# Japan Radio Test Report
## (BLE)

| | |
|---|---|
| **Applicant:** | Shenzhen Huafurui Technology Co., Ltd. |
| **Address of Applicant:** | Unit 1401 14/F, Jin qi zhi gu mansion Liu xian street ,Xili, Nan shan district Shenzhen China |

**Equipment Under Test (EUT)**

| | |
|---|---|
| Product Name: | SmartWatch |
| Model No.: | C5 |
| Trade mark: | CUBOT, HAFURY |
| **Applicable standards:** | Article 2 paragraph 1 item (19)<br>Appendix No.43 Notification No.88 of MIC, 2004 |
| **Date of sample receipt:** | 30 Oct., 2020 |
| **Date of Test:** | 30 Oct., 2020 to 19 Nov., 2020 |
| **Date of report issued:** | 20 Nov., 2020 |
| **Test Result:** | PASS* |

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the JYT product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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## 2 Version

| Version No. | Date | Description |
|---|---|---|
| *00* | *20 Nov., 2020* | *Original* |
| | | |
| | | |
| | | |
| | | |

***Tested by:*** YT Yang ***Date:*** *20 Nov., 2020*

***Test Engineer***

***Reviewed by:*** Winner Zhang ***Date:*** *20 Nov., 2020*

***Project Engineer***

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# 4 Test Summary

| Report Section | Test Item | Result |
|---|---|---|
| 6.2 | Frequency Deviation | Pass |
| 6.3 | Occupied frequency bandwidth and Spread bandwidth | Pass |
| 6.4 | Antenna power and deviation | Pass |
| 6.5 | Transmitter Spurious Emissions | Pass |
| 6.6 | Transmitting antenna absolute gain | Pass |
| 6.7 | Main lobe width of transmitting antenna | Pass |
| 6.8 | Spurious radiation or extraneous emission strength | Pass |
| 6.9 | Interference suppression function | Pass |
| *Remark:*<br>*Pass: The EUT complies with the essential requirements in the standard.* | | |

# 5 General Information

## 5.1 Client Information

| | |
|---|---|
| Applicant: | Shenzhen Huafurui Technology Co., Ltd. |
| Address: | Unit 1401 14/F, Jin qi zhi gu mansion Liu xian street ,Xili, Nan shan district Shenzhen China |
| Manufacturer: | Shenzhen Huafurui Technology Co., Ltd. |
| Address: | Unit 1401 14/F, Jin qi zhi gu mansion Liu xian street ,Xili, Nan shan district Shenzhen China |
| Factory: | Dongguan Branch of Shenzhen SAGA Digital Co., Ltd. |
| Address: | Room 101, Building 4, NO.7 Luyi South Road, Tangxia Town, Dongguan City, Guangdong Province. |

## 5.2 General Description of E.U.T.

| | |
|---|---|
| Product Name: | SmartWatch |
| Model No.: | C5 |
| Operation Frequency: | 2402MHz~2480MHz |
| Number of channel: | 40 |
| Modulation type: | GFSK |
| Modulation technology: | Other Modulation |
| Antenna Type: | Internal antenna |
| Antenna gain: | 0.35 dBi |
| Power supply: | Rechargeable Li-ion Battery3.8Vdc, 260mAh |

## 5.3 Test mode

| | |
|---|---|
| Carrier mode: | Keep the EUT in continuous transmitting mode without modulation. |
| Modulation mode: | Keep the EUT in continuously transmitting mode with modulation. |

## 5.4 Description of Support Units

The EUT was test as an independent unit

## 5.5 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **A2LA - Registration No.: 4346.01**

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. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

## 5.6 Laboratory Location

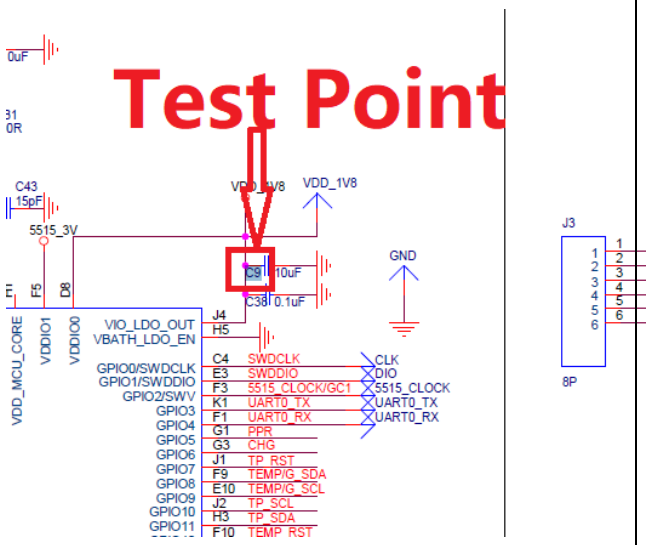
JianYan Testing Group Shenzhen Co., Ltd.
Address: No.110~116, Building B, Jinyuan Business Building, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

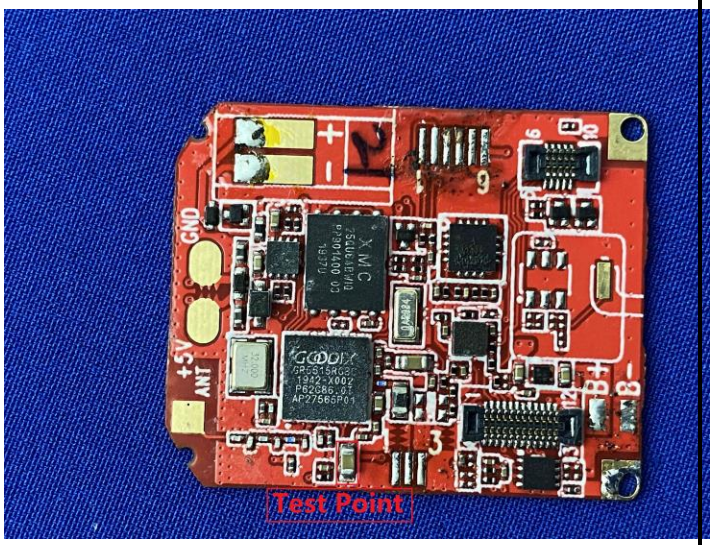
## 5.7 Environment of test site

| | |
|---|---|
| Temperature: | 22°C |
| Humidity: | 60% RH |
| Atmospheric Pressure: | 1010 mbar |
| Test Voltage: | Nominal: 3.80Vdc<br>Extreme: 3.42Vdc for low voltage, 4.18Vdc for high voltage |

Note: For extreme voltage test, we have tested the relationship between the external power supply and RF IC power supply. Base on the test results, only the normal voltage was selected to perform all items. The details information as below:

| External power supply | IC power supply | Deviation from normal | Deviation |
|---|---|---|---|
| 3.80V | 3.30V | --- | --- |
| 3.42V | 3.30V | 0.00V | 0.00% |
| 4.18V | 3.30V | 0.00V | 0.00% |




## 5.8 Test Instruments list

| Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date (mm-dd-yy) | Cal. Due date (mm-dd-yy) | Cal. By |
|---|---|---|---|---|---|---|
| EMI Test Receiver | R&S | ESCI 3 | 101189 | 03-18-2020 | 03-17-2021 | LiSai |
| EMI Test Receiver | R&S | ESRP7 | 101070 | 03-18-2020 | 03-17-2021 | LiSai |
| Spectrum Analyzer | R&S | FSP30 | 101454 | 03-18-2020 | 03-17-2021 | LiSai |
| DC Power Supply | ACTIVEPOWER | WYK-10020K | 1409050110020 | 09-26-2020 | 09-25-2021 | GRGTEST |

*Remark: Calibration reference to the standard: ANSI C63.4:2014, ANSI C63.2 and CISPR 16-1-1:2010-11.*

# 6 Test results and Measurement Data

## 6.1 Test Configuration of EUT

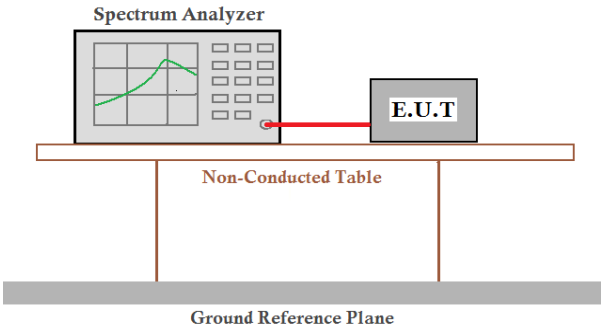
Channel list and Channels selected to perform the tests

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

Test configuration for each items

| Report Section | Test Channel | Test Conditions | Test mode |
|---|---|---|---|
| 6.2 | L, M, H | Normal | Carrier |
| 6.3 | L, M, H | Normal | Modulation |
| 6.4 | L, M, H | Normal | Modulation |
| 6.5 | L, M, H | Normal | Modulation |
| 6.6 | L, M, H | Normal | Modulation |
| 6.7 | M | Normal | Modulation |
| 6.8 | L, M, H | Normal | Modulation |
| 6.9 | / | Normal | Modulation |

## 6.2 Frequency Deviation

| | |
|---|---|
| Test Requirement: | Article 2 paragraph 1 item (19) |
| Test Method: | Appendix No.43 Notification No.88 of MIC, 2004 section 3 |
| Test Frequency Range: | 2400~2483.5MHz |
| Limit: | ± 50 ppm |
| Test setup: |  |
| Test procedure: | 1. Frequency accuracy of SA shall be less than 10% of limits tolerance (5ppm)<br>2. Setting of SA is following as: RBW:10 kHz / VBW:10 kHz<br>3. Center Frequency: The center frequency of testing for EUT<br>4. Sweep time: Auto<br>5. Sweep mode: Continuous sweep<br>6. Detect mode: Positive peak<br>7. EUT have transmitted absence of modulation signal and fixed channelize. f is using the mark cursor to mark the peak frequency value, $f_c$ is declaring of channel frequency. Then the frequency error formula is $(f-f_c)/f_c \times 10^6$ ppm and the limit is less than ± 50 ppm. |
| Test Instruments: | Refer to section 5.8 for details |
| Test Uncertainty: | ± 1 x $10^{-8}$ |
| Test results: | Pass |

**Measurement Data:**

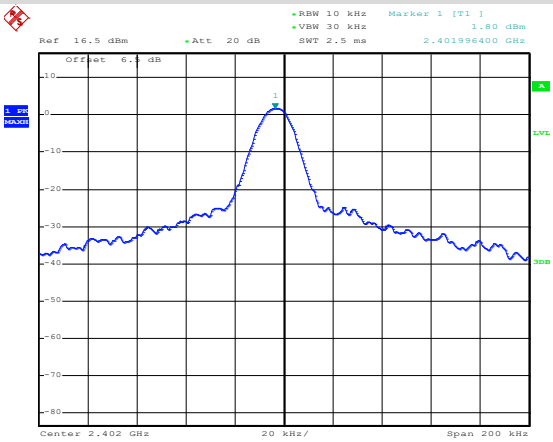
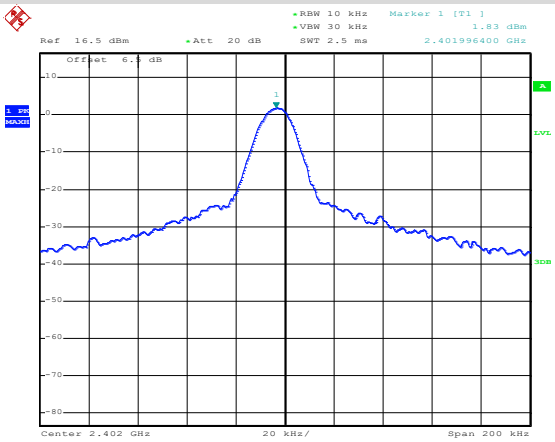
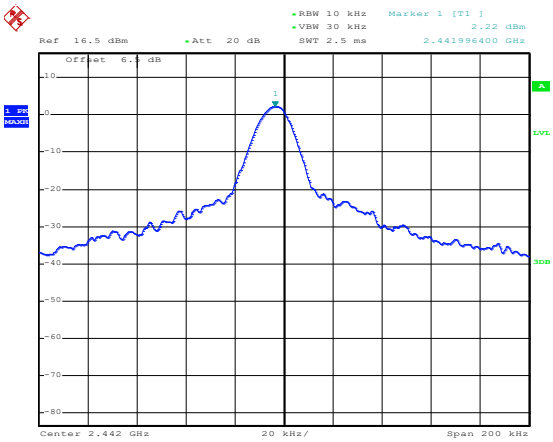
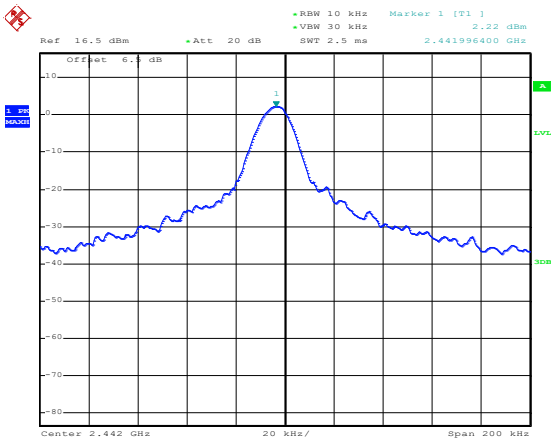
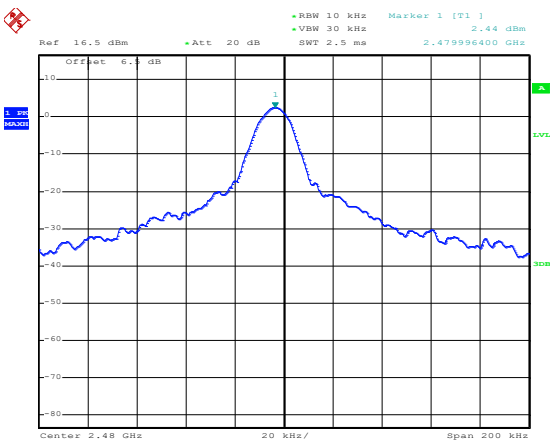
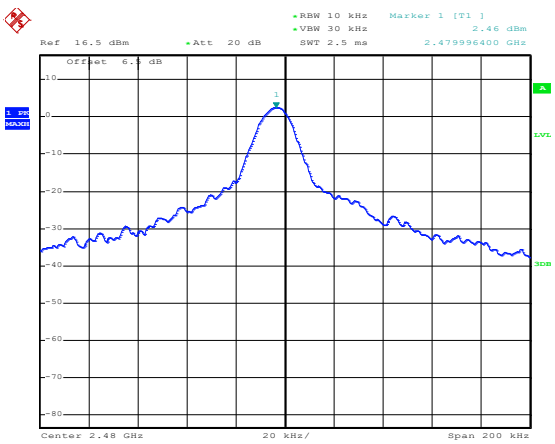
**1M PHY**

| Lowest channel | Middle channel | Highest channel | Limit | Result |
|---|---|---|---|---|
| 2401.9964 MHz | 2441.9964MHz | 2479.9964MHz | ± 50 ppm | Pass |
| -1.499ppm | -1.474ppm | -1.452ppm | | |

