G4B(www.g4b.go.kr)진위확인코드: lz/h5v9zhD8=



TEST REPORT

| Greventer | 9 | page : (1) / Total (42) | | | | | |
|------------------------------|---|--|--|--|--|--|--|
| | 네 번호 ort No. | ICRT-TR-E231964-0A | | | | | |
| 신청자 | 기관명 Name | Healingsound co.,Itd | | | | | |
| Client | 주 소 Address | 217, Yeoksam-ro, Gangnam-gu, Seoul, Republic of Korea | | | | | |
| | 상품목 ct name | Healingstone | | | | | |
| | 넬명 name | HS-01 | | | | | |
| | 격 ings | DC 3.7 V | | | | | |
| | 장소 of test | ■ 고정시험(Inside test) | | | | | |
| | 기간 of test | 21. Jul. 2023 ~ 01. Aug. 2023 | | | | | |
| 시험방 ^I Test Met | 법/항목 hod/Item | FCC Part 15 Subpart C | | | | | |
| | 결과 Results | Refer to 3. Test Summary | | | | | |
| 확 인 Affirmation | | 작성자 Tested by 기술책임자 Technical Manager 성명 Si-Yeon, Hwang (서명) Name Si-Yeon, Hwang (서명) (Signature) | | | | | |
| □ 위 성적서는 | 고객이 제공현 | / / / | | | | | |
| The above | test report is | certified that the above mentioned products have been tested for the sample. | | | | | |
| 🗆 위 성적서는 | KS Q ISO/IE | : 17025 및 한국인정기구(KOLAS)인정과 관련이 없습니다. | | | | | |
| The above | test report is | not related to accreditation by KS Q ISO/IEC 17025 and Korea Laboratory Accreditation scheme. | | | | | |
| 🗆 위 성적서는 | 주식회사 아이 | 씨알의 승인 없이는 일부 복제에 대해 금지됩니다. | | | | | |
| The test rep | port is prohib | ited for some reproduction without the approval of the ICR. | | | | | |
| | | 2023. 08. 10 주식회사 아이씨알 대표이 사표하다 The head of INTERNATIONAL CERTIFICATION REGISTRA | | | | | |
| | | 본 성적서의 진위 확인은 G4B 혹은 ICR 홈페이지에서 가능합니다. | | | | | |
| | | The authenticity of the test report can be checked on the G4B or ICR website. | | | | | |
| | 경기도 김포시 양촌읍 황금3로7번길 112 / Tel: 02-6351-9001 ~ 6 | | | | | | |

112, Hwanggeum3-ro 7beon-gil, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea / Tel: 02-6351-9001 ~ 6

Report no. ICRT-TR-E231964-0A



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| 6. Used equipment | <u>42</u> |

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Revision History

| Issued Report No. | Issued Date | Revisions | Effect Section |
|--------------------|--------------|---------------|----------------|
| ICRT-TR-E231964-0A | 2023. 08. 10 | Initial Issue | All |
| | | | |
| | | | |

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1. Applicant & Manufacturer & Test Laboratory Information

1.1 Applicant information

| ĺ | Applicant | Healingsound co.,Itd |
|---|-----------|---|
| | Address | 217, Yeoksam-ro, Gangnam-gu, Seoul, Republic of Korea |

1.2 Manufacturer Information

| Applicant | Healingsound co.,Itd |
|-----------|---|
| Address | 217, Yeoksam-ro, Gangnam-gu, Seoul, Republic of Korea |

1.3 Test Laboratory Information

| Laboratory | ICR Co., Ltd. |
|---------------|--|
| Address | 112, Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea |
| Telephone No. | +82-2-6351-9002 |
| Fax No. | +82-2-6351-9007 |
| KOLAS No. | KT652 |
| KC & FCC | KR0165 |

1.4 Measurement Uncertainty

| Parameter | Uncertainty | Limit | |
|---|----------------|----------------|--|
| Occupied Channel Bandwidth | 2.75% | ±5 % | |
| RF output power, conducted | 1.39 dB | ±1.5 dB | |
| Power Spectral Density, conducted | 1.65 dB | ±3 dB | |
| Unwanted Emissions, conducted | 1.82 dB | ±3 dB | |
| Supply voltages | 0.06% | ±3 % | |
| Time | 1.17% | ±5 % | |
| All emissions, radiated (Under the 1 GHz) | 3.22 dB | ±6 dB | |
| All emissions, radiated (Above the 1 Hz) | 3.67 dB | ±6 dB | |





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2. Equipment under Test(EUT) Information

2.1 General Information

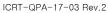
| Product Name | Healingstone |
|-----------------------|------------------|
| Model Name | HS-01 |
| Additional Model Name | COZYSTONE, CS-01 |
| FCC ID | 2BCI5-HW-HS-01 |
| Power Supply | DC 3.7 V |

2.2 Additional Information

| Equipment Class | DTS-Digital Transmission System | | | |
|-----------------------|----------------------------------|----------|--|--|
| Device Type | Stand-alone | | | |
| Temperature Range | -20 °C ~ 55 °C | | | |
| Adaptive/Non-Adaptive | Non-Adaptive Equipment | | | |
| Operating Frequency | Bluetooth LE 2 402 ₩z ~ 2 480 ₩z | | | |
| RF Output Power | Bluetooth LE (Earphone Right) | 4.64 dBm | | |
| KF Oulput Fower | Bluetooth LE (Earphone Left) | 3.18 dBm | | |
| Number of Channel | Bluetooth LE 40 | | | |
| Modulation Type | GFSK | | | |
| Antenna Type | Chip Antenna | | | |
| Antenna Gain | Antenna Gain 4.34 dBi | | | |

2.3 Reason of Additional Model Name

| NO | Family Model Name | Difference |
|----|-------------------|-------------------|
| 1 | COZYSTONE, CS-01 | Model name change |







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3. Test Summary

3.1 Test standards and results

| FCC Part 15 Subpart C | | | | | | |
|------------------------------------|---|--|------|--|--|--|
| Clause | Clause Test items | | | | | |
| §15.247 (a) (2) | 6 dB Bandwidth | | PASS | | | |
| §15.247 (b) (3) | Maximum Conducted Output Power | | PASS | | | |
| §15.247 (e) | 15.247 (e) Power Spectral Density | | | | | |
| §15.247 (d) | Conducted Spurious Emission & band Edge | | PASS | | | |
| §15.247 (d) & §15.209 & §15.205 | Radiated Spurious Emission | | PASS | | | |
| §15.207 | Power Line Conducted Emission | | PASS | | | |

3.2 Test Methodology

- Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

3.3 Configuration of Test System

- Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

3.3.1 Radiated emission test

- Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 m Semi Anechoic Chamber.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

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3.5 Antenna requirement

- According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

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.

And according to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.

Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Result: Pass

The transmitter has a Chip Antenna. The directional gain of the antenna is 4.34dBi.





