



Project No: Report No.: TM-2305000205P F TMWK2305001724KR

FCC ID: P27-SLMOD0

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RADIO TEST REPORT FCC 47 CFR PART 15 SUBPART C

| Test Standard | FCC Part 15.247 |
|-----------------------------|---|
| Product name | Multi sensor Module |
| Brand Name | Sercomm |
| Model No. | SLMOD0 |
| Test Result | Pass |
| Statements of Conformity | Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty. |

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc.(Wugu Laboratory)

Approved by:

mul 1

Shawn Wu Supervisor

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

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Revision History

| Rev. | Issue Date | Revisions | Effect Page | Revised By |
|------|---------------|----------------------------------|-------------|------------|
| 00 | June 21, 2023 | Initial Issue | ALL | Doris Chu |
| 01 | July 7, 2023 | See the following Note Rev. (01) | P.5 | Doris Chu |
| 02 | July 21, 2023 | See the following Note Rev. (02) | P.24 | Doris Chu |

Rev. (01)

1. Modify Antenna type in section 1.3

Rev. (02)

1. Added note 2 in section 4.5.4.



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| | RADIATION BANDEDGE AND SPURIOUS EMISSION |



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1. GENERAL INFORMATION

1.1 EUT INFORMATION

| Applicant | Sercomm Corporation 8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan |
|-------------------|---|
| Manufacturer | Sercomm Corporation 8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan |
| Equipment | Multi sensor Module |
| Model Name | SLMOD0 |
| Model Discrepancy | N/A |
| Brand Name | Sercomm |
| Received Date | May 12, 2023 |
| Date of Test | May 17 ~ June 7, 2023 |
| Power Supply | Power from Battery. (DC 3V) |

Remark:

1. For more details, please refer to the User's manual of the EUT.

2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.



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1.2 EUT CHANNEL INFORMATION

| Frequency Range | 902.3MHz-914.9MHz |
|--------------------|-------------------|
| Modulation Type | LoRa |
| Number of channels | 64 Channels |

Remark:

Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 for test channels

| Number of frequencies to be tested | | | | | | |
|--|---|--|--|--|--|--|
| Frequency range inNumber ofLocation in frequencywhich device operatesfrequenciesrange of operation | | | | | | |
| 1 MHz or less | 1 | Middle | | | | |
| 1 MHz to 10 MHz | 2 | 1 near top and 1 near bottom | | | | |
| More than 10 MHz | 3 | 1 near top, 1 near middle, and 1 near bottom | | | | |

1.3 ANTENNA INFORMATION

| Antenna Type | □ CHIP □ PCB □ Dipole ⊠ PIFA |
|-------------------|------------------------------|
| Antenna Gain | Gain: -4.8 dBi |
| Antenna Connector | N/A |

Remark:

1. The industrial epoxy adhesive is used making Antenna connection permanently prior to shipping. It complies with rule 15.203.



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1.4 MEASUREMENT UNCERTAINTY

| PARAMETER | UNCERTAINTY |
|--|-------------|
| AC Powerline Conducted Emission | ± 2.213 dB |
| Channel Bandwidth | ± 2.7 % |
| RF output power (Power Meter + Power sensor) | ± 0.243 dB |
| Channel Separation | ± 2.738 kHz |
| Conducted Bandedge | ± 2.739 dB |
| Conducted Spurious Emission | ± 2.742 dB |
| Radiated Emission_9kHz-30MHz | ± 3.115 dB |
| Radiated Emission_30MHz-200MHz | ± 4.071 dB |
| Radiated Emission_200MHz-1GHz | ± 4.419 dB |
| Radiated Emission_1GHz-6GHz | ± 5.023 dB |
| Radiated Emission_6GHz-18GHz | ± 5.068 dB |
| Radiated Emission_18GHz-26GHz | ± 3.349 dB |
| Radiated Emission_26GHz-40GHz | ± 3.229 dB |

Remark:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2

2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan.

No. 12, Ln. 116, Wugong 3rd Rd., Wugu Dist., New Taipei City, Taiwan 24803 CAB identifier: TW1309

| Test site | Test Engineer | Remark |
|--------------------|---------------|--|
| AC Conduction Room | - | Not applicable, because EUT doesn't connect to AC Main Source direct. |
| Radiation | Czerny Lin | - |
| RF Conducted | Jack Chen | - |

Remark: The lab has been recognized as the FCC accredited lab. under the KDB 974614 D01 and is listed in the FCC pubic Access Link (PAL) database, FCC Registration No. :444940, the FCC Designation No.:TW1309



1.6 INSTRUMENT CALIBRATION

| RF Conducted Test Site | | | | | | | | | |
|------------------------|----------|---------------|-----|--------------------------------|--------------------------|------------|------------------|------------|--------------------|
| Equipmen | t | Manufactu | rer | Model | Serial Number | Calibrat | ion Date | Cali | ibration Due |
| Power Sens | or | Anritsu | | MA2411B | 1911386 | 2022- | 08-08 2023-08 | | 023-08-07 |
| Power Sens | or | Anritsu | | MA2411B | 1911387 | 2022- | -08-08 2 | | 023-08-07 |
| EXA Signa Analyzer | l | Keysight | t | N9010B | MY60242460 | 2023- | 02-02 | 2 | 024-02-01 |
| Power Mete | er | Anritsu | | ML2496A | 2136002 | 2022- | 11-24 | 2 | 023-11-23 |
| DC Power Su | pply | GWINSTE | K | SPS-3610 | GPE880163 | 2022- | 12-02 | 2 | 023-12-01 |
| Software | | | | Radi | o Test Software | Ver. 21 | | | |
| | | | | 3M 966 Cham | ber Test Site | | | | |
| Equipment | Mar | nufacturer | | Model | Serial Nu | mber | Calibrat Date | | Calibration Due |
| Antenna | SHV | VARZBECK | | VULB 9168 | 1277 | , | 2023-01 | -13 | 2024-01-12 |
| Pre-Amplifier | | EMCI | E | MC118A45SE | 98082 | 0 | 2022-12-23 | | 2023-12-22 |
| Pre-Amplifier | | EMCI | | EMC330N | 980853 | | 2022-12-23 | | 2023-12-22 |
| Coaxial Cable | | EMC | | C101G-KM-KM-9 000 | 220407+211228+2302 05 | | 2023-03-21 | | 2024-03-20 |
| Signal Generator | | Agilent | | N9010A | MY52220 | MY52220817 | | 8-09 | 2024-03-08 |
| Coaxial Cable | | | | EMCCFD400 | 211212+2112 20 | 22+2110 | 2023-03 | 8-21 | 2024-03-20 |
| Thermo-Hygr o Meter | gr EDSDS | | | EDS-A49 | 966D | 1 | 2023-05 | 5-11 | 2024-05-10 |
| Pre-Amplifier | | EMCI | E | MC184045SE | 98087 | 2 | 2023-01-03 | | 2024-01-02 |
| Horn Antenna | F | RF SPIN | | DRH18-E | 210301A | 18ES | 2023-02-03 | | 2024-02-02 |
| Horn Antenna | SHV | VARZBECK | | BBHA 9170 | 1134 | 1134 | | 2-30 | 2023-12-29 |
| Loop Antenna | SCH | IWARZBEC K | F | MZB 1513-60 | 1513-60- | 028 | 2022-12 | 2-27 | 2023-12-26 |
| High Pass Filter | | TITAN | T04 | T04H10001000060S 211215-7-2 20 | | 2023-02 | 2-02 | 2024-02-01 | |
| Software | | | | ea | 6.11-20180413 | 3 | | | |

| AC Conducted Emissions Test Site | | | | | | | |
|----------------------------------|---|--|--|--|--|--|--|
| Equipment | Equipment Manufacturer Model S/N Cal Date Cal Due | | | | | | |
| N/A | | | | | | | |

Remark:

1. Each piece of equipment is scheduled for calibration once a year.

2. N.C.R. = No Calibration Required.



1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

| | EUT Accessories Equipment | | | | | | | | |
|-----|---|--|--|--|--|--|--|--|--|
| No. | No. Equipment Brand Model Series No. FCC ID | | | | | | | | |
| | N/A | | | | | | | | |

| Support Equipment | | | | | | | | | |
|-------------------|-----------------|--------|-------|------------|--------|--|--|--|--|
| No. | Equipment | Brand | Model | Series No. | FCC ID | | | | |
| 1 | DC Power Source | ABM | 9603D | N/A | N/A | | | | |
| 2 | NB(E) | Lenovo | T460 | N/A | N/A | | | | |

1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.247.



