

TEST REPORT

| Report No.: | BCTC2208002179E | |
|--------------------------|---------------------------------|-------------|
| Applicant: | Ningbo Suge Hemu Trade Co.,Ltd. | |
| Product Name: | TRANSISTOR MEGAPHONE | |
| Model/Type reference: | 66SUR | / |
| Tested Date: | 2022-08-11 to 2022-08-17 | |
| Issued Date: | 2022-08-17 | |
| | | |
| She | nzhen BCTC Testing Co., Ltd. | |
| | | |
| No.: BCTC/RF-EMC-007 | Page: 1 of 65 | dition: A.5 |



FCC ID: 2A8BP-66SUR

| Product Name: | TRANSISTOR MEGAPHONE |
|-----------------------|---|
| Trademark: | MyMealivos |
| Model/Type reference: | 66SUR 55SUR |
| Prepared For: | Ningbo Suge Hemu Trade Co.,Ltd. |
| Address: | Room 106, 1st Floor, Building 2, 58 Dagang Middle Road, Xinqi Sub-district, Beilun District, Ningbo,Zhejiang, China |
| Manufacturer: | Ningbo Suge Hemu Trade Co.,Ltd. |
| Address: | Room 106, 1st Floor, Building 2, 58 Dagang Middle Road, Xinqi Sub-district, Beilun District, Ningbo,Zhejiang, China |
| Prepared By: | Shenzhen BCTC Testing Co., Ltd. |
| Address: | 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China |
| Sample Received Date: | 2022-08-11 |
| Sample tested Date: | 2022-08-11 to 2022-08-17 |
| Issue Date: | 2022-08-17 |
| Report No.: | BCTC2208002179E |
| Test Standards: | FCC Part15.247 ANSI C63.10-2013 |
| Test Results: | PASS |
| Remark: | This is Bluetooth Classic radio test report. |

Tested by:

Vave

Brave Zeng/ Project Handler

Approved by:

Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.



Table Of Content

| Test I | Report Declaration | Page |
|------------|--|----------|
| 1. | Version | 5 |
| 2. | Test Summary | |
| 3. | Measurement Uncertainty | 7 |
| 4. | Product Information And Test Setup | 8 |
| 4.1 | Product Information | |
| 4.2 | Test Setup Configuration | 8 |
| 4.3 | Support Equipment | |
| 4.4 | Channel List | |
| 4.5 | Test Mode | |
| 4.6 | Table Of Parameters Of Text Software Setting | |
| 5. | Test Facility And Test Instrument Used | |
| 5.1 | Test Facility | |
| 5.2 | Test Instrument Used | |
| 6. | Conducted Emissions | |
| 6.1 | Block Diagram Of Test Setup | |
| 6.2 | Limit | |
| 6.3 | Test procedure | |
| 6.4 | EUT operating Conditions | |
| 6.5 | Test Result | |
| 7. | Radiated emissions | |
| 7.1 | Block Diagram Of Test Setup | |
| 7.2 | Limit | |
| 7.3 | Test procedure | |
| 7.4 | EUT operating Conditions | |
| 7.5 | Test Result | |
| 8. o 1 | Radiated Band Emission Measurement And Restricted Bands Of Opera | |
| 8.1 8.2 | Block Diagram Of Test Setup | |
| ŏ.∠ 8.3 | Limit | |
| o.s 8.4 | | |
| 0.4 8.5 | EUT operating Conditions | |
| 0.5 9. | Conducted Emission | |
| 9.1 | Block Diagram Of Test Setup | |
| 9.2 | Limit | 25 |
| 9.3 | | |
| 9.4 | Test Result | 20 26 |
| 10. | Limit Test procedure Test Result 20 dB Bandwidth Block Diagram Of Test Setup | |
| 10.1 | Block Diagram Of Test Setup | 35 |
| 10.2 | 2 Limit | |
| 10.3 | - Test procedure | |
| 10.4 | Frest Result | |
| 11. | Maximum Peak Output Power | 41 |
| 11.1 | | 41 |
| 11.2 | 2 Limit | 41 |
| 11.3 | 2 Limit | 41 |
| 11.4 | | |



| 12. Hopping Channel Separation | 47 |
|----------------------------------|----|
| 12.1 Block Diagram Of Test Setup | |
| 12.2 Limit | 47 |
| 12.3 Test procedure | 47 |
| 12.4 Test Result | 48 |
| 13. Number Of Hopping Frequency | 53 |
| 13.1 Block Diagram Of Test Setup | 53 |
| 13.2 Limit | 53 |
| 13.3 Test procedure | 53 |
| 13.4 Test Result | 54 |
| 14. Dwell Time | 56 |
| 14.1 Block Diagram Of Test Setup | |
| 14.2 Limit | 56 |
| 14.3 Test procedure | 56 |
| 14.4 Test Result | 57 |
| 15. Antenna Requirement | 62 |
| 15.1 Limit | 62 |
| 15.2 Test Result | |
| 16. EUT Photographs | 63 |
| 17. EUT Test Setup Photographs | |

(Note: N/A means not applicable)

Page: 4 of 65



1. Version

| Report No. | Issue Date | Description | Approved |
|-----------------|------------|-------------|----------|
| BCTC2208002179E | 2022-08-17 | Original | Valid |
| | | | |





2. Test Summary

The Product has been tested according to the following specifications:

| No. | Test Parameter | Clause No. | Results |
|-----|---|--------------------------------------|------------------|
| 1 | Conducted emission AC power port | §15.207 | N/A ¹ |
| 2 | Conducted peak output power for FHSS | §15.247(b)(1) | PASS |
| 3 | 20dB Occupied bandwidth | §1 5.247(a)(1) | PASS |
| 4 | Number of hoppingfrequencies | §15.247(a)(1)(iii) | PASS |
| 5 | Dwell Time | §15.247(a)(1)(iii) | PASS |
| 6 | Spurious RF conducted emissions | §15.247(d) | PASS |
| 7 | Band edge | §15.247(d) | PASS |
| 8 | Spurious radiated emissions for transmitter | §15.247(d) & §15.209 & §15.205 | PASS |
| 9 | Antenna Requirement | 15.203 | PASS |

Note1: The EUT is powered by the DC only, the test item is not applicable.

No.: BCTC/RF-EMC-007

Page: 6 of 65



3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| No. | Item | Uncertainty |
|-----|--|-------------|
| 1 | 3m chamber Radiated spurious emission(30MHz-1GHz) | U=4.3dB |
| 2 | 3m chamber Radiated spurious emission(9KHz-30MHz) | U=3.7dB |
| 3 | 3m chamber Radiated spurious emission(1GHz-18GHz) | U=4.5dB |
| 4 | 3m chamber Radiated spurious emission(18GHz-40GHz) | U=3.34dB |
| 5 | Conducted Emission (150kHz-30MHz) | U=3.20dB |
| 6 | Conducted Adjacent channel power | U=1.38dB |
| 7 | Conducted output power uncertainty Above 1G | U=1.576dB |
| 8 | Conducted output power uncertainty below 1G | U=1.28dB |
| 9 | humidity uncertainty | U=5.3% |
| 10 | Temperature uncertainty | U=0.59°C |



4. Product Information And Test Setup

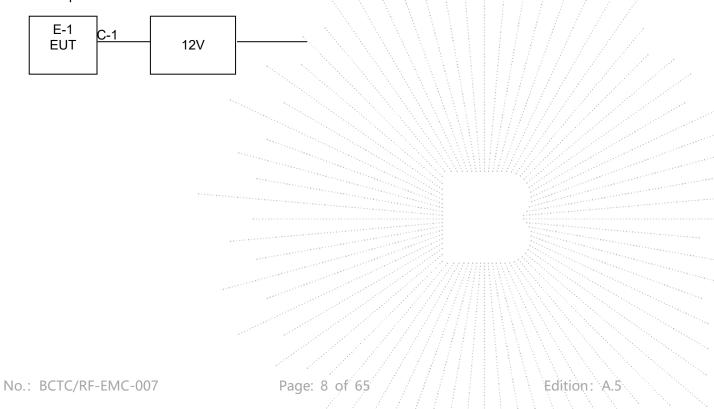
4.1 Product Information

| 66SUR 55SUR |
|---|
| All the model are the same circuit and RF module, except model names. |
| N/A |
| N/A |
| Bluetooth: 2402-2480MHz |
| Bluetooth: GFSK, Pi/4 DQPSK, 8DPSK |
| 79CH |
| PCB antenna |
| -0.58dBi |
| DC 12V |
| |

4.2 Test Setup Configuration

See test photographs attached in *EUT TEST SETUP PHOTOGRAPHS* for the actual connections between Product and support equipment.

Radiated Spurious Emission





4.3 Support Equipment

| No. | Device Type | Brand | Model | Series No. | Note |
|-----|-------------------------|------------|-------|------------|------|
| E-1 | TRANSISTOR MEGAPHONE | MyMealivos | 66SUR | 55SUR | EUT |

| ltem | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|---------------------|
| C-1 | N/A | N/A | N/A | DC cable unshielded |

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

| СН | Frequency (MHz) | СН | Frequency (MHz) | СН | Frequency (MHz) | СН | Frequency (MHz) |
|----|--------------------|----|--------------------|----|--------------------|----|--------------------|
| 0 | 2402 | 1 | 2403 | 2 | 2404 | 3 | 2405 |
| 4 | 2406 | 5 | 2407 | 6 | 2408 | 7 | 2409 |
| 8 | 2410 | 9 | 2411 | 10 | 2412 | 11 | 2413 |
| 12 | 2414 | 13 | 2415 | 14 | 2416 | 15 | 2417 |
| 16 | 2418 | 17 | 2419 | 18 | 2420 | 19 | 2421 |
| 20 | 2422 | 21 | 2423 | 22 | 2424 | 23 | 2425 |
| 24 | 2426 | 25 | 2427 | 26 | 2428 | 27 | 2429 |
| 28 | 2430 | 29 | 2431 | 30 | 2432 | 31 | 2433 |
| 32 | 2434 | 33 | 2435 | 34 | 2436 | 35 | 2437 |
| 36 | 2438 | 37 | 2439 | 38 | 2440 | 39 | 2441 |
| 40 | 2442 | 41 | 2443 | 42 | 2444 | 43 | 2445 |
| 44 | 2446 | 45 | 2447 | 46 | 2448 | 47 | 2449 |
| 48 | 2450 | 49 | 2451 | 50 | 2452 | 51 | 2453 |
| 52 | 2454 | 53 | 2455 | 54 | 2456 | 55 | 2457 |
| 56 | 2458 | 57 | 2459 | 58 | 2460 | 59 | 2461 |
| 60 | 2462 | 61 | 2463 | 62 | 2464 | 63 | 2465 |
| 64 | 2466 | 65 | 2467 | 66 | 2468 | 67 | 2469 |
| 68 | 2470 | 69 | 2471 | 70 | 2472 | 71 | 2473 |
| 72 | 2474 | 73 | 2475 | 74 | 2476 | 75 | 2477 |
| 76 | 2478 | 77 | 2479 | 78 | 2480 | 79 | 1 |



