

12. TIME OF OCCUPANCY (DWELL TIME)

12.1. 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 \leq channel spacing and where possible RBW should be set $\gg 1 / T$, where T is the expected dwell time per channel.
3. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
4. Detector function: Peak. Trace: Max hold.
5. Use the marker-delta function to determine the transmit time per hop.
6. Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

(Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer) \times (period specified in the requirements / analyzer sweep time)

7. The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements.

12.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 8.2

12.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

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12.4. LIMITS AND MEASUREMENT RESULT

Test Data of Dwell Time					
Channel	Time of Pulse for DH5 (ms)	Number of hops in the period specified in the requirements	Sweep Time (ms)	Limit (ms)	Pass or Fail
8DPSK_2402	2.886	27.0*4	311.688	400	Pass
8DPSK_2441	2.885	26.0*4	300.040	400	Pass
8DPSK_2480	2.886	26.0*4	300.144	400	Pass

Note: The 8DPSK modulation is the worst case and recorded in the report.

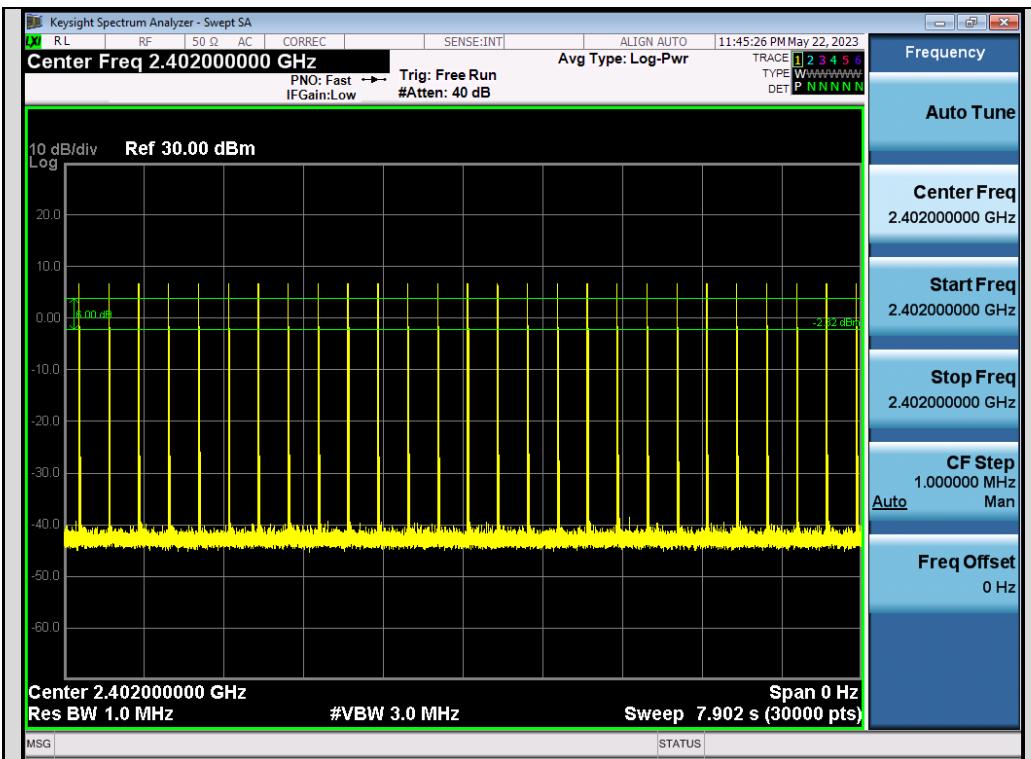
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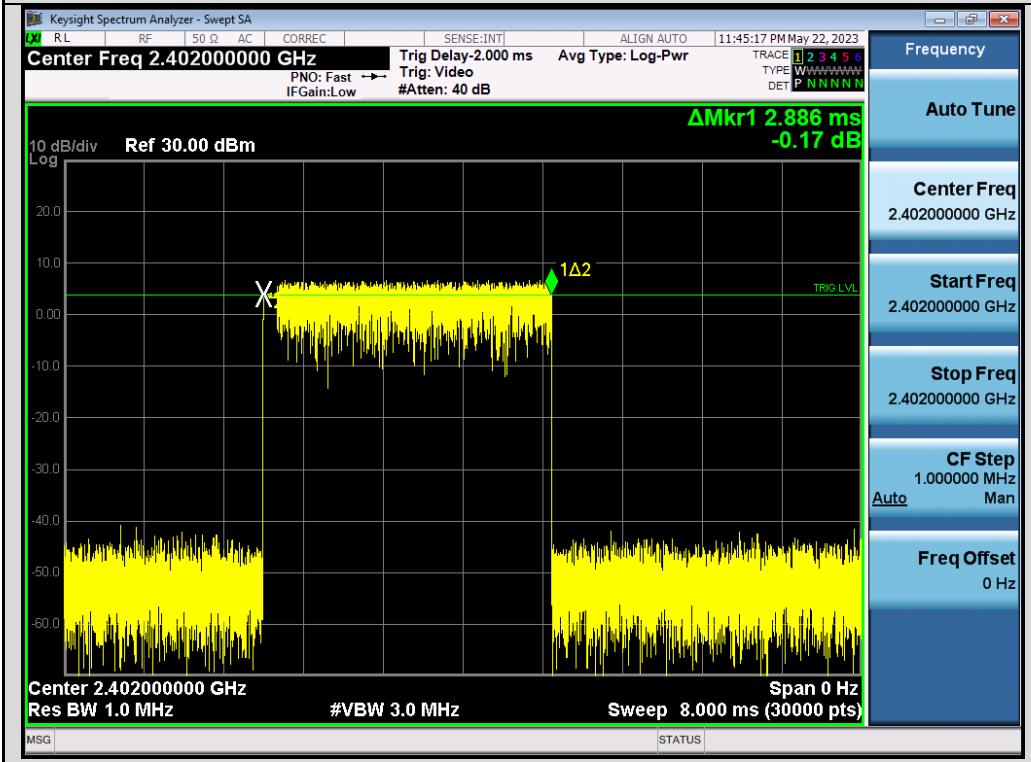
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Test Graphs of Dwell Time