2. TEST SUMMARY

| FCC Standard Section | Report Section | Test Item | Result |
|-------------------------|-------------------|-----------------------------|--------|
| 15.203 | 1.3 | Antenna Requirement | Pass |
| 15.207(a) | 4.1 | AC Conducted Emission | N/A |
| 15.247(a)(1)(i) | 4.2 | 20 dB Bandwidth | Pass |
| - | 4.2 | Occupied Bandwidth (99%) | Pass |
| 15.247(b)(2) | 4.3 | Output Power Measurement | Pass |
| 15.247(a)(1) | 4.4 | Frequency Separation | Pass |
| 15.247(a)(1)(i) | 4.5 | Number of Hopping | Pass |
| 15.247(d) | 4.6 | Conducted Band Edge | Pass |
| 15.247(d) | 4.6 | Conducted Spurious Emission | Pass |
| 15.247(f) | 4.7 | Time of Occupancy | Pass |
| 15.247(d) | 4.8 | Radiation Band Edge | Pass |
| 15.247(d) | 4.8 | Radiation Spurious Emission | Pass |



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3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

| Operation mode | LoRa with 125kHz Bandwidth | | | | | | | |
|--------------------------------|----------------------------|--------------------|---------|--------------------|---------|--------------------|--|--|
| | 1.Lowes | t Channe | : 902.3 | MHz | | | | |
| Test Channel Frequencies (MHz) | | Channel | | | | | | |
| | | | | | | | | |
| | 3.Highe | st Channe | 914.9 | MHZ | | | | |
| | | | | | | | | |
| | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | | |
| | CH0 | 902.3 | CH22 | 906.7 | CH44 | 911.1 | | |
| | CH1 | 902.5 | CH23 | 906.9 | CH45 | 911.3 | | |
| | CH2 | 902.7 | CH24 | 907.1 | CH46 | 911.5 | | |
| | CH3 | 902.9 | CH25 | 907.3 | CH47 | 911.7 | | |
| | CH4 | 903.1 | CH26 | 907.5 | CH48 | 911.9 | | |
| | CH5 | 903.3 | CH27 | 907.7 | CH49 | 912.1 | | |
| | CH6 | 903.5 | CH28 | 907.9 | CH50 | 912.3 | | |
| | CH7 | 903.7 | CH29 | 908.1 | CH51 | 912.5 | | |
| | CH8 | 903.9 | CH30 | 908.3 | CH52 | 912.7 | | |
| | CH9 | 904.1 | CH31 | 908.5 | CH53 | 912.9 | | |
| Channel List | CH10 | 904.3 | CH32 | 908.7 | CH54 | 913.1 | | |
| | CH11 | 904.5 | CH33 | 908.9 | CH55 | 913.3 | | |
| | CH12 | 904.7 | CH34 | 909.1 | CH56 | 913.5 | | |
| | CH13 | 904.9 | CH35 | 909.3 | CH57 | 913.7 | | |
| | CH14 | 905.1 | CH36 | 909.5 | CH58 | 913.9 | | |
| | CH15 | 905.3 | CH37 | 909.7 | CH59 | 914.1 | | |
| | CH16 | 905.5 | CH38 | 909.9 | CH60 | 914.3 | | |
| | CH17 | 905.7 | CH39 | 910.1 | CH61 | 914.5 | | |
| | CH18 | 905.9 | CH40 | 910.3 | CH62 | 914.7 | | |
| | CH19 | 906.1 | CH41 | 910.5 | CH63 | 914.9 | | |
| | CH20 | 906.3 | CH42 | 910.7 | | | | |
| | CH21 | 906.5 | CH43 | 910.9 | | | | |
| | | | | | | | | |

Remark:

1. The device supports hybrid mode.

2. RF output power was measured with Average detector



3.2 THE WORST MODE OF MEASUREMENT

| Radiated Emission Measurement Above 1G | | | | | |
|--|--|--|--|--|--|
| Test Condition | t Condition Radiated Emission Above 1G | | | | |
| Power supply Mode Mode 1: EUT power by Battery | | | | | |
| Worst Mode | ☑ Mode 1 | | | | |
| Worst Position | Placed in fixed position. Placed in fixed position at X-Plane (E2-Plane) Placed in fixed position at Y-Plane (E1-Plane) Placed in fixed position at Z-Plane (H-Plane) | | | | |

| Radiated Emission Measurement Below 1G | | | | | | |
|--|---|--|--|--|--|--|
| Test Condition | Test Condition Radiated Emission Below 1G | | | | | |
| Power supply Mode Mode 1: EUT power by Battery | | | | | | |
| Worst Mode Mode 1 Mode 2 Mode 3 Mode 4 | | | | | | |

Remark:

1. The worst mode was record in this test report.

2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(Y-Plane) were recorded in this report



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3.3 EUT DUTY CYCLE

 Temperature:
 $22.8 \sim 26.8^{\circ}$ Test date:
 May 17 ~ June 1, 2023

 Humidity:
 $52 \sim 60\%$ RH
 Tested by:
 Jack Chen

| Duty Cycle | | | | | | | | |
|---------------|----------------|--|-----------|----------------------|--|--|--|--|
| Configuration | Duty Cycle (%) | Duty Factor (dB) =10*log (1/Duty Cycle) | 1/T (kHz) | VBW setting (kHz) | | | | |
| LoRa-125kHz | 100.00 | 0.00 | 1.00 | 0.01 | | | | |

| Spectru Swept \$ | | zer 1 | • | + | | | | | | | | | | ₿. | Frequenc | y 、 段 |
|----------------------------------|----------------|---------------------------------|--------|------------|---|--------------------------------|-------------|---|--------------|-----------------------------|------|---------|---|---------------------------------|-------------------|--------------|
| KEYS RL | ight ⊶ | Input: F Couplir Align: A | ig: DC | Cor | ut Z: 50 Ω r CCorr q Ref: Int (S) | Atten: 40 d | В | PNO: F Gate: C IF Gain Sig Tra |)ff : Low | Avg Type: ' Trig: Free I | | v | 1 2 3 4 5 6 V W W W W P N N N N N | Center Fr 902.3000 | | Settings |
| 1 Spect Scale/I | | в | T | | | Ref LvI Offs Ref Level 33 | | | | | Δ | | 505.0 μs 0.01 dB | Span 0.000000 Swej | 000 Hz pt Span | |
| Log 23.5 | | | | | | | -v- | | 3∆4 | | | | | Zero | Span | |
| 13.5 3.50 | | | | | | | _∧ <u>a</u> | | | | | | | Ful | ll Span | |
| -6.50 -16.5 | | | | | | | | | | | | | | Start Fred 902.3000 | | |
| -26.5 -36.5 -46.5 -56.5 | | | | | | | | | | | | | | Stop Fred 902.3000 | | |
| Center | 002 20 | 000 M | u-, | | | Video BW | / 0 0 1 | AU-7 | | | | | Span 0 Hz | | O TUNE | |
| Res BV | | | nz | | | VIGEO BV | 0.01 | VINZ | | S | weep | 5.00 ms | s (1001 pts) | CF Step | | |
| 5 Marke | r Table | | • | | | | | | | | | | | 8.000000 | | |
| 1 | Mode ∆2 | Trace | Scale | (Δ) | X 505.0 u | Υ s (Δ) 0.0117 | 6 dB | Functio | n I | Function Widt | h | Functio | n Value | Auto Man | | |
| 2 | F | 1 | t | | 2.500 m | 20.18 | dBm | | | | | | | Freq Offs | et | |
| 3 4 5 6 | <u>Δ4</u> F | 1 | t | <u>(Δ)</u> | 505.0 μ: 2.500 m: | s <u>(Δ)</u> 0.0117 s 20.18 | | | | | | | | 0 Hz X Axis Sc Log Lin | ale | Local |
| | 5 | 2 | | ? M | ay 29, 2023 :35:29 PM | $\bigcirc \triangle$ | | | | | | | | Signal Tra | | |



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4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a),

| Limits(dBµV) | | | | |
|--------------|-------------------------------|--|--|--|
| Quasi-peak | Average | | | |
| 66 to 56* | 56 to 46* | | | |
| 56 | 46 | | | |
| 60 | 50 | | | |
| | Quasi-peak 66 to 56* 56 | | | |

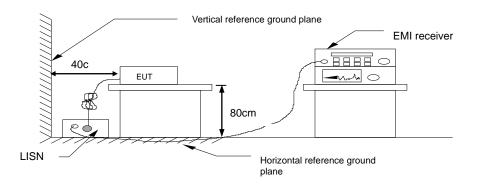
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 6.2,

- 1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
- 2. EUT connected to the line impedance stabilization network (LISN)
- 3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
- 4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5. Recorded Line for Neutral and Line.

4.1.3 Test Setup



4.1.4 Test Result

Not applicable, because EUT not connect to AC Main Source direct.



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4.220dB BANDWIDTH AND OCCUPIED BANDWIDTH (99%)

4.2.1 Test Limit

According to §15.247(a)(1)(i),

<u>20 dB Bandwidth</u> : For reporting purposes only.

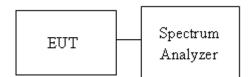
Occupied Bandwidth(99%) : For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 7.8.7,

- 1. The EUT RF output connected to the spectrum analyzer by RF cable.
- 2. Setting maximum power transmit of EUT
- 3. SA set RBW = 3kHz, VBW = 10kHz and Detector = Peak, to measurement 20 dB Bandwidth.
- 4. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth
- 5. Measure and record the result of 20 dB Bandwidth and 99% Bandwidth. in the test report.

