

# TEST REPORT

of

FCC Part 15 Subpart C §15.209

FCC ID: 2BNFQ-GWC001

Equipment Under Test : Wireless Charger  
Model Name : GWC-001  
Variant Model Name(s) : -  
Applicant : GKR CO., LTD.  
Manufacturer : GKR CO., LTD.  
Date of Receipt : 2025.01.21  
Date of Test(s) : 2025.03.25 ~ 2025.04.10  
Date of Issue : 2025.04.17

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

- 1) The results of this test report are effective only to the items tested.
- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
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- 4) The data marked ※ in this report was provided by the customer and may affect the validity of the test results.

We are responsible for all the information of this test report except for the data(※) provided by the customer.

Tested by:



Finn Nam

Technical  
Manager:



Jinhyoung Cho

**SGS Korea Co., Ltd. Gunpo Laboratory**

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## 1. General Information

### 1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

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### 1.2. Details of Applicant

Applicant : GKR CO., LTD.

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Contact Person : Seo, Jung-hyun

Phone No. : +82 70 7791 0332

### 1.3. Details of Manufacturer

Company : Same as applicant

Address : Same as applicant

### 1.4. Description of EUT

|                     |                       |         |
|---------------------|-----------------------|---------|
| Kind of Product     | Wireless Charger      |         |
| Model Name          | GWC-001               |         |
| Serial Number       | 300619-11952          |         |
| Power Supply        | DC 24 V               |         |
| Operation Mode      | 5 W, 15 W             |         |
| Frequency Range     | 5 W                   | 127 kHz |
|                     | 15 W                  | 127 kHz |
|                     | Idle                  | 127 kHz |
| Antenna Type        | Coil Antenna          |         |
| Antenna Part Number | AWTA-1000604R5-12R5-N |         |
| H/W Version         | MA00                  |         |
| S/W Version         | V0100                 |         |

### 1.5. Test Equipment List

| Equipment         | Manufacturer                | Model                                | S/N                    | Cal. Date     | Cal. Interval | Cal. Due        |
|-------------------|-----------------------------|--------------------------------------|------------------------|---------------|---------------|-----------------|
| Signal Generator  | R&S                         | SMBV100A                             | 259067                 | Jun. 19, 2024 | Annual        | Jun. 19, 2025   |
| DC Power Supply   | R&S                         | HMP2020                              | 102130                 | May 02, 2024  | Annual        | May 02, 2025    |
| Spectrum Analyzer | R&S                         | FSV30                                | 103210                 | Mar. 21, 2025 | Annual        | Mar. 21, 2026   |
| Loop Antenna      | Schwarzbeck Mess-Elektronik | HFRAE 5161                           | 5161-028               | Nov. 06, 2024 | Annual        | Nov. 06, 2025   |
| Amplifier         | H.P.                        | 8447F                                | 2944A03909             | Aug. 09, 2024 | Annual        | Aug. 09, 2025   |
| Loop Antenna      | Schwarzbeck Mess-Elektronik | FMZB 1519                            | 1519-039               | Mar. 25, 2025 | Biennial      | Mar. 25, 2027   |
| Bilog Antenna     | Schwarzbeck Mess-Elektronik | VULB 9163                            | 9163-396               | Apr. 02, 2025 | Biennial      | Apr. 02, 2027   |
| EMI Test Receiver | R&S                         | ESU26                                | 100109                 | Jan. 13, 2025 | N/A           | Jan. 13, 2026   |
| Turn Table        | Innco systems GmbH          | DS 1200 S                            | N/A                    | N.C.R.        | N/A           | N.C.R.          |
| Controller        | Innco systems GmbH          | CONTROLLER CO3000-4P                 | CO3000/963/3 8330516/L | N.C.R.        | N/A           | N.C.R.          |
| Antenna Mast      | Innco systems GmbH          | MA4640-XP-ET                         | MA4640/536/3 8330516/L | N.C.R.        | N/A           | N.C.R.          |
| Anechoic Chamber  | SY Corporation              | L × W × H<br>(9.6 m × 6.4 m × 6.6 m) | N/A                    | N.C.R.        | N/A           | N.C.R.          |
| Coaxial Cable     | SENSORVIEW                  | NMST-13A26-NMST-5 m                  | TPC24021900 04         | Apr. 08, 2025 | Semi-annual   | Oct. 08, 2025   |
| Coaxial Cable     | SENSORVIEW                  | NMST-13A26-NMST-10 m                 | TPC24021900 01         | Apr. 08, 2025 | Semi-annual   | Oct. 08ss, 2025 |
| Coaxial Cable     | RADIAL                      | TESTPRO 3                            | 182287                 | Apr. 11, 2025 | Semi-annual   | Oct. 11, 2025   |

### ► Support Equipment

| Description          | Manufacturer                  | Model    | FCC ID       |
|----------------------|-------------------------------|----------|--------------|
| SAMSUNG Mobile Phone | Samsung Electronics Co., Ltd. | SM-N950N | A3LSMN950KOR |
| SAMSUNG Mobile Phone | Samsung Electronics Co., Ltd. | SM-G925S | A3LSMG925KOR |

### Note;

- For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

## 1.6. Summary of Test Results

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 15 Subpart C |                                                                              |                   |
|-----------------------------------------|------------------------------------------------------------------------------|-------------------|
| Section                                 | Test Item(s)                                                                 | Result            |
| 15.209                                  | Radiated Emission,<br>Spurious Emission and<br>Field Strength of Fundamental | Pass              |
| 2.1049                                  | 20 dB Bandwidth                                                              | Pass              |
| 15.207                                  | AC Power Line Conducted Emission                                             | N/A <sup>1)</sup> |

### Note;

1) The AC power line test was not performed because the EUT use battery power for operation and which do not operate from the AC power lines.

-The three coils built into the product do not operate simultaneously.

## 1.7. Test Procedure(s)

The measurement procedures described in the American National Standard of Procedure for Compliance Testing of unlicensed Wireless Devices (ANSI C63.10-2013).

## 1.8. Sample Calculation

Where relevant, the following sample calculation is provided:

Field strength level (dB $\mu$ V/m) = Measured level (dB $\mu$ V) + Antenna factor (dB/m) + Cable loss (dB) + (AMP (dB))

## 1.9. Test Report Revision

| Revision | Report Number        | Date of Issue | Description |
|----------|----------------------|---------------|-------------|
| 0        | F690501-RF-RTL005939 | 2025.04.17    | Initial     |

### 1.10. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| Parameter                          | Uncertainty |         |
|------------------------------------|-------------|---------|
| 20 dB Bandwidth                    | 0.01 kHz    |         |
| Radiated Emission, 9 kHz to 30 MHz | H           | 3.40 dB |
|                                    | V           | 3.40 dB |
| Radiated Emission, below 1 GHz     | H           | 4.60 dB |
|                                    | V           | 5.00 dB |

All measurement uncertainty values are shown with a coverage factor of  $k=2$  to indicate a 95 % level of confidence.

### 1.11. Worst Case of Test Configurations

| Charging mode<br>With client device |            | Mode      |         | Description                                          |
|-------------------------------------|------------|-----------|---------|------------------------------------------------------|
| Model                               | FCC ID     |           |         |                                                      |
| SM-N981U                            | A3LSMN981U | 5 W, 15 W | 127 kHz | 1 % of battery<br>50 % of battery<br>99 % of battery |

#### Coil 1

| Mode | Battery | Frequency<br>(kHz) | Detect Mode | Reading<br>(dB $\mu$ V) |
|------|---------|--------------------|-------------|-------------------------|
| 5 W  | 1 %     | 127                | Average     | 70.30                   |
|      | 50 %    |                    |             | 70.30                   |
|      | 99 %    |                    |             | <b><u>76.30</u></b>     |
| 15 W | 1 %     | 127                | Average     | 74.60                   |
|      | 50 %    |                    |             | 74.50                   |
|      | 99 %    |                    |             | <b><u>75.70</u></b>     |

#### Coil 2

| Mode | Battery | Frequency<br>(kHz) | Detect Mode | Reading<br>(dB $\mu$ V) |
|------|---------|--------------------|-------------|-------------------------|
| 5 W  | 1 %     | 127                | Average     | 48.90                   |
|      | 50 %    |                    |             | 49.20                   |
|      | 99 %    |                    |             | <b><u>57.50</u></b>     |
| 15 W | 1 %     | 127                | Average     | <b><u>58.40</u></b>     |
|      | 50 %    |                    |             | 58.30                   |
|      | 99 %    |                    |             | 58.20                   |

#### Coil 3

| Mode | Battery | Frequency<br>(kHz) | Detect Mode | Reading<br>(dB $\mu$ V) |
|------|---------|--------------------|-------------|-------------------------|
| 5 W  | 1 %     | 127                | Average     | 69.10                   |
|      | 50 %    |                    |             | 69.10                   |
|      | 99 %    |                    |             | <b><u>76.70</u></b>     |
| 15 W | 1 %     | 127                | Average     | 74.70                   |
|      | 50 %    |                    |             | 75.20                   |
|      | 99 %    |                    |             | <b><u>78.40</u></b>     |

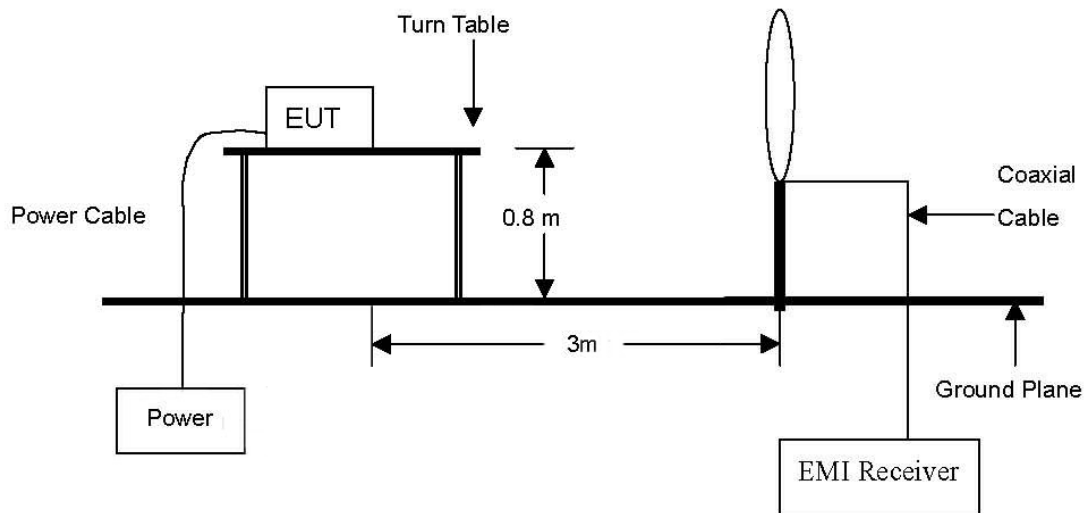
#### Note;

- EUT was investigated with client device under normal charging condition as above then worst value was only reported.

