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FCC Test Report

Test report

On Behalf of

Anhui Huichi Optoelectronics Technology Co., Ltd

For

Mobile smart screen

Model No.: HCH1-B320

FCC ID: 2BRZF-HCH1-B320

Prepared For : **Anhui Huichi Optoelectronics Technology Co., Ltd**

**Building A2, Phase II, Dream Technology Industrial Park, Yingshang County,
Fuyang City, Anhui Province, China**

Prepared By : **Shenzhen HUAK Testing Technology Co., Ltd.**

**1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai
Street, Bao'an District, Shenzhen, Guangdong, China**

Date of Test: **May 27, 2025 ~ Jul. 01, 2025**

Date of Report: **Jul. 01, 2025**

Report Number: **HK2505272756-E**

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Test Result Certification

Applicant's name Anhui Huichi Optoelectronics Technology Co., Ltd

Address Building A2, Phase II, Dream Technology Industrial Park, Yingshang County, Fuyang City, Anhui Province, China

Manufacturer's Name Anhui Huichi Optoelectronics Technology Co., Ltd

Address Building A2, Phase II, Dream Technology Industrial Park, Yingshang County, Fuyang City, Anhui Province, China

Product description

Trade Mark: N/A

Product name Mobile smart screen

Model and/or type reference HCH1-B320

Standards **47 CFR FCC Part 15 Subpart C 15.247**

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Date of Test

Date (s) of performance of tests.... **May 27, 2025 ~ Jul. 01, 2025**

Date of Issue **Jul. 01, 2025**

Test Result **Pass**

Testing Engineer



Len Liao

Len Liao

Technical Manager



Sliver Wan

Sliver Wan

Authorized Signatory



Jason Zhou

Jason Zhou



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**** Modified History ****

| Revision | Description | Issued Data | Remark |
|--------------|-----------------------------|---------------|------------|
| Revision 1.0 | Initial Test Report Release | Jul. 01, 2025 | Jason Zhou |
| | | | |
| | | | |



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1. Summary

1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

ANSI C63.10:2020: American National Standard for Testing Unlicensed Wireless Devices.

1.2. Test Description

| FCC PART 15.247 | | |
|----------------------------|---|------|
| FCC Part 15.207 | AC Power Line Conducted Emission | PASS |
| FCC Part 15.215 | 20dB Bandwidth & 99% Bandwidth | PASS |
| FCC Part 15.247(d) | Spurious RF Conducted Emission | PASS |
| FCC Part 15.247(b) | Maximum Peak Output Power | PASS |
| FCC Part 15.247(a)(1) | Pseudorandom Frequency Hopping Sequence | PASS |
| FCC Part 15.247(a)(1)(iii) | Number of hopping frequency & Time of Occupancy | PASS |
| FCC Part 15.247(a)(1) | Frequency Separation | PASS |
| FCC Part 15.205/15.209 | Radiated Emissions | PASS |
| FCC Part 15.247(d) | Band Edge Compliance of RF Emission | PASS |



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1.3. Information of the Test Laboratory

Shenzhen HUAK Testing Technology Co., Ltd.

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Testing Laboratory Authorization :

A2LA Accreditation Code is 4781.01.

FCC Designation Number is CN1229.

Canada IC CAB identifier is CN0045.

CNAS Registration Number is L9589.

1.4. Statement of the Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

| Test | Measurement Uncertainty | Notes |
|---|-------------------------|-------|
| Transmitter power conducted | $\pm 0.37\text{dB}$ | (1) |
| Transmitter power Radiated | $\pm 3.35\text{dB}$ | (1) |
| Conducted spurious emission 9KHz-40 GHz | $\pm 2.20\text{dB}$ | (1) |
| Occupied Bandwidth | $\pm 3.68\%$ | (1) |
| Radiated Emission 30~1000MHz | $\pm 3.90\text{dB}$ | (1) |
| Radiated Emission Above 1GHz | $\pm 4.28\text{dB}$ | (1) |
| Conducted Disturbance 0.15~30MHz | $\pm 2.71\text{dB}$ | (1) |

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2. General Information

2.1. Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

| | |
|---------------------|---------|
| Normal Temperature: | 25°C |
| Relative Humidity: | 55 % |
| Air Pressure: | 101 kPa |

2.2. General Description of EUT

| | |
|--|--|
| Product Name: | Mobile smart screen |
| Model Name | HCH1-B320 |
| Series Model(s): | N/A |
| Model Difference: | N/A |
| Trade Mark: | N/A |
| Power supply: | DC 5V From Adapter with AC 100-240V, 50-60Hz, 1.6A or DC12V From DC Power or DC 14.4V From Battery |
| Version: | Supported EDR |
| Modulation: | GFSK, $\pi/4$ DQPSK, 8DPSK |
| Operation frequency: | 2402MHz~2480MHz |
| Channel number: | 79CH |
| Channel separation: | 1MHz |
| Antenna type: | FPC Antenna |
| Antenna gain: | 3.43dBi |
| Hardware Version: | V1.0 |
| Software Version: | GM92V3-B-DRC-FHDNL-Z464-OVERSEA-20250410 |
| Note: | |
| 1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. | |
| 2. Antenna gain Refer to the antenna specifications. | |
| 3. The cable loss data is obtained from the supplier. | |
| 4. The test results in the report only apply to the tested sample. | |

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2. Antenna gain Refer to the antenna specifications.

3. The cable loss data is obtained from the supplier.

4. The test results in the report only apply to the tested sample.

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2.4. Equipments Used During the Test