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4. Test Result (Earphone Right)

4.1.6 dB Bandwidth

4.1.1 Test procedure

ANSI C63.10-2013 Clause 11.8

4.1.2 Limit

§15.247 (a) (2)

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

4.1.3 Test data

Result : Pass



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Mid ch_6 dB Bandwidth ew 📑 Sp.um × Sp.m2 × Sp.m4 × Sp.m7 × Sp.m9 × Sp.m3 × Sp.m5 × Sp.m6 × Sp.m8
 Ref Level
 20.00 dBm
 ● RBW
 100 kHz

 Att
 30 dB
 SWT
 41.71 µs (~7.6 ms)
 ● VBW
 300 kHz
 Mode
 Auto FFT

 TDF "RFC-001.TDF"
 1
 Frequency Sweep
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 1< 01Pk Max 1.27 dBm 2.440 236 80 GHz 1001 pts CF 2.44 GHz 300.0 kHz/ Span 3.0 MHz 2 Marker Table Function Result Trc Function Туре Ref X-Value 2.440 236 8 GHz Y-Value 1.27 dBm ndB ndB down BW Q Factor 752.20 kHz 2.4396104 2.4403626 High ch_6 dB Bandwidth ulti¥iew 📑 Sp.um × Sp.m2 X Sp.m3 X Sp.m4 X Sp.m5 X Sp.m6 X Sp.m7 × Sp.m8 × Sp.m9 ×
 Ref Level
 20.00 dBm
 ■ RBW 100 kHz

 Att
 30 dB
 SWT 41.71 μs (~7.6 ms)
 ■ VBW 300 kHz
 Mode Auto FFT

 TDF "RFC-001.TDF"
 1 Frequency Sweep
 ■
 ■
 ■
 ■
 ●1Pk Max M1[1] 0.02 dBm 2.479 925 10 GHz CF 2.48 GHz 1001 pts 300.0 kHz/ Span 3.0 MHz 2 Marker Table Type Ref X-Value 2.479 925 1 GHz 2.479 616 4 GHz 2.480 3596 GHz Туре Trc Function Function Result Y-Value 0.02 dBm ndB ndB down BW Q Factor 6.0 dB 743.30 kHz 3 336.6 -5.96 dBm -5.93 dBm

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4.2 Maximum Conducted Output Power

4.2.1 Test procedure

ANSI C63.10-2013 Clause 11.9

4.2.2 Limit

§15.247 (b) (3)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

4.2.3 Test data

Result : Pass

| Mode | Frequenc (MHz) | су | Mea | sured Valu (dBm) | a | Lim (dBi | |
|---------------------------|-------------------|------------|-----------|---------------------|---------|----------------|----------------------------|
| | 2 402 | 2 402 | | 4.64 | | | |
| Bluetooth LE 1M | 2 440 | | | 3.46 | | 30 |) |
| | 2 480 | | 2.00 | | | | |
| | Low ch_Ma | ximum Co | nducted O | utput Pow | er | | |
| MultiView 📰 Sp.um 🗙 Sp.m2 | X Sp.m3 X Sp.m4 | × Sp.m5 | X Sp.m6 | X Sp.m7 | X Sp.m8 | X Sp.m9 | × · |
| Ref Level 20.00 dBm | • RBW 1 MHz | | | | | | |
| TDF "RFC-001.TDF" | ms●VBW/3MHz Mode | Auto Sweep | | | | | ●1Pk Max |
| 1 Frequency Sweep | | | | | | M1[1] 2 | 4.64 dBm 402 152 80 GHz |
| 10 dBm- | | | M1 | | | | |
| 0 dBm | | | | | | | |
| | | | | | | | |
| -10 dBar | | | | | | | |
| -20 dBm | | | | | | | |
| -30 dBm | | | | | | | |
| | | | | | | | |
| -40 dBm- | | | | | | | |
| -50 dBm | | | | | | | |
| | | | | | | | |
| -60 dBm | | | | | | | |
| -70 dBm | | | | | | | |
| | | | | | | | |
| CF 2.402 GHz | 1001 pt | S | 30 | 0.0 kHz/ | | | Span 3.0 MHz |

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| | | ľ | Mid ch_Ma | ximum Coi | nducted O | utput Powe | ər | | |
|--|---------------------------|---|----------------------------|----------------------|---|------------|----------------|-----------------|-----------------------|
| Multi¥iew 📑 Sp.um | X Sp.m2 | X Sp.m3 | × Sp.m4 | × Sp.m5 | × Sp.m6 | × Sp.m7 | X Sp.m8 | × Sp.m9 | × · |
| Ref Level 20.00 Att 3 | 30 dB 🗢 SWT 1 | RBW 1.01 ms VBW | 1 MHz 3 MHz Mode | Auto Sweep | | | | | |
| TDF "RFC-001.TDF 1 Frequency Swi | | | | | | | | | • 1Pk Max |
| | | | | | | | | M1[1] | |
| 10 dBm | | | | | | | | | 120 50 6112 |
| | | _ | | | M1 V | | | | |
| | | | | | | | | | |
| -10 dBm | | | | | | | | | |
| - August - A | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| -50 dBm | | | | | | | | | |
| | | | | | | | | | |
| -60 dBm | | | | | | | | | |
| -70 dBm | | | | | | | | | |
| TO GOM | | | | | | | | | |
| CF 2.44 GHz | | | 1001 pts | | 30 | 10.0 kHz/ | | | Span 3.0 MHz |
| | | | | <u>.</u> | 30 | 10.0 KHZ/ | | | apan alo Minz |
| | | F | | aximum Co | | | er | | apan 3.0 Minz |
| Multi¥iew So.um | ¥ \$0.m2 | | ligh ch_Ma | aximum Co | nducted O | utput Pow | | X 50.009 | |
| Malti¥iew 📑 Sp.am Ref Level 20.00 | | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | | | er × sp.m8 | X Sp.m9 | |
| Ref Level 20.00 Att | dBm 30 dB = SWT | Sp.m3 • RBW | ligh ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | Sp.m9 | × |
| Ref Level 20.00 | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | | • 1Pk Max |
| Ref Level 20.00 Att C TDF "RFC-001.TDF 1 Frequency Sw | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | × |
| Ref Level 20.00 Att C | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |
| Ref Level 20.00 Att C TDF "RFC-001.TDF 1 Frequency Sw | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |
| Ref Level 20,00 Att TDF "RFC-001.TDF 1 Frequency Sw 10 dBm | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |
| Ref Level 20.00 Att 5 TDF "RFC-001.TDF 1 Frequency Sw 10 dBm | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |
| Ref Level 20,00 Att TDF "RFC-001.TDF 1 Frequency Sw 10 dBm | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |
| Ref Level 20.00 Att 70 TDF "BFC-001.TDF I Frequency Sw 10 dBm -10 dBm -20 dBm | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |
| Ref Level 20.00 Att 20.00 TDF "PFC-001.TDF I Frequency Sw 10 dBm -10 dBm | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |
| Ref Level 20.000 Att 707 "RFC-001.TD I Frequency Sw 10 dBm -10 dBm -20 dBm | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |
| Ref Level 20.00 Att 20.00 TDF "BFC-001.TDF 20.00 I Frequency Sw 20.00 0 dBm 20.00 -20 dBm -30.00 | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |
| Ref Level 20.00 Att 20.00 TDF "BFC-001.TDF 20.00 I Frequency Sw 20.00 0 dBm 20.00 -20 dBm -30.00 | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |
| Ref Level 20.00 Att 20.00 Tot "SPC-00.1TD" 1 Frequency Sw 0 dBm -10 dBm -20 dBm -30 dBm -50 dBm | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |
| Ref Level 20.000 Att 20.001 TDF "RFC-001.TDF 10 I Frequency Sw 0 0 dBm 0 -0 dBm -0 -30 dBm -0 -40 dBm -0 | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |
| Ref Level 20.00 Att 20.00 Tot "SPC-00.1TD" 1 Frequency Sw 0 dBm -10 dBm -20 dBm -30 dBm -50 dBm | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |
| Ref Level 20.00 Att 20.00 Att 20.00 Tor "BF-C-0.01 Trp" 1 I frequency Sw 10 10 dBm 0 -20 dBm | dBm 30 dB = SWT | Sp.m3 • RBW | High ch_Ma | Auto Sweep | Nducted O Spanie M1 M1 M2 M3 M3 M3 M3 M3 M3 M3 M3 M3 M3 | utput Pow | | M1[1] | • 1Pk Max 2.00 dBm |

