

RFFE - XRECEIVER (XCVRO_RF) (XRCEIVER 071) (XCVR1_RF)

IPHONE 7 INTEL

APN: 820-00189-A

RFFE1

RFFE2

GSM PA
RF

SKY77359
2G PA
0x5

MHBLN_RF

0x3

VDD_RFFE_VIO_1V8

TDD PA
RF

MB HB
TDD SPAD
4G
0xF

LBLN_RF

0x2

VDD_RFFE_VIO_1V8

ET RF

Q81003M
ENVELOPE
0xC

TUNFX_RF

Flex

PP1V8_SDRAM

MBHBPA
RF

MB HB
S PAD
0xE

Necessary test
points to read RFFE

- SLCK
- SDATA
- GND
- VDD_RFFE_VIO_1V8

MB HB
DRX ASM

D513
0xA

LATCP
RF

DUAL
COUPLER
0x6

UATCP_RF

0x7

LBPA_RF
LB S_PAD

RF6110
0xD

LB
DRX_ASM

D5325
0x9

1V8

R6503_RF
VDD_RFFE_VIO_1V8

RFFE1

R6503_RF
VDD_RFFE_VIO_1V8

R6505_RF
SCLK

R6504_RF
SDATA

RFFE2

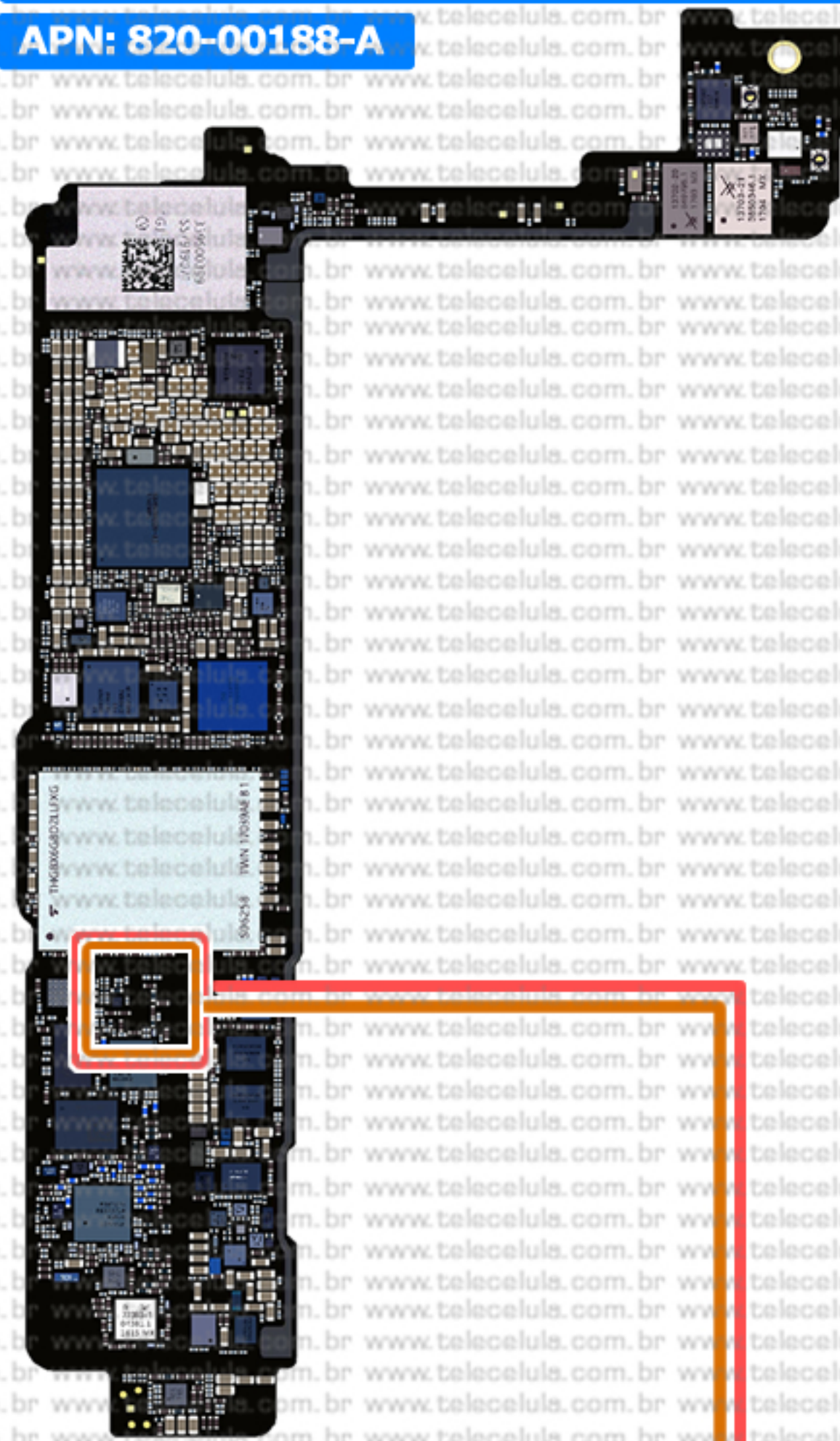
R6600_RF
SCLK

R6601_RF
SDATA

RFFE <-> (BB_RF)

IPHONE 7 QUALCOMM

APN: 820-00188-A



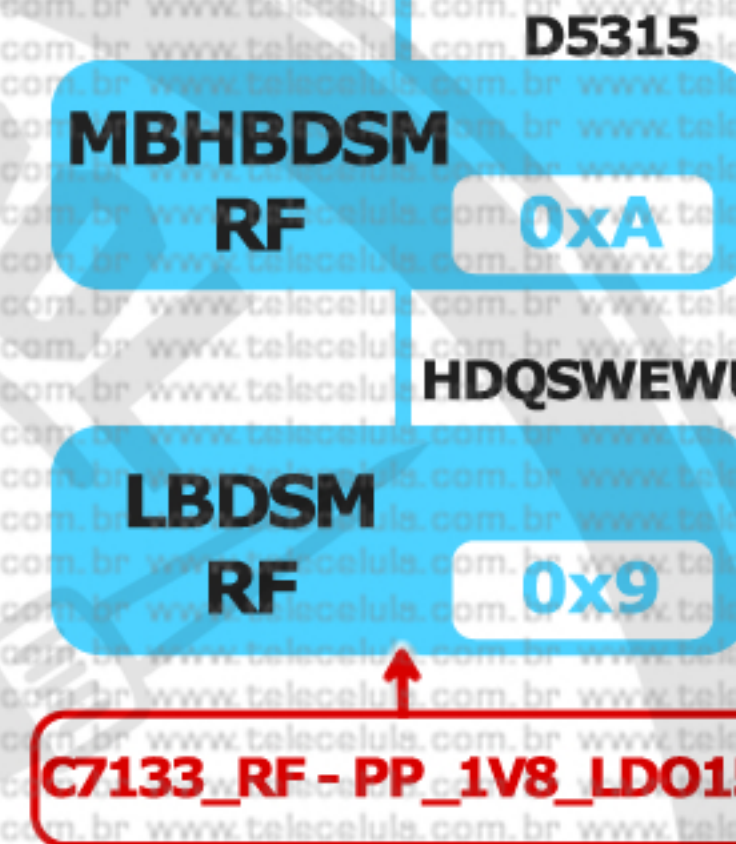
RFFE6



RFFE7

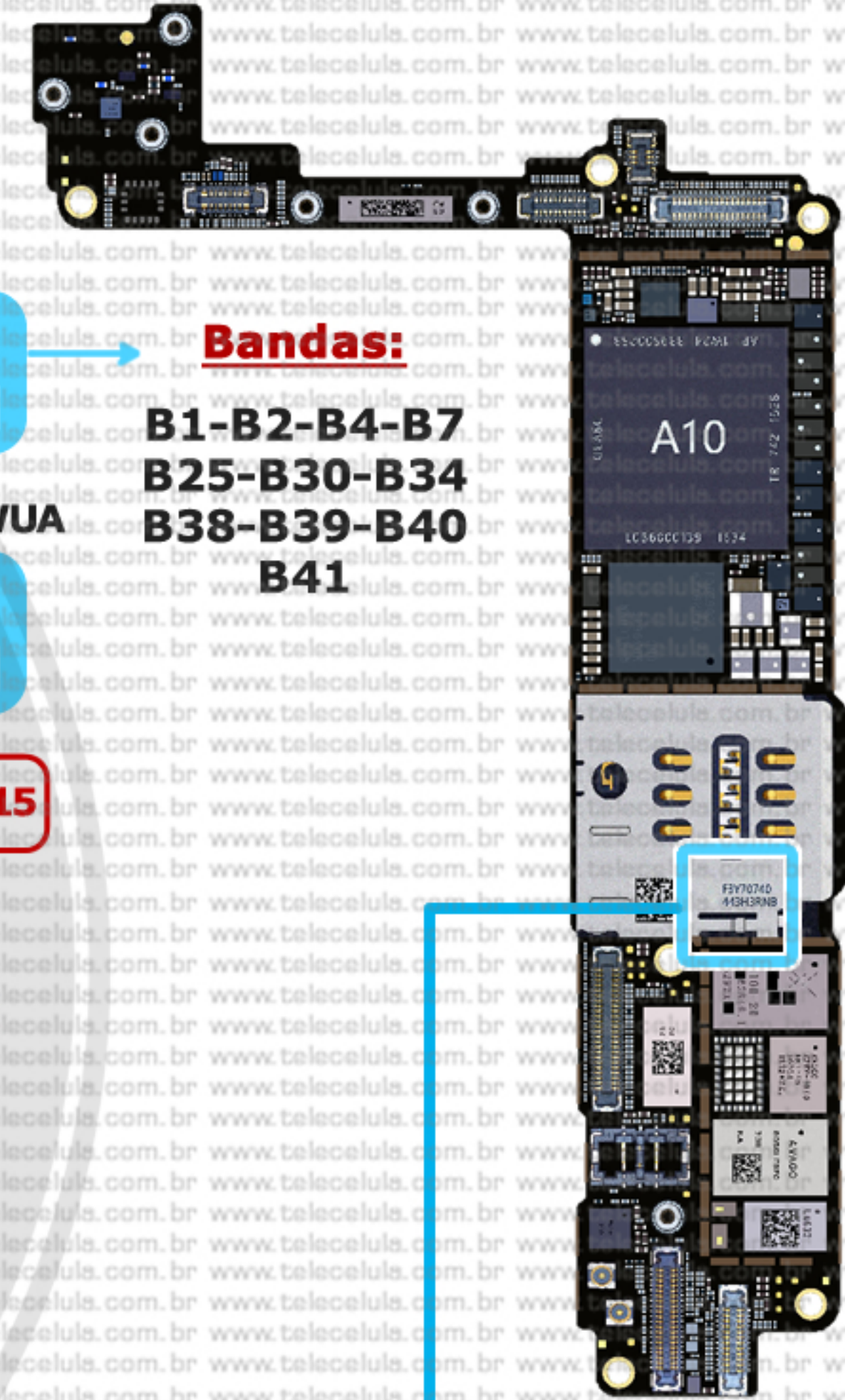


RFFE3



Bandas:

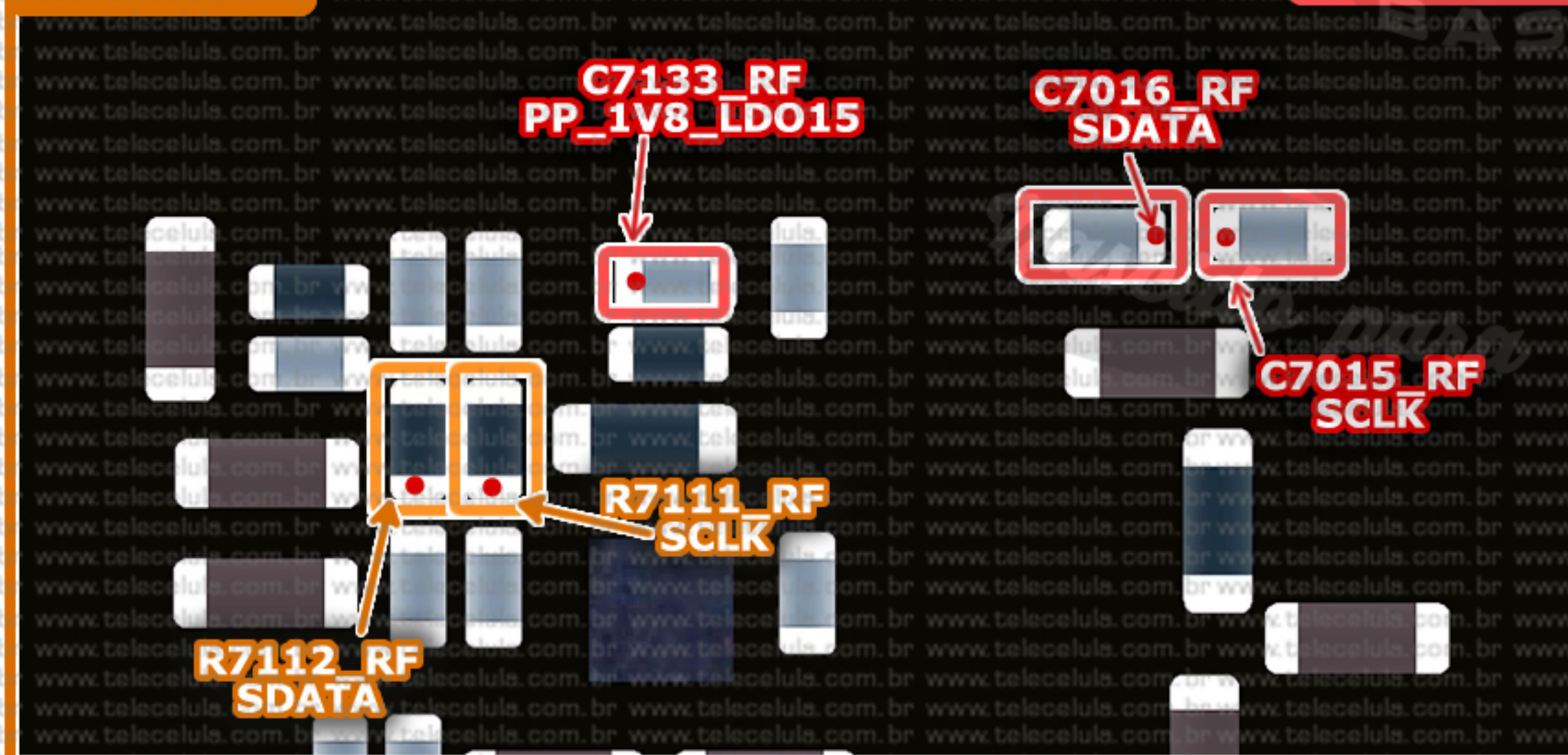
B1-B2-B4-B7
B25-B30-B34
B38-B39-B40
B41



Necessary test points to read RFFE

- **SLCK**
- **SDATA**
- **GND**
- **1V8***

RFFE7

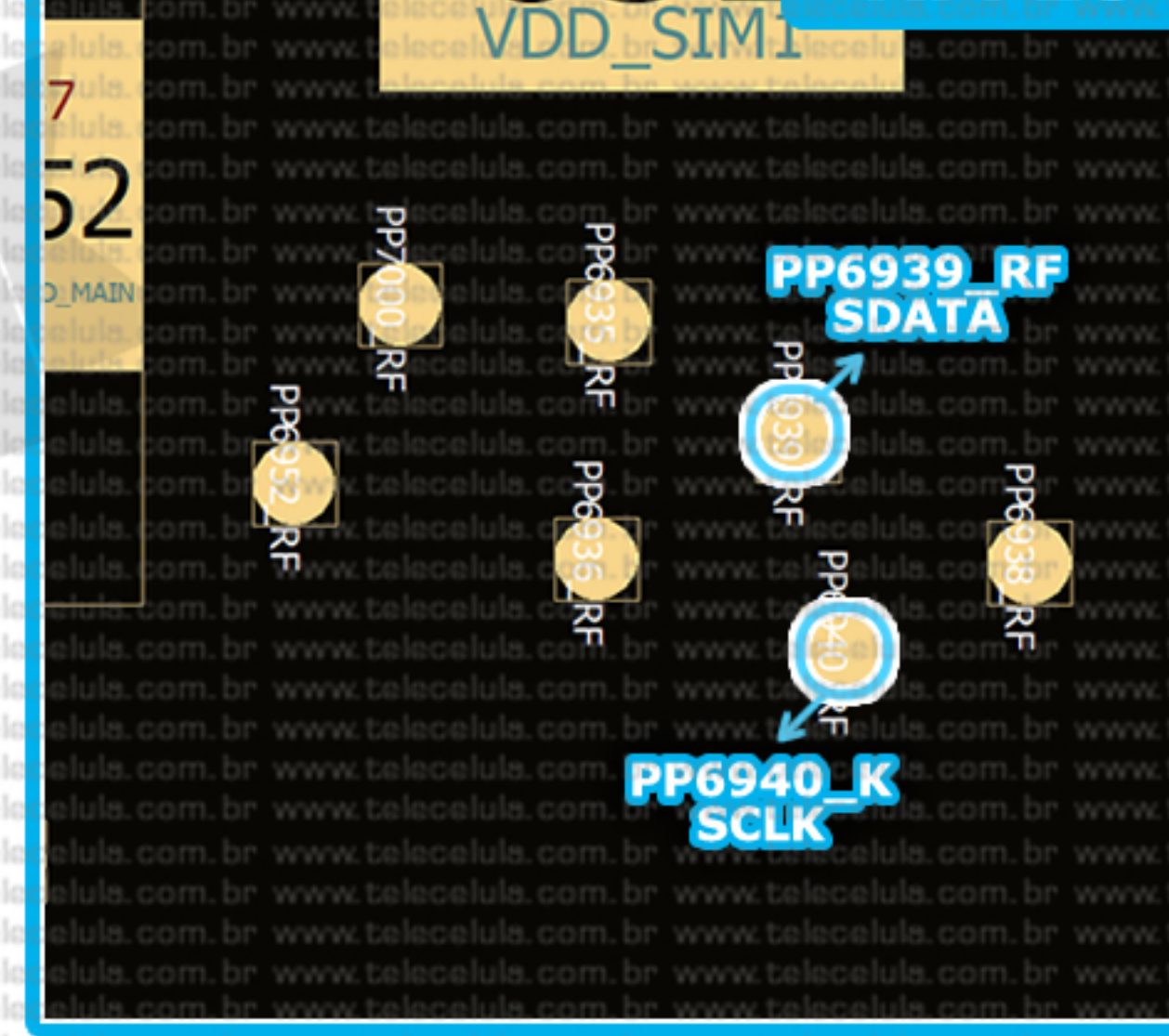


RFFE6

RFFE TABLE

- RFFE1: WTR 3925**
- RFFE2: QFE 3100**
- RFFE3: DIU MODULES**
- RFFE4: WTR 4905**
- RFFE5: TUNERS + ELNAS**
- RFFE6: 2GPA, MLB PA, MB/HB TDD PA, MB/HB FDD PA**
- RFFE7: LB PA, COUPLERS**

RFFE3



RFFE - (XCVR0_K)

(XCVR1_K)

IPHONE 8 INTEL

APN: 820-00872-A

RFFE1

SKY77367

GSM PA_K 2G PA

0x5

MB_HB_TDD
S_PAD

TDD PA_K 4G

0xF

QM 81004M

ET_K

0xC

AFEM_8056
AP1

MBHBPA_K

0xE

QM 76041

LBPA_K

0xD

SKY16708_11

UATCP_K

0x7

SKY16708_11

LATCP_K

0x6

DRX_DSM

0x9 0xA

LB_MB_HB_DRX_ASM

QM18099

LAT TUNER

* GPO 0x8

PP1V8_S2 - FL600_K

J6400

DOCK

FLEX

C801_K / R800_K

R1200_K

VDD_RFFE_VIO_1V8_K

RFFE2

FL301_KF
PP1V8_S2

R302_KF
SDATA

R304_KF
SCLK

RFFE2

SKY13764_14

MB/HB

DRX_LNA 0x3

VDD_RFFE_VIO_1V8_K
R800_K

SKY13767_11

LBLN_K

0x2

VDD_RFFE_VIO_1V8_K
R800_K

UAT_TUNER_FLEX

TUNFX_KF

* PP1V8_S2 - FL301_K

QM18098

UAT TUNER GPO

* 0x8

PP1V8_S2 - FL301_K

Necessary test
points to read RFFE

- SCLK
- SDATA
- GND
- 1V8*

FL600_K
PP1V8_S2

R1200_K
1V8

R1201_K
SDATA

R1202_K
SCLK

RFFE - BB (MDM)

