



## FCC ID TEST REPORT

Report Number : **709502402825-00A** Date of Issue: July 31, 2024

Model : CG01

Product Type : Key Fob

Applicant : Continental Automotive Technologies GmbH

Address : Siemensstrasse 12 Regensburg 93055 Germany

Manufacturer : Continental Automotive Technologies GmbH

Address : Siemensstrasse 12 Regensburg 93055 Germany

Production Facility : Continental Automotive Changchun Co., Ltd. Jingyue Branch

Address : 5800, Shengtai Street, 130000 Changchun, P. R. China

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including  
Appendices : 27



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2 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

| Issue | Description of Change | Date of Issue |
|-------|-----------------------|---------------|
| -00A  | First Issue           | 07/02/2024    |



### **3 Details about the Test Laboratory**

#### Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch  
No.16 Lane, 1951 Du Hui Road,  
Shanghai 201108,  
P.R. China

Telephone: +86 21 6141 0123

Fax: +86 21 6140 8600

FCC Registration No.: 820234

FCC Designation Number: CN1183

#### 4 Description of the Equipment Under Test

|                            |                                                                                                               |
|----------------------------|---------------------------------------------------------------------------------------------------------------|
| Product:                   | Key Fob                                                                                                       |
| Model no.:                 | CG01                                                                                                          |
| FCC ID:                    | KR5CG01                                                                                                       |
| Options and accessories:   | NA                                                                                                            |
| Rating:                    | Battery: 3VDC, 1 x CR2032                                                                                     |
| RF Transmission Frequency: | 433.66MHz-434.18MHz                                                                                           |
| No. of Operated Channel:   | 2                                                                                                             |
| Modulation:                | FSK                                                                                                           |
| RF Mode:                   | RF_RKE, RF_KV, RF_Approach                                                                                    |
| Hardware Version:          | AD                                                                                                            |
| Software Version:          | 43.0                                                                                                          |
| Antenna Type:              | internal, PCB loop antenna                                                                                    |
| Description of the EUT:    | The EUT was a Key Fob transmit at 433.66MHz-434.18MHz. We tested it and listed the worst data in this report. |
| Test sample no.:           | SHA-812923-1 (RF Radiated, RF_RKE)<br>SHA-812923-2 (RF Radiated, RF_PASE, RF_Approach)                        |

The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.



5 Summary of Test Standards

| Test Standards                             |                                                                        |
|--------------------------------------------|------------------------------------------------------------------------|
| FCC Part 15 Subpart C<br>10-1-2023 Edition | PART 15 - RADIO FREQUENCY DEVICES<br>Subpart C - Intentional Radiators |

All the test methods were according to ANSI C63.10-2013.

## 6 Summary of Test Results

| Technical Requirements                |                                   |       |             |                |
|---------------------------------------|-----------------------------------|-------|-------------|----------------|
| FCC Part 15 Subpart C                 |                                   |       |             |                |
| Test Condition                        |                                   | Pages | Test Site   | Test Result    |
| §15.207                               | Conducted emission AC power port  | N/A   | N/A         | Not Applicable |
| §15.205, §15.209, 15.35 (c)§15.231(b) | Radiated Emission, 9kHz to 4.5GHz | 12-19 | 3m chamber  | Pass           |
| §15.231(c)                            | Bandwidth Measurement             | 20-21 | Shield room | Pass           |
| §15.231(a)(1)                         | Deactivation Time                 | 22-23 | Shield room | Pass           |
| §15.203                               | Antenna requirement               | --    | See Note 2  | Pass           |

Note 1: N/A=Not Applicable. Conducted emission is not apply for battery operated device.

Note 2: The EUT uses a PCB loop antenna. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

## 7 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: KR5CG01, complies with Section 15.207, 15.205, 15.209, 15.231 of the FCC Part 15, Subpart C Rules.

The test sample consists of a Key Fob with 3 RF signal type: RF\_RKE (Remote key functionality), RF\_KV and RF\_Approach (Passive key functionality).

| RF Signal Type               | Trigger mode                                                                                                                                       | Tx Frequency (MHz) | Power level            | Duty cycle |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------|------------|
| RF_RKE                       | Key trigger                                                                                                                                        | 433.66/434.18      | High power level       | 24.54%     |
| RF_KV                        | After the key receives the 125kHz signal transmitted by the ZCU, it returns the RF signal to the ZCU, only emitted once                            |                    | Same lower power level | 37.68%     |
| RF_Approach (courtesy light) | Similar to RF_KV, but only emitted once after receiving the ZCU 125kHz low-frequency signal when the customer walks to the vehicle from a distance |                    |                        | 40.58%     |

So we tested the RF\_RKE and RF\_KV signal type for the radiated emission, tested all the signal type for duty cycle and Deactivation Time tests.



## SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: April 22, 2024

Testing Start Date: April 23, 2024

Testing End Date: July 23, 2024

TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch

Reviewed by:

Prepared by:

Tested by:

Hui Tong



Jiaxi Xu

Cheng Huali

Hui TONG  
EMC Section Manager

Jiaxi XU  
EMC Project Engineer

Cheng Huali  
EMC Test Engineer



## 8 Systems test configuration

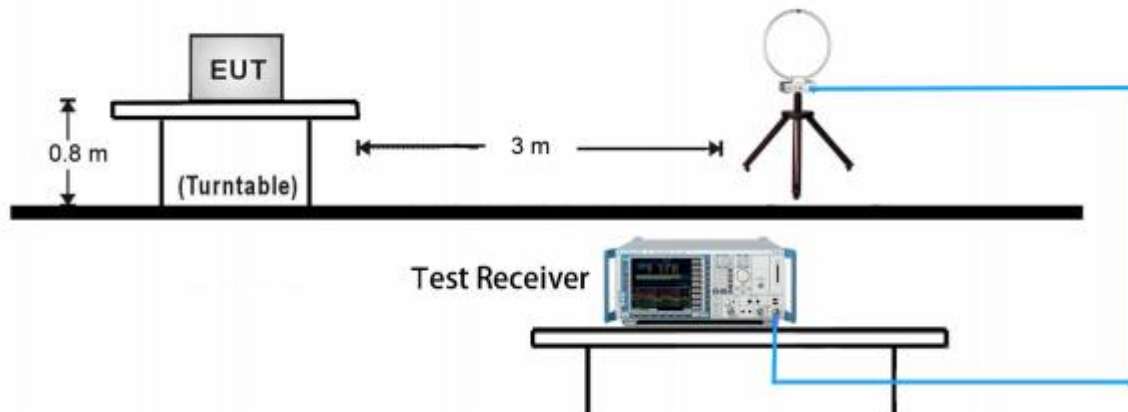
Auxiliary Equipment Used during Test:

| DESCRIPTION | MANUFACTURER | MODEL NO.(SHIELD) | S/N(LENGTH) |
|-------------|--------------|-------------------|-------------|
| --          | --           | --                | --          |

