B.6. Time of Occupancy (Dwell Time)

Method of Measurement: See ANSI C63.10-clause 7.8.4

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

- Span = zero span, centered on a hopping channel
- RBW = 1 MHz
- VBW ≥ RBW
- Sweep = as necessary to capture the entire dwell time per hopping channel
- Detector function = peak
- Trace = max hold

Measure a pulse time in time domain at middle frequency and then count the hopping number in 31.6s(which equals with 0.4 multiply 79) of middle frequency ,then multiply the pulse time and hopping number and record them.

Measurement Limit:

Standard	Limit (ms)
FCC 47 CFR Part 15.247(a) (1)(iii)	< 400

Measurement Result:

TestMode	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Hop	0.374	321	0.12	≤0.4	PASS
DH3	Hop	1.630	159	0.259	≤0.4	PASS
DH5	Hop	2.878	121	0.348	≤0.4	PASS
2DH1	Hop	0.383	320	0.123	≤0.4	PASS
2DH3	Hop	1.634	171	0.279	≤0.4	PASS
2DH5	Hop	2.883	109	0.314	≤0.4	PASS
3DH1	Hop	0.383	320	0.123	≤0.4	PASS
3DH3	Hop	1.633	152	0.248	≤0.4	PASS
3DH5	Hop	2.884	97	0.28	≤0.4	PASS

Conclusion: PASS

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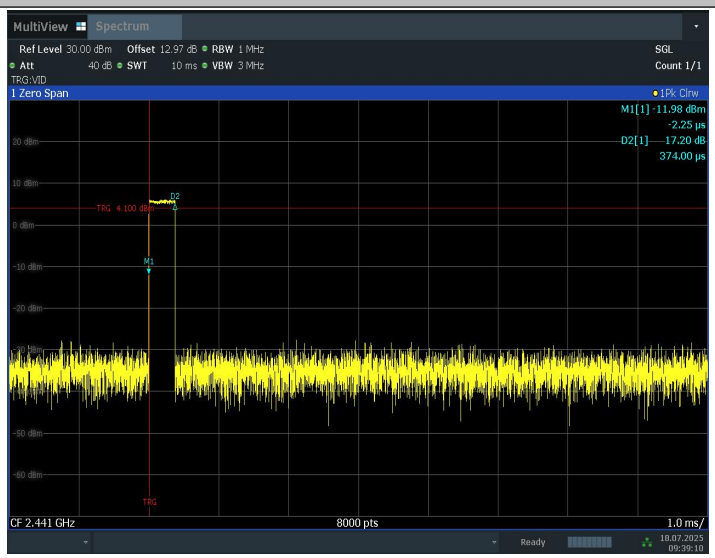
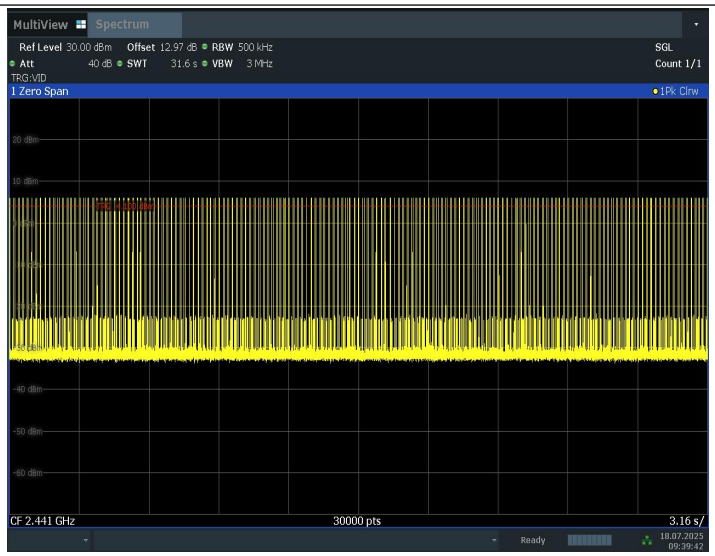
Test graphs as below:

DH1_Hop
 09:39:10 18.07.2025
 09:39:43 18.07.2025
DH3_Hop

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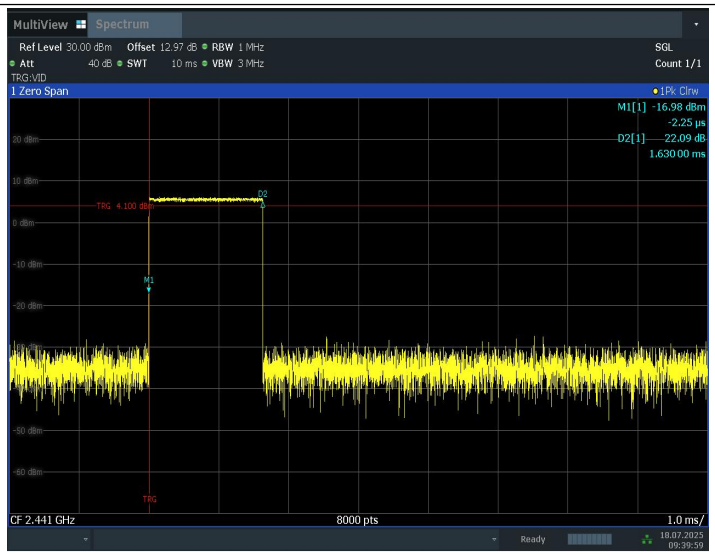

