The Hat Creek Radio Observatory

VNA test results of the IF Splitter

Alexander Pollak & Marc Jacquart

SETI Institute
339 Bernardo Ave, Suite 200
Mountain View, CA 94043
Alexander.Pollak.87@gmail.com

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1 General

This document contains all the scattering matrix measurements done in March-April 2024 during the two IF splitter modules construction to ensure their quality and for further reference. All the measurements were done following the instructions in the "Testing" section of "The IF Splitter" document.
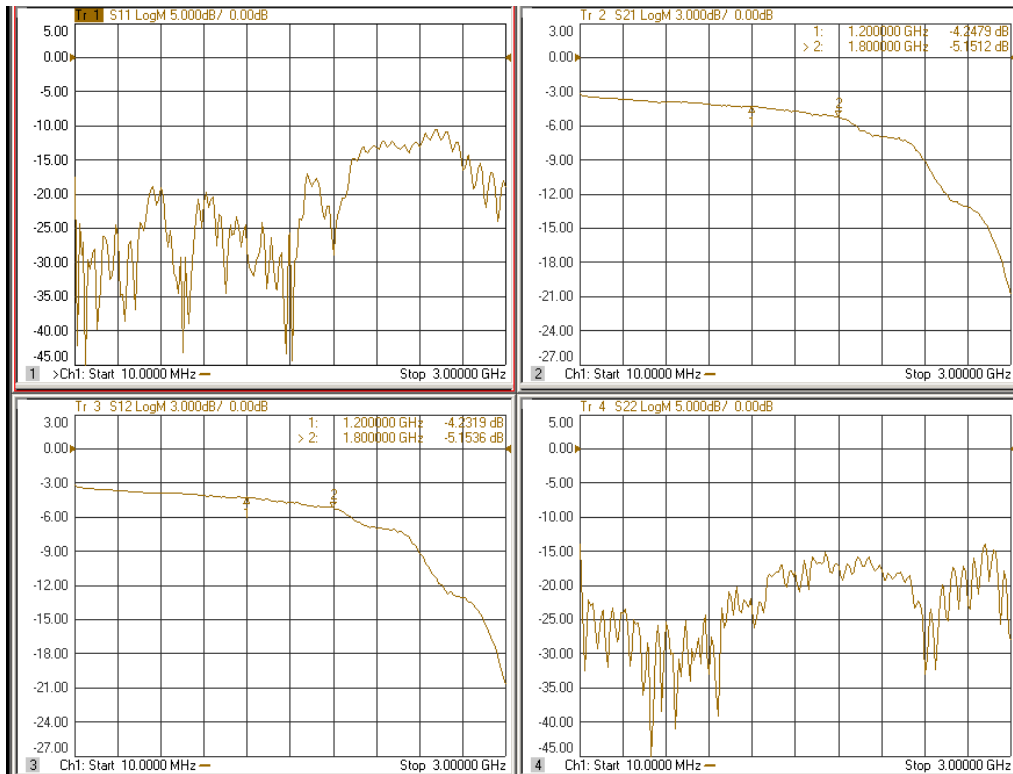
2 Results

Figure 1: Scattering matrix for channel 1A, polarization x and output 3dB1.
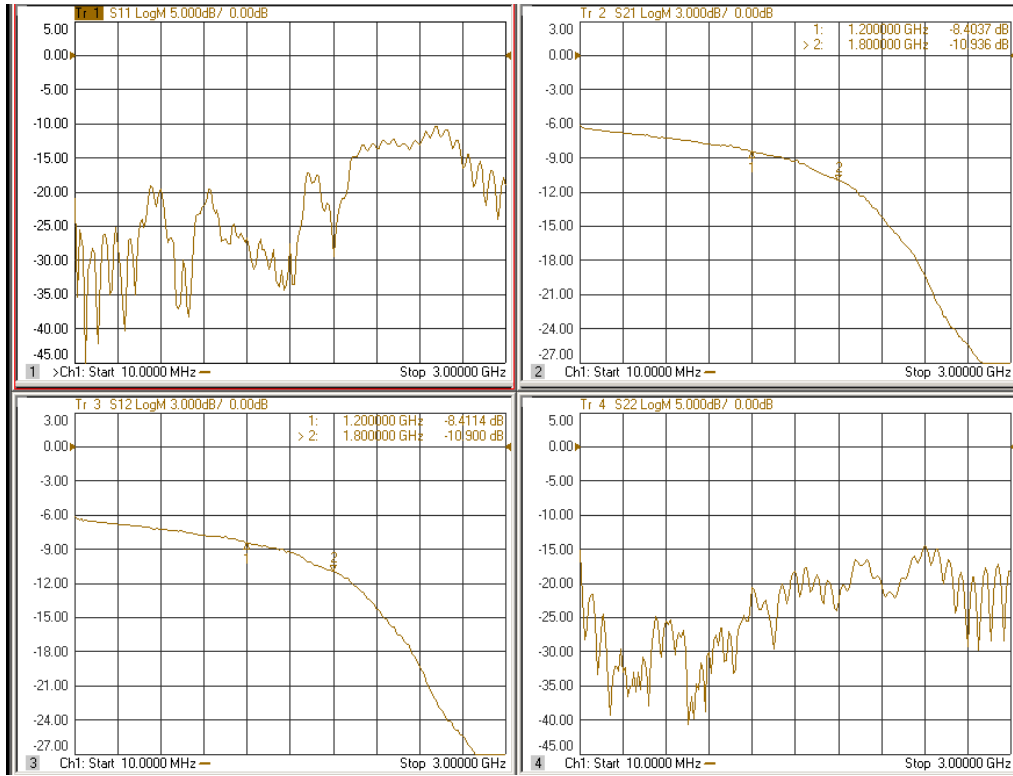
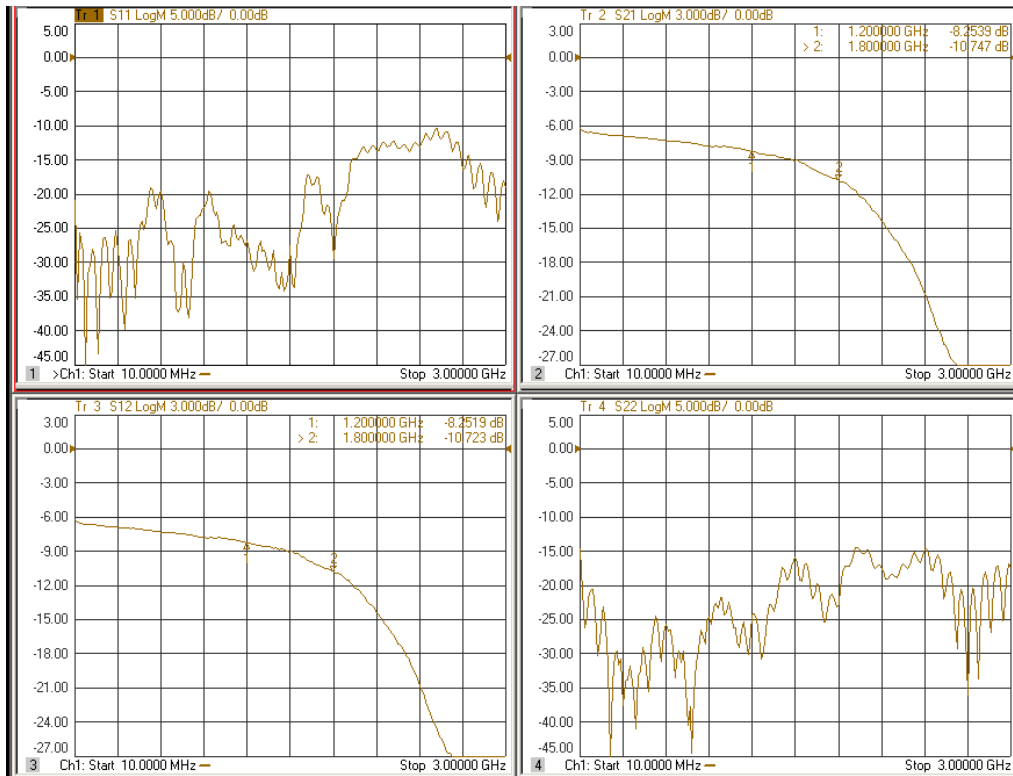Figure 2: Scattering matrix for channel 1A, polarization x and output 6dB2.

Figure 3: Scattering matrix for channel 1A, polarization x and output 6dB3.
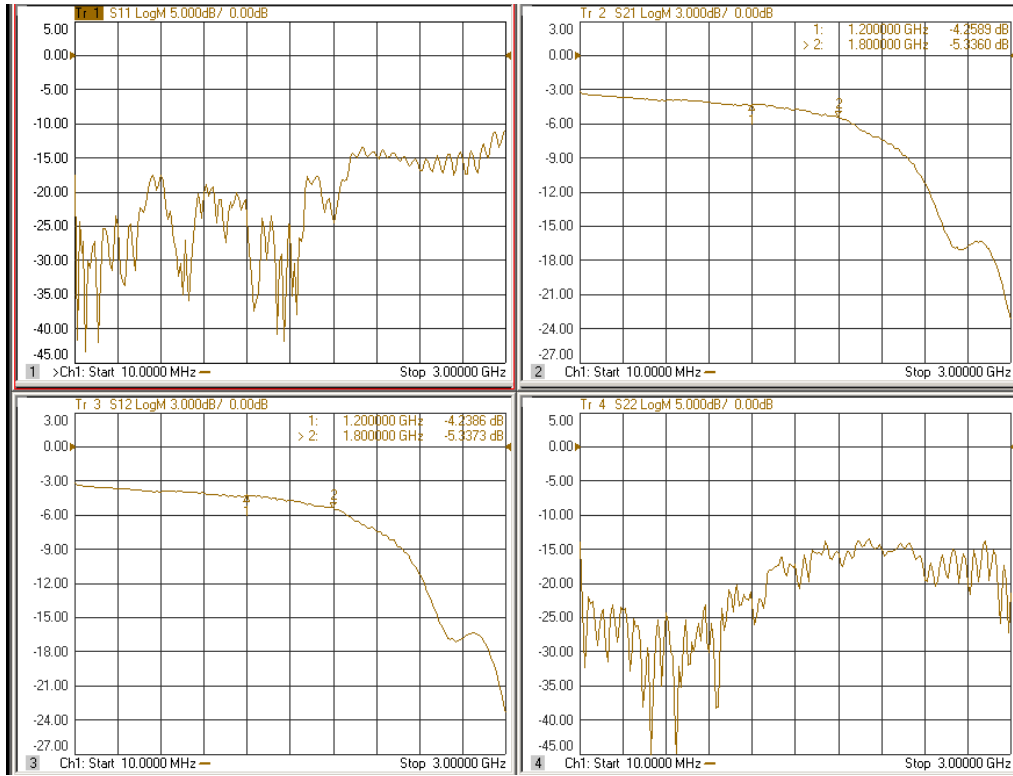
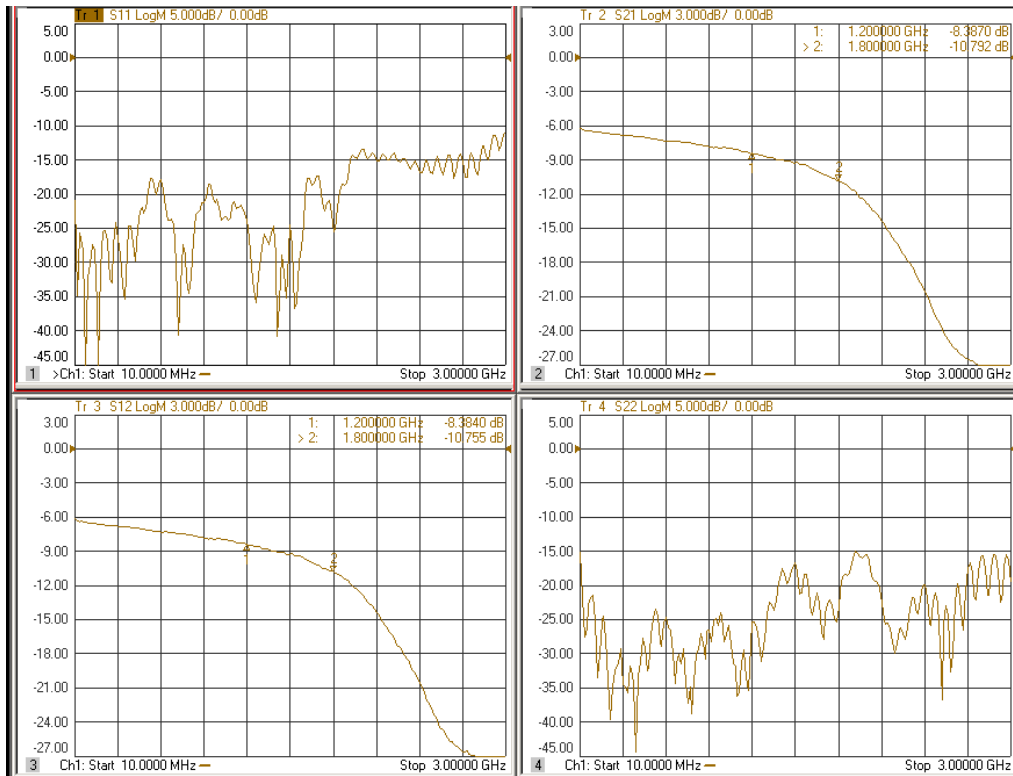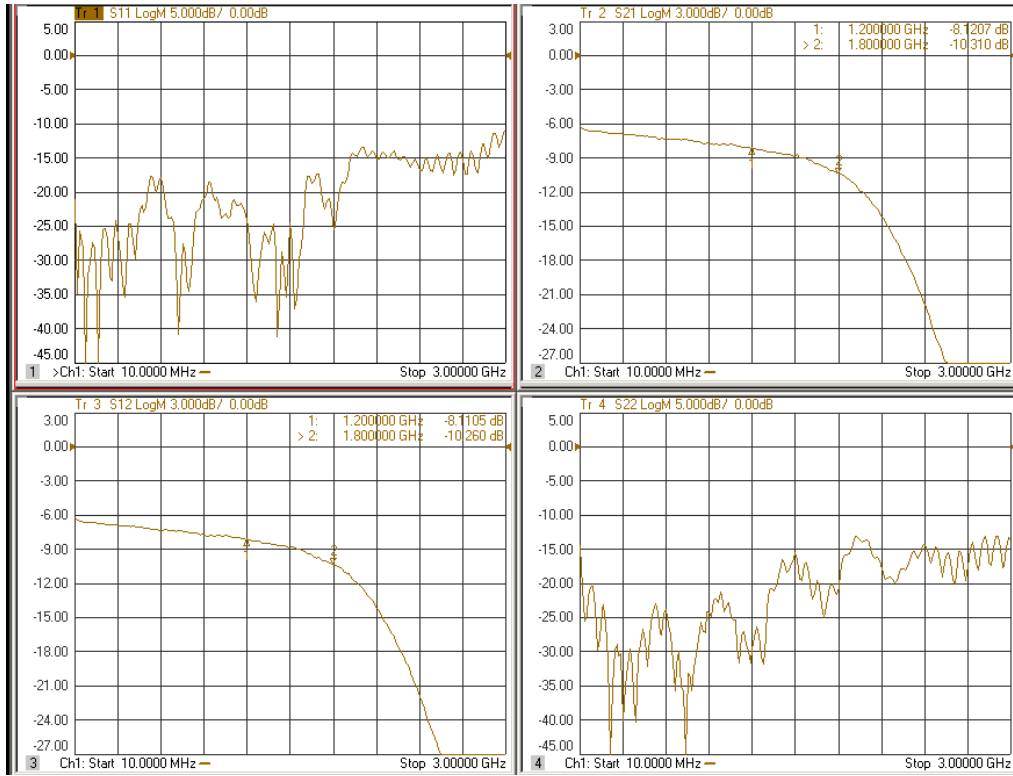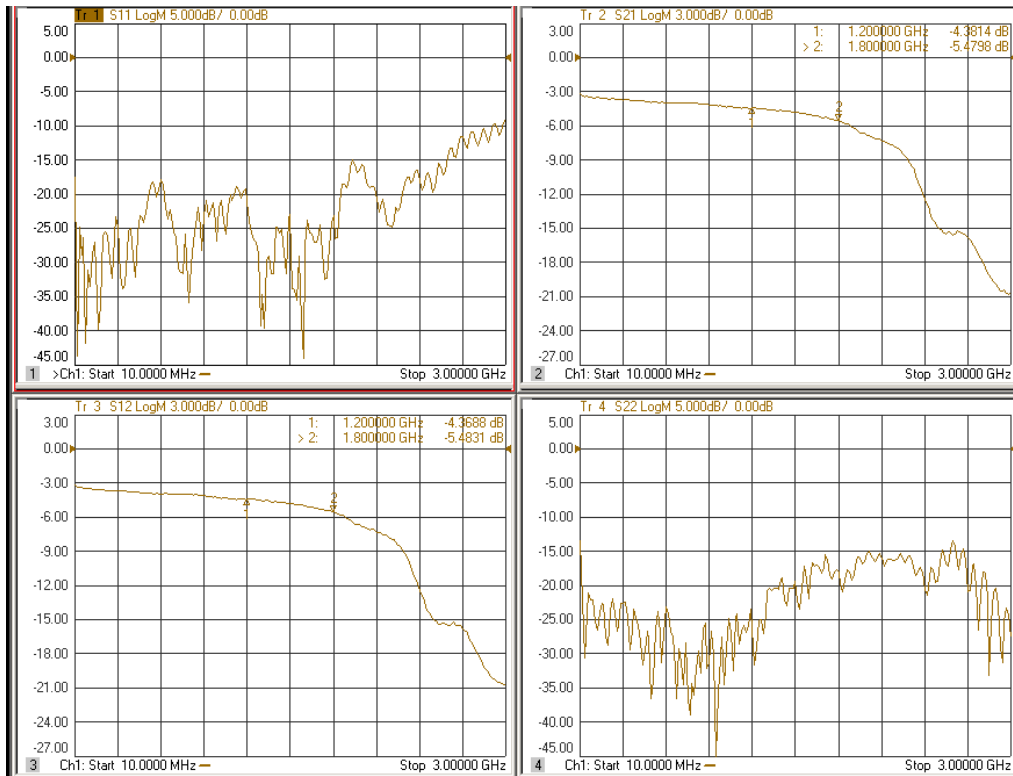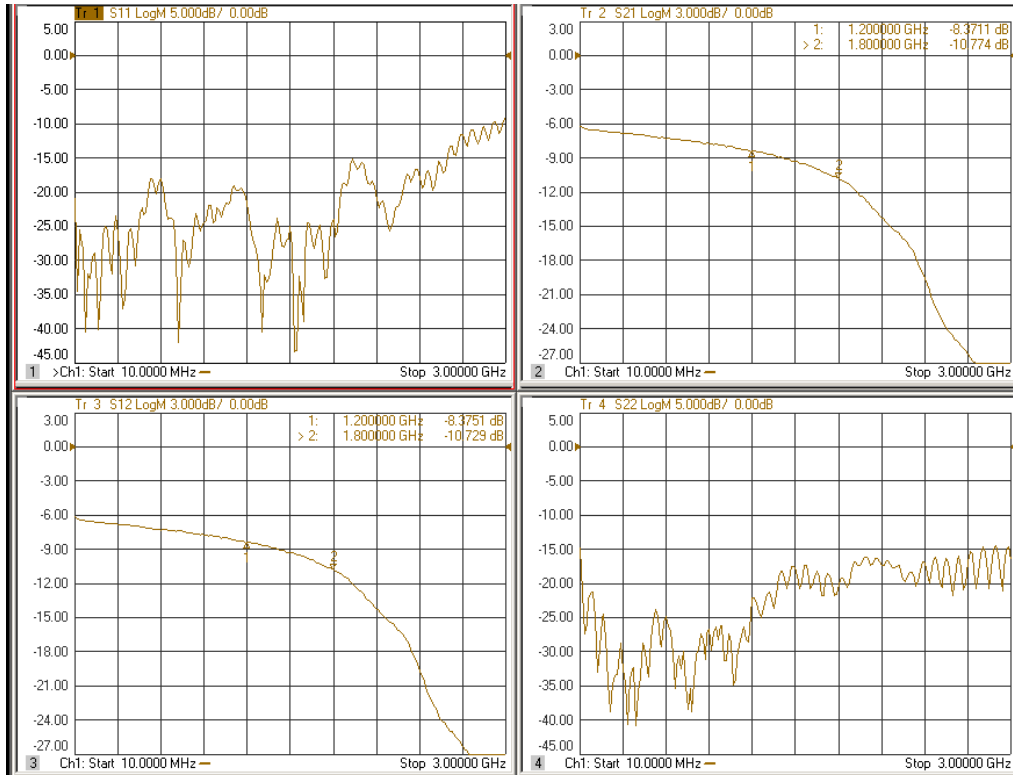Figure 4: Scattering matrix for channel 1A, polarization y and output 3dB1.

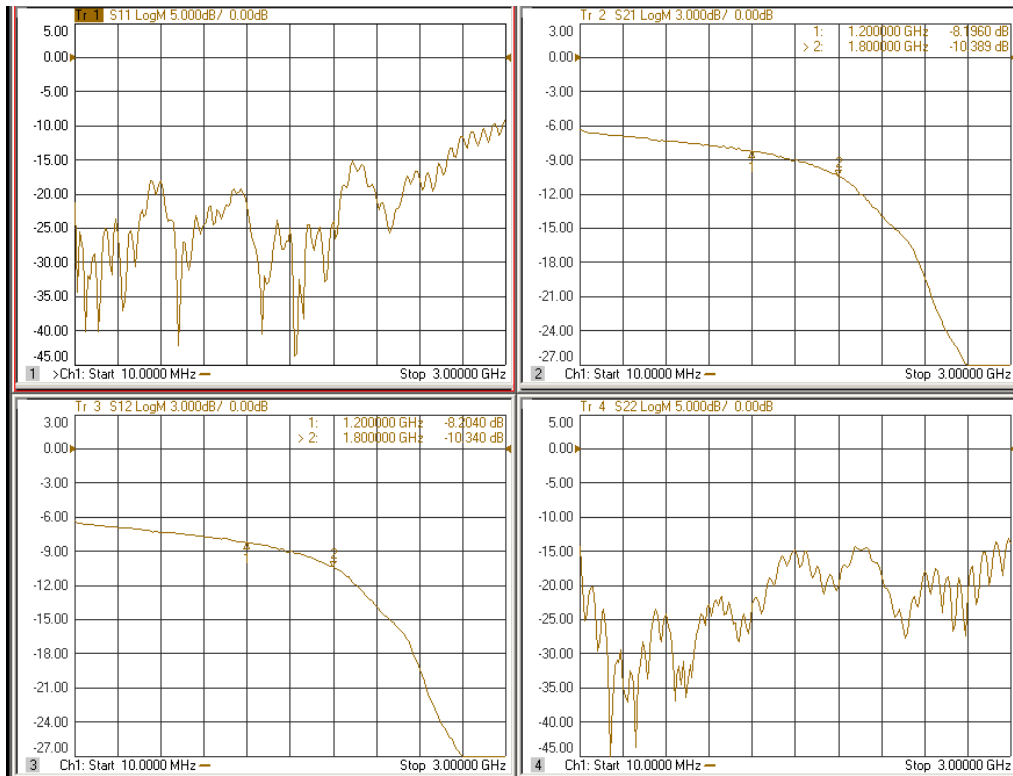Figure 5: Scattering matrix for channel 1A, polarization y and output 6dB2.

Figure 6: Scattering matrix for channel 1A, polarization y and output 6dB3.

Figure 7: Scattering matrix for channel 1B, polarization x and output 3dB1.

Figure 8: Scattering matrix for channel 1B, polarization x and output 6dB2.

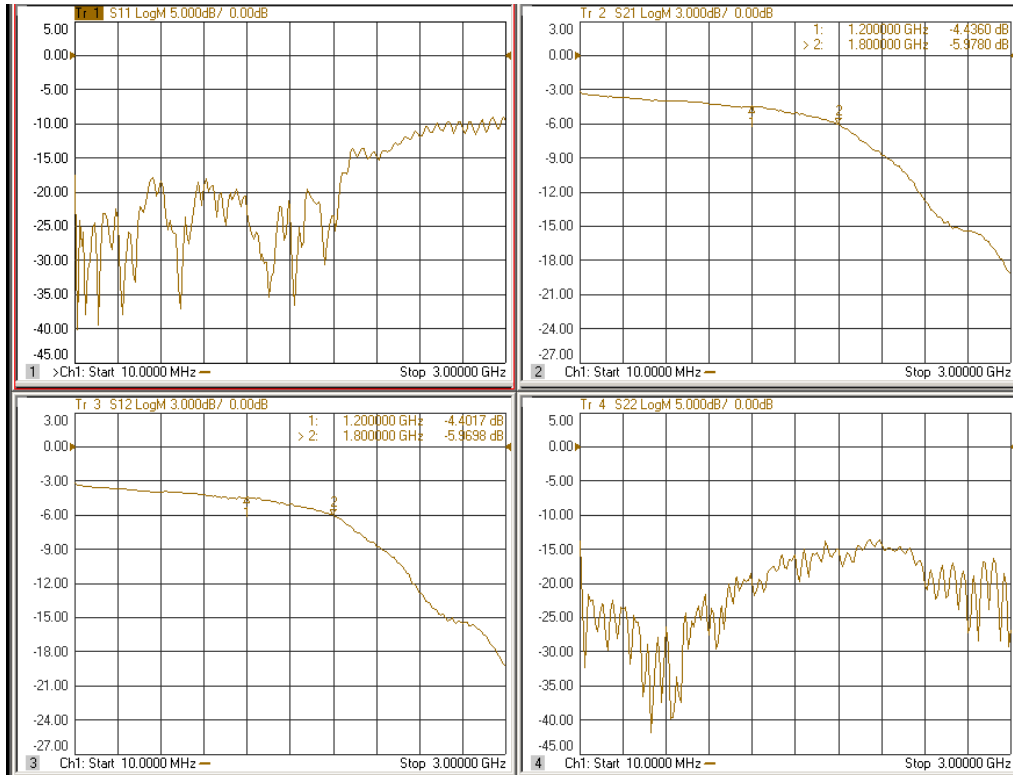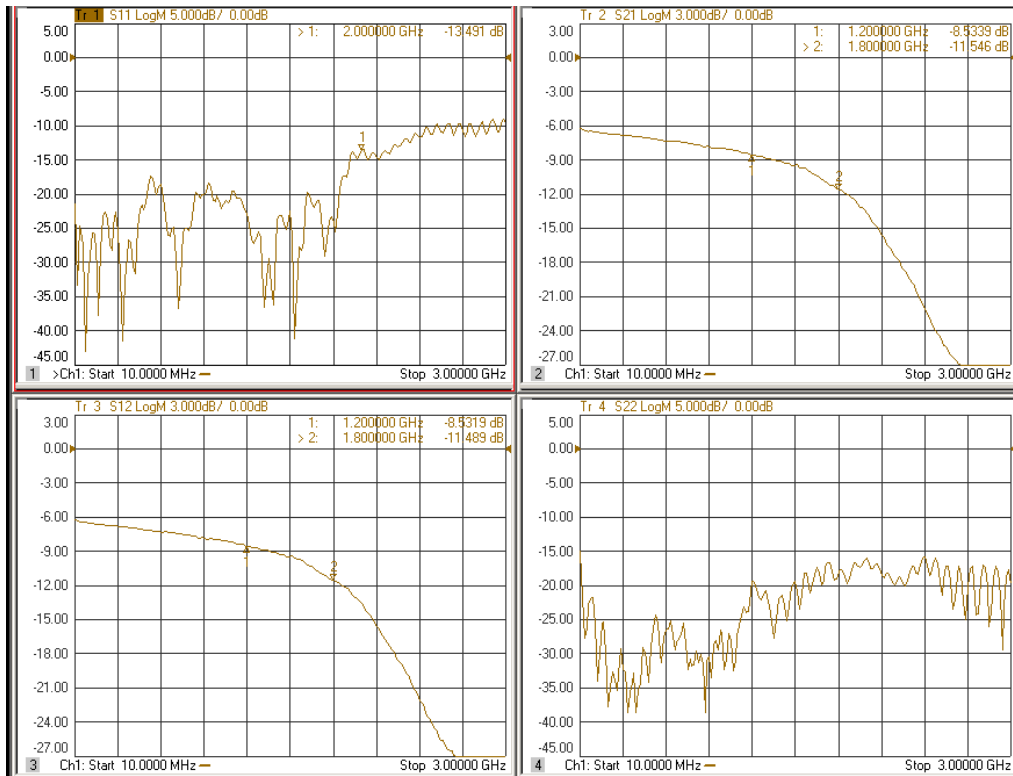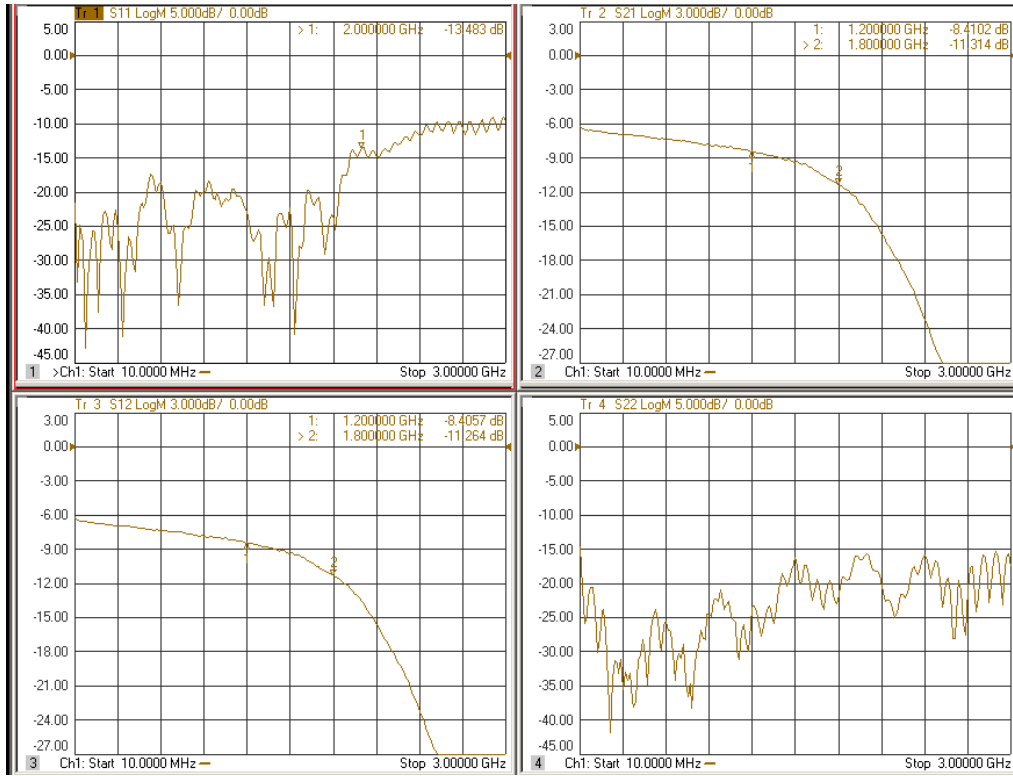Figure 9: Scattering matrix for channel 1B, polarization x and output 6dB3.

Figure 10: Scattering matrix for channel 1B, polarization y and output 3dB1.

Figure 11: Scattering matrix for channel 1B, polarization y and output 6dB2.

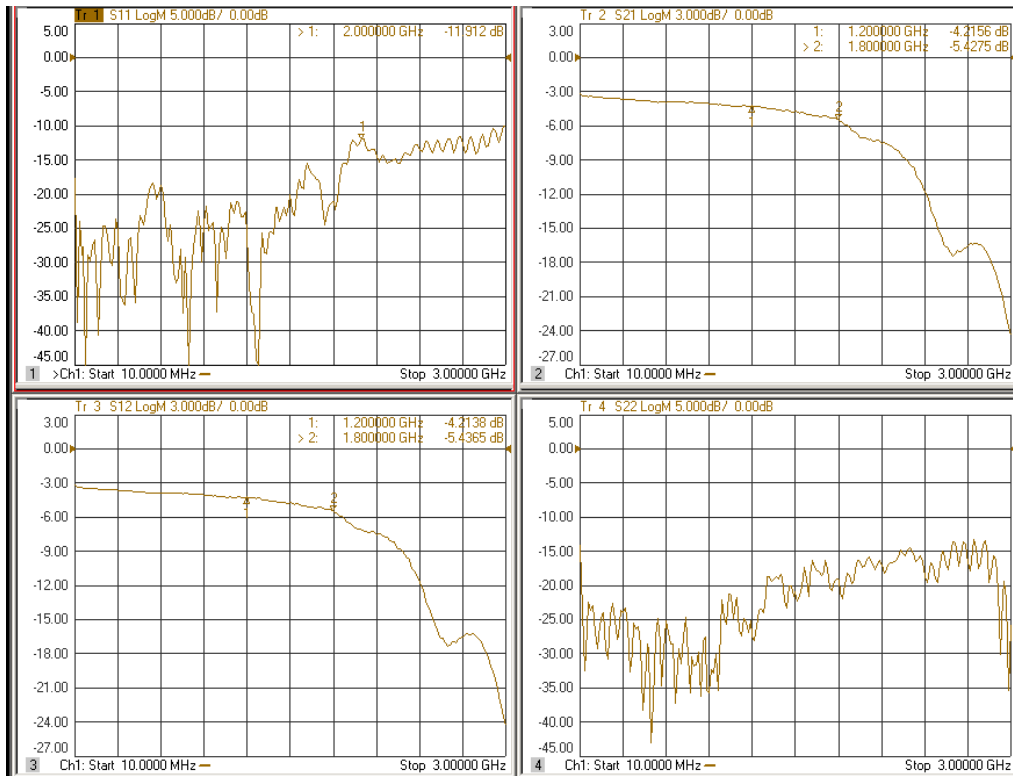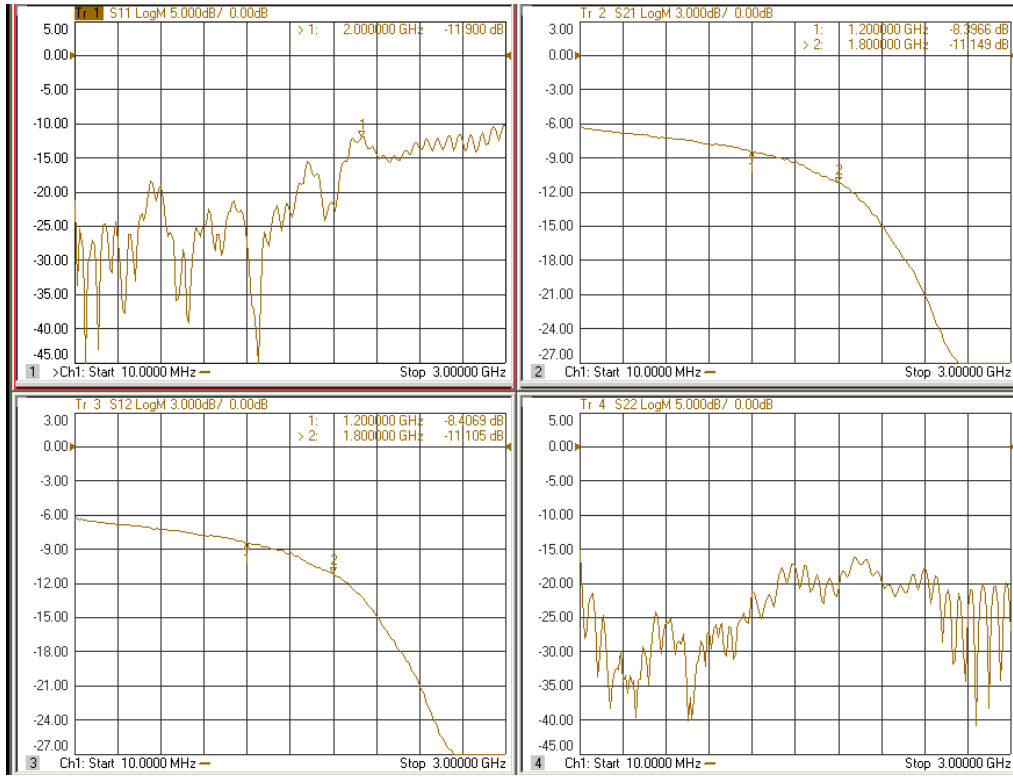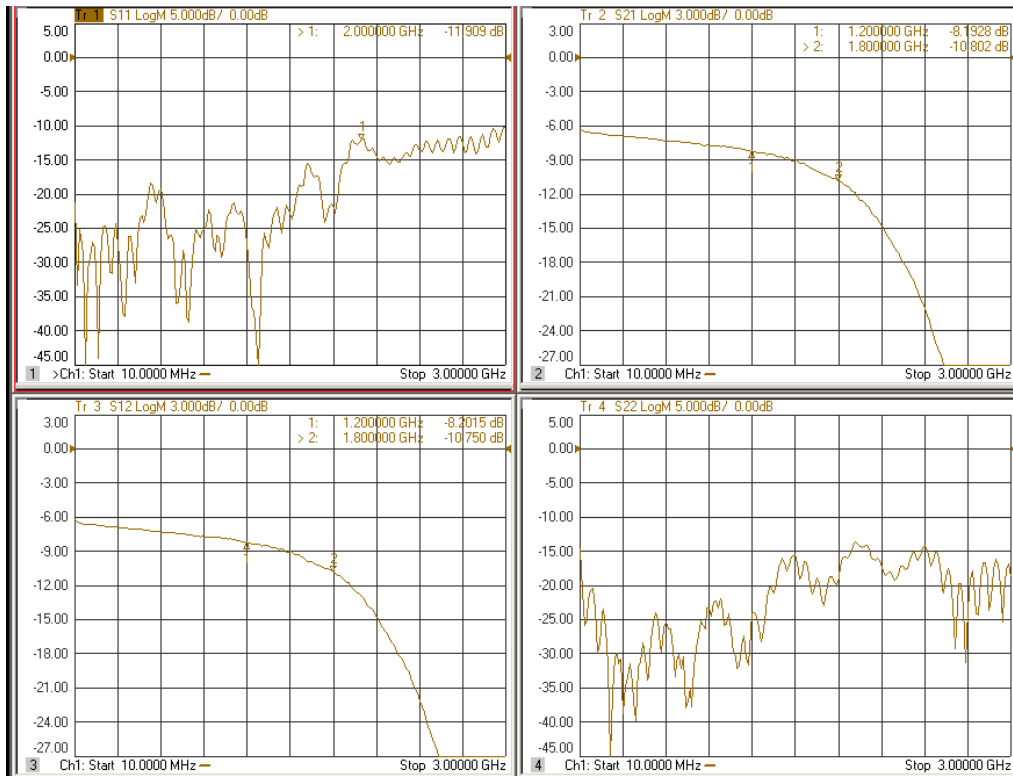Figure 12: Scattering matrix for channel 1B, polarization y and output 6dB3.

Figure 13: Scattering matrix for channel 1C, polarization x and output 3dB1.

Figure 14: Scattering matrix for channel 1C, polarization x and output 6dB2.

Figure 15: Scattering matrix for channel 1C, polarization x and output 6dB3.
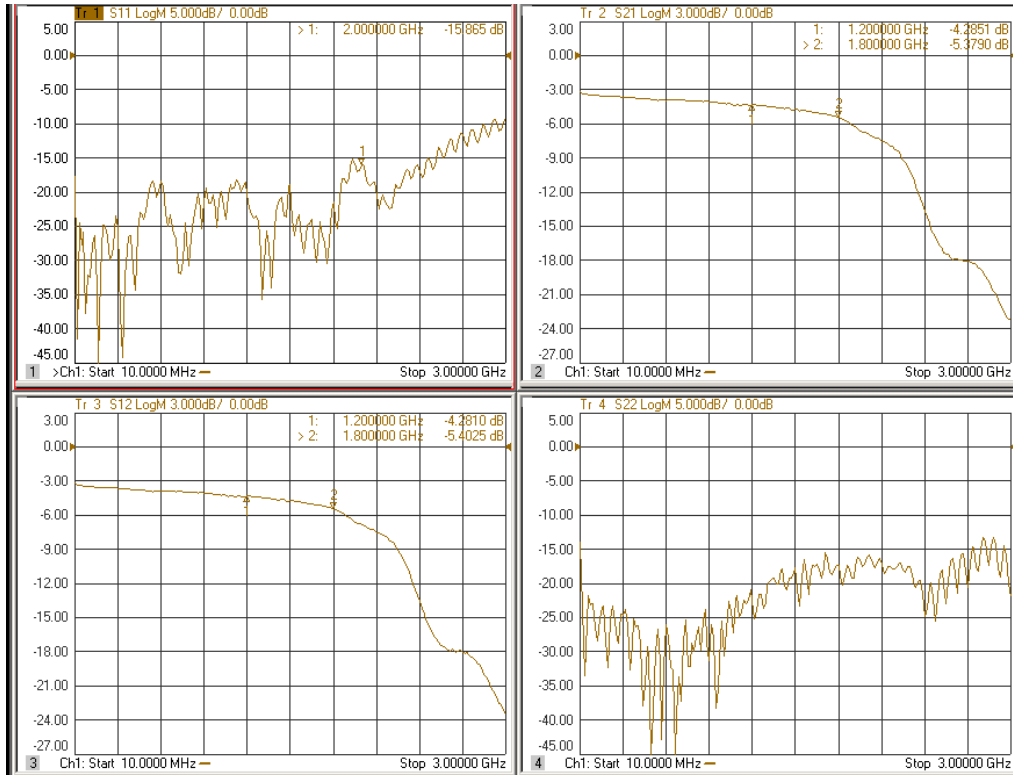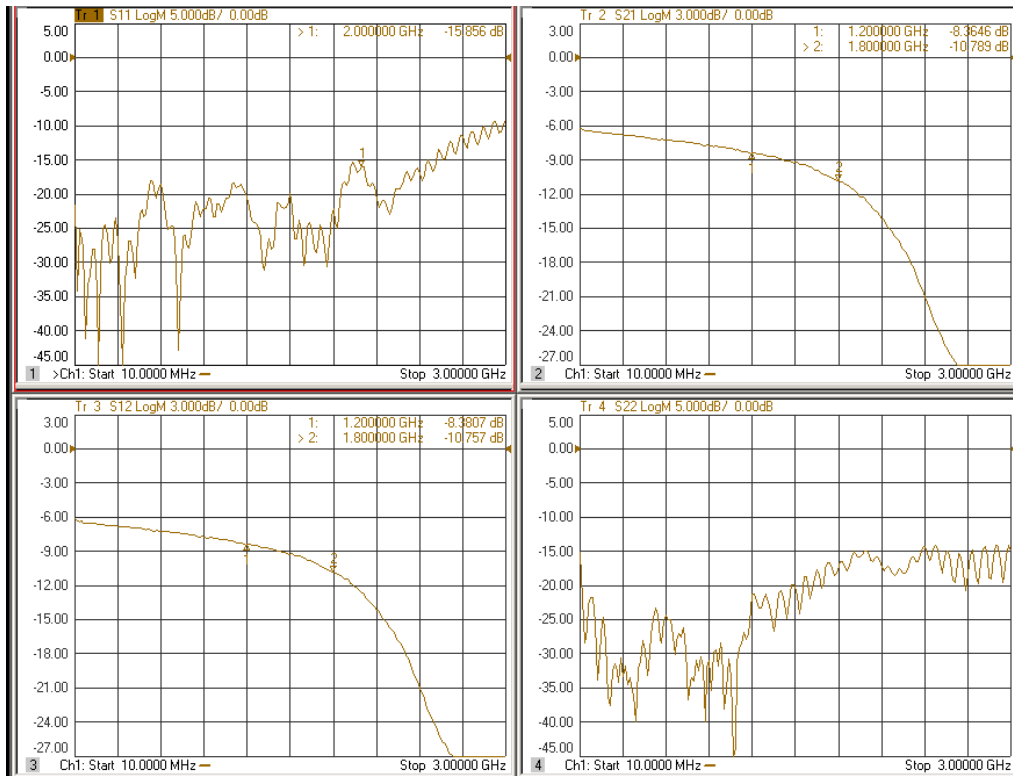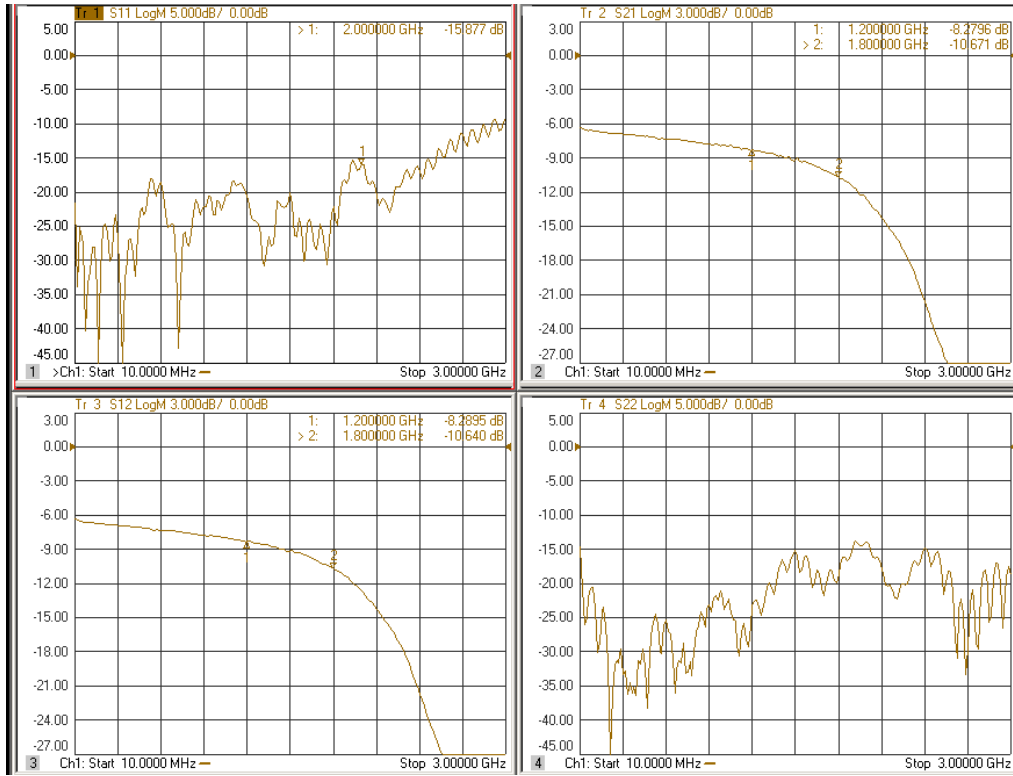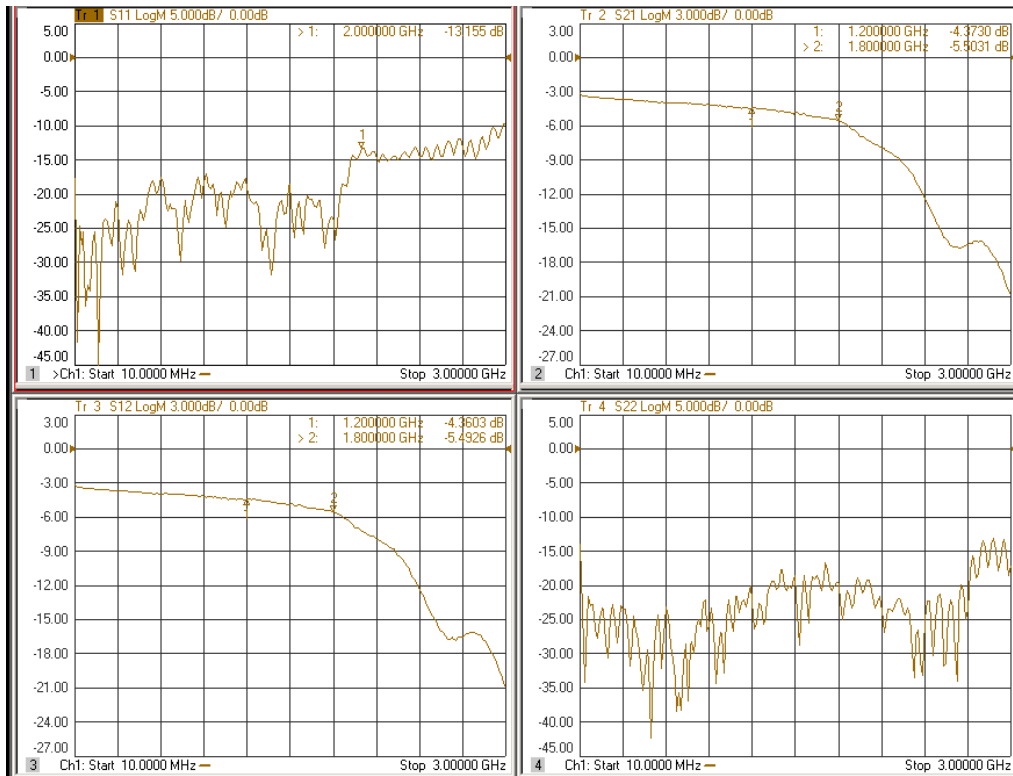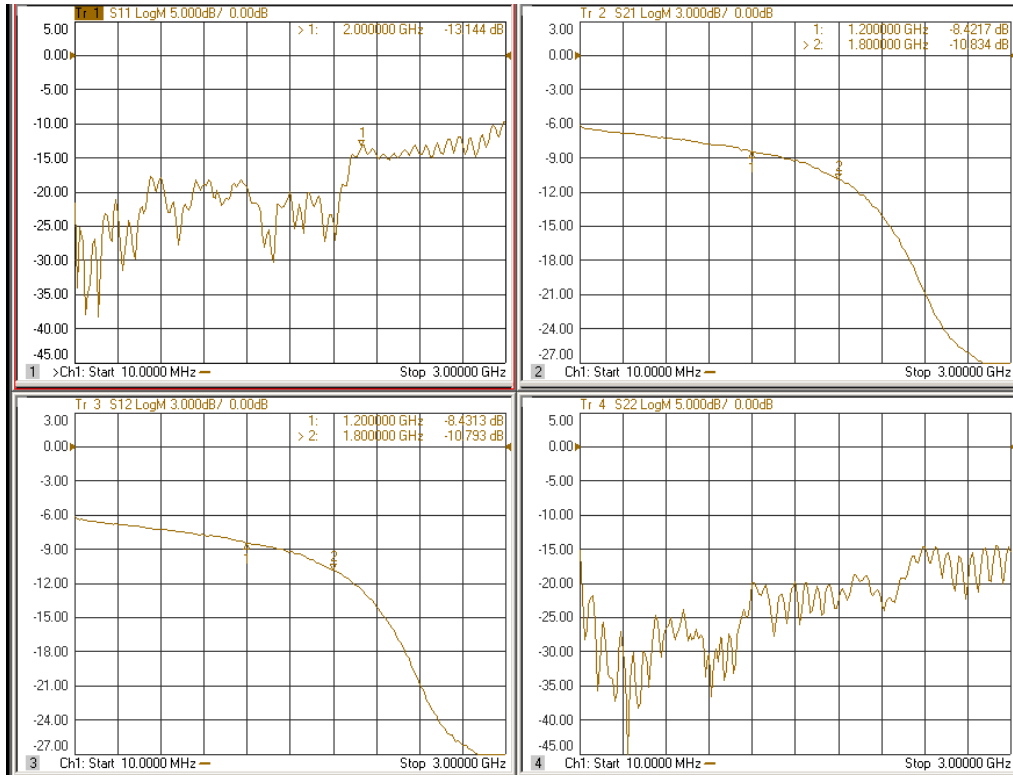
Figure 16: Scattering matrix for channel 1C, polarization y and output 3dB1.

Figure 17: Scattering matrix for channel 1C, polarization y and output 6dB2.

Figure 18: Scattering matrix for channel 1C, polarization y and output 6dB3.

Figure 19: Scattering matrix for channel 1D, polarization x and output 3dB1.

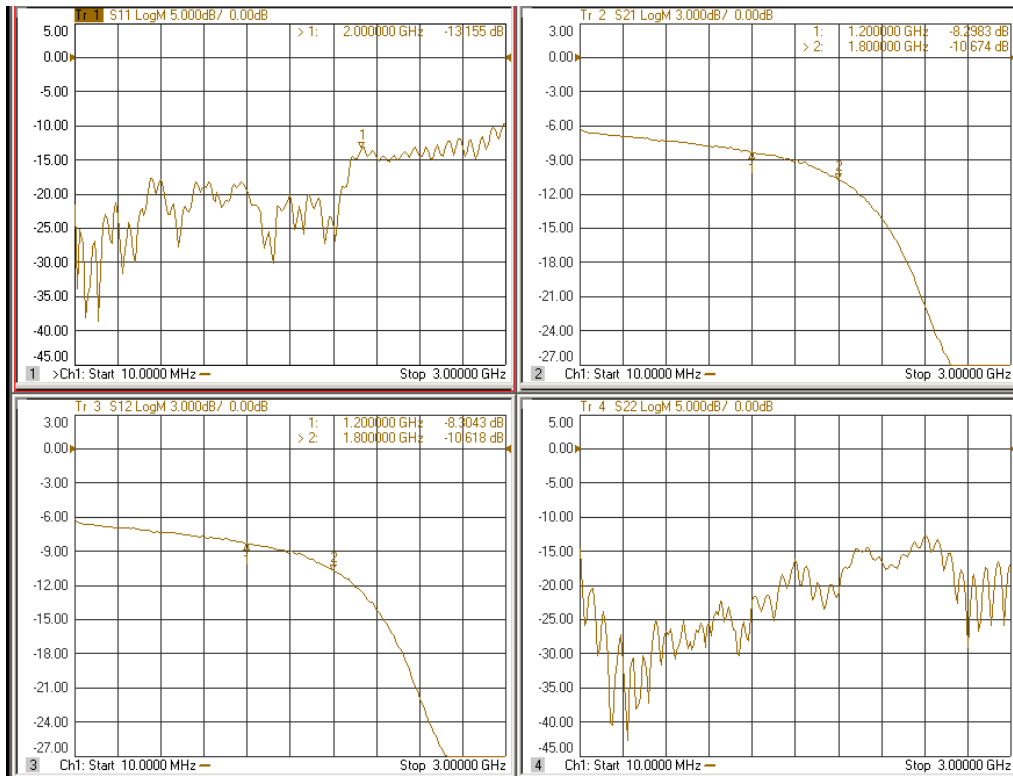Figure 20: Scattering matrix for channel 1D, polarization x and output 6dB2.

Figure 21: Scattering matrix for channel 1D, polarization x and output 6dB3.
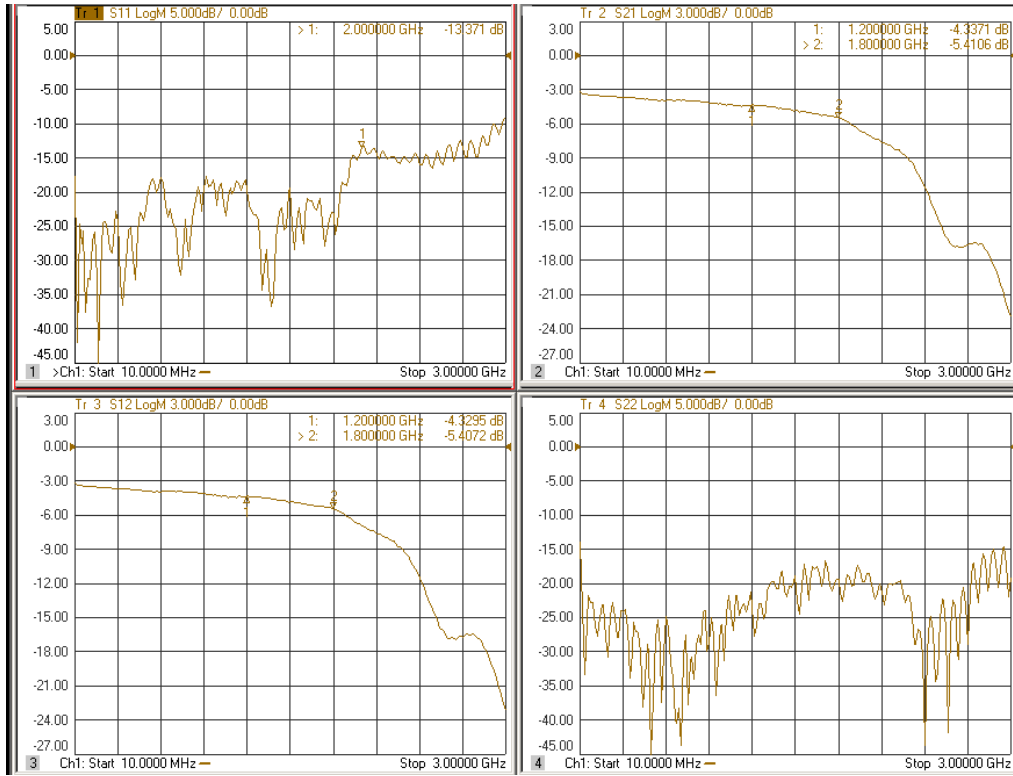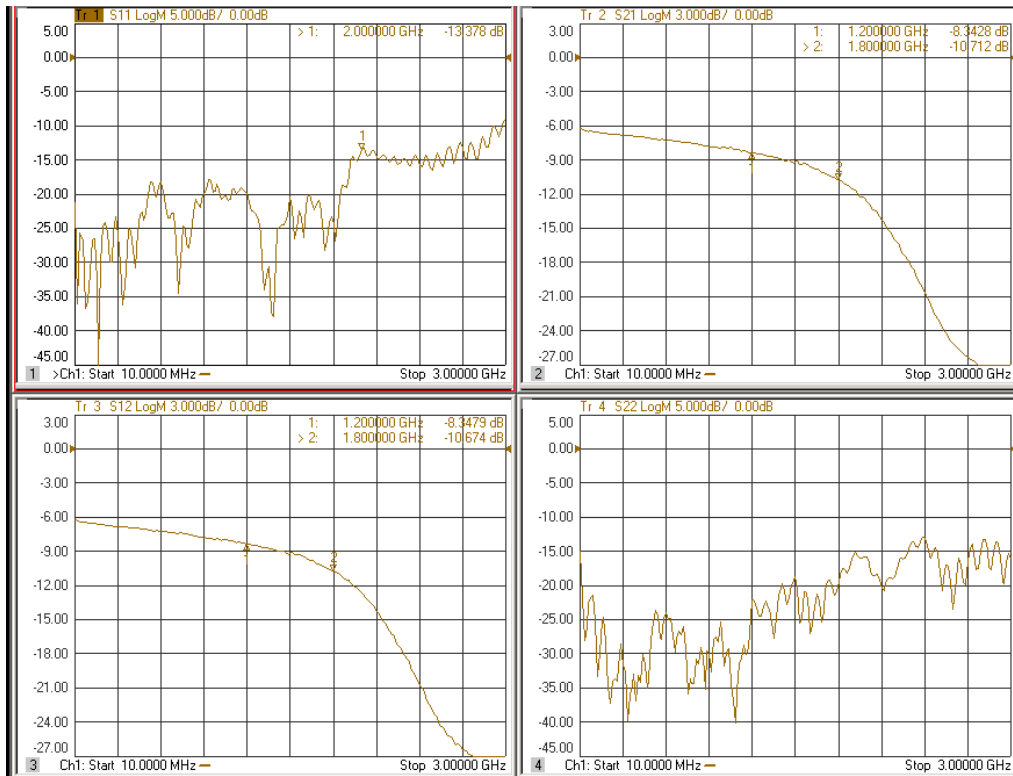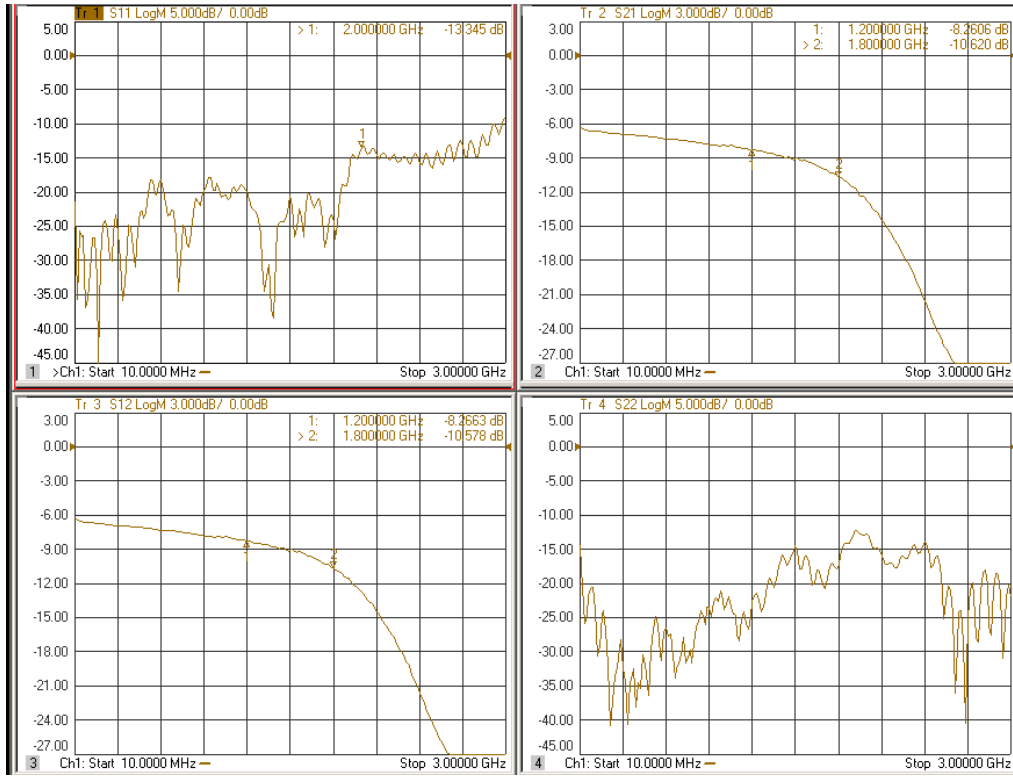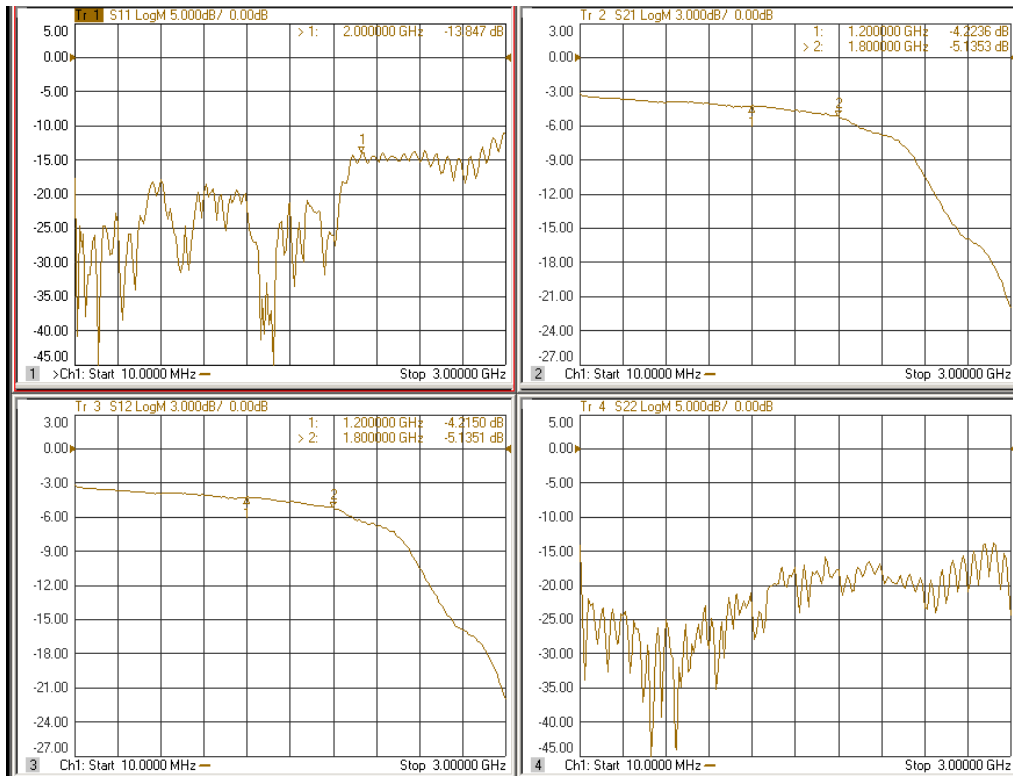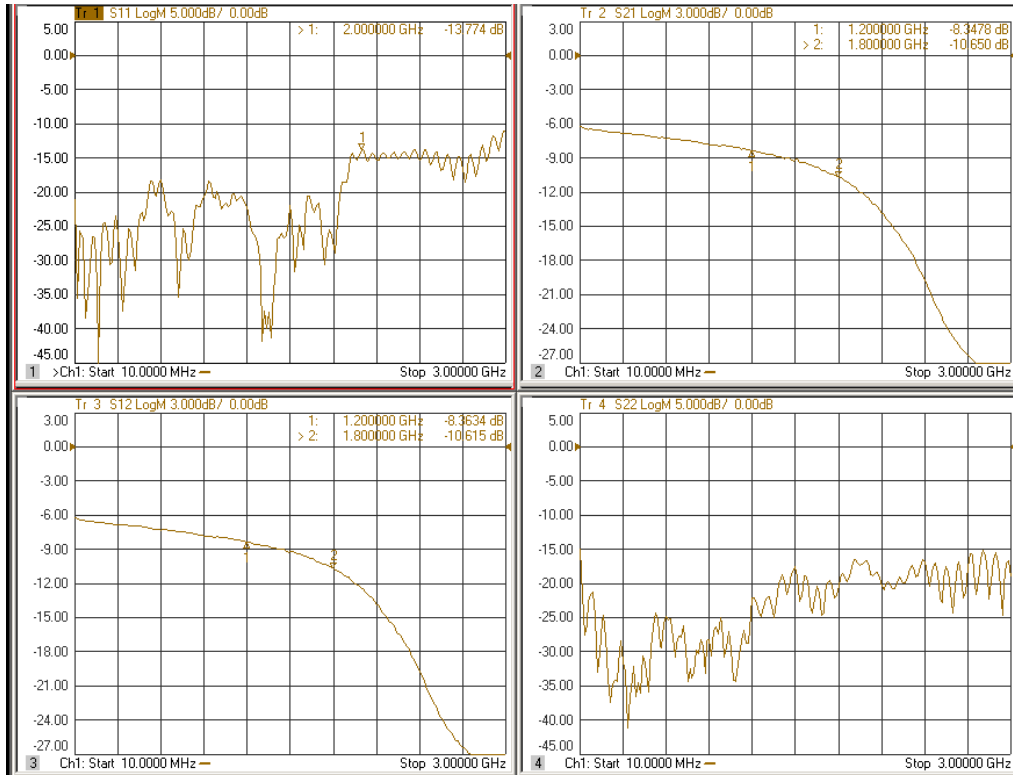
Figure 22: Scattering matrix for channel 1D, polarization y and output 3dB1.

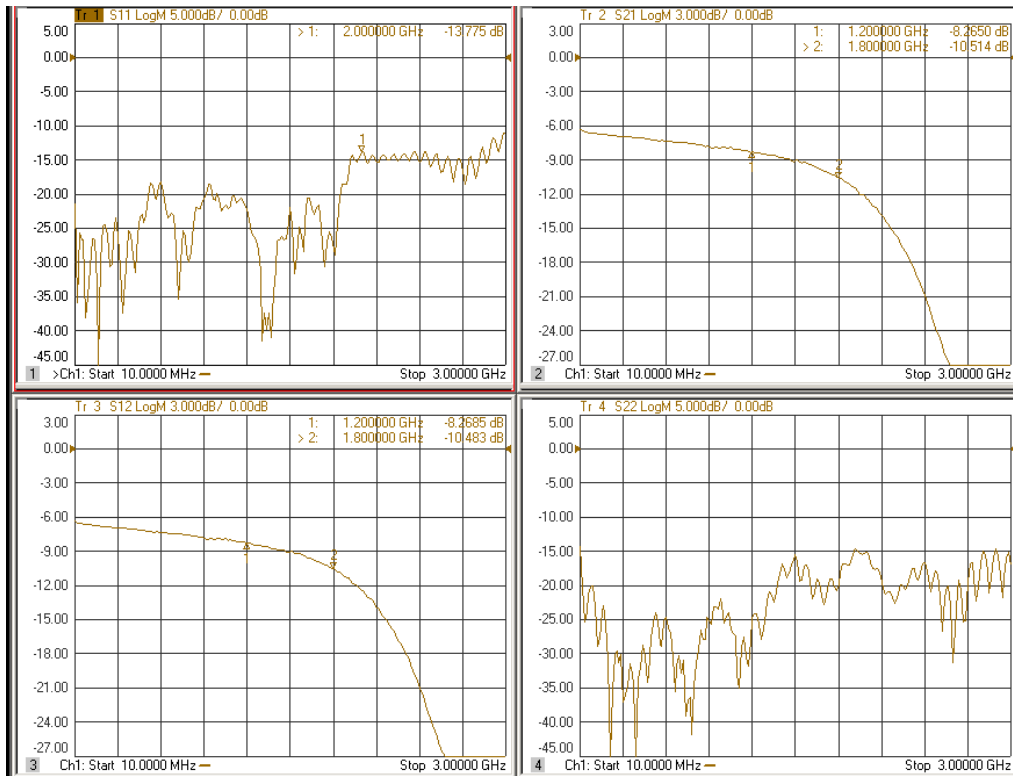Figure 23: Scattering matrix for channel 1D, polarization y and output 6dB2.

Figure 24: Scattering matrix for channel 1D, polarization y and output 6dB3.

Figure 25: Scattering matrix for channel 1E, polarization x and output 3dB1.

Figure 26: Scattering matrix for channel 1E, polarization x and output 6dB2.

Figure 27: Scattering matrix for channel 1E, polarization x and output 6dB3.
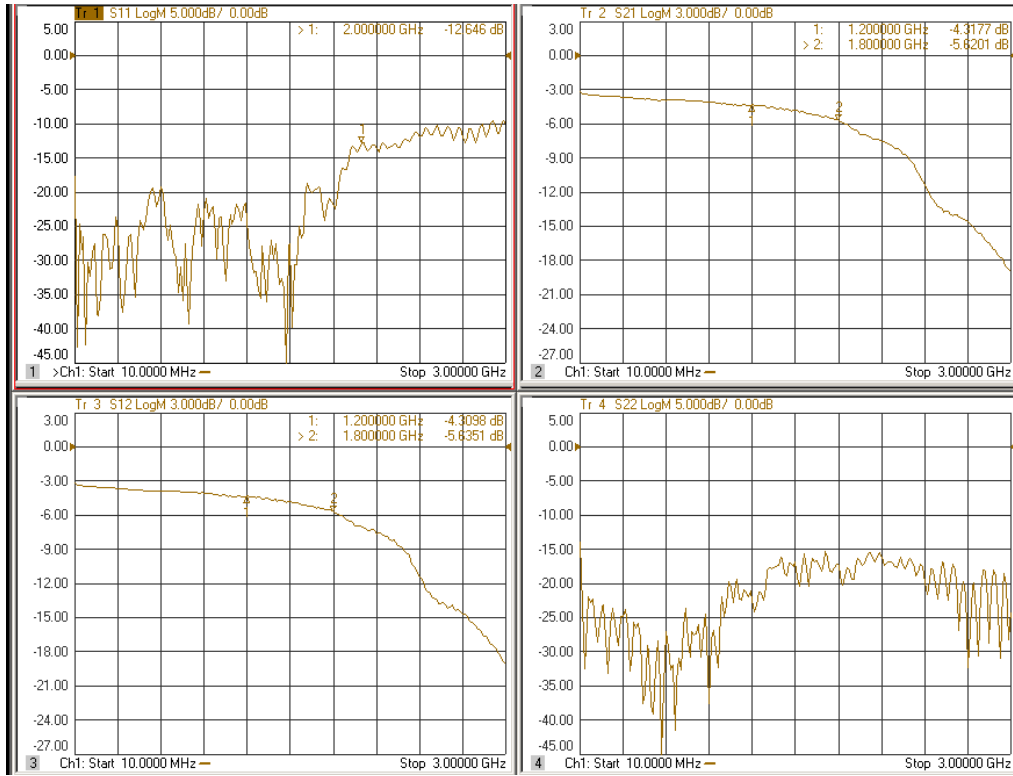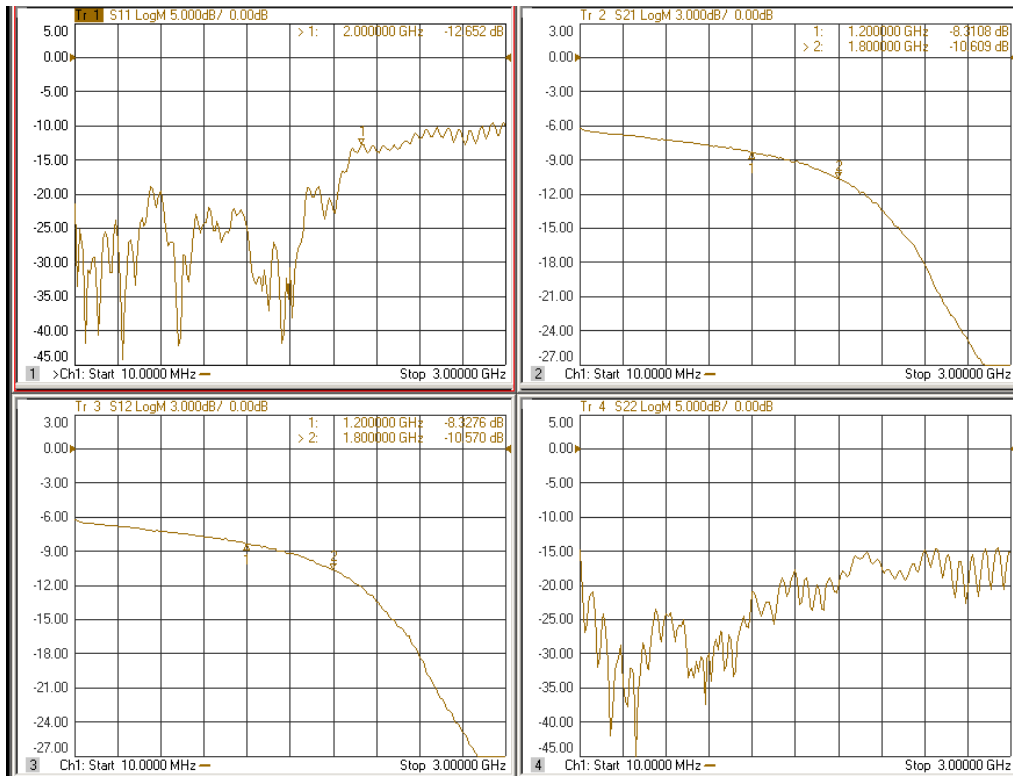
Figure 28: Scattering matrix for channel 1E, polarization y and output 3dB1.

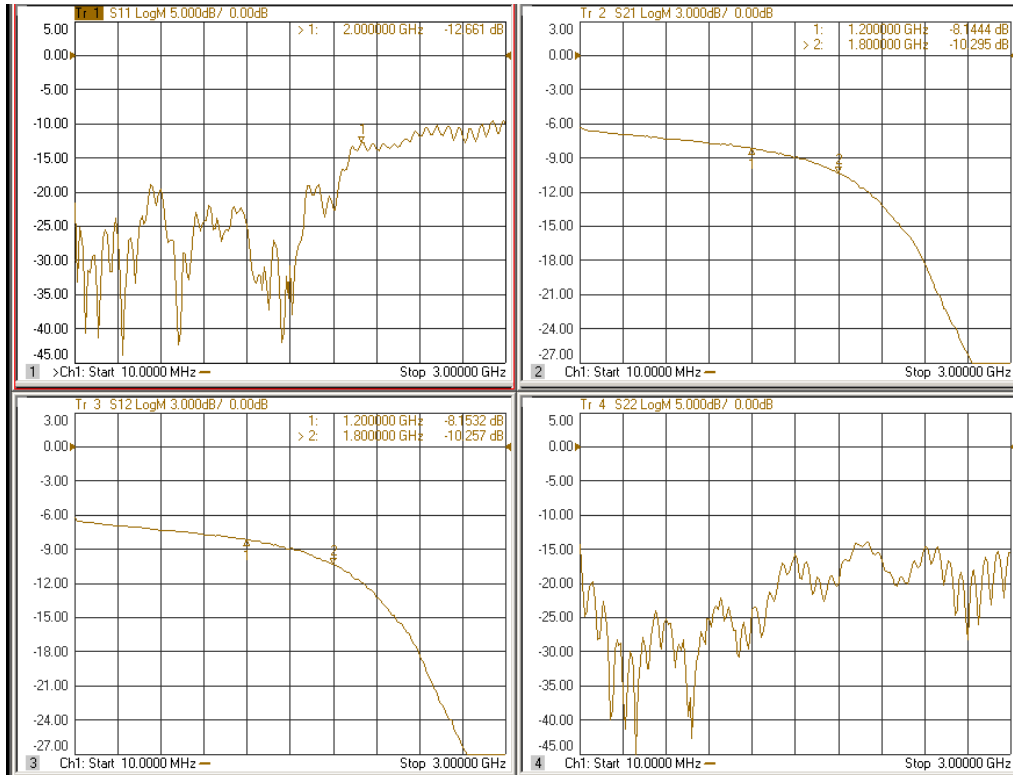Figure 29: Scattering matrix for channel 1E, polarization y and output 6dB2.

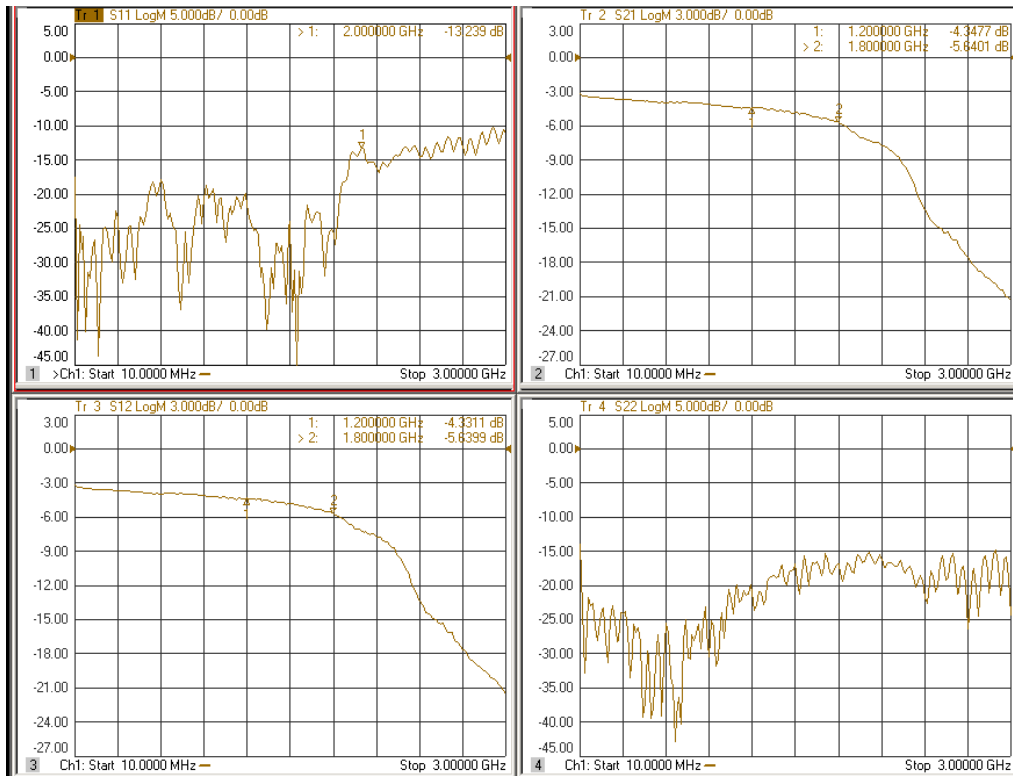Figure 30: Scattering matrix for channel 1E, polarization y and output 6dB3.

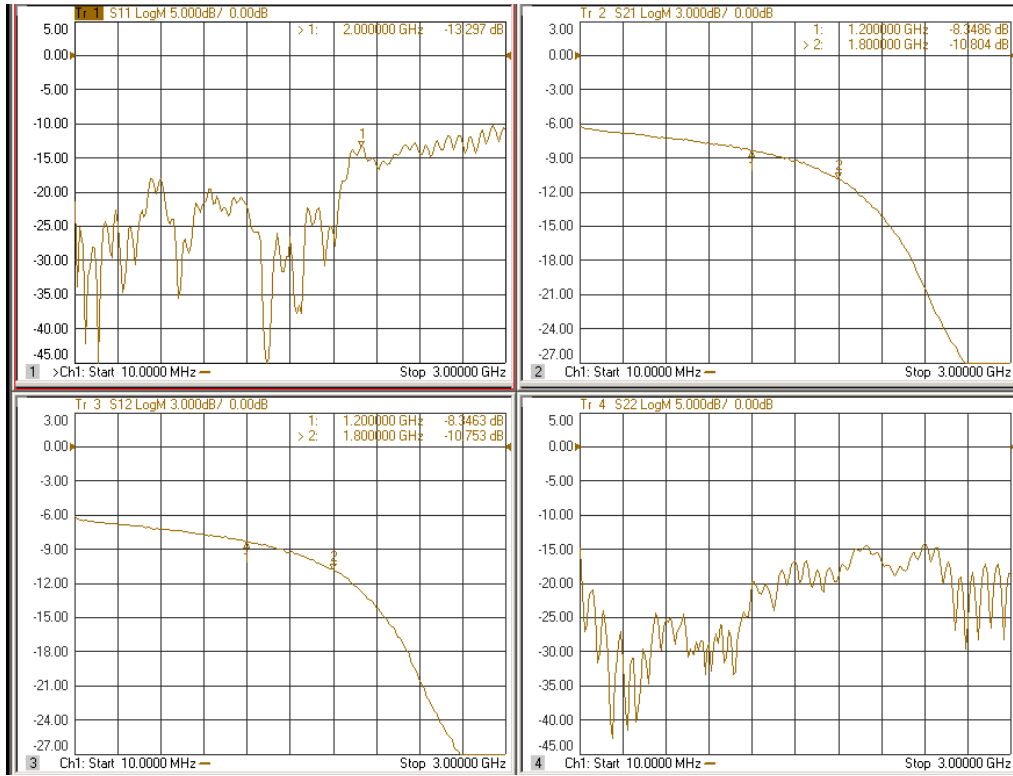Figure 31: Scattering matrix for channel 1F, polarization x and output 3dB1.

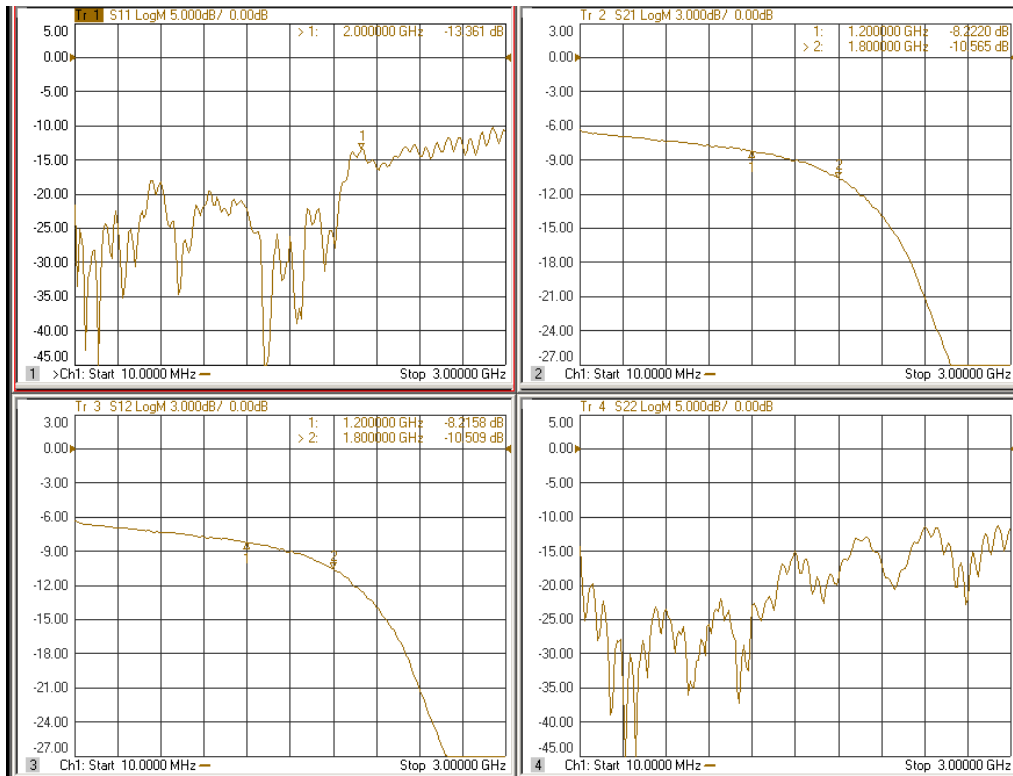Figure 32: Scattering matrix for channel 1F, polarization x and output 6dB2.

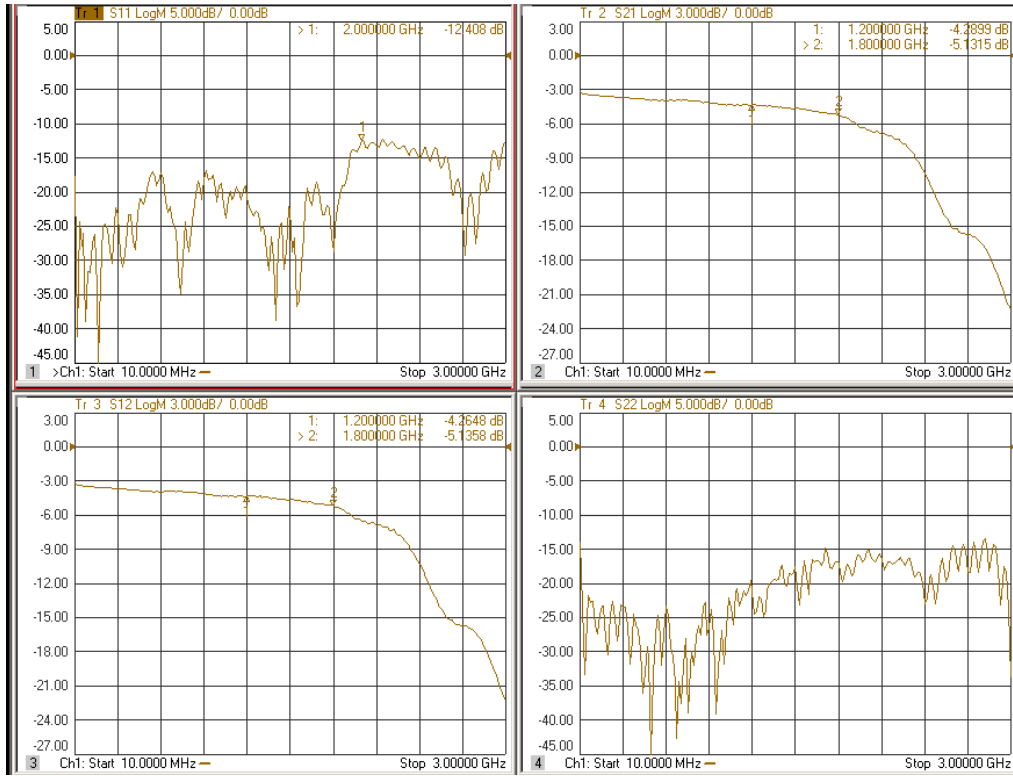Figure 33: Scattering matrix for channel 1F, polarization x and output 6dB3.

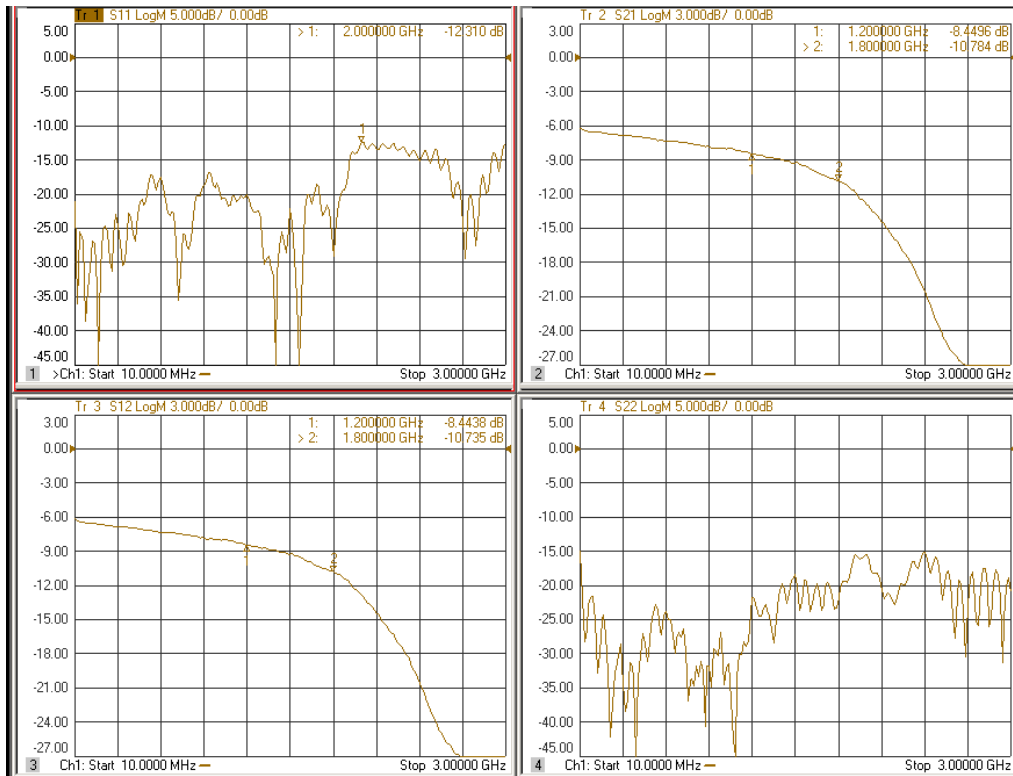Figure 34: Scattering matrix for channel 1F, polarization y and output 3dB1.

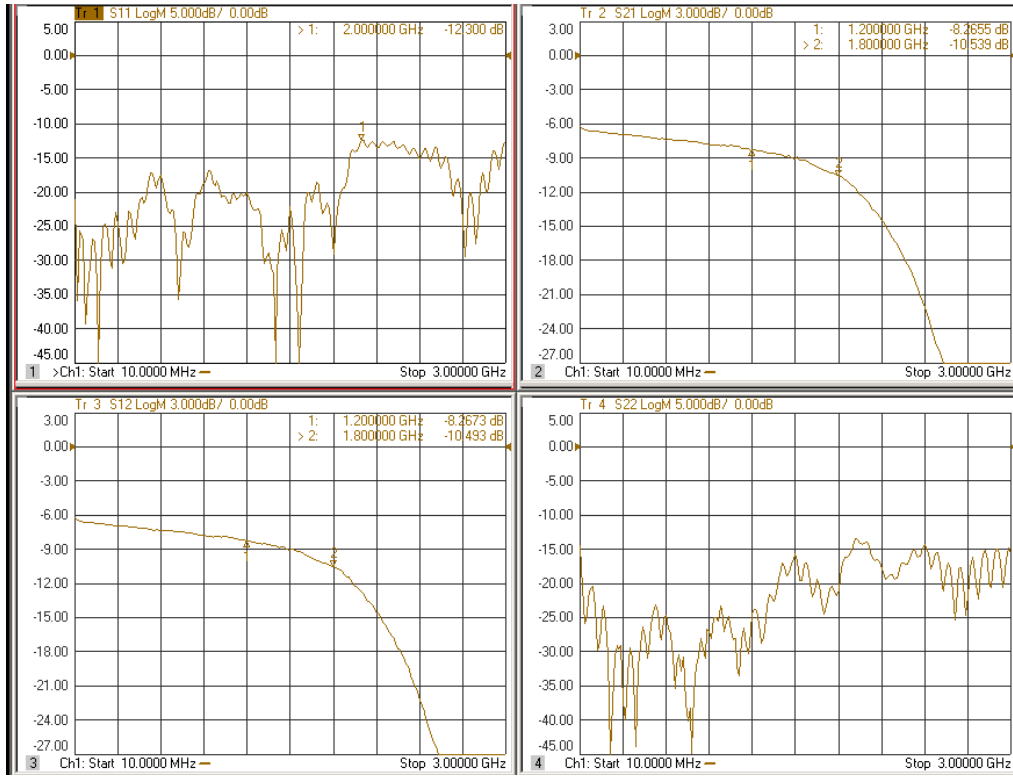Figure 35: Scattering matrix for channel 1F, polarization y and output 6dB2.