4.5 Test Mode

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.

| Test Mode | Test mode | Low channel | Middle channel | High channel | | |
|-----------|----------------------------------|-------------|----------------|--------------|--|--|
| 1 | Transmitting(GFSK) | 2402MHz | 2441MHz | 2480MHz | | |
| 2 | Transmitting(Pi/4DQPSK) | 2402MHz | 2441MHz | 2480MHz | | |
| 3 | Transmitting(8DPSK) | 2402MHz | 2441MHz | 2480MHz | | |
| 4 | Transmitting (Radiated emission) | | | | | |

Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

(2) Fully-charged battery is used during the test

4.6 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

| Test software Version | | CMD | |
|-----------------------|----------|----------|----------|
| Frequency | 2402 MHz | 2441 MHz | 2480 MHz |
| Parameters | DEF | DEF | DEF |



5. Test Facility And Test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

FCC Test Firm Registration Number: 712850

IC Registered No.: 23583

5.2 Test Instrument Used

| RF Conducted Test | | | | | |
|---|--------------|--------|------------|--------------|--------------|
| Equipment | Manufacturer | Model# | Serial# | Last Cal. | Next Cal. |
| Power Metter | Keysight | E4419 | 1 | May 24, 2022 | May 23, 2023 |
| Power Sensor (AV) | Keysight | E9300A | / | May 24, 2022 | May 23, 2023 |
| Signal Analyzer 20kHz-26.5G Hz | Keysight | N9020A | MY49100060 | May 24, 2022 | May 23, 2023 |
| Spectrum Analyzer 9kHz-40GHz | R&S | FSP 40 | | May 24, 2022 | May 23, 2023 |

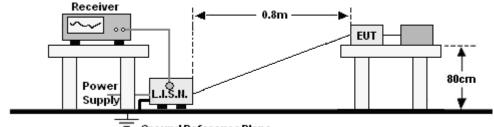


| Radiated Emissions Test (966 Chamber) | | | | | |
|---------------------------------------|--------------|----------------------|-------------------|---------------|---------------------------------|
| Equipment | Manufacturer | Model# | Serial# | Last Cal. | Next Cal. |
| 966 chamber | ChengYu | 966 Room | 966 | Jun. 06. 2020 | Jun. 05, 2023 |
| Receiver | R&S | ESR3 | 102075 | May 24, 2022 | May 23, 2023 |
| Receiver | R&S | ESRP | 101154 | May 24, 2022 | May 23, 2023 |
| Amplifier | SKET | LAPA_01G18 G-45dB | ١ | May 24, 2022 | May 23, 2023 |
| Amplifier | Schwarzbeck | BBV9744 | 9744-0037 | May 24, 2022 | May 23, 2023 |
| TRILOG Broadband Antenna | Schwarzbeck | VULB9163 | 942 | May 26, 2022 | May 25, 2023 |
| Horn Antenna | Schwarzbeck | BBHA9120D | 1541 | Jun. 06, 2022 | Jun. 05, 2023 |
| Horn Antenn (18GHz-40GHz) | Schwarzbeck | BBHA9170 | 00822 | Jun. 06, 2022 | Jun. 05, 2023 |
| Amplifier (18GHz-40GHz) | MITEQ | TTA1840-35- HG | 2034381 | May 26, 2022 | May 25, 2023 |
| Loop Antenna (9KHz-30MHz) | Schwarzbeck | FMZB1519B | 00014 | May 26, 2022 | May 25, 2023 |
| RF cables1 (9kHz-30MHz) | Huber+Suhnar | 9kHz-30MHz | B1702988-000 8 | May 26, 2022 | May 25, 2023 |
| RF cables2 (30MHz-1GHz) | Huber+Suhnar | 30MHz-1GHz | 1486150 | May 26, 2022 | May 25, 2023 |
| RF cables3 (1GHz-40GHz) | Huber+Suhnar | 1GHz-40GHz | 1607106 | May 26, 2022 | May 25, 2023 |
| Power Metter | Keysight | E4419 | V N | May 26, 2022 | May 25, 2023 |
| Power Sensor (AV) | Keysight | E9300A | | May 26, 2022 | May 25, 2023 |
| Signal Analyzer 20kHz-26.5GHz | Keysight | N9020A | MY49100060 | May 26, 2022 | May 25, 2023 |
| Spectrum Analyzer 9kHz-40GHz | R&S | FSP 40 | | May 26, 2022 | May 25, 2023 |
| Software | Frad | EZ-EMC | FA-03A2 RE | | $\langle / / \Lambda / \rangle$ |



6. Conducted Emissions

6.1 Block Diagram Of Test Setup



Ground Reference Plane

6.2 Limit

| | Limit | (dBuV) |
|-----------------|-----------|-----------|
| Frequency (MHz) | Quas-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 |

Notes:

1. *Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

6.3 Test procedure

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

a. The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).

b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.

c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

6.4 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.

6.5 Test Result

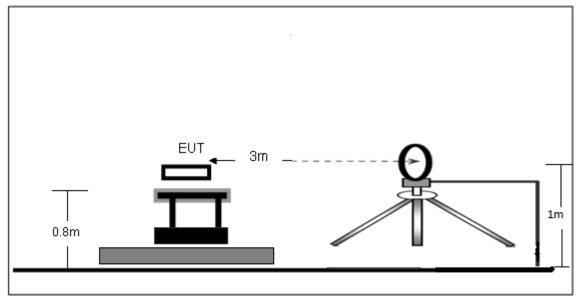
The EUT is powered by the DC only, the test item is not applicable.



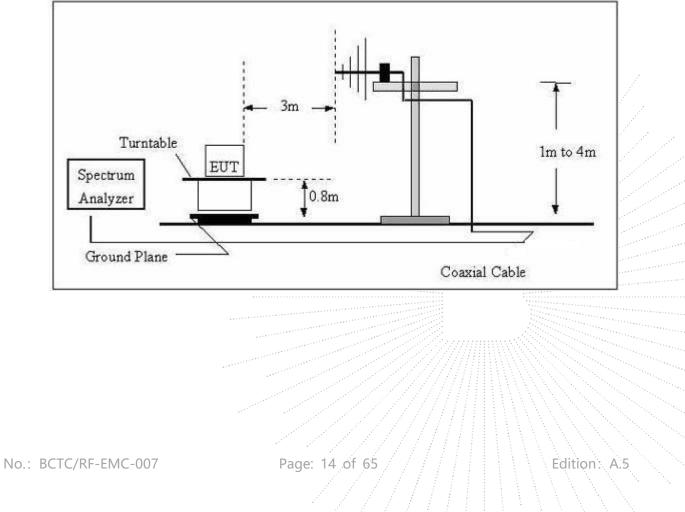
7. Radiated emissions

7.1 Block Diagram Of Test Setup

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

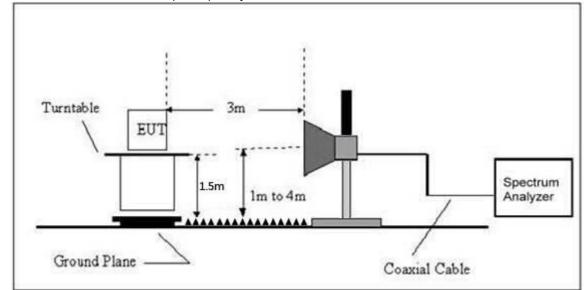


(B) Radiated Emission Test-Up Frequency 30MHz~1GHz





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



7.2 Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

| Frequency | Field Strength | Distance | Field Strength Limit at 3m Distance | | |
|---------------|----------------|----------|-------------------------------------|--------------------------------------|--|
| (MHz) | uV/m | (m) | uV/m | dBuV/m | |
| 0.009 ~ 0.490 | 2400/F(kHz) | 300 | 10000 * 2400/F(kHz) | 20log ^{(2400/F(kHz))} + 80 | |
| 0.490 ~ 1.705 | 24000/F(kHz) | 30 | 100 * 24000/F(kHz) | 20log ^{(24000/F(kHz))} + 40 | |
| 1.705 ~ 30 | 30 | 30 | 100 * 30 | 20log ⁽³⁰⁾ + 40 | |
| 30 ~ 88 | 100 | 3 | 100 | 20log ⁽¹⁰⁰⁾ | |
| 88 ~ 216 | 150 | 3 | 150 | 20log ⁽¹⁵⁰⁾ | |
| 216 ~ 960 | 200 | 3 | 200 | 20log ⁽²⁰⁰⁾ | |
| Above 960 | 500 | 3 | 500 | 20log ⁽⁵⁰⁰⁾ | |

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

| Frequency (MHz) | Limit (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).



7.3 Test procedure

| Receiver Parameter | Setting |
|--------------------|-------------------|
| Attenuation | Auto |
| 9kHz~150kHz | RBW 200Hz for QP |
| 150kHz~30MHz | RBW 9kHz for QP |
| 30MHz~1000MHz | RBW 120kHz for QP |

| Spectrum Parameter | Setting | |
|--------------------|--|--|
| 1-25GHz | RBW 1 MHz /VBW 1 MHz for Peak, RBW 1 MHz / VBW 10Hz for Average | |

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Page: 16 of 65



Above 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b.The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c.The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d.For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g.Test the EUT in the lowest channel, the middle channel, the Highest channel.

Note:

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

7.4 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.

