# FCC Test Report

| | |
|---|---|
| Product Name | Bike Navigation computer |
| Model No. | ROX GPS 12.0 |
| FCC ID. | M5LROX-12-0 |

| | |
|---|---|
| Applicant | SIGMA-ELEKTRO GMBH |
| Address | Dr.-Julius-Leber-Str. 15, 67433 Neustadt a. d. Weinstrase |

| | |
|---|---|
| Date of Receipt | May 25, 2017 |
| Issued Date | Sep 27, 2017 |
| Report No. | 1750612R-RFUSP23V00 |
| Report Version | V2.0 |

Testing Laboratory
3023

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
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# Test Report

Issued Date: Sep 27, 2017
Report No.: 1750612R-RFUSP23V00

| | |
|---|---|
| Product Name | Bike Navigation computer |
| Applicant | SIGMA-ELEKTRO GMBH |
| Address | Dr.-Julius-Leber-Str. 15, 67433 Neustadt a. d. Weinstrase |
| Manufacturer | SIGMA-ELEKTRO GMBH |
| Model No. | ROX GPS 12.0 |
| FCC ID. | M5LROX-12-0 |
| EUT Rated Voltage | DC 3.7V (Power by Battery) or DC 5V (Power by USB) |
| EUT Test Voltage | DC 5V (Power by USB) |
| Trade Name | SIGMA-ELEKTRO GMBH |
| Applicable Standard | FCC CFR Title 47 Part 15 Subpart C: 2016<br>ANSI C63.4: 2014, ANSI C63.10: 2013 |
| Test Result | Complied |

Documented By : Genie Chang

( Senior Adm. Specialist / Genie Chang )

Tested By : Ivan Chuang

( Senior Engineer / Ivan Chuang )

Approved By :

( Director / Vincent Lin )

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# 1. GENERAL INFORMATION

## 1.1. EUT Description

| | |
|---|---|
| Product Name | Bike Navigation computer |
| Trade Name | SIGMA-ELEKTRO GMBH |
| Model No. | ROX GPS 12.0 |
| FCC ID. | M5LROX-12-0 |
| Frequency Range | 2402 – 2480MHz |
| Channel Number | 79 |
| Type of Modulation | FHSS: GFSK(1Mbps) / $\pi$ /4DQPSK(2Mbps) / 8DPSK(3Mbps) |
| Antenna Type | Ceramic PIFA Antenna |
| Channel Control | Auto |
| Antenna Gain | Refer to the table “Antenna List” |

**Antenna List**

| No. | Manufacturer | Part No. | Antenna Type | Peak Gain |
|---|---|---|---|---|
| 1 | SIGMA-ELEKTRO GMBH | N/A | Ceramic PIFA Antenna | 1.1 dBi for 2.4 GHz |

Note: The antenna of EUT is conforming to FCC 15.203.

Center Frequency of Each Channel:

| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---|---|---|---|---|---|---|---|
| Channel 00: | 2402 MHz | Channel 20: | 2422 MHz | Channel 40: | 2442 MHz | Channel 60: | 2462 MHz |
| Channel 01: | 2403 MHz | Channel 21: | 2423 MHz | Channel 41: | 2443 MHz | Channel 61: | 2463 MHz |
| Channel 02: | 2404 MHz | Channel 22: | 2424 MHz | Channel 42: | 2444 MHz | Channel 62: | 2464 MHz |
| Channel 03: | 2405 MHz | Channel 23: | 2425 MHz | Channel 43: | 2445 MHz | Channel 63: | 2465 MHz |
| Channel 04: | 2406 MHz | Channel 24: | 2426 MHz | Channel 44: | 2446 MHz | Channel 64: | 2466 MHz |
| Channel 05: | 2407 MHz | Channel 25: | 2427 MHz | Channel 45: | 2447 MHz | Channel 65: | 2467 MHz |
| Channel 06: | 2408 MHz | Channel 26: | 2428 MHz | Channel 46: | 2448 MHz | Channel 66: | 2468 MHz |
| Channel 07: | 2409 MHz | Channel 27: | 2429 MHz | Channel 47: | 2449 MHz | Channel 67: | 2469 MHz |
| Channel 08: | 2410 MHz | Channel 28: | 2430 MHz | Channel 48: | 2450 MHz | Channel 68: | 2470 MHz |
| Channel 09: | 2411 MHz | Channel 29: | 2431 MHz | Channel 49: | 2451 MHz | Channel 69: | 2471 MHz |
| Channel 10: | 2412 MHz | Channel 30: | 2432 MHz | Channel 50: | 2452 MHz | Channel 70: | 2472 MHz |
| Channel 11: | 2413 MHz | Channel 31: | 2433 MHz | Channel 51: | 2453 MHz | Channel 71: | 2473 MHz |
| Channel 12: | 2414 MHz | Channel 32: | 2434 MHz | Channel 52: | 2454 MHz | Channel 72: | 2474 MHz |
| Channel 13: | 2415 MHz | Channel 33: | 2435 MHz | Channel 53: | 2455 MHz | Channel 73: | 2475 MHz |
| Channel 14: | 2416 MHz | Channel 34: | 2436 MHz | Channel 54: | 2456 MHz | Channel 74: | 2476 MHz |
| Channel 15: | 2417 MHz | Channel 35: | 2437 MHz | Channel 55: | 2457 MHz | Channel 75: | 2477 MHz |
| Channel 16: | 2418 MHz | Channel 36: | 2438 MHz | Channel 56: | 2458 MHz | Channel 76: | 2478 MHz |
| Channel 17: | 2419 MHz | Channel 37: | 2439 MHz | Channel 57: | 2459 MHz | Channel 77: | 2479 MHz |
| Channel 18: | 2420 MHz | Channel 38: | 2440 MHz | Channel 58: | 2460 MHz | Channel 78: | 2480 MHz |
| Channel 19: | 2421 MHz | Channel 39: | 2441 MHz | Channel 59: | 2461 MHz | | |

Note:

1. The EUT is a Bike Navigation computer with a 2.4GHz WLAN、Bluetooth and ANT+ transceiver, this report for Bluetooth.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

| | |
|---|---|
| Test Mode | Mode 1: Transmit - 1Mbps<br>Mode 2: Transmit - 2Mbps<br>Mode 3: Transmit - 3Mbps |

## 1.2. Operational Description

The EUT is a Bike Navigation computer with built-in Bluetooth V2.1+EDR transceiver. The number of the channels is 79 in 2402-2480MHz. This device provides three kinds of transmitting speed and modulation, respectively GFSK(1Mbps) / $\pi$ /4DQPSK(2Mbps) / 8DPSK(3Mbps). The antenna is Ceramic PIFA Antenna.

The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. The transmitter is presented with a continuous data stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its 79 channels and over the minimum number of hopping channels (75 channels).

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted.

The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

This equipment includes WLAN、Bluetooth and ANT+, which can not transmit signals simultaneously.

## 1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

**Mode 1 & Mode 3**

| Product | | Manufacturer | Model No. | Serial No. | Power Cord |
|---|---|---|---|---|---|
| 1 | Notebook PC | DELL | P62G | CY9FJC2 | N/A |

| Signal Cable Type | | Signal cable Description |
|---|---|---|
| A | Micro USB to USB Cable | Non-Shielded, 1.5m |

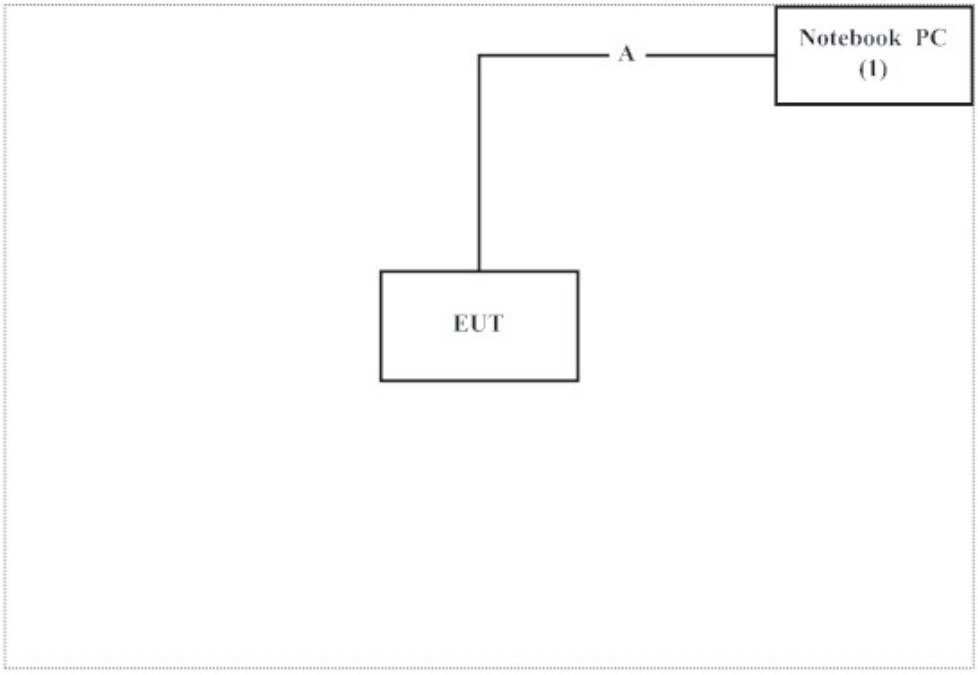
**Mode 2**

| Product | | Manufacturer | Model No. | Serial No. | Power Cord |
|---|---|---|---|---|---|
| 1 | Notebook PC | DELL | P62G | 416FJC2 | N/A |
| 2 | Bluetooth Tester | Anritsu | MT8852B | 6K00006247 | N/A |

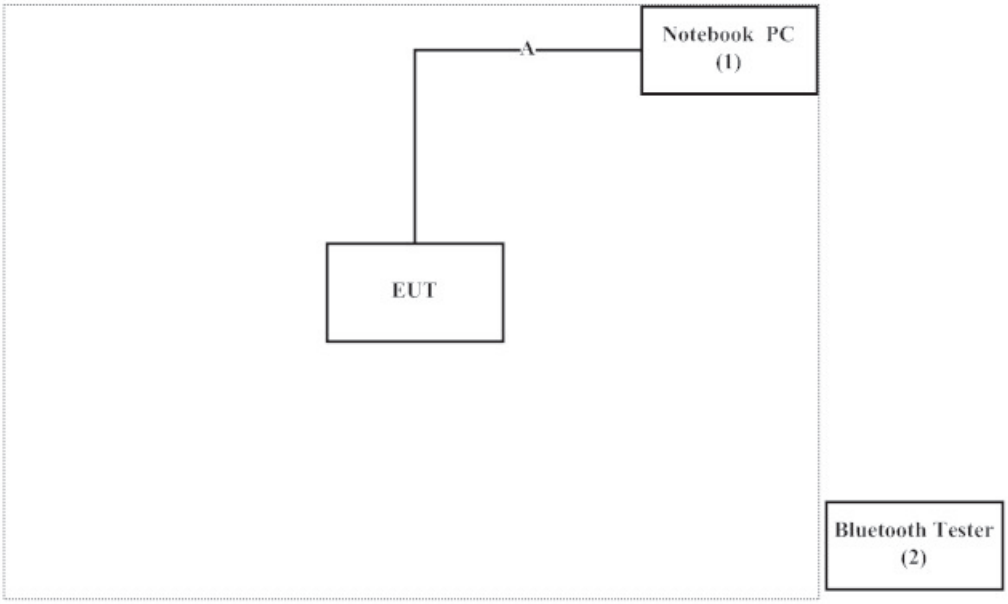
| Signal Cable Type | | Signal cable Description |
|---|---|---|
| A | Micro USB to USB Cable | Non-Shielded, 1.5m |

## 1.4. Configuration of Tested System

**Mode 1 & Mode 3**




**Mode 2**



## 1.5. EUT Exercise Software

**Mode 1 & Mode 3**

1. Setup the EUT as shown in Section 1.4.
2. Execute software “Ant RF Test App (Ver 1.00.00)” on the EUT.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

**Mode 2**

1. Setup the EUT as shown in Section 1.4.
2. The EUT is Controlled by the Bluetooth Tester.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

## 1.6. Test Facility

Ambient conditions in the laboratory:

| Items | Required (IEC 68-1) | Actual |
|---|---|---|
| Temperature (°C) | 15-35 | 20-35 |
| Humidity (%RH) | 25-75 | 50-65 |
| Barometric pressure (mbar) | 860-1060 | 950-1000 |

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site:
http://www.dekra.com.tw/english/about/certificates.aspx?bval=5
The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: http://www.dekra.com.tw/index_en

Site Description: Accredited by TAF
Accredited Number: 3023

Site Name: DEKRA Testing and Certification Co., Ltd.
Site Address: No.159, Sec. 2, Wenhua 1st Rd., Linkou Dist.,
New Taipei City 24457, Taiwan.
TEL: 886-2-2602-7968 / FAX : 866-2-2602-3286
E-Mail : info.tw@dekra.com

FCC Accreditation Number: TW3023

## 1.7. List of Test Equipment

**For Conduction measurements /ASR1**

| | Equipment | Manufacturer | Model No. | Serial No. | Cali. Data | Due. Data |
|---|---|---|---|---|---|---|
| X | EMI Test Receiver | R&S | ESR7 | 161601 | 2017.01.06 | 2018.01.05 |
| X | Two-Line V-Network | R&S | ENV216 | 101306 | 2017.02.16 | 2018.02.15 |
| X | Two-Line V-Network | R&S | ENV216 | 101307 | 2017.03.17 | 2018.03.16 |
| X | Coaxial Cable | Quietek | RG400_BNC | RF001 | 2017.05.24 | 2018.05.23 |

Note:
1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuieTek EMI 2.0 V2.1.113

**For Conducted measurements /ASR4**

| | Equipment | Manufacturer | Model No. | Serial No. | Cali. Data | Due. Data |
|---|---|---|---|---|---|---|
| X | Spectrum Analyzer | R&S | FSV30 | 103464 | 2017.01.09 | 2018.01.08 |
| X | Power Meter | Anritsu | ML2496A | 1548003 | 2016.12.15 | 2017.12.14 |
| X | Power Sensor | Anritsu | MA2411B | 1531024 | 2016.12.15 | 2017.12.14 |
| X | Power Sensor | Anritsu | MA2411B | 1531025 | 2016.12.15 | 2017.12.14 |
| X | Bluetooth Tester | Anritsu | MT8852B | 6K00006247 | 2017.08.15 | 2018.08.14 |

Note:
1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuieTek Conduction Test System V8.0.110

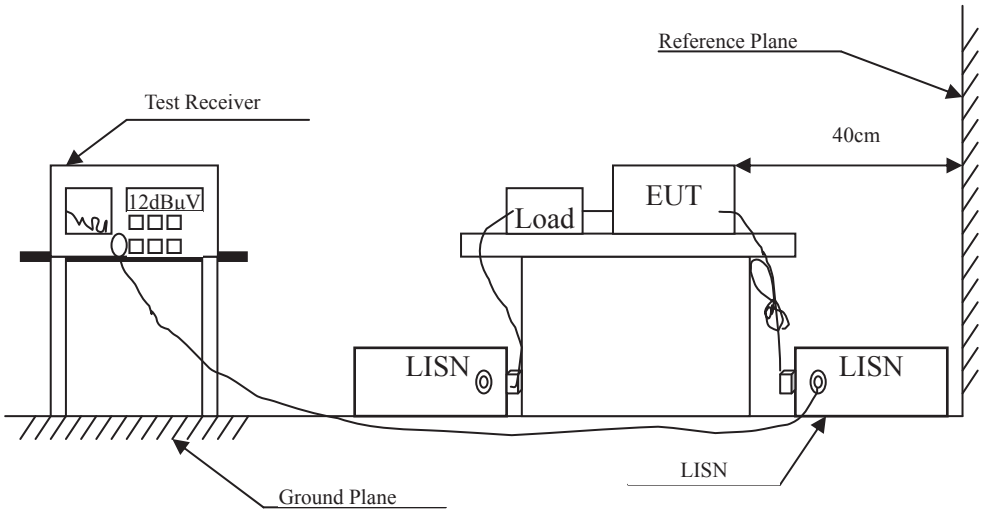
**For Radiated measurements /ACB1**

| | Equipment | Manufacturer | Model No. | Serial No. | Cali. Data | Due. Data |
|---|---|---|---|---|---|---|
| X | Loop Antenna | TESEQ | HLA6121 | 37133 | 2016.03.18 | 2018.03.17 |
| X | Bi-Log Antenna | SCHWARZBECK | VULB9168 | 9168-674 | 2017.02.13 | 2018.02.12 |
| X | Horn Antenna | ETS-Lindgren | 3117 | 00203800 | 2016.10.13 | 2017.10.12 |
| X | Horn Antenna | Com-Power | AH-840 | 101087 | 2017.05.24 | 2018.05.23 |
| X | Pre-Amplifier | EMCI | EMC001330 | 980316 | 2017.05.16 | 2018.05.15 |
| X | Pre-Amplifier | EMCI | EMC051835SE | 980311 | 2017.05.17 | 2018.05.16 |
| X | Pre-Amplifier | EMCI | EMC05820SE | 980310 | 2017.05.17 | 2018.05.16 |
| X | Pre-Amplifier | EMCI | EMC184045SE | 980314 | 2017.05.17 | 2018.05.16 |
| X | Filter | MICRO TRONICS | BRM50702 | G249 | 2017.08.11 | 2018.08.10 |
| | Filter | MICRO TRONICS | BRM50716 | G187 | 2017.08.16 | 2018.08.15 |
| X | EMI Test Receiver | R&S | ESR7 | 101602 | 2016.12.15 | 2017.12.14 |
| X | Spectrum Analyzer | R&S | FSV40 | 101148 | 2017.01.24 | 2018.01.23 |
| X | Coaxial Cable | SUHNER | SUCOFLEX 106 | RF002 | 2017.05.25 | 2018.05.24 |
| X | Mircoflex Cable | HUBER SUHNER | SUCOFLEX 102 | MY3381/2 | 2017.08.11 | 2018.08.10 |

Note:
1. Loop Antenna is calibrated every two year, the other equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuieTek EMI 2.0 V2.1.113

## 2. Conducted Emission

### 2.1. Test Setup




### 2.2. Limits

| FCC Part 15 Subpart C Paragraph 15.207 (dBµV) Limit | | |
|---|---|---|
| Frequency MHz | Limits | |
| | QP | AV |
| 0.15 - 0.50 | 66-56 | 56-46 |
| 0.50-5.0 | 56 | 46 |
| 5.0 - 30 | 60 | 50 |

Remarks: In the above table, the tighter limit applies at the band edges.

## 2.3. Test Procedure

The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

## 2.4. Uncertainty

±2.35dB

## 2.5. Test Result of Conducted Emission

Product : Bike Navigation computer
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 3: Transmit - 3Mbps (2441MHz)
Test Date : 2017/06/21

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBµV | dBµV | dB | dBµV |
| **LINE 1** | | | | | |
| **Quasi-Peak** | | | | | |
| 0.159 | 9.705 | 39.748 | 49.453 | -16.290 | 65.743 |
| 0.500 | 9.737 | 26.532 | 36.269 | -19.731 | 56.000 |
| 0.940 | 9.753 | 18.134 | 27.888 | -28.112 | 56.000 |
| 2.200 | 9.802 | 15.823 | 25.625 | -30.375 | 56.000 |
| 3.400 | 9.836 | 18.761 | 28.597 | -27.403 | 56.000 |
| 9.900 | 10.000 | 19.219 | 29.219 | -30.781 | 60.000 |
| **Average** | | | | | |
| 0.159 | 9.705 | 23.563 | 33.268 | -22.475 | 55.743 |
| 0.500 | 9.737 | 20.689 | 30.426 | -15.574 | 46.000 |
| 0.940 | 9.753 | 13.269 | 23.022 | -22.978 | 46.000 |
| 2.200 | 9.802 | 7.641 | 17.443 | -28.557 | 46.000 |
| 3.400 | 9.836 | 9.487 | 19.323 | -26.677 | 46.000 |
| 9.900 | 10.000 | 14.762 | 24.762 | -25.238 | 50.000 |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "  " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

| | | |
|---|---|---|
| Product | : | Bike Navigation computer |
| Test Item | : | Conducted Emission Test |
| Power Line | : | Line 2 |
| Test Mode | : | Mode 3: Transmit - 3Mbps (2441MHz) |
| Test Date | : | 2017/06/21 |

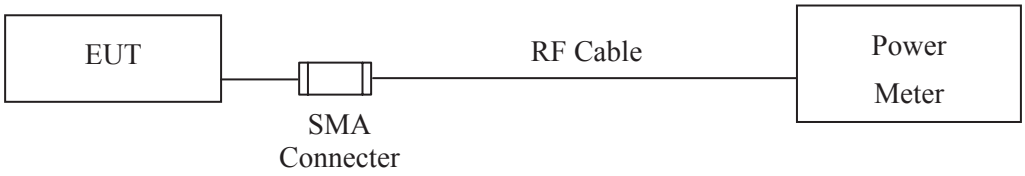
| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBµV | dBµV | dB | dBµV |
| **LINE 2** | | | | | |
| **Quasi-Peak** | | | | | |
| 0.159 | 9.697 | 41.966 | 51.662 | -14.081 | 65.743 |
| 0.480 | 9.725 | 27.689 | 37.414 | -19.157 | 56.571 |
| 0.940 | 9.753 | 18.682 | 28.436 | -27.564 | 56.000 |
| 2.200 | 9.802 | 17.954 | 27.756 | -28.244 | 56.000 |
| 3.400 | 9.836 | 19.733 | 29.568 | -26.432 | 56.000 |
| 10.000 | 9.996 | 11.261 | 21.257 | -38.743 | 60.000 |
| **Average** | | | | | |
| 0.159 | 9.697 | 24.256 | 33.953 | -21.790 | 55.743 |
| 0.480 | 9.725 | 19.529 | 29.254 | -17.317 | 46.571 |
| 0.940 | 9.753 | 14.179 | 23.933 | -22.067 | 46.000 |
| 2.200 | 9.802 | 9.919 | 19.721 | -26.279 | 46.000 |
| 3.400 | 9.836 | 10.253 | 20.089 | -25.911 | 46.000 |
| 10.000 | 9.996 | 6.885 | 16.881 | -33.119 | 50.000 |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "  " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

# 3. Peak Power Output

## 3.1. Test Setup




## 3.2. Limit

The maximum peak power shall be less 1Watt.

## 3.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

## 3.4. Uncertainty

±0.86 dB

## 3.5. Test Result of Peak Power Output

Product : Bike Navigation computer
Test Item : Peak Power Output
Test Mode : Mode 1: Transmit - 1Mbps
Test Date : 2017/06/03

| Channel No. | Frequency (MHz) | Measurement (dBm) | Required Limit | Result |
|---|---|---|---|---|
| Channel 00 | 2402.00 | 7.64 | 1 Watt= 30 dBm | Pass |
| Channel 39 | 2441.00 | 8.48 | 1 Watt= 30 dBm | Pass |
| Channel 78 | 2480.00 | 9.09 | 1 Watt= 30 dBm | Pass |

Product : Bike Navigation computer
Test Item : Peak Power Output
Test Mode : Mode 2: Transmit - 2Mbps
Test Date : 2017/09/26

| Channel No. | Frequency (MHz) | Measurement (dBm) | Required Limit | Result |
|---|---|---|---|---|
| Channel 00 | 2402.00 | 6.58 | 1 Watt= 30 dBm | Pass |
| Channel 39 | 2441.00 | 7.15 | 1 Watt= 30 dBm | Pass |
| Channel 78 | 2480.00 | 8.43 | 1 Watt= 30 dBm | Pass |

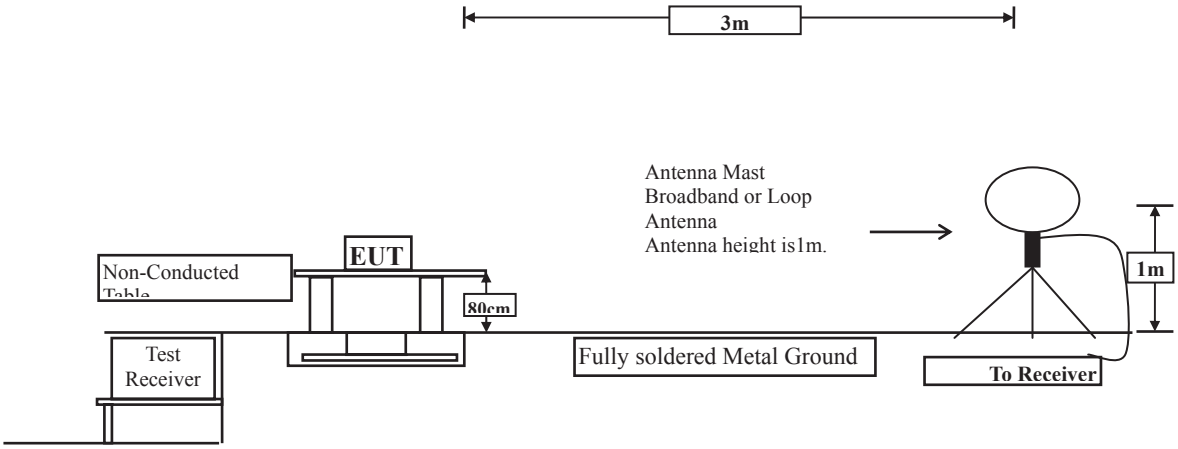
Product : Bike Navigation computer
Test Item : Peak Power Output
Test Mode : Mode 3: Transmit - 3Mbps
Test Date : 2017/06/03

| Channel No. | Frequency (MHz) | Measurement (dBm) | Required Limit | Result |
|---|---|---|---|---|
| Channel 00 | 2402.00 | 7.29 | 1 Watt= 30 dBm | Pass |
| Channel 39 | 2441.00 | 8.11 | 1 Watt= 30 dBm | Pass |
| Channel 78 | 2480.00 | 8.63 | 1 Watt= 30 dBm | Pass |

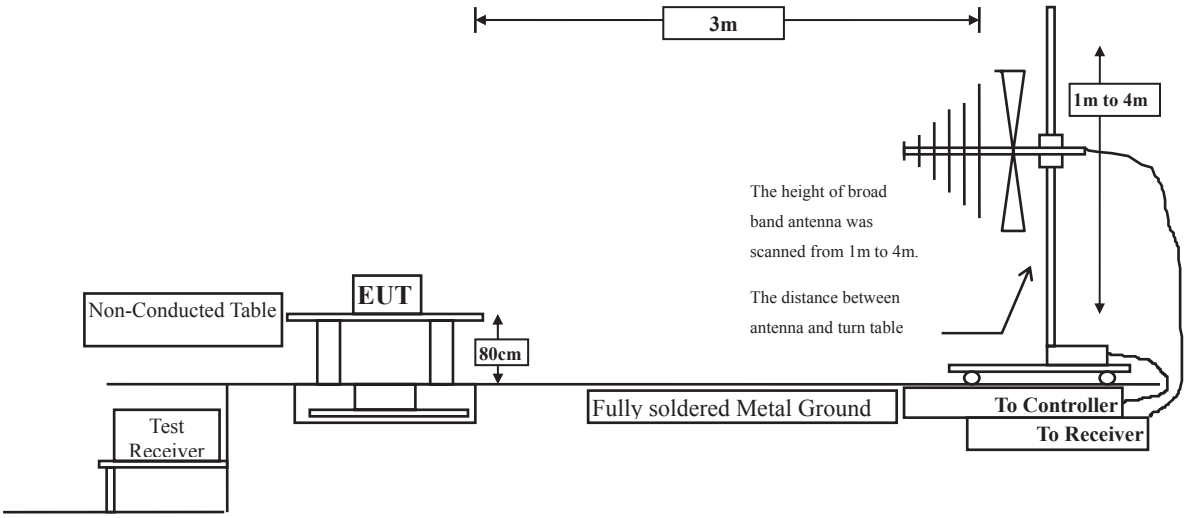
# 4. Radiated Emission

## 4.1. Test Setup

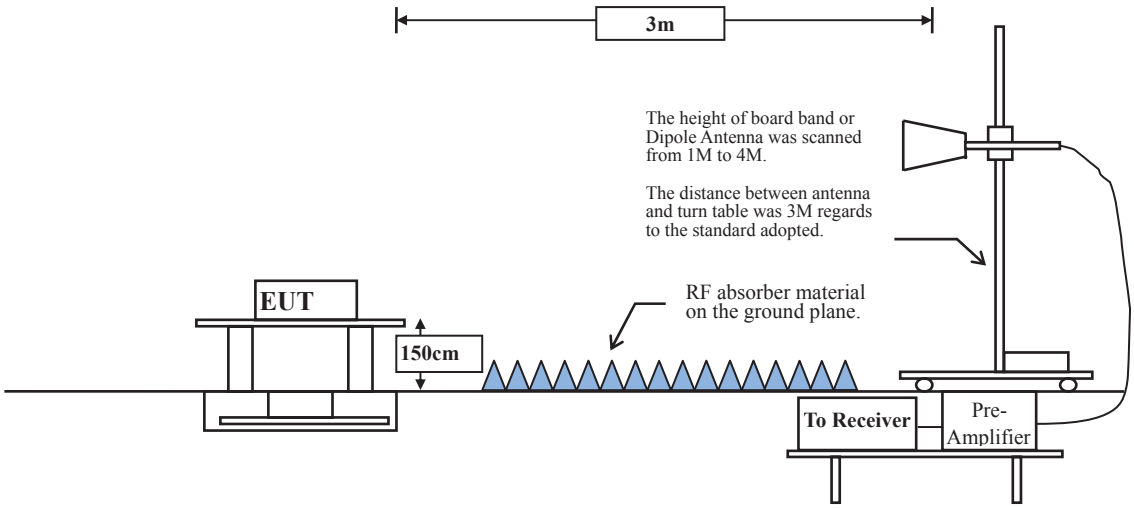
Radiated Emission Under 30MHz




Radiated Emission Below 1GHz




Radiated Emission Above 1GHz



## 4.2. Limits

### ➢ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

| FCC Part 15 Subpart C Paragraph 15.209 Limits | | |
|---|---|---|
| Frequency MHz | Field strength (microvolts/meter) | Measurement distance (meter) |
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Remarks: 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

