Title: Discussion meeting on the CSNS RCS Linear-cut BPM (JPARC-CSNS)

Participators: T. Toyama (KEK), K. Satou (KEK), R. Yang (IHEP), R. Qiu (IHEP), M. Rehman (IHEP), W. Chen (IHEP), B. Zhang (IHEP), C. Chen (IHEP)

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Place: Zoom

Q&A

Q1: What’s S21 measurement? How connect in lab.? (p6, Toyama-san)

A1: Port 1# and Port 2 w/ VNA.

Q2: In the CST simulation w/ only the BPM model, will it generate also an offset? (p11, Toyama-san)

A2: yes, close at the two ends. Not open

**Recommandation: Consider to add dummy pipe to suppress the non-linear effects!**

Q3: How setup the electronic board in simulation?

A3: closed in the other end, where the aperture does not change suddenly.

**Comment 1#: CST simulation with open boundy might include additional undesired artifical effects/errors. Therefore, simulations with dummy pipe is recommanded. The appropriate length of the dummy pipe should be checked via simulation and comparison of the results.**

**=> A length of the dummy pipe being >3\*BPM diameter has been recommanded by senior master; but, Toyama-san think L>1\*diam. Might also work. It should be confirmed through comparisons.**

Q4: Somehow, one can try CST simulation w/ 2D mesh.

A4: 3D mesh is favoured, while 2D mesh will be checked to speed up simulation.

Q5: Is the dummy pipe electrically connected to the BPM body?

A5: yes, via close touch.

Q5’: The surface of the dummy pipe is oxidized, will it affect?

A5: To be checked

Q6: Did you check the capacitance matrix terms in lab.?

A6: Not yet, but it could be done.

**Recommendation: use a two-port VNA and a 50 Ohm terminator; The lower frequency range is more important, i.e., determine the C\_ij value in a lower freq. (<1 MHz at JPARC , Toyama-san)**

Q7: Mapping with VNA at JPARC.

A7: use 5-port VNA;

**Recommendation:**

**1, Generator – Transformer at wire input – Wire: the transformer should be optimized to minimize the reflection; in the case of mis-matched impedance, the reflection RF signal will cause extra EM field distortion inside the BPM body, it does deform the waveform**

**2, Consider to use a RF power amplifier**

**3, might be 200-300 Ohm characteristics impedance of the (wire-BPM, the calibration system)**

**4, In Toyama-san’s mapping work, some problems were observed in the early phase, and the reason was found to be the mis-match between wire and coax. cable**

Q8: What about use the coef. from CST simulation to reconstruct beam position? (Rehman)

A8: Not recommended. Should trust in the wire mapping results. (Toyama-san)

Q9: which dummy pipe length is favoured for the calibration system in lab.? (R. Yang)

A9: Same trouble in JPARC’s BPM calibration system (several varying BPM apertures). **No clear norm. The 3\*Diam is assessed by senior master through static calculation (formula), and it is very rough. (Toyama-san)**

**=> better to use a longer one**

Q10: why the C00\_x and C00\_y are different on p28.? (Rehman)

A10: Toyama-san think it is related to the capatances are different for the electrodes. (Toyama-san)

Q11: How will you finally confirm the gain and offset calibration coef.?

Q12: BBA, these coef. assessed by beam is different from the calibration setup in lab.

Q12: Which parameters of the new MR BPM electronics will be check online with the calibration unit on the electronics board? (R. Qiu)

A12: reflection, gain, almost all the relavent parameters. (Satou-san)