

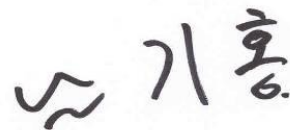
RADIO PERFORMANCE TEST REPORT

Test Report No. : OT-223-RWD-041
Reception No. : 2112005097
Applicant : LG Innotek Co., Ltd.
Address : 26, Hanamsandan 5beon-ro Gwangsan-gu, Gwangju, 506-731, South Korea
Manufacturer : LG Innotek Co., Ltd.
Address : 26, Hanamsandan 5beon-ro Gwangsan-gu, Gwangju, 506-731, South Korea
Type of Equipment : RF Module
FCC ID. : YZP-ATC6NPL002
Model Name : ATC6NPL002
Multiple Model Name : N/A
Serial number : N/A
Total page of Report : 71 pages (including this page)
Date of Incoming : December 01, 2021
Date of issue : March 21, 2022

SUMMARY

The equipment complies with the regulation; *FCC PART 15 SUBPART C Section 15.247*
 This test report only contains the result of a single test of the sample supplied for the examination.
 It is not a generally valid assessment of the features of the respective products of the mass-production.





Tested by
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 ONETECH Corp.

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 ONETECH Corp.

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※ Please refer to the Annex section for All test plots

Revision History

| Rev. No. | Issue Report No. | Issued Date | Revisions | Section Affected |
|----------|------------------|----------------|-----------------|------------------|
| 0 | OT-223-RWD-041 | March 21, 2022 | Initial Release | All |
| | | | | |
| | | | | |

1. VERIFICATION OF COMPLIANCE

Applicant : LG Innotek Co., Ltd.
 Address : 26, Hanamsandan 5beon-ro Gwangsan-gu, Gwangju, 506-731, South Korea
 Contact Person : Jeong Inchang / Senior Research Engineer
 Telephone No. : +82-62-950-0332
 FCC ID : YZP-ATC6NPL002
 Model Name : ATC6NPL002
 Brand Name :  **LG Innotek**
 Serial Number : N/A
 Date : March 21, 2022

| | |
|--|--|
| EQUIPMENT CLASS | DSS – PART 15 SPREAD SPECTRUM TRANSMITTER |
| E.U.T. DESCRIPTION | RF Module |
| THIS REPORT CONCERNS | Original Grant |
| MEASUREMENT PROCEDURES | ANSI C63.10: 2020 |
| TYPE OF EQUIPMENT TESTED | Pre-Production |
| KIND OF EQUIPMENT AUTHORIZATION REQUESTED | Certification |
| EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S) | FCC PART 15 SUBPART C Section 15.247 KDB 558074 D01 15.247 Meas Guidance v05r02 |
| Modifications on the Equipment to Achieve Compliance | None |
| Final Test was Conducted On | 3 m, Semi Anechoic Chamber |

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. TEST SUMMARY

2.1 Test items and results

| SECTION | TEST ITEMS | RESULTS |
|----------------------|---|------------------------|
| 15.247 (a) (1) | Carrier Frequency Separation | Met the Limit / PASS |
| 15.247 (a) (1) (iii) | Minimum Number of Hopping Channels | Met the Limit / PASS |
| 15.247 (a) (1) (iii) | Average Time of Occupancy | Met the Limit / PASS |
| 15.247 (b) (1) | Maximum Peak Conducted Output Power | Met the Limit / PASS |
| 15.247 (d) | 100 kHz Bandwidth Outside the Frequency Band | Met the Limit / PASS |
| 15.247 (d) | Radiated Emission which fall in the Restricted Band | Met the Limit / PASS |
| 15.209 | Radiated Emission Limits, General Requirement | Met the Limit / PASS |
| 15.207 | Conducted Limits | Met the Limit / PASS |
| 15.203 | Antenna Requirement | Met requirement / PASS |

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART C Section 15.247.

2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2020. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-20122/ C-14617/ G-10666/ T-11842

ISED (Innovation, Science and Economic Development Canada) – Registration No. Site# 3736A-3

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

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3. GENERAL INFORMATION

3.1 Product Description

The LG Innotek Co., Ltd., Model ATC6NPL002 (referred to as the EUT in this report) is a RF Module. The product specification described herein was obtained from product data sheet or user’s manual.

| DEVICE TYPE | RF Module | | |
|--|---|--|--|
| OPERATING FREQUENCY | Bluetooth LE | 2 402 MHz ~ 2 480 MHz | |
| | Bluetooth | 2 402 MHz ~ 2 480 MHz | |
| | WLAN 2.4 GHz | 2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20)/ax(HE20)) | |
| | | 2 422 MHz ~ 2 452 MHz (802.11n(HT40)/ax(HE40)) | |
| | WLAN 5 150 MHz ~ 5 250 MHz Band | 5 180 MHz ~ 5 240 MHz (802.11a/n(HT20)/ac(VHT20)/ax(HE20)) | |
| | | 5 190 MHz ~ 5 230 MHz (802.11n(HT40)/ac(VHT40)/ax(HE40)) | |
| | | 5 210 MHz (802.11ac(VHT80)/ax(HE80)) | |
| | WLAN 5 250 MHz ~ 5 350 MHz Band | 5 260 MHz ~ 5 320 MHz (802.11a/n(HT20)/ac(VHT20)/ax(HE20)) | |
| | | 5 270 MHz ~ 5 310 MHz (802.11n(HT40)/ac(VHT40)/ax(HE40)) | |
| | | 5 290 MHz (802.11ac(VHT80)/ax(HE80)) | |
| | WLAN 5 470 MHz ~ 5 725 MHz Band | 5 500 MHz ~ 5 720 MHz (802.11a/n(HT20)/ac(VHT20)/ax(HE20)) | |
| | | 5 510 MHz ~ 5 710 MHz (802.11n(HT40)/ac(VHT40)/ax(HE40)) | |
| | | 5 530 MHz ~ 5 690 MHz (802.11ac(VHT80)/ax(HE80)) | |
| | WLAN 5 725 MHz ~ 5 850 MHz Band | 5 745 MHz ~ 5 825 MHz (802.11a/n(HT20)/ac(VHT20)/ax(HE20)) | |
| 5 755 MHz ~ 5 795 MHz (802.11n(HT40)/ac(VHT40)/ax(HE40)) | | | |
| 5 775 MHz (802.11ac(VHT80)/ax(HE80)) | | | |
| MODULATION TYPE | Bluetooth LE | GFSK for 1 Mbps / 2 Mbps / 125 kbps / 500 kbps | |
| | Bluetooth | GFSK for 1Mbps, $\pi/4$ -DQPSK for 2Mbps, 8-DPSK for 3Mbps | |
| | WLAN 2.4 GHz | 802.11b: DSSS Modulation(DBPSK/DQPSK/CCK) | |
| | | 802.11g/n(HT20)/n(HT40)/ax(HE20)/ax(HE40): OFDM Modulation(BPSK/QPSK/16QAM/64QAM) | |
| WLAN 5 GHz | 802.11a/n(HT20)/n(HT40)/ac(VHT80)/ax(HE20)/ax(HE40)/ax(HE80): OFDM Modulation(BPSK/QPSK/16QAM/64QAM) | | |

| | | | |
|--------------------------------------|--------------|-----------|-----------------------------------|
| RF OUTPUT POWER | Bluetooth LE | 1 Mbps | 1.21 dBm |
| | | 2 Mbps | 1.17 dBm |
| | | 125 kbps | 1.22 dBm |
| | | 500 kbps | 1.24 dBm |
| | Bluetooth | 1 Mbps | 0.67 dBm |
| | | 2 Mbps | -0.27 dBm |
| | | 3 Mbps | 0.09 dBm |
| | WLAN 2.4 GHz | Antenna 0 | 15.57 dBm(802.11b) |
| | | | 11.80 dBm(802.11g) |
| | | | 11.67 dBm(802.11n_HT20) |
| | | | 13.27 dBm(802.11ax_HE20)_26 Tone |
| | | | 13.06 dBm(802.11ax_HE20)_52 Tone |
| | | | 12.66 dBm(802.11ax_HE20)_106 Tone |
| 11.85 dBm(802.11ax_HE20)_242 Tone | | | |
| 11.47 dBm(802.11ax_HE20)_Single User | | | |
| 11.31 dBm(802.11n_HT40) | | | |
| 12.02 dBm(802.11ax_HE40)_26 Tone | | | |
| 12.93 dBm(802.11ax_HE40)_52 Tone | | | |
| 13.04 dBm(802.11ax_HE40)_106 Tone | | | |
| 12.44 dBm(802.11ax_HE40)_242 Tone | | | |
| 11.52 dBm(802.11ax_HE40)_484 Tone | | | |
| 11.50 dBm(802.11ax_HE40)_Single User | | | |

| | | | |
|--------------------|--------------|------------------|---|
| RF OUTPUT POWER | WLAN 2.4 GHz | Antenna 1 | 16.19 dBm(802.11b) 12.88 dBm(802.11g) 13.11 dBm(802.11n_HT20) 13.35 dBm(802.11ax_HE20)_26 Tone 13.57 dBm(802.11ax_HE20)_52 Tone 13.47 dBm(802.11ax_HE20)_106 Tone 13.33 dBm(802.11ax_HE20)_242 Tone 13.65 dBm(802.11ax_HE20)_Single User 12.11 dBm(802.11n_HT40) 12.31 dBm(802.11ax_HE40)_26 Tone 12.67 dBm(802.11ax_HE40)_52 Tone 12.70 dBm(802.11ax_HE40)_106 Tone 12.68 dBm(802.11ax_HE40)_242 Tone 12.48 dBm(802.11ax_HE40)_484 Tone 12.69 dBm(802.11ax_HE40)_Single User |
| | | Multiple Antenna | 15.46 dBm(802.11n_HT20) 16.32 dBm(802.11ax_HE20)_26 Tone 16.22 dBm(802.11ax_HE20)_52 Tone 16.09 dBm(802.11ax_HE20)_106 Tone 15.66 dBm(802.11ax_HE20)_242 Tone 15.70 dBm(802.11ax_HE20)_Single User 14.74 dBm(802.11n_HT40) 14.90 dBm(802.11ax_HE40)_26 Tone 15.78 dBm(802.11ax_HE40)_52 Tone 15.83 dBm(802.11ax_HE40)_106 Tone 15.57 dBm(802.11ax_HE40)_242 Tone 15.04 dBm(802.11ax_HE40)_484 Tone 15.15 dBm(802.11ax_HE40)_Single User |

| | | | |
|----------------------------|--|------------------|--|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 150 MHz ~ 5 250 MHz Band</p> | <p>Antenna 0</p> | <p>12.59 dBm(802.11a) 12.15 dBm(802.11n_HT20) 2.53 dBm(802.11ax_HE20)_26 Tone 4.65 dBm(802.11ax_HE20)_52 Tone 7.54 dBm(802.11ax_HE20)_106 Tone 10.29 dBm(802.11ax_HE20)_242 Tone 12.19 dBm(802.11ax_HE20)_Single User 9.02 dBm(802.11n_HT40) 3.32 dBm(802.11ax_HE40)_26 Tone 5.26 dBm(802.11ax_HE40)_52 Tone 7.72 dBm(802.11ax_HE40)_106 Tone 7.54 dBm(802.11ax_HE40)_242 Tone 7.43 dBm(802.11ax_HE40)_484 Tone 9.15 dBm(802.11ax_HE40)_Single User 8.33 dBm(802.11ac_VHT80) 3.10 dBm(802.11ax_HE40)_26 Tone 5.03 dBm(802.11ax_HE40)_52 Tone 4.87 dBm(802.11ax_HE40)_106 Tone 4.76 dBm(802.11ax_HE40)_242 Tone 4.72 dBm(802.11ax_HE40)_484 Tone 4.33 dBm(802.11ax_HE40)_996 Tone 8.55 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|------------------|--|

| | | | |
|----------------------------|--|------------------|--|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 150 MHz ~ 5 250 MHz Band</p> | <p>Antenna 1</p> | <p>12.45 dBm(802.11a) 12.01 dBm(802.11n_HT20) 3.45 dBm(802.11ax_HE20)_26 Tone 5.63 dBm(802.11ax_HE20)_52 Tone 8.30 dBm(802.11ax_HE20)_106 Tone 10.77 dBm(802.11ax_HE20)_242 Tone 12.02 dBm(802.11ax_HE20)_Single User 8.87 dBm(802.11n_HT40) 4.18 dBm(802.11ax_HE40)_26 Tone 6.25 dBm(802.11ax_HE40)_52 Tone 8.44 dBm(802.11ax_HE40)_106 Tone 8.29 dBm(802.11ax_HE40)_242 Tone 8.20 dBm(802.11ax_HE40)_484 Tone 9.21 dBm(802.11ax_HE40)_Single User 8.11 dBm(802.11ac_VHT80) 4.10 dBm(802.11ax_HE40)_26 Tone 6.10 dBm(802.11ax_HE40)_52 Tone 5.90 dBm(802.11ax_HE40)_106 Tone 5.81 dBm(802.11ax_HE40)_242 Tone 5.75 dBm(802.11ax_HE40)_484 Tone 5.50 dBm(802.11ax_HE40)_996 Tone 8.27 dBm(802.11ax_HE40)_Single User</p> |
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| | | | |
|----------------------------|--|-------------------------|---|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 150 MHz ~ 5 250 MHz Band</p> | <p>Multiple Antenna</p> | <p>15.09 dBm(802.11n_HT20) 6.03 dBm(802.11ax_HE20)_26 Tone 8.18 dBm(802.11ax_HE20)_52 Tone 10.95 dBm(802.11ax_HE20)_106 Tone 13.55 dBm(802.11ax_HE20)_242 Tone 15.11 dBm(802.11ax_HE20)_Single User 11.95 dBm(802.11n_HT40) 6.78 dBm(802.11ax_HE40)_26 Tone 8.80 dBm(802.11ax_HE40)_52 Tone 11.11 dBm(802.11ax_HE40)_106 Tone 10.94 dBm(802.11ax_HE40)_242 Tone 10.84 dBm(802.11ax_HE40)_484 Tone 12.19 dBm(802.11ax_HE40)_Single User 11.24 dBm(802.11ac_VHT80) 6.64 dBm(802.11ax_HE40)_26 Tone 8.61 dBm(802.11ax_HE40)_52 Tone 8.42 dBm(802.11ax_HE40)_106 Tone 8.32 dBm(802.11ax_HE40)_242 Tone 8.27 dBm(802.11ax_HE40)_484 Tone 7.96 dBm(802.11ax_HE40)_996 Tone 11.42 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|-------------------------|---|

| | | | |
|----------------------------|--|------------------|--|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 250 MHz ~ 5 350 MHz Band</p> | <p>Antenna 0</p> | <p>12.38 dBm(802.11a) 11.90 dBm(802.11n_HT20) 2.66 dBm(802.11ax_HE20)_26 Tone 4.79 dBm(802.11ax_HE20)_52 Tone 7.63 dBm(802.11ax_HE20)_106 Tone 10.35 dBm(802.11ax_HE20)_242 Tone 11.97 dBm(802.11ax_HE20)_Single User 8.28 dBm(802.11n_HT40) 3.52 dBm(802.11ax_HE40)_26 Tone 5.62 dBm(802.11ax_HE40)_52 Tone 7.88 dBm(802.11ax_HE40)_106 Tone 5.55 dBm(802.11ax_HE40)_242 Tone 7.49 dBm(802.11ax_HE40)_484 Tone 8.44 dBm(802.11ax_HE40)_Single User 6.35 dBm(802.11ac_VHT80) 3.18 dBm(802.11ax_HE40)_26 Tone 5.13 dBm(802.11ax_HE40)_52 Tone 4.96 dBm(802.11ax_HE40)_106 Tone 4.88 dBm(802.11ax_HE40)_242 Tone 4.86 dBm(802.11ax_HE40)_484 Tone 4.82 dBm(802.11ax_HE40)_996 Tone 6.54 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|------------------|--|

| | | | |
|----------------------------|--|------------------|--|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 250 MHz ~ 5 350 MHz Band</p> | <p>Antenna 1</p> | <p>12.39 dBm(802.11a) 11.94 dBm(802.11n_HT20) 3.67 dBm(802.11ax_HE20)_26 Tone 5.73 dBm(802.11ax_HE20)_52 Tone 8.46 dBm(802.11ax_HE20)_106 Tone 10.87 dBm(802.11ax_HE20)_242 Tone 12.03 dBm(802.11ax_HE20)_Single User 8.21 dBm(802.11n_HT40) 4.43 dBm(802.11ax_HE40)_26 Tone 6.58 dBm(802.11ax_HE40)_52 Tone 8.63 dBm(802.11ax_HE40)_106 Tone 6.48 dBm(802.11ax_HE40)_242 Tone 8.39 dBm(802.11ax_HE40)_484 Tone 8.48 dBm(802.11ax_HE40)_Single User 6.23 dBm(802.11ac_VHT80) 4.28 dBm(802.11ax_HE40)_26 Tone 6.24 dBm(802.11ax_HE40)_52 Tone 6.07 dBm(802.11ax_HE40)_106 Tone 5.88 dBm(802.11ax_HE40)_242 Tone 5.90 dBm(802.11ax_HE40)_484 Tone 5.86 dBm(802.11ax_HE40)_996 Tone 6.54 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|------------------|--|

| | | | |
|----------------------------|--|-------------------------|--|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 250 MHz ~ 5 350 MHz Band</p> | <p>Multiple Antenna</p> | <p>14.89 dBm(802.11n_HT20) 6.21 dBm(802.11ax_HE20)_26 Tone 8.29 dBm(802.11ax_HE20)_52 Tone 11.07 dBm(802.11ax_HE20)_106 Tone 13.58 dBm(802.11ax_HE20)_242 Tone 15.01 dBm(802.11ax_HE20)_Single User 11.23 dBm(802.11n_HT40) 6.98 dBm(802.11ax_HE40)_26 Tone 9.14 dBm(802.11ax_HE40)_52 Tone 11.28 dBm(802.11ax_HE40)_106 Tone 9.05 dBm(802.11ax_HE40)_242 Tone 10.97 dBm(802.11ax_HE40)_484 Tone 11.47 dBm(802.11ax_HE40)_Single User 9.30 dBm(802.11ac_VHT80) 6.77 dBm(802.11ax_HE40)_26 Tone 8.73 dBm(802.11ax_HE40)_52 Tone 8.56 dBm(802.11ax_HE40)_106 Tone 8.41 dBm(802.11ax_HE40)_242 Tone 8.42 dBm(802.11ax_HE40)_484 Tone 8.38 dBm(802.11ax_HE40)_996 Tone 9.55 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|-------------------------|--|

