

# Troubleshooting Manual

## W890



ABOUT

General information

The purpose of this document is to provide enhanced technical information for Sony Ericsson repair technicians in order to assist during service, repair and troubleshooting operations on Sony Ericsson mobile phones. It should be used as a complement to other repair instructions and tools as notified by the local Sony Ericsson representative.

To search for components throughout the entire document use the “search” function in Adobe Acrobat Reader 7.0 (or later version) and enter the component name or other word. Use zoom to enlarge.

For easier navigation of the document you can use the bookmarks that appear in the Bookmarks tab on the left side of the Adobe Acrobat Reader window. Each bookmark jumps to a page in the document.

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Revision History

Rev.	Date	Changes / Comments
1	09/01/2008	Initial revision.

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## W890 Equipment List



**Note:** More additional information about the equipment used for TRS can be found in Repair Tools Catalogue on CSPN or on the following location: CSPN – Repair Instructions – Electrical – W890 – Equipment List.

### TRS Fixture Kit

Location: CSPN-Repair Instructions-Electrical-W890-Equipment List

### Dummy Battery

Location: CSPN-Repair Instructions-Electrical-W890-Equipment List  
Part number: NTZ 112 533

### Instruments

#### Power Supply Channel 1 VBATT

Agilent 6632B or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

Instrument Settings:  
Voltage: 3.8 Volt  
Limiter: 2A

**Note:** During the calibration the accurate voltage from the VBATT must be within  $\pm 0.015$  V. If this is not fulfilled it will result in a faulty calibration. (For more information about recommended power supply units, see the Repair Tool Catalogue on CSPN under the Mechanical level. The Power Supply Channel 1 VBATT must allow reverse current.

**Note:** Maximal cable length between the Power Supply Channel 1 VBATT and the dummy battery must be maximum 1m. The cable must have a capacity for at least 16A.

**Note:** It is very important to follow instrument settings instructions when performing the Battery Calibration Test.

#### Power Supply Channel 2 DCIO/SEPI

Agilent 6632B or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

Instrument Settings:  
Voltage: 5.0 Volt  
Limiter: 2A

**Note:** It is very important to follow instrument setting instructions when performing the Current Calibration Test.

#### Oscilloscope

Tektronix TDS 2012 or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

#### Digital Multimeter (DMM)

Fluke 83 or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
The 0, 64 mm Test Probes is recommended by Sony Ericsson when DMM is in use see picture 1.

Picture 1



#### Spectrum Analyzer

HP 8595E or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

#### RF probe

HP 85024A or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

#### Mobile Phone Tester

Yokogawa VC230 or similar  
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

#### FM Signal Generator

Agilent E4433B or similar  
Location: -

## RF Adaptor

### Adaptor 33 N-BNC-50-1

Adaptor to Signal Generator RF Output  
See Picture 2  
Location: -

Picture 2



## PC Package & PC Software

### PC Package (Computer)

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

### Urquell Fault Trace SW with project file

Location: CSPN-Repair Instructions-Electrical-W890-Trouble Shooting Application  
Project File: W890 Project\_R1A

### Drivers

SEPI BOX Drivers  
Location: EMMA III-Drivers-SEPI

### SE Communication Interface SEPI BOX

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
Part number: LTN 214 1484  
See Picture 3.

Picture 3



## Cables

### USB Computer Cable

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
See Picture 4.

Picture 4



### DSU-60/USB Cable

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
Part number: KRY 101 1413

### RF Test Cable Flexible

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
Part number: RPM 119 885  
See Picture 5.

Picture 5



### SEPI Interface Cable – A1

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
Part number: KRY 101 1119/1  
See Picture 6.

Picture 6





### Power Cable RED to Power Supply Channel 1 VBATT

Maximum Length: 1m

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

### Power Cable BLACK to Power Supply Channel 1 VBATT

Maximum Length: 1m

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue

### Customized Power Supply Channel 2 DCIO/SEPI Cable

To perform Current Calibration the phone must be supplied directly through the system connector. Customize the cable according to following instructions:

#### STEP 1:

Take the CST-75 battery charger and cut of the charger according to Picture 7.

Picture 7



**Note:** Cable length must be exact 1.3m.

#### STEP 2:

Connect the CST-75 charger Red or White wire to the Plus Output and the Black wire to the Minus (GND) Output at Power Supply Channel 2 DCIO/SEPI according to Picture 8.

Picture 8



#### STEP 3:

Cut of isolation material from inside of the charger plug according to Picture 9.

Picture 9



#### STEP 4:

Connect DCIO and SEPI Interface Cable – A1 cables according to Picture 10.

Picture 10



Wrong setup.

Picture 11



### Power Supply Channel 2 DCIO/SEPI Cable Connection Setups

Correct DCIO/SEPI Cable setup when TRS Fixture is used.

Picture 12



**Note:** Example of DCIO/SEPI and K750 TRS Fixture Setup.

Correct DCIO/SEPI Cable setup when the Dummy Battery is used.

Picture 13



Picture 14



### Customized FM Radio Cable

#### STEP 1:

Use Cable according to Picture 15

Picture 15



Product Name: Test lead BNC-4mm 1,5m

Product Description: Test lead with 4 mm lab plugs at one end and a BNC plug at the other.

Manufacturer: PMK Germany

Location: <http://www.elfa.se/en/> or other supplier.

Part number: 46-310-40 (**Note:** This is ELFA part number)

#### STEP 2:

Cut the Red lab plug according to Picture 16

Picture 16



#### STEP 3:

Use any Hands free (PHF) Cable and cut according to Picture 17

Picture 17



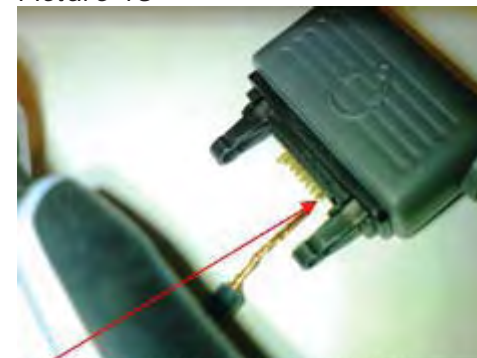
**Note:** Minimum Cable length 40 cm.

#### STEP 4:

Use only wire connected to Pin2 and cut all rest wires according to Picture 18.

Use digital multimeter instrument (DMM) and perform diode measurement to select wire connected to Pin2 at hands free system connector plug.

Picture 18



Pin2 (**Note:** Pin1 is not mounted)

#### STEP 5:

Connect by soldering cable from Picture 16 and cable from Picture 18 according to Picture 19.

Picture 19

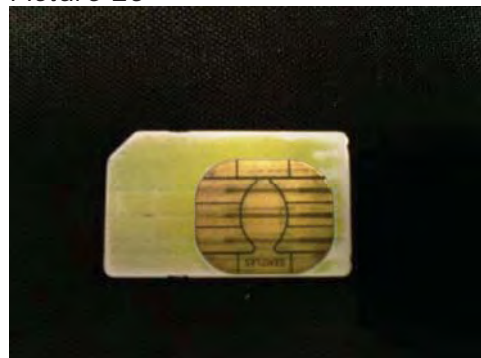


#### Test Cards

##### Local SIM

Any functional Local SIM Card, see Picture 20

Picture 20



##### Test SIM GSM/UMTS

One Test SIM GSM/UMTS is needed to perform Current Consumption Test, see Picture 21.  
Location: To buy a Test SIM GSM/UMTS, please contact your supplier of test equipment.

Picture 21



##### Sony Memory Stick M2

Any functional Memory Stick Micro M2 Card, see Picture 22

Picture 22



##### Rohde & Schwarz RF Shield Package (Box)

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
Part number: -

Picture 23



##### SMK RF Probe

Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
Part number: SXA 109 6356

Picture 24



##### RF Adapter for RF Shield Box

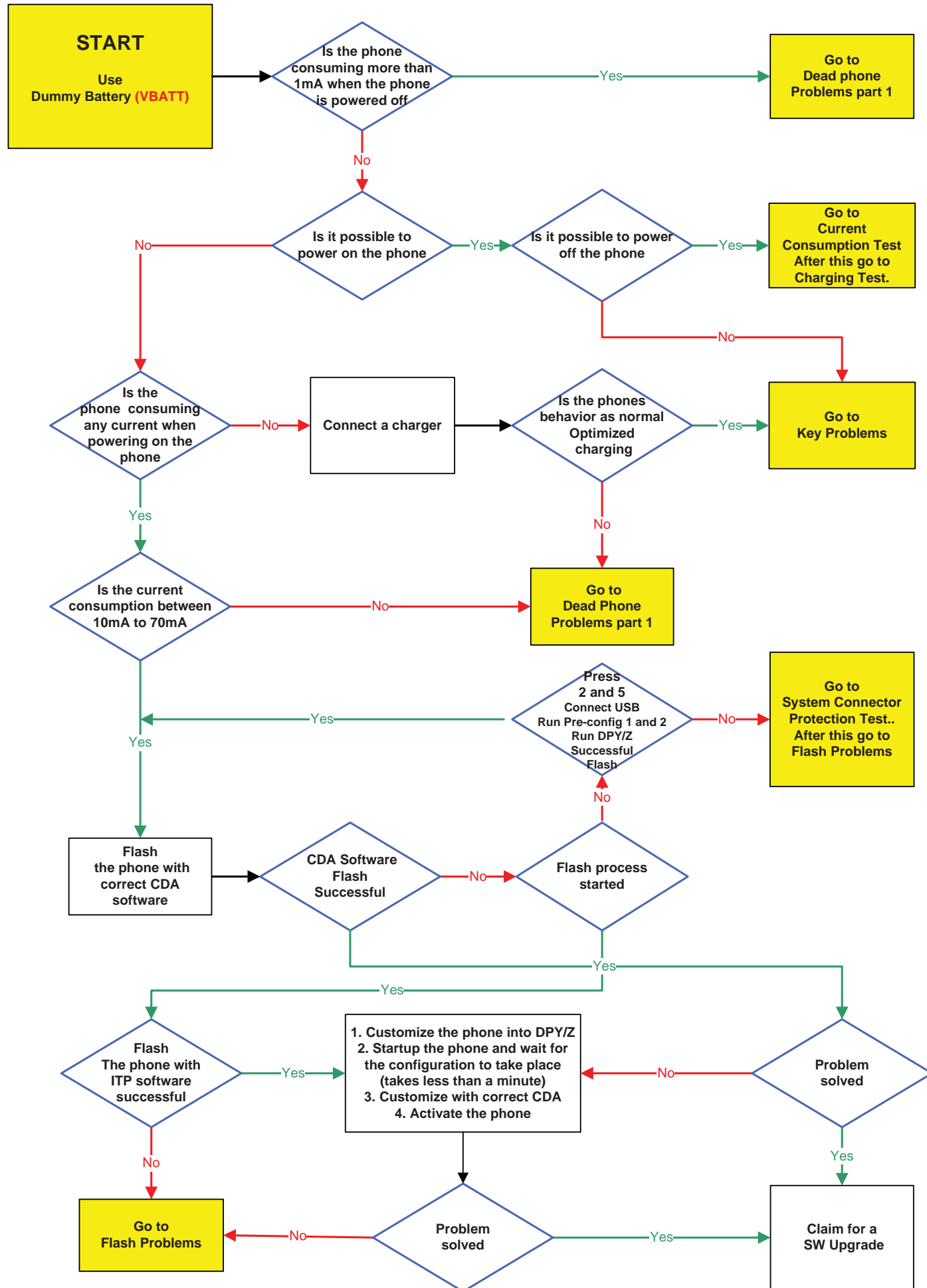
Location: CSPN-Repair Instructions-Level: Mechanical-Tool Catalogue  
Part number: -  
See picture 25.