4.2.3 Test Setup





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4.2.4 Test Result

| Temperature: | 22.8 ~ 26.8 °C | Test date: | May 17 ~ June 1, 2023 |
|--------------|-----------------------|------------|-----------------------|
| Humidity: | 52 ~ 60% RH | Tested by: | Jack Chen |

| Test mode: LoRa-125kHz / 902.3-914.9 MHz | | | | | | | | | | |
|--|--------------------|-------------------|------------------|--|--|--|--|--|--|--|
| Channel | Frequency (MHz) | OBW(99%) (MHz) | 20dB BW (MHz) | | | | | | | |
| Low | 902.3 | 0.12593 | 0.1429 | | | | | | | |
| Mid | 908.7 | 0.12612 | 0.1411 | | | | | | | |
| High | 914.9 | 0.12613 | 0.1417 | | | | | | | |



Test Data

20dB BANDWIDTH

ි ි I ? Jun 01, 2023

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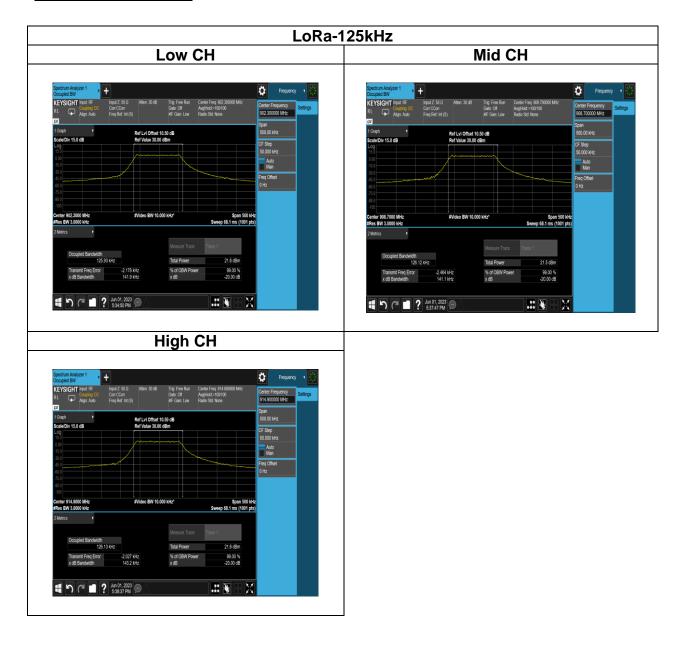
LoRa-125kHz Low CH Mid CH \$ 0 + KEYSIGHT Input Trig. Free Run Center Freq. 902.3 Gate: Off Avg/Hold.>100100 #IF Gain: Low Radio Std: None Trig: Free Run Center Freq: 908 Gate: Off Avg[Hold > 100/1 #E Gain: Low Radio Skt None Corr CCorr Freq Ref: Int (S Corr CCorr Freg Ref: Int (902.3 Alian: Auto Span 500.00 kHz Ref LvI Offset 10.50 dB Ref LvI Offset 10.50 dB CF Step 50.000 kHz Auto Man CF Step 50.000 kHz Auto Man req Offset 21.6 dBr Loca 50 ? Jun 01, 2023 **H** 🐺 M .: 💐 じつ ? Jun 01, 2023 5:37:30 PM High CH ö Trig: Free Run Center Freq 914. Gate: Off Avg|Hold > 100/10 #IF Gain: Low Radio Std: None Corr CCorr Freq Ref: Int (S 00 MH :pan 500.00 kH: Ref LvI Offset 10.50 dB Ref Value 30.00 dBm 15.0 di CF Step 50.000 kHz Auto Man ea Offse #Video BW 10.000 kHz

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Test Data BANDWIDTH 99%





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4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

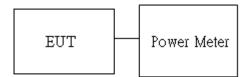
According to §15.247(b)(2)

For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

4.3.2 Test Procedure

- 1. The EUT RF output connected to the power meter by RF cable.
- 2. Setting maximum power transmit of EUT.
- 3. The path loss was compensated to the results for each measurement.
- 4. Measure and record the result of Peak output power and Average output power. in the test report.

4.3.3 Test Setup





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4.3.4 Test Result

| Temperature: | 22.8 ~ 26.8 ℃ | Test date: | May 17 ~ June 1, 2023 |
|--------------|----------------------|------------|-----------------------|
| Humidity: | 52 ~ 60% RH | Tested by: | Jack Chen |

LoRa-125kHz:

| СН | Freq. (MHz) | Power set | Maximum Output power (dBm) | Output Power (mW) | Limit (mW) |
|------|----------------|--------------|-------------------------------|-------------------------|---------------|
| Low | 902.3 | 22 | 21.48 | 140.605 | 1000 |
| Mid | 908.7 | 22 | 21.39 | 137.721 | 1000 |
| High | 914.9 | 22 | 21.35 | 136.458 | 1000 |



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4.4 FREQUENCY SEPARATION

4.4.1 Test Limit

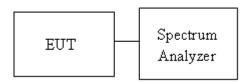
15.247(a)(1)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

4.4.2 Test Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. EUT RF output port connected to the SA by RF cable.
- 3. Set the spectrum analyzer as RBW = 10kHz, VBW = 30kHz, Sweep = auto. Max hold, mark 2 peaks of hopping channel and record the 2 peaks frequency

4.4.3 Test Setup





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4.4.4 Test Result

| Temperature: | 22.8 ~ 26.8 °C | Test date: | May 17 ~ June 1, 2023 |
|--------------|-----------------------|------------|-----------------------|
| Humidity: | 52 ~ 60% RH | Tested by: | Jack Chen |

| | Test | mode: LoRa-125kł | lz / 902.3-914.9 MHz | |
|---------|--------------------|--------------------------------|--|--------|
| Channel | Frequency (MHz) | Channel Separation (MHz) | Channel Separation Limits (MHz) | Result |
| Low | 902.3 | 0.2286 | 0.1429 | PASS |
| Mid | 908.7 | 0.2256 | 0.1411 | PASS |
| High | 914.9 | 0.2046 | 0.1417 | PASS |



Test Data



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Report No.: TMWK2305001724KR

4.5 NUMBER OF HOPPING

4.5.1 Test Limit

According to \$15.247(a)(1)(i)

For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies.

4.5.2 Test Procedure

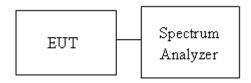
Test method Refer as ANSI C63.10: 2013 clause 7.8.3

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. EUT RF output port connected to the SA by RF cable.

3. Set spectrum analyzer Start Freq. = 902 MHz, Stop Freq. = 928 MHz, RBW

- =100KHz, VBW = 300KHz.
- 4. Max hold, view and count how many channels in the band.

4.5.3 Test Setup





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4.5.4 Test Result

| Temperature: | 22.8 ~ 26.8 ℃ | Test date: | May 17 ~ June 1, 2023 |
|--------------|----------------------|------------|-----------------------|
| Humidity: | 52 ~ 60% RH | Tested by: | Jack Chen |

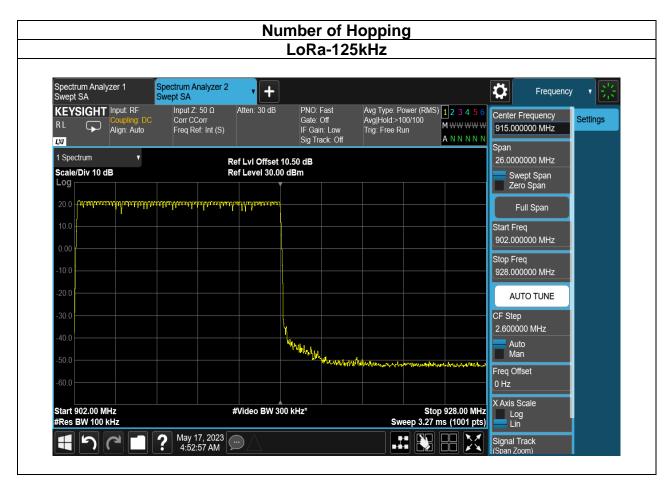
| | | Number of Hoppin | Ig | |
|-------------|--------------------|---------------------------|----------------------------------|--------|
| Mode | Frequency (MHz) | Hopping Channel Number | Hopping Channel Number Limits | Result |
| LoRa-125kHz | 902.3-914.9 | 64 | N/A ¹ | Pass |

Note:

1. Hybrid mode, No minimum number of hopping channels with hybrid system.

2. The hop sequence is appeared as pseudorandom

<u>Test Data</u>





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4.6 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

4.6.1 Test Limit

According to §15.247(d)

Limit

-30 dBc

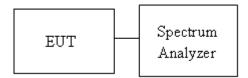
4.6.2 Test Procedure

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.

2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.

