

RADIO TEST REPORT

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Report No: STS1905146W04

Issued for

CHINA NATIONAL HUACHEN ENERGY GROUP CO., LTD.

3/F,Sangpu Building,No.10 Dayangfang, Beiyuan Road, Chaoyang Dist, Beijing, 100012, China

| Product Name: | Tablet |
|----------------|-----------------|
| Brand Name: | Blueing |
| Model Name: | RK8863H |
| Series Model: | N/A |
| FCC ID: | 2AS9KRK8863H |
| Test Standard: | FCC Part 15.247 |

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TEST RESULT CERTIFICATION

| Applicant's Name: | CHINA NATIONAL HUACHEN ENERGY GROUP CO.,LTD. |
|---------------------|--|
| Address | 3/F,Sangpu Building,No.10 Dayangfang, Beiyuan Road, Chaoyang Dist, Beijing, 100012, China |
| Manufacture's Name: | CHINA NATIONAL HUACHEN ENERGY GROUP CO., LTD. |
| Address | 3/F,Sangpu Building,No.10 Dayangfang, Beiyuan Road, Chaoyang Dist, Beijing, 100012, China |
| Product Description | |
| Product Name: | Tablet |
| Brand Name: | Blueing |
| Model Name: | RK8863H |
| Series Model: | N/A |
| Test Standards: | FCC Part15.247 |
| Test Procedure: | ANSI C63.10-2013 |

This device described above has been tested by STS, 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.

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Date of Test.....

Date (s) of performance of tests .: 09 May 2019 ~ 14 May 2019

Date of Issue 14 May 2019

Test Result Pass

Testing Engineer

(Chris Chen)

Technical Manager

Ju

(Sunday Hu)



Authorized Signatory :

(Vita Li)

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Revision History

| Rev. | Issue Date | Report NO. | Effect Page | Contents |
|------|-------------|---------------|-------------|---------------|
| 00 | 14 May 2019 | STS1905146W04 | ALL | Initial Issue |
| | | | | |



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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards: KDB 558074 D01 15.247 Meas Guidance v05r02

| | FCC Part 15.247,Subpart C | | |
|----------------------------------|--|----------|--------|
| Standard Section | Test Item | Judgment | Remark |
| 15.207 | Conducted Emission | PASS | |
| 15.247(a)(1) | Hopping Channel Separation | PASS | |
| 15.247(a)(1)&(b)(1) | Output Power | PASS | |
| 15.247(c) | Radiated Spurious Emission | PASS | |
| 15.247(d) | Conducted Spurious & Band Edge Emission | PASS | |
| 15.247(a)(iii) | Number of Hopping Frequency | PASS | |
| 15.247(a)(iii) | Dwell Time | PASS | |
| 15.247(a)(1) | Bandwidth | PASS | |
| 15.205 | Restricted Band Edge Emission | PASS | |
| Part 15.247(d)/part 15.209(a) | Band Edge Emission | PASS | |
| 15.203 | Antenna Requirement | PASS | |

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2) All tests are according to ANSI C63.10-2013

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1.1 TEST FACTORY

Shenzhen STS Test Services Co., Ltd. Add. : 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China FCC test Firm Registration Number: 625569 A2LA Certificate No.: 4338.01;

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended 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 | RF output power, conducted | ±0.71dB |
| 2 | Unwanted Emissions, conducted | ±0.63dB |
| 3 | All emissions, radiated 30-200MHz | ±3.43dB |
| 4 | All emissions, radiated 200MHz-1GHz | ±3.57dB |
| 5 | All emissions, radiated>1G | ±4.13dB |
| 6 | Conducted Emission (9KHz-150KHz) | ±3.18dB |
| 7 | Conducted Emission (150KHz-30MHz) | ±2.70dB |



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

| Product Name | Tablet |
|-------------------------|---|
| Trade Name | Blueing |
| Model Name | RK8863H |
| Series Model | N/A |
| Model Difference | N/A |
| Channel List | Please refer to the Note 2. |
| Bluetooth | Frequency:2402 – 2480 MHz Modulation: GFSK(1Mbps), π/4-DQPSK(2Mbps), 8DPSK(3Mbps) |
| Bluetooth Version | 4.2 |
| Bluetooth configuration | BR+EDR |
| Adapter | Input: 100-240V, 50-60Hz, 0.35A Output: DC 5V, 2A |
| Battery | Rated Voltage: 3.8V Charge Limit: 4.35V Capacity: 6000mAh |
| Hardware version number | R863-3368-168-V1.0 |
| Software version number | Rk3368-userdebug 8.1.0 OPM6.171019.030.B1 200617 test-keys |
| Connecting I/O Port(s) | Please refer to the User's Manual |

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

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2.

| | | Chanr | nel 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 | | |

3. Table for Filed Antenna

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | NOTE |
|------|---------|---------------|--------------|-----------|------------|---------------|
| 1 | Blueing | RK8863H | PIFA | N/A | 0 dBi | BT Antenna |



2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Description | Data Rate/Modulation |
|-------------|---|
| TX CH00 | 1Mbps/GFSK |
| TX CH39 | 1Mbps/GFSK |
| TX CH78 | 1Mbps/GFSK |
| TX CH00 | 2 Mbps/π/4-DQPSK |
| TX CH39 | 2 Mbps/π/4-DQPSK |
| TX CH78 | 2 Mbps/π/4-DQPSK |
| TX CH00 | 3 Mbps/8DPSK |
| TX CH39 | 3 Mbps/8DPSK |
| TX CH78 | 3 Mbps/8DPSK |
| | TX CH00 TX CH39 TX CH78 TX CH00 TX CH39 TX CH78 TX CH78 TX CH78 TX CH78 TX CH00 TX CH78 TX CH78 TX CH00 TX CH39 |

Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

(2) We have be tested for all avaiable U.S. voltage and frequencies(For 120V,50/60Hz

and 240V, 50/60Hz) for which the device is capable of operation, and the worst case of 120V/ 60Hz is shown in the report

For AC Conducted Emission

| | Test Case |
|--------------|-------------------------|
| AC Conducted | Mode 10 : Keeping BT TX |
| Emission | |

2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS.

| Test software Version | Test program: Bluetooth | | | | |
|---|---|---|---|--|--|
| Frequency | 2402 MHz 2441 MHz 2480 MHz | | | | |
| (Power control software) Parameters(1/2/3Mbps) | Power class: 1 M rate:4:27 2 M rate:11:183 3 M rate:15:339 | Power class: 1 M rate:4:27 2 M rate:11:183 3 M rate:15:339 | Power class: 1 M rate:4:27 2 M rate:11:183 3 M rate:15:339 | | |

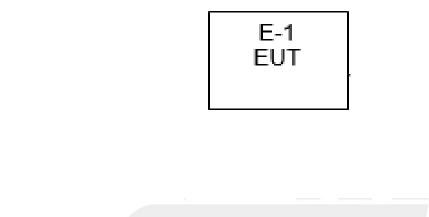


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2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Radiated Spurious Emission Test



Conducted Emission Test

| | E-2 apter | E-1 EUT |
|--|--------------|------------|
|--|--------------|------------|

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2.5 DESCRIPTION OF NECESSARY ACCESSORIES AND 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.

| | Necessary accessories | | | | | | | |
|------|-----------------------|-----------|-----------------|------|-----|--|--|--|
| Item | Equipment | Mfr/Brand | Serial No. | Note | | | | |
| E-2 | Adapter | MINGXIN | JZB310-050200UU | N/A | N/A | | | |
| C-1 | DC Cable | N/A | 100cm | N/A | N/A | | | |
| | | | | | | | | |
| | | | | | | | | |

Support units

| Item | Equipment | Mfr/Brand | Model/Type No. | Serial No. | Note |
|------|-----------|-----------|----------------|---------------|------|
| N/A | N/A | N/A | N/A | 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 ^rLength_a column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".



2.6 EQUIPMENTS LIST

Radiation Test equipment

| Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|-------------------------------------|--------------|---------------------|------------------|------------------|------------------|
| Test Receiver | R&S | ESCI | 101427 | 2018.10.13 | 2019.10.12 |
| Signal Analyzer | Agilent | N9020A | MY51110105 | 2019.03.02 | 2020.03.01 |
| Active loop Antenna | ZHINAN | ZN30900C | 16035 | 2018.03.11 | 2021.03.10 |
| Bilog Antenna | TESEQ | CBL6111D | 34678 | 2017.11.02 | 2020.11.1 |
| Horn Antenna | SCHWARZBECK | BBHA 9120D(1201) | 9120D-1343 | 2018.10.19 | 2021.10.18 |
| SHF-EHF Horn Antenna (18G-40GHz) | A-INFO | LB-180400-KF | J211020657 | 2018.03.11 | 2021.03.10 |
| Pre-Amplifier(0.1M-3G Hz) | EM | EM330 | 060665 | 2018.10.13 | 2019.10.12 |
| Pre-Amplifier (1G-18GHz) | SKET | LNPA-01018G-45 | SK201808090 1 | 2018.10.13 | 2019.10.12 |
| Temperature & Humidity | HH660 | Mieo | N/A | 2018.10.11 | 2019.10.10 |
| turn table | EM | SC100_1 | 60531 | N/A | N/A |
| Antenna mast | EM | SC100 | N/A | N/A | N/A |

Conduction Test equipment

| Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|---------------------------|--------------|----------|------------|------------------|------------------|
| Test Receiver | R&S | ESCI | 101427 | 2018.10.13 | 2019.10.12 |
| LISN | R&S | ENV216 | 101242 | 2018.10.11 | 2019.10.10 |
| LISN | EMCO | 3810/2NM | 23625 | 2018.10.11 | 2019.10.10 |
| Temperature & Humidity | HH660 | Mieo | N/A | 2018.10.11 | 2019.10.10 |

RF Connected Test

| Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|---------------------------|--------------|----------|---------------|------------------|------------------|
| USB RF power sensor | DARE | RPR3006W | 15100041SNO03 | 2018.10.13 | 2019.10.12 |
| Signal Analyzer | Agilent | N9020A | MY49100060 | 2018.10.13 | 2019.10.12 |
| Temperature & Humidity | HH660 | Mieo | N/A | 2018.10.11 | 2019.10.10 |



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 207(a) limit in the table below has to be followed.

| | Conducted Emissionlimit (dBuV) | | |
|-----------------|--------------------------------|-----------|--|
| FREQUENCY (MHz) | 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.

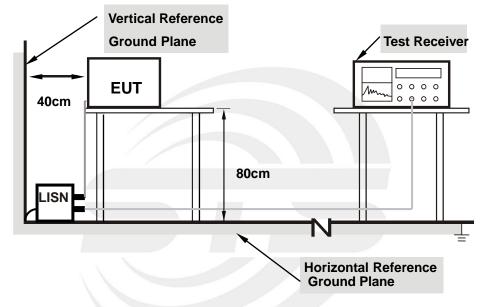
The following table is the setting of the receiver

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



3.1.2 TEST PROCEDURE

- a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical 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.
- b. 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.
- c. 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.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.



3.1.3 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

3.1.4 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.