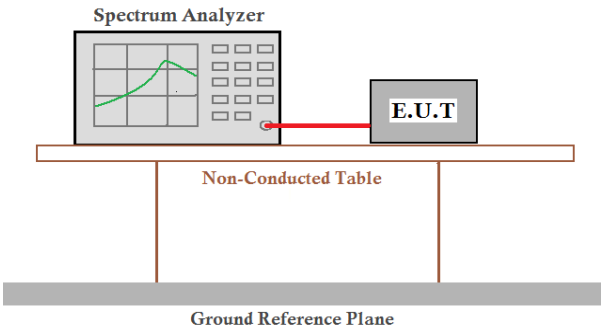
**2M PHY**

| Lowest channel | Middle channel | Highest channel | Limit | Result |
|---|---|---|---|---|
| 2401.9964 MHz | 2441.9964MHz | 2479.9964MHz | ± 50 ppm | Pass |
| -1.499ppm | -1.474ppm | -1.452ppm | | |

**Test plot as follows:**

| 1M PHY | 2M PHY |
|---|---|
|  |  |
| Date: 2.NOV.2020 11:36:56 | Date: 2.NOV.2020 11:36:48 |
| Lowest channel | Lowest channel |
|  |  |
| Date: 2.NOV.2020 11:37:09 | Date: 2.NOV.2020 11:37:17 |
| Middle channel | Middle channel |
|  |  |
| Date: 2.NOV.2020 11:38:08 | Date: 2.NOV.2020 11:37:52 |
| Highest channel | Highest channel |

## 6.3 Occupied frequency bandwidth and Spread bandwidth

| | |
|---|---|
| Test Requirement: | Article 2 paragraph 1 item (19) |
| Test Method: | Appendix No.43 Notification No.88 of MIC, 2004 section 4 |
| Limit: | 26 MHz for Occupied bandwidth<br>500 kHz for Spread bandwidth |
| Test setup: |  |
| Test procedure: | 1. Setting of SA is following as: RBW:300 kHz / VBW: 300 kHz / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold<br>2. EUT have transmitted the maximum modulation signal and fixed channelize (For DSSS or OFDM Device) or continuous maximum power of hopping mode (For FHSS14 Device). SA set to 99% of occupied bandwidth to measure occupied bandwidth. The limit is less than 26 MHz (For DSSS or OFDM Device) or 83.5 MHz (For FHSS Device).<br>3. SA set to 90% of occupied bandwidth to measure Spread Spectrum Bandwidth and must greater than 500 kHz. |
| Test Instruments: | Refer to section 5.8 for details |
| Test Uncertainty: | $\pm 1 \times 10^{-8}$ |
| Test results: | Pass |

**Measurement Data:**

**1M PHY**

| 90% Spread Bandwidth | | | | |
|---|---|---|---|---|
| Low | Middle | High | Limit | Result |
| 1056kHz | 966kHz | 1008kHz | >500kHz | Pass |
| 99% Occupied Bandwidth | | | | |
| Low | Middle | High | Limit | Result |
| 1.836MHz | 1.758MHz | 1.770MHz | <26 MHz | Pass |

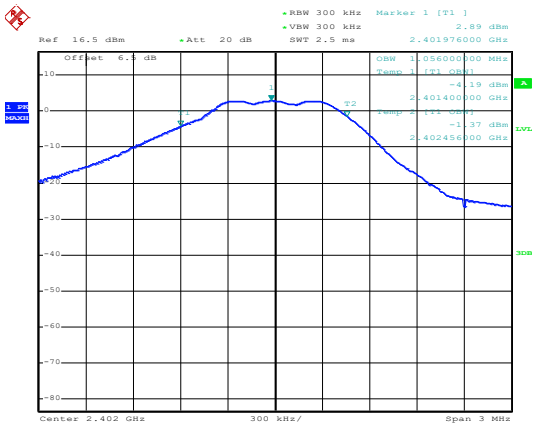
**2M PHY**

| 90% Spread Bandwidth | | | | |
|---|---|---|---|---|
| Low | Middle | High | Limit | Result |
| 1380kHz | 1380kHz | 1350kHz | >500kHz | Pass |
| 99% Occupied Bandwidth | | | | |
| Low | Middle | High | Limit | Result |
| 2.350MHz | 2.290MHz | 2.280MHz | <26 MHz | Pass |

**Test plot as follows:**

**1M PHY**

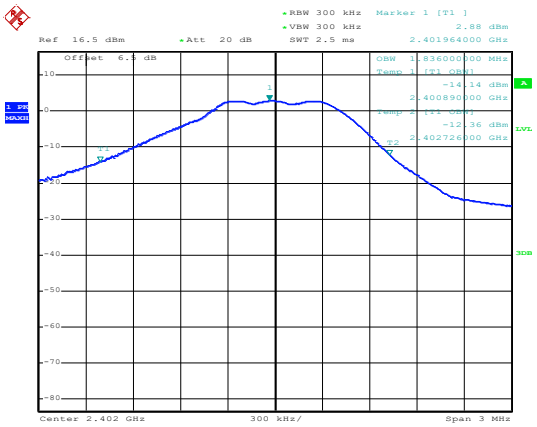
**90% OBW**




Date: 2.NOV.2020 11:28:29

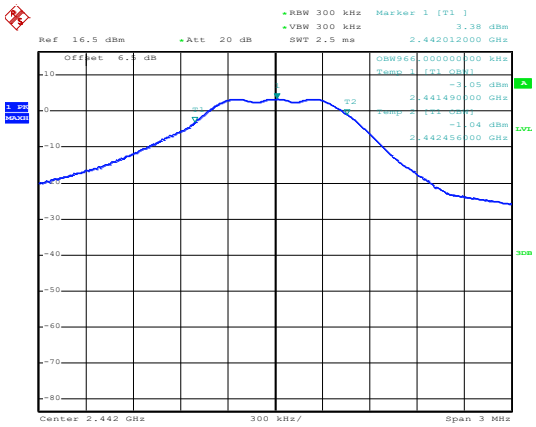
Lowest channel

**99% OBW**



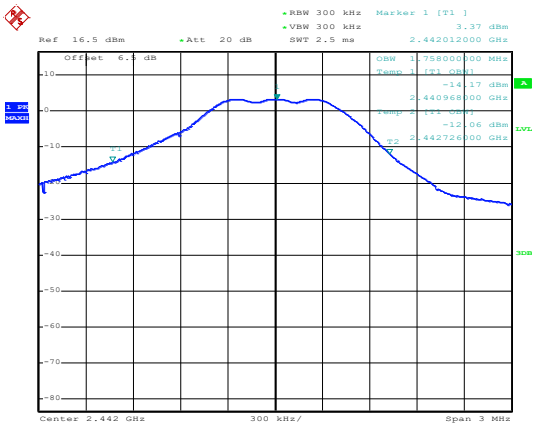

Date: 2.NOV.2020 11:28:10

Lowest channel




Date: 2.NOV.2020 11:26:59

Middle channel

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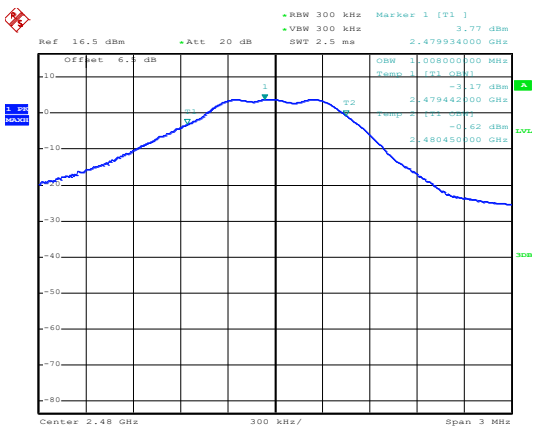
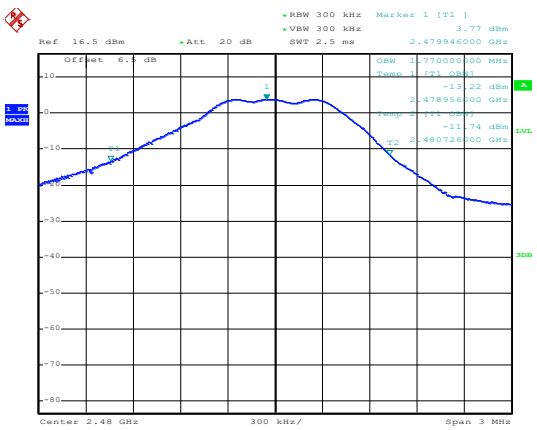
Middle channel




