



FCC ID: GDDJF-91
Report No.: T210414N06-RP1

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Rev.: 02

FCC 47 CFR PART 15 SUBPART C AND ANSI C63.10: 2013

TEST REPORT

For

Cherry Wireless Mouse

Model: JF-91

Brand: CHERRY

Issued for

Cherry Europe GmbH

Cherrystraße, 91275 Auerbach, Deutschland/Germany

Issued by:

Compliance Certification Services Inc.

Tainan Lab.

**No.8, Jiucengling, Xinhua Dist.,
Tainan City, Taiwan**

Issued Date: August 18, 2021

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REVISION HISTORY

| Rev. | Issue Date | Revisions | Effect Page | Revised By |
|------|-----------------|-------------------------------|-------------|------------|
| 00 | August 05, 2021 | Initial Issue | ALL | Gina Lin |
| 01 | August 12, 2021 | See the following note rev.01 | ALL | Gina Lin |
| 02 | August 18, 2021 | See the following note rev.02 | ALL | Gina Lin |
| | | | | |

Note:

- ※ Rev.00 Issue Date: August 05, 2021
Original Report
- ※ Rev.01 Issue Date: August 12, 2021
Add conduction test data.
- ※ Rev.02 Issue Date: August 18, 2021
Revised Operating Frequency Range.

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1. TEST REPORT CERTIFICATION

Applicant : **Cherry Europe GmbH**
 Cherrystraße, 91275 Auerbach, Deutschland/Germany
Manufacturer : **Jing Mold Electronic Tech. (Shen Zhen) Co., Ltd**
 Xin Qiao 3rd Industrial Estate, Sha Jing, Bao An, Shenzhen,
 Guangdong, P.R. China
Equipment Under Test : Cherry Wireless Mouse
Model Number : JF-91
Brand Name : CHERRY
Date of Test : April 28, 2021 ~ April 29, 2021
 May 03, 2021

| APPLICABLE STANDARD | |
|---|-------------------------|
| STANDARD | TEST RESULT |
| FCC 47 CFR Part 15 Subpart C ANSI C63.10: 2013 | No non-compliance noted |

| Statements of Conformity |
|--|
| Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty. |

| FCC Standard Section | Report Section | Test Item | Result |
|----------------------|----------------|-------------------------------|--------|
| 15.247(a) | 8.1 | 6dB BANDWIDTH | Pass |
| 15.247(b) | 8.2 | MAXIMUM PEAK OUTPUT POWER | Pass |
| - | 8.3 | DUTY CYCLE | - |
| 15.247(e) | 8.4 | POWER SPECTRAL DENSITY | Pass |
| 15.247(d) | 8.5 | CONDUCTED SPURIOUS EMISSION | Pass |
| 15.205(a) | 8.6 | RADIATED EMISSIONS | Pass |
| 15.207(a) | 8.7 | POWERLINE CONDUCTED EMISSIONS | Pass |
| 15.203 | 9 | ANTENNA REQUIREMENT | Pass |

Approved by:



Eric Huang
Section Manager

2. EUT DESCRIPTION

2.1 DESCRIPTION OF EUT & POWER

| | |
|----------------------------------|--|
| Product Name | Cherry Wireless Mouse |
| Model Number | JF-91 |
| Brand Name | CHERRY |
| Received Date | April 27, 2021 |
| Reported Date | May 18, 2021 |
| Operating Frequency Range | 2402MHz~2480MHz |
| Transmit Power | BT: -14.87dBm (0.033mW) RF: -14.64dBm (0.034mW) |
| Average Power | BT: -15.26dBm (0.030mW) RF: -15.06dBm (0.031mW) |
| Channel Spacing | 2 MHz |
| Channel Number | BT: 39 Channels RF: 79 Channels |
| Transmit Data Rate | BT: 2 Mbps RF: 1 Mbps |
| Type of Modulation | GFSK |
| Antenna Type | Manufacturer: Sunrex Type: PCB Model: JD-85M Gain: 0.37 dBi |
| RF Module Model | nRF51802 |
| Power Source | DC3.7V, 10mA |
| Temperature Range | 0°C ~ +40°C |
| Firmware Version | 7 |
| Software Version | N/A |

- REMARK:**
1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
 2. This submittal(s) (test report) is intended for FCC ID: **GDDJF-91** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.
 3. For more details, please refer to the user manual.
 4. According to customer declaration Cherry Wireless Dongle (**JR-91 / FCC ID: GDDJR-91**) & Cherry Wireless Keyboard (**JG-91 / FCC ID: GDDJG-91**) for sale.

3. DESCRIPTION OF TEST MODES

The EUT is a Cherry Wireless Mouse.

The RF Chip is manufactured by Nordic

The antenna peak gain 0.37 dBi (highest gain) were chosen for full testing.

GFSK mode

The EUT had been tested under operating condition.

There are three channels have been tested as following:

| Channel | Frequency (MHz) |
|---------|-----------------|
| Low | 2402 |
| Middle | 2442 |
| High | 2480 |

GFSK mode: 1Mbps long data rates (worst case) were chosen for full testing.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10 and FCC CFR 47 15.207, 15.209 and 15.247 and KDB 558074.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at No.8, Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)

The sites are constructed in conformance with the requirements of ANSI C63.7:1992, ANSI C63.10: 2013 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 LABORATORY ACCREDITATIONS LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by Taiwan Accreditation Foundation for the specific scope of accreditation under Lab Code: 1109 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by TAF or any agency of the Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: TW1109).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

| | |
|---------------|-----|
| Taiwan | TAF |
|---------------|-----|

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

| | |
|----------------|-----------------|
| Canada | Industry Canada |
| Germany | TUV NORD |
| Taiwan | BSMI |
| USA | FCC |
| Japan | VCCI |

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>

5.5 MEASUREMENT EQUIPMENT USED

For §8.6

| Chamber 966 Room (Radiated Test) | | | | | |
|-----------------------------------|---|-----------------|----------------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Date | Calibration Due |
| Active Loop Antenna | ETS-LINDREN | 6502 | 8905-2356 | 08/02/2019 | 08/01/2021 |
| Bilog Antenna With 6dB Attenuator | SUNOL SCIENCES & EMC I | JB1 & AT-N0681 | A070506-1 & AT-N0681 | 09/14/2020 | 09/13/2021 |
| Cable | Suhner | SUCOFLEX104PE A | 20520/4PEA&O6 | 01/29/2021 | 01/28/2022 |
| Double Ridged Guide Horn Antenna | ETS-LINDGREN | 3116 | 00078900 | 03/30/2021 | 03/29/2022 |
| EMI Test Receiver | R&S | ESCI | 100960 | 02/05/2021 | 02/04/2022 |
| EXA Spectrum Analyzer | KEYSIGHT | N9010A | MY54430216 | 07/20/2020 | 07/19/2021 |
| Horn Antenna | Com-Power | AH-118 | 071032 | 04/29/2020 | 04/28/2021 |
| Pre-Amplifier | EMCI | EMC012645 | 980098 | 01/29/2021 | 01/28/2022 |
| Pre-Amplifier | HP | 8447F | 2443A01683 | 01/19/2021 | 01/18/2022 |
| Pre-Amplifier | Com-Power | PAM-840A | 461378 | 07/20/2020 | 07/19/2021 |
| Type N coaxial cable | Suhner | CHA9513 | 6 | 01/19/2021 | 01/18/2022 |
| Notch Filter | MICRO-TRONICS | BRM50702-01 | 018 | N.C.R | N.C.R |
| Software | Excel(ccs-o6-2020 v1.1) , e3(v6.101222) | | | | |

For §8.1~8.5

| Chamber 966 Room (Conducted Test) | | | | | |
|-----------------------------------|-------------------------|--------------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Date | Calibration Due |
| EXA Spectrum Analyzer | KEYSIGHT | N9010A | MY54430216 | 07/20/2020 | 07/19/2021 |
| Power Meter | Anritsu | ML2487A | 6K00003888 | 11/20/2019 | 05/19/2021 |
| Power Sensor | Anritsu | MA2491A | 033265 | 11/20/2019 | 05/19/2021 |
| SMA Cable + 10dB Attenuator | CCS | SMA+10dB ATT | SMA/10dB | 01/29/2021 | 01/28/2022 |
| Software | Excel(ccs-o6-2020 v1.1) | | | | |

For §8.7

| Conducted Emission room #1 | | | | | |
|----------------------------|--------------|------------------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Date | Calibration Due |
| BNC Coaxial Cable | CCS | BNC50 | 11 | 01/21/2021 | 01/20/2022 |
| EMI Test Receiver | R&S | ESCS 30 | 100348 | 02/25/2021 | 02/24/2022 |
| LISN | FCC | FCC-LISN-50-32-2 | 08009 | 06/30/2020 | 06/29/2021 |
| LISN | SCHWARZBECK | NNLK8130 | 8130124 | 01/15/2021 | 01/14/2022 |
| Pulse Limiter | R&S | ESH3-Z2 | 100116 | 01/21/2021 | 01/20/2022 |
| Test S/W | e3(6.101222) | | | | |

6. CALIBRATION AND UNCERTAINTY

6.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

6.2 MEASUREMENT UNCERTAINTY

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

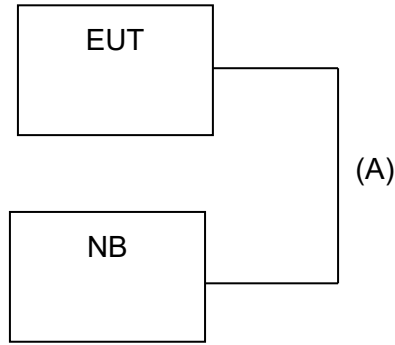
| Parameter | Uncertainty |
|---|-------------|
| Radiated Emission, 30 to 200 MHz Test Site : CB966 | ±3.1dB |
| Radiated Emission, 200 to 1000 MHz Test Site : CB966 | ±2.7dB |
| Radiated Emission, 1 to 6 GHz | ±2.7dB |
| Radiated Emission, 6 to 18 GHz | ±2.7dB |
| Radiated Emission, 18 to 26.5 GHz | ±2.7dB |
| Radiated Emission, 26 to 40 GHz | ±3.7dB |
| Power Line Conducted Emission | ±2.0dB |

This measurement uncertainty is confidence of approximately 95%, k=2

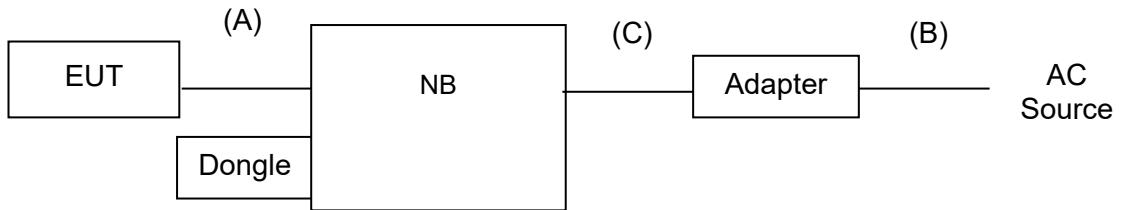
7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

【RF】



【EMC】



7.2 SUPPORT EQUIPMENT

【RF】

| No. | Product | Manufacturer | Model No. | Certify No. | Signal cable |
|-----|-----------|--------------|-----------|-------------|-------------------------------|
| 1 | Note Book | Acer | AS 3830TG | DOC | Unshielded, 1.8m with 1 core. |

| No. | Signal cable description | |
|-----|--------------------------|-----------------------|
| A | USB | Shielded, 1.0m, 1pcs. |

【EMC】

| No. | Product | Manufacturer | Model No. | Certify No. | Signal cable |
|-----|-----------|--------------|------------------|-------------|------------------|
| 1 | Adapter | TOSHIBA | PA511AE-1 AC3 | Doc | N/A |
| 2 | Note Book | THINKPAD | TP00096A | Doc | Unshielded, 0.4m |
| 3 | Dongle | CHERRY | N/A | N/A | N/A |

| No. | Signal cable description | |
|-----|--------------------------|-------------------------|
| A | DC Power Cable | Unshielded, 0.4m, 1pcs. |
| B | AC Power Cable | Unshielded, 1.6m, 1pcs. |
| C | DC Power Cable | Unshielded, 1.6m, 1pcs. |

Note:

- 1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
- 3) shd. = shielded; unshd. = unshielded

7.3 EUT OPERATING CONDITION

RF Setup

1. Make sure mouse power off
2. Press Left, Right, and Scroll Wheel buttons with BT(BT Mode) or RF(RF Mode) power on, continue for 3 seconds and release. (Red LED light keep on)
3. Press Scroll Wheel button into as below function. (Red LED off)
 - (1). Press Right button into Carrier Mode 2402MHz emission, one more time into Carrier Mode 2440MHz emission, one more time into Carrier Mode 2480MHz emission, going cycle.
 - (2). Press Left button into Modulation Mode 2402MHz emission, one more time into Modulation Mode 2440MHz emission, one more time into Modulation Mode 2480MHz emission, going cycle.

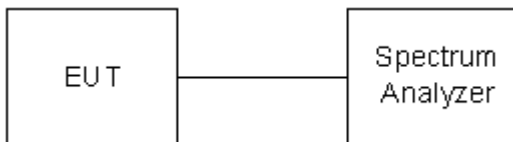
8. APPLICABLE LIMITS AND TEST RESULTS

8.1 6dB BANDWIDTH

LIMIT

§ 15.207(a) (2) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

TEST SETUP



TEST PROCEDURE

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) ≥ 3 RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

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TEST RESULTS

No non-compliance noted.

| | | | |
|----------------------------|-------------|------------------|------------|
| Model Name | JF-91 | Test By | Ted Huang |
| Temp & Humidity | 27.4°C, 53% | Test Date | 2021/04/28 |

GFSK(BT) mode

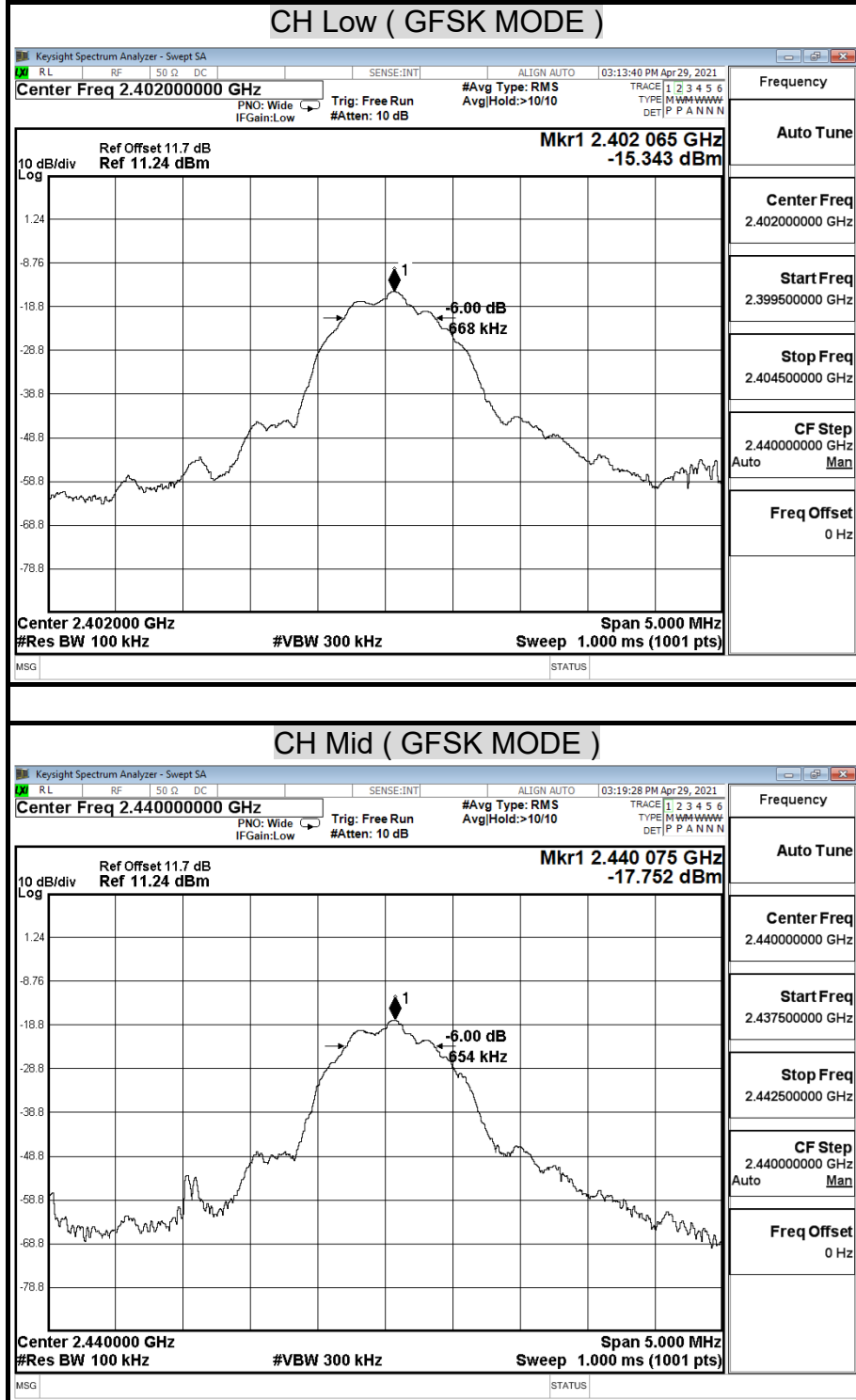
| Channel | Channel Frequency (MHz) | 6dB Bandwidth (kHz) | Minimum Limit (kHz) | Pass / Fail |
|---------|-------------------------|---------------------|---------------------|-------------|
| Low | 2402 | 668 | 500 | PASS |
| Middle | 2442 | 654 | 500 | PASS |
| High | 2480 | 654 | 500 | PASS |

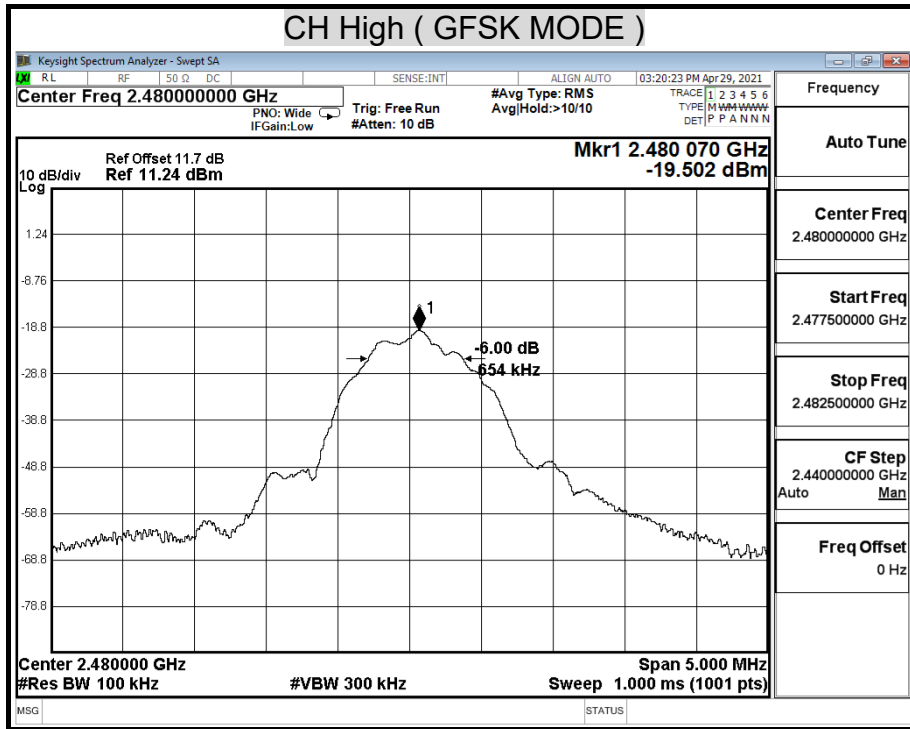
GFSK(RF) mode

| Channel | Channel Frequency (MHz) | 6dB Bandwidth (kHz) | Minimum Limit (kHz) | Pass / Fail |
|---------|-------------------------|---------------------|---------------------|-------------|
| Low | 2402 | 670 | 500 | PASS |
| Middle | 2442 | 663 | 500 | PASS |
| High | 2480 | 654 | 500 | PASS |

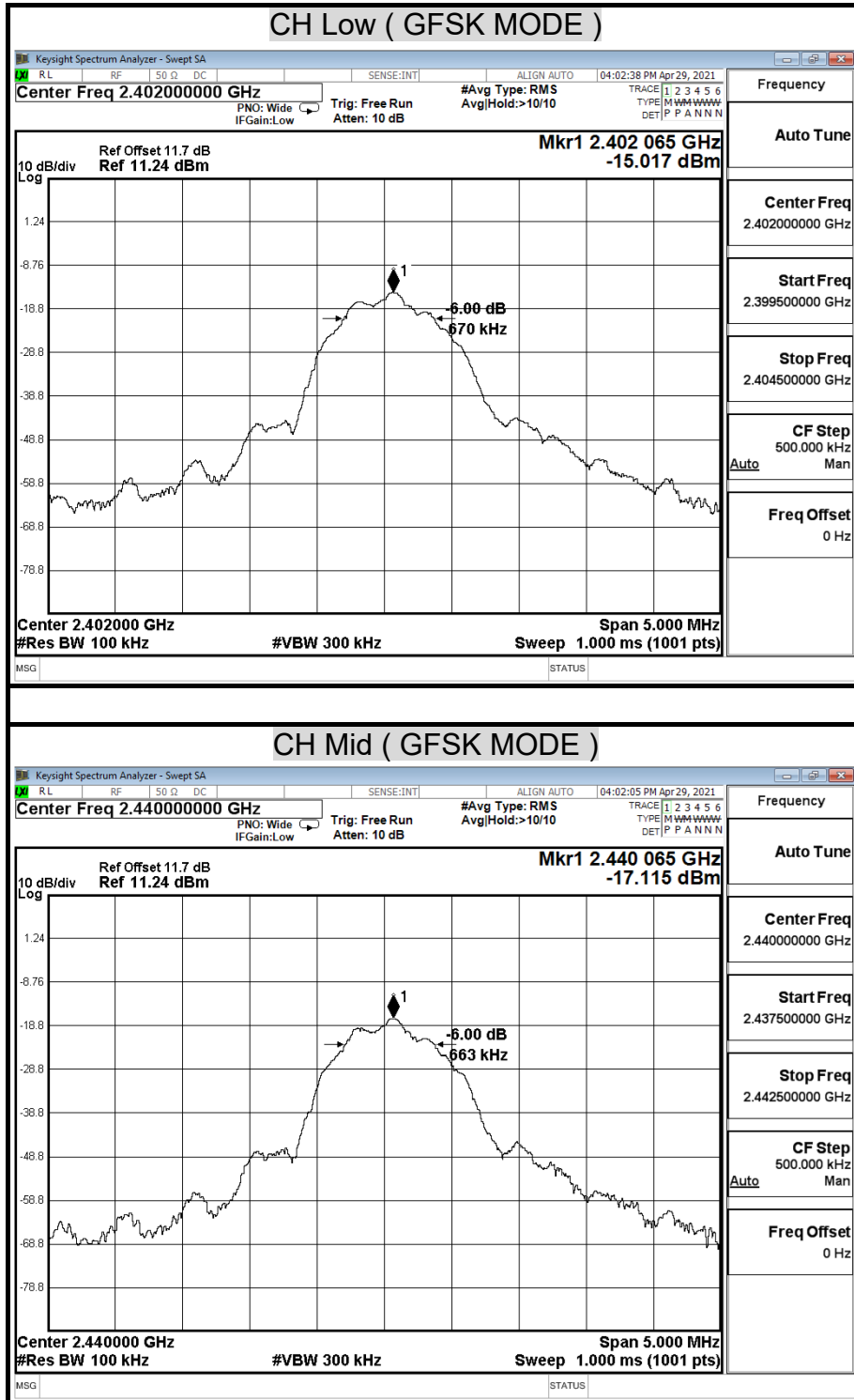
- NOTE :**
1. At final test to get the worst-case emission at 1Mbps long.
 2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was entered as an offset in the spectrum analyzer to allow for direct reading of power.

