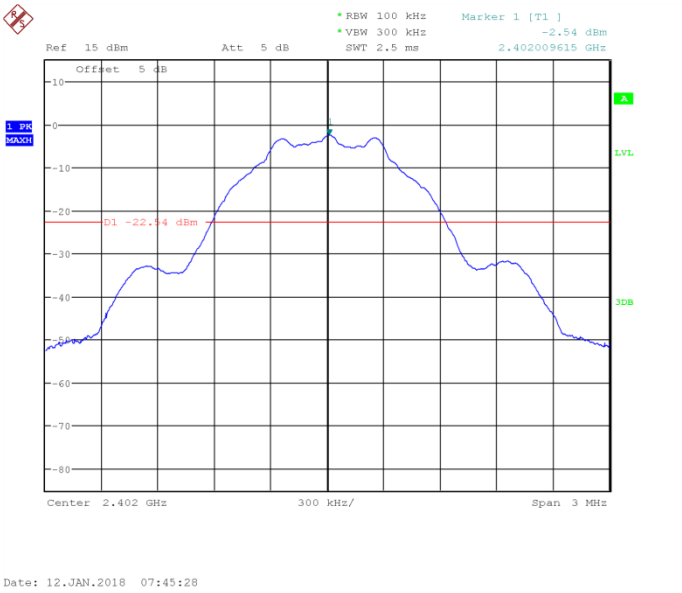



Fig.12 Conducted spurious emission: Ch0, 2402MHz

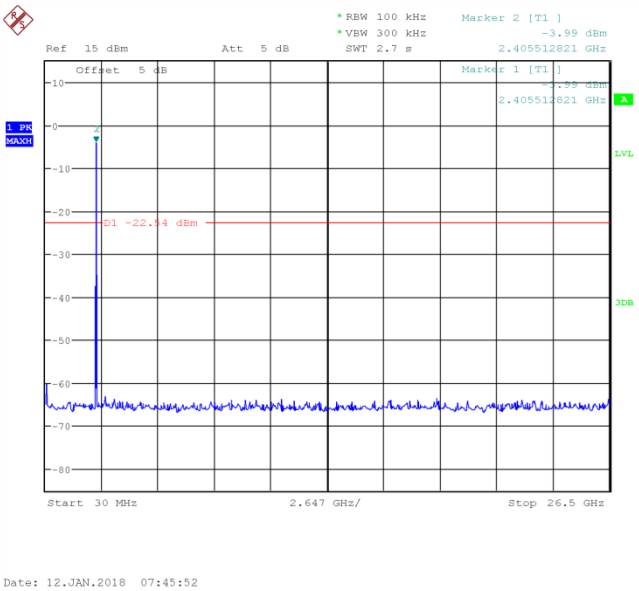



Fig.13 Conducted spurious emission: Ch0, 30MHz~26GHz

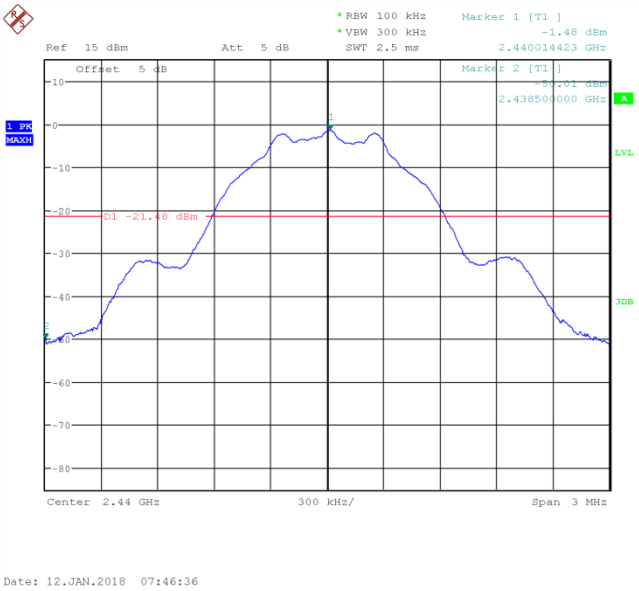



Fig.14 Conducted spurious emission: Ch19, 2440MHz

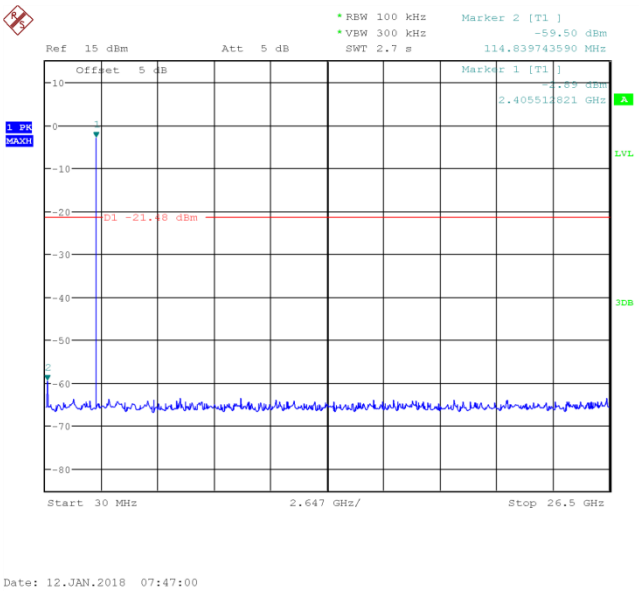



Fig.15 Conducted spurious emission: Ch19, 30MHz~26GHz

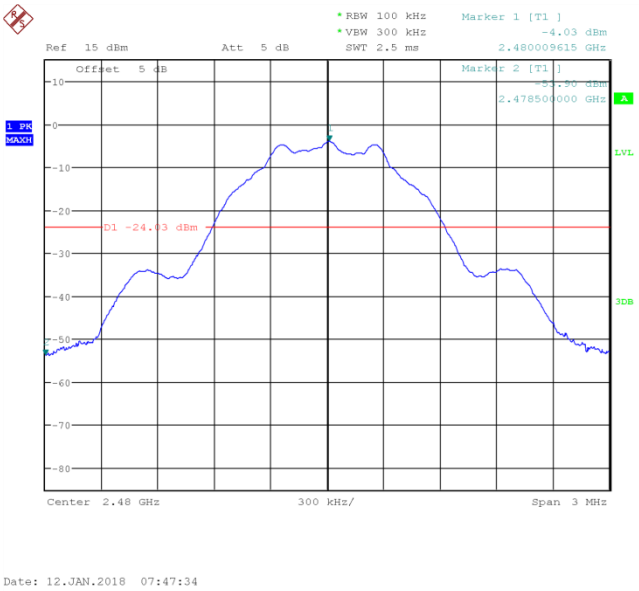



Fig.16 Conducted spurious emission: Ch39, 2480MHz

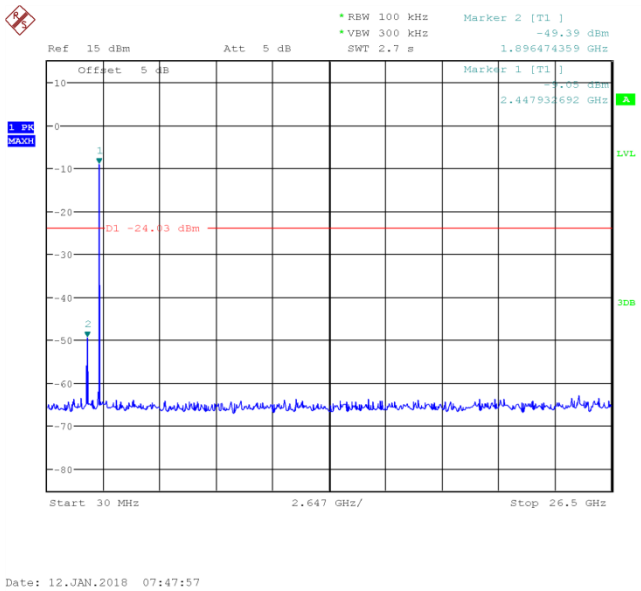



Fig.17 Conducted spurious emission: Ch39, 30MHz~26GHz

## 6.6. Radiated Emission

### 6.6.1 Measurement Limit:

| Standard | Limit |
|---|---|
| FCC 47 CFR Part 15.247, 15.205, 15.209 | 20dB below peak output power |

In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see 15.205(c)).

**Limit in restricted band:**

| Frequency of emission (MHz) | Field strength (uV/m) | Field strength (dBuV/m) |
|---|---|---|
| 30~88 | 100 | 40 |
| 88~216 | 150 | 43.5 |
| 216~960 | 200 | 46 |