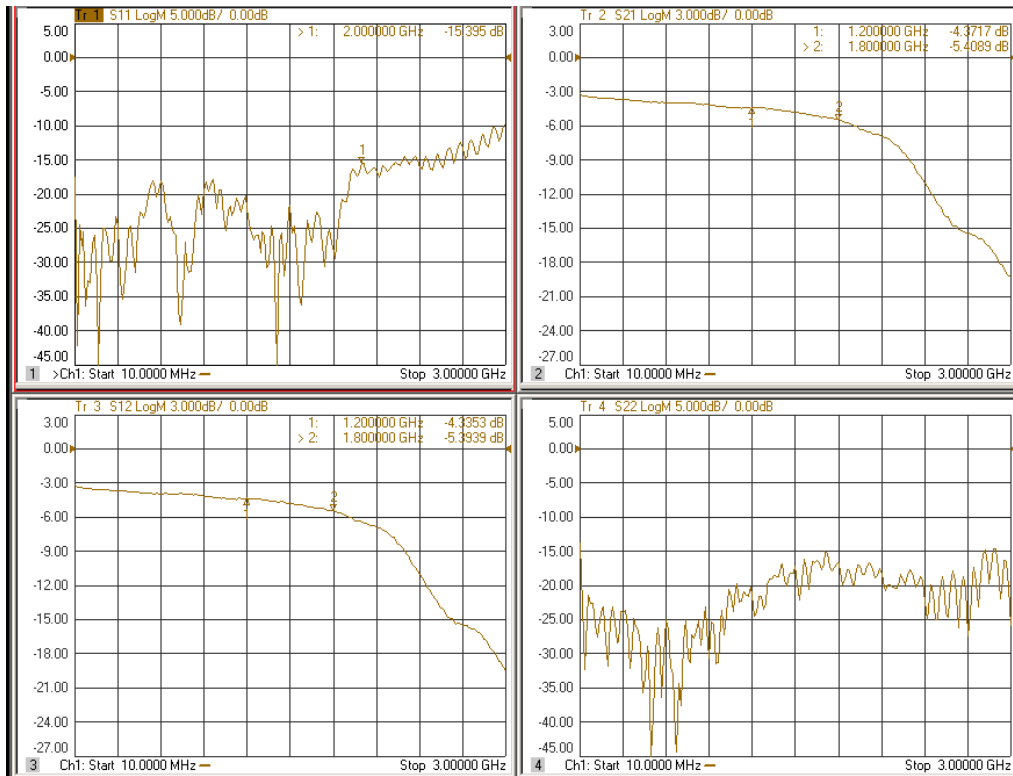Figure 36: Scattering matrix for channel 1F, polarization y and output 6dB3.

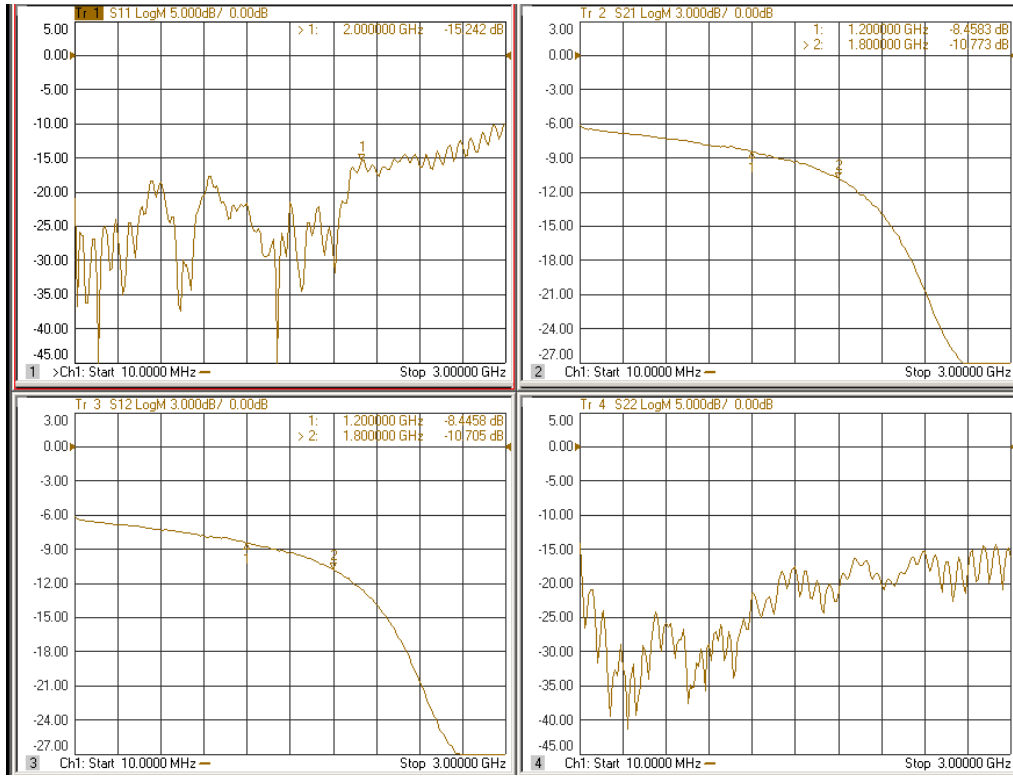Figure 37: Scattering matrix for channel 1G, polarization x and output 3dB1.

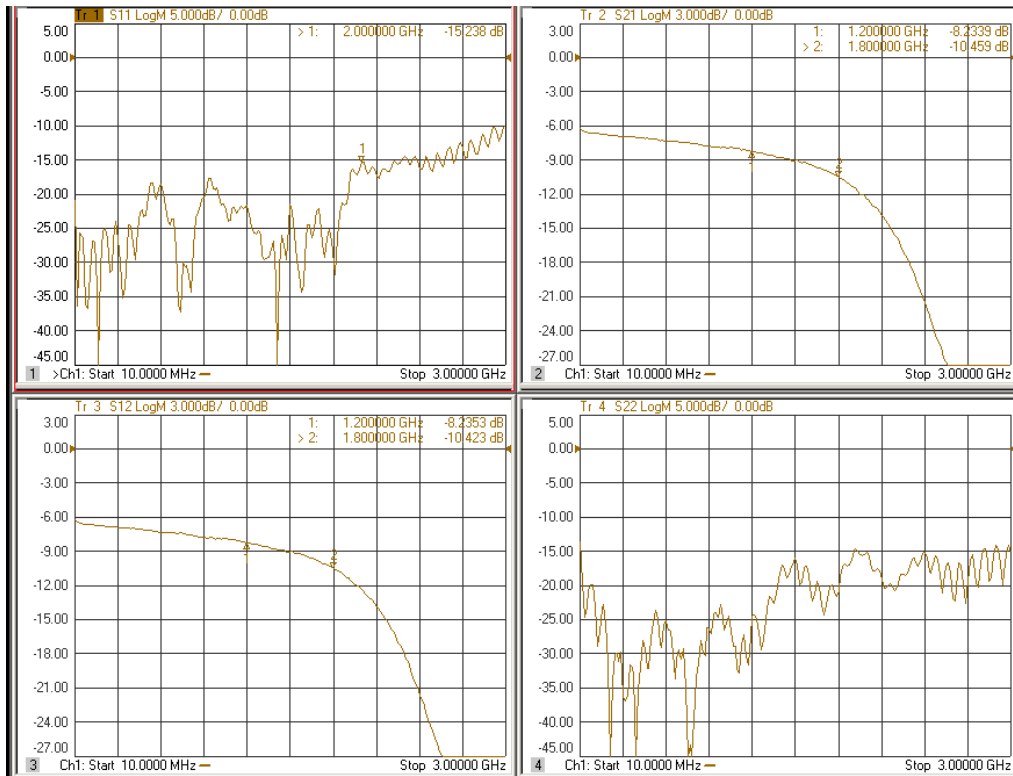Figure 38: Scattering matrix for channel 1G, polarization x and output 6dB2.

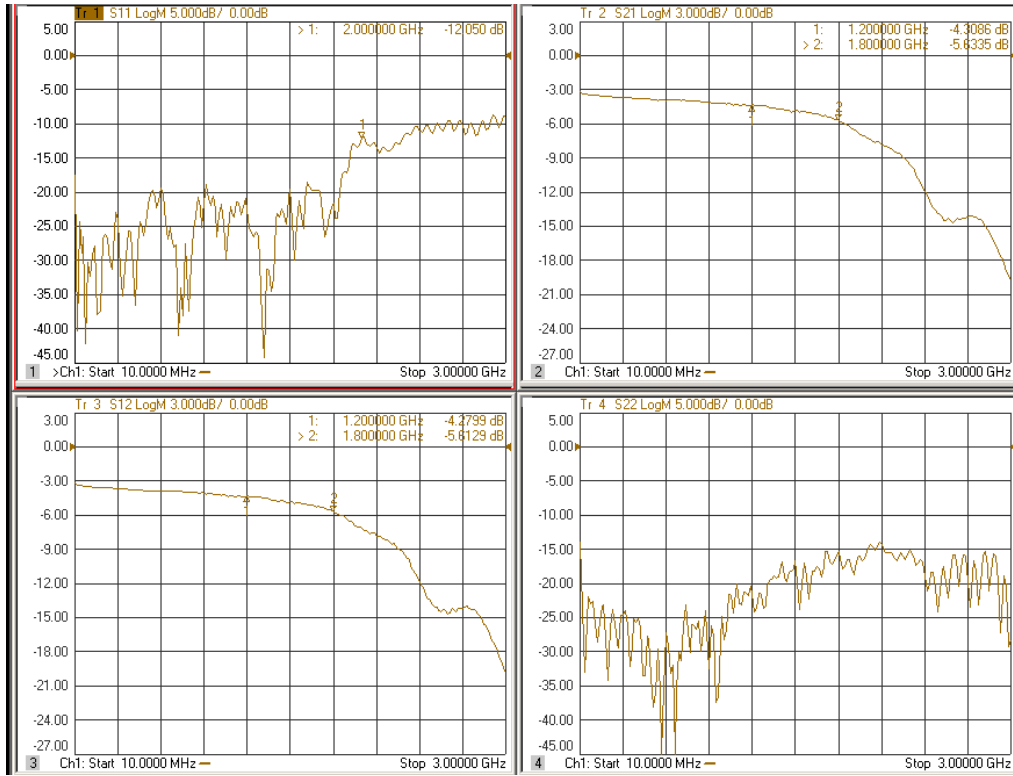Figure 39: Scattering matrix for channel 1G, polarization x and output 6dB3.

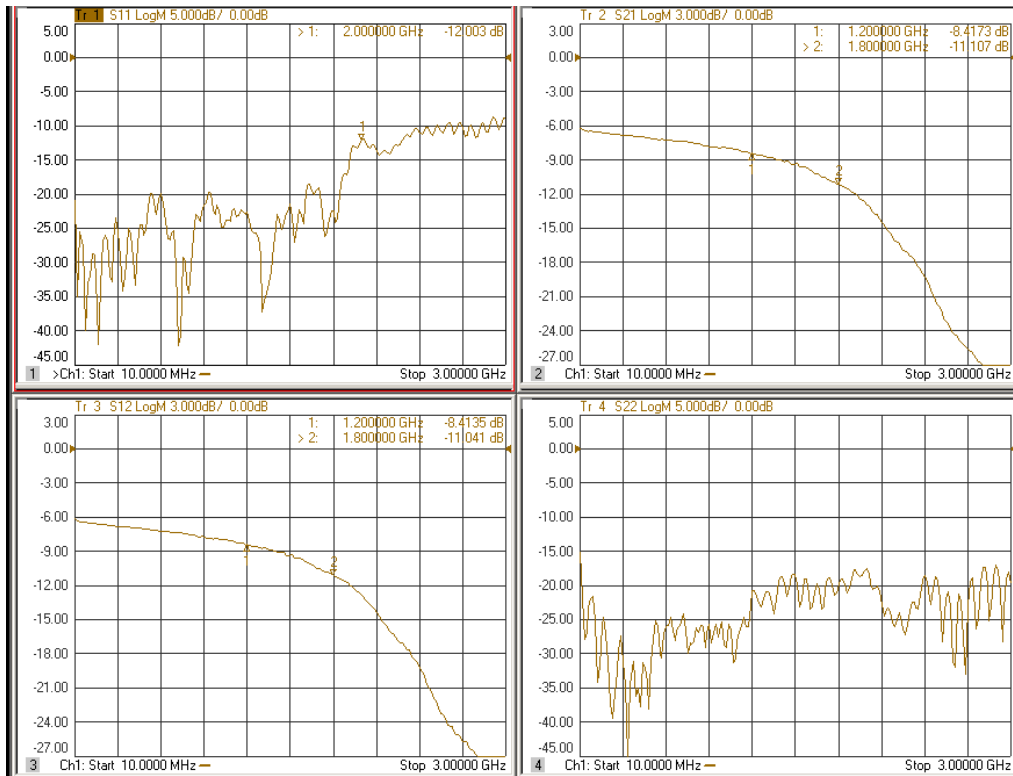Figure 40: Scattering matrix for channel 1G, polarization y and output 3dB1.

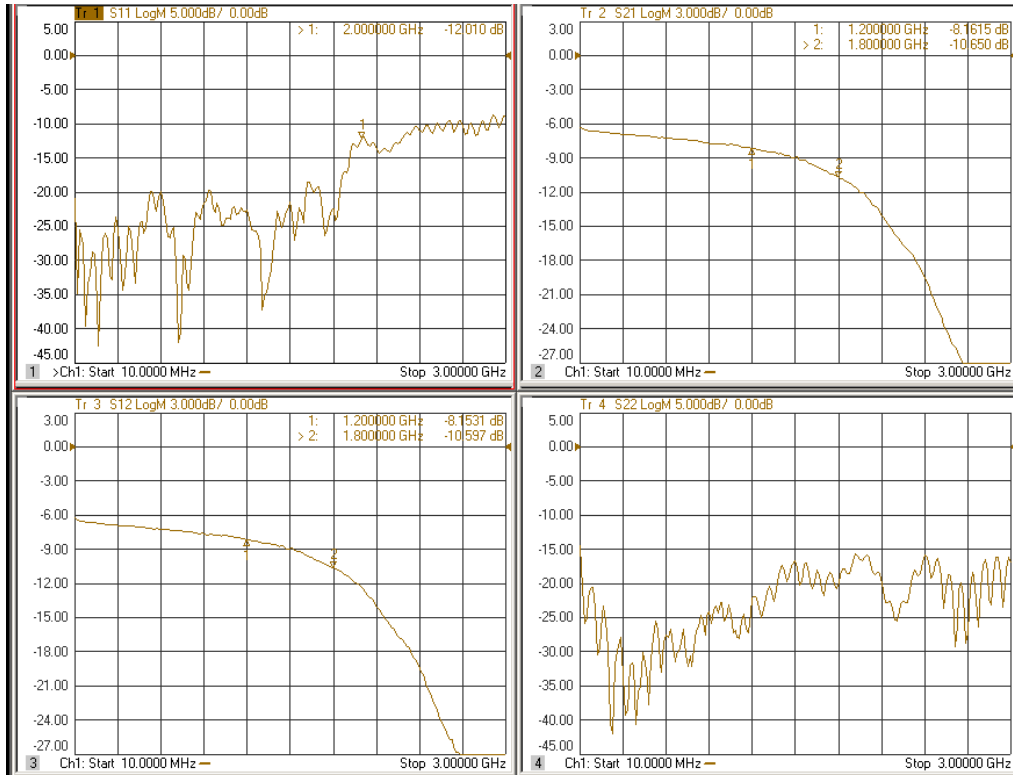Figure 41: Scattering matrix for channel 1G, polarization y and output 6dB2.

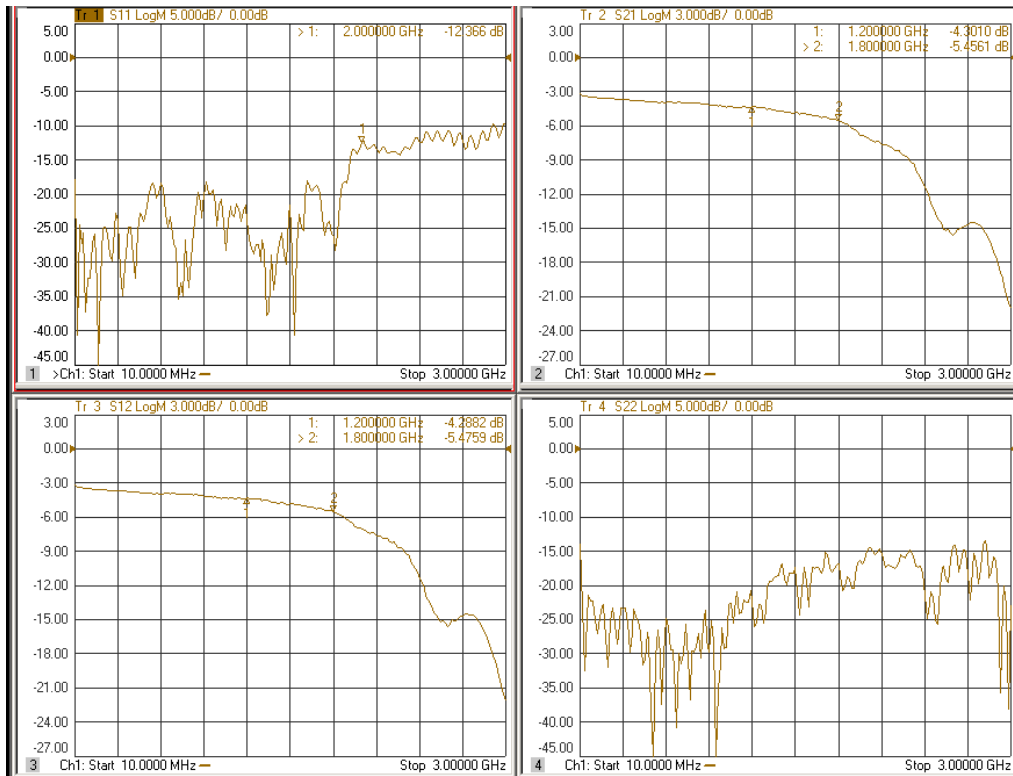Figure 42: Scattering matrix for channel 1G, polarization y and output 6dB3.

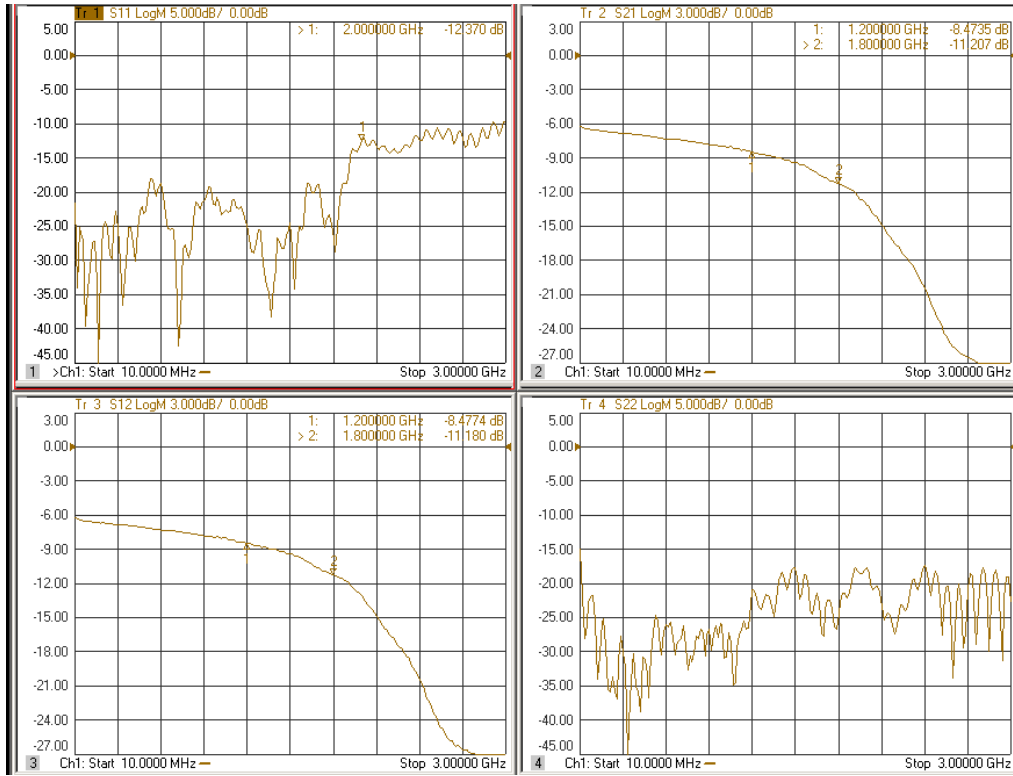Figure 43: Scattering matrix for channel 1H, polarization x and output 3dB1.

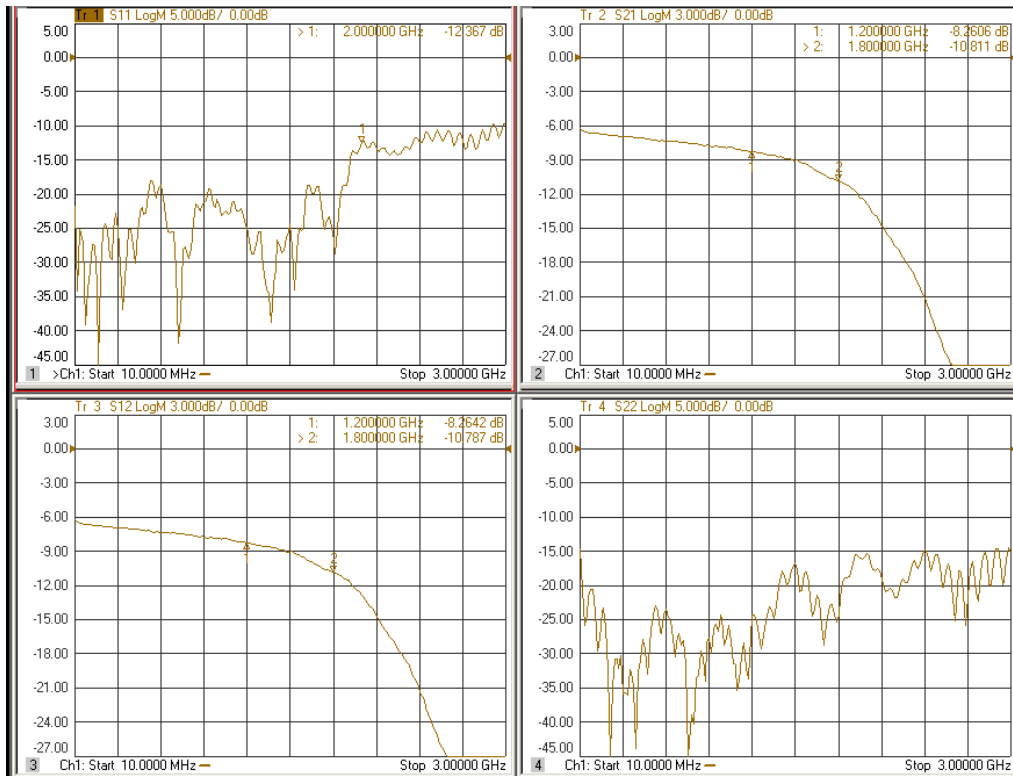Figure 44: Scattering matrix for channel 1H, polarization x and output 6dB2.

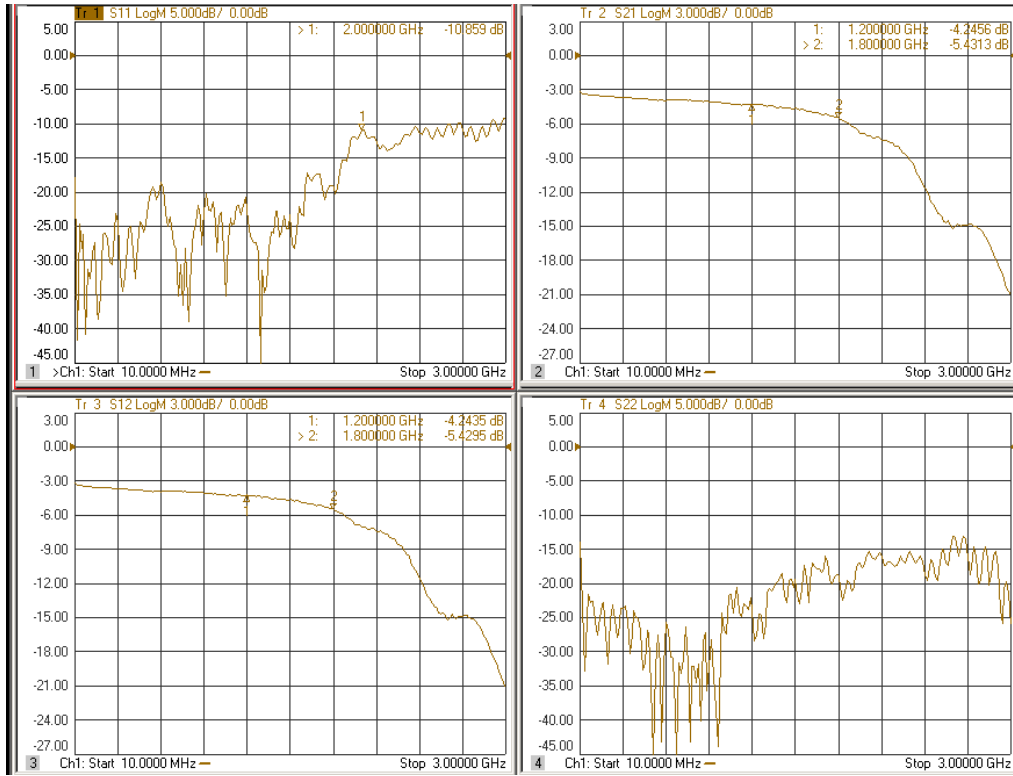Figure 45: Scattering matrix for channel 1H, polarization x and output 6dB3.

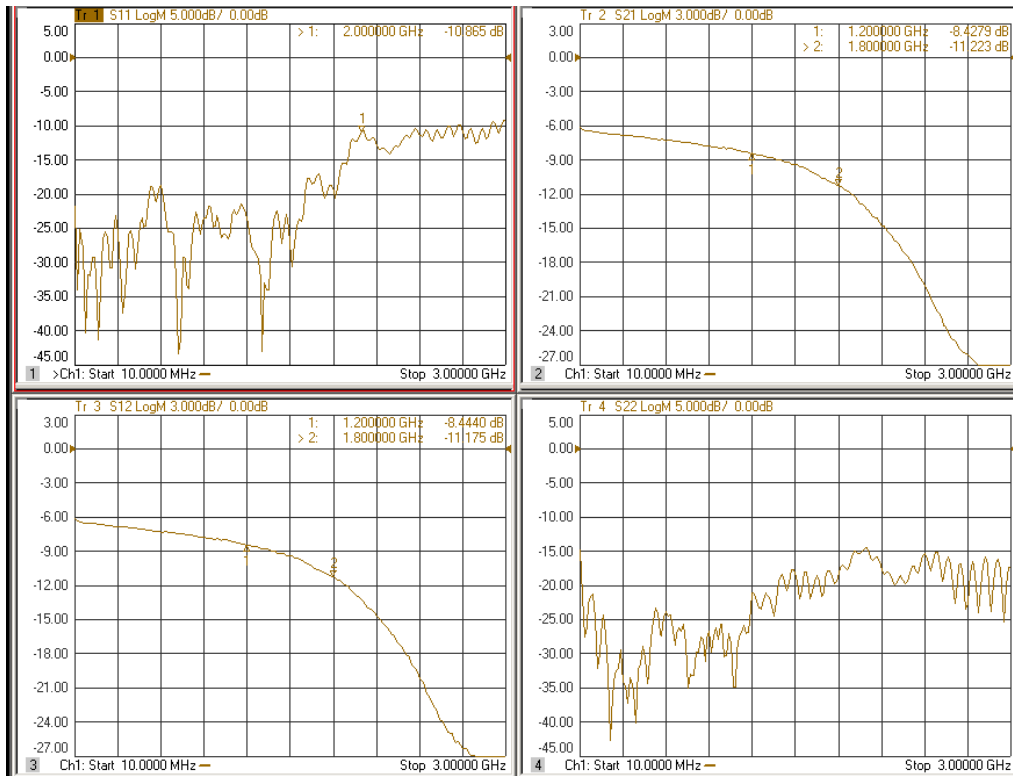Figure 46: Scattering matrix for channel 1H, polarization y and output 3dB1.

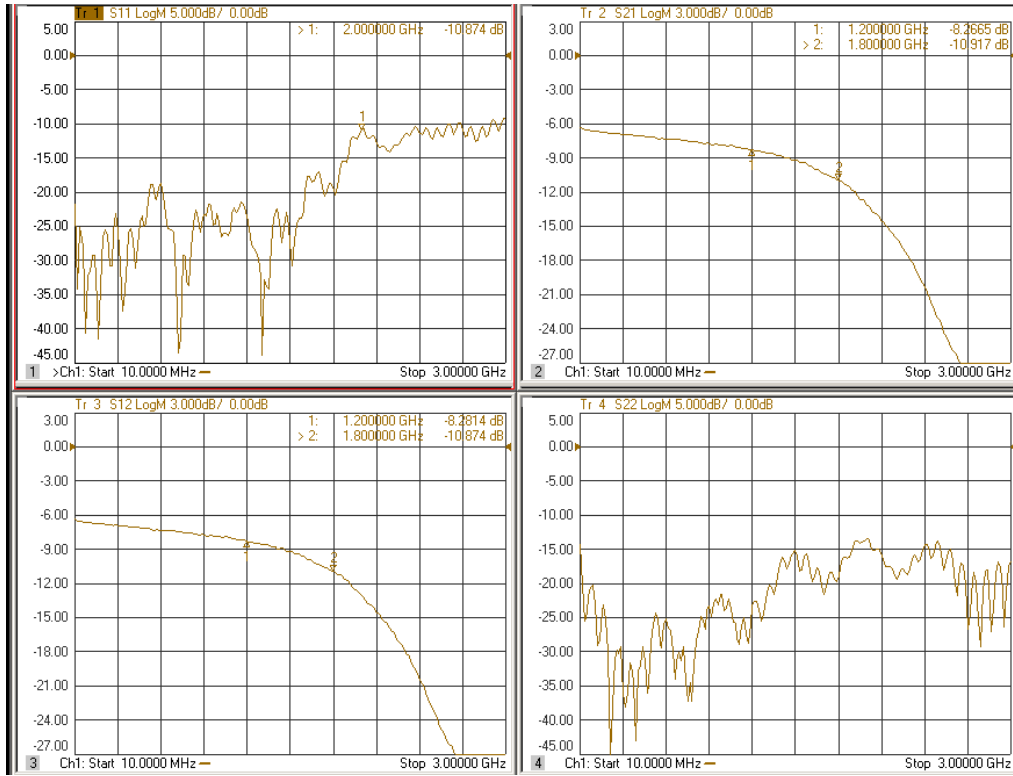Figure 47: Scattering matrix for channel 1H, polarization y and output 6dB2.

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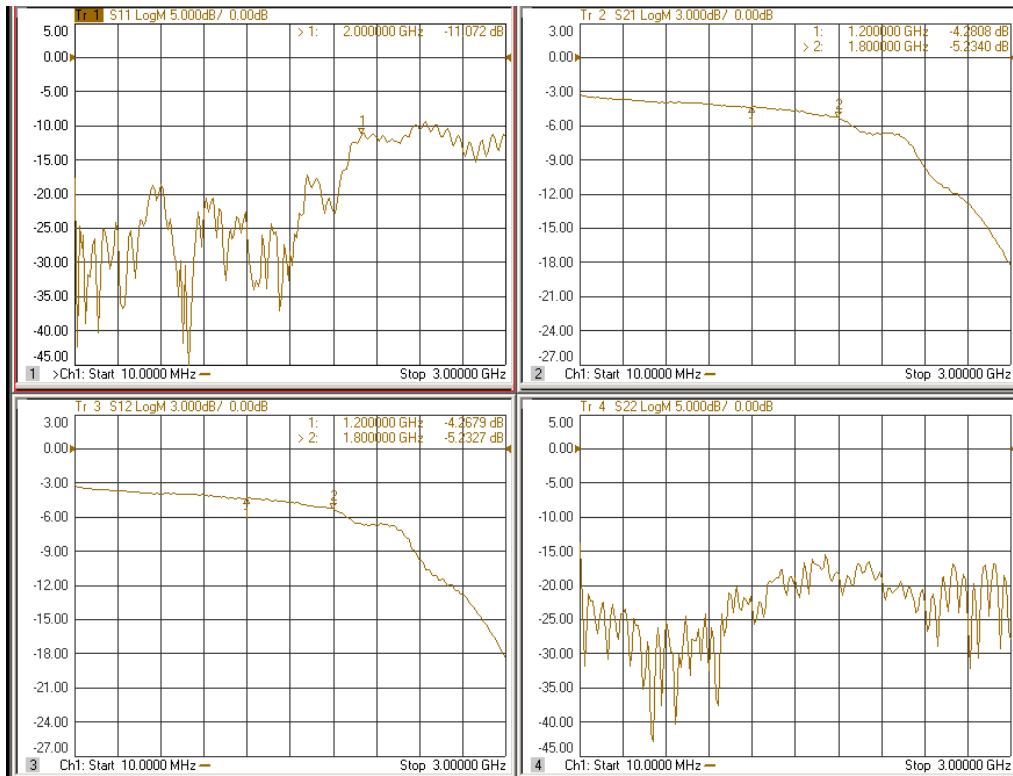Figure 48: Scattering matrix for channel 1H, polarization y and output 6dB3.

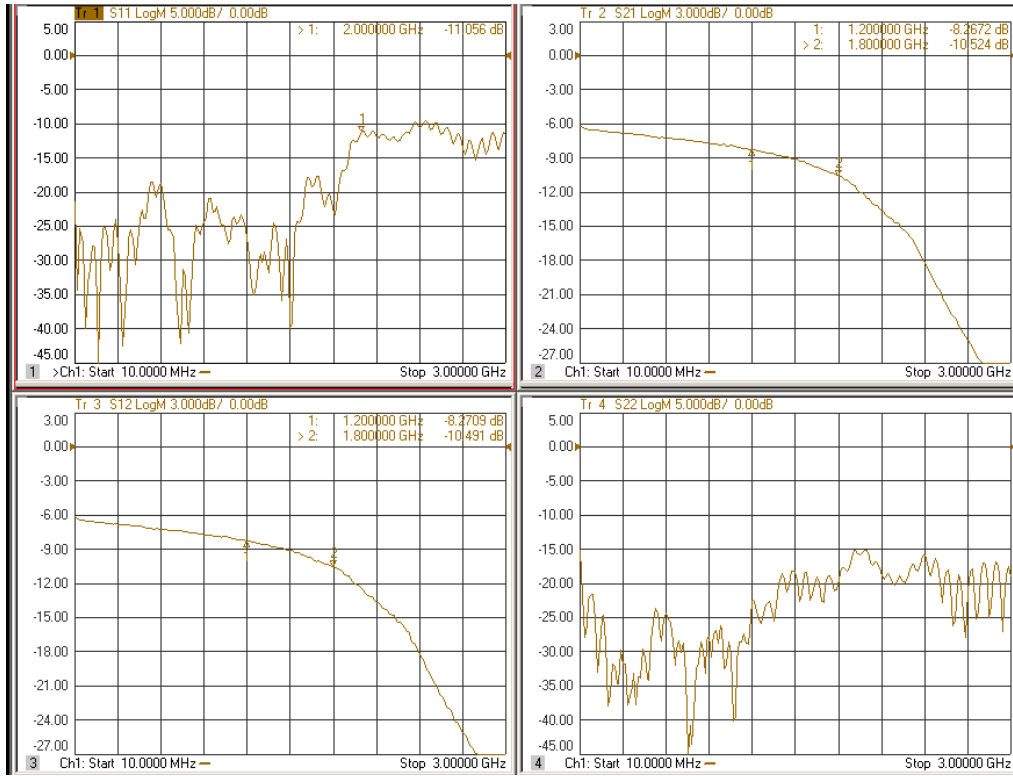Figure 49: Scattering matrix for channel 1J, polarization x and output 3dB1.

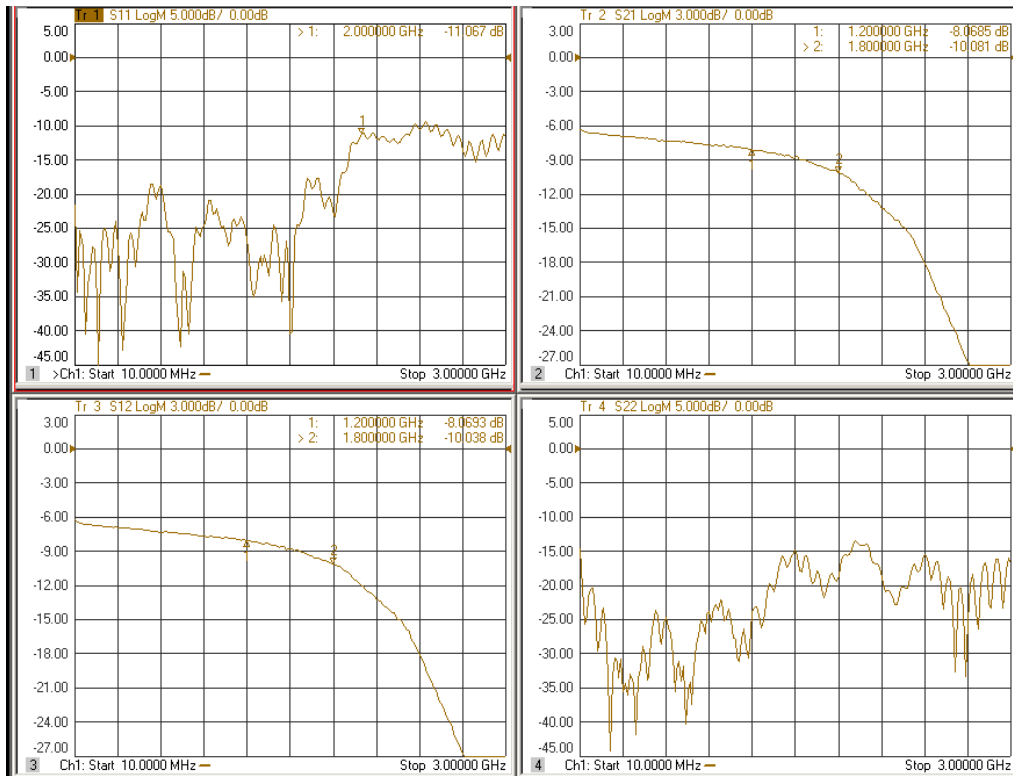Figure 50: Scattering matrix for channel 1J, polarization x and output 6dB2.

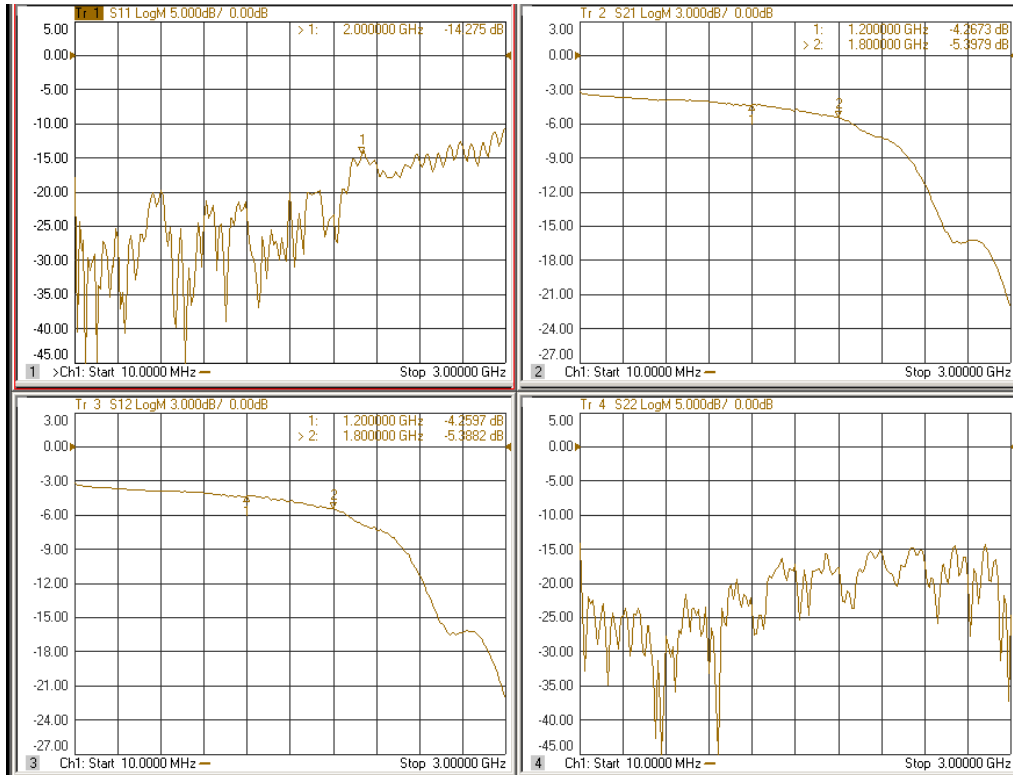Figure 51: Scattering matrix for channel 1J, polarization x and output 6dB3.

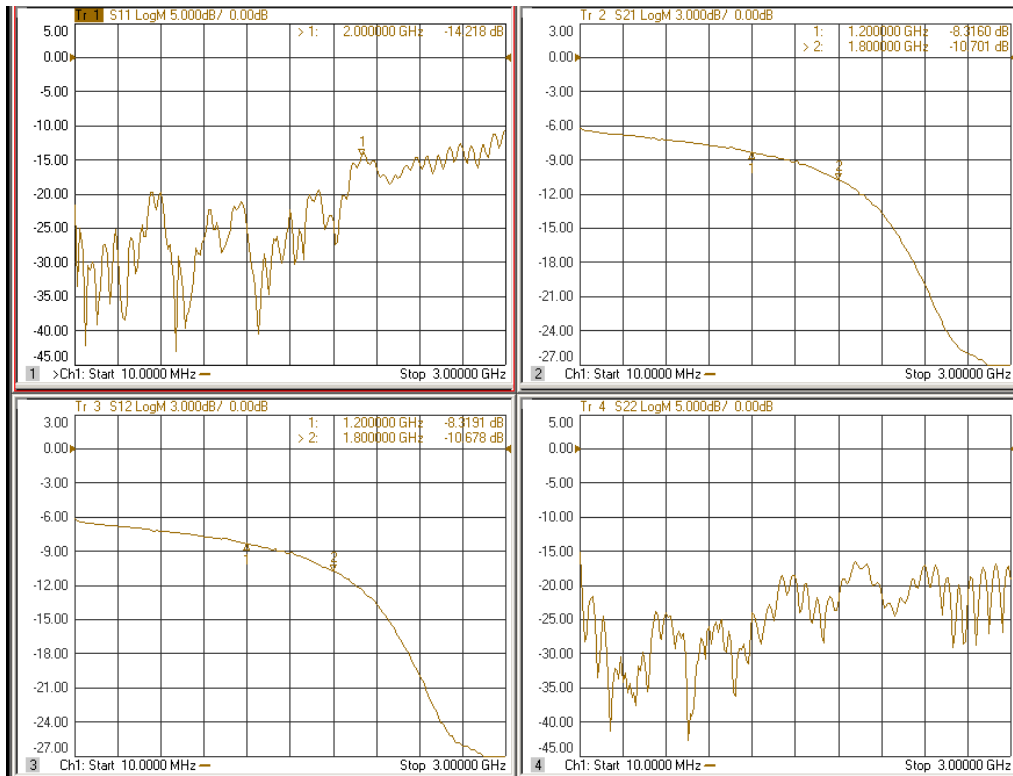Figure 52: Scattering matrix for channel 1J, polarization y and output 3dB1.

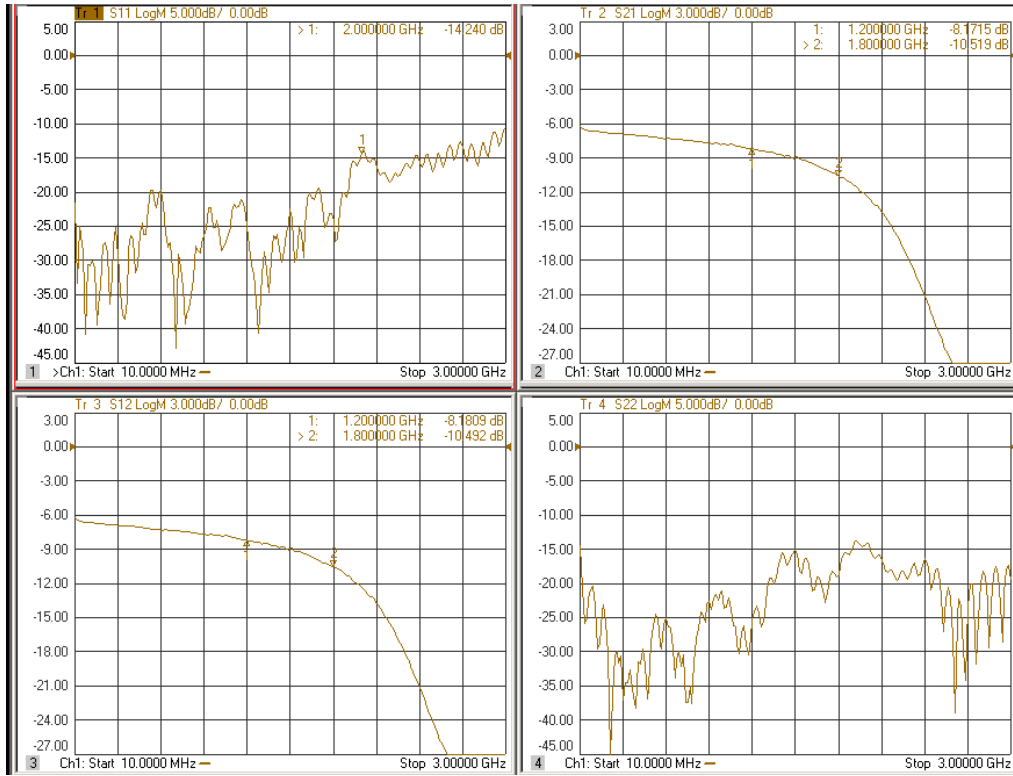Figure 53: Scattering matrix for channel 1J, polarization y and output 6dB2.

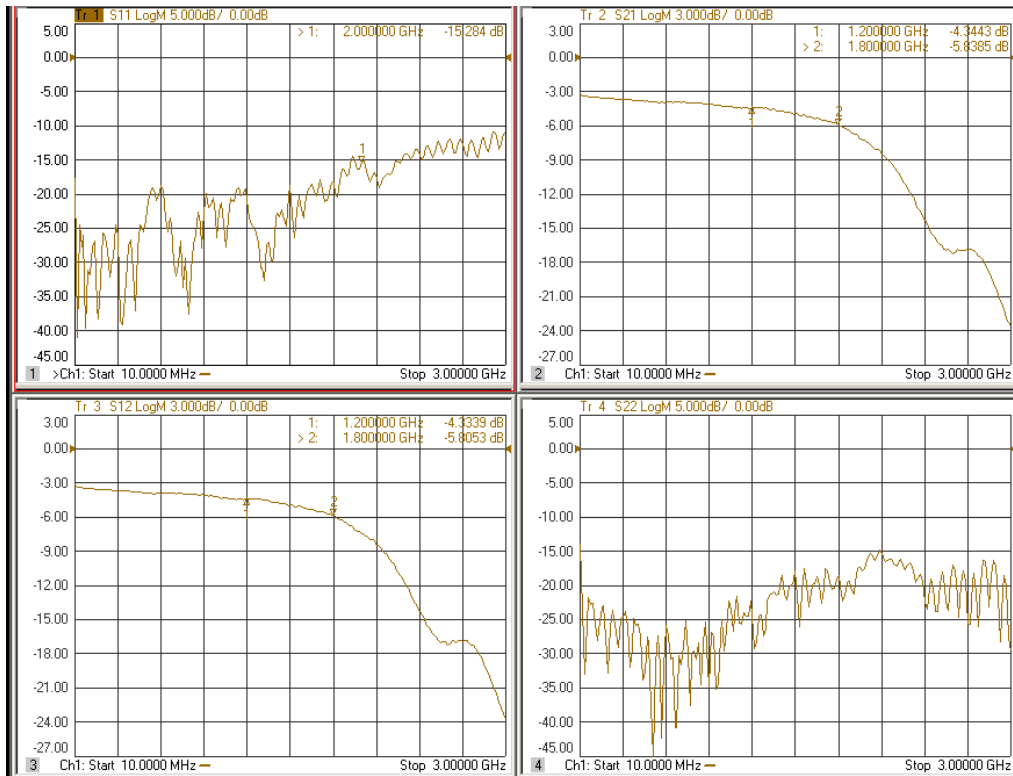Figure 54: Scattering matrix for channel 1J, polarization y and output 6dB3.

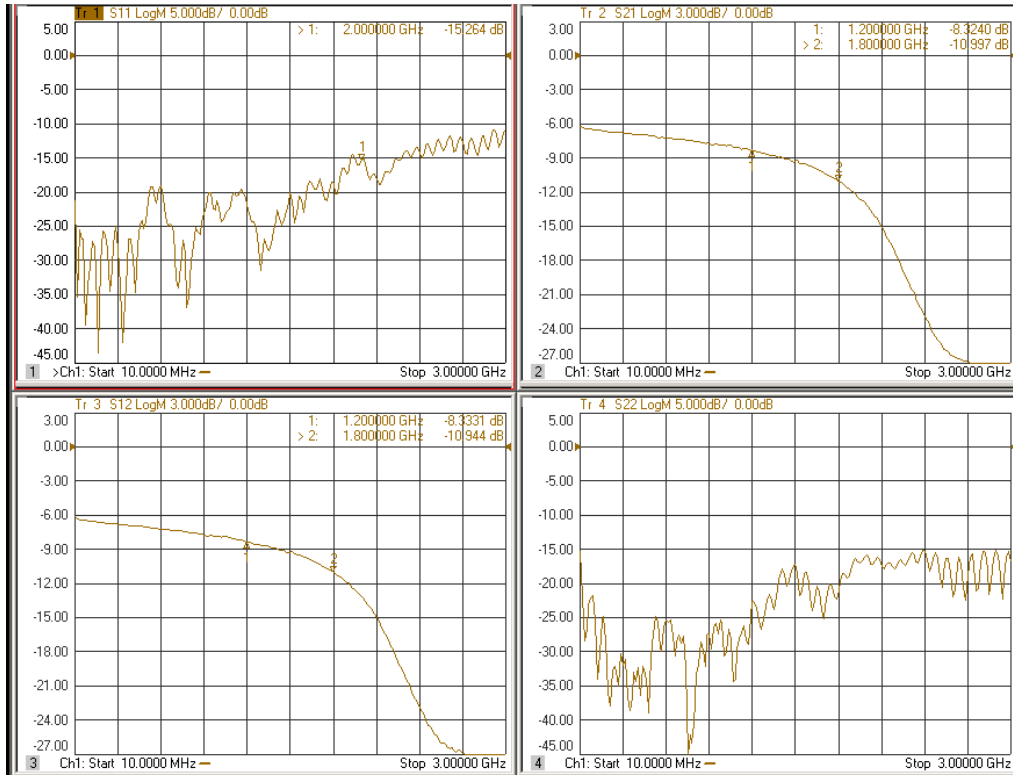Figure 55: Scattering matrix for channel 1K, polarization x and output 3dB1.

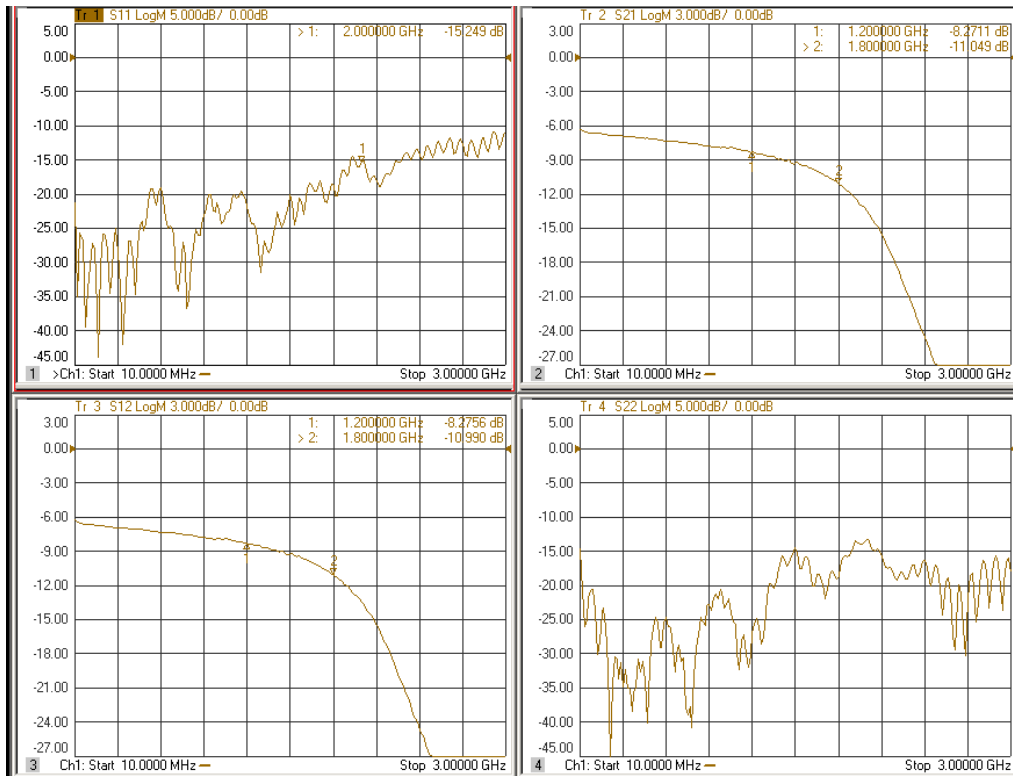Figure 56: Scattering matrix for channel 1K, polarization x and output 6dB2.

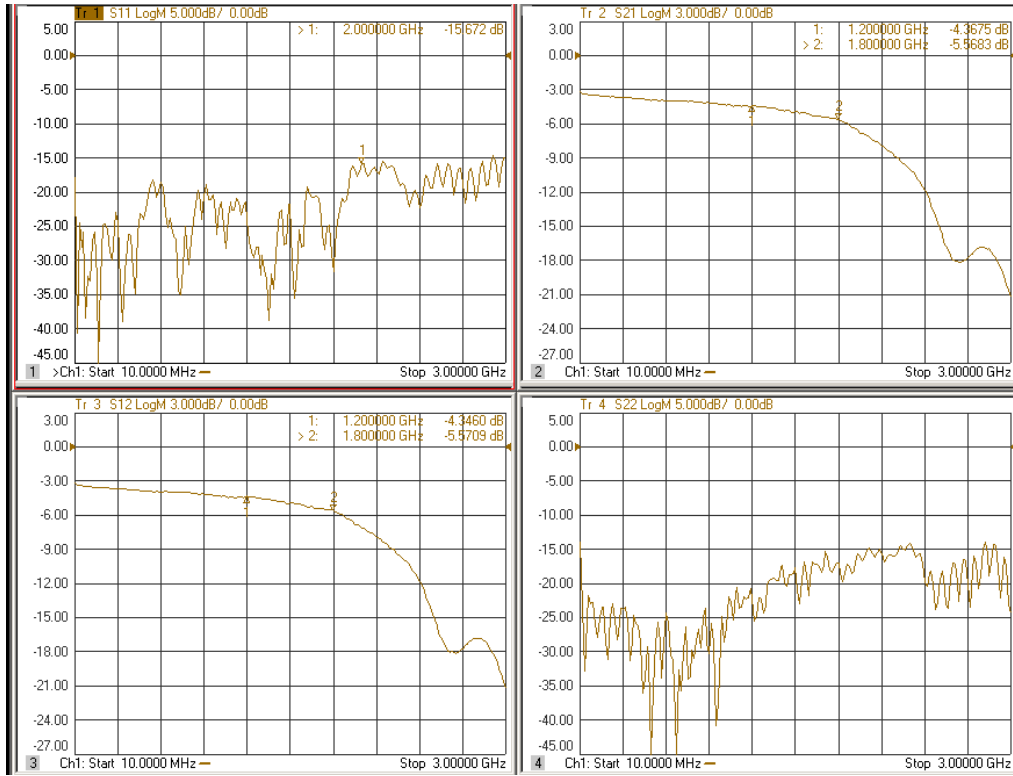Figure 57: Scattering matrix for channel 1K, polarization x and output 6dB3.

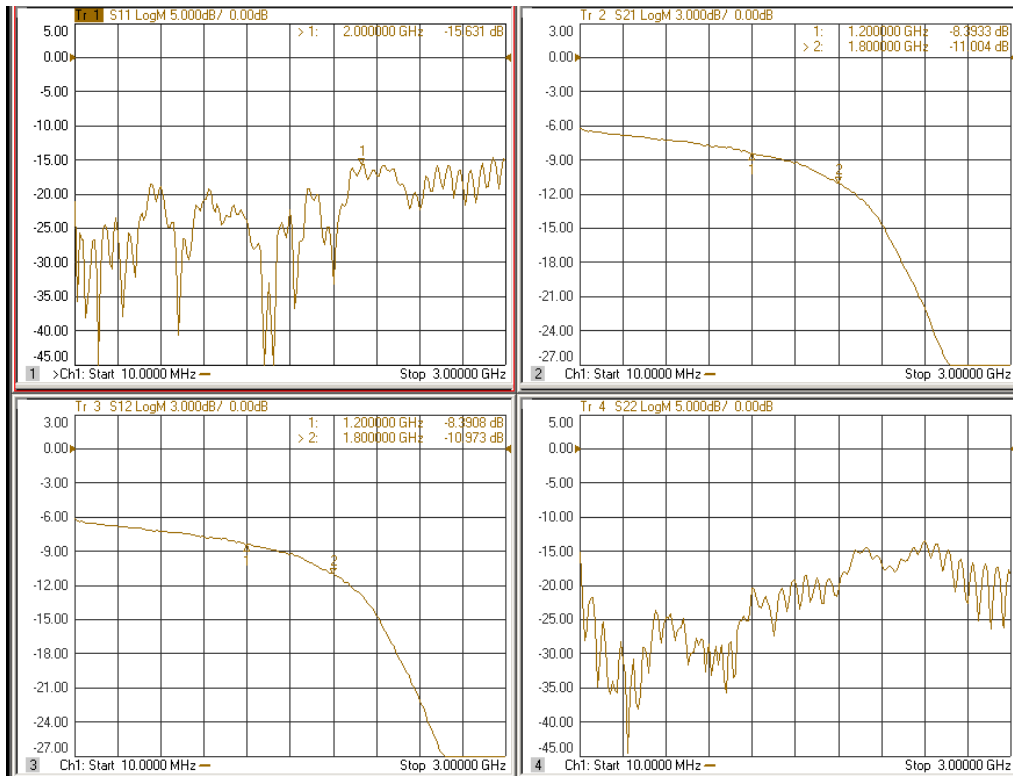Figure 58: Scattering matrix for channel 1K, polarization y and output 3dB1.

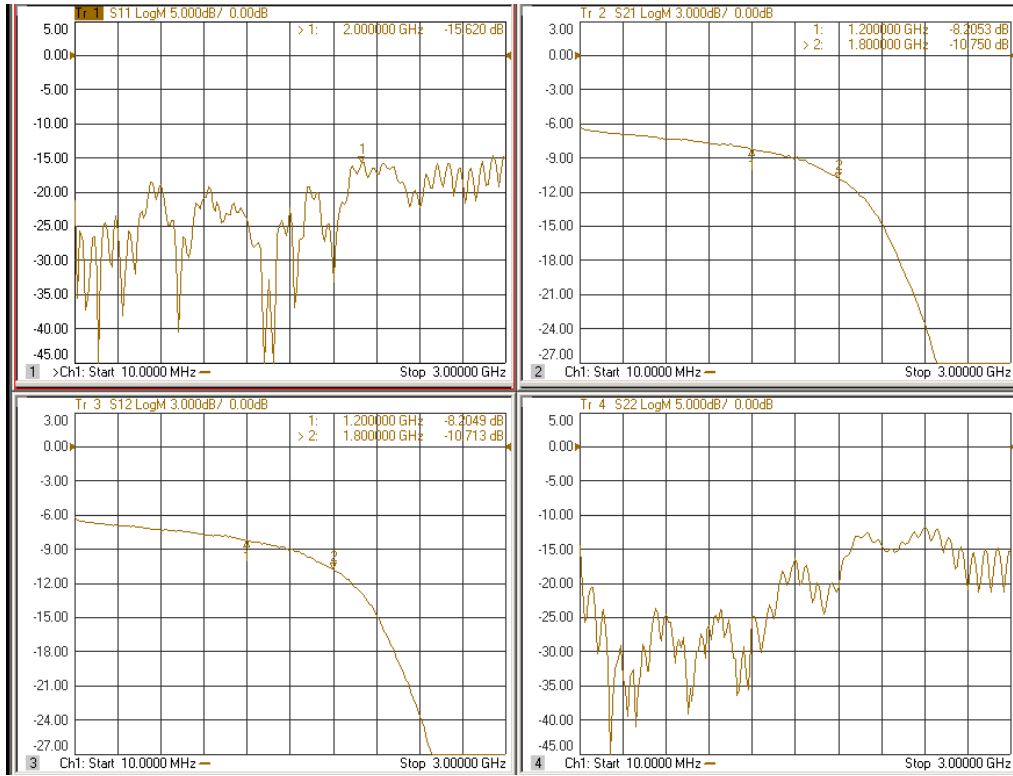Figure 59: Scattering matrix for channel 1K, polarization y and output 6dB2.

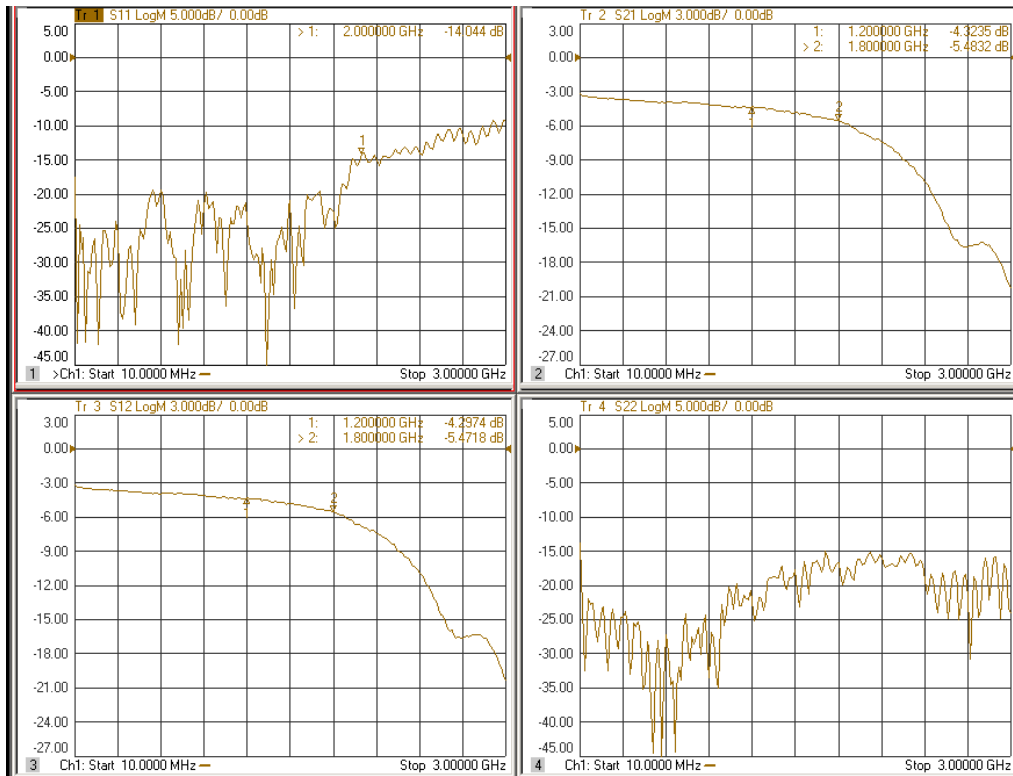Figure 60: Scattering matrix for channel 1K, polarization y and output 6dB3.

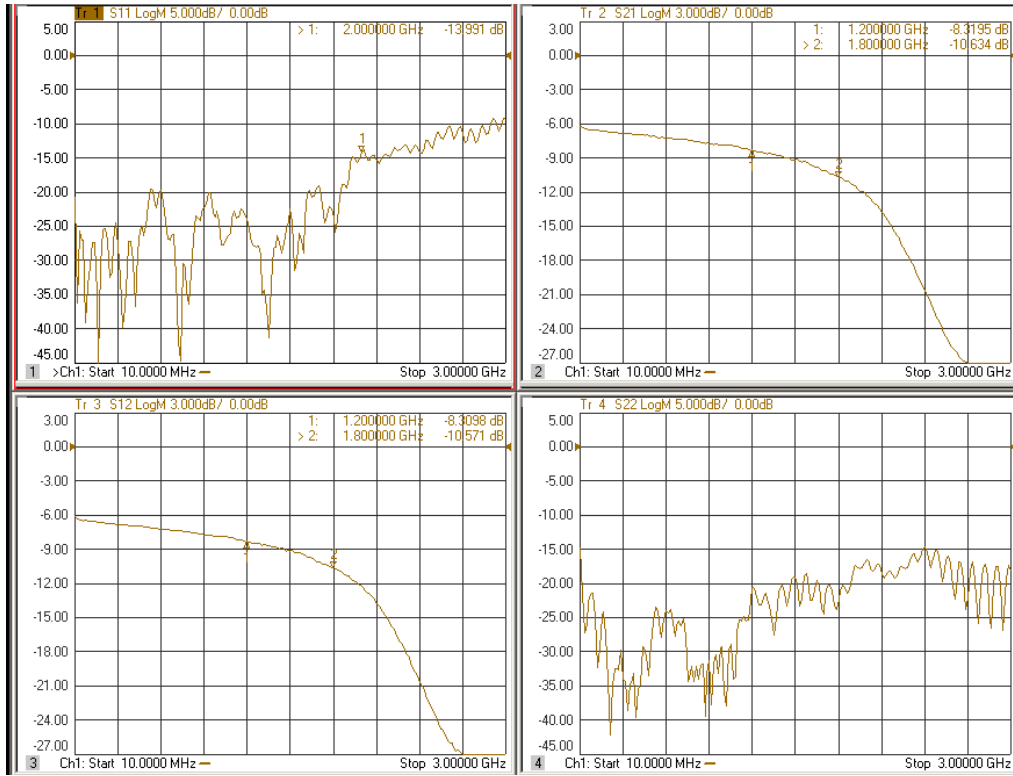Figure 61: Scattering matrix for channel 2A, polarization x and output 3dB1.

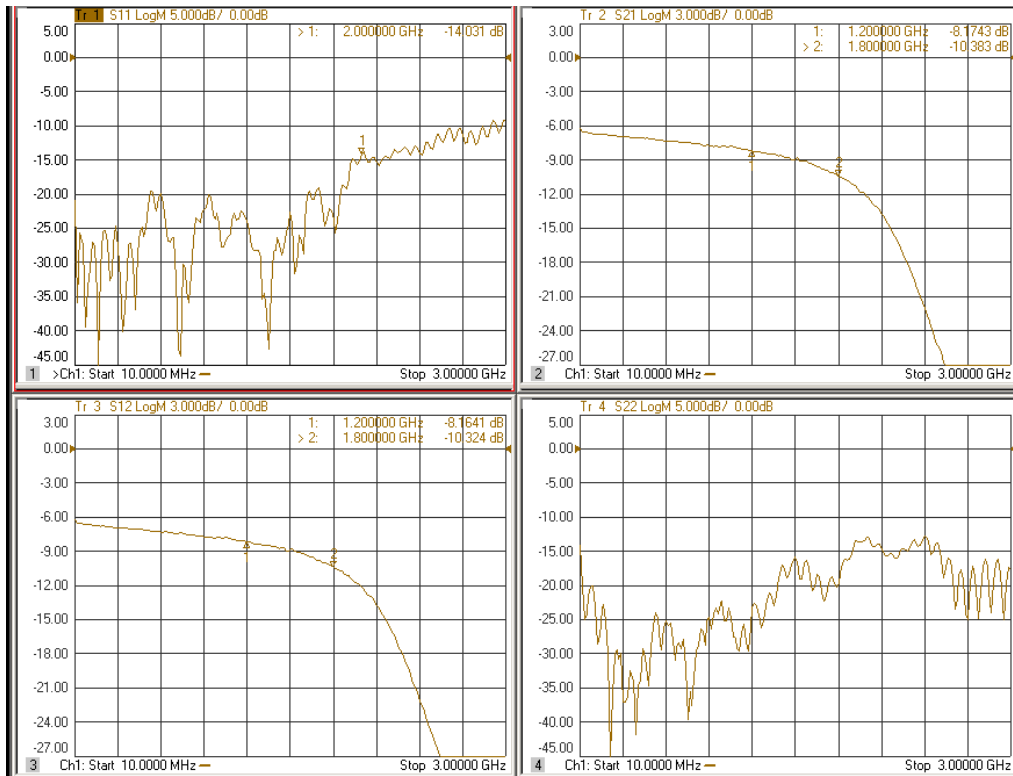Figure 62: Scattering matrix for channel 2A, polarization x and output 6dB2.

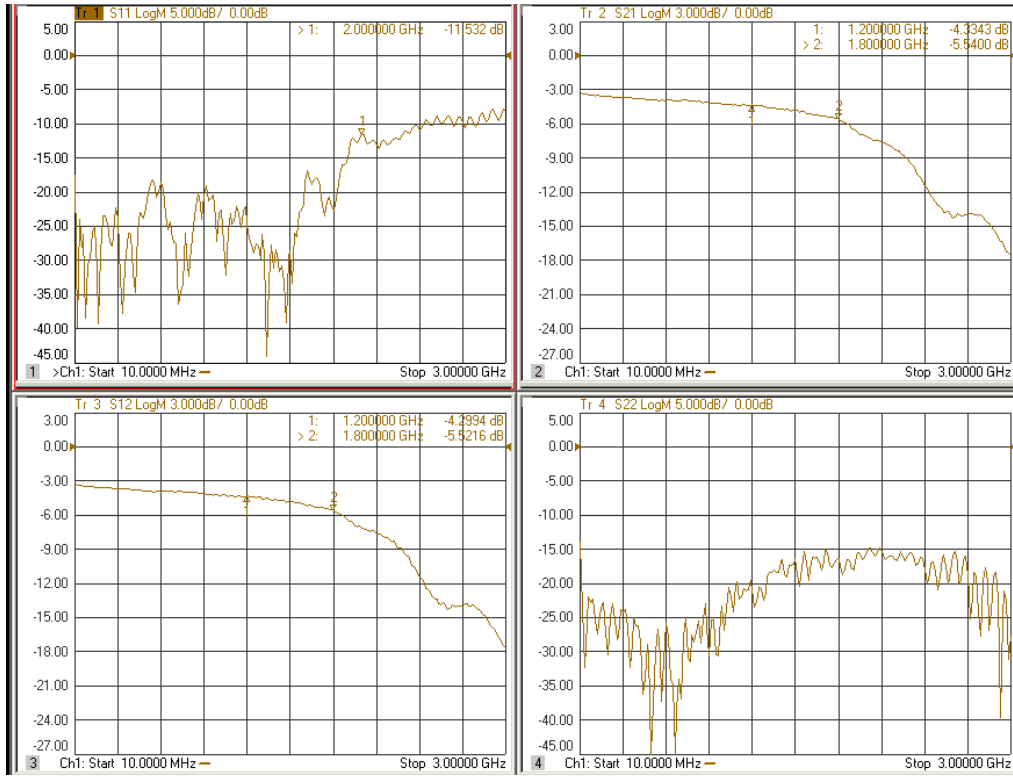Figure 63: Scattering matrix for channel 2A, polarization x and output 6dB3.

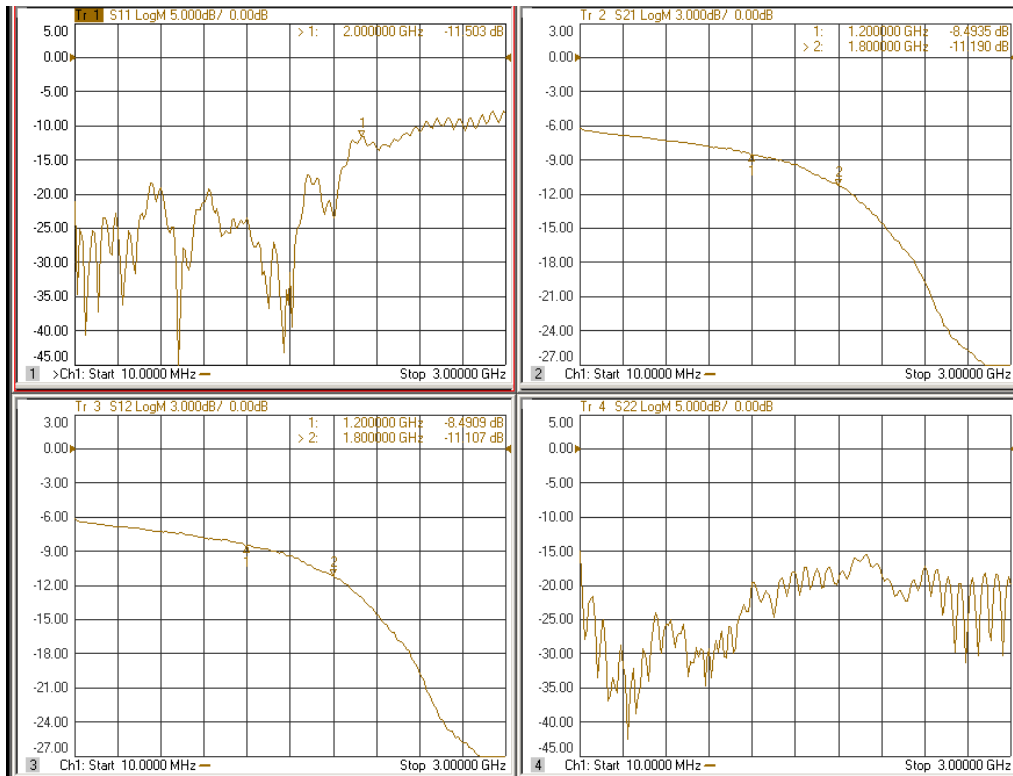Figure 64: Scattering matrix for channel 2A, polarization y and output 3dB1.

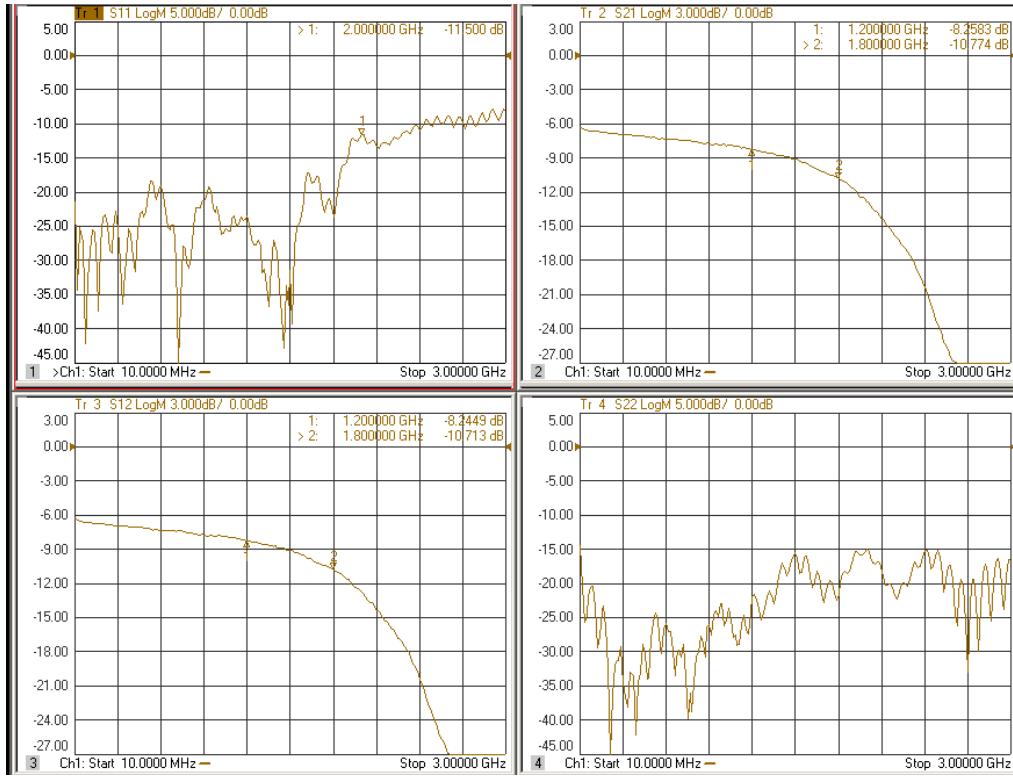Figure 65: Scattering matrix for channel 2A, polarization y and output 6dB2.

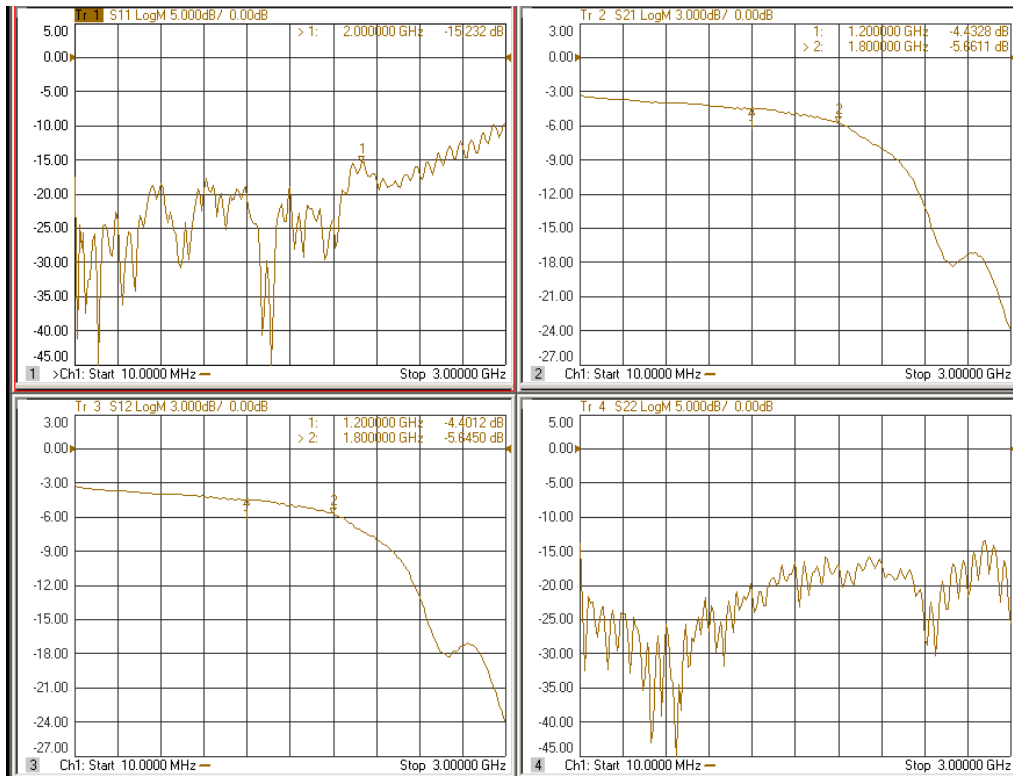Figure 66: Scattering matrix for channel 2A, polarization y and output 6dB3.

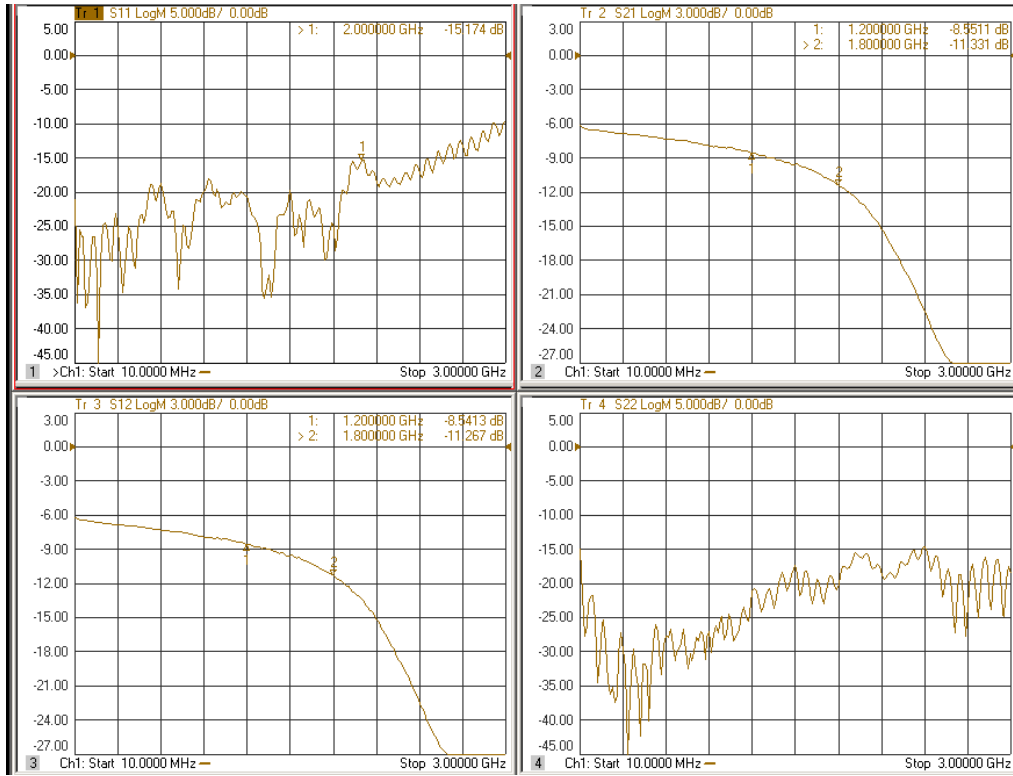Figure 67: Scattering matrix for channel 2B, polarization x and output 3dB1.

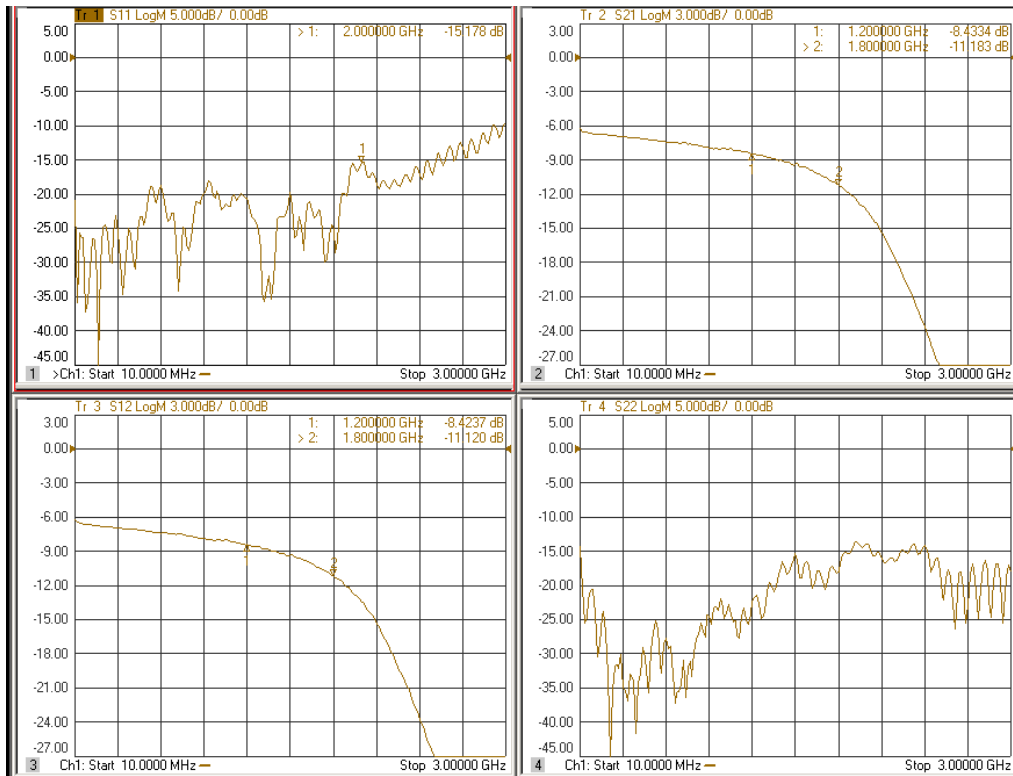Figure 68: Scattering matrix for channel 2B, polarization x and output 6dB2.

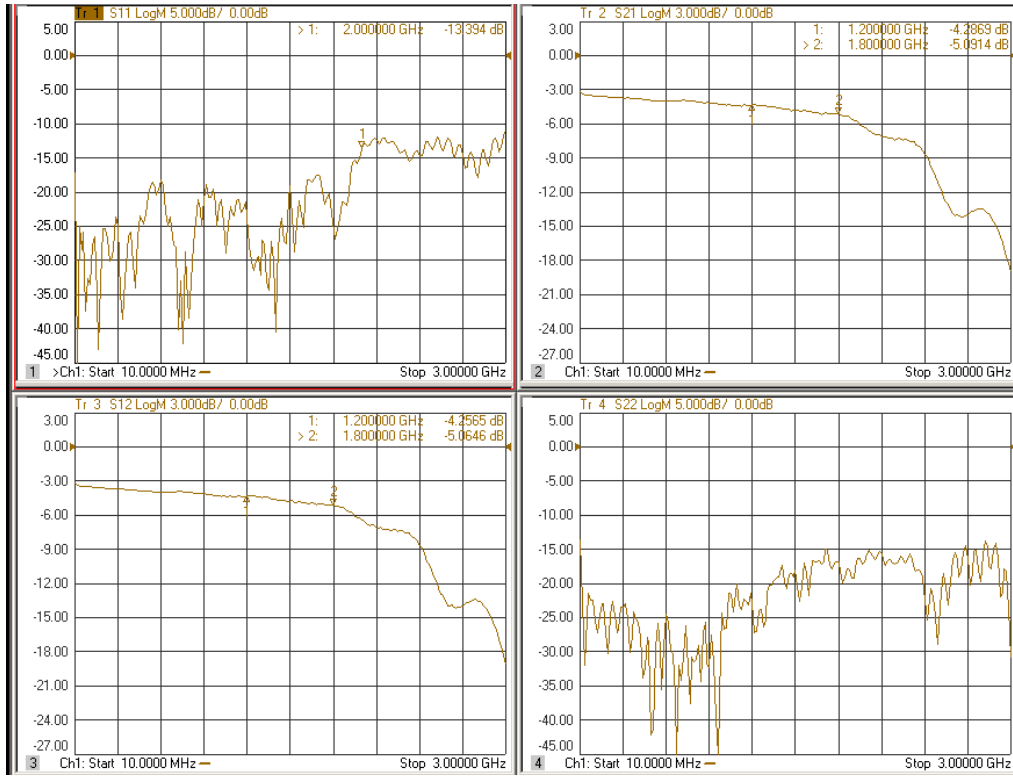Figure 69: Scattering matrix for channel 2B, polarization x and output 6dB3.

Figure 70: Scattering matrix for channel 2B, polarization y and output 3dB1.
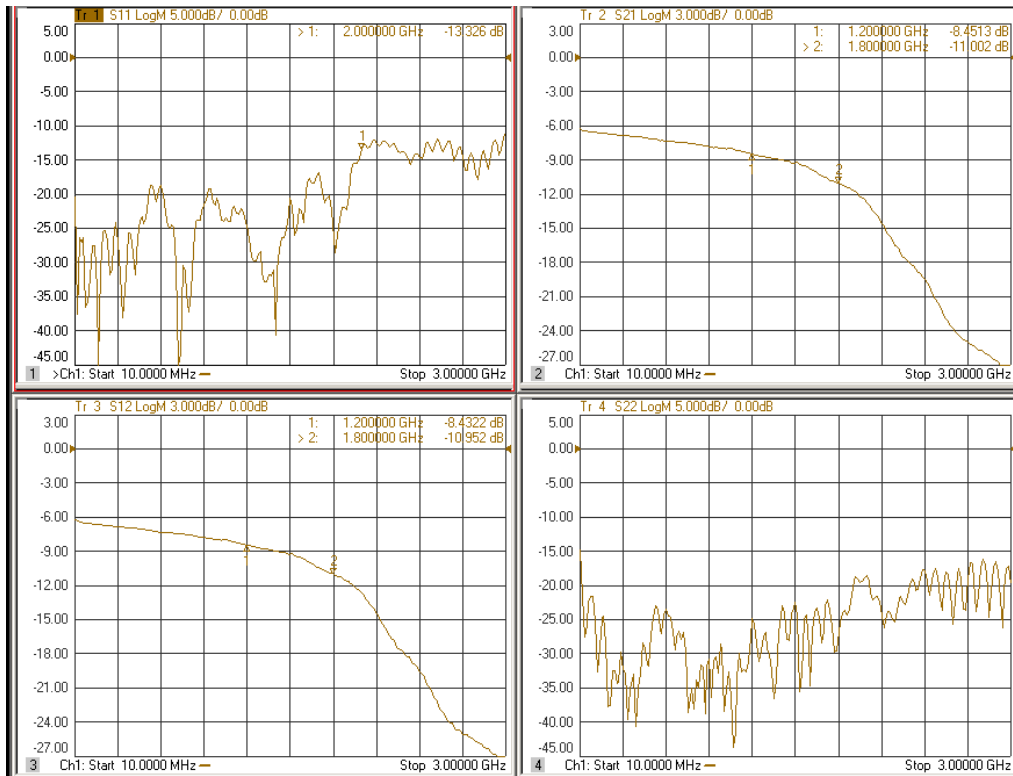

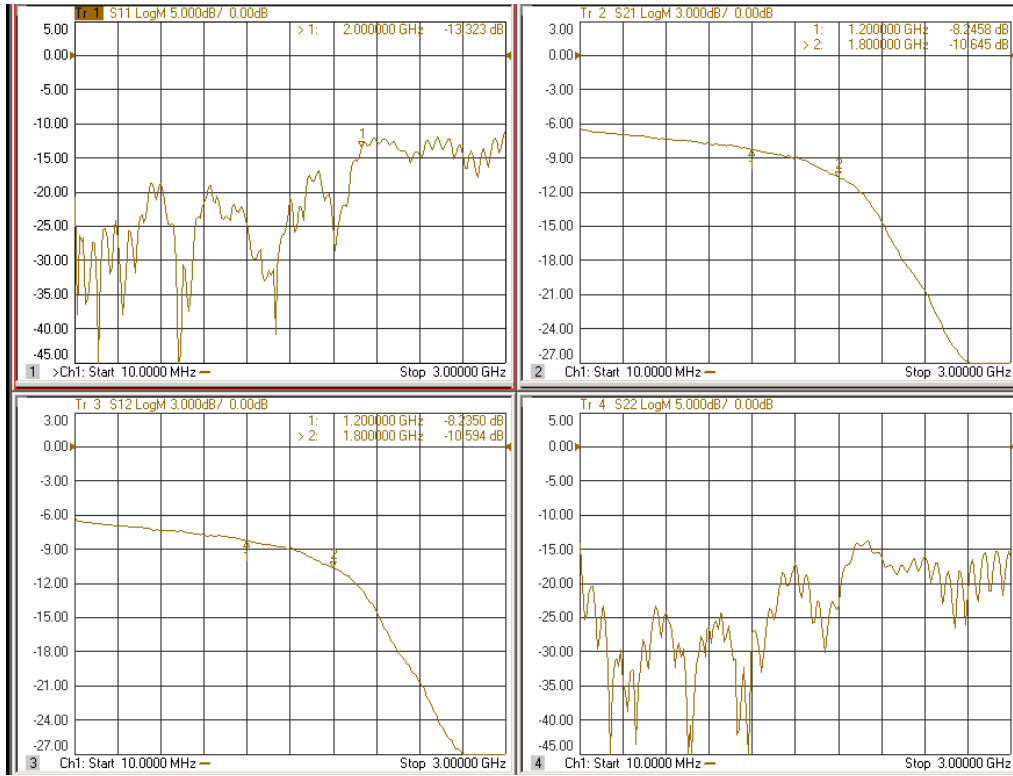Figure 71: Scattering matrix for channel 2B, polarization y and output 6dB2.

