

Test Report

FCC ID:XBD-ISBT32RB

Date of issue: Apr. 23, 2018

| | |
|---------------------|--|
| Report Number: | MTi180328E106 |
| Sample Description: | BluJax |
| Model(s): | ISBT32 Rev B |
| Applicant: | AAMP of Florida, Inc. dba AAMP Global |
| Address: | 15500 Lightwave Dr. Suite 202 Clearwater, FL 33760 United States |
| Date of Test: | Mar. 06, 2018 to Mar. 28, 2018 |

Shenzhen Microtest Co., Ltd.
<http://www.mtitest.com>

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Table of Contents

| | | |
|----------|---|-----------|
| 1 | GENERAL INFORMATION | 5 |
| 1.1 | DESCRIPTION OF EUT | 5 |
| 1.2 | OPERATION CHANNEL LIST | 5 |
| 1.3 | TEST CHANNEL LIST | 6 |
| 1.4 | ANCILLARY EQUIPMENT LIST | 6 |
| 1.5 | DESCRIPTION OF SUPPORT UNITS | 6 |
| 2 | SUMMARY OF TEST RESULTS | 7 |
| 3 | TEST FACILITIES AND ACCREDITATIONS | 8 |
| 3.1 | TEST LABORATORY | 8 |
| 3.2 | ENVIRONMENTAL CONDITIONS | 8 |
| 3.3 | MEASUREMENT UNCERTAINTY | 8 |
| 3.4 | TEST SOFTWARE | 8 |
| 4 | EQUIPMENT LIST | 9 |
| 5 | TEST RESULT | 10 |
| 5.1 | ANTENNA REQUIREMENT | 10 |
| 5.1.1 | <i>Standard requirement</i> | 10 |
| 5.1.2 | <i>EUT Antenna</i> | 10 |
| 5.2 | PEAK OUTPUT POWER | 11 |
| 5.2.1 | <i>Limit</i> | 11 |
| 5.2.2 | <i>Test setup</i> | 11 |
| 5.2.3 | <i>Test procedure</i> | 11 |
| 5.2.4 | <i>Test results</i> | 11 |
| 5.3 | CONDUCTED EMISSION | 16 |
| 5.3.1 | <i>Limits</i> | 16 |
| 5.3.2 | <i>Test setup</i> | 16 |
| 5.3.3 | <i>Test procedure</i> | 17 |
| 5.3.4 | <i>Test results</i> | 17 |
| 5.4 | RADIATED SPURIOUS EMISSION | 20 |
| 5.4.1 | <i>Limits</i> | 20 |
| 5.4.2 | <i>Test setup</i> | 21 |
| 5.4.3 | <i>Test procedure</i> | 22 |
| 5.4.4 | <i>Test results</i> | 23 |
| 5.4.4.1 | <i>Radiation emission</i> | 23 |
| | <i>Band edge - radiated</i> | 29 |
| 5.5 | 20dB OCCUPIED CHANNEL BANDWIDTH | 31 |
| 5.5.1 | <i>Limit</i> | 31 |
| 5.5.2 | <i>Test setup</i> | 31 |
| 5.5.3 | <i>Test procedure</i> | 31 |
| 5.5.4 | <i>Test results</i> | 31 |
| 5.6 | BAND EDGE - CONDUCTED | 36 |
| 5.6.1 | <i>Limit</i> | 36 |
| 5.6.2 | <i>Test setup</i> | 36 |
| 5.6.3 | <i>Test procedure</i> | 36 |
| 5.6.4 | <i>Test results</i> | 36 |
| 5.7 | CARRIER FREQUENCY SEPARATION | 45 |
| 5.7.1 | <i>Limit</i> | 45 |
| 5.7.2 | <i>Test setup</i> | 45 |
| 5.7.3 | <i>Test procedure</i> | 45 |
| 5.7.4 | <i>Test results</i> | 45 |
| 5.8 | DWELL TIME | 50 |

| | | |
|---|----------------------------------|-----------|
| 5.8.1 | Limit | 50 |
| 5.8.2 | Test setup | 50 |
| 5.8.3 | Test procedure..... | 50 |
| 5.8.4 | Test results..... | 50 |
| 5.9 | NUMBER OF HOPPING CHANNEL..... | 55 |
| 5.9.1 | Applied procedures / limit | 55 |
| 5.9.2 | TEST PROCEDURE | 55 |
| 5.9.3 | DEVIATION FROM STANDARD..... | 55 |
| 5.9.4 | TEST SETUP..... | 55 |
| 5.9.5 | TEST RESULTS | 55 |
| PHOTOGRAPHS OF THE TEST SETUP..... | | 57 |

TEST REPORT

Applicant's name: AAMP of Florida, Inc. dba AAMP Global

Address: 15500 Lightwave Dr. Suite 202 Clearwater, FL 33760 United States

Manufacture's Name: Skytech creations limited

Address: Unit 507, 5/F., IC Development Centre, No.6 Science Park West Avenue, Shatin, Hong Kong

Product name: BluJax

Trademark: iSimple

Model name: ISBT32 Rev B

Standards: FCC Part 15.247

Test Procedure: ANSI C63.10-2013
DA 00-705

This device described above has been tested by Shenzhen Microtest Co., Ltd and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Tested by:

Leo Su

Amy Lu

Mar. 28, 2018

Reviewed by:

Blue Zheng

Blue Zheng

Apr. 23, 2018

Approved by:

Smith Chen

Smith Chen

Apr. 23, 2018

1 General Information

1.1 Description of EUT

| | |
|--------------------------|------------------------------------|
| Product name | BluJax |
| Model name | ISBT32 Rev B |
| Serial Model | N/A |
| Operation Frequency | TX 2402-2480MHz RX 2402-2480MHz |
| Number Of Channel | 79 |
| Modulation Type: | GFSK, $\pi/4$ -DQPSK, 8DPSK |
| Bit Rate of Transmitter: | 1 Mbps, 2 Mbps, 3 Mbps |
| Max. Output Power: | 2.347dBm |
| Antenna Type: | PCB antenna (Antenna Gain 0dBi) |
| Supply Voltage: | DC 5V from adapter AC 120V/60Hz |
| Hardware Version: | V0.3 |
| Software Version: | V2.5 |

1.2 Operation channel list

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|
| 00 | 2402 | 27 | 2429 | 54 | 2456 |
| 01 | 2403 | 28 | 2430 | 55 | 2457 |
| 02 | 2404 | 29 | 2431 | 56 | 2458 |
| 03 | 2405 | 30 | 2432 | 57 | 2459 |
| 04 | 2406 | 31 | 2433 | 58 | 2460 |
| 05 | 2407 | 32 | 2434 | 59 | 2461 |
| 06 | 2408 | 33 | 2435 | 60 | 2462 |
| 07 | 2409 | 34 | 2436 | 61 | 2463 |
| 08 | 2410 | 35 | 2437 | 62 | 2464 |
| 09 | 2411 | 36 | 2438 | 63 | 2465 |
| 10 | 2412 | 37 | 2439 | 64 | 2466 |
| 11 | 2413 | 38 | 2440 | 65 | 2467 |
| 12 | 2414 | 39 | 2441 | 66 | 2468 |
| 13 | 2415 | 40 | 2442 | 67 | 2469 |
| 14 | 2416 | 41 | 2443 | 68 | 2470 |
| 15 | 2417 | 42 | 2444 | 69 | 2471 |
| 16 | 2418 | 43 | 2445 | 70 | 2472 |
| 17 | 2419 | 44 | 2446 | 71 | 2473 |

| | | | | | |
|----|------|----|------|----|------|
| 18 | 2420 | 45 | 2447 | 72 | 2474 |
| 19 | 2421 | 46 | 2448 | 73 | 2475 |
| 20 | 2422 | 47 | 2449 | 74 | 2476 |
| 21 | 2423 | 48 | 2450 | 75 | 2477 |
| 22 | 2424 | 49 | 2451 | 76 | 2478 |
| 23 | 2425 | 50 | 2452 | 77 | 2479 |
| 24 | 2426 | 51 | 2453 | 78 | 2480 |
| 25 | 2427 | 52 | 2454 | -- | -- |
| 26 | 2428 | 53 | 2455 | -- | -- |

1.3 Test channel list

| Channel | Channel | Frequency (MHz) |
|---------|---------|-----------------|
| Low | 00 | 2402 |
| Middle | 39 | 2441 |
| High | 78 | 2480 |

1.4 Ancillary equipment list

| Equipment | Model | S/N | Manufacturer | Certificate type |
|-----------|-------|-----|--------------|------------------|
| / | / | / | / | / |

1.5 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Brand | Model/Type No. | Series No. | Note |
|------|-----------|---------|----------------|------------|------|
| E-1 | BluJax | iSimple | ISBT32 Rev B | N/A | EUT |
| E-1 | Adapter | Huawei | N/A | N/A | |

Note:

(1)The support equipment was authorized by Declaration of Confirmation.

(2)For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2 Summary of Test Results

Test procedures according to the technical standards:

| No. | Standard Section | Test Item | Result | Remark |
|-----|------------------|--------------------------------|--------|--------|
| 1 | 15.203/15.247(c) | Antenna requirement | Pass | |
| 2 | 15.247(b)(1) | Peak output power | Pass | |
| 3 | 15.207 | Conducted emission | Pass | |
| 4 | 15.247(d) | Band edge | Pass | |
| 5 | 15.205/15.209 | Spurious emission | Pass | |
| 6 | 15.247(a) | 20dB occupied bandwidth | Pass | |
| 7 | 15.247(a) | Carrier Frequencies Separation | Pass | |
| 8 | 15.247(a) | Hopping channel number | Pass | |
| 9 | 15.247(a) | Dwell time | Pass | |

3 Test Facilities and Accreditations

3.1 Test laboratory

| | |
|-----------------------|---|
| Test Laboratory | Shenzhen Microtest Co., Ltd |
| Location | No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China |
| FCC Registration No.: | FCC Registration No.: 448573 |

3.2 Environmental conditions

| | |
|----------------------|--------------|
| Temperature: | 20°C~30°C |
| Humidity | 30%~70% |
| Atmospheric pressure | 98kPa~101kPa |

3.3 Measurement uncertainty

The reported uncertainty of measurement $y \pm U$ where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$ providing a level of confidence of approximately 95 %

| No. | Item | Uncertainty |
|-----|-------------------------------|-------------------------|
| 1 | Conducted Emission Test | $\pm 1.38\text{dB}$ |
| 2 | RF power, conducted | $\pm 0.16\text{dB}$ |
| 3 | Spurious emissions, conducted | $\pm 0.21\text{dB}$ |
| 4 | All emissions, radiated(<1G) | $\pm 4.68\text{dB}$ |
| 5 | All emissions, radiated(>1G) | $\pm 4.89\text{dB}$ |
| 6 | Temperature | $\pm 0.5^\circ\text{C}$ |
| 7 | Humidity | $\pm 2\%$ |

3.4 Test software

| Software Name | Manufacturer | Model | Version |
|----------------|--------------|-------|-----------|
| RF Test System | Farad | LZ-RF | Lz_Rf 3A3 |

4 Equipment list

| Software Name: EMI Measurement Software | | | | | | |
|---|--|-------------------------------|----------------|---------------|------------------|------------|
| Manufacturer: Farad | | | | | | |
| Model: EZ-EMC | | | | | | |
| Equipment No. | Equipment Name | Manufacturer | Model | Serial No. | Calibration date | Due date |
| MTI-E001 | Spectrum Analyzer | Agilent | E4407B | MY41441082 | 2017/09/18 | 2018/09/17 |
| MTI-E002 | CMU 200 universal radio communication tester | Rohde&schwarz | CMU 200 | 114587 | 2017/09/18 | 2018/09/17 |
| MTI-E004 | EMI Test Receiver | Rohde&schwarz | ESPI | 1000314 | 2017/09/18 | 2018/09/17 |
| MTI-E006 | Broadband antenna | schwarzbeck | VULB9163 | 872 | 2017/09/18 | 2018/09/17 |
| MTI-E007 | Horn antenna | schwarzbeck | BBHA9120D | 1201 | 2017/09/18 | 2018/09/17 |
| MTI-E014 | amplifier | America | 8447D | 3113A06150 | 2017/09/18 | 2018/09/17 |
| MTI-E015 | Conduction Immunity Signal Generator | Schloder | CDG6000 | 126A1343/2015 | 2017/09/18 | 2018/09/17 |
| MTI-E016 | Coupled decoupling network | Schloder | CDA M2/M3 | A2210332/2015 | 2017/09/18 | 2018/09/17 |
| MTI-E032 | Comprehensive test instrument | Rohde&schwarz | CMW500 | 124192 | 2017/04/13 | 2018/04/12 |
| MTI-E034 | amplifier | Agilent | 8449B | 3008A02400 | 2017/08/22 | 2018/08/21 |
| MTI-E040 | Spectrum analyzer | Agilent | N9020A | MY49100060 | 2018/03/04 | 2019/03/03 |
| MTI-E041 | Signal generator | Agilent | N5182A | MY49060455 | 2017/09/23 | 2018/09/22 |
| MTI-E042 | Analog signal generator | Agilent | E4421B | GB40051240 | 2017/09/23 | 2018/09/22 |
| MTI-E043 | Power probe | Dare Instruments | RPR3006W | 16I00054SN016 | 2017/09/29 | 2018/09/28 |
| MTI-E047 | 10dB attenuator | Mini-Circuits | UNAT-10+ | 15542 | 2017/05/24 | 2018/05/23 |
| MTI-E049 | spectrum analyzer | Rohde&schwarz | FSP-38 | 100019 | 2017/09/18 | 2018/09/17 |
| MTI-E050 | PSG Signal generator | Agilent | E8257D | MY46520873 | 2017/09/24 | 2018/09/23 |
| MTI-E051 | Active Loop Antenna 9kHz - 30MHz | Schwarzbeck | FMZB 1519 B | 00044 | 2018//2/26 | 2019/02/25 |
| MTI-E052 | 18-40GHz amplifier | Chengdu step Micro Technology | ZLNA-18-40G-21 | 1608001 | 2017/09/18 | 2018/09/17 |
| MTI-E053 | 15-40G Antenna | Schwarzbeck | BBHA9170 | BBHA9170582 | 2017/09/18 | 2018/09/17 |

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

5 Test Result

5.1 Antenna requirement

5.1.1 Standard requirement

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device

5.1.2 EUT Antenna

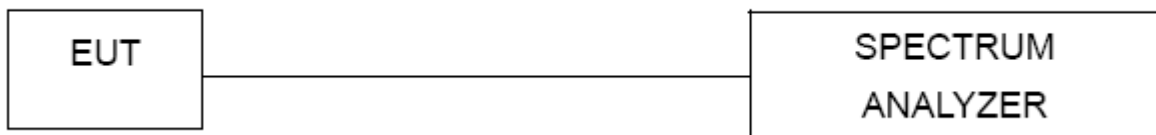
The EUT antenna is PCB antenna. It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.

5.2 Peak output power

5.2.1 Limit

| FCC Part15 Subpart C | | | |
|----------------------|-------------------|--|-----------------------|
| Section | Test Item | Limit | Frequency Range (MHz) |
| 15.247(b)(3) | Peak output power | Hopping Channels>75 Power<1W(30dBm) | 2400-2483.5 |

5.2.2 Test setup



5.2.3 Test procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
 RBW=1MHz, VBW=3MHz, Detector=Peak (If 20dB BW ≤1 MHz)
 RBW=3MHz, VBW=10MHz, Detector=Peak (If 20dB BW > 1 MHz)
- (3) The EUT was set to continuously transmitting in the max power during the test.

5.2.4 Test results

Test data

| | | | |
|---------------|----------|---------------------|---------------------------------|
| EUT : | BluJax | Model Name : | ISBT32 Rev B |
| Temperature : | 25 °C | Relative Humidity : | 60% |
| Pressure : | 1012 hPa | Test Voltage : | DC 5V from adapter AC 120V/60Hz |

GFSK

| Test Channel | Frequency (MHz) | Maximum Conducted Output Power(PK) | Limit (dBm) |
|--------------|-----------------|------------------------------------|-------------|
| CH00 | 2402 | 1.548 | 30 |
| CH39 | 2441 | 1.779 | 30 |
| CH78 | 2480 | 1.756 | 30 |

$\pi/4$ -DQPSK

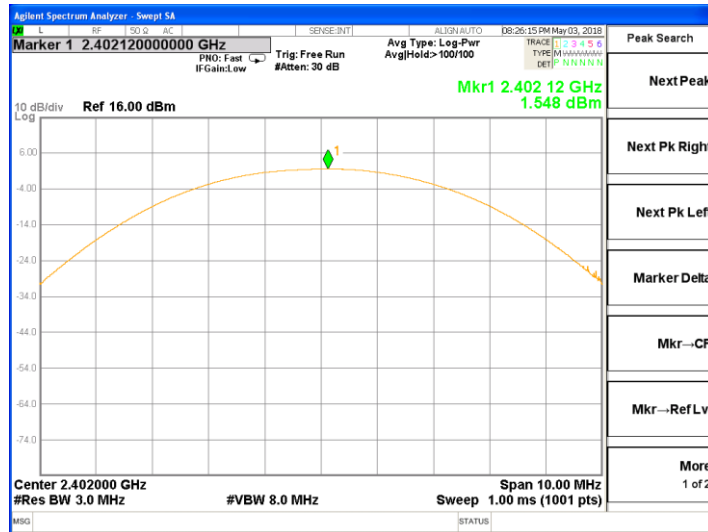
| Test Channel | Frequency (MHz) | Maximum Conducted Output Power(PK) | Limit (dBm) |
|--------------|-----------------|------------------------------------|-------------|
| CH00 | 2402 | 2.049 | 30 |
| CH39 | 2441 | 0.566 | 30 |
| CH78 | 2480 | -0.176 | 30 |

8DPSK

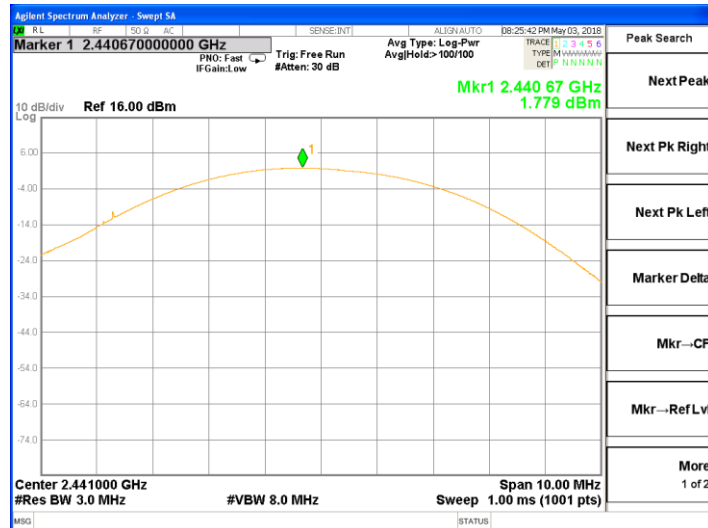
| Test Channel | Frequency (MHz) | Maximum Conducted Output Power(PK) | Limit (dBm) |
|--------------|-----------------|------------------------------------|-------------|
| CH00 | 2402 | 2.347 | 30 |
| CH39 | 2441 | 0.195 | 30 |
| CH78 | 2480 | 0.249 | 30 |

