PRODUCT ADVISORY NOTICE

KEEPING YOU INFORMED OF PRODUCT CHANGES

To: **All Customers, Sales Representatives and Distributors**

Date: July 12, 2024

Subject: Grayhill 3J and 3K Gen 2.0 Choke alternate

Please forward this notification to the appropriate person(s) in your organization.

Description of Change

Murata common mode choke part number DLW5BTM102SQ2K may not be available in sufficiently supply to allow production. Grayhill is currently showing supply exhausted in Q3 2024. Grayhill evaluated and validated an alternate component that may be used to ensure production should the Murata component indeed be exhausted.

Existing component: Murata DLW5BTM102SQ2K
Alternate component: Abracon ACMP-5025-102-T

Grayhill has performed radiated emissions / radiated immunity / conductive immunity testing on a sampling of products demonstrating equivalent performance. This technical summary will be included with the PAN.

Reason for Change

An earthquake in Japan has disrupted supply. While Murata is striving to resume production and supply, Grayhill has validated an equivalent that may be used to assure production. Grayhill has purchased the alternate but will not add it as an approved alternate until it is needed to assure production.

Effective Date

Grayhill will add the alternate as an approved component as late as possible to continue production. This currently looks like it will be July 2024 or later. Grayhill will have adequate records that can tag production serial numbers to the specific choke component used should this information be necessary.

Part Numbers Affected

All Grayhill standard 3J / 3K Plus versions (a.k.a. Gen 2.0).

3J Gen 2.0
Part numbers beginning with “3J” plus 4-digit number followed by “-G2” and ending with any suffix.
Examples:
3J2115-G2-C3AW
3J1305-G2-N3AW

3K Gen 2.0
Beginning with “3K” plus 3-digit number followed by “-G2” and ending with any suffix.
Examples:
3K208-G2-4RC3AW
3K012-G2-4RC3AG

This change also applied to any custom legend version of Grayhill’s 3J and 3K Plus (Gen 2.0) products.
These are listed on page 2.

Actions Required

No action is required. Refer questions to your local sales representative.

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All custom legend versions are included in this change notice as they are derived from standard product.

PAN 1376 - Grayhill, 3J and 3K Gen 2.0 Choke Alternative

STANDARD PART NUMBERS
3J2305-G2-N3AW
3J2305-G2-C3AW
3J2215-G2-N3AW
3J2215-G2-N3AG
3J2215-G2-C3AW
3J2215-G2-C3AG
3J2205-G2-N3AW
3J2205-G2-N3AG
3J2205-G2-C3AW
3J2205-G2-C3AG
3J2115-G2-N3AW
3J2115-G2-N3AG
3J2115-G2-C3AW
3J2115-G2-C3AG
3J2015-G2-N3AW
3J2015-G2-N3AG
3J2015-G2-C3AW
3J2015-G2-C3AG
3J2005-G2-N3AW
3J2005-G2-N3AG
3J2005-G2-C3AW
3J2005-G2-C3AG
3J1305-G2-N3AW
3J1305-G2-C3AW
3J1215-G2-PLAN
3J1215-G2-N3AW
3J1215-G2-N3AG
3J1215-G2-C3AW
3J1215-G2-C3AG
3J1205-G2-N3AW
3J1205-G2-N3AG
3J1205-G2-C3AW
3J1205-G2-C3AG
3J1115-G2-PLAN
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3J1115-G2-N3AG
3J1115-G2-C3AW
3J1115-G2-C3AG
3J1015-G2-PLAN
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3J1015-G2-C3AW
3J1015-G2-C3AG
3J1005-G2-N3AW
3J1005-G2-N3AG
3J1005-G2-C3AW
3J1005-G2-C3AG
3J0305-G2-N3AW
3J0305-G2-C3AW
3J0215-G2-N3AW
3J0215-G2-N3AG
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3J0215-G2-C3AG
3J0205-G2-N3AW
3J0205-G2-N3AG
3J0205-G2-C3AW
3J0205-G2-C3AG
3J0115-G2-N3AW
3J0115-G2-N3AG
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3J0115-G2-C3AG
3J0015-G2-N3AW
3J0015-G2-N3AG
3J0015-G2-C3AW
3J0005-G2-N3GG
3J0005-G2-N3AW
3J0005-G2-N3AG
3J0005-G2-C3GG
3J0005-G2-C3AW
3J0005-G2-C3AG
3K208-G2-4RC3AW
3K208-G2-2RC3AG
3K115-G2-3RC3AG
3K106-G2-2RC3AG
3K012-G2-4RC3AW
3K012-G2-4RC3AG
3K008-G2-2RC3AG