Test_Graph_BR_HOP_ANT1_NA_3Mbps_2402_Number of Bursts



Test_Graph_BR_HOP_ANT1_NA_3Mbps_2402_Time per Burst

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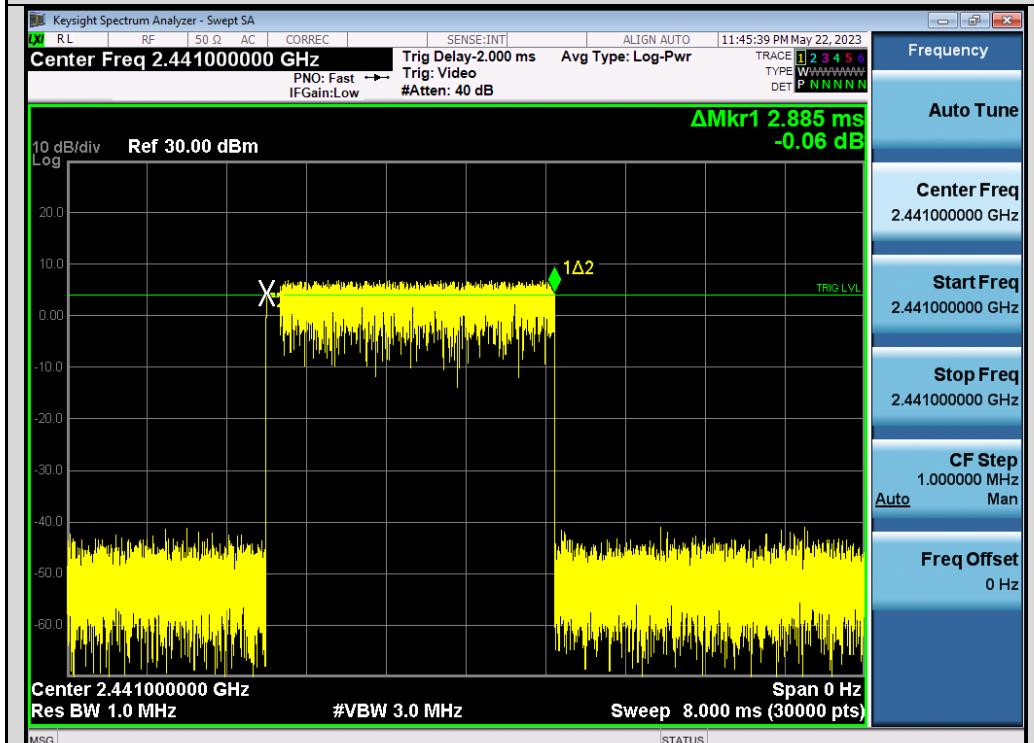
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Test_Graph_BR_HOP_ANT1_NA_3Mbps_2441_Number of Bursts