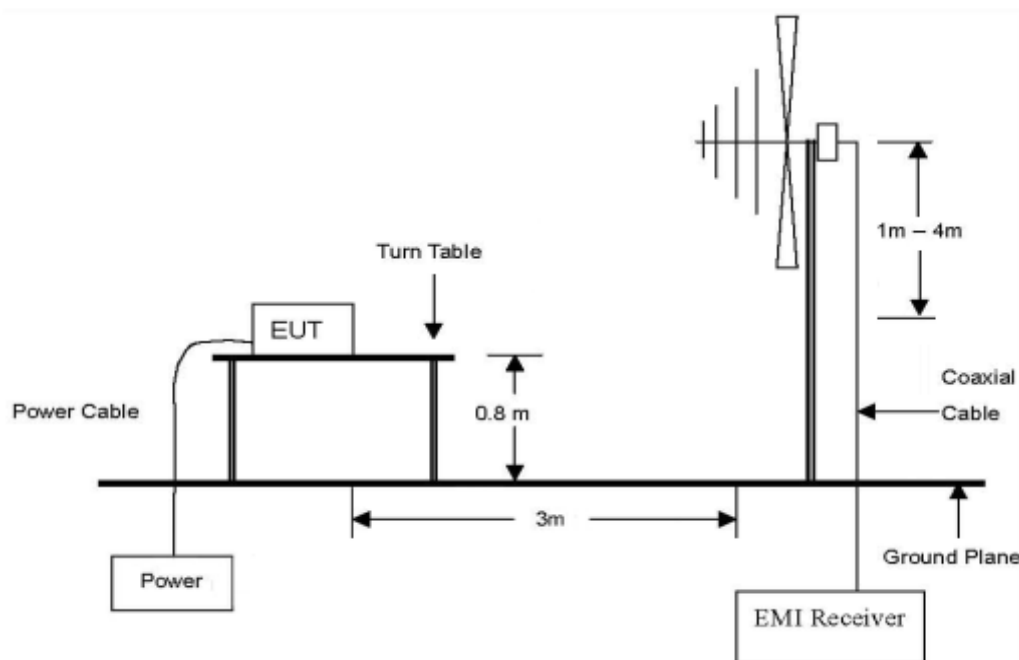
## 2. Field Strength of Fundamental and Spurious Emission

## 2.1. Test Setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz.



## 2.2. Limit

### 2.2.1. Radiated emission limits, general requirements

According to §15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance<br>(meter) |
|--------------------|--------------------------------------|---------------------------------|
| 0.009-0.490        | 2 400/F(kHz)                         | 300                             |
| 0.490-1.705        | 24 000/F(kHz)                        | 30                              |
| 1.705-30.0         | 30                                   | 30                              |
| 30-88              | 100**                                | 3                               |
| 88-216             | 150**                                | 3                               |
| 216-960            | 200**                                | 3                               |
| Above 960          | 500                                  | 3                               |

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. however, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241

According to §15.209(d), The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1 000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

## 2.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.10:2013.

### 2.3.1. Test Procedures for emission from 9 kHz to 30 MHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Then antenna is a loop antenna is fixed at one meter above the ground to determine the maximum value of the field strength. Both parallel and perpendicular of the antenna are set to make the measurement.
3. For each suspected emission, the EUT was arranged to its worst case and then the table was turned from 0 degrees to 360 degrees to find the maximum reading.
4. The test-receiver system was set to Quasi Peak and Average Detect Function and Specified Bandwidth with Maximum Hold Mode.
5. To get a maximum emission level from the EUT, the EUT is manipulated through three orthogonal planes (X, Y, Z). Worst orthogonal plan of EUT is X – axis during radiation test.

### 2.3.2. Test Procedures for emission from 30 MHz to 1 000 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3 meter away from the interference-receiving antenna.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.

## 2.4. Field Strength of Fundamental Test Result

Ambient temperature :  $(23 \pm 1) ^\circ\text{C}$   
Relative humidity : 47 % R.H.

The following table shows the highest levels of radiated emissions on between polarizations of horizontal and vertical.

### Test Condition: Idle mode

| Radiated Emissions           |                      |             | Ant. | Correction Factors |            | Total                        |                                | Limit                         |             |
|------------------------------|----------------------|-------------|------|--------------------|------------|------------------------------|--------------------------------|-------------------------------|-------------|
| Frequency (MHz)              | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | Cable (dB) | Actual (dB $\mu$ V/m) at 3 m | Actual (dB $\mu$ V/m) at 300 m | Limit (dB $\mu$ V/m) at 300 m | Margin (dB) |
| Operating Frequency: 127 kHz |                      |             |      |                    |            |                              |                                |                               |             |
| 0.127                        | 66.20                | Average     | H    | 18.30              | 0.06       | 84.56                        | 4.56                           | 25.53                         | 20.97       |

### Coil 1

### Test Condition: 5 W Operating mode with client device

| Radiated Emissions           |                      |             | Ant. | Correction Factors |            | Total                        |                                | Limit                         |             |
|------------------------------|----------------------|-------------|------|--------------------|------------|------------------------------|--------------------------------|-------------------------------|-------------|
| Frequency (MHz)              | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | Cable (dB) | Actual (dB $\mu$ V/m) at 3 m | Actual (dB $\mu$ V/m) at 300 m | Limit (dB $\mu$ V/m) at 300 m | Margin (dB) |
| Operating Frequency: 127 kHz |                      |             |      |                    |            |                              |                                |                               |             |
| 0.127                        | 76.30                | Average     | H    | 18.30              | 0.06       | 94.66                        | 14.66                          | 25.53                         | 10.87       |

### Test Condition: 15 W Operating mode with client device

| Radiated Emissions           |                      |             | Ant. | Correction Factors |            | Total                        |                                | Limit                         |             |
|------------------------------|----------------------|-------------|------|--------------------|------------|------------------------------|--------------------------------|-------------------------------|-------------|
| Frequency (MHz)              | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | Cable (dB) | Actual (dB $\mu$ V/m) at 3 m | Actual (dB $\mu$ V/m) at 300 m | Limit (dB $\mu$ V/m) at 300 m | Margin (dB) |
| Operating Frequency: 127 kHz |                      |             |      |                    |            |                              |                                |                               |             |
| 0.127                        | 75.70                | Average     | H    | 18.30              | 0.06       | 94.06                        | 14.06                          | 25.53                         | 11.47       |

**Coil 2**

**Test Condition: 5 W Operating mode with client device**

| Radiated Emissions           |                      |             | Ant. | Correction Factors |            | Total                        |                                | Limit                         |             |
|------------------------------|----------------------|-------------|------|--------------------|------------|------------------------------|--------------------------------|-------------------------------|-------------|
| Frequency (MHz)              | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | Cable (dB) | Actual (dB $\mu$ V/m) at 3 m | Actual (dB $\mu$ V/m) at 300 m | Limit (dB $\mu$ V/m) at 300 m | Margin (dB) |
| Operating Frequency: 127 kHz |                      |             |      |                    |            |                              |                                |                               |             |
| 0.127                        | 57.52                | Average     | H    | 18.30              | 0.06       | 75.88                        | -4.12                          | 25.53                         | 29.65       |

**Test Condition: 15 W Operating mode with client device**

| Radiated Emissions           |                      |             | Ant. | Correction Factors |            | Total                        |                                | Limit                         |             |
|------------------------------|----------------------|-------------|------|--------------------|------------|------------------------------|--------------------------------|-------------------------------|-------------|
| Frequency (MHz)              | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | Cable (dB) | Actual (dB $\mu$ V/m) at 3 m | Actual (dB $\mu$ V/m) at 300 m | Limit (dB $\mu$ V/m) at 300 m | Margin (dB) |
| Operating Frequency: 127 kHz |                      |             |      |                    |            |                              |                                |                               |             |
| 0.127                        | 58.40                | Average     | H    | 18.30              | 0.06       | 76.76                        | -3.24                          | 25.53                         | 28.77       |

**Coil 3**

**Test Condition: 5 W Operating mode with client device**

| Radiated Emissions           |                      |             | Ant. | Correction Factors |            | Total                        |                                | Limit                         |             |
|------------------------------|----------------------|-------------|------|--------------------|------------|------------------------------|--------------------------------|-------------------------------|-------------|
| Frequency (MHz)              | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | Cable (dB) | Actual (dB $\mu$ V/m) at 3 m | Actual (dB $\mu$ V/m) at 300 m | Limit (dB $\mu$ V/m) at 300 m | Margin (dB) |
| Operating Frequency: 127 kHz |                      |             |      |                    |            |                              |                                |                               |             |
| 0.127                        | 76.70                | Average     | H    | 18.30              | 0.06       | 95.06                        | 15.06                          | 25.53                         | 10.47       |

**Test Condition: 15 W Operating mode with client device**

| Radiated Emissions           |                      |             | Ant. | Correction Factors |            | Total                        |                                | Limit                         |             |
|------------------------------|----------------------|-------------|------|--------------------|------------|------------------------------|--------------------------------|-------------------------------|-------------|
| Frequency (MHz)              | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | Cable (dB) | Actual (dB $\mu$ V/m) at 3 m | Actual (dB $\mu$ V/m) at 300 m | Limit (dB $\mu$ V/m) at 300 m | Margin (dB) |
| Operating Frequency: 127 kHz |                      |             |      |                    |            |                              |                                |                               |             |
| 0.127                        | 78.40                | Average     | H    | 18.30              | 0.06       | 96.76                        | 16.76                          | 25.53                         | 8.77        |

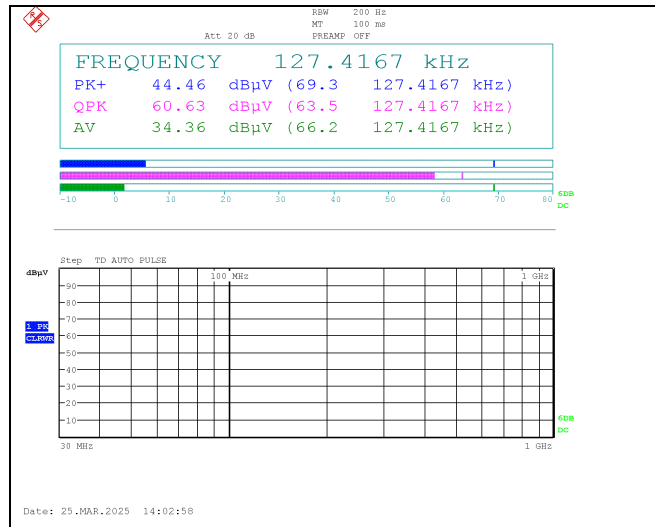
**Remark;**

1. According to §15.31(f)(2),
  - 300 m Result (dB $\mu$ V/m) = 3 m Result (dB $\mu$ V/m) - 40log (300/3) (dB $\mu$ V/m).
2. According to field strength table of general requirement in §15.209(a), field strength limits below 1.705 MHz were calculated as below.
  - 9 kHz to 490 kHz: 20log (2 400 / F (kHz)) at 300 m (dB $\mu$ V/m)
  - 490 kHz to 1.705 MHz: 20log (24 000/F (kHz)) at 30 m (dB $\mu$ V/m)
3. According to §15.209(d), the measurements were tested by using Quasi peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1 GHz in these three bands on measurements employing an average detector.
4. The limit above was calculated based on table of §15.209(a).
5. Actual (dB $\mu$ V/m) at 3 m = Reading (dB $\mu$ V) + AF (dB/m) + CL (dB).

