

Results on BLM Noise Analysis after Cable Exchange in R3

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Overview

The highest BLM noise level due to long cables can be seen in cells 09, 10 and 11 in R3.

In order to reduce this noise, three long signal cables have been exchanged during the TS beginning of September 2011.

In total 17 BLMs are affected.

Two types of cables have been used: MBB16 and NES18.

They were installed in cell 6 and 11.

The installation in cell 06 was chosen because of the restricted length of the MBB16 cable, even though the noise is not very high.

Cable MBB16 for BLMs in 06R3 (Collimators)

1) **MBB16:** Cable 1302149 < --- > BY02=UJ33 to BJBA.P.A6.R3

Element: **collimators in 06R3**

Cable length: ~ **500 meters**

4 BLMs affected:

BLMEI.06R3.B2E10_TCAPA.6R3.B2

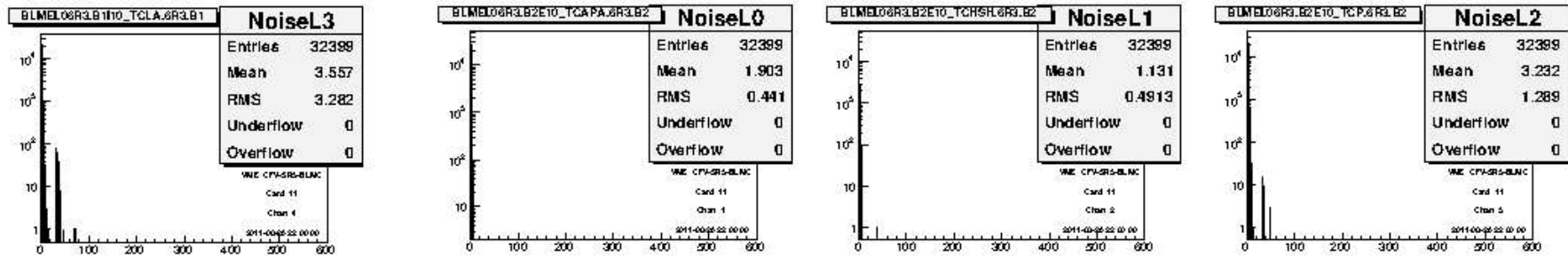
BLMEI.06R3.B2E10_TCHSH.6R3.B2

BLMEI.06R3.B2E10_TCP.6R3.B2

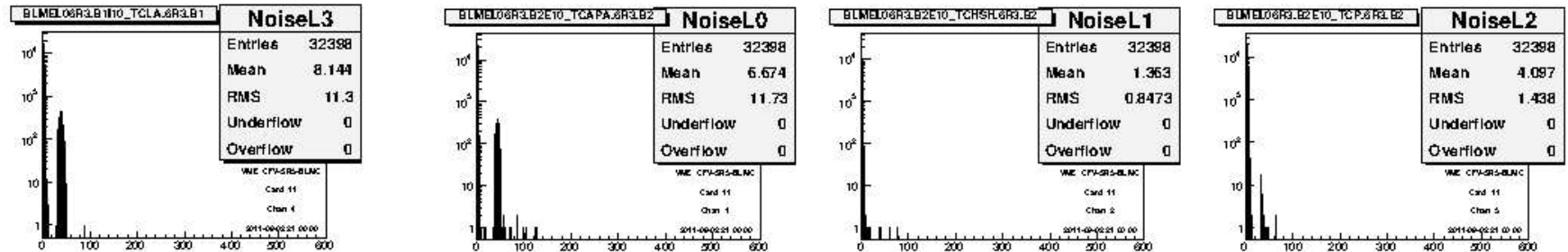
BLMEI.06R3.B1I10_TCLA.6R3.B1

Noise for BLMs in 06R3 (Collimators)

Before



After



Result: Partially increase in noise!

Results on Max. Noise for MBB 16 Cable for BLMs in 06R3 (Collimators)

Results on maximum noise (in BITS) for RS01

1 BIT = $(3.62e-9/40e-6)$ Gy/sec

<u>ExpertName</u>	<u>After</u>	<u>Before</u>	<u>Ratio Before/After</u>
"BLMEI.06R3.B2E10_TCAPA.6R3.B2"	126	6	0.0476
"BLMEI.06R3.B2E10_TCHSH.6R3.B2"	77	39	0.5065
"BLMEI.06R3.B2E10_TCP.6R3.B2"	65	47	0.7231
"BLMEI.06R3.B1I10_TCLA.6R3.B1"	89	71	0.7978

Comment:

The increase in noise can be explained by the cable under test. It shows higher sensitivity to EMI and therefore will not be used in future. The plan is to switch back to the previous standard cable during the next TS in 2011 (Nov. 2011).