| | | | |
|----------------------------|--|------------------|--|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 470 MHz ~ 5 725 MHz Band</p> | <p>Antenna 0</p> | <p>12.24 dBm(802.11a) 11.76 dBm(802.11n_HT20) 2.82 dBm(802.11ax_HE20)_26 Tone 4.98 dBm(802.11ax_HE20)_52 Tone 7.90 dBm(802.11ax_HE20)_106 Tone 10.64 dBm(802.11ax_HE20)_242 Tone 12.03 dBm(802.11ax_HE20)_Single User 9.62 dBm(802.11n_HT40) 3.69 dBm(802.11ax_HE40)_26 Tone 5.92 dBm(802.11ax_HE40)_52 Tone 8.02 dBm(802.11ax_HE40)_106 Tone 7.72 dBm(802.11ax_HE40)_242 Tone 7.76 dBm(802.11ax_HE40)_484 Tone 9.99 dBm(802.11ax_HE40)_Single User 5.91 dBm(802.11ac_VHT80) 3.20 dBm(802.11ax_HE40)_26 Tone 5.21 dBm(802.11ax_HE40)_52 Tone 4.98 dBm(802.11ax_HE40)_106 Tone 4.80 dBm(802.11ax_HE40)_242 Tone 4.78 dBm(802.11ax_HE40)_484 Tone 4.46 dBm(802.11ax_HE40)_996 Tone 6.27 dBm(802.11ax_HE40)_Single User</p> |
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|----------------------------|--|---------------------------|--|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 470 MHz ~ 5 725 MHz Band</p> | <p>Antenna 0_Straddle</p> | <p>9.32 dBm(802.11a) 9.20 dBm(802.11n_HT20) 2.00 dBm(802.11ax_HE20)_26 Tone 4.19 dBm(802.11ax_HE20)_52 Tone 6.86 dBm(802.11ax_HE20)_106 Tone 8.57 dBm(802.11ax_HE20)_242 Tone 9.31 dBm(802.11ax_HE20)_Single User 7.36 dBm(802.11n_HT40) -14.30 dBm(802.11ax_HE40)_26 Tone -6.24 dBm(802.11ax_HE40)_52 Tone 3.73 dBm(802.11ax_HE40)_106 Tone 5.66 dBm(802.11ax_HE40)_242 Tone 6.45 dBm(802.11ax_HE40)_484 Tone 7.74 dBm(802.11ax_HE40)_Single User 4.72 dBm(802.11ac_VHT80) -15.24 dBm(802.11ax_HE40)_26 Tone -7.11 dBm(802.11ax_HE40)_52 Tone 1.12 dBm(802.11ax_HE40)_106 Tone 2.80 dBm(802.11ax_HE40)_242 Tone 3.65 dBm(802.11ax_HE40)_484 Tone 4.16 dBm(802.11ax_HE40)_996 Tone 5.03 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|---------------------------|--|

| | | | |
|----------------------------|--|------------------|---|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 470 MHz ~ 5 725 MHz Band</p> | <p>Antenna 1</p> | <p>12.50 dBm(802.11a) 11.89 dBm(802.11n_HT20) 3.90 dBm(802.11ax_HE20)_26 Tone 8.53 dBm(802.11ax_HE20)_52 Tone 8.55 dBm(802.11ax_HE20)_106 Tone 11.07 dBm(802.11ax_HE20)_242 Tone 12.15 dBm(802.11ax_HE20)_Single User 9.93 dBm(802.11n_HT40) 5.05 dBm(802.11ax_HE40)_26 Tone 7.13 dBm(802.11ax_HE40)_52 Tone 9.13 dBm(802.11ax_HE40)_106 Tone 8.84 dBm(802.11ax_HE40)_242 Tone 8.81 dBm(802.11ax_HE40)_484 Tone 10.15 dBm(802.11ax_HE40)_Single User 5.90 dBm(802.11ac_VHT80) 4.26 dBm(802.11ax_HE40)_26 Tone 6.28 dBm(802.11ax_HE40)_52 Tone 6.15 dBm(802.11ax_HE40)_106 Tone 6.02 dBm(802.11ax_HE40)_242 Tone 5.96 dBm(802.11ax_HE40)_484 Tone 5.71 dBm(802.11ax_HE40)_996 Tone 6.27 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|------------------|---|

| | | | |
|----------------------------|--|---------------------------|--|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 470 MHz ~ 5 725 MHz Band</p> | <p>Antenna 1_Straddle</p> | <p>9.42 dBm(802.11a) 9.23 dBm(802.11n_HT20) 3.92 dBm(802.11ax_HE20)_26 Tone 5.88 dBm(802.11ax_HE20)_52 Tone 8.59 dBm(802.11ax_HE20)_106 Tone 9.80 dBm(802.11ax_HE20)_242 Tone 9.35 dBm(802.11ax_HE20)_Single User 7.45 dBm(802.11n_HT40) -12.01 dBm(802.11ax_HE40)_26 Tone -4.37 dBm(802.11ax_HE40)_52 Tone 5.52 dBm(802.11ax_HE40)_106 Tone 7.38 dBm(802.11ax_HE40)_242 Tone 7.74 dBm(802.11ax_HE40)_484 Tone 7.79 dBm(802.11ax_HE40)_Single User 4.37 dBm(802.11ac_VHT80) -13.11 dBm(802.11ax_HE40)_26 Tone -5.17 dBm(802.11ax_HE40)_52 Tone 2.86 dBm(802.11ax_HE40)_106 Tone 4.42 dBm(802.11ax_HE40)_242 Tone 5.11 dBm(802.11ax_HE40)_484 Tone 5.32 dBm(802.11ax_HE40)_996 Tone 4.66 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|---------------------------|--|

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|----------------------------|--|-------------------------|---|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 470 MHz ~ 5 725 MHz Band</p> | <p>Multiple Antenna</p> | <p>14.89 dBm(802.11n_HT20) 6.33 dBm(802.11ax_HE20)_26 Tone 9.99 dBm(802.11ax_HE20)_52 Tone 11.21 dBm(802.11ax_HE20)_106 Tone 13.87 dBm(802.11ax_HE20)_242 Tone 15.10 dBm(802.11ax_HE20)_Single User 12.79 dBm(802.11n_HT40) 7.44 dBm(802.11ax_HE40)_26 Tone 9.58 dBm(802.11ax_HE40)_52 Tone 11.62 dBm(802.11ax_HE40)_106 Tone 11.31 dBm(802.11ax_HE40)_242 Tone 11.33 dBm(802.11ax_HE40)_484 Tone 13.09 dBm(802.11ax_HE40)_Single User 8.92 dBm(802.11ac_VHT80) 6.77 dBm(802.11ax_HE40)_26 Tone 8.79 dBm(802.11ax_HE40)_52 Tone 8.61 dBm(802.11ax_HE40)_106 Tone 8.46 dBm(802.11ax_HE40)_242 Tone 8.42 dBm(802.11ax_HE40)_484 Tone 8.14 dBm(802.11ax_HE40)_996 Tone 9.28 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|-------------------------|---|

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|----------------------------|--|---------------------------------------|--|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 470 MHz ~ 5 725 MHz Band</p> | <p>Multiple Antenna _Straddle</p> | <p>12.22 dBm(802.11n_HT20) 5.99 dBm(802.11ax_HE20)_26 Tone 8.12 dBm(802.11ax_HE20)_52 Tone 10.82 dBm(802.11ax_HE20)_106 Tone 12.24 dBm(802.11ax_HE20)_242 Tone 12.34 dBm(802.11ax_HE20)_Single User 10.41 dBm(802.11n_HT40) -9.99 dBm(802.11ax_HE40)_26 Tone -2.19 dBm(802.11ax_HE40)_52 Tone 7.73 dBm(802.11ax_HE40)_106 Tone 9.62 dBm(802.11ax_HE40)_242 Tone 10.15 dBm(802.11ax_HE40)_484 Tone 10.78 dBm(802.11ax_HE40)_Single User 7.56 dBm(802.11ac_VHT80) -11.04 dBm(802.11ax_HE40)_26 Tone -3.02 dBm(802.11ax_HE40)_52 Tone 5.08 dBm(802.11ax_HE40)_106 Tone 6.69 dBm(802.11ax_HE40)_242 Tone 7.45 dBm(802.11ax_HE40)_484 Tone 7.79 dBm(802.11ax_HE40)_996 Tone 7.86 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|---------------------------------------|--|

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|----------------------------|--|------------------|---|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 725 MHz ~ 5 850 MHz Band</p> | <p>Antenna 0</p> | <p>11.47 dBm(802.11a) 11.43 dBm(802.11n_HT20) 10.25 dBm(802.11ax_HE20)_26 Tone 10.40 dBm(802.11ax_HE20)_52 Tone 10.13 dBm(802.11ax_HE20)_106 Tone 10.13 dBm(802.11ax_HE20)_242 Tone 11.28 dBm(802.11ax_HE20)_Single User 10.37 dBm(802.11n_HT40) 7.10 dBm(802.11ax_HE40)_26 Tone 7.39 dBm(802.11ax_HE40)_52 Tone 7.69 dBm(802.11ax_HE40)_106 Tone 7.32 dBm(802.11ax_HE40)_242 Tone 7.16 dBm(802.11ax_HE40)_484 Tone 10.38 dBm(802.11ax_HE40)_Single User 8.02 dBm(802.11ac_VHT80) 4.77 dBm(802.11ax_HE40)_26 Tone 4.91 dBm(802.11ax_HE40)_52 Tone 4.76 dBm(802.11ax_HE40)_106 Tone 4.66 dBm(802.11ax_HE40)_242 Tone 4.57 dBm(802.11ax_HE40)_484 Tone 4.48 dBm(802.11ax_HE40)_996 Tone 8.01 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|------------------|---|

| | | | |
|----------------------------|--|---------------------------|---|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 725 MHz ~ 5 850 MHz Band</p> | <p>Antenna 0_Straddle</p> | <p>3.14 dBm(802.11a) 3.50 dBm(802.11n_HT20) 1.68 dBm(802.11ax_HE20)_26 Tone 3.49 dBm(802.11ax_HE20)_52 Tone 3.76 dBm(802.11ax_HE20)_106 Tone 3.11 dBm(802.11ax_HE20)_242 Tone 3.94 dBm(802.11ax_HE20)_Single User -2.90 dBm(802.11n_HT40) 1.45 dBm(802.11ax_HE40)_26 Tone 4.04 dBm(802.11ax_HE40)_52 Tone 3.01 dBm(802.11ax_HE40)_106 Tone -0.30 dBm(802.11ax_HE40)_242 Tone -3.47 dBm(802.11ax_HE40)_484 Tone -2.02 dBm(802.11ax_HE40)_Single User -9.20 dBm(802.11ac_VHT80) 2.00 dBm(802.11ax_HE40)_26 Tone 3.63 dBm(802.11ax_HE40)_52 Tone 0.73 dBm(802.11ax_HE40)_106 Tone -2.85 dBm(802.11ax_HE40)_242 Tone -5.78 dBm(802.11ax_HE40)_484 Tone -8.89 dBm(802.11ax_HE40)_996 Tone -8.06 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|---------------------------|---|

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|----------------------------|--|------------------|---|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 725 MHz ~ 5 850 MHz Band</p> | <p>Antenna 1</p> | <p>11.78 dBm(802.11a) 11.49 dBm(802.11n_HT20) 11.36 dBm(802.11ax_HE20)_26 Tone 11.55 dBm(802.11ax_HE20)_52 Tone 11.29 dBm(802.11ax_HE20)_106 Tone 11.21 dBm(802.11ax_HE20)_242 Tone 11.16 dBm(802.11ax_HE20)_Single User 10.47 dBm(802.11n_HT40) 8.73 dBm(802.11ax_HE40)_26 Tone 9.01 dBm(802.11ax_HE40)_52 Tone 9.13 dBm(802.11ax_HE40)_106 Tone 8.83 dBm(802.11ax_HE40)_242 Tone 8.72 dBm(802.11ax_HE40)_484 Tone 10.31 dBm(802.11ax_HE40)_Single User 7.69 dBm(802.11ac_VHT80) 6.50 dBm(802.11ax_HE40)_26 Tone 6.53 dBm(802.11ax_HE40)_52 Tone 6.39 dBm(802.11ax_HE40)_106 Tone 6.26 dBm(802.11ax_HE40)_242 Tone 6.26 dBm(802.11ax_HE40)_484 Tone 5.91 dBm(802.11ax_HE40)_996 Tone 7.47 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|------------------|---|

| | | | |
|----------------------------|--|---------------------------|--|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 725 MHz ~ 5 850 MHz Band</p> | <p>Antenna 1_Straddle</p> | <p>3.33 dBm(802.11a) 3.62 dBm(802.11n_HT20) 3.83 dBm(802.11ax_HE20)_26 Tone 5.36 dBm(802.11ax_HE20)_52 Tone 5.47 dBm(802.11ax_HE20)_106 Tone 4.50 dBm(802.11ax_HE20)_242 Tone 4.12 dBm(802.11ax_HE20)_Single User -2.38 dBm(802.11n_HT40) 3.33 dBm(802.11ax_HE40)_26 Tone 5.93 dBm(802.11ax_HE40)_52 Tone 4.85 dBm(802.11ax_HE40)_106 Tone 1.50 dBm(802.11ax_HE40)_242 Tone -1.68 dBm(802.11ax_HE40)_484 Tone -1.56 dBm(802.11ax_HE40)_Single User -8.90 dBm(802.11ac_VHT80) 3.96 dBm(802.11ax_HE40)_26 Tone 5.51 dBm(802.11ax_HE40)_52 Tone 2.53 dBm(802.11ax_HE40)_106 Tone -0.93 dBm(802.11ax_HE40)_242 Tone -3.96 dBm(802.11ax_HE40)_484 Tone -7.03 dBm(802.11ax_HE40)_996 Tone -7.70 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|---------------------------|--|

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|----------------------------|--|-------------------------|---|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 725 MHz ~ 5 850 MHz Band</p> | <p>Multiple Antenna</p> | <p>14.34 dBm(802.11n_HT20) 13.70 dBm(802.11ax_HE20)_26 Tone 13.90 dBm(802.11ax_HE20)_52 Tone 13.63 dBm(802.11ax_HE20)_106 Tone 13.54 dBm(802.11ax_HE20)_242 Tone 14.17 dBm(802.11ax_HE20)_Single User 13.43 dBm(802.11n_HT40) 10.97 dBm(802.11ax_HE40)_26 Tone 11.25 dBm(802.11ax_HE40)_52 Tone 11.33 dBm(802.11ax_HE40)_106 Tone 11.04 dBm(802.11ax_HE40)_242 Tone 11.02 dBm(802.11ax_HE40)_484 Tone 13.34 dBm(802.11ax_HE40)_Single User 10.87 dBm(802.11ac_VHT80) 8.60 dBm(802.11ax_HE40)_26 Tone 8.61 dBm(802.11ax_HE40)_52 Tone 8.50 dBm(802.11ax_HE40)_106 Tone 8.50 dBm(802.11ax_HE40)_242 Tone 8.48 dBm(802.11ax_HE40)_484 Tone 8.26 dBm(802.11ax_HE40)_996 Tone 10.76 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|-------------------------|---|

| | | | |
|----------------------------|--|---------------------------------------|--|
| <p>RF OUTPUT POWER</p> | <p>WLAN 5 725 MHz ~ 5 850 MHz Band</p> | <p>Multiple Antenna _Straddle</p> | <p>6.57 dBm(802.11n_HT20) 5.90 dBm(802.11ax_HE20)_26 Tone 7.53 dBm(802.11ax_HE20)_52 Tone 7.71 dBm(802.11ax_HE20)_106 Tone 6.87 dBm(802.11ax_HE20)_242 Tone 7.04 dBm(802.11ax_HE20)_Single User 0.38 dBm(802.11n_HT40) 5.50 dBm(802.11ax_HE40)_26 Tone 8.10 dBm(802.11ax_HE40)_52 Tone 7.05 dBm(802.11ax_HE40)_106 Tone 3.70 dBm(802.11ax_HE40)_242 Tone 0.53 dBm(802.11ax_HE40)_484 Tone 1.23 dBm(802.11ax_HE40)_Single User -6.03 dBm(802.11ac_VHT80) 6.10 dBm(802.11ax_HE40)_26 Tone 7.68 dBm(802.11ax_HE40)_52 Tone 4.73 dBm(802.11ax_HE40)_106 Tone 1.23 dBm(802.11ax_HE40)_242 Tone -1.76 dBm(802.11ax_HE40)_484 Tone -4.85 dBm(802.11ax_HE40)_996 Tone -4.87 dBm(802.11ax_HE40)_Single User</p> |
|----------------------------|--|---------------------------------------|--|

| | | | | |
|--------------|---|------------------|-----------|--|
| ANTENNA TYPE | Dipole Antenna | | | |
| ANTENNA GAIN | Bluetooth LE | 7 dBi | | |
| | Bluetooth | 7 dBi | | |
| | WLAN 2.4 GHz | Antenna 0 | 7 dBi | |
| | | Antenna 1 | 7 dBi | |
| | | Multiple Antenna | 10.01 dBi | |
| | 5 150 MHz ~ 5 250 MHz Band | Antenna 0 | 9 dBi | |
| | | Antenna 1 | 9 dBi | |
| | | Multiple Antenna | 12.01 dBi | |
| | 5 250 MHz ~ 5 350 MHz Band | Antenna 0 | 9 dBi | |
| | | Antenna 1 | 9 dBi | |
| | | Multiple Antenna | 12.01 dBi | |
| | 5 470 MHz ~ 5 725 MHz Band | Antenna 0 | 9 dBi | |
| | | Antenna 1 | 9 dBi | |
| | | Multiple Antenna | 12.01 dBi | |
| | 5 725 MHz ~ 5 850 MHz Band | Antenna 0 | 9 dBi | |
| | | Antenna 1 | 9 dBi | |
| | | Multiple Antenna | 12.01 dBi | |
| | List of each Osc. or crystal Freq.(Freq. >= 1 MHz) | 40 MHz | | |

3.2 Alternative type(s)/model(s); also covered by this test report.

-. None

4. EUT MODIFICATIONS

-. None

5. SYSTEM TEST CONFIGURATION

5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

| DEVICE TYPE | MANUFACTURER | MODEL/PART NUMBER | FCC ID |
|-------------|----------------------|-------------------|--------|
| Main Board | LG Innotek Co., Ltd. | cTP3.0_Rev0.1 | N/A |

5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

| Model | Manufacturer | Description | Connected to |
|------------|----------------------|-----------------|--------------|
| ATC6NPL002 | LG Innotek Co., Ltd. | RF Module (EUT) | - |
| ZUP36-6 | NEMIC-LAMBDA | DC Power Supply | EUT |
| ideapad320 | Lenovo | Notebokk PC | EUT |

5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting is programmed.

