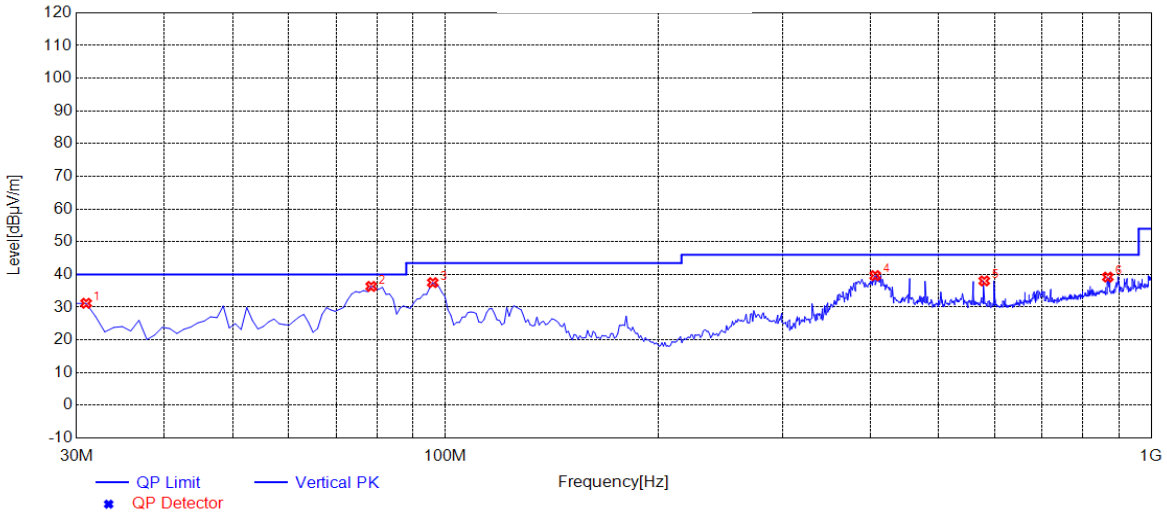
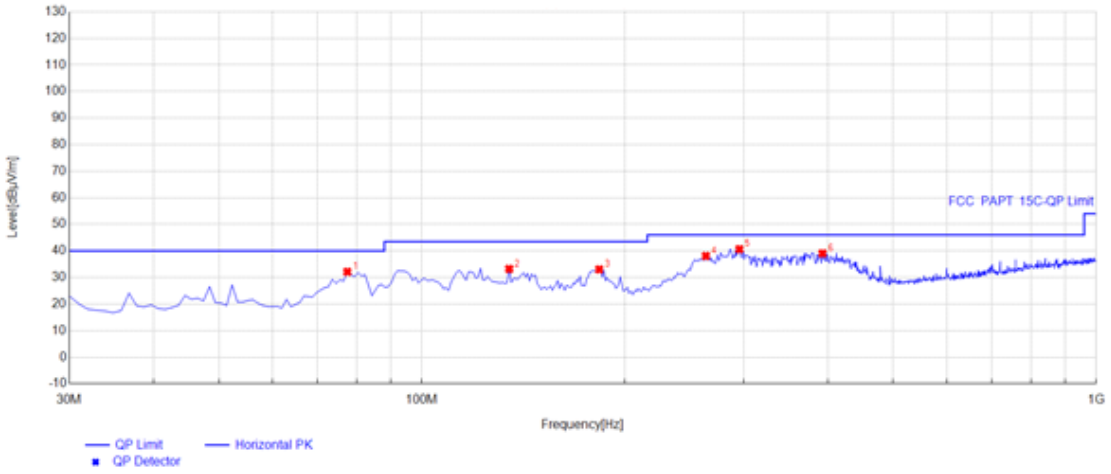
EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.9700	31.20	10.02	40.00	8.80	100	268	Vertical
2	78.5000	36.36	7.46	40.00	3.64	100	148	Vertical
3	95.9600	37.52	9.71	43.50	5.98	100	312	Vertical
4	406.3600	39.67	19.97	46.00	6.33	100	187	Vertical
5	579.9900	38.04	23.91	46.00	7.96	100	231	Vertical
6	868.0800	39.21	29.58	46.00	6.79	100	125	Vertical

RESULT: PASS

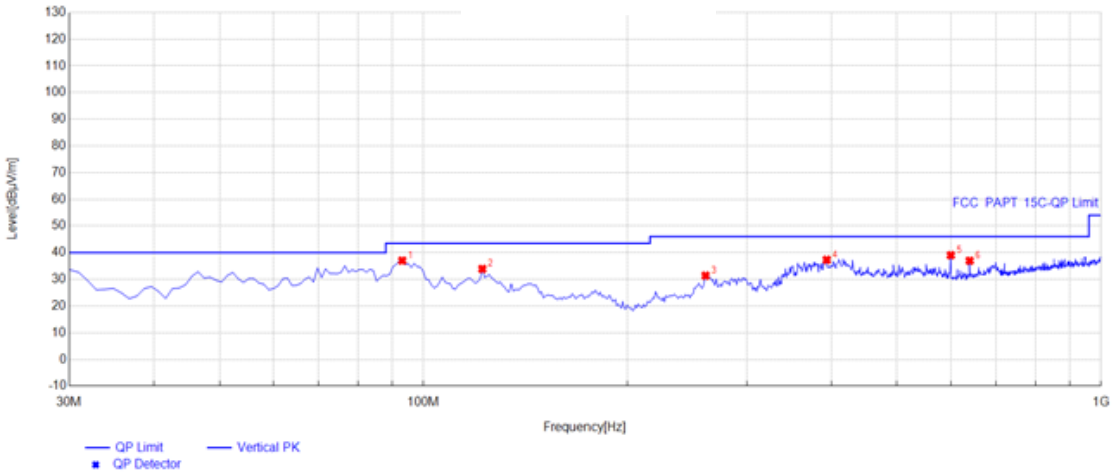
EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	77.53	32.14	7.66	40.00	7.86	100	73	Horizontal
2	134.76	33.21	14.49	43.50	10.29	100	200	Horizontal
3	183.26	33.03	12.83	43.50	10.47	100	23	Horizontal
4	263.77	38.09	14.88	46.00	7.91	100	255	Horizontal
5	295.78	40.65	15.97	46.00	5.35	100	276	Horizontal
6	392.78	39.06	19.51	46.00	6.94	100	352	Horizontal

RESULT: PASS

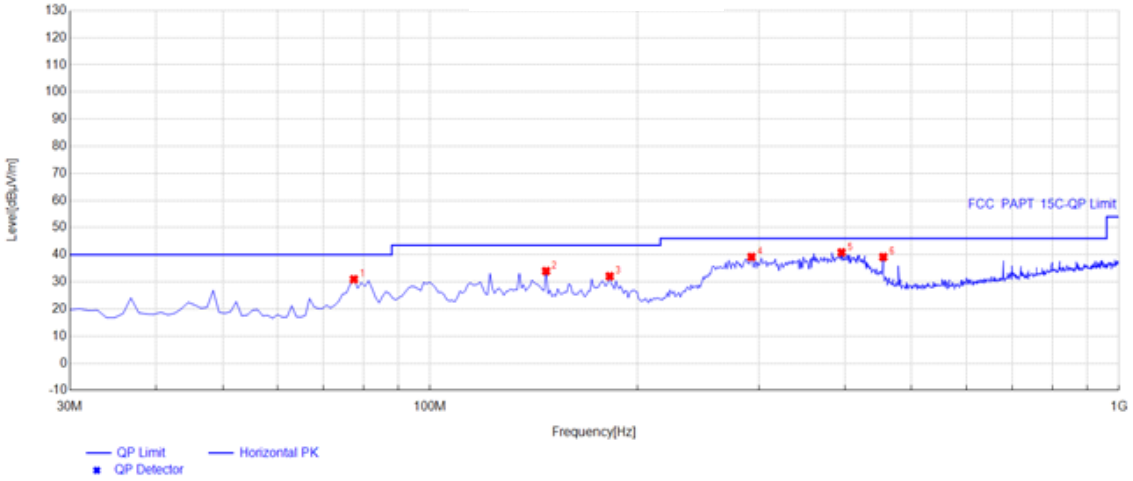
EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	93.05	37.02	8.52	43.50	6.48	100	141	Vertical
2	122.15	33.91	13.62	43.50	9.59	100	184	Vertical
3	260.86	31.38	14.63	46.00	14.62	100	235	Vertical
4	393.75	37.31	19.54	46.00	8.69	100	197	Vertical
5	600.36	39.05	24.33	46.00	6.95	100	238	Vertical
6	640.13	36.97	24.95	46.00	9.03	100	37	Vertical

RESULT: PASS

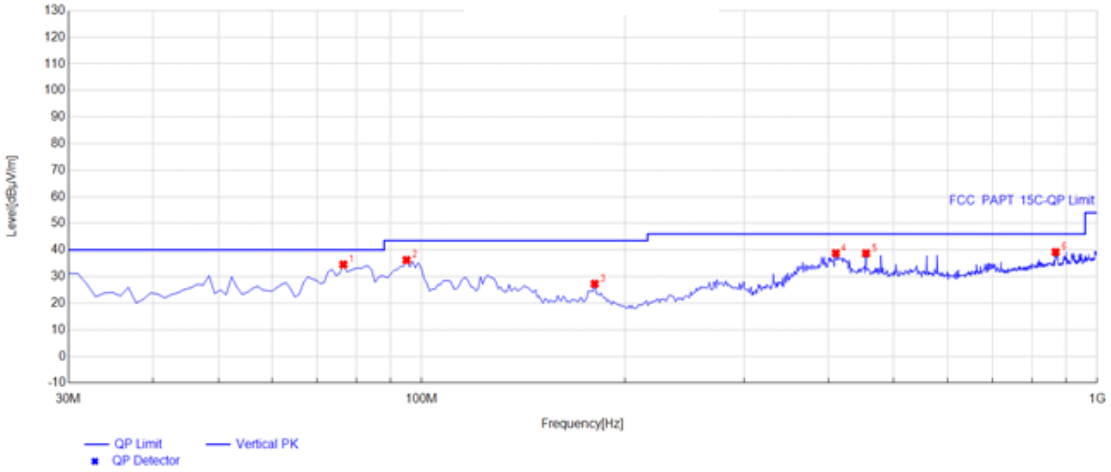
EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	77.53	30.95	7.66	40.00	9.05	100	71	Horizontal
2	147.37	33.97	14.88	43.50	9.53	100	8	Horizontal
3	182.29	32.05	12.88	43.50	11.45	100	31	Horizontal
4	292.87	39.20	16.04	46.00	6.80	100	115	Horizontal
5	395.69	40.87	19.60	46.00	5.13	100	2	Horizontal
6	454.86	39.17	21.08	46.00	6.83	100	20	Horizontal

RESULT: PASS

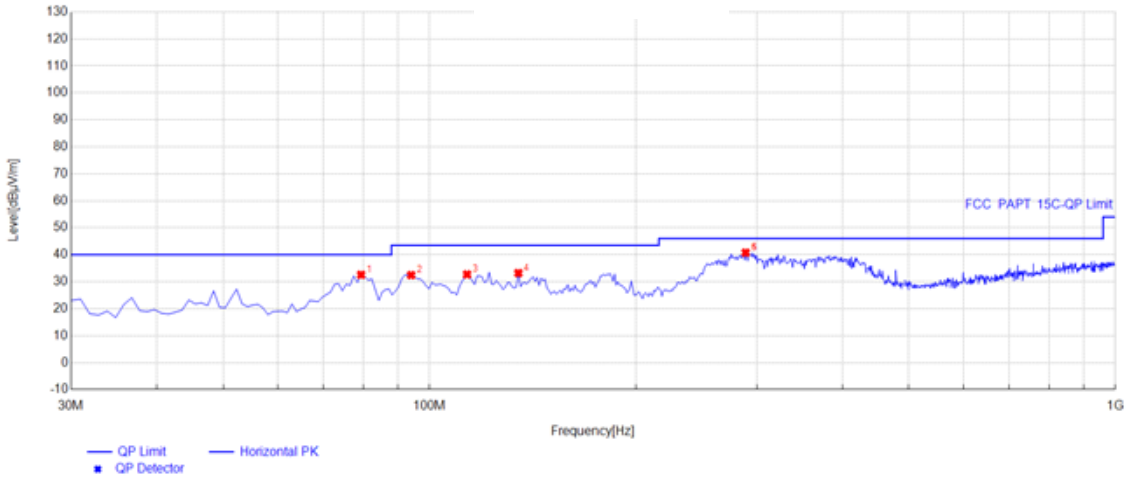
EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	76.56	34.54	7.87	40.00	5.46	100	166	Vertical
2	94.99	36.22	9.32	43.50	7.28	100	318	Vertical
3	180.35	27.28	12.98	43.50	16.22	100	278	Vertical
4	410.24	38.80	20.02	46.00	7.20	100	187	Vertical
5	454.86	38.75	21.08	46.00	7.25	100	358	Vertical
6	868.08	39.21	29.58	46.00	6.79	100	125	Vertical

