

## FCC CERTIFICATION TEST REPORT

|                             |   |                                                                                                                                                                                 |
|-----------------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant</b>            | : | HANSHOW PTE. LTD.                                                                                                                                                               |
| <b>Address</b>              | : | 138 ROBINSON ROAD #02-33 OXLEY TOWER<br>SINGAPORE(068906)                                                                                                                       |
| <b>Equipment under Test</b> | : | electronic shelf label                                                                                                                                                          |
| <b>Model No.</b>            | : | Nebular Pro-154Q-N                                                                                                                                                              |
| <b>Trade Mark</b>           | : | N/A                                                                                                                                                                             |
| <b>FCC ID</b>               | : | 2BPF3-NP1540                                                                                                                                                                    |
| <b>Manufacturer</b>         | : | HANSHOW PTE. LTD.                                                                                                                                                               |
| <b>Address</b>              | : | 138 ROBINSON ROAD #02-33 OXLEY TOWER<br>SINGAPORE(068906)                                                                                                                       |
| <b>Report No.</b>           | : | DDT-B25052222-1E02                                                                                                                                                              |
| <b>Issue Date</b>           | : | Aug. 06, 2025                                                                                                                                                                   |
| <b>Issued By</b>            | : | Tianjin Dongdian Testing Service Co., Ltd.                                                                                                                                      |
| <b>Address</b>              | : | Building D-1, No. 19, Weisi Road, Microelectronics<br>Industrial Park Development Area, Tianjin, China.<br>Tel: +86-22-58038033, E-mail: ddt@ddt.com,<br>http://www.ddttest.com |



# REPORT

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## Test Report Declare

|                             |   |                                                           |
|-----------------------------|---|-----------------------------------------------------------|
| <b>Applicant</b>            | : | HANSHOW PTE. LTD.                                         |
| <b>Address</b>              | : | 138 ROBINSON ROAD #02-33 OXLEY TOWER<br>SINGAPORE(068906) |
| <b>Equipment under Test</b> | : | electronic shelf label                                    |
| <b>Model No.</b>            | : | Nebular Pro-154Q-N                                        |
| <b>Trade Mark</b>           | : | N/A                                                       |
| <b>Manufacturer</b>         | : | HANSHOW PTE. LTD.                                         |
| <b>Address</b>              | : | 138 ROBINSON ROAD #02-33 OXLEY TOWER<br>SINGAPORE(068906) |

### Test Standard Used:

FCC Rules and Regulations Part 15 Subpart C.

### Test Procedure Used:

ANSI C63.10:2020.

### We Declare:

The equipment described above is tested by Tianjin Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Tianjin Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

**After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above standards.**

|                         |                    |                      |                               |
|-------------------------|--------------------|----------------------|-------------------------------|
| <b>Report No.:</b>      | DDT-B25052222-1E02 |                      |                               |
| <b>Date of Receipt:</b> | Jul. 17, 2025      | <b>Date of Test:</b> | Jul. 17, 2025 ~ Aug. 06, 2025 |

**Prepared By:**

*Sunny Zhang*

**Sunny Zhang/Engineer**

**Approved By:**

*Aaron Zhang*

**Aaron Zhang/Manager**

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Tianjin Dongdian Testing Service Co., Ltd.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

## Revision History

| Rev. | Revisions     | Issue Date    | Revised By |
|------|---------------|---------------|------------|
| ---  | Initial issue | Aug. 06, 2025 |            |
|      |               |               |            |

## 1. Summary of Test Results

| Description of Test Item                   | Standard                               | Verdict |
|--------------------------------------------|----------------------------------------|---------|
| 20dB Bandwidth                             | FCC 15.215                             | Pass    |
| Radiated Spurious Emissions                | FCC 15.249<br>FCC 15.209<br>FCC 15.205 | Pass    |
| Radiated Band Edge Compliance              | FCC 15.249<br>FCC 15.209<br>FCC 15.205 | Pass    |
| Power Line Conducted Emission              | FCC 15.207                             | Pass    |
| Antenna Requirement                        | FCC 15.203                             | Pass    |
| N/A is an abbreviation for Not Applicable. |                                        |         |

## 2. General Test Information

### 2.1. Description of EUT

|                          |                                               |
|--------------------------|-----------------------------------------------|
| EUT* Name                | : electronic shelf label                      |
| Test Model Number        | : Nebular Pro-154Q-N                          |
| EUT Function Description | : Please reference user manual of this device |
| Power Supply             | : DC 3V by Polymer Li-ion built-in battery    |
| Radio Specification      | : 2.4G SRD                                    |
| Operation Frequency      | : 2402 MHz - 2480 MHz                         |
| Modulation               | : GFSK                                        |
| Data Rate                | : 500k bps                                    |
| Antenna Type             | : PCB antenna 1, maximum PK gain: -0.7 dBi    |
| Sample Number            | : N/A                                         |

Note1: EUT is the ab. of equipment under test.

| Channel information |                 |         |                 |         |                 |         |                 |
|---------------------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|
| Channel             | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 4                   | 2402            | 44      | 2422            | 84      | 2442            | 124     | 2462            |
| 5                   | 2402.5          | 45      | 2422.5          | 85      | 2442.5          | 125     | 2462.5          |
| 6                   | 2403            | 46      | 2423            | 86      | 2443            | 126     | 2463            |
| 7                   | 2403.5          | 47      | 2423.5          | 87      | 2443.5          | 127     | 2463.5          |
| 8                   | 2404            | 48      | 2424            | 88      | 2444            | 128     | 2464            |
| 9                   | 2404.5          | 49      | 2424.5          | 89      | 2444.5          | 129     | 2464.5          |
| 10                  | 2405            | 50      | 2425            | 90      | 2445            | 130     | 2465            |
| 11                  | 2405.5          | 51      | 2425.5          | 91      | 2445.5          | 131     | 2465.5          |
| 12                  | 2406            | 52      | 2426            | 92      | 2446            | 132     | 2466            |
| 13                  | 2406.5          | 53      | 2426.5          | 93      | 2446.5          | 133     | 2466.5          |
| 14                  | 2407            | 54      | 2427            | 94      | 2447            | 134     | 2467            |
| 15                  | 2407.5          | 55      | 2427.5          | 95      | 2447.5          | 135     | 2467.5          |
| 16                  | 2408            | 56      | 2428            | 96      | 2448            | 136     | 2468            |
| 17                  | 2408.5          | 57      | 2428.5          | 97      | 2448.5          | 137     | 2468.5          |
| 18                  | 2409            | 58      | 2429            | 98      | 2449            | 138     | 2469            |
| 19                  | 2409.5          | 59      | 2429.5          | 99      | 2449.5          | 139     | 2469.5          |
| 20                  | 2410            | 60      | 2430            | 100     | 2450            | 140     | 2470            |
| 21                  | 2410.5          | 61      | 2430.5          | 101     | 2450.5          | 141     | 2470.5          |
| 22                  | 2411            | 62      | 2431            | 102     | 2451            | 142     | 2471            |
| 23                  | 2411.5          | 63      | 2431.5          | 103     | 2451.5          | 143     | 2471.5          |
| 24                  | 2412            | 64      | 2432            | 104     | 2452            | 144     | 2472            |
| 25                  | 2412.5          | 65      | 2432.5          | 105     | 2452.5          | 145     | 2472.5          |
| 26                  | 2413            | 66      | 2433            | 106     | 2453            | 146     | 2473            |
| 27                  | 2413.5          | 67      | 2433.5          | 107     | 2453.5          | 147     | 2473.5          |
| 28                  | 2414            | 68      | 2434            | 108     | 2454            | 148     | 2474            |

|    |        |    |        |     |        |     |        |
|----|--------|----|--------|-----|--------|-----|--------|
| 29 | 2414.5 | 69 | 2434.5 | 109 | 2454.5 | 149 | 2474.5 |
| 30 | 2415   | 70 | 2435   | 110 | 2455   | 150 | 2475   |
| 31 | 2415.5 | 71 | 2435.5 | 111 | 2455.5 | 151 | 2475.5 |
| 32 | 2416   | 72 | 2436   | 112 | 2456   | 152 | 2476   |
| 33 | 2416.5 | 73 | 2436.5 | 113 | 2456.5 | 153 | 2476.5 |
| 34 | 2417   | 74 | 2437   | 114 | 2457   | 154 | 2477   |
| 35 | 2417.5 | 75 | 2437.5 | 115 | 2457.5 | 155 | 2477.5 |
| 36 | 2418   | 76 | 2438   | 116 | 2458   | 156 | 2478   |
| 37 | 2418.5 | 77 | 2438.5 | 117 | 2458.5 | 157 | 2478.5 |
| 38 | 2419   | 78 | 2439   | 118 | 2459   | 158 | 2479   |
| 39 | 2419.5 | 79 | 2439.5 | 119 | 2459.5 | 159 | 2479.5 |
| 40 | 2420   | 80 | 2440   | 120 | 2460   | 160 | 2480   |
| 41 | 2420.5 | 81 | 2440.5 | 121 | 2460.5 |     |        |
| 42 | 2421   | 82 | 2441   | 122 | 2461   |     |        |
| 43 | 2421.5 | 83 | 2441.5 | 123 | 2461.5 |     |        |

Remark: The information in this section is provided by the applicant or manufacturer, the laboratory is not liable to the accuracy, suitability, reliability or/and integrity of the information.

## 2.2. Accessories of EUT

| Description of Accessories | Manufacturer | Model number | Description | Remark |
|----------------------------|--------------|--------------|-------------|--------|
| N/A                        | N/A          | N/A          | N/A         | N/A    |

## 2.3. Assistant equipment used for test

| Assistant equipment | Manufacturer            | Model number   | Description | SN       |
|---------------------|-------------------------|----------------|-------------|----------|
| Notebook            | Lenovo Beijing Co. Ltd. | ThinkPad E450c | N/A         | TP00067A |

## 2.4. Block diagram of EUT configuration for test

EUT

The test software was used to control EUT work in Continuous Tx mode, and select test channel, wireless mode as below table.

| Tested mode, channel, information |                  |           |                 |
|-----------------------------------|------------------|-----------|-----------------|
| Mode                              | Setting Tx Power | Channel   | Frequency (MHz) |
| GFSK                              | Default          | CH Low    | 2402            |
|                                   | Default          | CH Middle | 2441            |
|                                   | Default          | CH High   | 2480            |

## 2.5. Deviations of test standard

No deviation.

## 2.6. Test environment conditions

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

|                    |            |
|--------------------|------------|
| Temperature range: | 21-25 °C   |
| Humidity range:    | 25-75%     |
| Pressure range:    | 86-106 kPa |

## 2.7. Test laboratory

Tianjin Dongdian Testing Service Co., Ltd.

Address: Building D-1, No. 19, Weisi Road, Microelectronics Industrial Park Development Area, Tianjin, China.

Tel: +86-22-58038033, <http://www.ddttest.com>, Email: [ddt@dgddt.com](mailto:ddt@dgddt.com)

**NVLAP** (National Voluntary Laboratory Accreditation Program) CODE: 500036-0

**CNAS** (China National Accreditation Service for Conformity Assessment) CODE: L13402

**FCC** Designation Number: CN5004; FCC Test Firm Registration Number: 368676

**ISED** (Innovation, Science and Economic Development Canada) Company Number: 27768

Conformity Assessment Body Identifier: CN0125

**VCCI** Facility Registration Number: C-20089, T-20093, R-20125, G-20122



## 2.8. Measurement uncertainty

| Test Item                                                                                                                                     | Uncertainty                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Bandwidth                                                                                                                                     | 0.14%                                                  |
| Peak Output Power (Conducted) (Spectrum Analyzer)                                                                                             | 0.12 dB ( $10 \text{ MHz} \leq f < 3.6 \text{ GHz}$ ); |
|                                                                                                                                               | 0.32 dB ( $3.6 \text{ GHz} \leq f < 8 \text{ GHz}$ )   |
| Peak Output Power (Conducted) (Power Sensor)                                                                                                  | 0.51 dB                                                |
| Power Spectral Density                                                                                                                        | 0.12 dB ( $10 \text{ MHz} \leq f < 3.6 \text{ GHz}$ ); |
|                                                                                                                                               | 0.32 dB ( $3.6 \text{ GHz} \leq f < 8 \text{ GHz}$ )   |
| Frequencies Stability                                                                                                                         | $6.7 \times 10^{-8}$ (Antenna couple method)           |
|                                                                                                                                               | $3.4 \times 10^{-8}$ (Conducted method)                |
| Conducted Spurious Emissions                                                                                                                  | 0.12 dB ( $10 \text{ MHz} \leq f < 3.6 \text{ GHz}$ ); |
|                                                                                                                                               | 0.32 dB ( $3.6 \text{ GHz} \leq f < 8 \text{ GHz}$ )   |
|                                                                                                                                               | 0.52 dB ( $8 \text{ GHz} \leq f < 22 \text{ GHz}$ )    |
| Uncertainty for Radio Frequency (RBW < 20 kHz)                                                                                                | $3 \times 10^{-7}$                                     |
| Temperature                                                                                                                                   | $\pm 2^{\circ}\text{C}$                                |
| Humidity                                                                                                                                      | $\pm 1\%$                                              |
| Uncertainty for Radiation Emission Test<br>(30 MHz - 1 GHz)                                                                                   | 2.72 dB (Antenna Polarize: V)                          |
|                                                                                                                                               | 2.72 dB (Antenna Polarize: H)                          |
| Uncertainty for Radiation Emission Test<br>(1 GHz - 40 GHz)                                                                                   | 2.74 dB (1 - 6 GHz)                                    |
|                                                                                                                                               | 2.72 dB (6 GHz - 18 GHz)                               |
|                                                                                                                                               | 3.54 dB (18 GHz - 26 GHz)                              |
|                                                                                                                                               | 4.30 dB (26 GHz - 40 GHz)                              |
| Uncertainty for Power Line Conduction Emission Test                                                                                           | 3.40 dB (150 kHz - 30 MHz)                             |
| Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2. |                                                        |