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|---------------------------------|-----------------|-------------------------|------------|------------|---------------|
| 1 | L.I.S.N. | R&S | ENV216 | HKE-002 | 2025/02/19 | 1 Year |
| 2 | L.I.S.N. | R&S | ENV216 | HKE-059 | 2025/02/19 | 1 Year |
| 3 | EMI Test Receiver | R&S | ESR | HKE-005 | 2025/02/19 | 1 Year |
| 4 | Spectrum analyzer | Agilent | N9020A | HKE-025 | 2025/02/19 | 1 Year |
| 5 | Spectrum analyzer | Agilent | N9020A | HKE-117 | 2025/02/19 | 1 Year |
| 6 | Spectrum analyzer | R&S | FSV3044 | HKE-126 | 2025/02/19 | 1 Year |
| 7 | Preamplifier | EMCI | EMC051845S | HKE-006 | 2025/02/19 | 1 Year |
| 8 | Preamplifier | Schwarzbeck | BBV 9743 | HKE-016 | 2025/02/19 | 1 Year |
| 9 | Preamplifier | A.H. Systems | SAS-574 | HKE-182 | 2025/02/19 | 1 Year |
| 10 | 6d Attenuator | Pasternack | 6db | HKE-184 | 2025/02/19 | 1 Year |
| 11 | EMI Test Receiver | Rohde & Schwarz | ESR-7 | HKE-010 | 2025/02/19 | 1 Year |
| 12 | Broadband Antenna | Schwarzbeck | VULB9168 | HKE-167 | 2024/02/21 | 2 Year |
| 13 | Loop Antenna | COM-POWER | AL-130R | HKE-014 | 2024/02/21 | 2 Year |
| 14 | Horn Antenna | Schwarzbeck | 9120D | HKE-013 | 2024/02/21 | 2 Year |
| 15 | EMI Test Software | Tonscend | JS32-CE 2.5.0.6 | HKE-081 | / | / |
| 16 | EMI Test Software | Tonscend | JS32-RE 5.0.0 | HKE-082 | / | / |
| 17 | RF Automatic control unit | Tonscend | JS0806-2 | HKE-060 | 2025/02/19 | 1 Year |
| 18 | High pass filter unit | Tonscend | JS0806-F | HKE-055 | 2025/02/19 | 1 Year |
| 19 | Wireless Communication Test Set | R&S | CMU200 | HKE-026 | 2025/02/19 | 1 Year |
| 20 | Wireless Communication Test Set | R&S | CMW500 | HKE-027 | 2025/02/19 | 1 Year |
| 21 | High-low temperature chamber | Guangke | HT-80L | HKE-118 | 2025/06/09 | 1 Year |
| 22 | Temperature and humidity meter | Boyang | HTC-1 | HKE-075 | 2025/06/09 | 1 Year |
| 23 | RF Test Software | Tonscend | JS1120-3 Version 3.5.39 | HKE-083 | / | / |
| 24 | 10dB Attenuator | Schwarzbeck | VTSD9561F | HKE-153 | 2025/02/19 | 1 Year |
| 25 | RSE Test Software | Tonscend | JS36-RSE 5.0.0 | HKE-184 | / | / |

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2.8. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Trade Mark | Model/Type No. | Specification | Remark |
|------|---------------------|------------|----------------|---|------------|
| 1 | Mobile smart screen | N/A | HCH1-B320 | N/A | EUT |
| 2 | Power Line | N/A | N/A | Length:1.53m | Accessory |
| 3 | Adapter | N/A | PD100W | Input: 100-240V, 50/60Hz, 1.6A Output: 5.0V, 3.0A/9.0V, 3.0A/12.0V, 3.0A/15.0V, 3.0A/20.0V, 5.0A | Accessory |
| 4 | Laptop | N/A | TP00096A | Input: DC 20V, 2.25~3.25A | Peripheral |

Note:-

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, 20db Bandwidth, Frequency Separation, Number of Hopping Frequency, Time of Occupancy (Dwell Time), Out-of-Band Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.



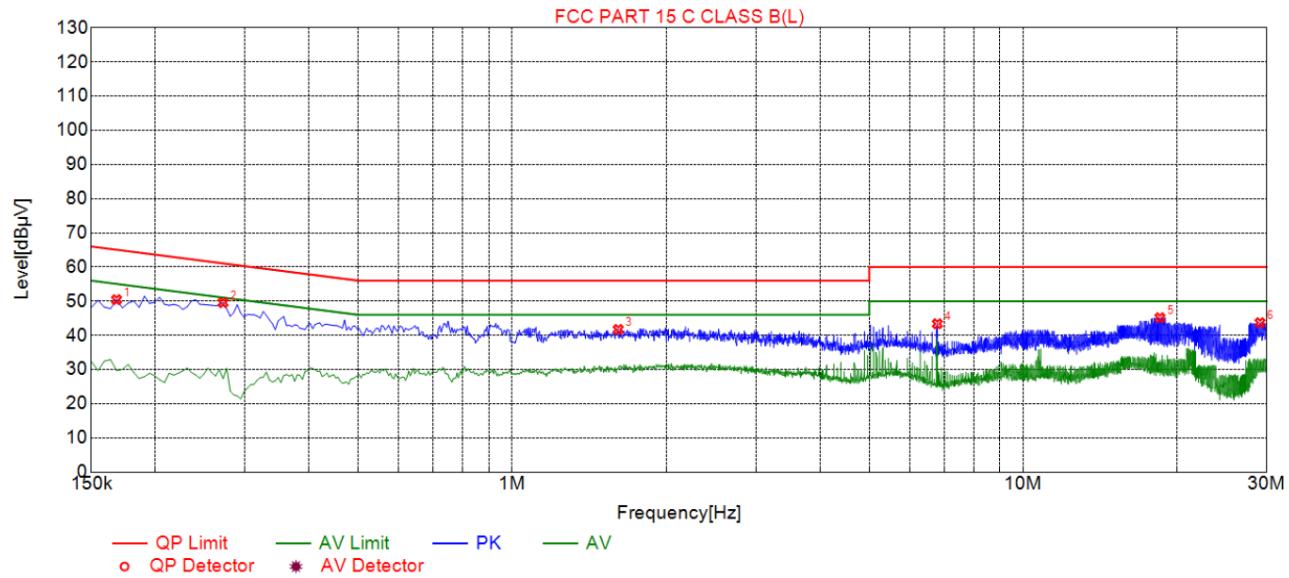
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TEST RESULTS

Remark: All modes are tested; only the worst result of was reported as below:

Test Specification: Line



Suspected List

| NO. | Freq. [MHz] | Level [dB μ V] | Factor [dB] | Limit [dB μ V] | Margin [dB] | Reading [dB μ V] | Detector | Type |
|-----|-------------|--------------------|-------------|--------------------|-------------|----------------------|----------|------|
| 1 | 0.1680 | 50.45 | 19.62 | 65.06 | 14.61 | 30.83 | PK | L |
| 2 | 0.2715 | 49.58 | 19.83 | 61.07 | 11.49 | 29.75 | PK | L |
| 3 | 1.6125 | 41.73 | 19.99 | 56.00 | 14.27 | 21.74 | PK | L |
| 4 | 6.7965 | 43.40 | 20.40 | 60.00 | 16.60 | 23.00 | PK | L |
| 5 | 18.5370 | 45.16 | 22.66 | 60.00 | 14.84 | 22.50 | PK | L |
| 6 | 29.1030 | 43.71 | 25.34 | 60.00 | 16.29 | 18.37 | PK | L |