Picture 25



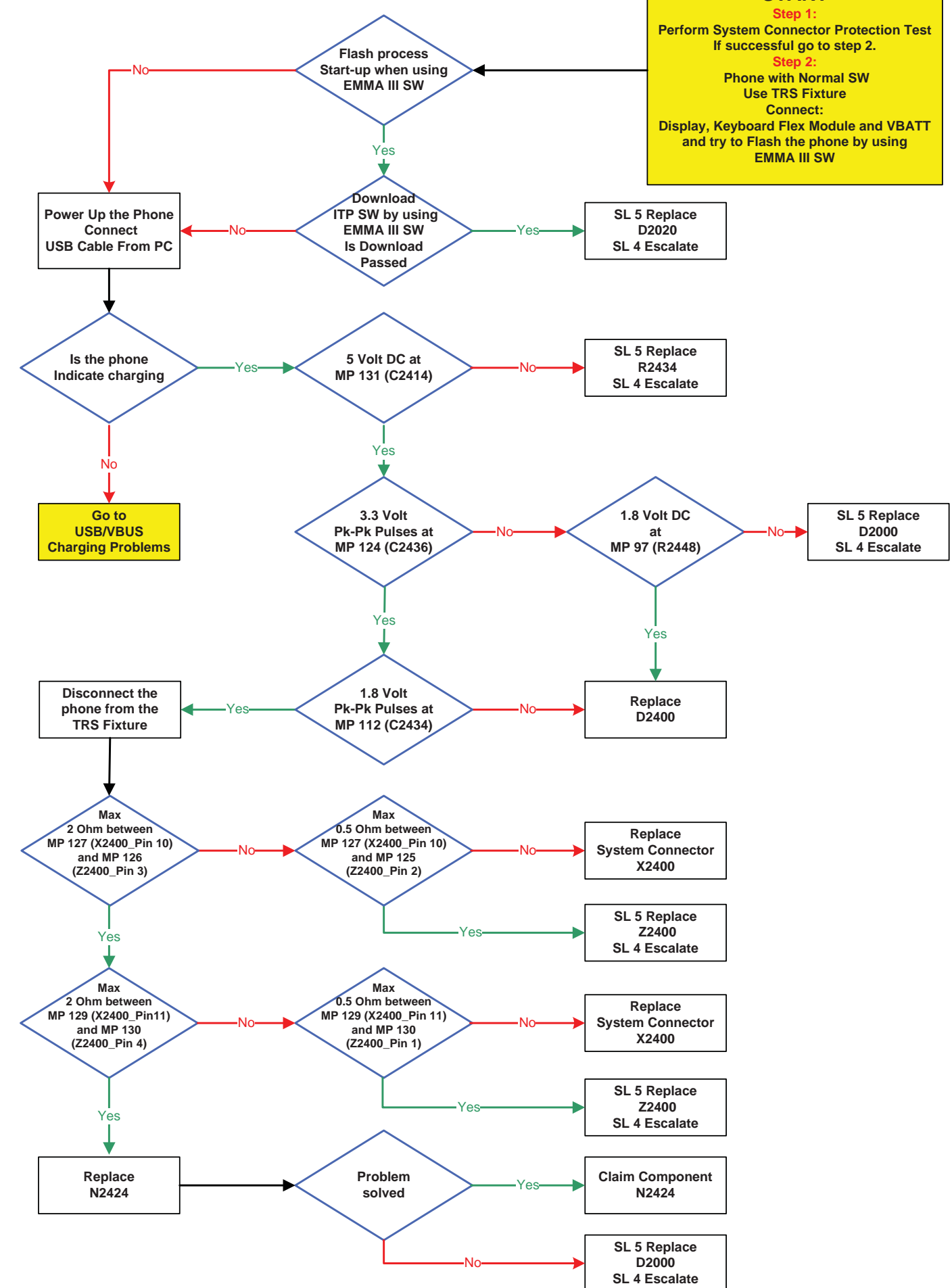


# On/Off Problems



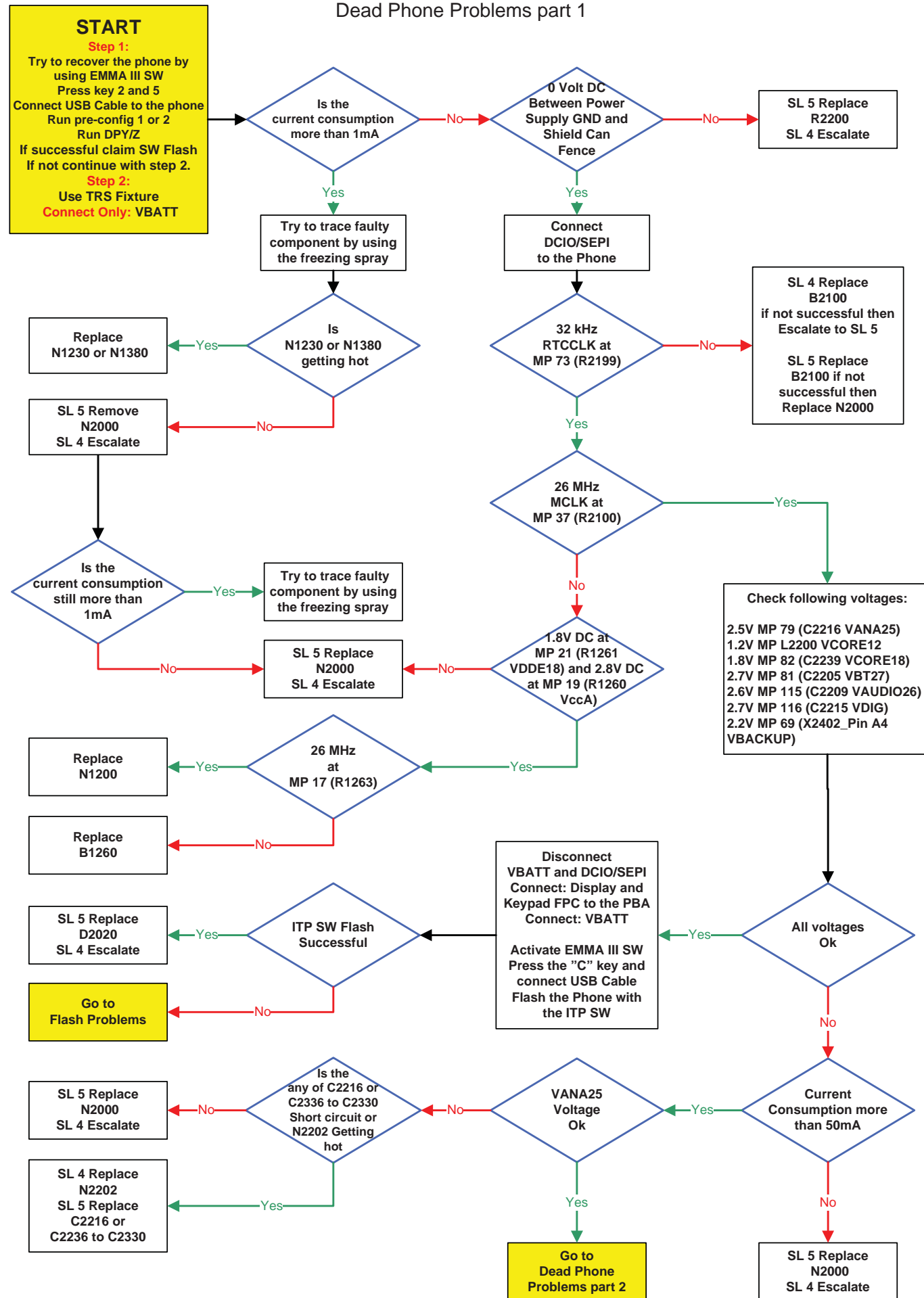
# On/Off Problems - Flash Problems

## Flash Problems

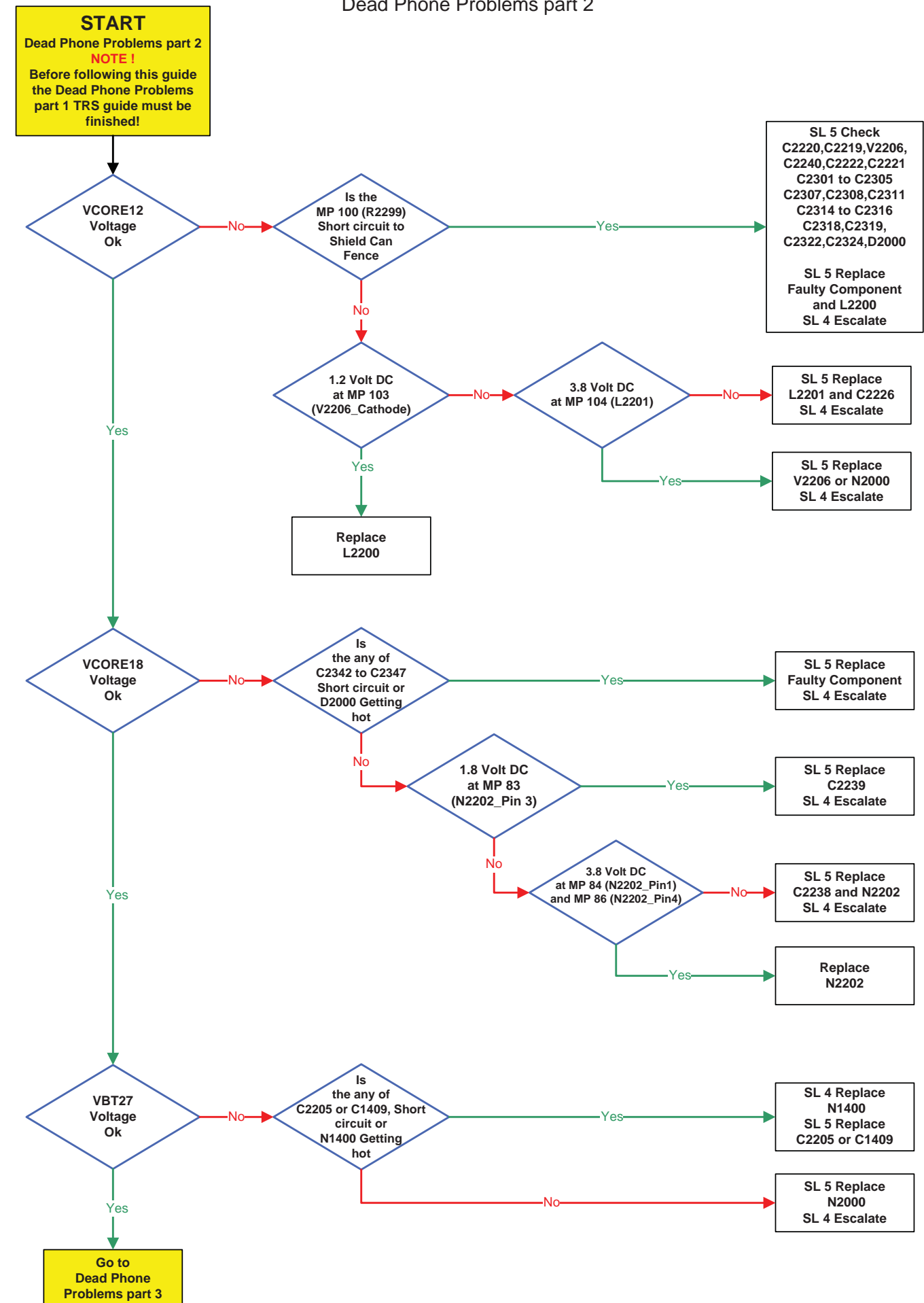




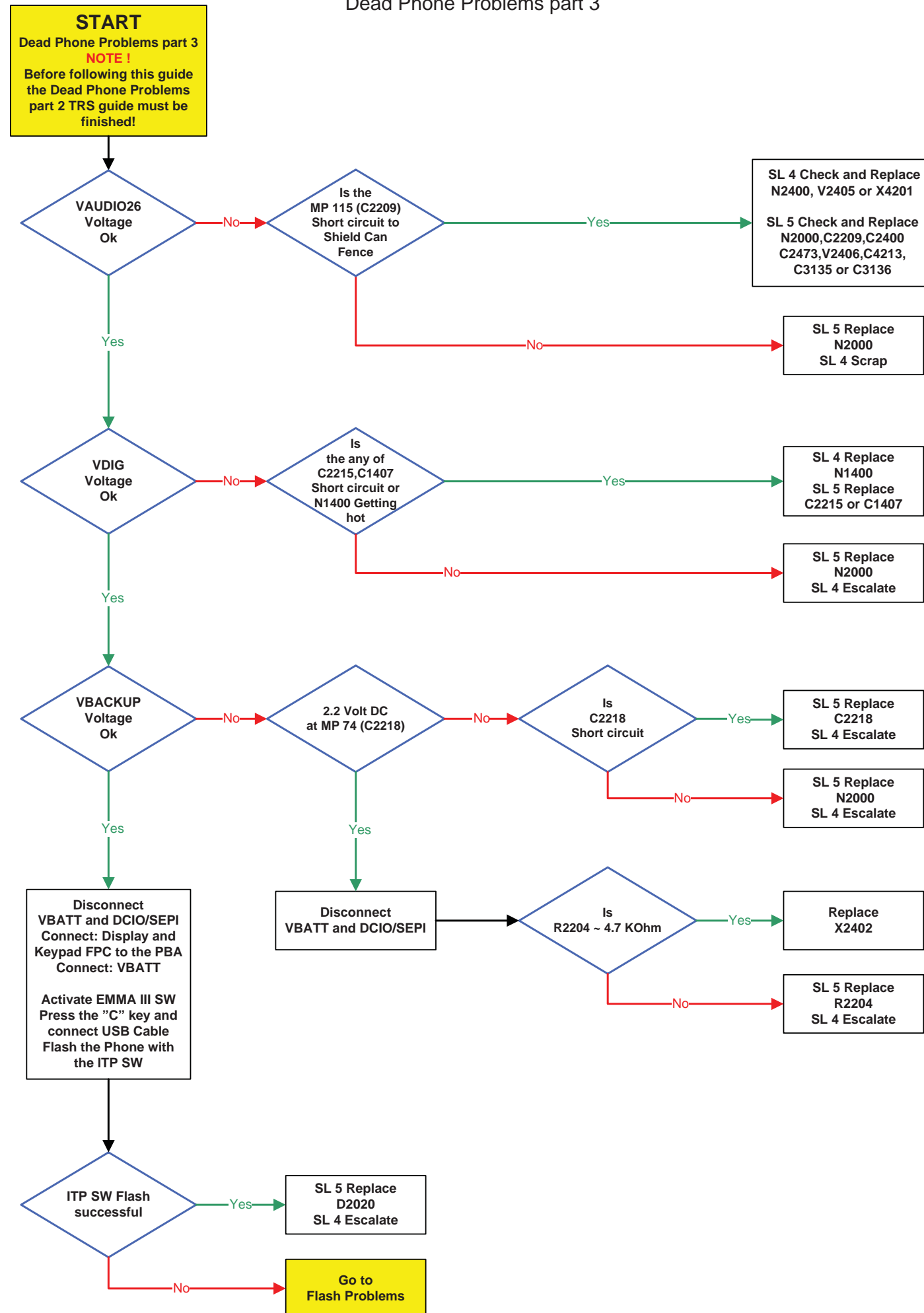
### Dead Phone Problems part 1



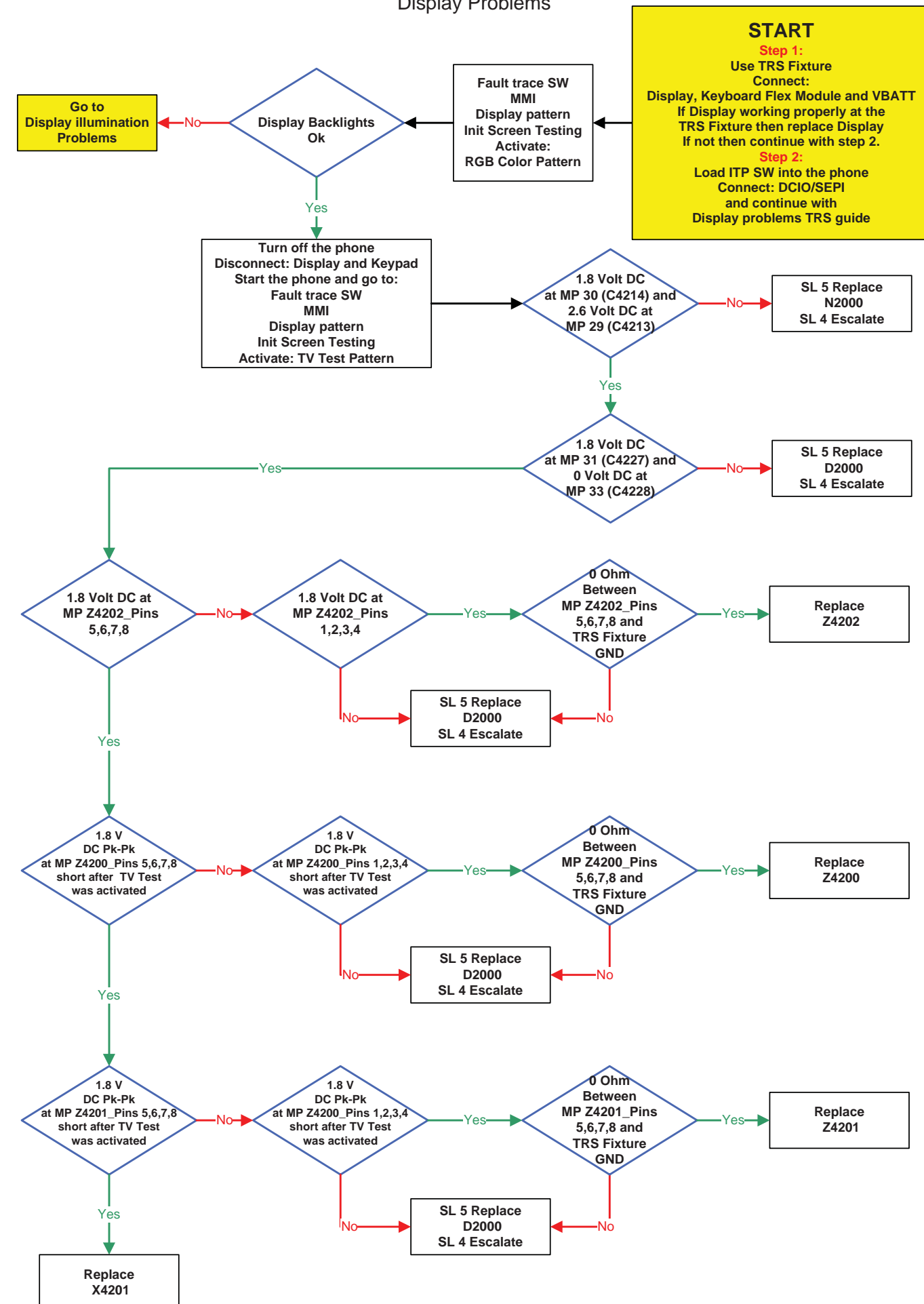
### Dead Phone Problems part 2



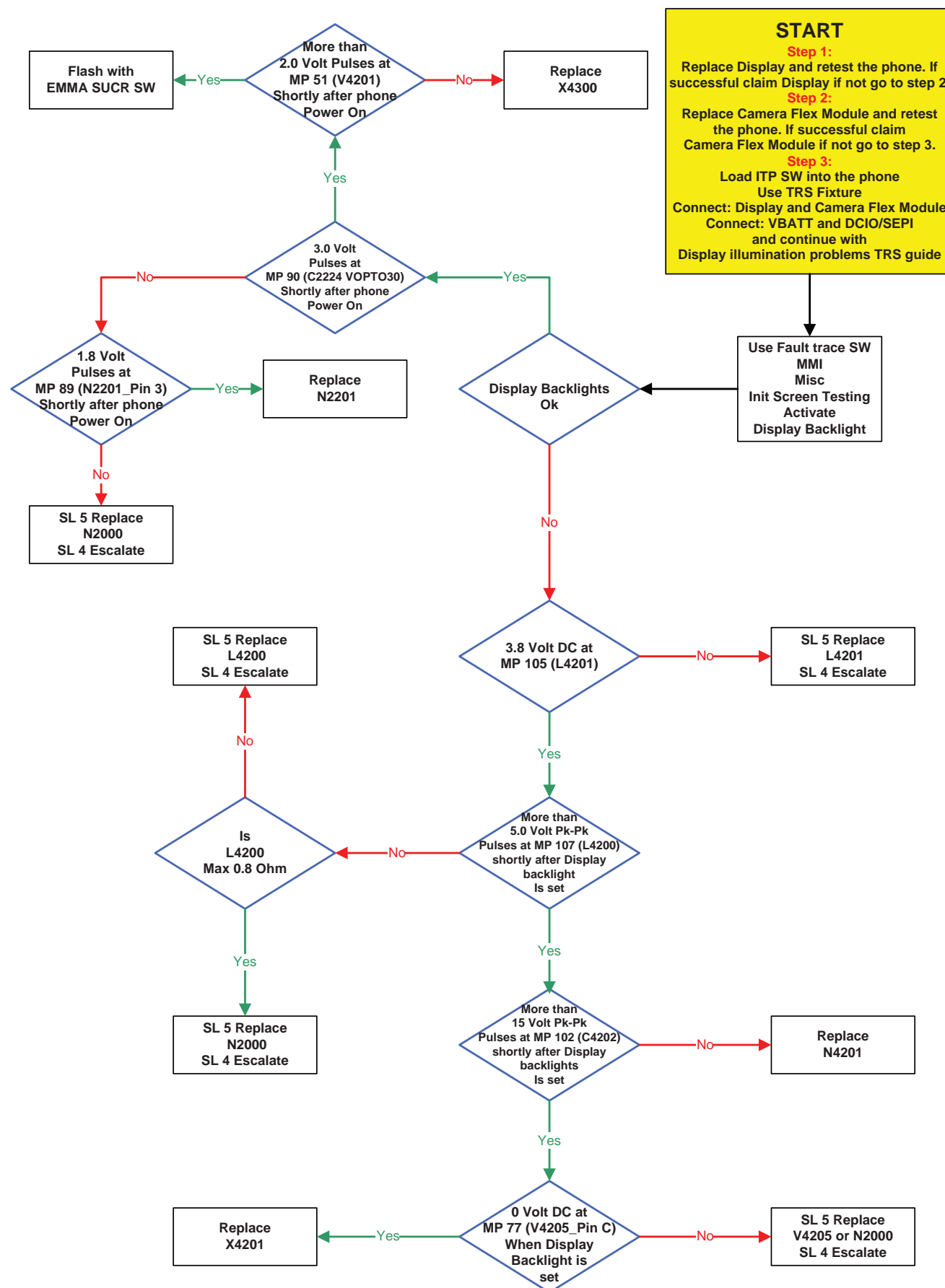
### Dead Phone Problems part 3



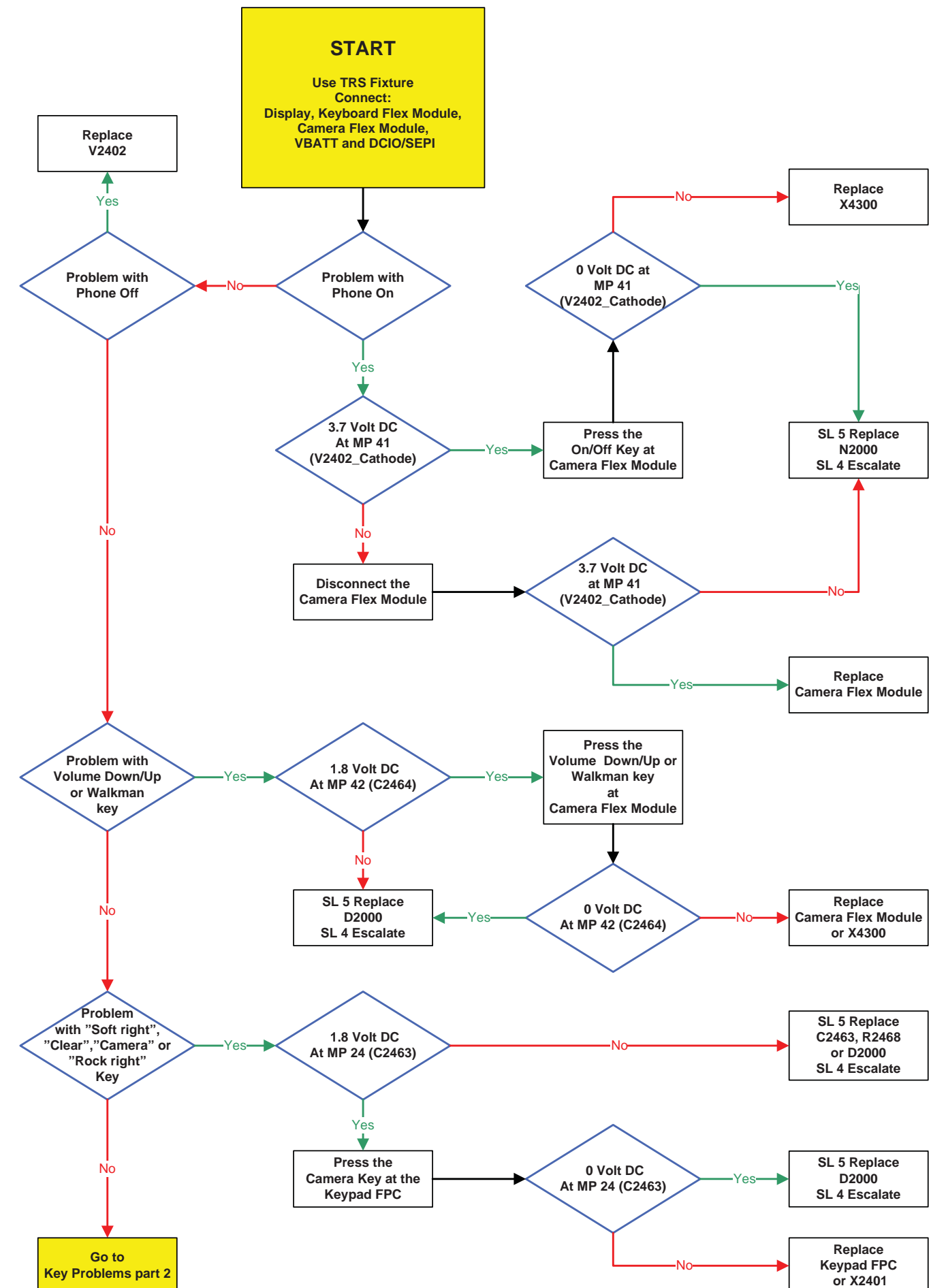
### Display Problems



# Display illumination Problems

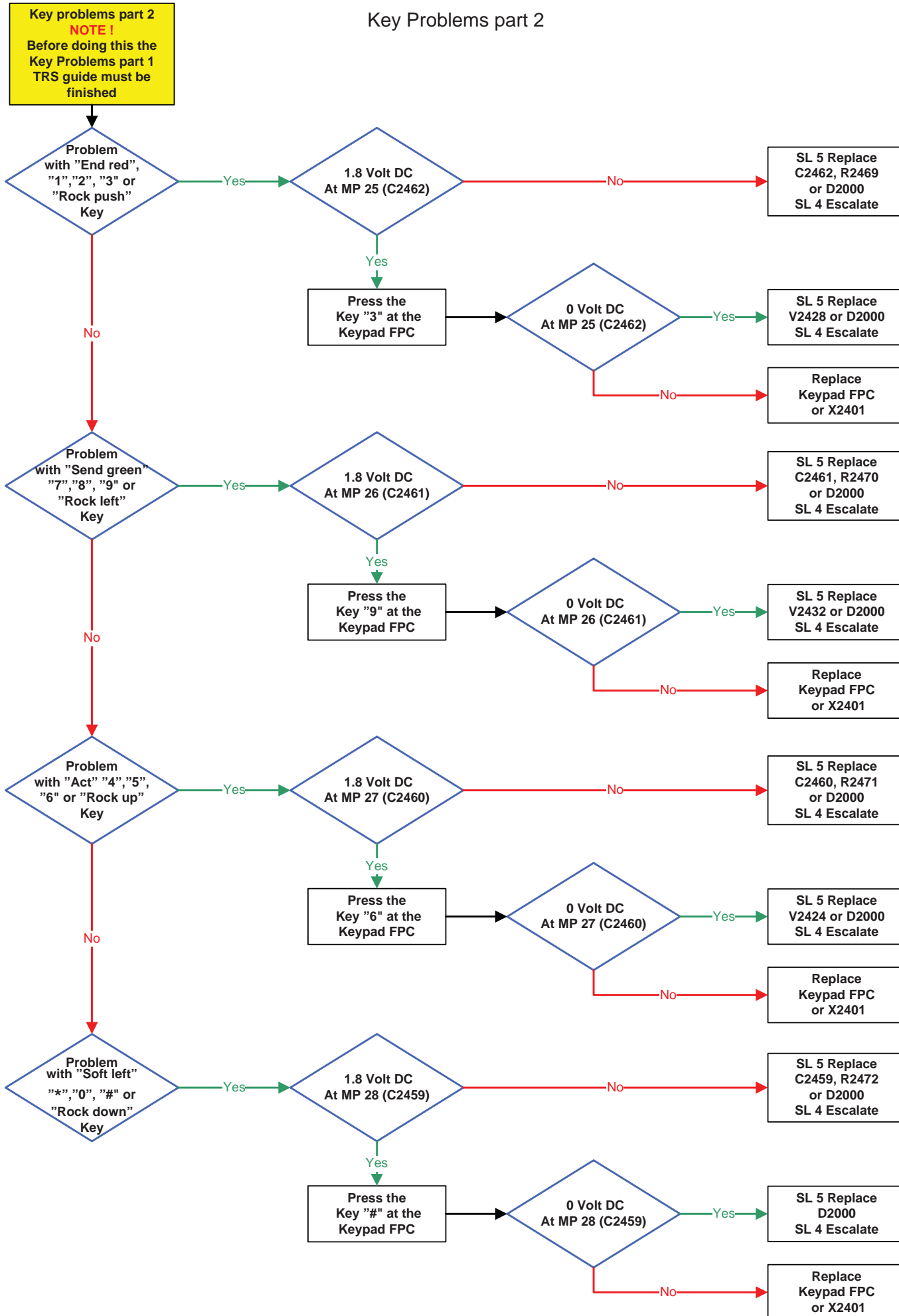


# Key Problems part 1

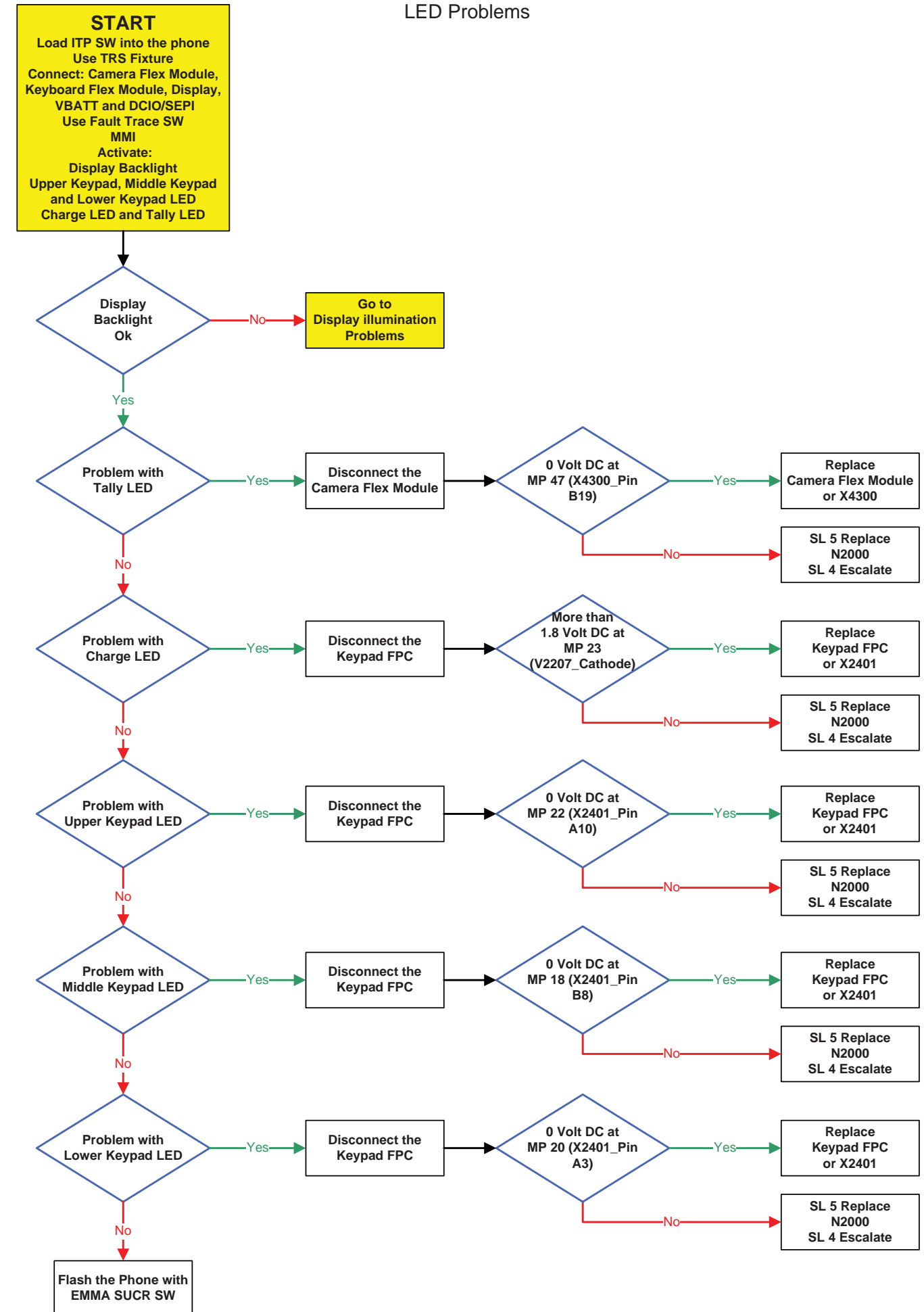




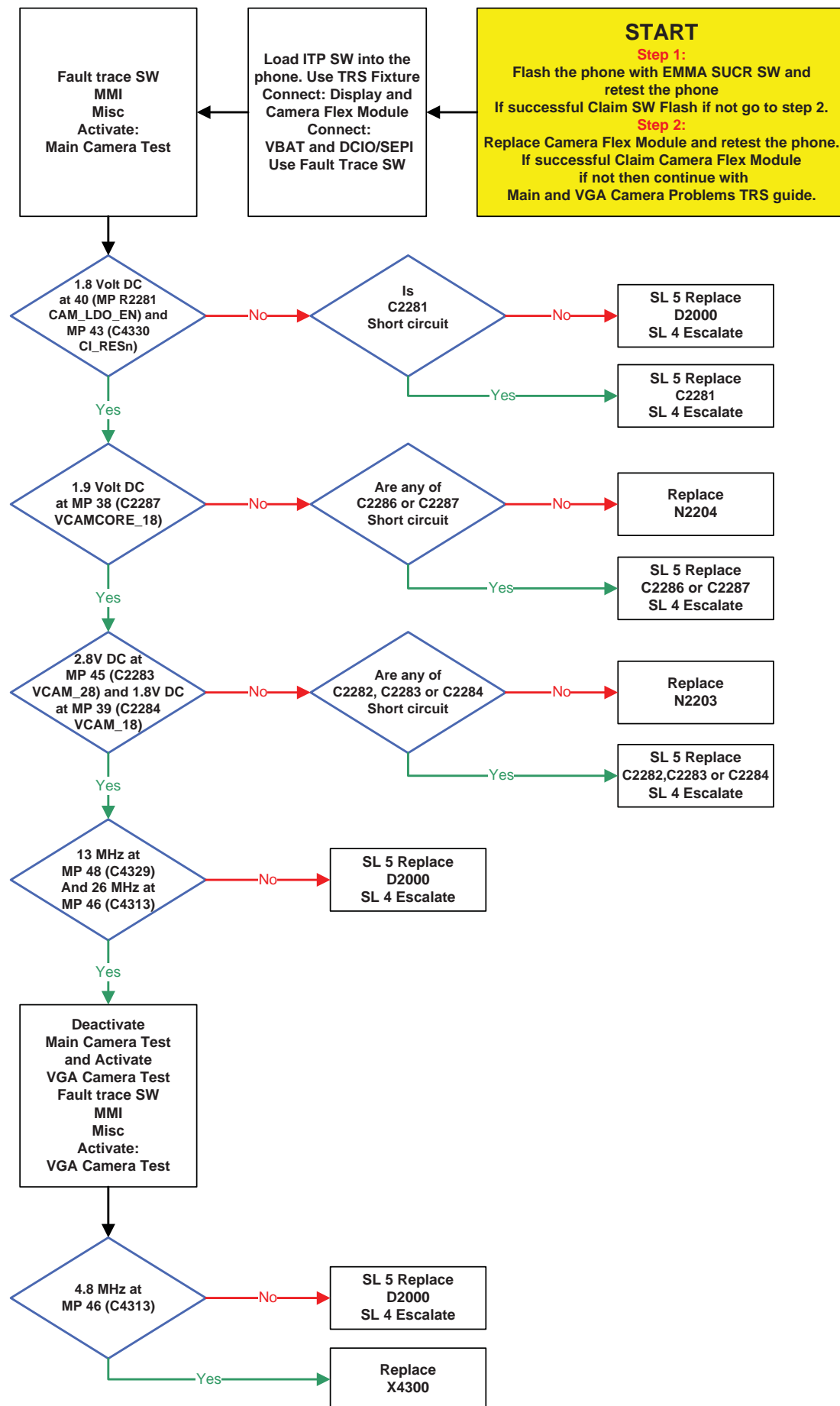
## Key Problems part 2



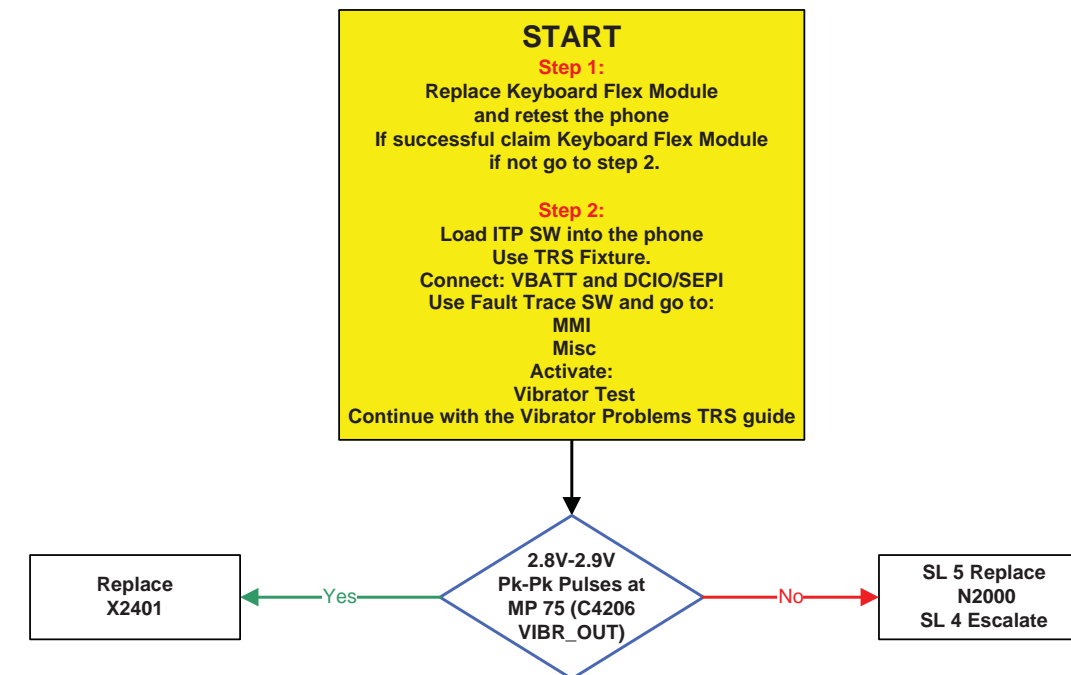
## LED Problems



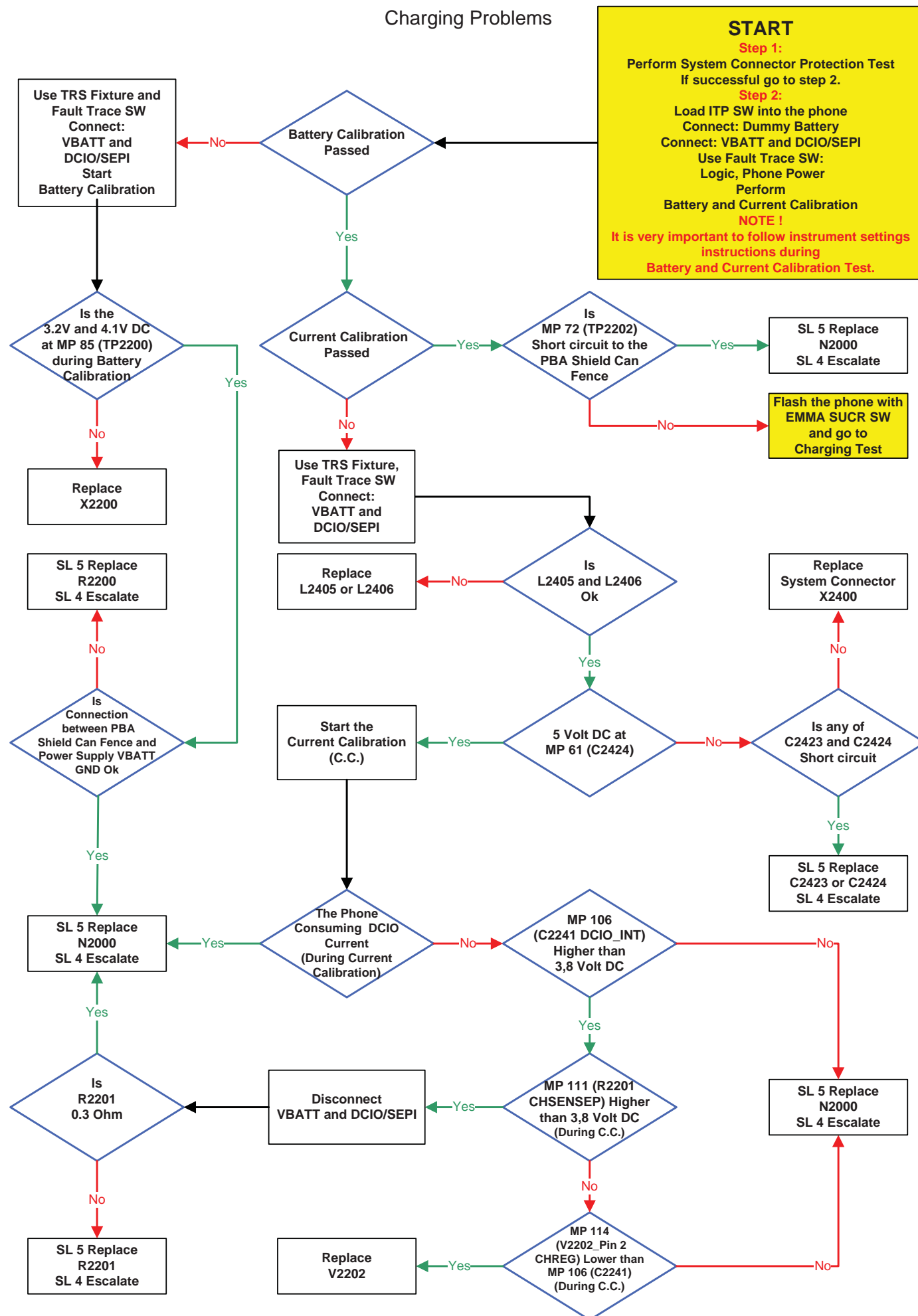
### Main and VGA Camera Problems



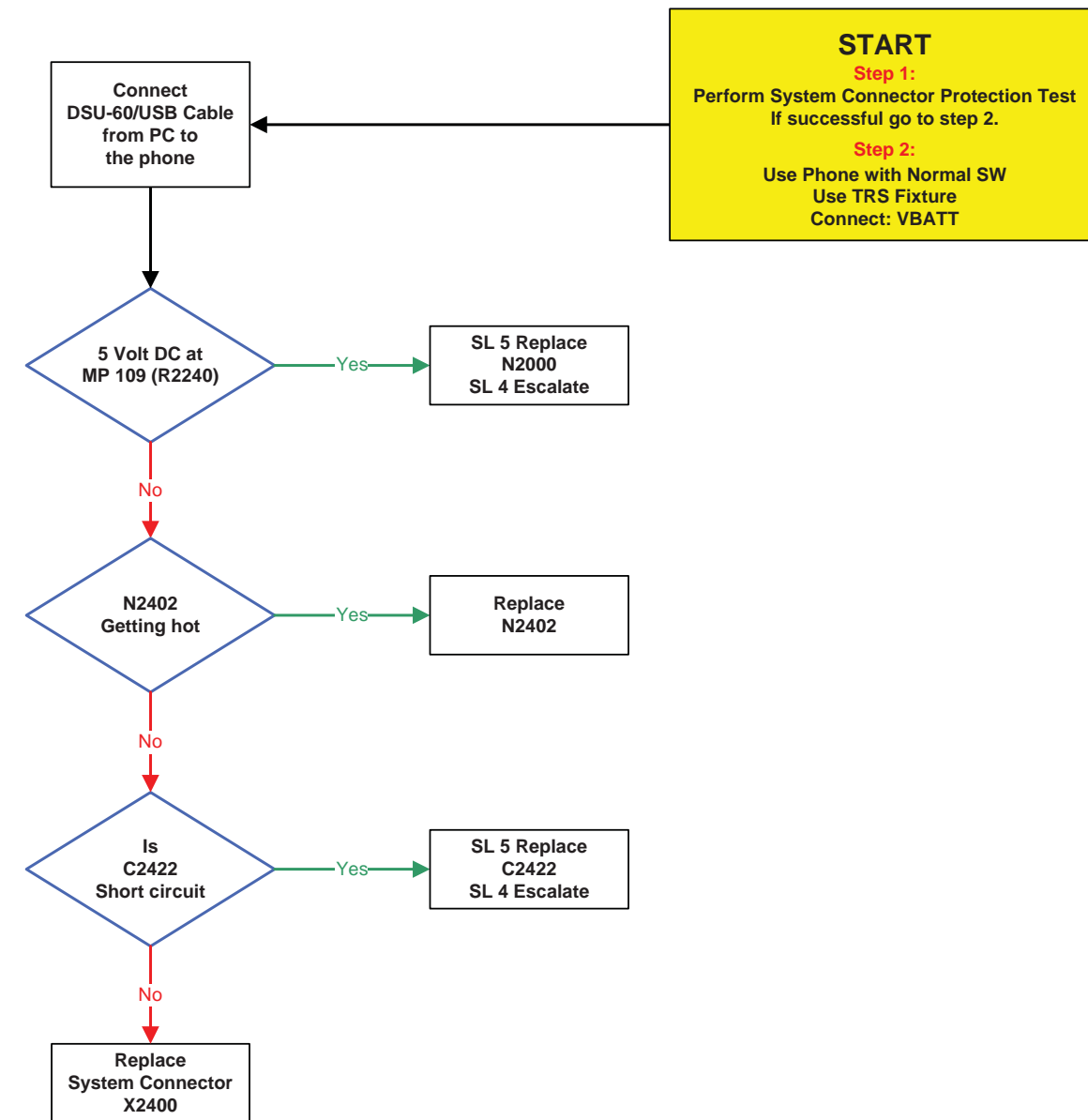
### Vibrator Problems



## Charging Problems

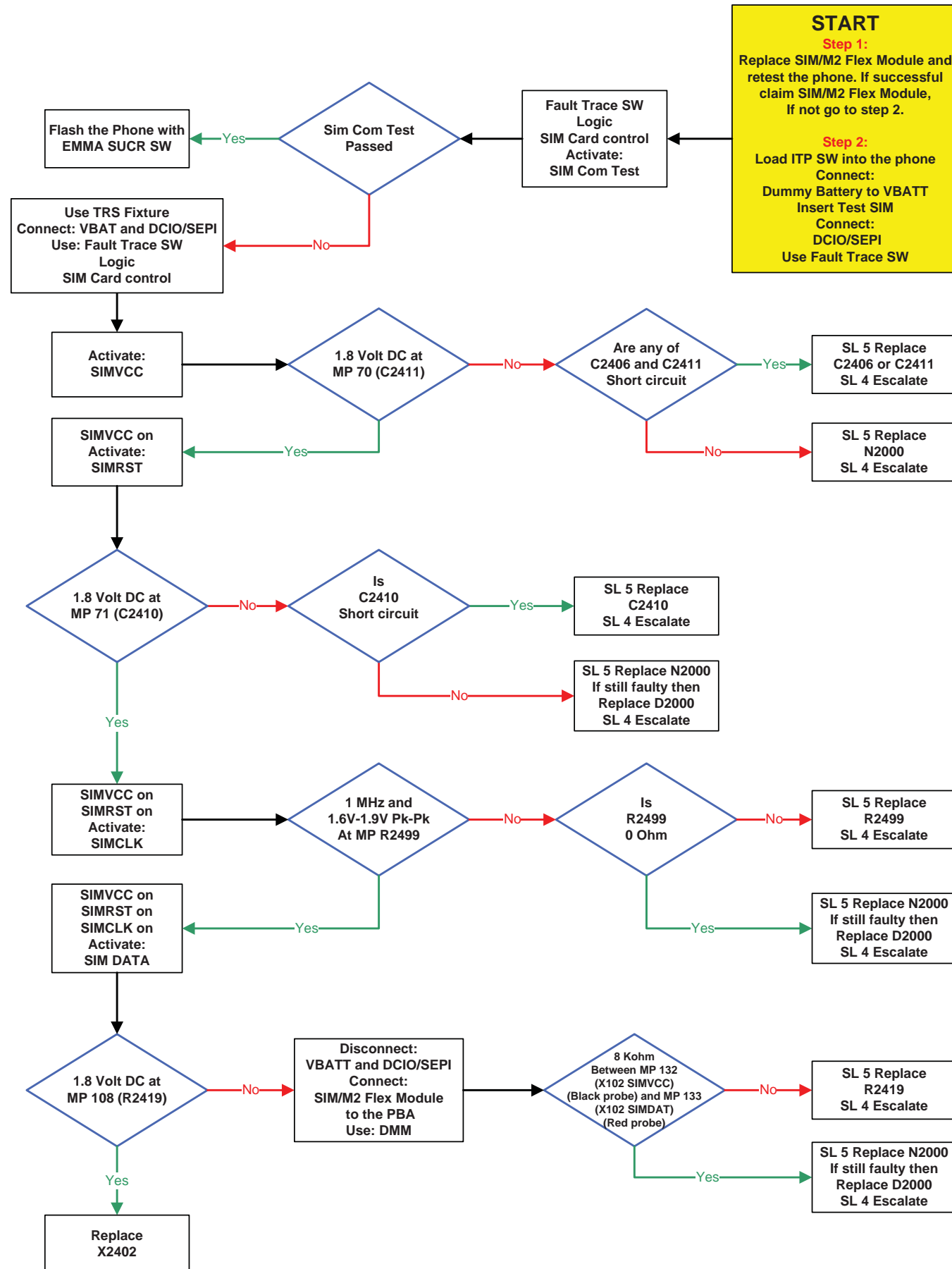


## USB/VBUS Charging Problems

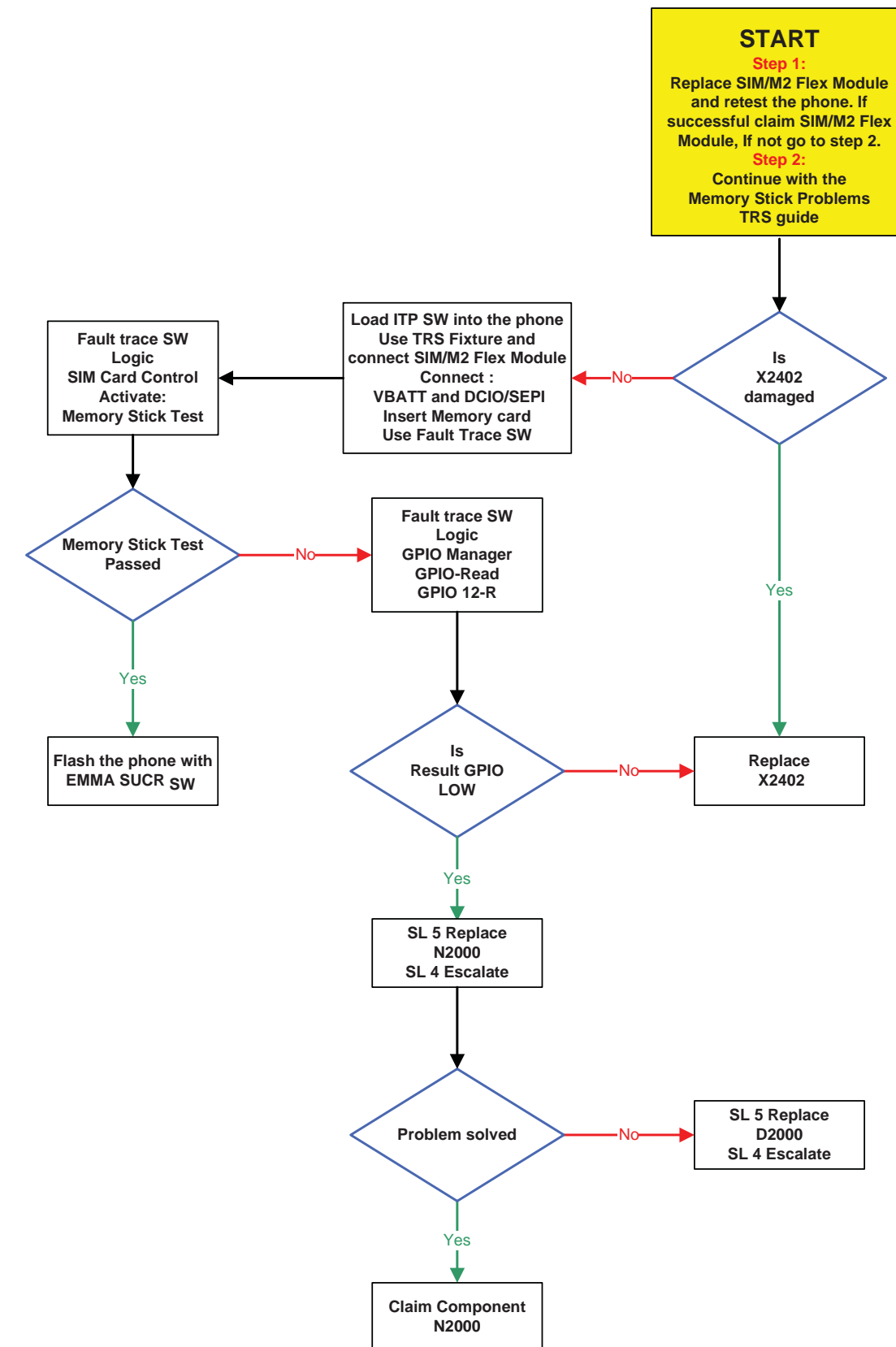




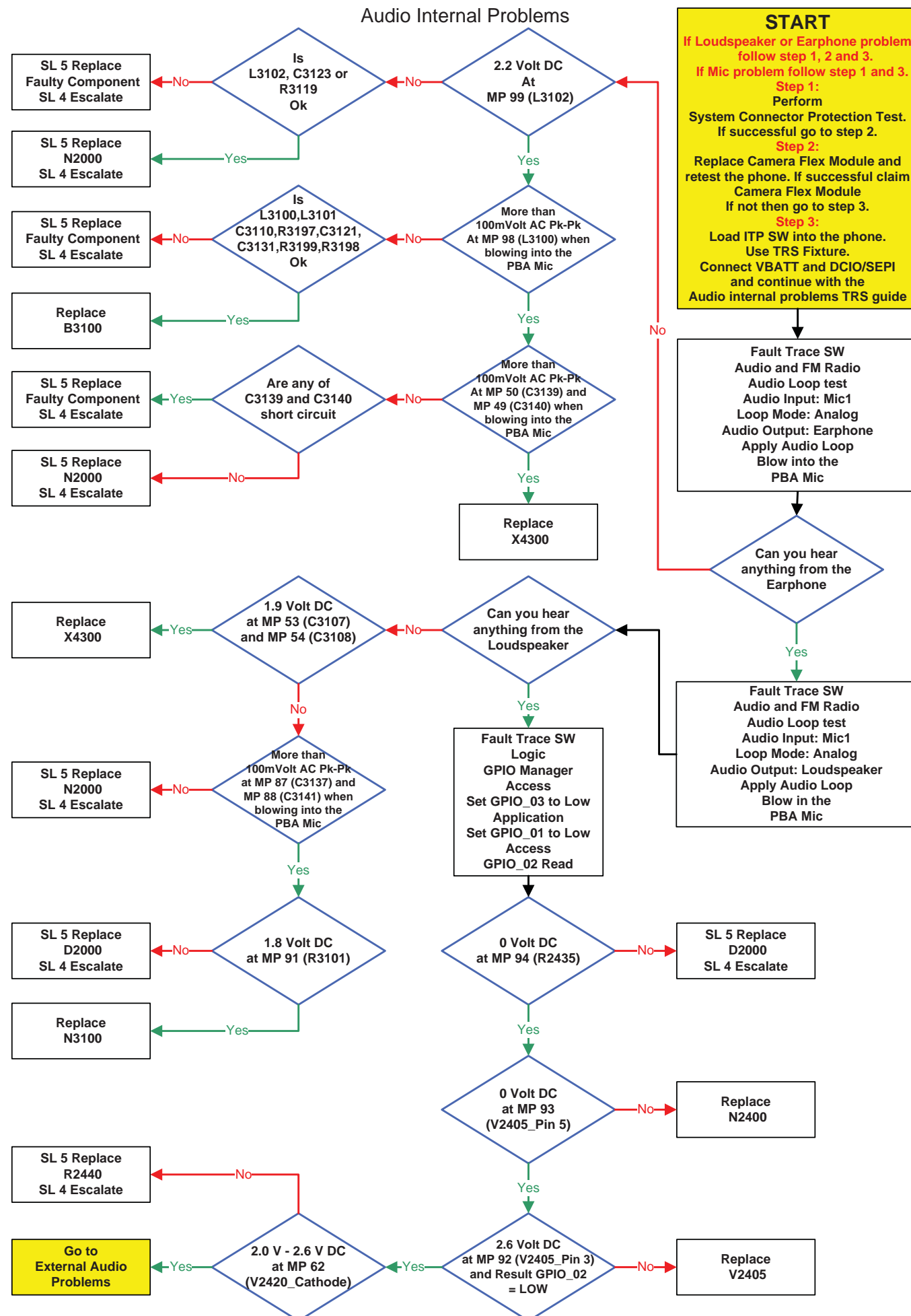
# SIM Problems



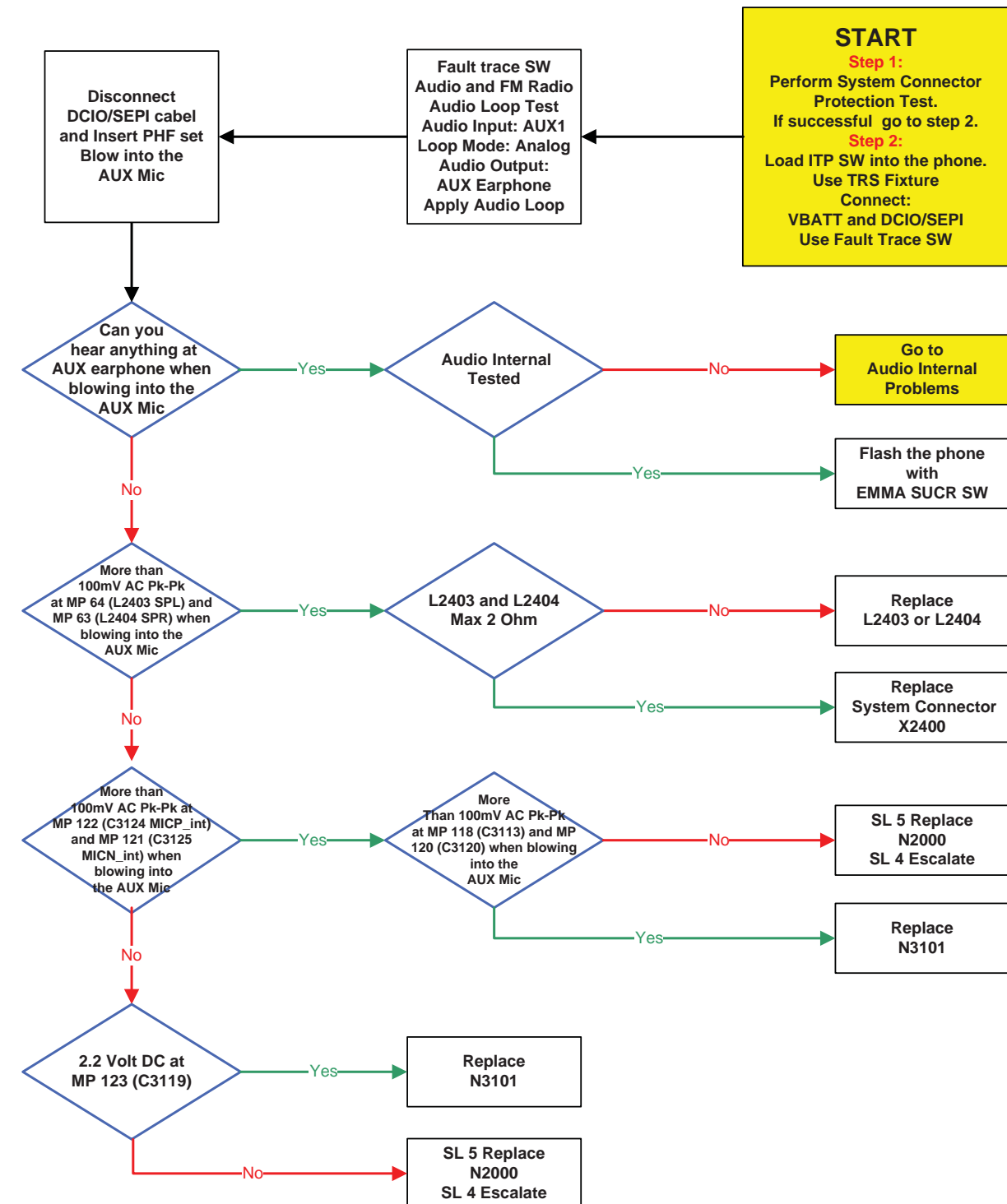
# Memory Stick Problems



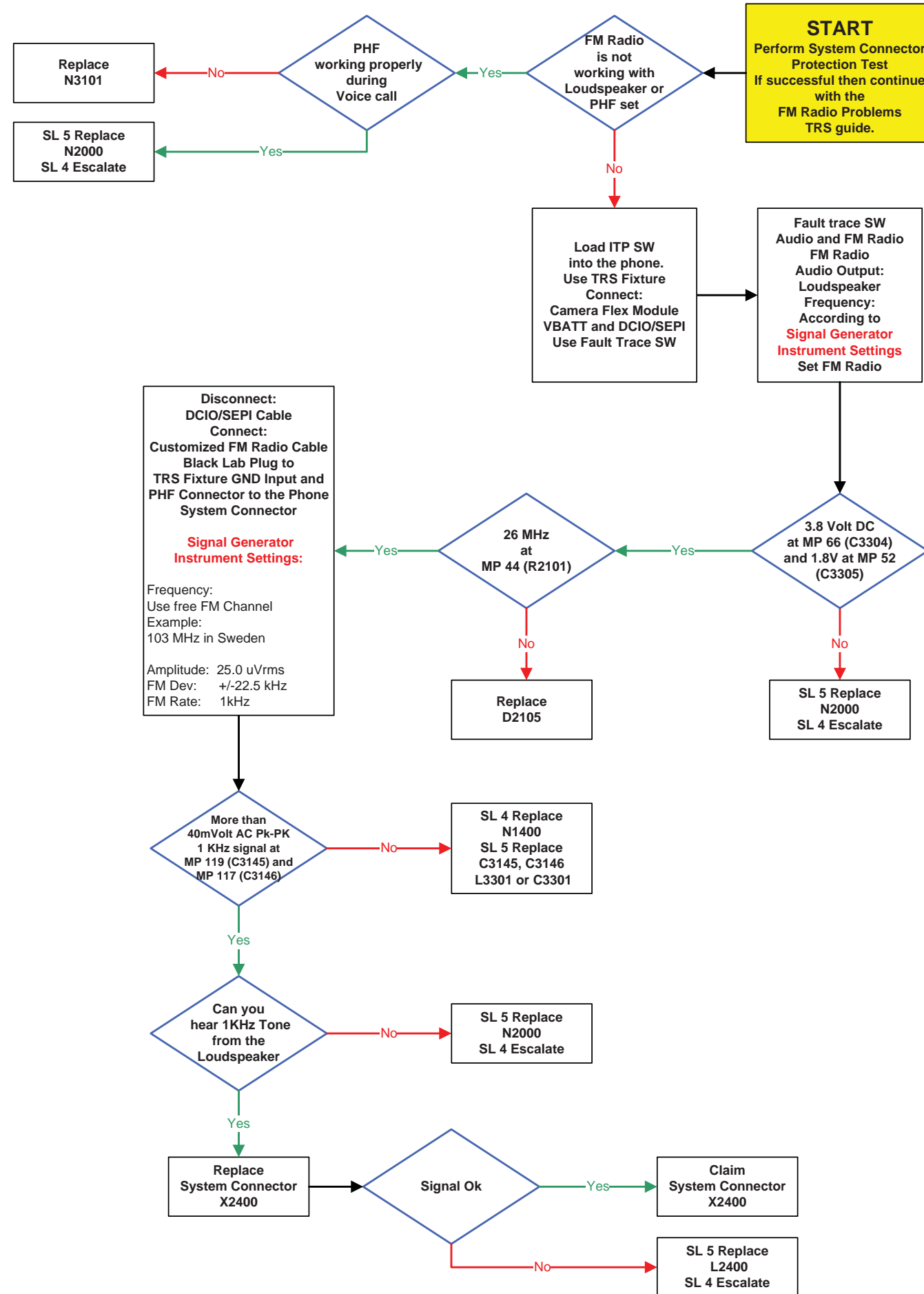
### Audio Internal Problems



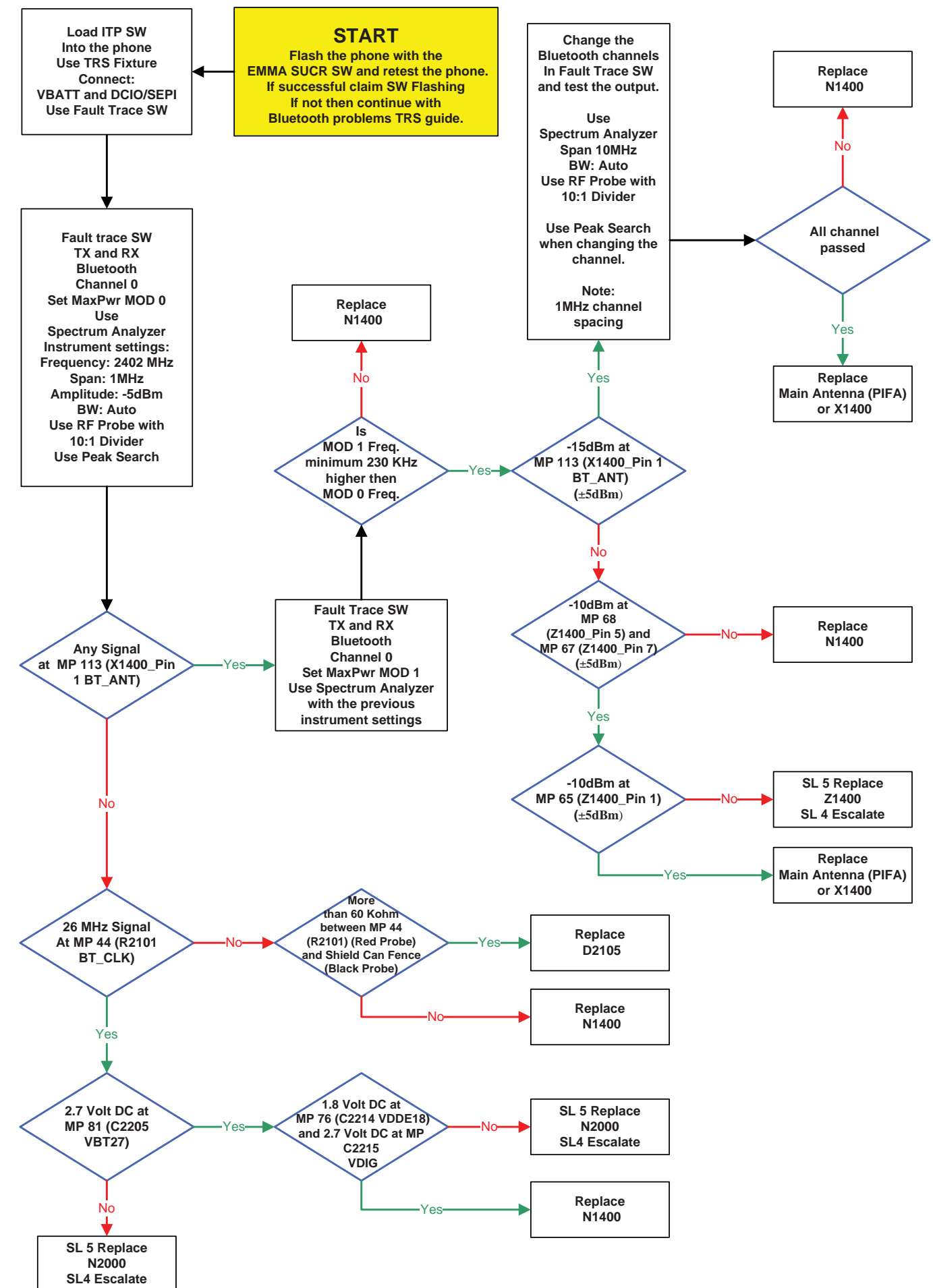
### Audio External Problems



### FM Radio Problems

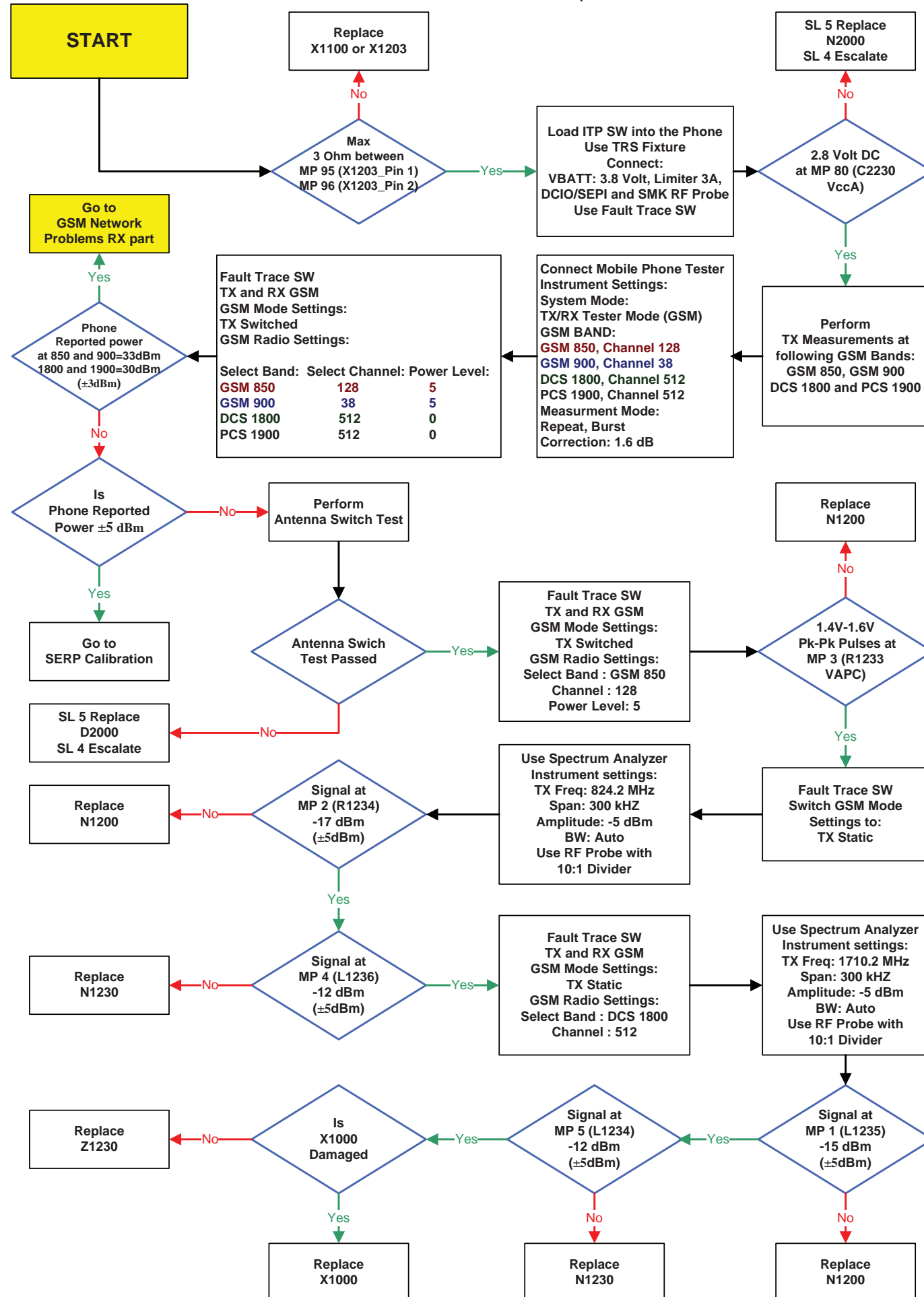


### Bluetooth Problems

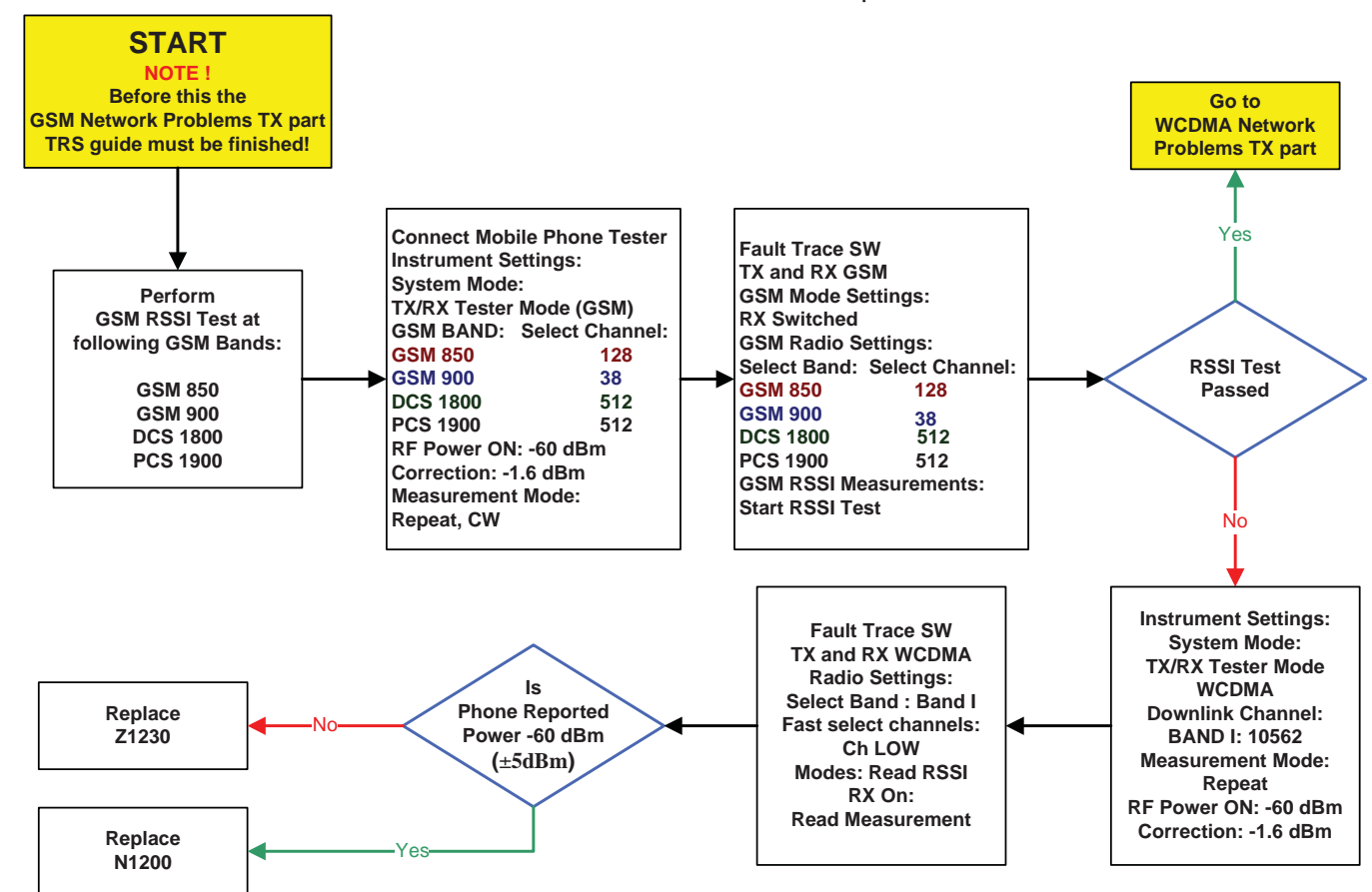




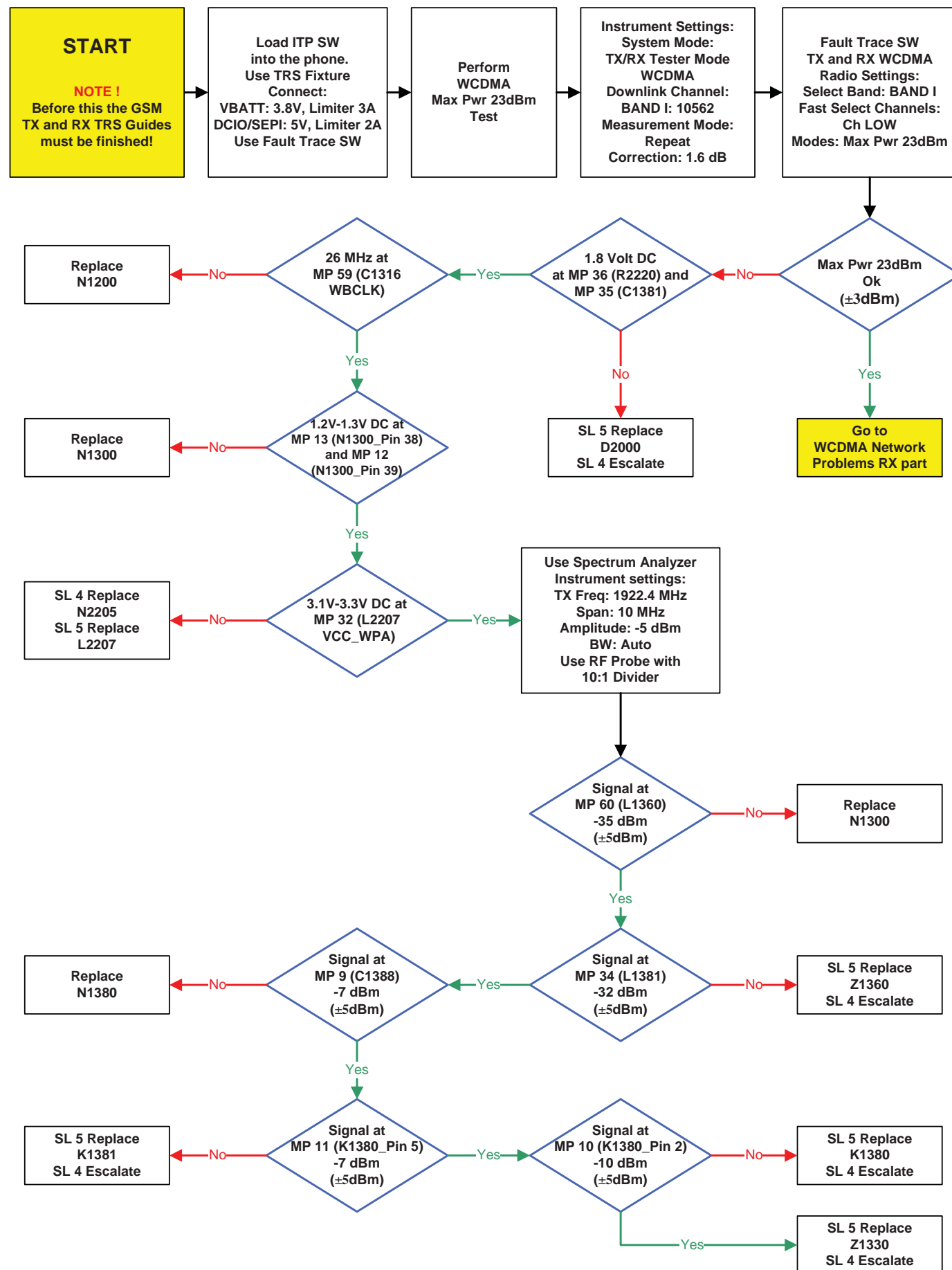
# GSM Network Problems TX part



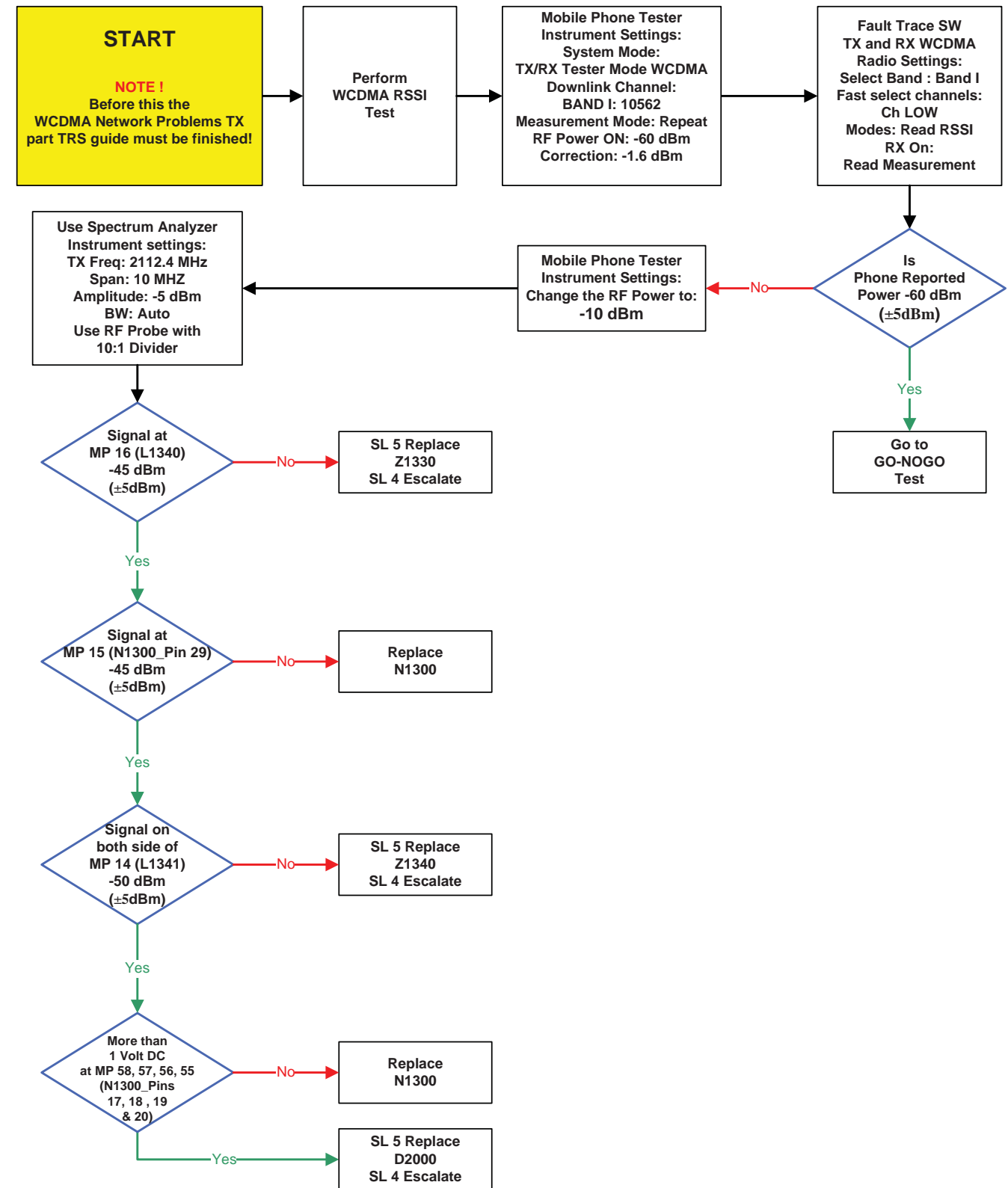
# GSM Network Problems RX part



### WCDMA Network Problems TX part

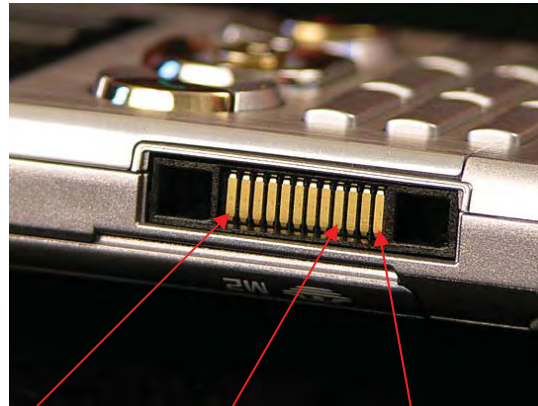


### WCDMA Network Problems RX part



## System Connector Protection Test

Perform Diode and Ohm measurements with a Multimeter  
Connect the black probe to ground (Pin 9 at system connector)



Pin 1 Pin 9(GND) Pin 12

Pin at X2400	Diode Measurements / Volt	Ohm Measurements / Ohm	SL 4 Action	SL 5 Action
1	OL	236K	N2402 if lower than 236KΩ	C2422 if lower than 236KΩ
2	0.0	0.0	X2400 If more than 0 Ohm	PBA If more than 0 Ohm
3	OL	8K	X2400 if higher than 8KΩ N3101 if lower or higher than 8KΩ. L2401/L2407 if higher than 8KΩ.	No Action
4	1.0	1K	X2400 if higher than 1KΩ N3101 if lower or higher than 1KΩ. L2402/L2408 if higher than 1KΩ.	No Action
5	OL	2.2K	X2400 if higher than 2.2KΩ N3101 if lower than 2.2KΩ. L2403 if higher than 2.2KΩ	C2416 if lower than 2.2KΩ
6	OL	2.2K	X2400 if higher than 2.2KΩ N3101 if lower than 2.2KΩ. L2404 if higher than 2.2KΩ	C2415 if lower than 2.2KΩ
7	OL	OL	Not connected	Not connected
8	OL	1.5K	X2400 if higher than 1.5KΩ V2420 if lower than 1.5KΩ	R2440 and R2436 if higher than 1.5KΩ
9	0	0	No Action (GND)	No Action (GND)
10	0.7	Minimum 30K	N2424 If lower than 30KΩ D2400 If lower than 30KΩ X2400 if higher than 30KΩ	Z2400 if higher than 30KΩ
11	0.7	Minimum 30K	N2424 If lower than 30KΩ D2400 If lower than 30KΩ X2400 if higher than 30KΩ	Z2400 if higher than 30KΩ
12	OL	80K	V2202 if lower than 80KΩ	C2423, C2424 or N2000 if lower than 80KΩ

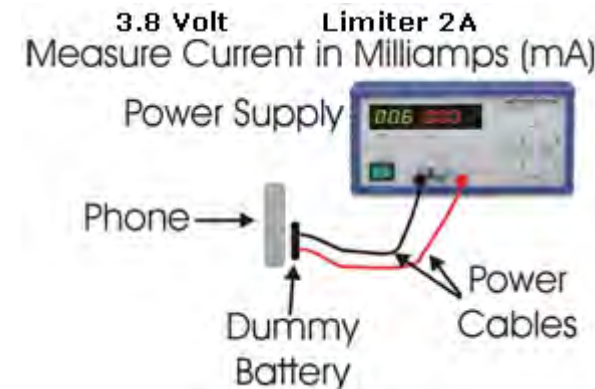
## Current Consumption Test

### Step 1:

Insert Local SIM Card and use the phone with the Normal SW (SSW) and dummy battery connected to Power Supply Channel 1 VBATT according to Picture 1.  
Instrument settings: Voltage: 3.8 Volt, Limiter 3A.

Measure the current when Phone is off. Check the current consumption at Power Supply Channel 1 VBATT.

Picture 1



Current consumption in off mode should be less than 1mA.  
If more than 1mA go to **Dead Phone problems part 1 TRS guide**.

### Step 2:

Start the phone:

Measure the deep sleep current max 6mA typical between **0-3mA**.  
Make sure that the operator is running with deep sleep. (This operation can be switched off by operator if the network is busy).

If phone using more than 6mA, then go to EMMA III and perform:  
**Software Update Contents Refresh (SUCR)**.

### Step 3 with Mobile Phone Tester Instrument

Insert Test SIM Card and use the phone with the Normal SW (SSW) and dummy battery connected to Power Supply Channel 1 VBATT according to Picture 1.  
Instrument settings: Voltage: 3.8 Volt, Limiter 3A.

Use Mobile Phone Tester Instrument in signalling mode direct connected to the phone with RF Connector or use Shield Box if not possible. **Phone Display** must be **on** during these tests to get correct current measurements.

Perform Radio TX measurements at GSM and WCDMA Band by making the phone call from the UE into the Mobile Phone Test Instrument (NW) and compare current consumption result with the test limits below.

### GSM 850, 900, 1800, 1900

- Transmitter current **850 MHz** at Ch: 128 power level 5. Typical **350mA**
- Transmitter current **900 MHz** at Ch: 1 power level 5. Typical **350mA**
- Transmitter current **1800 MHz** at Ch: 512 power level 0. Typical **300mA**
- Transmitter current **1900 MHz** at Ch: 512 power level 0. Typical **300mA**

\*Tolerance: ±20%



WCDMA BAND I

- Transmitter current **WCDMA BAND I** Low RX Ch: 10562 at 23dBm output power **Max 800mA**

If current consumption is not correct, the fault could be fixed by running SERP calibration if not then go to **GSM and WCDMA Network problems TRS guides**.  
If the current consumptions are equal to test limits then go to **Charging Test**.

Step 4 with Fault Trace SW application:

- Flash the phone with ITP SW
- Use TRS Fixture
- \_ Connect the:

**Power Supply Channel 1 VBATT:**  
Instrument settings: Voltage: 3.8 Volt, Limiter 3A

**Power Supply Channel 2 DCIO/SEPI**  
Instrument settings: Voltage: 5 Volt, Limiter 2A

-Connect DCIO/SEPI Cable to the phone

Perform the following tests:

- Max TX Power GSM 850 MHz

Fault Trace SW settings:

TX and RX GSM  
GSM Mode Settings:  
TX Switched  
GSM Radio Settings:  
Select Band: GSM 850  
Channel: 128  
Power Level: 5

- Max TX Power GSM 900 MHz

Fault Trace SW settings:

TX and RX GSM  
GSM Mode Settings:  
TX Switched  
GSM Radio Settings:  
Select Band: GSM 900  
Channel: 1  
Power Level: 5

- Max TX Power DCS 1800 MHz

Fault Trace SW settings:

TX and RX GSM  
GSM Mode Settings:  
TX Switched  
GSM Radio Settings:  
Select Band: DCS 1800  
Channel: 512  
Power Level: 0

- Max TX Power PCS 1900 MHz

Fault Trace SW settings:

TX and RX GSM  
GSM Mode Settings:  
TX Switched  
GSM Radio Settings:  
Select Band: PCS 1900  
Channel: 512  
Power Level: 0

- Max TX Power WCDMA BAND I

Fault Trace SW settings:

TX and RX WCDMA  
Radio Settings:  
Select Band: BAND I  
Fast Select Channels: Ch LOW  
Modes: Max Pwr 23dBm

Compare current consumption during Max TX Power Tests with the current consumption limits below.

Transmitter current **850 MHz** at Ch: 128, Power level 5. Typical **240mA**  
Transmitter current **900 MHz** at Ch: 1, Power level 5. Typical **300mA**  
Transmitter current **1800 MHz** at Ch: 512, Power level 0. Typical **200mA**  
Transmitter current **1900 MHz** at Ch: 512, Power level 0. Typical **280mA**  
Transmitter current in **WCDMA BAND I** at RX Ch Low: 10562, Max power level 23 dBm and RX On. Typical **600mA**

**Tolerance: ±10%**

If current consumption is not correct, the fault could be fixed by running SERP calibration if not then go to **GSM and WCDMA Network problems TRS guides**.

If the current consumptions are equal to the sheet then go to **Charging Test**.

## Battery and Current Calibration Test

### Use Phone with the ITP SW

#### Instrument settings for the Battery Calibration Test

##### Power Supply Channel 1 VBATT:

X Volt according to the Fault Trace SW Test Instructions:

Fault Trace SW-Logic-Phone Power-Battery Calibration and follow test instructions.

Limiter: 2A.

##### Power Supply Channel 2 DCIO/SEPI:

5.0 Volt

Limiter: 2A

If test is performed at the Core Level then use dummy battery according to the Equipment List for this test. If using TRS Fixture no dummy battery is needed.

**Note:** Maximal cable length between Power Supply Channel 1 VBATT and the dummy battery or TRS Fixture must be 1m. The cable must have a capacity for at least 16A.

Limits Table for the Battery Calibration Test

Voltage Level on VBATT	Min	Max	UNIT
3.2 Volt	250	350	mV
3.2 Volt	FA	15E	HEX
4.1 Volt	800	900	mV
4.1 Volt	320	384	HEX

#### Instrument settings for the Current Calibration Test

If test is performed at the Core Level then use dummy battery according to the Equipment List for this test. If using TRS Fixture no dummy battery is needed.

**Note:** The Power Supply Channel 1 VBATT must allow reverse current.

**Note:** Maximal cable length between Power Supply Channel 1 VBATT and the dummy battery or TRS Fixture must be 1m. The cable must have a capacity for at least 16A.

**Note:** Length of the Power Supply Channel 2 DCIO/SEPI customized cable must be exact 1,3m.

##### Power Supply Channel 1 VBATT:

3.8 Volt

Limiter 2A

##### Power Supply Channel 2 DCIO/SEPI:

5.0 Volt

Limiter: 2A

Use dummy battery according to the Equipment List for this test.

Limits Table for the Current Calibration Test

Measured Current	Name	Min	Max	Unit
100mA	DCIO Current	50	150	mA
800mA	DCIO Current	725	875	mA

## Backup Capacitor Test

To perform this test use:

- Phone with the ITP SW
- Power Supply Channel 1 VBATT: Instrument settings: Voltage: 3.8V, Limiter: 2A
- Power Supply Channel 2 DCIO/SEPI: Instrument settings Voltage: 5V, Limiter: 2A

This test should be performed in 3 steps:

#### Step1:

Measure the voltage at the Back up capacitor by using **Fault Trace SW- Logic - ADC Values – Read ADC Value** (Reading 1).

#### Step2:

This step should be done **30 seconds** after Step 1. Measure the voltage at the Backup capacitor by using **Fault Trace SW - Logic – ADC Values - ADC Channels – Read ADC Value** (Reading 2).

#### Step3:

Compare the difference between Reading 1 and Reading 2 with the reference table below. If the Reading 1 value is between 50 and 680 go to Interval 1, if between 681 and 800 go to Interval 2, if between 801 and 880 go to Interval 3 and compare with the Reading 2 – Reading 1 Min and Max Limits.

#### Reference Table:

	Min	Max	Unit
Absolute readout Reading 1	50	880	Dec

Reading 1 (Dec)	Reading 2 – Reading 1 (Dec)	
	Min	Max
Interval 1 (50 – 680)	20	210
Interval 2 (681 – 800)	5	30
Interval 3 (801 – 880)	0	10

**Note:** The upper table contains the absolute limits for the readouts. The lower table contains the allowed delta between the first and the second readout, separated in time with 30 seconds. If the readings is out of limits replace **SIM/M2 Flex Module**.

**If problem is not solved then SL 5 Replace N2000 SL 4 Escalate.**

## Charging Test

To perform this test use:

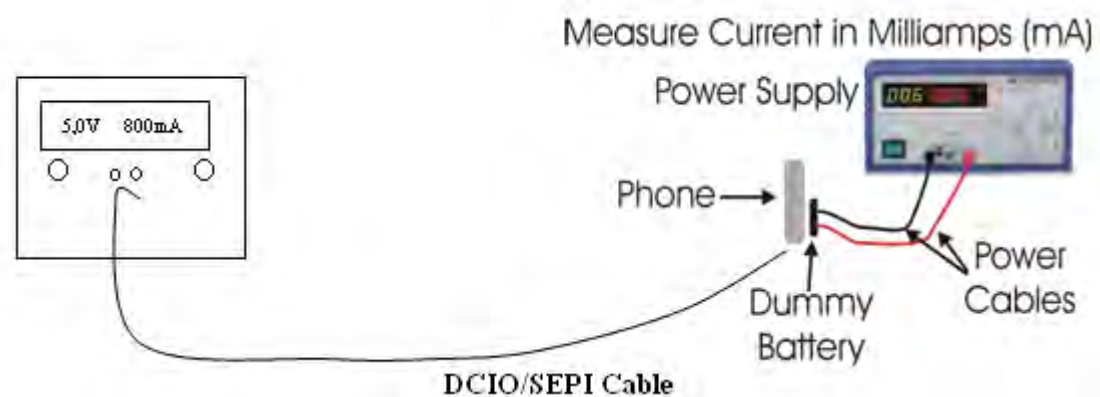
- Phone with the Normal SW (SSW)
- Dummy Battery connected to Power Supply Channel 1 VBATT
- Power Supply Channel 1 VBATT instrument settings:  
Voltage: 3.0 to 4.2 Volts, according to VBATT row in the Reference Table.  
Limiter: 2A
- Power Supply Channel 2 DCIO/SEPI instrument settings:  
Voltage: 5V  
Limiter: 2A

Test instructions:

- Disconnect the DCIO/SEPI Cable between each measurement and wait for phone to shutdown before changing VBATT voltage.
- Take a note of Current measurements at Power Supply Channel 2 DCIO/SEPI and Display charging indicator status, X seconds after DCIO/SEPI cable has been inserted according to Test Time row in the reference table below.
- Compare test results with reference table below, tolerance +/-20%.