| Above 960 | 500 | 54 |

### 6.6.2 Test Method

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2013 section 6.3.4 and 6.3.5). In making

any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

| Frequency of emission (MHz) | RBW/VBW | Sweep Time (s) |
|---|---|---|
| 30~1000 | 100KHz/300KHz | 5 |
| 1000~4000 | 1MHz/1MHz | 15 |
| 4000~18000 | 1MHz/1MHz | 40 |
| 18000~26500 | 1MHz/1MHz | 20 |

**6.6.3 Measurement Results:**

A “reference path loss” is established and $A_{Rpi}$ is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

$A_{Rpi}$ = Cable loss + Antenna Gain-Preamplifier gain

Result=$P_{Mea}$ + $A_{Rpi}$

| Channel | Frequency Range | Test Results | Conclusion |
|---|---|---|---|
| Ch0 2402MHz | 30MH~1GHz | Fig.18 | P |
| | 1GHz~3GHz | Fig.19 | P |
| | 3GHz~18GHz | Fig.20 | P |

| Channel | Frequency Range | Test Results | Conclusion |
|---|---|---|---|
| Ch39 2480MHz | 30MH~1GHz | Fig.21 | P |
| | 1GHz~3GHz | Fig.22 | P |
| | 3GHz~18GHz | Fig.23 | P |