Figure 72: Scattering matrix for channel 2B, polarization y and output 6dB3.
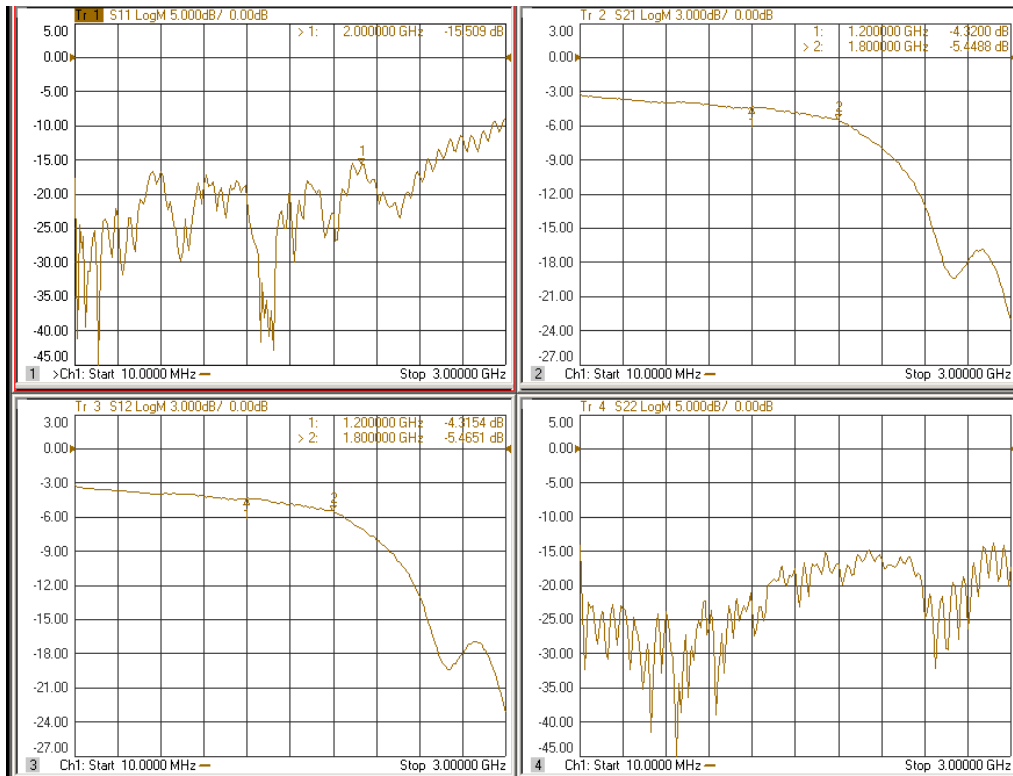

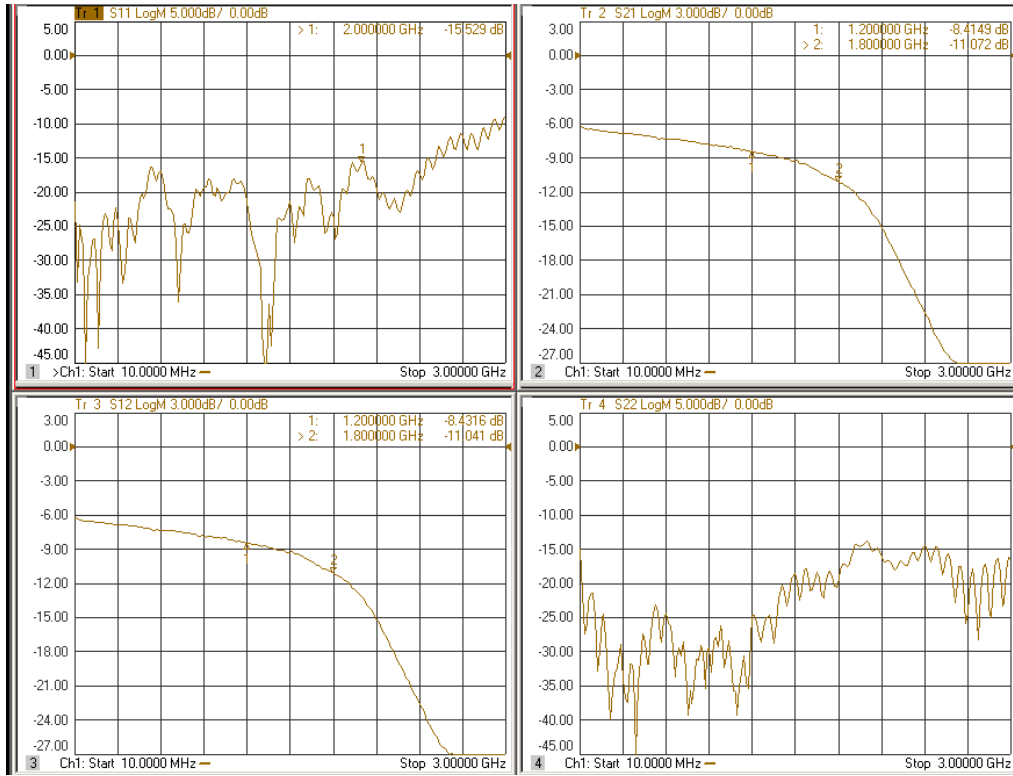Figure 73: Scattering matrix for channel 2C, polarization x and output 3dB1.

Figure 74: Scattering matrix for channel 2C, polarization x and output 6dB2.
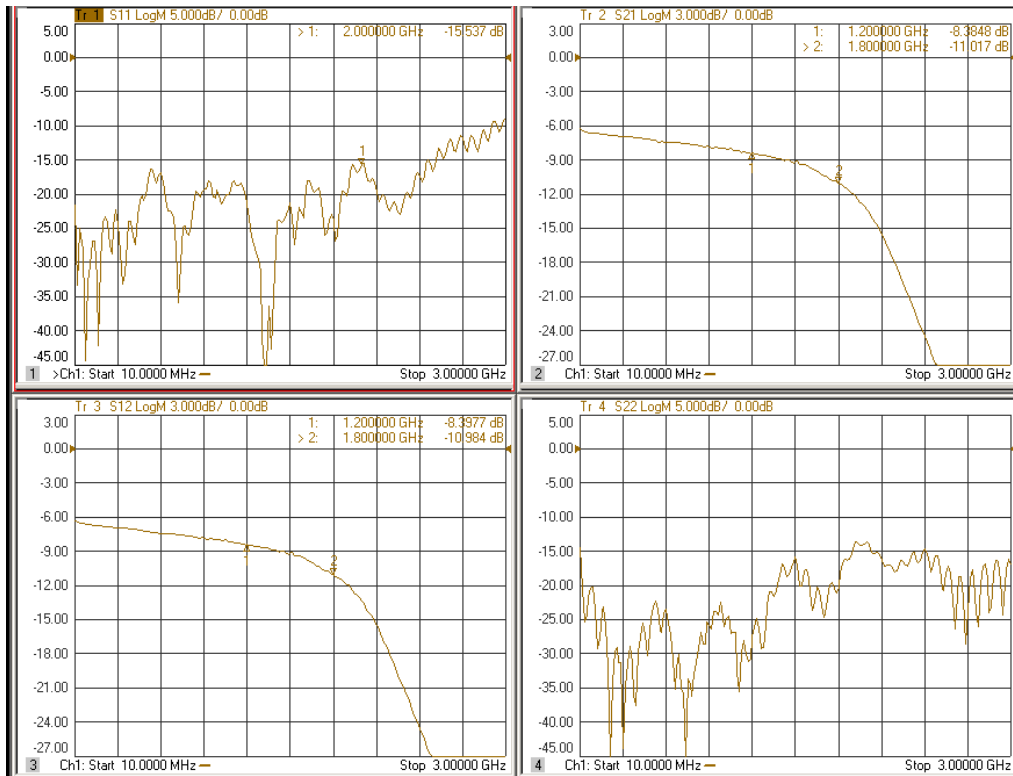

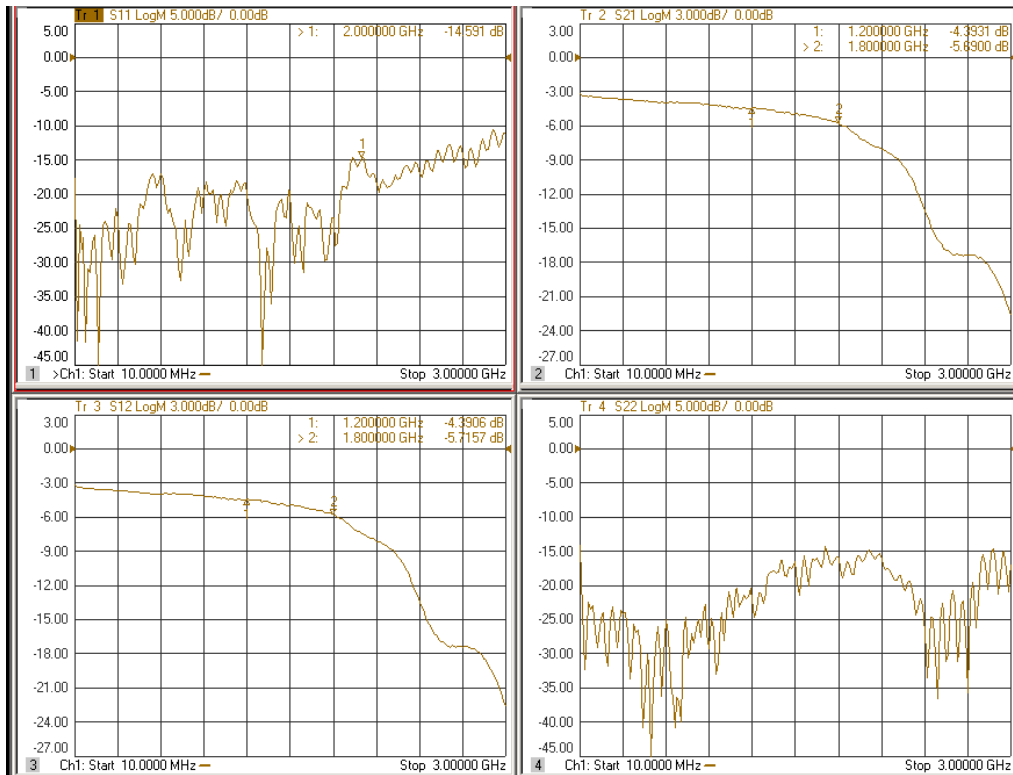Figure 75: Scattering matrix for channel 2C, polarization x and output 6dB3.

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Figure 76: Scattering matrix for channel 2C, polarization y and output 3dB1.
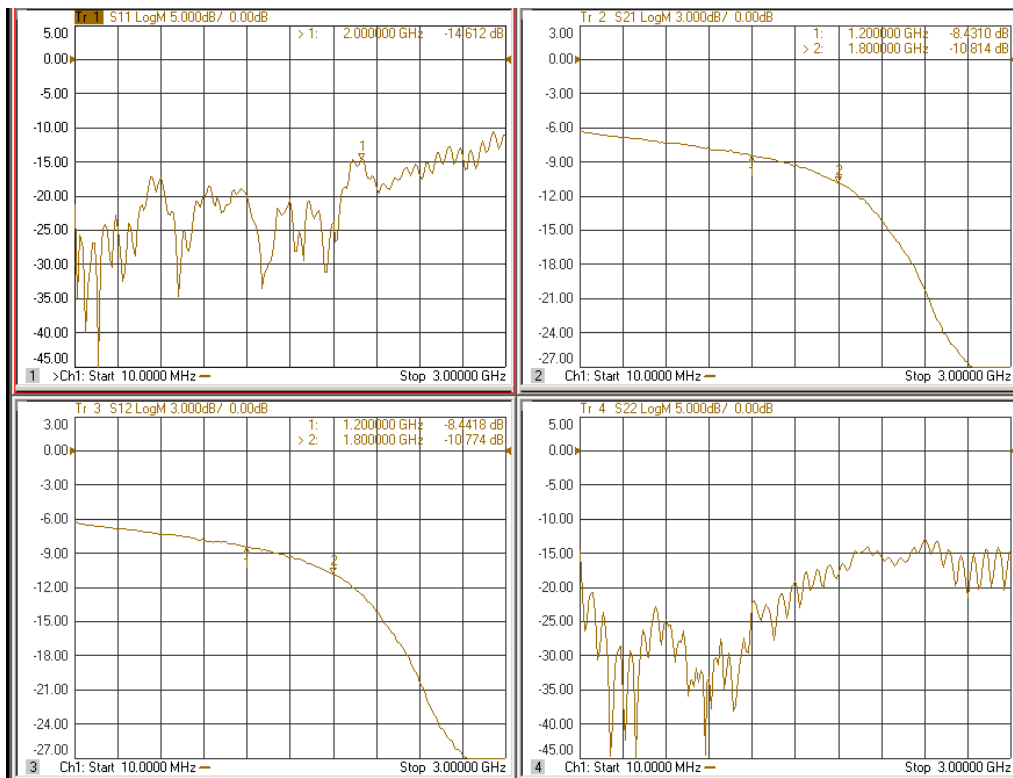

Figure 77: Scattering matrix for channel 2C, polarization y and output 6dB2.
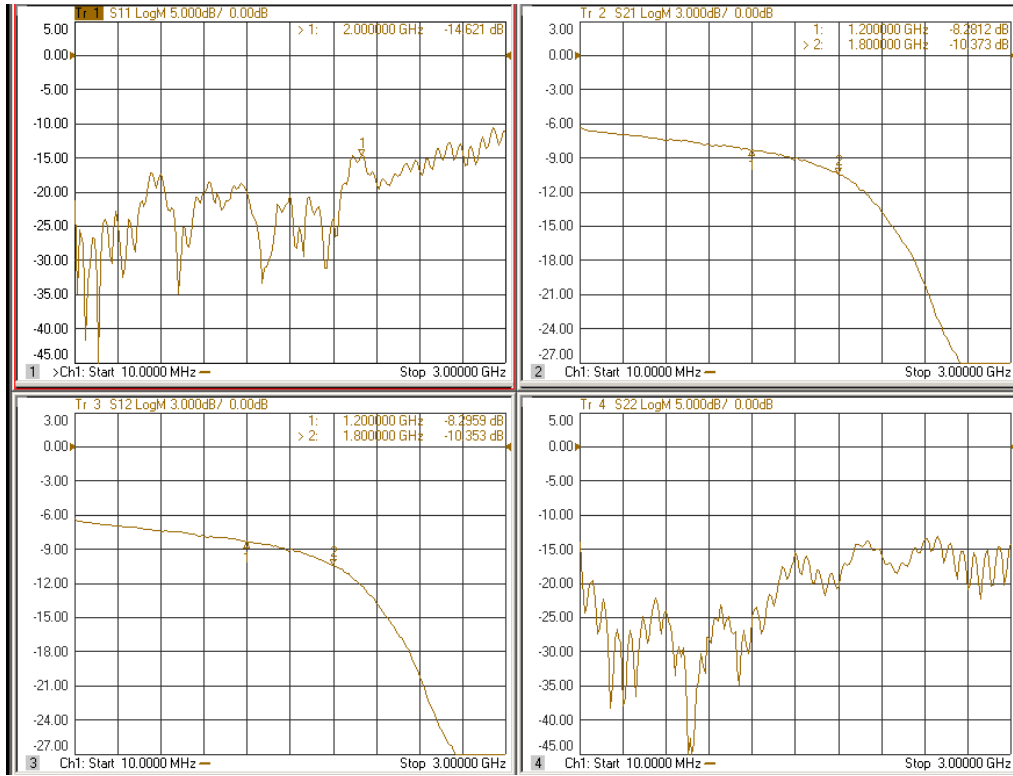
Figure 78: Scattering matrix for channel 2C, polarization y and output 6dB3.
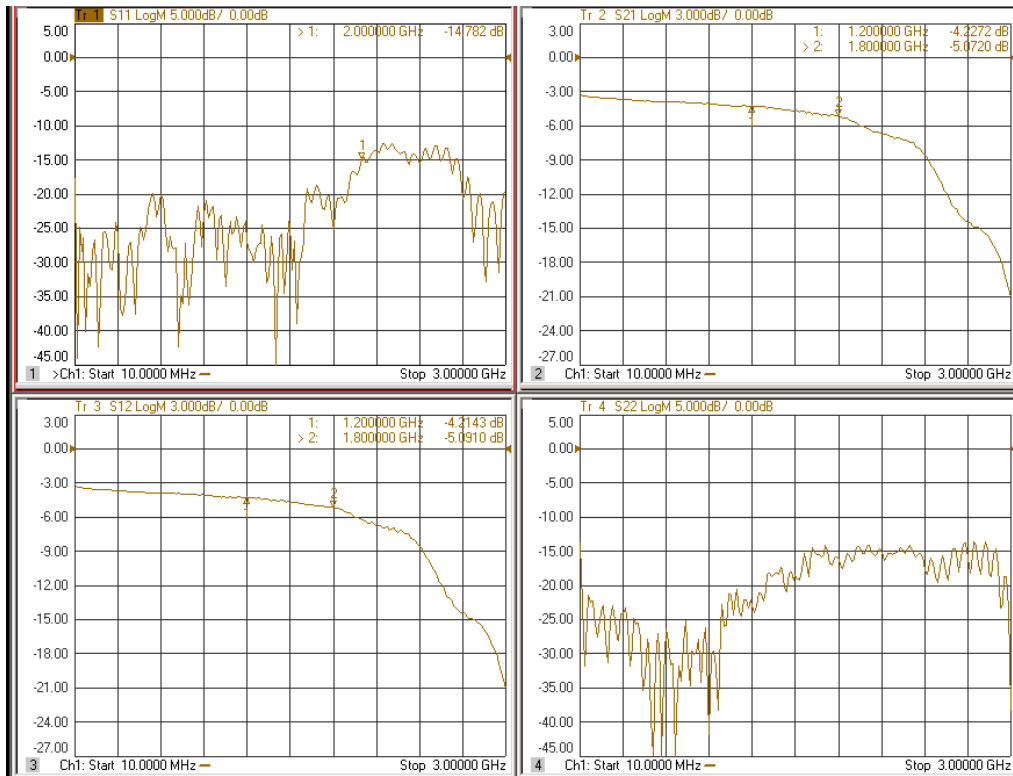

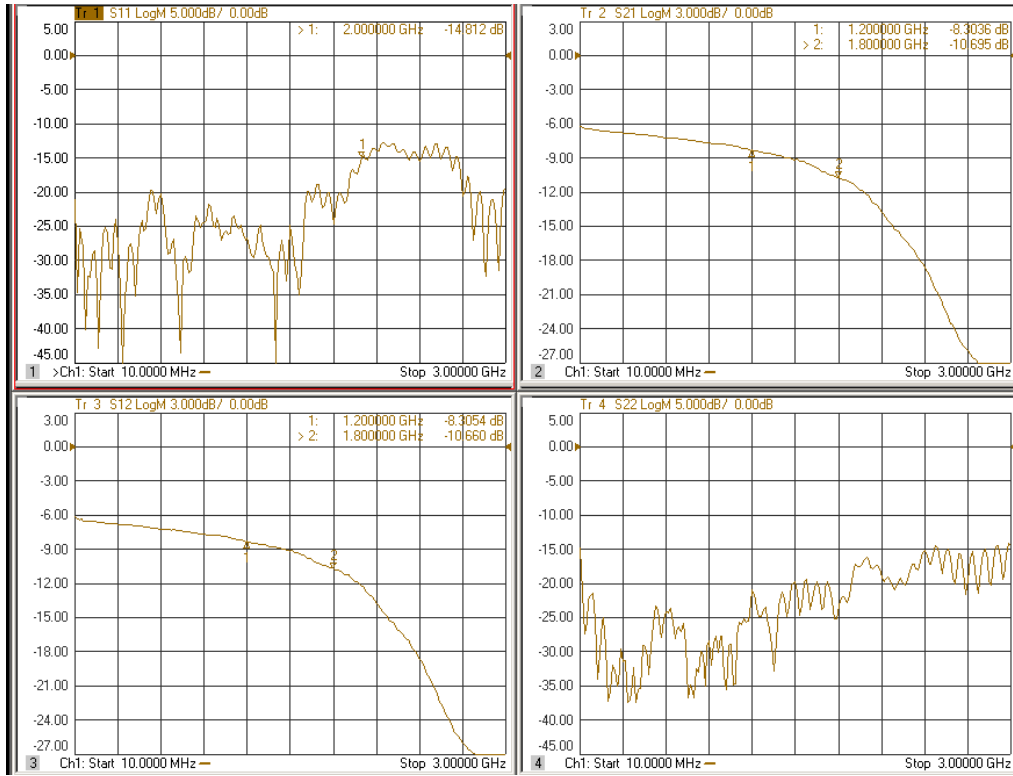Figure 79: Scattering matrix for channel 2D, polarization x and output 3dB1.

Figure 80: Scattering matrix for channel 2D, polarization x and output 6dB2.
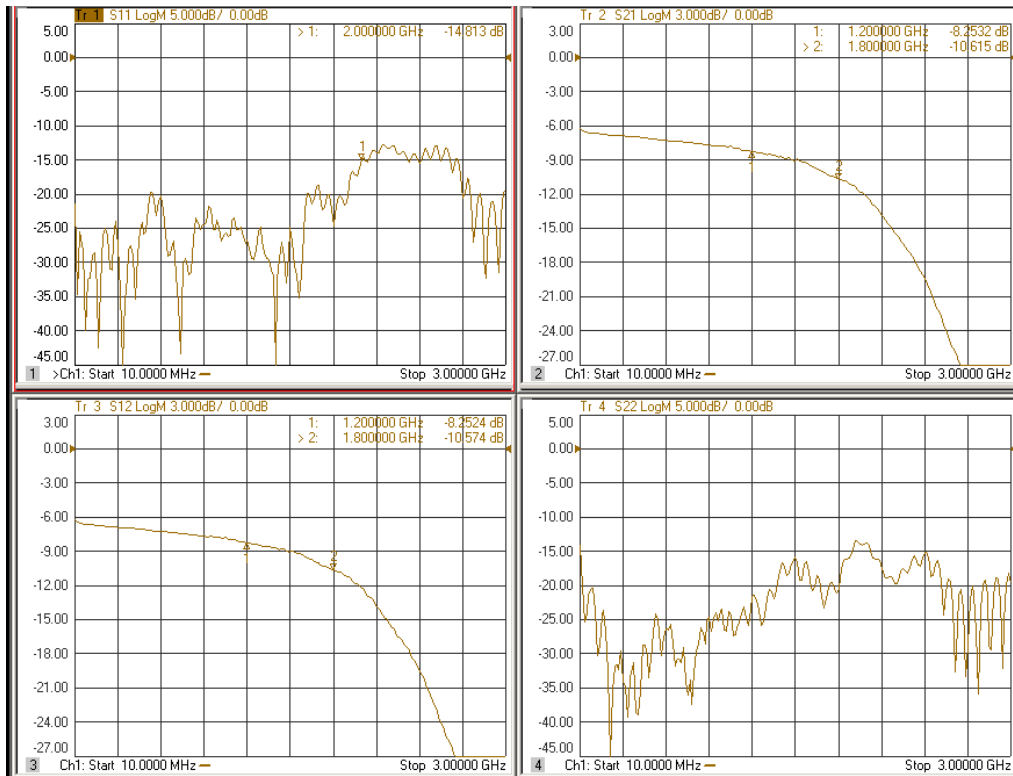

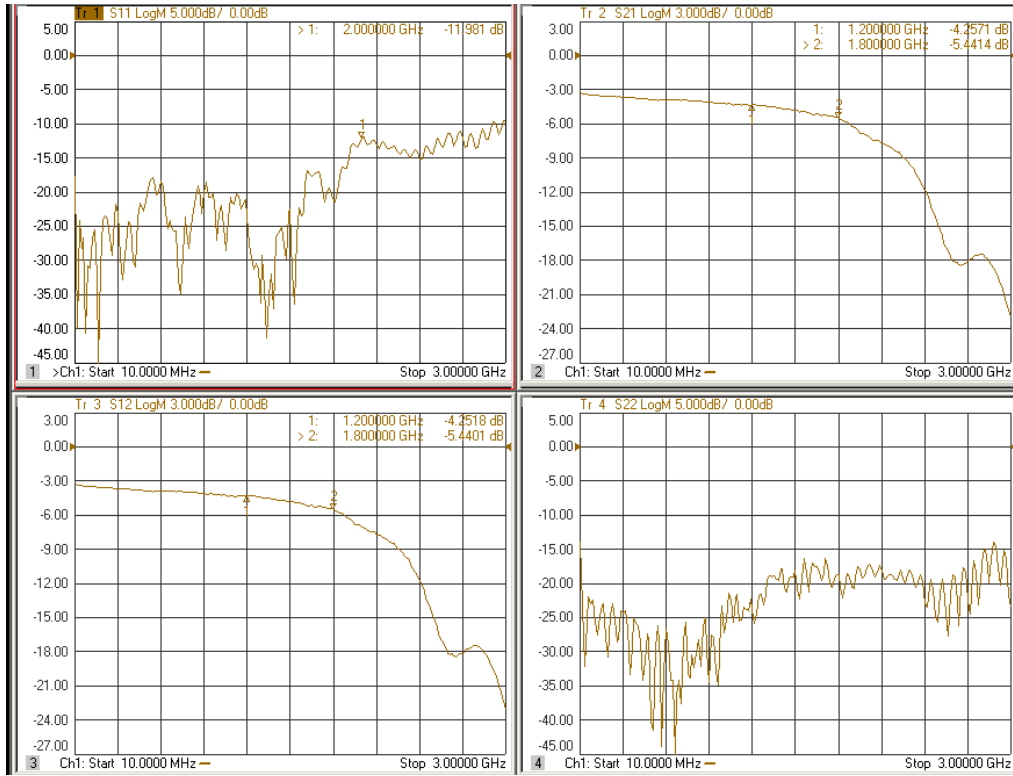Figure 81: Scattering matrix for channel 2D, polarization x and output 6dB3.

Figure 82: Scattering matrix for channel 2D, polarization y and output 3dB1.
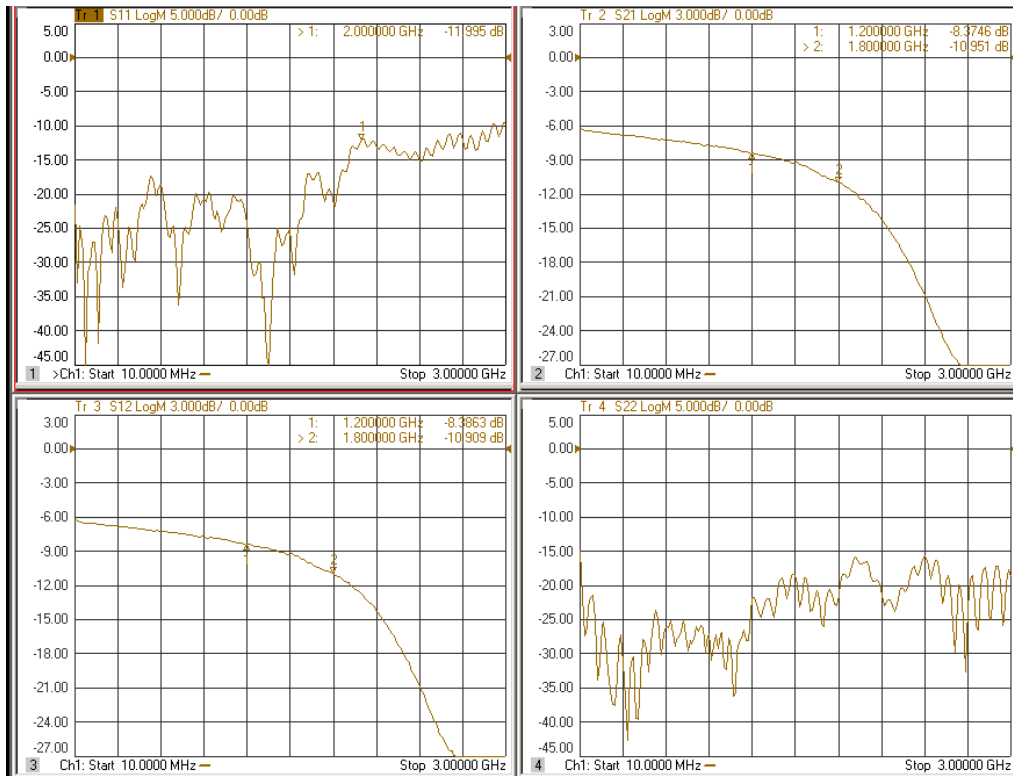

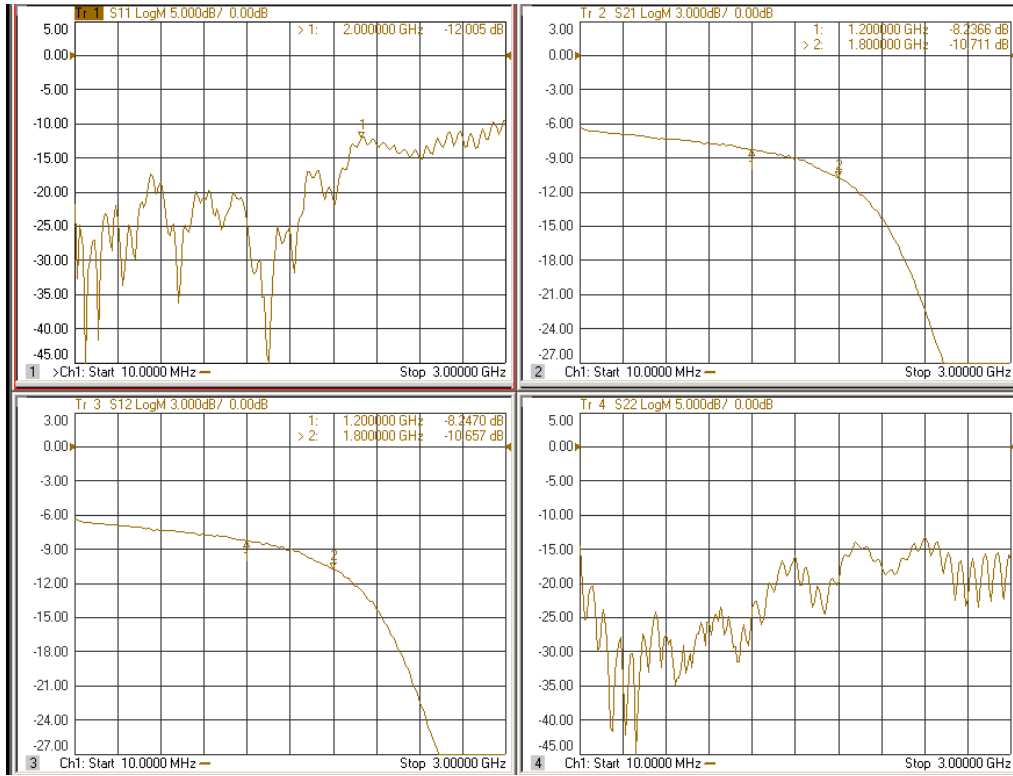Figure 83: Scattering matrix for channel 2D, polarization y and output 6dB2.

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Figure 84: Scattering matrix for channel 2D, polarization y and output 6dB3.
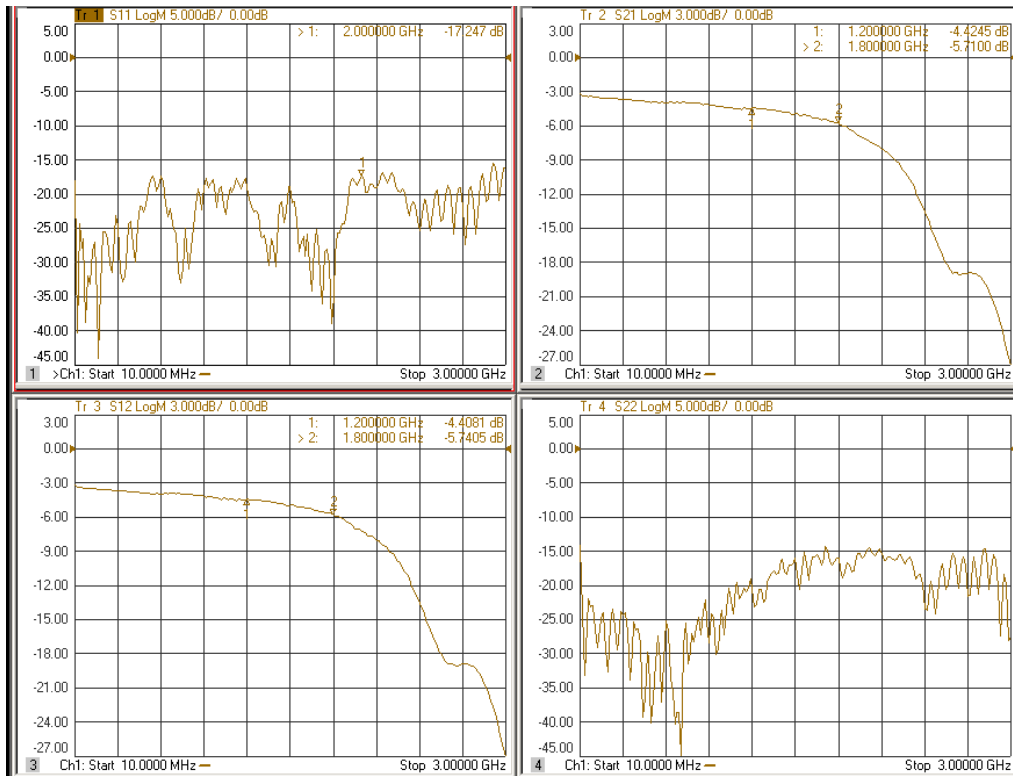

Figure 85: Scattering matrix for channel 2E, polarization x and output 3dB1.
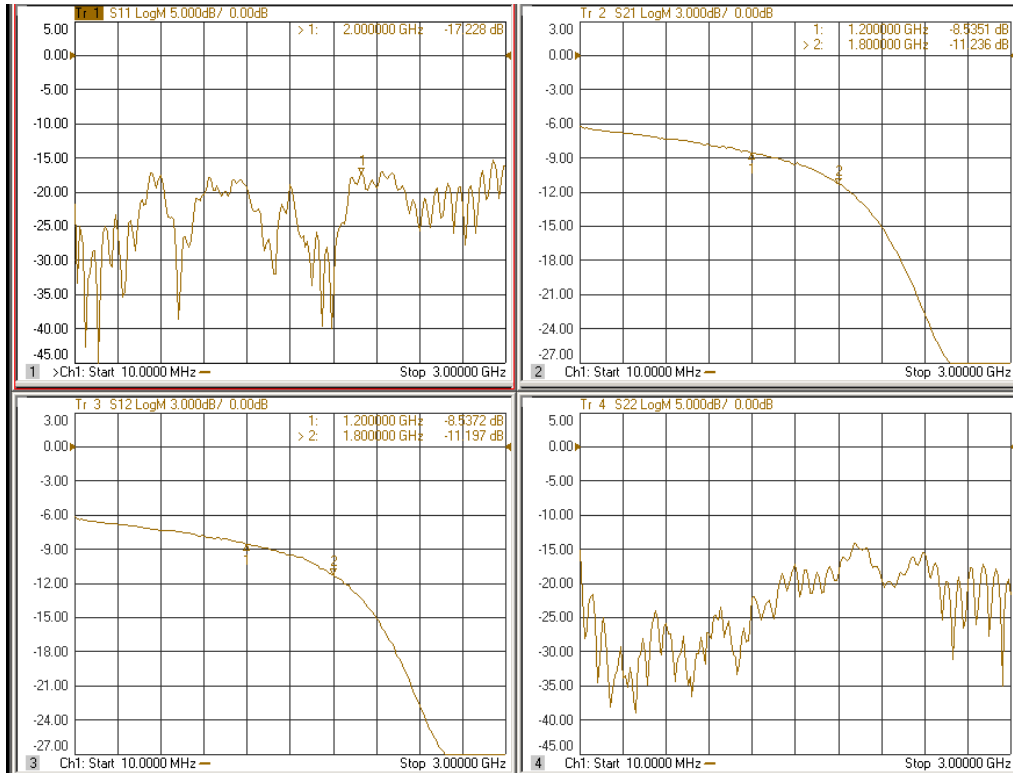
Figure 86: Scattering matrix for channel 2E, polarization x and output 6dB2.
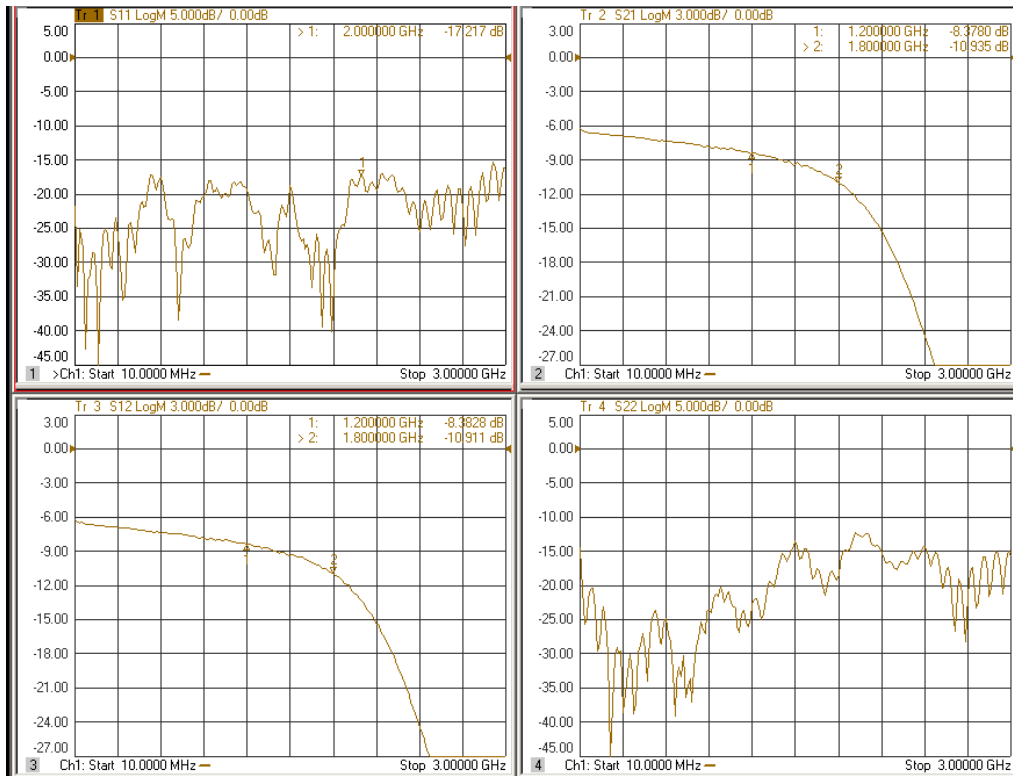

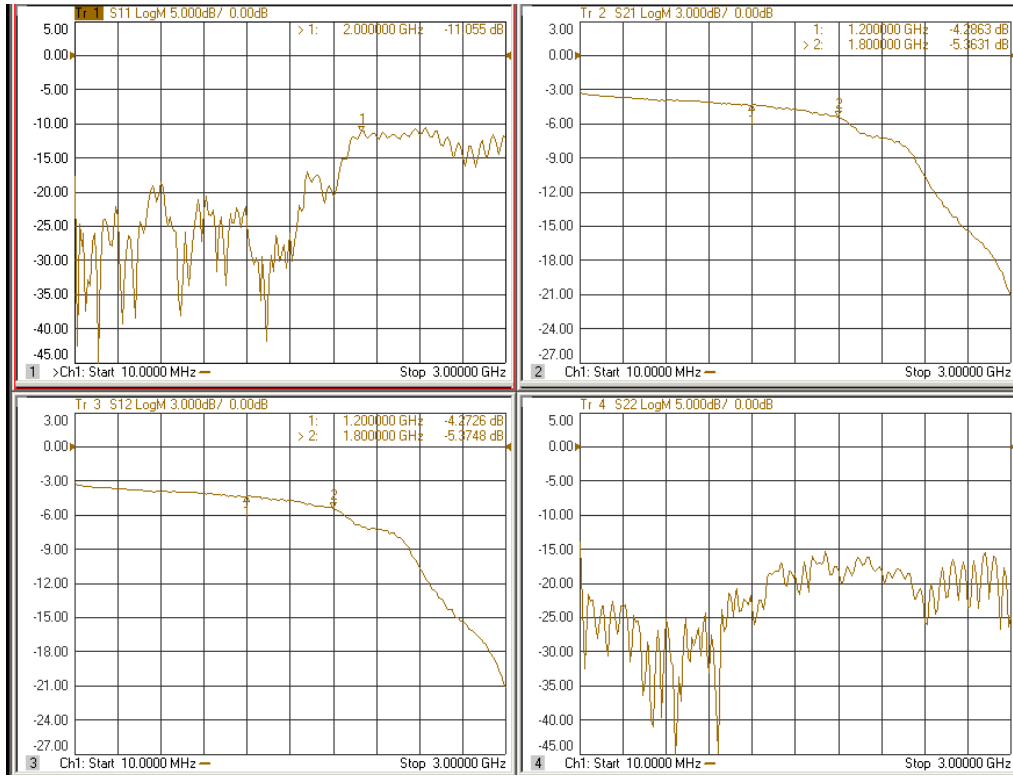Figure 87: Scattering matrix for channel 2E, polarization x and output 6dB3.

Figure 88: Scattering matrix for channel 2E, polarization y and output 3dB1.
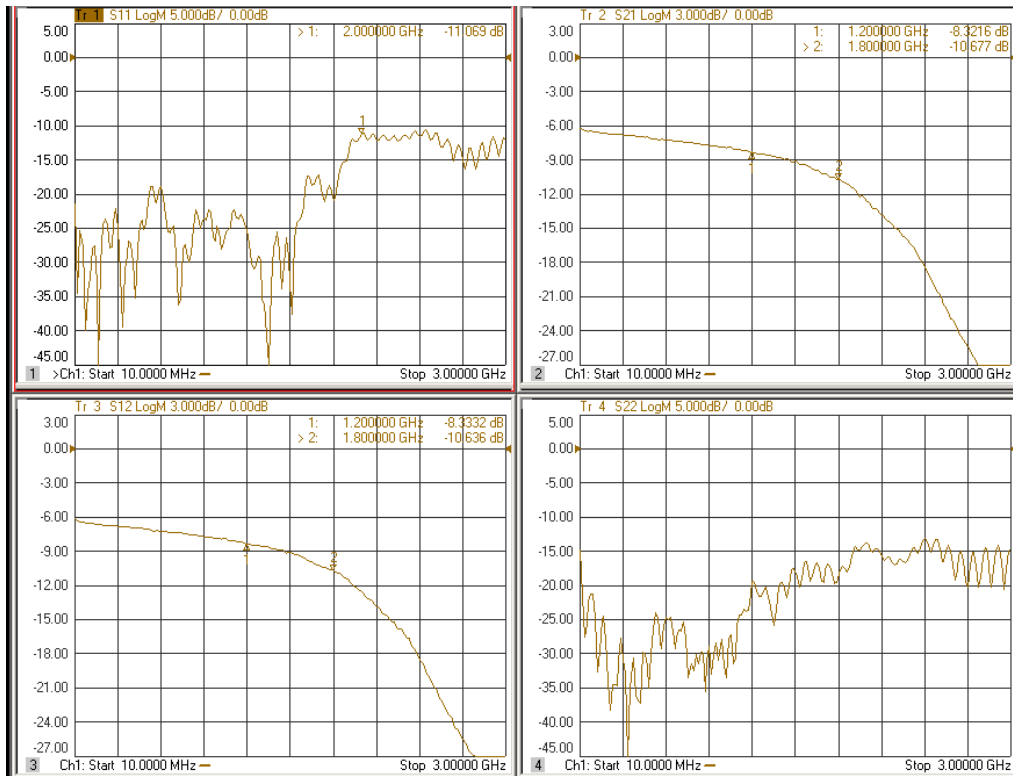

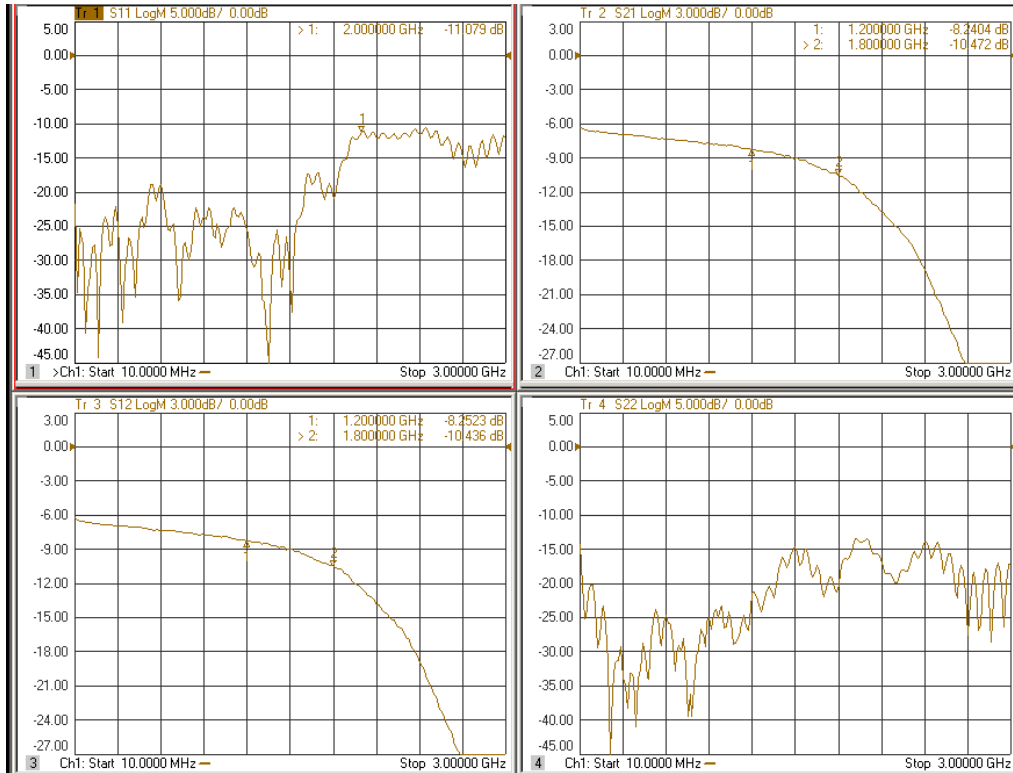Figure 89: Scattering matrix for channel 2E, polarization y and output 6dB2.

Figure 90: Scattering matrix for channel 2E, polarization y and output 6dB3.
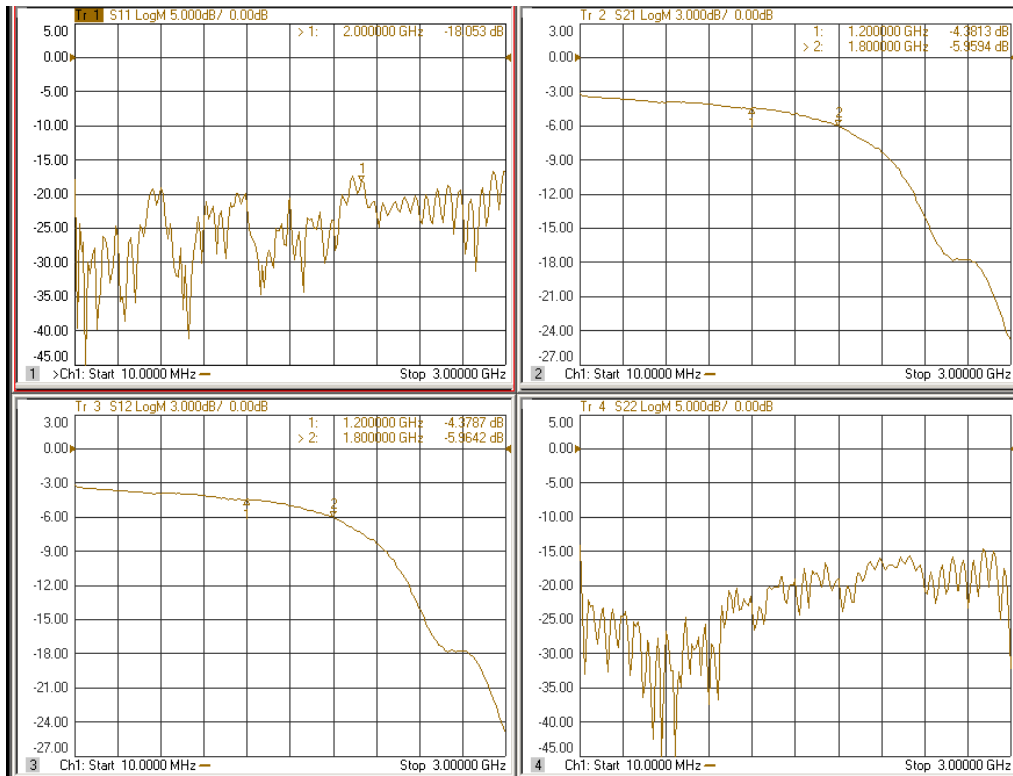

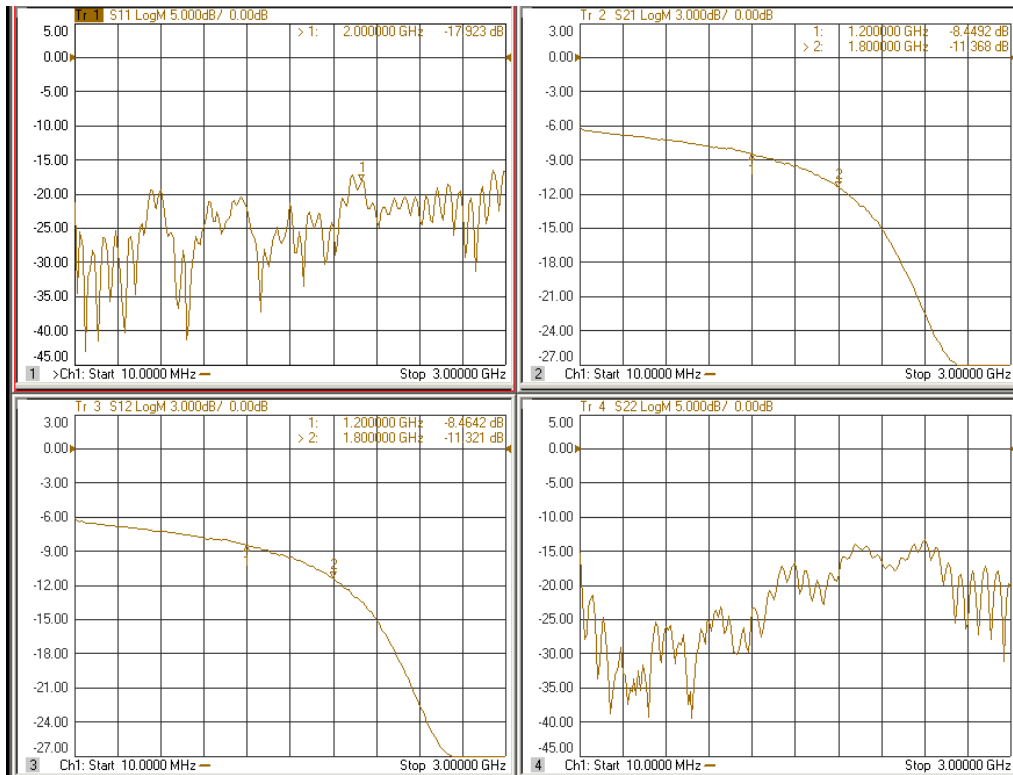Figure 91: Scattering matrix for channel 2F, polarization x and output 3dB1.

Figure 92: Scattering matrix for channel 2F, polarization x and output 6dB2.
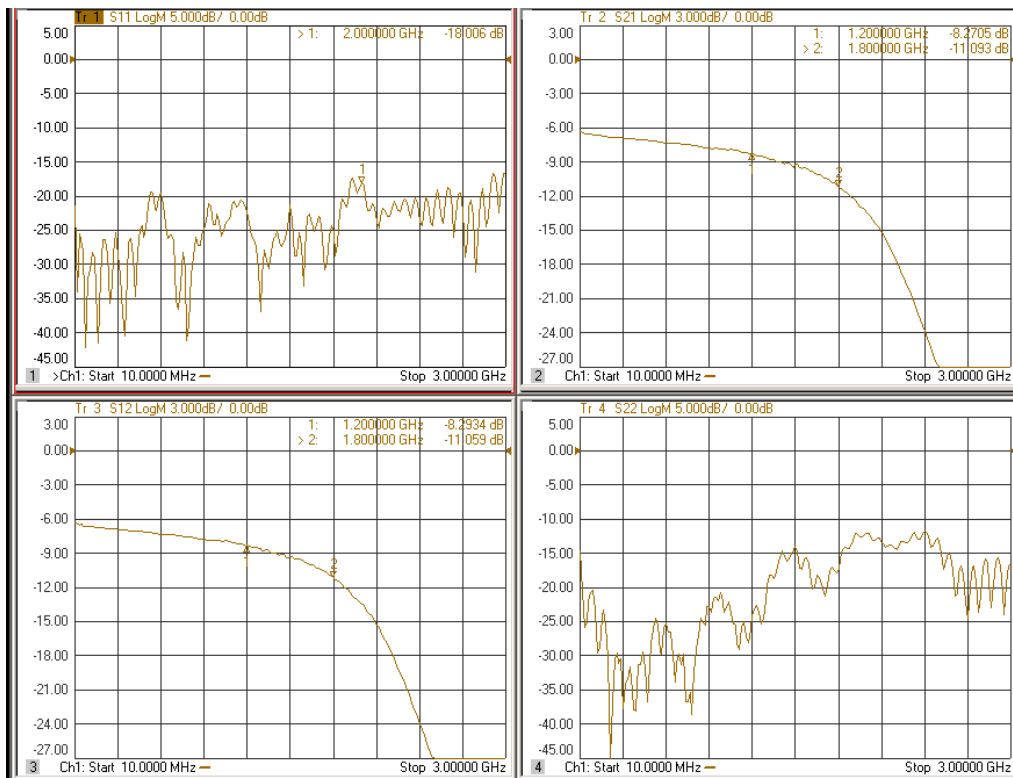

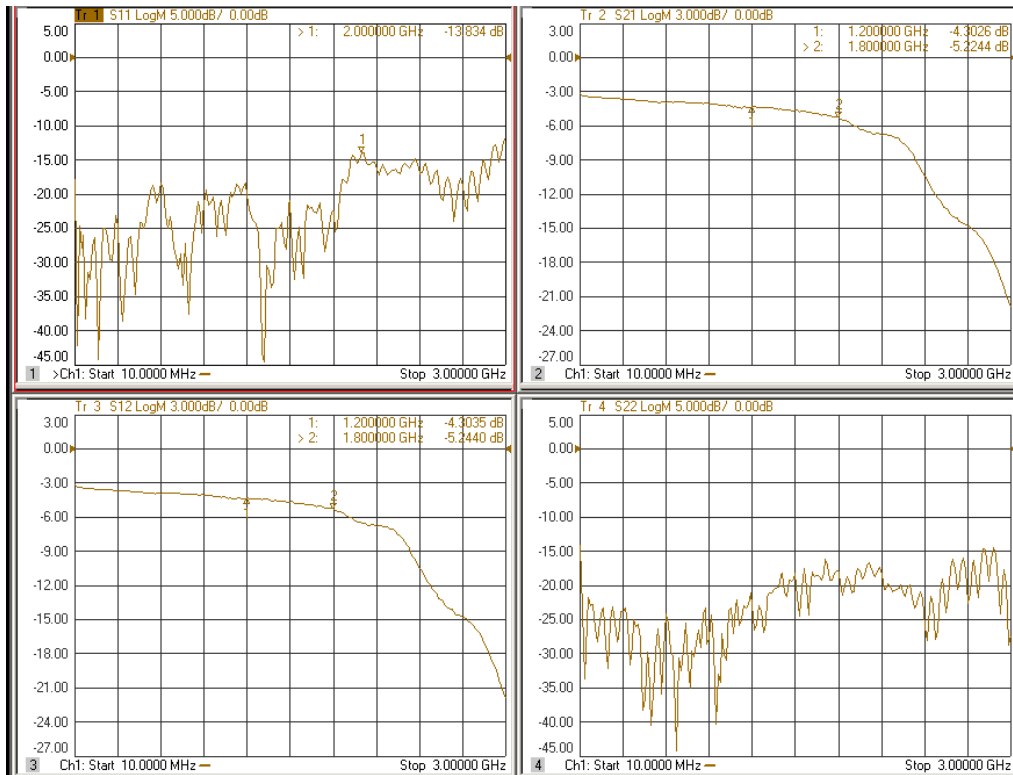Figure 93: Scattering matrix for channel 2F, polarization x and output 6dB3.

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Figure 94: Scattering matrix for channel 2F, polarization y and output 3dB1.
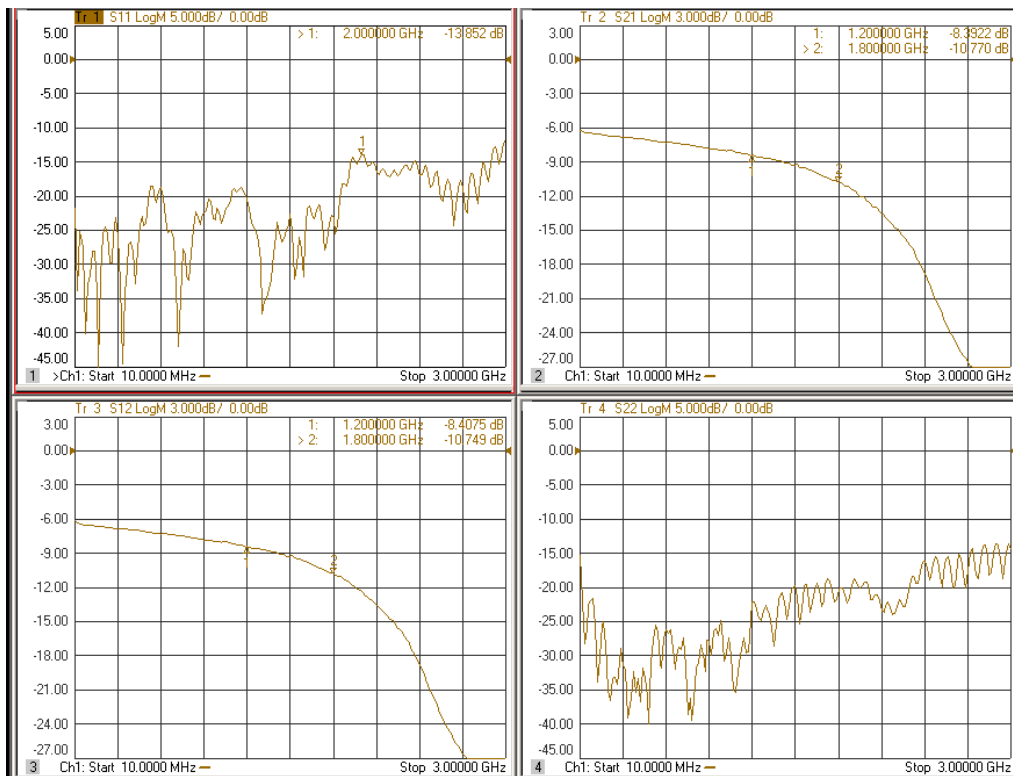

Figure 95: Scattering matrix for channel 2F, polarization y and output 6dB2.
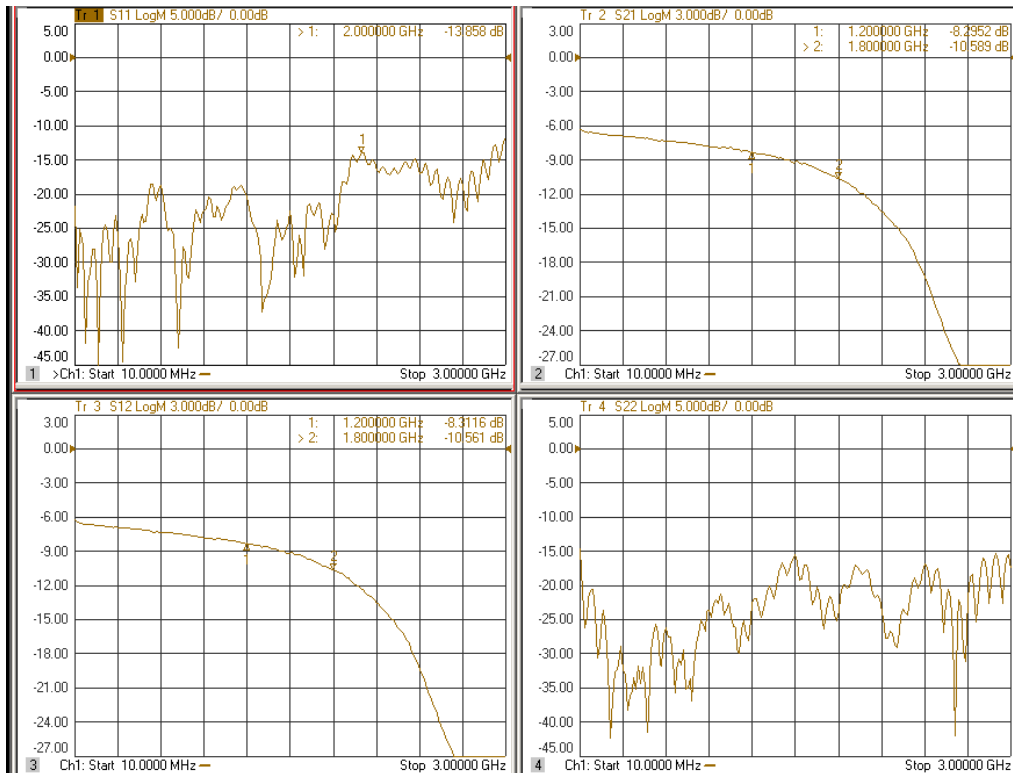
Figure 96: Scattering matrix for channel 2F, polarization y and output 6dB3.
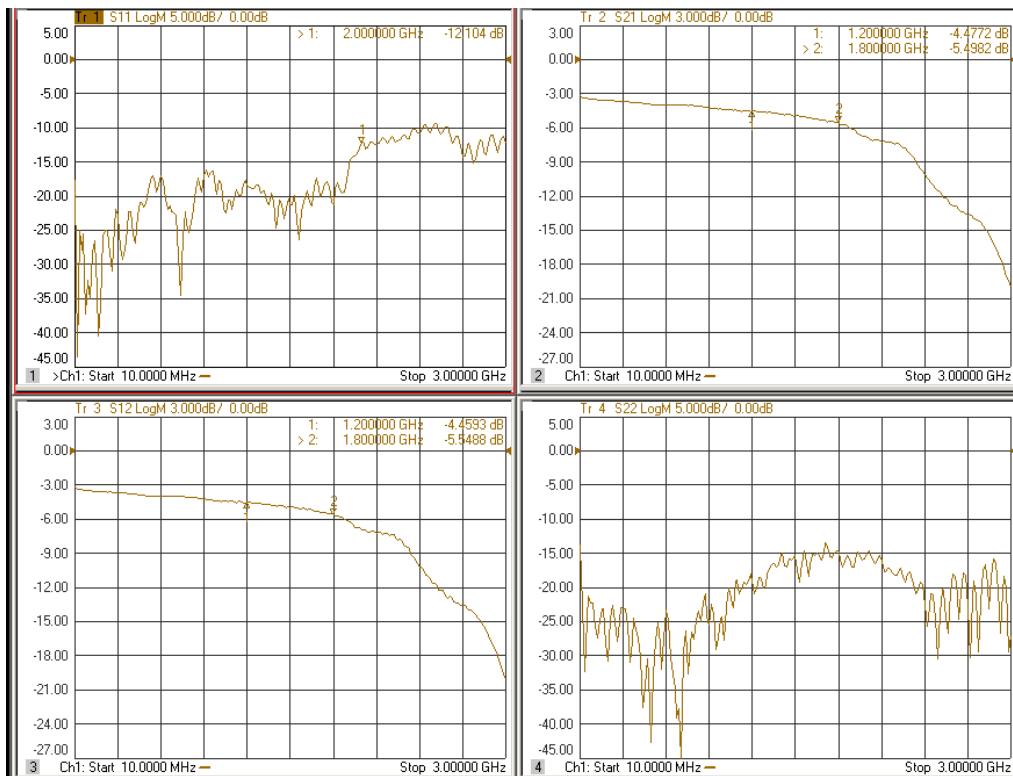

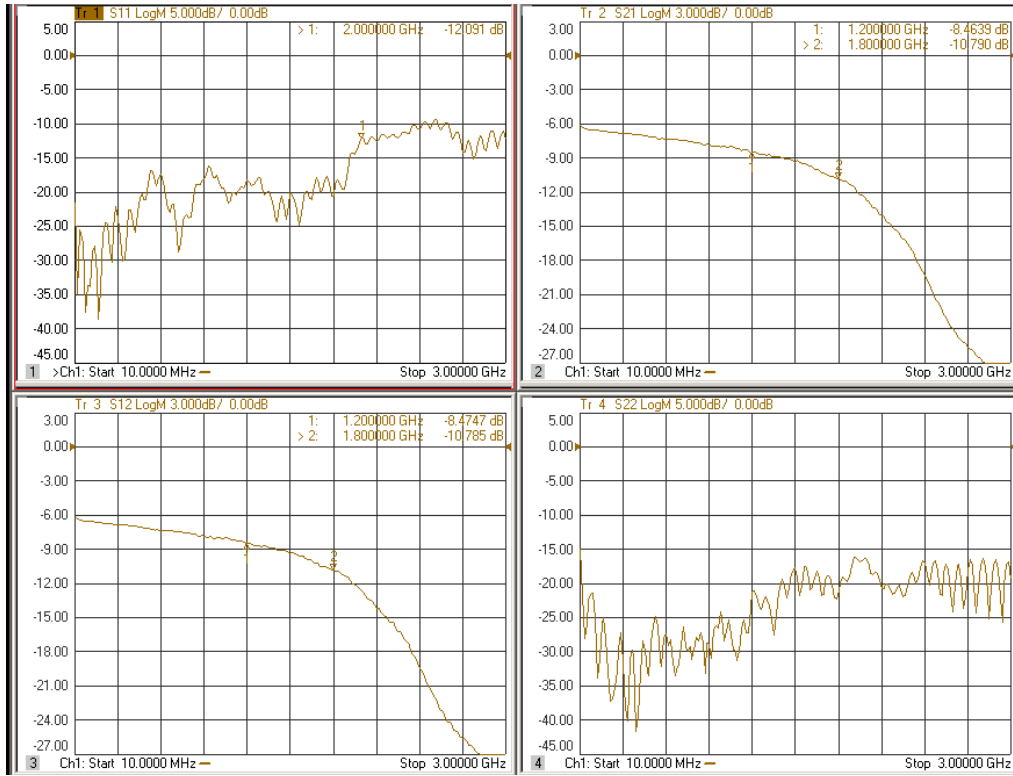Figure 97: Scattering matrix for channel 2G, polarization x and output 3dB1.

Figure 98: Scattering matrix for channel 2G, polarization x and output 6dB2.
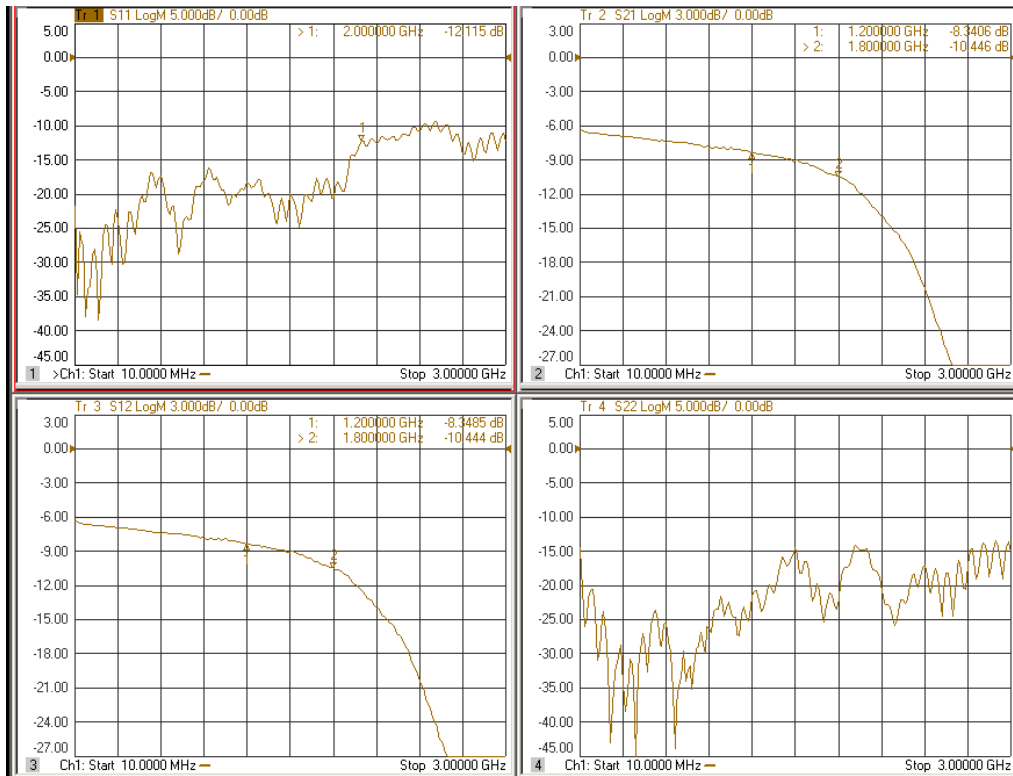

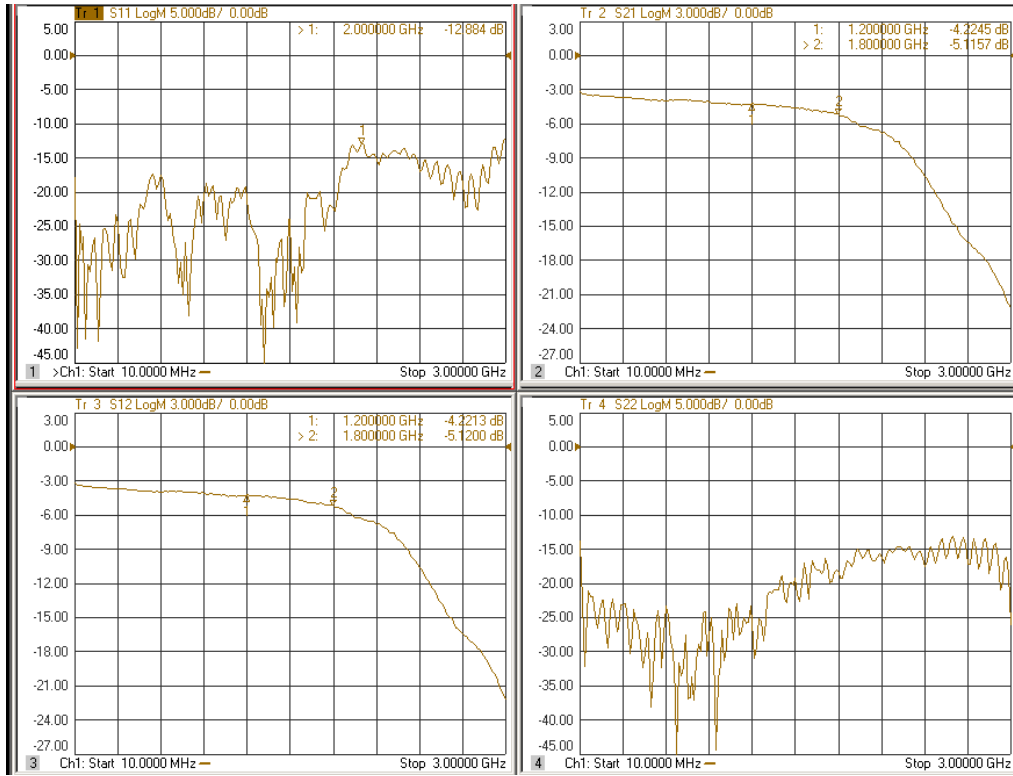Figure 99: Scattering matrix for channel 2G, polarization x and output 6dB3.

Figure 100: Scattering matrix for channel 2G, polarization y and output 3dB1.
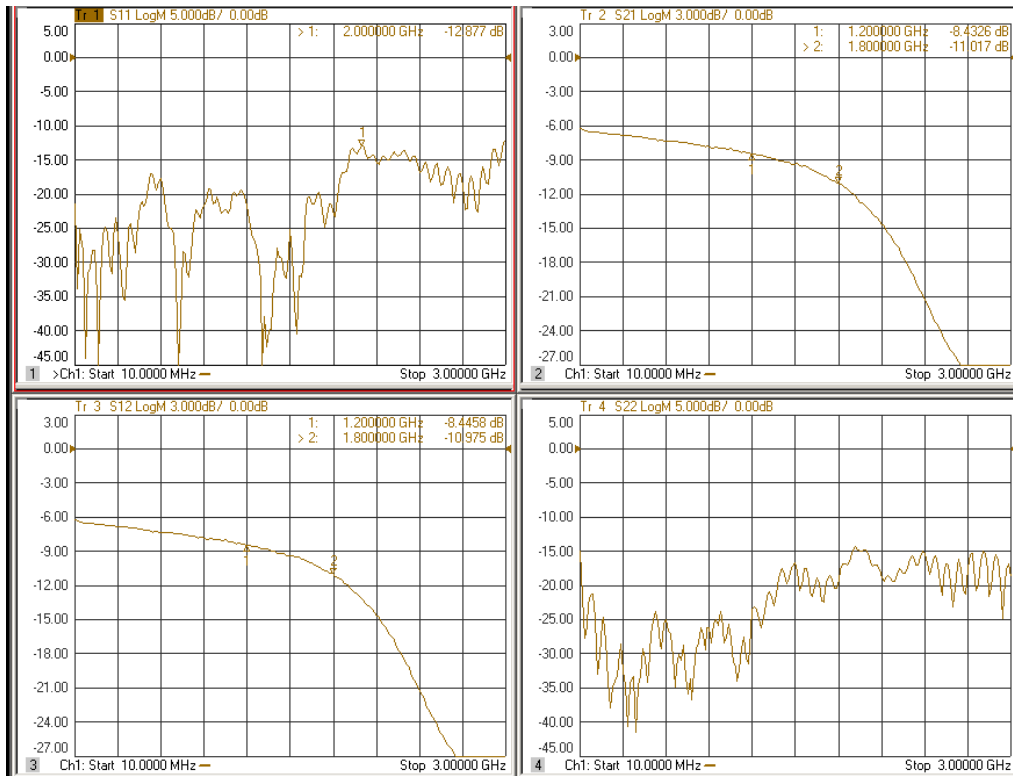

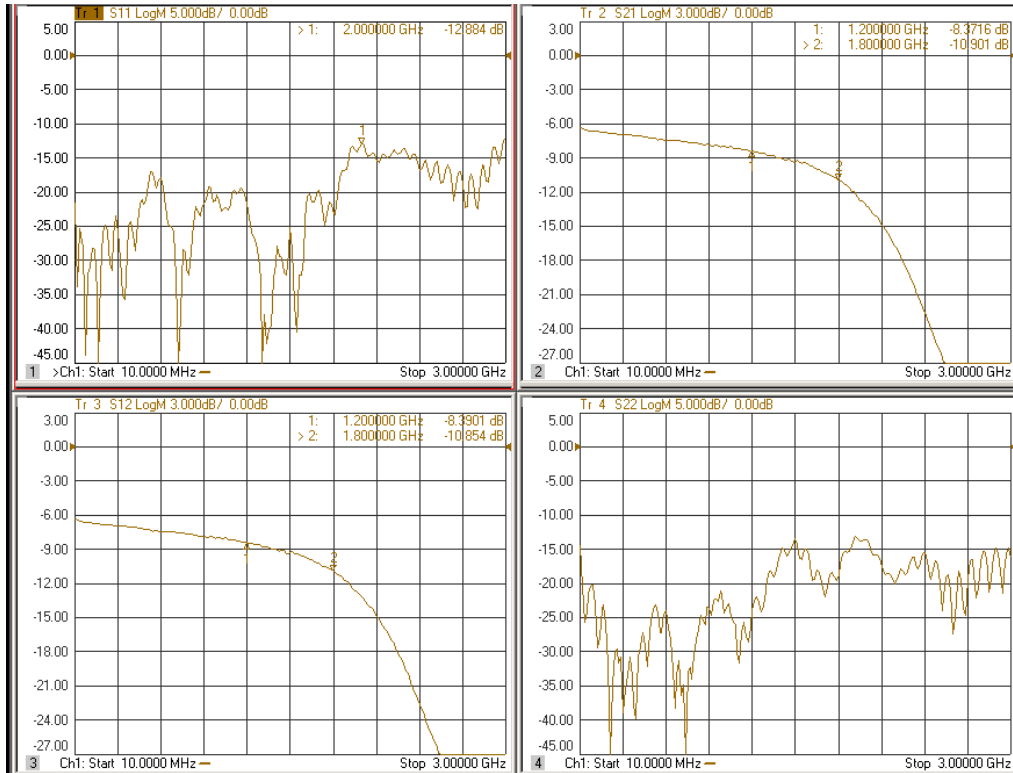Figure 101: Scattering matrix for channel 2G, polarization y and output 6dB2.

Figure 102: Scattering matrix for channel 2G, polarization y and output 6dB3.
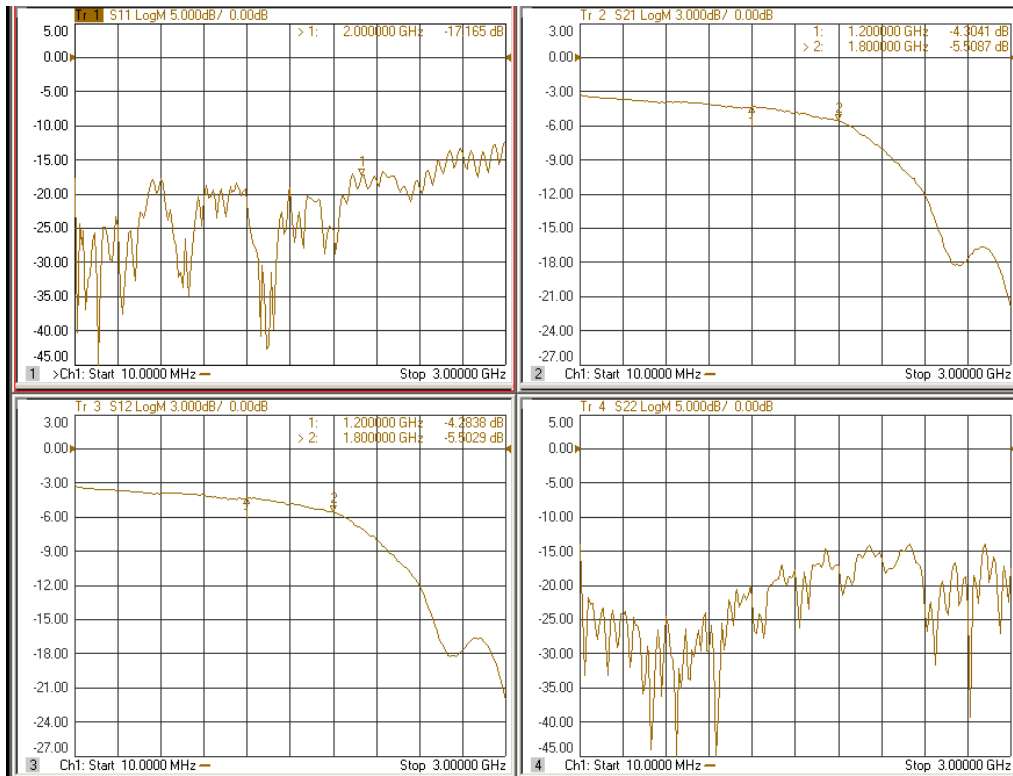

Figure 103: Scattering matrix for channel 2H, polarization x and output 3dB1.
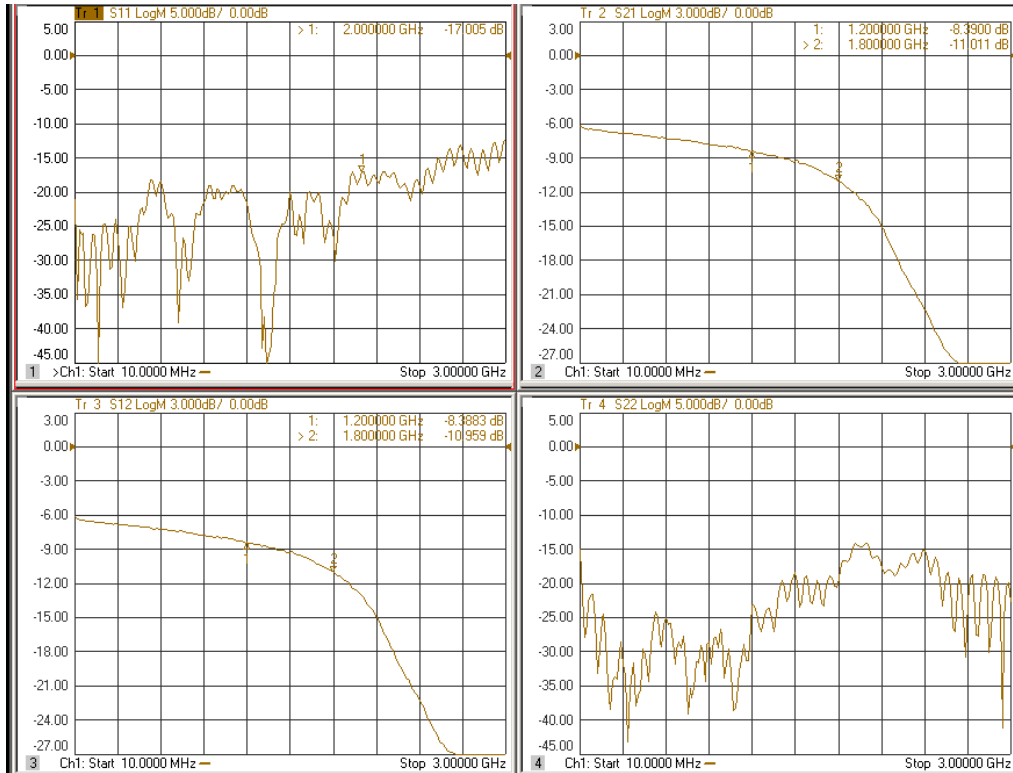
Figure 104: Scattering matrix for channel 2H, polarization x and output 6dB2.
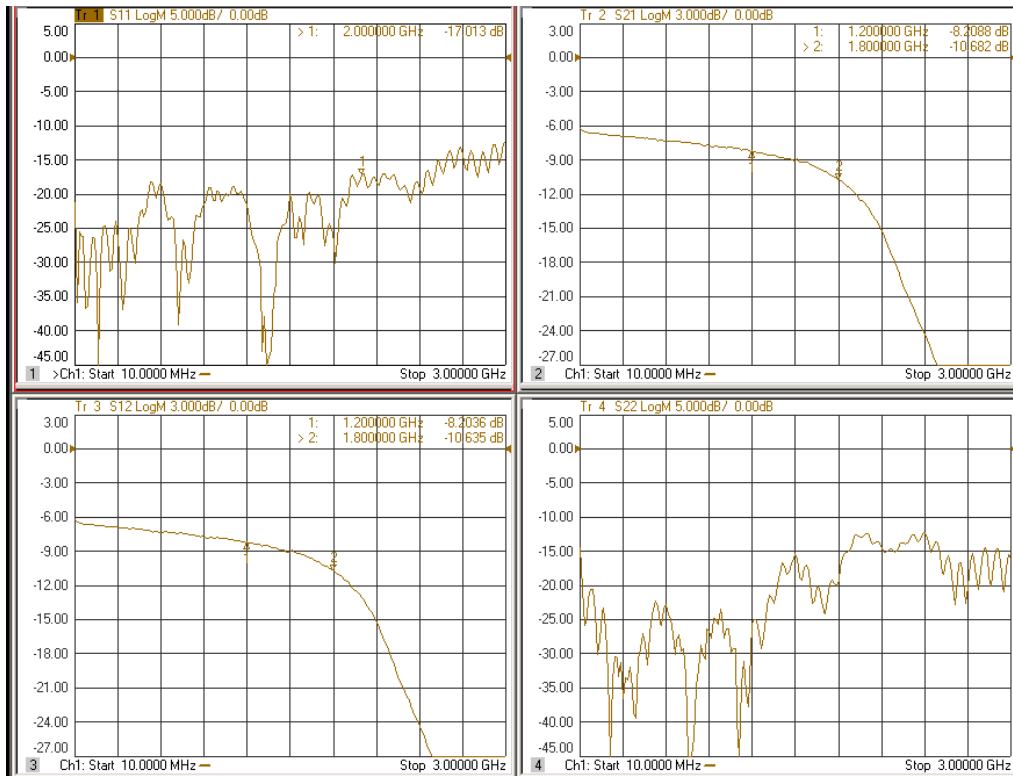

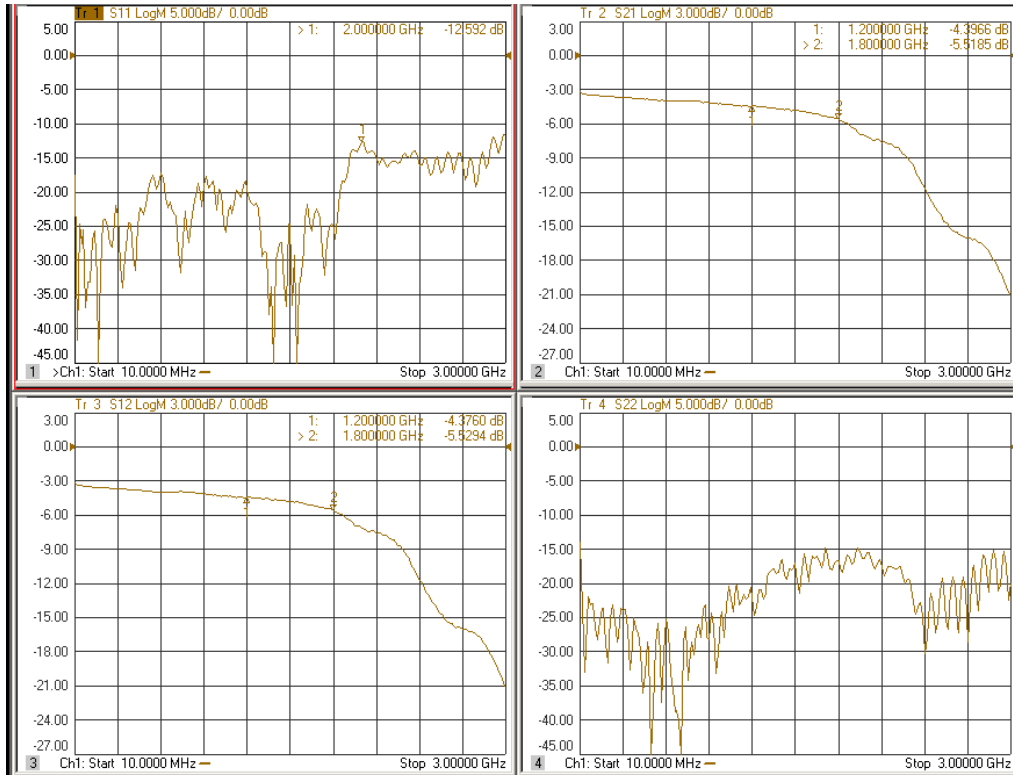Figure 105: Scattering matrix for channel 2H, polarization x and output 6dB3.

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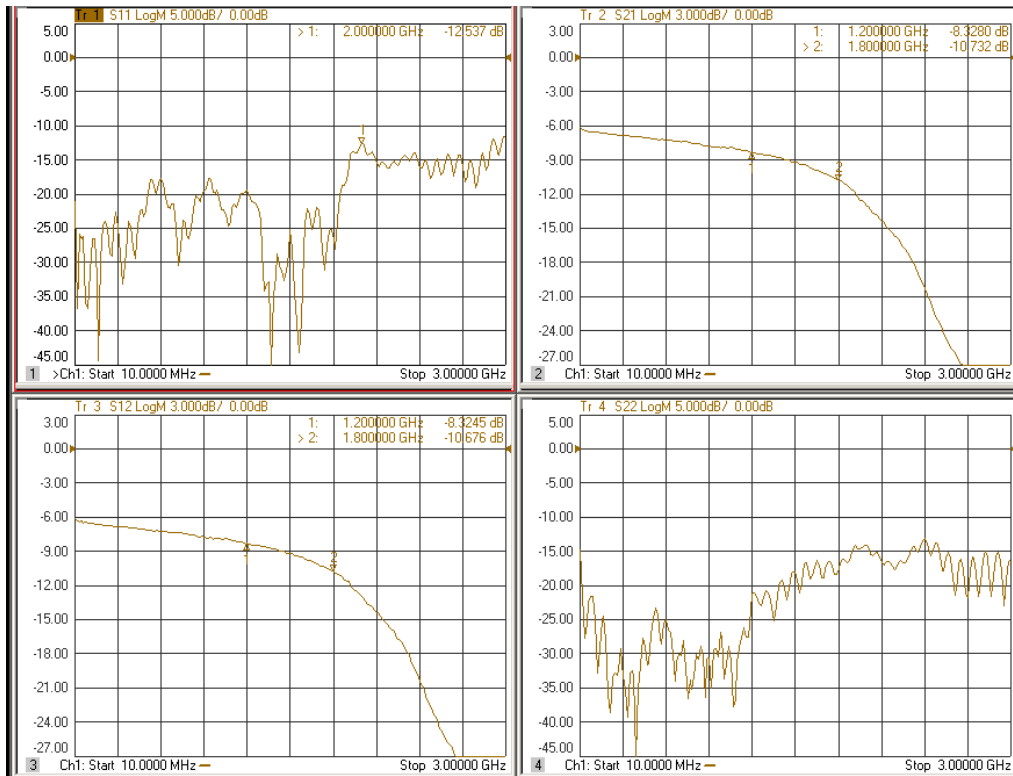Figure 106: Scattering matrix for channel 2H, polarization y and output 3dB1.