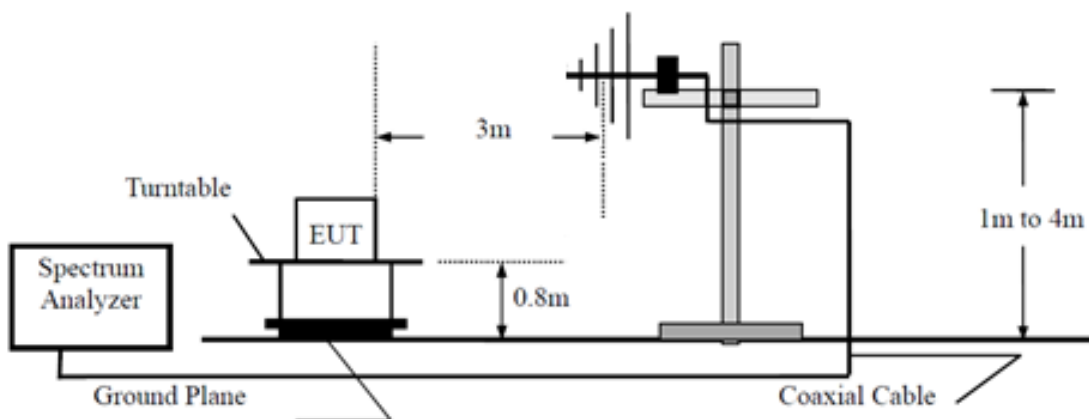
## 9 Test Setups

### 8.1 Radiated test setups

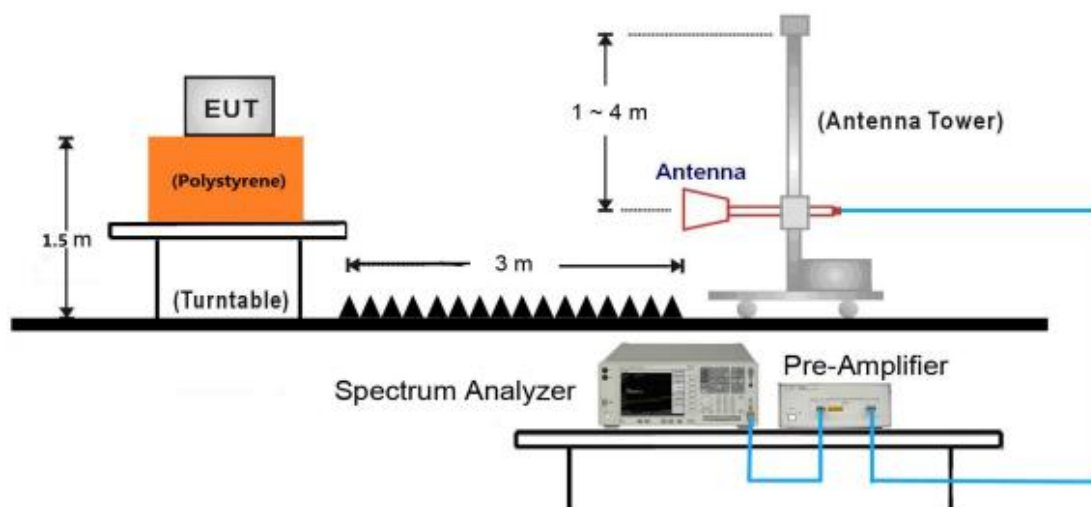
9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test- Setup



## 1GHz ~ 5GHz Test Setup:



## 10 Test Methodology

### 10.1 Radiated Emission

#### Test Method

1. The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3-meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3. The height of antenna 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.
4. 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. Use the following spectrum analyzer settings According to C63.10:  
For Above 1GHz  
Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 1MHz, VBW $\geq$ 3RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.  
For Below 1GHz  
Use the following spectrum analyzer settings:  
Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 100 KHz, VBW $\geq$ 3RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

#### Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (duty cycle  $\geq$ 98%) for peak detection at frequency above 1GHz.
4. If the emission is pulsed (duty cycle <98%), modify the unit for continuous operation: use the settings shown above, then correct the reading by subcontracting the peak to average duty cycle correction factor  $20\log(\text{duty cycle})$ , derived from the appropriate duty cycle calculation.

### Limit

According to §15.231 (b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

| Fundamental frequency (MHz) | Field Strength of Fundamental (Microvolts /meter @3m) | Field Strength of spurious emissions ((Microvolts /meter @3m) |
|-----------------------------|-------------------------------------------------------|---------------------------------------------------------------|
| 40.66-40.70                 | 2,250                                                 | 225                                                           |
| 70-130                      | 1,250                                                 | 125                                                           |
| 130-174                     | 1,250 to 3,370 *                                      | 125 to 3750 *                                                 |
| 174-260                     | 3,750                                                 | 375                                                           |
| 260-470 √                   | 3,750 to 12, 500*                                     | 375 to 1,250*                                                 |
| Above 470                   | 12,500                                                | 1,250                                                         |

### Limits for 15.209 Radiated emission limits; general requirements

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009-0.490     | 2400/F(kHz)                       | 300                           |
| 0.490-1.705     | 24000/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                             |

| Frequency             | Limit at 3m (dBuV/m)       |
|-----------------------|----------------------------|
| 0.009 MHz – 0.490 MHz | 128.5 to 93.8 <sup>1</sup> |
| 0.490 MHz – 1.705 MHz | 73.8 to 63 <sup>1</sup>    |
| 1.705 MHz – 30 MHz    | 69.5 <sup>1</sup>          |
| 30 MHz – 88 MHz       | 40.0 <sup>1</sup>          |
| 88 MHz – 216 MHz      | 43.5 <sup>1</sup>          |
| 216 MHz – 960 MHz     | 46.0 <sup>1</sup>          |
| Above 960 MHz         | 54.0 <sup>1</sup>          |
| Above 1000 MHz        | 54.0 <sup>2</sup>          |
| Above 1000 MHz        | 74.0 <sup>3</sup>          |

<sup>1</sup>Limit is with detector with bandwidths as defined in CISPR-16-1-1 except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz where an Average detector is used.

<sup>2</sup>Limit is with 1 MHz measurement bandwidth and using an Average detector.

<sup>3</sup>Limit is with 1 MHz measurement bandwidth and using a Peak detector.

## Spurious radiated emissions for transmitter

Signal Type: RF\_RKE, 433.66MHz Tx

| Radiated Emission |           |          |          |         |          |        |        |                 |
|-------------------|-----------|----------|----------|---------|----------|--------|--------|-----------------|
| Value             | Emissions | E-Field  | PK       | Average | AV       | Limit  |        | Emission Type   |
|                   | Frequency | Polarity | Emission | Factor  | Emission |        | Margin |                 |
|                   | MHz       |          | dBµV/m   | dB      | dBµV/m   | dBµV/m | dB     |                 |
| Below 1GHz        |           |          |          |         |          |        |        |                 |
| PK                | 433.66    | H        | 89.80    | 0.00    | /        | 100.80 | 11.00  | Fundamental     |
| AV                | 433.66    | H        | 89.80    | -12.21  | 77.59    | 80.80  | 3.21   | Fundamental     |
| PK                | 433.66    | V        | 88.42    | 0.00    | /        | 100.80 | 12.38  | Fundamental     |
| AV                | 433.66    | V        | 88.42    | -12.21  | 76.21    | 80.80  | 4.59   | Fundamental     |
| PK                | 867.32    | H        | 39.25    | 0.00    | /        | 80.80  | 41.55  | Spurious        |
| AV                | 867.32    | H        | 39.12    | -12.21  | 26.91    | 60.80  | 33.89  | Spurious        |
| PK                | 867.32    | V        | 38.22    | 0.00    | /        | 80.80  | 42.58  | Spurious        |
| AV                | 867.32    | V        | 38.22    | -12.21  | 26.01    | 60.80  | 34.79  | Spurious        |
| Above 1GHz        |           |          |          |         |          |        |        |                 |
| PK                | 1301      | H        | 34.29    | 0.00    | /        | 74.00  | 39.71  | Restricted band |
| AV                | 1301      | H        | 32.29    | -12.21  | 20.08    | 54.00  | 33.92  | Restricted band |
| PK                | 1301      | V        | 34.66    | 0.00    | /        | 74.00  | 39.34  | Restricted band |
| AV                | 1301      | V        | 34.66    | -12.21  | 22.45    | 54.00  | 31.55  | Restricted band |

## Remark:

- Corrected Amplitude = Read level + Corrector factor  
 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss - Amplifier Gain  
 Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
- Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz)
- Corrected Reading = Original Receiver Reading + Correct Factor
- Only the worst data listed in this report, Other frequency was 20dB below the limit
- Pre-scan all test modes (different power on modes) and only the worst case listed as above.
- AV Emission Level= PK Emission Level+20log (duty cycle),  
 Duty Cycle = (24.54\*1) ms /100ms = 24.54%,  
 Duty Cycle Factor = 20log (Duty Cycle) = -12.21
- The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz), therefore no data appear in the report.