**Ch0 30MHz-1GHz (Peak)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 34.834012 | 16.36 | -21.9 | 38.26 | V |
| 50.971808 | 12.19 | -20.1 | 32.29 | V |
| 64.904168 | 9.02 | -23.5 | 32.52 | V |
| 110.233636 | 9.03 | -23.5 | 32.53 | H |
| 310.142548 | 12.27 | -21.2 | 33.47 | V |
| 710.135952 | 20.41 | -12.5 | 32.91 | V |

**Ch0 1GHz-3GHz (Peak)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 2618.424807 | 54.5 | 7.5 | 47 | V |
| 2668.081346 | 54.76 | 7.8 | 46.96 | V |
| 2726.398269 | 55.41 | 7.8 | 47.61 | H |
| 2864.511731 | 55.56 | 8.5 | 47.06 | H |
| 2936.364616 | 56.73 | 8.7 | 48.03 | V |
| 2975.773654 | 55.79 | 8.8 | 46.99 | V |

**Ch0 1GHz-3GHz (Average)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 2618.424807 | 42.22 | 7.5 | 34.72 | V |
| 2668.081346 | 42.7 | 7.8 | 34.9 | V |
| 2726.398269 | 42.47 | 7.8 | 34.67 | H |
| 2864.511731 | 43.27 | 8.5 | 34.77 | H |
| 2936.364616 | 43.81 | 8.7 | 35.11 | V |
| 2975.773654 | 43.74 | 8.8 | 34.94 | V |

**Ch0 3GHz-18GHz (Peak)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 11970.108 | 50.5 | 14.8 | 35.7 | H |
| 14259.1552 | 54.05 | 19.6 | 34.45 | V |
| 14900.3194 | 56.13 | 21.7 | 34.43 | V |
| 16203.6966 | 58.71 | 25.1 | 33.61 | V |
| 16942.05653 | 59.53 | 26.8 | 32.73 | H |
| 17592.82053 | 61.21 | 28.8 | 32.41 | H |

**Ch0 3GHz-18GHz (Average)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 14259.1552 | 41.94 | 19.6 | 22.34 | V |
| 14900.3194 | 44.07 | 21.7 | 22.37 | V |
| 16203.6966 | 46.39 | 25.1 | 21.29 | V |
| 16942.05653 | 47.77 | 26.8 | 20.97 | H |
| 17592.82053 | 48.95 | 28.8 | 20.15 | H |

**Ch39 30MHz-1GHz (Peak)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 34.806548 | 17.24 | -21.9 | 39.14 | V |
| 174.182312 | 7.2 | -25.7 | 32.9 | V |
| 299.275968 | 11.57 | -21.8 | 33.37 | V |
| 566.110292 | 17.75 | -15.1 | 32.85 | V |
| 795.890456 | 21.58 | -11 | 32.58 | V |
| 948.37618 | 23.55 | -9.3 | 32.85 | H |

**Ch39 1GHz-3GHz (Peak)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 2620.963846 | 54.31 | 7.5 | 46.81 | V |
| 2695.258077 | 54.68 | 7.9 | 46.78 | H |

| | | | | |
|---|---|---|---|---|
| 2791.551154 | 54.61 | 7.8 | 46.81 | H |
| 2826.643654 | 56.24 | 8.1 | 48.14 | H |
| 2937.004038 | 56.23 | 8.7 | 47.53 | V |
| 2979.350577 | 56.08 | 8.9 | 47.18 | V |

**Ch39 1GHz-3GHz (Average)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 2620.963846 | 42.17 | 7.5 | 34.67 | V |
| 2695.258077 | 42.66 | 7.9 | 34.76 | H |
| 2791.551154 | 42.83 | 7.8 | 35.03 | H |
| 2826.643654 | 42.99 | 8.1 | 34.89 | H |
| 2937.004038 | 43.89 | 8.7 | 35.19 | V |
| 2979.350577 | 43.79 | 8.9 | 34.89 | V |

**Ch39 3GHz-18GHz (Peak)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 12414.9188 | 51.5 | 15.1 | 36.4 | V |
| 13505.826 | 53.35 | 18.1 | 35.25 | V |
| 14350.35633 | 53.93 | 19.6 | 34.33 | H |
| 14919.30593 | 56.67 | 21.6 | 35.07 | H |
| 16028.9046 | 58.64 | 24.5 | 34.14 | V |
| 17541.88967 | 61.93 | 28.6 | 33.33 | H |