3.1.5 TEST RESULT

| Temperature: | 23.7°C | Relative Humidity: | 67% |
|---------------|--------------|--------------------|-----|
| Test Voltage: | AC 120V/60Hz | Phase: | L |
| Test Mode: | Mode 10 | | |

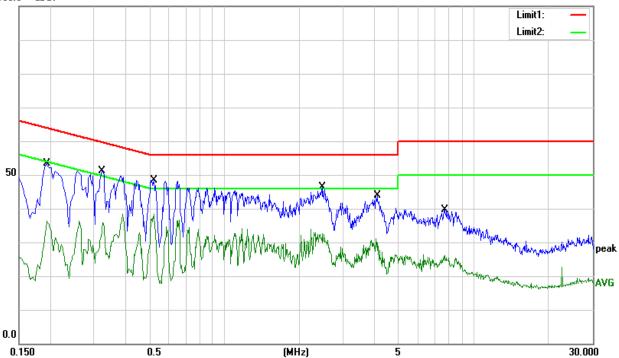
| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|-----|-----------|---------|------------|--------|--------|--------|--------|
| | (MHz) | (dBuV) | Factor(dB) | (dBuV) | (dBuV) | (dB) | |
| 1 | 0.1940 | 33.21 | 20.23 | 53.44 | 63.86 | -10.42 | QP |
| 2 | 0.1940 | 16.05 | 20.23 | 36.28 | 53.86 | -17.58 | AVG |
| 3 | 0.3220 | 30.38 | 20.67 | 51.05 | 59.66 | -8.61 | QP |
| 4 | 0.3220 | 17.63 | 20.67 | 38.30 | 49.66 | -11.36 | AVG |
| 5 | 0.5220 | 28.01 | 20.46 | 48.47 | 56.00 | -7.53 | QP |
| 6 | 0.5220 | 17.87 | 20.46 | 38.33 | 46.00 | -7.67 | AVG |
| 7 | 2.4740 | 26.29 | 20.02 | 46.31 | 56.00 | -9.69 | QP |
| 8 | 2.4740 | 12.53 | 20.02 | 32.55 | 46.00 | -13.45 | AVG |
| 9 | 4.1100 | 23.82 | 19.95 | 43.77 | 56.00 | -12.23 | QP |
| 10 | 4.1100 | 7.71 | 19.95 | 27.66 | 46.00 | -18.34 | AVG |
| 11 | 7.6860 | 19.71 | 19.95 | 39.66 | 60.00 | -20.34 | QP |
| 12 | 7.6860 | 5.40 | 19.95 | 25.35 | 50.00 | -24.65 | AVG |

Remark:

1. All readings are Quasi-Peak and Average values.

2. Margin = Result (Result = Reading + Factor)-Limit

100.0 dBuV



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| Temperature: | 23.7°C | Relative Humidity: | 67% |
|---------------|--------------|--------------------|-----|
| Test Voltage: | AC 120V/60Hz | Phase: | Ν |
| Test Mode: | Mode 10 | | |

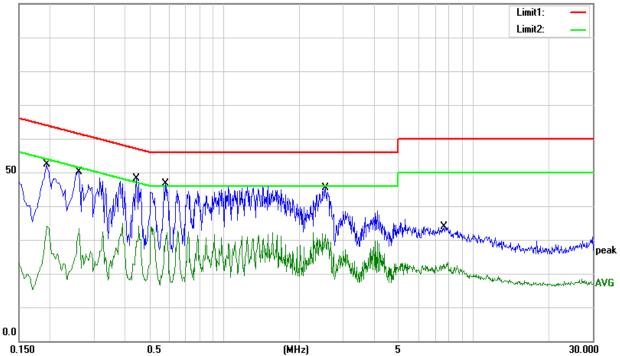
| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|-----|-----------|---------|------------|--------|--------|--------|--------|
| | (MHz) | (dBuV) | Factor(dB) | (dBuV) | (dBuV) | (dB) | |
| 1 | 0.1940 | 32.03 | 20.31 | 52.34 | 63.86 | -11.52 | QP |
| 2 | 0.1940 | 13.84 | 20.31 | 34.15 | 53.86 | -19.71 | AVG |
| 3 | 0.2620 | 29.56 | 20.60 | 50.16 | 61.37 | -11.21 | QP |
| 4 | 0.2620 | 12.83 | 20.60 | 33.43 | 51.37 | -17.94 | AVG |
| 5 | 0.4460 | 27.76 | 20.48 | 48.24 | 56.95 | -8.71 | QP |
| 6 | 0.4460 | 13.57 | 20.48 | 34.05 | 46.95 | -12.90 | AVG |
| 7 | 0.5820 | 26.20 | 20.37 | 46.57 | 56.00 | -9.43 | QP |
| 8 | 0.5820 | 12.14 | 20.37 | 32.51 | 46.00 | -13.49 | AVG |
| 9 | 2.5420 | 25.23 | 20.12 | 45.35 | 56.00 | -10.65 | QP |
| 10 | 2.5420 | 11.50 | 20.12 | 31.62 | 46.00 | -14.38 | AVG |
| 11 | 7.6260 | 13.95 | 19.89 | 33.84 | 60.00 | -26.16 | QP |
| 12 | 7.6260 | 3.38 | 19.89 | 23.27 | 50.00 | -26.73 | AVG |

Remark:

1. All readings are Quasi-Peak and Average values.

2. Margin = Result (Result = Reading + Factor)-Limit

100.0 dBuV



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3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

| Frequencies | Field Strength | Measurement Distance |
|-------------|--------------------|----------------------|
| (MHz) | (micorvolts/meter) | (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 |

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

| FREQUENCY (MHz) | (dBuV/m) (at 3M) | | |
|-----------------|------------------|---------|--|
| | PEAK | AVERAGE | |
| Above 1000 | 74 | 54 | |

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

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

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

For Radiated Emission

| Spectrum Parameter | Setting | | |
|---------------------------------|---------------------------------|--|--|
| Attenuation | Auto | | |
| Detector | Peak/AV | | |
| Start Frequency | 1000 MHz(Peak/AV) | | |
| Stop Frequency | 10th carrier hamonic(Peak/AV) | | |
| RB / VB (emission in restricted | | | |
| band) | PK=1MHz / 1MHz, AV=1 MHz /10 Hz | | |

For Band edge

| Spectrum Parameter | Setting | | |
|---------------------------------------|-----------------------------------|--|--|
| Detector | Peak/AV | | |
| Chart/Oton Engruenau | Lower Band Edge: 2300 to 2403 MHz | | |
| Start/Stop Frequency | Upper Band Edge: 2479 to 2500 MHz | | |
| RB / VB (emission in restricted band) | PK=1MHz / 1MHz, AV=1 MHz / 10 Hz | | |

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| Receiver Parameter | Setting |
|------------------------|--------------------------------------|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~90kHz / RB 200Hz for PK & AV |
| Start ~ Stop Frequency | 90kHz~110kHz / RB 200Hz for QP |
| Start ~ Stop Frequency | 110kHz~490kHz / RB 200Hz for PK & AV |
| Start ~ Stop Frequency | 490kHz~30MHz / RB 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |

3.2.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz,and above 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then QuasiPeak detector mode re-measured.
- e. 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.
- f. 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

3.2.3 DEVIATION FROM TEST STANDARD

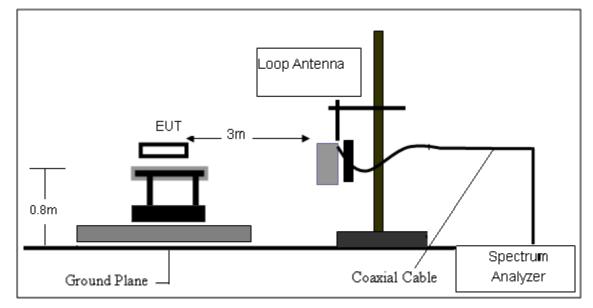
No deviation

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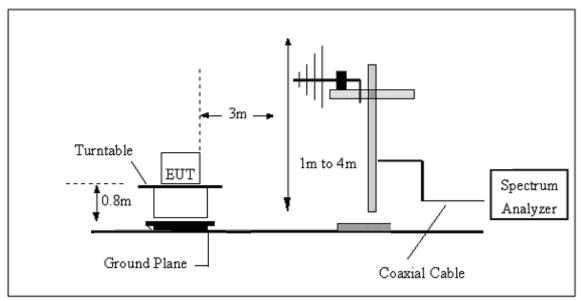


3.2.4 TESTSETUP

(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz

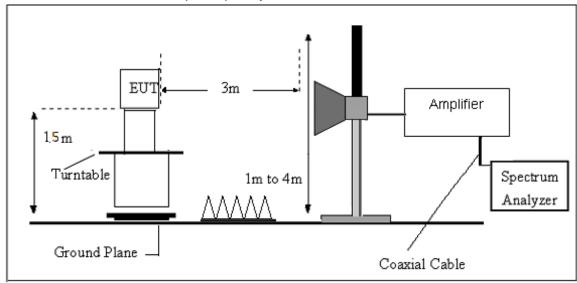




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(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

- AG = Amplifier Gain
- AF = Antenna Factor

For example

| Frequency | FS | RA | AF | CL | AG | Factor |
|-----------|----------|----------|------|------|------|--------|
| (MHz) | (dBµV/m) | (dBµV/m) | (dB) | (dB) | (dB) | (dB) |
| 300 | 40 | 58.1 | 12.2 | 1.6 | 31.9 | -18.1 |

Factor=AF+CL-AG



3.2.7 TEST RESULTS

(9KHz-30MHz)

| Temperature: | 20.5°C | Relative Humidity: | 64% |
|---------------|---------|--------------------|---------|
| Test Voltage: | DC 3.8V | Test Mode: | TX Mode |

| Freq. | Reading | Limit | Margin | State | Toot Dooult |
|-------|----------|----------|--------|-------|-------------|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB) | P/F | Test Result |
| | | | | | 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 (specific distance/test distance)(dB);

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





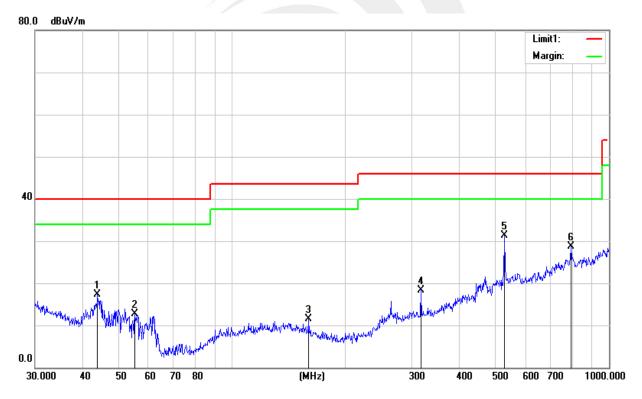
(30MHz-1000MHz)

| Temperature: | 20.5°C | Relative Humidity: | 64% | | |
|---------------|---|--------------------|------------|--|--|
| Test Voltage: | DC 3.8V | Phase: | Horizontal | | |
| Test Mode: | Mode 1/2/3/4/5/6/7/8/9(Mode 1 worst mode) | | | | |

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|-----|-----------|---------|--------------|----------|----------|--------|--------|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 43.9658 | 35.76 | -18.37 | 17.39 | 40.00 | -22.61 | QP |
| 2 | 55.2207 | 35.76 | -22.97 | 12.79 | 40.00 | -27.21 | QP |
| 3 | 159.7844 | 30.07 | -18.49 | 11.58 | 43.50 | -31.92 | QP |
| 4 | 316.5890 | 32.68 | -14.28 | 18.40 | 46.00 | -27.60 | QP |
| 5 | 528.2458 | 39.38 | -8.09 | 31.29 | 46.00 | -14.71 | QP |
| 6 | 793.3960 | 32.02 | -3.34 | 28.68 | 46.00 | -17.32 | QP |

Remark:

