

Additional Cross-talk measurement on connectors

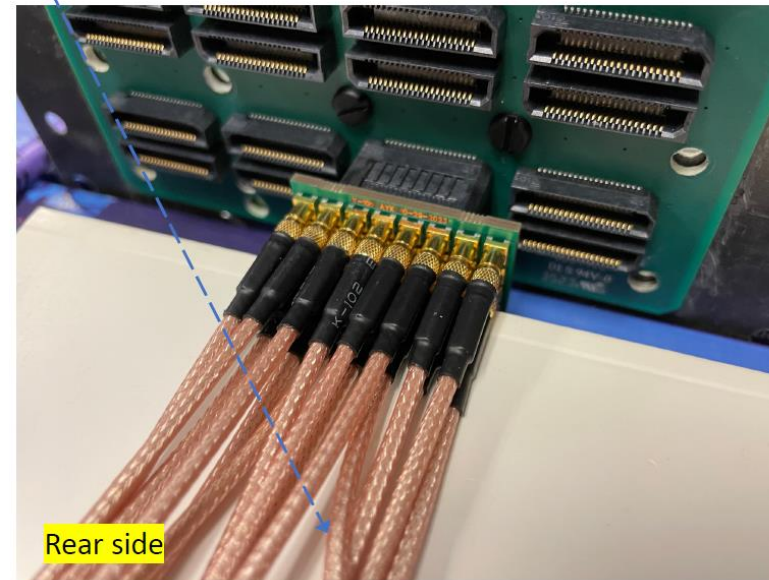
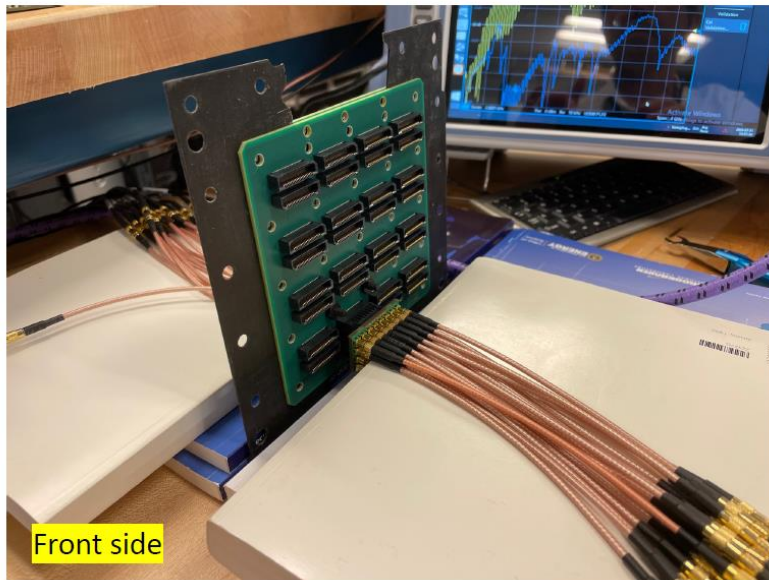
Takao Sakaguchi (BNL)

Setup (as shown by Alexander)

Y05f-Y05f sandwich

Setup #1 pictures

Cable to Port 1 spot (B2 in the scan)



- A Y10b-Y05f-interposer-Y05f-Y10b sandwich
 - Where Y05f is a backplane and Y10b a small Samtec -> MMCX adapter
- 2x8 MMCX->MCX cable pigtails on both sides
 - Permanently connected to V1742 DRS4 digitizer inputs (50 Ohm termination) except for a pair of Port 1 / Port 2 cables
- Rear sandwich side channel B2 -> ZNLE Port 1 (in all the subsequent plots)
- Front sandwich side -> to Port 2 (scan through all 16 MMCX connectors -> 16 plots total)

