

**经续检验**

SLG-CPC Testlaboratory

| TEST REPORT | | |
|--|---|------------------|
| Report Number.: | 90717-25-72-25-PP001 | |
| Date of issue | 2025-07-30 | |
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| Factory's name | Zhuhai Xprinter Electronics Technology Co., Ltd. | |
| Address | 5F,1st Building,613 Huawei Road,Qianshan Industrial Park,Xiangzhou District,Zhuhai City,Guangdong Province,China | |
| Standard(s).....: | FCC 47 CFR Part 15, Subpart C | |
| Test item description | THERMAL RECEIPT PRINTER, THERMAL BARCODE PRINTER, BLUETOOTH THERMAL RECEIPT PRINTER, BLUETOOTH THERMAL BARCODE PRINTER, WIRELESS THERMAL RECEIPT PRINTER, THERMAL LABEL PRINTER, CLOUD THERMAL RECEIPT PRINTER, CLOUD THERMAL BARCODE PRINTER | |
| Trade Mark.....: | Xprinter® 芯烨 | |
| Model/Type reference.....: | XP-58TS (See Page 4 for series model) | |
| FCC ID.....: | 2AWYKXP-58TS | |
| Date of receipt of test item ...: | 2025-07-16 | |
| Date (s) of performance of test | 2025-07-17 to 2025-07-25 | |
| Summary of Test Results | Pass | |
| The Summary of Test Results based on a technical opinion belongs to the standard(s). | | |
| General disclaimer: This report shall not be reproduced except in full, without the written approval of SLG-CPC Testlaboratory Co., Ltd. The test results in the report only apply to the tested sample. | | |



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Modified Information

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| Report No. | Revision Data | Summary |
|----------------------|---------------|------------------|
| 90717-25-72-25-PP001 | 2025-07-30 | Original Version |
| | | |

1 EUT TECHNICAL DESCRIPTION

| Characteristics | Description |
|--------------------------------------|---|
| Product | THERMAL RECEIPT PRINTER, THERMAL BARCODE PRINTER, BLUETOOTH THERMAL RECEIPT PRINTER, BLUETOOTH THERMAL BARCODE PRINTER, WIRELESS THERMAL RECEIPT PRINTER, THERMAL LABEL PRINTER, CLOUD THERMAL RECEIPT PRINTER, CLOUD THERMAL BARCODE PRINTER |
| Model Number | XP-T58AS, XP-T58BS, XP-T58CS, XP-T58DS, XP-T58ES, XP-T58FS, XP-T58GS, XP-T58HS, XP-T58KS, XP-T58LS, XP-T58MS, XP-T58NS, XP-T58SS, XP-T58XS, XP-T58US, XP-Q58AS, XP-Q58BS, XP-Q58CS, XP-Q58DS, XP-Q58ES, XP-Q58FS, XP-Q58GS, XP-Q58HS, XP-Q58S, XP-Q58KS, XP-Q58LS, XP-Q58MS, XP-Q58NS, XP-Q58SS, XP-Q58XS, XP-Q58US, XP-58AS, XP-58BS, XP-58CS, XP-58DS, XP-58ES, XP-58FS, XP-58GS, XP-58HS, XP-58KS, XP-58LS, XP-58MS, XP-58NS, XP-58SS, XP-58XS, XP-58US, XP-58TS (All models are identical to each other except for product name and model name. All tests are performed on model XP-58TS.) |
| Device Type | Bluetooth V3.0 |
| Data Rate | 1Mbps for BT V3.0 GFSK modulation 2Mbps for BT V3.0 pi/4-DQPSK modulation |
| Modulation: | GFSK modulation for BT V3.0 (1Mbps) pi/4-DQPSK modulation for BT V3.0 (2Mbps) |
| Operating Frequency Range(s): | 2402-2480MHz |
| Number of Channels: | 79 channels |
| Transmit Power Max: | -4.54 dBm |
| Antenna Type: | PCB Antenna |
| Antenna Gain: | 2.58 dBi |
| Power supply: | Power Input: 9V $\overline{\text{---}}$ 2A |
| AC/DC ADAPTER Information | MODEL: YC18-09020001 INPUT: 100-240V~ 50/60Hz 1.0A OUTPUT: 9V $\overline{\text{---}}$ 2A Manufacturer: Zhongshan City Youchuang Electronics Technology Co.,Ltd |

Note: for more details, please refer to the User's manual of the EUT.

2 SUMMARY OF TEST RESULT

| FCC Part Clause | Test Parameter | Verdict | Remark |
|---|--|---------|--------|
| 15.247(a)(1) | 20 dB Bandwidth | PASS | |
| 15.247(a)(1) | Carrier Frequency Separation | PASS | |
| 15.247(a)(1) | Number of Hopping Frequencies | PASS | |
| 15.247(a)(1) | Average Time of Occupancy (Dwell Time) | PASS | |
| 15.247(b)(1) | Maximum Peak Conducted Output Power | PASS | |
| 15.247(d) | Conducted Spurious Emissions | PASS | |
| 15.247(d) 15.209 | Radiated Spurious Emissions | PASS | |
| 15.207 | Conducted Emission | PASS | |
| 15.203 | Antenna Application | PASS | |
| 15.247 (a) (1)/g/h | Frequency Hopping System | PASS | |
| NOTE1: N/A (Not Applicable) NOTE2: According to FCC KDB 558074 D01 15.247 Meas Guidance v05r02, the report use radiated measurements in the restricted frequency bands. In addition, the radiated test is also performed to ensure the emissions emanating from the device cabinet also comply with the applicable limits. | | | |

RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is intended for FCC ID: 2AWYKXP-58TS filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

3 TEST METHODOLOGY

3.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:

FCC 47 CFR Part 15, Subpart C

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

3.2 MEASUREMENT EQUIPMENT USED

| Equipment | Manufacturer | Model | S/N | Last Cal. | DUE Cal. |
|-------------------------------------|-----------------|--------------|------------------|------------|----------|
| RF Connected Test | | | | | |
| Vector Signal Generator | Rohde & Schwarz | SMBV100B(6G) | 101166 | 2025/04/16 | 1 year |
| Analog Signal Generator | Rohde & Schwarz | SMB100A(40G) | 181333 | 2025/06/18 | 1 year |
| Signal Analyzer | Rohde & Schwarz | FSV40 | 101527 | 2025/03/26 | 1 year |
| Power Analyzer | Rohde & Schwarz | OSP-B157W8 | N/A | 2025/04/16 | 1 year |
| Wideband Radio Communication Tester | R&S | CMW270 | 101985 | 2025/04/18 | 1 year |
| Wideband Radio Communication Tester | Rohde & Schwarz | CMW500 | 166898 | 2025/04/14 | 1 year |
| Temperature&Humidity test chamber | ESPEC | VC 4018 | / | 2025/03/26 | 1 year |
| Radiated Emission Test | | | | | |
| EMI Test Receiver | KEYSIGHT | N9010A | MY56070465 | 2024/12/03 | 1 year |
| EMI Test Receiver | Rohde & Schwarz | FSV40 | 101511 | 2025/01/10 | 1 year |
| Bilog Antenna | Schwarzbeck | VULB 9163 | 01335 | 2023/04/21 | 3 year |
| Broadband Antenna | Schwarzbeck | 9162 | 139 | 2025/03/01 | 3 year |
| Power Amplifier | EMEC | EM330 | 060676 | 2025/03/11 | 3 year |
| Cable | Tuyue | F4309 | L-400-NmNm-12000 | 2024/12/03 | 2 year |
| Horn Antenna | Schwarzbeck | BBHA9120D | 1779 | 2025/03/28 | 3 year |
| Horn Antenna | Schwarzbeck | BBHA9170 | 00954 | 2022/09/13 | 3 year |
| Power Amplifier | Rohde & Schwarz | SCU08F2 | 008400019 | 2025/03/24 | 3 year |
| Power Amplifier | Rohde & Schwarz | SCU-18F | 180118 | 2025/03/24 | 3 year |
| Power Amplifier | Rohde & Schwarz | SCU40A | 100499 | 2023/06/21 | 3 year |
| Active Loop Antenna | ETS LINDGREN | 6512 | 41623 | 2025/03/19 | 3 year |
| Test Software | Farad | EZ-EMC | Ver.CPC-3A1 | / | / |
| Conducted Emission Test | | | | | |
| LISN | Schwarzbeck | NSLK 8127 | 8127-892 | 2025/03/17 | 1 year |
| EMI Test Receiver | R&S | ESR3 | 102124 | 2024/12/03 | 1 year |
| Triple loop | R&S | HM020 | 834206/006 | 2024/12/03 | 2 year |
| Pulse Limiter | R&S | ESH3-Z2 | 357.8810.52 | 2024/12/03 | 1 year |
| Test Software | Farad | EZ-EMC | Ver.CPC-3A1 | / | / |

3.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (1Mbps for Bluetooth V3.0 GFSK modulation; 2Mbps for Bluetooth V3.0 pi/4-DQPSK modulation) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Frequency and Channel list for Bluetooth V3.0

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|-----------------|---------|-----------------|---------|-----------------|
| 0 | 2402 | 39 | 2441 | ... | ... |
| 1 | 2403 | 40 | 2442 | 76 | 2478 |
| 2 | 2404 | 41 | 2443 | 77 | 2479 |
| ... | ... | ... | ... | 78 | 2480 |
| Note: $f_c = 2402\text{MHz} + (k-1) \times 1\text{MHz}$ $k=1$ to 79 | | | | | |

Test Frequency and channel for Bluetooth V3.0

| Lowest Frequency | | Middle Frequency | | Highest Frequency | |
|------------------|-----------------|------------------|-----------------|-------------------|-----------------|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 0 | 2402 | 39 | 2441 | 78 | 2480 |

4 FACILITIES AND ACCREDITATIONS

4.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No. 11, Wu Song Road, Dongcheng District Dongguan, Guangdong Province, 523117, People's Republic of China

The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.10 and CISPR Publication 32.

4.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

EMC Lab. : Accredited by ISED, October 31 2023
CAB identifier: CN0126
Company Number: 27767

Accredited by A2LA, October 31 2023
The Certificate Registration Number is 6325.01

Accredited by FCC
Designation Number: CN1287
Test Firm Registration Number: 394054

Name of Firm : SLG-CPC Testlaboratory Co., Ltd.
Site Location : No. 11, Wu Song Road, Dongcheng District Dongguan, Guangdong Province, 523117, People's Republic of China

5 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

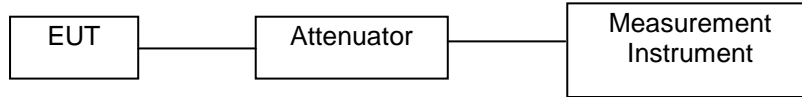
| Parameter | Uncertainty |
|--------------------------------|--|
| Radio Frequency | $\pm 1 \times 10^{-5}$ |
| Maximum Peak Output Power Test | $\pm 1.0\%$ |
| Conducted Emissions Test | $\pm 3.68\text{dB}$ |
| Radiated Emission Test | 4.80dB (Below 1GHz) 3.26dB (Above 1GHz) |
| Dwell time | $\pm 0.1\%$ |
| Power Density | $\pm 0.9\%$ |
| Occupied Bandwidth Test | $\pm 2.3\%$ |
| Band Edge Test | $\pm 1.2\%$ |
| Antenna Port Emission | $\pm 3\text{dB}$ |
| Temperature | $\pm 3.2\%$ |
| Humidity | $\pm 2.5\%$ |

Measurement Uncertainty for a level of Confidence of 95%

6 SETUP OF EQUIPMENT UNDER TEST

6.1 RADIO FREQUENCY TEST SETUP 1

The Bluetooth V3.0 component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



6.2 RADIO FREQUENCY TEST SETUP 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 32.

Below 30MHz:

The EUT is placed on a turntable 0.8meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The center of the loop shall be 1 m above the ground. For certain applications, the loop antenna plane may also need to be positioned horizontally at the the specified distance from the EUT.

Above 30MHz:

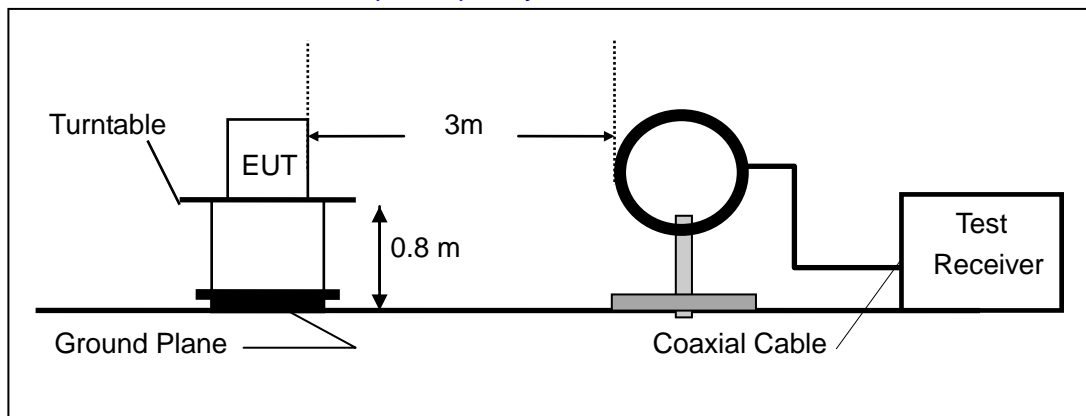
The EUT is placed on a turntable 0.8meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

Above 1GHz:

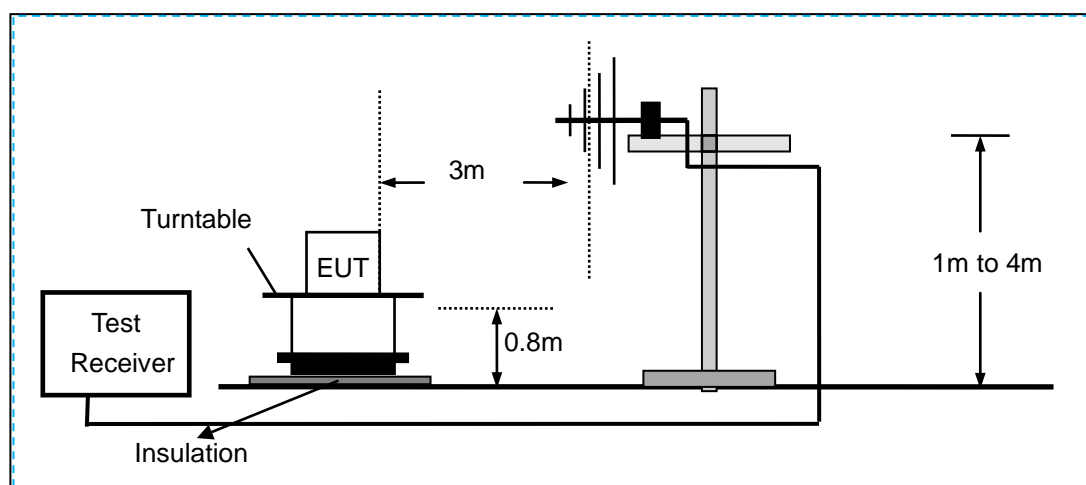
(Note: The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2013.)