GFSK:

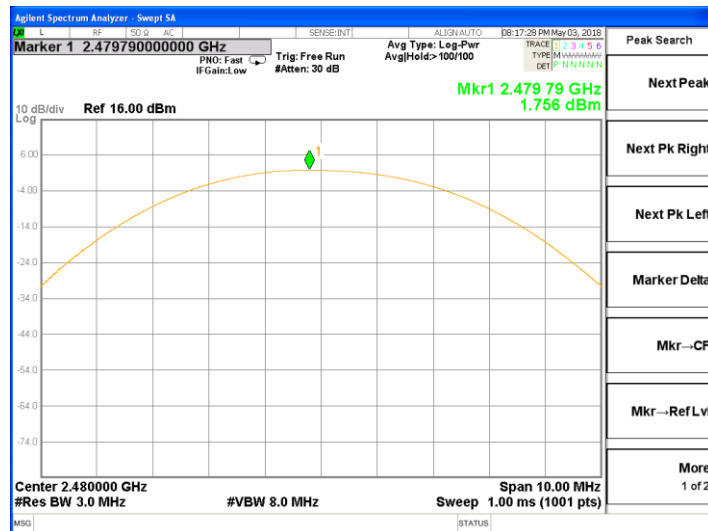
2402MHz



2441MHz

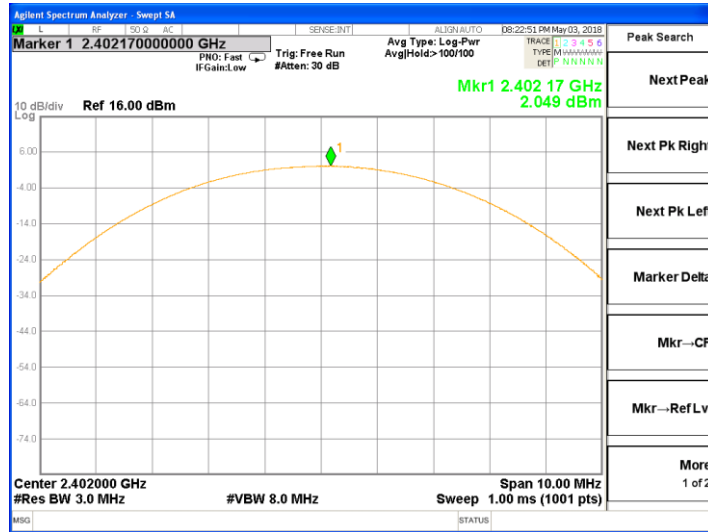


2480MHz

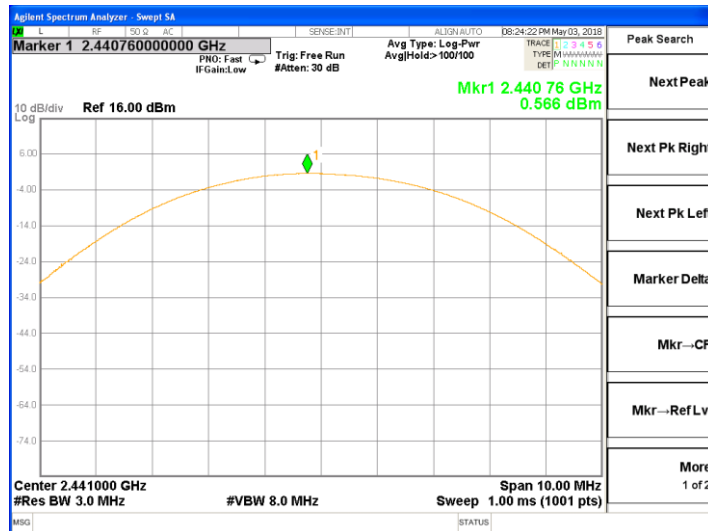


$\pi/4$ -DQPSK

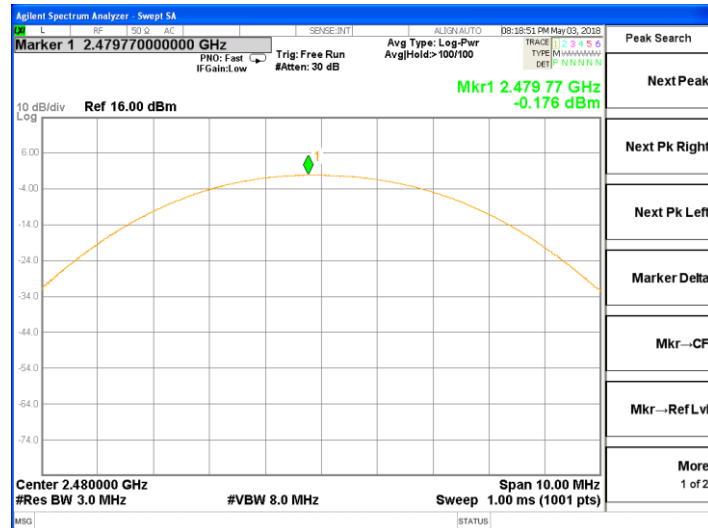
2402MHz



2441MHz

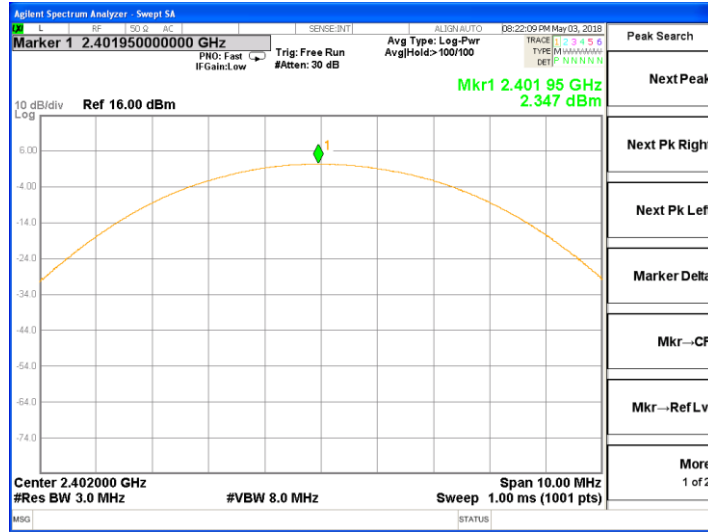


2480MHz

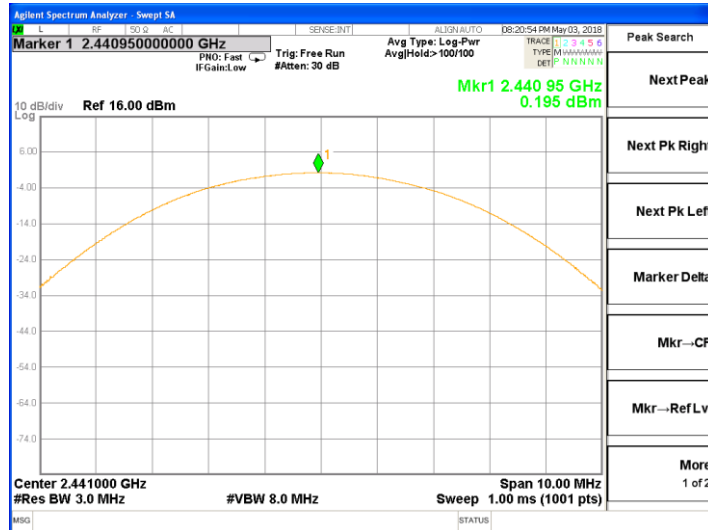


8DPSK

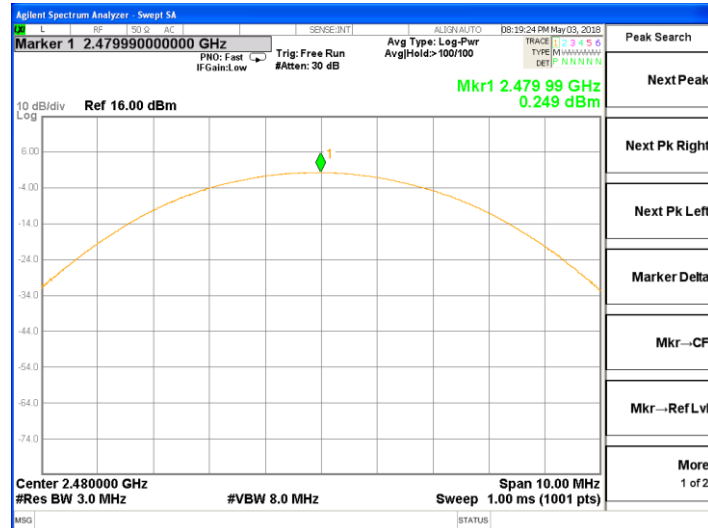
2402MHz



2441MHz



2480MHz



5.3 Conducted emission

5.3.1 Limits

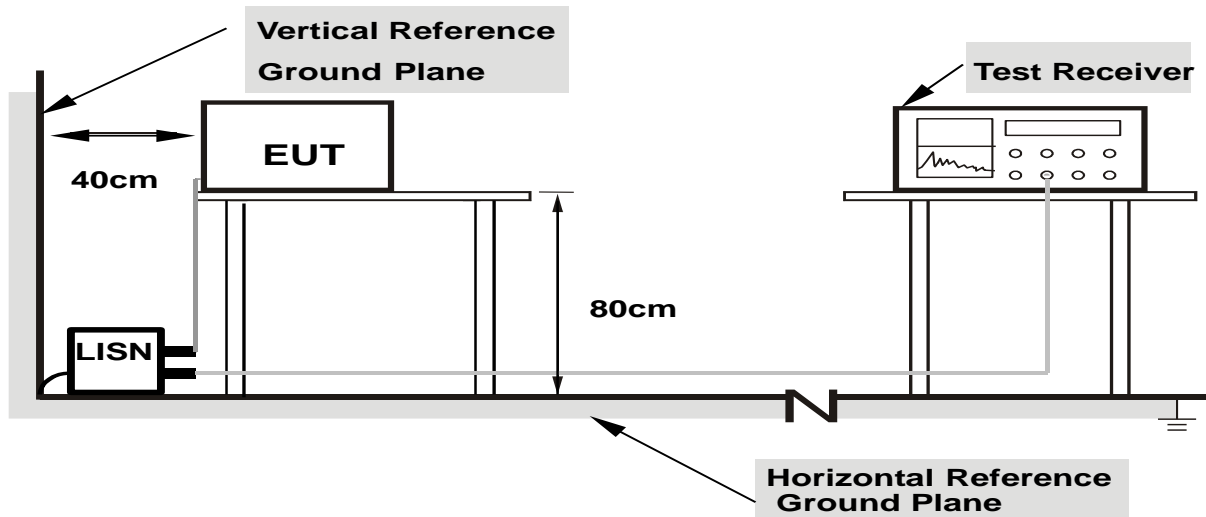
| FREQUENCY (MHz) | Class B (dBuV) | |
|-----------------|----------------|-----------|
| | Quasi-peak | Average |
| 0.15 -0.5 | 66 - 56 * | 56 - 46 * |
| 0.50 -5.0 | 56.00 | 46.00 |
| 5.0 -30.0 | 60.00 | 50.00 |

Note

(1)The tighter limit applies at the band edges.

(2)The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

5.3.2 Test setup



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

5.3.3 Test procedure

a. EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

b. The following table is the setting of the receiver

| Receiver Parameters | Setting |
|---------------------|----------|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |

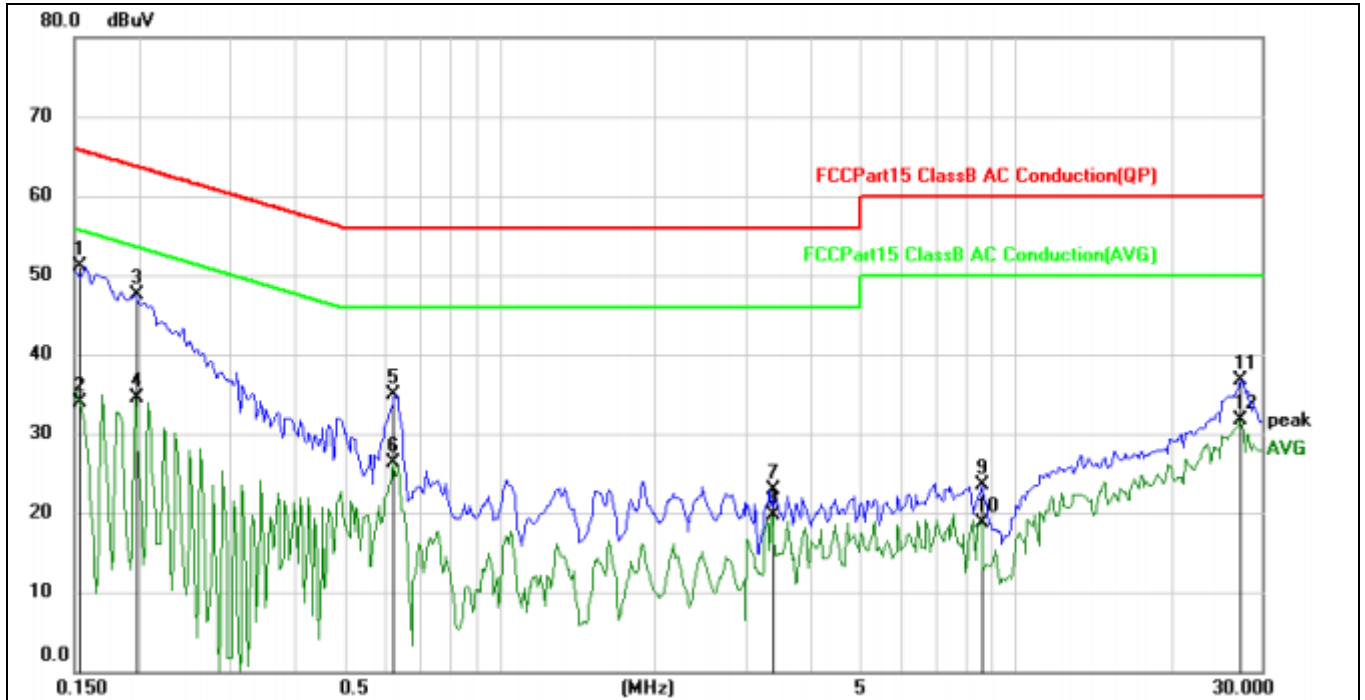
- c. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- d. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- e. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- f. LISN at least 80 cm from nearest part of EUT chassis.

For the actual test configuration, please refer to the related Item –EUT Test Photos.

5.3.4 Test results

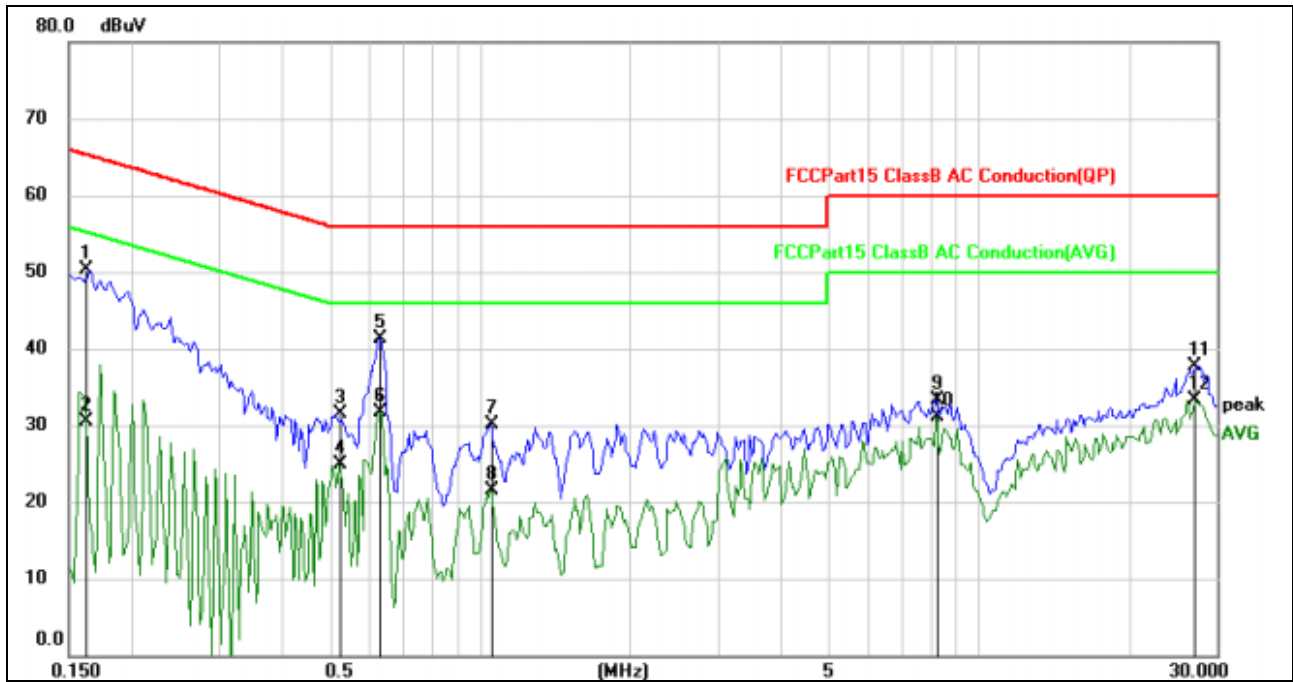
Test data

| | | | |
|----------------|---------------------------------|---------------------|--------------|
| EUT : | BluJax | Model Name. : | ISBT32 Rev B |
| Temperature : | 26 °C | Relative Humidity : | 54% |
| Pressure : | 1010hPa | Phase : | L |
| Test Voltage : | DC 5V from adapter AC 120V/60Hz | Test Mode : | TX Mode |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1 | * | 0.1539 | 49.52 | 1.58 | 51.10 | 65.79 | -14.69 | QP | |
| 2 | | 0.1539 | 32.32 | 1.58 | 33.90 | 55.79 | -21.89 | AVG | |
| 3 | | 0.1968 | 45.98 | 1.57 | 47.55 | 63.74 | -16.19 | QP | |
| 4 | | 0.1968 | 33.02 | 1.57 | 34.59 | 53.74 | -19.15 | AVG | |
| 5 | | 0.6238 | 33.40 | 1.57 | 34.97 | 56.00 | -21.03 | QP | |
| 6 | | 0.6238 | 24.82 | 1.57 | 26.39 | 46.00 | -19.61 | AVG | |
| 7 | | 3.3788 | 22.00 | 0.97 | 22.97 | 56.00 | -33.03 | QP | |
| 8 | | 3.3788 | 18.79 | 0.97 | 19.76 | 46.00 | -26.24 | AVG | |
| 9 | | 8.6132 | 23.11 | 0.38 | 23.49 | 60.00 | -36.51 | QP | |
| 10 | | 8.6132 | 18.41 | 0.38 | 18.79 | 50.00 | -31.21 | AVG | |
| 11 | | 27.2421 | 36.31 | 0.35 | 36.66 | 60.00 | -23.34 | QP | peak |
| 12 | | 27.2421 | 31.26 | 0.35 | 31.61 | 50.00 | -18.39 | AVG | AVG |