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4.3 Power Spectral Density

4.3.1 Test procedure

ANSI C63.10-2013 Clause 11.10

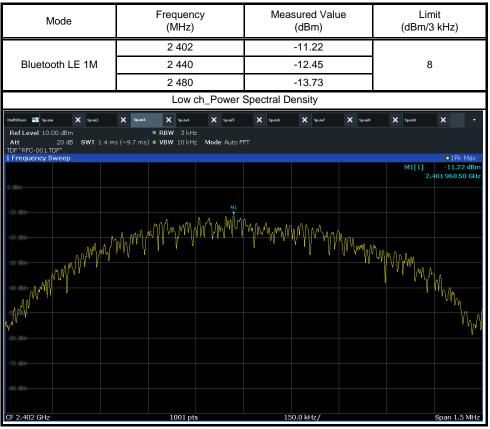
4.3.2 Limit

§15.247 (e)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

4.3.3 Test data

Result : Pass

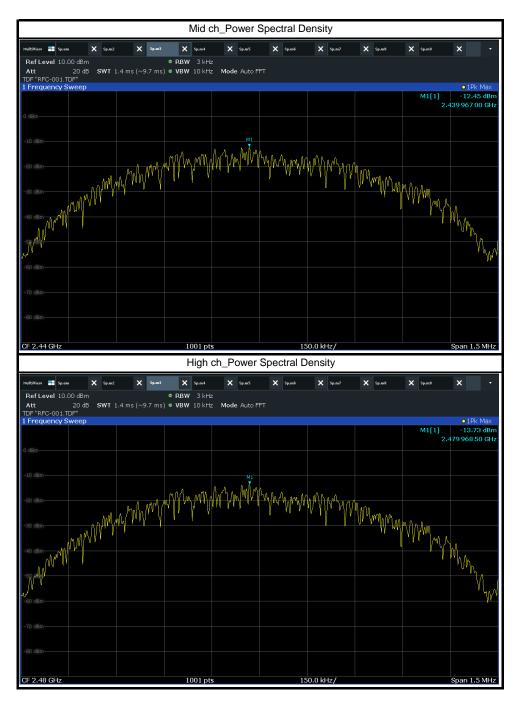


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4.4 Conducted Spurious Emission & Band Edge

4.4.1 Test procedure

ANSI C63.10-2013 Clause 11.11, 11.13

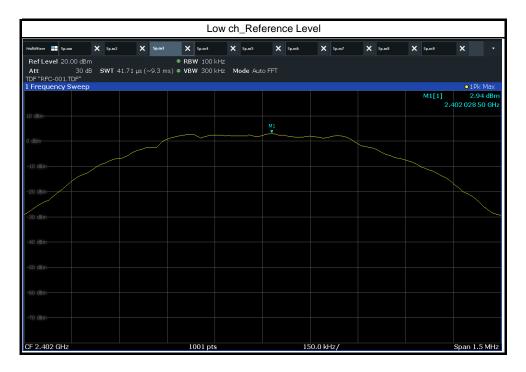
4.4.2 Limit

§15.247 (d)

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

4.4.3 Test data

Result : Pass

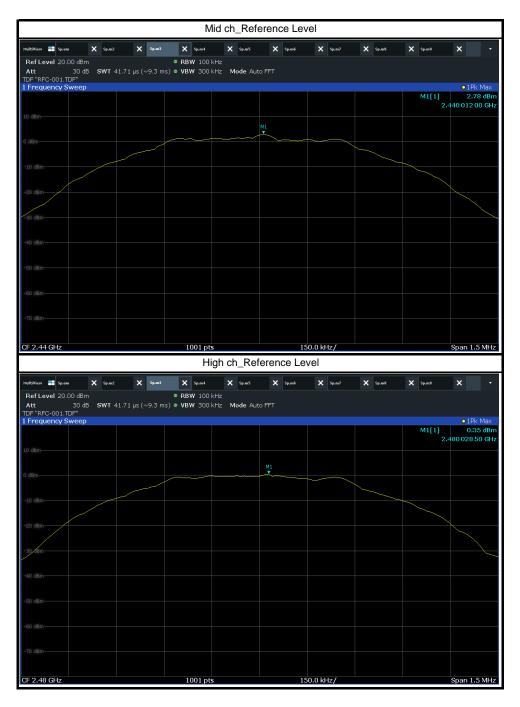


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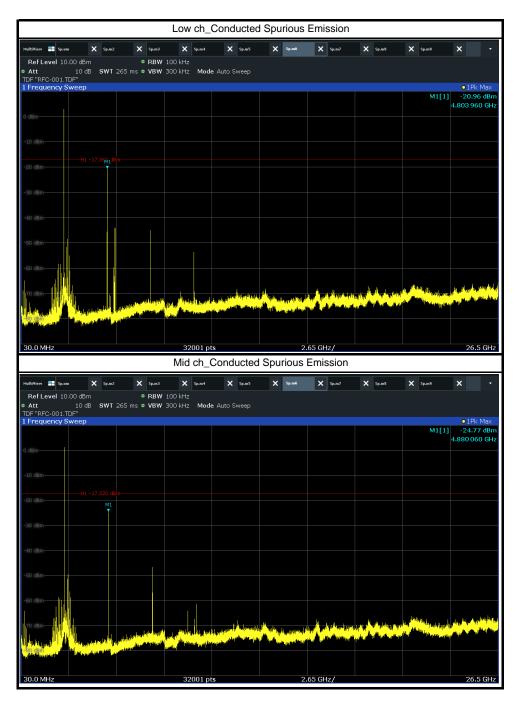