3. The Band Edge at 902 MHz and 928 MHz are investigated with both hopping "ON" and "OFF" modes ".

4.6.3 Test Setup





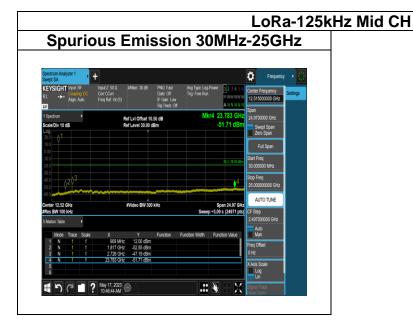
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4.6.4 Test Result

| Temperature: | 22.8 ~ 26.8 °C | Test date: | May 17 ~ June 1, 2023 |
|--------------|-----------------------|------------|-----------------------|
| Humidity: | 52 ~ 60% RH | Tested by: | Jack Chen |

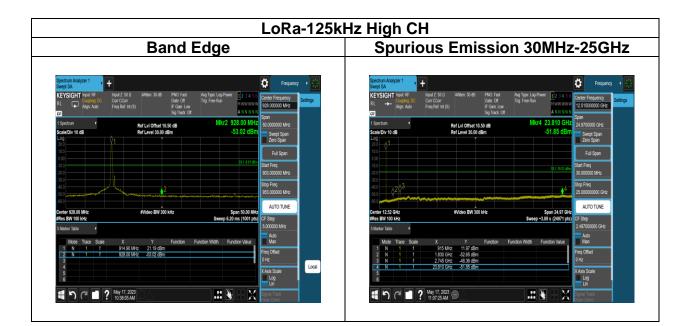
Test Data

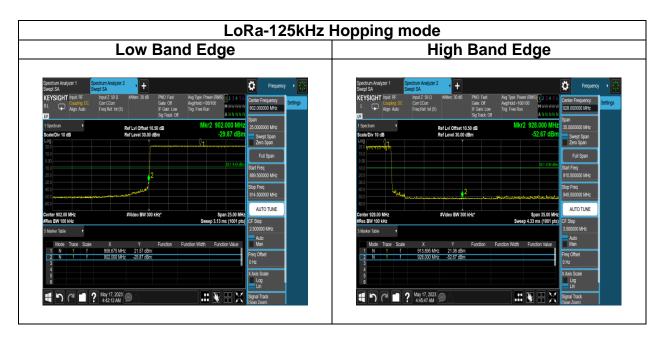
| | LoRa-125k | | |
|---|---|---|--|
| Band Edge | | Spurious Emission | on 30MHz-25GHz |
| Conclum Analyzer 1 + + + + + + + + + + + + + + + + + + | Prequency • | Concourter Analyzer 1 Canada SA KEVSIGHT Next RF RL →→ Canada C Torr Com RL →→ Com RL → | |
| 1 Spectrum Ref Lvi Offset 10.50 dB Mkr2 902 | A NA NA NA A 250000000 MHz 7.84 dBm Swept Span Swept Span | CO Sig Track O Sig Tr | or ANNINN Span Mkr4 22,958 GHz -52.08 dBm Swept Span zero Span |
| 200 100 100 100 100 100 100 100 100 100 | Ful Span Start Freq 889.500000 MHz | | Full Span |
| | Stop Freq 914.500000 MHz | 300 400 500 600 | \$top Freq 25.00000000 GHz |
| Res BW 100 HHz Sweep 3.13 m 5 Marker Table • INdde Trace Scale X Y Function Function With Funct | n 25.00 MHz s (1001 pts) CF Step 2.50000 MHz Auto on Value | Center 12.52 CHz #Video BW 300 KHz Bete BW 100 HHz 5 Marker Table + Mode Table X Y Function | Spin 24.97 GHz AUTO TUNE Sweep -1.09 s (24.97 GHz) CF Step 2.49700000 GHz Function Weth Function Wate |
| 1 N 1 f 902300 MHz 2146 56m 2 N 1 f 902700 MHz -2754 65m 3 4 | Freq Offset 0 Hz X Axis Scale Local | 1 N 1 f 920 MHz 122 98 dbm 2 N 1 f 1805 GHz 52 18 dbm 3 N 1 f 200 GHz 70 GHz 70 dbm 7 7 70 dbm 5 5 5 5 5 5 5 5 5 5 5 5 7 <th7< th=""> <th7< th=""> <th7< th=""> <th< td=""><td>Fieq Offset 0 Hz X.Axis Scale Lip</td></th<></th7<></th7<></th7<> | Fieq Offset 0 Hz X.Axis Scale Lip |
| 📲 🗅 🏲 🗖 ? May 17, 2023 | Signal Track Signal Track | 📲 🖒 (? 🖬 ? May 17, 2023 | En |





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4.7 TIME OF OCCUPANCY (DWELL TIME)

4.7.1 Test Limit

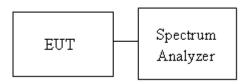
According to §15.247(f)

The frequency hopping operation of the hybrid system, with the direct sequence or digital modulation operation turned-off, shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4.

4.7.2 Test Procedure

- 1. EUT RF output port connected to the SA by RF cable.
- 2. Set center frequency of spectrum analyzer = operating frequency.
- 3. Set the spectrum analyzer as RBW=100 kHz, VBW= 300 kHz, Sweep = 500 ms

4.7.3 Test Setup



4.7.4 Test Result

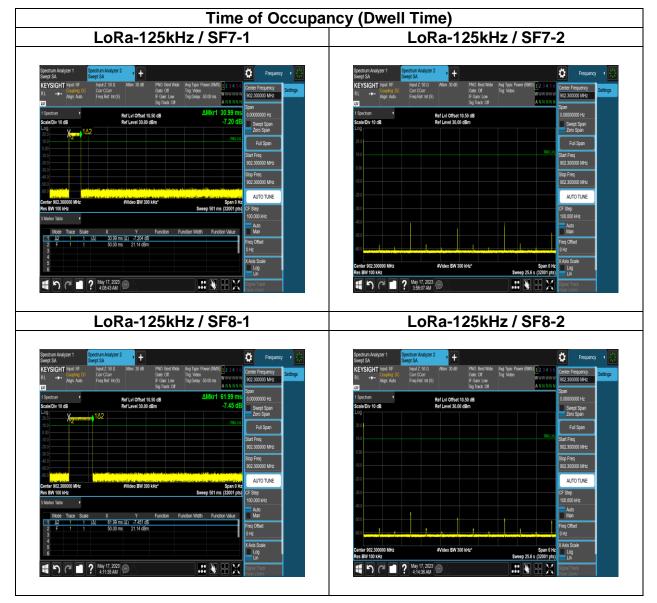
| Temperature: | 22.8 ~ 26.8 ℃ | Test date: | May 17 ~ June 1, 2023 |
|--------------|----------------------|------------|-----------------------|
| Humidity: | 52 ~ 60% RH | Tested by: | Jack Chen |

| Time of Occu | ıpancy (Dwell Ti | me) | | | |
|--------------|------------------|---|---|------------|-----------|
| Mode/SF | Freq.(MHz) | Length of Transmission Time (sec) | Number of Transmission in a 25.6 S (64 Hopping*0.4S) | Result (s) | Limit (s) |
| Lora / 7 | 902.3 | 0.03099 | 1 | 0.03099 | 0.4 |
| Lora / 8 | 902.3 | 0.06199 | 1 | 0.06199 | 0.4 |
| Lora / 9 | 902.3 | 0.124 | 1 | 0.124 | 0.4 |
| Lora / 10 | 902.3 | 0.2479 | 1 | 0.2479 | 0.4 |



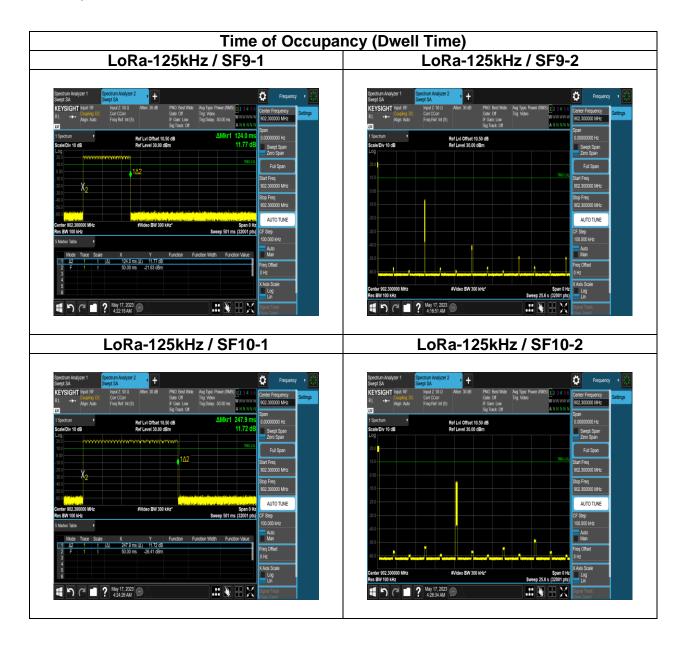
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Test Data





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4.8 RADIATION BANDEDGE AND SPURIOUS EMISSION

4.8.1 Test Limit

FCC according to §15.247(d), §15.209 and §15.205,

In any 100 kHz bandwidth outside the authorized frequency band, all harmonic and spurious must be least 20 dB below the highest emission level with the authorized frequency band. Radiation emission which fall in the restricted bands must also follow the FCC section 15.209 as below limit in table.

Below 30 MHz

| Frequency | Field Strength (microvolts/m) | Magnetic H-Field (microamperes/m) | Measurement Distance (metres) |
|---------------|----------------------------------|---|-------------------------------------|
| 9-490 kHz | 2,400/F (F in kHz) | 2,400/F (F in kHz) | 300 |
| 490-1,705 kHz | 24,000/F (F in kHz) | 24,000/F (F in kHz) | 30 |
| 1.705-30 MHz | 30 | N/A | 30 |

Above 30 MHz

| Frequency | Field Stre microvolts/m at 3 metr | |
|-----------|--------------------------------------|--------------|
| (MHz) | Transmitters | Receivers |
| 30-88 | 100 (3 nW) | 100 (3 nW) |
| 88-216 | 150 (6.8 nW) | 150 (6.8 nW) |
| 216-960 | 200 (12 nW) | 200 (12 nW) |
| Above 960 | 500 (75 nW) | 500 (75 nW) |

Remark:

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.



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4.8.2 Test Procedure

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10: 2013, and the EUT set in a continuous mode.

2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.