Date: 2.NOV.2020 11:26:34

Highest channel

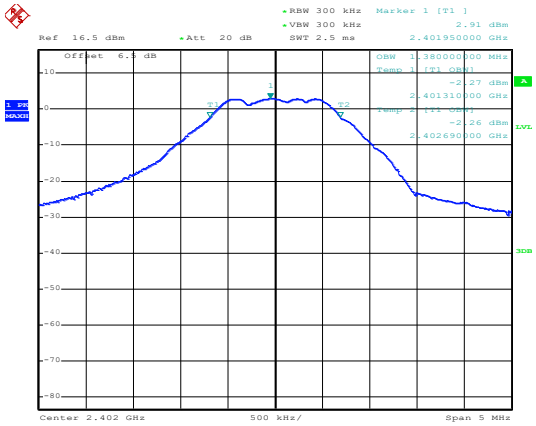



Date: 2.NOV.2020 11:26:14

Highest channel

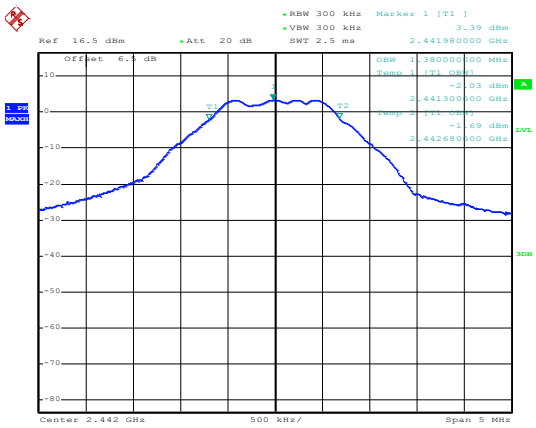
## 2M PHY

### 90% OBW



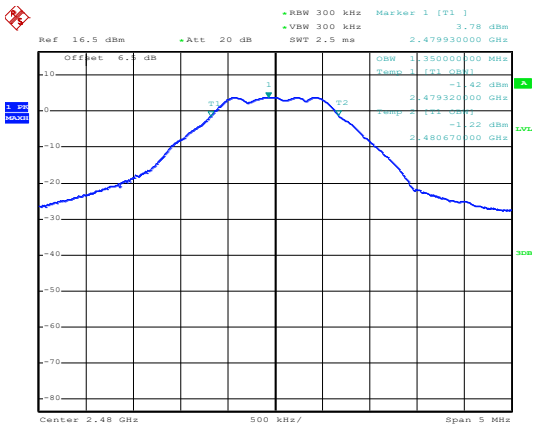

Date: 2.NOV.2020 11:33:59

Lowest channel




Date: 2.NOV.2020 11:35:09

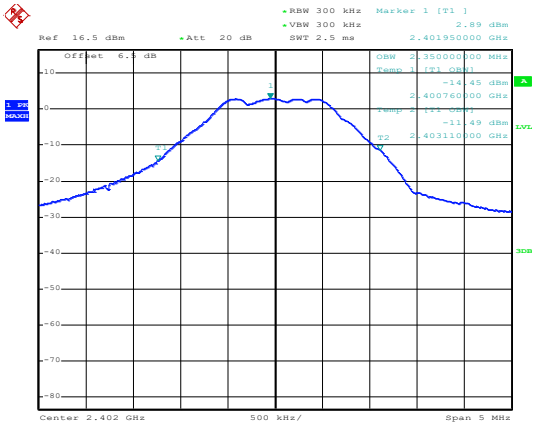
Middle channel




Date: 2.NOV.2020 11:35:34

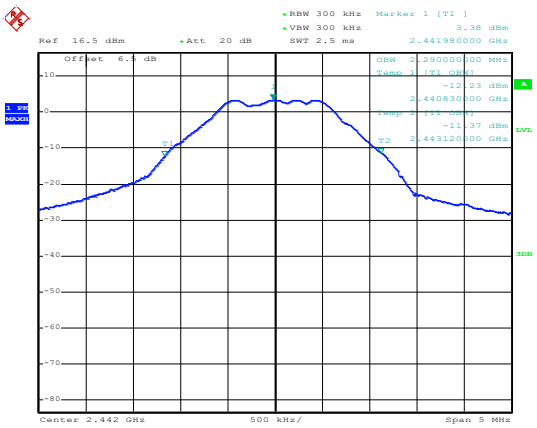
Highest channel

### 99% OBW



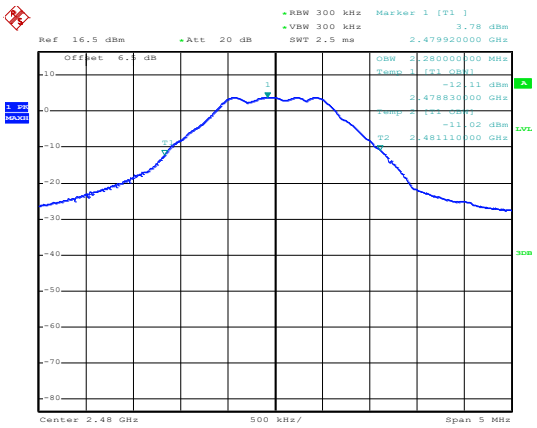

Date: 2.NOV.2020 11:34:23

Lowest channel




Date: 2.NOV.2020 11:34:50

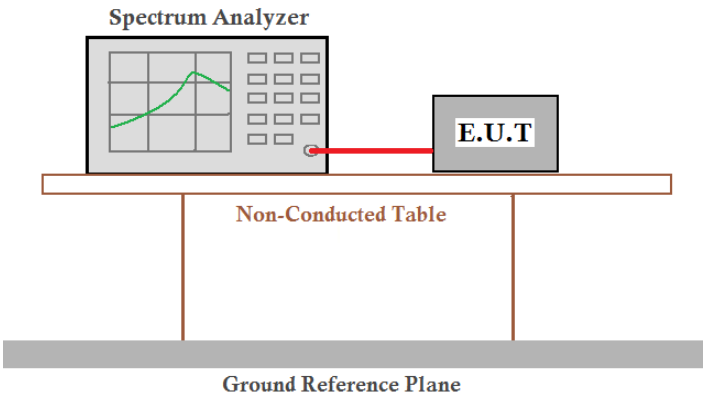
Middle channel




Date: 2.NOV.2020 11:35:55

Highest channel

## 6.4 Antenna power and deviation

| | |
|---|---|
| Test Requirement: | Article 2 paragraph 1 item (19) |
| Test Method: | Appendix No.43 Notification No.88 of MIC, 2004 section 6 |
| Equipment setup: | RBW=3MHz, VBW=3MHz, detector=Peak |
| Limit: | Antenna Power: 10mW, Deviation: + 20%≥ and ≥ -80% |
| Test setup: |  |
| Test Procedure | 1. Connect the UUT to the spectrum analyzer and use the following settings:<br>Centre Frequency: The centre frequency of the channel under test.<br>RBW: 3MHz/VBW: 10MHz/ Span: Wide enough to cover the complete power envelope of the signal of the EUT. / Detector: Peak. / Trace Mode: Max Hold.<br>2. When the trace is complete, find the peak value of the power envelope and record the frequency.<br>3. Calculated the Maximum deviation and recorded the results.<br>Deviation = (Antenna Power – Rated Output Power) / Rated Output Power * 100% |
| Test Instruments: | Refer to section 5.8 for details |
| Test Uncertainty: | ± 0.96 dB |
| Test results: | Pass |

**Measurement Data:**

**1M PHY**

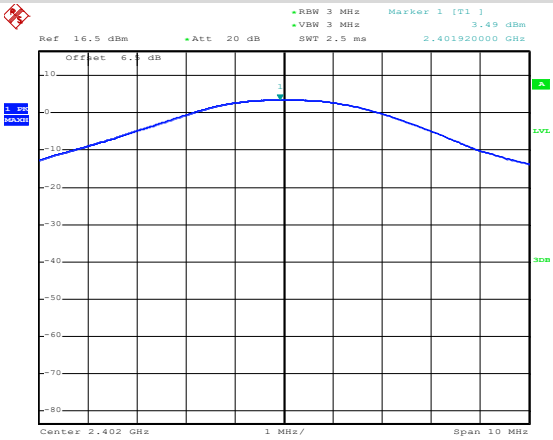
| Measured Power (mW) | | | Rated Power (mW) | Maximum Deviation (%) | Result |
|---|---|---|---|---|---|
| Lowest channel | Middle channel | Highest channel | | | |
| 2.23 | 2.27 | 2.15 | 2.5 | -14.00% | Pass |
| *Remark:*<br>*The Rated Power is 2.5mW, which declared by manufacturer.*<br>*Maximum Deviation = (Maximum power deviation)/Rated power * 100%.* | | | | | |

**2M PHY**

| Measured Power (mW) | | | Rated Power (mW) | Maximum Deviation (%) | Result |
|---|---|---|---|---|---|
| Lowest channel | Middle channel | Highest channel | | | |
| 2.24 | 2.26 | 2.15 | 2.5 | -14.00% | Pass |
| *Remark:*<br>*The Rated Power is 2.5mW, which declared by manufacturer.*<br>*Maximum Deviation = (Maximum power deviation)/Rated power * 100%.* | | | | | |

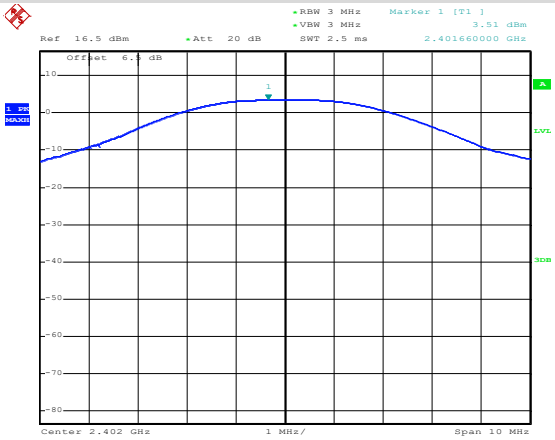
**Test plot as follows:**

| 1M PHY | 2M PHY |
|---|---|



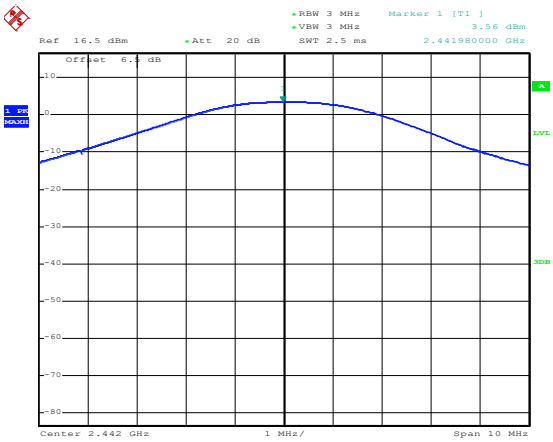

Date: 3.NOV.2020 14:48:45

Lowest channel



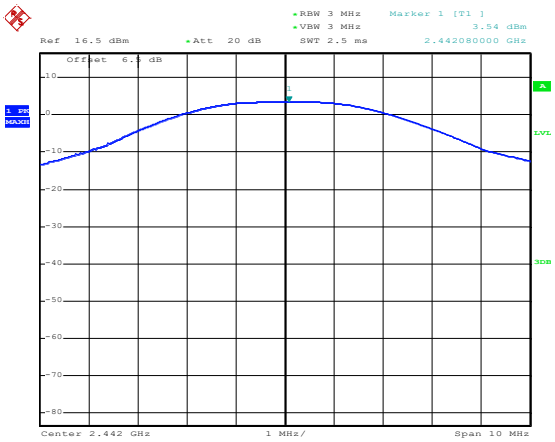

Date: 3.NOV.2020 14:47:56

Lowest channel



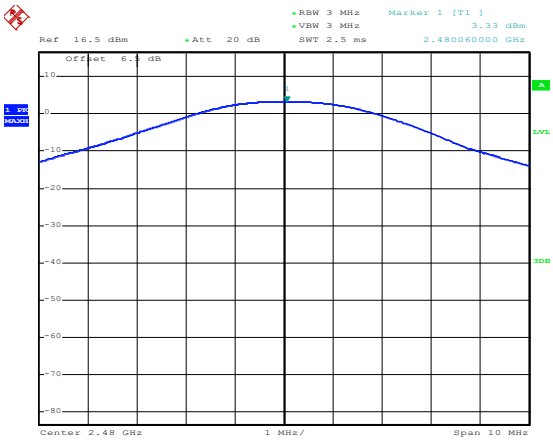

Date: 3.NOV.2020 14:49:18

Middle channel



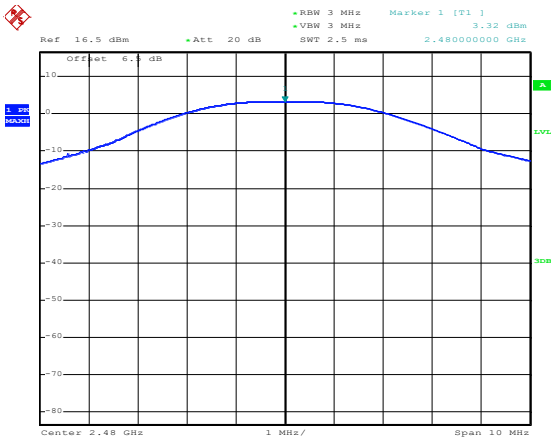

Date: 3.NOV.2020 14:47:20

Middle channel




Date: 3.NOV.2020 14:49:50

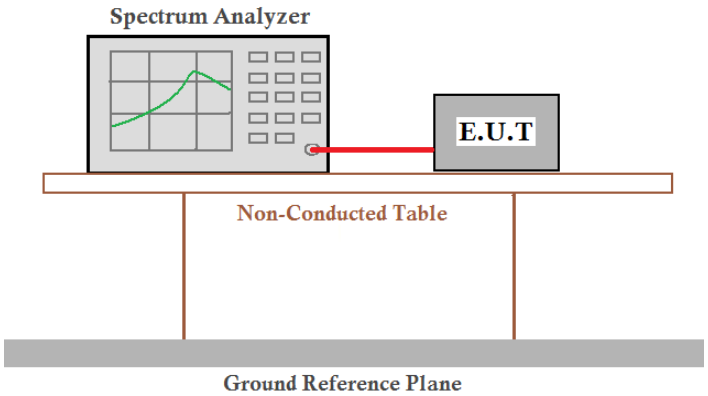
Highest channel




Date: 3.NOV.2020 14:46:45

Highest channel

## 6.5 Transmitter Spurious Emissions

| | |
|---|---|
| Test Requirement: | Article 2 paragraph 1 item (19) |
| Test Method: | Appendix No.43 Notification No.88 of MIC, 2004 section 7 |
| Equipment setup: | Below 1 GHz: RBW=100 kHz, VBW=100 kHz, detector=Peak<br>Above 1 GHz: RBW=1 MHz, VBW=1 MHz, detector=Peak |
| Limit: | 30MHz~1000MHz:2.5μW(-26dBm);<br>1000MHz~2387MHz: 2.5μW/MHz (-26dBm);<br>2387MHz~ 2400MHz:25μW/MHz (-16dBm)<br>2483.5 MHz~ 2496.5MHz : 25μW/MHz (-16dBm);<br>2496.5MHz~12.75 GHz : 2.5μW/MHz (-26dBm) |
| Test setup: |  |
| Test Procedure | 1. EUT have transmitted the maximum modulation signal and fixed channelize.<br>2. Setting of SA is following as: RBW:1MHz / VBW:1MHz/ Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold.<br>3. Setting of SA is following as 30 MHz and stop frequency 1000 MHz Then to mark peak reading value + cable loss shall be less than 0.25μW.<br>4. Setting of SA is following as 1000 MHz and stop frequency 2387 MHz, and then to mark peak reading value + cable loss shall be less than 2.5μW.<br>5. SA adjusted to start frequency 2387 MHz and stop frequency 2400 MHz, then to mark peak reading value + cable loss shall be less than 25μW.<br>6. SA adjusted to start frequency 2483.5 MHz and stop frequency 2496.5 MHz , then to mark peak reading value + cable loss shall be less than 25μW<br>7. SA adjusted to start frequency 2496.5 MHz and stop frequency 12750 MHz, then to mark peak reading value + cable loss shall be less than 2.5μW. |
| Test Instruments: | Refer to section 5.8 for details |
| Test Uncertainty: | ± 0.96 dB |
| Test results: | Pass |