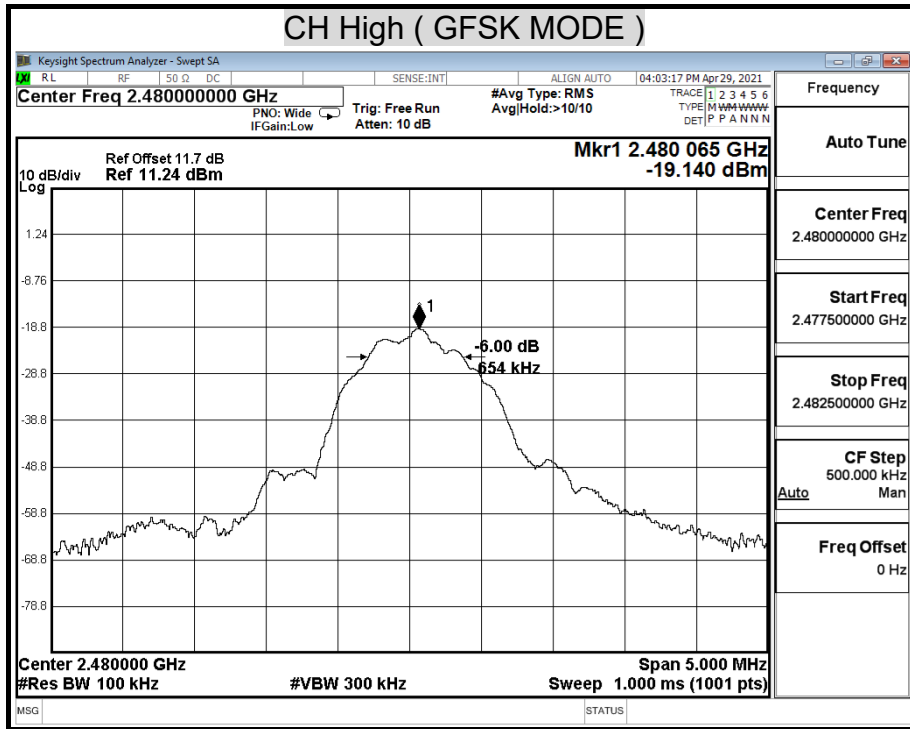
6dB BANDWIDTH (GFSK(BT) MODE)





6dB BANDWIDTH (GFSK(RF) MODE)





8.2 MAXIMUM PEAK OUTPUT POWER

LIMIT

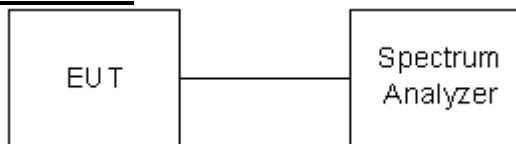
§ 15.247(b) The maximum peak output power of the intentional radiator shall not exceed the following :

§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands : 1 watt.

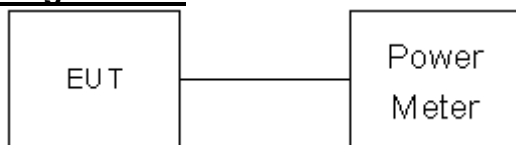
§ 15.247(b) (4) Except as shown in paragraphs (c) of this section , if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2), and (b)(3) of this section , as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST SETUP

For Peak Power



For Average Power



TEST PROCEDURE

The tests were performed in accordance with KDB 558074 D01 v05r02 and ANSI C63.10-2013, 11.9.1.1.

9.1.1 Measurement Procedure PK2:

- a) Set the RBW \geq DTS bandwidth.
- b) Set VBW \geq 3 RBW.
- c) Set span \geq 3 x RBW
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

Average Power

The tests were performed in accordance with ANSI C63.10-2013, 11.9.2.3.1.

Connect the EUT to power meter, set the center frequency of the power meter to the channel center frequency.

TEST RESULTS

No non-compliance noted.

| | | | |
|----------------------------|-------------|------------------|------------|
| Model Name | JF-91 | Test By | Ted Huang |
| Temp & Humidity | 27.4°C, 53% | Test Date | 2021/04/28 |

GFSK(BT) mode

| Channel | Channel Frequency (MHz) | Peak Power (dBm) | Peak Power Limit (dBm) | Pass / Fail |
|---------|-------------------------|------------------|------------------------|-------------|
| Low | 2402 | -14.87 | 30.00 | PASS |
| Middle | 2442 | -16.89 | 30.00 | PASS |
| High | 2480 | -19.21 | 30.00 | PASS |

GFSK(RF) mode

| Channel | Channel Frequency (MHz) | Peak Power (dBm) | Peak Power Limit (dBm) | Pass / Fail |
|---------|-------------------------|------------------|------------------------|-------------|
| Low | 2402 | -14.64 | 30.00 | PASS |
| Middle | 2442 | -16.88 | 30.00 | PASS |
| High | 2480 | -18.91 | 30.00 | PASS |

- NOTE :**
1. At final test to get the worst-case emission at 1Mbps long.
 2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Average Power Data

| | | | |
|----------------------------|-------------|------------------|------------|
| Model Name | JF-91 | Test By | Ted Huang |
| Temp & Humidity | 27.4°C, 53% | Test Date | 2021/04/28 |

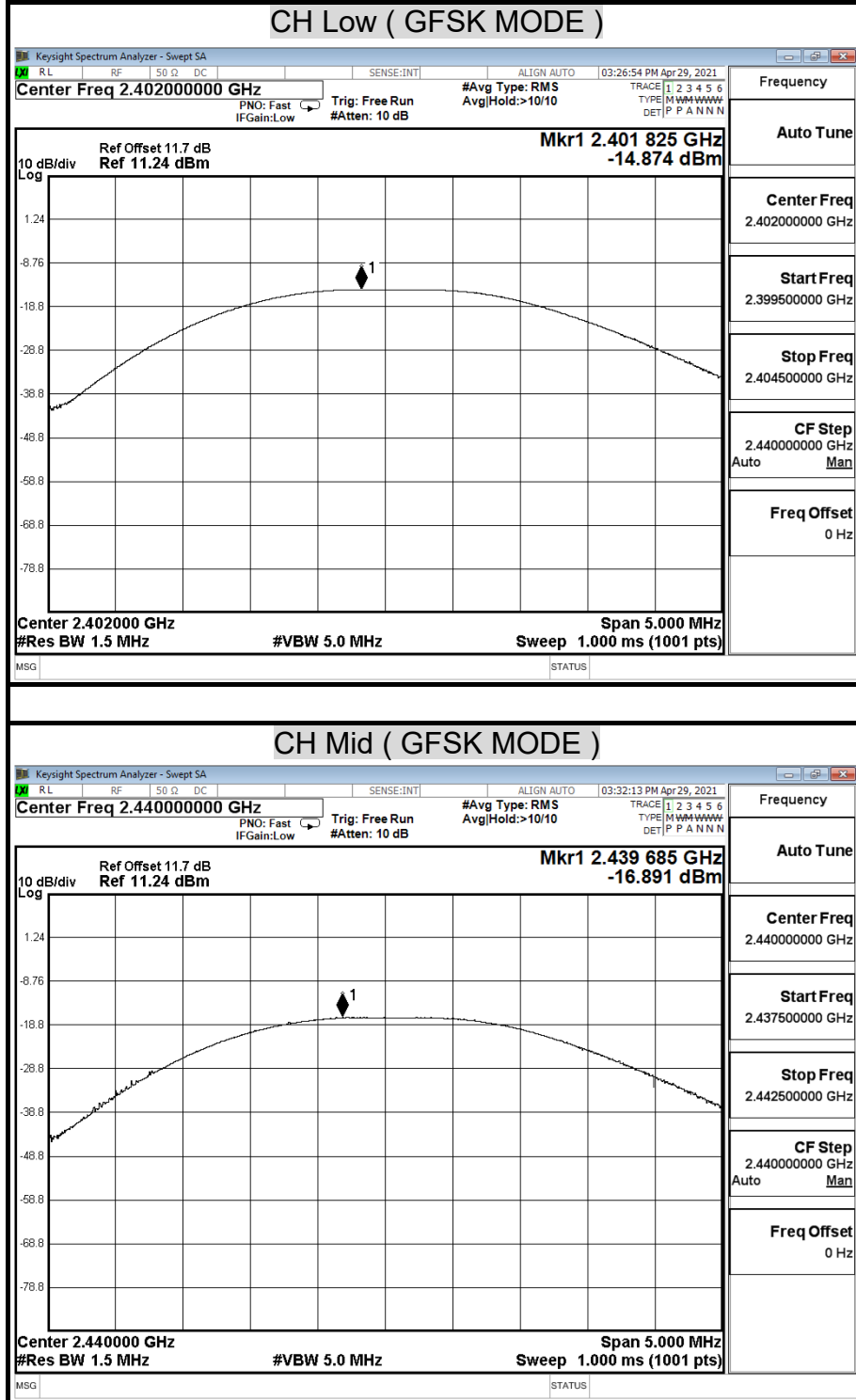
GFSK(BT) mode

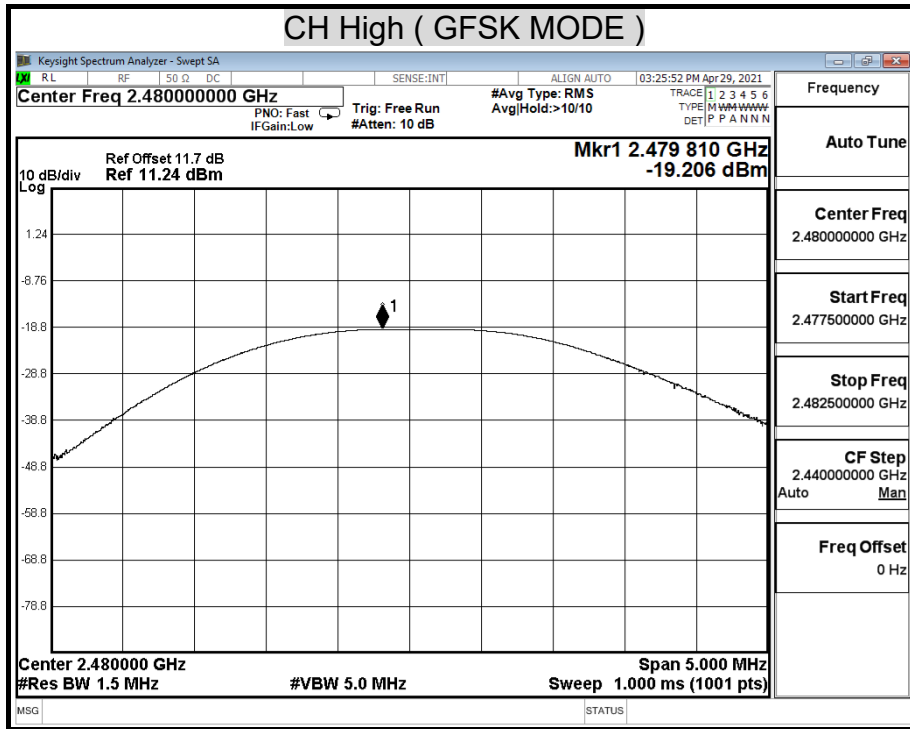
| Channel | Channel Frequency (MHz) | Average Power (dBm) |
|---------|-------------------------|---------------------|
| Low | 2402 | -15.26 |
| Middle | 2442 | -17.76 |
| High | 2480 | -19.66 |

GFSK(RF) mode

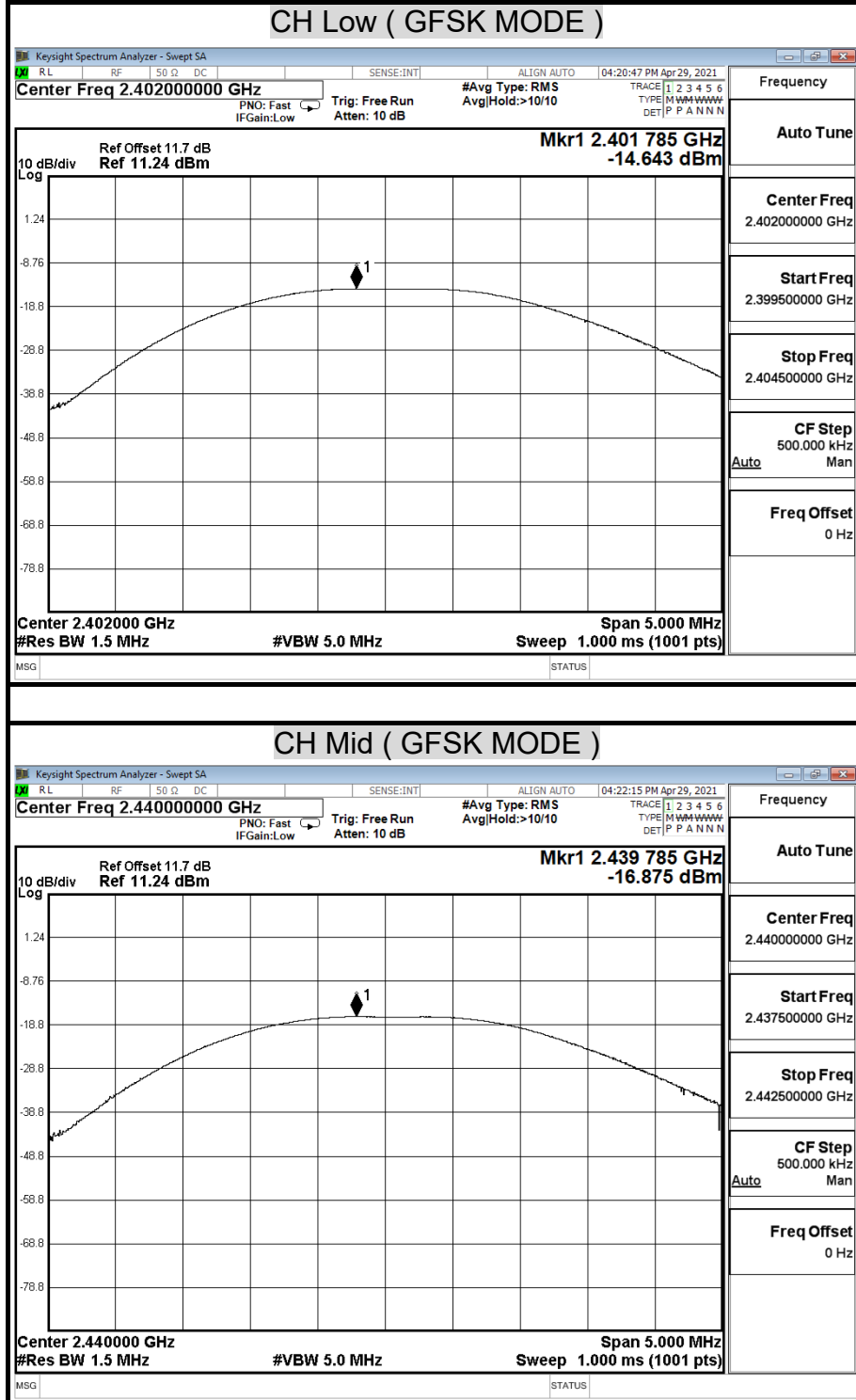
| Channel | Channel Frequency (MHz) | Average Power (dBm) |
|---------|-------------------------|---------------------|
| Low | 2402 | -15.06 |
| Middle | 2442 | -17.24 |
| High | 2480 | -19.24 |

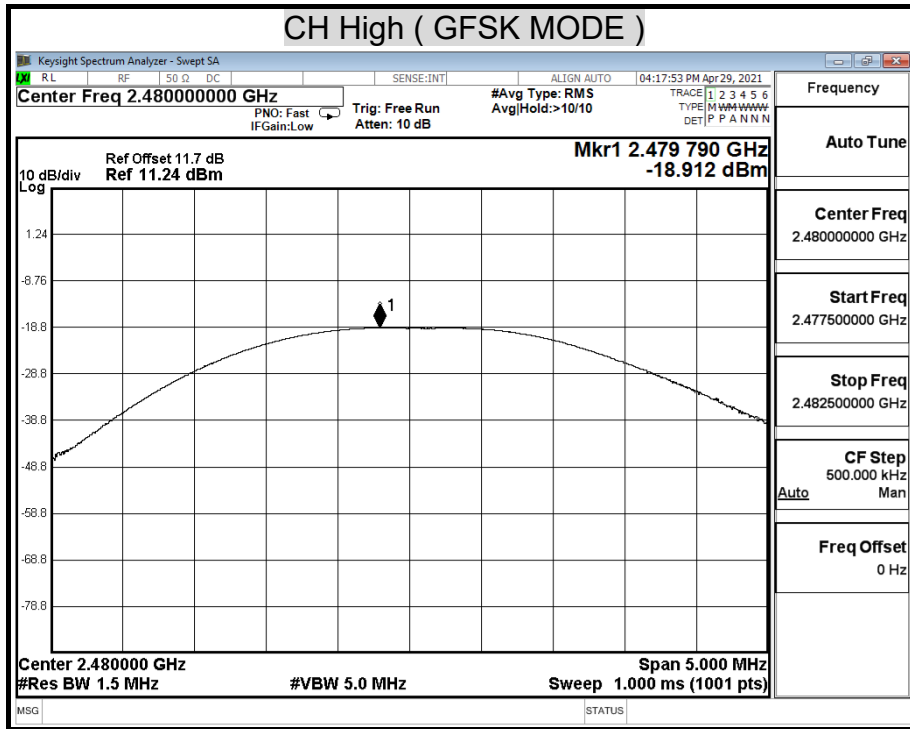
MAXIMUM PEAK OUTPUT POWER (GFSK(BT) MODE)





MAXIMUM PEAK OUTPUT POWER (GFSK(RF) MODE)



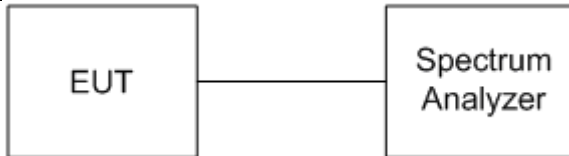


8.3 DUTY CYCLE

LIMIT

Nil (No dedicated limit specified in the Rules)

TEST SETUP



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

Report No.: T210414N06-RP1

TEST RESULTS

No non-compliance noted.

| | | | |
|----------------------------|-------------|------------------|------------|
| Model Name | JF-91 | Test By | Ted Huang |
| Temp & Humidity | 27.4°C, 53% | Test Date | 2021/04/28 |

GFSK(BT) Mode

| | us | Times | Ton | Total Ton time(ms) |
|------|---------|-------|-----|--------------------|
| Ton1 | 425.000 | 1 | 425 | 0.425 |
| Ton2 | | 0 | 0 | |
| Ton3 | | | 0 | 0.425 |
| Tp | | | | 0.625 |

| | |
|--------------|-------|
| Ton | 0.425 |
| Tp(Ton+Toff) | 0.625 |
| Duty Cycle | 0.68 |
| Duty Factor | 1.675 |

GFSK(RF) Mode

| | us | Times | Ton | Total Ton time(ms) |
|------|---------|-------|-----|--------------------|
| Ton1 | 425.000 | 1 | 425 | 0.425 |
| Ton2 | | 0 | 0 | |
| Ton3 | | | 0 | 0.425 |
| Tp | | | | 0.625 |