The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

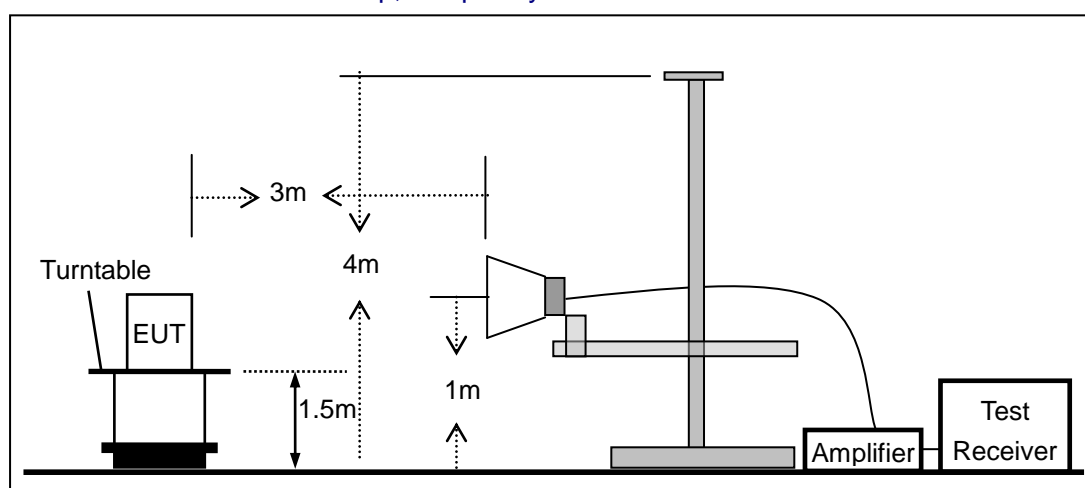
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(c) Radiated Emission Test Set-Up, Frequency above 1000MHz

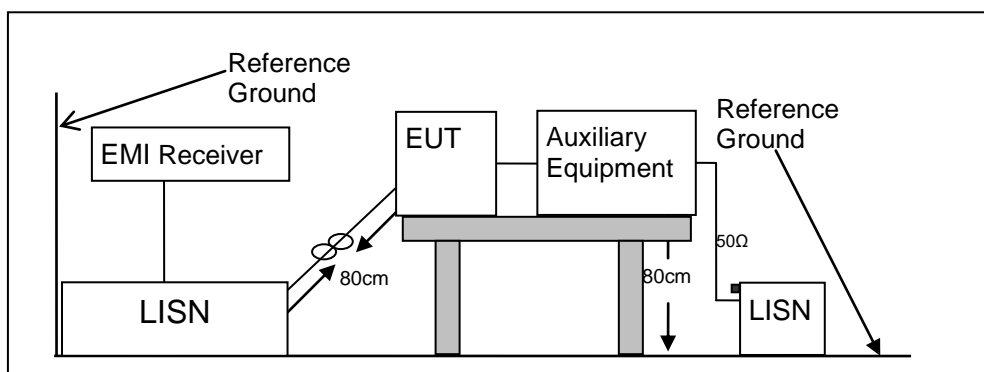


6.3 CONDUCTED EMISSION TEST SETUP

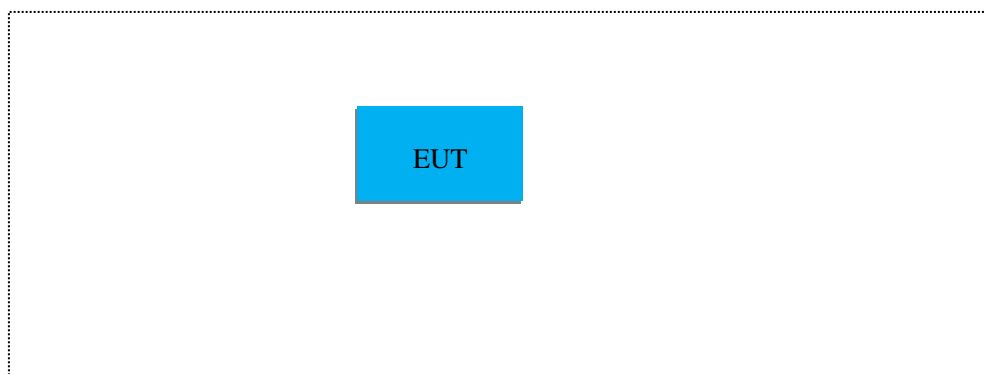
The mains cable of the EUT (Perfect Share Mini) must be connected to LISN. The LISN shall be placed 0.8m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.8m.

According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



6.4 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM



6.5 SUPPORT EQUIPMENT

| EUT Cable List and Details | | | |
|----------------------------|------------|---------------------|------------------------|
| Cable Description | Length (m) | Shielded/Unshielded | With / Without Ferrite |
| | | | |
| | | | |

| Auxiliary Cable List and Details | | | |
|----------------------------------|------------|---------------------|------------------------|
| Cable Description | Length (m) | Shielded/Unshielded | With / Without Ferrite |
| | | | |
| | | | |

| Auxiliary Equipment List and Details | | | |
|--------------------------------------|--------------|-------|---------------|
| Description | Manufacturer | Model | Serial Number |
| | | | |
| | | | |

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.

7 TEST REQUIREMENTS

7.1 20DB BANDWIDTH

7.1.1 Applicable Standard

According to FCC Part 15.247(a)(1) and KDB 558074 D01 15.247 MEAS GUIDANCE v05r02

7.1.2 Conformance Limit

No limit requirement.

7.1.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

7.1.4 Test Procedure

The EUT was operating in Bluetooth V3.0 mode and controlled its channel. Printed out the test result from the spectrum by hard copy function.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously

Set RBW = 30 kHz.

Set the video bandwidth (VBW) =100 kHz.

Set Span= approximately 1 to 3 times the 20 dB bandwidth

Set Detector = Peak.

Set Trace mode = max hold.

Set Sweep = auto couple.

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the markerdelta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

Measure and record the results in the test report.

Test Results

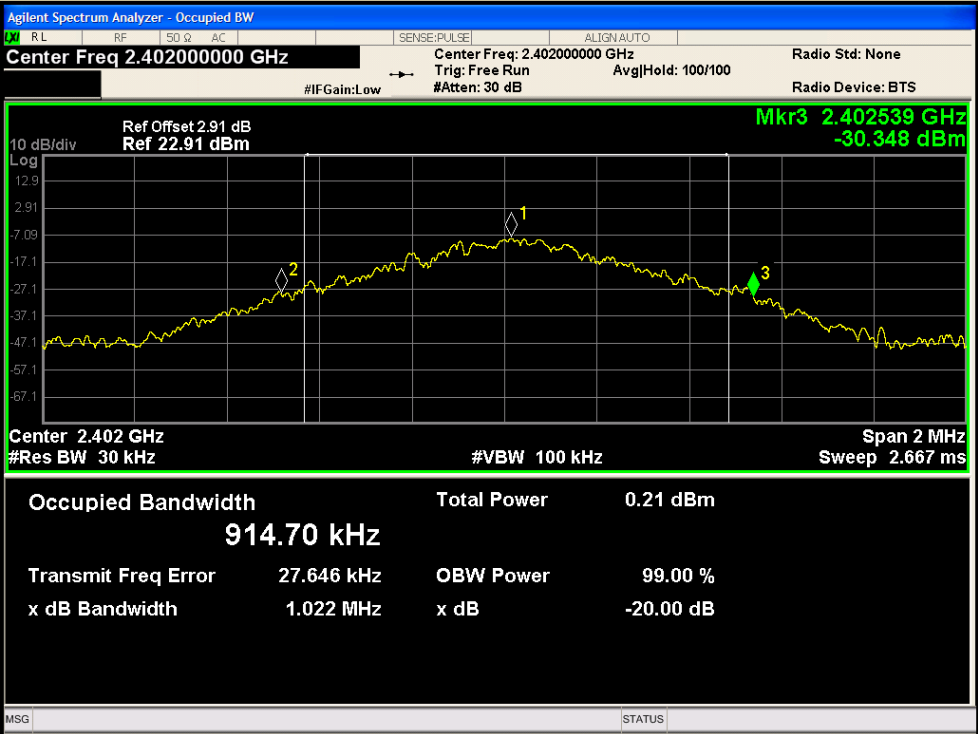
| | |
|--------------------|-----------|
| Temperature: | 26° C |
| Relative Humidity: | 54% |
| ATM Pressure: | 1011 mbar |

| Modulation Mode | Channel Number | Channel Frequency (MHz) | Measurement Bandwidth (MHz) | Limit (MHz) | Verdict |
|----------------------------|----------------|-------------------------|-----------------------------|-------------|---------|
| GFSK | 00 | 2402 | 1.022 | N/A | PASS |
| | 39 | 2441 | 1.045 | N/A | PASS |
| | 78 | 2480 | 1.02 | N/A | PASS |
| pi/4-DQPSK | 00 | 2402 | 1.333 | N/A | PASS |
| | 39 | 2441 | 1.368 | N/A | PASS |
| | 78 | 2480 | 1.346 | N/A | PASS |
| Note: N/A (Not Applicable) | | | | | |