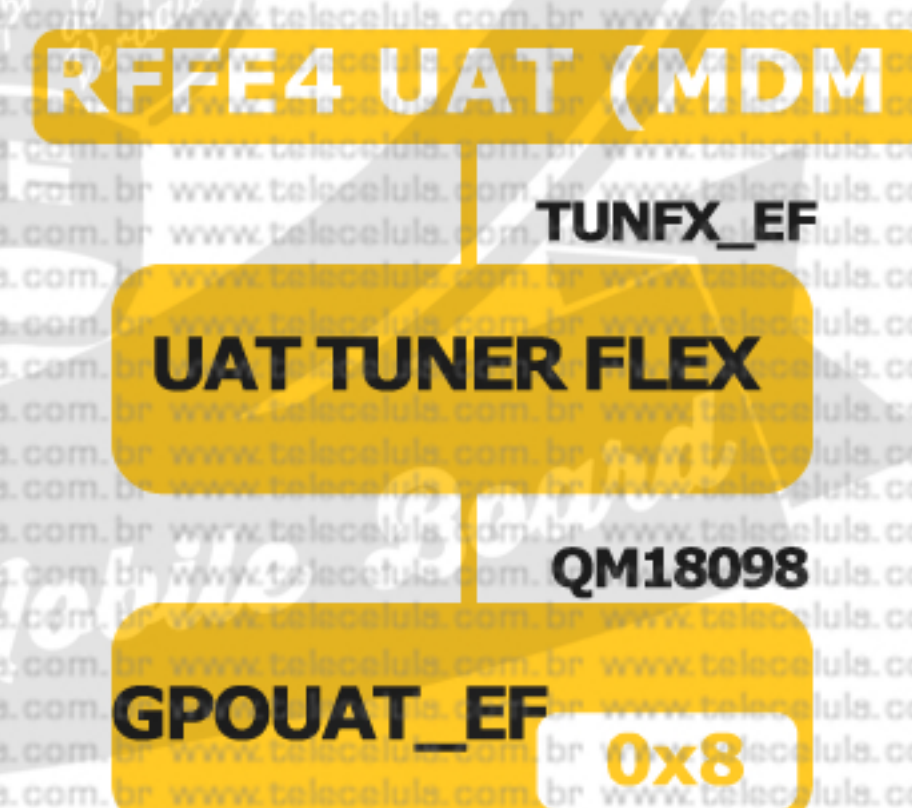
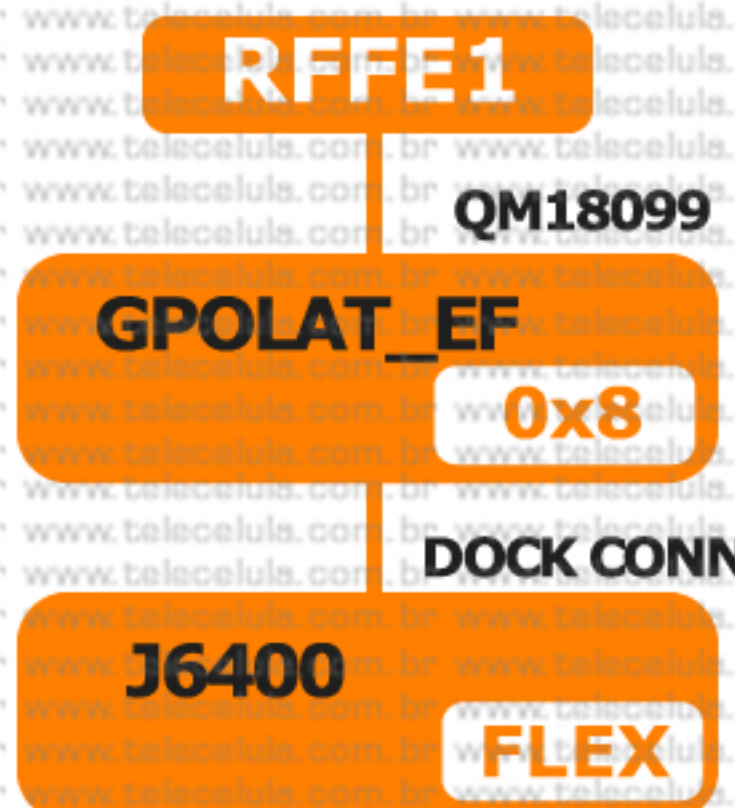
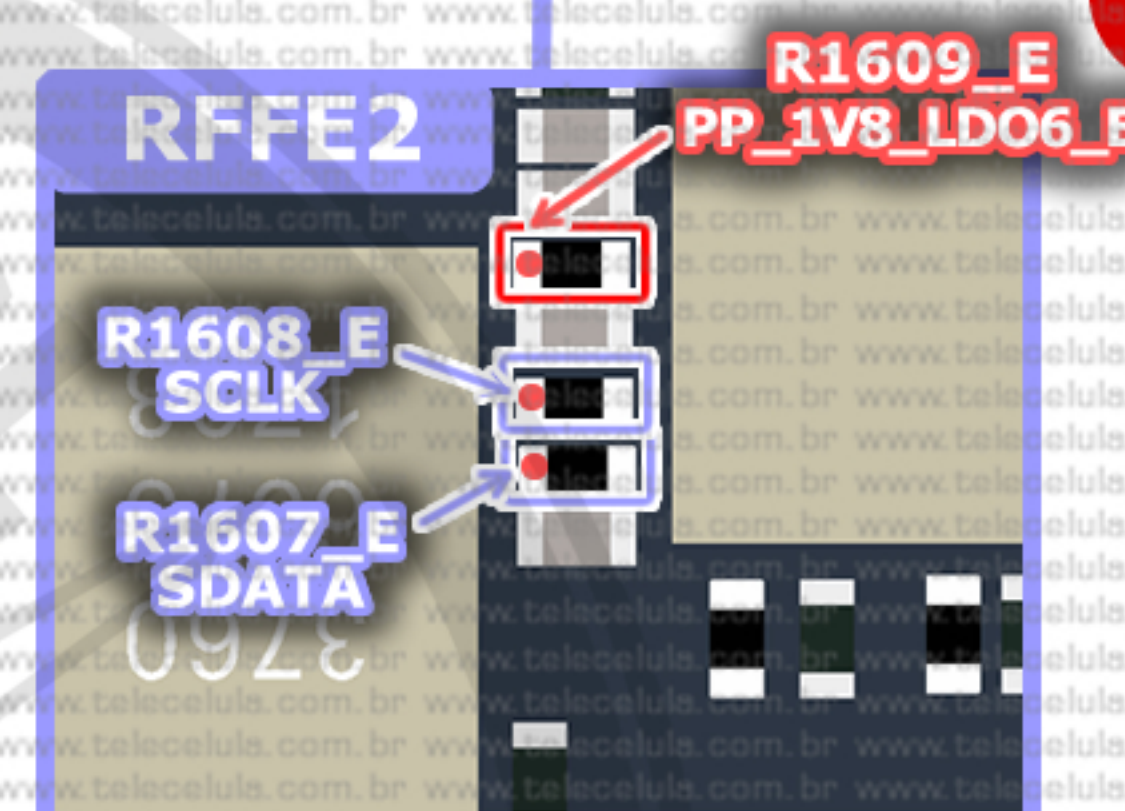
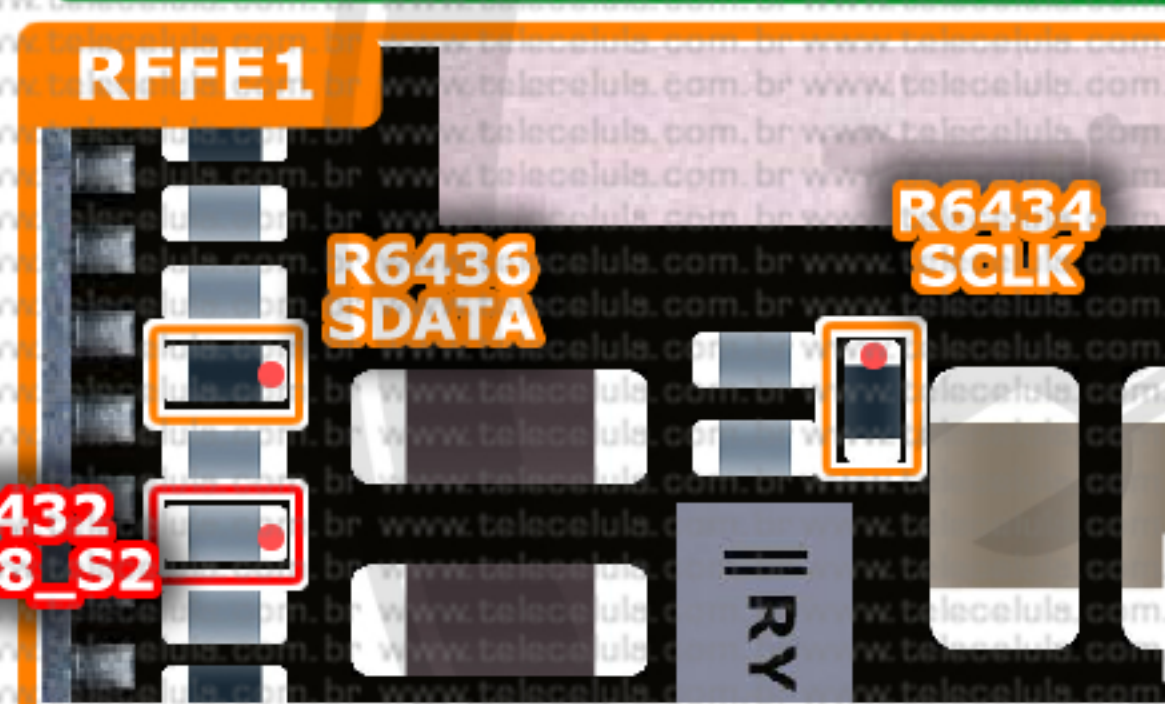
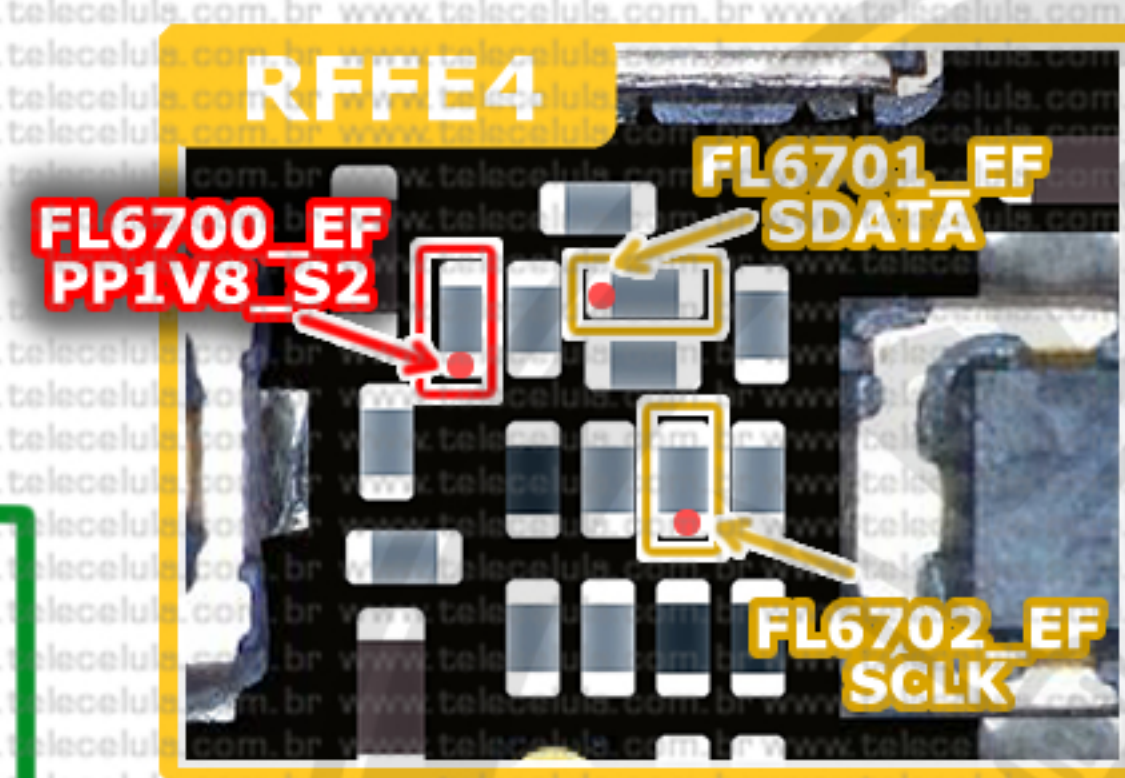
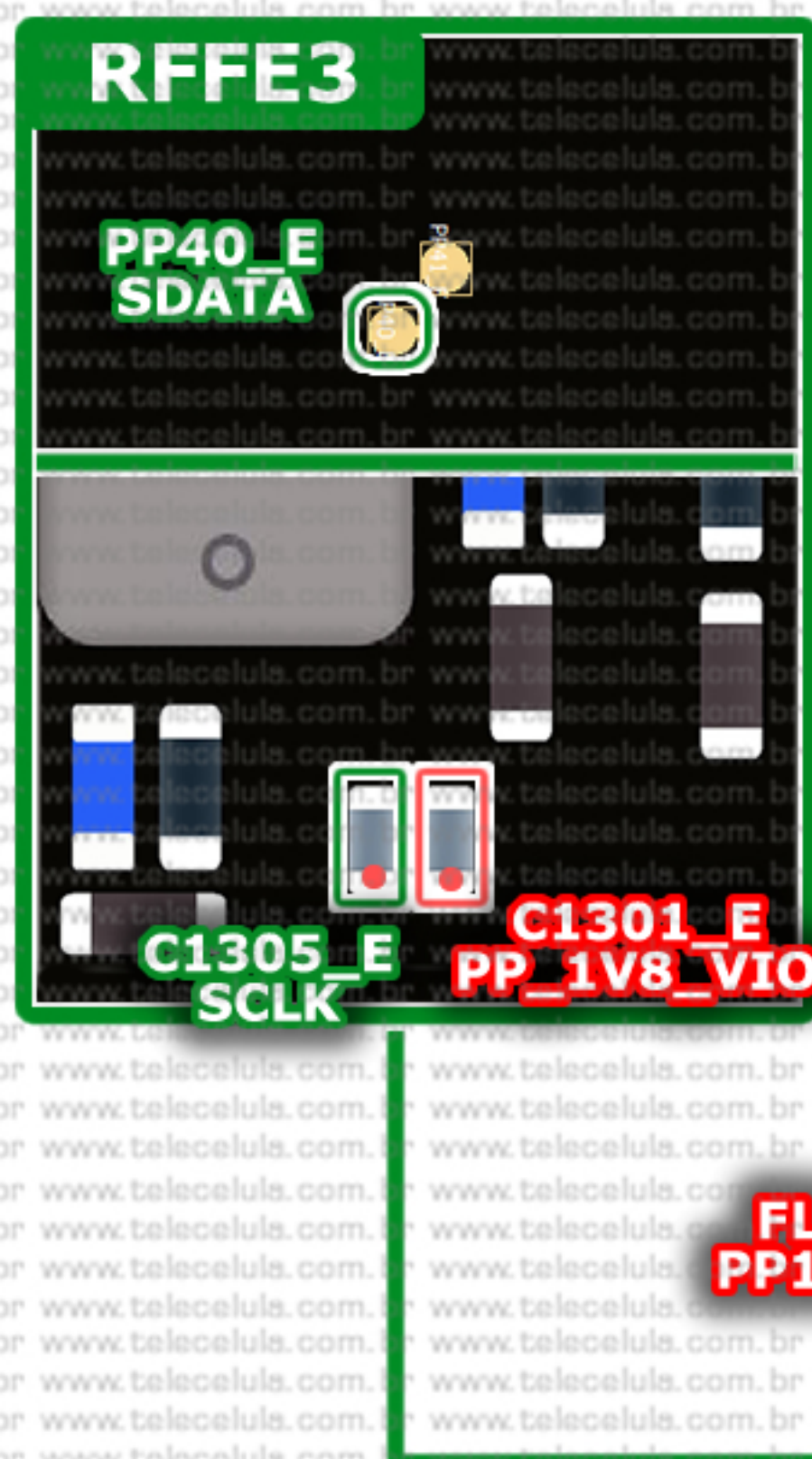
Necessary test points to read RFFE

IPHONE 8 QUALCOMM

APN: 820-00871-A

TOP BOTTOM

- SLCK
- SDATA
- GND
- 1V8*



FL6432
FL6902 EF
PP1V8_S2

R1609_E
PP_1V8_LDO6_E

R1301_E
PP_1V8_VIO = PP_1V8_LDO6_E

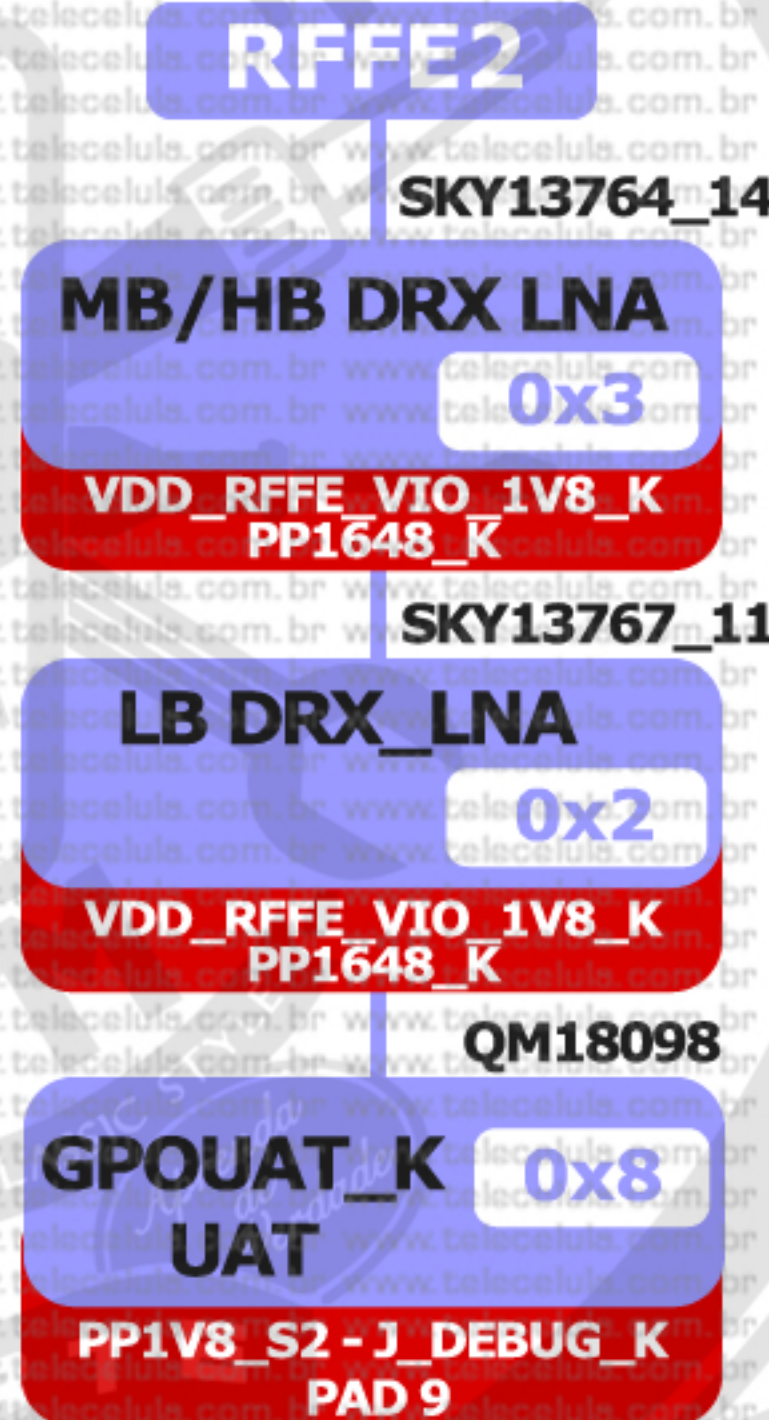
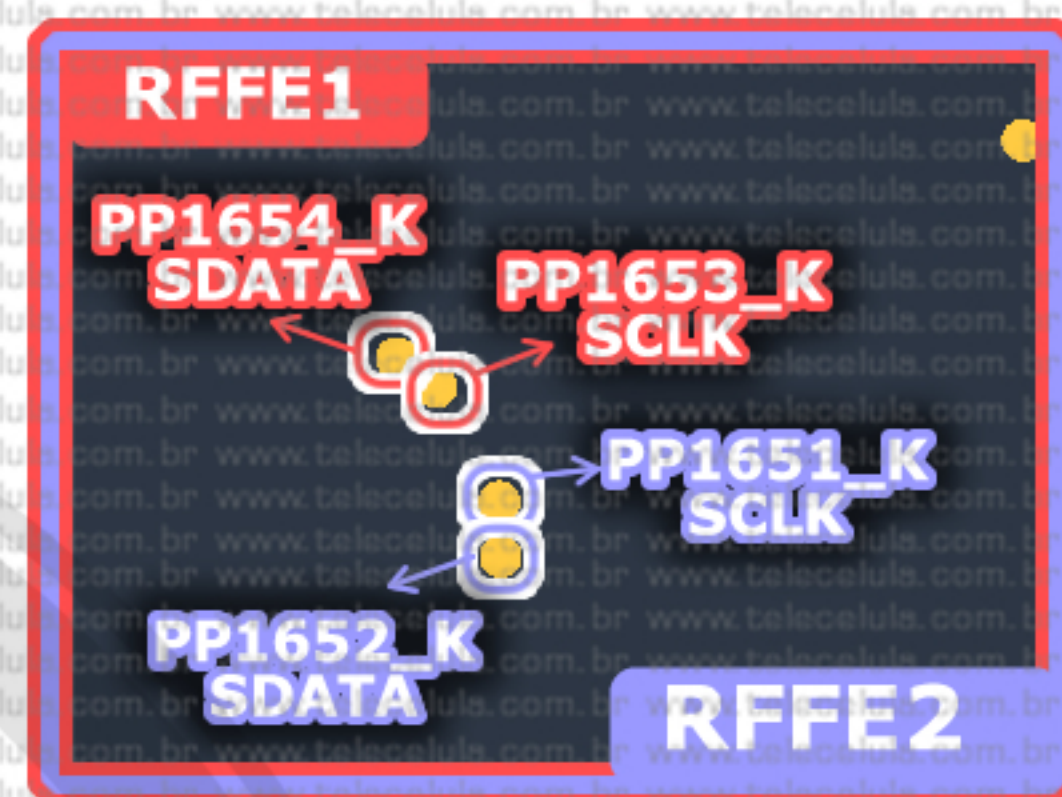
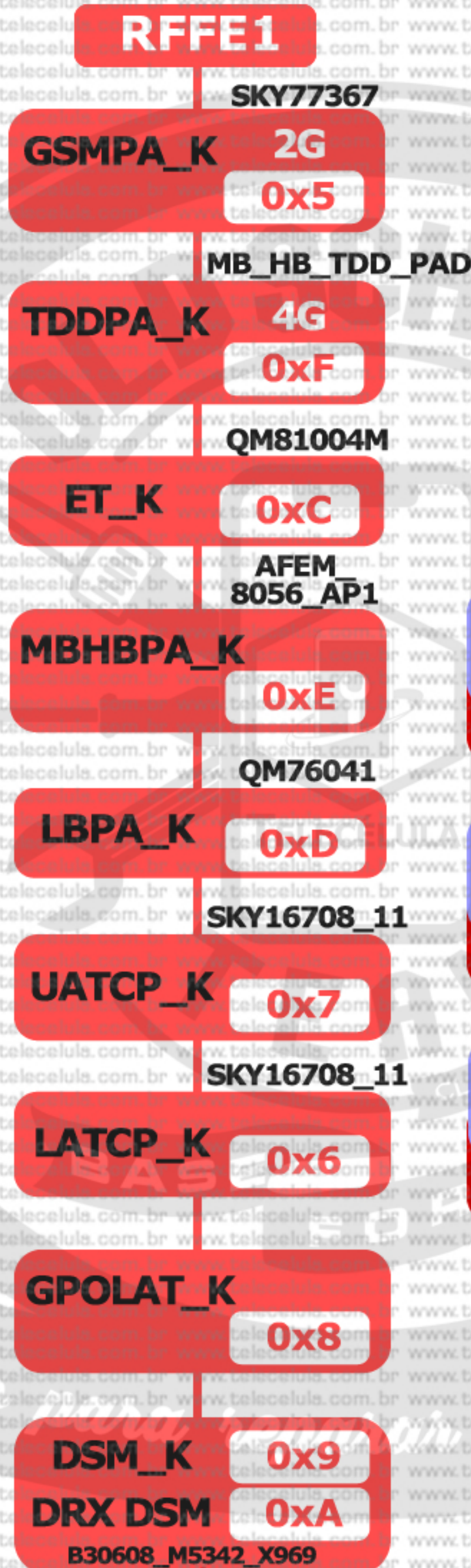
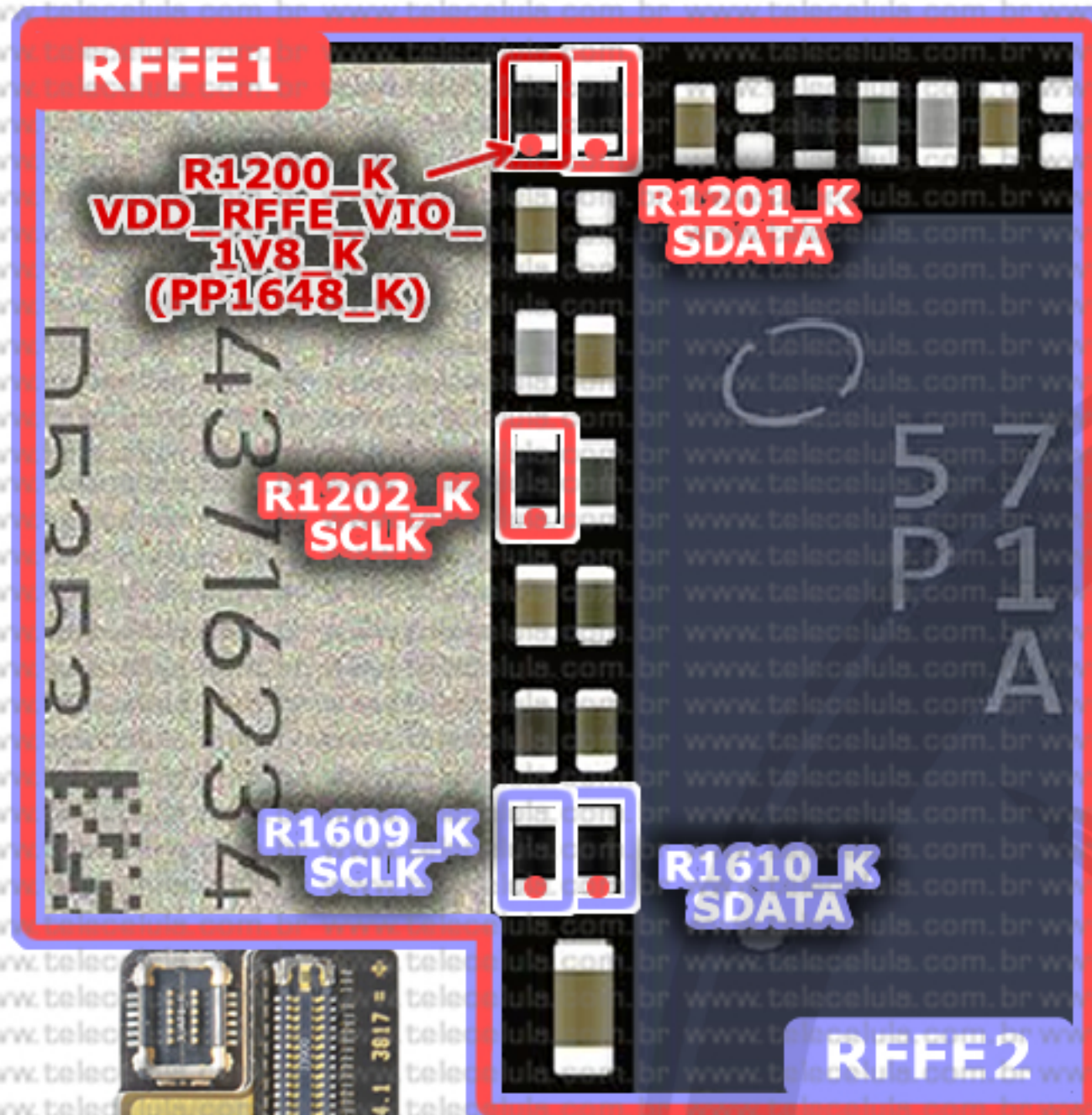
FL6700_EF
PP1V8_S2