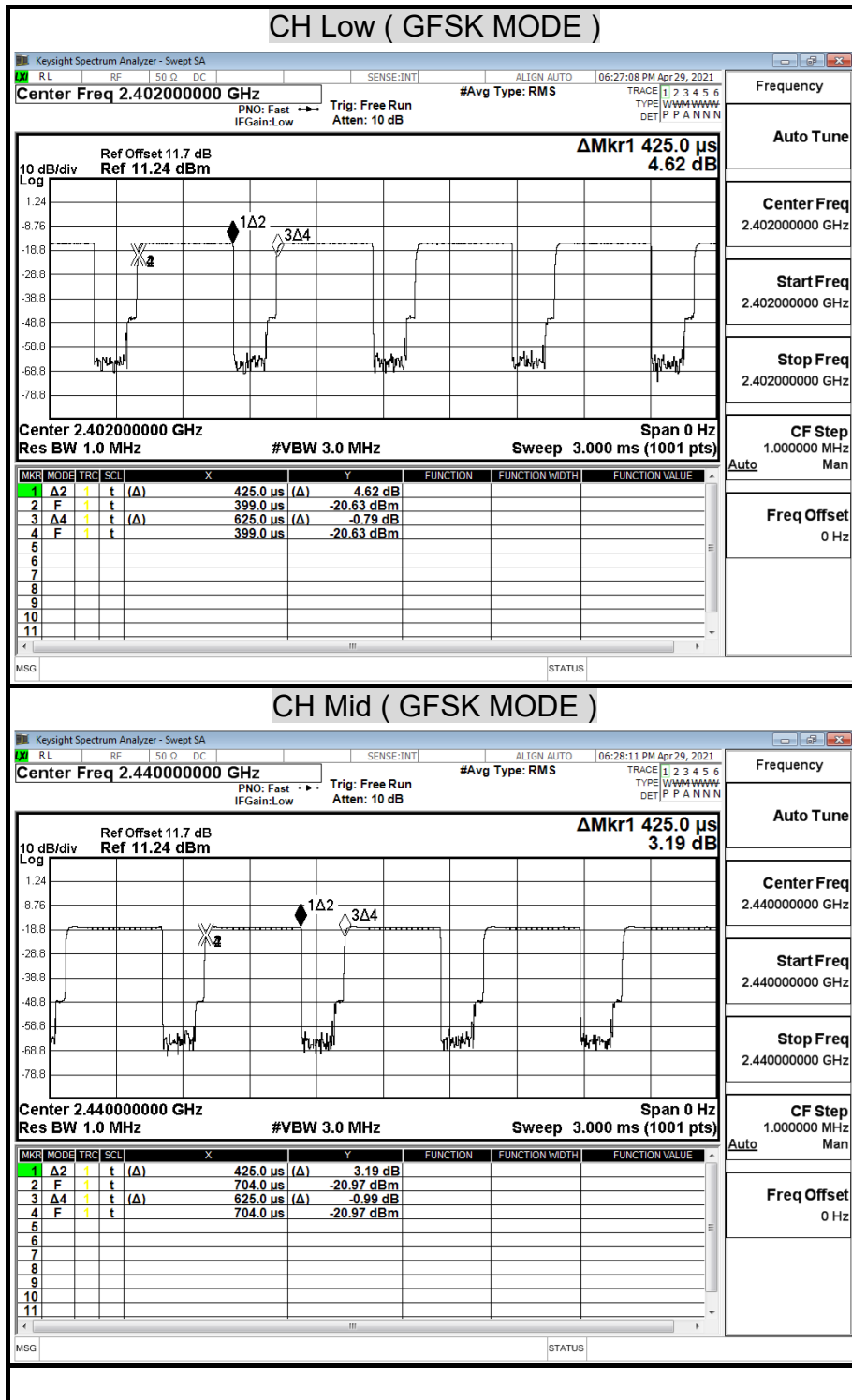
| | |
|--------------|-------|
| Ton | 0.425 |
| Tp(Ton+Toff) | 0.625 |
| Duty Cycle | 0.68 |
| Duty Factor | 1.675 |

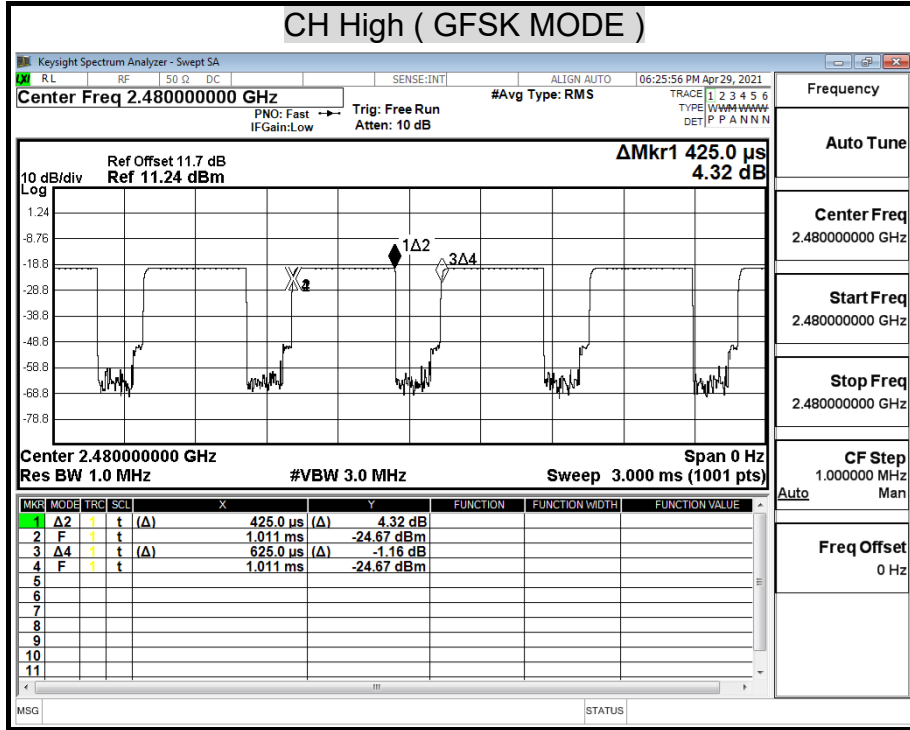
Report No.: T210414N06-RP1

TEST PLOT

Duty Cycle

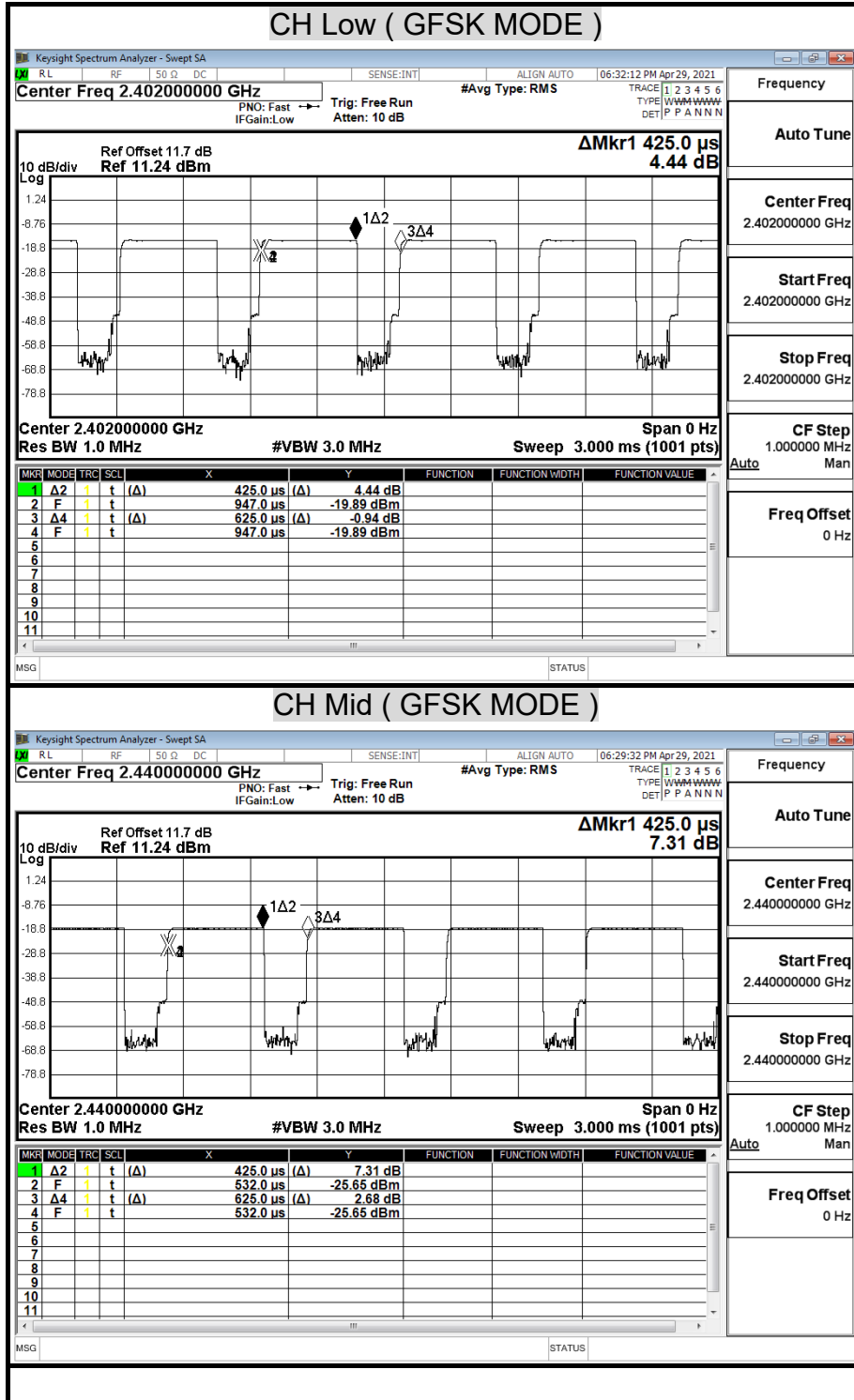
GFSK(BT) Mode

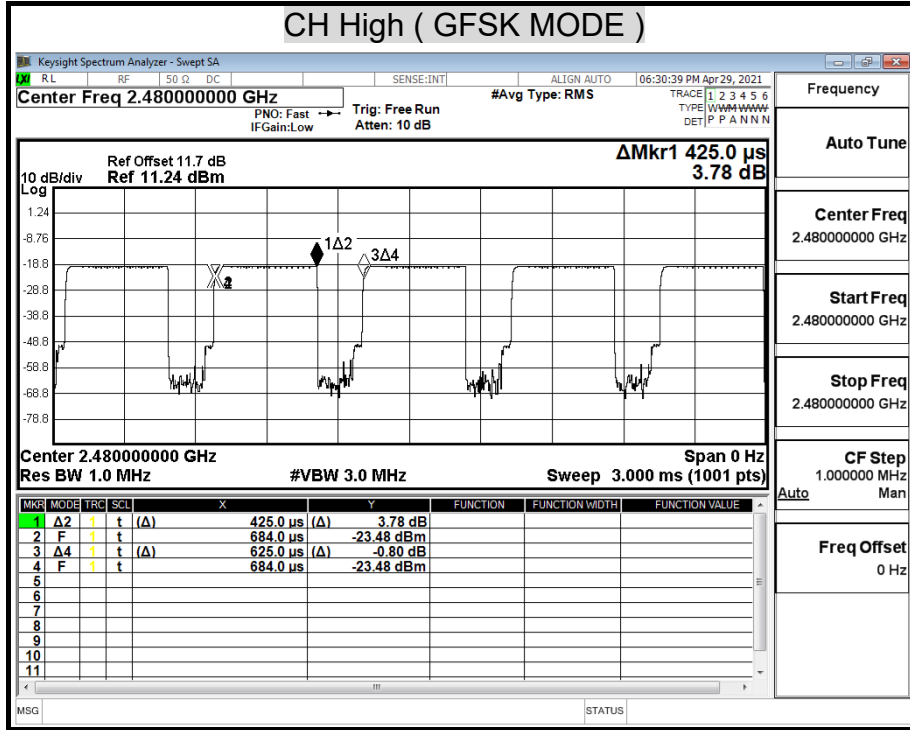




Report No.: T210414N06-RP1

GFSK(RF) Mode



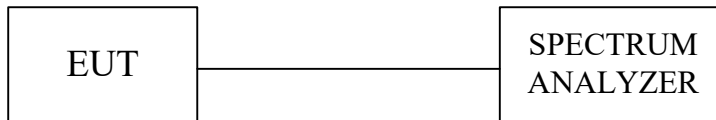


8.4 POWER SPECTRAL DENSITY

LIMIT

§ 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST SETUP



TEST PROCEDURE

The tests were performed in accordance with KDB 558074 D01 v05r02.

10.2 Method PKPSD (peak PSD):

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \text{ RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

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TEST RESULTS

No non-compliance noted.

| | | | |
|----------------------------|-------------|------------------|------------|
| Model Name | JF-91 | Test By | Ted Huang |
| Temp & Humidity | 27.4°C, 53% | Test Date | 2021/04/28 |

GFSK(BT) mode

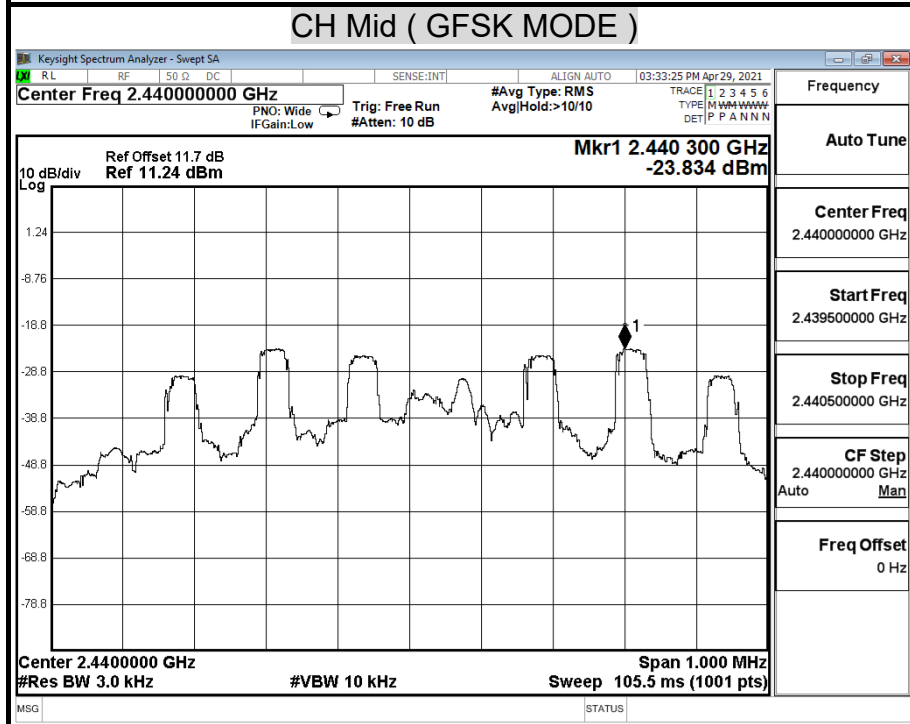
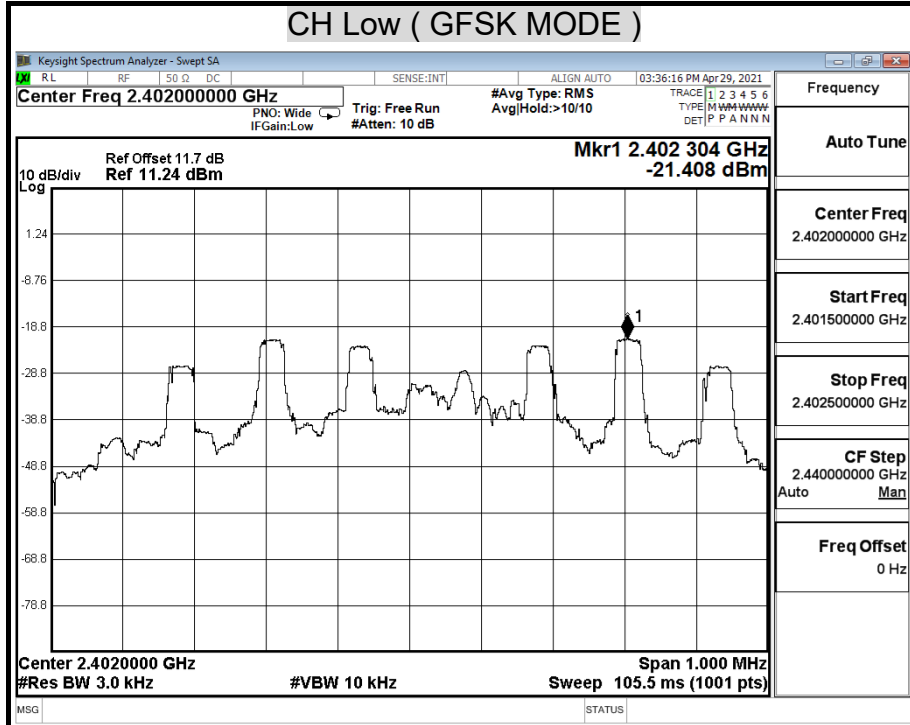
| Channel | Frequency (MHz) | PPSD/3kHz (dBm) | Limit (dBm) | Margin (dB) | Result |
|---------|-----------------|-----------------|-------------|-------------|--------|
| Low | 2402 | -21.41 | 8.00 | -29.41 | PASS |
| Middle | 2442 | -23.83 | 8.00 | -31.83 | PASS |
| High | 2480 | -25.82 | 8.00 | -33.82 | PASS |

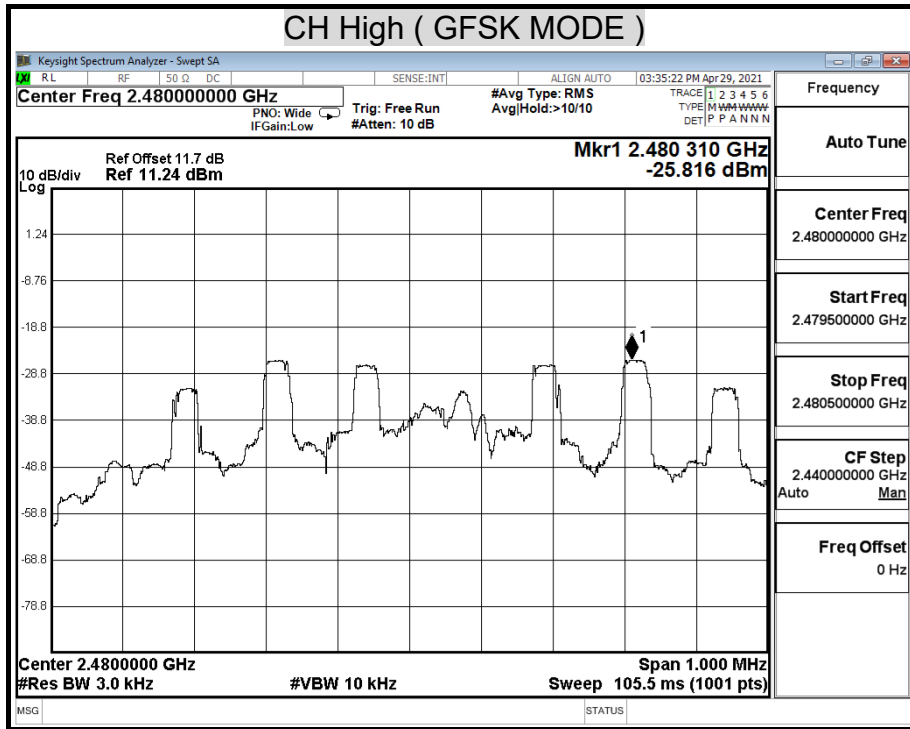
GFSK(RF) mode

| Channel | Frequency (MHz) | PPSD/3kHz (dBm) | Limit (dBm) | Margin (dB) | Result |
|---------|-----------------|-----------------|-------------|-------------|--------|
| Low | 2402 | -21.27 | 8.00 | -29.27 | PASS |
| Middle | 2442 | -23.48 | 8.00 | -31.48 | PASS |
| High | 2480 | -25.48 | 8.00 | -33.48 | PASS |

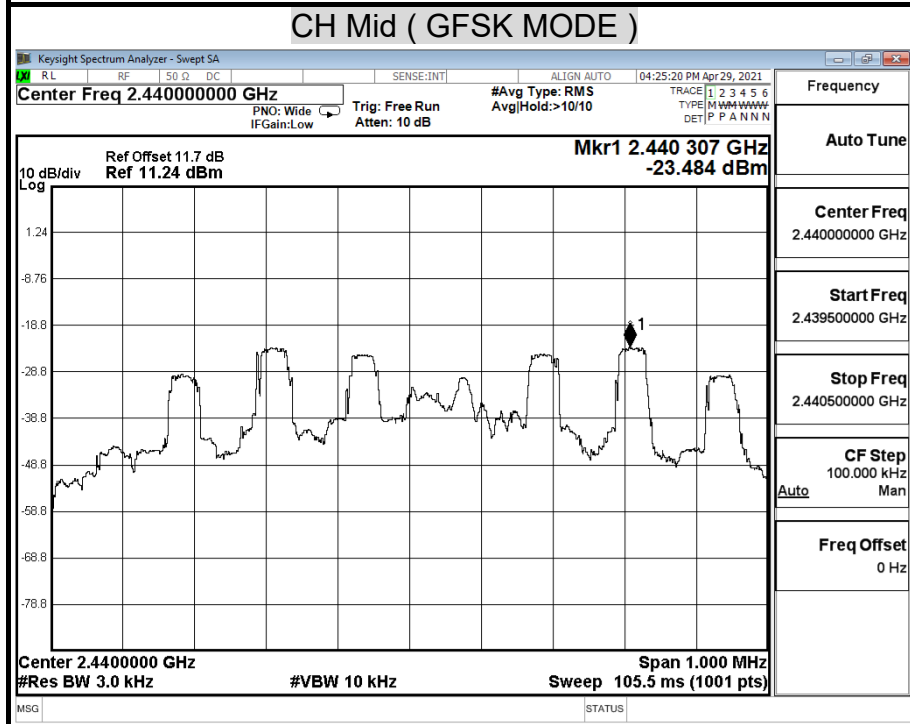
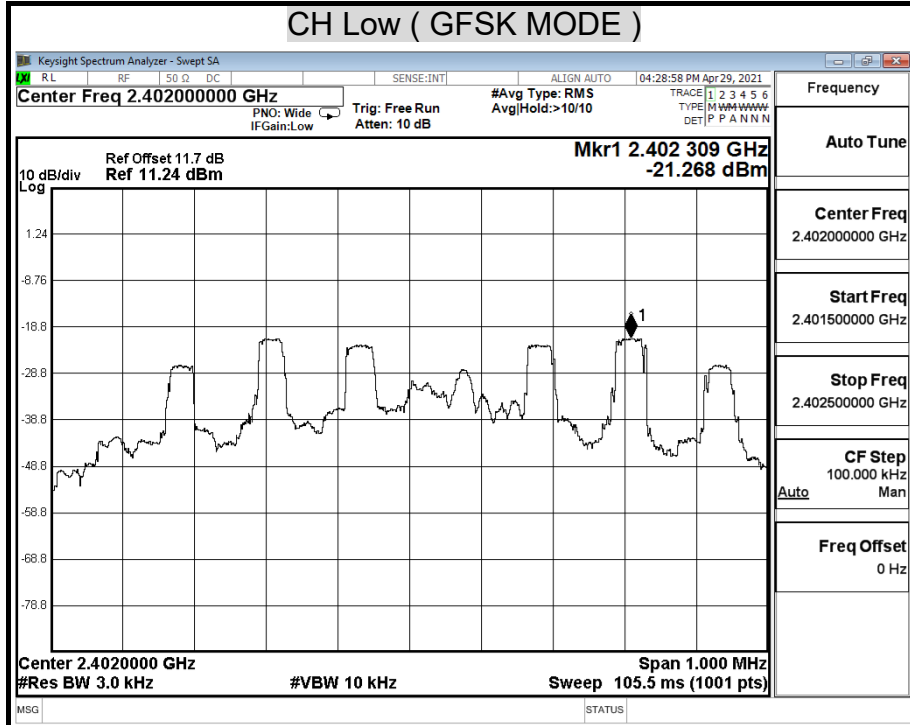
NOTE : 1. At final test to get the worst-case emission at 1Mbps long.
2. The cable assembly insertion loss of 11.1dB (including 10 dB pad and 1.1 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