Test Model

20dB Bandwidth
Bluetooth V3.0
Channel 0: 2402MHz

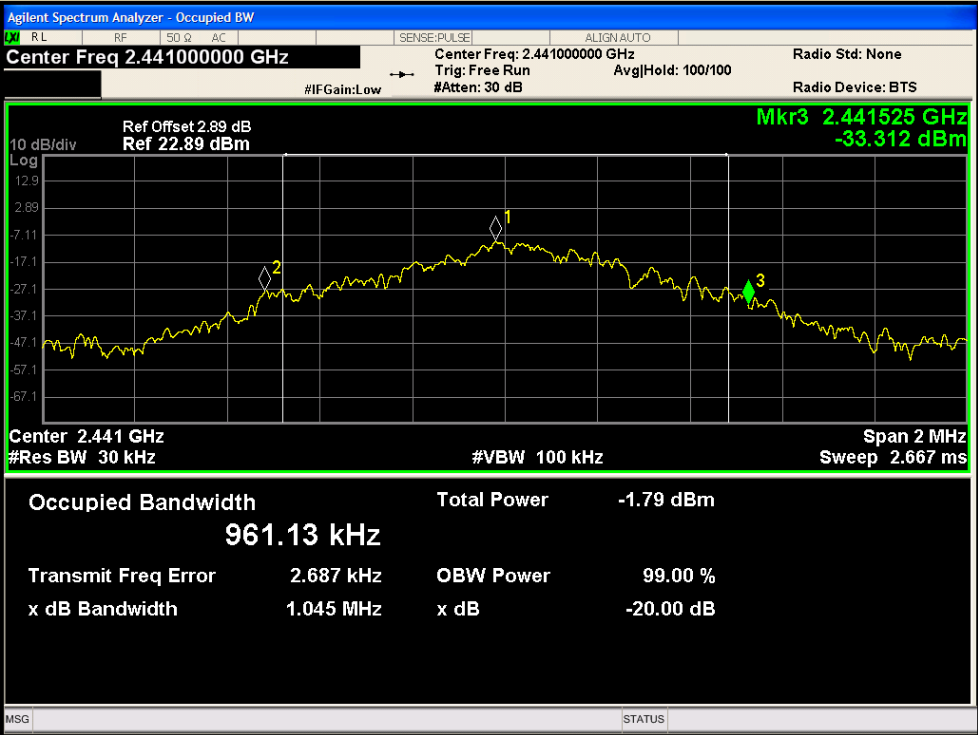
GFSK Modulation



Test Model

20dB Bandwidth
Bluetooth V3.0
Channel 39: 2441MHz

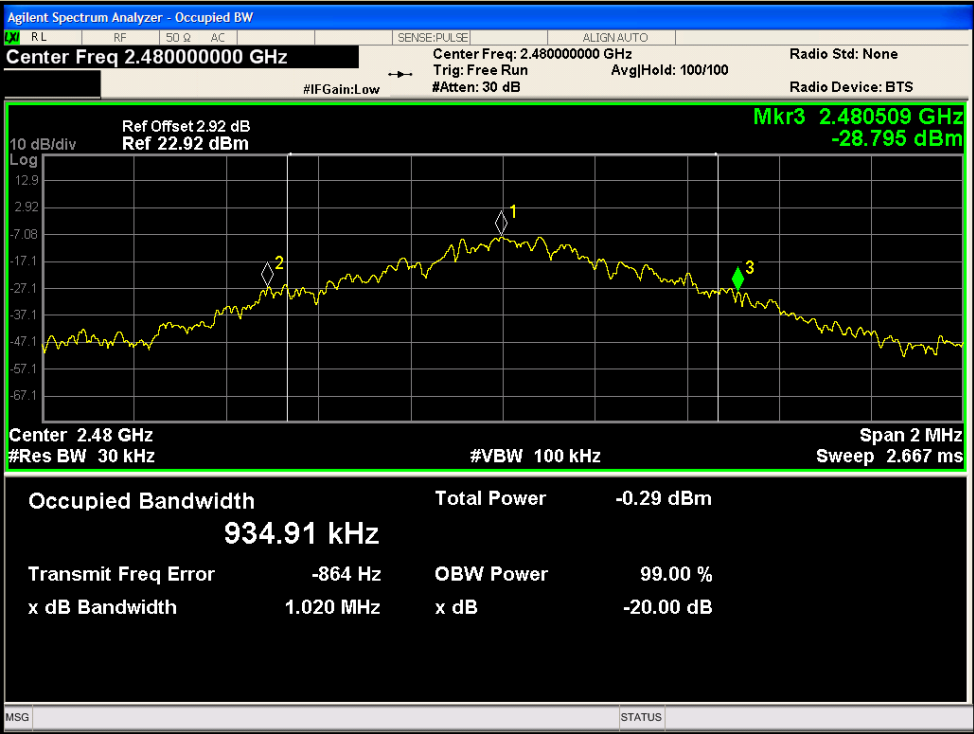
GFSK Modulation



Test Model

20dB Bandwidth
Bluetooth V3.0
Channel 78: 2480MHz

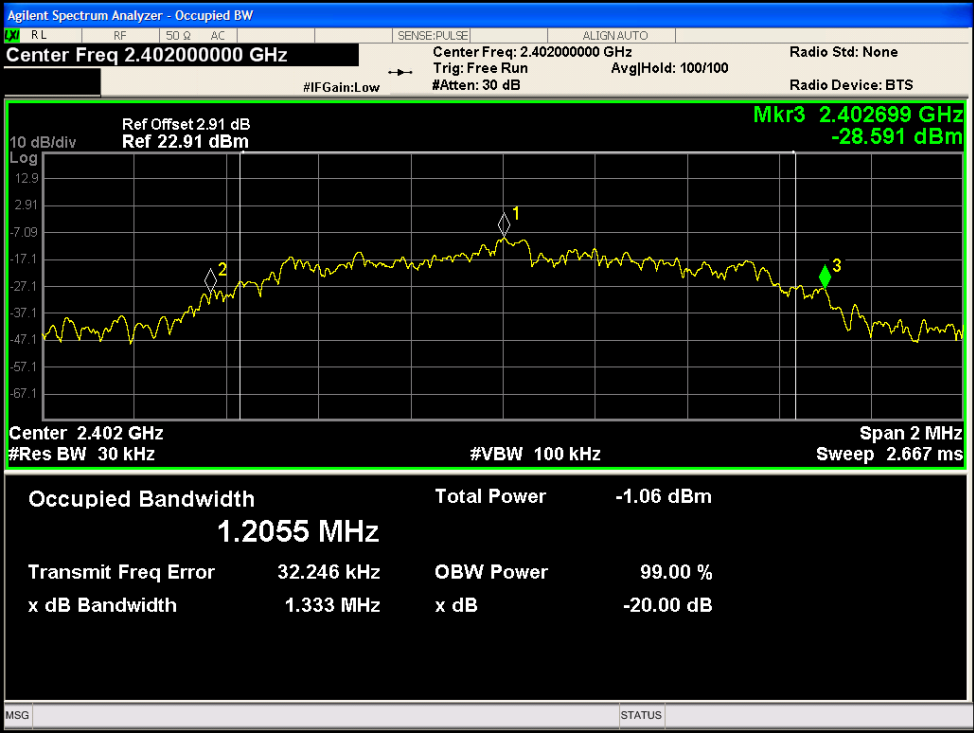
GFSK Modulation



Test Model

20dB Bandwidth
Bluetooth V3.0
Channel 0: 2402MHz

pi/4-DQPSK Modulation

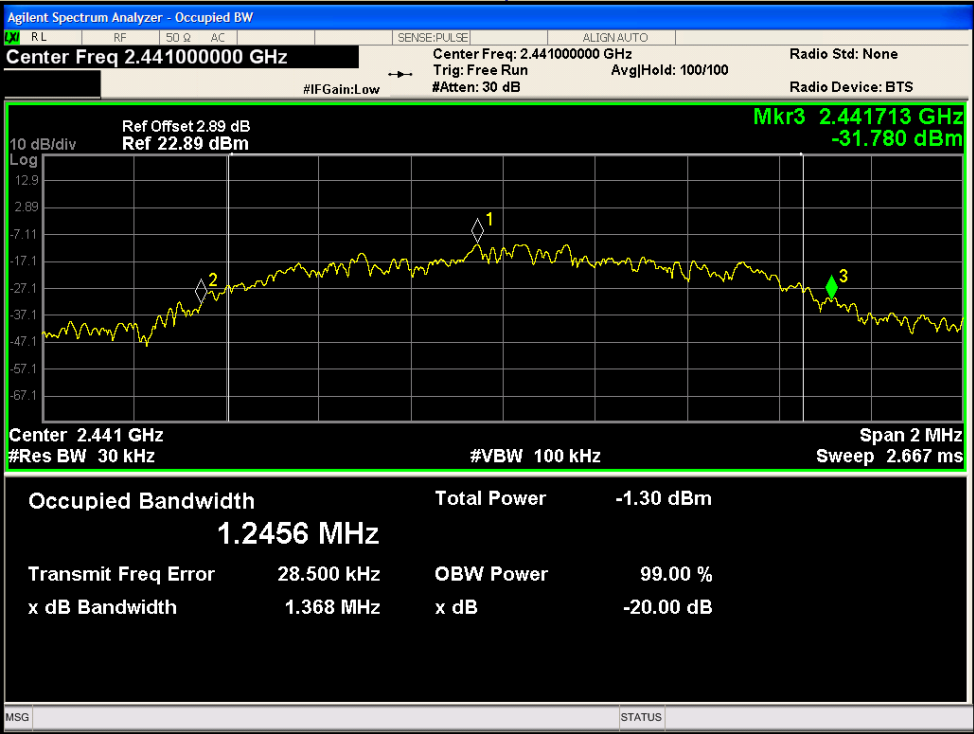


20dB Bandwidth

Test Model Bluetooth V3.0

Channel 39: 2441MHz

pi/4-DQPSK Modulation

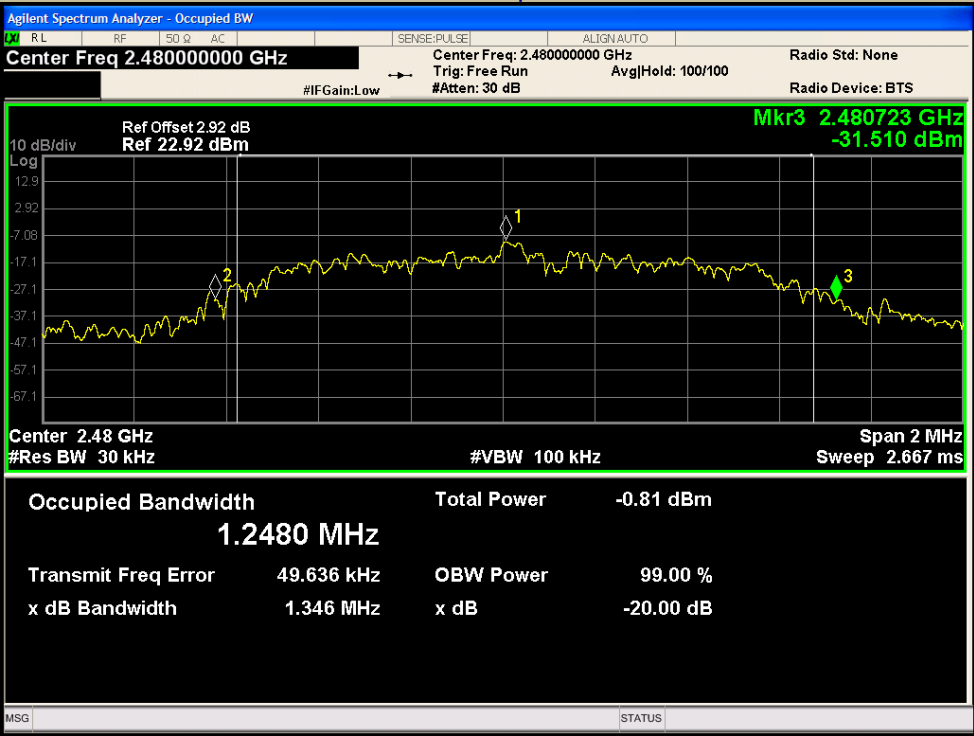


20dB Bandwidth

Test Model Bluetooth V3.0

Channel 78: 2480MHz

pi/4-DQPSK Modulation



7.2 CARRIER FREQUENCY SEPARATION

7.2.1 Applicable Standard

According to FCC Part 15.247(a)(1) and KDB 558074 D01 15.247 MEAS GUIDANCE v05r02

7.2.2 Conformance Limit

Frequency hopping systems operating in the 2400-2483.5MHz band shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

In case of an output power less than 125mW, the frequency hopping system may have channels separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

7.2.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

7.2.4 Test Procedure

■ According to FCC Part 15.247(a)(1)

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.

VBW: Video (or average) bandwidth (VBW) \geq RBW

Set the span = wide enough to capture the peaks of two adjacent channels

Set Sweep time = auto couple.

Set Detector = peak. Set Trace mode = max hold.

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.

Test Results

| | |
|--------------------|-----------|
| Temperature: | 26° C |
| Relative Humidity: | 54% |
| ATM Pressure: | 1011 mbar |

| Modulation Mode | Channel Number | Channel Frequency (MHz) | Measurement Bandwidth (MHz) | Limit (kHz) | Verdict |
|------------------------------------|----------------|-------------------------|-----------------------------|-------------|---------|
| GFSK | 0 | 2402 | 1.048 | >681 | PASS |
| | 39 | 2441 | 1.008 | >681 | PASS |
| | 78 | 2480 | 1.008 | >697 | PASS |
| pi/4-DQPSK | 0 | 2402 | 1.005 | >680 | PASS |
| | 39 | 2441 | 1.024 | >889 | PASS |
| | 78 | 2480 | 1.028 | >912 | PASS |
| Note: Limit = 20dB bandwidth * 2/3 | | | | | |

Test Model

Carrier Frequency Separation
Bluetooth V3.0
Channel 0: 2402MHz

GFSK Modulation



Test Model

Carrier Frequency Separation
Bluetooth V3.0
Channel 39: 2441MHz

GFSK Modulation



Test Model

Carrier Frequency Separation
Bluetooth V3.0
Channel 78: 2480MHz

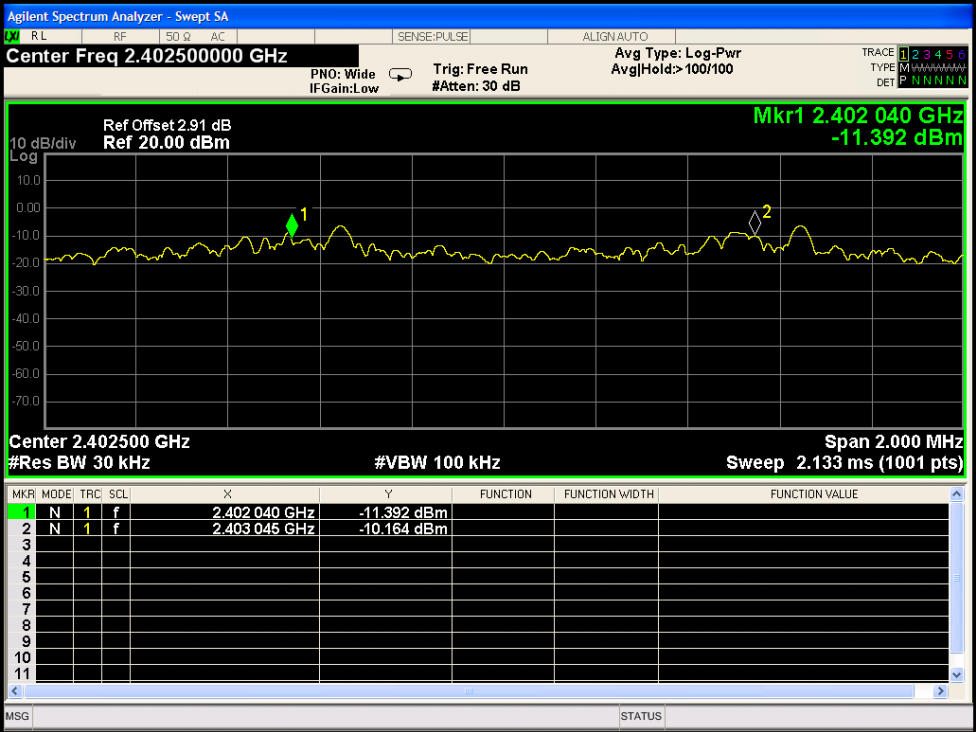
GFSK Modulation



Test Model

Carrier Frequency Separation
Bluetooth V3.0
Channel 0: 2402MHz

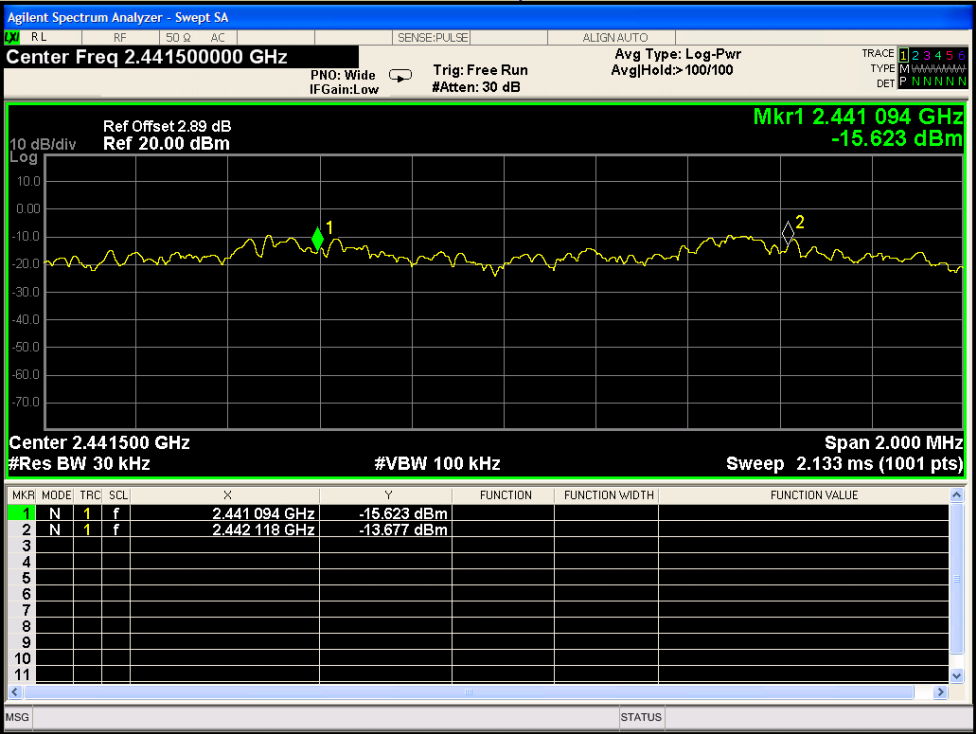
pi/4-DQPSK Modulation



Test Model

Carrier Frequency Separation
Bluetooth V3.0
Channel 39: 2441MHz

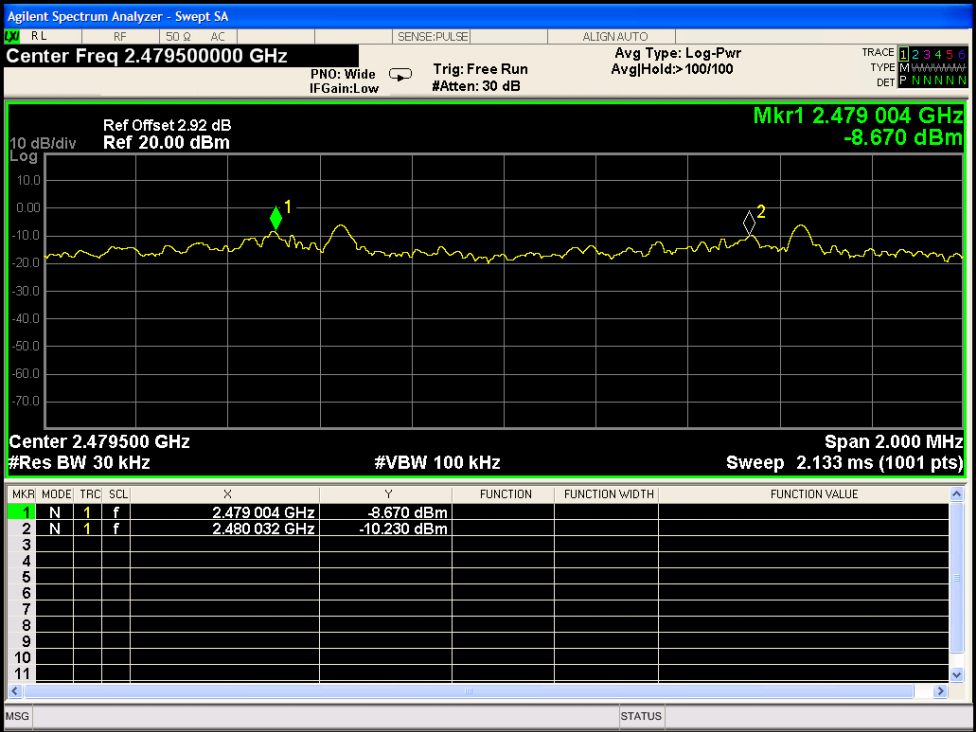
pi/4-DQPSK Modulation



Test Model

Carrier Frequency Separation
Bluetooth V3.0
Channel 78: 2480MHz

pi/4-DQPSK Modulation



7.3 NUMBER OF HOPPING FREQUENCIES

7.3.1 Applicable Standard

According to FCC Part 15.247(a)(1) (iii) and KDB 558074 D01 15.247 MEAS GUIDANCE v05r02

7.3.2 Conformance Limit

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

7.3.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

7.3.4 Test Procedure

■ According to FCC Part 15.247(a)(1)(iii)

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = the frequency band of operation (2400-2483.5MHz)

RBW \geq 100KHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

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.