Cable NES18 for BLMs in 11R3 (MB)

2) **NES18:** Cable: 1307403 < --- > BY02=UJ33 to BJBAP.A11.R3

Element: **MB 11R3**

Cable length: ~ **699 meters**

6 BLMs affected:

BLM2I.11R3.B1I21_MBA_MBA

BLM2I.11R3.B1I22_MBA_MBA

BLM2I.11R3.B1I30_MBA_MBA

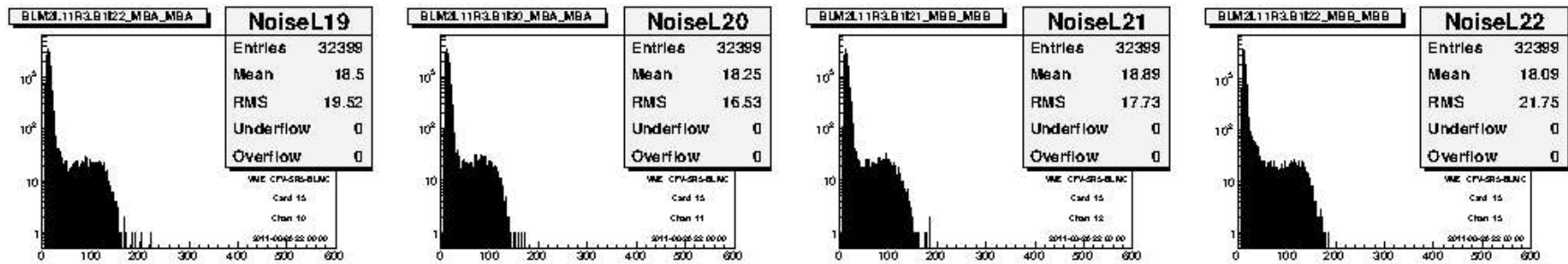
BLM2I.11R3.B1I21_MBB_MBB

BLM2I.11R3.B1I22_MBB_MBB

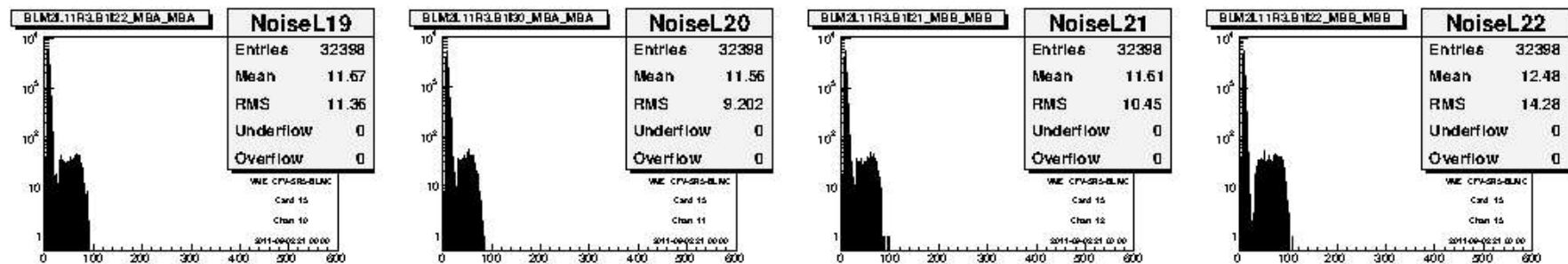
BLM2I.11R3.B1I23_MBB_MBB

Noise for BLMs in 11R3 (MB)

Before



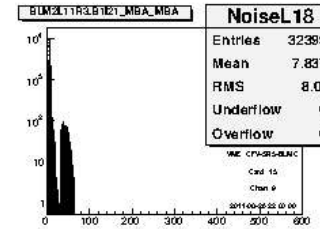
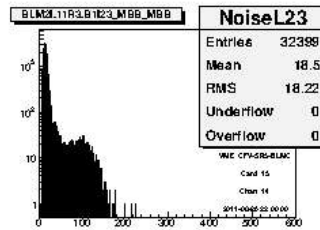
After



Result: Factor of ~2 in noise reduction

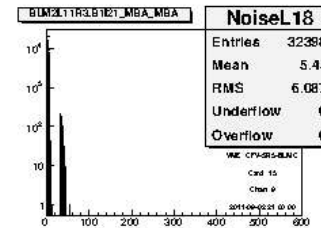
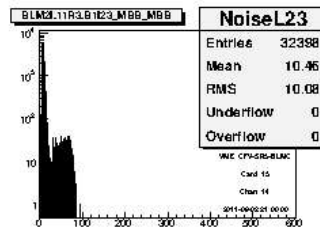
Noise for BLMs in 11R3 (MB)

Before



Channel 1

After



Result: Factor of ~2 in noise reduction

Results on Max. Noise for NES18 cable for BLMs in 11R3 (MB)