RESULT: PASS

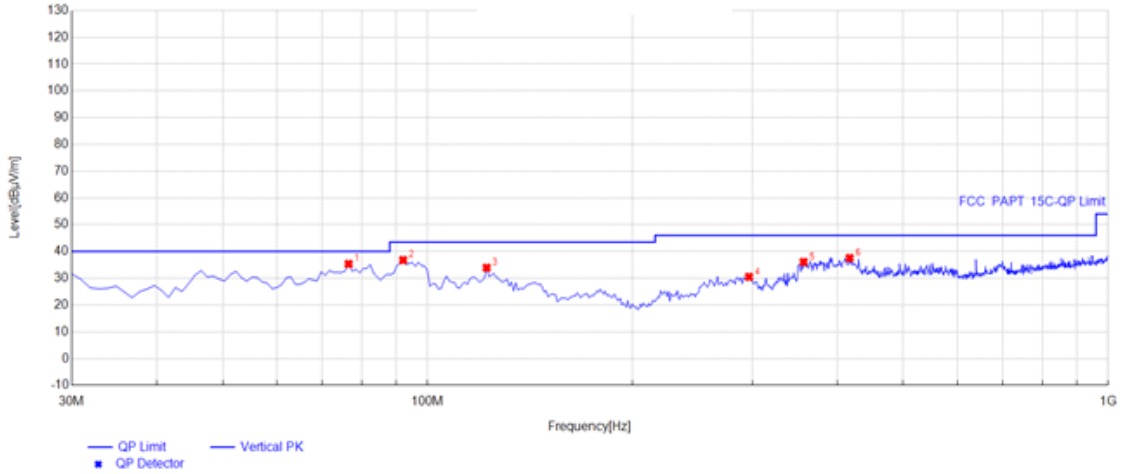
EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Horizontal



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	79.47	32.57	7.26	40.00	7.43	100	118	Horizontal
2	94.02	32.44	8.92	43.50	11.06	100	281	Horizontal
3	113.42	32.70	12.79	43.50	10.80	100	168	Horizontal
4	134.76	33.21	14.49	43.50	10.29	100	200	Horizontal
5	288.99	40.77	16.14	46.00	5.23	100	268	Horizontal
6	288.99	40.77	16.14	46.00	5.23	100	268	Horizontal

RESULT: PASS

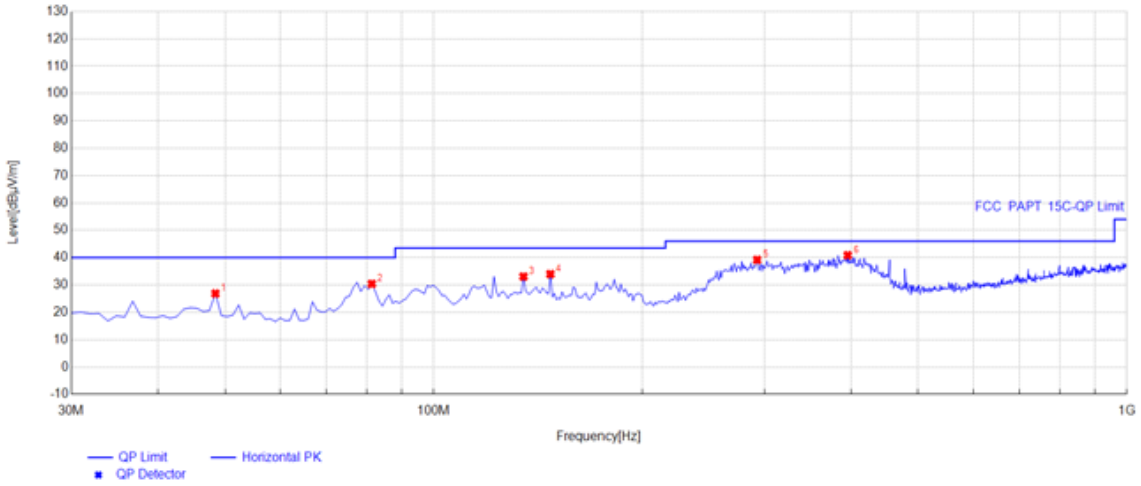
EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	76.56	35.35	7.87	40.00	4.65	100	144	Vertical
2	92.08	36.79	8.12	43.50	6.71	100	184	Vertical
3	122.15	33.91	13.62	43.50	9.59	100	184	Vertical
4	296.75	30.52	15.96	46.00	15.48	100	1	Vertical
5	356.89	36.07	18.09	46.00	9.93	100	197	Vertical
6	417.03	37.56	20.17	46.00	8.44	100	192	Vertical

RESULT: PASS

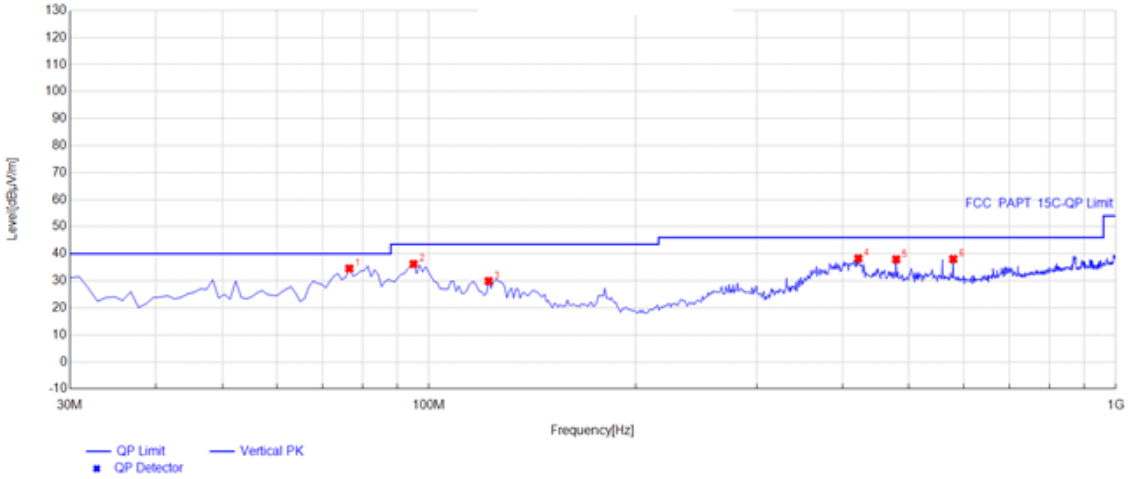
EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 8	Antenna	Horizontal



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	48.43	26.86	11.71	40.00	13.14	100	358	Horizontal
2	81.41	30.40	7.16	40.00	9.60	100	100	Horizontal
3	134.76	33.06	14.49	43.50	10.44	100	168	Horizontal
4	147.37	33.97	14.88	43.50	9.53	100	8	Horizontal
5	292.87	39.20	16.04	46.00	6.80	100	115	Horizontal
6	395.69	40.87	19.60	46.00	5.13	100	2	Horizontal

RESULT: PASS

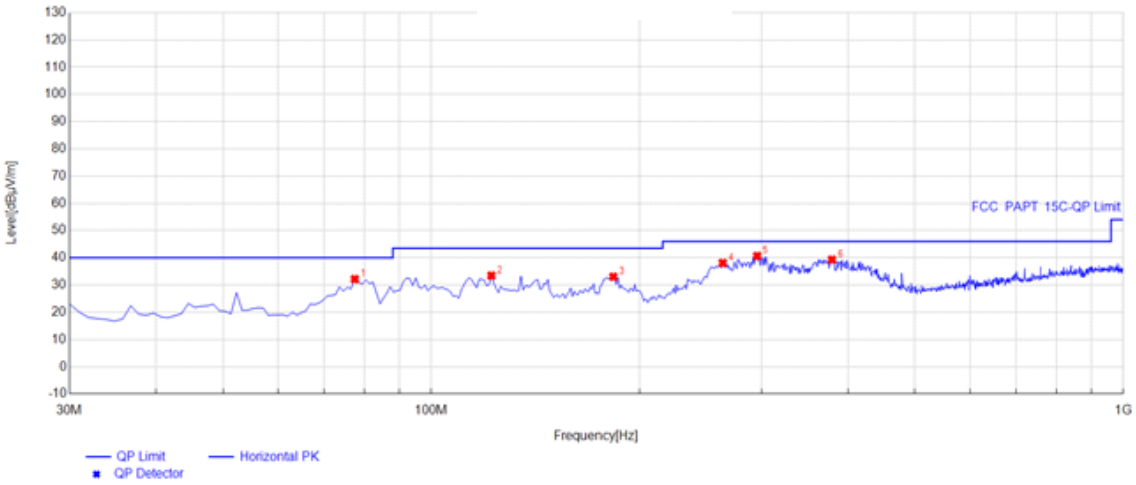
EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 8	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	76.56	34.54	7.87	40.00	5.46	100	166	Vertical
2	94.99	36.22	9.32	43.50	7.28	100	318	Vertical
3	122.15	29.91	13.62	43.50	13.59	100	323	Vertical
4	421.88	38.27	20.31	46.00	7.73	100	197	Vertical
5	479.11	37.92	21.69	46.00	8.08	100	358	Vertical
6	579.99	38.04	23.91	46.00	7.96	100	231	Vertical

RESULT: PASS

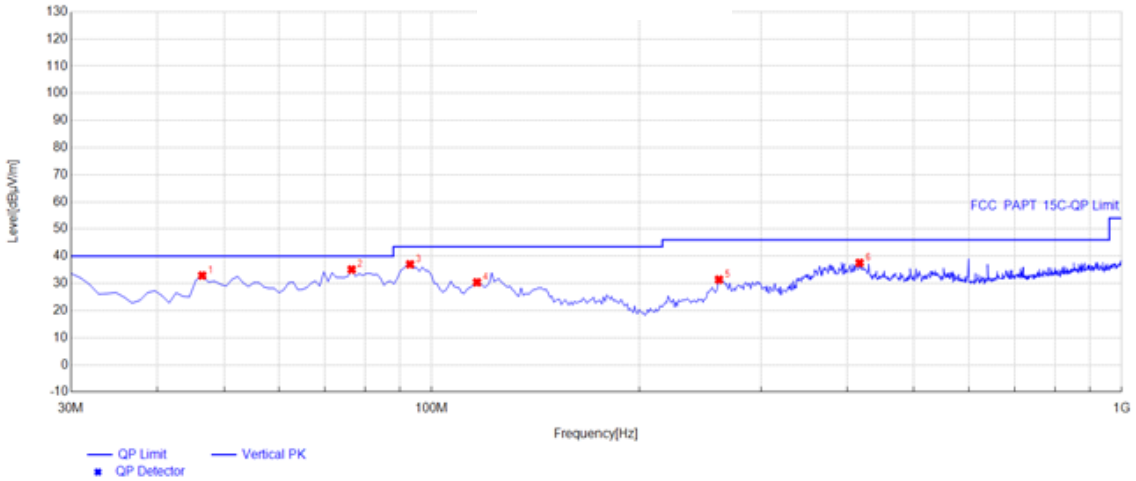
EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Horizontal



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	77.53	32.14	7.66	40.00	7.86	100	73	Horizontal
2	122.15	33.46	13.62	43.50	10.04	100	179	Horizontal
3	183.26	33.03	12.83	43.50	10.47	100	23	Horizontal
4	263.77	38.09	14.88	46.00	7.91	100	255	Horizontal
5	295.78	40.65	15.97	46.00	5.35	100	276	Horizontal
6	379.2	39.31	19.00	46.00	6.69	100	33	Horizontal

RESULT: PASS

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	46.49	32.88	11.77	40.00	7.12	100	230	Vertical
2	76.56	35.11	7.87	40.00	4.89	100	144	Vertical
3	93.05	37.02	8.52	43.50	6.48	100	141	Vertical
4	116.33	30.39	13.09	43.50	13.11	100	283	Vertical
5	260.86	31.38	14.63	46.00	14.62	100	235	Vertical
6	417.03	37.56	20.17	46.00	8.44	100	192	Vertical

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Limit-Level.

