11. Time of Occupancy (Dwell Time) Measurement

11.1 Provisions Applicable

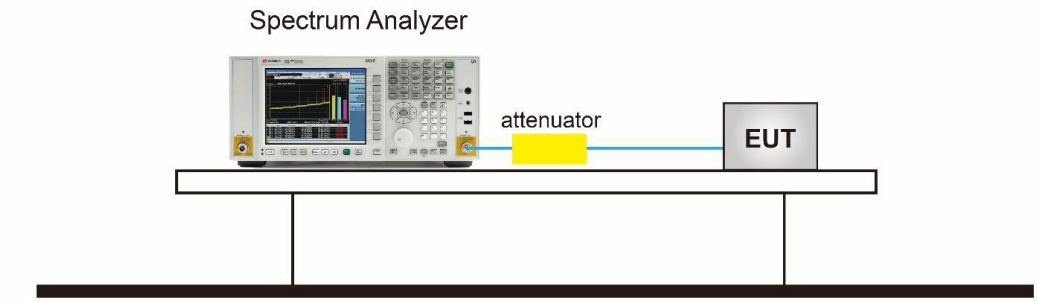
The maximum permissible time of occupancy is 400ms within a period of 400ms multiplied by the number of hopping channels employed.

11.2 Measurement Procedure

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

1. Span = Zero span, centered on a hopping channel.
2. RBW shall be ⩽ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
3. VBW ⩾ RBW
4. Sweep time = As necessary to capture the entire dwell time per hopping channel
5. Detector = Peak
6. Trace mode = Free Run
7. Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time. An oscilloscope may be used instead of a spectrum analyzer. The EUT shall show compliance with the appropriate regulatory limit for the number of hopping channels. A plot of the data shall be included in the test report.

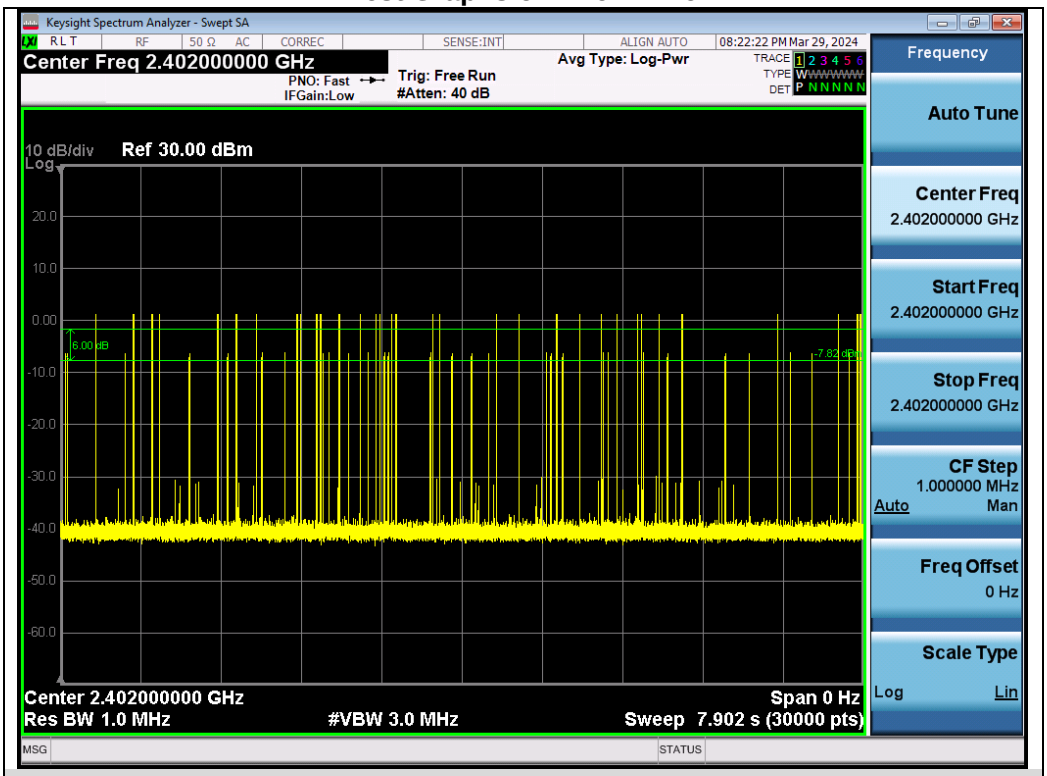
11.3 Measurement Setup (Block Diagram of Configuration)