For final testing, the EUT was set at 2 402 MHz, 2 441 MHz, and 2 480 MHz to get a maximum emission levels from the EUT. The EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XY” axis, but the worst data was recorded in this report.

- Channel List (Bluetooth)

| Channel | Frequency[MHz] | Channel | Frequency[MHz] | Channel | Frequency[MHz] |
|---------|----------------|---------|----------------|---------|----------------|
| 0 | 2 402.00 | 27 | 2 429.00 | 54 | 2 456.00 |
| 1 | 2 403.00 | 28 | 2 430.00 | 55 | 2 457.00 |
| 2 | 2 404.00 | 29 | 2 431.00 | 56 | 2 458.00 |
| 3 | 2 405.00 | 30 | 2 432.00 | 57 | 2 459.00 |
| 4 | 2 406.00 | 31 | 2 433.00 | 58 | 2 460.00 |
| 5 | 2 407.00 | 32 | 2 434.00 | 59 | 2 461.00 |
| 6 | 2 408.00 | 33 | 2 435.00 | 60 | 2 462.00 |
| 7 | 2 409.00 | 34 | 2 436.00 | 61 | 2 463.00 |
| 8 | 2 410.00 | 35 | 2 437.00 | 62 | 2 464.00 |
| 9 | 2 411.00 | 36 | 2 438.00 | 63 | 2 465.00 |
| 10 | 2 412.00 | 37 | 2 439.00 | 64 | 2 466.00 |
| 11 | 2 413.00 | 38 | 2 440.00 | 65 | 2 467.00 |
| 12 | 2 414.00 | 39 | 2 441.00 | 66 | 2 468.00 |
| 13 | 2 415.00 | 40 | 2 442.00 | 67 | 2 469.00 |
| 14 | 2 416.00 | 41 | 2 443.00 | 68 | 2 470.00 |
| 15 | 2 417.00 | 42 | 2 444.00 | 69 | 2 471.00 |
| 16 | 2 418.00 | 43 | 2 445.00 | 70 | 2 472.00 |
| 17 | 2 419.00 | 44 | 2 446.00 | 71 | 2 473.00 |
| 18 | 2 420.00 | 45 | 2 447.00 | 72 | 2 474.00 |
| 19 | 2 421.00 | 46 | 2 448.00 | 73 | 2 475.00 |
| 20 | 2 422.00 | 47 | 2 449.00 | 74 | 2 476.00 |
| 21 | 2 423.00 | 48 | 2 450.00 | 75 | 2 477.00 |
| 22 | 2 424.00 | 49 | 2 451.00 | 76 | 2 478.00 |
| 23 | 2 425.00 | 50 | 2 452.00 | 77 | 2 479.00 |
| 24 | 2 426.00 | 51 | 2 453.00 | 78 | 2 480.00 |
| 25 | 2 427.00 | 52 | 2 454.00 | | |
| 26 | 2 428.00 | 53 | 2 455.00 | | |

- Duty Cycle

| Mode | Tx On Time [ms] | Tx Off Time [ms] | Duty Cycle [%] | Correction Factor [dB] |
|-------------------------|----------------------|-----------------------|---------------------|-----------------------------|
| Bluetooth [1 Mbps] | 3.76 | 2.88 | 56.63 | 2.47 |
| Bluetooth [2 Mbps] | 3.76 | 2.88 | 56.63 | 2.47 |
| Bluetooth [3 Mbps] | 3.76 | 2.88 | 56.63 | 2.47 |

Note – Duty Cycle : $(Tx\ On\ Time / (Tx\ On\ Time + Tx\ Off\ Time)) * 100$

Correction Factor : $10 * \log(1 / (Duty\ Cycle / 100))$

- For the Duty cycle test data, Please See The Appendix Data File.

5.4 Configuration of Test System

Line Conducted Test: The EUT was tested in the Transmitting mode. All supporting equipment were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.10: 2020 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2020 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter 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.

5.5 Antenna Requirement

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

Antenna Construction:

The antenna of the EUT is a Dipole Antenna. However, The manufacture has designed a strucyure that connects to the antenna using a unique coupling connector of the Fakra Type. So no consideration of replacement by the user.

6. PRELIMINARY TEST

6.1 AC Power line Conducted Emissions Tests

During Preliminary Test, the following operating mode was investigated.

| Operation Mode | The Worse operating condition (Please check one only) |
|-------------------|---|
| Transmitting Mode | X |

6.2 General Radiated Emissions Tests

During Preliminary Test, the following operating mode was investigated.

| Operation Mode | The Worse operating condition (Please check one only) |
|-------------------|---|
| Transmitting Mode | X |

7. MINIMUM 20 dB BANDWIDTH

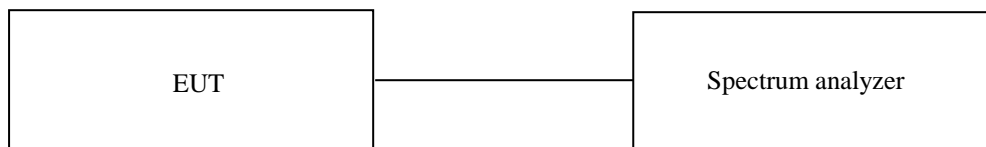
7.1 Operating environment

Temperature : 23 °C

Relative humidity : 46 % R.H.

7.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 1 % to 5 % of the OBW, and peak detection was used. The 20 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 20 dB.



7.3 Test Date

December 05, 2021 ~ March 08, 2022

7.4 Test data for 1 Mbps

| CHANNEL | FREQUENCY (MHz) | 20 dB Bandwidth (kHz) |
|---------|-----------------|-----------------------|
| Low | 2 402.00 | 954.00 |
| Middle | 2 441.00 | 944.10 |
| High | 2 480.00 | 959.00 |

7.5 Test data for 2 Mbps

| CHANNEL | FREQUENCY (MHz) | 20 dB Bandwidth (kHz) |
|---------|-----------------|-----------------------|
| Low | 2 402.00 | 1 381.70 |
| Middle | 2 441.00 | 1 318.70 |
| High | 2 480.00 | 1 318.70 |

7.6 Test data for 3 Mbps

| CHANNEL | FREQUENCY (MHz) | 20 dB Bandwidth (kHz) |
|---------|-----------------|-----------------------|
| Low | 2 402.00 | 1 278.70 |
| Middle | 2 441.00 | 1 278.70 |
| High | 2 480.00 | 1 278.70 |

8. HOPPING FREQUENCY SEPARATION

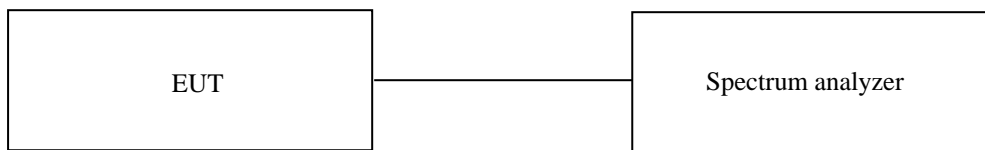
8.1 Operating environment

Temperature : 23 °C

Relative humidity : 46 % R.H.

8.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The frequency span is set to 10 MHz. The analyzer is set to peak hold then a pseudo-random hopping sequence of the transmitter is captured. The mark delta function was used to measure the frequency separation between two adjacent hopping channels.



8.3 Test Date

December 05, 2021 ~ March 08, 2022

8.4 Test data for 1 Mbps

-. Test Result : Pass

| MEASURED VALUE (kHz) | Two-third of 20 dB Bandwidth (kHz) | LIMIT |
|----------------------|------------------------------------|--------------------------------------|
| 999.00 | 629.40 | Separated by a minimum of 629.40 kHz |

8.5 Test data for 2 Mbps

-. Test Result : Pass

| MEASURED VALUE (kHz) | Two-third of 20 dB Bandwidth (kHz) | LIMIT |
|----------------------|------------------------------------|--------------------------------------|
| 999.00 | 879.13 | Separated by a minimum of 879.13 kHz |

8.6 Test data for 3 Mbps

-. Test Result : Pass

| MEASURED VALUE (kHz) | Two-third of 20 dB Bandwidth (kHz) | LIMIT |
|----------------------|------------------------------------|--------------------------------------|
| 999.00 | 852.47 | Separated by a minimum of 852.47 kHz |

9. NUMBER OF HOPPING CHANNELS

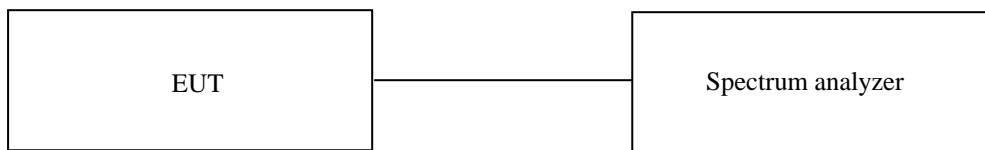
9.1 Operating environment

Temperature : 23 °C

Relative humidity : 46 % R.H.

9.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The frequency span is set to 100 kHz and the resolution bandwidth is set to 300 kHz. The analyzer is set to peak hold and then complete pseudo-random hopping sequence of the transmitter is captured.



9.3 Test Date

December 05, 2021 ~ March 08, 2022

9.4 Test data for 1 Mbps

-. Test Result : Pass

| Data Transfer Rate | Measured value (Number) | Limit (Number) | Margin (Number) |
|--------------------|-------------------------|----------------|-----------------|
| 1 Mbps | 79 | Minimum of 15 | 64 |

9.5 Test data for 2 Mbps

-. Test Result : Pass

| Data Transfer Rate | Measured value (Number) | Limit (Number) | Margin (Number) |
|--------------------|-------------------------|----------------|-----------------|
| 2 Mbps | 79 | Minimum of 15 | 64 |

9.6 Test data for 3 Mbps

-. Test Result : Pass

| Data Transfer Rate | Measured value (Number) | Limit (Number) | Margin (Number) |
|--------------------|-------------------------|----------------|-----------------|
| 3 Mbps | 79 | Minimum of 15 | 64 |

10. TIME OF OCCUPANCY

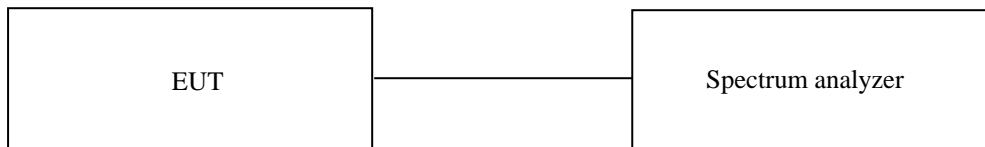
10.1 Operating environment

Temperature : 23 °C

Relative humidity : 46 % R.H.

10.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The transmitter is set to operate in its normal frequency hopping mode. The center frequency of the spectrum analyzer is set to one of hopping channels near the center of the operating band and span is set to zero Hz. The sweep time is set to display one complete pulse. The mark delta function is used to measure the duration of the pulses.



10.3 Test Date

December 05, 2021 ~ March 08, 2022

10.4 Test data for 1 Mbps

The system makes worst case 1 600 hops per second or 1 time slot has a length of 625 μs with 79 channels.

For DH1 packet type, the EUT needs 1 time slot for transmitting and 1 time slot for receiving and for DH3 packet type, the EUT needs 3 times slots for transmitting and 1 time slot for receiving, and DH5 packet needs 5 times slots for transmitting and 1 time slot for receiving. So The EUT has each channel for 10.13 times per second (= 1 600/2/79) for DH1, and 5.06 times (= 1 600/4/79) for DH3, and 3.38 times (= 1 600/6/79) for DH5.

| Packet Type | Pulse Time (ms) | Hops per second with channels | Period Time (ms) | Total Dwell Time (ms) | Limit (ms) | Test Result |
|-------------|-----------------|-------------------------------|------------------|-----------------------|------------|-------------|
| DH1 | 0.38 | 10.13 | 31.60 | 121.64 | 400.00 | PASS |
| DH3 | 1.65 | 5.06 | 31.60 | 263.83 | 400.00 | |
| DH5 | 2.91 | 3.38 | 31.60 | 310.81 | 400.00 | |

Total dwell time is calculated as following.

Total Dwell Time = Pulse time * Hops per second with channels * period time

Remark: See next page for an overview sweep performed with peak detector.

10.5 Test data for 2 Mbps

The system makes worst case 1 600 hops per second or 1 time slot has a length of 625 μs with 79 channels.

For DH1 packet type, the EUT needs 1 time slot for transmitting and 1 time slot for receiving and for DH3 packet type, the EUT needs 3 times slots for transmitting and 1 time slot for receiving, and DH5 packet needs 5 times slots for transmitting and 1 time slot for receiving. So The EUT has each channel for 10.13 times per second (= 1 600/2/79) for DH1, and 5.06 times (= 1 600/4/79) for DH3, and 3.38 times (= 1 600/6/79) for DH5.

| Packet Type | Pulse Time (ms) | Hops per second with channels | Period Time (ms) | Total Dwell Time (ms) | Limit (ms) | Test Result |
|-------------|-----------------|-------------------------------|------------------|-----------------------|------------|-------------|
| DH1 | 0.38 | 10.13 | 31.60 | 121.64 | 400.00 | PASS |
| DH3 | 1.64 | 5.06 | 31.60 | 262.23 | 400.00 | |
| DH5 | 2.90 | 3.38 | 31.60 | 309.74 | 400.00 | |

Total dwell time is calculated as following.

Total Dwell Time = Pulse time * Hops per second with channels * period time

Remark: See next page for an overview sweep performed with peak detector.

10.6 Test data for 3 Mbps

The system makes worst case 1 600 hops per second or 1 time slot has a length of 625 μs with 79 channels.

For DH1 packet type, the EUT needs 1 time slot for transmitting and 1 time slot for receiving and for DH3 packet type, the EUT needs 3 times slots for transmitting and 1 time slot for receiving, and DH5 packet needs 5 times slots for transmitting and 1 time slot for receiving. So The EUT has each channel for 10.13 times per second (= 1 600/2/79) for DH1, and 5.06 times (= 1 600/4/79) for DH3, and 3.38 times (= 1 600/6/79) for DH5.

| Packet Type | Pulse Time (ms) | Hops per second with channels | Period Time (ms) | Total Dwell Time (ms) | Limit (ms) | Test Result |
|-------------|-----------------|-------------------------------|------------------|-----------------------|------------|-------------|
| DH1 | 0.38 | 10.13 | 31.60 | 121.64 | 400.00 | PASS |
| DH3 | 1.65 | 5.06 | 31.60 | 263.83 | 400.00 | |
| DH5 | 2.89 | 3.38 | 31.60 | 308.68 | 400.00 | |

Total dwell time is calculated as following.

Total Dwell Time = Pulse time * Hops per second with channels * period time

Remark: See next page for an overview sweep performed with peak detector.

11. MAXIMUM PEAK OUTPUT POWER

11.1 Operating environment

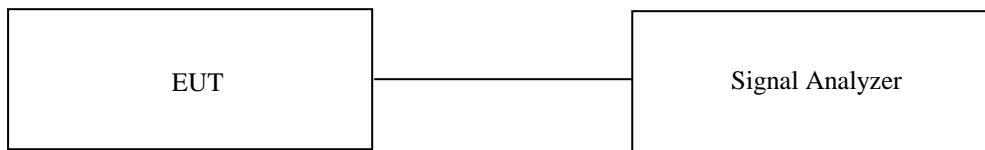
Temperature : 23 °C

Relative humidity : 46 % R.H.

11.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to \geq DTS Bandwidth, the video bandwidth is set to 3 times the resolution bandwidth.



11.3 Test Date

December 05, 2021 ~ March 08, 2022

11.4 Test data for 1 Mbps

-. Test Result : Pass

| CHANNEL | FREQUENCY (MHz) | MEASURED VALUE (dBm) | LIMIT (dBm) | MARGIN (dB) |
|---------|--------------------|-------------------------|----------------|----------------|
| LOW | 2 402.00 | 0.10 | 21.00 | 20.90 |
| MIDDLE | 2 441.00 | -0.06 | 21.00 | 21.06 |
| HIGH | 2 480.00 | 0.67 | 21.00 | 20.33 |

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

11.5 Test data for 2 Mbps

-. Test Result : Pass

| CHANNEL | FREQUENCY (MHz) | MEASURED VALUE (dBm) | LIMIT (dBm) | MARGIN (dB) |
|---------|--------------------|-------------------------|----------------|----------------|
| LOW | 2 402.00 | -0.78 | 21.00 | 21.78 |
| MIDDLE | 2 441.00 | -0.89 | 21.00 | 21.89 |
| HIGH | 2 480.00 | -0.27 | 21.00 | 21.27 |

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

11.6 Test data for 3 Mbps

-. Test Result : Pass

| CHANNEL | FREQUENCY (MHz) | MEASURED VALUE (dBm) | LIMIT (dBm) | MARGIN (dB) |
|---------|--------------------|-------------------------|----------------|----------------|
| LOW | 2 402.00 | -0.51 | 21.00 | 21.51 |
| MIDDLE | 2 441.00 | -0.63 | 21.00 | 21.63 |
| HIGH | 2 480.00 | 0.09 | 21.00 | 20.91 |

Remark. Margin = Limit – Measured Value (=Receiver Reading + Cable Loss)

12. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

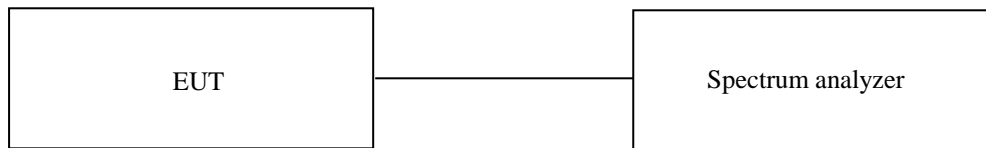
12.1 Operating environment

Temperature : 23 °C

Relative humidity : 46 % R.H.