| | | | |
|----------------|---------------------------------|---------------------|--------------|
| EUT : | BluJax | Model Name. : | ISBT32 Rev B |
| Temperature : | 26 °C | Relative Humidity : | 54% |
| Pressure : | 1010hPa | Phase : | N |
| Test Voltage : | DC 5V from adapter AC 120V/60Hz | Test Mode : | TX Mode |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1 | | 0.1621 | 48.64 | 1.57 | 50.21 | 65.36 | -15.15 | QP | |
| 2 | | 0.1621 | 28.99 | 1.57 | 30.56 | 55.36 | -24.80 | AVG | |
| 3 | | 0.5210 | 29.96 | 1.57 | 31.53 | 56.00 | -24.47 | QP | |
| 4 | | 0.5210 | 23.24 | 1.57 | 24.81 | 46.00 | -21.19 | AVG | |
| 5 | | 0.6300 | 39.75 | 1.57 | 41.32 | 56.00 | -14.68 | QP | |
| 6 | * | 0.6300 | 30.22 | 1.57 | 31.79 | 46.00 | -14.21 | AVG | |
| 7 | | 1.0523 | 28.44 | 1.58 | 30.02 | 56.00 | -25.98 | QP | |
| 8 | | 1.0523 | 19.97 | 1.58 | 21.55 | 46.00 | -24.45 | AVG | |
| 9 | | 8.1951 | 32.96 | 0.38 | 33.34 | 60.00 | -26.66 | QP | |
| 10 | | 8.1951 | 30.81 | 0.38 | 31.19 | 50.00 | -18.81 | AVG | |
| 11 | | 27.0230 | 37.45 | 0.35 | 37.80 | 60.00 | -22.20 | QP | |
| 12 | | 27.0230 | 32.86 | 0.35 | 33.21 | 50.00 | -16.79 | AVG | |

5.4 Radiated spurious emission

5.4.1 Limits

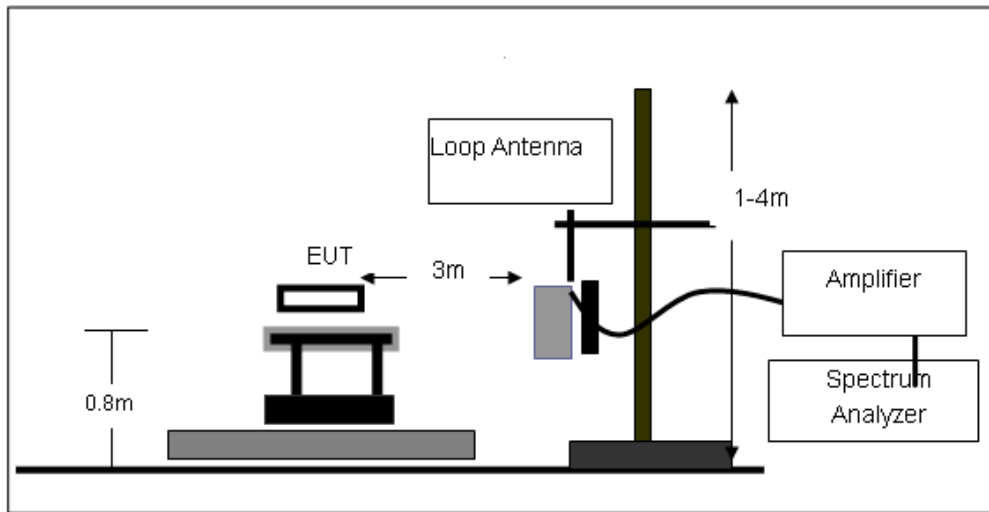
| Frequency (MHz) | Field Strength (micovolts/meter) | Measurement Distance (meters) |
|-----------------|----------------------------------|-------------------------------|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

| Spectrum Parameter | Setting |
|---------------------------------------|--|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 10th carrier harmonic |
| RB / VB (emission in restricted band) | 1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average |

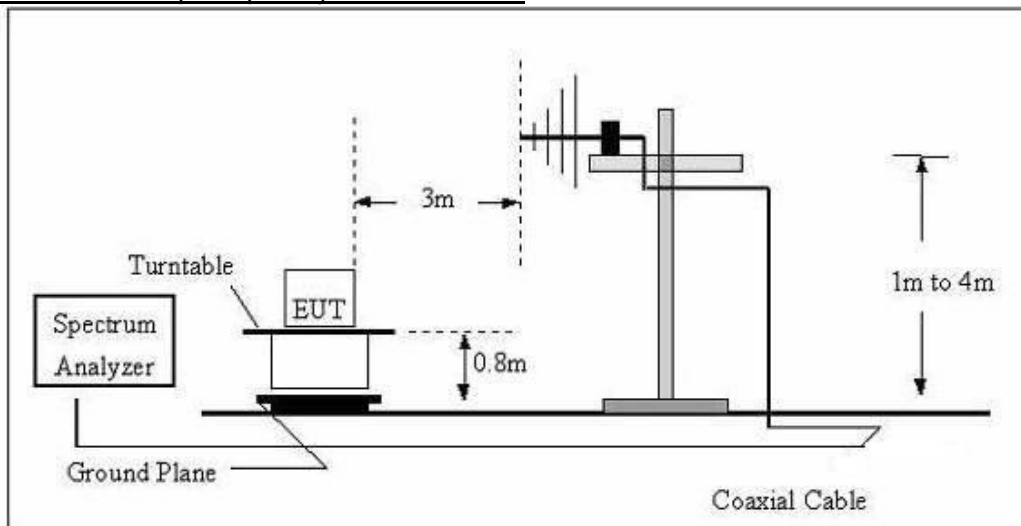
| Receiver Parameter | Setting |
|------------------------|----------------------------------|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~150kHz / RB 200Hz for QP |
| Start ~ Stop Frequency | 150kHz~30MHz / RB 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |

5.4.2 Test setup

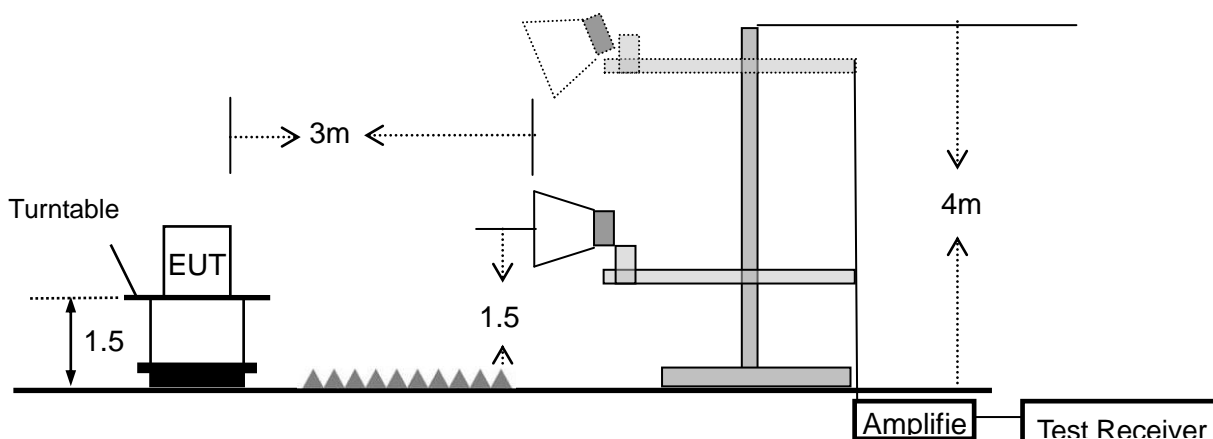
Radiated emission test-up frequency below 30MHz



Radiated emission test-up frequency 30MHz~1GHz



Radiated emission test-up frequency above 1GHz



5.4.3 Test procedure

- a. The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range below 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.
- b. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- c. Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for $f \geq 1\text{GHz}$, 100 kHz for $f < 1\text{GHz}$, VBW \geq RBW, Sweep = auto, Detector function = peak, Trace = max hold.
- d. Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- e. The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = RMS for AV value, while maintaining all of the other instrument settings.
- f. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- g. For the actual test configuration, please refer to the related Item –EUT Test photos.

Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

5.4.4 Test results

5.4.4.1 Radiation emission

Below 30MHz

| | | | |
|--------------|----------|--------------------|---------------------------------|
| EUT: | BluJax | Model Name: | ISBT32 Rev B |
| Temperature: | 20 °C | Relative Humidity: | 48% |
| Pressure: | 1010 hPa | Test Voltage: | DC 5V from adapter AC 120V/60Hz |
| Test Mode: | TX | Polarization : | -- |

| Freq. | Reading | Limit | Margin | State |
|-------|----------|----------|--------|-------|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB) | P/F |
| -- | -- | -- | -- | Pass |
| -- | -- | -- | -- | Pass |

Note:

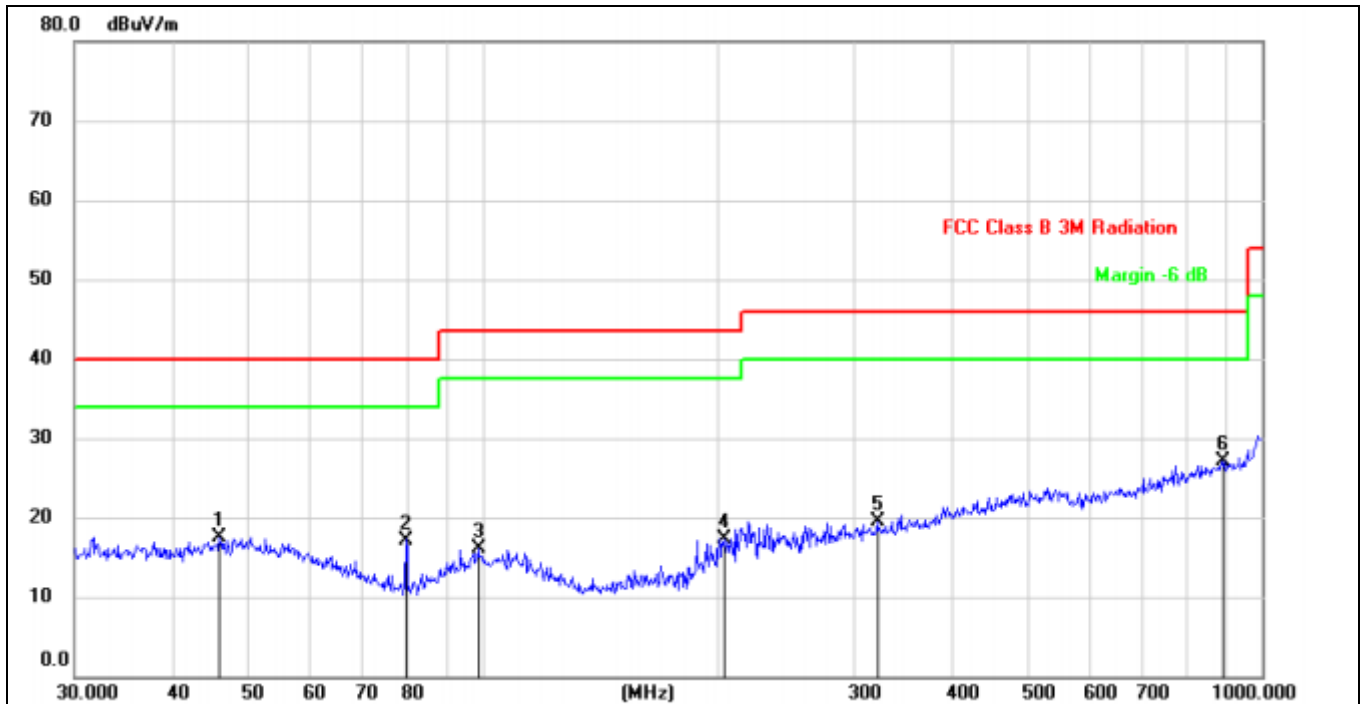
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log(\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuV) + distance extrapolation factor.

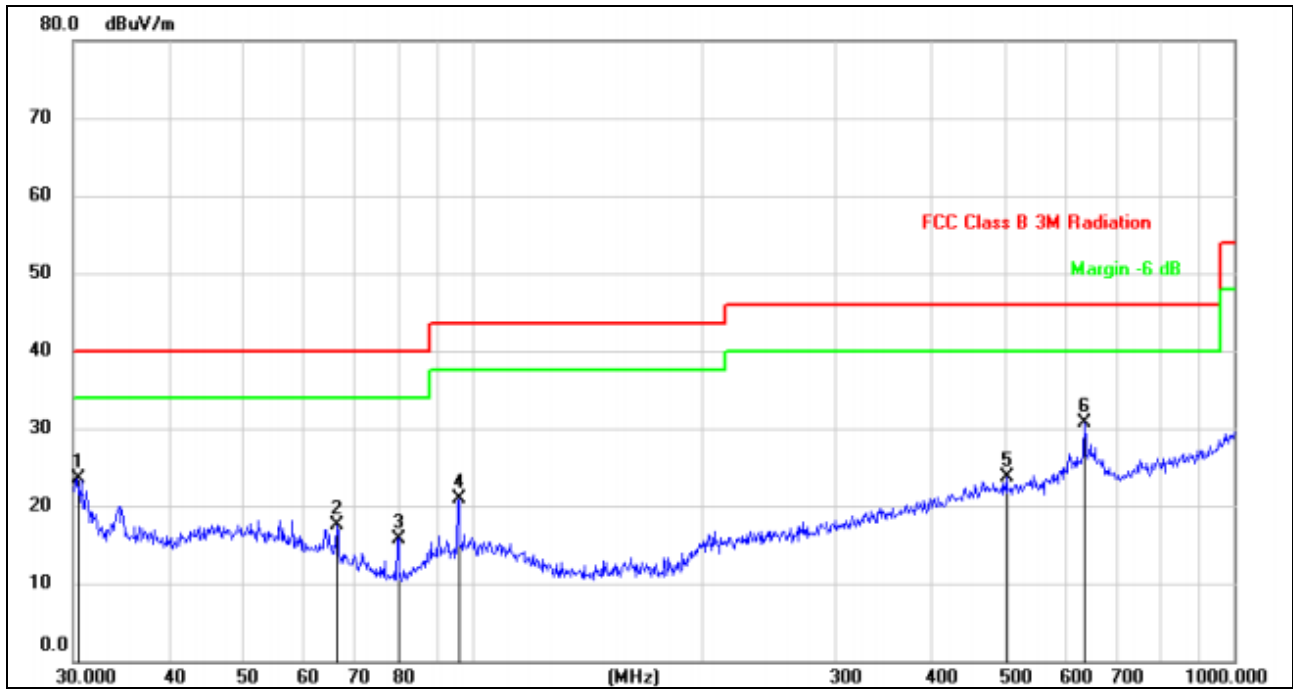
Between 30MHz – 1GHz

| | | | |
|----------------|---------------------------------|---------------------|--------------|
| EUT : | BluJax | Model Name. : | ISBT32 Rev B |
| Temperature : | 26 °C | Relative Humidity : | 54% |
| Pressure : | 1010hPa | Phase : | H |
| Test Voltage : | DC 5V from adapter AC 120V/60Hz | Test Mode : | TX Mode |



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | Antenna Height | Table Degree | |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------------|--------------|---------|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | dB | cm | degree | Comment |
| 1 | | 46.0162 | 27.19 | -9.69 | 17.50 | 40.00 | -22.50 | QP | | |
| 2 | | 79.8002 | 32.67 | -15.47 | 17.20 | 40.00 | -22.80 | QP | | |
| 3 | | 98.8324 | 27.73 | -11.63 | 16.10 | 43.50 | -27.40 | QP | | |
| 4 | | 204.2376 | 28.88 | -11.58 | 17.30 | 43.50 | -26.20 | QP | | |
| 5 | | 321.0607 | 27.68 | -8.18 | 19.50 | 46.00 | -26.50 | QP | | |
| 6 | * | 887.6100 | 28.57 | -1.47 | 27.10 | 46.00 | -18.90 | QP | | |

| | | | |
|----------------|---------------------------------|---------------------|--------------|
| EUT : | BluJax | Model Name. : | ISBT32 Rev B |
| Temperature : | 26 °C | Relative Humidity : | 54% |
| Pressure : | 1010hPa | Phase : | V |
| Test Voltage : | DC 5V from adapter AC 120V/60Hz | Test Mode : | TX Mode |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dBuV/m | Measurement dBuV/m | Limit dBuV/m | Over dB | Detector | Antenna Height cm | Table Degree degree | Comment |
|-----|-----|--------------|-----------------------|--------------------------|-----------------------|-----------------|------------|----------|----------------------|------------------------|---------|
| 1 | | 30.3173 | 35.01 | -11.51 | 23.50 | 40.00 | -16.50 | QP | | | |
| 2 | | 66.4989 | 30.30 | -12.80 | 17.50 | 40.00 | -22.50 | QP | | | |
| 3 | | 80.0806 | 30.30 | -14.50 | 15.80 | 40.00 | -24.20 | QP | | | |
| 4 | | 96.0986 | 32.98 | -12.08 | 20.90 | 43.50 | -22.60 | QP | | | |
| 5 | | 502.9395 | 29.72 | -6.02 | 23.70 | 46.00 | -22.30 | QP | | | |
| 6 | * | 636.1340 | 35.63 | -4.93 | 30.70 | 46.00 | -15.30 | QP | | | |