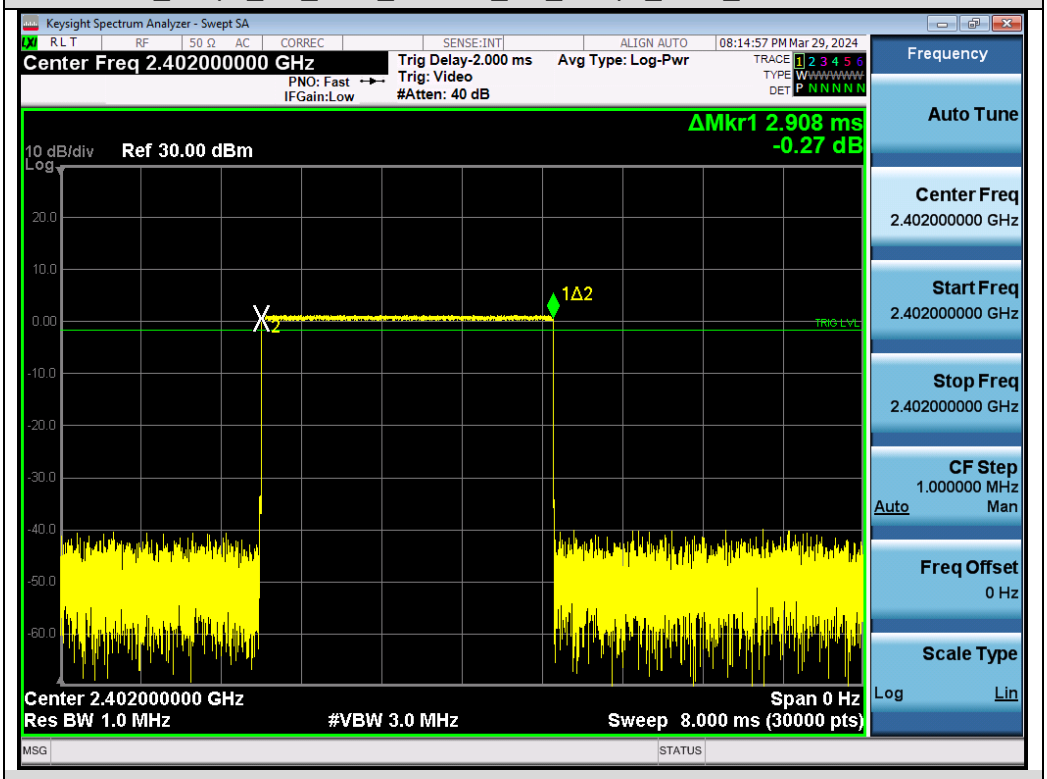
11.4 Measurement Result

Test Data of Dwell Time					
Channel	Time of Pulse for DH5 (ms)	Number of hops in the period specified in the requirements	Dwell Time (ms)	Limit (ms)	Pass or Fail
2402	2.908	33.0*4	383.856	400	Pass
2441	2.908	31.0*4	360.592	400	Pass
2480	2.908	24.0*4	279.168	400	Pass