12.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz and video bandwidth is set to 300 kHz, and peak detection was used.



12.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m semi anechoic chamber. The EUT was placed on turntable approximately 1.5 m above the ground plane.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

12.4 Test Date

December 05, 2021 ~ March 08, 2022

12.5 Test data for conducted emission

Please refer to the Annex

12.6 Test data for Transmitting mode radiated emission

12.6.1 Radiated Emission which fall in the Restricted Band

12.6.1.1 Test data for 1 Mbps

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 76.60 %
- Result : PASSED

| Frequency (MHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | AMP Factor | ATT (dB) | Duty Factor (dB) | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|-----------------------------------|----------------|---------------|-----------------|-------------|------------|------------|----------|------------------|----------------|-----------------|-------------|
| Test Data for Low Channel | | | | | | | | | | | |
| 2 334.402 | 54.63 | Peak | H | 28.30 | 6.03 | 45.14 | 6.05 | - | 49.87 | 74.00 | 24.13 |
| 2 330.817 | 42.68 | Average | H | 28.30 | 6.03 | 45.14 | 6.05 | 2.47 | 39.08 | 54.00 | 13.61 |
| 2 372.452 | 53.16 | Peak | V | 28.30 | 6.03 | 45.14 | 6.05 | - | 48.40 | 74.00 | 25.60 |
| 2 330.817 | 41.59 | Average | V | 28.30 | 6.03 | 45.14 | 6.05 | 2.47 | 37.99 | 54.00 | 14.70 |
| Test Data for High Channel | | | | | | | | | | | |
| 2 497.592 | 54.24 | Peak | H | 28.70 | 6.12 | 45.79 | 6.08 | - | 49.35 | 74.00 | 24.65 |
| 2 484.125 | 43.29 | Average | H | 28.70 | 6.12 | 45.79 | 6.08 | 2.47 | 39.56 | 54.00 | 13.13 |
| 2 492.957 | 54.05 | Peak | V | 28.70 | 6.12 | 45.79 | 6.08 | - | 49.16 | 74.00 | 24.84 |
| 2 483.686 | 43.28 | Average | V | 28.70 | 6.12 | 45.79 | 6.08 | 2.4 | 39.55 | 54.00 | 13.14 |

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{ATT} + \text{Duty Factor} - \text{Amp Factor}$$

12.6.1.2 Test data for 2 Mbps

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 76.60 %
- Result : PASSED

| Frequency (MHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | AMP Factor | ATT (dB) | Duty Factor (dB) | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|-----------------------------------|----------------|---------------|-----------------|-------------|------------|------------|----------|------------------|----------------|-----------------|-------------|
| Test Data for Low Channel | | | | | | | | | | | |
| 2 335.228 | 54.79 | Peak | H | 28.30 | 6.03 | 45.14 | 6.05 | - | 50.03 | 74.00 | 23.97 |
| 2 324.751 | 44.55 | Average | H | 28.30 | 6.03 | 45.14 | 6.05 | 2.47 | 40.95 | 54.00 | 11.74 |
| 2 337.802 | 54.15 | Peak | V | 28.30 | 6.03 | 45.14 | 6.05 | - | 49.39 | 74.00 | 24.61 |
| 2 334.677 | 44.48 | Average | V | 28.30 | 6.03 | 45.14 | 6.05 | 2.47 | 40.88 | 54.00 | 11.81 |
| Test Data for High Channel | | | | | | | | | | | |
| 2 489.200 | 53.87 | Peak | H | 28.70 | 6.12 | 45.79 | 6.08 | - | 48.98 | 74.00 | 25.02 |
| 2 483.666 | 43.08 | Average | H | 28.70 | 6.12 | 45.79 | 6.08 | 2.47 | 39.35 | 54.00 | 13.34 |
| 2 492.018 | 54.56 | Peak | V | 28.70 | 6.12 | 45.79 | 6.08 | - | 49.67 | 74.00 | 24.33 |
| 2 487.302 | 43.10 | Average | V | 28.70 | 6.12 | 45.79 | 6.08 | 2.47 | 39.37 | 54.00 | 13.32 |

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{ATT} + \text{Duty Factor} - \text{Amp Factor}$$

12.6.1.3 Test data for 3 Mbps

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 76.60 %
- Result : PASSED

| Frequency (MHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | AMP Factor | ATT (dB) | Duty Factor (dB) | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|-----------------------------------|----------------|---------------|-----------------|-------------|------------|------------|----------|------------------|----------------|-----------------|-------------|
| Test Data for Low Channel | | | | | | | | | | | |
| 2 334.309 | 54.54 | Peak | H | 28.30 | 6.03 | 45.14 | 6.05 | - | 49.78 | 74.00 | 24.22 |
| 2 334.401 | 45.32 | Average | H | 28.30 | 6.03 | 45.14 | 6.05 | 2.47 | 41.72 | 54.00 | 10.97 |
| 2 335.412 | 54.98 | Peak | V | 28.30 | 6.03 | 45.14 | 6.05 | - | 50.22 | 74.00 | 23.78 |
| 2 334.125 | 45.13 | Average | V | 28.30 | 6.03 | 45.14 | 6.05 | 2.47 | 41.53 | 54.00 | 11.16 |
| Test Data for High Channel | | | | | | | | | | | |
| 2 483.606 | 56.34 | Peak | H | 28.70 | 6.12 | 45.79 | 6.08 | - | 51.45 | 74.00 | 22.55 |
| 2 483.506 | 43.43 | Average | H | 28.70 | 6.12 | 45.79 | 6.08 | 2.47 | 39.70 | 54.00 | 12.99 |
| 2 483.706 | 55.68 | Peak | V | 28.70 | 6.12 | 45.79 | 6.08 | - | 50.79 | 74.00 | 23.21 |
| 2 483.566 | 43.83 | Average | V | 28.70 | 6.12 | 45.79 | 6.08 | 2.47 | 40.10 | 54.00 | 12.59 |

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{ATT} + \text{Duty Factor} - \text{Amp Factor}$$

12.6.2 Spurious & Harmonic Radiated Emission above 1 GHz

12.6.2.1 Test data for 1 Mbps

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 76.60 %
- Result : PASSED

| Frequency (MHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | AMP Factor | Duty Factor (dB) | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|-------------------------------------|----------------|---------------|-----------------|-------------|------------|------------|------------------|----------------|-----------------|-------------|
| Test Data for Low Channel | | | | | | | | | | |
| 4 804.000 | 51.44 | Peak | H | 33.40 | 7.91 | 45.10 | - | 47.65 | 74.00 | 26.35 |
| 4 804.000 | 38.97 | Average | H | 33.40 | 7.91 | 45.10 | 2.47 | 36.34 | 54.00 | 16.35 |
| 4 804.000 | 51.38 | Peak | V | 33.40 | 7.91 | 45.10 | - | 47.59 | 74.00 | 26.41 |
| 4 804.000 | 38.61 | Average | V | 33.40 | 7.91 | 45.10 | 2.47 | 35.98 | 54.00 | 16.71 |
| Test Data for Middle Channel | | | | | | | | | | |
| 4 882.000 | 51.36 | Peak | H | 33.50 | 8.08 | 45.08 | - | 47.86 | 74.00 | 26.14 |
| 4 882.000 | 38.95 | Average | H | 33.50 | 8.08 | 45.08 | 2.47 | 36.61 | 54.00 | 16.08 |
| 4 882.000 | 51.22 | Peak | V | 33.50 | 8.08 | 45.08 | - | 47.72 | 74.00 | 26.28 |
| 4 882.000 | 38.71 | Average | V | 33.50 | 8.08 | 45.08 | 2.47 | 36.37 | 54.00 | 16.32 |
| Test Data for High Channel | | | | | | | | | | |
| 4 960.000 | 51.48 | Peak | H | 33.30 | 8.14 | 45.03 | - | 47.89 | 74.00 | 26.11 |
| 4 960.000 | 38.68 | Average | H | 33.30 | 8.14 | 45.03 | 2.47 | 36.25 | 54.00 | 16.44 |
| 4 960.000 | 51.29 | Peak | V | 33.30 | 8.14 | 45.03 | - | 47.70 | 74.00 | 26.30 |
| 4 960.000 | 38.71 | Average | V | 33.30 | 8.14 | 45.03 | 2.47 | 36.28 | 54.00 | 16.41 |

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{Duty Factor} - \text{Amp Factor}$$

12.6.2.2 Test data for 2 Mbps

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 76.60 %
- Result : PASSED

| Frequency (MHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | AMP Factor | Duty Factor (dB) | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|-------------------------------------|----------------|---------------|-----------------|-------------|------------|------------|------------------|----------------|-----------------|-------------|
| Test Data for Low Channel | | | | | | | | | | |
| 4 804.000 | 51.33 | Peak | H | 33.40 | 7.91 | 45.10 | - | 47.54 | 74.00 | 26.46 |
| 4 804.000 | 38.26 | Average | H | 33.40 | 7.91 | 45.10 | 2.47 | 35.63 | 54.00 | 17.06 |
| 4 804.000 | 51.22 | Peak | V | 33.40 | 7.91 | 45.10 | - | 47.43 | 74.00 | 26.57 |
| 4 804.000 | 38.62 | Average | V | 33.40 | 7.91 | 45.10 | 2.47 | 35.99 | 54.00 | 16.70 |
| Test Data for Middle Channel | | | | | | | | | | |
| 4 882.000 | 51.62 | Peak | H | 33.50 | 8.08 | 45.08 | - | 48.12 | 74.00 | 25.88 |
| 4 882.000 | 38.56 | Average | H | 33.50 | 8.08 | 45.08 | 2.47 | 36.22 | 54.00 | 16.47 |
| 4 882.000 | 51.22 | Peak | V | 33.50 | 8.08 | 45.08 | - | 47.72 | 74.00 | 26.28 |
| 4 882.000 | 38.74 | Average | V | 33.50 | 8.08 | 45.08 | 2.47 | 36.40 | 54.00 | 16.29 |
| Test Data for High Channel | | | | | | | | | | |
| 4 960.000 | 51.59 | Peak | H | 33.30 | 8.14 | 45.03 | - | 48.00 | 74.00 | 26.00 |
| 4 960.000 | 38.61 | Average | H | 33.30 | 8.14 | 45.03 | 2.47 | 36.18 | 54.00 | 16.51 |
| 4 960.000 | 51.66 | Peak | V | 33.30 | 8.14 | 45.03 | - | 48.07 | 74.00 | 25.93 |
| 4 960.000 | 38.67 | Average | V | 33.30 | 8.14 | 45.03 | 2.47 | 36.24 | 54.00 | 16.45 |

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{Duty Factor} - \text{Amp Factor}$$

12.6.2.3 Test data for 3 Mbps

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 76.60 %
- Result : PASSED

| Frequency (MHz) | Reading (dBμV) | Detector Mode | Ant. Pol. (H/V) | Ant. Factor | Cable Loss | AMP Factor | Duty Factor (dB) | Total (dBμV/m) | Limits (dBμV/m) | Margin (dB) |
|-------------------------------------|----------------|---------------|-----------------|-------------|------------|------------|------------------|----------------|-----------------|-------------|
| Test Data for Low Channel | | | | | | | | | | |
| 4 804.000 | 51.62 | Peak | H | 33.40 | 7.91 | 45.10 | - | 47.83 | 74.00 | 26.17 |
| 4 804.000 | 38.65 | Average | H | 33.40 | 7.91 | 45.10 | 2.47 | 36.02 | 54.00 | 16.67 |
| 4 804.000 | 51.82 | Peak | V | 33.40 | 7.91 | 45.10 | - | 48.03 | 74.00 | 25.97 |
| 4 804.000 | 38.69 | Average | V | 33.40 | 7.91 | 45.10 | 2.47 | 36.06 | 54.00 | 16.63 |
| Test Data for Middle Channel | | | | | | | | | | |
| 4 882.000 | 51.38 | Peak | H | 33.50 | 8.08 | 45.08 | - | 47.88 | 74.00 | 26.12 |
| 4 882.000 | 38.71 | Average | H | 33.50 | 8.08 | 45.08 | 2.47 | 36.37 | 54.00 | 16.32 |
| 4 882.000 | 51.75 | Peak | V | 33.50 | 8.08 | 45.08 | - | 48.25 | 74.00 | 25.75 |
| 4 882.000 | 38.65 | Average | V | 33.50 | 8.08 | 45.08 | 2.47 | 36.31 | 54.00 | 16.38 |
| Test Data for High Channel | | | | | | | | | | |
| 4 960.000 | 51.44 | Peak | H | 33.30 | 8.14 | 45.03 | - | 47.85 | 74.00 | 26.15 |
| 4 960.000 | 38.68 | Average | H | 33.30 | 8.14 | 45.03 | 2.47 | 36.25 | 54.00 | 16.44 |
| 4 960.000 | 51.29 | Peak | V | 33.30 | 8.14 | 45.03 | - | 47.70 | 74.00 | 26.30 |
| 4 960.000 | 38.71 | Average | V | 33.30 | 8.14 | 45.03 | 2.47 | 36.28 | 54.00 | 16.41 |

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} + \text{Duty Factor} - \text{Amp Factor}$$

13. RADIATED EMISSION TEST

13.1 Operating environment

Temperature : 22 °C
 Relative humidity : 46 % R.H.

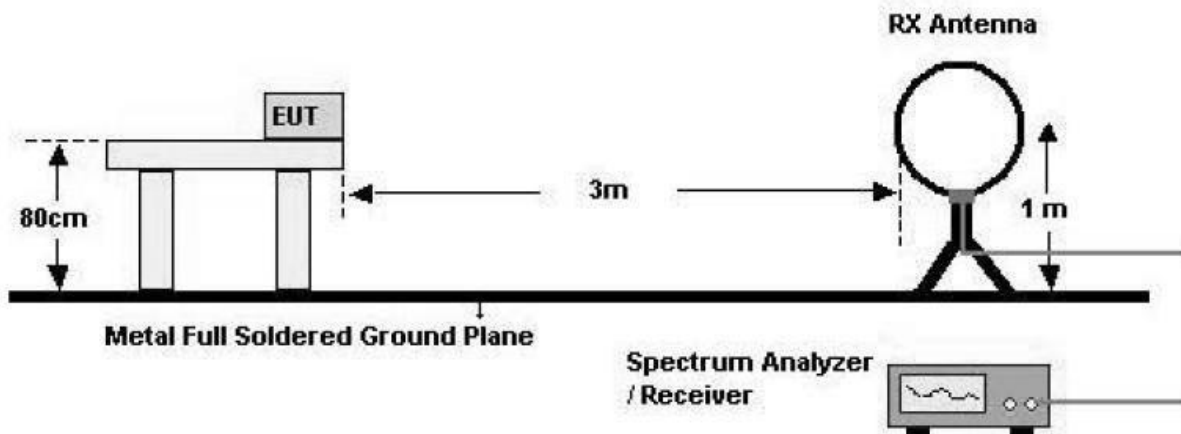
13.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

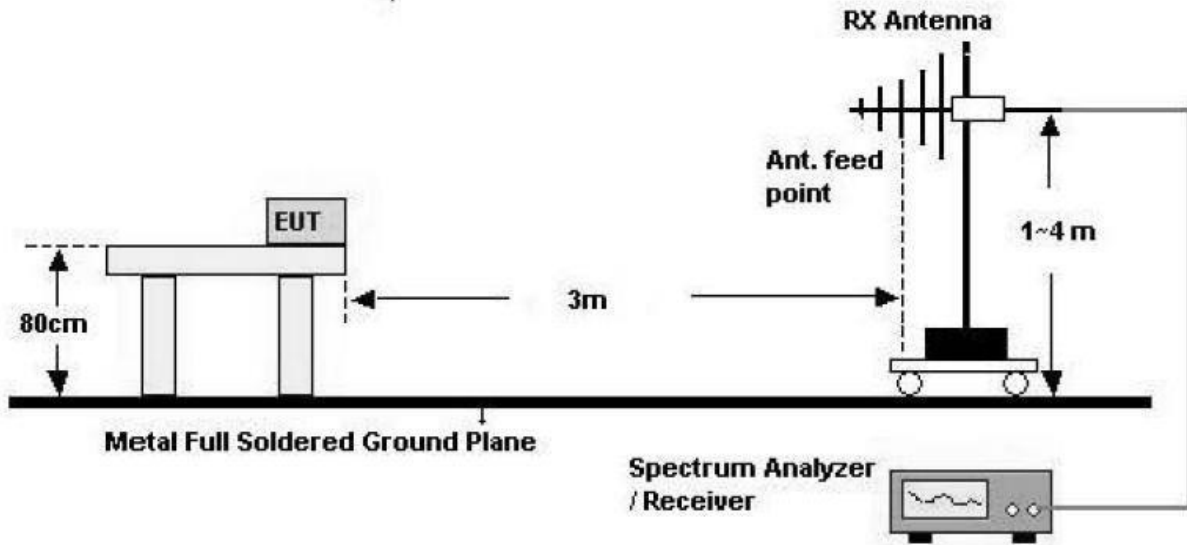
The frequency spectrum from 30 MHz to 26.5 GHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