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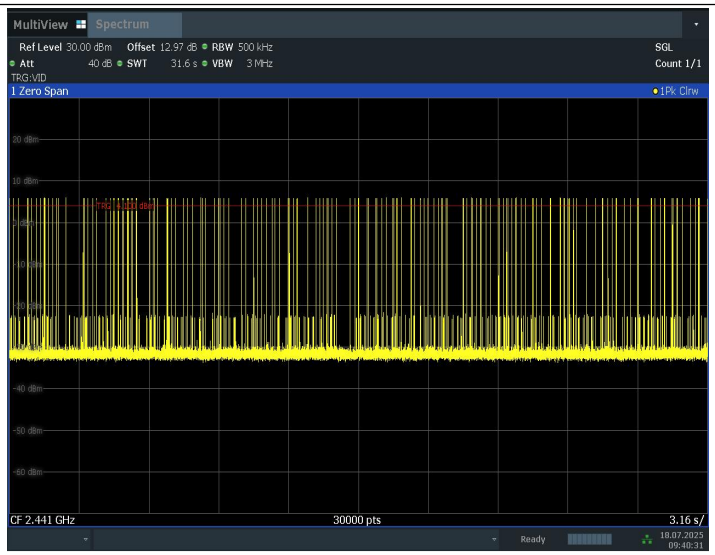

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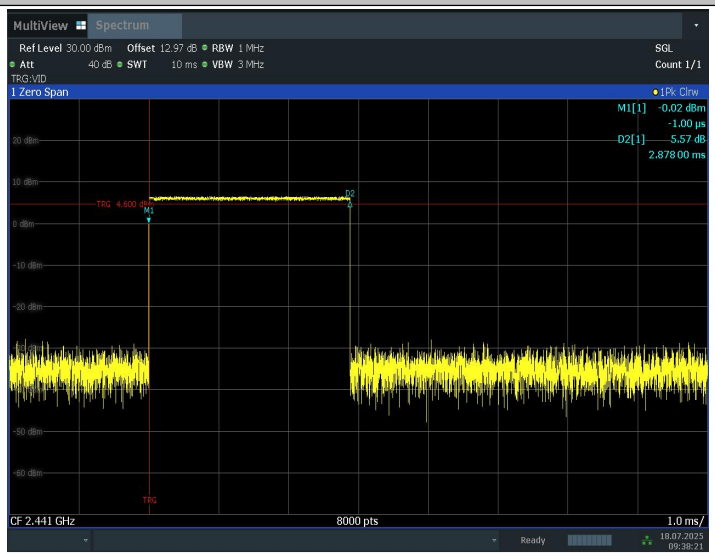
DH5_Hop



09:38:22 18.07.2025

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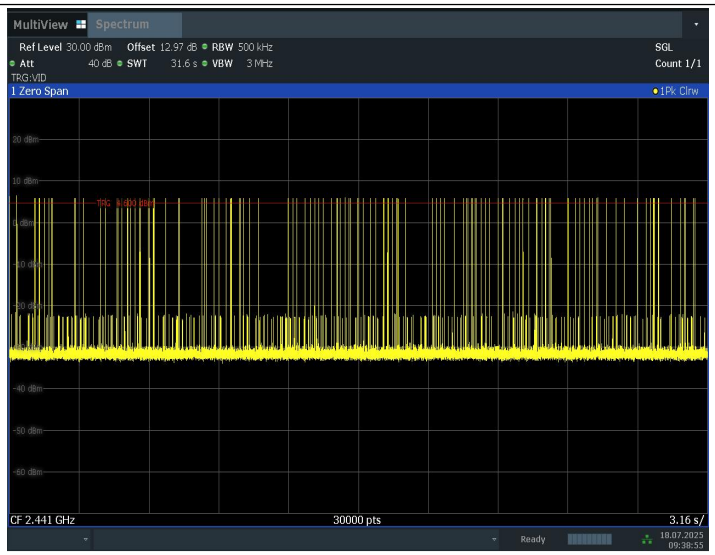

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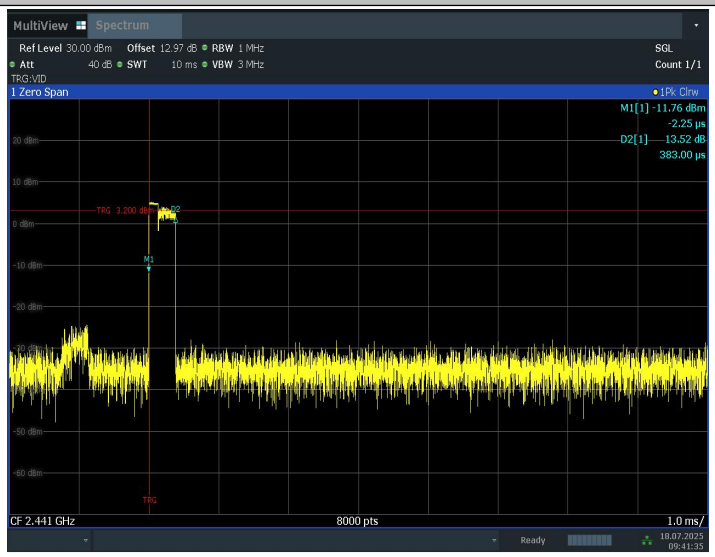
2DH1_Hop



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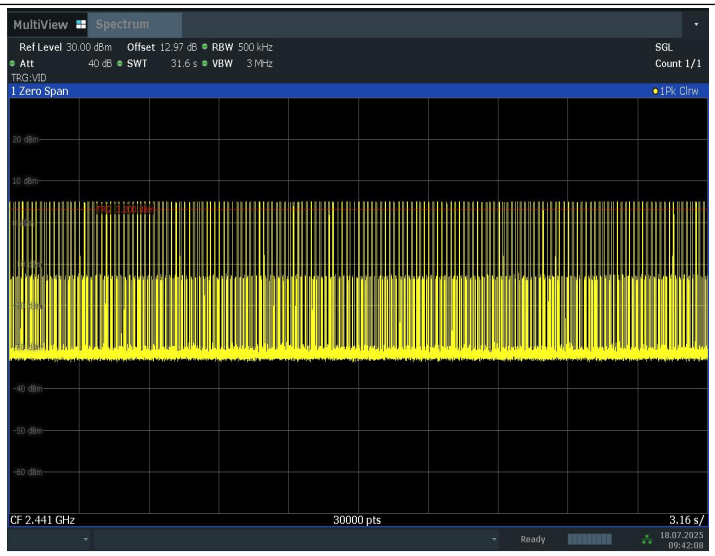