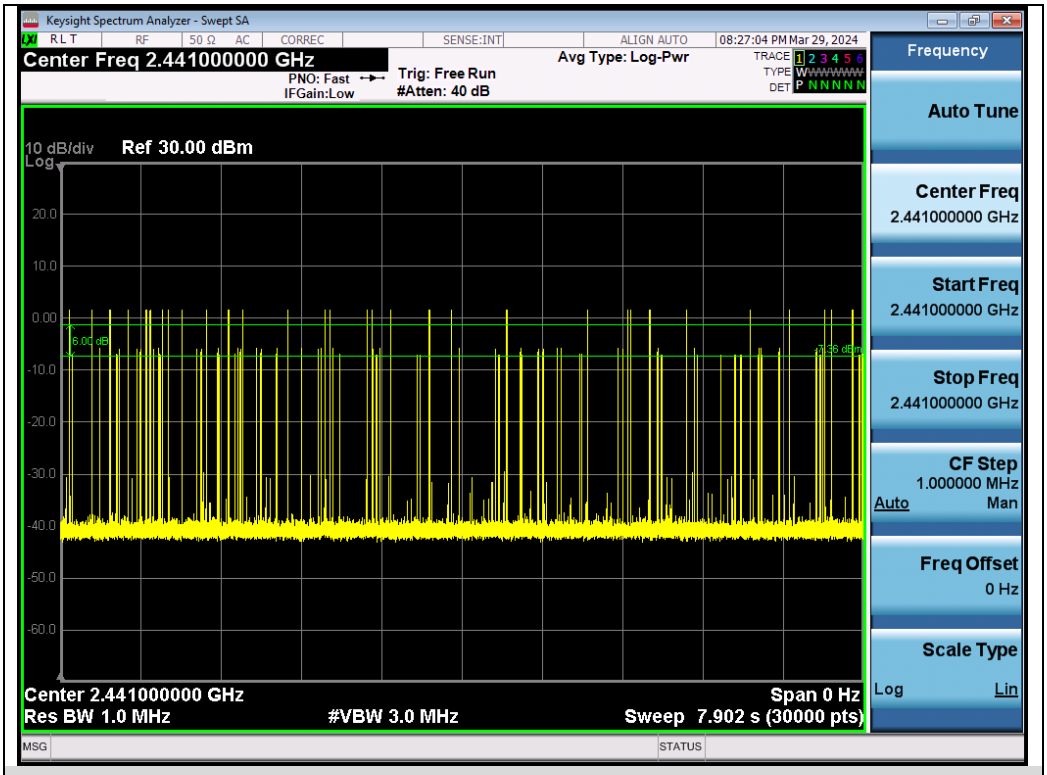
Test Graphs of Dwell Time



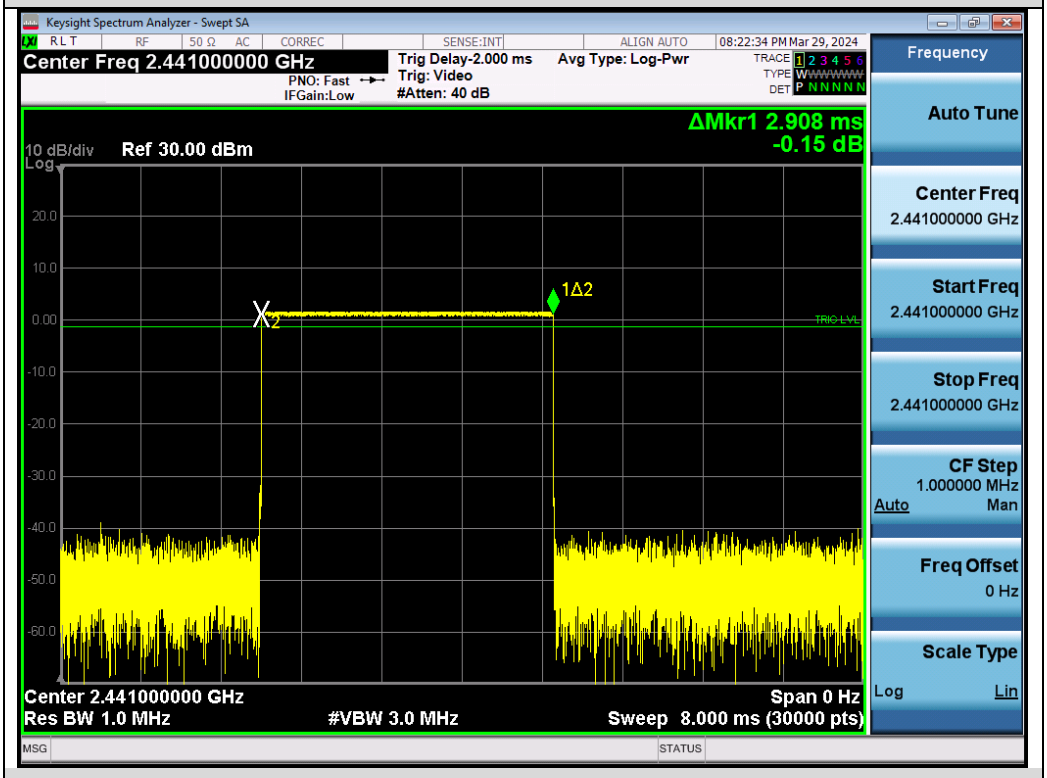
Test_Graph_BR_HOP_Chain A_NA_1Mbps_2402_Number of Busrt



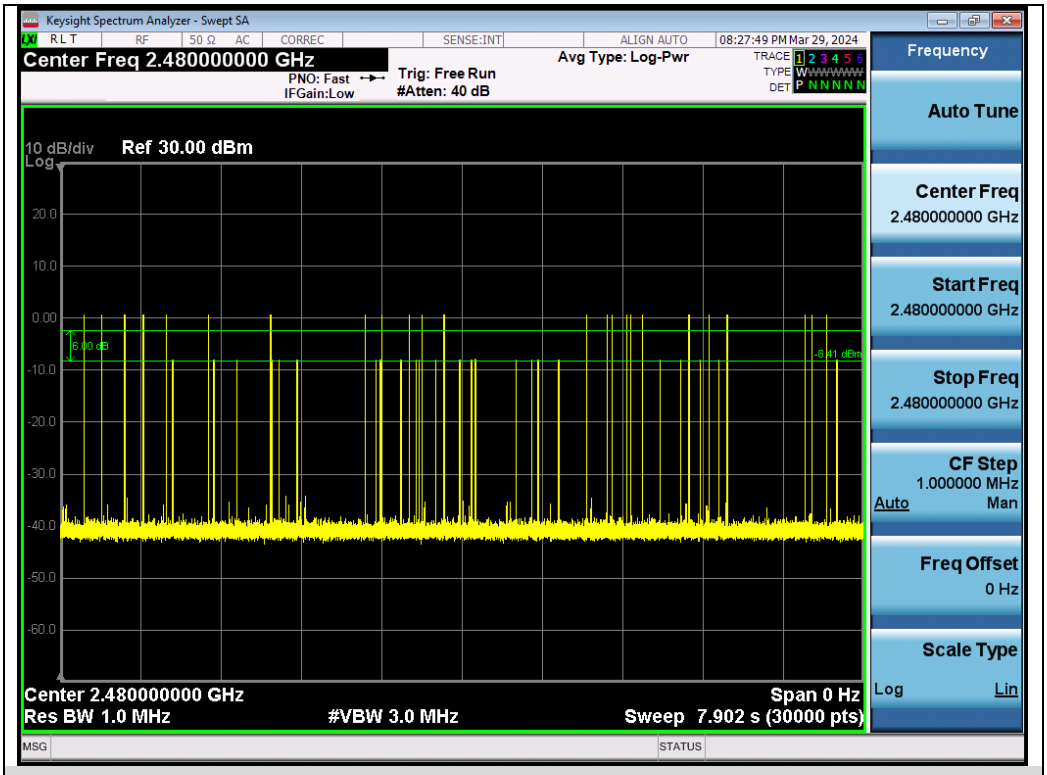
Test_Graph_BR_HOP_Chain A_NA_1Mbps_2402_Time per Burst