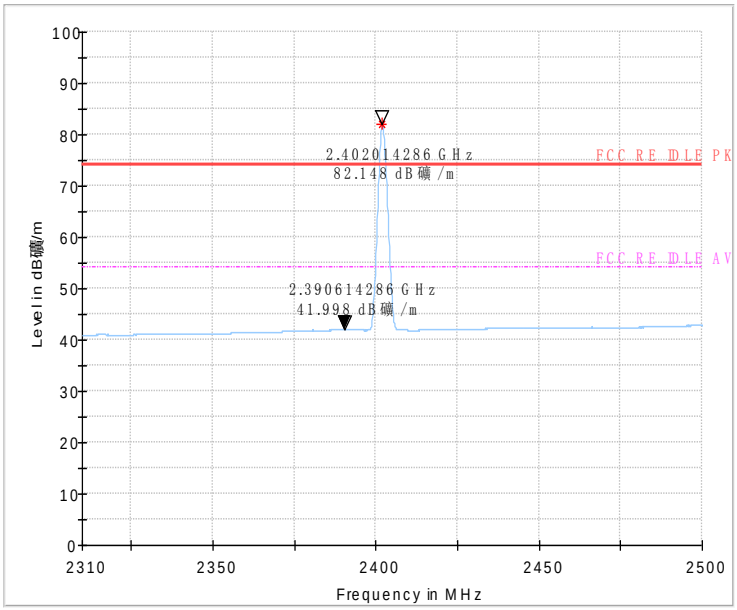
**Ch39 3GHz-18GHz (Average)**

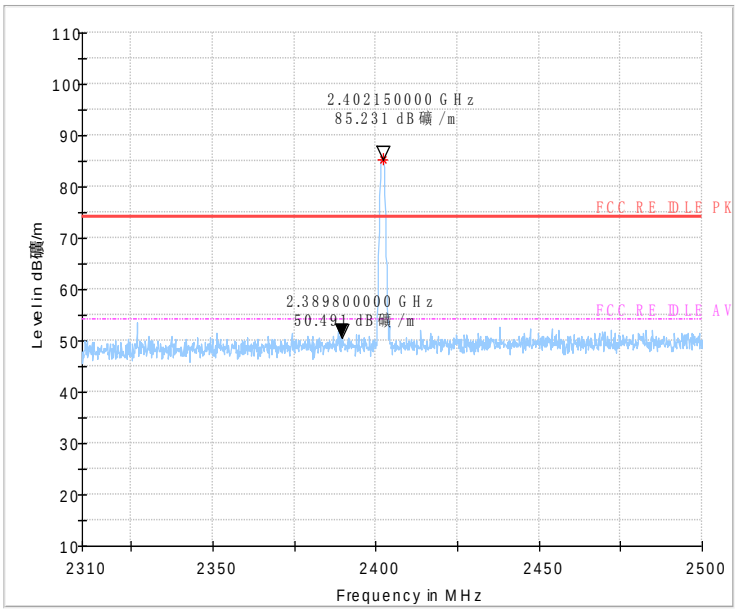
| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 14919.30593 | 43.69 | 21.6 | 22.09 | H |
| 16028.9046 | 46.54 | 24.5 | 22.04 | V |
| 17541.88967 | 49.01 | 28.6 | 20.41 | H |