C1110_E
PP_1V8_LDO6_E

IPHONE X INTEL

APN: 820-0863-12

RFFE - (XCVR0_K) (XCVR1_K)

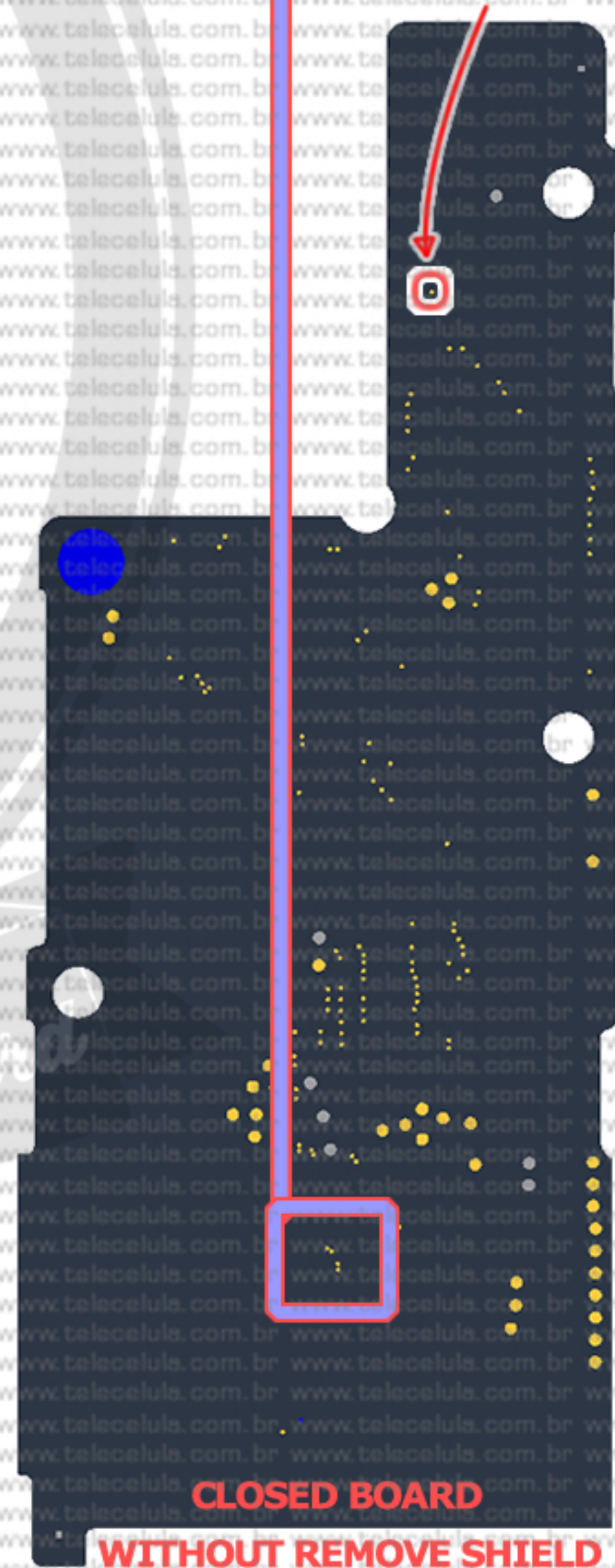


Necessary test
points to read RFFE

- SCLK
- SDATA
- GND
- 1V8*

VDD_RFFE_VIO_1V8_K - PP1648_K

PP1648_K
VDD_RFFE_VIO_1V8_K



CLOSED BOARD

WITHOUT REMOVE SHIELD

REMOVED SHIELD

IPHONE X QUALCOMM

APN: 820-0864-A

RFFE - (XCVRO_K) - MDM (XCVR1_K) - MDM

RFFE MAP

RFFE1: WTR, LATGPO
LATUNE

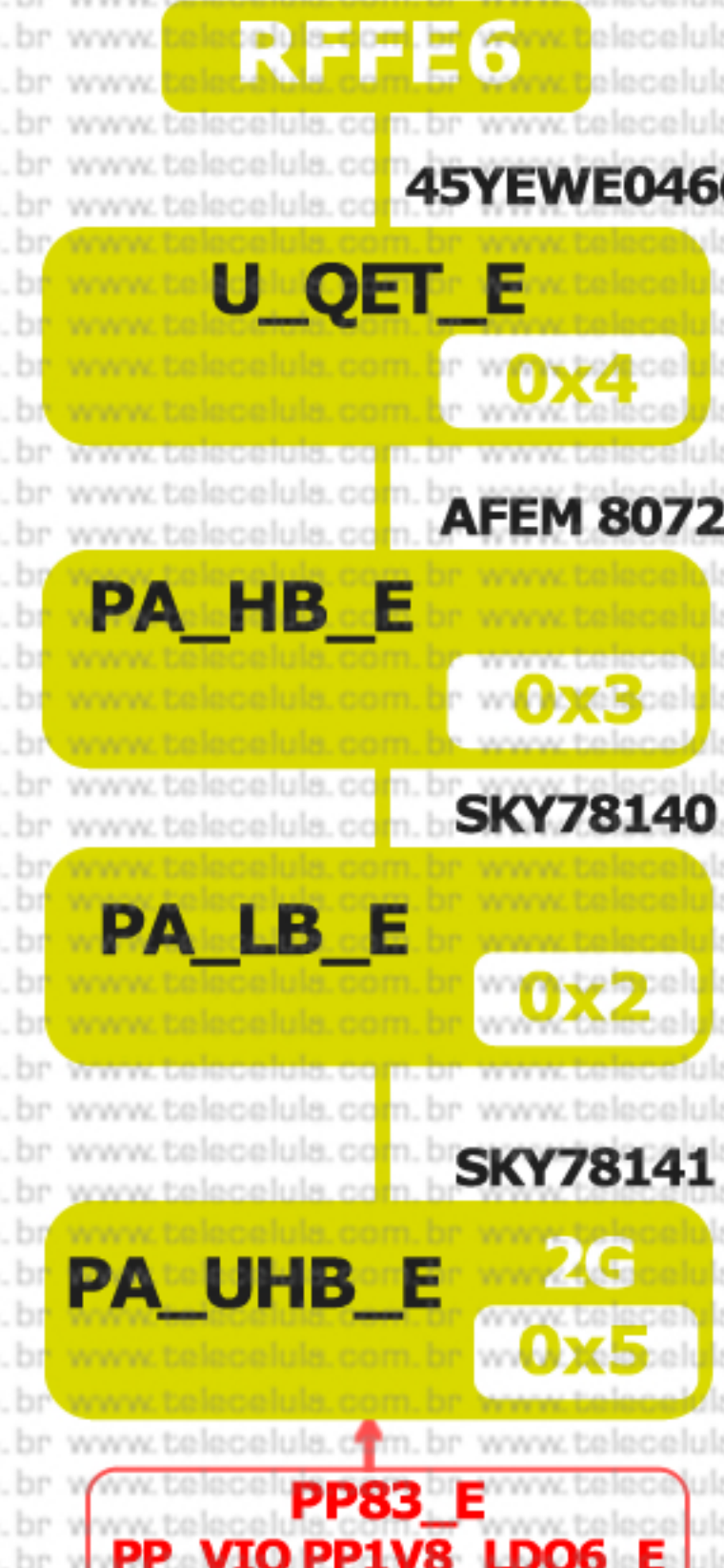
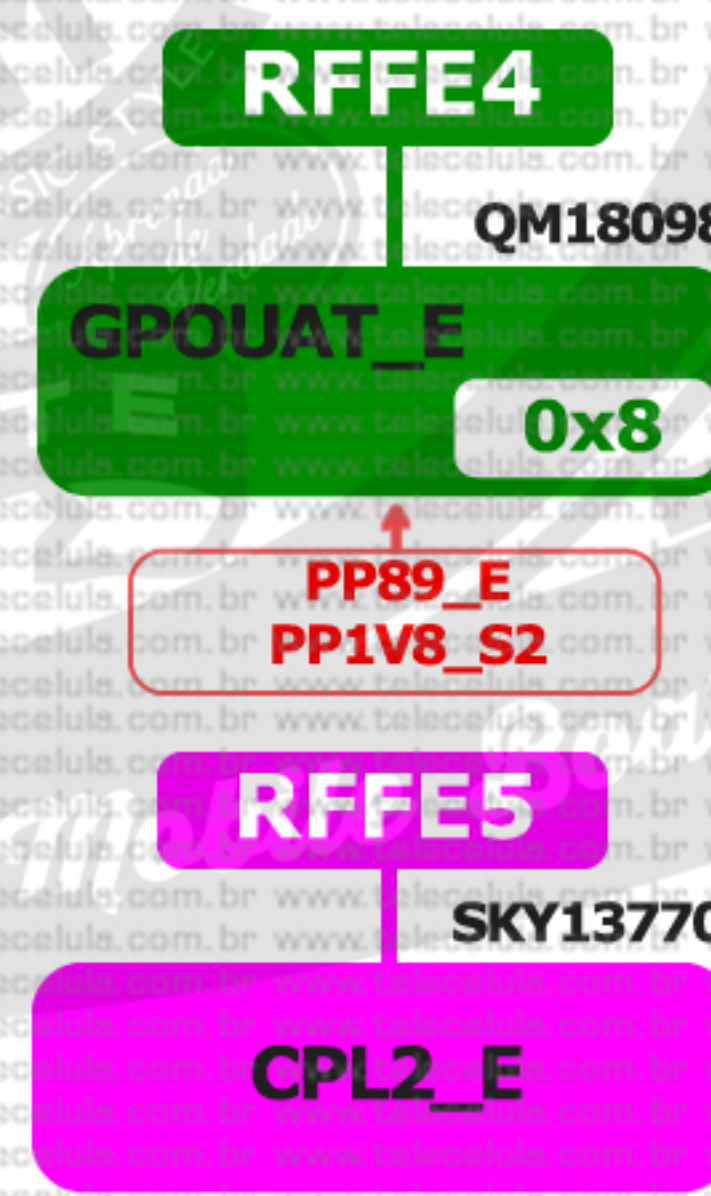
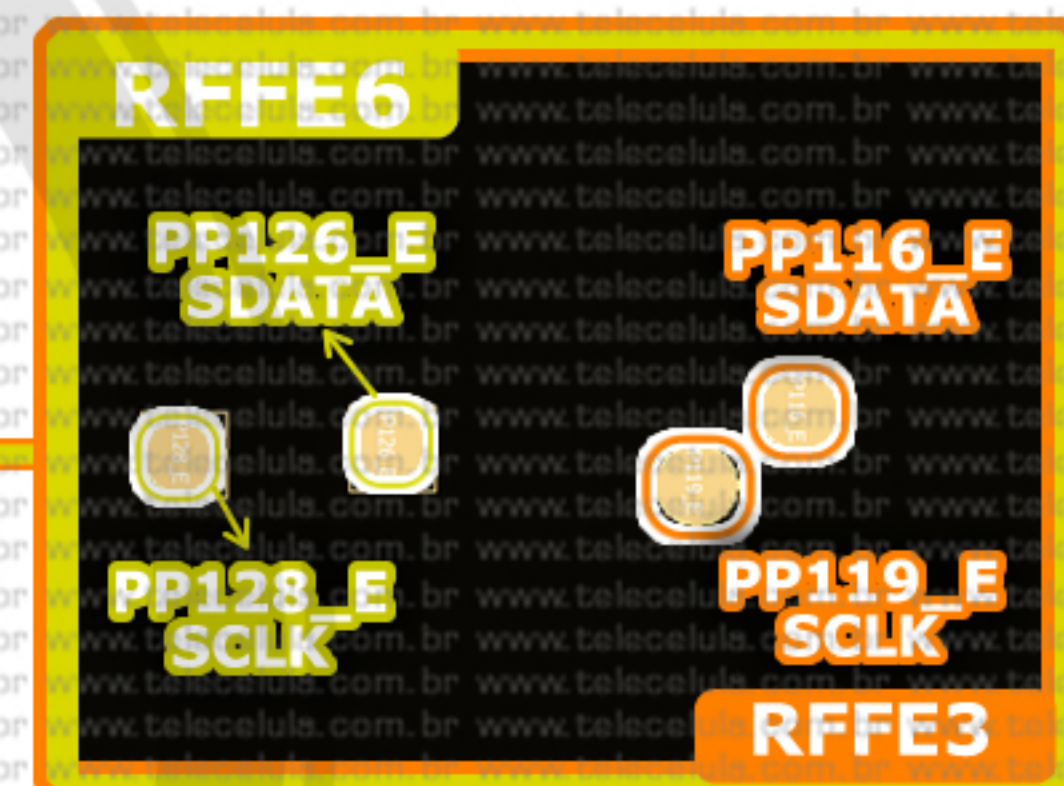
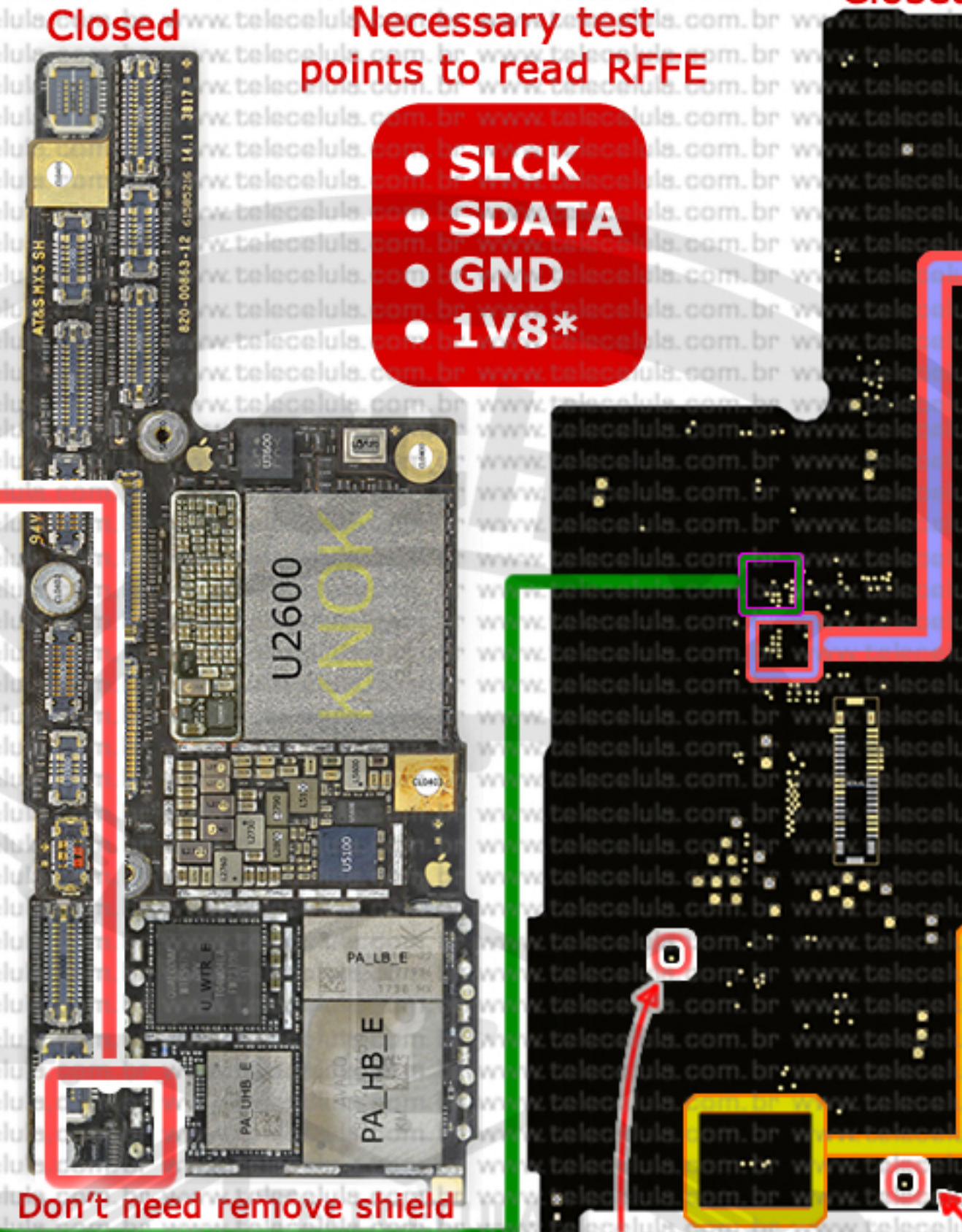
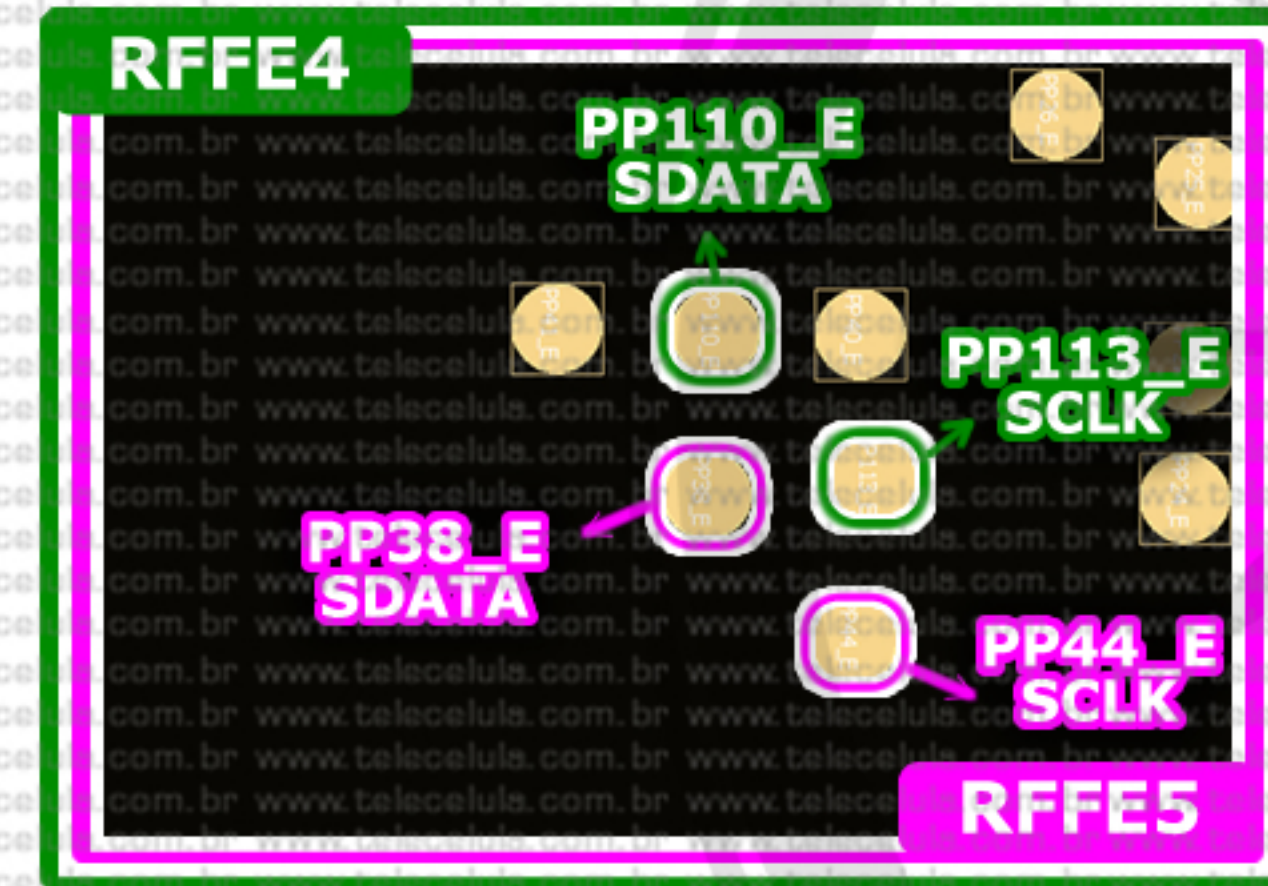
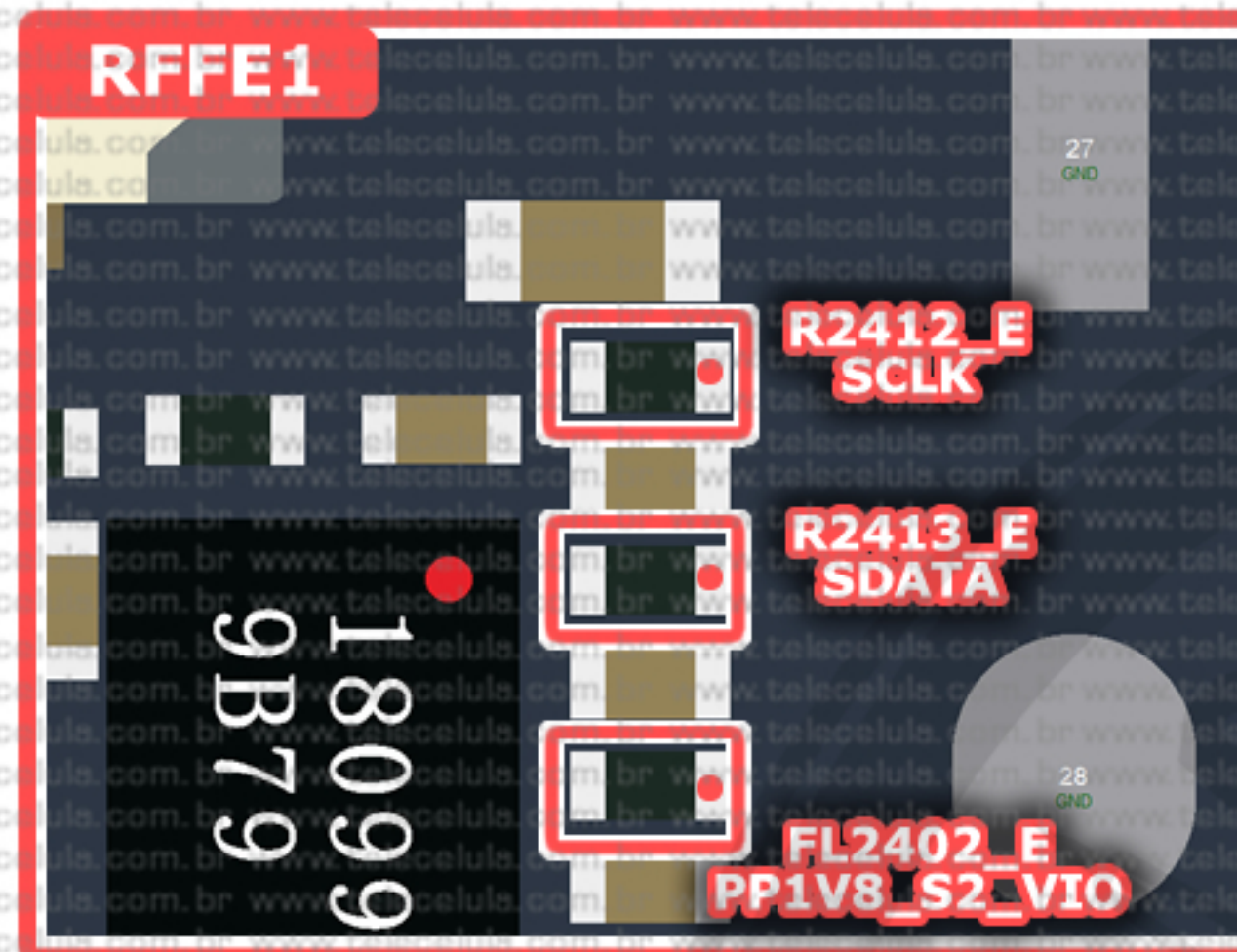
RFFE2: HB DSM, LB DSM

