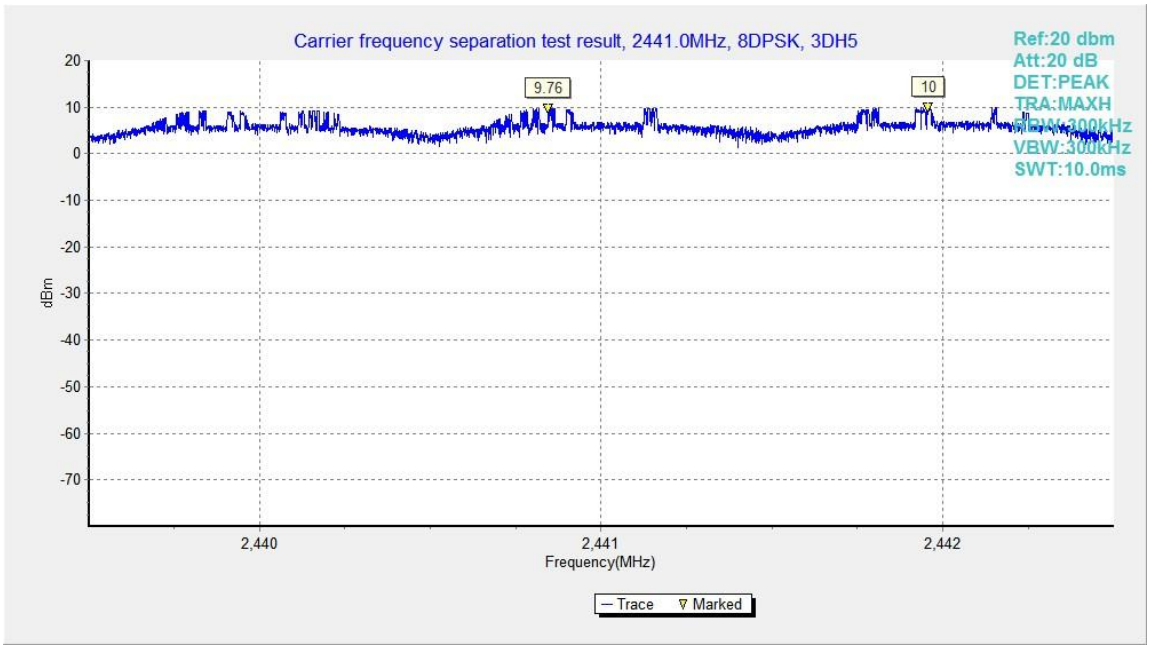


Fig.102. Carrier frequency separation measurement: 8DPSK, Channel 39

B.9. Number of Hopping Channels

Method of Measurement: See ANSI C63.10-clause 7.8.3

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

- Span = the frequency band of operation
- RBW = 500kHz
- VBW = 500kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a) (1)(iii)	At least 15 non-overlapping channels

Measurement Result:

For GFSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.103	79	P
40~78	Fig.104		

Forπ/4 DQPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.105	79	P
40~78	Fig.106		

For 8DPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.107	79	P
40~78	Fig.108		

Conclusion: PASS

Test graphs as below:

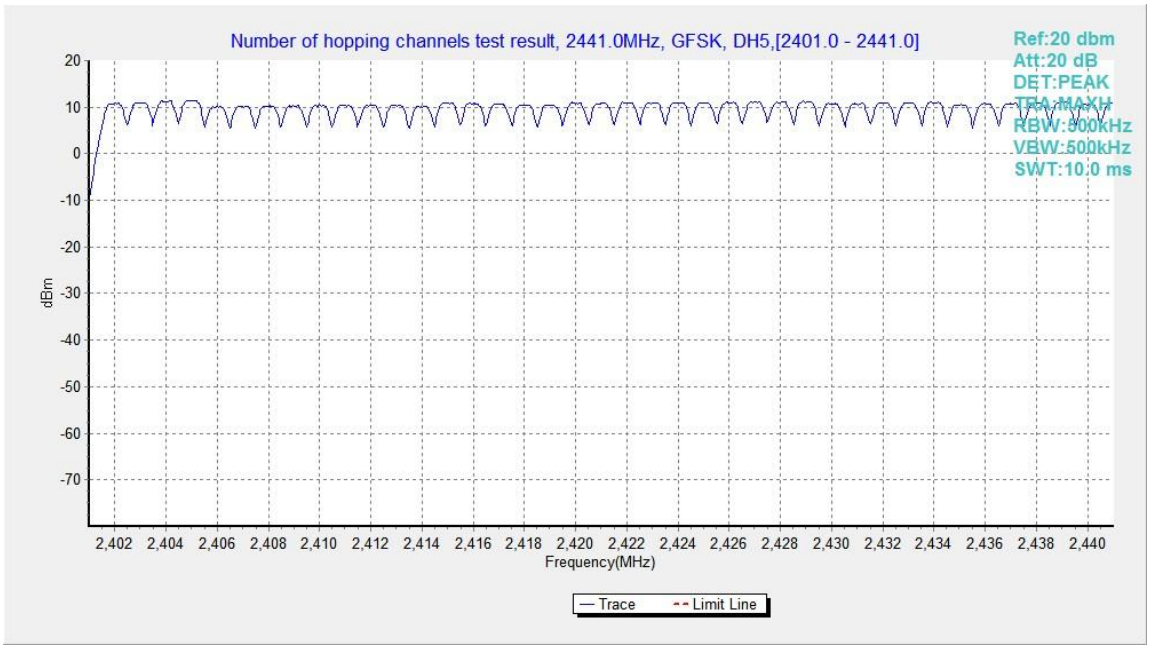


Fig.103. Number of hopping frequencies: GFSK, Channel 0 - 39

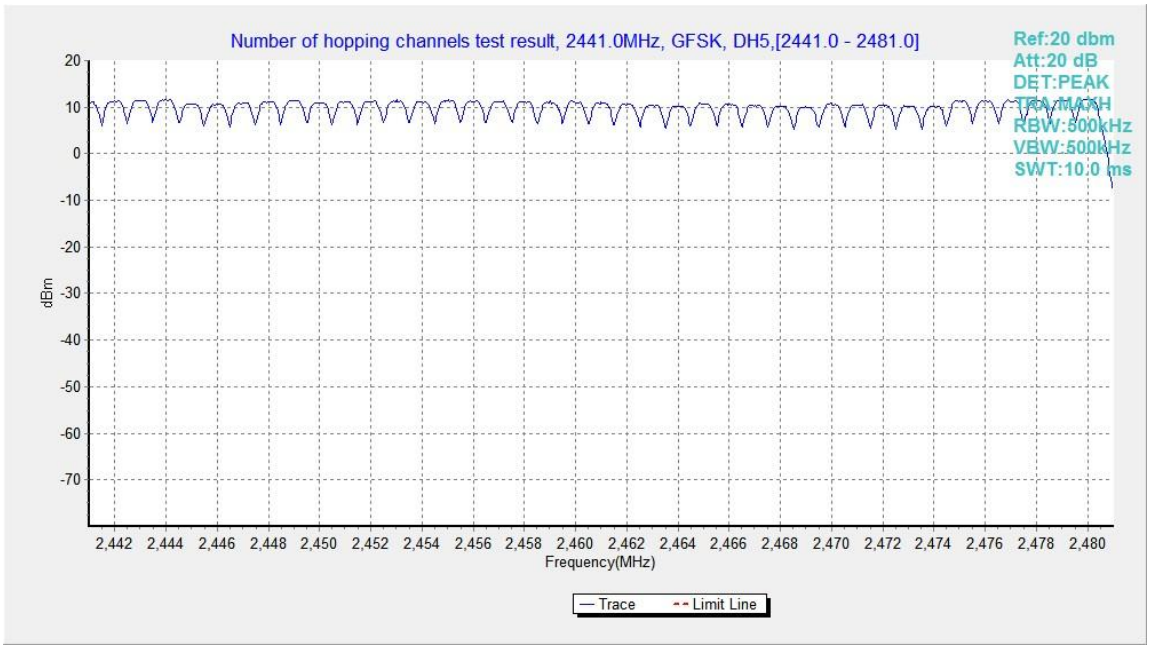


Fig.104. Number of hopping frequencies: GFSK, Channel 40 - 78

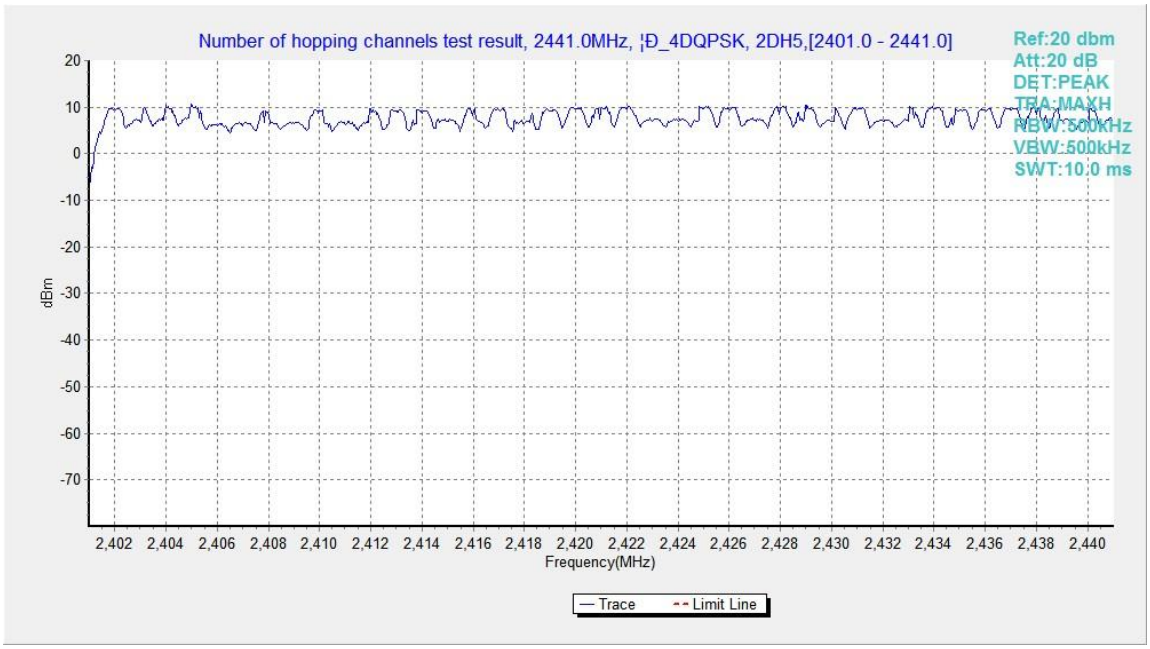


Fig.105. Number of hopping frequencies: π/4 DQPSK, Channel 0 - 39