**Note: Only the worst case is written in the report.**

**Conclusion: PASS**

**Test graphs as below:**




Bandedge:ch0

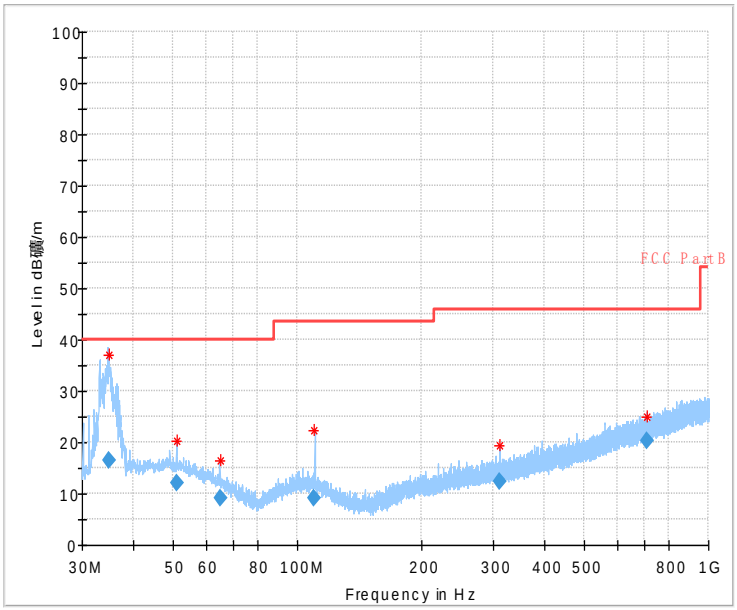



Fig.18 Radiated emission: Ch0, 30MHz~1GHz