RFFE3: UHB, HB, LB PAD LNA

RFFE4: UATGPO, UATUNE

RFFE5: CPL

RFFE6: QET, 2G PA/UHB,
HB, LA PAD



RFFE - XCVR (U_XCVR_K)

IPHONE XR

APN: 820-01209-A



RFFE2

U_XCVR_K (TX)

QM76018

PA_HB_K

0x3

HRPDAF092

PA_UHB_K

0x5

SKY78170

PA_LB_K

2G

0x2

QM81019

U_ET2_K

0xC

HFQFEGVGB

CPL_K

0x6

PP_1V8_VIO_TX

RFFE3

XCVR_TO_FE_RX_RFFE

SKY13768

DSM_HB_K

0xA

SKY13765

DSM_LB_K

0x9

HRPDAF092

PA_UHB_K

0xC

QM76018

PA_HB_K

0xE

SKY78170

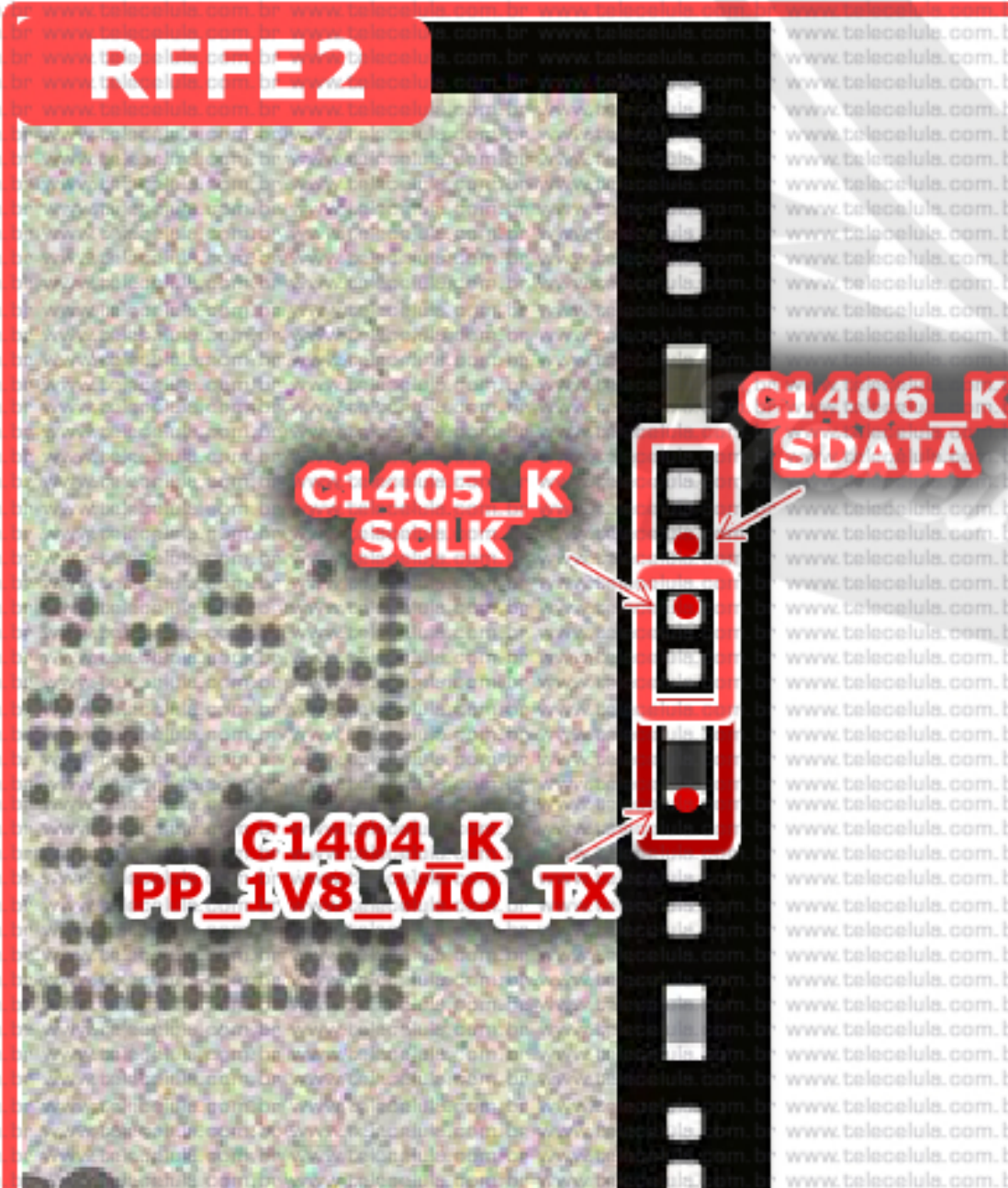
PA_LB_K

2G

0xD

PP1V8_LBDSM_RFFE_IO_FILT

RFFE2



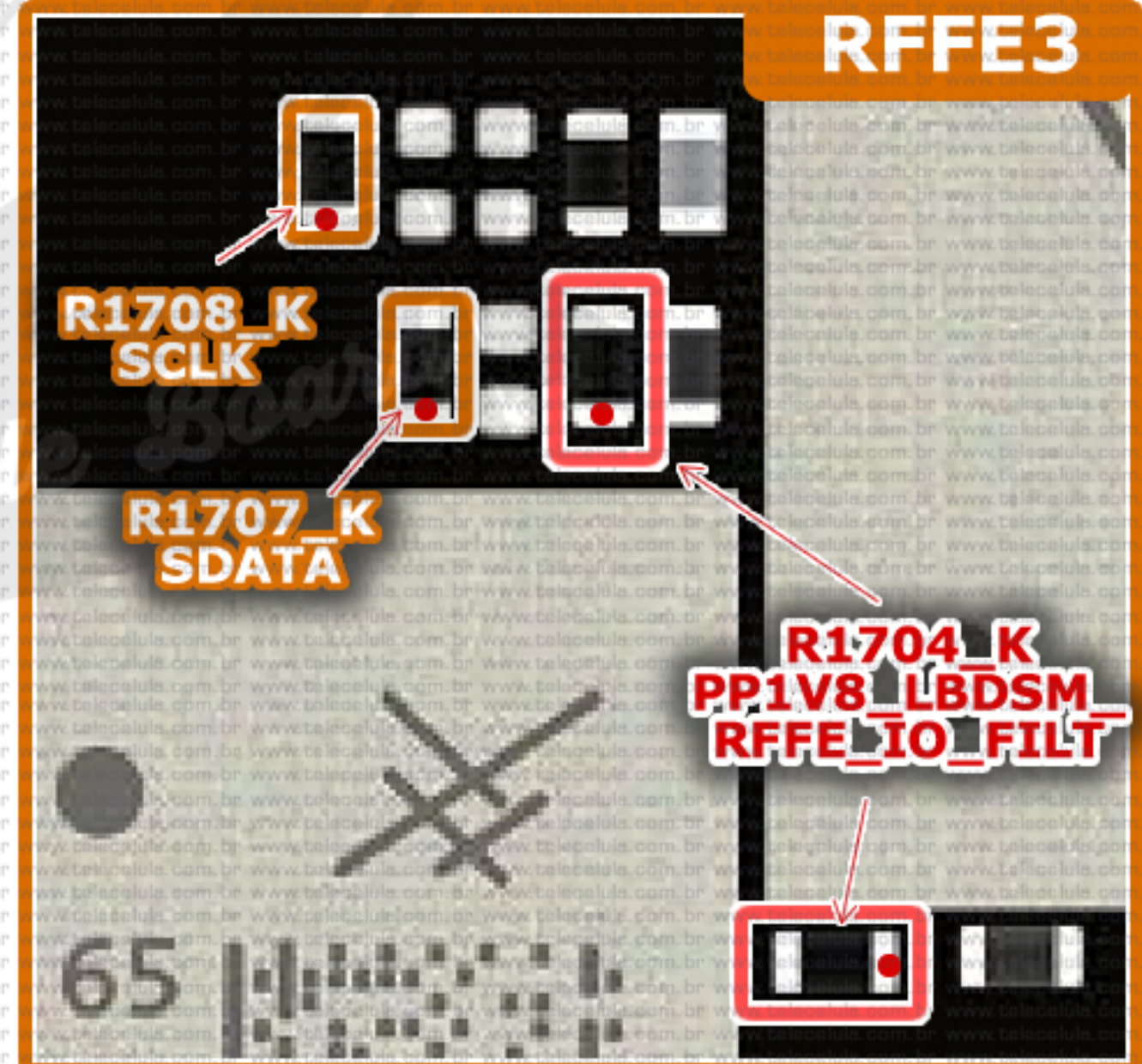
Necessary test
points to read RFFE

- SLCK
- SDATA
- GND
- 1V8*

PP1V8_LBDSM_RFFE_IO_FILT

PP_1V8_VIO_TX

RFFE3



RFFE -XCVR

IPHONE XS

APN: 820-0997-A

RFFE2

PP24K3_K
SCLK

PP24K2_K
SDATA

PP24E8_K - 1V8

PP_1V8_XCVR_TO_FE
RFFE_IO

RFFE3

PP2473_K
SDATA

PP2474_K
SCLK

R1905_K
PP_1V8_XCVR_TO_FE_RFFE_IO

RFFE3

R1708_K
SCLK

R1707_K
SDATA

RFFE2/XCVR

SKY13775

CPL_K

0x6

HRPDAF091

PA_UHB_K

0xF

AFEM
8092_AP1

PA_HB_K

0x3

SKY78170

PA_LB_K

0x2

QM81019M

U_ET2_K
ALPES

0xC

PP_1V8_XCVR_TO_FE
RFFE_IO

XCVR TO FE RX RFFE 3

SKY78170

PA_LB_RF

2G

0xD

AFEM
8092_AP1

PA_HB_K

0xE

HRPDAF091

PA_UHB_K

0xF

PP_1V8_XCVR_TO_FE
RFFE_IO

- SCLK
- SDATA
- GND
- 1V8

Necessary test
points to read RFFE

SKY13768

DSM_HB_K

0xA

SKY13765

DSM_LB_K

0x9

HFQRXRCJB_500

DSM44U_K

MIMO RDM

0x4

SKY85759

U_5G_U_W

0x42

WIFI 5G

0x6

SKY85759

U_5G_L_W

0x5

HFQRXRCJB_500

DSM44L_K

RPM MIMO

0x3

CLOSED BOARD

BOARD OPEN

PP1V8_XCVR_TO_FE
RFFE_IO-PP24E8_K

RFFE2

C2004_K
SDATA

C2003_K
SCLK

RFFE

IPHONE XS MAX

APN: 820-001063-A

RFFE2

PP2471_K
SDATA

PP2472_K
SCLK

RFFE3

PP2473_K
SDATA

PP2474_K
SCLK

RFFE3

50

R1708_K
SCLK

R1707_K
SDATA

R1704_K
PP1V8_IO

RFFE 2

RFFE 3

CLOSED BOARD

BOARD OPEN

SHIELD RFFE TX SCLK

XCVR TO FE RX RFFE 3

SKY13775

CPL_K

0x6

QM81019

U_ET2_K

0xC

AFEM
8092_AP1

PA_HB_K

2G
0x3

SKY78170

PA_LB_L

0x2

HRPDAF092

PA_UHB_K

0x5

PP1V8_IO
PP24J2_K / PP24E8_K

SKY78170

PA_LB_L

0xD

AFEM
8092_AP1

PA_HB_K

0xE

HRPDAF092

PA_UHB_K

0xC

PP1V8_IO
PP24J2_K / PP24E8_K

- SCLK
- SDATA
- GND
- 1V8

Necessary test
points to read RFFE

SKY13768

DSM_HB_K
LNA

0xA

SKY13765

DSM_LB_K

0x9

HFQRXRCJB_500

DSM44U_K

MIMO RDM
0x4

SKY85759

U_5G U_W

UAT
0x6

SKY85759

U_5G L_W

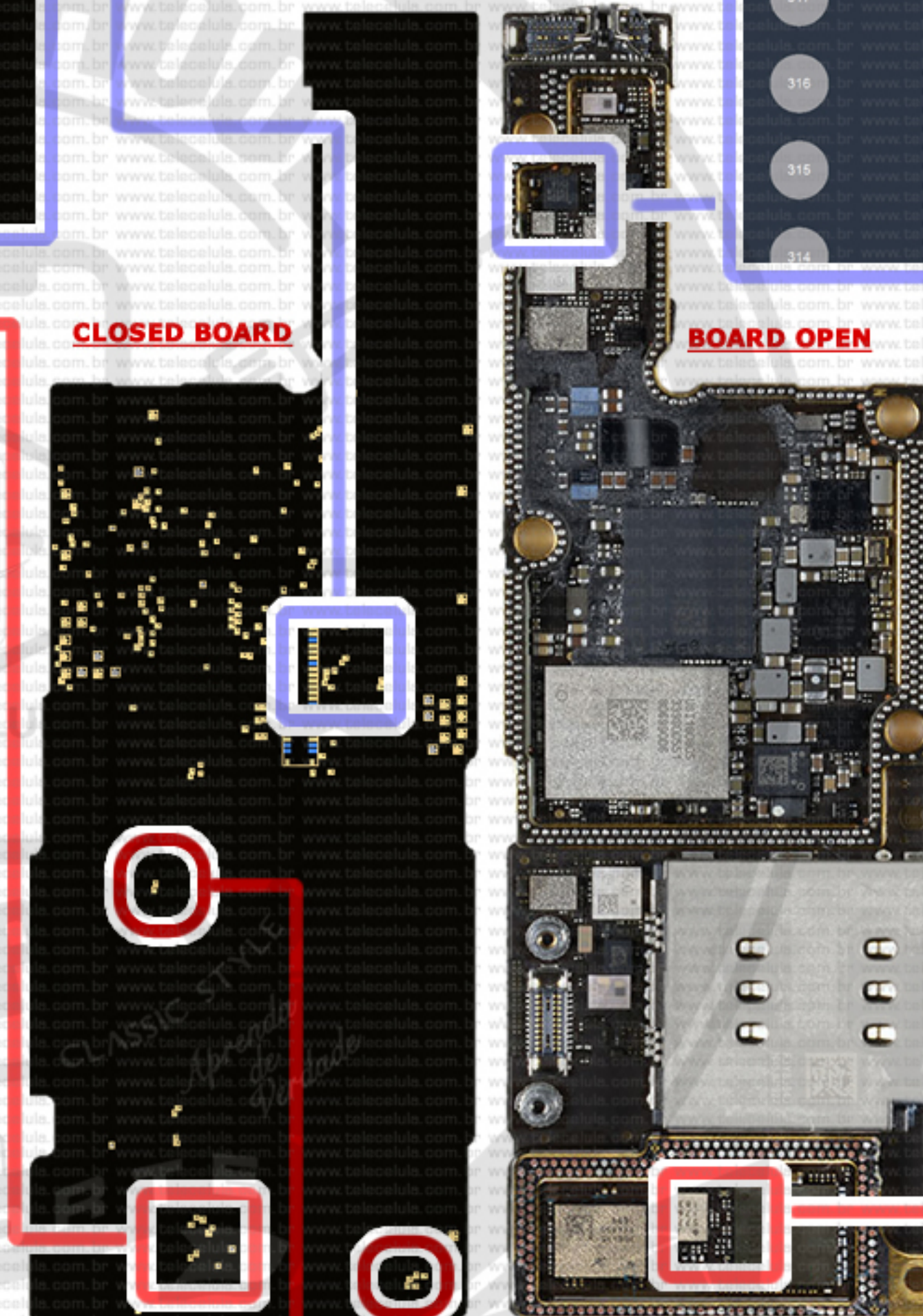
LAT
0x41

MURATA
0x5

HFQRXRCJB_500

DSM44L_K

RPM MIMO
0x3



PP24J2_K
PP1V8_IO

PP24E8_K
PP1V8_IO

RFFE2

C2004_K
SDATA

C2003_K
SCLK

R2020_K
PP1V8_IO

RFFE (XCVR_K)