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2DH3_Hop

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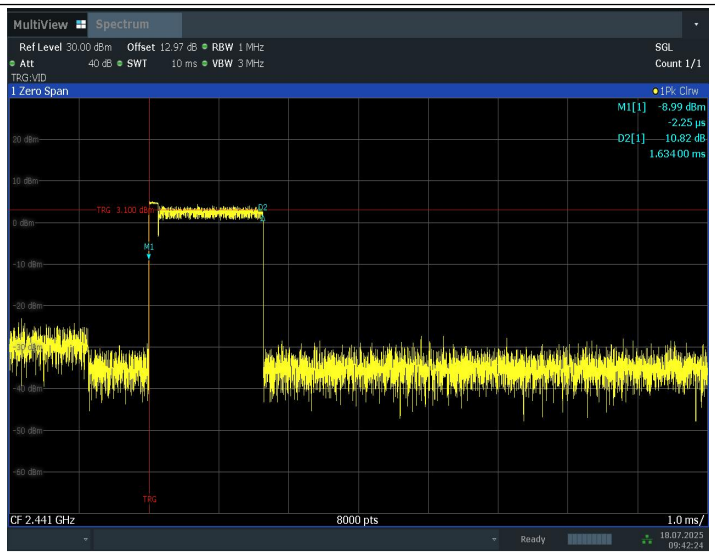

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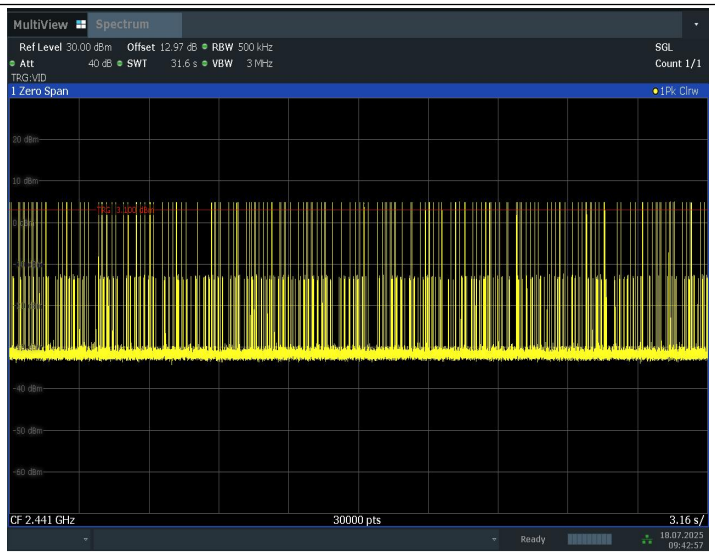

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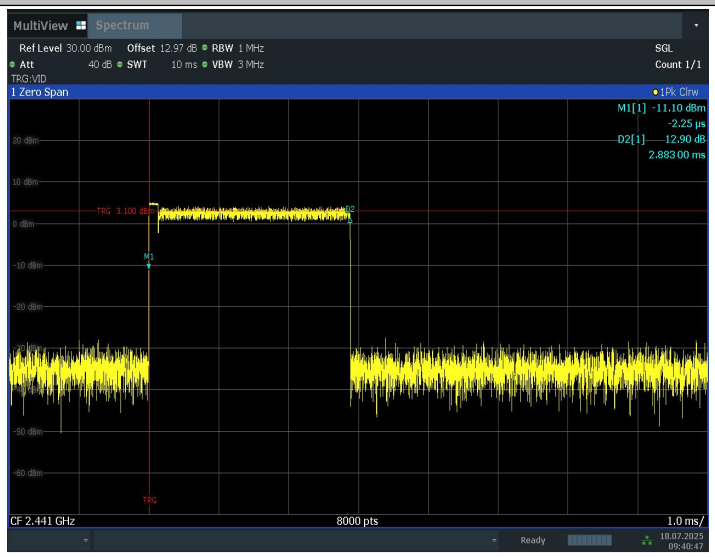
2DH5_Hop



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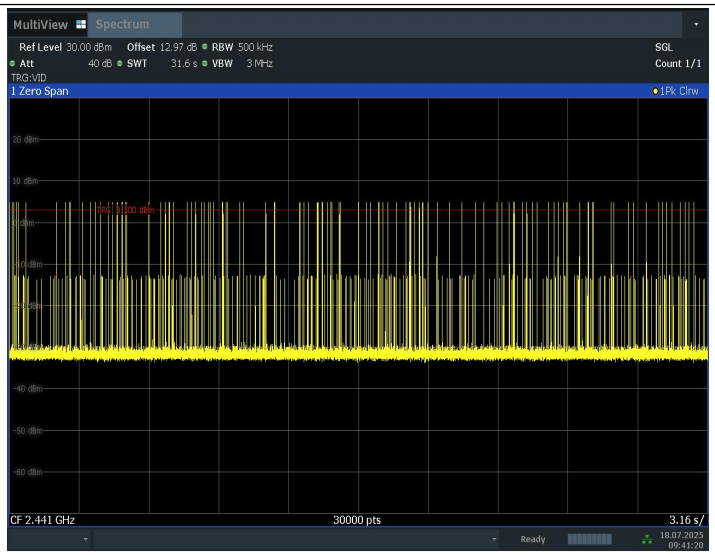