Remark: Margin = Limit - Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

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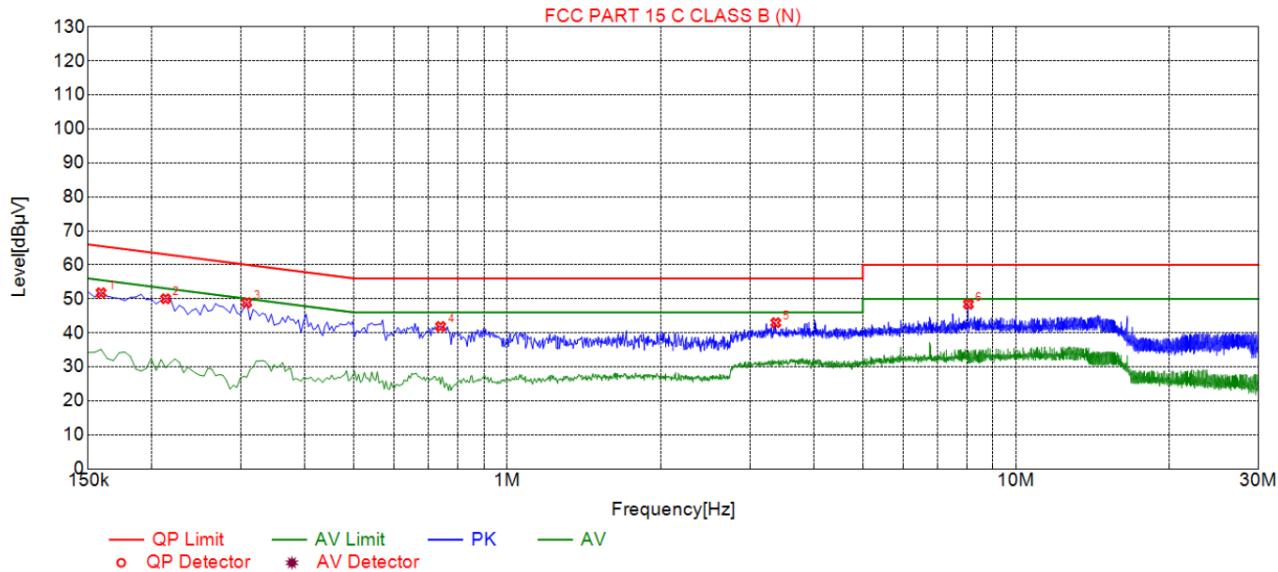


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Test Specification: Neutral



Suspected List

| NO. | Freq. [MHz] | Level [dBμV] | Factor [dB] | Limit [dBμV] | Margin [dB] | Reading [dBμV] | Detector | Type |
|-----|-------------|--------------|-------------|--------------|-------------|----------------|----------|------|
| 1 | 0.1590 | 51.79 | 19.61 | 65.52 | 13.73 | 32.18 | PK | N |
| 2 | 0.2130 | 50.03 | 19.65 | 63.09 | 13.06 | 30.38 | PK | N |
| 3 | 0.3075 | 48.88 | 19.69 | 60.04 | 11.16 | 29.19 | PK | N |
| 4 | 0.7395 | 41.87 | 19.76 | 56.00 | 14.13 | 22.11 | PK | N |
| 5 | 3.3720 | 42.98 | 20.11 | 56.00 | 13.02 | 22.87 | PK | N |
| 6 | 8.0655 | 48.42 | 20.65 | 60.00 | 11.58 | 27.77 | PK | N |

Remark: Margin = Limit - Level

Correction factor = Cable loss + LISN insertion loss

Level=Test receiver reading + correction factor

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3.2. Radiated Emissions and Band Edge

Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

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).

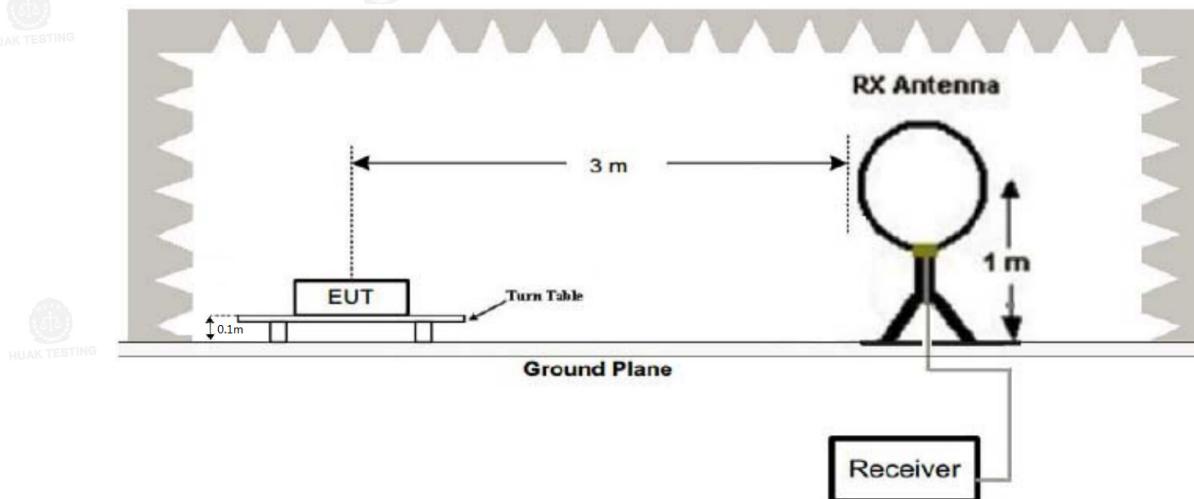
Except when the requirements applicable to a given device state otherwise, emissions from license-exempt transmitters shall comply with the field strength limits shown in table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

Radiated emission limits

| Radiated Emission Limits | | | |
|--------------------------|-------------------|--|-----------------------|
| Frequency (MHz) | Distance (Meters) | Radiated (dB μ V/m) | Radiated (μ V/m) |
| 0.009-0.49 | 3 | $20\log(2400/F(\text{KHz}))+40\log(300/3)$ | $2400/F(\text{KHz})$ |
| 0.49-1.705 | 3 | $20\log(24000/F(\text{KHz}))+40\log(30/3)$ | $24000/F(\text{KHz})$ |
| 1.705-30 | 3 | $20\log(30)+40\log(30/3)$ | 30 |
| 30-88 | 3 | 40.0 | 100 |
| 88-216 | 3 | 43.5 | 150 |
| 216-960 | 3 | 46.0 | 200 |
| Above 960 | 3 | 54.0 | 500 |