IPHONE 11

APN: 820-01523-A

RFFE FE RX



RFFE LB TX

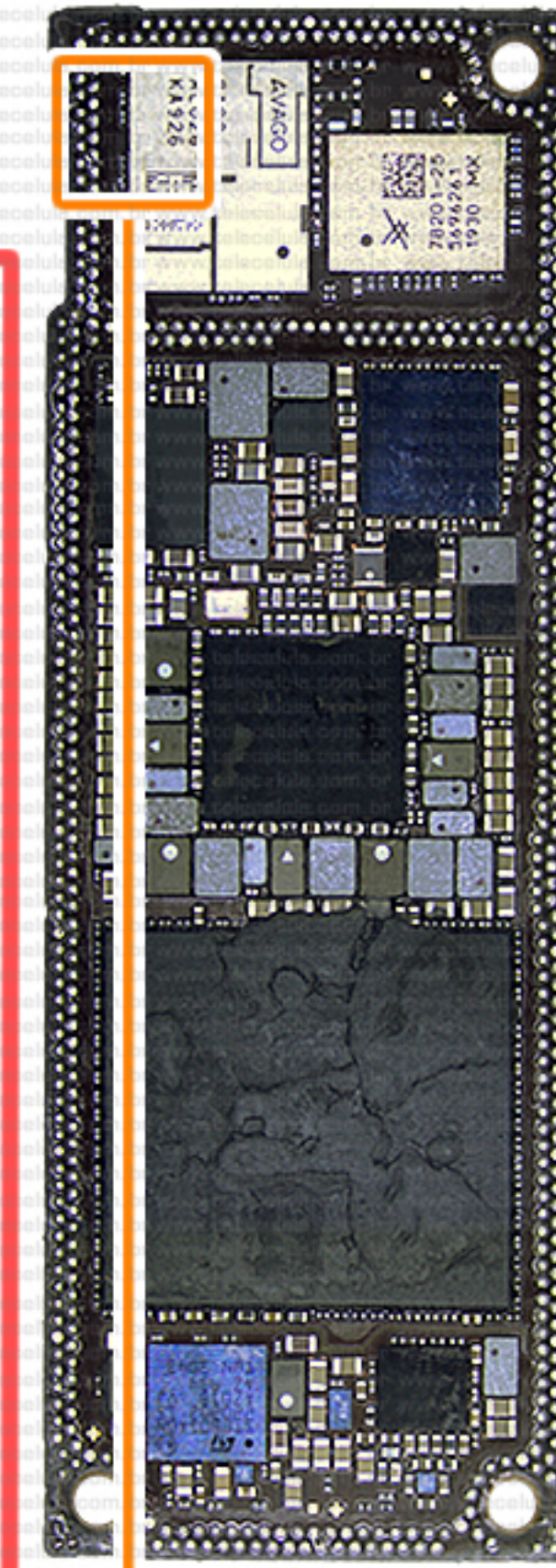
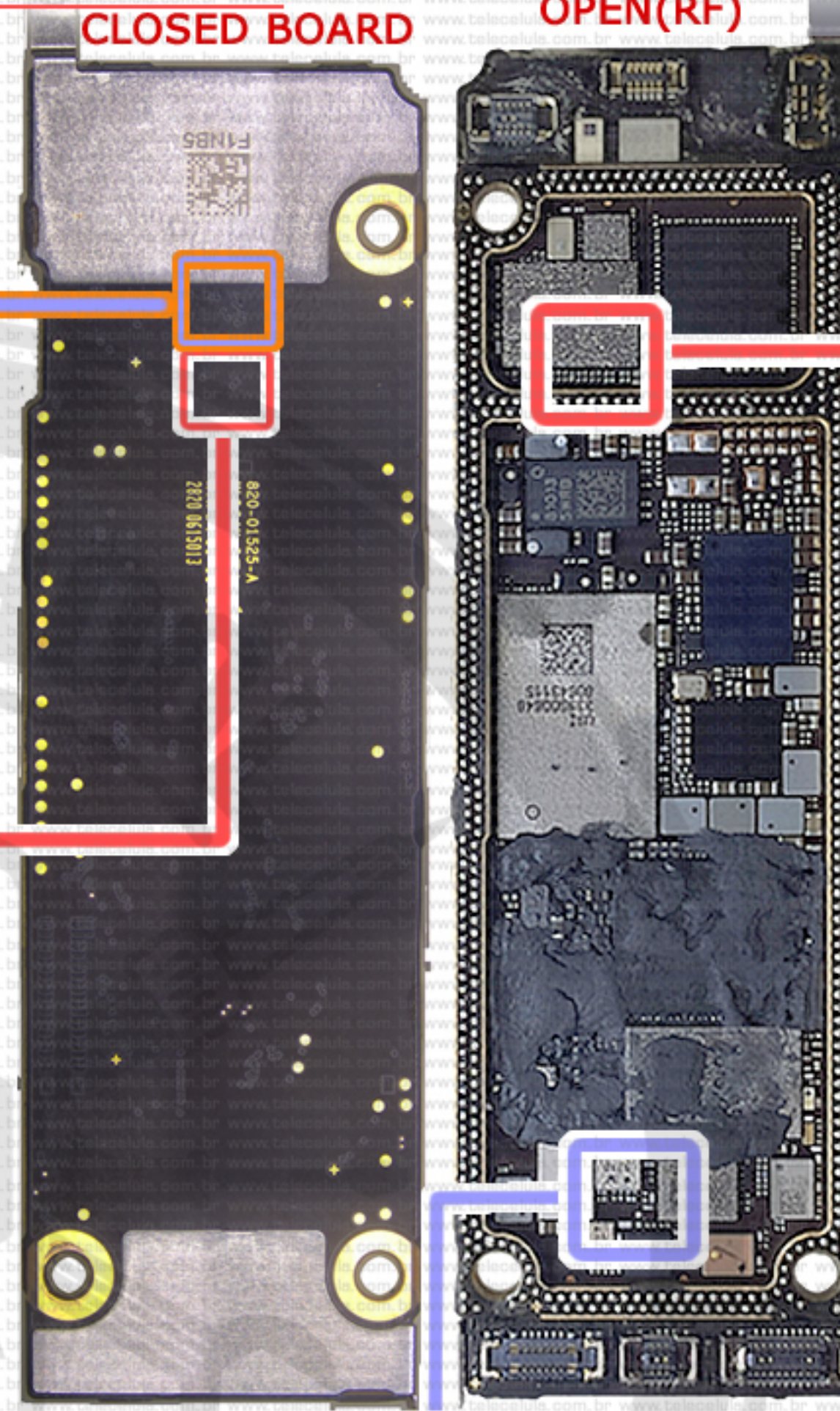


RFFE HB TX

CLOSED BOARD

OPEN(RF)

OPEN(CORE)



PP2495_K

RFFE_LAA_UAT / RFFE_LAA_LAT

RFFE XCVR TO FE RX CLK

SKY78220

PA LB K

0xD

AFEM
8100_AP1

PA HB K

0xE

PA UHB K

2G
0xF

MDFEGFFB_126

U 5G L W

0x41

LAT/WI-FI/5G

0x5

SKY13789

DSM HB K

0xB

HB LNA

LMRXFRJB_K57

DSM LB K

0xA

UAT_5G

MDFEGFFB_126

U 5G U W

0x6

FEM

PP2495_K - PP1V8_VIO

RFFE XCVR TO
LBTX DATA

QM81013

ET

ETIC_K

0xC

PA LB K

0x1

SKY16710

CPLR U K

UAT

0x9

SKY16710

CPLR L K

LAT

0x8

UHB_MLB_2GS_PAD

PA UHB K

0xF

PP2495_K - PP1V8_VIO

- SLCK
- SDATA
- GND
- 1V8

Necessary test
points to read RFFE

RFFE XCVR TO
HBTX DATA
RFFE XCVR TO
HBTX SCL

UHB_MLB_2GS_PAD

PA_UHB_K

2G

0x3

ATEM_8100_AP1

PA_HB_K

0x2

QM81013

ETIC_K

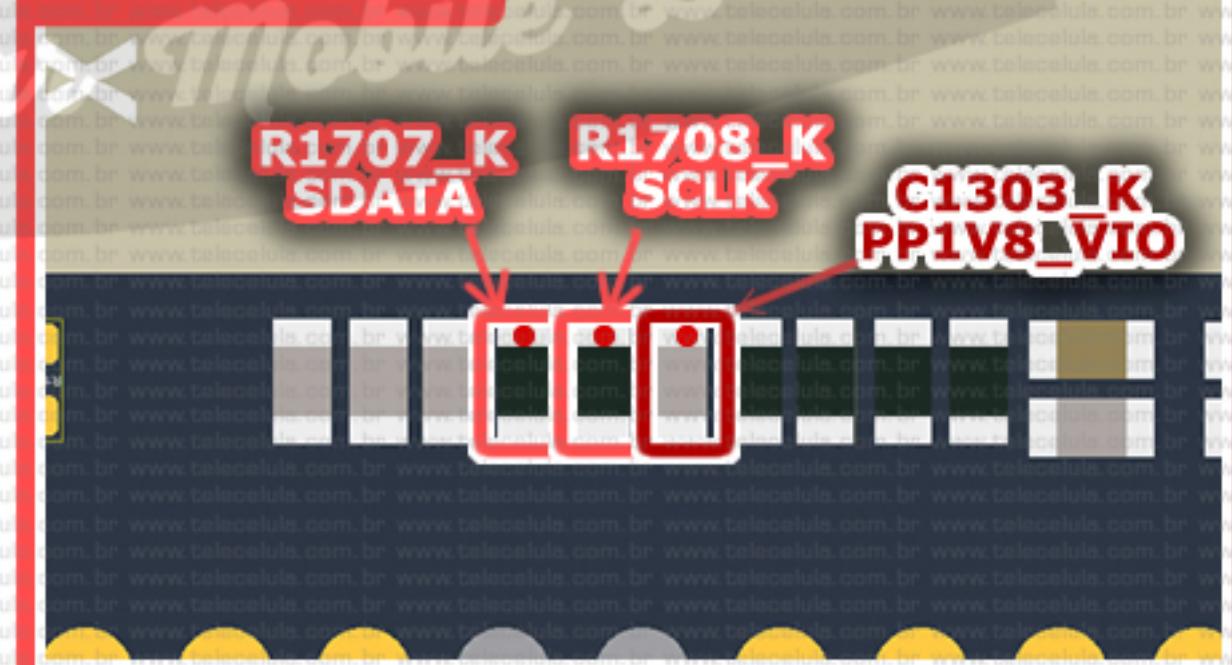
0xC

PP2495_K - PP1V8_VIO

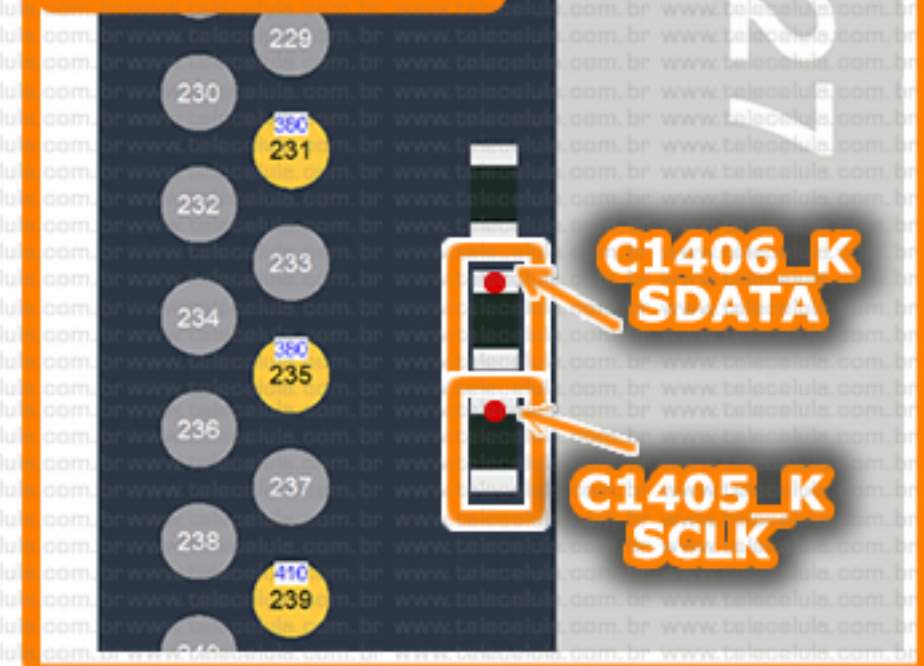
RFFE LB TX



RFFE FE RX



RFFE HB TX

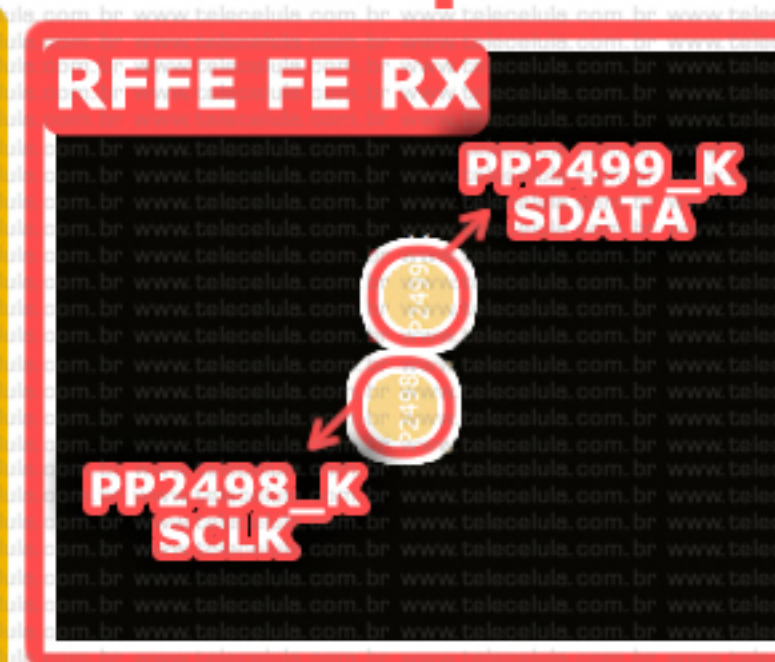
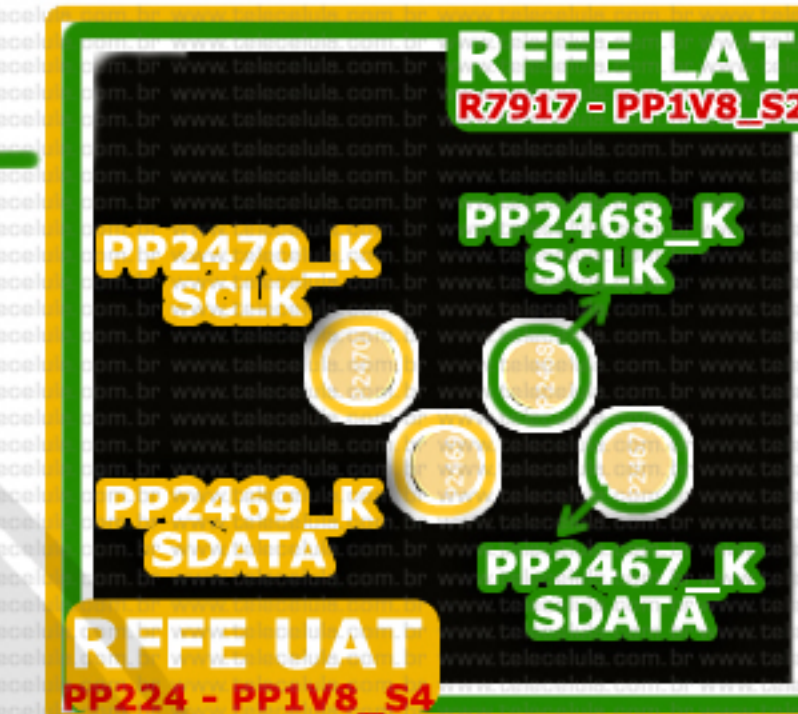
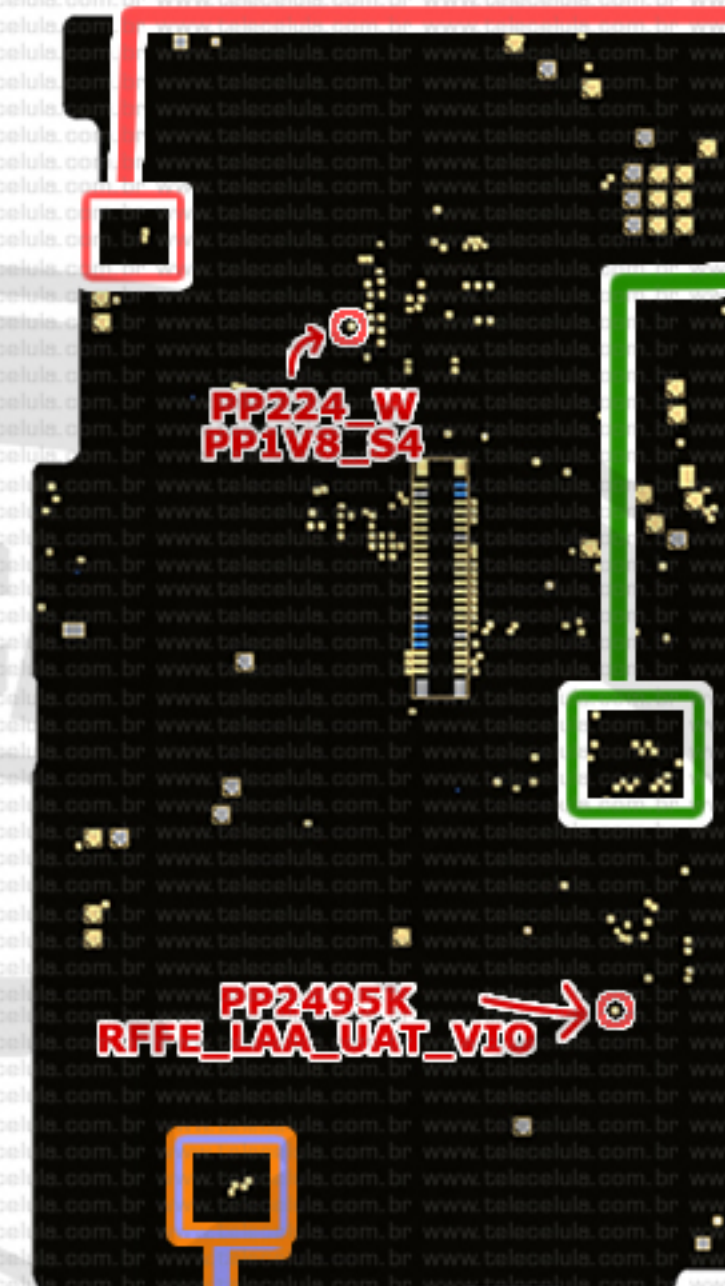
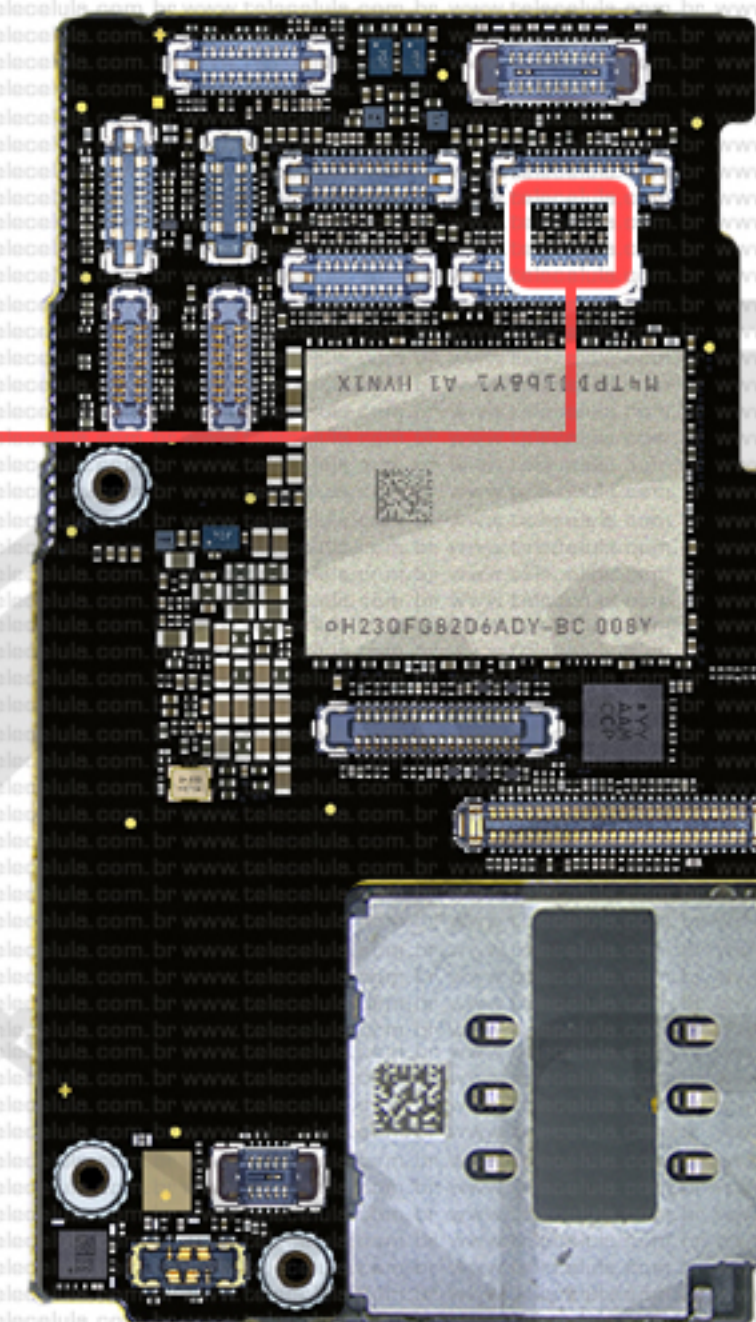
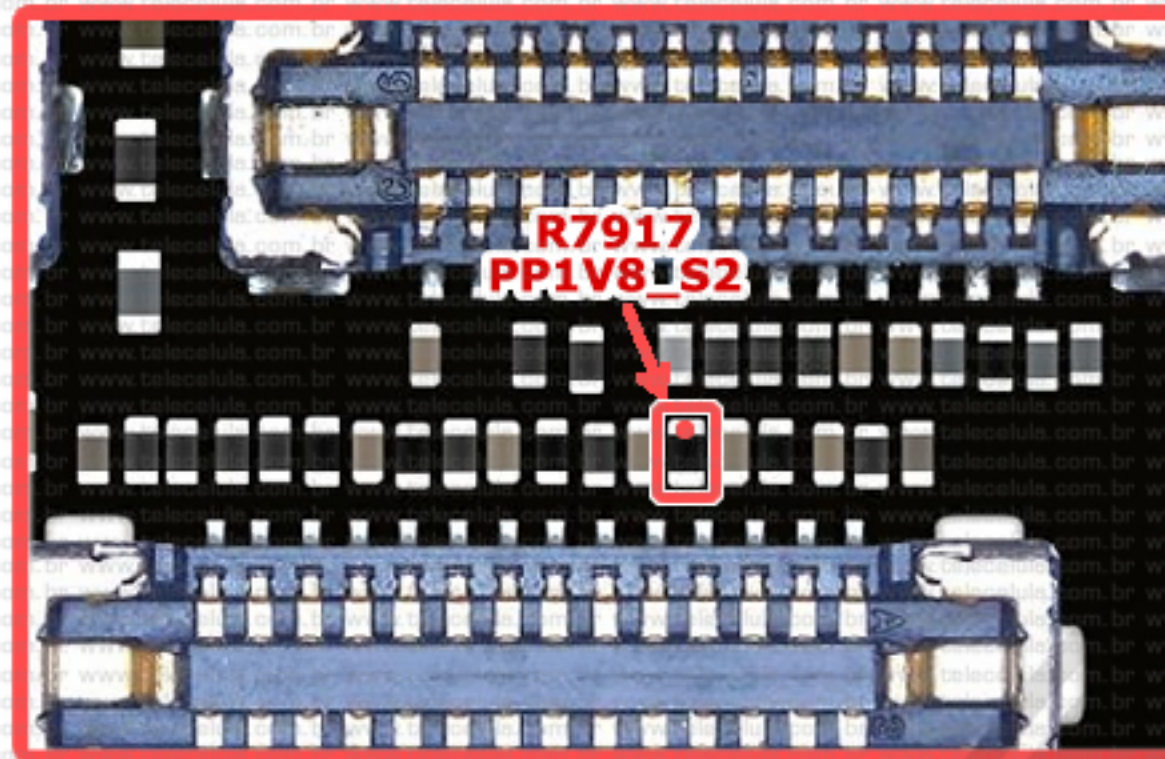