1. Margin = Result (Result = Reading + Factor)-Limit



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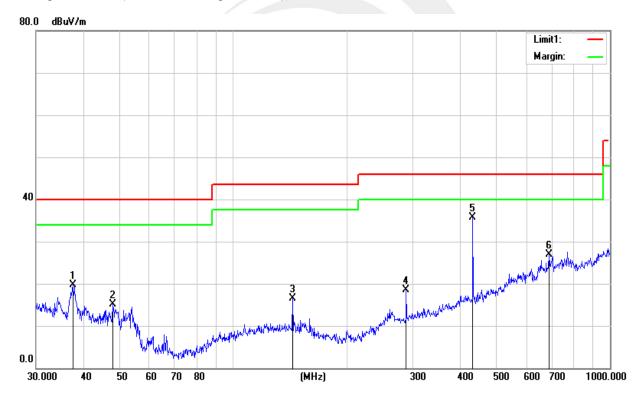


| Temperature: | 20.5°C | Relative Humidity: | 64% | | |
|---------------|---|--------------------|----------|--|--|
| Test Voltage: | DC 3.8V | Phase: | Vertical | | |
| Test Mode: | Mode 1/2/3/4/5/6/7/8/9(Mode 1 worst mode) | | | | |

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|-----|-----------|---------|--------------|----------|----------|--------|--------|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 37.5478 | 34.71 | -15.06 | 19.65 | 40.00 | -20.35 | QP |
| 2 | 47.9940 | 35.64 | -20.45 | 15.19 | 40.00 | -24.81 | QP |
| 3 | 143.8294 | 34.24 | -17.69 | 16.55 | 43.50 | -26.95 | QP |
| 4 | 287.9904 | 34.00 | -15.49 | 18.51 | 46.00 | -27.49 | QP |
| 5 | 432.5457 | 46.55 | -10.89 | 35.66 | 46.00 | -10.34 | QP |
| 6 | 689.5643 | 32.39 | -5.57 | 26.82 | 46.00 | -19.18 | QP |

Remark:

1. Margin = Result (Result = Reading + Factor)-Limit



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(1GHz~25GHz) Restricted band and Spurious emission Requirements

| | | | | | GFSK | | | | | |
|-----------|------------------|---------------|---------------|-------------------|--------------------|-------------------|----------|--------|----------|------------|
| Frequency | Meter Reading | Amplifier | Loss | Antenna Factor | Orrected Factor | Emission Level | Limits | Margin | Detector | Comment |
| (MHz) | (dBµV) | (dB) | (dB) | (dB/m) | (dB) | (dBµV/m) | (dBµV/m) | (dB) | Туре | |
| | | | | Low C | hannel (2402 | MHz) | | | | |
| 3264.84 | 60.97 | 44.70 | 6.70 | 28.20 | -9.80 | 51.17 | 74.00 | -22.83 | PK | Vertical |
| 3264.84 | 51.55 | 44.70 | 6.70 | 28.20 | -9.80 | 41.75 | 54.00 | -12.25 | AV | Vertical |
| 3264.83 | 62.07 | 44.70 | 6.70 | 28.20 | -9.80 | 52.27 | 74.00 | -21.73 | PK | Horizontal |
| 3264.83 | 50.42 | 44.70 | 6.70 | 28.20 | -9.80 | 40.62 | 54.00 | -13.38 | AV | Horizontal |
| 4804.35 | 59.21 | 44.20 | 9.04 | 31.60 | -3.56 | 55.65 | 74.00 | -18.35 | PK | Vertical |
| 4804.35 | 49.38 | 44.20 | 9.04 | 31.60 | -3.56 | 45.82 | 54.00 | -8.18 | AV | Vertical |
| 4804.49 | 58.85 | 44.20 | 9.04 | 31.60 | -3.56 | 55.29 | 74.00 | -18.71 | PK | Horizontal |
| 4804.49 | 50.34 | 44.20 | 9.04 | 31.60 | -3.56 | 46.78 | 54.00 | -7.22 | AV | Horizontal |
| 5359.61 | 49.24 | 44.20 | 9.86 | 32.00 | -2.34 | 46.90 | 74.00 | -27.10 | PK | Vertical |
| 5359.61 | 39.52 | 44.20 | 9.86 | 32.00 | -2.34 | 37.18 | 54.00 | -16.82 | AV | Vertical |
| 5359.79 | 48.07 | 44.20 | 9.86 | 32.00 | -2.34 | 45.73 | 74.00 | -28.27 | PK | Horizontal |
| 5359.79 | 38.70 | 44.20 | 9.86 | 32.00 | -2.34 | 36.36 | 54.00 | -17.64 | AV | Horizontal |
| 7205.77 | 53.53 | 43.50 | 11.40 | 35.50 | 3.40 | 56.93 | 74.00 | -17.07 | PK | Vertical |
| 7205.77 | 44.20 | 43.50 | 11.40 | 35.50 | 3.40 | 47.60 | 54.00 | -6.40 | AV | Vertical |
| 7205.88 | 53.93 | 43.50 | 11.40 | 35.50 | 3.40 | 57.33 | 74.00 | -16.67 | PK | Horizontal |
| 7205.88 | 44.50 | 43.50 | 11.40 | 35.50 | 3.40 | 47.90 | 54.00 | -6.10 | AV | Horizontal |
| | | | • | Middle | Channel (244 | 1 MHz) | | | | |
| 3264.79 | 61.82 | 44.70 | 6.70 | 28.20 | -9.80 | 52.02 | 74.00 | -21.98 | PK | Vertical |
| 3264.79 | 50.92 | 44.70 | 6.70 | 28.20 | -9.80 | 41.12 | 54.00 | -12.88 | AV | Vertical |
| 3264.74 | 62.02 | 44.70 | 6.70 | 28.20 | -9.80 | 52.22 | 74.00 | -21.78 | PK | Horizontal |
| 3264.74 | 51.16 | 44.70 | 6.70 | 28.20 | -9.80 | 41.36 | 54.00 | -12.64 | AV | Horizontal |
| 4882.43 | 59.52 | 44.20 | 9.04 | 31.60 | -3.56 | 55.96 | 74.00 | -18.04 | PK | Vertical |
| 4882.43 | 49.93 | 44.20 | 9.04 | 31.60 | -3.56 | 46.37 | 54.00 | -7.63 | AV | Vertical |
| 4882.49 | 59.59 | 44.20 | 9.04 | 31.60 | -3.56 | 56.03 | 74.00 | -17.97 | PK | Horizontal |
| 4882.49 | 49.33 | 44.20 | 9.04 | 31.60 | -3.56 | 45.77 | 54.00 | -8.23 | AV | Horizontal |
| 5359.74 | 48.86 | 44.20 | 9.86 | 32.00 | -2.34 | 46.52 | 74.00 | -27.48 | PK | Vertical |
| 5359.74 | 38.94 | 44.20 | 9.86 | 32.00 | -2.34 | 36.60 | 54.00 | -17.40 | AV | Vertical |
| 5359.62 | 47.91 | 44.20 | 9.86 | 32.00 | -2.34 | 45.57 | 74.00 | -28.43 | PK | Horizontal |
| 5359.62 | 39.44 | 44.20 | 9.86 | 32.00 | -2.34 | 37.10 | 54.00 | -16.90 | AV | Horizontal |
| 7323.95 | 54.76 | 43.50 | 11.40 | 35.50 | 3.40 | 58.16 | 74.00 | -15.84 | PK | Vertical |
| 7323.95 | 44.33 | 43.50 | 11.40 | 35.50 | 3.40 | 47.73 | 54.00 | -6.27 | AV | Vertical |
| 7323.84 | 54.63 | 43.50 | 11.40 | 35.50 | 3.40 | 58.03 | 74.00 | -15.97 | PK | Horizontal |
| 7323.84 | 44.40 | 43.50 | 11.40 | 35.50 | 3.40 | 47.80 | 54.00 | -6.20 | AV | Horizontal |



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| | | | | High C | hannel (248 | 0 MHz) | | | | |
|---------|-------|-------|-------|--------|-------------|--------|-------|--------|----|------------|
| 3264.64 | 62.07 | 44.70 | 6.70 | 28.20 | -9.80 | 52.27 | 74.00 | -21.73 | PK | Vertical |
| 3264.64 | 50.62 | 44.70 | 6.70 | 28.20 | -9.80 | 40.82 | 54.00 | -13.18 | AV | Vertical |
| 3264.75 | 61.01 | 44.70 | 6.70 | 28.20 | -9.80 | 51.21 | 74.00 | -22.79 | PK | Horizontal |
| 3264.75 | 50.52 | 44.70 | 6.70 | 28.20 | -9.80 | 40.72 | 54.00 | -13.28 | AV | Horizontal |
| 4960.51 | 58.53 | 44.20 | 9.04 | 31.60 | -3.56 | 54.97 | 74.00 | -19.03 | PK | Vertical |
| 4960.51 | 50.14 | 44.20 | 9.04 | 31.60 | -3.56 | 46.58 | 54.00 | -7.42 | AV | Vertical |
| 4960.33 | 58.88 | 44.20 | 9.04 | 31.60 | -3.56 | 55.32 | 74.00 | -18.68 | PK | Horizontal |
| 4960.33 | 50.47 | 44.20 | 9.04 | 31.60 | -3.56 | 46.91 | 54.00 | -7.09 | AV | Horizontal |
| 5359.81 | 49.45 | 44.20 | 9.86 | 32.00 | -2.34 | 47.11 | 74.00 | -26.89 | PK | Vertical |
| 5359.81 | 39.97 | 44.20 | 9.86 | 32.00 | -2.34 | 37.63 | 54.00 | -16.37 | AV | Vertical |
| 5359.69 | 48.21 | 44.20 | 9.86 | 32.00 | -2.34 | 45.87 | 74.00 | -28.13 | PK | Horizontal |
| 5359.69 | 38.86 | 44.20 | 9.86 | 32.00 | -2.34 | 36.52 | 54.00 | -17.48 | AV | Horizontal |
| 7439.72 | 54.86 | 43.50 | 11.40 | 35.50 | 3.40 | 58.26 | 74.00 | -15.74 | PK | Vertical |
| 7439.72 | 44.94 | 43.50 | 11.40 | 35.50 | 3.40 | 48.34 | 54.00 | -5.66 | AV | Vertical |
| 7439.73 | 54.08 | 43.50 | 11.40 | 35.50 | 3.40 | 57.48 | 74.00 | -16.52 | PK | Horizontal |
| 7439.73 | 44.98 | 43.50 | 11.40 | 35.50 | 3.40 | 48.38 | 54.00 | -5.62 | AV | Horizontal |

Note:

1) Scan with GFSK, π/4-DQPSK,8DPSK,the worst case is GFSK Mode

2) Factor = Antenna Factor + Cable Loss - Pre-amplifier.

Emission Level = Reading + Factor

The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency

emission is mainly from the environment noise.

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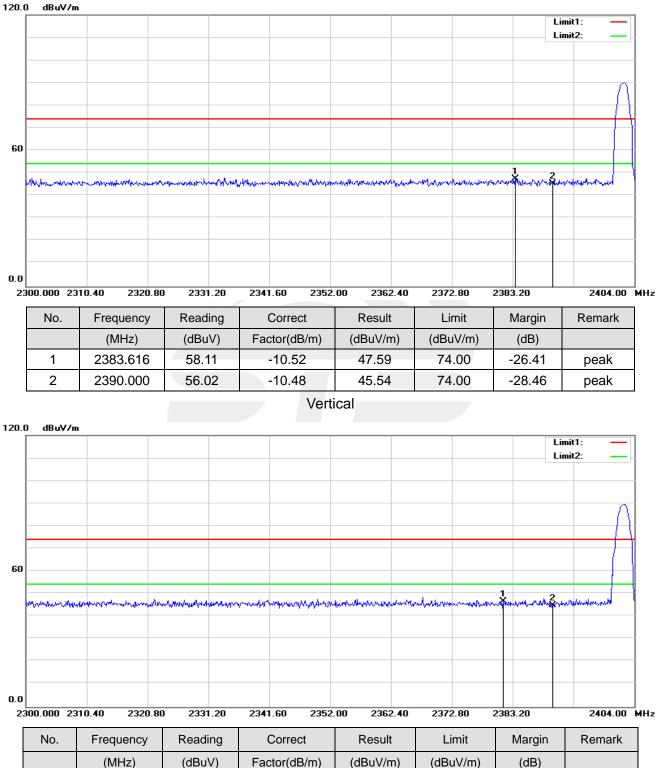
 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China

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 E-mail: sts@stsapp.com



Restricted band Requirements

GFSK-Low Horizontal



Shenzhen STS Test Services Co., Ltd.