No.: BCTC/RF-EMC-007

Page: 17 of 65



7.5 Test Result

| Below 30MHz | | | | |
|--|--------|----------------|--------|--|
| Temperature:26 °CRelative Humidity:54% | | | | |
| Pressure: | 101KPa | Teet Voltage : | DC 12V | |
| Test Mode: | Mode 4 | Test Voltage : | | |

| 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 (specific distance/test distance)(dB);

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

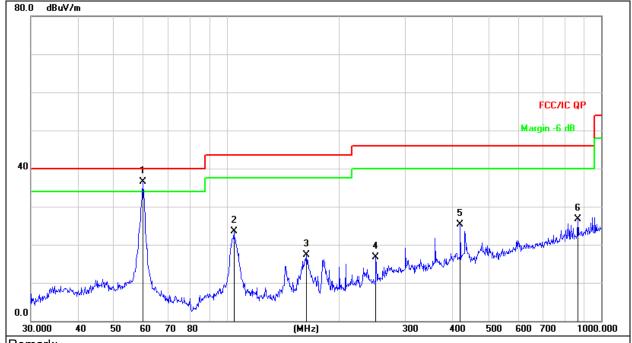
No.: BCTC/RF-EMC-007

Page: 18 of 65



| Between 30MHZ – 1GHZ | | | | |
|----------------------|-------------|--------------------|------------|--|
| Temperature: | 26 ℃ | Relative Humidity: | 54% | |
| Pressure: | 101KPa | Phase : | Horizontal | |
| Test Mode: | Mode 4 | Test Voltage: | DC 12V | |





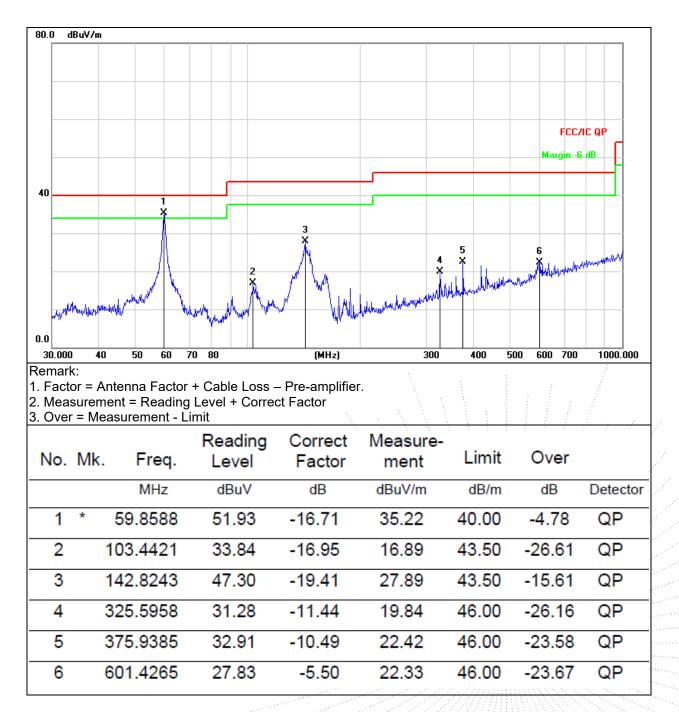
Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.
 Measurement = Reading Level + Correct Factor
 Over = Measurement - Limit

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure- ment | Limit | Over | |
|-----|-----|----------|------------------|-------------------|------------------|-------|--------|----------|
| | | MHz | dBuV | dB | dBuV/m | dB/m | dB | Detector |
| 1 | * | 59.6493 | 53.10 | -16.67 | 36.43 | 40.00 | -3.57 | QP |
| 2 | | 104.5361 | 40.49 | -17.01 | 23.48 | 43.50 | -20.02 | QP |
| 3 | | 163.1818 | 36.18 | -18.83 | 17.35 | 43.50 | -26.15 | QP |
| 4 | | 250.3012 | 30.94 | -14.18 | 16.76 | 46.00 | -29.24 | QP |
| 5 | | 420.5803 | 35.00 | -9.73 | 25.27 | 46.00 | -20.73 | QP |
| 6 | 1 | 866.0879 | 28.18 | -1.45 | 26.73 | 46.00 | -19.27 | QP |



| Temperature: | 26 ℃ | Relative Humidity: | 54% |
|--------------|-------------|--------------------|----------|
| Pressure: | 101KPa | Phase : | Vertical |
| Test Mode: | Mode 4 | Test Voltage: | DC 12V |





| | Frequency | Reading | Correct | Measure-m | Limits | Over | |
|-------|-----------|----------|--------------|-----------|--------------|--------|----------|
| Polar | riequency | Level | Factor | ent | Liiiits | Over | Detector |
| (H/V) | (MHz) | (dBuV/m) | (dB) | (dBuV/m) | (dBuV/ m) | (dB) | Туре |
| | | | GFSK Low ch | annel | | | |
| V | 4804.00 | 52.80 | -0.43 | 52.37 | 74.00 | -21.63 | PK |
| V | 4804.00 | 41.89 | -0.43 | 41.46 | 54.00 | -12.54 | AV |
| V | 7206.00 | 43.73 | 8.31 | 52.04 | 74.00 | -21.96 | PK |
| V | 7206.00 | 32.90 | 8.31 | 41.21 | 54.00 | -12.79 | AV |
| Н | 4804.00 | 49.07 | -0.43 | 48.64 | 74.00 | -25.36 | PK |
| Н | 4804.00 | 39.76 | -0.43 | 39.33 | 54.00 | -14.67 | AV |
| Н | 7206.00 | 41.78 | 8.31 | 50.09 | 74.00 | -23.91 | PK |
| Н | 7206.00 | 34.10 | 8.31 | 42.41 | 54.00 | -11.59 | AV |
| | | G | FSK Middle c | hannel | | | |
| V | 4882.00 | 51.16 | -0.38 | 50.78 | 74.00 | -23.22 | PK |
| V | 4882.00 | 43.33 | -0.38 | 42.95 | 54.00 | -11.05 | AV |
| V | 7323.00 | 44.01 | 8.83 | 52.84 | 74.00 | -21.16 | PK |
| V | 7323.00 | 34.58 | 8.83 | 43.41 | 54.00 | -10.59 | AV |
| Н | 4882.00 | 48.62 | -0.38 | 48.24 | 74.00 | -25.76 | PK |
| Н | 4882.00 | 39.21 | -0.38 | 38.83 | 54.00 | -15.17 | AV |
| Н | 7323.00 | 41.44 | 8.83 | 50.27 | 74.00 | -23.73 | PK |
| Н | 7323.00 | 33.51 | 8.83 | 42.34 | 54.00 | -11.66 | AV |
| | | | GFSK High ch | annel | | | |
| V | 4960.00 | 53.14 | -0.32 | 52.82 | 74.00 | -21.18 | PK |
| V | 4960.00 | 45.04 | -0.32 | 44.72 | 54.00 | -9.28 | AV |
| V | 7440.00 | 44.98 | 9.35 | 54.33 | 74.00 | -19.67 | PK |
| V | 7440.00 | 34.64 | 9.35 | 43.99 | 54.00 | -10.01 | AV |
| Н | 4960.00 | 51.97 | -0.32 | 51.65 | 74.00 | -22.35 | PK |
| Н | 4960.00 | 42.50 | -0.32 | 42.18 | 54.00 | -11.82 | AV |
| Н | 7440.00 | 42.74 | 9.35 | 52.09 | 74.00 | -21.91 | PK |
| Н | 7440.00 | 35.68 | 9.35 | 45.03 | 54.00 | -8.97 | AV |

Between 1GHz – 25GHz

Remark:

1.Emission Level = Meter Reading + Factor, Factor = Antenna Factor + Cable Loss – Pre-amplifier. Over= Emission Level - Limit

2.If peak below the average limit, the average emission was no test.

3. In restricted bands of operation, The spurious emissions below the permissible value more than 20dB 4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible

value has no need to be reported.

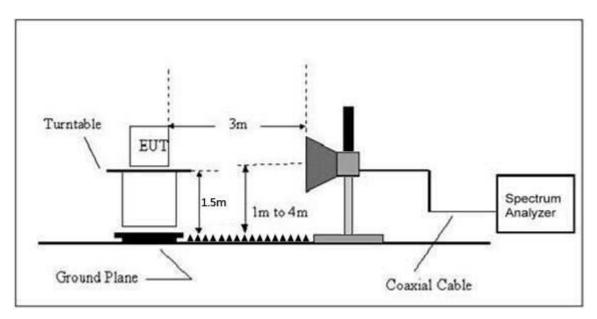
5.All the Modulation are test, the worst mode is GFSK, the data recording in the report.



8. Radiated Band Emission Measurement And Restricted Bands Of Operation

8.1 Block Diagram Of Test Setup

Radiated Emission Test-Up Frequency Above 1GHz



8.2 Limit

FCC Part15 C Section 15.209 and 15.205

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

| MHz | MHz | MHz | GHz |
|--------------------------|---------------------|---------------|------------------|
| 0.090-0.110 | 16.42-16.423 | 399.9-410 | 4.5-5.15 |
| ¹ 0.495-0.505 | 16.69475-16.69525 | 608-614 | 5.35-5.46 |
| 2.1735-2.1905 | 16.80425-16.80475 | 960-1240 | 7.25-7.75 |
| 4.125-4.128 | 25.5-25.67 | 1300-1427 | 8.025-8.5 |
| 4.17725-4.17775 | 37.5-38.25 | 1435-1626.5 | 9.0-9.2 |
| 4.20725-4.20775 | 73-74.6 | 1645.5-1646.5 | 9.3-9.5 |
| 6.215-6.218 | 74.8-75.2 | 1660-1710 | 10.6-12.7 |
| 6.26775-6.26825 | 108-121.94 | 1718.8-1722.2 | 13.25-13.4 |
| 6.31175-6.31225 | 123-138 | 2200-2300 | 14.47-14.5 |
| 8.291-8.294 | 149.9-150.05 | 2310-2390 | 15.35-16.2 |
| 8.362-8.366 | 156.52475-156.52525 | 2483.5-2500 | 17.7-21.4 |
| 8.37625-8.38675 | 156.7-156.9 | 2690-2900 | 22.01-23.12 |
| 8.41425-8.41475 | 162.0125-167.17 | 3260-3267 | 23.6-24.0 |
| 12.29-12.293 | 167.72-173.2 | 3332-3339 | 31.2-31.8 |
| 12.51975-12.52025 | 240-285 | 3345.8-3358 | 36.43-36.5 |
| 12.57675-12.57725 | 322-335.4 | 3600-4400 | (²) |
| 13.36-13.41 | | | |



Limits Of Radiated Emission Measurement (Above 1000MHz)

| | Limit (dBuV/m) (at 3M) | | | | |
|-----------------|------------------------|---------|--|--|--|
| Frequency (MHz) | 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).

8.3 Test procedure

| Receiver Parameter | Setting | | |
|---------------------------------------|--|--|--|
| Attenuation | Auto | | |
| Start Frequency | 2300MHz | | |
| Stop Frequency | 2520 | | |
| RB / VB (emission in restricted band) | 1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average | | |

Above 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b.The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c.The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d.For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g.Test the EUT in the lowest channel,the Highest channel. Note:

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

8.4 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.