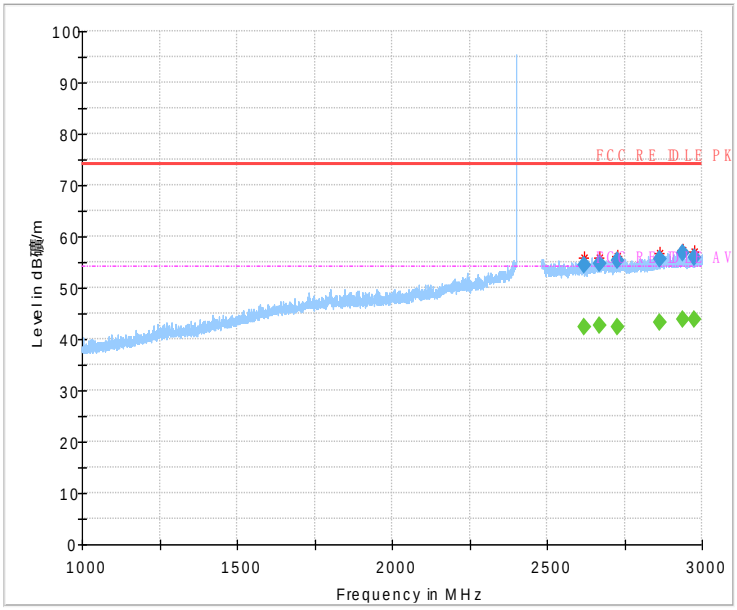



Fig.19 Radiated emission: Ch0, 1GHz~3GHz

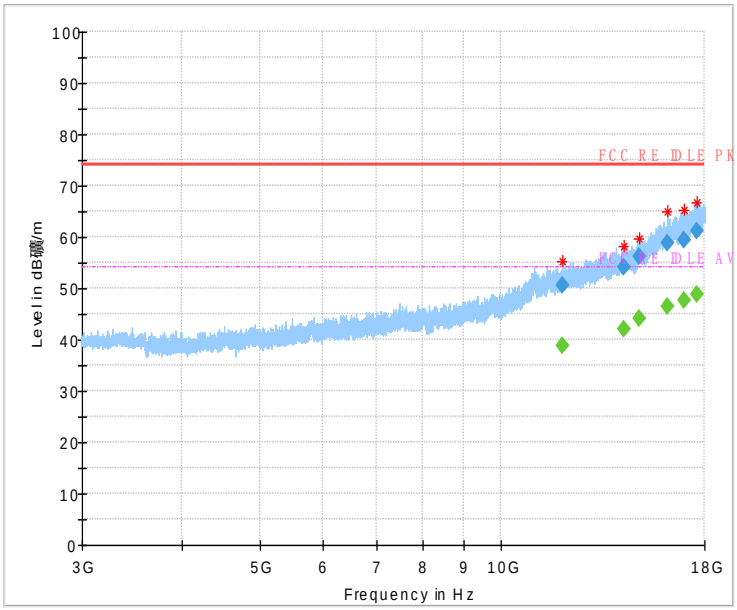
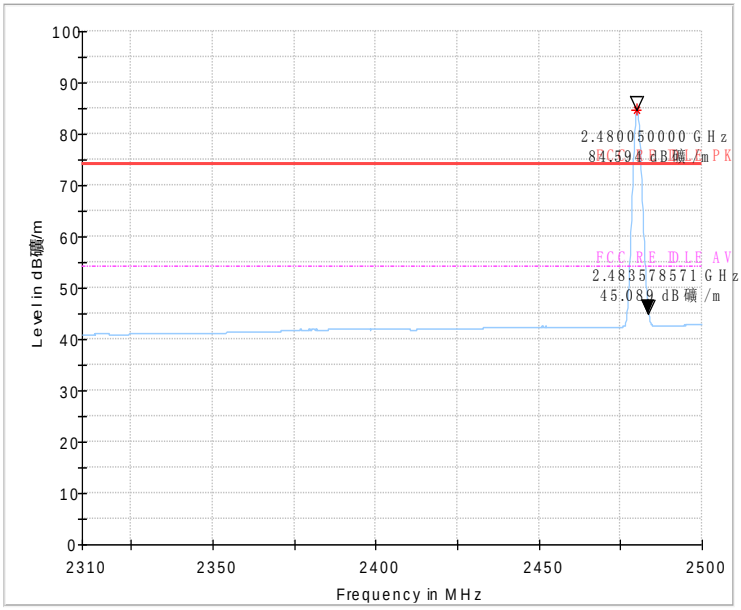
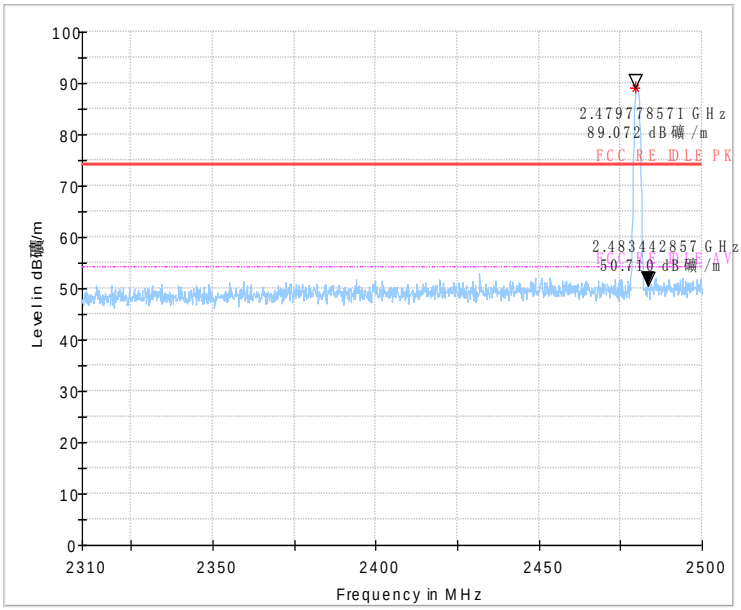