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| | | | | | | High | ı ch_ | Cond | ducted | d Spu | irious | Emi | ssion | | | | | | |
|----------------|----------|--------------|--------------------------------|------------------|-------------------|--------------------|-----------------|--|-------------------------|---------|----------------------------|--------|---------------|------------|--|------|----------------------|----------|------------|
| MultiView | Sp.u | m | × Sp.m | | X Sp.m3 | × | Sp.m4 | × | Sp.m5 | × | Sp.mő | × | Sp.m7 | × | Sp.m8 | × | Sp.m9 | × | • |
| Ref L • Att | .evel 10 |).00 dBm | | | | 100 kHz 300 kHz | | | | | | | | | | | | | |
| TDF "RF | -C-001. | TDF" | 5 5 44 1 | 265 m | S 🛎 ARAA | 300 KHZ | Mod | e Auto s | weep | | | | | | | | | | |
| 1 Freq | uency \$ | Sweep | | | | | | | | | | | | | | | M1[1] | 01Pk | |
| | | | | | | | | | | | | | | | | | | 4.960 30 | |
| 0 dBm— | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| -10 dBm | | | | | | | | | | | | | | | | | | | |
| 0.0 10 | | | | | | | | | | | | | | | | | | | |
| -20 dBm | | | | | | | | | | | | | | | | | | | |
| -30 dBm | | | Ĭ | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| -40 dBm | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| -50 dBm | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| -60 dBm | | | | | | | | | | | | | | | | | | | |
| 1 | | d . | | | | | | | | | | | | | | . A. | h | | An dan. |
| 70 dBm | | 1 | | | a. Helena | . Philip | يعلموا أوأرم ال | ی مراجع اور | <mark>History</mark> ał | al a da | المراجعة المرجعة الم | and an | La Manuella . | a de la | (lingel japa) Historia | | in the second second | A share | فراطامتناه |
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| -at) dBm | month | Thund | is delike ti di ⁿ a | 1 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| 30.0 M | 1Hz | | | | | 32 | :001 p | ts | | | 2. | .65 GH | lz/ | | | | | 26. | 5 GHz |

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Low ch_Band Edge × Sp.m6 × Sp.m7 × Sp.m9
 Ref Level
 10:00 dBm
 9:002
 X
 \$p:m3
 X
 \$p:m4
 X
 \$p:m5

 e Att
 10:00 dB
 W
 RBW
 100 kHz
 e
 e
 Att
 10:00 SWT
 1.01 ms = VBW
 300 kHz
 Mode
 Auto Sweep

 1DF "PFC-00:1DF"
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 1 × Sp.m2 × Sp.m3 × Sp.m-4 × Sp.m5 X Sp.m8 × •1Pk Max 49.79 dB 2,400 000 0 GHz 2.31 GHz 1001 pts 10.0 MHz/ 2.41 GHz High ch_Band Edge **X** Sp.m5 × Sp.m6 🕂 Sp.um × Sp.m2 X Sp.m3 X Sp.m4 × Sp.m7 X Sp.m8 X Sp.m9 ×
 Ref Level
 10.00 dBm
 © RBW
 100 kHz

 Att
 20 dB
 SWT
 1.02 ms
 © VBW
 300 kHz
 Mode
 Auto Sweep

 TDF "&FC-001.TDF"
 "
 "
 TDF "APC-001.TDF"
 "
 TDF "APC-001.TDF"
 o1Pk Max 1 Frequency S M1[1] -56.50 dBm 2,483 500 0 GHz M1 ww Man Many man have been you .478 GHz 1001 pt 2.2 MHz/ 2.5 GHz

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4.5 Radiated Spurious Emission

4.5.1 Test procedure

ANSI C63.10-2013 Clause 11.11, 11.12

4.5.2 Limit

§15.247 (d)

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

§15.209 Radiated emission limits; general requirements.(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 ** | 3 |
| 88-216 | 150 ** | 3 |
| 216-960 | 200 ** | 3 |
| Above 960 | 500 | 3 |

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

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§15.205 Restricted bands of operation.(a),(b)

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

¹ Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.

² Above 38.6

Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in § 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in § 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35 apply to these measurements.

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4.5.3 Test data

Result : Pass

- Below 30 MHz_Low ch

| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note | | |
|--|--|-------------|--------|----------------|--------------------|-------------------|--------------------|------|--|--|
| It was not found any emissions peaks found from the EUT. | | | | | | | | | | |
| | | | | | | | | | | |
| - Below 30 M | MHz_Mid ch | | | | | | | | | |
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note | | |
| | lt | was not fou | nd any | / emissions p | beaks found t | from the EUT | Г. | | | |
| - Below 30 M | MHz_High ch | ı | | | | | | | | |
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note | | |
| | It was not found any emissions peaks found from the EUT. | | | | | | | | | |

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| - 30 IVIAZ ~ | 1 GHZ_LOW | CIT | | | | | | |
|--------------------|---------------------|----------|------|----------------|--------------------|-------------------|--------------------|------|
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note |
| 120.02 | 62.22 | QP | V | -26.6 | 35.62 | 43.5 | 7.88 | |
| 372.02 | 55.45 | QP | Н | -19.5 | 35.95 | 46.0 | 10.05 | |
| 408.01 | 53.88 | QP | Н | -18.4 | 35.48 | 46.0 | 10.52 | |
| 420.04 | 55.13 | QP | Н | -18.1 | 37.03 | 46.0 | 8.97 | |
| - 30 MHz ~ | 1 GHz_Mid o | h | | | | | | |
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note |
| 120.02 | 62.69 | QP | V | -26.6 | 36.09 | 43.5 | 7.41 | |
| 372.02 | 57.43 | QP | Н | -19.5 | 37.93 | 46.0 | 8.07 | |
| 408.01 | 54.73 | QP | Н | -18.4 | 36.33 | 46.0 | 9.67 | |
| 420.04 | 55.49 | QP | Н | -18.1 | 37.39 | 46.0 | 8.61 | |
| - 30 MHz ~ | 1 GHz_High | ch | | | | | | |
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note |
| 120.02 | 62.90 | QP | V | -26.6 | 36.30 | 43.5 | 7.20 | |
| 372.02 | 57.62 | QP | Н | -19.5 | 38.12 | 46.0 | 7.88 | |
| 408.01 | 54.37 | QP | Н | -18.4 | 35.97 | 46.0 | 10.03 | |
| 420.04 | 54.91 | QP | Н | -18.1 | 36.81 | 46.0 | 9.19 | |