3J CUSTOM LEGEND
3JYY1015-G2-200
3JYY1015-G2-205
3JYY1015-G2-210
3JYY1015-G2-211
3JYY1015-G2-212
3JYY1015-G2-215
3JYY1015-G2-217
3JYY1015-G2-219
3JYY1015-G2-220
3JYY1015-G2-222
3JYY1015-G2-231
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3JYY1015-G2-246
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3JYY1015-G2-252N
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3JYY1115-G2-232
3JYY1115-G2-234
3JYY1115-G2-247
3JYY1115-G2-253
3JYY1215-G2-206
3JYY1215-G2-206
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3JYY1215-G2-243
3JYY1215-G2-244
3JYY1215-G2-244-B
3JYY1215-G2-248
3JYY1305-G2-248

3K CUSTOM LEGEND
3KYY1008-G2-238
3KYY1008-G2-584
3KYY1008-G2-584
3KYY1008-G2-613
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3KYY1115-G2-875
3KYY1115-G2-897
3KYY1115-G2-904
3KYY1115-G2-905

April 25, 2024

Technical Summary-
Application example and test results validating alternate common mode choke

Timeline

On January 18, 2024 Grayhill was notified of a possible supply disruption of parts coming from the Murata factory located in Anamizu Japan. No details were given as to the severity of the situation.

On February 6. 2024, Grayhill was notified by the local manufacturer's rep that the factory was not operational, and no parts would be produced until possibly later in the year. Grayhill engineering began looking for an alternate part and Grayhill purchasing began procuring as much stock as possible from the secondary market at premium pricing. Based on current inventory and requirements Grayhill has enough of the Murata parts to last into July 2024.

March 5, 2024: update from Murata website:

Anamizu Murata Manufacturing Co., Ltd.	Manufacturing of chip inductors and common mode choke coils	Confirmation of the status of infrastructure and equipment currently underway ahead of resumption of production; timing of resumption of production to be announced at a later date(appended on Jan.5) *Production is expected to resume in mid-May or later. The results of an assessment inside the plant indicate that equipment and building need to repair before production can be resumed. As this process will require more than four months. Therefore, production is expected to resume in mid-May or later. After the resumption of production, shipments will be resumed methodically as soon as preparations are complete.(appended on Jan. 19)

March 12, 2024: Grayhill engineering identified and received samples of an alternate common mode choke from Abracon.

Currently approved Murata Choke: DLW5BTM102SQ2K

Grayhill part number (SET3898-0011)

Proposed Abracon Alternate Choke: ACMP-5025-102-T

March 13,2024: Grayhill engineering started to qualify the new part for use in production. The common mode choke is part of the filtering circuit applied to the input power. The choke is used in the same manner on all affected part numbers.

Typical Application

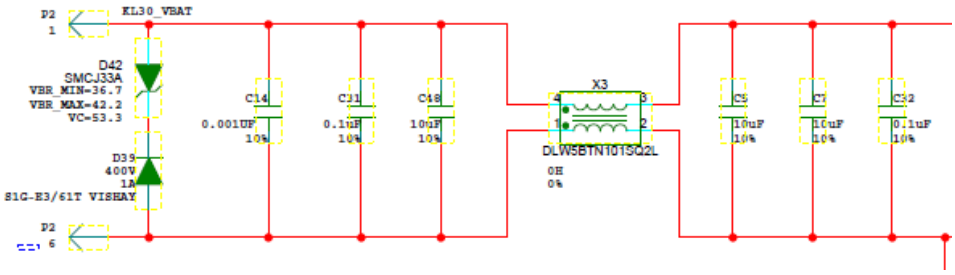


Figure 1 Typical Circuit

The choke is used on the power supply leads coming into the assembly. The choke is used to limit the conducted emissions from the assembly and provide immunity against noise coupling to the harness.

Datasheet Comparison of Impedance Curves

The impedance curves for both common mode and differential mode are very similar.