3. Span shall wide enough to full capture the emission measured. The SA from 9kHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.

Note: No emission found between lowest internal used/generated frequency to 30MHz(9KHz~30MHz)

4. For harmonic, the worst case of output power was BDR-1Mbps. Therefore only BDR-1Mbps record in the report.

- 5. The SA setting following :
 - (1) Below 1G : RBW = 100kHz, VBW ≥ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2) Above 1G:
 - (2.1) For Peak measurement : RBW = 1MHz, VBW ≥ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2.2) For Average measurement : RBW = 1MHz, VBW

If Duty Cycle \geq 98%, VBW=10Hz.

[·]If Duty Cycle < 98%, VBW≥1/T.



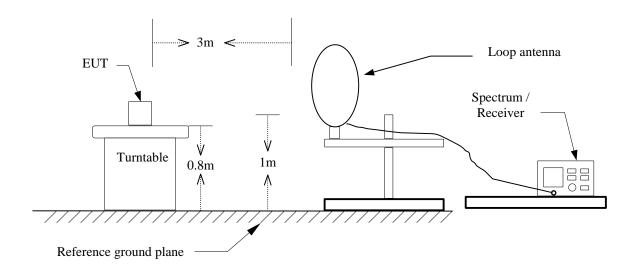
ŀ

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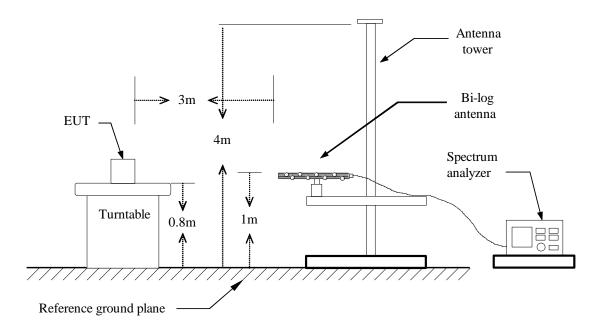
Report No.: TMWK2305001724KR

4.8.3 Test Setup

<u>9kHz ~ 30MHz</u>



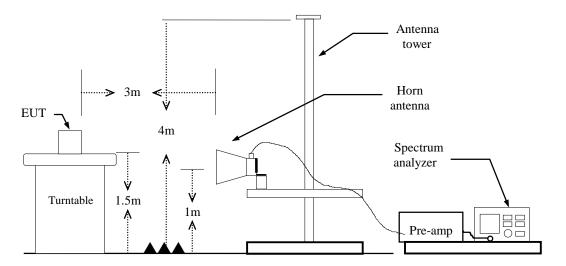
<u>30MHz ~ 1GHz</u>





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Above 1 GHz





4.8.4 Test Result

Band Edge Test Data

| Test M | lode: | Low 902.3 | | Temp/Hu | um | 22.4(°(| C)/ 64%RH |
|---|---|---|--|---|--------------------------|--|--|
| Test I | tem | Band B | | Test Da | te | May | 25, 2023 |
| Pola | rize | Verti | | Test Engi | neer | | erny Lin |
| Dete | ctor | Peak / A | verage | | | | |
| Lee | vel (dBuV/r | n) | | | | | |
| 120 | | | | | | | |
| 105.0 | | | | | | | |
| 90.0 | | | | | | | |
| 75.0 | | | | | | | |
| 60.0 | | | | | | | |
| 45.0 | | | - <u>A</u> | | | | |
| 30.0 | | in a star and | ~~~ | | Render | | F-spitel |
| | | | | | | | |
| 15.0 | | | | | | | |
| | 5 | 0.09 | 905 | 030 | 06 | 5 | 1000 |
| 0 829 | | | 895. Frequency | | 96 | | 1000 |
| | Detector | Spectru | Frequency m Facto | (MHz) or Actua | | Limit | 1000 Margin |
| o 829 Freq. | Detector Mode | Spectrue Reading Lo | m Facto | (MHz) or Actua FS | al | Limit @3m | Margin |
| Freq. | Detector Mode PK/QP/A | Spectrue Reading Lo dBµV | m Facto evel dB | (MHz) or Actua FS dBµV/ | n | Limit @3m dBµV/m | Margin dB |
| 082 Freq. MHz 870.27 | Detector Mode PK/QP/A Peak | Spectrum Reading Log dBµV 40.08 | m Factor evel dB | (MHz) or Actua FS dBµV/ 5 38.83 | m 3 | Limit @3m dBµV/m 79.80 ¹ | Margin dB -40.97 |
| 0822 Freq. MHz 870.27 902.00 | Detector Mode PK/QP/A Peak QP | Spectrum Reading Log dBµV 40.08 58.35 | m Factor evel dB -1.23 -0.84 | (MHz) or Actua FS dBµV/ 5 38.83 4 57.5 ⁴ | al m | Limit @3m dBμV/m 79.80 ¹ 79.36 ¹ | Margin dB -40.97 -21.85 |
| Freq. MHz 870.27 902.00 902.00 | Detector Mode PK/QP/A Peak QP Peak | Spectrum Reading Lo dBµV 40.08 58.35 63.49 | Frequency m Factor evel dB -1.23 -0.84 -0.84 | (MHz) or Actua FS dBµV/ 5 38.83 4 57.5 ² 4 62.65 | n m 3 | Limit @3m dBμV/m 79.80 ¹ 79.36 ¹ 79.80 ¹ | Margin dB -40.97 |
| Freq. MHz 870.27 902.00 902.00 902.30 | Detector Mode PK/QP/A Peak QP Peak QP | Spectrue Reading Lo / dBµV 40.08 58.35 63.49 110.20 | Frequency m Factor evel dB -1.2 -0.8 -0.8 -0.8 | (MHz) or Actua FS dBµV/ 5 38.83 4 57.57 4 62.65 4 109.3 | nl m 3 1 5 6 | Limit @3m dBμV/m 79.80 ¹ 79.36 ¹ | Margin dB -40.97 -21.85 |
| MHz 870.27 902.00 902.30 902.30 | Detector Mode PK/QP/A Peak QP Peak | Spectrue Reading Lo / dBµV 40.08 58.35 63.49 110.20 110.64 | Frequency m Factor evel dB -1.2 -0.8 -0.8 -0.8 -0.8 -0.8 | (MHz) or Actua FS dBµV/ 5 38.83 4 57.57 4 62.65 4 109.3 | nl m 3 1 5 6 | Limit @3m dBμV/m 79.80 ¹ 79.36 ¹ 79.80 ¹ | Margin dB -40.97 -21.85 -17.15 |
| Freq. MHz 870.27 902.00 902.00 902.30 | Detector Mode PK/QP/A Peak QP Peak QP | Spectrue Reading Lo / dBµV 40.08 58.35 63.49 110.20 110.64 | Frequency m Factor evel dB -1.2 -0.8 -0.8 -0.8 -0.8 -0.8 | (MHz) or Actua FS dBµV/ 5 38.83 4 57.57 4 62.65 4 109.3 4 109.8 | al m 33 | Limit @3m dBµV/m 79.80 ¹ 79.36 ¹ 79.80 ¹ | Margin dB -40.97 -21.85 -17.15 |

Remark:

934.31

Peak

1. The limit is fundamental signal – 30 dB since the frequency of the unwanted emission was not in restricted band.

42.00

-0.02

41.98

79.80¹

-37.82



| Test M | ode: | Low CH 902.3 MHz | | Te | emp/H | um | 22.4 | •(°C)/ 64%R |
|--|--|---|---|------------|--|---|--|--|
| Test It | tem | Band Edge | | Т | Test Da | ate | Ma | ay 25, 2023 |
| Polar | | Horizontal | | Tes | st Engi | ineer | | Zerny Lin |
| Detec | ctor | Peak / Averag | ge | | | | | |
| 120 | vel (dBuV/m) | | | | | | | |
| 105.0 | | | | | | | | |
| 90.0 | | | | | | | | |
| 75.0 | | | | | | | | |
| 60.0 | | | | | | | | |
| 45.0 | | | | | | | | |
| 30.0 | | | | | - | | | |
| 15.0 | | | | | | | | |
| | | | | | | | | |
| 0 825 | 5 86 | | | 930 MHz |). | 9 | 65. | 1000 |
| 0825 825 | Detector | | quency (| MHZ |).) Actu | | 65. Limit | 1000 Margir |
| | | Fred | quency (| MHZ |) | al | | |
| | Detector | Spectrum | quency (| MHZ |) Actu | al | Limit | Margir |
| Freq. | Detector Mode | Spectrum Reading Level | Factor | MHZ |) Actu FS | al /m | Limit @3m | Margir |
| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor | MHZ |) Actu FS dBµV | al /m 2 | Limit @3m dBµV/m | Margir dB |
| Freq. MHz 870.33 | Detector Mode PK/QP/AV Peak | Free Spectrum Reading Level dBµV 46.07 | Factor dB -1.25 | MHZ | Actu FS dBμV 44.8 | al /m 2 6 | Limit @3m dBµV/m 86.07 ¹ | Margir dB -41.25 |
| Freq. MHz 870.33 902.00 | Detector Mode PK/QP/AV Peak QP | Free Spectrum Reading Level dBµV 46.07 64.40 | Factor dB -1.25 -0.84 | MHZ |) Actu FS dBμV 44.8 63.5 | al /m 2 6 9 | Limit @3m dBµV/m 86.07 ¹ 85.26 ¹ | Margir dB -41.25 -21.70 |
| Freq. MHz 870.33 902.00 902.00 | Detector Mode PK/QP/AV Peak QP Peak | Free Spectrum Reading Level dBµV 46.07 64.40 69.23 | Factor dB -1.25 -0.84 -0.84 | MHZ |) Actu FS dBµV 44.8 63.5 68.3 | al /m 2 6 9 26 | Limit @3m dBµV/m 86.07 ¹ 85.26 ¹ 86.07 ¹ | Margir dB -41.25 -21.70 -17.68 |
| Freq. MHz 870.33 902.00 902.00 902.30 | Detector Mode PK/QP/AV Peak QP Peak QP | Spectrum Reading Level dBµV 46.07 64.40 69.23 116.10 | Factor dB -1.25 -0.84 -0.84 -0.84 | MHZ | Actu FS dBµV 44.8 63.5 68.3 115.2 | al /m 2 6 9 26 07 | Limit @3m dBµV/m 86.07 ¹ 85.26 ¹ 86.07 ¹ | Margir dB -41.25 -21.70 -17.68 |
| Freq. MHz 870.33 902.00 902.30 902.30 | Detector Mode PK/QP/AV Peak QP Peak QP Peak | Spectrum Reading Level dBμV 46.07 64.40 69.23 116.10 116.91 | Factor dB -1.25 -0.84 -0.84 -0.84 -0.84 | MHZ | Асти FS dBµV 44.8 63.5 68.3 115.2 116.0 | al /m 2 2 2 6 2 2 6 2 6 2 7 5 2 | Limit @3m dBµV/m 86.07 ¹ 85.26 ¹ 86.07 ¹ | Margir dB -41.25 -21.70 -17.68 |