- 30 MHz ~ 1 GHz Low ch

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| - | 1 | GHz Above | Low | ch |
|---|---|------------|-----|-----|
| | | 0112700000 | | 011 |

| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note |
|--------------------|---------------------|----------|------|----------------|--------------------|-------------------|--------------------|------------|
| 0.057.05 | 43.39 | PK | V | 40.4 | 32.99 | 74 | 41.01 | Restricted |
| 2 357.25 | 29.88 | AVG | V | -10.4 | 19.48 | 54 | 34.52 | band |
| 4 000 00 | 44.39 | PK | Н | 4.0 | 43.19 | 74 | 30.81 | 2nd |
| 4 808.00 | 33.53 | AVG | Н | -1.2 | 32.33 | 54 | 21.67 | Harmonic |
| 7 204.80 | 39.77 | PK | Н | 3.4 | 43.17 | 74 | 30.83 | 3nd |
| 7 204.80 | 25.71 | AVG | Н | 3.4 | 29.11 | 54 | 24.89 | Harmonic |
| 9 607.20 | 38.79 | PK | Н | 5.6 | 44.39 | 74 | 29.61 | 4nd |
| 9 007.20 | 24.63 | AVG | Н | 5.6 | 30.23 | 54 | 23.77 | Harmonic |
| - 1 GHz Abo | ove_Mid ch | | | | | - | | - |
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note |
| 4 000 50 | 41.54 | PK | Н | | 40.44 | 74 | 33.56 | 2nd |
| 4 880.50 | 27.57 | AVG | Н | -1.1 | 26.47 | 54 | 27.53 | Harmonic |
| 7 000 00 | 38.45 | PK | V | 0.4 | 41.55 | 74 | 32.45 | 3nd |
| 7 320.00 | 25.08 | AVG | V | 3.1 | 28.18 | 54 | 25.82 | Harmonic |
| 0.750.00 | 36.98 | PK | Н | 0.7 | 43.68 | 74 | 30.32 | 4nd |
| 9 759.60 | 23.62 | AVG | Н | 6.7 | 30.32 | 54 | 23.68 | Harmonic |
| - 1 GHz Abc | ove_High ch | | | | | | | |
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note |
| 0.400.00 | 45.02 | PK | Н | 0.0 | 35.22 | 74 | 38.78 | Restricted |
| 2 499.23 | 31.48 | AVG | Н | -9.8 | 21.68 | 54 | 32.32 | band |
| 4 000 00 | 40.64 | PK | V | 4.0 | 39.64 | 74 | 34.36 | 2nd |
| 4 960.00 | 27.02 | AVG | V | -1.0 | 26.02 | 54 | 27.98 | Harmonic |
| 7 440 00 | 39.11 | PK | н | 2.8 | 41.91 | 74 | 32.09 | 3nd |
| 7 440.00 | 25.42 | AVG | н | 2.8 | 28.22 | 54 | 25.78 | Harmonic |
| 0.010.00 | 36.82 | PK | V | 6.0 | 43.02 | 74 | 30.98 | 4nd |
| 9 919.20 | 23.17 | AVG | V | 6.2 | 29.37 | 54 | 24.63 | Harmonic |
| | | | | | | | | |

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5. Test Result (Earphone Left)

5.1.6 dB Bandwidth

5.1.1 Test procedure

ANSI C63.10-2013 Clause 11.8

5.1.2 Limit

§15.247 (a) (2)

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.1.3 Test data

Result : Pass



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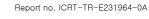




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5.2 Maximum Conducted Output Power

5.2.1 Test procedure

ANSI C63.10-2013 Clause 11.9

5.2.2 Limit

§15.247 (b) (3)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

5.2.3 Test data

Result : Pass

| Mode | Frequenc (MHz) | Mea | sured Valı (dBm) | a | Limit (dBm) | | | |
|--|---|-----------|---------------------|-----------|----------------|-------------|----------------------------|--|
| | 2 402 | | 3.18 | | | | | |
| Bluetooth LE 1M | 2 440 | | | 2.05 | | 30 | | |
| | 2 480 | | | 0.61 | | | | |
| | Low ch_Max | kimum Col | nducted O | utput Pow | er | | | |
| MultiView Sp.um Sp.m2 Ref Level 20.00 dBm Att 30 dB • SWT 1.01 | Sp.m3 X Sp.m4 RBW 1 MHz ms VBW 3 MHz Mode A | × sp.m5 | X Sp.m6 | X Sp.m7 | X 5p.m8 | Sp.m9 | × | |
| TDF "RFC-001.TDF" 1 Frequency Sweep | | | | | | | ●1Pk Max | |
| | | | | | | M1[1] 2. | 3.18 dBm 402 128 90 GHz | |
| 10 dBm- | | | | | | | | |
| 0 dBm | | | T | | | | | |
| | | | | | | | | |
| -10 dBm | | | | | | | | |
| -20 dBm | | | | | | | | |
| | | | | | | | | |
| -30 dBm | | | | | | | | |
| -40 dBm | | | | | | | | |
| -50 dBm- | | | | | | | | |
| | | | | | | | | |
| -60 dBm | | | | | | | | |
| -70 dBm- | | | | | | | | |
| | | | | | | | | |
| CF 2.402 GHz | 1001 pts | | 30 | 0.0 kHz/ | | | Span 3.0 MHz | |



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| | | Ν | /lid ch_Ma | ximum Coi | nducted O | utput Pow | er | | |
|--|---------------------------|----------------|---------------------|---------------------------------------|----------------|-----------|----------------|----------------|-----------------------|
| Multi¥iew 📕 Sp.um | X Sp.m2 | X Sp.m3 | ★ Sp.m-4 | × Sp.m5 | X Sp.m6 | × Sp.m7 | X Sp.m8 | X Sp.m9 | × · |
| Ref Level 20.00 dB Att 30 d | m 18 • SWT 1.01 | RBW | 1 MHz 3 MHz Mode | Auto Sween | | | | | |
| TDF "RFC-001.TDF" 1 Frequency Sweep | | | STAILS MODE | Auto oweep | | | | | o1Pk Max |
| 1 Frequency Sweet | | | | | | | | M1[1] | 2.05 dBm |
| 10 dBm | | | | | | | | | 2.439 799 20 GHz |
| 10 000 | | | | M1 | | | | | |
| 0 dBm- | | | | · · · · · · · · · · · · · · · · · · · | | | | | |
| | | | | | | | | | |
| -10 dBm | | | | | | | | | |
| -20 dBm | | | | | | | | | |
| | | | | | | | | | |
| -30 dBm | | | | | | | | | |
| -40 dBm | | | | | | | | | |
| -40 ubm | | | | | | | | | |
| -50 dBm | | | | | | | | | |
| | | | | | | | | | |
| -60 dBm- | | | | | | | | | |
| -70 dBm- | | | | | | | | | |
| | | | | | | | | | |
| CF 2.44 GHz | | | 1001 pts | s | 30 | 0.0 kHz/ | | | Span 3.0 MHz |
| | | | | | 50 | | | | opun olo minz |
| | | Н | | aximum Co | | | ver | | Span 310 Minz |
| Multi¥iew III Sp.um | X Sp.m2 | H × sp.m3 | | | | | /er × sp.m8 | X Sp.m9 | × · |
| Ref Level 20.00 dB | m | Sp.m3 • RBW | ligh ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | Sp.m9 | |
| Ref Level 20.00 dBi Att 30 d TDF "RFC-001.TDF" | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | Sp.m9 | × · |
| RefLevel 20.00 dB Att 30 d | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | | |
| Ref Level 20.00 dB Att 30 c TDF "RFC-001.TDF" 1 Frequency Sweep | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max |
| Ref Level 20.00 dBi Att 30 d TDF "RFC-001.TDF" | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Aximum Co x Spans Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dB Att 30 c TDF "RFC-001.TDF" 1 Frequency Sweep | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | aximum Co × sp.m5 | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dB Att 300 TDF "RFC-01.TDF" I Frequency Sweet 10 dBm- | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Aximum Co x Spans Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dBi Att 30 d TDF "RFC-001.TDF" 1 Frequency Sweep | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Aximum Co x Spans Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dBi Att 30 0 TDF "RFC-001.TDF" I Frequency Sweet 10 dBm | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Aximum Co x Spans Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dB Att 30 0 TDF "RFC-01.TDF" I Frequency Sweet | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Aximum Co x Spans Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dBi Att 30 0 TDF "RFC-001.TDF" I Frequency Sweet 10 dBm | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Aximum Co x Spans Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dBi Att 30 c TDF "RFC-001.TDF" I Frequency Sweet 10 dBm - 0 dBm - 20 dBm - 30 dBm | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Aximum Co x Spans Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dBi Att 30 0 TDF "RFC-001.TDF" I Frequency Sweer 10 dBm -10 dBm -20 dBm | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Aximum Co x Spans Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dBi Att 30 c TDF "RFC-001.TDF" I Frequency Sweet 10 dBm -10 dBm -20 dBm -30 dBm | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Aximum Co x Spans Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dBi Att 30 c TDF "RFC-001.TDF" I Frequency Sweet 10 dBm 0 dBm -20 dBm -30 dBm | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Aximum Co x Spans Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dBi Att 30 c TDF "RFC-001.TDF" I Frequency Sweet 10 dBm 0 dBm -20 dBm -30 dBm | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Aximum Co x Spans Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dB Att 30 c The "Ref-coil Top" I Frequency Sweet 10 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Aximum Co x Spans Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dB Att 30 c The "Ref-Coll Top" I Frequency Sweet 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -50 dBm | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Aximum Co x Spans Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |
| Ref Level 20.00 dB Att 30 c The Test Constraint of the test of | m iB = SWT 1.01 | Sp.m3 • RBW | ligh ch_Ma | Auto Sweep | nducted O | utput Pow | | M1[1] | • 1Pk Max 0.61 dBm |