- Test Configuration

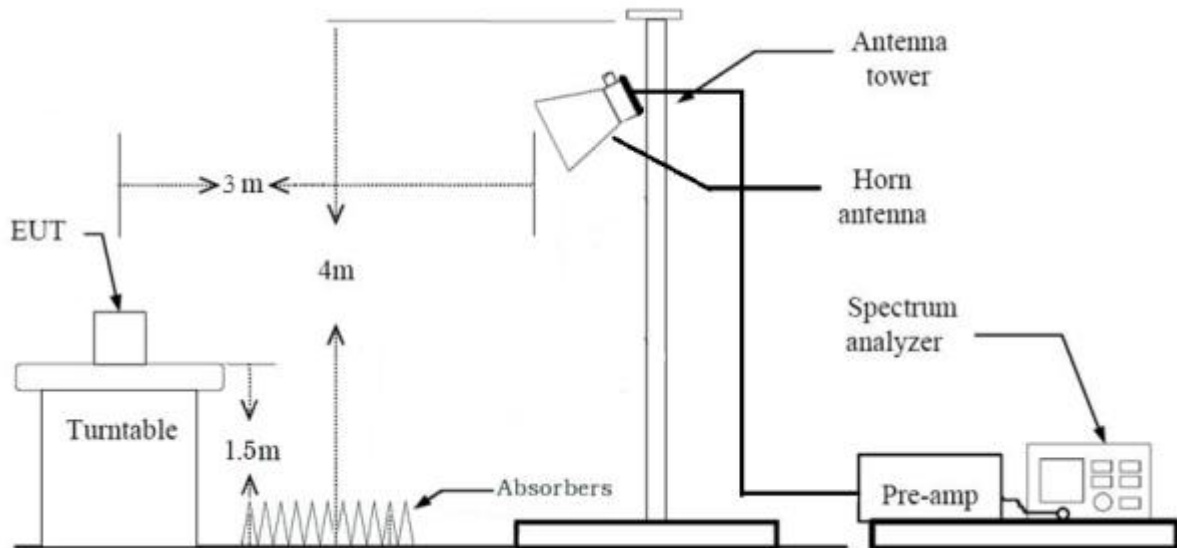
1. Below 30 MHz



2. 30 MHz - 1 GHz



3. Above 1 GHz



13.3 Test Date

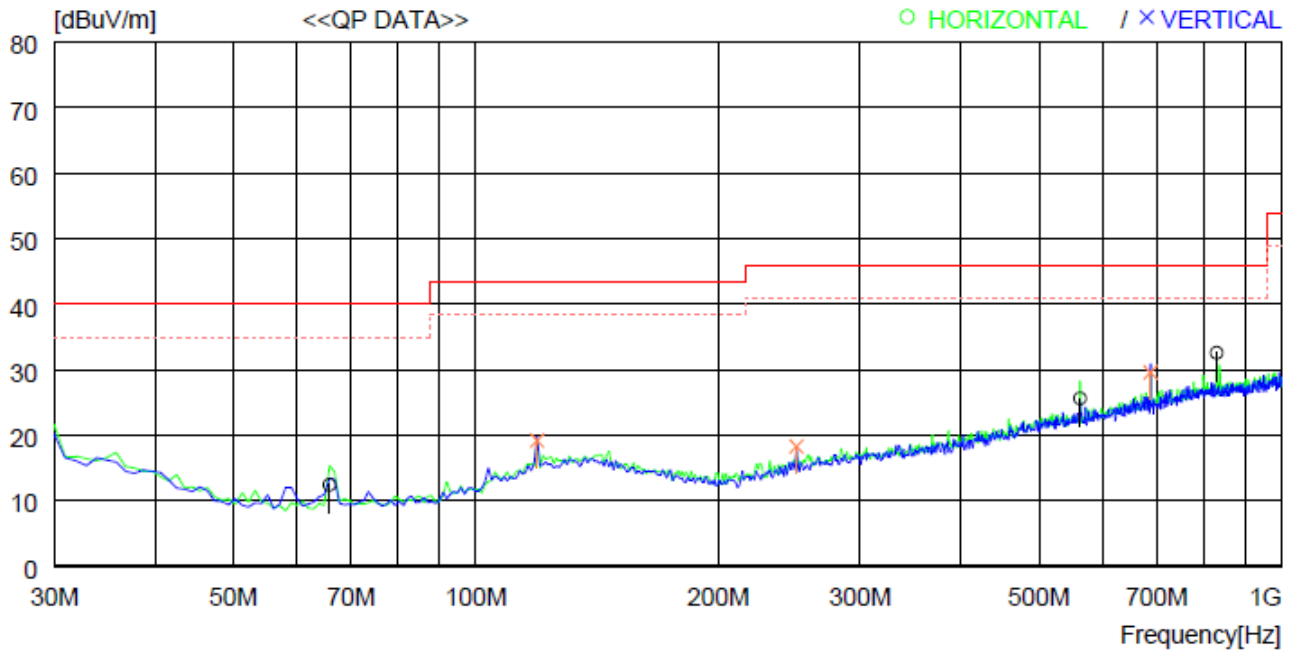
December 05, 2021 ~ March 08, 2022

13.4 Test data for 30 MHz ~ 1 000 MHz

13.4.1 Test data for Bluetooth

- Resolution bandwidth : 120 kHz
- Frequency range : 30 MHz ~ 1 000 MHz
- Measurement distance : 3 m

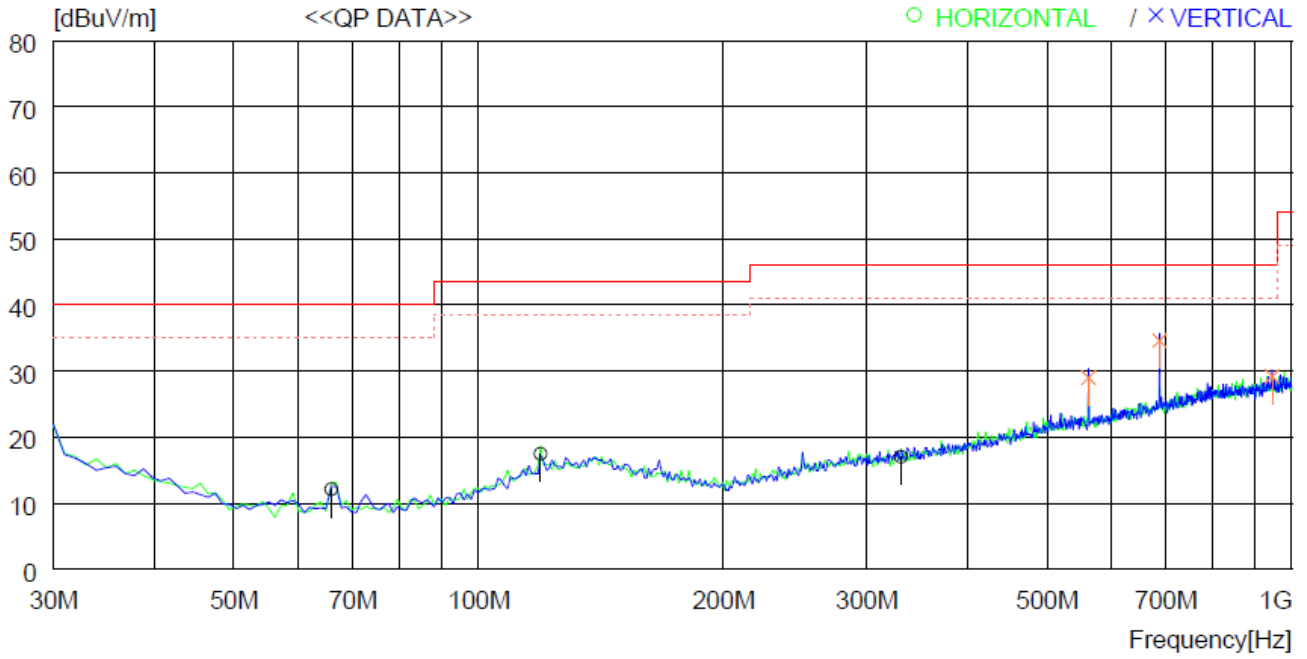
LIMIT : FCC Part15 Subpart.B Class B (3m)
MARGIN: 5 dB



| No. | FREQ | READING | ANT | LOSS | GAIN | RESULT | LIMIT | MARGIN | ANTENNA | TABLE |
|------------------------|---------|---------|--------|------|------|----------|----------|--------|---------|-------|
| | [MHz] | [dBuV] | FACTOR | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB] | [cm] | [DEG] |
| ----- Horizontal ----- | | | | | | | | | | |
| 1 | 65.890 | 30.3 | 12.6 | 1.5 | 32.0 | 12.4 | 40.0 | 27.6 | 100 | 338 |
| 2 | 562.529 | 30.1 | 23.8 | 4.1 | 32.4 | 25.6 | 46.0 | 20.4 | 200 | 263 |
| 3 | 831.211 | 32.5 | 27.2 | 5.1 | 32.2 | 32.6 | 46.0 | 13.4 | 200 | 106 |
| ----- Vertical ----- | | | | | | | | | | |
| 4 | 119.240 | 30.8 | 18.5 | 2.0 | 32.1 | 19.2 | 43.5 | 24.3 | 200 | 0 |
| 5 | 250.190 | 29.9 | 17.8 | 2.8 | 32.2 | 18.3 | 46.0 | 27.7 | 200 | 0 |
| 6 | 687.655 | 32.0 | 25.4 | 4.6 | 32.4 | 29.6 | 46.0 | 16.4 | 200 | 0 |

13.4.2 Test data for Intermodulation Mode(Bluetooth + WLAN 2.4 GHz)

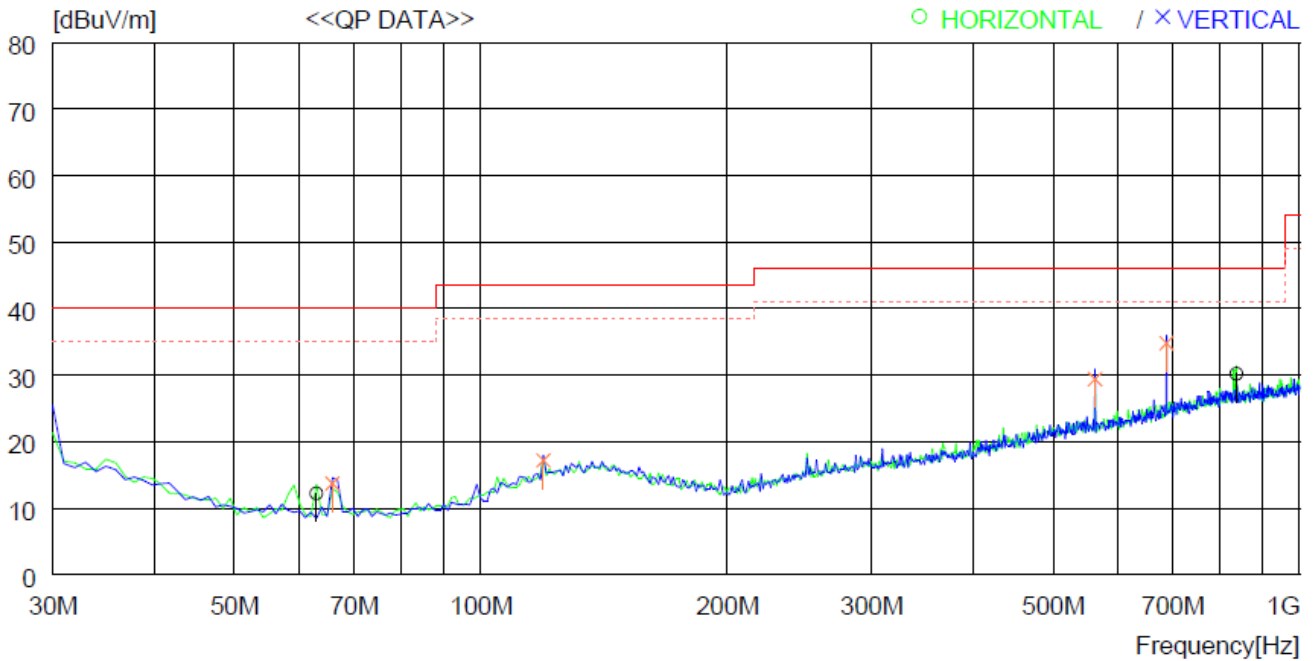
- Resolution bandwidth : 120 kHz
- Frequency range : 30 MHz ~ 1 000 MHz
- Measurement distance : 3 m



| No. | FREQ [MHz] | READING QP [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|------------------------|---------------|-------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- | | | | | | | | | | |
| 1 | 65.890 | 30.0 | 12.6 | 1.5 | 32.0 | 12.1 | 40.0 | 27.9 | 100 | 359 |
| 2 | 119.240 | 29.1 | 18.5 | 2.0 | 32.1 | 17.5 | 43.5 | 26.0 | 100 | 276 |
| 3 | 330.700 | 26.3 | 19.7 | 3.2 | 32.2 | 17.0 | 46.0 | 29.0 | 100 | 359 |
| ----- Vertical ----- | | | | | | | | | | |
| 4 | 562.529 | 33.5 | 23.8 | 4.1 | 32.4 | 29.0 | 46.0 | 17.0 | 100 | 359 |
| 5 | 687.655 | 37.0 | 25.4 | 4.6 | 32.4 | 34.6 | 46.0 | 11.4 | 100 | 359 |
| 6 | 945.668 | 27.5 | 28.0 | 5.4 | 31.7 | 29.2 | 46.0 | 16.8 | 200 | 0 |

13.4.3 Test data for Intermodulation Mode(Bluetooth + WLAN 5 GHz)

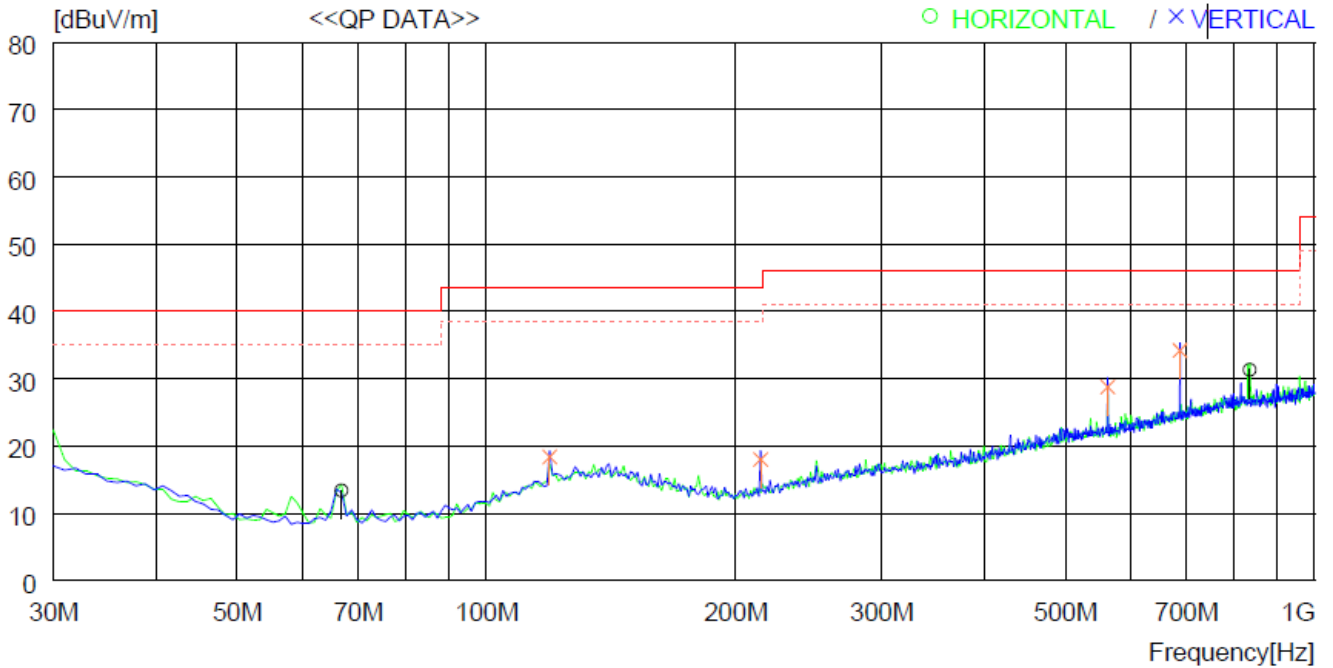
- Resolution bandwidth : 120 kHz
- Frequency range : 30 MHz ~ 1 000 MHz
- Measurement distance : 3 m



| No. | FREQ [MHz] | READING QP [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|------------------------|---------------|-------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- | | | | | | | | | | |
| 1 | 62.980 | 30.4 | 12.3 | 1.5 | 32.0 | 12.2 | 40.0 | 27.8 | 200 | 107 |
| 2 | 837.031 | 30.1 | 27.2 | 5.1 | 32.2 | 30.2 | 46.0 | 15.8 | 100 | 58 |
| ----- Vertical ----- | | | | | | | | | | |
| 3 | 65.890 | 31.6 | 12.6 | 1.5 | 32.0 | 13.7 | 40.0 | 26.3 | 200 | 0 |
| 4 | 119.240 | 28.8 | 18.5 | 2.0 | 32.1 | 17.2 | 43.5 | 26.3 | 100 | 359 |
| 5 | 562.529 | 33.9 | 23.8 | 4.1 | 32.4 | 29.4 | 46.0 | 16.6 | 100 | 359 |
| 6 | 687.655 | 37.2 | 25.4 | 4.6 | 32.4 | 34.8 | 46.0 | 11.2 | 100 | 179 |