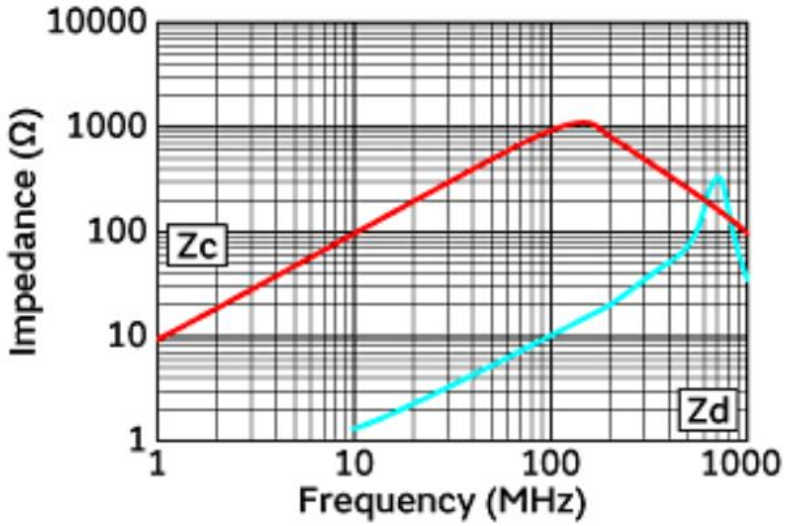


Figure 2 Murata DLW5BTM102SQ2K

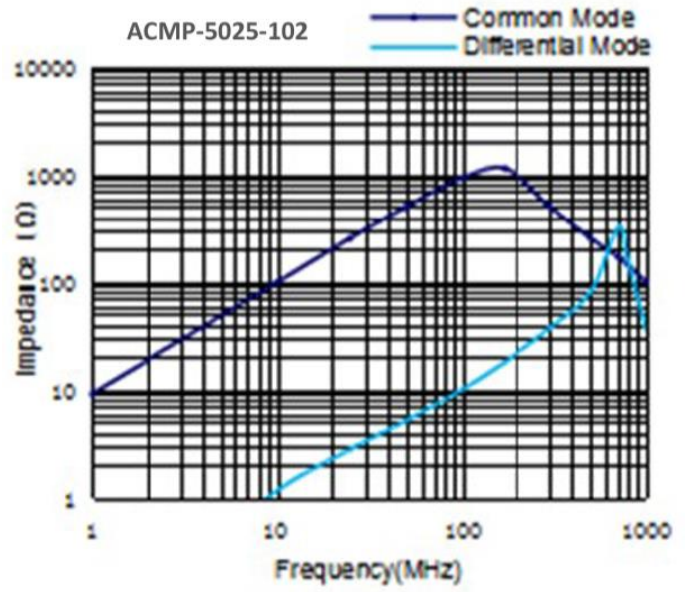


Figure 3 Abracon ACMP-5025-102-T

Datasheet Comparison of Package Dimensions

The package dimensions are very similar. Grayhill manufacturing expressed confidence that the subtle package differences will not have any adverse effects. No change is needed to process the alternate.

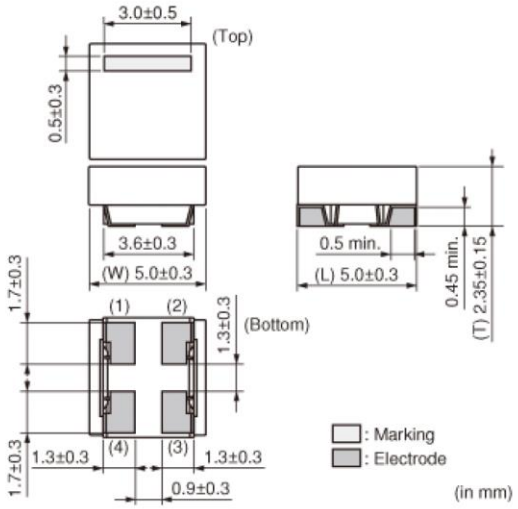


Figure 4 Murata DLW5BTM102SQ2K

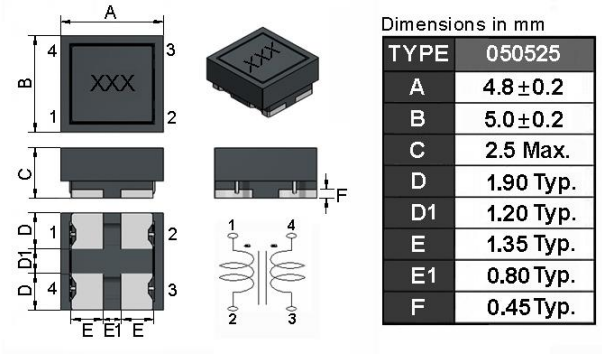


Figure 5 Abracon ACMP-5025-102-T

Datasheet Comparison of General Specifications

General specifications are equivalent.