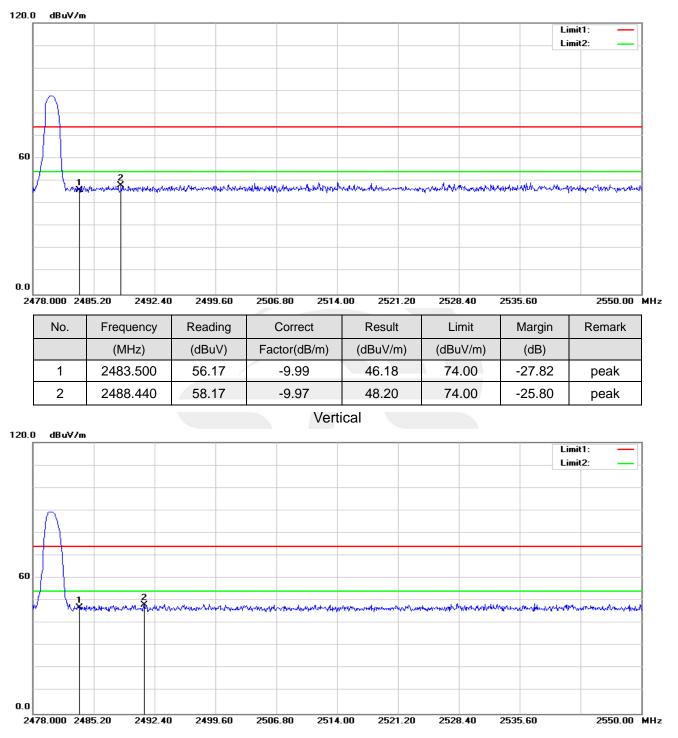
1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China Tel: + 86-755 3688 6288 Fax:+ 86-755 3688 6277 Http://www.stsapp.com E-mail: sts@stsapp.com



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GFSK-High Horizontal



| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|-----|-----------|---------|--------------|----------|----------|--------|--------|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2483.500 | 56.95 | -9.99 | 46.96 | 74.00 | -27.04 | peak |
| 2 | 2491.176 | 58.19 | -9.95 | 48.24 | 74.00 | -25.76 | peak |

Note: GFSK, π /4-DQPSK, 8DPSK of the nohopping and hopping mode all have been test, the worst case is GFSK of the nohopping mode, this report only show the worst case.

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4. CONDUCTED SPURIOUS & BAND EDGE EMISSION

4.1 LIMIT

According to FCC section 15.247(d), in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

4.2 TEST PROCEDURE

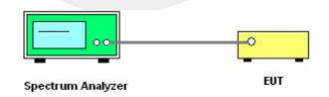
| Spectrum Parameter | Setting |
|---------------------------------------|---------------------------------|
| Detector | Peak |
| Start/Stop Frequency | 30 MHz to 10th carrier harmonic |
| RB / VB (emission in restricted band) | 100 KHz/300 KHz |
| Trace-Mode: | Max hold |

For Band edge

| Spectrum Parameter | Setting |
|---------------------------------------|----------------------------------|
| Detector | Peak |
| Start/Stop Eroguapau | Lower Band Edge: 2300– 2403 MHz |
| Start/Stop Frequency | Upper Band Edge: 2479 – 2500 MHz |
| RB / VB (emission in restricted band) | 100 KHz/300 KHz |
| Trace-Mode: | Max hold |

Remark: Hopping on and Hopping off mode all have been tested, only worst case hopping off is reported.

4.3 TEST SETUP



The EUT is connected to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

4.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



4.5 TEST RESULTS

| Temperature: | 25 ℃ | Relative Humidity: | 50% |
|--------------|-------------------------|--------------------|---------|
| Test Mode: | GFSK(1Mbps)-00/39/78 CH | Test Voltage: | DC 3.8V |

00 CH

| | um Analyzer - Sw | | | | | | | |
|----------------------|------------------------------|--|--|------------------------------|-------------------------|---------|--------------------|--|
| enter Fr | | | | ≊E j:FreeRun :en:30 dB | ALIGN AUTO Avg Type: | Log-Pwr | | S AM May 13, 20: RACE 1 2 3 4 5 TYPE M WAAAAA DET P P P P P |
|) dB/div | Ref Offset 0.9 Ref 4.67 d | 5 dB Bm | | | | | Mkr1 2.4 -5 | .02 2 GH .335 dBr |
| .33 | 1 | | | | | | | |
| i.3 | | | | | | | | -25.33 di |
| 5.3 | | | | | | | | |
| i.3 | <u>^2</u> | | | | | | | |
| i.3 | - P | | and the second of the second | | and the second second | | | |
| i.3 | | | a Marina and a star and a star a s | | | | | |
| 5.3 | | | | | | | | |
| art 30 N tes BW | /Hz 100 kHz | | #VBW 30 |) kHz | | Swe | Stop ep 2.387 s |) 25.00 GH (40001 pt |
| IN 1 2N 1 3N 1 | f | × 2.402 2 GHz 2.711 8 GHz 5.886 1 GHz | -5.335 dBm -56.490 dBm -56.523 dBm | FUNCTION | FUNCTION WIDTH | | FUNCTION VALUE | |
| N 1 | f | 24.327 1 GHz | -47.728 dBm | | | | | |
| 7 3 9 | | | | | | | | |
| i I | | | | | | | | > |
| | | | | | STATUS | | | |

39 CH

| R L | rum Ana RF | l <mark>lyzer - Swept</mark> S | | CEN | VSE:PULSE | | LIGN AUTO | | 10:54:4 | 2 AM May 13, 20 |
|---------------------|---------------|--------------------------------|-----------------------------|-----------------------|--|-----------------------|----------------|-------------------------|-------------------|---|
| | | 2.515000 | 1000 GHz | IO: Fast 😱 ain:Low | Trig: Free #Atten: 30 | Run | Avg Type: Lo | - | т | RACE 1 2 3 4 5 TYPE MWAAAAA DET P P P P F |
|) dB/div | | Offset 0.5 dB -0.31 dBn | | | | | | | Mkr1 2.4 -10. | 40 9 GH 310 dBi |
| og 0.3 | | 1 | | | | | | | | |
| 0.3 | | | | | | | | | | |
| 0.3 | | | | | | | | | | -30.31 d |
| 1.3 | | | | | | | | | | |
| 0.3 | | ۸2 | ∧3 | | | | | | | \square |
| | | $\langle Q \rangle$ | $\sum_{i=1}^{n}$ | | and the second | المتله ومناقروهم ومقا | And the second | No. of Concession, Name | | A CONTRACTOR |
|).3 | | | 1 | | | | | | | |
| 0.3 | | | | | | | | | | |
|).3 | | | | | | | | | | |
| 0.3 | | | | | | | | | | |
| tart 30 ľ Res BW | | kHz | | #VB\ | N 300 kHz | | | Swee | Stop p 2.387 s | 25.00 GH (40001 pt |
| R MODE T | | | × | Y | | CTION FUNC | TION WIDTH | FL. | INCTION VALUE | |
| 1 N ^ 2 N ^ | | | 2.440 9 GHz 3.052 0 GHz | -10.310 -57.312 | | | | | | |
| 3 N 4 N | | | 5.992 2 GHz 24.281 5 GHz | -57.088 -48.541 | | | | | | |
| 5 | | | 24.2010 0112 | -40.041 | abiii | | | | | |
| 5 7 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 5 | | | | | | | | | | |
| 1 | | | | | | | | | | |

П



78 CH

| ilent Spectrum A | | | SENS | E:PULSE | AL | IGNAUTO | | 10:57: | 01 AM May 13, 20 |
|--|-----------------------------|--|---|---------------------------------|---------------|------------|---------|----------------|--|
| enter Freq | | 00000 GHz | NO: Fast 🖵 Gain:Low | Trig: Free Run #Atten: 30 dB | | Avg Type: | Log-Pwr | | TRACE 1 2 3 4 5 TYPE MWWWW DET P P P P |
| | ef Offset 0.5 ef_1.02 dE | | | | | | | | 480 2 GH 8.983 dBr |
| 98 | 1 | | | | | | | | |
| 9.0 | | | | | | | | | -28.98 di |
| 0.0 | | | | | | | | | |
| .0 | 2 | 3 | | | المربعة المرا | | | | |
| | | | | | | | | | |
| 9.0 | | | | | | | | | |
| art 30 MHz | | | | | | | | Sto | p 25.00 GH |
| Res BW 100 | | | #VBW | / 300 kHz | | | Swe | ep 2.387 s | |
| 8 MODE TRG 50 1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f 5 | | × 2.480 2 GHz 2.801 7 GHz 4.982 8 GHz 24.600 5 GHz | -8.983 dl -57.038 dl -56.840 dl -48.010 dl | Bm Bm | N FUNC | TION WIDTH | | FUNCTION VALUE | |
| | | | | | | | | | |
| 3 9 0 | | | | | | | | | |
|) | | | | | | STATUS | | | |



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Shenzhen STS Test Services Co., Ltd.

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 Fax:+ 86-755 3688 6277
 Http://www.stsapp.com
 E-mail: sts@stsapp.com



For Band edge

00 CH

| Avg Type: Log-Pwr PNO: Fast PNO: Fast PNO | 5.395 dB |
|--|---------------------------|
| All All <th>5.395 dB</th> | 5.395 dB |
| 39 30 < | |
| 4 4 4 4 4 4 4 4 4 <th></th> | |
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| 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | 2 |
| 4 4 4 4 <t< td=""><td>2</td></t<> | 2 |
| 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | |
| 4 | - manager Miner |
| art 2.30000 GHz Stop es BW 100 kHz #VBW 300 kHz Sweep 9.867 r | |
| tes BW 100 kHz #VBW 300 kHz Sweep 9.867 r | |
| N MODE TRC SCL X Y FUNCTION VIDTH FUNCTION VAL | 2.40300 Gi ns (1001 pi |
| N 1 f 2.402 073 GHz -5.395 dBm | E |
| N 1 f 2.390 022 GHz -60.091 dBm N 1 f 2.398 777 GHz -58.946 dBm | |
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78 CH

| RL RF | - Swept SA 50 Ω AC | SENSE:PULS | E | ALIGNAUTO | | 10:57:39 AM May 13, 20 |
|----------------------------------|-------------------------------------|---------------------------|-------------------------|----------------|----------------|--|
| nter Freq 2.48 | 9500000 GHz | NO: East Trig | : Free Run en: 30 dB | Avg Type: Lo | og-Pwr | TRACE 1 2 3 4 TYPE MWWWW DET P P P P |
| Ref Offs dB/div Ref 3.0 | et 0.5 dB 19 dBm | | | | Mkr1 | 2.480 176 GH -6.895 dB |
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| 9 | | | | | | -26.91 c |
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| | mm | -monte | -m-masm | moundantia | alman door and | mmmmmmm |
| 9 | | | | | | |
| 9 | | | | | | |
| art 2.47900 GHz es BW 100 kHz | | #VBW 300 |) kHz | | | Stop 2.50000 G 067 ms (1001 p |
| MODE TRC SCL N 1 f N 1 f | × 2.480 176 GHz 2.483 767 GHz | -6.895 dBm -59.195 dBm | FUNCTION | FUNCTION WIDTH | FUNCTIO | ON VALUE |
| N 1 f | 2.494 246 GHz | -57.752 dBm | | | | |
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For Hopping Band edge