## 4.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground,when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

## 4.4. Uncertainty

Horizontal polarization：

30-300MHz: ±4.08dB；300M-1GHz: ±3.86dB；1-18GHz: ±3.77dB；18-40GHz: ±3.98dB

Vertical polarization：

30-300MHz: ±4.81dB；300M-1GHz: ±3.87dB；1-18GHz : ±3.83dB；18-40GHz: ±3.98dB

## 4.5. Test Result of Radiated Emission

Product : Bike Navigation computer
Test Item : Harmonic Radiated Emission
Test Mode : Mode 1: Transmit - 1Mbps(2402MHz)
Test Date : 2017/06/01

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBμV | dBμV/m | dB | dBμV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4804.000 | -3.773 | 44.380 | 40.607 | -33.393 | 74.000 |
| 7206.000 | -0.784 | 45.930 | 45.145 | -28.855 | 74.000 |
| 9608.000 | 1.052 | 43.510 | 44.563 | -29.437 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4804.000 | -3.773 | 44.620 | 40.847 | -33.153 | 74.000 |
| 7206.000 | -0.784 | 46.180 | 45.395 | -28.605 | 74.000 |
| 9608.000 | 1.052 | 43.480 | 44.533 | -29.467 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bike Navigation computer
Test Item : Harmonic Radiated Emission
Test Mode : Mode 1: Transmit - 1Mbps(2441MHz)
Test Date : 2017/06/01

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBµV | dBµV/m | dB | dBµV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4882.000 | -3.770 | 44.280 | 40.510 | -33.490 | 74.000 |
| 7323.000 | -0.712 | 45.700 | 44.988 | -29.012 | 74.000 |
| 9764.000 | 1.371 | 42.470 | 43.842 | -30.158 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4882.000 | -3.770 | 44.710 | 40.940 | -33.060 | 74.000 |
| 7323.000 | -0.712 | 45.340 | 44.628 | -29.372 | 74.000 |
| 9764.000 | 1.371 | 42.410 | 43.782 | -30.218 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bike Navigation computer
Test Item : Harmonic Radiated Emission
Test Mode : Mode 1: Transmit - 1Mbps(2480MHz)
Test Date : 2017/06/01

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBµV | dBµV/m | dB | dBµV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4960.000 | -3.732 | 44.050 | 40.318 | -33.682 | 74.000 |
| 7440.000 | -0.646 | 45.540 | 44.893 | -29.107 | 74.000 |
| 9920.000 | 1.687 | 42.670 | 44.357 | -29.643 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4960.000 | -3.732 | 44.640 | 40.908 | -33.092 | 74.000 |
| 7440.000 | -0.646 | 45.870 | 45.223 | -28.777 | 74.000 |
| 9920.000 | 1.687 | 42.620 | 44.307 | -29.693 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bike Navigation computer
Test Item : Harmonic Radiated Emission
Test Mode : Mode 2: Transmit - 2Mbps(2402MHz)
Test Date : 2017/09/26

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBµV | dBµV/m | dB | dBµV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4804.000 | -3.773 | 45.850 | 42.077 | -31.923 | 74.000 |
| 7206.000 | -0.784 | 46.580 | 45.796 | -28.204 | 74.000 |
| 9608.000 | 1.052 | 43.180 | 44.232 | -29.768 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4804.000 | -3.773 | 46.520 | 42.747 | -31.253 | 74.000 |
| 7206.000 | -0.784 | 47.550 | 46.766 | -27.234 | 74.000 |
| 9608.000 | 1.052 | 43.160 | 44.212 | -29.788 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bike Navigation computer
Test Item : Harmonic Radiated Emission
Test Mode : Mode 2: Transmit - 2Mbps (2441MHz)
Test Date : 2017/09/26

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBµV | dBµV/m | dB | dBµV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4882.000 | -3.770 | 45.620 | 41.850 | -32.150 | 74.000 |
| 7323.000 | -0.712 | 47.510 | 46.798 | -27.202 | 74.000 |
| 9764.000 | 1.371 | 43.690 | 45.061 | -28.939 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4882.000 | -3.770 | 45.360 | 41.590 | -32.410 | 74.000 |
| 7323.000 | -0.712 | 46.820 | 46.108 | -27.892 | 74.000 |
| 9764.000 | 1.371 | 43.180 | 44.551 | -29.449 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bike Navigation computer
Test Item : Harmonic Radiated Emission
Test Mode : Mode 2: Transmit - 2Mbps (2480MHz)
Test Date : 2017/09/26

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBµV | dBµV/m | dB | dBµV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4960.000 | -3.732 | 45.850 | 42.118 | -31.882 | 74.000 |
| 7440.000 | -0.646 | 46.310 | 45.664 | -28.336 | 74.000 |
| 9920.000 | 1.687 | 43.850 | 45.537 | -28.463 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4960.000 | -3.732 | 45.740 | 42.008 | -31.992 | 74.000 |
| 7440.000 | -0.646 | 46.740 | 46.094 | -27.906 | 74.000 |
| 9920.000 | 1.687 | 43.640 | 45.327 | -28.673 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bike Navigation computer
Test Item : Harmonic Radiated Emission
Test Mode : Mode 3: Transmit - 3Mbps(2402MHz)
Test Date : 2017/06/01

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBµV | dBµV/m | dB | dBµV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4804.000 | -3.773 | 44.760 | 40.987 | -33.013 | 74.000 |
| 7206.000 | -0.784 | 45.610 | 44.825 | -29.175 | 74.000 |
| 9608.000 | 1.052 | 42.030 | 43.083 | -30.917 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4804.000 | -3.773 | 45.490 | 41.717 | -32.283 | 74.000 |
| 7206.000 | -0.784 | 46.190 | 45.405 | -28.595 | 74.000 |
| 9608.000 | 1.052 | 42.050 | 43.103 | -30.897 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bike Navigation computer
Test Item : Harmonic Radiated Emission
Test Mode : Mode 3: Transmit - 3Mbps (2441MHz)
Test Date : 2017/06/01

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBµV | dBµV/m | dB | dBµV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4882.000 | -3.770 | 44.120 | 40.350 | -33.650 | 74.000 |
| 7323.000 | -0.712 | 46.600 | 45.888 | -28.112 | 74.000 |
| 9764.000 | 1.371 | 42.850 | 44.222 | -29.778 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4882.000 | -3.770 | 44.770 | 41.000 | -33.000 | 74.000 |
| 7323.000 | -0.712 | 45.780 | 45.068 | -28.932 | 74.000 |
| 9764.000 | 1.371 | 42.730 | 44.102 | -29.898 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bike Navigation computer
Test Item : Harmonic Radiated Emission
Test Mode : Mode 3: Transmit - 3Mbps (2480MHz)
Test Date : 2017/06/01

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBµV | dBµV/m | dB | dBµV/m |
| **Horizontal** | | | | | |
| **Peak Detector:** | | | | | |
| 4960.000 | -3.732 | 44.150 | 40.418 | -33.582 | 74.000 |
| 7440.000 | -0.646 | 45.590 | 44.943 | -29.057 | 74.000 |
| 9920.000 | 1.687 | 42.520 | 44.207 | -29.793 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |
| **Vertical** | | | | | |
| **Peak Detector:** | | | | | |
| 4960.000 | -3.732 | 44.730 | 40.998 | -33.002 | 74.000 |
| 7440.000 | -0.646 | 45.990 | 45.343 | -28.657 | 74.000 |
| 9920.000 | 1.687 | 42.800 | 44.487 | -29.513 | 74.000 |
| **Average** | | | | | |
| **Detector:** | | | | | |
| -- | | | | | 54.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Bike Navigation computer
Test Item : General Radiated Emission
Test Mode : Mode 1: Transmit - 1Mbps (2441MHz)
Test Date : 2017/06/22

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBµV | dBµV/m | dB | dBµV/m |
| **Horizontal** | | | | | |
| 79.203 | -15.244 | 35.509 | 20.265 | -19.735 | 40.000 |
| 149.493 | -10.756 | 33.126 | 22.371 | -21.129 | 43.500 |
| 202.913 | -13.531 | 41.379 | 27.849 | -15.651 | 43.500 |
| 391.290 | -7.822 | 29.910 | 22.088 | -23.912 | 46.000 |
| 462.986 | -6.187 | 29.737 | 23.549 | -22.451 | 46.000 |
| 552.957 | -4.462 | 29.485 | 25.023 | -20.977 | 46.000 |
| **Vertical** | | | | | |
| 58.116 | -11.732 | 39.269 | 27.537 | -12.463 | 40.000 |
| 139.652 | -11.129 | 29.445 | 18.316 | -25.184 | 43.500 |
| 270.391 | -11.024 | 30.389 | 19.364 | -26.636 | 46.000 |
| 306.942 | -9.924 | 31.957 | 22.033 | -23.967 | 46.000 |
| 401.130 | -7.558 | 28.830 | 21.272 | -24.728 | 46.000 |
| 498.130 | -5.580 | 29.244 | 23.665 | -22.335 | 46.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Bike Navigation computer
Test Item : General Radiated Emission
Test Mode : Mode 2: Transmit - 2Mbps (2441MHz)
Test Date : 2017/09/26

| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBµV | dBµV/m | dB | dBµV/m |
| **Horizontal** | | | | | |
| 52.493 | -11.212 | 35.669 | 24.457 | -15.543 | 40.000 |
| 162.145 | -10.934 | 35.587 | 24.653 | -18.847 | 43.500 |
| 318.188 | -9.936 | 37.162 | 27.226 | -18.774 | 46.000 |
| 440.493 | -7.085 | 36.879 | 29.794 | -16.206 | 46.000 |
| 529.058 | -5.569 | 35.198 | 29.629 | -16.371 | 46.000 |
| 613.406 | -3.974 | 37.122 | 33.148 | -12.852 | 46.000 |
| **Vertical** | | | | | |
| 52.493 | -11.212 | 34.212 | 23.000 | -17.000 | 40.000 |
| 160.739 | -10.884 | 36.335 | 25.452 | -18.048 | 43.500 |
| 257.739 | -12.018 | 36.284 | 24.267 | -21.733 | 46.000 |
| 344.899 | -9.328 | 36.950 | 27.622 | -18.378 | 46.000 |
| 433.464 | -7.256 | 36.202 | 28.947 | -17.053 | 46.000 |
| 522.029 | -5.679 | 36.148 | 30.469 | -15.531 | 46.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Bike Navigation computer
Test Item : General Radiated Emission
Test Mode : Mode 3: Transmit - 3Mbps (2441MHz)
Test Date : 2017/06/22

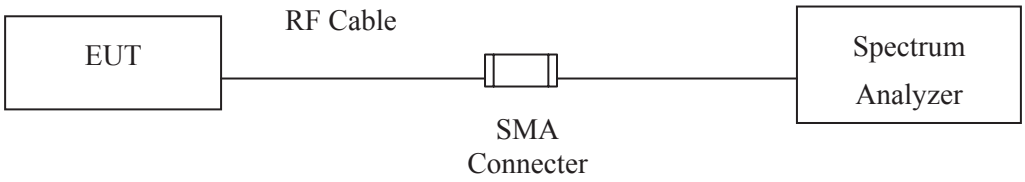
| Frequency | Correct Factor | Reading Level | Measurement Level | Margin | Limit |
|---|---|---|---|---|---|
| MHz | dB | dBµV | dBµV/m | dB | dBµV/m |
| **Horizontal** | | | | | |
| 77.797 | -14.987 | 36.221 | 21.235 | -18.765 | 40.000 |
| 149.493 | -10.756 | 33.300 | 22.545 | -20.955 | 43.500 |
| 198.696 | -13.646 | 41.798 | 28.153 | -15.347 | 43.500 |
| 387.072 | -7.940 | 28.849 | 20.909 | -25.091 | 46.000 |
| 512.188 | -5.299 | 29.492 | 24.193 | -21.807 | 46.000 |
| 599.348 | -3.344 | 28.858 | 25.515 | -20.485 | 46.000 |
| **Vertical** | | | | | |
| 59.522 | -11.878 | 39.126 | 27.248 | -12.752 | 40.000 |
| 173.391 | -11.499 | 29.543 | 18.044 | -25.456 | 43.500 |
| 311.159 | -9.832 | 31.868 | 22.036 | -23.964 | 46.000 |
| 388.478 | -7.901 | 29.526 | 21.625 | -24.375 | 46.000 |
| 471.420 | -6.041 | 29.524 | 23.483 | -22.517 | 46.000 |
| 581.072 | -3.783 | 28.223 | 24.440 | -21.560 | 46.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

# 5. RF Antenna Conducted Test

## 5.1. Test Setup




## 5.2. Limits

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

## 5.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

## 5.4. Uncertainty

±1.23dB

## 5.5. Test Result of RF Antenna Conducted Test

| | | |
|---|---|---|
| Product | : | Bike Navigation computer |
| Test Item | : | RF Antenna Conducted Test |
| Test Mode | : | Mode 1: Transmit - 1Mbps |
| Test Date | : | 2017/06/03 |

**Figure Channel 00:**

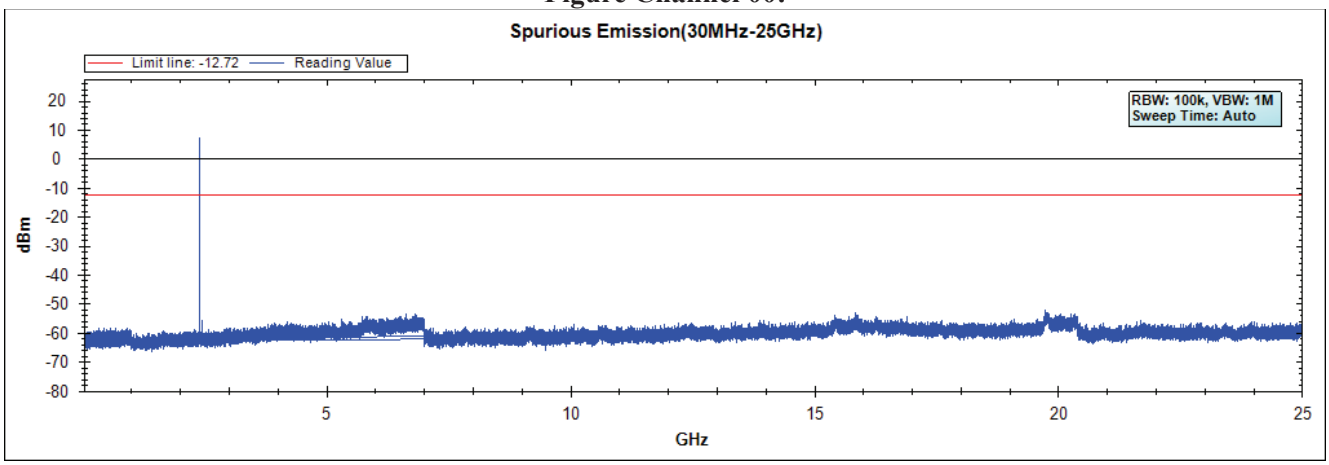



**Figure Channel 39:**

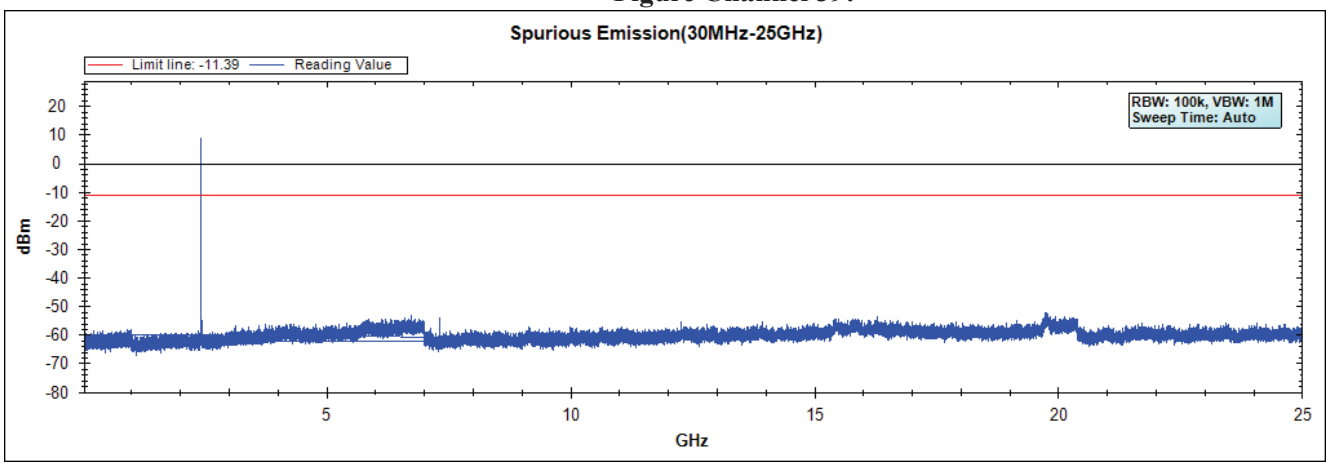
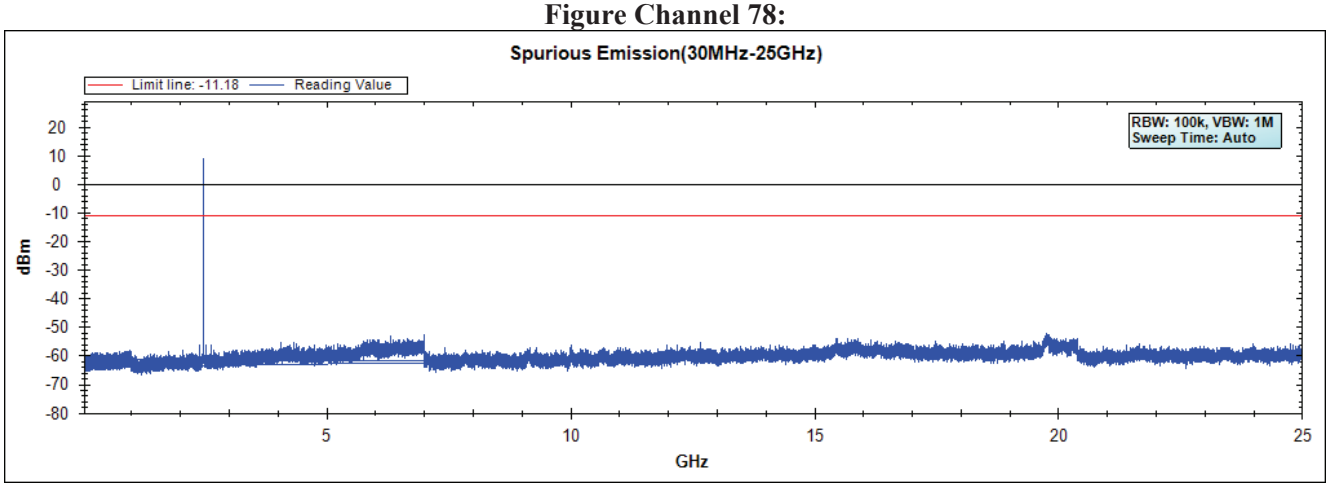



**Figure Channel 78:**




Note: The above test pattern is synthesized by multiple of the frequency range.

| | | |
|---|---|---|
| Product | : | Bike Navigation computer |
| Test Item | : | RF Antenna Conducted Test |
| Test Mode | : | Mode 2: Transmit - 2Mbps |
| Test Date | : | 2017/09/26 |

**Figure Channel 00:**

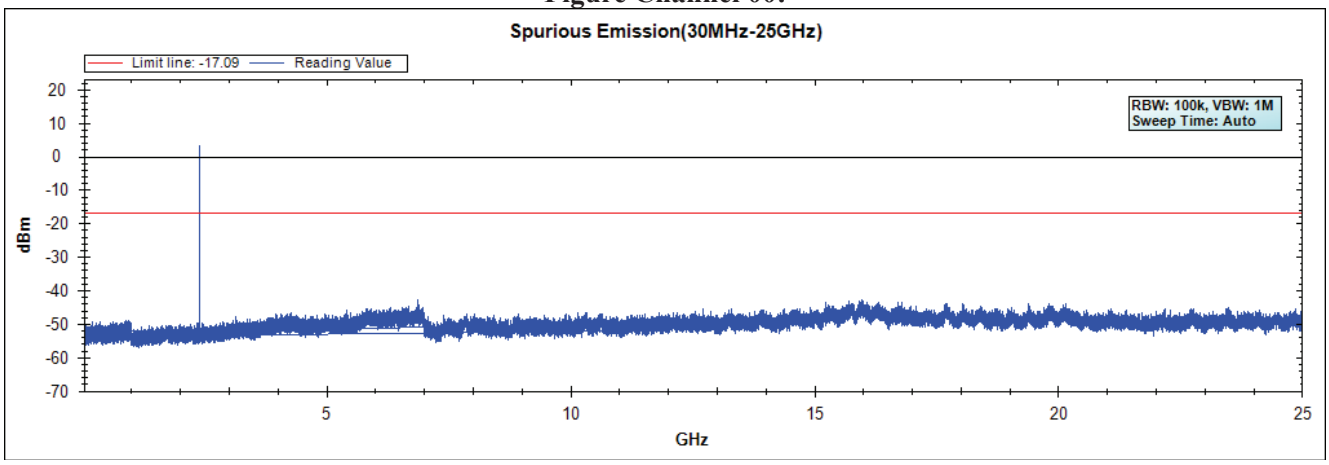



**Figure Channel 39:**

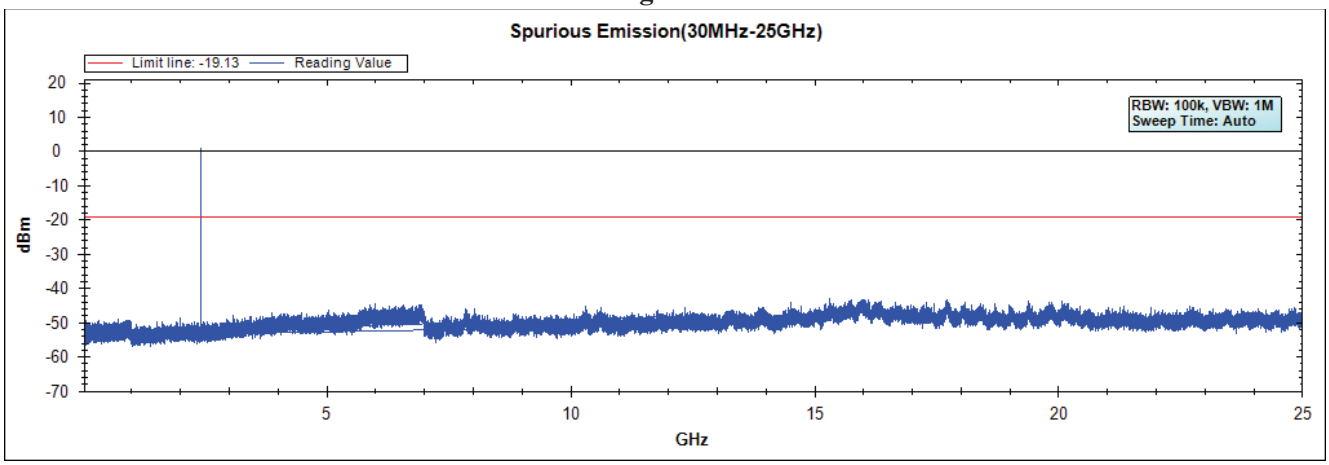
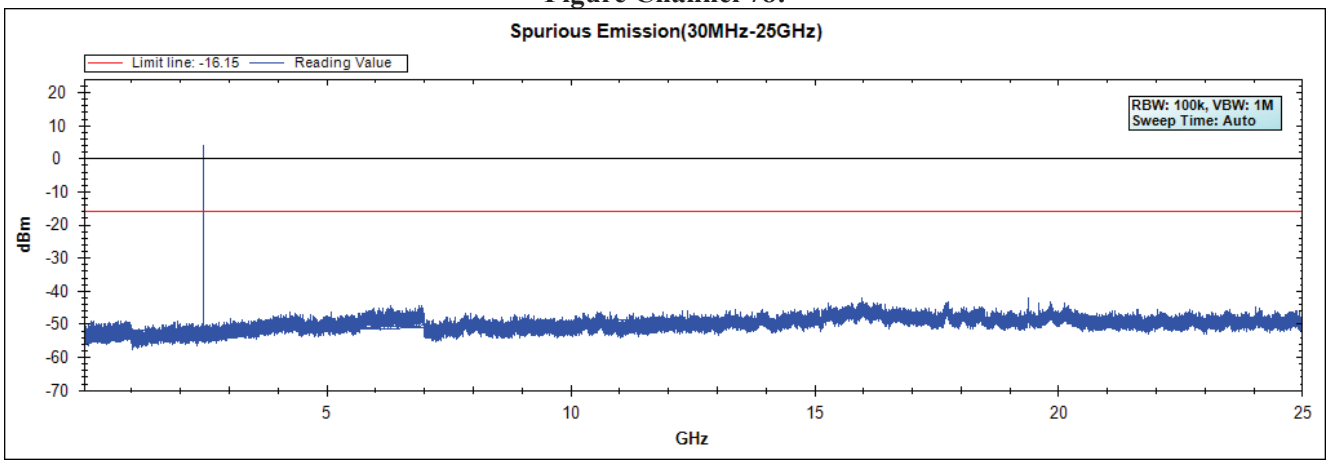



**Figure Channel 78:**




Note: The above test pattern is synthesized by multiple of the frequency range.

| | | |
|---|---|---|
| Product | : | Bike Navigation computer |
| Test Item | : | RF Antenna Conducted Test |
| Test Mode | : | Mode 3: Transmit - 3Mbps |
| Test Date | : | 2017/06/03 |