13.4.4 Test data for Intermodulation Mode(Bluetooth + WLAN 2 GHz AX Mode)

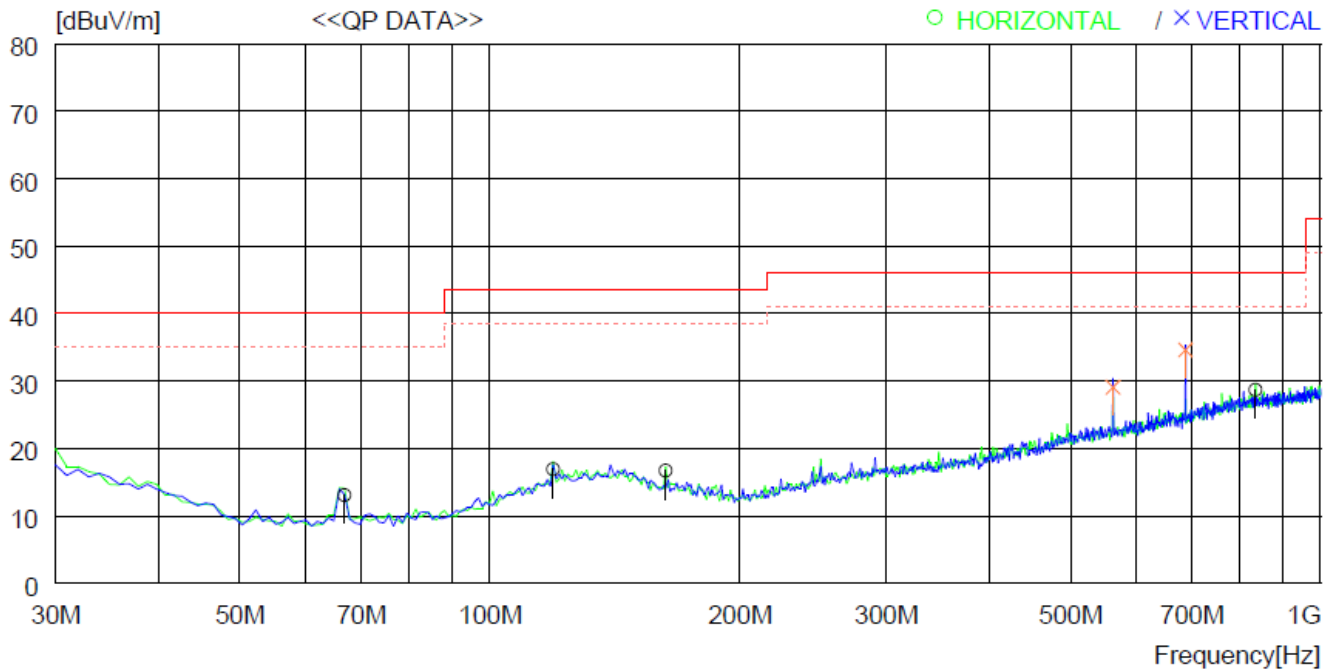
- Resolution bandwidth : 120 kHz
- Frequency range : 30 MHz ~ 1 000 MHz
- Measurement distance : 3 m



| No. | FREQ [MHz] | READING QP [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|------------------------|---------------|-------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- | | | | | | | | | | |
| 1 | 66.860 | 31.2 | 12.6 | 1.6 | 32.0 | 13.4 | 40.0 | 26.6 | 100 | 359 |
| 2 | 835.091 | 31.2 | 27.2 | 5.1 | 32.2 | 31.3 | 46.0 | 14.7 | 200 | 0 |
| ----- Vertical ----- | | | | | | | | | | |
| 3 | 119.240 | 30.0 | 18.5 | 2.0 | 32.1 | 18.4 | 43.5 | 25.1 | 200 | 234 |
| 4 | 214.300 | 31.4 | 16.2 | 2.5 | 32.1 | 18.0 | 43.5 | 25.5 | 100 | 359 |
| 5 | 562.529 | 33.3 | 23.8 | 4.1 | 32.4 | 28.8 | 46.0 | 17.2 | 100 | 359 |
| 6 | 687.655 | 36.6 | 25.4 | 4.6 | 32.4 | 34.2 | 46.0 | 11.8 | 100 | 359 |

13.4.5 Test data for Intermodulation Mode(Bluetooth + WLAN 5 GHz AX Mode)

- Resolution bandwidth : 120 kHz
- Frequency range : 30 MHz ~ 1 000 MHz
- Measurement distance : 3 m



| No. | FREQ [MHz] | READING QP [dBuV] | ANT FACTOR [dB] | LOSS [dB] | GAIN [dB] | RESULT [dBuV/m] | LIMIT [dBuV/m] | MARGIN [dB] | ANTENNA [cm] | TABLE [DEG] |
|------------------------|---------------|-------------------------|-----------------------|--------------|--------------|--------------------|-------------------|----------------|-----------------|----------------|
| ----- Horizontal ----- | | | | | | | | | | |
| 1 | 66.860 | 30.9 | 12.6 | 1.6 | 32.0 | 13.1 | 40.0 | 26.9 | 100 | 174 |
| 2 | 119.240 | 28.5 | 18.5 | 2.0 | 32.1 | 16.9 | 43.5 | 26.6 | 200 | 0 |
| 3 | 162.890 | 28.8 | 17.7 | 2.3 | 32.1 | 16.7 | 43.5 | 26.8 | 100 | 350 |
| 4 | 835.091 | 28.6 | 27.2 | 5.1 | 32.2 | 28.7 | 46.0 | 17.3 | 100 | 359 |
| ----- Vertical ----- | | | | | | | | | | |
| 5 | 562.529 | 33.6 | 23.8 | 4.1 | 32.4 | 29.1 | 46.0 | 16.9 | 100 | 359 |
| 6 | 687.655 | 37.0 | 25.4 | 4.6 | 32.4 | 34.6 | 46.0 | 11.4 | 100 | 191 |

13.5 Test data for Below 30 MHz

- Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- Frequency range : 9 kHz ~ 30 MHz
- Measurement distance : 3 m

| Frequency (MHz) | Reading (dB μ V) | Ant. Pol. (H/V) | Ant. Factor (dB/m) | Cable Loss | Amp Gain | Emission Level(dB μ V/m) | Limits (dB μ V/m) | Margin (dB) |
|--|----------------------|-----------------|--------------------|------------|----------|------------------------------|-----------------------|-------------|
| Emission from the EUT more than 20 dB below the limit in each frequency range. | | | | | | | | |

13.6 Test data for above 1 GHz

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m

| Frequency (MHz) | Reading (dB μ V) | Ant. Pol. (H/V) | Ant. Factor (dB/m) | Cable Loss | Amp Gain | Emission Level(dB μ V/m) | Limits (dB μ V/m) | Margin (dB) |
|--|----------------------|-----------------|--------------------|------------|----------|------------------------------|-----------------------|-------------|
| Emission from the EUT more than 20 dB below the limit in each frequency range. | | | | | | | | |

14. CONDUCTED EMISSION TEST

14.1 Operating environment

Temperature : 23 °C
Relative humidity : 46 % R.H.

14.2 Test set-up

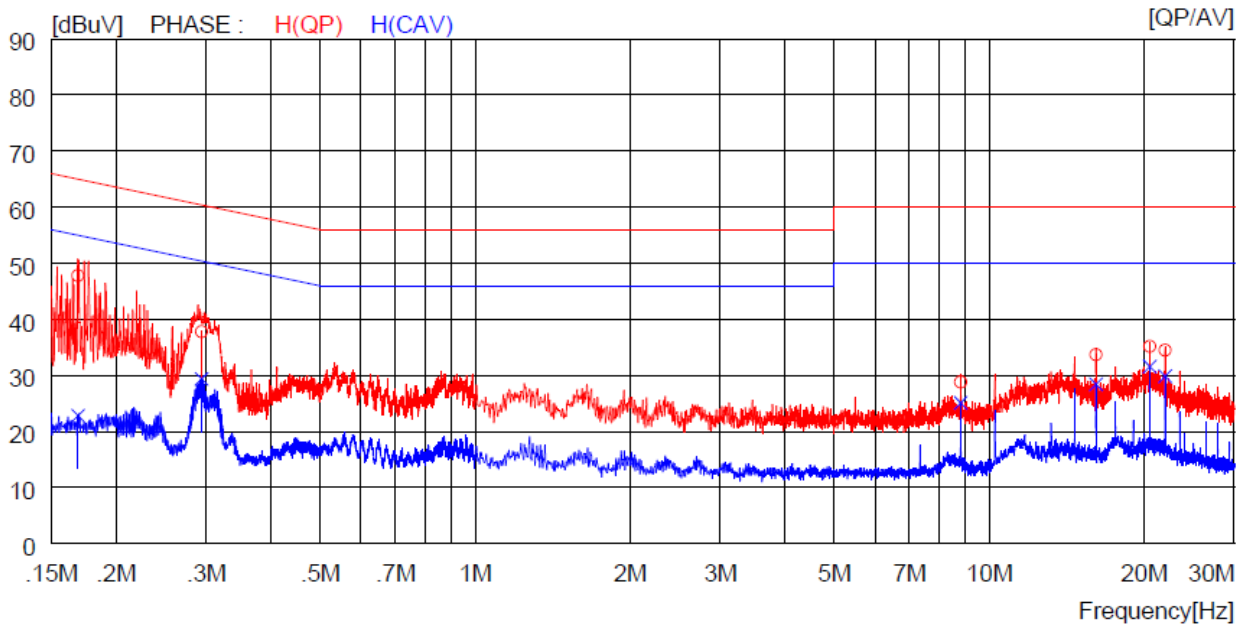
The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a 50 Ω / 50 μ H + 5 Ω Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

14.3 Test Date

December 05, 2021 ~ March 08, 2022

14.4 Test data for Bluetooth

- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : LIVE LINE

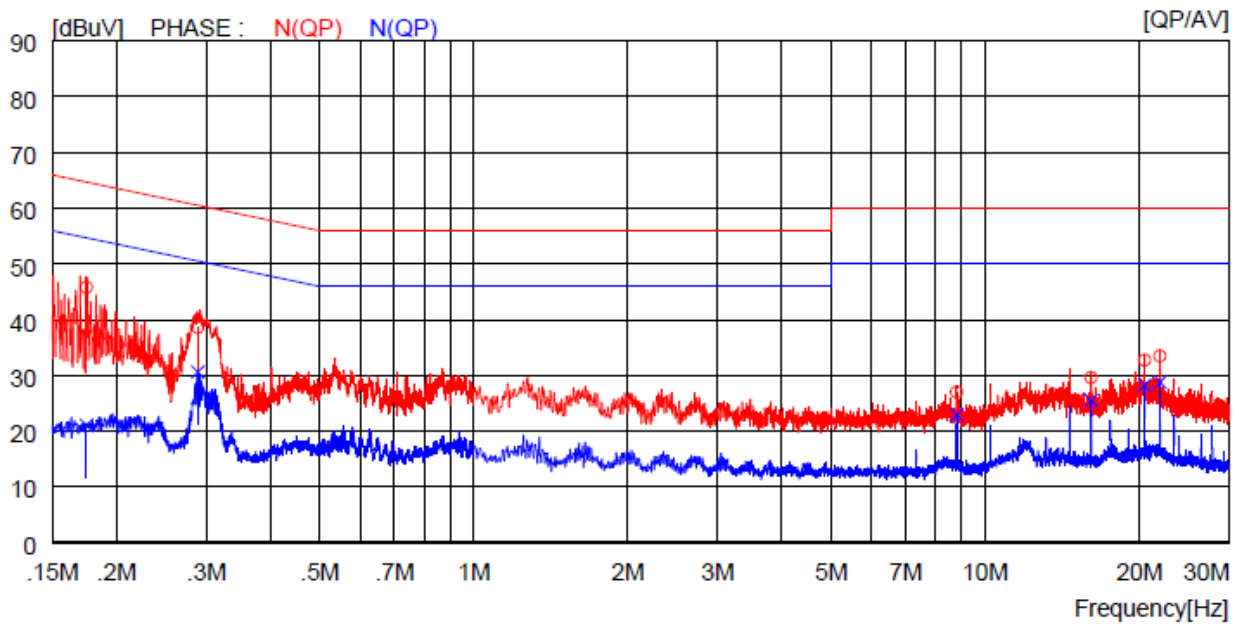


| NO | FREQ [MHz] | READING | | C. FACTOR [dB] | RESULT | | LIMIT | | MARGIN | | PHASE |
|----|---------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| | | QP [dBuV] | AV [dBuV] | | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | |
| 1 | 0.16900 | 37.8 | ---- | 10.0 | 47.8 | ---- | 65.0 | ---- | 17.2 | ---- | H (QP) |
| 2 | 0.29400 | 27.8 | ---- | 10.0 | 37.8 | ---- | 60.4 | ---- | 22.6 | ---- | H (QP) |
| 3 | 8.80500 | 18.6 | ---- | 10.2 | 28.8 | ---- | 60.0 | ---- | 31.2 | ---- | H (QP) |
| 4 | 16.14000 | 23.4 | ---- | 10.3 | 33.7 | ---- | 60.0 | ---- | 26.3 | ---- | H (QP) |
| 5 | 20.54000 | 24.8 | ---- | 10.4 | 35.2 | ---- | 60.0 | ---- | 24.8 | ---- | H (QP) |
| 6 | 22.01000 | 24.1 | ---- | 10.4 | 34.5 | ---- | 60.0 | ---- | 25.5 | ---- | H (QP) |
| 7 | 0.16900 | ---- | 12.8 | 10.0 | ---- | 22.8 | ---- | 55.0 | ---- | 32.2 | H (CAV) |
| 8 | 0.29400 | ---- | 19.4 | 10.0 | ---- | 29.4 | ---- | 50.4 | ---- | 21.0 | H (CAV) |
| 9 | 8.80500 | ---- | 14.9 | 10.2 | ---- | 25.1 | ---- | 50.0 | ---- | 24.9 | H (CAV) |
| 10 | 16.14000 | ---- | 18.1 | 10.3 | ---- | 28.4 | ---- | 50.0 | ---- | 21.6 | H (CAV) |
| 11 | 20.54000 | ---- | 21.2 | 10.4 | ---- | 31.6 | ---- | 50.0 | ---- | 18.4 | H (CAV) |
| 12 | 22.01000 | ---- | 19.5 | 10.4 | ---- | 29.9 | ---- | 50.0 | ---- | 20.1 | H (CAV) |

- Tested Line : NEUTRAL LINE

Remark: Margin (dB) = Limit – Level (Result)

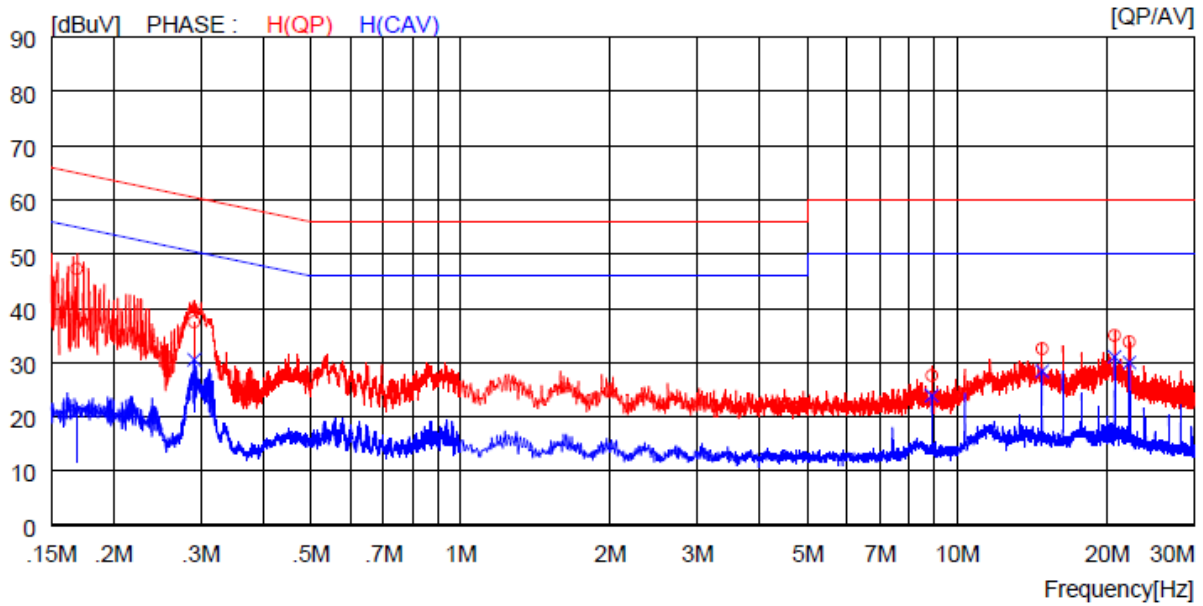
The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.



| NO | FREQ [MHz] | READING | | C. FACTOR [dB] | RESULT | | LIMIT | | MARGIN | | PHASE |
|----|---------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| | | QP [dBuV] | AV [dBuV] | | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | |
| 1 | 0.17500 | 35.8 | ---- | 10.0 | 45.8 | ---- | 64.7 | ---- | 18.9 | ---- | N (QP) |
| 2 | 0.28900 | 28.6 | ---- | 10.0 | 38.6 | ---- | 60.6 | ---- | 22.0 | ---- | N (QP) |
| 3 | 8.79500 | 16.8 | ---- | 10.2 | 27.0 | ---- | 60.0 | ---- | 33.0 | ---- | N (QP) |
| 4 | 16.12000 | 19.3 | ---- | 10.3 | 29.6 | ---- | 60.0 | ---- | 30.4 | ---- | N (QP) |
| 5 | 20.51000 | 22.3 | ---- | 10.4 | 32.7 | ---- | 60.0 | ---- | 27.3 | ---- | N (QP) |
| 6 | 21.98000 | 23.1 | ---- | 10.4 | 33.5 | ---- | 60.0 | ---- | 26.5 | ---- | N (QP) |
| 7 | 0.17500 | ---- | 11.0 | 10.0 | ---- | 21.0 | ---- | 54.7 | ---- | 33.7 | N (CAV) |
| 8 | 0.28900 | ---- | 20.6 | 10.0 | ---- | 30.6 | ---- | 50.6 | ---- | 20.0 | N (CAV) |
| 9 | 8.79500 | ---- | 12.7 | 10.2 | ---- | 22.9 | ---- | 50.0 | ---- | 27.1 | N (CAV) |
| 10 | 16.12000 | ---- | 15.2 | 10.3 | ---- | 25.5 | ---- | 50.0 | ---- | 24.5 | N (CAV) |
| 11 | 20.51000 | ---- | 17.8 | 10.4 | ---- | 28.2 | ---- | 50.0 | ---- | 21.8 | N (CAV) |
| 12 | 21.98000 | ---- | 18.4 | 10.4 | ---- | 28.8 | ---- | 50.0 | ---- | 21.2 | N (CAV) |