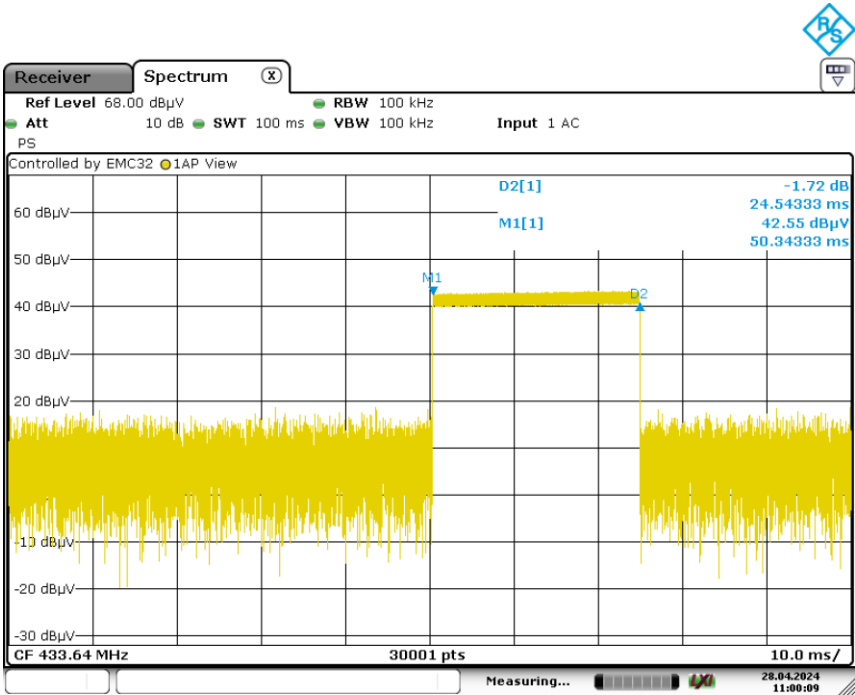
Duty Cycle

Signal Type: RF\_RKE 433.6MHz

Duty Cycle = (24.54\*1) ms /100ms = 24.54%,  
Duty Cycle Factor = 20log (Duty Cycle) = -12.21



Date: 28.APR.2024 10:56:41



Date: 28.APR.2024 11:00:10

## Signal Type: RF\_RKE, 434.18MHz Tx

| Radiated Emission |           |          |          |         |          |        |        |                 |
|-------------------|-----------|----------|----------|---------|----------|--------|--------|-----------------|
| Value             | Emissions | E-Field  | PK       | Average | AV       | Limit  |        | Emission Type   |
|                   | Frequency | Polarity | Emission | Factor  | Emission |        | Margin |                 |
|                   | MHz       |          | dBµV/m   | dB      | dBµV/m   | dBµV/m | dB     |                 |
| Below 1GHz        |           |          |          |         |          |        |        |                 |
| PK                | 434.18    | H        | 90.08    | 0.00    | /        | 100.80 | 10.72  | Fundamental     |
| AV                | 434.18    | H        | 90.08    | -12.55  | 77.53    | 80.80  | 3.27   | Fundamental     |
| PK                | 434.18    | V        | 88.76    | 0.00    | /        | 100.80 | 12.04  | Fundamental     |
| AV                | 434.18    | V        | 88.76    | -12.55  | 76.21    | 80.80  | 4.59   | Fundamental     |
| PK                | 868.33    | H        | 39.25    | 0.00    | /        | 80.80  | 41.55  | Spurious        |
| AV                | 868.33    | H        | 39.12    | -12.55  | 26.57    | 60.80  | 34.23  | Spurious        |
| PK                | 868.36    | V        | 38.22    | 0.00    | /        | 80.80  | 42.58  | Spurious        |
| AV                | 868.36    | V        | 38.22    | -12.55  | 25.67    | 60.80  | 35.13  | Spurious        |
| Above 1GHz        |           |          |          |         |          |        |        |                 |
| PK                | 1302.42   | H        | 35.91    | 0.00    | /        | 74.00  | 38.09  | Restricted band |
| AV                | 1302.42   | H        | 35.91    | -12.55  | 23.36    | 54.00  | 30.64  | Restricted band |
| PK                | 1302.42   | V        | 35.63    | 0.00    | /        | 74.00  | 38.37  | Restricted band |
| AV                | 1302.42   | V        | 35.63    | -12.55  | 23.08    | 54.00  | 30.92  | Restricted band |

## Remark:

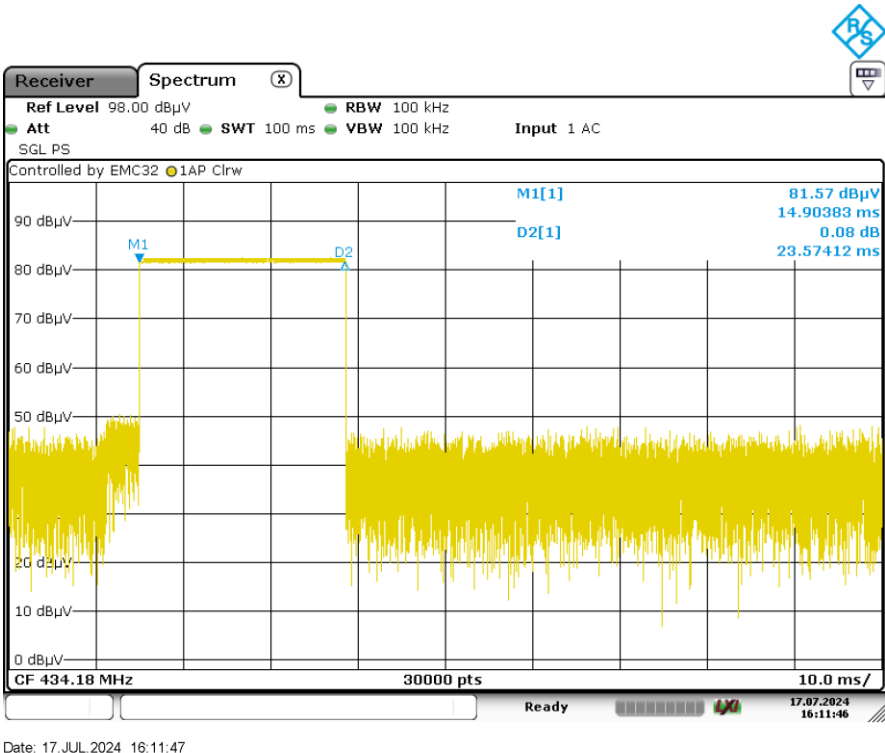
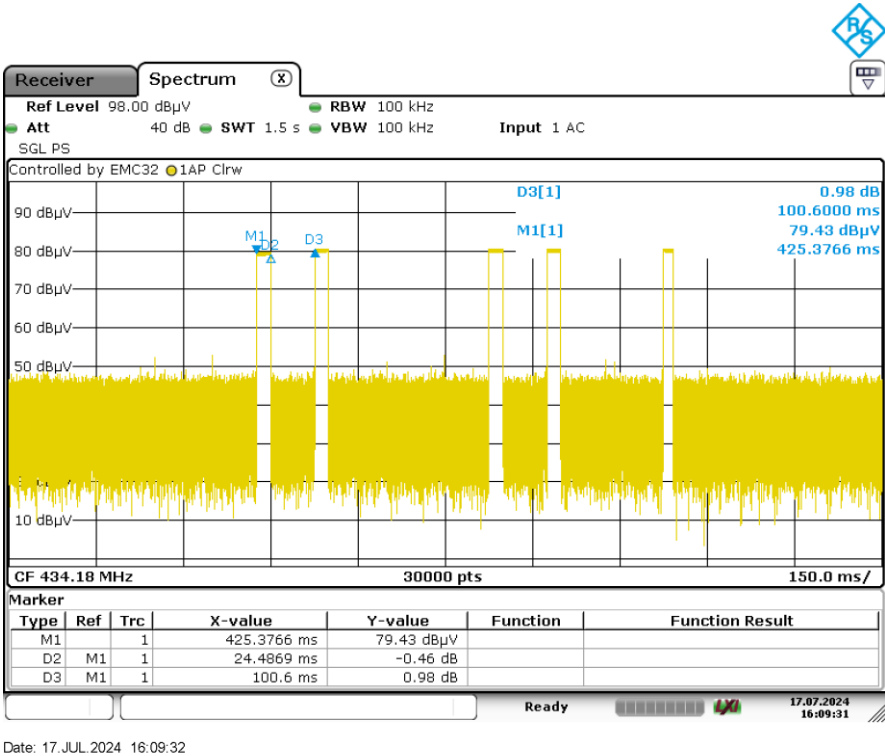
- Corrected Amplitude = Read level + Corrector factor  
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain  
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
- Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz)
- Corrected Reading = Original Receiver Reading + Correct Factor
- Only the worst data listed in this report, other frequency was 20dB below the limit
- Pre-scan all test modes (different power on modes) and only the worst case listed as above.
- AV Emission Level= PK Emission Level+20log (duty cycle),  
Duty Cycle = (23.57\*1) ms /100ms = 23.57%,  
Duty Cycle Factor = 20log (Duty Cycle) = -12.55
- The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz), therefore no data appear in the report.



