# FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

TCL Entertainment Solutions Limited

Wireless subwoofer

Model Number: S642W-SW

Additional Model: S210W-SW,S4210-SW,S642W*-SW
(*can be any numerica number"0~9" or alphebtical number "A~Z")

FCC ID: 2ARUDS210WSW

| | |
|---|---|
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| | |
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| | |
|---|---|
| Report Number: | ESTE-R2302015 |
| Date of Test: | Jan. 07~Feb. 01, 2023 |
| Date of Report: | Feb. 03, 2023 |

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# EST Technology Co., Ltd.

| | |
|---|---|
| **Applicant:**<br>**Address:** | TCL Entertainment Solutions Limited<br>7/F, building 22E, 22 science park east avenue Hong Kong science park, SHATIN, N.T. ,Hong Kong, China |
| **Manufacturer:**<br>**Address:** | TCL OVERSEAS MARKETING LTD<br>5/F, Building 22E, 22 Science Park East Avenue HongKong Science Park, Shatin, Hong Kong. |
| **Factory:**<br>**Address:** | Zhong Shan City Richsound Electronic Industrial Ltd.<br>NO. 16, East ShaGang Road, GangKou Town, ZhongShan City, GuangDong, China |
| **E.U.T:** | Wireless subwoofer |
| **Model Number:** | S642W-SW |
| **Additional Model:** | S210W-SW,S4210-SW,S642W*-SW (*can be any numerica number"0~9" or alphebtical number "A~Z")<br>Note: They are identical except model name. |
| **Power Supply:** | AC 100-240V~ 50/60Hz, 30W |
| **Trade Name:** | TCL  Serial No.: ------ |
| **Date of Receipt:** | Jan. 07, 2023  Date of Test: Jan. 07~Feb. 01, 2023 |
| **Test Specification:** | FCC Part 15 Subpart C (15.247)<br>ANSI C63.10:2013<br>FCC KDB 558074 D01 15.247 Meas Guidance v05r02 |
| **Test Result:** | The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements.<br><br>This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.<br><br>**Date:** Feb. 03, 2023 |

| Prepared by: | Reviewed by: | Approved by: |
|---|---|---|
| Ring Yang / Assistant | Seven Wang / Engineer | Iceman Hu / Manager |

**Other Aspects:**

None.

*Abbreviations: OK/P=passed  fail/F=failed  n.a/N=not applicable  E.U.T=equipment under tested*

*This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.*

# 1. GENERAL INFORMATION

## 1.1. Description of Device (EUT)

| | | |
|---|---|---|
| Product Name | : | Wireless subwoofer |
| Model Number | : | S642W-SW |
| Software Version | : | N/A |
| Hardware Version | : | N/A |
| Operation frequency | : | 2402MHz~2480MHz |
| Number of channel | : | 79 |
| Max Output Power (PEAK) | : | 5.60dBm |
| Modulation Type | : | BT BDR(1Mbps): GFSK<br>BT EDR(2Mbps): π/4-DQPSK<br>BT EDR(3Mbps): 8-DPSK |
| Sample Type | : | Prototype production |

Note:For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

## 1.2. Antenna Information

| Ant No. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|---|---|---|---|---|---|
| 1 | - | - | PCB | - | 2.29 |

Note: This information is provided by the applicant.

## 1.3. Information of RF Cable

| Cable Loss(dB) | Provided by |
|---|---|
| 1.0 | TCL Entertainment Solutions Limited |
| Note: 1.The customer declared the loss value of the RF Cable, and the test results of this report only apply to the sample as received.<br>2. This information is provided by the applicant. | |

# 2. SUMMARY OF TEST

## 2.1. Summary of test result

| No. | Description of Test Item | FCC Standard Section | Results |
|---|---|---|---|
| 1 | Maximum Peak Output Power | 15.247(a)(1) | PASS |
| 2 | 20dB Bandwidth | 15.247(a)(1) | PASS |
| 3 | Carrier Frequency Separation | 15.247(a)(1) | PASS |
| 4 | Number Of Hopping Channel | 15.247(a)(1)(iii) | PASS |
| 5 | Dwell Time | 15.247(a)(1)(iii) | PASS |
| 6 | Conducted Band Edge | 15.247(d) | PASS |
| 7 | Conducted Spurious Emissions | 15.247(d) | PASS |
| 8 | Radiated Spurious Emissions and Band Edge | 15.205<br>15.209<br>15.247(d) | PASS |
| 9 | AC Power Line Conducted Emissions | 15.207 | PASS |
| 10 | Antenna Requirement | 15.203 | PASS |

Note:“N/A” denotes test is not applicable in this test report.

## 2.2. Test Facilities

EMC Lab : Certificated by CNAS, CHINA
Registration No.: L5288
This Certificate is valid until: November 12, 2023

Certificated by FCC, USA
Designation Number: CN1215
This Certificate is valid until: January 31, 2024

Certificated by A2LA, USA
Registration No.: 4366.01
This Certificate is valid until: January 31, 2024

Certificated by Industry Canada
CAB identifier No.: CN0035
This Certificate is valid until: January 31, 2024

Certificated by VCCI, Japan
Registration No.:C-14103; T-20073; R-13663; R-20103; G-20097
Date of registration: Apr. 20, 2020
This Certificate is valid until: Apr. 19, 2023

Certificated by TUV Rheinland, Germany
Registration No.: UA 50413872 0001
Date of registration: July 31, 2018

Certificated by Intertek
Registration No.: 2011-RTL-L2-64
Date of registration: November 08, 2018

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China

## 2.3. Measurement uncertainty

| Test Item | Uncertainty |
|---|---|
| Uncertainty for Conduction emission test | ±3.48dB |
| Uncertainty for spurious emissions test (Below 30MHz) | ±1.62 dB |
| Uncertainty for spurious emissions test (30MHz-1GHz) | ±4.60 dB(Polarize: H) |
| | ±4.68 dB(Polarize: V) |
| Uncertainty for spurious emissions test (1GHz to 25GHz) | ±4.96dB |
| Uncertainty for radio frequency | $7\times10^{-8}$ |
| Uncertainty for conducted RF Power | 1.08dB |
| Uncertainty for Power density test | 0.26dB |

Note:This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

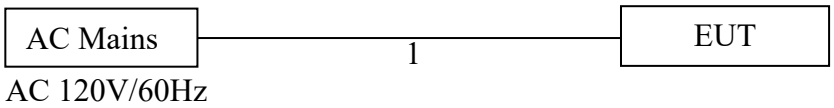
## 2.4. Assistant equipment used for test

| Item | Equipment | Brand | Model Name/Type No. | FCC ID | Series No. |
|---|---|---|---|---|---|
| - | - | - | - | - | - |

| Item | Shielded Type | Ferrite Core | Length | Note |
|---|---|---|---|---|
| 1 | NO | NO | 1.6m | AC Cable |

## 2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 (or 1.5) meter high above ground. EUT was beset into Bluetooth test mode by software before test.




(EUT: Wireless subwoofer)

## 2.6. Test mode

Combining all the rates, modulations, and packet types, the Pre-scans had been carried out. The worst case test mode was selected for the final test as listed below.

| Test Item | Modulation Type | Operating Mode | Packet Type | Test Channel |
|---|---|---|---|---|
| Maximum Peak Output Power | GFSK&π/4-DQPSK/ 8-DPSK | Non Hopping | DH5 | Low/Middle/High |
| 20dB Bandwidth | GFSK&π/4-DQPSK/ 8-DPSK | Non Hopping | DH5 | Low/Middle/High |
| Carrier Frequency Separation | GFSK&π/4-DQPSK/ 8-DPSK | Hopping | DH5 | Low/Middle/High |
| Number Of Hopping Channel | GFSK&π/4-DQPSK/ 8-DPSK | Hopping | DH5 | All Channel Hopping |
| Dwell Time | GFSK&π/4-DQPSK/ 8-DPSK | Hopping | DH1/DH 3/DH5 | Middle( All Channel Hopping) |
| Conducted Band Edge | GFSK&π/4-DQPSK/ 8-DPSK | Non Hopping&Hopping | DH5 | Low/ High& All Channel Hopping |
| Conducted Spurious Emissions | GFSK&π/4-DQPSK/ 8-DPSK | Non Hopping | DH5 | Low/Middle/High |
| Radiated Spurious Emissions(Below 1GHz) | GFSK&π/4-DQPSK/ 8-DPSK | Non Hopping | DH5 | Low/Middle/High |
| Radiated Spurious Emissions(Above 1GHz) | GFSK&π/4-DQPSK/ 8-DPSK | Non Hopping | DH5 | Low/Middle/High |
| Radiated Band Edge | GFSK&π/4-DQPSK/ 8-DPSK | Non Hopping | DH5 | Low/High |
| AC Power Line Conducted Emissions | GFSK&π/4-DQPSK/ 8-DPSK | Non Hopping | DH5 | Low/Middle/High |

Note: In radiated measurement,the EUT had been pre-scan on the positioned of each 3 axis(X,Y,Z), the worst case was found when positioned on **X-plane.**

## 2.7. Channel List

| Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | 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 | - | - |

## 2.8. Power Setting of Test Software

| Software Name | FCC Assist 1.0.2.2 | | |
|---|---|---|---|
| Frequency(MHz) | 2402 | 2441 | 2480 |
| GFSK(1Mbps) Setting | 10 | 10 | 10 |
| π/4-DQPSK(2Mbps) Setting | 10 | 10 | 10 |
| 8-DPSK(3Mbps) Setting | 10 | 10 | 10 |

Note: This information is provided by the applicant.

## 2.9. Test Equipment

| For conducted emission test | | | | | | |
|---|---|---|---|---|---|---|
| Equipment | Manufacturer | Model No. | Serial No. | Calibration Body | Last Cal. | Next Cal. |
| EMI Test Receiver | Rohde & Schwarz | ESHS30 | EST-E001 | LISAI | June 13,22 | 1 Year |
| Artificial Mains Network | Rohde & Schwarz | ENV216 | EST-E002 | LISAI | June 13,22 | 1 Year |
| Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | EST-E078 | LISAI | June 13,22 | 1 Year |
| Test Software | Audix | e3-6.111221a | N/A | N/A | N/A | N/A |

| For radiated emission test(9 kHz-30MHz) | | | | | | |
|---|---|---|---|---|---|---|
| Equipment | Manufacturer | Model No. | Serial No. | Calibration Body | Last Cal. | Next Cal. |
| EMI Test Receiver | Rohde & Schwarz | ESR7 | EST-E047 | LISAI | June 13,22 | 1 Year |
| Active Loop Antenna | SCHWAREBECK | FMZB 1519B | EST-E054 | LISAI | June 13,22 | 1 Year |
| Test Software | Audix | e3-6.111221a | N/A | N/A | N/A | N/A |
| 9kHz-30MHz Cable | N/A | EST-001 | N/A | N/A | N/A | N/A |

| For radiated emissions test (30-1000MHz) | | | | | | |
|---|---|---|---|---|---|---|
| Equipment | Manufacturer | Model No. | Serial No. | Calibration Body | Last Cal. | Next Cal. |
| EMI Test Receiver | Rohde & Schwarz | ESR7 | EST-E047 | LISAI | June 13,22 | 1 Year |
| Bilog Antenna | Teseq | CBL 6111D | EST-E034 | LISAI | June 13,22 | 1 Year |
| Test Software | Audix | e3-6.111221a | N/A | N/A | N/A | N/A |
| 30-1000MHz Cable | N/A | EST-002 | N/A | N/A | N/A | N/A |

| For radiated emission test(Above 1000MHz) | | | | | | |
|---|---|---|---|---|---|---|
| Equipment | Manufacturer | Model No. | Serial No. | Calibration Body | Last Cal. | Next Cal. |
| Horn Antenna | SCHWARZBECK | BBHA9120D | EST-E031 | LISAI | June 13,22 | 1 Year |
| Horn Antenna | Com-Power | AHA-840 | EST-E133 | LISAI | June 13,22 | 1 Year |
| Low Noise Amplifier | RF | TRLA-010180G45N | EST-E142 | LISAI | June 13,22 | 1 Year |
| Spectrum Analyzer | Rohde &Schwarz | FSV40 | EST-E069 | LISAI | June 13,22 | 1 Year |
| Test Software | Audix | e3-6.111221a | N/A | N/A | N/A | N/A |
| Above 1GHz Cable | N/A | EST-003 | N/A | N/A | N/A | N/A |

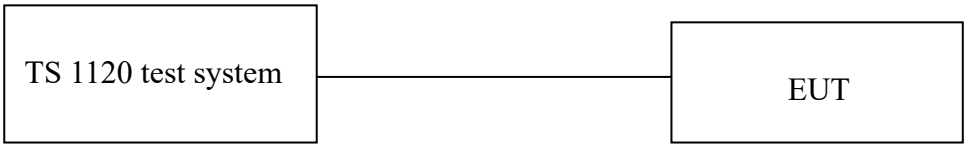
| For connect EUT antenna terminal test | | | | | | |
|---|---|---|---|---|---|---|
| Equipment | Manufacturer | Model No. | Serial No. | Calibration Body | Last Cal. | Next Cal. |
| TS 1120 | Tonscend | / | / | / | / | / |
| Test Software | Tonscend | TS1120-3 | 3.2.11 | / | / | / |
| RF Control Unit | Tonscend | JS0806-2 | EST-E134 | LISAI | June 13,22 | 1 Year |
| Signal and Spectrum Analyzer | Keysight | N9010B | EST-E141 | LISAI | June 13,22 | 1 Year |

# 3. MAXIMUM PEAK OUTPUT POWER

## 3.1. Limit

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

## 3.2. Test Setup




## 3.3. Spectrum Analyzer Setting

| Spectrum Parameters | Setting |
|---|---|
| RBW | 3MHz |
| VBW | 3MHz |
| Span | 7.5MHz |
| Sweep Time | Auto |
| Detector | Peak |
| Trace Mode | Max Hold |

## 3.4. Test Procedure

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 3.3.
c. Set the EUT transmit continuously with maximum output power over fixed single hopping channel.
d. Allow trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission.
e. Repeat above procedures until all channels and test modes were measured.
f. Record the results in the test report.