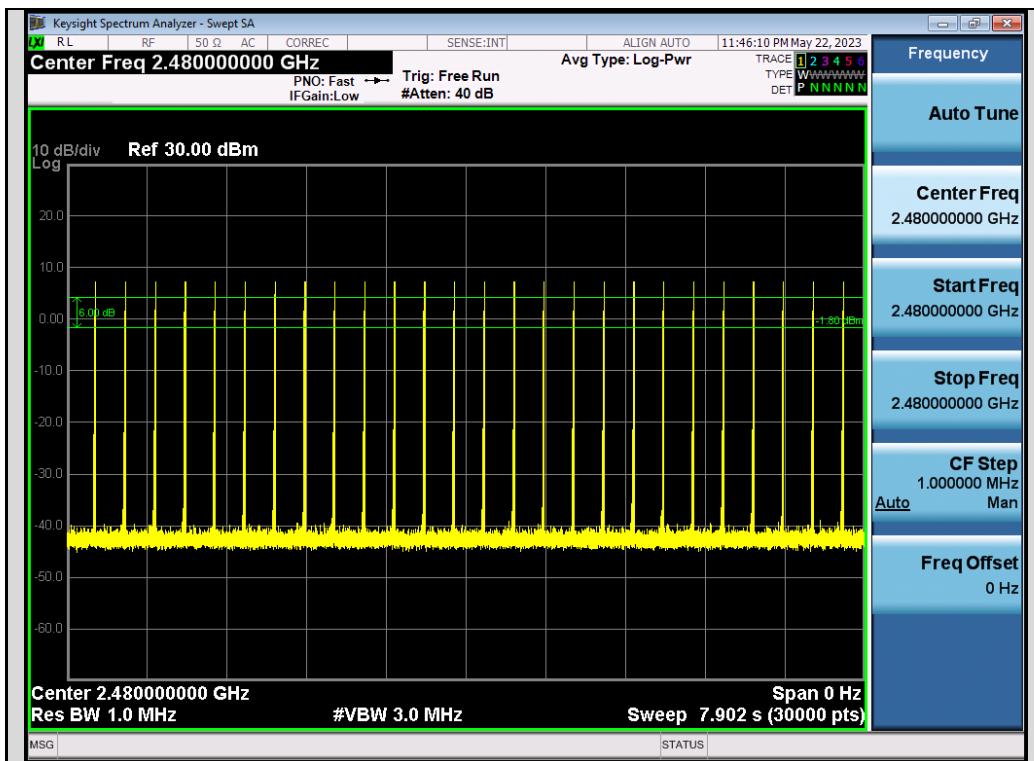
Test_Graph_BR_HOP_ANT1_NA_3Mbps_2441_Time per Burst

