12. Frequency Separation Measurement

12.1 Provisions Applicable

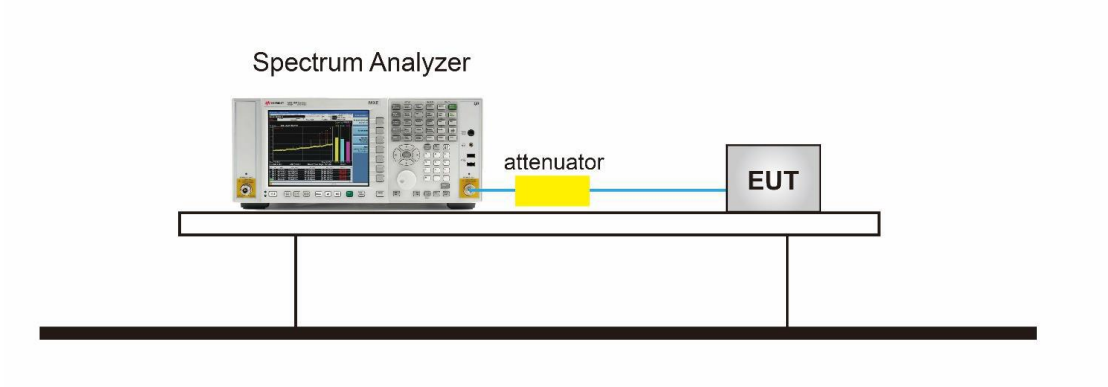
When the power is less than 0.125W: The minimum permissible channel separation for this system is 2/3 the value of the 20dB BW.
When the power is less than 1W: The minimum permissible channel separation for this system is 20dB BW.

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	1.006	⩾0.638	Pass
π /4-DQPSK	1.000	⩾0.853	Pass
8DPSK	1.063	⩾.863	Pass

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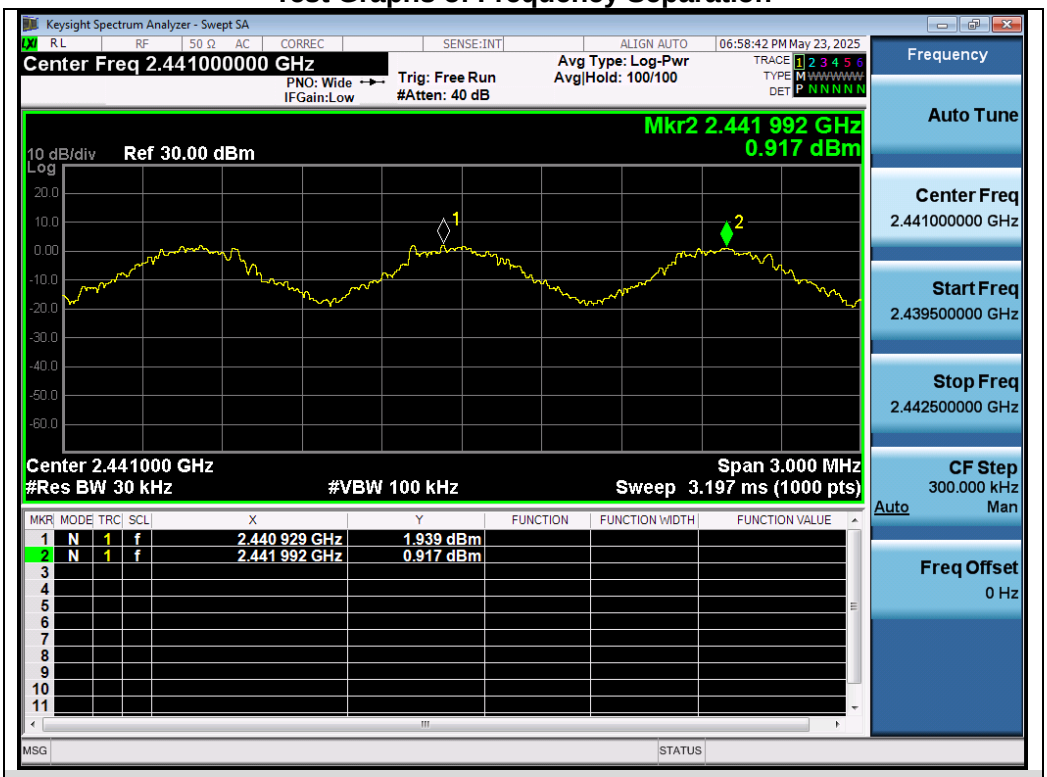
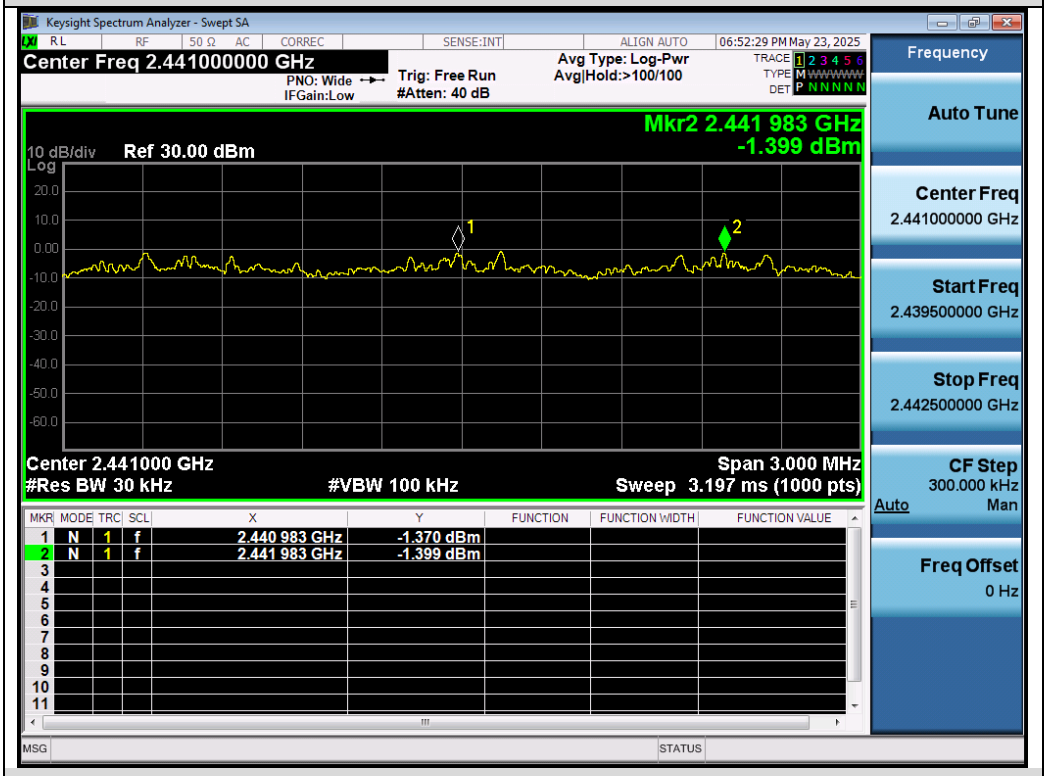
Test Graphs of Frequency Separation