Test Results

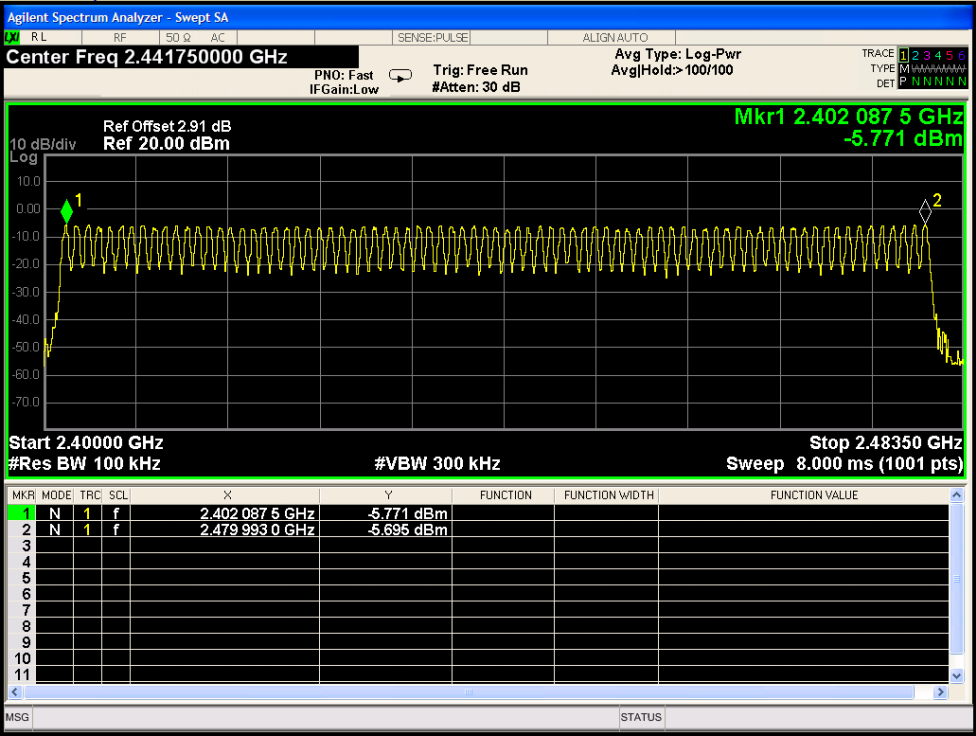
| | |
|--------------------|-----------|
| Temperature: | 26° C |
| Relative Humidity: | 54% |
| ATM Pressure: | 1011 mbar |

| Modulation Mode | Hopping Channel Frequency Range | Quantity of Hopping Channel | Quantity of Hopping Channel limit |
|-----------------|---------------------------------|-----------------------------|-----------------------------------|
| GFSK | 2402-2480 | 79 | > 15 |
| pi/4-DQPSK | 2402-2480 | 79 | > 15 |

Test Model

Number Of Hopping Frequencies
Bluetooth V3.0
Span: 2400-2483.5MHz

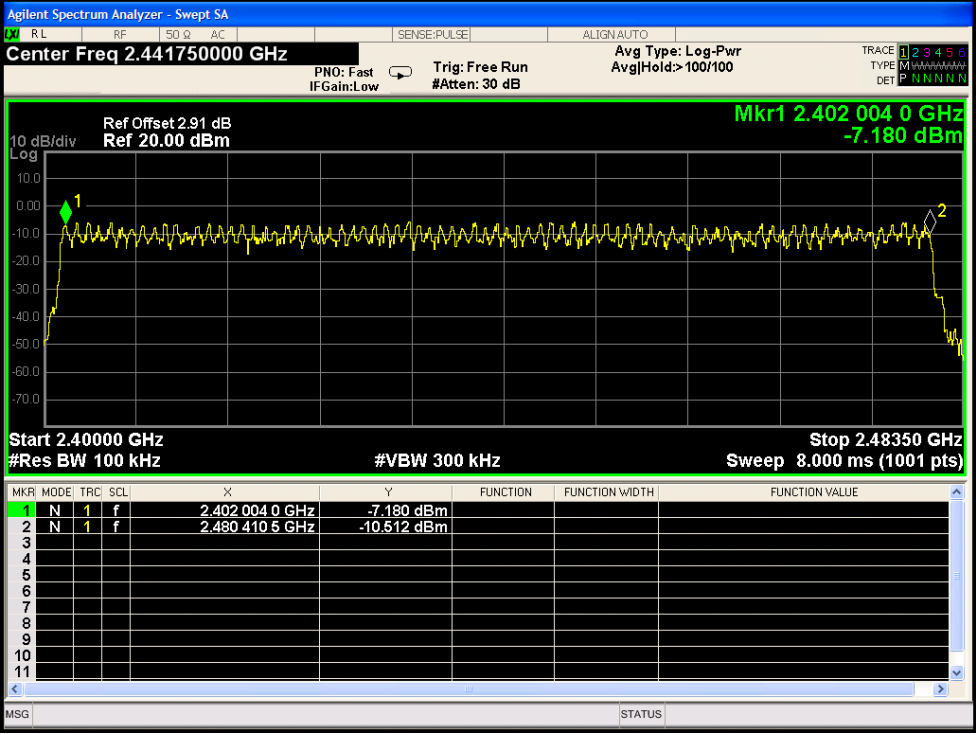
GFSK Modulation



Test Model

Number Of Hopping Frequencies
Bluetooth V3.0
Span: 2400-2483.5MHz

pi/4-DQPSK Modulation



7.4 AVERAGE TIME OF OCCUPANCY (DWELL TIME)

7.4.1 Applicable Standard

According to FCC Part 15.247(a)(1)(iii) and KDB 558074 D01 15.247 MEAS GUIDANCE v05r02

7.4.2 Conformance Limit

For frequency hopping systems operating in the 2400-2483.5MHz band, the average time of occupancy on any channel shall not be greater than 0.4s within a period of 0.4s multiplied by the number of hopping channels employed.

7.4.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

7.4.4 Test Procedure

■ According to FCC Part 15.247(a)(1)(iii)

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel

RBW = 1 MHz

VBW \geq RBW

Sweep = as necessary to capture the entire dwell time per hopping channel

Detector function = peak

Trace = max hold

If possible, 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.

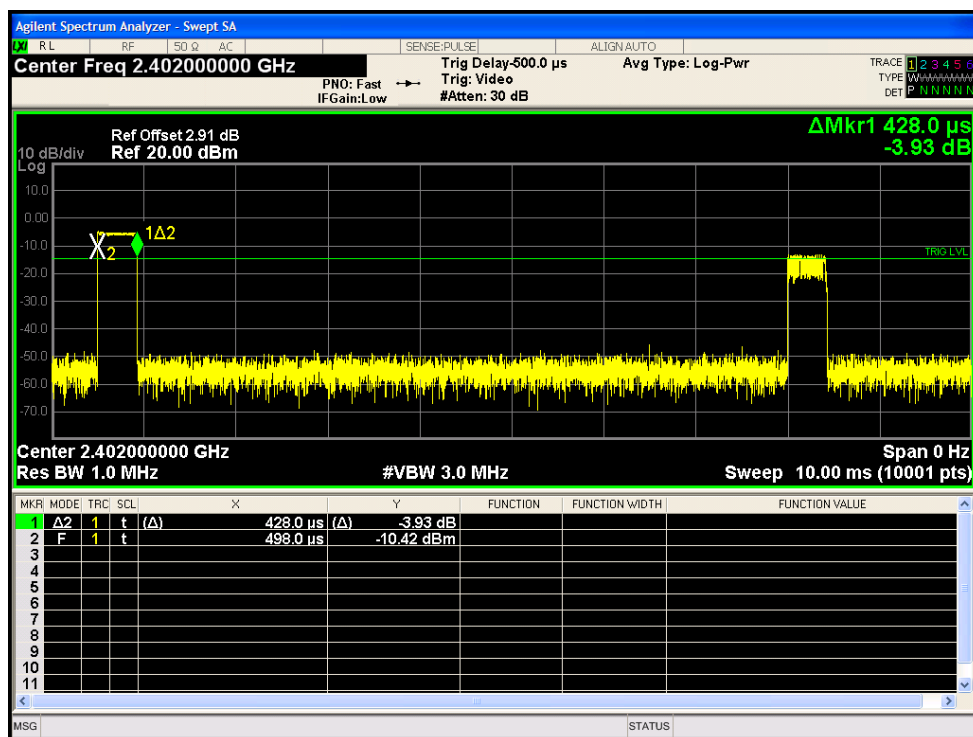
7.4.5 Test Results

| | |
|--------------------|-----------|
| Temperature: | 26° C |
| Relative Humidity: | 54% |
| ATM Pressure: | 1011 mbar |

Bluetooth (GFSK, pi/4-DQPSK) mode have been tested, and the worst result(GFSK) was report as below:

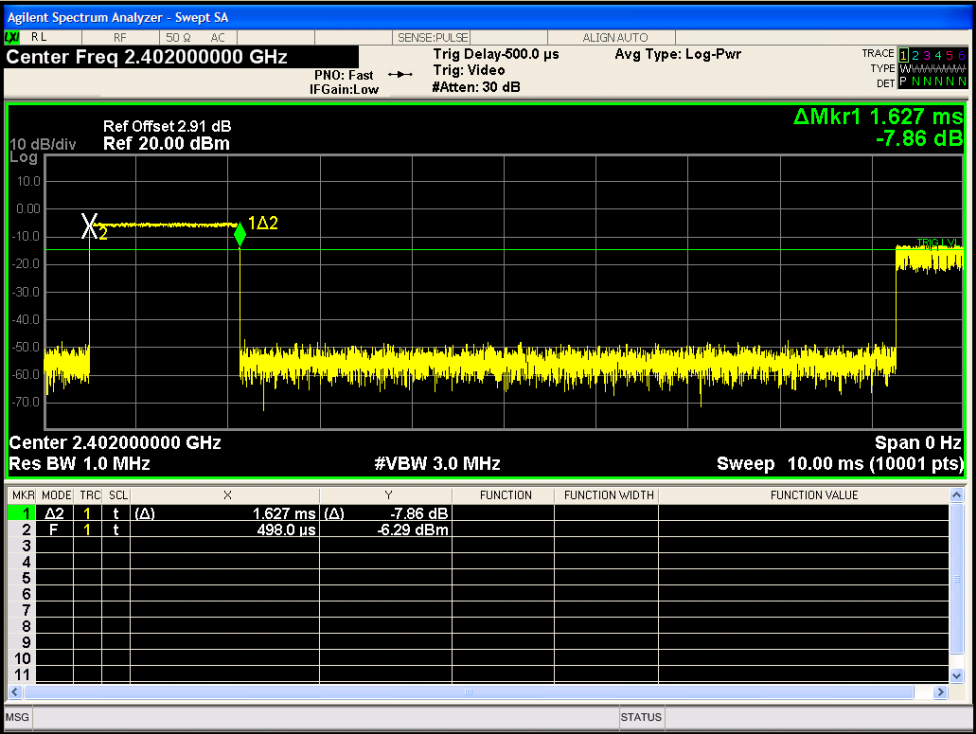
| Modulation Mode | Packet type | Frequency (MHz) | Pulse width (ms) | Dwell Time (ms) | Limit (ms) | Verdict |
|---|-------------|-----------------|------------------|-----------------|------------|---------|
| GFSK | DH1 | 2402 | 0.428 | 136.96 | <400 | PASS |
| | DH3 | 2402 | 1.627 | 260.32 | <400 | PASS |
| | DH5 | 2402 | 2.827 | 301.55 | <400 | PASS |
| Note: Dwell Time(DH1)=PW*(1600/2/79)*31.6 Dwell Time(DH3)=PW*(1600/4/79)*31.6 Dwell Time(DH5)=PW*(1600/6/79)*31.6 | | | | | | |

Test Model Average Time Of Occupancy (Dwell Time)
 Bluetooth V3.0
 CH 0: 2402MHz GFSK DH1



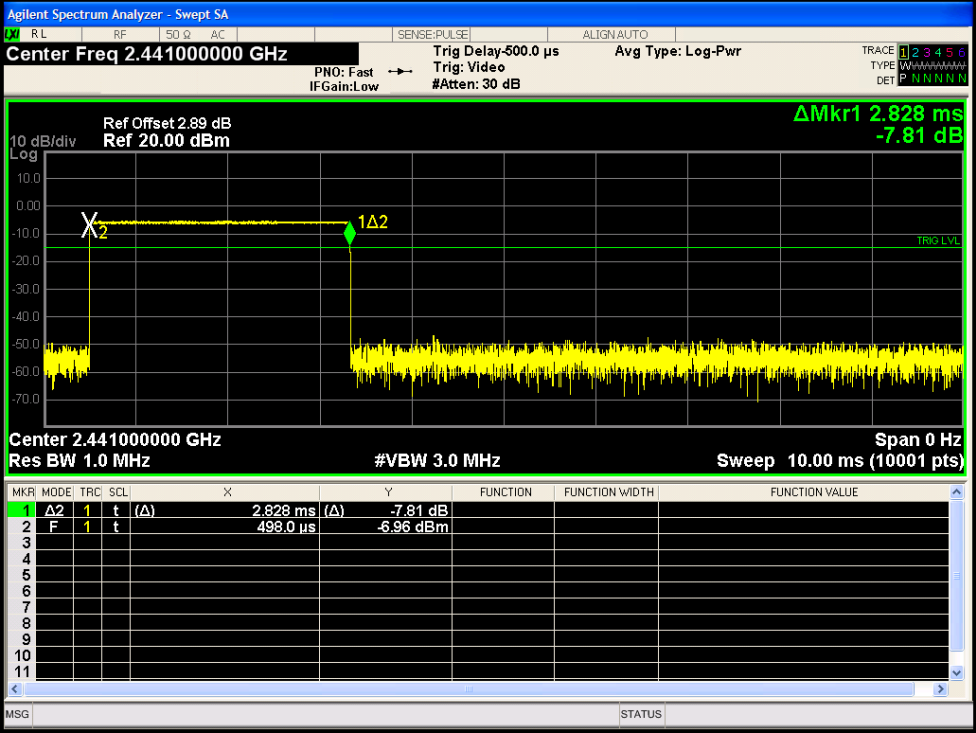
Test Model

Average Time Of Occupancy (Dwell Time)
Bluetooth V3.0
CH 0: 2402MHz
GFSK DH3



Test Model

Average Time Of Occupancy (Dwell Time)
Bluetooth V3.0
CH 0: 2402MHz
GFSK DH5



7.5 MAXIMUM PEAK CONDUCTED OUTPUT POWER

7.5.1 Applicable Standard

According to FCC Part 15.247(b)(1) and KDB 558074 D01 15.247 MEAS GUIDANCE v05r02

7.5.2 Conformance Limit

The max For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

7.5.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

7.5.4 Test Procedure

■ According to FCC Part 15.247(b)(1)

As an alternative to a peak power measurement, compliance with the limit can be based on a measurement of the maximum conducted output power.

Use the following spectrum analyzer settings:

Set Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel

Set RBW > the 20 dB bandwidth of the emission being measured

Set VBW ≥ RBW

Set Sweep = auto

Set Detector function = peak

Set Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission to determine the peak amplitude level.