## - Test plots

**Test Condition: Idle mode**

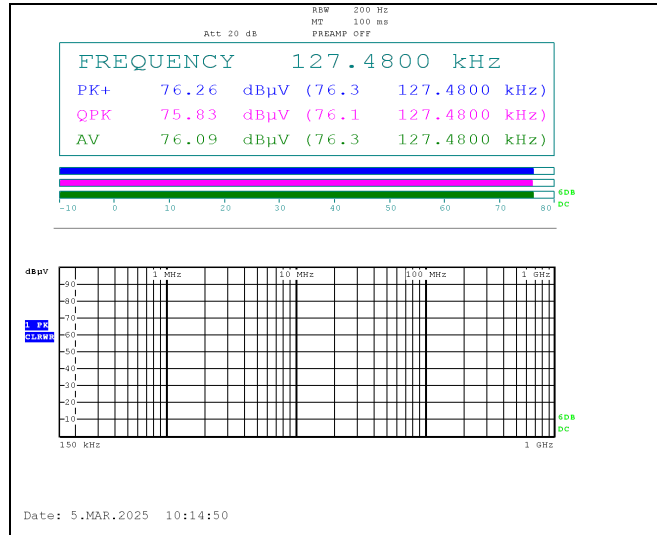
Operating Frequency: 127 kHz



### Coil 1

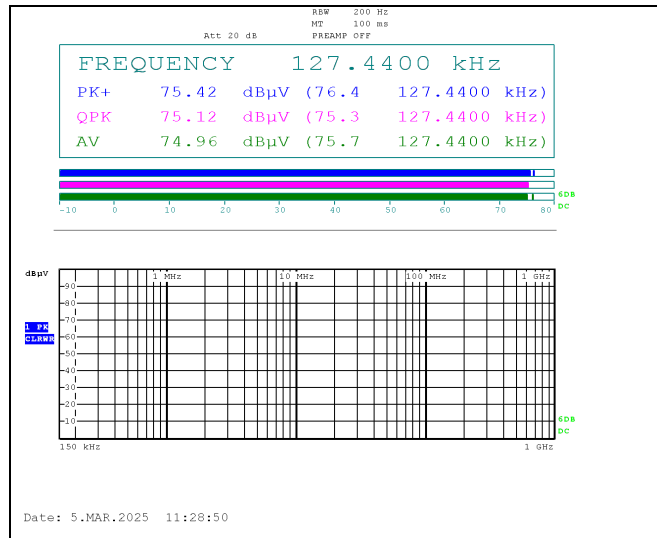
**Test Condition: 5 W Operating mode with client device**

Operating Frequency: 127 kHz



**Test Condition: 15 W Operating mode with client device**

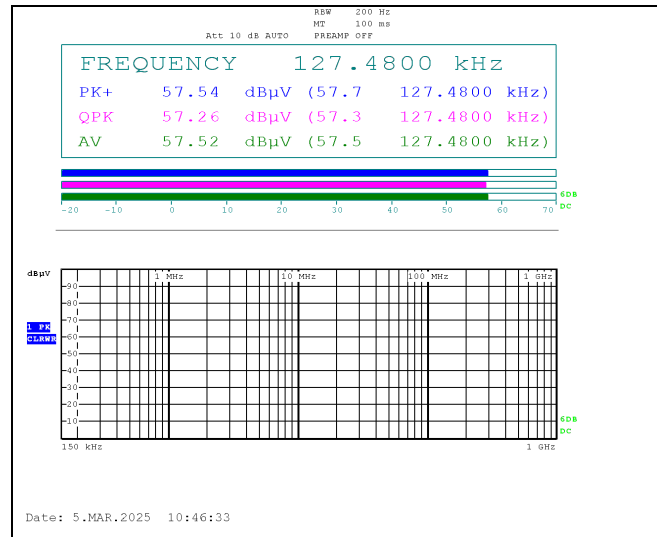
Operating Frequency: 127 kHz



## Coil 2

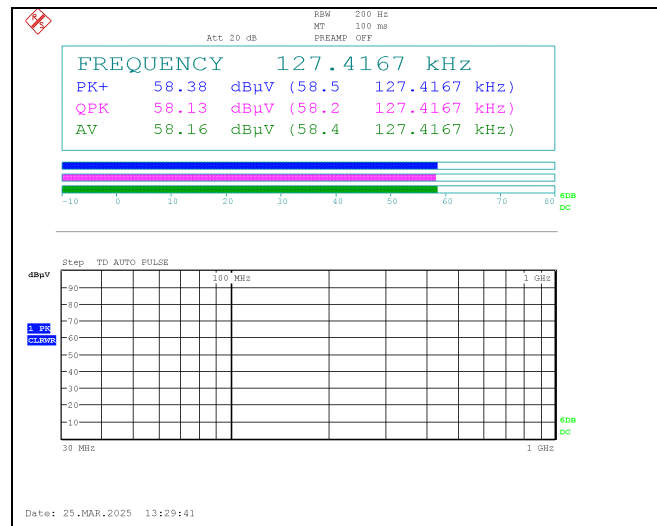
**Test Condition: 5 W Operating mode with client device**

Operating Frequency: 127 kHz



**Test Condition: 15 W Operating mode with client device**

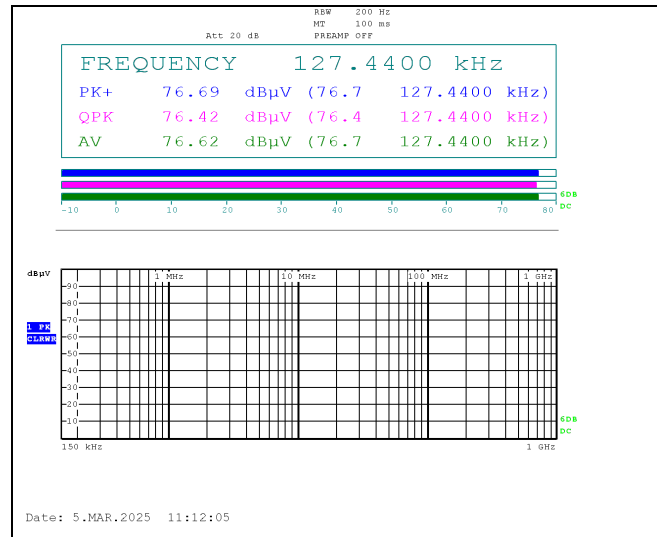
Operating Frequency: 127 kHz



### Coil 3

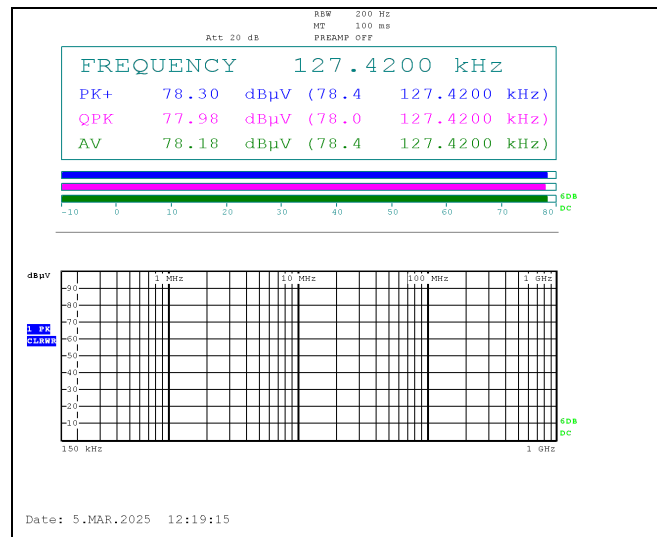
**Test Condition: 5 W Operating mode with client device**

Operating Frequency: 127 kHz



**Test Condition: 15 W Operating mode with client device**

Operating Frequency: 127 kHz



## 2.5. Spurious Emission Test Result

Ambient temperature : (23 ± 1) °C  
 Relative humidity : 47 % R.H.

The following table shows the highest levels of radiated emissions on between polarizations of horizontal and vertical.

**Test Condition: Idle mode**

**Operating Frequency: 127 MHz**

**Below 30 MHz**

| Radiated Emissions |                |             | Ant. | Correction Factors |         | Total                  |                                  | Limit                           |             |
|--------------------|----------------|-------------|------|--------------------|---------|------------------------|----------------------------------|---------------------------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dBμV/m) at 3 m | Actual (dBμV/m) at 300 m or 30 m | Limit (dBμV/m) at 300 m or 30 m | Margin (dB) |
| 0.034              | 40.10          | Average     | H    | 18.49              | 0.03    | 58.62                  | -21.38                           | 36.97                           | 58.35       |
| 0.104              | 21.70          | Quasi Peak  | H    | 18.30              | 0.04    | 40.04                  | -39.96                           | 27.26                           | 67.22       |
| 0.582              | 22.90          | Quasi Peak  | H    | 18.33              | 0.45    | 41.68                  | 1.68                             | 32.31                           | 30.63       |
| Above 1.000        | Not detected   | -           | -    | -                  | -       | -                      | -                                | -                               | -           |

**Above 30 MHz**

| Radiated Emissions |                |             | Ant. | Correction (dB/m) | Total           | Limit          |             |
|--------------------|----------------|-------------|------|-------------------|-----------------|----------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. |                   | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| 413.96             | 31.67          | Quasi Peak  | V    | -3.23             | <b>28.44</b>    | 46.00          | 17.56       |
| 904.72             | 23.64          | Quasi Peak  | H    | 4.45              | 28.09           | 46.00          | 17.91       |

**Coil 1**

**Test Condition: 5 W Operating mode with client device**

**Operating Frequency: 127 MHz**

**Below 30 MHz**

| Radiated Emissions |                      |             | Ant. | Correction Factors |         | Total                        |                                        | Limit                                 |             |
|--------------------|----------------------|-------------|------|--------------------|---------|------------------------------|----------------------------------------|---------------------------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dB $\mu$ V/m) at 3 m | Actual (dB $\mu$ V/m) at 300 m or 30 m | Limit (dB $\mu$ V/m) at 300 m or 30 m | Margin (dB) |
| 0.021              | 24.50                | Average     | H    | 18.68              | 0.03    | 43.21                        | -36.79                                 | 41.16                                 | 77.95       |
| 0.086              | 21.10                | Average     | H    | 18.34              | 0.04    | 39.48                        | -40.52                                 | 28.91                                 | 69.43       |
| 0.382              | 41.70                | Average     | H    | 18.30              | 0.26    | 60.26                        | -19.74                                 | 15.96                                 | 35.70       |
| 1.569              | 25.10                | Quasi Peak  | H    | 18.56              | 0.63    | 44.29                        | 4.29                                   | 23.69                                 | 19.40       |
| 2.674              | 15.60                | Quasi Peak  | H    | 18.67              | 0.18    | 34.45                        | -5.55                                  | 29.54                                 | 35.09       |
| Above 3.000        | Not detected         | -           | -    | -                  | -       | -                            | -                                      | -                                     | -           |