**Figure Channel 00:**

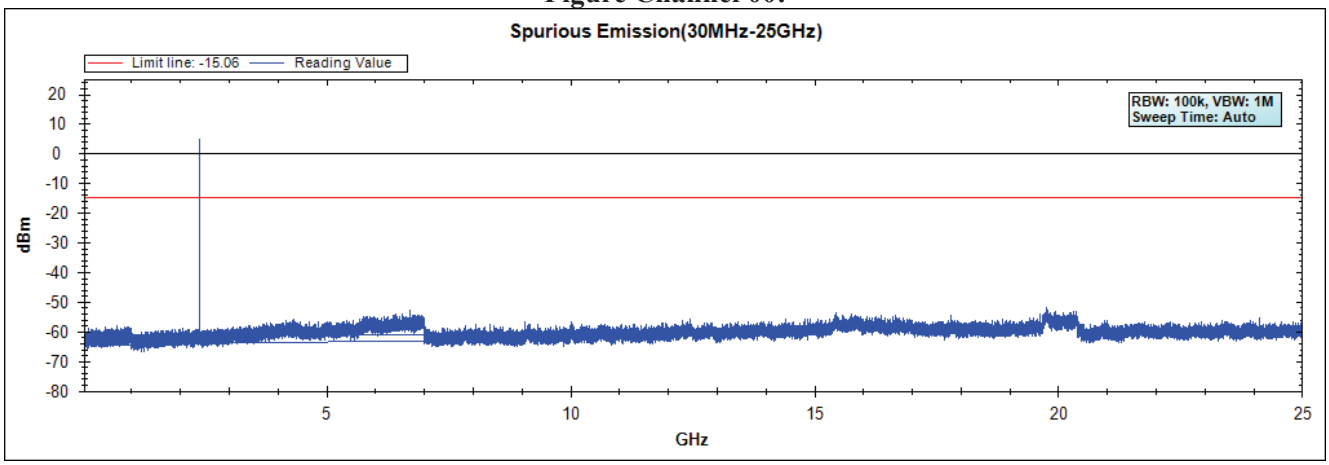



**Figure Channel 39:**

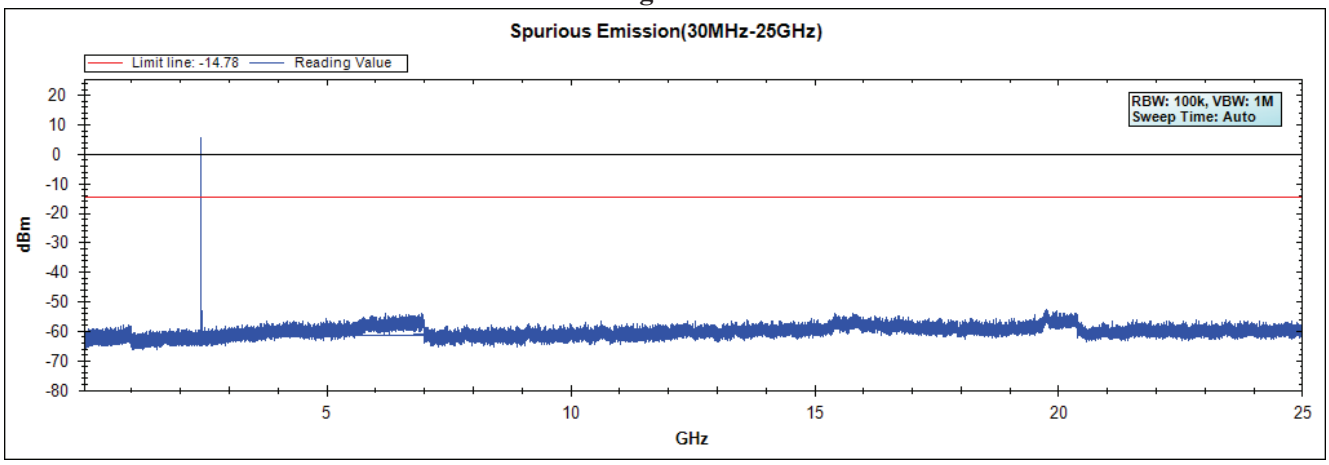
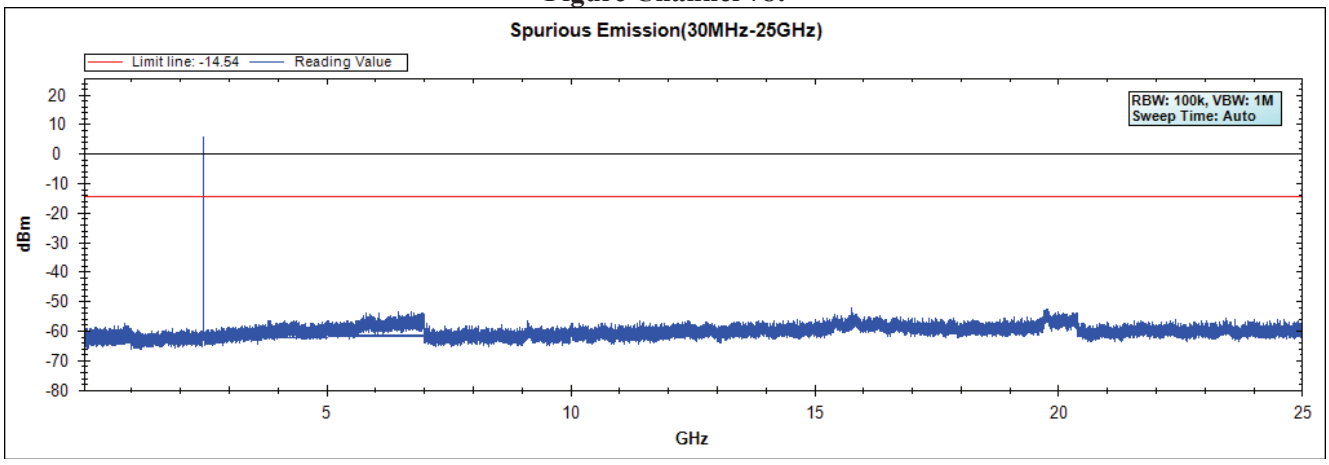



**Figure Channel 78:**

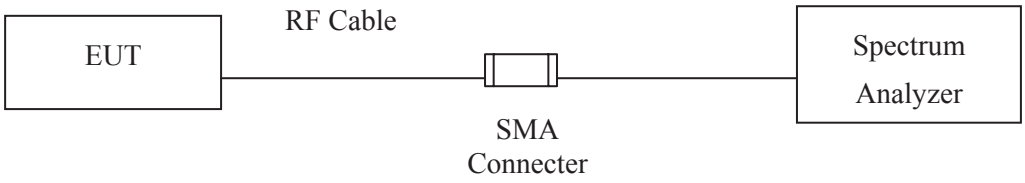



Note: The above test pattern is synthesized by multiple of the frequency range.

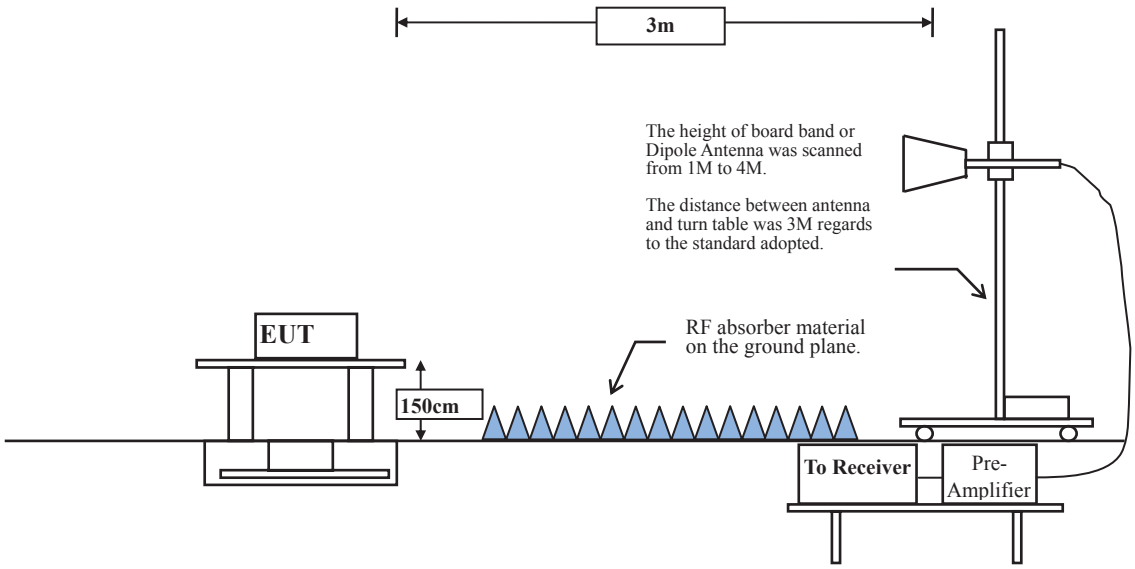
# 6. Band Edge

## 6.1. Test Setup

**RF Conducted Measurement**




**RF Radiated Measurement:**



## 6.2. Limit

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

## 6.3. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.
The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

## 6.4. Uncertainty

Conducted: ±1.23dB
Radiated:
Horizontal polarization：1-18GHz: ±3.77dB
Vertical polarization：1-18GHz : ±3.83dB

## 6.5. Test Result of Band Edge

Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps (2402MHz)
Test Date : 2017/06/12

**RF Radiated Measurement (Horizontal):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBμV) | Emission Level (dBμV/m) | Peak Limit (dBμV/m) | Arerage Limit (dBμV/m) | Result |
|---|---|---|---|---|---|---|---|
| 00 (Peak) | 2362.609 | 11.469 | 37.970 | 49.439 | 74.00 | 54.00 | Pass |
| 00 (Peak) | 2390.000 | 11.556 | 35.997 | 47.553 | 74.00 | 54.00 | Pass |
| 00 (Peak) | 2400.000 | 11.579 | 49.793 | 61.372 | -- | -- | Pass |
| 00 (Peak) | 2402.174 | 11.584 | 83.809 | 95.393 | -- | -- | -- |
| 00 (Average) | 2390.000 | 11.556 | 23.487 | 35.043 | 74.00 | 54.00 | Pass |
| 00 (Average) | 2400.000 | 11.579 | 35.989 | 47.568 | -- | -- | Pass |
| 00 (Average) | 2402.029 | 11.584 | 70.437 | 82.021 | -- | -- | -- |

**Figure Channel 00: Horizontal (Peak)**

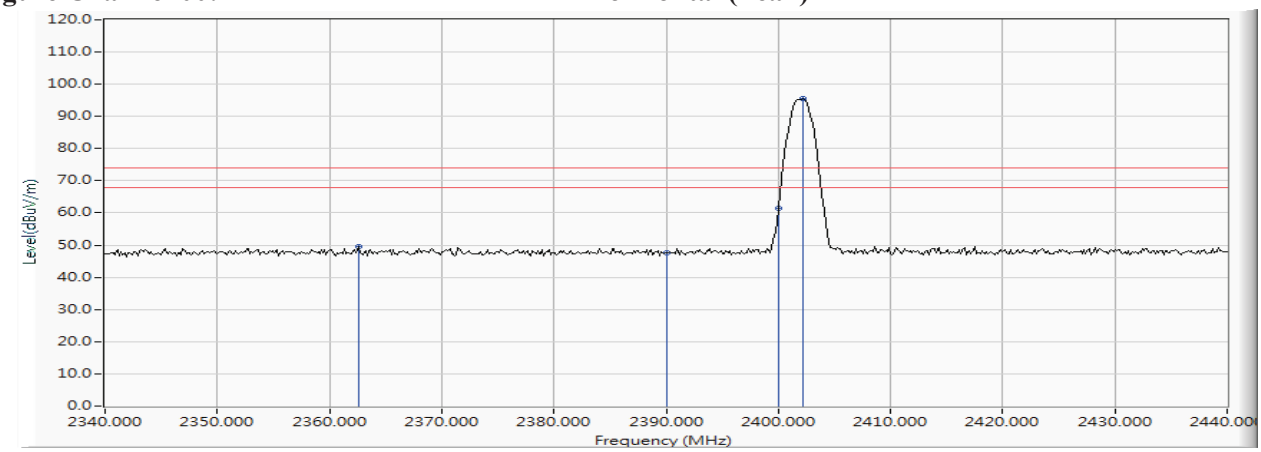
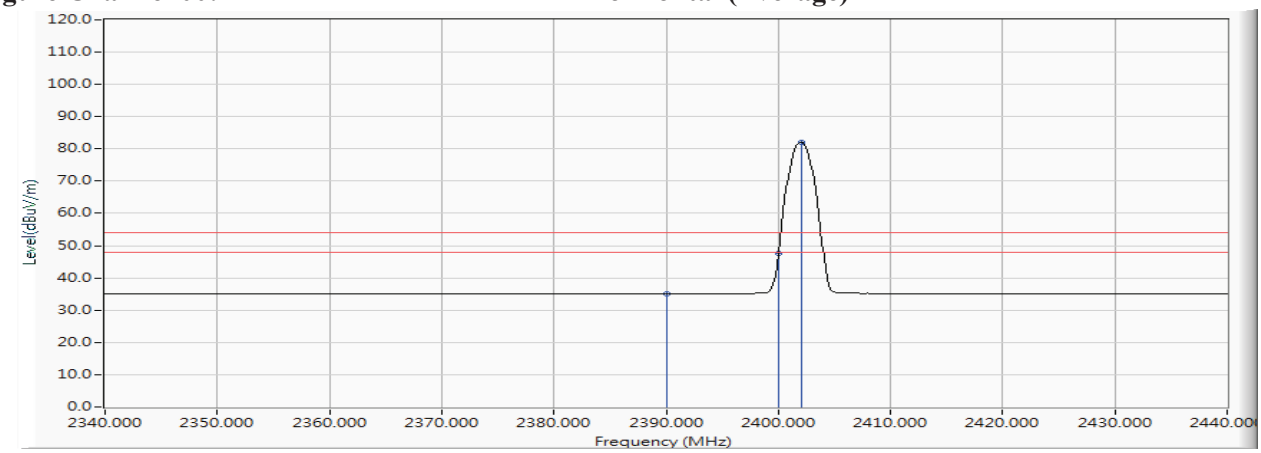



**Figure Channel 00: Horizontal (Average)**




Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps (2402MHz)
Test Date : 2017/06/12

**RF Radiated Measurement (VERTICAL):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBμV) | Emission Level (dBμV/m) | Peak Limit (dBμV/m) | Arerage Limit (dBμV/m) | Result |
|---|---|---|---|---|---|---|---|
| 00 (Peak) | 2357.971 | 11.455 | 38.298 | 49.753 | 74.00 | 54.00 | Pass |
| 00 (Peak) | 2390.000 | 11.556 | 35.792 | 47.348 | 74.00 | 54.00 | Pass |
| 00 (Peak) | 2400.000 | 11.579 | 44.201 | 55.780 | -- | -- | Pass |
| 00 (Peak) | 2402.174 | 11.584 | 76.890 | 88.474 | -- | -- | -- |
| 00 (Average) | 2390.000 | 11.556 | 23.465 | 35.021 | 74.00 | 54.00 | Pass |
| 00 (Average) | 2400.000 | 11.579 | 31.243 | 42.822 | -- | -- | Pass |
| 00 (Average) | 2402.029 | 11.584 | 64.956 | 76.540 | -- | -- | -- |

**Figure Channel 00: VERTICAL (Peak)**

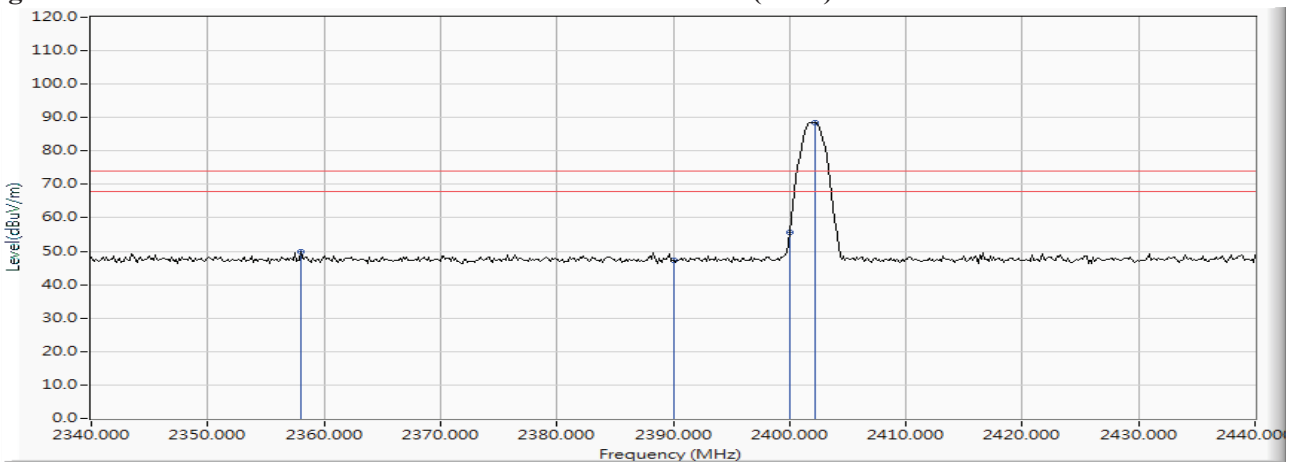
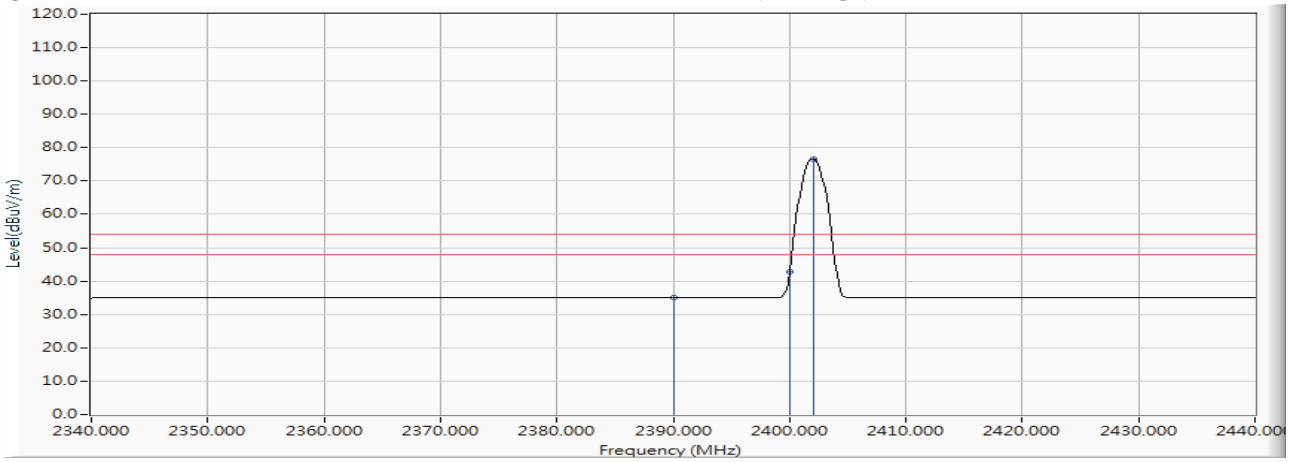



**Figure Channel 00: VERTICAL (Average)**




Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps (2480MHz)
Test Date : 2017/06/12

**RF Radiated Measurement (Horizontal):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBμV) | Emission Level (dBμV/m) | Peak Limit (dBμV/m) | Arerage Limit (dBμV/m) | Result |
|---|---|---|---|---|---|---|---|
| 78 (Peak) | 2479.877 | 11.791 | 87.442 | 99.233 | -- | -- | -- |
| 78 (Peak) | 2483.500 | 11.800 | 37.097 | 48.897 | 74.00 | 54.00 | Pass |
| 78 (Average) | 2480.022 | 11.791 | 73.328 | 85.119 | -- | -- | -- |
| 78 (Average) | 2483.500 | 11.800 | 24.399 | 36.199 | 74.00 | 54.00 | Pass |

**Figure Channel 78: Horizontal (Peak)**

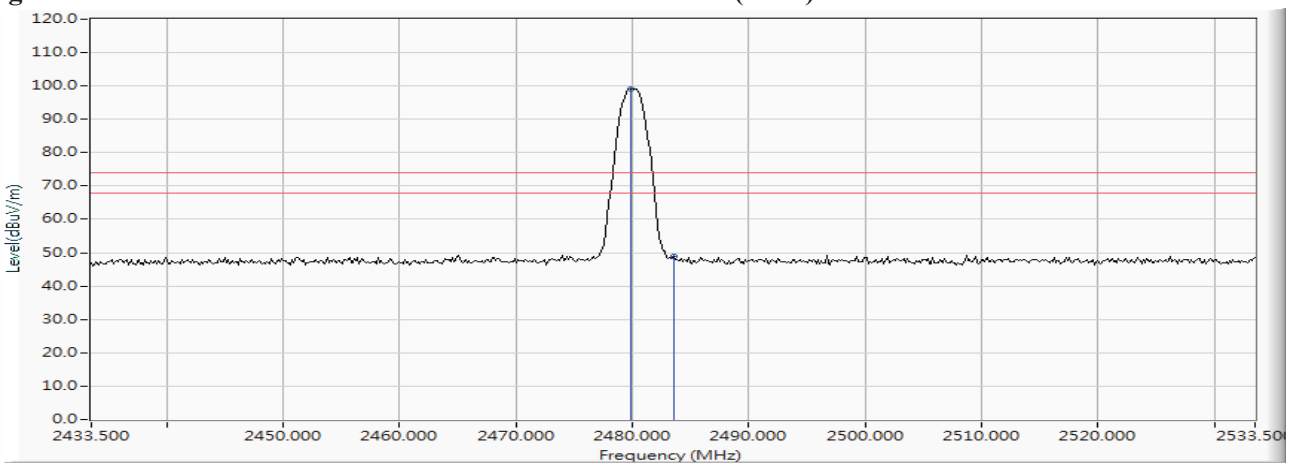
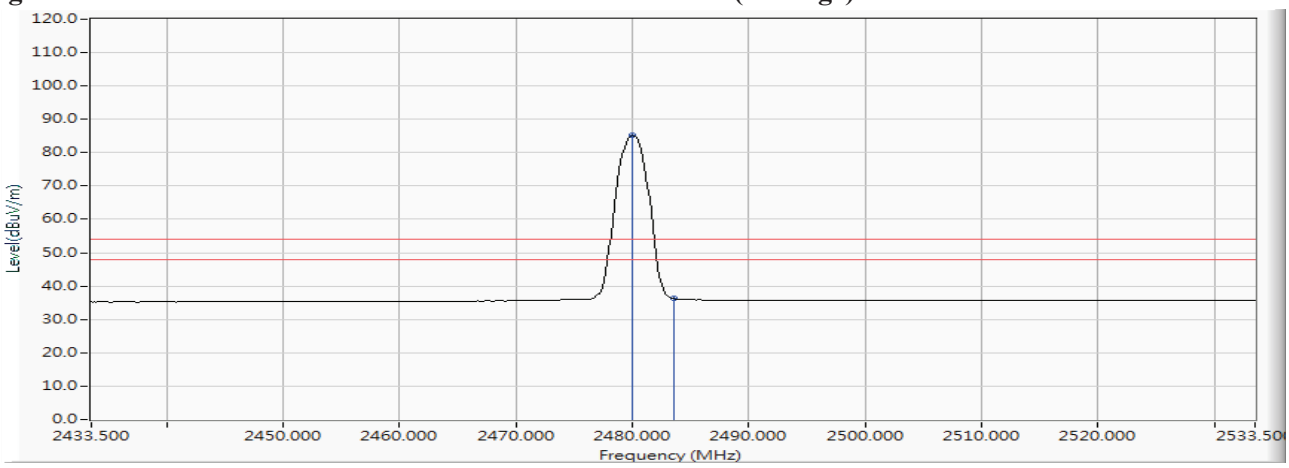



**Figure Channel 78: Horizontal (Average)**




Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps (2480MHz)
Test Date : 2017/06/12

**RF Radiated Measurement (VERTICAL):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBµV) | Emission Level (dBµV/m) | Peak Limit (dBµV/m) | Arerage Limit (dBµV/m) | Result |
|---|---|---|---|---|---|---|---|
| 78 (Peak) | 2480.167 | 11.792 | 82.890 | 94.682 | -- | -- | -- |
| 78 (Peak) | 2483.500 | 11.800 | 36.537 | 48.337 | 74.00 | 54.00 | Pass |
| 78 (Peak) | 2490.746 | 11.817 | 37.023 | 48.840 | 74.00 | 54.00 | Pass |
| 78 (Average) | 2480.022 | 11.791 | 69.760 | 81.551 | -- | -- | -- |
| 78 (Average) | 2483.500 | 11.800 | 23.964 | 35.764 | 74.00 | 54.00 | Pass |

**Figure Channel 78: VERTICAL (Peak)**

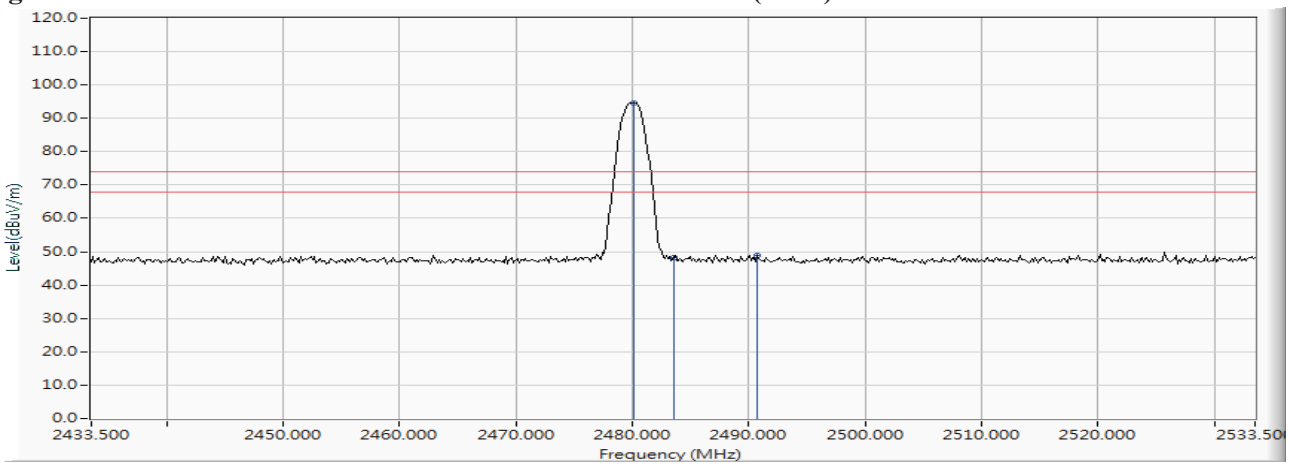
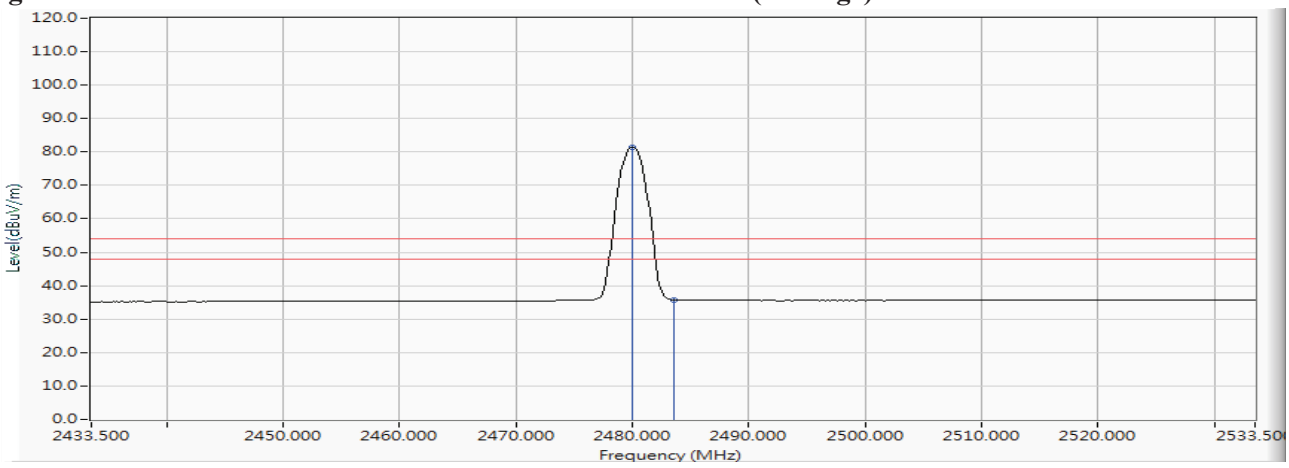



**Figure Channel 78: VERTICAL (Average)**




Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 2Mbps (2402MHz)
Test Date : 2017/09/26