Figure 107: Scattering matrix for channel 2H, polarization y and output 6dB2.
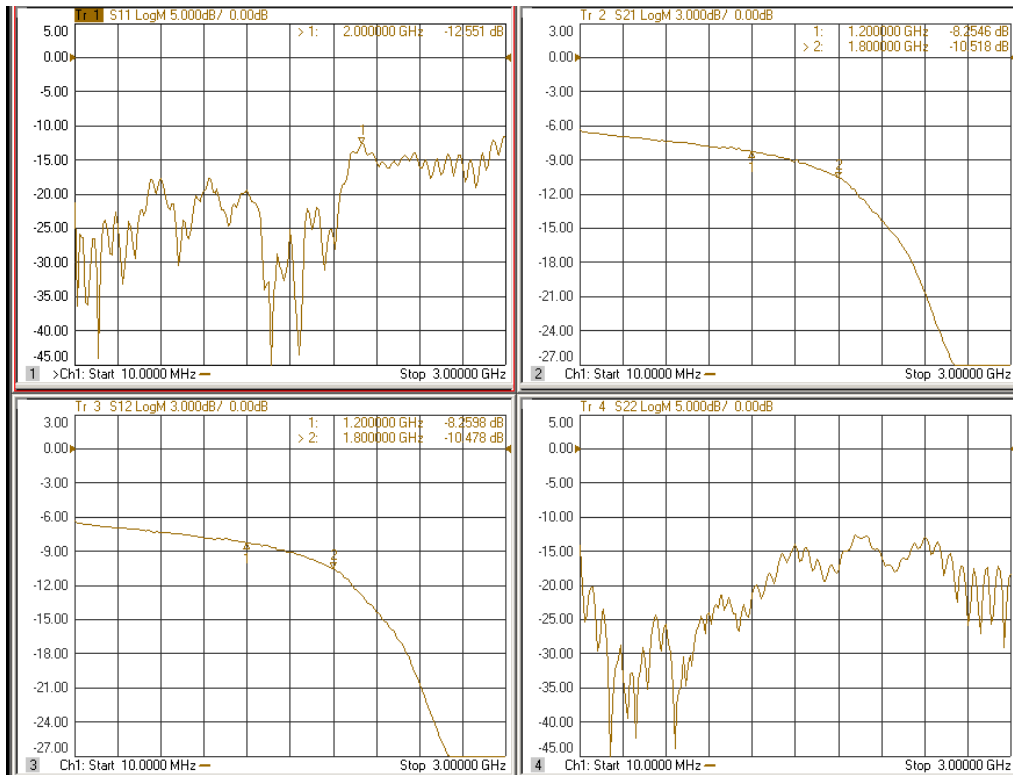
Figure 108: Scattering matrix for channel 2H, polarization y and output 6dB3.
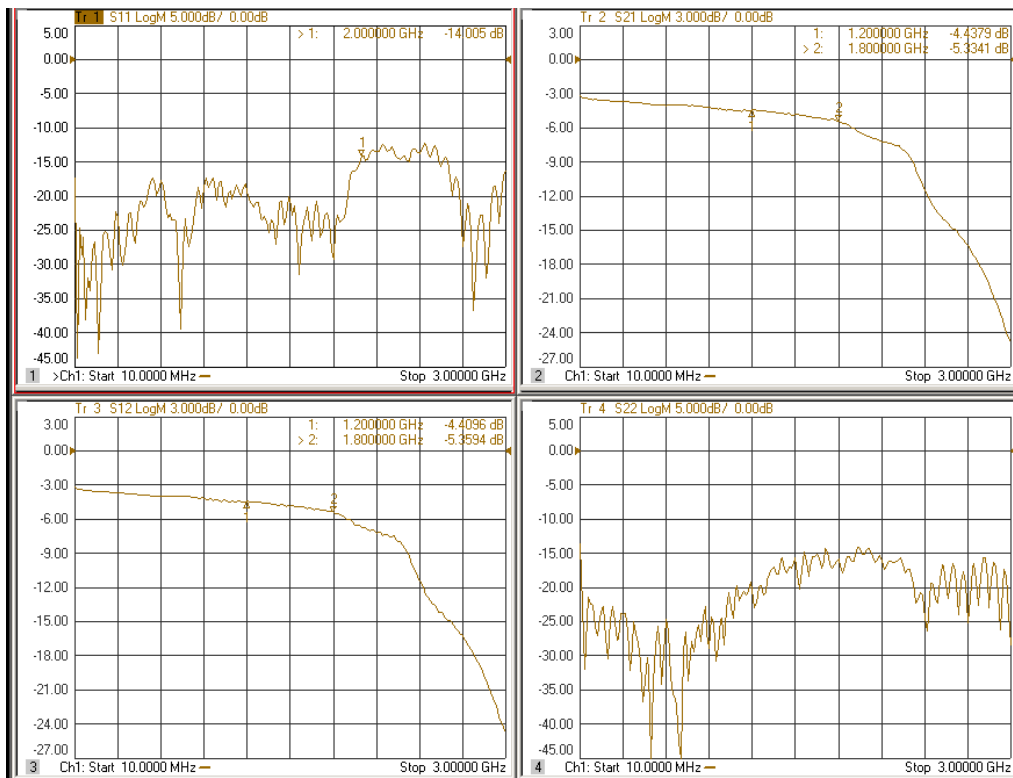

Figure 109: Scattering matrix for channel 2J, polarization x and output 3dB1.
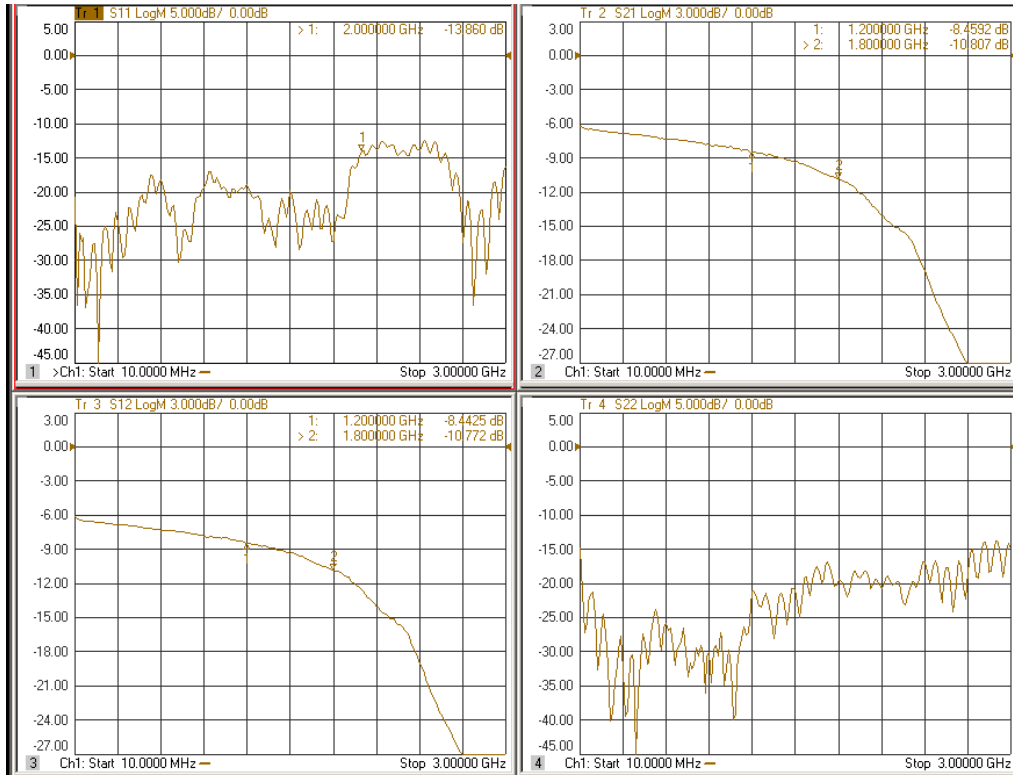
Figure 110: Scattering matrix for channel 2J, polarization x and output 6dB2.
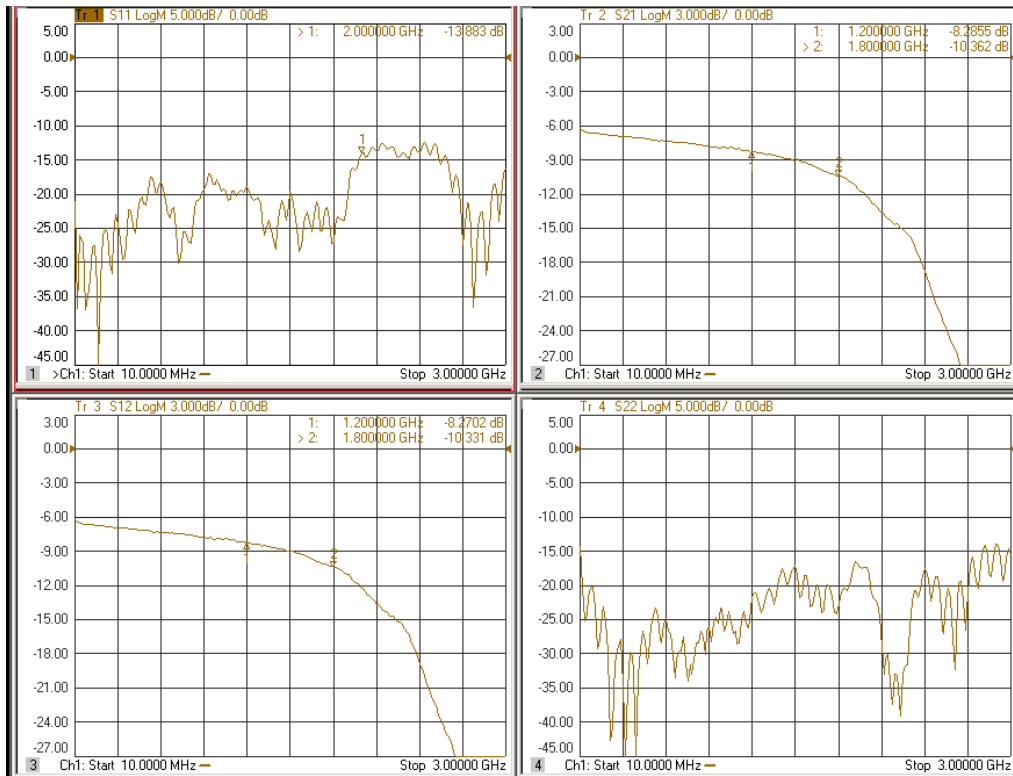

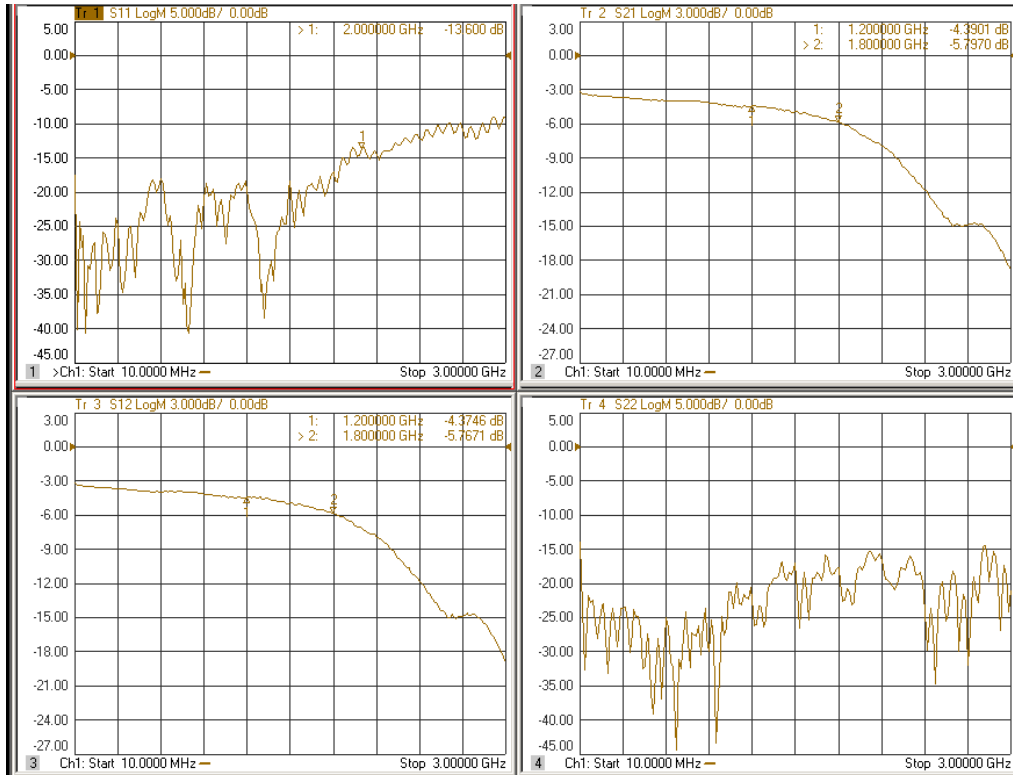Figure 111: Scattering matrix for channel 2J, polarization x and output 6dB3.

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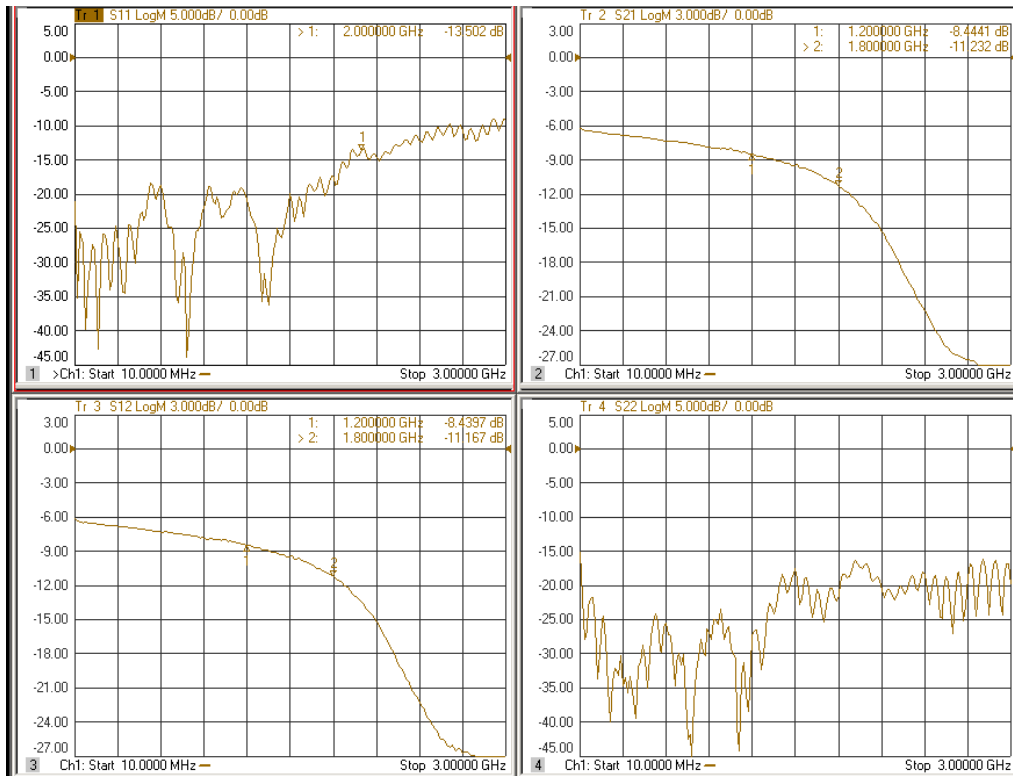Figure 112: Scattering matrix for channel 2J, polarization y and output 3dB1.

Figure 113: Scattering matrix for channel 2J, polarization y and output 6dB2.
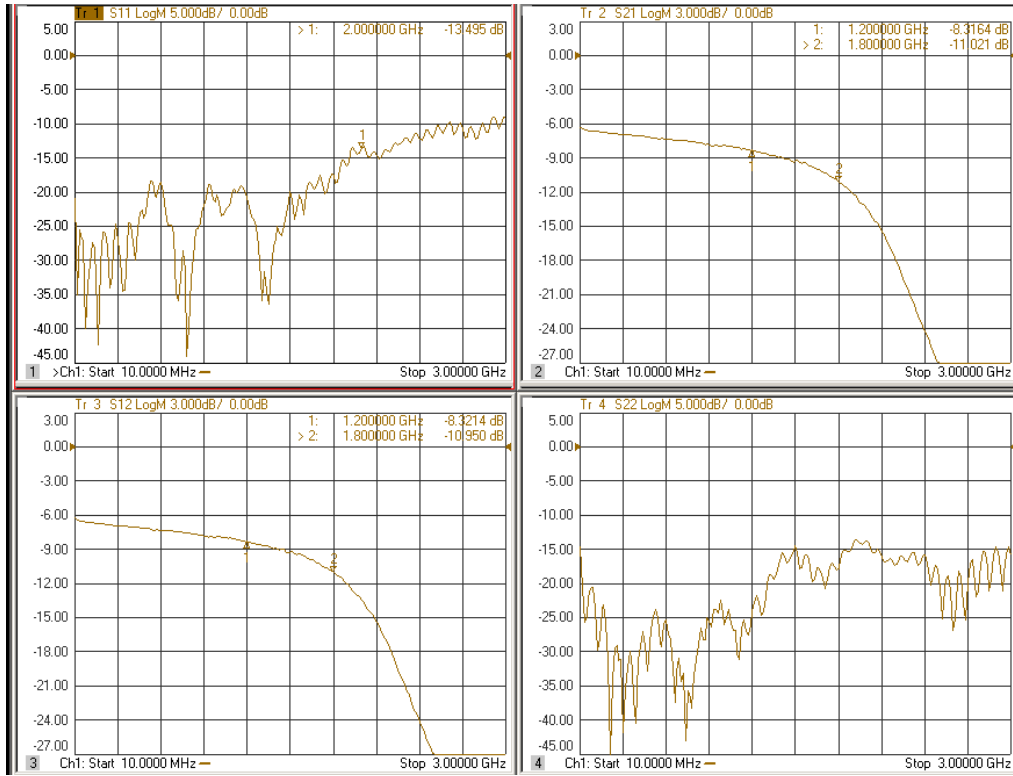
Figure 114: Scattering matrix for channel 2J, polarization y and output 6dB3.
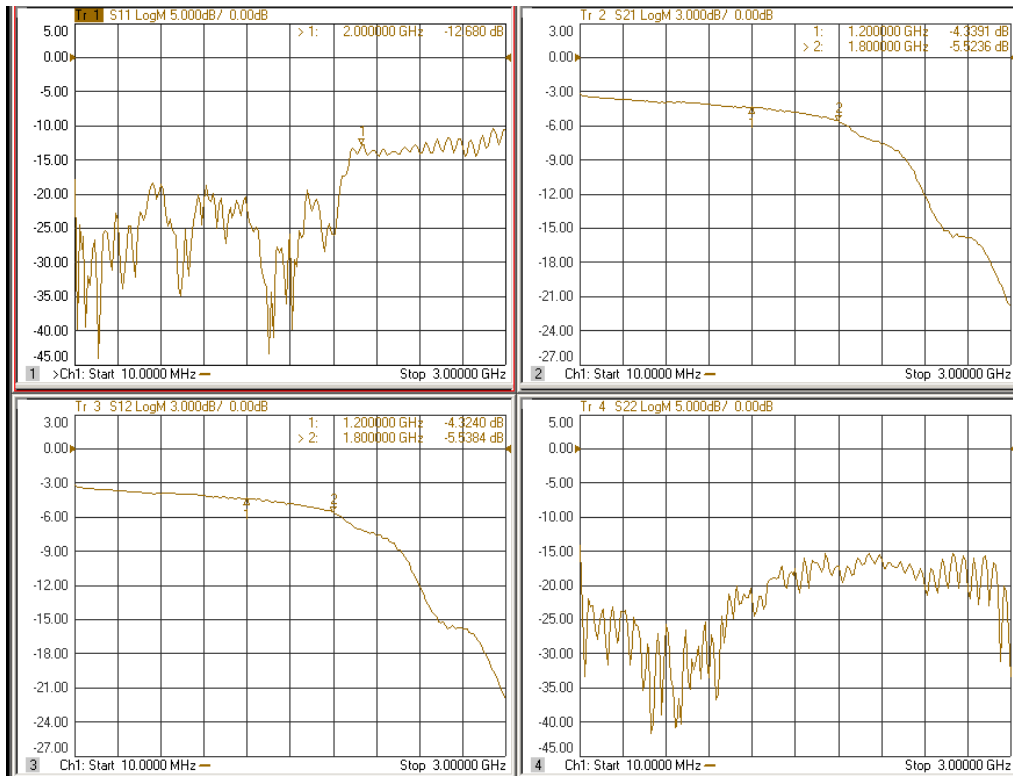

Figure 115: Scattering matrix for channel 2K, polarization x and output 3dB1.
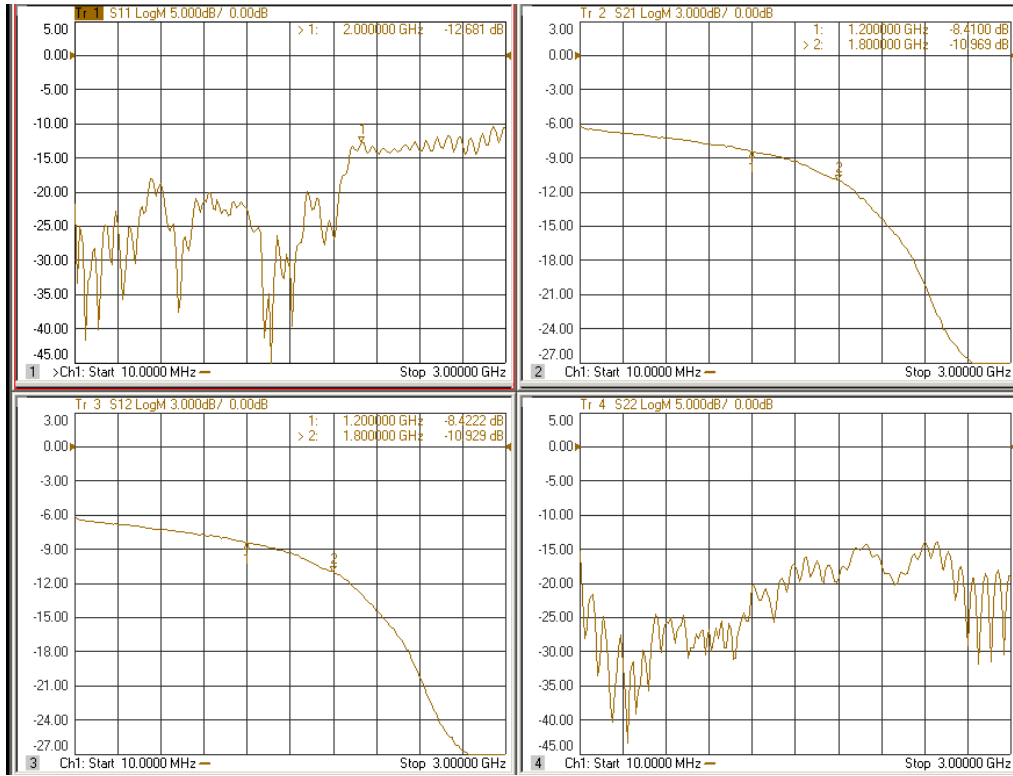
Figure 116: Scattering matrix for channel 2K, polarization x and output 6dB2.
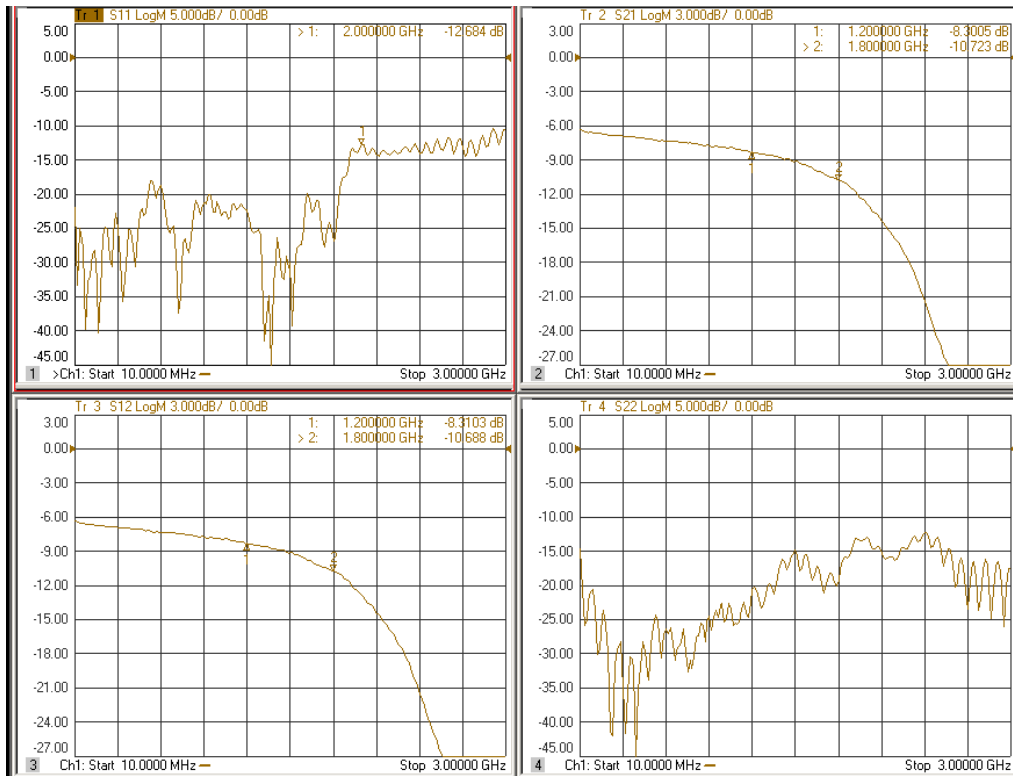

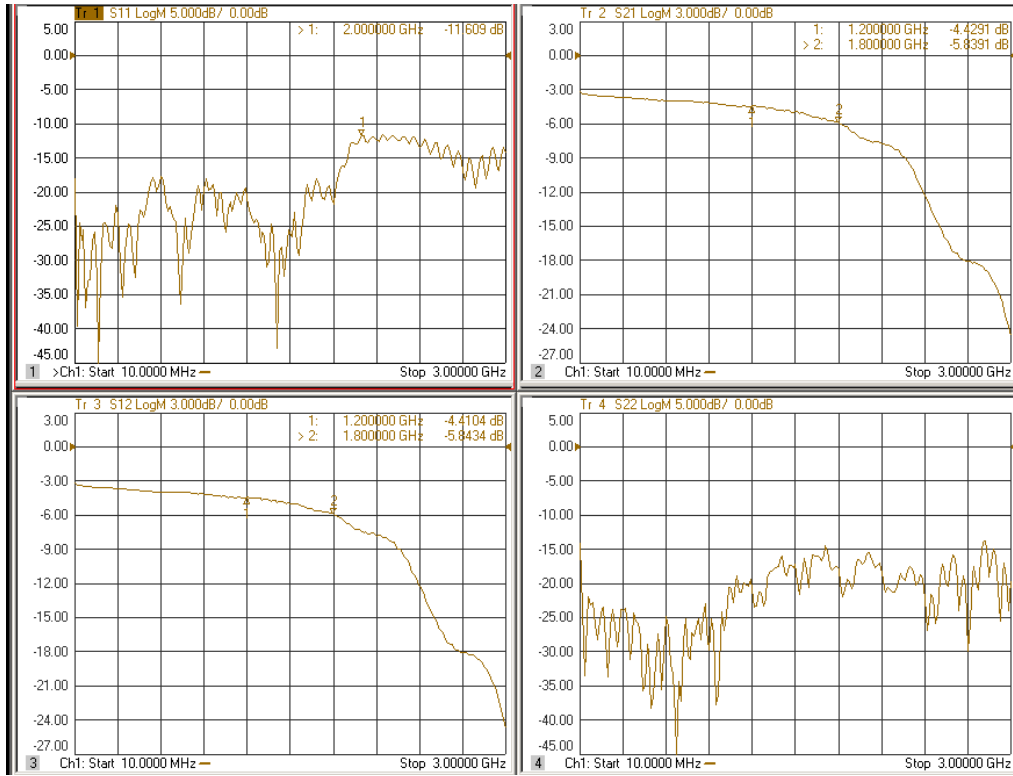Figure 117: Scattering matrix for channel 2K, polarization x and output 6dB3.

Figure 118: Scattering matrix for channel 2K, polarization y and output 3dB1.
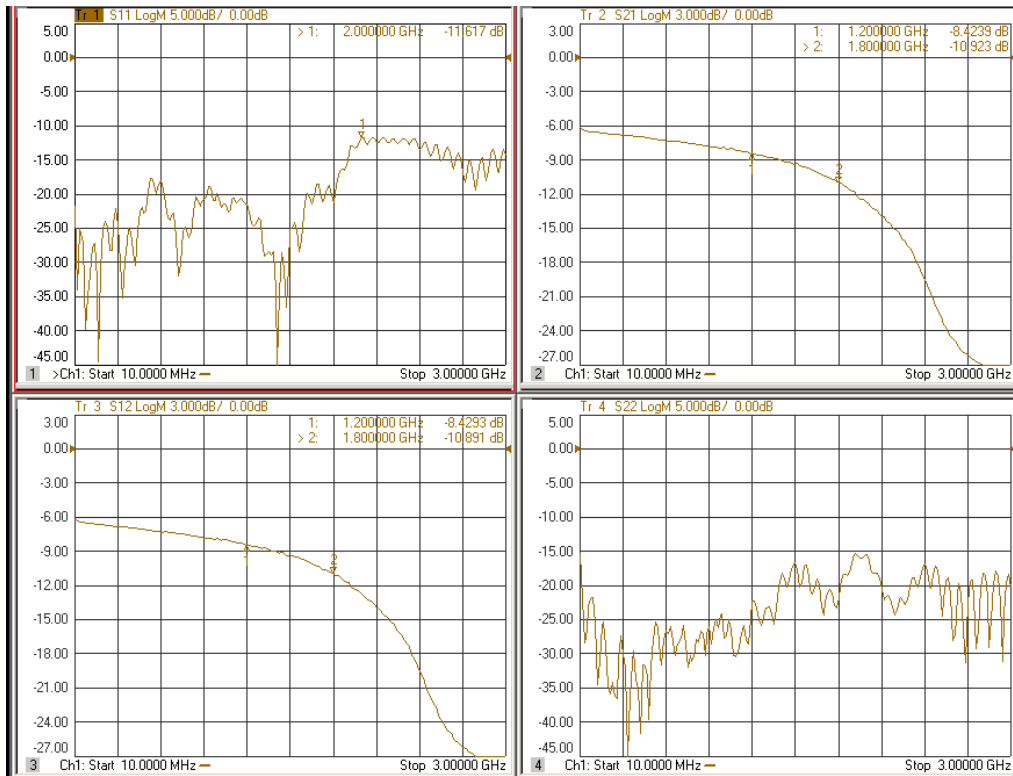

Figure 119: Scattering matrix for channel 2K, polarization y and output 6dB2.
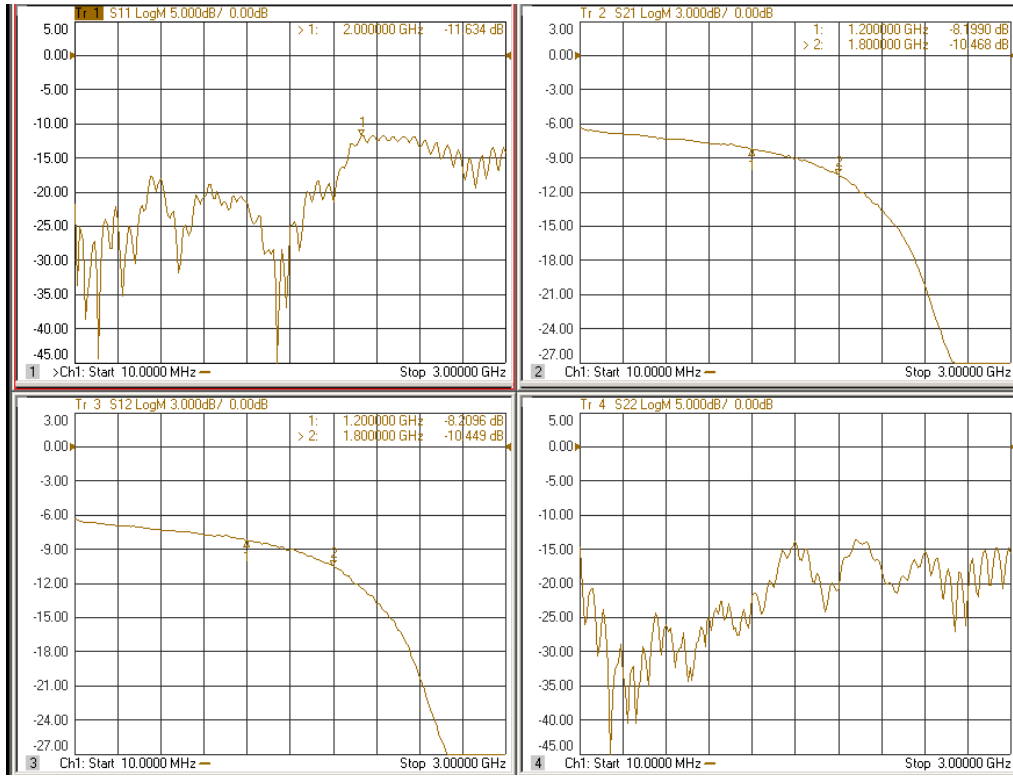
Figure 120: Scattering matrix for channel 2K, polarization y and output 6dB3.
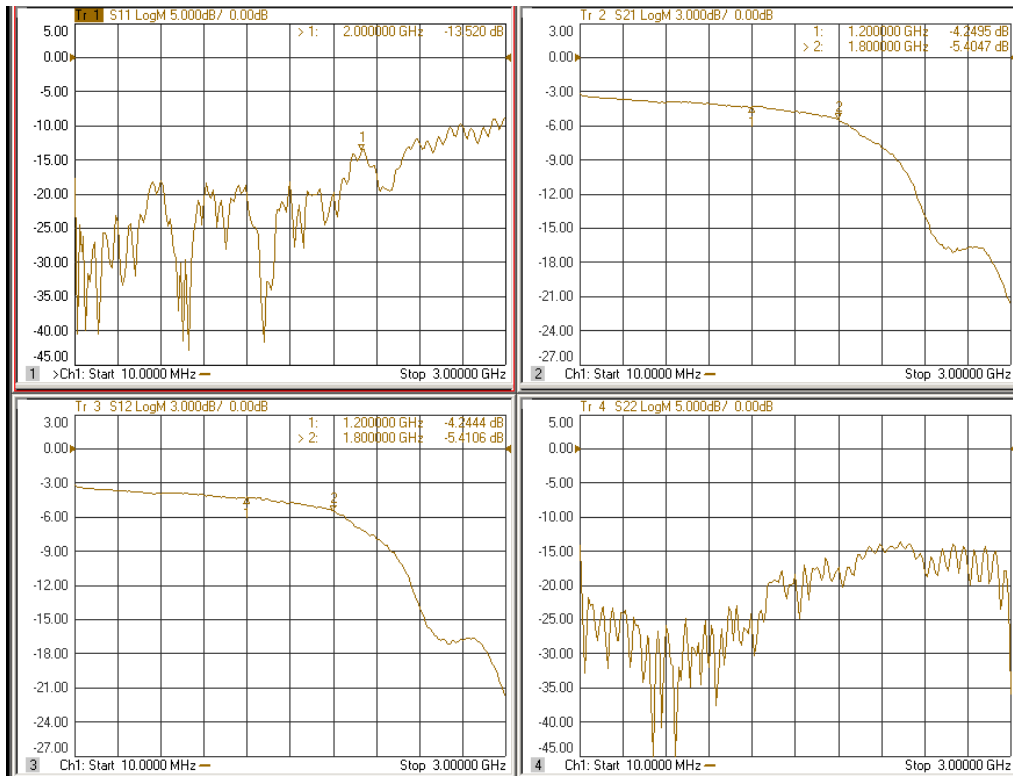

Figure 121: Scattering matrix for channel 2L, polarization x and output 3dB1.
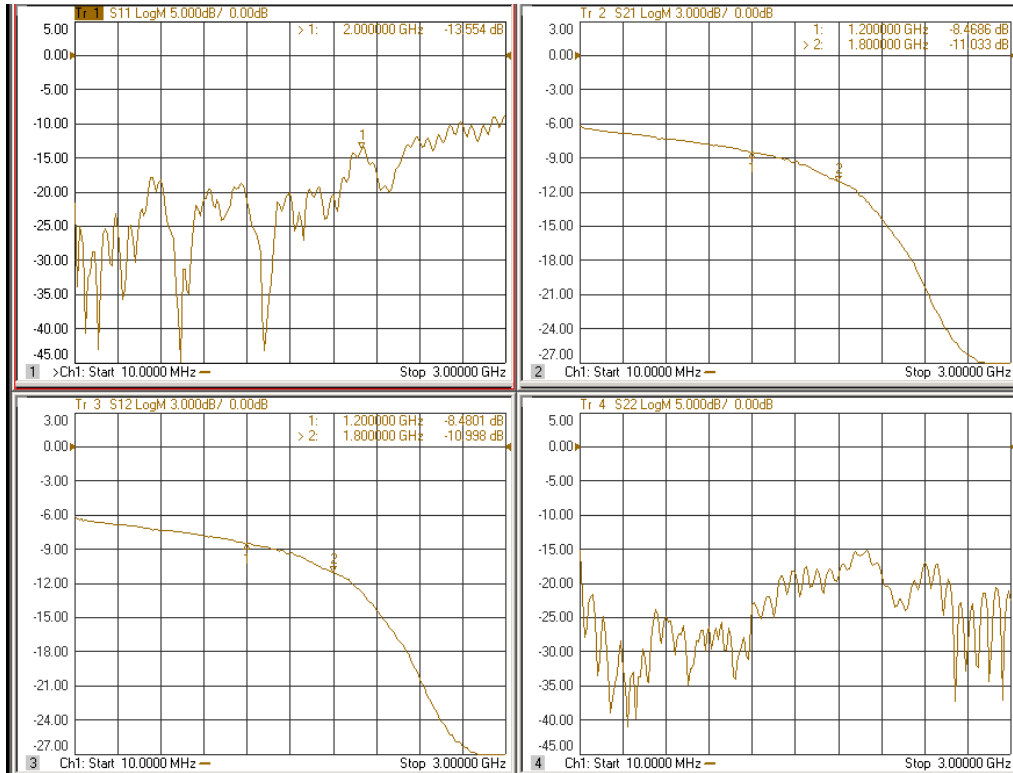
Figure 122: Scattering matrix for channel 2L, polarization x and output 6dB2.
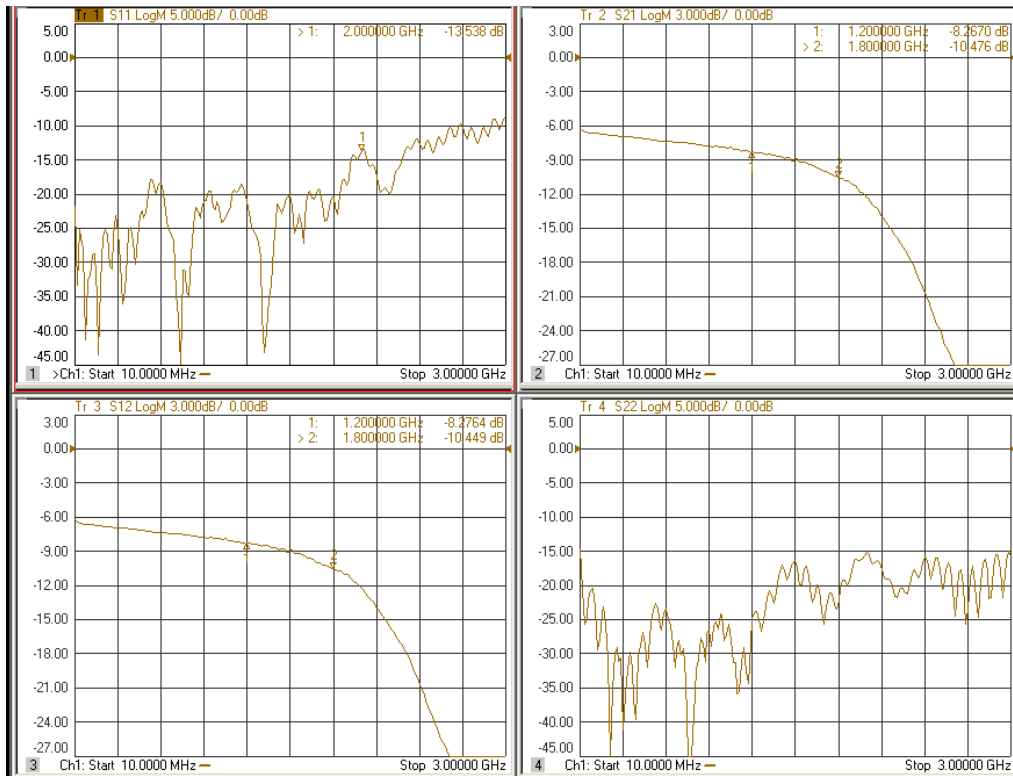

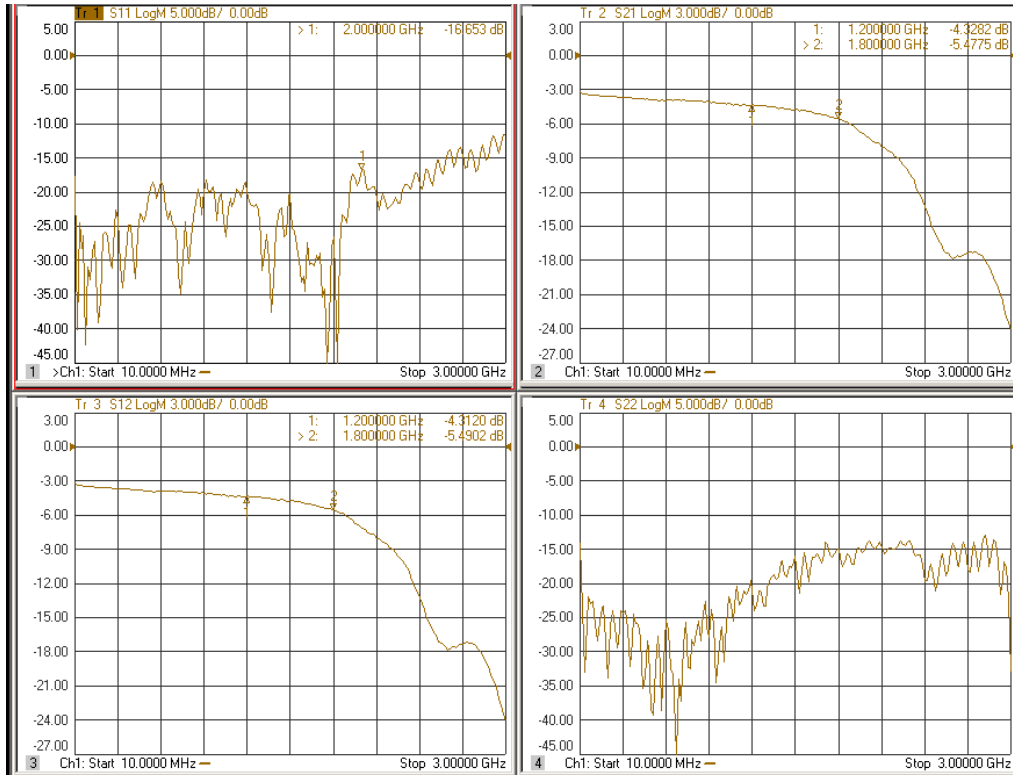Figure 123: Scattering matrix for channel 2L, polarization x and output 6dB3.

Figure 124: Scattering matrix for channel 2L, polarization y and output 3dB1.
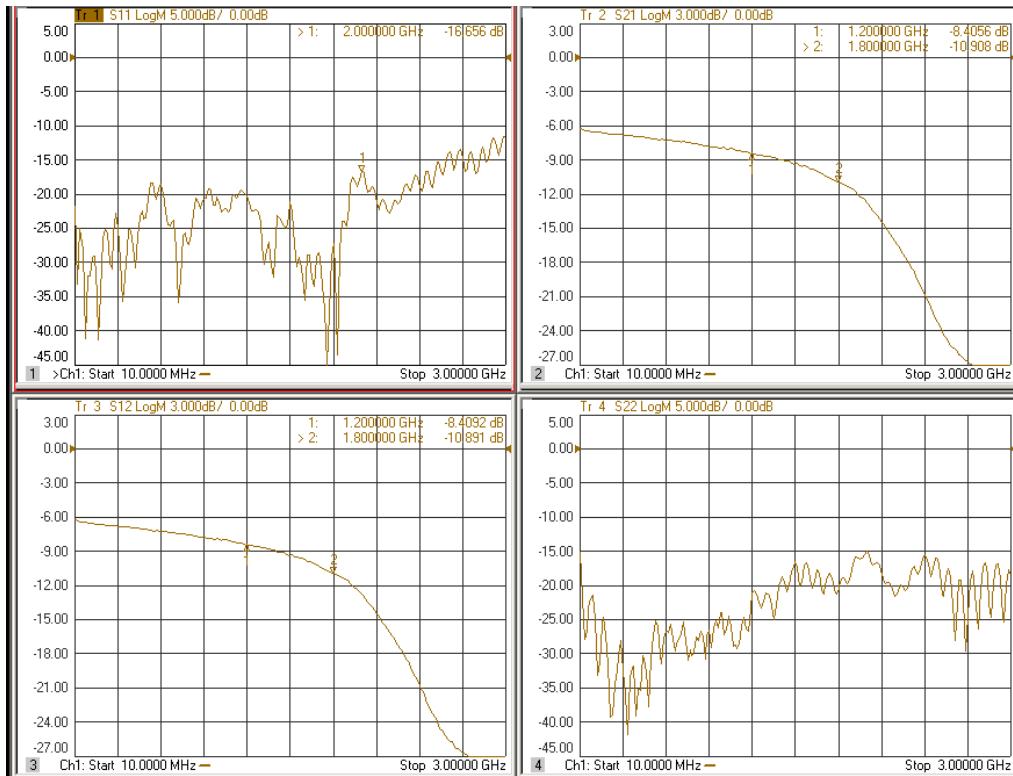

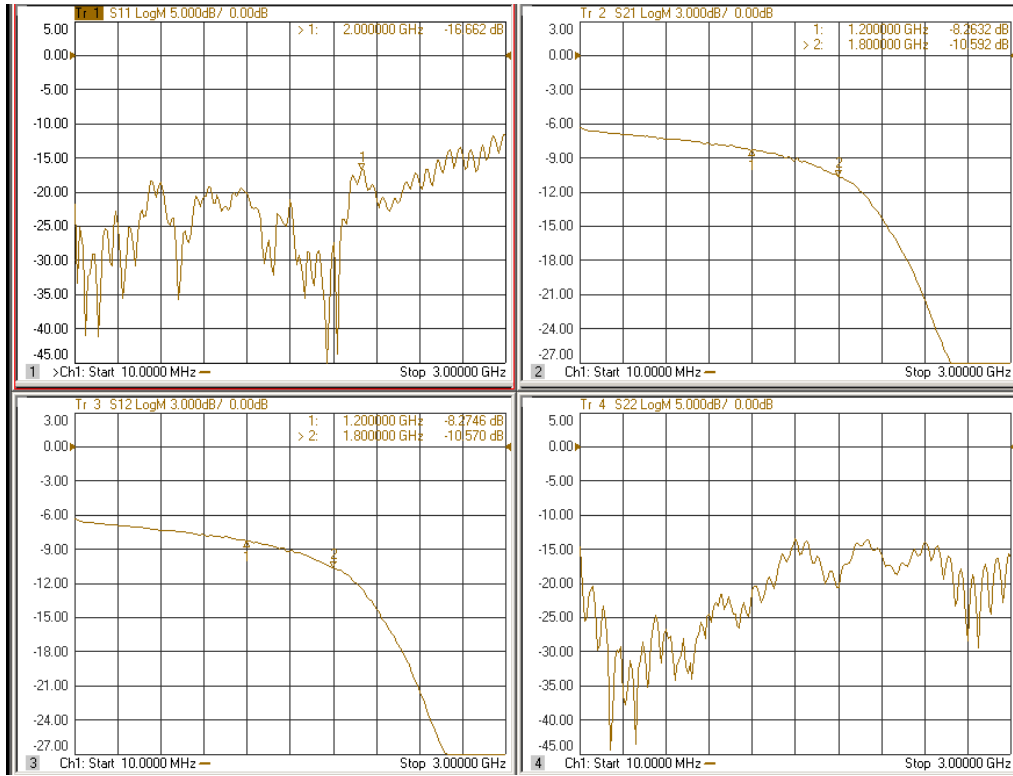Figure 125: Scattering matrix for channel 2L, polarization y and output 6dB2.

Figure 126: Scattering matrix for channel 2L, polarization y and output 6dB3.
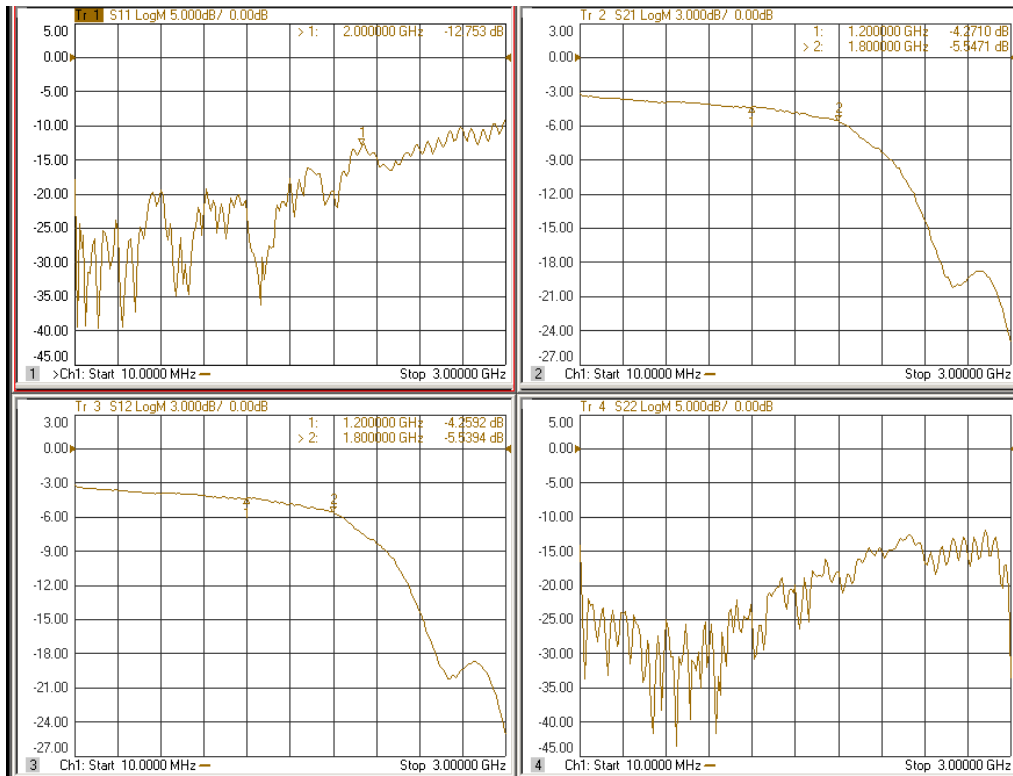

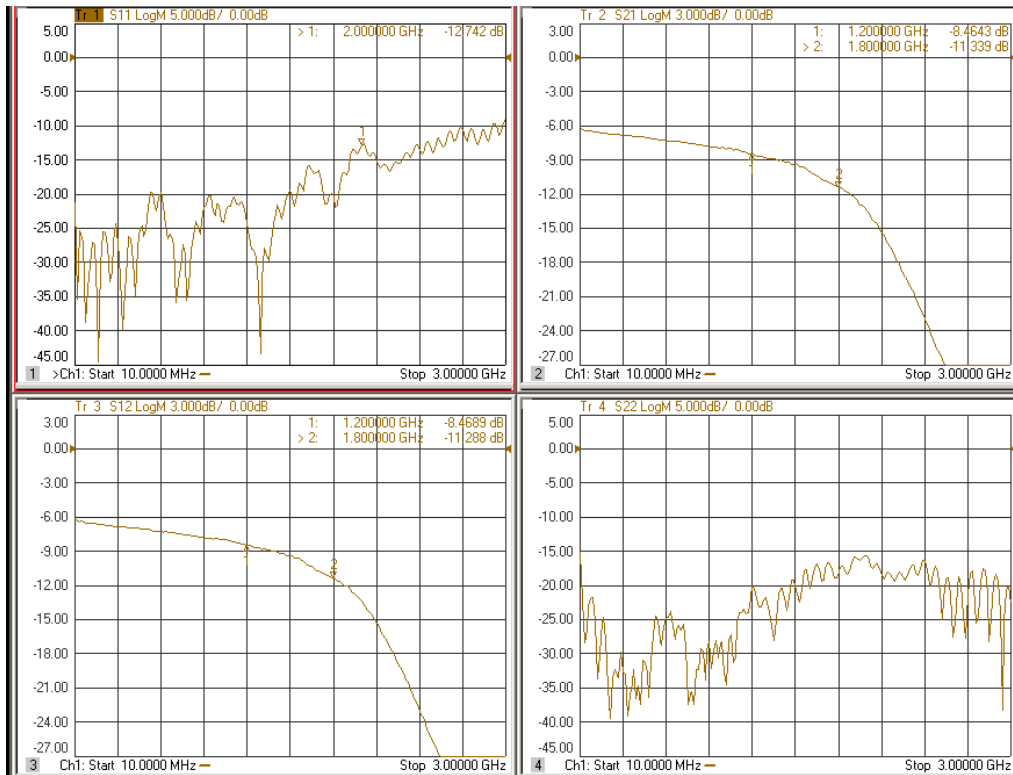Figure 127: Scattering matrix for channel 2M, polarization x and output 3dB1.

Figure 128: Scattering matrix for channel 2M, polarization x and output 6dB2.
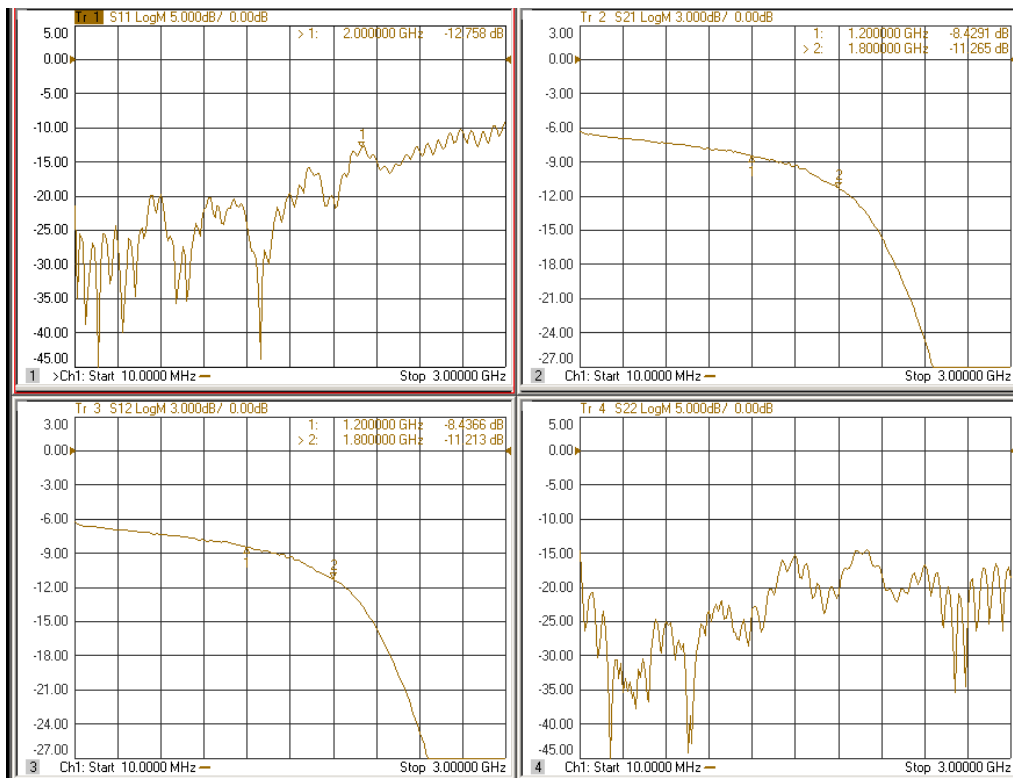

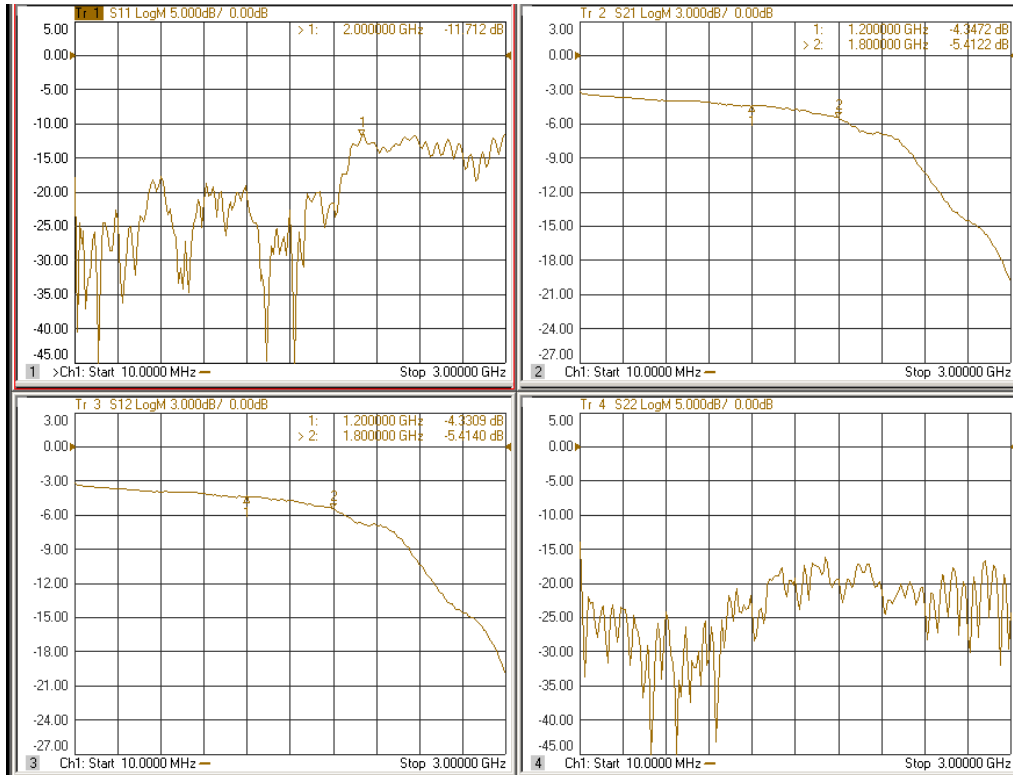Figure 129: Scattering matrix for channel 2M, polarization x and output 6dB3.

Figure 130: Scattering matrix for channel 2M, polarization y and output 3dB1.
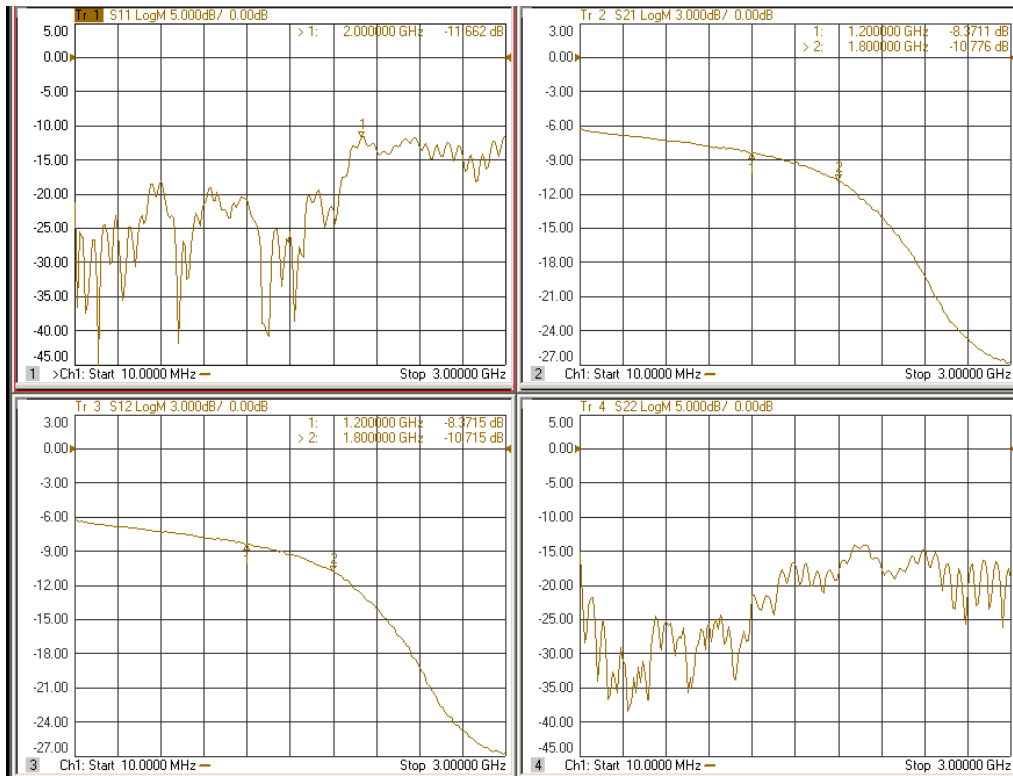

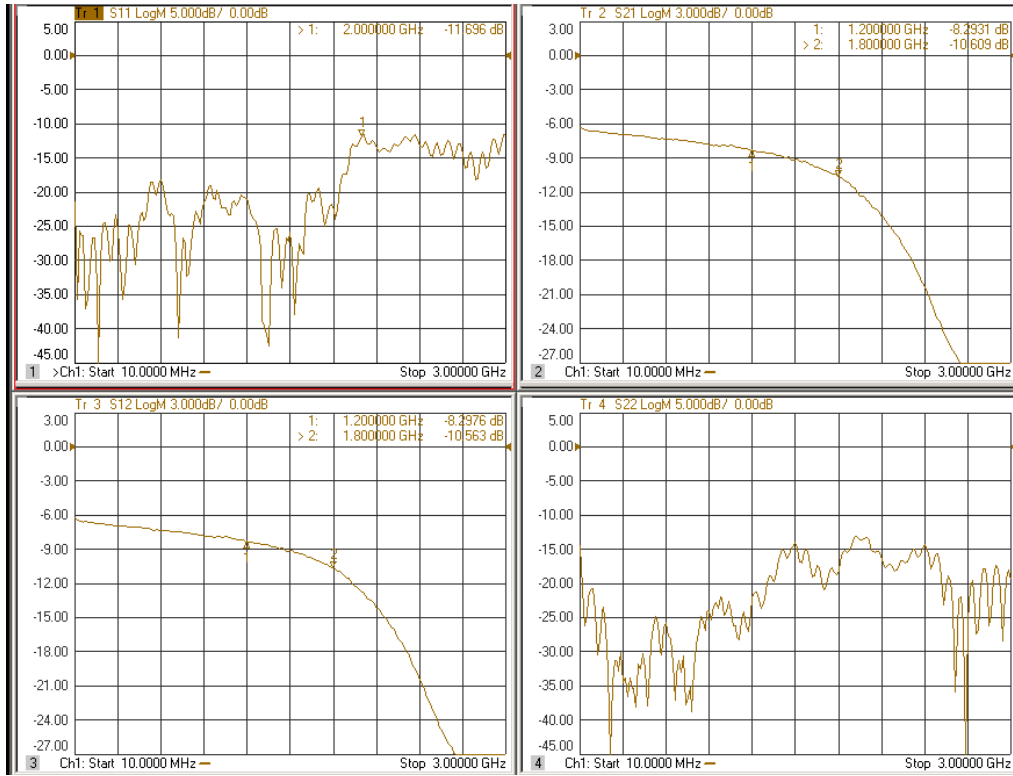Figure 131: Scattering matrix for channel 2M, polarization y and output 6dB2.

Figure 132: Scattering matrix for channel 2M, polarization y and output 6dB3.
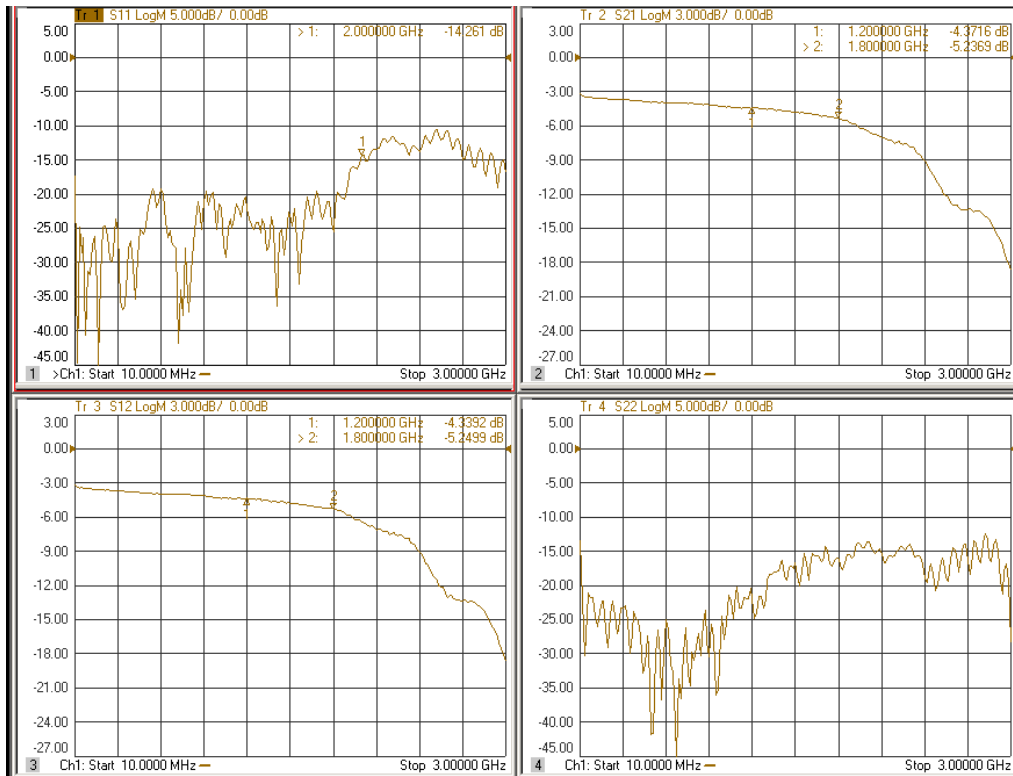

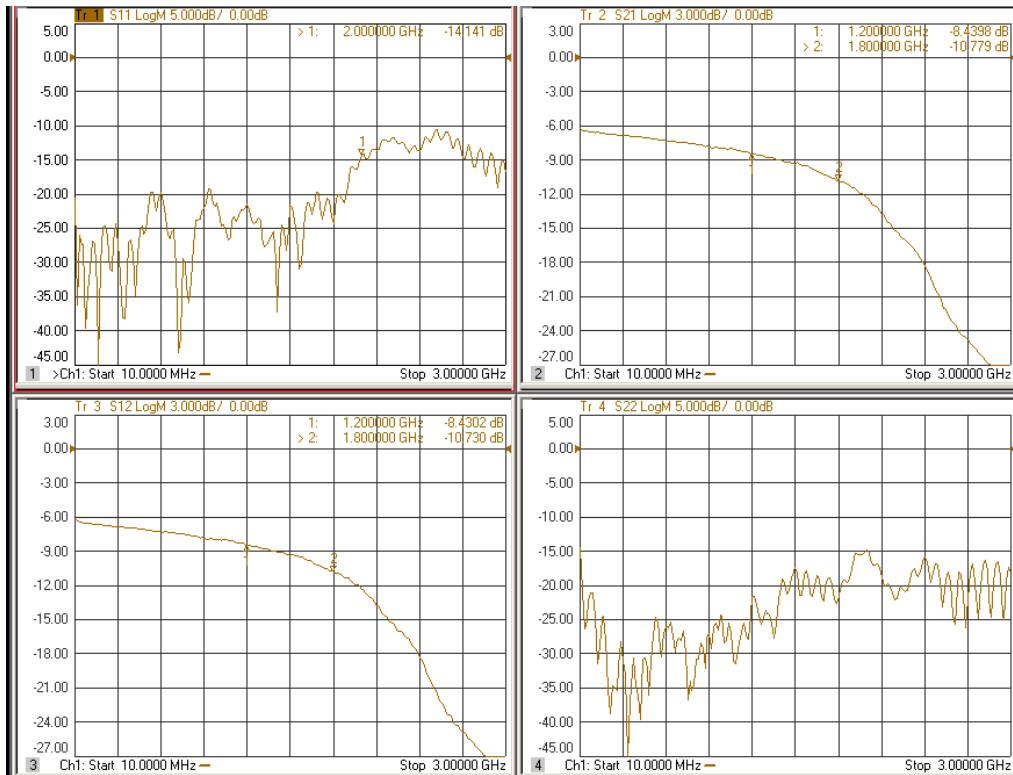Figure 133: Scattering matrix for channel Ia, polarization x and output 3dB1.

Figure 134: Scattering matrix for channel Ia, polarization x and output 6dB2.
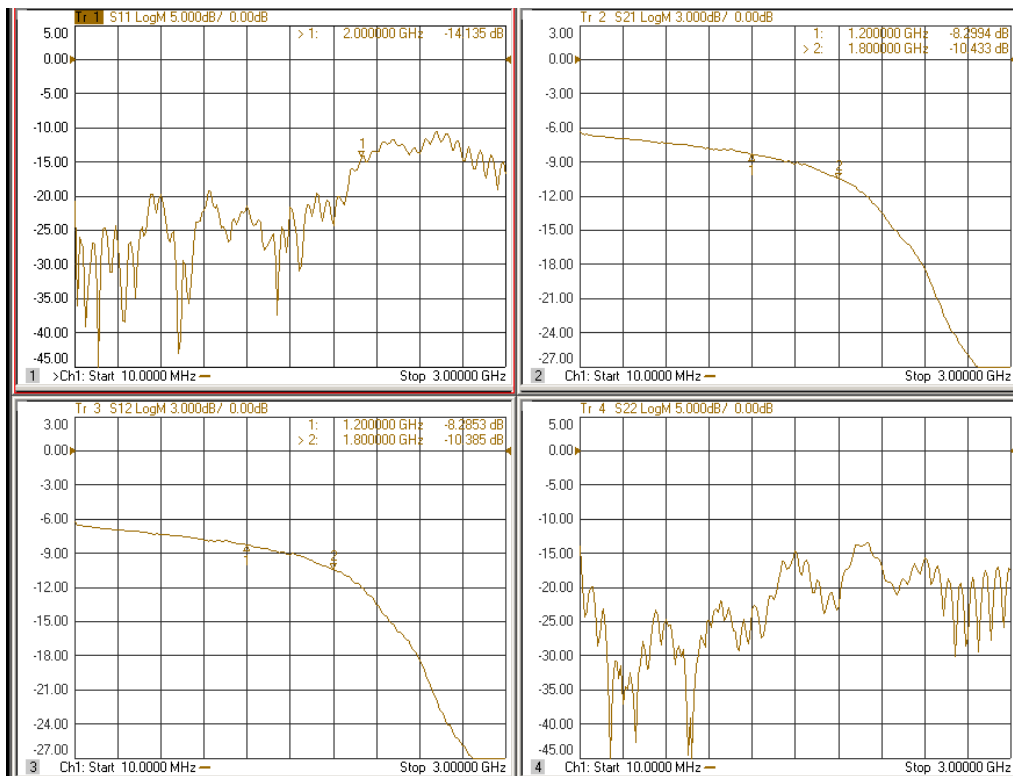

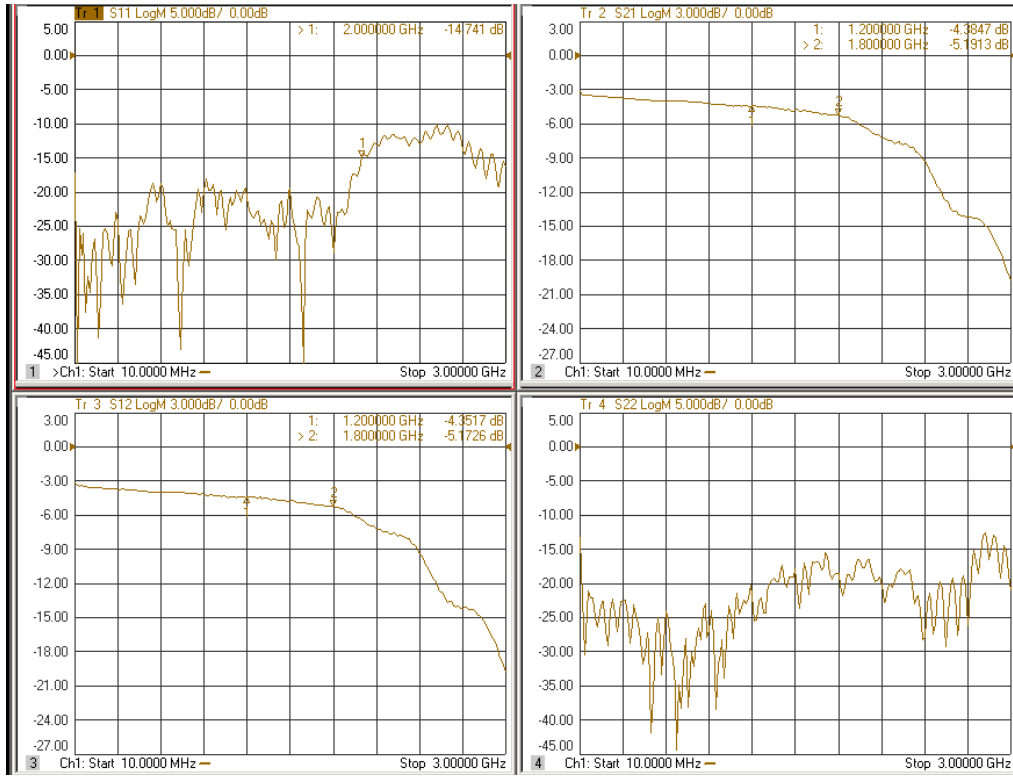Figure 135: Scattering matrix for channel Ia, polarization x and output 6dB3.

Figure 136: Scattering matrix for channel Ia, polarization y and output 3dB1.
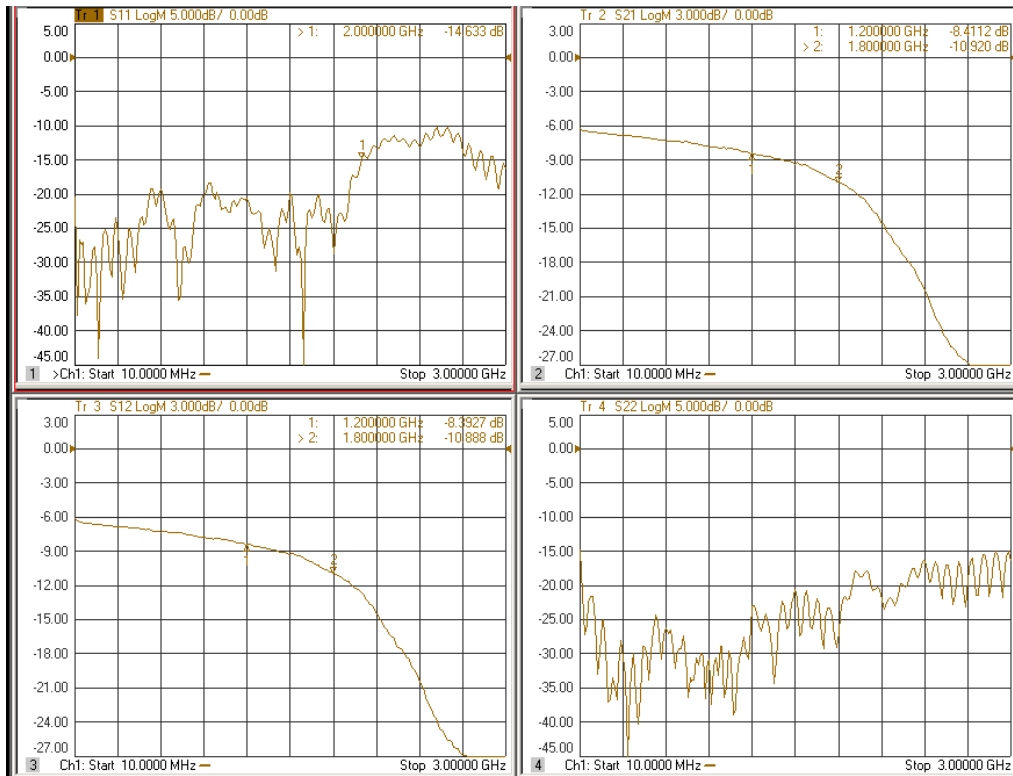

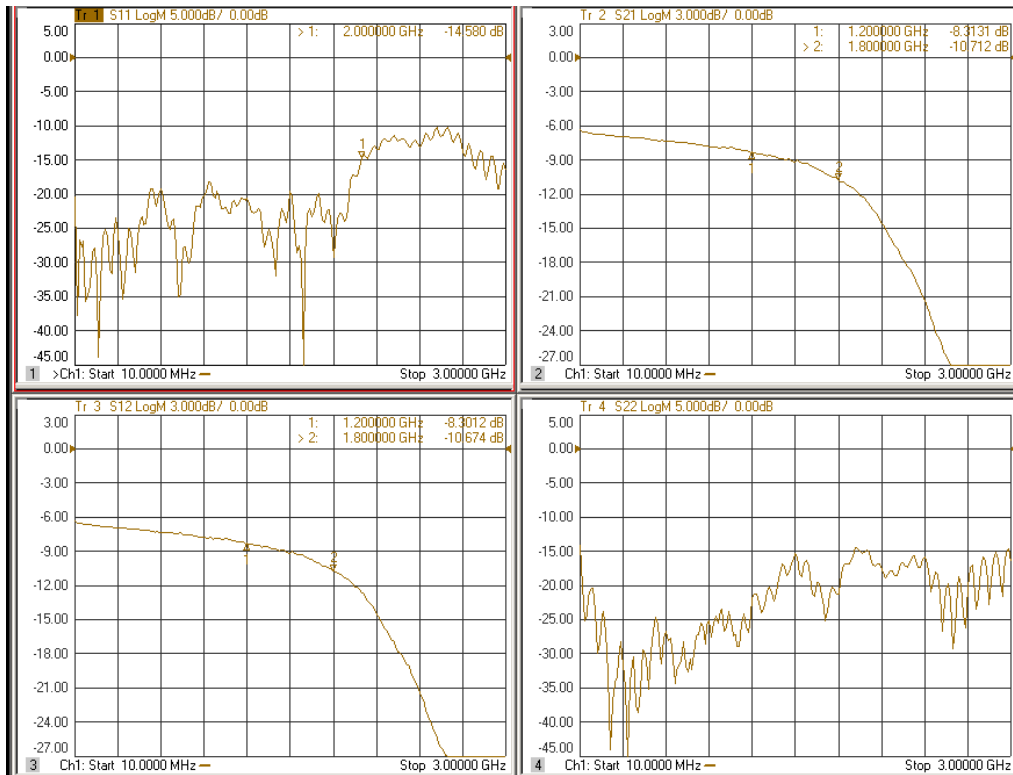Figure 137: Scattering matrix for channel Ia, polarization y and output 6dB2.

Figure 138: Scattering matrix for channel Ia, polarization y and output 6dB3.
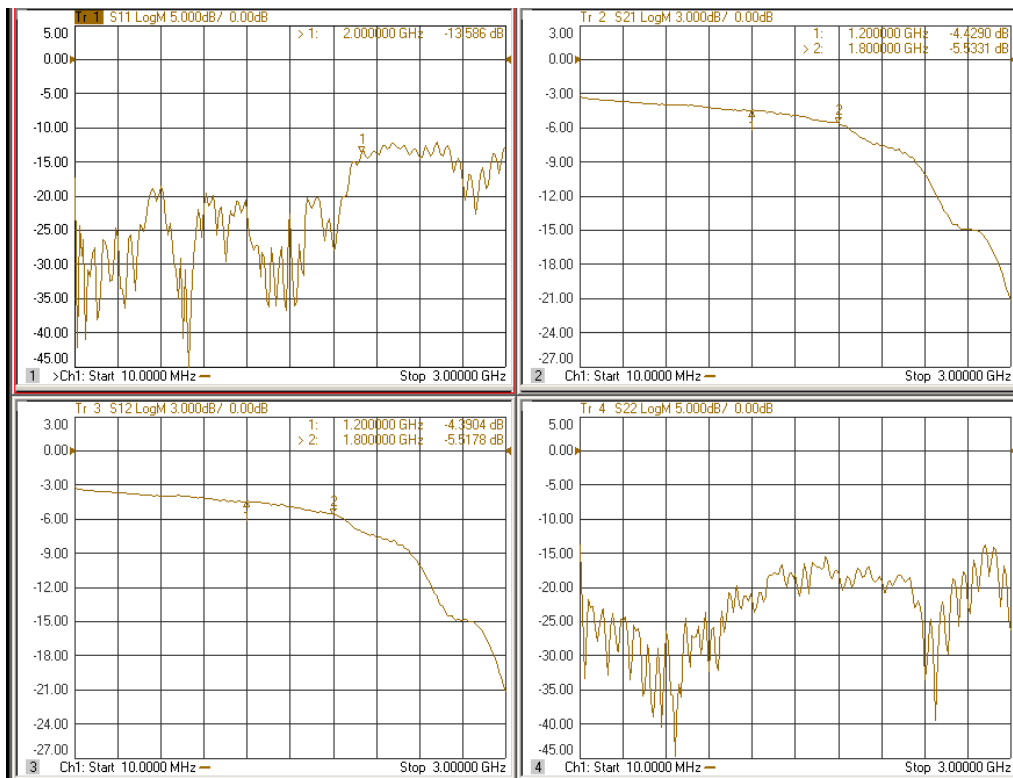

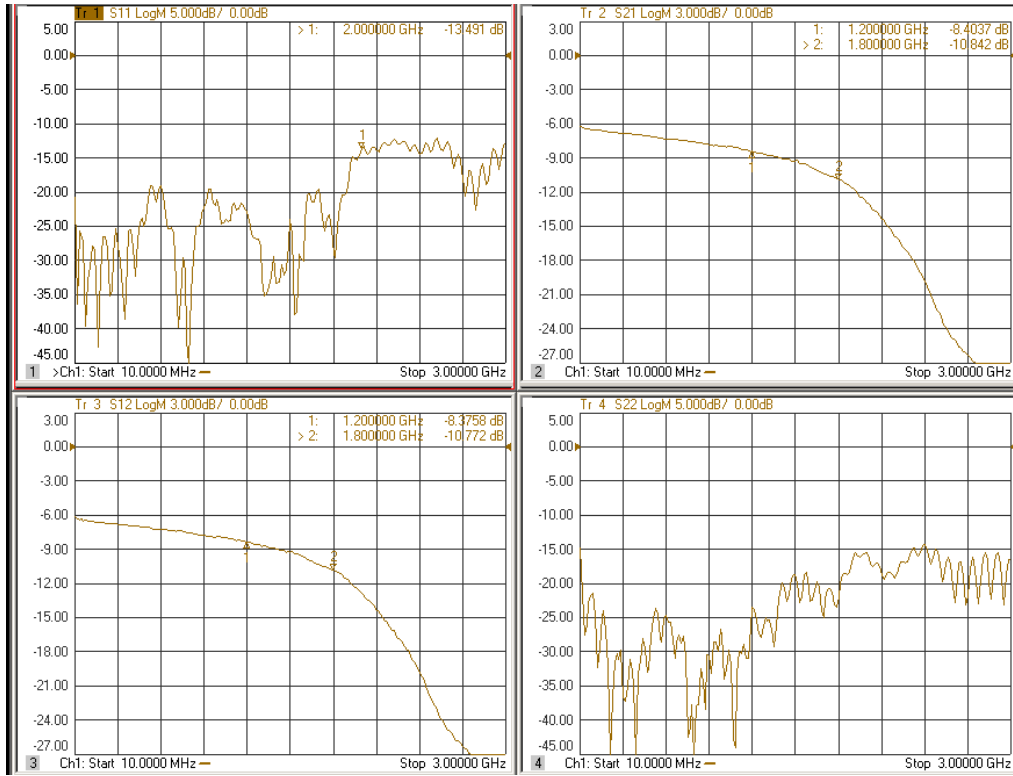Figure 139: Scattering matrix for channel IIa, polarization x and output 3dB1.

Figure 140: Scattering matrix for channel IIa, polarization x and output 6dB2.
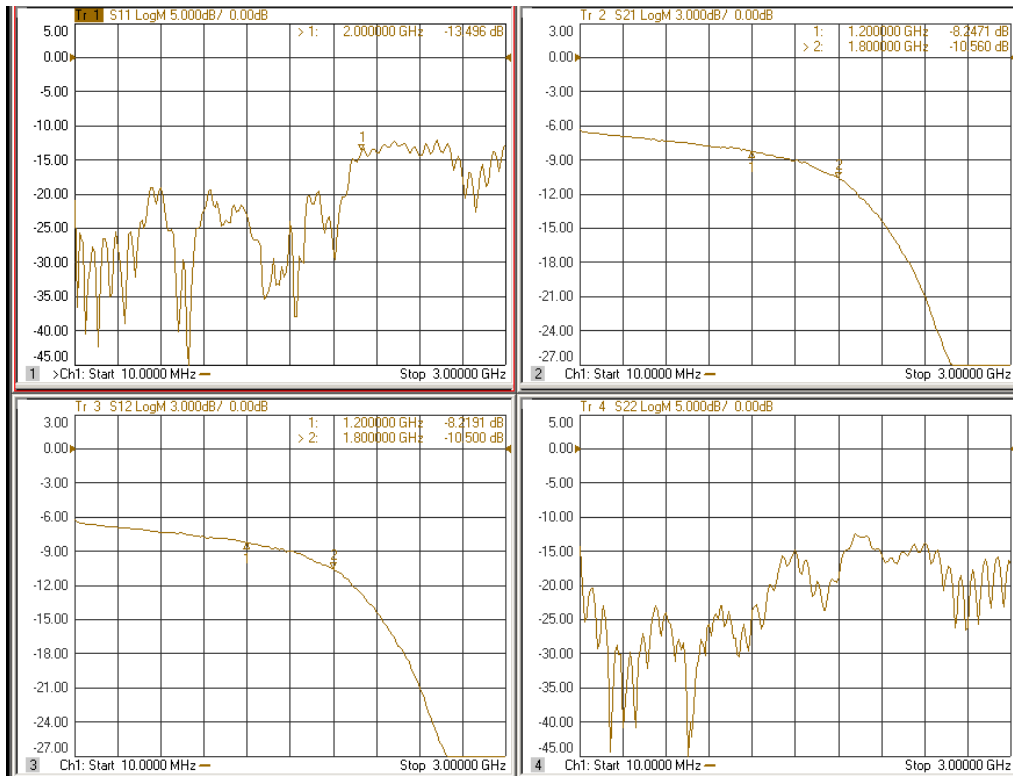

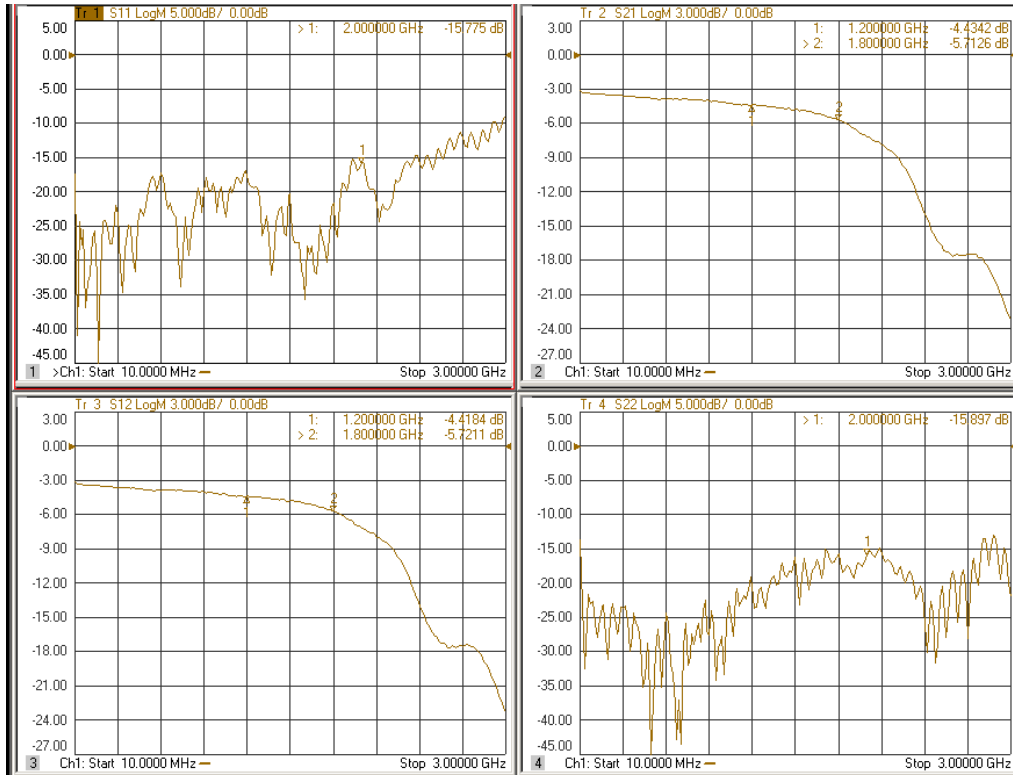Figure 141: Scattering matrix for channel IIa, polarization x and output 6dB3.

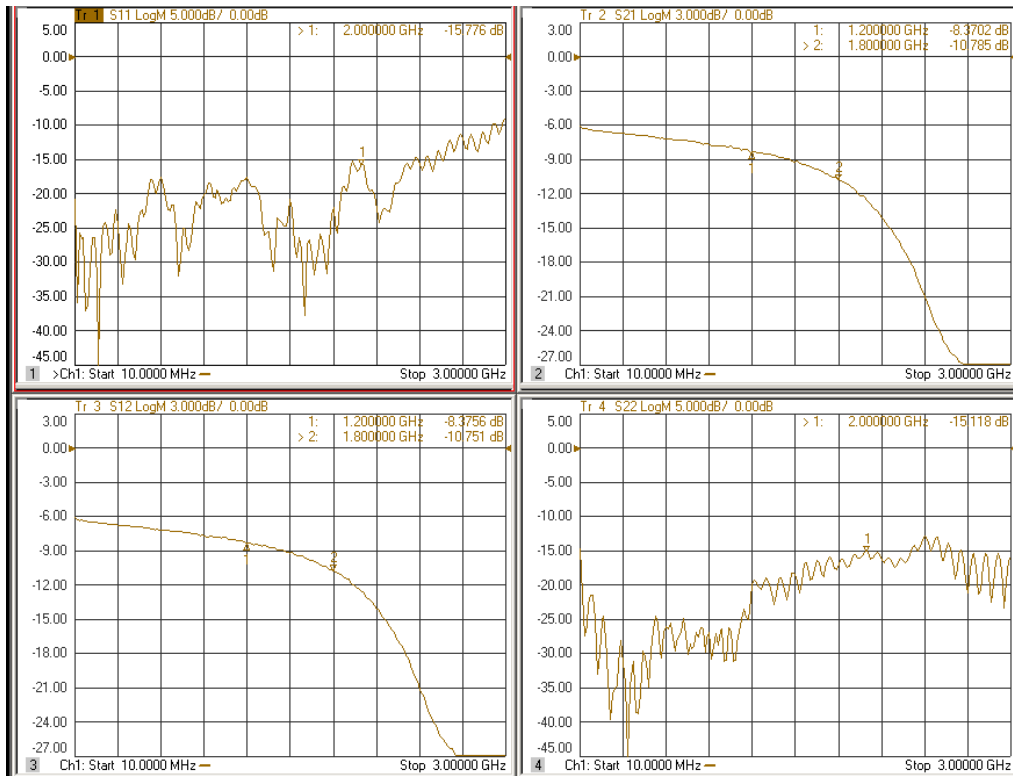Figure 142: Scattering matrix for channel IIa, polarization y and output 3dB1.

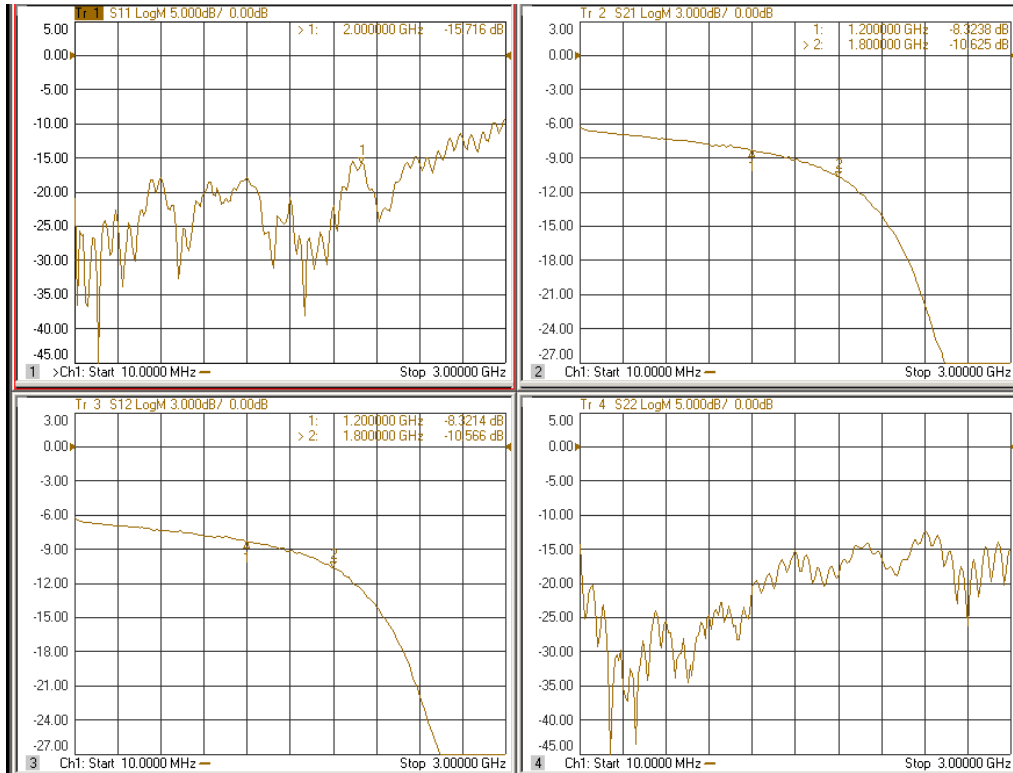Figure 143: Scattering matrix for channel IIa, polarization y and output 6dB2.