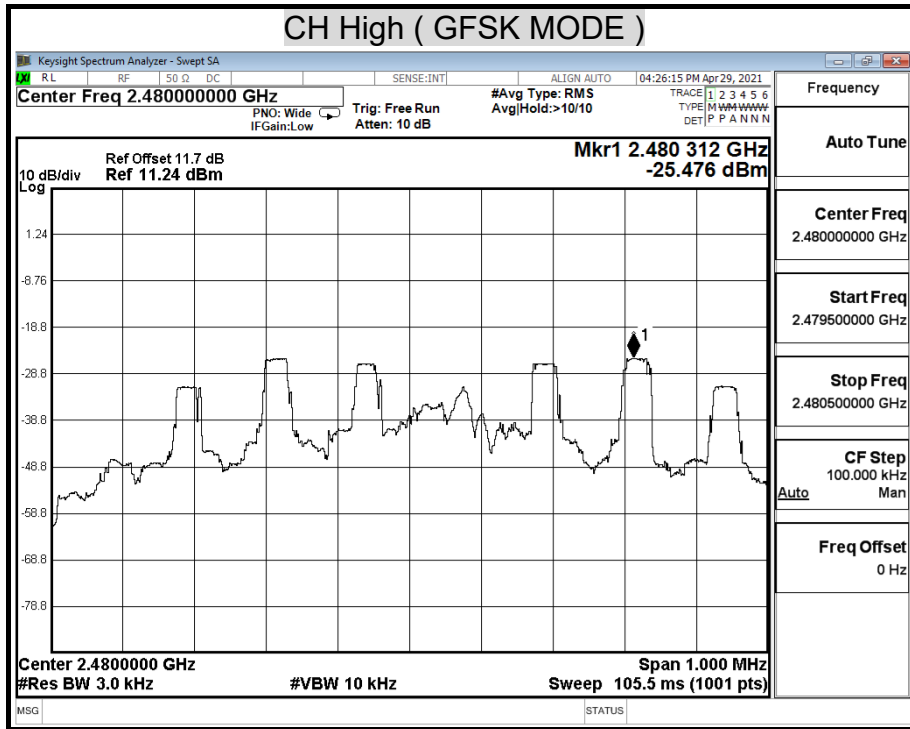
POWER SPECTRAL DENSITY (GFSK(BT) MODE)





POWER SPECTRAL DENSITY (GFSK(RF) MODE)



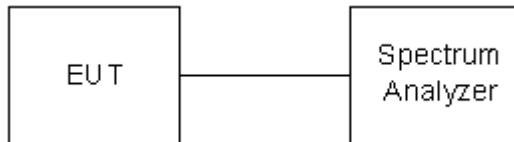


8.6 CONDUCTED SPURIOUS EMISSION

LIMITS

§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

TEST RESULTS

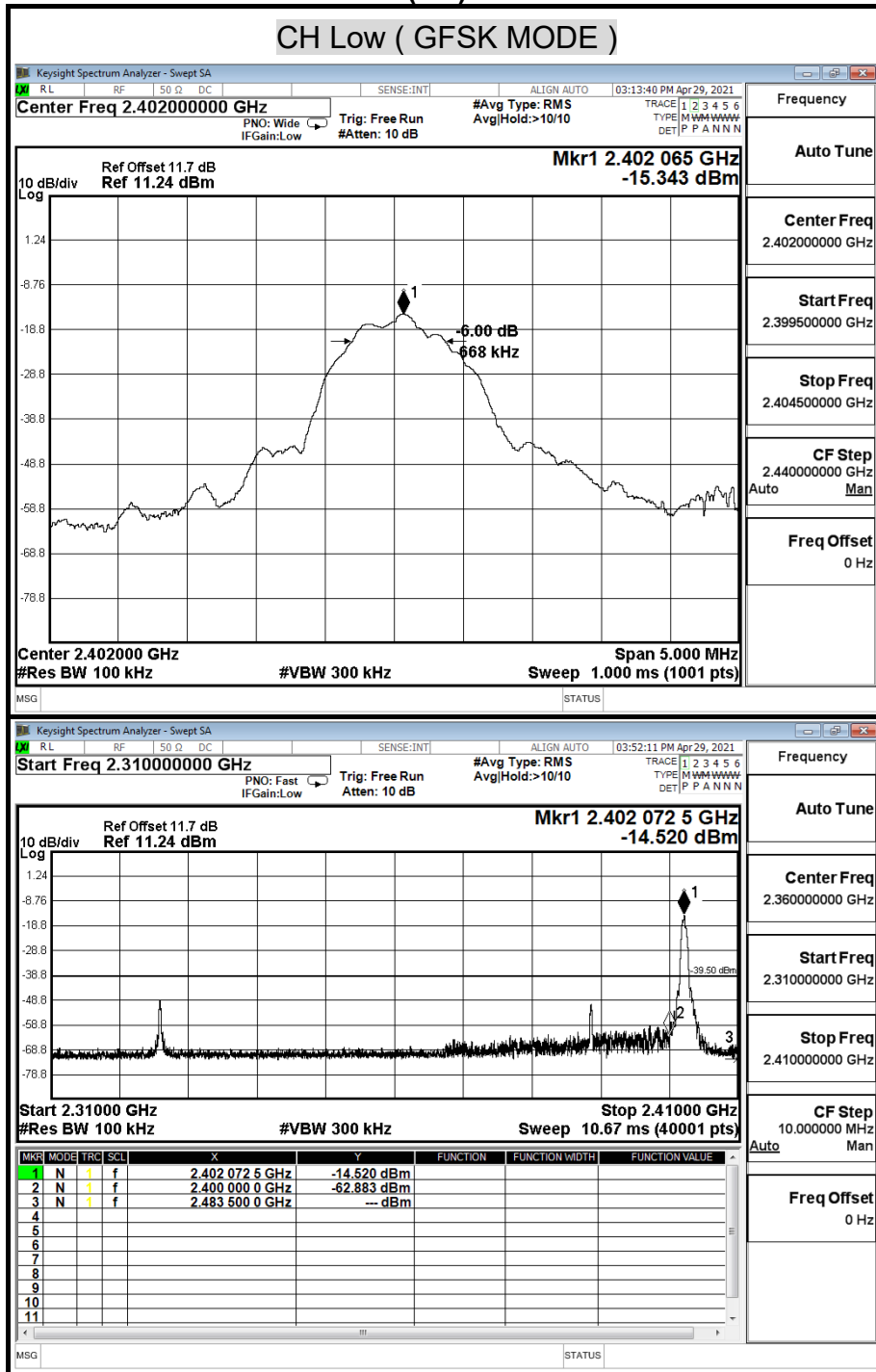
No non-compliance noted.

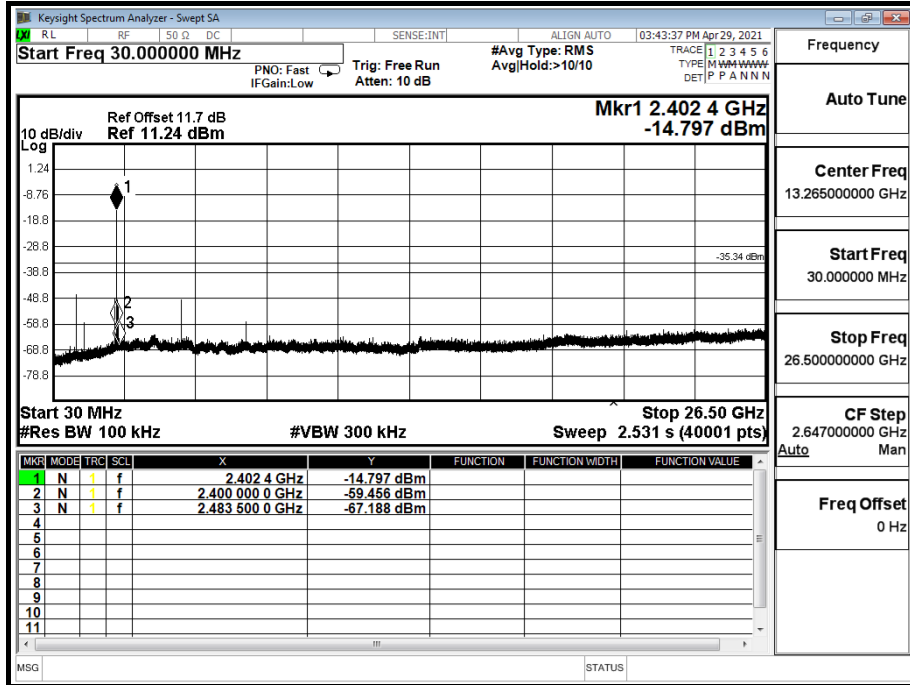
TEST DATA

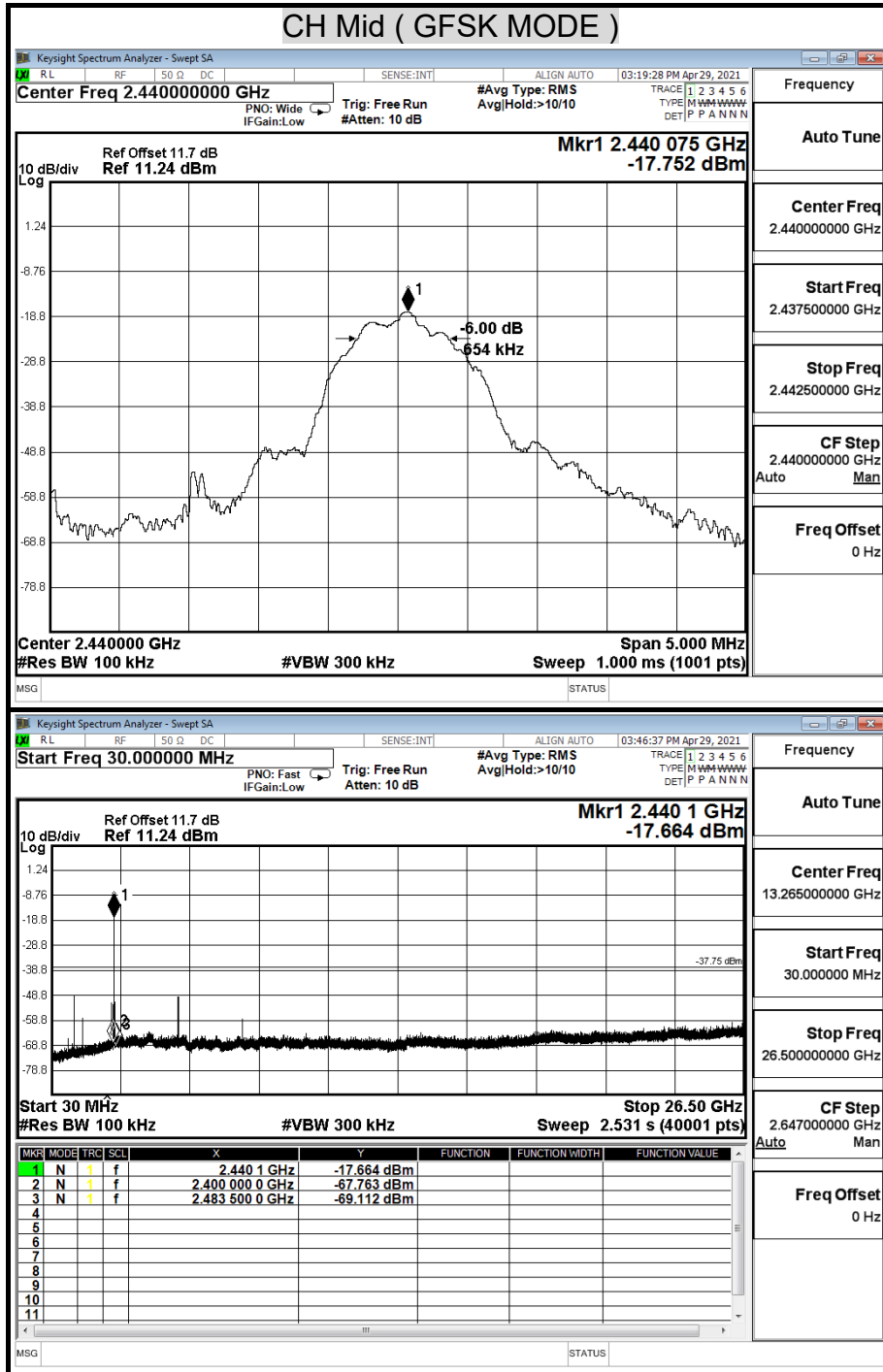
| | | | |
|----------------------------|-------------|------------------|------------|
| Model Name | JF-91 | Test By | Ted Huang |
| Temp & Humidity | 27.4°C, 53% | Test Date | 2021/04/28 |

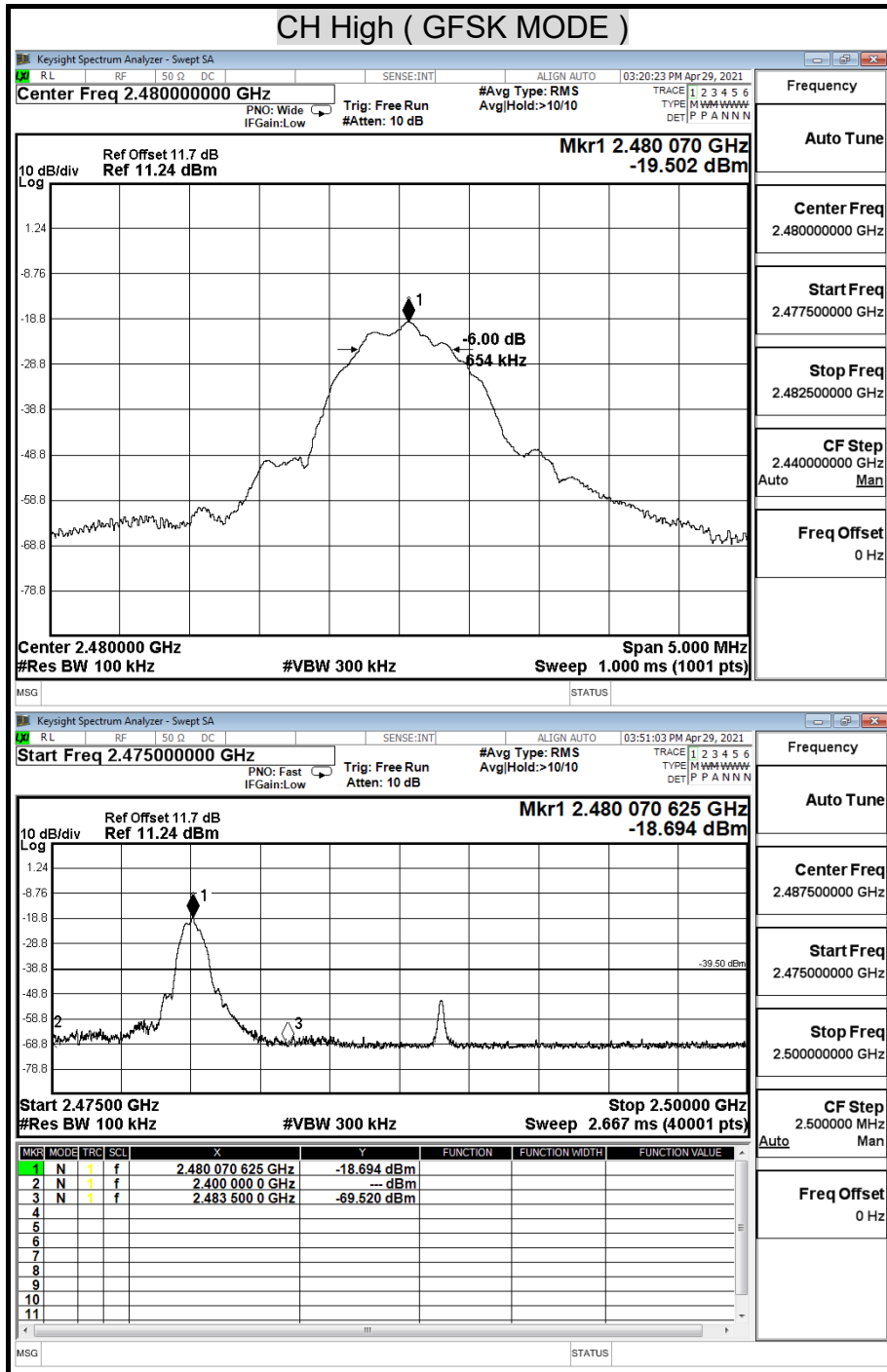
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