**Above 30 MHz**

| Radiated Emissions |                      |             | Ant. | Correction (dB/m) | Total                 | Limit                |             |
|--------------------|----------------------|-------------|------|-------------------|-----------------------|----------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. |                   | Actual (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
| 37.11              | 43.48                | Quasi Peak  | V    | -9.66             | <b><u>33.82</u></b>   | 40.00                | 6.18        |
| 83.62              | 33.54                | Quasi Peak  | V    | -13.12            | 20.42                 | 40.00                | 19.58       |
| 107.33             | 32.60                | Quasi Peak  | V    | -8.82             | 23.78                 | 43.50                | 19.72       |
| 162.67             | 45.03                | Quasi Peak  | H    | -11.25            | 33.78                 | 43.50                | 9.72        |
| 415.79             | 29.75                | Quasi Peak  | V    | -3.26             | 26.49                 | 46.00                | 19.51       |
| Above 500.00       | Not detected         | -           | -    | -                 | -                     | -                    | -           |

Test Condition: 15 W Operating mode with client device

Operating Frequency: 127 MHz

Below 30 MHz

| Radiated Emissions |                |             | Ant. | Correction Factors |         | Total                  |                                  | Limit                           |             |
|--------------------|----------------|-------------|------|--------------------|---------|------------------------|----------------------------------|---------------------------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dBμV/m) at 3 m | Actual (dBμV/m) at 300 m or 30 m | Limit (dBμV/m) at 300 m or 30 m | Margin (dB) |
| 0.020              | 24.40          | Average     | H    | 18.70              | 0.03    | 43.13                  | -36.87                           | 41.58                           | 78.45       |
| 0.051              | 22.00          | Average     | H    | 18.44              | 0.03    | 40.47                  | -39.53                           | 33.45                           | 72.98       |
| 0.089              | 15.10          | Average     | H    | 18.33              | 0.04    | 33.47                  | -46.53                           | 28.62                           | 75.15       |
| 0.384              | 34.90          | Average     | H    | 18.30              | 0.27    | 53.47                  | -26.53                           | 15.92                           | 42.45       |
| 1.586              | 24.20          | Quasi Peak  | H    | 18.56              | 0.63    | 43.39                  | 3.39                             | 23.60                           | 20.21       |
| Above 2.000        | Not detected   | -           | -    | -                  | -       | -                      | -                                | -                               | -           |

Above 30 MHz

| Radiated Emissions |                |             | Ant. | Correction (dB/m) | Total           | Limit          |             |
|--------------------|----------------|-------------|------|-------------------|-----------------|----------------|-------------|
| Frequency (MHz)    | Reading (dBμV) | Detect Mode | Pol. |                   | Actual (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
| 36.84              | 42.68          | Quasi Peak  | V    | -9.78             | <b>32.90</b>    | 40.00          | 7.10        |
| 84.91              | 39.54          | Quasi Peak  | V    | -12.67            | 26.87           | 40.00          | 13.13       |
| 106.09             | 39.89          | Quasi Peak  | V    | -8.75             | 31.14           | 43.50          | 12.36       |
| 160.95             | 47.36          | Quasi Peak  | H    | -11.34            | 36.02           | 43.50          | 7.48        |
| 835.32             | 23.77          | Quasi Peak  | H    | 2.86              | 26.63           | 46.00          | 19.37       |
| Above 900.00       | Not detected   | -           | -    | -                 | -               | -              | -           |

**Coil 2**

**Test Condition: 5 W Operating mode with client device**

**Operating Frequency: 127 MHz**

**Below 30 MHz**

| Radiated Emissions |                      |             | Ant. | Correction Factors |         | Total                        |                                        | Limit                                 |             |
|--------------------|----------------------|-------------|------|--------------------|---------|------------------------------|----------------------------------------|---------------------------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dB $\mu$ V/m) at 3 m | Actual (dB $\mu$ V/m) at 300 m or 30 m | Limit (dB $\mu$ V/m) at 300 m or 30 m | Margin (dB) |
| 0.020              | 26.70                | Average     | H    | 18.70              | 0.03    | 45.43                        | -34.57                                 | 41.58                                 | 76.15       |
| 0.067              | 15.40                | Average     | H    | 18.39              | 0.04    | 33.83                        | -46.17                                 | 31.08                                 | 77.25       |
| 0.426              | 28.80                | Average     | H    | 18.30              | 0.32    | 47.42                        | -32.58                                 | 15.02                                 | 47.60       |
| 1.533              | 24.70                | Quasi Peak  | H    | 18.55              | 0.64    | 43.89                        | 3.89                                   | 23.89                                 | 20.00       |
| 2.690              | 15.50                | Quasi Peak  | H    | 18.67              | 0.17    | 34.34                        | -5.66                                  | 29.54                                 | 35.20       |
| Above 3.000        | Not detected         | -           | -    | -                  | -       | -                            | -                                      | -                                     | -           |

**Above 30 MHz**

| Radiated Emissions |                      |             | Ant. | Correction (dB/m) | Total                 | Limit                |             |
|--------------------|----------------------|-------------|------|-------------------|-----------------------|----------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. |                   | Actual (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
| 36.14              | 46.43                | Quasi Peak  | V    | -10.14            | <b>36.29</b>          | 40.00                | 3.71        |
| 84.70              | 35.33                | Quasi Peak  | V    | -12.76            | 22.57                 | 40.00                | 17.43       |
| 149.53             | 49.04                | Quasi Peak  | H    | -12.24            | 36.80                 | 43.50                | 6.70        |
| 418.05             | 33.11                | Quasi Peak  | V    | -3.21             | 29.90                 | 46.00                | 16.10       |
| Above 500.00       | Not detected         | -           | -    | -                 | -                     | -                    | -           |

Test Condition: 15 W Operating mode with client device

Operating Frequency: 127 MHz

Below 30 MHz

| Radiated Emissions |                      |             | Ant. | Correction Factors |         | Total                        |                                        | Limit                                 |             |
|--------------------|----------------------|-------------|------|--------------------|---------|------------------------------|----------------------------------------|---------------------------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dB $\mu$ V/m) at 3 m | Actual (dB $\mu$ V/m) at 300 m or 30 m | Limit (dB $\mu$ V/m) at 300 m or 30 m | Margin (dB) |
| 0.019              | 28.30                | Average     | H    | 18.72              | 0.03    | 47.05                        | -32.95                                 | 42.03                                 | 74.98       |
| 0.077              | 12.70                | Average     | H    | 18.37              | 0.04    | 31.11                        | -48.89                                 | 29.87                                 | 78.76       |
| 0.383              | 41.70                | Average     | H    | 18.30              | 0.27    | 60.27                        | -19.73                                 | 15.94                                 | 35.67       |
| 1.662              | 25.40                | Quasi Peak  | H    | 18.57              | 0.61    | 44.58                        | 4.58                                   | 23.19                                 | 18.61       |
| Above 2.000        | Not detected         | -           | -    | -                  | -       | -                            | -                                      | -                                     | -           |

Above 30 MHz

| Radiated Emissions |                      |             | Ant. | Correction (dB/m) | Total                 | Limit                |             |
|--------------------|----------------------|-------------|------|-------------------|-----------------------|----------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. |                   | Actual (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
| 36.84              | 44.61                | Quasi Peak  | V    | -9.78             | <b>34.83</b>          | 40.00                | 5.17        |
| 84.64              | 35.43                | Quasi Peak  | V    | -12.78            | 22.65                 | 40.00                | 17.35       |
| 107.06             | 33.21                | Quasi Peak  | V    | -8.82             | 24.39                 | 43.50                | 19.11       |
| 159.06             | 47.93                | Quasi Peak  | H    | -11.45            | 36.48                 | 43.50                | 7.02        |
| Above 200.00       | Not detected         | -           | -    | -                 | -                     | -                    | -           |

**Coil 3**

**Test Condition: 5 W Operating mode with client device**

**Operating Frequency: 127 MHz**

**Below 30 MHz**

| Radiated Emissions |                      |             | Ant. | Correction Factors |         | Total                        |                                        | Limit                                 |             |
|--------------------|----------------------|-------------|------|--------------------|---------|------------------------------|----------------------------------------|---------------------------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dB $\mu$ V/m) at 3 m | Actual (dB $\mu$ V/m) at 300 m or 30 m | Limit (dB $\mu$ V/m) at 300 m or 30 m | Margin (dB) |
| 0.021              | 24.30                | Average     | H    | 18.68              | 0.03    | 43.01                        | -36.99                                 | 41.16                                 | 78.15       |
| 0.035              | 27.00                | Average     | H    | 18.49              | 0.03    | 45.52                        | -34.48                                 | 36.72                                 | 71.20       |
| 0.077              | 21.20                | Average     | H    | 18.37              | 0.04    | 39.61                        | -40.39                                 | 29.87                                 | 70.26       |
| 0.382              | 34.80                | Average     | H    | 18.30              | 0.26    | 53.36                        | -26.64                                 | 15.96                                 | 42.60       |
| 1.626              | 26.50                | Quasi Peak  | H    | 18.56              | 0.62    | 45.68                        | 5.68                                   | 23.38                                 | 17.70       |
| 2.697              | 14.40                | Quasi Peak  | H    | 18.67              | 0.16    | 33.23                        | -6.77                                  | 29.54                                 | 36.31       |
| Above 3.000        | Not detected         | -           | -    | -                  | -       | -                            | -                                      | -                                     | -           |

**Above 30 MHz**

| Radiated Emissions |                      |             | Ant. | Correction (dB/m) | Total                 | Limit                |             |
|--------------------|----------------------|-------------|------|-------------------|-----------------------|----------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. |                   | Actual (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
| 37.11              | 43.22                | Quasi Peak  | V    | -9.66             | <b>33.56</b>          | 40.00                | 6.44        |
| 85.72              | 36.65                | Quasi Peak  | V    | -12.35            | 24.30                 | 40.00                | 15.70       |
| 107.17             | 37.82                | Quasi Peak  | V    | -8.82             | 29.00                 | 43.50                | 14.50       |
| 156.91             | 43.27                | Quasi Peak  | H    | -11.68            | 31.59                 | 43.50                | 11.91       |
| 417.52             | 29.40                | Quasi Peak  | V    | -3.22             | 26.18                 | 46.00                | 19.82       |
| 891.74             | 24.44                | Quasi Peak  | H    | 4.03              | 28.47                 | 46.00                | 17.53       |
| Above 900.00       | Not detected         | -           | -    | -                 | -                     | -                    | -           |

Test Condition: 15 W Operating mode with client device

Operating Frequency: 127 MHz

Below 30 MHz

| Radiated Emissions |                      |             | Ant. | Correction Factors |         | Total                        |                                        | Limit                                 |             |
|--------------------|----------------------|-------------|------|--------------------|---------|------------------------------|----------------------------------------|---------------------------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. | AF (dB/m)          | CL (dB) | Actual (dB $\mu$ V/m) at 3 m | Actual (dB $\mu$ V/m) at 300 m or 30 m | Limit (dB $\mu$ V/m) at 300 m or 30 m | Margin (dB) |
| 0.020              | 24.30                | Average     | H    | 18.70              | 0.03    | 43.03                        | -36.97                                 | 41.58                                 | 78.55       |
| 0.051              | 25.30                | Average     | H    | 18.44              | 0.03    | 43.77                        | -36.23                                 | 33.45                                 | 69.68       |
| 0.117              | 25.90                | Average     | H    | 18.30              | 0.05    | 44.25                        | -35.75                                 | 26.24                                 | 61.99       |
| 0.380              | 42.20                | Average     | H    | 18.30              | 0.26    | 60.76                        | -19.24                                 | 16.01                                 | 35.25       |
| 1.576              | 25.40                | Quasi Peak  | H    | 18.56              | 0.63    | 44.59                        | 4.59                                   | 23.65                                 | 19.06       |
| Above 2.000        | Not detected         | -           | -    | -                  | -       | -                            | -                                      | -                                     | -           |