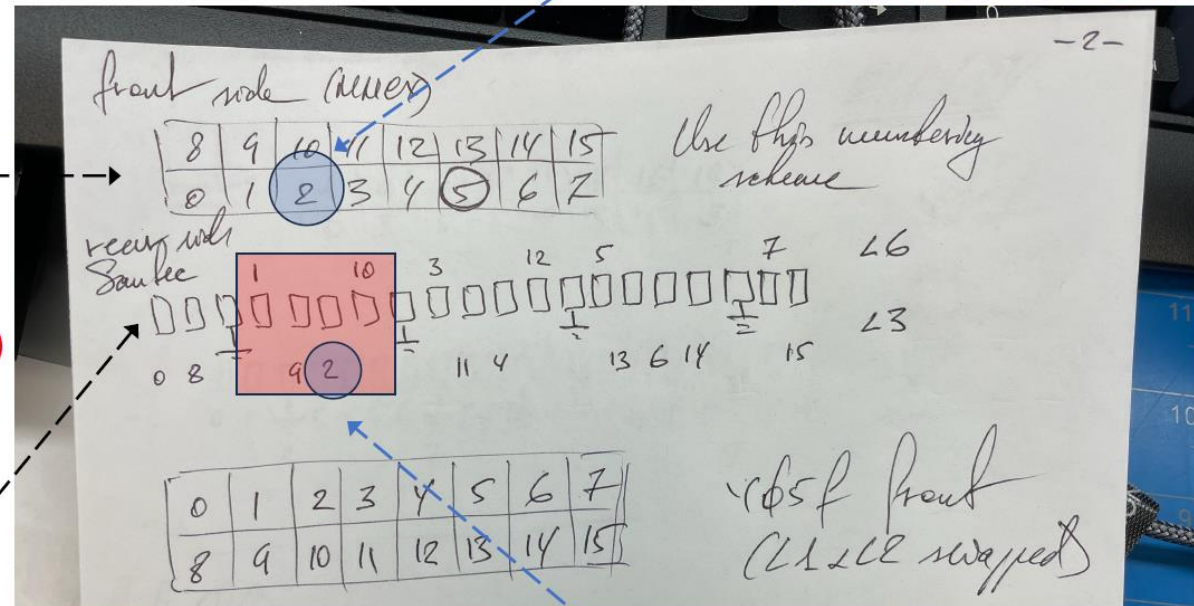
Pin assignment

Setup #1 channel map

Port 1 was connected to this spot in a 2x8 matrix of installed MMCX cables (location as seen from the front side)

Channel 00..15 numbering convention on MMCX adapter

Expect channels 1,9,10 (channel 2 neighbors) to look "bad"

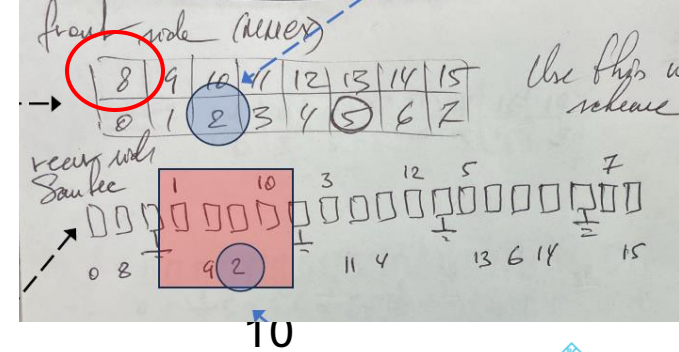


This same channel 2 location on a 2x20-pin ERF8 connector (only one side is of interest)

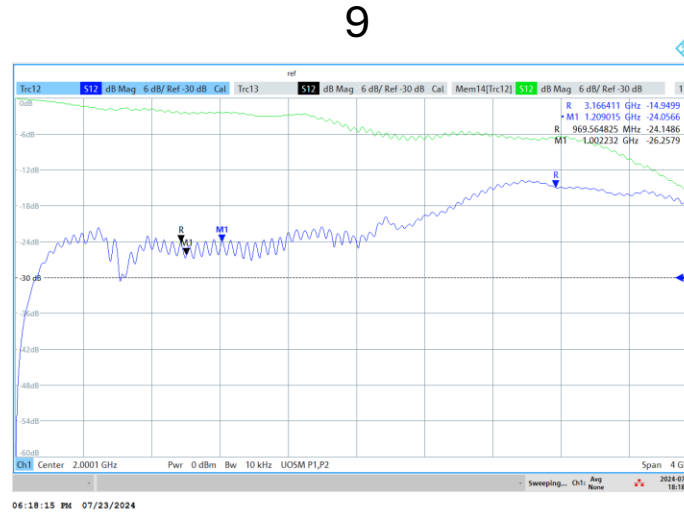
Effectively use one 20-pin side of a single Samtec ERF8 connector