## 3.5. Test Result

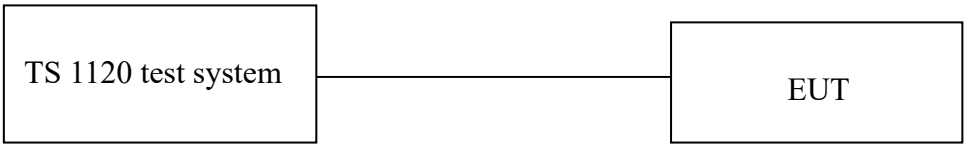
Refer to section 13: Appendix A

# 4. 20 DB BANDWIDTH

## 4.1. Limit

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

## 4.2. Test Setup




## 4.3. Spectrum Analyzer Setting

| Spectrum Parameters | Setting |
|---|---|
| RBW | 30KHz |
| VBW | 100KHz |
| Span | 3MHz |
| Sweep Time | Auto |
| Detector | Peak |
| Trace Mode | Max Hold |

## 4.4. Test Procedure

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 4.3.
c. Set the EUT transmit continuously with maximum output power over fixed single hopping channel.
d. Allow trace to stabilize, use the ndB down function to measure 20dB Bandwidth.
e. Repeat above procedures until all channels and test modes were measured.
f. Record the results in the test report.

## 4.5. Test Result

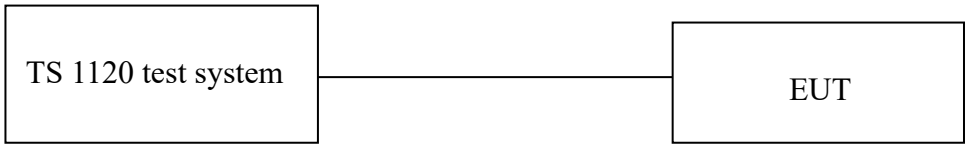
Refer to section 13: Appendix B

# 5. CARRIER FREQUENCY SEPARATION

## 5.1. Limit

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

## 5.2. Test Setup




## 5.3. Spectrum Analyzer Setting

| Spectrum Parameters | Setting |
|---|---|
| RBW | 30KHz |
| VBW | 100KHz |
| Span | 3MHz |
| Sweep Time | Auto |
| Detector | Peak |
| Trace Mode | Max Hold |

## 5.4. Test Procedure

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 5.3.
c. Set the EUT transmit continuously with maximum output power in all channel hopping mode.
d. Allow trace to stabilize, use the marker-delta function to measure channel separation between two adjacent channels.
e. Repeat above procedures until all channels and test modes were measured.
f. Record the results in the test report.

## 5.5. Test Result

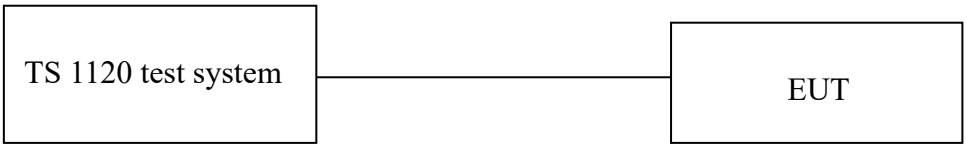
Refer to section 13: Appendix C

# 6. NUMBER OF HOPPING CHANNEL

## 6.1. Limit

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

## 6.2. Test Setup




## 6.3. Spectrum Analyzer Setting

| Spectrum Parameters | Setting |
|---|---|
| RBW | 300KHz |
| VBW | 300KHz |
| Start frequency | 2400MHz |
| Stop frequency | 2483.5MHz |
| Sweep Time | Auto |
| Detector | Peak |
| Trace Mode | Max Hold |

## 6.4. Test Procedure

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 6.3.
c. Set the EUT transmit continuously with maximum output power in all channel hopping mode.
d. Allow trace to stabilize, use the marker-peak function to mark the first and last frequency hopping channel.
e. Repeat above procedures until all test modes were measured.
f. Record the results in the test report.

## 6.5. Test Result

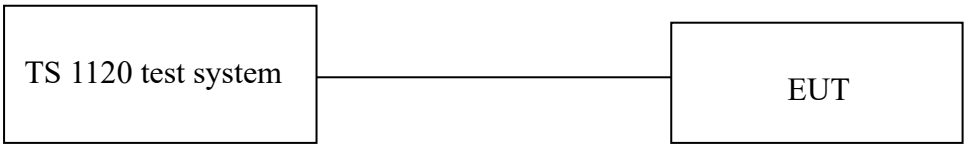
Refer to section 13: Appendix D

# 7. DWELL TIME

## 7.1. Limit

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

## 7.2. Test Setup




## 7.3. Spectrum Analyzer Setting

| Spectrum Parameters | Setting |
|---|---|
| RBW | 1MHz |
| VBW | 1MHz |
| Span | Zero |
| Detector | Peak |
| Sweep Time | 2.5ms(DH1)/10ms(DH3)/20ms(DH5) |
| Sweep Mode | Single Sweep |

## 7.4. Test Procedure

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 7.3.
c. Set the EUT transmit continuously with maximum output power in all channel hopping mode.
d. Allow trace to stabilize, use the marker-delta function to measure single pulse duration.
e. Repeat above procedures until all test modes were measured.
f. Record the results in the test report.

## 7.5. Test Result

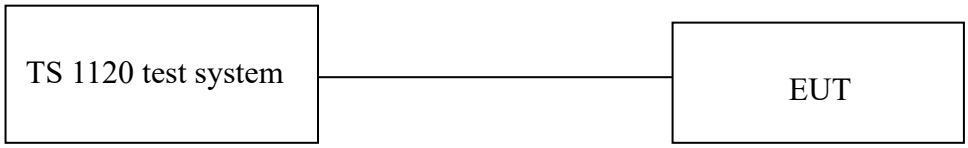
Refer to section 13: Appendix E

# 8. CONDUCTED BAND EDGE

## 8.1. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

## 8.2. Test Setup




## 8.3. Spectrum Analyzer Setting

| Spectrum Parameters | Setting |
|---|---|
| RBW | 100KHz |
| VBW | 300KHz |
| Span | 100MHz |
| Sweep Time | Auto |
| Detector | Peak |
| Trace Mode | Max Hold |

## 8.4. Test Procedure

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 8.3.
c. Set the EUT transmit continuously with maximum output power over fixed single hopping channel.
d. Allow trace to stabilize, use the marker function to mark the highest emission level outside the authorized band.
e. Repeat above procedures until all channels and test modes were measured(including frequency hopping off and frequency hopping on).
f. Record the results in the test report.

## 8.5. Test Result

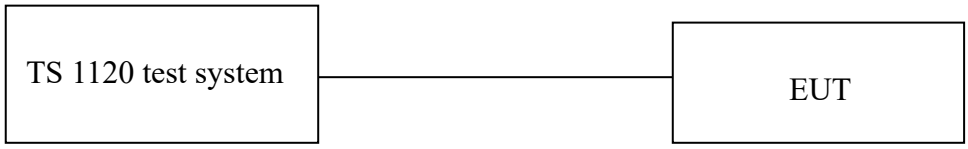
Refer to section 13: Appendix F & G

# 9. CONDUCTED SPURIOUS EMISSIONS

## 9.1. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the ntentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

## 9.2. Test Setup




## 9.3. Spectrum Analyzer Setting

| Spectrum Parameters | Setting |
|---|---|
| RBW | 100KHz |
| VBW | 300KHz |
| Start frequency | 30MHz |
| Stop frequency | 26.5GHz |
| Sweep Time | Auto |
| Detector | Peak |
| Trace Mode | Max Hold |

## 9.4. Test Procedure

a. Connect EUT antenna terminal to the spectrum analyzer with RF cable.
b. Spectrum analyzer setting parameters in accordance with section 9.3.
c. Set the EUT transmit continuously with maximum output power over fixed single hopping channel.
d. Allow trace to stabilize, use the marker function to mark the highest emission level outside the authorized band.
e. Repeat above procedures until all channels and test modes were measured.
f. Record the results in the test report.

## 9.5. Test Result

Refer to section 13: Appendix F & H

# 10. RADIATED SPURIOUS EMISSIONS AND BAND EDGE

## 10.1. Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

| 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]) |

15.209 Limit

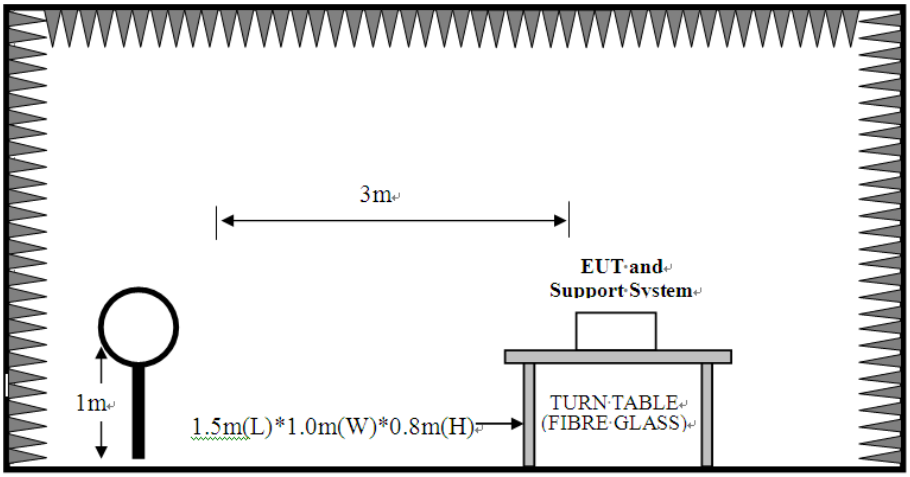
| Frequency (MHz) | Field Strength(μV/m) | Distance(m) |
|---|---|---|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Note:

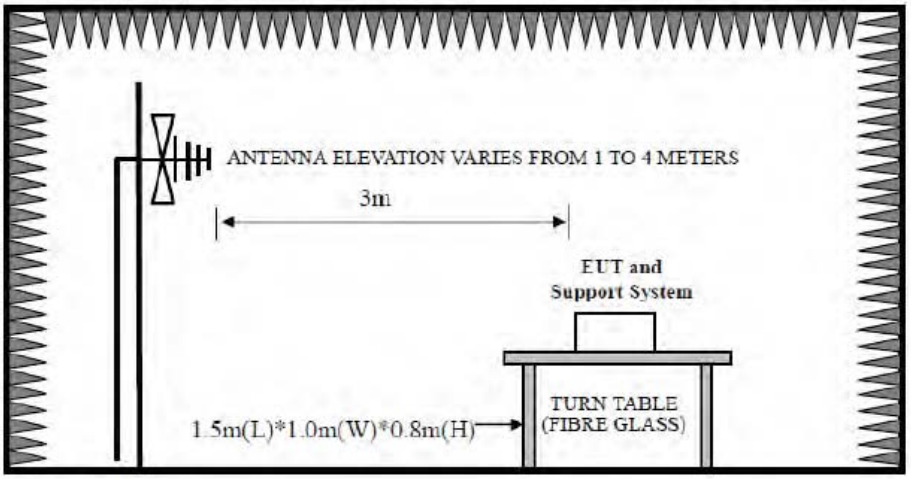
(1) Emission level dBμV = 20 log Emission level μV/m.
(2) The smaller limit shall apply at the cross point between two frequency bands.
(3) Distance is the distance in meters between the measuring instrument,antenna and the closest point of any part of the device or system.