Above 30 MHz

| Radiated Emissions |                      |             | Ant. | Correction (dB/m) | Total                 | Limit                |             |
|--------------------|----------------------|-------------|------|-------------------|-----------------------|----------------------|-------------|
| Frequency (MHz)    | Reading (dB $\mu$ V) | Detect Mode | Pol. |                   | Actual (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) |
| 36.84              | 45.28                | Quasi Peak  | V    | -9.78             | <b>35.50</b>          | 40.00                | 4.50        |
| 84.54              | 44.25                | Quasi Peak  | V    | -12.83            | 31.42                 | 40.00                | 8.58        |
| 106.36             | 41.69                | Quasi Peak  | V    | -8.77             | 32.92                 | 43.50                | 10.58       |
| 164.94             | 41.64                | Quasi Peak  | H    | -11.11            | 30.53                 | 43.50                | 12.97       |
| 414.34             | 29.43                | Quasi Peak  | V    | -3.24             | 26.19                 | 46.00                | 19.81       |
| 799.53             | 23.82                | Quasi Peak  | H    | 2.43              | 26.25                 | 46.00                | 19.75       |
| Above 800.00       | Not detected         | -           | -    | -                 | -                     | -                    | -           |

**Remark;**

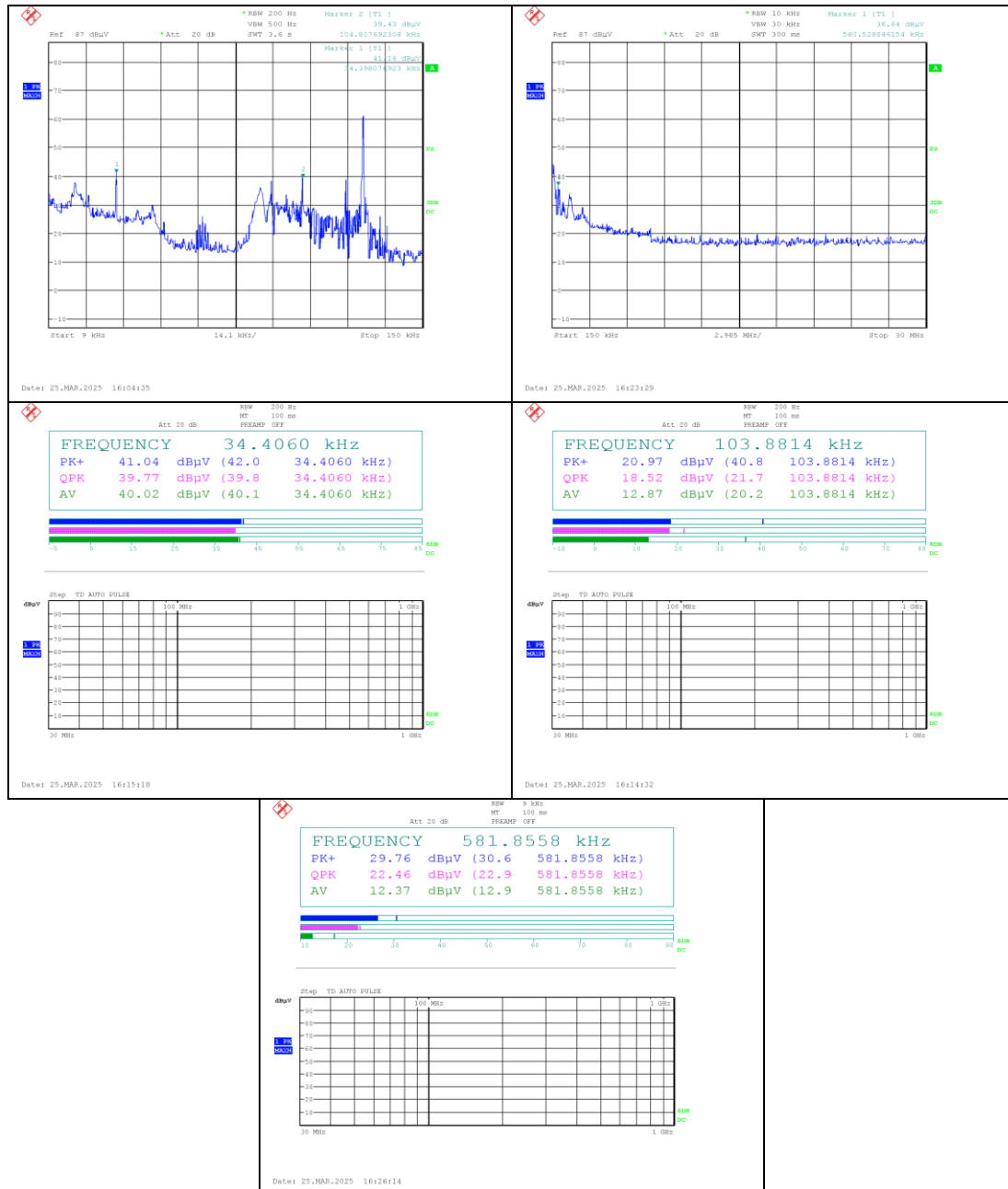
1. According to §15.31 (f)(2),
  - 300 m Result (dB $\mu$ V/m) = 3 m Result (dB $\mu$ V/m) - 40log (300/3) (dB $\mu$ V/m)
  - 30 m Result (dB $\mu$ V/m) = 3 m Result (dB $\mu$ V/m) - 40log (30/3) (dB $\mu$ V/m)
2. According to field strength table of general requirement in §15.209 (a), field strength limits below 1.705 MHz were calculated as below.
  - 9 kHz to 490 kHz: 20log (2 400 / F (kHz)) at 300 m (dB $\mu$ V/m)
  - 490 kHz to 1.705 MHz: 20log (24 000 / F (kHz)) at 30 m (dB $\mu$ V/m)
3. According to §15.209 (d), the measurements were tested by using Quasi peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1 GHz in these three bands on measurements employing an average detector.
4. The limit above was calculated based on table of §15.209 (a).
5. Actual (dB $\mu$ V/m) at 3 m were calculated as below.
  - Below 30 MHz : Reading (dB $\mu$ V) + AF (dB/m) + CL (dB)
  - Above 30 MHz : Actual = Reading + Correction (Correction = Antenna Factor + AMP Factor + Cable Loss)
6. According to §15.31(o), emission levels are not report much lower than the limits by over 20 dB.
7. Test from 30 MHz to 1 000 MHz was performed using the software of ELEKTRAT(V5.02) from Rohde & Schwarz GmbH & Co. KG.

## - Test plots

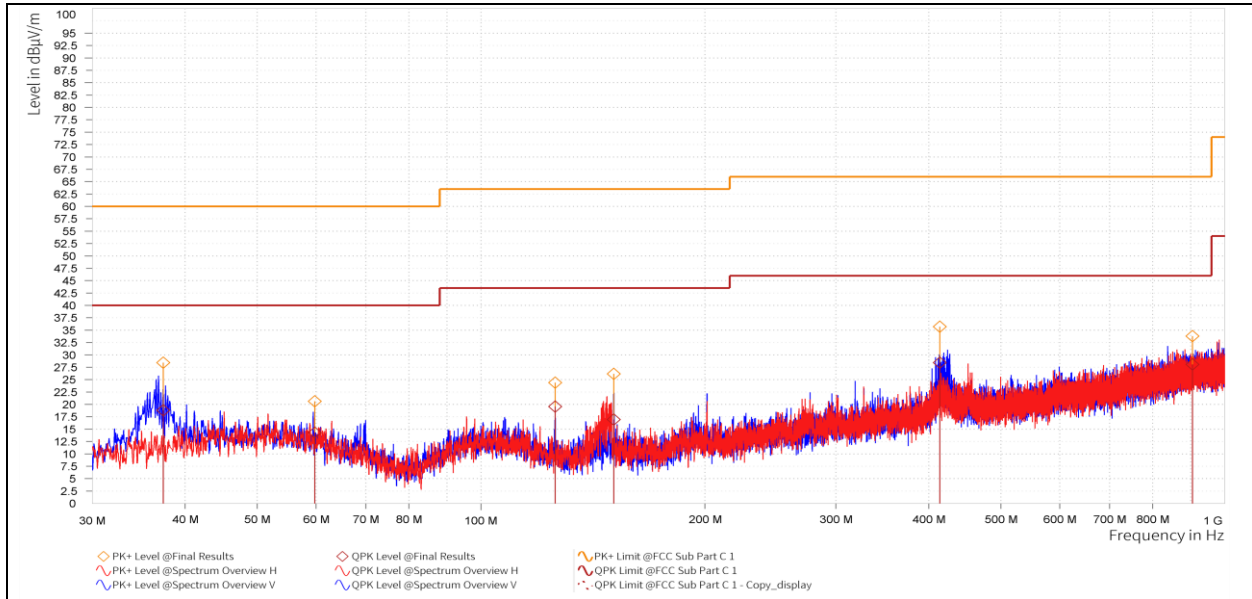
Test Condition: Idle mode

Operating Frequency: 127 MHz

Below 30 MHz



**Above 30 MHz**



## Coil 1

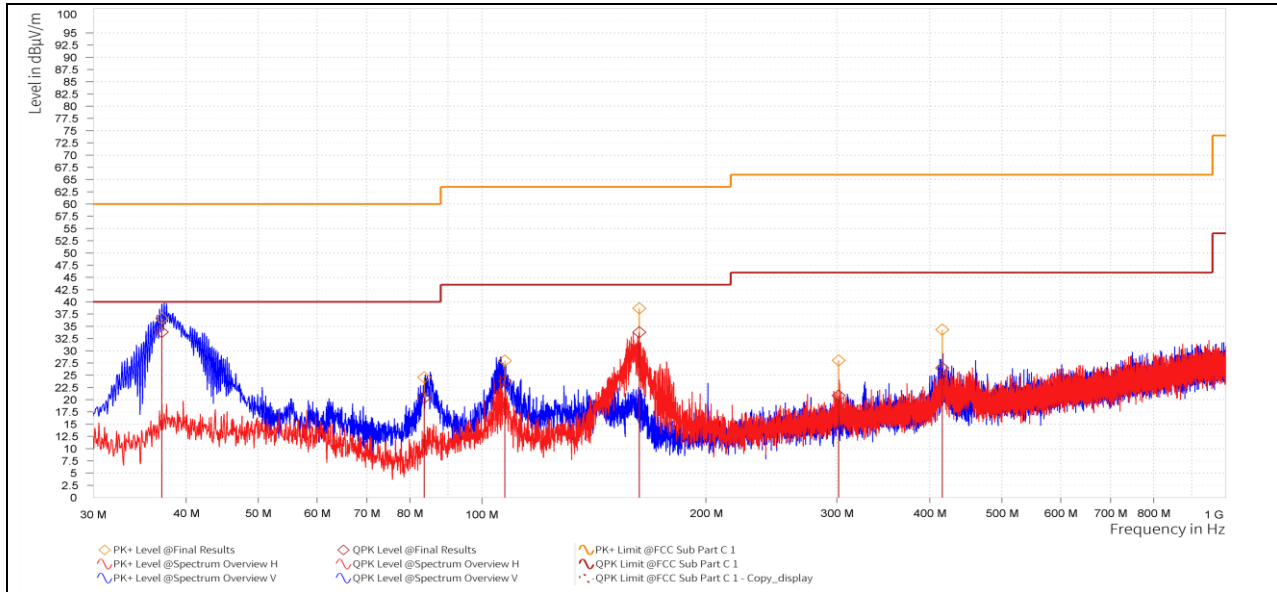
Test Condition: 5 W Operating mode with client device