14.5 Test data for Intermodulation Mode(Bluetooth + WLAN 2 GHz)

- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : LIVE LINE



| NO | FREQ [MHz] | READING | | C. FACTOR [dB] | RESULT | | LIMIT | | MARGIN | | PHASE |
|----|---------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| | | QP [dBuV] | AV [dBuV] | | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | |
| 1 | 0.16900 | 37.3 | ---- | 10.0 | 47.3 | ---- | 65.0 | ---- | 17.7 | ---- | H (QP) |
| 2 | 0.29100 | 27.5 | ---- | 10.0 | 37.5 | ---- | 60.5 | ---- | 23.0 | ---- | H (QP) |
| 3 | 8.88500 | 17.4 | ---- | 10.2 | 27.6 | ---- | 60.0 | ---- | 32.4 | ---- | H (QP) |
| 4 | 14.81000 | 22.3 | ---- | 10.3 | 32.6 | ---- | 60.0 | ---- | 27.4 | ---- | H (QP) |
| 5 | 20.73000 | 24.6 | ---- | 10.4 | 35.0 | ---- | 60.0 | ---- | 25.0 | ---- | H (QP) |
| 6 | 22.21000 | 23.4 | ---- | 10.4 | 33.8 | ---- | 60.0 | ---- | 26.2 | ---- | H (QP) |
| 7 | 0.16900 | ---- | 11.1 | 10.0 | ---- | 21.1 | ---- | 55.0 | ---- | 33.9 | H (CAV) |
| 8 | 0.29100 | ---- | 20.5 | 10.0 | ---- | 30.5 | ---- | 50.5 | ---- | 20.0 | H (CAV) |
| 9 | 8.88500 | ---- | 13.7 | 10.2 | ---- | 23.9 | ---- | 50.0 | ---- | 26.1 | H (CAV) |
| 10 | 14.81000 | ---- | 18.1 | 10.3 | ---- | 28.4 | ---- | 50.0 | ---- | 21.6 | H (CAV) |
| 11 | 20.73000 | ---- | 20.7 | 10.4 | ---- | 31.1 | ---- | 50.0 | ---- | 18.9 | H (CAV) |
| 12 | 22.21000 | ---- | 19.6 | 10.4 | ---- | 30.0 | ---- | 50.0 | ---- | 20.0 | H (CAV) |

This Report is not correlated with the authentication of KOLAS

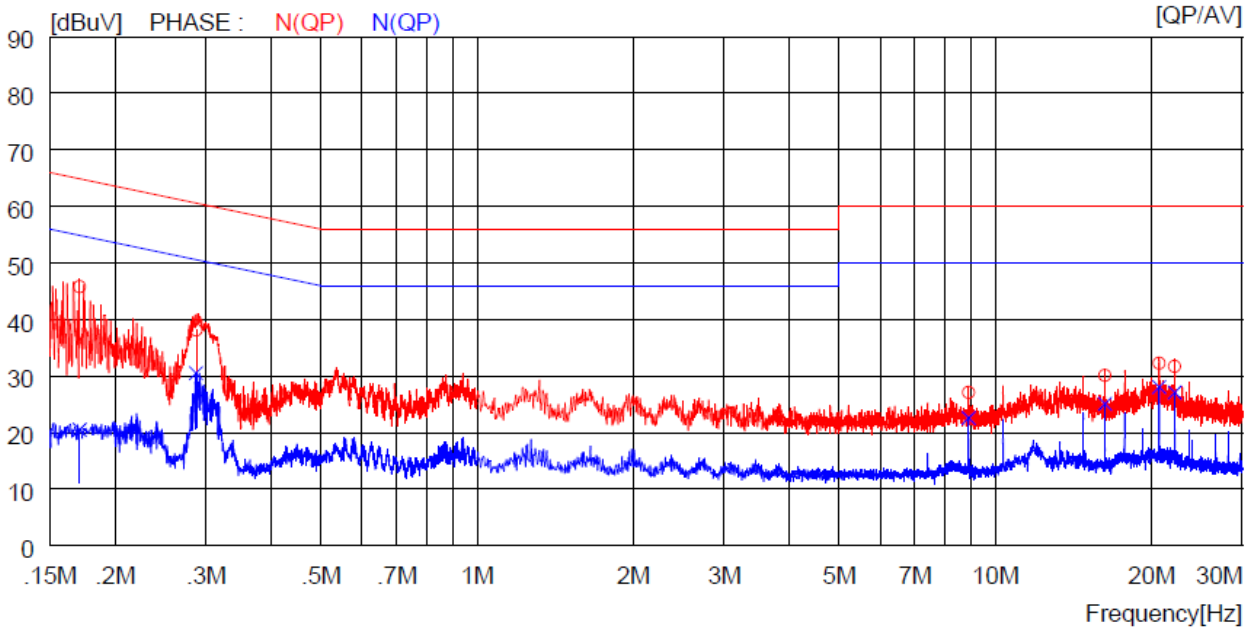
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OTC-TRF-RF-001(0)

- Tested Line : NEUTRAL LINE

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.



| NO | FREQ [MHz] | READING | | C. FACTOR [dB] | RESULT | | LIMIT | | MARGIN | | PHASE |
|----|---------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------|
| | | QP [dBuV] | AV [dBuV] | | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | |
| 1 | 0.17100 | 35.8 | ---- | 10.0 | 45.8 | ---- | 64.9 | ---- | 19.1 | ---- | N(QP) |
| 2 | 0.28700 | 28.1 | ---- | 10.0 | 38.1 | ---- | 60.6 | ---- | 22.5 | ---- | N(QP) |
| 3 | 8.88500 | 16.9 | ---- | 10.2 | 27.1 | ---- | 60.0 | ---- | 32.9 | ---- | N(QP) |
| 4 | 16.29000 | 19.8 | ---- | 10.3 | 30.1 | ---- | 60.0 | ---- | 29.9 | ---- | N(QP) |
| 5 | 20.72000 | 21.9 | ---- | 10.4 | 32.3 | ---- | 60.0 | ---- | 27.7 | ---- | N(QP) |
| 6 | 22.21000 | 21.3 | ---- | 10.4 | 31.7 | ---- | 60.0 | ---- | 28.3 | ---- | N(QP) |
| 7 | 0.17100 | ---- | 10.5 | 10.0 | ---- | 20.5 | ---- | 54.9 | ---- | 34.4 | N(CAV) |
| 8 | 0.28700 | ---- | 20.5 | 10.0 | ---- | 30.5 | ---- | 50.6 | ---- | 20.1 | N(CAV) |
| 9 | 8.88500 | ---- | 12.4 | 10.2 | ---- | 22.6 | ---- | 50.0 | ---- | 27.4 | N(CAV) |
| 10 | 16.29000 | ---- | 14.8 | 10.3 | ---- | 25.1 | ---- | 50.0 | ---- | 24.9 | N(CAV) |
| 11 | 20.72000 | ---- | 17.7 | 10.4 | ---- | 28.1 | ---- | 50.0 | ---- | 21.9 | N(CAV) |
| 12 | 22.21000 | ---- | 16.7 | 10.4 | ---- | 27.1 | ---- | 50.0 | ---- | 22.9 | N(CAV) |

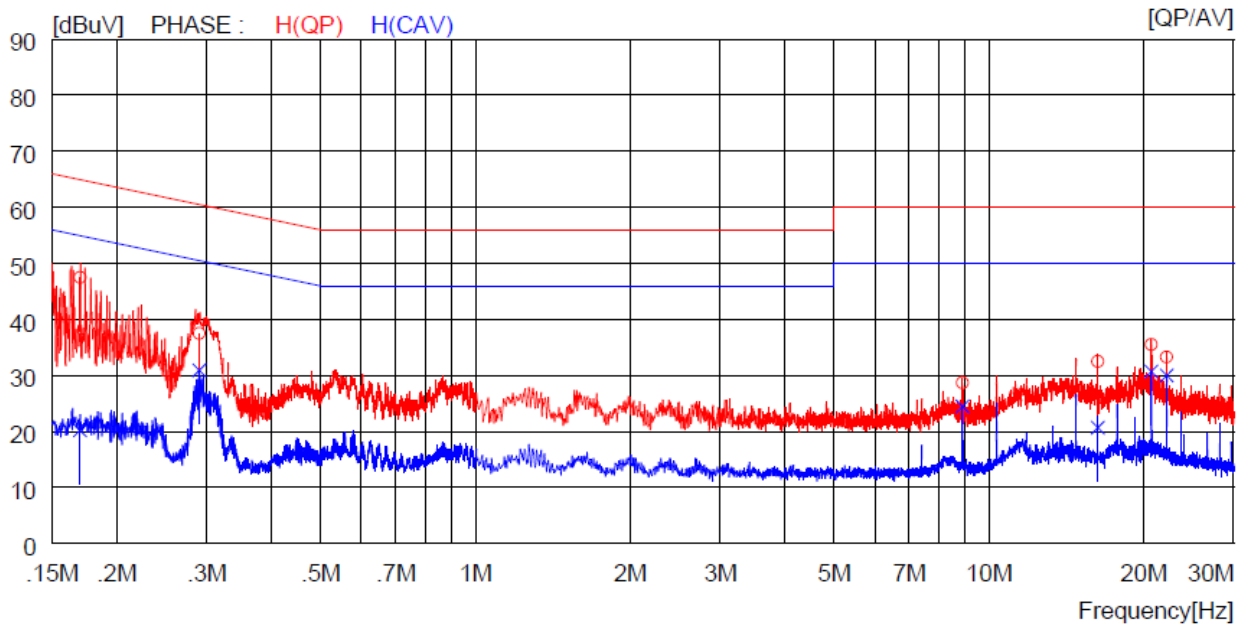
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OTC-TRF-RF-001(0)

14.6 Test data for Intermodulation Mode(Bluetooth + WLAN 5 GHz)

- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : LIVE LINE

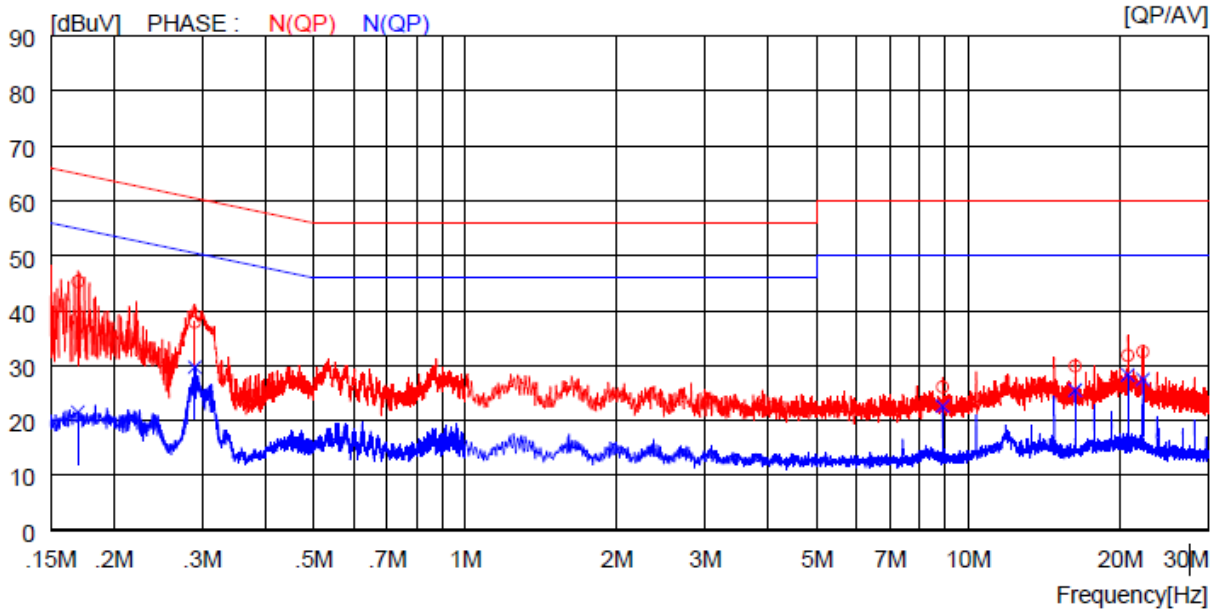


| NO | FREQ [MHz] | READING | | C. FACTOR [dB] | RESULT | | LIMIT | | MARGIN | | PHASE |
|----|---------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| | | QP [dBuV] | AV [dBuV] | | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | |
| 1 | 0.17000 | 37.5 | ---- | 10.0 | 47.5 | ---- | 65.0 | ---- | 17.5 | ---- | H (QP) |
| 2 | 0.29000 | 27.5 | ---- | 10.0 | 37.5 | ---- | 60.5 | ---- | 23.0 | ---- | H (QP) |
| 3 | 8.88500 | 18.5 | ---- | 10.2 | 28.7 | ---- | 60.0 | ---- | 31.3 | ---- | H (QP) |
| 4 | 16.30000 | 22.2 | ---- | 10.3 | 32.5 | ---- | 60.0 | ---- | 27.5 | ---- | H (QP) |
| 5 | 20.73000 | 25.1 | ---- | 10.4 | 35.5 | ---- | 60.0 | ---- | 24.5 | ---- | H (QP) |
| 6 | 22.21000 | 22.9 | ---- | 10.4 | 33.3 | ---- | 60.0 | ---- | 26.7 | ---- | H (QP) |
| 7 | 0.17000 | ---- | 10.2 | 10.0 | ---- | 20.2 | ---- | 55.0 | ---- | 34.8 | H (CAV) |
| 8 | 0.29000 | ---- | 20.9 | 10.0 | ---- | 30.9 | ---- | 50.5 | ---- | 19.6 | H (CAV) |
| 9 | 8.88500 | ---- | 14.3 | 10.2 | ---- | 24.5 | ---- | 50.0 | ---- | 25.5 | H (CAV) |
| 10 | 16.30000 | ---- | 10.4 | 10.3 | ---- | 20.7 | ---- | 50.0 | ---- | 29.3 | H (CAV) |
| 11 | 20.73000 | ---- | 20.3 | 10.4 | ---- | 30.7 | ---- | 50.0 | ---- | 19.3 | H (CAV) |
| 12 | 22.21000 | ---- | 19.6 | 10.4 | ---- | 30.0 | ---- | 50.0 | ---- | 20.0 | H (CAV) |

- Tested Line : NEUTRAL LINE

Remark: Margin (dB) = Limit – Level (Result)

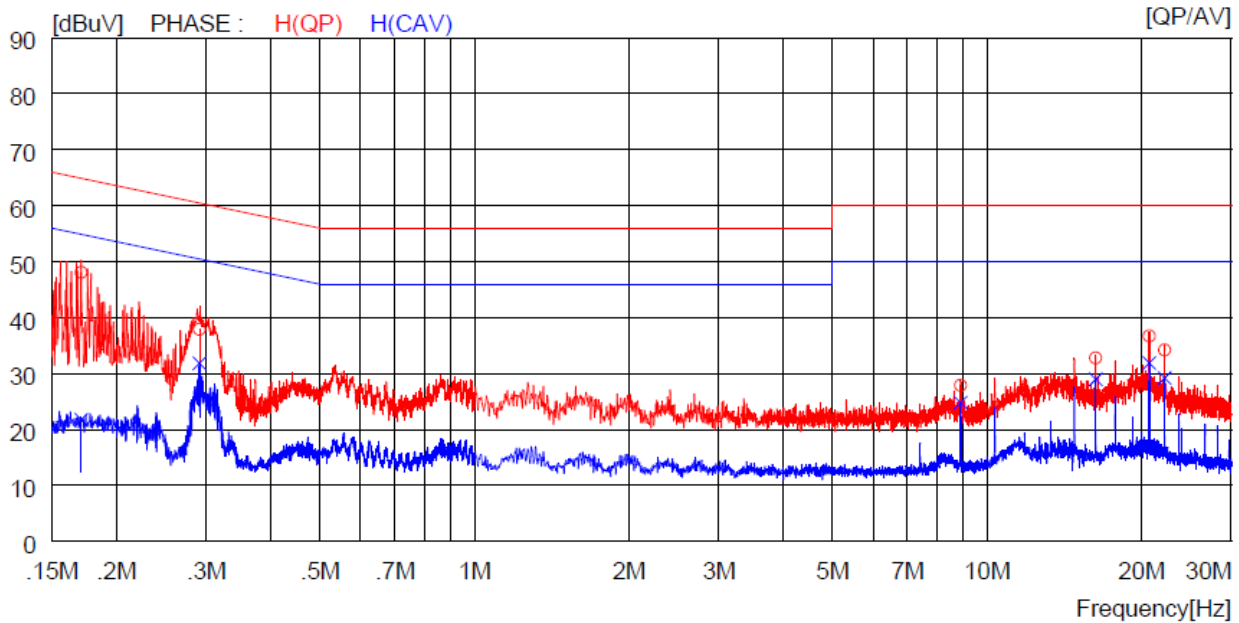
The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.



| NO | FREQ [MHz] | READING | | C. FACTOR [dB] | RESULT | | LIMIT | | MARGIN | | PHASE |
|----|---------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| | | QP [dBuV] | AV [dBuV] | | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | |
| 1 | 0.17000 | 35.3 | ---- | 10.0 | 45.3 | ---- | 65.0 | ---- | 19.7 | ---- | N (QP) |
| 2 | 0.29000 | 27.9 | ---- | 10.0 | 37.9 | ---- | 60.5 | ---- | 22.6 | ---- | N (QP) |
| 3 | 8.89000 | 15.9 | ---- | 10.2 | 26.1 | ---- | 60.0 | ---- | 33.9 | ---- | N (QP) |
| 4 | 16.30000 | 19.6 | ---- | 10.3 | 29.9 | ---- | 60.0 | ---- | 30.1 | ---- | N (QP) |
| 5 | 20.74000 | 21.4 | ---- | 10.4 | 31.8 | ---- | 60.0 | ---- | 28.2 | ---- | N (QP) |
| 6 | 22.22000 | 22.1 | ---- | 10.4 | 32.5 | ---- | 60.0 | ---- | 27.5 | ---- | N (QP) |
| 7 | 0.17000 | ---- | 11.5 | 10.0 | ---- | 21.5 | ---- | 55.0 | ---- | 33.5 | N (CAV) |
| 8 | 0.29000 | ---- | 19.7 | 10.0 | ---- | 29.7 | ---- | 50.5 | ---- | 20.8 | N (CAV) |
| 9 | 8.89000 | ---- | 12.4 | 10.2 | ---- | 22.6 | ---- | 50.0 | ---- | 27.4 | N (CAV) |
| 10 | 16.30000 | ---- | 15.2 | 10.3 | ---- | 25.5 | ---- | 50.0 | ---- | 24.5 | N (CAV) |
| 11 | 20.74000 | ---- | 17.9 | 10.4 | ---- | 28.3 | ---- | 50.0 | ---- | 21.7 | N (CAV) |
| 12 | 22.22000 | ---- | 17.1 | 10.4 | ---- | 27.5 | ---- | 50.0 | ---- | 22.5 | N (CAV) |