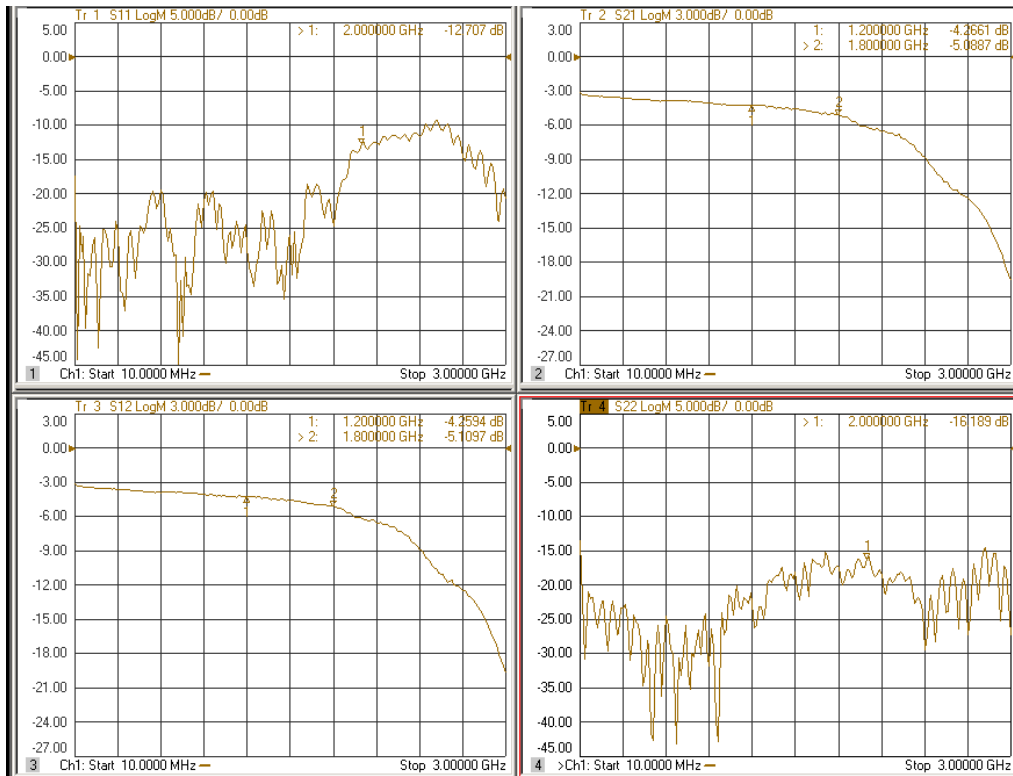Figure 144: Scattering matrix for channel IIa, polarization y and output 6dB3.

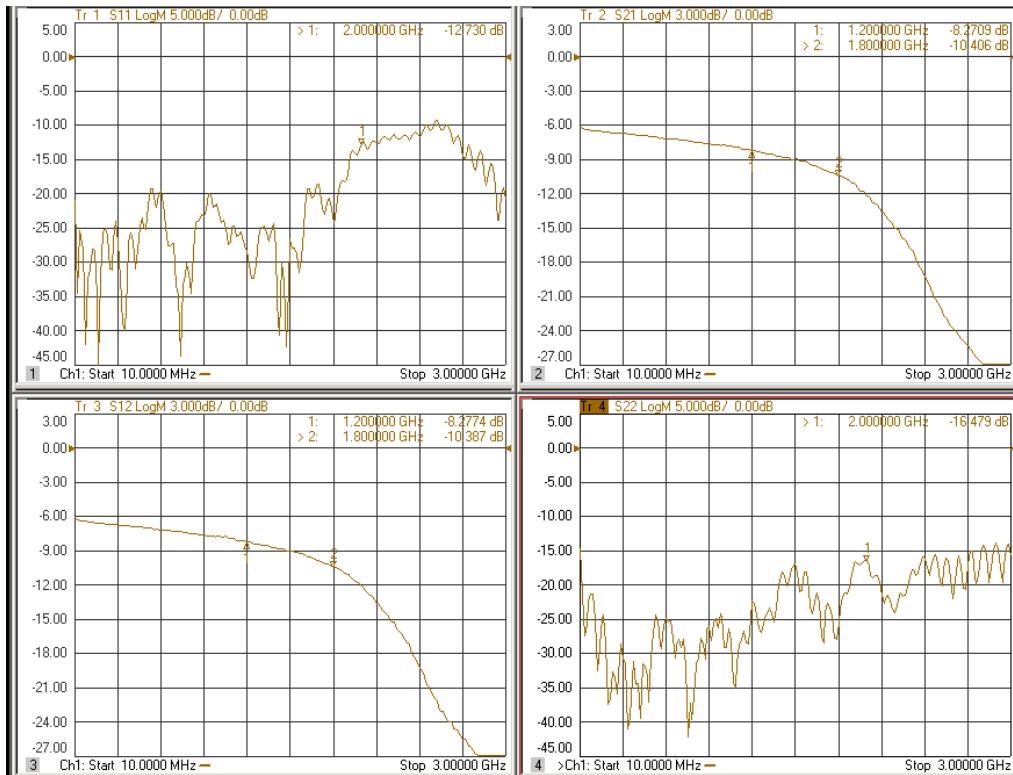Figure 145: Scattering matrix for channel 3C, polarization x and output 3dB1.

Figure 146: Scattering matrix for channel 3C, polarization x and output 6dB2.
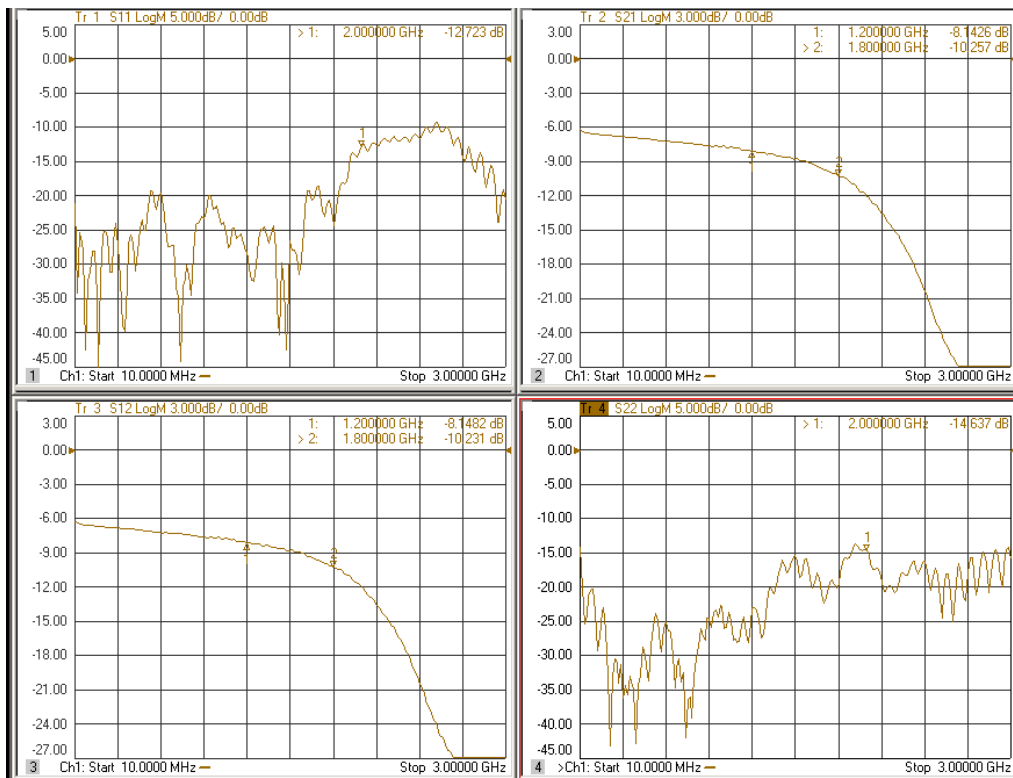

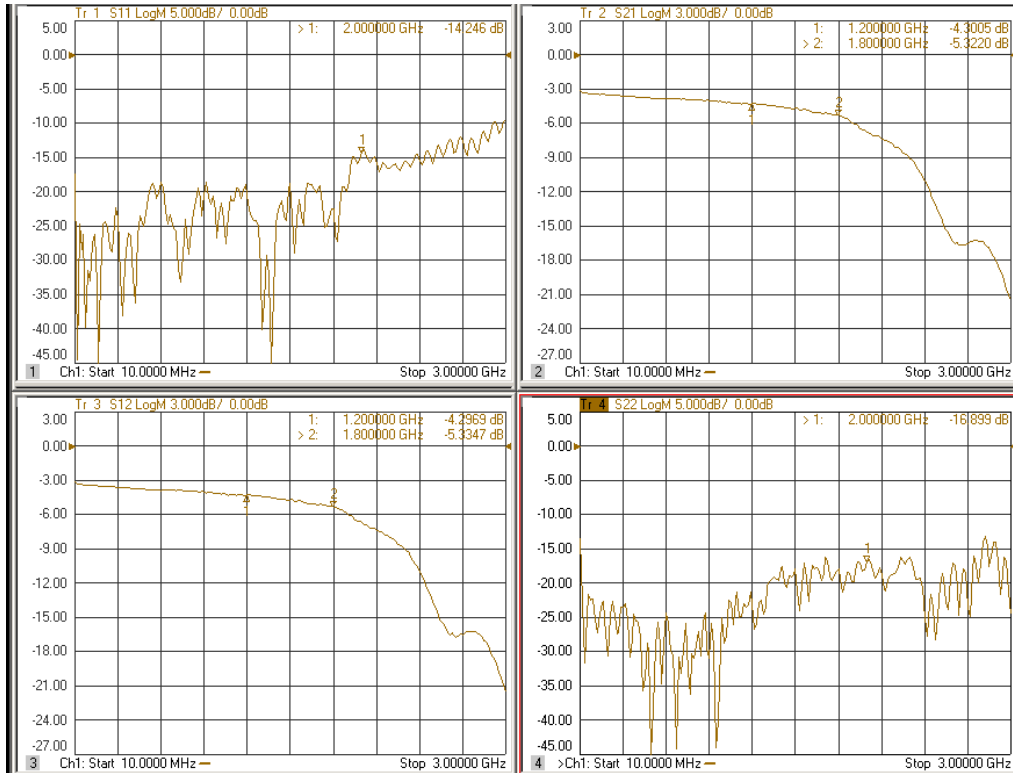Figure 147: Scattering matrix for channel 3C, polarization x and output 6dB3.

Figure 148: Scattering matrix for channel 3C, polarization y and output 3dB1.
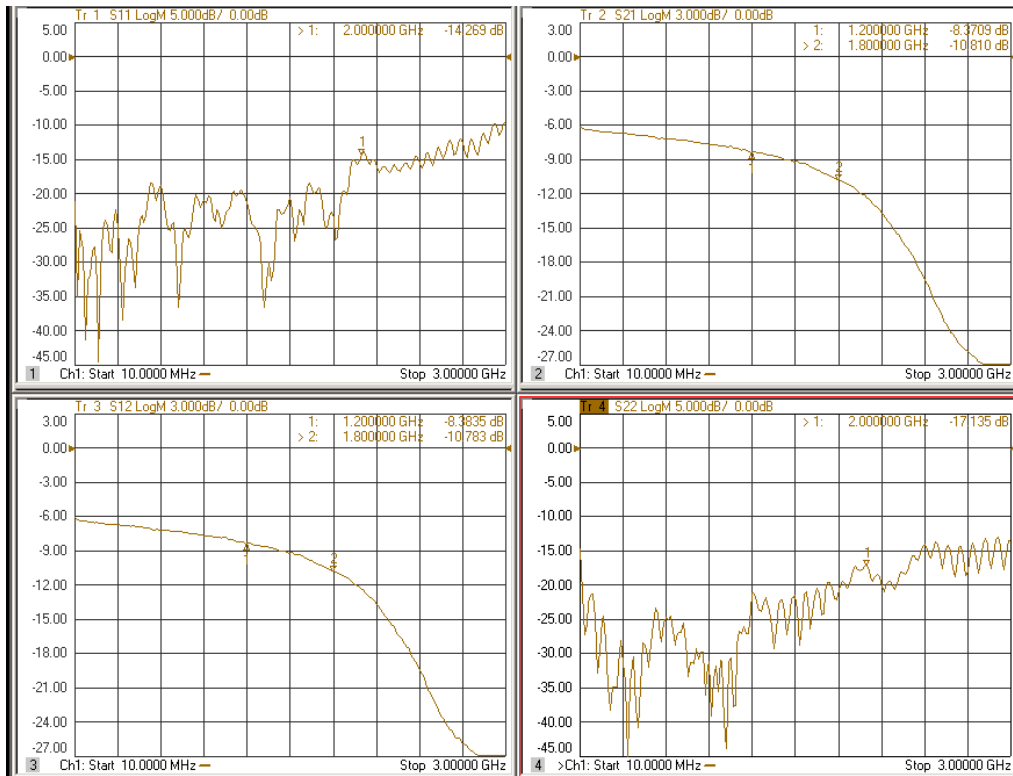

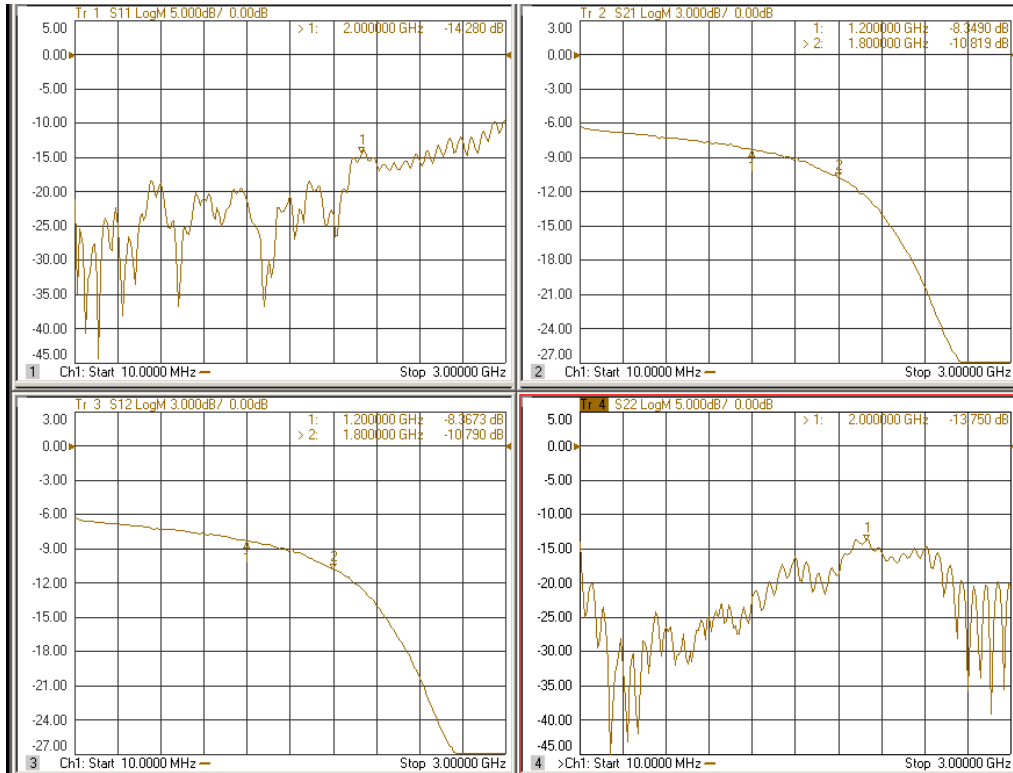Figure 149: Scattering matrix for channel 3C, polarization y and output 6dB2.

Figure 150: Scattering matrix for channel 3C, polarization y and output 6dB3.
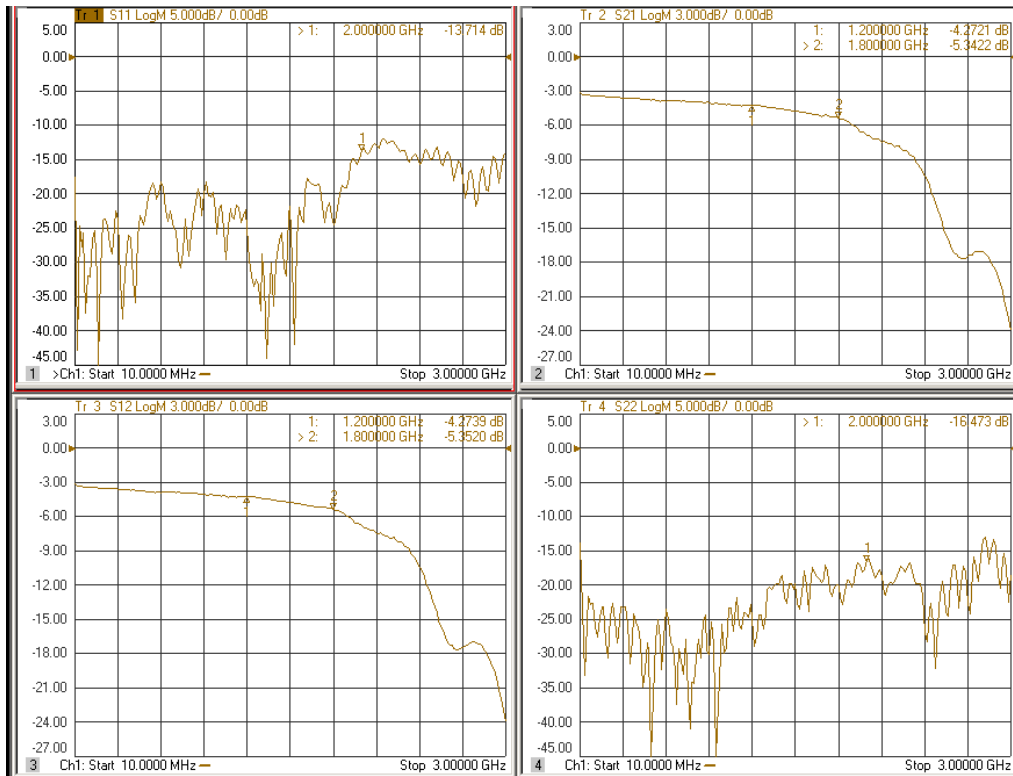

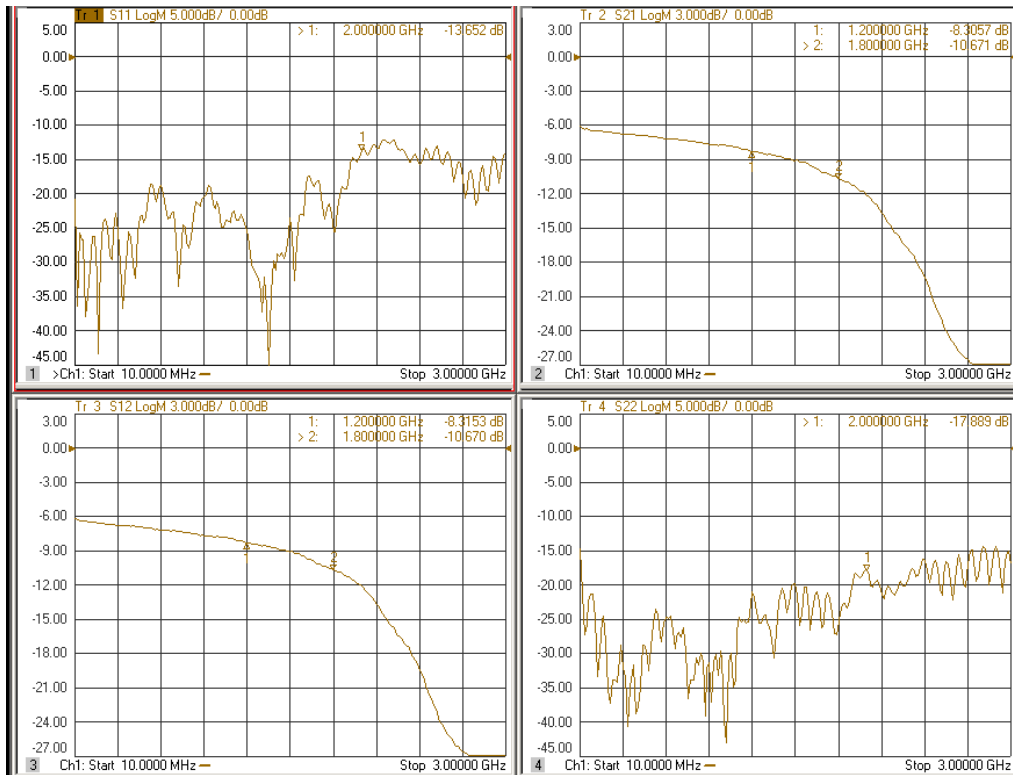Figure 151: Scattering matrix for channel 3D, polarization x and output 3dB1.

Figure 152: Scattering matrix for channel 3D, polarization x and output 6dB2.
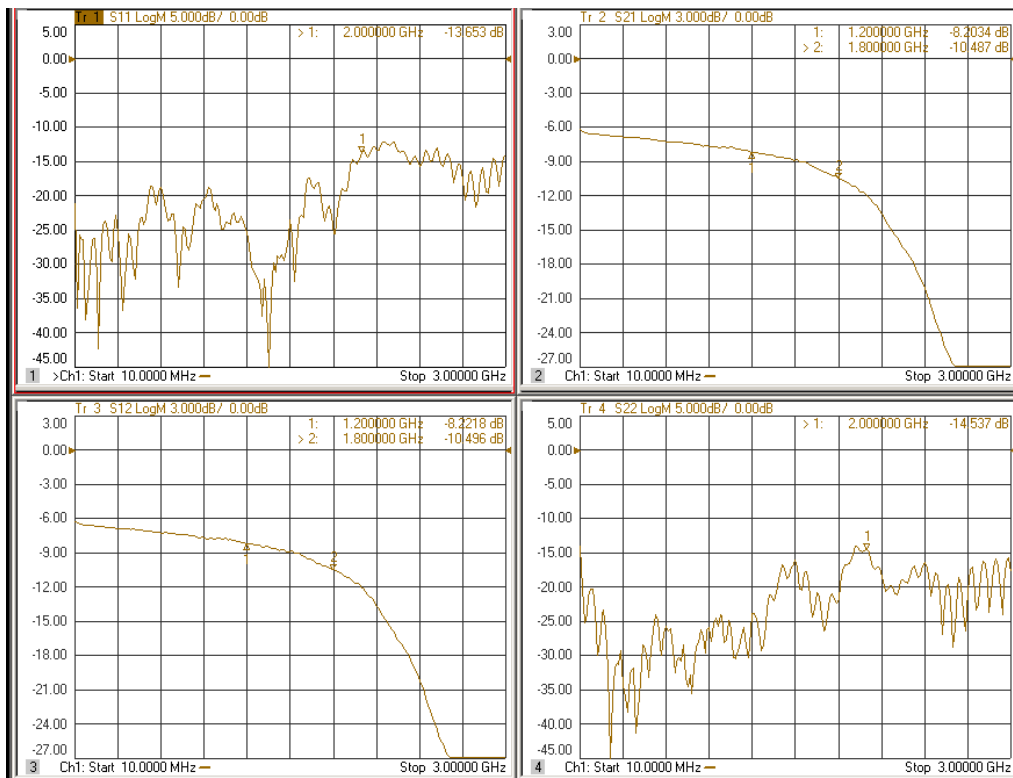

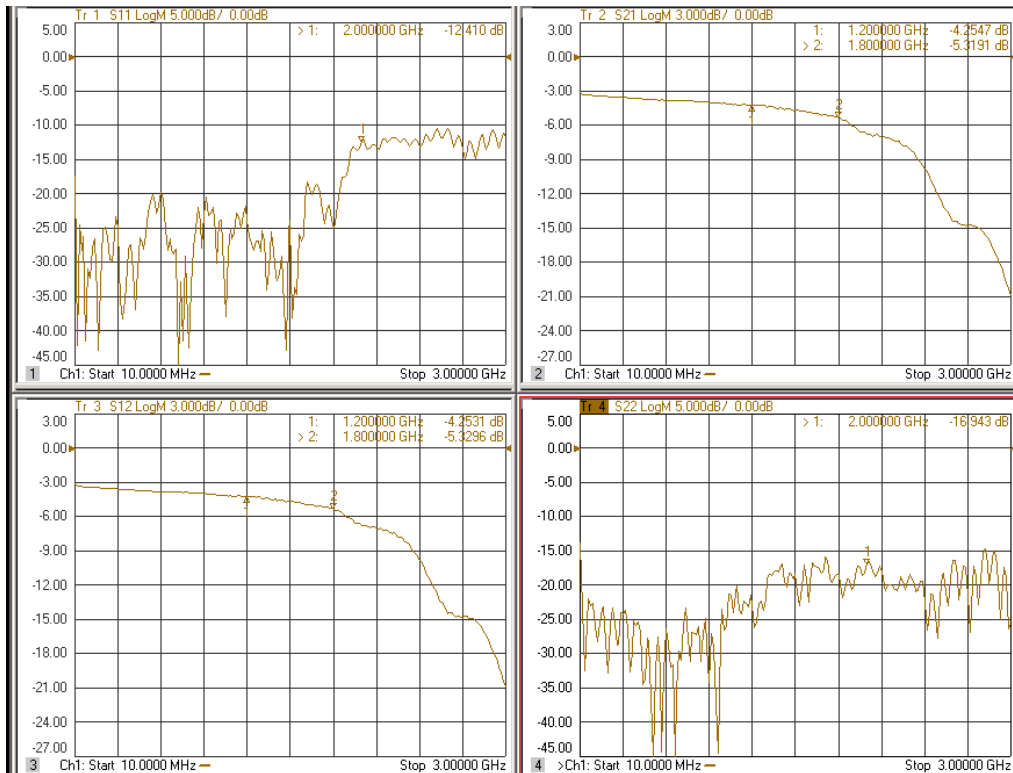Figure 153: Scattering matrix for channel 3D, polarization x and output 6dB3.

Figure 154: Scattering matrix for channel 3D, polarization y and output 3dB1.
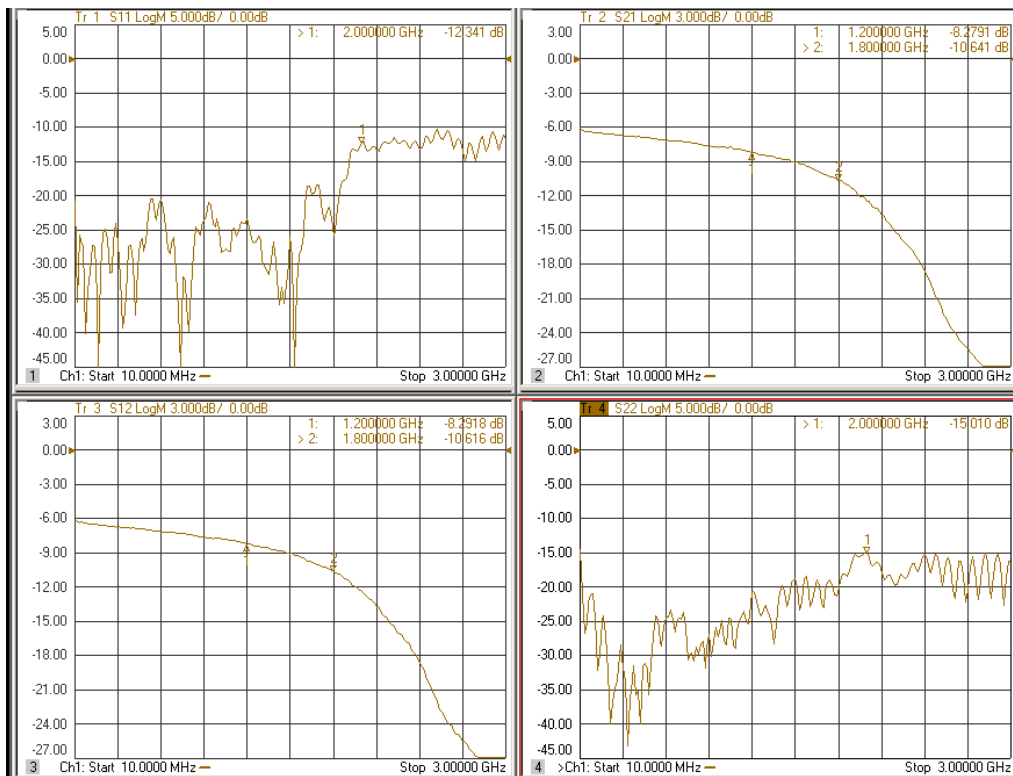

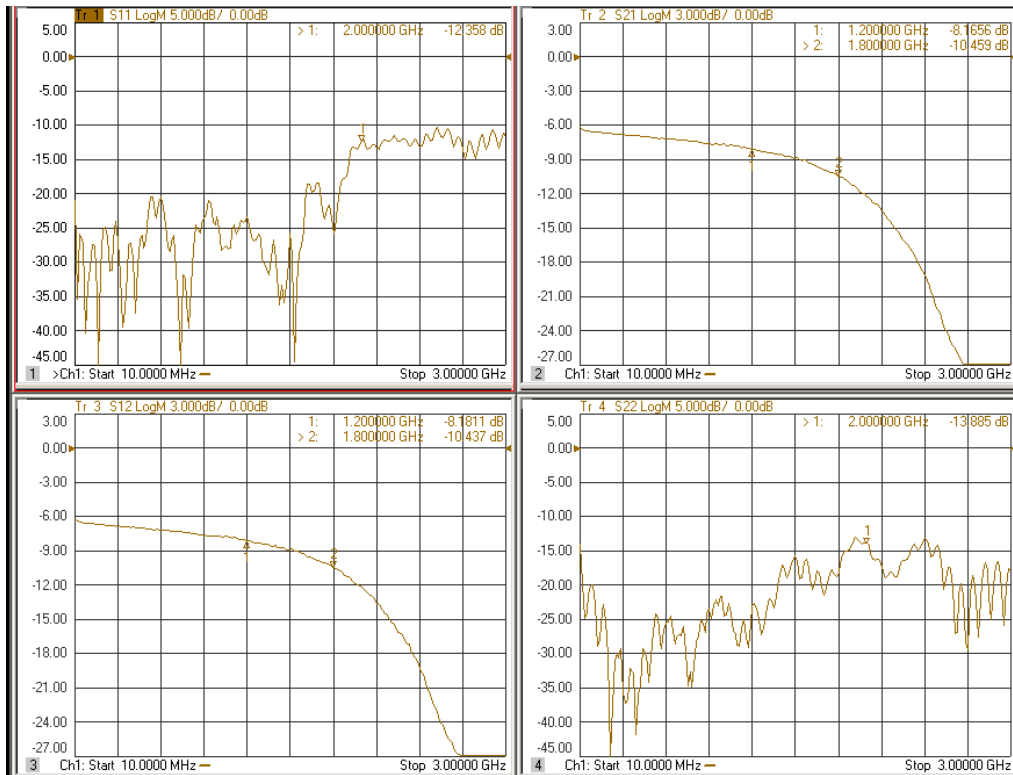Figure 155: Scattering matrix for channel 3D, polarization y and output 6dB2.

Figure 156: Scattering matrix for channel 3D, polarization y and output 6dB3.
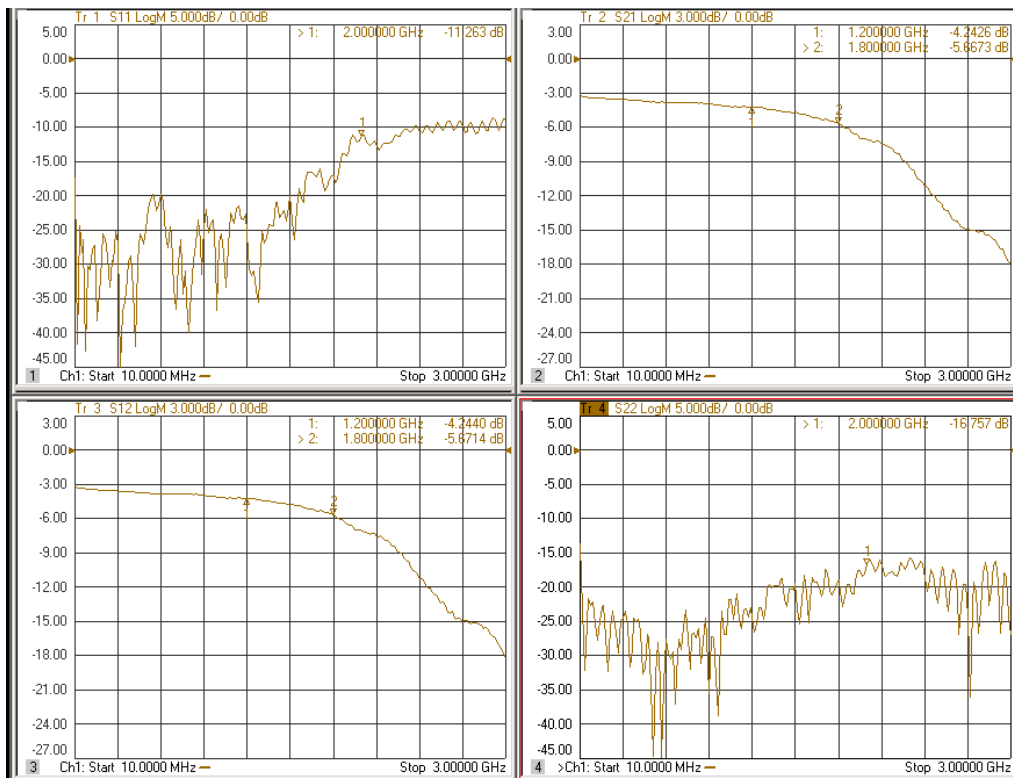

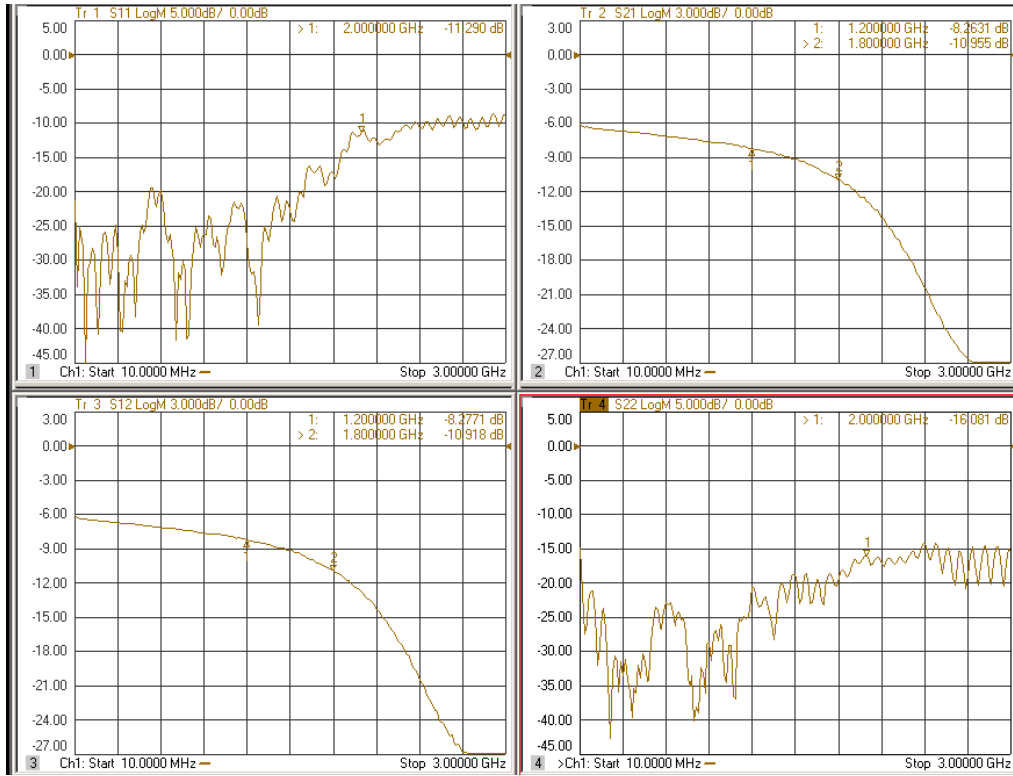Figure 157: Scattering matrix for channel 3E, polarization x and output 3dB1.

Figure 158: Scattering matrix for channel 3E, polarization x and output 6dB2.
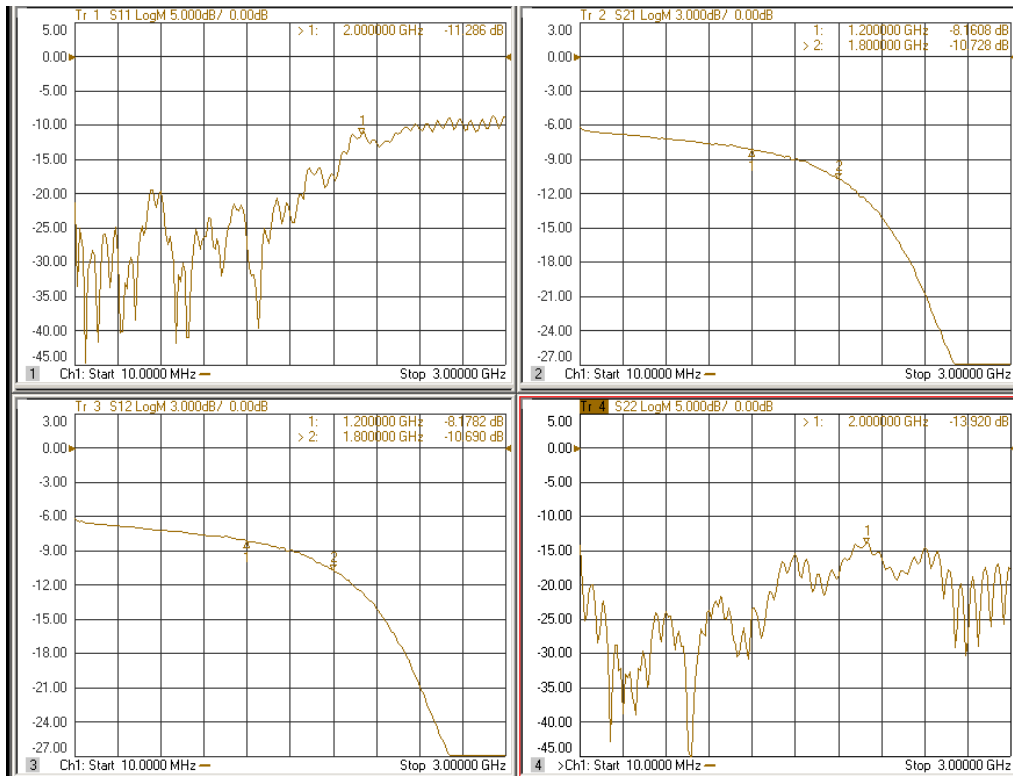

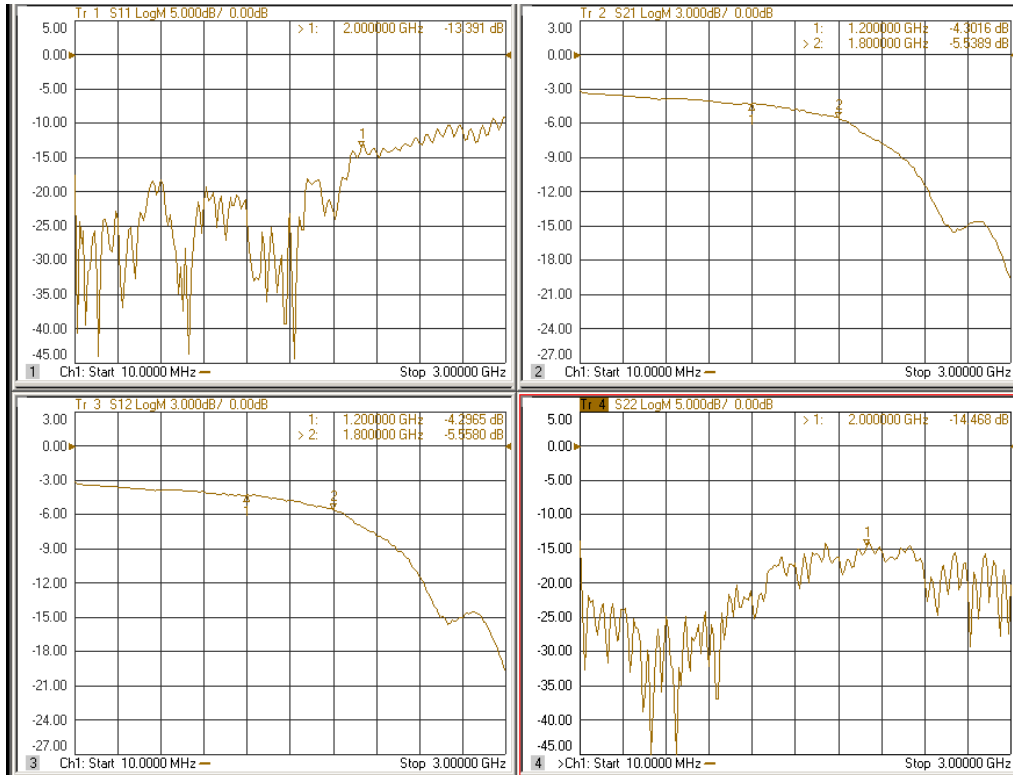Figure 159: Scattering matrix for channel 3E, polarization x and output 6dB3.

Figure 160: Scattering matrix for channel 3E, polarization y and output 3dB1.
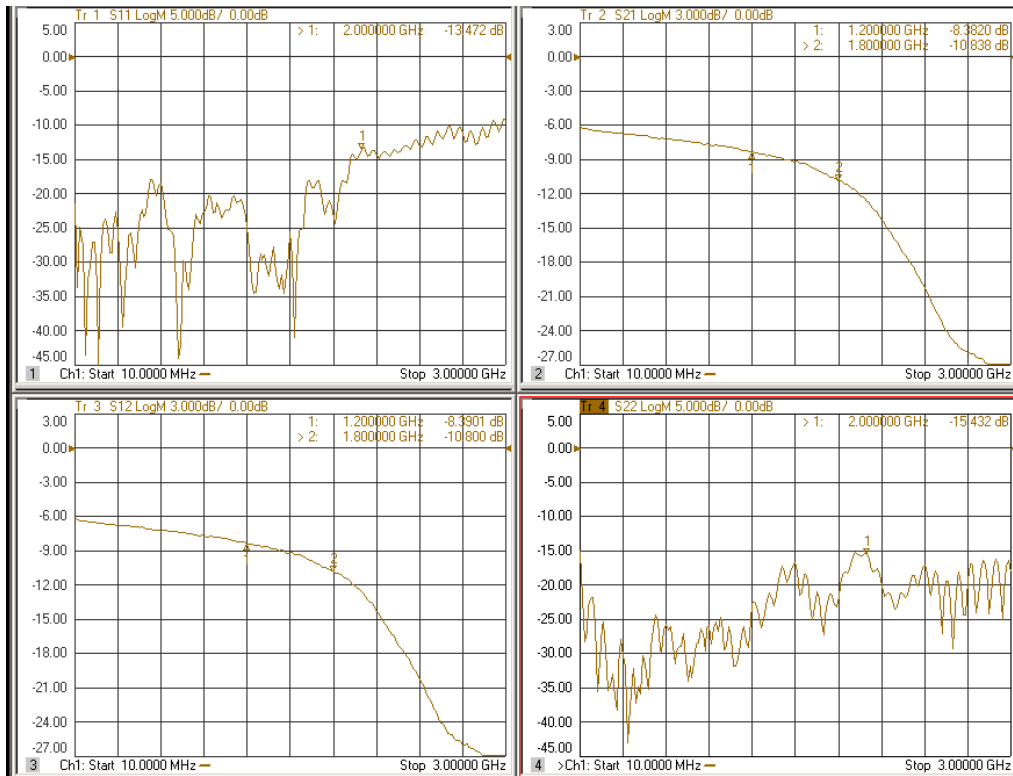

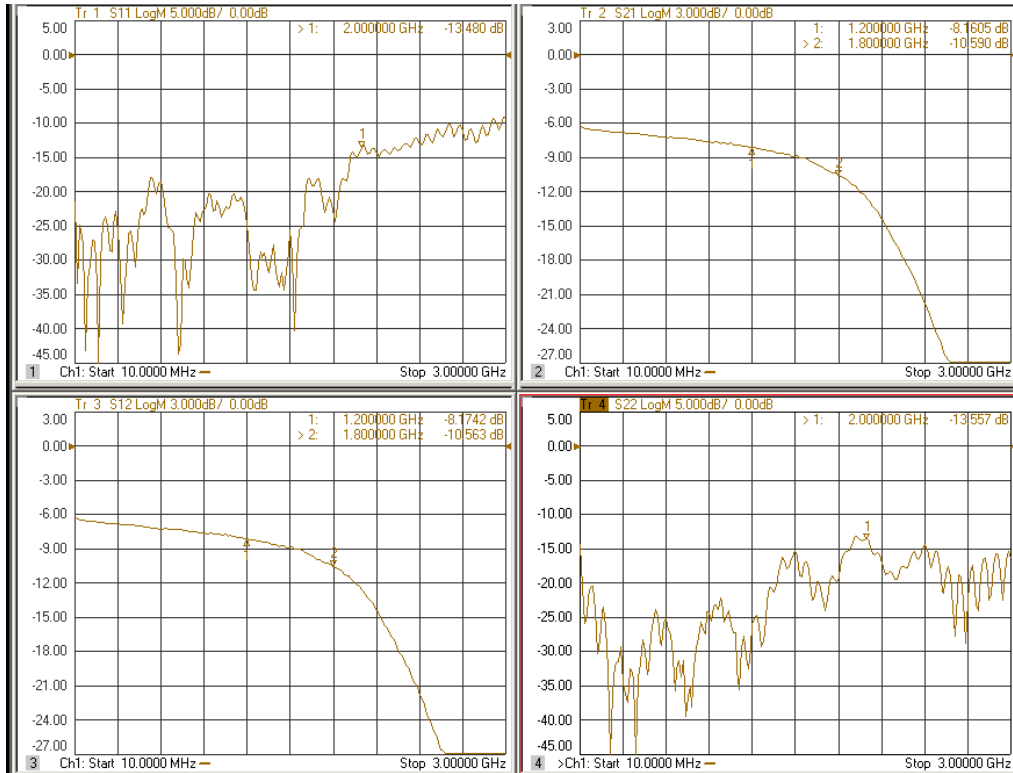Figure 161: Scattering matrix for channel 3E, polarization y and output 6dB2.

Figure 162: Scattering matrix for channel 3E, polarization y and output 6dB3.
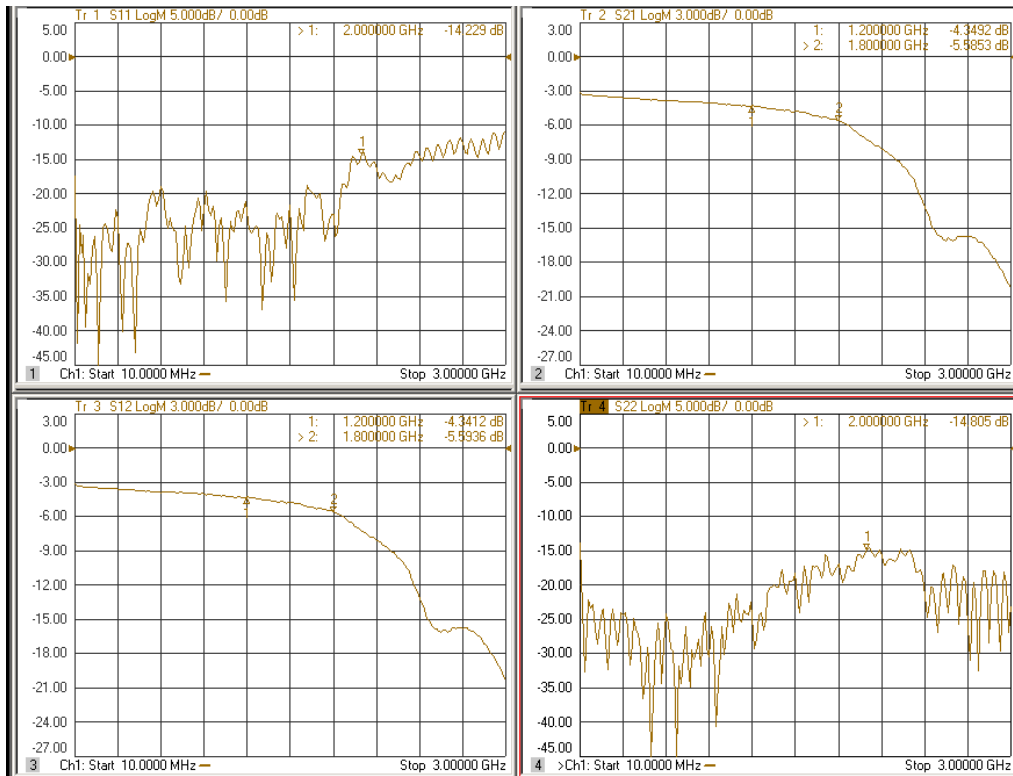

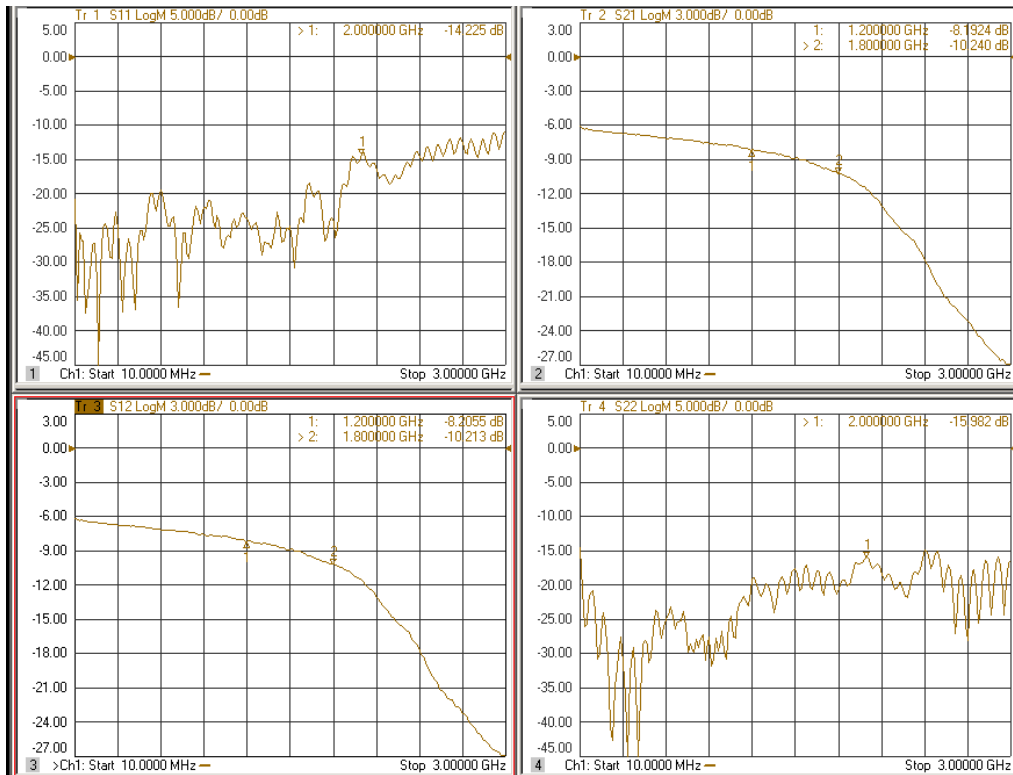Figure 163: Scattering matrix for channel 3F, polarization x and output 3dB1.

Figure 164: Scattering matrix for channel 3F, polarization x and output 6dB2.
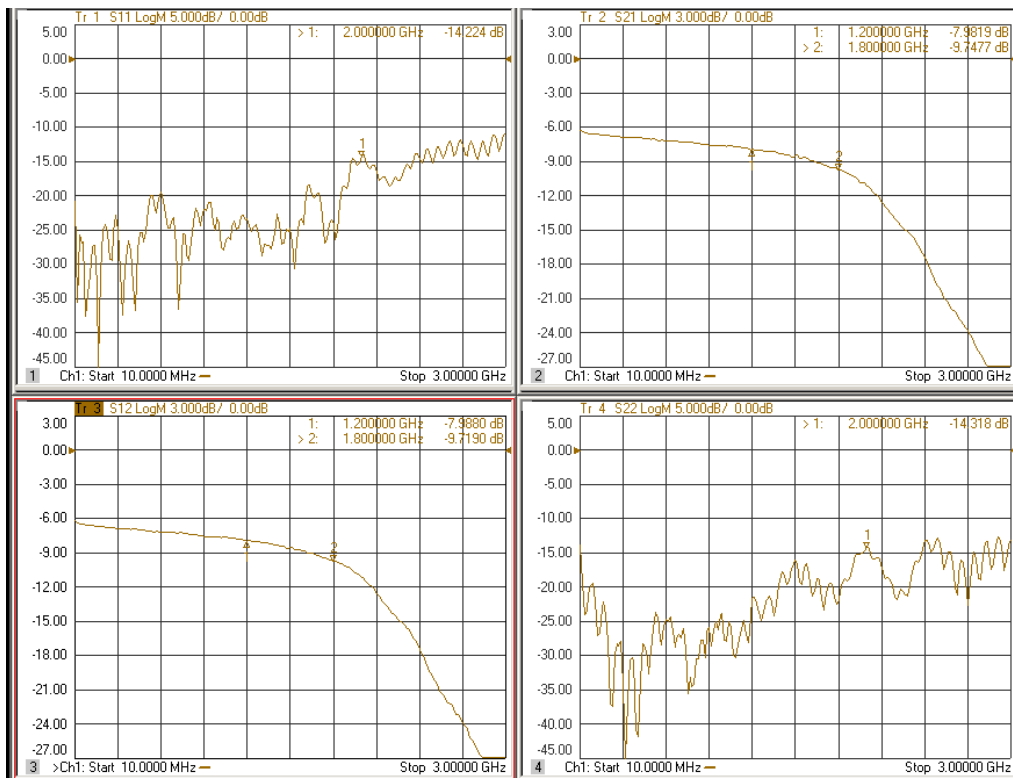

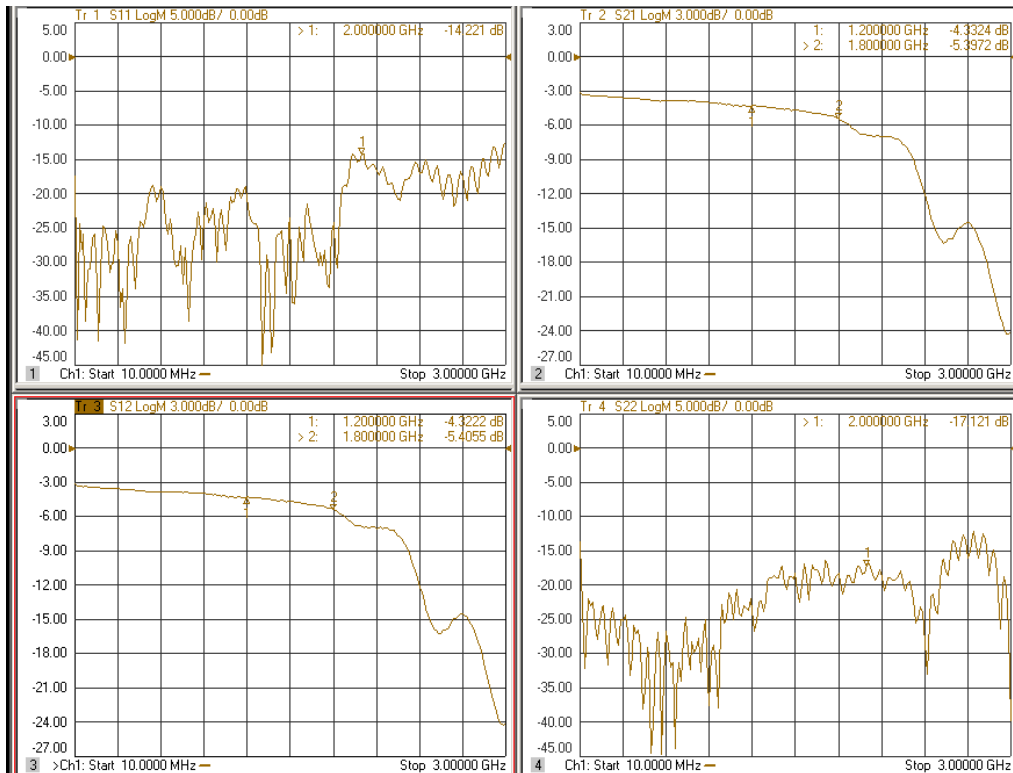Figure 165: Scattering matrix for channel 3F, polarization x and output 6dB3.

Figure 166: Scattering matrix for channel 3F, polarization y and output 3dB1.
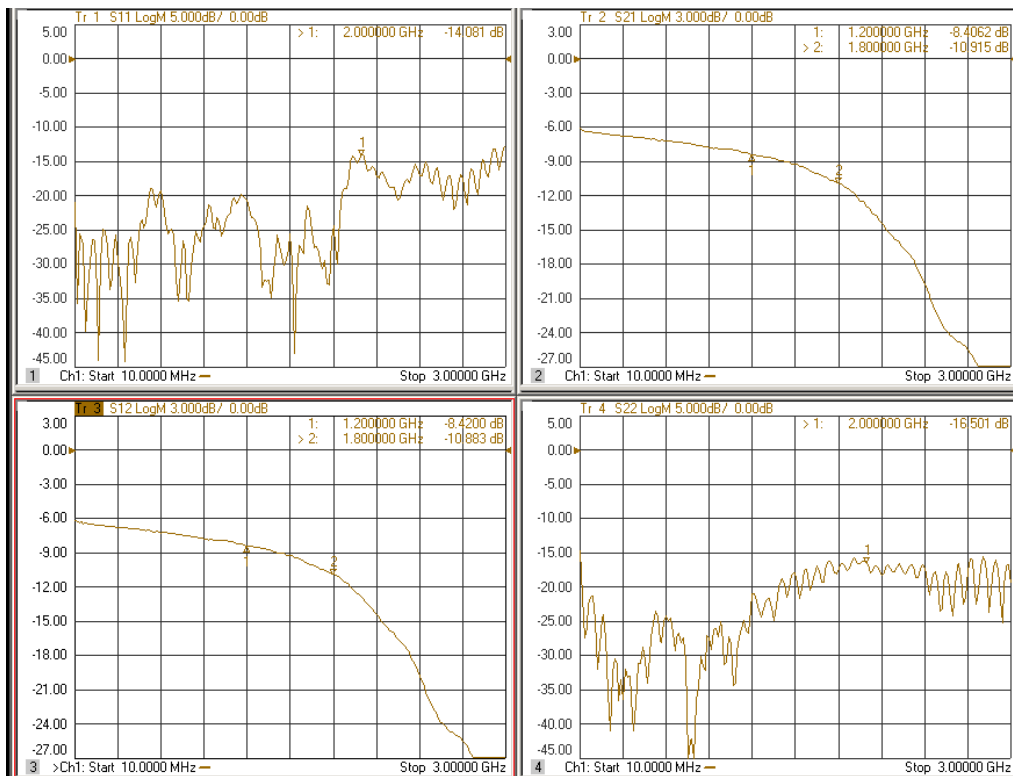

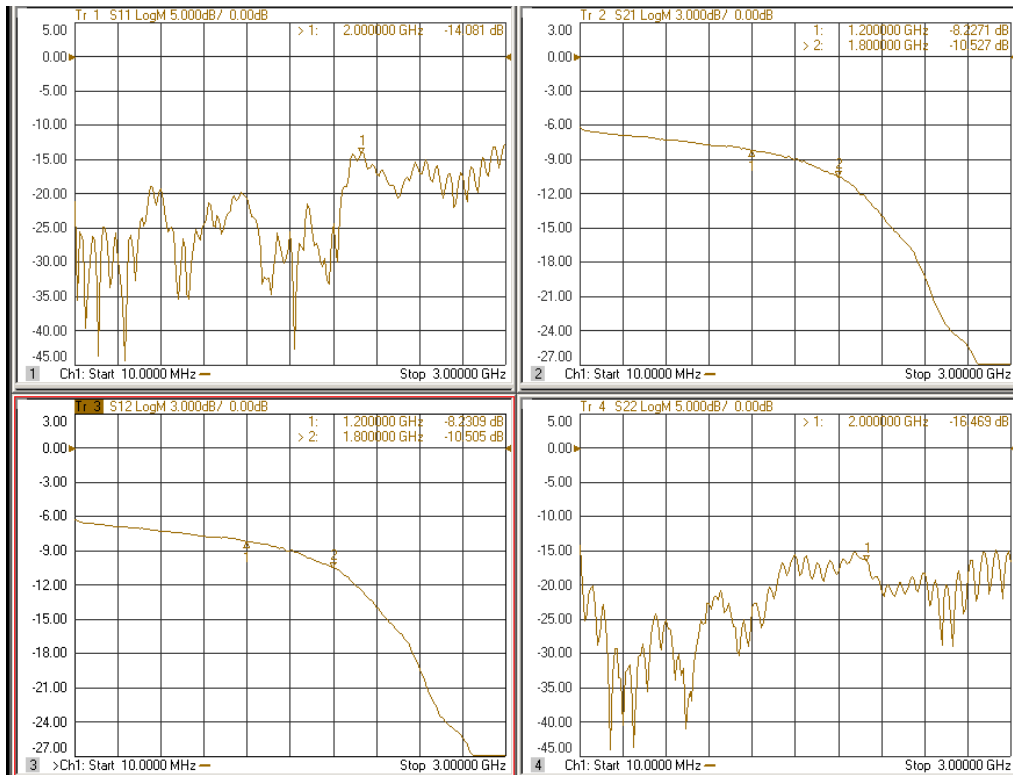Figure 167: Scattering matrix for channel 3F, polarization y and output 6dB2.

Figure 168: Scattering matrix for channel 3F, polarization y and output 6dB3.
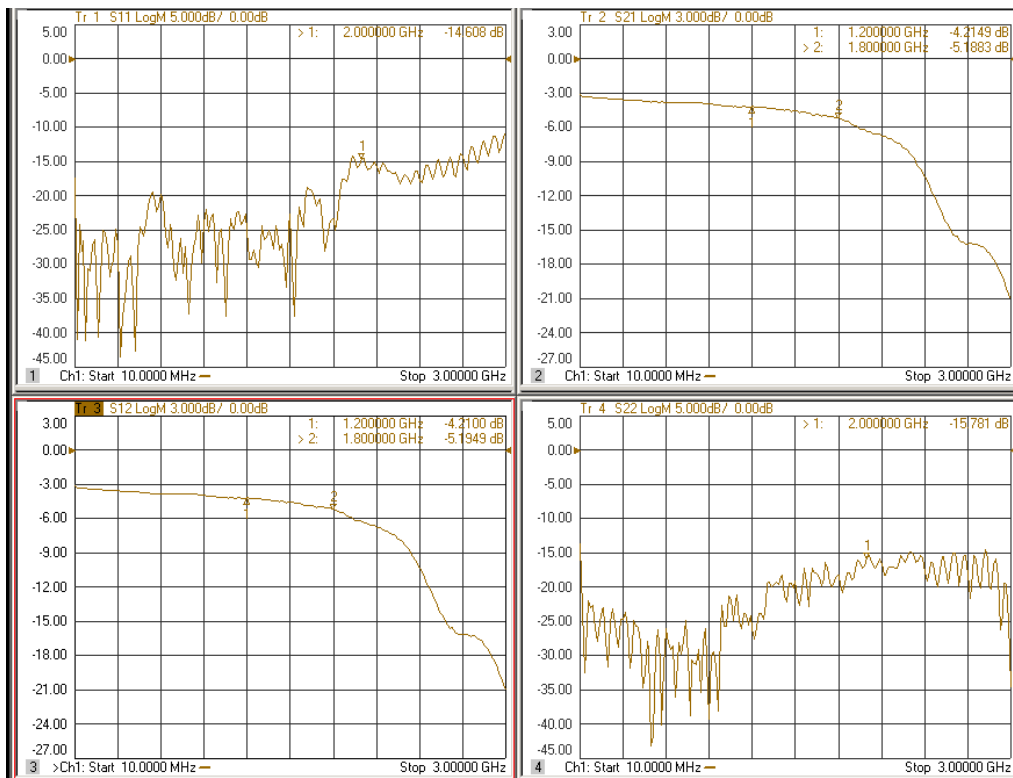

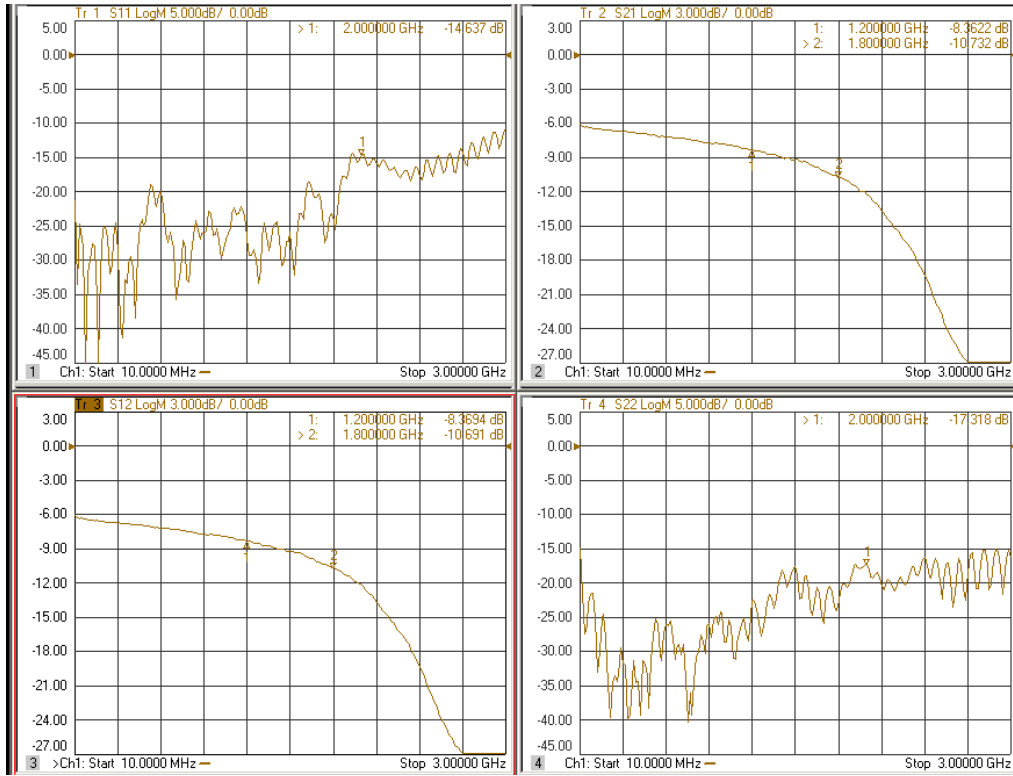Figure 169: Scattering matrix for channel 3G, polarization x and output 3dB1.

Figure 170: Scattering matrix for channel 3G, polarization x and output 6dB2.
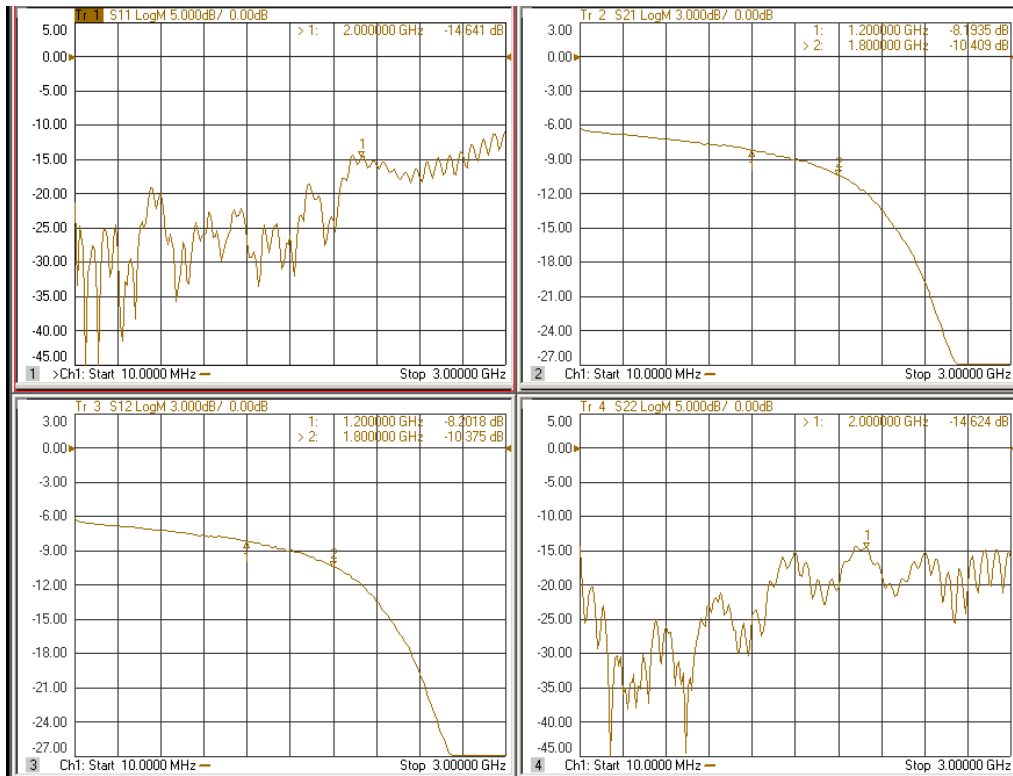

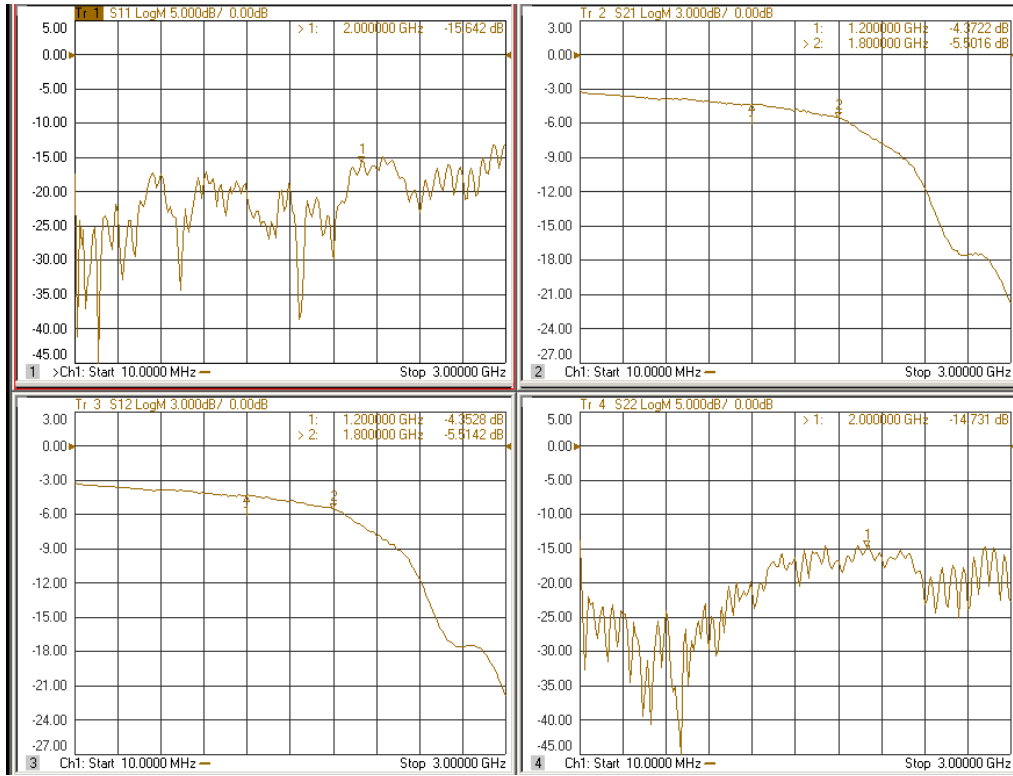Figure 171: Scattering matrix for channel 3G, polarization x and output 6dB3.

Figure 172: Scattering matrix for channel 3G, polarization y and output 3dB1.
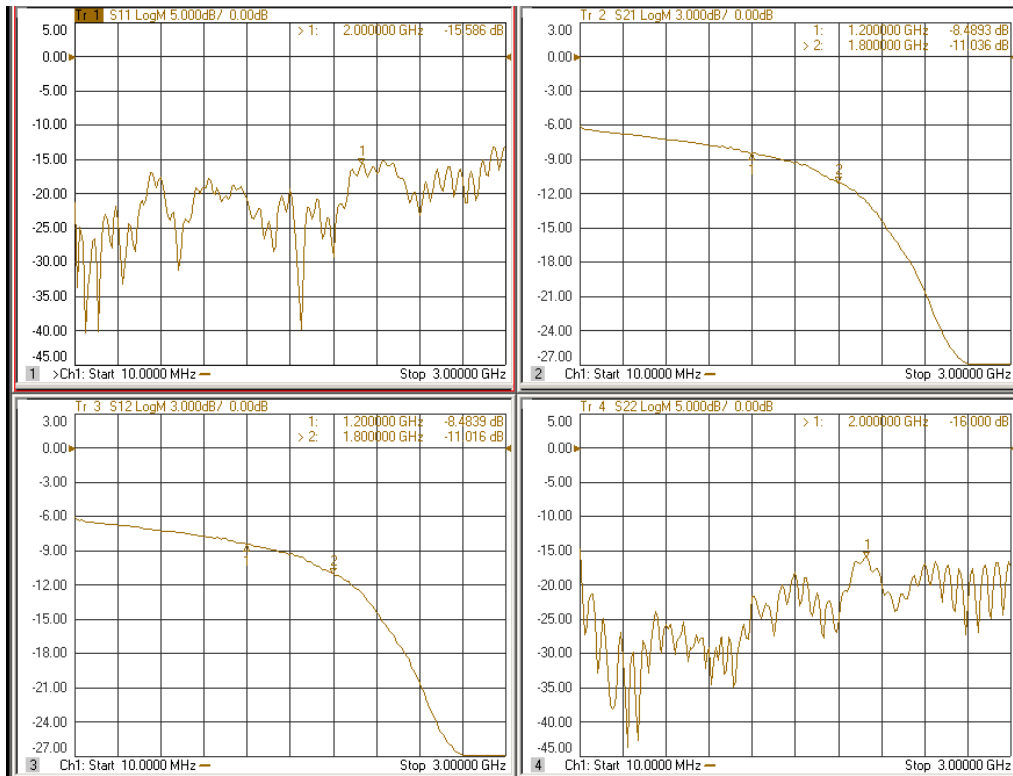

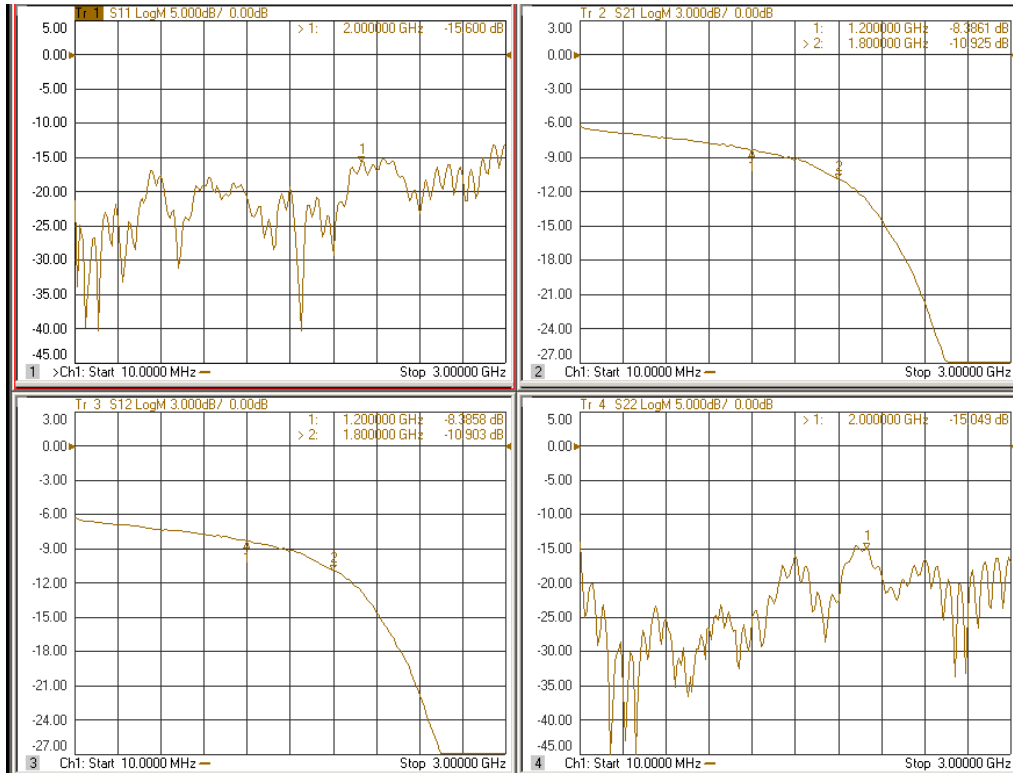Figure 173: Scattering matrix for channel 3G, polarization y and output 6dB2.

Figure 174: Scattering matrix for channel 3G, polarization y and output 6dB3.
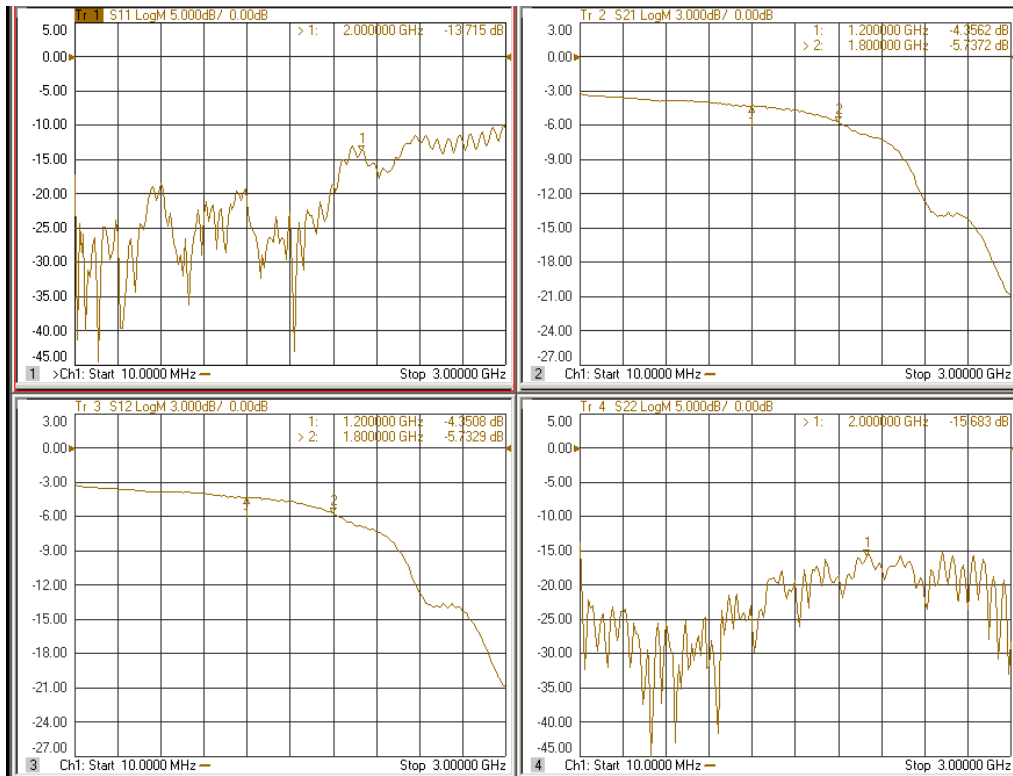

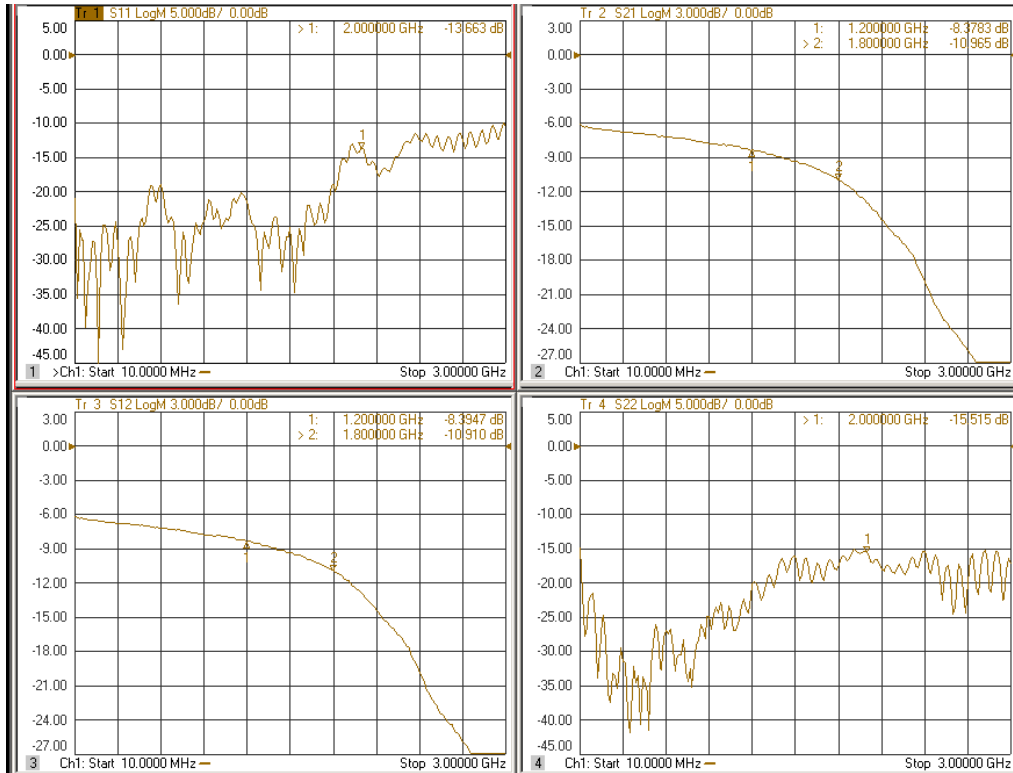Figure 175: Scattering matrix for channel 3H, polarization x and output 3dB1.

Figure 176: Scattering matrix for channel 3H, polarization x and output 6dB2.
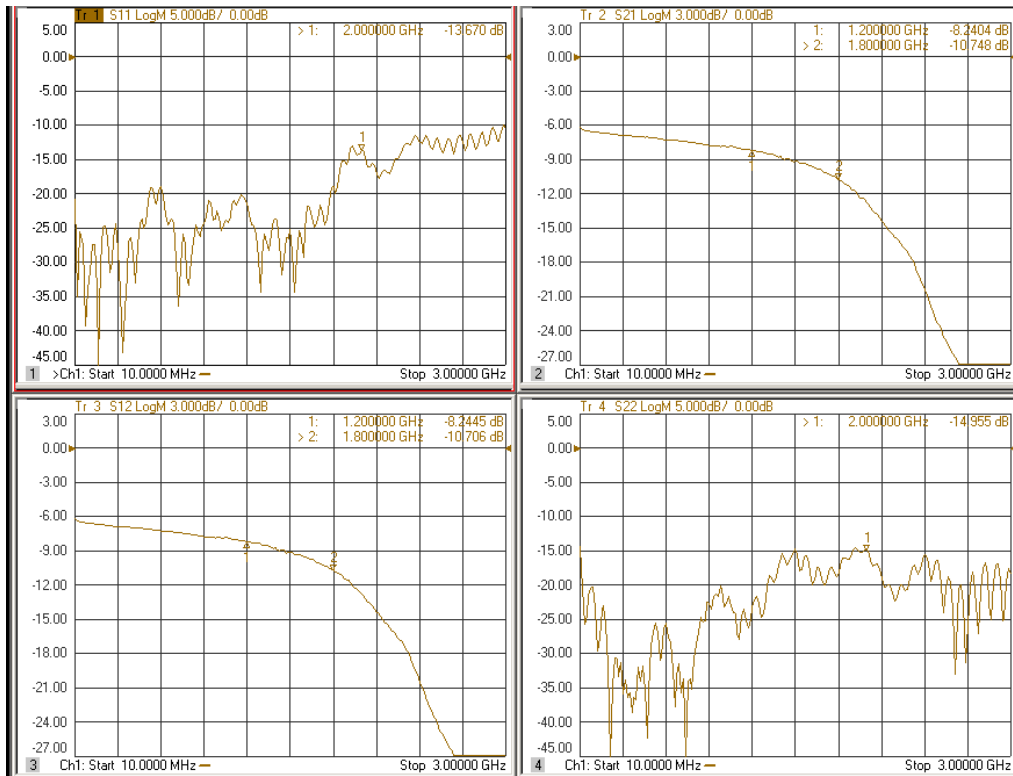

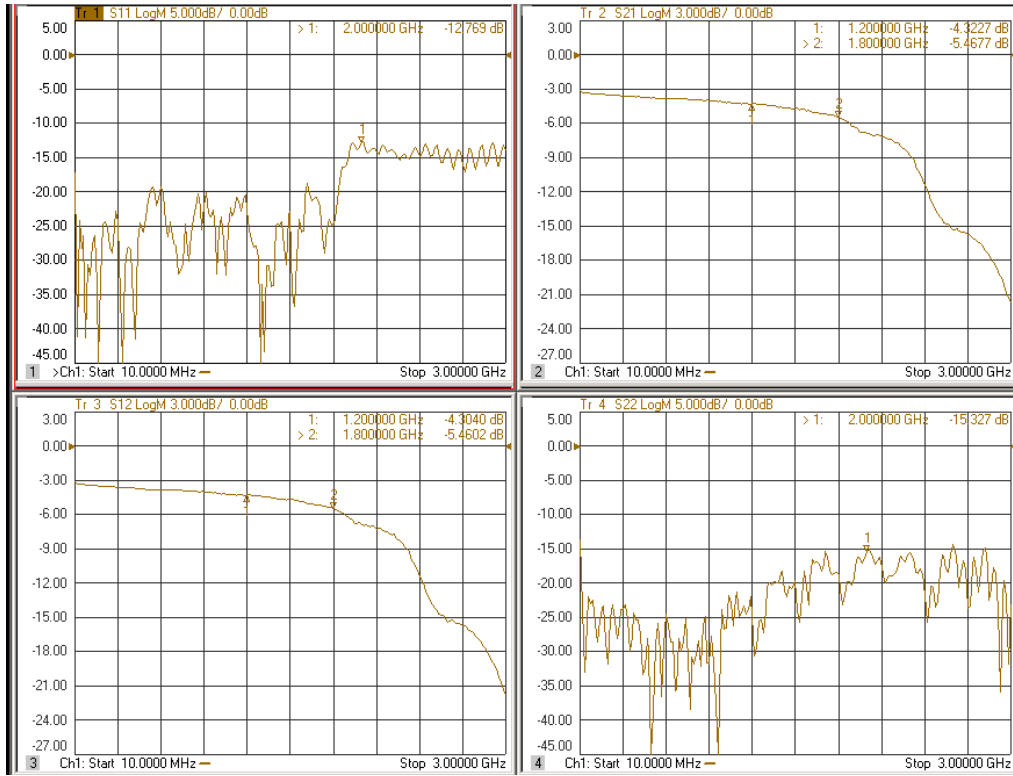Figure 177: Scattering matrix for channel 3H, polarization x and output 6dB3.

Figure 178: Scattering matrix for channel 3H, polarization y and output 3dB1.
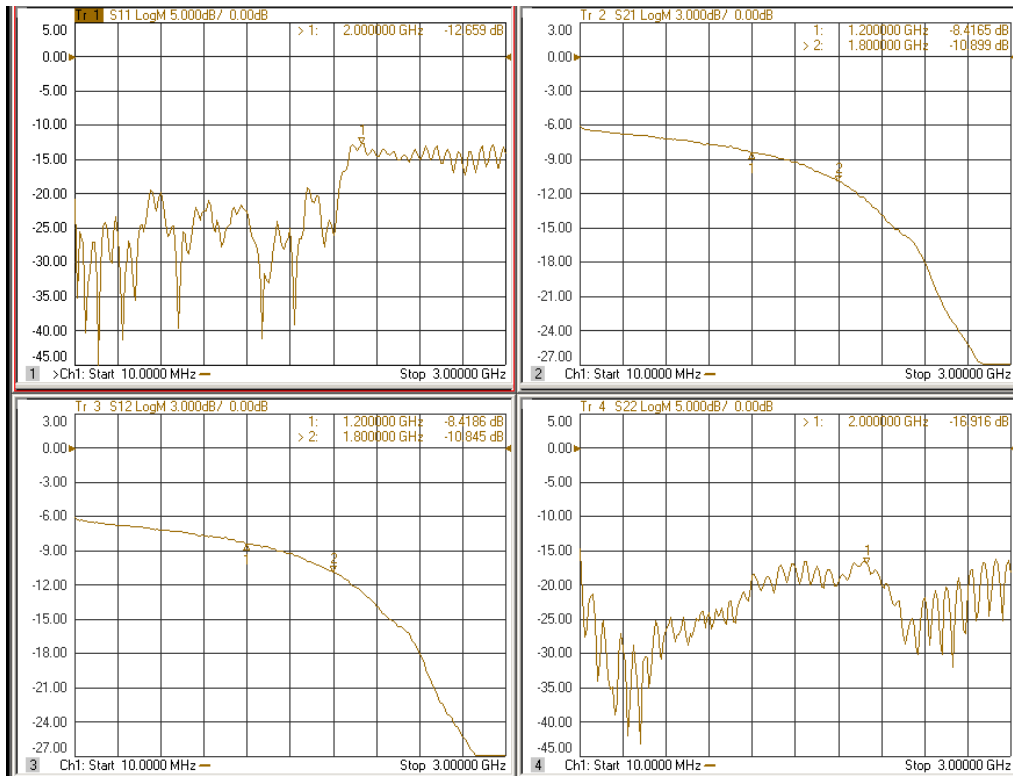

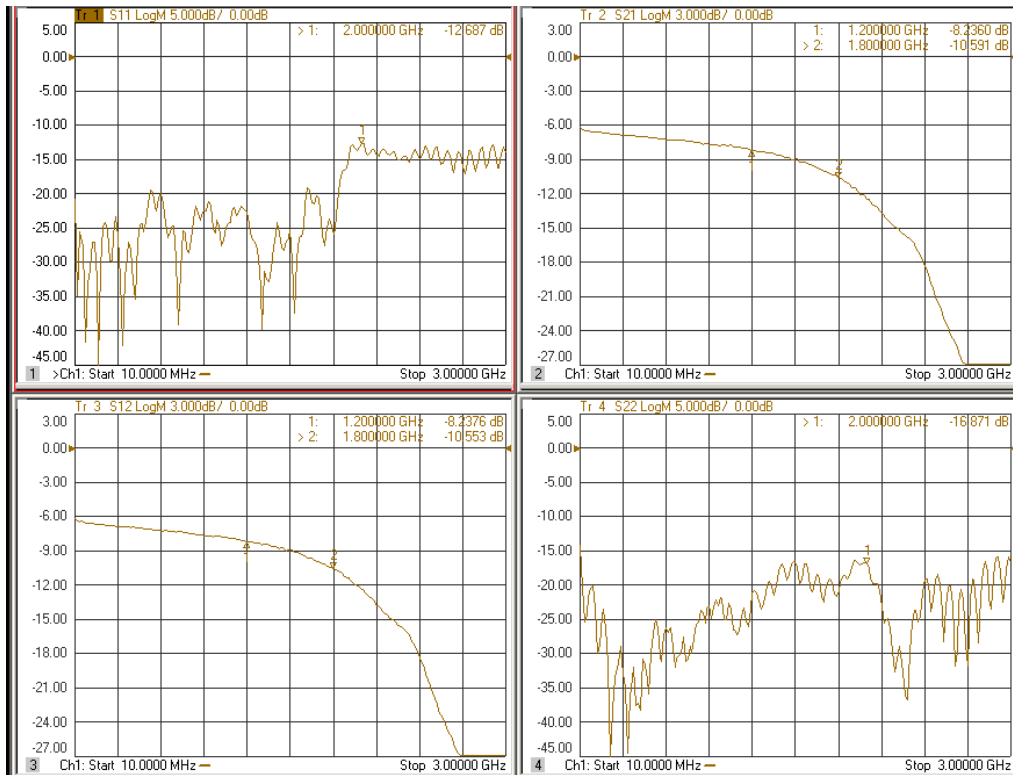Figure 179: Scattering matrix for channel 3H, polarization y and output 6dB2.