Operating Frequency: 127 MHz

Below 30 MHz



## Above 30 MHz



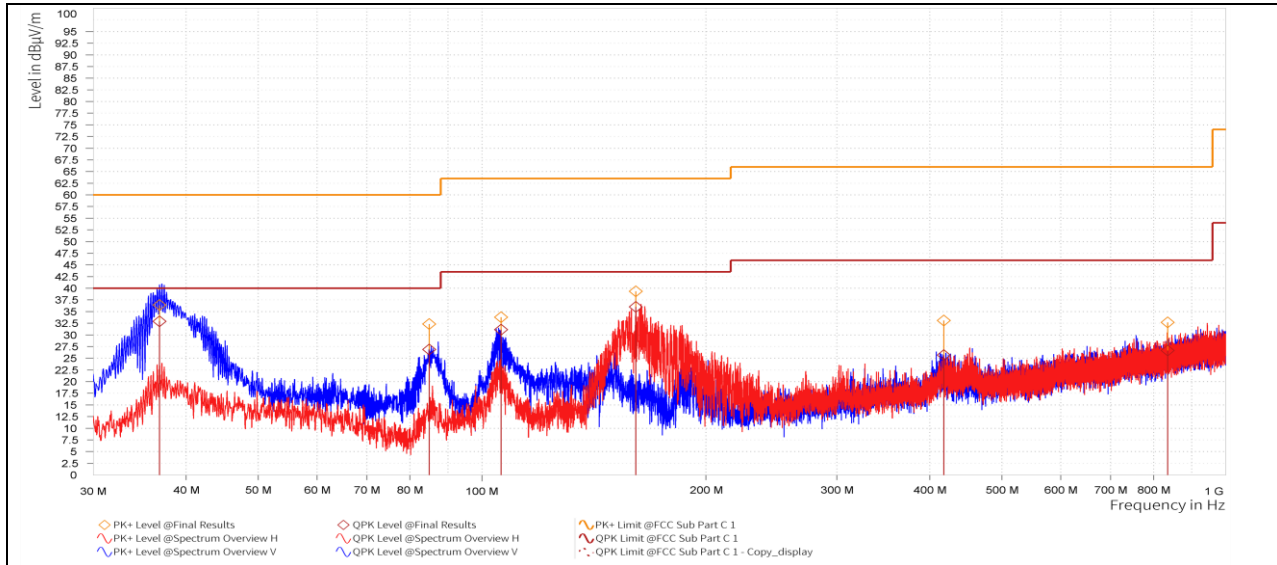
Test Condition: 15 W Operating mode with client device

Operating Frequency: 127 MHz

Below 30 MHz



## Above 30 MHz

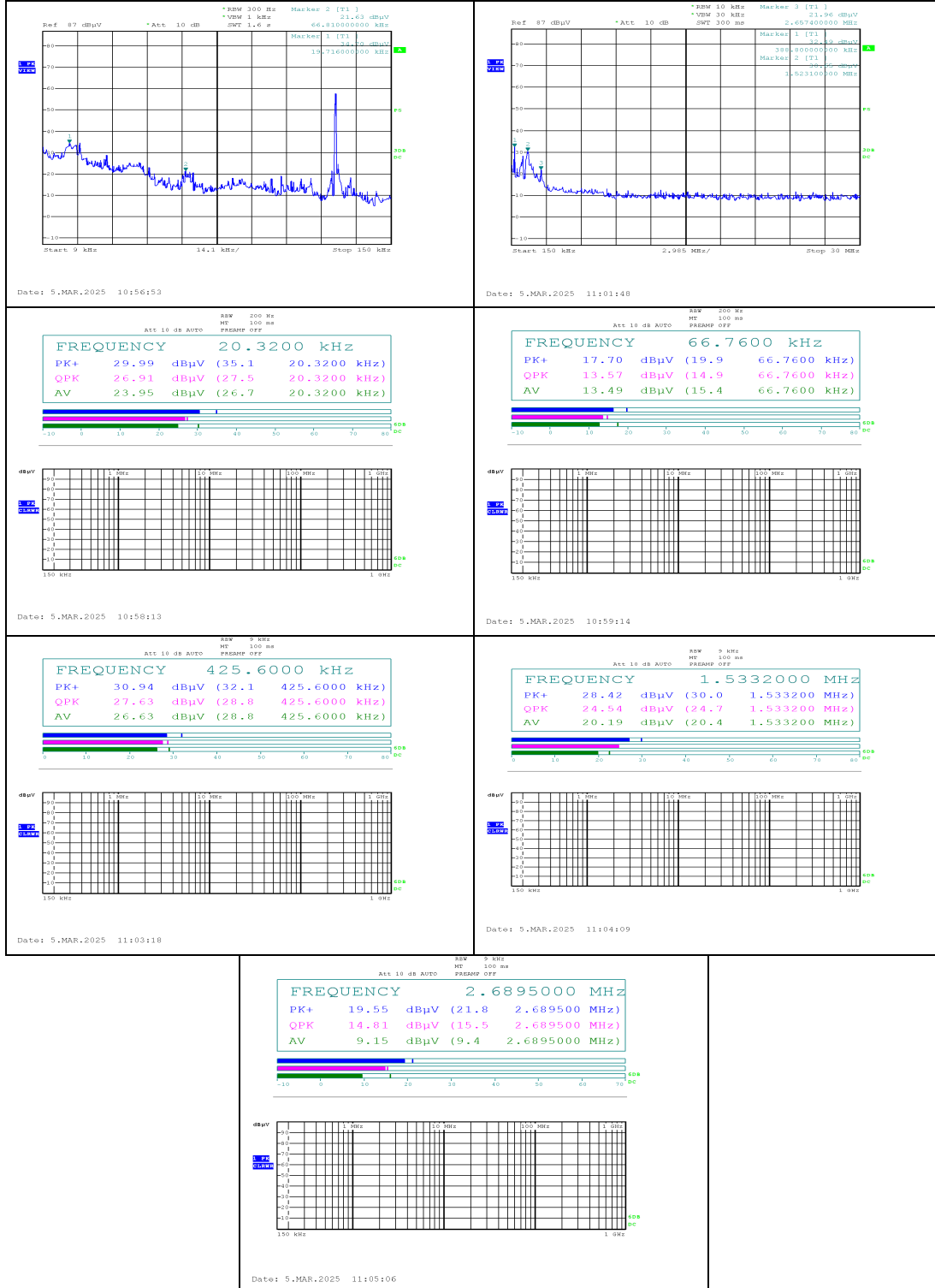


## Coil 2

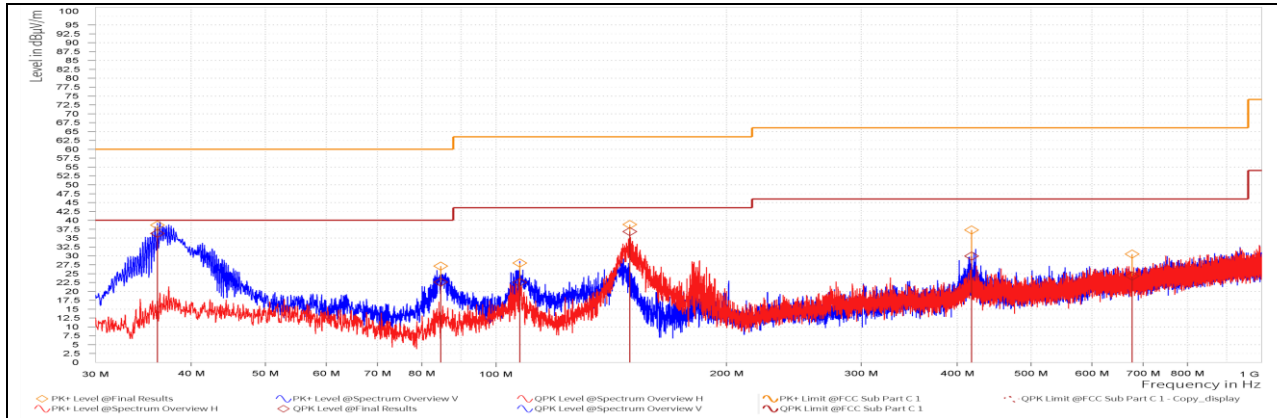
Test Condition: 5 W Operating mode with client device