Duty Cycle

Signal Type: RF\_RKE 434.18MHz

Duty Cycle = (23.57\*1) ms /100ms = 23.57%,  
Duty Cycle Factor = 20log (Duty Cycle) = -12.55



## Signal Type: RF\_Approach, 433.66MHz Tx

| Radiated Emission |           |          |          |         |          |        |        |                 |
|-------------------|-----------|----------|----------|---------|----------|--------|--------|-----------------|
| Value             | Emissions | E-Field  | PK       | Average | AV       | Limit  |        | Emission Type   |
|                   | Frequency | Polarity | Emission | Factor  | Emission |        | Margin |                 |
|                   | MHz       |          | dBµV/m   | dB      | dBµV/m   | dBµV/m | dB     |                 |
| Below 1GHz        |           |          |          |         |          |        |        |                 |
| PK                | 433.66    | H        | 85.23    | 0.00    | /        | 100.80 | 15.57  | Fundamental     |
| AV                | 433.66    | H        | 85.23    | -7.83   | 77.40    | 80.80  | 3.40   | Fundamental     |
| PK                | 433.66    | V        | 83.72    | 0.00    | /        | 100.80 | 17.08  | Fundamental     |
| AV                | 433.66    | V        | 83.72    | -7.83   | 75.89    | 80.80  | 4.91   | Fundamental     |
| PK                | 867.32    | H        | 37.88    | 0.00    | /        | 80.80  | 42.92  | Spurious        |
| AV                | 867.32    | H        | 37.88    | -7.83   | 30.05    | 60.80  | 30.75  | Spurious        |
| PK                | 867.32    | V        | 38.29    | 0.00    | /        | 80.80  | 42.51  | Spurious        |
| AV                | 867.32    | V        | 38.29    | -7.83   | 30.46    | 60.80  | 30.34  | Spurious        |
| Above 1GHz        |           |          |          |         |          |        |        |                 |
| PK                | 1301      | H        | 33.77    | 0.00    | /        | 74.00  | 40.23  | Restricted band |
| AV                | 1301      | H        | 33.77    | -7.83   | 25.94    | 54.00  | 28.06  | Restricted band |
| PK                | 1734.89   | V        | 33.15    | 0.00    | /        | 74.00  | 40.85  | Restricted band |
| AV                | 1734.89   | V        | 33.15    | -7.83   | 25.32    | 54.00  | 28.68  | Restricted band |

## Remark:

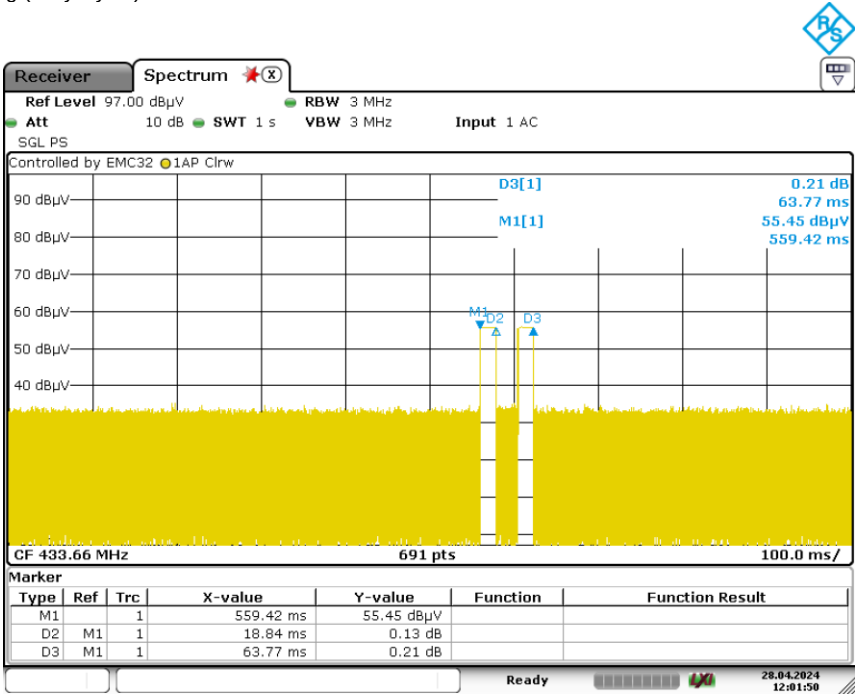
- Corrected Amplitude = Read level + Corrector factor  
 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain  
 Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
- Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz)
- Corrected Reading = Original Receiver Reading + Correct Factor
- Only the worst data listed in this report, Other frequency was 20dB below the limit
- Pre-scan all test modes (different power on modes) and only the worst case listed as above.
- AV Emission Level= PK Emission Level+20log (duty cycle),  
 Worst case Duty Cycle =  $(40.58 \times 1) \text{ ms} / 100\text{ms} = 40.58\%$ ,  
 Duty Cycle Factor =  $20\log (\text{Duty Cycle}) = -7.83$
- The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz), therefore no data appear in the report.



Duty Cycle

Signal Type: RF\_KV, 433.66MHz

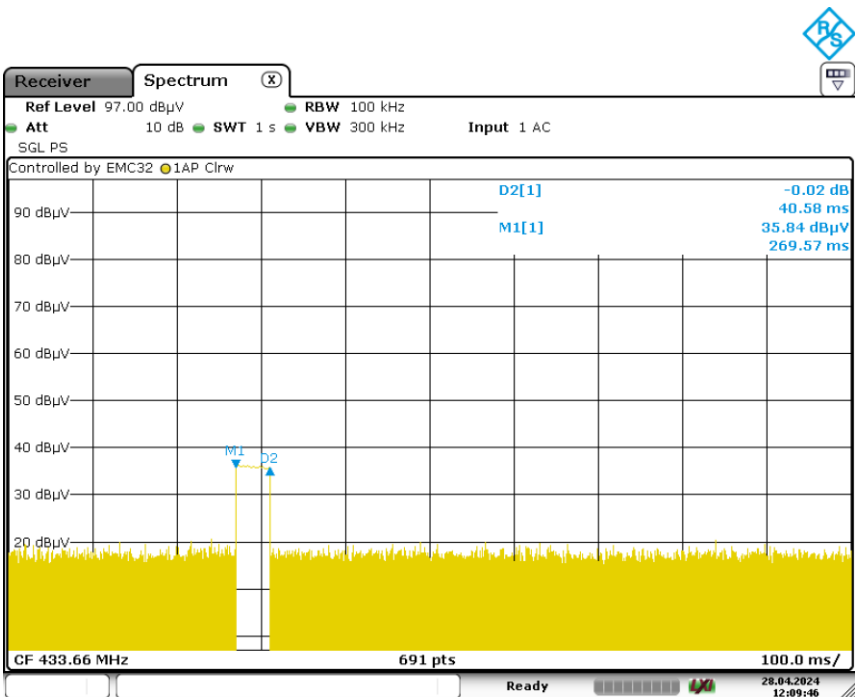
Duty Cycle = (18.84\*2) ms /100ms = 37.68%,  
Duty Cycle Factor = 20log (Duty Cycle) = -8.47



Date: 28.APR.2024 12:01:50

Signal Type: RF\_Approach, 433.66MHz

Duty Cycle = (40.58\*1) ms /100ms = 40.58%,  
Duty Cycle Factor = 20log (Duty Cycle) = -7.83