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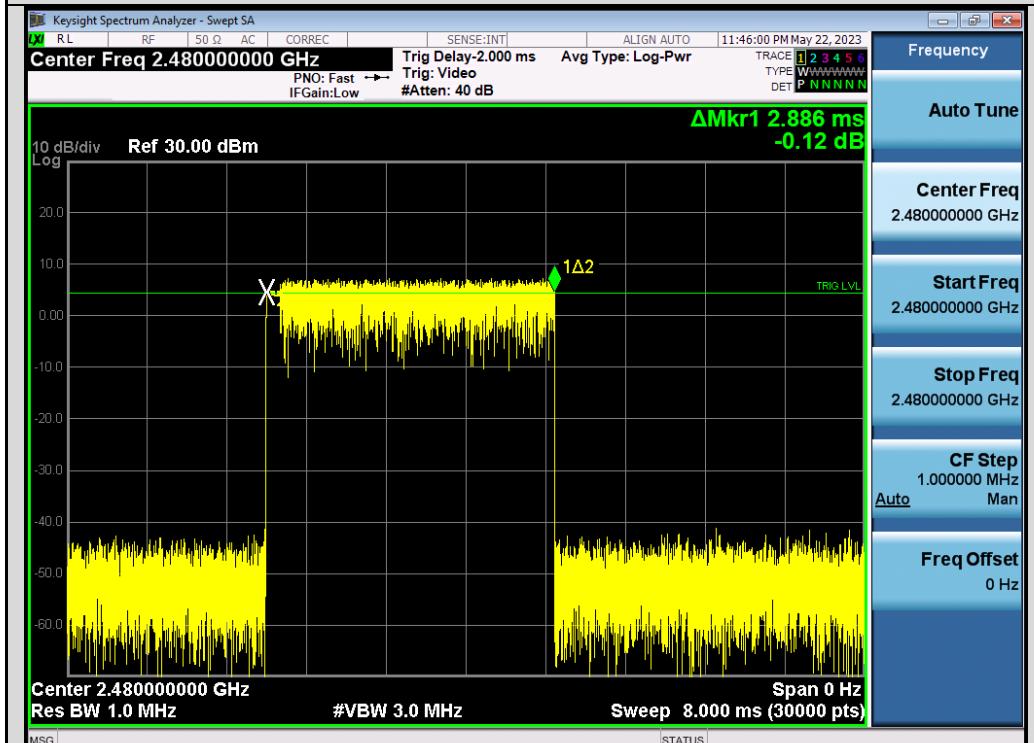
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Test_Graph_BR_HOP_ANT1_NA_3Mbps_2480_Number of Bursts



Test_Graph_BR_HOP_ANT1_NA_3Mbps_2480_Time per Burst

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13. FREQUENCY SEPARATION

13.1. 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) \geq RBW.
4. Sweep: Auto. e) Detector function: Peak. f) Trace: Max hold. g) Allow the trace to stabilize.

Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

13.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 6.2

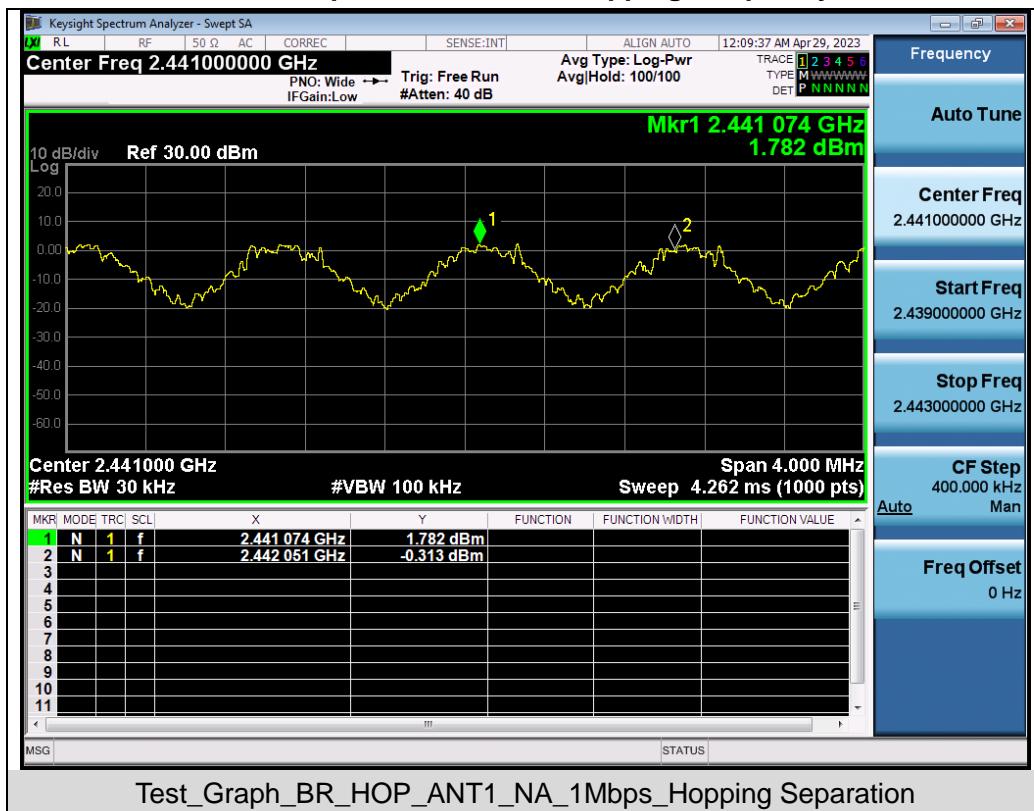
13.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.3