**Measurement Data:**

**1M PHY**

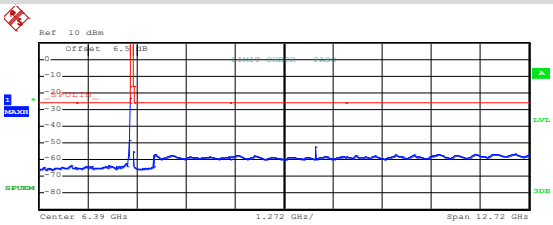
| Test channel: Low Channel | | | |
|---|---|---|---|
| Frequency(MHz) | Read Level(dBm) | Limit(dBm) | Result |
| 856.440 | -63.26 | -26 | Pass |
| 2375.904 | -54.05 | | |
| 2399.298 | -23.04 | -16 | |
| 2490.663 | -55.47 | | |
| 7205.000 | -52.46 | -26 | |
| Test channel: Middle Channel | | | |
| Frequency(MHz) | Read Level(dBm) | Limit(dBm) | Result |
| 704.150 | -63.55 | -26 | Pass |
| 2385.613 | -58.46 | | |
| 2398.531 | -49.16 | -16 | |
| 2484.410 | -50.42 | | |
| 7328.000 | -54.24 | -26 | |
| Test channel: High Channel | | | |
| Frequency(MHz) | Read Level(dBm) | Limit(dBm) | Result |
| 685.720 | -63.49 | -26 | Pass |
| 2374.517 | -60.75 | | |
| 2395.970 | -52.59 | -16 | |
| 2484.163 | -29.65 | | |
| 2499.004 | -53.68 | -26 | |

**2M PHY**

| Test channel: Low Channel | | | |
|---|---|---|---|
| Frequency(MHz) | Read Level(dBm) | Limit(dBm) | Result |
| 823.460 | -63.65 | -26 | Pass |
| 2382.839 | -48.39 | | |
| 2399.961 | -19.55 | -16 | |
| 24885.333 | -55.37 | | |
| 7208.000 | -51.52 | -26 | |
| Test channel: Middle Channel | | | |
| Frequency(MHz) | Read Level(dBm) | Limit(dBm) | Result |
| 964.110 | -63.00 | -26 | Pass |
| 2380.0065 | -58.59 | | |
| 2393.201 | -50.25 | -16 | |
| 2484.514 | -50.06 | | |
| 7325.000 | -55.06 | -26 | |
| Test channel: High Channel | | | |
| Frequency(MHz) | Read Level(dBm) | Limit(dBm) | Result |
| 886.510 | -64.05 | -26 | Pass |
| 2385.613 | -61.70 | | |
| 2392.811 | -51.63 | -16 | |
| 2483.773 | -28.41 | | |
| 2499.004 | -53.32 | -26 | |

**Test plots as follows:**

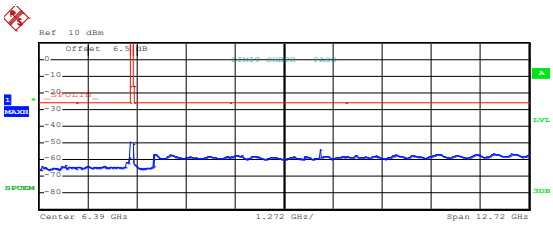
## 1M PHY




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 856.440000 M | -63.26 | -37.26 |
| 1.000 G | 2.387 G | 1.00 M | 2.375904 G | -54.05 | -28.05 |
| 2.387 G | 2.400 G | 1.00 M | 2.399298 G | -23.04 | -7.04 |
| 2.483 G | 2.497 G | 1.00 M | 2.490663 G | -55.47 | -39.47 |
| 2.497 G | 5.000 G | 1.00 M | 3.059788 G | -56.76 | -30.76 |
| 5.000 G | 8.000 G | 1.00 M | 7.205000 G | -52.46 | -26.46 |
| 8.000 G | 12.750 G | 1.00 M | 12.389000 G | -56.44 | -30.44 |

Date: 2.NOV.2020 11:21:13

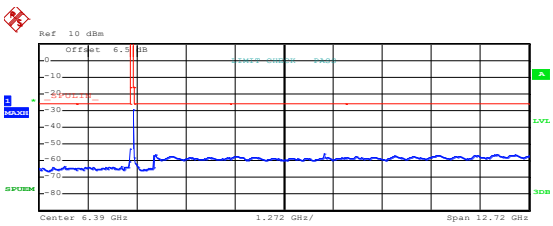
Lowest channel




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 704.150000 M | -63.55 | -37.55 |
| 1.000 G | 2.387 G | 1.00 M | 2.385613 G | -58.46 | -32.46 |
| 2.387 G | 2.400 G | 1.00 M | 2.398531 G | -49.16 | -33.16 |
| 2.483 G | 2.497 G | 1.00 M | 2.484410 G | -50.42 | -34.42 |
| 2.497 G | 5.000 G | 1.00 M | 3.022235 G | -57.01 | -31.01 |
| 5.000 G | 8.000 G | 1.00 M | 7.328000 G | -54.24 | -28.24 |
| 8.000 G | 12.750 G | 1.00 M | 12.298750 G | -56.55 | -30.55 |

Date: 2.NOV.2020 11:21:45

Middle channel

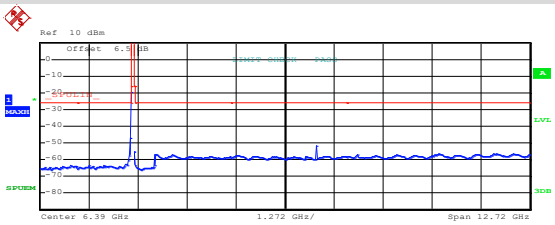



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 685.720000 M | -63.49 | -37.49 |
| 1.000 G | 2.387 G | 1.00 M | 2.374517 G | -60.75 | -34.75 |
| 2.387 G | 2.400 G | 1.00 M | 2.395970 G | -62.59 | -36.59 |
| 2.483 G | 2.497 G | 1.00 M | 2.484163 G | -29.65 | -13.65 |
| 2.497 G | 5.000 G | 1.00 M | 2.499004 G | -53.68 | -27.68 |
| 5.000 G | 8.000 G | 1.00 M | 7.442000 G | -55.86 | -29.86 |
| 8.000 G | 12.750 G | 1.00 M | 11.923500 G | -56.55 | -30.55 |

Date: 2.NOV.2020 11:22:17

Highest channel

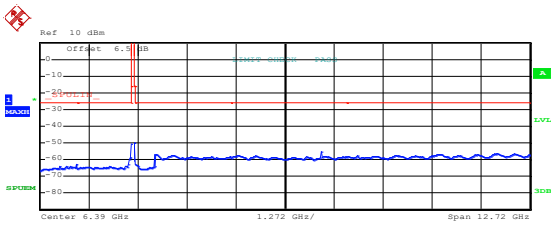
## 2M PHY




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 823.460000 M | -63.65 | -37.65 |
| 1.000 G | 2.387 G | 1.00 M | 2.382839 G | -48.39 | -22.39 |
| 2.387 G | 2.400 G | 1.00 M | 2.399961 G | -19.55 | -3.55 |
| 2.483 G | 2.497 G | 1.00 M | 2.485333 G | -55.37 | -39.37 |
| 2.497 G | 5.000 G | 1.00 M | 3.062291 G | -56.70 | -30.70 |
| 5.000 G | 8.000 G | 1.00 M | 7.208000 G | -51.52 | -25.52 |
| 8.000 G | 12.750 G | 1.00 M | 11.809500 G | -56.49 | -30.49 |

Date: 2.NOV.2020 11:19:19

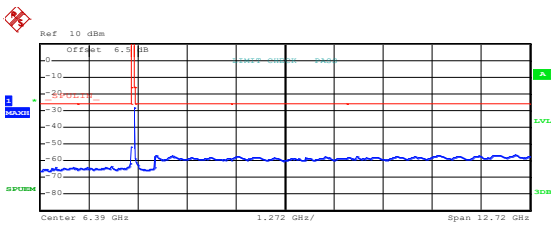
Lowest channel




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 964.110000 M | -63.00 | -37.00 |
| 1.000 G | 2.387 G | 1.00 M | 2.380065 G | -58.59 | -32.59 |
| 2.387 G | 2.400 G | 1.00 M | 2.393201 G | -50.25 | -34.25 |
| 2.483 G | 2.497 G | 1.00 M | 2.484514 G | -50.06 | -34.06 |
| 2.497 G | 5.000 G | 1.00 M | 3.052277 G | -56.81 | -30.81 |
| 5.000 G | 8.000 G | 1.00 M | 7.325000 G | -55.06 | -29.06 |
| 8.000 G | 12.750 G | 1.00 M | 11.876000 G | -56.56 | -30.56 |

Date: 2.NOV.2020 11:20:26

Middle channel

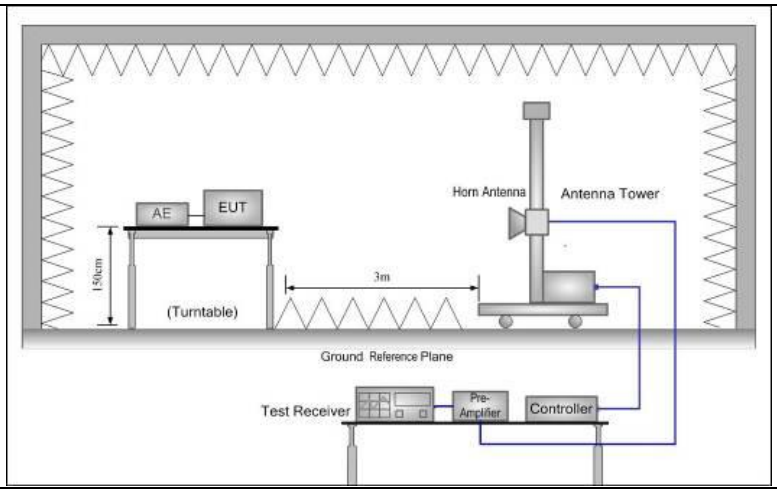



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 1.00 M | 886.510000 M | -64.05 | -38.05 |
| 1.000 G | 2.387 G | 1.00 M | 2.385613 G | -61.70 | -35.70 |
| 2.387 G | 2.400 G | 1.00 M | 2.392811 G | -51.63 | -35.63 |
| 2.483 G | 2.497 G | 1.00 M | 2.483773 G | -28.41 | -12.41 |
| 2.497 G | 5.000 G | 1.00 M | 2.499004 G | -53.32 | -27.32 |
| 5.000 G | 8.000 G | 1.00 M | 7.442000 G | -57.32 | -31.32 |
| 8.000 G | 12.750 G | 1.00 M | 12.351000 G | -56.51 | -30.51 |

Date: 2.NOV.2020 11:20:49

Highest channel

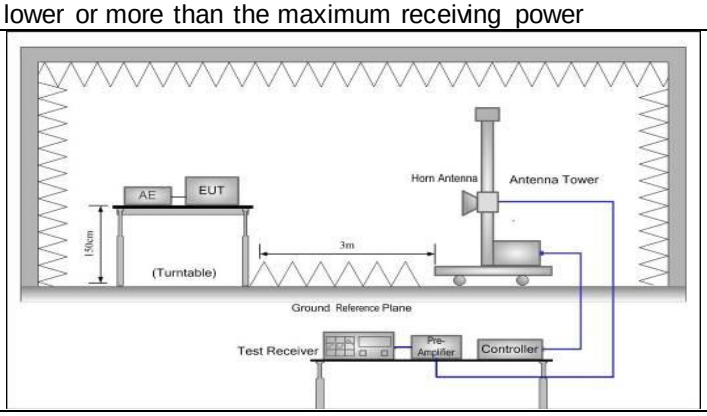
## 6.6 Transmitting antenna absolute gain

| | |
|---|---|
| Test Requirement: | Article 2 paragraph 1 item (19) |
| Test Method: | Appendix No.43 Notification No.88 of MIC, 2004 section 8 |
| Equipment setup: | RBW=1MHz, VBW=3MHz, Frequency range= 2400MHz~2483.5MHz, Detector = Peak |
| Test setup: |  |
| Test procedure | 1. Set EUT and measuring antenna at the same height and roughly facing each other.<br>2. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of the measuring antenna. The output level at the spectrum analyzer is read sa "E".<br>3. Remove the EUT from the turn table and put the replacing antenna facing to measuring antenna at same height. Set the standard signal generator (SSG) at same frequency and transmit on then receive the signal<br>4. Swing the replacing antenna give a maximum receiving level.<br>5. Move the measuring antenna height up and down within ± 50cm of replacing antenna height and swing it to find the maximum receiving level.<br>6. Set SSG output power at Pt to give the equivalent output level of "E" or calculate Pt with SSG output which gives the nearest of "E" and difference (± 1dB). Record the Pt.<br>7. Calculate EIRP by the formula below EIRP = Gt – L + Pt.<br>Gt: gain of replacing antenna (dBi) L: feeder loss between SSG and replacing antenna Pt: Output power of the SSG<br>8. If the antenna for the EUT has circular polarization, sum of V-field and H-field will be result if measuring antenna is linear polarization. |
| Test Instruments: | Refer to section 5.8 for details |
| Test results: | Pass |