TEST CONFIGURATION

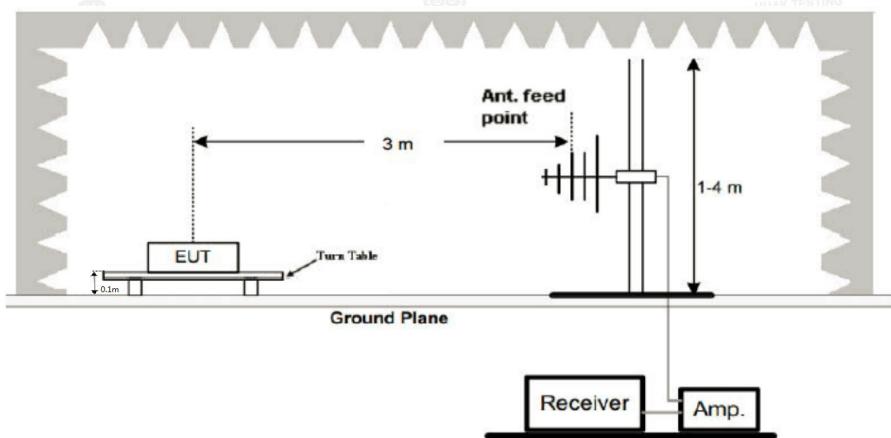
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz.



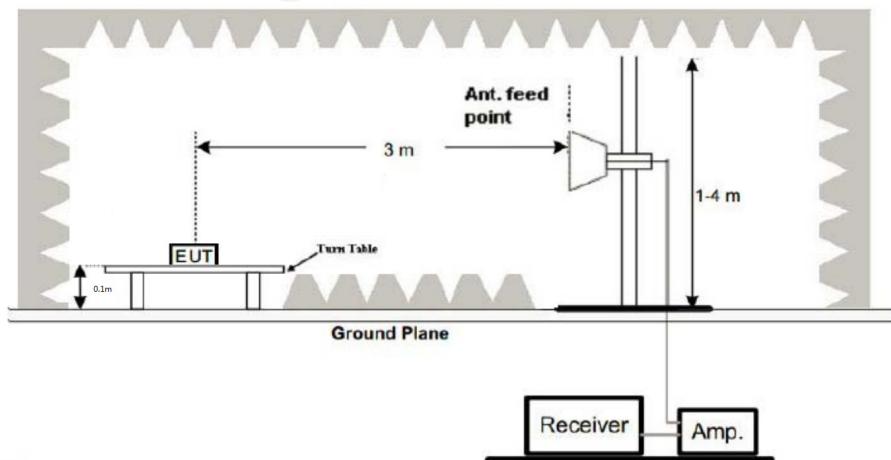
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(B) Radiated Emission Test Set-Up, Frequency below 1000MHz.



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz.



Test Procedure

1. The EUT was placed on turn table which is 0.1m above ground plane for below 1GHz test, and on a low permittivity and low loss tangent turn table which is 0.1m above ground plane for above 1GHz test.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

TEST RESULTS

Remark:

1. Radiated Emission measured at GFSK, $\pi/4$ DQPSK and 8DPSK mode from 9 KHz to 10th harmonic of fundamental and recorded worst case at GFSK DH5 mode.
2. There is no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.
3. For below 1GHz testing recorded worst at GFSK DH5 low channel.

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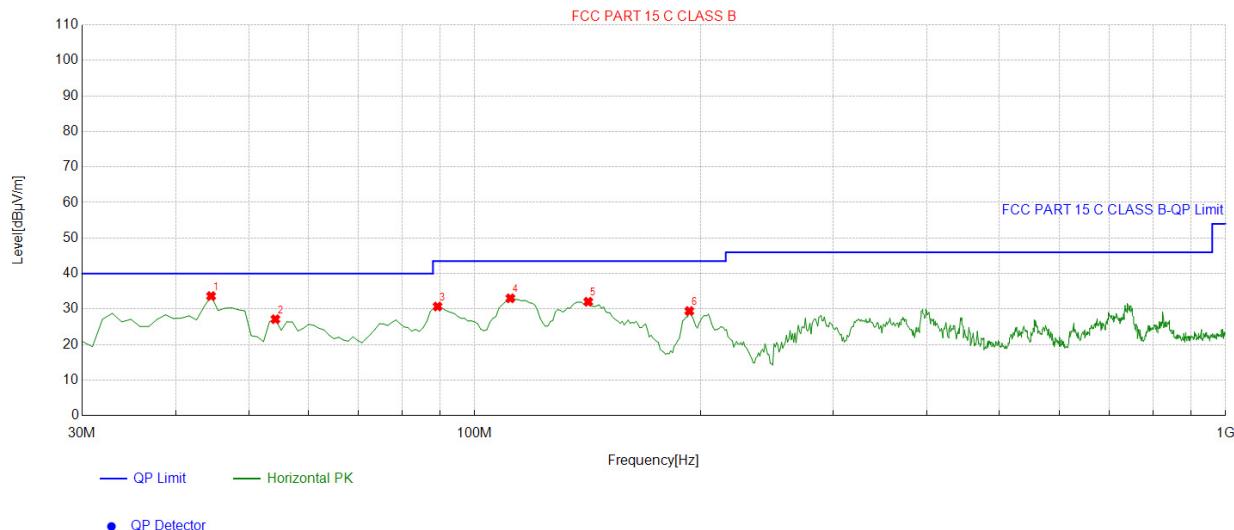
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Below 1GHz Test Results:

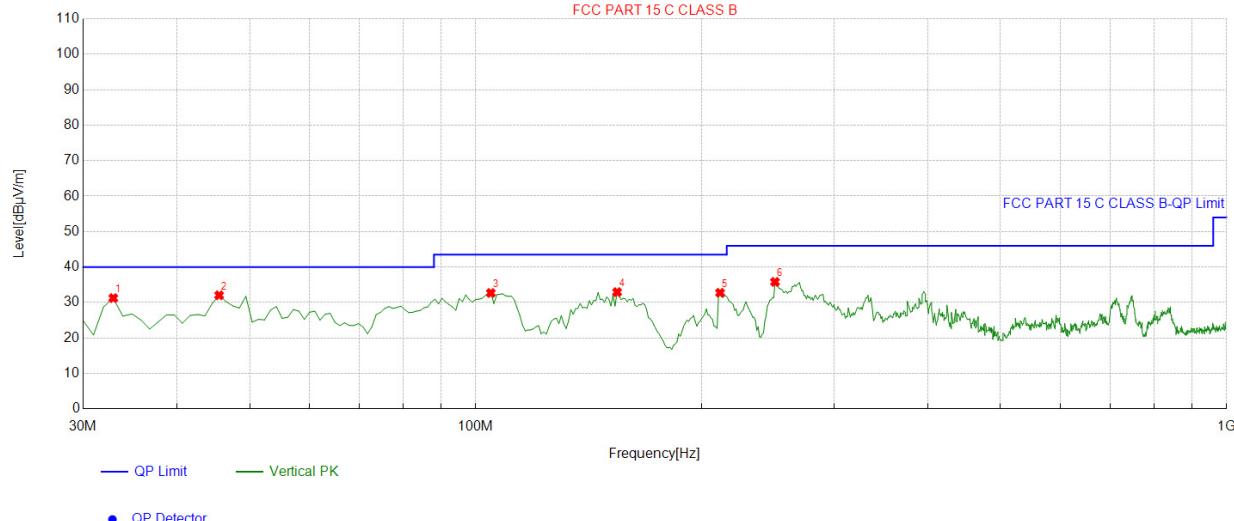
Horizontal



| Suspected List | | | | | | | | | |
|----------------|-------------|-------------|------------------------|----------------------|----------------------|-------------|-------------|-----------|------------|
| NO. | Freq. [MHz] | Factor [dB] | Reading [dB μ V/m] | Level [dB μ V/m] | Limit [dB μ V/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1 | 44.5646 | -13.72 | 47.38 | 33.66 | 40.00 | 6.34 | 100 | 263 | Horizontal |
| 2 | 54.2743 | -13.50 | 40.65 | 27.15 | 40.00 | 12.85 | 100 | 79 | Horizontal |
| 3 | 89.2292 | -16.75 | 47.47 | 30.72 | 43.50 | 12.78 | 100 | 258 | Horizontal |
| 4 | 111.5616 | -14.50 | 47.54 | 33.04 | 43.50 | 10.46 | 100 | 105 | Horizontal |
| 5 | 141.6617 | -18.38 | 50.44 | 32.06 | 43.50 | 11.44 | 100 | 64 | Horizontal |
| 6 | 193.1231 | -15.59 | 45.04 | 29.45 | 43.50 | 14.05 | 100 | 269 | Horizontal |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Vertical



| Suspected List | | | | | | | | | |
|-----------------------|-------------|-------------|------------------------|----------------------|----------------------|-------------|-------------|-----------|----------|
| NO. | Freq. [MHz] | Factor [dB] | Reading [dB μ V/m] | Level [dB μ V/m] | Limit [dB μ V/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1 | 32.9129 | -15.12 | 46.36 | 31.24 | 40.00 | 8.76 | 100 | 179 | Vertical |
| 2 | 45.5355 | -13.92 | 45.96 | 32.04 | 40.00 | 7.96 | 100 | 213 | Vertical |
| 3 | 104.7648 | -14.69 | 47.37 | 32.68 | 43.50 | 10.82 | 100 | 346 | Vertical |
| 4 | 154.2843 | -17.76 | 50.69 | 32.93 | 43.50 | 10.57 | 100 | 219 | Vertical |
| 5 | 211.5716 | -14.85 | 47.60 | 32.75 | 43.50 | 10.75 | 100 | 131 | Vertical |
| 6 | 250.4104 | -13.45 | 49.26 | 35.81 | 46.00 | 10.19 | 100 | 137 | Vertical |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Harmonics and Spurious Emissions

Frequency Range (9kHz-30MHz)

| Frequency (MHz) | Level@3m (dB μ V/m) | Limit@3m (dB μ V/m) |
|-----------------|-------------------------|-------------------------|
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |
| -- | -- | -- |

Note: 1. Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor.

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement.

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For 1GHz to 25GHz

CH Low (2402MHz)

Horizontal:

| Frequency (MHz) | Meter Reading (dB μ V) | Factor (dB) | Emission Level (dB μ V/m) | Limits (dB μ V/m) | Margin (dB) | Detector Type |
|--------------------|----------------------------------|----------------|----------------------------------|--------------------------|----------------|------------------|
| 4804.00 | 54.26 | -3.65 | 50.61 | 74.00 | 23.39 | peak |
| 4804.00 | 43.71 | -3.65 | 40.06 | 54.00 | 13.94 | Avg |
| 7206.00 | 52.03 | -0.95 | 51.08 | 74.00 | 22.92 | peak |
| 7206.00 | 41.55 | -0.95 | 40.60 | 54.00 | 13.40 | Avg |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor;
Margin = Limit - Level.

Vertical:

| Frequency (MHz) | Meter Reading (dB μ V) | Factor (dB) | Emission Level (dB μ V/m) | Limits (dB μ V/m) | Margin (dB) | Detector Type |
|--------------------|----------------------------------|----------------|----------------------------------|--------------------------|----------------|------------------|
| 4804.00 | 56.03 | -3.65 | 52.38 | 74.00 | 21.62 | peak |
| 4804.00 | 43.22 | -3.65 | 39.57 | 54.00 | 14.43 | Avg |
| 7206.00 | 53.84 | -0.95 | 52.89 | 74.00 | 21.11 | peak |
| 7206.00 | 40.19 | -0.95 | 39.24 | 54.00 | 14.76 | Avg |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor;
Margin = Limit - Level.

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**CH Middle (2441MHz)****Horizontal:**

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 4882.00 | 55.92 | -3.54 | 52.38 | 74.00 | 21.62 | peak |
| 4882.00 | 44.08 | -3.54 | 40.54 | 54.00 | 13.46 | AVG |
| 7323.00 | 51.64 | -0.81 | 50.83 | 74.00 | 23.17 | peak |
| 7323.00 | 40.91 | -0.81 | 40.10 | 54.00 | 13.90 | AVG |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit - Level.

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 4882.00 | 53.71 | -3.54 | 50.17 | 74.00 | 23.83 | peak |
| 4882.00 | 44.16 | -3.54 | 40.62 | 54.00 | 13.38 | AVG |
| 7323.00 | 50.69 | -0.81 | 49.88 | 74.00 | 24.12 | peak |
| 7323.00 | 42.05 | -0.81 | 41.24 | 54.00 | 12.76 | AVG |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit - Level.