Test_Graph_BR_HOP_ANT1_NA_1Mbps_Hopping Separation



Test_Graph_EDR_HOP_ANT1_NA_2Mbps_Hopping Separation

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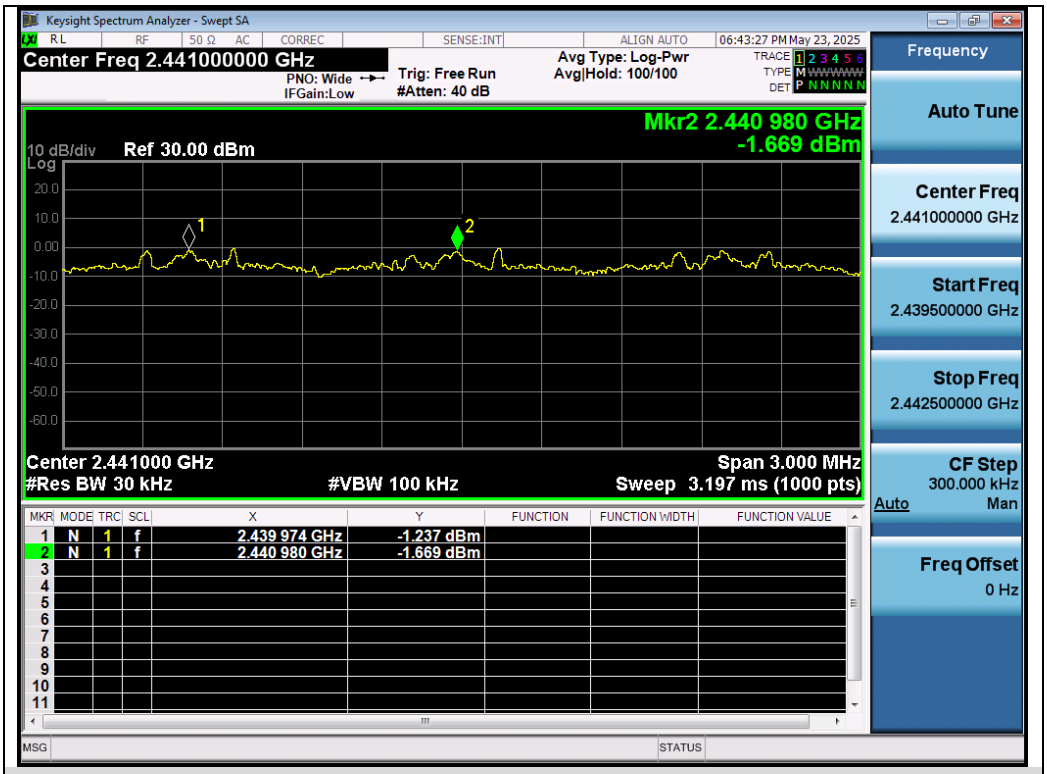