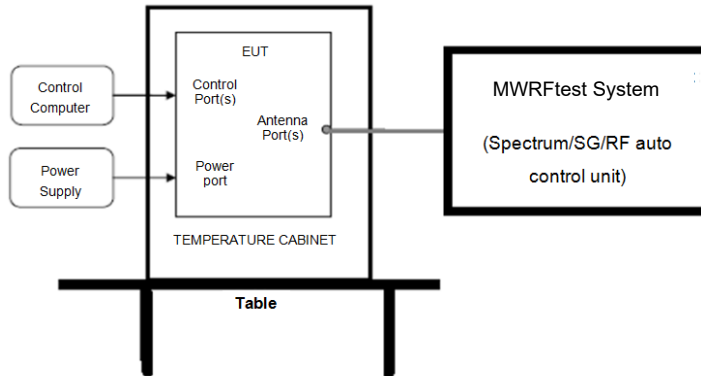
### 3. Equipment Used During Test

| Equipment                                  | Manufacturer | Model No.      | Serial No. | Last Cal.  | Cal. Interval |
|--------------------------------------------|--------------|----------------|------------|------------|---------------|
| <b>RF Connected Test (MWRFTest system)</b> |              |                |            |            |               |
| EXG Analog Signal Generator                | Keysight     | N5173B         | MY53270968 | 2025/02/20 | 1 Year        |
| MXG Vector Signal Generator                | Keysight     | N5182A         | MY50143288 | 2025/02/20 | 1 Year        |
| PXA Signal Analyzer                        | Keysight     | N9030B         | MY56320639 | 2025/02/20 | 1 Year        |
| PXA Signal Analyzer                        | Keysight     | N9010A         | MY53281492 | 2025/02/20 | 1 Year        |
| Wideband Radio Communication Tester        | R&S          | CMW500         | 158800     | 2025/02/20 | 1 Year        |
| Power Sensor                               | KEYSIGHT     | U2021XA        | MY59150007 | 2025/02/20 | 1 Year        |
| DC Power Supply                            | inSTEK       | PSP-2010       | EN122317   | 2025/02/03 | 1 Year        |
| Test Software                              | MWRFTest     | MTS8310        | V03        | N/A        | N/A           |
| <b>Radiated Emission -10m EMI Chamber</b>  |              |                |            |            |               |
| Broadband Horn Antenna                     | TESEQ        | BHA 9118       | 31754      | 2023/10/11 | 2 Year        |
| Broad Band Horn Antenna                    | Com-Power    | AHA-840        | 10100024   | 2023/10/16 | 2 Year        |
| Active Loop Antenna                        | R&S          | HFH2-Z2        | 100269     | 2024/08/25 | 2 Year        |
| Active Loop Antenna                        | SCHWARZBECK  | FMZB1519-60D   | 00058      | 2024/11/05 | 1 Year        |
| Amplifier                                  | CMO-MW       | DPA8 1000 1800 | 09211739   | 2025/02/17 | 1 Year        |
| EMI Test Receiver                          | R&S          | ESCI           | 101024     | 2025/02/17 | 1 Year        |
| EMI Test Receiver                          | R&S          | ESCI           | 101030     | 2025/02/17 | 1 Year        |
| EMI Test Receiver                          | R&S          | ESU26          | 100244     | 2025/02/17 | 1 Year        |
| EXA Signal Analyzer                        | Keysight     | N9010A         | MY53281492 | 2025/02/20 | 1 Year        |
| Bilog Antenna                              | TESEQ        | CBL6112D       | 29068      | 2024/10/10 | 2 Year        |
| Bilog Antenna                              | TESEQ        | CBL6112D       | 29069      | 2024/10/10 | 2 Year        |
| Amplifier                                  | Sonoma       | 310N           | 300913     | 2025/02/17 | 1 Year        |
| Amplifier                                  | Sonoma       | 310N           | 334532     | 2025/02/17 | 1 Year        |
| Ant Mast                                   | Innco        | MA4000         | N/A        | N/A        | N/A           |
| Ant Mast                                   | Innco        | MA4000         | N/A        | N/A        | N/A           |
| Mast Controller                            | Innco        | CO2000         | N/A        | N/A        | N/A           |
| Mast Controller                            | Innco        | CO2000         | N/A        | N/A        | N/A           |
| RF Selector 4CH                            | TOYO         | NS4904N        | Selector1  | N/A        | N/A           |
| RF Selector 4CH                            | TOYO         | NS4904N        | Selector2  | N/A        | N/A           |
| Test software                              | TOYO         | EP5/RSE        | Ver 1.9.1  | N/A        | N/A           |
| Test software                              | Audix        | E3             | V 6.11111b | N/A        | N/A           |
| <b>Radiated Emission -3m EMI Chamber</b>   |              |                |            |            |               |
| Broadband Horn Antenna                     | TESEQ        | BHA 9118       | 31754      | 2023/10/11 | 2 Year        |
| Broad Band Horn Antenna                    | Com-Power    | AHA-840        | 10100024   | 2023/10/16 | 2 Year        |
| Active Loop Antenna                        | R&S          | HFH2-Z2        | 100269     | 2024/08/25 | 2 Year        |
| Active Loop Antenna                        | SCHWARZBECK  | FMZB1519-60D   | 00058      | 2024/11/05 | 1 Year        |

|                                            |          |                   |            |            |        |
|--------------------------------------------|----------|-------------------|------------|------------|--------|
| Amplifier                                  | CMO-MW   | DPA8 1000<br>1800 | 09211739   | 2025/02/17 | 1 Year |
| EMI Test Receiver                          | R&S      | ESCI              | 101397     | 2025/02/17 | 1 Year |
| EMI Test Receiver                          | R&S      | ESU26             | 100244     | 2025/02/17 | 1 Year |
| EXA Signal Analyzer                        | Keysight | N9010A            | MY53281492 | 2025/02/20 | 1 Year |
| Bilog Antenna                              | TESEQ    | CBL6112D          | 29067      | 2025/06/17 | 2 Year |
| Amplifier                                  | Sonoma   | 310N              | 334533     | 2025/02/17 | 1 Year |
| Ant Mast                                   | Innco    | MA4000            | N/A        | N/A        | N/A    |
| Mast Controller                            | Innco    | CO2000            | N/A        | N/A        | N/A    |
| RF Selector 4CH                            | TOYO     | NS4904N           | Selector1  | N/A        | N/A    |
| Test software                              | TOYO     | EP5/RE            | Ver 5.7.10 | N/A        | N/A    |
| Test software                              | Audix    | E3                | V 6.11111b | N/A        | N/A    |
| <b>Power Line Conducted Emissions Test</b> |          |                   |            |            |        |
| Test Receiver                              | R&S      | ESCI              | 101375     | 2025/02/17 | 1 Year |
| LISN                                       | R&S      | ENV216            | 101122     | 2025/02/17 | 1 Year |
| Test software                              | TOYO     | EP5/CE            | V 5.4.40   | N/A        | N/A    |

## 4. 20 dB Bandwidth

### 4.1. Block diagram of test setup



### 4.2. Limits

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

### 4.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) 99% Bandwidth set the spectrum analyzer as follows:

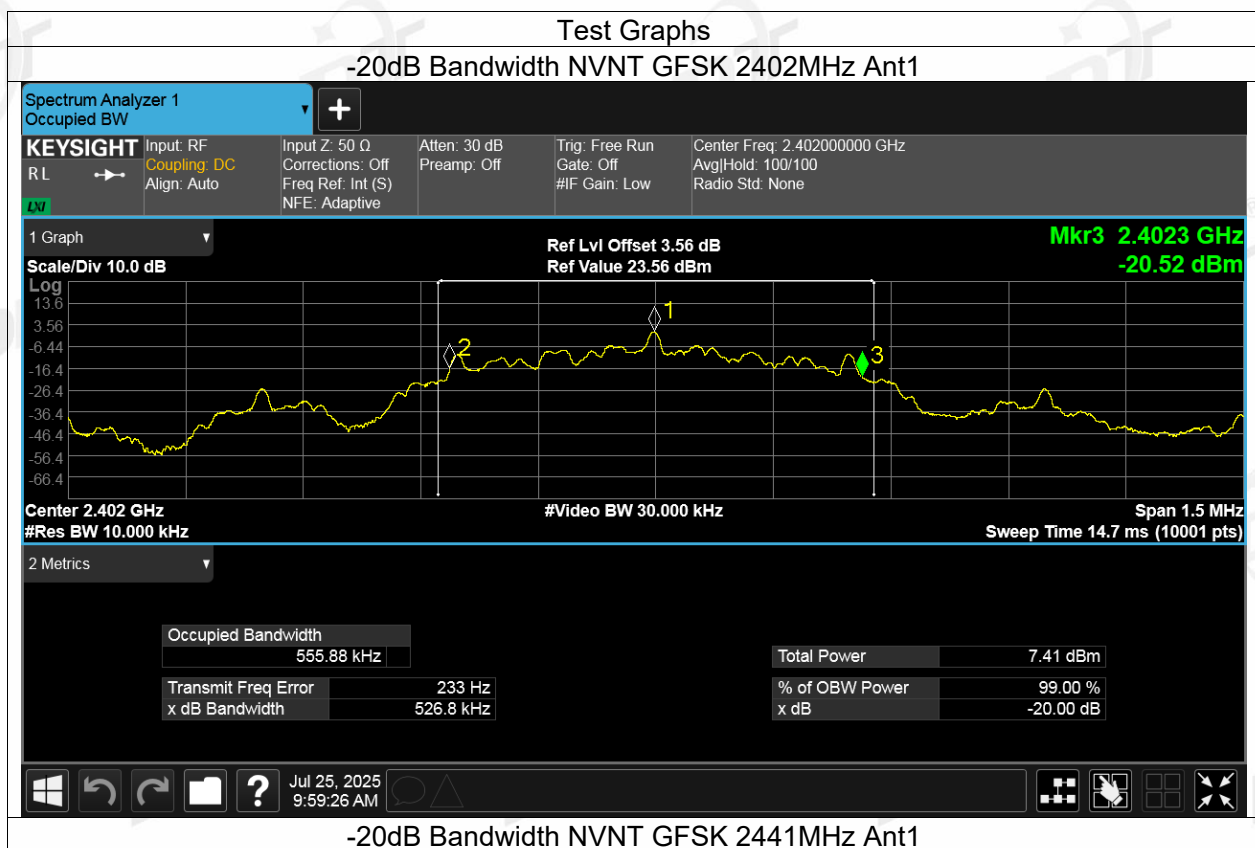
|                |                          |
|----------------|--------------------------|
| RBW:           | 1% to 5% of the OBW      |
| VBW:           | at least three times RBW |
| Detector Mode: | Peak                     |
| Sweep time:    | auto                     |
| Trace mode     | Max hold                 |

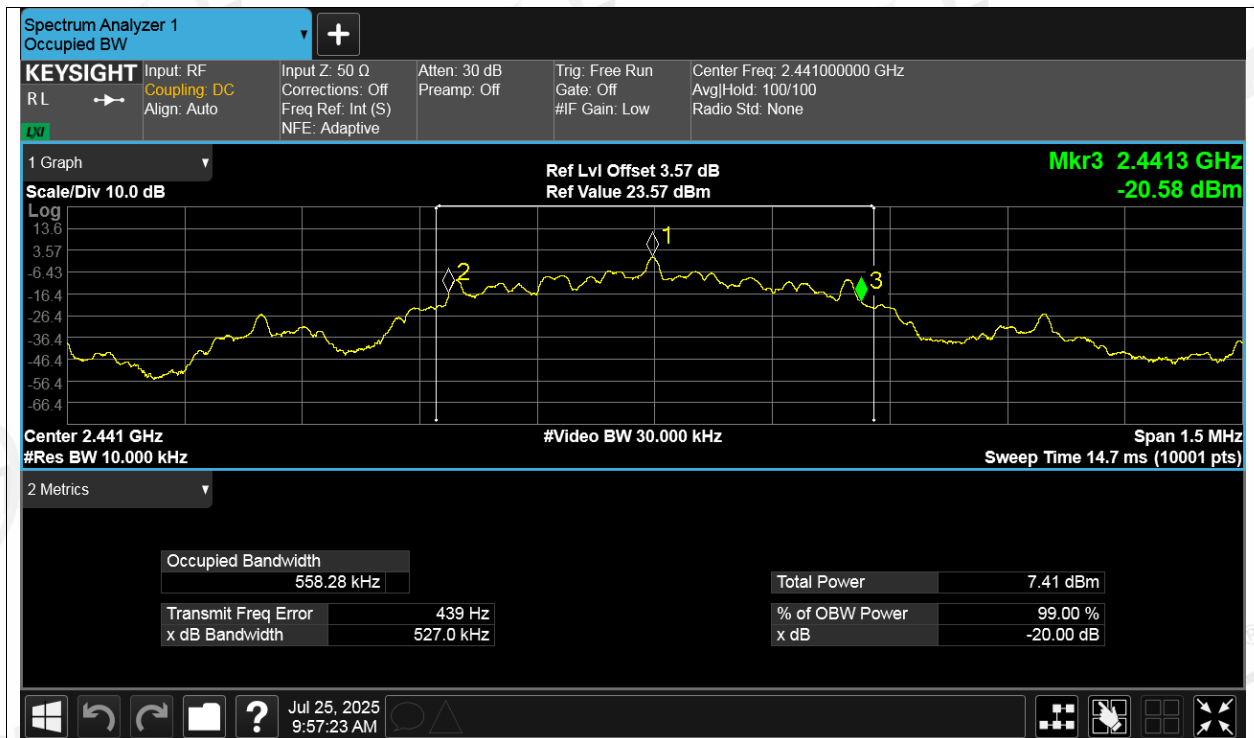
(3) Allow the trace to stabilize, measure the 20 dB and 99% bandwidth of signal.

#### 4.4. Test result

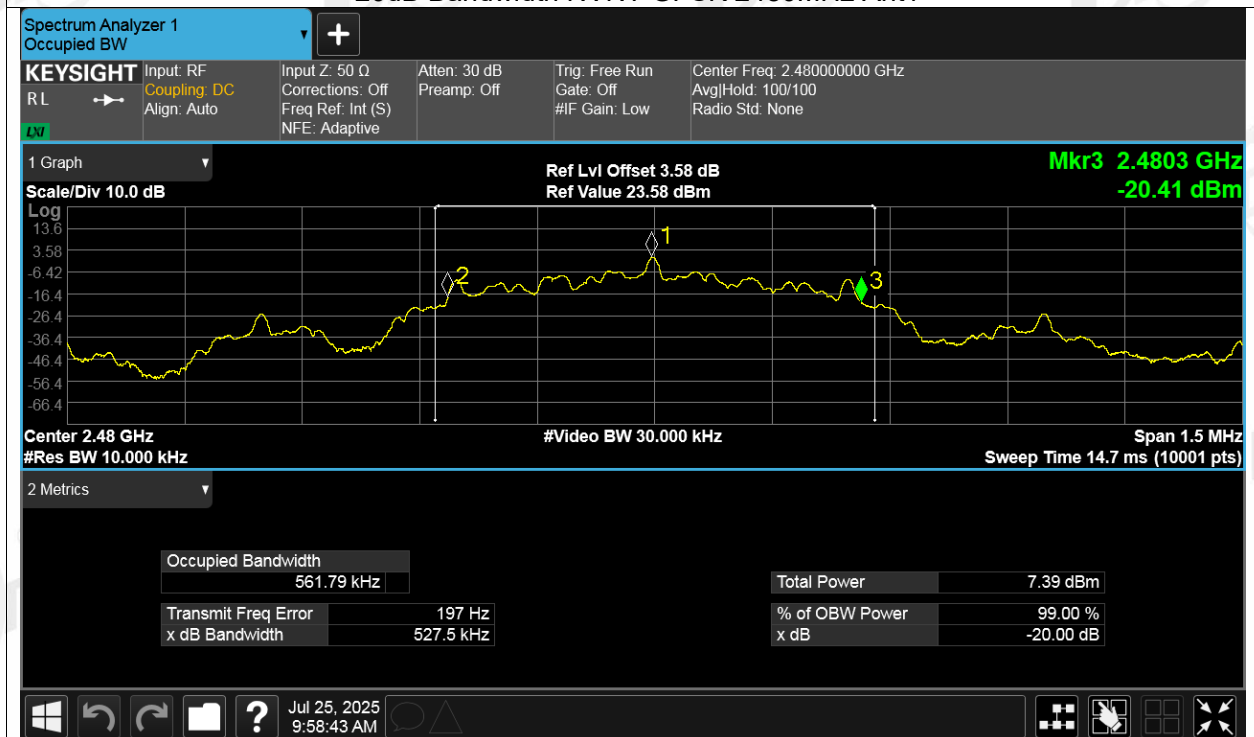
| Condition | Mode | Frequency (MHz) | Antenna | -20 dB Bandwidth (MHz) | Verdict |
|-----------|------|-----------------|---------|------------------------|---------|
| NVNT      | GFSK | 2402            | Ant1    | 0.527                  | Pass    |
| NVNT      | GFSK | 2441            | Ant1    | 0.527                  | Pass    |
| NVNT      | GFSK | 2480            | Ant1    | 0.528                  | Pass    |