Customer Part Number	MURATA Part Number	Impedance at 10MHz, Under Standard Testing Conditions (Ω min.)	Impedance at 100MHz, Under Standard Testing Conditions (Ω Typ.)	Rated Voltage V(DC)	Withstanding Voltage V(DC)	* Rated Current (A)	DC Resistance (Rdc) (Ωmax.)	Insulation Resistance (MΩ min.)
	DLW5BTM142SQ2L	100	1400			1.5	0.056	
	DLW5BTM142SQ2K							
	DLW5BTM142SQ2B							
	DLW5BTM102SQ2L							
	DLW5BTM102SQ2K	60	1000			2	0.034	
	DLW5BTM102SQ2B							
	DLW5BTM501SQ2L	30	500	50	125	4	0.027	10
	DLW5BTM501SQ2K							
	DLW5BTM501SQ2B							

Figure 6 Murata DLW5BTM102SQ2K

Part Number	Impedance (Ω) @100MHz	DCR (mΩ)	Rated Current (A)	Rated Voltage (Vdc)	Withstand Voltage (V)	Insulation Resistance (MΩ)
	Typ.	±25%	Typ.	Max	VDC	Min
ACMP-5025-101	100	9	6.5	50	125	10
ACMP-5025-251	250	14	5.0	50	125	10
ACMP-5025-501	500	19	4.0	50	125	10
ACMP-5025-102	1000	24	2.0	50	125	10
ACMP-5025-142	1400	40	1.5	50	125	10

Figure 7 Abracon ACMP-5025-102-T

Qualification

Grayhill currently uses this choke on over fifty different circuit boards. It is not only practical but also technically sensible to validate the alternate based on a sampling of boards.

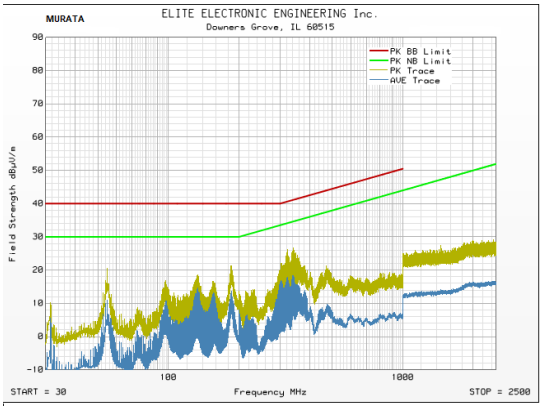
Grayhill testing on a sampling of circuit boards shows that the alternate part has similar performance. Conducted emission scans were run in the Grayhill EMC laboratory. These results are perfect for comparative analysis. Grayhill cautions that while suitable for comparison this equipment is not appropriate for determining regulatory compliance. Regulatory compliance was done with suitable equipment during original product validation.

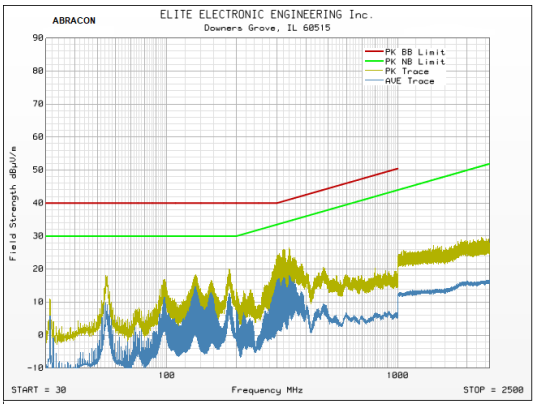
Radiated Emissions and Radiated Immunity was conducted at a third-party laboratory. Grayhill funded sample testing of a control board and alternate component board. Emissions and immunity results are available on a cross-section of Grayhill standard products and customer-specific designs.