14.7 Test data for Intermodulation Mode(Bluetooth + WLAN 2 GHz AX Mode)

- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : LIVE LINE



| NO | FREQ [MHz] | READING | | C. FACTOR [dB] | RESULT | | LIMIT | | MARGIN | | PHASE |
|----|---------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------|
| | | QP [dBuV] | AV [dBuV] | | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | |
| 1 | 0.17100 | 38.1 | ---- | 10.0 | 48.1 | ---- | 64.9 | ---- | 16.8 | ---- | H(QP) |
| 2 | 0.29100 | 27.9 | ---- | 10.0 | 37.9 | ---- | 60.5 | ---- | 22.6 | ---- | H(QP) |
| 3 | 8.89000 | 17.7 | ---- | 10.2 | 27.9 | ---- | 60.0 | ---- | 32.1 | ---- | H(QP) |
| 4 | 16.30000 | 22.5 | ---- | 10.3 | 32.8 | ---- | 60.0 | ---- | 27.2 | ---- | H(QP) |
| 5 | 20.74000 | 26.3 | ---- | 10.4 | 36.7 | ---- | 60.0 | ---- | 23.3 | ---- | H(QP) |
| 6 | 22.22000 | 23.8 | ---- | 10.4 | 34.2 | ---- | 60.0 | ---- | 25.8 | ---- | H(QP) |
| 7 | 0.17100 | ---- | 11.8 | 10.0 | ---- | 21.8 | ---- | 54.9 | ---- | 33.1 | H(CAV) |
| 8 | 0.29100 | ---- | 21.8 | 10.0 | ---- | 31.8 | ---- | 50.5 | ---- | 18.7 | H(CAV) |
| 9 | 8.89000 | ---- | 14.6 | 10.2 | ---- | 24.8 | ---- | 50.0 | ---- | 25.2 | H(CAV) |
| 10 | 16.30000 | ---- | 18.7 | 10.3 | ---- | 29.0 | ---- | 50.0 | ---- | 21.0 | H(CAV) |
| 11 | 20.74000 | ---- | 21.5 | 10.4 | ---- | 31.9 | ---- | 50.0 | ---- | 18.1 | H(CAV) |
| 12 | 22.22000 | ---- | 18.8 | 10.4 | ---- | 29.2 | ---- | 50.0 | ---- | 20.8 | H(CAV) |

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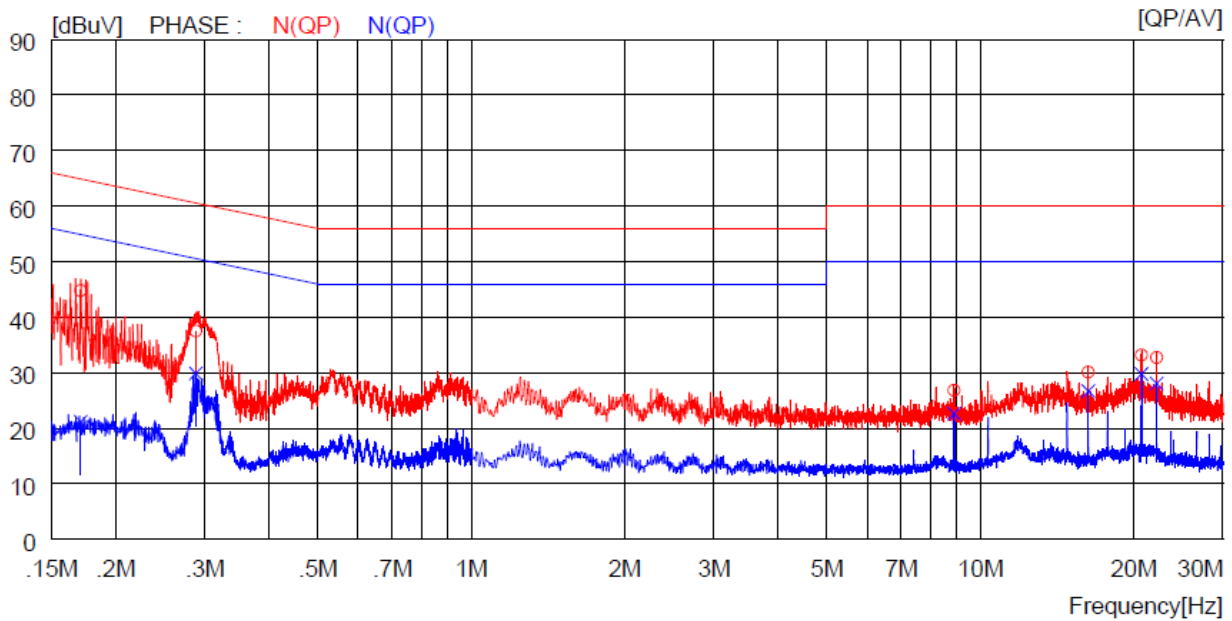
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- Tested Line : NEUTRAL LINE

Remark: Margin (dB) = Limit – Level (Result)

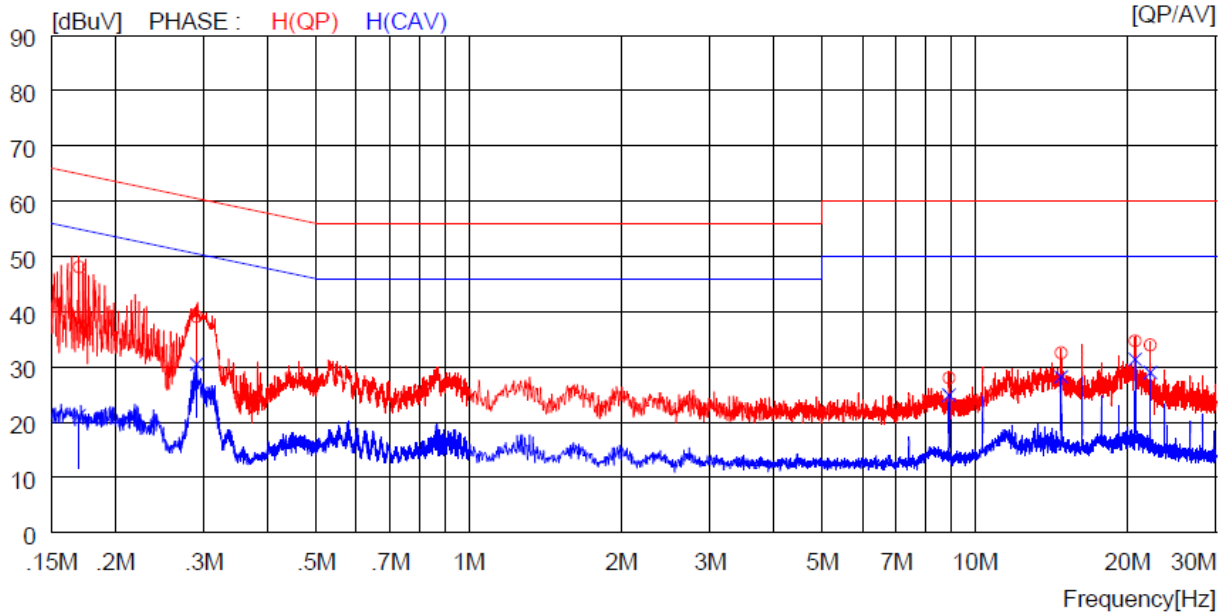
The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.



| NO | FREQ [MHz] | READING | | C. FACTOR [dB] | RESULT | | LIMIT | | MARGIN | | PHASE |
|----|---------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| | | QP [dBuV] | AV [dBuV] | | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | |
| 1 | 0.17100 | 34.8 | ---- | 10.0 | 44.8 | ---- | 64.9 | ---- | 20.1 | ---- | N (QP) |
| 2 | 0.28800 | 27.5 | ---- | 10.0 | 37.5 | ---- | 60.6 | ---- | 23.1 | ---- | N (QP) |
| 3 | 8.89000 | 16.6 | ---- | 10.2 | 26.8 | ---- | 60.0 | ---- | 33.2 | ---- | N (QP) |
| 4 | 16.30000 | 19.8 | ---- | 10.3 | 30.1 | ---- | 60.0 | ---- | 29.9 | ---- | N (QP) |
| 5 | 20.74000 | 22.8 | ---- | 10.4 | 33.2 | ---- | 60.0 | ---- | 26.8 | ---- | N (QP) |
| 6 | 22.22000 | 22.3 | ---- | 10.4 | 32.7 | ---- | 60.0 | ---- | 27.3 | ---- | N (QP) |
| 7 | 0.17100 | ---- | 11.2 | 10.0 | ---- | 21.2 | ---- | 54.9 | ---- | 33.7 | N (CAV) |
| 8 | 0.28800 | ---- | 19.9 | 10.0 | ---- | 29.9 | ---- | 50.6 | ---- | 20.7 | N (CAV) |
| 9 | 8.89000 | ---- | 12.5 | 10.2 | ---- | 22.7 | ---- | 50.0 | ---- | 27.3 | N (CAV) |
| 10 | 16.30000 | ---- | 16.4 | 10.3 | ---- | 26.7 | ---- | 50.0 | ---- | 23.3 | N (CAV) |
| 11 | 20.74000 | ---- | 19.4 | 10.4 | ---- | 29.8 | ---- | 50.0 | ---- | 20.2 | N (CAV) |
| 12 | 22.22000 | ---- | 17.7 | 10.4 | ---- | 28.1 | ---- | 50.0 | ---- | 21.9 | N (CAV) |

14.8 Test data for Intermodulation Mode(Bluetooth + WLAN 5 GHz AX Mode)

- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : LIVE LINE



| NO | FREQ [MHz] | READING | | C. FACTOR [dB] | RESULT | | LIMIT | | MARGIN | | PHASE |
|----|---------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| | | QP [dBuV] | AV [dBuV] | | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | |
| 1 | 0.17000 | 38.1 | ---- | 10.0 | 48.1 | ---- | 65.0 | ---- | 16.9 | ---- | H (QP) |
| 2 | 0.29000 | 29.1 | ---- | 10.0 | 39.1 | ---- | 60.5 | ---- | 21.4 | ---- | H (QP) |
| 3 | 8.89500 | 17.8 | ---- | 10.2 | 28.0 | ---- | 60.0 | ---- | 32.0 | ---- | H (QP) |
| 4 | 14.82000 | 22.3 | ---- | 10.3 | 32.6 | ---- | 60.0 | ---- | 27.4 | ---- | H (QP) |
| 5 | 20.74000 | 24.3 | ---- | 10.4 | 34.7 | ---- | 60.0 | ---- | 25.3 | ---- | H (QP) |
| 6 | 22.22000 | 23.6 | ---- | 10.4 | 34.0 | ---- | 60.0 | ---- | 26.0 | ---- | H (QP) |
| 7 | 0.17000 | ---- | 11.2 | 10.0 | ---- | 21.2 | ---- | 55.0 | ---- | 33.8 | H (CAV) |
| 8 | 0.29000 | ---- | 20.5 | 10.0 | ---- | 30.5 | ---- | 50.5 | ---- | 20.0 | H (CAV) |
| 9 | 8.89500 | ---- | 14.7 | 10.2 | ---- | 24.9 | ---- | 50.0 | ---- | 25.1 | H (CAV) |
| 10 | 14.82000 | ---- | 17.9 | 10.3 | ---- | 28.2 | ---- | 50.0 | ---- | 21.8 | H (CAV) |
| 11 | 20.74000 | ---- | 21.0 | 10.4 | ---- | 31.4 | ---- | 50.0 | ---- | 18.6 | H (CAV) |
| 12 | 22.22000 | ---- | 18.6 | 10.4 | ---- | 29.0 | ---- | 50.0 | ---- | 21.0 | H (CAV) |

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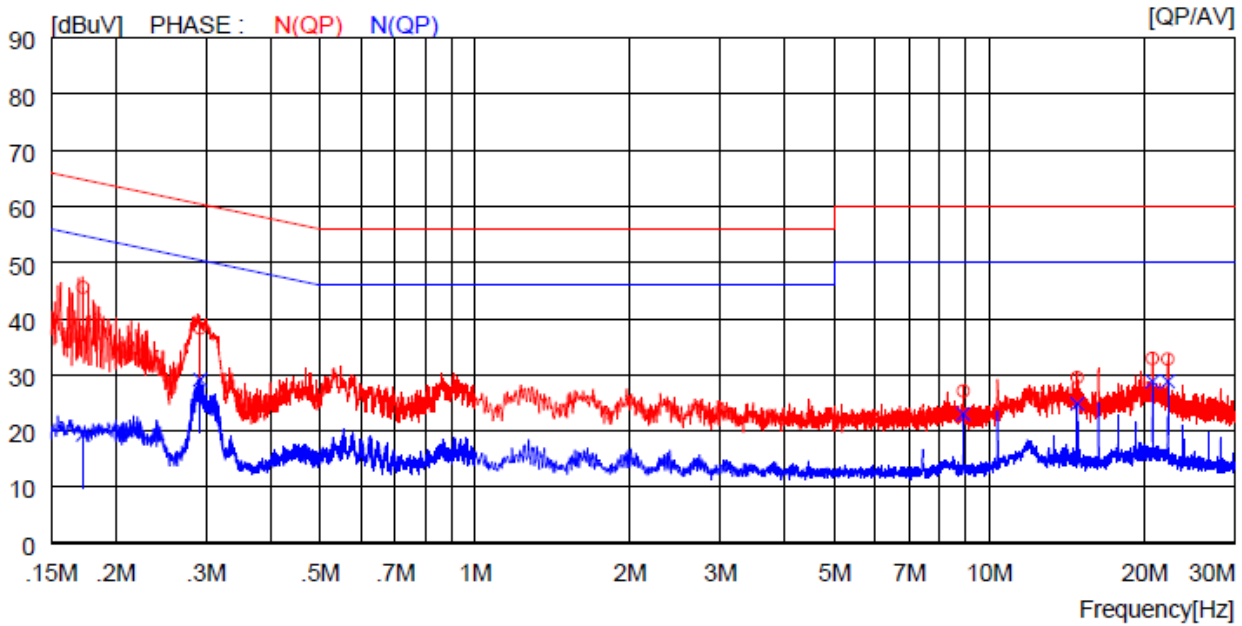
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- Tested Line : NEUTRAL LINE

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.



| NO | FREQ [MHz] | READING | | C. FACTOR [dB] | RESULT | | LIMIT | | MARGIN | | PHASE |
|----|---------------|--------------|--------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------|
| | | QP [dBuV] | AV [dBuV] | | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | QP [dBuV] | AV [dBuV] | |
| 1 | 0.17300 | 35.6 | ---- | 10.0 | 45.6 | ---- | 64.8 | ---- | 19.2 | ---- | N (QP) |
| 2 | 0.29200 | 28.3 | ---- | 10.0 | 38.3 | ---- | 60.5 | ---- | 22.2 | ---- | N (QP) |
| 3 | 8.89500 | 16.9 | ---- | 10.2 | 27.1 | ---- | 60.0 | ---- | 32.9 | ---- | N (QP) |
| 4 | 14.82000 | 19.2 | ---- | 10.3 | 29.5 | ---- | 60.0 | ---- | 30.5 | ---- | N (QP) |
| 5 | 20.75000 | 22.5 | ---- | 10.4 | 32.9 | ---- | 60.0 | ---- | 27.1 | ---- | N (QP) |
| 6 | 22.23000 | 22.4 | ---- | 10.4 | 32.8 | ---- | 60.0 | ---- | 27.2 | ---- | N (QP) |
| 7 | 0.17300 | ---- | 9.3 | 10.0 | ---- | 19.3 | ---- | 54.8 | ---- | 35.5 | N (CAV) |
| 8 | 0.29200 | ---- | 19.1 | 10.0 | ---- | 29.1 | ---- | 50.5 | ---- | 21.4 | N (CAV) |
| 9 | 8.89500 | ---- | 12.8 | 10.2 | ---- | 23.0 | ---- | 50.0 | ---- | 27.0 | N (CAV) |
| 10 | 14.82000 | ---- | 14.5 | 10.3 | ---- | 24.8 | ---- | 50.0 | ---- | 25.2 | N (CAV) |
| 11 | 20.75000 | ---- | 18.4 | 10.4 | ---- | 28.8 | ---- | 50.0 | ---- | 21.2 | N (CAV) |
| 12 | 22.23000 | ---- | 18.4 | 10.4 | ---- | 28.8 | ---- | 50.0 | ---- | 21.2 | N (CAV) |

15. LIST OF TEST EQUIPMENT

| Model Number | Manufacturer | Description | Serial Number | Last Cal.(Interval) |
|--------------|-------------------|-------------------|-----------------|---------------------|
| FSV40-N | Rohde & Schwarz | Signal Analyzer | 102177 | Apr. 16, 2021 (1Y) |
| ESW 44 | Rohde & Schwarz | EMI Test Receiver | 101851 | Mar. 08, 2022 (1Y) |
| ZUP36-6 | NEMIC-LAMBDA | DC Power Supply | YJV-535Z14-0018 | Apr. 16, 2021(1Y) |
| 310N | Sonoma Instrument | Pre-Amplifier | 392756 | Oct. 14, 2021 (1Y) |
| SCU18 | Rohde & Schwarz | Pre-Amplifier | 102266 | Jul. 14, 2021 (1Y) |
| PAM-840A | Com-Power | Pre-Amplifier | 461339 | Oct. 12, 2021 (1Y) |
| DT3000-3t | Innco System | Turn Table | DT3000/093 | N/A |
| MA-4000XPET | Innco System | Antenna Master | MA4000/509 | N/A |
| FMZB 1513 | Schwarzbeck | Loop Antenna | 1513-235 | Mar. 24, 2022 (2Y) |
| HLP-2008 | TDK | Hybrid Antenna | 131316 | Mar. 07, 2022 (2Y) |
| BBHA9120D | Schwarzbeck | Horn Antenna | 9120D-1366 | Jul. 20, 2021 (1Y) |
| BBHA9170 | Schwarzbeck | Horn Antenna | BBHA9170178 | Jan. 06, 2022(1Y) |
| HPF 3GHz | Rohde & Schwarz | High Pass Filter | N/A | Jan. 19, 2022(1Y) |
| ESCI | Rohde & Schwarz | EMI TEST RECEIVER | 101012 | Oct. 20, 2021 (1Y) |
| NSLK8126 | Schwarzbeck | AMN | 8126-404 | Mar. 14, 2022 (1Y) |
| ESH3-Z2 | Rohde & Schwarz | PULSE LIMITER | 100655 | Mar. 14, 2022 (1Y) |

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