## 10.2. Test Setup

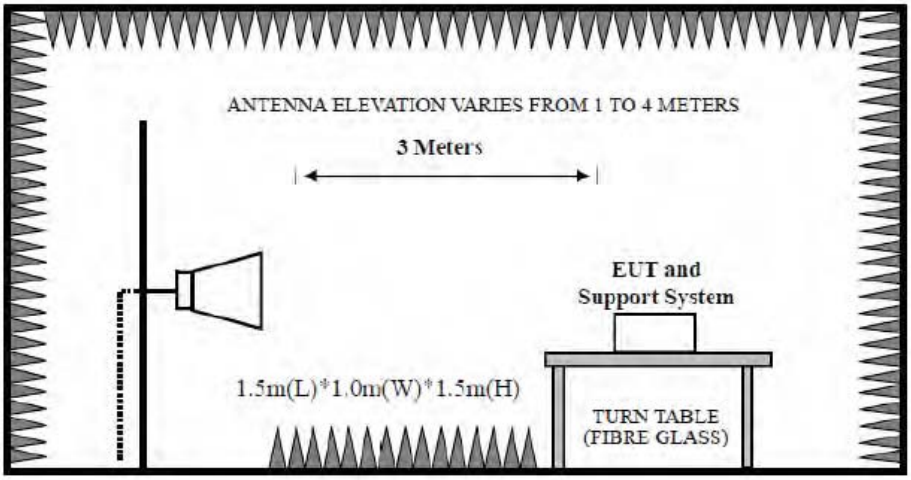
9kHz~30MHz




30~1000MHz




Above 1GHz



## 10.3. Spectrum Analyzer Setting

For 9KHz-150KHz

| Spectrum Parameters | Setting |
|---|---|
| RBW | 300Hz(for Peak&AVG)/CISPR 200Hz(for QP) |
| VBW | 300Hz(for Peak&AVG)/CISPR 200Hz(for QP) |
| Start frequency | 9KHz |
| Stop frequency | 150KHz |
| Sweep Time | Auto |
| Detector | PEAK/QP/AVG |
| Trace Mode | Max Hold |

For 150KHz-30MHz

| Spectrum Parameters | Setting |
|---|---|
| RBW | 9KHz |
| VBW | 9KHz |
| Start frequency | 150KHz |
| Stop frequency | 30MHz |
| Sweep Time | Auto |
| Detector | QP |
| Trace Mode | Max Hold |

For 30MHz-1GHz

| Spectrum Parameters | Setting |
|---|---|
| RBW | 120KHz |
| VBW | 300KHz |
| Start frequency | 30MHz |
| Stop frequency | 1GHz |
| Sweep Time | Auto |
| Detector | QP |
| Trace Mode | Max Hold |

For Above 1GHz

| Spectrum Parameters | Setting | |
|---|---|---|
| RBW | 1MHz | |
| VBW | PEAK Measurement | AVG Measurement |
| | 3MHz | Duty cycle≥98%,VBW=10Hz |
| | | Duty cycle＜98%,VBW≥1/T |
| Start frequency | 1GHz | |
| Stop frequency | 25GHz | |
| Sweep Time | Auto | |
| Detector | PEAK | |
| Trace Mode | Max Hold | |

## 10.4. Test Procedure

a. EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz test, and which is 1.5 meter high above ground for above 1GHz test.
b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
c. Set the EUT transmit continuously with maximum output power.
d. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
e. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
f. Spectrum analyzer setting parameters in accordance with section 10.3.
g. Repeat above procedures until all channels and test modes were measured.
h. Record the results in the test report.

Note:

1. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.
2. The frequency 2402MHz ,2441MHz and 2480MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.

## 10.5. Test Result

### Radiated Emissions Below 1GHz

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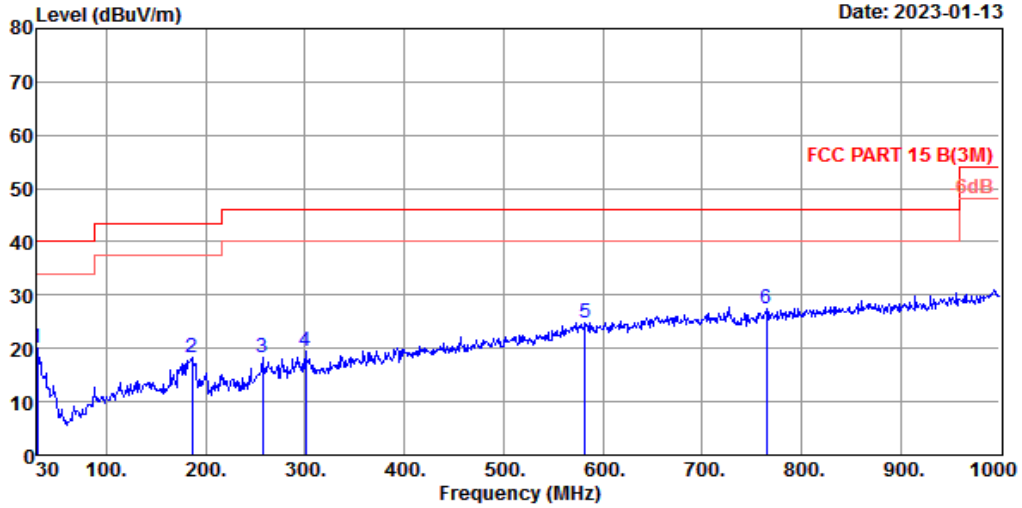
Data: 25 File: \\emc-966-1\test data\2023\RF\T\TCL 多媒体\S642W\S642W-SW(FCC IC).EM6 (80)




Site no. : 1# 966 Chamber Data no. : 25
Dis. / Ant. : 3m 37062 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 B(3M)
Env. / Ins. : Temp:23.9℃,Humi:52.3%;Press:101.82KPa
Engineer : ZQL
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : TX Mode

| | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 30.000 | 19.20 | 0.59 | 0.28 | 20.07 | 40.00 | 19.93 | QP |
| 2 | 186.170 | 9.52 | 1.22 | 7.60 | 18.34 | 43.50 | 25.16 | QP |
| 3 | 256.980 | 14.18 | 1.55 | 2.57 | 18.30 | 46.00 | 27.70 | QP |
| 4 | 300.630 | 14.30 | 1.68 | 3.41 | 19.39 | 46.00 | 26.61 | QP |
| 5 | 581.930 | 20.64 | 2.18 | 2.00 | 24.82 | 46.00 | 21.18 | QP |
| 6 | 765.260 | 22.90 | 2.77 | 1.73 | 27.40 | 46.00 | 18.60 | QP |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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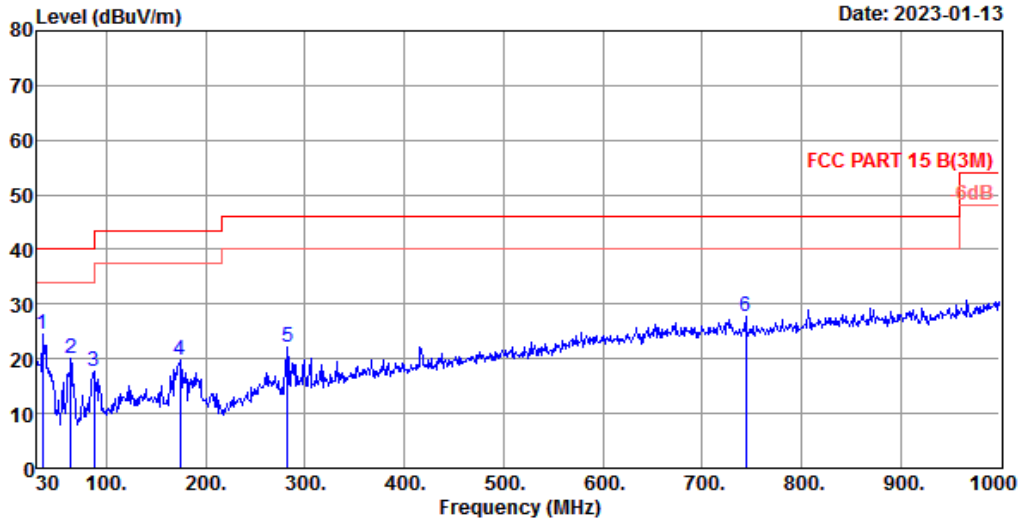
Data: 26 File: \\emc-966-1\test data\2023\RF\T\TCL 多媒体\S642W\S642W-SW(FCC IC).EM6 (80)




Site no. : 1# 966 Chamber Data no. : 26
Dis. / Ant. : 3m 37062 Ant. pol. : VERTICAL
Limit : FCC PART 15 B(3M)
Env. / Ins. : Temp:23.9℃,Humi:52.3%;Press:101.82KPa
Engineer : ZQL
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : TX Mode

| | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 35.820 | 15.00 | 0.63 | 8.75 | 24.38 | 40.00 | 15.62 | QP |
| 2 | 63.950 | 6.06 | 0.78 | 13.11 | 19.95 | 40.00 | 20.05 | QP |
| 3 | 87.230 | 9.34 | 0.94 | 7.58 | 17.86 | 40.00 | 22.14 | QP |
| 4 | 174.530 | 10.10 | 1.17 | 8.54 | 19.81 | 43.50 | 23.69 | QP |
| 5 | 282.200 | 13.36 | 1.64 | 7.18 | 22.18 | 46.00 | 23.82 | QP |
| 6 | 743.920 | 22.08 | 2.78 | 2.86 | 27.72 | 46.00 | 18.28 | QP |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

Note:

1. The amplitude of 9KHz to 30MHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
2. All test mode had been pre-test,only the worst case was reported.

# Radiated Emissions Above 1G

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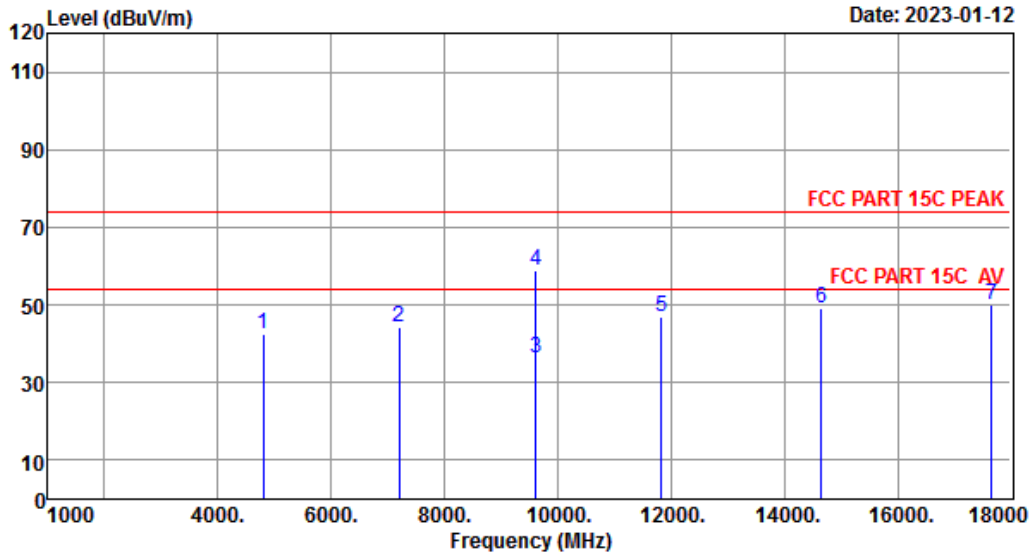
Data: 29 File: \\emc-966-1\test data\2023\RF\T\TCL 多媒体\S642W\S642W-SW(FCC IC).EM6 (80)




Site no. : 1# 966 Chamber Data no. : 29
Dis. / Ant. : 3m BBHA9120D 1-18G 2208 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:18.9℃;Humi:50%;Press:101.55kPa
Engineer : JBR
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : 8-DPSK TX 2402MHz

| | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Amp Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4804.000 | 32.39 | 4.90 | 45.44 | 50.58 | 42.43 | 74.00 | 31.57 | Peak |
| 2 | 7206.000 | 36.16 | 6.25 | 44.99 | 46.80 | 44.22 | 74.00 | 29.78 | Peak |
| 3 | 9608.000 | 38.12 | 7.43 | 44.58 | 35.48 | 36.45 | 54.00 | 17.55 | Average |
| 4 | 9608.000 | 38.12 | 7.43 | 44.58 | 57.71 | 58.68 | 74.00 | 15.32 | Peak |
| 5 | 11829.000 | 38.82 | 8.18 | 43.29 | 43.22 | 46.93 | 74.00 | 27.07 | Peak |
| 6 | 14651.000 | 39.67 | 9.32 | 43.45 | 43.61 | 49.15 | 74.00 | 24.85 | Peak |
| 7 | 17660.000 | 40.48 | 10.54 | 43.91 | 42.75 | 49.86 | 74.00 | 24.14 | Peak |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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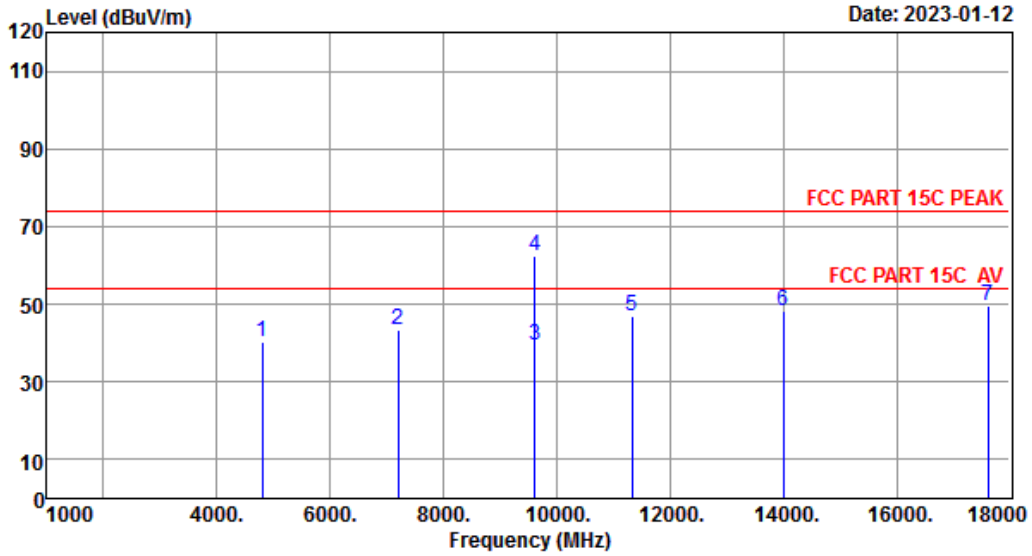
Data: 30 File: \\emc-966-1\test data\2023\RF\T\TCL 多媒体\S642W\S642W-SW(FCC IC).EM6 (80)