2. All test modes had been tested. The GFSK and 8DPSK modulation is the worst case and recorded in the report.

Radiated emission above 1GHz

EUT	VAVA Chroma 4K UST Triple Laser Projector	**Model Name**	VA-SP003
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 1	**Antenna**	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	44.26	0.08	44.34	74	-29.66	peak
4804.000	37.13	0.08	37.21	54	-16.79	AVG
7206.000	40.57	2.21	42.78	74	-31.22	peak
7206.000	32.81	2.21	35.02	54	-18.98	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	VAVA Chroma 4K UST Triple Laser Projector	**Model Name**	VA-SP003
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	Mode 1	**Antenna**	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	45.19	0.08	45.27	74	-28.73	peak
4804.000	36.87	0.08	36.95	54	-17.05	AVG
7206.000	40.25	2.21	42.46	74	-31.54	peak
7206.000	31.74	2.21	33.95	54	-20.05	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.000	46.29	0.14	46.43	74	-27.57	peak
4882.000	36.48	0.14	36.62	54	-17.38	AVG
7323.000	41.27	2.36	43.63	74	-30.37	peak
7323.000	34.57	2.36	36.93	54	-17.07	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4882.000	46.29	0.14	46.43	74	-27.57	peak
4882.000	37.54	0.14	37.68	54	-16.32	AVG
7323.000	42.85	2.36	45.21	74	-28.79	peak
7323.000	32.67	2.36	35.03	54	-18.97	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	47.52	0.22	47.74	74	-26.26	peak
4960.000	38.54	0.22	38.76	54	-15.24	AVG
7440.000	42.66	2.64	45.3	74	-28.7	peak
7440.000	32.92	2.64	35.56	54	-18.44	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	47.15	0.22	47.37	74	-26.63	peak
4960.000	35.27	0.22	35.49	54	-18.51	AVG
7440.000	41.59	2.64	44.23	74	-29.77	peak
7440.000	31.97	2.64	34.61	54	-19.39	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RESULT: PASS

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	45.29	0.08	45.37	74	-28.63	peak
4804.000	37.54	0.08	37.62	54	-16.38	AVG
7206.000	40.53	2.21	42.74	74	-31.26	peak
7206.000	32.97	2.21	35.18	54	-18.82	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 7	Antenna	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4804.000	46.58	0.08	46.66	74	-27.34	peak
4804.000	36.37	0.08	36.45	54	-17.55	AVG
7206.000	41.19	2.21	43.4	74	-30.6	peak
7206.000	32.57	2.21	34.78	54	-19.22	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 8	Antenna	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4880.000	46.23	0.14	46.37	74	-27.63	peak
4880.000	35.27	0.14	35.41	54	-18.59	AVG
7320.000	40.19	2.36	42.55	74	-31.45	peak
7320.000	30.24	2.36	32.6	54	-21.4	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 8	Antenna	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4880.000	46.37	0.14	46.51	74	-27.49	peak
4880.000	35.42	0.14	35.56	54	-18.44	AVG
7320.000	41.59	2.36	43.95	74	-30.05	peak
7320.000	31.81	2.36	34.17	54	-19.83	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	46.28	0.22	46.5	74	-27.5	peak
4960.000	38.54	0.22	38.76	54	-15.24	AVG
7440.000	41.33	2.64	43.97	74	-30.03	peak
7440.000	32.87	2.64	35.51	54	-18.49	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 9	Antenna	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4960.000	48.51	0.22	48.73	74	-25.27	peak
4960.000	36.57	0.22	36.79	54	-17.21	AVG
7440.000	41.23	2.64	43.87	74	-30.13	peak
7440.000	32.57	2.64	35.21	54	-18.79	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RESULT: PASS

Note:

The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

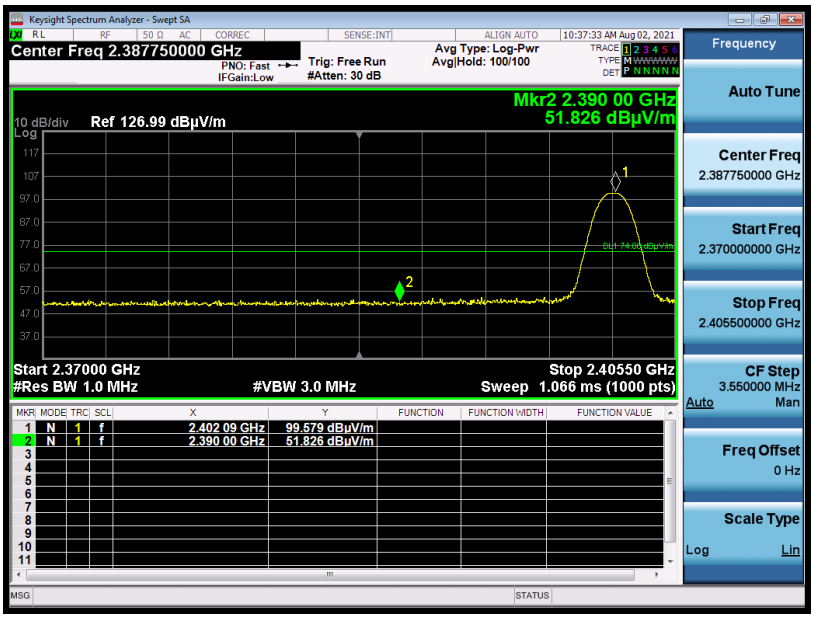
The “Factor” value can be calculated automatically by software of measurement system.

All test modes had been tested. The GFSK and 8DPSK modulation is the worst case and recorded in the report.

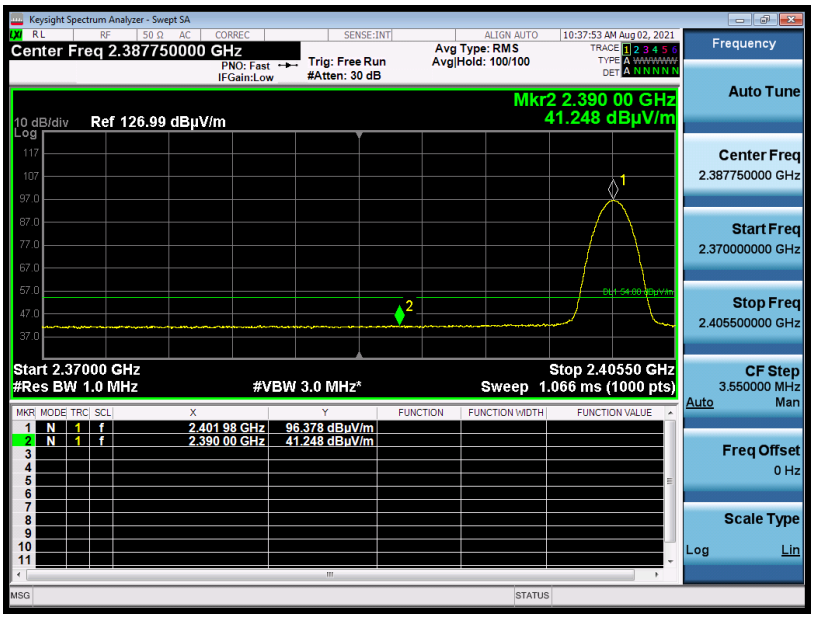
Test result for band edge emission at restricted bands

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25℃	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

Test Graph for Peak Measurement



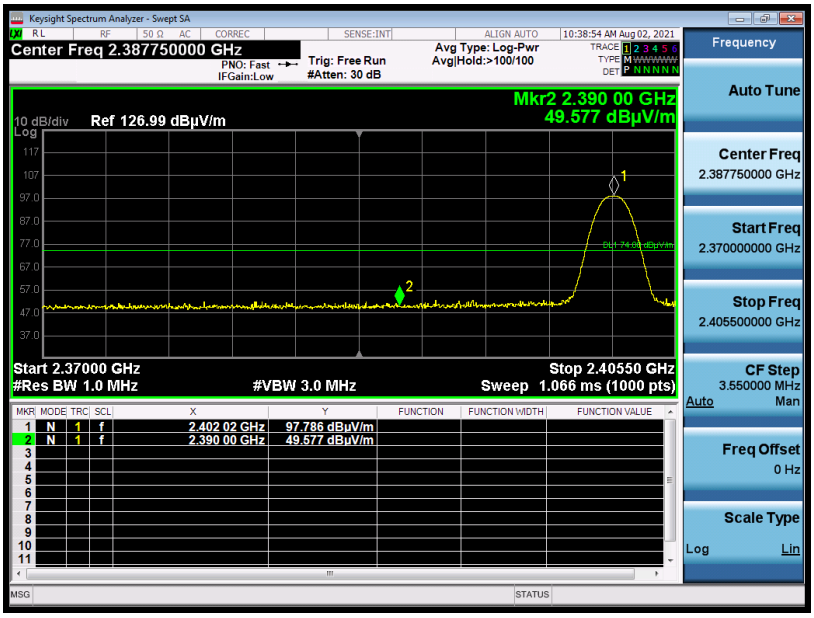
Test Graph for Average Measurement



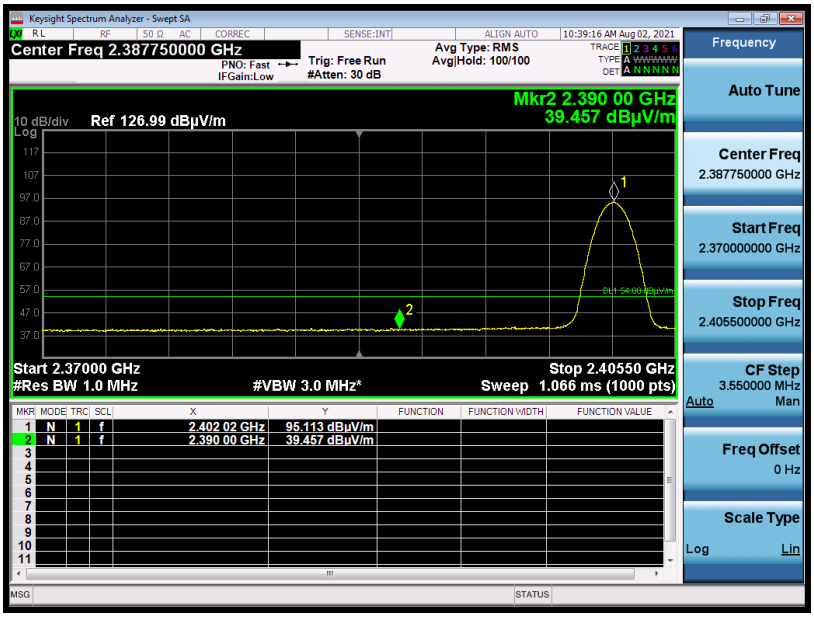
RESULT: PASS

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Test Graph for Peak Measurement