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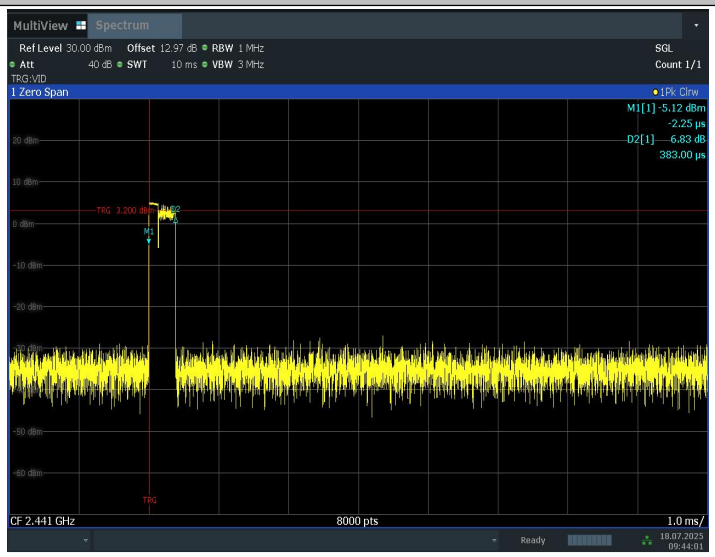
3DH1_Hop



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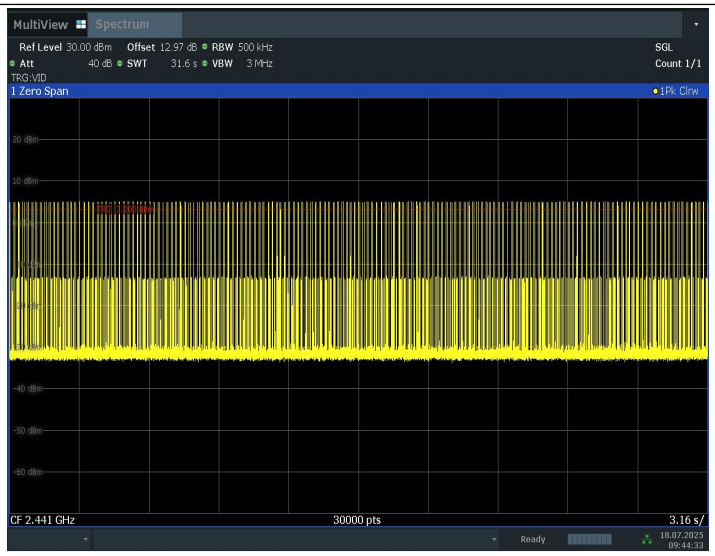

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3DH3_Hop

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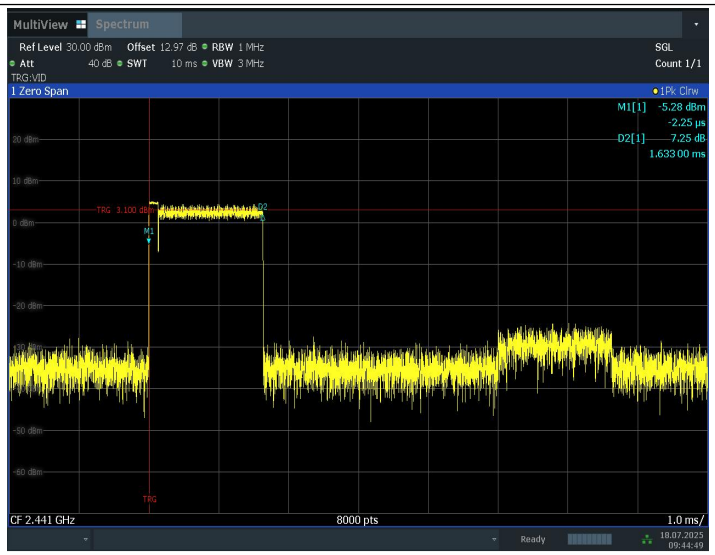

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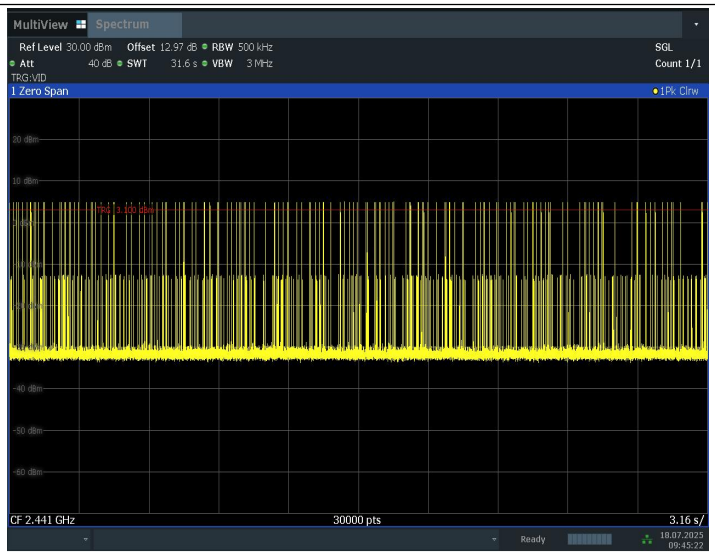

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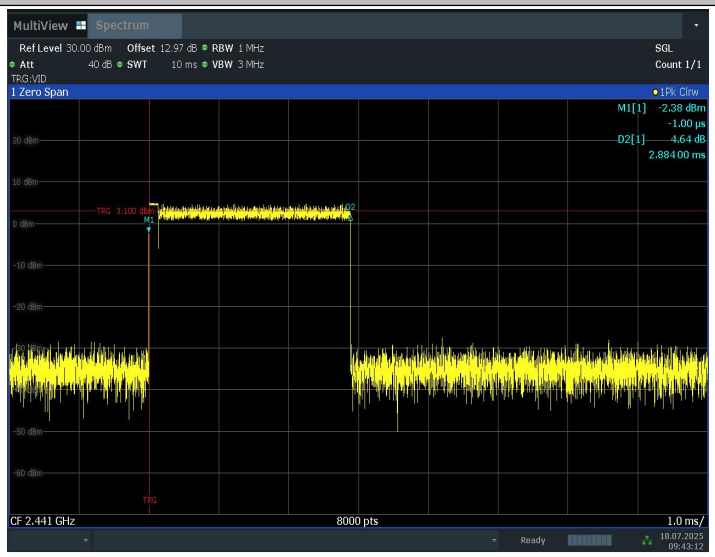
3DH5_Hop