Fig.20 Radiated emission: Ch0, 3GHz~18GHz






Bandedge:ch39

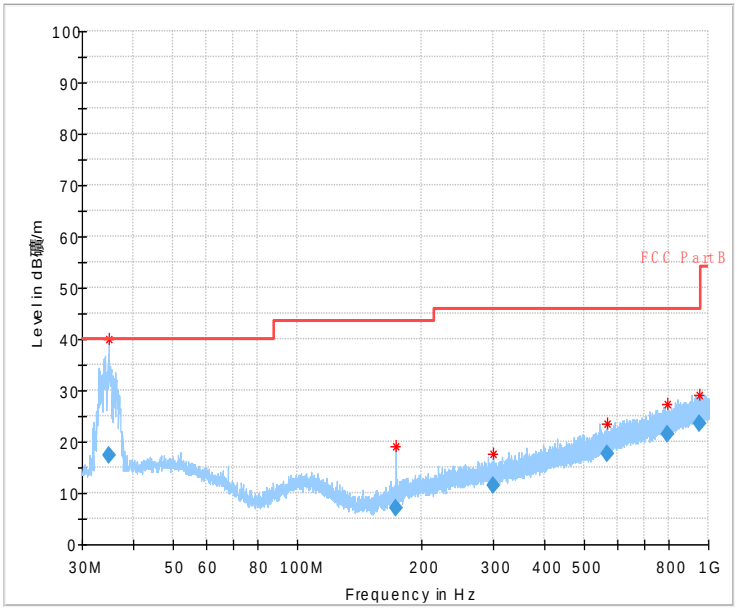



Fig.21 Radiated emission: Ch39, 30MHz~1GHz

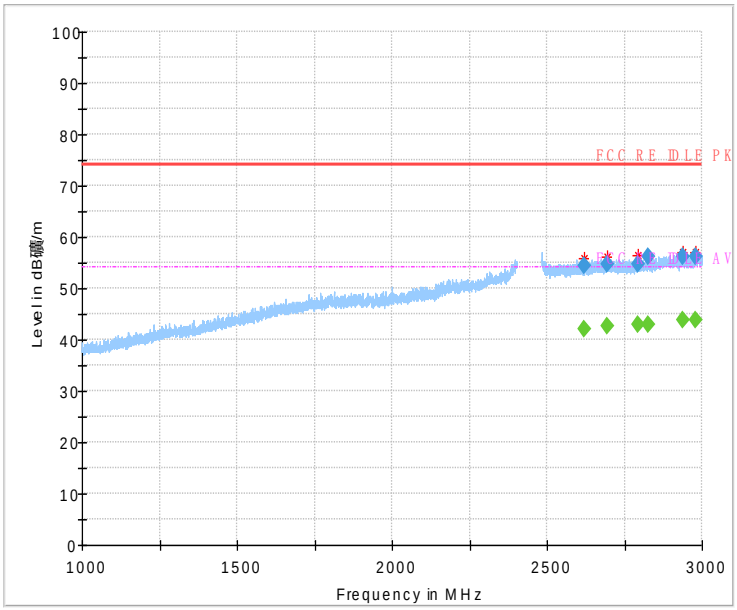



Fig.22 Radiated emission: Ch39, 1GHz~3GHz

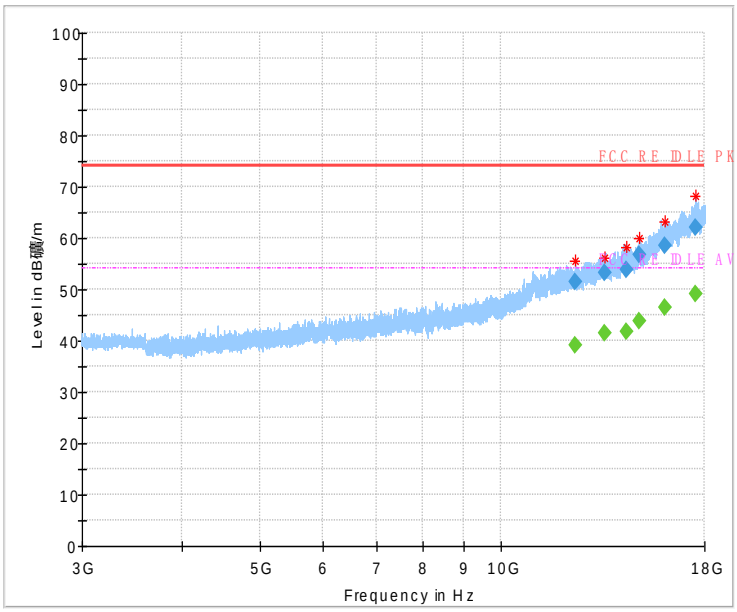
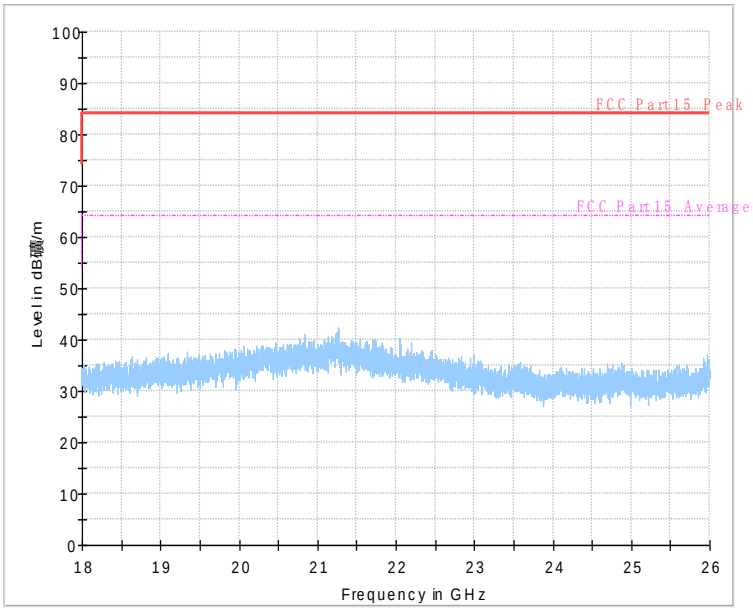



Fig.23 Radiated emission: Ch39, 3GHz~18GHz




ALL Channel 18GHz~26GHz

## 6.7. AC Powerline Conducted Emission

**Method of Measurement: See ANSI C63.10-2013-clause 6.2**

1 The one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.

2 If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.

3 The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.

4 If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a non-detachable antenna may be replaced with a dummy load for the measurements

within the fundamental emission band of the transmitter, but only for those measurements.36 Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

**Test Condition:**

| Voltage（V） | Frequency（Hz） |
|---|---|
| 120 | 60 |

**Measurement Result and limit:**

(Quasi-peak-average Limit)

| Frequency range (MHz) | Quasi-peak Limit (dBμV) | Average Limit (dBμV) | Result (dBμV) With charger BLE | Conclusion |
|---|---|---|---|---|
| 0.15 to 0.5 | 66 to 56 | 56 to 46 | Fig.24 | P |
| 0.5 to 5 | 56 | 46 | | |
| 5 to 30 | 60 | 50 | | |
| NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz. | | | | |