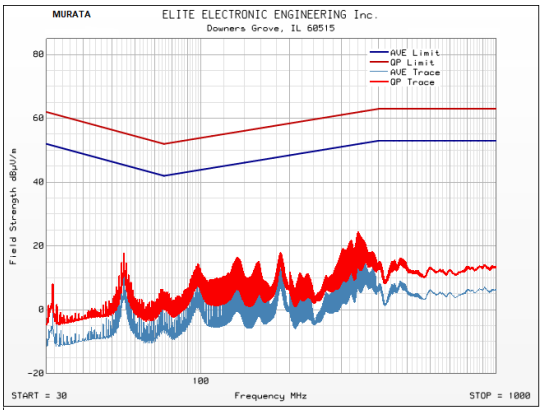
Radiated Immunity was performed on a representative sample according to the table below for x, y and z-axes. No abnormal behavior was observed.

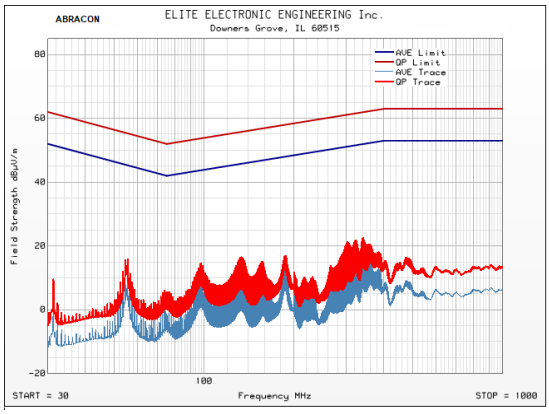
Test Type	Applicable Frequency Range	Exposure	Modulation	Antenna Polarization	Field Strength	Provisions
ALSE	500kHz to 200MHz	DUT & Harness	CW & AM	Horizontal & Vertical	125 V/m	Stripline Test Method ISO 11452-5:2002, Section 5.3.2.2
ALSE	200MHz to 800MHz	DUT & Harness	CW & AM	Horizontal & Vertical	125 V/m	
ALSE	800MHz to 1000MHz	DUT & Harness	CW & PM	Horizontal & Vertical	125 V/m	ISO13766 (2017)
ALSE	1000MHz to 2GHz	DUT	PM	Horizontal & Vertical	40 V/m	ISO13766 (2017)
ALSE	2.0GHz to 2.4GHz	DUT	PM	Horizontal & Vertical	15 V/m	ISO13766 (2017)
ALSE	2.4GHz to 2.7GHz	DUT	PM	Horizontal & Vertical	10 V/m	ISO13766 (2017)

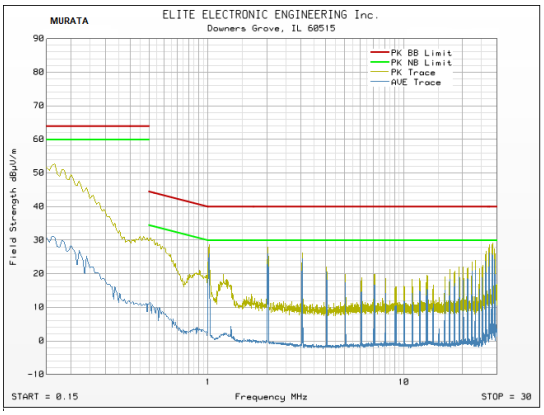
Radiated Emissions per CISPR 25 (2002)

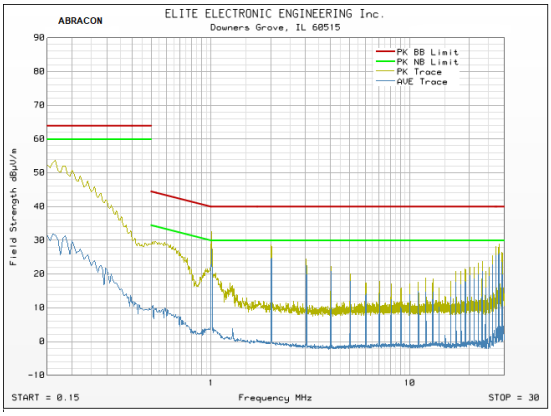












Grayhill did see a slightly higher emissions at 1MHz with the alternate. Although shown as minimally over the limit line this is likely normal variation in performance. With additional samples and setup tweaks this likely would be identical with the existing Murata choke. As shown on the datasheet impedance curves both chokes become much less effective at lower frequencies having common mode impedance around 10Ω at 1MHz.