Date: 28.APR.2024 12:09:46

## Signal Type: RF\_Approach, 434.18MHz Tx

| Radiated Emission |           |          |          |         |          |        |        |                 |
|-------------------|-----------|----------|----------|---------|----------|--------|--------|-----------------|
| Value             | Emissions | E-Field  | PK       | Average | AV       | Limit  |        | Emission Type   |
|                   | Frequency | Polarity | Emission | Factor  | Emission |        | Margin |                 |
|                   | MHz       |          | dBµV/m   | dB      | dBµV/m   | dBµV/m | dB     |                 |
| Below 1GHz        |           |          |          |         |          |        |        |                 |
| PK                | 434.18    | H        | 85.27    | 0.00    | /        | 100.80 | 15.53  | Fundamental     |
| AV                | 434.18    | H        | 85.27    | -7.83   | 77.44    | 80.80  | 3.36   | Fundamental     |
| PK                | 434.18    | V        | 83.27    | 0.00    | /        | 100.80 | 17.53  | Fundamental     |
| AV                | 434.18    | V        | 83.27    | -7.83   | 75.44    | 80.80  | 5.36   | Fundamental     |
| PK                | 868.33    | H        | 38.17    | 0.00    | /        | 80.80  | 42.63  | Spurious        |
| AV                | 868.33    | H        | 38.17    | -7.83   | 30.34    | 60.80  | 30.46  | Spurious        |
| PK                | 868.36    | V        | 38.29    | 0.00    | /        | 80.80  | 42.51  | Spurious        |
| AV                | 868.36    | V        | 38.29    | -7.83   | 30.46    | 60.80  | 30.34  | Spurious        |
| Above 1GHz        |           |          |          |         |          |        |        |                 |
| PK                | 1302.42   | H        | 30.80    | 0.00    | /        | 74.00  | 43.20  | Restricted band |
| AV                | 1302.42   | H        | 30.80    | -7.83   | 22.97    | 54.00  | 31.03  | Restricted band |
| PK                | 1302.42   | V        | 31.11    | 0.00    | /        | 74.00  | 42.89  | Restricted band |
| AV                | 1302.42   | V        | 31.11    | -7.83   | 23.28    | 54.00  | 30.72  | Restricted band |

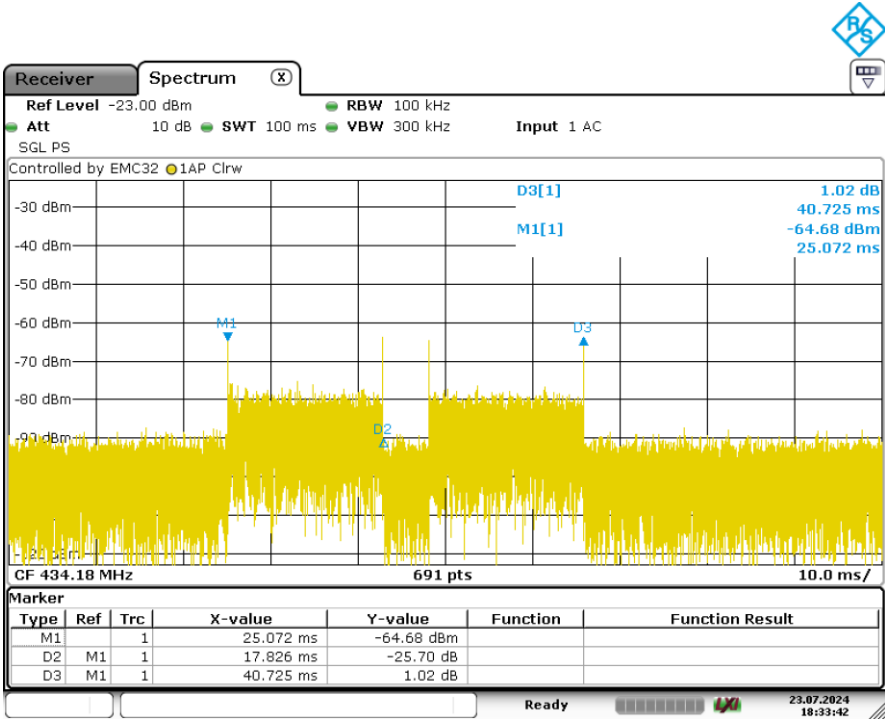
## Remark:

- Corrected Amplitude = Read level + Corrector factor  
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain  
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
- Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz)
- Corrected Reading = Original Receiver Reading + Correct Factor
- Only the worst data listed in this report, other frequency was 20dB below the limit
- Pre-scan all test modes (different power on modes) and only the worst case listed as above.
- AV Emission Level= PK Emission Level+20log (duty cycle),  
Worst case Duty Cycle = (40.58\*1) ms /100ms = 40.58%,  
Duty Cycle Factor = 20log (Duty Cycle) = -7.83
- The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz), therefore no data appear in the report.



Duty Cycle  
Signal Type: RF\_KV

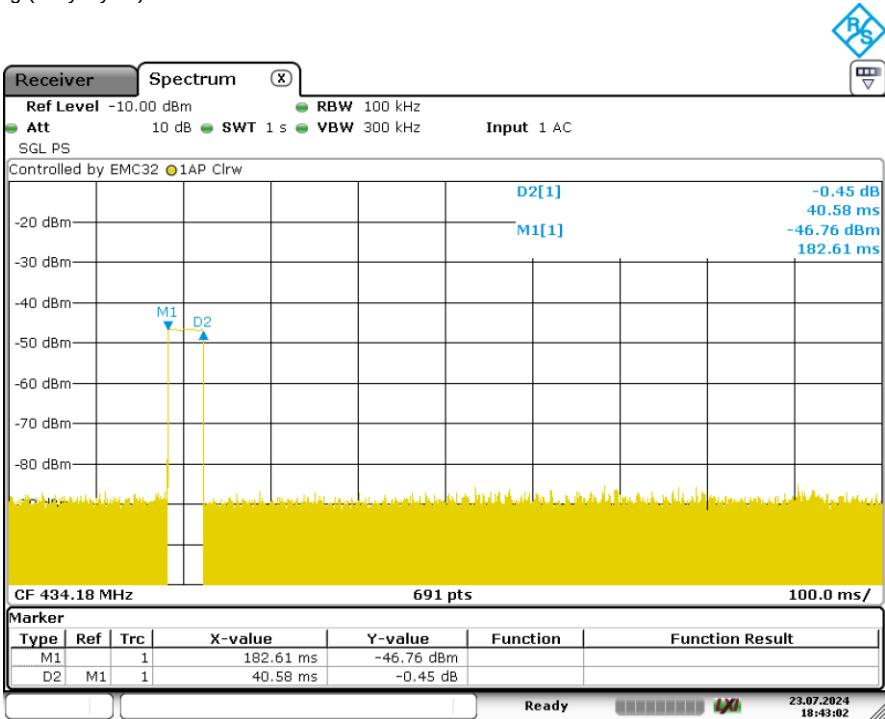
Duty Cycle = (17.83\*2) ms /100ms = 35.66%,  
Duty Cycle Factor = 20log (Duty Cycle) = -8.96



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Signal Type: RF\_Approach

Duty Cycle = (40.58\*1) ms /100ms = 40.58%,  
Duty Cycle Factor = 20log (Duty Cycle) = -7.83



Date: 23 JUL 2024 18:43:01

## 10.2 Bandwidth Measurement

### Test Method

1. Set to the maximum power setting and enable the EUT transmit continuously.
2. Use the following test receiver settings:  
Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel  
RBW = 1% to 5% of the 20dB bandwidth of the emission being measured, VBW ≥ RBW,  
Sweep = auto, Detector function = peak, Trace = max hold
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth. Record the results.
4. Repeat above procedures until all frequencies measured were complete.

### Limit

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20dB down from the modulated carrier.