Input 8, looking at 0, 1, 2, 9, 10

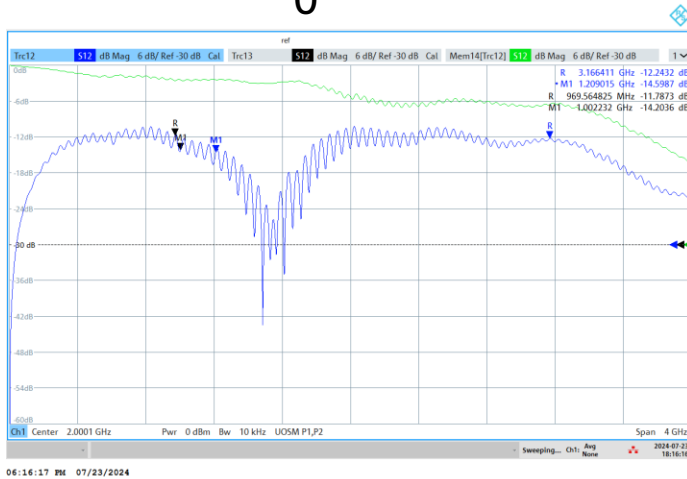
- Green is "baseline", Vert: 6dB/cell. Hori: 0-4GHz



8



0



1



2



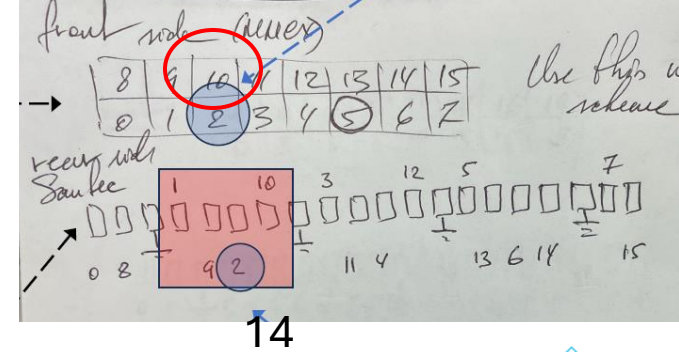
8/21/2024

eRD110 meeting

4

Input 10, looking at 4, 5, 6, 12, 13, 14

- Green is "baseline", Vert: 6dB/cell. Hori: 0-4GHz



12



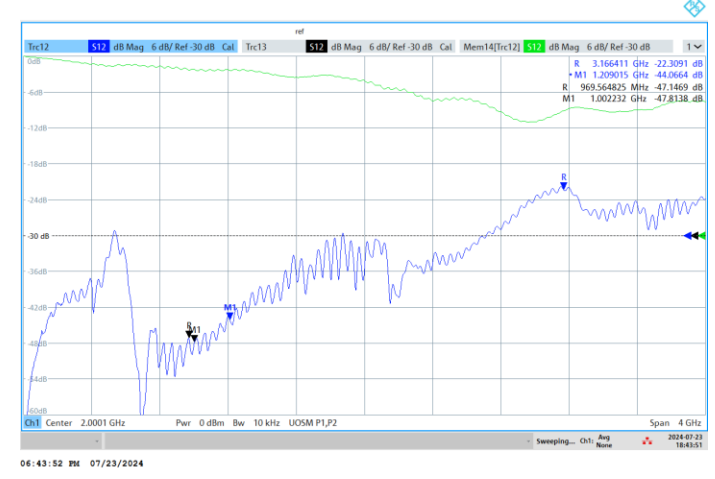
06:38:40 PM 07/23/2024

13



06:41:18 PM 07/23/2024

14



06:43:52 PM 07/23/2024

4



06:40:19 PM 07/23/2024

5



06:42:32 PM 07/23/2024

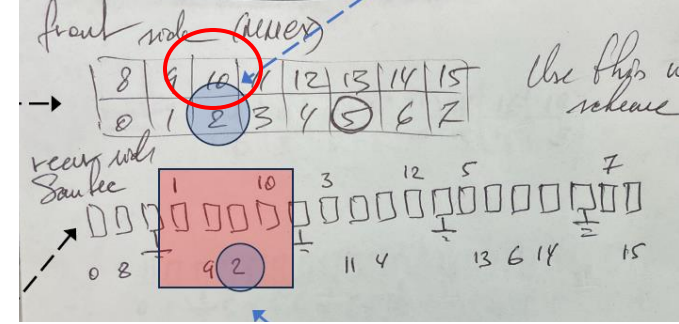
6



06:44:52 PM 07/23/2024

Input 10, looking at 3, 14, 11

- Green is "baseline", Vert: 6dB/cell. Hori: 0-4GHz



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11



4

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6



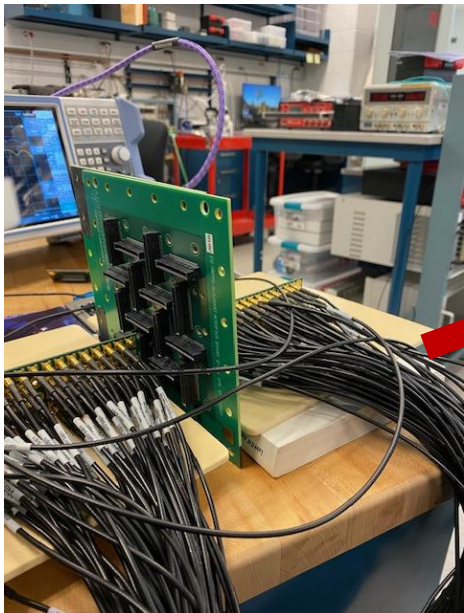
Another setup

M00k-Q00-M00k sandwich

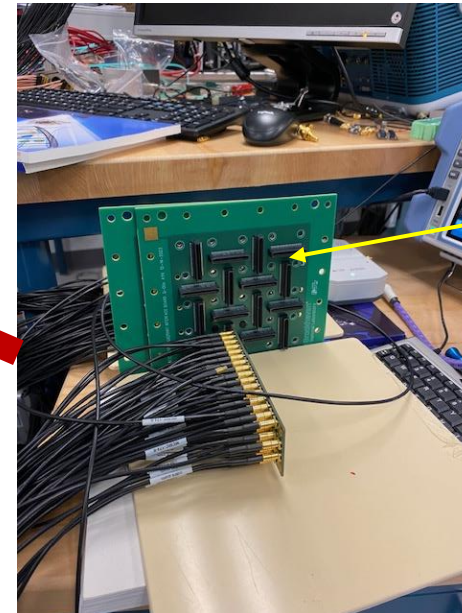
- Two Q00a are attached each other with the transponder inside.
 - Shifted by one connector so that the connectors face in the same direction