Remark:

1. The limit is fundamental signal – 30 dB since the frequency of the unwanted emission was not in restricted band.



| Test N | /lode: | Mid CH 908.7 MH | 7 | Temp/Hum | 22.4(°(| C)/ 64%R |
|---|--|--|--|--|--|--------------------------------------|
| Test | Item | Band Edg | | Test Date | May | 25, 2023 |
| Pola | rize | Vertical | | Test Enginee | | erny Lin |
| Dete | ctor | Peak / Avera | age | | | |
| Le | vel (dBuV/m) | | | | | |
| | | | | | | |
| 105.0 | | | | | | |
| 90.0 | | | | | | |
| 75.0 | | | | | | |
| 60.0 | | | | | | |
| 45.0 | | | | | | |
| 30.0 | | An open set of the set | * \ | | - | - |
| | | | | | | |
| 15.0 | | | | | | |
| 825 | 5 86 | | | 930. | | |
| | | Free | quency (N | /Hz) | 965. | 1000 |
| Frea. | Detector | | Factor | | Limit | |
| Freq. | Detector Mode | Spectrum | | AHz) Actual FS | | |
| Freq. MHz | | | | Actual | Limit | |
| | Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
| MHz | Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor | Actual FS dBμV/m | Limit @3m dBµV/m | Margin dB |
| MHz 876.73 | Mode PK/QP/AV Peak | Spectrum Reading Level dBµV 40.86 | Factor dB -1.19 | Actual FS dBμV/m 39.67 | Limit @3m dBµV/m 79.25 ¹ | Margin dB -39.58 |
| MHz 876.73 902.00 | Mode PK/QP/AV Peak Peak | Spectrum Reading Level dBµV 40.86 38.81 | Factor dB -1.19 -0.84 | Actual FS dBμV/m 39.67 37.98 | Limit @3m dBµV/m 79.25 ¹ 79.25 ¹ | Margin dB -39.58 -41.27 |
| MHz 876.73 902.00 908.70 | Mode PK/QP/AV Peak Peak QP | Spectrum Reading Level dBµV 40.86 38.81 109.12 | Factor dB -1.19 -0.84 -0.71 | Actual FS dBμV/m 39.67 37.98 108.41 | Limit @3m dBµV/m 79.25 ¹ 79.25 ¹ | Margin dB -39.58 -41.27 |
| MHz 876.73 902.00 908.70 908.70 | Mode PK/QP/AV Peak Peak QP Peak | Spectrum Reading Level dBµV 40.86 38.81 109.12 109.96 | Factor dB -1.19 -0.84 -0.71 -0.71 | Actual FS dBμV/m 39.67 37.98 108.41 109.25 | Limit @3m dBµV/m 79.25 ¹ 79.25 ¹ | Margin dB -39.58 -41.27 |

Remark:



| rest N | /lode: | Mid CH 908.7 MH | z | Temp | /Hum | 22.4(° | °C)/ 64%R |
|--|--|---|--|--------------|---|--|--|
| Test | Item | Band Edg | | Test | Date | May | / 25, 2023 |
| Pola | rize | Horizonta | | Test E | ngineer | | erny Lin |
| Dete | ctor | Peak / Avera | age | | | | |
| 120 | vel (dBuV/m) | | | | | | |
| 105.0 | | | | | | | |
| 90.0 | | | | | | | |
| 75.0 | | | | | | | |
| 60.0 | | | | | | | |
| 45.0 | ate barren ar and a | | | | 1 | | |
| 30.0 | | | | | | | |
| 15.0 | | | | | | | |
| oL | | | | | | | |
| 825 | 5 86 | 0. 895. Free | quency (N | 930. /Hz) | 9 | 65. | 1000 |
| 825 Freq. | 5 86 | 0. 895. Free Spectrum | quency (N Factor | /Hz) | 94 stual | 65. Limit | 1000 Margin |
| | | Free | quency (N | AHZ) | | | |
| | Detector | Spectrum | quency (N | AHZ) | tual | Limit | |
| Freq. | Detector Mode | Free Spectrum Reading Level | quency (N Factor | AHz) | tual FS | Limit @3m | Margin |
| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | AHZ) | tual =S μV/m | Limit @3m dBµV/m | Margin dB |
| Freq. MHz 876.70 | Detector Mode PK/QP/AV Peak | Spectrum Reading Level dBµV 46.33 | Factor dB -1.19 | AHZ) | FS µV/m 5.14 | Limit @3m dBµV/m 86.91 ¹ | Margin dB -41.77 |
| Freq. MHz 876.70 902.00 | Detector Mode PK/QP/AV Peak Peak | Free Spectrum Reading Level dBµV 46.33 42.71 | Factor dB -1.19 -0.84 | AHz) | 5 .14 5 .14 | Limit @3m dBµV/m 86.91 ¹ 86.91 ¹ | Margin dB -41.77 -45.04 |
| Freq. MHz 876.70 902.00 908.70 | Detector Mode PK/QP/AV Peak Peak QP | Free Spectrum Reading Level dBµV 46.33 42.71 117.21 | Factor dB -1.19 -0.84 -0.71 | AHz) | stual FS μV/m 5.14 1.87 6.50 | Limit @3m dBµV/m 86.91 ¹ 86.91 ¹ | Margin dB -41.77 -45.04 |
| Freq. MHz 876.70 902.00 908.70 908.70 | Detector Mode PK/QP/AV Peak Peak QP Peak | Spectrum Reading Level dBµV 46.33 42.71 117.21 117.62 | Factor dB -1.19 -0.84 -0.71 -0.71 | AHz) | 5.14 6.50 6.91 | Limit @3m dBµV/m 86.91 ¹ 86.91 ¹ | Margin dB -41.77 -45.04 |

Remark:



| rest M | ode: | High CH 914.9 MHz | | Temp/ | Hum | 22.4(°(| C)/ 64%R |
|--|--|---|---|--|--|--|--|
| Test I | tem | Band Edge | | Test D | Date | May | 25, 2023 |
| Polar | ize | Vertical | | Test Eng | gineer | Cze | erny Lin |
| Deteo | ctor | Peak / Avera | ge | | | | |
| 420 Le | vel (dBuV/n | 1) | | | | | |
| 105.0 | | | | | | | |
| | | | | | | | |
| 90.0 | | | | | | | |
| 75.0 | | | | | | | |
| 60.0 | | | | | | | |
| 45.0 | | | <u> </u> | | | | |
| 30.0 | alles pire believetet | | ~~ ^ | | - | **** | |
| 15.0 | | | | | 1 | | |
| 15.0 | | | | | | | |
| 15.0 0 825 | 5 8 | 60. 895 | | 930. | 96 | 5. | 1000 |
| 0 825 | | Fre | quency (| (MHz) | | | |
| | Detector | Spectrum | | r Act | ual | Limit | 1000 Margin |
| 0 825 | Detector Mode | Spectrum Reading Level | quency (| r Act | ual S | Limit @3m | Margin |
| Freq. | Detector | Spectrum Reading Level | quency (Facto | r Act F dBµ | ual S V/m | Limit | |
| Freq. | Detector Mode PK/QP/AV | Free Spectrum Reading Level dBµV | Facto dB | r Act F dBµ | ual S V/m 64 | Limit @3m dBµV/m | Margin dB |
| Freq. MHz 882.96 | Detector Mode PK/QP/AV Peak | Free Spectrum Reading Level dBµV 40.80 | Facto dB -1.16 | r Act F dBµ 39. | ual S V/m 64 88 | Limit @3m dBμV/m 79.45 ¹ | Margin dB -39.81 |
| Freq. MHz 882.96 902.00 | Detector Mode PK/QP/AV Peak Peak | Free Spectrum Reading Level dBµV 40.80 34.71 | Facto dB -1.16 -0.84 | r Act F dBµ 39. 33. 109 | ual S V/m 64 88 .17 | Limit @3m dBμV/m 79.45 ¹ 79.45 ¹ | Margin dB -39.81 -45.57 |
| Freq. MHz 882.96 902.00 914.90 | Detector Mode PK/QP/AV Peak Peak QP | Spectrum Reading Level ν 40.80 34.71 109.80 | Facto dB -1.16 -0.84 -0.63 | r Act F dBµ 39. 33. 109 109 | ual S V/m 64 88 .17 .45 | Limit @3m dBµV/m 79.45 ¹ 79.45 ¹ | Margin dB -39.81 -45.57 |
| Freq. MHz 882.96 902.00 914.90 914.90 | Detector Mode PK/QP/AV Peak Peak QP Peak | Free Spectrum Reading Level dBµV 40.80 34.71 109.80 110.08 | Facto dB -1.16 -0.84 -0.63 -0.63 | r Act F dBµ 39. 33. 109 109 107 | ual S V/m 64 88 .17 .45 .90 | Limit @3m dBµV/m 79.45 ¹ | Margin dB -39.81 -45.57 |