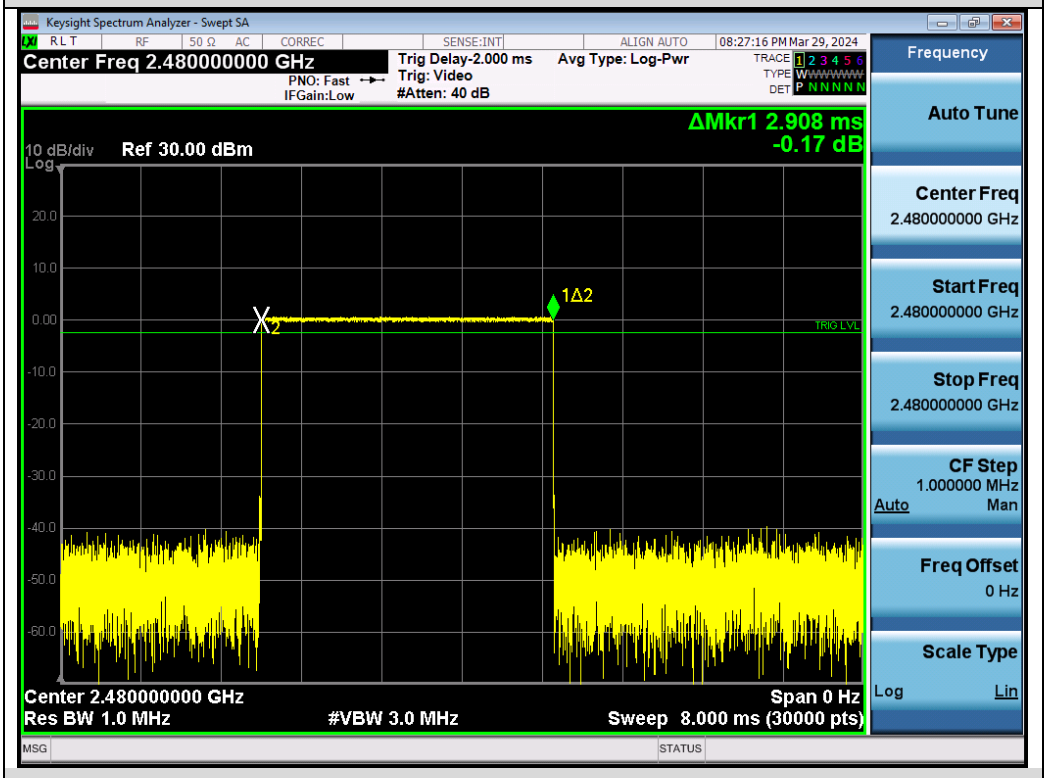
Test_Graph_BR_HOP_Chain A_NA_1Mbps_2441_Number of Busrt



Test_Graph_BR_HOP_Chain A_NA_1Mbps_2441_Time per Burst



Test_Graph_BR_HOP_Chain A_NA_1Mbps_2480_Number of Busrt



Test_Graph_BR_HOP_Chain A_NA_1Mbps_2480_Time per Burst

Note: All mode rates are tested and evaluated, GFSK modulated DH5 mode is the worst case and documented in the report.

12. Frequency Separation Measurement

12.1 Provisions Applicable

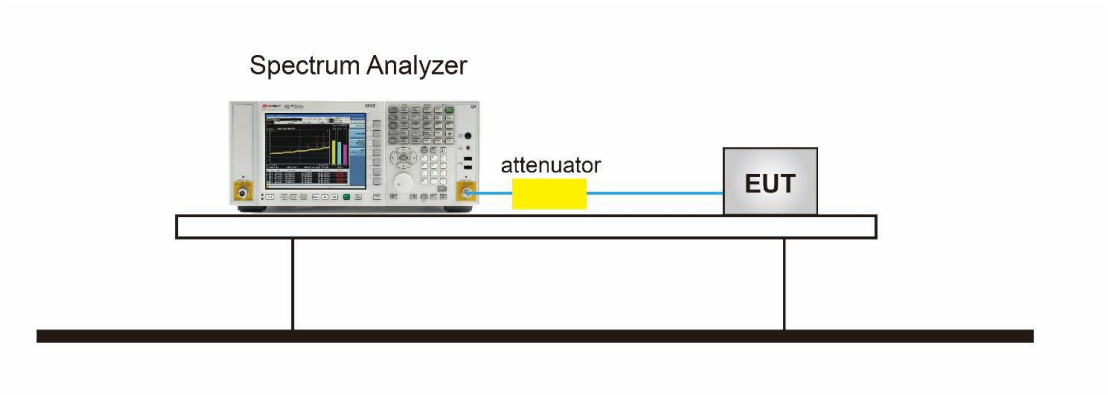
When the power is less than 0.125W: The minimum permissible channel separation for this system is 2/3 the value of the 20dB BW.
When the power is less than 1W: The minimum permissible channel separation for this system is 20dB BW.

12.2 Measurement Procedure

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

1. Span: Wide enough to capture the peaks of two adjacent channels.
2. RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3. Video (or average) bandwidth (VBW) ≥ RBW.
4. Sweep: Auto.
5. Detector function: Peak.
6. Trace: Max hold. g) Allow the trace to stabilize.
7. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