00 CH

| lent Spectr | um Analyzer - S | Swept SA | SENSE: | nuise | ALIGNAUTO | | 18:42:42 | AM May 13, 20 |
|----------------|------------------------|--------------------------------|---------------------------------------|---|----------------|------|------------------------|---|
| | | 500000 GHz | NO: East | Folder Trig: Free Run #Atten: 30 dB | Aug Type: | | TR T | ACE 1 2 3 4 5 YPE MWWWW DET P P P P F |
| dB/div | Ref Offset Ref 4.38 | | | | | M | kr1 2.402 -5.0 | 073 GH 625 dBr |
| 62 | | | | | | | | |
| .6 | | | | | | | | -25.63 di |
| .6 | | | | | | | | -25.63 0 |
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| i.6 | | | | | | | | |
| i.6 | | | | | | | | |
| | 000 GHz 100 kHz | | #VBW : | 300 kHz | | Swee | Stop 2.4 p 9.867 ms | 10300 GH (1001 pt: |
| R MODE TR | ic scu f | × 2.402 073 GHz | -5.625 dB | FUNCTION | FUNCTION WIDTH | | FUNCTION VALUE | |
| 2 N 1 8 N 1 | | 2.390 022 GHz 2.399 395 GHz | -58.835 dB -58.470 dB | | | | | |
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| | | | | | STATUS | | | / |

78 CH

| RL RF | 50 Ω AC | SENSE:PULS | E | ALIGN AUTO | | l0:45:04 AM May 13, 2 |
|---|--|--|-----------------------|--|----------|--|
| nter Freq 2.48 | | | Free Run en: 30 dB | Avg Type: Lo | ·g-Pwr | TRACE 1 2 3 4 TYPE MWAAA DET P P P P |
| Ref Offs B/div Ref 3.0 | | | | | Mkr1 2. | 480 176 GI -6.990 dB |
| | | | | | | |
| $\sqrt{1}$ | | | | | | -26.99 |
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| <u> </u> | ^ 2 | | | | | |
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| | | | | | | |
| | | | | | | |
| rt 2.47900 GHz s BW 100 kHz | | #VBW 300 | kHz | | | op 2.50000 G 7 ms (1001 p |
| MODE TRC SCL N 1 f N 1 f N 1 f | × 2.480 176 GHz 2.483 641 GHz 2.487 841 GHz | -6.990 dBm -57.855 dBm -56.805 dBm | FUNCTION | FUNCTION WIDTH | FUNCTION | ALUE |
| | | | | | | |
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Page 34 of 68 Report No.: STS1905146W04

| Temperature: | 25 ℃ | Relative Humidity: | 50% |
|--------------|----------------------------------|--------------------|---------|
| Test Mode: | π/4-DQPSK(2Mbps)– 00/39/78 CH | Test Voltage: | DC 3.8V |

| nt Spectrum Analyzer - S L RF 50 | | SENSE:PUL | SE I | ALIGNAUTO | | 11:29:05 AM May 13, |
|-------------------------------------|----------------------------|----------------------------|--------------------------|----------------|---------|---------------------------------|
| ter Freq 12.51 | 5000000 GHz | . | : Free Run | Avg Type: | Log-Pwr | TRACE 1 2 3 |
| | | | en:30 dB | | | DET P P P |
| Ref Offset | | | | | Mk | r1 2.402 2 G |
| B/div Ref -3.39 | | | | | | -13.391 dE |
| | | | | | | |
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| | | | | | | -33.35 |
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| rt 30 MHz s BW 100 kHz | | #VBW 30 | 0 kHz | | Sweep 2 | Stop 25.00 G ا 387 s (40001) |
| MODE TRC SCL | × | Y | FUNCTION | FUNCTION WIDTH | | ON VALUE |
| N 1 f | 2.402 2 GHz | -13.391 dBm | | | | |
| N 1 f N 1 f | 2.792 9 GHz 5.865 5 GHz | -57.182 dBm -57.188 dBm | | | | |
| N 1 f | 24.435 7 GHz | -47.298 dBm | | | | |
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| RL | rum Analyzer RF | 50 Q AC | SENSE:PUL | 9E | ALIGNAUTO | | 11:26:1 | 2 AM May 13, 20 |
|-----------------------|-----------------------|-----------------------------|----------------------------|---------------------------|------------------------------|-----------------|-----------------------|------------------------------|
| enter F | | 15000000 GHz | NO: East 😱 Trig | g: Free Run ten: 30 dB | Avg Type | : Log-Pwr | Т | TYPE MWAAAA DET P P P P I |
|) dB/div | Ref Offse Ref -7.4 | | | | | | Mkr1 2.4 -12. | 40 9 GH 237 dB |
| 7.5 | 1 | | | | | | | |
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| .5 | | | | | | | | -37.49 |
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| art 30 I Res BW | MHz 100 kHz | | #VBW 30 | 0 kHz | | Swe | Stop ep 2.387 s | 25.00 GI (40001 p |
| R MODE T | | X | Y | FUNCTION | FUNCTION WIDTH | | FUNCTION VALUE | |
| | 1 f 1 f | 2.440 9 GHz 2.667 5 GHz | -12.237 dBm -56.637 dBm | | | | | |
| | 1 f 1 f | 5.437 3 GHz 24.265 3 GHz | -55.595 dBm -47.696 dBm | | | | | |
| | | 24.200 0 0112 | 47.000 dBill | | | | | |
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78 CH

| | | lyzer - Swept | | | | | | | | |
|-------------------|------------------------|----------------------------|--|--|----------------------------|----------|------------------|---------------------------------|--------------------|--|
| nter F | _{RF} req 1 | | | | g: Free Run tten: 30 dB | ALIGN # | NUTO Ng Type: | Log-Pwr | | 34 AM May 13, TRACE 1 2 3 4 TYPE MWWW DET P P P F |
| dB/div | | Offset 0.5 dl -9.28 dBr | | | | | | | Mkr1 2.4 -19 | 180 2 G .276 dE |
| 3 | (| | | | | | | | | |
| 3 | | | | | | | | | | -39.28 |
| 3 | | 2 | 3 | | | 6 | | Antonitika | | |
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| 3 | | | | | | | | | _ | |
| urt 30 I es BW | | ĸHz | | #VBW 30 | 0 kHz | | | Swe | Stop ep 2.387 s | o 25.00 G (40001 p |
| 14 | 1 f 1 f | | × 2.480 2 GHz 3.049 5 GHz 6.393 0 GHz | Y -19.276 dBm -56.100 dBm -56.473 dBm | FUNCTION | FUNCTION | WIDTH | | FUNCTION VALUE | |
| N 1 | 1 f 1 f | | 24.094 8 GHz | -47.618 dBm | | | | | | |
| N [*] | | | | | | | | | | |



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 Fax:+ 86-755 3688 6277
 Http://www.stsapp.com
 E-mail: sts@stsapp.com



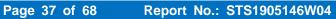
For Band edge

00 CH

| | um Analyzer | | | | | | | | | |
|----------------|-----------------------|---------|------------------------|--------------------|--------------------------|------------|------------------------|---------------|-----------------------|---------------------------------|
| RL | RF 1 | 50Ω AC | CH ₇ | SE | NSE:PULSE | | ALIGNAUTO Avg Type: | Log-Pwr | | AM May 13, 20 RACE 1 2 3 4 5 |
| | 164 2.33 | 1300000 | Р | NO: Fast 🖵 | Trig: Free #Atten: 30 | | | | | DET P P P P |
| | | | IF | Gain:Low | #Atten: 30 | dВ | | | | , |
|) dB/div | Ref Offse Ref -1.7 | | | | | | | IVI | 402 kr1 2.40 11- | 176 GH 773 dBr |
| g aBlaiv | Rei -1.7 | | | | | | | | | |
| 1.8 | | | | | | | | | | |
| 1.8 | | | | | | | | | | |
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| 1.8 | | | | | | | | | | |
| 1.8 | | | | | | | | | | |
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| | 000 GHz 100 kHz | | | #VB | W 300 kHz | | | Swee | 5.0p 2. p 9.867 ms | 40300 GH |
| R MODE TH | ad sa l | × | | Y | FUN | ICTION FUN | ICTION WIDTH | | UNCTION VALUE | · · |
| 1 N 1 | f | 2.40 | 2 176 GHz | -11.773 | dBm | | | | | |
| 2 N 1 3 N 1 | | | 0 022 GHz 9 704 GHz | -59.757 -59.187 | | | | | | |
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| i | | | | | | | STATUS | | | |

78 CH

| ent Spectrum Analyze R L RF | r - Swept SA 50 Ω AC | SENSE:PULS | Ξ | ALIGN AUTO | | 11:23:13 AM May 13, 2 |
|--------------------------------|---|-------------|-------------------------|----------------|----------|--|
| nter Freq 2.48 | 39500000 GHz | | : Free Run en: 30 dB | Avg Type: Lo | og-Pwr | TRACE 1 2 3 4 TYPE MWWWW DET P P P P |
| | et 0.5 dB 68 dBm | | | | Mkr1 2 | .480 176 GI -13.682 dB |
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| 7 N M | | | | | | |
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| rt 2.47900 GHz s BW 100 kHz | | #VBW 300 |) kHz | | | top 2.50000 G 67 ms (1001 p |
| MODE TRC SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION | VALUE |
| N 1 f N 1 f N 1 f | 2.480 176 GHz 2.484 313 GHz 2.499 643 GHz | -58.536 dBm | | | | |
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For Hopping Band edge

00 CH

| | ectrur | | zer - Swept | | | | | | | | | | |
|-------------|------------|---------------------|------------------------|------------------------------|----------|--------------------|------------|--------|-------|---------------------|-----------|----------------|---|
| RL enter | r Fre | RF 9 q 2. | 50 Ω 351500 | AC 000 GHz | PNO: F | | NSE:PULSE | Run | AL | IGNAUTO Avg Type | : Log-Pwr | 11:16 | 20 AM May 13, 20 TRACE 1 2 3 4 5 TYPE MWWWW |
| | | | | | IFGain:L | ast 🖵 | #Atten: 30 | | | | | | DETPPPF |
|) dB/d | | | ffset 0.5 d 2.09 dB | | | | | | | | IV | | 2 176 GH 2.093 dBr |
| 2.1 | | | | | | | | | | | | | |
| 2.1 | | | | | | | | | | | | | |
| 2.1 | | | | | | | | | | | | | -32.09 d |
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| 2.1 | | | | | | | | | | | | | |
| 2.1 | | | | | | | | | | | | | |
| 2.1 | | | | | _ | | | | | | | | |
| tart 2 | .300 | 00 G | Hz | | | | | | | | | Stop | 2.40300 GH |
| Res E | 3W 1 | 00 kl | Hz | | | #VB | W 300 kH: | z | | | Swe | ep 9.867 n | ns (1001 pt |
| R MOD | e Trc 1 | SCL f | | × 2.402 176 GH | -Iz | ۲ -12.093 | | NCTION | FUNC | TION WIDTH | | FUNCTION VALUE | |
| 2 N 3 N | 1 | f | | 2.390 022 GH 2.398 571 GH | | -58.418 -57.988 | | | | | | | |
| 4 | | | | | | | | | | | | | |
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78 CH

| tL | | ίΟ Ω ΑC | SENSE:PUL: | SE | ALIGN AUTO | | 11:18:41 AM May 13, 20 |
|-------------------|-------------------------|---|---|---------------------------|----------------|---------|--|
| nter Fi | req 2.489 | 9500000 GHz PN IFG | | g: Free Run :en: 30 dB | Avg Type: L | og-Pwr | TRACE 1 2 3 4 TYPE MMMMM DET P P P P |
| B/div | Ref Offset Ref -3.94 | | | | | Mkr1 | 2.479 189 GF -13.943 dB |
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| ΨŲ. | 1 | | | | | | -33.94 (|
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| | 900 GHz 100 kHz | | #VBW 30 | 0 kHz | | Sweep 2 | Stop 2.50000 G .067 ms (1001 p |
| MODE TH | | × | Y | FUNCTION | FUNCTION WIDTH | FUNCTI | ON VALUE |
| N 1 N 1 N 1 | f | 2.479 189 GHz 2.483 998 GHz 2.491 873 GHz | -13.943 dBm -57.353 dBm -57.122 dBm | | | | |
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Page 38 of 68 Report No.: STS1905146W04

| Temperature: | 25 ℃ | Relative Humidity: | 50% |
|--------------|---------------------------|--------------------|---------|
| Test Mode: | 8DPSK(3Mbps) -00/39/78 CH | Test Voltage: | DC 3.8V |