Site no. : 1# 966 Chamber Data no. : 30
Dis. / Ant. : 3m BBHA9120D 1-18G 2208 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:18.9℃;Humi:50%;Press:101.55kPa
Engineer : JBR
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : 8-DPSK TX 2402MHz

| | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Amp Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4804.000 | 32.39 | 4.90 | 45.44 | 48.49 | 40.34 | 74.00 | 33.66 | Peak |
| 2 | 7206.000 | 36.16 | 6.25 | 44.99 | 46.00 | 43.42 | 74.00 | 30.58 | Peak |
| 3 | 9608.000 | 38.12 | 7.43 | 44.58 | 38.36 | 39.33 | 54.00 | 14.67 | Average |
| 4 | 9608.000 | 38.12 | 7.43 | 44.58 | 61.34 | 62.31 | 74.00 | 11.69 | Peak |
| 5 | 11336.000 | 38.87 | 7.99 | 43.62 | 43.76 | 47.00 | 74.00 | 27.00 | Peak |
| 6 | 14005.000 | 40.00 | 9.12 | 41.97 | 41.20 | 48.35 | 74.00 | 25.65 | Peak |
| 7 | 17609.000 | 40.31 | 10.51 | 43.93 | 42.49 | 49.38 | 74.00 | 24.62 | Peak |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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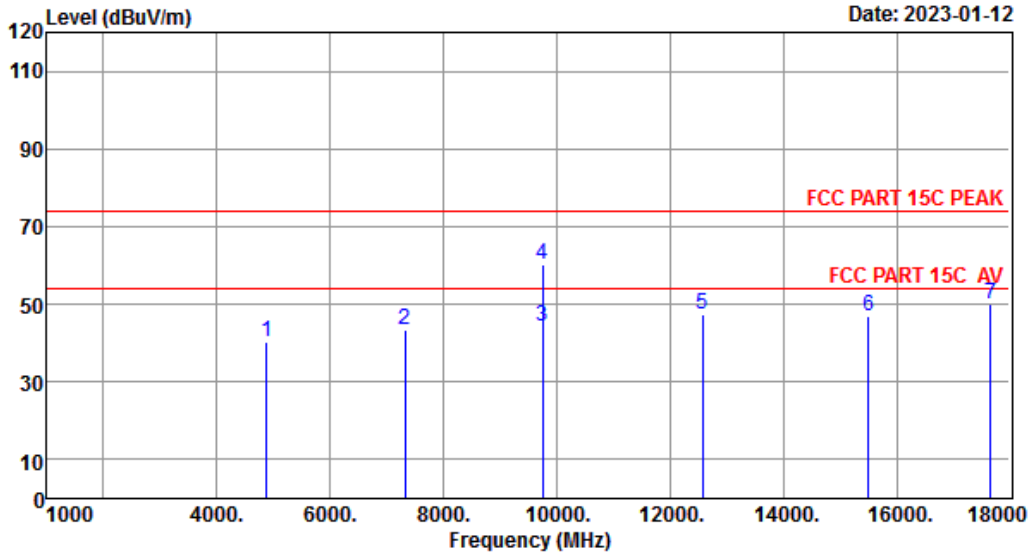
Data: 31 File: \\emc-966-1\test data\2023\RF\T\TCL 多媒体\S642W\S642W-SW(FCC IC).EM6 (80)




Site no. : 1# 966 Chamber Data no. : 31
Dis. / Ant. : 3m BBHA9120D 1-18G 2208 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:18.9℃;Humi:50%;Press:101.55kPa
Engineer : JBR
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : 8-DPSK TX 2441MHz

| | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Amp Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4882.000 | 32.55 | 4.94 | 45.41 | 48.01 | 40.09 | 74.00 | 33.91 | Peak |
| 2 | 7323.000 | 36.26 | 6.34 | 44.97 | 45.98 | 43.61 | 74.00 | 30.39 | Peak |
| 3 | 9755.000 | 38.15 | 7.52 | 44.55 | 43.21 | 44.33 | 54.00 | 9.67 | Average |
| 4 | 9755.000 | 38.15 | 7.52 | 44.55 | 59.04 | 60.16 | 74.00 | 13.84 | Peak |
| 5 | 12577.000 | 39.32 | 8.56 | 42.79 | 42.35 | 47.44 | 74.00 | 26.56 | Peak |
| 6 | 15501.000 | 38.65 | 9.54 | 44.87 | 43.63 | 46.95 | 74.00 | 27.05 | Peak |
| 7 | 17660.000 | 40.48 | 10.54 | 43.91 | 42.80 | 49.91 | 74.00 | 24.09 | Peak |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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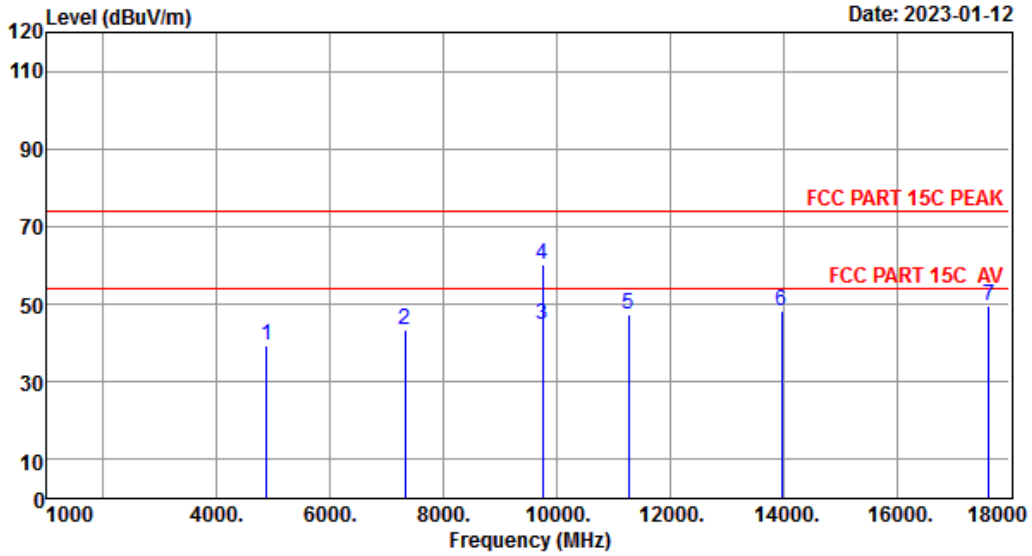
Data: 32 File: \\emc-966-1\test data\2023\RF\T\TCL 多媒体\S642W\S642W-SW(FCC IC).EM6 (80)




Site no. : 1# 966 Chamber Data no. : 32
Dis. / Ant. : 3m BBHA9120D 1-18G 2208 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:18.9℃;Humi:50%;Press:101.55kPa
Engineer : JBR
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : 8-DPSK TX 2441MHz

| | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Amp Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4882.000 | 32.55 | 4.94 | 45.41 | 47.47 | 39.55 | 74.00 | 34.45 | Peak |
| 2 | 7323.000 | 36.26 | 6.34 | 44.97 | 45.70 | 43.33 | 74.00 | 30.67 | Peak |
| 3 | 9755.000 | 38.15 | 7.52 | 44.55 | 43.66 | 44.78 | 54.00 | 9.22 | Average |
| 4 | 9755.000 | 38.15 | 7.52 | 44.55 | 58.91 | 60.03 | 74.00 | 13.97 | Peak |
| 5 | 11268.000 | 38.87 | 7.96 | 43.67 | 44.05 | 47.21 | 74.00 | 26.79 | Peak |
| 6 | 13971.000 | 39.99 | 9.09 | 41.89 | 41.05 | 48.24 | 74.00 | 25.76 | Peak |
| 7 | 17626.000 | 40.37 | 10.52 | 43.92 | 42.81 | 49.78 | 74.00 | 24.22 | Peak |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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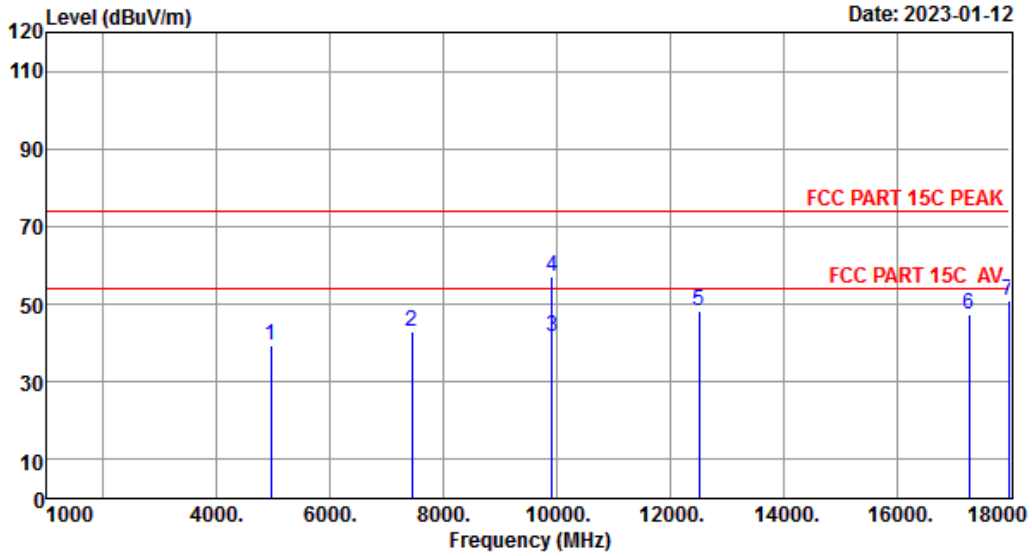
Data: 33 File: \\emc-966-1\test data\2023\RF\T\TCL 多媒体\S642W\S642W-SW(FCC IC).EM6 (80)




Site no. : 1# 966 Chamber Data no. : 33
Dis. / Ant. : 3m BBHA9120D 1-18G 2208 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:18.9℃;Humi:50%;Press:101.55kPa
Engineer : JBR
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : 8-DPSK TX 2480MHz

| | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Amp Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4960.000 | 32.72 | 4.98 | 45.38 | 47.08 | 39.40 | 74.00 | 34.60 | Peak |
| 2 | 7440.000 | 36.35 | 6.43 | 44.95 | 45.10 | 42.93 | 74.00 | 31.07 | Peak |
| 3 | 9920.000 | 38.18 | 7.61 | 44.53 | 40.34 | 41.60 | 54.00 | 12.40 | Average |
| 4 | 9920.000 | 38.18 | 7.61 | 44.53 | 56.00 | 57.26 | 74.00 | 16.74 | Peak |
| 5 | 12509.000 | 39.26 | 8.54 | 42.84 | 43.09 | 48.05 | 74.00 | 25.95 | Peak |
| 6 | 17286.000 | 39.24 | 10.35 | 44.07 | 41.96 | 47.48 | 74.00 | 26.52 | Peak |
| 7 | 17983.000 | 41.54 | 10.70 | 43.76 | 42.34 | 50.82 | 74.00 | 23.18 | Peak |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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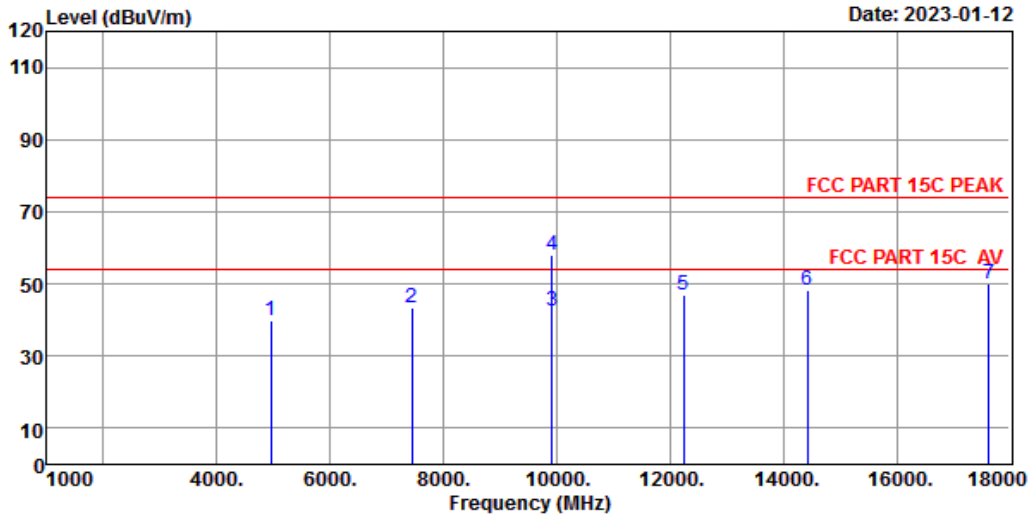
Data: 34 File: \\emc-966-1\test data\2023\RF\T\TCL 多媒体\S642W\S642W-SW(FCC IC).EM6 (80)




Site no. : 1# 966 Chamber Data no. : 34
Dis. / Ant. : 3m BBHA9120D 1-18G 2208 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:18.9℃;Humi:50%;Press:101.55kPa
Engineer : JBR
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : 8-DPSK TX 2480MHz

| | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Amp Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4960.000 | 32.72 | 4.98 | 45.38 | 47.35 | 39.67 | 74.00 | 34.33 | Peak |
| 2 | 7440.000 | 36.35 | 6.43 | 44.95 | 45.75 | 43.58 | 74.00 | 30.42 | Peak |
| 3 | 9920.000 | 38.18 | 7.61 | 44.53 | 41.26 | 42.52 | 54.00 | 11.48 | Average |
| 4 | 9920.000 | 38.18 | 7.61 | 44.53 | 56.88 | 58.14 | 74.00 | 15.86 | Peak |
| 5 | 12237.000 | 39.01 | 8.39 | 43.02 | 42.50 | 46.88 | 74.00 | 27.12 | Peak |
| 6 | 14430.000 | 39.78 | 9.25 | 42.95 | 42.06 | 48.14 | 74.00 | 25.86 | Peak |
| 7 | 17626.000 | 40.37 | 10.52 | 43.92 | 42.98 | 49.95 | 74.00 | 24.05 | Peak |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

Note:

1. The amplitude of 18GHz to 25GHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
2. All test mode had been pre-test,only Low/Middle/High Channel of the worst case modulation mode was reported.