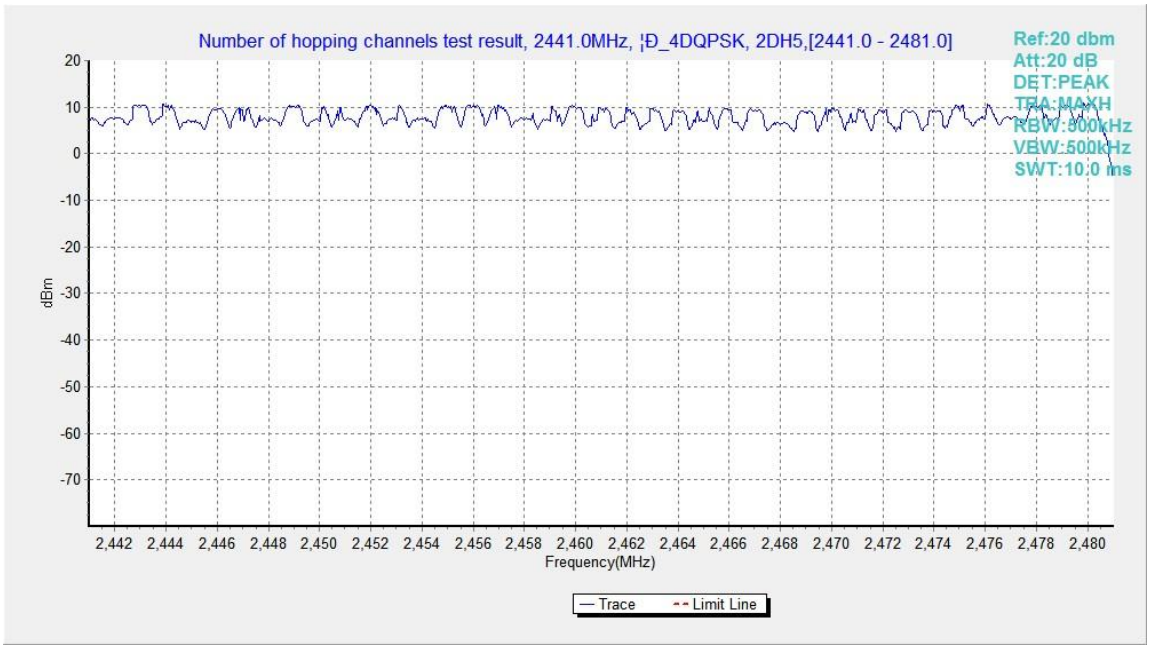


Fig.106. Number of hopping frequencies: π/4 DQPSK, Channel 40 - 78

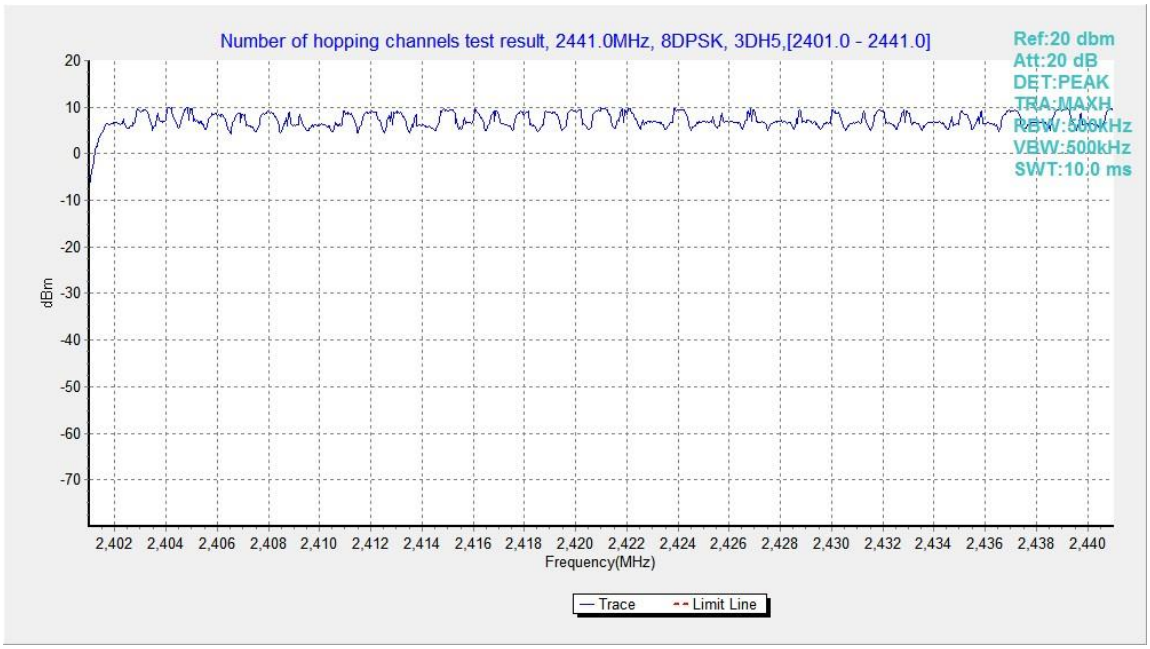


Fig.107. Number of hopping frequencies: 8DPSK, Channel 0 - 39

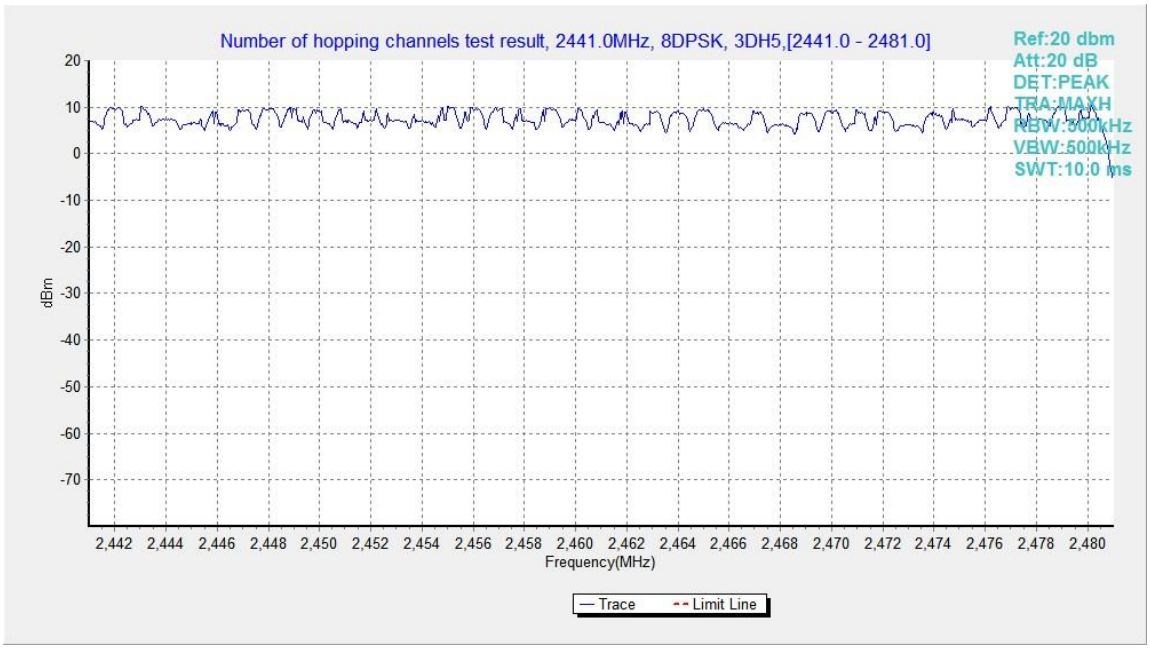


Fig.108. Number of hopping frequencies: 8DPSK, Channel 40 - 78

B.10. AC Powerline Conducted Emission

Summary

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section

Method of Measurement:

See Clause 6.2 of ANSI C63.10 specifically.

See Clause 4 and Clause 5 of ANSI C63.10 generally.

The conducted emissions from the AC port of the EUT are measured in a shielding room. The EUT is connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection was performed. The measurements were performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detector of the test receiver:Quasi-Peak / Average Detector.