The limit for the EUT Channel 1 =  $0.25\% \times 433.66 \text{ MHz} = 1084 \text{ kHz}$

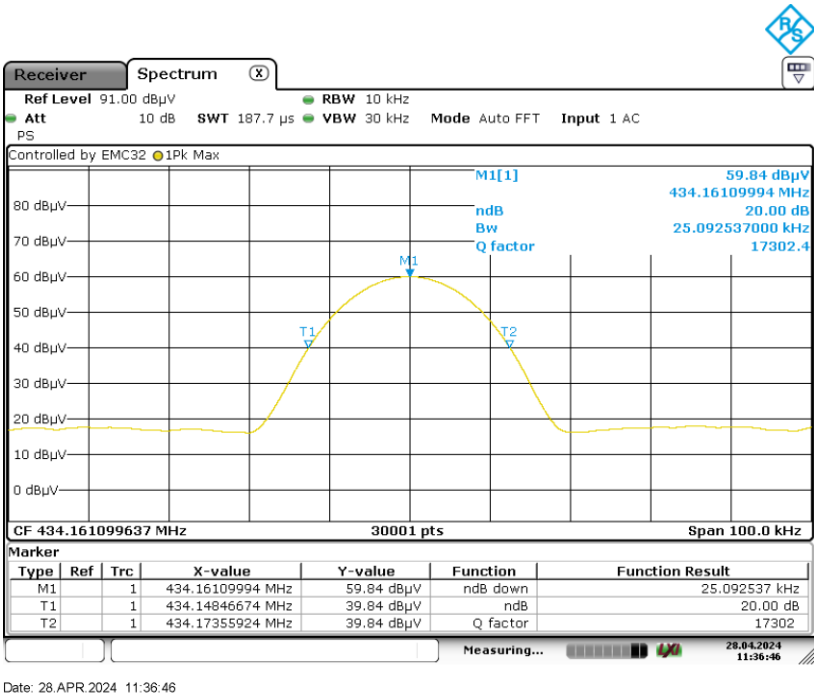
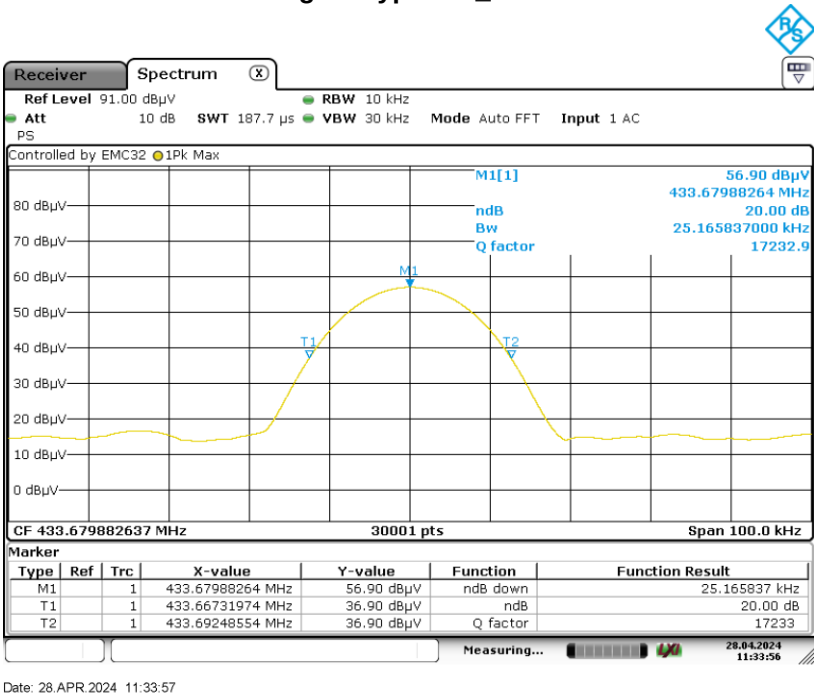
The limit for the EUT Channel 2 =  $0.25\% \times 434.18 \text{ MHz} = 1085 \text{ kHz}$

### Test Result

| Channel | Frequency | 20dB Bandwidth (kHz) | Limit (kHz) |
|---------|-----------|----------------------|-------------|
| 1       | 433.66MHz | 25.17                | <1084       |
| 2       | 434.18MHz | 25.09                | <1085       |



Signal Type: RF\_RKE



## 10.3 Deactivation Time

### Test Method

1. Set to the maximum power setting and enable the EUT in transmitting mode.
2. Set center frequency of spectrum analyzer=operating frequency.
3. Set the spectrum analyzer as RBW=100 kHz, VBW=100 kHz, Span=0Hz.
4. Repeat above procedures until all frequency measured was complete.

### Limit

According to FCC Part 15.231 (a), the transmitter shall be complied the following requirements:

(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

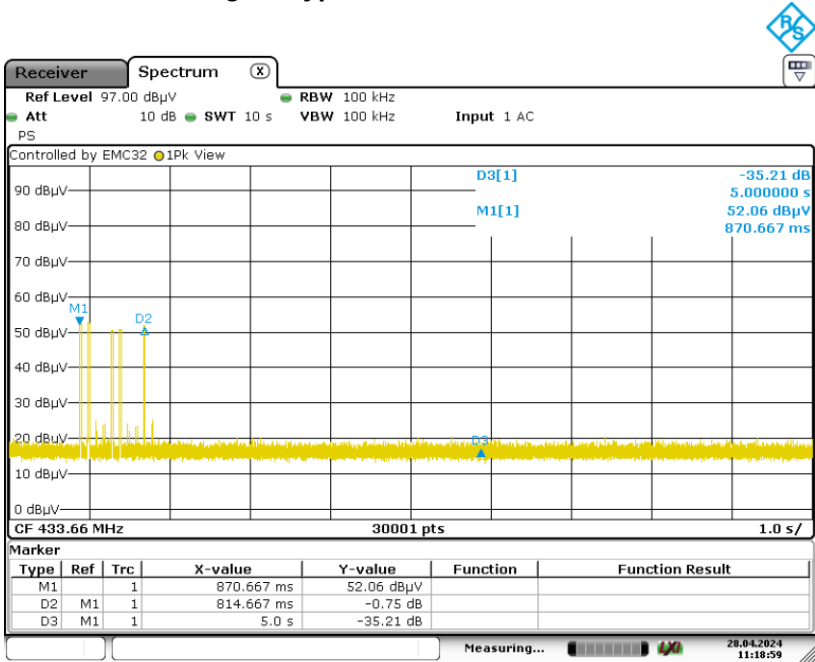
(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

### Test Result

| Signal Type       | Channel | Frequency | Deactivation Time | Result |
|-------------------|---------|-----------|-------------------|--------|
| RF_RKE            | 1       | 433.66MHz | 814.667ms         | Pass   |
|                   | 2       | 434.18MHz | 715.0ms           | Pass   |
| RF_RKE<br>on hold | 1       | 433.66MHz | 448.232ms         | Pass   |
|                   | 2       | 434.18MHz | 535.6ms           | Pass   |
| RF_KV             | 1       | 433.66MHz | 58.0ms            | Pass   |
|                   | 2       | 434.18MHz | 58.0ms            | Pass   |
| RF_Approach       | 1       | 433.66MHz | 58.0ms            | Pass   |
|                   | 2       | 434.18MHz | 58.0ms            | Pass   |