00 CH

| | ım Analyzer - Swe | | | | | | | |
|---------------------|-------------------------------|----------------------------|----------------------------|-----------------------------|------------------------|--|------------------------------|--|
| enter Fr | RF 50 Ω | AC 00000 GHz | SENSE:P | | ALIGNAUTO Avg Type: | Log-Pwr | | O AM May 13, 201 RACE 1 2 3 4 5 |
| | | PI | | ig: Free Run tten: 30 dB | | | | DET P P P P P |
| | | | | | | | Mkr1 2.4 | 02 2 GH |
|) dB/div | Ref Offset 0.5 Ref -5.05 d | | | | | | | .050 dBr |
| 5.1 | 1 | | | | | | | |
| 5.1 | | | | | | | | |
| 5.1 | | | | | | | | -35.05 df |
| 5.1 | | | | | | | | |
| 5.1 | \Diamond^2 | $\langle \rangle^3$ | | | | and the second | and the second second second | and the second sec |
| | | | والمراجع المراجع المراجع | أراف فالجويل | | | | |
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| 5.1 | | | | | | | | |
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| tart 30 M Res BW | | | #VBW 3 | 00 641- | | C auca | | 25.00 GH |
| | | | #VBW J | | | | ep 2.387 s | (40001 pt |
| KR MODE TR | f | × 2.402 2 GHz | -15.050 dBm | FUNCTION | FUNCTION WIDTH | | FUNCTION VALUE | |
| 2 N 1 3 N 1 | f | 3.030 8 GHz 5.532 8 GHz | -56.075 dBm -57.082 dBm | | | | | |
| 4 N 1 | f | 24.811 5 GHz | -47.451 dBm | | | | | |
| 5 6 | | | | | | | | |
| 7 B | | | | | | | | |
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39 CH

| | | zer - Swept S | | | | | | | |
|--------------------------|-------------------|--|--|-------------------------------------|---|------------------|--------------------|--------------------|--|
| enter F | req 12 | 50 Q AC 2.515000 | 000 GHz | SENS 10: Fast Gain:Low | E:PULSE Trig: Free Run #Atten: 30 dB | ALIGNAUTO Avg |) Type: Log-Pwr | | 36 AM May 13, 2 TRACE 1 2 3 4 TYPE MWMM DET P P P P |
|) dB/div | | ffset 0.5 dB •2 <mark>.27 dB</mark> m | | | | | | | 440 9 GI 2.267 dB |
| 2.3 | | 1 | | | | | | | |
| 2.3 | | | | | | | | | -32.27 |
| 2.3 | | \ <mark>2</mark> | 3 | | | | | استغارین از | |
| .3 .3 <mark>.1</mark> | | | | | and the second secon | Angel Street | | | |
| .3 | | | | | | | | | |
| 2.3 | | | | | | | | | |
| art 30 I tes BW | | Hz | | #VBW | 300 kHz | | Sw | Sto eep 2.387 s | p 25.00 G s (40001 p |
| | 1 f | | × 2.440 9 GHz | -12.267 d | | FUNCTION WIDT | Н | FUNCTION VALUE | |
| N | 1 f 1 f 1 f | | 2.700 5 GHz 5.933 5 GHz 24.278 4 GHz | -56.744 d -56.680 d -46.563 d | Bm | | | | |
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78 CH

| enter Fre | RF 50 Ω q 12.5150 | AC 00000 GHz | SENSE:PUL: | | ALIGNAUTO | | | LAM May 13, 20: |
|-----------------------|-------------------------------|--|--|---------------------------|---------------------------|---------|-------------------|---|
| | | PN | 0: Fast 😱 Trig ain:Low #Att | g: Free Run ten: 30 dB | Avg Type: | Log-Pwr | | RACE 1 2 3 4 5 TYPE MWAAAAA DET P P P P P |
| | Ref Offset 0.5 Ref -4.02 d | | | | | | Mkr1 2.4 -14. | 80 2 GH 020 dBr |
| .0 | 1 | | | | | | | |
| 0 | | | | | | | | -34.02 d |
| o | <u>2</u> | 3 | | | | | | {√4 |
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| art 30 MH es BW 10 | | | #VBW 300 |) kHz | | Swee | Stop p 2.387 s | 25.00 GH (40001 pt |
| | SCL f f f f | x 2.480 2 GHz 2.613 8 GHz 5.458 5 GHz 24.184 7 GHz | -14.020 dBm -55.303 dBm -56.673 dBm -47.057 dBm | FUNCTION | FUNCTION WIDTH | F | UNCTION VALUE | |
| | | 24.1047 0112 | | | | | | |
| | | | | | | | | |
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For Band edge

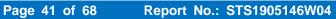
00 CH

| RL | | Swept SA | | | | | | | |
|---------------------------------------|-------------------------|------------------------------|---------------------------|------------------------------|------------|---------------------|-------------|--------------------|-------------------|
| optor E | | 0 Ω AC 500000 GHz | | ENSE:PULSE | AL | IGNAUTO Avg Type: I | og-Pwr | | AM May 13, 20 |
| | eq 2.551 | 500000 GH2 | PNO: Fast 😱 IFGain:Low | Trig: Free R #Atten: 30 d | | | | | DET P P P F |
| dB/div | Ref Offset Ref -1.88 | | | | | | MI | kr1 2.402 -11.8 | 176 GH 875 dBi |
| g | | | | | | | | | |
| .9 | | | | | | | | | |
| .9 | | | | | | | | | -31.88 d |
| .9 | | | | | | | | | |
| .9 | | | | | | | | <u>2</u> | -0^3 |
| 9 marte | universiteshere | wangerman | whenter | wan manuel | hounderson | montport | mangenerary | mannakin | modal |
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| .9 | | | | | | | | | |
| .9 | | | | | | | | | |
| | | | | | | | | Stop 2.4 | 40300 GH |
| art 2.30 | 1000 GHz | | | | | | Sweet | p 9.867 ms | (1001 pt |
| art 2.30 Res BW | 0000 GHz 100 kHz | | #VB | W 300 kHz | | | | | (1001 |
| Res BW | 100 kHz | X | Y | FUNC | TION FUNCT | ION WIDTH | | UNCTION VALUE | (1001 - 20 |
| Res BW R MODE TR N 1 2 N 1 | 100 kHz f f | 2.402 176 GI 2.390 022 GI | Hz -11.875 Hz -59.249 | dBm dBm | TION FUNCT | ION WIDTH | | | (1001) |
| Res BW Mode H N 1 N 1 N 1 | 100 kHz Reisel f | 2.402 176 G | Hz -11.875 Hz -59.249 | dBm dBm | TION FUNCT | ION WIDTH | | | (1 |
| Res BW | 100 kHz f f | 2.402 176 GI 2.390 022 GI | Hz -11.875 Hz -59.249 | dBm dBm | TION FUNCT | ION WIDTH | | | (1 |
| Res BW | 100 kHz f f | 2.402 176 GI 2.390 022 GI | Hz -11.875 Hz -59.249 | dBm dBm | TION FUNC | ION WIDTH | | | (1 |
| N 1 N 1 N 1 | 100 kHz f f | 2.402 176 GI 2.390 022 GI | Hz -11.875 Hz -59.249 | dBm dBm | TION FUNCT | ION WIDTH | | | (|
| es BW MODE TE N 1 N 1 | 100 kHz f f | 2.402 176 GI 2.390 022 GI | Hz -11.875 Hz -59.249 | dBm dBm | FUNCT | ION WIDTH | | | |

78 CH

| | RF 50 Ω AC | | SENSE;PU | JLSE | ALIGNAUTO | | 11:39:30 AM May 13, 2 |
|----------------------|------------------------------------|---------------------------|---|---|----------------|----------|---|
| nter Frec | 2.489500000 | GHz PNO: F IFGain:I |] ast ⊂⊃ Tr Low #A | rig: Free Run Atten: 30 dB | Avg Type: L | .og-Pwr | TRACE 1 2 3 4 TYPE MWWW DET P P P P |
| | tef Offset 0.5 dB tef -3.63 dBm | | | | | Mkr1 | 2.480 176 GF -13.625 dB |
| ' 1 | | | | | | | |
| s N h | | | | | | | |
| i | | | | | | | -33.63 |
| μ | | | | | | | |
| Υ | 4 | 2 | | | | | |
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| | | | | | | | |
| rt 2.4790 s BW 10 | | | #VBW 3 | 00 kHz | | | Stop 2.50000 G .067 ms (1001 p |
| MODE TRC S | | | Y | FUNCTION | FUNCTION WIDTH | FUNCT | ON VALUE |
| N 1 | f 2.484 | 187 GHz | -13.625 dBm -58.969 dBm -57.691 dBm | 1 | | | |
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Shenzhen STS Test Services Co., Ltd.