Operating Frequency: 127 MHz

Below 30 MHz



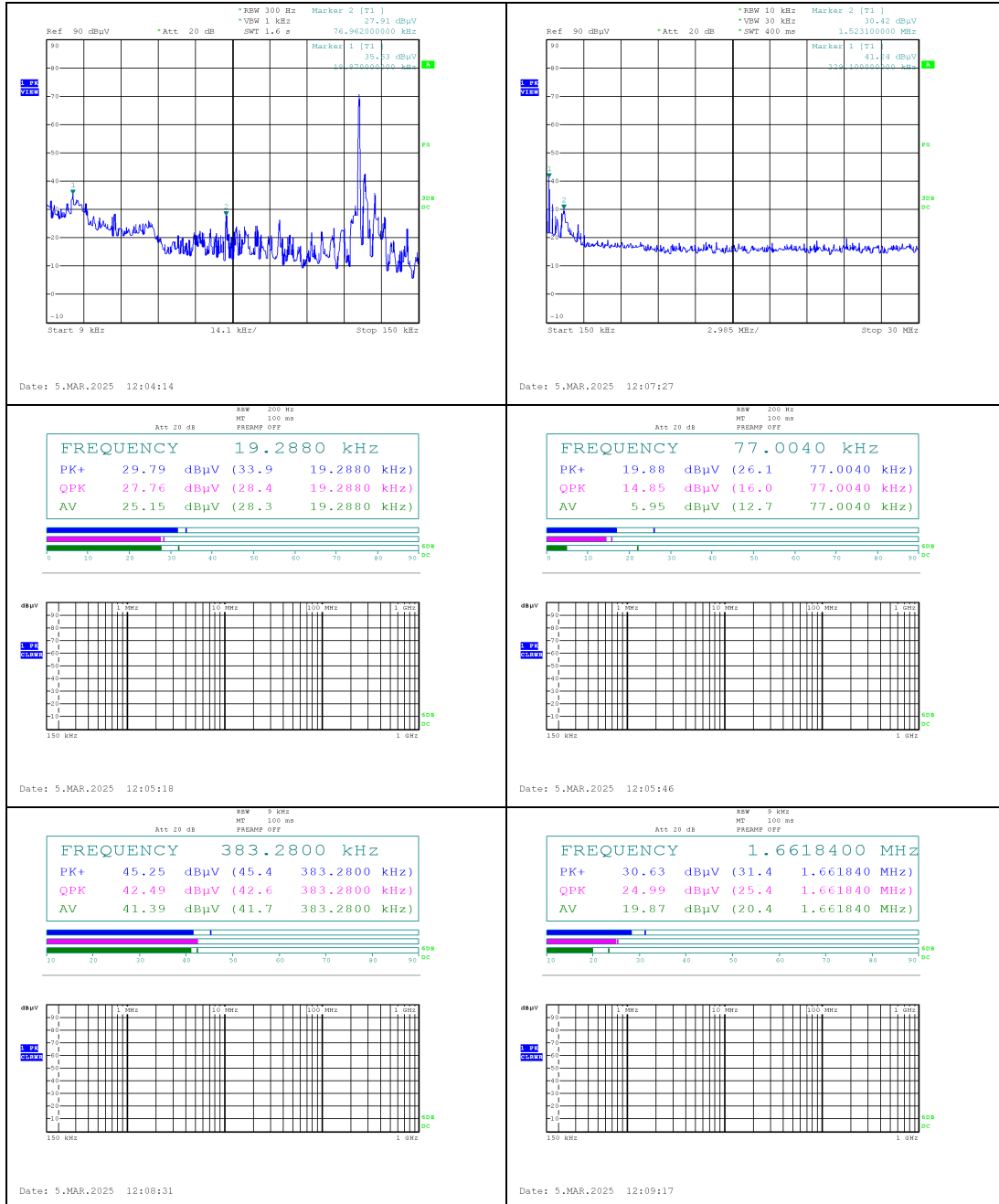
## Above 30 MHz



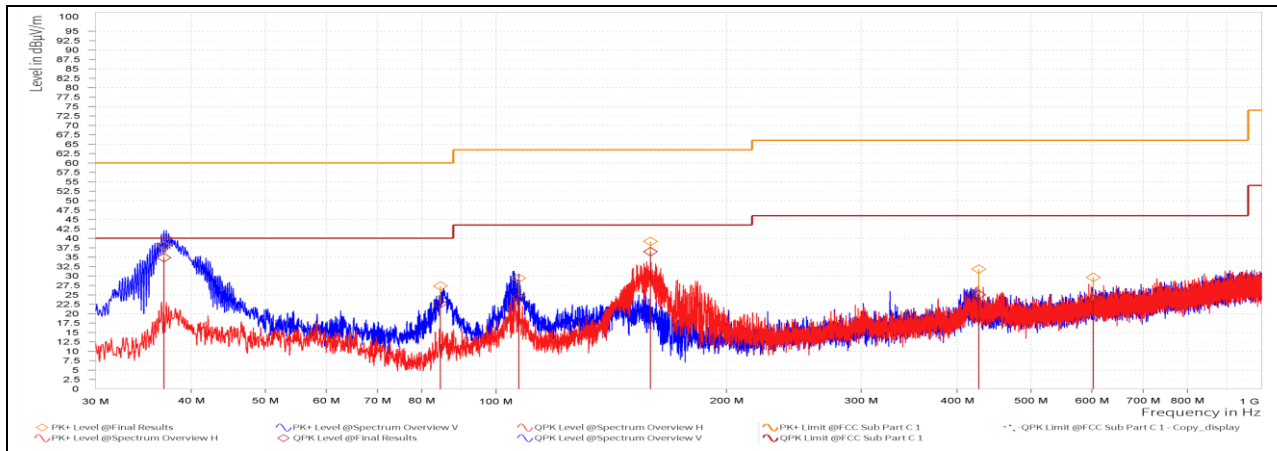
Test Condition: 15 W Operating mode with client device

Operating Frequency: 127 MHz

Below 30 MHz



## Above 30 MHz

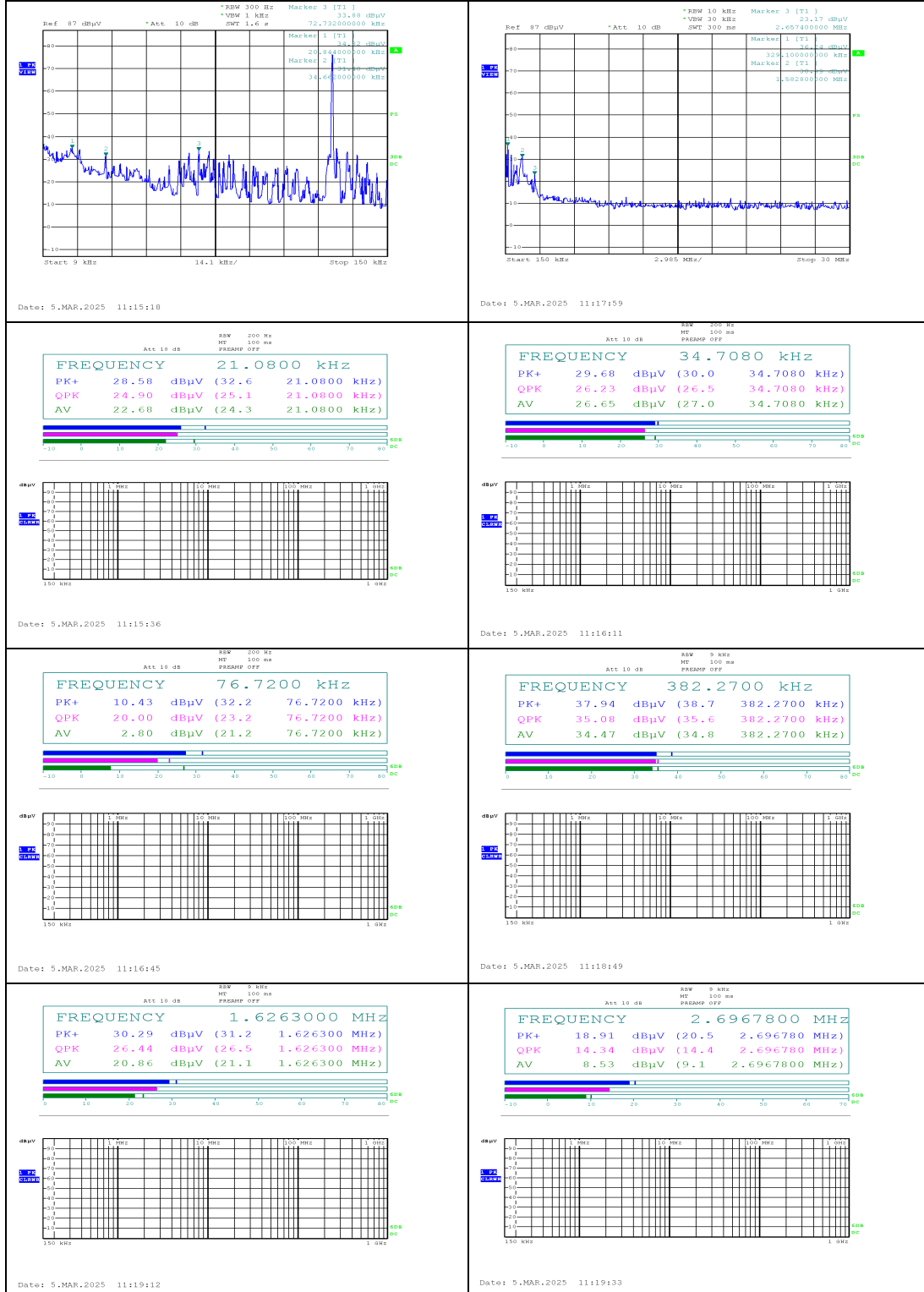


### Coil 3

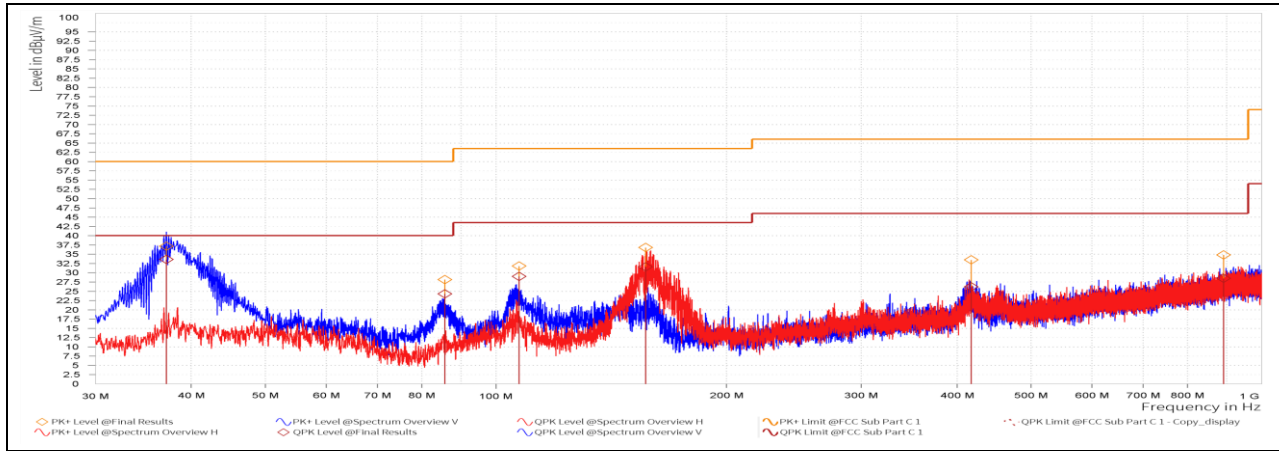
Test Condition: 5 W Operating mode with client device

Operating Frequency: 127 MHz

Below 30 MHz



**Above 30 MHz**



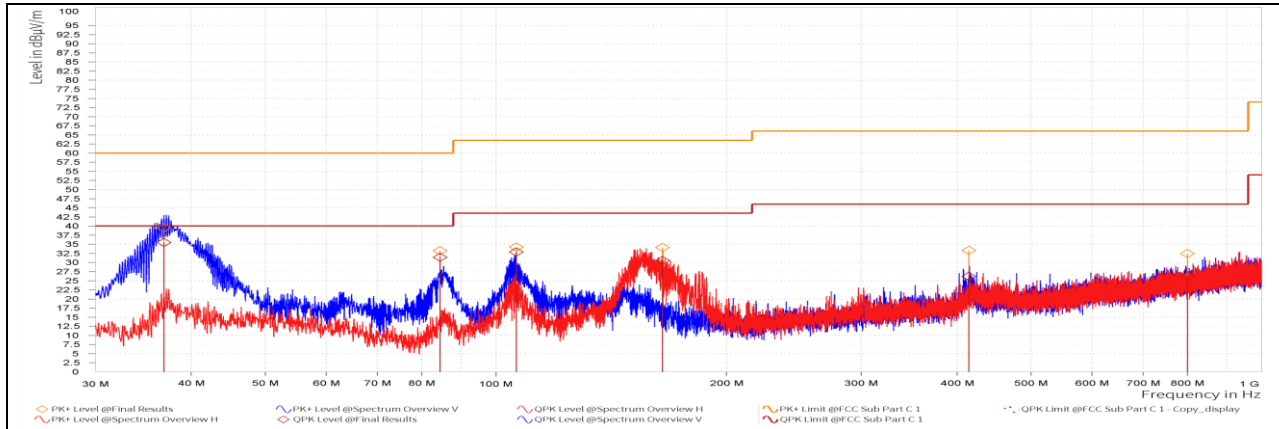
Test Condition: 15 W Operating mode with client device