IPHONE 11 PRO/ PRO MAX

APN: 820-01682-08 APN: 820-00189-A

RFFE - XCVR

CLOSED BOARD



RFFE XCVR TO FE RX CLK

SKY78220

PA LB K

0xD

HFQXRJDB 728

MIMODS K

0x7

AFEM
8100_AP1

PA HB K

0xE

UHB_2GS_PAD

PA UHB K

0xF

MDFEGFFB_126

U 5G L W

0x41

WI-FI/5G

0x5

SKY13787

DSM HB K

0xB

HB LNA

LMRXFRJB_K57

DSM LB K

0xA

MDFEGFFB_126

U 5G U W

0x41

FEM

0x6

PP2495_K
RFFE_LAA_UAT_VIO

- SLCK
- SDATA
- GND
- 1V8*

Necessary test points to read RFFE

RFFE XCVR TO LBTX DATA

QM81013

ETIC_K

0xC

SKY78220

PA_LB_K

0x1

SKY16710

CPLR_U_K

COUPLER

0x9

SKY16710

CPLR_L_K

COUPLER

0x8

UHB_2GS_PAD

PA_UHB_K

2G

0x3

PP2495_K
RFFE_LAA_UAT_VIO

RFFE BB TO LAT DATA RFFE BB TO LAT SCK

QM18833

LAT_SUBBUS

LATTUN_K

0x8

R7917 - PP1V8_S2

RFFE XCVR TO HBTX DATA RFFE XCVR TO HBTX SCL

UHB_2GS_PAD

PA_UHB_K

0x3

0xF

ATEM_8100_AP1

PA_HB_K

0x2

ETIC_K

0xC

PP2495_K
RFFE_LAA_UAT_VIO

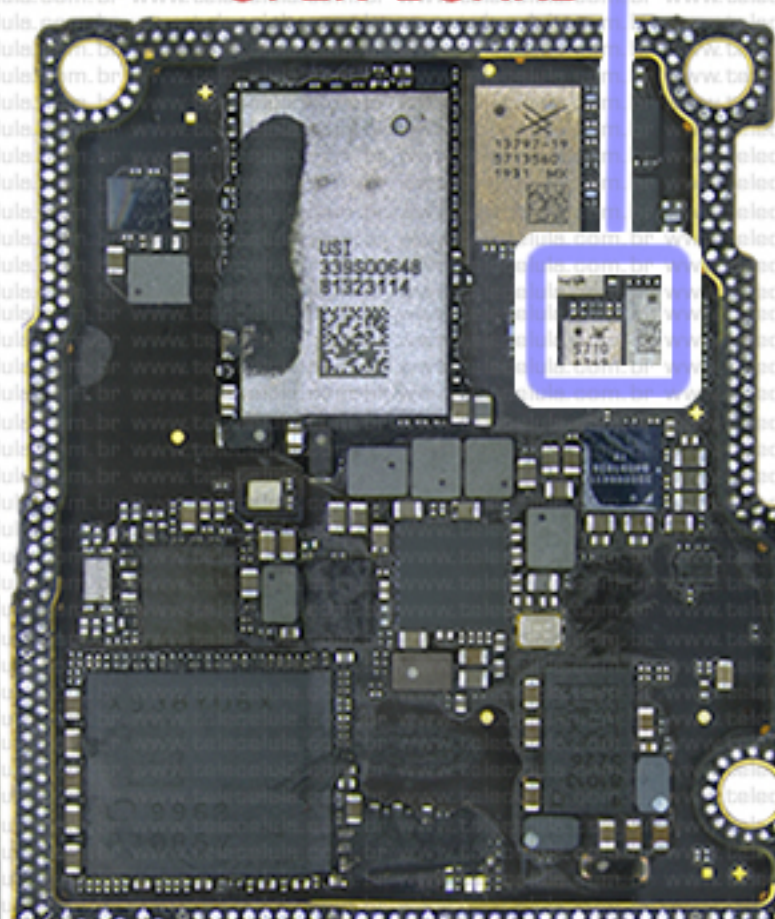
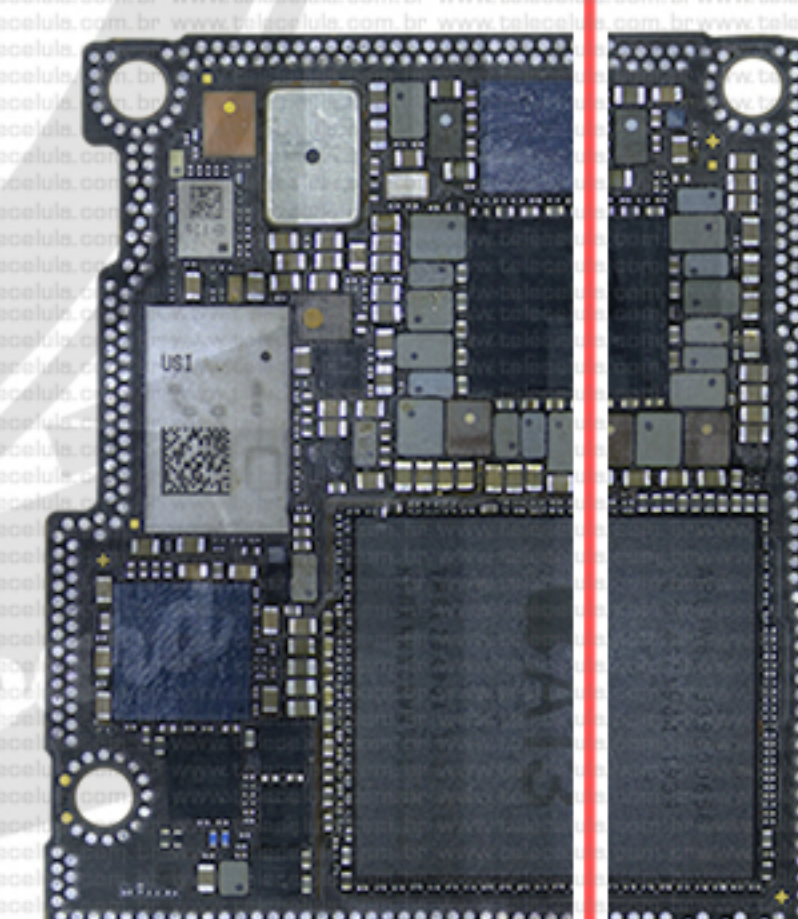
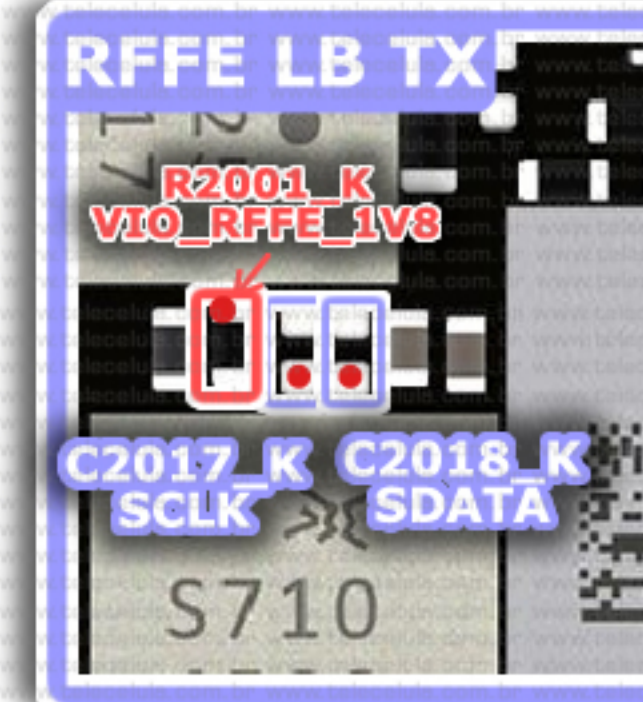
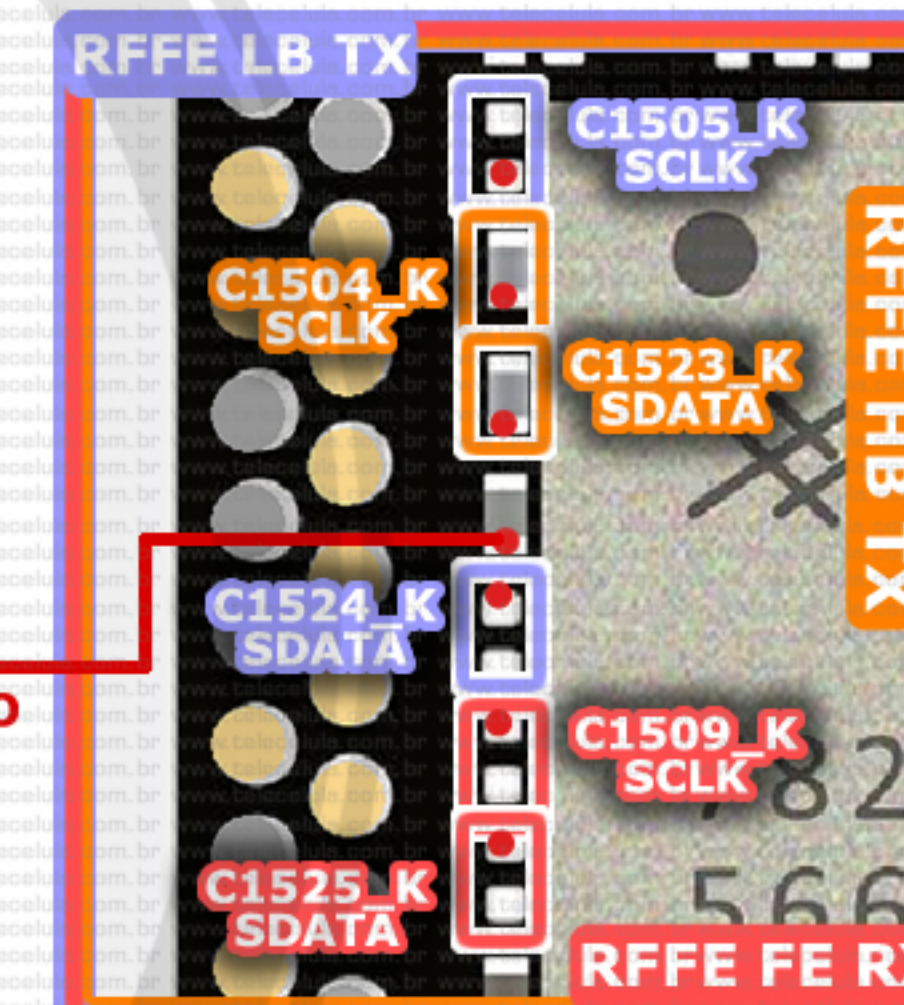
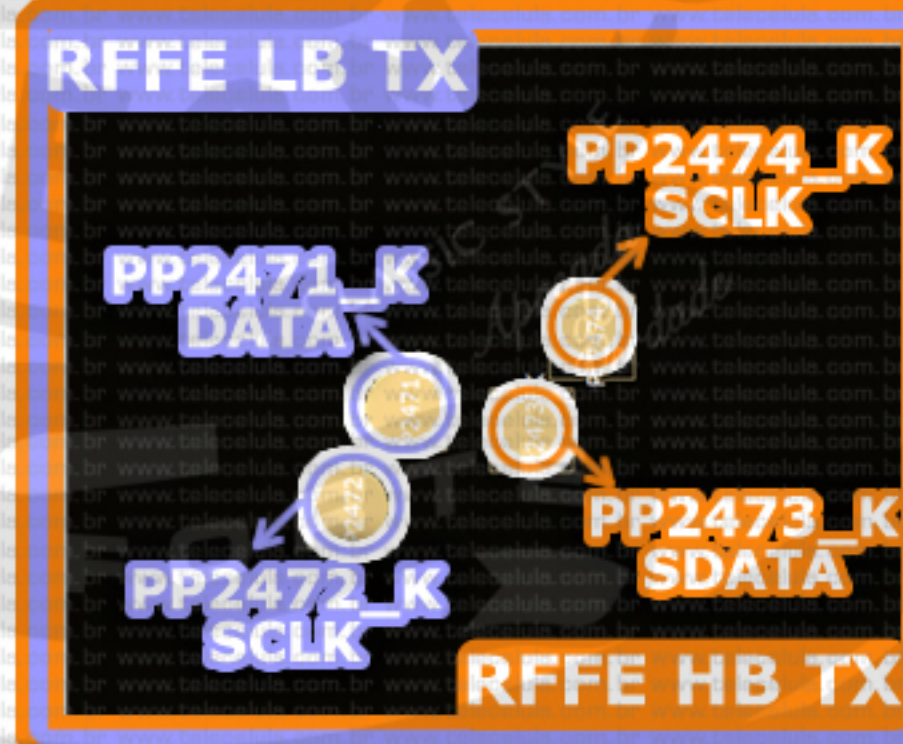
RFFE BB TO UAT

QM18833

UATTUN_K

0x8

PP224_W
VDD1V8_S4



OPEN BOARD

OPEN BOARD

RFFE - (U_SDRE)