For Hopping Band edge

00 CH

| | | alyzer - Swep | | | | | | | | |
|--------|----------------|--------------------------|--------------------------------|---------------------------|-------------------------------|----------------|-------------------|------------|-------------------|-------------------------|
| RL | RF | | | SE | NSE:PULSE | A | IGNAUTO Avg Type: | Log Pur | | 3 PM May 13, 20 |
| enter | Freq | 2.351500 | 0000 GHz | PNO: Fast 🖵 IFGain:Low | Trig: Free R #Atten: 30 dl | | Avg type. | | | DET P P P P |
| dB/div | | Offset 0.5 f -2.05 dE | | | | | | N | lkr1 2.403 -12 | 000 GH .048 dBi |
| | | | | | | | | | | |
| .1 | | | | | | | | | | |
| .1 | | | | | | | | | | -32.05 d |
| .1 | | | | | | | | | | |
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| .1 | | | | | | | | | | |
| | 30000 W 100 | | | #VB | W 300 kHz | | 1 | Swee | Stop 2 9.867 m | .40300 GH s (1001 pt |
| R MODE | TRO SCL 1 f | | × 2.403 000 GHz | -12.048 | dBm | ION FUNC | TION WIDTH | | FUNCTION VALUE | |
| N N | 1 f 1 f | | 2.390 022 GHz 2.398 983 GHz | -59.409 | dBm | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| 1 | | | | | | | | | | |
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78 CH

| L | RF | 50 Ω | | SENSE | E:PULSE | ALIGNAUTO | | 01:14:53 PM May 13, |
|--------|-------------------|----------------------------|---|--|---------------------------------|----------------|-----------|--|
| ter F | req 2 | 2.489500 | PN | 0: Fast 😱 ain:Low | Trig: Free Run #Atten: 30 dB | Avg Type | : Log-Pwr | TRACE 1 2 3 TYPE MWAAN DET P P P |
| B/div | | Offset 0.5 d f -3.86 dB | | | | | Mkr | 1 2.480 155 G -13.863 dE |
| n. 1 | | | | | | | | |
| W | Vh | | | | | | | |
| | + | | | | | | | -33.8 |
| - | | n | <u>^2</u> | | | | | |
| | ſ | hormours | | mannon | mann | man | mmmaa | manna |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | 7900 | | | #VBW | 300 kHz | | Sweep | Stop 2.50000 G 2.067 ms (1001 j |
| MODE T | | | × | Y | FUNCTION | FUNCTION WIDTH | FUNC | TION VALUE |
| N | 1 f 1 f 1 f | | 2.480 155 GHz 2.484 124 GHz 2.498 236 GHz | -13.863 dE -57.280 dE -56.877 dE | Зm | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |



5. NUMBER OF HOPPING CHANNEL

5.1 LIMIT

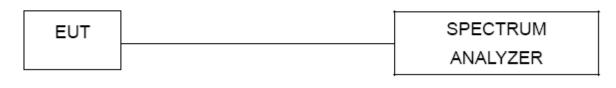
| | FCC Part 15.247,Subpart C | | | | | | | | |
|-----------------------|------------------------------|-------|-------------------------|--------|--|--|--|--|--|
| Section | Test Item | Limit | FrequencyRange (MHz) | Result | | | | | |
| 15.247 (a)(1)(iii) | Number of Hopping Channel | ≥15 | 2400-2483.5 | PASS | | | | | |

| Spectrum Parameters | Setting |
|---------------------|----------------------------|
| Attenuation | Auto |
| Span Frequency | > Operating FrequencyRange |
| RB | 300KHz |
| VB | 300KHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

5.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 300KHz, VBW=300KHz, Sweep time = Auto.

5.3 TEST SETUP



5.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



5.5 TEST RESULTS

| Temperature: | 25 ℃ | Relative Humidity: | 60% |
|--------------|-------------------------|--------------------|---------|
| Test Mode: | Hopping Mode -GFSK Mode | Test Voltage: | DC 3.8V |

Number of Hopping Channel

79

Hopping channel

| Ref Offset 0.5 dB Mkr2 2.479 930 G 0 GB/div Ref offset 0.5 dB 0 GB/div Ref 0.11 (GB/div 0 GB/div GB/div 0 GB/div GB/div <th>ent Spectrum Analyzer - Swept SA R L RF 50 Q AC</th> <th>SENSE:PULSE</th> <th>ALIGNAUTO</th> <th>10:40:20 AM May 13, 20</th> | ent Spectrum Analyzer - Swept SA R L RF 50 Q AC | SENSE:PULSE | ALIGNAUTO | 10:40:20 AM May 13, 20 |
|---|--|--------------------------|-----------|---|
| dB/div Ref 3.31 dBm -6.57 dE 37 | nter Freq 2.441750000 GHz | PNO: Fast C Trig: Free I | Run | TRACE 1 2 3 4 5 TYPE MWMMMM DET P P P P |
| art 2.40000 GHz Stop 2.48350 G | dB/div Ref 3.31 dBm | | Mk | r2 2.479 993 0 GH -6.57 dBi |
| art 2.40000 GHz Stop 2.48350 G | | | | |
| X X FUNCTION FUNCTION< | art 2.40000 GHz es BW 300 kHz | GHz -5.05 dBm | | Stop 2.48350 GF ep 1.133 ms (1001 pt FUNCTION VALUE |

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6. AVERAGE TIME OF OCCUPANCY

6.1 LIMIT

| FCC Part 15.247,Subpart C | | | | | |
|---------------------------|------------------------------|--------|-------------------------|--------|--|
| Section | Test Item | Limit | FrequencyRange (MHz) | Result | |
| 15.247 (a)(1)(iii) | Average Time of Occupancy | 0.4sec | 2400-2483.5 | PASS | |

6.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW =1MHz/VBW =3MHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to e. zero span.
- f. Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- h. Measure the maximum time duration of one single pulse.
- i. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). Sothe dwell time is the time duration of the pulse times 3.37 x 31.6 = 106.6 within 31.6 seconds.
- j. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So he dwell time is the time duration of the pulse times $5.06 \times 31.6 = 160$ within 31.6 seconds.
- k. DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So the dwell time is the time duration of the pulse times $10.12 \times 31.6 = 320$ within 31.6 seconds.

6.3 TEST SETUP



6.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



6.5 TEST RESULTS

| Temperature: | 25 ℃ | Relative Humidity: | 50% |
|--------------|-------------------------|--------------------|---------|
| Test Mode: | GFSK(1Mbps)-DH1/DH3/DH5 | Test Voltage: | DC 3.8V |

| Data Packet | Channel | pulse time(ms) | Dwell Time(s) | Limits(s) |
|-------------|---------|----------------|---------------|-----------|
| DH1 | middle | 0.384 | 0.123 | 0.4 |
| DH3 | middle | 1.647 | 0.264 | 0.4 |
| DH5 | middle | 2.808 | 0.300 | 0.4 |



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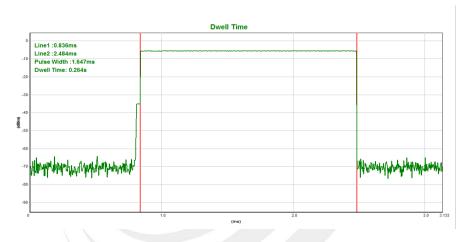
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 Fax:+ 86-755 3688 6277
 Http://www.stsapp.com
 E-mail: sts@stsapp.com



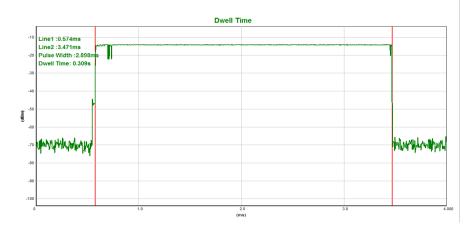
CH39-DH1



CH39-DH3







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 6287
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| Temperature: | 25 ℃ | Relative Humidity: | 50% |
|--------------|-------------------------------------|--------------------|---------|
| Test Mode: | π/4-DQPSK(2Mbps)– 2DH1/2DH3/2DH5 | Test Voltage: | DC 3.8V |

| Data Packet | Channel | pulse time(ms) | Dwell Time(s) | Limits(s) |
|-------------|---------|----------------|---------------|-----------|
| 2DH1 | middle | 0.392 | 0.125 | 0.4 |
| 2DH3 | middle | 1.646 | 0.263 | 0.4 |
| 2DH5 | middle | 2.901 | 0.309 | 0.4 |



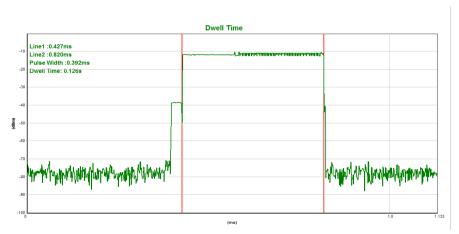
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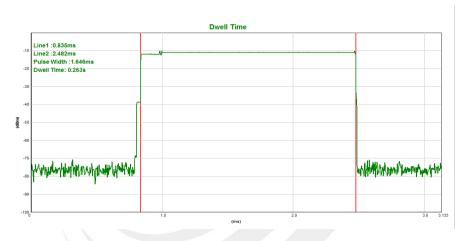
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 Fax:+ 86-755 3688 6277
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 E-mail: sts@stsapp.com



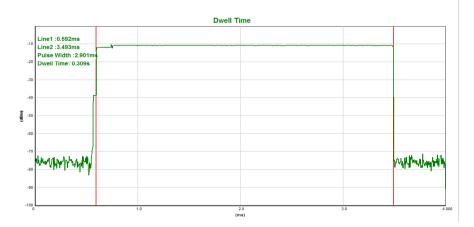
CH39-2DH1



CH39-2DH3



CH39-2DH5





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| Temperature: | 25 ℃ | Relative Humidity: | 50% |
|--------------|---------------------------------|--------------------|---------|
| | 8DPSK(3Mbps)– 3DH1/3DH3/3DH5 | Test Voltage: | DC 3.8V |

| Data Packet | Channel | pulse time(ms) | Dwell Time(s) | Limits(s) |
|-------------|---------|----------------|---------------|-----------|
| 3DH1 | middle | 0.392 | 0.125 | 0.4 |
| 3DH3 | middle | 1.648 | 0.264 | 0.4 |
| 3DH5 | middle | 2.899 | 0.309 | 0.4 |



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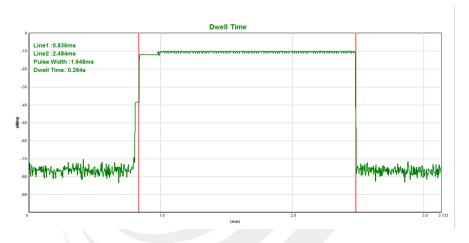
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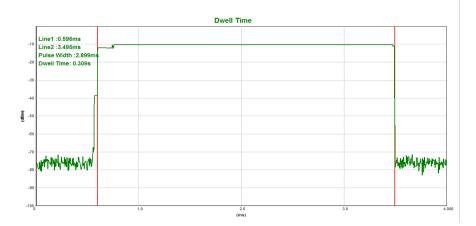
CH39-3DH1



CH39-3DH3



CH39-3DH5





7. HOPPING CHANNEL SEPARATION MEASUREMEN

7.1 LIMIT

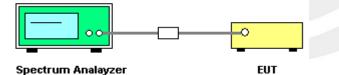
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

| Spectrum Parameter | Setting |
|--------------------|---|
| Attenuation | Auto |
| Span Frequency | > 20 dB Bandwidth or Channel Separation |
| RB | 30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation) |
| VB | 100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation) |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

7.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- b. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
- c. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for channel separation measurement.

7.3 TEST SETUP



7.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.