-20dB Bandwidth





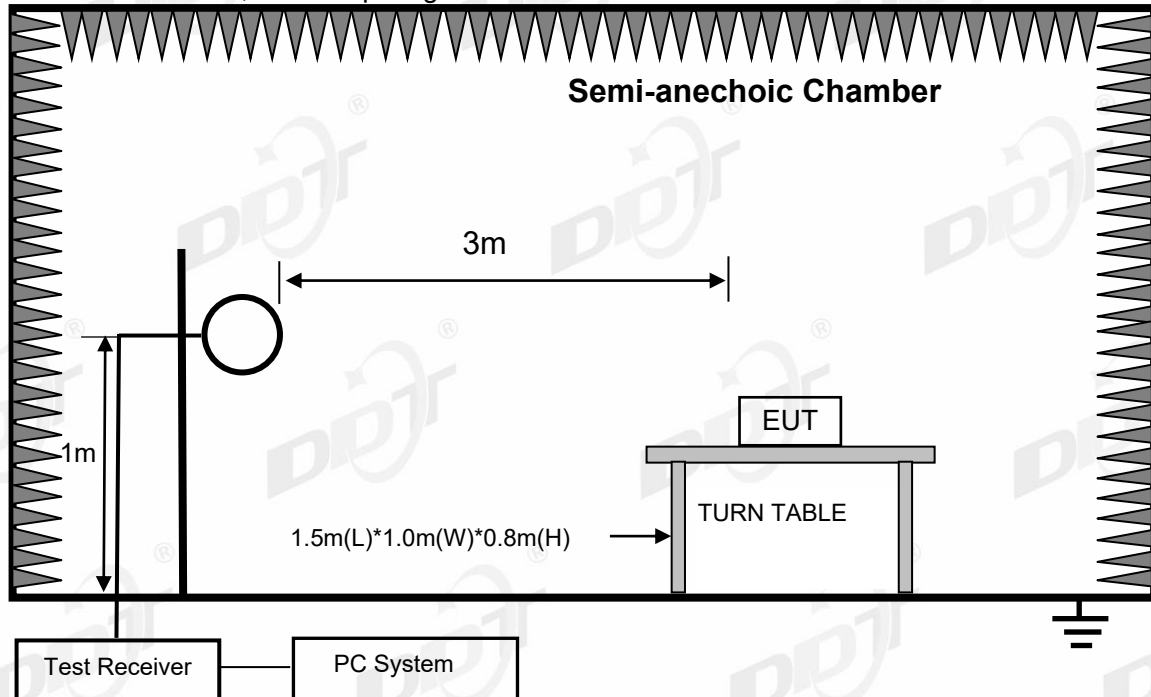
-20dB Bandwidth NVNT GFSK 2480MHz Ant1



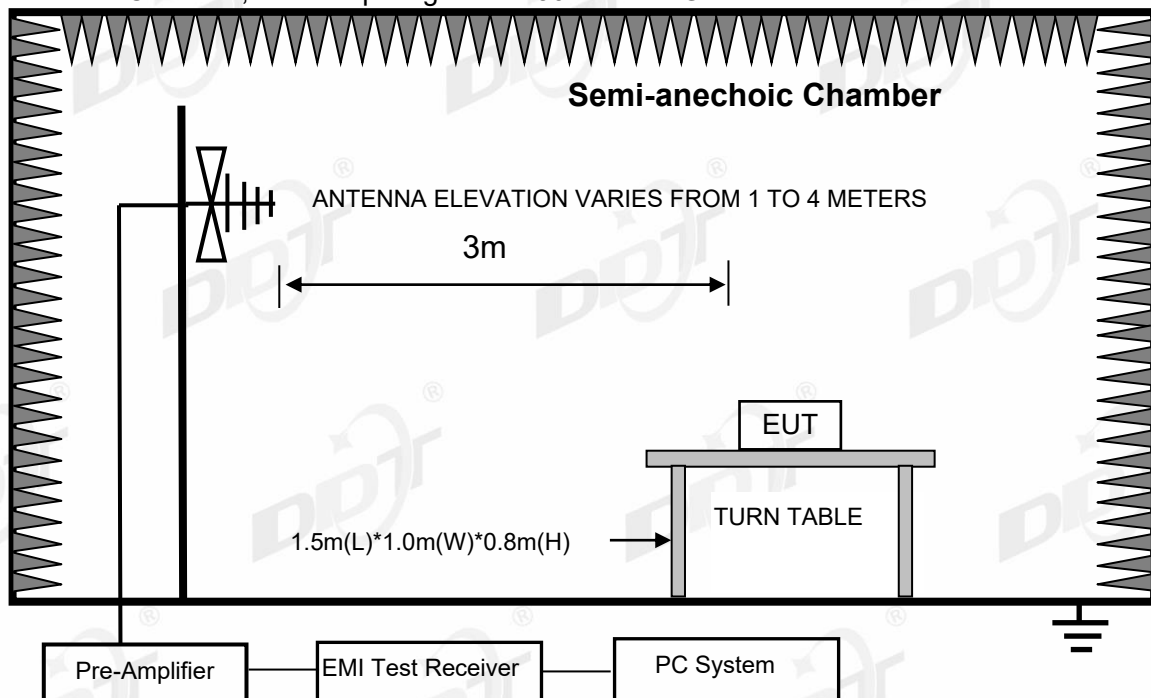
## 5. Radiated Emission

### 5.1. Block diagram of test setup

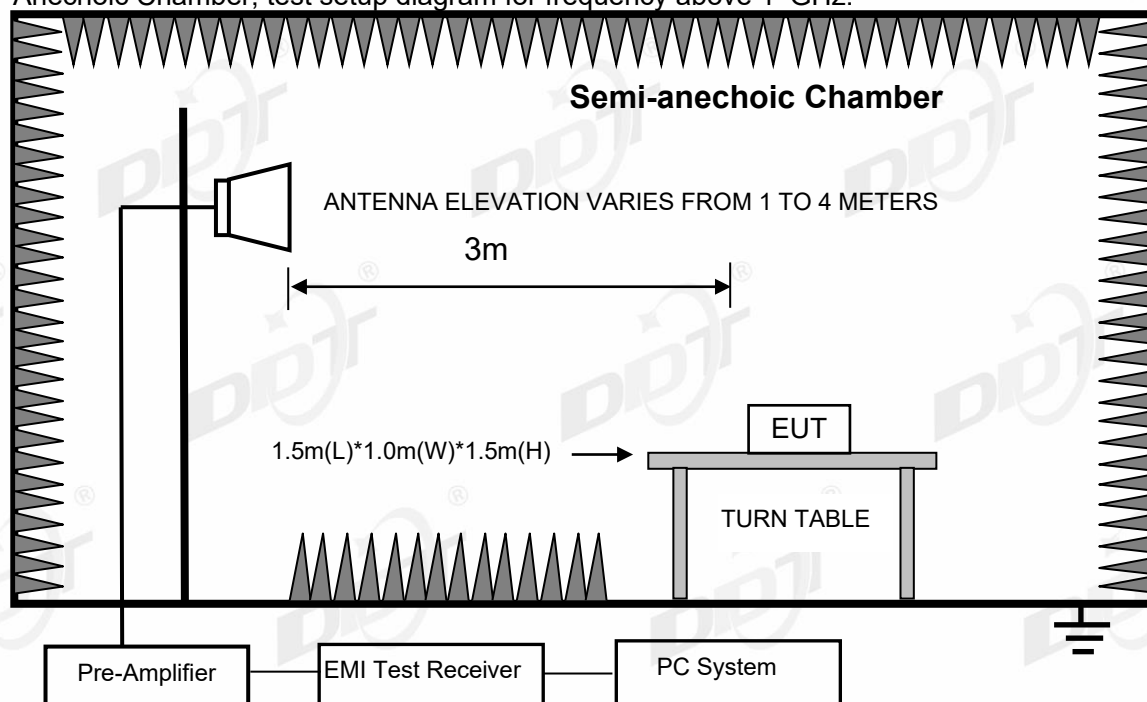
Anechoic Chamber, test setup diagram for 9 kHz - 30 MHz:



Anechoic Chamber, test setup diagram for 30 MHz - 1 GHz:



Anechoic Chamber, test setup diagram for frequency above 1 GHz:



Note: For harmonic emissions test an appropriate high pass filter was inserted in the input port of AMP.

## 5.2. Limit

(1) FCC 15.205 Restricted frequency band

| MHz                      | MHz                 | MHz           | GHz              |
|--------------------------|---------------------|---------------|------------------|
| 0.090-0.110              | 16.42-16.423        | 399.9-410     | 4.5-5.15         |
| <sup>1</sup> 0.495-0.505 | 16.69475-16.69525   | 608-614       | 5.35-5.46        |
| 2.1735-2.1905            | 16.80425-16.80475   | 960-1240      | 7.25-7.75        |
| 4.125-4.128              | 25.5-25.67          | 1300-1427     | 8.025-8.5        |
| 4.1772&4.17775           | 37.5-38.25          | 1435-1626.5   | 9.0-9.2          |
| 4.2072&4.20775           | 73-74.6             | 1645.5-1646.5 | 9.3-9.5          |
| 6.215-6.218              | 74.8-75.2           | 1660-1710     | 10.6-12.7        |
| 6.26775-6.26825          | 108-121.94          | 1718.8-1722.2 | 13.25-13.4       |
| 6.31175-6.31225          | 123-138             | 2200-2300     | 14.47-14.5       |
| 8.291-8.294              | 149.9-150.05        | 2310-2390     | 15.35-16.2       |
| 8.362-8.366              | 156.52475-156.52525 | 2483.5-2500   | 17.7-21.4        |
| 8.37625-8.38675          | 156.7-156.9         | 2690-2900     | 22.01-23.12      |
| 8.41425-8.41475          | 162.0125-167.17     | 3260-3267     | 23.6-24.0        |
| 12.29-12.293             | 167.72-173.2        | 3332-3339     | 31.2-31.8        |
| 12.51975-12.52025        | 240-285             | 3345.8-3358   | 36.43-36.5       |
| 12.57675-12.57725        | 322-335.4           | 3600-4400     | ( <sup>2</sup> ) |
| 13.36-13.41              |                     |               |                  |

<sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.



<sup>2</sup>Above 38.6

(2) FCC 15.209 Limit.

| FREQUENCY<br>MHz                                                      | DISTANCE<br>Meters | FIELD STRENGTHS LIMIT                                                                              |                                   |
|-----------------------------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------|-----------------------------------|
|                                                                       |                    | $\mu\text{V/m}$                                                                                    | $\text{dB}(\mu\text{V})/\text{m}$ |
| 0.009 ~ 0.490                                                         | 300                | $2400/F(\text{kHz})$                                                                               | $67.6-20\log(F)$                  |
| 0.490 ~ 1.705                                                         | 30                 | $24000/F(\text{kHz})$                                                                              | $87.6-20\log(F)$                  |
| 1.705 ~ 30.0                                                          | 30                 | 30                                                                                                 | 29.54                             |
| 30 ~ 88                                                               | 3                  | 100                                                                                                | 40.0                              |
| 88 ~ 216                                                              | 3                  | 150                                                                                                | 43.5                              |
| 216 ~ 960                                                             | 3                  | 200                                                                                                | 46.0                              |
| 960 ~ 1000                                                            | 3                  | 500                                                                                                | 54.0                              |
| Above 1000                                                            | 3                  | 74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak)<br>54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)  |                                   |
| Field Strength of Fundamental<br>emission for 2.4 GHz - 2.4835<br>GHz | 3                  | 94.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)<br>114.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) |                                   |
| Field Strength of Harmonics                                           | 3                  | 74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak)<br>54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)  |                                   |

Note: (1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9 - 90 kHz, 110 - 490 kHz and above 1000 MHz, radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30 MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3\text{m}}(\text{dB}\mu\text{V}/\text{m}) = \text{Limit}_{30\text{m}}(\text{dB}\mu\text{V}/\text{m}) + 40\log(30\text{m}/3\text{m})$$

(3) Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions or comply with 15.209 limits.

### 5.3. Test Procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1G and 150 cm above the ground plane inside a fully-anechoic chamber for above 1G.

(2) Test antenna was located on an adjustable mast, the distance from test antenna to EUT and the antenna used as below table.

| Test frequency range | Test antenna used        | Test antenna distance |
|----------------------|--------------------------|-----------------------|
| 9 kHz - 30 MHz       | Active Loop antenna      | 3 m                   |
| 30 MHz - 1 GHz       | Trilog Broadband Antenna | 3 m                   |

|                 |                                                |     |
|-----------------|------------------------------------------------|-----|
| 1 GHz - 18 GHz  | Double Ridged Horn Antenna<br>(1 GHz - 18 GHz) | 3 m |
| 18 GHz - 40 GHz | Horn Antenna<br>(18 GHz - 40 GHz)              | 3 m |

According ANSI C63.10:2020 clause 6.4.4.2 and 6.5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna also is positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9 kHz to 25 GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1 m to 4 m (Except loop antenna, it's fixed 1 m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9 kHz to 25 GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 18 GHz to 25 GHz, so below final test was performed with frequency range from 9 kHz to 18 GHz.

(4) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to ANSI C63.10:2020 on Radiated Emission test.

(5) The emissions from 9 kHz to 1 GHz were measured based on CISPR QP detector except for the frequency bands 9 - 90 kHz, 110 - 490 kHz, for emissions from 9 kHz - 90 kHz, 110 kHz - 490 kHz and above 1 GHz were measured based on average detector, for emissions above 1 GHz, peak emissions also be measured and need comply with Peak limit.

(6) The emissions from 9 kHz to 1 GHz, QP or average values were measured with EMI receiver with below RBW.

| Frequency band   | RBW     |
|------------------|---------|
| 9 kHz - 150 kHz  | 200 Hz  |
| 150 kHz - 30 MHz | 9 kHz   |
| 30 MHz - 1 GHz   | 120 kHz |

- (7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1 MHz, VBW is set at 3 MHz for Peak measure; According ANSI C63.10:2020 clause 4.1.5.2.3 and 4.1.5.2.5 procedure for average measure.
- (8) X axis, Y axis, Z axis are tested, and worse setup X axis is reported.

#### 5.4. Test result

Pass. (See below detailed test result)

All the emissions except fundamental emission from 9 kHz to 25 GHz were comply with 15.209 limits.

Note1: For emissions below 1 GHz and above 18 GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1 GHz, the final test was only performed with EUT working in GFSK Ant1 2480MHz transmission mode.

Note 2: Scan with all modes, the worst case was recorded in this report.