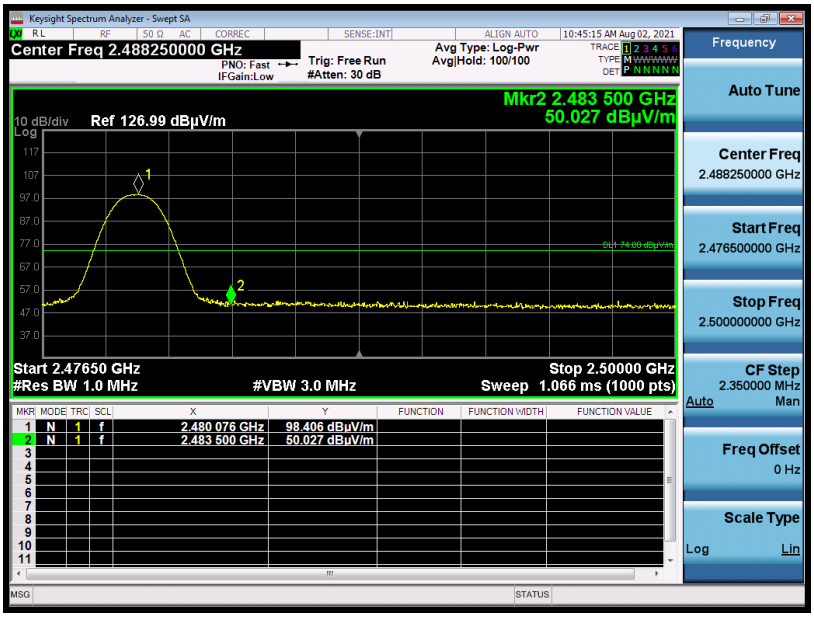
Test Graph for Average Measurement



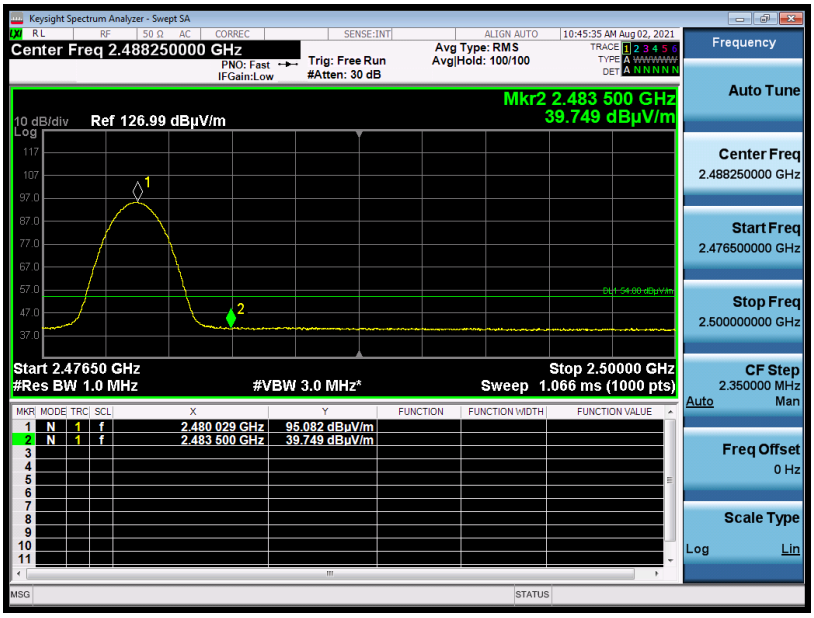
RESULT: PASS

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

Test Graph for Peak Measurement



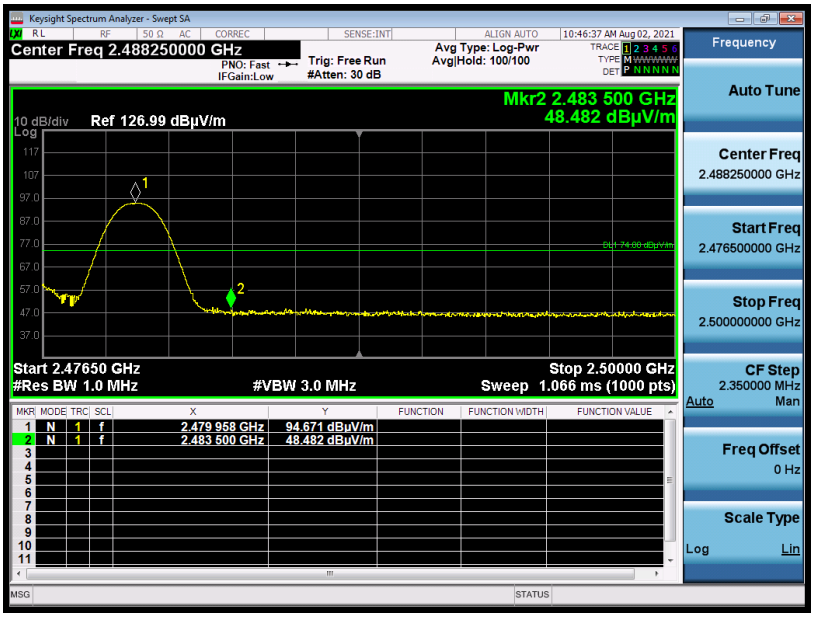
Test Graph for Average Measurement



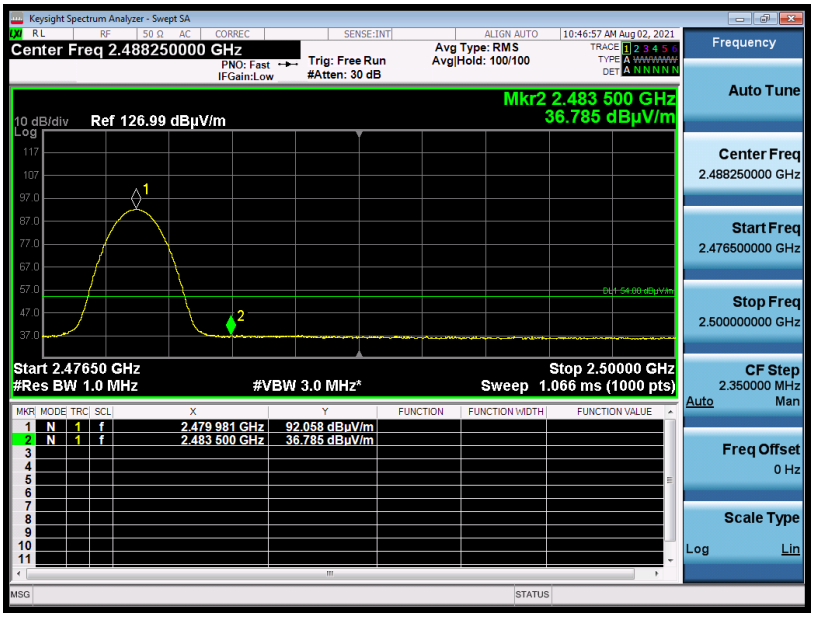
RESULT: PASS

EUT	VAVA Chroma 4K UST Triple Laser Projector	Model Name	VA-SP003
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement



RESULT: PASS

Note: The factor had been edited in the “Input Correction” of the Spectrum Analyzer. The GFSK modulation is the worst case and recorded in the report.

11. NUMBER OF HOPPING FREQUENCY

11.1. MEASUREMENT PROCEDURE

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:
1. Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
2. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
3. VBW ≥ RBW. Sweep: Auto. Detector function: Peak. Trace: Max hold.
4. Allow the trace to stabilize.

11.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 8.2

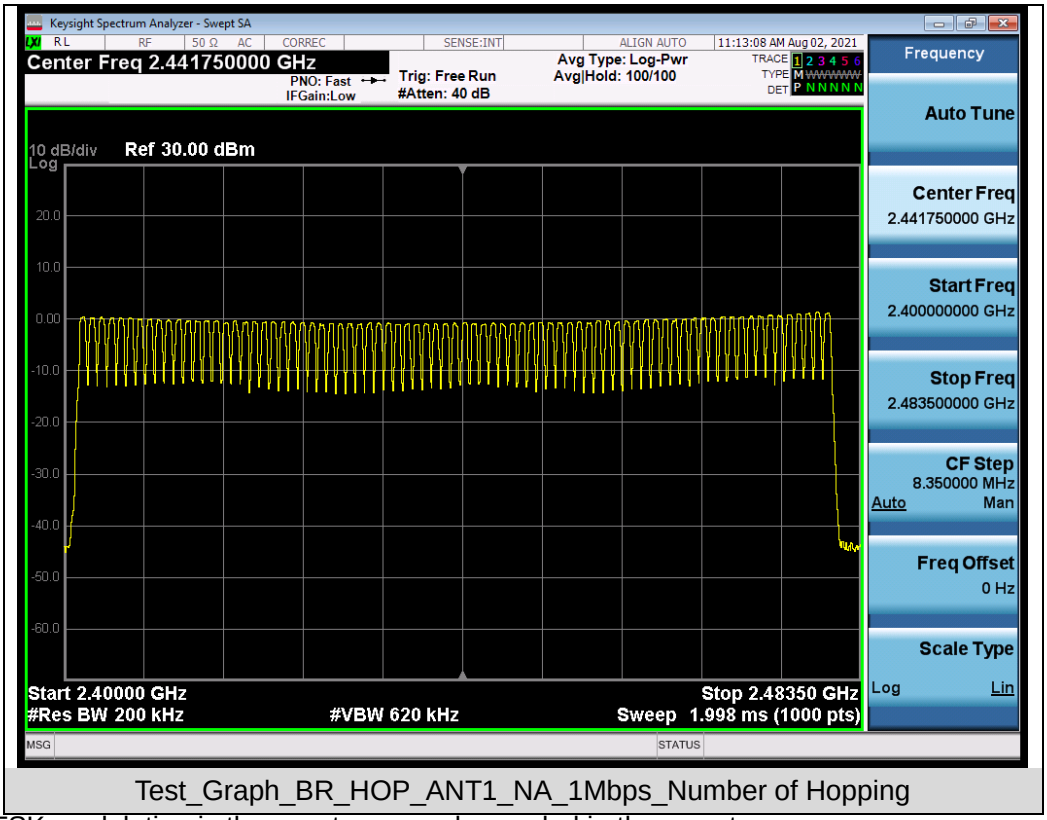
11.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6

11.4. LIMITS AND MEASUREMENT RESULT

Test Data of Number of Hopping Frequency			
Test Mode	Number of Hopping Frequency	Limits	Pass or Fail
GFSK Hopping	79	>=15	Pass

Test Graphs of Number of Hopping Frequency



Test_Graph_BR_HOP_ANT1_NA_1Mbps_Number of Hopping

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

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≤channel spacing and where possible RBW should be set >> 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) × (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

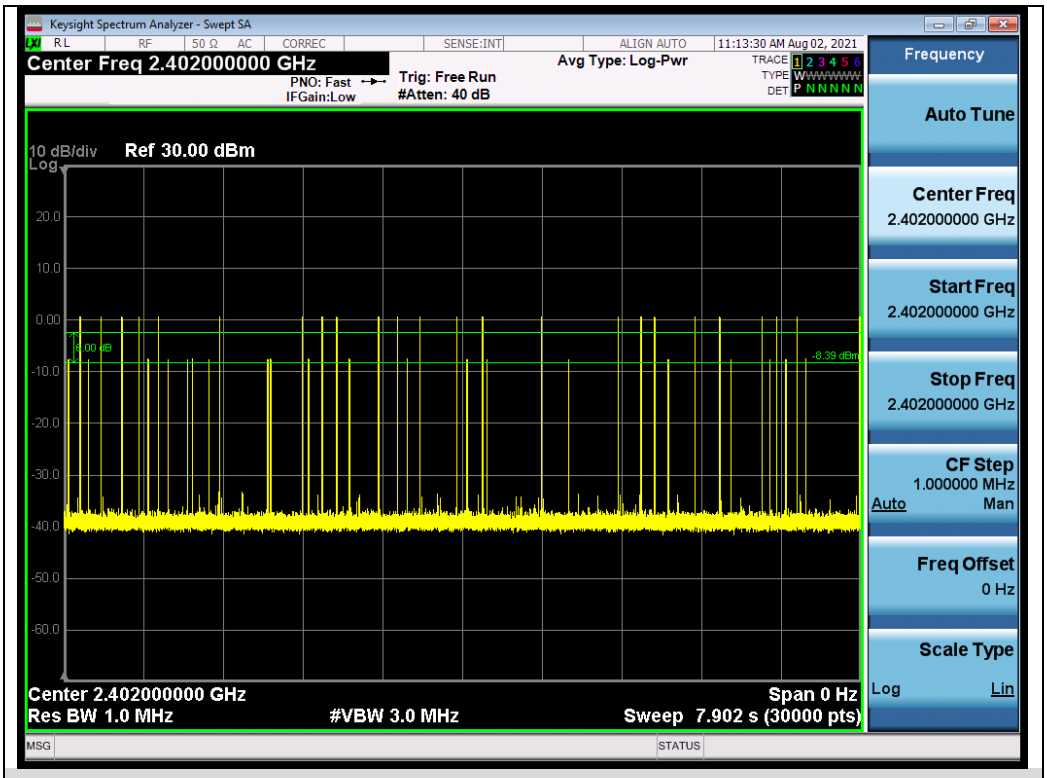
The same as described in section 6

12.4. LIMITS AND MEASUREMENT RESULT

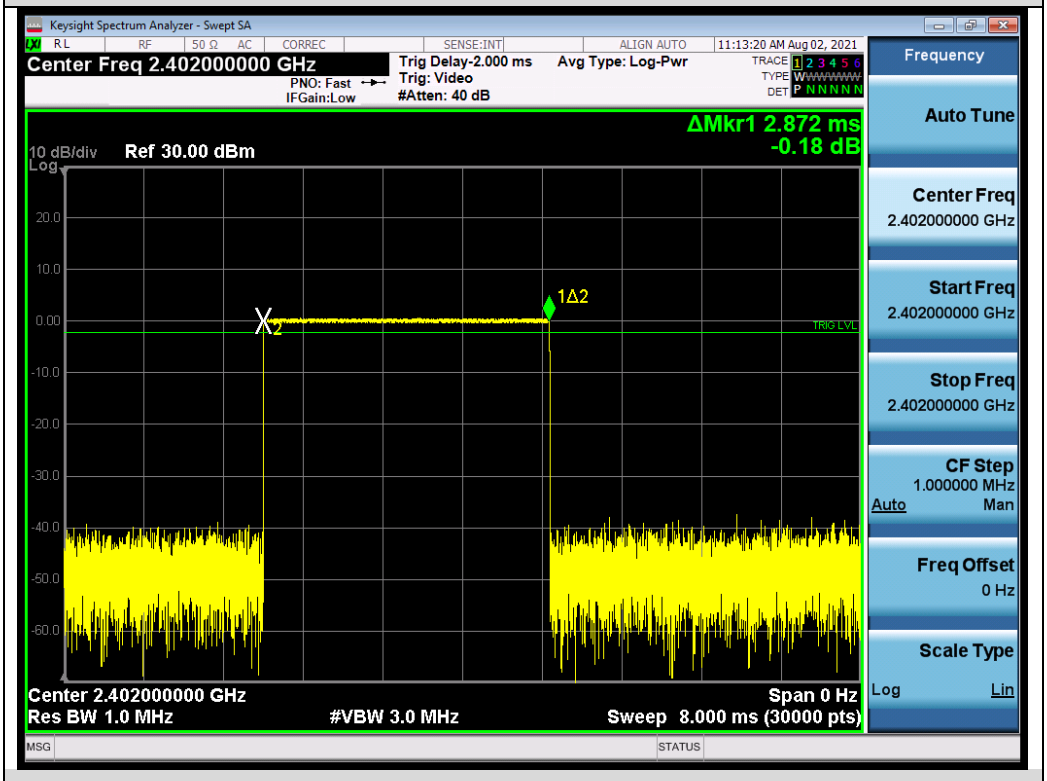
Test Data of Dwell Time					
Channel	Time of Pulse for DH5 (ms)	Number of hops in the period specified in the requirements	Sweep Time (ms)	Limit (ms)	Pass or Fail
2402	2.872	24.0*4	275.712	400	Pass
2441	2.872	21.0*4	241.248	400	Pass
2480	2.872	22.0*4	252.736	400	Pass