**Conclusion: Pass**

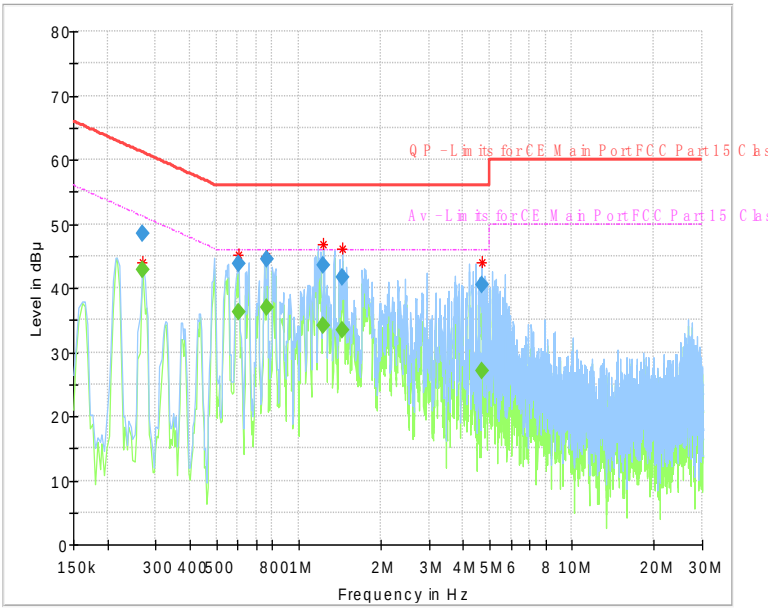



**Fig.24 AC Powerline Conducted Emission**

| Frequency (MHz) | QuasiPeak (dB μ V) | Average (dB μ V) | Limit (dB μ | Margin (dB) | Meas. Time | Bandwidth (kHz) | Line | Filter | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 0.269400 | --- | 42.90 | 51.14 | 8.24 | 1000.0 | 9.000 | L1 | ON | 9.6 |
| 0.269400 | 48.57 | --- | 61.14 | 12.57 | 1000.0 | 9.000 | L1 | ON | 9.6 |
| 0.601481 | --- | 36.16 | 46.00 | 9.84 | 1000.0 | 9.000 | N | ON | 9.7 |
| 0.601481 | 43.77 | --- | 56.00 | 12.23 | 1000.0 | 9.000 | N | ON | 9.7 |
| 0.765656 | 44.57 | --- | 56.00 | 11.43 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 0.765656 | --- | 36.97 | 46.00 | 9.03 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 1.235794 | --- | 34.14 | 46.00 | 11.86 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 1.235794 | 43.45 | --- | 56.00 | 12.55 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 1.444744 | 41.62 | --- | 56.00 | 14.38 | 1000.0 | 9.000 | N | ON | 9.7 |
| 1.444744 | --- | 33.45 | 46.00 | 12.55 | 1000.0 | 9.000 | N | ON | 9.7 |
| 4.690931 | --- | 27.13 | 46.00 | 18.87 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 4.690931 | 40.38 | --- | 56.00 | 15.62 | 1000.0 | 9.000 | L1 | ON | 9.7 |

# 7. Test Equipment and Ancillaries Used For Tests

The test equipment and ancillaries used are as follows.

**Conducted test system**

| No. | Equipment | Model | Serial Number | Manufacturer | Calibration date | Cal.interval |
|---|---|---|---|---|---|---|
| 1 | Vector Signal Analyzer | FSQ26 | 101096 | Rohde&Schwarz | 2017-05-11 | 1 Year |
| 2 | DC Power Supply | ZUP60-14 | LOC-220Z006-0007 | TDL-Lambda | 2017-05-11 | 1 Year |

**Radiated emission test system**

| No. | Equipment | Model | Serial Number | Manufacturer | Calibration date | Cal.interval |
|---|---|---|---|---|---|---|
| 1 | Universal Radio Communication Tester | CMU200 | 123123 | R&S | 2017-05-11 | 1 Year |
| 2 | EMI Test Receiver | ESU40 | 100307 | R&S | 2017-05-11 | 1 Year |
| 3 | TRILOG Broadband Antenna | VULB9163 | VULB9163-515 | Schwarzbeck | 2017-02-25 | 3 Year |
| 4 | Double-ridged Waveguide Antenna | ETS-3117 | 00135890 | ETS | 2017-01-11 | 3 Year |
| 5 | 2-Line V-Network | ENV216 | 101380 | R&S | 2017-05-11 | 1 Year |

**Anechoic chamber**

Fully anechoic chamber by Frankonia German.

# 8. Test Environment

**Shielding Room1** (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 35 ℃ |
| Relative humidity | Min. = 20 %, Max. = 75 % |
| Shielding effectiveness | > 100 dB |
| Ground system resistance | < 0.5 Ω |

**Control room** did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 35 ℃ |
| Relative humidity | Min. =25 %, Max. = 75 % |
| Shielding effectiveness | > 100 dB |
| Electrical insulation | > 10 kΩ |
| Ground system resistance | < 0.5 Ω |

**Fully-anechoic chamber1** (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 35 ℃ |
| Relative humidity | Min. = 25 %, Max. = 75 % |
| Shielding effectiveness | > 100 dB |
| Electrical insulation | > 10 kΩ |
| Ground system resistance | < 0.5 Ω |
| VSWR | Between 0 and 6 dB, from 1GHz to 18GHz |
| Site Attenuation Deviation | Between -4 and 4 dB,30MHz to 1GHz |
| Uniformity of field strength | Between 0 and 6 dB, from 80MHz to 3000 MHz |

# ANNEX A. Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

# ANNEX B. Accreditation Certificate

ilac-MRA a2LA

**Accredited Laboratory**

A2LA has accredited

**EAST CHINA INSTITUTE OF TELECOMMUNICATIONS**

*Shanghai, People's Republic of China*

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 15th day of March 2017.

President and CEO
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2019

*For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.*

************END OF REPORT************