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5.3 Power Spectral Density

5.3.1 Test procedure

ANSI C63.10-2013 Clause 11.10

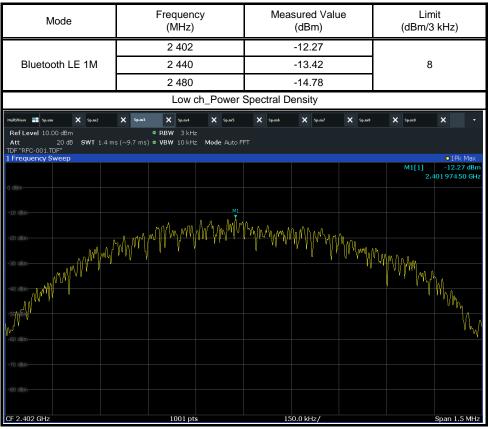
5.3.2 Limit

§15.247 (e)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

5.3.3 Test data

Result : Pass



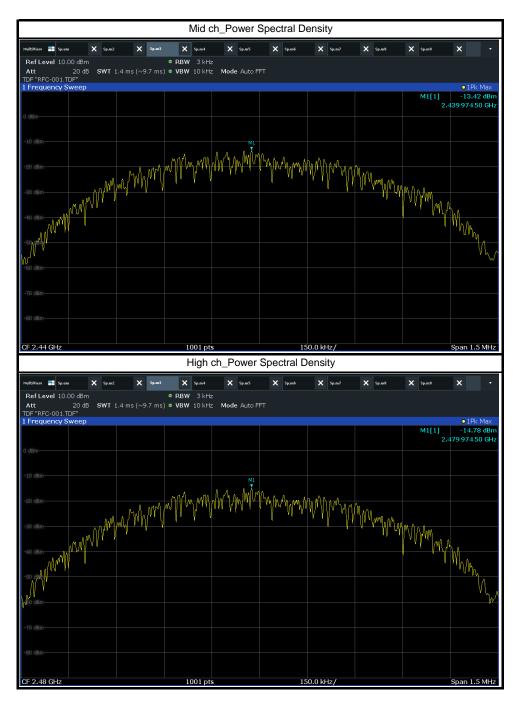
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5.4 Conducted Spurious Emission & Band Edge

5.4.1 Test procedure

ANSI C63.10-2013 Clause 11.11, 11.13

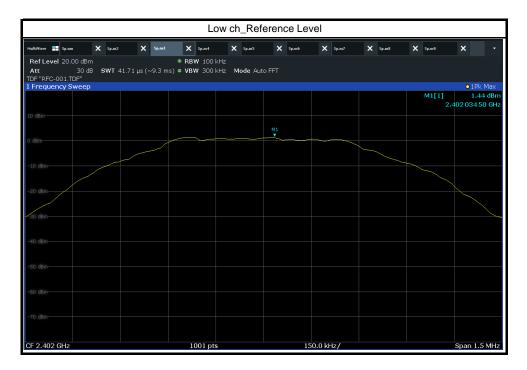
5.4.2 Limit

§15.247 (d)

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

5.4.3 Test data

Result : Pass

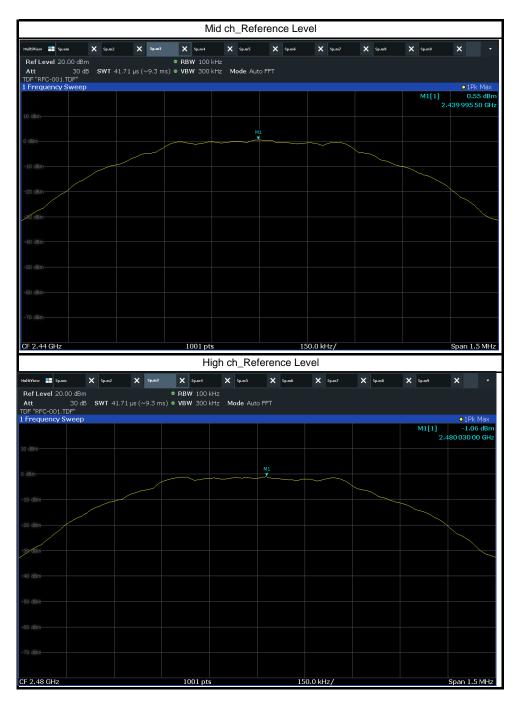


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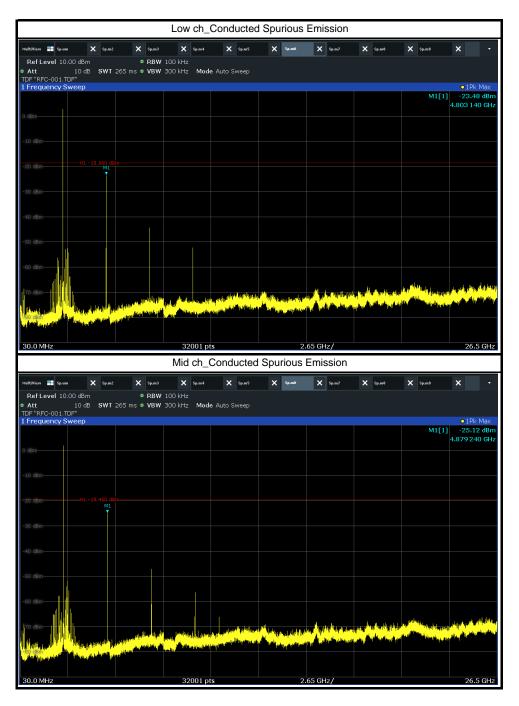