**RF Radiated Measurement (Horizontal):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBμV) | Emission Level (dBμV/m) | Peak Limit (dBμV/m) | Arerage Limit (dBμV/m) | Result |
|---|---|---|---|---|---|---|---|
| 00 (Peak) | 2368.551 | 11.176 | 38.329 | 49.505 | 74.00 | 54.00 | Pass |
| 00 (Peak) | 2390.000 | 11.556 | 36.596 | 48.152 | 74.00 | 54.00 | Pass |
| 00 (Peak) | 2400.000 | 11.579 | 59.602 | 71.181 | -- | -- | Pass |
| 00 (Peak) | 2402.174 | 11.584 | 83.624 | 95.208 | -- | -- | -- |
| 00 (Average) | 2390.000 | 11.556 | 24.396 | 35.952 | 74.00 | 54.00 | Pass |
| 00 (Average) | 2400.000 | 11.579 | 41.348 | 52.927 | -- | -- | Pass |
| 00 (Average) | 2402.029 | 11.584 | 69.152 | 80.736 | -- | -- | -- |

**Figure Channel 00: Horizontal (Peak)**

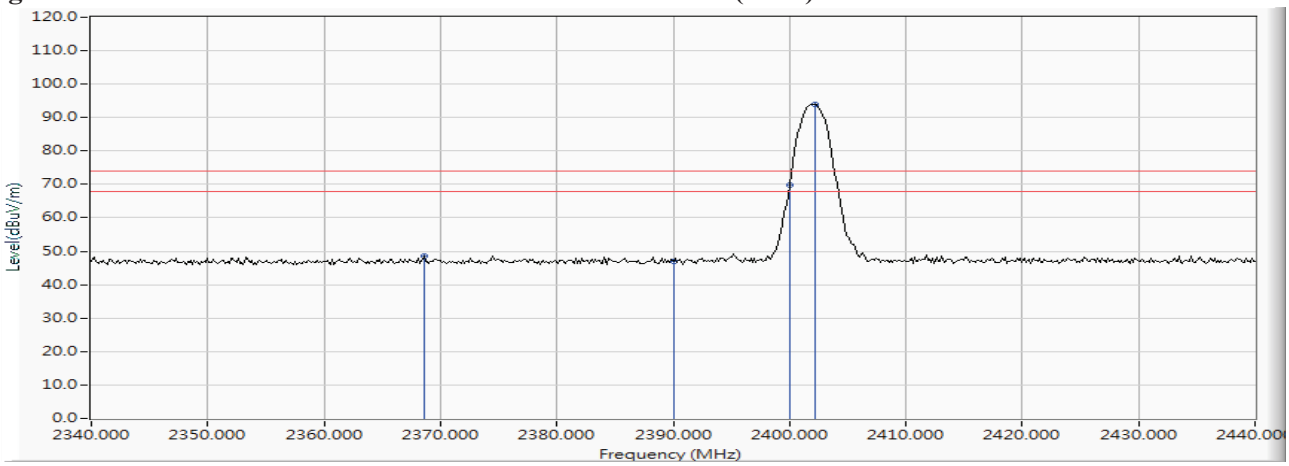
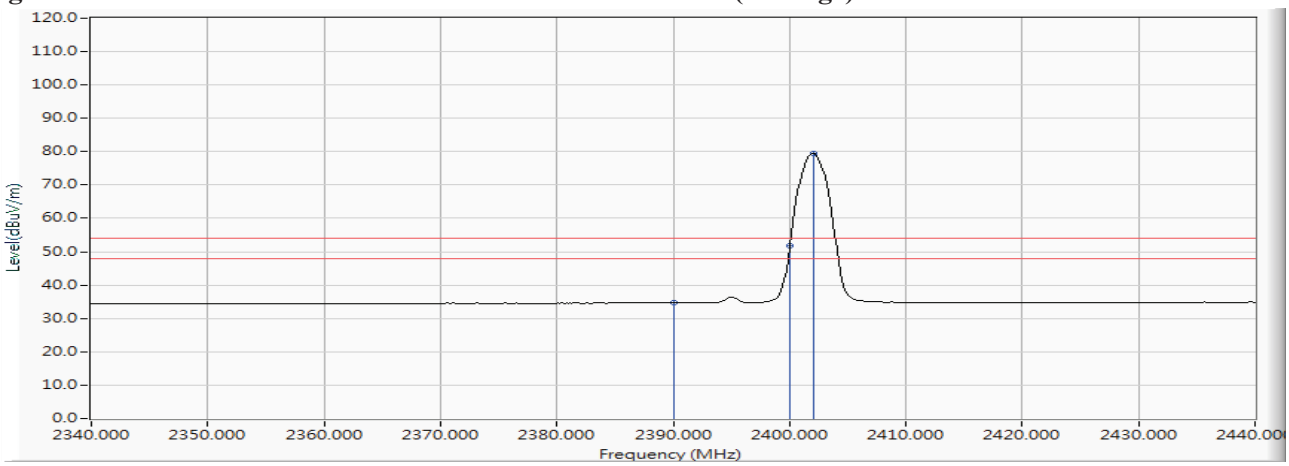



**Figure Channel 00: Horizontal (Average)**




Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 2Mbps (2402MHz)
Test Date : 2017/09/26

**RF Radiated Measurement (VERTICAL):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBµV) | Emission Level (dBµV/m) | Peak Limit (dBµV/m) | Arerage Limit (dBµV/m) | Result |
|---|---|---|---|---|---|---|---|
| 00 (Peak) | 2368.406 | 11.176 | 38.733 | 49.909 | 74.00 | 54.00 | Pass |
| 00 (Peak) | 2390.000 | 11.556 | 35.990 | 47.546 | 74.00 | 54.00 | Pass |
| 00 (Peak) | 2400.000 | 11.579 | 55.486 | 67.065 | -- | -- | Pass |
| 00 (Peak) | 2402.174 | 11.584 | 78.860 | 90.444 | -- | -- | -- |
| 00 (Average) | 2390.000 | 11.556 | 24.384 | 35.940 | 74.00 | 54.00 | Pass |
| 00 (Average) | 2400.000 | 11.579 | 37.832 | 49.411 | -- | -- | Pass |
| 00 (Average) | 2402.029 | 11.584 | 65.247 | 76.831 | -- | -- | -- |

**Figure Channel 00: VERTICAL (Peak)**

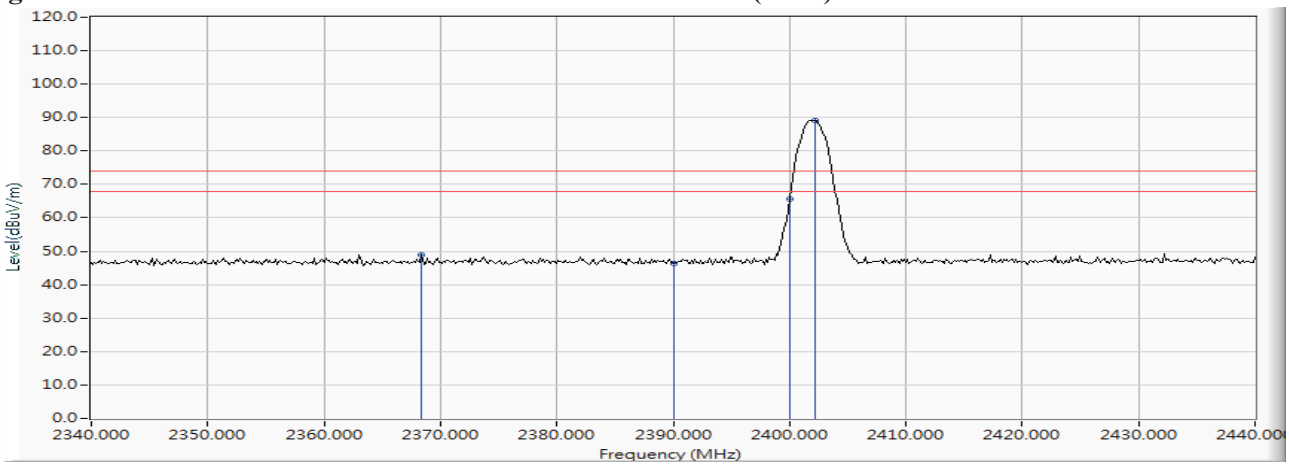
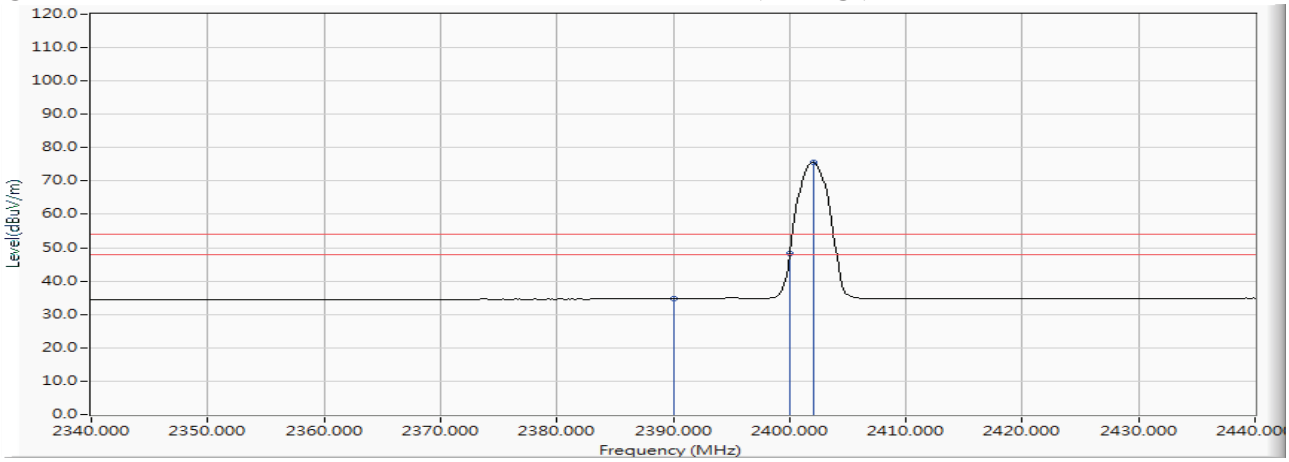



**Figure Channel 00: VERTICAL (Average)**




Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 2Mbps (2480MHz)
Test Date : 2017/09/26

**RF Radiated Measurement (Horizontal):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBμV) | Emission Level (dBμV/m) | Peak Limit (dBμV/m) | Arerage Limit (dBμV/m) | Result |
|---|---|---|---|---|---|---|---|
| 78 (Peak) | 2480.167 | 11.791 | 85.592 | 97.383 | -- | -- | -- |
| 78 (Peak) | 2483.500 | 11.800 | 41.582 | 53.382 | 74.00 | 54.00 | Pass |
| 78 (Average) | 2480.022 | 11.791 | 70.756 | 82.547 | -- | -- | -- |
| 78 (Average) | 2483.500 | 11.800 | 25.764 | 37.564 | 74.00 | 54.00 | Pass |

**Figure Channel 78: Horizontal (Peak)**

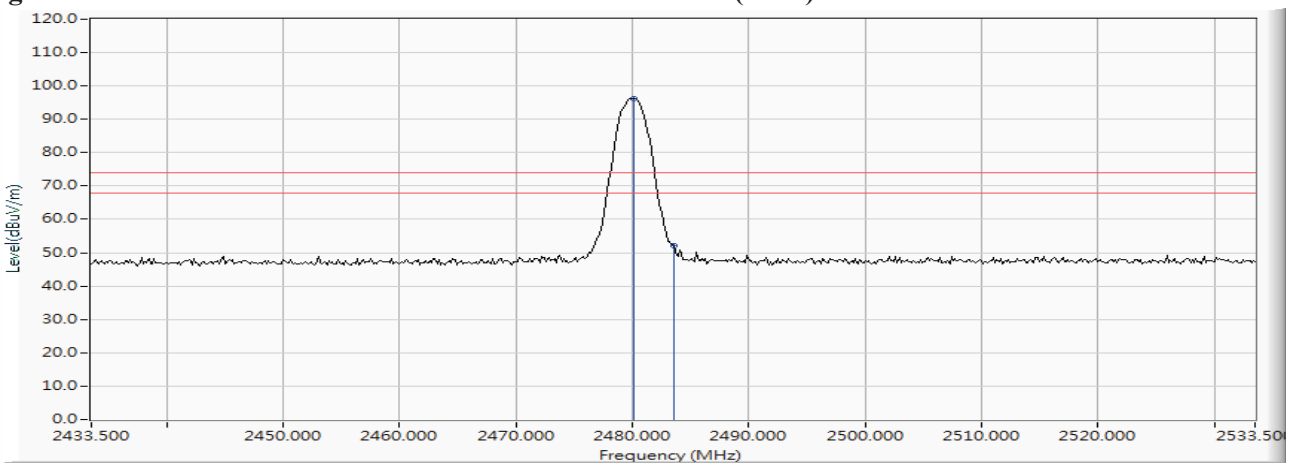
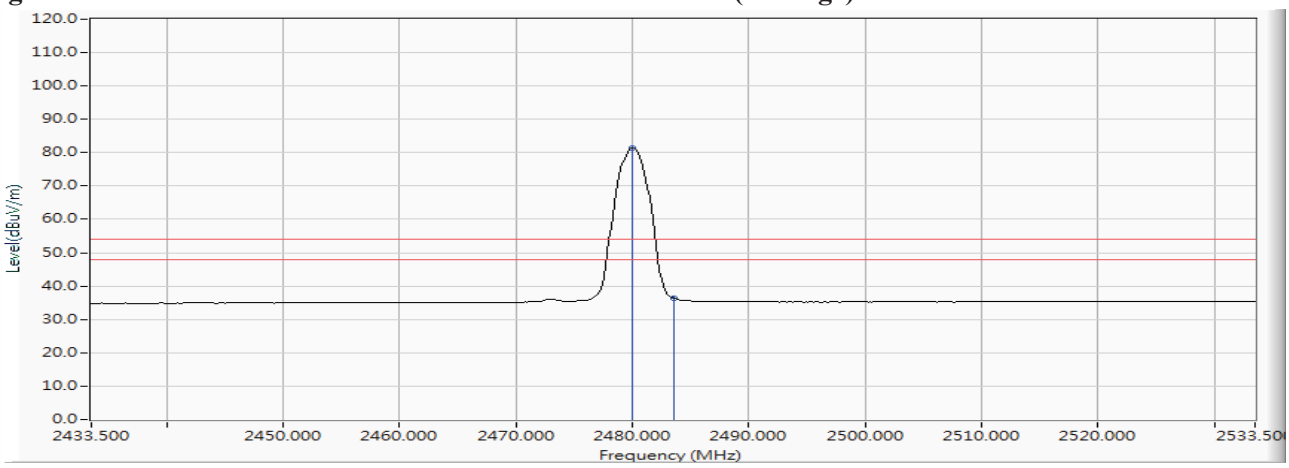



**Figure Channel 78: Horizontal (Average)**




Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 2Mbps (2480MHz)
Test Date : 2017/09/26

**RF Radiated Measurement (VERTICAL):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBμV) | Emission Level (dBμV/m) | Peak Limit (dBμV/m) | Arerage Limit (dBμV/m) | Result |
|---|---|---|---|---|---|---|---|
| 78 (Peak) | 2480.022 | 11.791 | 81.520 | 93.311 | -- | -- | -- |
| 78 (Peak) | 2483.500 | 11.800 | 38.784 | 50.584 | 74.00 | 54.00 | Pass |
| 78 (Average) | 2480.022 | 11.791 | 67.230 | 77.977 | -- | -- | -- |
| 78 (Average) | 2483.500 | 11.800 | 25.118 | 35.755 | 74.00 | 54.00 | Pass |

**Figure Channel 78: VERTICAL (Peak)**

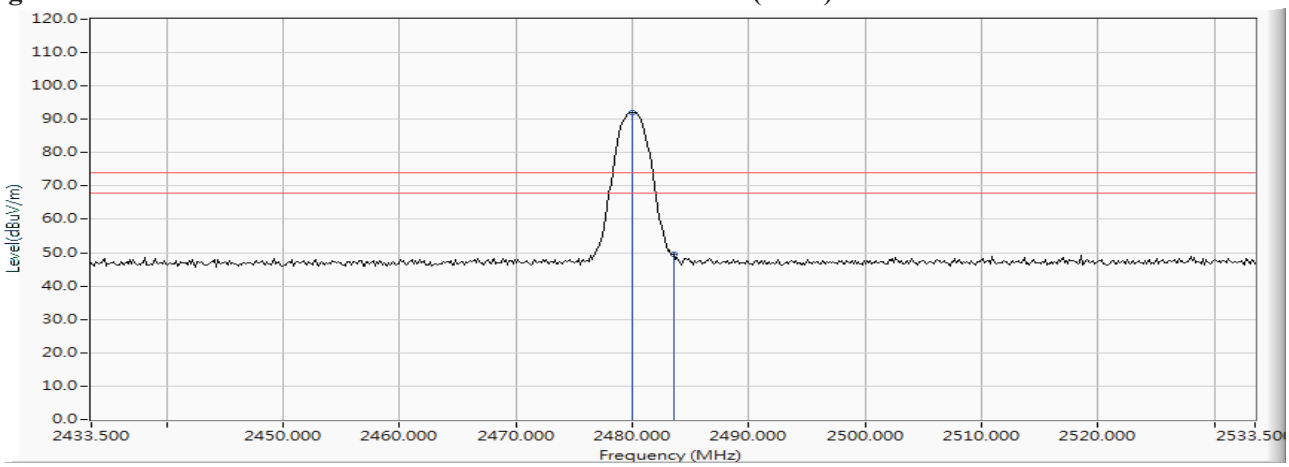
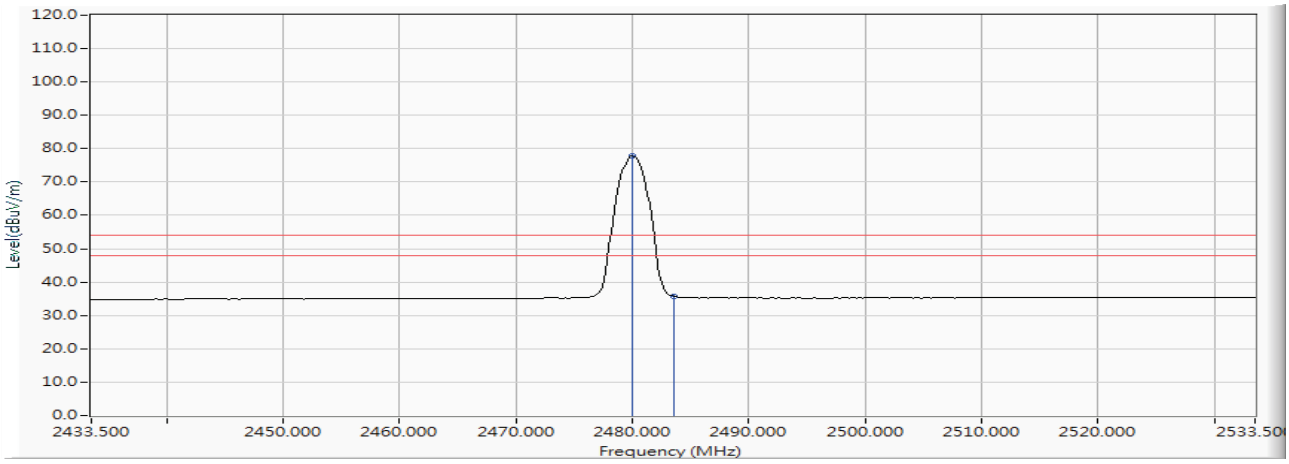



**Figure Channel 78: VERTICAL (Average)**




Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 3: Transmit - 3Mbps (2402MHz)
Test Date : 2017/06/12

**RF Radiated Measurement (Horizontal):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBμV) | Emission Level (dBμV/m) | Peak Limit (dBμV/m) | Arerage Limit (dBμV/m) | Result |
|---|---|---|---|---|---|---|---|
| 00 (Peak) | 2365.797 | 11.479 | 37.314 | 48.794 | 74.00 | 54.00 | Pass |
| 00 (Peak) | 2390.000 | 11.556 | 35.920 | 47.476 | 74.00 | 54.00 | Pass |
| 00 (Peak) | 2400.000 | 11.579 | 57.859 | 69.438 | -- | -- | Pass |
| 00 (Peak) | 2402.029 | 11.584 | 83.843 | 95.427 | -- | -- | -- |
| 00 (Average) | 2390.000 | 11.556 | 23.516 | 35.072 | 74.00 | 54.00 | Pass |
| 00 (Average) | 2400.000 | 11.579 | 41.073 | 52.652 | -- | -- | Pass |
| 00 (Average) | 2402.029 | 11.584 | 68.325 | 79.909 | -- | -- | -- |

**Figure Channel 00: Horizontal (Peak)**

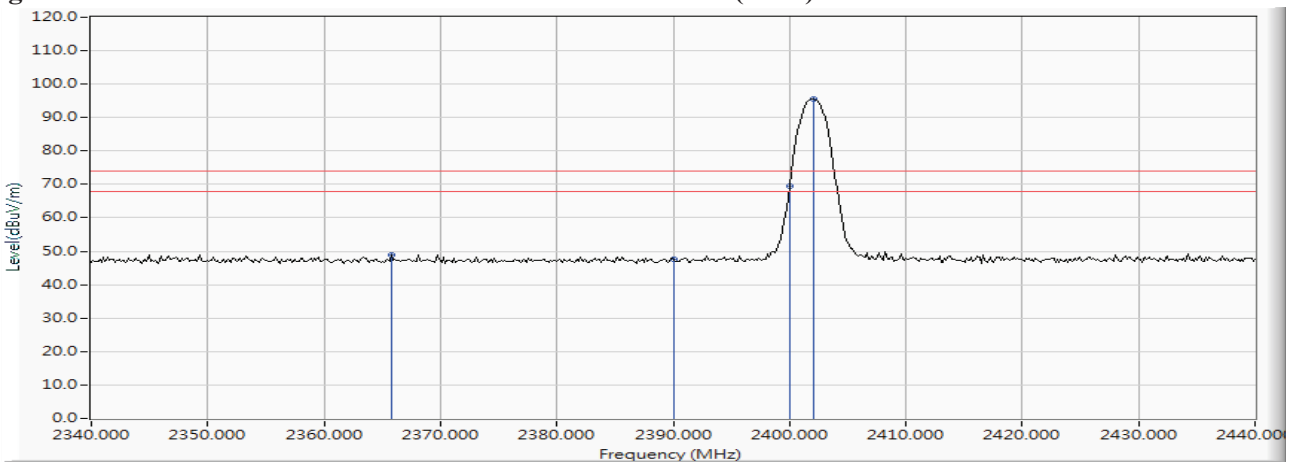
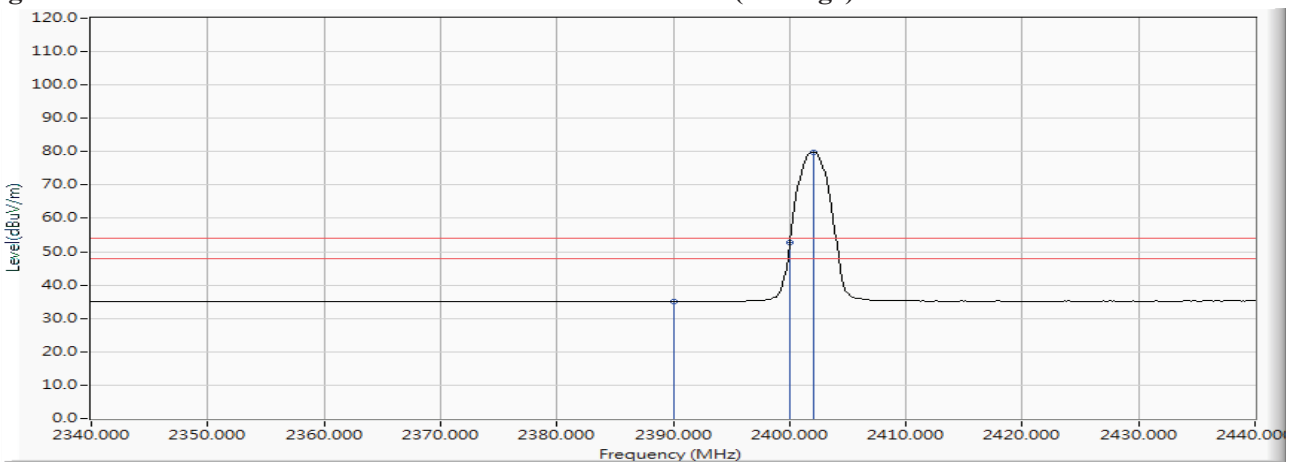



**Figure Channel 00: Horizontal (Average)**




Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 3: Transmit - 3Mbps (2402MHz)
Test Date : 2017/06/12

**RF Radiated Measurement (VERTICAL):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBμV) | Emission Level (dBμV/m) | Peak Limit (dBμV/m) | Arerage Limit (dBμV/m) | Result |
|---|---|---|---|---|---|---|---|
| 00 (Peak) | 2367.246 | 11.485 | 36.888 | 48.373 | 74.00 | 54.00 | Pass |
| 00 (Peak) | 2390.000 | 11.556 | 35.204 | 46.760 | 74.00 | 54.00 | Pass |
| 00 (Peak) | 2400.000 | 11.579 | 53.548 | 65.127 | -- | -- | Pass |
| 00 (Peak) | 2402.029 | 11.584 | 79.244 | 90.828 | -- | -- | -- |
| 00 (Average) | 2390.000 | 11.556 | 23.528 | 35.084 | 74.00 | 54.00 | Pass |
| 00 (Average) | 2400.000 | 11.579 | 37.599 | 49.178 | -- | -- | Pass |
| 00 (Average) | 2402.029 | 11.584 | 64.738 | 76.322 | -- | -- | -- |

**Figure Channel 00: VERTICAL (Peak)**

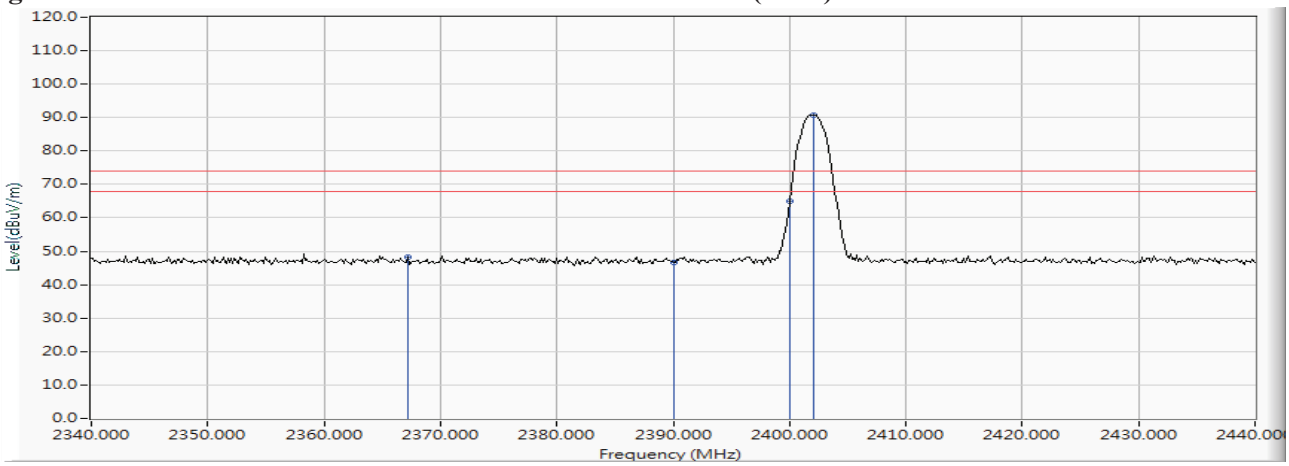
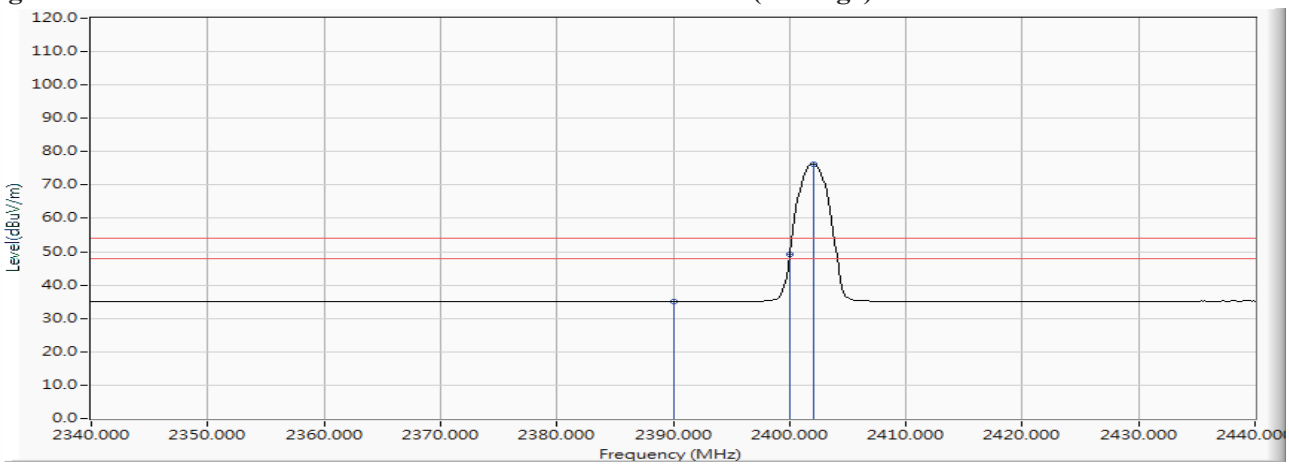