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

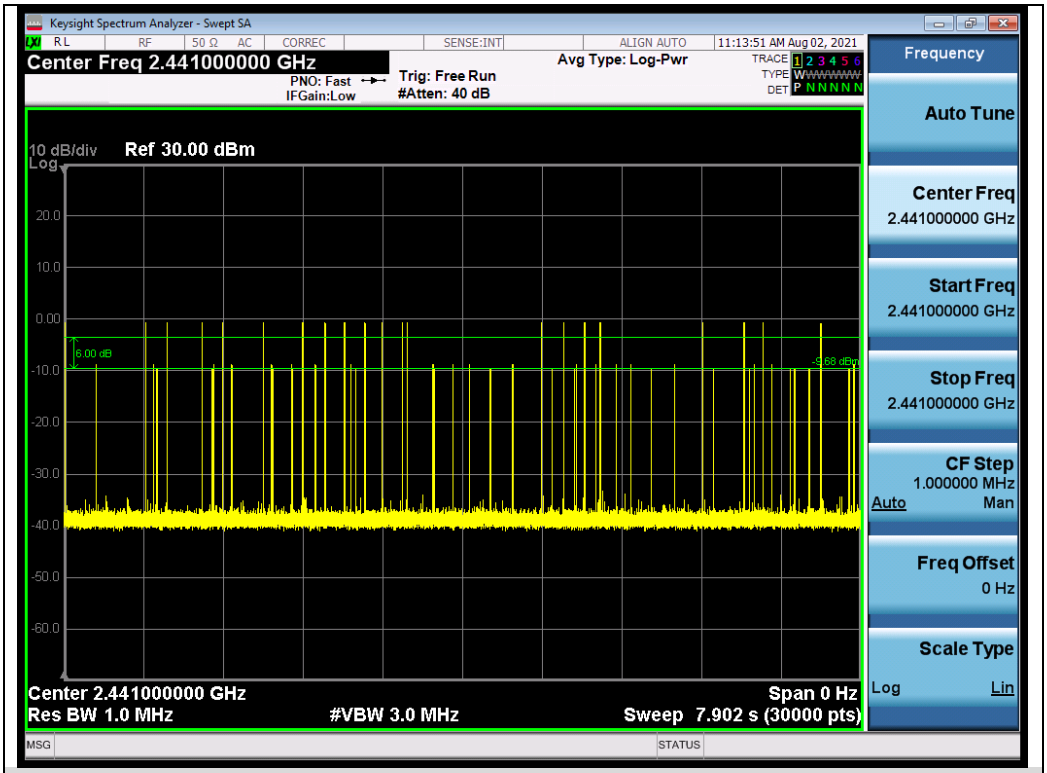
Test Graphs of Dwell Time



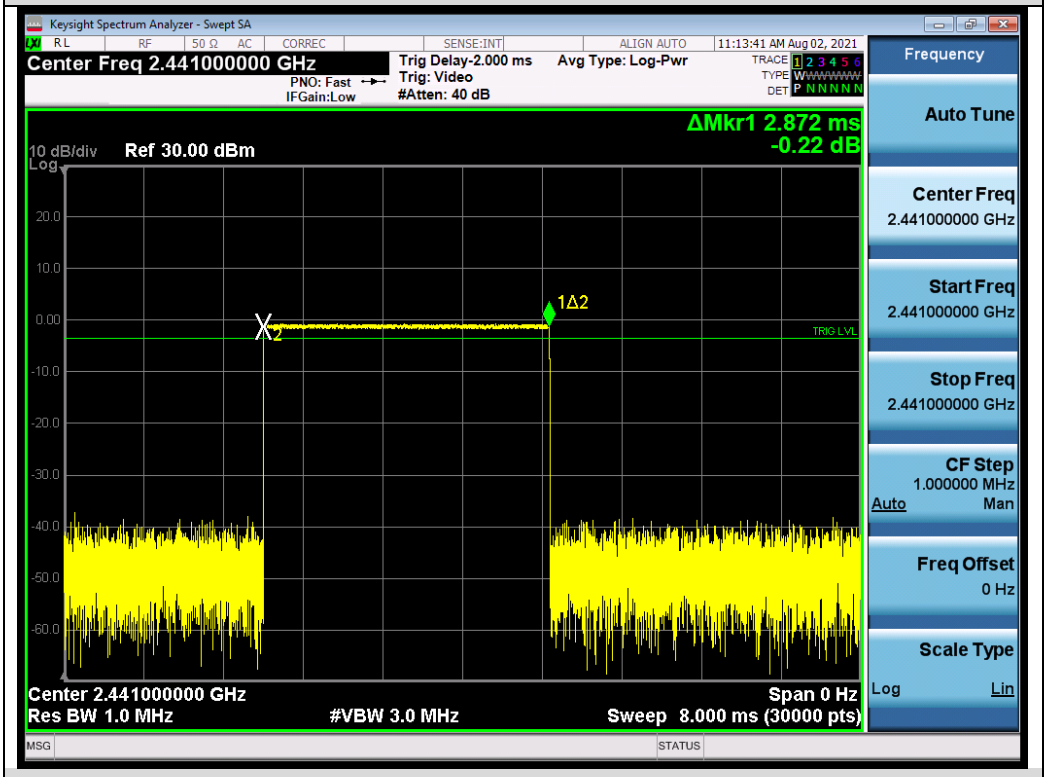
Test_Graph_BR_HOP_ANT1_NA_1Mbps_2402_Number of Busrt



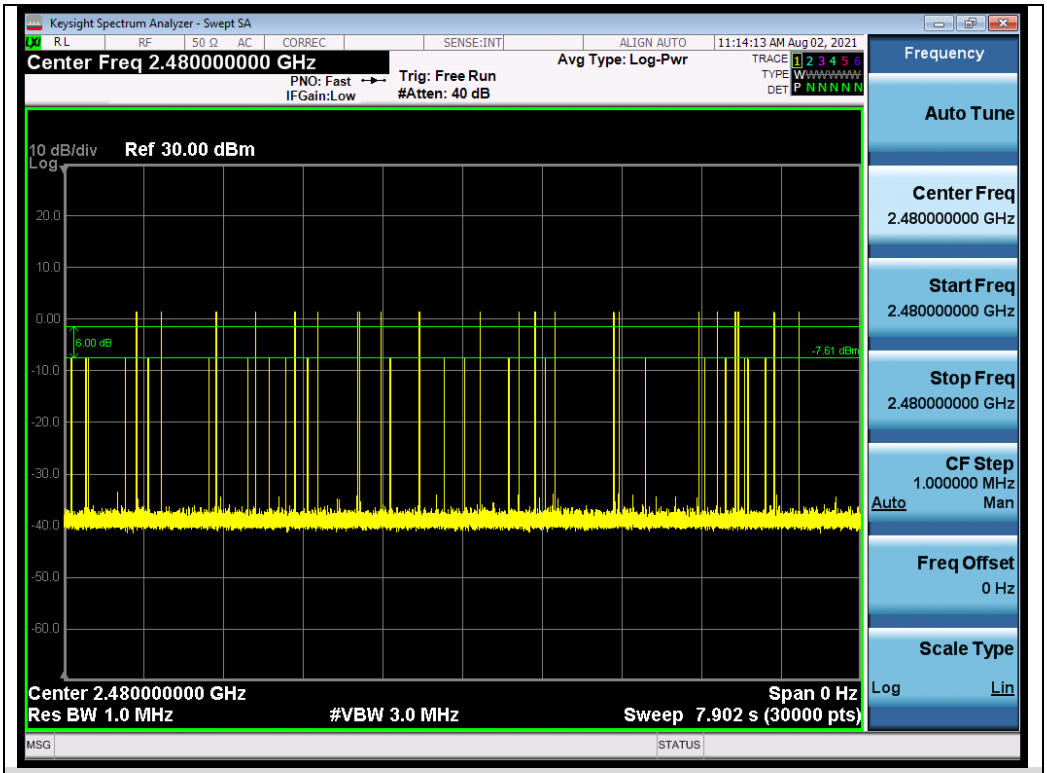
Test_Graph_BR_HOP_ANT1_NA_1Mbps_2402_Time per Burst



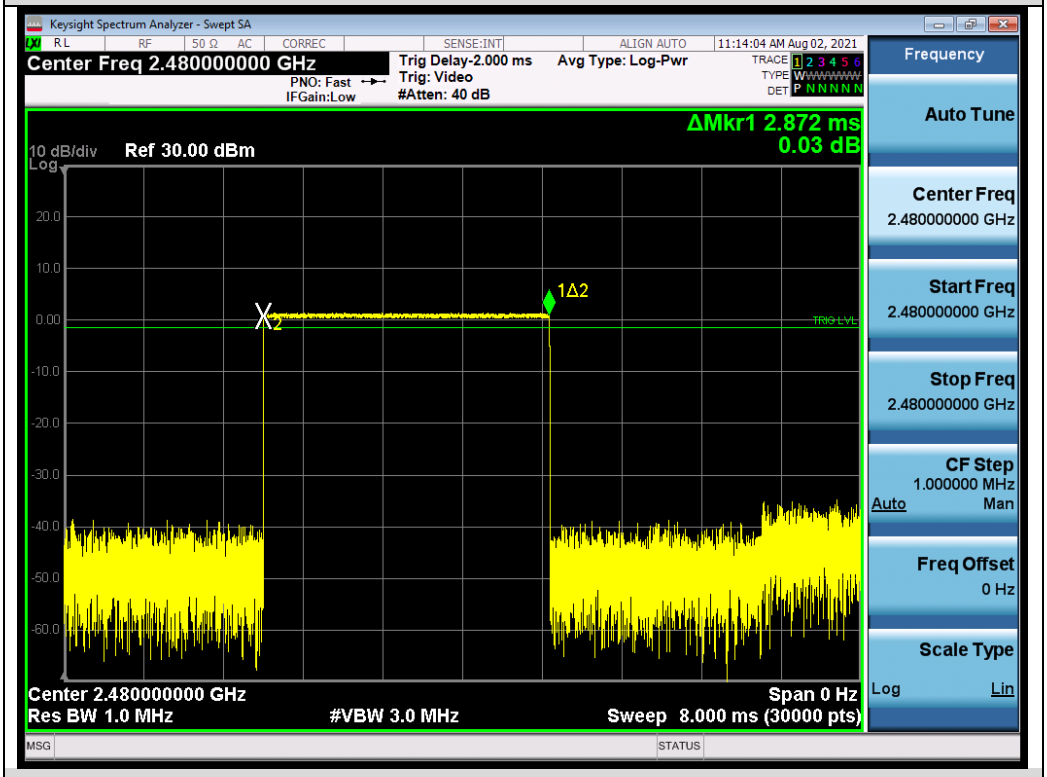
Test_Graph_BR_HOP_ANT1_NA_1Mbps_2441_Number of Busrt



Test_Graph_BR_HOP_ANT1_NA_1Mbps_2441_Time per Burst



Test_Graph_BR_HOP_ANT1_NA_1Mbps_2480_Number of Busrt



Test_Graph_BR_HOP_ANT1_NA_1Mbps_2480_Time per Burst

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) ≥ 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