Reference Table

VBATT x Volt	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2
Test Time x sec.	15s	15s	25s	25s	25s	25s	50s	50s	45s	25s	25s	25s	45s
DCIO/SEPI Current mA	250	250	500	500	500	500	900	900	900	800	700	500	0
Display indicate charging	Nothing	Nothing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Fully Charged



**Power Supply Channel 1 VBATT must allow reverse current.**

If the charging current is **Not** equal to the reference table go to **Charging problems** TRS Guide.

If the charging current is equal to reference table then insert the normal battery and test the charging current to define if the phone battery is working properly.

Measure the voltage at the battery to define the current level.

If the battery is receiving the right current, then the phone and the battery are working properly.

## ASIC Revision Test

### Note:

*The Keypad Scan Test must be disabled in Fault Trace SW when performing this test.*

Purpose with this test is to check following items:

- that ASIC-s Revision State is correct
- Check if communication to and from the ASIC-s is Ok

The tested ASIC-s is:

- D2000 (Anja)
- N2000 (Vera)
- N1400 (Bluetooth and FM Radio ASIC)
- N1200 (Gimli)

To perform this test use:

- Phone with the ITP SW
- TRS Fixture (On PBA Level)
- Dummy Battery (When TRS Fixture is not used)
- Power Supply Channel 1 VBATT (Voltage: 3.8V, Limiter: 2A)
- Power supply Channel 2 DCIO/SEPI (Voltage: 5V, Limiter: 2A)
- Fault Trace SW: **General – ASIC Revisions – Read All**

Reference return value can be found in the table below.

ASIC	Description	Part number	Return value (hex)
<b>D2000</b>	CPU (Anja)	1200-0186	0xC9
<b>N2000</b>	Power Management (Vera)	1000-8142	0xC7
<b>N1400</b>	Bluetooth Firmware Revision Chip ID	1200-6182	0x5,0x1  0x0,0x0,0x0,0x0  Will always return 0 on STLC because Chip ID is not supported.
<b>N1400</b>	FM Radio	1200-6182	0x800
<b>N1200</b>	GSM Transceiver (Gimli) Revision R1A: Revision R1B:	100-8134	0x7 0x8

Antenna Switch Test

The purpose of this test is to check antenna switch functionality controlled by CPU (Central Processing Unit)

To perform this test use:

- Phone with the ITP SW
- TRS Fixture
- Fault Trace SW
  - SW Settings: According to Fault Trace SW Settings Instructions
- Power Supply Channel 1 VBATT
  - Instrument settings: 3.8 Volt, Limiter 3 A
- Power Supply Channel 2 DCIO/SEPI
  - Instrument settings: 5.0 Volt, Limiter 2 A
- DMM (Digital Multi Meter).

Test Instructions:

Use Fault Trace SW to switch between GSM 850, DCS 1800 and WCDMA BAND I.  
Use DMM and measure voltage at MP 6 (C1240), MP 7 (C1241) and MP 8 (C1242).  
Compare the result with Antenna Switch Reference Table.

**Note:** 1.8 Volt = H (High) and 0.0 Volt = L (Low)

Fault Trace SW Settings Instructions:

**Note:** All bands below must be tested!

GSM 850:

Fault Trace SW  
Tx and Rx  
GSM  
Gsm Mode Settings: TX Static  
Gsm Radio Settings  
Select Band: GSM 850  
Select Channel: 128

DCS 1800:

Fault Trace SW  
Tx and Rx  
GSM  
Radio Settings: TX Static  
Gsm Radio Settings  
Select Band: DCS 1800  
Select Channel: 512

WCDMA BAND I:

Fault Trace SW  
Tx and Rx  
WCDMA  
Select Band: BAND I  
Select TX Channel: 9612  
Modes: Max Pwr 23dBm

Antenna Switch Reference Table:

BAND	MP C1240	MP C1241	MP C1242
GSM 850	H	L	H
DCS 1800	H	H	L
WCDMA BAND I	H	L	L

If all Bands passed Antenna Switch Test then continue with GSM Network Problems  
TX part TRS guide, if not SL 5 Replace D2000 SL 4 Escalate.



Voltages to N2000

MP	Shield Can Fence (78)	MP TP2200 (85)	MP TP2202 (72)	
	PBA GND	VBATi	BDA	
Phone Off	0.00V	3.8V	0.00V	Power sup 3.80 V
Phone On	0.00V	3.8V	0.00V	Power sup 3.80 V

Voltages from N2000

MP	MP C2209 (115)	MP C2216 (79)	MP R1261 (21)	MP C2205 (81)	MP C2215 (116)	
	VAUDIO26	VANA25	VDDE18	VBT27	VDIG	
	0.00V	0.00V	0.00V	0.00V	0.00V	Power sup 0.00 Volt
Phone Off	0.00V	0.00V	0.00V	0.00V	0.00V	Power sup 3.80 Volt
Phone On	2.6V	2.5V	1.8V	2.7V	2.7V	Power sup 3.80 Volt

Voltages from N2000

MP	MP L2200 (101)	MP R1260 (19)	MP C2218 (74)	
	VCORE12	VccA	VBACKUP	
	0.00V	0.00V	2.2V	Power sup 0.00 Volt
Phone Off	0.00V	0.00V	2.2V	Power sup 3.80 Volt
Phone On	1.2V	2.8V	2.2V	Power sup 3.80 Volt
				C100 Completely charged and SIM/M2 Reader Connected to the PBA

Clocks from N2000

MP	MP R2199 (73)	
	RTCCLK	
Phone Off	0Hz	Power sup 3.80 Volt
Phone On	32.768kHz	Power sup 3.80 Volt

VCORE18 from N2202

MP	MP C2239 (82)	
	VCORE18	
Phone Off	0.00V	Power sup 0.00 Volt
Phone On	1.8V	Power sup 3.80 Volt

WCDMA

Use Fault Trace SW to activate and deactivate WCDMA Radio

MP	MP L2207 (32)	MP N1300_Pin 39 (12)	MP N1300_Pin 38 (13)	MP R2220(36)	MP C2230 (80)	MP C1316 (59)
	VCC_WPA	WPAVcc	WPABIAS	DCDC_EN	VccA	26 MHz WBCLK
WCDMA Radio Off	0.00V	0.00V	0.00V	0.00V	2.8V	0 Hz
WCDMA Radio On	3.2V	1.3V	1.3V	1.8V	2.8V	26 MHz

FM Radio N1400

Use Fault Trace SW to activate and deactivate FM Radio

MP	MP C3304 (66)	MP C1408	MP R2101 (44)
	VBATi	VDDE18	BT_CLK
FM Radio Off	3.8V	1.8V	26MHz
FM Radio On	3.8V	1.8V	26MHz

Bluetooth N1400

Use Fault Trace SW to activate and deactivate Bluetooth

MP	MP C2205 (81)	MP C3305 (52)	MP C2215 (116)	MP R2101 (44)
	VBT27	VDDE18	VDIG	BT_CLK
Bluetooth Off	2.7V	1.8V	1.8V	26MHz
Bluetooth On	2.7V	1.8V	1.8V	26MHz

Main Camera

Use Fault Trace SW to activate and deactivate Main Camera. Camera Flex Module and Display must be connected to the PBA

MP	MP R2281 (40)	MP C4330 (43)	MP C2287 (38)	MP C2283 (45)	MP C2284 (39)	MP C4329 (48)	MP C4313 (46)
	CAM_LDO_EN	CI_RESn	VCAMCORE_18	VCAM_28	VCAM_18	CAMSYSCLK	CI_PCLK
Main Camera Off	0.00V	0.00V	0.00V	0.00V	0.00V	0Hz	0Hz
Main Camera On	1.8V	1.8V	1.9V	2.8V	1.8V	13MHz	26MHz

VGA Camera

Use Fault Trace SW to activate and deactivate VGA Camera. Camera Flex Module and Display must be connected to the PBA

MP	MP R2281 (40)	MP C4330 (43)	MP C2287 (38)	MP C2283 (45)	MP C2284 (39)	MP C4329 (48)	MP C4313 (46)
	CAM_LDO_EN	CI_RESn	VCAMCORE_18	VCAM_28	VCAM_18	CAMSYSCLK	CI_PCLK
VGA Camera Off	0.00V	0.00V	0.00V	0.00V	0.00V	0Hz	0Hz
VGA Camera On	1.8V	1.8V	1.9V	2.8V	1.8V	13MHz	4.8MHz

Charging

Charging off 1: DCIO/SEPI not connected.

2: DCIO/SEPI connected. Charging off

Charging 100mA:

Fault Trace SW: Start Current Calibration----> Set VBATT to 3.8

Note: The Current Calibration Test must be repeted if current consumption drop-down lower then 50mA at Power Supply Channel 2 when you performing this measurements.

Use Charging 800mA:

Fault Trace SW: Start Current Calibration-->Set VBATT to 3.8V-->Perform Step1

Note: The Current Calibration Test must be repeted if current consumption drop-down lower then 725mA at Power Supply Channel 2 when you performing this measurements.

MP	MP C2424 (61)	MP C2241 (106)	MP V2202 Pin2 (114)	MP R2201 (111)		
	DCIO	DCIO_INT	CHREG	CHSENSEP	DCIO/SEPI	VBATT
Charging off 1	0.00V	3.6V	3.2V	3.8V	Charger voltage 0.0 Volt	Power sup 3.8 Volt
Charging off 2	5.0V	4.7V	4.7V	3.8V	Charger voltage 5.0 Volt	Power sup 3.8 Volt
Charging 100mA	5.0V	4.8V	3.8V	3.8V	Charger voltage 5.0 Volt	Power sup 3.8 Volt
Charging 800mA	4.5V	4.3V	2.3V	4.2V	Charger voltage 5.0 Volt	Power sup 3.8 Volt

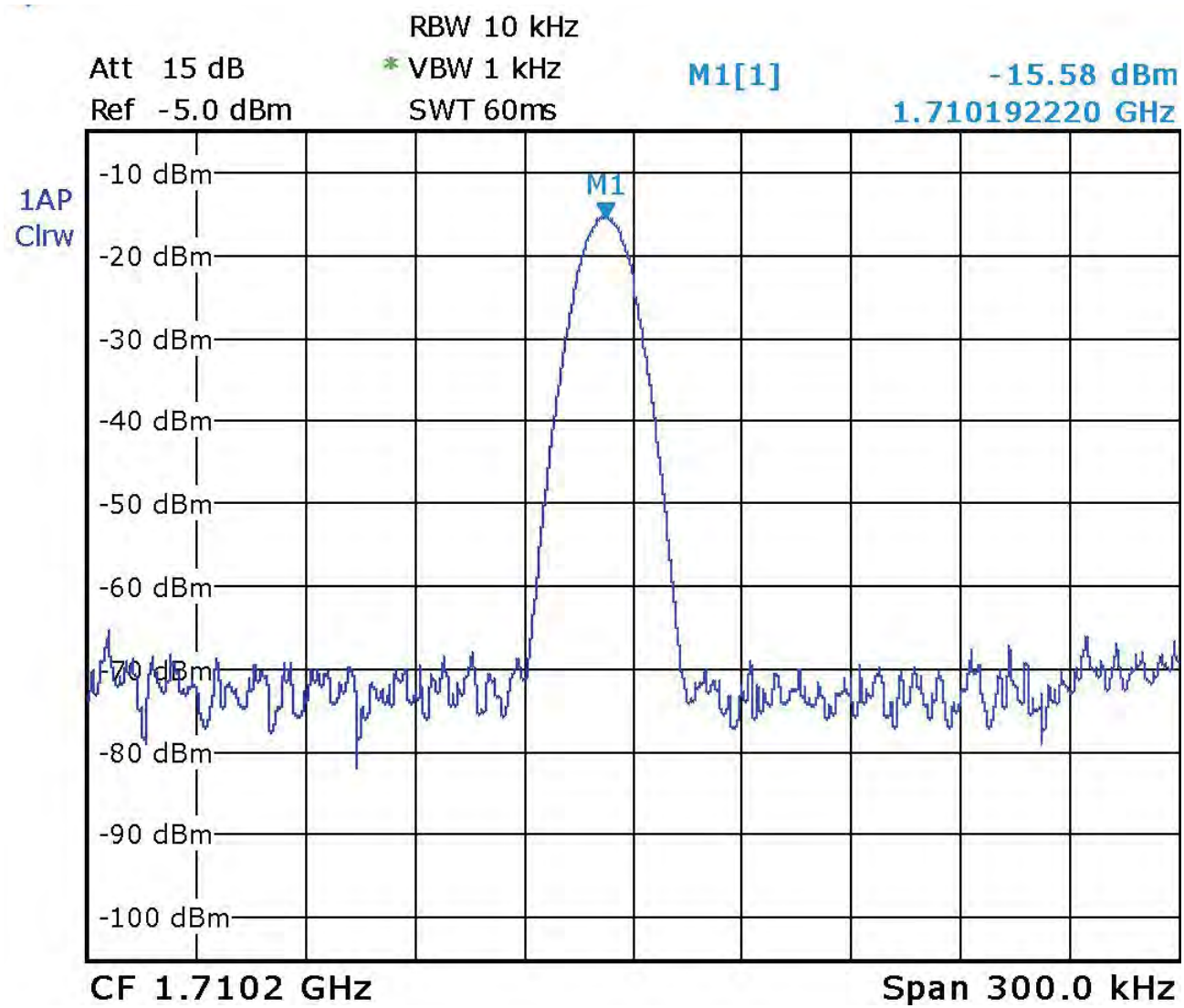
VBUS

USB cable connected to PC

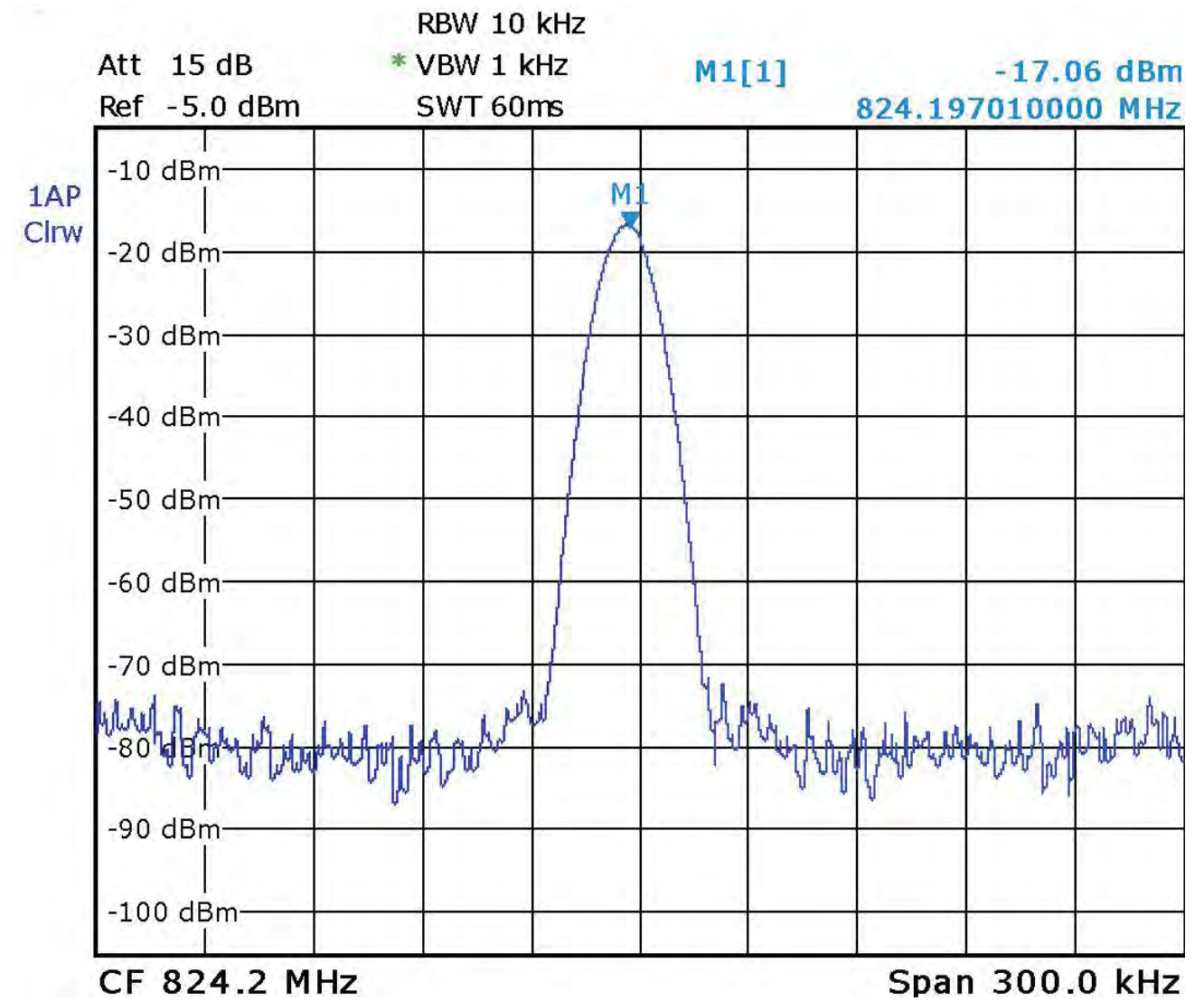
MP	MP R2240 (109)	
	VBUS	
USB Cable disconnected from the phone	0.00V	Power sup 3.80 Volt
USB Cable connected to the phone	5.0V	Power sup 3.80 Volt

MCLK 26MHz from N1200

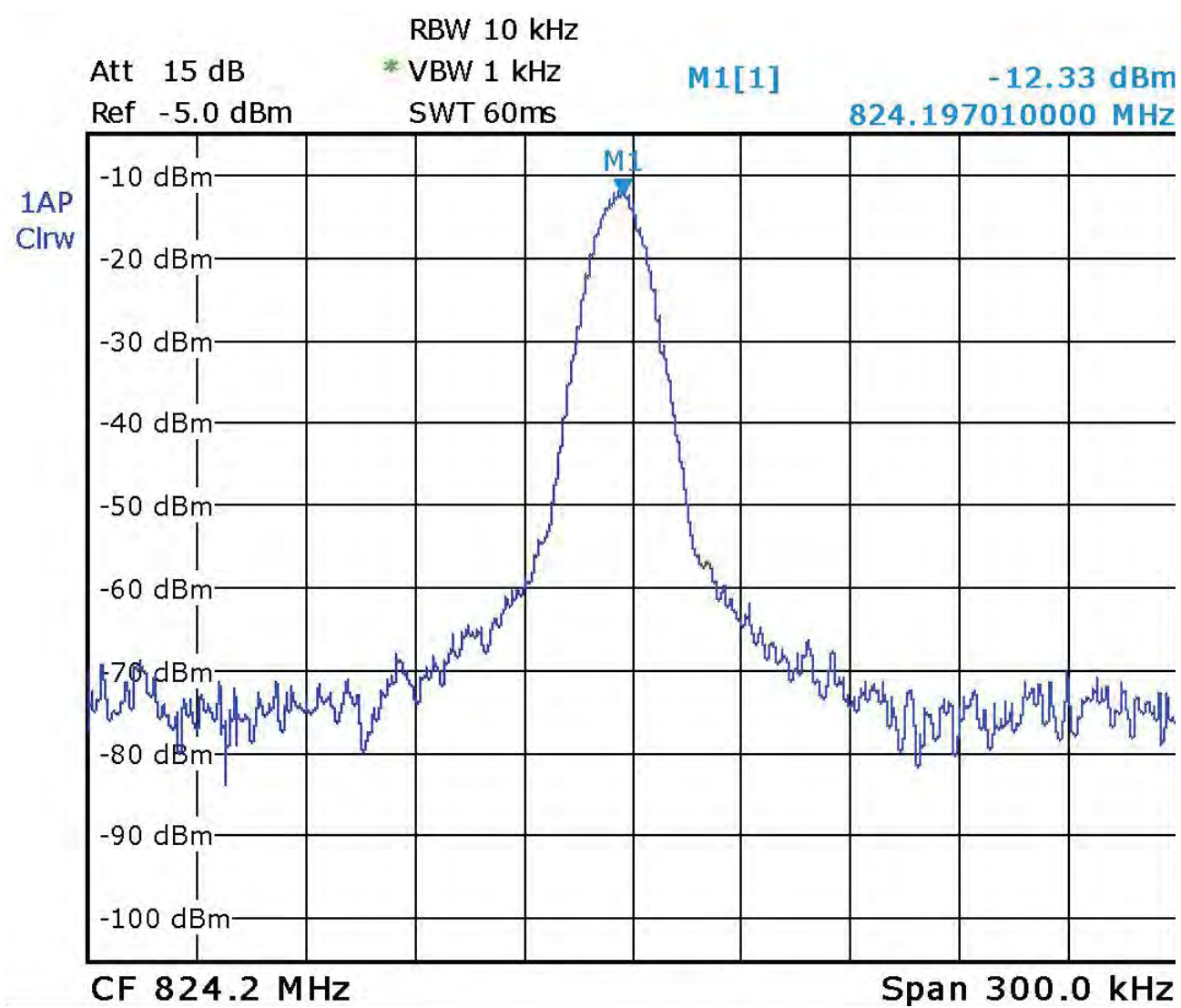
MP	MP R2100 (37)	
	MCLK	
Phone Off	0Hz	Power sup 3.80 Volt
Phone On	26MHz	Power sup 3.80 Volt



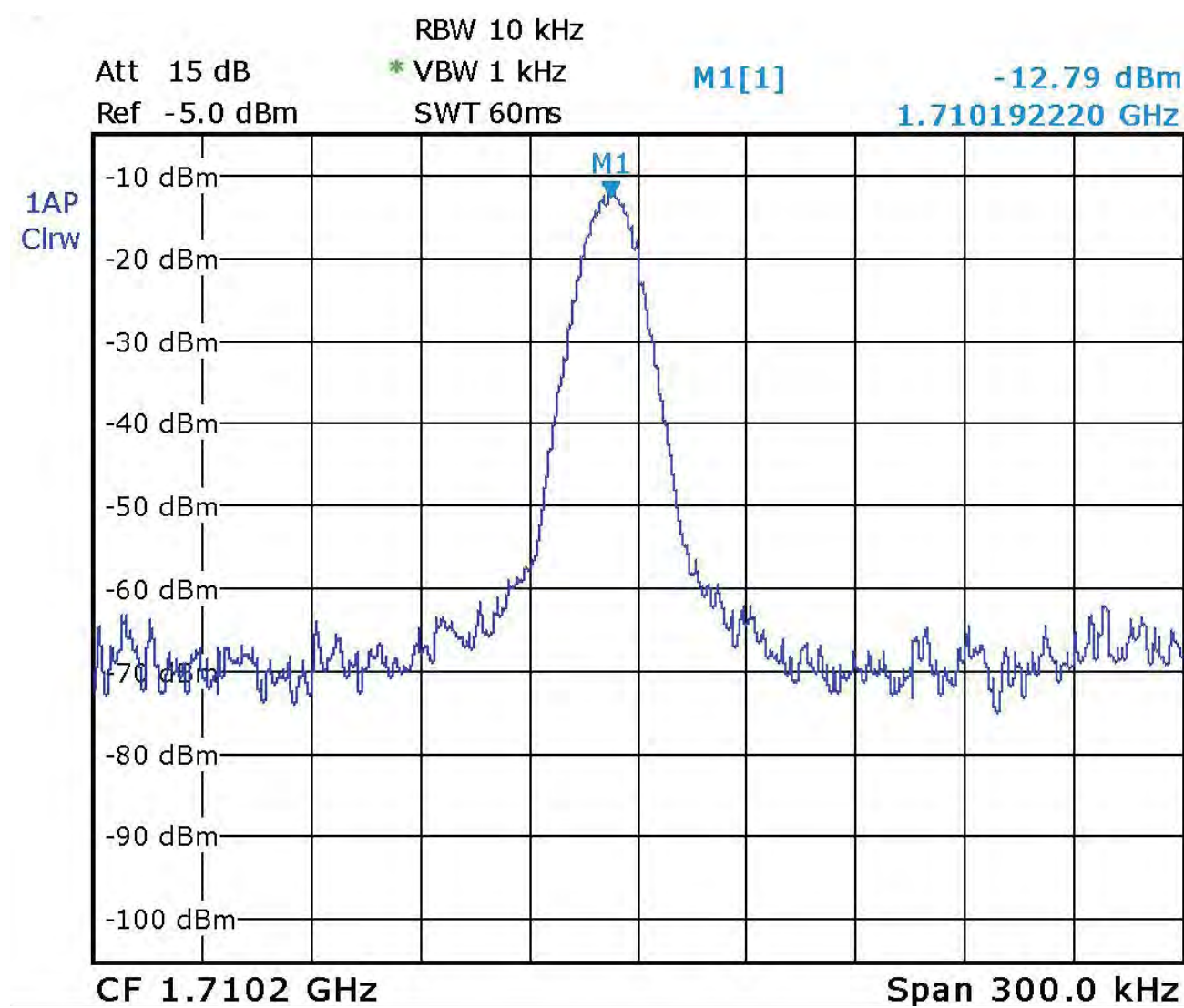
MP 1 (L1235)



MP 2 (R1234)

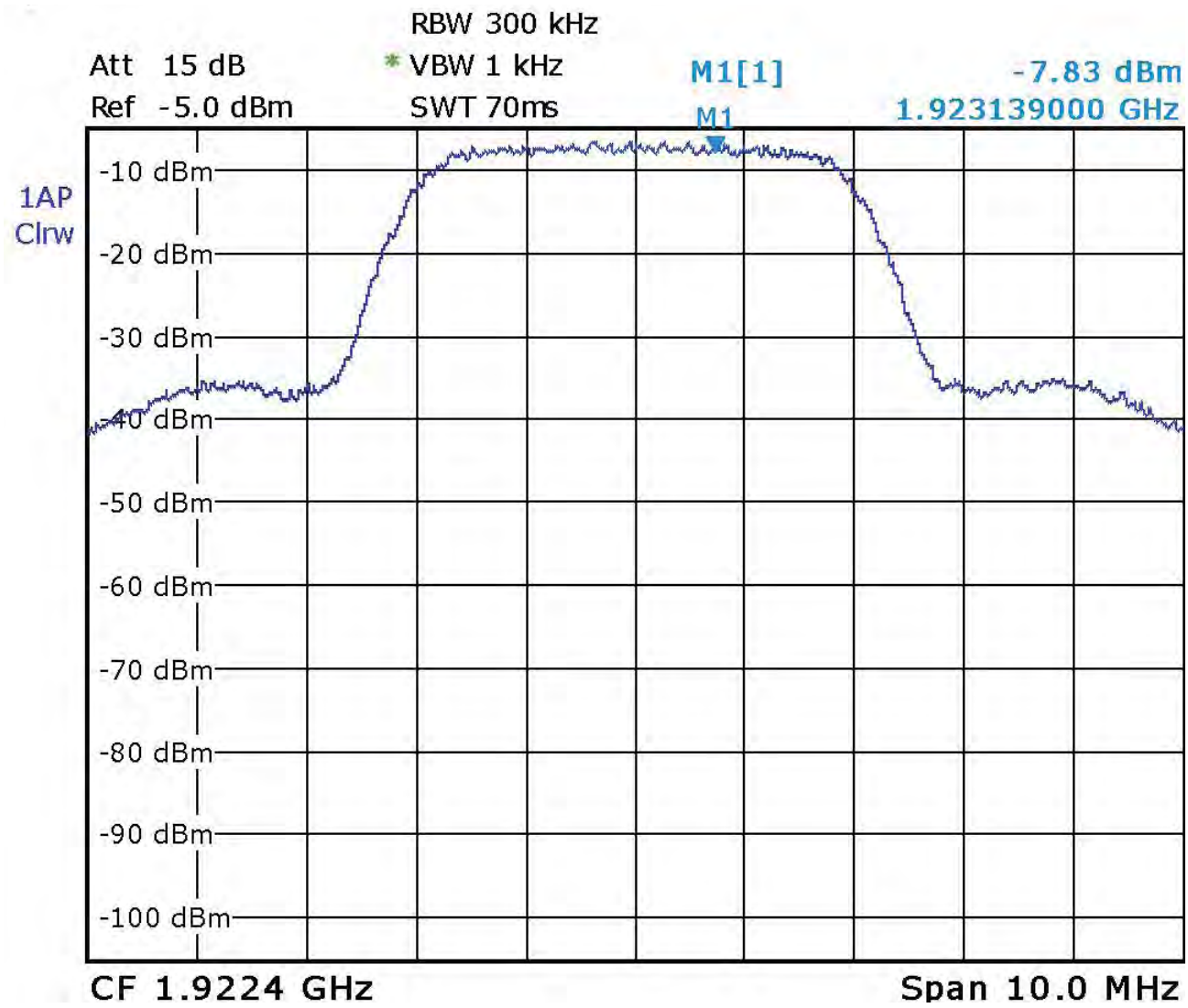


MP 4 (L1236)

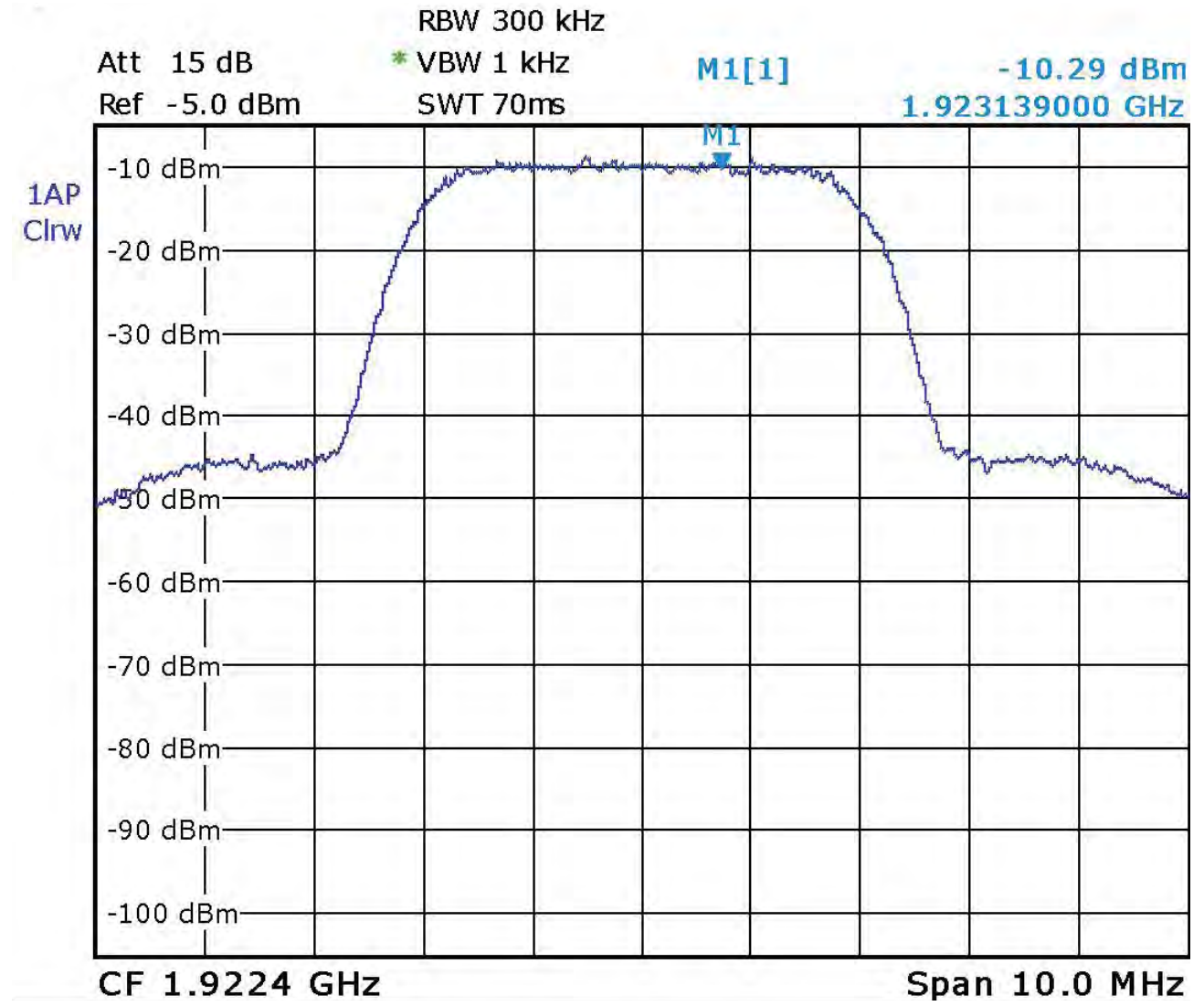


MP 5 (L1234)



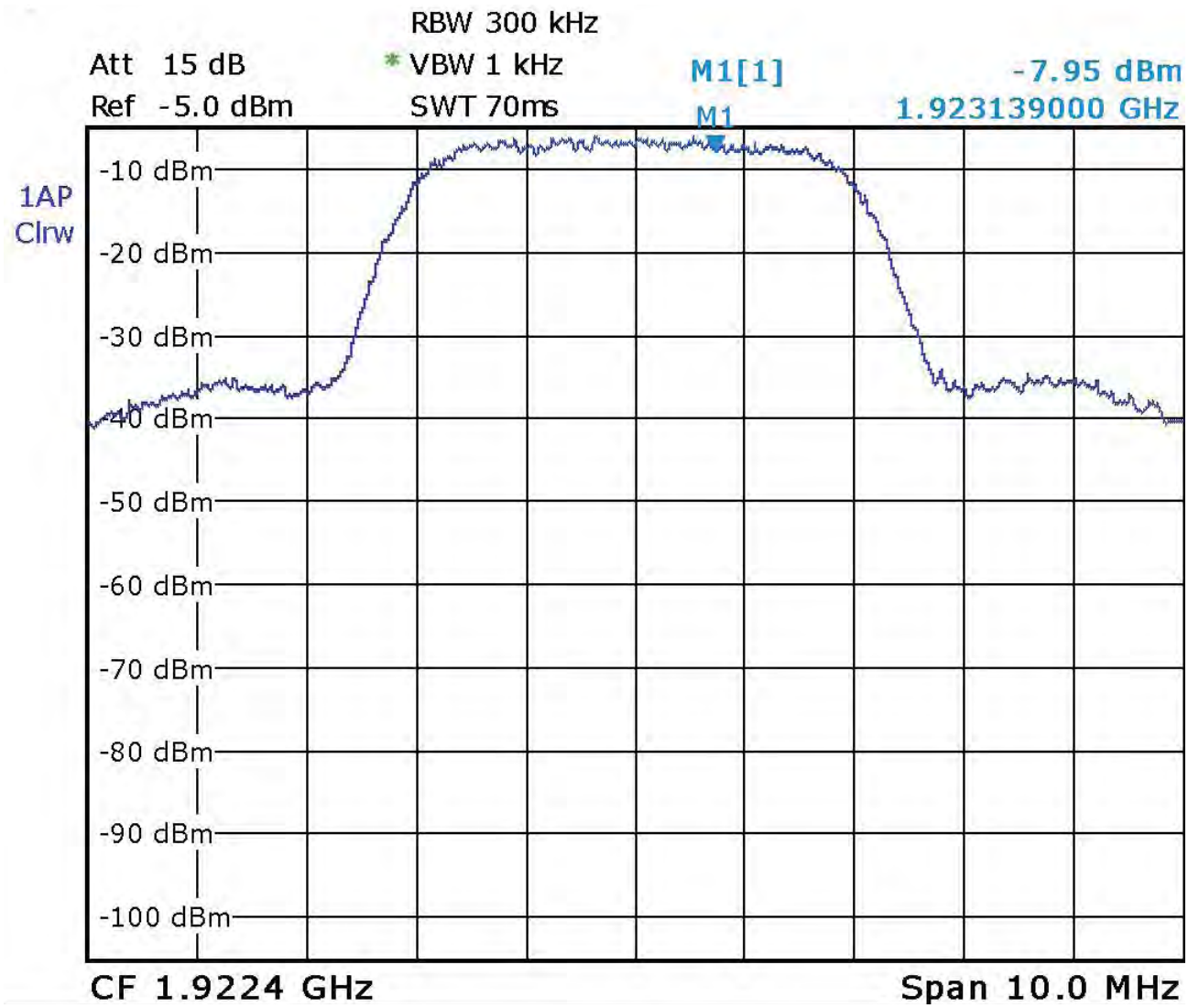


MP 9 (C1388)

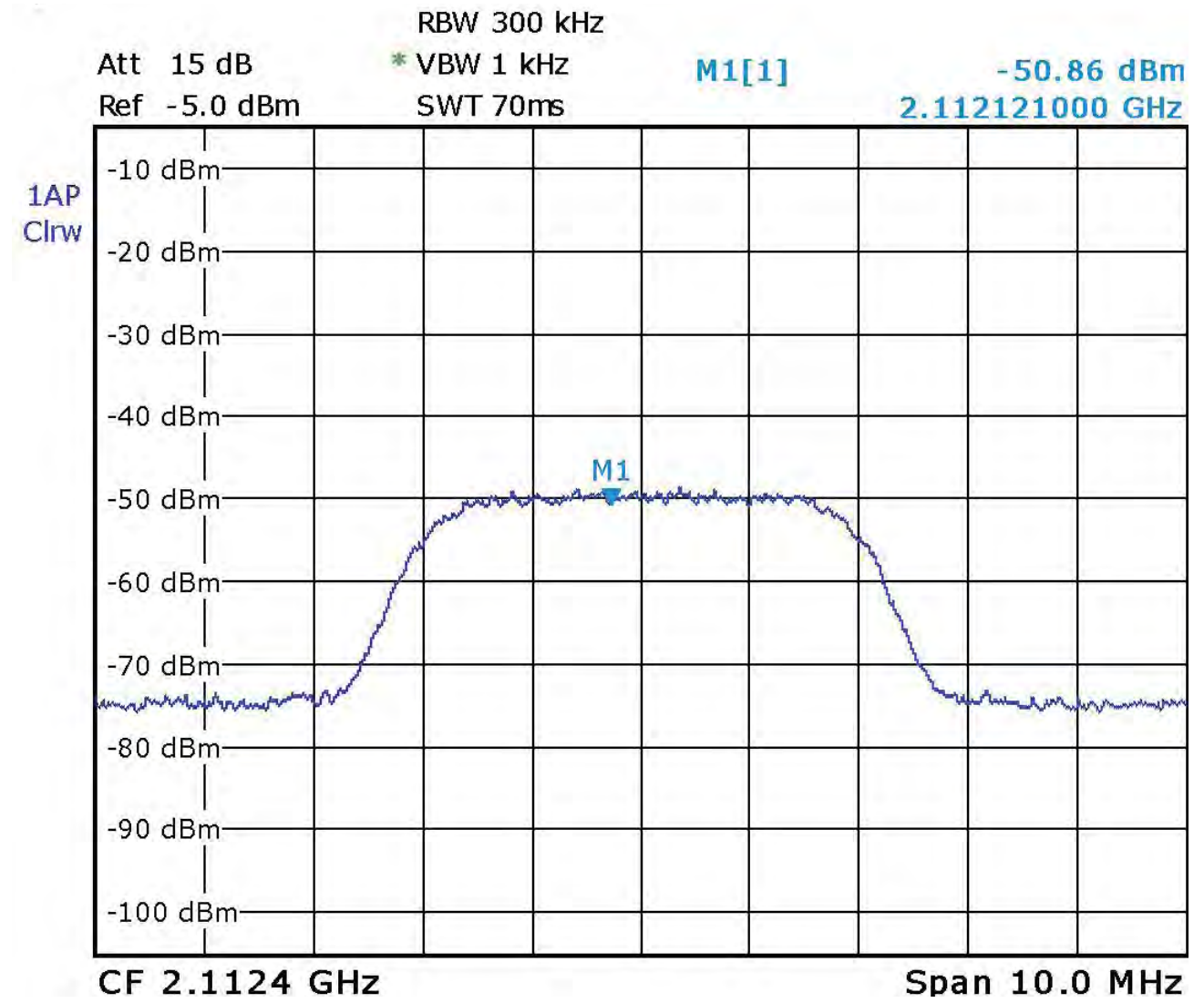


MP 10 (K1380 Pin 2)

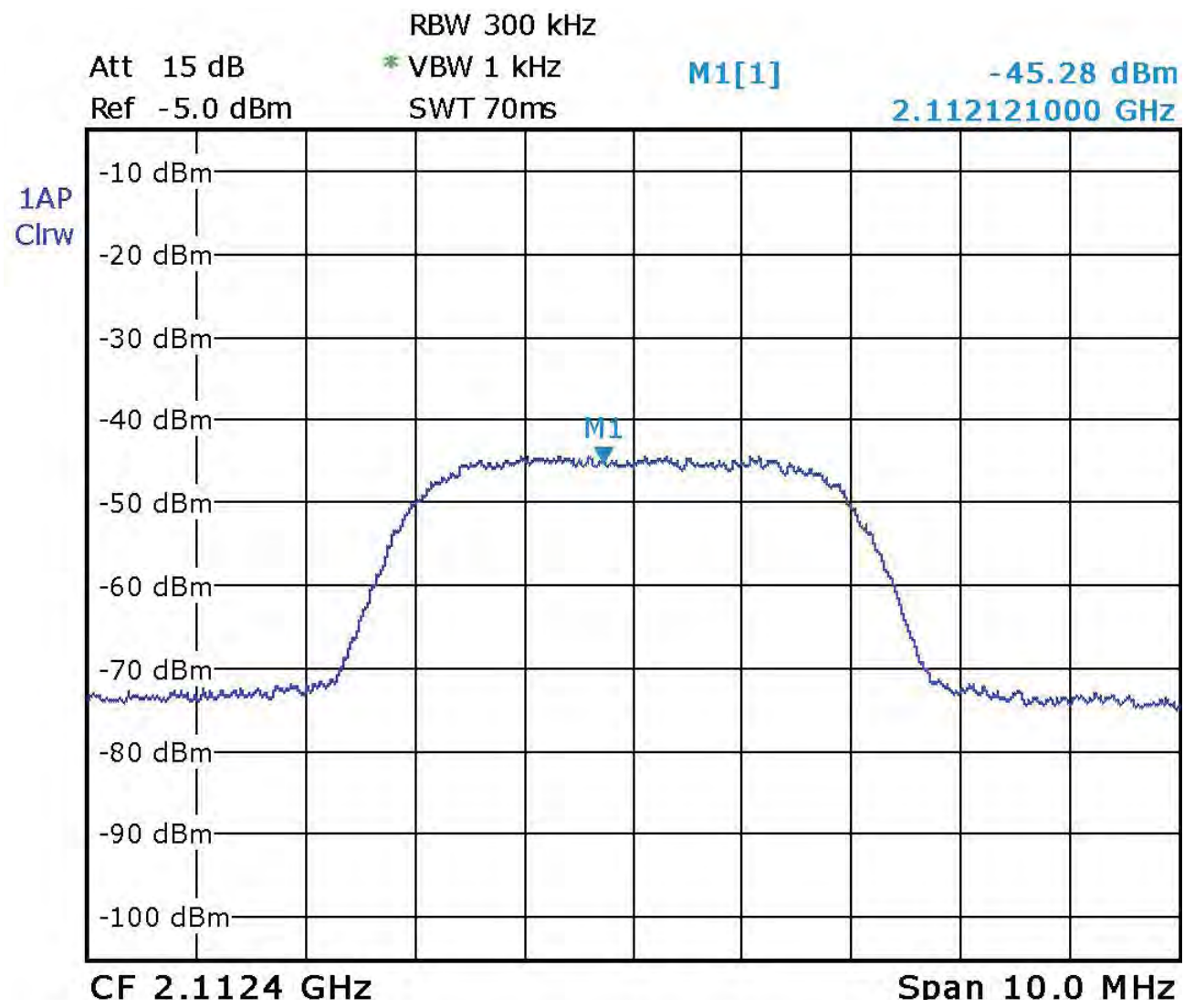




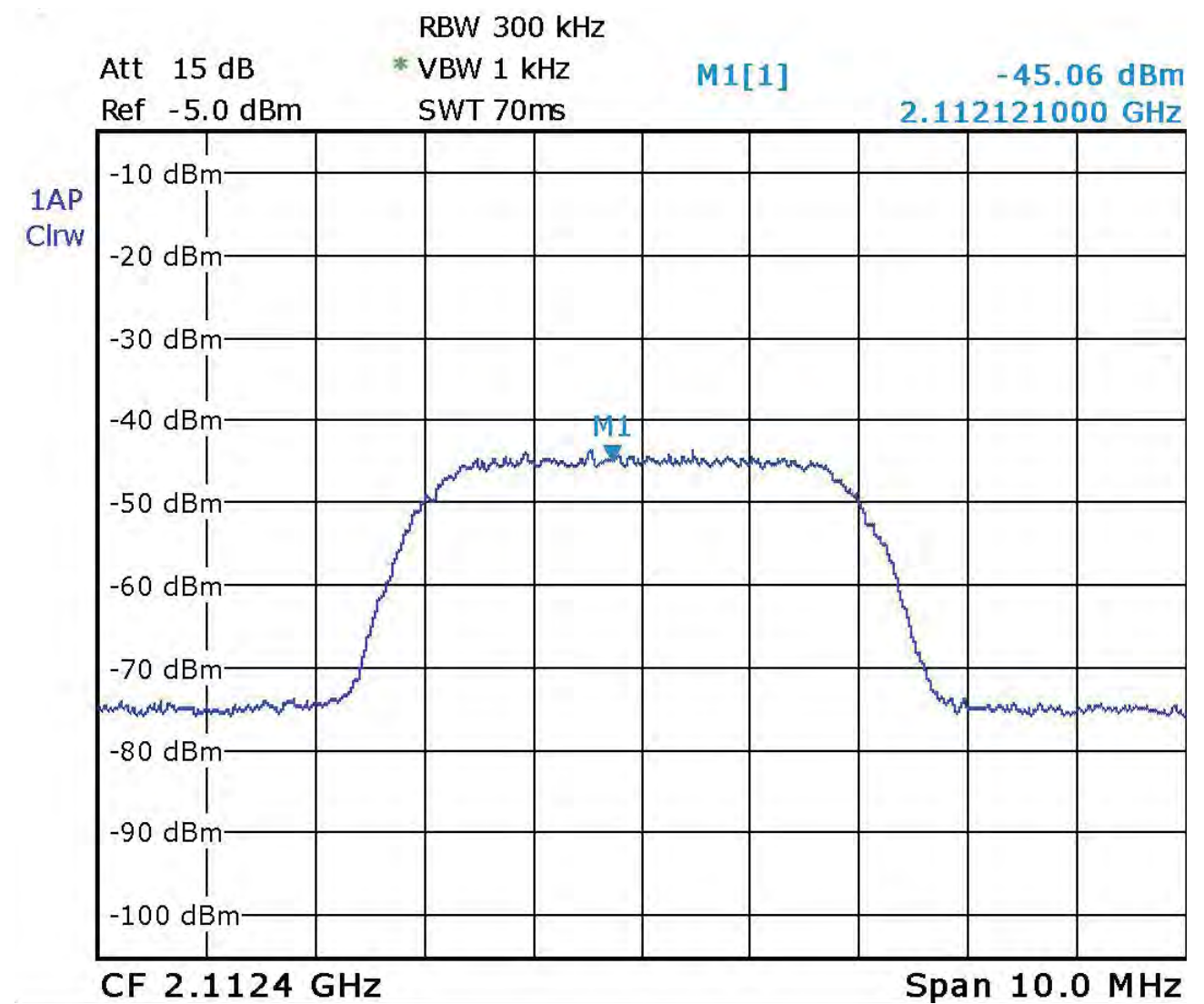
MP 11 (K1380 Pin 5)



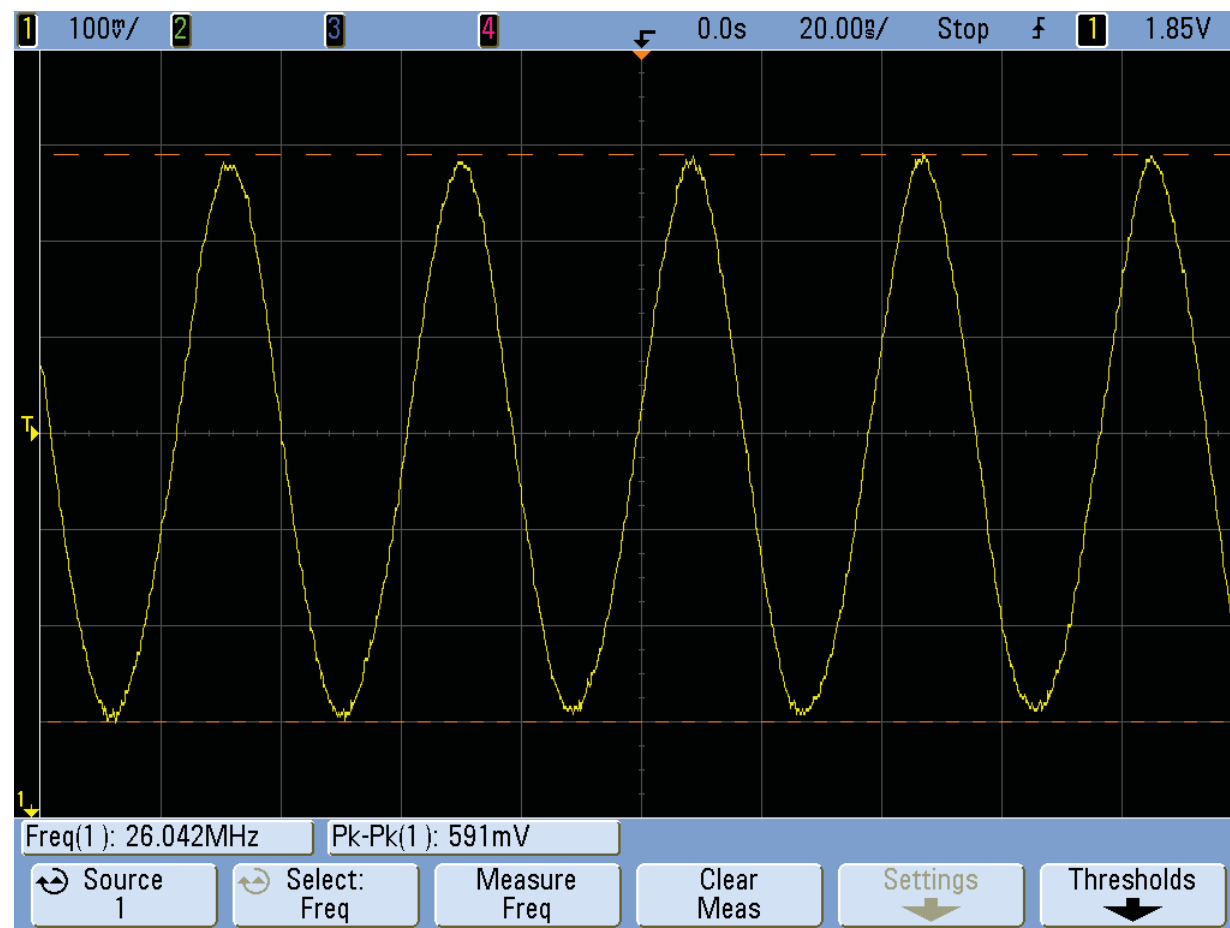
MP 14 (L1341)



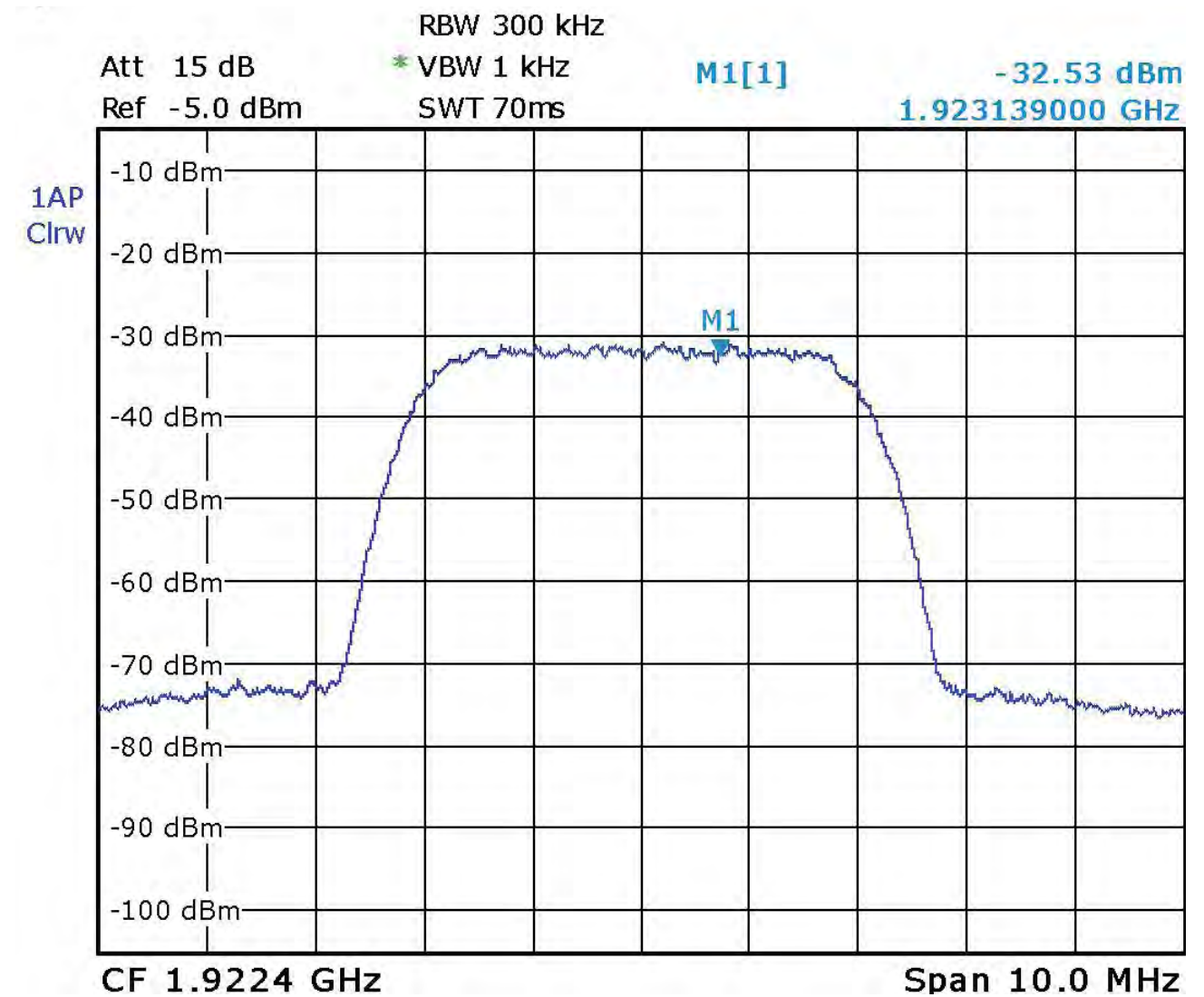
MP 15 (N3100 Pin 29)