1G-25GHz

GFSK

Normal Voltage

| Polar (H/V) | Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-------------------------|-----------|---------------|--------|----------------|----------|--------|---------------|
| | (MHz) | (dBuV) | (dB) | (dBuV/m) | (dBuV/m) | (dB) | |
| Low Channel (2402 MHz) | | | | | | | |
| Vertical | 4808.000 | 60.91 | -8.93 | 51.98 | 74.00 | -22.02 | Peak |
| Vertical | 7205.000 | 51.19 | -4.57 | 46.62 | 74.00 | -27.38 | Peak |
| Vertical | 9602.000 | 46.27 | -1.07 | 45.20 | 74.00 | -28.80 | Peak |
| Vertical | 11149.000 | 45.81 | 0.34 | 46.15 | 74.00 | -27.85 | Peak |
| Vertical | 13886.000 | 38.94 | 5.32 | 44.26 | 74.00 | -29.74 | Peak |
| Vertical | 15059.000 | 38.79 | 4.57 | 43.36 | 74.00 | -30.64 | Peak |
| Horizontal | 4808.000 | 55.36 | -7.20 | 48.16 | 74.00 | -25.84 | Peak |
| Horizontal | 7205.000 | 48.88 | -2.82 | 46.06 | 74.00 | -27.94 | Peak |
| Horizontal | 9619.000 | 51.83 | 0.72 | 52.55 | 74.00 | -21.45 | Peak |
| Horizontal | 11744.000 | 45.75 | 2.47 | 48.22 | 74.00 | -25.78 | Peak |
| Horizontal | 12968.000 | 45.07 | 3.08 | 48.15 | 74.00 | -25.85 | Peak |
| Horizontal | 13886.000 | 40.61 | 5.87 | 46.48 | 74.00 | -27.52 | Peak |
| Mid Channel (2441 MHz) | | | | | | | |
| Vertical | 4808.000 | 60.91 | -8.93 | 51.98 | 74.00 | -22.02 | Peak |
| Vertical | 7205.000 | 51.19 | -4.57 | 46.62 | 74.00 | -27.38 | Peak |
| Vertical | 9602.000 | 46.27 | -1.07 | 45.20 | 74.00 | -28.80 | Peak |
| Vertical | 11149.000 | 45.81 | 0.34 | 46.15 | 74.00 | -27.85 | Peak |
| Vertical | 13886.000 | 38.94 | 5.32 | 44.26 | 74.00 | -29.74 | Peak |
| Vertical | 15059.000 | 38.79 | 4.57 | 43.36 | 74.00 | -30.64 | Peak |
| Horizontal | 4893.000 | 60.89 | -7.67 | 53.22 | 74.00 | -20.78 | Peak |
| Horizontal | 7630.000 | 46.22 | -2.49 | 43.73 | 74.00 | -30.27 | Peak |
| Horizontal | 9772.000 | 52.02 | 1.19 | 53.21 | 74.00 | -20.79 | Peak |
| Horizontal | 11744.000 | 45.06 | 2.47 | 47.53 | 74.00 | -26.47 | Peak |
| Horizontal | 13903.000 | 40.00 | 5.92 | 45.92 | 74.00 | -28.08 | Peak |
| Horizontal | 16776.000 | 37.77 | 8.00 | 45.77 | 74.00 | -28.23 | Peak |
| High Channel (2480 MHz) | | | | | | | |
| Vertical | 4893.000 | 61.14 | -9.39 | 51.75 | 74.00 | -22.25 | Peak |
| Vertical | 7324.000 | 57.40 | -4.44 | 52.96 | 74.00 | -21.04 | Peak |
| Vertical | 9772.000 | 50.97 | -0.71 | 50.26 | 74.00 | -23.74 | Peak |
| Vertical | 11744.000 | 47.48 | 0.32 | 47.80 | 74.00 | -26.20 | Peak |
| Vertical | 13155.000 | 44.67 | 2.03 | 46.70 | 74.00 | -27.30 | Peak |
| Vertical | 14294.000 | 39.91 | 5.40 | 45.31 | 74.00 | -28.69 | Peak |
| Horizontal | 4961.000 | 55.80 | -9.77 | 46.03 | 74.00 | -27.97 | Peak |
| Horizontal | 7443.000 | 52.17 | -4.33 | 47.84 | 74.00 | -26.16 | Peak |
| Horizontal | 9925.000 | 53.20 | -0.36 | 52.84 | 74.00 | -21.16 | Peak |
| Horizontal | 11608.000 | 47.10 | 0.35 | 47.45 | 74.00 | -26.55 | Peak |
| Horizontal | 13121.000 | 45.43 | 1.88 | 47.31 | 74.00 | -26.69 | Peak |
| Horizontal | 17813.000 | 35.81 | 14.05 | 49.86 | 74.00 | -24.14 | Peak |

Note1 : Absolute Level = Reading Level+ Factor, Margin= Absolute Level- Limit, Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Note2 :The peak value is less than the AV value, AV value is not required Factor added by measurement software automatically.

π /4-DQPSK

Normal Voltage

| Polar (H/V) | Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|--------------------------------|-----------|---------------|--------|----------------|----------|--------|---------------|
| | (MHz) | (dBuV) | (dB) | (dBuV/m) | (dBuV/m) | (dB) | |
| Low Channel (2402 MHz) | | | | | | | |
| Vertical | 4808.000 | 58.91 | -8.93 | 49.98 | 74.00 | -24.02 | Peak |
| Vertical | 7205.000 | 50.19 | -4.57 | 45.62 | 74.00 | -28.38 | Peak |
| Vertical | 9381.000 | 45.51 | -1.47 | 44.04 | 74.00 | -29.96 | Peak |
| Vertical | 11914.000 | 44.77 | 0.28 | 45.05 | 74.00 | -28.95 | Peak |
| Vertical | 13189.000 | 42.63 | 2.17 | 44.80 | 74.00 | -29.20 | Peak |
| Vertical | 14991.000 | 39.90 | 4.73 | 44.63 | 74.00 | -29.37 | Peak |
| Horizontal | 4808.000 | 58.66 | -7.20 | 51.46 | 74.00 | -22.54 | Peak |
| Horizontal | 7205.000 | 46.88 | -2.82 | 44.06 | 74.00 | -29.94 | Peak |
| Horizontal | 9619.000 | 48.83 | 0.72 | 49.55 | 74.00 | -24.45 | Peak |
| Horizontal | 11744.000 | 44.25 | 2.47 | 46.72 | 74.00 | -27.28 | Peak |
| Horizontal | 13886.000 | 39.11 | 5.87 | 44.98 | 74.00 | -29.02 | Peak |
| Horizontal | 16266.000 | 37.51 | 5.34 | 42.85 | 74.00 | -31.15 | Peak |
| Mid Channel (2441 MHz) | | | | | | | |
| Vertical | 4893.000 | 60.39 | -7.67 | 52.72 | 74.00 | -21.28 | Peak |
| Vertical | 7137.000 | 44.46 | -2.84 | 41.62 | 74.00 | -32.38 | Peak |
| Vertical | 9772.000 | 50.02 | 1.19 | 51.21 | 74.00 | -22.79 | Peak |
| Vertical | 11744.000 | 43.56 | 2.47 | 46.03 | 74.00 | -27.97 | Peak |
| Vertical | 12951.000 | 43.14 | 3.07 | 46.21 | 74.00 | -27.79 | Peak |
| Vertical | 14838.000 | 38.24 | 4.48 | 42.72 | 74.00 | -31.28 | Peak |
| Horizontal | 4893.000 | 60.14 | -9.39 | 50.75 | 74.00 | -23.25 | Peak |
| Horizontal | 7324.000 | 55.40 | -4.44 | 50.96 | 74.00 | -23.04 | Peak |
| Horizontal | 9772.000 | 48.97 | -0.71 | 48.26 | 74.00 | -25.74 | Peak |
| Horizontal | 12747.000 | 45.39 | 1.18 | 46.57 | 74.00 | -27.43 | Peak |
| Horizontal | 14090.000 | 39.58 | 5.72 | 45.30 | 74.00 | -28.70 | Peak |
| Horizontal | 17099.000 | 37.02 | 8.51 | 45.53 | 74.00 | -28.47 | Peak |
| High Channel (2480 MHz) | | | | | | | |
| Vertical | 4961.000 | 56.80 | -9.77 | 47.03 | 74.00 | -26.97 | Peak |
| Vertical | 7443.000 | 51.17 | -4.33 | 46.84 | 74.00 | -27.16 | Peak |
| Vertical | 9925.000 | 50.20 | -0.36 | 49.84 | 74.00 | -24.16 | Peak |
| Vertical | 12543.000 | 46.74 | 1.03 | 47.77 | 74.00 | -26.23 | Peak |
| Vertical | 15025.000 | 39.21 | 4.66 | 43.87 | 74.00 | -30.13 | Peak |
| Vertical | 17915.000 | 36.32 | 14.87 | 51.19 | 74.00 | -22.81 | Peak |
| Horizontal | 4961.000 | 55.15 | -8.06 | 47.09 | 74.00 | -26.91 | Peak |
| Horizontal | 7443.000 | 47.13 | -2.74 | 44.39 | 74.00 | -29.61 | Peak |
| Horizontal | 8803.000 | 48.55 | -1.31 | 47.24 | 74.00 | -26.76 | Peak |
| Horizontal | 9925.000 | 50.46 | 1.67 | 52.13 | 74.00 | -21.87 | Peak |
| Horizontal | 10775.000 | 47.23 | 2.29 | 49.52 | 74.00 | -24.48 | Peak |
| Horizontal | 12781.000 | 46.65 | 3.03 | 49.68 | 74.00 | -24.32 | Peak |

Note1 : Absolute Level = Reading Level+ Factor, Margin= Absolute Level- Limit, Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Note2 :The peak value is less than the AV value, AV value is not required Factor added by measurement software automatically.

8DPSK

Normal Voltage

| Polar (H/V) | Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-------------------------|-----------|---------------|--------|----------------|----------|--------|---------------|
| | (MHz) | (dBuV) | (dB) | (dBuV/m) | (dBuV/m) | (dB) | |
| Low Channel (2402 MHz) | | | | | | | |
| Vertical | 4808.000 | 59.41 | -8.93 | 50.48 | 74.00 | -23.52 | Peak |
| Vertical | 7205.000 | 50.69 | -4.57 | 46.12 | 74.00 | -27.88 | Peak |
| Vertical | 10571.000 | 45.44 | 0.23 | 45.67 | 74.00 | -28.33 | Peak |
| Vertical | 11744.000 | 45.99 | 0.32 | 46.31 | 74.00 | -27.69 | Peak |
| Vertical | 14685.000 | 40.62 | 4.94 | 45.56 | 74.00 | -28.44 | Peak |
| Vertical | 17745.000 | 35.61 | 13.50 | 49.11 | 74.00 | -24.89 | Peak |
| Horizontal | 4808.000 | 59.16 | -7.20 | 51.96 | 74.00 | -22.04 | Peak |
| Horizontal | 7205.000 | 47.38 | -2.82 | 44.56 | 74.00 | -29.44 | Peak |
| Horizontal | 9619.000 | 49.83 | 0.72 | 50.55 | 74.00 | -23.45 | Peak |
| Horizontal | 12390.000 | 43.78 | 2.85 | 46.63 | 74.00 | -27.37 | Peak |
| Horizontal | 14447.000 | 38.95 | 5.15 | 44.10 | 74.00 | -29.90 | Peak |
| Horizontal | 17575.000 | 36.23 | 11.86 | 48.09 | 74.00 | -25.91 | Peak |
| Mid Channel (2441 MHz) | | | | | | | |
| Vertical | 4893.000 | 61.14 | -9.39 | 51.75 | 74.00 | -22.25 | Peak |
| Vertical | 7324.000 | 56.40 | -4.44 | 51.96 | 74.00 | -22.04 | Peak |
| Vertical | 9772.000 | 50.47 | -0.71 | 49.76 | 74.00 | -24.24 | Peak |
| Vertical | 12747.000 | 46.39 | 1.18 | 47.57 | 74.00 | -26.43 | Peak |
| Vertical | 14090.000 | 40.08 | 5.72 | 45.80 | 74.00 | -28.20 | Peak |
| Vertical | 16844.000 | 38.86 | 6.84 | 45.70 | 74.00 | -28.30 | Peak |
| Horizontal | 4893.000 | 60.89 | -7.67 | 53.22 | 74.00 | -20.78 | Peak |
| Horizontal | 7324.000 | 45.21 | -2.77 | 42.44 | 74.00 | -31.56 | Peak |
| Horizontal | 9772.000 | 50.52 | 1.19 | 51.71 | 74.00 | -22.29 | Peak |
| Horizontal | 11744.000 | 44.06 | 2.47 | 46.53 | 74.00 | -27.47 | Peak |
| Horizontal | 12951.000 | 43.64 | 3.07 | 46.71 | 74.00 | -27.29 | Peak |
| Horizontal | 14345.000 | 38.29 | 5.40 | 43.69 | 74.00 | -30.31 | Peak |
| High Channel (2480 MHz) | | | | | | | |
| Vertical | 4961.000 | 56.80 | -9.77 | 47.03 | 74.00 | -26.97 | Peak |
| Vertical | 7443.000 | 51.17 | -4.33 | 46.84 | 74.00 | -27.16 | Peak |
| Vertical | 9925.000 | 50.20 | -0.36 | 49.84 | 74.00 | -24.16 | Peak |
| Vertical | 12543.000 | 46.24 | 1.03 | 47.27 | 74.00 | -26.73 | Peak |
| Vertical | 14243.000 | 39.00 | 5.47 | 44.47 | 74.00 | -29.53 | Peak |
| Vertical | 16963.000 | 39.32 | 7.55 | 46.87 | 74.00 | -27.13 | Peak |
| Horizontal | 4961.000 | 56.15 | -8.06 | 48.09 | 74.00 | -25.91 | Peak |
| Horizontal | 8803.000 | 50.05 | -1.31 | 48.74 | 74.00 | -25.26 | Peak |
| Horizontal | 9925.000 | 51.46 | 1.67 | 53.13 | 74.00 | -20.87 | Peak |
| Horizontal | 10775.000 | 48.73 | 2.29 | 51.02 | 74.00 | -22.98 | Peak |
| Horizontal | 12781.000 | 47.15 | 3.03 | 50.18 | 74.00 | -23.82 | Peak |
| Horizontal | 15433.000 | 39.62 | 4.09 | 43.71 | 74.00 | -30.29 | Peak |

Note1 : Absolute Level = Reading Level+ Factor, Margin= Absolute Level- Limit, Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Note2 :The peak value is less than the AV value, AV value is not required Factor added by measurement software automatically.

Band edge - radiated

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type | Comment |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|------------------|------------|
| GFSK | | | | | | | |
| 2390 | 53.83 | -10.40 | 43.43 | 74.00 | -30.57 | peak | Vertical |
| 2390 | 53.99 | -9.53 | 44.46 | 74.00 | -29.54 | peak | Horizontal |
| 2400 | 58.91 | -9.43 | 49.48 | 74.00 | -24.52 | peak | Vertical |
| 2400 | 56.19 | -10.31 | 45.88 | 74.00 | -28.12 | peak | Horizontal |
| 2483.5 | 52.45 | -9.73 | 42.72 | 74.00 | -31.28 | peak | Vertical |
| 2483.5 | 53.16 | -8.66 | 44.5 | 74.00 | -29.5 | peak | Horizontal |
| π/4-DQPSK | | | | | | | |
| 2390 | 53.59 | -10.40 | 43.19 | 74.00 | -30.81 | peak | Vertical |
| 2390 | 53.48 | -9.53 | 43.95 | 74.00 | -30.05 | peak | Horizontal |
| 2400 | 55.26 | -9.43 | 45.83 | 74.00 | -28.17 | peak | Vertical |
| 2400 | 53.18 | -10.31 | 42.87 | 74.00 | -31.13 | peak | Horizontal |
| 2483.5 | 54.86 | -9.73 | 45.13 | 74.00 | -28.87 | peak | Vertical |
| 2483.5 | 56.37 | -8.66 | 47.71 | 74.00 | -26.29 | peak | Horizontal |
| 8DPSK | | | | | | | |
| 2390 | 53.63 | -10.40 | 43.23 | 74.00 | -30.77 | peak | Vertical |
| 2390 | 54.53 | -9.53 | 45 | 74.00 | -29 | peak | Horizontal |
| 2400 | 54.36 | -9.43 | 44.93 | 74.00 | -29.07 | peak | Vertical |
| 2400 | 53.86 | -10.31 | 43.55 | 74.00 | -30.45 | peak | Horizontal |
| 2483.5 | 55.64 | -9.73 | 45.91 | 74.00 | -28.09 | peak | Vertical |
| 2483.5 | 53.28 | -8.66 | 44.62 | 74.00 | -29.38 | peak | Horizontal |

Note1 : Absolute Level = Reading Level+ Factor, Margin= Absolute Level- Limit, Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Note2 :The peak value is less than the AV value, AV value is not required Factor added by measurement software automatically.

Band edge - radiated (Hopping Mode)

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type | Comment |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|------------------|------------|
| GFSK | | | | | | | |
| 2390 | 59.32 | -10.40 | 48.92 | 74.00 | -25.08 | peak | Vertical |
| 2390 | 54.01 | -9.53 | 44.48 | 74.00 | -29.52 | peak | Horizontal |
| 2483.5 | 52.51 | -9.73 | 42.78 | 74.00 | -31.22 | peak | Vertical |
| 2483.5 | 53.46 | -8.66 | 44.8 | 74.00 | -29.2 | peak | Horizontal |
| π/4-DQPSK | | | | | | | |
| 2390 | 52.01 | -10.40 | 41.61 | 74.00 | -32.39 | peak | Vertical |
| 2390 | 57.95 | -9.53 | 48.42 | 74.00 | -25.58 | peak | Horizontal |
| 2483.5 | 53.56 | -9.73 | 43.83 | 74.00 | -30.17 | peak | Vertical |
| 2483.5 | 55.94 | -8.66 | 47.28 | 74.00 | -26.72 | peak | Horizontal |
| 8-DPSK | | | | | | | |
| 2390 | 59.32 | -10.40 | 48.92 | 74.00 | -25.08 | peak | Vertical |
| 2390 | 54.01 | -9.53 | 44.48 | 74.00 | -29.52 | peak | Horizontal |
| 2483.5 | 53.46 | -9.73 | 43.73 | 74.00 | -30.27 | peak | Vertical |
| 2483.5 | 52.51 | -8.66 | 43.85 | 74.00 | -30.15 | peak | Horizontal |

NOTE: The PK value is less than the AV value, AV value is not required.