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CH High (2480MHz)

Horizontal:

| Frequency MHz | Meter Reading dBµV | Factor dB | Emission Level dBµV/m | Limits dBµV/m | Margin dB | Detector Type |
|------------------|--------------------------|--------------|--------------------------|------------------|--------------|------------------|
| 4960.00 | 55.46 | -3.43 | 52.03 | 74.00 | 21.97 | peak |
| 4960.00 | 44.06 | -3.44 | 40.62 | 54.00 | 13.38 | AVG |
| 7440.00 | 52.81 | -0.77 | 52.04 | 74.00 | 21.96 | peak |
| 7440.00 | 42.01 | -0.77 | 41.24 | 54.00 | 12.76 | AVG |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit - Level.

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 4960.00 | 53.18 | -3.43 | 49.75 | 74.00 | 24.25 | peak |
| 4960.00 | 43.18 | -3.44 | 39.74 | 54.00 | 14.26 | AVG |
| 7440.00 | 50.64 | -0.77 | 49.87 | 74.00 | 24.13 | peak |
| 7440.00 | 40.92 | -0.77 | 40.15 | 54.00 | 13.85 | AVG |

Remark :

Remark :

- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency; "E" denotes band edge frequency.
- (3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not recorded in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.
- (7) All modes of operation were investigated and the worst-case emissions are reported.

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HUAK TESTING

Radiated Band Edge Test:

Hopping

Horizontal (Worst case)

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 2310.00 | 54.26 | -5.81 | 48.45 | 74 | 25.55 | peak |
| 2310.00 | / | -5.81 | / | 54 | / | AVG |
| 2390.00 | 52.18 | -5.84 | 46.34 | 74 | 27.66 | peak |
| 2390.00 | / | -5.84 | / | 54 | / | AVG |

Vertical:

| Frequency (MHz) | Meter Reading (dB μ V) | Factor (dB) | Emission Level (dB μ V/m) | Limits (dB μ V/m) | Margin (dB) | Detector Type |
|--------------------|----------------------------------|----------------|----------------------------------|--------------------------|----------------|------------------|
| 2310.00 | 54.03 | -5.81 | 48.22 | 74 | 25.78 | peak |
| 2310.00 | / | -5.81 | / | 54 | / | AVG |
| 2390.00 | 53.66 | -5.84 | 47.82 | 74 | 26.18 | peak |
| 2390.00 | / | -5.84 | / | 54 | / | AVG |

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Horizontal (Worst case)

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 2483.50 | 54.19 | -5.81 | 48.38 | 74 | 25.62 | peak |
| 2483.50 | / | -5.81 | / | 54 | / | AVG |
| 2500.00 | 52.73 | -6.06 | 46.67 | 74 | 27.33 | peak |
| 2500.00 | / | -6.06 | / | 54 | / | AVG |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit-Level.

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 2483.50 | 55.16 | -5.81 | 49.35 | 74 | 24.65 | peak |
| 2483.50 | / | -5.81 | / | 54 | / | AVG |
| 2500.00 | 53.08 | -6.06 | 47.02 | 74 | 26.98 | peak |
| 2500.00 | / | -6.06 | / | 54 | / | AVG |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit-Level.

Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.

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HUAK TESTING

NO hopping

Operation Mode: TX CH Low (2402MHz)

Horizontal (Worst case)

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 2310.00 | 53.47 | -5.81 | 47.66 | 74 | 26.34 | peak |
| 2310.00 | / | -5.81 | / | 54 | / | AVG |
| 2390.00 | 51.44 | -5.84 | 45.6 | 74 | 28.4 | peak |
| 2390.00 | / | -5.84 | / | 54 | / | AVG |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit-Level.

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 2310.00 | 53.69 | -5.81 | 47.88 | 74 | 26.12 | peak |
| 2310.00 | / | -5.81 | / | 54 | / | AVG |
| 2390.00 | 51.84 | -5.84 | 46 | 74 | 28 | peak |
| 2390.00 | / | -5.84 | / | 54 | / | AVG |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit-Level.



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HUAK TESTING



HUAK TESTING

Operation Mode: TX CH High (2480MHz)

Horizontal (Worst case)

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 2483.50 | 54.18 | -5.81 | 48.37 | 74 | 25.63 | peak |
| 2483.50 | / | -5.81 | / | 54 | / | AVG |
| 2500.00 | 52.34 | -6.06 | 46.28 | 74 | 27.72 | peak |
| 2500.00 | / | -6.06 | / | 54 | / | AVG |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit-Level.

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz) | (dB μ V) | (dB) | (dB μ V/m) | (dB μ V/m) | (dB) | |
| 2483.50 | 55.02 | -5.81 | 49.21 | 74 | 24.79 | peak |
| 2483.50 | / | -5.81 | / | 54 | / | AVG |
| 2500.00 | 53.18 | -6.06 | 47.12 | 74 | 26.88 | peak |
| 2500.00 | / | -6.06 | / | 54 | / | AVG |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit-Level.

Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.

Remark:

1. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.
2. In restricted bands of operation, the spurious emissions below the permissible value more than 20dB.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

3.3. Maximum Peak Conducted Output Power

Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the RF automatic control unit.

Test Configuration



Test Results

| Type | Channel | Maximum Peak Conducted Output Power (dBm) | Limit (dBm) | Result |
|---------------|---------|---|-------------|--------|
| GFSK | 00 | 2.50 | 21.00 | Pass |
| | 39 | 2.63 | | |
| | 78 | 2.08 | | |
| $\pi/4$ DQPSK | 00 | 2.78 | 21.00 | Pass |
| | 39 | 2.92 | | |
| | 78 | 2.54 | | |
| 8DPSK | 00 | 3.04 | 21.00 | Pass |
| | 39 | 3.16 | | |
| | 78 | 2.76 | | |

Note: 1. The test results including the cable lose

3.4. 20db Bandwidth

Limit

For frequency hopping systems operating in the 2400MHz-2483.5MHz no limit for 20dB bandwidth.

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 KHz RBW and 100 KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

RBW=1% to 5% of the OBW

VBW=approximately 3 X RBW

Detector=Peak

Trace Mode: Max Hold

Use the 99% power bandwidth function of the instrument to measure the Occupied Bandwidth and record.