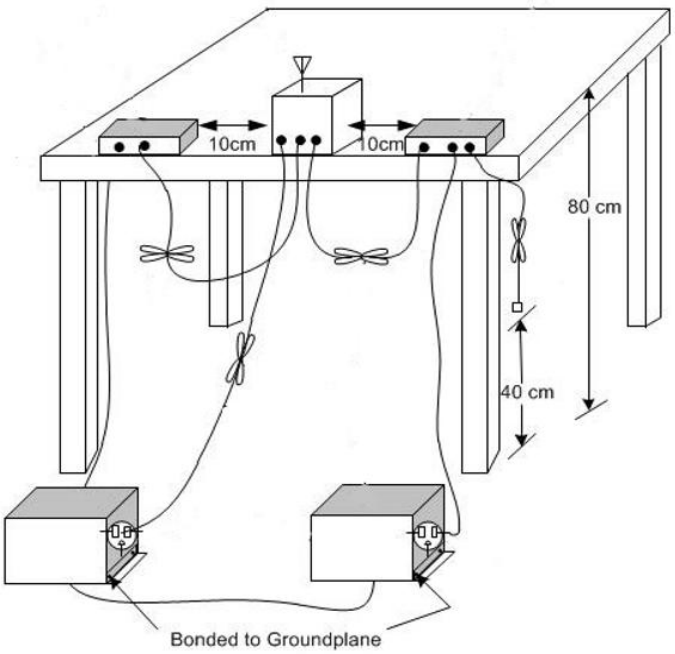
The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/IF bandwidth
0.15-30	9kHz

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Test setup



Measurement Result and limit:

Bluetooth (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		bluetooth	Idle	
0.15 to 0.5	66 to 56	Fig.B.10.1	Fig.B.10.2	P
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Bluetooth (Average Limit)

Frequency range (MHz)	Average Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		bluetooth	Idle	
0.15 to 0.5	56 to 46	Fig.B.10.1	Fig.B.10.2	P
0.5 to 5	46			
5 to 30	50			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Conclusion: Pass

Test graphs as below:

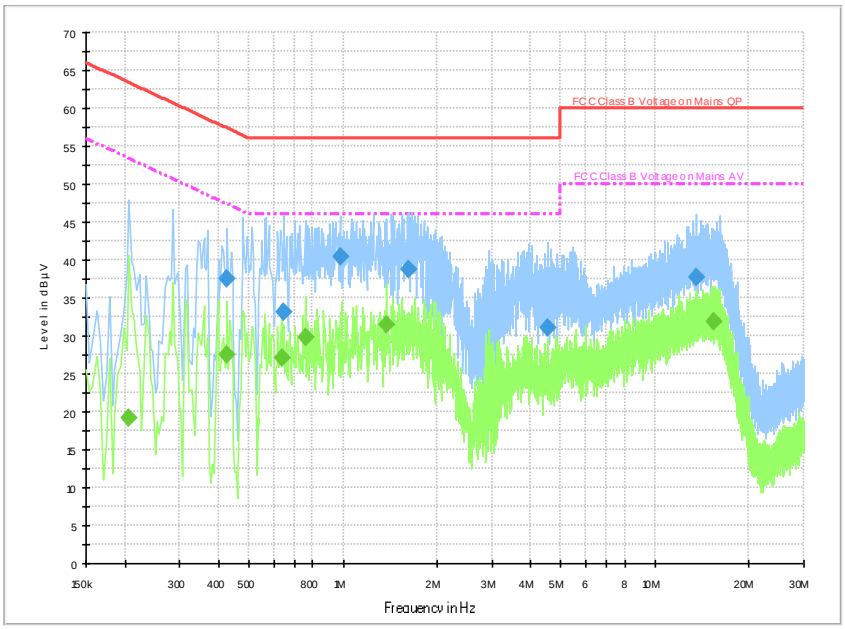


Fig.B.10.1 AC Powerline Conducted Emission-bluetooth

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.426000	37.4	2000.0	9.000	On	L1	20.0	19.9	57.3	
0.646000	33.2	2000.0	9.000	On	L1	20.0	22.8	56.0	
0.978000	40.4	2000.0	9.000	On	L1	19.9	15.6	56.0	
1.614000	38.7	2000.0	9.000	On	L1	19.8	17.3	56.0	
4.550000	30.9	2000.0	9.000	On	L1	19.8	25.1	56.0	
13.582000	37.7	2000.0	9.000	On	L1	20.0	22.3	60.0	