# Radiated Band Edge

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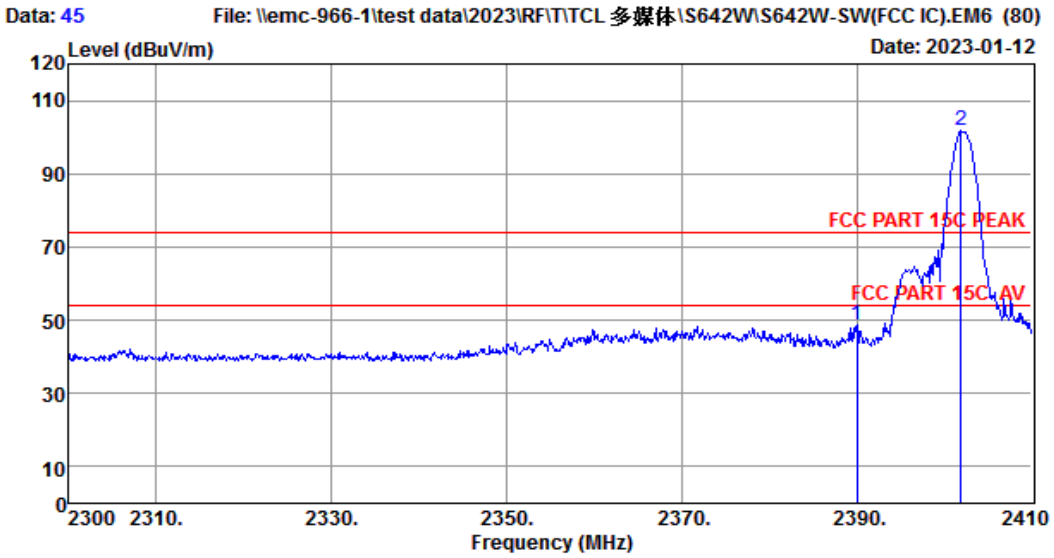


Site no. : 1# 966 Chamber Data no. : 45
Dis. / Ant. : 3m BBHA9120D 1-18G 2208 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:18.9℃;Humi:50%;Press:101.55kPa
Engineer : JBR
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : 8-DPSK TX 2402MHz

| | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Amp Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2390.000 | 27.43 | 3.47 | 32.06 | 49.69 | 48.53 | 74.00 | 25.47 | Peak |
| 2 | 2401.860 | 27.47 | 3.48 | 32.08 | 102.81 | 101.68 | 74.00 | -27.68 | Peak |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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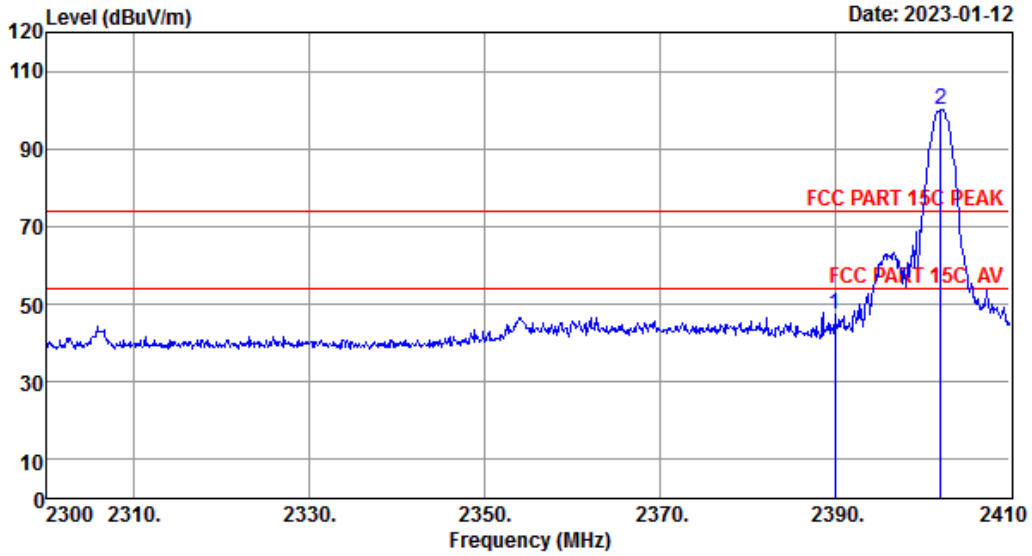
Data: 46 File: \\emc-966-1\test data\2023\RF\T\TCL 多媒体\S642W\S642W-SW(FCC IC).EM6 (80)




Site no. : 1# 966 Chamber Data no. : 46
Dis. / Ant. : 3m BBHA9120D 1-18G 2208 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:18.9℃;Humi:50%;Press:101.55kPa
Engineer : JBR
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : 8-DPSK TX 2402MHz

| | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Amp Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2390.000 | 27.43 | 3.47 | 32.06 | 48.70 | 47.54 | 74.00 | 26.46 | Peak |
| 2 | 2402.080 | 27.47 | 3.48 | 32.08 | 101.16 | 100.03 | 74.00 | -26.03 | Peak |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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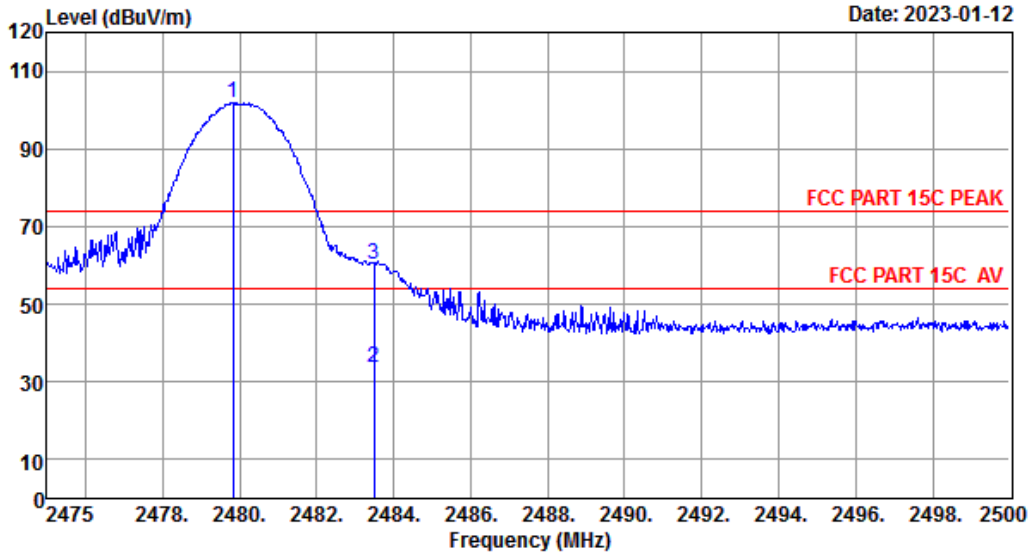
Data: 47 File: \\emc-966-1\test data\2023\RF\T\TCL 多媒体\S642W\S642W-SW(FCC IC).EM6 (80)




Site no. : 1# 966 Chamber Data no. : 47
Dis. / Ant. : 3m BBHA9120D 1-18G 2208 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:18.9℃;Humi:50%;Press:101.55kPa
Engineer : JBR
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : 8-DPSK TX 2480MHz

| | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Amp Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2479.825 | 27.69 | 3.51 | 32.22 | 102.93 | 101.91 | 74.00 | -27.91 | Peak |
| 2 | 2483.500 | 27.70 | 3.51 | 32.22 | 34.88 | 33.87 | 54.00 | 20.13 | Average |
| 3 | 2483.500 | 27.70 | 3.51 | 32.22 | 61.44 | 60.43 | 74.00 | 13.57 | Peak |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

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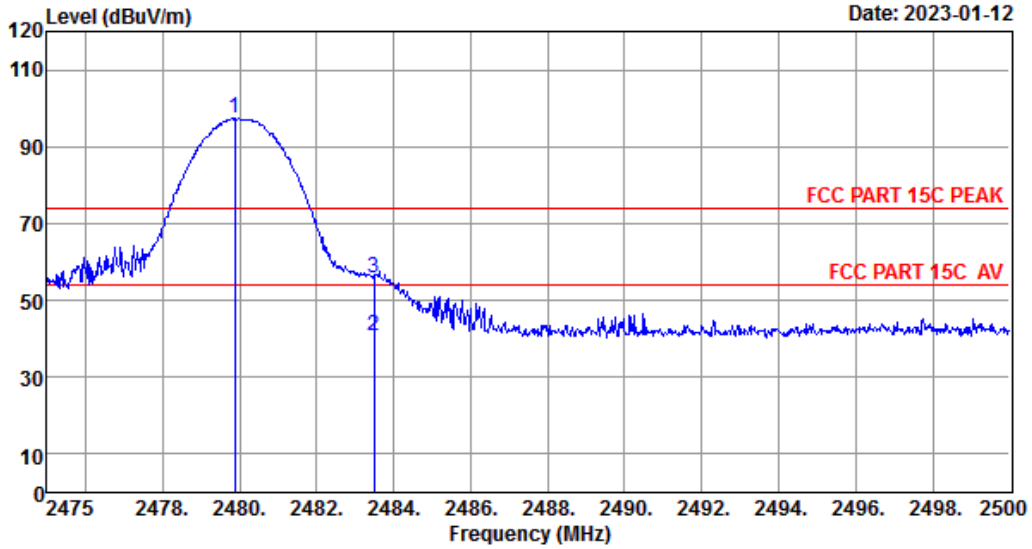
Data: 48 File: \\emc-966-1\test data\2023\RF\T\TCL 多媒体\S642W\S642W-SW(FCC IC).EM6 (80)




Site no. : 1# 966 Chamber Data no. : 48
Dis. / Ant. : 3m BBHA9120D 1-18G 2208 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:18.9℃;Humi:50%;Press:101.55kPa
Engineer : JBR
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : 8-DPSK TX 2480MHz

| | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Amp Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2479.875 | 27.69 | 3.51 | 32.22 | 98.37 | 97.35 | 74.00 | -23.35 | Peak |
| 2 | 2483.500 | 27.70 | 3.51 | 32.22 | 41.66 | 40.65 | 54.00 | 13.35 | Average |
| 3 | 2483.500 | 27.70 | 3.51 | 32.22 | 56.96 | 55.95 | 74.00 | 18.05 | Peak |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

Note: All test mode had been pre-test,only Low/High Channel of the worst case modulation mode was reported.

# 11. AC POWER LINE CONDUCTED EMISSIONS

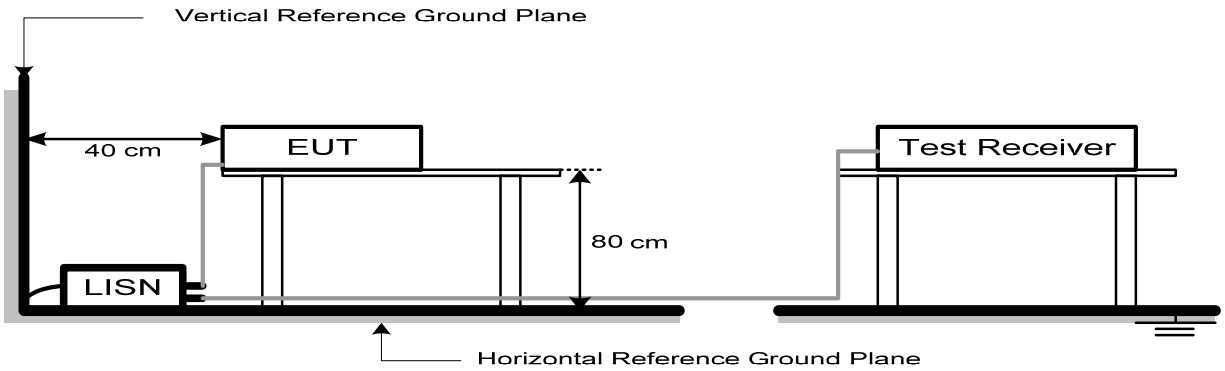
## 11.1. Limit

| Frequency | | | Maximum RF Line Voltage | |
|---|---|---|---|---|
| | | | Quasi-Peak Level dB(μV) | Average Level dB(μV) |
| 150kHz | ~ | 500kHz | 66 ~ 56* | 56 ~ 46* |
| 500kHz | ~ | 5MHz | 56 | 46 |
| 5MHz | ~ | 30MHz | 60 | 50 |

Note:

1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

## 11.2. Test Setup




## 11.3. Spectrum Analyzer Setting

| Spectrum Parameters | Setting |
|---|---|
| RBW | 9KHz |
| VBW | 9KHz |
| Start frequency | 150KHz |
| Stop frequency | 30MHz |
| Sweep Time | Auto |
| Detector | QP/AVG |
| Trace Mode | Max Hold |

## 11.4. Test Procedure

a. The EUT was placed on a non-metallic table, 80cm above the ground plane.
b. The EUT Power connected to the power mains through a line impedance stabilization network.
c. Provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs).
d. Set the EUT transmit continuously with maximum output power.
e. Spectrum analyzer setting parameters in accordance with section 11.3.
f. The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Test.
g. Record the results in the test report.