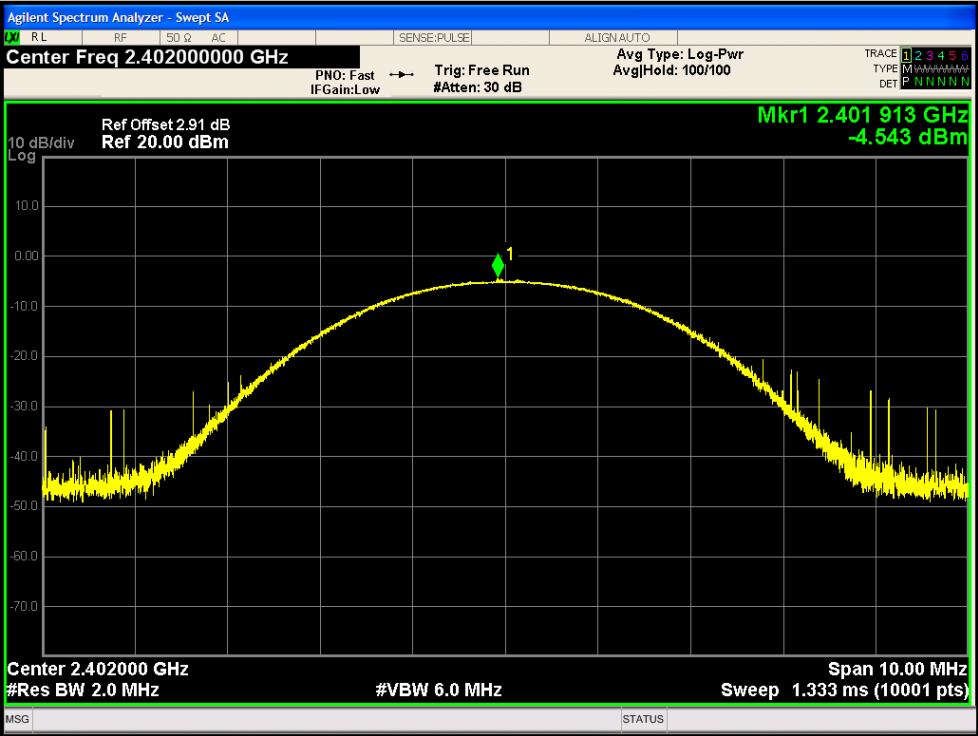
Test Results

| | |
|--------------------|-----------|
| Temperature: | 26° C |
| Relative Humidity: | 54% |
| ATM Pressure: | 1011 mbar |

| Operation Mode | Channel Number | Channel Frequency (MHz) | Measurement Level (dBm) | Limit (dBm) | Verdict |
|----------------|----------------|-------------------------|-------------------------|-------------|---------|
| GFSK | 0 | 2402 | -4.54 | 21 | PASS |
| | 39 | 2441 | -4.87 | 21 | PASS |
| | 78 | 2480 | -4.75 | 21 | PASS |
| pi/4-DQPSK | 0 | 2402 | -4.58 | 21 | PASS |
| | 39 | 2441 | -5 | 21 | PASS |
| | 78 | 2480 | -4.73 | 21 | PASS |
| Note: N/A | | | | | |

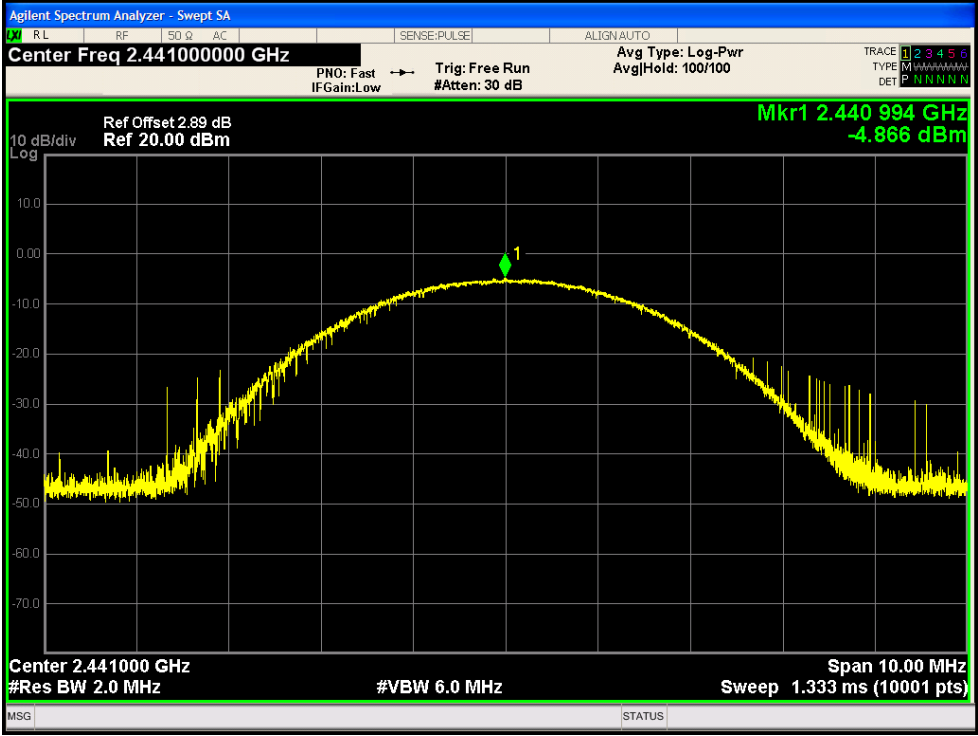
Test Model

Maximum Peak Conducted Output Power
Bluetooth V3.0
Channel 0: 2402MHzGFSK

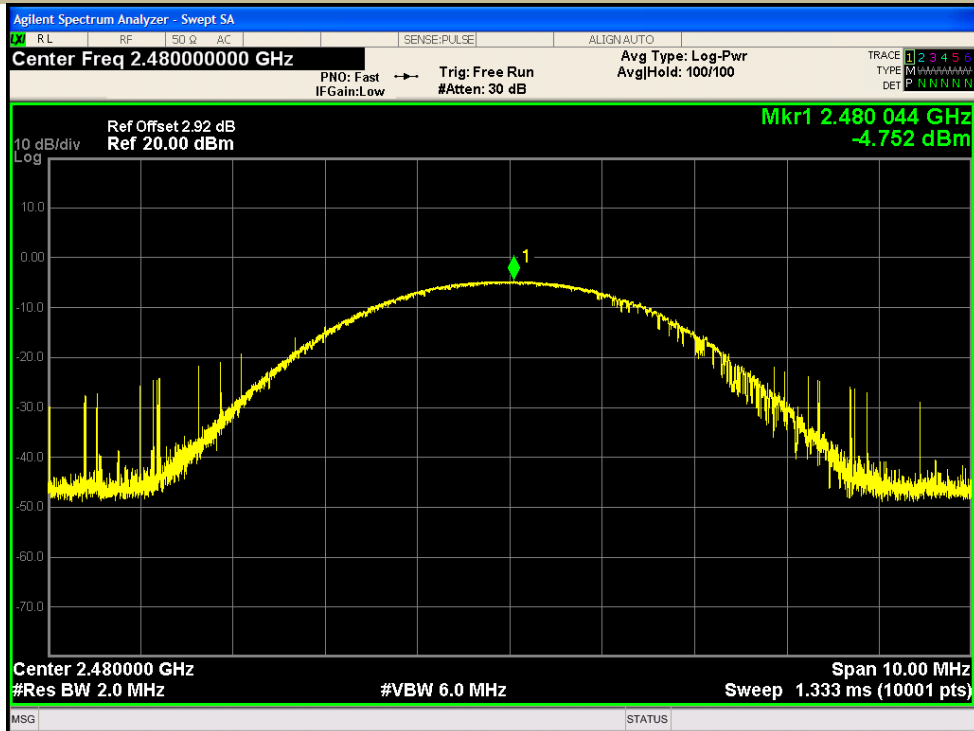


Test Model

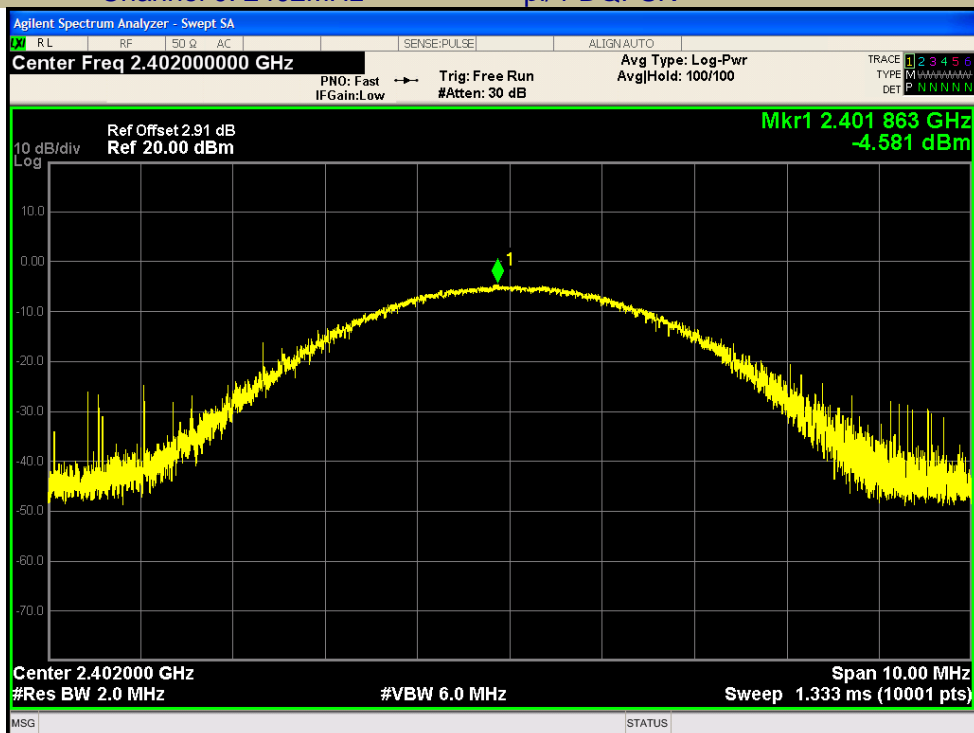
Maximum Peak Conducted Output Power
Bluetooth V3.0
Channel 39: 2441MHzGFSK



Test Model Maximum Peak Conducted Output Power
Bluetooth V3.0
Channel 78: 2480MHz GFSK

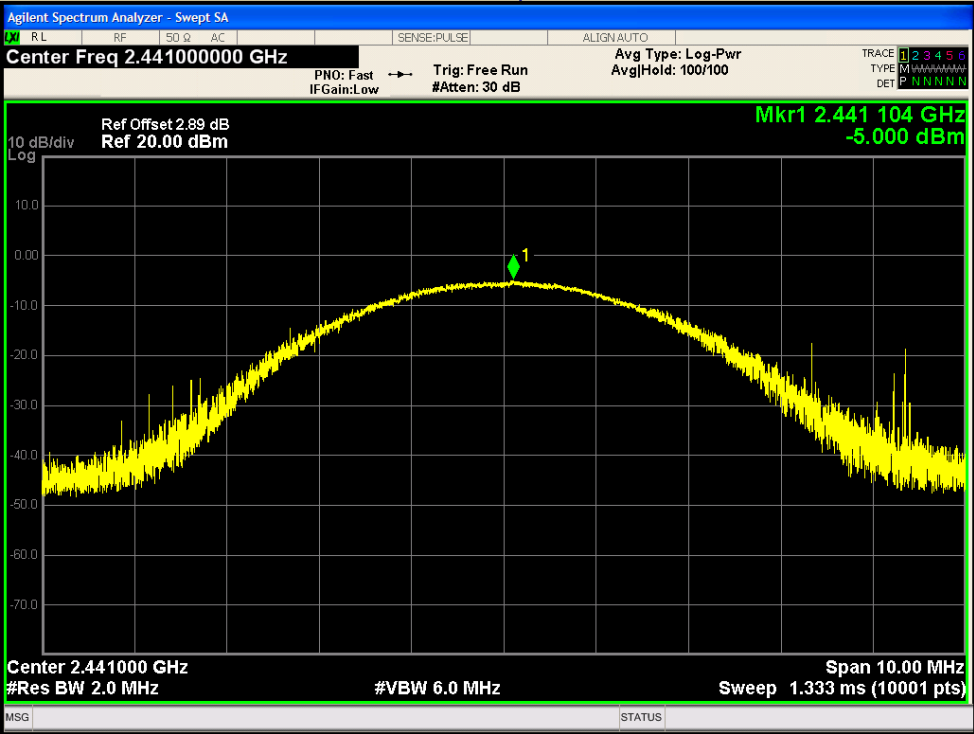


Test Model Maximum Peak Conducted Output Power
Bluetooth V3.0
Channel 0: 2402MHz pi/4-DQPSK



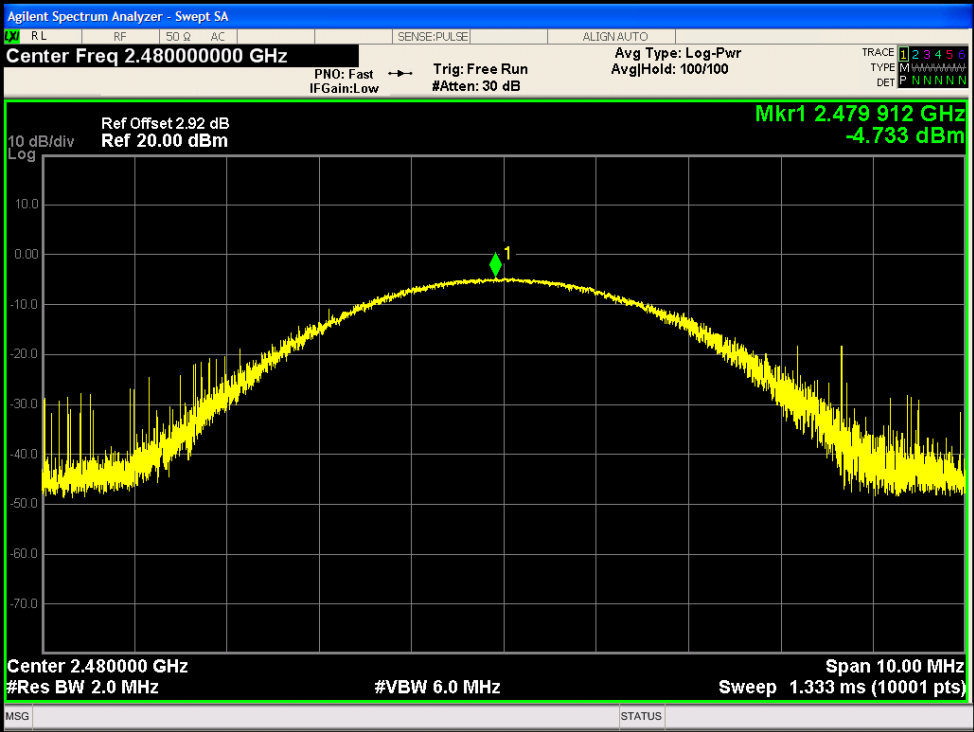
Test Model

Maximum Peak Conducted Output Power
Bluetooth V3.0
Channel 39: 2441MHzpi/4-DQPSK



Test Model

Maximum Peak Conducted Output Power
Bluetooth V3.0
Channel 78: 2480MHzpi/4-DQPSK



7.6 CONDUCTED SUPRIIOUS EMISSION

7.6.1 Applicable Standard

According to FCC Part 15.247(d) and KDB 558074 D01 15.247 MEAS GUIDANCE v05r02

7.6.2 Conformance Limit

According to FCC Part 15.247(d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted, provided the transmitter demonstrates compliance with the peak conducted power limits.

7.6.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

7.6.4 Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer

■ Reference level measurement

Establish a reference level by using the following procedure:

Set instrument center frequency to DSS channel center frequency.

Set Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel.

Set the RBW = 100 kHz. Set the VBW $\geq 3 \times$ RBW.

Set Detector = peak. Set Sweep time = auto couple.

Set Trace mode = max hold. Allow trace to fully stabilize.

Use the peak marker function to determine the maximum Maximum conduceted level.

Note that the channel found to contain the maximum conduceted level can be used to establish the reference level.

■ Band-edge Compliance of RF Conducted Emissions

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation

Set RBW $\geq 1\%$ of the span=100kHz Set VBW \geq RBW

Set Sweep = auto Set Detector function = peak Set Trace = max hold

Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section.

Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit.