5.5 20dB occupied channel bandwidth

5.5.1 Limit

| FCC Part15 (15.247) , Subpart C | | | |
|---------------------------------|----------------|-------|-----------------------|
| Section | Test Item | Limit | Frequency Range (MHz) |
| 15.247a(1) | 20dB bandwidth | / | 2400-2483.5 |

5.5.2 Test setup



5.5.3 Test procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
Bandwidth: RBW=30 kHz, VBW=100 kHz, detector= Peak

5.5.4 Test results

Test data

GFSK mode:

| | | | |
|---------------|----------|---------------------|---------------------------------|
| EUT : | BluJax | Model Name : | ISBT32 Rev B |
| Temperature : | 25 °C | Relative Humidity : | 60% |
| Pressure : | 1012 hPa | Test Voltage : | DC 5V from adapter AC 120V/60Hz |

| Channel | Frequency (MHz) | 20dB Bandwidth (MHz) | Limit (kHz) | Result |
|---------|-----------------|----------------------|-------------|--------|
| Low | 2402 | 1.046 | / | Pass |
| Middle | 2441 | 1.044 | / | Pass |
| High | 2480 | 1.041 | / | Pass |

π /4-DQPSK mode:

| | | | |
|---------------|----------|---------------------|---------------------------------|
| EUT : | BluJax | Model Name : | ISBT32 Rev B |
| Temperature : | 25 °C | Relative Humidity : | 60% |
| Pressure : | 1012 hPa | Test Voltage : | DC 5V from adapter AC 120V/60Hz |

| Channel | Frequency (MHz) | 20dB Bandwidth (MHz) | Limit (kHz) | Result |
|---------|-----------------|----------------------|-------------|--------|
| Low | 2402 | 1.045 | / | Pass |
| Middle | 2441 | 1.043 | / | Pass |
| High | 2480 | 1.040 | / | Pass |

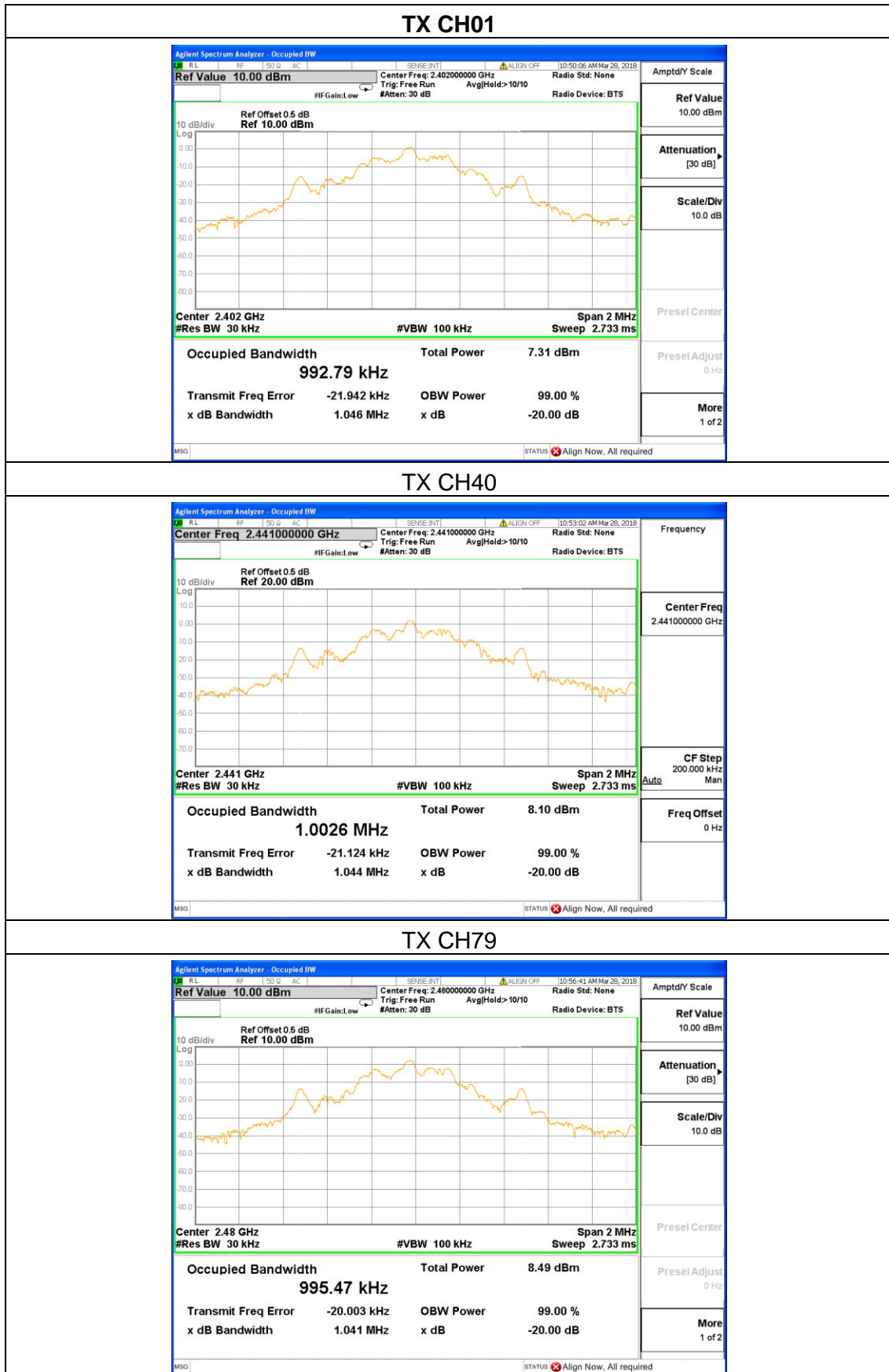
8DPSK mode:

| | | | |
|---------------|----------|---------------------|---------------------------------|
| EUT : | BluJax | Model Name : | ISBT32 Rev B |
| Temperature : | 25 °C | Relative Humidity : | 60% |
| Pressure : | 1012 hPa | Test Voltage : | DC 5V from adapter AC 120V/60Hz |

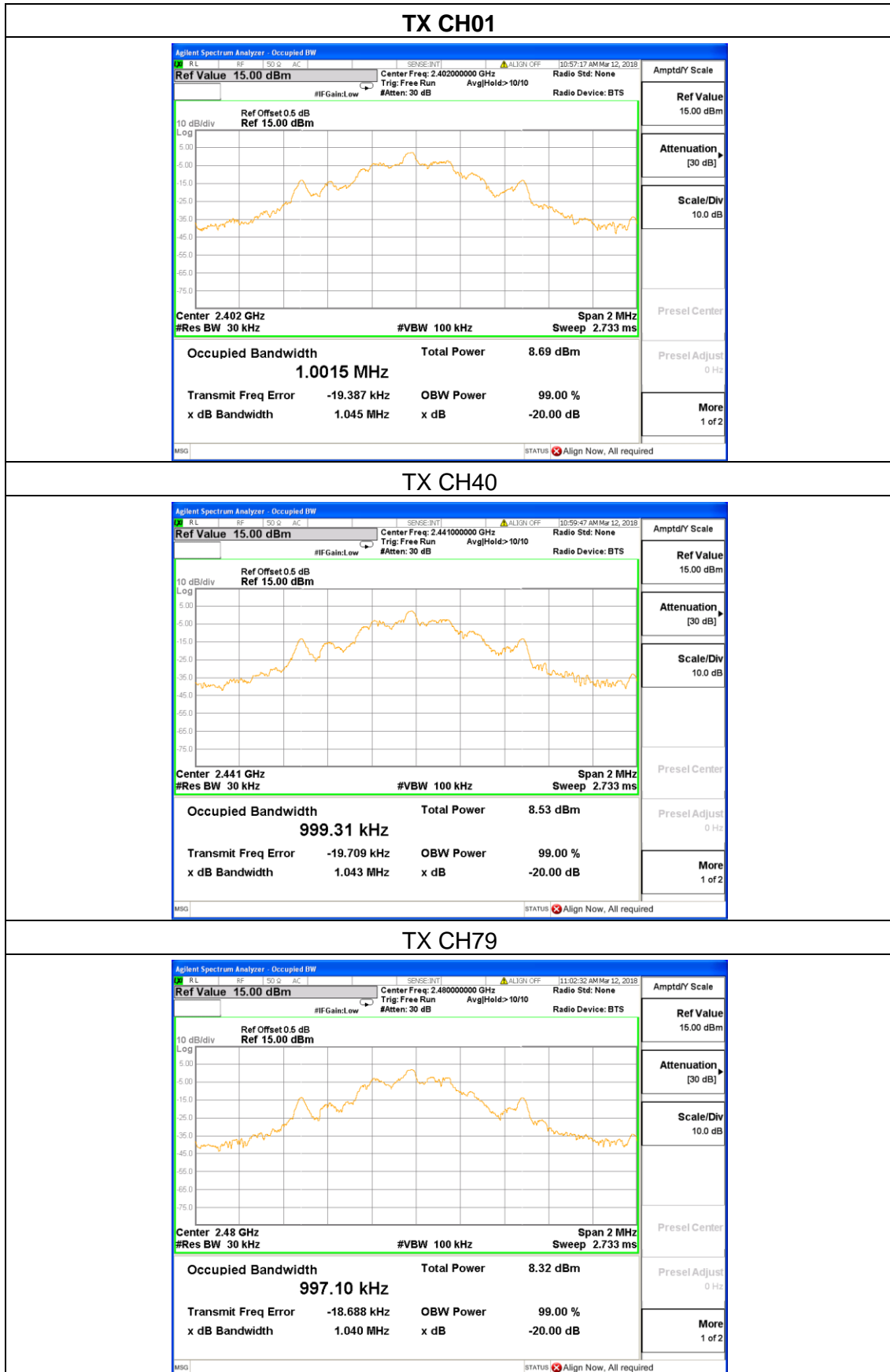
| Channel | Frequency (MHz) | 20dB Bandwidth (MHz) | Limit (kHz) | Result |
|---------|-----------------|----------------------|-------------|--------|
| Low | 2402 | 1.214 | / | Pass |
| Middle | 2441 | 1.205 | / | Pass |
| High | 2480 | 1.196 | / | Pass |

Test plots

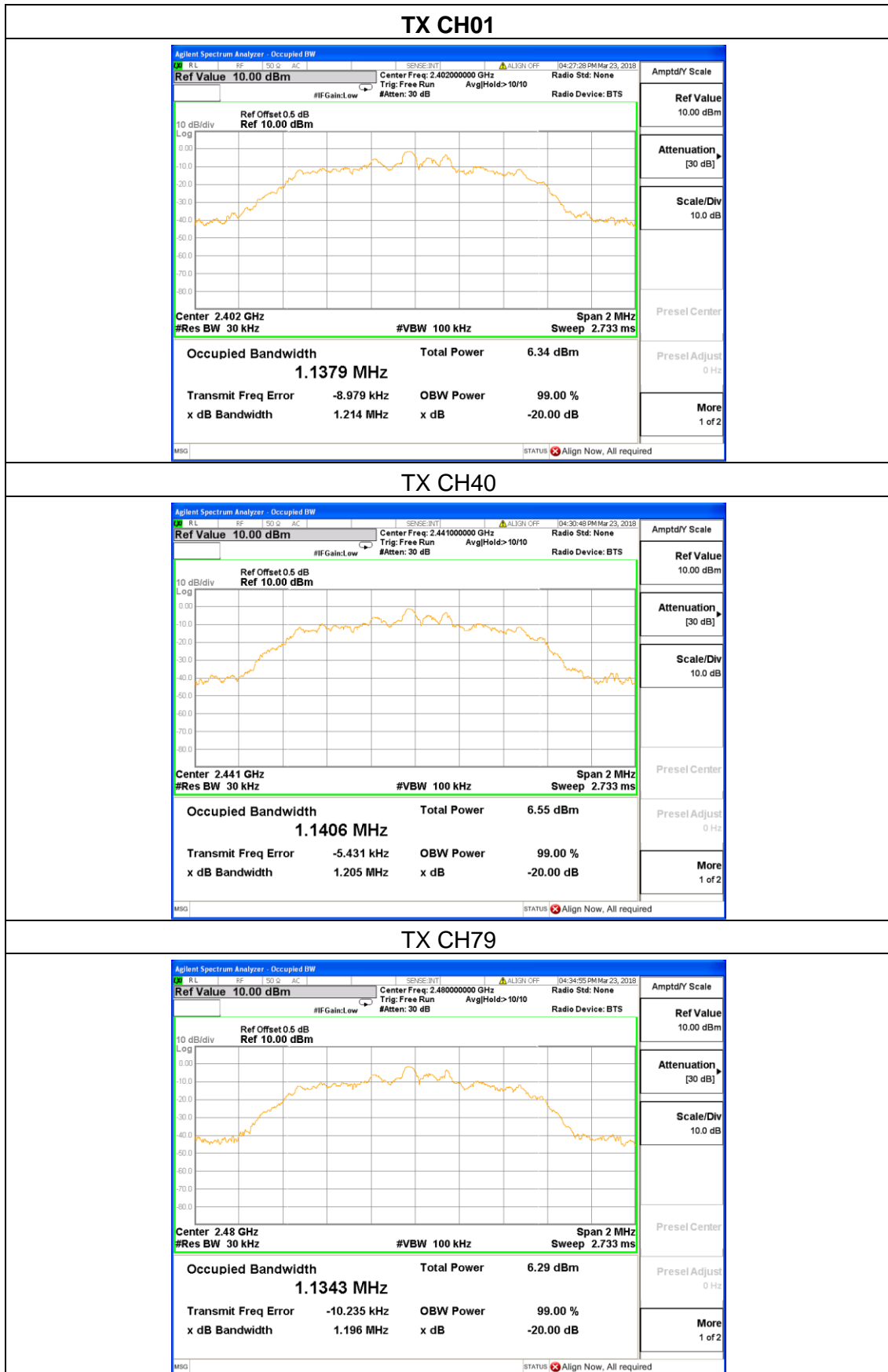
GFSK mode



π /4-DQPSK mode



8DPSK mode:



5.6 Band edge - Conducted

5.6.1 Limit

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 a radiated 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

5.6.2 Test setup



5.6.3 Test procedure

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

5.6.4 Test results

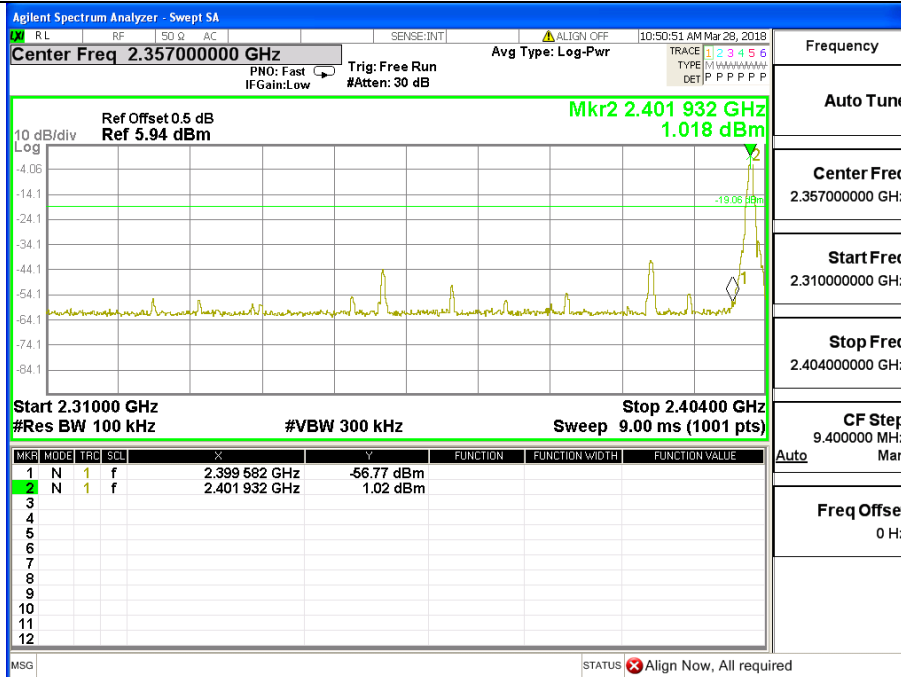
Test data

| | | | |
|---------------|----------|---------------------|---------------------------------|
| EUT : | BluJax | Model Name : | ISBT32 Rev B |
| Temperature : | 25 °C | Relative Humidity : | 60% |
| Pressure : | 1012 hPa | Test Voltage : | DC 5V from adapter AC 120V/60Hz |

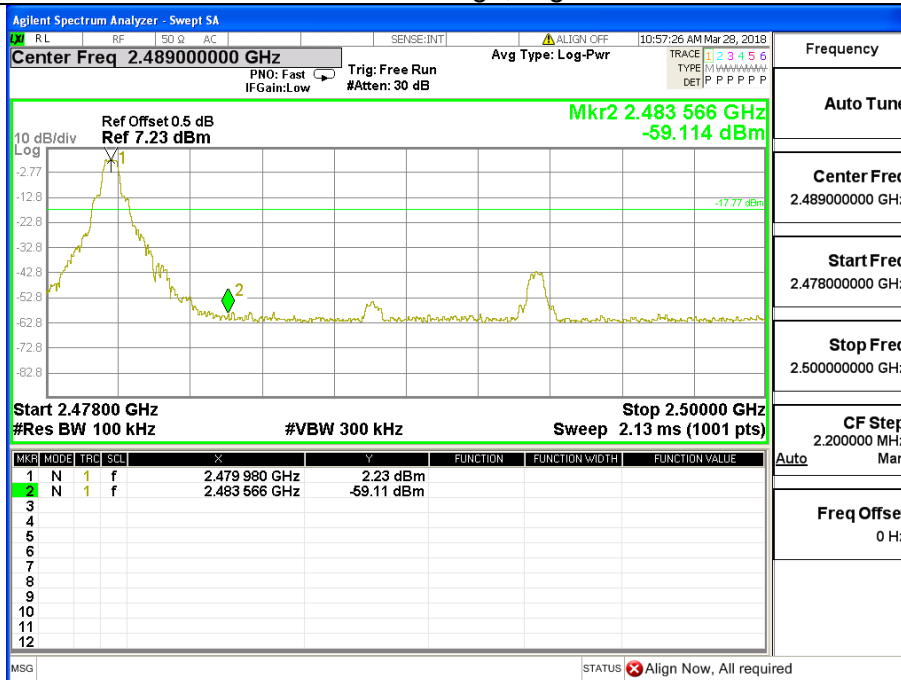
| Frequency Band | Delta Peak to band emission (dBc) | > Limit (dBc) | Result |
|---------------------|-----------------------------------|---------------|--------|
| GFSK mode | | | |
| Left-band | 57.79 | 20 | Pass |
| Right-band | 61.34 | 20 | Pass |
| $\pi/4$ -DQPSK mode | | | |
| Left-band | 54.58 | 20 | Pass |
| Right-band | 59.91 | 20 | Pass |
| 8DPSK mode | | | |
| Left-band | 54.79 | 20 | Pass |
| Right-band | 60.23 | 20 | Pass |