## 11.5. Test Result

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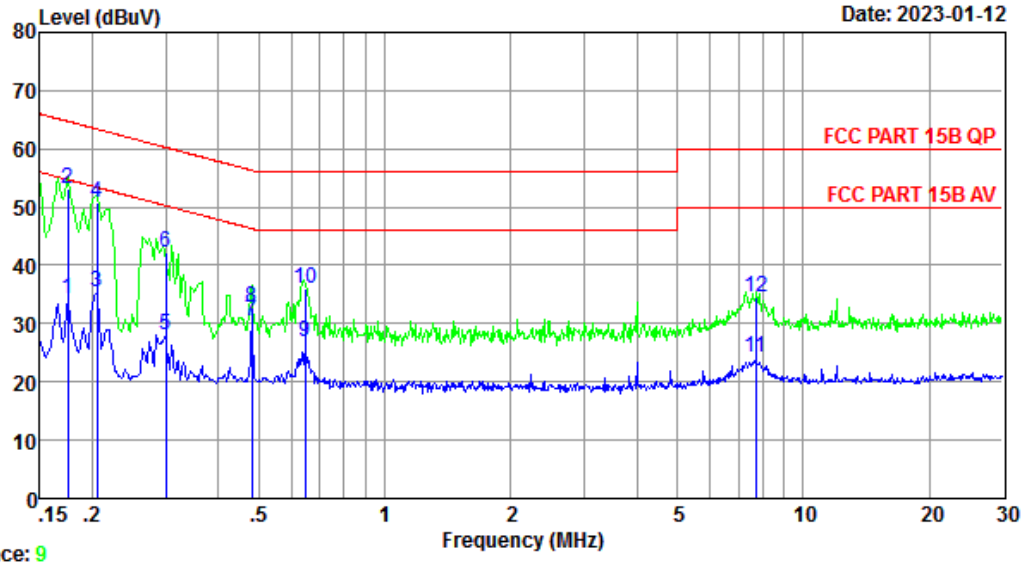
Data: 10 File: \\Emc-CE-2\Test Data\2023\RF\T\S642W(FCC IC).EM6 (32)




Site no : 2#CE Shield Room Data no. : 10
Env. / Ins. : Temp:24.8℃ Humi:55% Press:101.50kPa LINE Phase : NEUTRAL
Limit : FCC PART 15B QP
Engineer : XJF
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : TX Mode

| | Freq. (MHz) | LISN Factor (db) | Cable Loss (db) | Reading dBuV) | Emission Level (dBuv) | Limits (dBuv) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.175 | 9.72 | 9.77 | 14.89 | 34.38 | 54.72 | 20.34 | Average |
| 2 | 0.175 | 9.72 | 9.77 | 33.60 | 53.09 | 64.72 | 11.63 | QP |
| 3 | 0.205 | 9.78 | 9.84 | 15.82 | 35.44 | 53.40 | 17.96 | Average |
| 4 | 0.205 | 9.78 | 9.84 | 31.20 | 50.82 | 63.40 | 12.58 | QP |
| 5 | 0.300 | 9.83 | 9.92 | 8.30 | 28.05 | 50.24 | 22.19 | Average |
| 6 | 0.300 | 9.83 | 9.92 | 22.56 | 42.31 | 60.24 | 17.93 | QP |
| 7 | 0.481 | 9.76 | 9.92 | 10.65 | 30.33 | 46.32 | 15.99 | Average |
| 8 | 0.481 | 9.76 | 9.92 | 13.06 | 32.74 | 56.32 | 23.58 | QP |
| 9 | 0.644 | 9.75 | 9.92 | 7.20 | 26.87 | 46.00 | 19.13 | Average |
| 10 | 0.644 | 9.75 | 9.92 | 16.47 | 36.14 | 56.00 | 19.86 | QP |
| 11 | 7.687 | 10.06 | 10.04 | 3.99 | 24.09 | 50.00 | 25.91 | Average |
| 12 | 7.687 | 10.06 | 10.04 | 14.51 | 34.61 | 60.00 | 25.39 | QP |

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. If the average limit is met when useing a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

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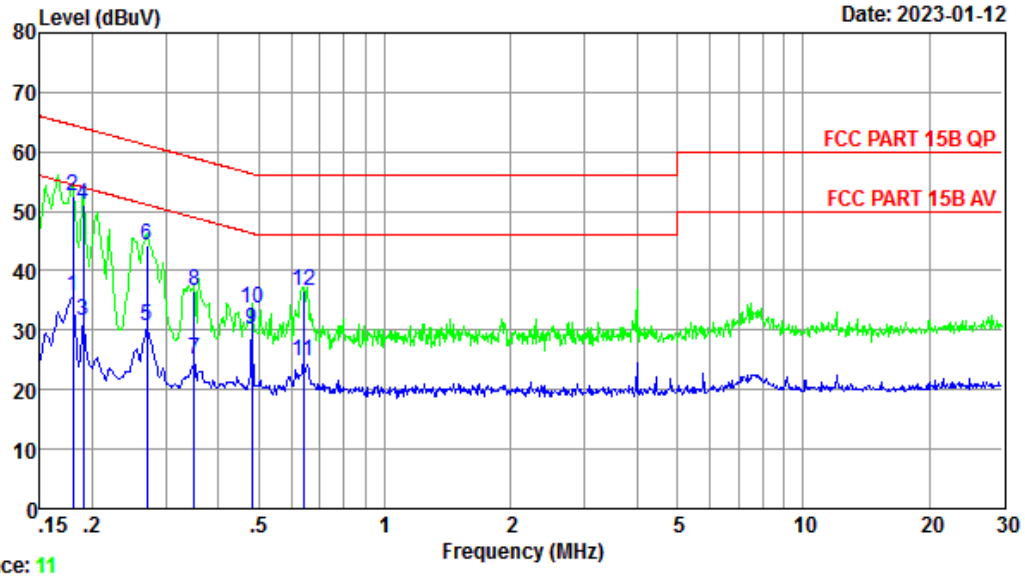
Data: 12 File: \\Emc-CE-2\Test Data\2023\RF\T\S642W(FCC IC).EM6 (32)




Trace: 11

Site no : 2#CE Shield Room Data no. : 12
Env. / Ins. : Temp:24.8℃ Humi:55% Press:101.50kPa LINE Phase : LINE
Limit : FCC PART 15B QP
Engineer : XJF
EUT : Wireless subwoofer

Power : AC 120V/60Hz
M/N : S642W-SW
Test Mode : TX Mode

| | Freq. (MHz) | LISN Factor (db) | Cable Loss (db) | Reading dBuV) | Emission Level (dBuv) | Limits (dBuv) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.180 | 9.84 | 9.77 | 16.04 | 35.65 | 54.50 | 18.85 | Average |
| 2 | 0.180 | 9.84 | 9.77 | 32.98 | 52.59 | 64.50 | 11.91 | QP |
| 3 | 0.190 | 9.84 | 9.77 | 11.83 | 31.44 | 54.02 | 22.58 | Average |
| 4 | 0.190 | 9.84 | 9.77 | 31.50 | 51.11 | 64.02 | 12.91 | QP |
| 5 | 0.270 | 9.77 | 9.92 | 11.14 | 30.83 | 51.12 | 20.29 | Average |
| 6 | 0.270 | 9.77 | 9.92 | 24.71 | 44.40 | 61.12 | 16.72 | QP |
| 7 | 0.350 | 9.76 | 9.92 | 5.53 | 25.21 | 48.96 | 23.75 | Average |
| 8 | 0.350 | 9.76 | 9.92 | 17.07 | 36.75 | 58.96 | 22.21 | QP |
| 9 | 0.481 | 9.84 | 9.92 | 10.47 | 30.23 | 46.32 | 16.09 | Average |
| 10 | 0.481 | 9.84 | 9.92 | 13.97 | 33.73 | 56.32 | 22.59 | QP |
| 11 | 0.641 | 9.83 | 9.92 | 5.12 | 24.87 | 46.00 | 21.13 | Average |
| 12 | 0.641 | 9.83 | 9.92 | 16.85 | 36.60 | 56.00 | 19.40 | QP |

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. If the average limit is met when useing a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

# 12. ANTENNA REQUIREMENTS

## 12.1. Limit

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, 15.221, or §15.236. 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.

## 12.2. Test Result

The antennas used for this product is PCB antenna ,so compliance with antenna requirements.
( Please refer to the EUT photo for details)

# 13. APPENDIX

Appendix A: Maximum conducted output power
Test Result Peak

| Test Mode | Antenna | Freq(MHz) | Conducted Peak Power[dBm] | Conducted Limit[dBm] | Verdict |
|---|---|---|---|---|---|
| DH5# | Ant1 | 2402 | 4.68 | ≤20.97 | PASS |
| | | 2441 | 4.69 | ≤20.97 | PASS |
| | | 2480 | 4.81 | ≤20.97 | PASS |
| 2DH5 | Ant1 | 2402 | 5.34 | ≤20.97 | PASS |
| | | 2441 | 5.35 | ≤20.97 | PASS |
| | | 2480 | 5.50 | ≤20.97 | PASS |
| 3DH5 | Ant1 | 2402 | 5.27 | ≤20.97 | PASS |
| | | 2441 | 5.45 | ≤20.97 | PASS |
| | | 2480 | 5.60 | ≤20.97 | PASS |

#

## Test Graphs

DH5_Ant1_2402#

DH5_Ant1_2441

DH5_Ant1_2480

2DH5_Ant1_2402

2DH5_Ant1_2441

2DH5_Ant1_2480

3DH5_Ant1_2402

3DH5_Ant1_2441

3DH5_Ant1_2480

## Appendix B: 20dB Emission Bandwidth

Test Result

| Test Mode | Antenna | Freq(MHz) | 20dB EBW[MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| DH5# | Ant1 | 2402 | 0.960 | 2401.547 | 2402.507 | --- | --- |
| | | 2441 | 0.954 | 2440.550 | 2441.504 | --- | --- |
| | | 2480 | 0.951 | 2479.550 | 2480.501 | --- | --- |
| 2DH5 | Ant1 | 2402 | 1.347 | 2401.346 | 2402.693 | --- | --- |
| | | 2441 | 1.305 | 2440.361 | 2441.666 | --- | --- |
| | | 2480 | 1.320 | 2479.352 | 2480.672 | --- | --- |
| 3DH5 | Ant1 | 2402 | 1.287 | 2401.361 | 2402.648 | --- | --- |
| | | 2441 | 1.260 | 2440.403 | 2441.663 | --- | --- |
| | | 2480 | 1.311 | 2479.355 | 2480.666 | --- | --- |

## Test Graphs

DH5_Ant1_2402#

DH5_Ant1_2441

DH5_Ant1_2480

2DH5_Ant1_2402

2DH5_Ant1_2441

2DH5_Ant1_2480

3DH5_Ant1_2402

3DH5_Ant1_2441

3DH5_Ant1_2480

#

# Appendix C: Carrier frequency separation

## Test Result

| Test Mode | Antenna | Freq(MHz) | Result[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|
| DH5# | Ant1 | 2402 | 0.993 | ≥0.960 | PASS |
| | | 2441 | 0.984 | ≥0.960 | PASS |
| | | 2480 | 1.092 | ≥0.960 | PASS |
| 2DH5 | Ant1 | 2402 | 0.993 | ≥0.898 | PASS |
| | | 2441 | 1.002 | ≥0.898 | PASS |
| | | 2480 | 0.993 | ≥0.898 | PASS |
| 3DH5 | Ant1 | 2402 | 1.158 | ≥0.874 | PASS |
| | | 2441 | 0.996 | ≥0.874 | PASS |
| | | 2480 | 1.011 | ≥0.874 | PASS |