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| | | | | | | | Hig | h ch_ | Cond | ducte | d Spu | irious | Emi | ssion | | | | | | |
|-----------------------|------------------------|------|-----------|-------------|---|-----------------------|------------------------|--------------------|---------------------------|-----------------|--------|--------|-----------------------|------------|---|----------------------------|------------|-------------------|--------------------|---------------------------------------|
| MultiView | Sp.a | unı | × | Sp.m2 | | X Sp.m3 | × | Sp.m4 | × | Sp.m5 | × | Sp.mő | × | Sp.m7 | × | Sp.m8 | × | Sp.m9 | × | • |
| Ref L Att | evel 1 | | | WT : | 265 ms | | ♥ 100 kH: ♥ 300 kH: | | e Auto : | Sween | | | | | | | | | | |
| TDF "RF 1 Frequ | | TDF" | | | | | | | | | | | | | | | | | o1Pk | Max |
| | ĺ | | | | | | | | | | | | | | | | | M1[1] | -27.5 4.959 47 | 9 dBm '0 GHz |
| 0 dBm— | | | | | | | | | | | | | | | | | | | | |
| -10 dBm | | | | | | | | | | | | | | | | | | | | |
| -20 dBm | | - | | 60 dB M1 | | | | | | | | | | | | | | | | |
| -30 dBm | | | | | | | | | | | | | | | | | | | | |
| -40 dBm | | | | | | | | | | | | | | | | | | | | |
| -50 dBm | | | | | | | | | | | | | | | | | | | | |
| -60 dBm | | | | | | | | | | | | | | | | | | | | |
| <mark>1</mark> 70 dBm | _ | | | | | | | | | | He. 1. | | . III ¹¹ 1 | u. Martu | | ويلد وماريطي | J. P | | | te atilan |
| -30 dBm | | | d di alla | e la ple | ana ang ang ang Sang ang ang ang ang ang ang ang ang ang | an ^{an a} bh | | MARINE Andreada | and Parling Planta del | a the photo sur | | | A. | N. Hudbert | | alitic ala Alitic de la | A 1 | AND AND AND AND A | Jite Marine Marine | a a a a a a a a a a a a a a a a a a a |
| a, that has | il and a second second | | 1.57 | | | | | | | | | | | | | | | | | |
| 30.0 M | 1Hz | | | | | | 3 | 2001 p | ts | | | 2. | .65 GH | lz/ | | | | | 26. | 5 GHz |

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Low ch_Band Edge Sp.um × Sp.m4 × Sp.m5 × Sp.m6 × Sp.m7 **X** Sp.m8 × Sp.m9 × Sp.m2 × Sp.m3
 RefLevel 10.00 dBm

 • RBW 100 kHz

 • Att 10 dB SWT 1.01 ms
 • VBW 300 kHz
 Mode Auto Sweep

 IFrequency Sweep
 01Pk Max 50.82 dB M1[1] 2.400 000 0 GHz 2.31 GHz 2.41 GHz 1001 pts 10.0 MHz/ High ch_Band Edge X Sp.m5 X Sp.m6 iew 📑 Sp.um × Sp.m3 × Sp.m-4 × Sp.m7 🗙 Sp.m8 × Sp.m9 ×
 Ref Level
 10.00 dBm
 © RBW
 100 kHz

 Att
 20 dB
 SWT
 1.02 ms
 © VBW
 300 kHz
 Mode
 Auto Sweep

 TDF "RFC-001.TDF"
 "
 "
 "
 100 kHz
 Node
 ○1Pk Max 1 Frequency Sv M1[1] -58.59 dBm 2.483 500 0 GHz M1 2.478 GHz 1001 pts 2.2 MHz/ 2.5 GHz

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5.5 Radiated Spurious Emission

5.5.1 Test procedure

ANSI C63.10-2013 Clause 11.11, 11.12

5.5.2 Limit

§15.247 (d)

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

§15.209 Radiated emission limits; general requirements.(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 ** | 3 |
| 88-216 | 150 ** | 3 |
| 216-960 | 200 ** | 3 |
| Above 960 | 500 | 3 |

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

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§15.205 Restricted bands of operation.(a),(b)

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

¹ Until February 1, 1999, this restricted band shall be 0.490–0.510 MHz.

² Above 38.6

Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in § 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in § 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35 apply to these measurements.

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5.5.3 Test data

Result : Pass

- Below 30 MHz_Low ch

| r | _ | | | - | 1 | | - | | | |
|--|--|-------------|--------|----------------|--------------------|-------------------|--------------------|------|--|--|
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note | | |
| | | | | | | | | | | |
| It was not found any emissions peaks found from the EUT. | | | | | | | | | | |
| | | | | | | | | | | |
| - Below 30 N | √Hz_Mid ch | | | | | | | | | |
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note | | |
| | | | | | | | | | | |
| | lt | was not fou | nd any | / emissions p | eaks found | from the EUT | Г. | | | |
| | | | | | | | | | | |
| - Below 30 N | MHz_High ch | 1 | | | | | | | | |
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note | | |
| | | | | | | | | | | |
| | It was not found any emissions peaks found from the EUT. | | | | | | | | | |
| | | | | | | | | | | |

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| - 30 MHz ~ 1 GHz_Low ch | | | | | | | | |
|-------------------------|---------------------|----------|------|----------------|--------------------|-------------------|--------------------|------|
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note |
| 384.05 | 58.51 | QP | Н | -18.9 | 39.61 | 46 | 6.39 | |
| 408.01 | 57.76 | QP | Н | -18.4 | 39.36 | 46 | 6.64 | |
| 432.07 | 52.79 | QP | Н | -18.0 | 34.79 | 46 | 11.21 | |
| 444.00 | 52.87 | QP | Н | -17.9 | 34.97 | 46 | 11.03 | |
| - 30 MHz ~ | 1 GHz_Mid c | h | | | | | | |
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note |
| 252.03 | 59.40 | QP | Н | -22.6 | 36.80 | 46 | 9.20 | |
| 384.05 | 58.22 | QP | Н | -18.9 | 39.32 | 46 | 6.68 | |
| 408.01 | 58.00 | QP | Н | -18.4 | 39.60 | 46 | 6.40 | |
| 432.07 | 54.85 | QP | Н | -18.0 | 36.85 | 46 | 9.15 | |
| - 30 MHz ~ | 1 GHz_High | ch | | | | | | |
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note |
| 252.03 | 59.46 | QP | Н | -22.6 | 36.86 | 46 | 9.14 | |
| 384.05 | 57.15 | QP | Н | -18.9 | 38.25 | 46 | 7.75 | |
| 408.01 | 56.39 | QP | Н | -18.4 | 37.99 | 46 | 8.01 | |
| 432.07 | 54.58 | QP | Н | -18.0 | 36.58 | 46 | 9.42 | |