Test Configuration



Test Results

| Modulation | Channel | 20dB bandwidth (MHz) | Result |
|---------------|---------|----------------------|--------|
| GFSK | CH00 | 0.945 | Pass |
| | CH39 | 0.960 | |
| | CH78 | 0.960 | |
| $\pi/4$ DQPSK | CH00 | 1.353 | Pass |
| | CH39 | 1.308 | |
| | CH78 | 1.317 | |
| 8DPSK | CH00 | 1.308 | Pass |
| | CH39 | 1.338 | |
| | CH78 | 1.296 | |

Test plot as follows:

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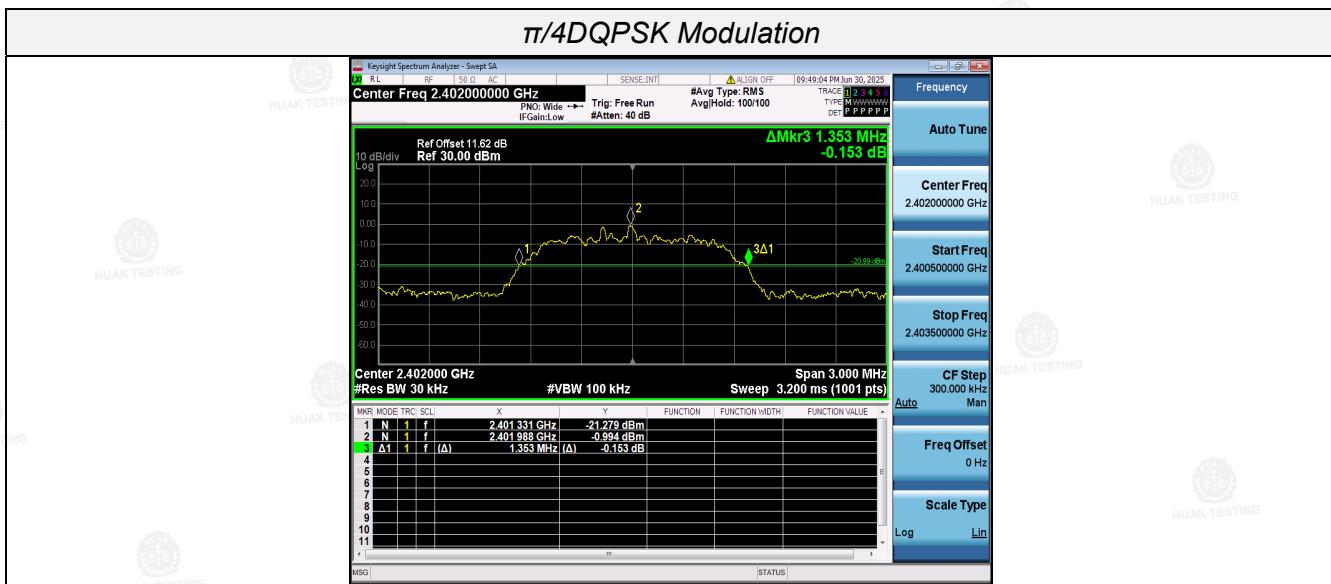
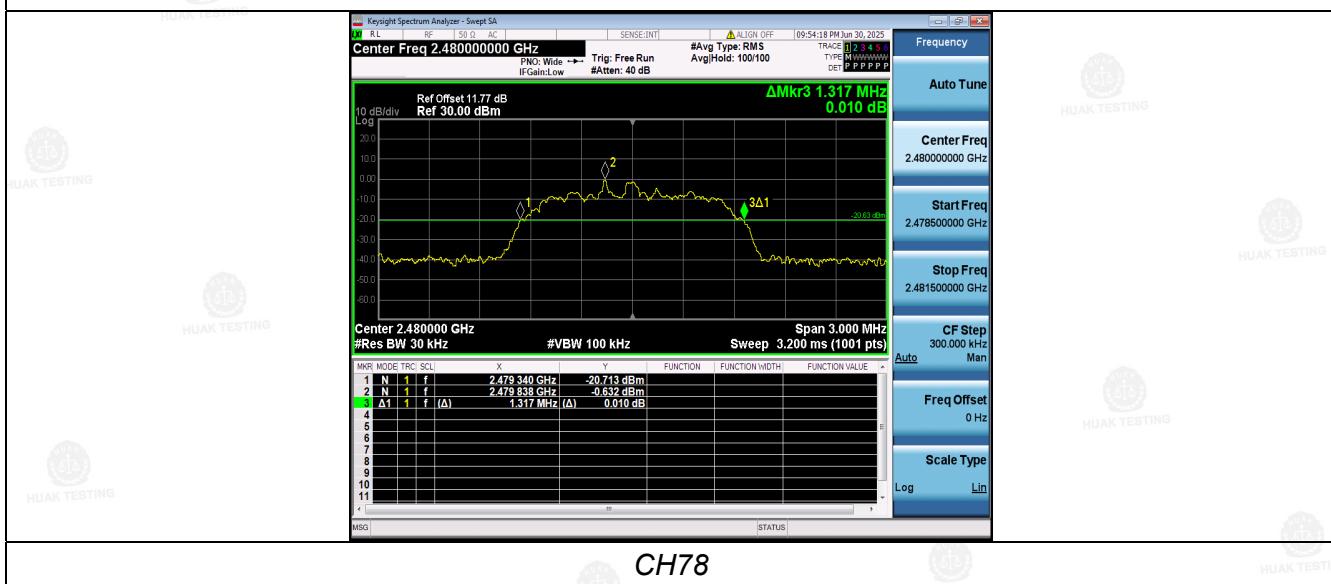
20dB bandwidth



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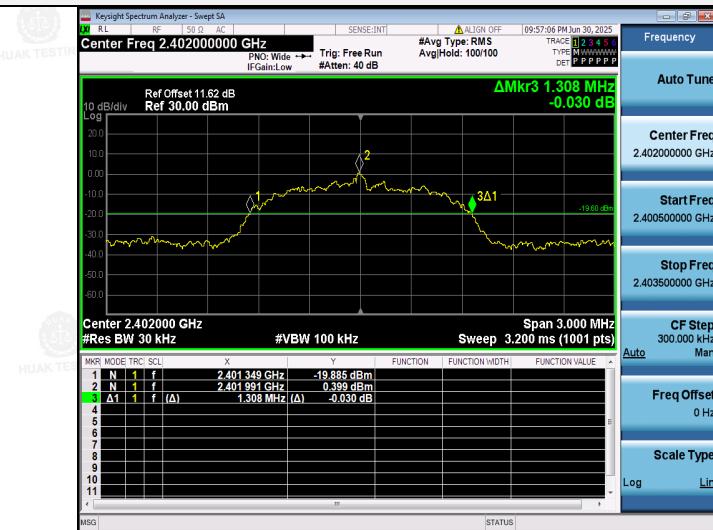
 **$\pi/4$ DQPSK Modulation****CH00****CH39****CH78**

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8DPSK Modulation



CHOO



CH39



CH78

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3.5. Frequency Separation

LIMIT

Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25 KHz or the $2/3 \times 20$ dB bandwidth of the hopping channel, whichever is greater.

TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 300 KHz RBW and 1000 KHz VBW.

TEST CONFIGURATION



TEST RESULTS

| Modulation | Channel | Channel Separation (MHz) | Limit(MHz) | Result |
|---------------|----------------|--------------------------|------------|--------|
| GFSK | Middle Channel | 0.996 | 0.640 | Pass |
| $\pi/4$ DQPSK | Middle Channel | 0.986 | 0.902 | Pass |
| 8DPSK | Middle Channel | 1.000 | 0.892 | Pass |

Note: We have tested all mode at high, middle and low channel, and recorded worst case at middle.

Test plot as follows:



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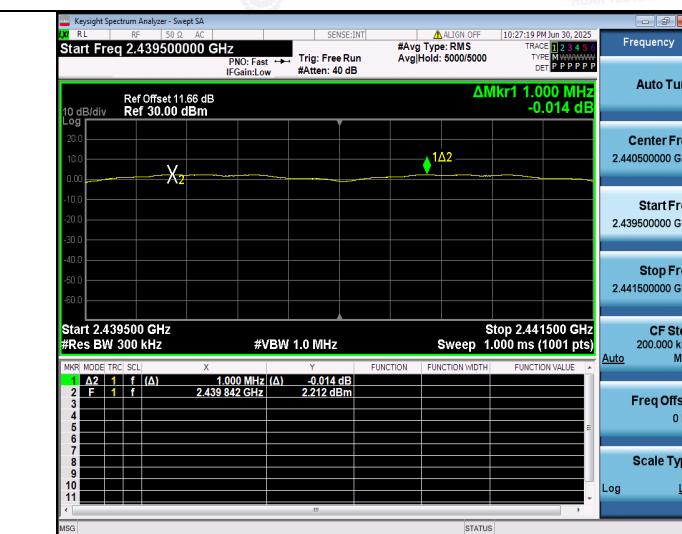
Frequency Separation



GFSK



π/4DQPSK



8DPSK

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3.6. Number of Hopping Frequency

Limit

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. Set spectrum analyzer start 2400MHz to 2483.5MHz.

Test Configuration



Test Results

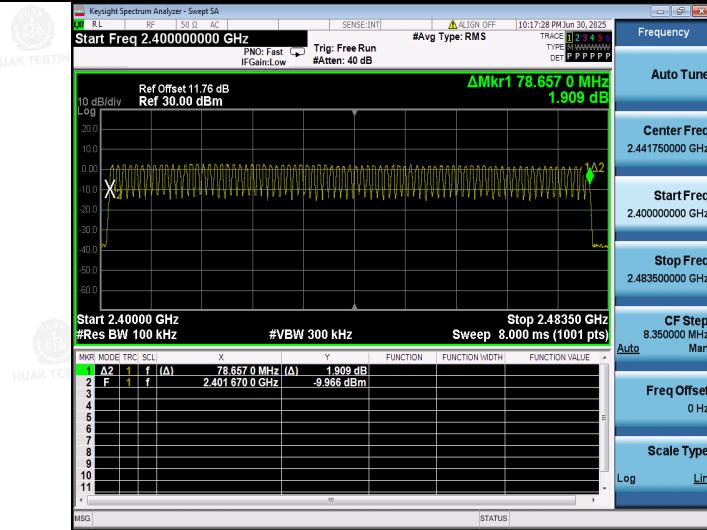
| Modulation | Number of Hopping Channel | Limit | Result |
|---------------|---------------------------|-------|--------|
| GFSK | 79 | | |
| $\pi/4$ DQPSK | 79 | ≥15 | Pass |
| 8DPSK | 79 | | |

Test plot as follows:

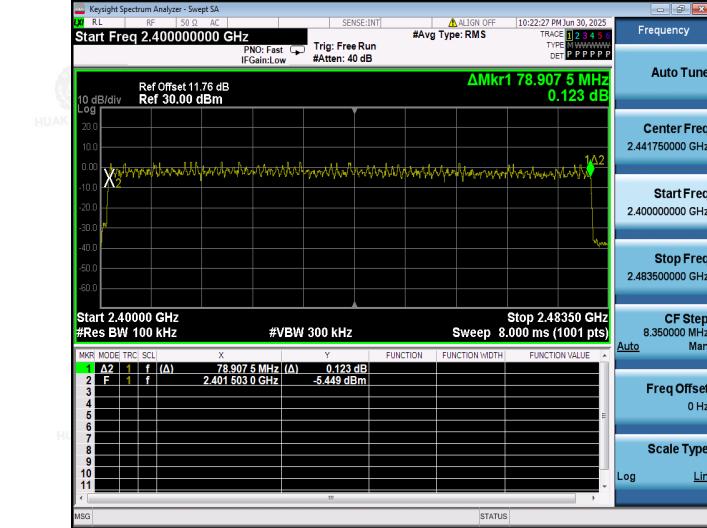


HUAK TESTING

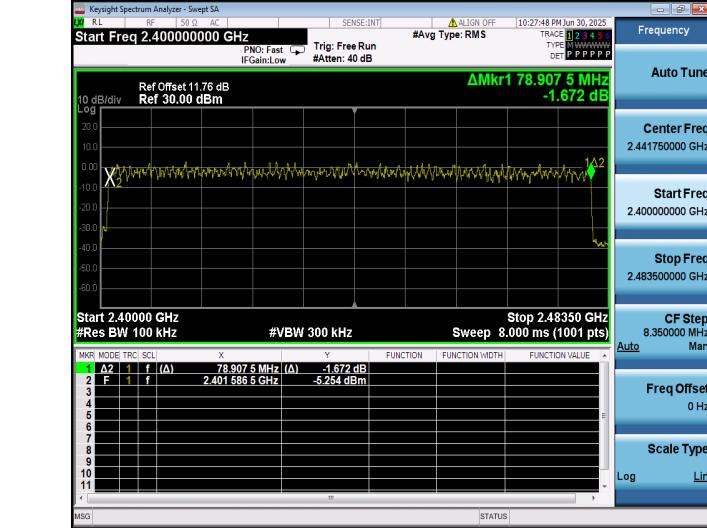
GFSK Modulation



π/4DQPSK Modulation



8DPSK Modulation



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