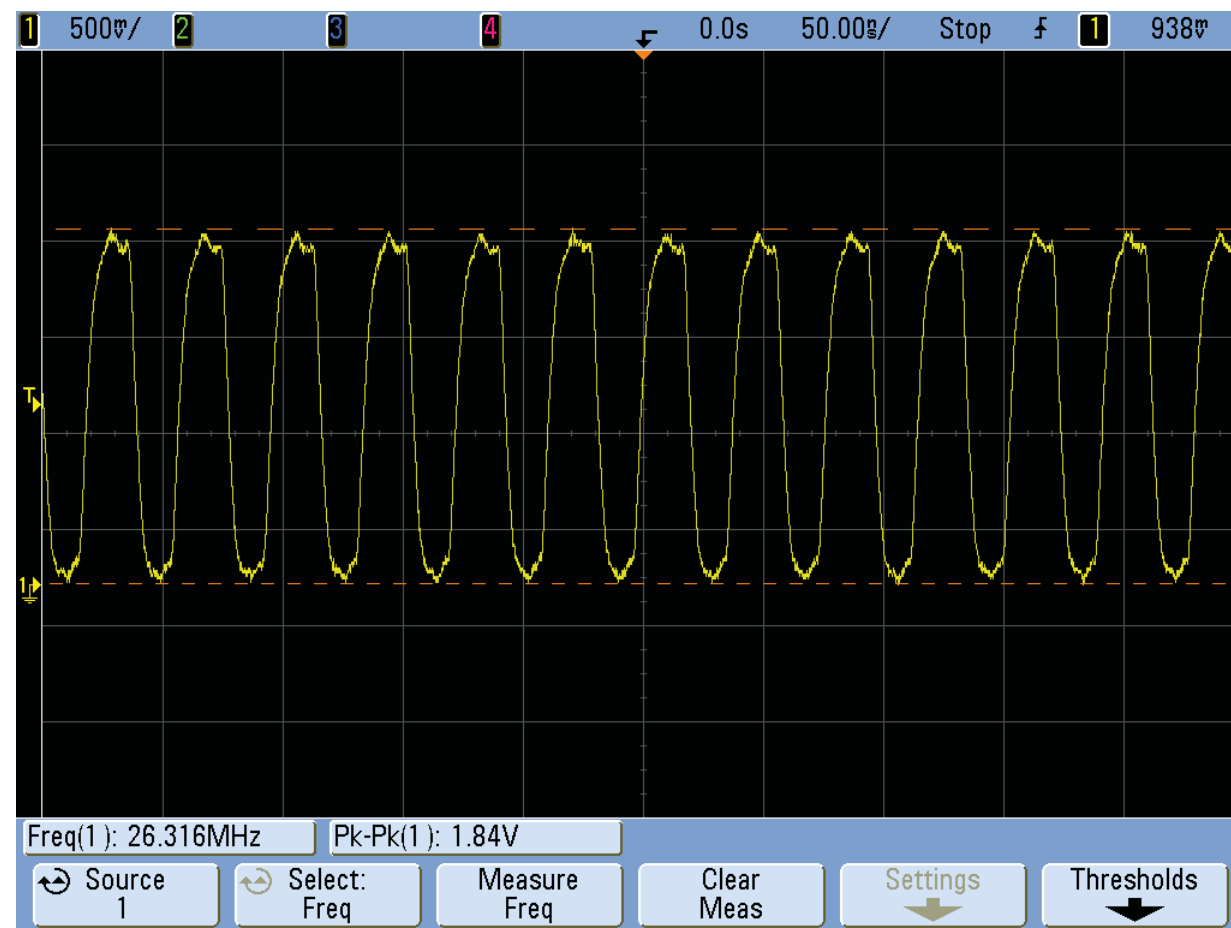
MP 16 (L3140)



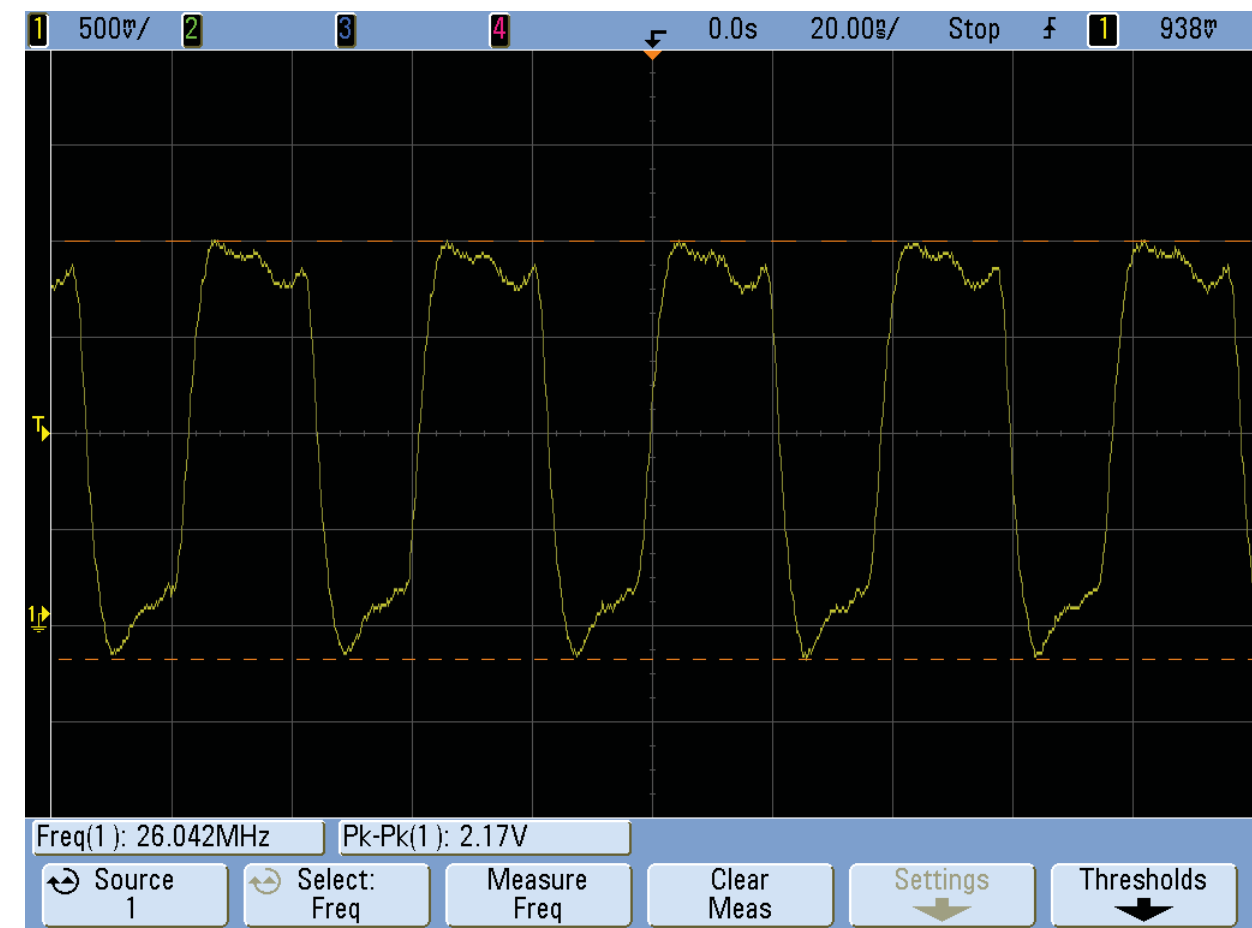
MP 17 (R1263)



MP 34 (L1381)

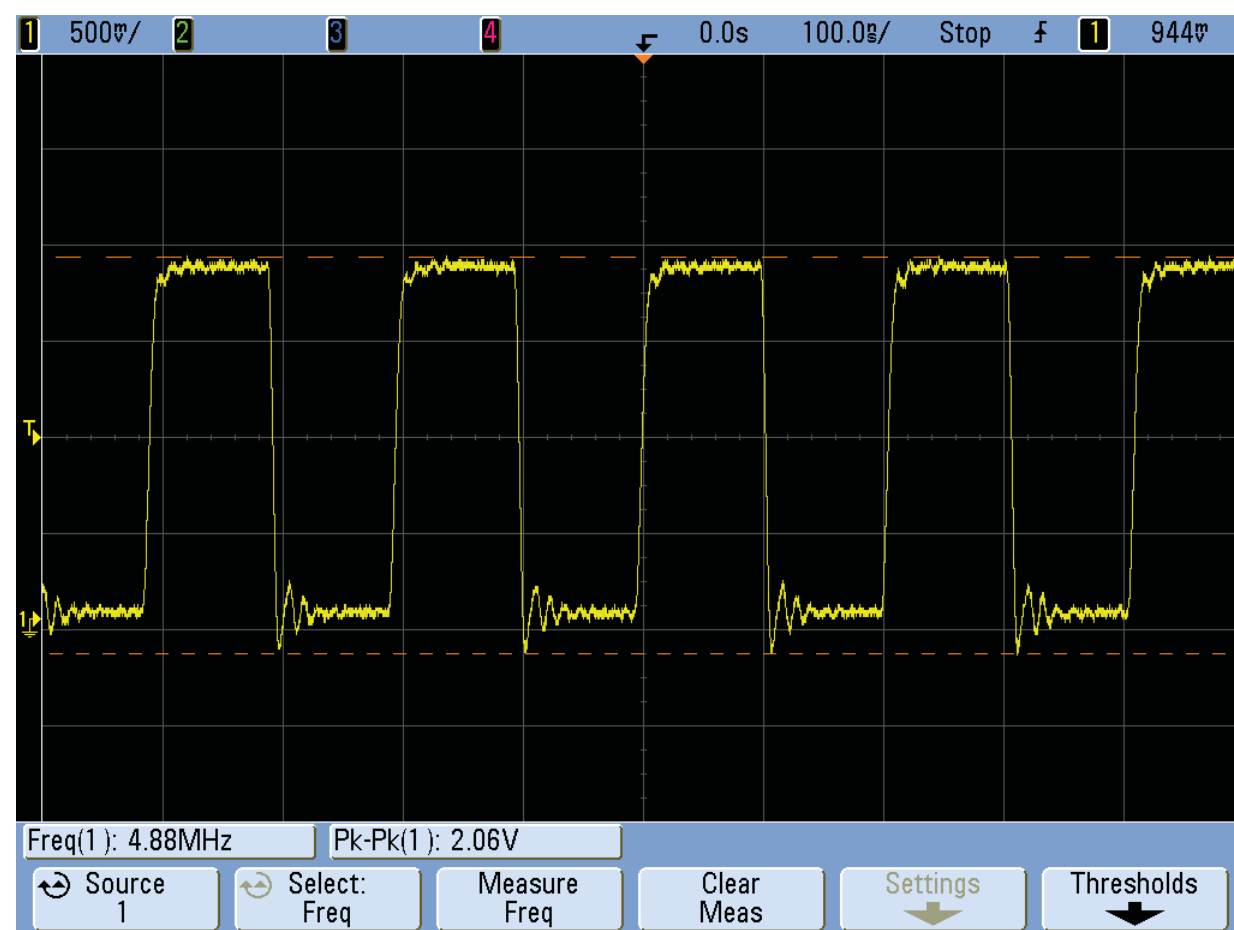


MP 37 (R2100 MCLK)

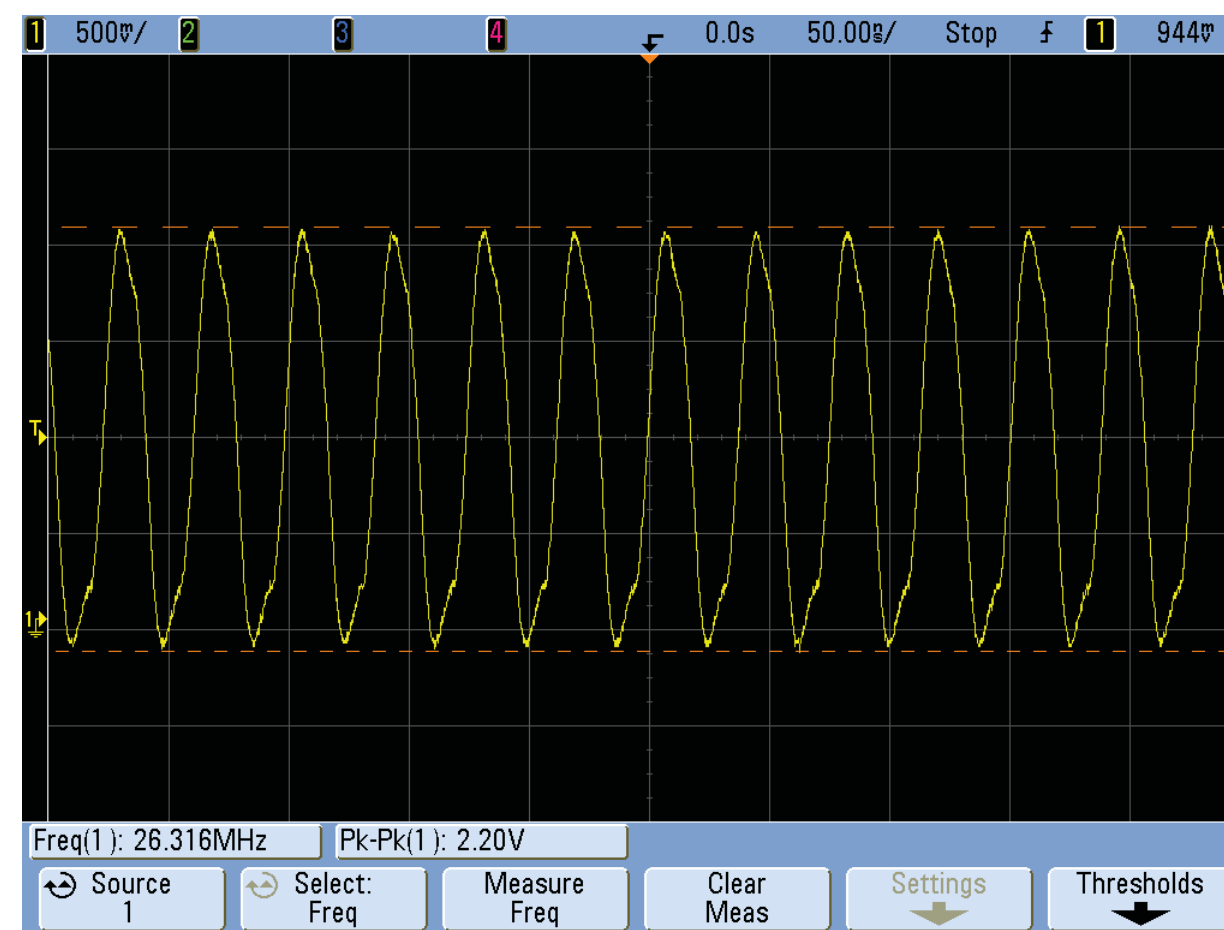


MP 44 (R2101 BTCLK)

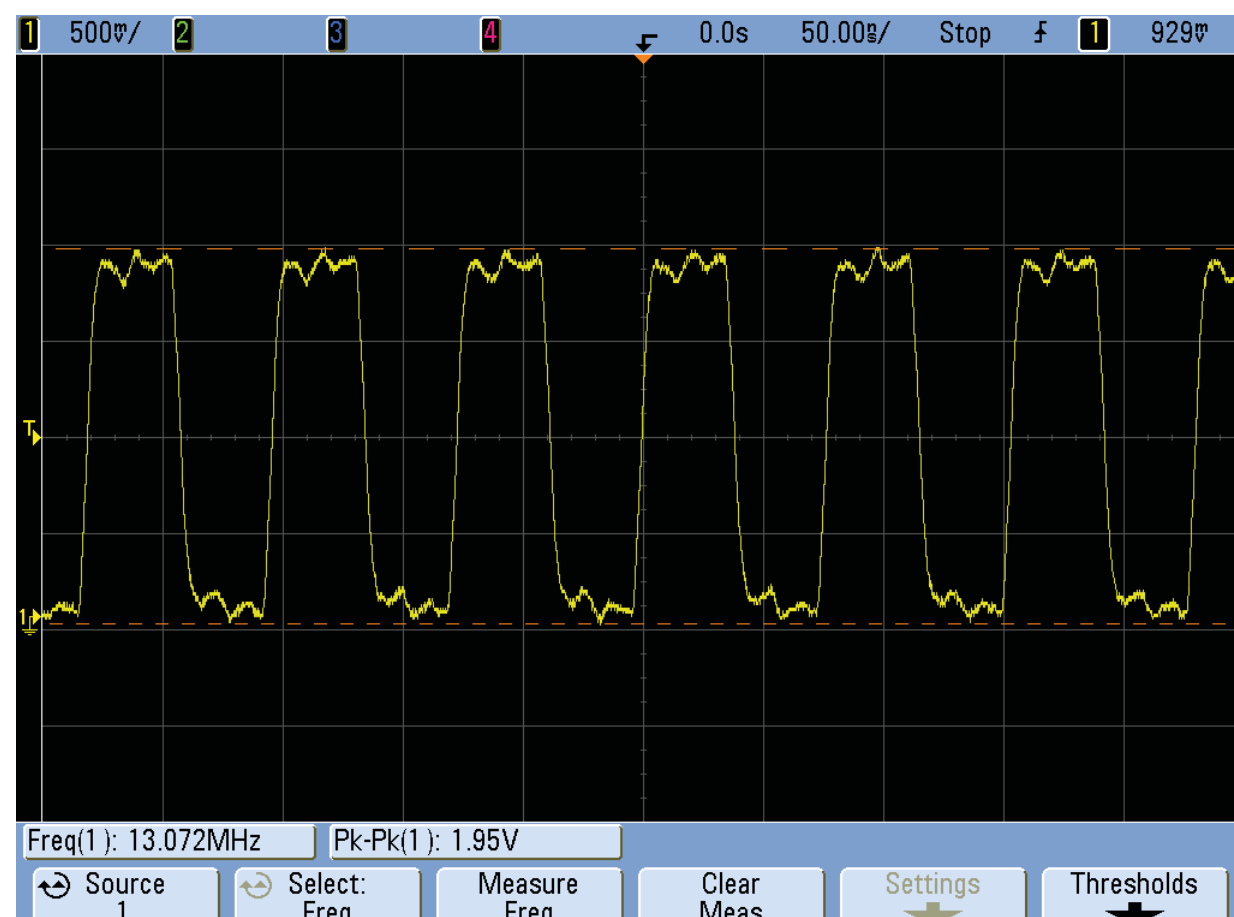




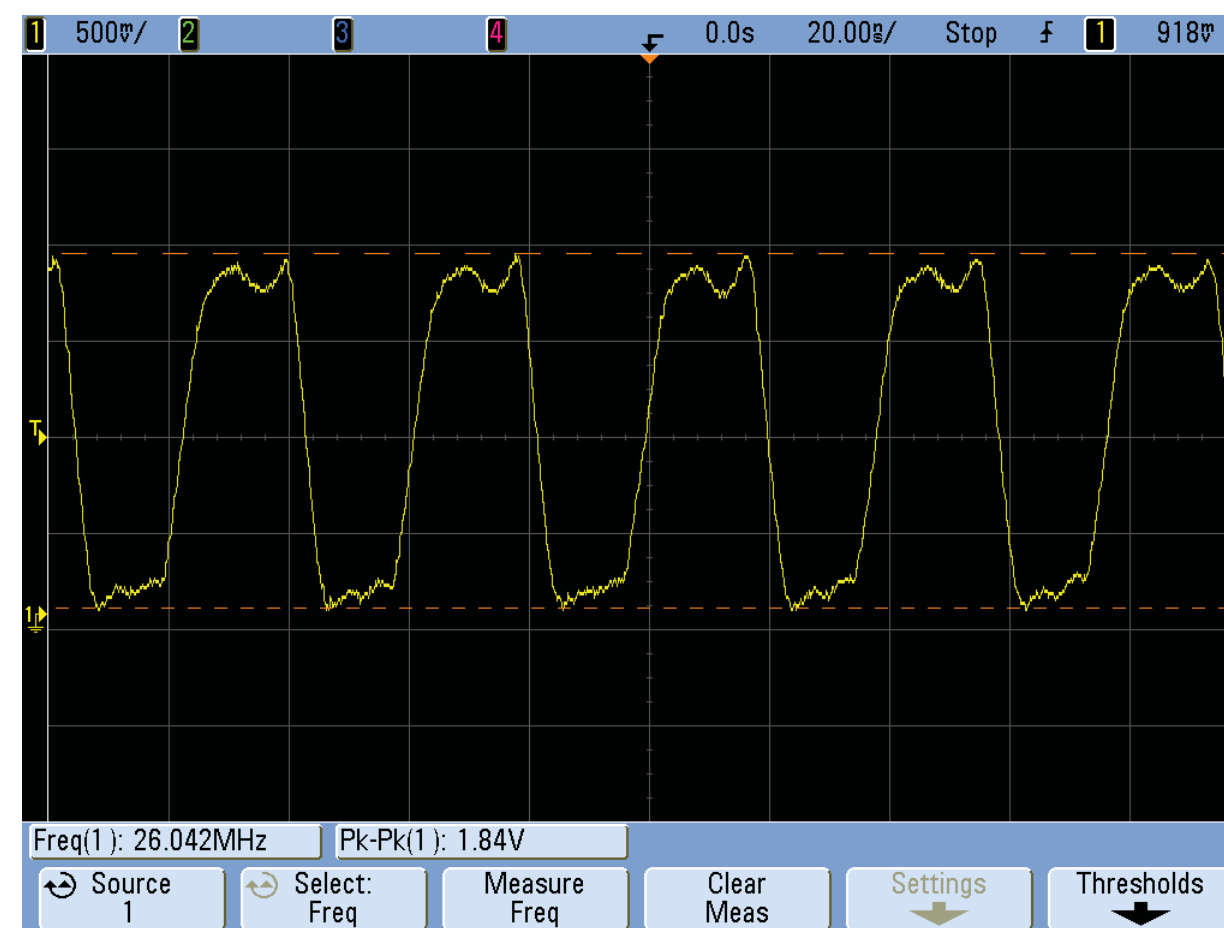
MP 46 (C4313 4,8 MHz)



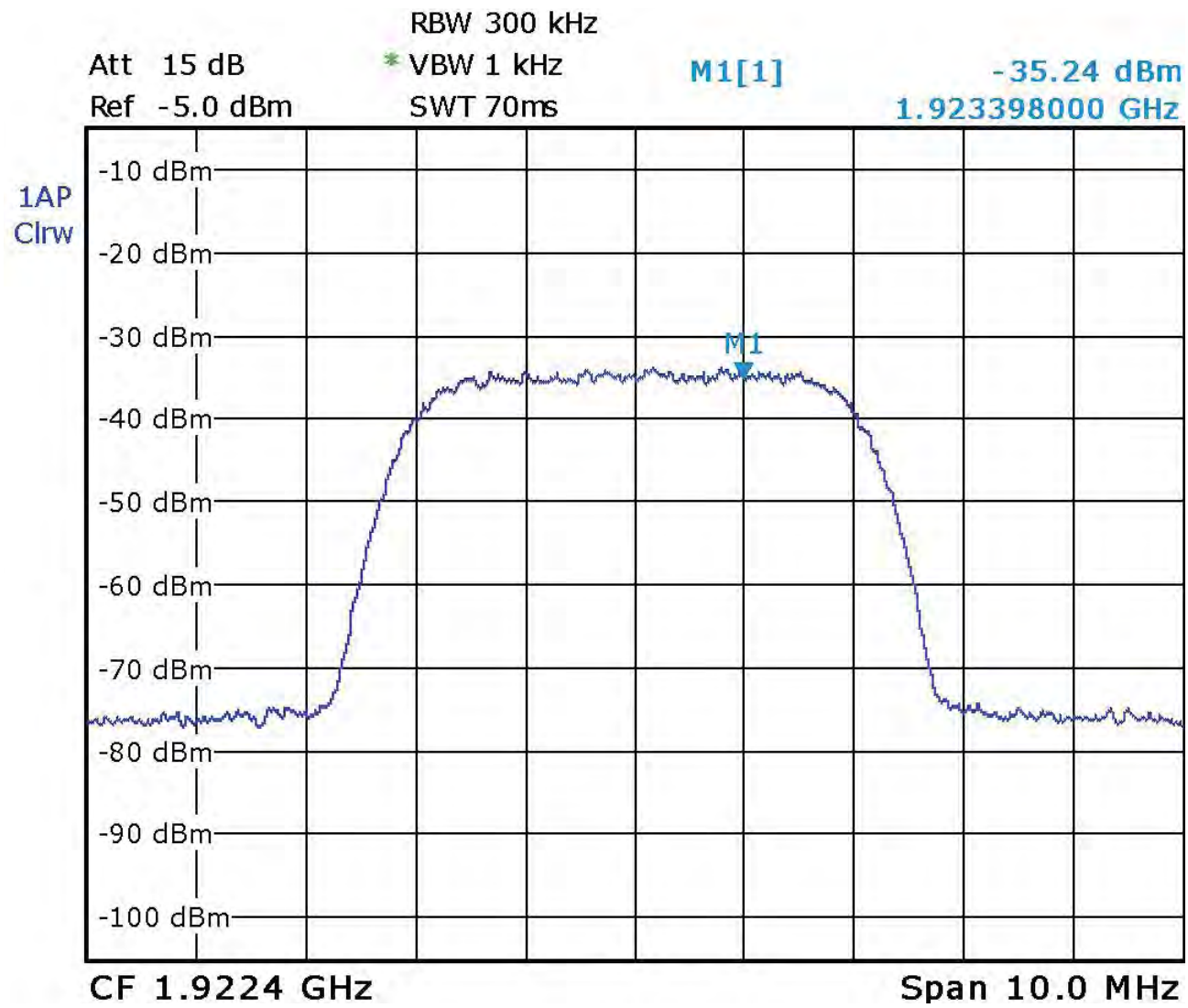
MP 46 (C4313 26 MHz)



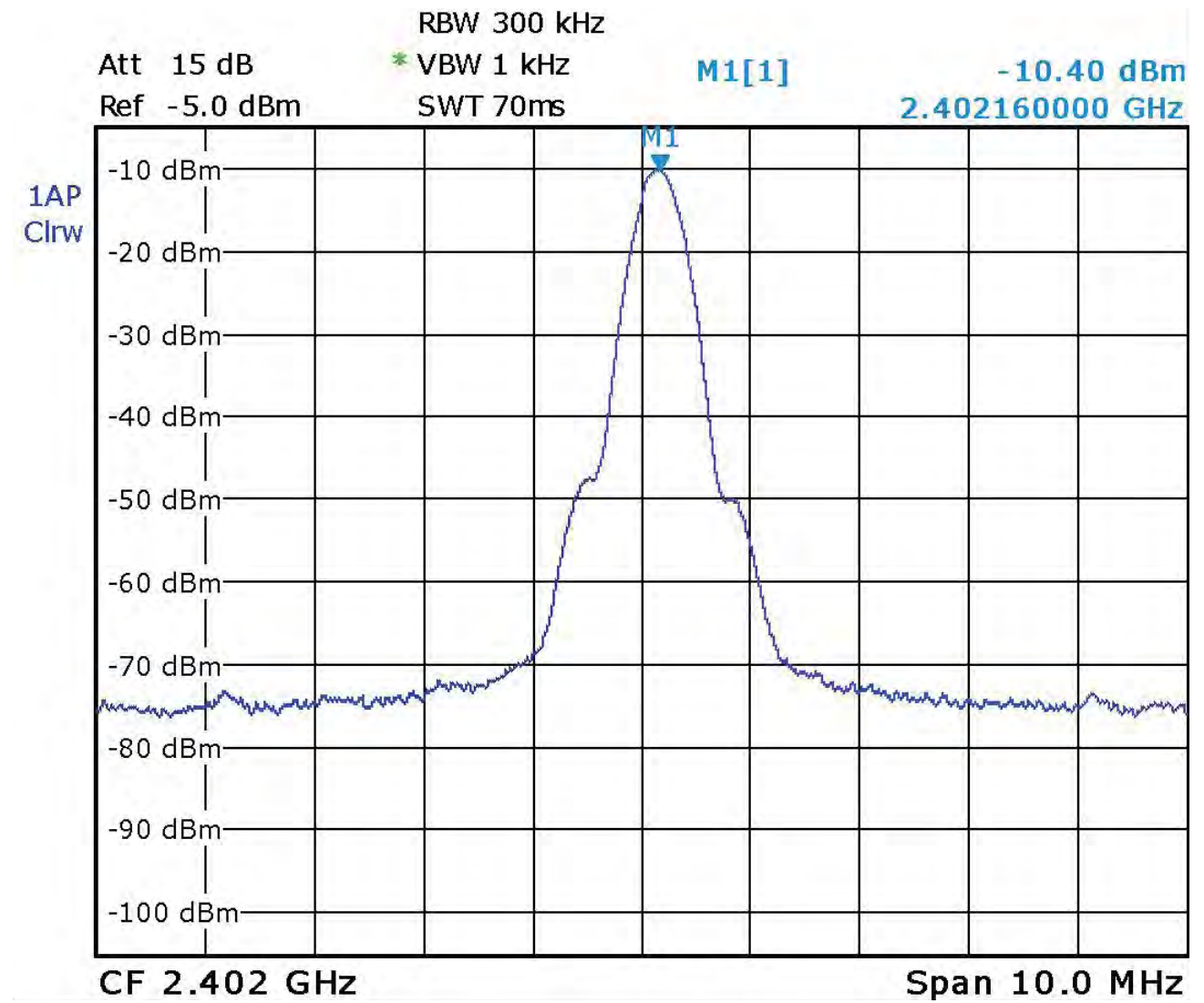
MP MP 48 (C4329 13 MHz)



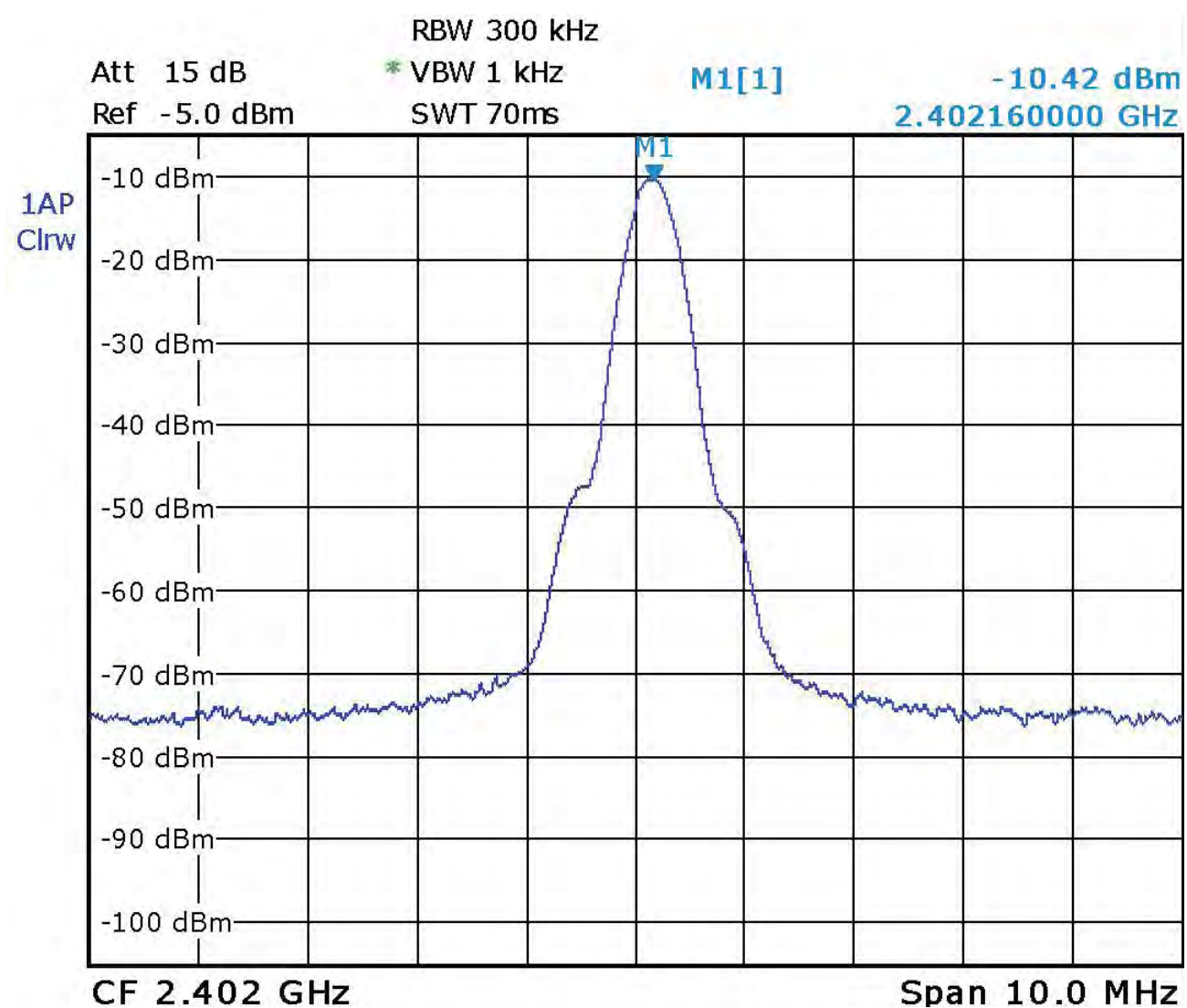
MP 59 (C1316 WBCLK)



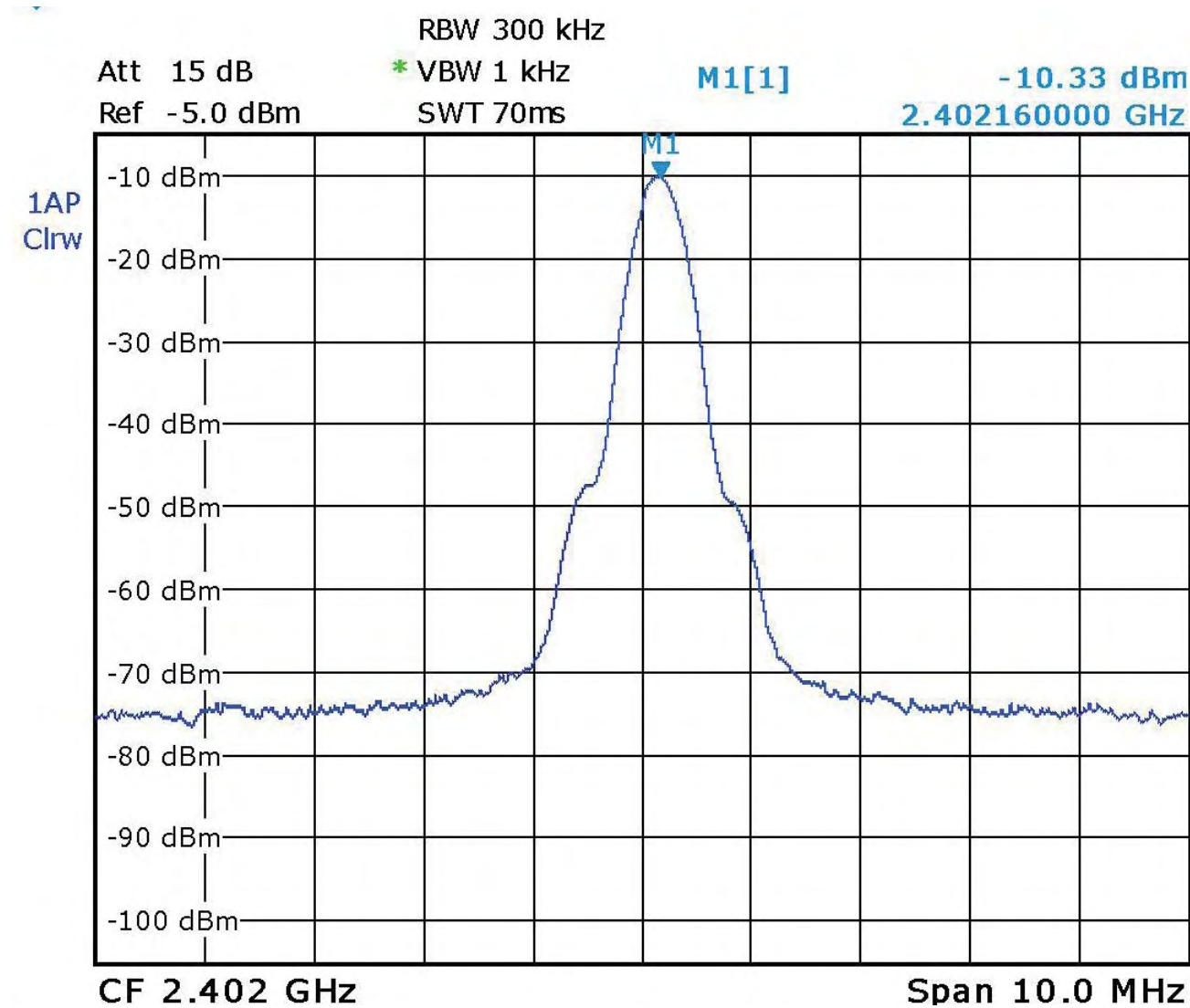
MP 60 (L1360)



MP 65 (Z1400 Pin 1)

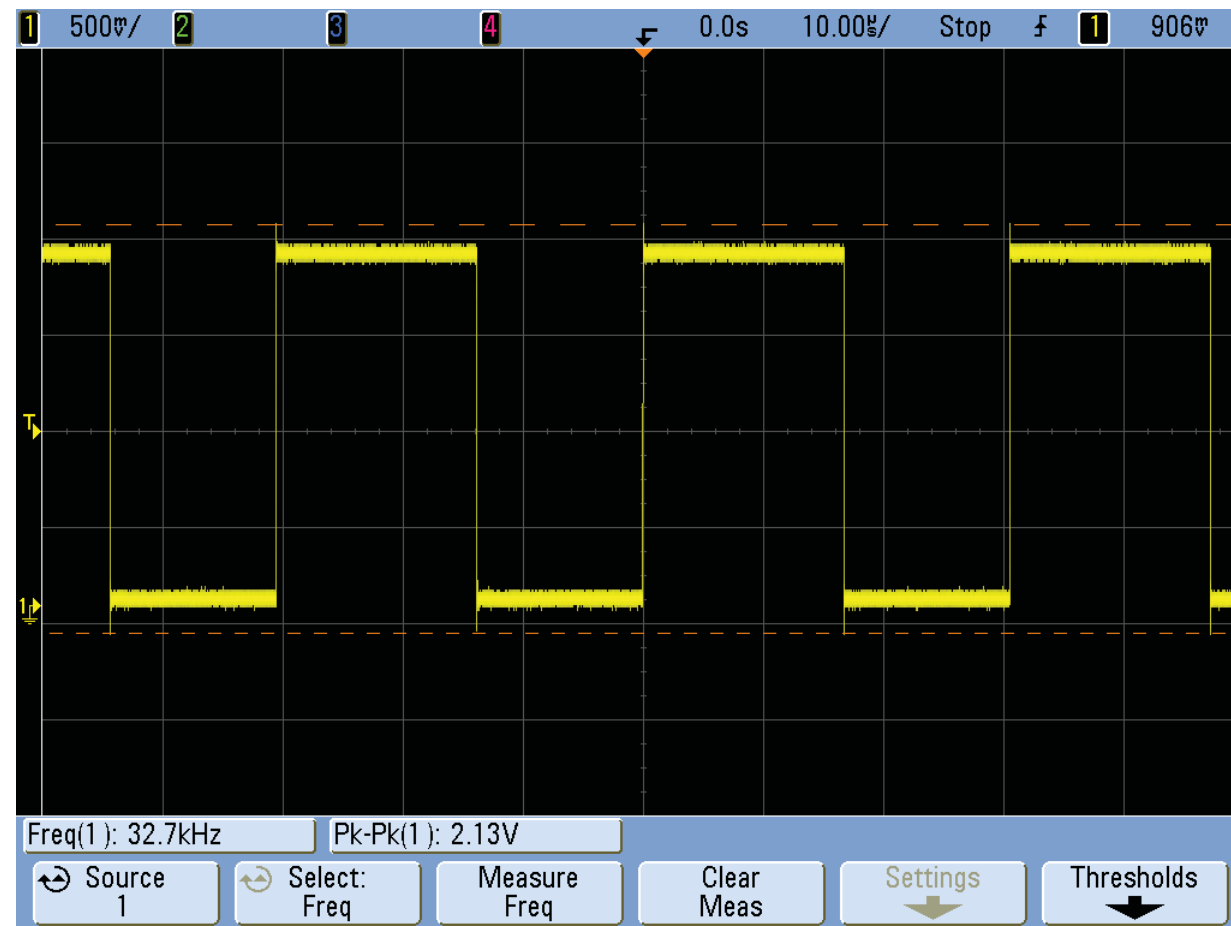


MP 67 (Z1400 Pin 7)

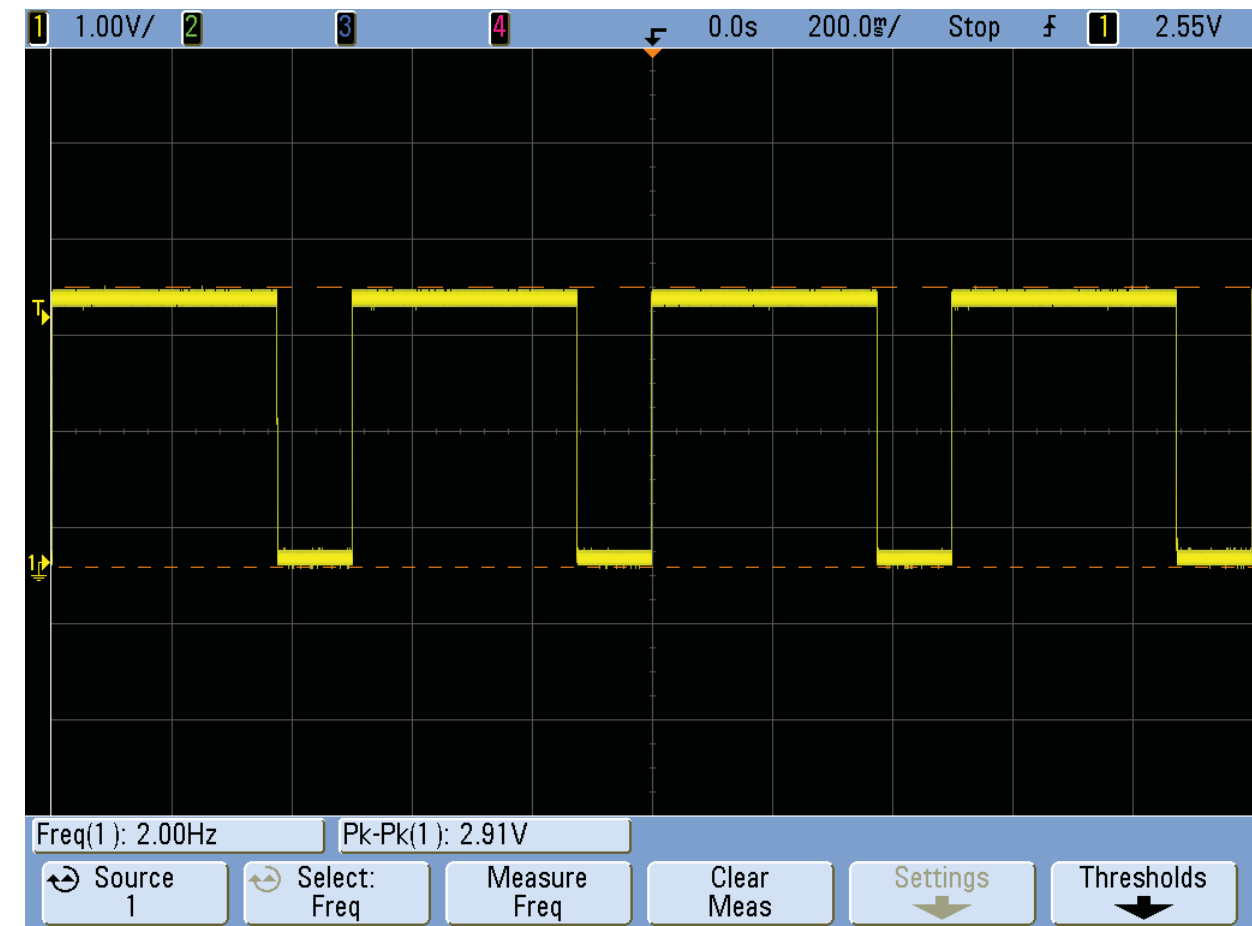


MP 68 (Z1400 Pin 8)

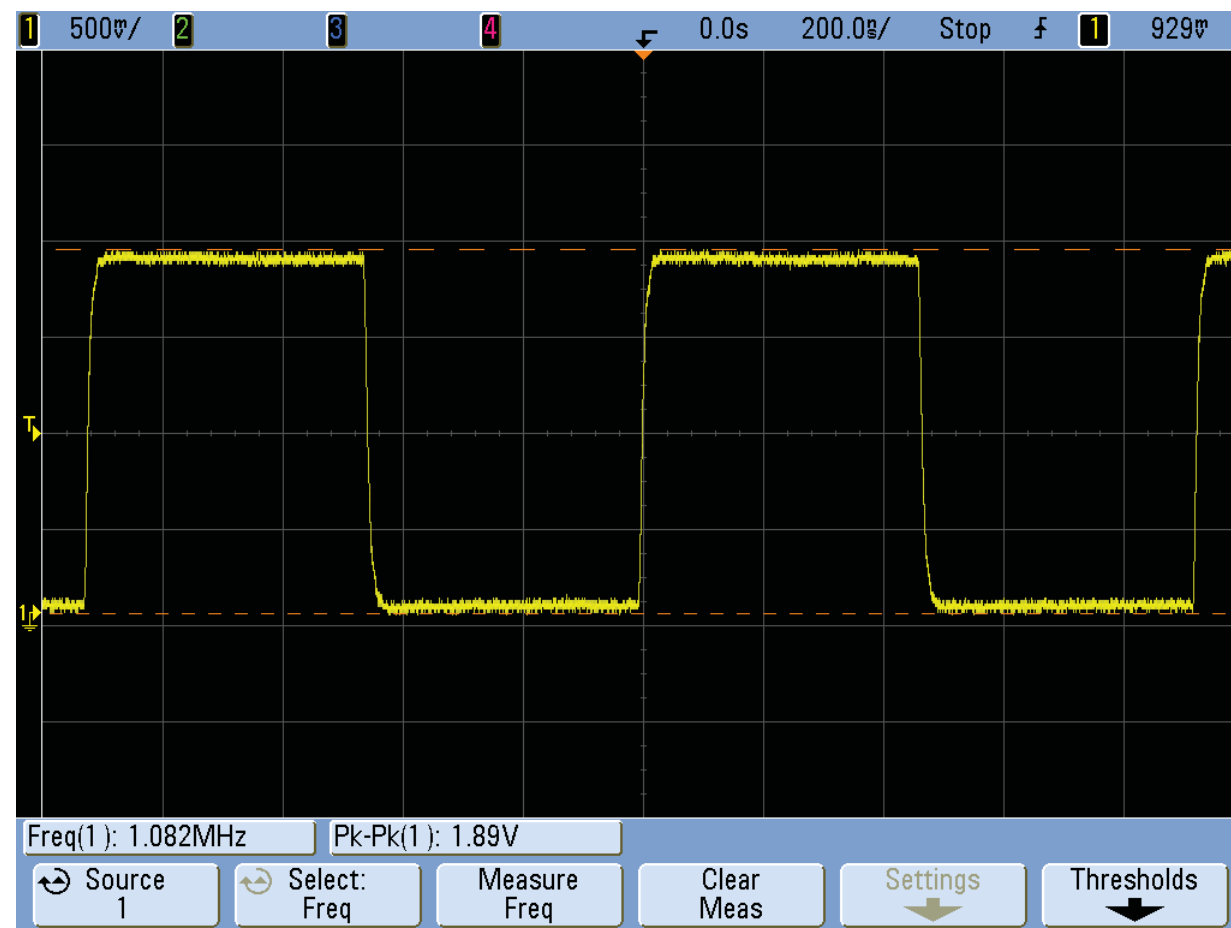




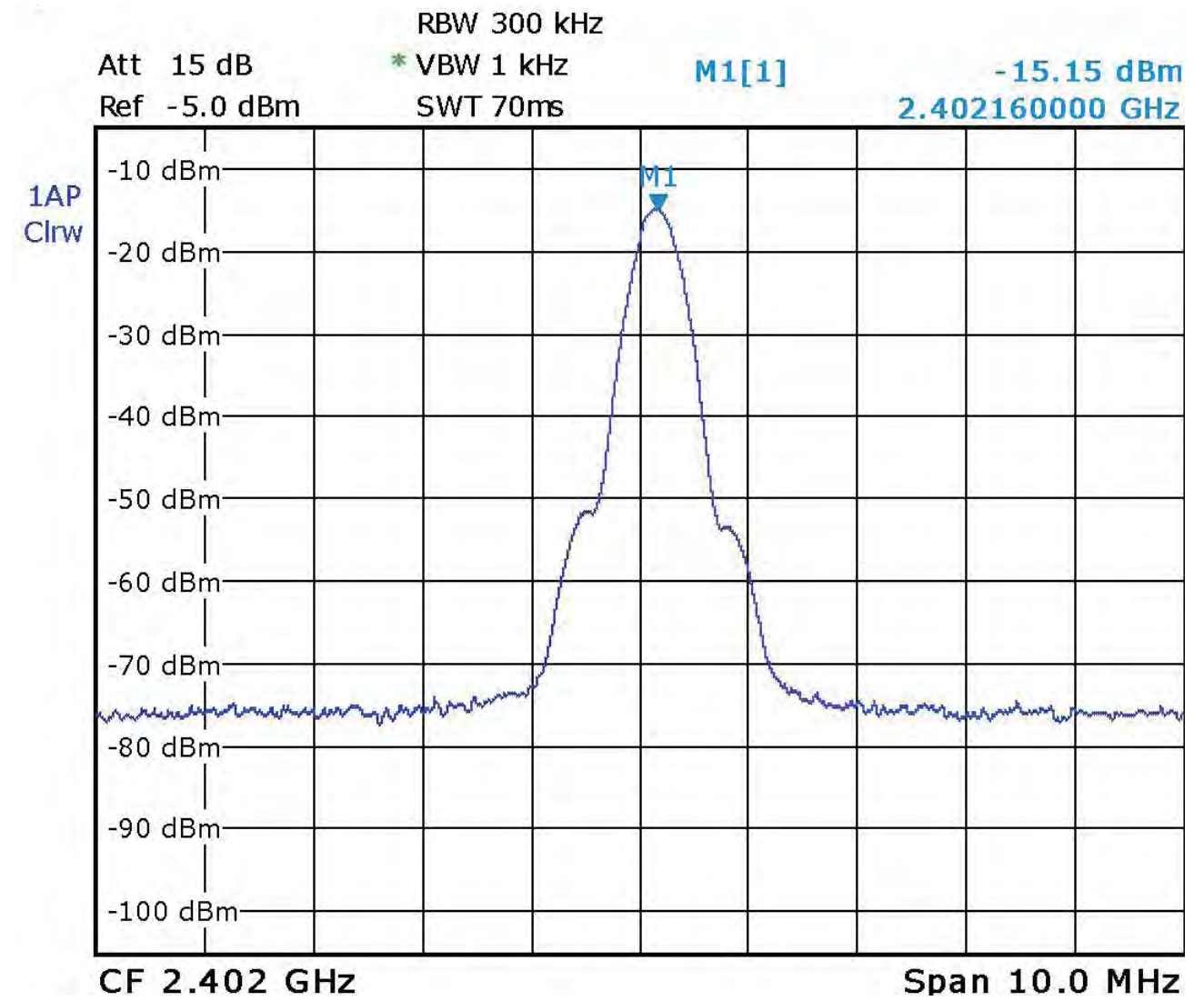
MP 73 (R2199 RTCCLK)



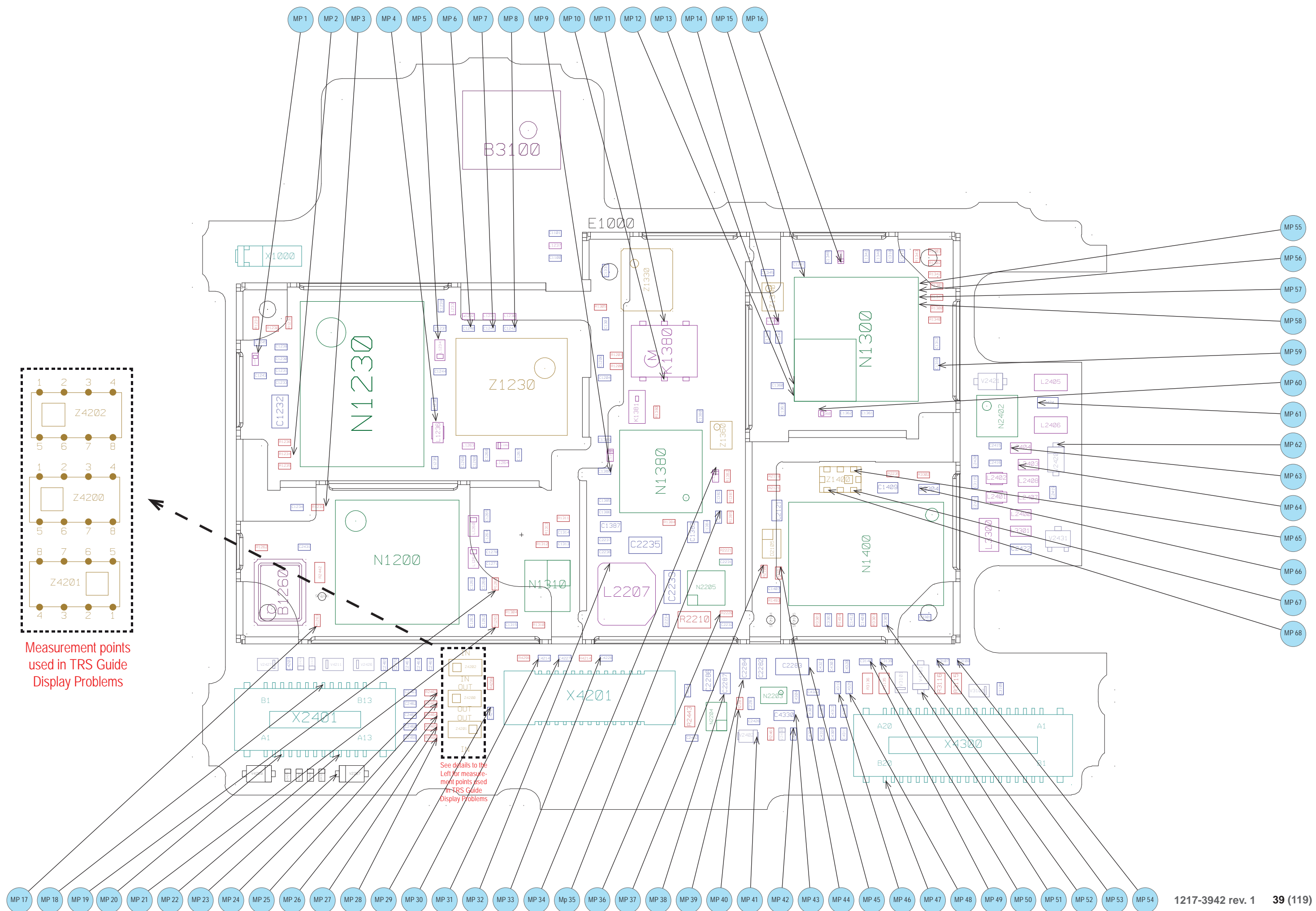
MP 75 (C4206 VIBR\_OUT)



MP 110 (R2499 SIMCLK)