Test_Graph_EDR_HOP_ANT1_NA_3Mbps_Hopping Separation

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13. AC Power Line Conducted Emission Test

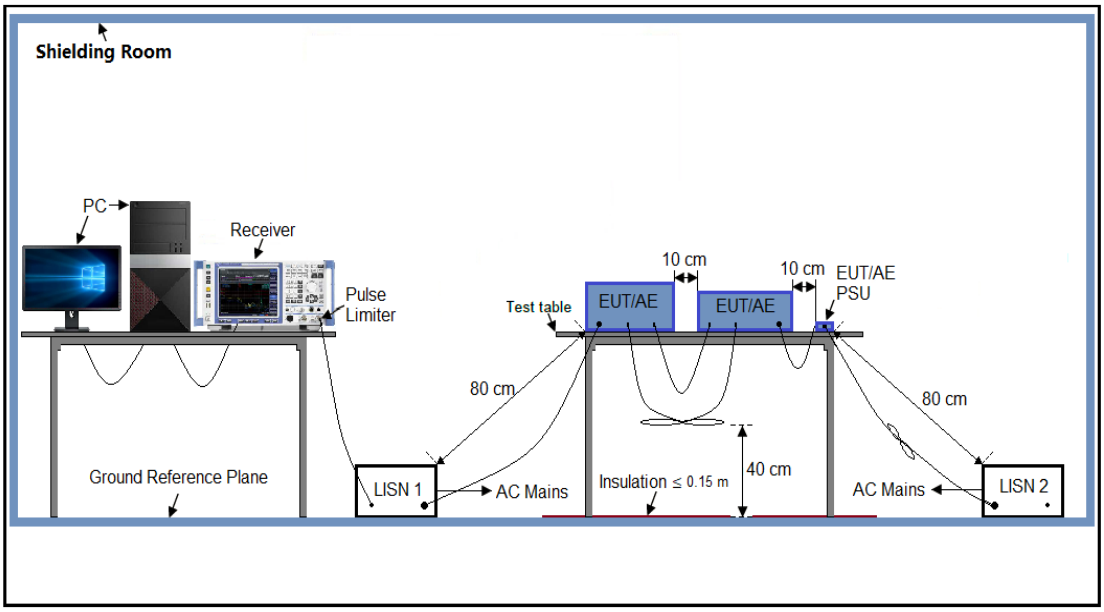
13.1 Measurement Limit

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)



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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 5V power from PC 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).
7. 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.
8. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
9. During the above scans, the emissions were maximized by cable manipulation.
10. The test mode(s) were scanned during the preliminary test.
11. 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.
3. 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.
4. The test data of the worst case condition(s) was reported on the Summary Data page.
5. A conducted emission is calculated by the following equation:
   - Measurement Level (dBμV) = Receiver reading (dBμV) + Transd (dB)
   - Transd (dB)= AMN Factor(dB)+Cable Loss(dB)+Attenuation(dB)
   - Margin= Limit-Level

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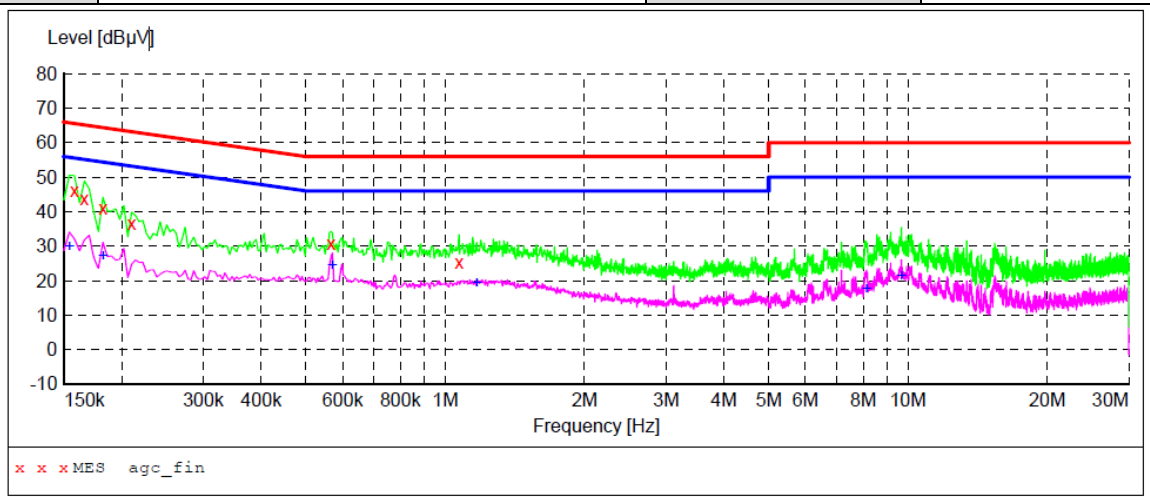
13.5 Measurement Result