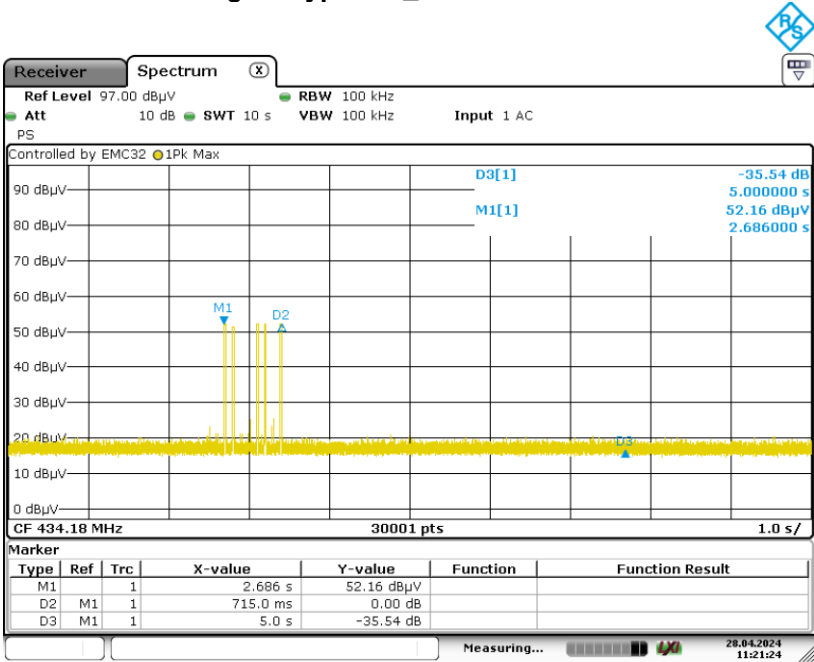


Signal Type: RF\_RKE 433.66MHz



Date: 28.APR 2024 11:18:59

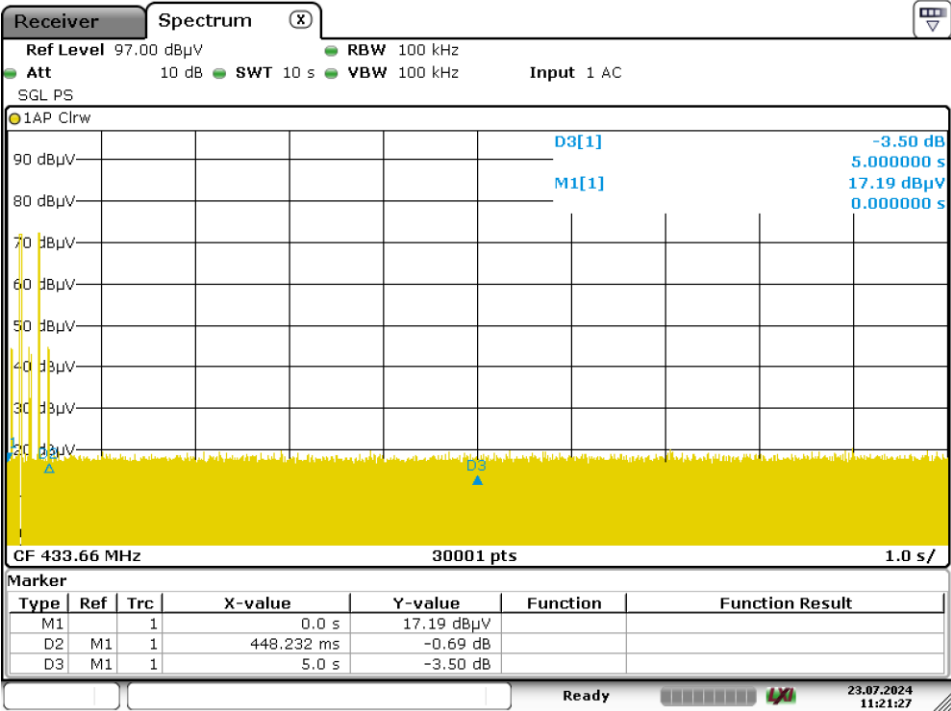
Signal Type: RF\_RKE 434.18MHz



Date: 28.APR 2024 11:21:24

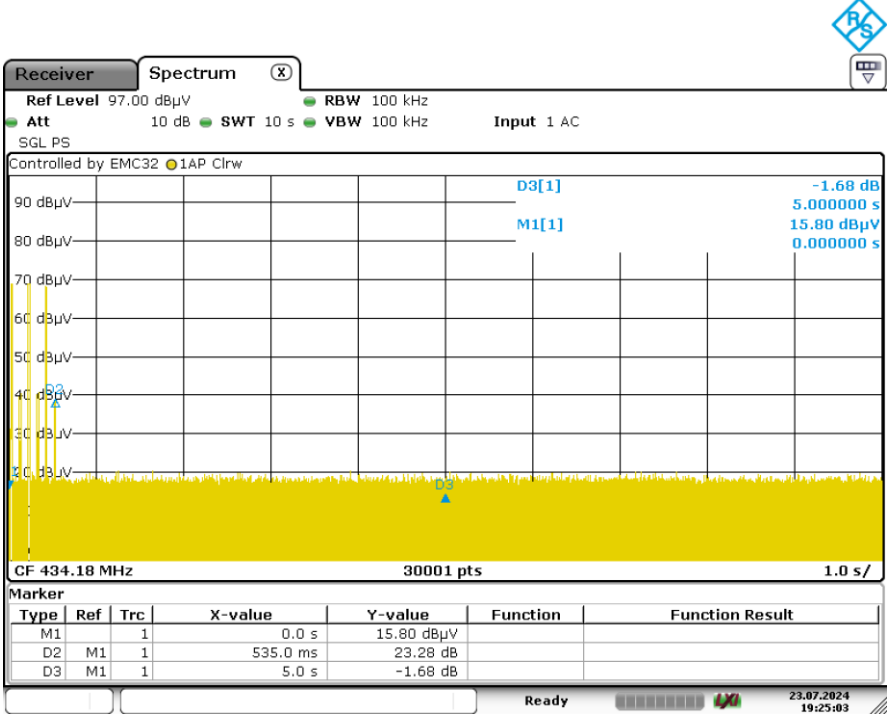


Signal Type: RF\_RKE 433.66MHz, on hold mode, release the button at the sweep begin.



Date: 23.JUL.2024 11:21:27

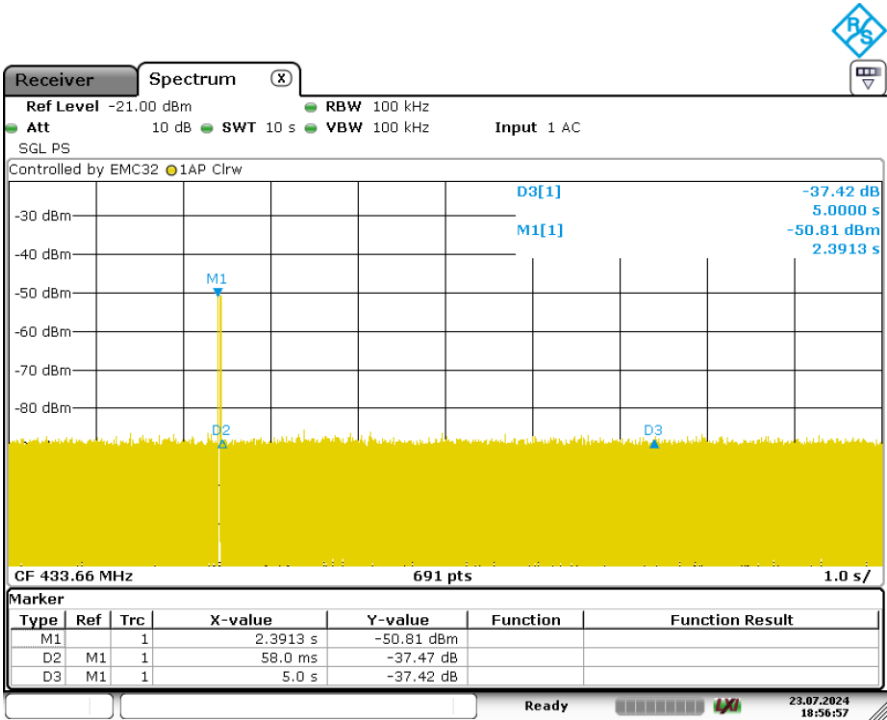
Signal Type: RF\_RKE 434.18MHz, on hold mode, release the button at the sweep begin.