Test plots

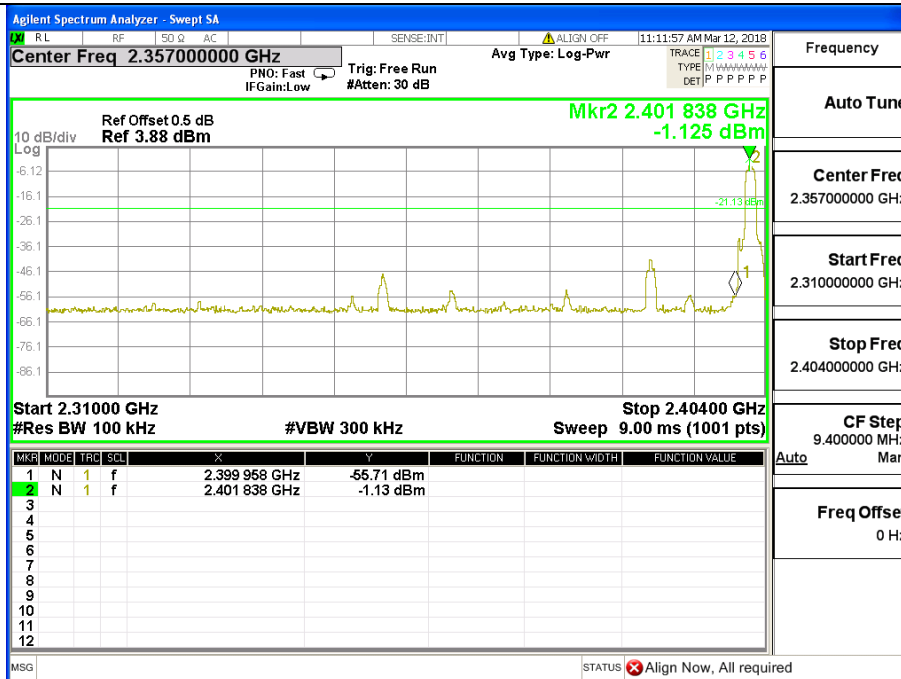
GFSK: Band Edge, Left Side



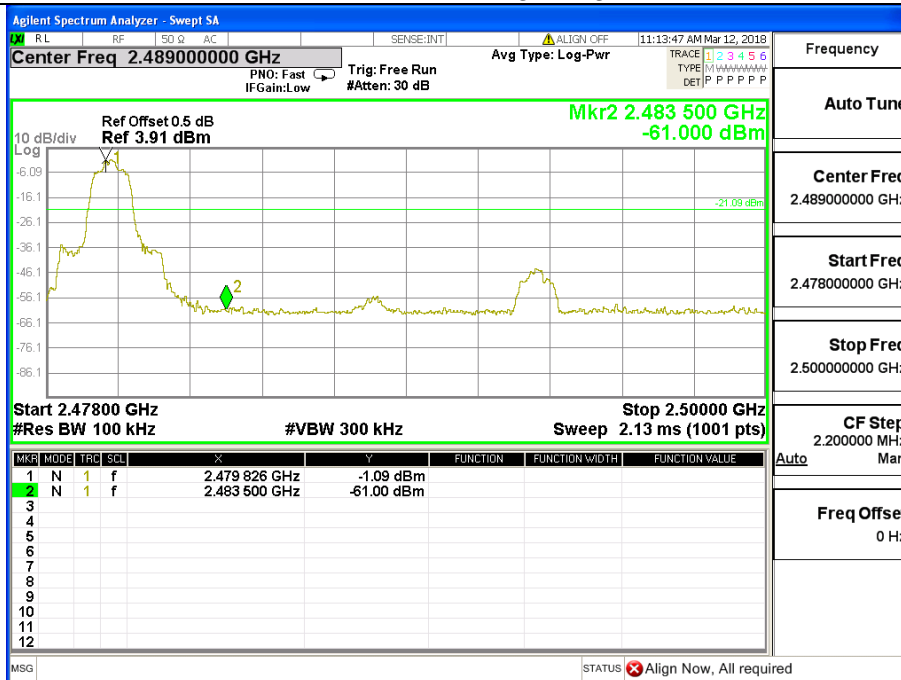
GFSK: Band Edge, Right Side



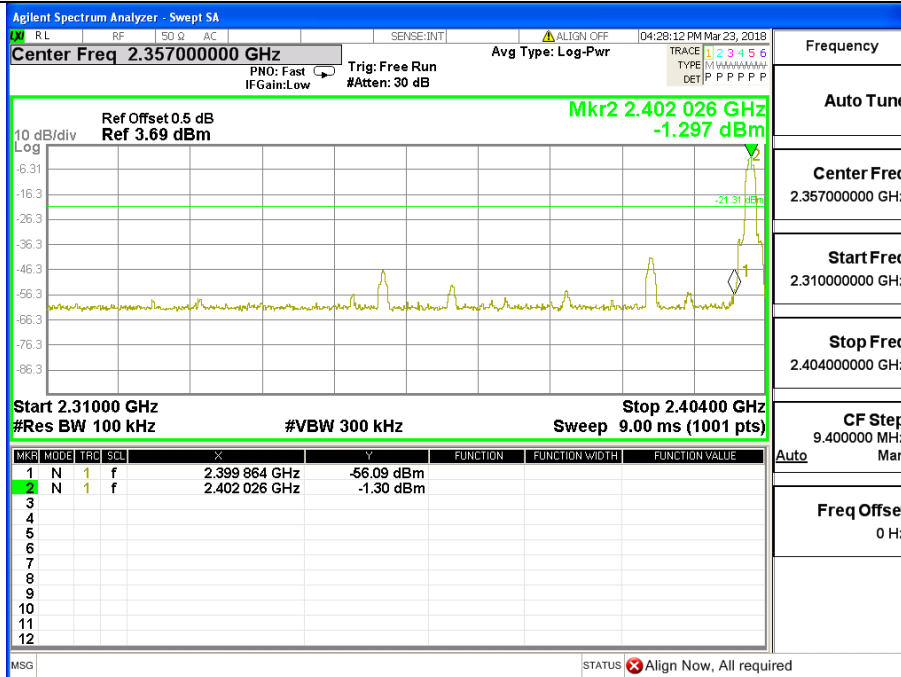
π /4-DQPSK: Band Edge, Left Side



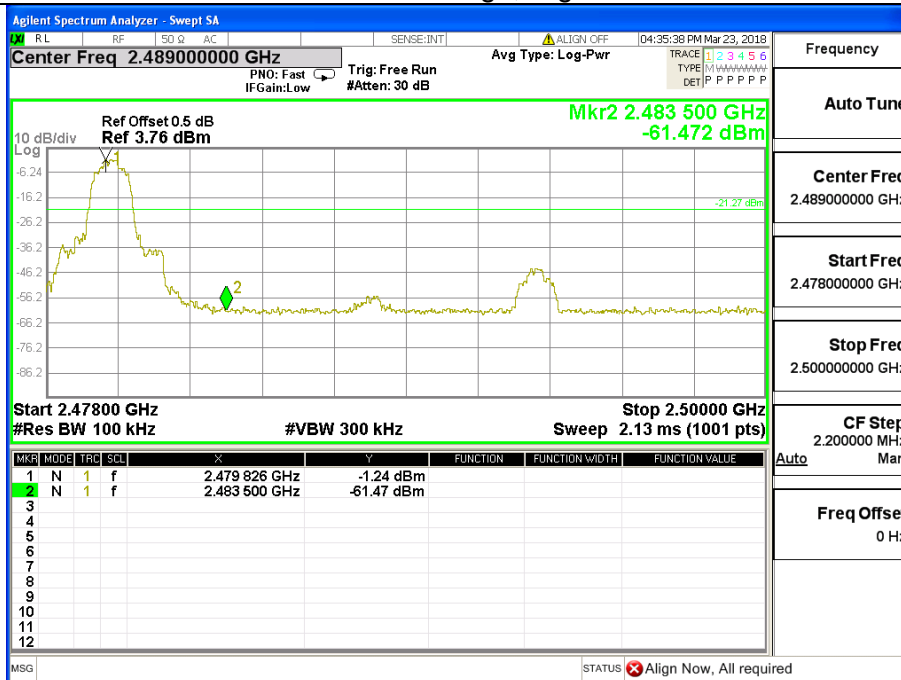
π /4-DQPSK: Band Edge, Right Side



8DPSK: Band Edge, Left Side



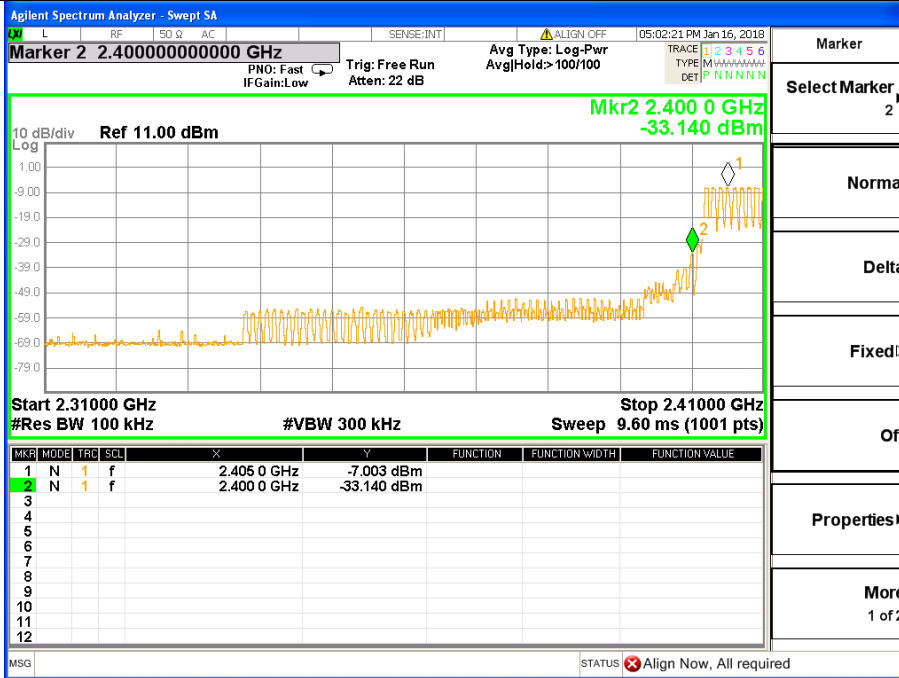
8DPSK: Band Edge, Right Side



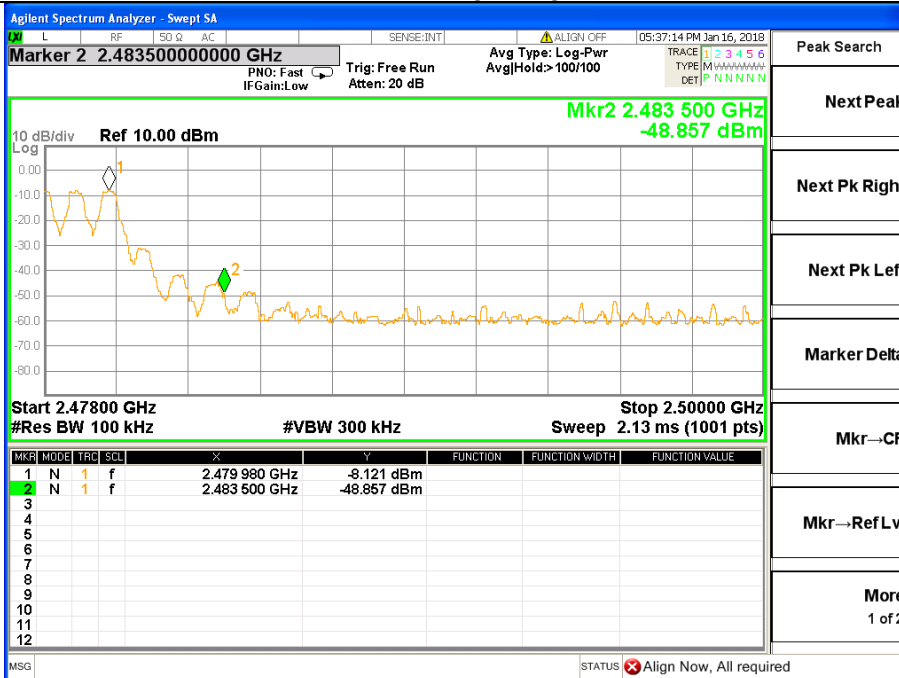
Hopping Mode

| Frequency Band | Delta Peak to band emission (dBc) | > Limit (dBc) | Result |
|---------------------|--------------------------------------|------------------|--------|
| GFSK mode | | | |
| Left-band | 43.523 | 20 | Pass |
| Right-band | 42.679 | 20 | Pass |
| $\pi/4$ -DQPSK mode | | | |
| Left-band | 45.588 | 20 | Pass |
| Right-band | 39.357 | 20 | Pass |
| 8DPSK mode | | | |
| Left-band | 45.691 | 20 | Pass |
| Right-band | 38.55 | 20 | Pass |