No.: BCTC/RF-EMC-007



8.5 Test Result

| Test mode | Polar (H/V) | Frequency (MHz) | Reading Level | Level Factor | | Limits (dBuV/m) | | Result | | | | | |
|-----------|----------------------|----------------------|------------------|--------------|--------|--------------------|-------|--------|--|--|--|--|--|
| | (11/1) | (11112) | (dBuV/m) | (dB) | РК | РК | AV | | | | | | |
| | | I | Low | Channel 2 | 402MHz | | | | | | | | |
| | Н | 2390.00 | 52.08 | -6.70 | 45.38 | 74.00 | 54.00 | PASS | | | | | |
| | Н | 2400.00 | 56.27 | -6.71 | 49.56 | 74.00 | 54.00 | PASS | | | | | |
| | V | 2390.00 | 51.80 | -6.70 | 45.10 | 74.00 | 54.00 | PASS | | | | | |
| GFSK | V | 2400.00 | 52.48 | -6.71 | 45.77 | 74.00 | 54.00 | PASS | | | | | |
| Gran | | High Channel 2480MHz | | | | | | | | | | | |
| | Н | 2483.50 | 51.19 | -6.79 | 44.40 | 74.00 | 54.00 | PASS | | | | | |
| | Н | 2500.00 | 47.25 | -6.81 | 40.44 | 74.00 | 54.00 | PASS | | | | | |
| | V | 2483.50 | 50.23 | -6.79 | 43.44 | 74.00 | 54.00 | PASS | | | | | |
| | V | 2500.00 | 45.44 | -6.81 | 38.63 | 74.00 | 54.00 | PASS | | | | | |
| | Low Channel 2402MHz | | | | | | | | | | | | |
| | Н | 2390.00 | 52.89 | -6.70 | 46.19 | 74.00 | 54.00 | PASS | | | | | |
| | Н | 2400.00 | 56.73 | -6.71 | 50.02 | 74.00 | 54.00 | PASS | | | | | |
| | V | 2390.00 | 53.11 | -6.70 | 46.41 | 74.00 | 54.00 | PASS | | | | | |
| | V | 2400.00 | 53.11 | -6.71 | 46.40 | 74.00 | 54.00 | PASS | | | | | |
| π/4DQPSK | High Channel 2480MHz | | | | | | | | | | | | |
| | Н | 2483.50 | 52.51 | -6.79 | 45.72 | 74.00 | 54.00 | PASS | | | | | |
| | Н | 2500.00 | 49.49 | -6.81 | 42.68 | 74.00 | 54.00 | PASS | | | | | |
| | V | 2483.50 | 53.56 | -6.79 | 46.77 | 74.00 | 54.00 | PASS | | | | | |
| | V | 2500.00 | 48.77 | -6.81 | 41.96 | 74.00 | 54.00 | PASS | | | | | |
| | | L | Low | Channel 2 | 402MHz | : | / | | | | | | |
| | Н | 2390.00 | 53.64 | -6.70 | 46.94 | 74.00 | 54.00 | PASS | | | | | |
| | Н | 2400.00 | 57.62 | · -6.71 · | 50.91 | 74.00 | 54.00 | PASS | | | | | |
| | V | 2390.00 | 53.66 | -6.70 | 46.96 | 74.00 | 54.00 | PASS | | | | | |
| | V | 2400.00 | 55.11 | -6.71 | 48.40 | 74.00 | 54.00 | PASS | | | | | |
| 8DPSK | | • | High | n Channel 2 | 480MHz | | | | | | | | |
| | Н | 2483.50 | 53.34 | -6.79 | 46.55 | 74.00 | 54.00 | PASS | | | | | |
| | Н | 2500.00 | 49.09 | -6.81 | 42.28 | 74.00 | 54.00 | PASS | | | | | |
| | V | 2483.50 | 52.09 | -6.79 | 45.30 | 74.00 | 54.00 | PASS | | | | | |
| | V | 2500.00 | 48.89 | -6.81 | 42.08 | 74.00 | 54.00 | PASS | | | | | |
| Remark: | • | | | | | | | | | | | | |

Remark:

1. Emission Level = Meter Reading + Factor, Factor = Antenna Factor + Cable Loss – Pre-amplifier. Over= Emission Level – Limit

2. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

3 In restricted bands of operation, The spurious emissions below the permissible value more than 20Db 4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



9. Conducted Emission

9.1 Block Diagram Of Test Setup

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

9.2 Limit

Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or 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 §15.205(c))

9.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

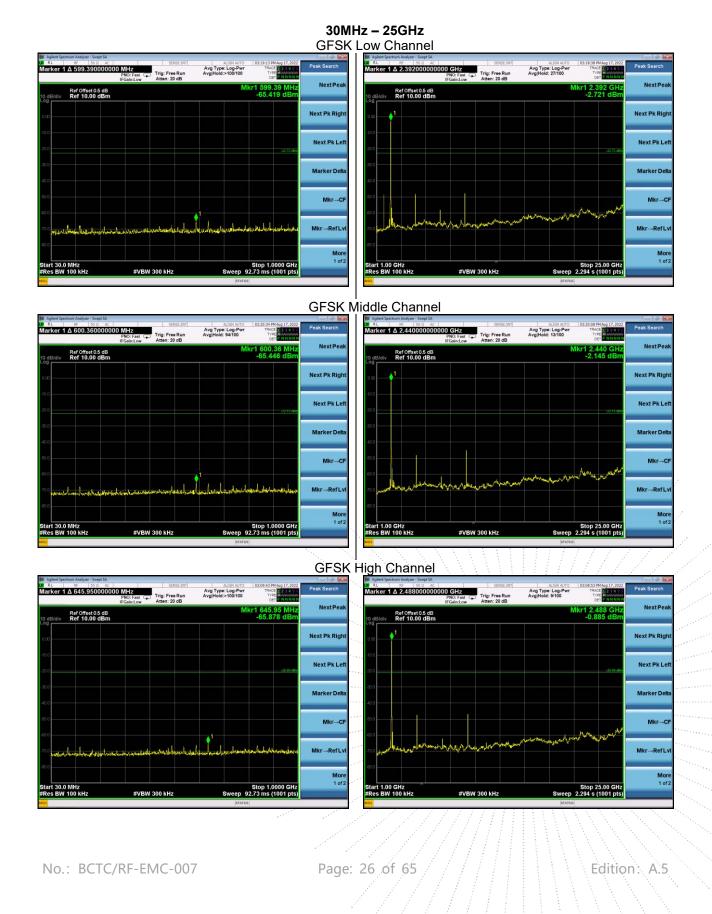
2. Set the spectrum analyzer:

RBW = 100kHz, VBW = 300kHz, Sweep = auto

Detector function = peak, Trace = max hold

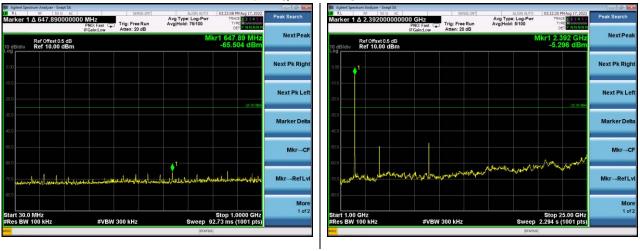


9.4 Test Result

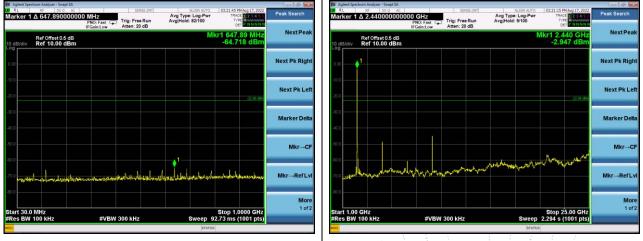


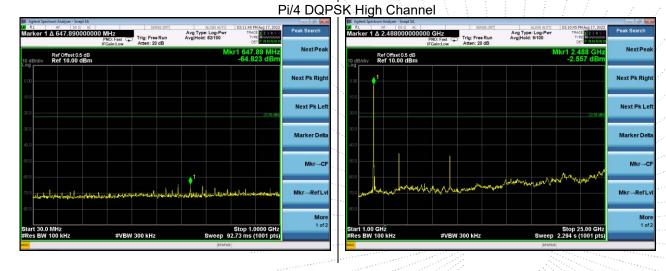


Pi/4 DQPSK Low Channel



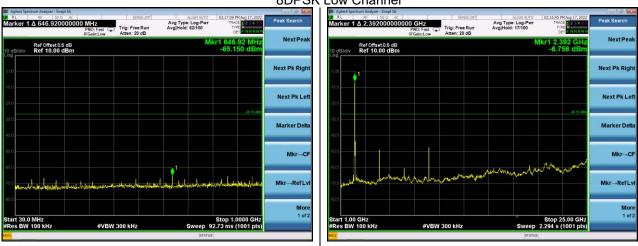




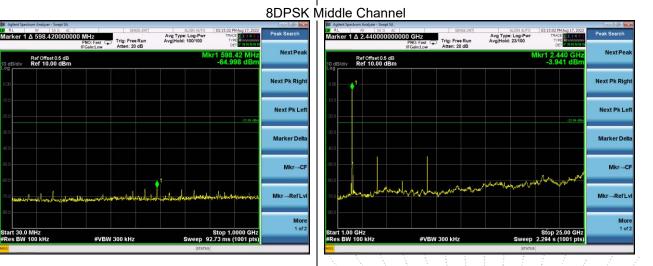


No.: BCTC/RF-EMC-007

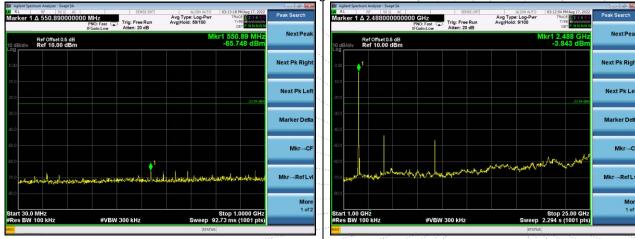




8DPSK Low Channel



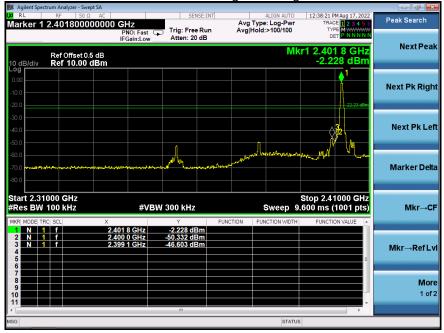
8DPSK High Channel



Edition: A.5

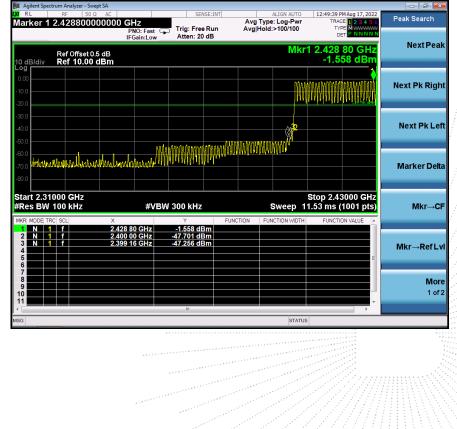
Mor 1 of





GFSK Transmitting Band edge-left side

GFSK Hopping Band edge-left side

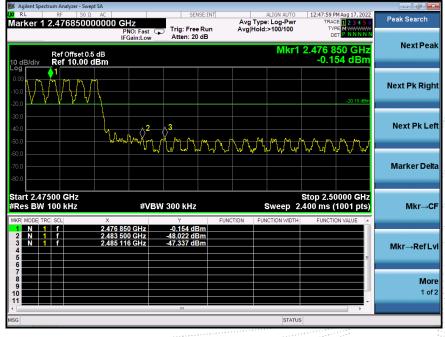




| 📕 Agilent Spec | | | | | | | | | | | - C × |
|--------------------------------|------------------------|------------------------------|-------|-------------------------------|--|--------|---------|--|--|--|----------------|
| Marker 1 | ^{RF} 2.480 | 50 Ω 15600 | AC | PNO: Fast | | | | ALIGN AUTO Type: Log-Pwr Hold:>100/100 | TRA T) | PM Aug 17, 2022 CE 1 2 3 4 5 6 PE M WWWWWW FT P N N N N N | Peak Search |
| 10 dB/div | | ffset 0.5 I 0.00 d | | IFGain:Low | Atten: | 20 dB | | Mkr | 1 2.480 | | NextPeak |
| -10.0 | | | | | | | | | | -20.08 dBm | Next Pk Right |
| -30.0 -40.0 -50.0 | | <i>ر</i> | M^2 | 3 | | | | | | | Next Pk Left |
| 60.0 -70.0 -80.0 | | | | | and and a second se | ~~~~~~ | ~~~^~^~ | ~mm, | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | hour front of the | Marker Delta |
| Start 2.47 FRes BW | 100 kl | | X | | 300 kH Y | F | JNCTION | Sweep | 2.133 ms | 0000 GHz (1001 pts) | Mkr→CF |
| 1 N 1 2 N 1 3 N 1 4 5 | f | | 2.483 | 156 GHz 500 GHz 996 GHz | -0.078 -43.663 -57.732 | dBm | | | | ====================================== | Mkr→RefLv |
| 7 8 9 10 11 | | | | | | | | | | | More 1 of 2 |
| 4 ISG | | | | | | | | STAT | s | F | |

GFSK Transmitting Band edge-right side

GFSK Hopping Band edge-right side



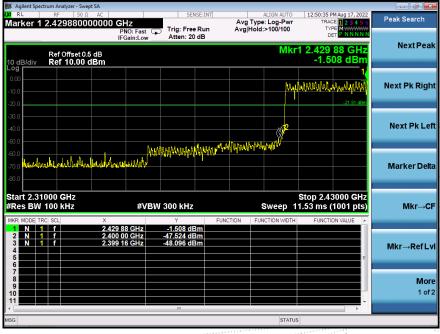






Pi/4 DQPSK Transmitting Band edge-left side

Pi/4 DQPSK Hopping Band edge-left side



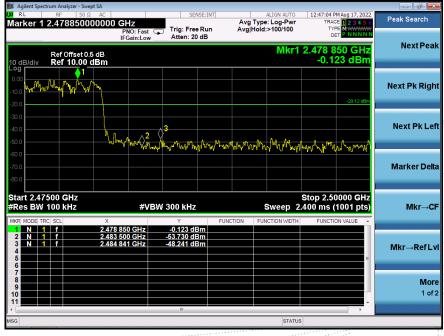
No.: BCTC/RF-EMC-007



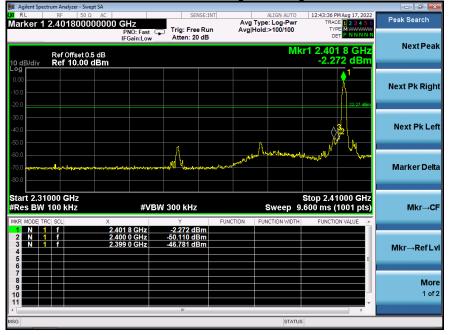
| | trum Analyzer - Si | | | | | | | |
|-------------------------------------|--------------------|----------------------------------|--------------------------|--|----------|--|---|-----------------|
| Marker 1 | RF 50 2.479848 | 000000 G | | SENSE | Avg | ALIGN AUTO Type: Log-Pwr Hold:>100/100 | 12:41:02 PM Aug 17, 20 TRACE 1 2 3 4 TYPE M | 5 6 Peak Search |
| 10 dB/div | Ref Offset | IF 0.5 dB | NO: Fast Gain:Low | Atten: 20 dE | | - | 2.479 848 GH -0.062 dB | NN NextPeak |
| Log 0.00 -10.0 -20.0 | | | | | | | -20.06 d | Next Pk Right |
| -30.0 -40.0 -50.0 | | and 2 | 3 | | | | | Next Pk Left |
| -60.0 -70.0 -80.0 | | <u> </u> | hand and an and a second | a manana a a a a a a a a a a a a a a a a | | non and | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | Marker Delta |
| Start 2.47 #Res BW | 100 kHz | X | #VBV | V 300 kHz Y | FUNCTION | | Stop 2.50000 GF .133 ms (1001 pt FUNCTION VALUE | |
| 1 N 1 2 N 1 3 N 1 4 5 6 | f f f | 2.479 84 2.483 50 2.485 56 | 0 GHz | -0.062 dBm -43.663 dBm -56.939 dBm | | | | Mkr→RefLvl |
| 7 8 9 10 11 | | | | | | | | More 1 of 2 |
| MSG | | | | m | | STATUS | • | |

Pi/4 DQPSK Transmitting Band edge-right side

Pi/4 DQPSK Hopping Band edge-right side

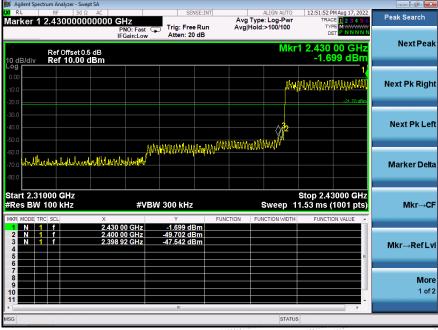






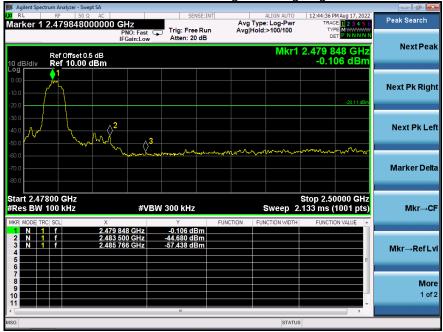
8DPSK Transmitting Band edge-left side

8DPSK Hopping Band edge-left side



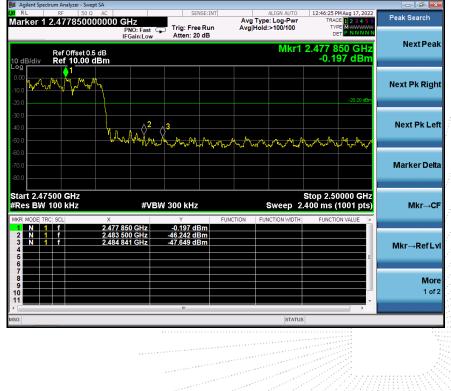
No.: BCTC/RF-EMC-007





8DPSK Transmitting Band edge-right side

8DPSK Hopping Band edge-right side





10. 20 dB Bandwidth

10.1 Block Diagram Of Test Setup



10.2 Limit

N/A

10.3 Test procedure

- 1. Set RBW = 30kHz.
- 2. Set the video bandwidth (VBW) \ge 3 x RBW.
- 3. Detector = Peak.
- 4. Trace mode = max hold.
- 5. Sweep = auto couple.

6. Allow the trace to stabilize.

7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



10.4 Test Result

| Temperature: | 26 ℃ | Relative Humidity: | 54% |
|--------------|-------------|--------------------|-------------|
| Pressure: | 101KPa | Test Voltage : | AC120V/60Hz |

| Modulation | Test Channel | Bandwidth(MHz) |
|------------|--------------|----------------|
| GFSK | Low | 0.874 |
| GFSK | Middle | 0.877 |
| GFSK | High | 0.873 |
| Pi/4 DQPSK | Low | 1.250 |
| Pi/4 DQPSK | Middle | 1.252 |
| Pi/4 DQPSK | High | 1.253 |
| 8DPSK | Low | 1.216 |
| 8DPSK | Middle | 1.218 |
| 8DPSK | High | 1.219 |