■ Conduceted Spurious RF Conducted Emission

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th

harmonic.(30MHz to 25GHz). Set RBW = 100 kHz Set VBW \geq RBW

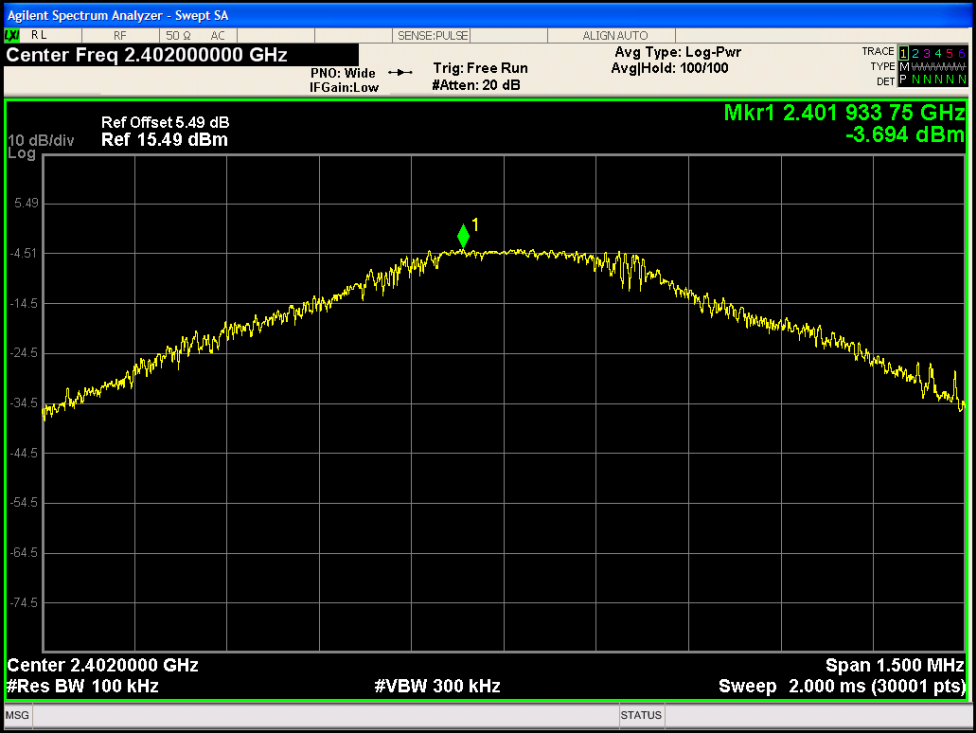
Set Sweep = auto Set Detector function = peak Set Trace = max hold

Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section.

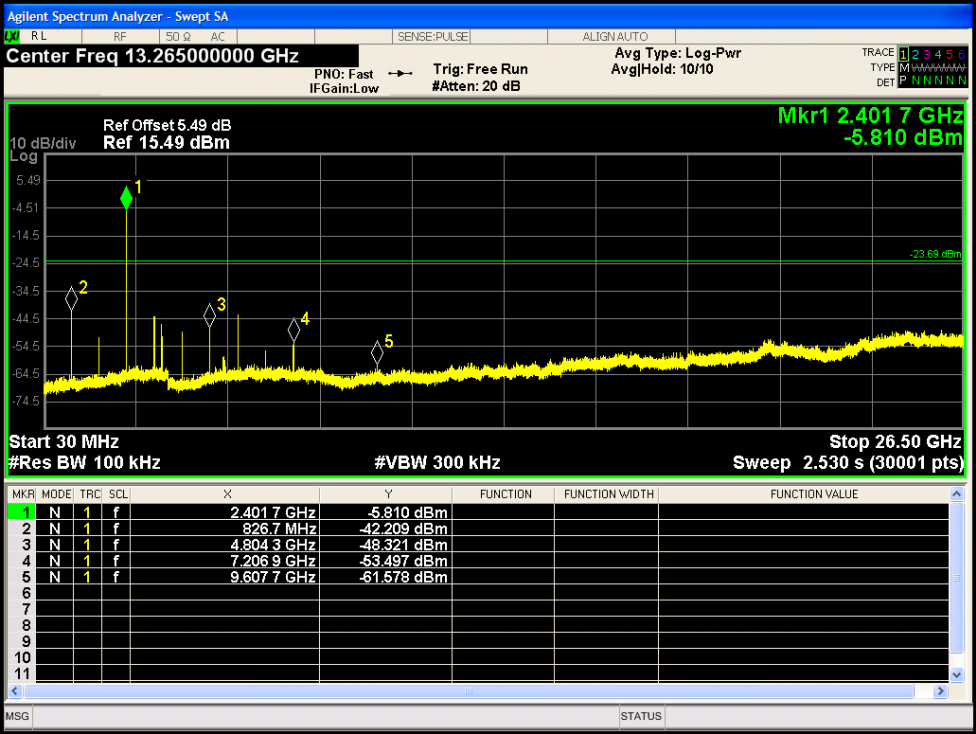
7.6.5 Test Results

Bluetooth (GFSK, pi/4-DQPSK) mode have been tested, and the worst result(GFSK) was report as below:

| | | |
|------------|-----------------------------------|------|
| | Maximum Conduced Level RBW=100kHz | |
| Test Model | Bluetooth V3.0 | |
| | Channel 0: 2402MHz | GFSK |



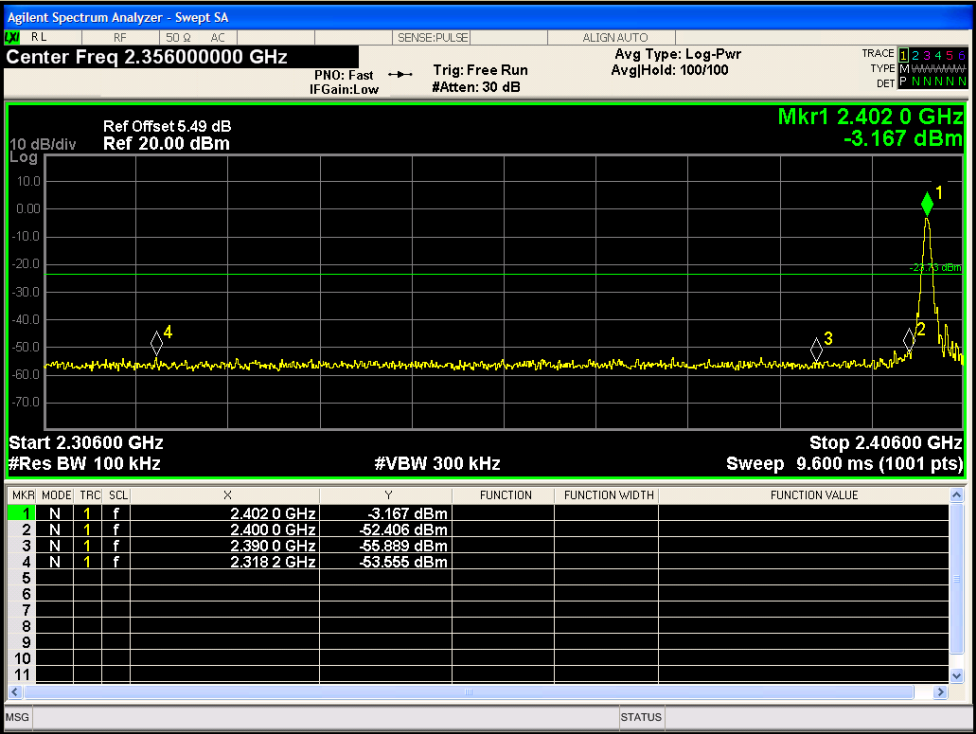
| | | |
|------------|---|------|
| | Conduced Spurious RF Conducted Emission | |
| Test Model | Bluetooth V3.0 | |
| | Channel 0: 2402MHz | GFSK |



Test Model

Band-edge Conducted Emissions
Bluetooth V3.0
Channel 0: 2402MHz

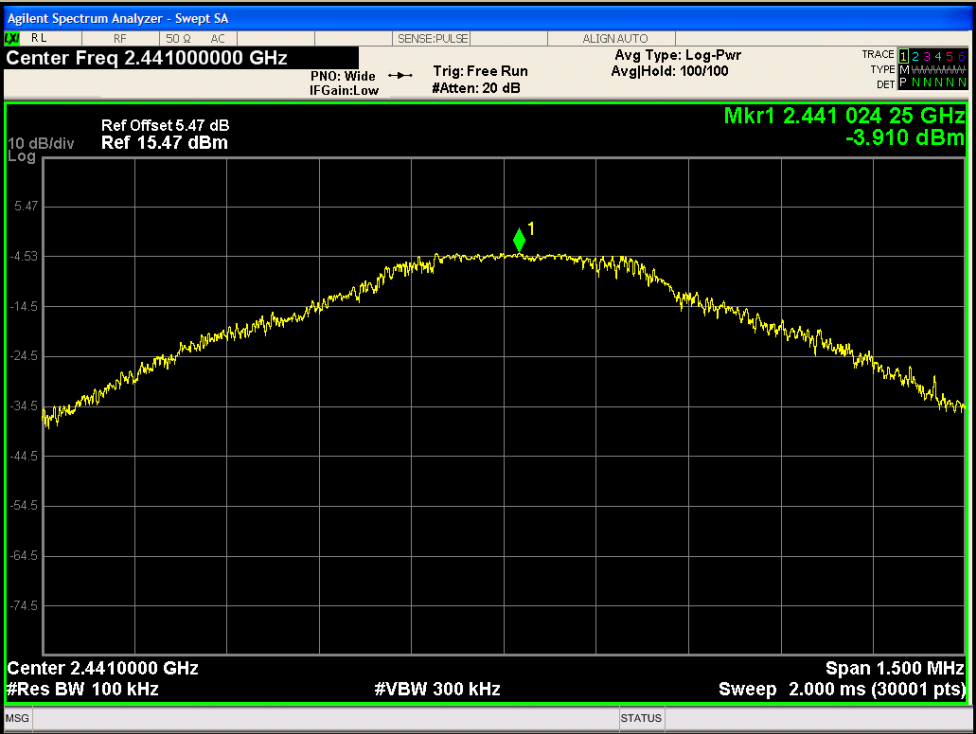
GFSK



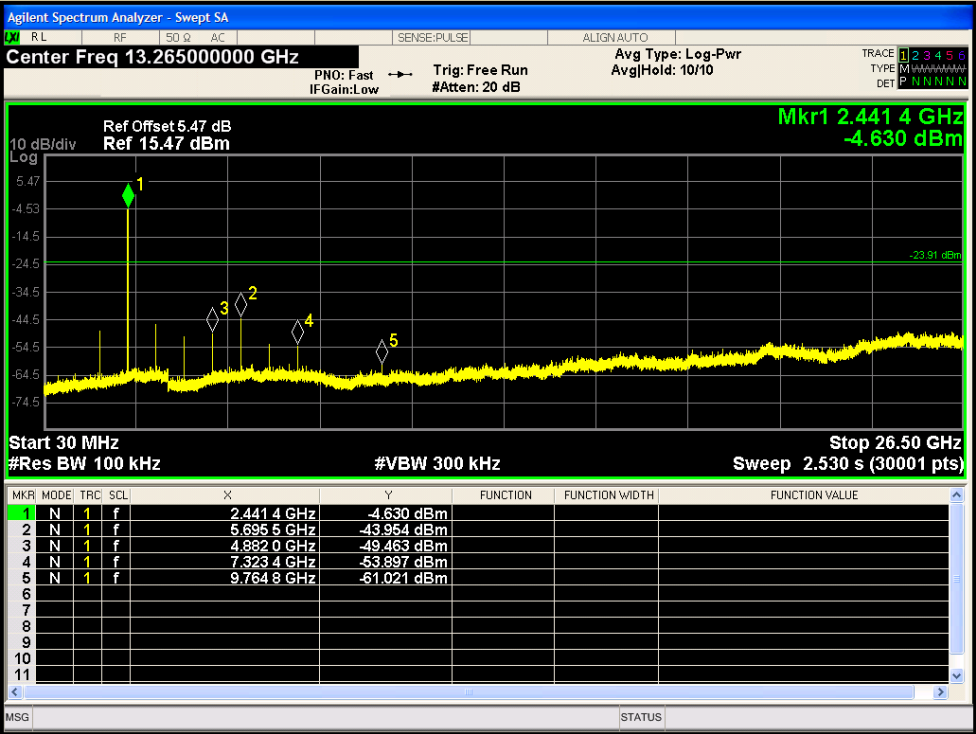
Test Model

Maximum Conducted Level RBW=100kHz
Bluetooth V3.0
Channel 39: 2441MHz

GFSK



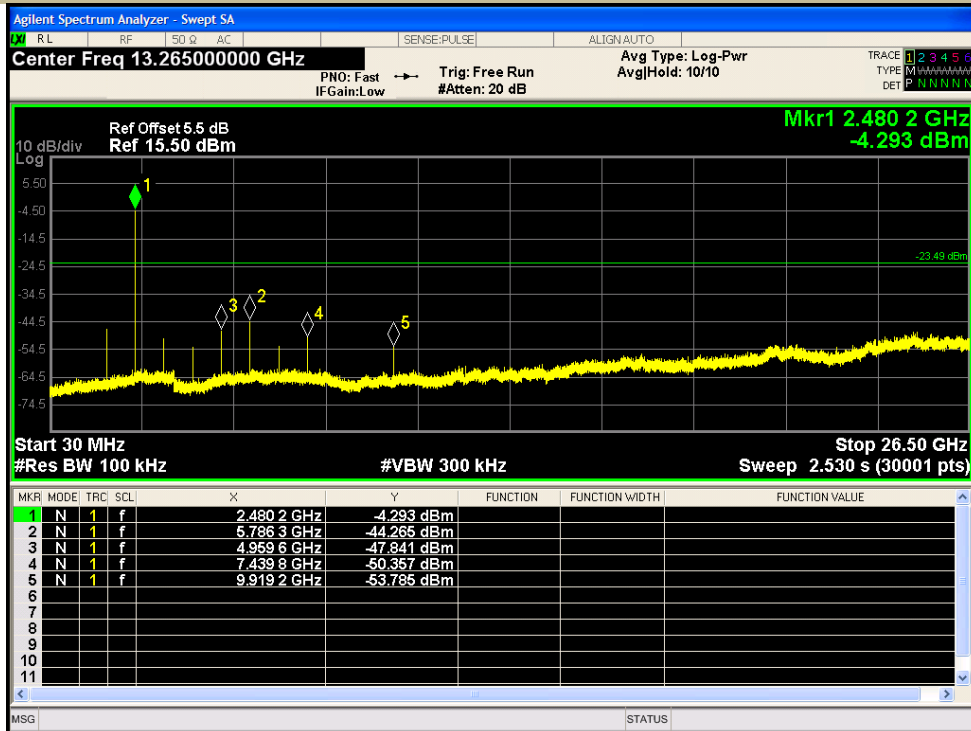
Test Model Conducted Spurious RF Conducted Emission
Bluetooth V3.0
Channel 39: 2441MHz GFSK



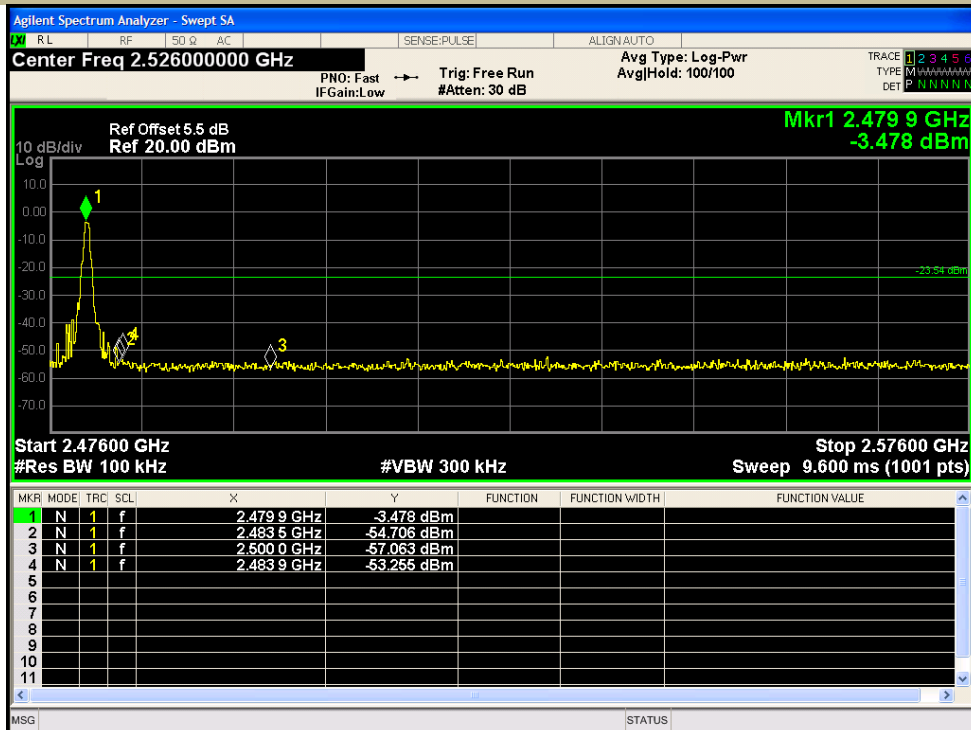
Test Model Maximum Conducted Level RBW=100kHz
Bluetooth V3.0
Channel 78: 2480MHz GFSK