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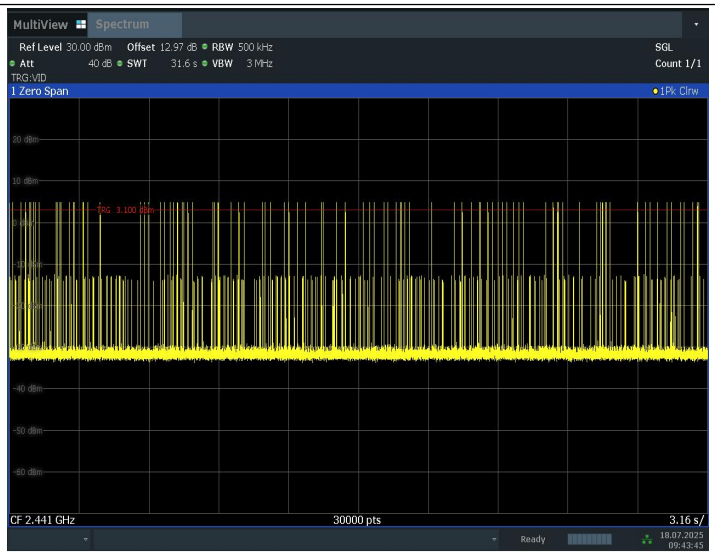

09:43:46 18.07.2025

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B.7. 20dB Bandwidth

Method of Measurement: See ANSI C63.10-clause 6.9.2

Measurement Procedure - Unwanted Emissions

1. Set RBW = 30kHz.

2. Set VBW = 100 kHz.

3. Set span to 3MHz

4. Detector = peak.

5. Trace Mode = max hold.

6. Sweep = auto couple.

7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a)(1)	NA *

Use NdB Down function of the SA to measure the 20dB Bandwidth

* Comment: This test case is not required according to the latest FCC 47 CFR Part 15.247. But the test results are necessary for “carrier frequency separation” test case, in Annex A.8.

Measurement Results:

TestMode	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	2402	0.86	2401.55	2402.41	---	---
	2441	0.86	2440.55	2441.41	---	---
	2480	0.86	2479.55	2480.41	---	---
2DH5	2402	1.26	2401.37	2402.63	---	---
	2441	1.26	2440.37	2441.63	---	---
	2480	1.26	2479.37	2480.63	---	---
3DH5	2402	1.27	2401.36	2402.63	---	---
	2441	1.27	2440.36	2441.63	---	---
	2480	1.27	2479.36	2480.63	---	---

Conclusion: NA

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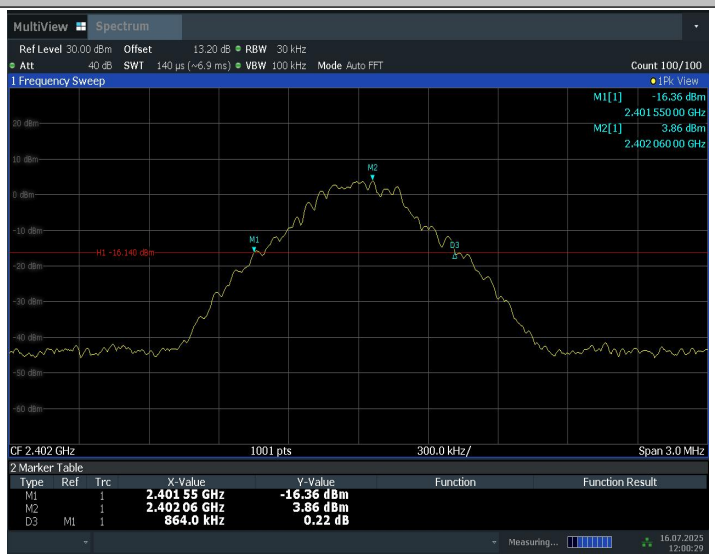
Test graphs as below:

DH5_2402



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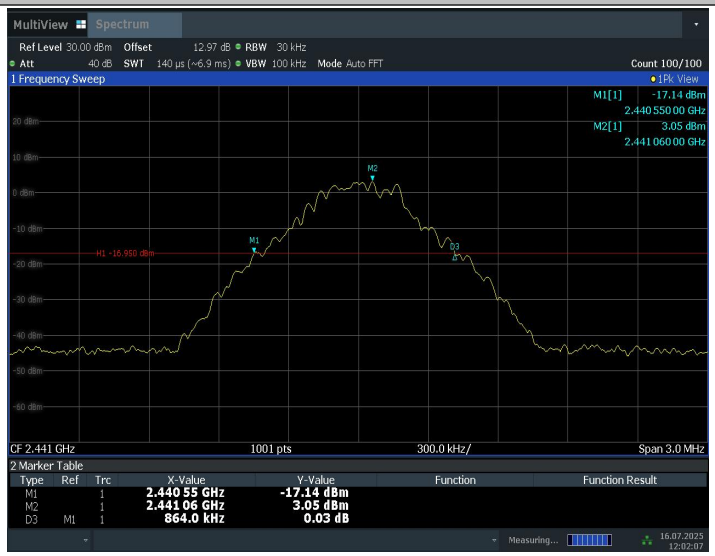
DH5_2441