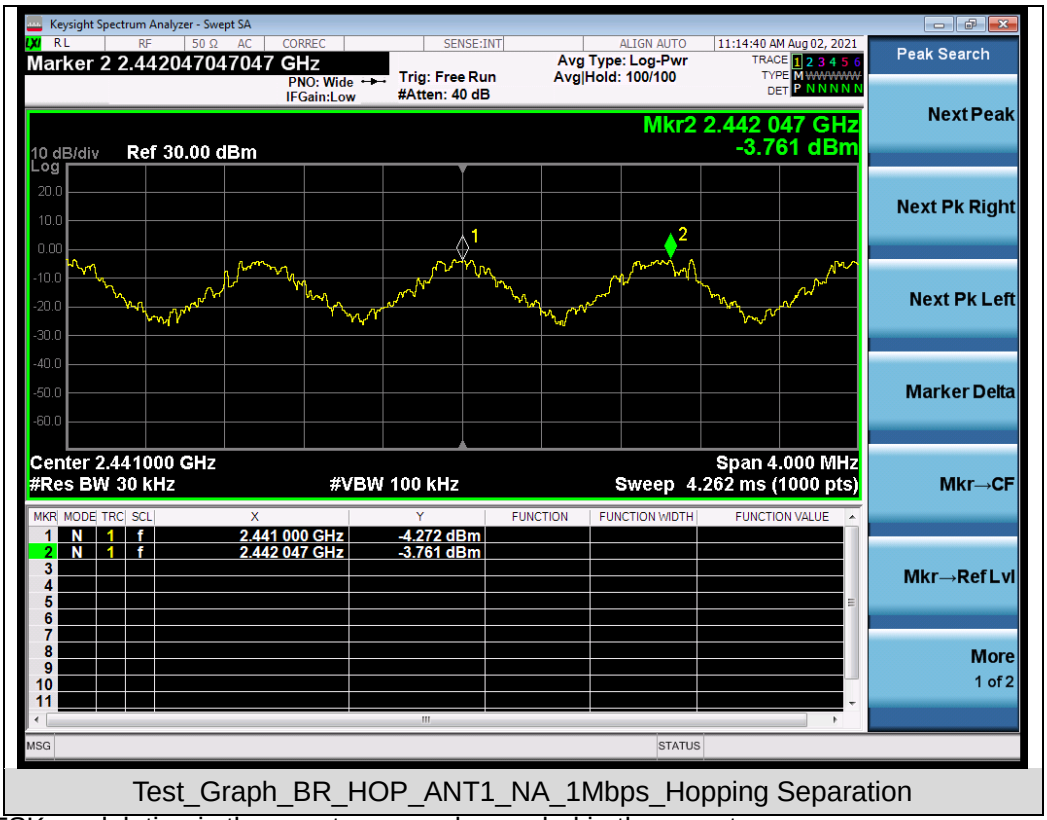
13.3. MEASUREMENT EQUIPMENT USED

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	1.047	>= 2/3 -20dB BW	Pass

Test Graphs of Number of Hopping Frequency



Test_Graph_BR_HOP_ANT1_NA_1Mbps_Hopping Separation

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

14. LINE CONDUCTED EMISSION TEST

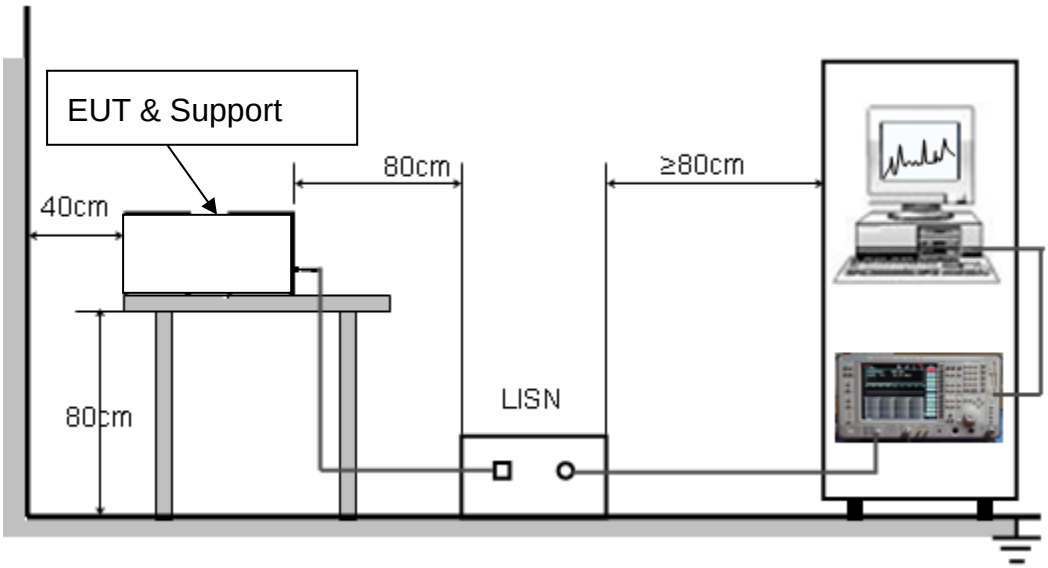
14.1. LIMITS OF LINE CONDUCTED EMISSION TEST

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.

14.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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 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.

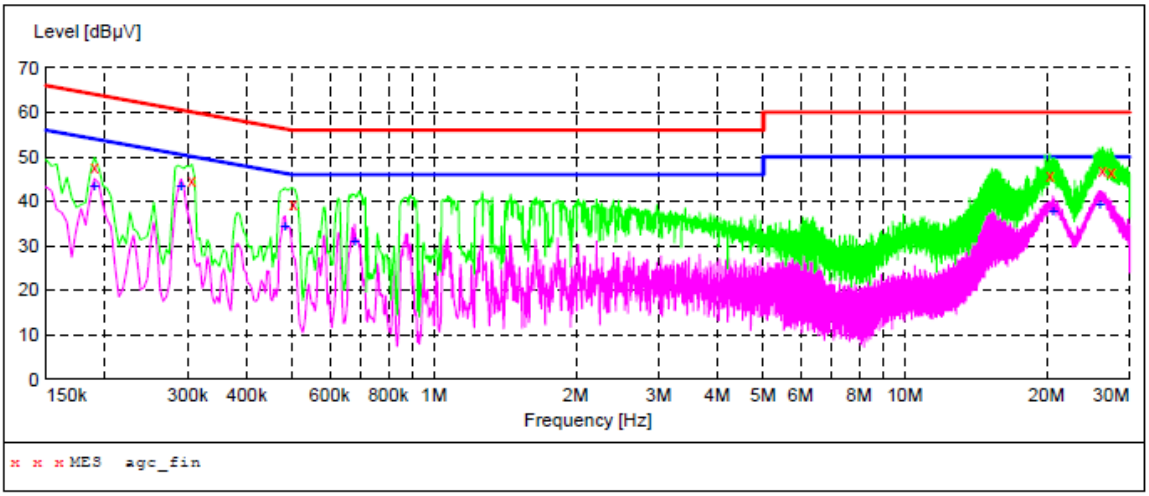
14.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

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.

14.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Mode 1

Line Conducted Emission Test Line 1-L



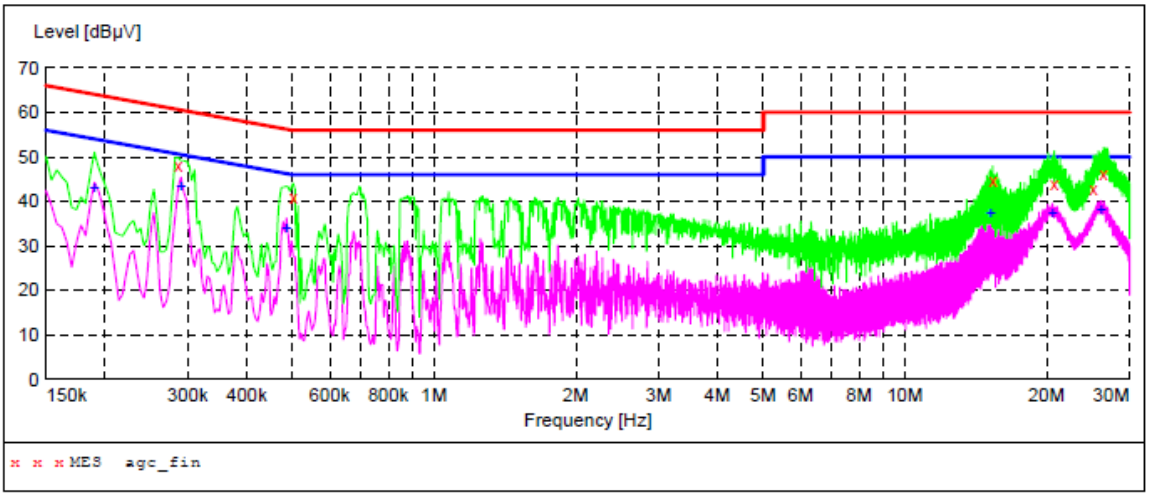
MEASUREMENT RESULT: "agc_fin"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.190000	47.80	6.6	64	16.2	QP	L1
0.305000	44.60	6.0	60	15.5	QP	L1
0.503000	39.70	5.4	56	16.3	QP	L1
20.296000	44.50	8.8	60	15.5	QP	L1
26.276000	46.00	9.3	60	14.0	QP	L1
27.412000	45.10	9.4	60	14.9	QP	L1

MEASUREMENT RESULT: "agc_fin2"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.190000	42.40	6.6	54	11.6	AV	L1
0.290000	42.20	6.1	51	8.3	AV	L1
0.482000	34.50	5.4	46	11.8	AV	L1
0.678000	31.00	5.4	46	15.0	AV	L1
20.610000	37.40	8.8	50	12.6	AV	L1
25.978000	39.40	9.2	50	10.6	AV	L1

Line Conducted Emission Test Line 2-N



MEASUREMENT RESULT: "agc_fin"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.288000	48.60	6.1	61	12.0	QP	N
0.503000	40.60	5.4	56	15.4	QP	N
15.36000	44.50	8.4	60	15.5	QP	N
20.768000	43.30	8.9	60	16.7	QP	N
25.132000	42.80	9.2	60	17.2	QP	N
26.416000	45.90	9.3	60	14.1	QP	N

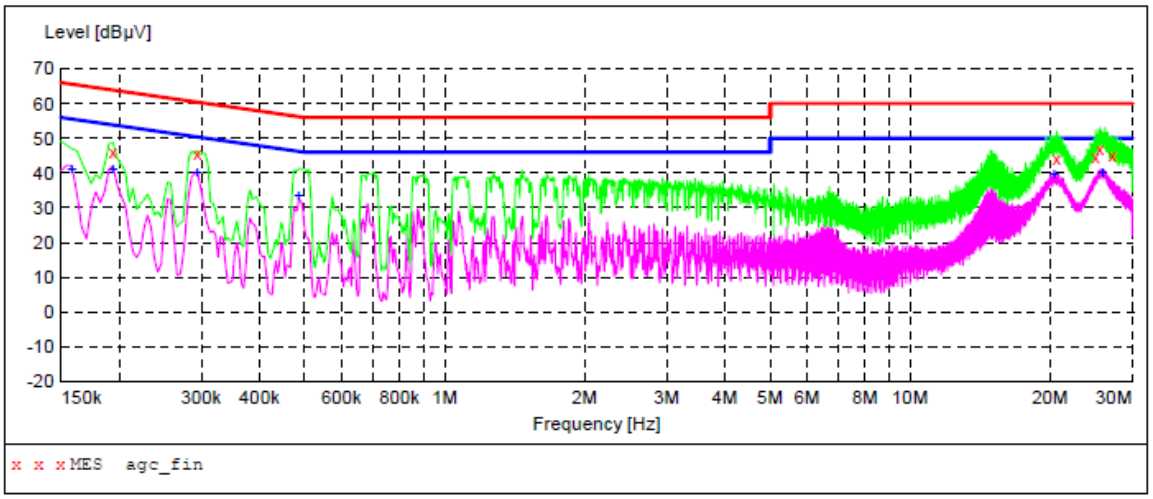
MEASUREMENT RESULT: "agc_fin2"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.190000	43.30	6.6	54	10.7	AV	N
0.292000	43.80	6.1	51	6.7	AV	N
0.487000	34.60	5.4	46	11.6	AV	N
15.235000	37.30	8.3	50	12.7	AV	N
20.596000	37.30	8.8	50	12.7	AV	N
26.076000	38.80	9.3	50	11.2	AV	N

RESULT: PASS

Mode 2

Line Conducted Emission Test Line 1-L



MEASUREMENT RESULT: "agc_fin"