Frequency [MHz]	Average Level [dBµV/m]	Peak Level [dBµV/m]	Peak NB Limit [dBµV/m]	Peak BB Limit [dBµV/m]
1.015	26.1	28.7	30	40

Frequency [MHz]	Average Level [dBµV/m]	Peak Level [dBµV/m]	Peak NB Limit [dBµV/m]	Peak BB Limit [dBµV/m]
1.01	27.57	32.53	30	40
1.015	19.32	25.74	30	40

3KG2 15 Button Keypad Radiated Emissions

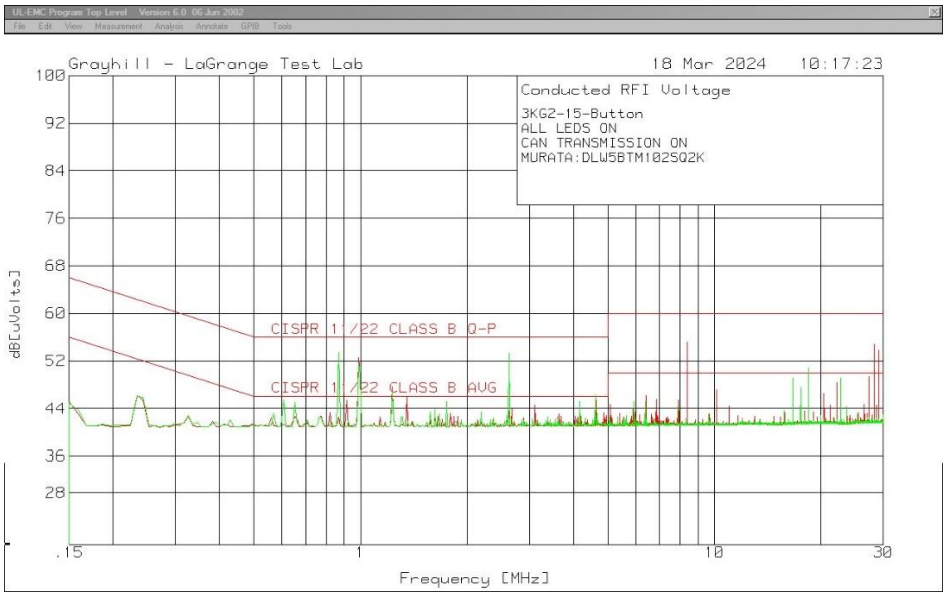


Figure 8 3KG2-15 Button Current Choke

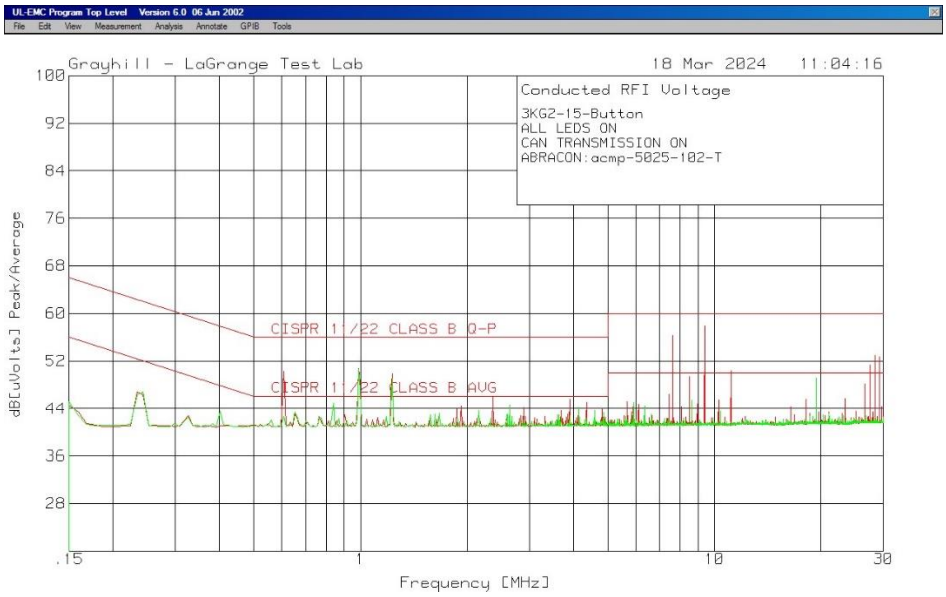


Figure 9 3KG2-15 Button Alternate Choke