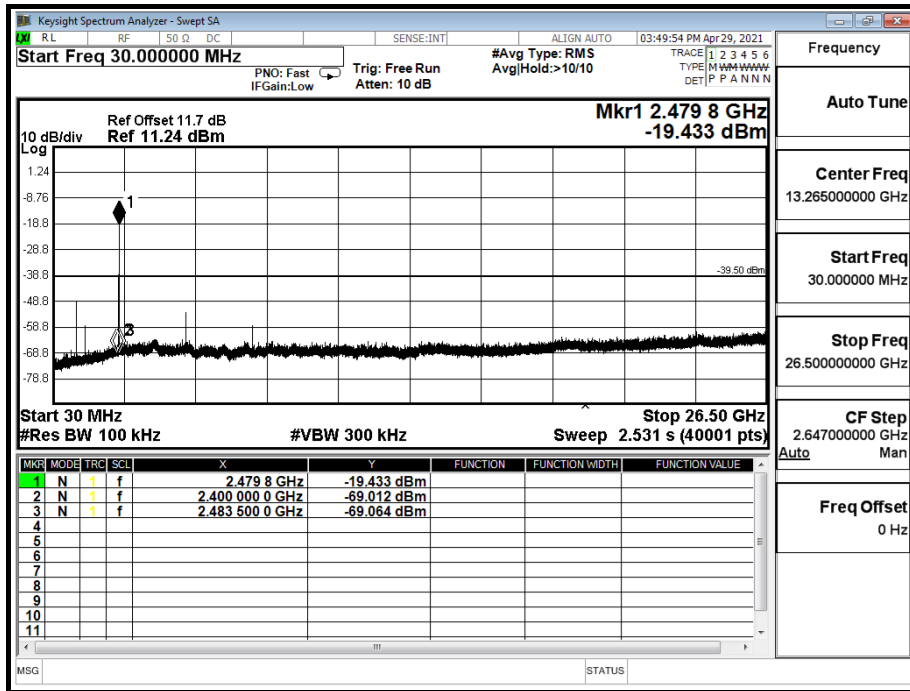
GFSK(BT) Mode





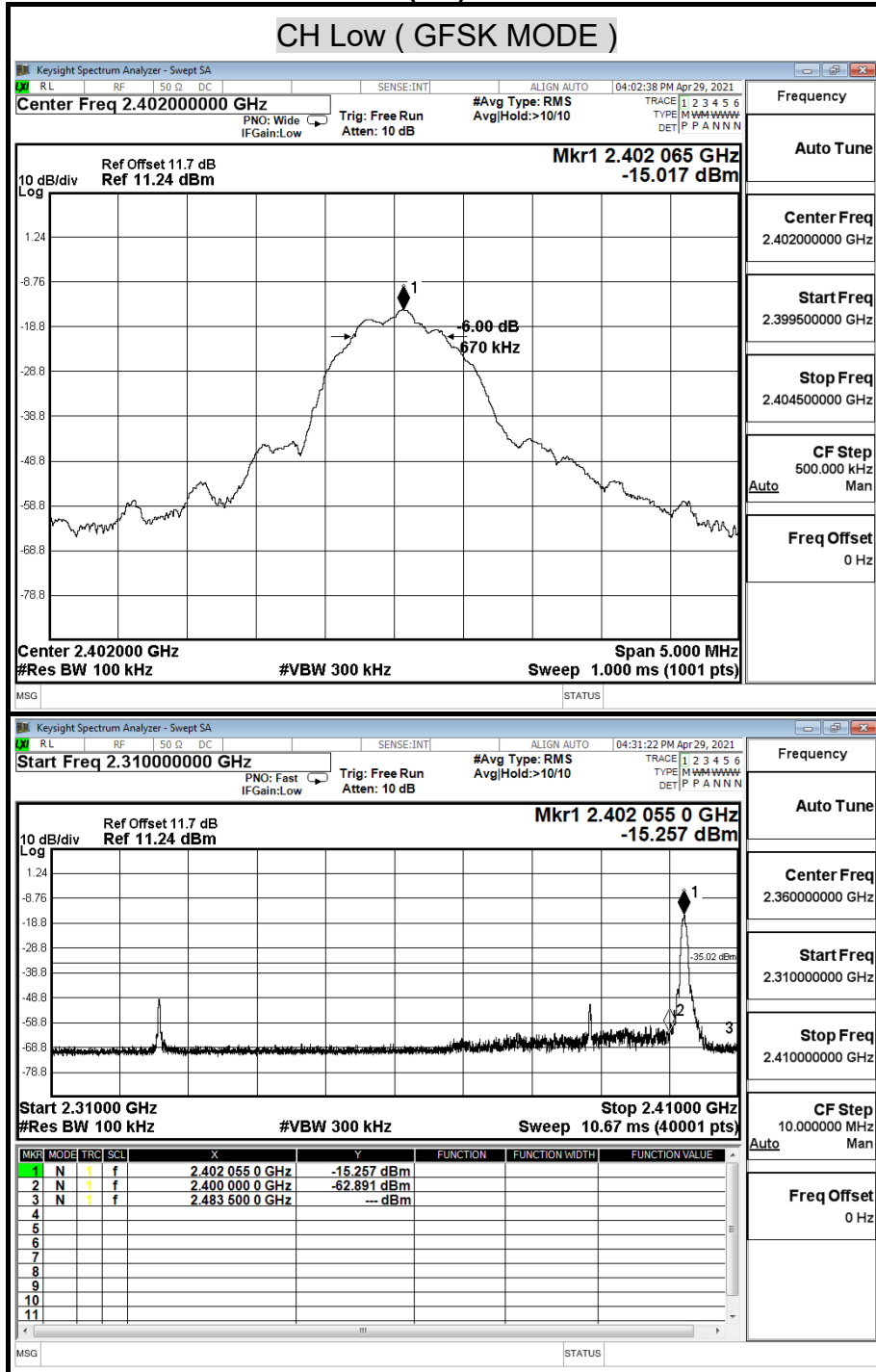


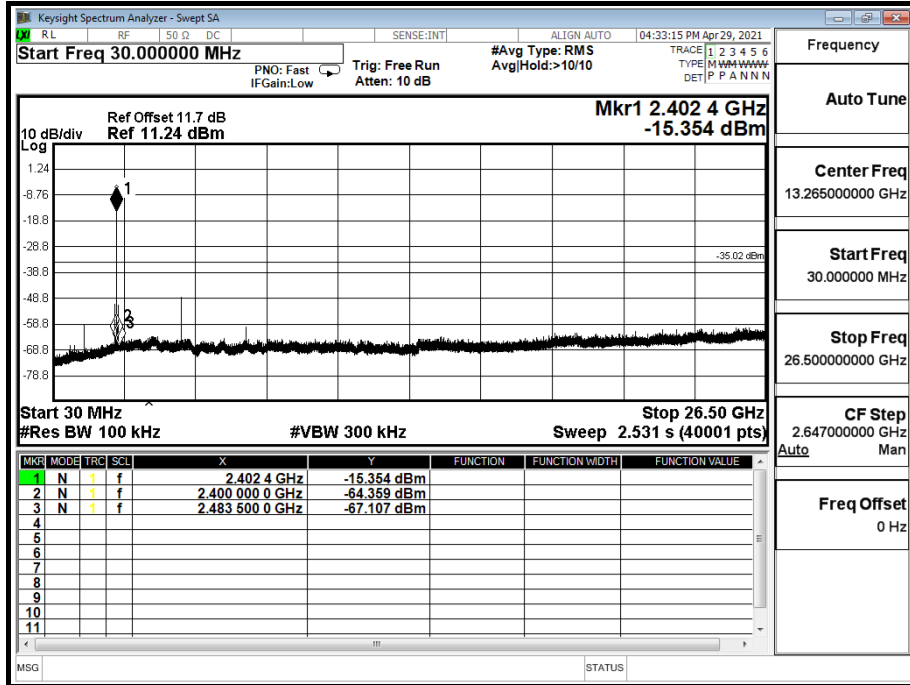


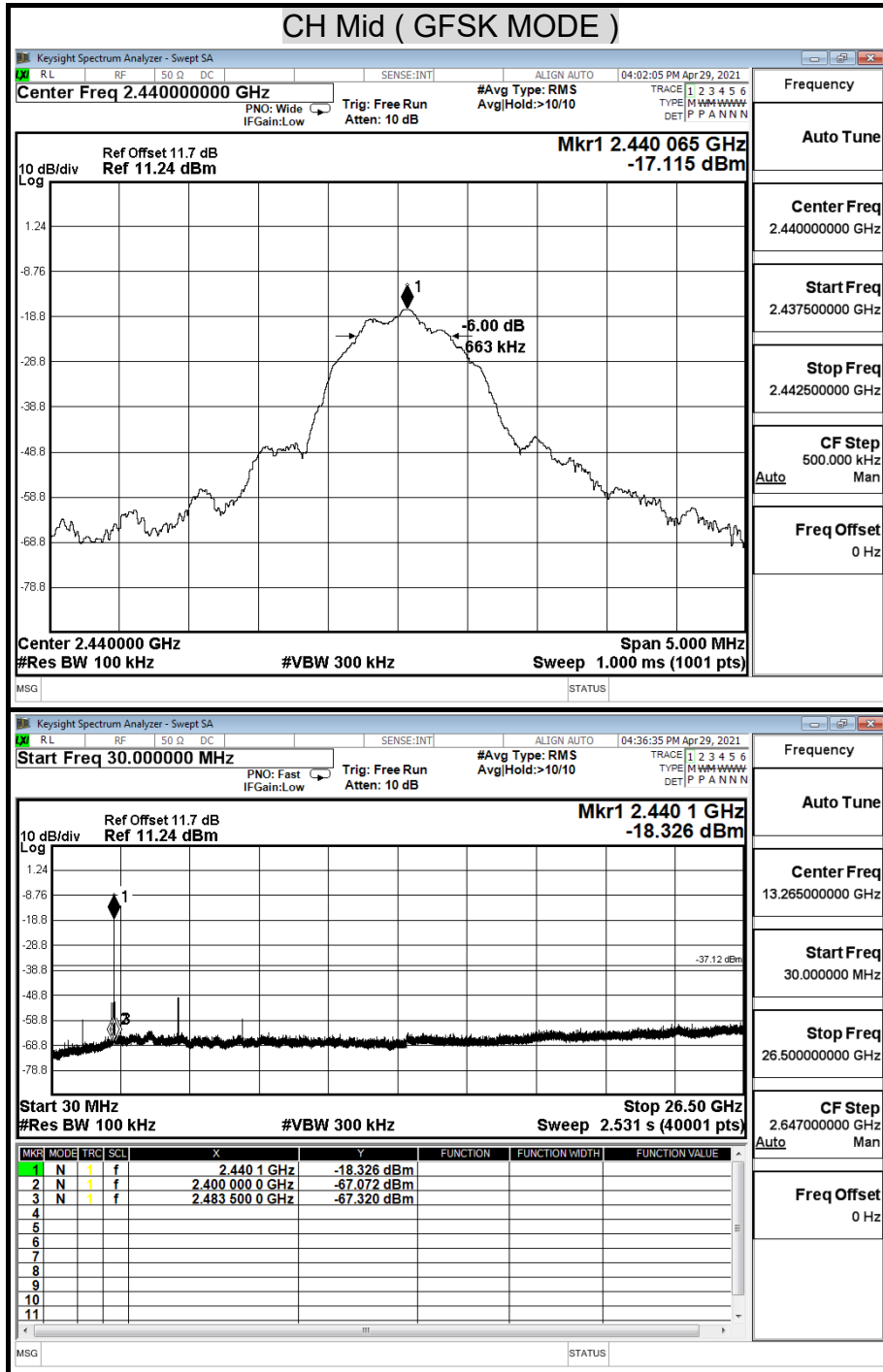


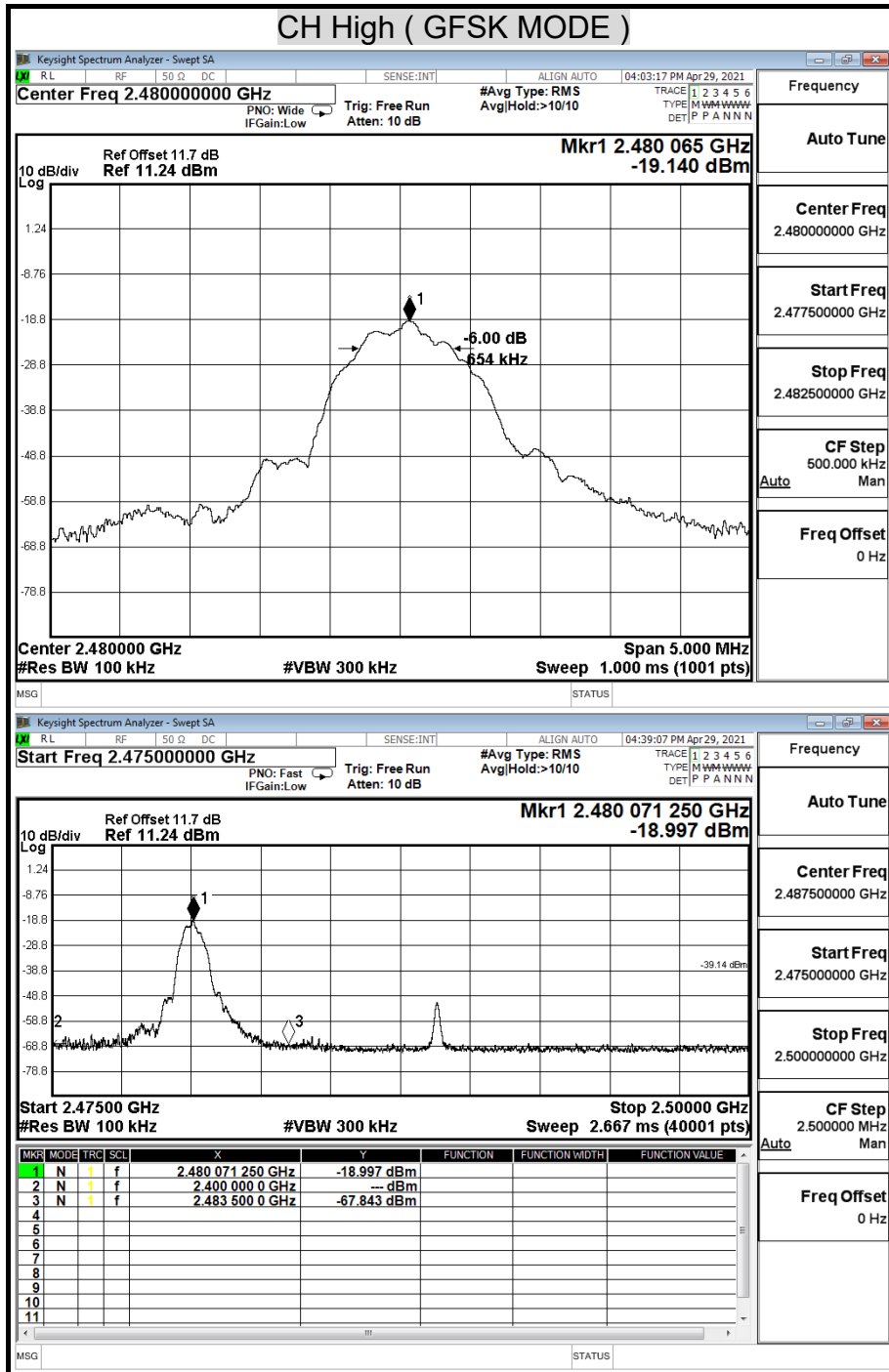
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

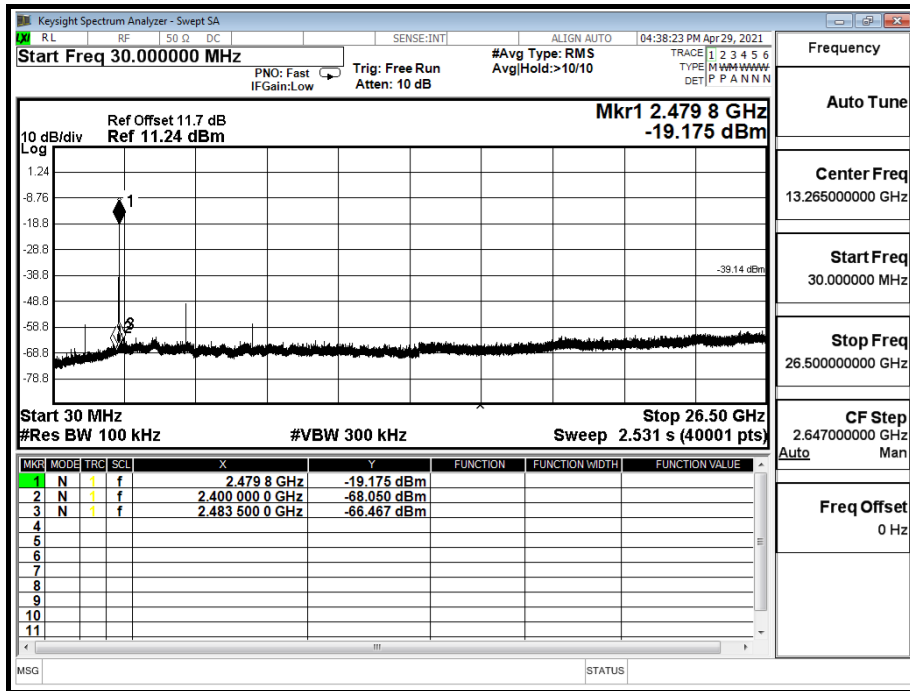
GFSK(RF) Mode











Report No.: T210414N06-RP1

8.7 RADIATED EMISSIONS

8.7.1 TRANSMITTER RADIATED SUPURIOUS EMISSIONS LIMITS

§ 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| ¹ 0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2655 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3338 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | (²) |
| 13.36 - 13.41 | | | |

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

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

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|------------------------|--|--------------------------------------|
| 30 - 88 | 100 ** | 3 |
| 88 - 216 | 150 ** | 3 |
| 216 - 960 | 200 ** | 3 |
| Above 960 | 500 | 3 |

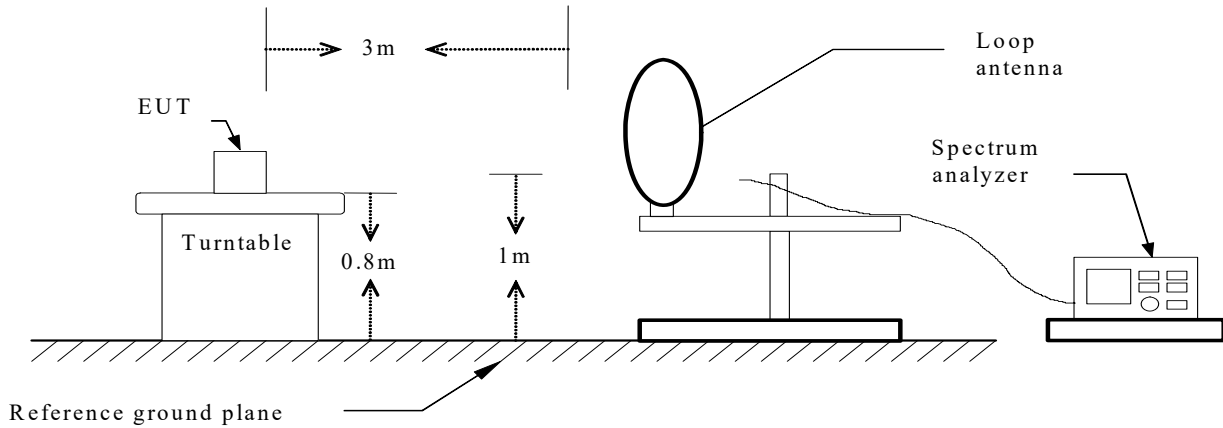
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz, However, operation within these frequency bands is permitted under other sections of this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

§ 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

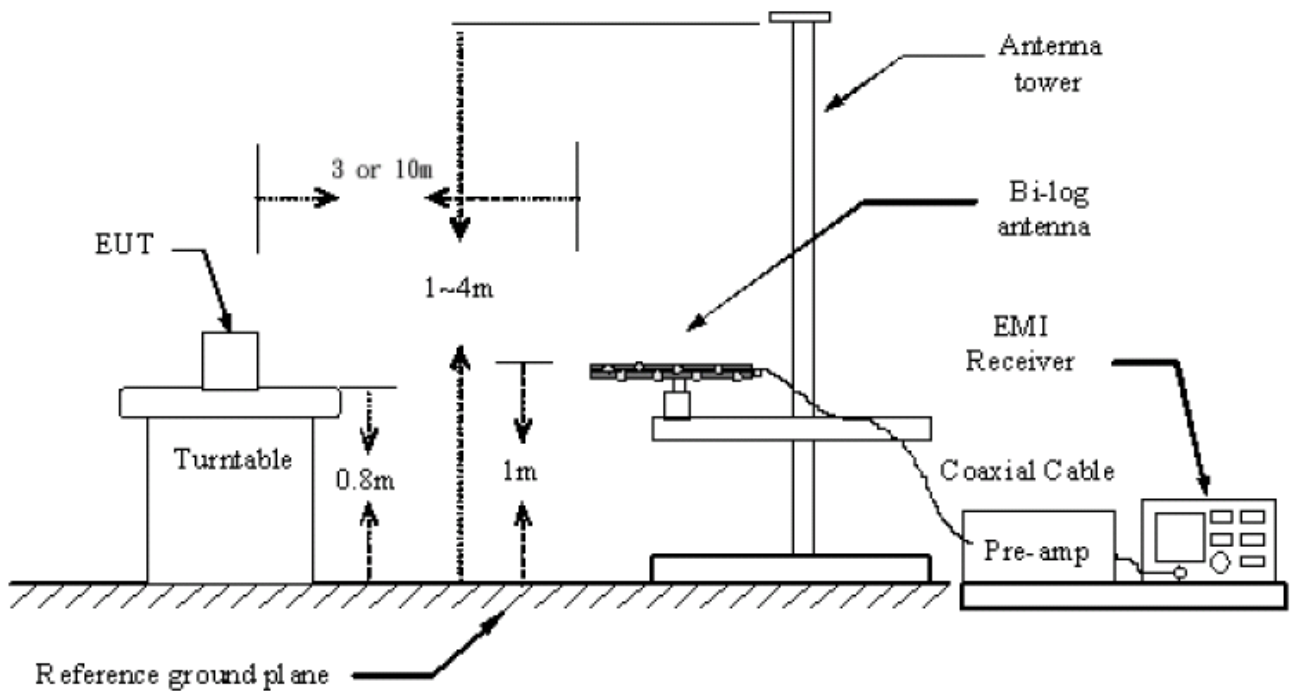
TEST SETUP

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

9kHz ~ 30MHz

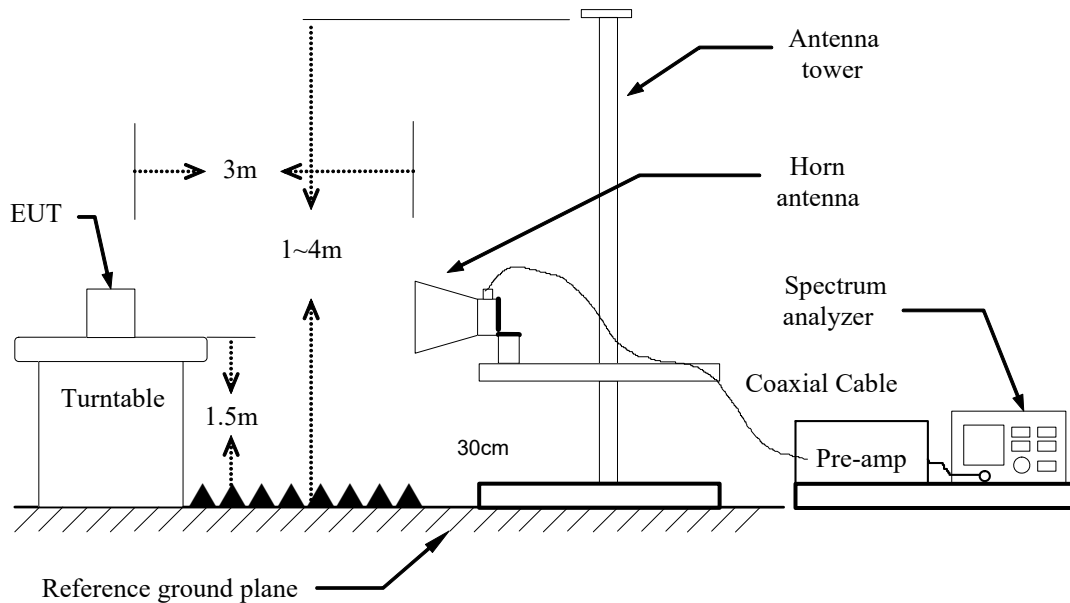


30MHz ~ 1GHz



Report No.: T210414N06-RP1

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



TEST PROCEDURE

- The EUT was placed on the top of a rotating table 0.8/1.5 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
- The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- The tests were performed in accordance with KDB 558074 D01 15.247 Meas Guidance v05

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.
4. No emission is found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)

TEST RESULTS

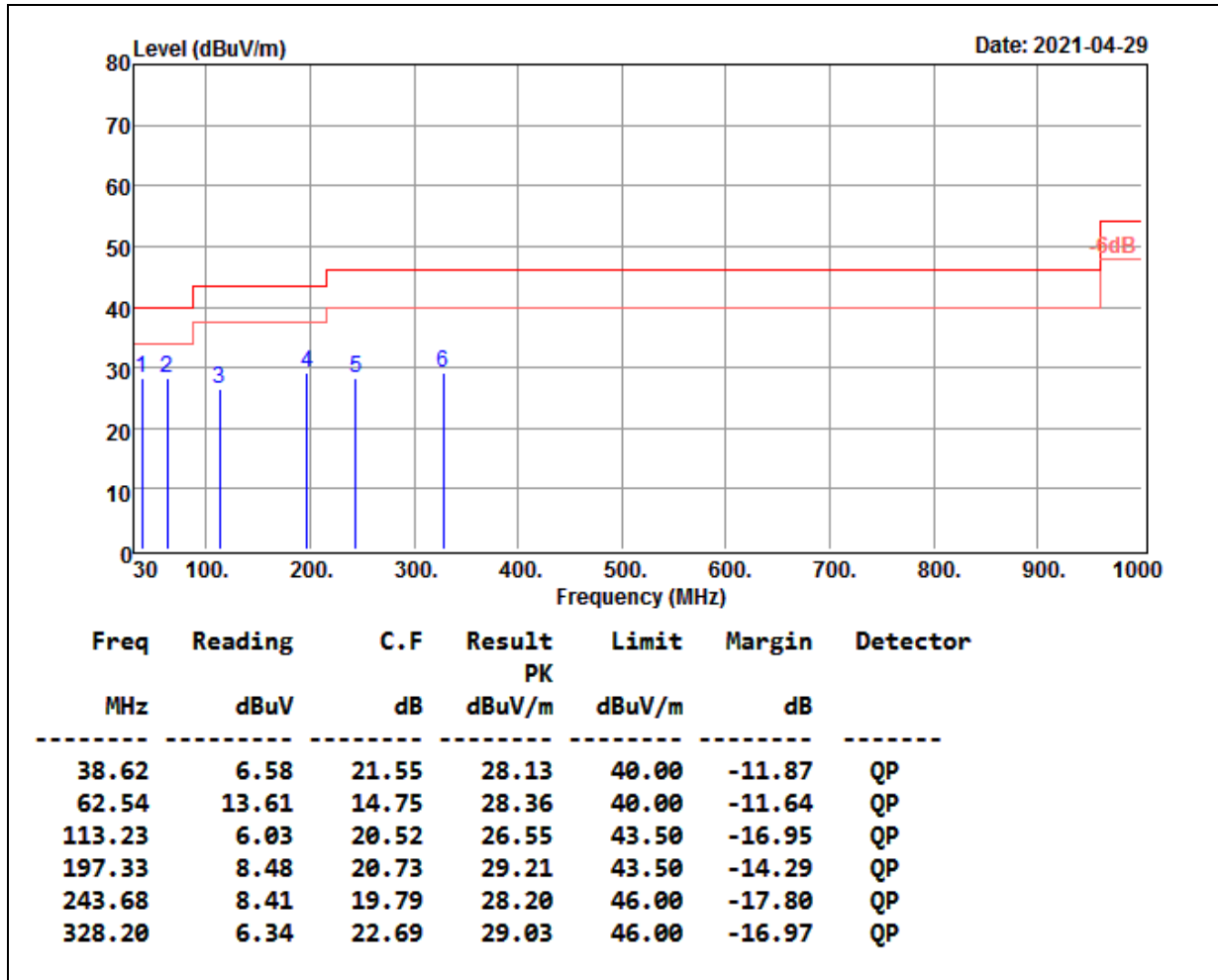
No non-compliance noted.