2021/7/20 22:53

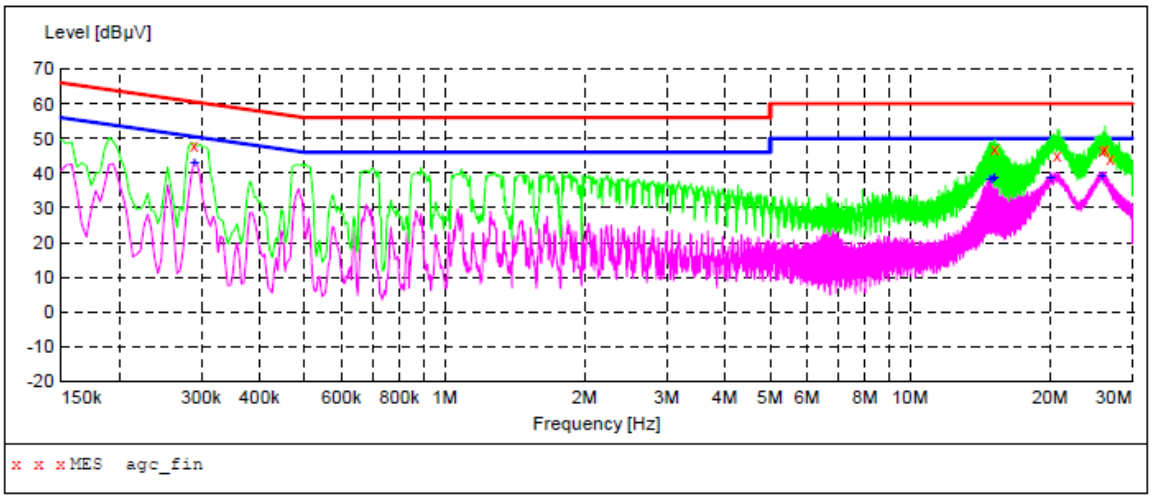
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.194000	45.90	6.6	64	18.0	QP	L1
0.294000	45.40	6.1	60	15.0	QP	L1
20.618000	44.00	8.8	60	16.0	QP	L1
25.010000	44.70	9.2	60	15.3	QP	L1
25.570000	46.80	9.2	60	13.2	QP	L1
27.202000	45.20	9.4	60	14.8	QP	L1

MEASUREMENT RESULT: "agc_fin2"

2021/7/20 22:53

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.158000	41.50	6.8	56	14.1	AV	L1
0.194000	41.20	6.6	54	12.7	AV	L1
0.294000	40.30	6.1	50	10.1	AV	L1
0.486000	33.50	5.4	46	12.7	AV	L1
20.410000	39.80	8.8	50	10.2	AV	L1
25.894000	40.40	9.2	50	9.6	AV	L1

Line Conducted Emission Test Line 2-N



MEASUREMENT RESULT: "agc_fin"

2021/7/20 23:22

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.290000	47.90	6.1	61	12.6	QP	N
15.178000	46.80	8.3	60	13.2	QP	N
20.710000	45.10	8.9	60	14.9	QP	N
25.958000	46.30	9.2	60	13.7	QP	N
26.206000	46.90	9.3	60	13.1	QP	N
26.930000	44.30	9.3	60	15.7	QP	N

MEASUREMENT RESULT: "agc_fin2"

2021/7/20 23:22

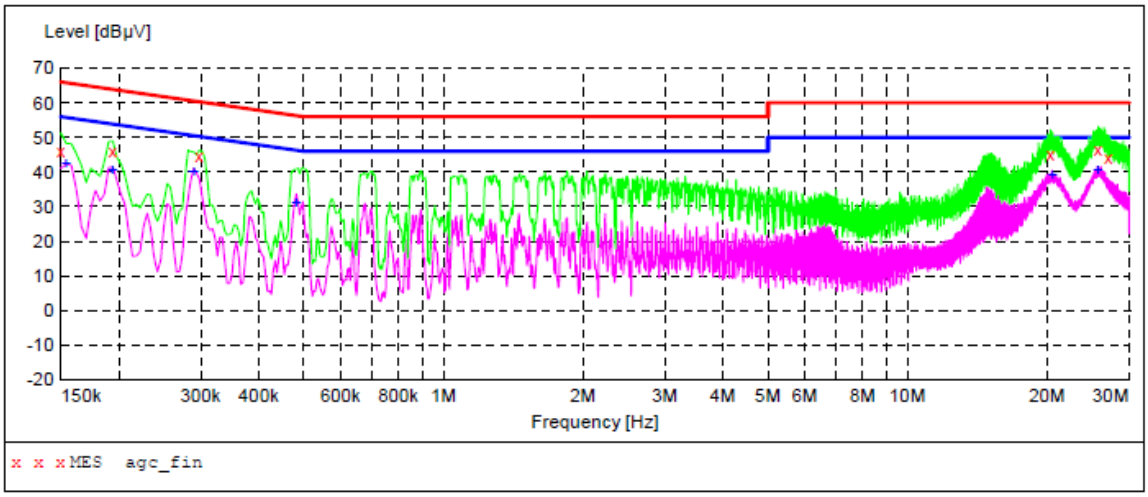
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.290000	43.20	6.1	51	7.3	AV	N
14.862000	38.60	8.3	50	11.4	AV	N
14.990000	38.40	8.3	50	11.6	AV	N
15.178000	38.70	8.3	50	11.3	AV	N
20.022000	39.00	8.8	50	11.0	AV	N
25.806000	39.20	9.2	50	10.8	AV	N

RESULT: PASS

.

Mode 3

Line Conducted Emission Test Line 1-L



MEASUREMENT RESULT: "agc_fin"

2021/7/20 23:00

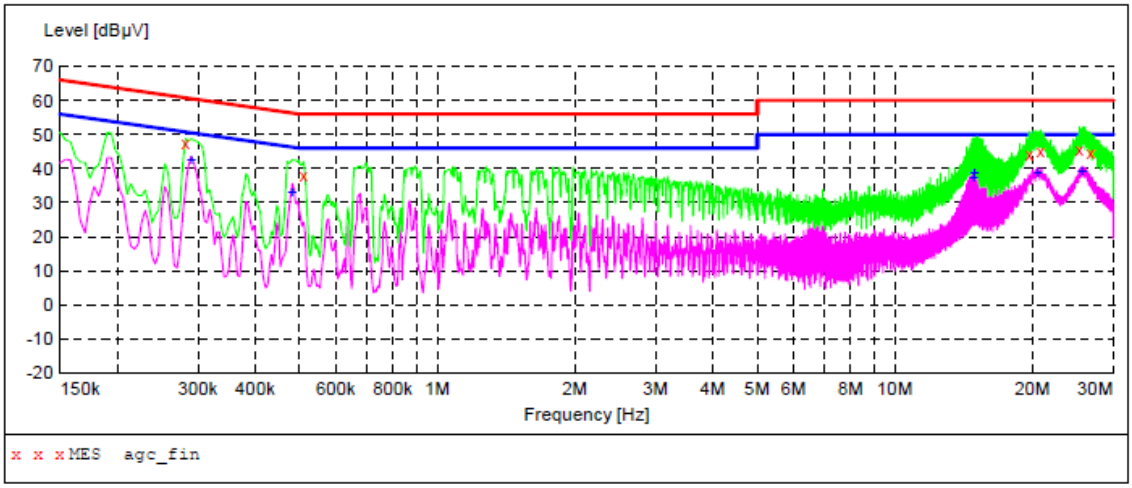
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.150000	46.00	6.9	66	20.0	QP	L1
0.194000	46.00	6.6	64	17.9	QP	L1
0.298000	44.40	6.0	60	15.9	QP	L1
20.322000	45.10	8.8	60	14.9	QP	L1
25.722000	46.40	9.2	60	13.6	QP	L1
27.098000	44.10	9.3	60	15.9	QP	L1

MEASUREMENT RESULT: "agc_fin2"

2021/7/20 23:00

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.154000	42.80	6.9	56	13.0	AV	L1
0.194000	41.00	6.6	54	12.9	AV	L1
0.290000	40.40	6.1	51	10.1	AV	L1
0.482000	31.20	5.4	46	15.1	AV	L1
20.470000	39.40	8.8	50	10.6	AV	L1
25.702000	40.70	9.2	50	9.3	AV	L1

Line Conducted Emission Test Line 2-N



MEASUREMENT RESULT: "agc_fin"

2021/7/20 23:25

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.282000	47.50	6.1	61	13.3	QP	N
0.510000	38.20	5.4	56	17.8	QP	N
19.642000	44.00	8.8	60	16.0	QP	N
20.802000	45.20	8.9	60	14.8	QP	N
25.290000	45.60	9.2	60	14.4	QP	N
26.738000	44.70	9.3	60	15.3	QP	N

MEASUREMENT RESULT: "agc_fin2"

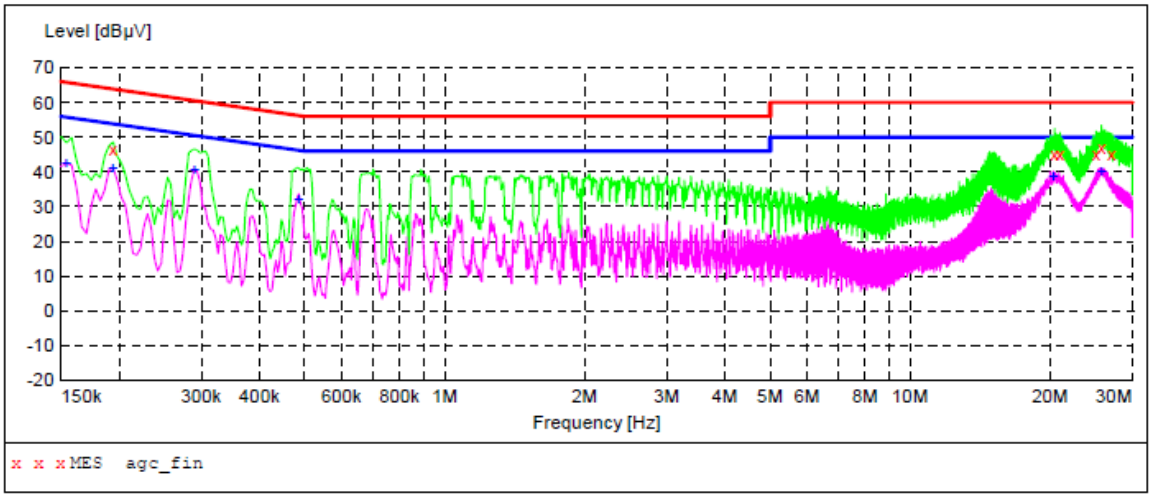
2021/7/20 23:25

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.290000	42.60	6.1	51	7.9	AV	N
0.482000	33.00	5.4	46	13.3	AV	N
14.858000	37.60	8.3	50	12.4	AV	N
14.926000	38.70	8.3	50	11.3	AV	N
20.466000	39.10	8.8	50	10.9	AV	N
25.614000	39.40	9.2	50	10.6	AV	N

RESULT: PASS

Mode 7

Line Conducted Emission Test Line 1-L



MEASUREMENT RESULT: "agc_fin"

2021/7/20 23:11

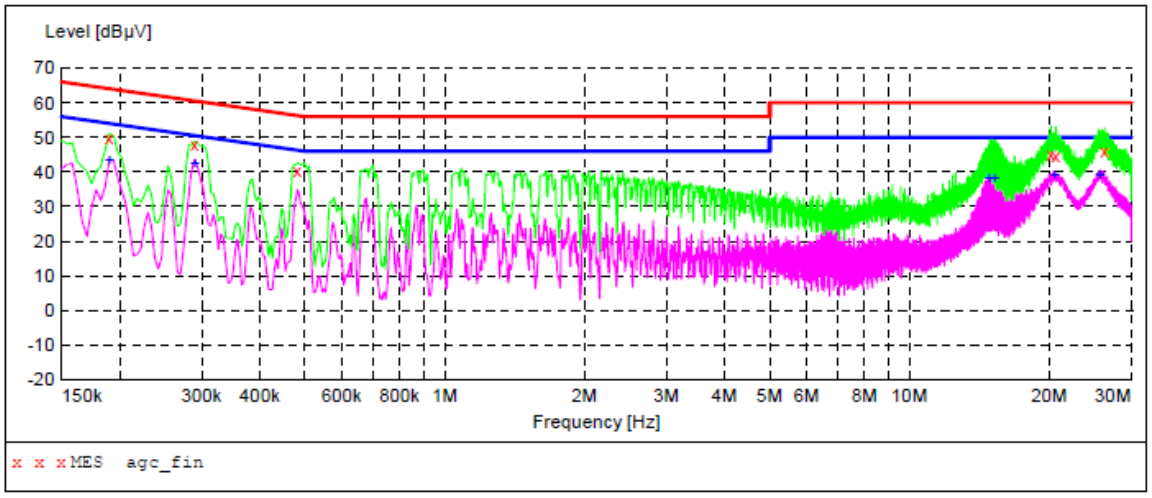
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.194000	46.40	6.6	64	17.5	QP	L1
20.430000	45.10	8.8	60	14.9	QP	L1
20.982000	45.10	8.9	60	14.9	QP	L1
25.062000	44.90	9.2	60	15.1	QP	L1
25.738000	46.90	9.2	60	13.1	QP	L1
27.082000	45.00	9.3	60	15.0	QP	L1