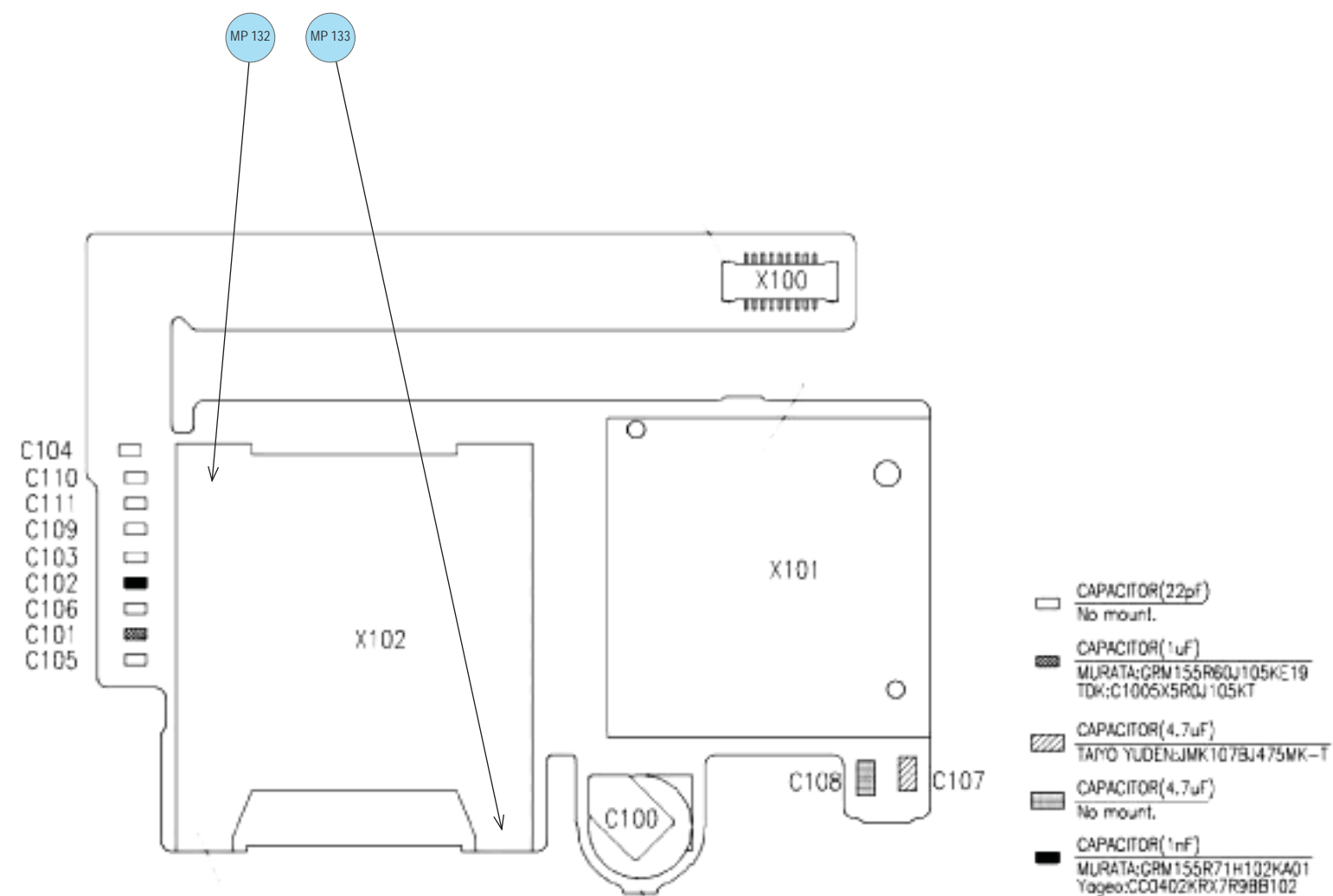


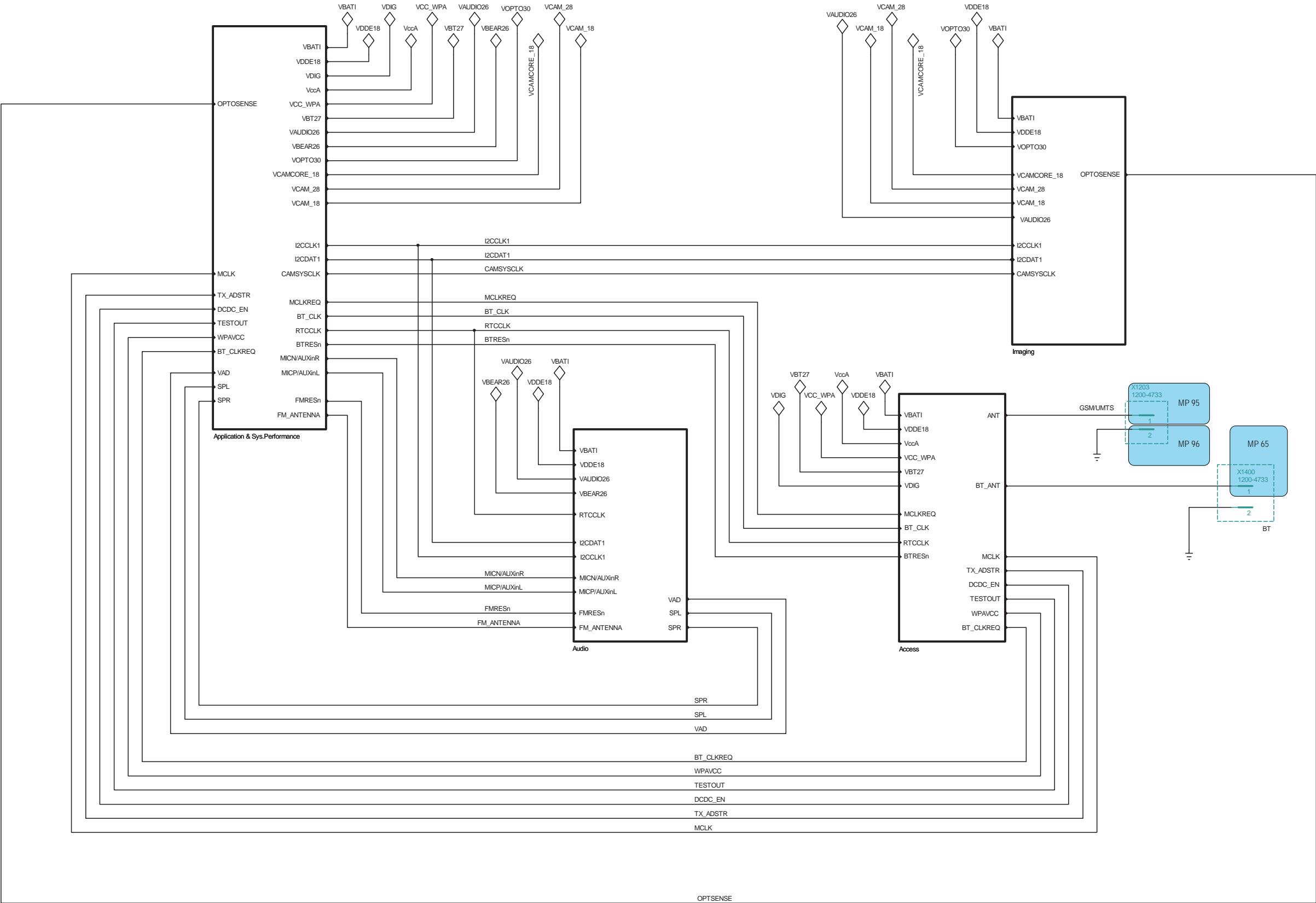
MP 113 (X1400 Pin 1)







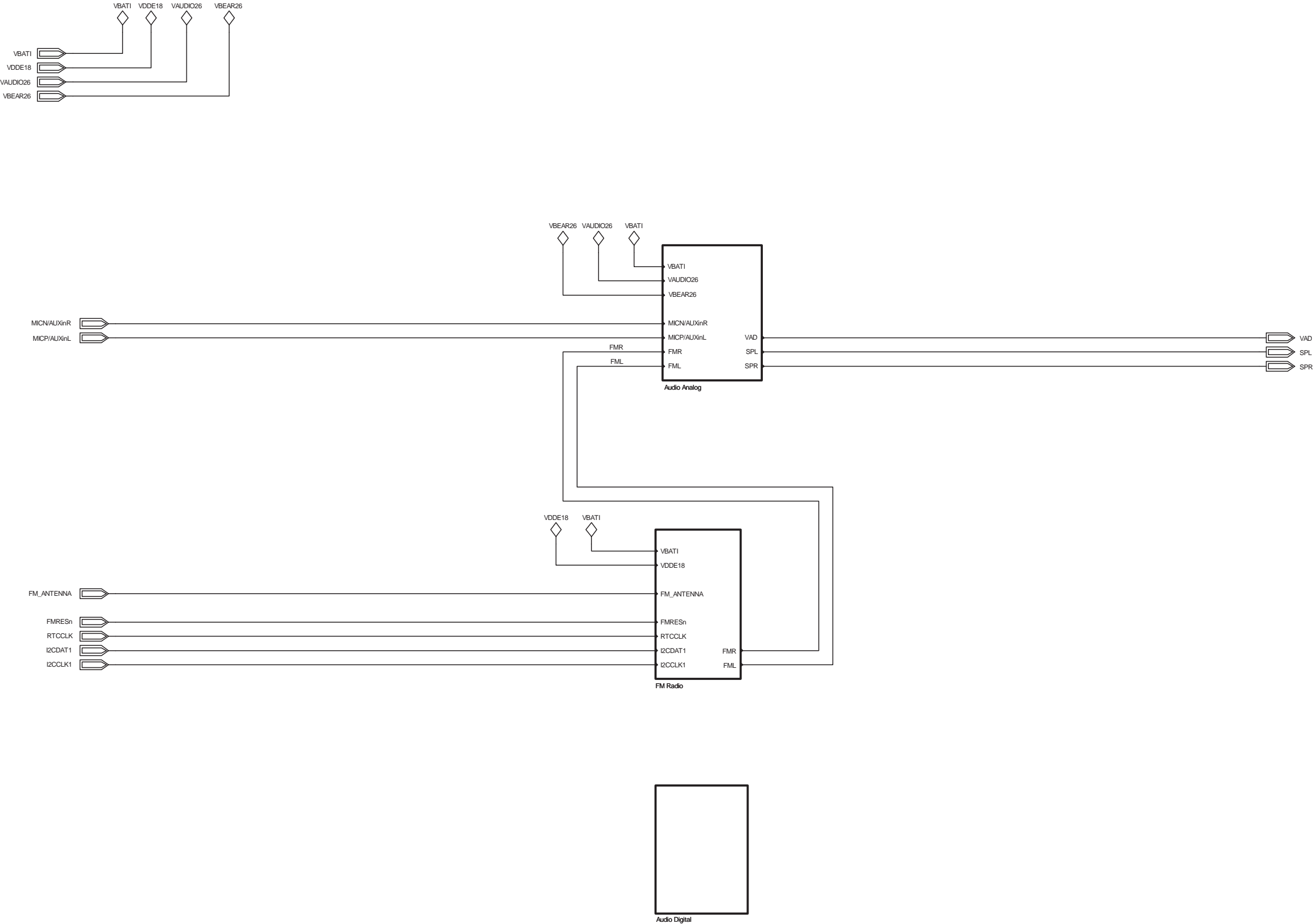




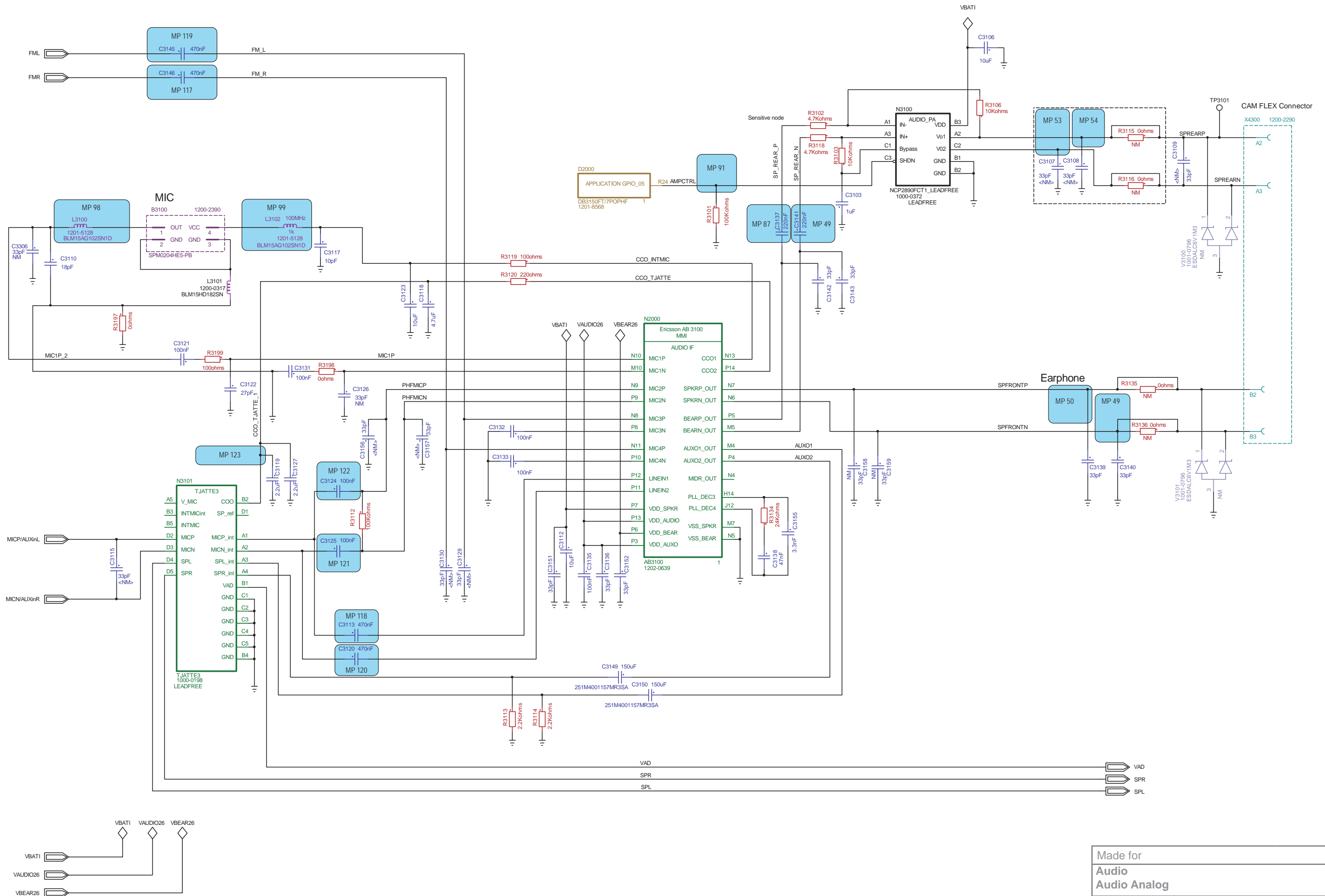
Access side GPIO mapping		
Port	Usage	Page
AccGPIO00	USB_HSSTP	B14
AccGPIO01	USB_HSDIR	B14
AccGPIO02	CTMS	B14
AccGPIO03	APP_LOG	B14
AccGPIO04	USB_HSINCLK	B14
AccGPIO05	USB_HSNXT	B14
AccGPIO06	USB_HSDATA4	B14
AccGPIO07	USB_HSDATA5	B14
AccGPIO08	USB_HSDATA6	B14
AccGPIO09	USB_HSDATA7	B14
AccGPIO10	not used*	B15
AccGPIO11	OVP_FLAG	B14
AccGPIO12	BT_SPL_INT	R12
AccGPIO13	not used*	B15
AccGPIO14	not used*	B15
AccGPIO15	not used*	B15
AccGPIO16	USB_HSCHIP_SEL	B14
AccGPIO17	not used*	B15
AccGPIO18	USB_HSDATA3	B14
AccGPIO19	BT_SPL_CS0n	R12
AccGPIO20	BT_SPL_DI	R12
AccGPIO21	BT_SPL_DO	R12
AccGPIO22	BT_SPL_CLK	R12
AccGPIO23	not used*	B15

Application side GPIO mapping		
Port	Usage	Page
AppGPIO00	FM_INT	A04
AppGPIO01	CFMS_AID	B14
AppGPIO02	not used*	B15
AppGPIO03	MEGA_STANDBY	I03
AppGPIO04	CAM_LDO_EN	B08
AppGPIO05	AMPCTRL	A02
AppGPIO06	not used*	B15
AppGPIO07	not used*	B15
AppGPIO08	not used*	B15
AppGPIO09	not used*	B15
AppGPIO10	not used*	B15
AppGPIO11	CIF_STANDBY	I03
AppGPIO12	MSDETECT	B13
AppGPIO13	not used	B15
AppGPIO14	not used	B15
AppGPIO15	DCON	B03

Made for Top Schematic	
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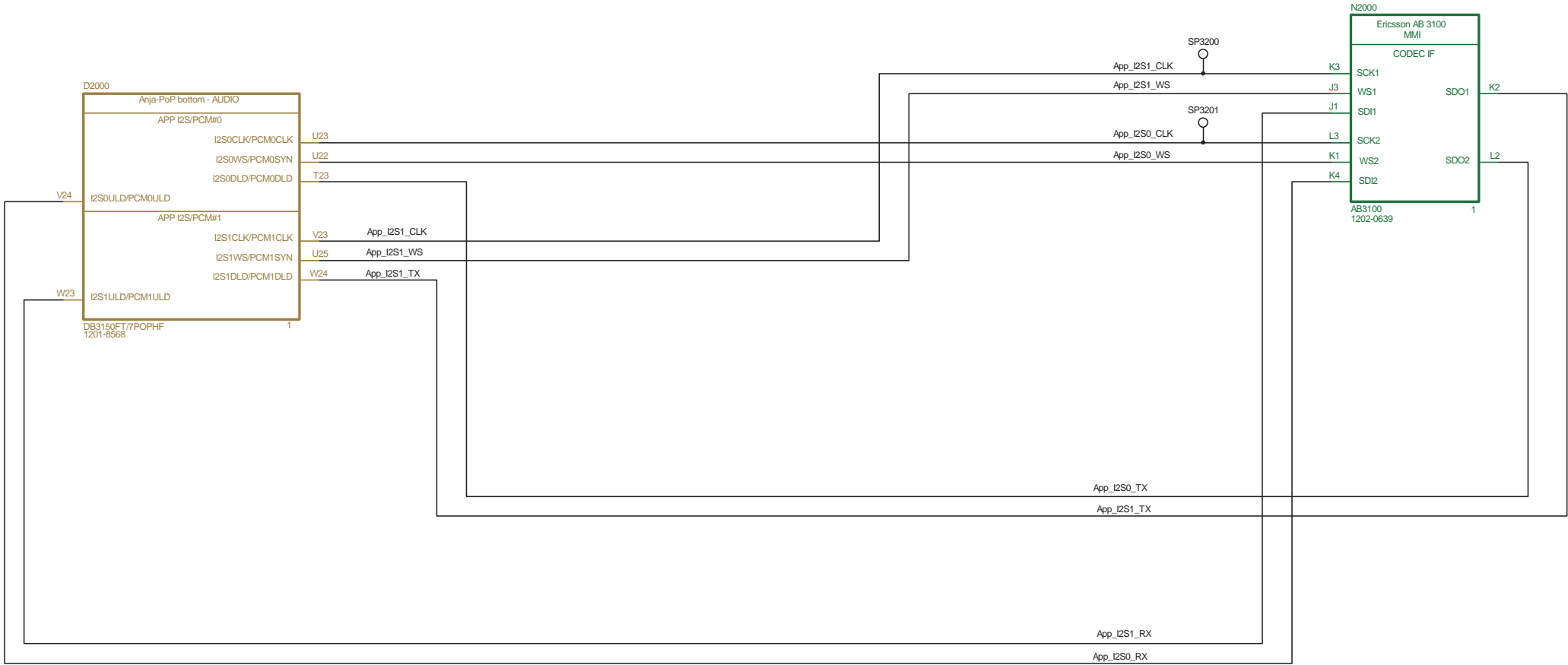


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Audio	
Audio Top	
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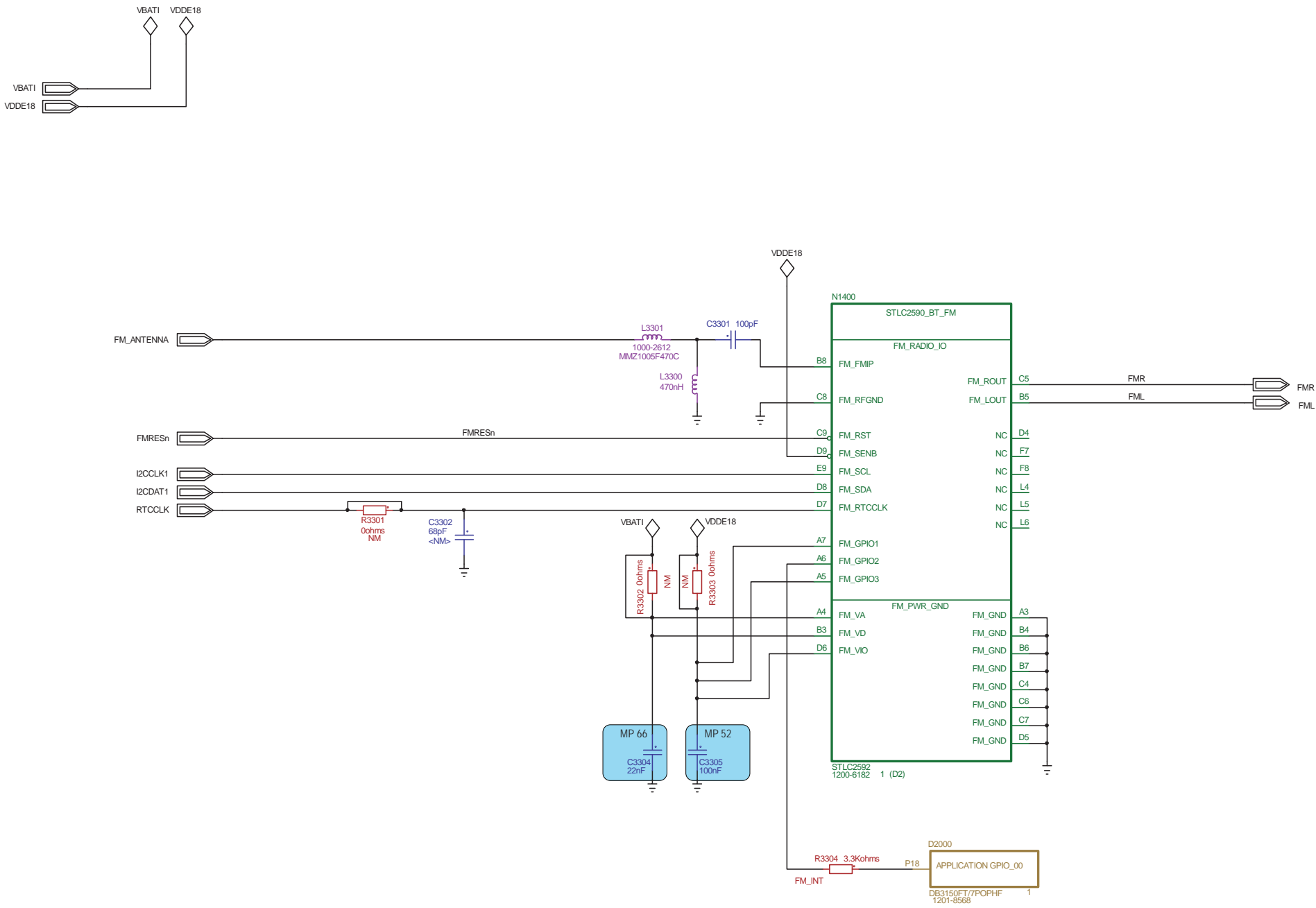


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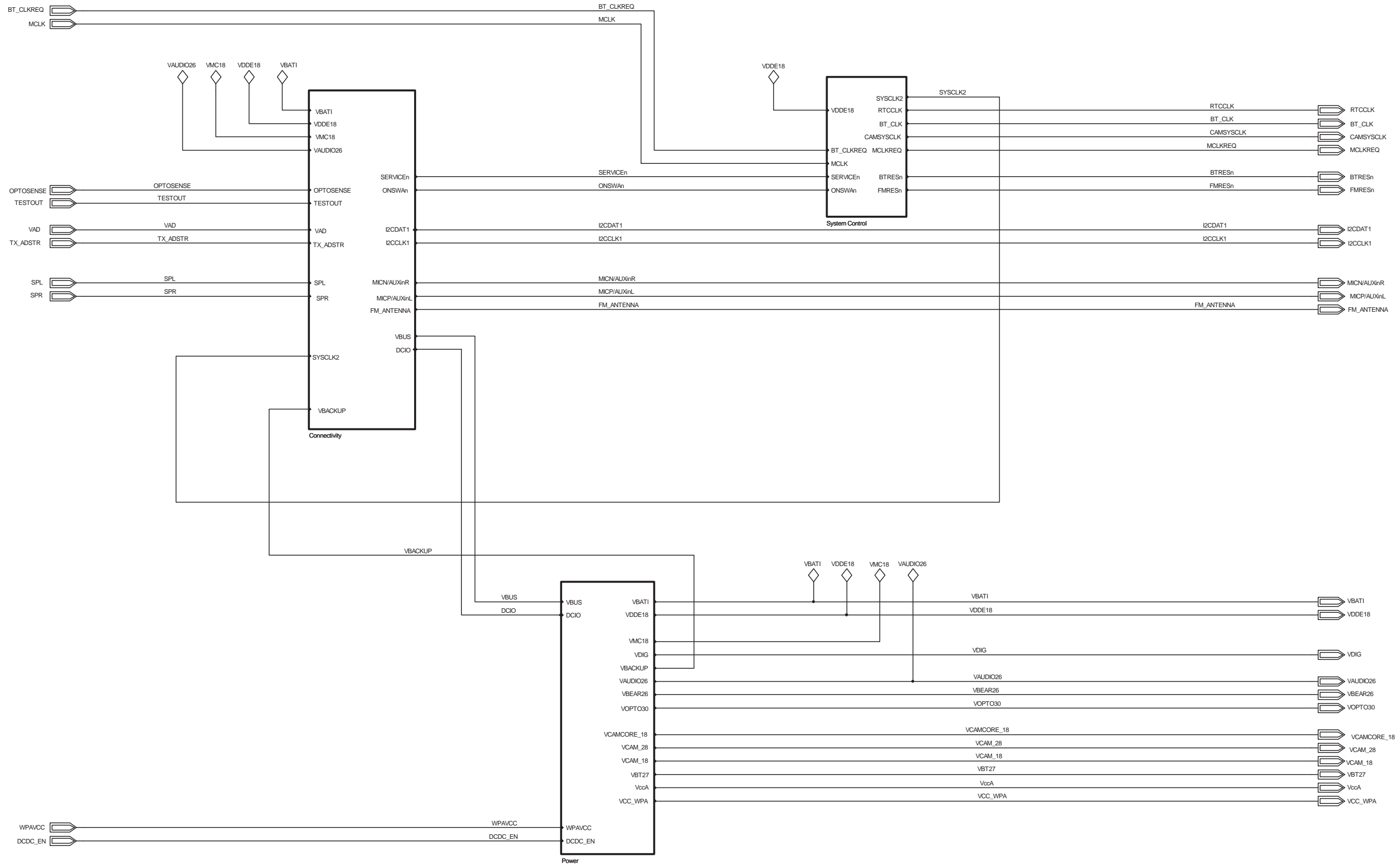




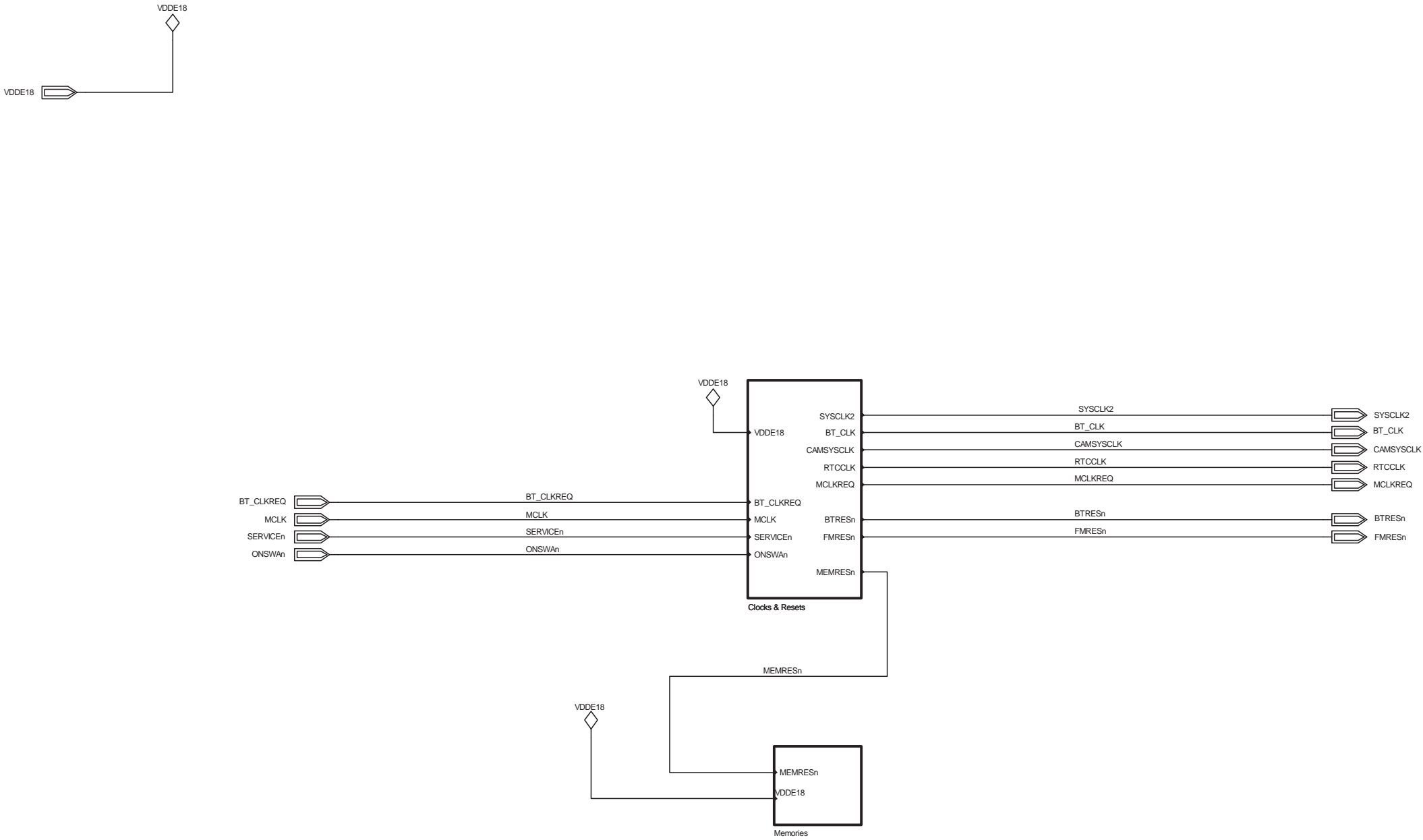
Made for	
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Audio Digital	
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Made for	
Audio	
FM Radio	
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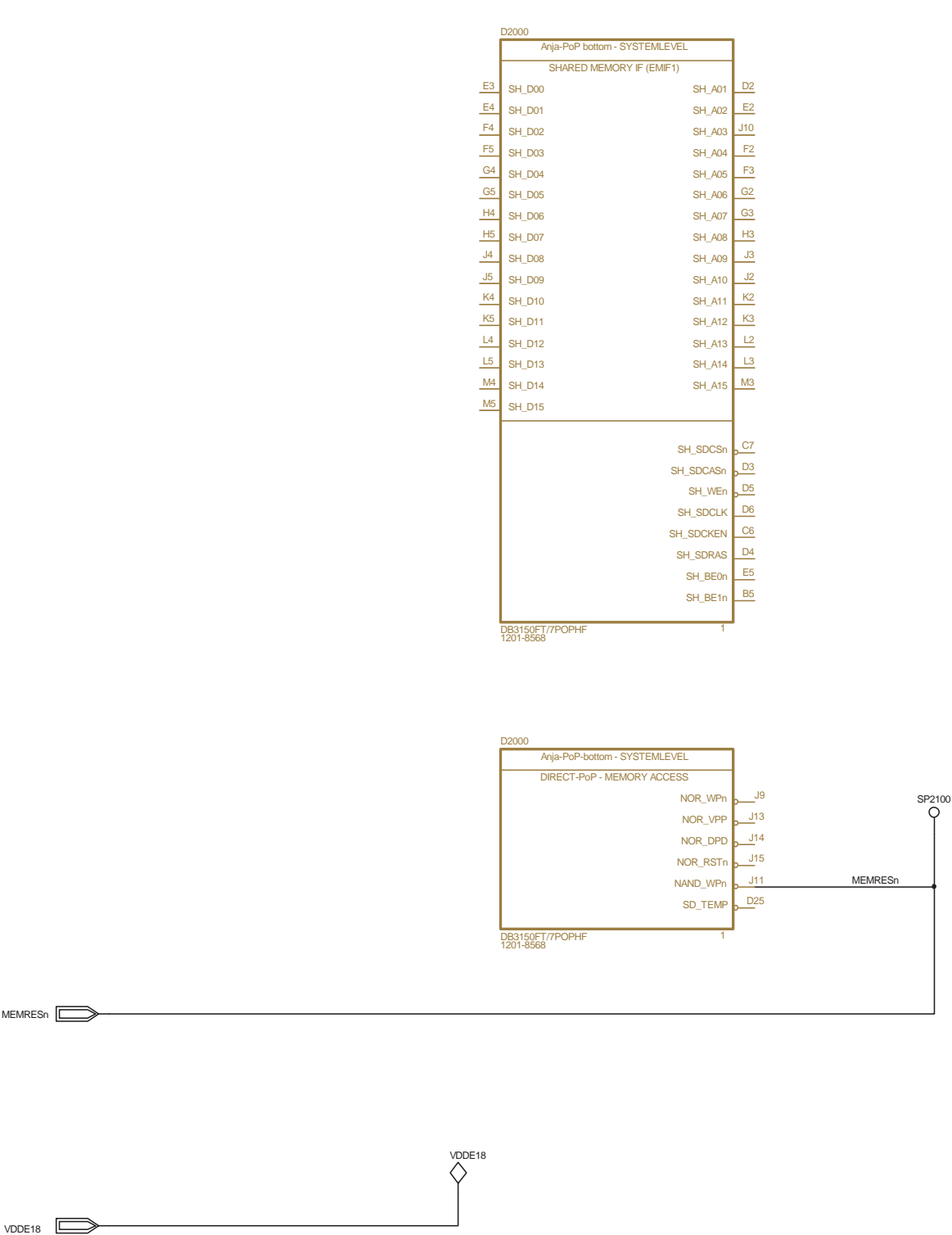
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Application & System Performance	
Performance & Applications Top	
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Made for	
Application & System Performance System Top	
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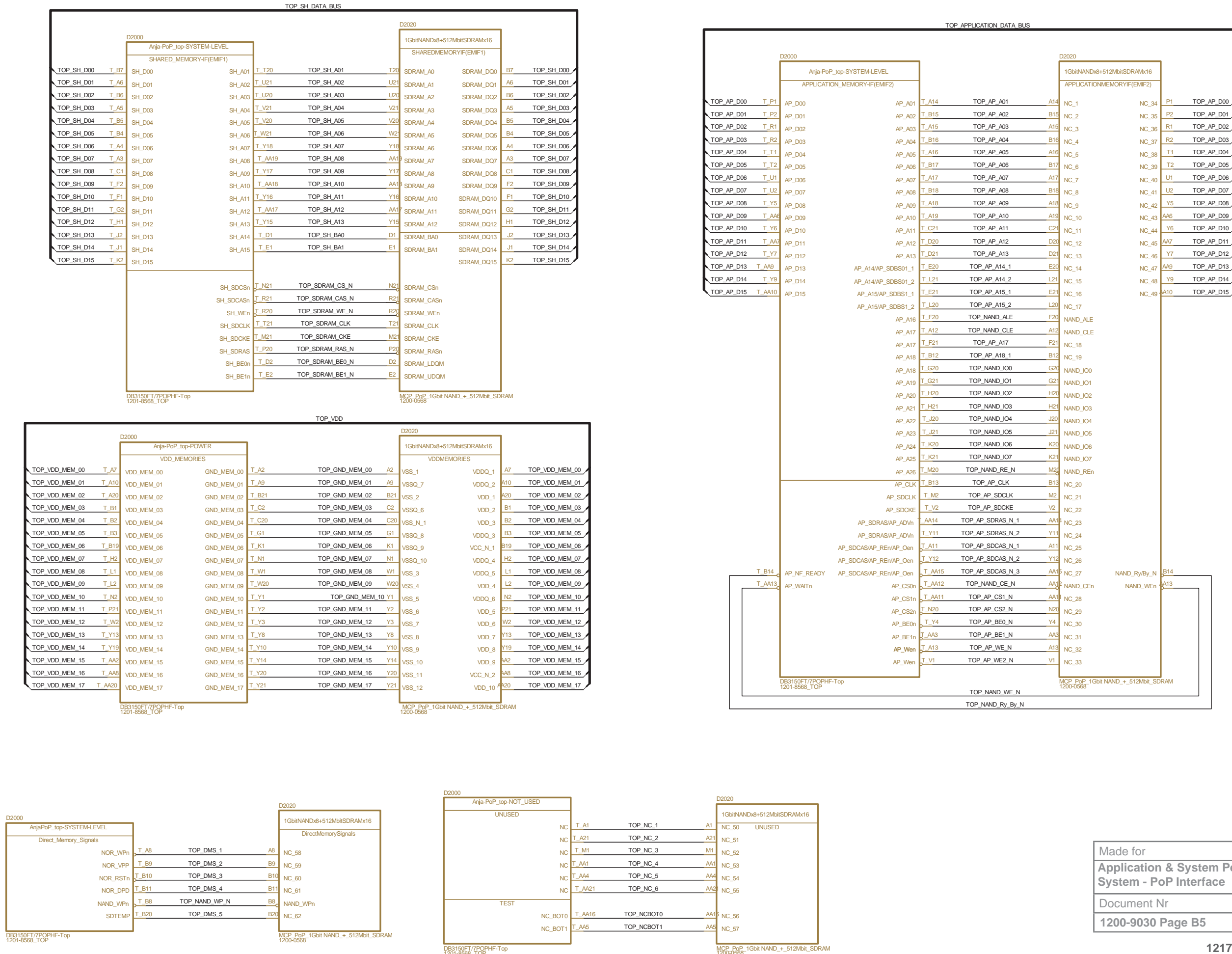


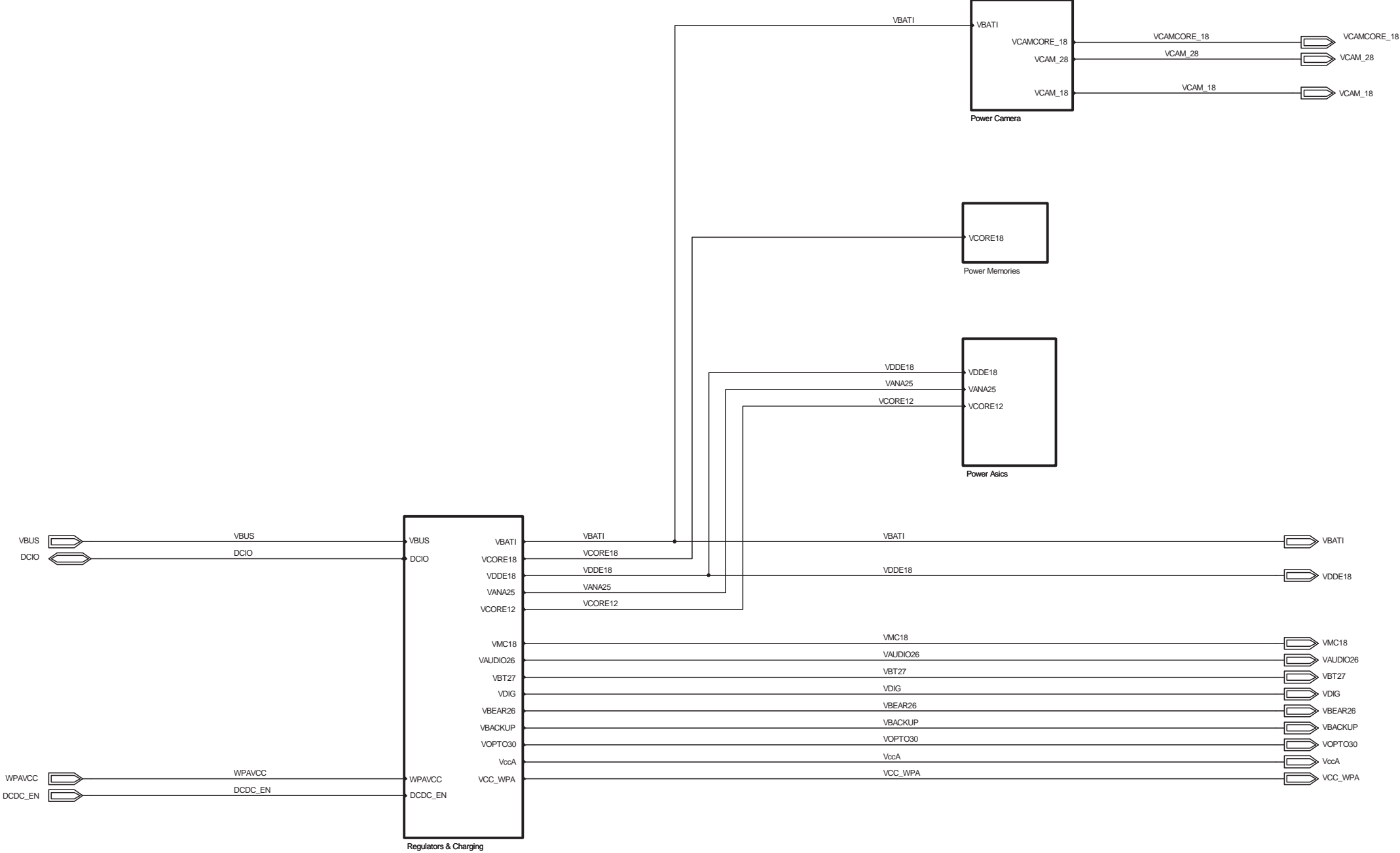
1217-3942 rev. 1 49 (119)



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Application & System Performance	
System - Memories	
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# Interface between Anja PoP top and PoP-mounted memories



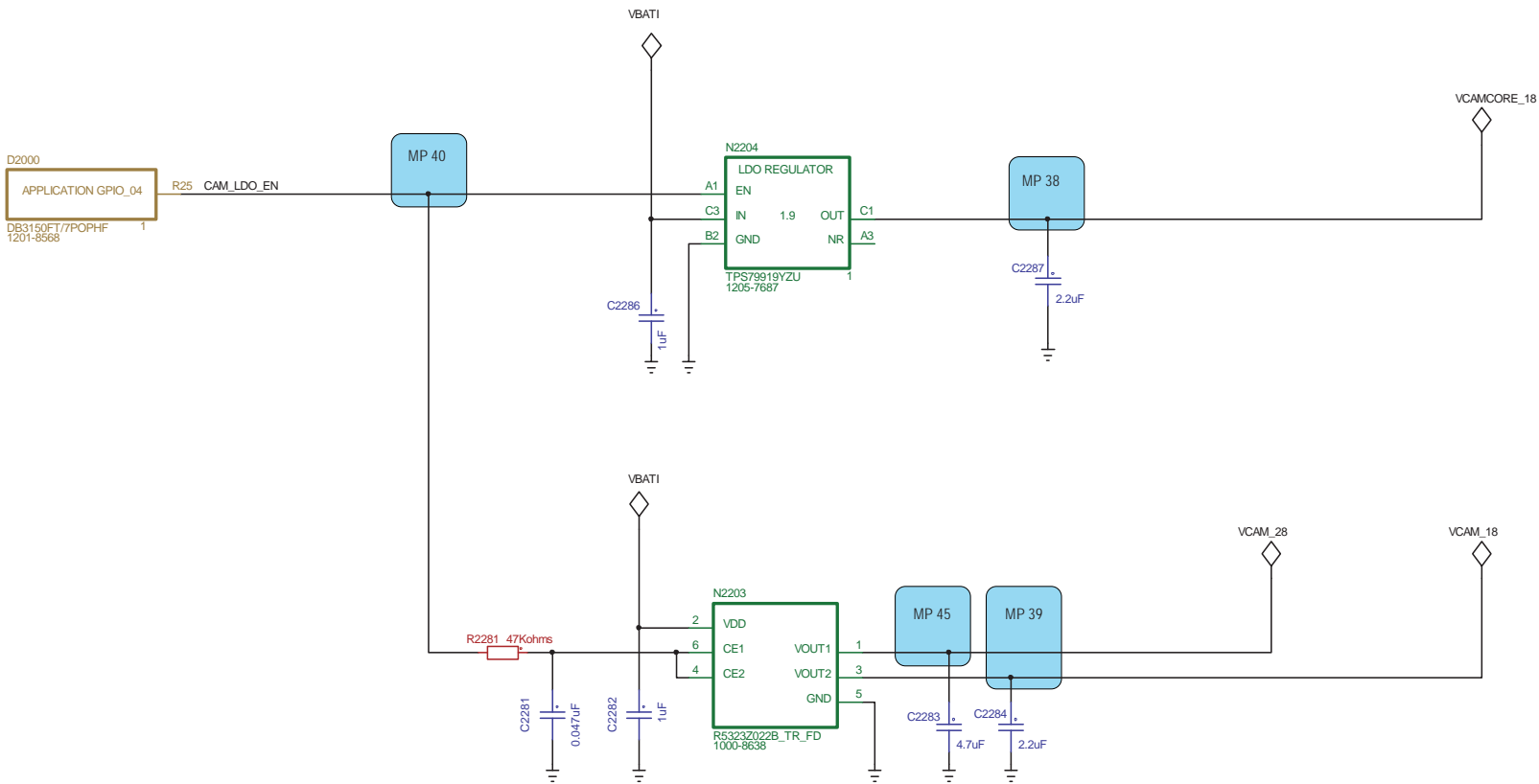
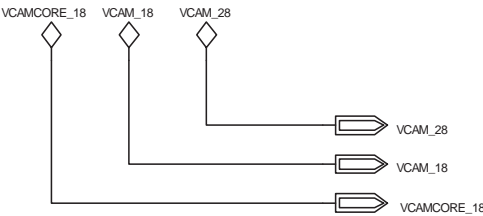
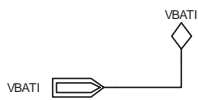


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Application & System Performance	
Power Top	
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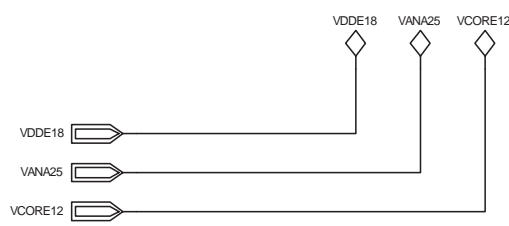
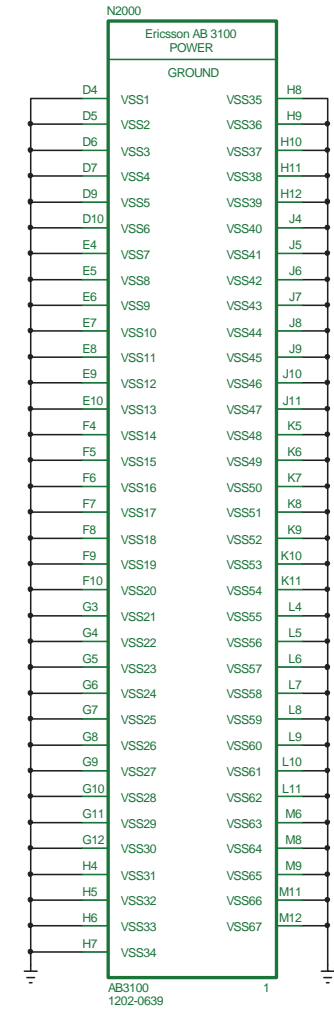
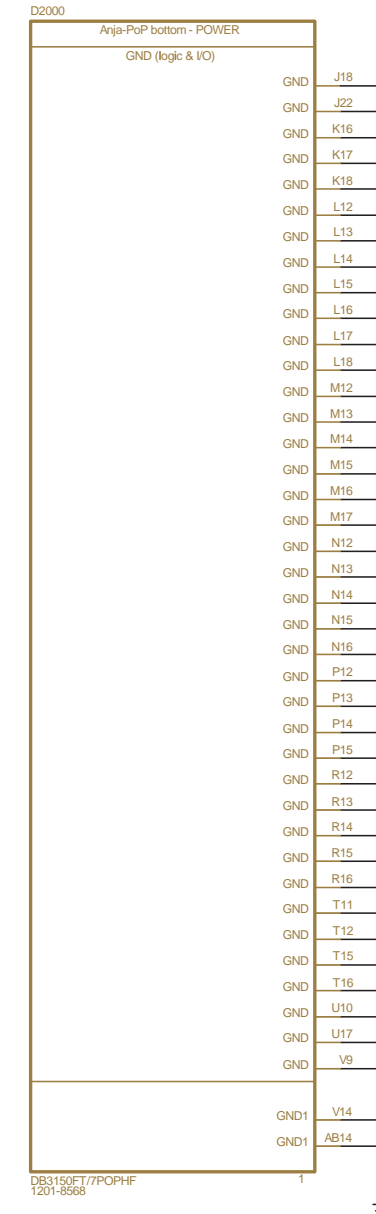
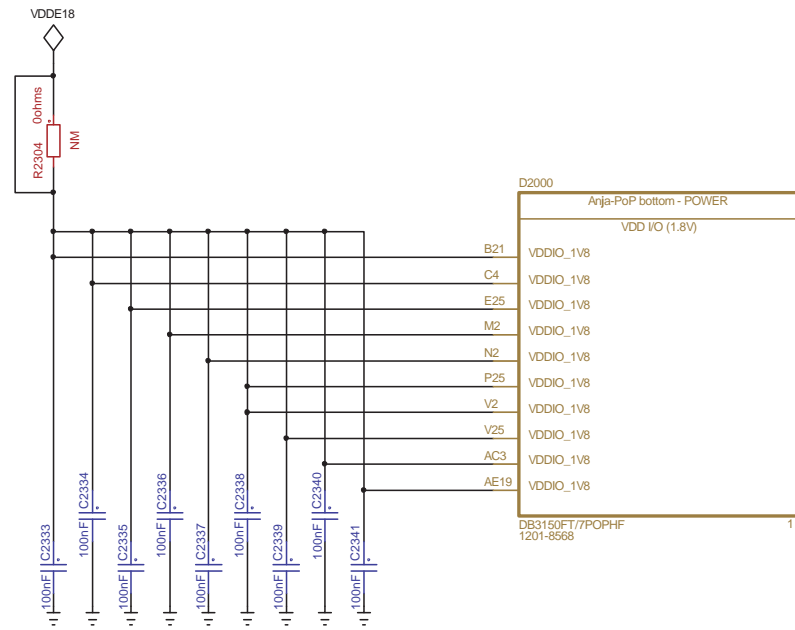
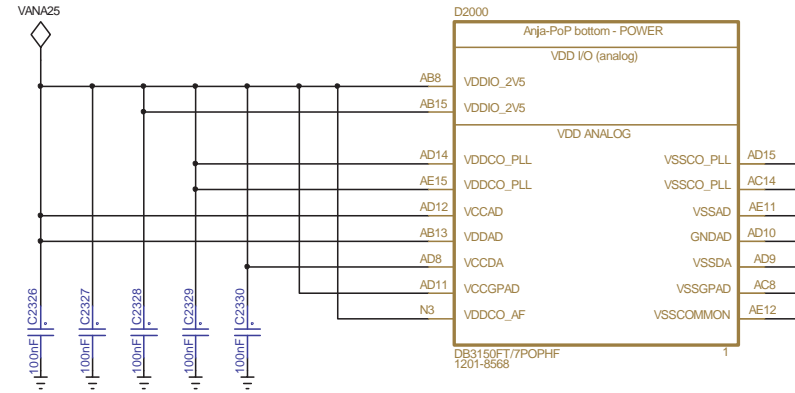
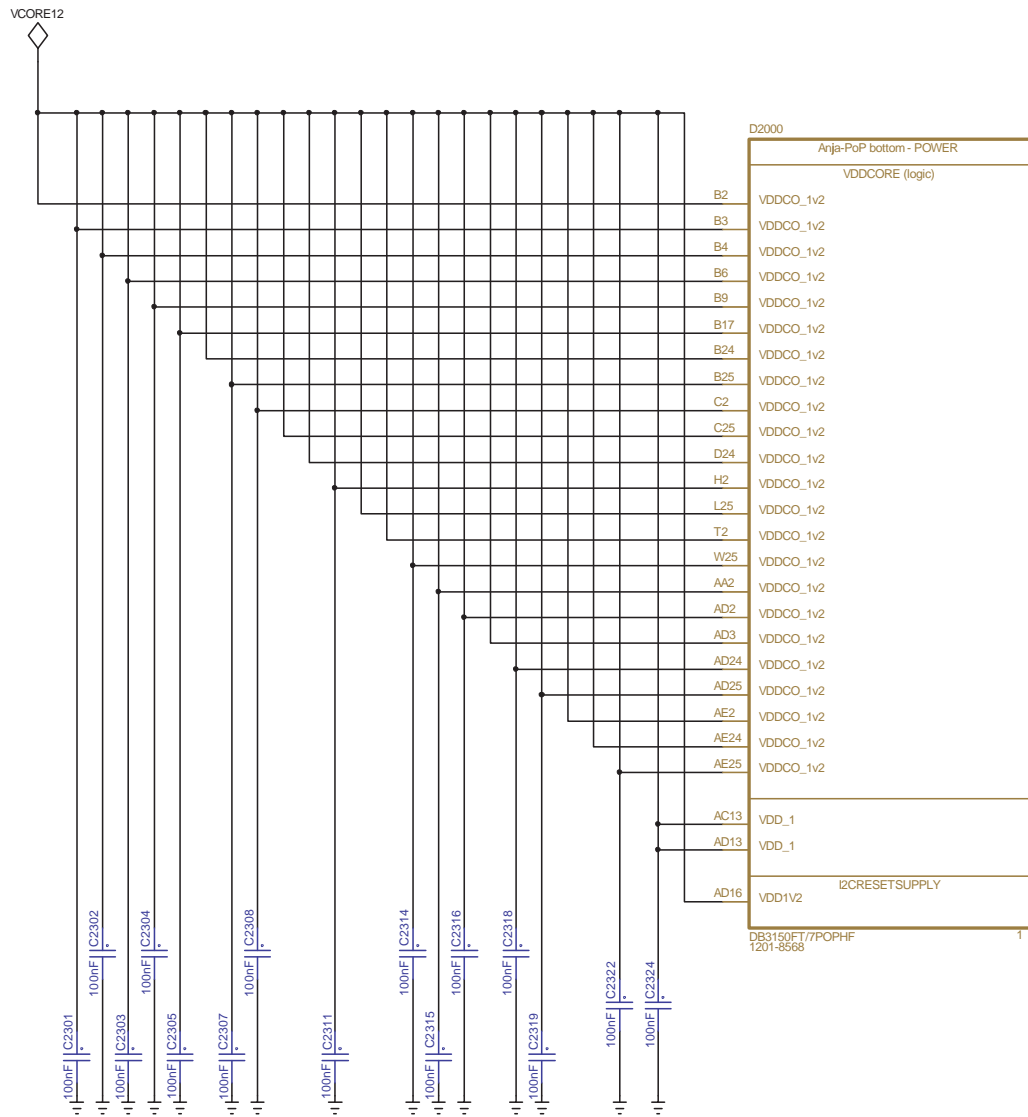