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| 1 GHz Above_Low of | ch |
|--|----|
|--|----|

| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note |
|--------------------|---------------------|----------|------|----------------|--------------------|-------------------|--------------------|-----------------|
| 2,296,06 | 43.36 | PK | Н | -10.2 | 33.16 | 74 | 40.84 | Restricted |
| 2 386.06 | 29.79 | AVG | Н | -10.2 | 19.59 | 54 | 34.41 | band |
| 4 904 50 | 45.89 | PK | Н | -1.2 | 44.69 | 74 | 29.31 | 2nd |
| 4 804.50 | 33.49 | | | -1.2 | 32.29 | 54 | 21.71 | Harmonic |
| 7 206.00 | 46.8 | PK | V | 2.4 | 50.20 | 74 | 23.80 | 3rd |
| 7 206.00 | 34.86 | AVG | V | 3.4 | 38.26 | 54 | 15.74 | Harmonic |
| 7 608.40 | 38.87 | PK | V | 5.7 | 44.57 | 74 | 29.43 | 4th |
| 7 000.40 | 24.52 | AVG | V | 5.7 | 30.22 | 54 | 23.78 | Harmonic |
| 10,000,00 | 44.31 | PK | V | 0.4 | 52.41 | 74 | 21.59 | 5th |
| 12 009.60 | 31.34 | AVG | V | 8.1 | 39.44 | 54 | 14.56 | Harmonic |
| - 1 GHz Abc | ove_Mid ch | | | | | | | |
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note |
| 4 879.50 | 44.76 | PK | Н | -1.1 | 43.66 | 74 | 30.34 | 2nd Harmonic |
| | 32.62 | AVG | Н | | 31.52 | 54 | 22.48 | |
| 7 000 00 | 38.15 | PK | V | 3.1 | 41.25 | 74 | 32.75 | 3nd |
| 7 320.00 | 25.07 | AVG | V | 3.1 | 28.17 | 54 | 25.83 | Harmonic |
| 9 759.60 | 37.86 | PK | Н | 6.7 | 44.56 | 74 | 29.44 | 4nd |
| 9759.00 | 23.72 | AVG | Н | 0.7 | 30.42 | 54 | 23.58 | Harmonic |
| - 1 GHz Abc | ve_High ch | | | | | | | |
| Frequency (MHz) | Reading (dBuV/m) | Detector | Pol. | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dBuV/m) | note |
| 0 490 40 | 44.63 | PK | Н | 0.0 | 34.83 | 74 | 39.17 | Restricted |
| 2 489.49 | 31.13 | AVG | Н | -9.8 | 21.33 | 54 | 32.67 | band |
| 4 064 00 | 42.58 | PK | Н | 1.0 | 41.58 | 74 | 32.42 | 2nd |
| 4 961.00 | 28.80 | AVG | Н | -1.0 | 27.80 | 54 | 26.20 | Harmonic |
| 7 200 22 | 38.58 | PK | н | 2.4 | 41.68 | 74 | 32.32 | 3nd |
| 7 399.20 | 25.30 | AVG | Н | 3.1 | 28.40 | 54 | 25.60 | Harmonic |
| 0.004.00 | 36.99 | PK | V | 6.2 | 43.19 | 74 | 30.81 | 4nd |
| 9 921.60 | 23.19 | AVG | V | <u></u> 6.2 | 29.39 | 54 | 24.61 | Harmonic |

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4.6 Power Line Conducted Emission

4.6.1 Test procedure

ANSI C63.10-2013 Clause 6.2

4.6.2 Limit

§15.207 (a)

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| Frequency of emission (MHz) | Conducted limit (dBµV) | | | |
|------------------------------|------------------------|-----------|--|--|
| riequency of emission (Mriz) | Quasi-peak | Average | | |
| 0.15-0.5 | 66 to 56* | 56 to 46* | | |
| 0.5-5 | 56 | 46 | | |
| 5-30 | 60 | 50 | | |

*Decreases with the logarithm of the frequency.

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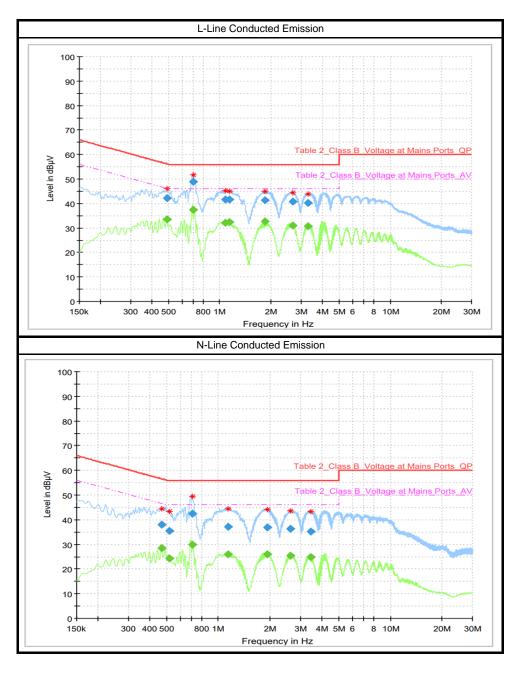




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4.6.3 Test data

Result : Pass



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6. Used equipment

| Description | Model Name | Manufacturer | Serial Number | Calibration | Next Cal |
|--------------------------------|--------------------------|--------------|---------------|-------------|------------|
| SIGNAL GENERATOR | SMB100A | R&S | 180607 | 2023-03-02 | 2024-03-02 |
| SIGNAL & SPECTRUM ANALYZER | FSW85 | R&S | 101306 | 2023-03-03 | 2024-03-03 |
| ATTENUATOR | PFA40K2-10 | PSATEK | - | 2023-03-07 | 2024-03-07 |
| DC BLOCK | PDCB-00012650 -SMSF-3 | PSATEK INC. | - | 2023-05-02 | 2024-05-02 |
| DC POWER SUPPLY | E3632A | AGILANT | MY51300069 | 2023-03-03 | 2024-03-03 |
| LOOP ANTENNA | HFH2-Z2 | R&S | 100271 | 2023-03-08 | 2025-03-08 |
| BI-Log ANTENNA | VULB 9162 | SCHWARZBECK | 120 | 2022-12-26 | 2024-12-26 |
| SIGNAL CONDITIONING UNIT | SCU 08 | R&S | 100746 | 2023-04-03 | 2024-04-03 |
| EMI TEST RECEIVER | ESR26 | R&S | 101462 | 2023-04-04 | 2024-04-04 |
| DOUBLE RIDGED HORN ANTENNA | HF907 | R&S | 102556 | 2023-08-04 | 2024-08-04 |
| SIGNAL CONDITIONING UNIT | SCU18 | R&S | 102342 | 2023-04-03 | 2024-04-03 |
| EMI TEST RECEIVER | ESR26 | R&S | 101461 | 2023-04-04 | 2024-04-04 |
| HORN ANTENNA | LB-42-10-C-KF | A-INFOMW | J202024625 | 2023-03-07 | 2024-03-07 |
| PREAMPLIFIER | AMF-4F-18265- 35-8P-1 | MITEQ | - | 2023-03-07 | 2024-03-07 |

- END OF REPORT.

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