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8.7.2 WORST-CASE RADIATED EMISSION BELOW 1 GHz

| | | | |
|---------------------|-----------------------|----------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/29 |
| Model Name | JF-91 | Test By | Peter Chu |
| Test Mode | TX | Temp & Humidity | 24.6°C, 64% |

Vertical



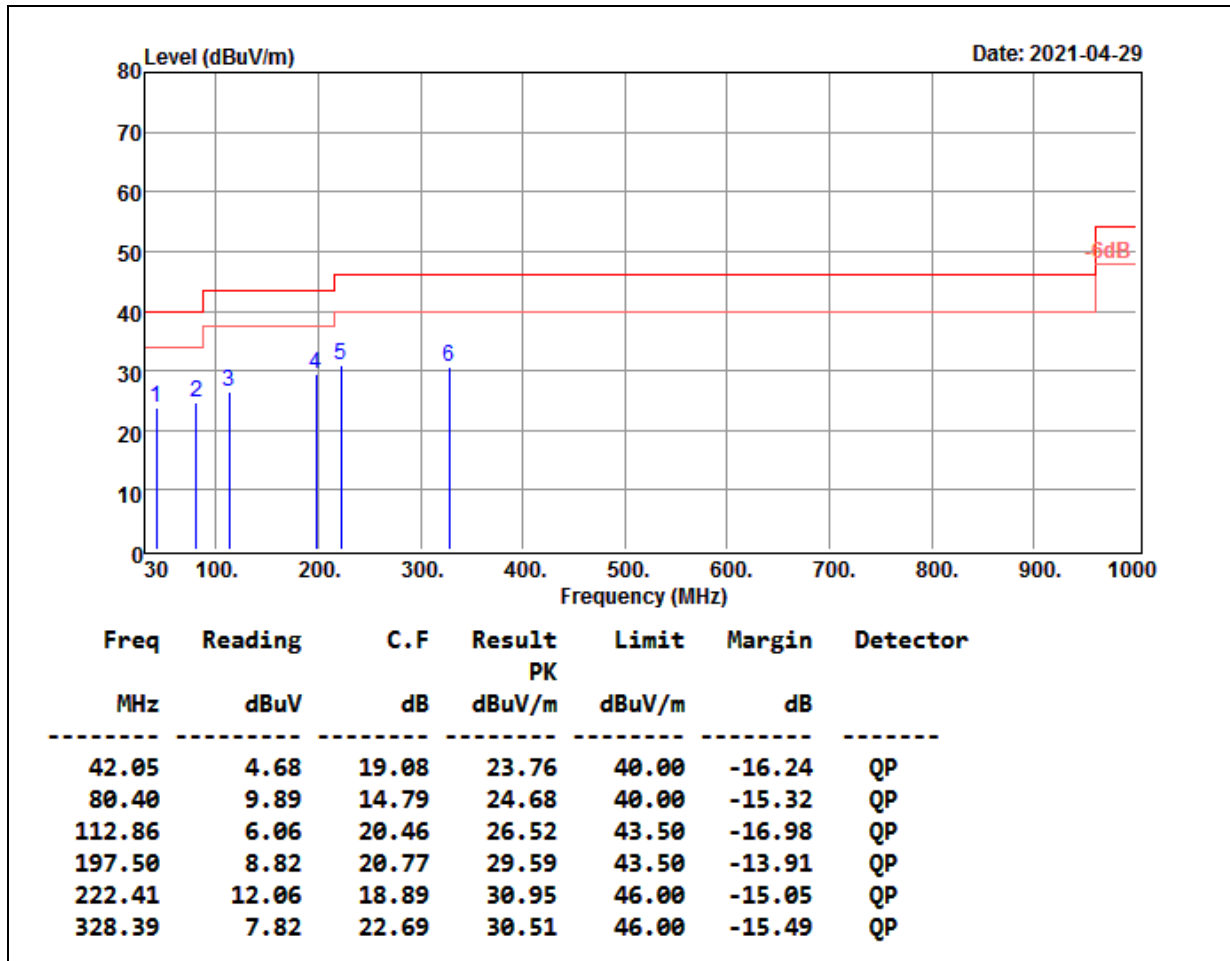
Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
2. Radiated emissions measured were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).

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| | | | |
|---------------------|-----------------------|----------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/29 |
| Model Name | JF-91 | Test By | Peter Chu |
| Test Mode | TX | Temp & Humidity | 24.6°C, 64% |

Horizontal



Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
2. Radiated emissions measured were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Margin (dB) = Remark result (dBUV/m) – Quasi-peak limit (dBUV/m).

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8.7.3 TRANSMITTER RADIATED EMISSION ABOVE 1 GHz

| | | | |
|---------------------|-----------------------|---------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/28 |
| Model | JF-91 | Test By | Ted Huang |
| Test Mode | GFSK(BT) TX (CH Low) | TEMP& Humidity | 27.4°C, 53% |

Horizontal

| TX / GFSK mode / CH Low | | | | Measurement Distance at 3m | | | | Horizontal polarity | | |
|-------------------------|---------|--------|------------|----------------------------|--------|----------|----------|---------------------|---------|--|
| Freq. | Reading | AF | Cable Loss | Pre-amp | Filter | Level | Limit | Margin | Mark | |
| (MHz) | (dBµV) | (dB/m) | (dB) | (dB) | (dB) | (dBµV/m) | (dBµV/m) | (dB) | (P/Q/A) | |
| * 1695.14 | 58.25 | 28.10 | 3.37 | 44.47 | 0.66 | 45.91 | 74.00 | -28.09 | P | |
| * 1695.14 | 46.35 | 28.10 | 3.37 | 44.47 | 0.66 | 34.01 | 54.00 | -19.99 | A | |
| * 4804.57 | 58.09 | 33.24 | 5.46 | 42.61 | 0.22 | 54.39 | 74.00 | -19.61 | P | |
| * 4804.57 | 48.61 | 33.24 | 5.46 | 42.61 | 0.22 | 44.91 | 54.00 | -9.09 | A | |
| 7206.96 | 55.54 | 38.69 | 6.57 | 42.44 | 0.27 | 58.63 | 74.00 | -15.37 | P | |
| 7206.96 | 44.75 | 38.69 | 6.57 | 42.44 | 0.27 | 47.84 | 54.00 | -6.16 | A | |

| | | | |
|---------------------|-----------------------|---------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/28 |
| Model | JF-91 | Test By | Ted Huang |
| Test Mode | GFSK(BT) TX (CH Low) | TEMP& Humidity | 27.4°C, 53% |

Vertical

| TX / GFSK mode / CH Low | | | | Measurement Distance at 3m | | | | Vertical polarity | | |
|-------------------------|---------|--------|------------|----------------------------|--------|----------|----------|-------------------|---------|--|
| Freq. | Reading | AF | Cable Loss | Pre-amp | Filter | Level | Limit | Margin | Mark | |
| (MHz) | (dBµV) | (dB/m) | (dB) | (dB) | (dB) | (dBµV/m) | (dBµV/m) | (dB) | (P/Q/A) | |
| * 1415.50 | 56.85 | 26.15 | 3.08 | 44.76 | 0.45 | 41.77 | 74.00 | -32.23 | P | |
| * 1415.50 | 47.39 | 26.15 | 3.08 | 44.76 | 0.45 | 32.31 | 54.00 | -21.69 | A | |
| * 4804.17 | 59.10 | 33.23 | 5.46 | 42.61 | 0.22 | 55.40 | 74.00 | -18.60 | P | |
| * 4804.17 | 51.54 | 33.23 | 5.46 | 42.61 | 0.22 | 47.84 | 54.00 | -6.16 | A | |
| 7205.19 | 55.84 | 38.68 | 6.57 | 42.44 | 0.27 | 58.92 | 74.00 | -15.08 | P | |
| 7205.19 | 44.58 | 38.68 | 6.57 | 42.44 | 0.27 | 47.66 | 54.00 | -6.34 | A | |

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.
6. *=Restricted bands of operation

| | | | |
|---------------------|-------------------------|---------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/28 |
| Model | JF-91 | Test By | Ted Huang |
| Test Mode | GFSK(BT) TX (CH Middle) | TEMP& Humidity | 27.4°C, 53% |

Horizontal

| TX / GFSK mode / CH Middle | | | | Measurement Distance at 3m | | | | Horizontal polarity | | |
|----------------------------|---------|--------|------------|----------------------------|--------|----------|----------|---------------------|---------|--|
| Freq. | Reading | AF | Cable Loss | Pre-amp | Filter | Level | Limit | Margin | Mark | |
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | (P/Q/A) | |
| * 1696.52 | 57.25 | 28.11 | 3.37 | 44.47 | 0.66 | 44.93 | 74.00 | -29.07 | P | |
| * 1696.52 | 47.51 | 28.11 | 3.37 | 44.47 | 0.66 | 35.19 | 54.00 | -18.81 | A | |
| * 4880.42 | 57.95 | 33.49 | 5.51 | 42.60 | 0.23 | 54.58 | 74.00 | -19.42 | P | |
| * 4880.42 | 49.30 | 33.49 | 5.51 | 42.60 | 0.23 | 45.93 | 54.00 | -8.07 | A | |
| * 7319.35 | 55.48 | 39.11 | 6.59 | 42.29 | 0.27 | 59.16 | 74.00 | -14.84 | P | |
| * 7319.35 | 44.00 | 39.11 | 6.59 | 42.29 | 0.27 | 47.68 | 54.00 | -6.32 | A | |

| | | | |
|---------------------|-------------------------|---------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/28 |
| Model | JF-91 | Test By | Ted Huang |
| Test Mode | GFSK(BT) TX (CH Middle) | TEMP& Humidity | 27.4°C, 53% |

Vertical

| TX / GFSK mode / CH Middle | | | | Measurement Distance at 3m | | | | Vertical polarity | | |
|----------------------------|---------|--------|------------|----------------------------|--------|----------|----------|-------------------|---------|--|
| Freq. | Reading | AF | Cable Loss | Pre-amp | Filter | Level | Limit | Margin | Mark | |
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | (P/Q/A) | |
| * 1416.52 | 57.11 | 26.15 | 3.08 | 44.76 | 0.45 | 42.03 | 74.00 | -31.97 | P | |
| * 1416.52 | 48.63 | 26.15 | 3.08 | 44.76 | 0.45 | 33.55 | 54.00 | -20.45 | A | |
| * 4880.61 | 59.14 | 33.49 | 5.51 | 42.60 | 0.23 | 55.77 | 74.00 | -18.23 | P | |
| * 4880.61 | 51.97 | 33.49 | 5.51 | 42.60 | 0.23 | 48.60 | 54.00 | -5.40 | A | |
| * 7319.34 | 55.70 | 39.11 | 6.59 | 42.29 | 0.27 | 59.38 | 74.00 | -14.62 | P | |
| * 7319.34 | 44.35 | 39.11 | 6.59 | 42.29 | 0.27 | 48.03 | 54.00 | -5.97 | A | |

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.
6. *=Restricted bands of operation

| | | | |
|---------------------|-----------------------|---------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/28 |
| Model | JF-91 | Test By | Ted Huang |
| Test Mode | GFSK(BT) TX (CH High) | TEMP& Humidity | 27.4°C, 53% |

Horizontal

| TX / GFSK mode / CH High | | | | Measurement Distance at 3m | | | | Horizontal polarity | |
|--------------------------|---------|--------|------------|----------------------------|--------|----------|----------|---------------------|---------|
| Freq. | Reading | AF | Cable Loss | Pre-amp | Filter | Level | Limit | Margin | Mark |
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | (P/Q/A) |
| * 1701.20 | 58.22 | 28.15 | 3.37 | 44.46 | 0.67 | 45.95 | 74.00 | -28.05 | P |
| * 1701.20 | 47.21 | 28.15 | 3.37 | 44.46 | 0.67 | 34.94 | 54.00 | -19.06 | A |
| * 4960.00 | 58.82 | 33.76 | 5.57 | 42.59 | 0.24 | 55.80 | 74.00 | -18.20 | P |
| * 4960.00 | 51.15 | 33.76 | 5.57 | 42.59 | 0.24 | 48.13 | 54.00 | -5.87 | A |
| * 7440.69 | 55.40 | 39.57 | 6.62 | 42.13 | 0.27 | 59.73 | 74.00 | -14.27 | P |
| * 7440.69 | 44.40 | 39.57 | 6.62 | 42.13 | 0.27 | 48.73 | 54.00 | -5.27 | A |

| | | | |
|---------------------|-----------------------|---------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/28 |
| Model | JF-91 | Test By | Ted Huang |
| Test Mode | GFSK(BT) TX (CH High) | TEMP& Humidity | 27.4°C, 53% |

Vertical

| TX / GFSK mode / CH High | | | | Measurement Distance at 3m | | | | Vertical polarity | |
|--------------------------|---------|--------|------------|----------------------------|--------|----------|----------|-------------------|---------|
| Freq. | Reading | AF | Cable Loss | Pre-amp | Filter | Level | Limit | Margin | Mark |
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | (P/Q/A) |
| * 1416.42 | 58.21 | 26.15 | 3.08 | 44.76 | 0.45 | 43.13 | 74.00 | -30.87 | P |
| * 1416.42 | 47.58 | 26.15 | 3.08 | 44.76 | 0.45 | 32.50 | 54.00 | -21.50 | A |
| * 4959.63 | 61.12 | 33.76 | 5.57 | 42.59 | 0.24 | 58.09 | 74.00 | -15.91 | P |
| * 4959.63 | 54.24 | 33.76 | 5.57 | 42.59 | 0.24 | 51.21 | 54.00 | -2.79 | A |
| * 7440.20 | 55.59 | 39.57 | 6.62 | 42.13 | 0.27 | 59.92 | 74.00 | -14.08 | P |
| * 7440.20 | 44.62 | 39.57 | 6.62 | 42.13 | 0.27 | 48.95 | 54.00 | -5.05 | A |

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.
6. *=Restricted bands of operation

| | | | |
|---------------------|-----------------------|---------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/28 |
| Model | JF-91 | Test By | Ted Huang |
| Test Mode | GFSK(RF) TX (CH Low) | TEMP& Humidity | 27.4°C, 53% |

Horizontal

| TX / GFSK mode / CH Low | | | | Measurement Distance at 3m | | | | Horizontal polarity | | |
|-------------------------|---------|--------|------------|----------------------------|--------|----------|----------|---------------------|---------|--|
| Freq. | Reading | AF | Cable Loss | Pre-amp | Filter | Level | Limit | Margin | Mark | |
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | (P/Q/A) | |
| * 1695.14 | 58.25 | 28.10 | 3.37 | 44.47 | 0.66 | 45.91 | 74.00 | -28.09 | P | |
| * 1695.14 | 46.35 | 28.10 | 3.37 | 44.47 | 0.66 | 34.01 | 54.00 | -19.99 | A | |
| * 4804.57 | 58.09 | 33.24 | 5.46 | 42.61 | 0.22 | 54.39 | 74.00 | -19.61 | P | |
| * 4804.57 | 48.61 | 33.24 | 5.46 | 42.61 | 0.22 | 44.91 | 54.00 | -9.09 | A | |
| 7206.96 | 55.54 | 38.69 | 6.57 | 42.44 | 0.27 | 58.63 | 74.00 | -15.37 | P | |
| 7206.96 | 44.75 | 38.69 | 6.57 | 42.44 | 0.27 | 47.84 | 54.00 | -6.16 | A | |

| | | | |
|---------------------|-----------------------|---------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/28 |
| Model | JF-91 | Test By | Ted Huang |
| Test Mode | GFSK(RF) TX (CH Low) | TEMP& Humidity | 27.4°C, 53% |

Vertical

| TX / GFSK mode / CH Low | | | | Measurement Distance at 3m | | | | Vertical polarity | | |
|-------------------------|---------|--------|------------|----------------------------|--------|----------|----------|-------------------|---------|--|
| Freq. | Reading | AF | Cable Loss | Pre-amp | Filter | Level | Limit | Margin | Mark | |
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | (P/Q/A) | |
| * 1415.50 | 56.85 | 26.15 | 3.08 | 44.76 | 0.45 | 41.77 | 74.00 | -32.23 | P | |
| * 1415.50 | 47.39 | 26.15 | 3.08 | 44.76 | 0.45 | 32.31 | 54.00 | -21.69 | A | |
| * 4804.17 | 59.10 | 33.23 | 5.46 | 42.61 | 0.22 | 55.40 | 74.00 | -18.60 | P | |
| * 4804.17 | 51.54 | 33.23 | 5.46 | 42.61 | 0.22 | 47.84 | 54.00 | -6.16 | A | |
| 7205.19 | 55.84 | 38.68 | 6.57 | 42.44 | 0.27 | 58.92 | 74.00 | -15.08 | P | |
| 7205.19 | 44.58 | 38.68 | 6.57 | 42.44 | 0.27 | 47.66 | 54.00 | -6.34 | A | |

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.
6. *=Restricted bands of operation

Report No.: T210414N06-RP1

| | | | |
|---------------------|-------------------------|---------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/28 |
| Model | JF-91 | Test By | Ted Huang |
| Test Mode | GFSK(RF) TX (CH Middle) | TEMP& Humidity | 27.4°C, 53% |

Horizontal

| TX / GFSK mode / CH Middle | | | | Measurement Distance at 3m | | | | Horizontal polarity | | |
|----------------------------|---------|--------|------------|----------------------------|--------|----------|----------|---------------------|---------|--|
| Freq. | Reading | AF | Cable Loss | Pre-amp | Filter | Level | Limit | Margin | Mark | |
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | (P/Q/A) | |
| * 1696.52 | 57.25 | 28.11 | 3.37 | 44.47 | 0.66 | 44.93 | 74.00 | -29.07 | P | |
| * 1696.52 | 47.51 | 28.11 | 3.37 | 44.47 | 0.66 | 35.19 | 54.00 | -18.81 | A | |
| * 4880.42 | 57.95 | 33.49 | 5.51 | 42.60 | 0.23 | 54.58 | 74.00 | -19.42 | P | |
| * 4880.42 | 49.30 | 33.49 | 5.51 | 42.60 | 0.23 | 45.93 | 54.00 | -8.07 | A | |
| * 7319.35 | 55.48 | 39.11 | 6.59 | 42.29 | 0.27 | 59.16 | 74.00 | -14.84 | P | |
| * 7319.35 | 44.00 | 39.11 | 6.59 | 42.29 | 0.27 | 47.68 | 54.00 | -6.32 | A | |

| | | | |
|---------------------|-------------------------|---------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/28 |
| Model | JF-91 | Test By | Ted Huang |
| Test Mode | GFSK(RF) TX (CH Middle) | TEMP& Humidity | 27.4°C, 53% |

Vertical

| TX / GFSK mode / CH Middle | | | | Measurement Distance at 3m | | | | Vertical polarity | | |
|----------------------------|---------|--------|------------|----------------------------|--------|----------|----------|-------------------|---------|--|
| Freq. | Reading | AF | Cable Loss | Pre-amp | Filter | Level | Limit | Margin | Mark | |
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | (P/Q/A) | |
| * 1416.52 | 57.11 | 26.15 | 3.08 | 44.76 | 0.45 | 42.03 | 74.00 | -31.97 | P | |
| * 1416.52 | 48.63 | 26.15 | 3.08 | 44.76 | 0.45 | 33.55 | 54.00 | -20.45 | A | |
| * 4880.61 | 59.14 | 33.49 | 5.51 | 42.60 | 0.23 | 55.77 | 74.00 | -18.23 | P | |
| * 4880.61 | 51.97 | 33.49 | 5.51 | 42.60 | 0.23 | 48.60 | 54.00 | -5.40 | A | |
| * 7319.34 | 55.70 | 39.11 | 6.59 | 42.29 | 0.27 | 59.38 | 74.00 | -14.62 | P | |
| * 7319.34 | 44.35 | 39.11 | 6.59 | 42.29 | 0.27 | 48.03 | 54.00 | -5.97 | A | |