**Figure Channel 00: VERTICAL (Average)**




Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 3: Transmit - 3Mbps (2480MHz)
Test Date : 2017/06/12

**RF Radiated Measurement (Horizontal):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBµV) | Emission Level (dBµV/m) | Peak Limit (dBµV/m) | Arerage Limit (dBµV/m) | Result |
|---|---|---|---|---|---|---|---|
| 78 (Peak) | 2480.022 | 11.791 | 85.806 | 97.597 | -- | -- | -- |
| 78 (Peak) | 2483.500 | 11.800 | 35.711 | 47.511 | 74.00 | 54.00 | Pass |
| 78 (Peak) | 2483.790 | 11.800 | 37.672 | 49.472 | 74.00 | 54.00 | Pass |
| 78 (Average) | 2480.022 | 11.791 | 69.619 | 81.410 | -- | -- | -- |
| 78 (Average) | 2483.500 | 11.800 | 24.409 | 36.209 | 74.00 | 54.00 | Pass |

**Figure Channel 00: Horizontal (Peak)**

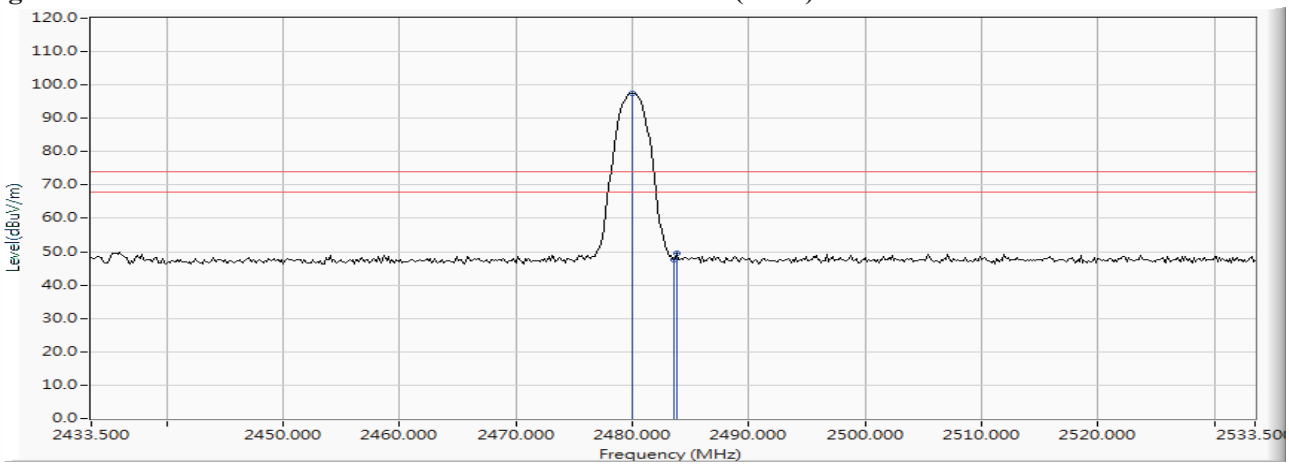
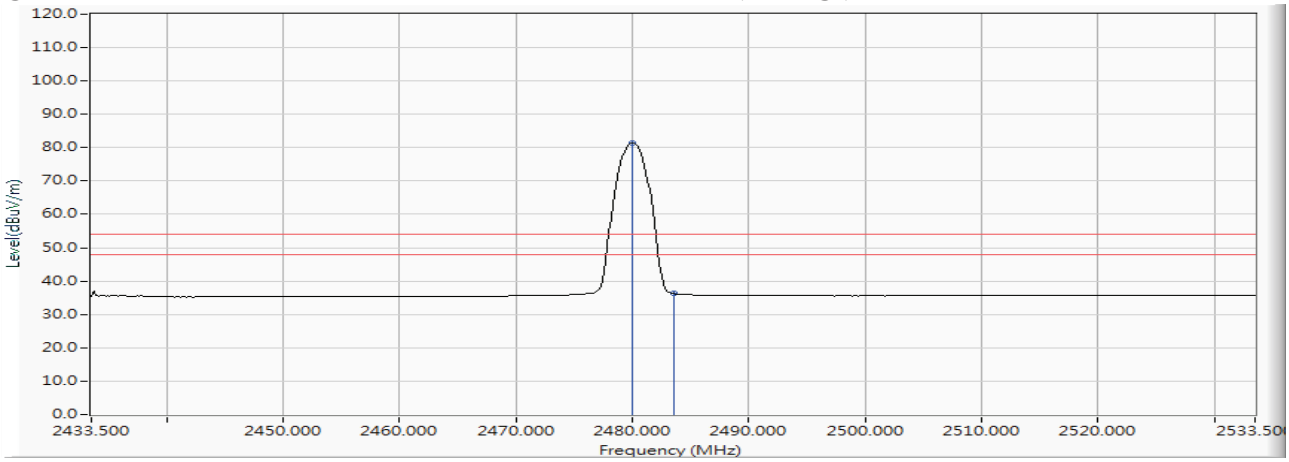



**Figure Channel 00: Horizontal (Average)**




Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 3: Transmit - 3Mbps (2480MHz)
Test Date : 2017/06/12

**RF Radiated Measurement (VERTICAL):**

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBµV) | Emission Level (dBµV/m) | Peak Limit (dBµV/m) | Arerage Limit (dBµV/m) | Result |
|---|---|---|---|---|---|---|---|
| 78 (Peak) | 2480.022 | 11.791 | 81.511 | 93.302 | -- | -- | -- |
| 78 (Peak) | 2483.500 | 11.800 | 37.378 | 49.178 | 74.00 | 54.00 | Pass |
| 78 (Peak) | 2511.181 | 11.865 | 38.144 | 50.009 | 74.00 | 54.00 | Pass |
| 78 (Average) | 2480.022 | 11.791 | 66.186 | 77.977 | -- | -- | -- |
| 78 (Average) | 2483.500 | 11.800 | 23.955 | 35.755 | 74.00 | 54.00 | Pass |

**Figure Channel 78: VERTICAL (Peak)**

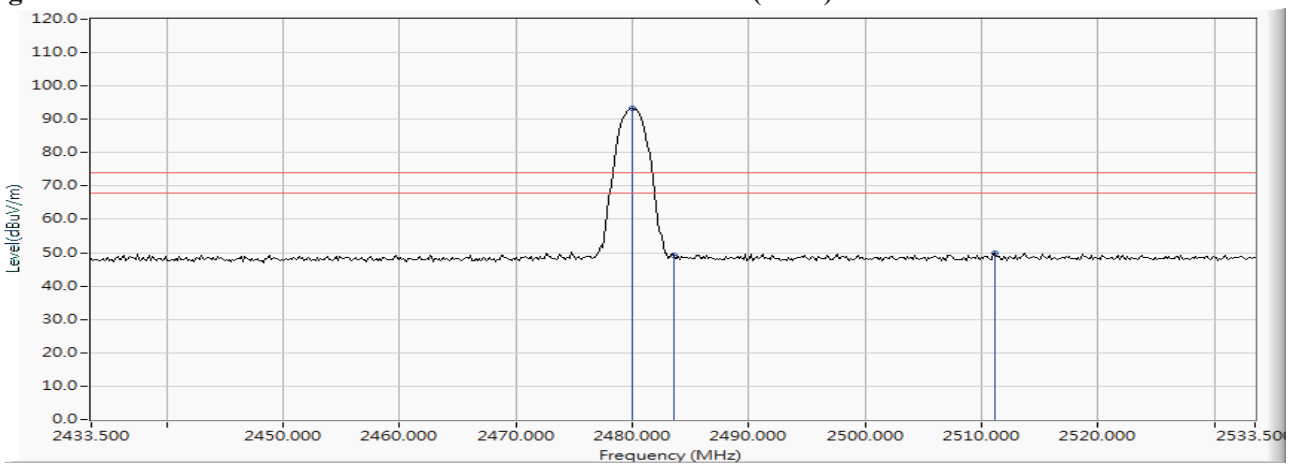
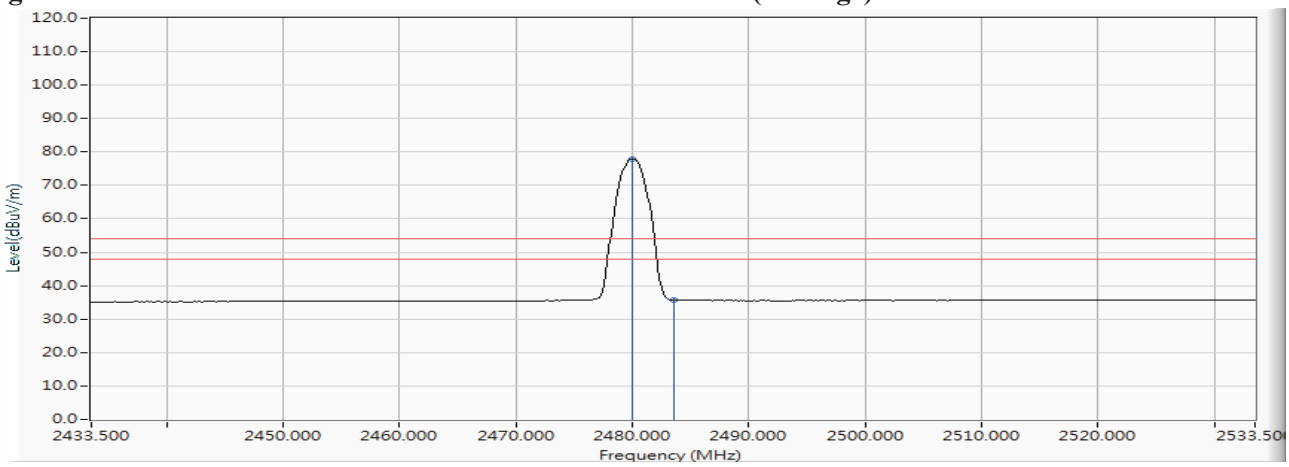



**Figure Channel 78: VERTICAL (Average)**




Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correction Factor.
6. The average measurement was not performed when the peak measured data is under the limit of average detection.

Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps(Hopping off)

| Measurement Level<br>Δ (dB) | Result |
|---|---|
| > 20 | PASS |

**Figure Channel 00:**

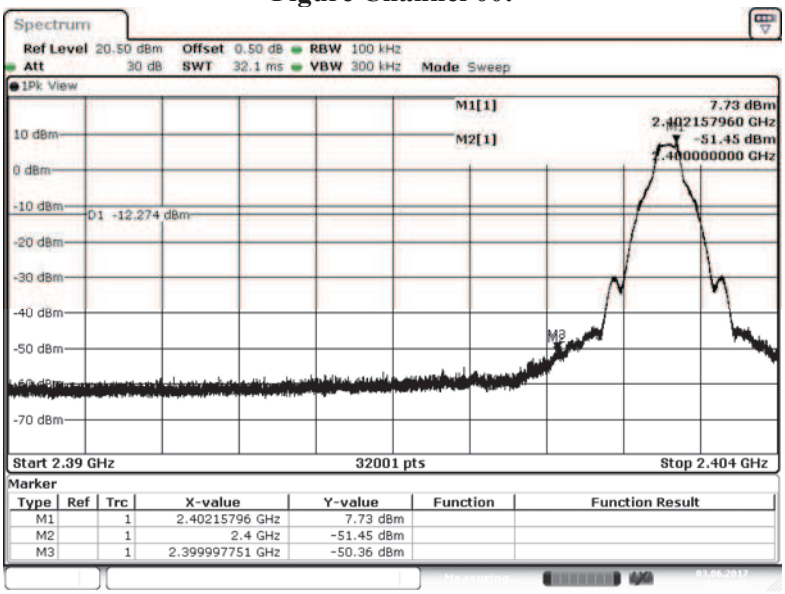
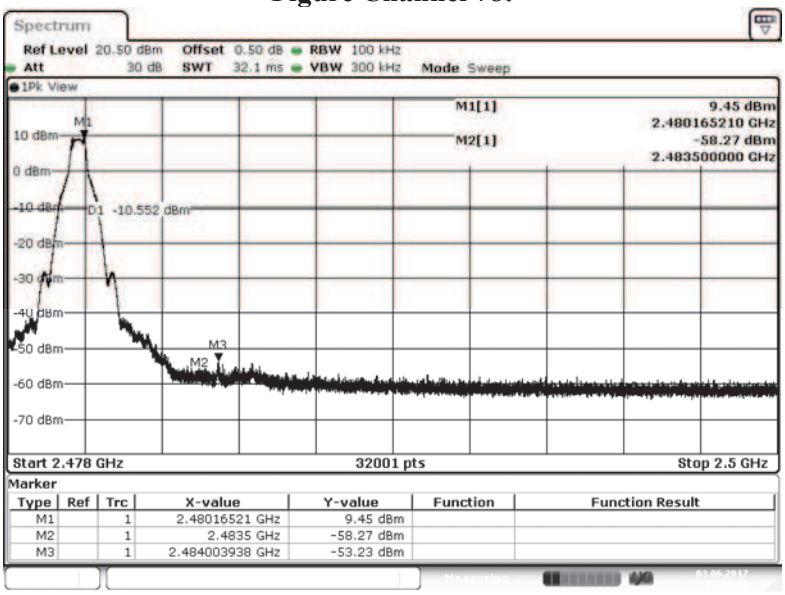



**Figure Channel 78:**



Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 2Mbps(Hopping off)

| Measurement Level<br>Δ (dB) | Result |
|---|---|
| > 20 | PASS |

**Figure Channel 00:**

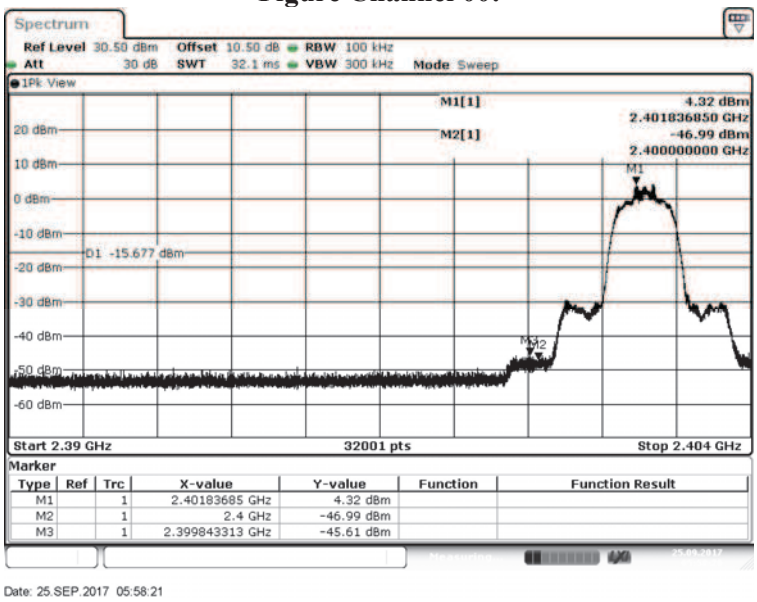
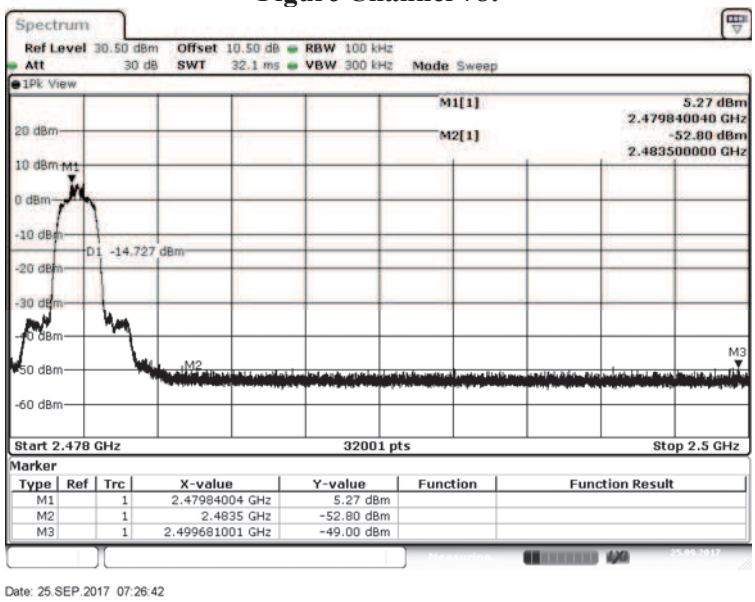



**Figure Channel 78:**



Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 3: Transmit - 3Mbps (Hopping off)

| Measurement Level<br>Δ (dB) | Result |
|---|---|
| > 20 | PASS |

**Figure Channel 00:**

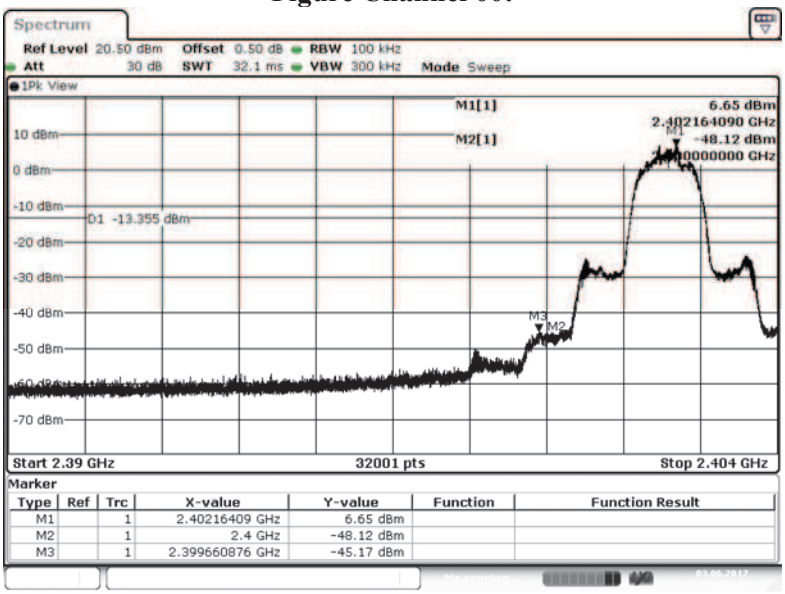
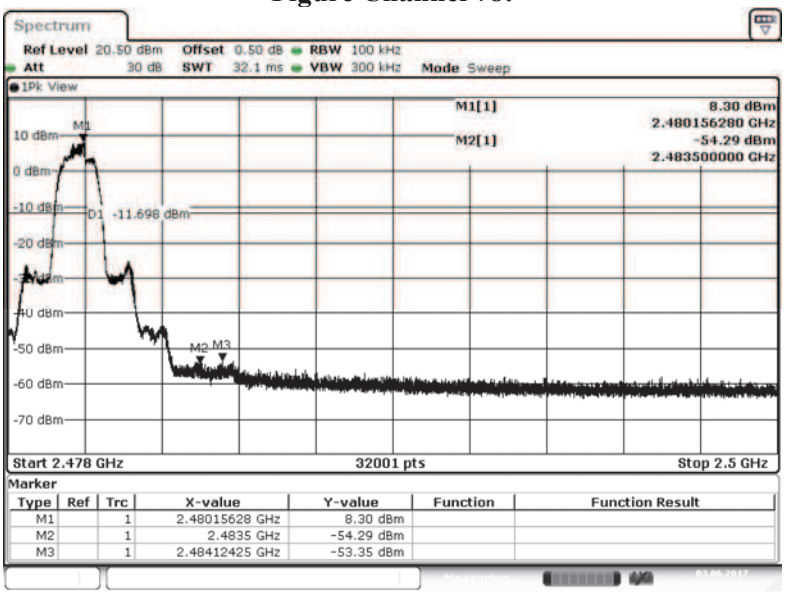



**Figure Channel 78:**



Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 1: Transmit - 1Mbps(Hopping on)

| Measurement Level<br>Δ (dB) | Result |
|---|---|
| > 20 | PASS |

**Figure Channel Hopping:**

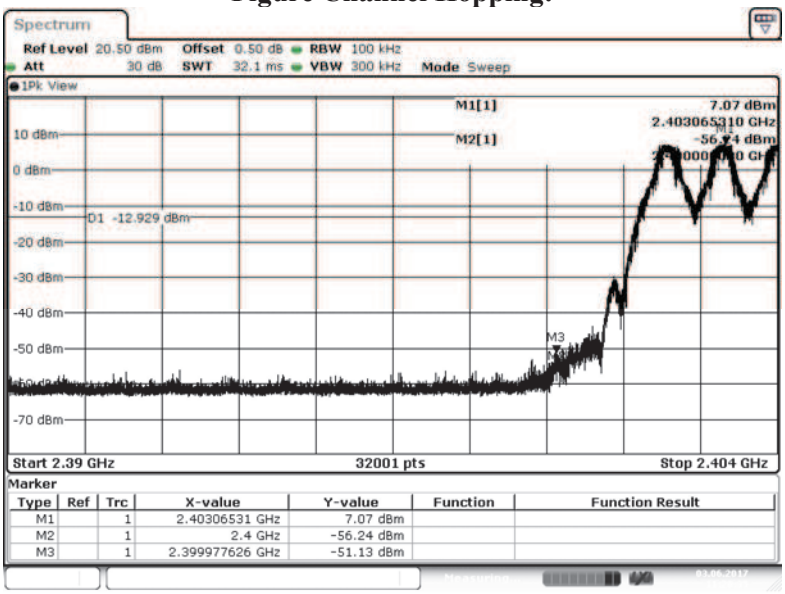
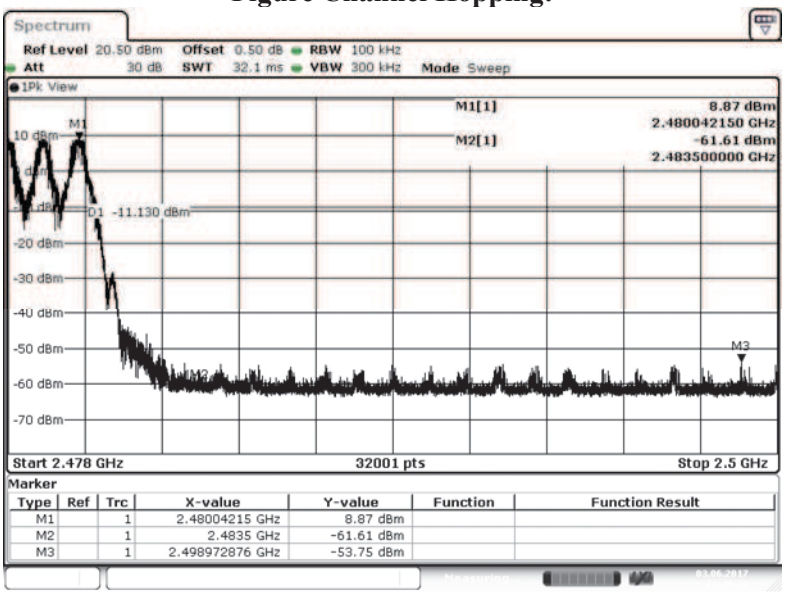



**Figure Channel Hopping:**



Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 2: Transmit - 2Mbps (Hopping on)

| Measurement Level<br>Δ (dB) | Result |
|---|---|
| > 20 | PASS |

**Figure Channel Hopping:**

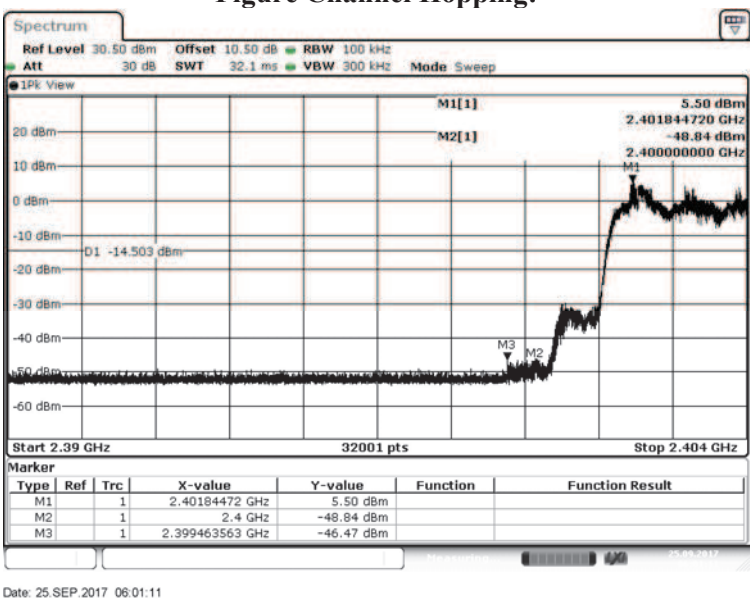
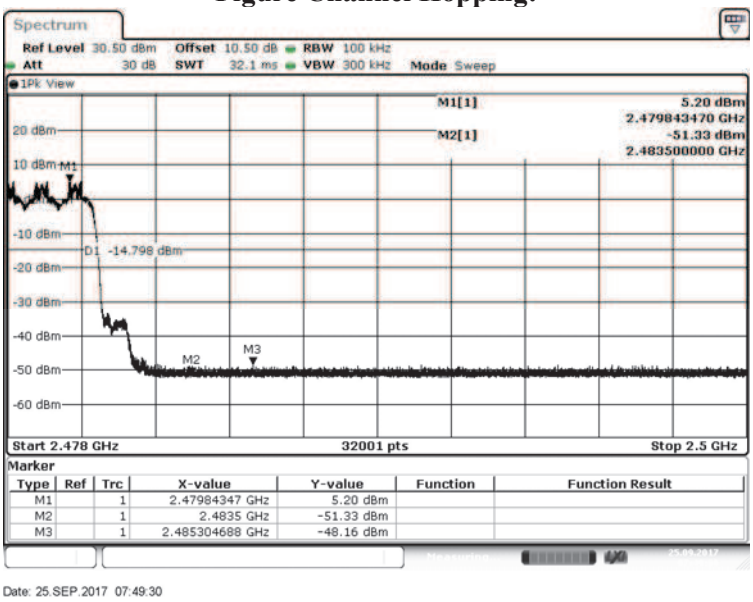



**Figure Channel Hopping:**



Product : Bike Navigation computer
Test Item : Band Edge
Test Mode : Mode 3: Transmit - 3Mbps (Hopping on)

| Measurement Level<br>Δ (dB) | Result |
|---|---|
| > 20 | PASS |

**Figure Channel Hopping:**

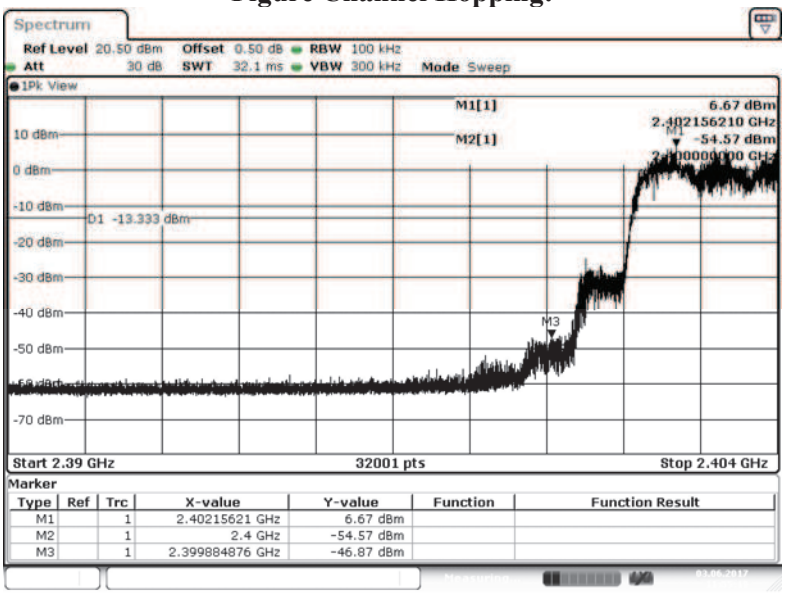
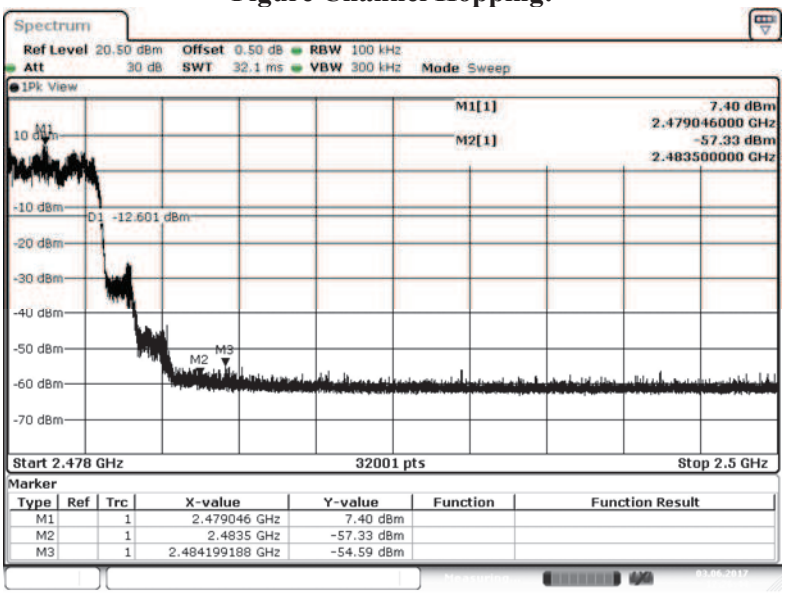
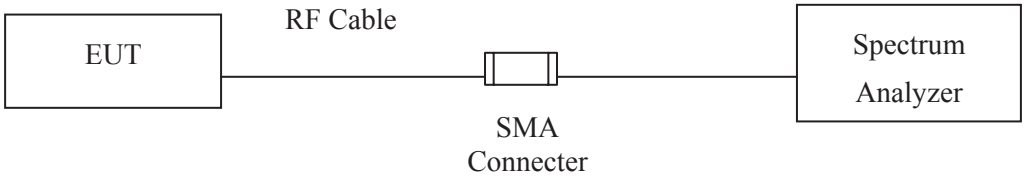



**Figure Channel Hopping:**



# 7. Channel Number

## 7.1. Test Setup




## 7.2. Limit

Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 75 hopping frequencies.