Results on maximum noise (in BITS) for RS01

1 BIT = $(3.62e-9/40e-6)$ Gy/sec

<u>ExpertName</u>		<u>After</u>	<u>Before</u>	<u>Ratio Before/After</u>
"BLM2I.11R3.B1I21_MBA_MBA"	56	65	1.1607	
"BLM2I.11R3.B1I22_MBA_MBA"	90	222	2.4667	
"BLM2I.11R3.B1I30_MBA_MBA"	84	171	2.0357	
"BLM2I.11R3.B1I21_MBB_MBB"	98	185	1.8878	
"BLM2I.11R3.B1I22_MBB_MBB"	108	185	1.7130	
"BLM2I.11R3.B1I23_MBB_MBB"	93	225	2.4194	

Cable NES18 for BLMs in 11R3 (MQ)

3) **NES18**: Cable: 1302155 < --- > BY02=UJ33 to BJBAP.B11.R3

Element: **MQ 11R3**

Cable length ~ **733 meters**

7 BLMs affected:

BLMQI.11R3.B2E30_MQ

BLMQI.11R3.B1I10_MQ

BLMQI.11R3.B2E20_MQ

BLMQI.11R3.B1I21_MQ

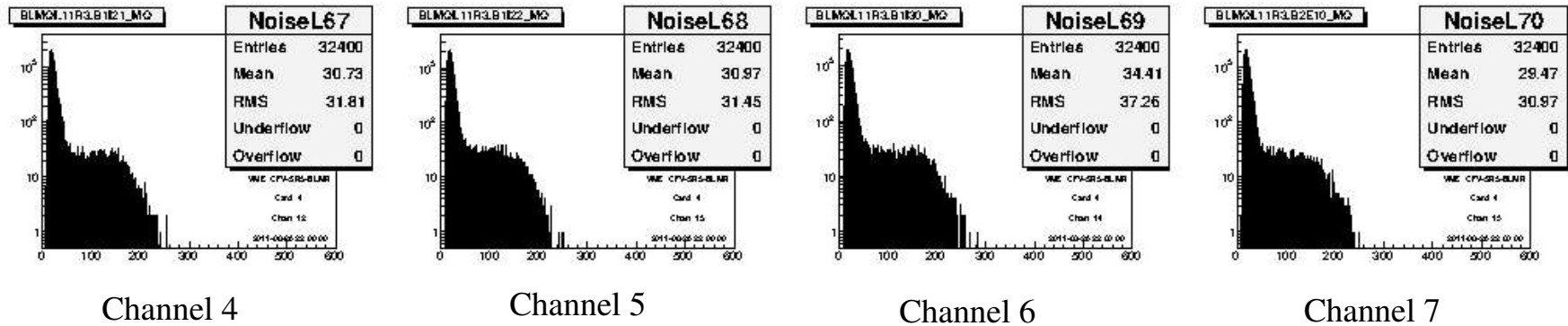
BLMQI.11R3.B1I22_MQ

BLMQI.11R3.B1I30_MQ

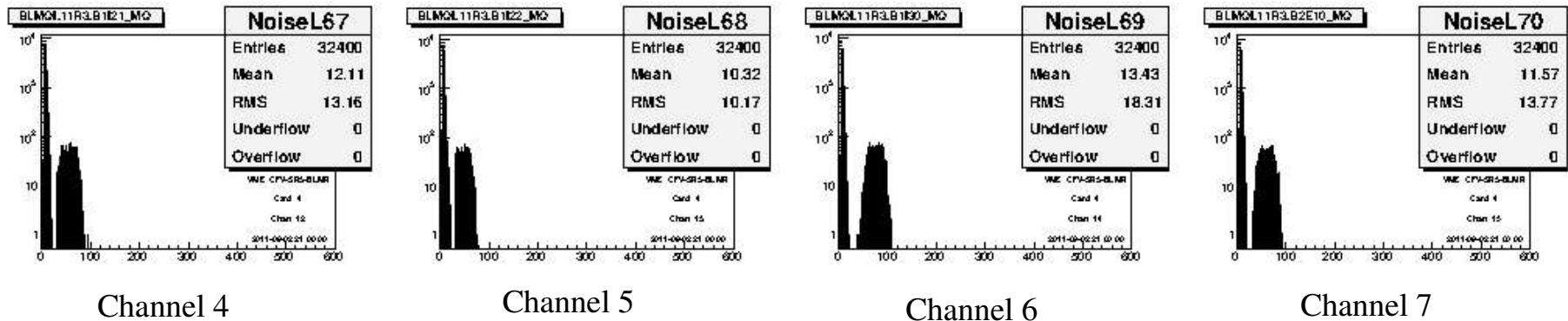
BLMQI.11R3.B2E10_MQ

Example Noise for BLMs in 11R3

Before



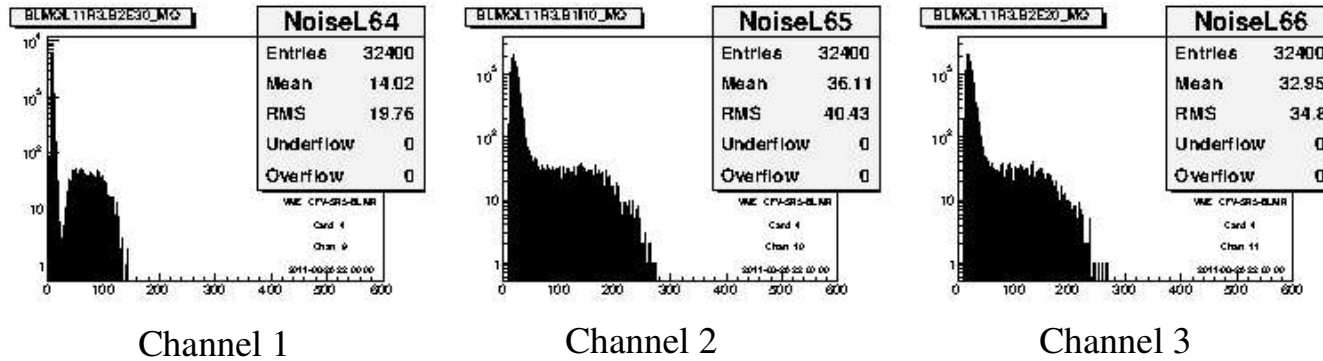
After



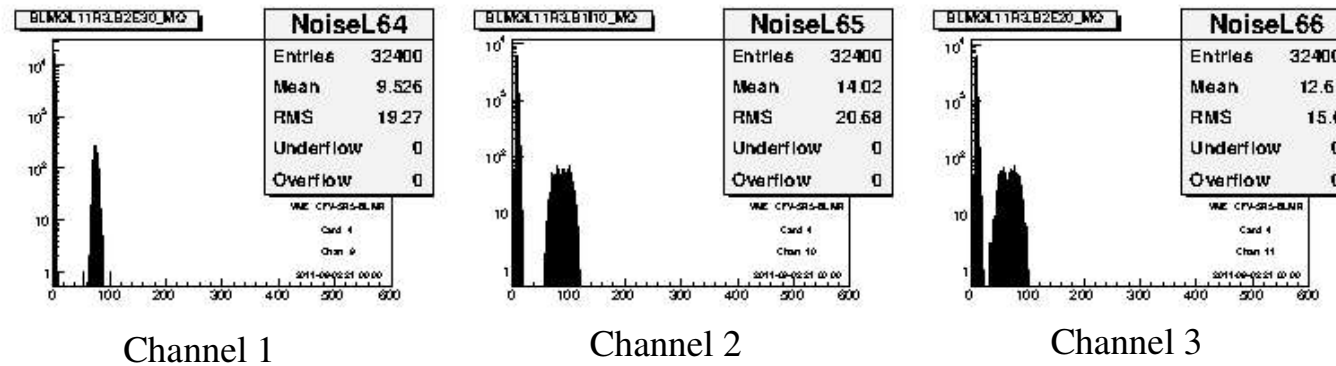
Result: Factor of ~3 in noise reduction

Example Noise for BLMs in 11R3

Before



After



Result: Factor of ~3 in noise reduction

Results on Max. Noise for NES18 cable for BLMs in 11R3 (MQ)