Remark:

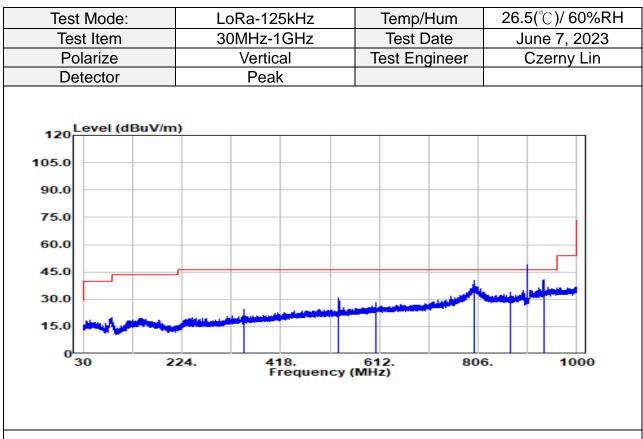


| Iest M | ode: | High CF 914.9 MF | | Te | emp/H | um | 22.4(| ℃)/ 64%RI |
|--|--|--|---|--------------|--|--|--|--|
| Test It | tem | Band Edg | | Т | est Da | ate | May | / 25, 2023 |
| Polar | ize | Horizonta | al | Tes | st Engi | ineer | | zerny Lin |
| Deteo | ctor | Peak / Aver | age | | | | | |
| 120 Le | vel (dBuV/m | 1) | | | | | | |
| 105.0 | | | | | | | | |
| 90.0 | | | | | | | | |
| 75.0 | | | | | | | | |
| 60.0 | | | | | | | | |
| | | | Λ | | | | | |
| 45.0 | ul in alger anythe las | uquun a nort | | | | | interestation, | |
| 30.0 | | | | | | | | |
| 15.0 | | | | | | | | |
| | | | | | | | | |
| 0 825 | 5 8 | 60. 89 Fr | 5. equency | 930 (MHz) | | 96 | 55. | 1000 |
| Freq. | 5 8 Detector | 60. 89 Fr | 5. equency Facto | (MHz) | | | 55. Limit | 1000 Margin |
| | | Fr | Facto | (MHz) |) | al | | - |
| | Detector | Fr Spectrum Reading Leve | Facto | (MHz) | Actu | al | Limit | - |
| Freq. | Detector Mode | Fr Spectrum Reading Leve | Equency Facto | (MHz) |) Actu FS | al //m | Limit @3m | Margin |
| Freq. MHz | Detector Mode PK/QP/AV | Fr Spectrum Reading Leve dBµV | Facto Facto | (MHz) | Actu FS dBμV | al //m | Limit @3m dBµV/m | Margin dB |
| Freq. MHz 882.94 | Detector Mode PK/QP/AV Peak | Fr Spectrum Reading Leve dBµV 45.87 | Factor I dB -1.10 | (MHz) | Actu FS dBμV 44.7 | al //m ///m //////////////////////////// | Limit @3m dBµV/m 86.82 ¹ | Margin dB -42.11 |
| Freq. MHz 882.94 902.00 | Detector Mode PK/QP/AV Peak Peak | Fr Spectrum Reading Leve dBµV 45.87 41.98 | Factor Factor I -1.16 -0.84 | (MHz) | Асти FS dBµV 44.7 41.1 | al //m 1 4 51 | Limit @3m dBµV/m 86.82 ¹ 86.82 ¹ | Margin dB -42.11 |
| Freq. MHz 882.94 902.00 914.90 | Detector Mode PK/QP/AV Peak Peak QP | Fr Spectrum Reading Leve dBµV 45.87 41.98 117.14 | Factor I -1.16 -0.84 -0.63 | (MHz) | Асти FS dBµV 44.7 41.1 116.5 | al /m //m /// ////////////////////////// | Limit @3m dBµV/m 86.82 ¹ 86.82 ¹ | Margin dB -42.11 -45.68 |
| Freq. MHz 882.94 902.00 914.90 914.90 | Detector Mode PK/QP/AV Peak Peak QP Peak | Fr Spectrum Reading Leve dBµV 45.87 41.98 117.14 117.45 | Factor Factor B -1.16 -0.84 -0.63 -0.63 | (MHz) | Actu FS dBµV 44.7 41.1 116.8 116.8 | al //m ///m //////////////////////////// | Limit @3m dBµV/m 86.82 ¹ 86.82 ¹ | Margin dB -42.11 -45.68 |

Remark:



Below 1G Test Data

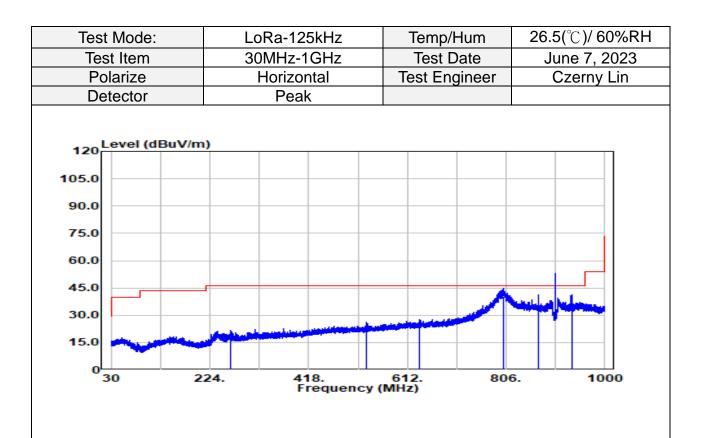


| Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|------------------|--|--|---|--|---|
| PK/QP/AV | dBµV | dB | dBµV/m | dBµV/m | dB |
| Peak | 35.71 | -11.18 | 24.53 | 46.00 | -21.47 |
| Peak | 37.71 | -6.88 | 30.82 | 46.00 | -15.18 |
| Peak | 32.77 | -4.85 | 27.92 | 46.00 | -18.08 |
| Peak | 42.29 | -2.04 | 40.25 | 46.00 | -5.75 |
| Peak | 35.19 | -1.25 | 33.94 | 46.00 | -12.06 |
| Peak | 40.61 | -0.02 | 40.58 | 46.00 | -5.42 |
| | Mode PK/QP/AV Peak Peak Peak Peak Peak | Mode PK/QP/AVReading Level dBµVPeak35.71Peak37.71Peak32.77Peak42.29Peak35.19 | Mode Reading Level PK/QP/AV dBµV dB Peak 35.71 -11.18 Peak 37.71 -6.88 Peak 32.77 -4.85 Peak 42.29 -2.04 Peak 35.19 -1.25 | Mode Reading Level AB FS PK/QP/AV dBµV dB dBµV/m Peak 35.71 -11.18 24.53 Peak 37.71 -6.88 30.82 Peak 32.77 -4.85 27.92 Peak 42.29 -2.04 40.25 Peak 35.19 -1.25 33.94 | Mode PK/QP/AV Reading Level dBµV FS @3m Peak 35.71 dB dBµV/m dBµV/m Peak 35.71 -11.18 24.53 46.00 Peak 37.71 -6.88 30.82 46.00 Peak 32.77 -4.85 27.92 46.00 Peak 42.29 -2.04 40.25 46.00 Peak 35.19 -1.25 33.94 46.00 |

Note: No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).



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| Freq. | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
|--------|------------------|---------------------------|--------|--------------|--------------|--------|
| MHz | PK/QP/AV | dBµV | dB | dBµV/m | dBµV/m | dB |
| 263.96 | Peak | 35.35 | -13.53 | 21.82 | 46.00 | -24.18 |
| 531.68 | Peak | 33.02 | -6.87 | 26.15 | 46.00 | -19.85 |
| 634.60 | Peak | 32.11 | -4.56 | 27.55 | 46.00 | -18.45 |
| 800.18 | QP | 42.30 | -2.04 | 40.26 | 46.00 | -5.74 |
| 870.31 | Peak | 42.66 | -1.25 | 41.41 | 46.00 | -4.59 |
| 934.33 | Peak | 41.07 | -0.02 | 41.05 | 46.00 | -4.95 |

Note: No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).