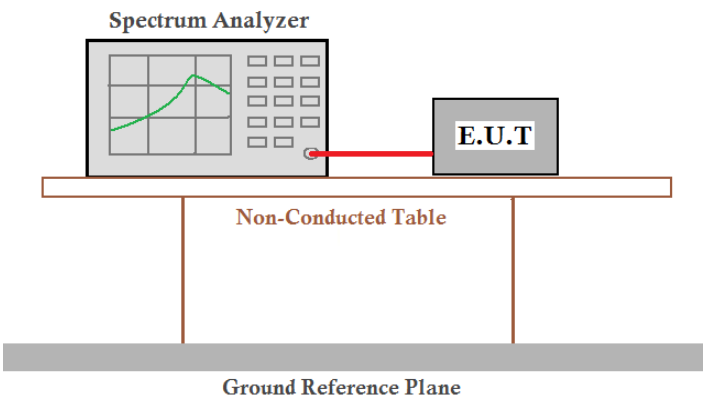
**Measurement Data:**

| Test Channel | Antenna Power (Conducted) | Antenna Gain | Antenna Power (Radiated) |
|---|---|---|---|
| Middle Channel | 3.56dBm | 0.35dBi | 3.91dBm |
| *Remark: The maximum EIRP less than 12.14 dBm, so the test not requirement.* | | | |

## 6.7 Main lobe width of transmitting antenna

| | |
|---|---|
| Test Requirement: | Article 2 paragraph 1 item (19) |
| Test Method: | Appendix No.43 Notification No.88 of MIC, 2004 section 9 |
| Equipment setup: | RBW=1 MHz, VBW=1 kHz, Span = 0, Detector=Peak |
| Requirement: | The receiving power at the side lobes except the main lobe (Θ0) is 3dB lower or more than the maximum receiving power |
| Test setup: |  |
| Test Procedure: | (1) Put the radio equipment and the test antenna approximately to face each other.<br>(2) Set the spectrum analyzer as the above. Adjust its reference level so as to observe the receiving power in its suitable receiving condition.<br>(3) Adjust the radio equipment rotating horizontally and vertically so as to coincide to the maximum power direction.<br>(4) Changing the height of the test antenna between +50cm against the height of the radio equipment and adjusting its direction too, look out a maximum point of the receiving power. The indication of the spectrum analyzer at this point is referred as "E".<br>(5) Using the equivalent isotropic radiation power (PE) which was already measured, calculate the allowable main lobe width (Θ0) concerning horizontal and vertical planes. Allowable main lobe width (Θ0) =360/A here, Θ0 : Allowable main lobe width of the transmitting antenna of the radio equipment (half-width) (º) PE : Equivalent isotropic radiation power of the radio equipment (dBm) A : This is calculated as the equivalent isotropic radiation power divided by absolute gain 2.14dBi of transmitting antenna being fed by average antenna power 10mW (10mW/MHz for the orthogonal frequency division multiplexing system, the direct diffusion system, the frequency hopping system, the compound system of direct diffusion and frequency hopping, and the compound system of orthogonal frequency division multiplexing and frequency hopping.<br>(6) Rotating the radio equipment horizontally a round as possible, confirm that the receiving power at the side lobes except main lobe width (Θ0) is lower than 3dB or more of the maximum receiving power "E".<br>(7) Once put the radio equipment back to the state (3). Inclining the radio equipment vertically as far as possible (more than 90 degree; it may be possible to measure referring "6. Other conditions"), confirm that the receiving power at the side lobes except main lobe width (Θ0) is lower than 3dB or more of the maximum receiving power "E". |
| Test Instruments: | Refer to section 5.8 for details |
| Test results: | This test item not requirement for EIRP less than 12.14 dBm. Because the EIRP of EUT is less than 12.14 dBm, so not requirement. |

## 6.8 Spurious radiation or extraneous emission strength for Receiver part

| | |
|---|---|
| Test Requirement: | Article 2 paragraph 1 item (19) |
| Test Method: | Appendix No.43 Notification No.88 of MIC, 2004 section 5 |
| Equipment Setup: | RBW = 100 kHz,VBW= 100 kHz for below 1 GHz<br>RBW = 1 MHz, VBW = 1 MHz for above 1 GHz |
| Limit: | 4 nW for below 1 GHz, 20 nW for above 1 GHz |
| Test setup: |  |
| Test Procedure: | 1. EUT have the continuous reception mode and fixed only one channelize.<br>2. Setting of SA is following as RB / VB: 100 kHz (below 1GHz emissions) / 1 MHz (above 1GHz emissions) / AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold<br>3. SA set RB: 100 kHz and VB: 100 kHz. Then adjust to start frequency 30MHz and stop frequency 1000 MHz. Search to mark peak reading value + cable loss shall be less than 4nW<br>4. SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12750 MHz. Search to mark peak reading value + cable loss shall be less than 20 nW<br>5. If power level of lower emissions are more than 1/10 of limit (.0.4nW for f < 1GHz, 2 nW for f >= 1GHz), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated. |
| Test Instruments: | Refer to section 5.8 for details |
| Test Uncertainty | ± 0.96 dB |
| Test results: | Pass |

**Measurement Data:**

**1M PHY**

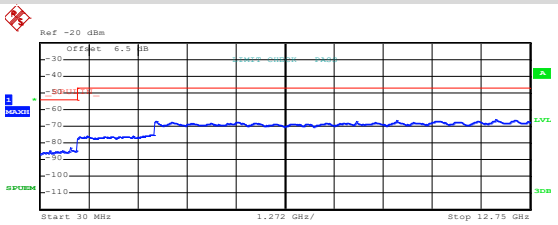
| Test channel: Lowest Channel | | | |
|---|---|---|---|
| Frequency(MHz) | Read Level(dBm) | Limit(dBm) | Result |
| 824.430 | -83.11 | -54 | Pass |
| 11851.125 | -66.18 | -47 | |
| Test channel: Middle Channel | | | |
| Frequency(MHz) | Read Level(dBm) | Limit(dBm) | Result |
| 814.730 | -83.64 | -54 | Pass |
| 11880.500 | -66.21 | -47 | |
| Test channel: Highest Channel | | | |
| Frequency(MHz) | Read Level(dBm) | Limit(dBm) | Result |
| 843.830 | -83.77 | -54 | Pass |
| 12362.250 | -65.96 | -47 | |

**2M PHY**

| Test channel: Lowest Channel | | | |
|---|---|---|---|
| Frequency(MHz) | Read Level(dBm) | Limit(dBm) | Result |
| 816.670 | -83.00 | -54 | Pass |
| 11845.250 | -65.79 | -47 | |
| Test channel: Middle Channel | | | |
| Frequency(MHz) | Read Level(dBm) | Limit(dBm) | Result |
| 821.520 | -83.78 | -54 | Pass |
| 12391.625 | -66.40 | -47 | |
| Test channel: Highest Channel | | | |
| Frequency(MHz) | Read Level(dBm) | Limit(dBm) | Result |
| 786.600 | -83.68 | -54 | Pass |
| 12347.563 | -66.52 | -47 | |

**Test plots as follows:**

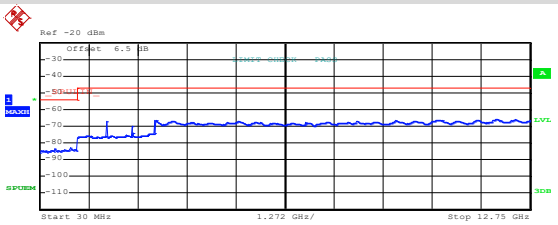
| 1M PHY | 2M PHY |
|---|---|




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 100.00 k | 824.430000 M | -83.11 | -29.11 |
| 1.000 G | 12.750 G | 1.00 M | 11.851125 G | -66.18 | -19.18 |

Date: 2.NOV.2020 11:17:19

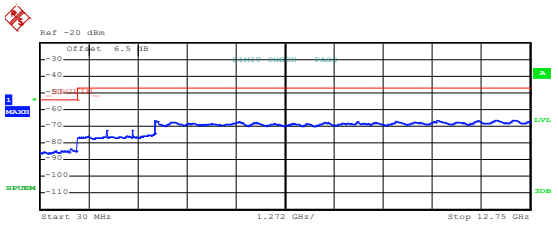
Lowest channel




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 100.00 k | 816.670000 M | -83.00 | -29.00 |
| 1.000 G | 12.750 G | 1.00 M | 11.845250 G | -65.79 | -18.79 |

Date: 2.NOV.2020 11:14:24

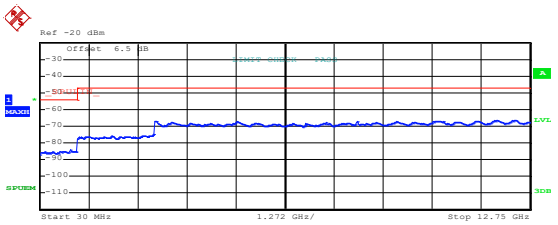
Lowest channel




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 100.00 k | 814.730000 M | -83.64 | -29.64 |
| 1.000 G | 12.750 G | 1.00 M | 11.880500 G | -66.21 | -19.21 |

Date: 2.NOV.2020 11:17:53

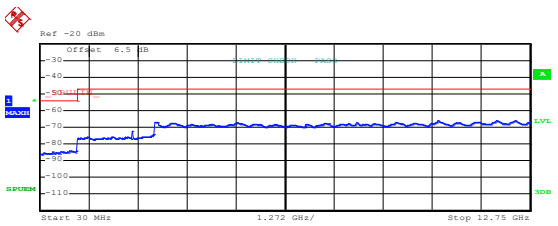
Middle channel




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 100.00 k | 821.520000 M | -83.78 | -29.78 |
| 1.000 G | 12.750 G | 1.00 M | 12.391625 G | -66.40 | -19.40 |

Date: 2.NOV.2020 11:16:21

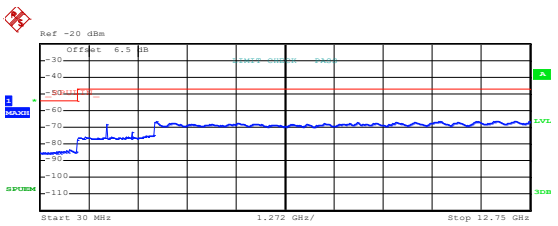
Middle channel




| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 100.00 k | 843.830000 M | -83.77 | -29.77 |
| 1.000 G | 12.750 G | 1.00 M | 12.362250 G | -65.96 | -18.96 |

Date: 2.NOV.2020 11:18:28

Highest channel

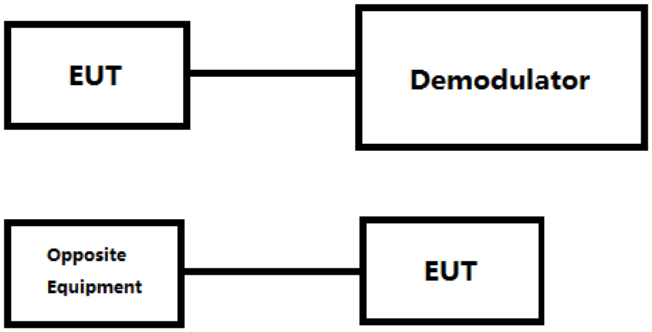



| Start [Hz] | Stop [Hz] | RBW [Hz] | Freq [Hz] | PwrAbs [dBm] | ΔLimit [dB] |
|---|---|---|---|---|---|
| 30.000 M | 1.000 G | 100.00 k | 786.600000 M | -83.68 | -29.68 |
| 1.000 G | 12.750 G | 1.00 M | 12.347563 G | -66.52 | -19.52 |

Date: 2.NOV.2020 11:17:04

Highest channel

## 6.9 Interference suppression function

| | |
|---|---|
| Test Requirement: | Article 2 paragraph 1 item (19) |
| Test Method: | Appendix No.43 Notification No.88 of MIC, 2004 section 10 |
| Requirement: | 1. The demodulator shall be able to demodulate the transmitting signal from the radio equipment and to display contents of the identification code.<br>2. The opposite equipment shall be able to transmit the identification code as same as the transmitting signal from the radio equipment |
| Test setup: |  |
| Test Procedure: | 1. The radio equipment with automatic transmitting function of identification code<br>A. Transmit the assigned identification code from the radio equipment.<br>B. Confirm the identification code received by the demodulator.<br>2. The radio equipment with automatic receiving function of identification code<br>A. Transmit the assigned identification code from the opposite equipment.<br>B. Confirm that the usual communication is available.<br>C. Transmit the identification code distinct from the assigned one from the opposite equipment.<br>D. Confirm that the radio equipment is stopped or an indication is displayed as the identification code is different. |
| Test Instruments: | Refer to section 5.8 for details |
| Test results: | Pass. |