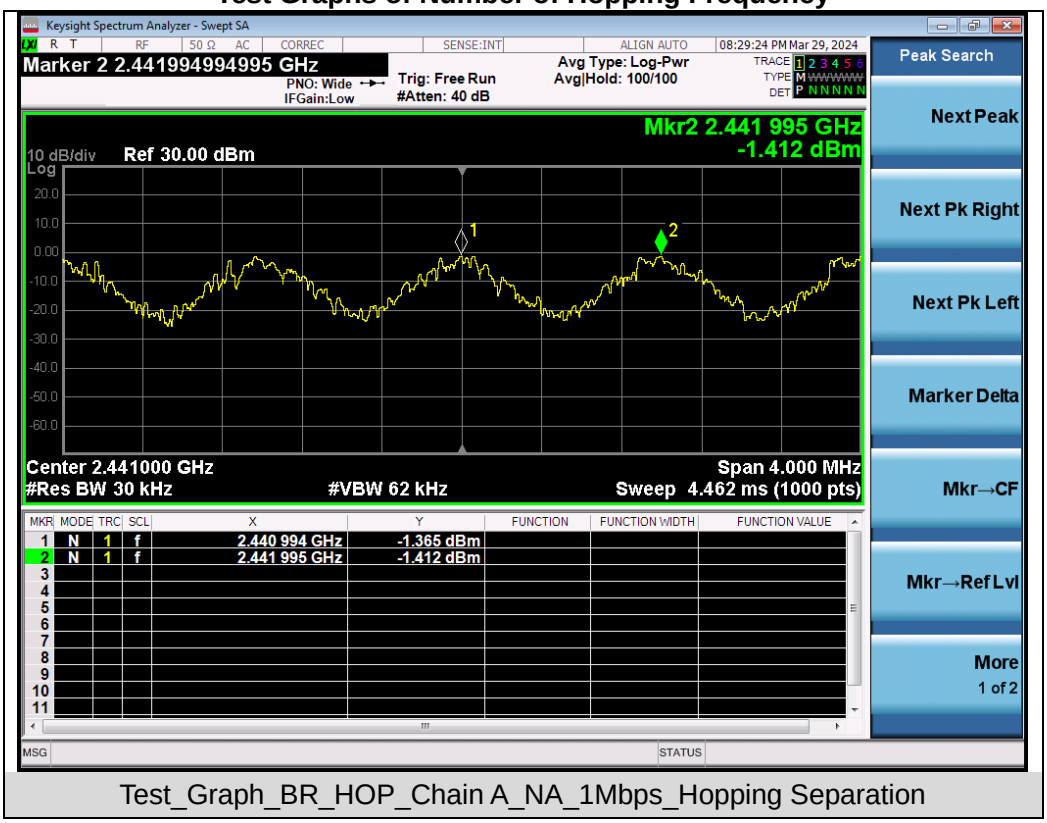
12.3 Measurement Setup (Block Diagram of Configuration)



12.4 Measurement Result

Test Data of Frequency Separation			
Test Mode	Channel Separation (MHz)	Limits (MHz)	Pass or Fail
GFSK	1.001	0.575	Pass

Test Graphs of Number of Hopping Frequency



Test_Graph_BR_HOP_Chain A_NA_1Mbps_Hopping Separation

Note: All mode rates are tested and evaluated, GFSK modulated DH5 mode is the worst case and documented in the report.

13. AC Power Line Conducted Emission Test

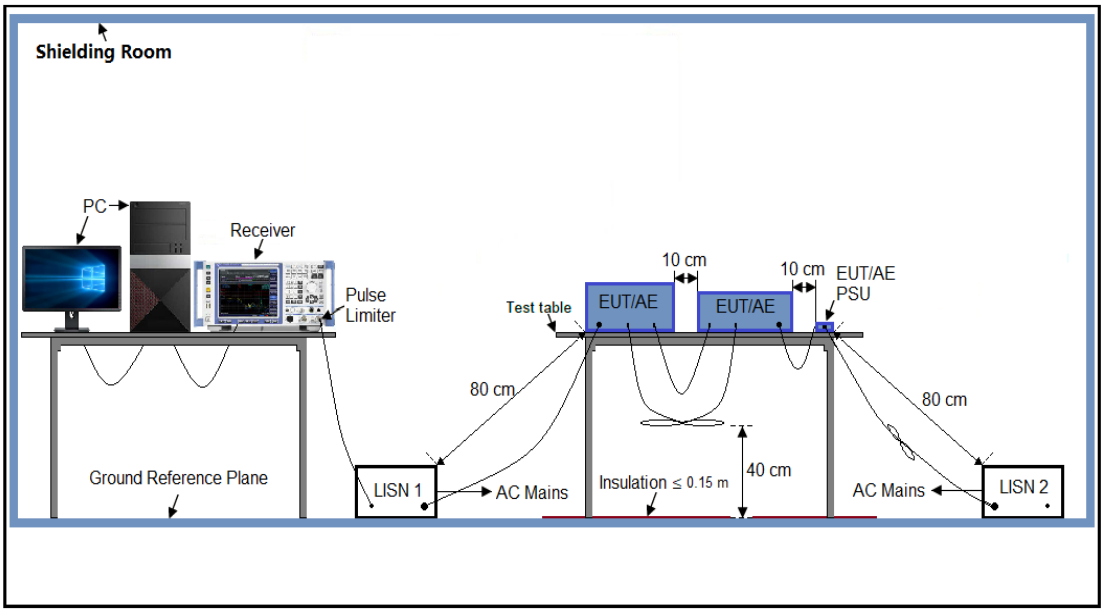
13.1 Measurement Limit

Frequency	Maximum RF Line Voltage	
	Q.P. (dBμV)	Average (dBμV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

13.2 Measurement Setup (Block Diagram of Configuration)



13.3 Preliminary Procedure of Line Conducted Emission Test

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 19V power from adapter which received AC120V/60Hz power from a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