Test plots GFSK Low Channel







GFSK Middle Channel

GFSK High Channel







Pi/4 DQPSK Low Channel

Pi/4 DQPSK Middle Channel







Pi/4 DQPSK High Channel

8DPSK Low Channel

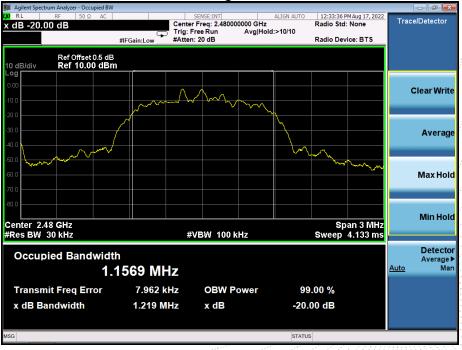




| Image: Second State Image: Second State< | | | 8043 | n ivilaal | e Channe | | |
|---|-------------------------------|----------------------------|-----------|--------------|-----------|------------------|----------------------|
| enter Freq 2.441000000 GHz FigsinLow Genter Freq: 2.44000000 GHz Trig: Free Run Avg Hold:>10/10 Radio Device: BTS Radio Device: BTS Radio Device: BTS Clear Write Average Max Hold Min Hold Average Max Hold Min Hold Average Max Hold Clear Write Detector Min Hold Average Max Hold Min Hold Average Max Hold Max Hold Max Hold Max Hold Max Hold Min Hold Average Max Hold Max Hold Min Hold Average Max Hold Max Hold Min Hold Max Hold Min Hold Average Max Hold Min Hold Max Hold Min Hold Max Hold Min Hold Max Hold Max Hold Min Hold Max Hold Max Hold Max Hold Min Hold Max Hol | | er - Occupied BW | | | | | |
| Add Std: Note Ref Offset 0.5 dB dB/div Ref 0ffset 0.5 dB dB/div Ref 0ffset 0.5 dB dB/div Ref 0ffset 0.5 dB dB/div Ref 0ffset 0.5 dB Clear Write Average Max Hole Max Hole Ma | | | | | | | ,2022 Trace/Detector |
| #FGain:Low #Atten: 20 dB Radio Device: BTS dB/div Ref 00fiset 0.5 dB Image: Clear Write in the cl | Center Freq 2.4 | 41000000 GF | Tuinu | | | Radio Std: None | The off betoetor |
| dB/div Ref 10.00 dBm Clear Write Clear Write Clear Write Average Average Max Hole Min Hole See BW 30 kHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB | | #IF | | | /reginera | Radio Device: BT | s |
| dB/div Ref 10.00 dBm Clear Write Clear Write Clear Write Average Average Max Hole Min Hole See BW 30 kHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB | | | | | | | |
| Clear Write Clear Write Clear Write Clear Write Average Max Hold Min Hold Clear Write Average Max Hold Min Hold Clear Write Average Max Hold Min Hold Clear Write Average Max Hold Min Hold Clear Write Average Max Hold Min Hold Average Max Hold Min Hold Min Hold Average Max Hold Min Hold Average Max Hold Min Hold Average Max Hold Min Hold Average Max Hold Max Hold Max Hold Min Hold Max | Ref C 10 dB/div Ref Log | offset 0.5 dB 10.00 dBm | | | | | |
| Clear Write Clear Write Clear Write Clear Write Clear Write Average Max Hole Min Hole Min Hole Sweep 4.133 ms Occupied Bandwidth 1.1543 MHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB | | | | | | | |
| Average Average Max Hold Max Hold | 0.00 | | Δ | ^ | | | Clear Write |
| Average Average Max Hold Max Hold | 10.0 | | Anner | ~ mh | | | |
| Average Average Max Hold Max Hold | 20.0 | | | \checkmark | ~~~~~ | | |
| Image: Constraint of the second se | 20.0 | <u>~</u> | / | | | | |
| Image: Constraint of the second se | -30.0 | | | | h | | Average |
| Image: Span 3 MHz Max Hold Min Hold Min Hold Span 3 MHz Span 3 MHz Cocupied Bandwidth #VBW 100 kHz Span 3 MHz Sweep 4.133 ms Occupied Bandwidth Auto 1.1543 MHz OBW Power Span 3 MHz Max Hold Min Hold Auto | -40.0 | · / | | | | | |
| Image: Constraint of the second se | | month | | | | M n | |
| Image: Second state of the second s | -50.0 | | | | | | |
| Image: Second state of the second s | 60.0 WWW | | | | | Mary Mary | Max Hold |
| Image: Second | | | | | | | Maxmora |
| enter 2.441 GHz tes BW 30 kHz Coccupied Bandwidth 1.1543 MHz Transmit Freq Error x dB Bandwidth 1.218 MHz x dB Auto Min Hold Sweep 4.133 ms Detecto Average I Man Min Hold Sweep 4.133 ms Detecto Average I Man Min Hold Sweep 4.133 ms Detecto Average I Man | 70.0 | | | | | | |
| enter 2.441 GHz Span 3 MHz tes BW 30 kHz #VBW 100 kHz Sweep 4.133 ms Occupied Bandwidth 1.1543 MHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB | 80.0 | | | | | | |
| enter 2.441 GHz Span 3 MHz tes BW 30 kHz #VBW 100 kHz Sweep 4.133 ms Occupied Bandwidth 1.1543 MHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB | | | | | | | Min Hold |
| Res BW 30 kHz #VBW 100 kHz Sweep 4.133 ms Occupied Bandwidth 1.1543 MHz Detecto Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB | Center 2 441 GH | 7 | | | | Snan 3 I | MHz |
| Occupied Bandwidth 1.1543 MHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB | #Res BW 30 kHz | | | #VBW 100 ki | lz | | |
| Occupied Bandwidth 1.1543 MHz Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB | | | | | | | |
| 1.1543 MHz Auto Mar Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB | Occupied B | andwidth | | | | | |
| Transmit Freq Error 8.347 kHz OBW Power 99.00 % x dB Bandwidth 1.218 MHz x dB -20.00 dB | | | 40 MIL- | | | | |
| x dB Bandwidth 1.218 MHz x dB -20.00 dB | | 1.15 | 43 MHZ | | | | Man Wan |
| | Transmit Free | q Error | 8.347 kHz | OBW Po | wer | 99.00 % | |
| | x dB Bandwid | ith | 1.218 MHz | x dB | _ | 20.00 dB | |
| status | | | | | | | |
| STATUS | | | | | | | |
| | ISG | | | | ST | ATUS | |

8DPSK Middle Channel

8DPSK High Channel





11. Maximum Peak Output Power

11.1 Block Diagram Of Test Setup



11.2 Limit

| | | | FCC Part15 (15.247), | Subpart C | |
|-------------|------|--------------------|----------------------|--------------------------|--------|
| Section | Т | est Item | Limit | Frequency Range (MHz) | Result |
| 15.247(b)(1 |) Pe | ak Output Power | 0.125 watt or 21dBm | 2400-2483.5 | PASS |

11.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 3MHz. VBW = 3MHz. Sweep = auto; Detector Function = Peak.

3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

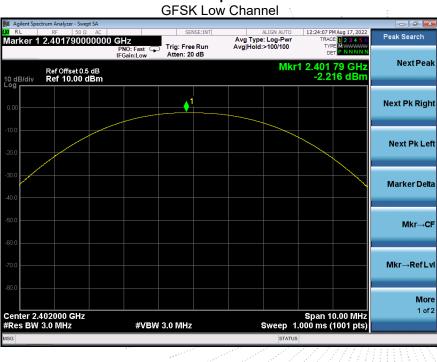
Page: 41 of 65



11.4 Test Result

| Temperature: | 26 ℃ | Relative Humidity: | 54% |
|--------------|-------------|--------------------|-------------|
| Pressure: | 101KPa | Test Voltage : | AC120V/60Hz |

| Modulation | Test Channel | Output Power (dBm) | Limit (dBm) |
|------------|--------------|--------------------|-------------|
| GFSK | Low | -2.216 | 21 |
| GFSK | Middle | -1.026 | 21 |
| GFSK | High | -0.075 | 21 |
| Pi/4 DQPSK | Low | -1.313 | 21 |
| Pi/4 DQPSK | Middle | -0.116 | 21 |
| Pi/4 DQPSK | High | 0.810 | 21 |
| 8DPSK | Low | -0.705 | 21 |
| 8DPSK | Middle | 0.453 | 21 |
| 8DPSK | High | 1.352 | 21 |



Test plots SESK Low Channe

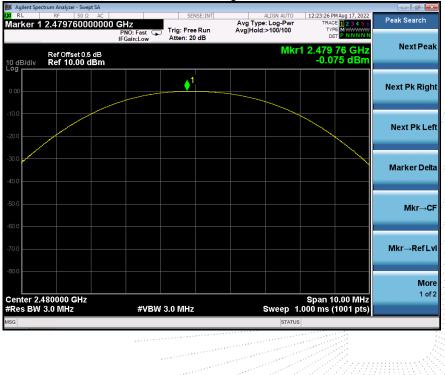




| | | hanne | adle C | FSK M | GF | | | |
|----------------|--|--------------------------------------|--------|-----------------------------------|---------------|----------------------|----------------------------------|----------------|
| | | | | | | | um Analyzer - Swept S | |
| Peak Search | 12:23:45 PM Aug 17, 2022 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N | ALIGN AUTO :: Log-Pwr >100/100 | | SENSE:INT Free Run n: 20 dB | st 😱 Trig: Fr | 00000 GHz | RF 50 Ω 2.440740000 | RL Iarker 1 |
| NextPeak | 2.440 74 GHz -1.026 dBm | Mkr1 | | | | i dB J B m | Ref Offset 0.5 c Ref 10.00 dE | 0 dB/div |
| Next Pk Righ | | | | ↓ ¹ | • | | | 0.00 |
| | | | | | | | | 10.0 |
| Next Pk Lef | | | | | | | | 20.0 |
| | | | | | | | | 30.0 |
| Marker Delta | | | | | | | | 40.0 |
| Mkr→CF | | | | | | | | 50.0 |
| Mkr→RefLv | | | | | | | | 70.0 |
| | | | | | | | | 30.0 |
| More 1 of 2 | Span 10.00 MHz | | | | | | 1000 GHz | enter 2 |
| | 000 ms (1001 pts) | Sweep 1. | | IHz | VBW 3.0 MH | | | Res BW |
| | | STATUS | | | | | | SG |

GFSK Middle Channel

GFSK High Channel



No.: BCTC/RF-EMC-007



| 📕 Agilent Spectrum Analyzer - Swept S | | | | |
|---|---|-------|--|--------------|
| XI RL RF 50 Ω | | | | Peak Search |
| Marker 1 2.40200000 | D000 GHz PNO: Fast IFGain:Low Atten: 20 dE | | TRACE 123456 TYPE MWWWW DET PNNNNN | |
| Ref Offset 0.5 c 0 dB/div Ref 10.00 dE | dB βm | Mł | r1 2.402 00 GHz -1.313 dBm | NextPeal |
| 0.00 | 1 | | | Next Pk Righ |
| 10.0 | | | | |
| 20.0 | | | | Next Pk Lef |
| 10.0 | | | | Marker Delt |
| 0.0 | | | | Mkr→C |
| 0.0 | | | | |
| 0.0 | | | | Mkr→RefLv |
| 60.0 | | | | Mor 1 of |
| Center 2.402000 GHz Res BW 3.0 MHz | #VBW 3.0 MHz | Sweep | Span 10.00 MHz 1.000 ms (1001 pts) | |
| ISG | | STAT | 110 | |