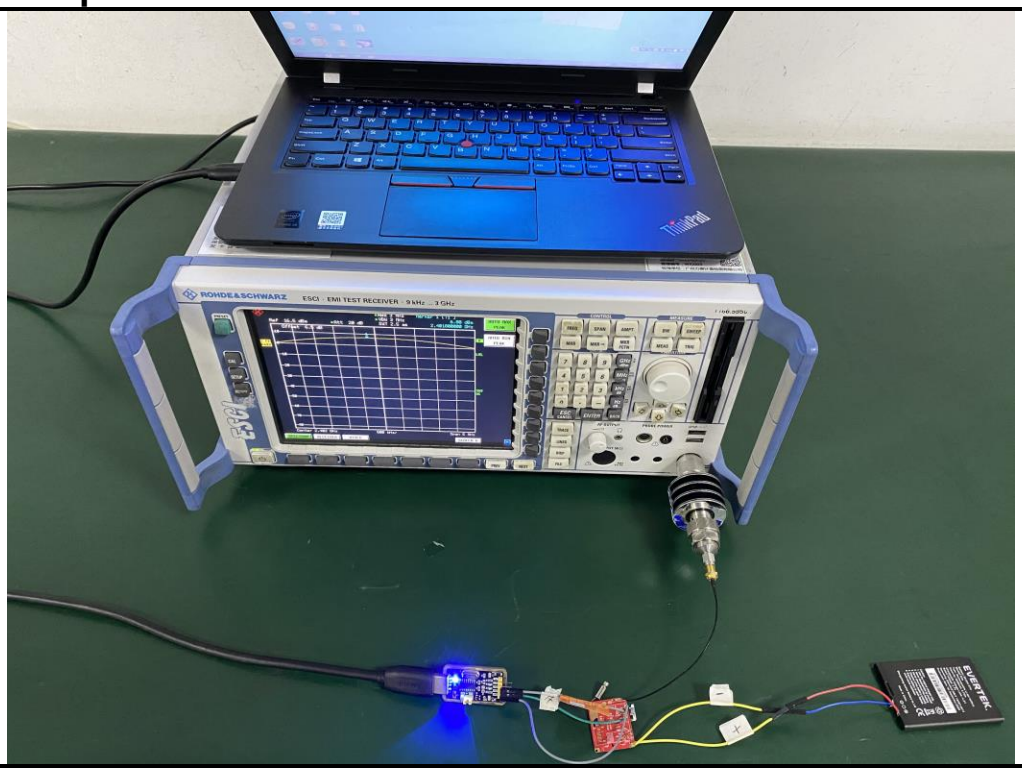
**Please refer to below plot:**

C5

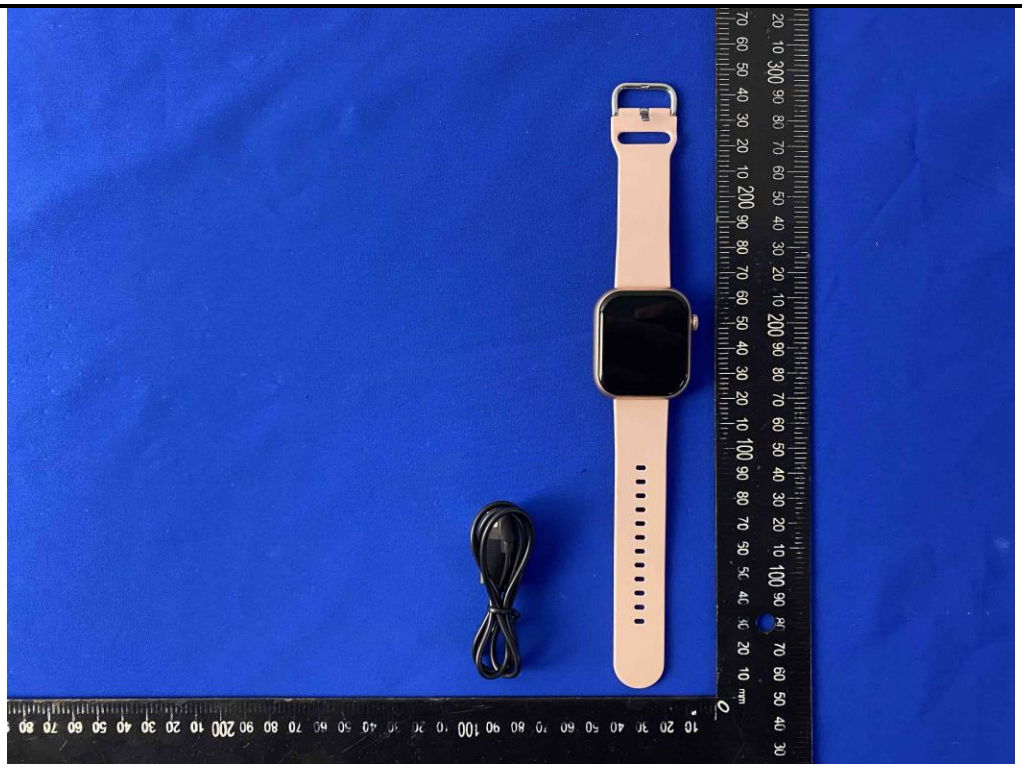
Services:FEE7

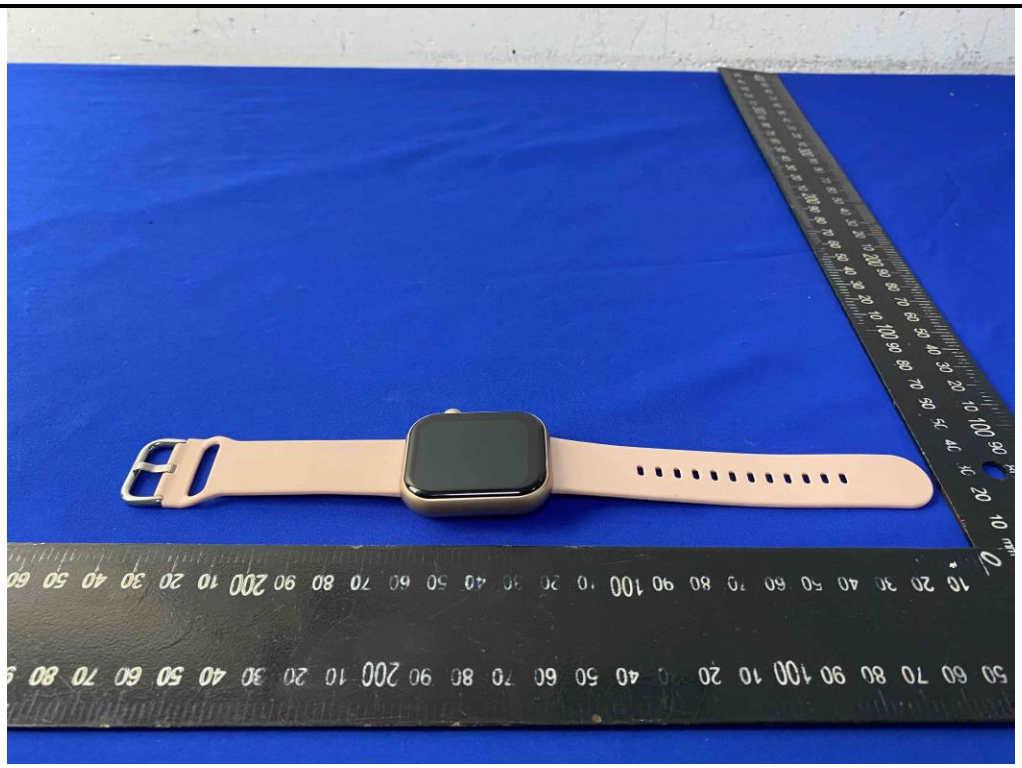
Mac:F8:F8:05:7C:A8:0A

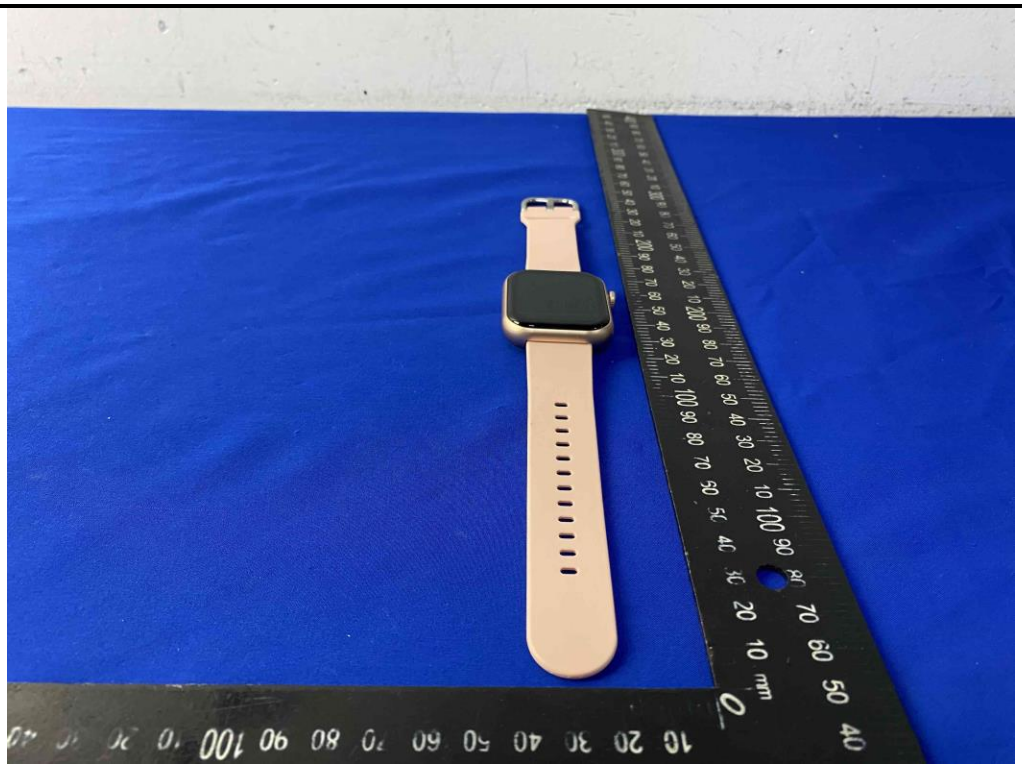
# 7 Test Setup Photo

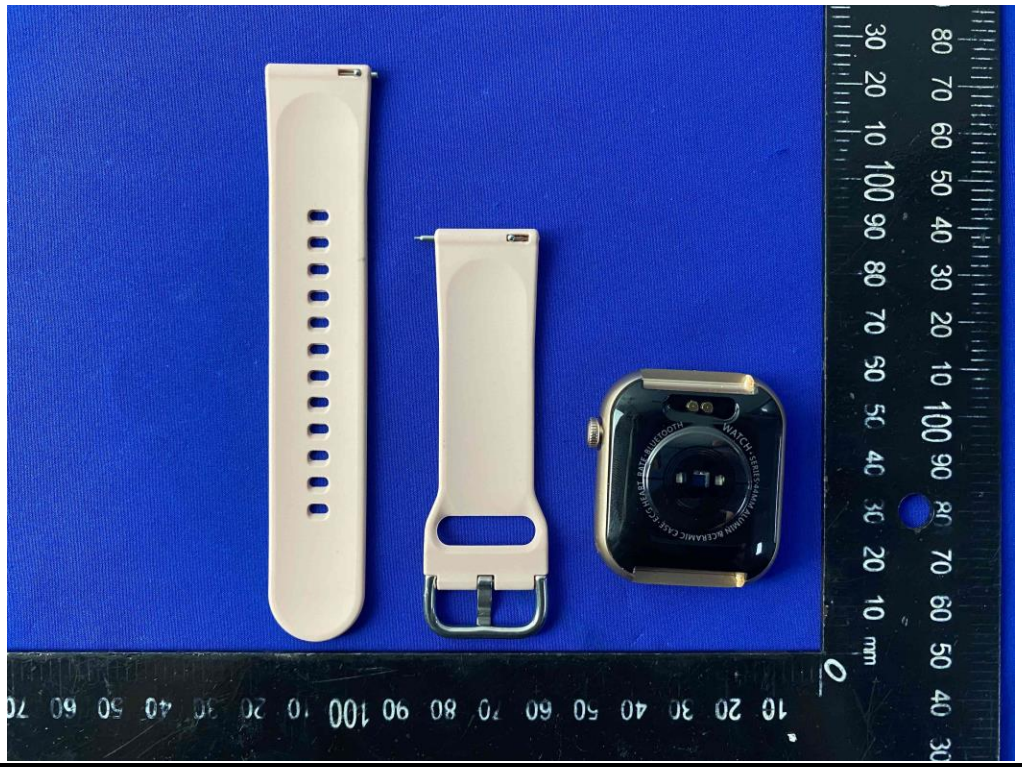


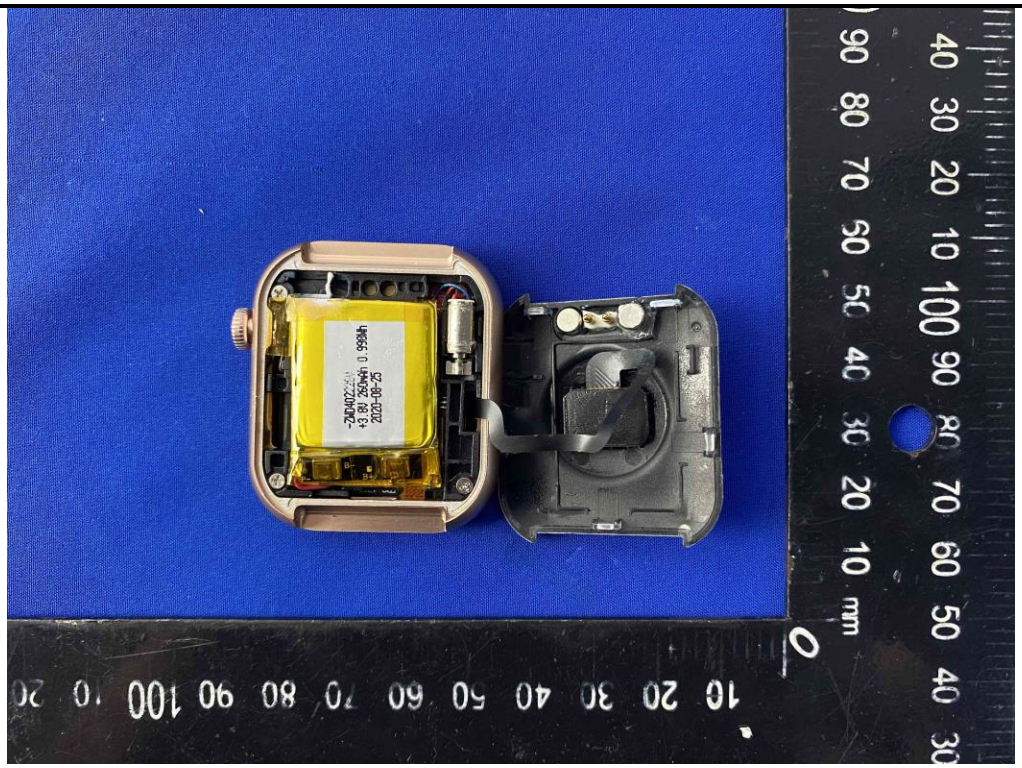
# 8 EUT Constructional Details

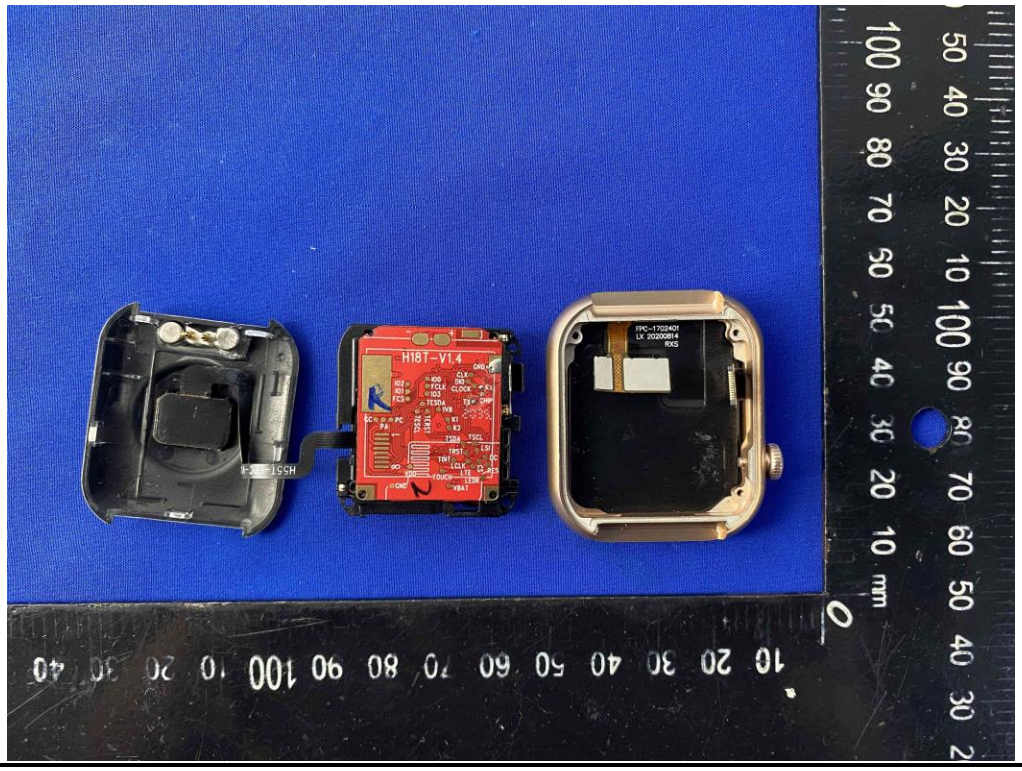


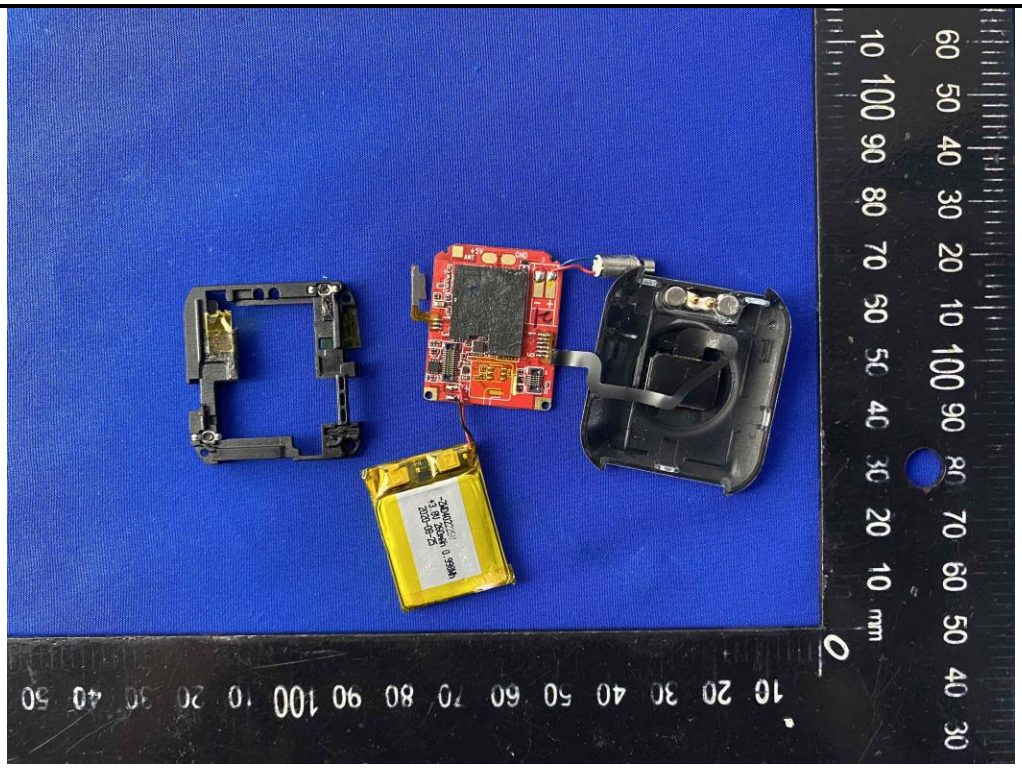