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:

$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.
6. *=Restricted bands of operation

Report No.: T210414N06-RP1

| | | | |
|---------------------|-----------------------|---------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/28 |
| Model | JF-91 | Test By | Ted Huang |
| Test Mode | GFSK(RF) TX (CH High) | TEMP& Humidity | 27.4°C, 53% |

Horizontal

| TX / GFSK mode / CH High | | | | Measurement Distance at 3m | | | | Horizontal polarity | |
|--------------------------|---------|--------|------------|----------------------------|--------|----------|----------|---------------------|---------|
| Freq. | Reading | AF | Cable Loss | Pre-amp | Filter | Level | Limit | Margin | Mark |
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | (P/Q/A) |
| * 1701.20 | 58.22 | 28.15 | 3.37 | 44.46 | 0.67 | 45.95 | 74.00 | -28.05 | P |
| * 1701.20 | 47.21 | 28.15 | 3.37 | 44.46 | 0.67 | 34.94 | 54.00 | -19.06 | A |
| * 4960.00 | 58.82 | 33.76 | 5.57 | 42.59 | 0.24 | 55.80 | 74.00 | -18.20 | P |
| * 4960.00 | 51.15 | 33.76 | 5.57 | 42.59 | 0.24 | 48.13 | 54.00 | -5.87 | A |
| * 7440.69 | 55.40 | 39.57 | 6.62 | 42.13 | 0.27 | 59.73 | 74.00 | -14.27 | P |
| * 7440.69 | 44.40 | 39.57 | 6.62 | 42.13 | 0.27 | 48.73 | 54.00 | -5.27 | A |

| | | | |
|---------------------|-----------------------|---------------------------|-------------|
| Product Name | Cherry Wireless Mouse | Test Date | 2021/04/28 |
| Model | JF-91 | Test By | Ted Huang |
| Test Mode | GFSK(RF) TX (CH High) | TEMP& Humidity | 27.4°C, 53% |

Vertical

| TX / GFSK mode / CH High | | | | Measurement Distance at 3m | | | | Vertical polarity | |
|--------------------------|---------|--------|------------|----------------------------|--------|----------|----------|-------------------|---------|
| Freq. | Reading | AF | Cable Loss | Pre-amp | Filter | Level | Limit | Margin | Mark |
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | (P/Q/A) |
| * 1416.42 | 58.21 | 26.15 | 3.08 | 44.76 | 0.45 | 43.13 | 74.00 | -30.87 | P |
| * 1416.42 | 47.58 | 26.15 | 3.08 | 44.76 | 0.45 | 32.50 | 54.00 | -21.50 | A |
| * 4959.63 | 61.12 | 33.76 | 5.57 | 42.59 | 0.24 | 58.09 | 74.00 | -15.91 | P |
| * 4959.63 | 54.24 | 33.76 | 5.57 | 42.59 | 0.24 | 51.21 | 54.00 | -2.79 | A |
| * 7440.20 | 55.59 | 39.57 | 6.62 | 42.13 | 0.27 | 59.92 | 74.00 | -14.08 | P |
| * 7440.20 | 44.62 | 39.57 | 6.62 | 42.13 | 0.27 | 48.95 | 54.00 | -5.05 | A |

REMARK:

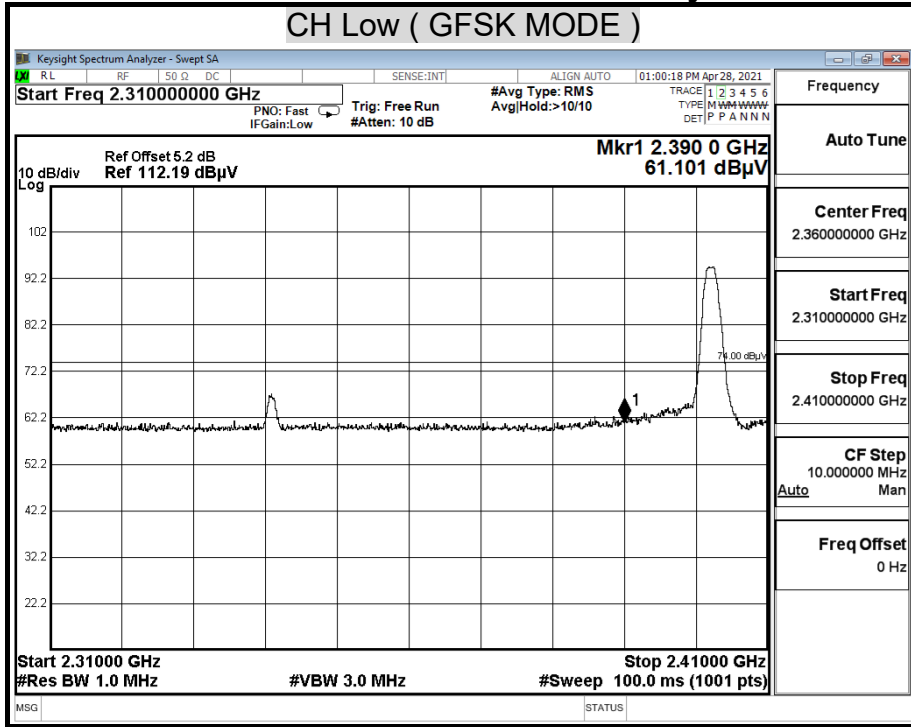
1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: 2.4GHz~2.5GHz Filter Insertion Loss
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
 Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.
6. *=Restricted bands of operation

Report No.: T210414N06-RP1
8.7.4 RESTRICTED BAND EDGES

GFSK(BT) Mode

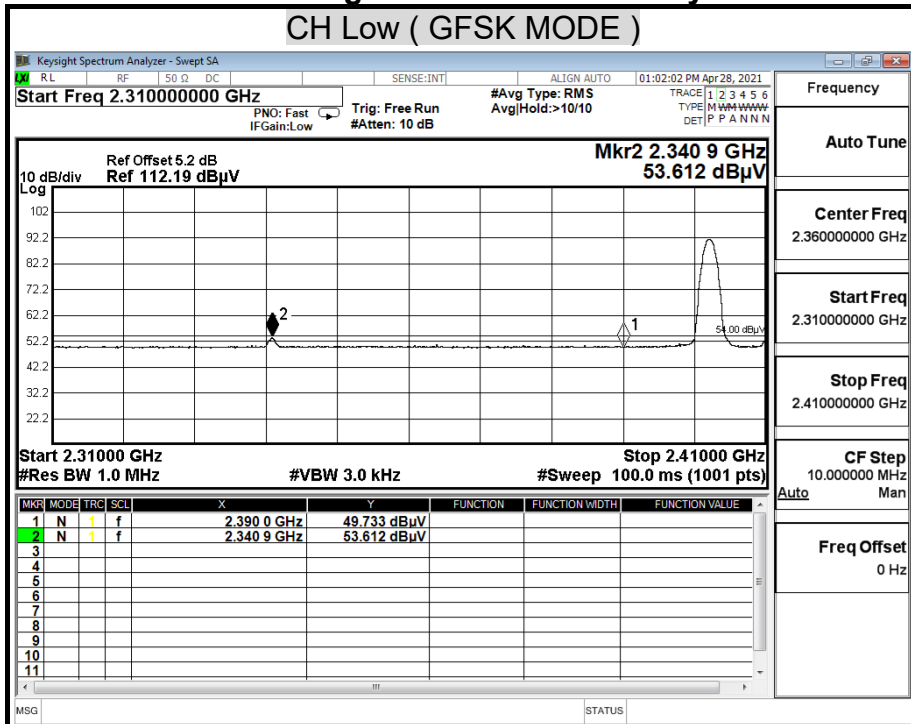
Detector mode : Peak

Polarity : Horizontal



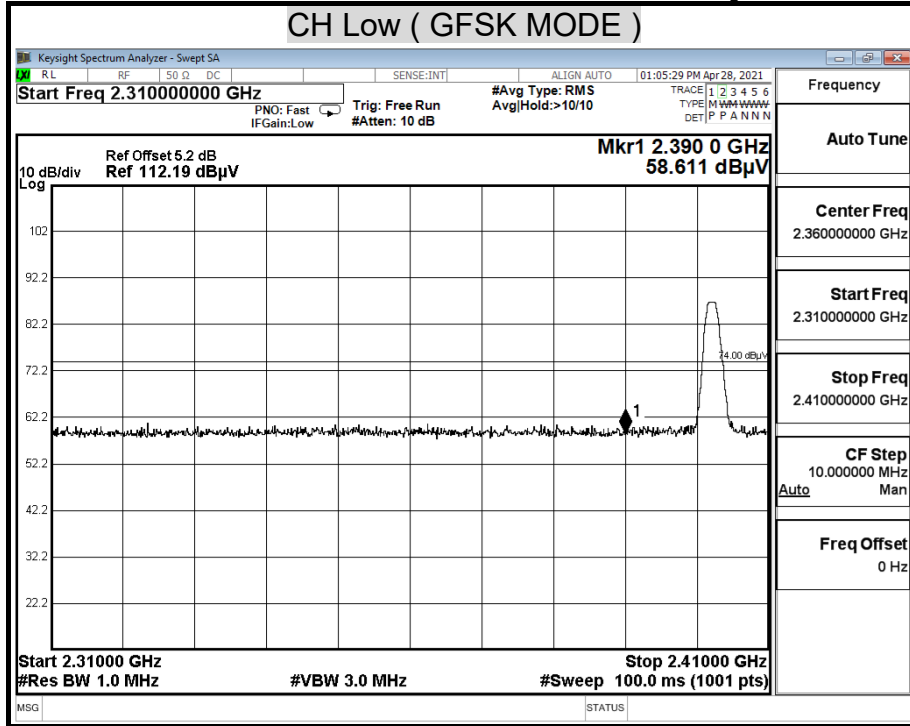
Detector mode : Average

Polarity : Horizontal



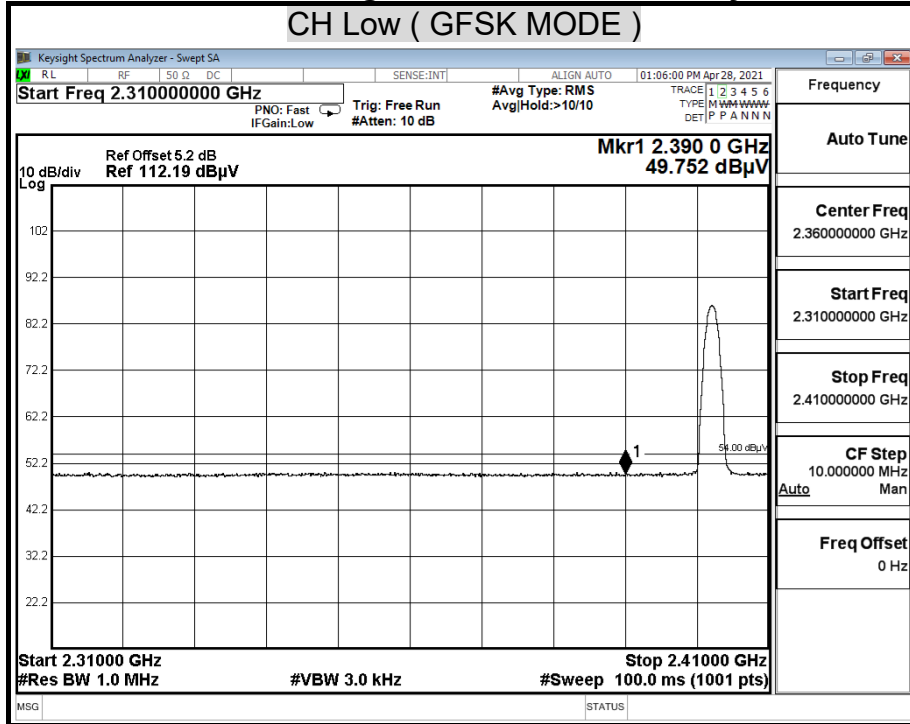
Detector mode : Peak

Polarity : Vertical

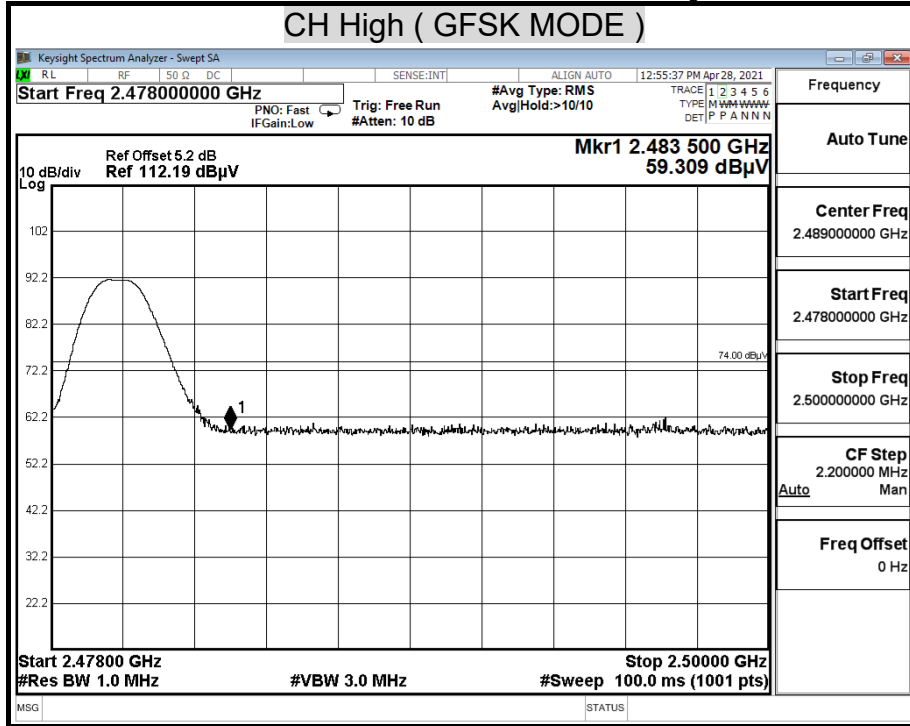


Detector mode : Average

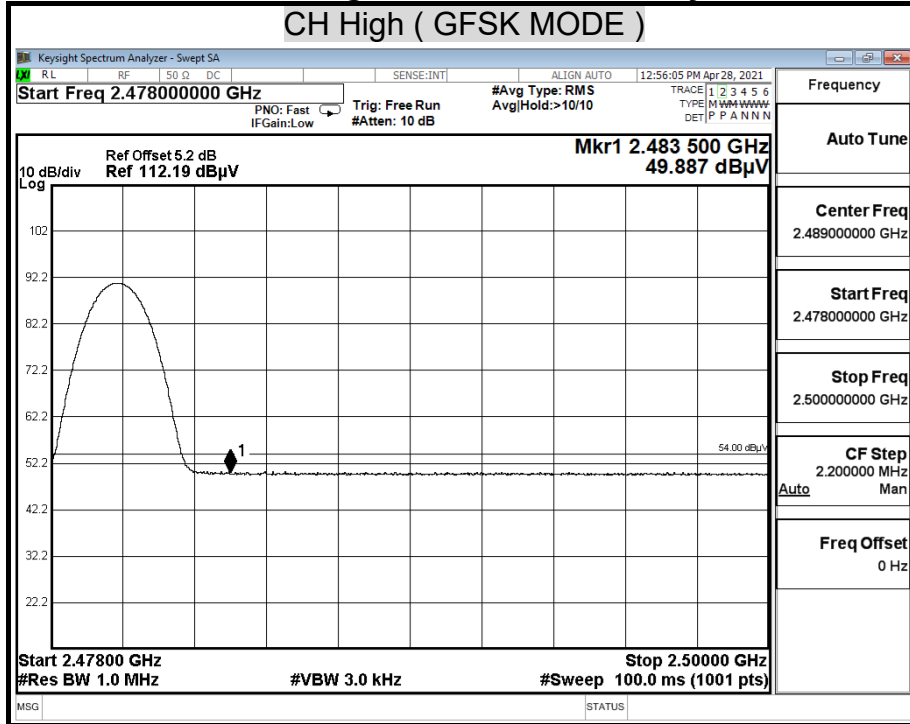
Polarity : Vertical



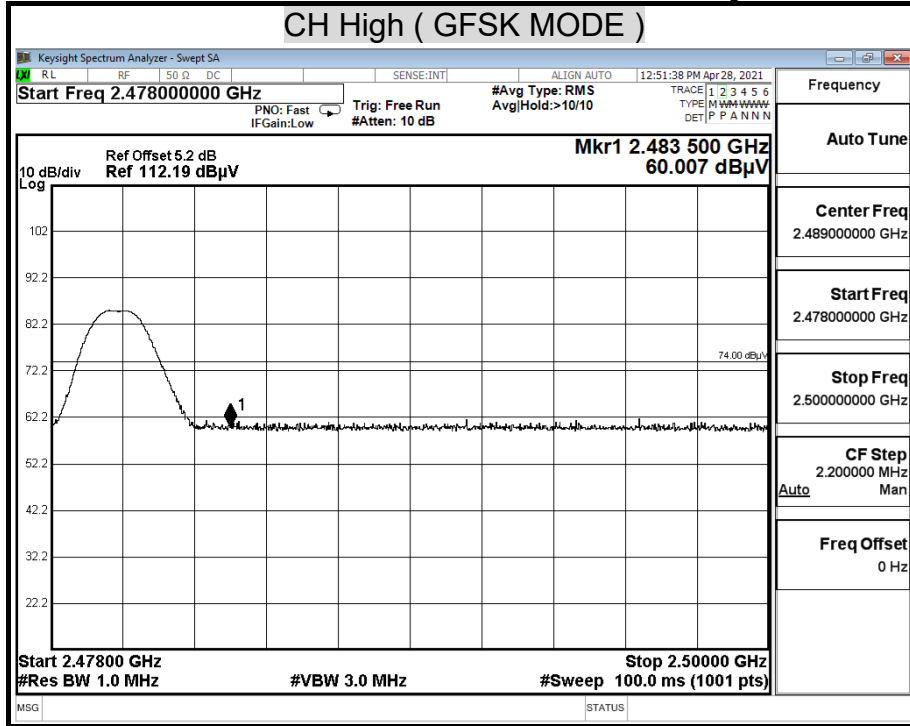
Detector mode : Peak **Polarity : Horizontal**



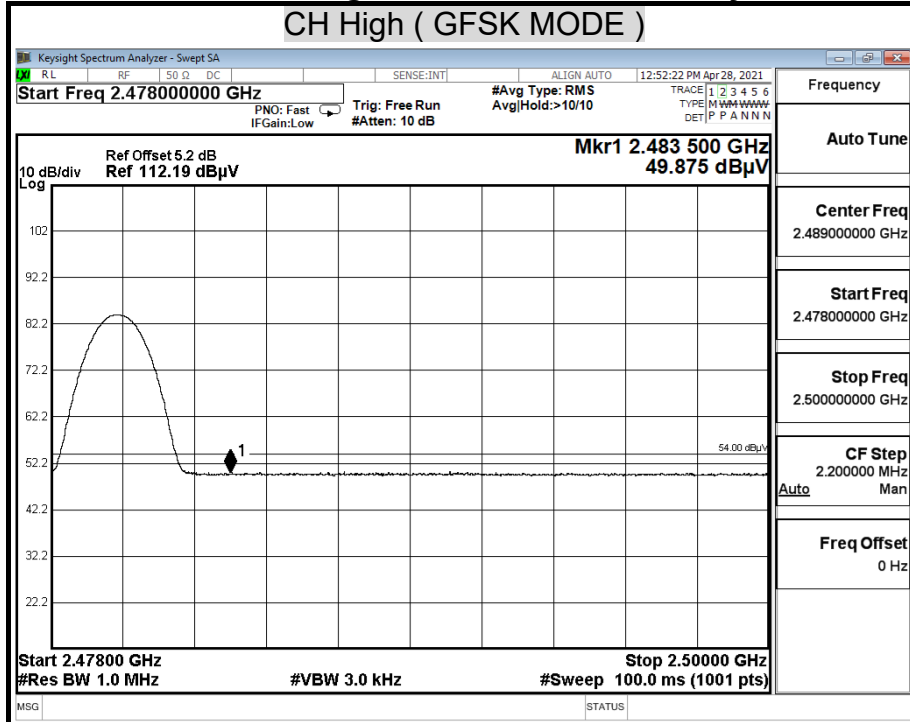
Detector mode : Average **Polarity : Horizontal**



Detector mode : Peak **Polarity : Vertical**



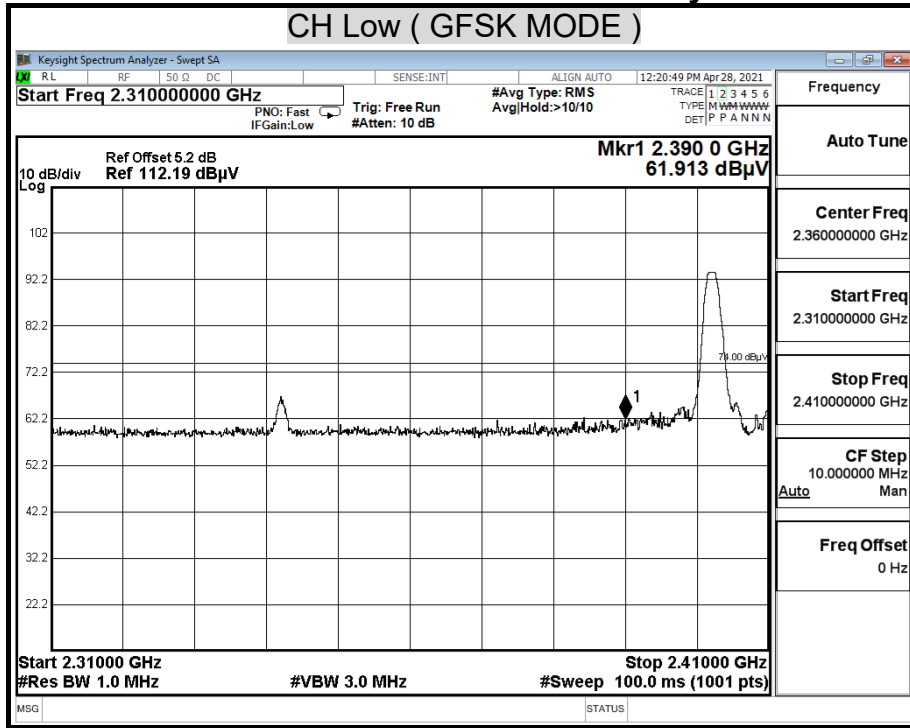
Detector mode : Average **Polarity : Vertical**