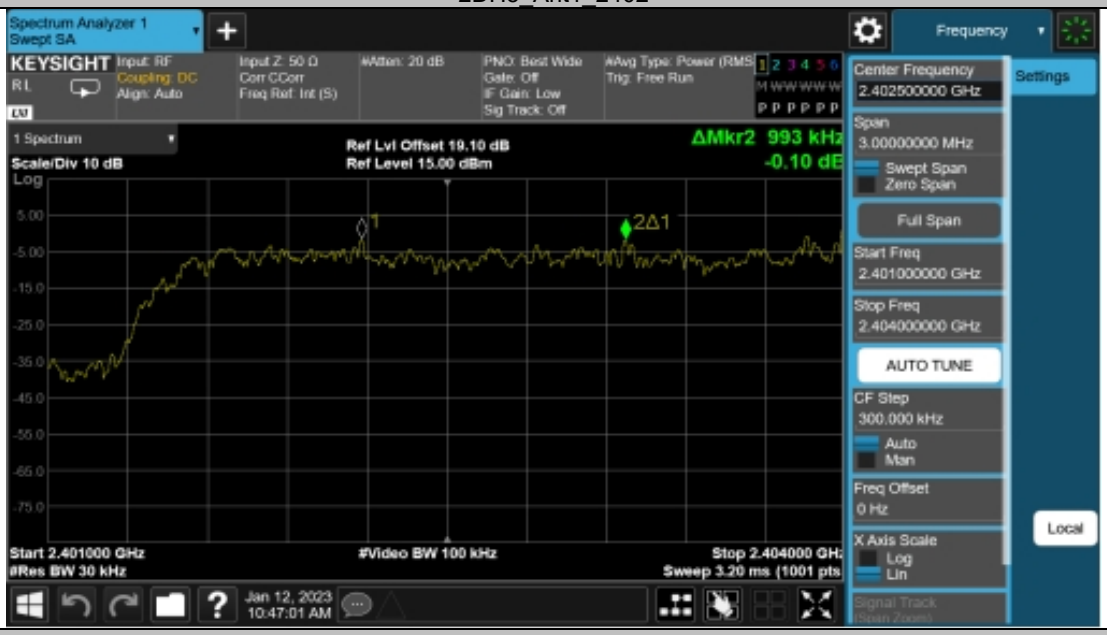
## Test Graphs

DH5_Ant1_2402#

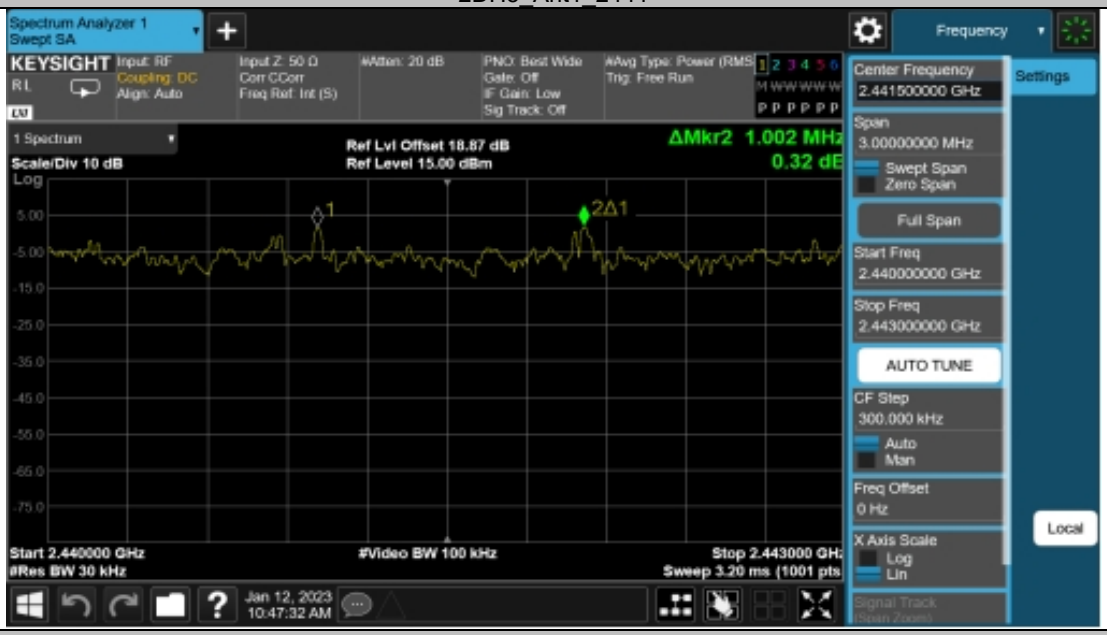
DH5_Ant1_2441

DH5_Ant1_2480

2DH5_Ant1_2402

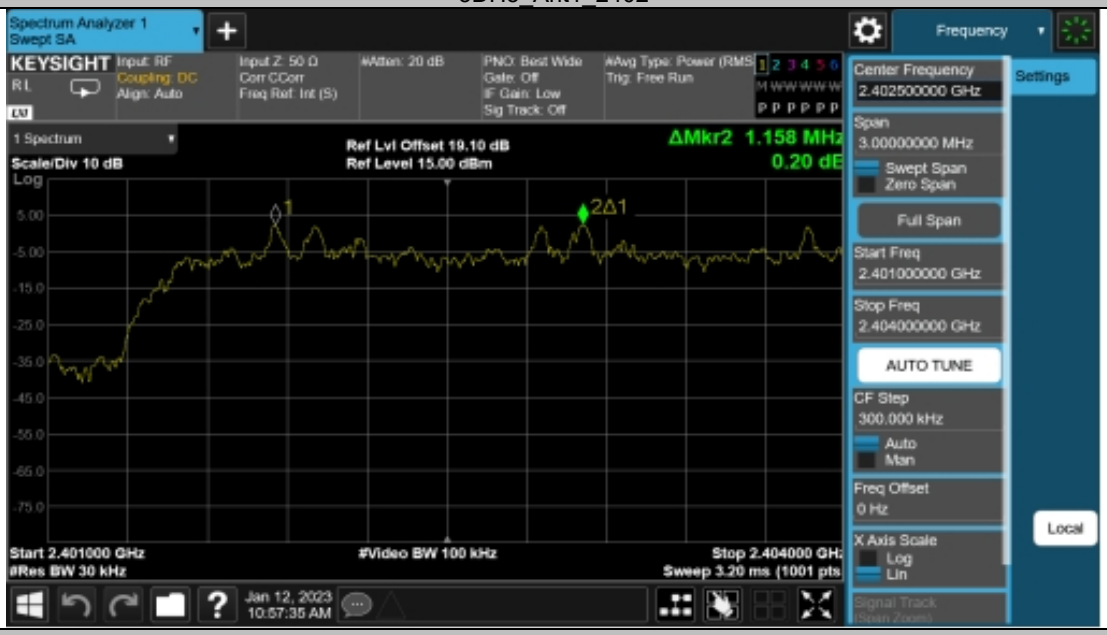



2DH5_Ant1_2441




2DH5_Ant1_2480

3DH5_Ant1_2402




3DH5_Ant1_2441

3DH5_Ant1_2480

#

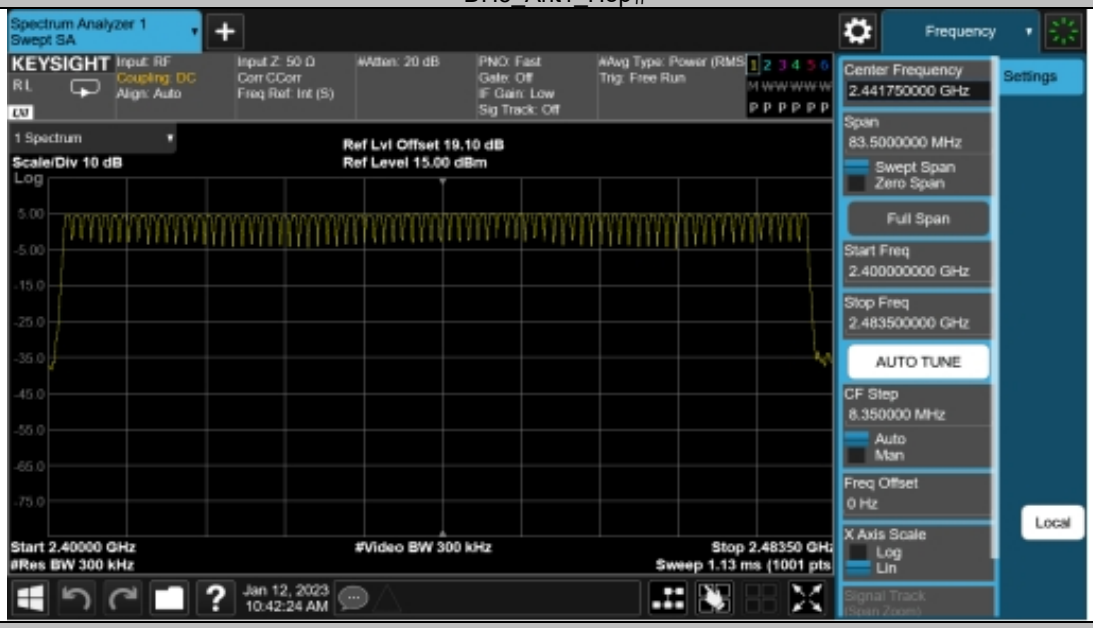
# Appendix D: Number of hopping channels

Test Result

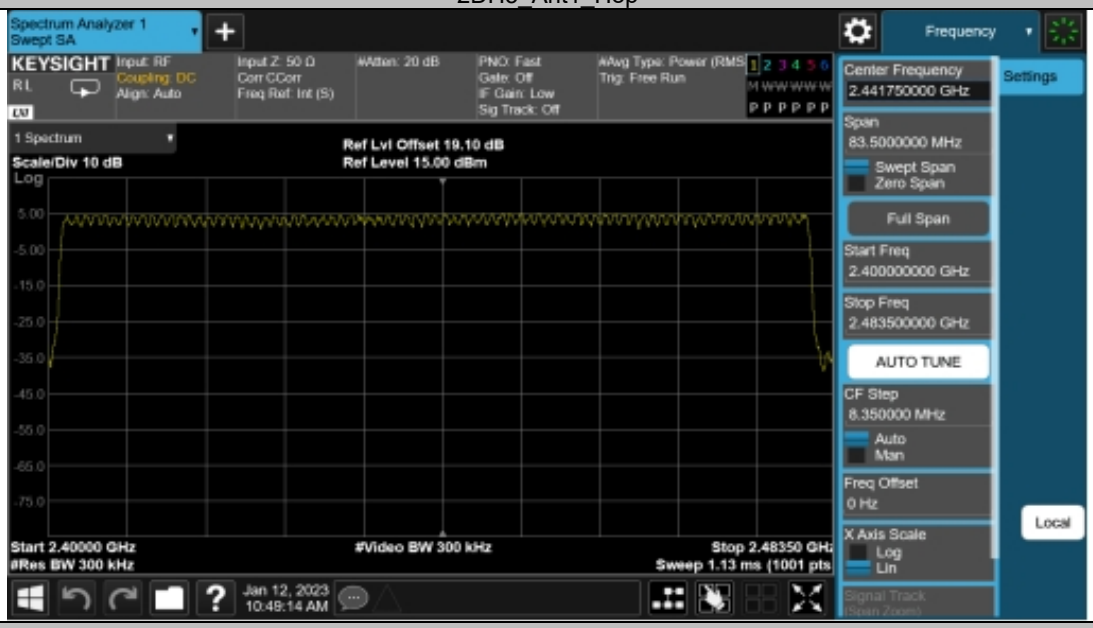
| Test Mode | Antenna | Freq(MHz) | Result[Num] | Limit[Num] | Verdict |
|---|---|---|---|---|---|
| DH5# | Ant1 | Hop | 79 | ≥15 | PASS |
| 2DH5 | Ant1 | Hop | 79 | ≥15 | PASS |
| 3DH5 | Ant1 | Hop | 79 | ≥15 | PASS |