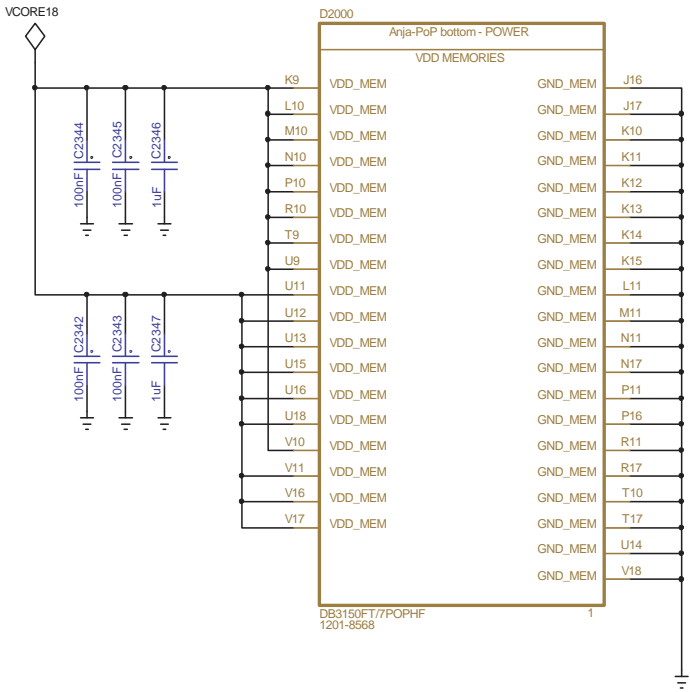
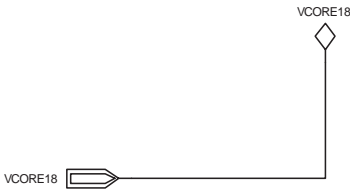
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Power -Camera	
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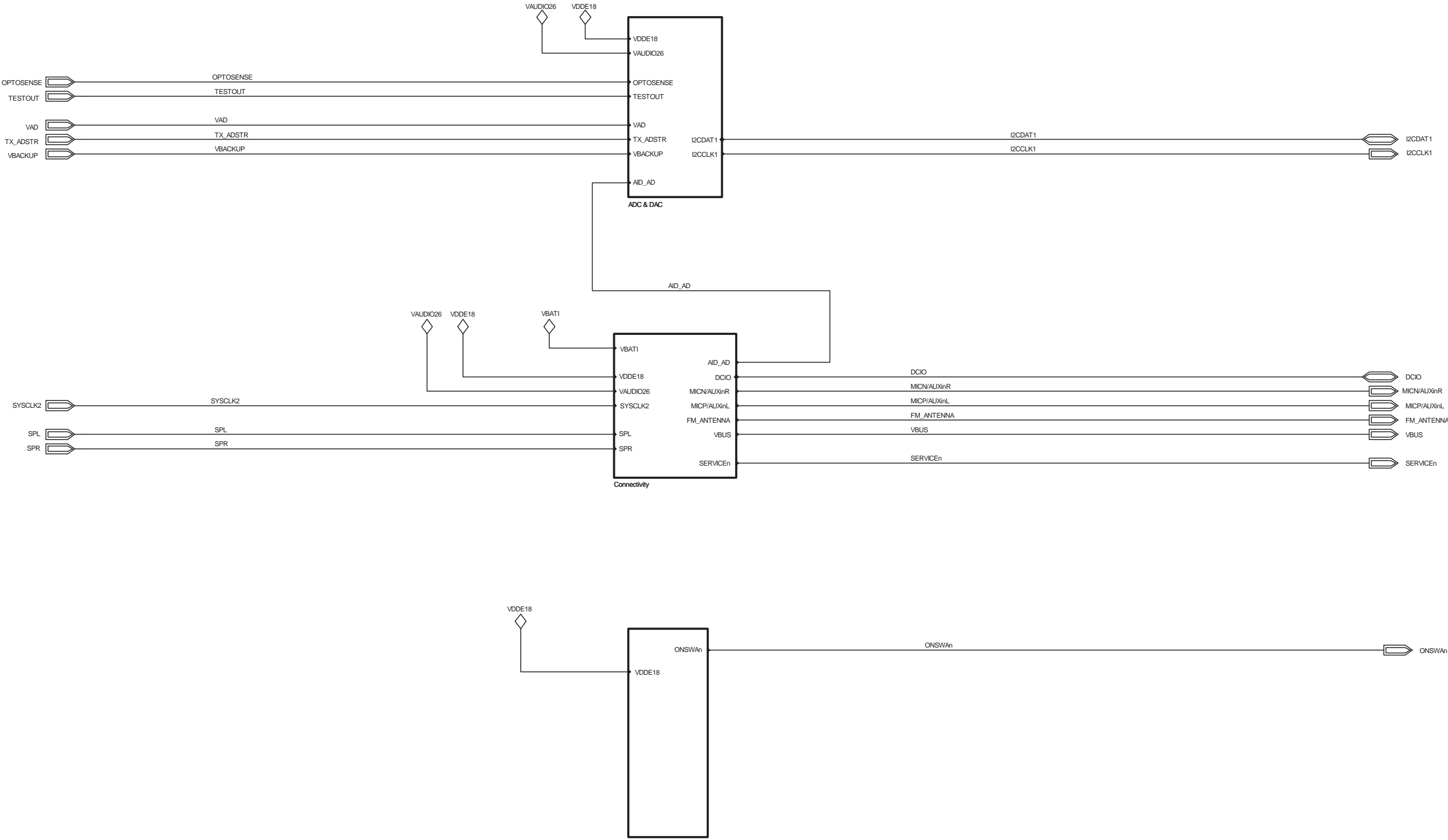


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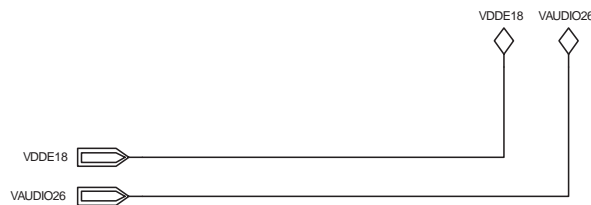
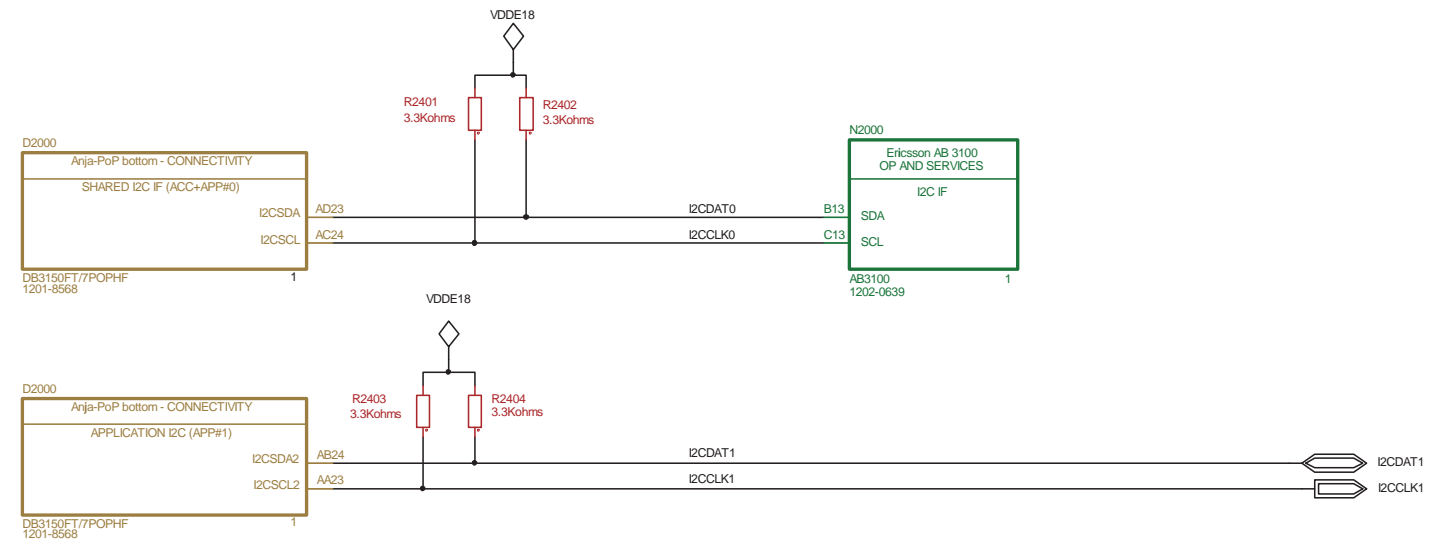
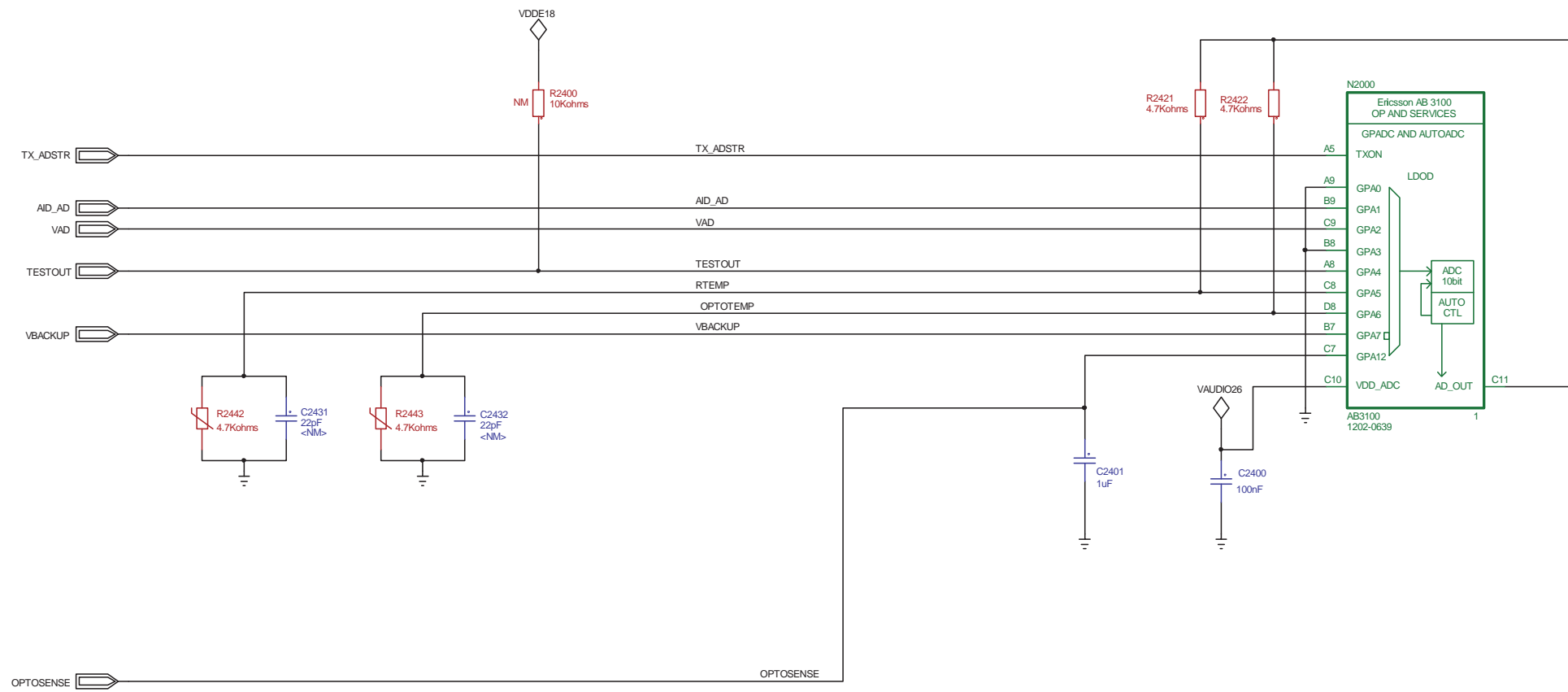


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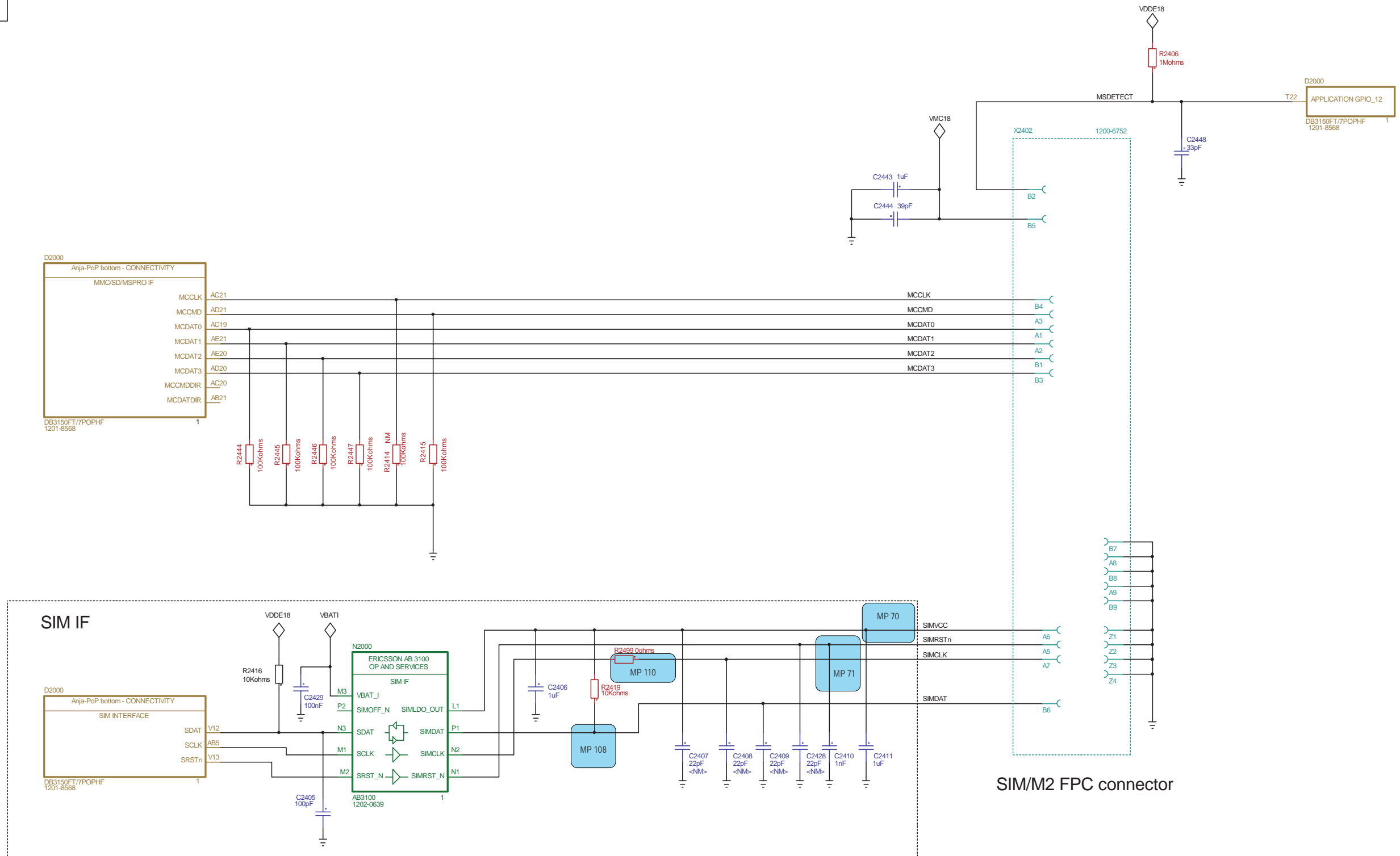
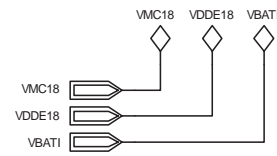




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Application & System Performance Connectivity Top	
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Application & System Performance	
Connectivity - ADC & I2C	
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Connectivity - Cards	
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<b>Application &amp; System Performance Connectivity - USB, SYScon</b>	
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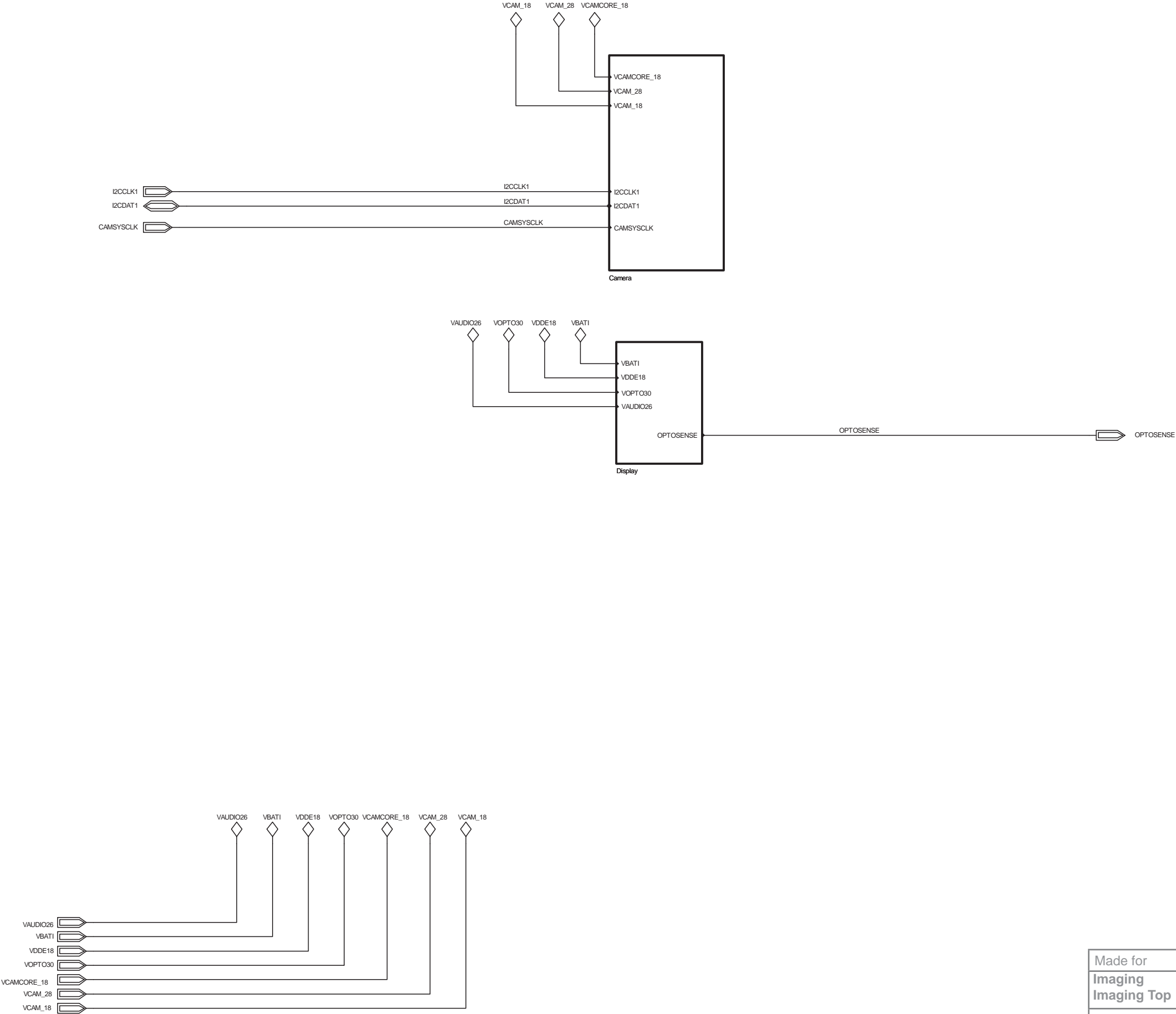


Figure 10 illustrates the Application and Access GPIOs. The diagram shows two rows of GPIO pins, each connected to a D2000 device. The top row contains Application GPIOs 02 through 14, and the bottom row contains Access GPIOs 10 through 23. Each pin is labeled with its name, a connection label (e.g., V15, P24), and its pin number (e.g., 1, 1201-8568).

GPIO Name	Connection Label	Pin Number
APPLICATION GPIO_02	V15	1
APPLICATION GPIO_06	P24	1
APPLICATION GPIO_07	N25	1
APPLICATION GPIO_08	R23	1
APPLICATION GPIO_09	R22	1
APPLICATION GPIO_10	T24	1
APPLICATION GPIO_13	R18	1
APPLICATION GPIO_14	T14	1
ACCESS GPIO_10	U3	1
ACCESS GPIO_13	W5	1
ACCESS GPIO_14	W2	1
ACCESS GPIO_15	V4	1
ACCESS GPIO_17	Y5	1
ACCESS GPIO_23	U24	1

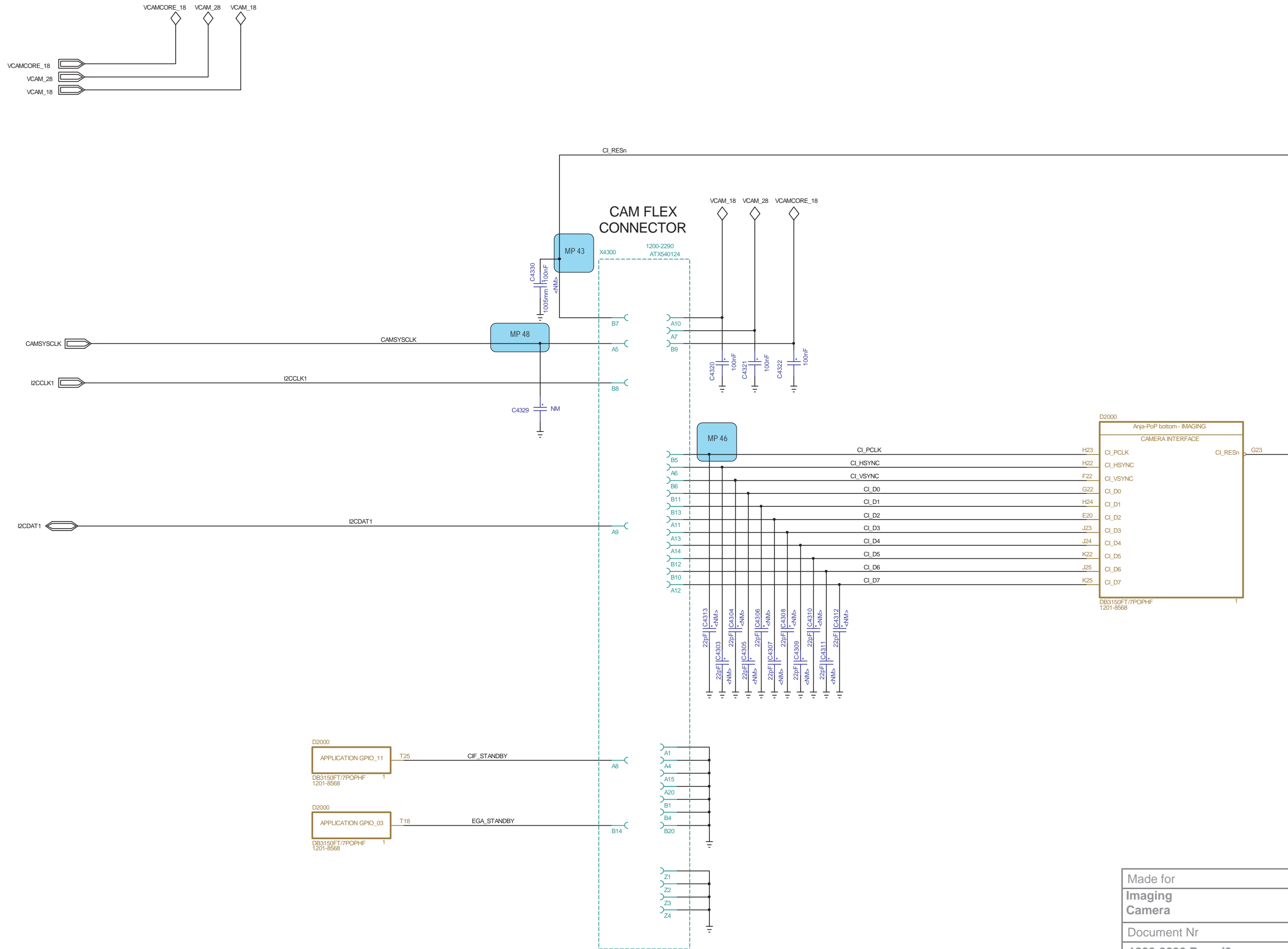
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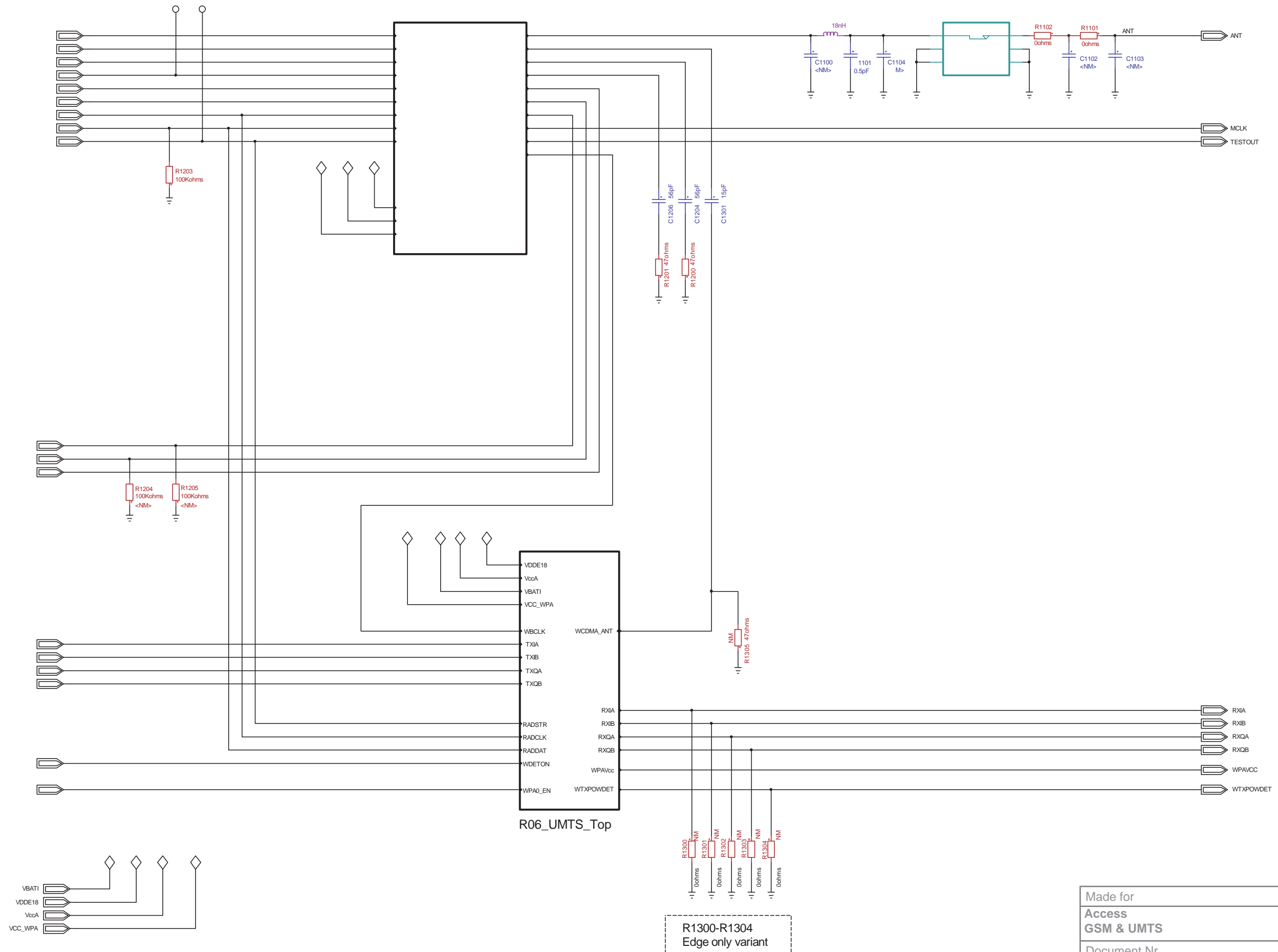
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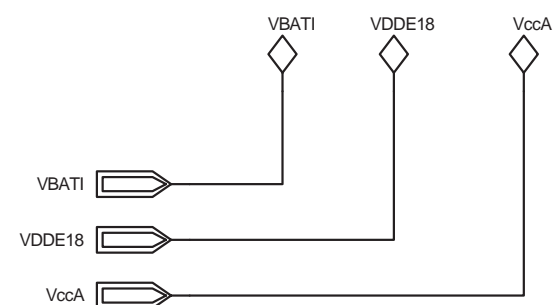
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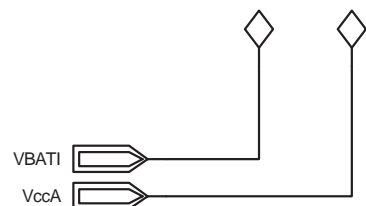
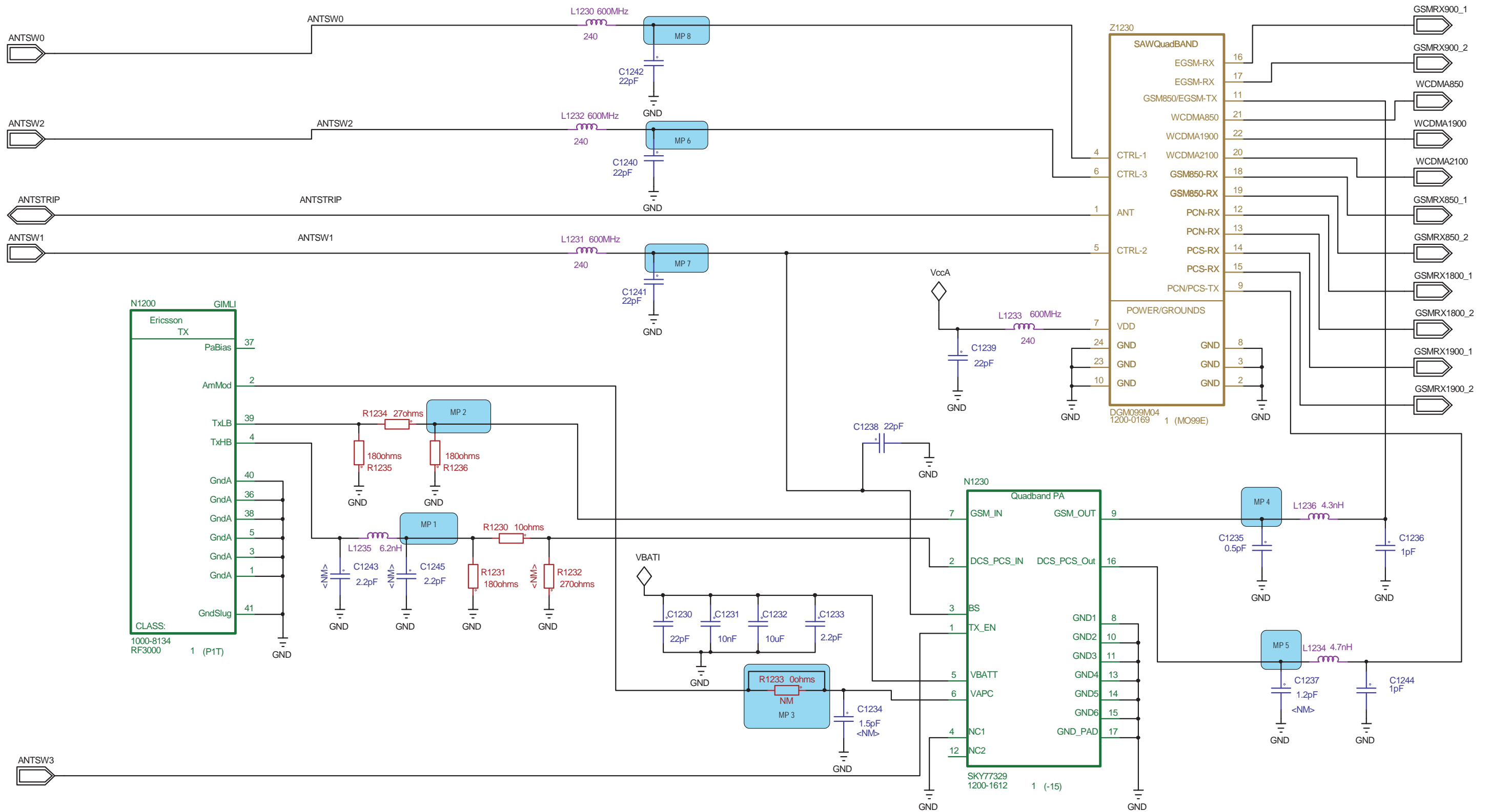


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Access	
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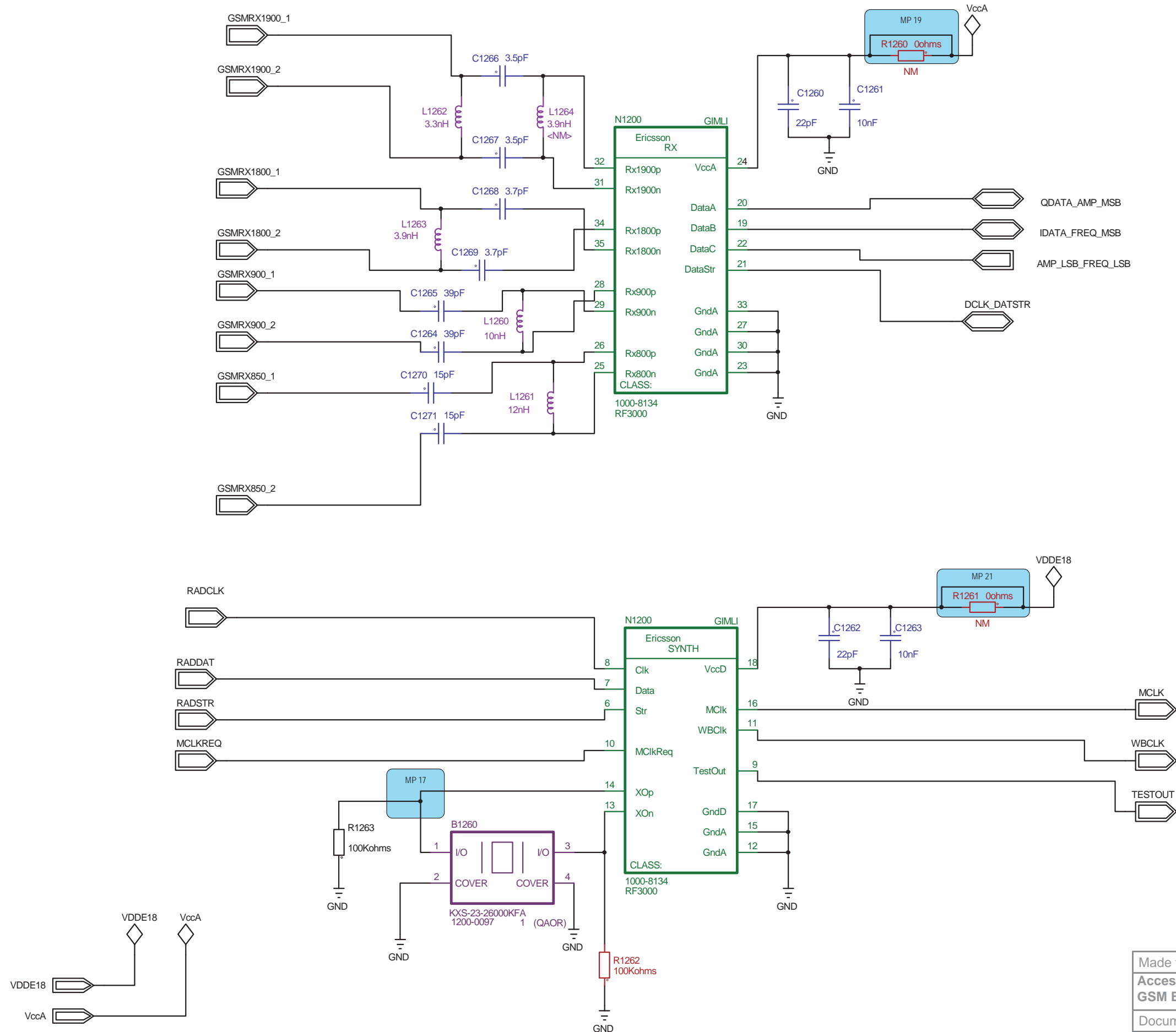




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Document Nr	Revision
<b>1200-9030 Page R3</b>	<b>2</b>

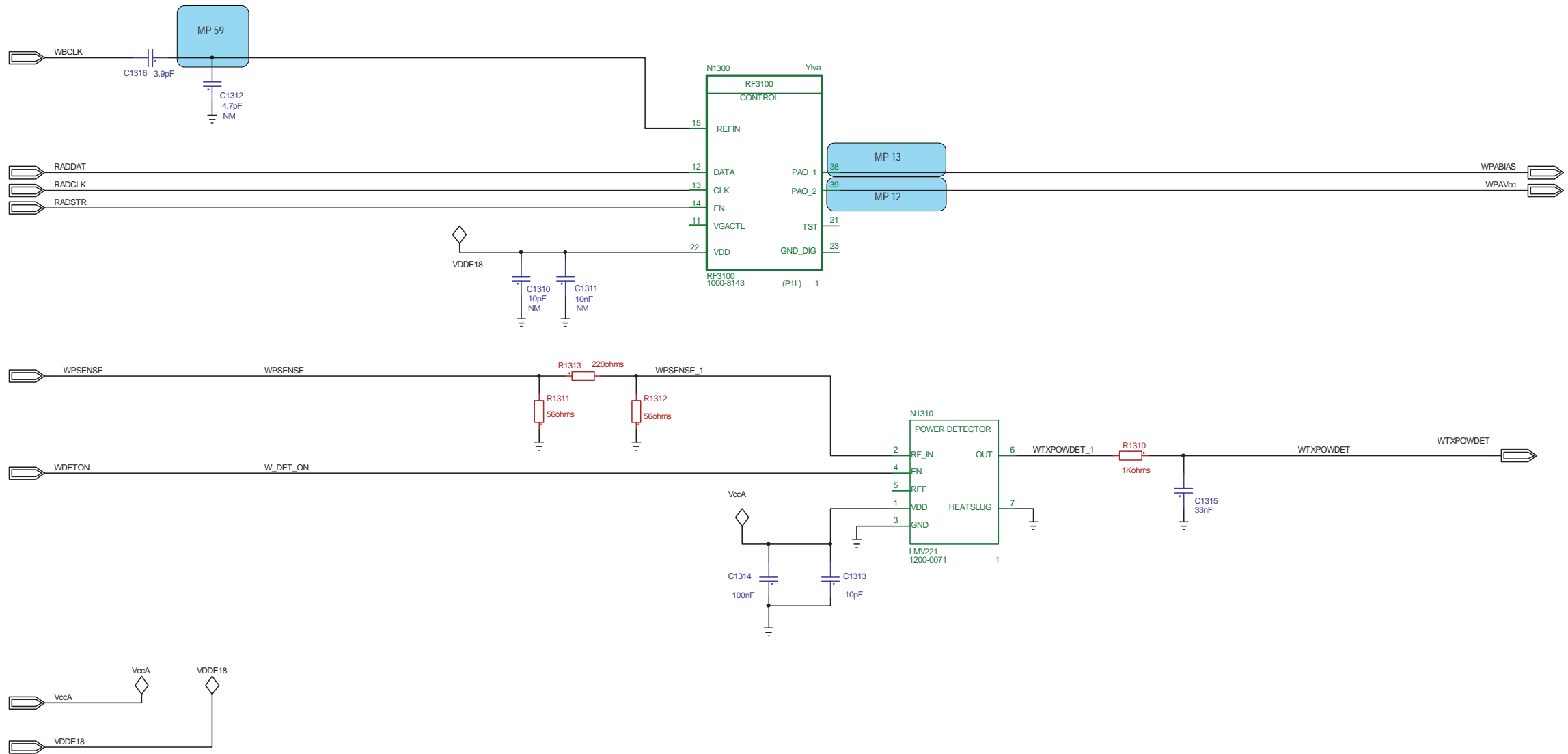


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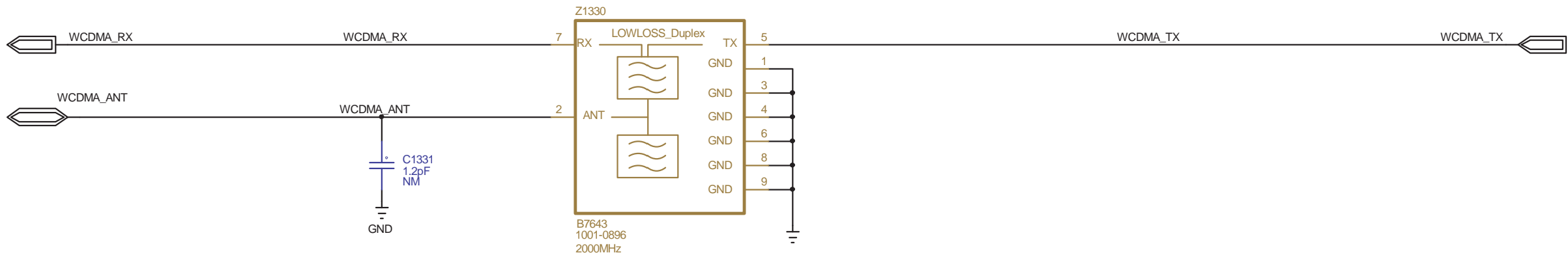
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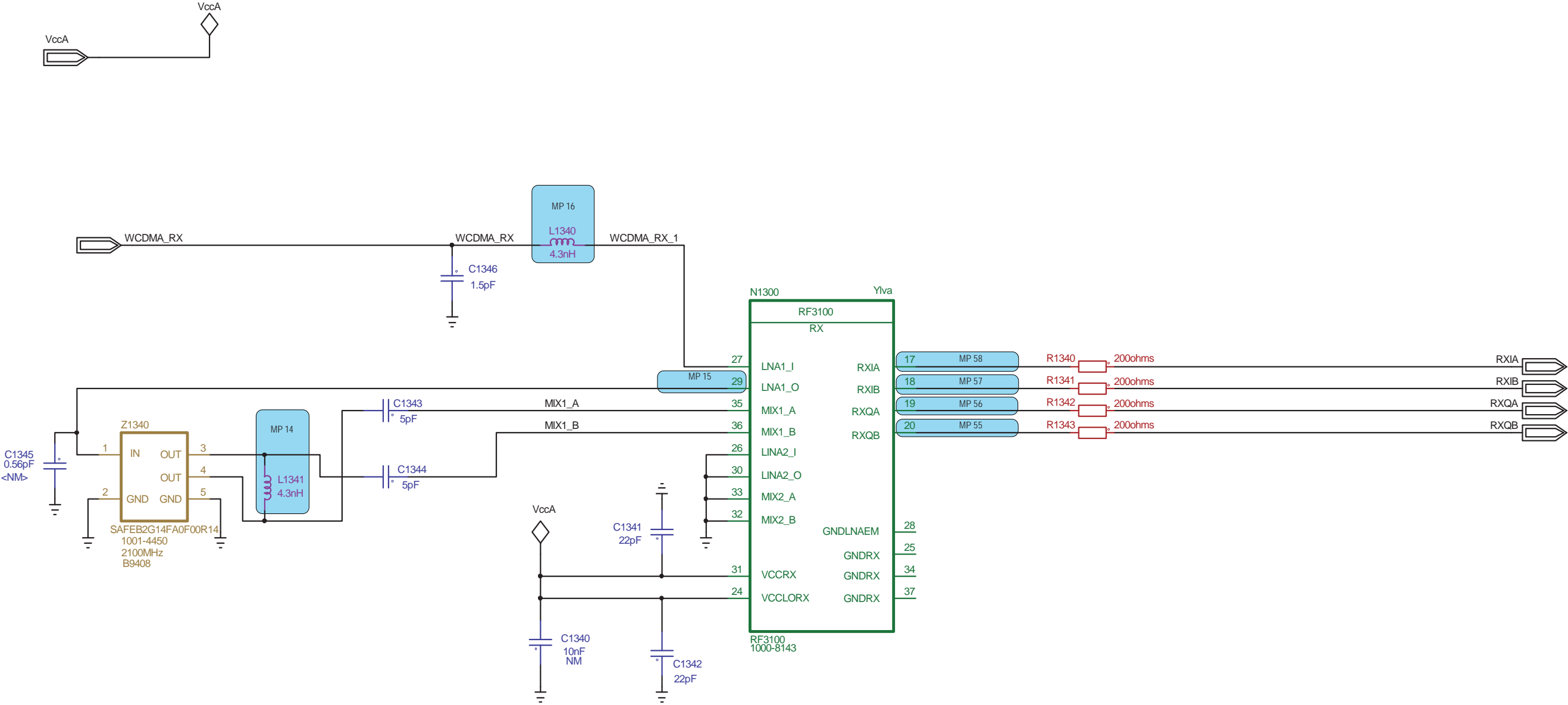


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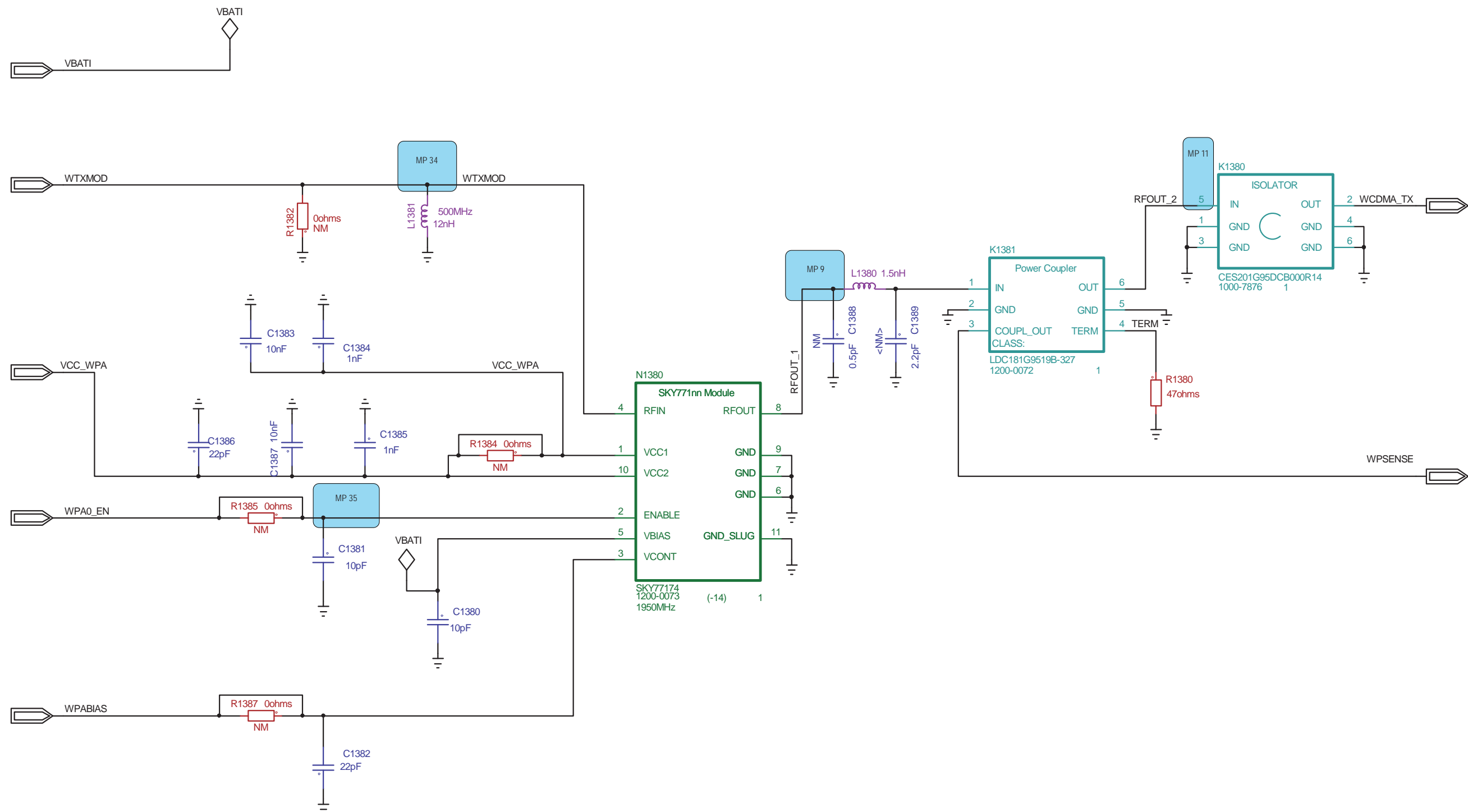


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Document Nr	Revision
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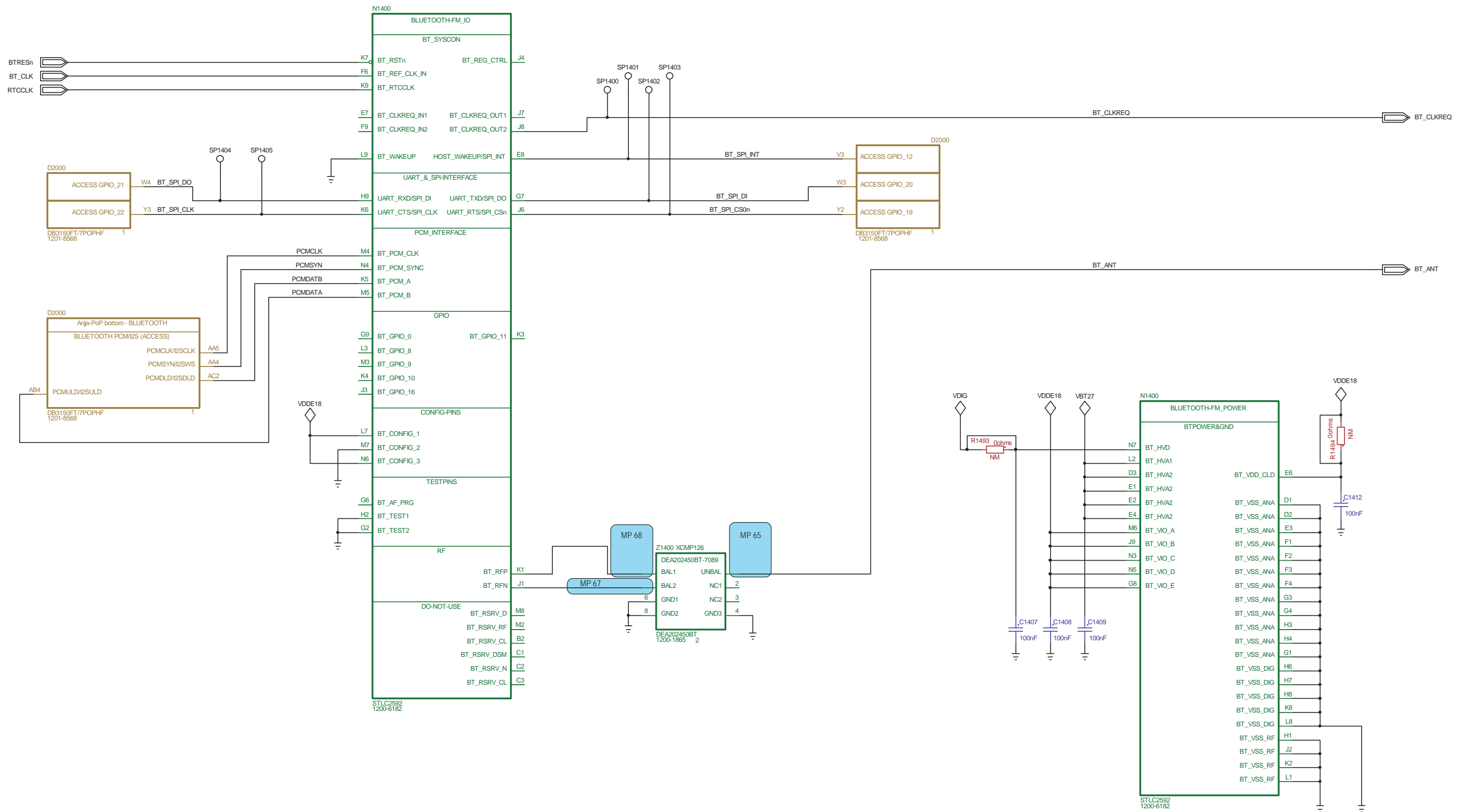


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Document Nr	Revision
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1217-3942 rev. 1 74 (119)

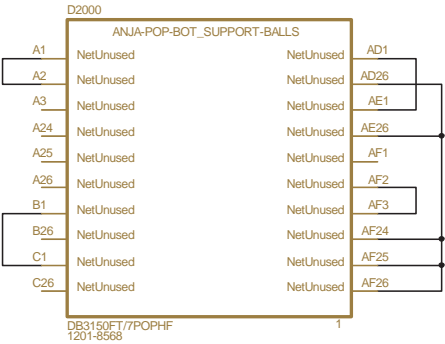
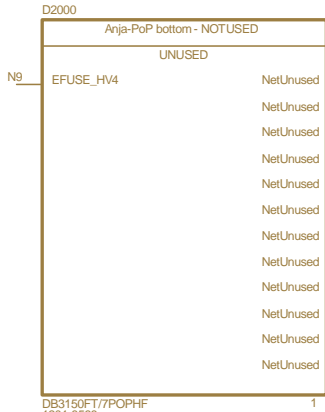
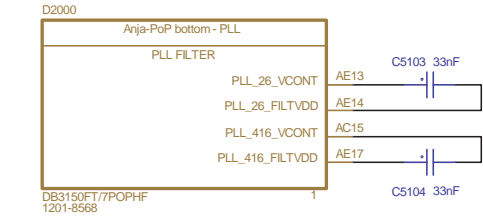
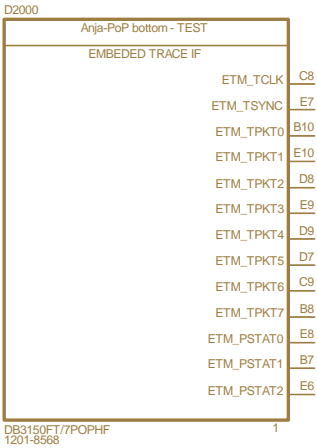
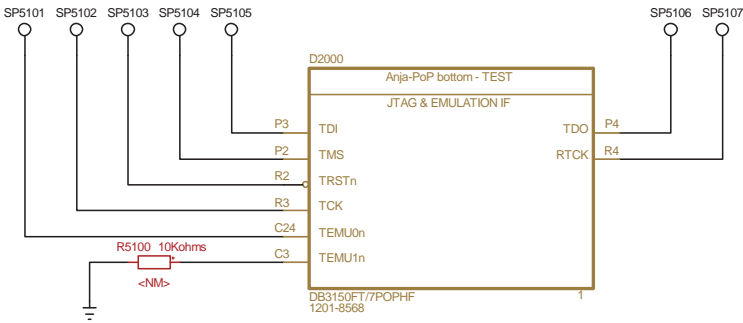