Final Result 2

Frequency (MHz)	CAverage(dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.206000	19.1	2000.0	9.000	On	L1	19.8	34.2	53.4	
0.426000	27.5	2000.0	9.000	On	L1	20.0	19.9	47.3	
0.634000	27.2	2000.0	9.000	On	N	19.8	18.8	46.0	
0.758000	29.8	2000.0	9.000	On	N	19.8	16.2	46.0	
1.378000	31.4	2000.0	9.000	On	L1	19.9	14.6	46.0	
15.390000	31.9	2000.0	9.000	On	L1	20.0	18.1	50.0	

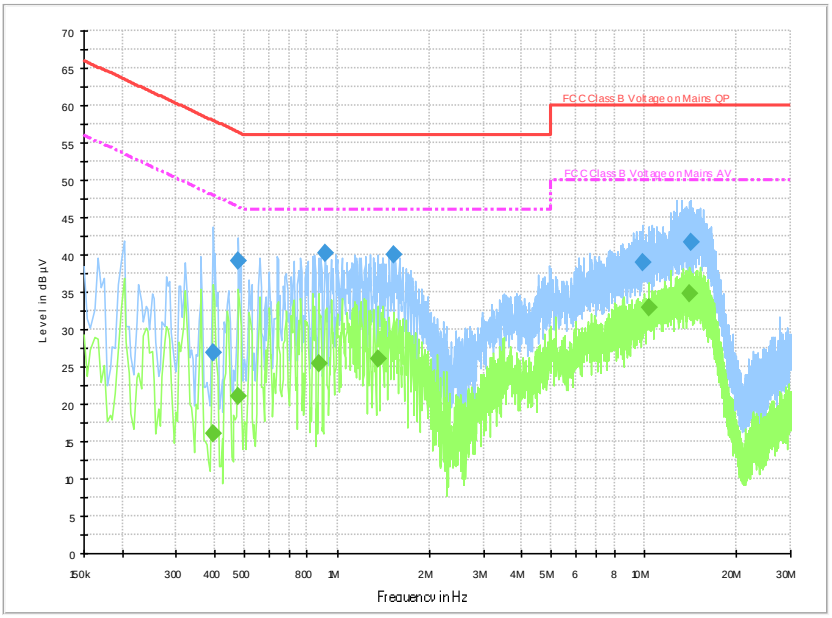


Fig.B.10.2 AC Powerline Conducted Emission-Idle

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.394000	**27.0**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**31.0**	**58.0**	
0.478000	**39.1**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**17.3**	**56.4**	
0.914000	**40.2**	**2000.0**	**9.000**	**On**	**N**	**19.7**	**15.8**	**56.0**	
1.526000	**40.0**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**16.0**	**56.0**	
9.906000	**38.9**	**2000.0**	**9.000**	**On**	**N**	**19.7**	**21.1**	**60.0**	
14.142000	**41.6**	**2000.0**	**9.000**	**On**	**N**	**19.8**	**18.4**	**60.0**	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.394000	**15.9**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**32.0**	**48.0**	
0.478000	**21.0**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**25.4**	**46.4**	
0.874000	**25.5**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**20.5**	**46.0**	
1.362000	**26.0**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**20.0**	**46.0**	
10.326000	**32.9**	**2000.0**	**9.000**	**On**	**N**	**19.7**	**17.1**	**50.0**	
14.090000	**34.9**	**2000.0**	**9.000**	**On**	**N**	**19.8**	**15.1**	**50.0**	

B.11.Antenna Requirement

The antenna of the device is permanently attached. There are no provisions for connection to an external antenna.
The unit complies with the requirement of FCC Part 15.203.

B.12.RX Input Bandwidth

This EUT uses Bluetooth technology, so it complies with the requirement of RX Input Bandwidth inFCC Part 15.247 (a)(1).

B.13.Hopping Capability

This EUT uses Bluetooth technology, so it complies with the requirement of Hopping Capabilityin FCC Part 15.247 (a)(1).

ANNEX C: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

TELECOMMUNICATION TECHNOLOGY LABS, CAICT

Beijing, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 23rd day of July 2024.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 7049.01
Valid to July 31, 2026

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

*****END OF REPORT*****