7.5 TEST RESULTS

| Temperature: | 25°C | Relative Humidity: | 50% |
|--------------|--|--------------------|---------|
| | CH00 / CH39 / CH78 (GFSK(1Mbps) Mode) | Test Voltage: | DC 3.8V |

| Frequency | Ch. Separation (MHz) | Limit (MHz) | Result |
|-----------|-------------------------|-------------|----------|
| 2402 MHz | 1.002 | 0.697 | Complies |
| 2441 MHz | 1.002 | 0.697 | Complies |
| 2480 MHz | 0.999 | 0.696 | Complies |

For GFSK: Ch. Separation Limits: > two-thirds 20dB bandwidth

| RL | RF 5 | iOΩ AC | | SENSE:PULSE | ALIGNAU | ЛО | 10:52:49 AM | May 13, 20 |
|-------------------------------|------------------------|------------------------|--|------------------|-----------------|--|---------------------------|--|
| enter F | req 2.402 | 2500000 GHz | PNO: Wide C IFGain:Low | | Av | g Type: Log-Pwr | TRACE | 12345 MWWWW PPPPF |
|) dB/div | Ref Offsel Ref 2.23 | | | | | M | kr2 2.403 01 -7.71 | I0 GH 0 dBr |
| 2g | | | <u>1</u> | | | 2 | | |
| 7.8 | | | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | γ | \sim | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | |
| 7.8 | | \sim | | ~ | \sim | ~~~ \ | 00 | |
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| 7.8 | | | | | | | | |
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| .8 | | | | | | | | |
| .8 | | | | | | | | |
| 7.8 | | | | | | | | |
| enter 2. Res BW | 402500 GI 30 kHz | Hz | #V | BW 100 kHz | | Swee | Span 3.0 p 3.200 ms (1 | 000 MH 001 pt |
| R MODE T | | × | Y | FUNC | TION FUNCTION W | IDTH | FUNCTION VALUE | |
| 1 N 1 2 N 1 3 4 5 | | 2.402 008 2.403 010 | | 78 dBm 71 dBm | | | | |
| 7 3 9 0 1 | | | | | | | | |
| • | | | | | | | | > |

CH00 -1Mbps

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CH39 -1Mbps



CH78 -1Mbps



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| Temperature: | 25℃ | Relative Humidity: | 50% |
|--------------|---|--------------------|---------|
| Test Mode: | CH00 / CH39 / CH78 (π/4-DQPSK(2Mbps) Mode) | Test Voltage: | DC 3.8V |

| Frequency | Ch. Separation (MHz) | Limit (MHz) | Result |
|-----------|-------------------------|-------------|----------|
| 2402 MHz | 0.999 | 0.872 | Complies |
| 2441 MHz | 0.996 | 0.873 | Complies |
| 2480 MHz | 1.005 | 0.872 | Complies |

For π /4-DQPSK(2Mbps): Ch. Separation Limits: > two-thirds 20dB bandwidth

| RF 50 Ω cq 2.40250 | AC 00000 GHz | - SENG | E:PULSE | AL AL | IGN AUTO | | | |
|-----------------------|--------------------|----------------------------------|--------------------------------|--|--|--|---|--|
| | | | | | Avg Type: | Log-Pwr | Т | 5 AM May 13, RACE 1 2 3 |
| | | NO: Wide 😱 Gain:Low | Trig: Free Ru #Atten: 30 dB | 1 | | | | DET P P P |
| Ref Offset 0 / | 5 dB | | | | | Mk | r2 2.403 | |
| | | | | | | | -14. | 393 dI |
| | | | | | 2 | | | |
| | ~~~~ | 1° hay | \sim | Λ | $\sim \sim$ | m_{γ} | | |
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| | | | | | | | | |
| 2500 GHz | | -43 (D14 | 400 611- | | | 0 | | 3.000 N |
| | | | | | | | | , (1001 |
| | × 2.402 008 GHz | | | N FUNCT | TION WIDTH | FU | NCTION VALUE | |
| f | 2.403 007 GHz | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | Ref -4.52 c | 0 kHz sciX f 2.402 008 GHz | Ref -4.52 dBm | Ref -4.52 dBm 4.52 dBm 4.52 dBm 4.52 dBm 4.52 dBm 4.52 dBm 502500 GHz 0 kHz #VBW 100 kHz 502 7 2.402 008 GHz -14.42 dBm -14.39 dBm | Kef 4.52 dBm 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 500 GHz #VBW 100 kHz 501 2.402 008 GHz 7 2.402 008 GHz -14.39 dBm 4 | Kef 4.52 dBm 1 1 1 | Ref - 4.52 dBm 1 2 2 2 4 2 4 4 4 4 500 GHz #VBW 100 kHz 500 GHz 14.42 dBm 1 14.39 dBm | Ref -4.52 dBm -14. 1 2 1 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 </td |

CH00 -2Mbps



CH39 -2Mbps



CH78 -2Mbps



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| Temperature: | 25℃ | Relative Humidity: | 50% |
|--------------|--|--------------------|---------|
| LOCT MINDAD. | CH00 / CH39 / CH78 (8DPSK(3Mbps)Mode) | Test Voltage: | DC 3.8V |

| Frequency | Ch. Separation (MHz) | Limit (MHz) | Result |
|-----------|-------------------------|-------------|----------|
| 2402 MHz | 0.996 | 0.855 | Complies |
| 2441 MHz | 1.002 | 0.854 | Complies |
| 2480 MHz | 1.002 | 0.855 | Complies |

For 8DPSK(3Mbps):Ch. Separation Limits: > two-thirds 20dB bandwidth

| | | yzer - Swept S | | | | | | | | |
|--|--------------------------|----------------------------|---------------------------------|---|---------------------------------------|------------|------------------------|----|---|---|
| enter F | _R , req 2. | 50 Ω AC 4025000 | 00 GHz P | SB NO: Wide 🖵 Gain:Low | NSE:PULSE Trig: Free #Atten: 30 | Run | LIGN AUTO Avg Type: | | т | DAM May 13, 20 RACE 1 2 3 4 5 TYPE MWWWW DET P P P P |
| 0 dB/div | | offset 0.5 dB -4.54 dBm | | | | | | MI | kr2 2.403 -14. | 001 GH 518 dBi |
| .0g 14.5 24.5 34.5 44.5 | | \sim | ~~~~~ | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | Λ | ~~~~ | 2 | | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | |
| 54.5 54.5 74.5 | | | | | | | | | | |
| 34.5 94.5 | | | | | | | | | Span | 3.000 MI |
| Res BW | | | | #VB | W 100 kHz | | | | p 3.200 ms | s (1001 p |
| KE MODE 17 1 N 1 2 N 1 3 4 5 6 7 8 | f | 2 | × 402 005 GHz 403 001 GHz | -14.39 -14.52 | dBm | CTION FUNC | TION WIDTH | | UNCTION VALUE | |
| 9 0 1 G | | | | | | | STATUS | | | > |

CH00 -3Mbps

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CH39 -3Mbps



CH78 -3Mbps



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 6277
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8. BANDWIDTH TEST

8.1 LIMIT

| FCC Part15 15.247,Subpart C | | | | | | |
|-----------------------------|-----------|------------------|-------------------------|--------|--|--|
| Section | Test Item | Limit | FrequencyRange (MHz) | Result | | |
| 15.247 (a)(1) | Bandwidth | (20dB bandwidth) | 2400-2483.5 | PASS | | |

| Spectrum Parameter | Setting | |
|--------------------|---|--|
| Attenuation | Auto | |
| Span Frequency | > Measurement Bandwidth or Channel Separation | |
| RB | 30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation) | |
| VB | 100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation) | |
| Detector | Peak | |
| Trace | Max Hold | |
| Sweep Time | Auto | |

8.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 30KHz, VBW=100KHz, Sweep time = Auto.

8.3 TEST SETUP

| EUT | SPECTRUM |
|-----|----------|
| | ANALYZER |

8.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



8.5 TEST RESULTS

| Temperature: | 25℃ | Relative Humidity: | 50% |
|--------------|----------------------------------|--------------------|---------|
| | GFSK(1Mbps) CH00 / CH39 / C78 | Test Voltage: | DC 3.8V |

| Frequency | 20dB Bandwidth (MHz) | Result |
|-----------|-------------------------|--------|
| 2402 MHz | 1.045 | PASS |
| 2441 MHz | 1.045 | PASS |
| 2480 MHz | 1.044 | PASS |

CH00 -1Mbps



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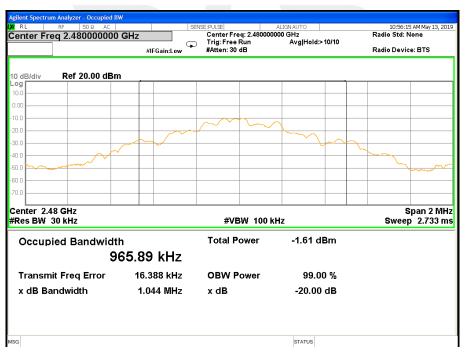
 Http://www.stsapp.com
 E-mail: sts@stsapp.com



CH39 -1Mbps



CH78 -1Mbps



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| Temperature: | 25℃ | Relative Humidity: | 50% |
|--------------|---------------------------------------|--------------------|---------|
| | π/4-DQPSK(2Mbps) CH00 / CH39 / C78 | Test Voltage: | DC 3.8V |

| Frequency | 20dB Bandwidth (MHz) | Result |
|-----------|-------------------------|--------|
| 2402 MHz | 1.308 | PASS |
| 2441 MHz | 1.309 | PASS |
| 2480 MHz | 1.308 | PASS |

CH00 -2Mbps



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CH39 -2Mbps



CH78 -2Mbps



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| Temperature: | 25°C | Relative Humidity: | 50% |
|--------------|------------------------------------|--------------------|---------|
| | 8DPSK(3Mbps) CH00 / CH39 / CH78 | Test Voltage: | DC 3.8V |

| Frequency | 20dB Bandwidth (MHz) | Result |
|-----------|-------------------------|--------|
| 2402 MHz | 1.282 | PASS |
| 2441 MHz | 1.281 | PASS |
| 2480 MHz | 1.282 | PASS |

CH00 -3Mbps



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CH39 -3Mbps



CH78 -3Mbps



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9. OUTPUT POWER TEST

9.1 LIMIT

| FCC Part 15.247,Subpart C | | | | | |
|---------------------------|-----------------|--|-------------------------|--------|--|
| Section | Test Item | Limit | FrequencyRange (MHz) | Result | |
| 15.247 | Outout | 1 W or 0.125W | | | |
| (a)(1)&(b)(1) | Output Power | if channel separation > 2/3 bandwidthprovided thesystems operatewith an output power no greater than125 mW(20.97dBm) | 2400-2483.5 | PASS | |

9.2 TEST PROCEDURE

a. The EUT was directly connected to the Power Sensor&PC

9.3 TEST SETUP

| EUT | Power sensor | | PC |
|-----|--------------|--|----|
|-----|--------------|--|----|

9.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



9.5 TEST RESULTS

| Temperature: | 25°C | Relative Humidity: | 60% |
|---------------|---------|--------------------|-----|
| Test Voltage: | DC 3.8V | | |

| Mode | Channel | Frequency | Peak Power | Average Power | Limit |
|----------|---------|-----------|------------|------------------|-------|
| | Number | (MHz) | (dBm) | (dBm) | (dBm) |
| | 0 | 2402 | -4.98 | -13.89 | 20.97 |
| GFSK(1M) | 39 | 2441 | -5.68 | -14.60 | 20.97 |
| | 78 | 2480 | -6.70 | -15.66 | 20.97 |

Note: the channel separation >2/3 20dB bandwidth

| Mode | Channel | Frequency | Peak Power (dBm) -8.81 | Average Power | Limit |
|---------------------|---------|-----------|------------------------------|------------------|-------|
| | Number | (MHz) | | (dBm) | (dBm) |
| π/4-DQPSK(2bps) | 0 | 2402 | -8.81 | -18.51 | 20.97 |
| | 39 | 2441 | -9.25 | -19.02 | 20.97 |
| | 78 | 2480 | -10.60 | -19.33 | 20.97 |

Note: the channel separation >2/3 20dB bandwidth

| Mode | Channel | Frequency | Peak Power | Average Power | Limit |
|-------------------|---------|-----------|----------------|------------------|-------|
| | Number | (MHz) | (dBm) -8.82 | (dBm) | (dBm) |
| 8-DPSK(3Mb ps) | 0 | 2402 | -8.82 | -20.12 | 20.97 |
| | 39 | 2441 | -9.21 | -21.85 | 20.97 |
| | 78 | 2480 | -10.56 | -22.20 | 20.97 |

Note: the channel separation >2/3 20dB bandwidth



10. ANTENNA REQUIREMENT

10.1 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.

10.2 EUT ANTENNA

The EUT antenna is PIFA Antenna. It comply with the standard requirement.



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APPENDIX-PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.



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