GFSK(RF) Mode

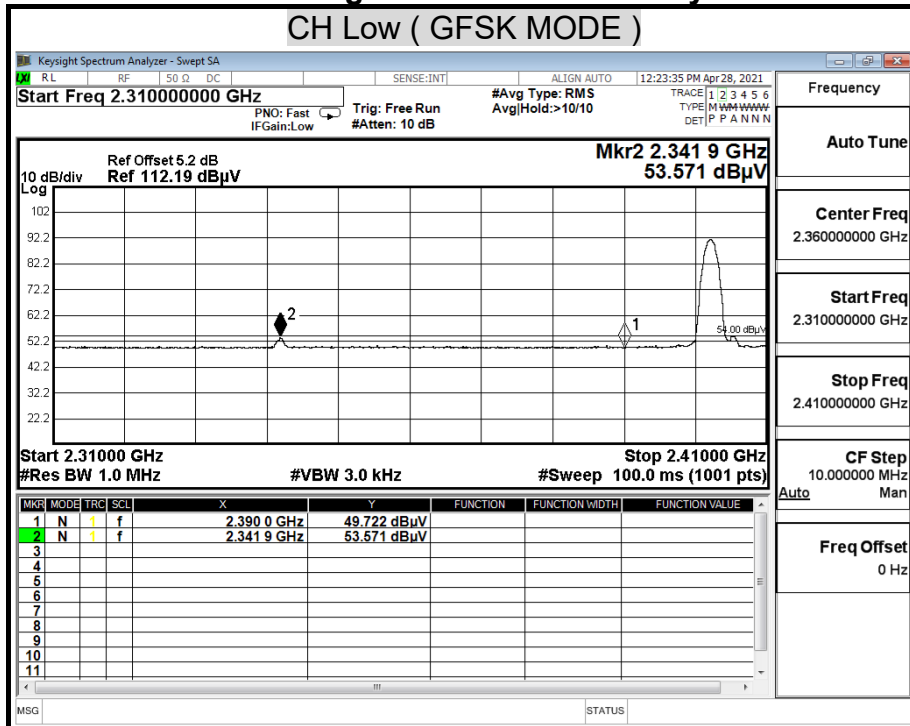
Detector mode : Peak

Polarity : Horizontal



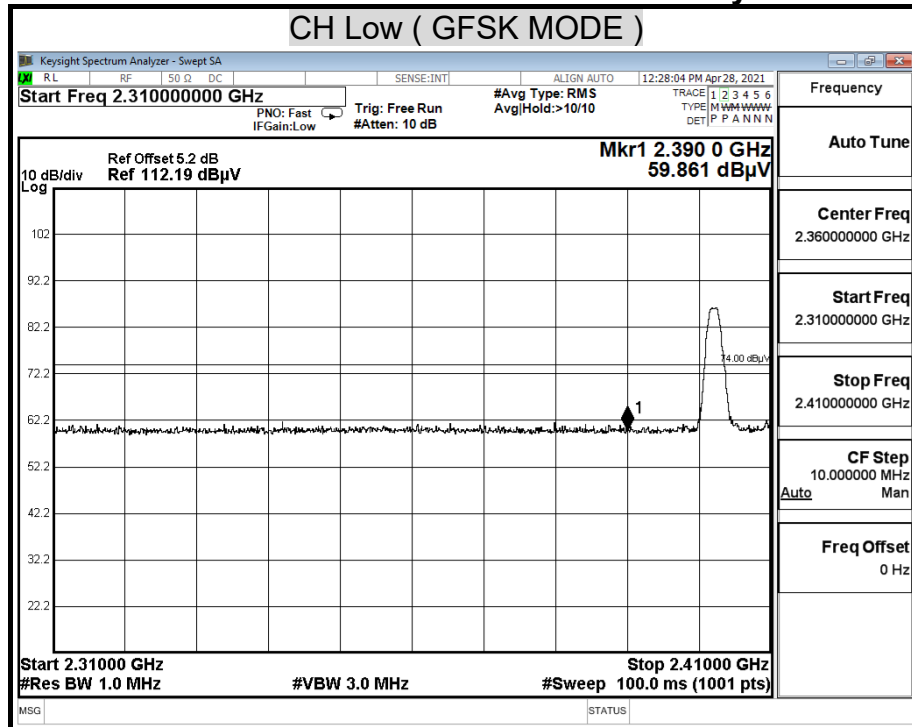
Detector mode : Average

Polarity : Horizontal



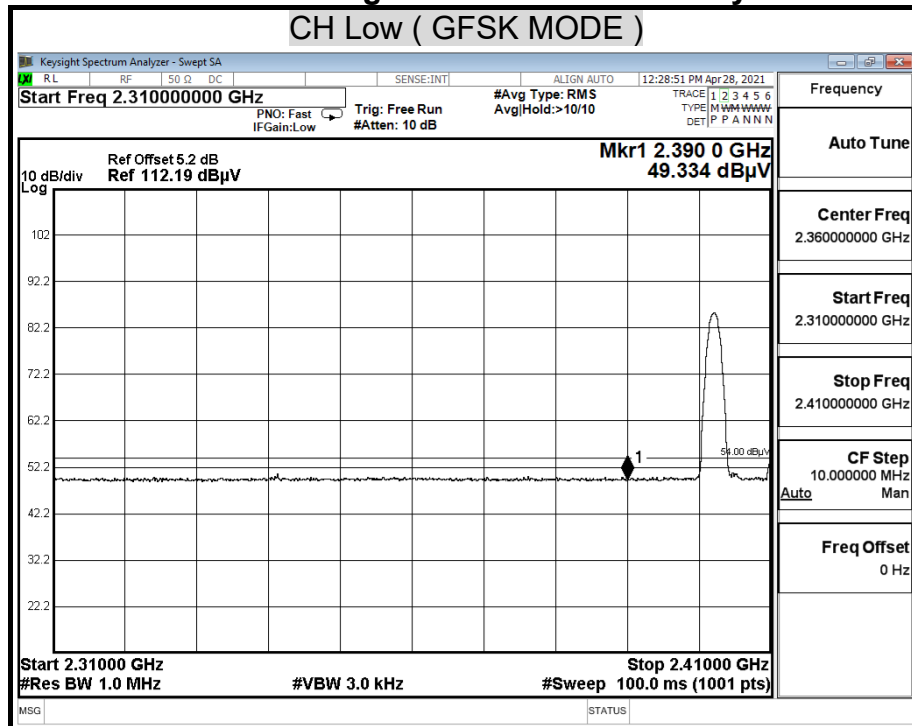
Detector mode : Peak

Polarity : Vertical

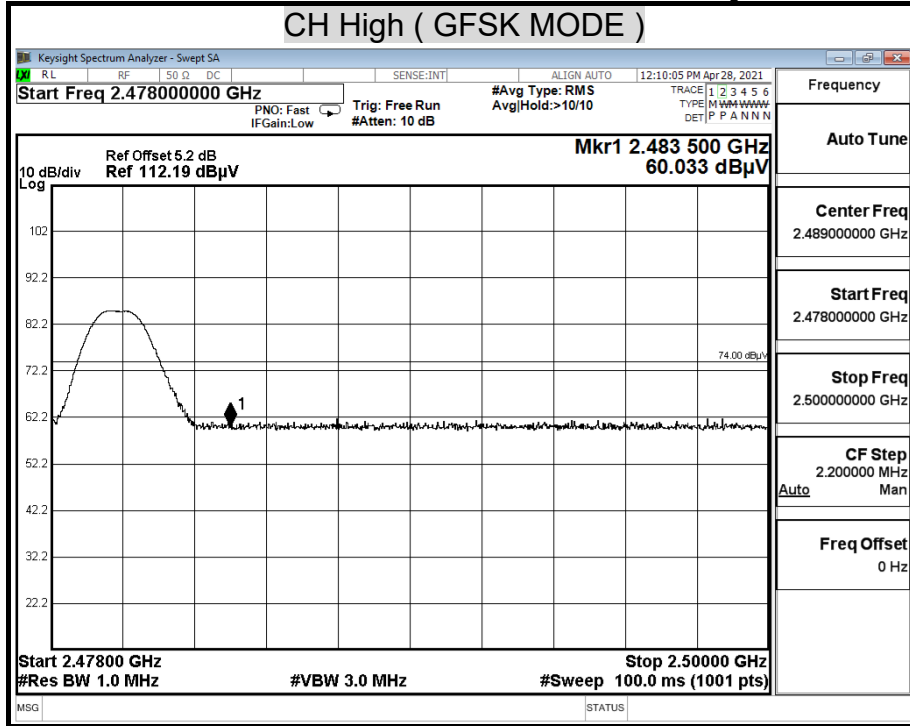


Detector mode : Average

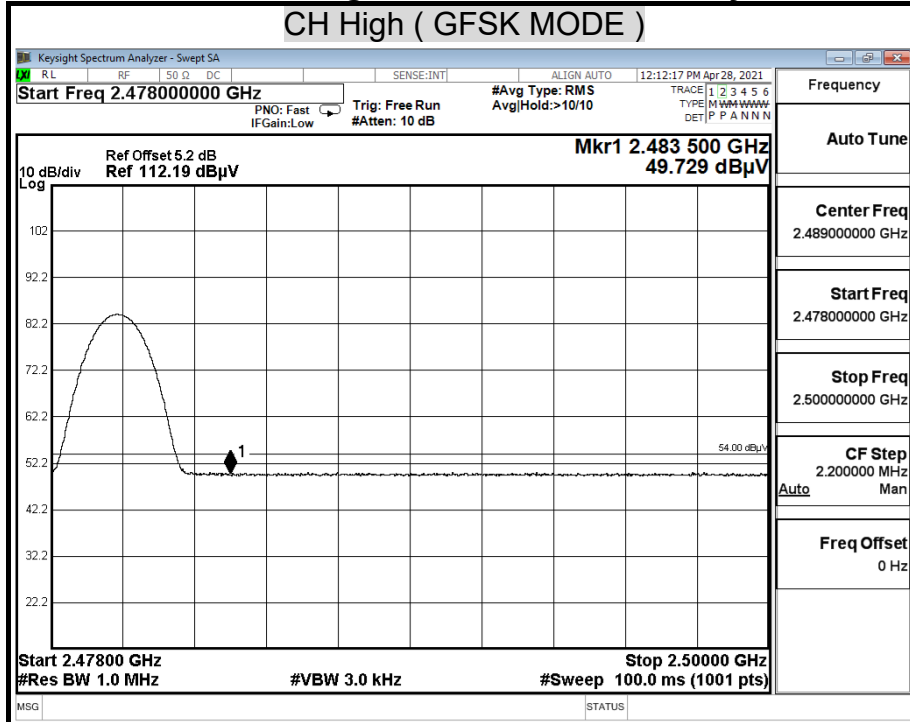
Polarity : Vertical



Detector mode : Peak **Polarity : Vertical**



Detector mode : Average **Polarity : Vertical**



8.8 POWERLINE CONDUCTED EMISSIONS

LIMITS

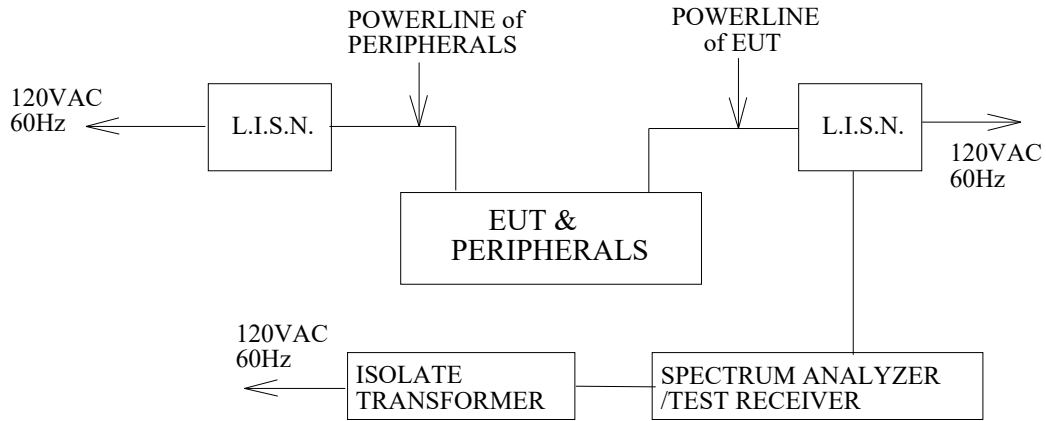
§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

| Frequency of Emission (MHz) | Conducted limit (dB μ v) | |
|-----------------------------|------------------------------|----------|
| | Quasi-peak | Average |
| 0.15 - 0.5 | 66 to 56 | 56 to 46 |
| 0.5 - 5 | 56 | 46 |
| 5 - 30 | 60 | 50 |

Report No.: T210414N06-RP1

TEST SETUP



TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80cm above the horizontal ground plane. The EUT IS CONFIGURED IN ACCORDANCE WITH ANSI C63.10.

The resolution bandwidth is set to 9 kHz for both quasi-peak detection and average detection measurements.

Line conducted data is recorded for both NEUTRAL and LINE.

Report No.: T210414N06-RP1

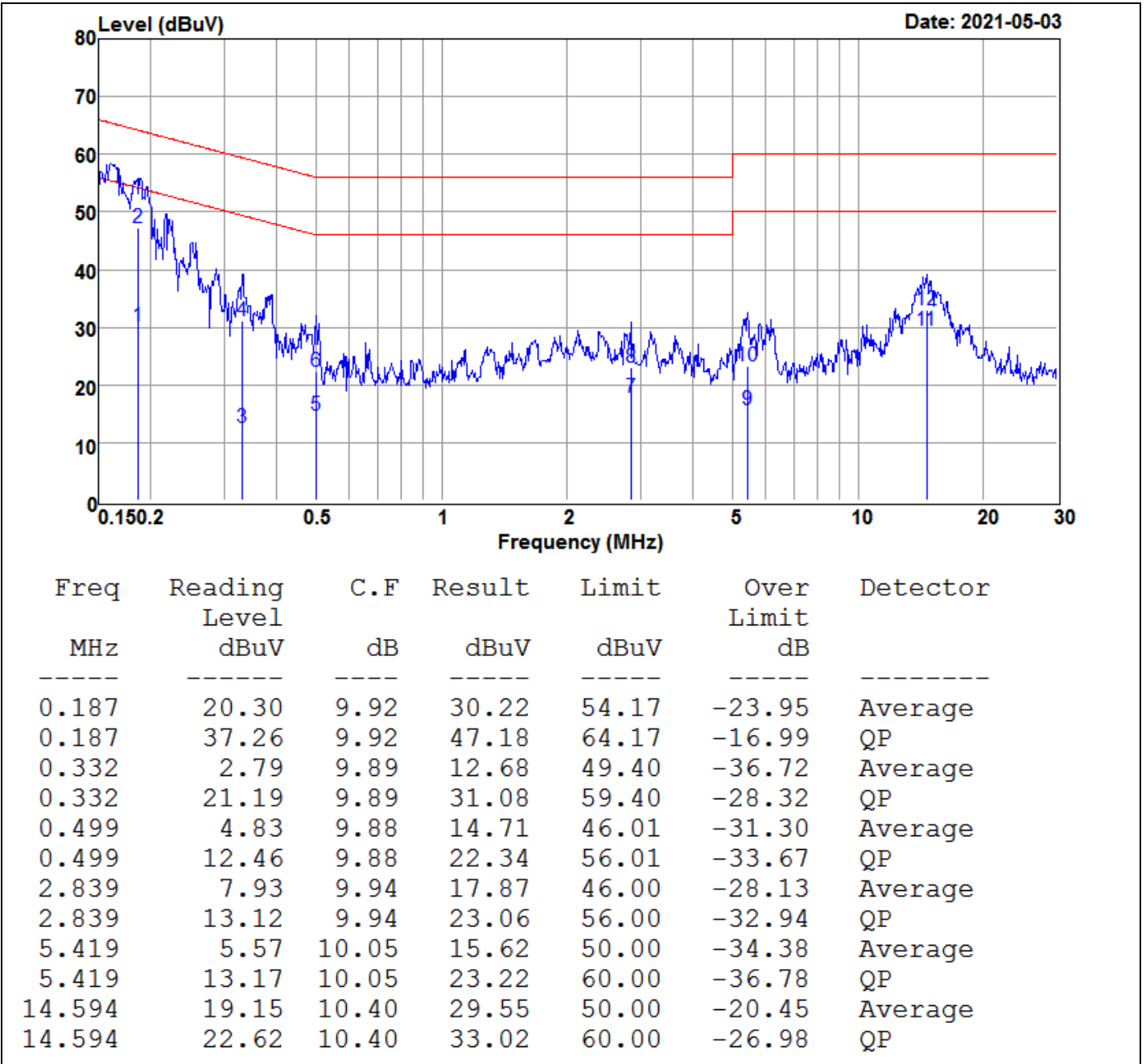
TEST RESULTS

No non-compliance noted.

| | | | |
|---------------------------------|----------------|-----------------------------|-------|
| Model No. | JF-91 | Test Mode | BT |
| Environmental Conditions | 26.5°C, 70% RH | Resolution Bandwidth | 9 kHz |
| Tested by | Oz Ding | | |

Line

(The chart below shows the highest readings taken from the final data.)

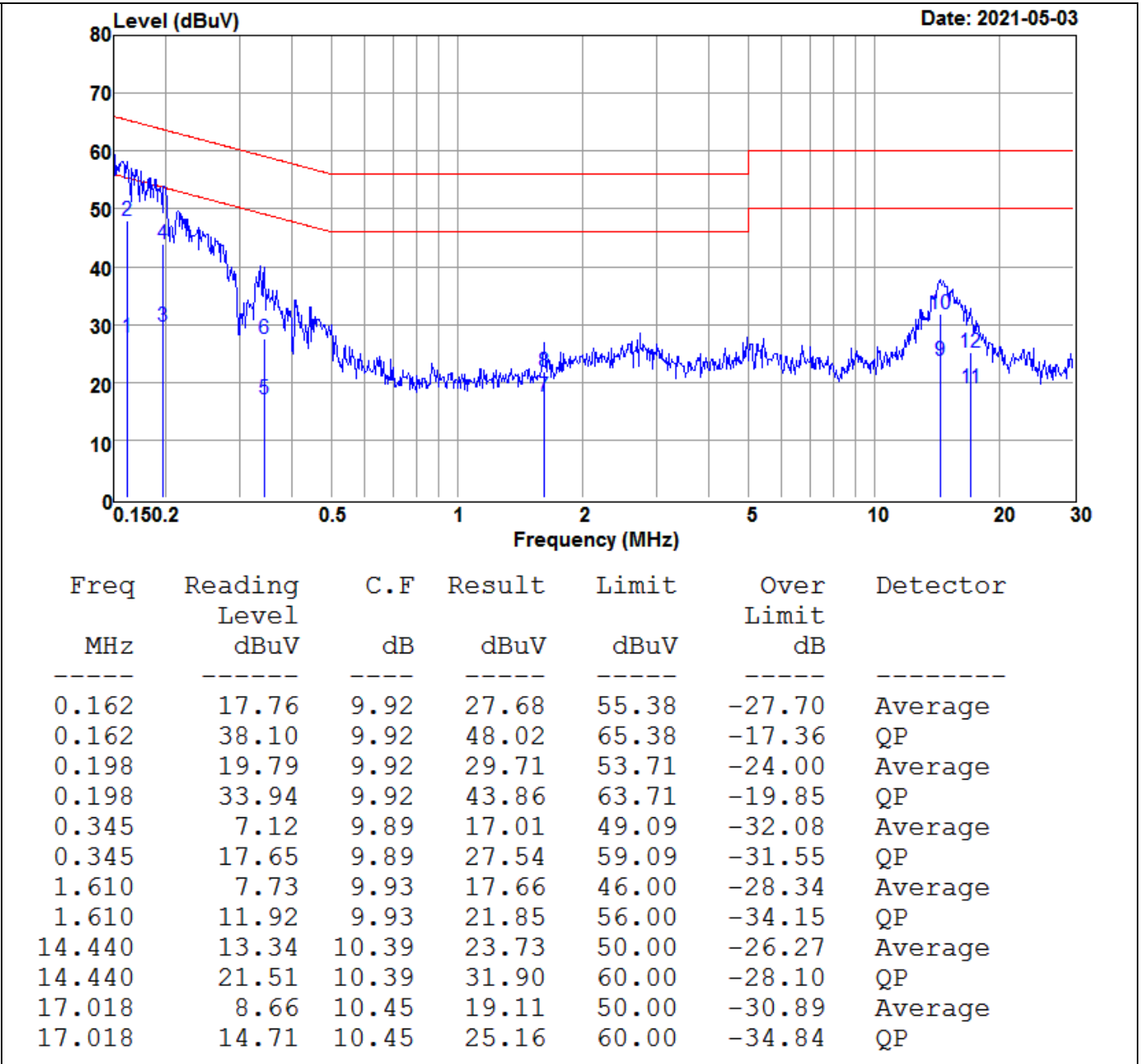


Report No.: T210414N06-RP1

| | | | |
|---------------------------------|----------------|-----------------------------|-------|
| Model No. | JF-91 | Test Mode | BT |
| Environmental Conditions | 26.5°C, 70% RH | Resolution Bandwidth | 9 kHz |
| Tested by | Oz Ding | | |

Neutral

(The chart below shows the highest readings taken from the final data.)



9. ANTENNA REQUIREMENT

9.1 STANDARD APPLICABLE

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

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.2 ANTENNA CONNECTED CONSTRUCTION

Manufacturer: Sunrex
Type: PCB
Model: JD-85M
Gain: 0.37 dBi

===End of Test Report===