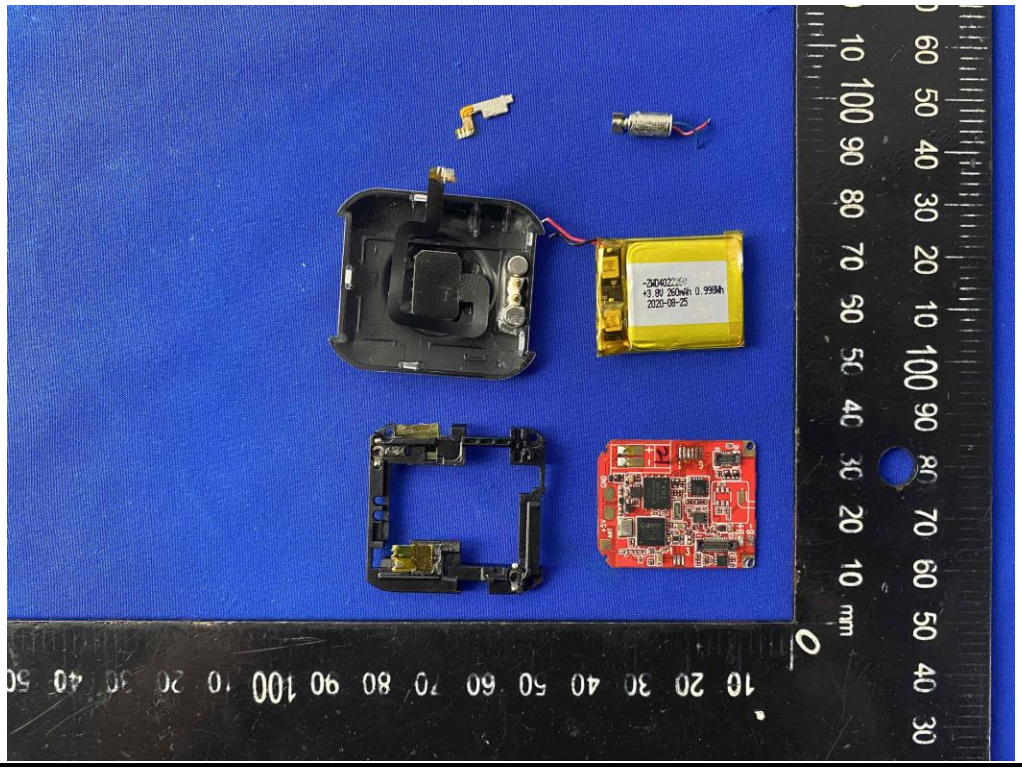


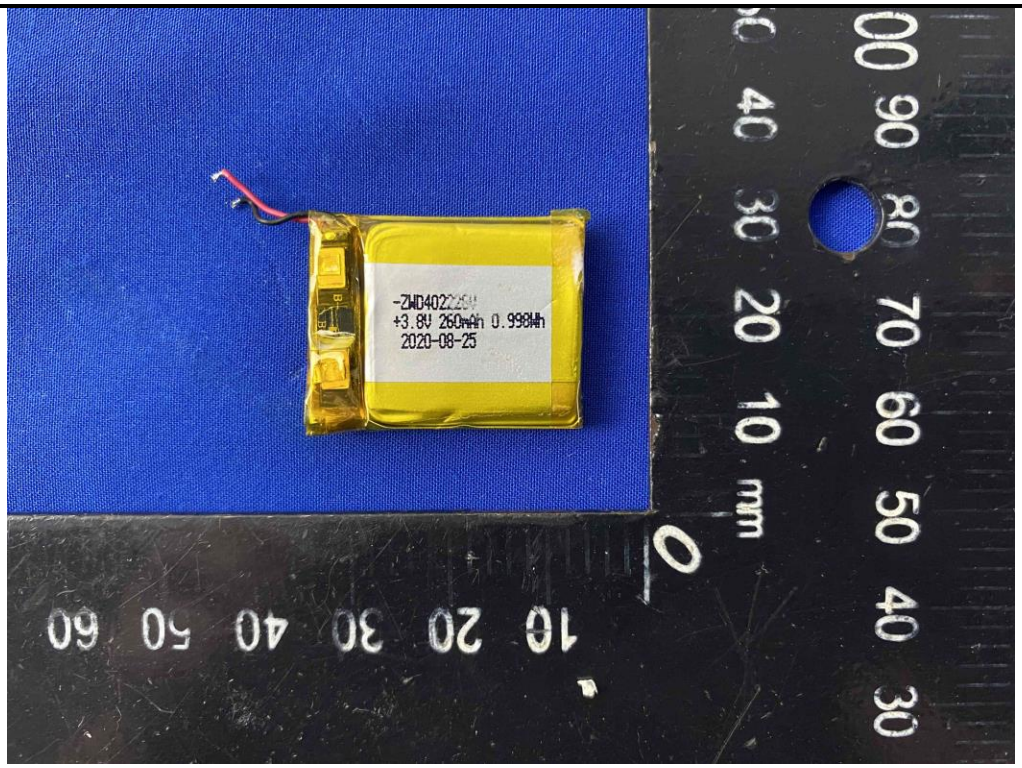


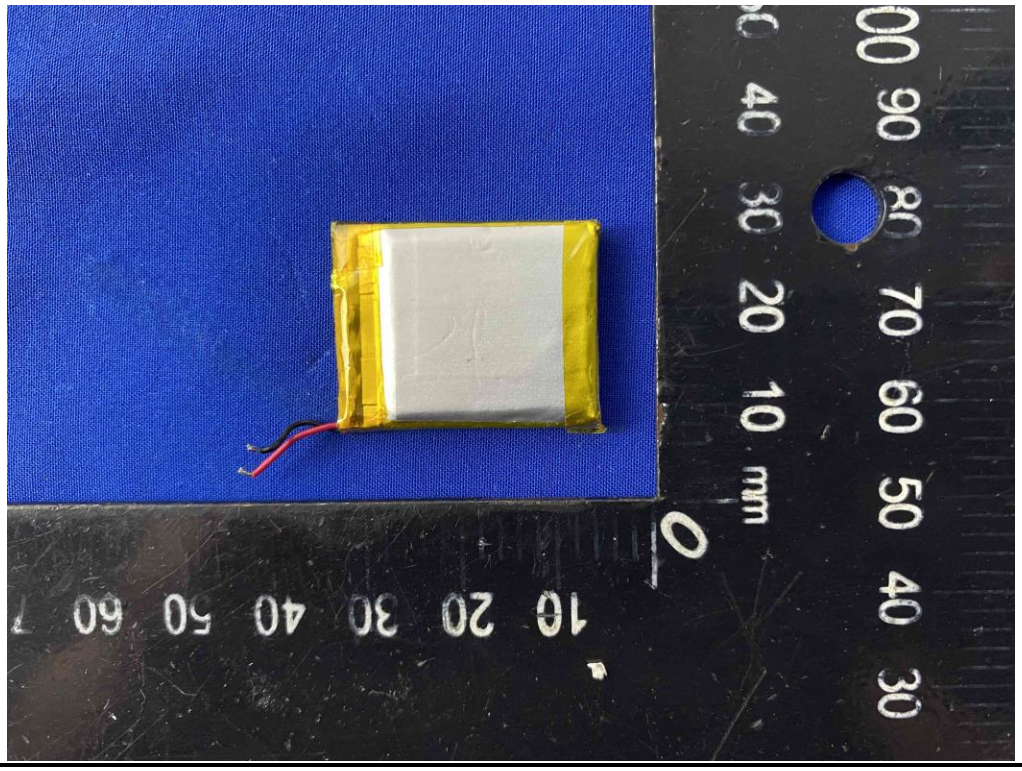

-2JD402
+3.8V 265mAh 0.999Wh
2020-08-25

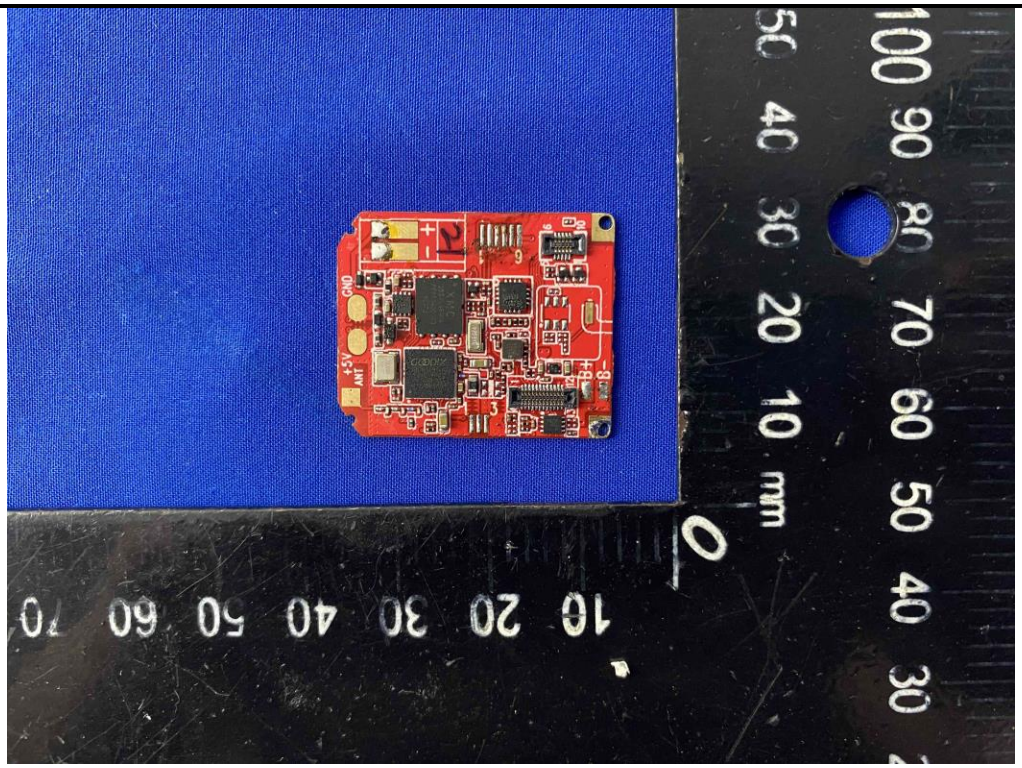

H18T-V1.4
FPC-1702401
LX 20200814
RKS

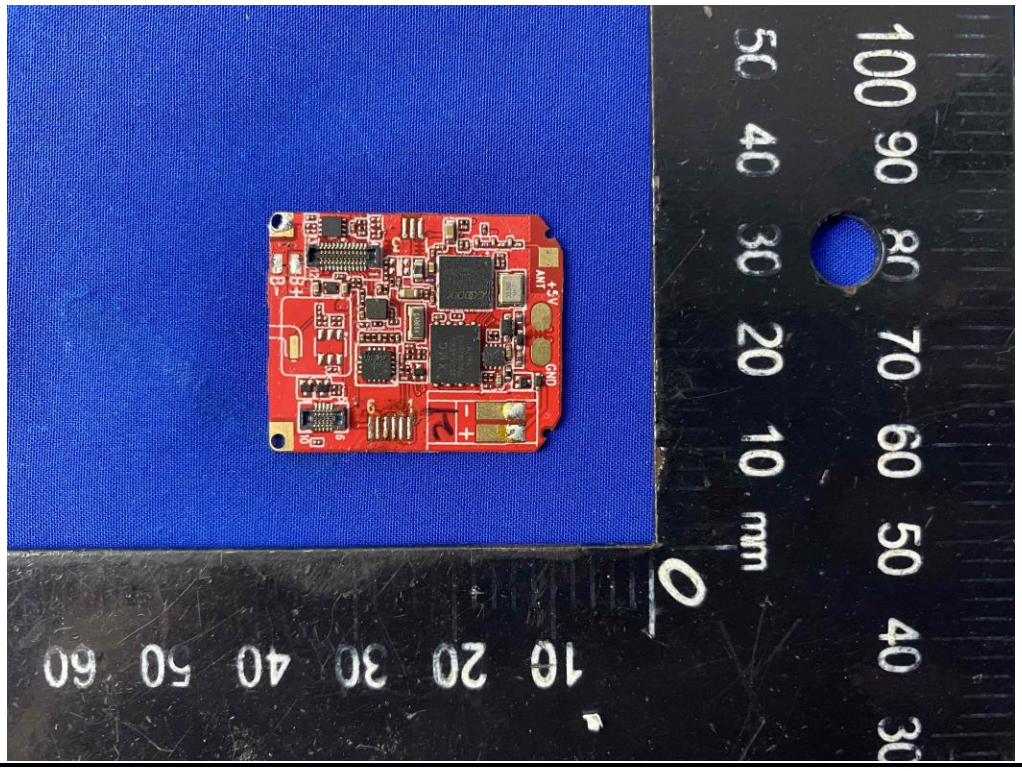


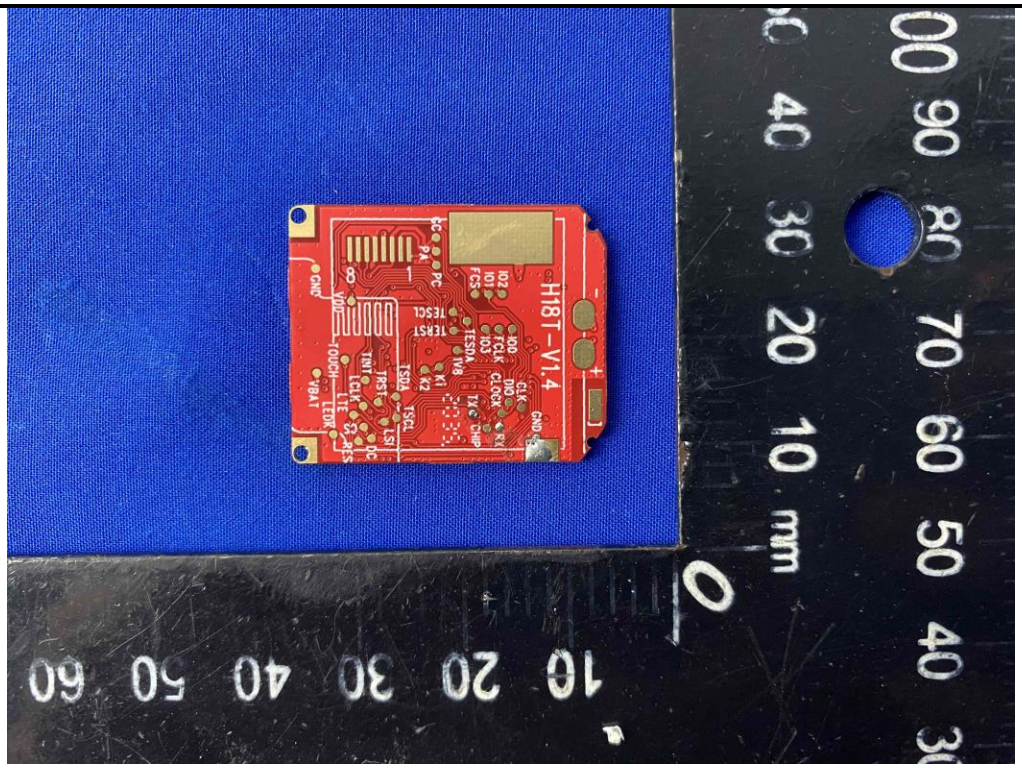


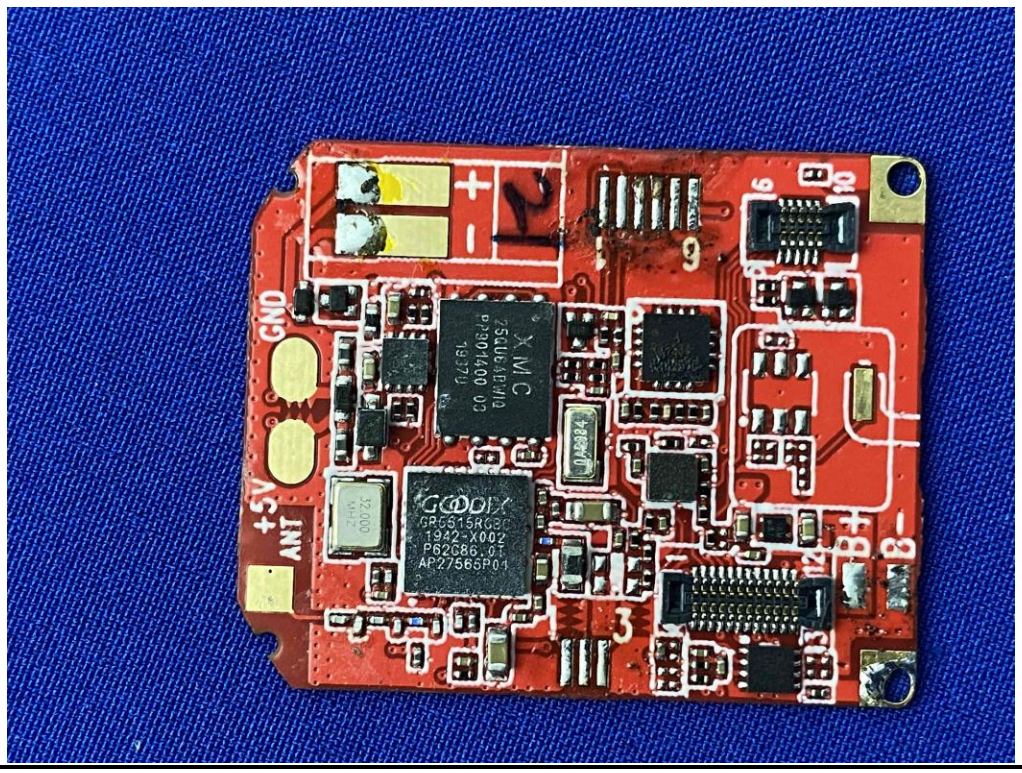

-ZWD402
+3.8V 260mAh 0.998Wh
2020-08-25

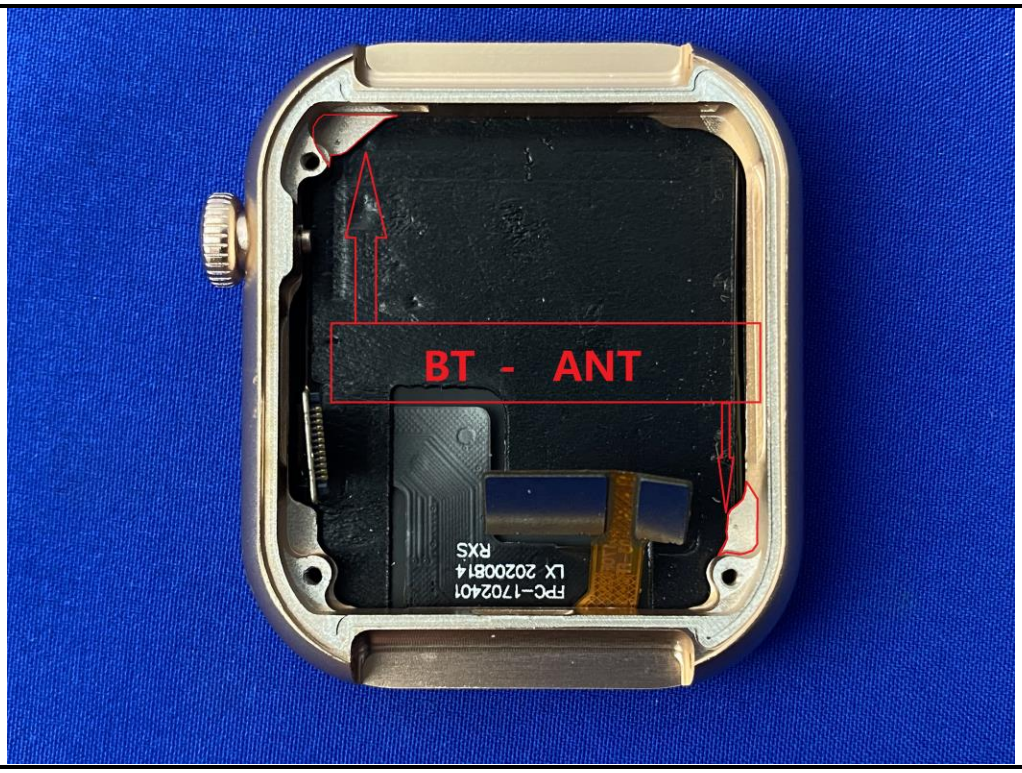



100 90 80 70 60 50 40 30
50 40 30 20 10 mm 0
10 20 30 40 50 60 70
+5V
ANT
GND


100 90 80 70 60 50 40 30
50 40 30 20 10 mm 0
10 20 30 40 50 60
+5V
ANT
GND


H18T-V1.4
GND
CLK
RX
CHIP
TX
CLOCK
GND
IO0
FCLK
IO3
TESDA
TVB
X1
X2
TSDA
TSCL
LSI
DC
CS
S3
LEDK
CLK
TINT
TP5
TOUCH
VDD
GND
RAM
TERST
TESCL
PC
PA
FCS
IO1
IO2
10 20 30 40 50 60
0
10 20 30 40 50 60 70 80 90 00
mm


+5V
ANT
GND
XMC
GOODIX
32.000
MHz
AP27566P01
+B
-B




-----End of report------