## 7.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

## 7.4. Uncertainty

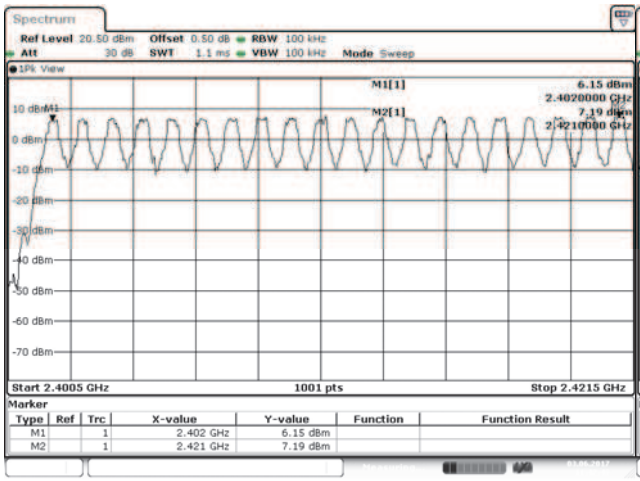
N/A

## 7.5. Test Result of Channel Number

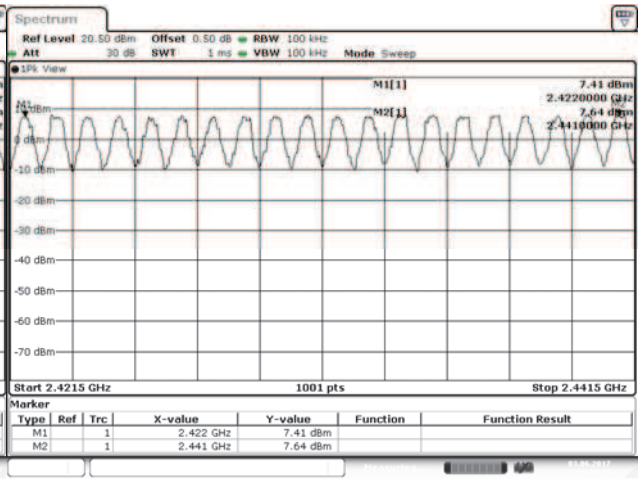
Product : Bike Navigation computer
Test Item : Channel Number
Test Mode : Mode 1: Transmit - 1Mbps

| Frequency Range (MHz) | Measurement (Hopping Channel) | Required Limit (Hopping Channel) | Result |
|---|---|---|---|
| 2402 ~ 2480 | 79 | >75 | Pass |

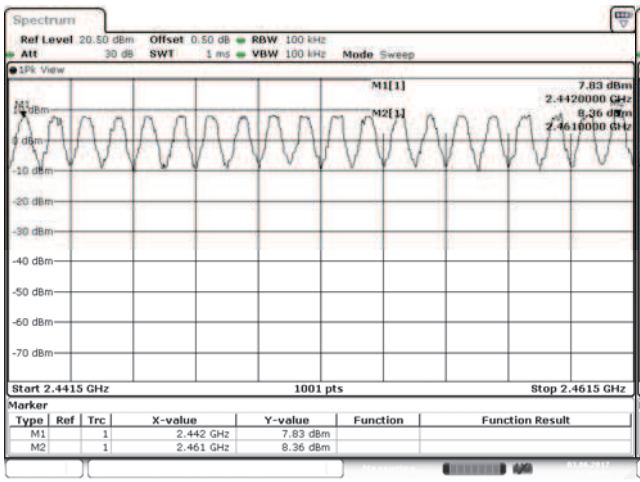
**2402-2421MHz**



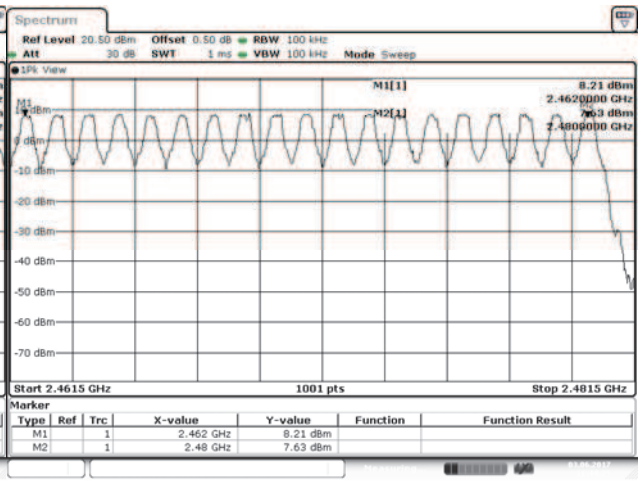

**2422-2441MHz**




**2442-2461MHz**



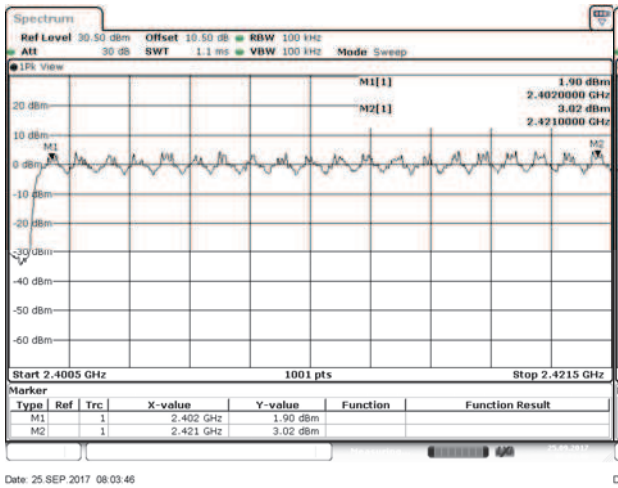

**2462-2480MHz**



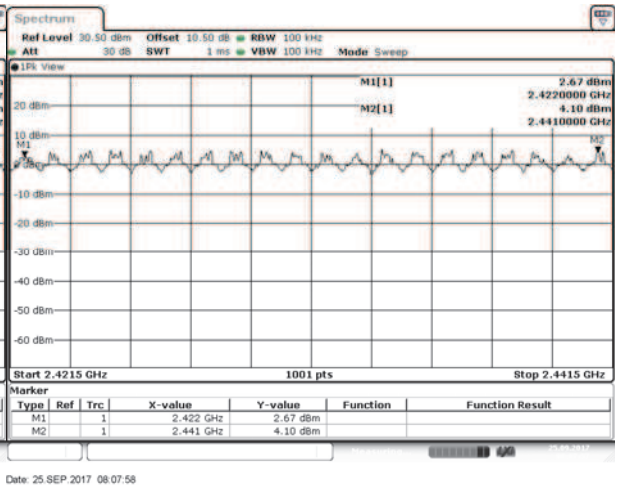
Product : Bike Navigation computer
Test Item : Channel Number
Test Mode : Mode 2: Transmit - 2Mbps

| Frequency Range (MHz) | Measurement (Hopping Channel) | Required Limit (Hopping Channel) | Result |
|---|---|---|---|
| 2402 ~ 2480 | 79 | >75 | Pass |

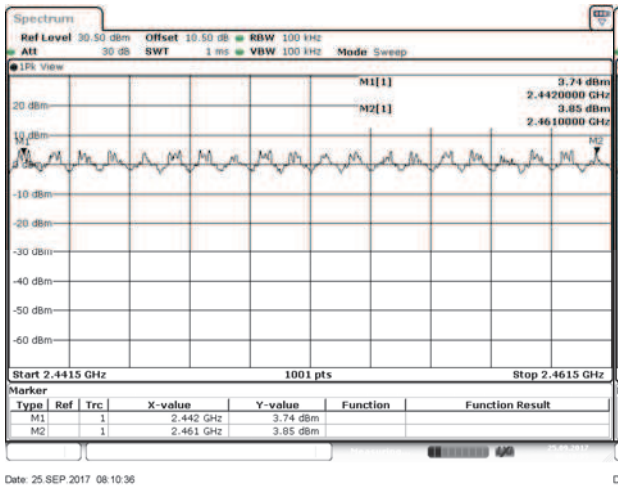
**2402-2421MHz**



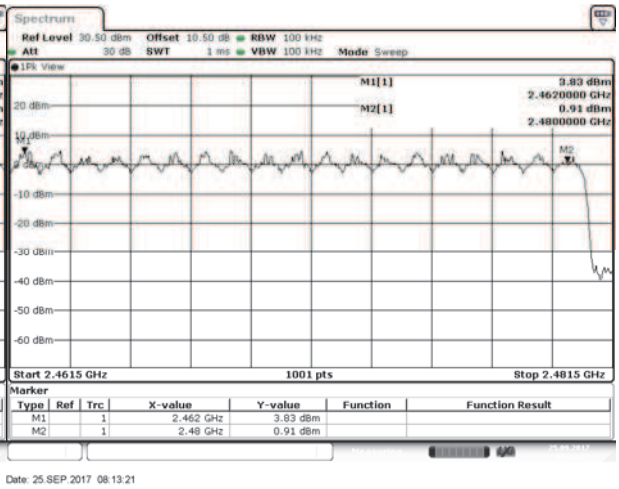

**2422-2441MHz**




**2442-2461MHz**



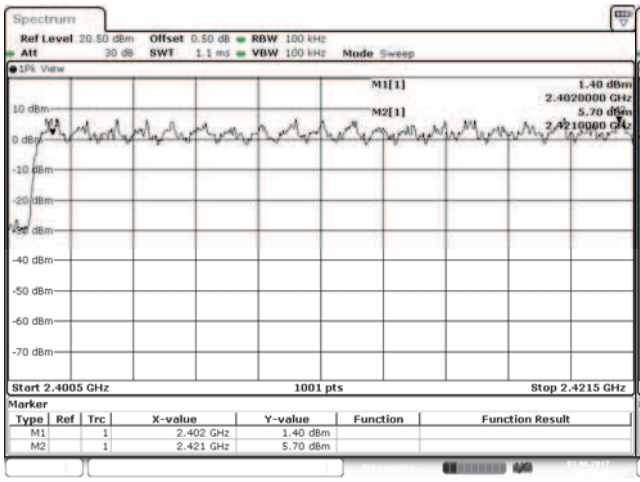

**2462-2480MHz**



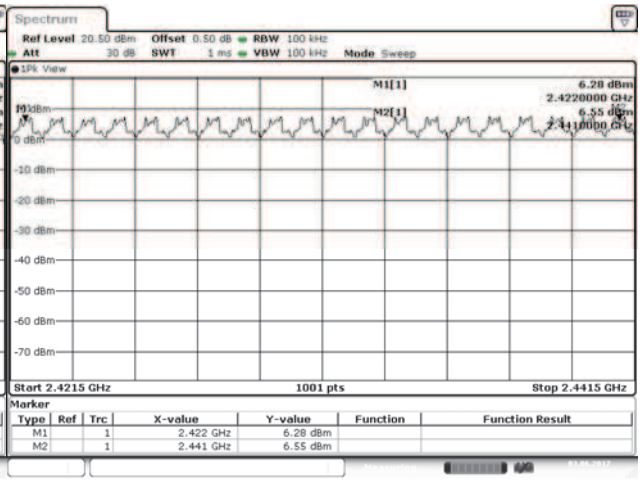
Product : Bike Navigation computer
Test Item : Channel Number
Test Mode : Mode 3: Transmit - 3Mbps

| Frequency Range (MHz) | Measurement (Hopping Channel) | Required Limit (Hopping Channel) | Result |
|---|---|---|---|
| 2402 ~ 2480 | 79 | >75 | Pass |

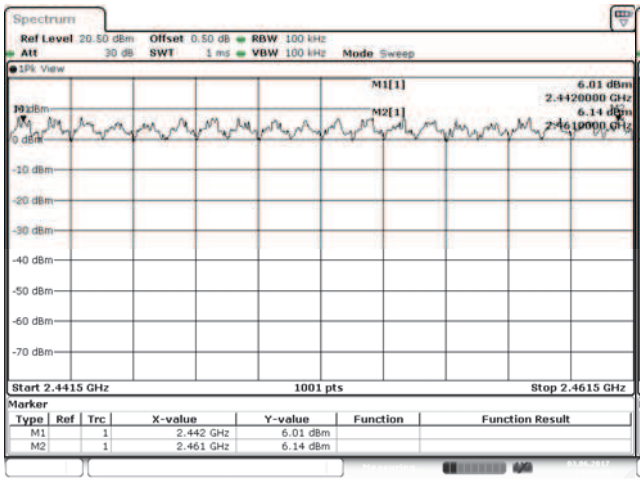
**2402-2421MHz**



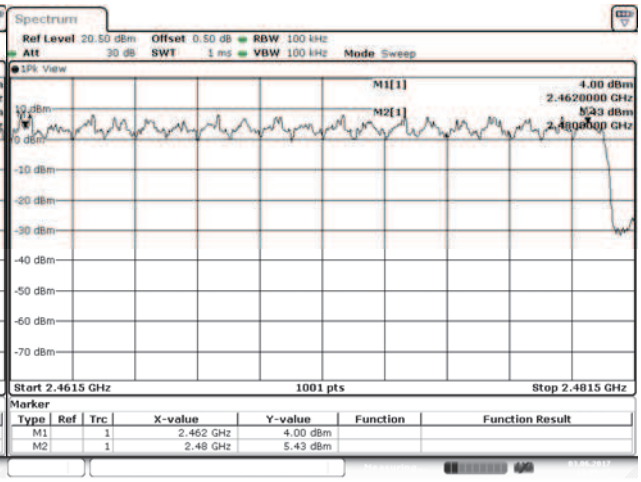

**2422-2441MHz**




**2442-2461MHz**

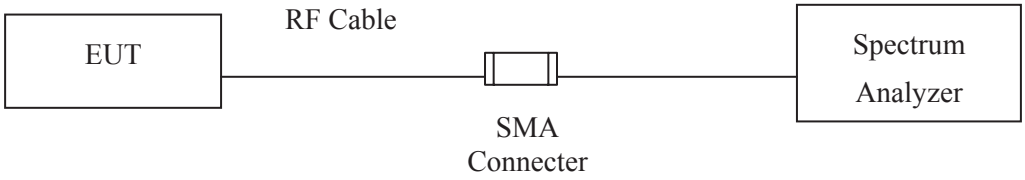



**2462-2480MHz**



# 8. Channel Separation

## 8.1. Test Setup




## 8.2. Limit

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.

## 8.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

## 8.4. Uncertainty

±279.2Hz

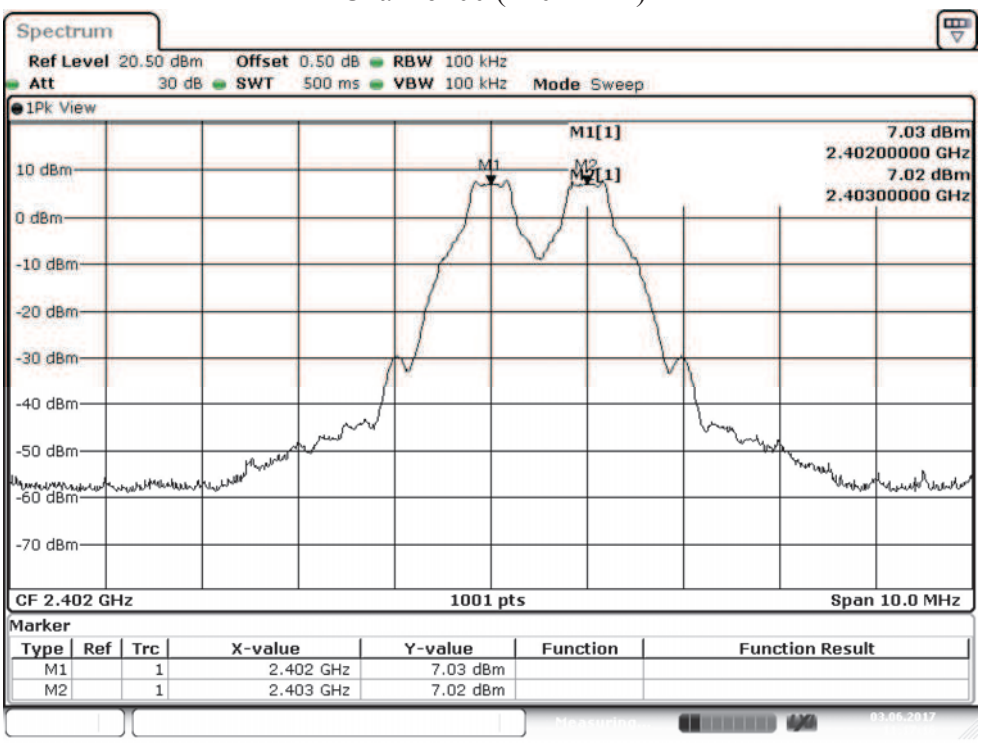
## 8.5. Test Result of Channel Separation

Product : Bike Navigation computer
Test Item : Channel Separation
Test Mode : Mode 1: Transmit - 1Mbps

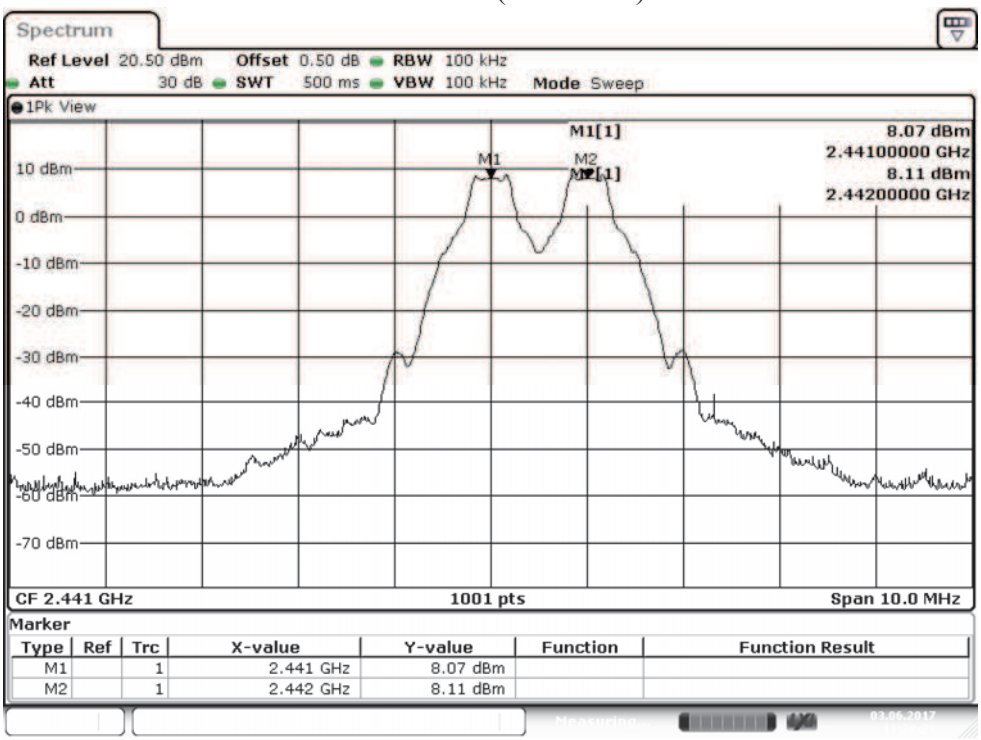
| Channel No. | Frequency (MHz) | Measurement Level (kHz) | Limit (kHz) | Limit of (2/3)*20dB Bandwidth (kHz) | Result |
|---|---|---|---|---|---|
| 00 | 2402 | 1000 | >25 kHz | 642.0 | Pass |
| 39 | 2441 | 1000 | >25 kHz | 642.0 | Pass |
| 78 | 2480 | 1000 | >25 kHz | 642.0 | Pass |

NOTE: The 20dB Bandwidth is refer to section 10.

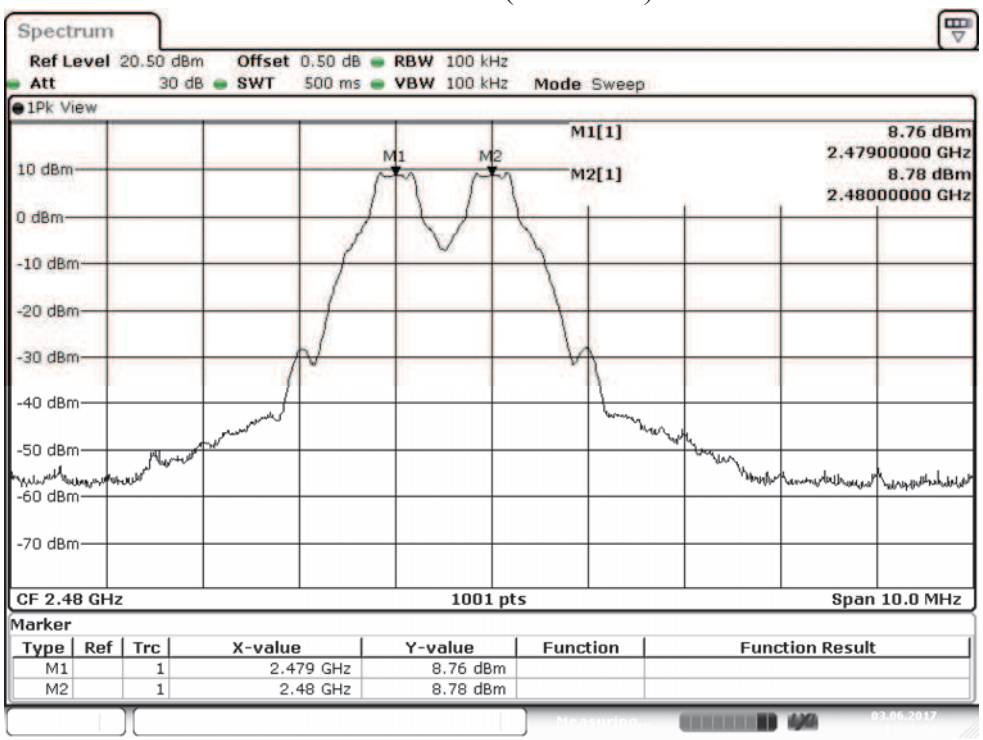
Channel 00 (2402MHz)



Channel 39 (2441MHz)




Channel 78 (2480MHz)

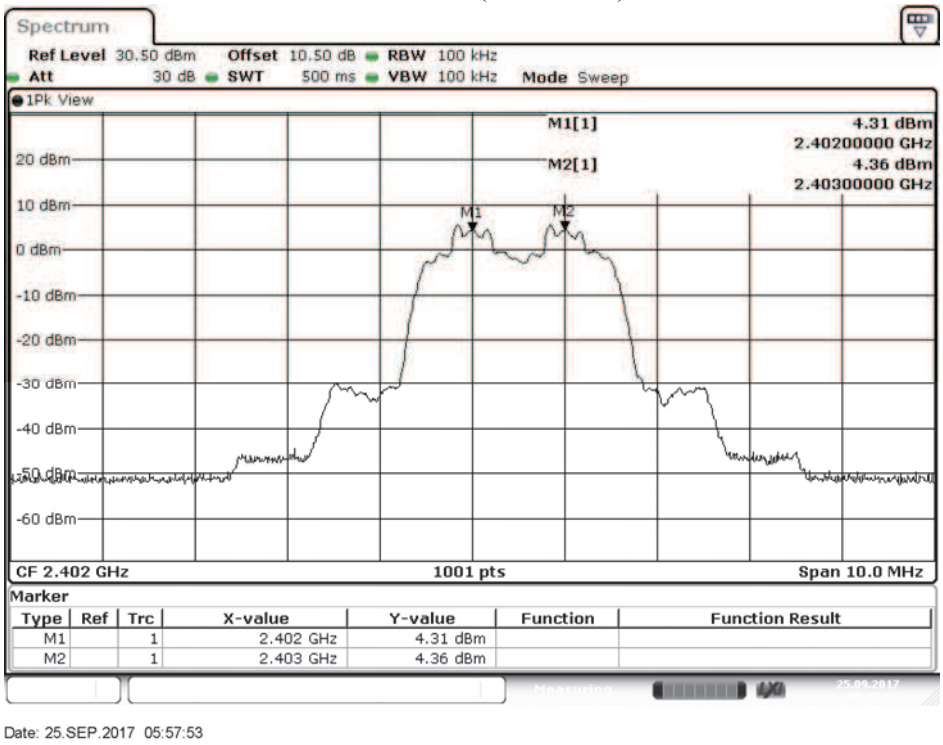


Product : Bike Navigation computer
Test Item : Channel Separation
Test Mode : Mode 2: Transmit - 2Mbps

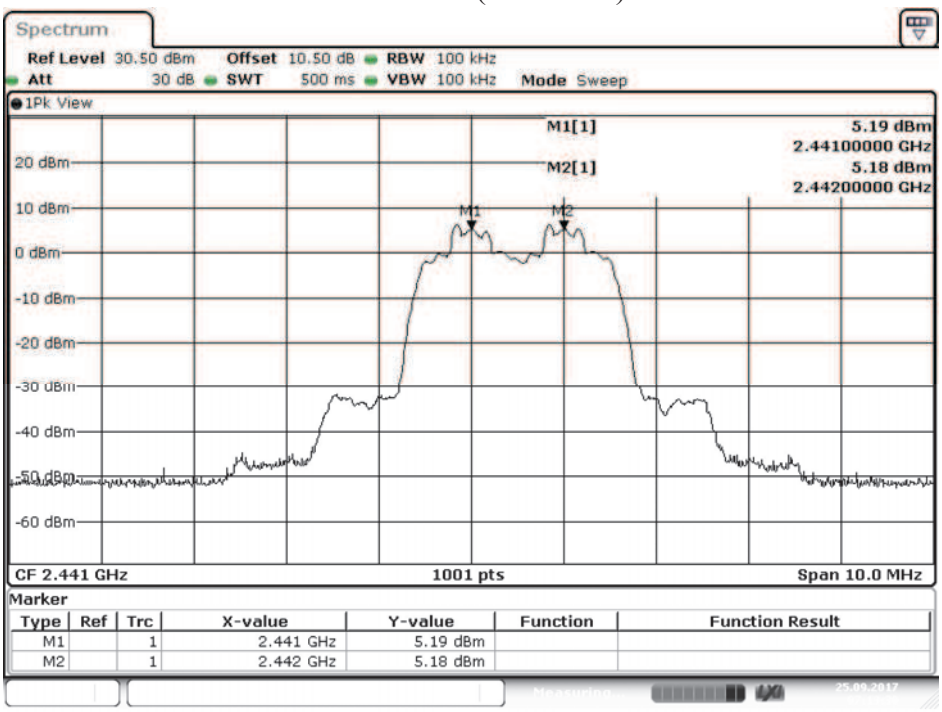
| Channel No. | Frequency (MHz) | Measurement Level (kHz) | Limit (kHz) | Limit of (2/3)*20dB Bandwidth (kHz) | Result |
|---|---|---|---|---|---|
| 00 | 2402 | 1000 | >25 kHz | 858.0 | Pass |
| 39 | 2441 | 1000 | >25 kHz | 856.0 | Pass |
| 78 | 2480 | 1000 | >25 kHz | 856.0 | Pass |

NOTE: The 20dB Bandwidth is refer to section 10.