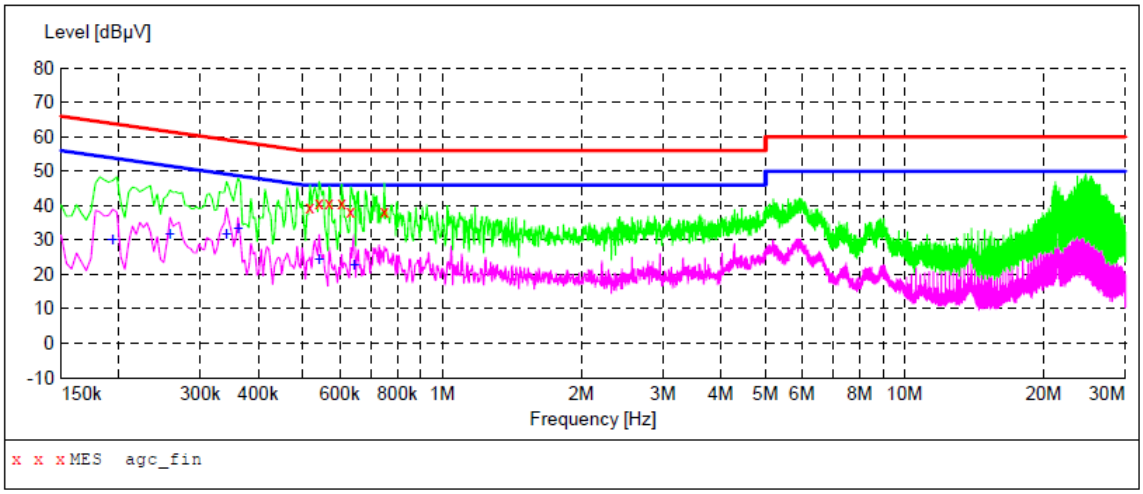
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

13.4 Final Procedure of Line Conducted Emission Test

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

13.5 Measurement Results

AC Power Line Conducted Emission Test			
Test Mode	Mode 1	LISN Line	Hot Side



MEASUREMENT RESULT: "agc_fin"

2024/3/22 16:58

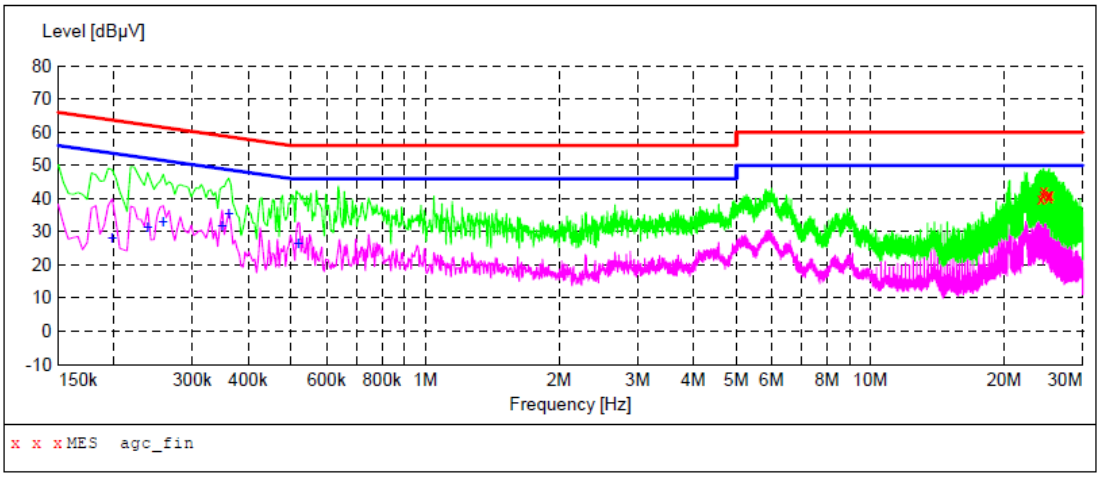
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.518000	39.60	6.2	56	16.4	QP	L1
0.542000	40.60	6.2	56	15.4	QP	L1
0.570000	40.60	6.2	56	15.4	QP	L1
0.606000	40.70	6.2	56	15.3	QP	L1
0.634000	38.50	6.2	56	17.5	QP	L1
0.750000	38.10	6.2	56	17.9	QP	L1

MEASUREMENT RESULT: "agc_fin2"

2024/3/22 16:58

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.194000	30.10	6.1	54	23.8	AV	L1
0.258000	31.90	6.1	52	19.6	AV	L1
0.342000	31.70	6.1	49	17.5	AV	L1
0.362000	33.30	6.1	49	15.4	AV	L1
0.542000	24.40	6.2	46	21.6	AV	L1
0.646000	23.00	6.2	46	23.0	AV	L1

AC Power Line Conducted Emission Test			
Test Mode	Mode 1	LISN Line	Neutral Side



MEASUREMENT RESULT: "agc_fin"

2024/3/22 17:01

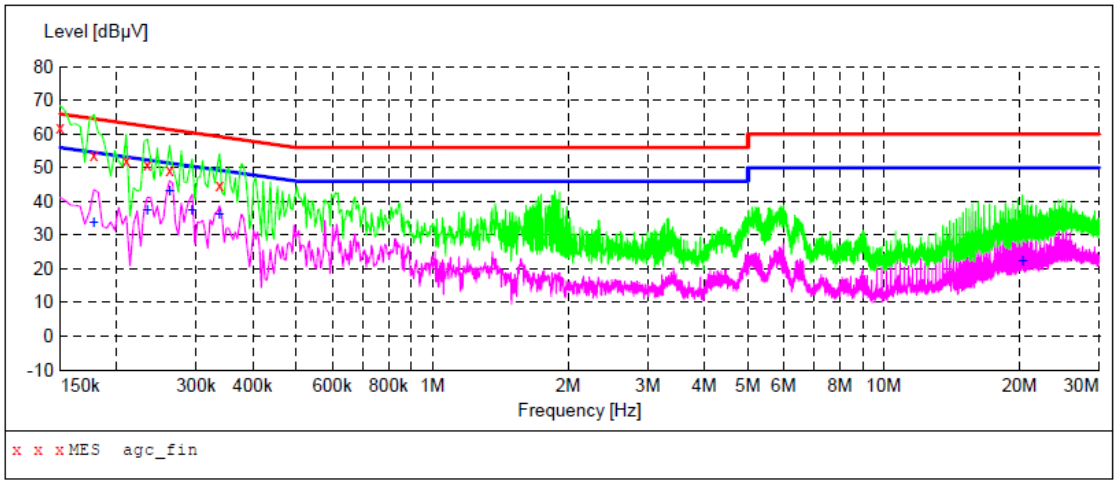
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
24.162000	40.10	7.8	60	19.9	QP	N
24.458000	41.20	7.9	60	18.8	QP	N
24.510000	42.40	7.9	60	17.6	QP	N
25.138000	40.40	8.0	60	19.6	QP	N
25.166000	41.10	8.0	60	18.9	QP	N
25.246000	41.10	8.0	60	18.9	QP	N