CLOSED BOARD

IPHONE 12 MINI

RFFE5

PP210
SCLK

PP212
SDATA

RFFE1

PP171
SDATA

PP172
SCLK

PP173
SDATA

PP178
SCLK

RFFE2

PP241

PP_LD06_VIO_1V8

RFFE3

PP266
SDATA

PP265
SCLK

TP90

RFFE1_SDR

PA HB E

0x3

PA LMB E

0x5

CPLR L E

0x6

U QET0 E

0x4

PP_LD06_VIO_1V8
PP241

RFFE2_SDR

U_APTL_E

PAUHLB_E

PP_LD06_VIO_1V8
PP241

Necessary test
points to read RFFE

- SCLK
- SDATA
- GND
- 1V8

RFFE3_SDR

PA HB E

0x3

PA UHB L E

0x6

PA LMB E

0x5

PA LB E

0x1

U 5G L

0xE

MIMO L E

0xA

PP_LD06_VIO_1V8
PP241

RFFE5_SDR

DSM UHB E

0x6

DSM LB E

0x1

DSM HB E

0x3

MIMO U E

0xA

U 5G U

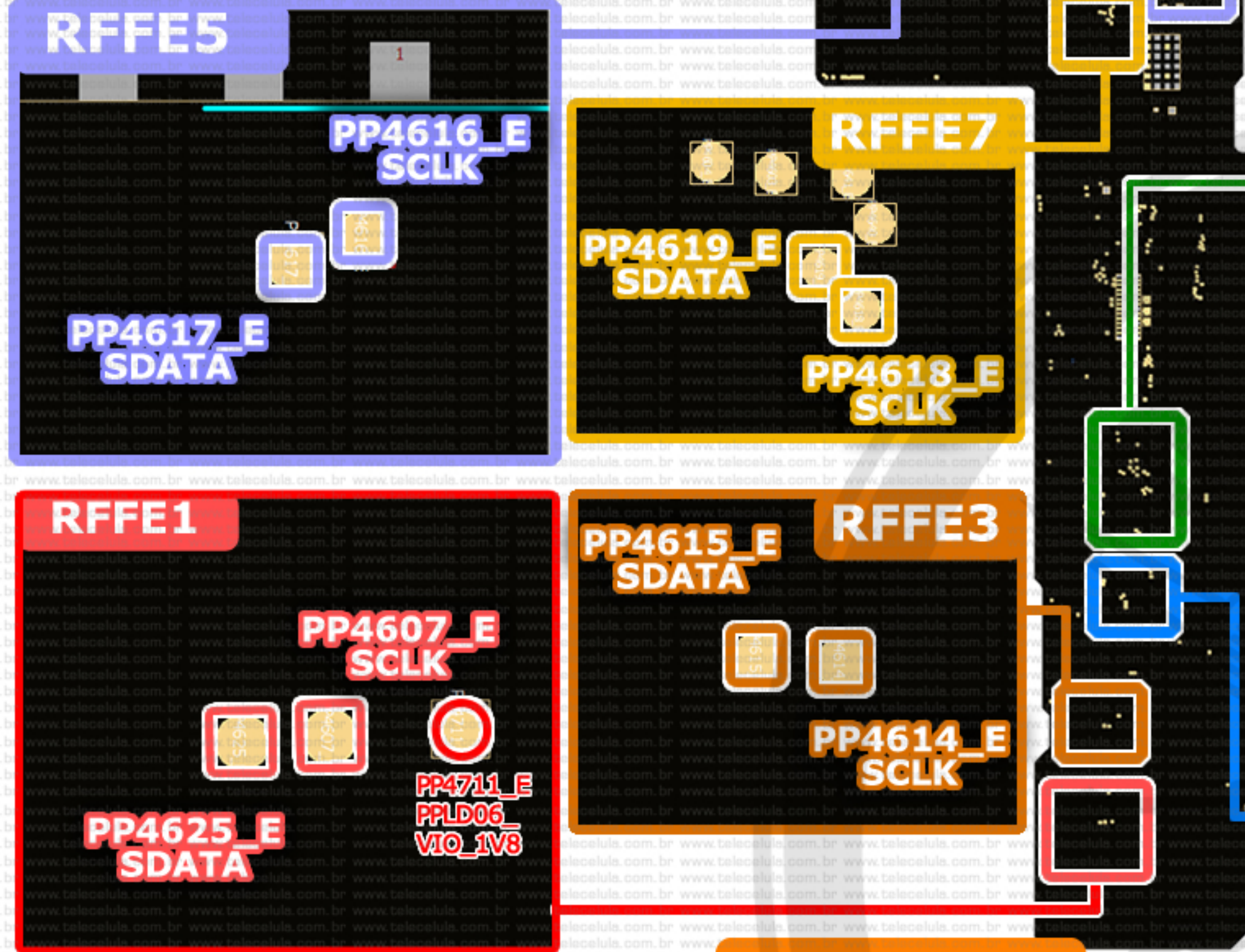
0xE

PP_LD06_VIO_1V8
PP241

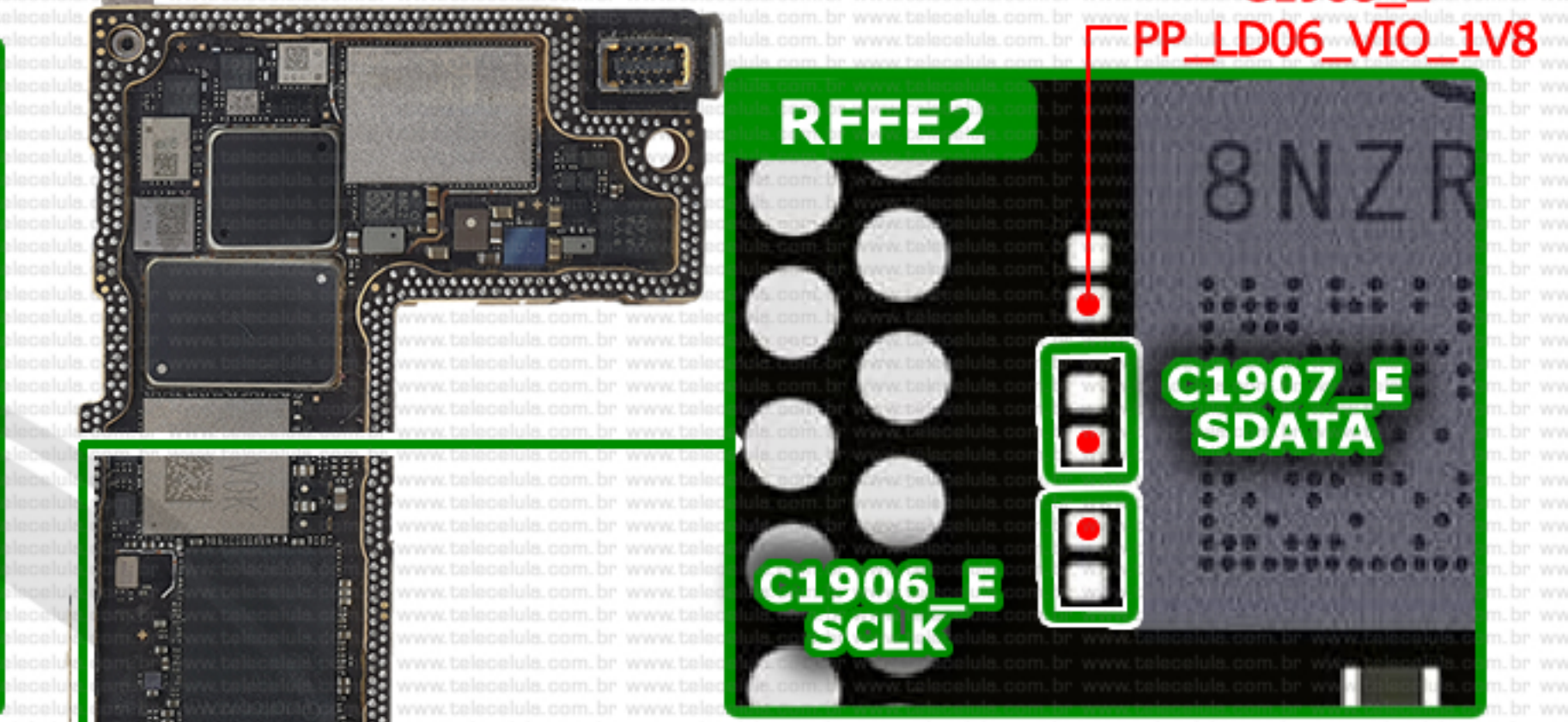
RFFE - SDR

IPHONE 12 / 12 PRO

CLOSED BOARD



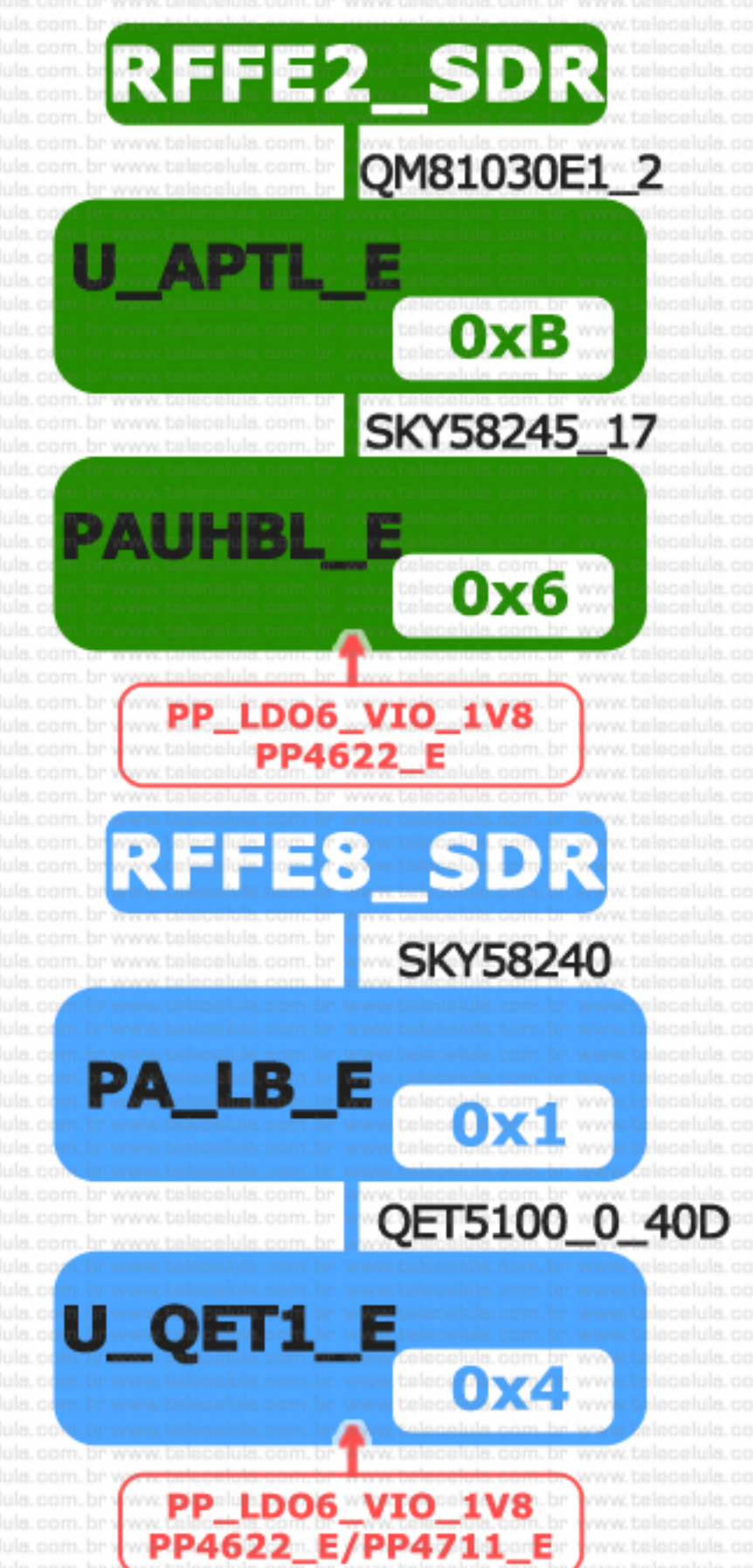
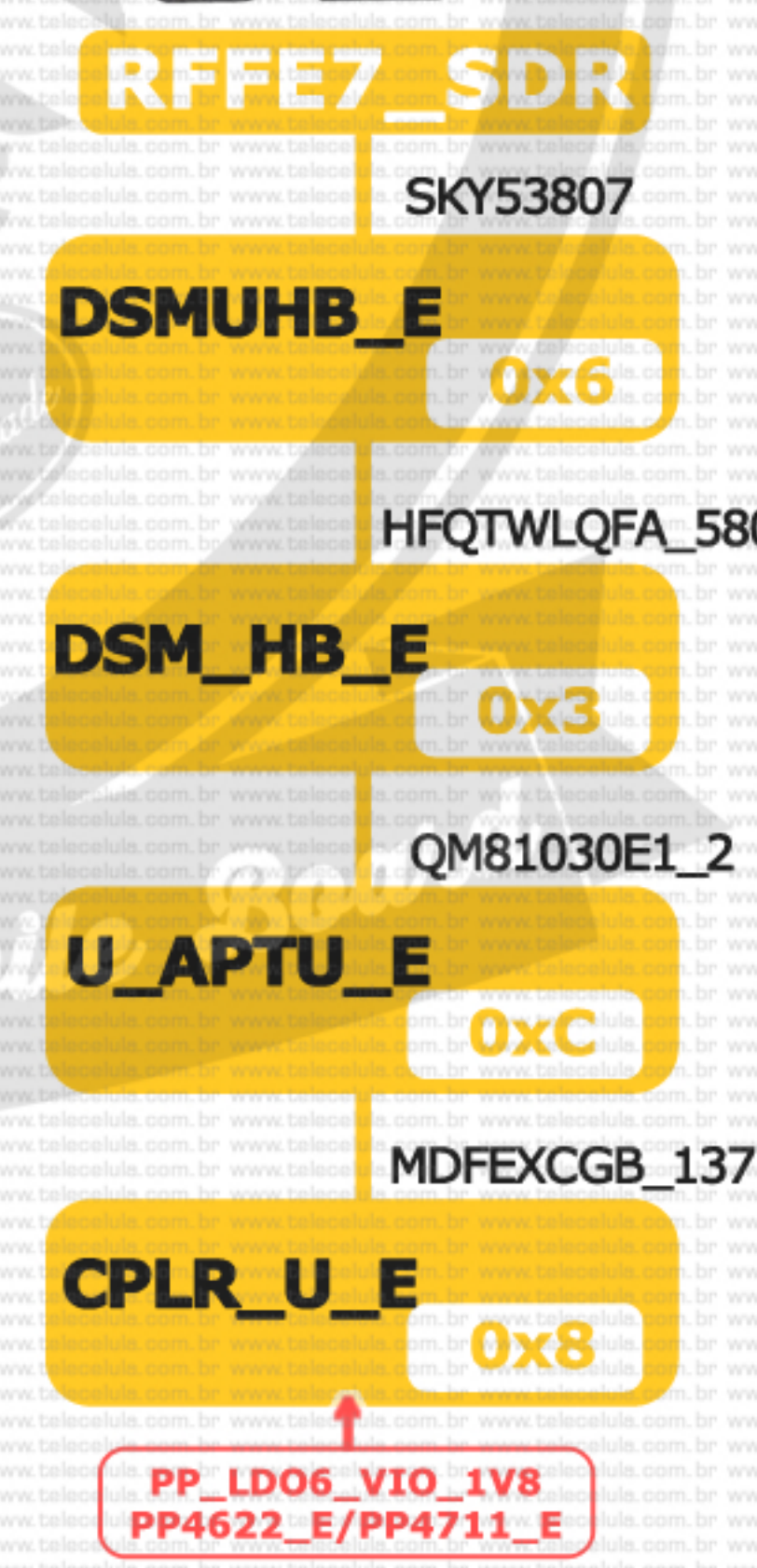
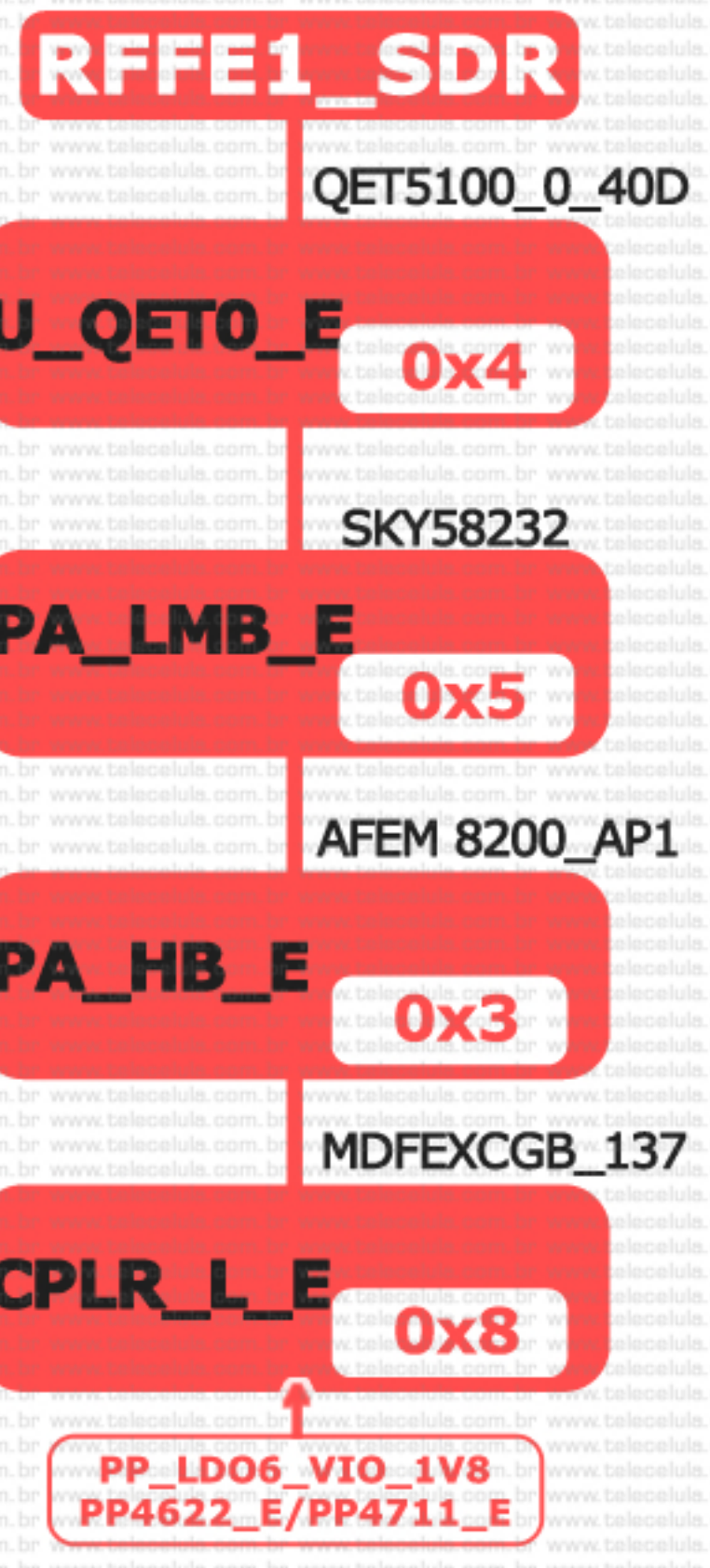
OPEN BOARD