12:02:07 16.07.2025

DH5_2480

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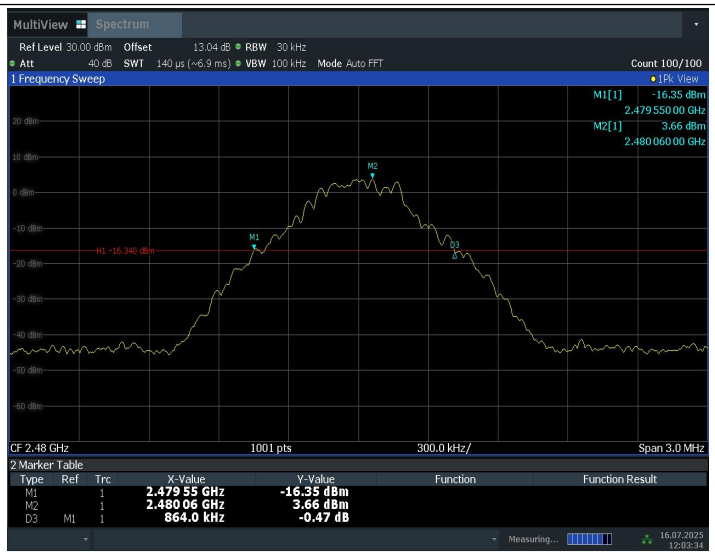

12:03:34 16.07.2025

2DH5_2402

12:05:11 16.07.2025

2DH5_2441

12:06:48 16.07.2025

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2DH5_2480

12:08:16 16.07.2025

3DH5_2402

12:09:53 16.07.2025

3DH5_2441

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12:11:30 16.07.2025

3DH5_2480

12:12:59 16.07.2025

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B.8. Carrier Frequency Separation

Method of Measurement: See ANSI C63.10-clause 7.8.2

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

- Span = 3MHz
- RBW=300kHz
- VBW=300kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

Search the peak marks of the middle frequency and adjacent channel, then record the separation between them.

* Comment: This limit should be over 25 kHz or (2/3) * 20dB bandwidth, whichever is greater.

Measurement Limit:

Standard	Limit(kHz)
FCC 47 CFR Part 15.247(a)(1)	over 25 kHz or (2/3) * 20dB bandwidth

Measurement Result:

TestMode	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
DH5	Hop	1.11	≥0.860	PASS
2DH5	Hop	1.074	≥0.840	PASS
3DH5	Hop	1.444	≥1.270	PASS

Conclusion: PASS

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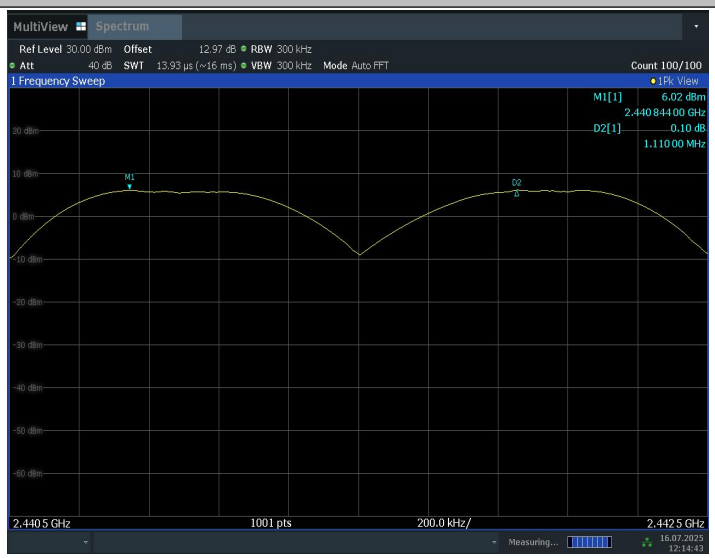
Test graphs as below:

DH5_Hop


12:14:43 16.07.2025

2DH5_Hop

12:16:24 16.07.2025

3DH5_Hop

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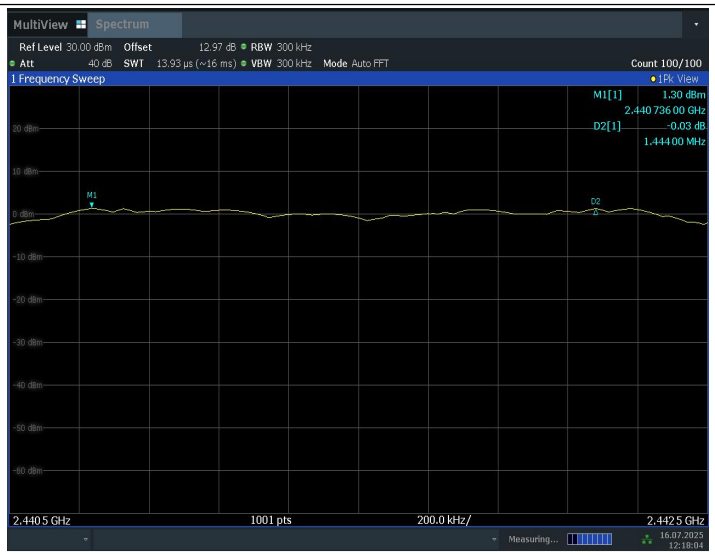

12:18:05 16.07.2025

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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:

TestMode	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
DH5	Hop	79	≥15	PASS
2DH5	Hop	79	≥15	PASS
3DH5	Hop	79	≥15	PASS