- Two M00k's are placed each on Q00a side.
 - All the connectors are terminated with 50Ohm (DRS), except for channels of interest
- Mapping of the connector pins to M00k channels
- Looking into the Q00a and mapping to M00k channels

G	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	G	47	45	43	41	39	37	35	33	63	61	59	57	55	53	51	49	G
G	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	G	46	44	42	40	38	36	34	32	62	60	58	56	54	52	50	48	G

Signal input side



Signal output side



Input 15, looking at the output 0-7

Connector pins on Q00a, mapping to M00k channels

Black is "baseline", vert: 10dB/cell

Input pin

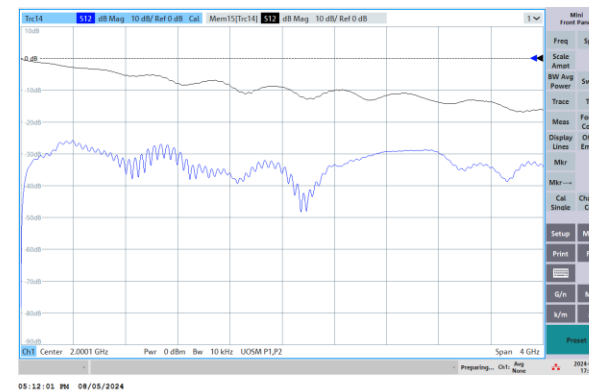
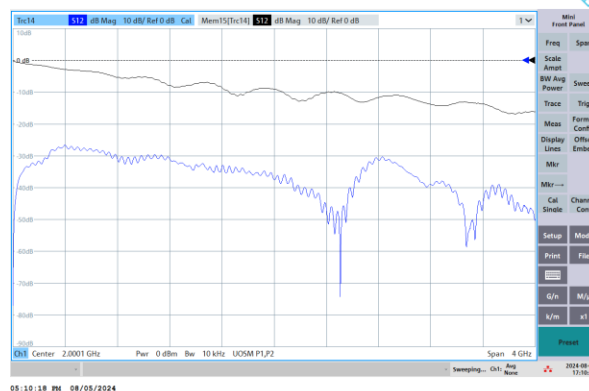
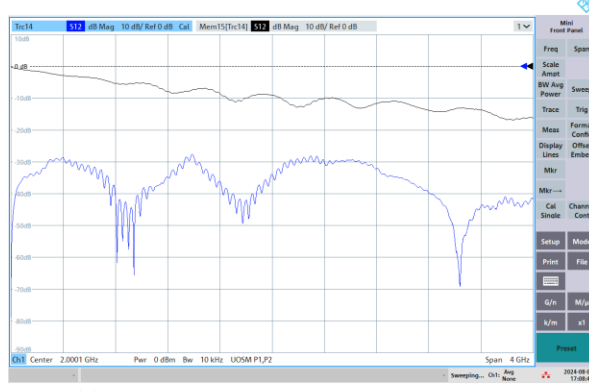
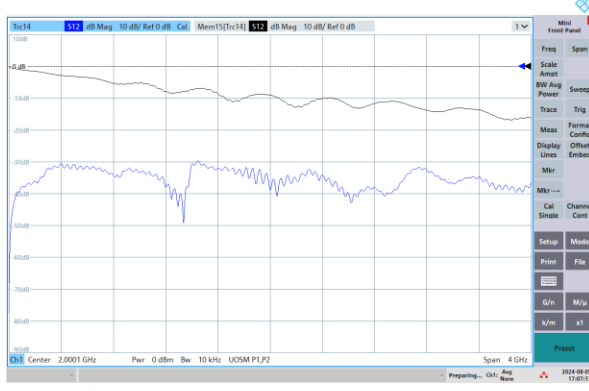
G	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	G	47	45	43	41	39	37	35	33	63	61	59	57	55	53	51	49	G
G	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	G	46	44	42	40	38	36	34	32	62	60	58	56	54	52	50	48	G