Test Model Conducted Spurious RF Conducted Emission
 Bluetooth V3.0
 Channel 78: 2480MHz GFSK



Test Model Band-edge Conducted Emissions
 Bluetooth V3.0
 Channel 78: 2480MHz GFSK



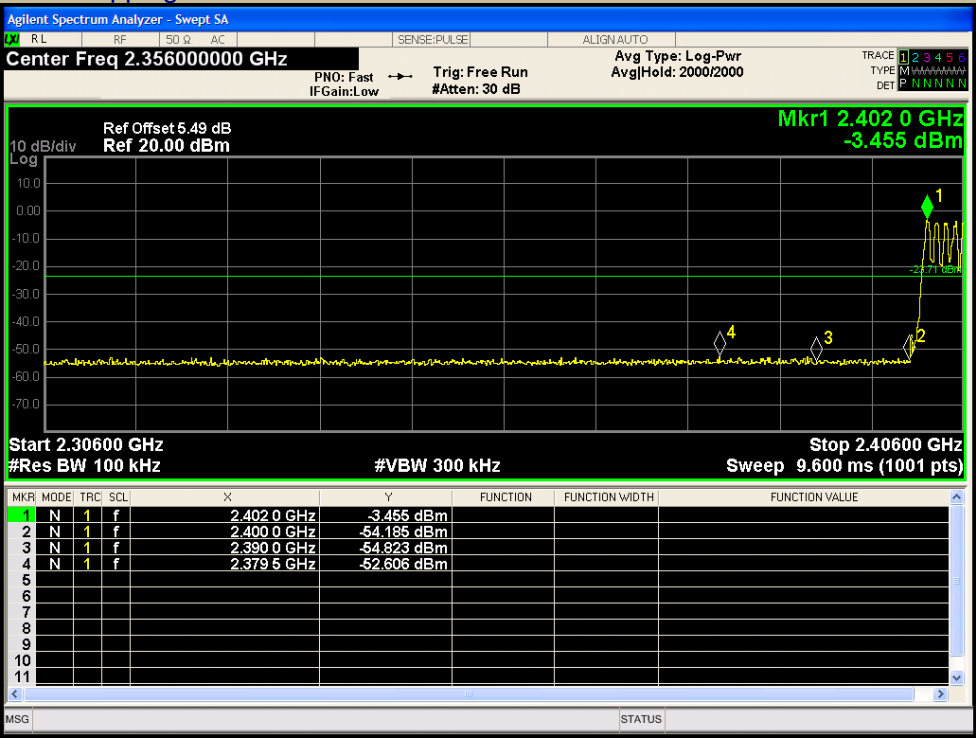
Test Model

Maximum Conduceted Level RBW=100kHz
Bluetooth V3.0
Hopping
GFSK



Test Model

Conduceted Spurious RF Conducted Emission
Bluetooth V3.0
Hopping
GFSK



Test Model

Band-edge Conducted Emissions
Bluetooth V3.0
Hopping

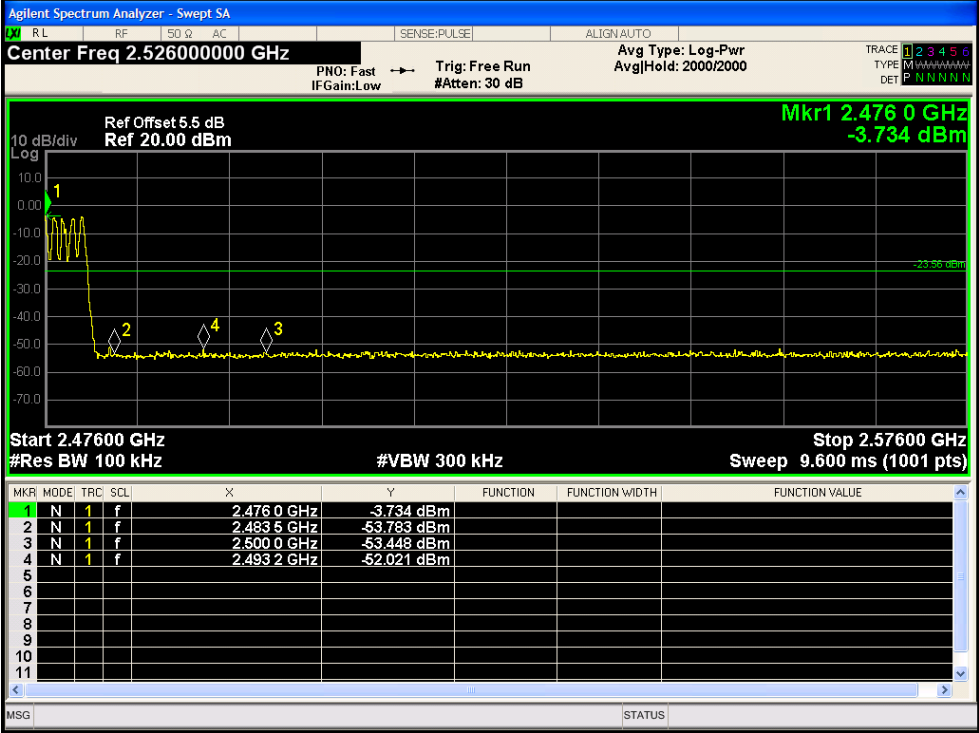
GFSK



Test Model

Band-edge Conducted Emissions
Bluetooth V3.0
Hopping

GFSK



7.7 RADIATED SPURIOUS EMISSION

7.7.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and KDB 558074 D01 15.247 MEAS GUIDANCE v05r02

7.7.2 Conformance Limit

According to FCC Part 15.247(d): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

According to FCC Part 15.205, Restricted bands

| MHz | MHz | MHz | GHz |
|-------------------|---------------------|---------------|-------------|
| 0.090-0.110 | 16.42-16.423 | 399.9-410 | 4.5-5.15 |
| 10.495-0.505 | 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 | 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 | | | |

According to FCC Part 15.205, the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

| Restricted Frequency(MHz) | Field Strength ($\mu\text{V/m}$) | Field Strength (dB $\mu\text{V/m}$) | Measurement Distance |
|---------------------------|------------------------------------|--------------------------------------|----------------------|
| 0.009-0.490 | 2400/F(KHz) | 20 log ($\mu\text{V/m}$) | 300 |
| 0.490-1.705 | 24000/F(KHz) | 20 log ($\mu\text{V/m}$) | 30 |
| 1.705-30 | 30 | 29.5 | 30 |
| 30-88 | 100 | 40 | 3 |
| 88-216 | 150 | 43.5 | 3 |
| 216-960 | 200 | 46 | 3 |
| Above 960 | 500 | 54 | 3 |

7.7.3 Test Configuration

Test according to clause 6.2 radio frequency test setup 2

7.7.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

For Above 1GHz:

The EUT was placed on a turn table which is 1.5m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

For Below 1GHz:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 100 kHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

For Below 30MHz:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 9kHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

For Below 150KHz:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 200Hz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from $20\log(\text{dwell time}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Repeat above procedures until all frequency measured was complete.

7.7.5 Test Results

■ Spurious Emission below 30MHz (9KHz to 30MHz)

| | |
|--------------------|-----------|
| Temperature: | 26° C |
| Relative Humidity: | 54% |
| ATM Pressure: | 1011 mbar |

| Freq. (MHz) | Ant.Pol. H/V | Emission Level(dBuV/m) | | Limit 3m(dBuV/m) | | Over(dB) | |
|----------------|-----------------|---------------------------|----|------------------|----|----------|----|
| | | PK | AV | PK | AV | PK | AV |
| -- | -- | -- | -- | -- | -- | -- | -- |

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor =40log(Specific distance/ test distance)(dB);

Limit line=Specific limits(dBuV) + distance extrapolation factor

■ Spurious Emission Above 1GHz (1GHz to 25GHz)

Bluetooth (GFSK, pi/4-DQPSK) mode have been tested, and the worst result(GFSK) was report as below:

| Test mode: GFSK | | Frequency: | | Channel 0: 2402MHz | | | |
|-----------------|----------|------------------------|-------|--------------------|-------|----------|--------|
| Freq. (MHz) | Ant.Pol. | Emission Level(dBuV/m) | | Limit 3m(dBuV/m) | | Over(dB) | |
| | H/V | PK | AV | PK | AV | PK | AV |
| 4804.00 | V | 55.07 | 35.23 | 74.00 | 54.00 | -18.93 | -18.77 |
| 7206.00 | V | 58.48 | 38.19 | 74.00 | 54.00 | -15.52 | -15.81 |
| 9608.00 | V | 48.62 | 39.29 | 74.00 | 54.00 | -25.38 | -14.71 |
| 12010.00 | V | 48.30 | 40.09 | 74.00 | 54.00 | -25.70 | -13.91 |
| 14412.00 | V | 57.51 | 37.42 | 74.00 | 54.00 | -16.49 | -16.58 |
| 4804.00 | H | 53.24 | 42.04 | 74.00 | 54.00 | -22.10 | -13.03 |
| 7206.00 | H | 54.95 | 38.23 | 74.00 | 54.00 | -18.90 | -13.88 |
| 9608.00 | H | 52.44 | 36.86 | 74.00 | 54.00 | -24.68 | -13.17 |
| 12010.00 | H | 58.70 | 38.61 | 74.00 | 54.00 | -28.67 | -16.91 |
| 14412.00 | H | 45.25 | 35.41 | 74.00 | 54.00 | -16.98 | -16.39 |

| Test mode: GFSK | | Frequency: | | Channel 39: 2441MHz | | | |
|-----------------|----------|------------------------|-------|---------------------|-------|----------|--------|
| Freq. (MHz) | Ant.Pol. | Emission Level(dBuV/m) | | Limit 3m(dBuV/m) | | Over(dB) | |
| | H/V | PK | AV | PK | AV | PK | AV |
| 4882.00 | V | 52.08 | 40.48 | 74.00 | 54.00 | -21.92 | -13.52 |
| 7323.00 | V | 50.67 | 43.85 | 74.00 | 54.00 | -23.33 | -10.15 |
| 9764.00 | V | 46.60 | 35.18 | 74.00 | 54.00 | -27.40 | -18.82 |
| 12205.00 | V | 55.59 | 38.12 | 74.00 | 54.00 | -18.41 | -15.88 |
| 14646.00 | V | 45.07 | 40.64 | 74.00 | 54.00 | -28.93 | -13.36 |
| 4882.00 | H | 50.81 | 39.65 | 74.00 | 54.00 | -23.19 | -14.35 |
| 7323.00 | H | 45.56 | 39.23 | 74.00 | 54.00 | -28.44 | -14.77 |
| 9764.00 | H | 56.58 | 41.55 | 74.00 | 54.00 | -17.42 | -12.45 |
| 12205.00 | H | 58.85 | 38.36 | 74.00 | 54.00 | -15.15 | -15.64 |
| 14646.00 | H | 48.21 | 43.43 | 74.00 | 54.00 | -25.79 | -10.57 |

| Test mode: GFSK | | Frequency: | | Channel 78: 2480MHz | | | |
|-----------------|----------|------------------------|-------|---------------------|-------|----------|--------|
| Freq. (MHz) | Ant.Pol. | Emission Level(dBuV/m) | | Limit 3m(dBuV/m) | | Over(dB) | |
| | H/V | PK | AV | PK | AV | PK | AV |
| 4960.00 | V | 49.07 | 42.86 | 74.00 | 54.00 | -19.12 | -12.38 |
| 7440.00 | V | 48.95 | 41.32 | 74.00 | 54.00 | -23.42 | -17.83 |
| 9920.00 | V | 59.87 | 43.40 | 74.00 | 54.00 | -21.40 | -9.30 |
| 12400.00 | V | 52.91 | 38.38 | 74.00 | 54.00 | -22.16 | -13.02 |
| 14880.00 | V | 47.84 | 36.37 | 74.00 | 54.00 | -24.00 | -11.43 |
| 4960.00 | H | 55.10 | 38.18 | 74.00 | 54.00 | -16.55 | -18.34 |
| 7440.00 | H | 59.75 | 36.99 | 74.00 | 54.00 | -14.49 | -18.41 |
| 9920.00 | H | 47.14 | 35.32 | 74.00 | 54.00 | -17.78 | -16.80 |
| 12400.00 | H | 59.97 | 44.23 | 74.00 | 54.00 | -21.00 | -15.78 |
| 14880.00 | H | 56.42 | 44.14 | 74.00 | 54.00 | -16.73 | -16.90 |

Note: (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
 (2) Emission Level= Reading Level+Probe Factor +Cable Loss.