Conclusion: PASS

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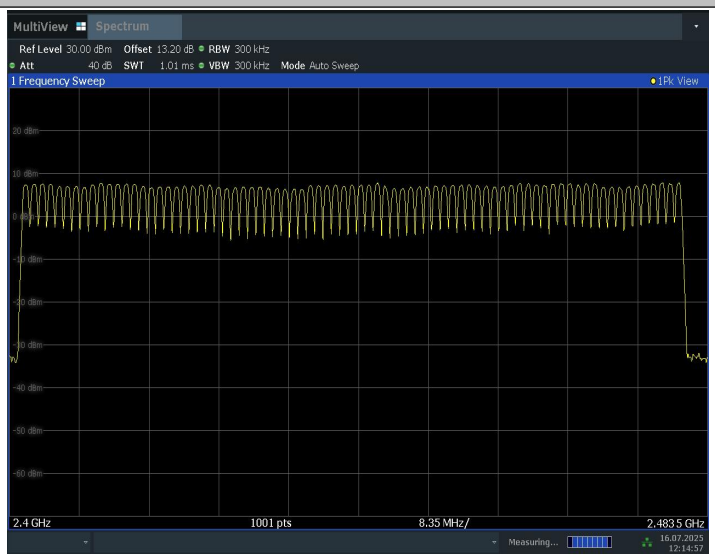
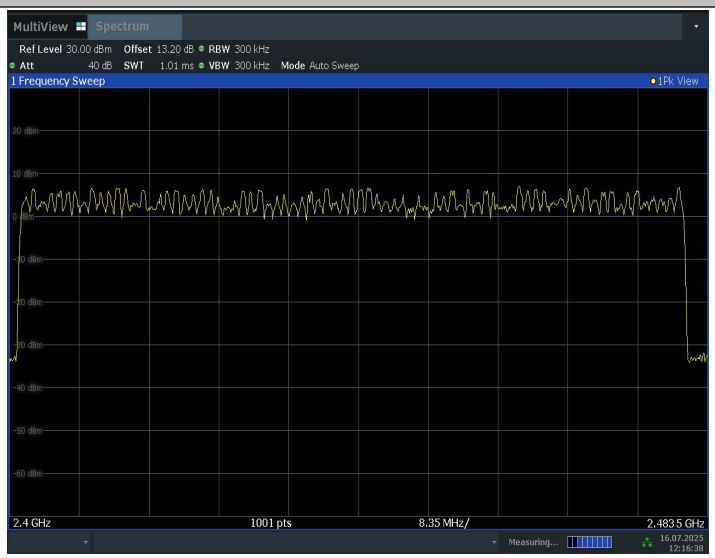
Test graphs as below:

DH5_Hop
 12:14:57 16.07.2025
2DH5_Hop
 12:16:38 16.07.2025
3DH5_Hop

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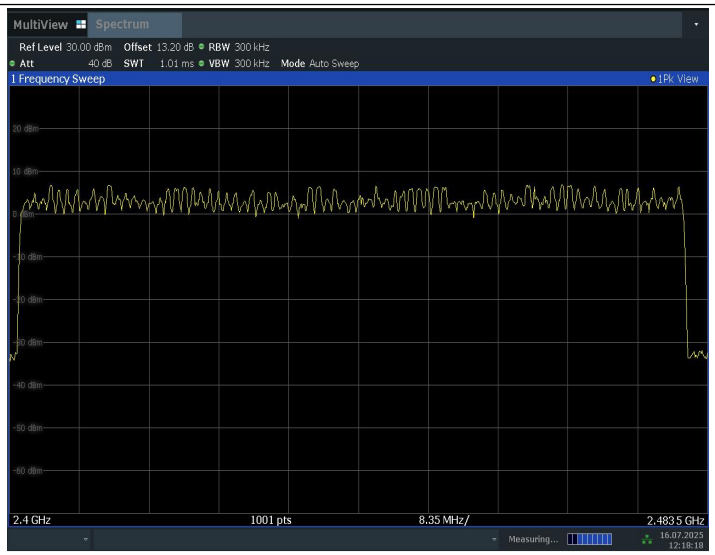

12:18:19 16.07.2025

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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.

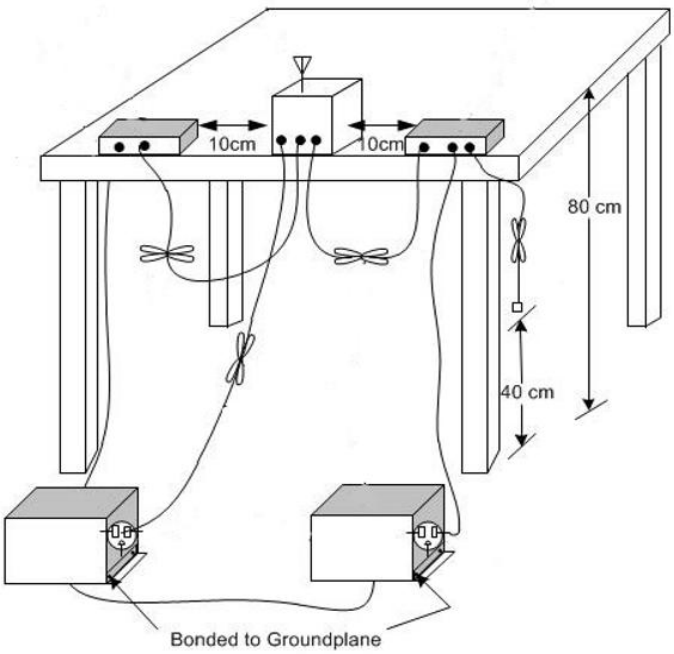
The measurement bandwidth is:

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

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Test setup



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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:

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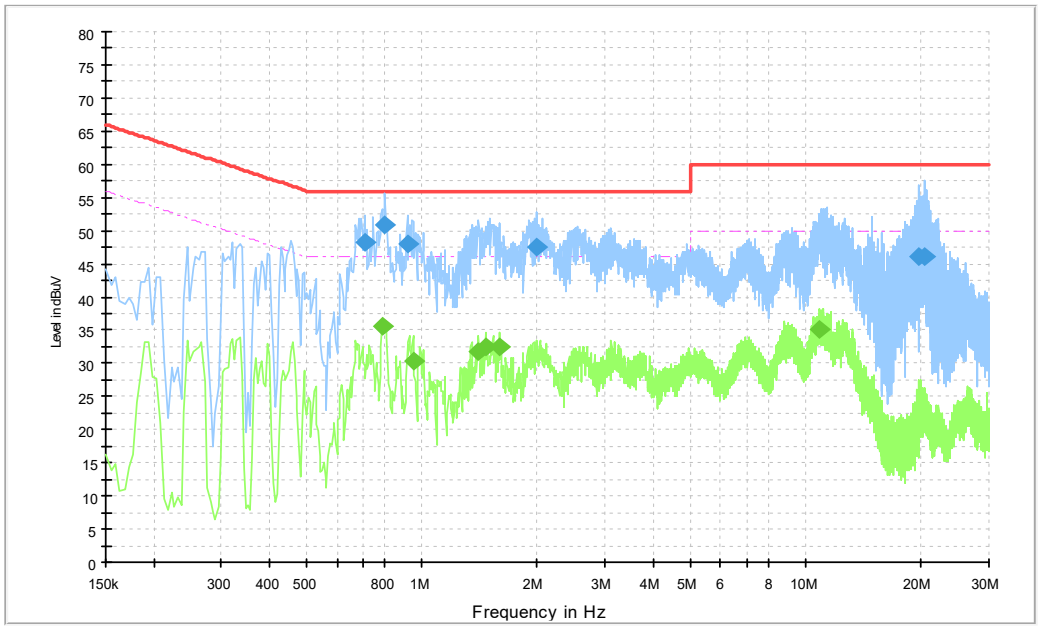

Fig.B.10.1 AC Powerline Conducted Emission- Bluetooth

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 (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.708000	48.2	2000.0	9.000	On	L1	20.2	7.8	56.0
0.802500	50.8	2000.0	9.000	On	L1	20.2	5.2	56.0
0.915000	48.0	2000.0	9.000	On	L1	20.2	8.0	56.0
1.990500	47.5	2000.0	9.000	On	L1	20.1	8.5	56.0
19.707000	46.2	2000.0	9.000	On	N	20.4	13.8	60.0
20.296500	46.1	2000.0	9.000	On	N	20.5	13.9	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.789000	35.7	2000.0	9.000	On	L1	20.2	10.3	46.0
0.946500	30.2	2000.0	9.000	On	L1	20.2	15.8	46.0
1.405500	31.6	2000.0	9.000	On	L1	20.2	14.4	46.0
1.459500	32.5	2000.0	9.000	On	L1	20.2	13.5	46.0
1.590000	32.4	2000.0	9.000	On	L1	20.1	13.6	46.0
10.905000	35.2	2000.0	9.000	On	L1	20.3	14.8	50.0

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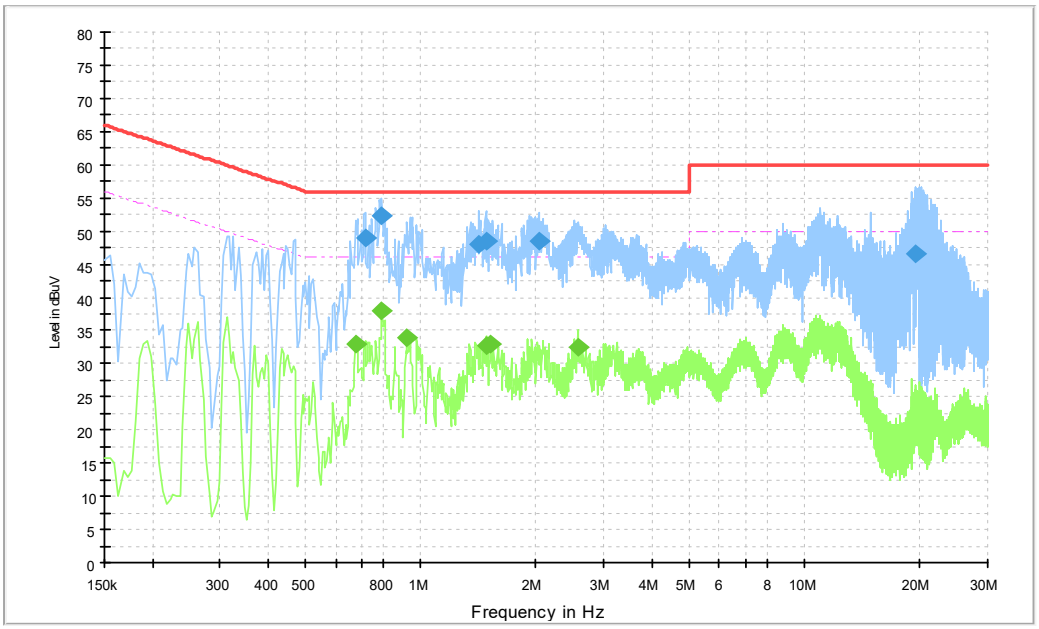

Fig.B.10.2 AC Powerline Conducted Emission-Idle

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 (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.717000	49.1	2000.0	9.000	On	L1	20.2	6.9	56.0
0.793500	52.4	2000.0	9.000	On	L1	20.2	3.6	56.0
1.419000	48.0	2000.0	9.000	On	L1	20.2	8.0	56.0
1.477500	48.5	2000.0	9.000	On	L1	20.2	7.5	56.0
2.026500	48.4	2000.0	9.000	On	L1	20.1	7.6	56.0
19.504500	46.5	2000.0	9.000	On	N	20.4	13.5	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.676500	32.9	2000.0	9.000	On	L1	20.2	13.1	46.0
0.793500	37.9	2000.0	9.000	On	L1	20.2	8.1	46.0
0.924000	34.0	2000.0	9.000	On	L1	20.2	12.0	46.0
1.477500	32.6	2000.0	9.000	On	L1	20.2	13.4	46.0
1.527000	32.8	2000.0	9.000	On	L1	20.2	13.2	46.0
2.562000	32.6	2000.0	9.000	On	L1	20.2	13.4	46.0

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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.

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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*****

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