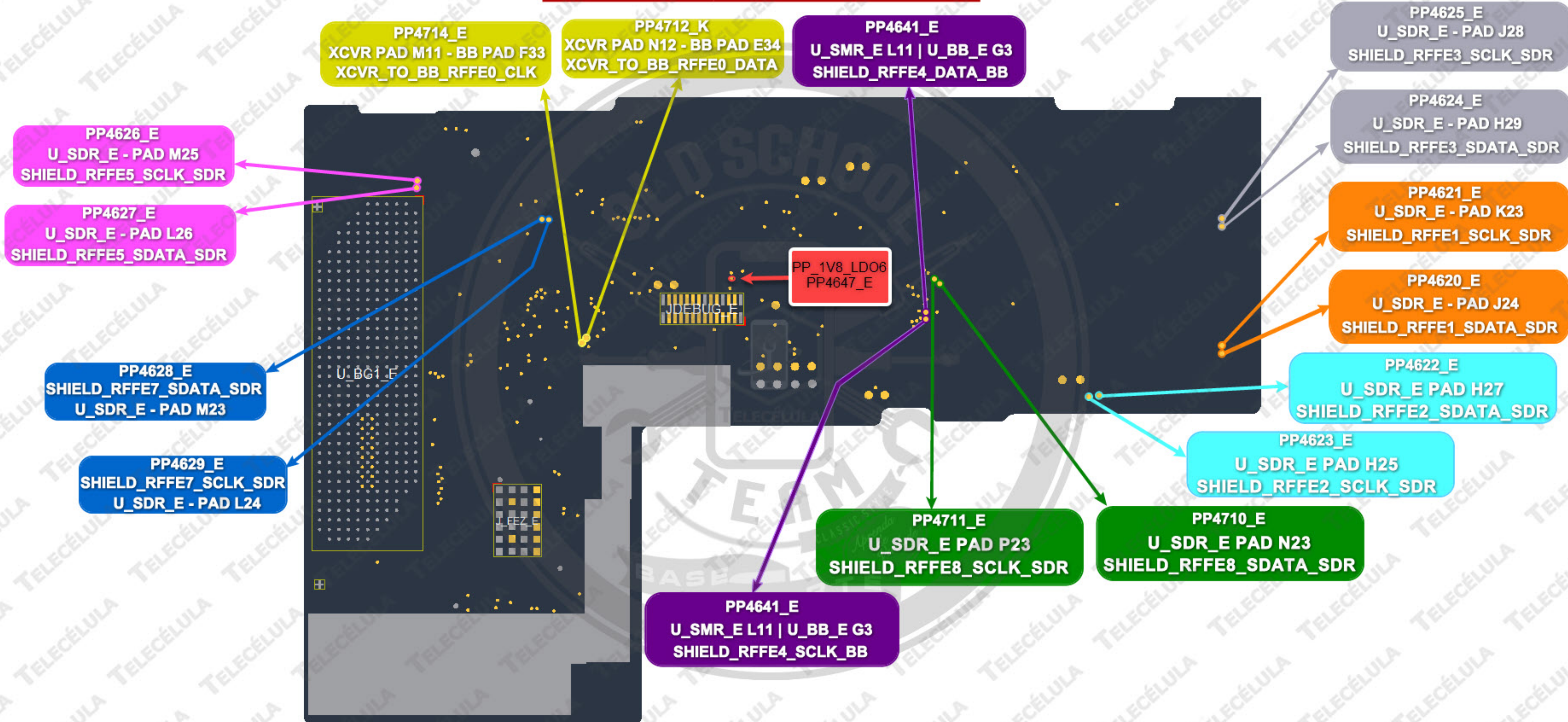
Necessary test points to read RFFE

- SCLK
- SDATA
- GND
- 1V8

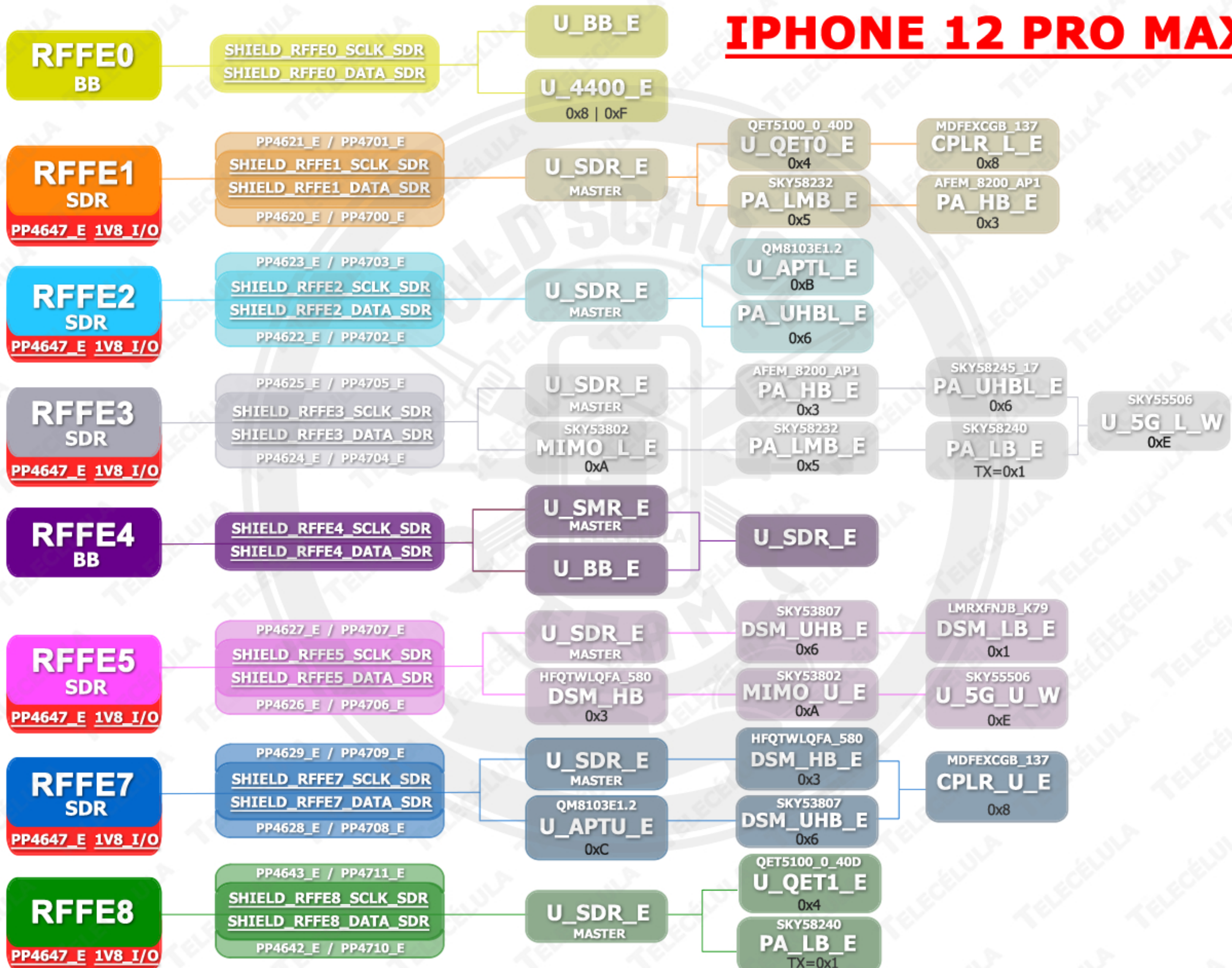
LB: 2G
MB: 3G
HB: 4G
N77/N79: 5G



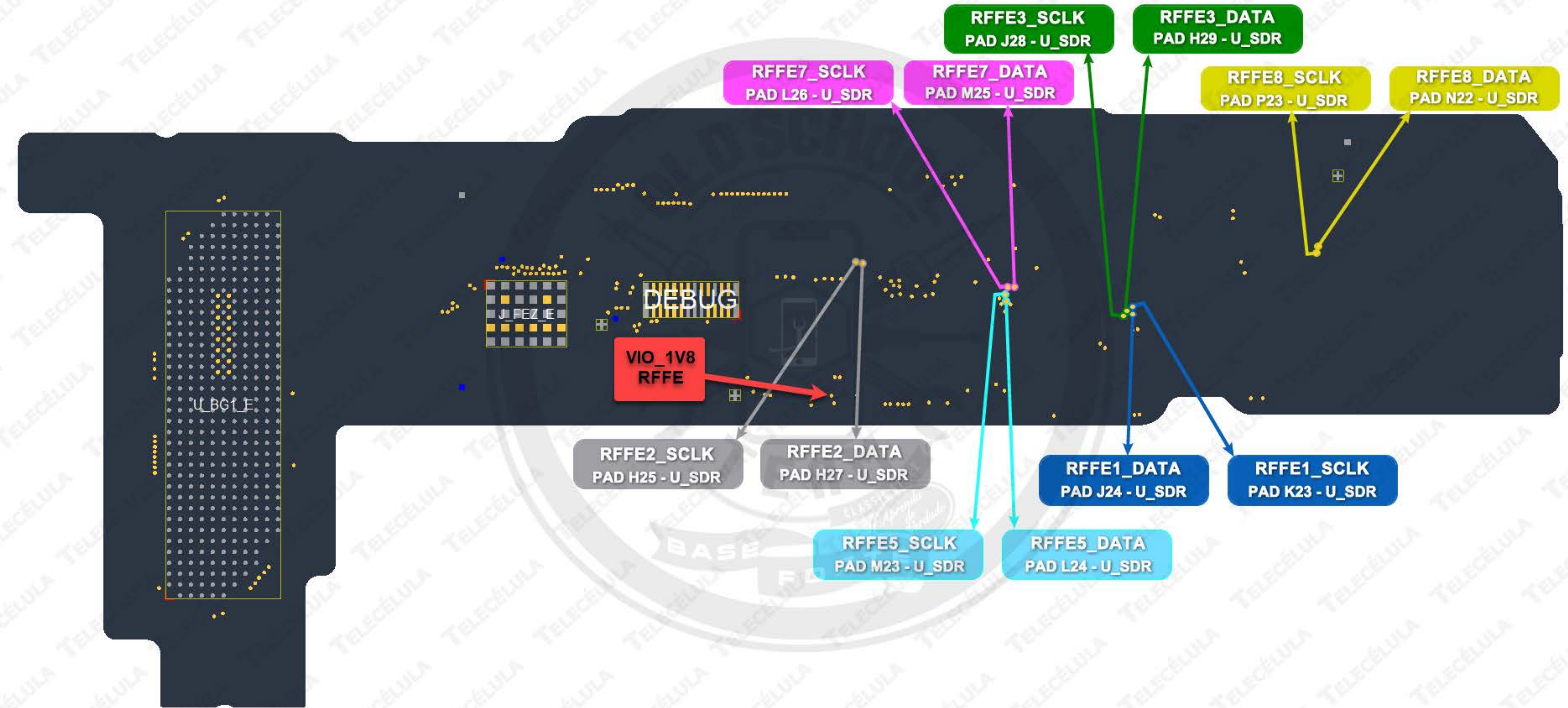
SMARTBOARD - IPHONE 12 PRO MAX



IPHONE 12 PRO MAX



SMARTBOARD - IPHONE 13



RFFE 1 SDR

PA_HB_E	0x3
PA_LMB_E	0x5
CPLR_L_E	0x8
U_QET0_E	0x4

RFFE 3 SDR

PA_HB_E	0x3
PA_UHB_L_E	0x6
MIMO_L_E	0xA
PA_LB_E	0x1
U_5G_L_W	0xE

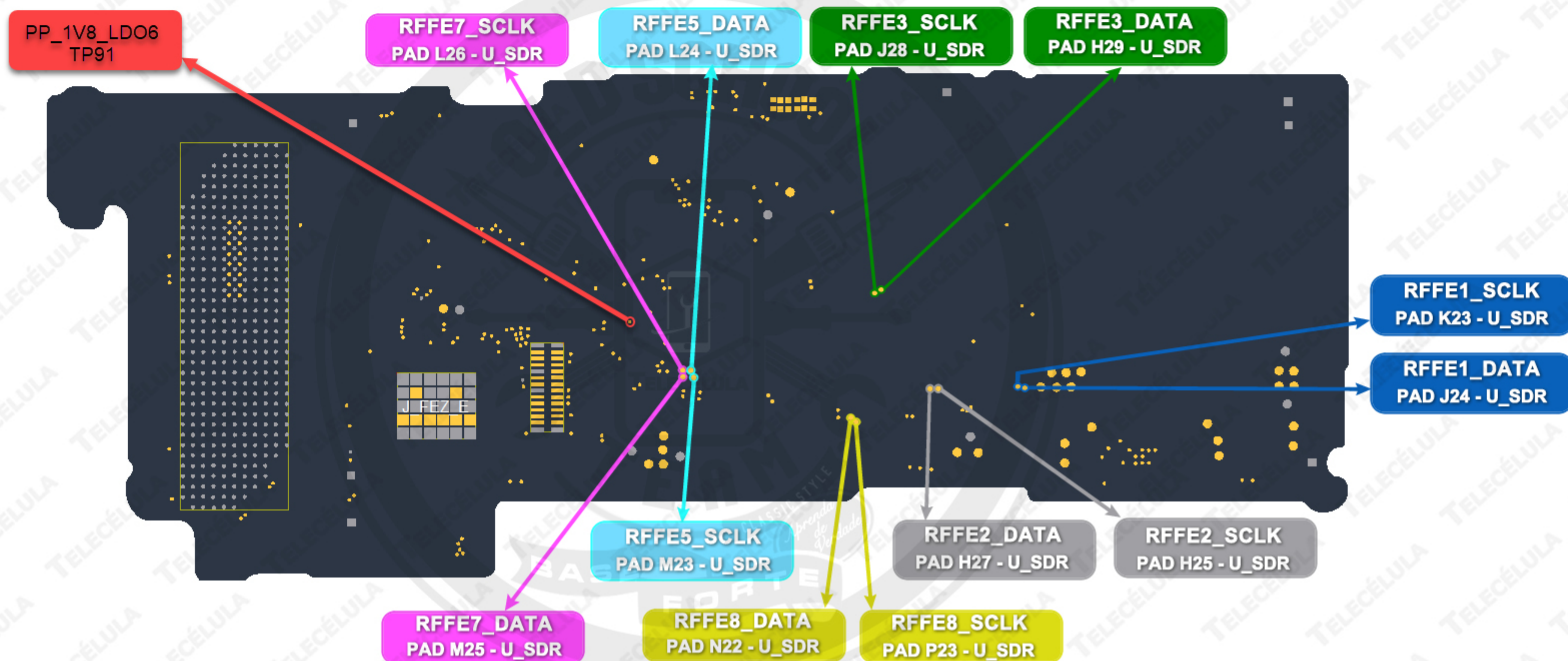
RFFE 5 SDR

UAPTL	0xB
CPLR_U	0x8
DSM_HB_E	0x3

RFFE 7 SDR

DSM_LB_E	0x1
DSM_HB_E	0x3
U_5G_U_W	0xE
MIMO_U_E	0xA
DSM_UHB_E	0x7

SMARTBOARD - IPHONE 13 PRO



RFFE 1 SDR

PA_HB_E	0x3	RFFE1_SDR
PA_LMB_E	0x5	RFFE1_SDR
CPLR_L_E	0x8	RFFE1_SDR
U_QET0_E	0x4	RFFE1_SDR

RFFE 3 SDR

PA_HB_E	0x3	RFFE3_SDR
PA_UHB_L_E	0x6	RFFE3_SDR
MIMO_L_E	0xA	RFFE3_SDR
PA_LB_E	0x1	RFFE3_SDR
U_5G_L_W	0xE	RFFE3_SDR

RFFE 5 SDR

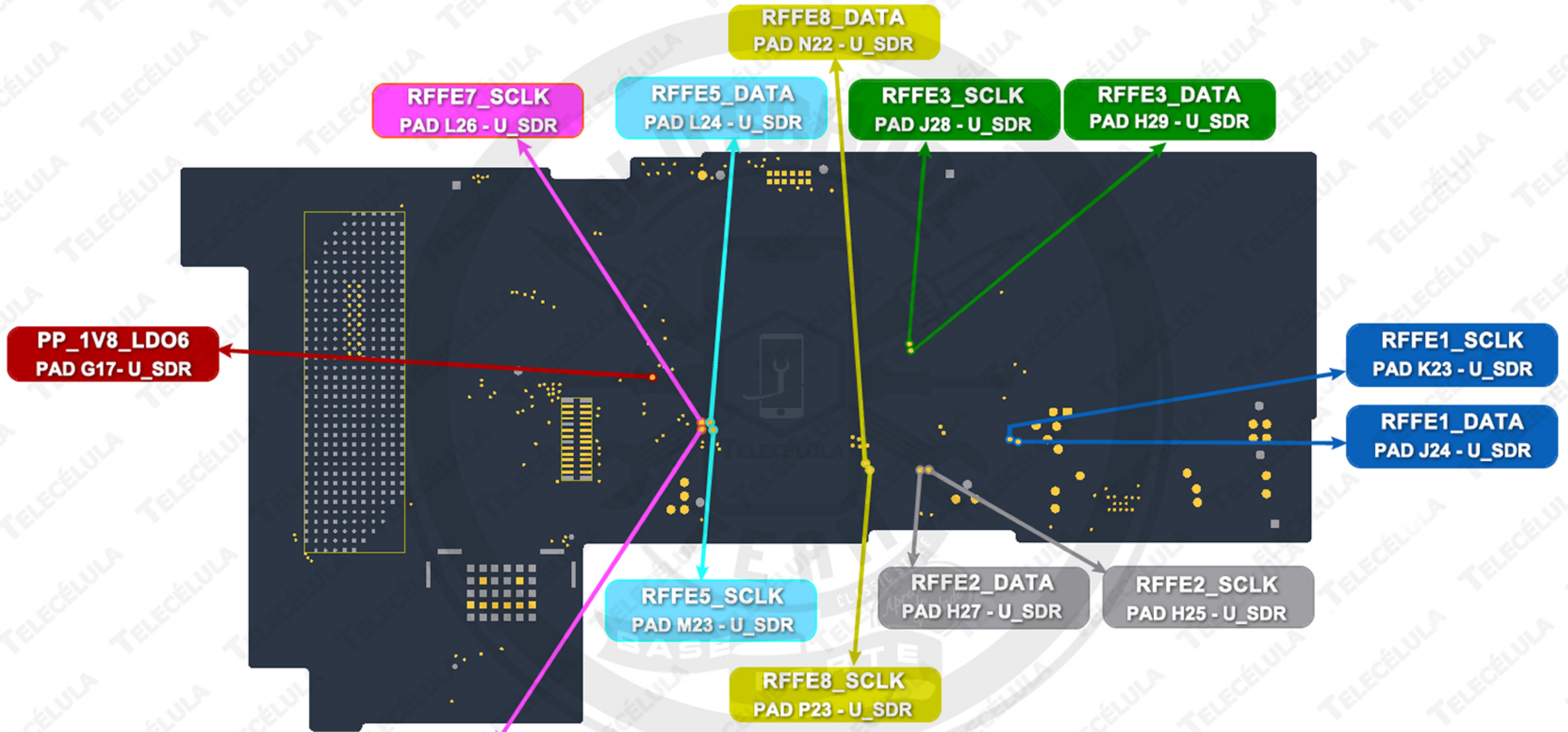
UAPTL	0xB	RFFE5_SDR
CPLR_U	0x8	RFFE5_SDR
DSM_HB_E	0x3	RFFE5_SDR

RFFE 7 SDR

U_5G_U_W	0xE	RFFE7_SDR
DSM_UHB	0x7	RFFE7_SDR
DSM_LB_E	0x1	RFFE7_SDR
DSM_HB_E	0x3	RFFE7_SDR
MIMO_U_E	0xA	RFFE7_SDR

BOARD BOTTOM

SMARTBOARD - IPHONE 13 PRO MAX



RFFE 1 SDR

PA_HB_E	0x3	RFFE1_SDR
PA_LMB_E	0x5	RFFE1_SDR
CPLR_L_E	0x8	RFFE1_SDR
U_QET0_E	0x4	RFFE1_SDR

RFFE 3 SDR

PA_HB_E	0x3	RFFE3_SDR
PA_UHB_L_E	0x6	RFFE3_SDR
MIMO_L_E	0xA	RFFE3_SDR
PA_LB_E	0x1	RFFE3_SDR
U_5G_L_W	0xE	RFFE3_SDR

RFFE 5 SDR

UAPT_L	0xB	RFFE5_SDR
CPLR_U	0x8	RFFE5_SDR
DSM_HB_E	0x3	RFFE5_SDR

RFFE 7 SDR

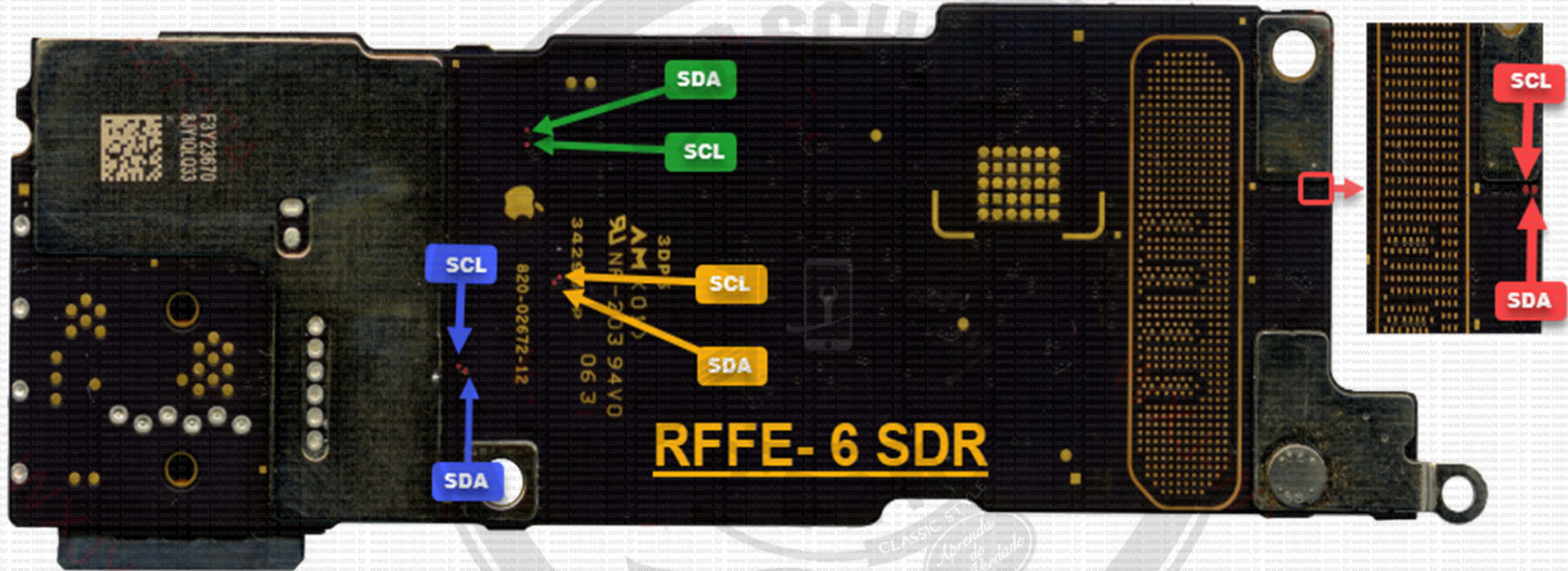
BOARD TOP		
U_5G_U_W	0xE	RFFE7_SDR
DSM_UHB	0x7	RFFE7_SDR
DSM_LB_E	0x1	RFFE7_SDR
DSM_HB_E	0x3	RFFE7_SDR
MIMO_U_E	0xA	RFFE7_SDR
BOARD BOTTOM		

IPHONE 14 PRO RFFE SDR

RFFE-1 SDR

RFFE-3 SDR

RFFE-7 SDR



RFFE-1 SDR

RFFE-3 SDR

RFFE-6 SDR

RFFE-7 SDR

PA_HB_E
U_QET0_E
CPLR_L_E

0x3 RFFE1_SDR
0x4 RFFE1_SDR
0x8 RFFE1_SDR

MIMO_L_E
PA_LB_E
U_5G_L_W
PA_HB_E
PA_UHB_L_E

0xA RFFE3_SDR
0x1 RFFE3_SDR
0xE RFFE3_SDR
0x3 RFFE3_SDR
0x6 RFFE3_SDR

PA_LMB
PA_LB_E
QET_1

0x5 RFFE6_SDR
0x1 RFFE6_SDR
0x4 RFFE6_SDR

MIMO_U_E
DSM_UHB
DSM_HB_E
DSM_LB_E

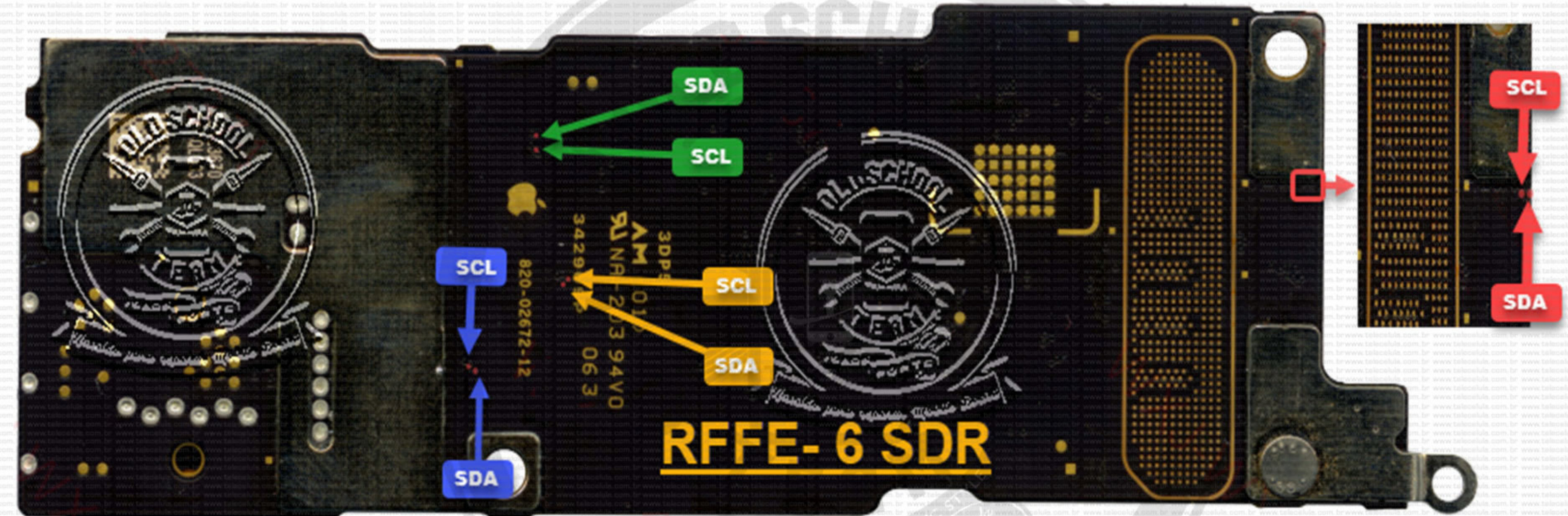
0xA RFFE7_SDR
0x7 RFFE7_SDR
0x3 RFFE5_SDR
0x1 RFFE7_SDR

IPHONE 14 PRO MAX (RFFE - SDR)

RFFE-1 SDR

RFFE-3 SDR

RFFE-7 SDR



RFFE-1 SDR

PA_HB_E 0x3 RFFE1_SDR
U_QET0_E 0x4 RFFE1_SDR
CPLR_L_E 0x8 RFFE1_SDR

RFFE-3 SDR

MIMO_L_E 0xA RFFE3_SDR
PA_LB_E 0x1 RFFE3_SDR
U_5G_L_W 0xE RFFE3_SDR
PA_HB_E 0x3 RFFE3_SDR
PA_UHB_L_E 0x6 RFFE3_SDR

RFFE-6 SDR

PA_LMB 0x5 RFFE6_SDR
PA_LB_E 0x1 RFFE6_SDR
QET_1 0x4 RFFE6_SDR

RFFE-7 SDR

MIMO_U_E 0xA RFFE7_SDR
DSM_UHB 0x7 RFFE7_SDR
DSM_HB_E 0x3 RFFE5_SDR
DSM_LB_E 0x1 RFFE7_SDR
U_5G_U_W 0xE RFFE7_SDR