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Access	
UMTS PA	
Document Nr	Revision
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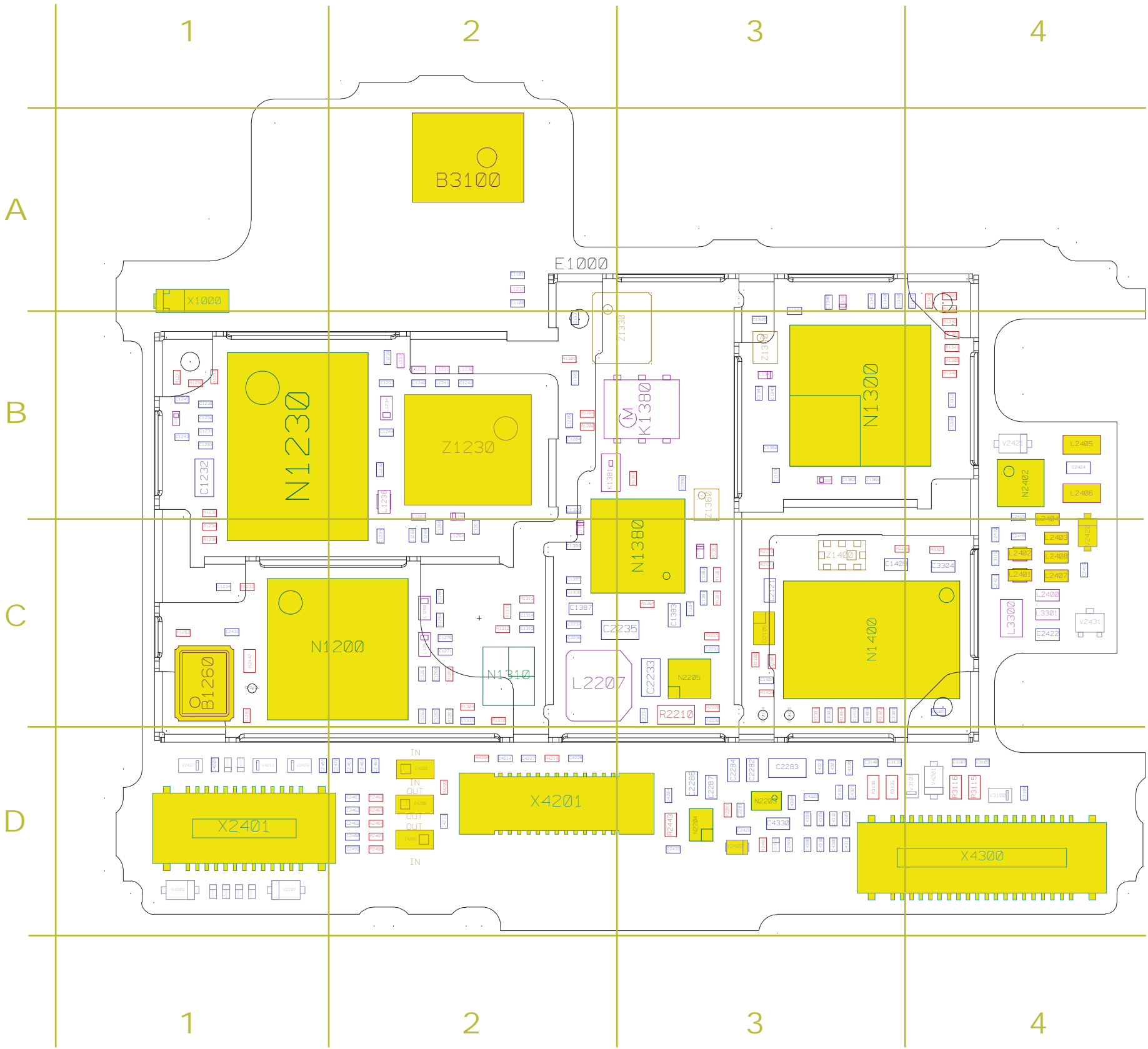


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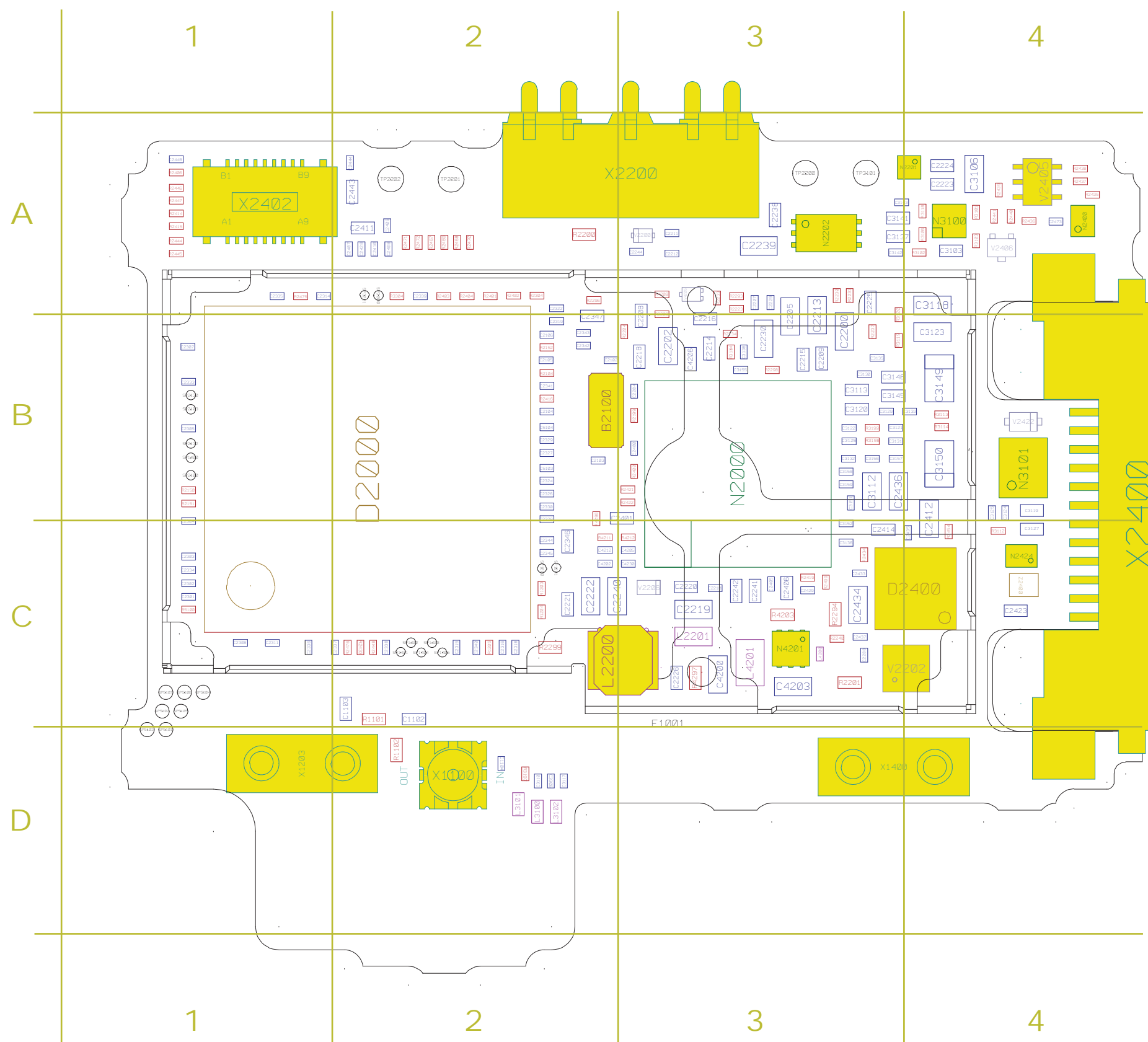


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Test	
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B3100	1200-2390	A2	C1386	1000-0049	C2	K1381	1200-0072	B2	R1235	1000-0235	C1
C1101	1200-4295	A2	C1387	1000-0057	C2	L1230	1000-2593	B2	R1236	1000-0235	B1
C1204	1000-6080	B2	C1407	1000-0048	C3	L1231	1000-2593	B2	R1262	1000-0231	C1
C1206	1000-6080	B2	C1408	1000-0048	C3	L1232	1000-2593	B2	R1263	1000-0231	C1
C1230	1000-0049	B1	C1409	1000-0336	C3	L1233	1000-2593	B2	R1310	1000-0172	C2
C1231	1000-0045	B1	C1412	1000-0048	C3	L1234	1000-0113	B2	R1311	1000-4037	C2
C1232	1000-0061	B1	C2121	1000-6849	C3	L1235	1201-2742	B1	R1312	1000-4037	C2
C1233	1000-6070	B1	C2231	1000-0049	C3	L1236	1201-2436	B2	R1313	1000-0237	C2
C1235	1200-4295	C2	C2232	1000-0048	C3	L1237	1000-3112	A2	R1340	1000-4102	B4
C1236	1001-1173	B2	C2233	1000-0061	C3	L1260	1000-3615	C2	R1341	1000-4102	B4
C1238	1000-0049	B1	C2234	1000-0048	C3	L1261	1000-3616	C2	R1342	1000-4102	B4
C1239	1000-0049	B2	C2235	1000-0039	C3	L1262	1001-0863	B2	R1343	1000-4102	A4
C1240	1000-0049	B2	C2236	1000-0048	C2	L1263	1200-0742	B2	R1380	1000-0267	B3
C1241	1000-0049	B2	C2281	1000-0069	D3	L1340	1201-2630	A3	R2100	1000-4164	C3
C1242	1000-0049	B2	C2282	1000-0062	D3	L1341	1201-2630	B3	R2101	1000-0231	C3
C1244	1001-1173	B2	C2283	1000-0039	D3	L1360	1001-1242	B3	R2119	1000-0231	C3
C1260	1000-0049	C2	C2284	1000-6849	D3	L1380	1001-0366	C2	R2121	1000-0378	C3
C1261	1000-0045	C2	C2286	1000-0062	D3	L1381	1001-0371	C3	R2220	1000-0231	C3
C1262	1000-0049	C2	C2287	1000-6849	D3	L2207	1200-0092	C2	R2281	1000-0382	D3
C1263	1000-0045	C2	C2415	1000-6842	B4	L2400	1200-6898	C4	R2401	1000-0243	A2
C1264	1000-6079	C2	C2416	1000-6842	C4	L2401	1001-2140	C4	R2402	1000-0243	A2
C1265	1000-6079	C2	C2420	1200-1100	C4	L2402	1001-2140	C4	R2403	1000-0243	A2
C1266	1201-5909	C2	C2421	1200-1100	C4	L2403	1200-0317	C4	R2404	1000-0243	A2
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C1381	1000-0066	C3	C4321	1000-0048	D3	R1200	1000-0232	B2	Z4201	1200-1824	D2
C1382	1000-0049	C3	C4322	1000-0048	D3	R1201	1000-0232	B2	Z4202	1200-1824	D2
C1383	1000-0057	C3	D2105	1200-0425	C3	R1230	1000-0378	B1			
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R - Replaceable  
See Appendix for  
more information.



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C2104	1000-0050	B2	C2335	1000-0048	A1	C3143	1000-0056	A3	R2439	1000-0172	A4
C2105	1000-0060	B2	C2336	1000-0048	C1	C3145	1000-0340	B3	R2440	1000-0230	A4
C2106	1000-0066	B2	C2337	1000-0048	C2	C3146	1000-0340	B3	R2441	1000-0382	A4
C2200	1000-0039	B3	C2338	1000-0048	C2	C3149	1200-4608	B4	R2444	1000-0231	A1
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C2216	1000-0051	B3	C2406	1000-0051	C3	D2400	1200-1694	C4	R3101	1000-0231	A4
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C2238	1000-0051	A3	C2443	1000-0051	A2	N2400	1000-0369	A4	R3198	1000-0181	B3
C2239	1000-0061	A3	C2444	1000-6079	A2	N2424	1200-0454	C4	R3199	1000-0377	B3
C2240	1000-0061	C2	C2448	1000-0056	A1	N3100	1000-0372	A4	R3304	1000-0243	A2
C2241	1200-0879	C3	C2473	1000-0048	A4	N3101	1000-0198	B4	R4203	1000-0264	C3
C2242	1000-0051	C3	C3103	1000-0051	A4	N4201	1001-0077	C3	R4209	1000-0175	A3
C2244	1000-0048	A3	C3106	1000-0061	A4	R1101	1000-0179	C2	R4211	1200-1061	C2
C2301	1000-0048	C1	C3110	1000-6078	D2	R1102	1000-0179	D2	R4212	1000-4160	C3
C2302	1000-0048	C1	C3112	1000-0061	B3	R1203	1000-0231	C2	R4297	1000-0179	C3
C2303	1000-0048	C1	C3113	1000-0340	B3	R2104	1000-4034	B2	V2200	1000-0282	A3
C2304	1000-0048	B1	C3117	1000-0066	D2	R2150	1000-0243	A1	V2202	1200-0145	C3
C2305	1000-0048	B1	C3118	1000-0039	A4	R2151	1000-0243	A1	V2206	1001-0073	C3
C2307	1000-0048	B1	C3119	1000-6849	B4	R2200	1000-4380	A2	V2405	1000-0270	A4
C2308	1000-0048	C1	C3120	1000-0340	B3	R2201	1000-4376	C3	V2406	1000-0271	A4
C2311	1000-0048	C1	C3121	1000-0048	B3	R2203	1000-0376	A3	V4205	1200-7850	A3
C2314	1000-0048	A1	C3122	1000-0155	B3	R2204	1000-0249	B3	X1100	1000-8181	D2
C2315	1000-0048	C2	C3123	1000-0061	B4	R2240	1000-0231	C3	X1203	1200-4733	D1
C2316	1000-0048	C2	C3124	1000-0048	B4	R2406	1000-0265	A1	X1400	1200-4733	D3
C2318	1000-0048	C2	C3125	1000-0048	B4	R2415	1000-0231	A1	X2200	1201-9869	A3
C2319	1000-0048	B2	C3127	1000-6849	C4	R2416	1000-0175	B2	X2400	1001-0890	B4
C2322	1000-0048	A2	C3131	1000-0048	B3	R2419	1000-0175	C3	X2402	1200-6752	A1
C2324	1000-0048	B2	C3132	1000-0048	B3	R2421	1000-0249	B3	Z2400	1201-6833	C4
C2326	1000-0048	B2	C3133	1000-0048	B4	R2422	1000-0249	B3	R - Replaceable See Appendix for more information		
C2327	1000-0048	B2	C3135	1000-0048	B3	R2433	1000-0231	C2			
C2328	1000-0048	B2	C3136	1000-0056	C3	R2434	1000-0240	C3			
C2329	1000-0048	B2	C3137	1000-0052	A3	R2435	1000-0231	A4			

## W890 Overview



## General Information

Size: 104 x 46.5 x 9.9 mm  
Weight: 78 grams  
Screen: 262,144 color TFT  
Resolution: 240 x 320 pixels  
Size: 2 inches

Colors:  
Mocha Brown  
Sparkling Silver  
Espresso Black

Phone memory: Up to 28 MB  
Memory Stick Micro™ (M2™) support  
Talk time GSM: Up to 9 hrs 30 min  
Standby time GSM: Up to 360 hrs  
Talk time UMTS: Up to 4 hrs 30 min  
Standby time UMTS: Up to 310 hrs  
Video call time: Up to 3 hrs  
Music listening time: Up to 20 hrs

### Networks

UMTS/HSDPA 2100  
GSM/GPRS/EDGE 850/900/1800/1900

### Camera

3.2 megapixel camera  
3.2x digital zoom  
Picture blogging  
Video blogging  
Video recording  
PictBridge printing

### Music

Walkman® player  
SensMe™  
Bluetooth stereo (A2DP)  
Mega Bass™  
Music tones (MP3/AAC)  
PlayNow™  
TrackID™

### Internet

RSS feeds  
Access NetFront™ Web browser  
Communication  
Polyphonic ringtones  
Speakerphone  
Vibrating alert  
Video calling

### Messaging

Email  
Picture messaging (MMS)  
Predictive text input  
Sound recorder  
Text messaging (SMS)

### Design

Navigation key  
Picture wallpaper  
Wallpaper animation

### Entertainment

3D games  
Java  
FM radio with RDS  
Video streaming  
Video viewing

### Organiser

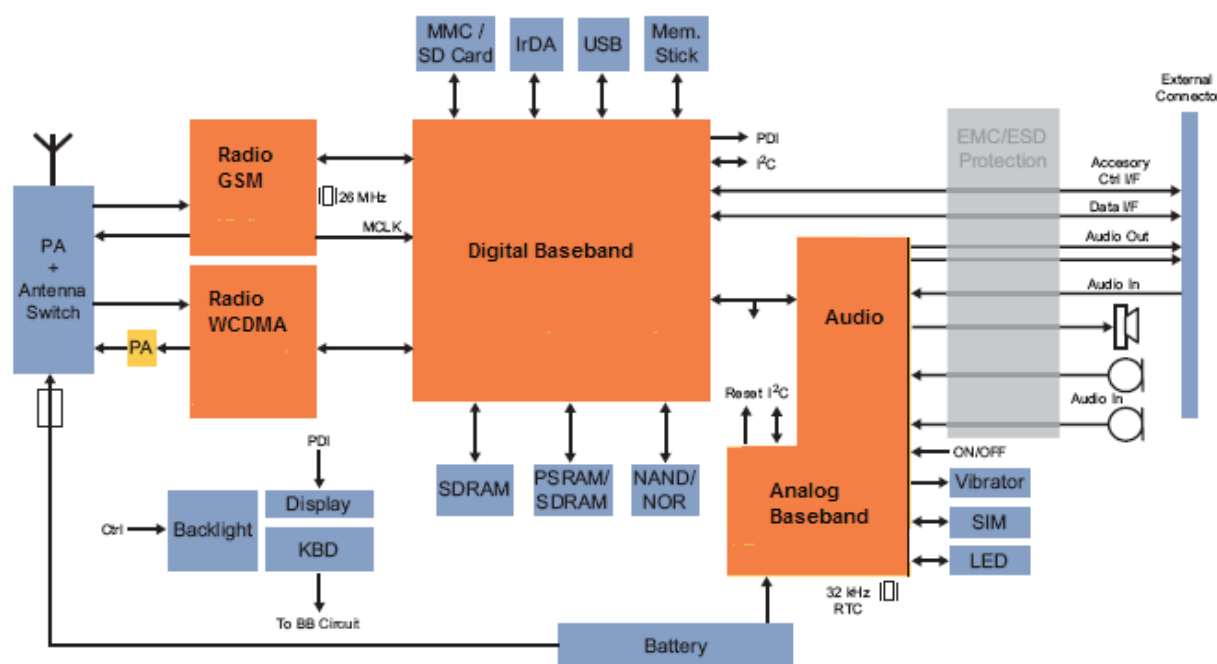
Alarm clock  
Calculator  
Calendar  
Flight mode  
Notes  
Phone book  
Stopwatch  
Tasks  
Timer

### Connectivity

Bluetooth™ technology  
Modem  
Synchronization  
USB mass storage  
USB support

## Hardware Overview

The W890 is using the U360 2.0 platform provided by Ericsson Mobile Platform (EMP)



## Baseband Part

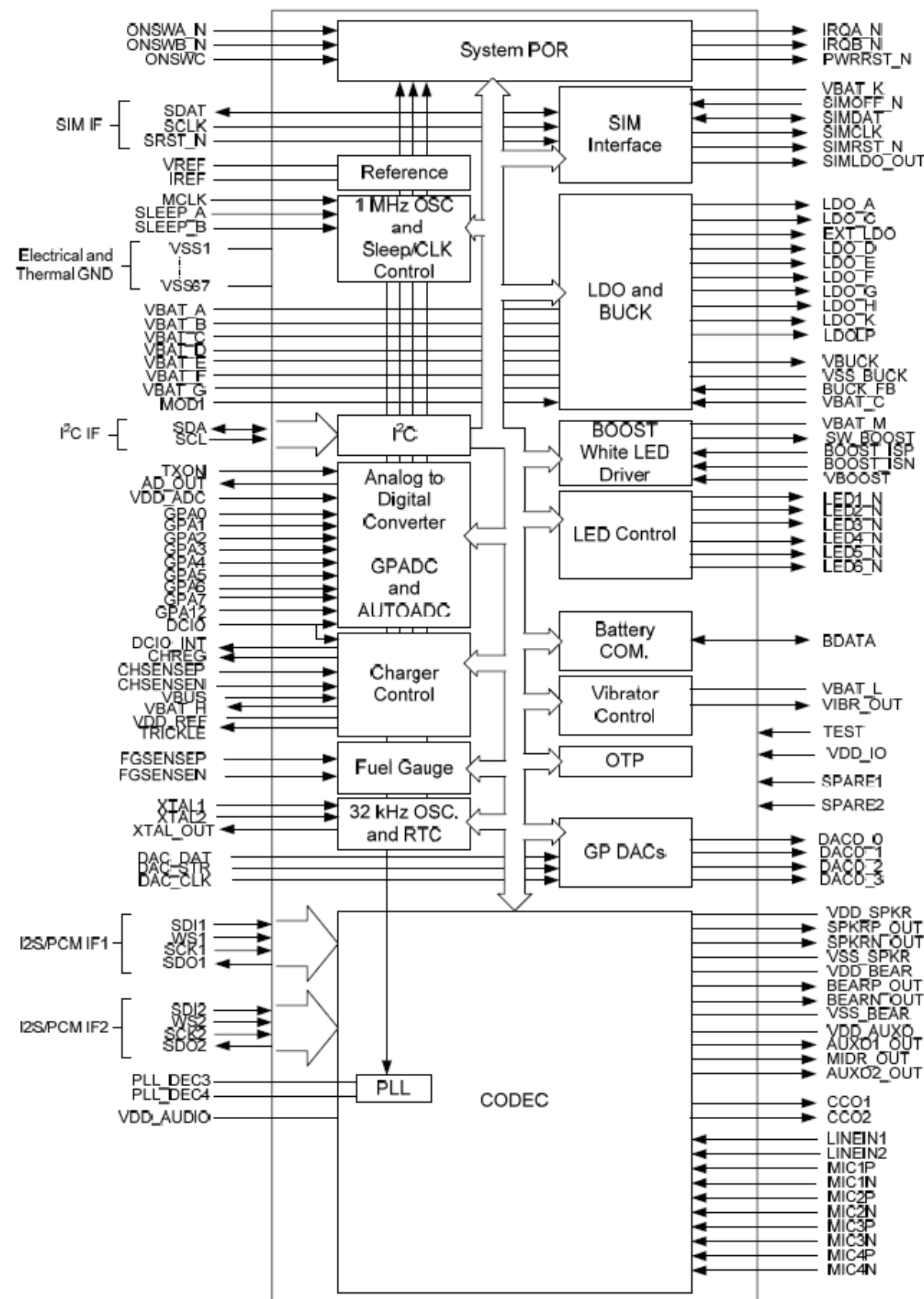
### Analog Baseband Controller Power Management N2000 (Vera)

This component is not replaceable on SL 4 because Baseband calibration is required. The analog baseband controller is a mixed digital and analog device that supports the following circuitry:

- Power management circuitry
- Voltage regulation circuitry
- Eight Low Dropout (LDO) regulators and low power regulator
- 600 mA integrated Buck regulator
- Boost step-up DC/DC converter for White Light Emitting Diode (WLED) driving
- Battery charging and communication circuitry
- Battery fuel gauging circuitry
- Analog-to-Digital Converter (ADC)
- SIM interface
- Six programmable LED drivers
- Accurate band gap reference
- Vibrator driver
- Real Time Clock (RTC)
- Eight-byte One-Time Programmable (OTP) memory
- Pulse Code Modulation (PCM) voice coder/decoder
- PCM audio coder/decoder
- Microphone interface
- Stereo line input
- Earphone driver
- Earpiece driver
- 8-Ω speaker driver / Stereo line output

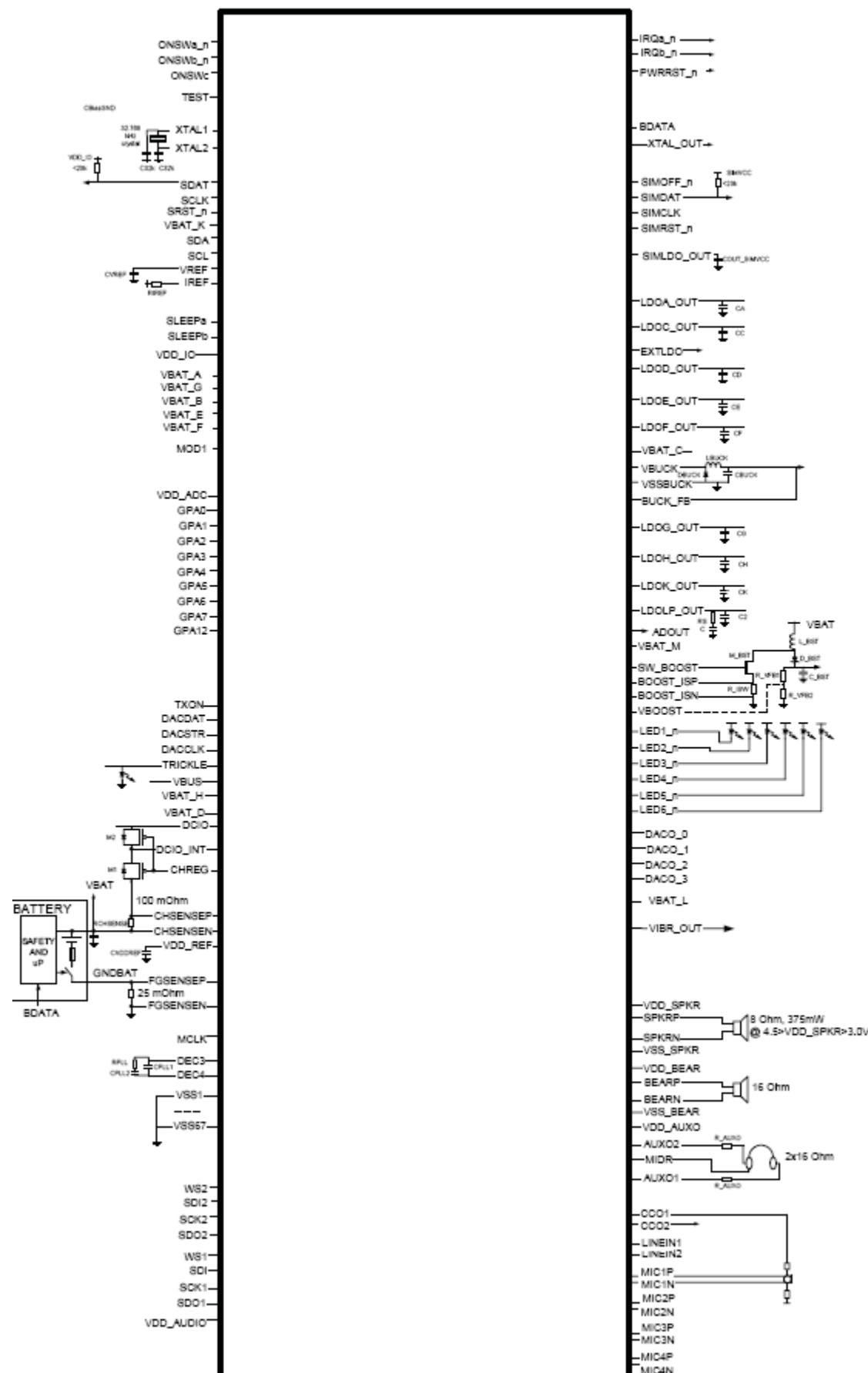
The analog baseband controller is controlled by an I2C™ interface. It also comprises the main power management circuits, equipped with a number of converters and regulators for generating the required supply voltages.

Functional Blocks of the Analog Baseband Controller.





Connection Diagram



## Charger Control

A programmable charger is used for battery charging.

Limits can be set for the output voltage at CHSENSE- and the output current from DCIO through the sense resistor to CHSENSE-.

The programmable charger is enabled or disabled by the assertion/negation of the external signal DCIO. Parts of the programmable charger are activated and deactivated depending on the level of VBAT. The rest of the programmable charger is activated and deactivated through I2C.

The programmable charger supports the following functions:

- Constant current charging
- Constant voltage charging
- Trickle charging
- PWM controlled charging
- Over-voltage and over current detection
- Watchdog termination
- DCIO assertion/removal detection
- Voltage and current measure functions
- Low resistive path (reverse mode)

The programmable charger is able to control the voltage and limit the current to a load seen at CHSENSE-. The programmable charger can also be run in PWM mode to turn the charging on and off in accordance with the particular period and duty cycle. When the charging is on, it is set to the current and voltage selected by I2C.

A low resistive path from VBAT to DCIO can be formed when DCIO is not detected. When this setting is done in the appropriate registers, a lowering of CHREG to 0 V turns on the external pass device. The pass device is automatically turned off when an external source is detected on DCIO, or when the watchdog termination block times out. The watchdog termination block must be active when the external switch is enabled, both in normal charging mode and in the low resistive path mode. The watchdog is set through the serial interface, and if it has not been set again before timeout, the watchdog turns off the external switch. The watchdog is disregarded during trickle charging.

When no battery is present, the system can be booted and supplied from DCIO by applying the correct voltage on DCIO.

## USB Charger

The analog baseband controller contains a standalone USB charger. The USB charger has a separate input and incorporates full functionality during low VBAT.

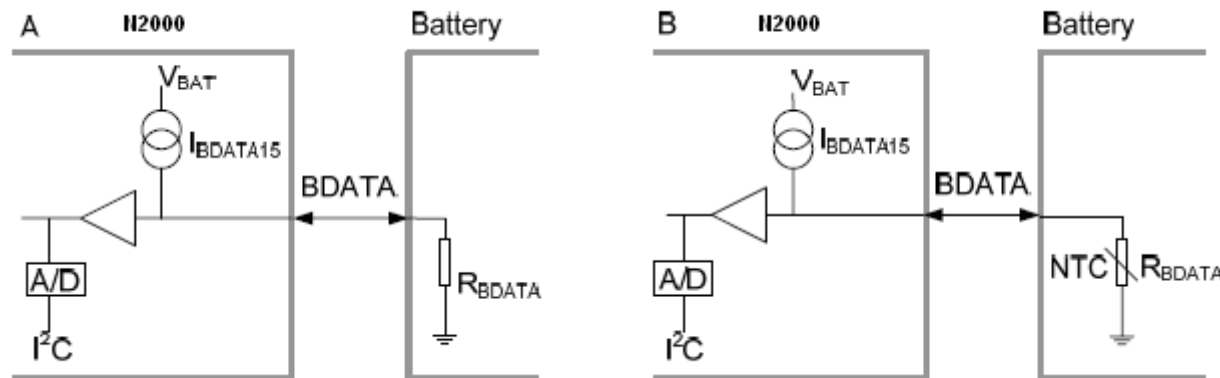
The programmable charger supports the following functions:

- Trickle charging
- Constant current charging
- Watchdog termination
- Trickle LED indication
- VBUS assertion/removal detection



## Resistance Identification and Temperature Measurement

The resistance identification mode utilizes the constant current source to feed the battery data output while monitoring the voltage at the battery data node with general purpose ADC. The conversion is started through I2C.

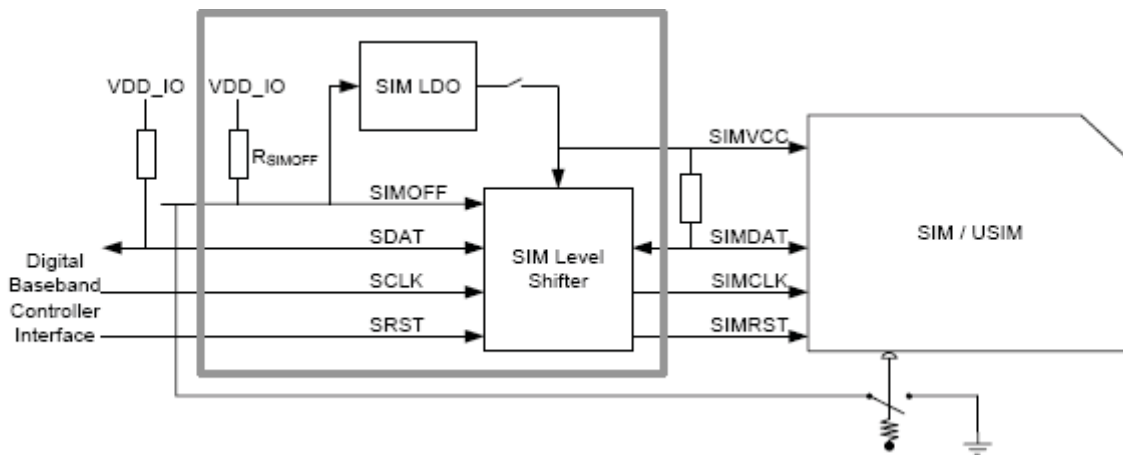


Resistance Identification (A) and Temperature Measurement (B)

## SIM Interface

The SIM interface supplies level shifting between the digital baseband controller and the SIM/USIM card. Moreover, hard-wired SIM deactivation functionality manages removal of a SIM card that has not been powered down.

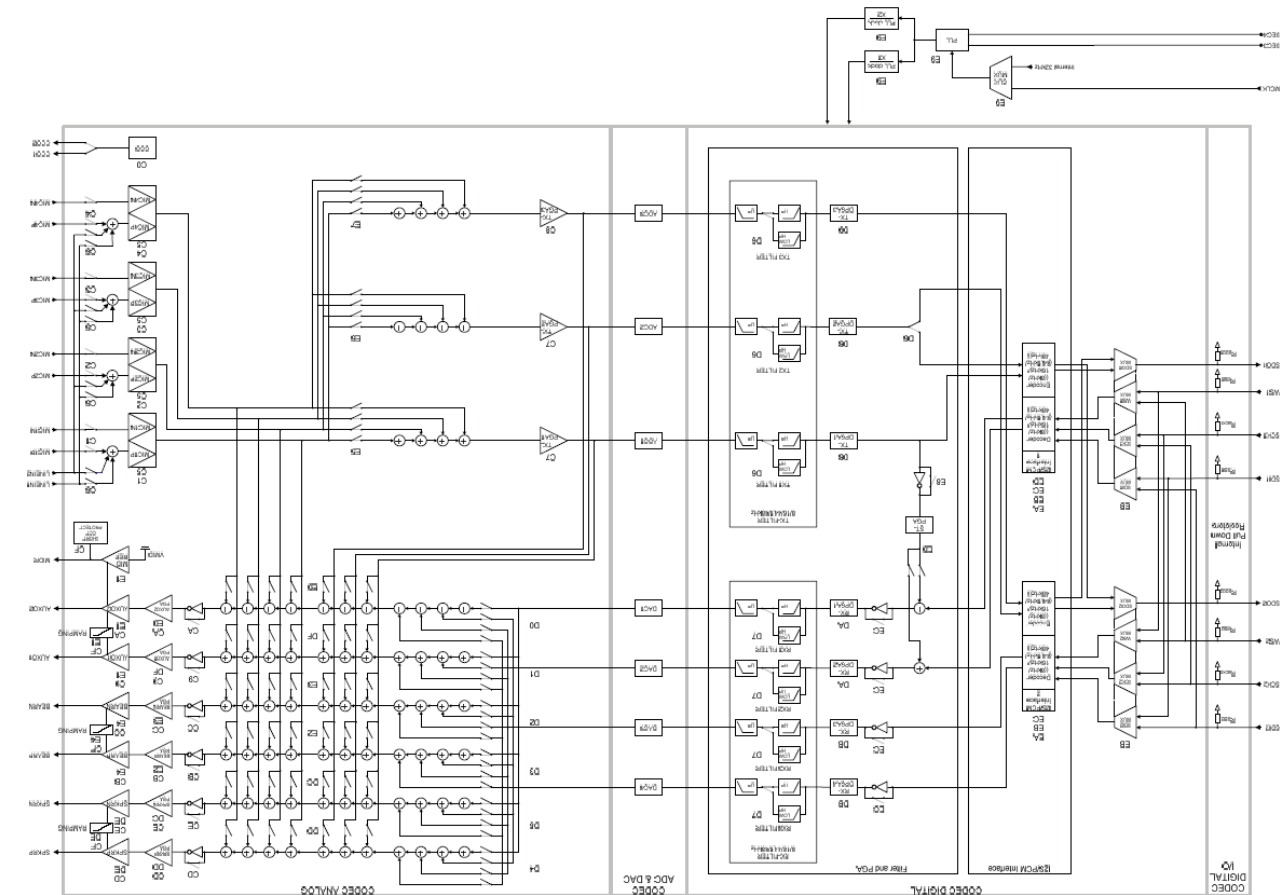
Block Diagram of the SIM Interface.



## CODEC Overview

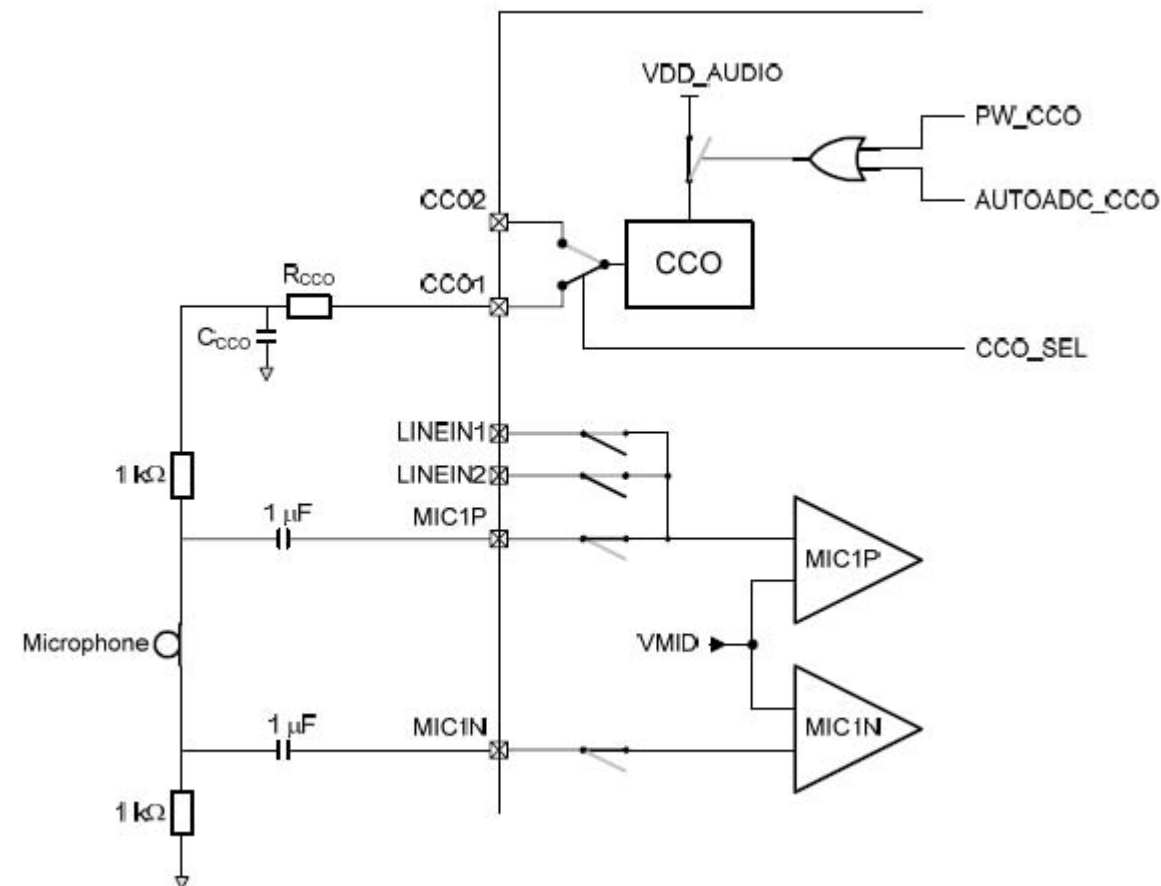
The CODEC is encoding analog audio signals and analog voice signals into digital signals using ADCs. This is done in the coder section of the CODEC, also named the TX path (transfer section). The CODEC is also decoding digital audio signals and digital voice signals into analog signals using DACs. This is done in the decoder section of the CODEC, also named the RX path (receiver section).

## CODEC Block Schematic



## CODEC CCO Voltage Source

There is an internal voltage source CCO that provides the necessary drive current for electret microphones. The voltage source is I<sup>2</sup>C programmable to 2.2 V or 2.4 V. The source can be disabled during standby. A typical use case with a microphone connected to MIC1 and the CCO is shown in picture below.



## Earphone Amplifier

The earphone amplifiers (BEARP and BEARN) are mainly intended to be differentially configured and drive a low impedance dynamic transducer (earpiece) but they can also be single ended configured. The BEARP and BEARN amplifiers can be powered down by the I<sup>2</sup>C. The amplifiers can exhibit high impedance to 1.4 V or low impedance to ground when powered-down. Fifty-one gains are available for BEARP and BEARN: from +15 dB down to -60 dB in

1.5 dB steps. When the BEARP and BEARN outputs are operating in differential mode, an I<sup>2</sup>C selectable bit must invert one of the inputs.

## Digital Baseband Controller (CPU) D2000 (Anja)

This component is not replaceable on SL 4 because Baseband calibration is required.

The Digital Baseband Controller is divided in two subsystems:

- Application
- Access

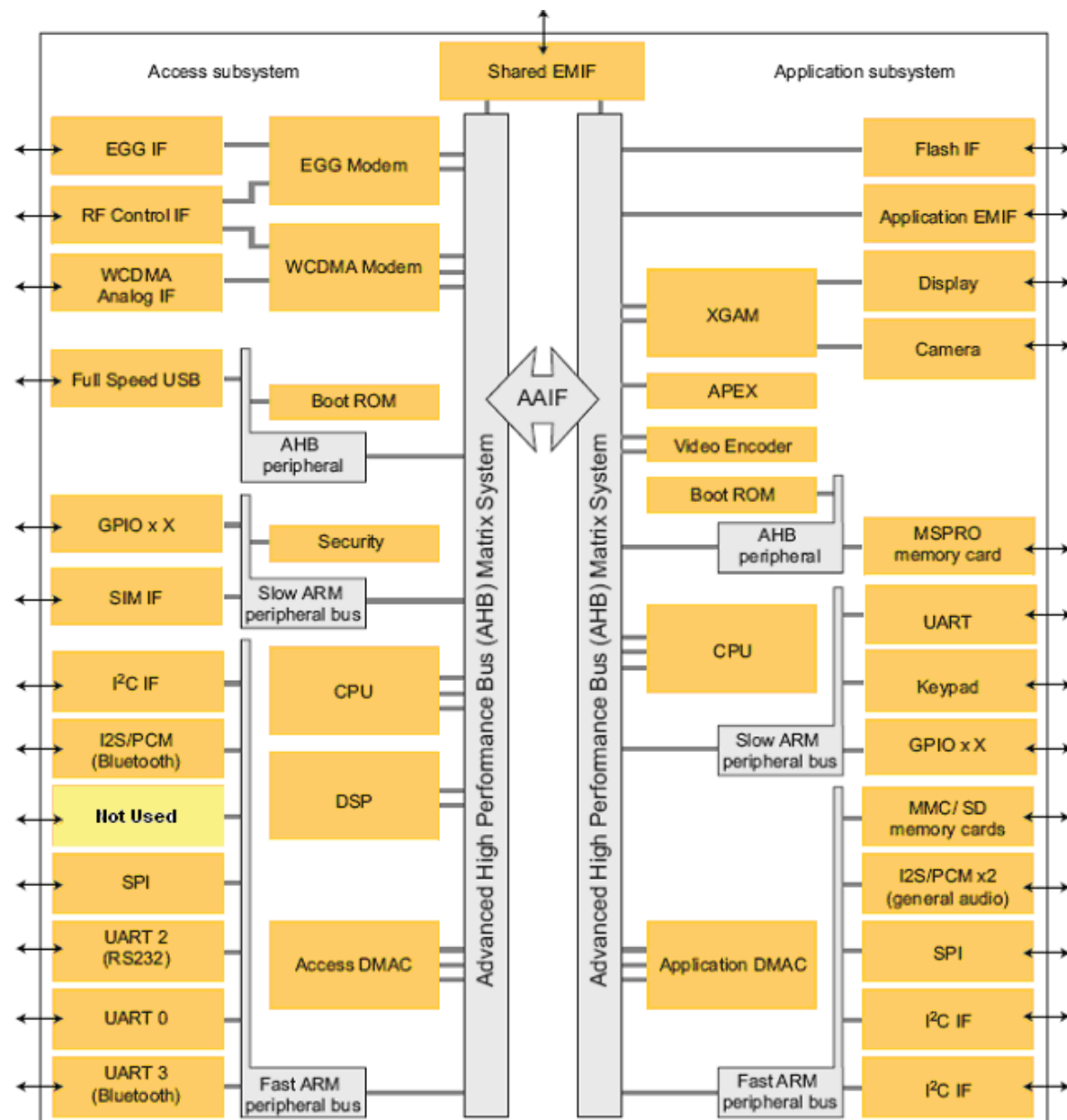
### Access Subsystem

All modem functionality in the digital baseband controller resides in the Access subsystem. This includes EDGE/GPRS/GSM interface, WCDMA interface, USB, and other peripheral modules. The control CPU is an ARM926 and a DSP is used for signal processing and layer one control code. The main communication between the blocks in the Access subsystem is done through the Advanced High-performance bus (AHB) matrix, which is a set of control buses connecting the different parts together. A block called Syscon is responsible for distributing clocks and resets to all parts of the Access subsystem. This block is under SW control. The Access subsystem is connected to the Shared EMIF, an interface for communication with an external SDRAM. The interface has 39 signals (including one chip select) and supports memory sizes up to 512 Mbit. The Shared EMIF is shared between the Access subsystem and the Application subsystem.

### Application Subsystem

The Application subsystem contains functionality related to functions such as MMI, graphics, audio and memory media. The control CPU is an ARM926 with three external memory interfaces, one shared with the Access subsystem and two dedicated for the Application subsystem. The Application subsystem contains several blocks. The main communication between the blocks is done through the Advanced High performance bus (AHB) matrix, which is a set of control buses connecting the different parts. A block called Syscon is responsible for distributing clocks and resets to all parts of the Application subsystem. This block is under SW control. The Application subsystem is connected to the Shared EMIF that is used for code execution or data storage. In addition, a dedicated EMIF and a Flash IF are also available. The Application EMIF is a general interface for communication with, for example external SDRAM, PSRAM, NOR flash, NAND flash and companion chips. The Application EMIF has a total of 56 signals (including a maximum of 7 chip selects if GPIO is used) and can be set in several different modes to support different types of memory combinations.

Functional blocks of the Digital Baseband Controller



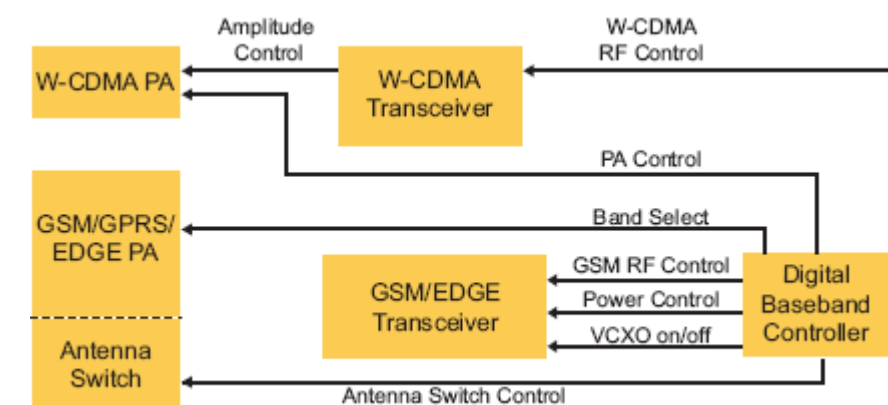
## Keypad

The keypad interface block supports up to 30 keys with 65 columns and 6 rows and operates in both scan and idle mode. The keypad scan is performed by software. Any transition in the state of the column inputs is written directly to the register. The keypad interface differentiates between single key presses, simultaneous presses of any keys with a function key, and any key releases. The period between successive scans is programmable over the range 5 ms to 80 ms, in 5 ms steps. During scan mode, the keypad generates an interrupt whenever a valid keypad state change occurs (including a release of any pressed keys). The scan function is disabled during system power-up. The keypad is able to detect at least four simultaneous key presses. Not all combinations are supported.

## RF System Control

The access subsystem of the digital baseband controller controls the overall radio system. In both EDGE/GSM/GPRS and WCDMA air interface mode, the digital baseband controller controls the radio system through a 3-wire serial bus. The digital baseband controller also manages PA band control and the antenna switch mechanism in the front end module. The 26 MHz VCXO clock residing in the GSM/GPRS/EDGE transceiver is turned on only when required. The digital baseband controller initiates turning on of the clock. The GSM/GPRS/EDGE RF system requires control, which is temperature dependent. The temperature within the RF system is estimated by a voltage measurement performed by the analog baseband controller N2000 (Vera).

Control flow of the RF system.

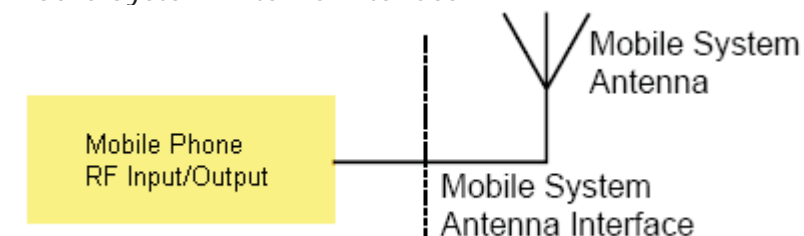


## Radio Part

### Antenna

The mobile system antenna interface connects the Wideband Code Division Multiple Access (WCDMA) and Global System for Mobile Communication (GSM) input/output to the antenna of the Mobile Phone. It is a bi-directional RF interface containing signals in the range 800 MHz to 2.2 GHz. The mobile system antenna interface is the interface between the Mobile Phone Radio Frequency (RF) input/output and the mobile system antenna. The interface handles the GSM 850, EGSM 900, GSM 1800, GSM 1900 and WCDMA Band I, RF inputs/outputs.

Mobile System Antenna Interface:





## Radio Part

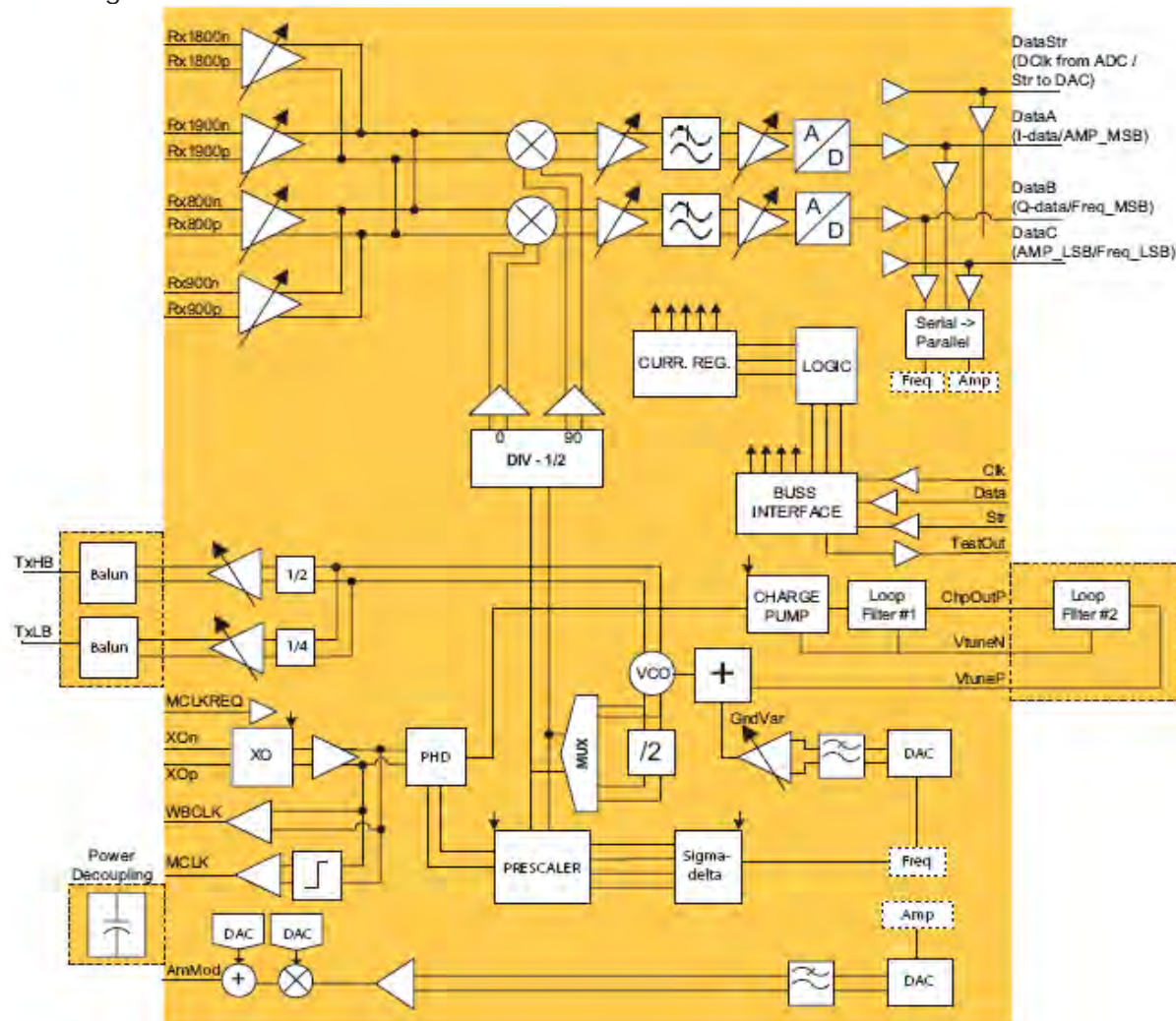
### GSM/GPRS/EDGE

The GSM/GPRS/EDGE transceiver use a digital interface that is shared between receive and transmit data. The receive interface is based on I and Q data and the transmitter interface is based on envelope and frequency data. The quad band GSM/GPRS/EDGE transceiver has the following general features:

The GSM/EDGE transceiver has the following features:

- Individual low-noise amplifiers for the 850, 900, 1800 and 1900 MHz frequency bands with a common quadrature mixer
- Fully integrated VCO with dividers to generate both receive and transmit frequencies
- I and Q baseband receive channel amplifiers with on-chip antialiasing filtering
- I and Q receiver sigma-delta A to D converters
- Digital interface for the receive I and Q channel
- Multi modulus prescaler for direct VCO modulation in transmit mode
- Integrated phase detector with programmable charge pump
- Transmit output buffer with controllable output power level
- Transmit baluns integrated
- Digital interface for the transmit frequency and amplitude modulation
- 3-wire serial bus interface for control, configuration, and test
- Deep power down function
- Programmable power level to power amplifier (PA)

Block diagram of the GSM/EDGE Transceiver



### Frequency Generation

The 26 MHz reference signal is used as the reference for the on-chip synthesizer. To cover the required frequency range, the integrated Voltage Controlled Oscillator (VCO) operates at twice the frequency for band 1800/1900, and at four times the desired frequency for band 850/900.