Channel 00 (2402MHz)

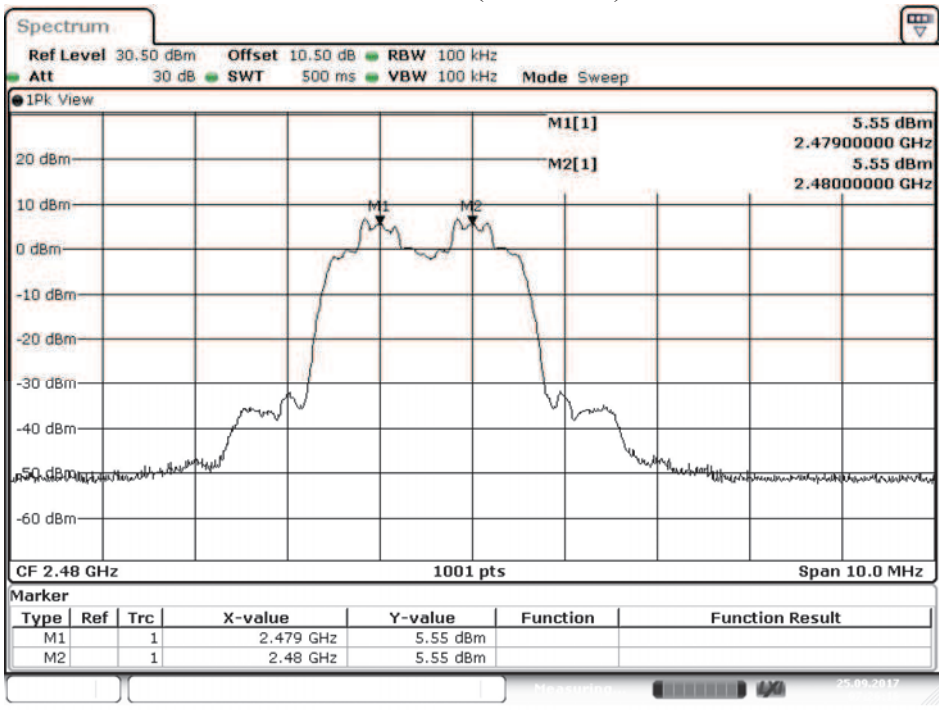


Channel 39 (2441MHz)




Date: 25.SEP.2017 07:13:30

Channel 78 (2480MHz)



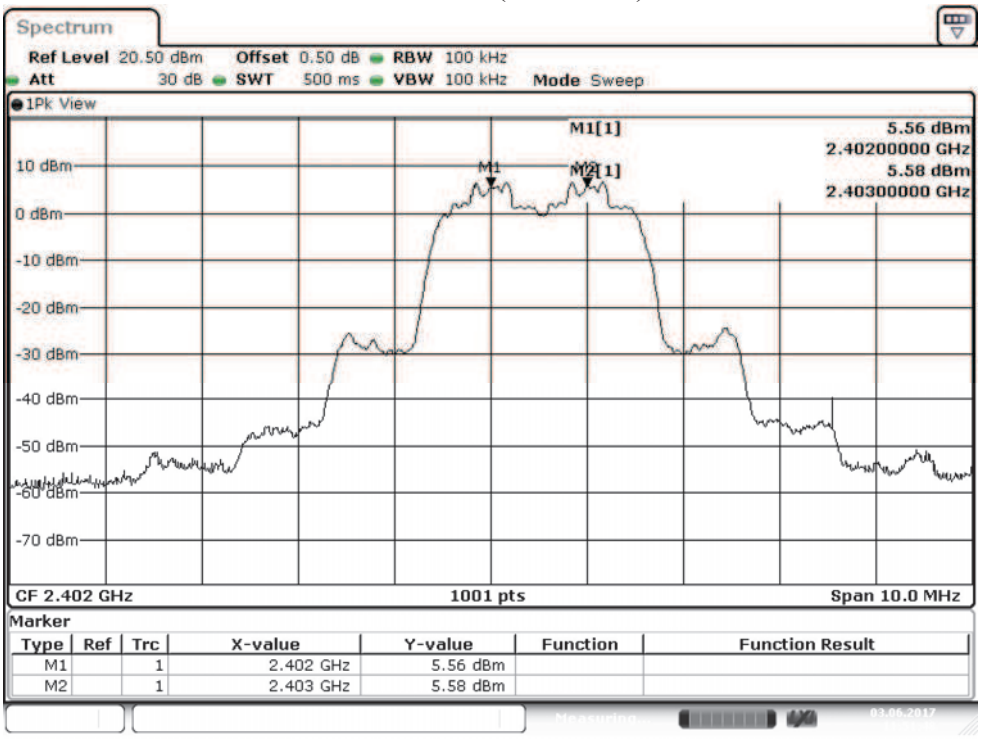

Date: 25.SEP.2017 07:26:16

Product : Bike Navigation computer
Test Item : Channel Separation
Test Mode : Mode 3: Transmit - 3Mbps

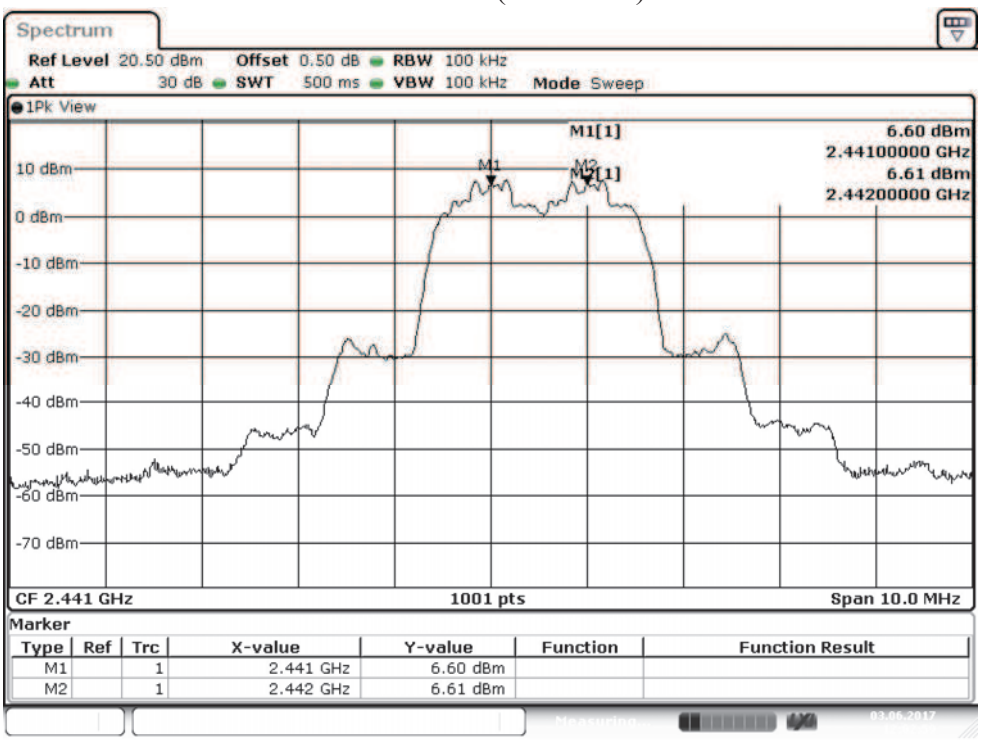
| Channel No. | Frequency (MHz) | Measurement Level (kHz) | Limit (kHz) | Limit of (2/3)*20dB Bandwidth (kHz) | Result |
|---|---|---|---|---|---|
| 00 | 2402 | 1000 | >25 kHz | 864.0 | Pass |
| 39 | 2441 | 1000 | >25 kHz | 864.0 | Pass |
| 78 | 2480 | 1000 | >25 kHz | 860.0 | Pass |

NOTE: The 20dB Bandwidth is refer to section 10.

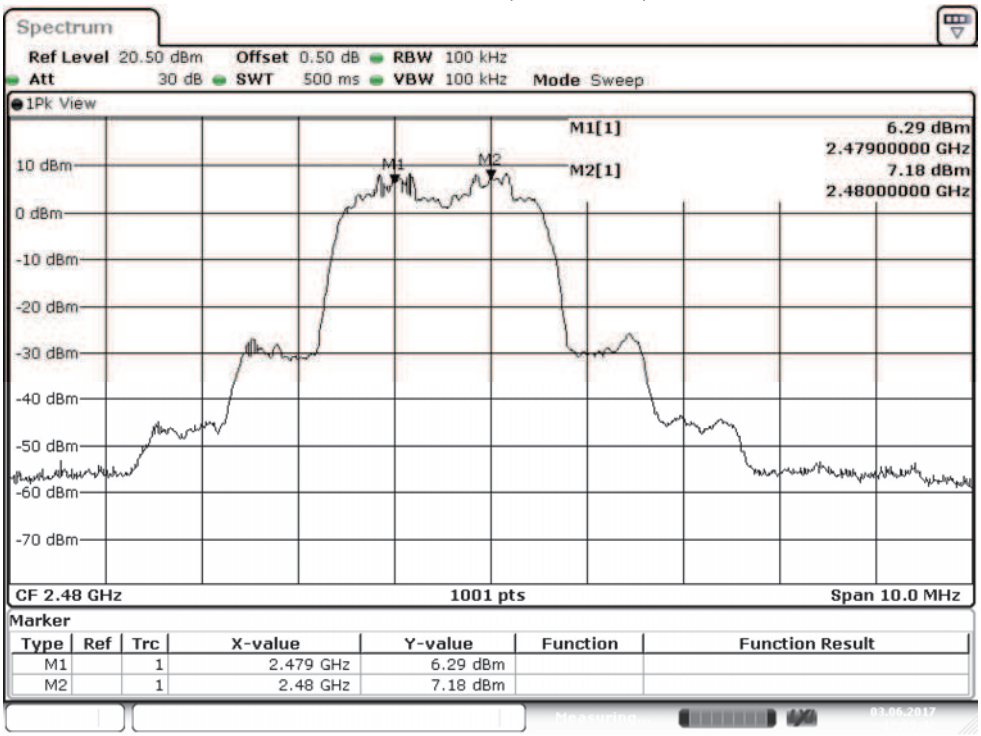
Channel 00 (2402MHz)



Channel 39 (2441MHz)

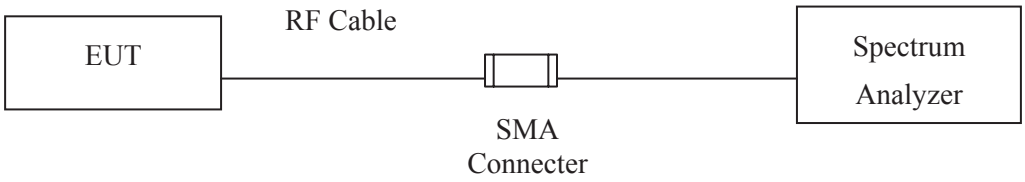



Channel 78 (2480MHz)



# 9. Dwell Time

## 9.1. Test Setup




## 9.2. Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

## 9.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

## 9.4. Uncertainty

±2.31msec

## 9.5. Test Result of Dwell Time

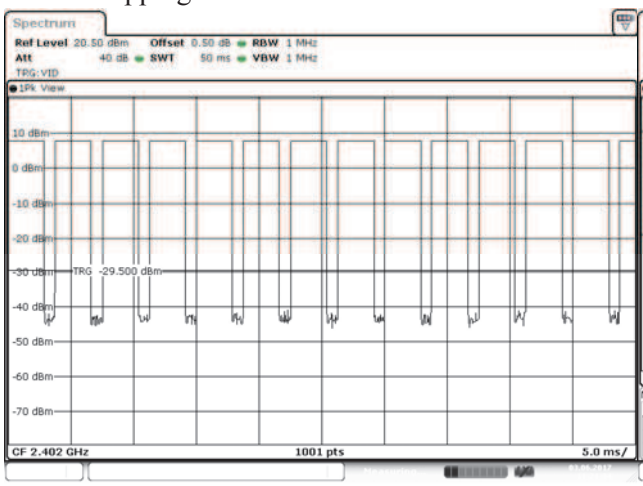
Product : Bike Navigation computer
Test Item : Dwell Time
Test Mode : Mode 1: Transmit - 1Mbps (Channel 00,39,78)

| Frequency (MHz) | Time slot length (ms) | Hopping of Number | Sweep time (ms) | Duty cycle | Dwell Time (Sec) | Limit (Sec) | Result |
|---|---|---|---|---|---|---|---|
| 2402 | 2.877 | 13 | 50 | 0.75 | 0.299 | 0.4 | Pass |
| 2441 | 2.877 | 13 | 50 | 0.75 | 0.299 | 0.4 | Pass |
| 2480 | 2.877 | 13 | 50 | 0.75 | 0.299 | 0.4 | Pass |

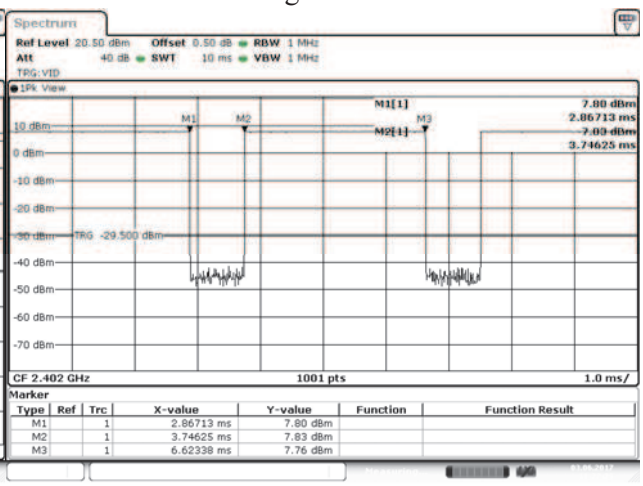
Duty cycle = ((Time slot length(ms)*Hopping of Number) / Sweep time (ms)

Dwell time = (Duty cycle /79) * (79*0.4)

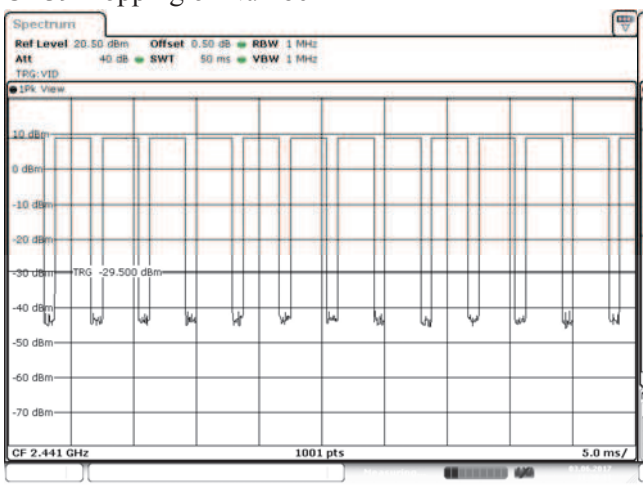
CH 00 Hopping of Number



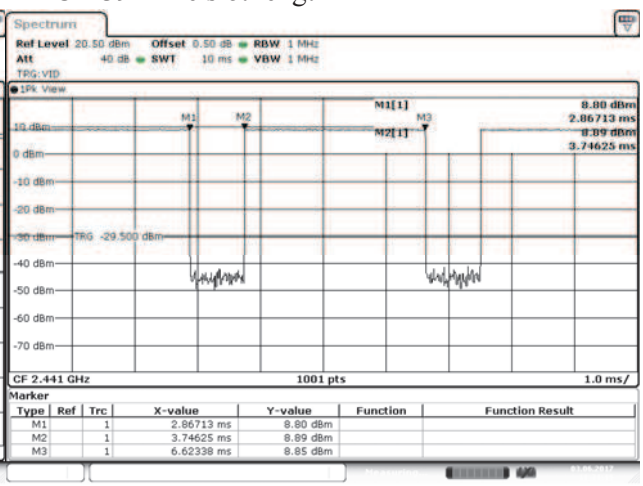

CH 00 Time slot length



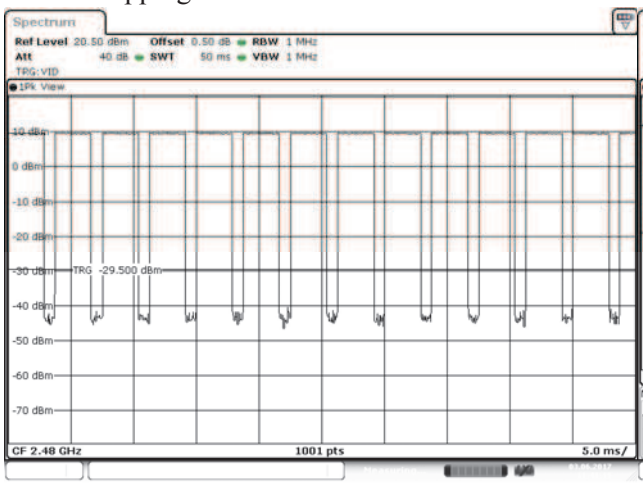

CH39 Hopping of Number



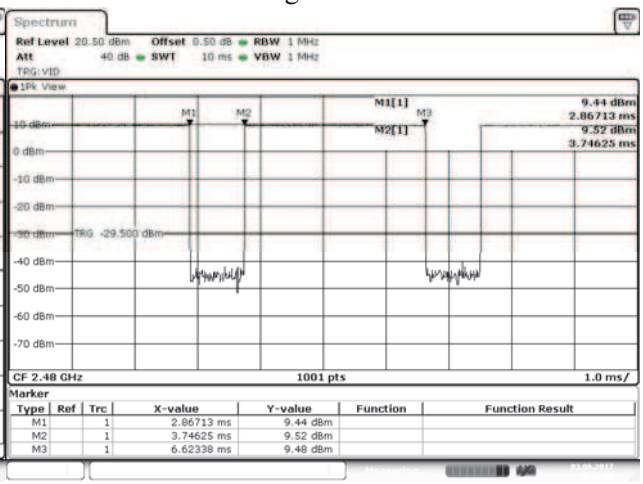

CH 39 Time slot length



CH 78 Hopping of Number




CH 78 Time slot length




Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

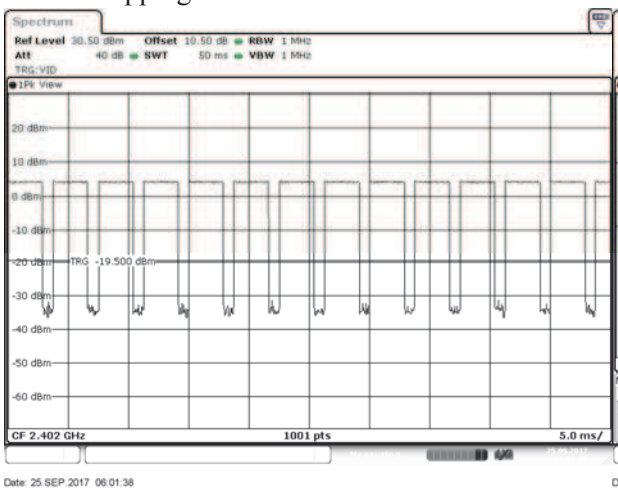
Product : Bike Navigation computer
Test Item : Dwell Time
Test Mode : Mode 2: Transmit - 2Mbps (Channel 00,39,78)

| Frequency (MHz) | Time slot length (ms) | Hopping of Number | Sweep time (ms) | Duty cycle | Dwell Time (Sec) | Limit (Sec) | Result |
|---|---|---|---|---|---|---|---|
| 2402 | 2.877 | 13 | 50 | 0.75 | 0.299 | 0.4 | Pass |
| 2441 | 2.877 | 13 | 50 | 0.75 | 0.299 | 0.4 | Pass |
| 2480 | 2.877 | 13 | 50 | 0.75 | 0.299 | 0.4 | Pass |

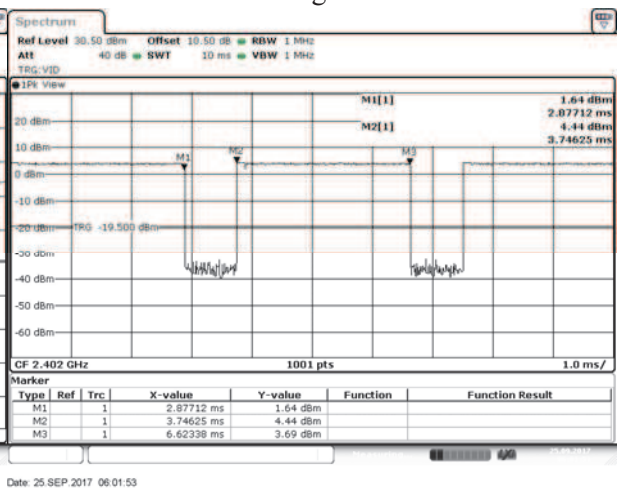
Duty cycle =((Time slot length(ms)*Hopping of Number) / Sweep time (ms)

Dwell time = (Duty cycle /79) * (79*0.4)

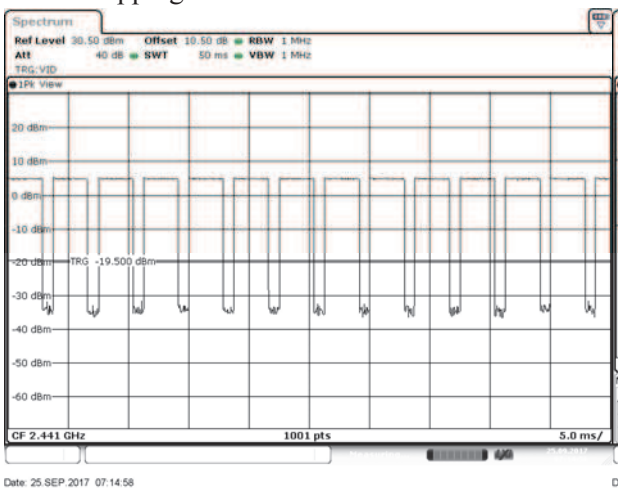
CH 00 Hopping of Number



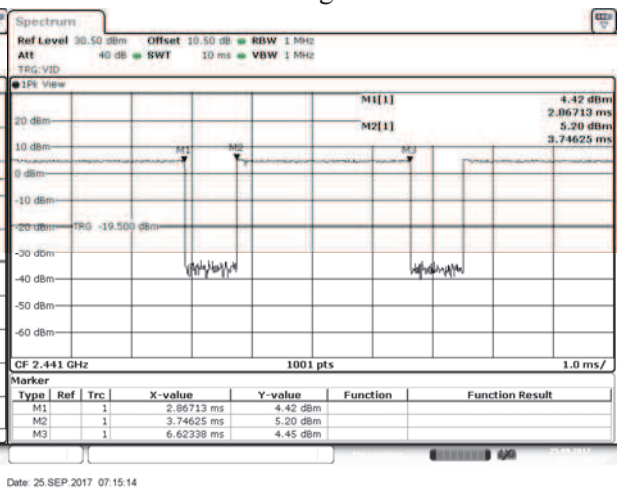

CH 00 Time slot length



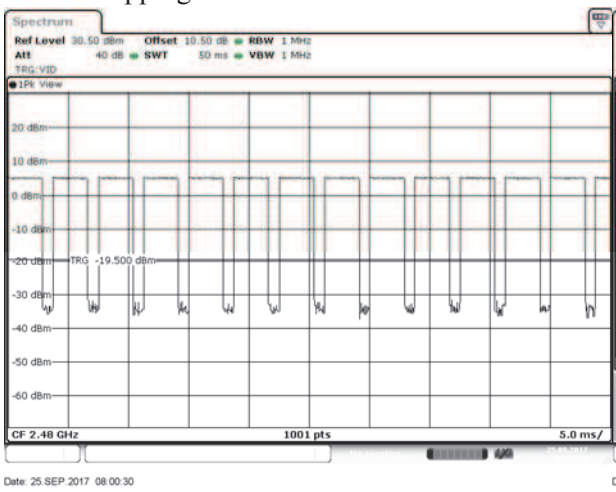

CH39 Hopping of Number



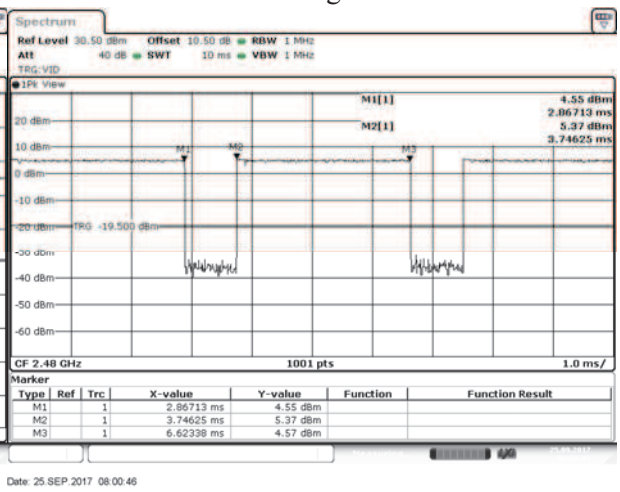

CH 39 Time slot length



CH 78 Hopping of Number




CH 78 Time slot length




Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

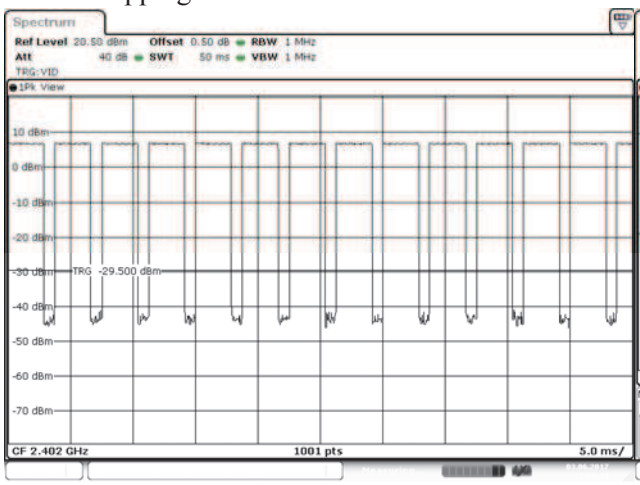
Product : Bike Navigation computer
Test Item : Dwell Time
Test Mode : Mode 3: Transmit - 3Mbps (Channel 00,39,78)

| Frequency (MHz) | Time slot length (ms) | Hopping of Number | Sweep time (ms) | Duty cycle | Dwell Time (Sec) | Limit (Sec) | Result |
|---|---|---|---|---|---|---|---|
| 2402 | 2.877 | 13 | 50 | 0.75 | 0.299 | 0.4 | Pass |
| 2441 | 2.877 | 13 | 50 | 0.75 | 0.299 | 0.4 | Pass |
| 2480 | 2.877 | 13 | 50 | 0.75 | 0.299 | 0.4 | Pass |