1

3

5

7

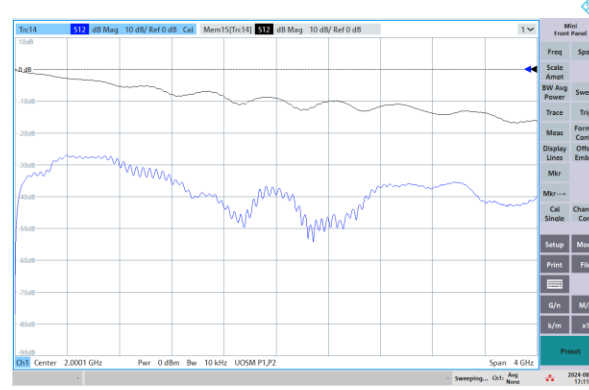
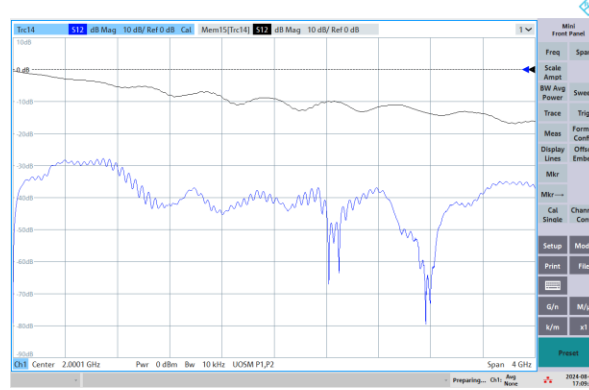
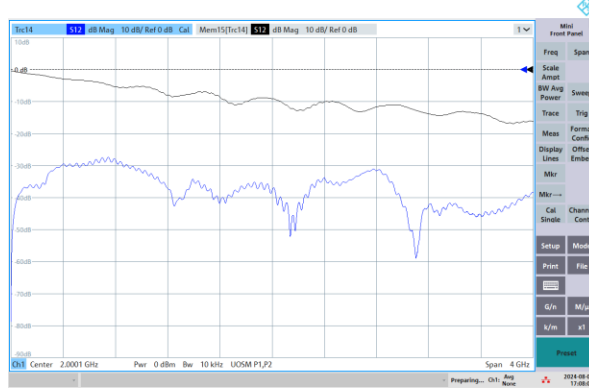
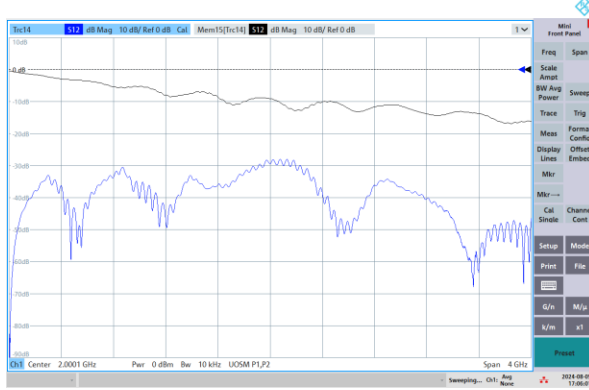