13.4. LIMITS AND MEASUREMENT RESULT

Test Data of Frequency Separation			
Test Mode	Channel Separation (MHz)	Limits	Pass or Fail
GFSK Hopping	0.977	$\geq 2/3 \text{ -20dB BW}$	Pass
$\pi/4$ -DQPSK Hopping	0.997	$\geq 2/3 \text{ -20dB BW}$	Pass
8DPSK Hopping	1.009	$\geq 2/3 \text{ -20dB BW}$	Pass

Test Graphs of Number of Hopping Frequency

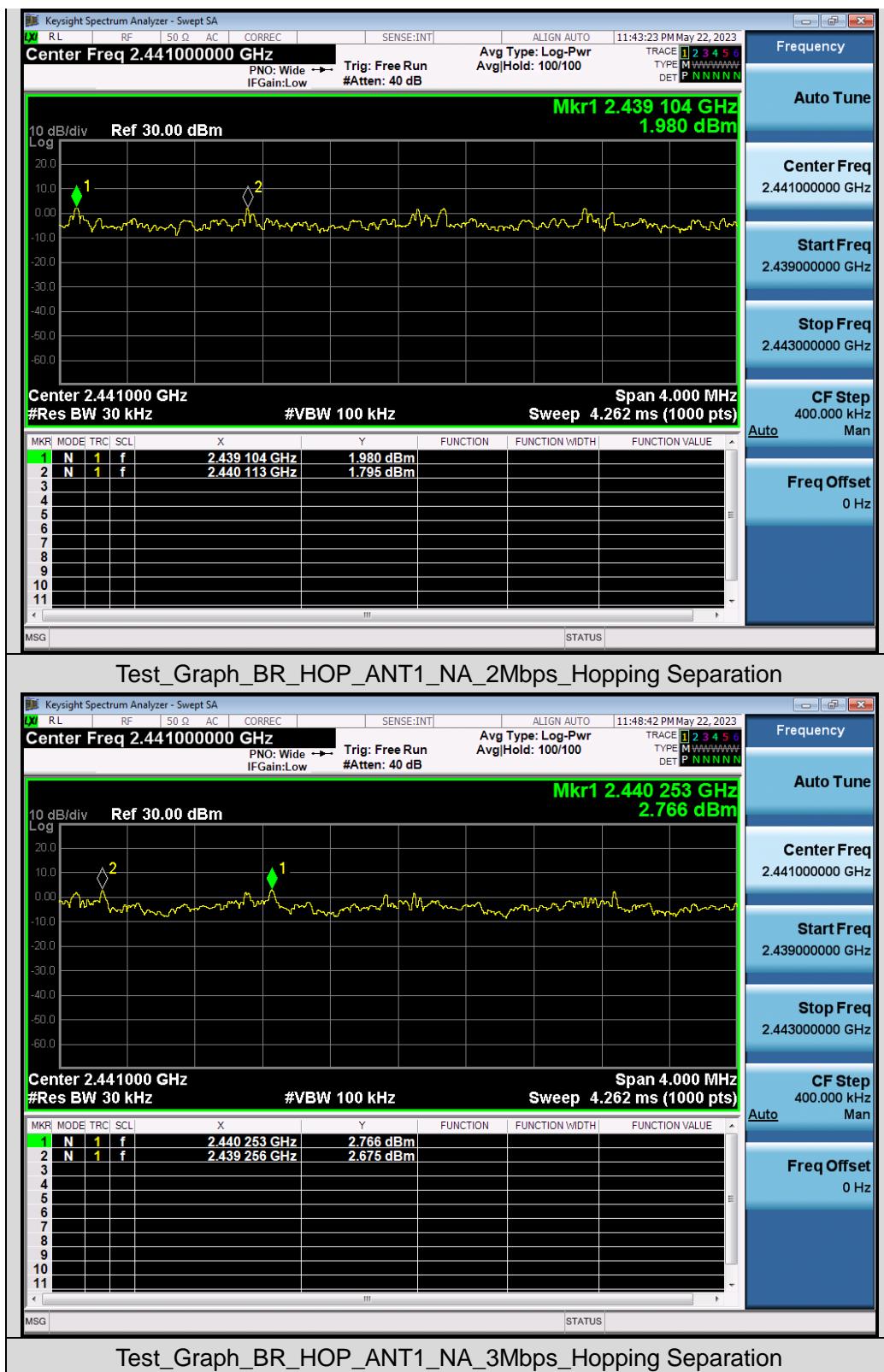


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14. LINE CONDUCTED EMISSION TEST