Results on maximum noise (in BITS) for RS01

1 BIT = (3.62e-9/40e-6) Gy/sec

<u>ExpertName</u>	<u>After</u>	<u>Before</u>	<u>Ratio Before/After</u>
"BLMQI.11R3.B2E30_MQ"	101	143	1.4158
"BLMQI.11R3.B1I10_MQ"	120	273	2.2750
"BLMQI.11R3.B2E20_MQ"	102	267	2.6177
"BLMQI.11R3.B1I21_MQ"	93	255	2.7419
"BLMQI.11R3.B1I22_MQ"	75	252	3.3600
"BLMQI.11R3.B1I30_MQ"	108	282	2.6111
"BLMQI.11R3.B2E10_MQ"	92	249	2.7065

Summary

3 new cables were installed during TS04 to test possibilities for noise reduction in the BLM system in areas where very long cables need to be used.

The installation of the 2 **NES18** cables in cell 11 R3 was leading to a reduction in maximum noise by a

- **factor of 2** (on MB element, 700 m length)
- **factor of 3** (on MQ element, 730m length)

The installation of the **MBB16** cable in cell 06 R3 seems not promising and the cable will be exchanged again due to an increase in noise.

Note: the noise on channel 1 for each CFC card is always smaller than for the other channels. The twisted pair for channel 1 is located in the middle of the cable and has the biggest shielding.