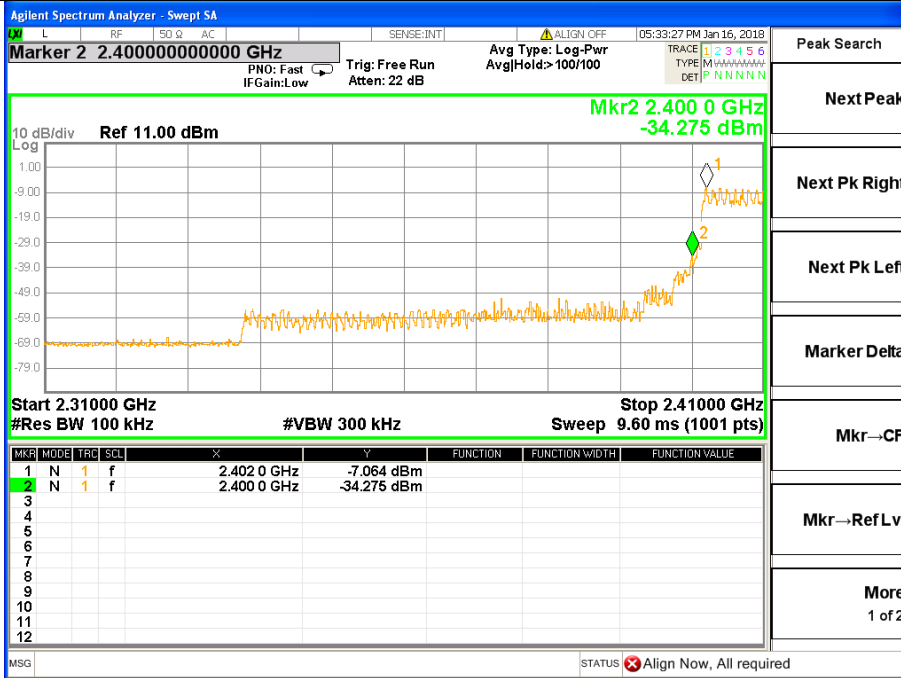
GFSK: Band Edge, Left Side



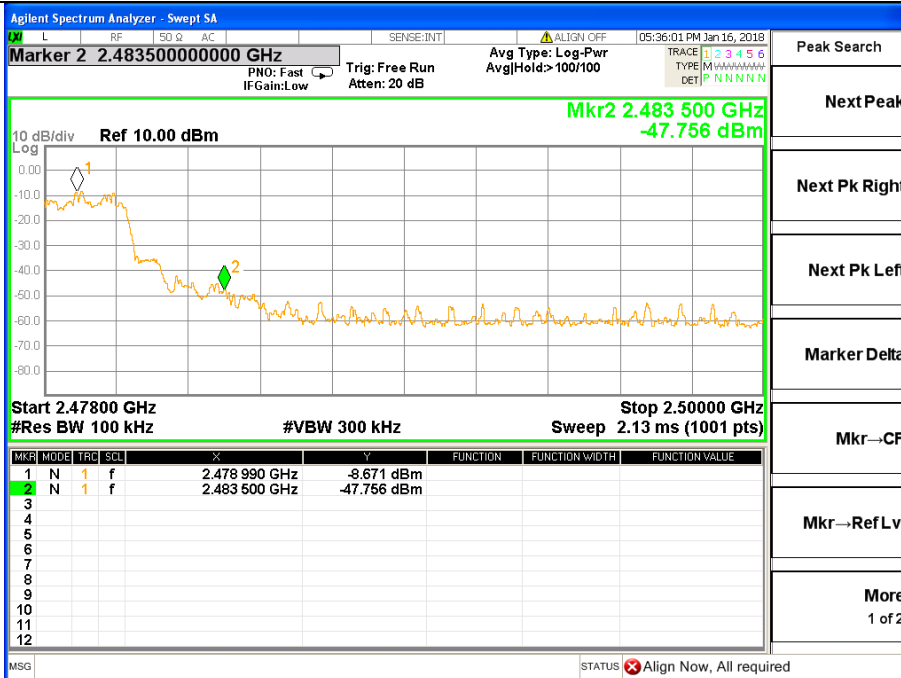
GFSK: Band Edge, Right Side



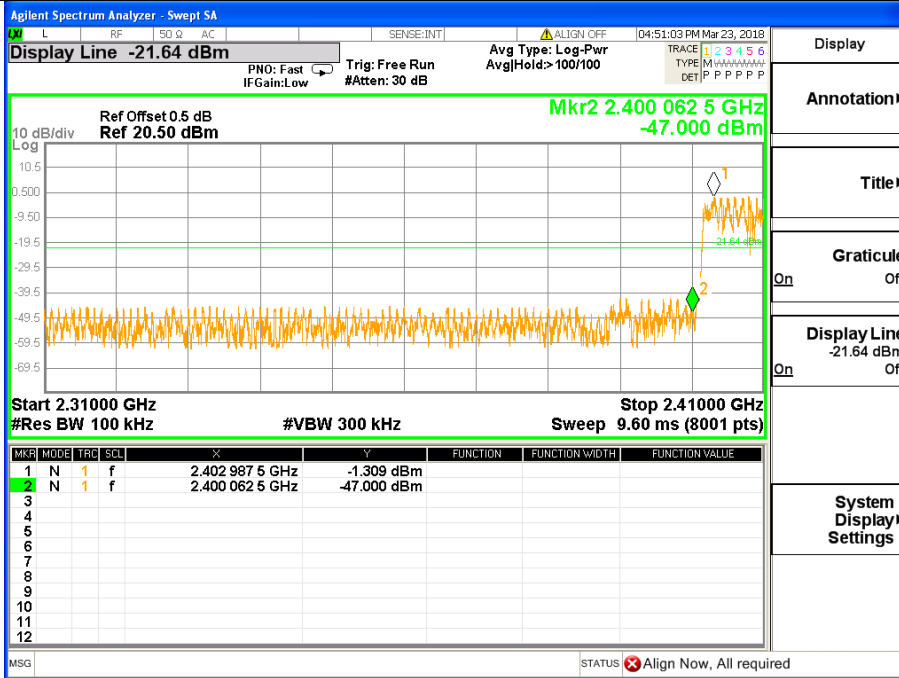
$\pi/4$ -DQPSK: Band Edge, Left Side



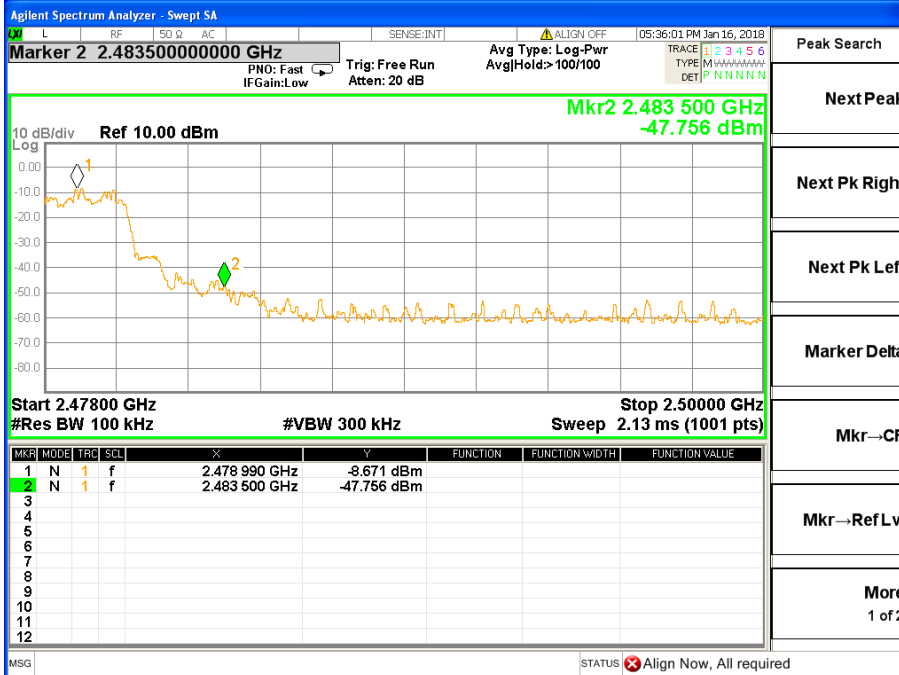
$\pi/4$ -DQPSK: Band Edge, Right Side



8DPSK: Band Edge, Left Side



8DPSK: Band Edge, Right Side



5.7 Carrier frequency separation

5.7.1 Limit

| FCC Part15 (15.247) , Subpart C | | | |
|---------------------------------|--------------------|---|-----------------------|
| Section | Test Item | Limit | Frequency Range (MHz) |
| 15.247(a)(1) | Channel Separation | >25KHz or >two-thirds of the 20 dB bandwidth (Which is greater) | 2400-2483.5 |

5.7.2 Test setup



5.7.3 Test procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
RBW=30 kHz, VBW=100 kHz, detector= Peak, Sweep Time =auto.
- (3) The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Test.

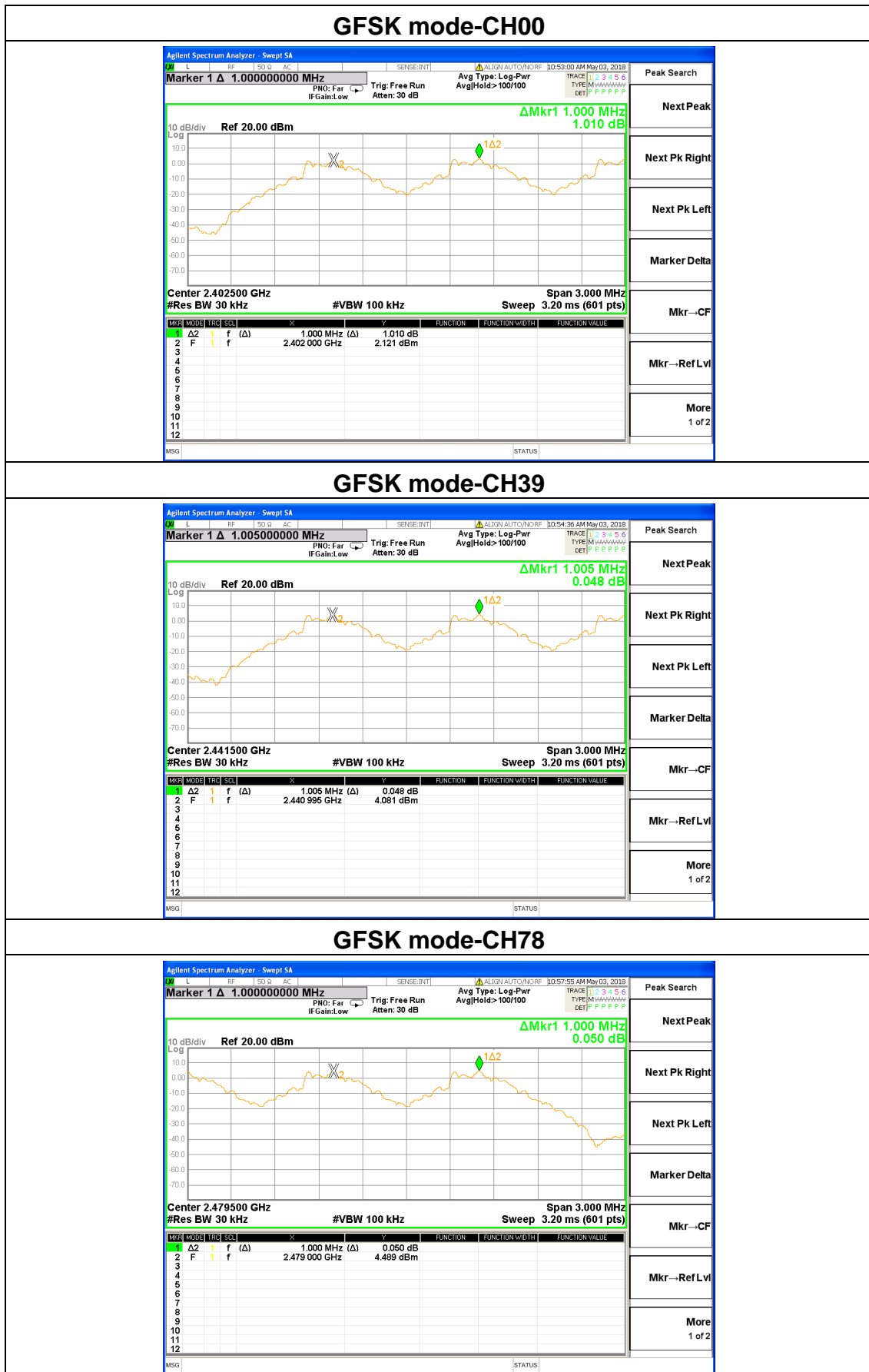
5.7.4 Test results

Test data

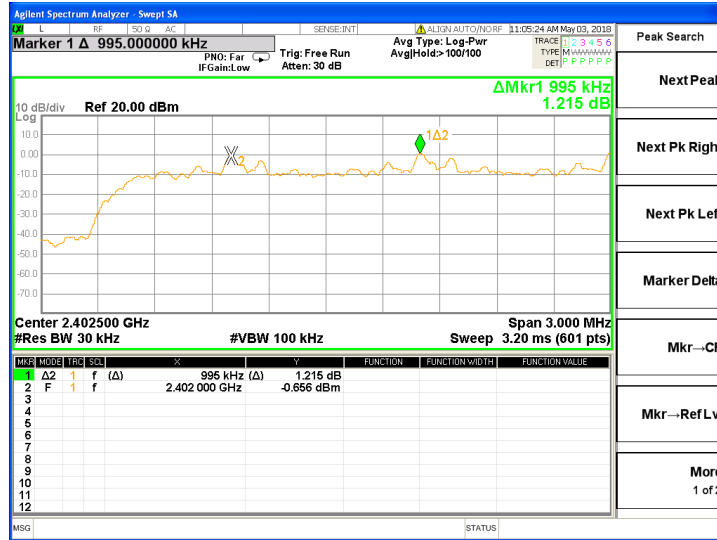
| | | | |
|---------------|--|---------------------|---------------------------------|
| EUT : | BluJax | Model Name : | ISBT32 Rev B |
| Temperature : | 25 °C | Relative Humidity : | 60% |
| Pressure : | 1012 hPa | Test Voltage : | DC 5V from adapter AC 120V/60Hz |
| Test Mode : | GFSK $\pi/4$ -DQPSK, 8DPSK Mode, /CH00, CH39, CH78 | | |

| Mode | Channel | Frequency (MHz) | Test Result (KHz) | Limit (kHz) | Result |
|----------------|---------|-----------------|-------------------|-------------|--------|
| GFSK | Low | 2402 | 1000 | >697.333 | Pass |
| | Middle | 2441 | 1005 | >696.000 | Pass |
| | High | 2480 | 1000 | >694.000 | Pass |
| $\pi/4$ -DQPSK | Low | 2402 | 995 | >696.667 | Pass |
| | Middle | 2441 | 1010 | >695.333 | Pass |
| | High | 2480 | 995 | >693.333 | Pass |
| 8DPSK | Low | 2402 | 1000 | >809.333 | Pass |
| | Middle | 2441 | 1000 | >803.333 | Pass |
| | High | 2480 | 1005 | >797.333 | Pass |

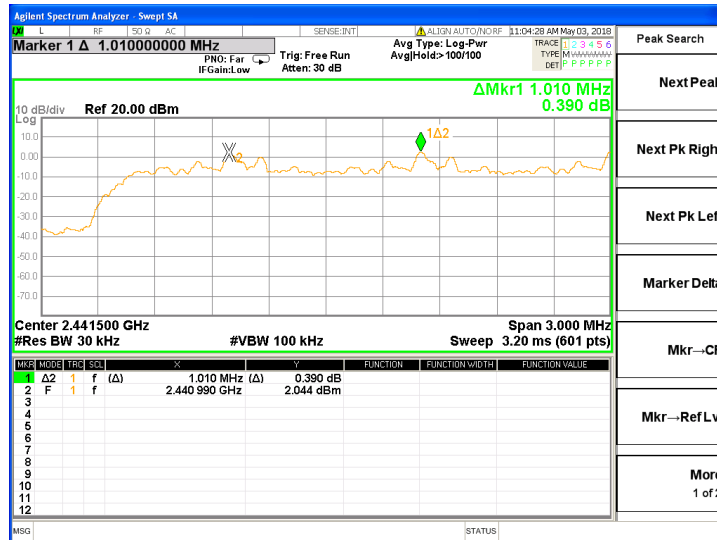
Test plots



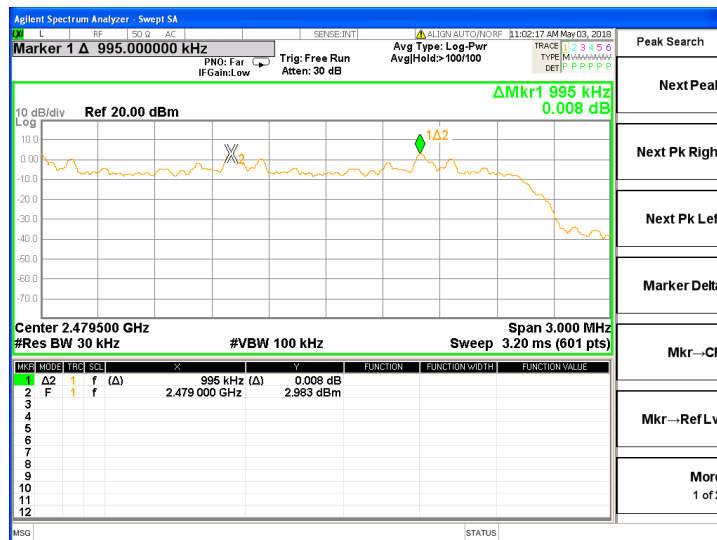
$\pi/4$ -DQPSK mode-CH00



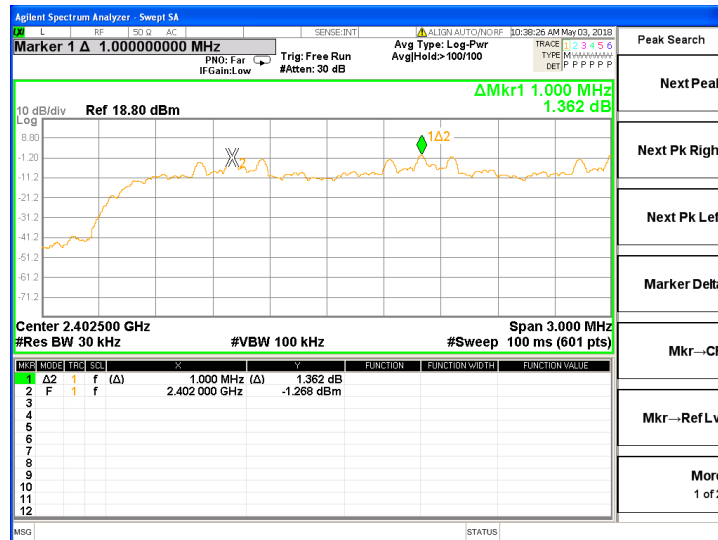
$\pi/4$ -DQPSK mode-CH39



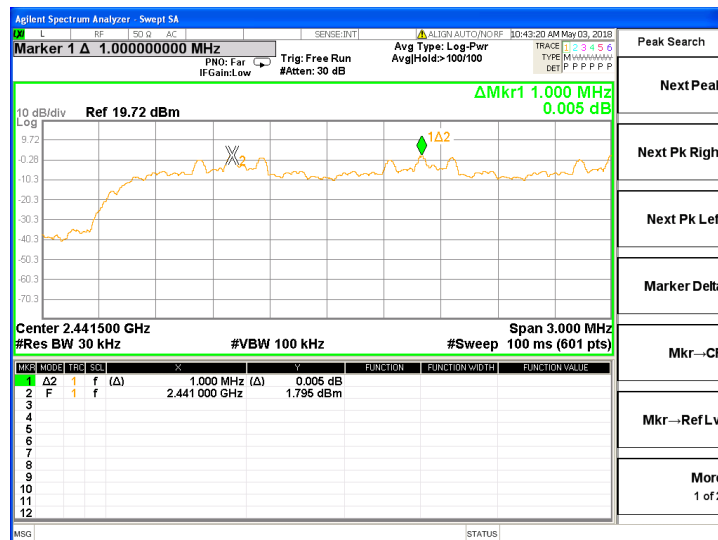
$\pi/4$ -DQPSK mode-CH78



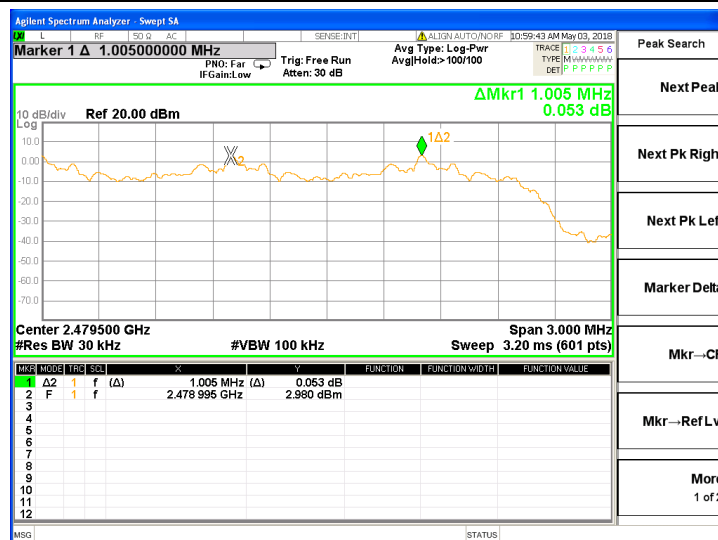
8DPSK mode-CH00



8DPSK mode-CH39



8DPSK mode-CH78



5.8 Dwell time

5.8.1 Limit

| FCC Part15 (15.247) , Subpart C | | | |
|---------------------------------|------------|---------|-----------------------|
| Section | Test Item | Limit | Frequency Range (MHz) |
| 15.247(a) | Dwell time | 0.4 sec | 2400-2483.5 |

5.8.2 Test setup



5.8.3 Test procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=1MHz, VBW=1MHz, Span=0Hz, Detector=Peak
- (3) Use video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for packet transmitting.
- (8) Measure the maximum time duration of one single pulse.
- (9) The EUT was set to the Hopping Mode for Dwell Time Test

5.8.4 Test results

Test data

| | | | |
|---------------|-------------------------------|---------------------|---------------------------------|
| EUT : | BluJax | Model Name : | ISBT32 Rev B |
| Temperature : | 25 °C | Relative Humidity : | 60% |
| Pressure : | 1012 hPa | Test Voltage : | DC 5V from adapter AC 120V/60Hz |
| Test Mode : | GFSK, π/4-DQPSK, 8DPSK / CH39 | | |

| Mode | Data Packet | Frequency (MHz) | Pulse Duration (ms) | Dwell Time (ms) | Limit(s) | Conclusion |
|-----------|-------------|-----------------|---------------------|-----------------|----------|------------|
| GFSK | DH1 | 2441 | 0.49 | 156.80 | <0.4 | Pass |
| | DH3 | 2441 | 1.75 | 280.00 | <0.4 | Pass |
| | DH5 | 2441 | 3.0 | 320.00 | <0.4 | Pass |
| π/4 DQPSK | 2DH1 | 2441 | 0.51 | 163.20 | <0.4 | Pass |
| | 2DH3 | 2441 | 1.76 | 281.60 | <0.4 | Pass |
| | 2DH5 | 2441 | 3.01 | 321.07 | <0.4 | Pass |
| 8DPSK | 3DH1 | 2441 | 0.51 | 163.20 | <0.4 | Pass |
| | 3DH3 | 2441 | 1.76 | 281.60 | <0.4 | Pass |
| | 3DH5 | 2441 | 3.00 | 320.00 | <0.4 | Pass |

Note1: A period time = 0.4 (s) * 79 = 31.6(s)

Note2:

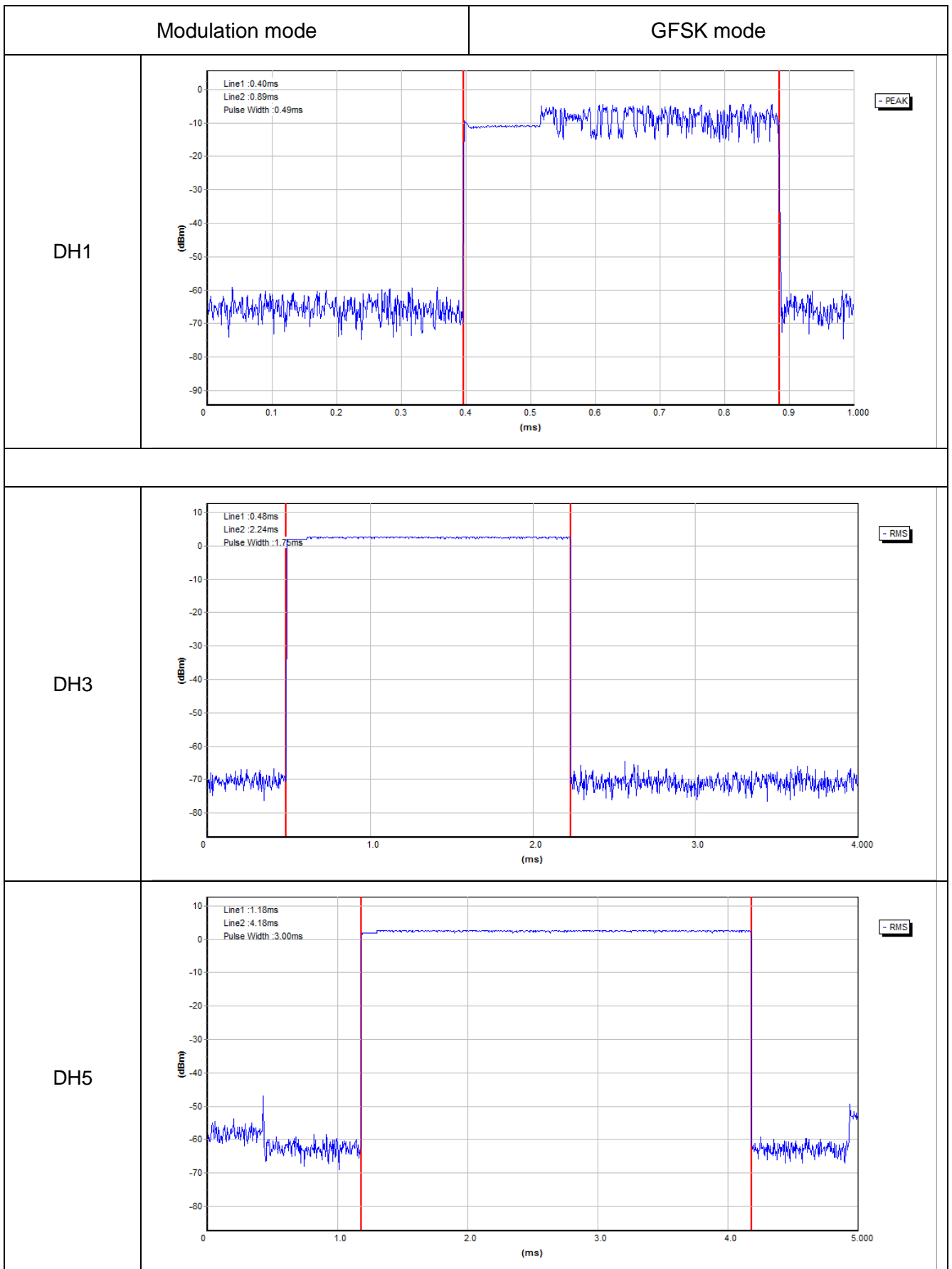
DH1 time slot = Pulse Duration * (1600/(2*79)) * A period time

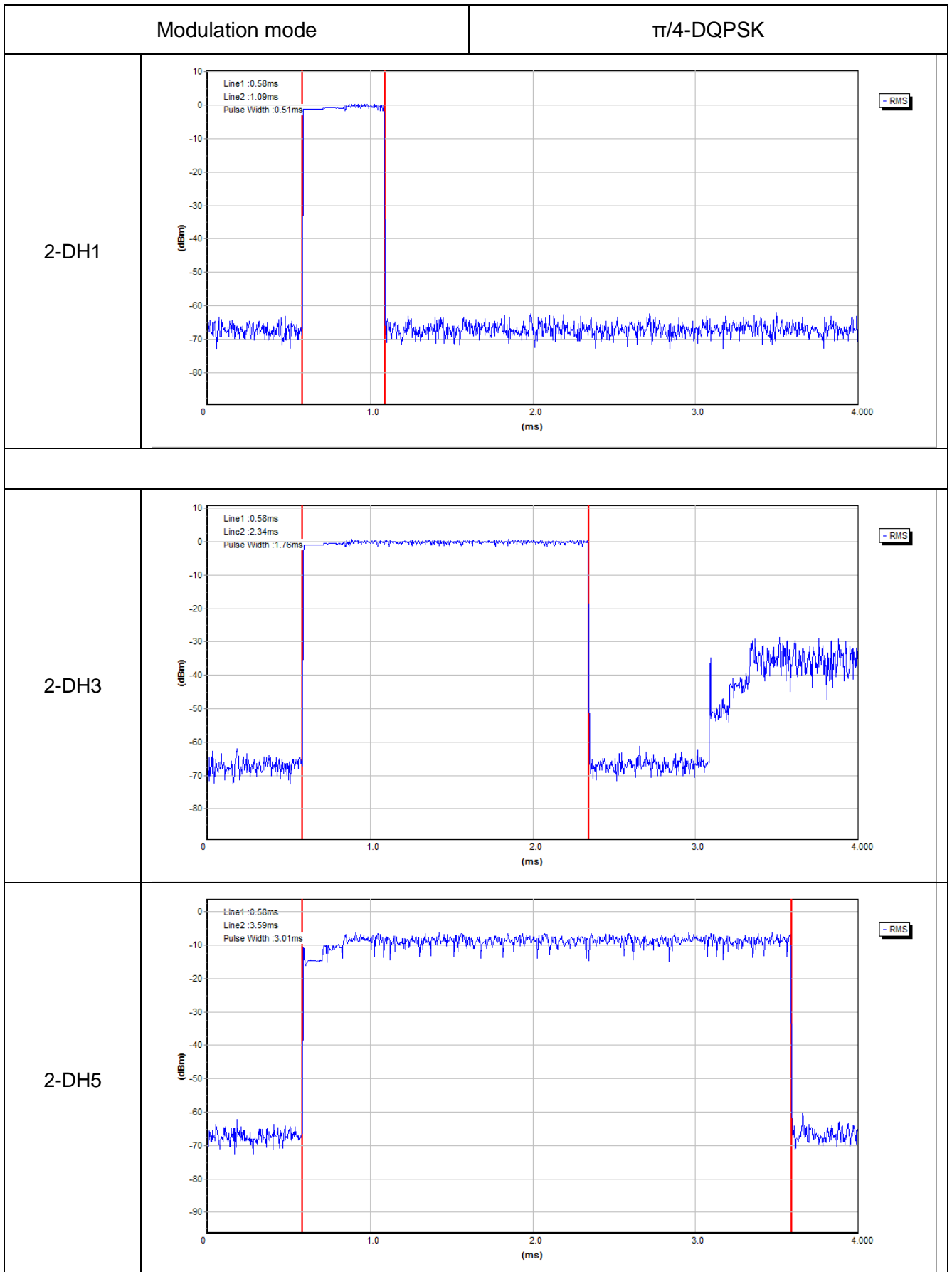
DH3 time slot = Pulse Duration * (1600/(4*79)) * A period time

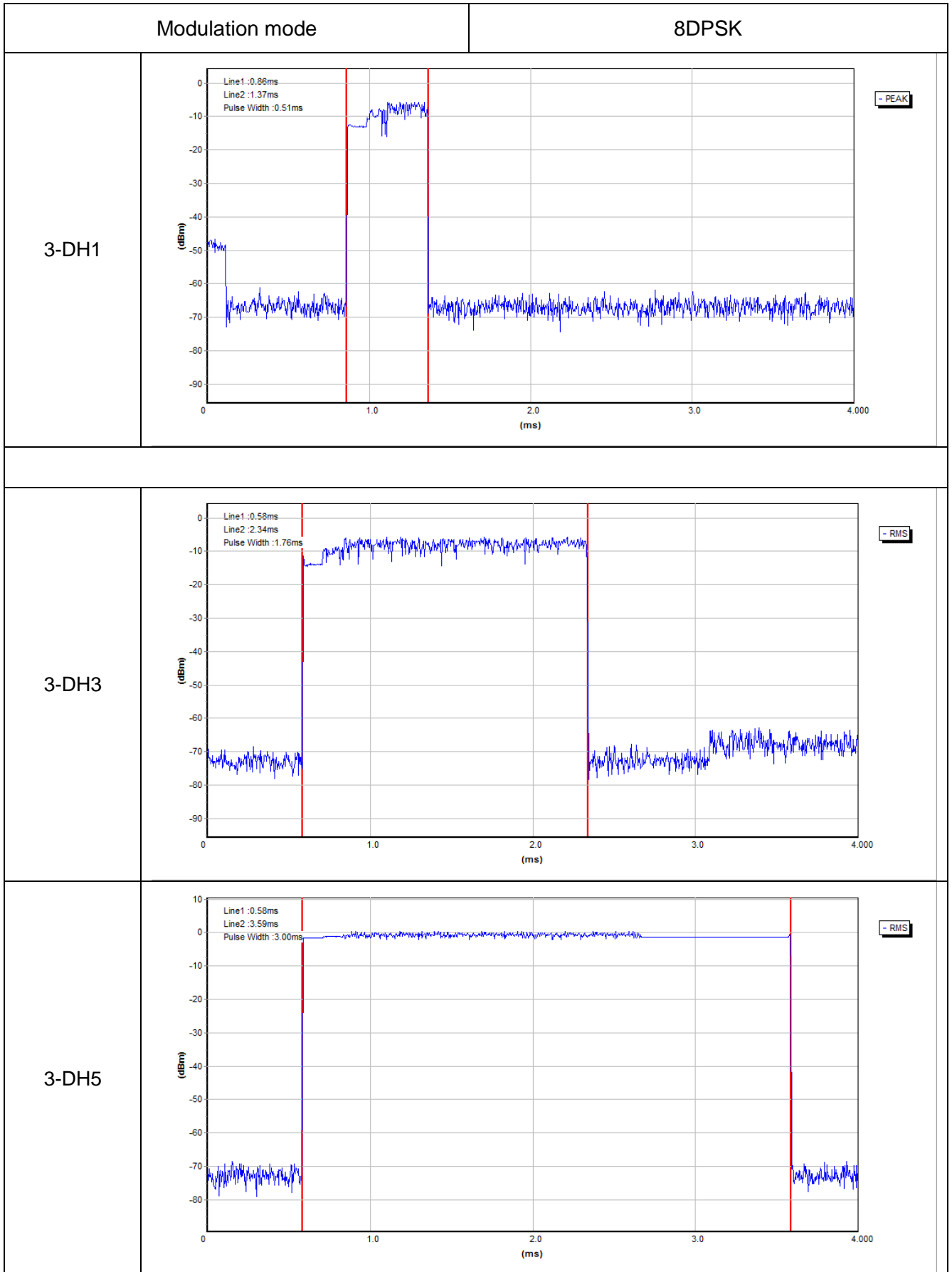
DH5 time slot = Pulse Duration * (1600/(6*79)) * A period time

Note3: For GFSK, π/4-DQPSK and 8DPSK: The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test plots







5.9 NUMBER OF HOPPING CHANNEL

5.9.1 Applied procedures / limit

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|---------------------------|--------------|-----------------------|--------|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247(a)(1)(iii) | Number of Hopping Channel | >15 channels | 2400-2483.5 | PASS |

5.9.2 TEST PROCEDURE

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=100 kHz, VBW=300 kHz, Detector=Peak, Sweep time= Auto.
- (3) The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Test.

5.9.3 DEVIATION FROM STANDARD

No deviation.

5.9.4 TEST SETUP



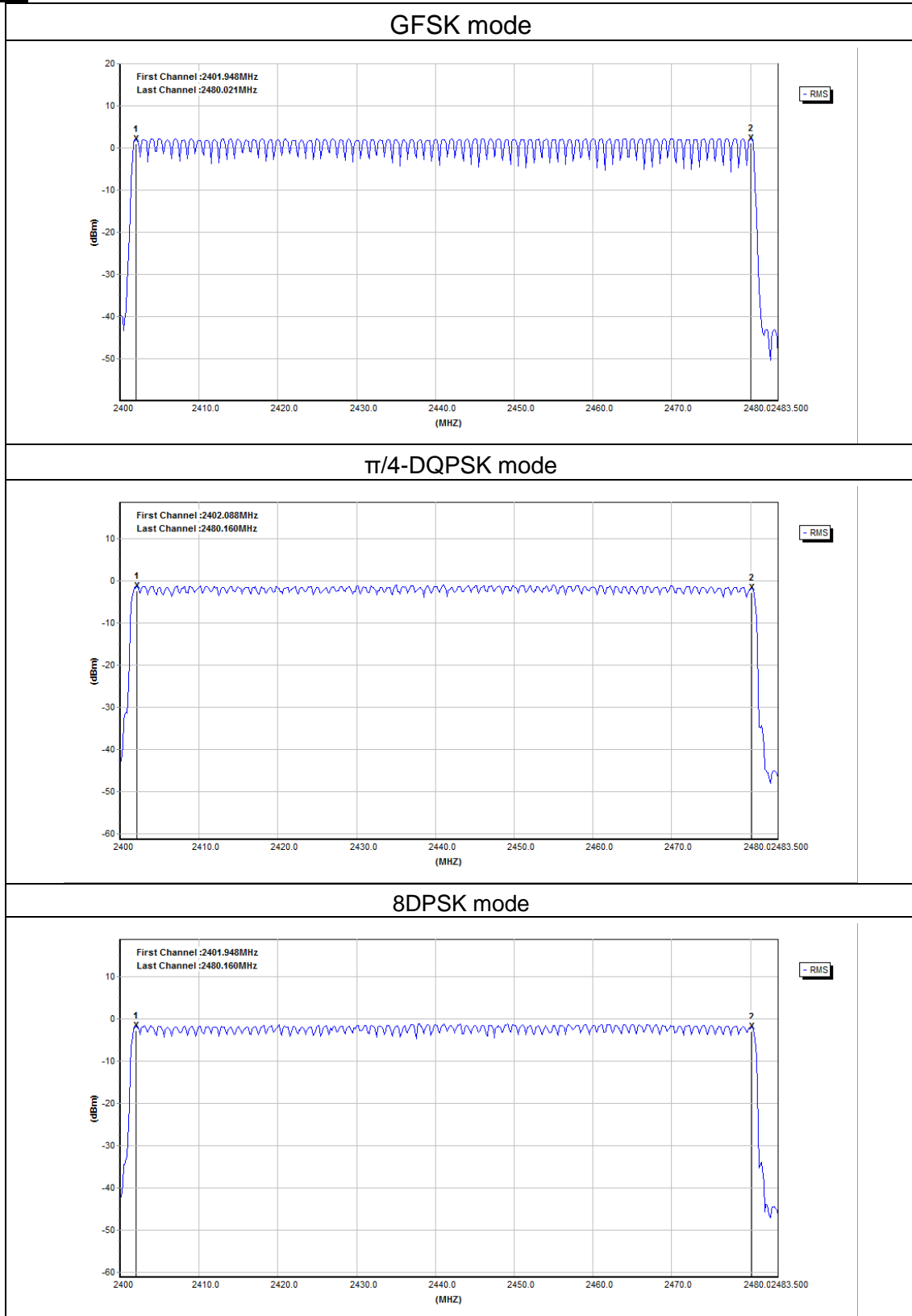
5.9.5 TEST RESULTS

| | | | |
|---------------|----------|---------------------|---------------------------------|
| EUT : | BluJax | Model Name : | ISBT32 Rev B |
| Temperature : | 25 °C | Relative Humidity : | 60% |
| Pressure : | 1012 hPa | Test Voltage : | DC 5V from adapter AC 120V/60Hz |

HOPPING CHANNEL

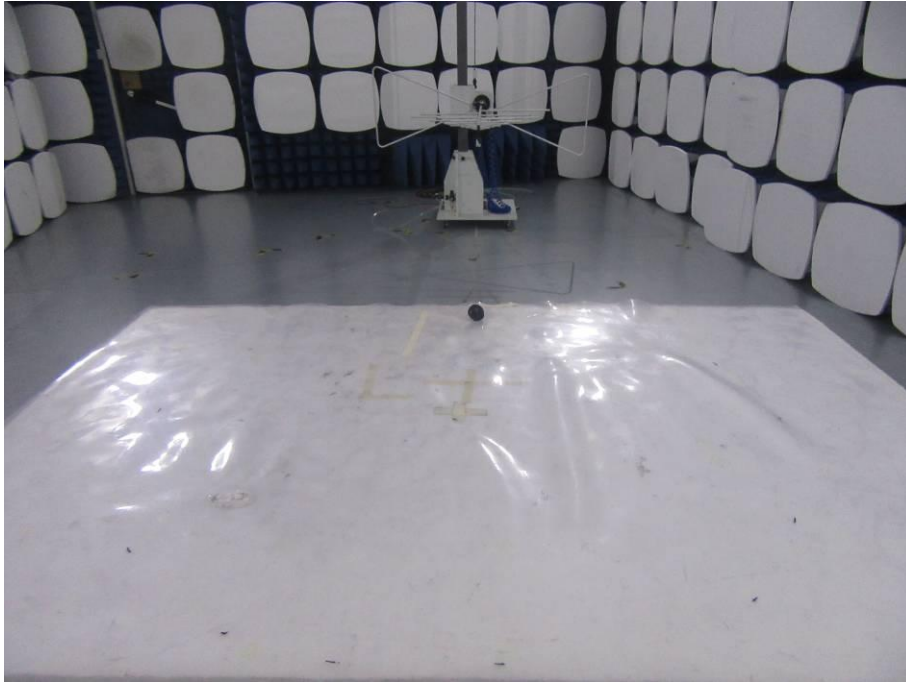
| Mode | Quantity of Hopping Channel | Limit | Results |
|-----------------------------|-----------------------------|-------|---------|
| GFSK, $\pi/4$ -DQPSK, 8DPSK | 79 | >15 | Pass |

Test plots



PHOTOGRAPHS OF THE TEST SETUP

Radiated emission – below 1GHz



Radiated emission – above 1GHz



Conducted emission



---END OF REPORT---