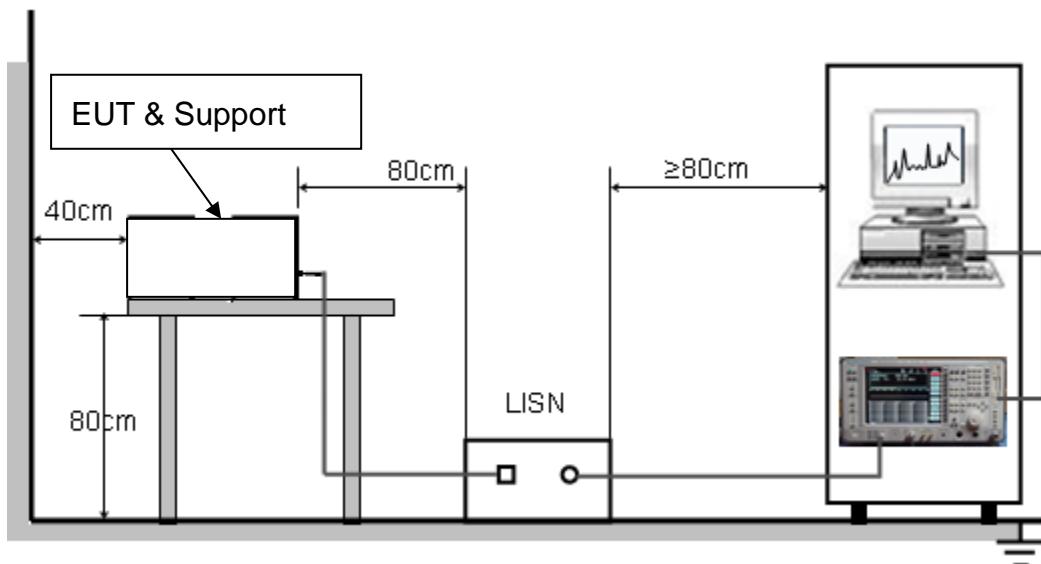
14.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P. (dB μ V)	Average (dB μ V)
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.

14.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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14.3. 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 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.

14.4. 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.

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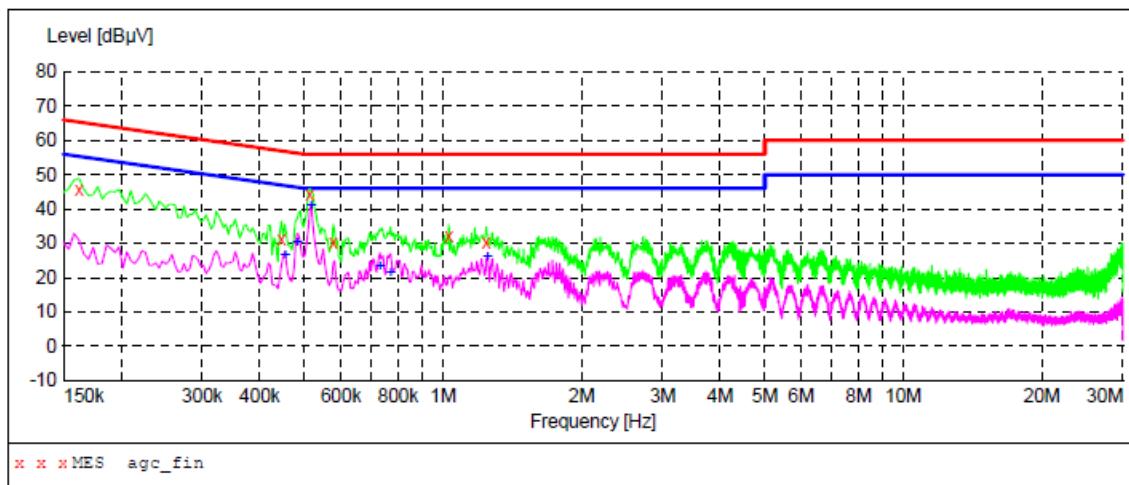
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14.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Line Conducted Emission Test Line 1-L