MEASUREMENT RESULT: "agc_fin2"

2024/3/22 17:01

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.198000	28.10	6.1	54	25.6	AV	N
0.238000	31.20	6.1	52	21.0	AV	N
0.258000	33.20	6.1	52	18.3	AV	N
0.350000	31.70	6.1	49	17.3	AV	N
0.362000	35.40	6.1	49	13.3	AV	N
0.518000	26.30	6.2	46	19.7	AV	N

AC Power Line Conducted Emission Test			
Test Mode	Mode 2	LISN Line	Hot Side



MEASUREMENT RESULT: "agc_fin"

2024/4/16 10:13

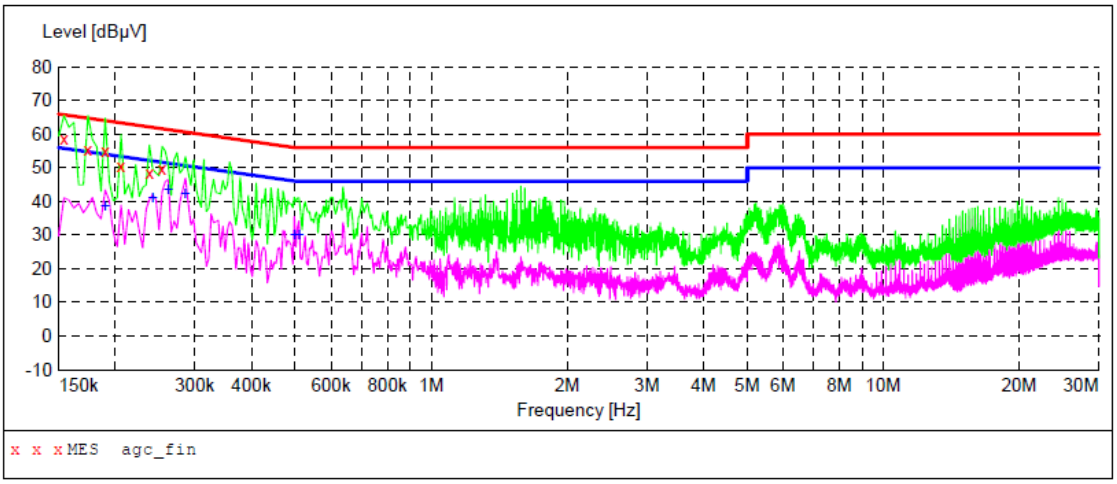
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.150000	61.80	6.1	66	4.2	QP	L1
0.178000	53.90	6.1	65	10.7	QP	L1
0.210000	52.10	6.1	63	11.1	QP	L1
0.234000	50.90	6.1	62	11.4	QP	L1
0.262000	49.40	6.1	61	12.0	QP	L1
0.338000	44.90	6.1	59	14.4	QP	L1

MEASUREMENT RESULT: "agc_fin2"

2024/4/16 10:13

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.178000	34.00	6.1	55	20.6	AV	L1
0.234000	37.60	6.1	52	14.7	AV	L1
0.262000	43.20	6.1	51	8.2	AV	L1
0.294000	37.40	6.1	50	13.0	AV	L1
0.338000	36.10	6.1	49	13.2	AV	L1
20.290000	22.30	7.1	50	27.7	AV	L1

AC Power Line Conducted Emission Test			
Test Mode	Mode 2	LISN Line	Neutral Side



MEASUREMENT RESULT: "agc_fin"

2024/4/16 10:16

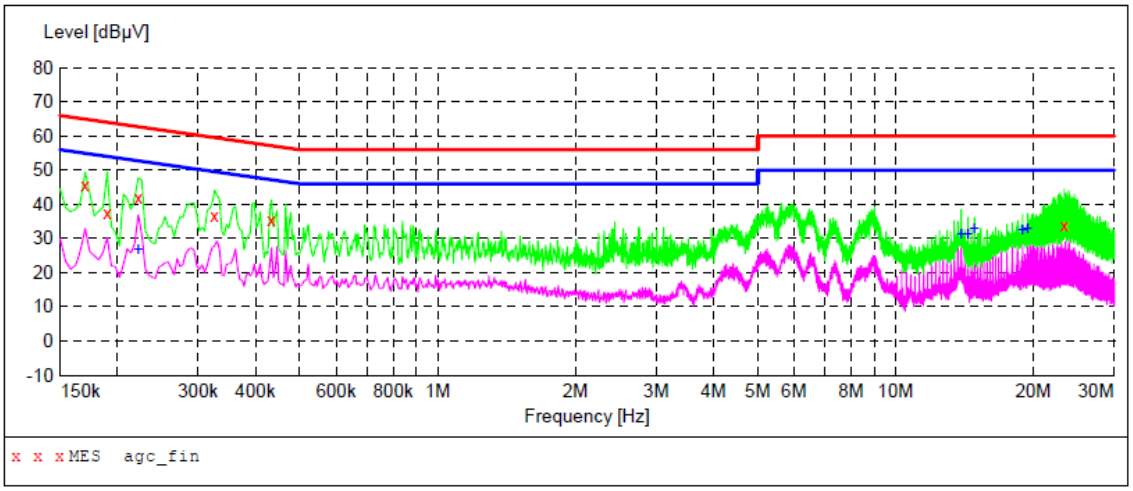
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.154000	58.50	6.1	66	7.3	QP	N
0.174000	55.50	6.1	65	9.3	QP	N
0.190000	55.10	6.1	64	8.9	QP	N
0.206000	50.70	6.1	63	12.7	QP	N
0.238000	48.30	6.1	62	13.9	QP	N
0.254000	49.70	6.1	62	11.9	QP	N