0

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6



Input 15, looking at the output 10-17

Connector pins on Q00a, mapping to M00k channels

Black is "baseline", vert: 10dB/cell

Input pin

G	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	G	47	45	43	41	39	37	35	33	63	61	59	57	55	53	51	49	G
G	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	G	46	44	42	40	38	36	34	32	62	60	58	56	54	52	50	48	G

11

13

17

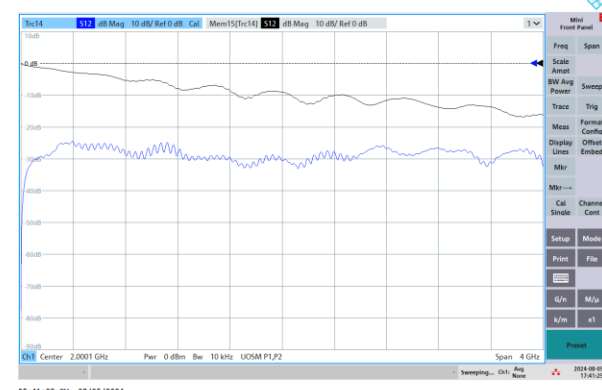
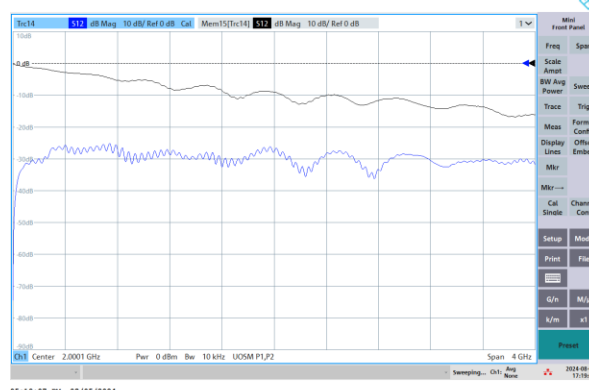
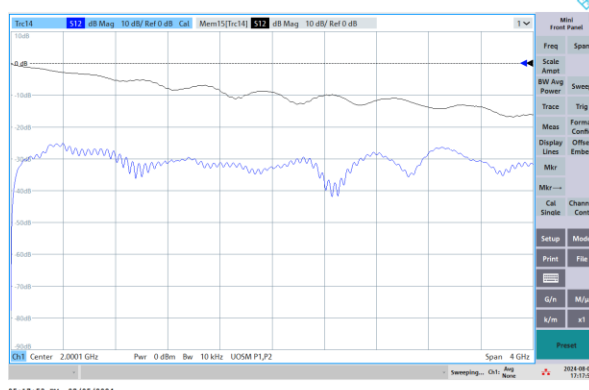
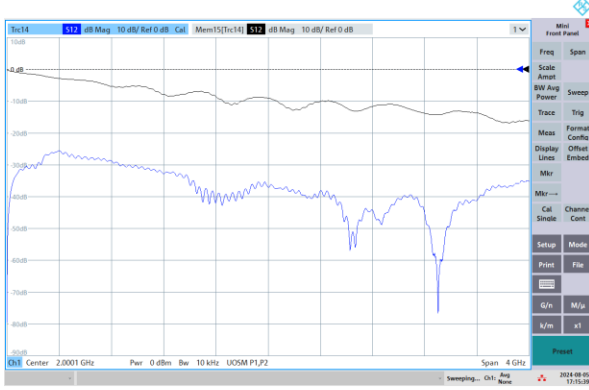
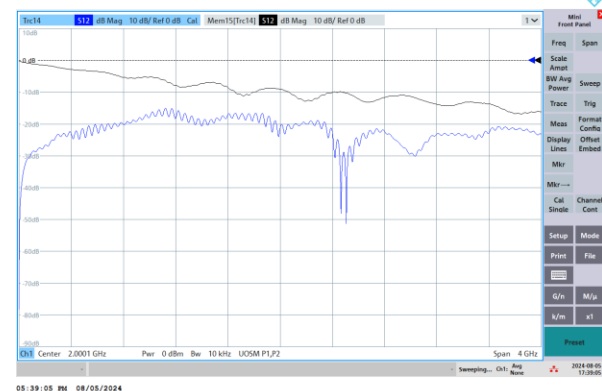
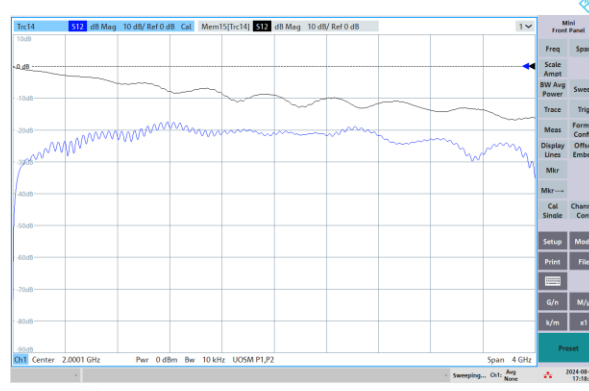
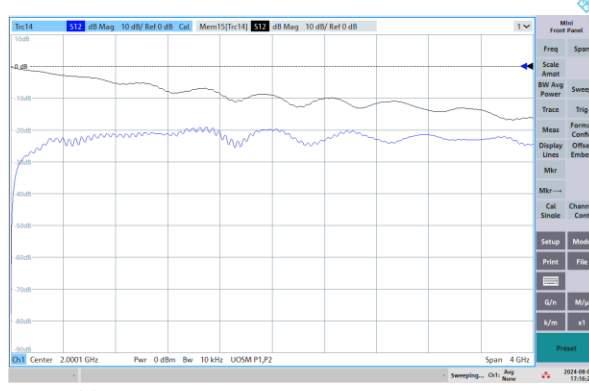
15