3KG2 12 Button Keypad Radiated Emissions

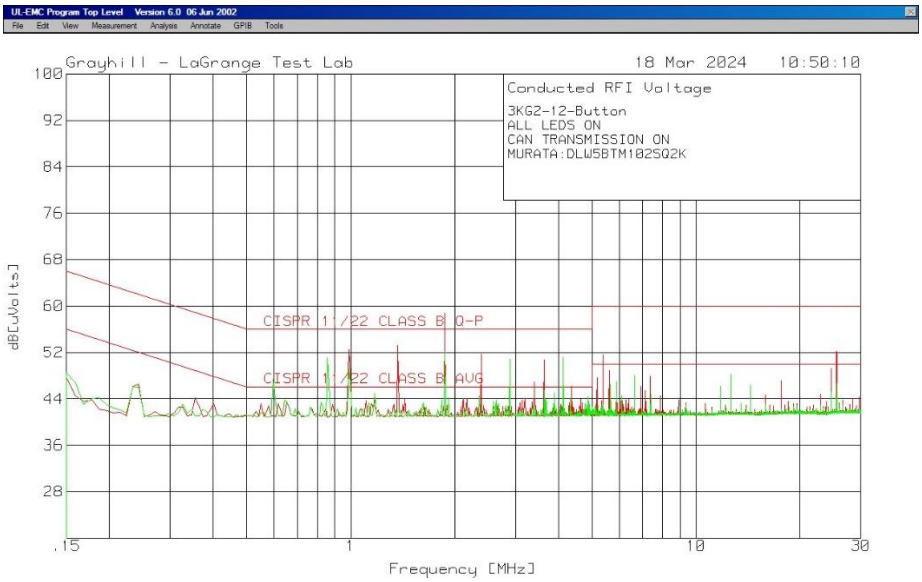


Figure 8 3KG2-12 Button Current Choke

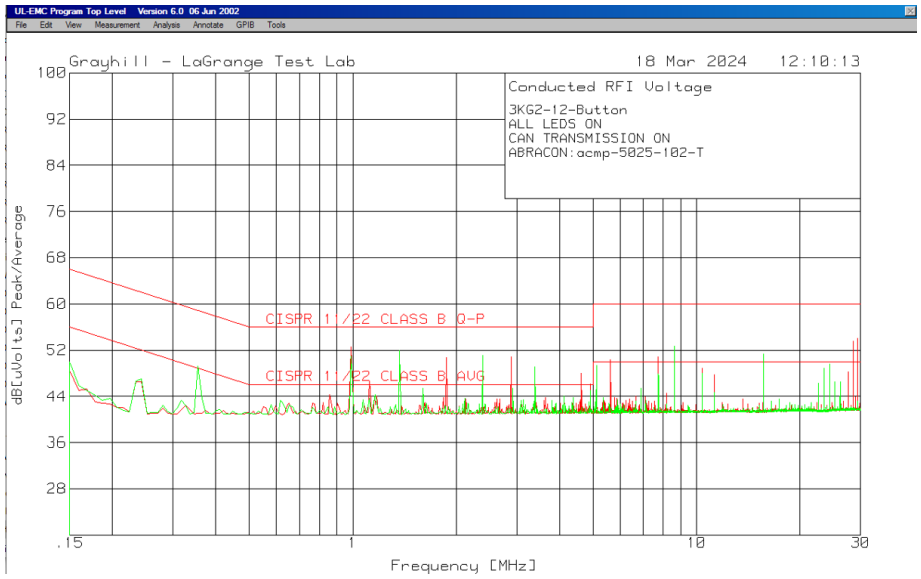


Figure 9 3KG2-12 Button Alternate Choke

Summary

It is Grayhill's position that the alternate choke component provides equivalent performance as detailed in this report. As such, it will not have adverse effects in our customer's applications and shall be allowed as assurance of supply demands.