Pi/4 DQPSK Low Channel

Pi/4 DQPSK Middle Channel

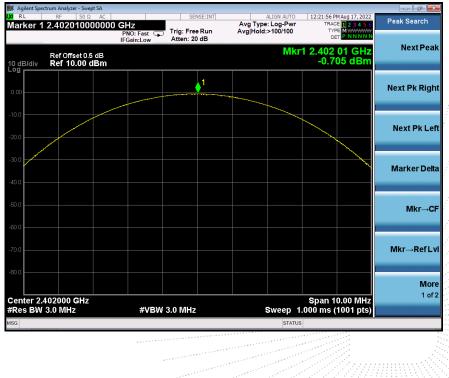




| 🚺 Agilent Spec | trum Analyzer - Swept SA | - | ., | It flight chan | | |
|-----------------------|------------------------------------|-----------------------------------|--------------------------------|--|---|----------------|
| X/RL | RF 50 Ω AC | | SENSE:INT | ALIGN AUTO | 12:25:25 PM Aug 17, 2022 | Peak Search |
| Marker 1 | 2.4800300000 | DO GHZ PNO: Fast IFGain:Low | Trig: Free Run Atten: 20 dB | Avg Type: Log-Pwr Avg Hold:>100/100 | TRACE 1 2 3 4 5 6 TYPE MWWWW DET PNNNNN | |
| 10 dB/div Log | Ref Offset 0.5 dB Ref 10.00 dBm | | | Mkr | 1 2.480 03 GHz 0.810 dBm | NextPeak |
| 0.00 | | | 1 | | | Next Pk Right |
| -10.0 | | | | | | |
| -20.0 | | | | | | Next Pk Left |
| 30.0 | | | | | | Marker Delta |
| 40.0 | | | | | | Warker Dela |
| 50.0 | | | | | | Mkr→CF |
| 50.0 | | | | | | |
| 30.0 | | | | | | Mkr→RefLv |
| | | | | | | More 1 of 2 |
| Center 2.4 #Res BW | 180000 GHz 3.0 MHz | #VBW | 3.0 MHz | Sweep 1 | Span 10.00 MHz .000 ms (1001 pts) | |
| 1SG | | | | STATUS | | |

Pi/4 DQPSK High Channel

8DPSK Low Channel



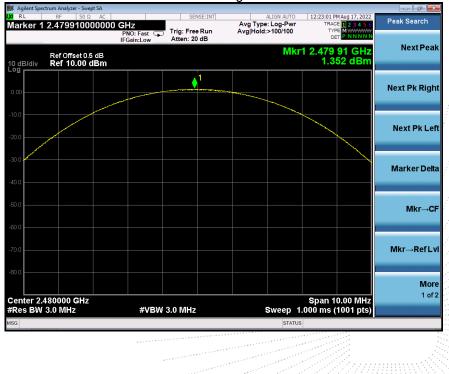
No.: BCTC/RF-EMC-007



| Og Image: Constraint of the second secon | | | liddle Channel | | |
|--|---------------------------------------|----------------------------|---|-------------------------------|---------------|
| Pro: Fast Pro: F | | | | | |
| Ref Offset 05 dB Mkr1 2.440 87 GHz 0.453 dBm Next Peak 000 000 0 <th></th> <th></th> <th></th> <th></th> <th>Peak Search</th> | | | | | Peak Search |
| Ref Offset 0.5 dB MKr 1 2.440 87 GHz 00 0.453 dBm 00 0.454 dBm 00 | Marker 1 2.44087000000 | PNO: Fast 🕞 Trig: Free Run | Avg Hold:>100/100 | TYPE MWWWW DET P NNNNN | |
| Next Pk Right Next Pk Ri | IO dB/div Ref 10.00 dBm | | Mkr1 2.4 | 40 87 GHz 0.453 dBm | NextPeak |
| Next Pk Left Nover Pk Left< | 0.00 | 1 | | | Next Pk Right |
| 300 Marker Delta 300 Marker Delta <t< td=""><td></td><td></td><td></td><td></td><td>Next Pk Lef</td></t<> | | | | | Next Pk Lef |
| 500 | 30.0 | | | | Marker Delta |
| 300 | 40.0 50.0 | | | | Mkr_C |
| Res BW 3.0 MHz #VBW 3.0 MHz Sweep 1.000 ms (1001 pts) | 50.0 | | | | |
| enter 2.441000 GHz Span 10.00 MHz 1 of Res BW 3.0 MHz #VBW 3.0 MHz Sweep 1.000 ms (1001 pts) | 30.0 | | | | Mkr→RefLv |
| | Center 2.441000 GHz Res BW 3.0 MHz | #VBW 3.0 MHz | Spanner | an 10.00 MHz ns (1001 pts) | |
| | SG | | STATUS | | |

8DPSK Middle Channel

8DPSK High Channel





12. Hopping Channel Separation

12.1 Block Diagram Of Test Setup



12.2 Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. 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 0.125W.

12.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 30kHz. VBW = 100kHz , Span = 2.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.



Page: 47 of 65



12.4 Test Result

| Modulation | Test Channel | Separation (MHz) | Limit(MHz) | Result |
|------------|--------------|------------------|------------|--------|
| GFSK | Low | 1.004 | 0.874 | PASS |
| GFSK | Middle | 1.002 | 0.877 | PASS |
| GFSK | High | 1.002 | 0.873 | PASS |
| Pi/4 DQPSK | Low | 1.004 | 0.833 | PASS |
| Pi/4 DQPSK | Middle | 1.002 | 0.835 | PASS |
| Pi/4 DQPSK | High | 1.000 | 0.835 | PASS |
| 8DPSK | Low | 1.000 | 0.811 | PASS |
| 8DPSK | Middle | 1.002 | 0.812 | PASS |
| 8DPSK | High | 1.002 | 0.813 | PASS |

Test plots GFSK Low Channel



Edition: A.5





| | GFSK N | liddle Channel | | |
|--|-------------------------|--|--|----------------|
| 🎉 Agilent Spectrum Analyzer - Swept SA | | | | |
| X RL RF 50 Ω AC Marker 1 Δ 1.002000000 Ν | Alten: 20 dB | ALIGN AUTO (Avg Type: Log-Pwr Avg Hold:>100/100 | D1:08:10 PM Aug 17, 2022 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N | Peak Search |
| Ref Offset 0.5 dB 10 dB/div Ref 10.00 dBm | IFGain:Low Atten: 20 dB | ΔΜκ | r1 1.002 MHz 0.054 dB | Next Peak |
| 0.00 X2 | | | | Next Pk Right |
| 20.0 | | | | Next Pk Left |
| 40.0 | | | | Marker Delta |
| 60.0 | | | | Mkr→CF |
| 70.0 | | | | Mkr→RefLvl |
| 80 0 Center 2.441500 GHz | | | Span 2.000 MHz | More 1 of 2 |
| ¢Res BW 30 kHz Iss | #VBW 100 kHz | Sweep 2.13 | 3 ms (1001 pts) | |

~ - - -

GFSK High Channel





| | | | | | | DR LOW | Chai | | |
|---------------------|-------------------------------|-----------|------------------------|-------------------------|---------|----------|------------|---|--------------|
| | trum Analyzer - Swep | t SA | | | | | | | |
| RL | RF 50 Ω | AC | | SEN | ISE:INT | | ALIGN AUTO | 01:03:19 PM Aug 17, 2022 TRACE 1 2 3 4 5 6 | Peak Search |
| larker 1 | 1.00400000 | PN | IO: Wide 🖵 Gain:Low | Trig: Free Atten: 20 | | Avg Hold | :>100/100 | TYPE MWWWWW DET P NNNNN | |
| 0 dB/div | Ref Offset 0.5 Ref 10.00 d | dB Bm | | | | | ΔΝ | /kr1 1.004 MHz 0.078 dB | Next Pea |
| | | | | | | 1 | Δ2 | | Next Pk Righ |
| 10.0 | X2 | $ \land $ | \sim | ~ | | | | | |
| 20.0 | | V V. | 500 | ~~~ | ~~~ | ~~ | | m | Next Pk Lei |
| 0.0 | | | | | | | | | |
| 0.0 | | | | | | | | | Marker Delt |
| 0.0 | | | | | | | | | Mkr→C |
| 0.0 | | | | | | | | | |
| 0.0 | | | | | | | | | Mkr→RefL |
| 30.0 | | | | | | | | | Mon |
| enter 2.4 Res BW | 02500 GHz | | #\/B\M | 100 kHz | | | Swaan 2 | Span 2.000 MHz .133 ms (1001 pts) | 1 of |
| G SG | JU KHZ | | #VDVV | 100 KHZ | | | | | |
| 3 | | | | | | | STATUS | | |

Pi/4 DQPSK Low Channel

Pi/4 DQPSK Middle Channel







Pi/4 DQPSK High Channel

8DPSK Low Channel







8DPSK Middle Channel

8DPSK High Channel





13. Number Of Hopping Frequency

13.1 Block Diagram Of Test Setup



13.2 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

13.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.