10

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14

16



Input 47, looking at the output 26-31

Connector pins on Q00a, mapping to M00k channels

Black is "baseline", vert: 10dB/cell

Input pin

G	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	G	47	45	43	41	39	37	35	33	63	61	59	57	55	53	51	49	G
G	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	G	46	44	42	40	38	36	34	32	62	60	58	56	54	52	50	48	G

27

29

31

GND

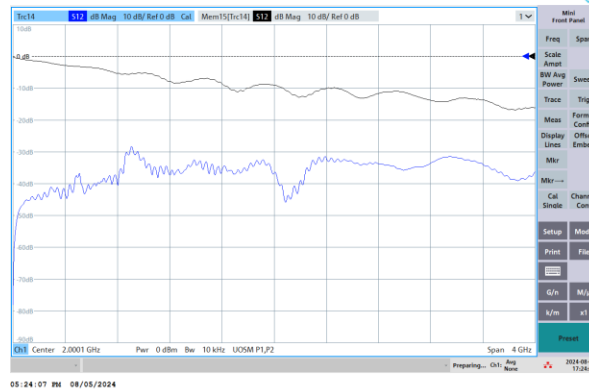
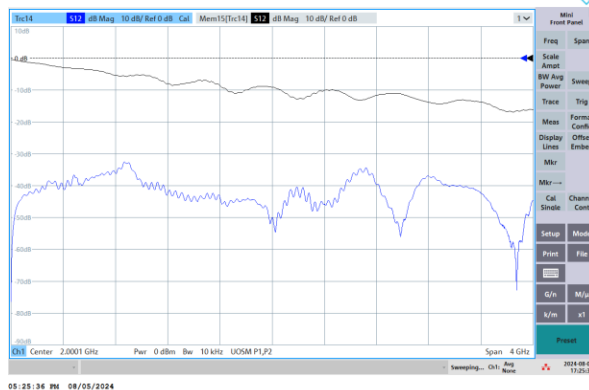
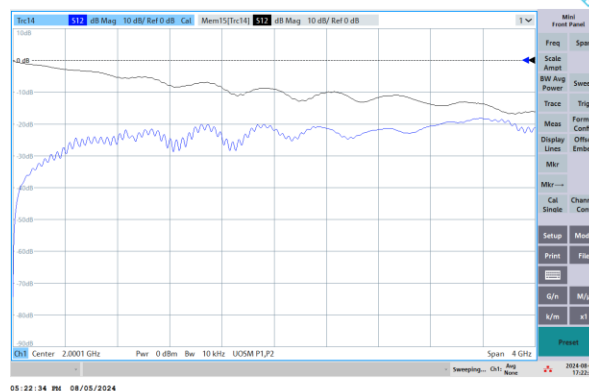
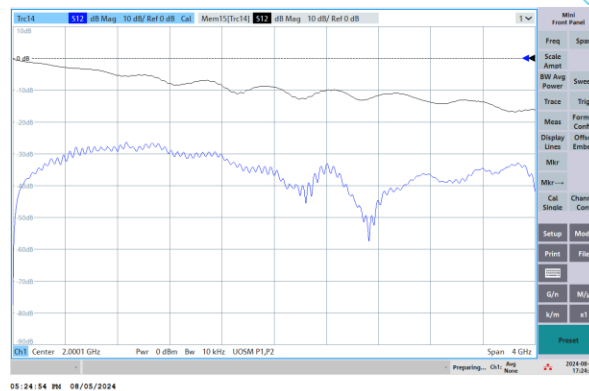
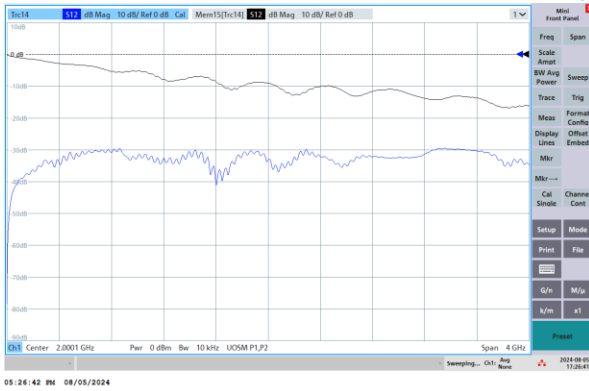
47