Above 1G Test Data

| Test Mo | ode: | Low CH | | Temp/Hum | 22.4(°(|)/ 64%RI |
|---|------------------|---------------------------|-----------------|--------------|--------------------|----------|
| Test Ite | | Harmonic | | Test Date | | 25, 2023 |
| Polari | | Vertical | Т | est Engineer | | erny Lin |
| Detec | tor | Peak | | U | | 3 |
| 120 Leve 105.0 90.0 75.0 60.0 45.0 30.0 | el (dBuV/m) | | | | | |
| 15.0 | | | | | | |
| 0 1000 | 2800 |). 4600. Freq | 64 uency (MH | 00. 8 z) | 200. | 10000 |
| Freq. | Detector Mode | Spectrum Reading Level | Factor | Actual FS | Limit @3m | Margin |
| MHz | PK/QP/AV | dBµV | dB | dBµV/m | dBµV/m | dB |
| 1804.60 | Peak | 52.52 | -7.35 | 45.17 | 79.80 ² | -34.63 |
| 1804.60 | Average | 50.48 | -7.35 | 43.13 | 77.85 ² | -34.72 |
| 2706.90 | Peak | 58.53 | -4.41 | 54.12 | 74.00 | -19.88 |
| | | | | | | |

Remark:

2706.90

Average

56.78

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

-4.41

52.38

54.00

-1.62



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| T N | | | | T / | 20 4/% | |
|------------|-------------|------------------|------------------|---------------|--------------------|------------------|
| Test Mo | | Low CH | | Temp/Hum | | <u>)/ 64%R</u> F |
| Test It | | Harmonic | | Test Date | | 25, 2023 |
| Polari | | Horizonta | I | lest Engineer | - Cze | erny Lin |
| Detec | tor | Peak | | | | |
| 120 Lev | el (dBuV/m) |) | | | | |
| 105.0 | | | | | | |
| 90.0 | | | | | | |
| 75.0 | | | | | | |
| 60.0 | | | | | | |
| 45.0 | | | | | | |
| 30.0 | | | | | | |
| 15.0 | | | | | | |
| 0 1000 | 28 | 00. 4600 Fred | 64 Juency (MH | 00. 8 iz) | 200. | 10000 |
| Freq. | Detecto | r Spectrum | Factor | Actual | Limit | Margin |
| 1109. | Mode | Reading Leve | | FS | @3m | ina giri |
| MHz | PK/QP/A | - | dB | dBµV/m | dBµV/m | dB |
| 1804.60 | Peak | 51.22 | -7.35 | 43.87 | 86.07 ² | -42.20 |
| 1804.60 | Average | e 49.35 | -7.35 | 42.00 | 83.75 ² | -41.75 |
| 2706.90 | Peak | 60.36 | -4.41 | 55.95 | 74.00 | -18.05 |

Remark:

2706.90

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

-4.41

53.36

54.00

-0.64

2. The limit is fundamental signal – 30 dB since the frequency of the unwanted emission was not in restricted band.

57.77

Average



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| Test Mo | ode: | Mid CH | | Temp/Hum | 22.4(°C | c)/ 64%RI |
|-----------|-------------|---------------|-----------------|--------------|--------------------|-----------|
| Test Ite | em | Harmonic | | Test Date | May | 25, 2023 |
| Polari | | Vertical | Т | est Engineer | Cze | erny Lin |
| Detec | tor | Peak | | | | |
| | | | | | | |
| 120 Leve | el (dBuV/m) | | | | | |
| | | | | | | |
| 105.0 | | | | | | |
| 90.0 | | | | | | |
| 75.0 | | | | | | |
| 60.0 | | | | | | |
| 45.0 | | | | | | |
| | | | | | | |
| 30.0 | | | | | | |
| 15.0 | | | | | | |
| 0 1000 | | | | | | |
| 1000 | 280 | | 640 ency (MH | z) 8 | 200. | 10000 |
| | | | | | | |
| | | | | | | |
| Freq. | Detector | Spectrum | Factor | Actual | Limit | Margin |
| | Mode | Reading Level | | FS | @3m | |
| MHz | PK/QP/AV | dBµV | dB | dBµV/m | dBµV/m | dB |
| 1817.40 | Peak | 53.24 | -7.31 | 45.93 | 79.25 ² | -33.32 |
| 1817.40 | Average | 51.04 | -7.31 | 43.73 | 78.28 ² | -34.55 |
| 2726.10 | Peak | 57.96 | -4.30 | 53.66 | 74.00 | -20.34 |
| | | | | | | 1 |

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. The limit is fundamental signal 30 dB since the frequency of the unwanted emission was not in restricted band.



| Test Mo | ode: | Mid CH | - | Temp/Hum | 22.4(°C |)/ 64%RF |
|--------------|------------------|--|-------------------|--------------|-----------------|--------------|
| Test Ite | | Harmonic | | Test Date | | 25, 2023 |
| Polari | | Horizontal | | est Engineer | | erny Lin |
| Detec | tor | Peak | | U | | |
| Lev | el (dBuV/m) | | | | | |
| 120 | | | | | | |
| 105.0 | | | | | | |
| 90.0 | | | | | | |
| 75.0 | | | | | | |
| 60.0 | | | | | | |
| 45.0 | | | | | | |
| 30.0 | | | | | | |
| 15.0 | | | | | | |
| 0 1000 | 280 | 00. 4600. Frequ | 640 uency (MHz | | 200. | 10000 |
| | | | | - | | |
| | | | | | | |
| Freq. | Detector | Spectrum | Factor | Actual | Limit | Margin |
| Freq. | Detector Mode | Spectrum Reading Level | | Actual FS | Limit @3m | Margin |
| Freq. MHz | | Reading Level | | | | Margin dB |
| | Mode | Reading Level | | FS | @3m | - |
| MHz | Mode PK/QP/A | Reading Level / dBµV 53.09 | dB | FS dBµV/m | @3m dBµV/m | dB |

Remark:

2726.10

Average

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

-4.30

52.83

54.00

-1.17

2. The limit is fundamental signal – 30 dB since the frequency of the unwanted emission was not in restricted band.

57.14



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| Test Mo | de: | High CH | | Temp/Hum | 22.4(°C | C)/ 64%RI |
|-----------|------------|---------------|-----------|--------------|--------------------|-----------|
| Test Ite | em | Harmonic | | Test Date | May | 25, 2023 |
| Polariz | | Vertical | Т | est Engineer | Cze | erny Lin |
| Detect | or | Peak | | | | |
| | | | | | | |
| 120 Leve | l (dBuV/m) | | | | | |
| 105.0 | | | | | | |
| 90.0 | | | | | | |
| 75.0 | | | | | | |
| 60.0 | | | | | | |
| | | | | | | |
| 45.0 | | | | | | |
| 30.0 | | | | | | |
| 15.0 | | | | | | |
| 0 1000 | 2800 | | 64 | | 200. | 10000 |
| | | Frequ | uency (MH | Z) | | |
| | | | | | | |
| Freq. | Detector | Spectrum | Factor | Actual | Limit | Margin |
| | Mode | Reading Level | | FS | @3m | |
| MHz | PK/QP/AV | dBµV | dB | dBµV/m | dBµV/m | dB |
| 1829.80 | Peak | 52.10 | -7.32 | 44.79 | 79.45 ² | -34.66 |
| 1829.80 | Average | 50.85 | -7.32 | 43.53 | 77.90 ² | -34.37 |
| 2744.70 | Peak | 57.63 | -4.19 | 53.43 | 74.00 | -20.57 |
| 2744.70 | Average | 55.15 | -4.19 | 50.95 | 54.00 | -3.05 |

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. The limit is fundamental signal 30 dB since the frequency of the unwanted emission was not in restricted band.



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| Test Mo | de: | High CH | Т | emp/Hum | 22.4(℃ |)/ 64%Rł |
|----------|-------------|------------------|------------|--------------|--------------------|----------|
| Test Ite | | Harmonic | | Test Date | | 25, 2023 |
| Polariz | | Horizontal | Te | st Engineer | Cze | rny Lin |
| Detect | or | Peak | | | | |
| Lev | el (dBuV/m) | | | | | |
| 120 | | | | | | |
| 105.0 | | | | | | |
| 90.0 | | | | | | |
| 75.0 | | | | | | |
| 60.0 | | | | | | |
| 45.0 | | | | | | |
| 30.0 | | | | | | |
| 15.0 | | | | | | |
| 9 | 2800 | 4600. | 640 | | 200. | 10000 |
| 1000 | 2800 | . 4600. Frequ | uency (MHz | 10. 8. 1) | 200. | 10000 |
| | | | | | | |
| Freq. | Detector | Spectrum | Factor | Actual | Limit | Margin |
| i i cq. | Mode | Reading Level | 1 dotor | FS | @3m | margin |
| MHz | PK/QP/AV | dBµV | dB | dBµV/m | dBµV/m | dB |
| 1829.80 | Peak | 51.41 | -7.32 | 44.09 | 86.82 ² | -42.73 |
| 1829.80 | Average | 48.07 | -7.32 | 40.75 | 82.29 ² | -41.54 |
| 0744 70 | Peak | 59.07 | -4.19 | F 4 00 | 74.00 | 10.10 |
| 2744.70 | Peak | 59.07 | -4.19 | 54.88 | 74.00 | -19.12 |

Remark:

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. The limit is fundamental signal 30 dB since the frequency of the unwanted emission was not in restricted band.

- End of Test Report -