MEASUREMENT RESULT: "agc_fin"

2023/5/4 9:50

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.162000	45.50	6.2	65	19.9	QP	L1	GND
0.446000	31.20	6.2	57	25.7	QP	L1	GND
0.514000	44.00	6.2	56	12.0	QP	L1	GND
0.578000	30.30	6.2	56	25.7	QP	L1	GND
1.030000	32.10	6.3	56	23.9	QP	L1	GND
1.242000	30.30	6.3	56	25.7	QP	L1	GND

MEASUREMENT RESULT: "agc_fin2"

2023/5/4 9:50

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.454000	26.70	6.2	47	20.1	AV	L1	GND
0.482000	30.20	6.2	46	16.1	AV	L1	GND
0.518000	41.00	6.2	46	5.0	AV	L1	GND
0.730000	23.20	6.3	46	22.8	AV	L1	GND
0.770000	21.40	6.3	46	24.6	AV	L1	GND
1.250000	26.10	6.3	46	19.9	AV	L1	GND

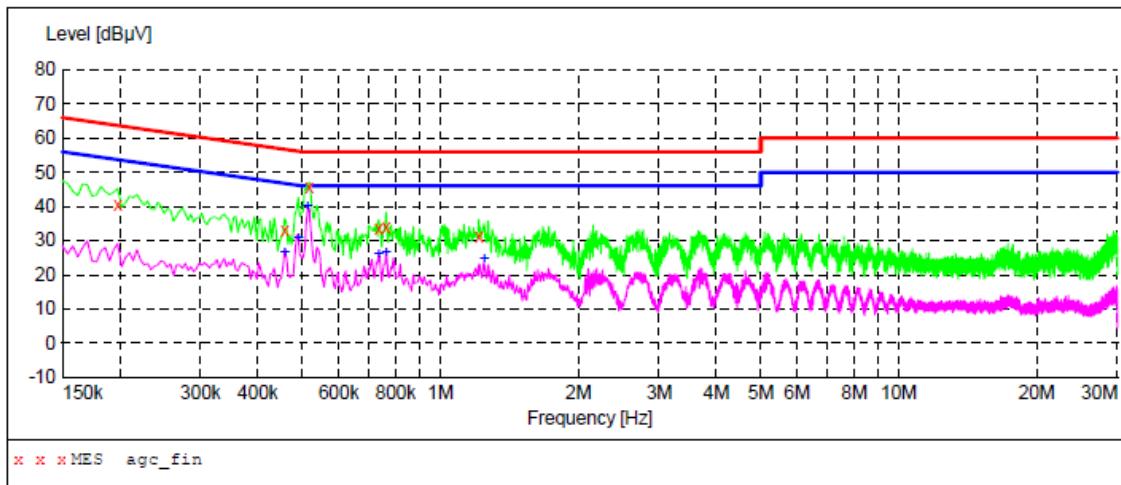
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Line Conducted Emission Test Line 2-N


MEASUREMENT RESULT: "agc_fin"

2023/5/4 9:53

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.198000	40.40	6.2	64	23.3	QP	N	GND
0.458000	33.10	6.2	57	23.6	QP	N	GND
0.518000	45.70	6.2	56	10.3	QP	N	GND
0.734000	33.40	6.3	56	22.6	QP	N	GND
0.762000	33.90	6.3	56	22.1	QP	N	GND
1.214000	31.40	6.3	56	24.6	QP	N	GND

MEASUREMENT RESULT: "agc_fin2"

2023/5/4 9:53

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.458000	26.30	6.2	47	20.4	AV	N	GND
0.490000	30.90	6.2	46	15.3	AV	N	GND
0.514000	39.80	6.2	46	6.2	AV	N	GND
0.734000	26.00	6.3	46	20.0	AV	N	GND
0.762000	26.40	6.3	46	19.6	AV	N	GND
1.246000	24.50	6.3	46	21.5	AV	N	GND

RESULT: PASS

Note: All the test modes had been tested, the mode 9 was the worst case. Only the data of the worst case would be record in this test report.

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APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Refer to the Report No.: AGC06913230402AP02

APPENDIX B: PHOTOGRAPHS OF EUT

Refer to the Report No.: AGC06913230402AP03

----END OF REPORT----

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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.
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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 or warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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