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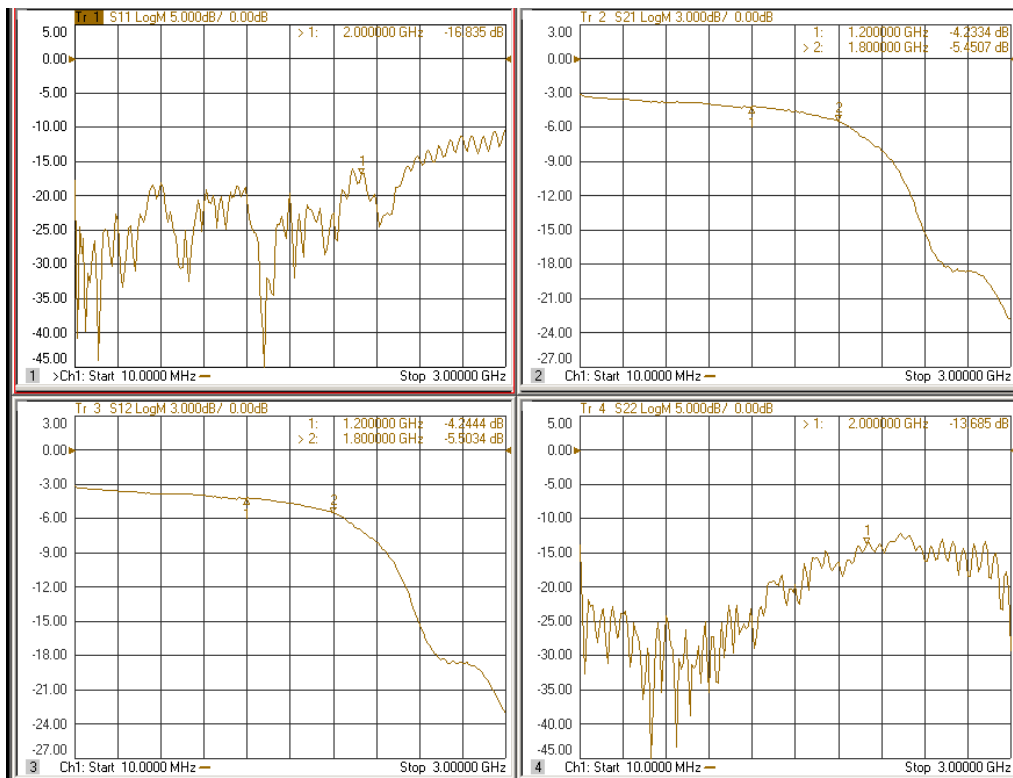Figure 180: Scattering matrix for channel 3H, polarization y and output 6dB3.

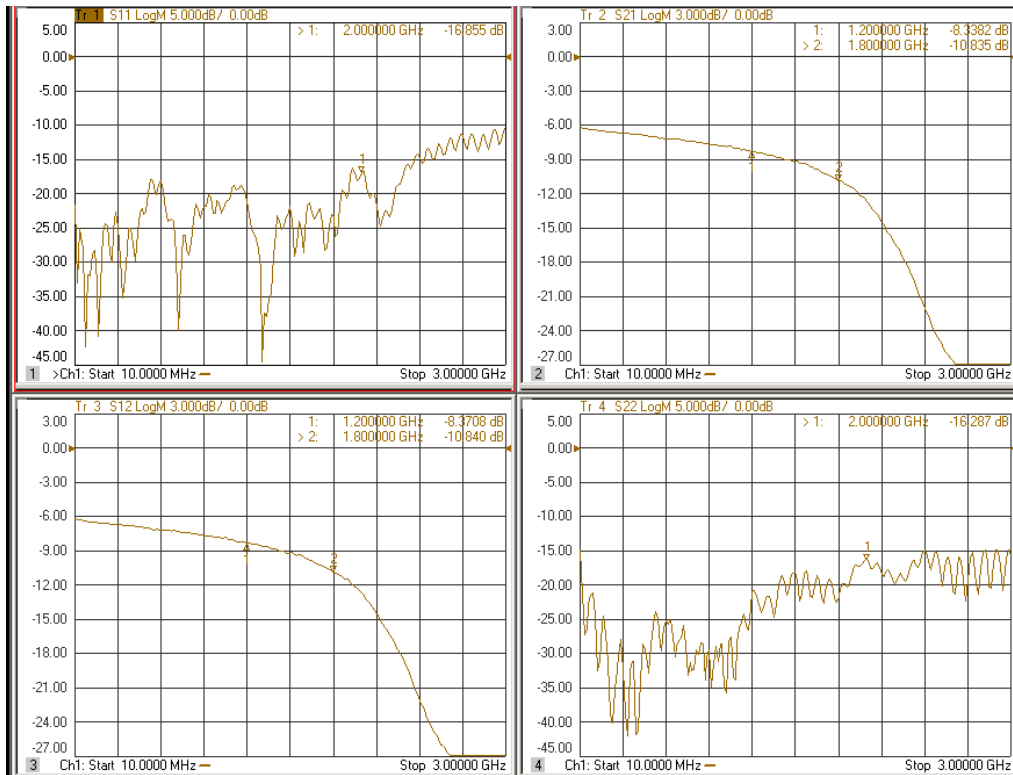Figure 181: Scattering matrix for channel 3J, polarization x and output 3dB1.

Figure 182: Scattering matrix for channel 3J, polarization x and output 6dB2.
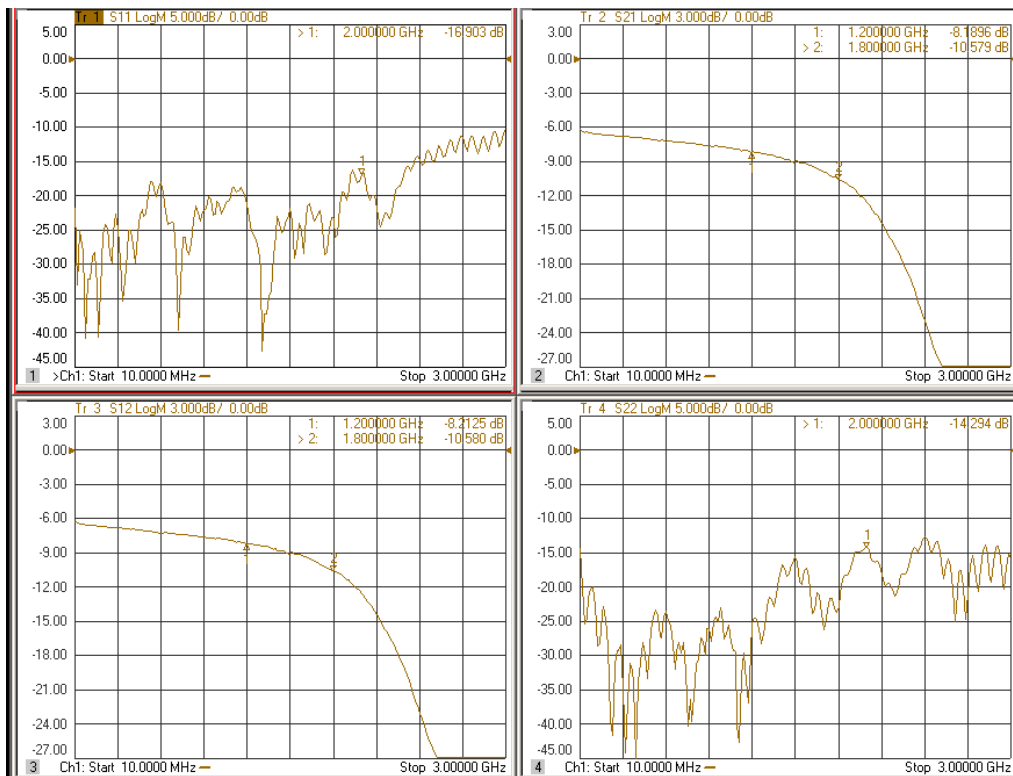

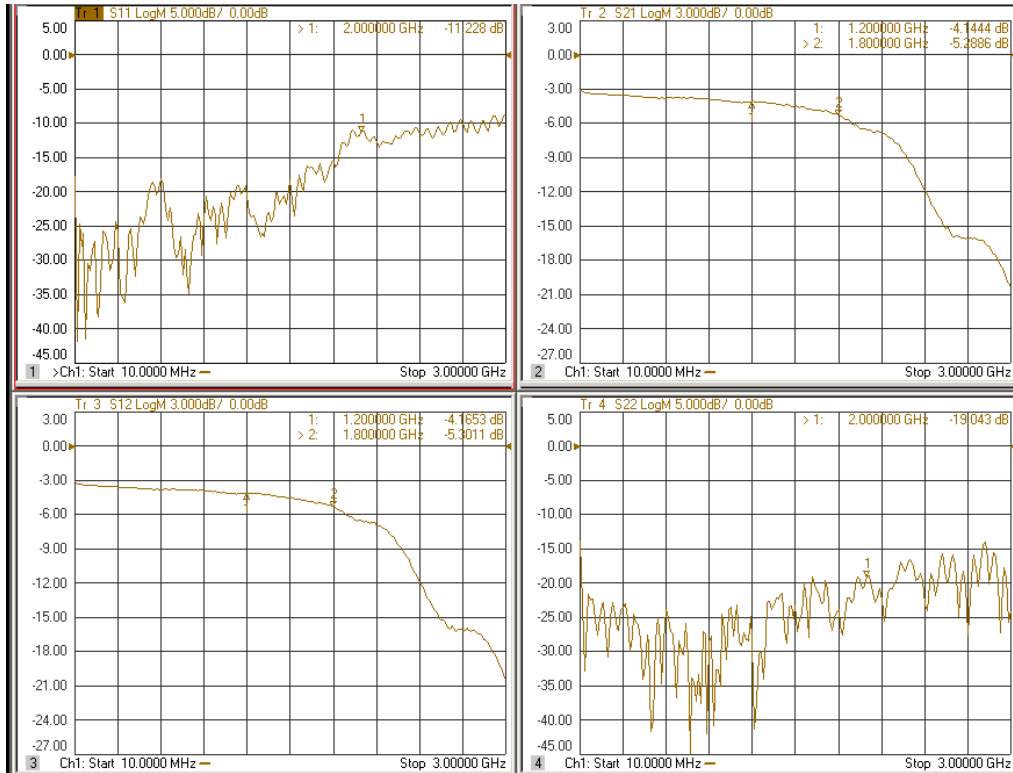Figure 183: Scattering matrix for channel 3J, polarization x and output 6dB3.

Figure 184: Scattering matrix for channel 3J, polarization y and output 3dB1.
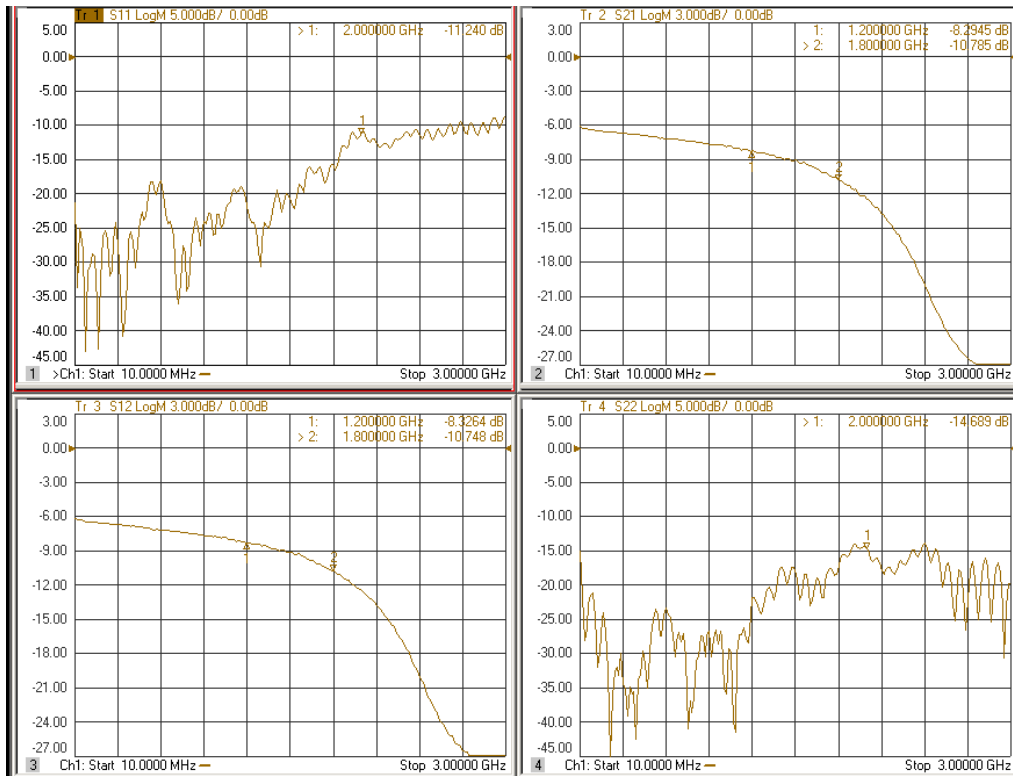

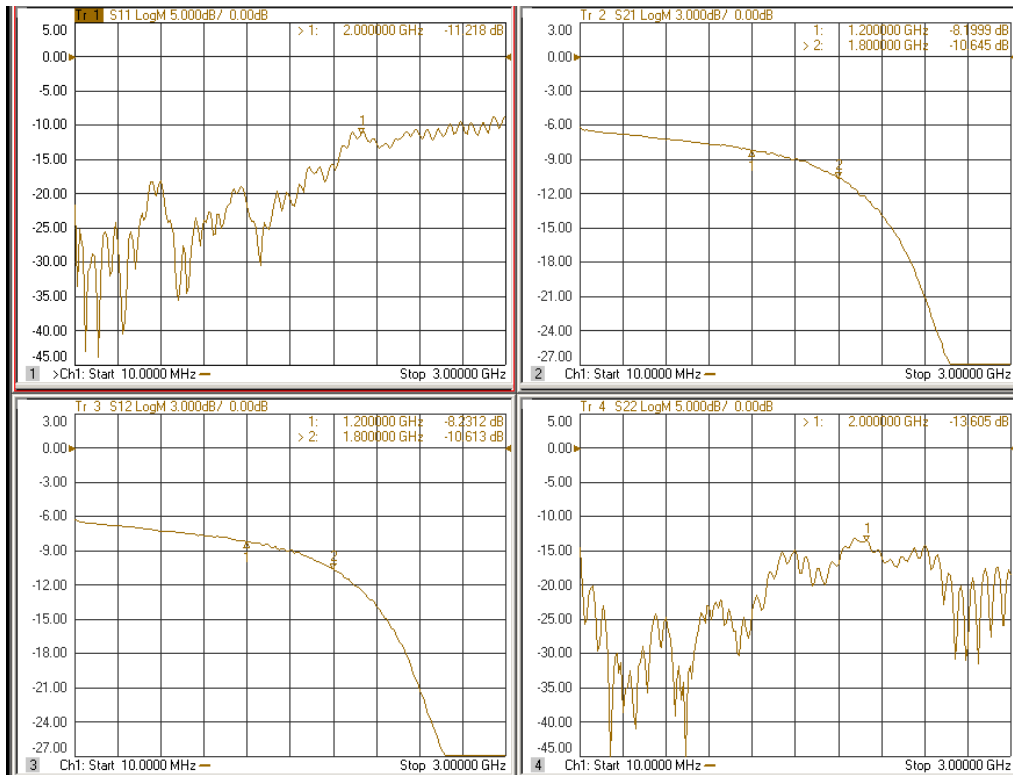Figure 185: Scattering matrix for channel 3J, polarization y and output 6dB2.

Figure 186: Scattering matrix for channel 3J, polarization y and output 6dB3.
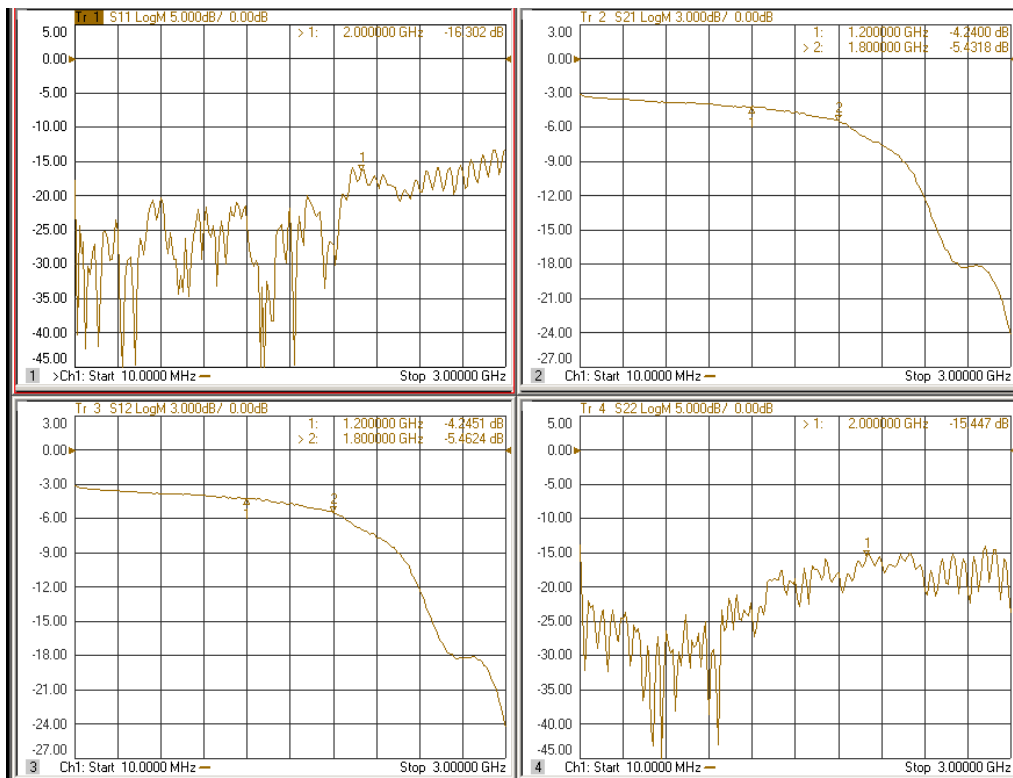

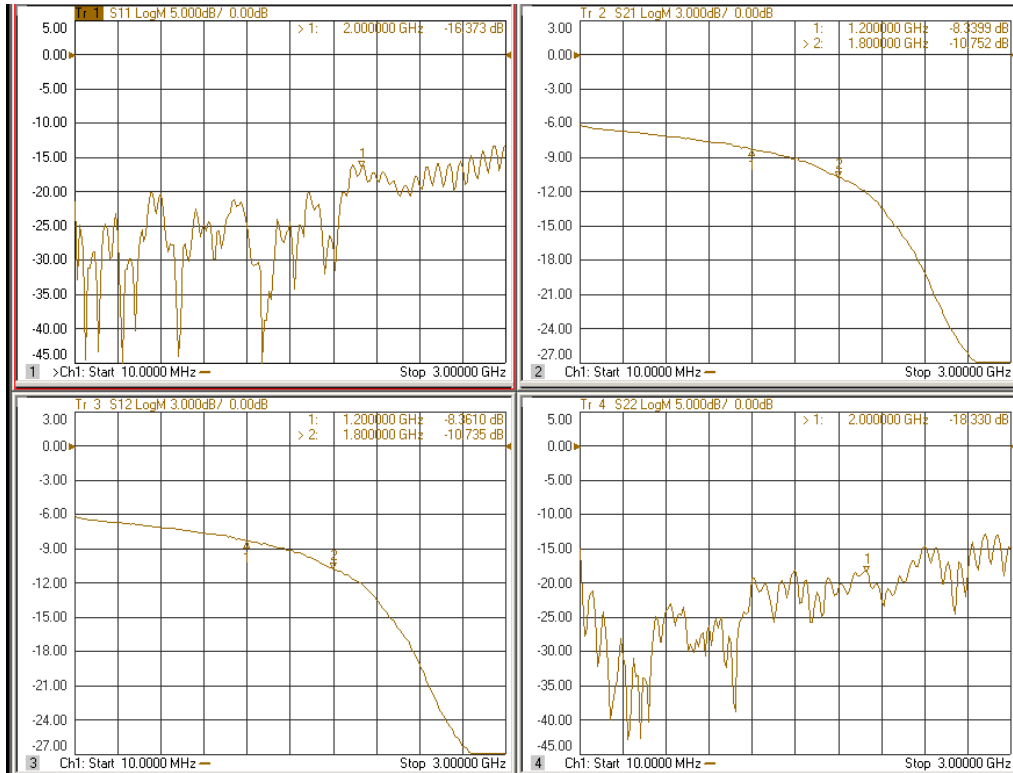Figure 187: Scattering matrix for channel 3L, polarization x and output 3dB1.

Figure 188: Scattering matrix for channel 3L, polarization x and output 6dB2.
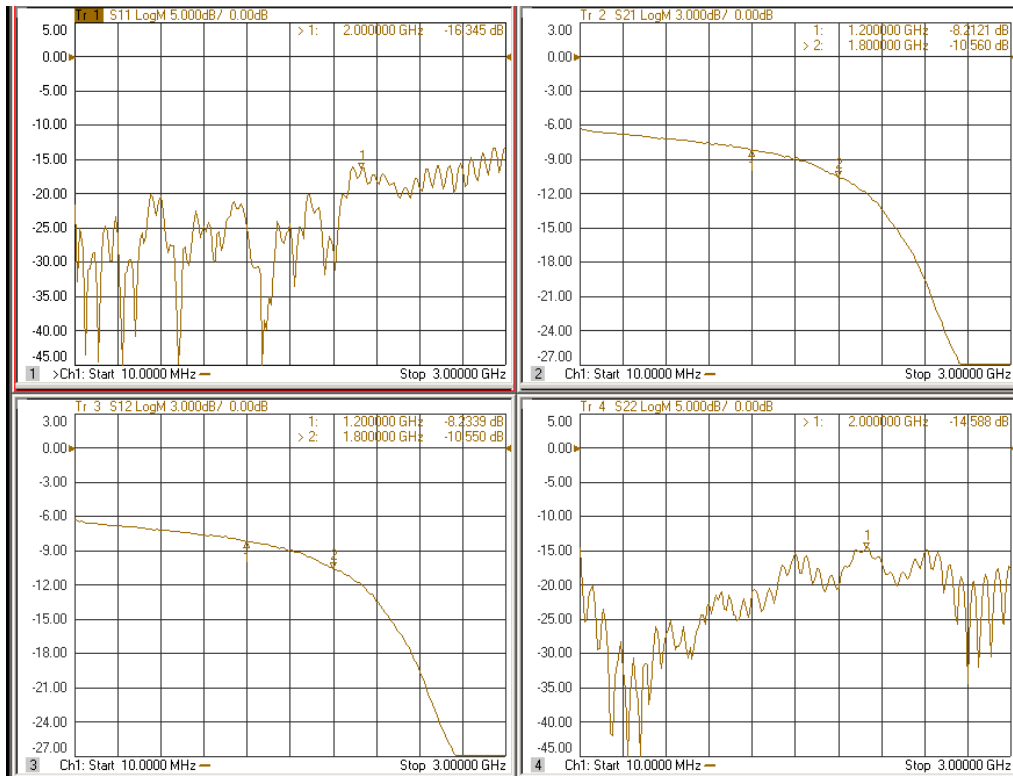

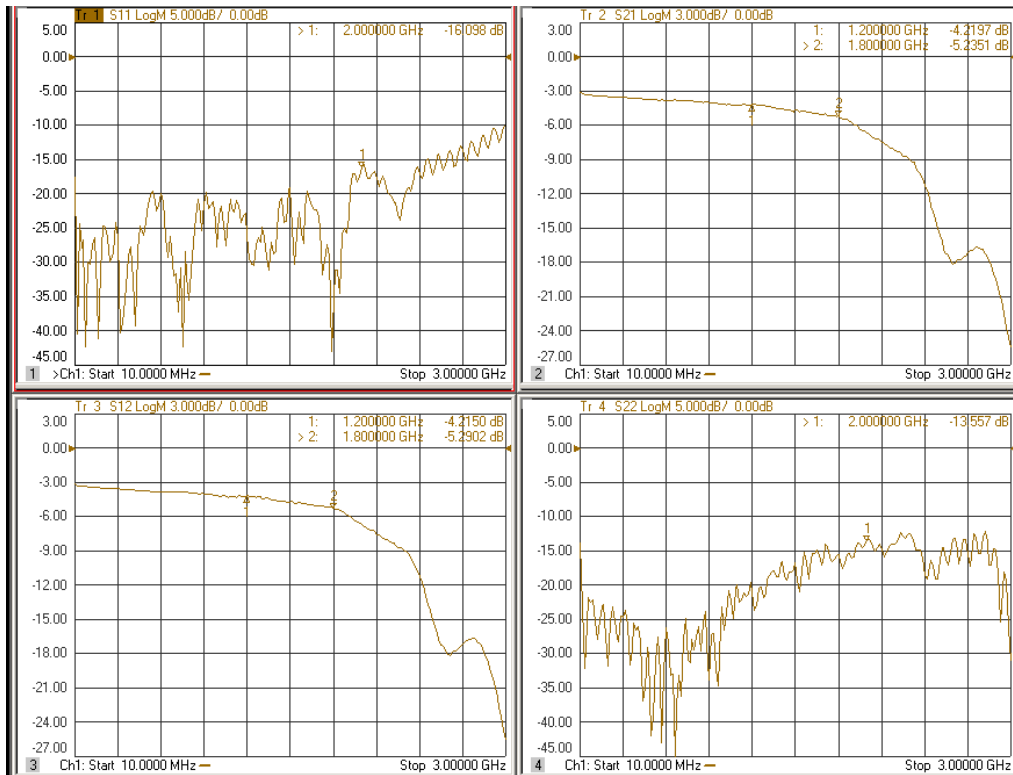Figure 189: Scattering matrix for channel 3L, polarization x and output 6dB3.

Figure 190: Scattering matrix for channel 3L, polarization y and output 3dB1.
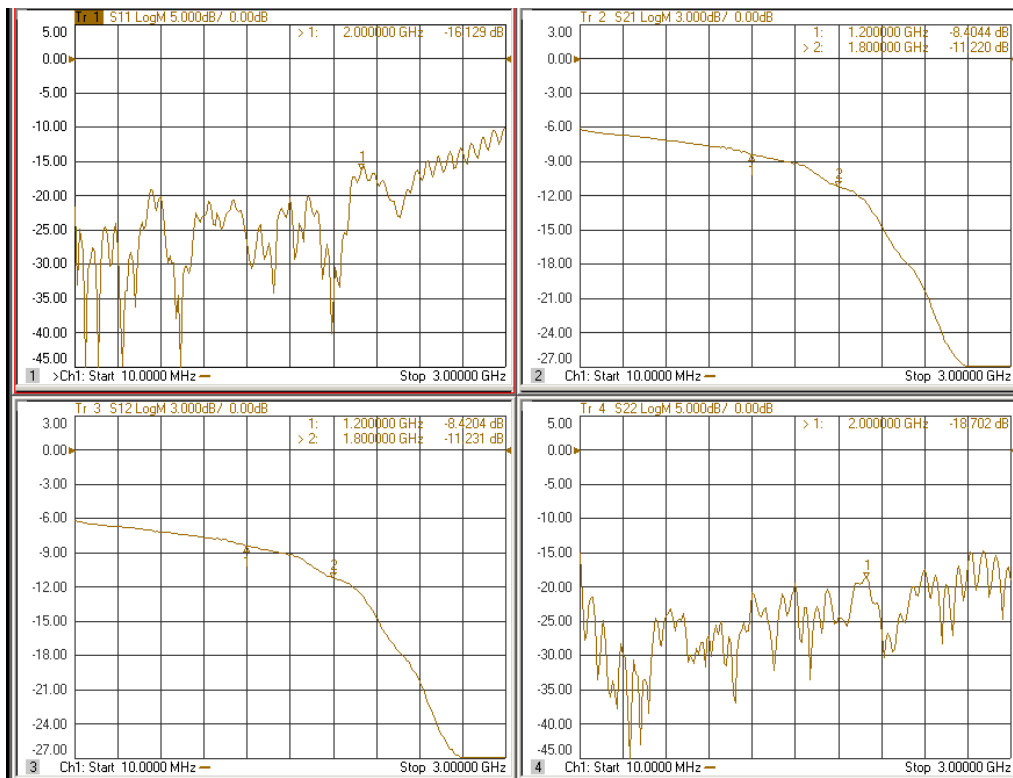

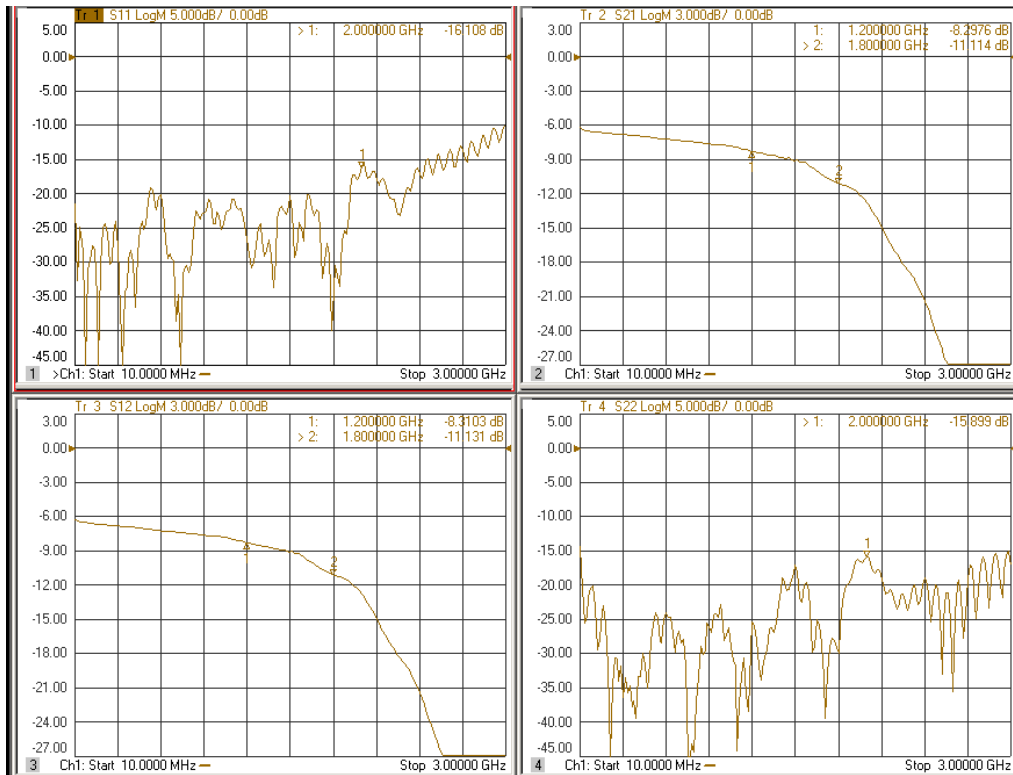Figure 191: Scattering matrix for channel 3L, polarization y and output 6dB2.

Figure 192: Scattering matrix for channel 3L, polarization y and output 6dB3.
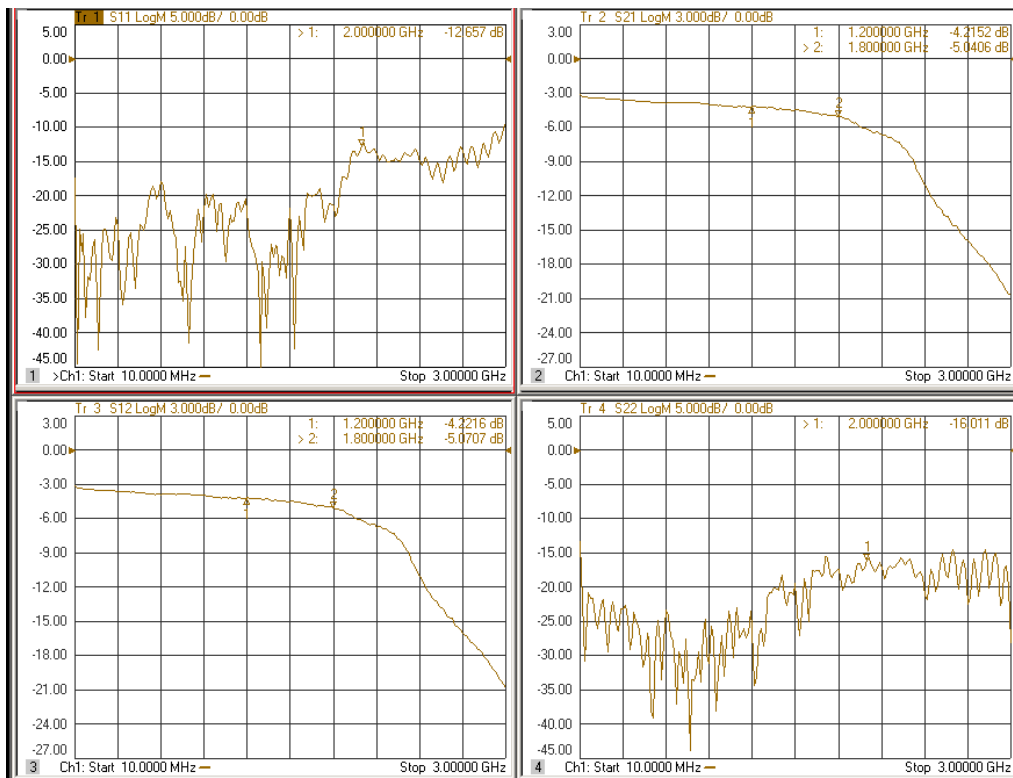

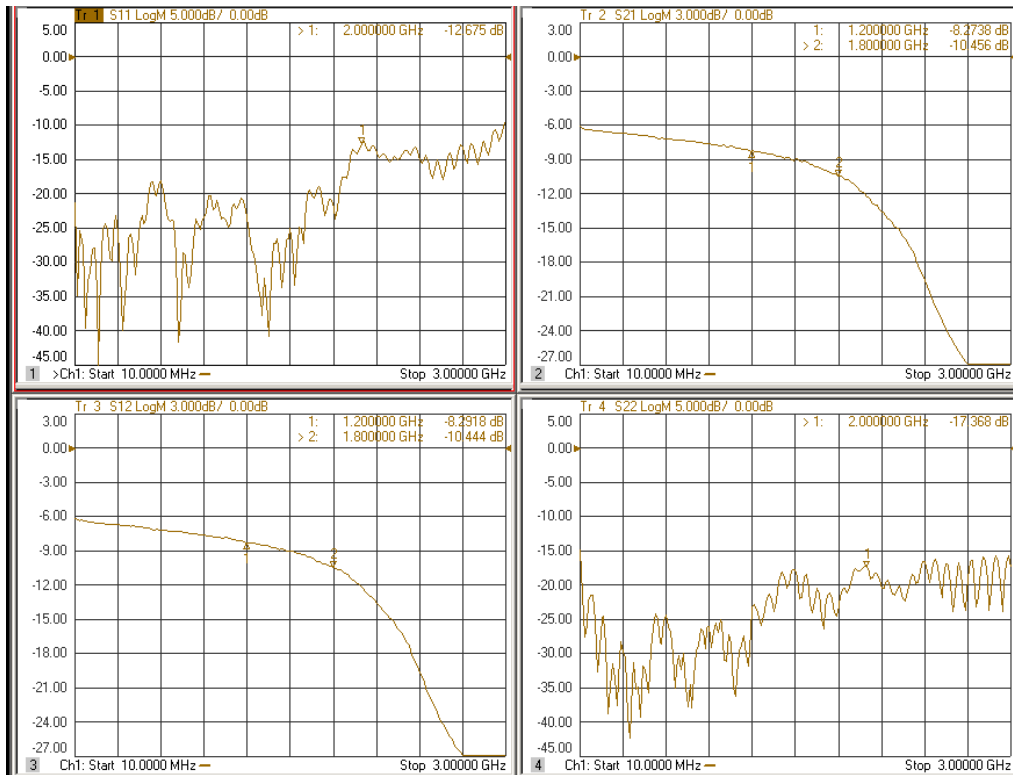Figure 193: Scattering matrix for channel 4E, polarization x and output 3dB1.

Figure 194: Scattering matrix for channel 4E, polarization x and output 6dB2.
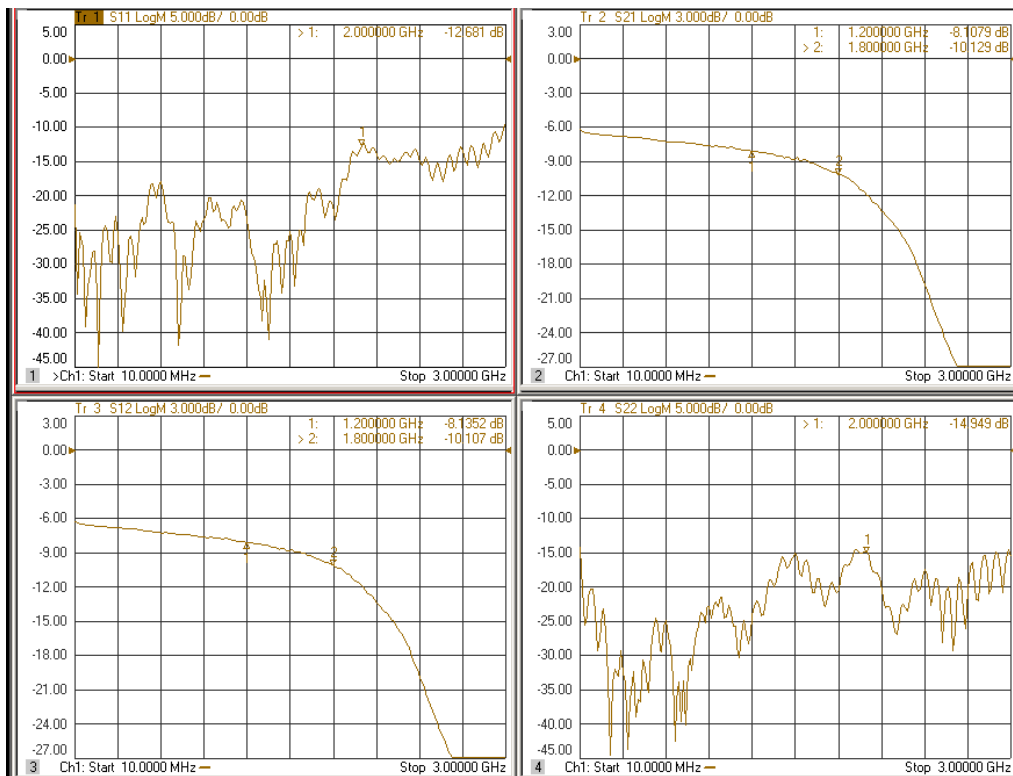

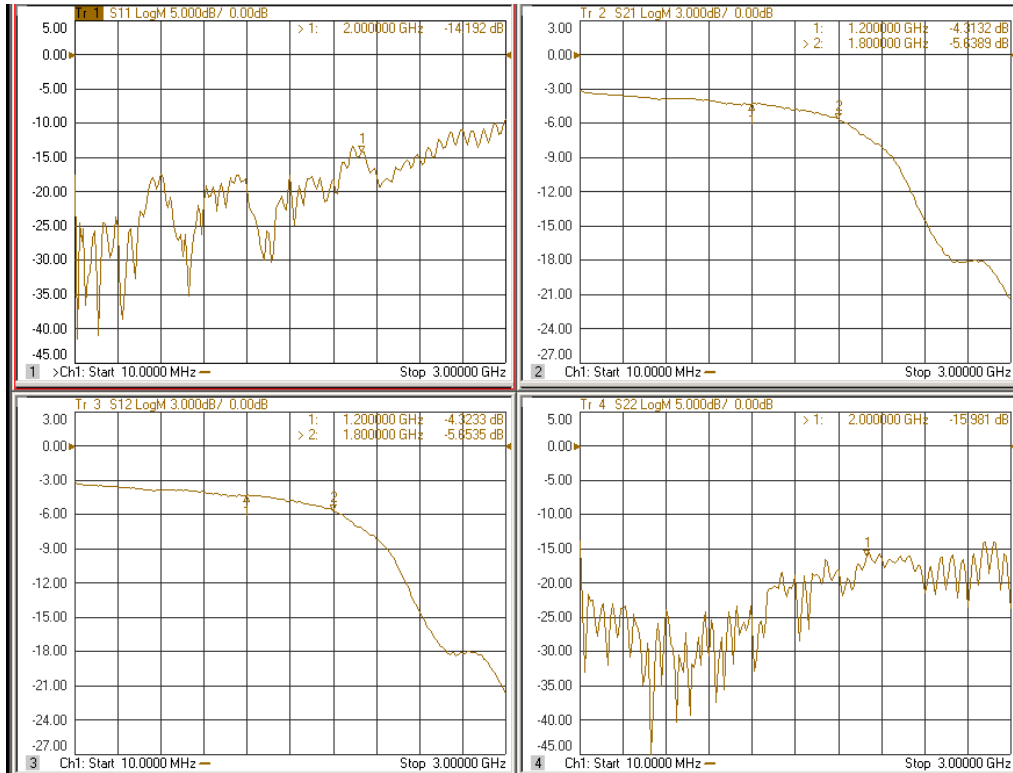Figure 195: Scattering matrix for channel 4E, polarization x and output 6dB3.

Figure 196: Scattering matrix for channel 4E, polarization y and output 3dB1.
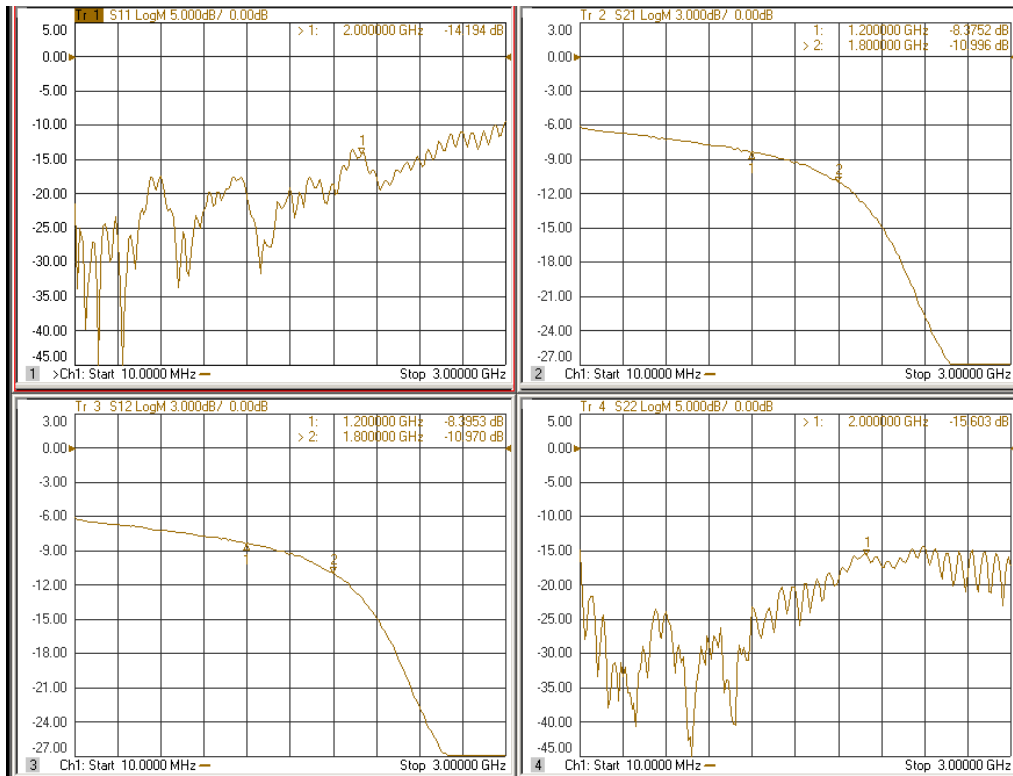

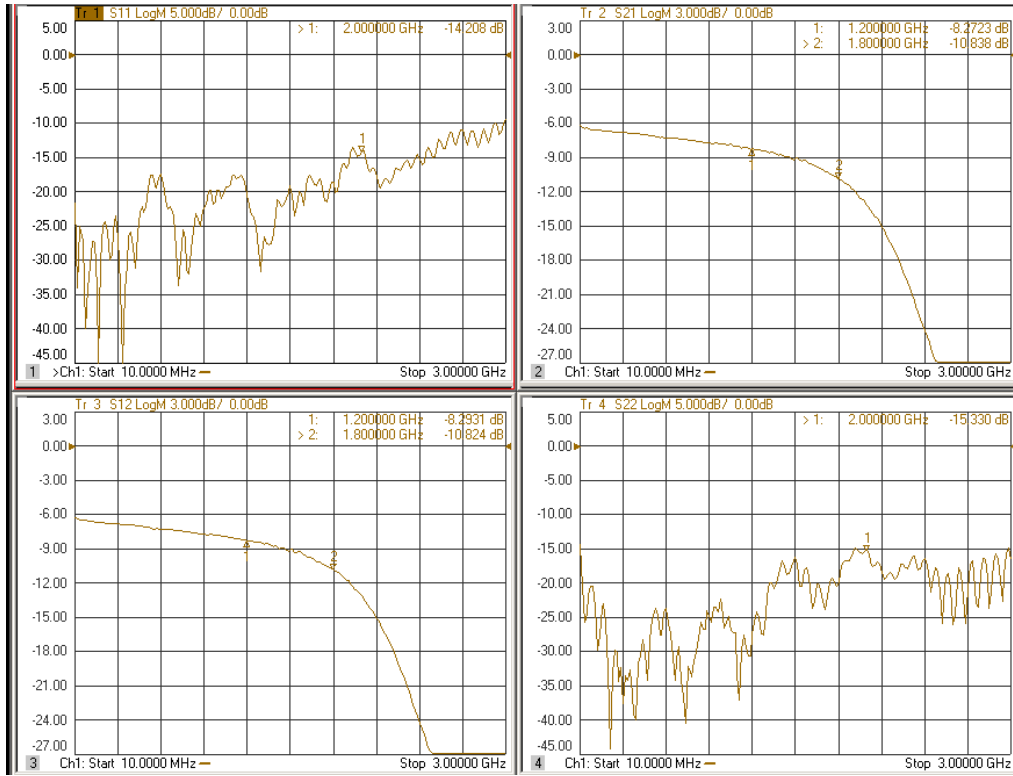Figure 197: Scattering matrix for channel 4E, polarization y and output 6dB2.

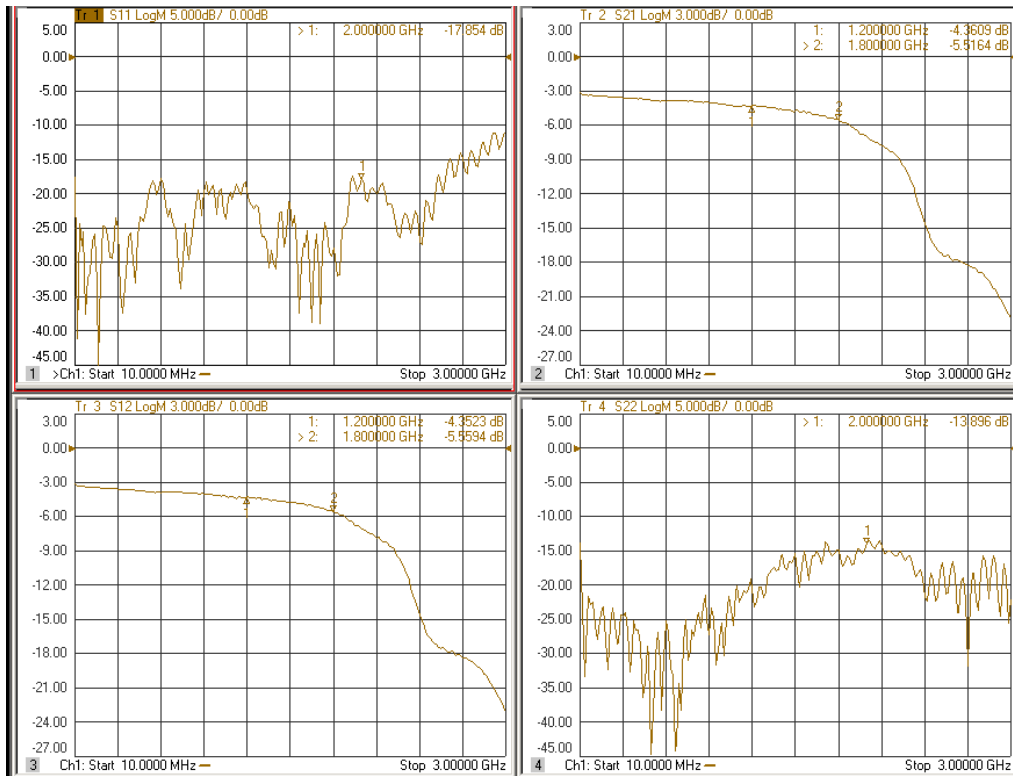Figure 198: Scattering matrix for channel 4E, polarization y and output 6dB3.

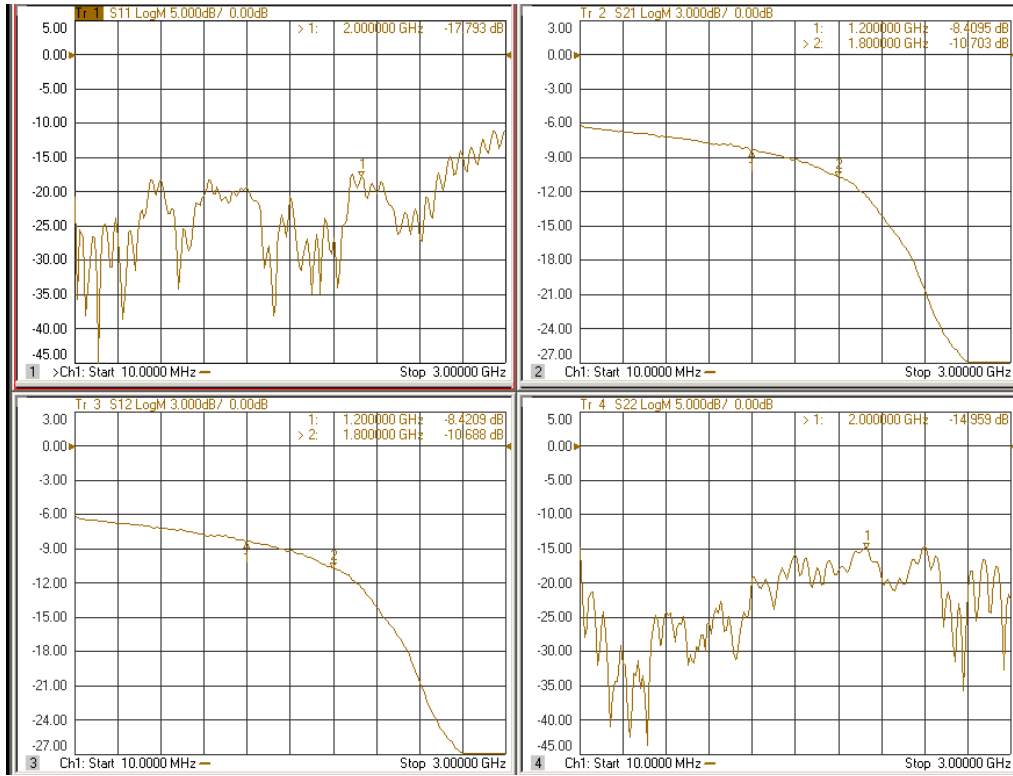Figure 199: Scattering matrix for channel 4F, polarization x and output 3dB1.

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Figure 200: Scattering matrix for channel 4F, polarization x and output 6dB2.
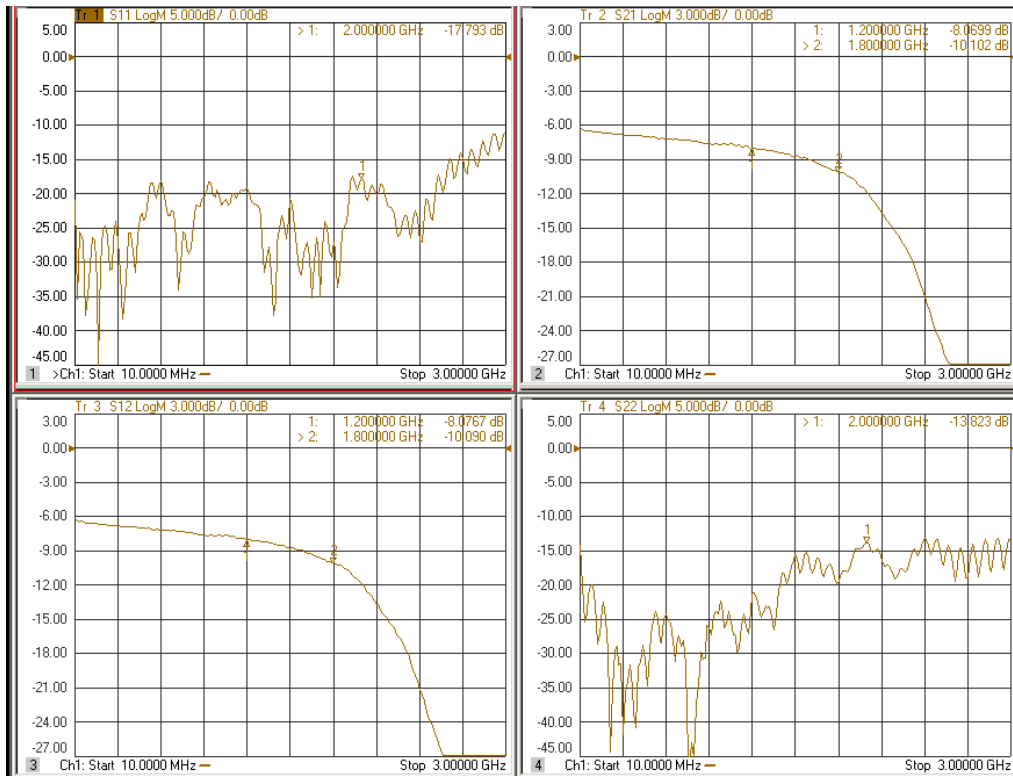

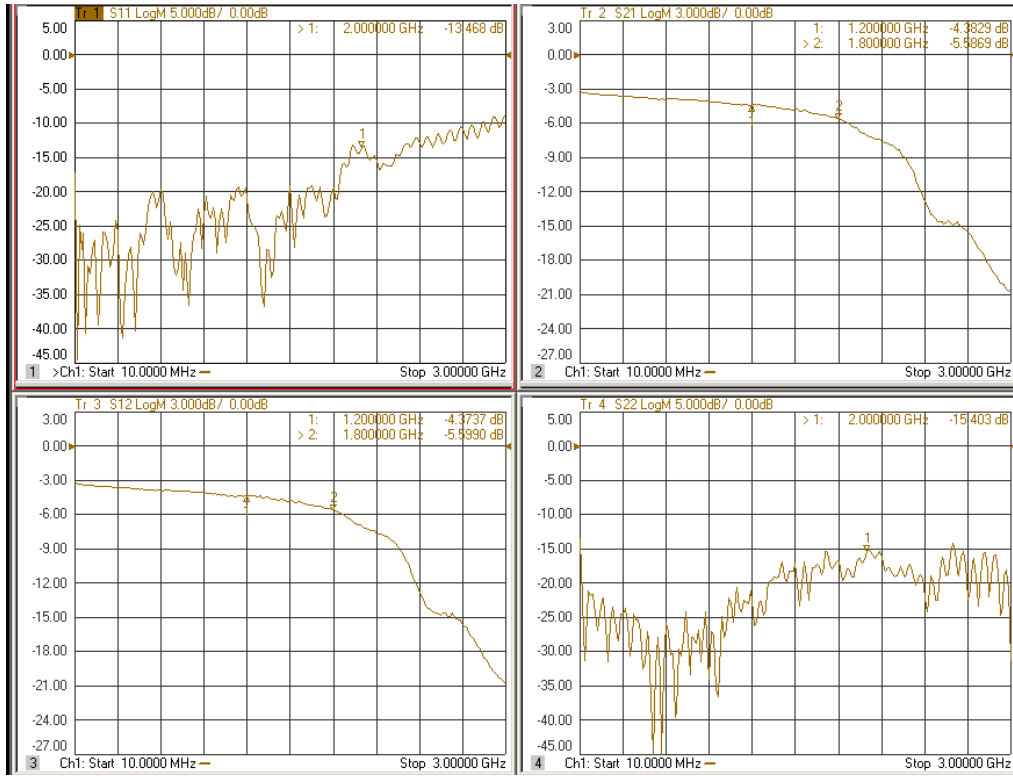Figure 201: Scattering matrix for channel 4F, polarization x and output 6dB3.

Figure 202: Scattering matrix for channel 4F, polarization y and output 3dB1.
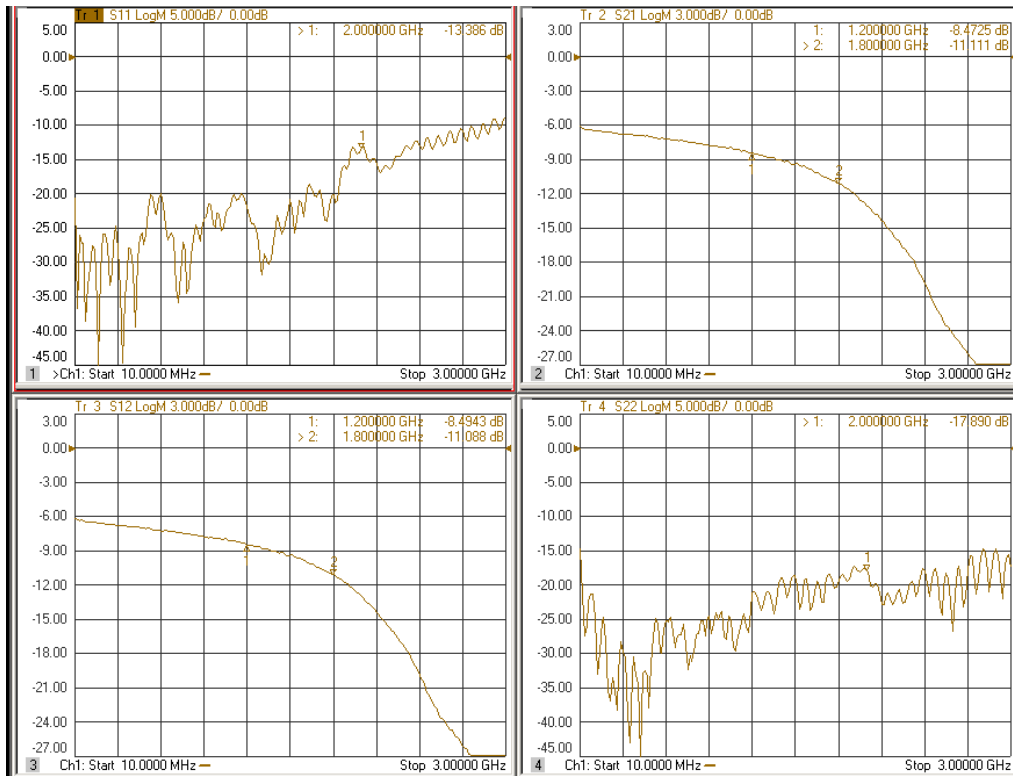

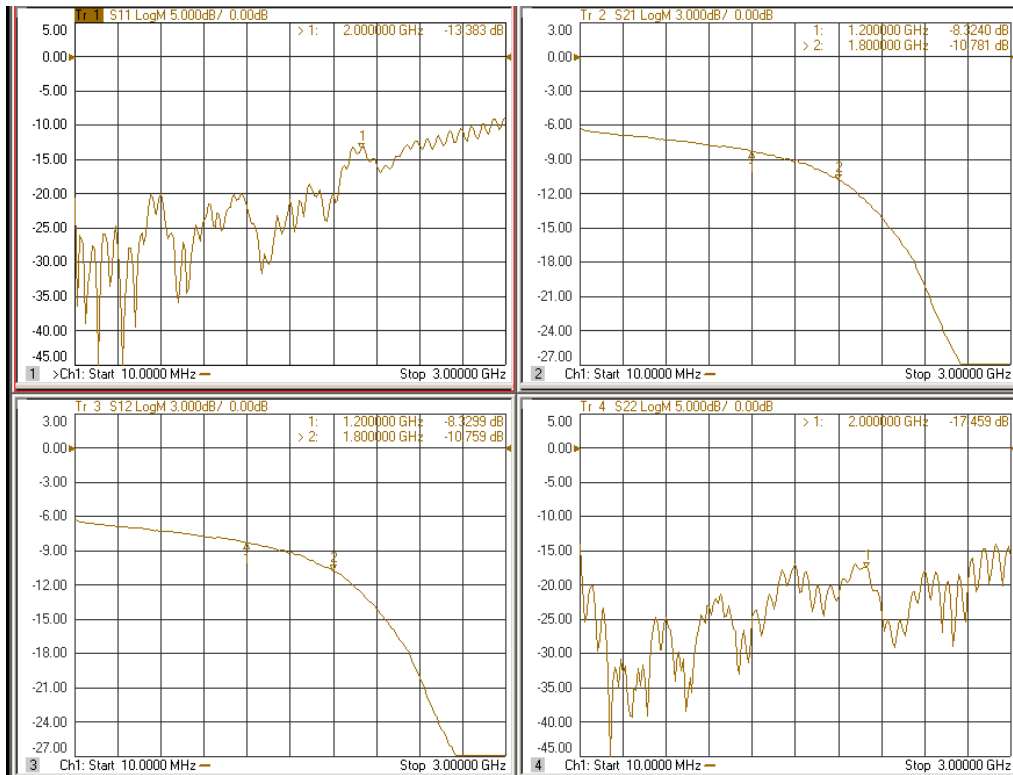Figure 203: Scattering matrix for channel 4F, polarization y and output 6dB2.

Figure 204: Scattering matrix for channel 4F, polarization y and output 6dB3.
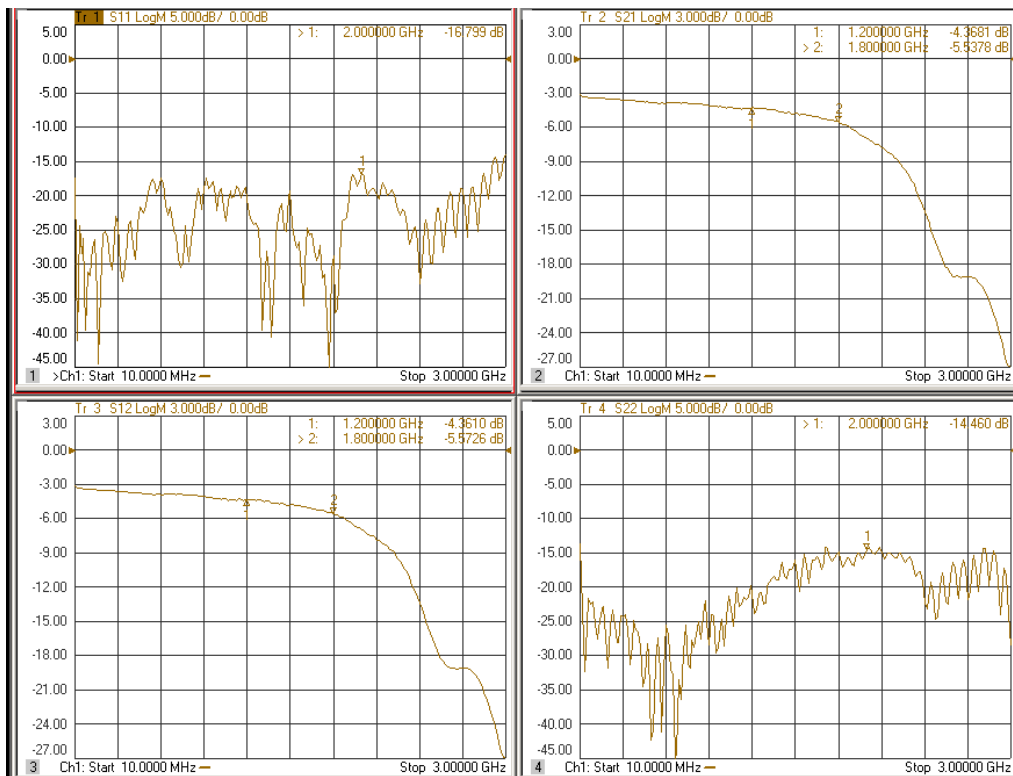

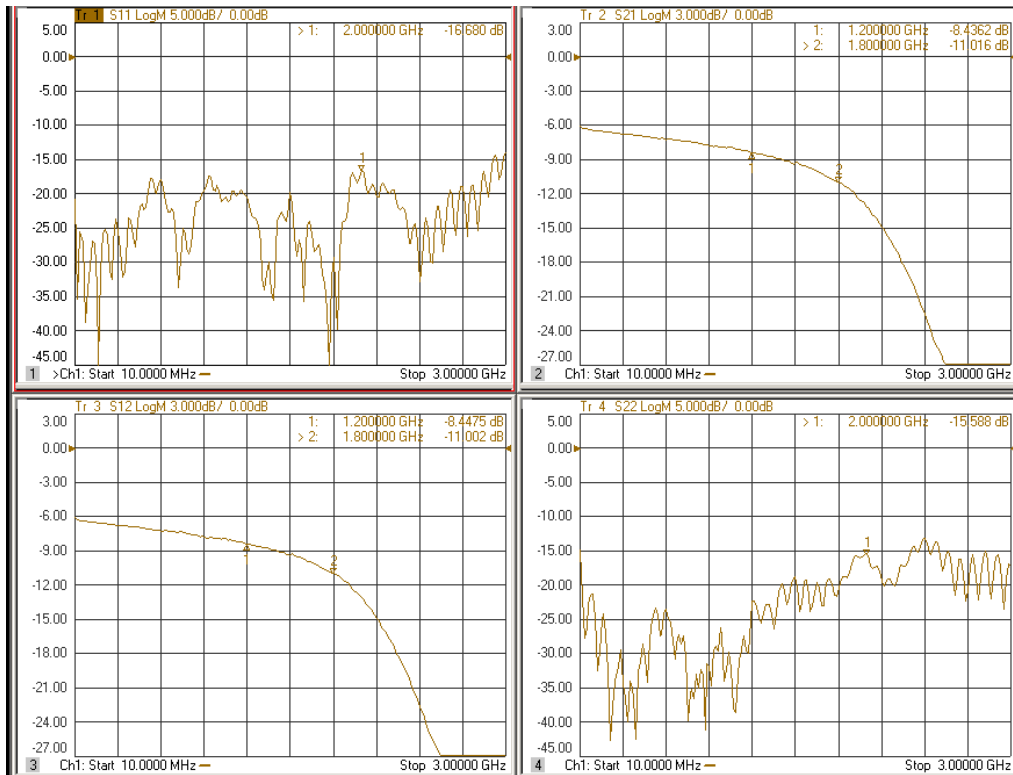Figure 205: Scattering matrix for channel 4G, polarization x and output 3dB1.

Figure 206: Scattering matrix for channel 4G, polarization x and output 6dB2.
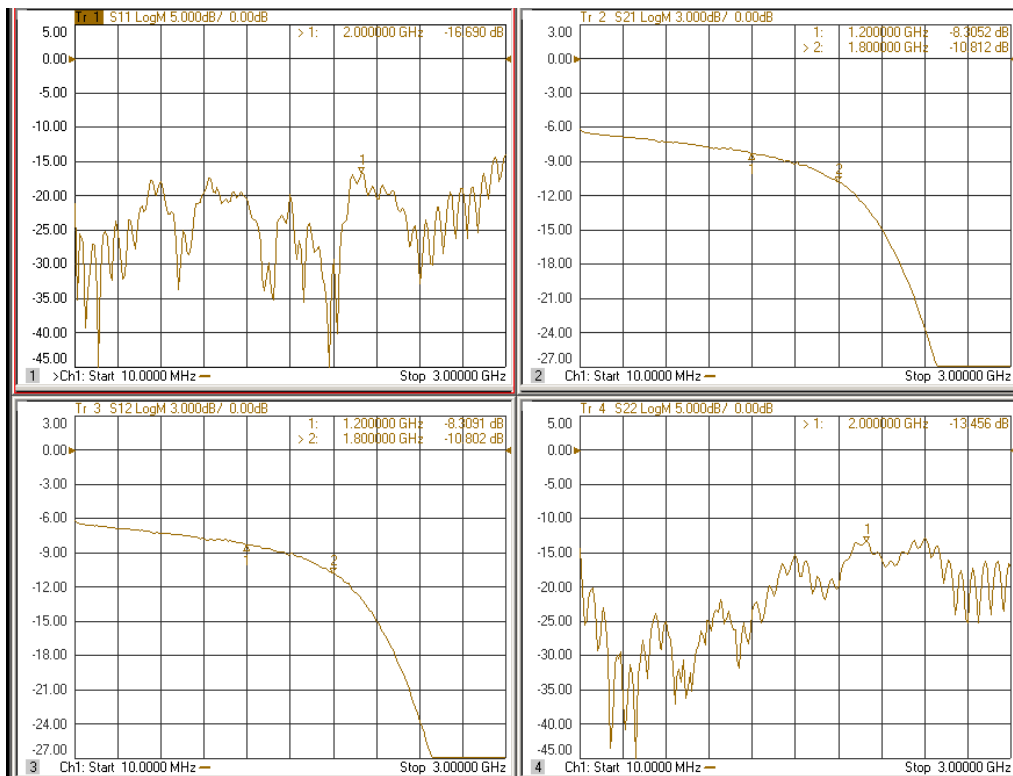

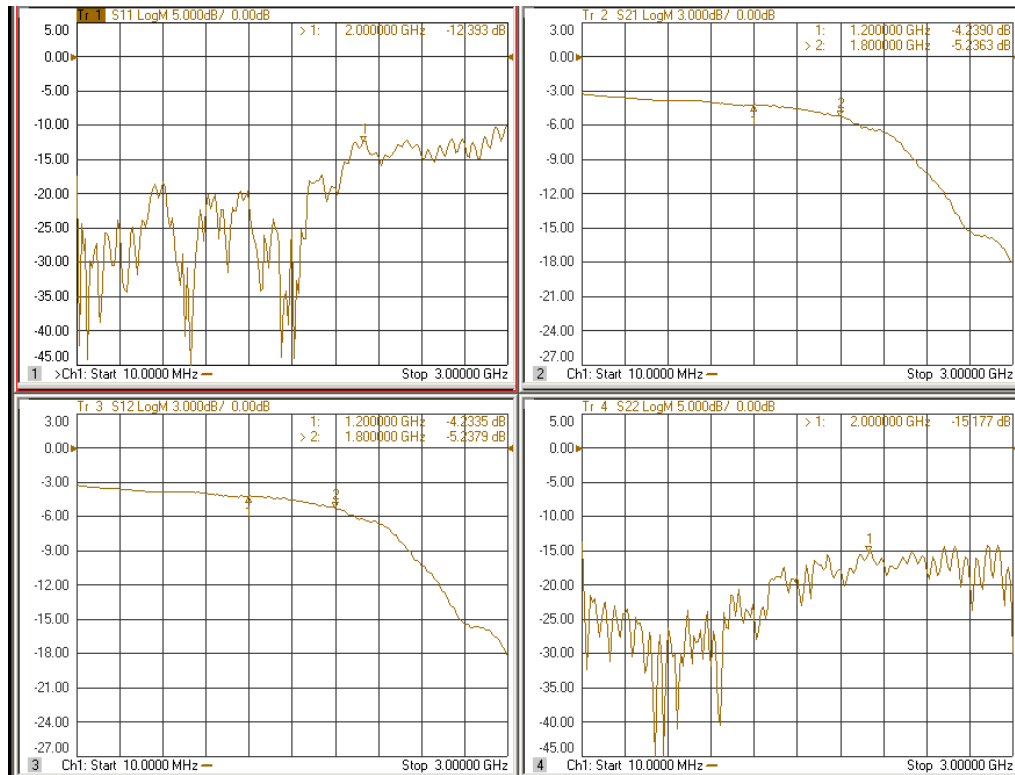Figure 207: Scattering matrix for channel 4G, polarization x and output 6dB3.

Figure 208: Scattering matrix for channel 4G, polarization y and output 3dB1.
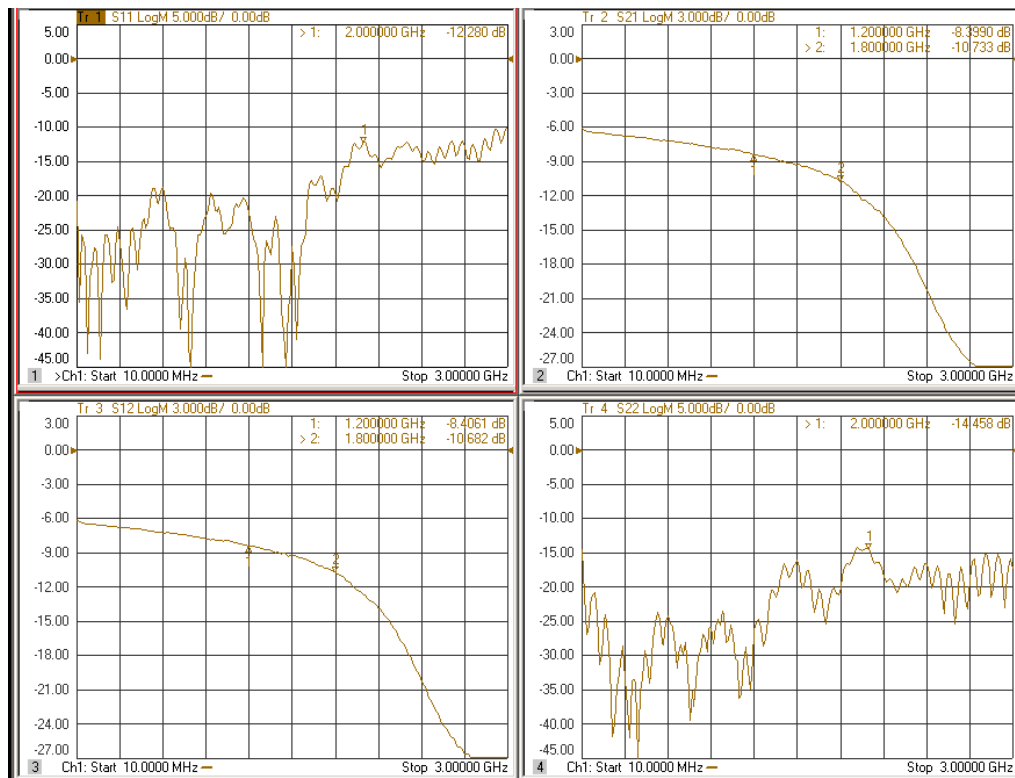

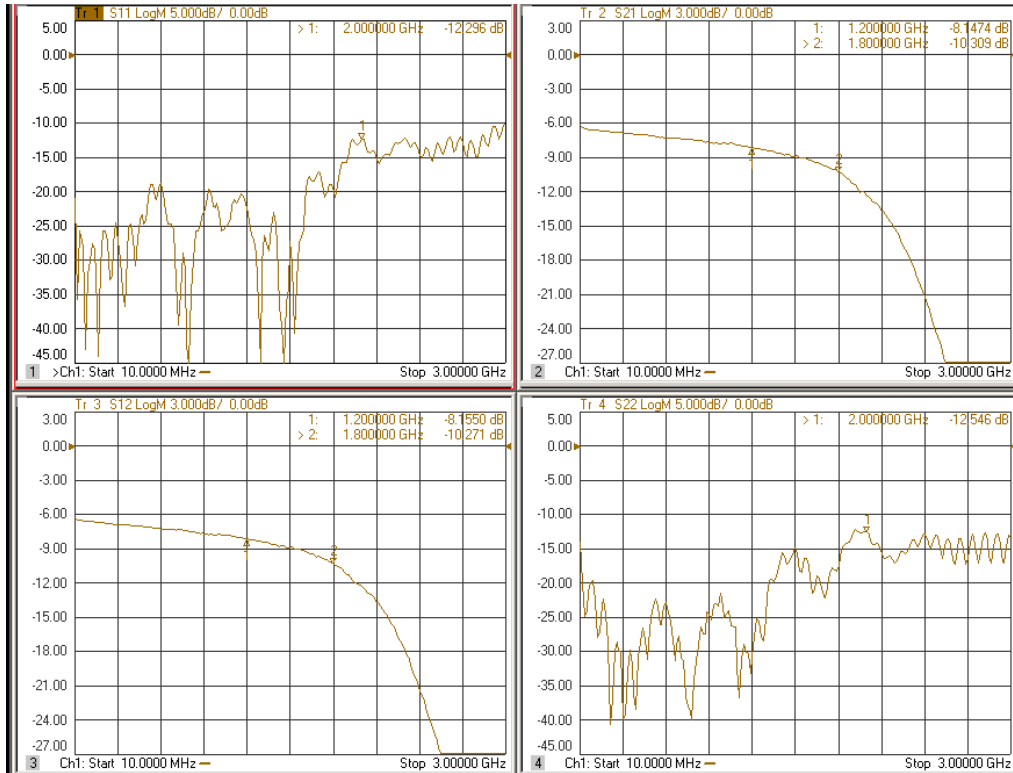Figure 209: Scattering matrix for channel 4G, polarization y and output 6dB2.

Figure 210: Scattering matrix for channel 4G, polarization y and output 6dB3.
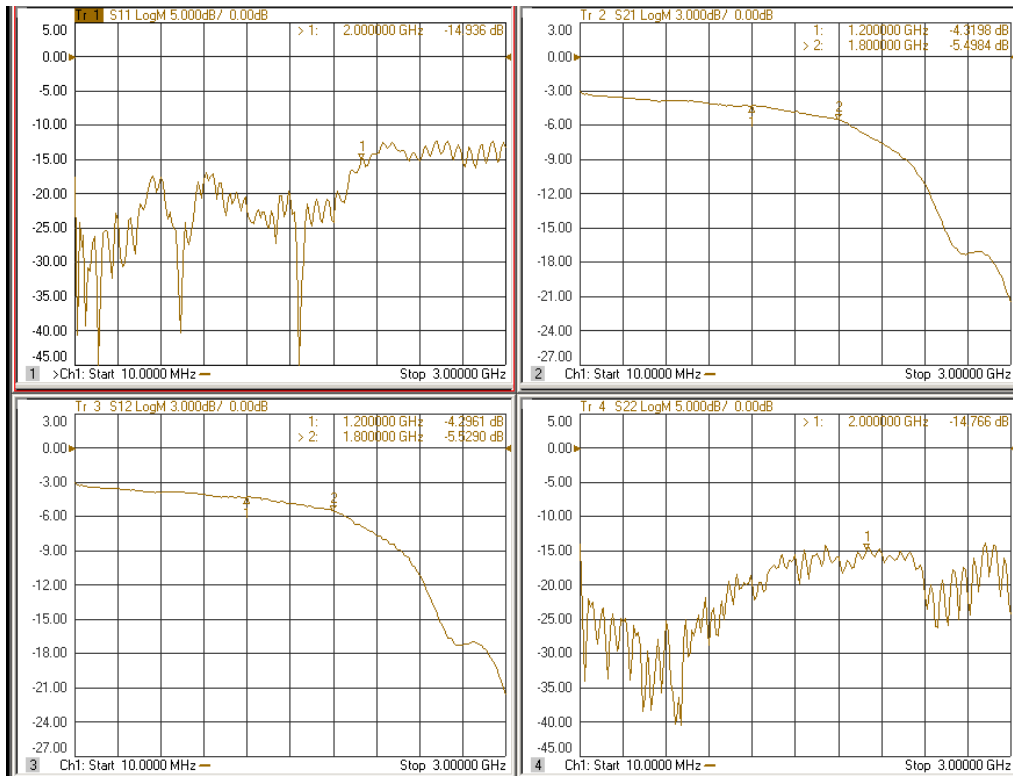

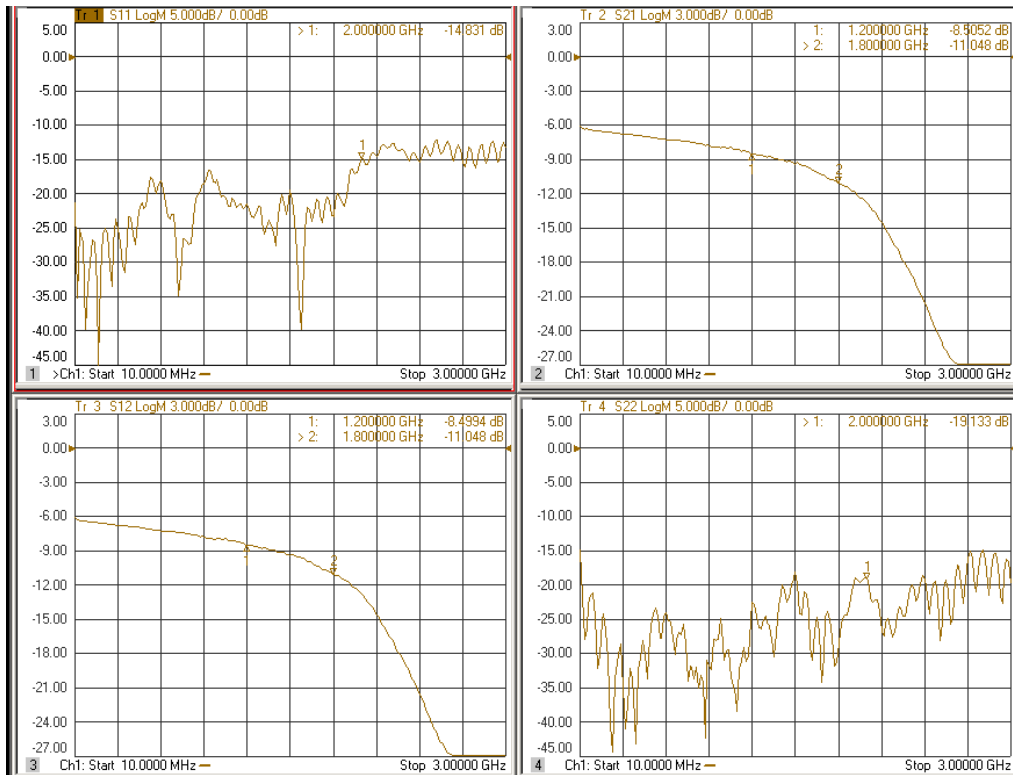Figure 211: Scattering matrix for channel 4H, polarization x and output 3dB1.

Figure 212: Scattering matrix for channel 4H, polarization x and output 6dB2.
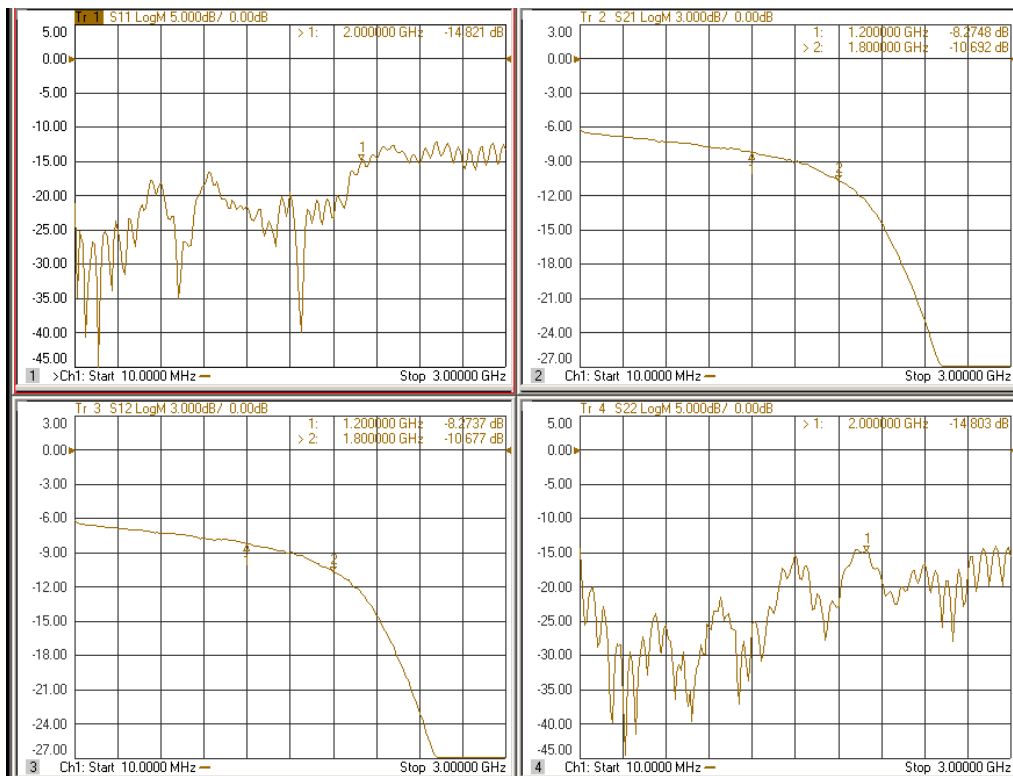

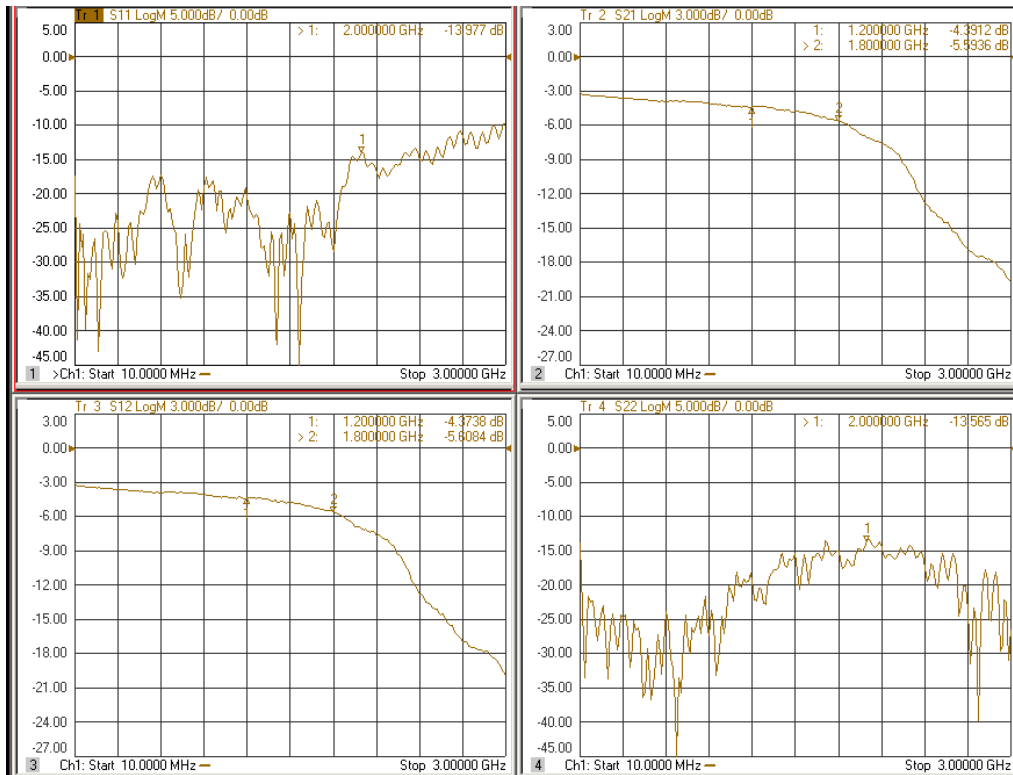Figure 213: Scattering matrix for channel 4H, polarization x and output 6dB3.

Figure 214: Scattering matrix for channel 4H, polarization y and output 3dB1.
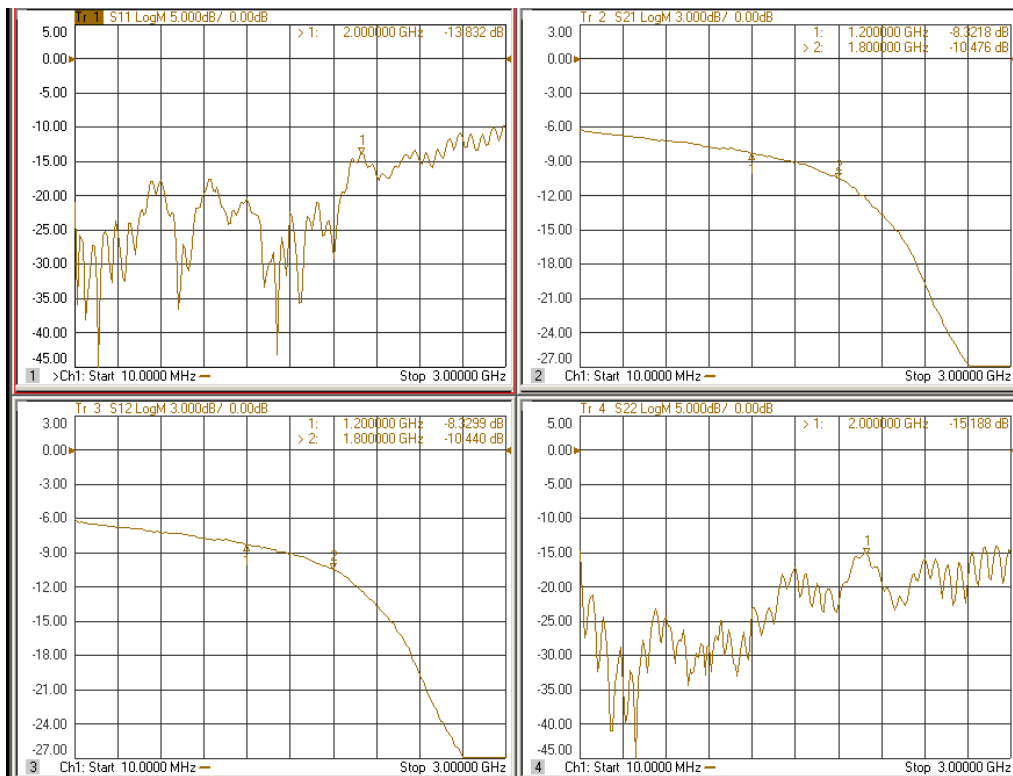

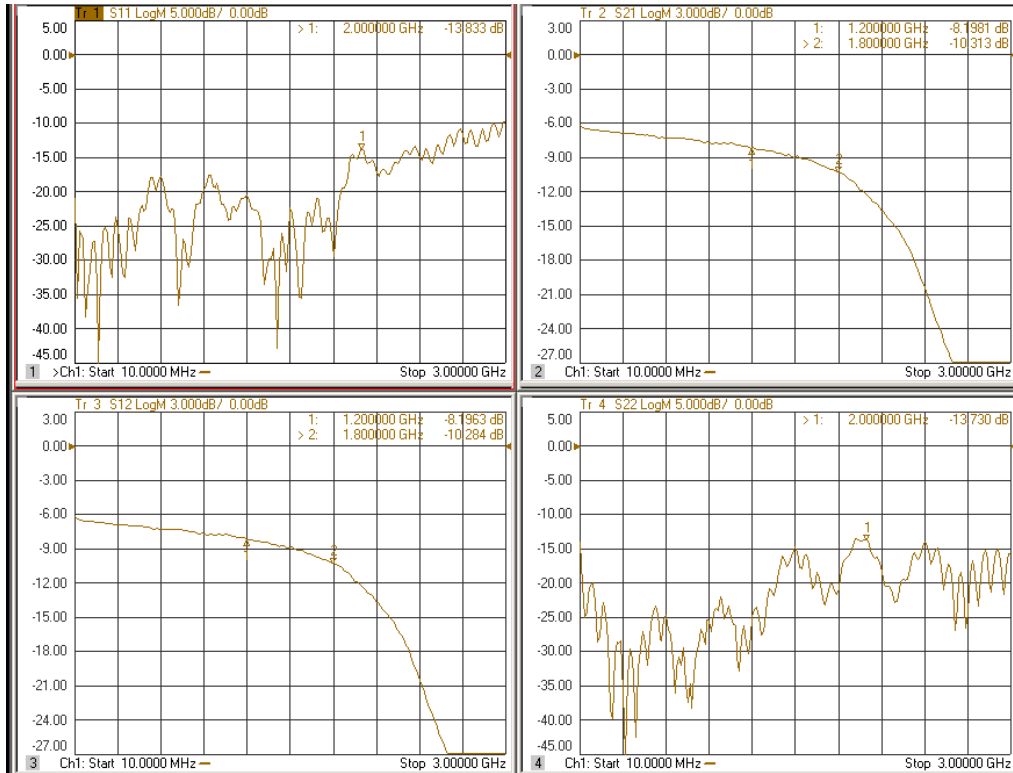Figure 215: Scattering matrix for channel 4H, polarization y and output 6dB2.