Operating Frequency: 127 MHz

Below 30 MHz

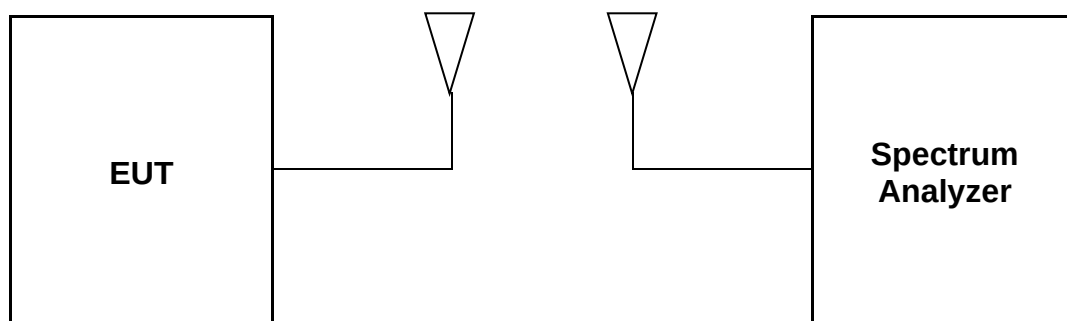


## Above 30 MHz



### 3. 20 dB Bandwidth

#### 3.1. Test Setup



#### 3.2. Limit

None; for reporting purposed only

#### 3.3. Test Procedure

- a. Span = set to capture all products of the modulation process, including the emission skirts.  
 RBW = 200 Hz, VBW = 200 Hz, Sweep = auto, Detector = peak, Trace = max hold.
- b. The marker-to-peak function to set the mark to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is 20 dB bandwidth of the emission.

### 3.4. Test Result

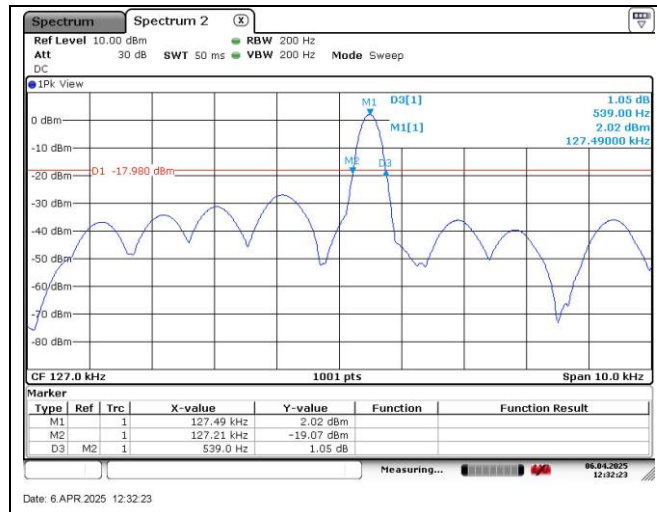
Ambient temperature :  $(23 \pm 1) ^\circ\text{C}$   
 Relative humidity : 47 % R.H.

| Test Condition | Coil | Frequency (kHz) | EUT Status            | 20 dB Bandwidth (kHz) | Limit                   |
|----------------|------|-----------------|-----------------------|-----------------------|-------------------------|
| Idle           | -    | 127             | Without client device | 0.539                 | Reporting proposed only |
| 5 W            | 1    | 127             | With client device    | 0.549                 |                         |
|                | 2    |                 |                       | 0.559                 |                         |
|                | 3    |                 |                       | 0.549                 |                         |
| 15 W           | 1    | 127             |                       | 0.559                 |                         |
|                | 2    |                 |                       | 0.559                 |                         |
|                | 3    |                 |                       | 0.549                 |                         |

## - Test plots

Test Condition: Idle mode

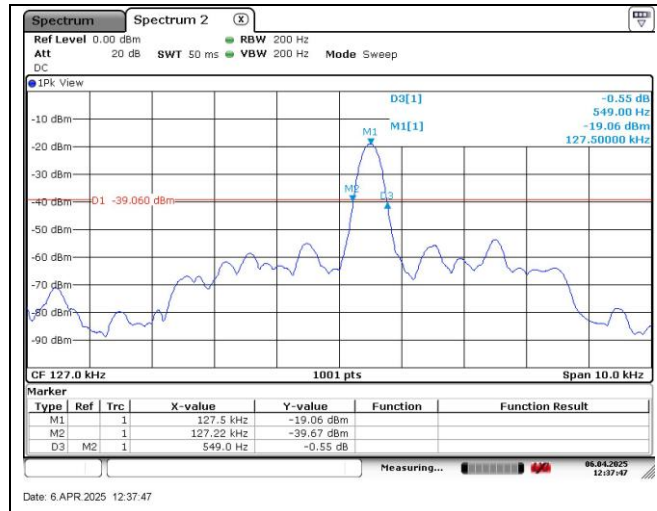
Operating Frequency: 127 kHz



## Coil 1

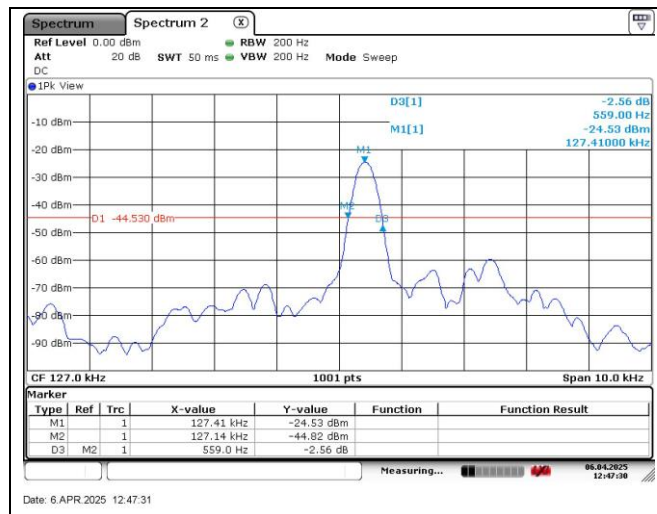
Test Condition: 5 W Operating mode with client device

Operating Frequency: 127 kHz



Test Condition: 15 W Operating mode with client device

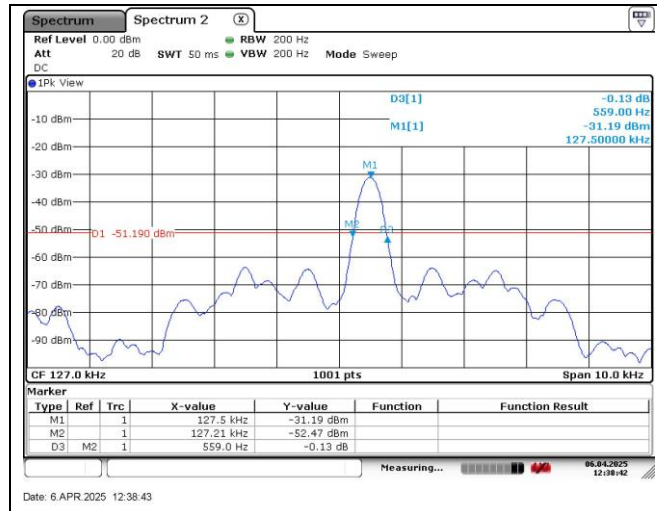
Operating Frequency: 127 kHz



## Coil 2

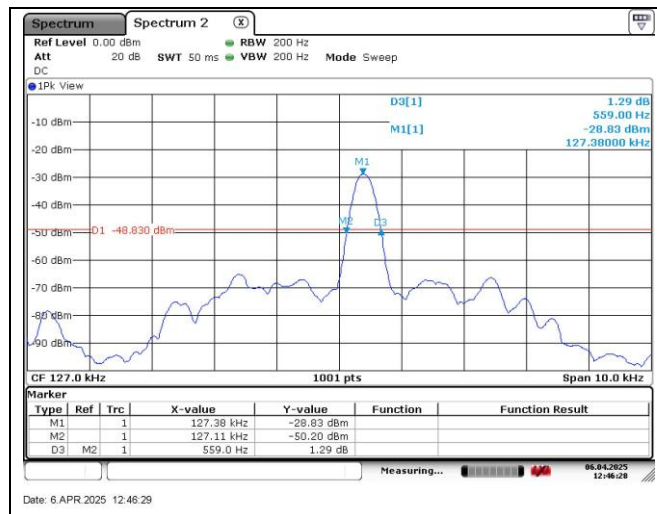
Test Condition: 5 W Operating mode with client device

Operating Frequency: 127 kHz



Test Condition: 15 W Operating mode with client device

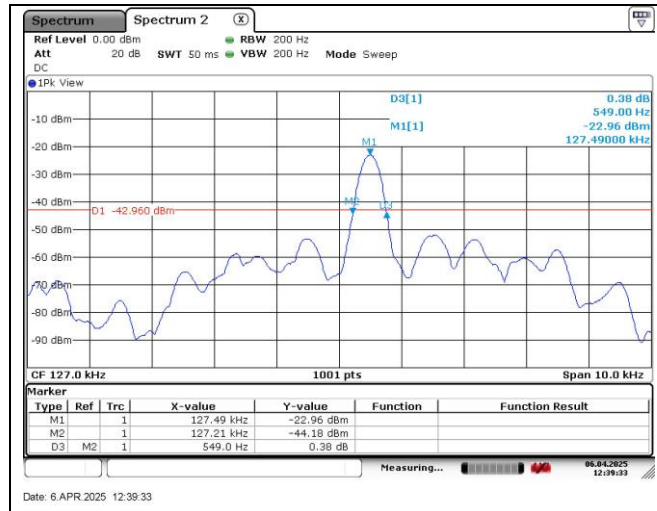
Operating Frequency: 127 kHz



## Coil 3

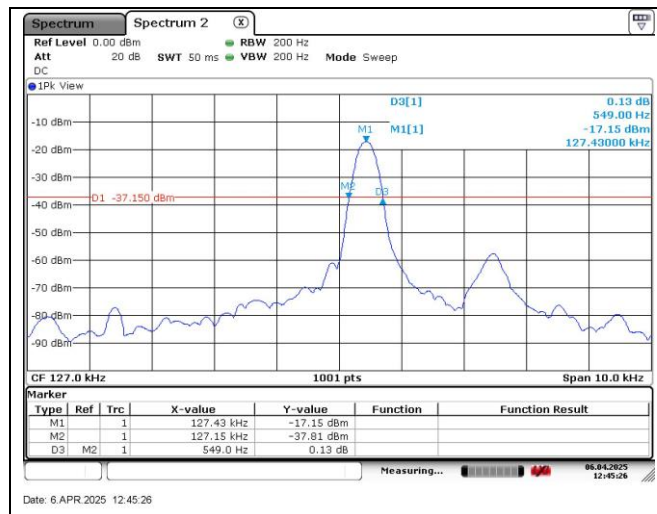
Test Condition: 5 W Operating mode with client device

Operating Frequency: 127 kHz



Test Condition: 15 W Operating mode with client device

Operating Frequency: 127 kHz



- End of the Test Report -