Date: 23.JUL.2024 19:25:03

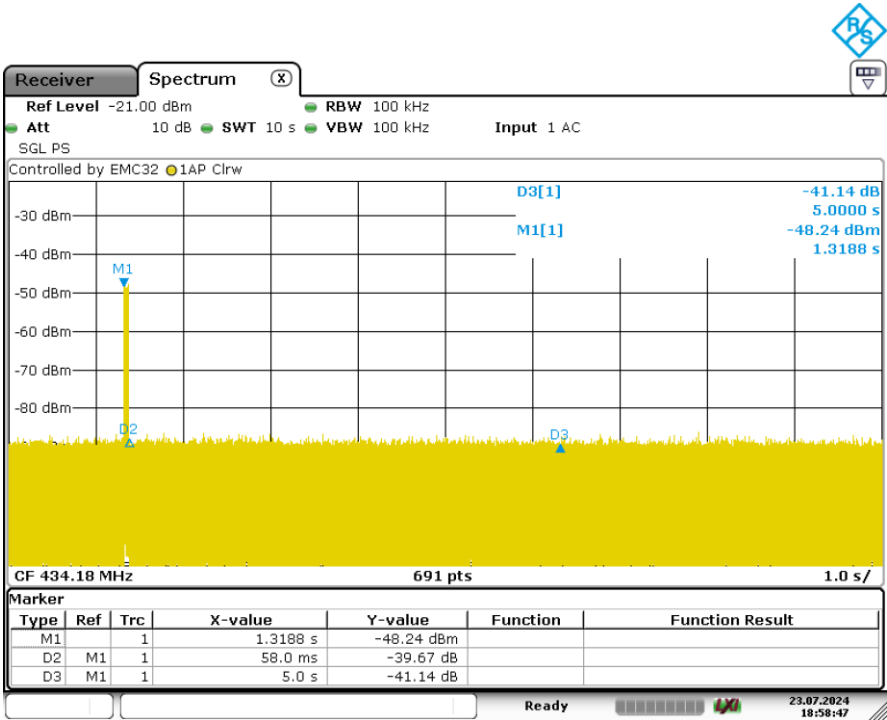


Signal Type: RF\_KV 433.66MHz



Date: 23.JUL.2024 18:56:57

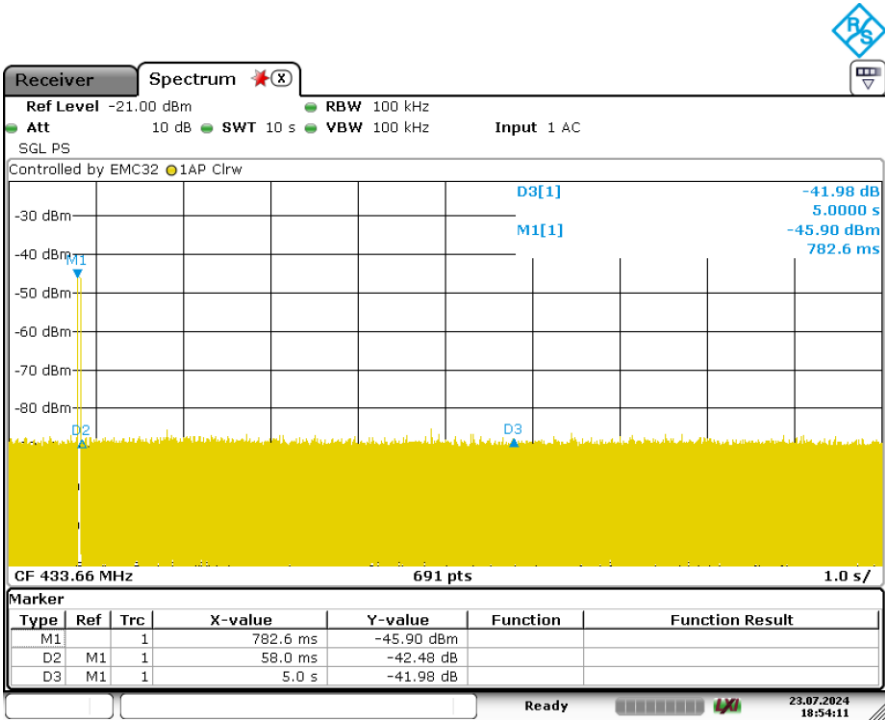
Signal Type: RF\_KV 434.18MHz



Date: 23.JUL.2024 18:58:47

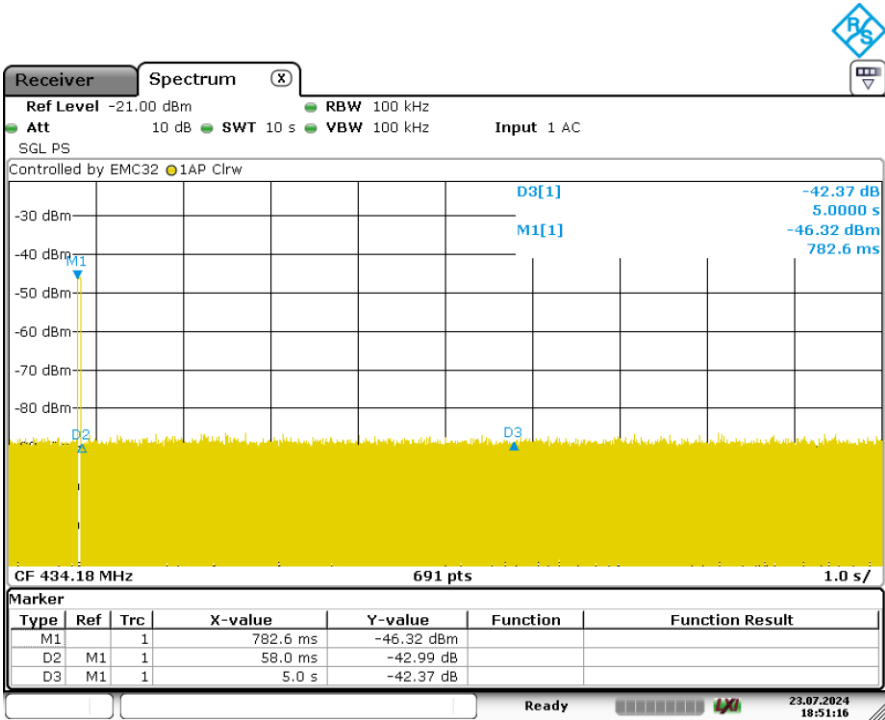


Signal Type: RF\_Approach 433.66MHz



Date: 23.JUL.2024 18:54:11

Signal Type: RF\_Approach 434.18MHz



Date: 23.JUL.2024 18:51:16

## 11 Test Equipment List

### List of Test Instruments

#### RF Test

| Description                  | Manufacturer | Model no. | Serial no.      | Calibration Date | Calibration Due |
|------------------------------|--------------|-----------|-----------------|------------------|-----------------|
| Signal and spectrum analyzer | R&S          | FSV40     | S1503003-YQ-EMC | 2023-8-01        | 2024-7-31       |

#### Radiated Emission Test

| USED                                | Equipment Name                       | Model       | Manufacturer   | Equipment ID.    | Calibration Date | Calibration Due |
|-------------------------------------|--------------------------------------|-------------|----------------|------------------|------------------|-----------------|
| <input checked="" type="checkbox"/> | EMI test receiver                    | ESR3        | R&S            | S1503109-YQ-EMC  | 2023-8-01        | 2024-7-31       |
| <input checked="" type="checkbox"/> | Trilog super broadband test antenna  | SCHWARZBECK | VULB9168       | S1808296-YQ-EMC  | 2021-9-23        | 2024-9-22       |
| <input checked="" type="checkbox"/> | Double-ridged waveguide horn antenna | HF907       | R&S            | S1503009-YQ-EMC  | 2024-4-14        | 2027-4-13       |
| <input checked="" type="checkbox"/> | Pre-amplifier                        | HPAP-9K0130 | Shenzhen HzEMC | S2110423b-YQ-EMC | 2023-8-01        | 2024-7-31       |
| <input checked="" type="checkbox"/> | Signal and spectrum analyzer         | FSV40       | R&S            | S1503003-YQ-EMC  | 2023-8-01        | 2024-7-31       |
| <input checked="" type="checkbox"/> | Loop antenna                         | HFH2-Z2     | R&S            | S1503013-YQ-EMC  | 2024-6-26        | 2025-6-25       |

#### Measurement Software Information

| Test Item | Software | Manufacturer    | Version   |
|-----------|----------|-----------------|-----------|
| RE        | EMC 32   | Rohde & Schwarz | V10.50.40 |



12 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

| Items                | Extended Uncertainty               |
|----------------------|------------------------------------|
| Radiated Disturbance | 9kHz to 30MHz, 3.52dB              |
|                      | 30MHz to 1GHz, 5.03dB (Horizontal) |
|                      | 5.12dB (Vertical)                  |
|                      | 1GHz to 18GHz, 5.49dB              |
|                      | 18GHz to 40GHz, 5.63dB             |

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2023, clause 4.3.3.



## **13 Photographs of Test Set-ups**

Refer to the < Test Setup photos >.



## 14 Photographs of EUT

Refer to the < External Photos > & < Internal Photos >.

-----End of Test Report-----