MEASUREMENT RESULT: "agc_fin2"

2021/7/20 23:11

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.154000	42.70	6.9	56	13.1	AV	L1
0.194000	41.20	6.6	54	12.7	AV	L1
0.290000	41.00	6.1	51	9.5	AV	L1
0.486000	32.40	5.4	46	13.8	AV	L1
20.278000	38.70	8.8	50	11.3	AV	L1
25.738000	40.50	9.2	50	9.5	AV	L1

Line Conducted Emission Test Line 2-N



MEASUREMENT RESULT: "agc_fin"

2021/7/20 23:36

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.190000	49.70	6.6	64	14.3	QP	N
0.290000	47.70	6.1	61	12.8	QP	N
0.482000	40.20	5.4	56	16.1	QP	N
20.134000	45.10	8.8	60	14.9	QP	N
20.626000	44.70	8.8	60	15.3	QP	N
26.270000	45.80	9.3	60	14.2	QP	N

MEASUREMENT RESULT: "agc_fin2"

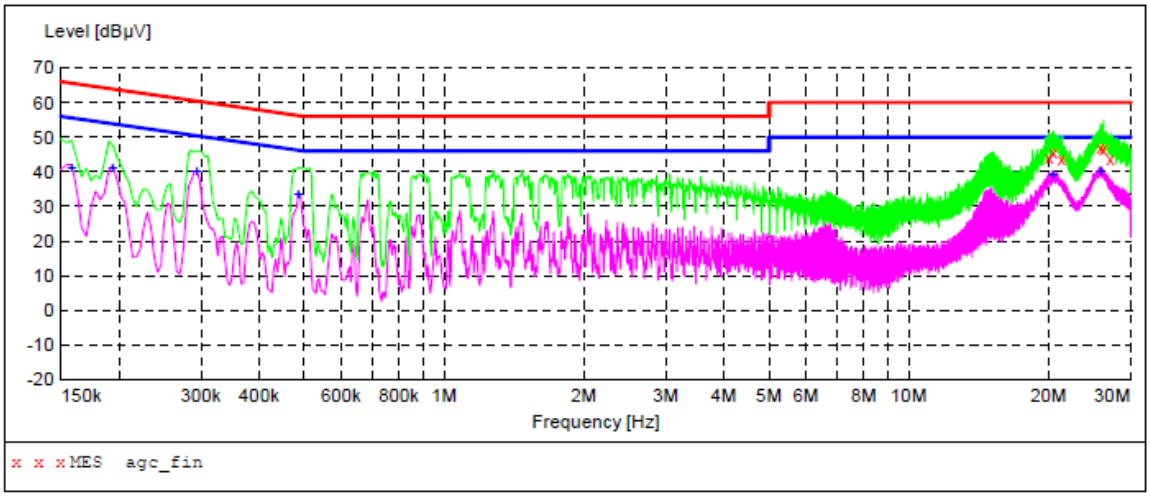
2021/7/20 23:36

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.190000	43.50	6.6	54	10.5	AV	N
0.290000	42.60	6.1	51	7.9	AV	N
14.858000	38.60	8.3	50	11.4	AV	N
15.242000	38.30	8.3	50	11.7	AV	N
20.470000	39.50	8.8	50	10.5	AV	N
25.670000	39.60	9.2	50	10.4	AV	N

RESULT: PASS

Mode 8

Line Conducted Emission Test Line 1-L



MEASUREMENT RESULT: "agc_fin"

2021/7/20 23:13

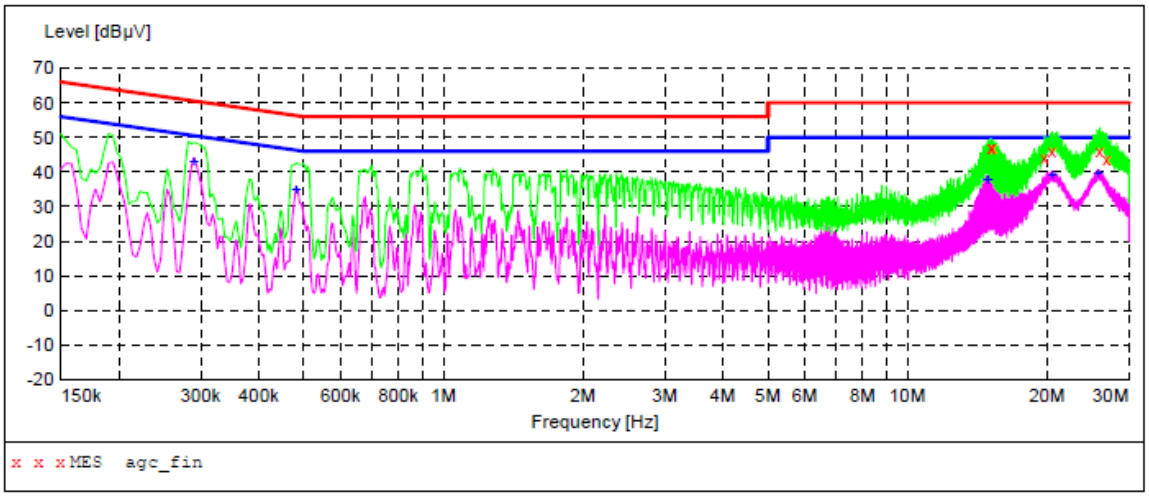
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
20.014000	44.30	8.8	60	15.7	QP	L1
20.466000	45.40	8.8	60	14.6	QP	L1
21.302000	43.50	8.9	60	16.5	QP	L1
25.830000	47.20	9.2	60	12.8	QP	L1
26.206000	46.60	9.3	60	13.4	QP	L1
27.130000	43.50	9.3	60	16.5	QP	L1

MEASUREMENT RESULT: "agc_fin2"

2021/7/20 23:13

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.158000	41.50	6.8	56	14.1	AV	L1
0.194000	41.10	6.6	54	12.8	AV	L1
0.294000	40.30	6.1	50	10.1	AV	L1
0.486000	33.60	5.4	46	12.6	AV	L1
20.406000	39.60	8.8	50	10.4	AV	L1
25.890000	40.50	9.2	50	9.5	AV	L1

Line Conducted Emission Test Line 2-N



MEASUREMENT RESULT: "agc_fin"

2021/7/20 23:39

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
15.110000	46.80	8.3	60	13.2	QP	N
15.238000	46.90	8.3	60	13.1	QP	N
19.710000	44.20	8.8	60	15.8	QP	N
20.470000	45.90	8.8	60	14.1	QP	N
25.930000	46.20	9.2	60	13.8	QP	N
26.826000	43.70	9.3	60	16.3	QP	N

MEASUREMENT RESULT: "agc_fin2"

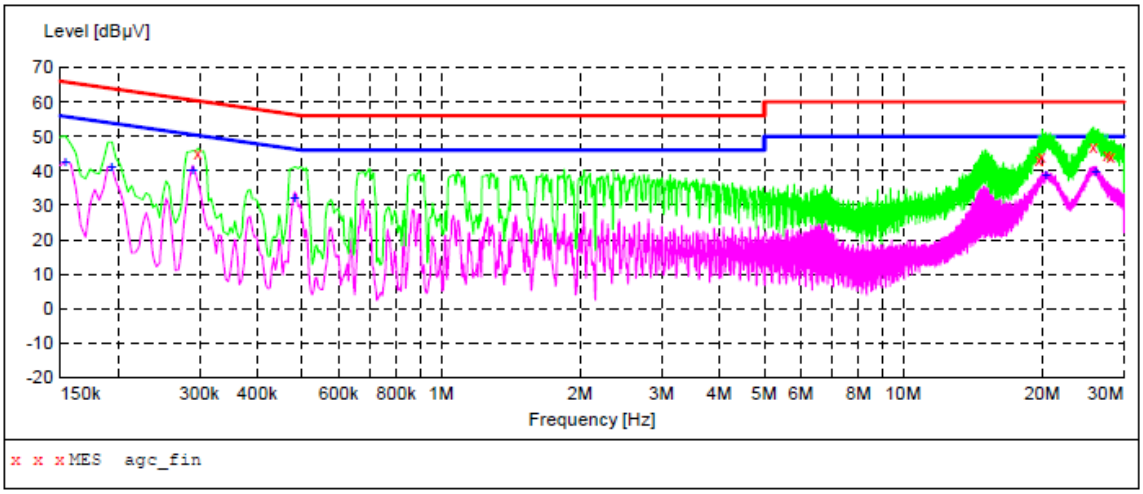
2021/7/20 23:39

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.290000	43.30	6.1	51	7.2	AV	N
0.482000	35.30	5.4	46	11.0	AV	N
14.858000	38.00	8.3	50	12.0	AV	N
14.922000	38.20	8.3	50	11.8	AV	N
20.466000	39.40	8.8	50	10.6	AV	N
25.762000	39.90	9.2	50	10.1	AV	N

RESULT: PASS

Mode 9

Line Conducted Emission Test Line 1-L



MEASUREMENT RESULT: "agc_fin"

2021/7/20 23:16

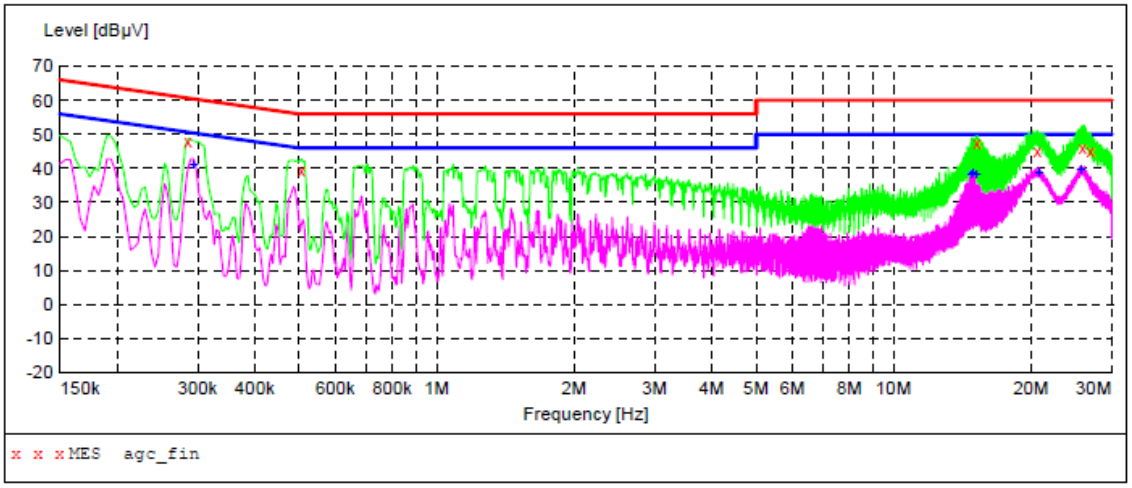
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.298000	45.00	6.0	60	15.3	QP	L1
19.654000	43.10	8.8	60	16.9	QP	L1
19.946000	44.10	8.8	60	15.9	QP	L1
25.762000	47.20	9.2	60	12.8	QP	L1
27.546000	44.80	9.4	60	15.2	QP	L1
28.118000	44.00	9.4	60	16.0	QP	L1

MEASUREMENT RESULT: "agc_fin2"

2021/7/20 23:16

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.154000	42.70	6.9	56	13.1	AV	L1
0.194000	41.20	6.6	54	12.7	AV	L1
0.290000	40.30	6.1	51	10.2	AV	L1
0.482000	32.50	5.4	46	13.8	AV	L1
20.350000	38.70	8.8	50	11.3	AV	L1
26.022000	40.00	9.3	50	10.0	AV	L1

Line Conducted Emission Test Line 2-N



MEASUREMENT RESULT: "agc_fin"

2021/7/20 23:42

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.286000	47.80	6.1	61	12.8	QP	N
0.506000	39.50	5.4	56	16.5	QP	N
15.238000	47.40	8.3	60	12.6	QP	N
20.606000	45.20	8.8	60	14.8	QP	N
25.950000	46.20	9.2	60	13.8	QP	N
26.946000	45.00	9.3	60	15.0	QP	N

MEASUREMENT RESULT: "agc_fin2"

2021/7/20 23:42

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.294000	41.50	6.1	50	8.9	AV	N
14.794000	38.50	8.3	50	11.5	AV	N
14.922000	38.80	8.3	50	11.2	AV	N
15.178000	38.40	8.3	50	11.6	AV	N
20.786000	38.90	8.9	50	11.1	AV	N
25.698000	39.90	9.2	50	10.1	AV	N

RESULT: PASS

Note: All test modes had been tested. The GFSK and 8DPSK modulation is the worst case and recorded in the report.

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Refer to the Report No.: AGC00210210705AP02

APPENDIX B: PHOTOGRAPHS OF EUT

Refer to the Report No.: AGC00210210705AP04

----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.