4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;



13.4 Test Result

Test Plots:

79 Channels in total GFSK



| | | | Κ | DQPS | PI/4 L | | | | | | |
|-------------------------|---|---------------|---------------------------------|-----------------------|--------|---------|----------------------------|------------|--------------------------------|---------------------|----------|
| | | | | | | | | | Analyzer - Swep | | |
| Marker Select Marker | MAug 17, 2022 E 1 2 3 4 5 6 PE M P N N N N N | TRAC | LIGN AUTO Log-Pwr 100/100 | Avg Type Avg Hold: | | | Z NO:Fast ⊂ Gain:Low | PI | ^{ξε} 50 Ω 78.07250 | | RI ar |
| Select Marker 1 | 2 5 MHz .780 dB | 1 78.07: 0 | ΔMkr | | | | | dB | ef Offset 0.5 ef 10.00 d | R 3/div R | dE |
| Norm | 102 MM | UMMA | WWW | ah an An An | MMM | NUMM | IN MARIAN | LUVUUU | ስለለስስሲኒል | XANN | 0 |
| Delt | | | | A MILLAN | | | | al Ardacak | 4979v144. | |) |
| Fixed | | | | | | | | | | |) |
| o | <u> </u> | | | | | | | | | ļ | 2 |
| Properties | | | | | | | | | | |] |
| Moi 1 of | 3350 GHz 1001 pts) | Stop 2.43 | weep 8 | | | 300 kHz | #VBW | | | t 2.4000 s BW 10 | |
| | | | STATU | | | | | | | | - |



| | 80 | DPSK | | |
|---|---|--|--|--------------------|
| Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC arker 1 Δ 78.156000000 | 0 MHz PNO: Fast C | ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100 | 12:54:46 PM Aug 17, 2022 TRACE 1 2 3 4 5 6 TYPE MWWWWW | Marker |
| Ref Offset 0.5 dB) dB/div Ref 10.00 dBm | IFGain:Low Atten: 20 dB | | 78.156 0 MHz 2.465 dB | Select Marker 1 |
| a XPANAWWWWWWWW | INALAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA | MANAMANAN | | Norm |
| | | | | Del |
| 0.0 | | | | Fixed |
| 0.0 | | | ¥ | c |
| 0.0 | | | | Properties |
| tart 2.40000 GHz Res BW 100 kHz | #VBW 300 kHz | Sweep 8.0 | top 2.48350 GHz 00 ms (1001 pts) | Mo 1 of |
| G | | STATUS | | |

No.: BCTC/RF-EMC-007

Page: 55 of 65



14. Dwell Time

14.1 Block Diagram Of Test Setup



14.2 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

14.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set spectrum analyzer span = 0. Centred on a hopping channel;

3. Set RBW = 1MHz and VBW = 3MHz.Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.

4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

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14.4 Test Result

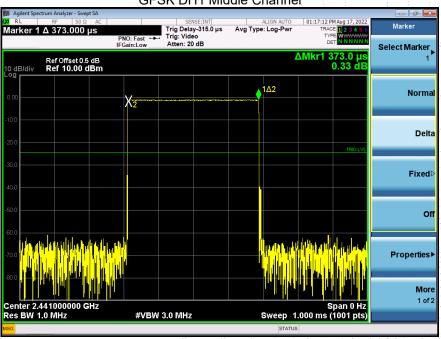
DH5 Packet permit maximum 1600 / 79 / 6 hops per second in each channel (5 time slots RX, 1 time slot TX).

DH3 Packet permit maximum 1600 / 79 / 4 hops per second in each channel (3 time slots RX, 1 time slot TX).

DH1 Packet permit maximum 1600 / 79 /2 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows:

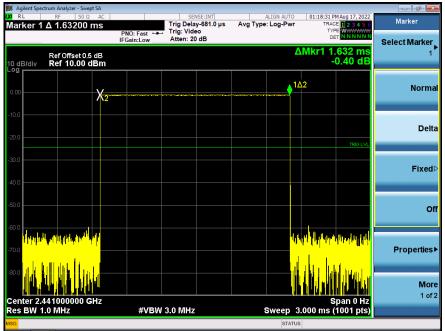
DH5:1600/79/6*0.4*79*(MkrDelta)/1000 DH3:1600/79/4*0.4*79*(MkrDelta)/1000 DH1:1600/79/2*0.4*79*(MkrDelta)/1000 Remark: Mkr Delta is once pulse time.

| Modulation | Channel Data | Packet | pulse time(ms) | Dwell Time(s) | Limits(s) |
|------------|-----------------|--------|-------------------|------------------|-----------|
| GFSK | Middle | 1DH1 | 0.373 | 0.119 | 0.4 |
| | | 1DH3 | 1.632 | 0.261 | 0.4 |
| | | 1DH5 | 2.868 | 0.306 | 0.4 |
| Pi/4DQPSK | Middle | 2DH1 | 0.383 | 0.123 | 0.4 |
| | | 2DH3 | 1.632 | 0.261 | 0.4 |
| | | 2DH5 | 2.872 | 0.306 | 0.4 |
| 8DPSK | Middle | 3DH1 | 0.385 | 0.123 | 0.4 |
| | | 3DH3 | 1.629 | 0.261 | 0.4 |
| | | 3DH5 | 2.860 | 0.305 | 0.4 |



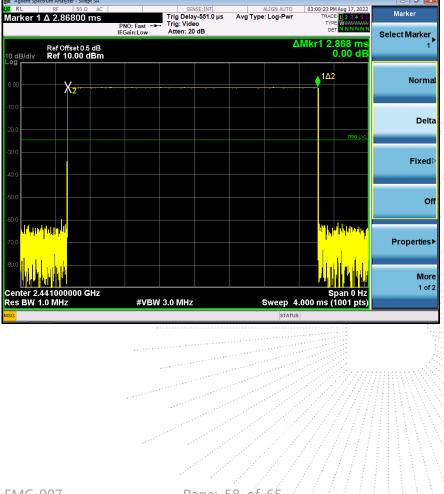
Test Plots GFSK DH1 Middle Channel





GFSK DH3 Middle Channel

GFSK DH5 High Middle Channel

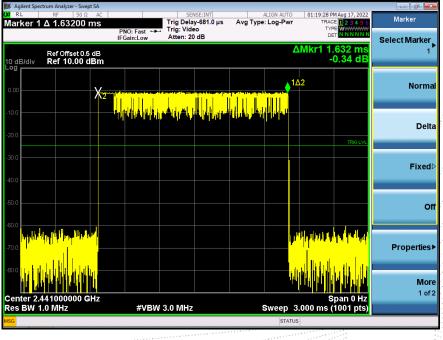




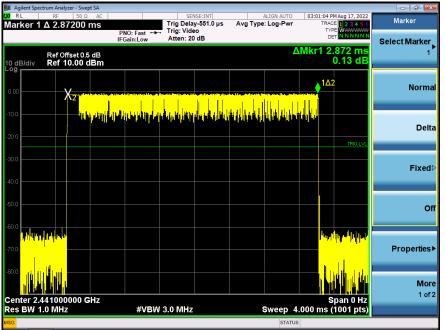


Pi/4DQPSK DH1 Middle Channel

Pi/4DQPSK DH3 Middle Channel

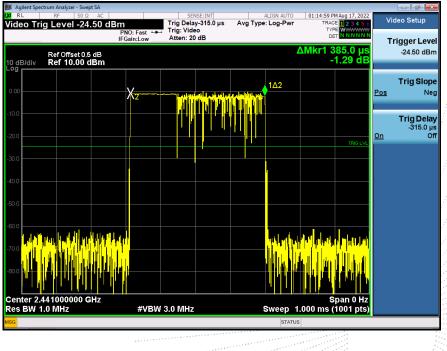




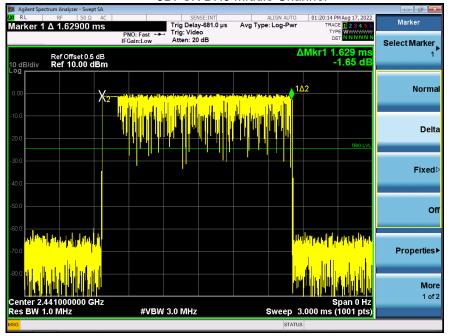


Pi/4DQPSK DH5 Middle Channel

8DPSK DH1 Middle Channel

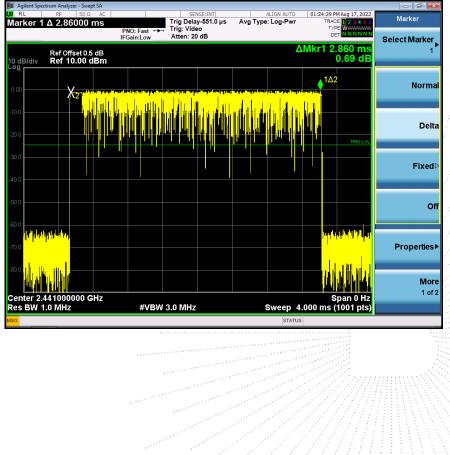






8DPSK DH3 Middle Channel

8DPSK DH5 Middle Channel



No.: BCTC/RF-EMC-007



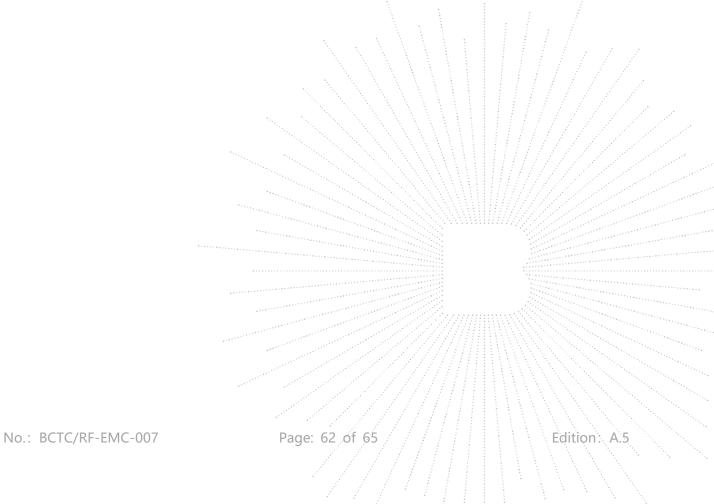
15. Antenna Requirement

15.1 Limit

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.

15.2 Test Result

The EUT antenna is PCB antenna, fulfill the requirement of this section.





16. EUT Photographs

EUT Photo



NOTE: Appendix-Photographs Of EUT Constructional Details

No.: BCTC/RF-EMC-007

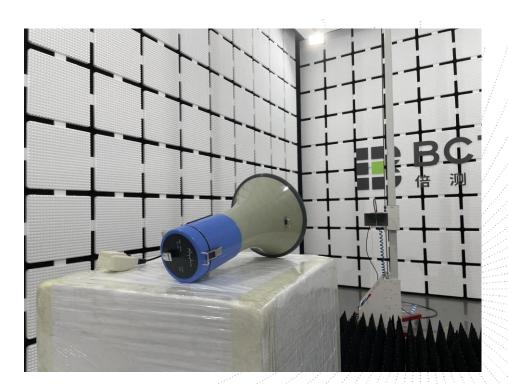
Page: 63 of 65



17. EUT Test Setup Photographs

Radiated Measurement Photos





No.: BCTC/RF-EMC-007



STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The test report without CMA mark is only used for scientific research, teaching, enterprise product development and internal quality control purposes.

8. The quality system of our laboratory is in accordance with ISO/IEC17025.

9. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:

1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: 400-788-9558

P.C.: 518103

FAX: 0755-33229357

Website: http://www.chnbctc.com

E-Mail: bctc@bctc-lab.com.cn

******** END ******

No.: BCTC/RF-EMC-007

Page: 65 of 65