## Radiated Emission test (9kHz-30MHz)

## Radiated Emission Test Result

Test Site : DDT 10m Chamber

Test Date : 07-23-2025

Tested By : Sunny

EUT : electronic shelf label

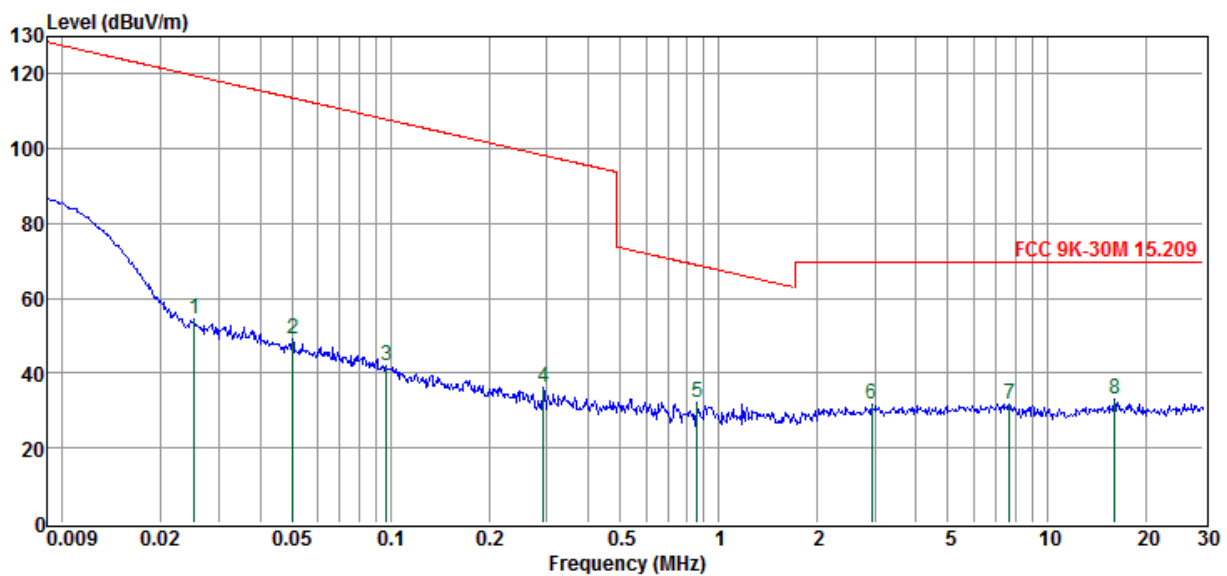
Model Number : Nebular Pro-154Q-N

Power Supply : Battery

Test Mode : Tx mode

Memo : GFSK ANT1 2480MHz

Data: 208



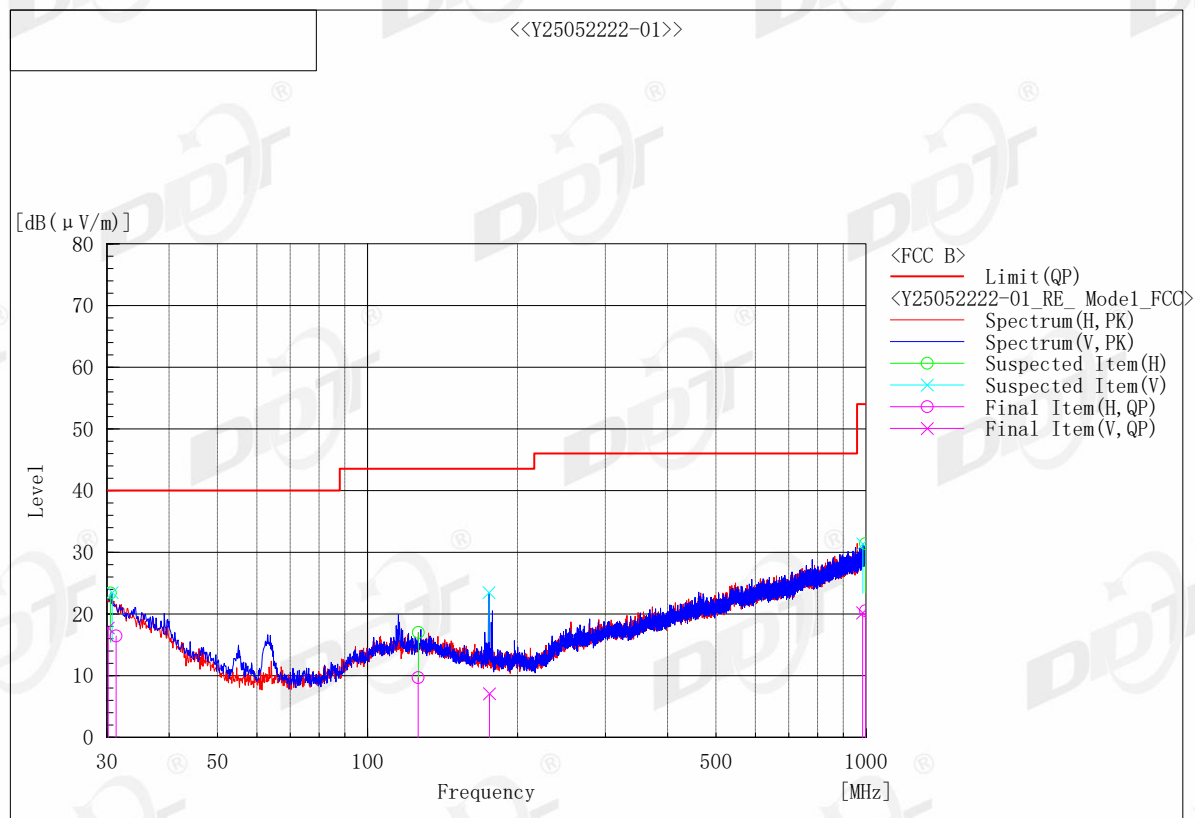
| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>dB | Result<br>Level<br>(dBuV/m) | Limit<br>Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | Detect<br>or | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|-----------------------------|---------------------------|-----------------------|--------------|--------------|
| 1              | 0.025          | 34.78                   | 19.90                       | 0.02                | 54.70                       | 119.57                    | -64.87                | Peak         | HORIZONTAL   |
| 2              | 0.050          | 29.44                   | 19.60                       | 0.03                | 49.07                       | 113.58                    | -64.51                | Peak         | HORIZONTAL   |
| 3              | 0.097          | 22.64                   | 19.41                       | 0.03                | 42.08                       | 107.87                    | -65.79                | Peak         | HORIZONTAL   |
| 4              | 0.292          | 16.74                   | 19.25                       | 0.04                | 36.03                       | 98.28                     | -62.25                | Peak         | HORIZONTAL   |
| 5              | 0.859          | 12.84                   | 19.17                       | 0.07                | 32.08                       | 68.92                     | -36.84                | Peak         | HORIZONTAL   |
| 6              | 2.925          | 12.60                   | 19.12                       | 0.14                | 31.86                       | 69.54                     | -37.68                | Peak         | HORIZONTAL   |
| 7              | 7.679          | 12.59                   | 19.12                       | 0.19                | 31.90                       | 69.54                     | -37.64                | Peak         | HORIZONTAL   |
| 8              | 16.064         | 13.30                   | 19.35                       | 0.26                | 32.91                       | 69.54                     | -36.63                | Peak         | HORIZONTAL   |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: 9k-150kHz, RBW: 300Hz; 150k-30Mhz, RBW: 10kHz, Sweep time: auto.

## Radiated Emission test (30MHz - 1 GHz)



## Final Result

| No. | Frequency<br>[MHz] | (P) | Reading<br>QP<br>[dB (μV)] | c. f<br>[dB(1/m)] | Result<br>QP<br>[dB (μV/m)] | Limit<br>QP<br>[dB (μV/m)] | Margin<br>QP<br>[dB] | Height<br>[cm] | Angle<br>[°] | Remark |
|-----|--------------------|-----|----------------------------|-------------------|-----------------------------|----------------------------|----------------------|----------------|--------------|--------|
| 1   | 31.293             | H   | 21.4                       | -4.9              | 16.5                        | 40.0                       | 23.5                 | 299.0          | 212.0        |        |
| 2   | 998.160            | H   | 15.6                       | 4.9               | 20.5                        | 54.0                       | 33.5                 | 101.0          | 345.5        |        |
| 3   | 126.259            | H   | 21.0                       | -11.3             | 9.7                         | 43.5                       | 33.8                 | 154.0          | 172.0        |        |
| 4   | 30.177             | V   | 22.0                       | -4.2              | 17.8                        | 40.0                       | 22.2                 | 200.0          | 73.4         |        |
| 5   | 984.225            | V   | 15.6                       | 4.6               | 20.2                        | 54.0                       | 33.8                 | 384.0          | 135.3        |        |
| 6   | 175.577            | V   | 20.3                       | -13.2             | 7.1                         | 43.5                       | 36.4                 | 196.0          | 25.2         |        |

## Radiated Emission test (1 GHz – 18GHz)

## Radiated Emission Test Result

Test Site : 10m Chamber

Test Date : 07-21-2025

Tested By : Sunny

EUT : electronic shelf label

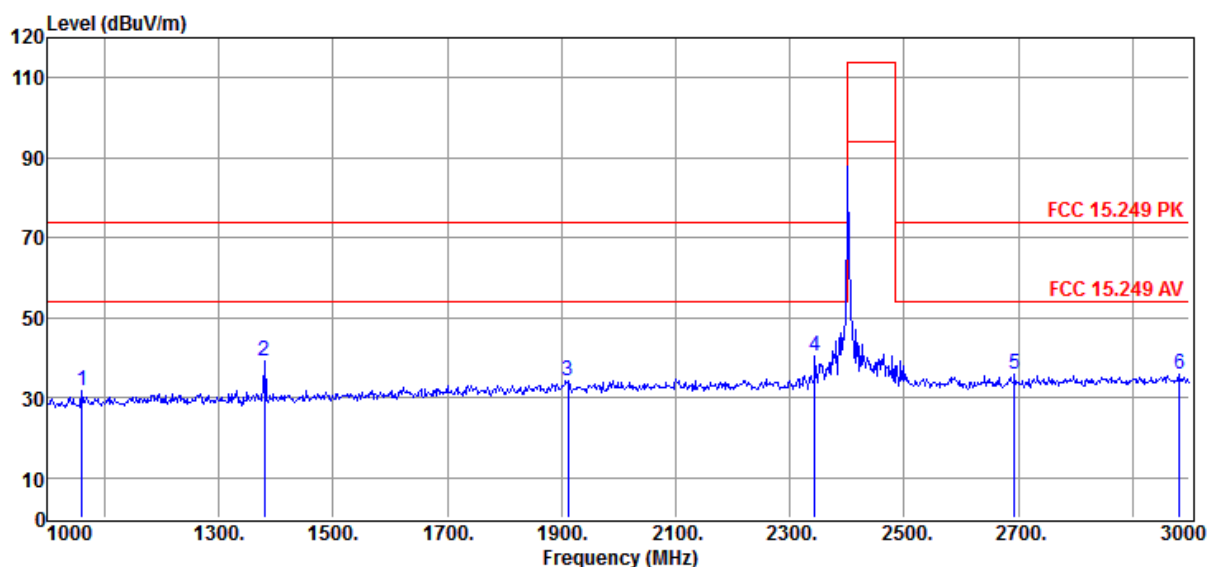
Model Number : Nebular Pro-154Q-N

Power Supply : by battery

Test Mode : Tx mode

Memo : GFSK 2402MHz

Data: 143



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBuV/m) | Limit<br>Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 1060.00        | 48.34                   | 24.20                       | 43.62               | 2.78                | 31.70                       | 74.00                     | -42.30                | Peak     | HORIZONTAL   |
| 2              | 1380.00        | 54.48                   | 25.29                       | 43.71               | 3.13                | 39.19                       | 74.00                     | -34.81                | Peak     | HORIZONTAL   |
| 3              | 1912.00        | 46.45                   | 27.84                       | 43.87               | 3.74                | 34.16                       | 74.00                     | -39.84                | Peak     | HORIZONTAL   |
| 4              | 2344.00        | 51.74                   | 28.37                       | 43.80               | 4.08                | 40.39                       | 74.00                     | -33.61                | Peak     | HORIZONTAL   |
| 5              | 2694.00        | 46.41                   | 28.94                       | 43.69               | 4.37                | 36.03                       | 74.00                     | -37.97                | Peak     | HORIZONTAL   |
| 6              | 2982.00        | 45.06                   | 29.75                       | 43.61               | 4.64                | 35.84                       | 74.00                     | -38.16                | Peak     | HORIZONTAL   |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.

## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 07-21-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

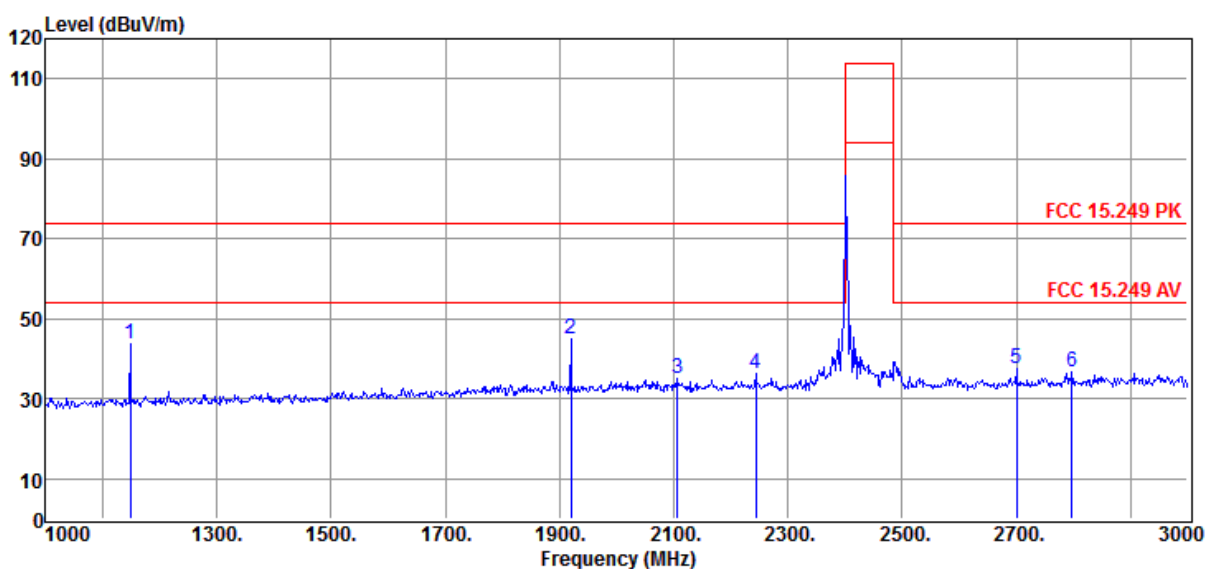
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2402MHz

Data: 144



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 1148.00        | 59.62                   | 24.50                       | 43.64               | 3.14                | 43.62                       | 74.00                     | -30.38                | Peak     | VERTICAL     |
| 2              | 1920.00        | 57.31                   | 27.88                       | 43.88               | 3.72                | 45.03                       | 74.00                     | -28.97                | Peak     | VERTICAL     |
| 3              | 2106.00        | 46.65                   | 28.32                       | 43.87               | 3.83                | 34.93                       | 74.00                     | -39.07                | Peak     | VERTICAL     |
| 4              | 2244.00        | 47.72                   | 28.35                       | 43.83               | 3.96                | 36.20                       | 74.00                     | -37.80                | Peak     | VERTICAL     |
| 5              | 2700.00        | 47.99                   | 28.96                       | 43.69               | 4.38                | 37.64                       | 74.00                     | -36.36                | Peak     | VERTICAL     |
| 6              | 2798.00        | 46.42                   | 29.23                       | 43.66               | 4.52                | 36.51                       | 74.00                     | -37.49                | Peak     | VERTICAL     |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.



## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 08-01-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

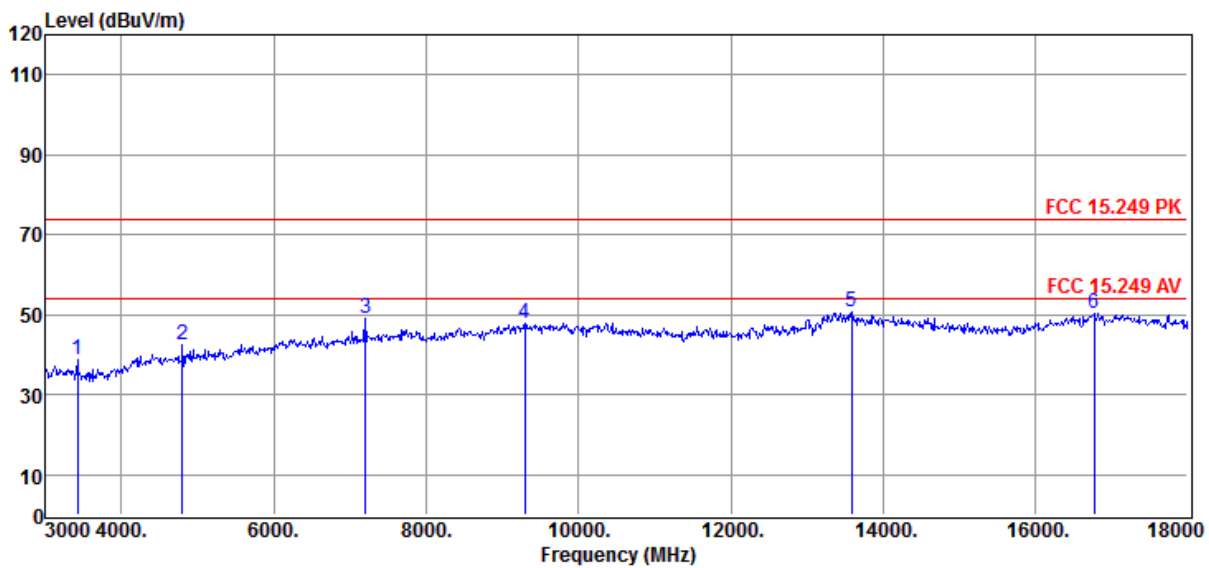
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2402MHz

Data: 145



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 3420.00        | 44.78                   | 30.89                       | 43.39               | 6.33                | 38.61                       | 74.00                     | -35.39                | Peak     | HORIZONTAL   |
| 2              | 4800.00        | 45.26                   | 33.24                       | 42.70               | 6.70                | 42.50                       | 74.00                     | -31.50                | Peak     | HORIZONTAL   |
| 3              | 7206.00        | 46.33                   | 37.76                       | 42.68               | 7.80                | 49.21                       | 74.00                     | -24.79                | Peak     | HORIZONTAL   |
| 4              | 9300.00        | 42.67                   | 38.38                       | 42.87               | 9.81                | 47.99                       | 74.00                     | -26.01                | Peak     | HORIZONTAL   |
| 5              | 13590.00       | 41.69                   | 40.96                       | 43.06               | 11.00               | 50.59                       | 74.00                     | -23.41                | Peak     | HORIZONTAL   |
| 6              | 16770.00       | 39.39                   | 41.66                       | 42.60               | 11.88               | 50.33                       | 74.00                     | -23.67                | Peak     | HORIZONTAL   |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.



## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 08-01-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

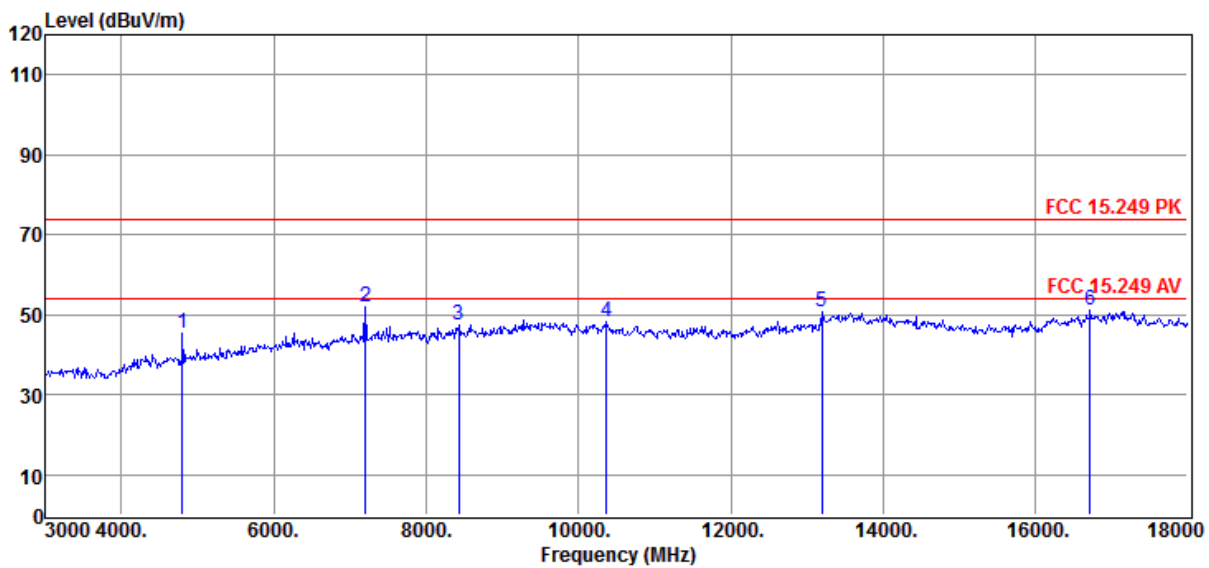
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2402MHz

Data: 146



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 4800.00        | 48.23                   | 33.24                       | 42.70               | 6.70                | 45.47                       | 74.00                     | -28.53                | Peak     | VERTICAL     |
| 2              | 7206.00        | 49.09                   | 37.76                       | 42.68               | 7.80                | 51.97                       | 74.00                     | -22.03                | Peak     | VERTICAL     |
| 3              | 8430.00        | 43.30                   | 37.83                       | 42.96               | 9.45                | 47.62                       | 74.00                     | -26.38                | Peak     | VERTICAL     |
| 4              | 10365.00       | 40.96                   | 38.95                       | 42.80               | 10.96               | 48.07                       | 74.00                     | -25.93                | Peak     | VERTICAL     |
| 5              | 13200.00       | 42.17                   | 40.70                       | 43.02               | 10.88               | 50.73                       | 74.00                     | -23.27                | Peak     | VERTICAL     |
| 6              | 16725.00       | 39.88                   | 41.52                       | 42.60               | 12.18               | 50.98                       | 74.00                     | -23.02                | Peak     | VERTICAL     |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.

## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 07-21-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

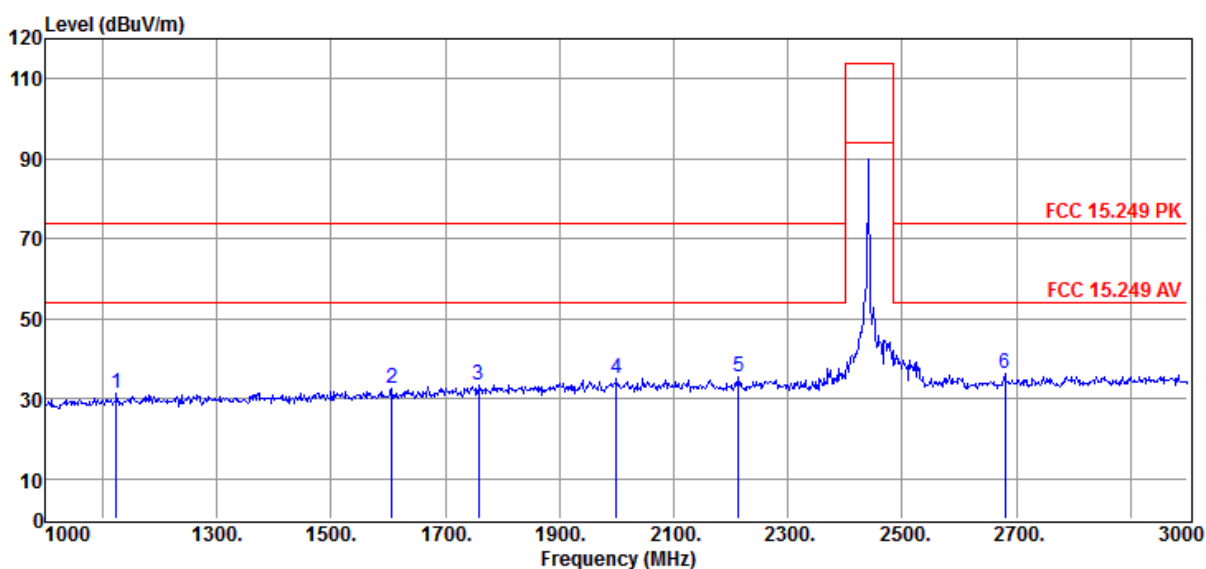
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2441MHz

Data: 147



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 1124.00        | 47.29                   | 24.42                       | 43.64               | 3.10                | 31.17                       | 74.00                     | -42.83                | Peak     | HORIZONTAL   |
| 2              | 1606.00        | 46.99                   | 26.25                       | 43.78               | 3.30                | 32.76                       | 74.00                     | -41.24                | Peak     | HORIZONTAL   |
| 3              | 1758.00        | 46.85                   | 27.04                       | 43.83               | 3.52                | 33.58                       | 74.00                     | -40.42                | Peak     | HORIZONTAL   |
| 4              | 2000.00        | 46.98                   | 28.30                       | 43.90               | 3.68                | 35.06                       | 74.00                     | -38.94                | Peak     | HORIZONTAL   |
| 5              | 2214.00        | 47.19                   | 28.34                       | 43.84               | 3.92                | 35.61                       | 74.00                     | -38.39                | Peak     | HORIZONTAL   |
| 6              | 2680.00        | 46.82                   | 28.90                       | 43.70               | 4.33                | 36.35                       | 74.00                     | -37.65                | Peak     | HORIZONTAL   |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.

## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 07-21-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

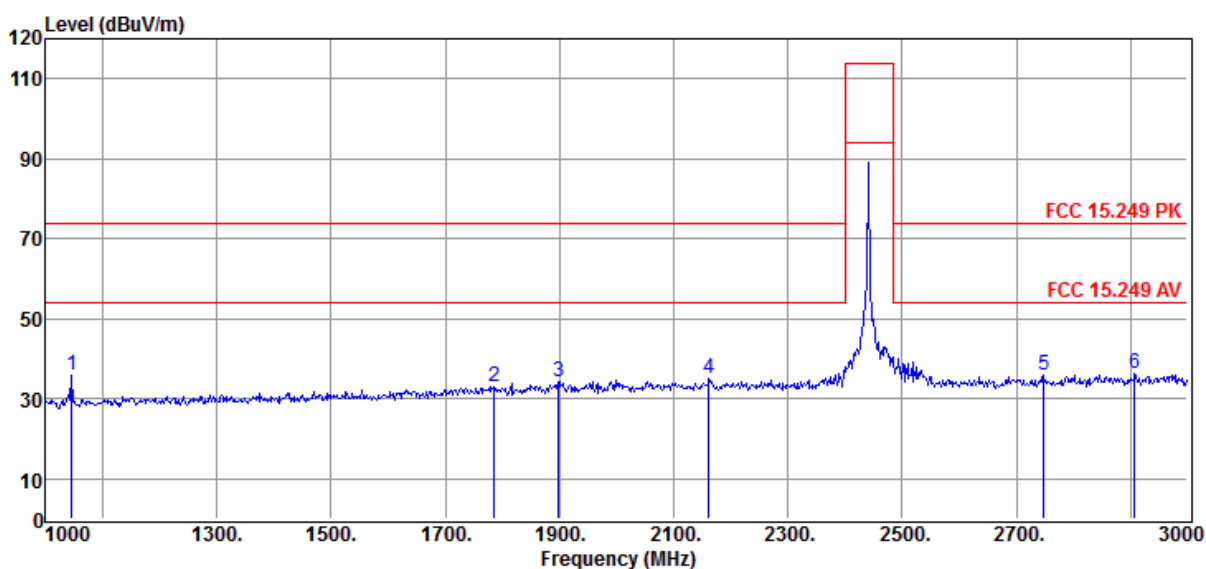
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2441MHz

Data: 148



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 1046.00        | 52.75                   | 24.16                       | 43.61               | 2.68                | 35.98                       | 74.00                     | -38.02                | Peak     | VERTICAL     |
| 2              | 1786.00        | 46.15                   | 27.19                       | 43.84               | 3.58                | 33.08                       | 74.00                     | -40.92                | Peak     | VERTICAL     |
| 3              | 1898.00        | 46.41                   | 27.77                       | 43.87               | 3.77                | 34.08                       | 74.00                     | -39.92                | Peak     | VERTICAL     |
| 4              | 2162.00        | 46.58                   | 28.33                       | 43.85               | 3.87                | 34.93                       | 74.00                     | -39.07                | Peak     | VERTICAL     |
| 5              | 2748.00        | 45.89                   | 29.09                       | 43.68               | 4.49                | 35.79                       | 74.00                     | -38.21                | Peak     | VERTICAL     |
| 6              | 2908.00        | 45.89                   | 29.54                       | 43.63               | 4.65                | 36.45                       | 74.00                     | -37.55                | Peak     | VERTICAL     |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.

# Radiated Emission Test Result

Test Site : 10m Chamber

Test Date : 08-01-2025

Tested By : Sunny

EUT : electronic shelf label

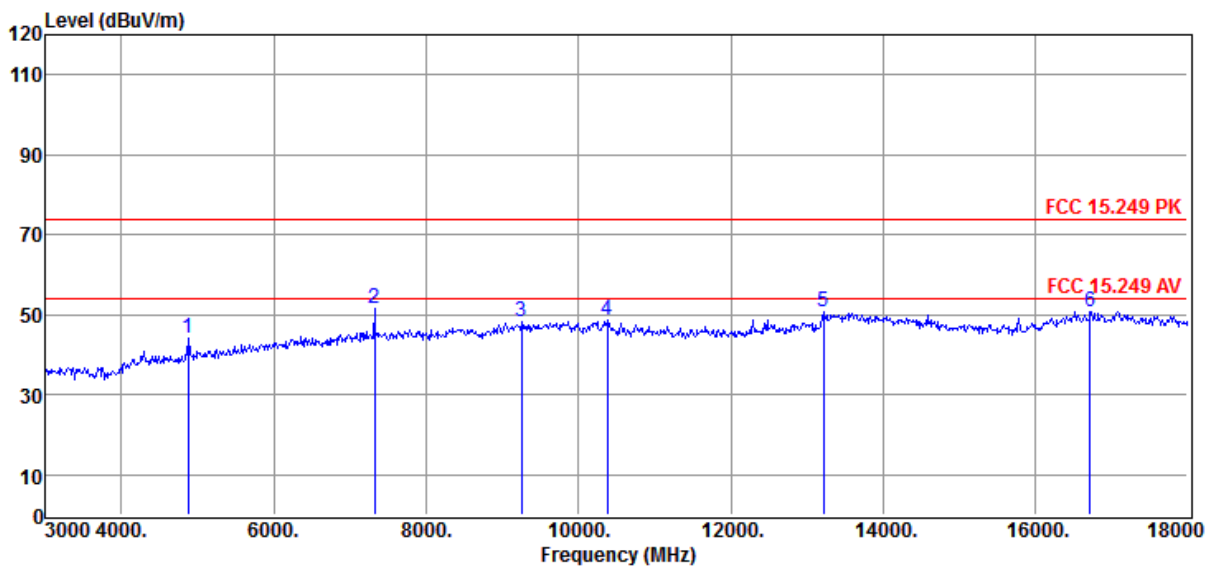
Model Number : Nebular Pro-154Q-N

Power Supply : by battery

Test Mode : Tx mode

Memo : GFSK 2441MHz

Data: 149



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBuV/m) | Limit<br>Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 4875.00        | 45.95                   | 33.38                       | 42.66               | 7.45                | 44.12                       | 74.00                     | -29.88                | Peak     | HORIZONTAL   |
| 2              | 7323.00        | 48.13                   | 37.86                       | 42.73               | 8.13                | 51.39                       | 74.00                     | -22.61                | Peak     | HORIZONTAL   |
| 3              | 9255.00        | 43.08                   | 38.35                       | 42.87               | 9.68                | 48.24                       | 74.00                     | -25.76                | Peak     | HORIZONTAL   |
| 4              | 10380.00       | 41.15                   | 38.95                       | 42.80               | 11.18               | 48.48                       | 74.00                     | -25.52                | Peak     | HORIZONTAL   |
| 5              | 13215.00       | 42.10                   | 40.72                       | 43.02               | 10.74               | 50.54                       | 74.00                     | -23.46                | Peak     | HORIZONTAL   |
| 6              | 16725.00       | 39.56                   | 41.52                       | 42.60               | 12.18               | 50.66                       | 74.00                     | -23.34                | Peak     | HORIZONTAL   |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.

# Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 08-01-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

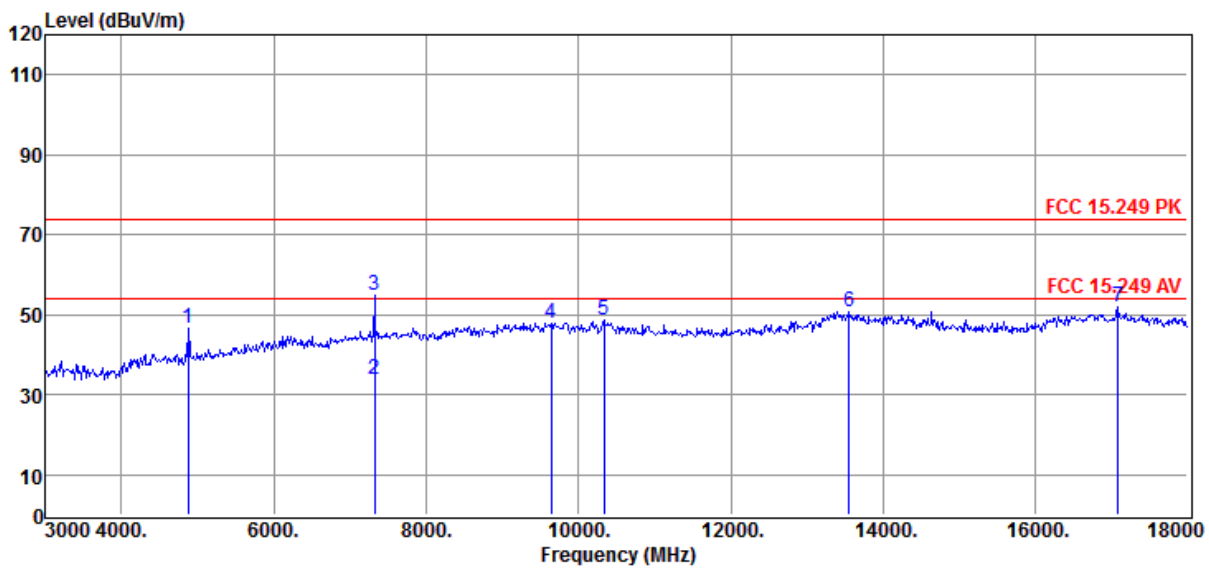
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2441MHz

Data: 150



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBuV/m) | Limit<br>Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 4875.00        | 48.33                   | 33.38                       | 42.66               | 7.45                | 46.50                       | 74.00                     | -27.50                | Peak     | VERTICAL     |
| 2              | 7323.00        | 30.40                   | 37.86                       | 42.73               | 8.13                | 33.66                       | 54.00                     | -20.34                | Average  | VERTICAL     |
| 3              | 7323.00        | 51.77                   | 37.86                       | 42.73               | 8.13                | 55.03                       | 74.00                     | -18.97                | Peak     | VERTICAL     |
| 4              | 9645.00        | 42.34                   | 38.59                       | 42.84               | 9.93                | 48.02                       | 74.00                     | -25.98                | Peak     | VERTICAL     |
| 5              | 10335.00       | 42.17                   | 38.93                       | 42.80               | 10.51               | 48.81                       | 74.00                     | -25.19                | Peak     | VERTICAL     |
| 6              | 13560.00       | 42.05                   | 40.98                       | 43.06               | 10.91               | 50.88                       | 74.00                     | -23.12                | Peak     | VERTICAL     |
| 7              | 17085.00       | 39.15                   | 42.38                       | 42.54               | 13.02               | 52.01                       | 74.00                     | -21.99                | Peak     | VERTICAL     |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.

## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 07-21-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

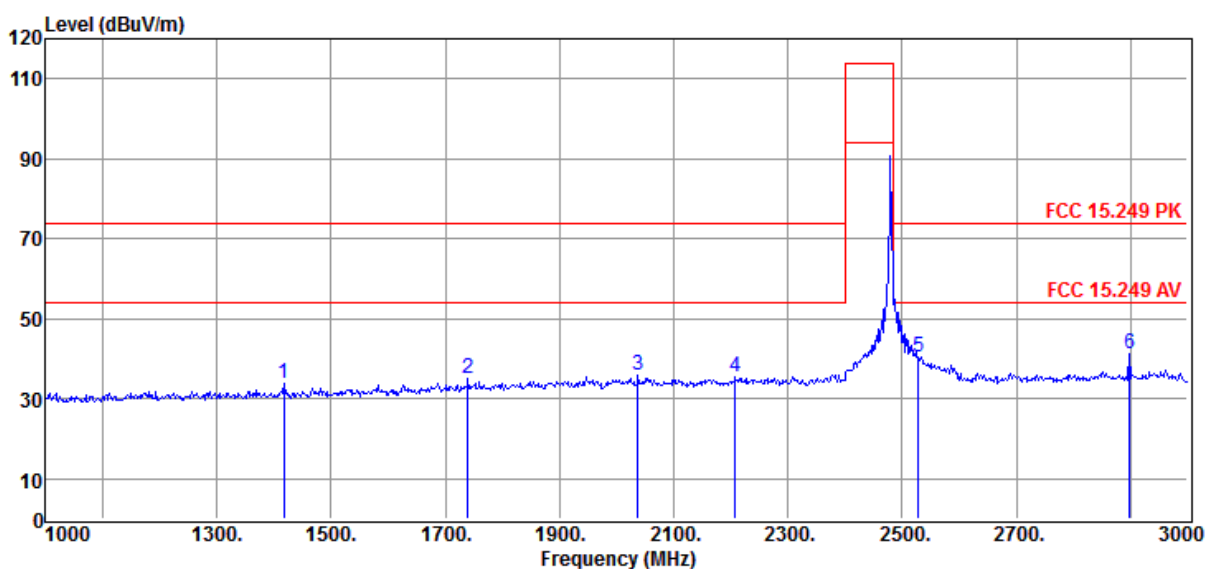
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2480MHz

Data: 151



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 1418.00        | 49.19                   | 25.42                       | 43.73               | 3.09                | 33.97                       | 74.00                     | -40.03                | Peak     | HORIZONTAL   |
| 2              | 1740.00        | 48.53                   | 26.95                       | 43.82               | 3.47                | 35.13                       | 74.00                     | -38.87                | Peak     | HORIZONTAL   |
| 3              | 2038.00        | 47.68                   | 28.31                       | 43.89               | 3.76                | 35.86                       | 74.00                     | -38.14                | Peak     | HORIZONTAL   |
| 4              | 2208.00        | 47.03                   | 28.34                       | 43.84               | 3.92                | 35.45                       | 74.00                     | -38.55                | Peak     | HORIZONTAL   |
| 5              | 2528.00        | 51.47                   | 28.48                       | 43.74               | 4.27                | 40.48                       | 74.00                     | -33.52                | Peak     | HORIZONTAL   |
| 6              | 2898.00        | 50.79                   | 29.51                       | 43.63               | 4.64                | 41.31                       | 74.00                     | -32.69                | Peak     | HORIZONTAL   |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.



## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 07-21-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

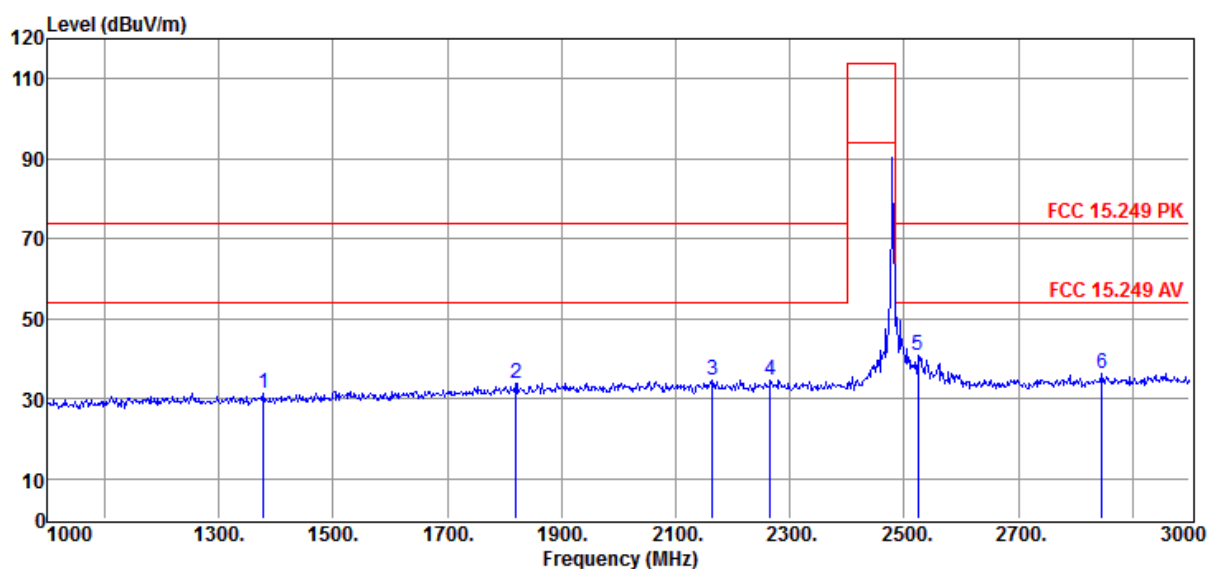
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2480MHz

Data: 152



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 1378.00        | 46.62                   | 25.29                       | 43.71               | 3.12                | 31.32                       | 74.00                     | -42.68                | Peak     | VERTICAL     |
| 2              | 1820.00        | 46.93                   | 27.36                       | 43.85               | 3.55                | 33.99                       | 74.00                     | -40.01                | Peak     | VERTICAL     |
| 3              | 2164.00        | 46.31                   | 28.33                       | 43.85               | 3.87                | 34.66                       | 74.00                     | -39.34                | Peak     | VERTICAL     |
| 4              | 2266.00        | 46.15                   | 28.35                       | 43.82               | 4.00                | 34.68                       | 74.00                     | -39.32                | Peak     | VERTICAL     |
| 5              | 2524.00        | 51.86                   | 28.47                       | 43.74               | 4.26                | 40.85                       | 74.00                     | -33.15                | Peak     | VERTICAL     |
| 6              | 2846.00        | 46.10                   | 29.37                       | 43.65               | 4.52                | 36.34                       | 74.00                     | -37.66                | Peak     | VERTICAL     |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.

## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 07-21-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

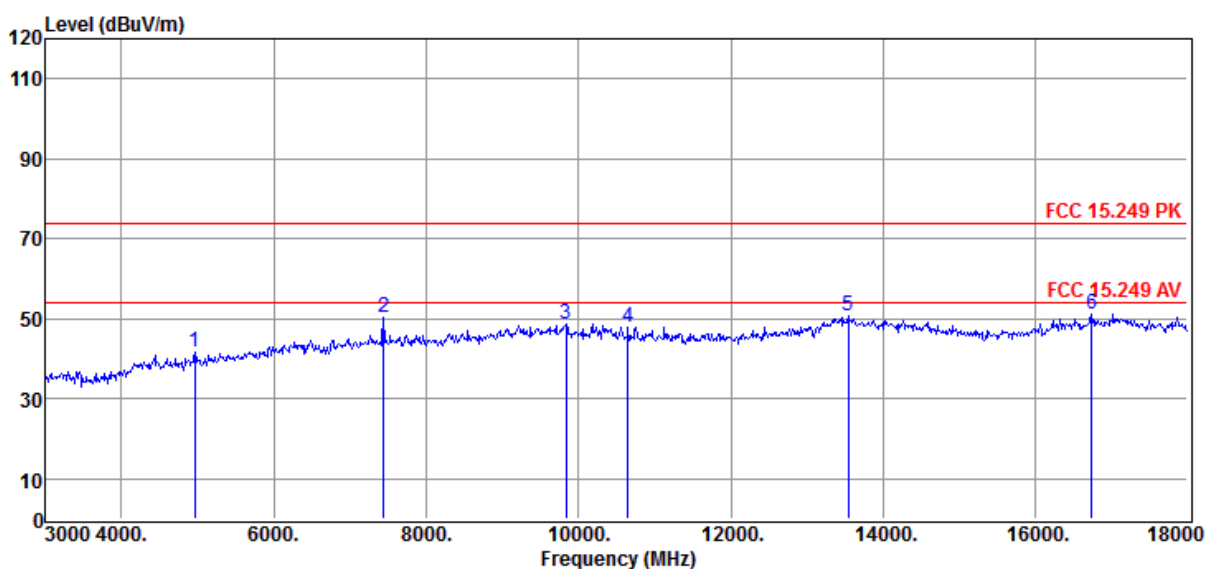
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2480MHz

Data: 153



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 4965.00        | 43.66                   | 33.54                       | 42.62               | 6.93                | 41.51                       | 74.00                     | -32.49                | Peak     | HORIZONTAL   |
| 2              | 7440.00        | 47.17                   | 37.95                       | 42.78               | 8.13                | 50.47                       | 74.00                     | -23.53                | Peak     | HORIZONTAL   |
| 3              | 9840.00        | 42.22                   | 38.70                       | 42.82               | 10.41               | 48.51                       | 74.00                     | -25.49                | Peak     | HORIZONTAL   |
| 4              | 10650.00       | 41.97                   | 38.97                       | 42.80               | 9.78                | 47.92                       | 74.00                     | -26.08                | Peak     | HORIZONTAL   |
| 5              | 13545.00       | 41.75                   | 40.98                       | 43.05               | 10.88               | 50.56                       | 74.00                     | -23.44                | Peak     | HORIZONTAL   |
| 6              | 16740.00       | 39.91                   | 41.57                       | 42.60               | 12.11               | 50.99                       | 74.00                     | -23.01                | Peak     | HORIZONTAL   |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.



## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 08-01-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

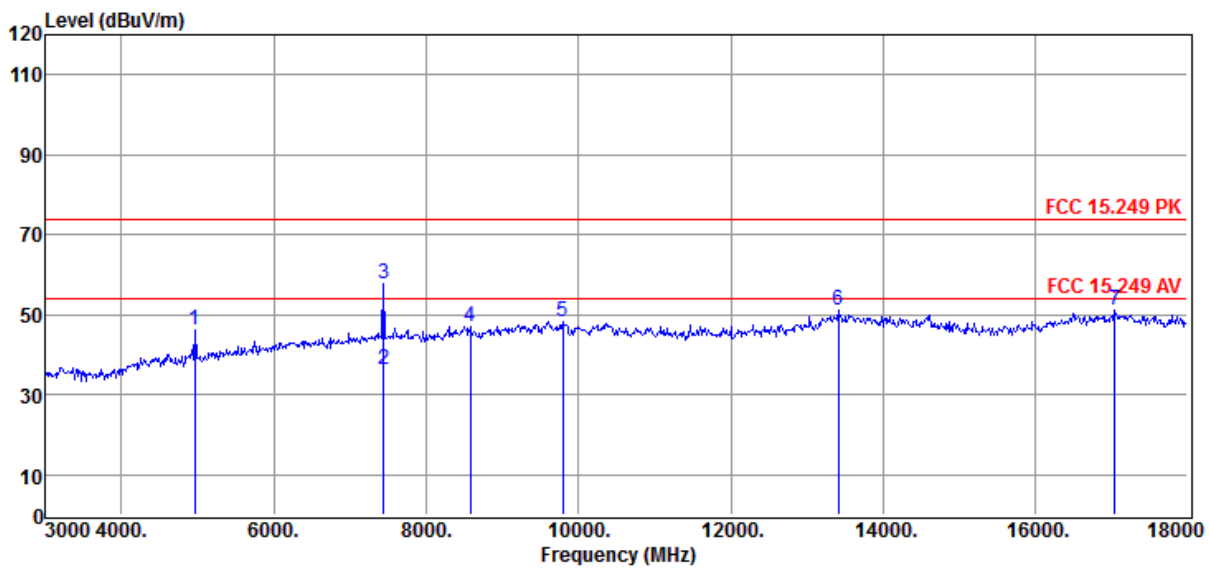
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2480MHz

Data: 154



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 4965.00        | 48.29                   | 33.54                       | 42.62               | 6.93                | 46.14                       | 74.00                     | -27.86                | Peak     | VERTICAL     |
| 2              | 7440.00        | 33.19                   | 37.95                       | 42.78               | 8.13                | 36.49                       | 54.00                     | -17.51                | Average  | VERTICAL     |
| 3              | 7440.00        | 54.56                   | 37.95                       | 42.78               | 8.13                | 57.86                       | 74.00                     | -16.14                | Peak     | VERTICAL     |
| 4              | 8580.00        | 42.86                   | 37.95                       | 42.94               | 9.20                | 47.07                       | 74.00                     | -26.93                | Peak     | VERTICAL     |
| 5              | 9795.00        | 42.06                   | 38.68                       | 42.82               | 10.50               | 48.42                       | 74.00                     | -25.58                | Peak     | VERTICAL     |
| 6              | 13410.00       | 42.05                   | 40.91                       | 43.04               | 11.10               | 51.02                       | 74.00                     | -22.98                | Peak     | VERTICAL     |
| 7              | 17040.00       | 38.87                   | 42.39                       | 42.57               | 12.44               | 51.13                       | 74.00                     | -22.87                | Peak     | VERTICAL     |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.