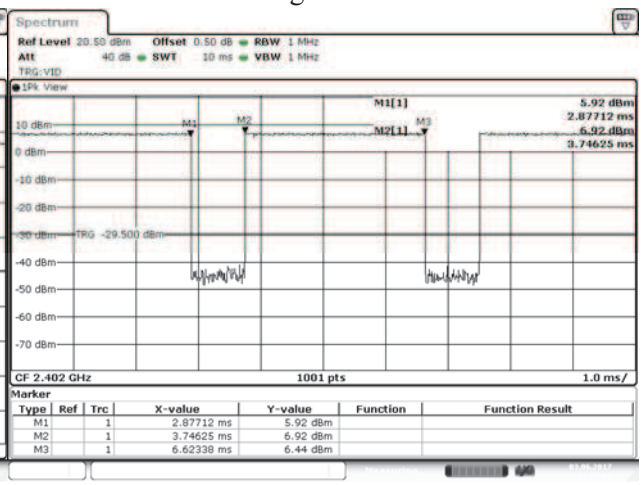
Duty cycle =((Time slot length(ms)*Hopping of Number) / Sweep time (ms)

Dwell time = (Duty cycle /79) * (79*0.4)

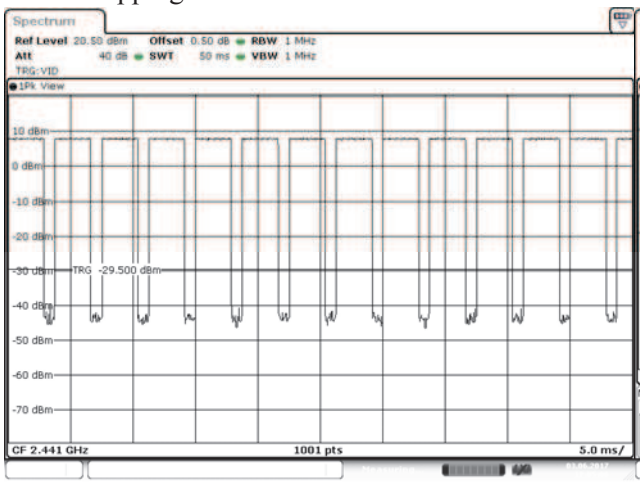
CH 00 Hopping of Number



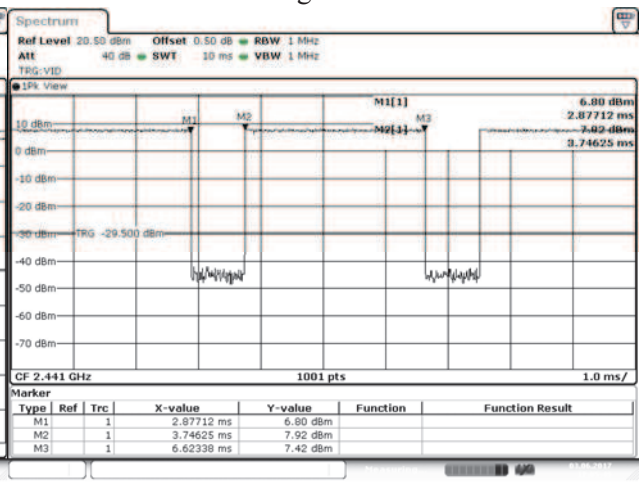

CH 00 Time slot length



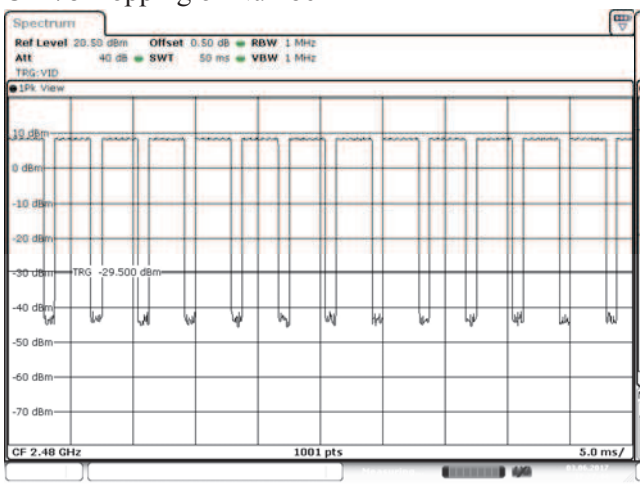

CH39 Hopping of Number



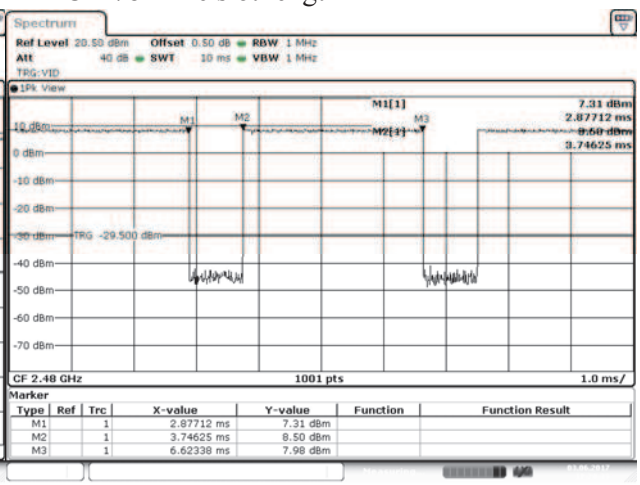

CH 39 Time slot length



CH 78 Hopping of Number




CH 78 Time slot length

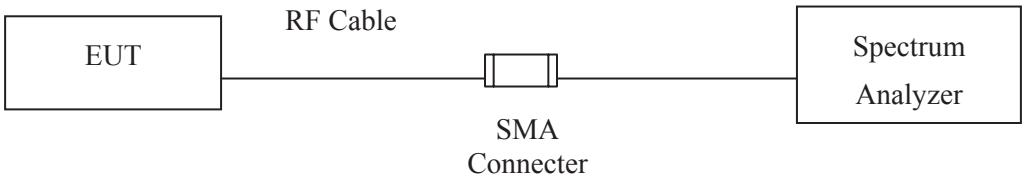



Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.

# 10. Occupied Bandwidth

## 10.1. Test Setup




## 10.2. Limits

N/A

## 10.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

## 10.4. Uncertainty

±279.2Hz

## 10.5. Test Result of Occupied Bandwidth

Product : Bike Navigation computer
Test Item : Occupied Bandwidth Data
Test Mode : Mode 1: Transmit - 1Mbps

| Channel No. | Frequency (MHz) | Measurement Level (kHz) | Required Limit (kHz) | Result |
|---|---|---|---|---|
| 00 | 2402 | 963 | -- | NA |
| 39 | 2441 | 963 | -- | NA |
| 78 | 2480 | 963 | -- | NA |

**Figure Channel 00:**

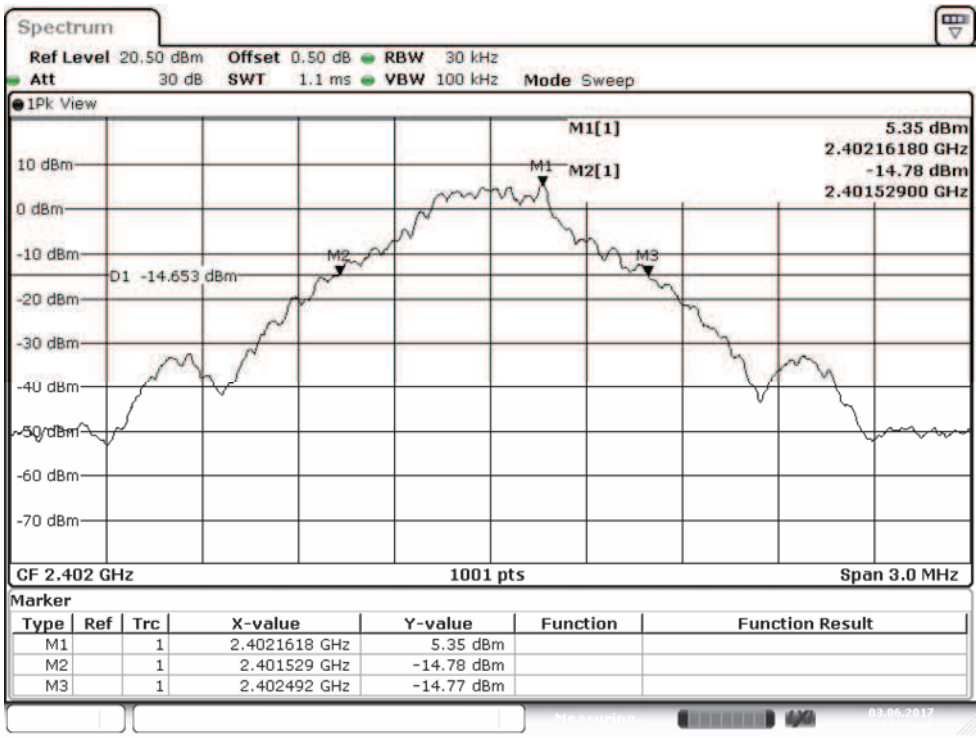


**Figure Channel 39:**

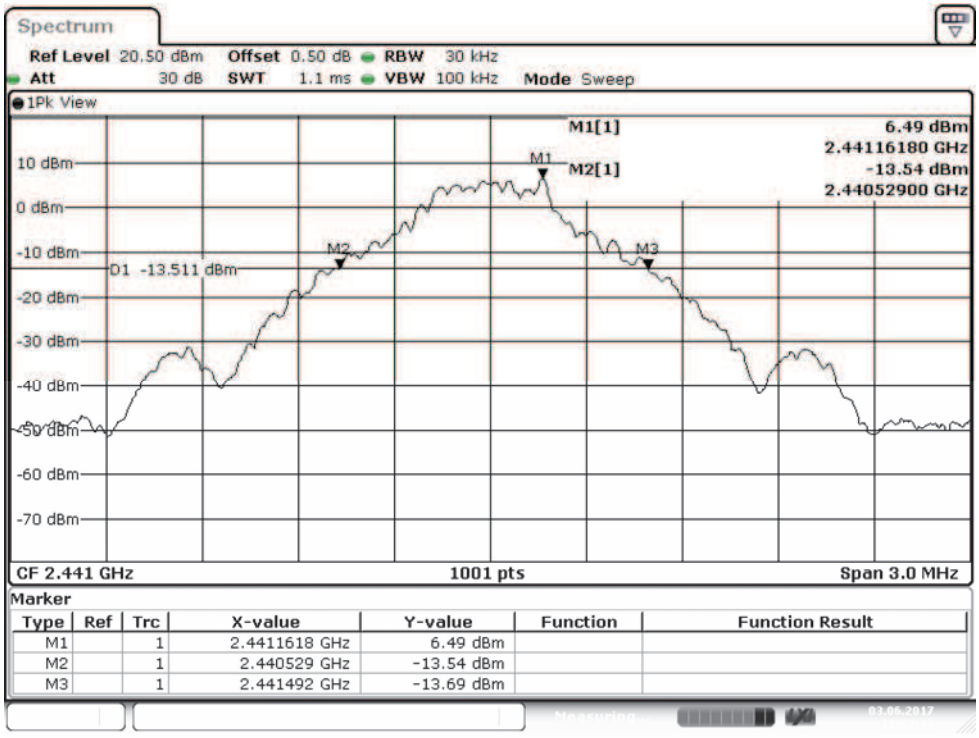
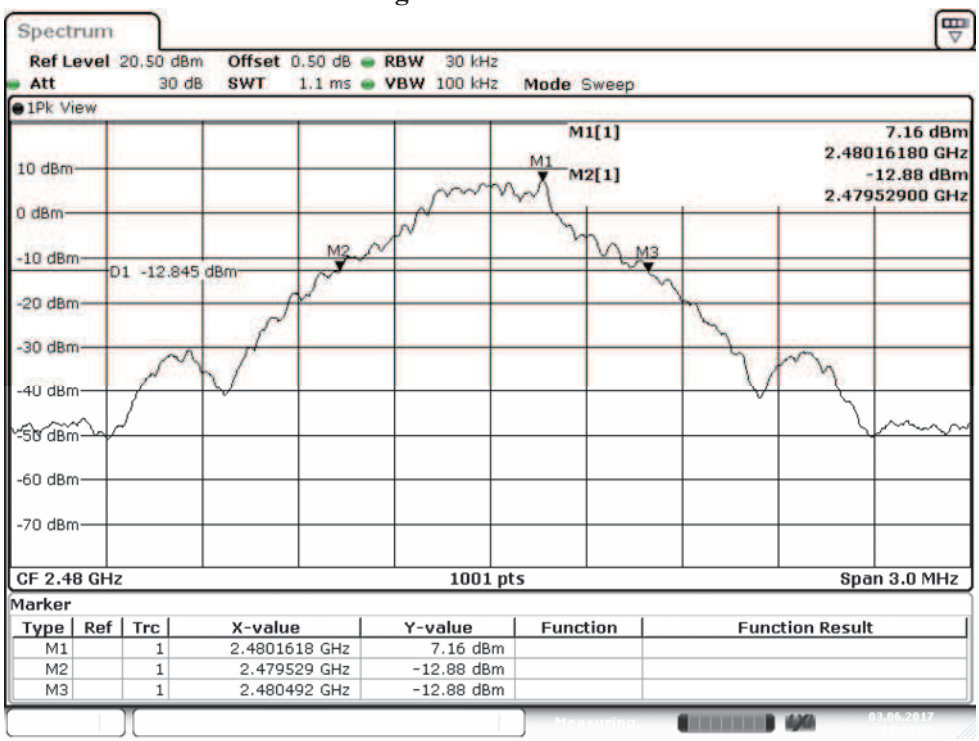



**Figure Channel 78:**



Product : Bike Navigation computer
Test Item : Occupied Bandwidth Data
Test Mode : Mode 2: Transmit - 2Mbps

| Channel No. | Frequency (MHz) | Measurement Level (kHz) | Required Limit (kHz) | Result |
|---|---|---|---|---|
| 00 | 2402 | 1287 | -- | NA |
| 39 | 2441 | 1284 | -- | NA |
| 78 | 2480 | 1284 | -- | NA |

**Figure Channel 00:**

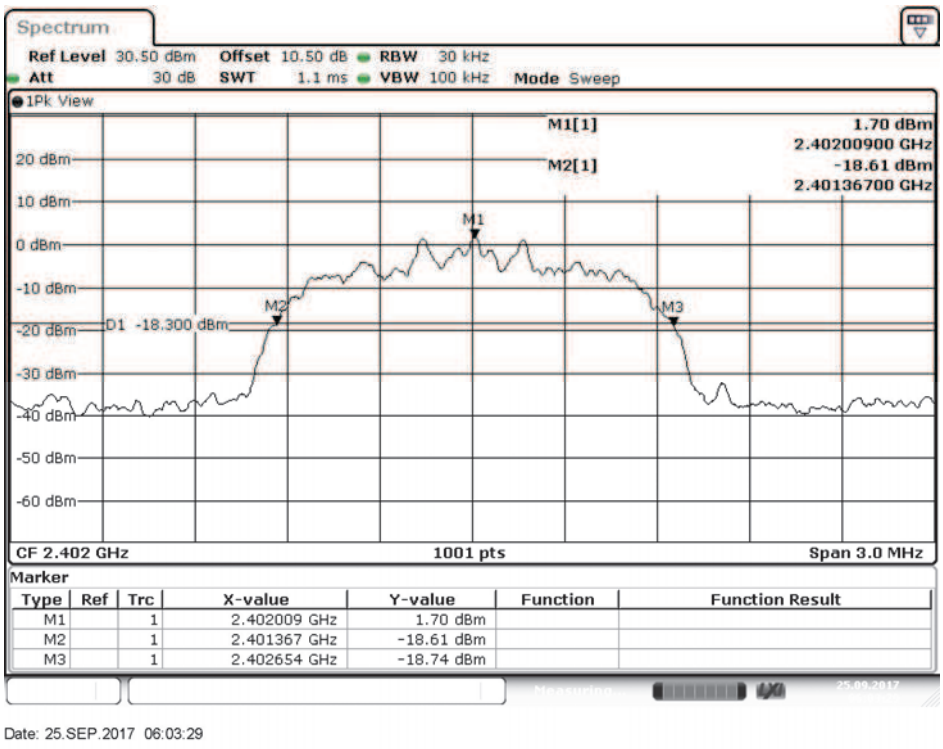
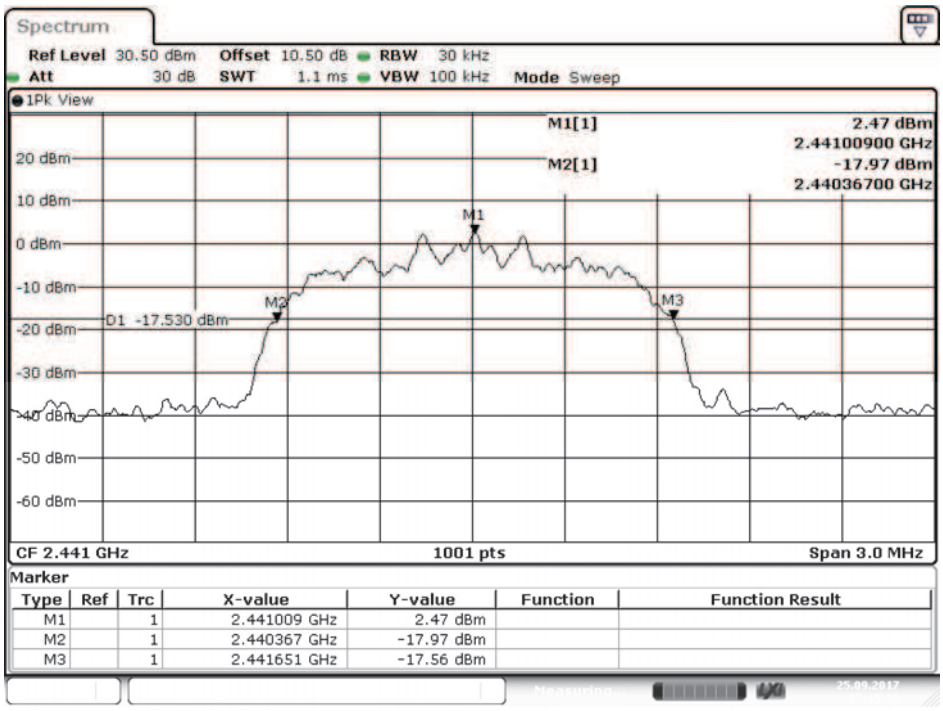
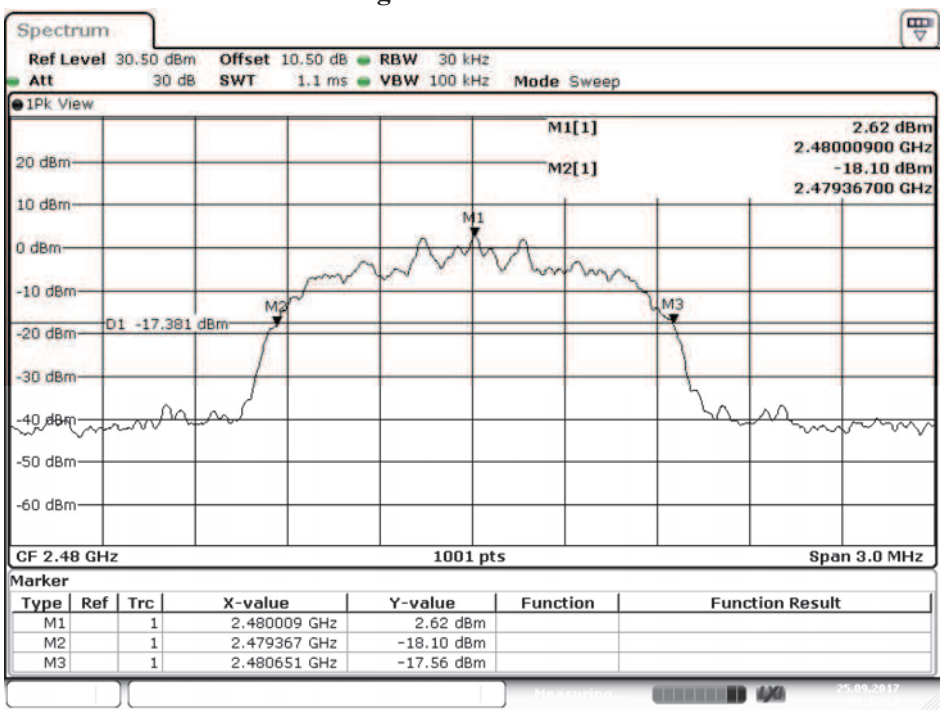


**Figure Channel 39:**




Date: 25.SEP.2017 07:15:56

**Figure Channel 78:**




Date: 25.SEP.2017 08:16:18

Product : Bike Navigation computer
Test Item : Occupied Bandwidth Data
Test Mode : Mode 3: Transmit - 3Mbps

| Channel No. | Frequency (MHz) | Measurement Level (kHz) | Required Limit (kHz) | Result |
|---|---|---|---|---|
| 00 | 2402 | 1296 | -- | NA |
| 39 | 2441 | 1296 | -- | NA |
| 78 | 2480 | 1290 | -- | NA |

**Figure Channel 00:**

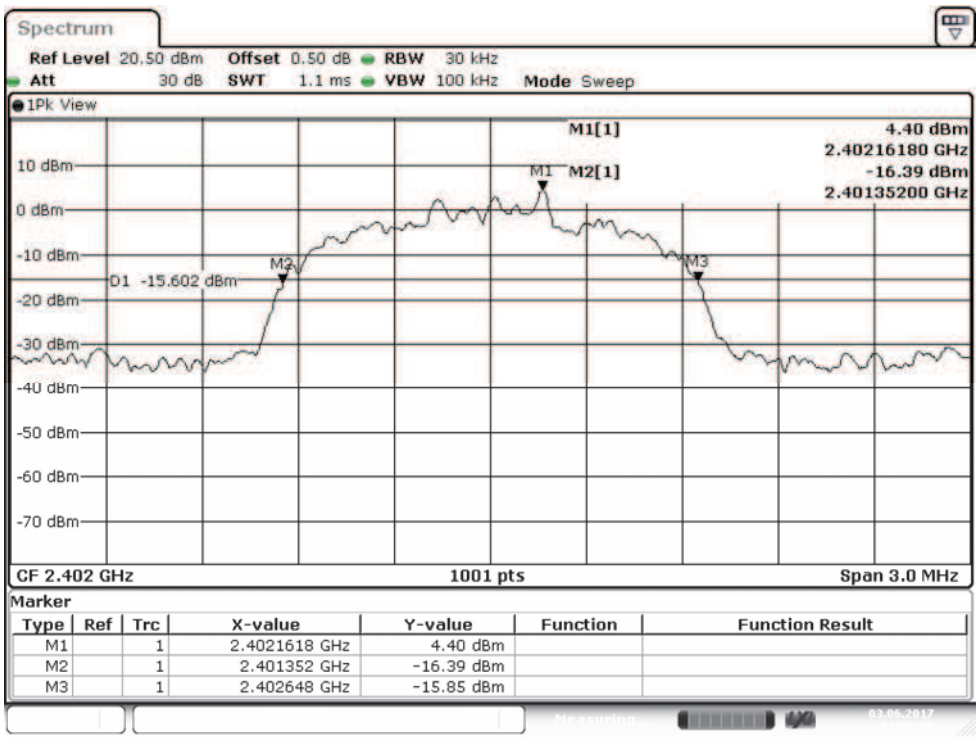


**Figure Channel 39:**

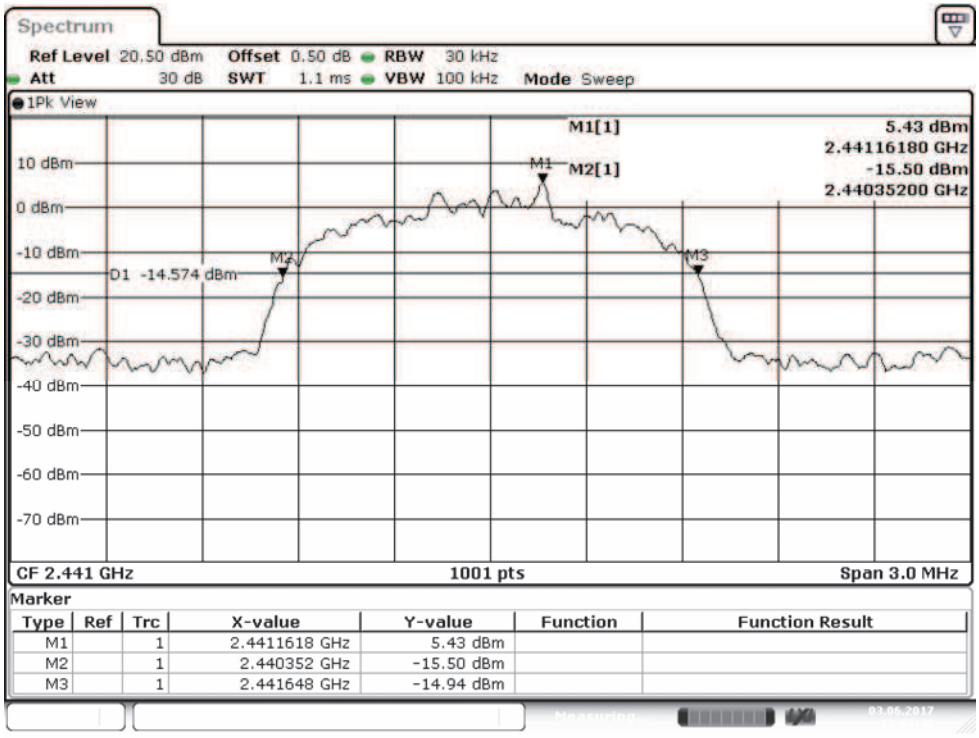
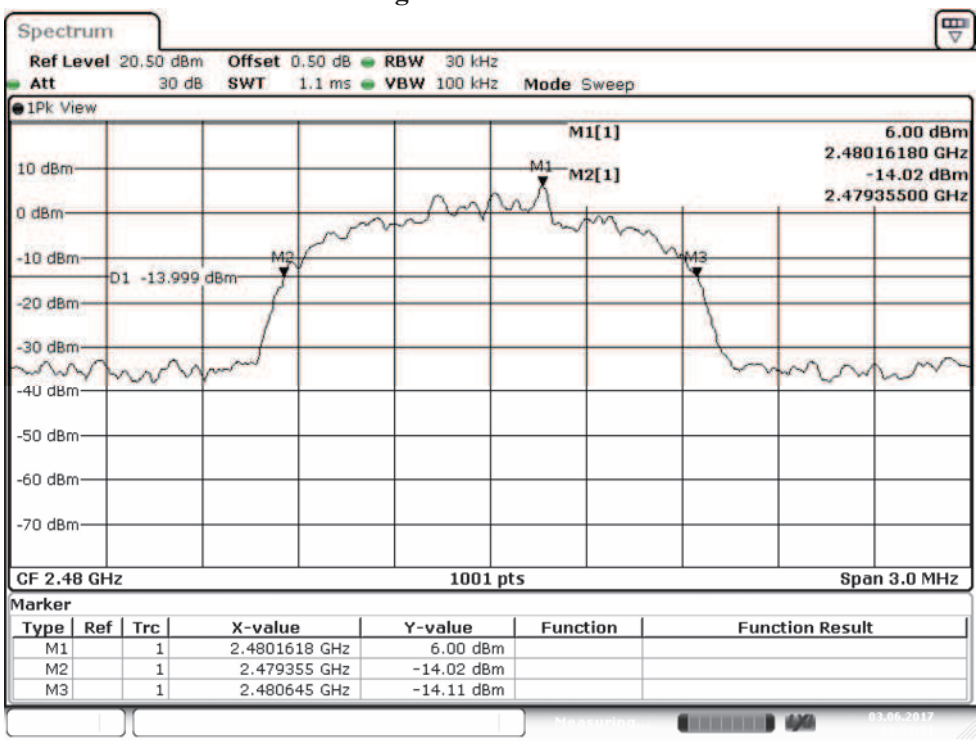



**Figure Channel 78:**



## 11. EMI Reduction Method During Compliance Testing

No modification was made during testing.