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



MEASUREMENT RESULT: "agc_fin"

2025/5/21 17:17

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.158000	46.00	10.3	66	19.6	QP	L1
0.166000	43.60	10.3	65	21.6	QP	L1
0.182000	41.00	10.3	64	23.4	QP	L1
0.210000	36.60	10.3	63	26.6	QP	L1
0.566000	30.70	10.3	56	25.3	QP	L1
1.070000	25.10	10.4	56	30.9	QP	L1

MEASUREMENT RESULT: "agc_fin2"

2025/5/21 17:17

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.154000	29.90	10.3	56	25.9	AV	L1
0.182000	27.40	10.3	54	27.0	AV	L1
0.570000	24.60	10.3	46	21.4	AV	L1
1.170000	19.40	10.4	46	26.6	AV	L1
8.134000	17.80	11.7	50	32.2	AV	L1
9.678000	21.70	12.2	50	28.3	AV	L1

RESULT: PASS

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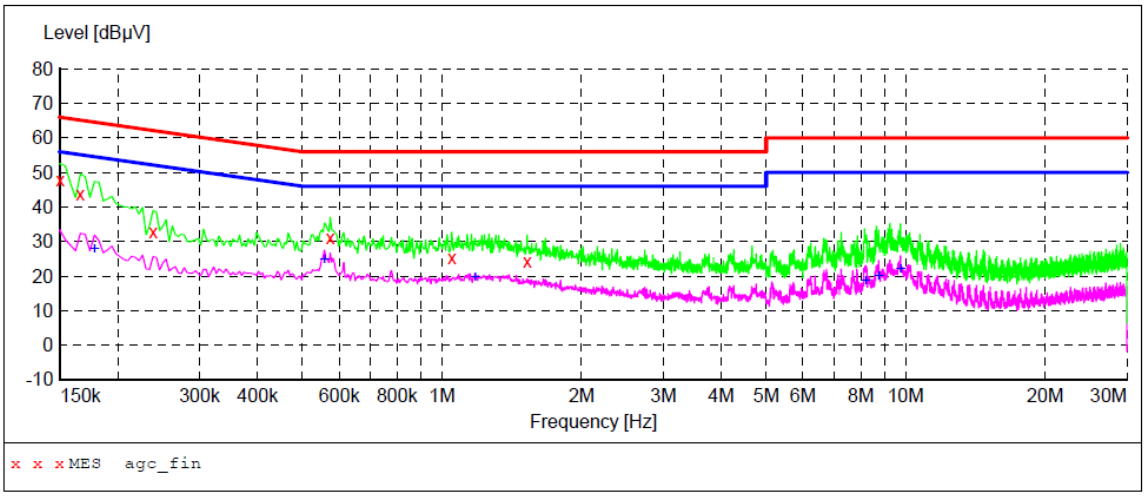
AC Power Line Conducted Emission Test			
Test Mode	Mode 1	LISN Line	Neutral Side



MEASUREMENT RESULT: "agc_fin"

2025/5/21 17:14

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.150000	47.70	10.3	66	18.3	QP	N
0.166000	43.80	10.3	65	21.4	QP	N
0.238000	32.90	10.3	62	29.3	QP	N
0.574000	31.00	10.3	56	25.0	QP	N
1.050000	25.10	10.4	56	30.9	QP	N
1.526000	24.40	10.4	56	31.6	QP	N

MEASUREMENT RESULT: "agc_fin2"

2025/5/21 17:14

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.178000	28.00	10.3	55	26.6	AV	N
0.558000	24.80	10.3	46	21.2	AV	N
1.178000	19.70	10.4	46	26.3	AV	N
8.202000	18.90	11.7	50	31.1	AV	N
8.738000	20.30	11.9	50	29.7	AV	N
9.746000	22.10	12.2	50	27.9	AV	N

RESULT: PASS

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Appendix I: Photographs of Test Setup

Refer to the Report No.: AGC00765250501AP02

Appendix II: Photographs of Test EUT

Refer to the Report No.: AGC00765250501AP03

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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.

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

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