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48



Input 48, looking at the output 0-2 (coupled through GND?)

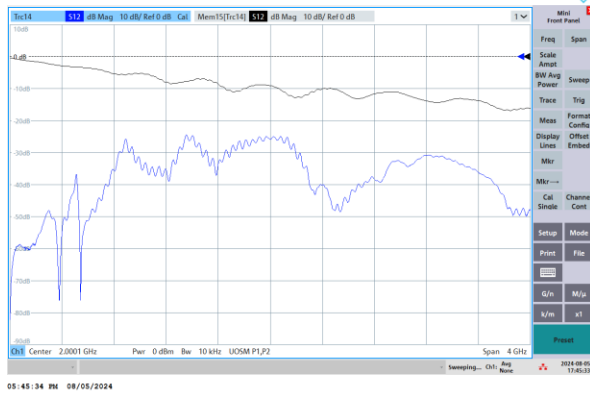
Connector pins on Q00a, mapping to M00k channels

Black is "baseline", vert: 10dB/cell

Input pin

G	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	G	47	45	43	41	39	37	35	33	63	61	59	57	55	53	51	49	G
G	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	G	46	44	42	40	38	36	34	32	62	60	58	56	54	52	50	48	G

1

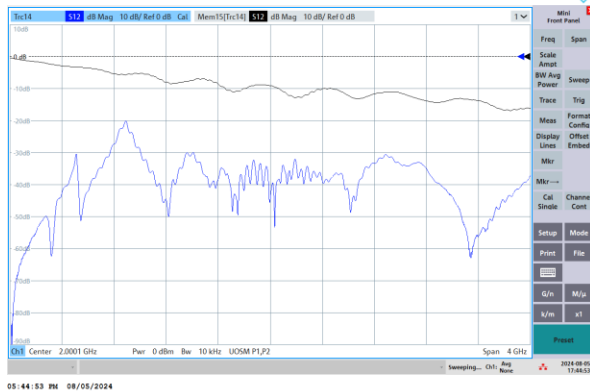


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47

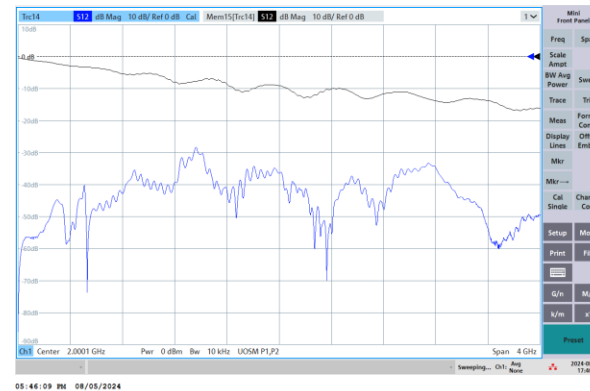
0



2



48



Observation

- Crosstalk of signals reduce with distance as expected.
 - Neighboring pins get higher crosstalk.
 - GND line in-between does not work well
 - could be daughter PCB problem or weak grounding.
 - Needs additional check.
 - Some outliers (crosstalk at far ends) may be due to coupling through GND.
- We would need to make a small testing PCB that is with a connector only to test the crosstalk further