Figure 216: Scattering matrix for channel 4H, polarization y and output 6dB3.
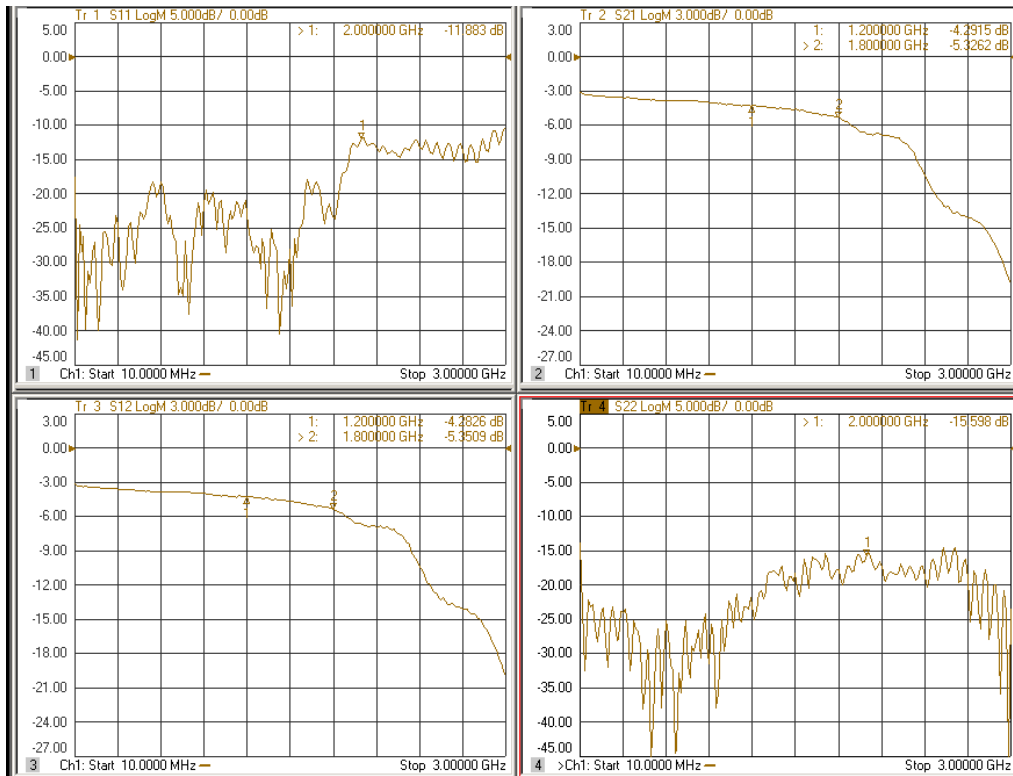

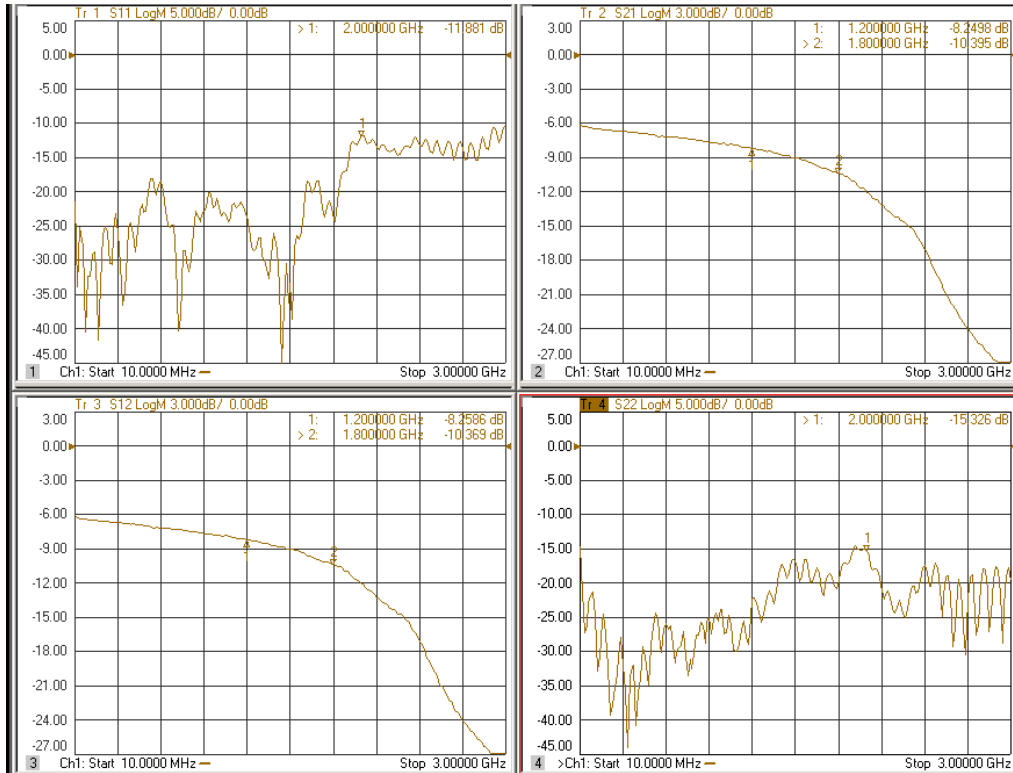Figure 217: Scattering matrix for channel 4J, polarization x and output 3dB1.

Figure 218: Scattering matrix for channel 4J, polarization x and output 6dB2.
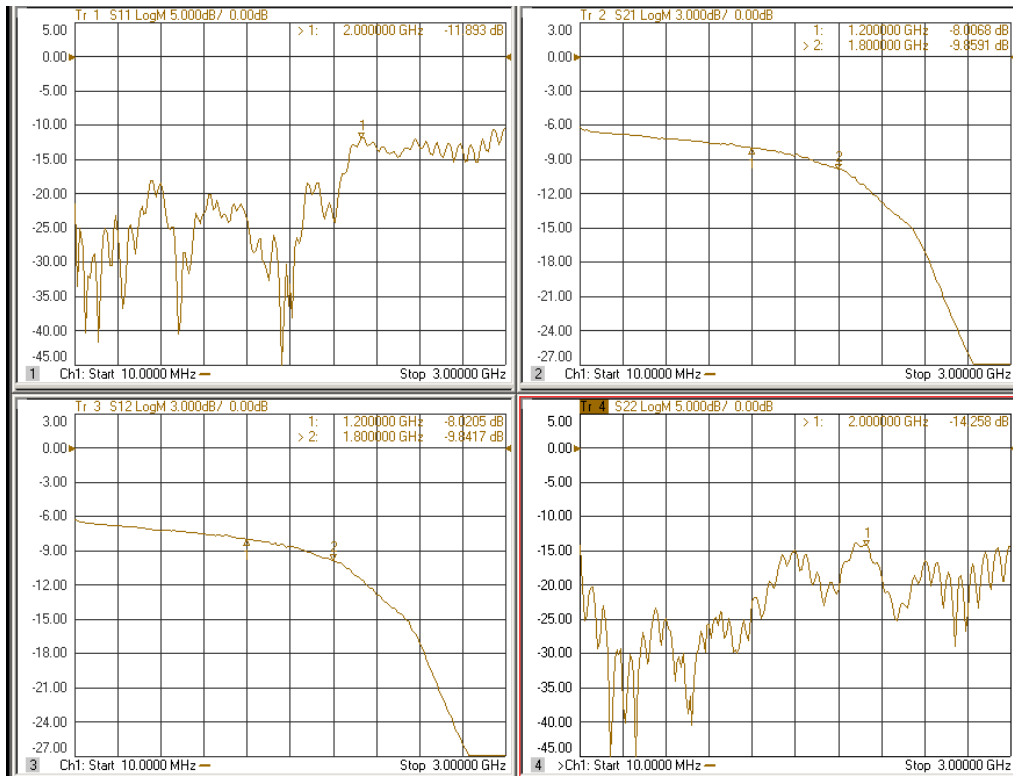

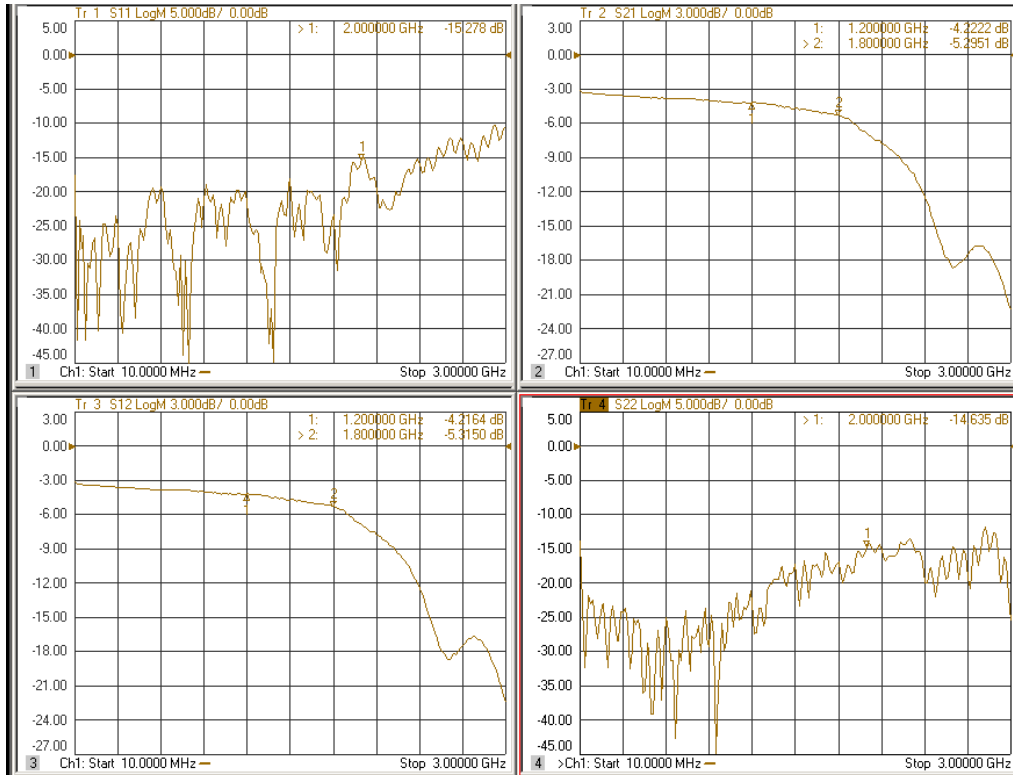Figure 219: Scattering matrix for channel 4J, polarization x and output 6dB3.

Figure 220: Scattering matrix for channel 4J, polarization y and output 3dB1.
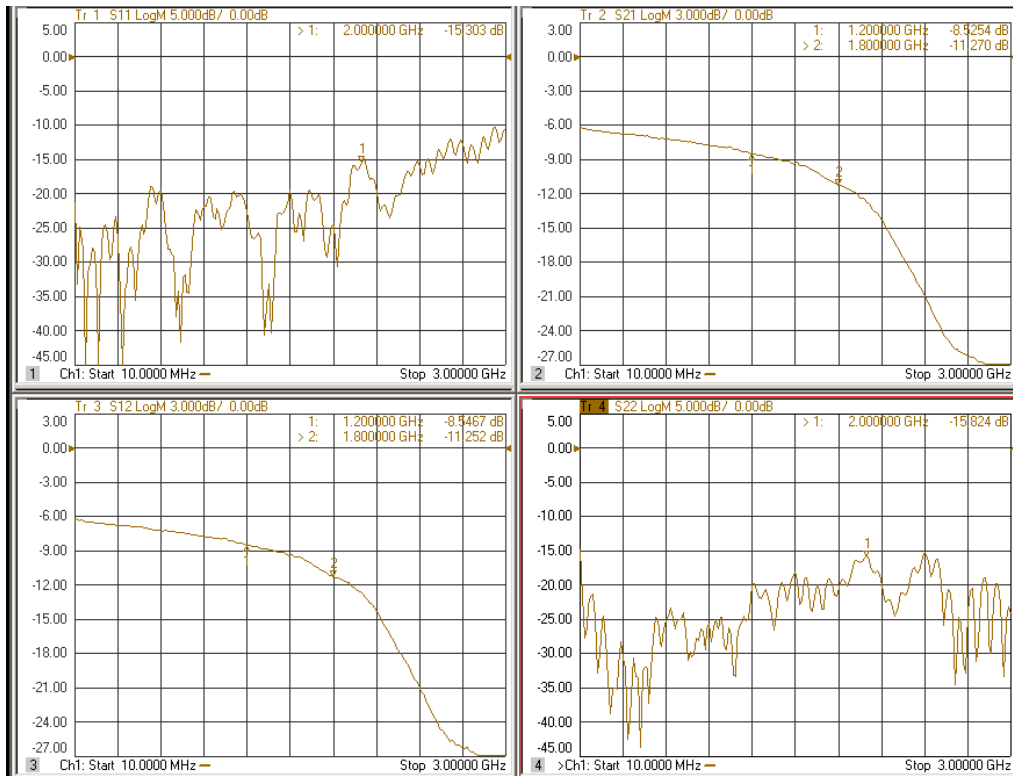

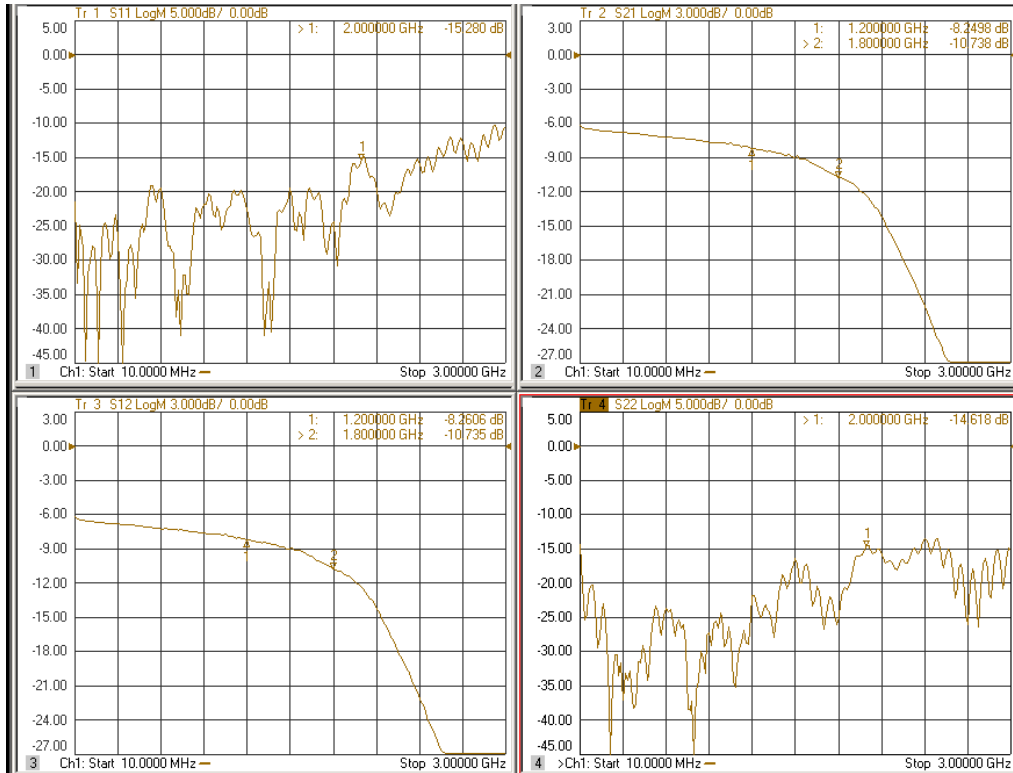Figure 221: Scattering matrix for channel 4J, polarization y and output 6dB2.

Figure 222: Scattering matrix for channel 4J, polarization y and output 6dB3.
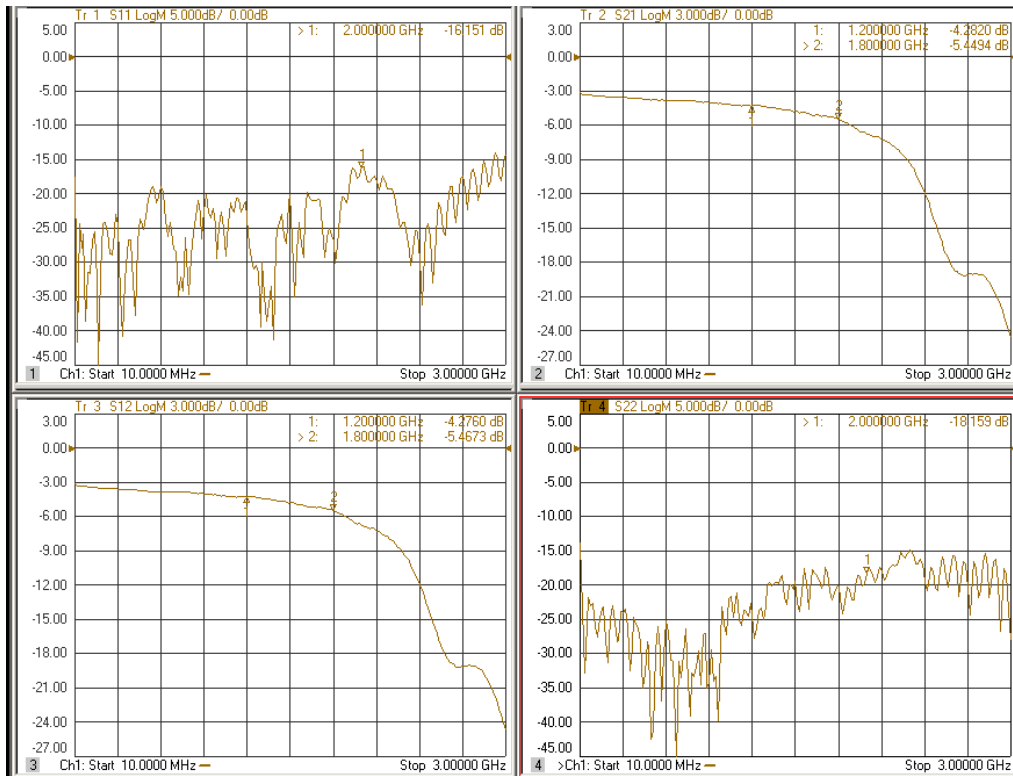

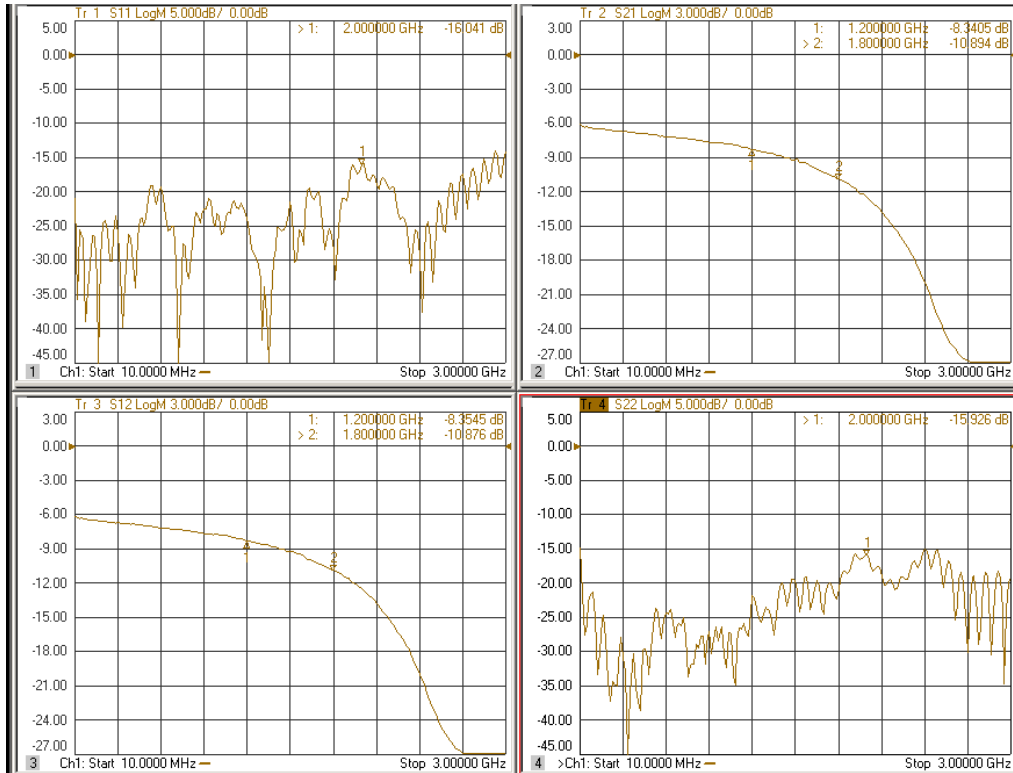Figure 223: Scattering matrix for channel 4K, polarization x and output 3dB1.

Figure 224: Scattering matrix for channel 4K, polarization x and output 6dB2.
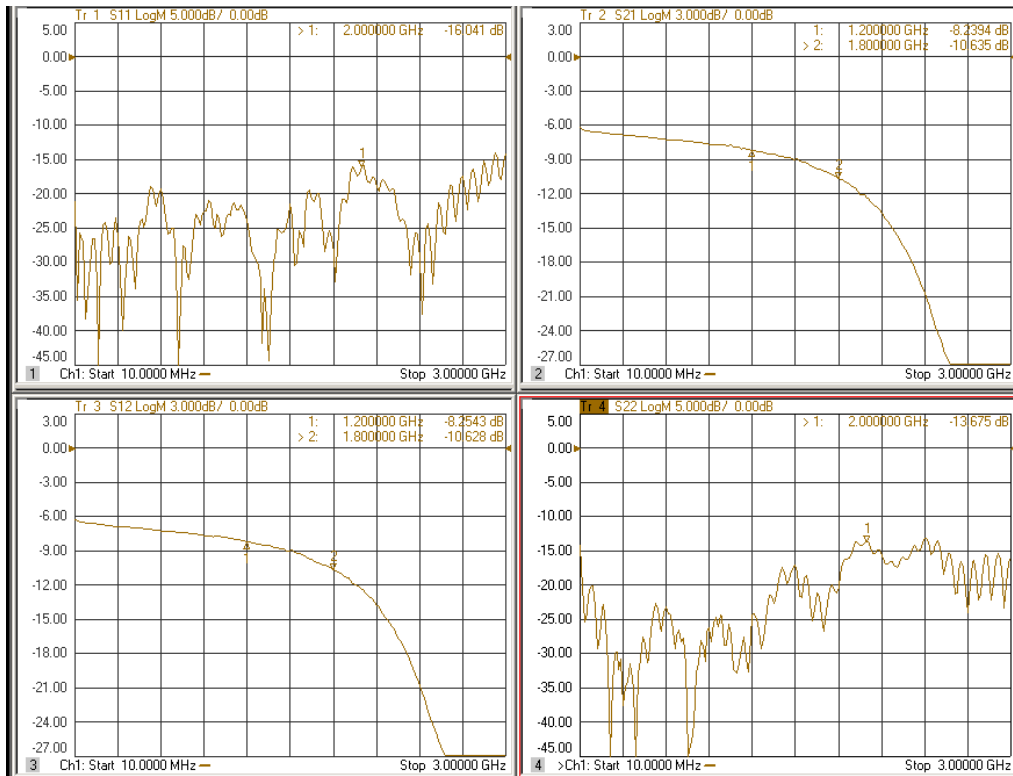

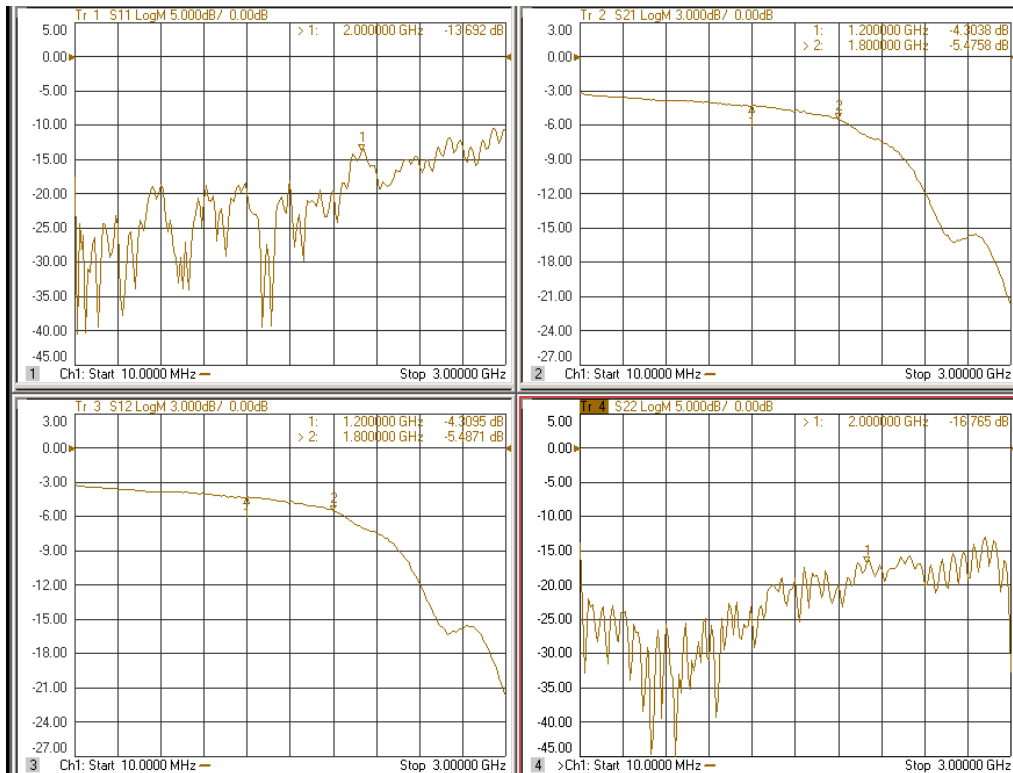Figure 225: Scattering matrix for channel 4K, polarization x and output 6dB3.

Figure 226: Scattering matrix for channel 4K, polarization y and output 3dB1.
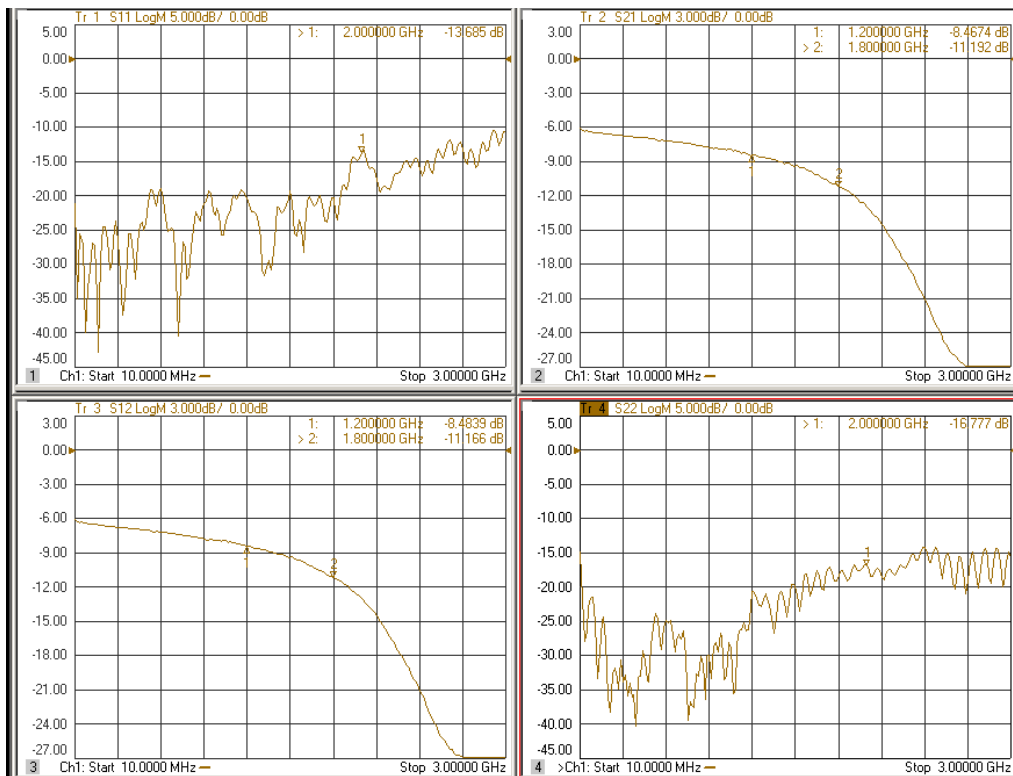

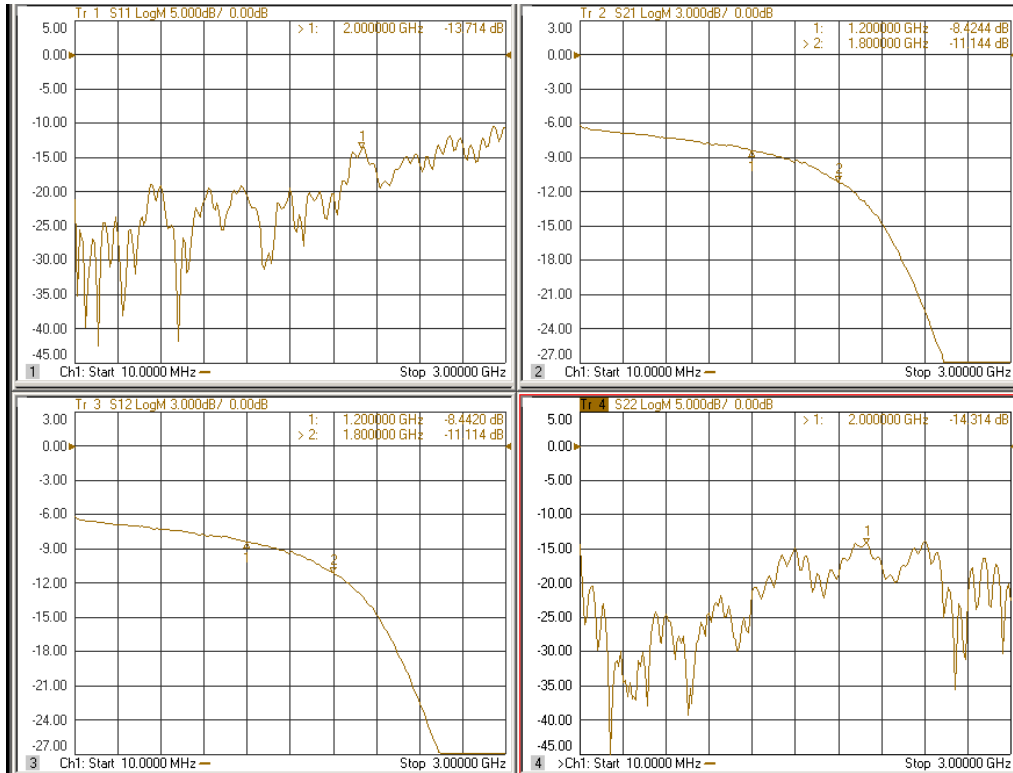Figure 227: Scattering matrix for channel 4K, polarization y and output 6dB2.

Figure 228: Scattering matrix for channel 4K, polarization y and output 6dB3.
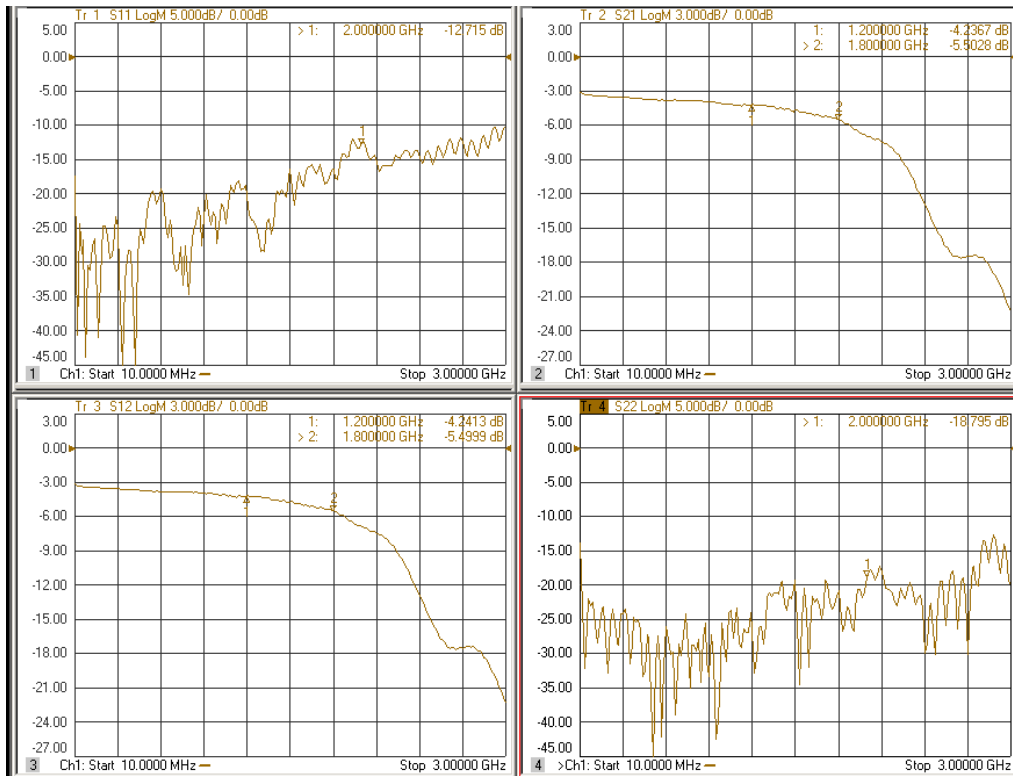

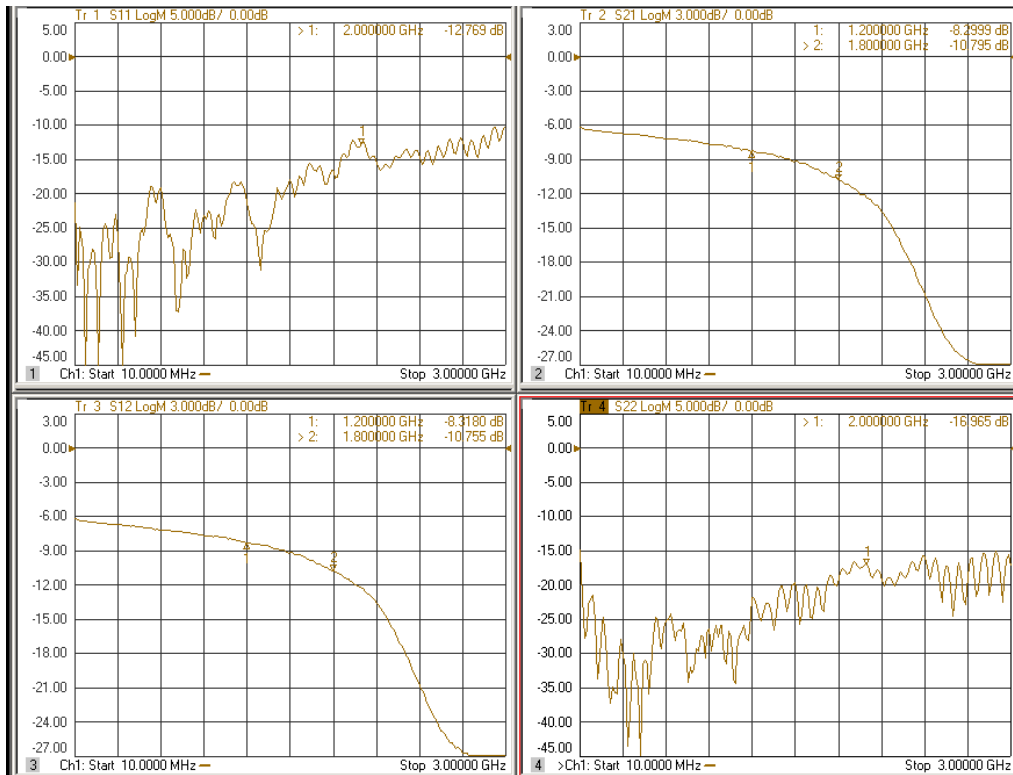Figure 229: Scattering matrix for channel 4L, polarization x and output 3dB1.

Figure 230: Scattering matrix for channel 4L, polarization x and output 6dB2.
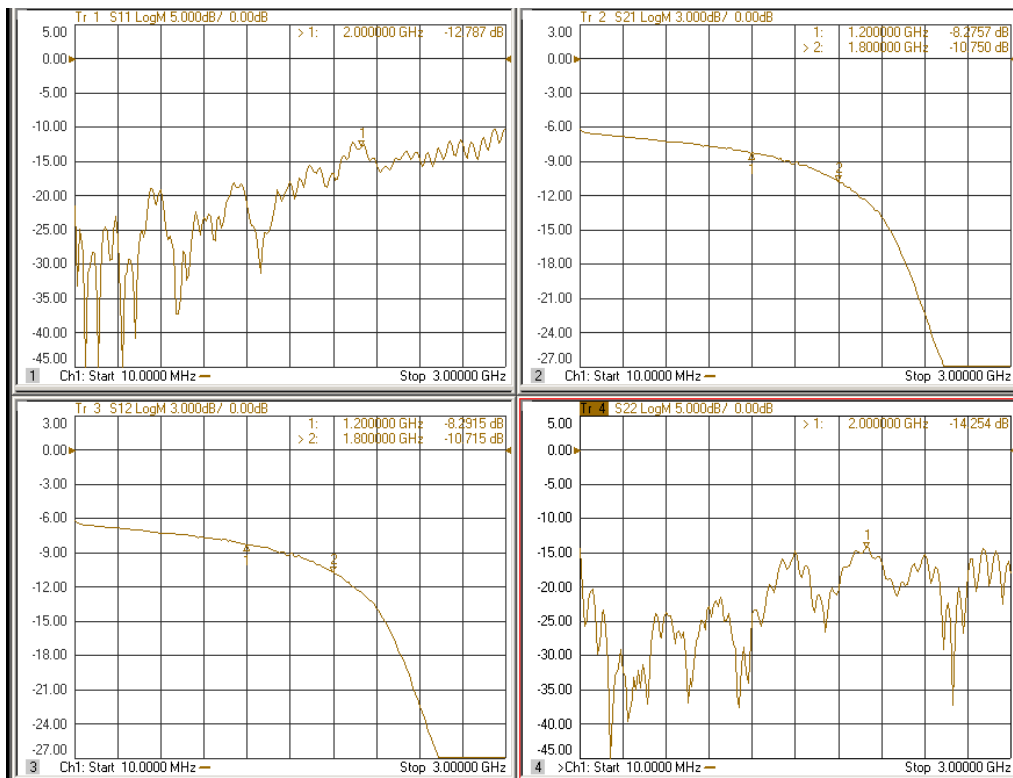

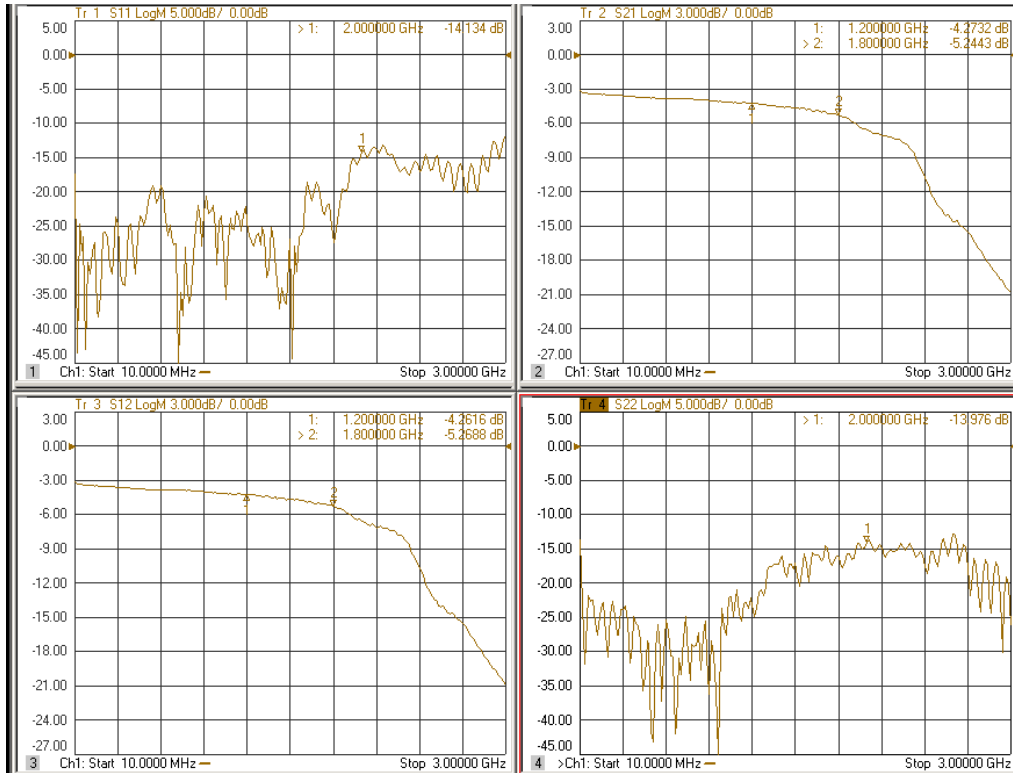Figure 231: Scattering matrix for channel 4L, polarization x and output 6dB3.

Figure 232: Scattering matrix for channel 4L, polarization y and output 3dB1.
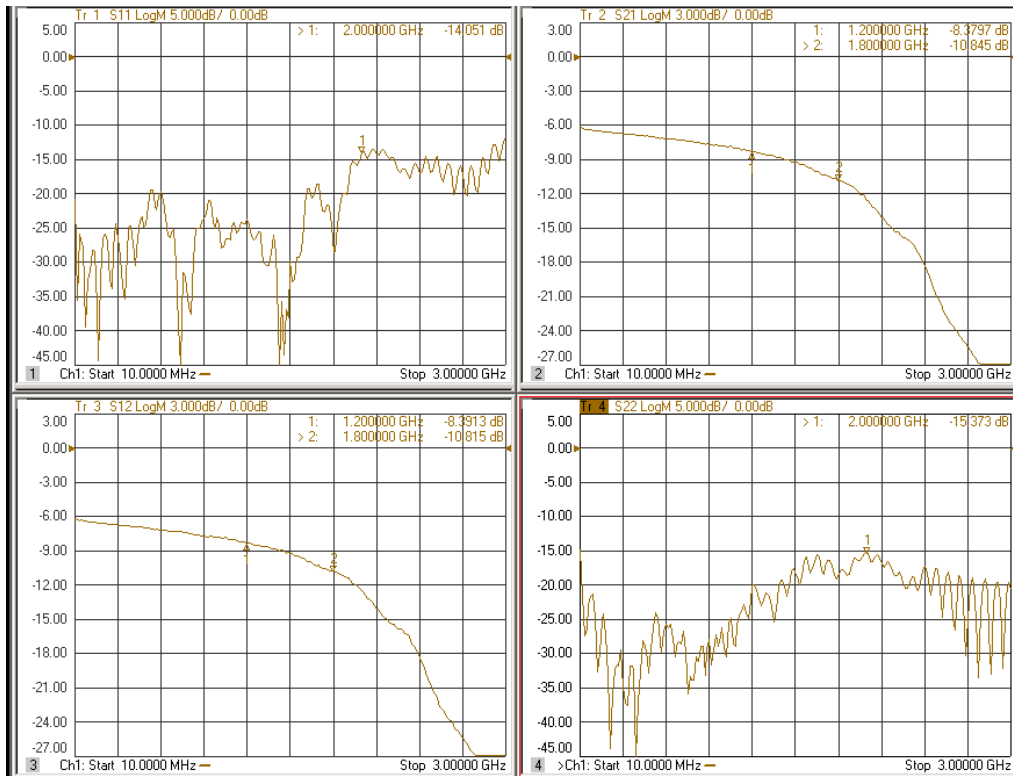

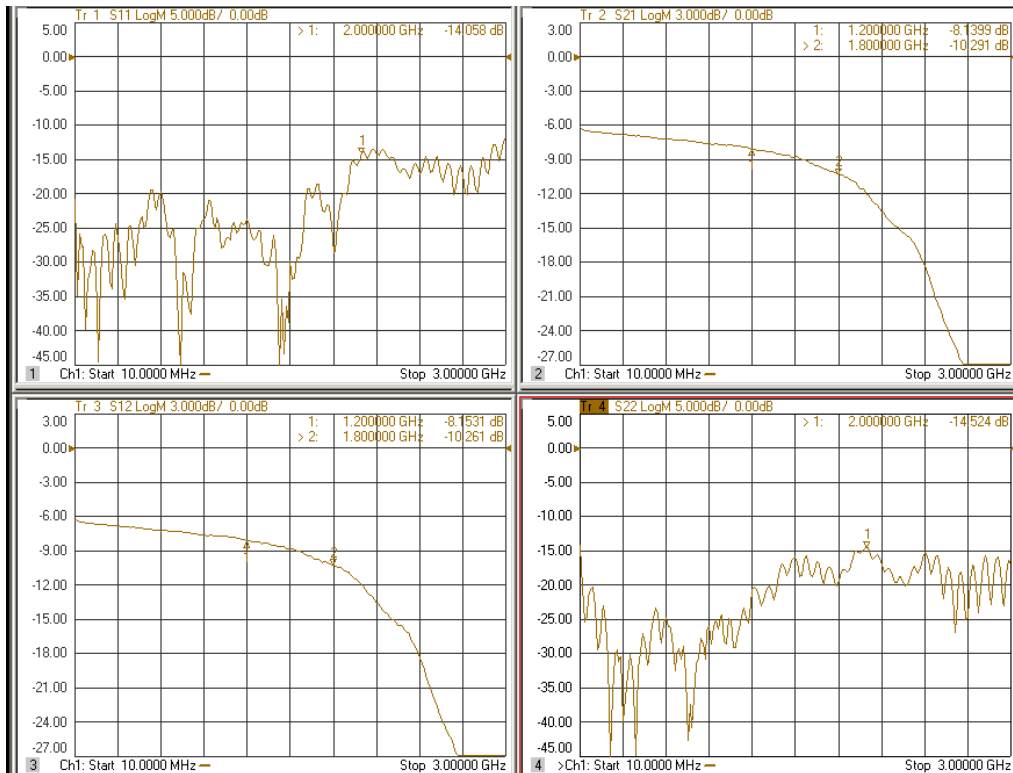Figure 233: Scattering matrix for channel 4L, polarization y and output 6dB2.

Figure 234: Scattering matrix for channel 4L, polarization y and output 6dB3.
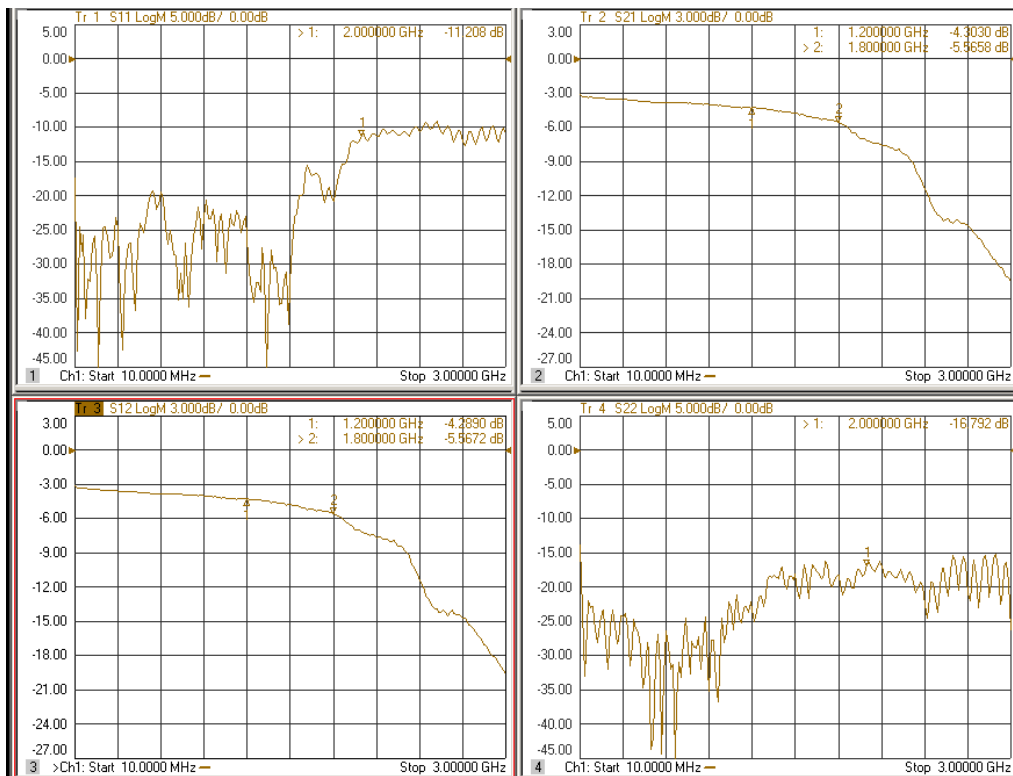

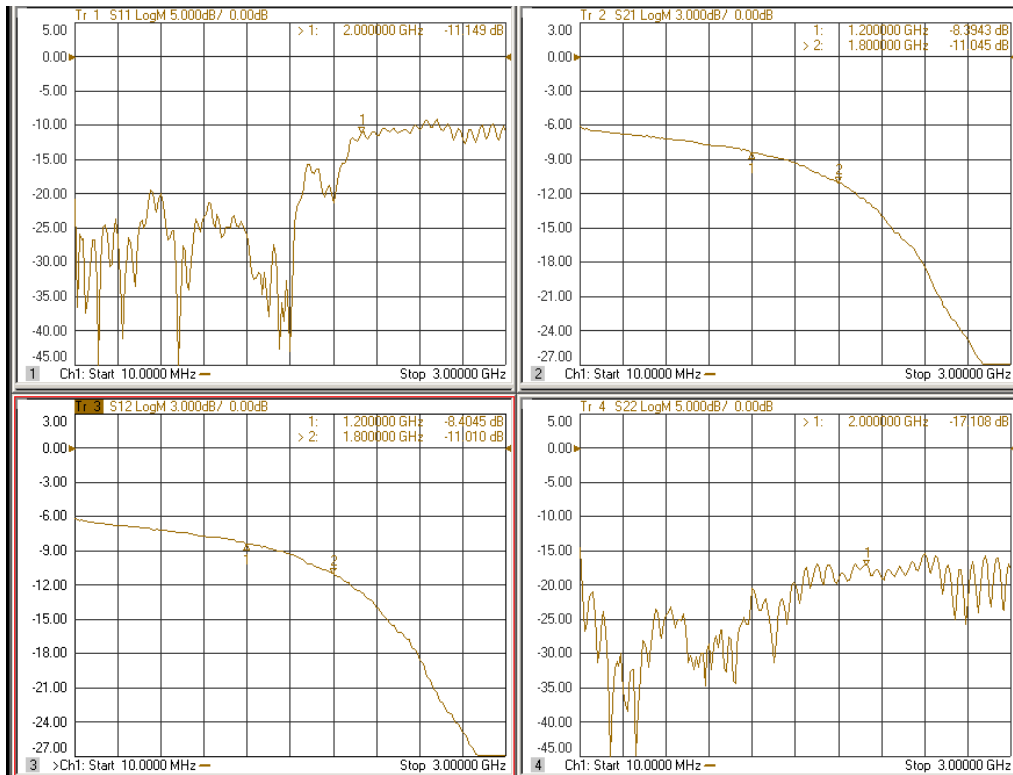Figure 235: Scattering matrix for channel 5B, polarization x and output 3dB1.

Figure 236: Scattering matrix for channel 5B, polarization x and output 6dB2.
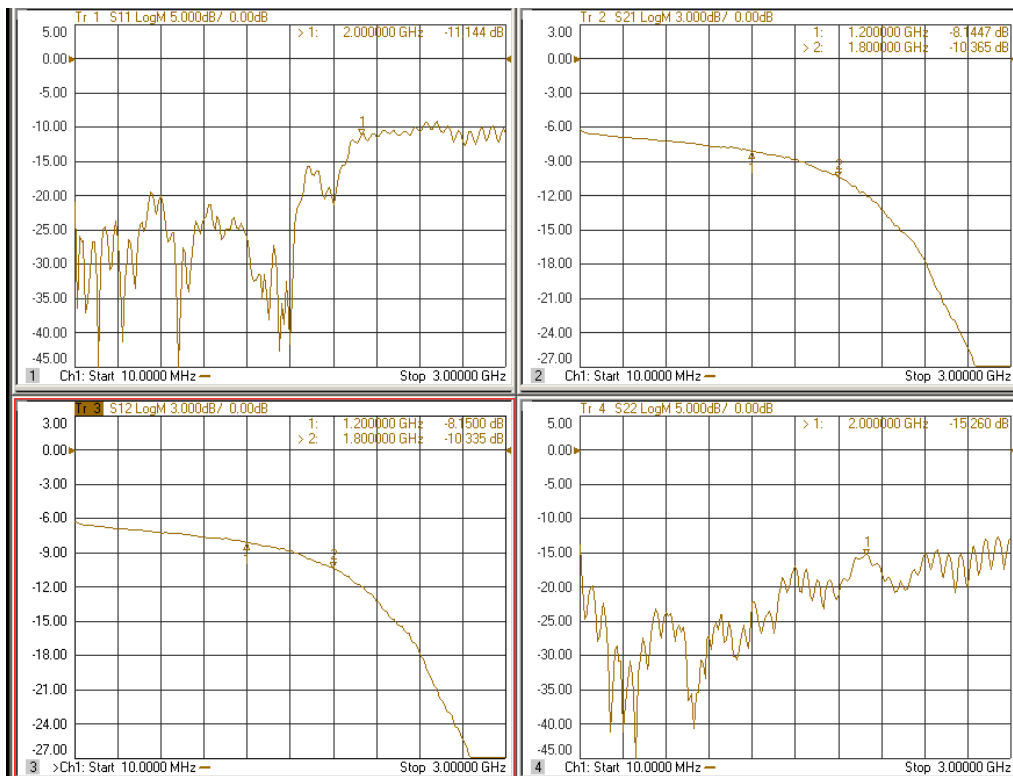

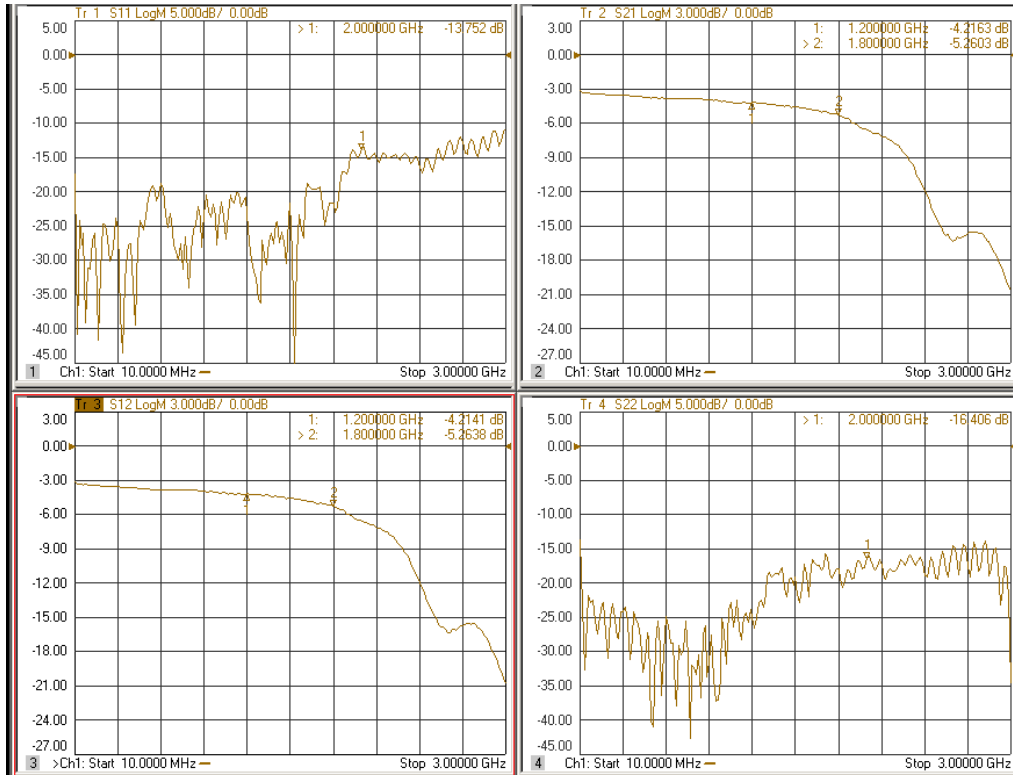Figure 237: Scattering matrix for channel 5B, polarization x and output 6dB3.

Figure 238: Scattering matrix for channel 5B, polarization y and output 3dB1.
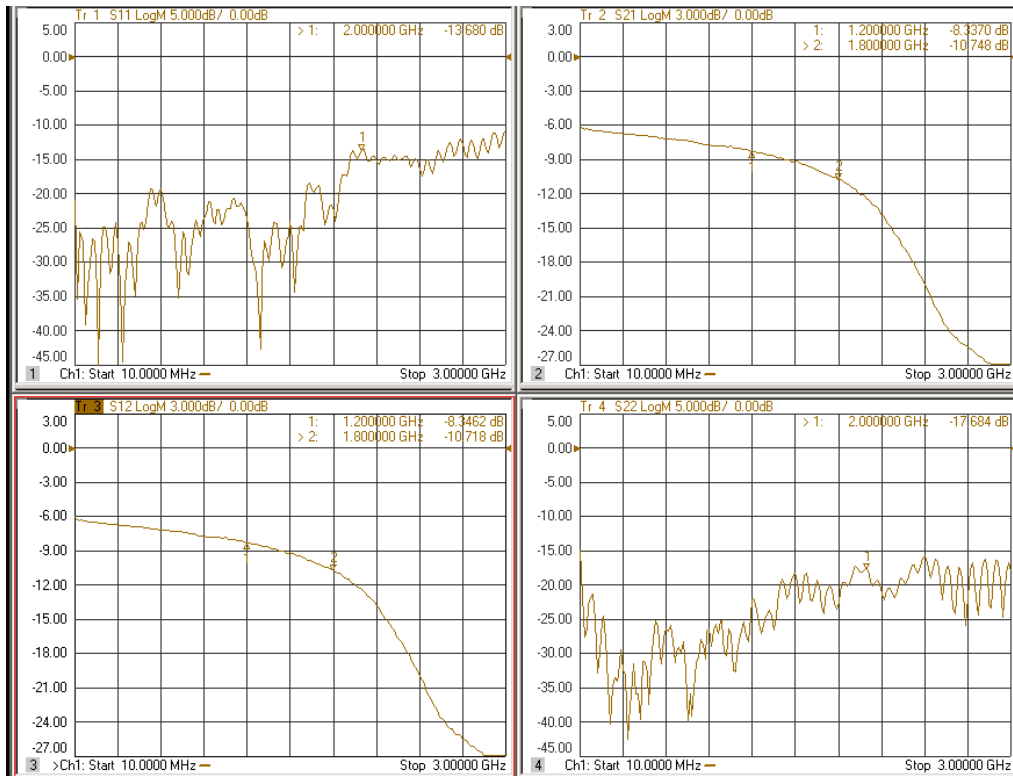

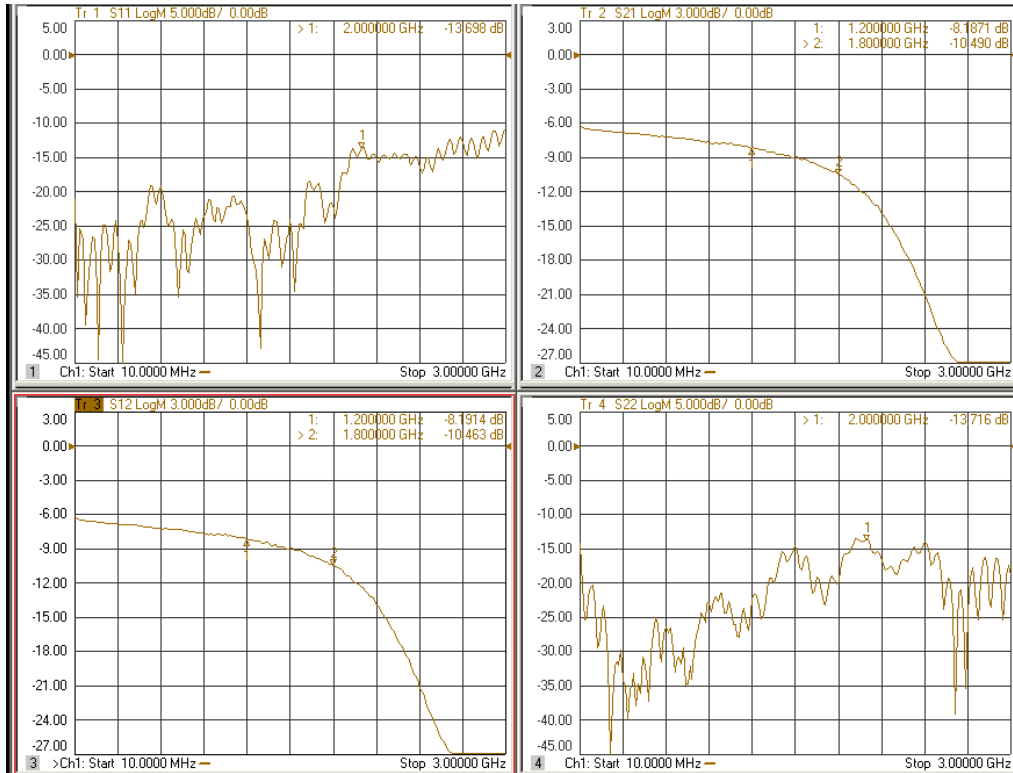Figure 239: Scattering matrix for channel 5B, polarization y and output 6dB2.

Figure 240: Scattering matrix for channel 5B, polarization y and output 6dB3.
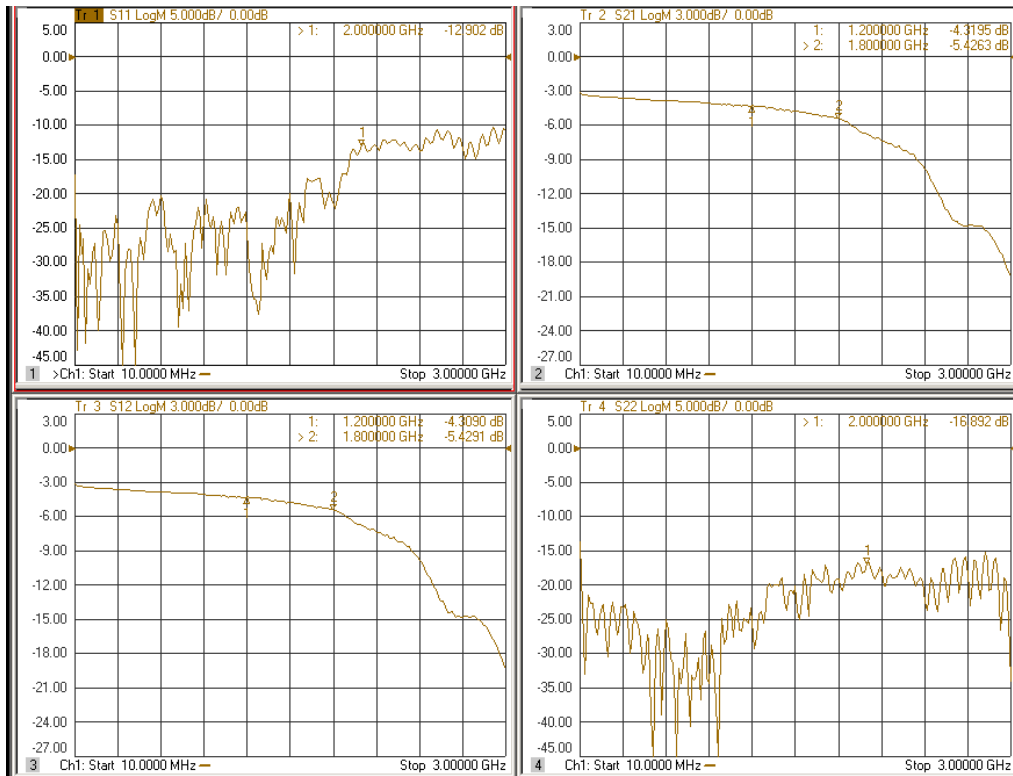

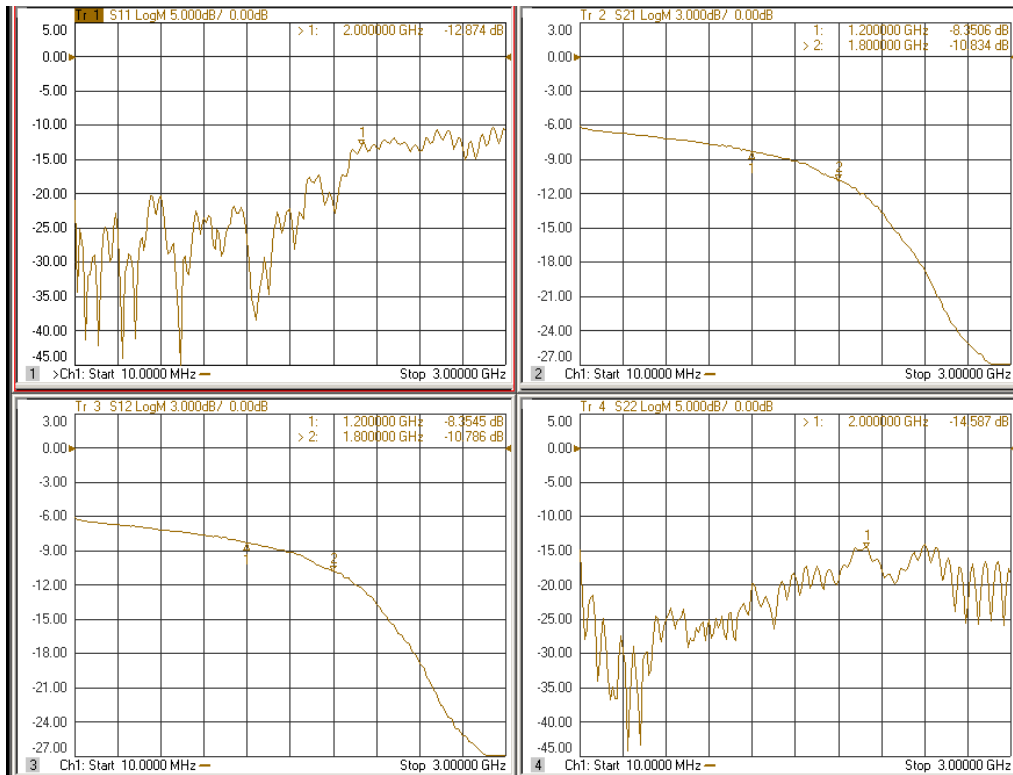Figure 241: Scattering matrix for channel 5C, polarization x and output 3dB1.

Figure 242: Scattering matrix for channel 5C, polarization x and output 6dB2.
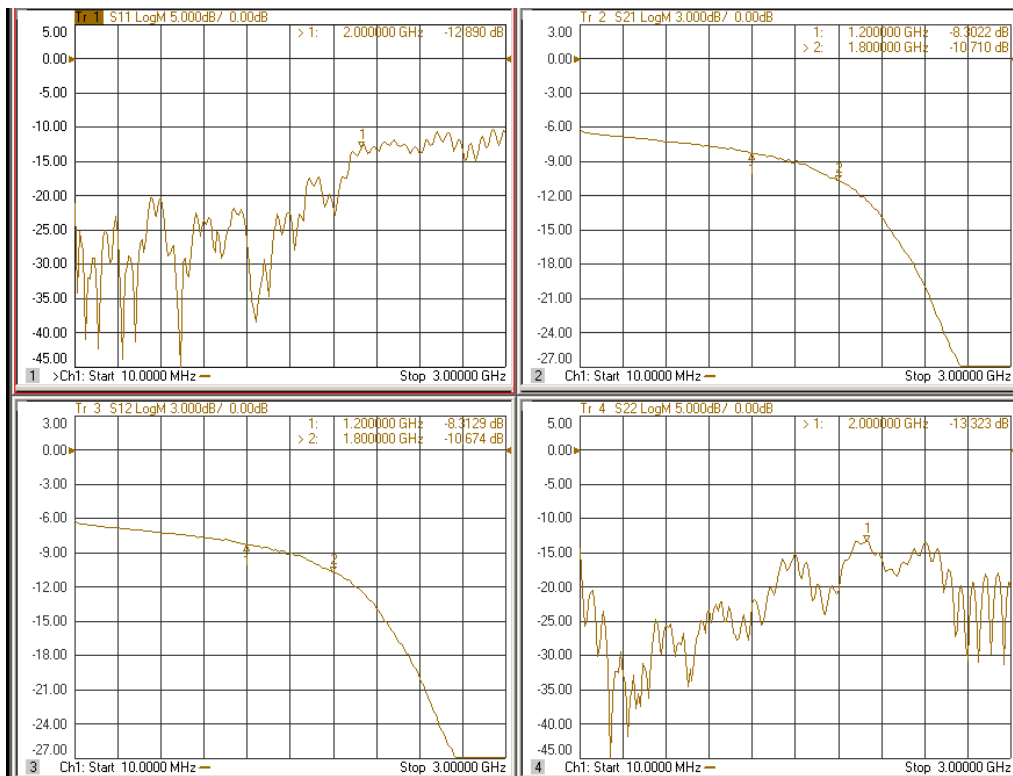

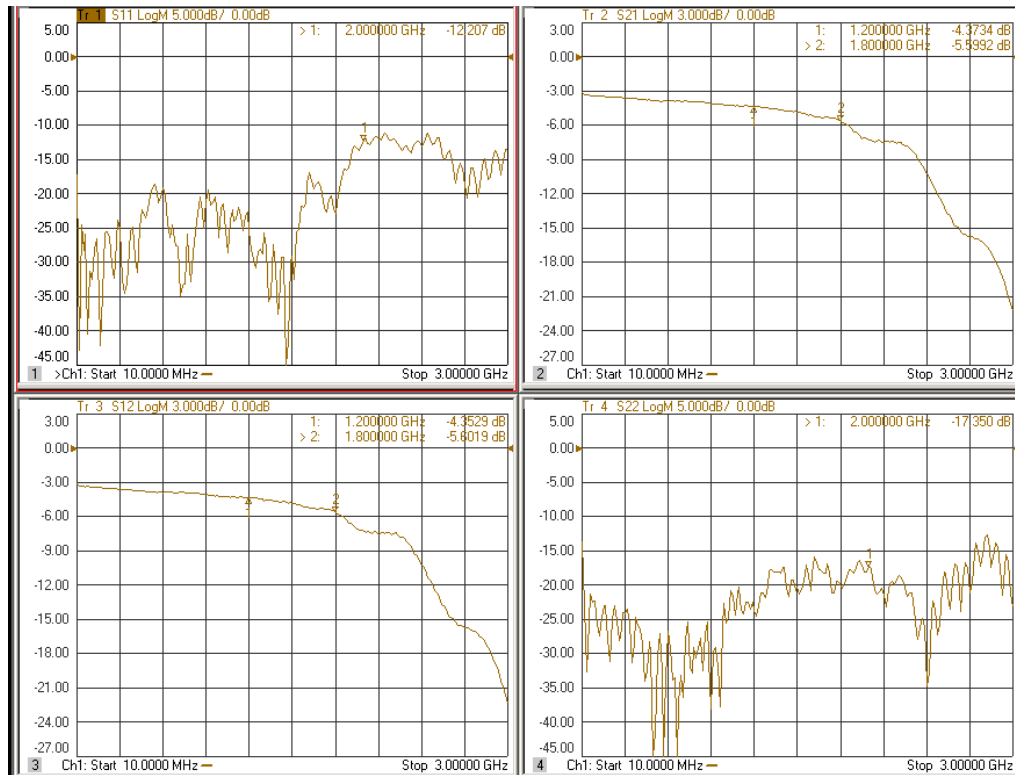Figure 243: Scattering matrix for channel 5C, polarization x and output 6dB3.

Figure 244: Scattering matrix for channel 5C, polarization y and output 3dB1.
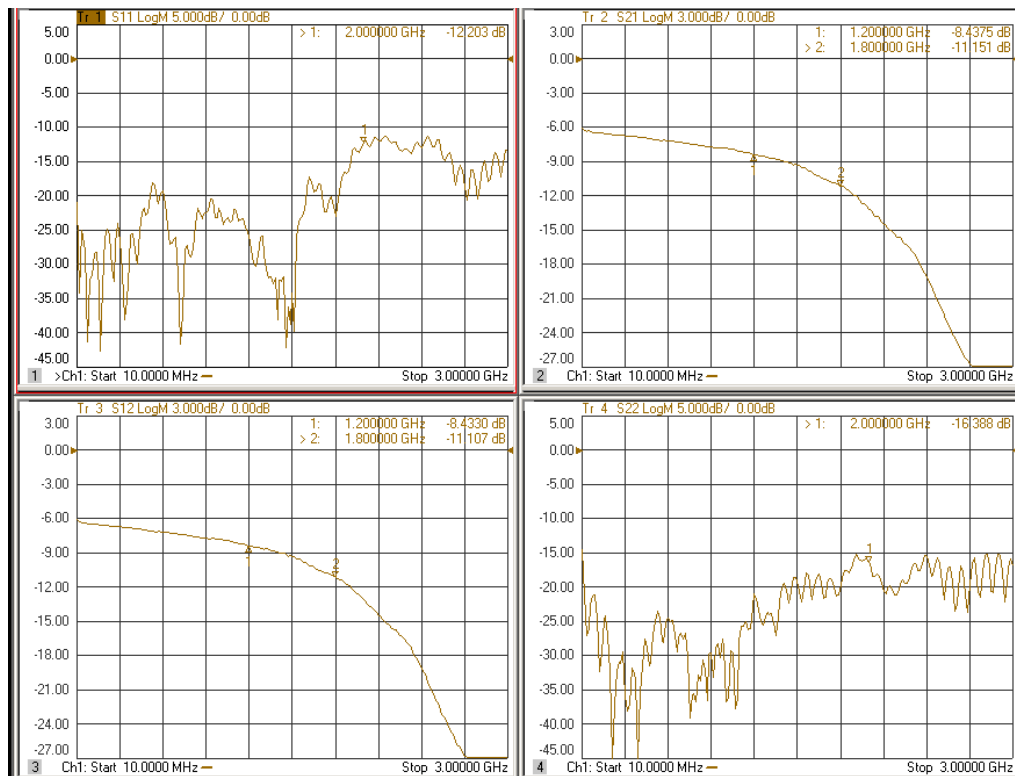

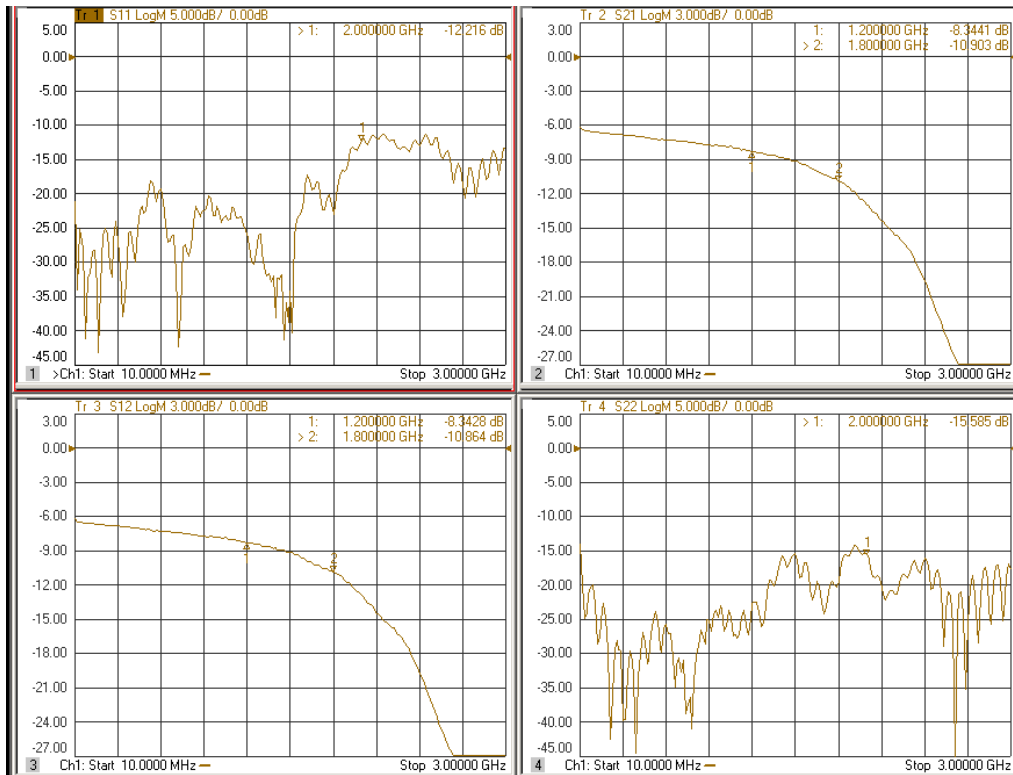Figure 245: Scattering matrix for channel 5C, polarization y and output 6dB2.

Figure 246: Scattering matrix for channel 5C, polarization y and output 6dB3.
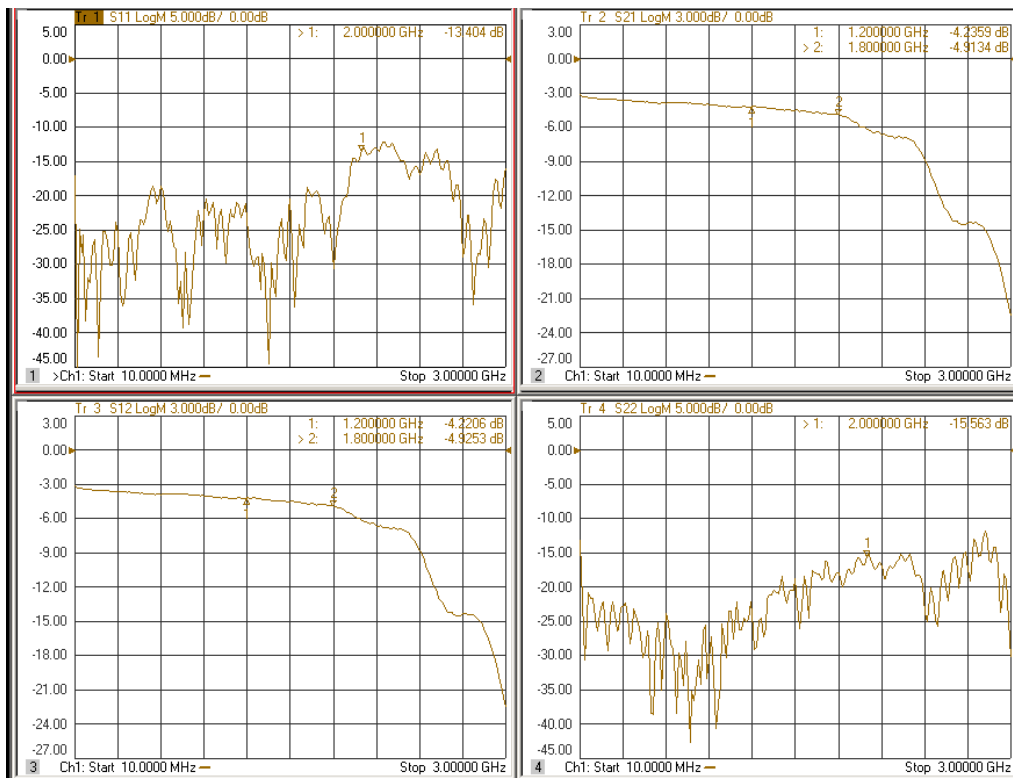

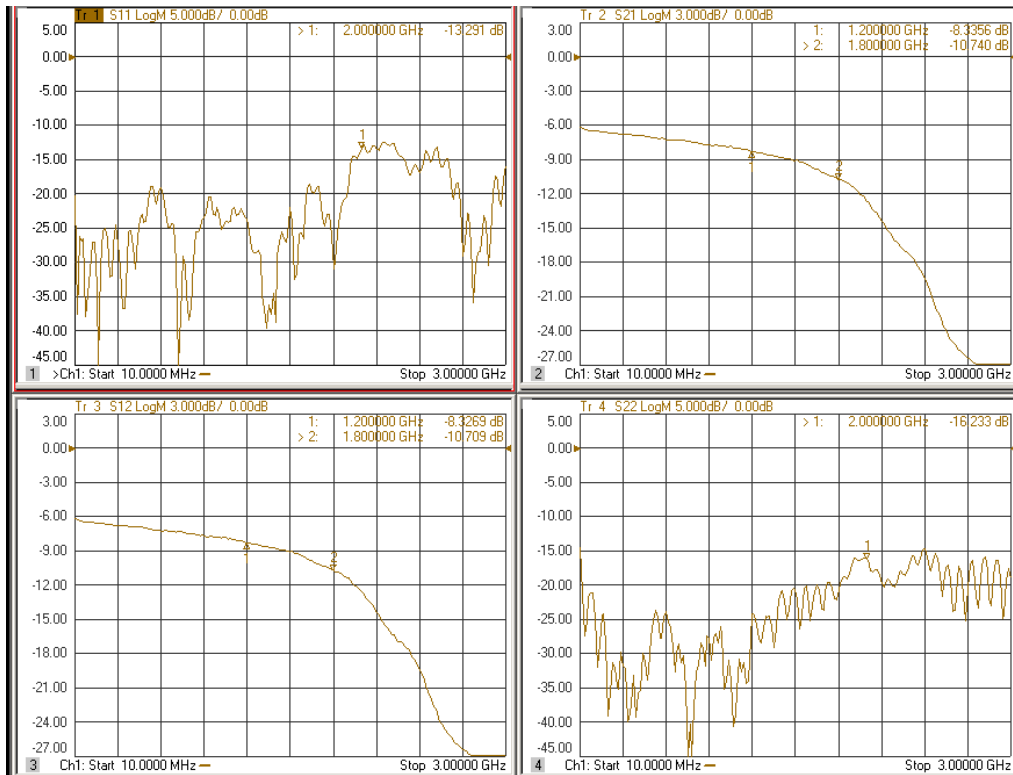Figure 247: Scattering matrix for channel 5E, polarization x and output 3dB1.

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Figure 248: Scattering matrix for channel 5E, polarization x and output 6dB2.
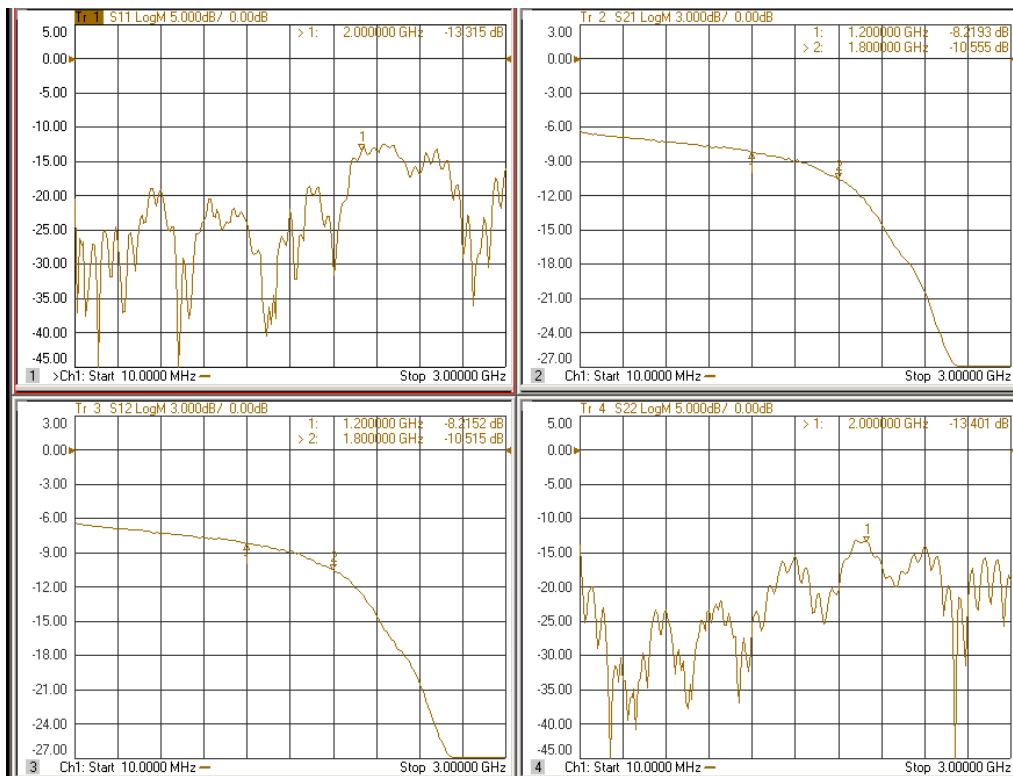

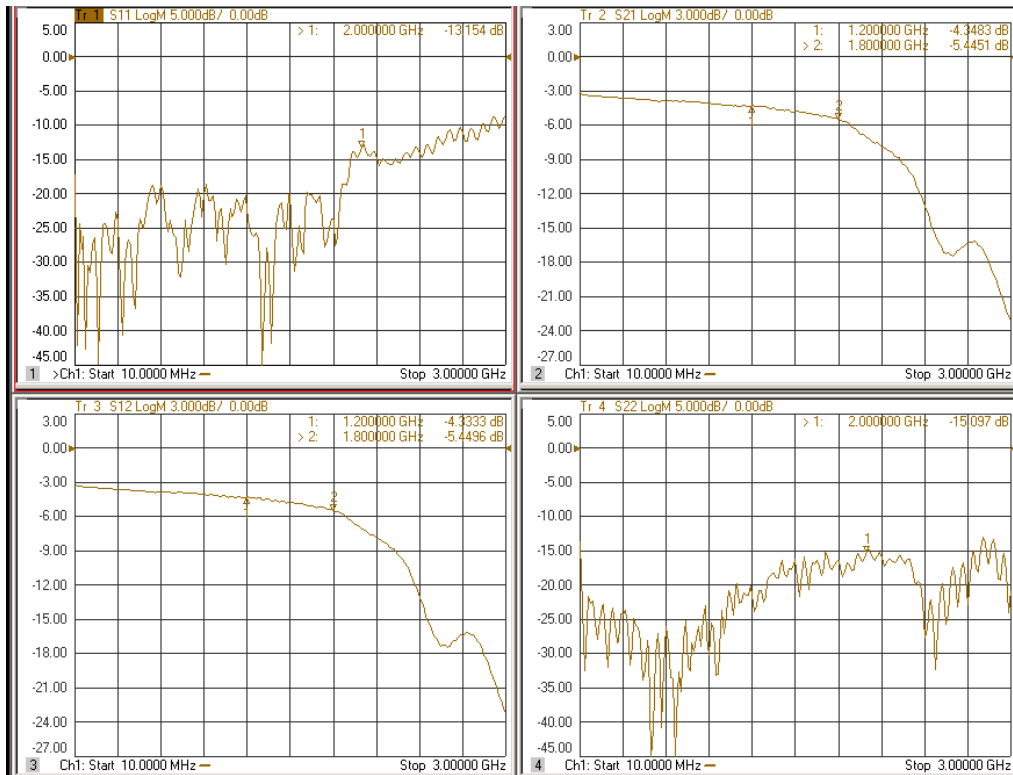Figure 249: Scattering matrix for channel 5E, polarization x and output 6dB3.

Figure 250: Scattering matrix for channel 5E, polarization y and output 3dB1.
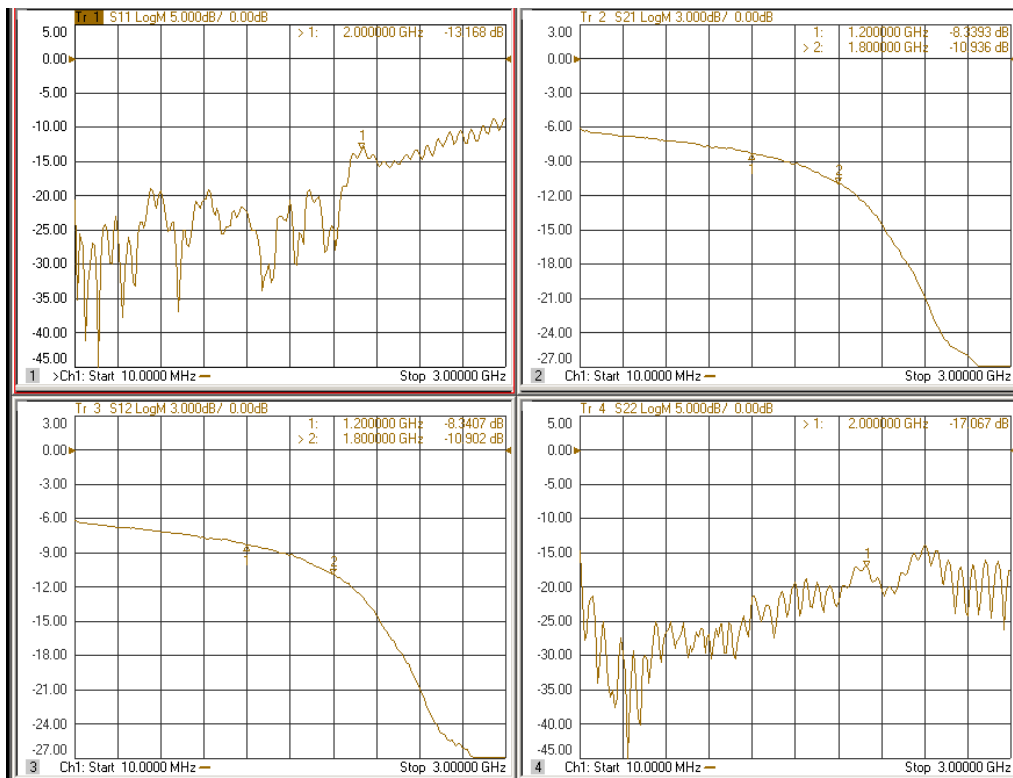

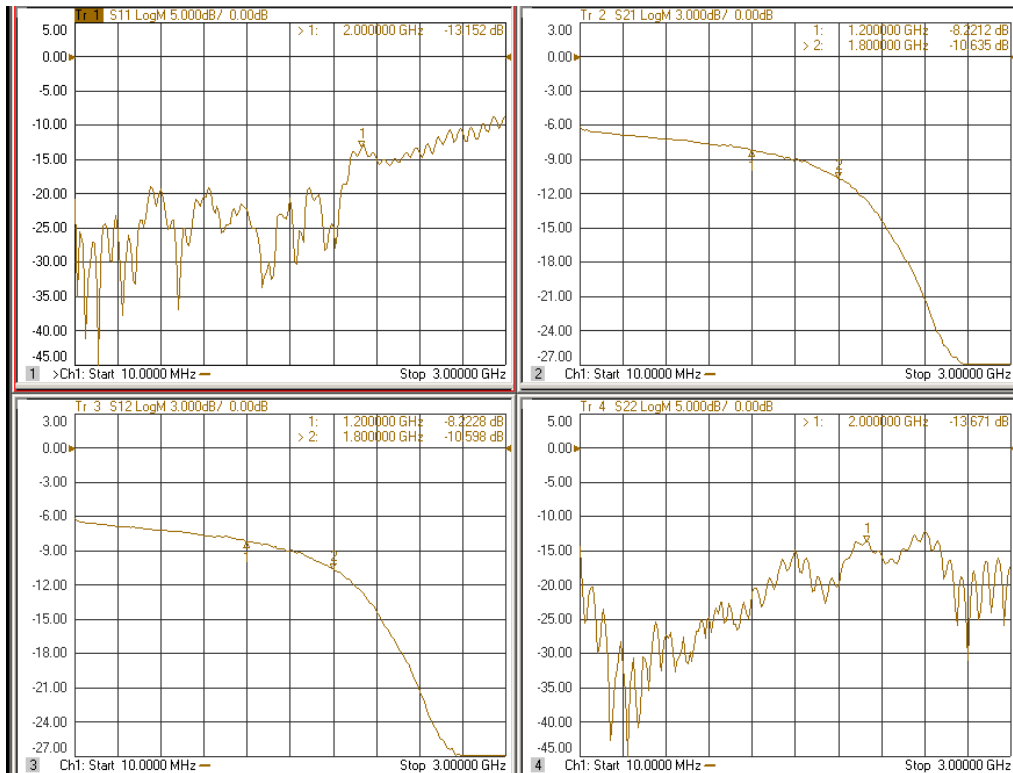Figure 251: Scattering matrix for channel 5E, polarization y and output 6dB2.