## Test Graphs

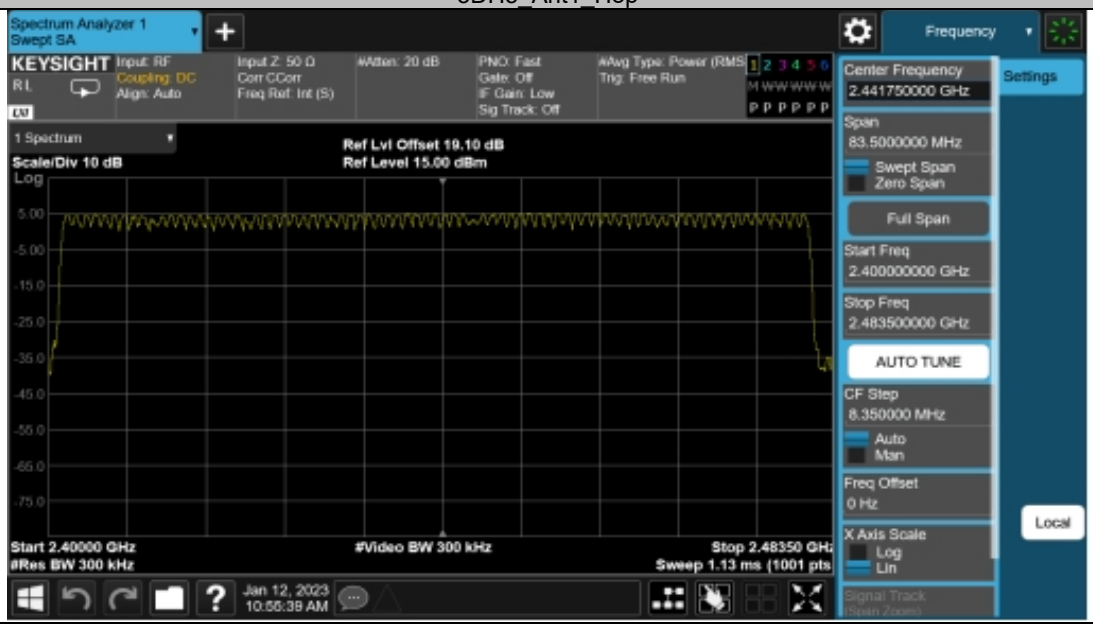
DH5_Ant1_Hop#




2DH5_Ant1_Hop




3DH5_Ant1_Hop



# Appendix E: Time of occupancy

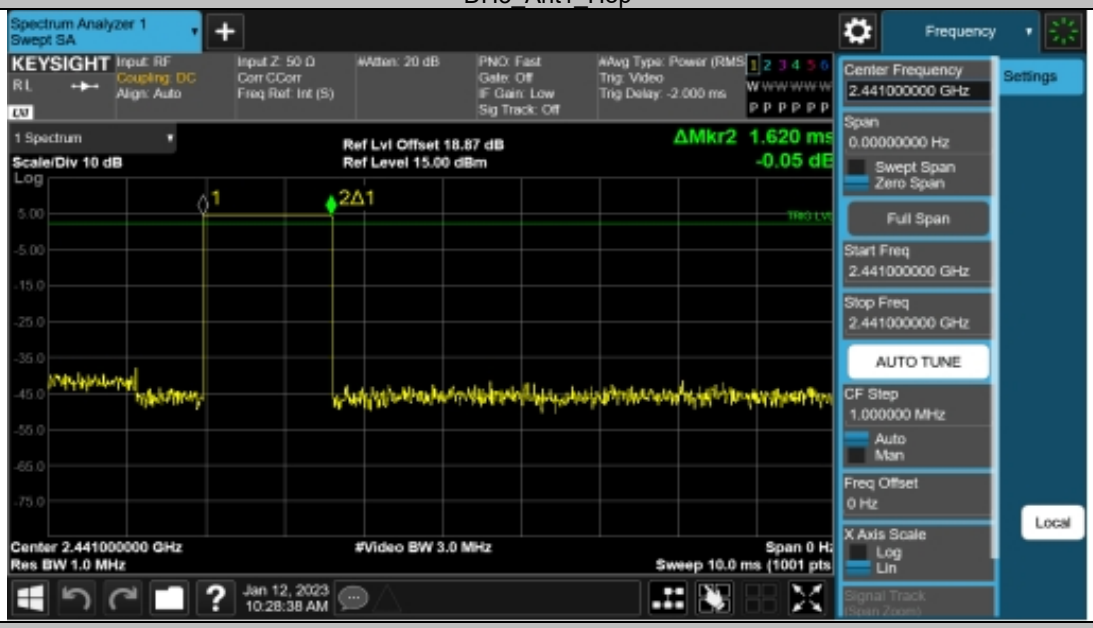
## Test Result

| Test Mode | Antenna | Freq(MHz) | Burst Width [ms] | Total Hops [Num] | Result[s] | Limit[s] | Verdict |
|---|---|---|---|---|---|---|---|
| DH1# | Ant1 | Hop | 0.38 | 320 | 0.121 | ≤0.4 | PASS |
| DH3 | Ant1 | Hop | 1.62 | 160 | 0.259 | ≤0.4 | PASS |
| DH5 | Ant1 | Hop | 2.86 | 106.67 | 0.305 | ≤0.4 | PASS |
| 2DH1 | Ant1 | Hop | 0.39 | 320 | 0.124 | ≤0.4 | PASS |
| 2DH3 | Ant1 | Hop | 1.62 | 160 | 0.259 | ≤0.4 | PASS |
| 2DH5 | Ant1 | Hop | 2.87 | 106.67 | 0.306 | ≤0.4 | PASS |
| 3DH1 | Ant1 | Hop | 0.65 | 320 | 0.207 | ≤0.4 | PASS |
| 3DH3 | Ant1 | Hop | 0.63 | 160 | 0.101 | ≤0.4 | PASS |
| 3DH5 | Ant1 | Hop | 0.87 | 106.67 | 0.093 | ≤0.4 | PASS |

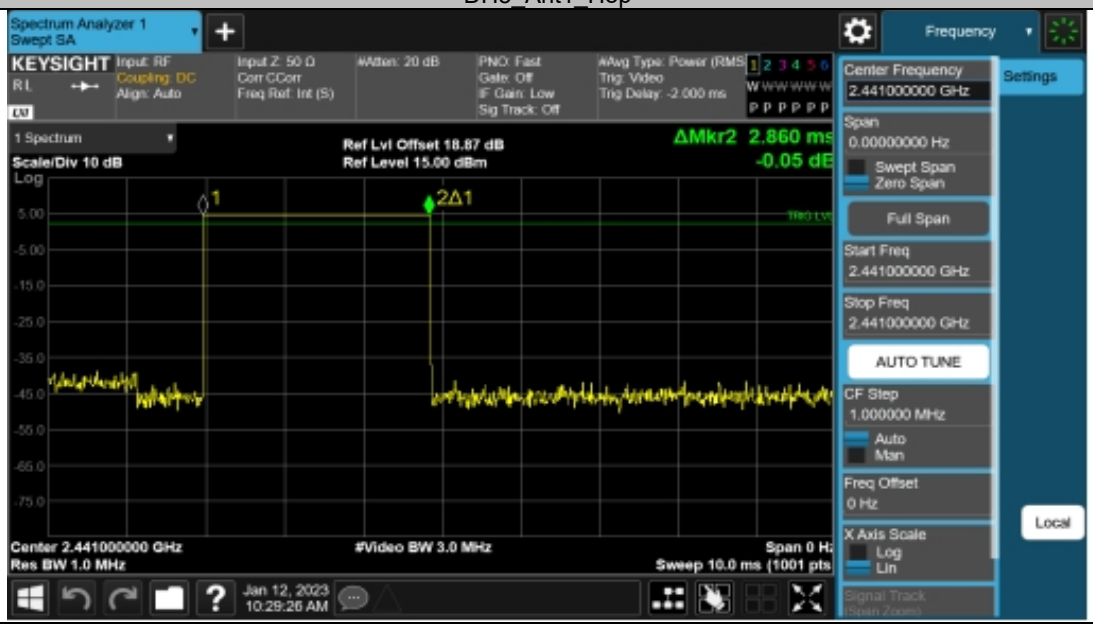
## Test Graphs

DH1_Ant1_Hop#

DH3_Ant1_Hop



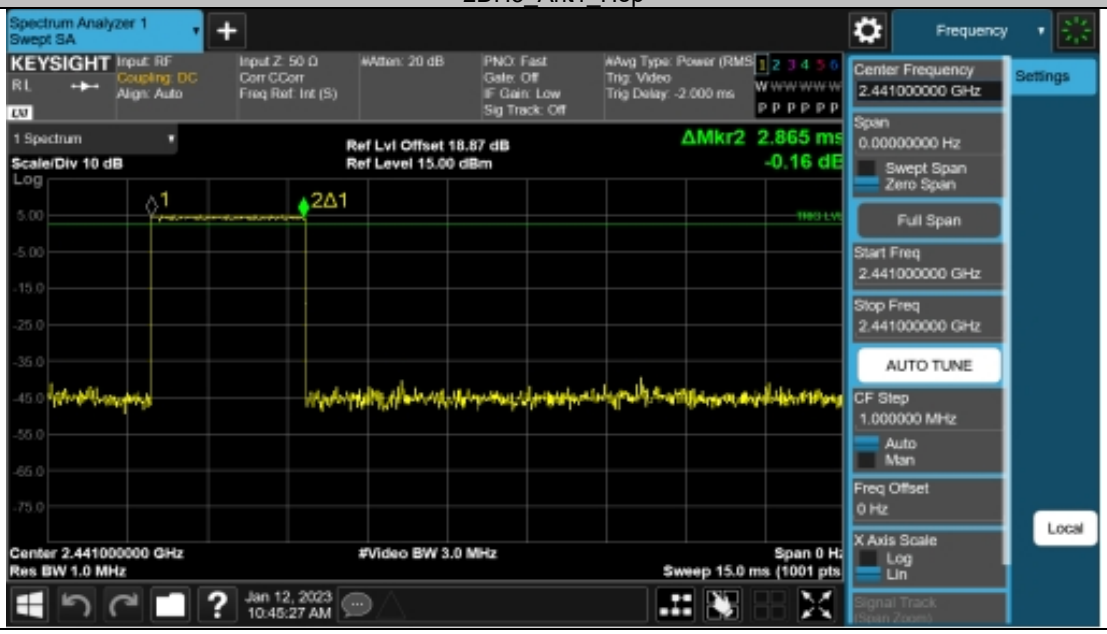

DH5_Ant1_Hop



2DH1_Ant1_Hop

2DH3_Ant1_Hop

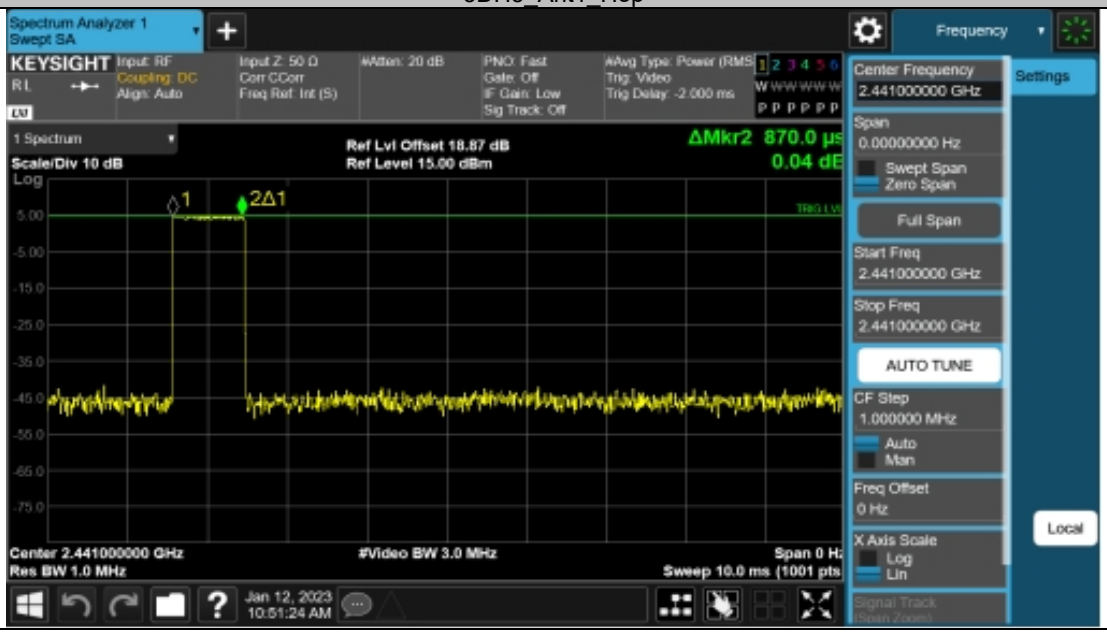
2DH5_Ant1_Hop



3DH1_Ant1_Hop

3DH3_Ant1_Hop

3DH5_Ant1_Hop



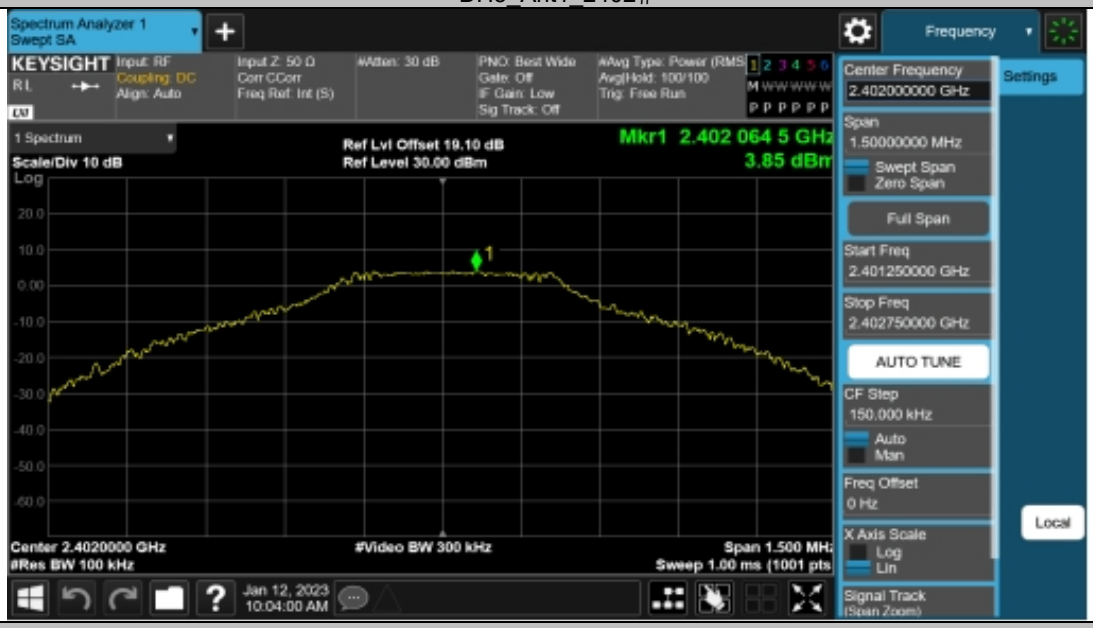
# Appendix F: Reference level measurement

## Test Result

| Test Mode | Antenna | Freq(MHz) | Max.Point[MHz] | Result[dBm] |
|---|---|---|---|---|
| DH5# | Ant1 | 2402 | 2402.06 | 3.85 |
| | | 2441 | 2440.86 | 4.23 |
| | | 2480 | 2479.99 | 4.40 |
| 2DH5 | Ant1 | 2402 | 2401.99 | 4.17 |
| | | 2441 | 2441.01 | 4.20 |
| | | 2480 | 2480.17 | 4.27 |
| 3DH5 | Ant1 | 2402 | 2402.01 | 4.10 |
| | | 2441 | 2440.86 | 4.48 |
| | | 2480 | 2479.99 | 4.47 |

## Test Graphs

DH5_Ant1_2402#




DH5_Ant1_2441

DH5_Ant1_2480

2DH5_Ant1_2402

2DH5_Ant1_2441

2DH5_Ant1_2480