## Radiated Emission test (18 GHz – 26.5GHz)

## Radiated Emission Test Result

Test Site : DDT 10m Chamber

Test Date : 07-24-2025

Tested By : Sunny

EUT : electronic shelf label

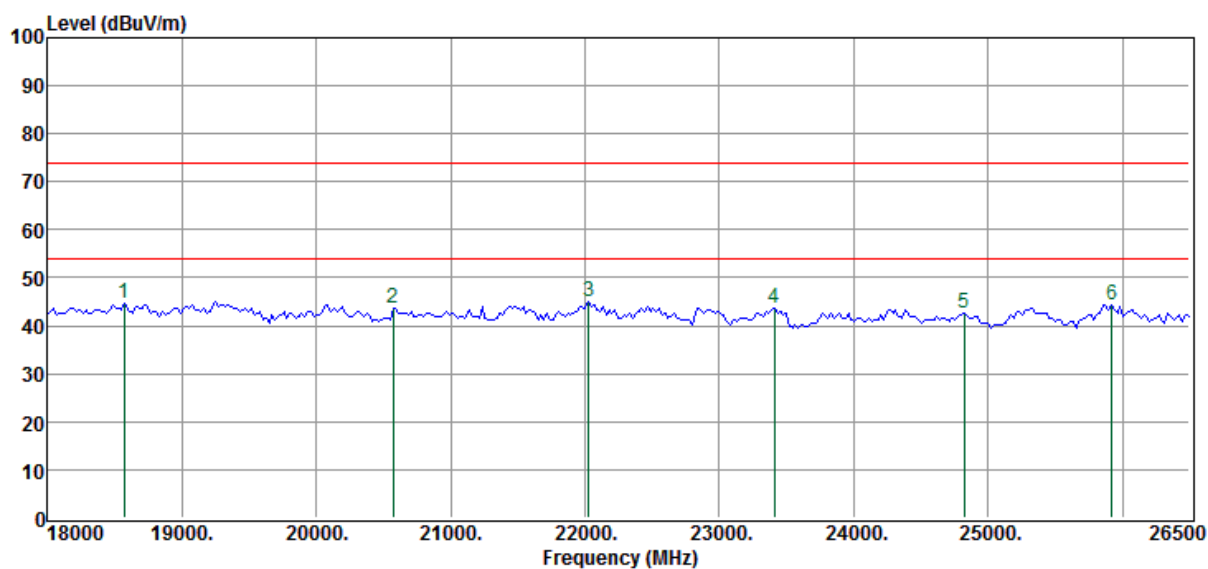
Model Number : Nebular Pro-154Q-N

Power Supply : Battery

Test Mode : Tx mode

Memo : GFSK ANT1 2480MHz

Data: 3



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 18572.00       | 38.52                   | -2.43                       | 0.00                | 8.45                | 44.54                       | 74.00                     | -29.46                | Peak     | HORIZONTAL   |
| 2              | 20574.00       | 40.02                   | -4.60                       | 0.00                | 8.06                | 43.48                       | 74.00                     | -30.52                | Peak     | HORIZONTAL   |
| 3              | 22026.00       | 41.29                   | -5.08                       | 0.00                | 8.93                | 45.14                       | 74.00                     | -28.86                | Peak     | HORIZONTAL   |
| 4              | 23412.00       | 39.82                   | -4.84                       | 0.00                | 8.77                | 43.75                       | 74.00                     | -30.25                | Peak     | HORIZONTAL   |
| 5              | 24820.00       | 38.26                   | -5.20                       | 0.00                | 9.46                | 42.52                       | 74.00                     | -31.48                | Peak     | HORIZONTAL   |
| 6              | 25920.00       | 39.21                   | -4.71                       | 0.00                | 9.83                | 44.33                       | 74.00                     | -29.67                | Peak     | HORIZONTAL   |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

## Radiated Emission Test Result

**Test Site** : DDT 10m Chamber

**Test Date** : 07-24-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

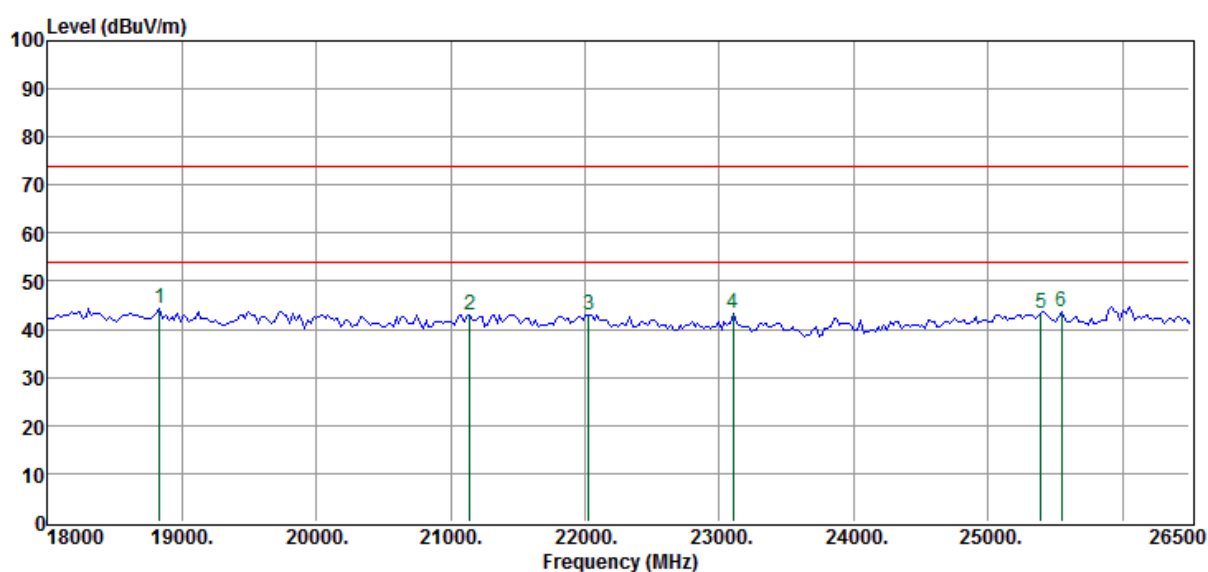
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : Battery

**Test Mode** : Tx mode

**Memo** : GFSK ANT1 2480MHz

Data: 4



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 18836.00       | 39.31                   | -3.05                       | 0.00                | 8.17                | 44.43                       | 74.00                     | -29.57                | Peak     | VERTICAL     |
| 2              | 21146.00       | 39.54                   | -5.11                       | 0.00                | 8.68                | 43.11                       | 74.00                     | -30.89                | Peak     | VERTICAL     |
| 3              | 22026.00       | 39.23                   | -5.08                       | 0.00                | 8.93                | 43.08                       | 74.00                     | -30.92                | Peak     | VERTICAL     |
| 4              | 23104.00       | 39.39                   | -4.71                       | 0.00                | 8.68                | 43.36                       | 74.00                     | -30.64                | Peak     | VERTICAL     |
| 5              | 25392.00       | 38.59                   | -4.76                       | 0.00                | 9.44                | 43.27                       | 74.00                     | -30.73                | Peak     | VERTICAL     |
| 6              | 25546.00       | 38.95                   | -4.69                       | 0.00                | 9.50                | 43.76                       | 74.00                     | -30.24                | Peak     | VERTICAL     |

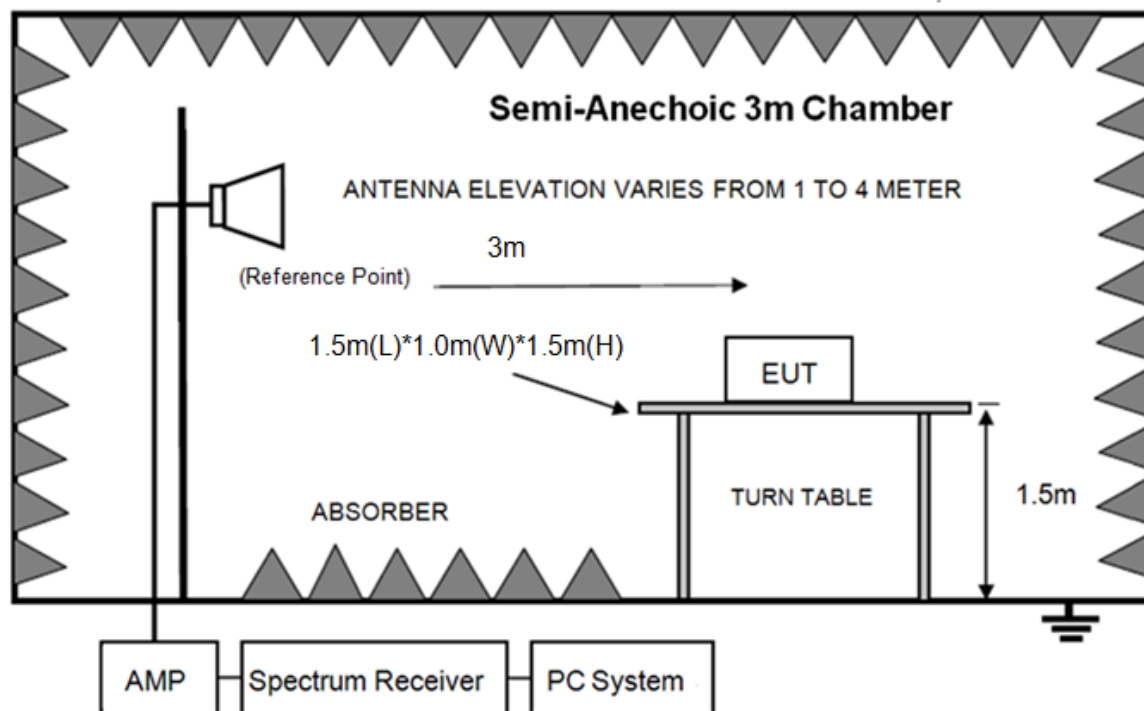
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

## 6. Band Edge Compliance

### 6.1. Block diagram of test setup



### 6.2. Limit

All the lower and upper band-edges emissions appearing within 2310 MHz to 2390 MHz and 2483.5 MHz to 2500 MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

### 6.3. Test Procedure

Same with clause 5.3 except change investigated frequency range.

Remark: All restriction band have been tested, and only the worst case is shown in report.

### 6.4. Test result

Pass. (See below detailed test result)

## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 07-21-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

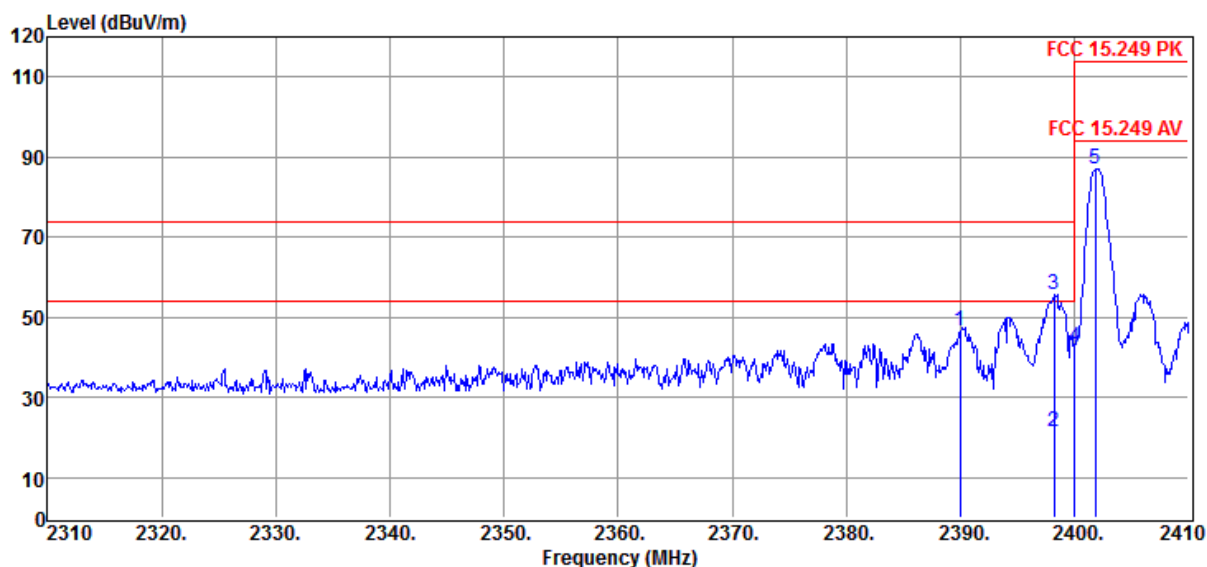
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2402MHz

Data: 137



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 2390.00        | 57.77                   | 28.38                       | 43.78               | 4.21                | 46.58                       | 74.00                     | -27.42                | Peak     | HORIZONTAL   |
| 2              | 2398.20        | 32.71                   | 28.38                       | 43.78               | 4.24                | 21.55                       | 54.00                     | -32.45                | Average  | HORIZONTAL   |
| 3              | 2398.20        | 66.81                   | 28.38                       | 43.78               | 4.24                | 55.65                       | 74.00                     | -18.35                | Peak     | HORIZONTAL   |
| 4              | 2400.00        | 53.71                   | 28.38                       | 43.78               | 4.24                | 42.55                       | 74.00                     | -31.45                | Peak     | HORIZONTAL   |
| 5              | 2401.80        | 98.03                   | 28.38                       | 43.78               | 4.25                | 86.88                       | 114.00                    | -27.12                | Peak     | HORIZONTAL   |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.

## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 07-21-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

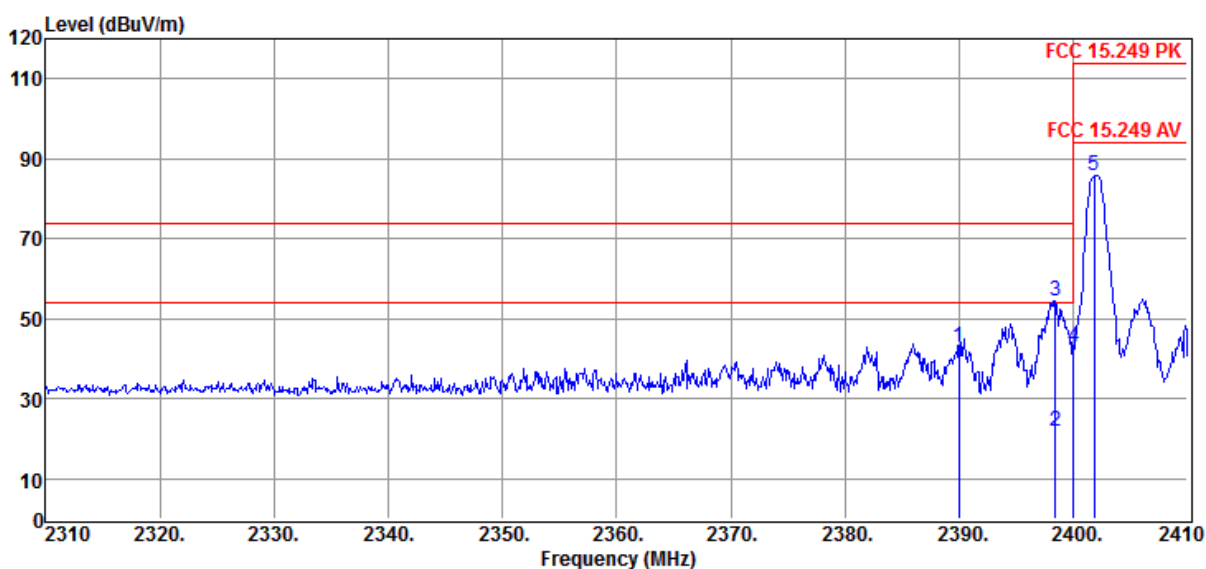
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2402MHz

Data: 138



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 2390.00        | 54.11                   | 28.38                       | 43.78               | 4.21                | 42.92                       | 74.00                     | -31.08                | Peak     | VERTICAL     |
| 2              | 2398.40        | 33.10                   | 28.38                       | 43.78               | 4.24                | 21.94                       | 54.00                     | -32.06                | Average  | VERTICAL     |
| 3              | 2398.40        | 65.47                   | 28.38                       | 43.78               | 4.24                | 54.31                       | 74.00                     | -19.69                | Peak     | VERTICAL     |
| 4              | 2400.00        | 53.91                   | 28.38                       | 43.78               | 4.24                | 42.75                       | 74.00                     | -31.25                | Peak     | VERTICAL     |
| 5              | 2401.80        | 96.97                   | 28.38                       | 43.78               | 4.25                | 85.82                       | 114.00                    | -28.18                | Peak     | VERTICAL     |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.



## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 07-21-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

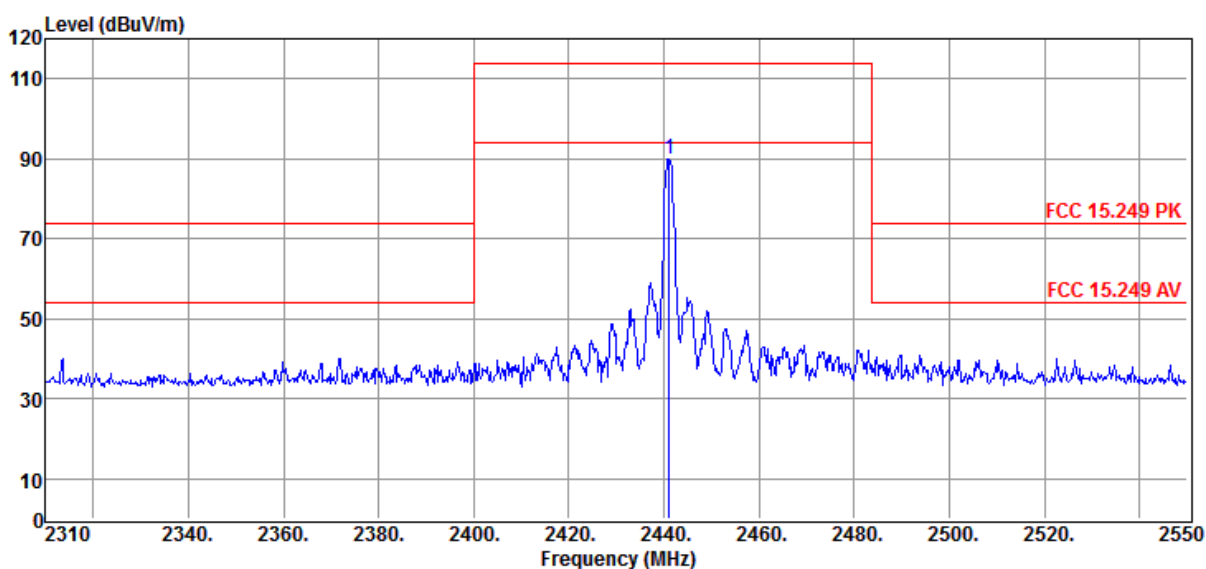
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2441MHz

Data: 139



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBuV/m) | Limit<br>Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 2441.04        | 100.85                  | 28.39                       | 43.77               | 4.32                | 89.79                       | 114.00                    | -24.21                | Peak     | HORIZONTAL   |

- Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.  
 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.  
 4. Margin = Result Level - Limit.

## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 07-21-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

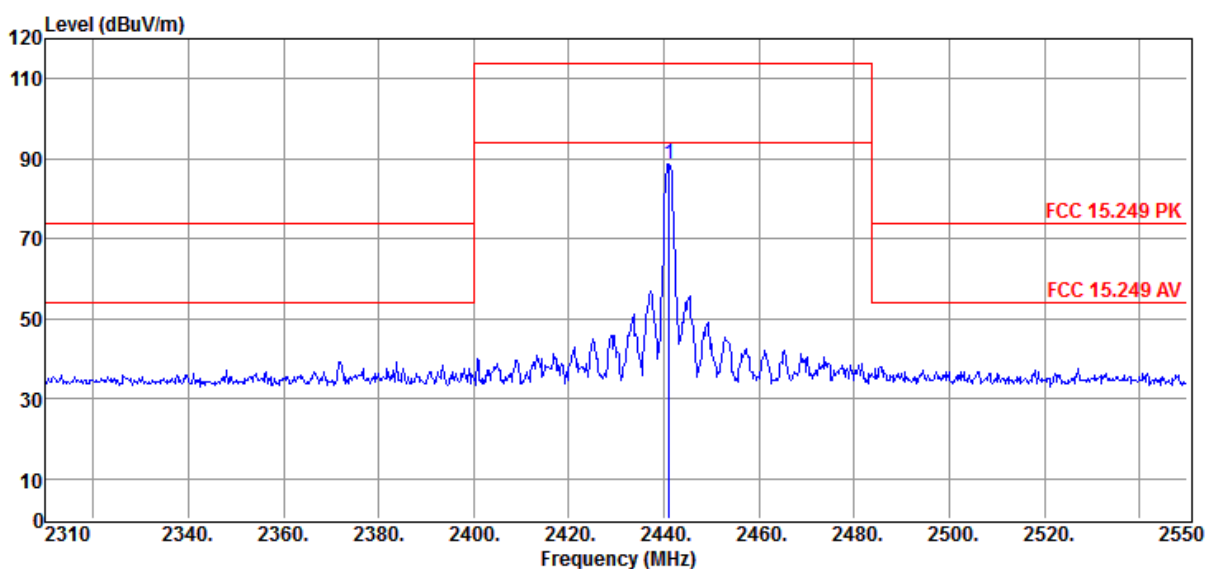
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2441MHz

Data: 140



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBuV/m) | Limit<br>Line<br>(dBuV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 2441.04        | 99.63                   | 28.39                       | 43.77               | 4.32                | 88.57                       | 114.00                    | -25.43                | Peak     | VERTICAL     |

- Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.  
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.  
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.  
4. Margin = Result Level - Limit.



## Radiated Emission Test Result

Test Site : 10m Chamber

Test Date : 07-21-2025

Tested By : Sunny

EUT : electronic shelf label

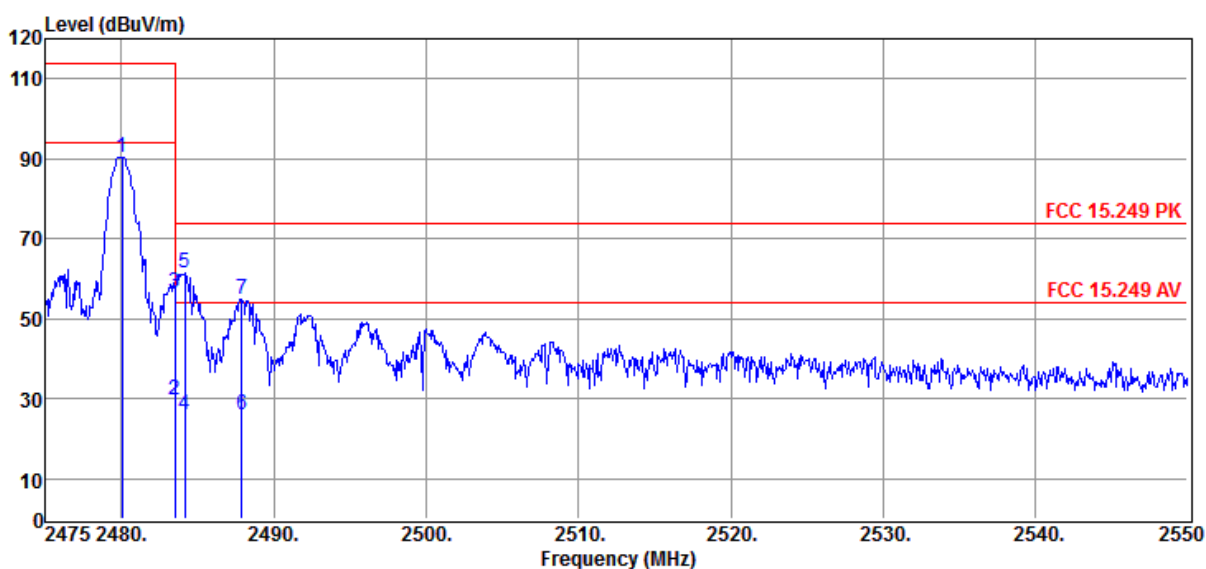
Model Number : Nebular Pro-154Q-N

Power Supply : by battery

Test Mode : Tx mode

Memo : GFSK 2480MHz

Data: 141



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 2480.03        | 101.44                  | 28.40                       | 43.76               | 4.21                | 90.29                       | 114.00                    | -23.71                | Peak     | HORIZONTAL   |
| 2              | 2483.50        | 40.68                   | 28.40                       | 43.75               | 4.21                | 29.54                       | 54.00                     | -24.46                | Average  | HORIZONTAL   |
| 3              | 2483.50        | 67.49                   | 28.40                       | 43.75               | 4.21                | 56.35                       | 74.00                     | -17.65                | Peak     | HORIZONTAL   |
| 4              | 2484.15        | 37.10                   | 28.40                       | 43.75               | 4.21                | 25.96                       | 54.00                     | -28.04                | Average  | HORIZONTAL   |
| 5              | 2484.15        | 72.53                   | 28.40                       | 43.75               | 4.21                | 61.39                       | 74.00                     | -12.61                | Peak     | HORIZONTAL   |
| 6              | 2487.90        | 37.27                   | 28.40                       | 43.75               | 4.22                | 26.14                       | 54.00                     | -27.86                | Average  | HORIZONTAL   |
| 7              | 2487.90        | 66.02                   | 28.40                       | 43.75               | 4.22                | 54.89                       | 74.00                     | -19.11                | Peak     | HORIZONTAL   |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.

## Radiated Emission Test Result

**Test Site** : 10m Chamber

**Test Date** : 07-21-2025

**Tested By** : Sunny

**EUT** : electronic shelf label

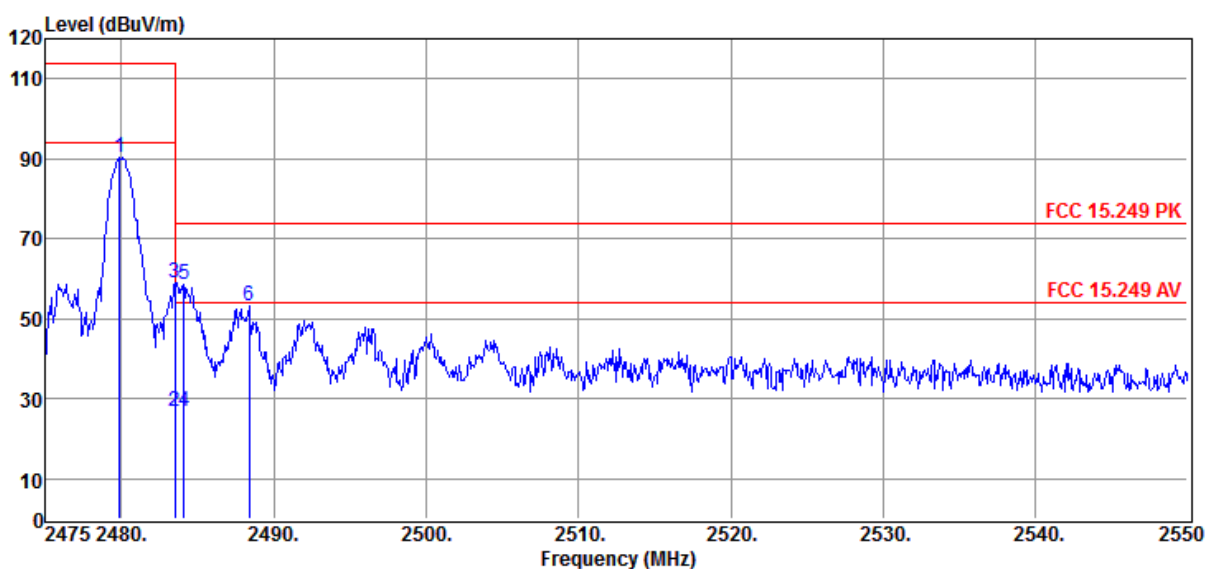
**Model Number** : Nebular Pro-154Q-N

**Power Supply** : by battery

**Test Mode** : Tx mode

**Memo** : GFSK 2480MHz

Data: 142



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>(dB/m) | PRM<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>Level<br>(dBμV/m) | Limit<br>Line<br>(dBμV/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------|-----------------------------|---------------------|---------------------|-----------------------------|---------------------------|-----------------------|----------|--------------|
| 1              | 2479.88        | 101.31                  | 28.40                       | 43.76               | 4.21                | 90.16                       | 114.00                    | -23.84                | Peak     | VERTICAL     |
| 2              | 2483.50        | 37.99                   | 28.40                       | 43.75               | 4.21                | 26.85                       | 54.00                     | -27.15                | Average  | VERTICAL     |
| 3              | 2483.50        | 69.90                   | 28.40                       | 43.75               | 4.21                | 58.76                       | 74.00                     | -15.24                | Peak     | VERTICAL     |
| 4              | 2484.08        | 37.76                   | 28.40                       | 43.75               | 4.21                | 26.62                       | 54.00                     | -27.38                | Average  | VERTICAL     |
| 5              | 2484.08        | 69.56                   | 28.40                       | 43.75               | 4.21                | 58.42                       | 74.00                     | -15.58                | Peak     | VERTICAL     |
| 6              | 2488.35        | 64.45                   | 28.40                       | 43.75               | 4.22                | 53.32                       | 74.00                     | -20.68                | Peak     | VERTICAL     |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss – PRM Factor.

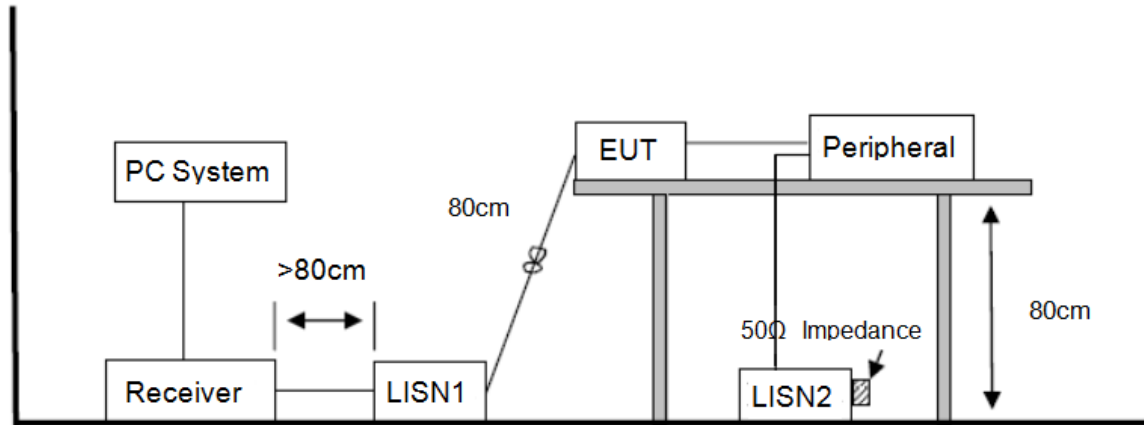
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

4. Margin = Result Level - Limit.

## 7. Power Line Conducted Emission

### 7.1. Block diagram of test setup



### 7.2. Power line conducted emission limits

| Frequency         | Quasi-Peak Level<br>dB( $\mu$ V) | Average Level<br>dB( $\mu$ V) |
|-------------------|----------------------------------|-------------------------------|
| 150 kHz ~ 500 kHz | 66 ~ 56*                         | 56 ~ 46*                      |
| 500 kHz ~ 5 MHz   | 56                               | 46                            |
| 5 MHz ~ 30 MHz    | 60                               | 50                            |

Note 1: \* Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

### 7.3. Test procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80 cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 3.0 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 kHz.

#### **7.4. Test result**

No Applicable.

## **8. Antenna Requirements**

### **8.1. Limit**

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### **8.2. Result**

The antenna used for this product is PCB antenna and no antenna other than that furnished by the responsible party shall be used with the device.

## 9. Test Setup Photograph

Please find the detailed in APPENDIXES-Test Setup.

## 10. Photos of the EUT

Please find the photos of EUT in APPENDIXES-Photos.

**END OF REPORT**