Figure 252: Scattering matrix for channel 5E, polarization y and output 6dB3.
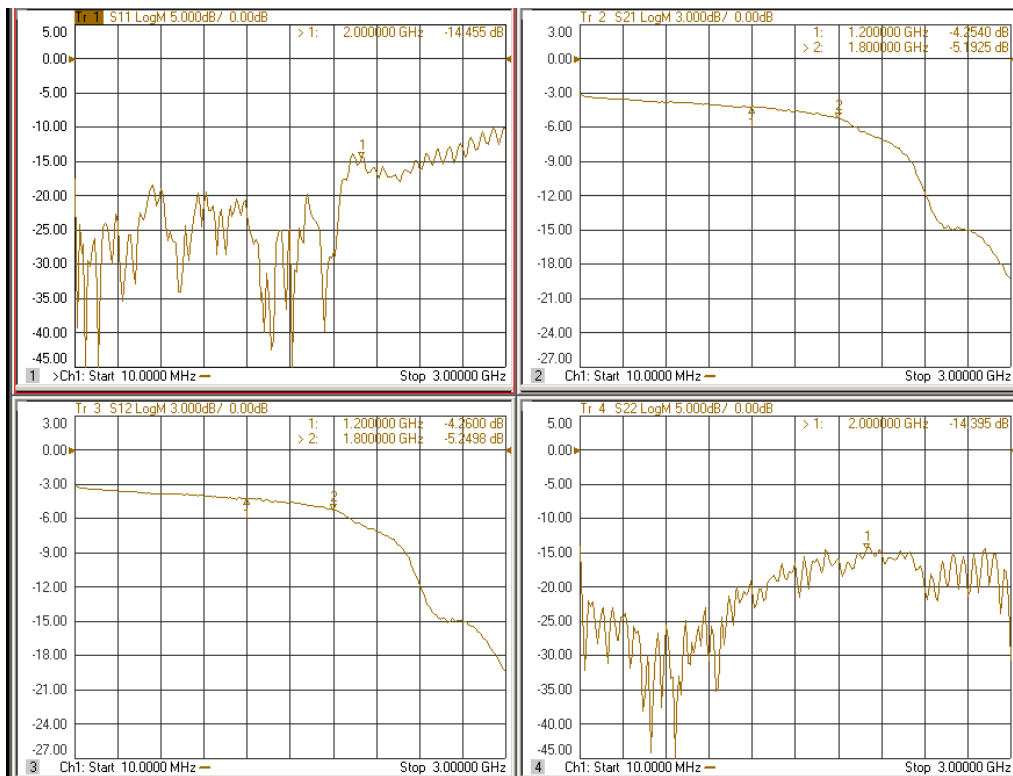

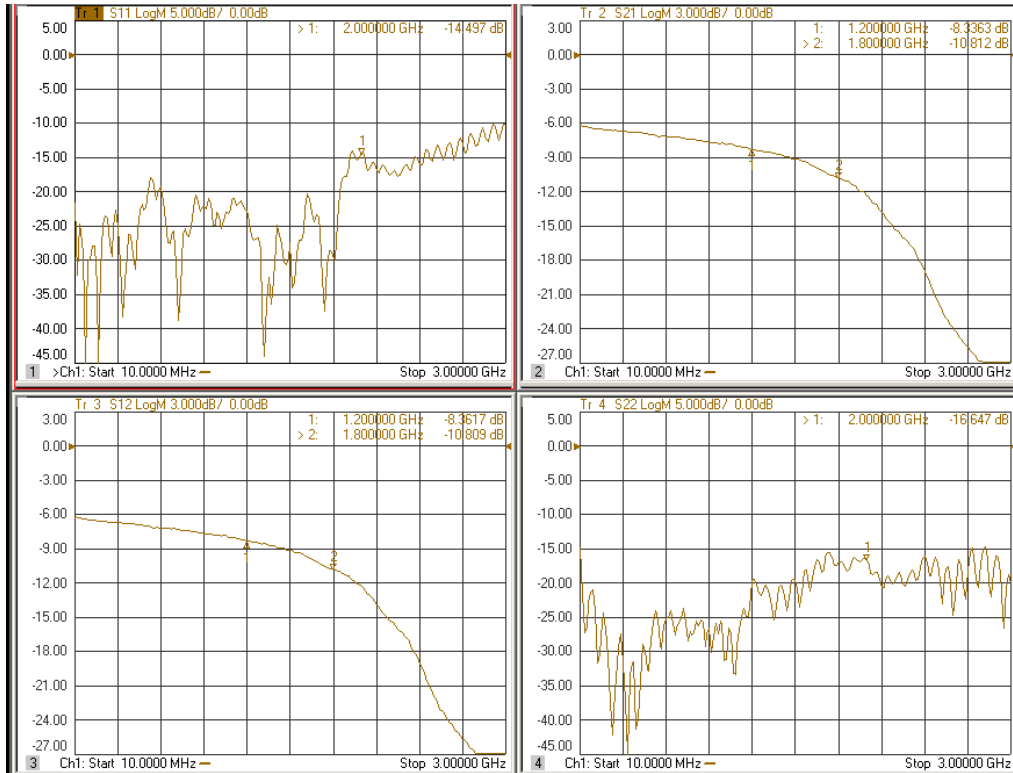Figure 253: Scattering matrix for channel 5G, polarization x and output 3dB1.

Figure 254: Scattering matrix for channel 5G, polarization x and output 6dB2.

Figure 255: Scattering matrix for channel 5G, polarization x and output 6dB3.

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Figure 256: Scattering matrix for channel 5G, polarization y and output 3dB1.

Figure 257: Scattering matrix for channel 5G, polarization y and output 6dB2.
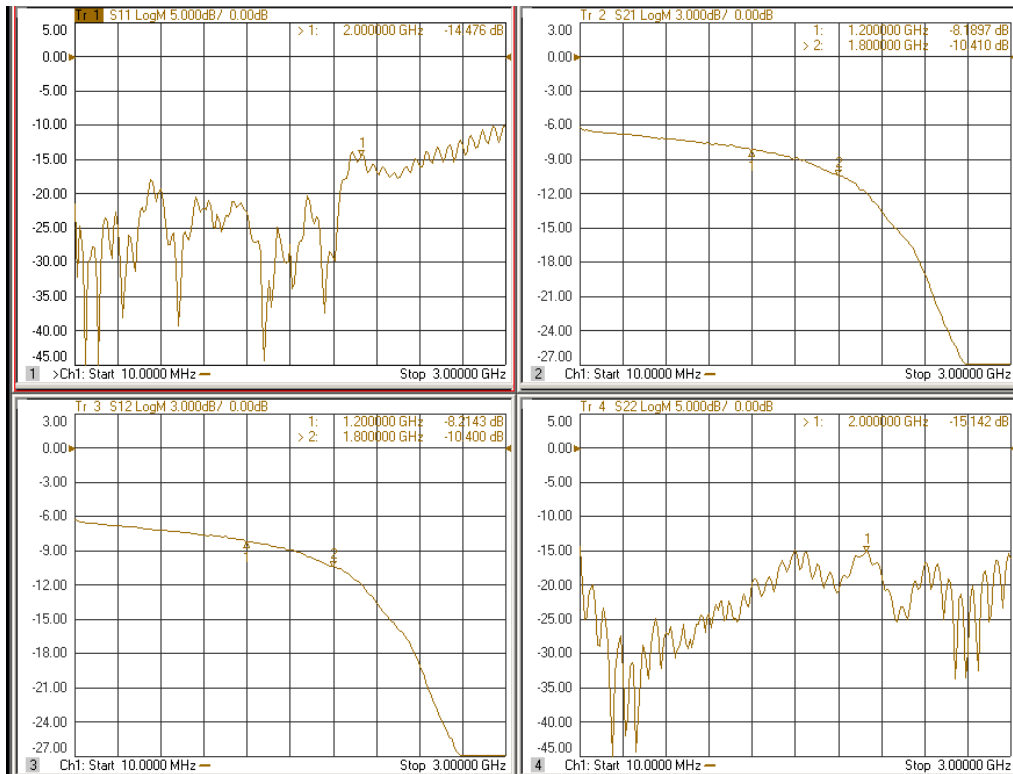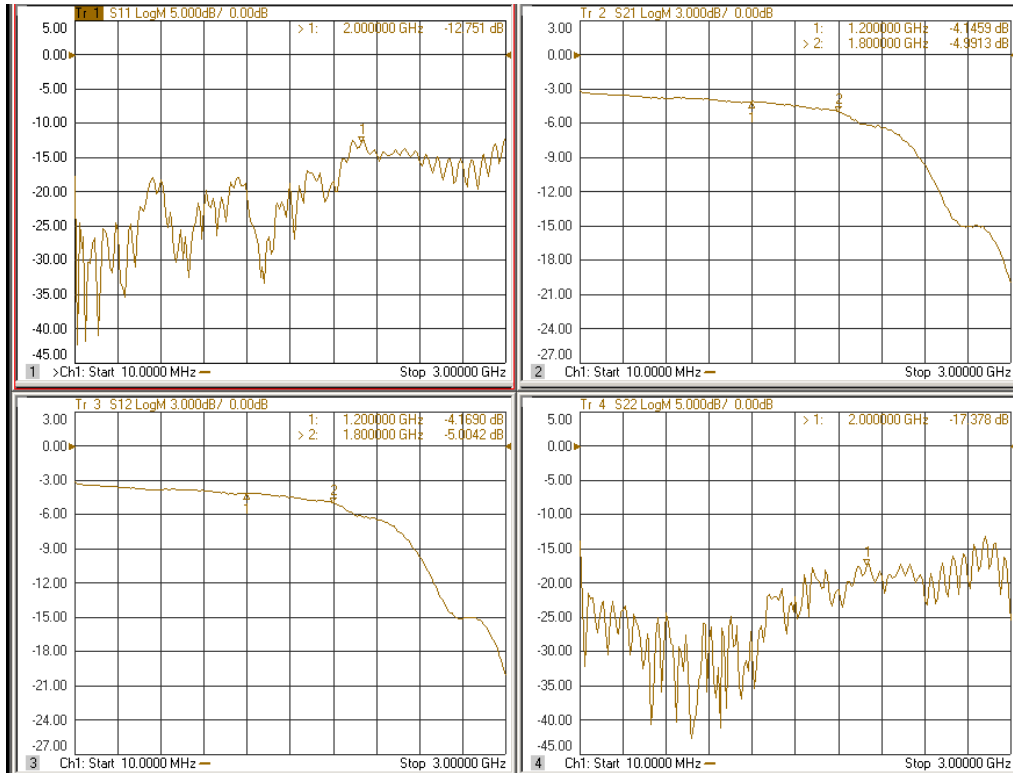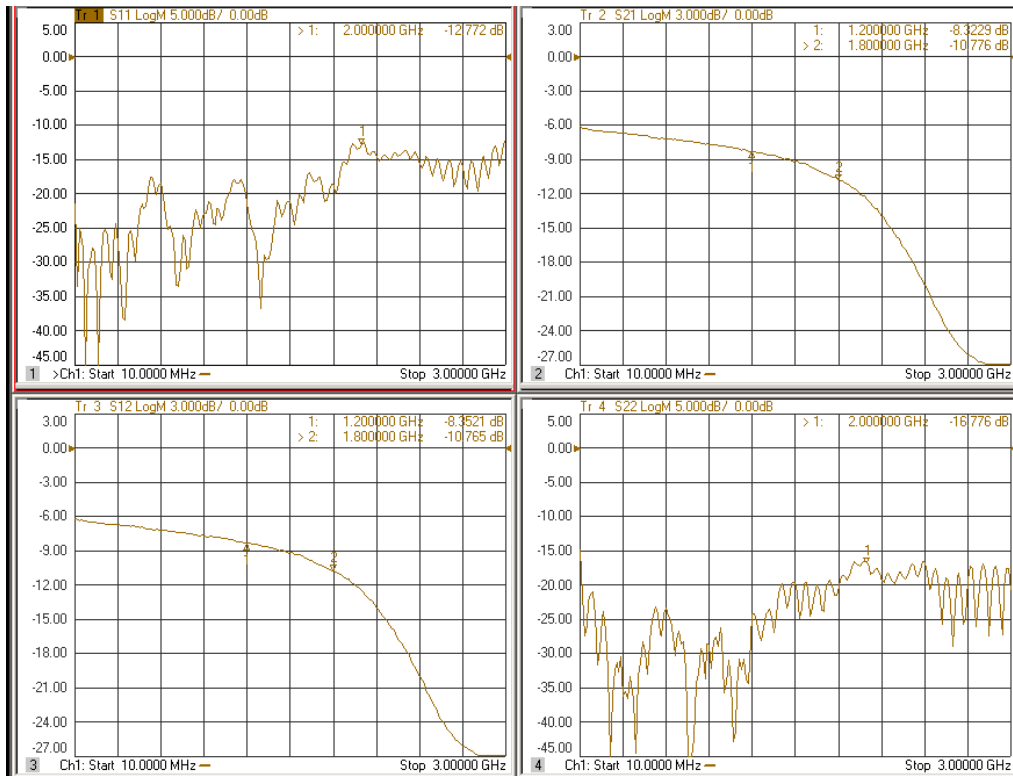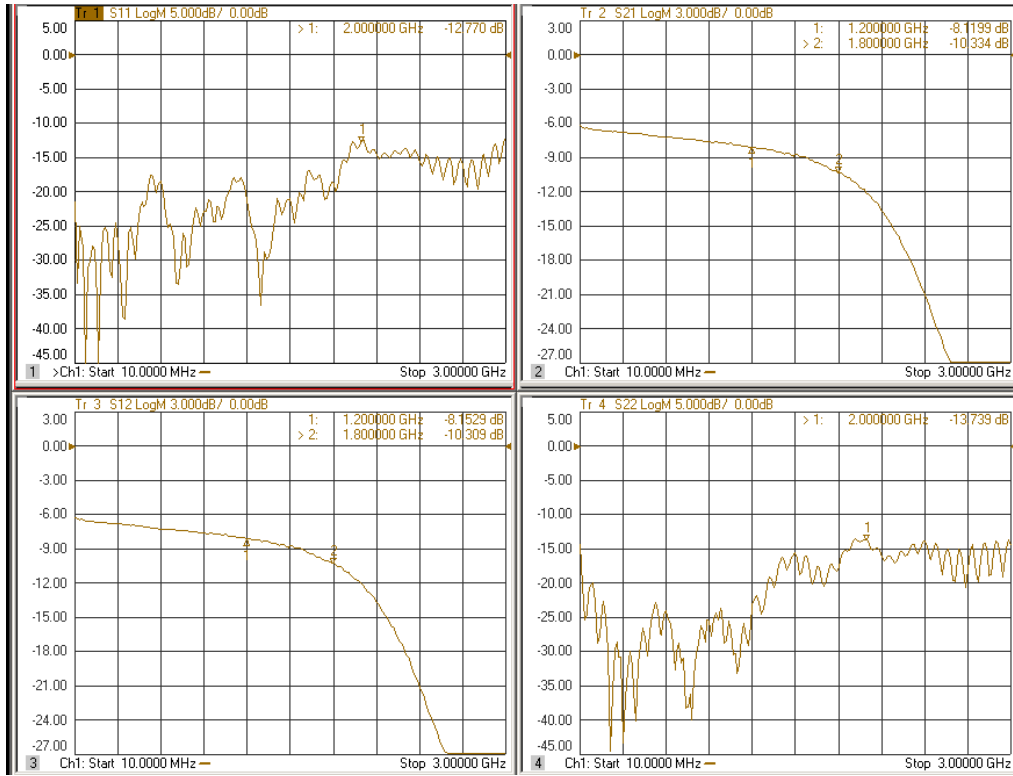
Figure 258: Scattering matrix for channel 5G, polarization y and output 6dB3.
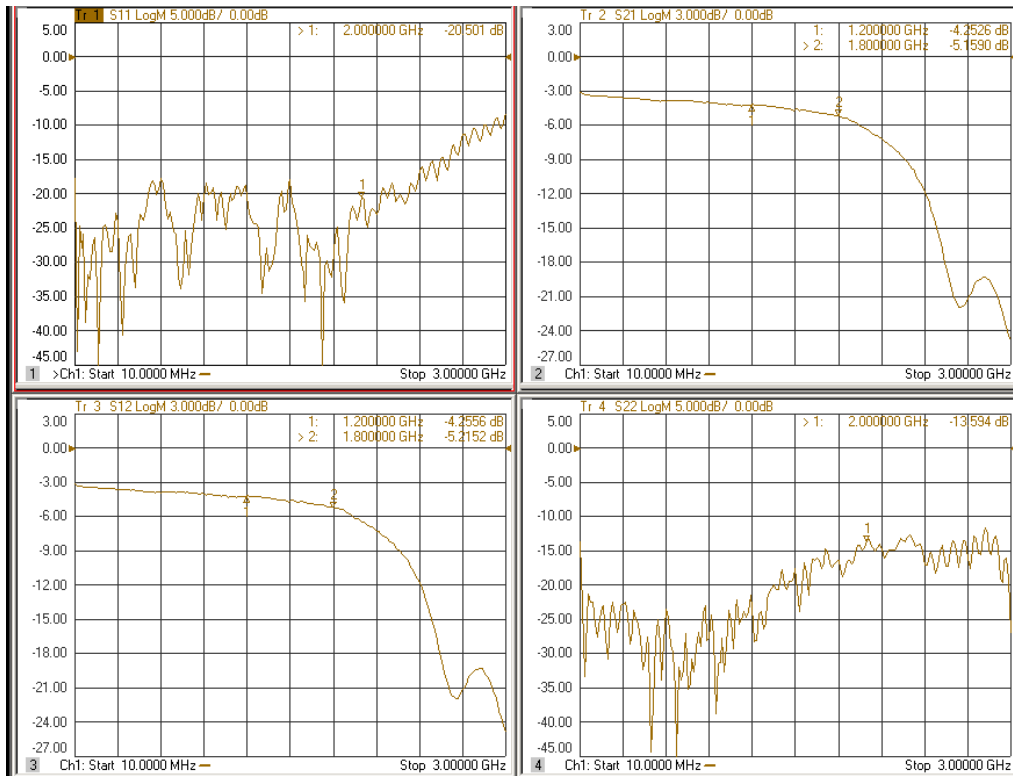

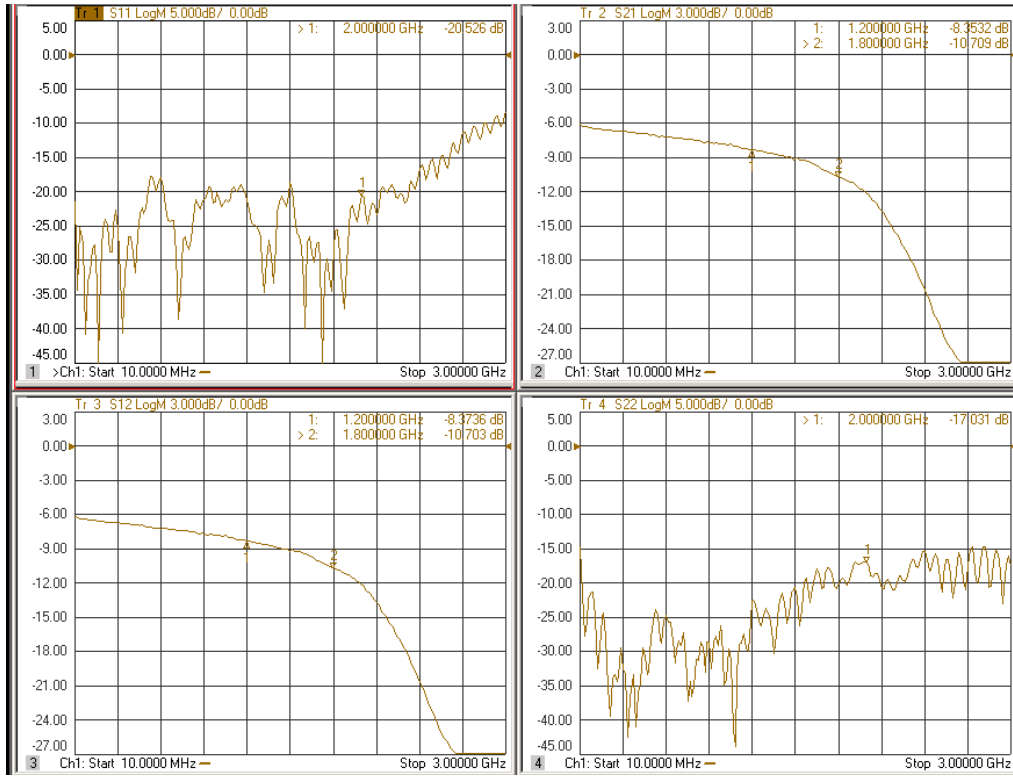Figure 259: Scattering matrix for channel 5H, polarization x and output 3dB1.

Figure 260: Scattering matrix for channel 5H, polarization x and output 6dB2.
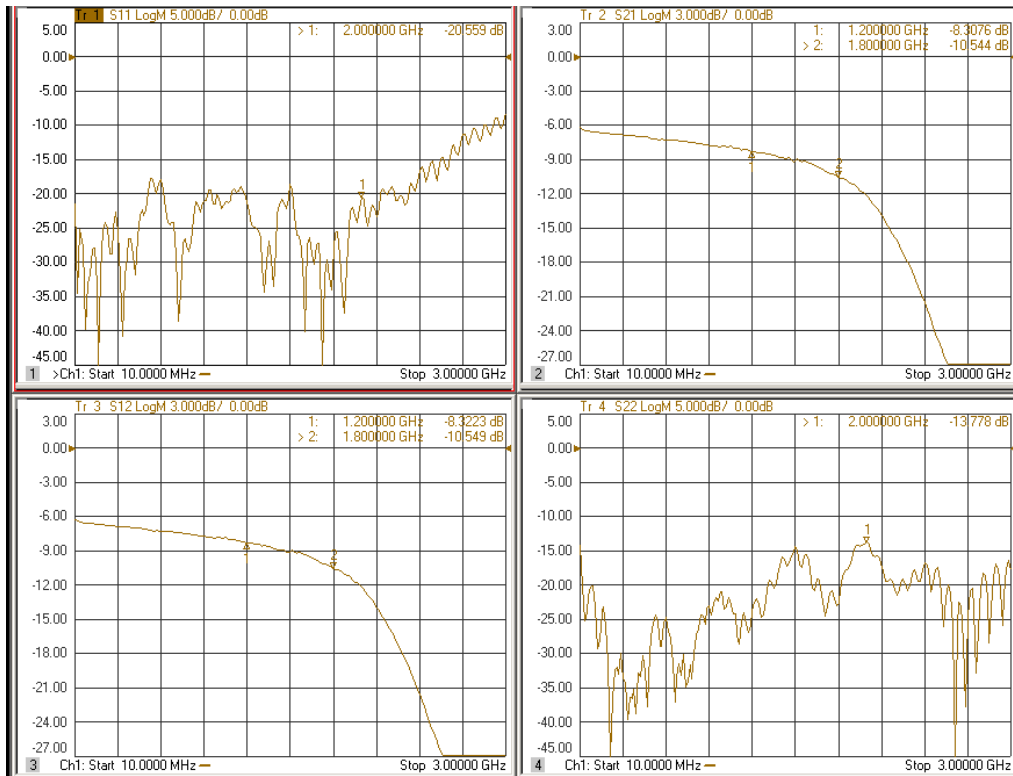

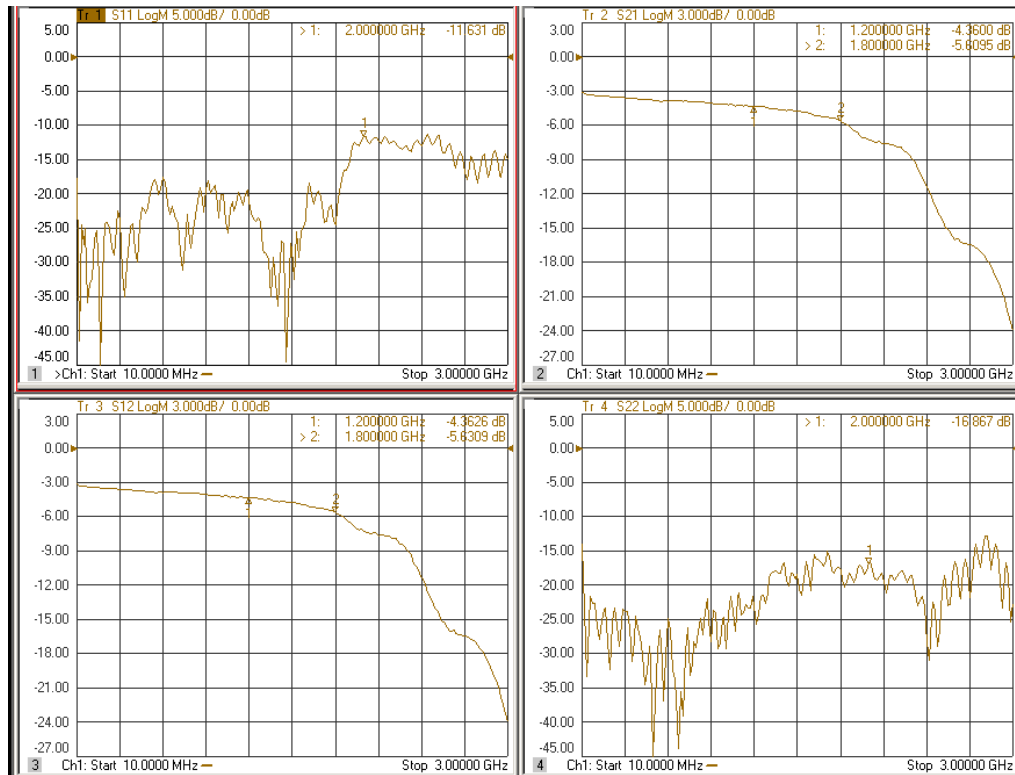Figure 261: Scattering matrix for channel 5H, polarization x and output 6dB3.

Figure 262: Scattering matrix for channel 5H, polarization y and output 3dB1.
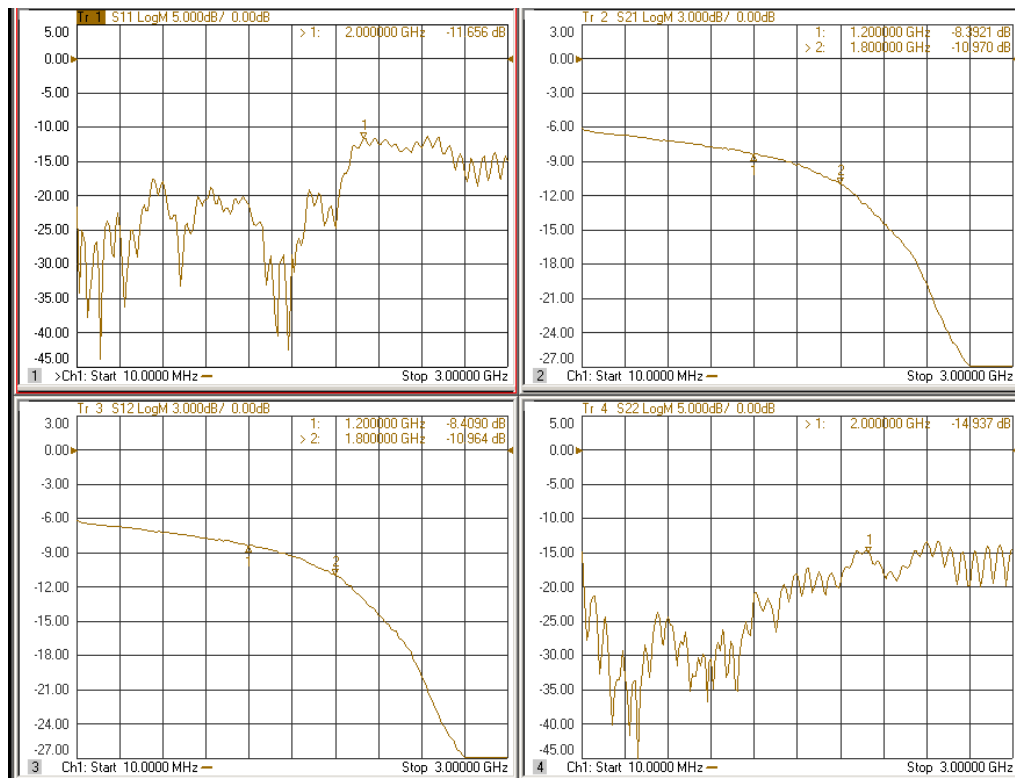

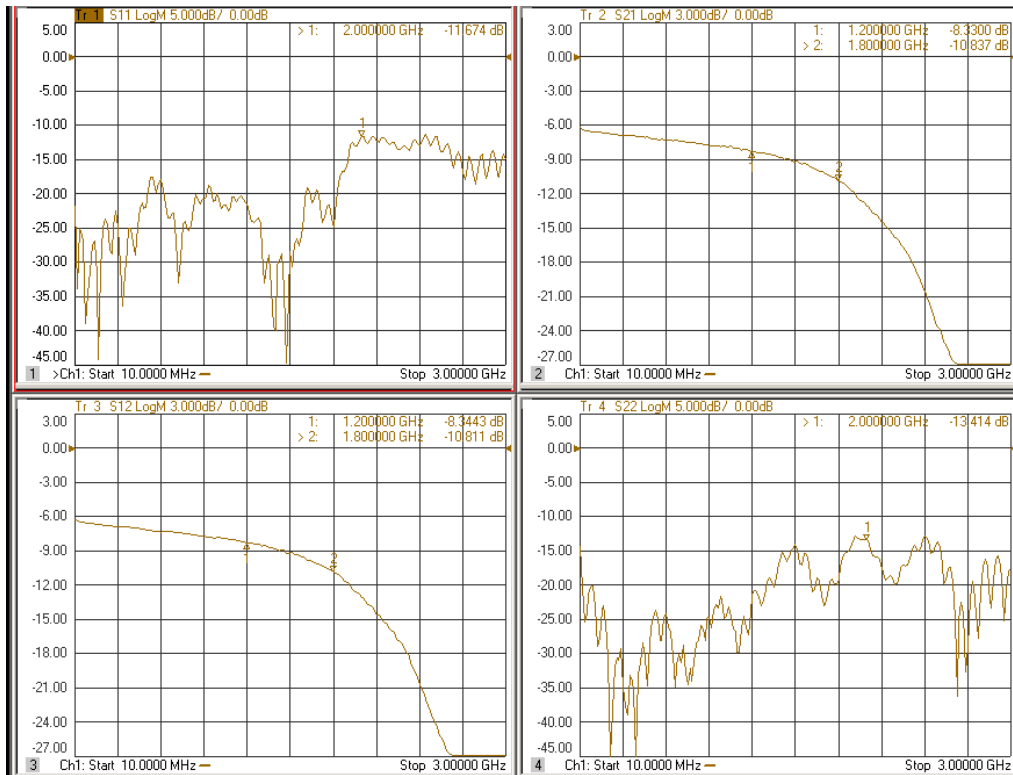Figure 263: Scattering matrix for channel 5H, polarization y and output 6dB2.

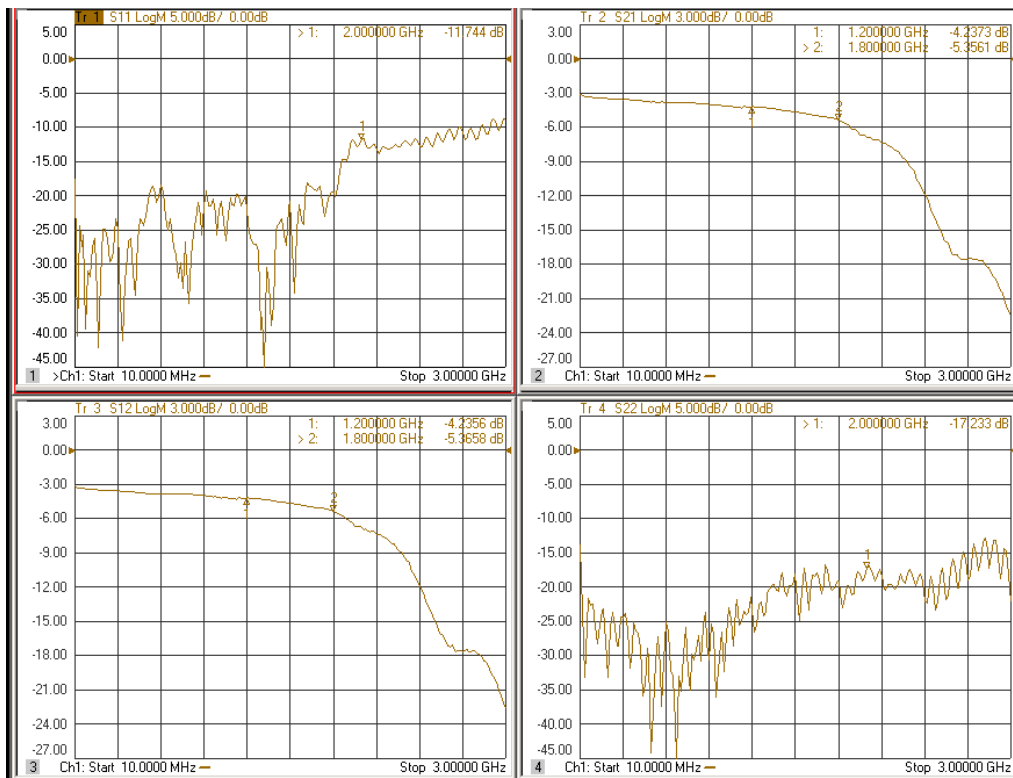Figure 264: Scattering matrix for channel 5H, polarization y and output 6dB3.

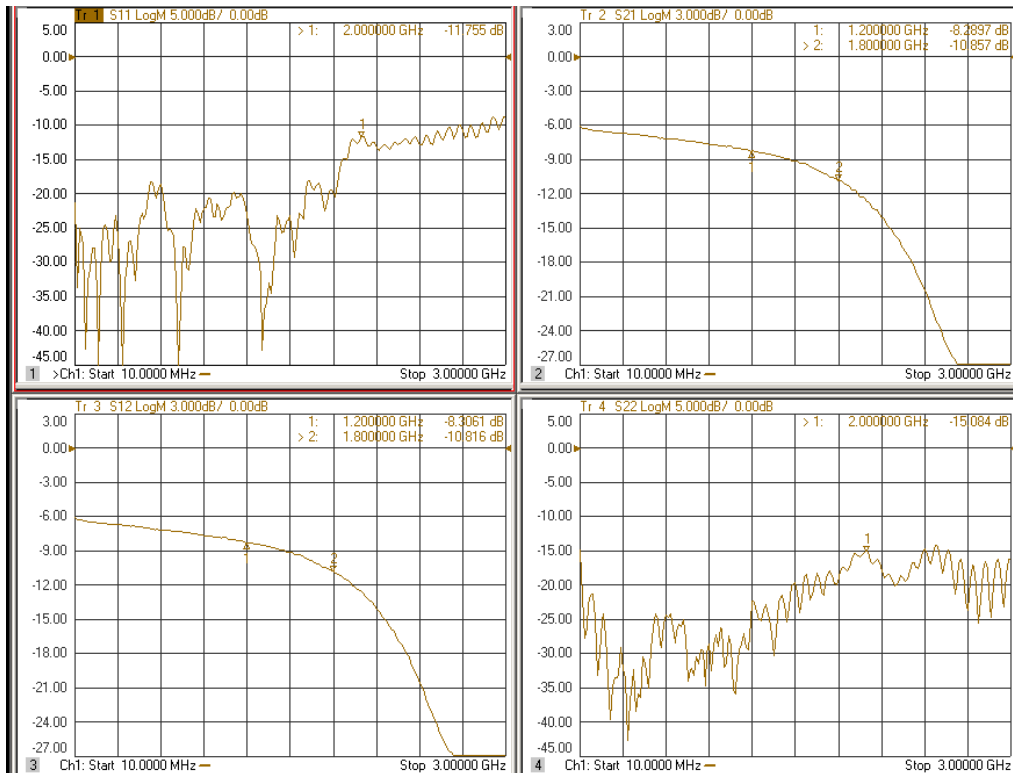Figure 265: Scattering matrix for channel Ib, polarization x and output 3dB1.
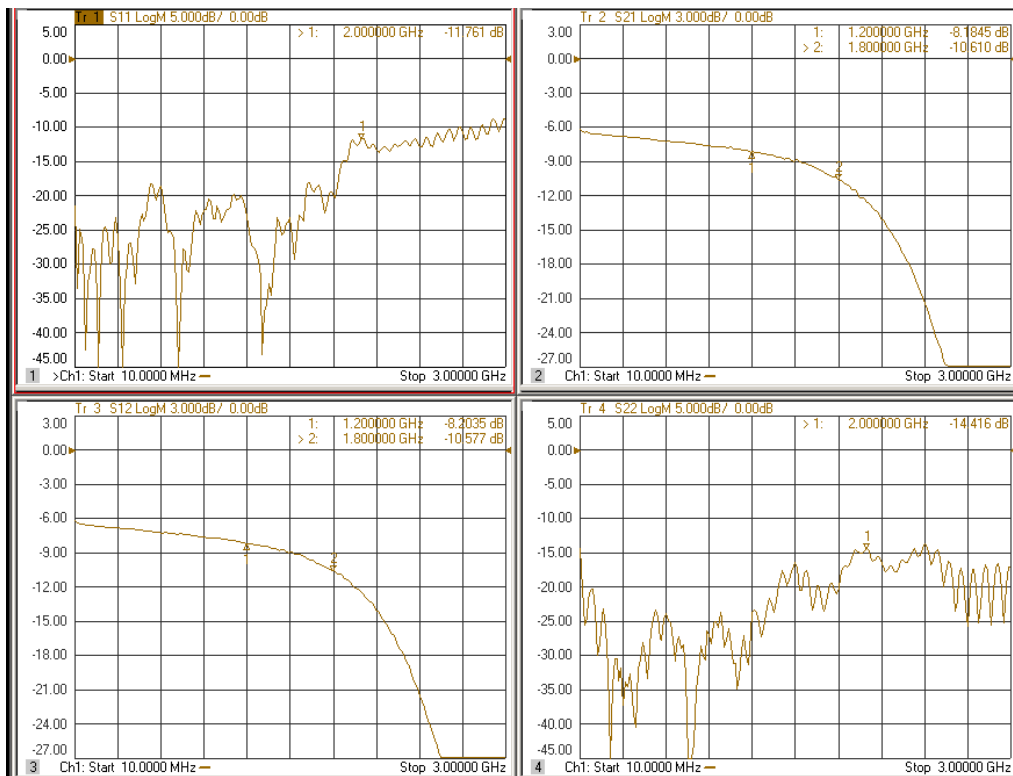
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Figure 266: Scattering matrix for channel Ib, polarization x and output 6dB2.

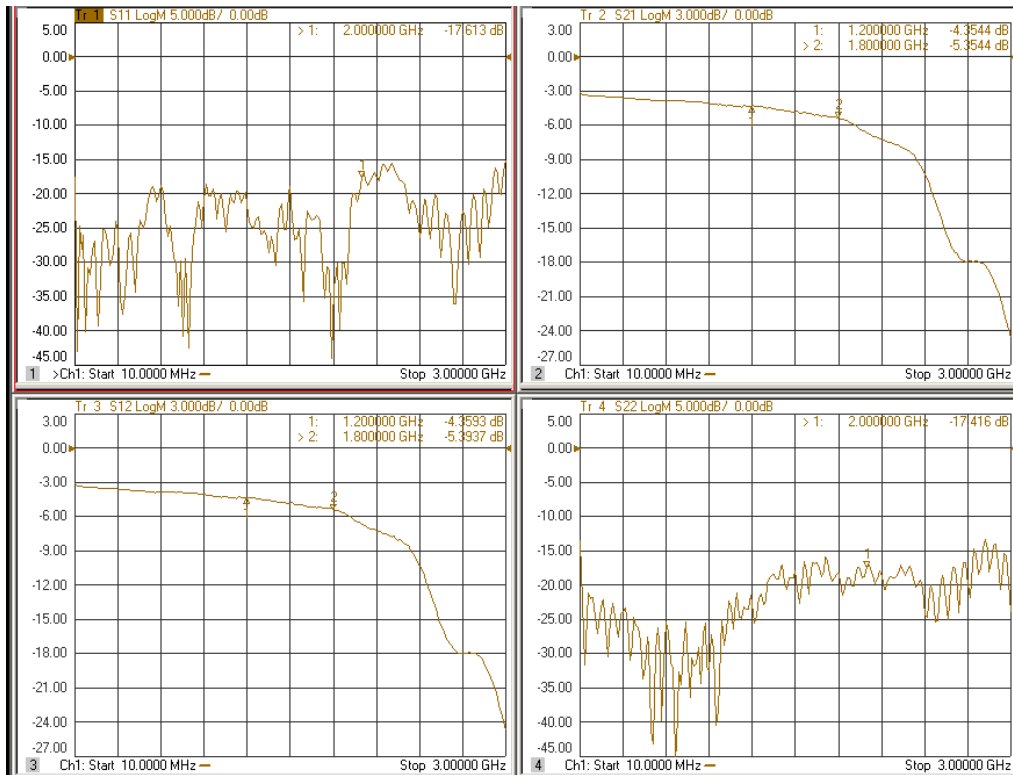Figure 267: Scattering matrix for channel Ib, polarization x and output 6dB3.

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Figure 268: Scattering matrix for channel Ib, polarization y and output 3dB1.
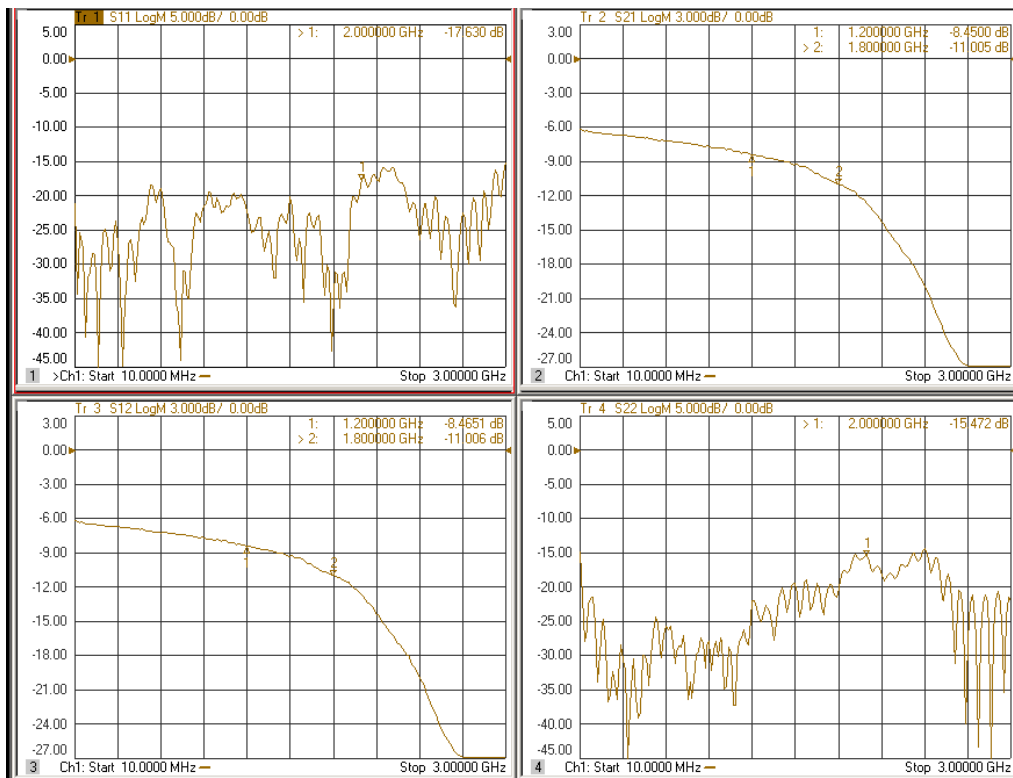

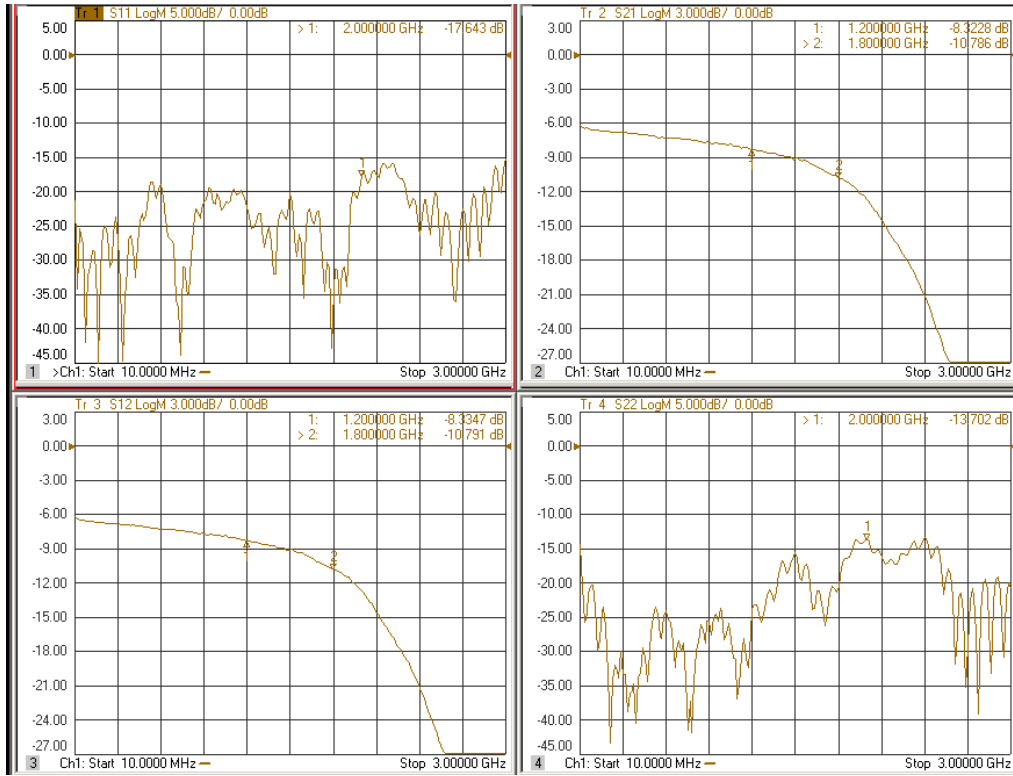Figure 269: Scattering matrix for channel Ib, polarization y and output 6dB2.

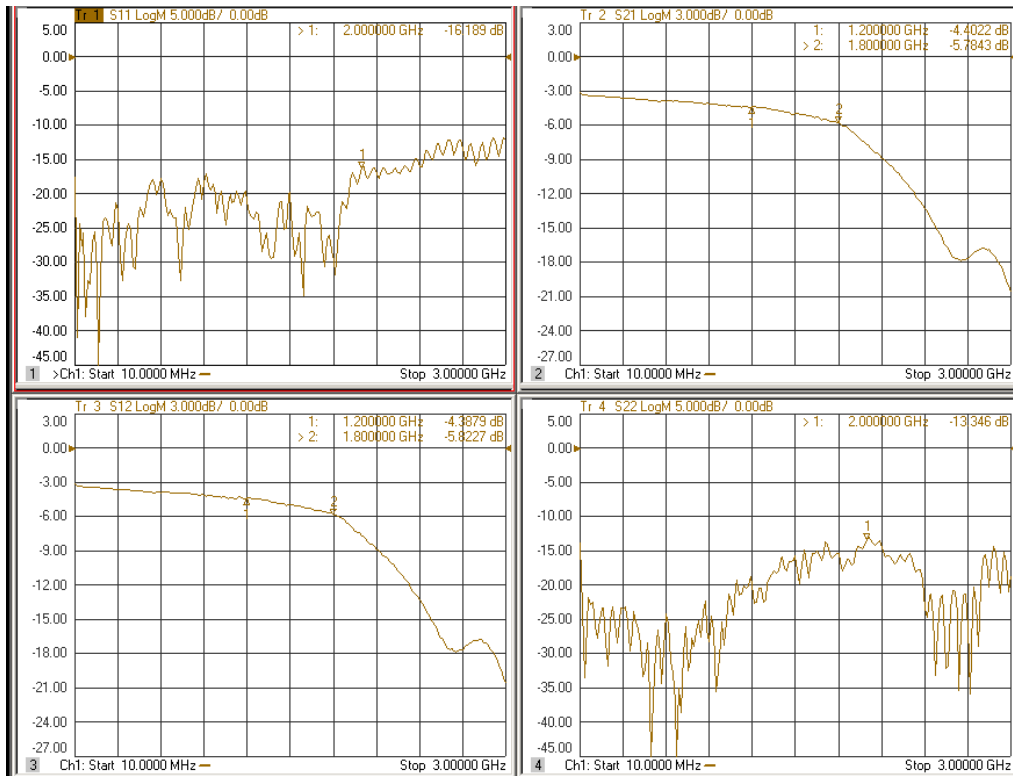Figure 270: Scattering matrix for channel Ib, polarization y and output 6dB3.

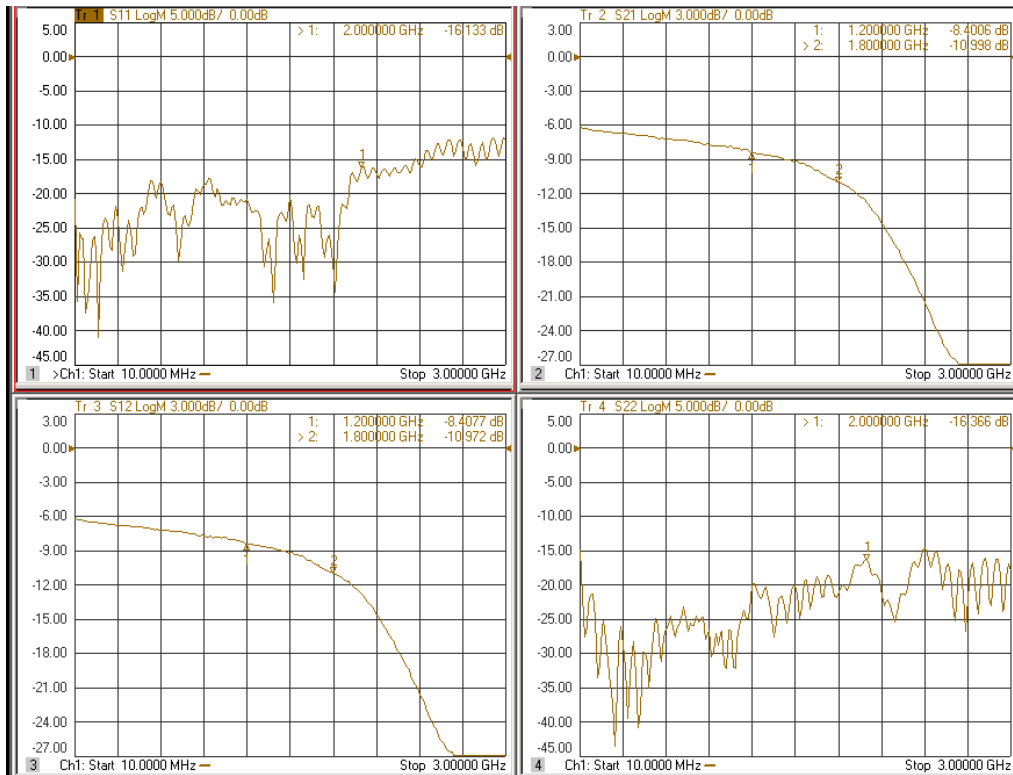Figure 271: Scattering matrix for channel IIb, polarization x and output 3dB1.

Figure 272: Scattering matrix for channel IIb, polarization x and output 6dB2.

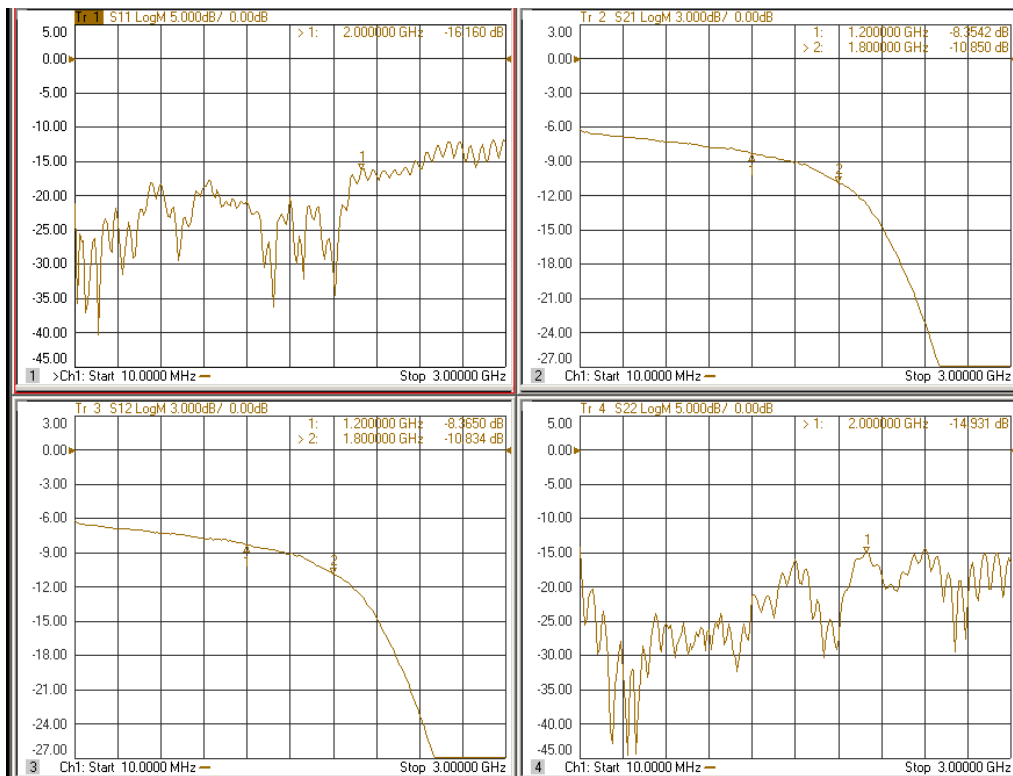
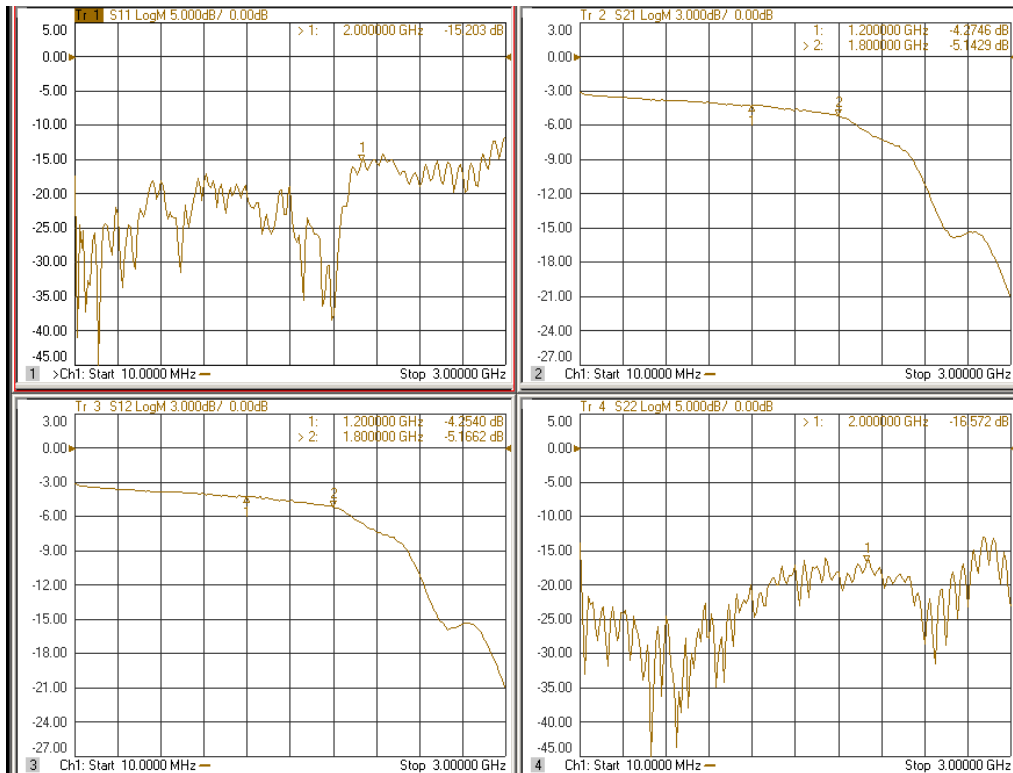Figure 273: Scattering matrix for channel IIb, polarization x and output 6dB3.

Figure 274: Scattering matrix for channel IIb, polarization y and output 3dB1.
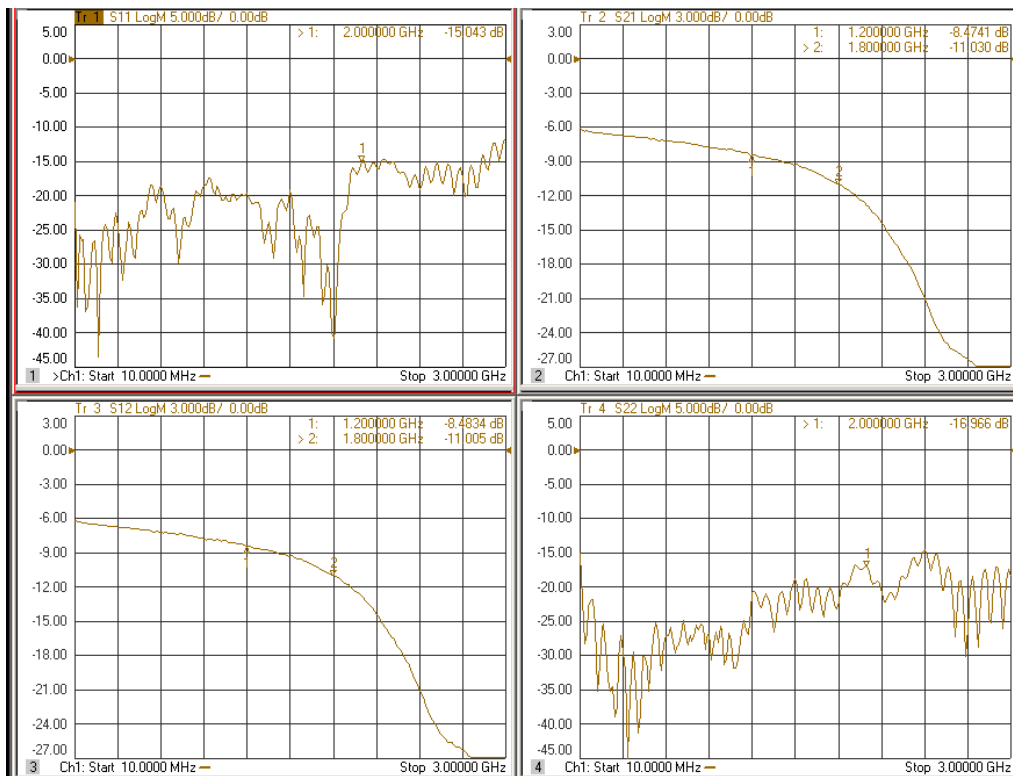

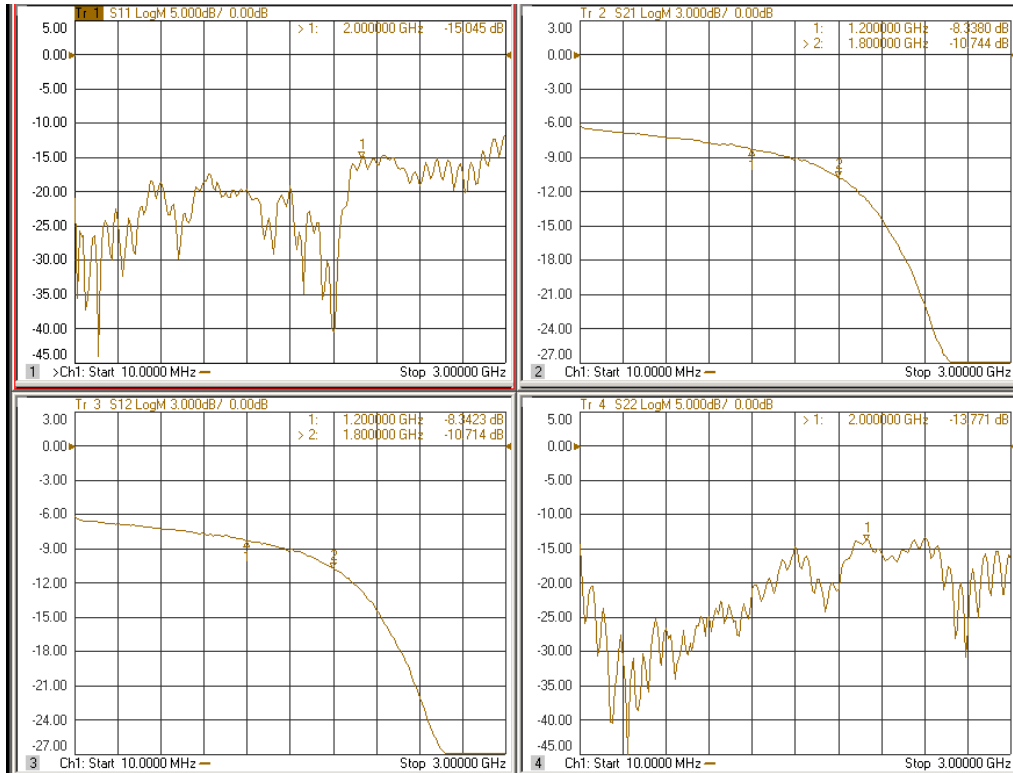Figure 275: Scattering matrix for channel IIb, polarization y and output 6dB2.

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Figure 276: Scattering matrix for channel IIb, polarization y and output 6dB3.
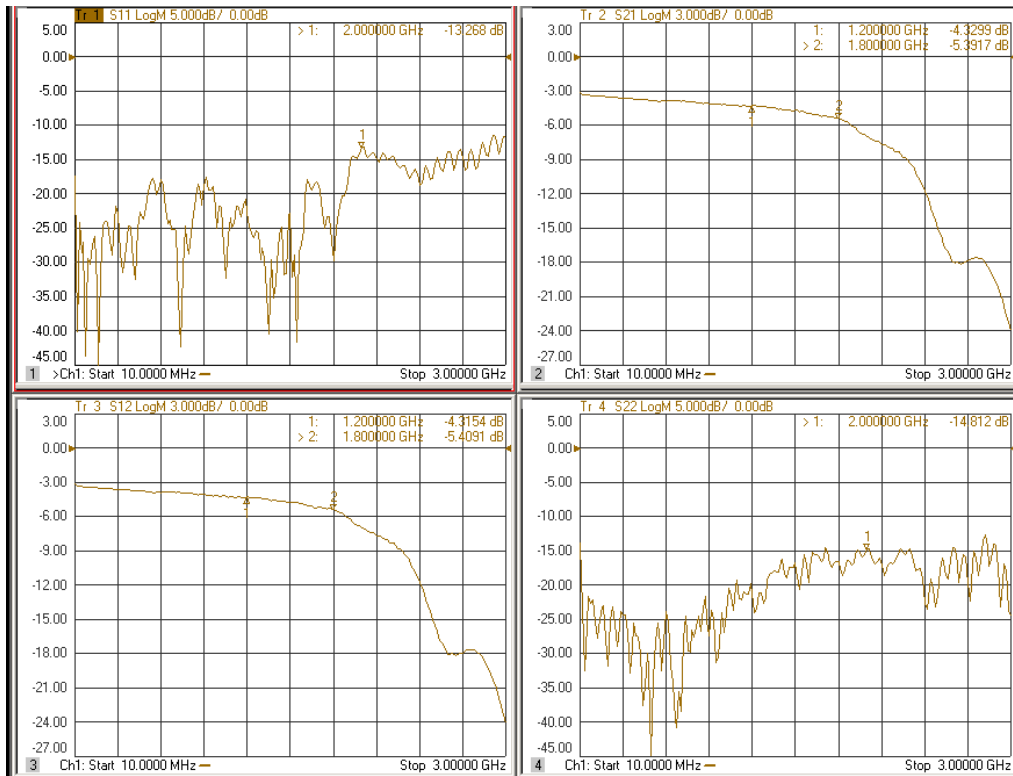

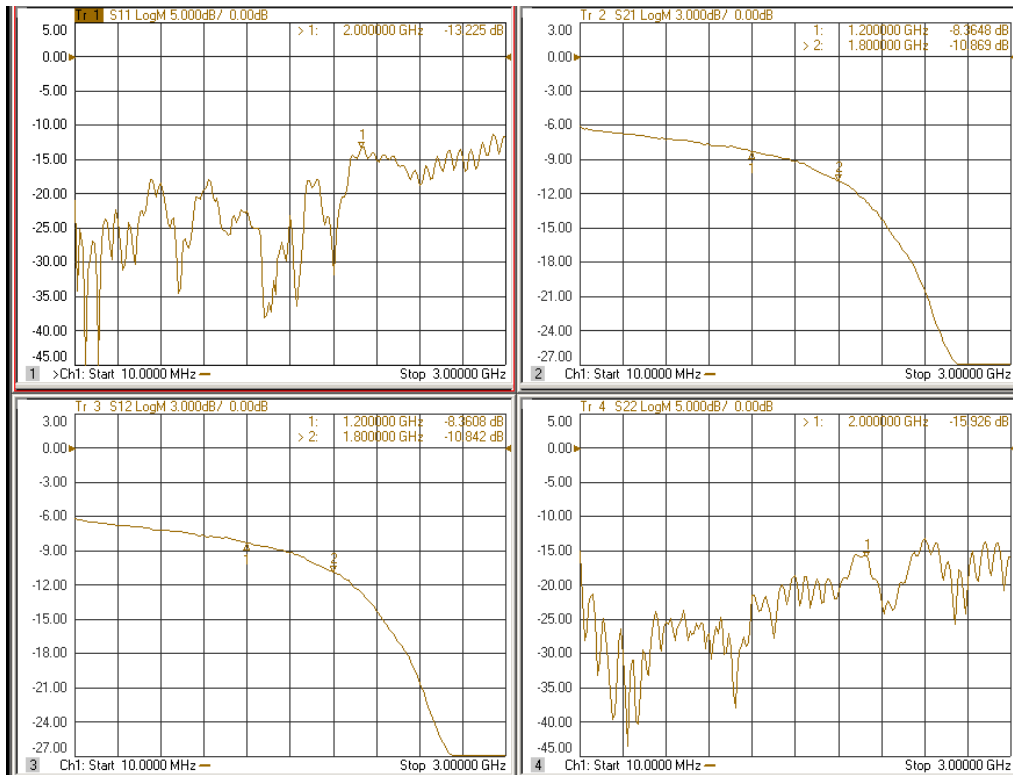Figure 277: Scattering matrix for channel IIIb, polarization x and output 3dB1.

Figure 278: Scattering matrix for channel IIIb, polarization x and output 6dB2.
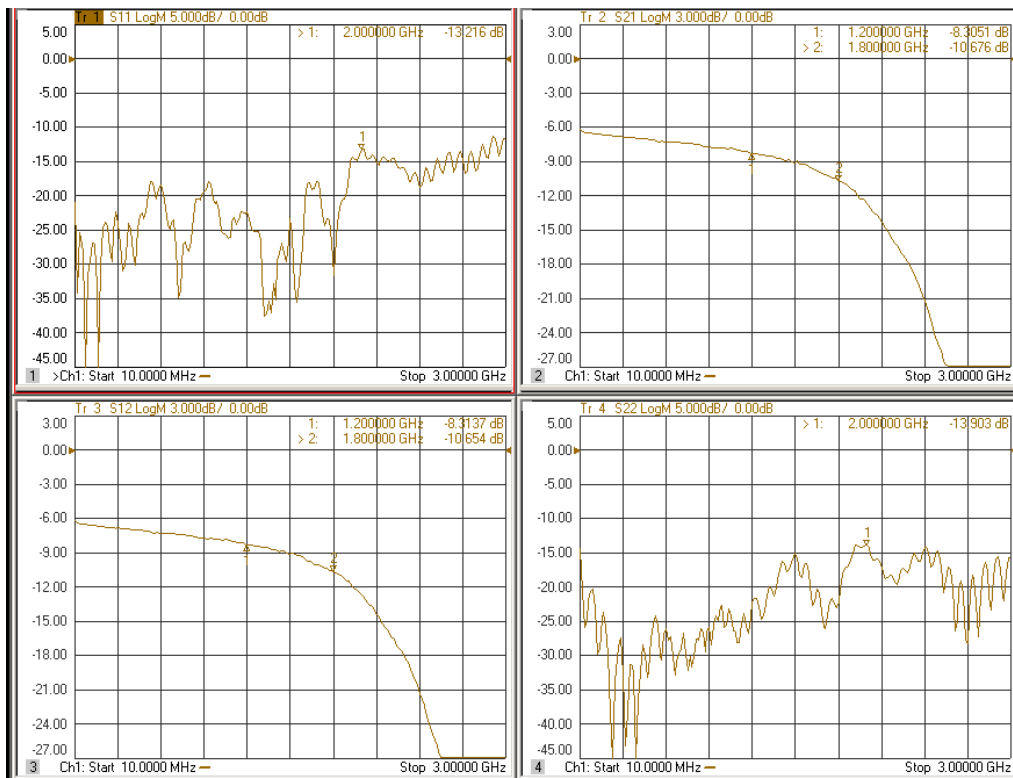

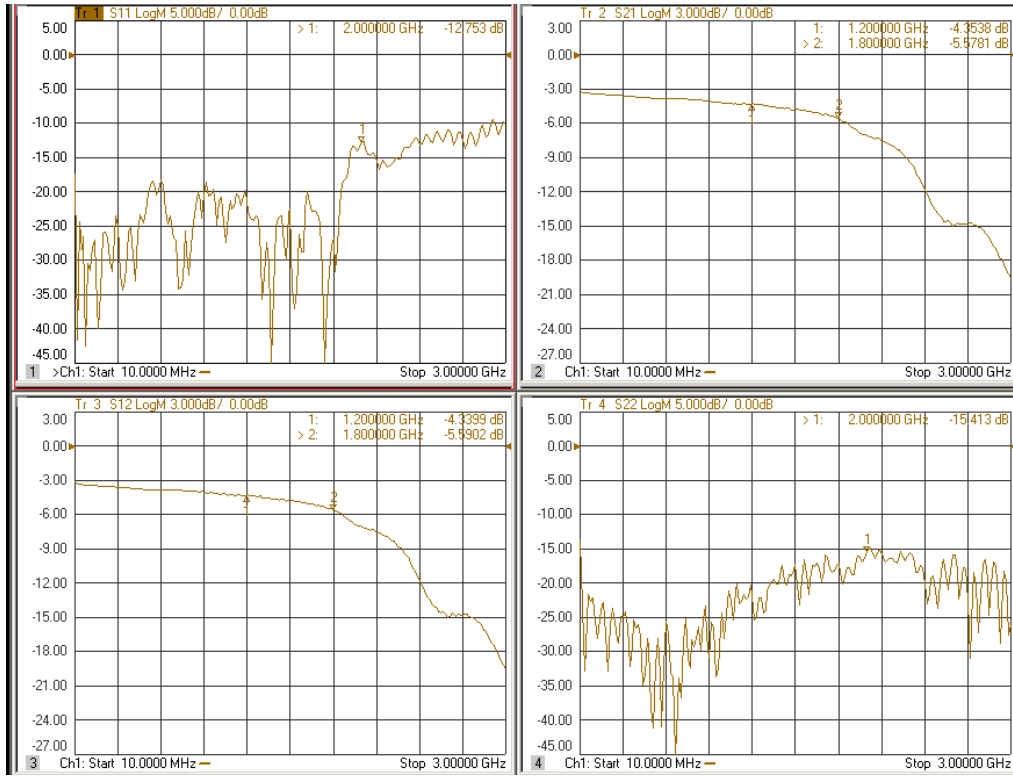Figure 279: Scattering matrix for channel IIIb, polarization x and output 6dB3.

Figure 280: Scattering matrix for channel IIIb, polarization y and output 3dB1.
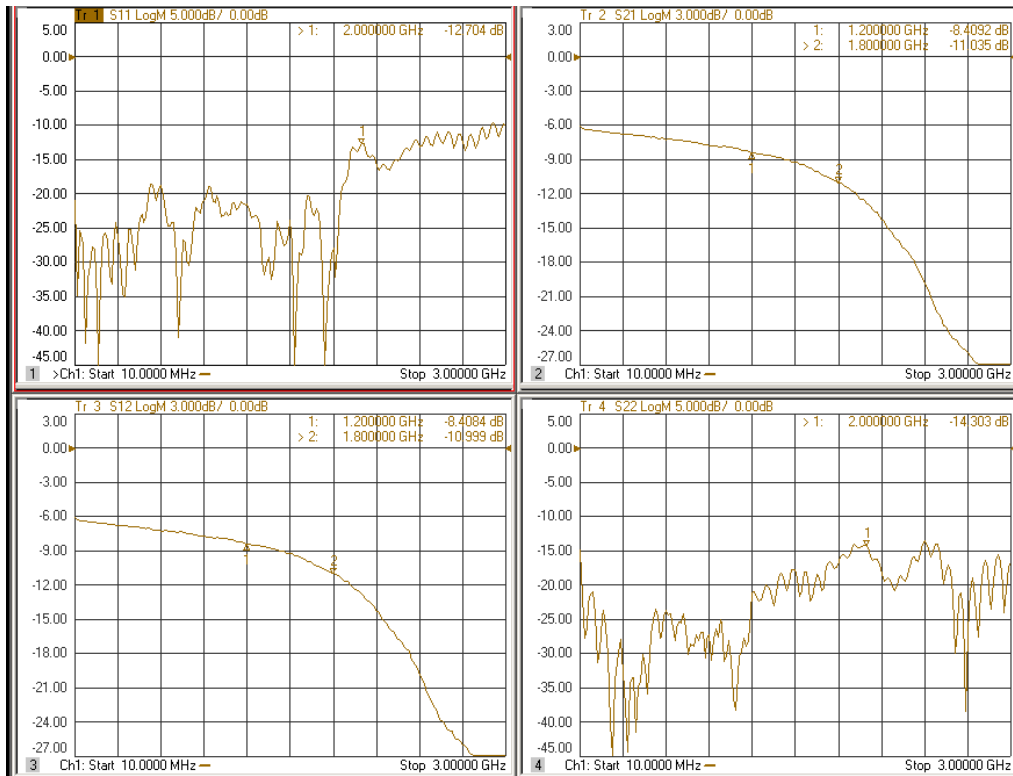

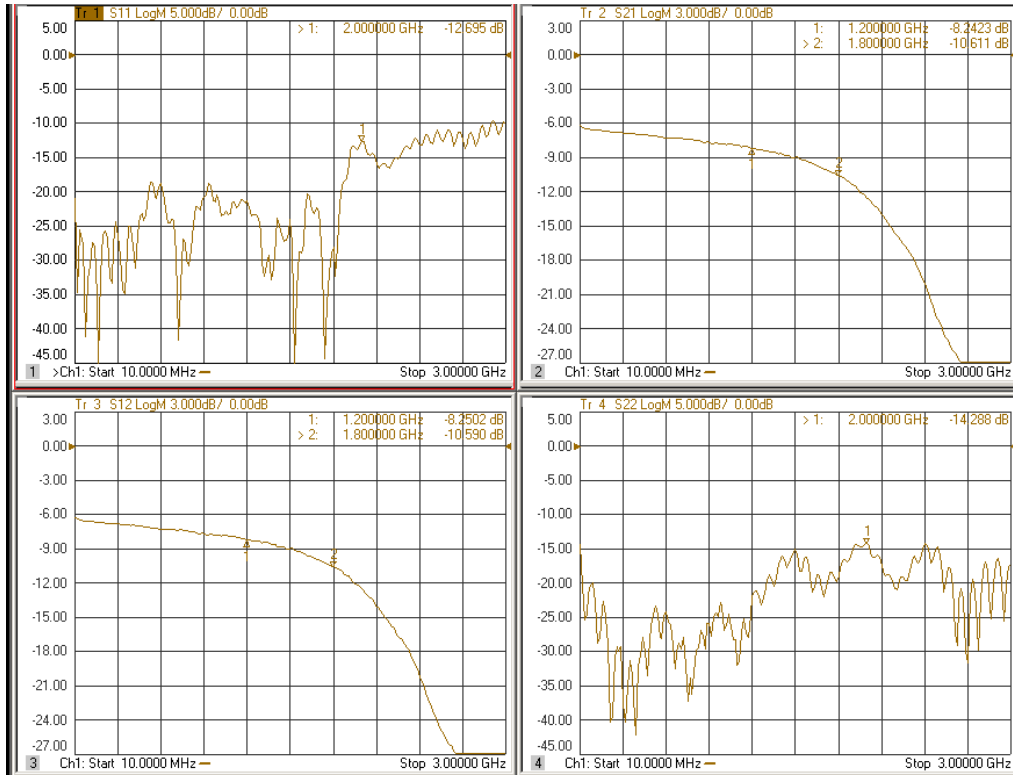Figure 281: Scattering matrix for channel IIIb, polarization y and output 6dB2.

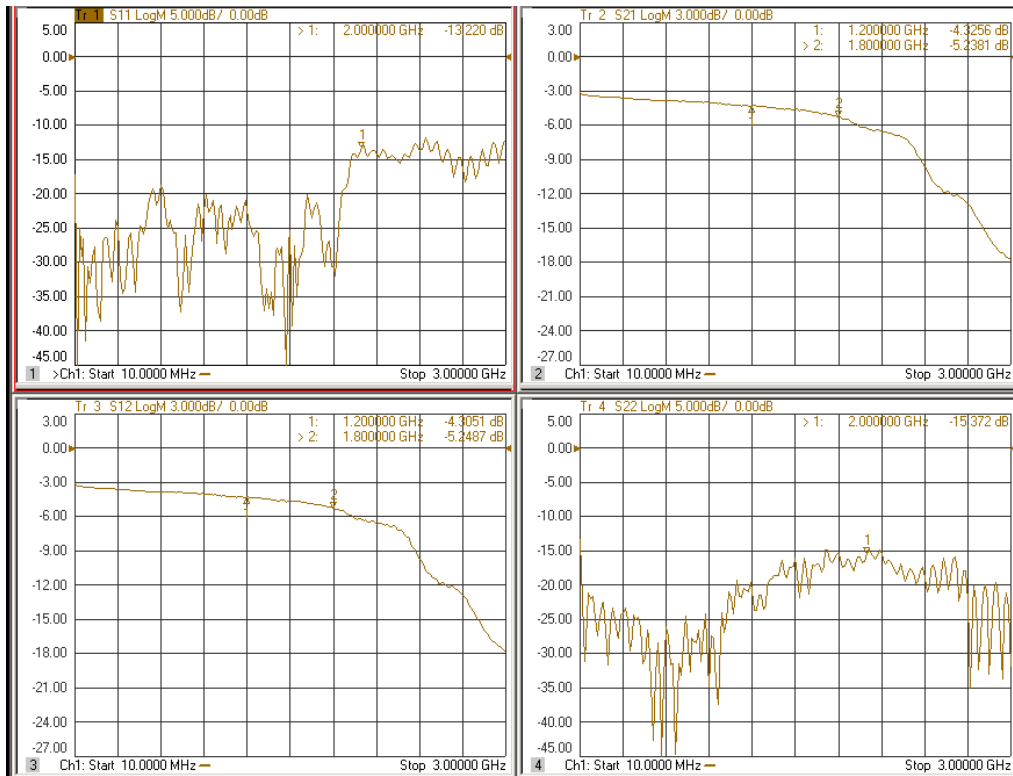Figure 282: Scattering matrix for channel IIIb, polarization y and output 6dB3.

Figure 283: Scattering matrix for channel IVb, polarization x and output 3dB1.
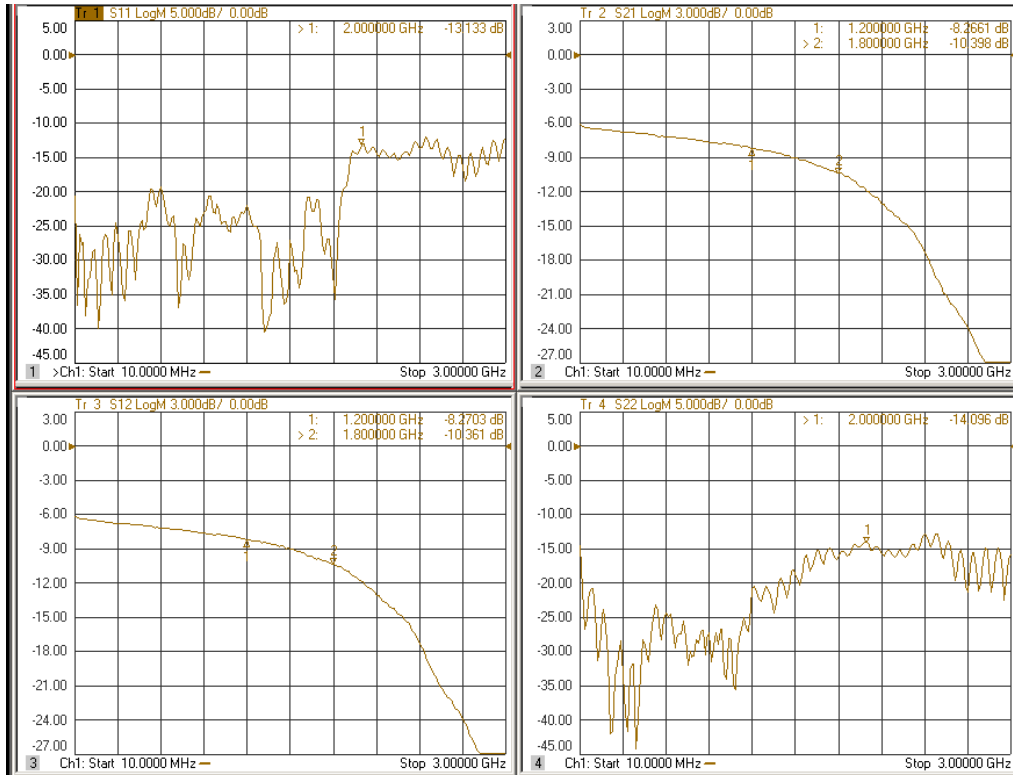
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Figure 284: Scattering matrix for channel IVb, polarization x and output 6dB2.
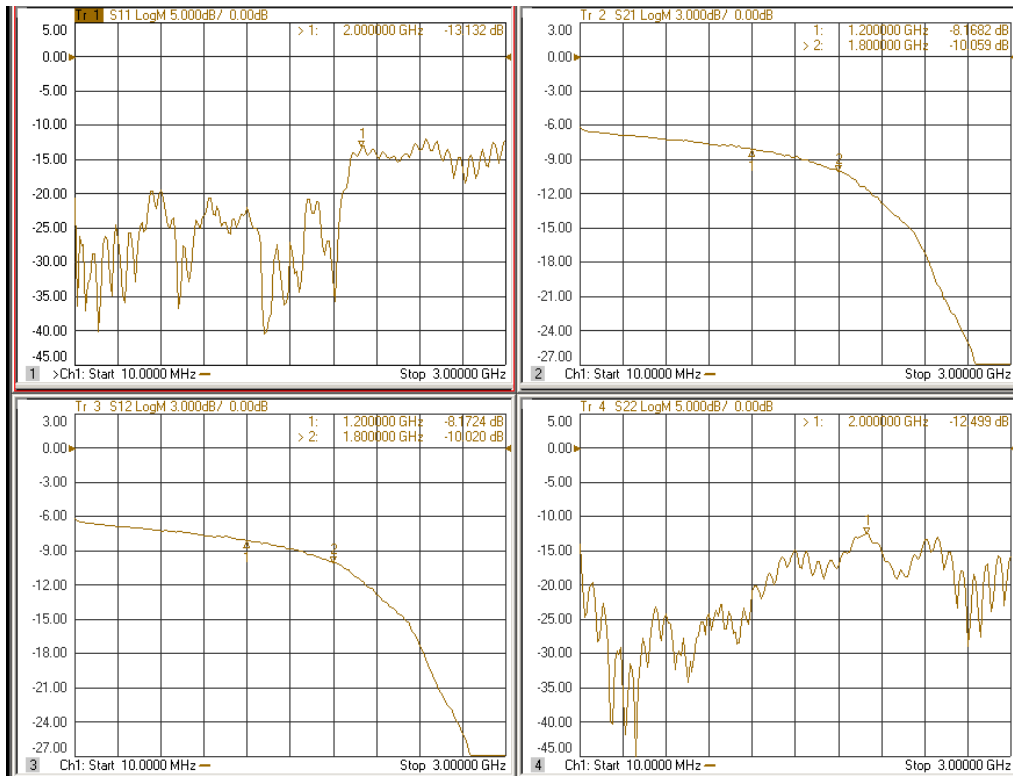

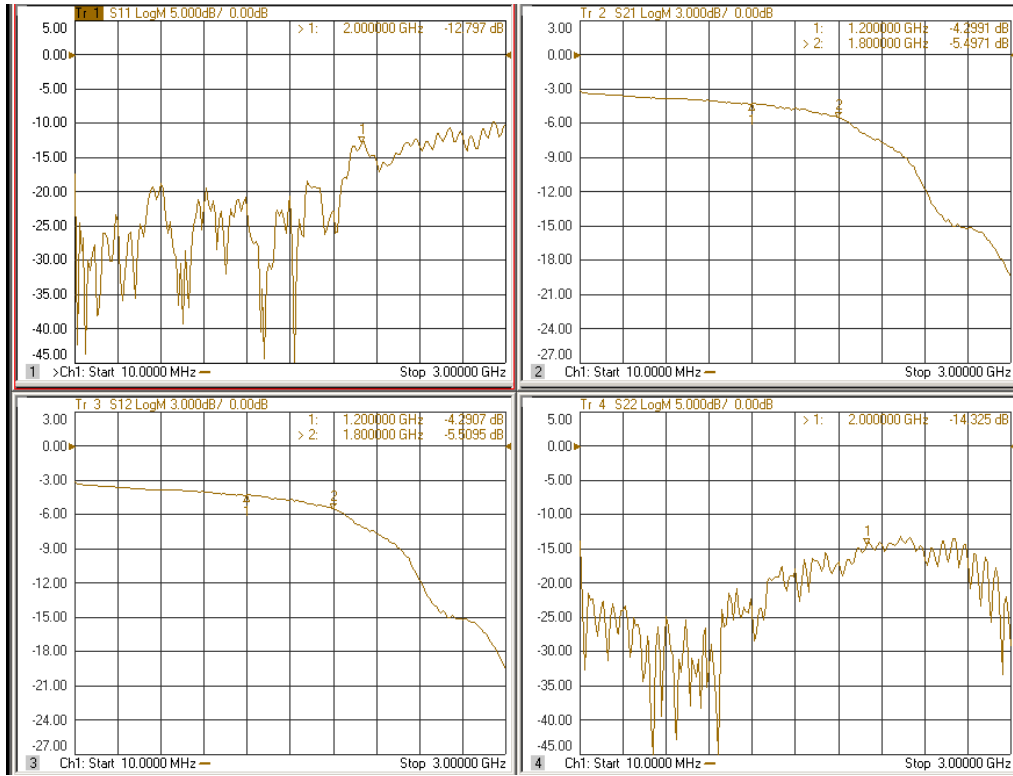Figure 285: Scattering matrix for channel IVb, polarization x and output 6dB3.

Figure 286: Scattering matrix for channel IVb, polarization y and output 3dB1.
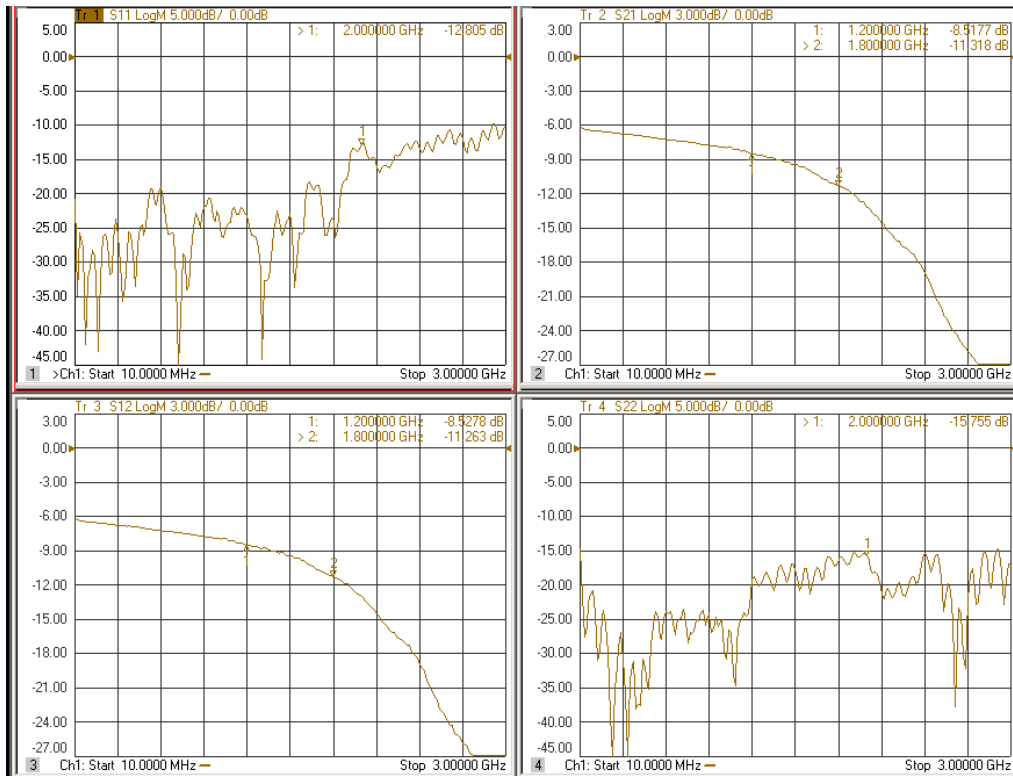

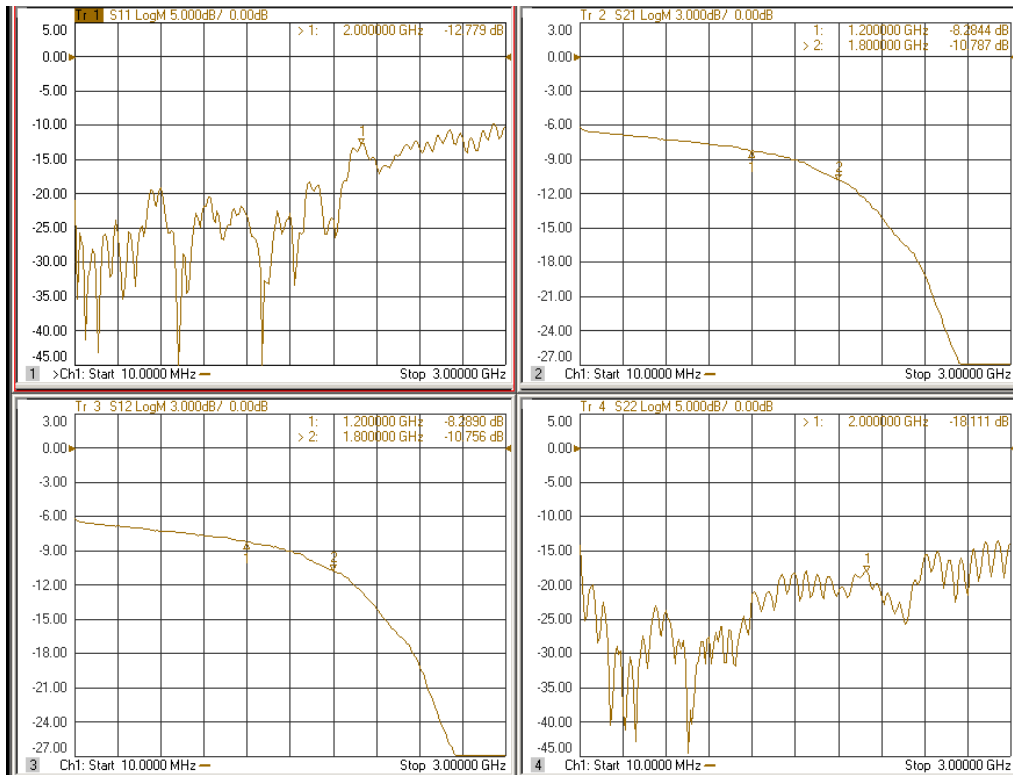Figure 287: Scattering matrix for channel IVb, polarization y and output 6dB2.

Figure 288: Scattering matrix for channel IVb, polarization y and output 6dB3.