■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz Bluetooth (GFSK, pi/4-DQPSK, Hopping) mode have been tested, and the worst result(GFSK, Hopping) was report as below:

| Test mode: GFSK | | Frequency: | | Channel 0: 2402MHz | |
|-----------------|--------------|-----------------------|-------------------|-----------------------|-------------------|
| Frequency (MHz) | Polarity H/V | PK(dBuV/m) (VBW=3MHz) | Limit 3m (dBuV/m) | AV(dBuV/m) (VBW=10Hz) | Limit 3m (dBuV/m) |
| 2310.00 | H | 43.39 | 74.00 | 32.25 | 54.00 |
| 2390.00 | H | 50.18 | 74.00 | 26.56 | 54.00 |
| 2310.00 | V | 52.18 | 74.00 | 22.98 | 54.00 |
| 2390.00 | V | 52.72 | 74.00 | 36.67 | 54.00 |

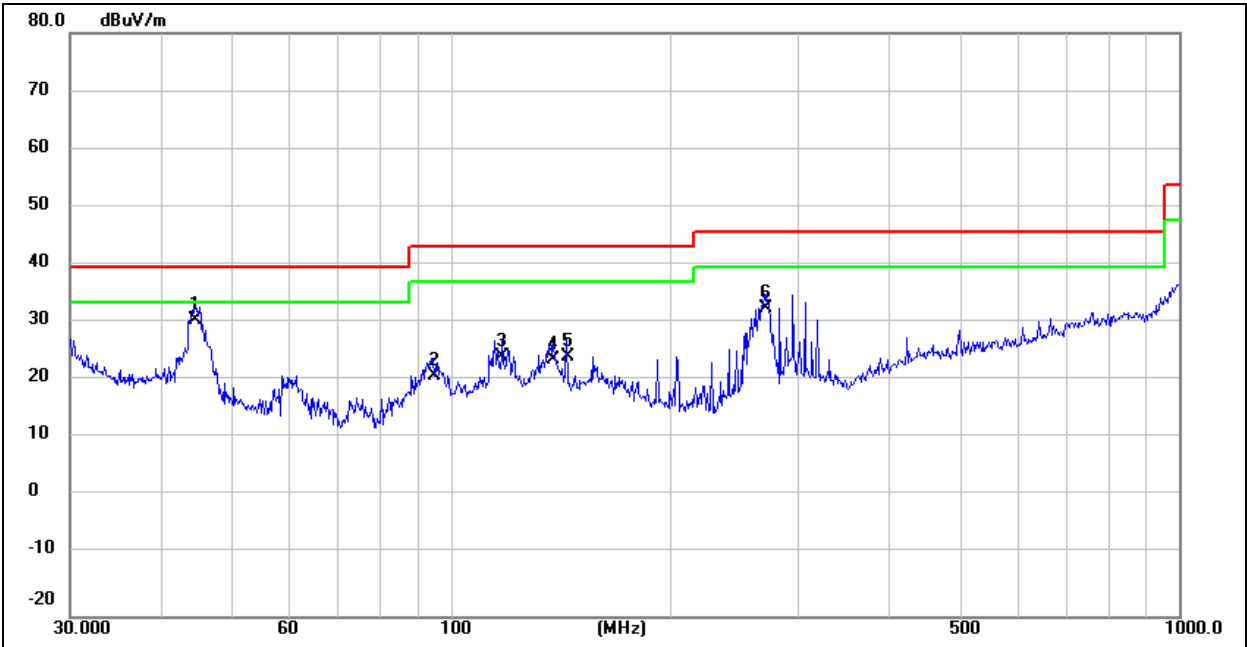
| Test mode: GFSK | | Frequency: | | Channel 78: 2480MHz | |
|-----------------|--------------|-----------------------|-------------------|-----------------------|-------------------|
| Frequency (MHz) | Polarity H/V | PK(dBuV/m) (VBW=3MHz) | Limit 3m (dBuV/m) | AV(dBuV/m) (VBW=10Hz) | Limit 3m (dBuV/m) |
| 2483.50 | H | 51.44 | 74.00 | 23.99 | 54.00 |
| 2500.00 | H | 55.28 | 74.00 | 32.26 | 54.00 |
| 2483.50 | V | 49.79 | 74.00 | 30.39 | 54.00 |
| 2500.00 | V | 46.42 | 74.00 | 34.60 | 54.00 |

| Test mode: GFSK | | Frequency: | | Hopping | |
|-----------------|--------------|-----------------------|-------------------|-----------------------|-------------------|
| Frequency (MHz) | Polarity H/V | PK(dBuV/m) (VBW=3MHz) | Limit 3m (dBuV/m) | AV(dBuV/m) (VBW=10Hz) | Limit 3m (dBuV/m) |
| 2390.00 | H | 55.78 | 74.00 | 34.55 | 54.00 |
| 2400.00 | H | 45.56 | 74.00 | 26.75 | 54.00 |
| 2483.50 | H | 51.22 | 74.00 | 24.35 | 54.00 |
| 2500.00 | H | 51.91 | 74.00 | 29.32 | 54.00 |
| 2390.00 | V | 56.46 | 74.00 | 26.84 | 54.00 |
| 2400.00 | V | 44.18 | 74.00 | 25.33 | 54.00 |
| 2483.50 | V | 55.78 | 74.00 | 34.55 | 54.00 |
| 2500.00 | V | 45.56 | 74.00 | 26.75 | 54.00 |

Note: (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
 (2) Emission Level= Reading Level+Probe Factor +Cable Loss.

■ Spurious Emission below 1GHz (30MHz to 1GHz)
Bluetooth (GFSK, pi/4-DQPSK) mode have been tested, and the worst result (GFSK) Low Channel (2402MHz) was report as below:

| | |
|--------------|--------------|
| Phase: | Vertical |
| Test Power : | AC 120V/60Hz |



| No. | Frequency (MHz) | Reading Level (dBuV) | Correct Factor (dB/m) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | | | |
|-----|-----------------|----------------------|-----------------------|-------------------------|----------------|-------------|--------|--|--|--|
| 1 | 44.5868 | 34.68 | -3.82 | 30.86 | 40.00 | -9.14 | QP | | | |
| 2 | 94.7601 | 28.35 | -6.93 | 21.42 | 43.50 | -22.08 | QP | | | |
| 3 | 117.7725 | 28.06 | -3.40 | 24.66 | 43.50 | -18.84 | QP | | | |
| 4 | 138.3873 | 26.89 | -2.69 | 24.20 | 43.50 | -19.30 | QP | | | |
| 5 | 144.3348 | 27.57 | -2.96 | 24.61 | 43.50 | -18.89 | QP | | | |
| 6 | 269.4284 | 35.67 | -2.84 | 32.83 | 46.00 | -13.17 | QP | | | |

| | |
|--------------|--------------|
| Phase: | Horizontal |
| Test Power : | AC 120V/60Hz |



| No. | Frequency (MHz) | Reading Level (dBuV) | Correct Factor (dB/m) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | | | |
|-----|-----------------|----------------------|-----------------------|-------------------------|----------------|-------------|--------|--|--|--|
| 1 | 80.0806 | 31.23 | -10.87 | 20.36 | 40.00 | -19.64 | QP | | | |
| 2 | 94.7601 | 30.69 | -6.93 | 23.76 | 43.50 | -19.74 | QP | | | |
| 3 | 115.7256 | 24.78 | -3.60 | 21.18 | 43.50 | -22.32 | QP | | | |
| 4 | 136.4598 | 21.87 | -2.82 | 19.05 | 43.50 | -24.45 | QP | | | |
| 5 | 216.7828 | 30.67 | -6.68 | 23.99 | 46.00 | -22.01 | QP | | | |
| 6 | 295.1469 | 29.50 | -1.12 | 28.38 | 46.00 | -17.62 | QP | | | |

7.8 CONDUCTED EMISSION TEST

7.8.1 Applicable Standard

According to FCC Part 15.207(a)

7.8.2 Conformance Limit

| Conducted Emission Limit | | |
|---|------------|---------|
| Frequency(MHz) | Quasi-peak | Average |
| 0.15-0.5 | 66-56 | 56-46 |
| 0.5-5.0 | 56 | 46 |
| 5.0-30.0 | 60 | 50 |
| Note: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz. | | |

Remark: Test results were obtained from the following equation:

Measurement (dB μ V) = LISN Factor (dB) + Cable Loss (dB) + Reading (dB μ V)

Margin (dB) = Measurement (dB μ V) - Limit (dB μ V)

7.8.3 Test Configuration

Test according to clause 6.3 conducted emission test setup

7.8.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

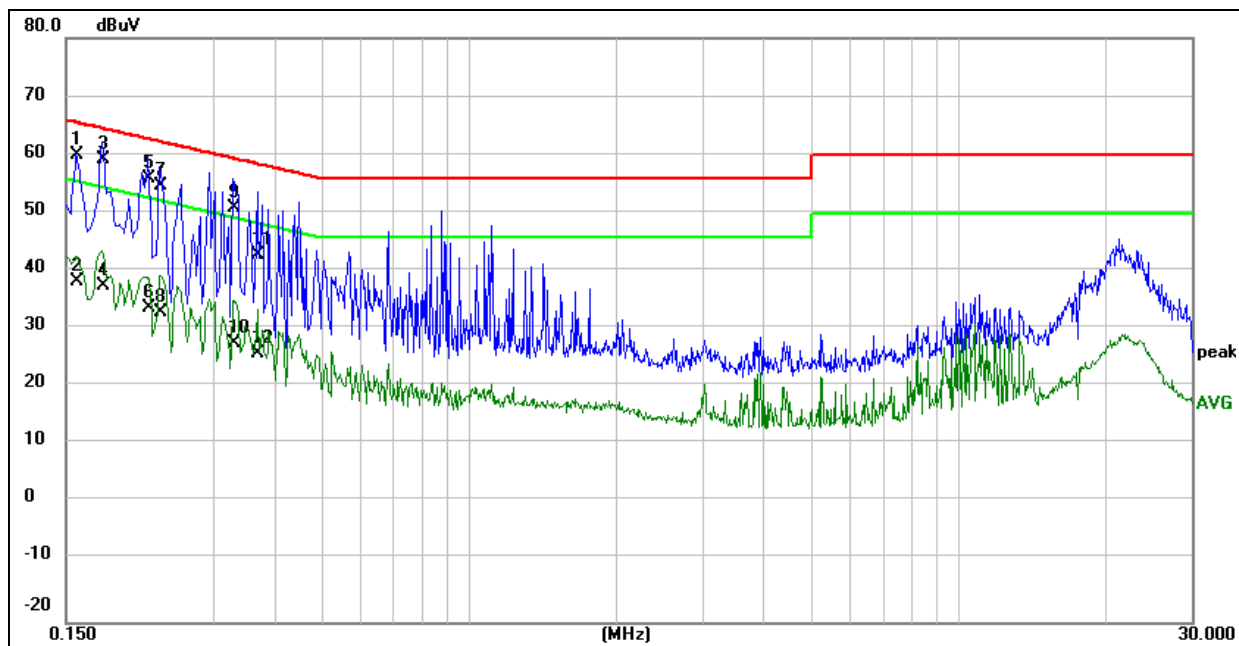
Repeat above procedures until all frequency measured were complete.

7.8.5 Test Results

Pass

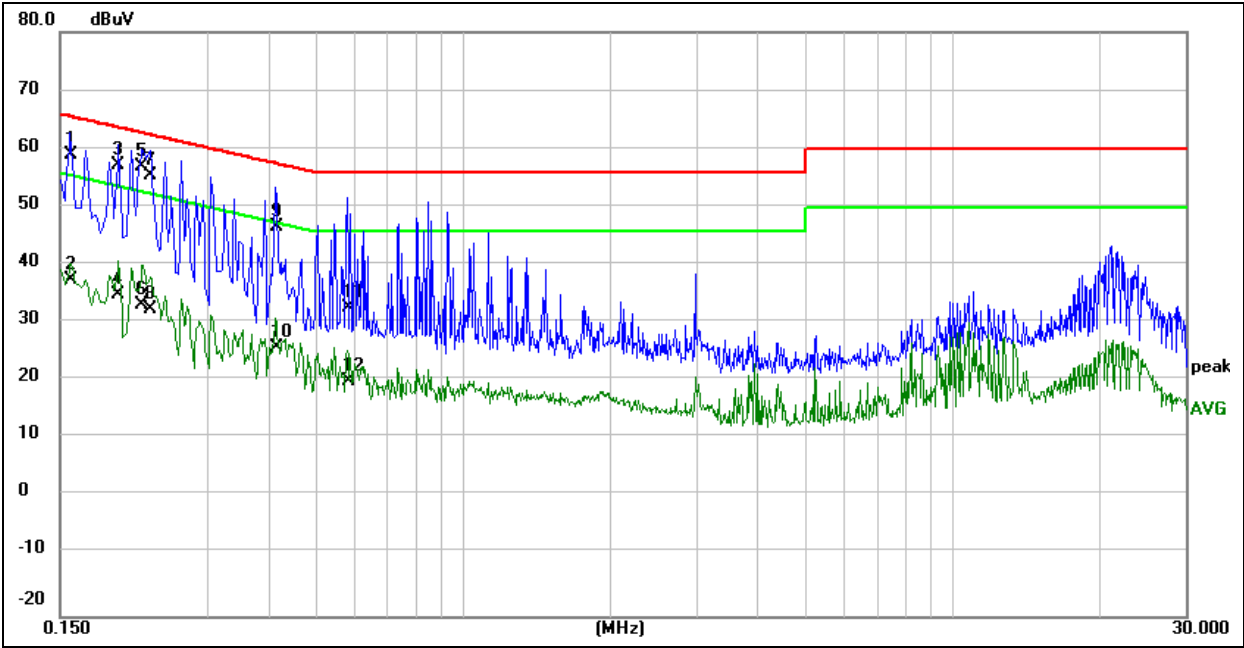
Conducted emission at both 120V & 240V is assessed, and emission at 120V represents the worst case. All the modulation modes were tested the data of the worst mode (GFSK) are recorded in the following pages and the others modulation methods do not exceed the limits.

| | | | |
|----------|-----|---------|---|
| Channel: | Low | Phase : | L |
|----------|-----|---------|---|



| No. | Frequency (MHz) | Reading Level(dBuV) | Factor (dB) | Measure-ment(dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|---------------------|-------------|--------------------|--------------|-------------|----------|
| 1 | 0.1580 | 39.64 | 20.29 | 59.93 | 65.57 | -5.64 | QP |
| 2 | 0.1580 | 18.25 | 20.29 | 38.54 | 55.57 | -17.03 | AVG |
| 3 | 0.1780 | 38.14 | 21.08 | 59.22 | 64.58 | -5.36 | QP |
| 4 | 0.1780 | 16.55 | 21.08 | 37.63 | 54.58 | -16.95 | AVG |
| 5 | 0.2220 | 33.96 | 21.93 | 55.89 | 62.74 | -6.85 | QP |
| 6 | 0.2220 | 11.93 | 21.93 | 33.86 | 52.74 | -18.88 | AVG |
| 7 | 0.2340 | 32.90 | 21.92 | 54.82 | 62.31 | -7.49 | QP |
| 8 | 0.2340 | 11.31 | 21.92 | 33.23 | 52.31 | -19.08 | AVG |
| 9 | 0.3300 | 28.98 | 21.88 | 50.86 | 59.45 | -8.59 | QP |
| 10 | 0.3300 | 6.09 | 21.88 | 27.97 | 49.45 | -21.48 | AVG |
| 11 | 0.3700 | 21.13 | 21.88 | 43.01 | 58.50 | -15.49 | QP |
| 12 | 0.3700 | 4.10 | 21.88 | 25.98 | 48.50 | -22.52 | AVG |

| | | | |
|----------|-----|---------|---|
| Channel: | Low | Phase : | N |
|----------|-----|---------|---|



| No. | Frequency (MHz) | Reading Level(dBuV) | Factor (dB) | Measure-ment(dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|---------------------|-------------|--------------------|--------------|-------------|----------|
| 1 | 0.1580 | 38.81 | 20.20 | 59.01 | 65.57 | -6.56 | QP |
| 2 | 0.1580 | 17.38 | 20.20 | 37.58 | 55.57 | -17.99 | AVG |
| 3 | 0.1973 | 35.60 | 21.77 | 57.37 | 63.72 | -6.35 | QP |
| 4 | 0.1973 | 13.41 | 21.77 | 35.18 | 53.72 | -18.54 | AVG |
| 5 | 0.2207 | 35.13 | 21.88 | 57.01 | 62.79 | -5.78 | QP |
| 6 | 0.2207 | 11.61 | 21.88 | 33.49 | 52.79 | -19.30 | AVG |
| 7 | 0.2286 | 33.71 | 21.88 | 55.59 | 62.50 | -6.91 | QP |
| 8 | 0.2286 | 10.72 | 21.88 | 32.60 | 52.50 | -19.90 | AVG |
| 9 | 0.4140 | 24.75 | 21.88 | 46.63 | 57.57 | -10.94 | QP |
| 10 | 0.4140 | 4.18 | 21.88 | 26.06 | 47.57 | -21.51 | AVG |
| 11 | 0.5820 | 10.95 | 21.89 | 32.84 | 56.00 | -23.16 | QP |
| 12 | 0.5820 | -1.68 | 21.89 | 20.21 | 46.00 | -25.79 | AVG |

7.9 ANTENNA APPLICATION

7.9.1 Antenna Requirement

| Standard | Requirement |
|---------------------|--|
| FCC CRF Part 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded. |

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

7.9.2 Result

PASS.

The EUT has 1 antenna: PCB Antenna for BT V5.3 with classic model, the gain is 2.58 dBi;

Note: ☒ Antenna use a permanently attached antenna which is not replaceable.
☐ Not using a standard antenna jack or electrical connector for antenna replacement
☐ The antenna has to be professionally installed (please provide method of installation)

which in accordance to section 15.203, please refer to the internal photos.

----- END OF REPORT -----

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