MEASUREMENT RESULT: "agc_fin2"

2024/4/16 10:16

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.190000	38.60	6.1	54	15.4	AV	N
0.242000	41.20	6.1	52	10.8	AV	N
0.262000	43.40	6.1	51	8.0	AV	N
0.286000	42.20	6.1	51	8.4	AV	N
0.498000	30.10	6.1	46	15.9	AV	N
0.510000	30.00	6.2	46	16.0	AV	N

AC Power Line Conducted Emission Test			
Test Mode	Mode 3	LISN Line	Hot Side



MEASUREMENT RESULT: "agc_fin"

2024/3/22 17:38

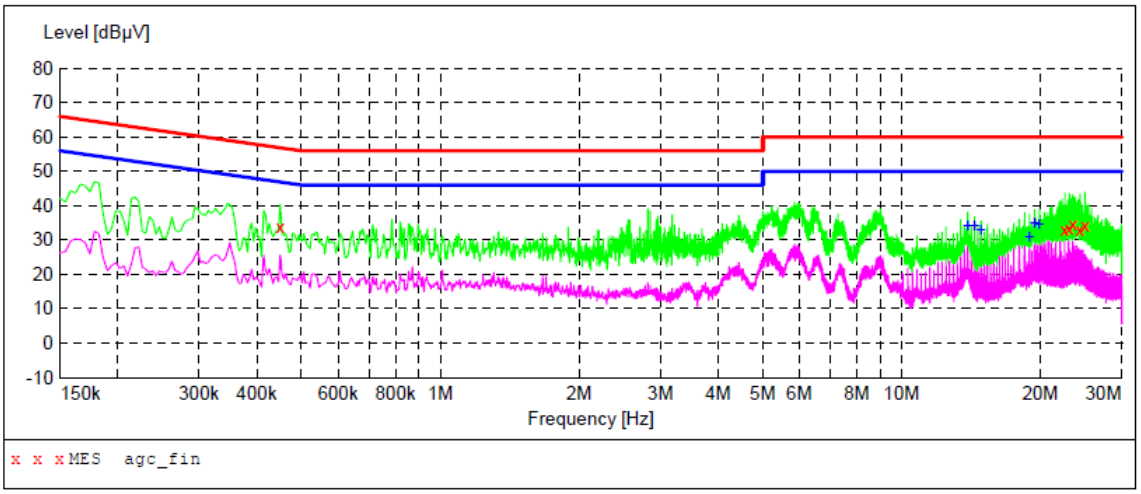
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.170000	45.50	6.1	65	19.5	QP	L1
0.190000	37.40	6.1	64	26.6	QP	L1
0.222000	41.80	6.1	63	20.9	QP	L1
0.326000	36.80	6.1	60	22.8	QP	L1
0.434000	35.30	6.1	57	21.9	QP	L1
23.342000	34.00	7.7	60	26.0	QP	L1

MEASUREMENT RESULT: "agc_fin2"

2024/3/22 17:38

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.222000	26.80	6.1	53	25.9	AV	L1
13.906000	31.40	6.8	50	18.6	AV	L1
14.386000	31.30	6.8	50	18.7	AV	L1
14.862000	33.20	6.8	50	16.8	AV	L1
18.938000	32.60	7.0	50	17.4	AV	L1
19.418000	33.10	7.1	50	16.9	AV	L1

AC Power Line Conducted Emission Test			
Test Mode	Mode 3	LISN Line	Neutral Side



MEASUREMENT RESULT: "agc_fin"

2024/3/22 17:35

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.450000	33.80	6.1	57	23.1	QP	N
22.570000	32.80	7.6	60	27.2	QP	N
23.094000	33.30	7.7	60	26.7	QP	N
23.502000	34.80	7.7	60	25.2	QP	N
24.370000	33.20	7.9	60	26.8	QP	N
24.966000	34.10	8.0	60	25.9	QP	N

MEASUREMENT RESULT: "agc_fin2"

2024/3/22 17:35

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
13.906000	34.10	6.8	50	15.9	AV	N
14.386000	34.20	6.8	50	15.8	AV	N
14.866000	32.90	6.8	50	17.1	AV	N
18.942000	31.10	7.0	50	18.9	AV	N
19.418000	35.00	7.1	50	15.0	AV	N
19.898000	34.50	7.1	50	15.5	AV	N

Appendix I: Photographs of Test Setup

Refer to the Report No.: AGC12060240301AP03

Appendix II: Photographs of Test EUT

Refer to the Report No.: AGC12060240301AP04

-----End of Report-----

Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.