### Transmitter

The transmitter block consists of the following sub-blocks:

A separate block is used to convert the digital bit streams from the baseband into parallel words to be used in the DAC-s and the Sigma Delta modulator. This block also includes programmable delays for optimizing delays between the different modulation paths. The combined DAC and LP-filter is used to convert the digital words of the digital block into analog signals. The second FM-path is used to add the high frequency part of the FM to the VCO. It also includes an auto-tuning block that compensates VCO gain variations. The AM-block converts the differential voltage from the DAC to a single-ended output that drives the PA. The output is scaled according to the desired output power, and an offset can be added for PA linearization. The TX-buffer is used to drive the PA with the correct power level. A divide by 2 or 4 block is used to generate the correct output frequency from the 4 GHz VCO.

TX Frequency, Channel and Power Level Range:

#### GSM 850:

Frequency Range: 824,2 MHz – 848,8 MHz

Channel Range: 128 – 251

Power Level: Min: 19 – Max 5

#### GSM 900:

Frequency Range: 890,2 MHz – 914,8 MHz

Channel Range: 1 - 124

Power Level: Min: 19 – Max 5

#### EGSM 900:

Frequency Range: 880,2 MHz – 889,8 MHz

Channel Range: 975 - 1023

Power Level: Min: 19 – Max 5

#### DCS 1800:

Frequency Range: 1710,2 MHz – 1784,8 MHz

Channel Range: 512 – 885

Power Level: Min: 15 – Max 0

#### PCS 1900:

Frequency Range: 1850,2 MHz – 1909,8 MHz

Channel Range: 512 - 810

Power Level: Min: 15 – Max 0

### Receiver

The receiver is a homodyne receiver with direct conversion of the received radio channel to baseband I and Q channels. The analog signals are converted to digital bit streams in a sigma delta A/D converter. The receiver block consists of a front-end with separate LNA-s for each band and a common quadrature mixer. The front-end block is followed by a baseband block with active anti aliasing filters that also suppress blocking signals and interferers. After the baseband block is a fully integrated Analog to Digital Converter of sigma delta structure with high dynamic range. The digital output signals are sent over a serial interface to the digital base-band circuit for further processing and detection.

## RX Frequency and Channel Range

### GSM 850:

Frequency Range: 869,2 MHz – 893,8 MHz  
Channel Range: 128 – 251

### GSM 900:

Frequency Range: 935,2 MHz – 959,8 MHz  
Channel Range: 1 - 124

### EGSM 900:

Frequency Range: 925,2 MHz – 934,8 MHz  
Channel Range: 975 – 1023

### DCS 1800:

Frequency Range: 1805,2 MHz – 1879,8 MHz  
Channel Range: 512 – 885

### PCS 1900:

Frequency Range: 1930,2 MHz – 1989,8 MHz  
Channel Range: 512 - 810

## WCDMA

N1300 (RF 3100) is an integrated transceiver intended for the Universal Mobile Telecommunication System (UMTS). The circuit is specially designed for the Frequency Division Duplex (FDD) mode of the Wideband Code Division Multiple Access (WCDMA) that operates in Band I (TX Frequency Range: 1920-1980 MHz, RX Frequency Range: 2110-2170 MHz). The baluns, loop filters and most of the passive components are included in the package.

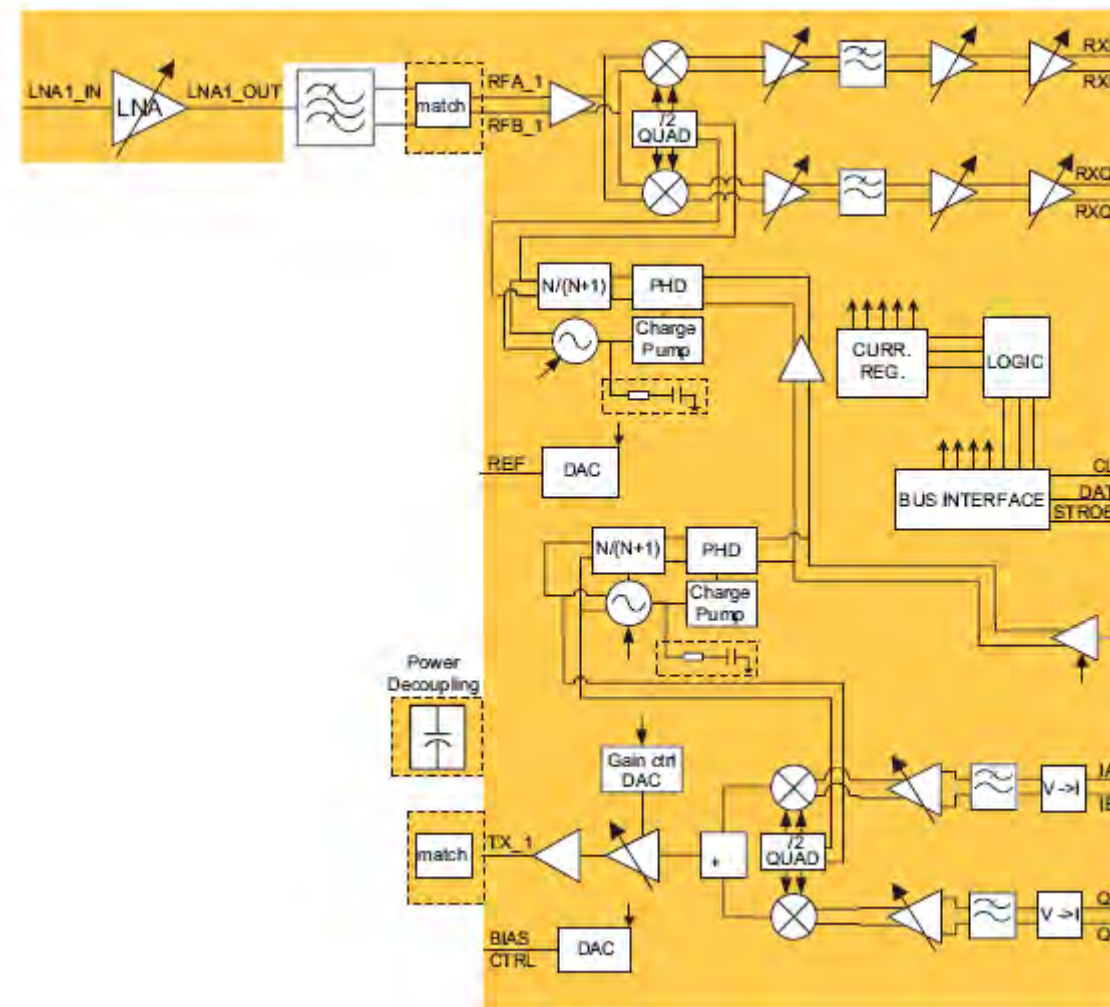
The WCDMA transceiver has the following features:

- System in Package solution
- Single band application (UMTS band I)
- High Speed Downlink Packet Access (HSDPA) capability
- Variable duplex in band I
- Fully integrated TX baluns, loop filters and decoupling capacitors
- Low noise, wide dynamic range for zero IF RX and TX
- RX 87 dB gain control range in increments of 1 dB
- TX 80 dB gain analog control range; 1 dB minimum resolution
- RX 99 dB voltage gain
- Maximum TX output power at least +5dBm average
- Integrated RX channel filters (band I)
- RX & TX fully integrated fractional-N synthesizer with AFC control capability
- RX & TX fully integrated RF VCO with integrated supply voltage regulator
- Supply voltage from 2.6 V to 3.0 V
- 3-wire serial interface bus
- HVQFN40 package
- Lead-free

## Frequency Generation

The transmitter and receiver frequency synthesizers and the VCOs are fully integrated in the WCDMA radio circuit. The signal from the crystal oscillator is used as a reference for the synthesizers. The two synthesizers are controlled through the serial bus from the access subsystem of the digital baseband controller.

## WCDMA Transceiver Block Diagram



## Transmitter

The TX IQ modulator has differential voltage I and Q inputs. It converts input signals to RF output frequency and is designed to achieve LO and image suppression. The transmit output stage provides at least +5 dBm at maximum power control at the single-ended 50  $\Omega$  output. Gain is set through the 3-wire bus. Two 10-bit DAC-s are used to control the DC/DC converter and the PA gain. These DAC-s are controlled through the 3-wire bus.

## Receiver

The front-end receiver converts the aerial RF signal from WCDMA band I down to a Zero Intermediate Frequency (ZIF). The first stage consists of one single-ended low noise amplifier (LNA) with a 16 dB gain step. This LNA is followed through an external filter by an IQ down-mixer which consists of a mixer in parallel driven by quadrature out-of-phase LO signals. The In phase (I) and Quadrature phase (Q) ZIF signal are then low pass filtered to provide protection from high frequency offset interferer fed into the channel filter. The front-end zero IF I and Q outputs are applied to the integrated low-pass channel filter with a provision for 4 x 8 dB gain steps in front of the filter. The filter is a self-calibrated 6 pole, 2 zero filter with a cut-off frequency around 2.15 MHz and a second order group delay compensation (2 poles, 2 zeroes). Once filtered, the zero IF I and Q signals are further amplified with provision of 31 x 1 dB steps and DC offset compensation. The zero IF output buffer provides close rail-to-rail output signals.



Bluetooth and FM Radio

The STLC2592 circuit N1400 combines Bluetooth and FM tuner functionality into one.

Bluetooth

The Bluetooth implementation is compliant with Bluetooth specification 2.1 + EDR. The Bluetooth™ transceiver has frequency channels with 1 MHz separation from 2402 to 2480 MHz. The same band is used for both transmission and reception. This gives 79 frequency channels.

Receiver

The first stage of the receiver is an external antenna filter, which suppresses unwanted frequencies. The receiver is of a “near-zero” IF receiver architecture. The local oscillator is generated by a frequency synthesizer, which allows the receiver to be set at frequencies in intervals of 1 MHz. The synthesizer is controlled from the logic part. The received signal is sampled in the logic for later signal processing.

Transmitter

The synthesizer generates the TX frequency which modulated by the BT baseband block. It is then amplified. The BT system is a class 1 device with maximum of +4 dBm output power (minimum setting is about -50 dBm).

FM Radio

FM Receiver

The receiver uses a digital low-IF architecture. The receive (RX) section integrates a low noise amplifier (LNA) supporting the worldwide FM broadcast band (76 to 108 MHz). An automatic gain control (AGC) circuit controls the gain of the LNA to optimize sensitivity and rejection of strong interferers. An image-reject mixer down converts the RF signal to low-IF. The quadrature mixer output is amplified, filtered and digitized with high resolution analog-to-digital converters (ADCs). This advanced architecture allows the use of digital signal processing (DSP) to perform channel selection, FM demodulation and stereo audio processing.

Tuning

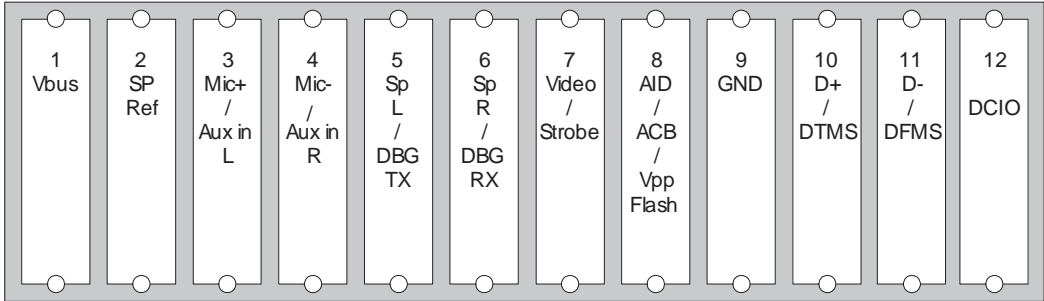
The receiver uses frequency synthesizer technology including a completely integrated VCO. The frequency synthesizer generates the quadrature local oscillator signal used to downconvert the RF input to a low intermediate frequency. The VCO frequency is locked to the reference clock and adjusted with an automatic frequency control (AFC) servo loop during reception. The tuning frequency is defined as:

Freq (MHz) = Spacing (kHz) × Channel + Bottom of Band (MHz)

External Connectors

External units are connected to the transceiver by means of a 12-pin connector on the bottom of the phone.

System connector pin out:



Clocks

Clock Distribution

The clocking for the access and application subsystems is separated. This means that they can wake up or go to sleep mode independently. The access subsystem is clocked by the 26 MHz Voltage Controlled Crystal Oscillator (VCXO) located in the GSM/EDGE module N1200 (Thor). When the access subsystem has a job to do, the Master Clock (MCLK) signal is requested from the RF part. Most other clocks needed within the access subsystem are generated from the MCLK. Some minor parts like sleep timer and cable detect use the 32 kHz real-time clock. The 32 kHz real-time clock clocks the application subsystem, and all other internal clocks needed within the application subsystem are generated from this clock. However, when audio is transferred between the application and the access subsystems, the MCLK is used.

Master Clock  
(26 MHz)

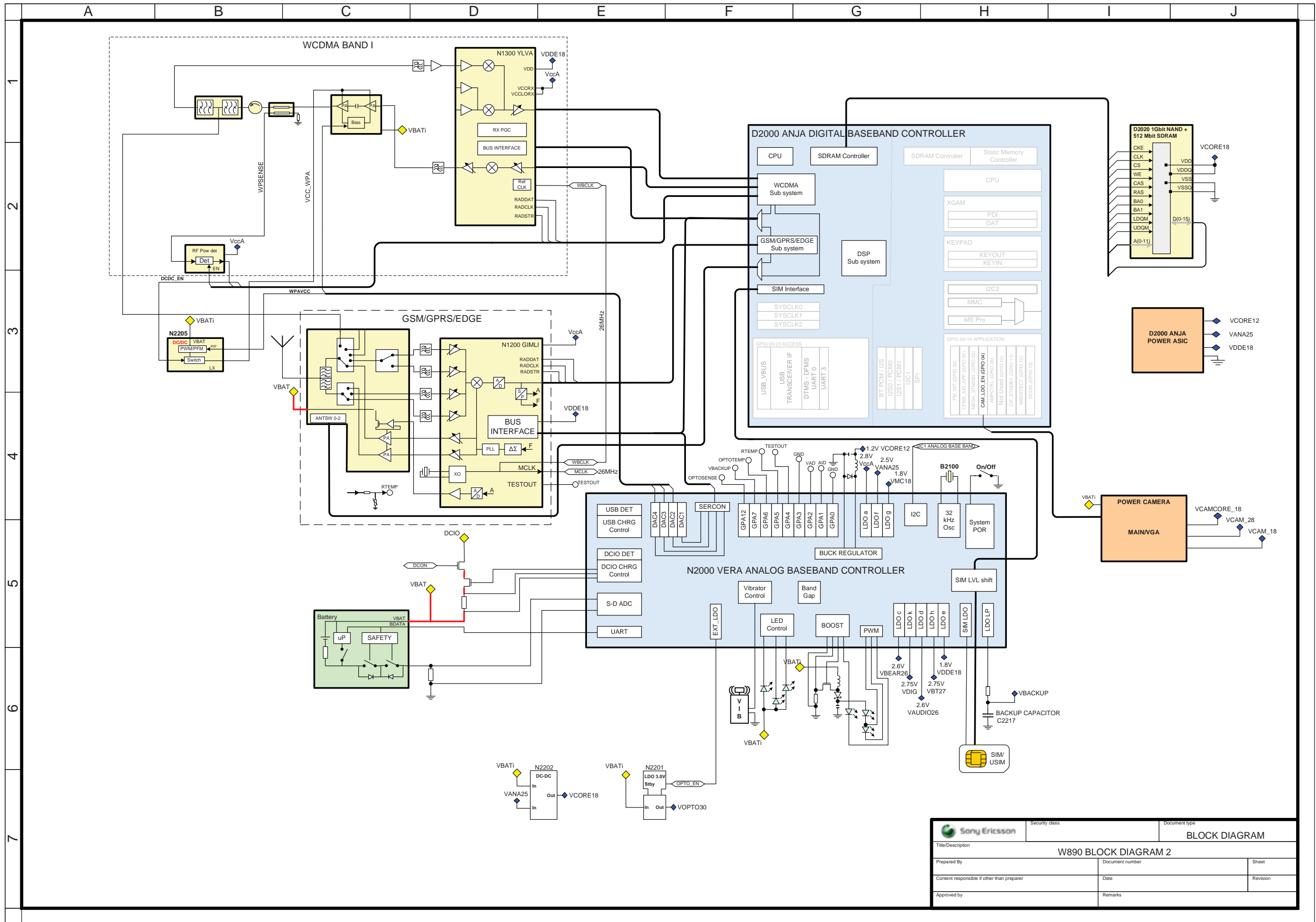
The 26.00 MHz VCXO-based MCLK is distributed as a square wave signal from the N1200 Gimli circuit. In order to have full control over the load on the MCLK, only the access side of the digital baseband controller is allowed to request the MCLK. However, by indirect means also the application side CPU can issue the request. A VCXO-based square wave is also distributed to the WCDMA circuit, but is turned on only upon a command from the digital baseband controller.

Real-time Clock  
(32. 768 KHz)

A 32.768 kHz crystal oscillator provides a low frequency clock whenever the phone has power. This clock is used to keep the Real-Time Clock (RTC) block functioning, so that the phone can keep track of the time and date. The low frequency clock is generated in the analog baseband controller N2000 (Vera) and distributed to the digital baseband controller D2000 (Anja), and if necessary to external devices like Bluetooth, FM radio and A-GPS.







Sony Ericsson		Security class	Document type
Title/Description		BLOCK DIAGRAM	
Prepared By		W890 BLOCK DIAGRAM 2	
Content responsible if other than preparer		Document number	Sheet
Approved by		Date	Revision
		Remarks	

## Part List Main Board

Contains only components that are possible to replace on the main board.  
Pos. number refers to the components position number on the board.

Some components are noted as MSL X. These components are moisture-sensitive and are rated at various levels (MSL):

- Level 1:** Unlimited floor life; does not require dry pack or re-baking.
- Level 2:** 1 year floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.
- Level 2A:** 4 week floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.
- Level 3:** 168 hours floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.
- Level 4:** 72 hours floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.
- Level 5:** 48 hours floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.
- Level 5A:** 24 hours floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.
- Level 6:** 6 hours floor life;  $\leq 30$  °C; 60%rh; shipped in dry pack; must be re-baked after being opened if floor life is exceeded.

**NOTE!** RF Calibration by using SERP can only be done by authorized repair centers.

F=Front side, B=Back side.

Side	Pos.	Description	Part Number	Comments	Page
F	B1260	Crystal 26.0 MHz 3225	1200-0097	Calibration required (SERP) MSL2	93
B	B2100	Crystal 32768Hz +-20PPM 12.5pF	RTM 501 911/2	Calibration required (SERP)	93
F	B3100	MICROPHONE/CHARLOT TE	RLC 509 440		93
F	D2105	IC Single bus buffer gate	1200-0425	MSL1	94
B	D2400	IC IF ISP1508 ES3 (3.5*3.5*0.8)	1200-1694		94
B	L2200	Ind WW 4.7 uH K3012	1200-2214	MSL1	94
F,F	L2401,L2402	Inductor 120nH 5% 0402 0.11A	REG 724 5543/12J		94
F,F	L2403,L2404	Filter 0.0 Hz 0402	REG 706 18/20	MSL1	94
F,F	L2407,L2408				
F,F	L2405,L2406	Filter 220ohm 0603 2A 0.05ohm Bead	REG 706 05/24		95
F	N1200	ASIC GIMLI	ROP 101 3080/1	Calibration required (SERP) MSL3	95
F	N1230	PA Module. 22 TERMINAL LGA	RYT 101 988/1	Calibration required (SERP)	95
F	N1300	ASIC YLVA	ROP 101 3107/1	Calibration required (SERP)	96
F	N1380	Module PA WLAN 4040	1200-0073	Calibration required (SERP) MSL2	96

Side	Pos.	Description	Part Number	Comments	Page
F	N1400	Module Bluetooth + FM STLC2592	1200-6182	MSL3	97
B	N2201	IC Vreg PLP1010-4	1201-6465	MSL1	97
B	N2202	IC Vreg SON-6	1200-0373	MSL1	97
F	N2203	2ch-LDO, Vout1=2.8V, Vout2=1.8V, WL-CSP6	RYT 113 997/4		98
F	N2204	LDO1.8 V, 200mA, low noice, CS-5	RYT 113 7816/4		98
F	N2205	DC/DC Converter	RYT 113 7838/1		98
B	N2400	1-Bit Level Translator	RYT 109 914/1		
F	N2402	IC ESD Prot UDFN 6 2x2 mm	1200-6309	MSL1	98
B	N2424	ESD/EMI protection for USB	RKZ 923 926/1		99
B	N3100	OPAMP 1W Pb-Free	RYT 101 947/2		99
B	N3101	ASIC Tjatte3 CSP20	ROP 101 3074/1	MSL1	99
B	N4201	Trans N-ch FET	RYN 901 936/1		99
B	V2202	TRANS V;DUAL_PMOSEFET;BYX1 01603_A;REQ318	RYN 122 910/1		99
F	V2402	Switching Diode	RKZ 323 916/1		99
B	V2405	MOSFET Complementary N P 20 V (D S)	RYN 901 918/2		99
F	V2420	Zener Diode voltage regulator 15V 5%	RKZ 223 905/2	MSL1	99
F	X1000	Conn Leaf Spring	1201-4841		
B	X1100	Conn Antenna	RPT 799 47		100
B,B	X1203, X1400	Conn Pogopin	1200-4733		100
B	X2200	Conn Pogopin 0p CSS5005-7L02E	1201-9869		100
B	X2400	12p System Connector	SXA1097055/12		100
F	X2401	Conn BtB	1200-2529		
B	X2402	Conn BtB Receptacle 18p	1200-6752		
F	X4201	Conn BtB Receptacle 26p	1202-9266		
F	X4300	Conn BtB	1200-2290		
F	Z1230	Module GSM FEM/Switch/SAW/5.4x4.7x 1.2mm	1200-0169	Calibration required (SERP) MSL3	101
F,F	Z4200,Z4201 Z4202	Filter 400.0 MHz KNA16400	REV 501 46/1	MSL1	101

## B1260 Crystal 26.0 MHz 3225 1200-0097



Pb Free

RoHS Compliant

### Features

- Reference frequency for telecommunication systems
- Reflow compatible
- Using Ceramic Package resulting in high reliability
- Small and low profile

### Applications

- Cellular phone, IC Card, GPS

### How to Order

KSX-23-26000K C A-Q C 0 R  
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① Type

② Nominal Frequency

Code	Freq.(kHz)	Code	Freq.(kHz)
19200K	19200.000	32000K	32000.000
19680K	19680.000	38400K	38400.000
19800K	19800.000	40000K	40000.000
26000K	26000.000		

\* Please inquire about frequencies other than the above.

③ Load Capacitance

C	12pF
---	------

④ Frequency Stability

A	±10ppm
---	--------

⑤ Operating Temperature

Q	-30°C to +85°C
---	----------------

⑥ Frequency Temperature Stability

C	±15ppm
---	--------

⑦ Frequency Offset

0	0Hz(Standard)
---	---------------

⑧ Packaging

R	Taping
---	--------

### Specifications

Items	Symbol	Specification	Units	Remarks
Frequency Range	F <sub>0</sub>	19200~40000	kHz	
Overtone Order	—	Fundamental	—	
Frequency Tolerance	ΔF/F	±10	ppm	@ 25°C
Frequency Temperature Character	ΔF/T	±15	ppm	ref@ 25°C Over Operating Temp Range
Motional Series Resistance	C <sub>L</sub>	Table 1	ohm	
Level of Drive	—	Table 2	μW	
Load Capacitance	C <sub>L</sub>	12	pF	
Operating Temp. Range	T <sub>OPR</sub>	-30~+85	°C	
Storage Temp. Range	T <sub>STG</sub>	-40~+85	°C	

\* Taping packing : one unit 1,000pcs & 3,000pcs  
\* Please inquire about specifications other than the above.

Table1 Motional Series Resistances

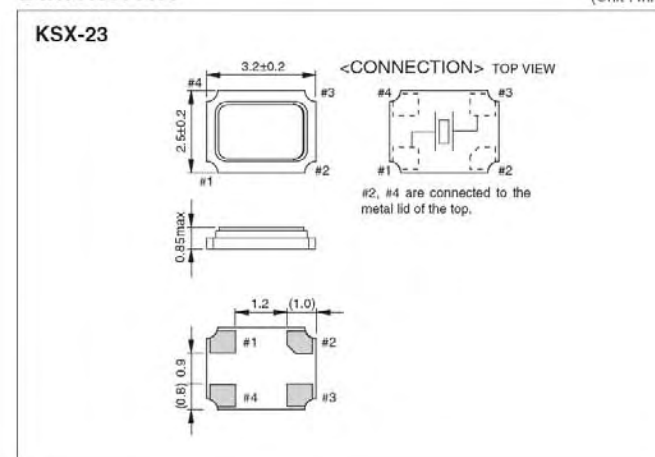
Frequency Range	Motional Series Resistance	Units
19200~24999kHz	60Max	ohm
25000~40000kHz	40Max	

Table2 Level of Drive

Frequency Range	Level of Drive	Units
19200~40000kHz	10(Max 100)	μW

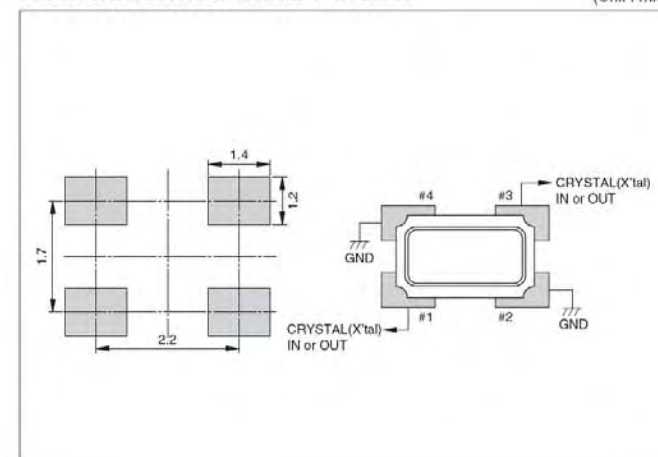
### Dimensions

(Unit : mm)

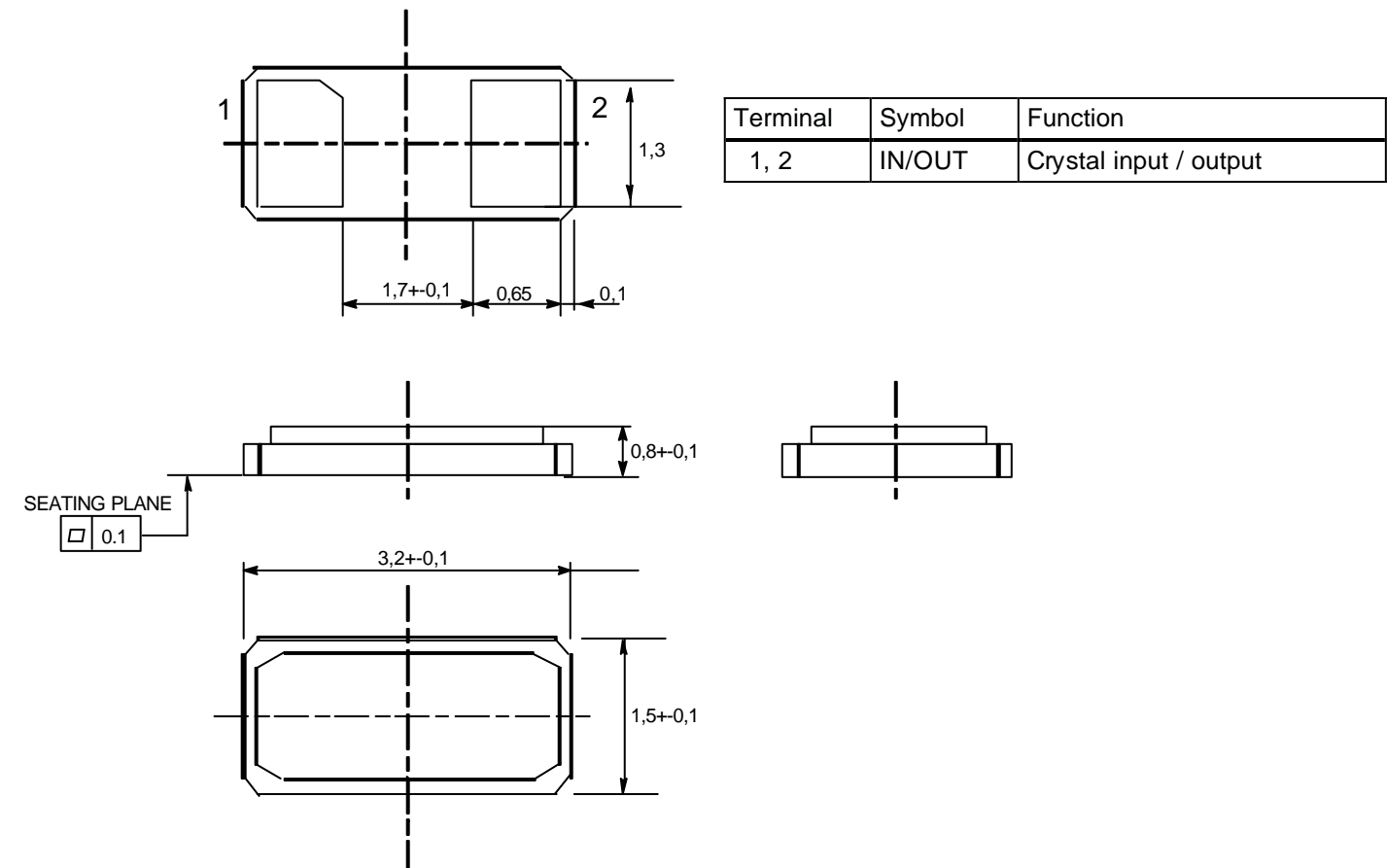


### Recommended Land Pattern

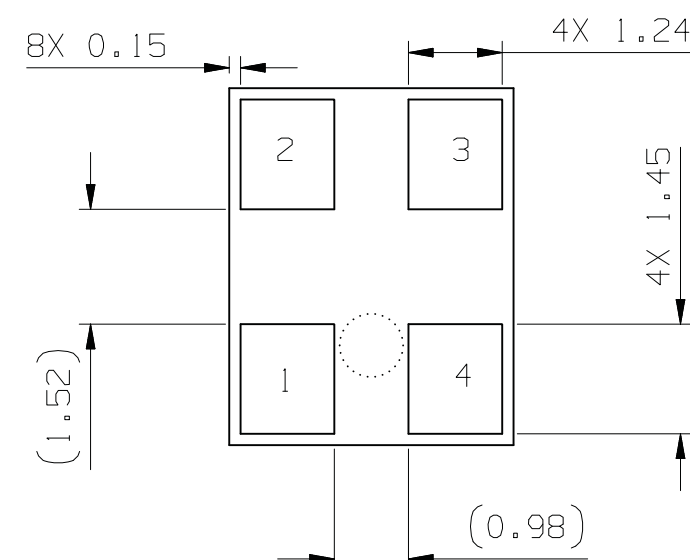
(Unit : mm)



## B2100 Crystal 32768 Hz +-20PPM 12.5pF RTM 501 911/2



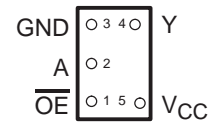
## B3100 Microphone/Charlotte RLC 509 440



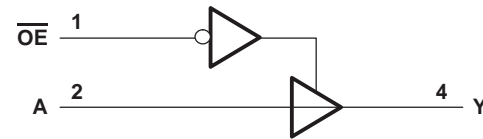


## D2105 IC Single Bus Buffer Gate 1200-0425

(BOTTOM VIEW)

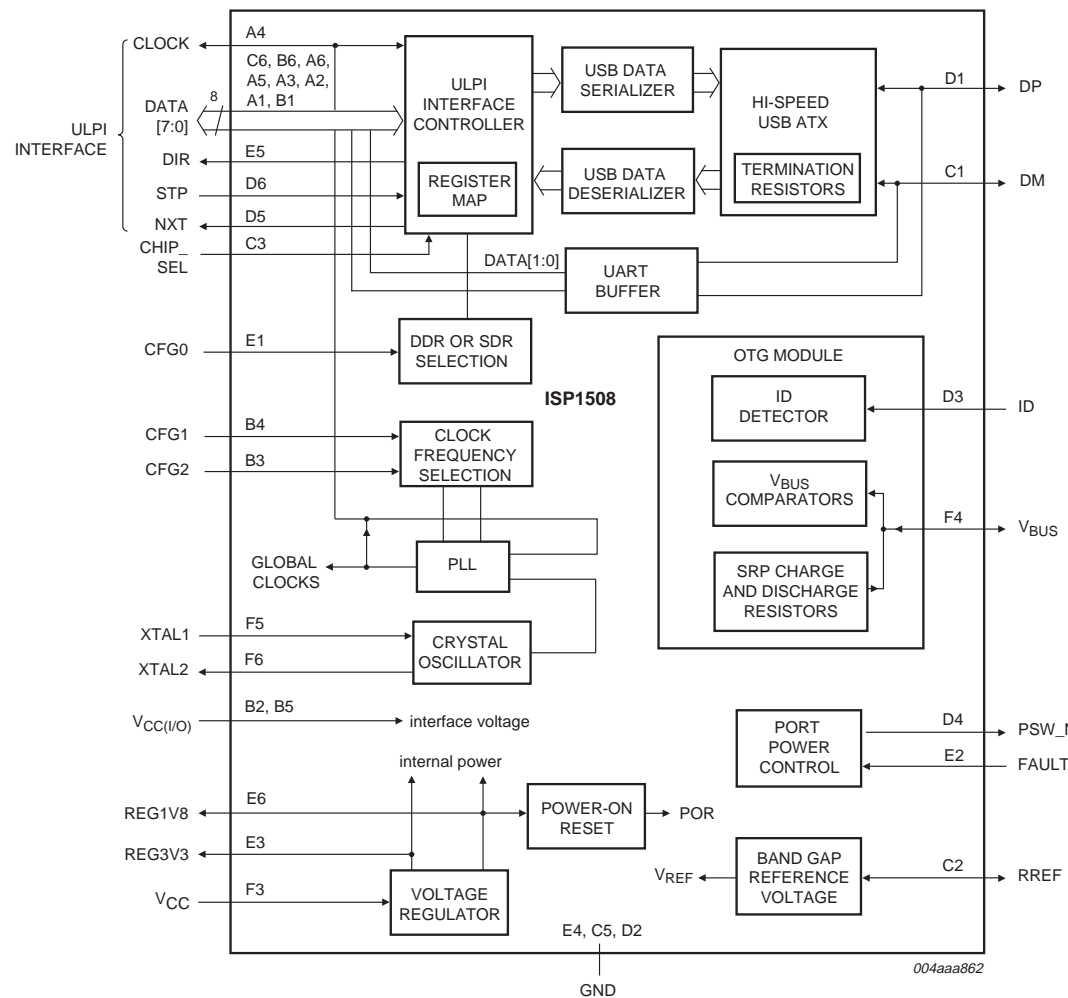


logic diagram (positive logic)

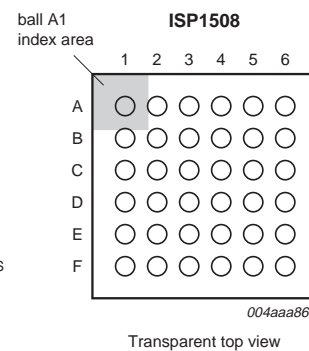


FUNCTION TABLE		
INPUTS		OUTPUT
OE	A	Y
L	H	H
L	L	L
H	X	Z

## D2400 IC IF ISP1508 ES3 1200-1694

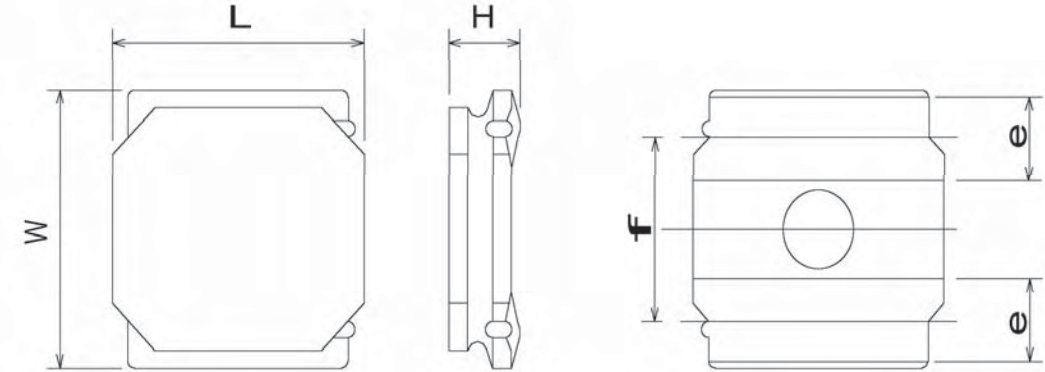


Block diagram



Pin configuration

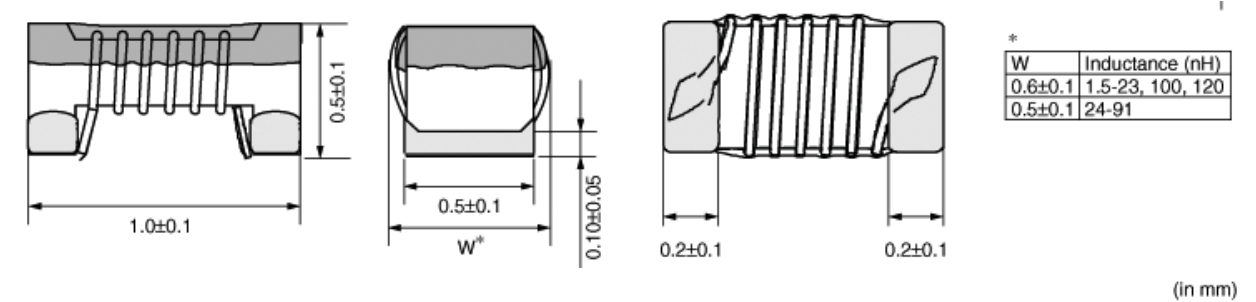
## L2200 Ind WW 4.7uH K3012 1200-2214



Description	Mark	Dimensions
Length	L	$3.0 \pm 0.1$
Width	W	$3.0 \pm 0.1$
Height	H	1.2Max.
Width of Electrode	e	$0.9 \pm 0.2$
Space between electrodes	f	$1.9 \pm 0.2$

(Unit: mm)

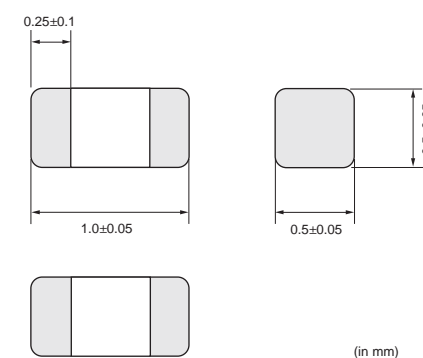
## L2401 - 02 Inductor 120nH 5% 0402 0.11A REG 724 5543/12J



(in mm)

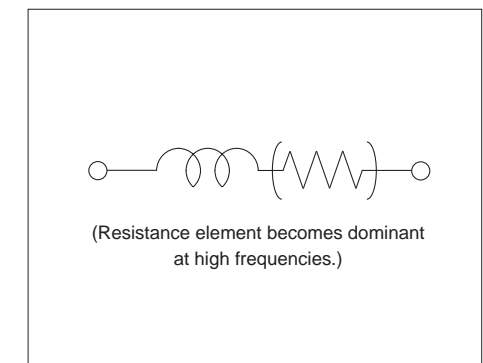
## L2403-04, L2407-08 Filter 0.0 Hz 0402 REG70618/20

### Dimension



(in mm)

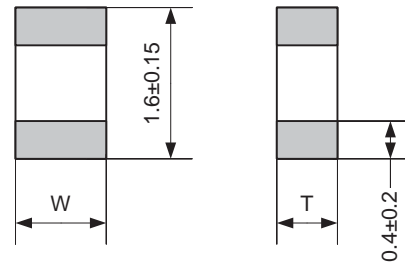
### Equivalent Circuit



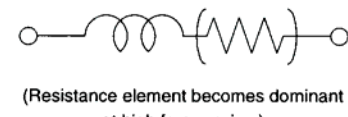
## L2405-06 Filter 220ohm 0603 2A 0.05ohm Bead REG 706 05/24

### DIMENSIONS

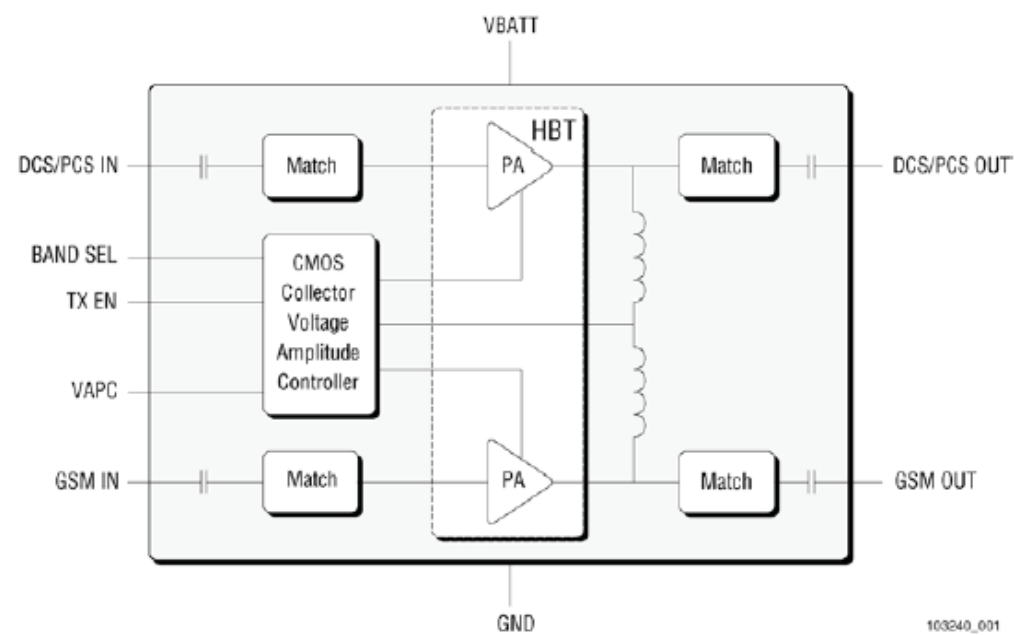
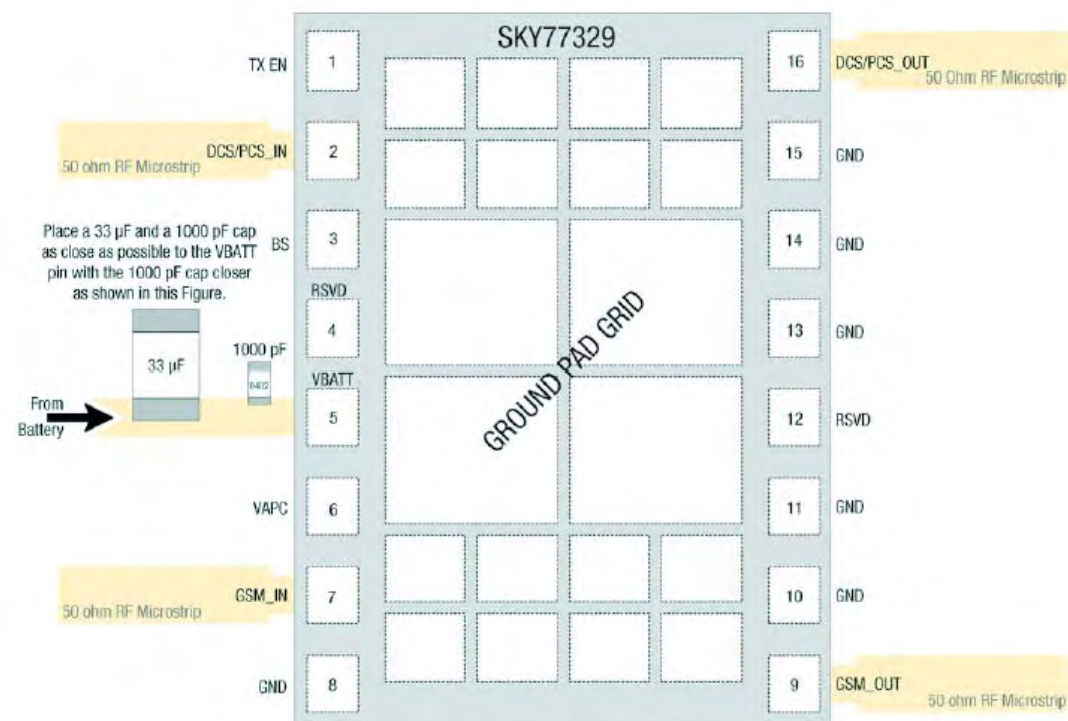
Dimensions in mm.



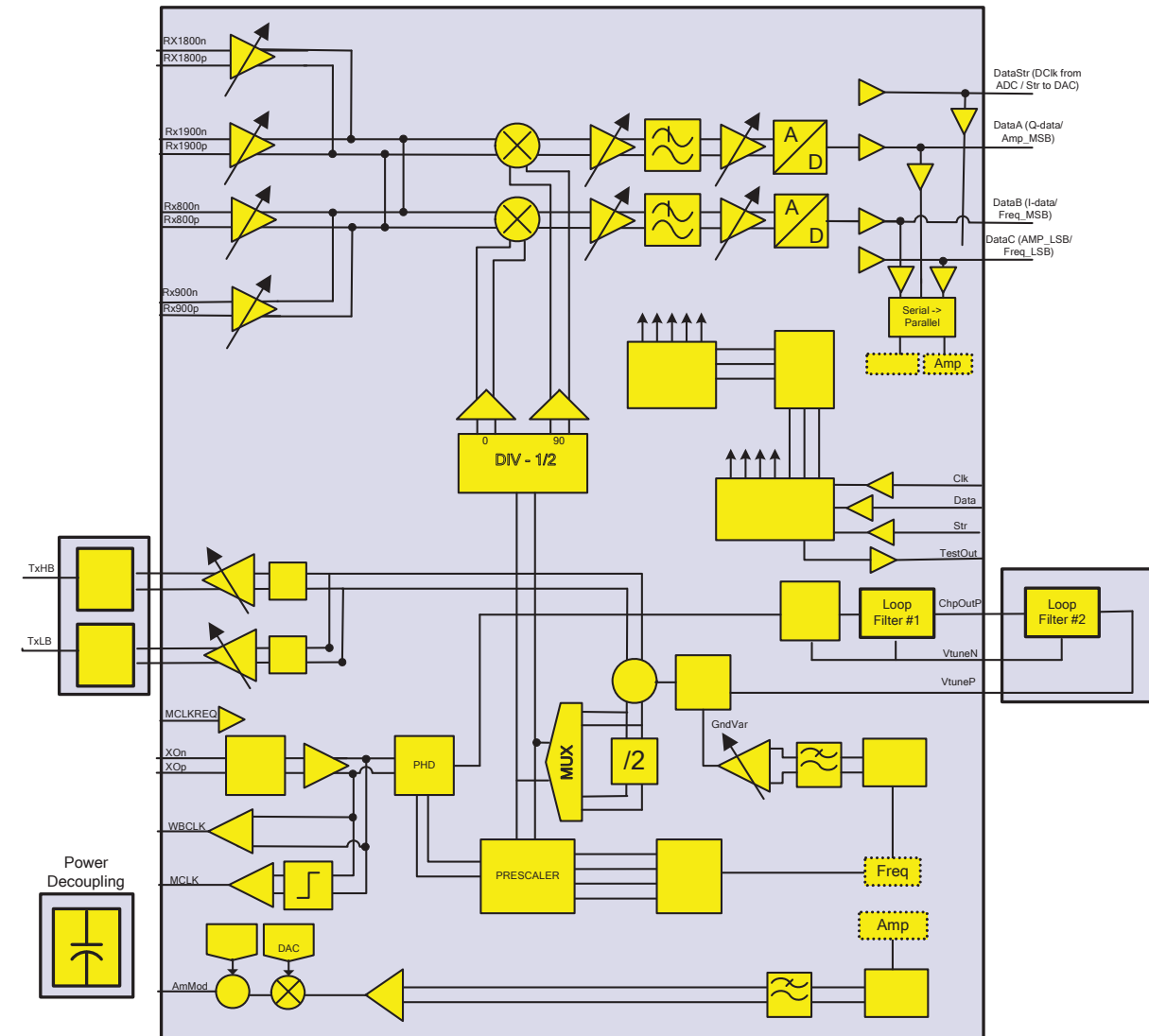
### EQUIVALENT CIRCUIT



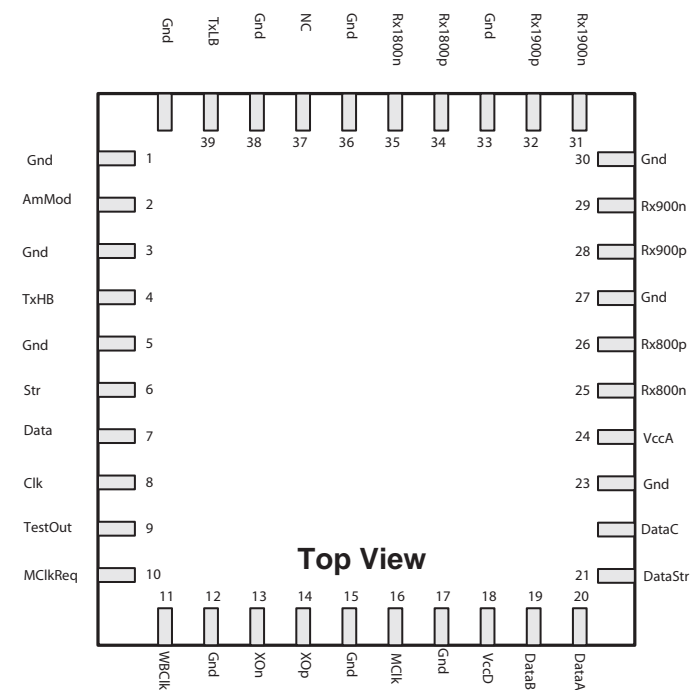
## N1230 PA Module 22 Terminal LGA RYT 101 988/1



## N1200 ASIC GIMLI ROP 101 3080/1



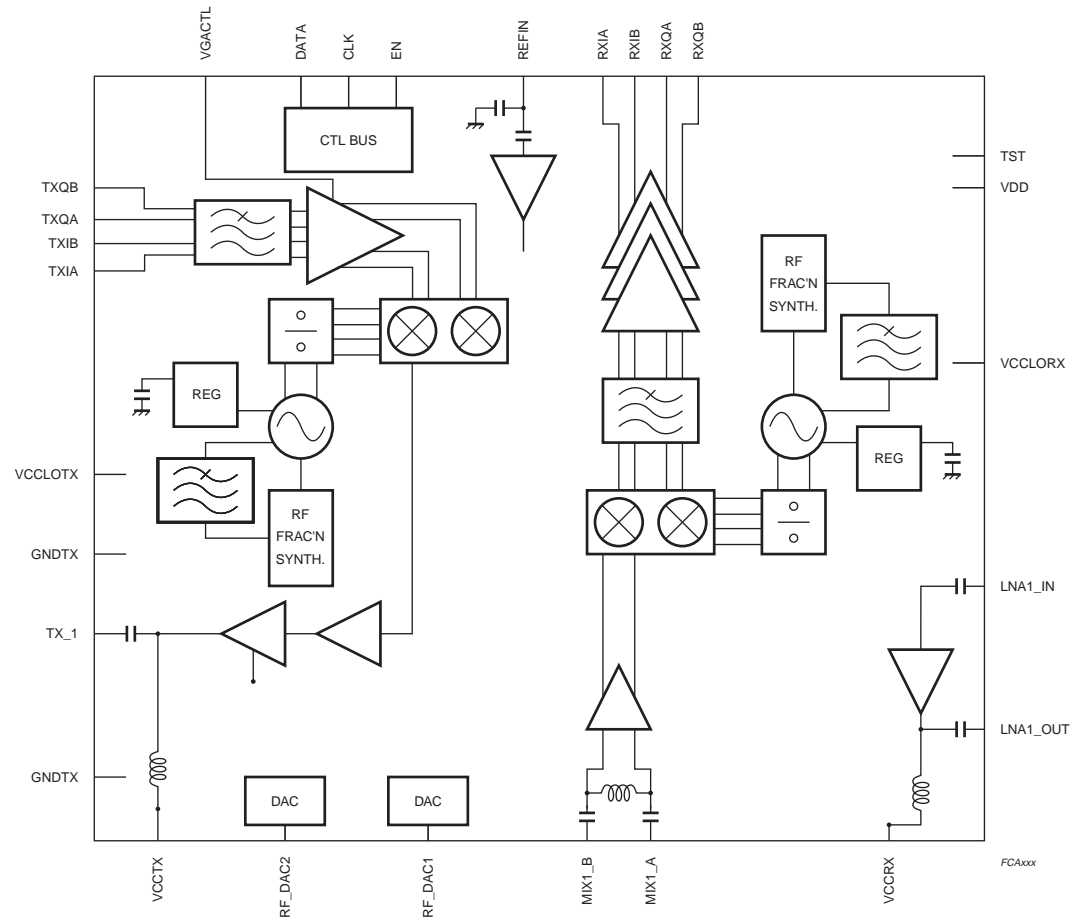
### Pin Configuration



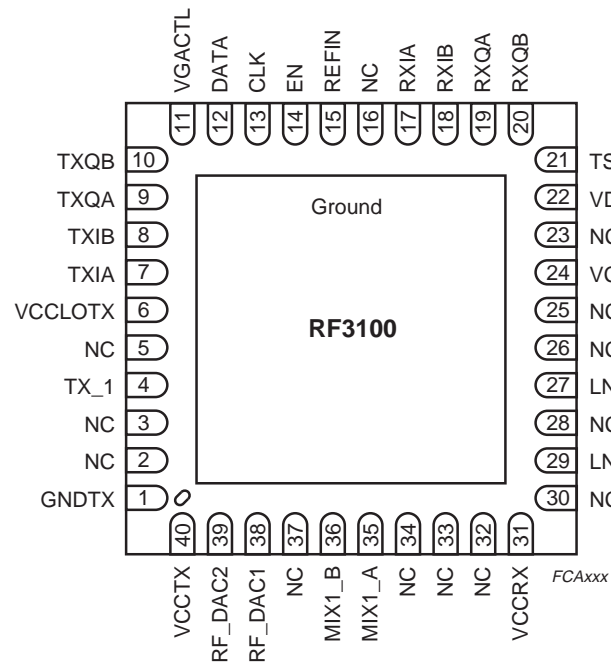


## N1300 ASIC YLVA ROP 101 3107/1

### Block diagram



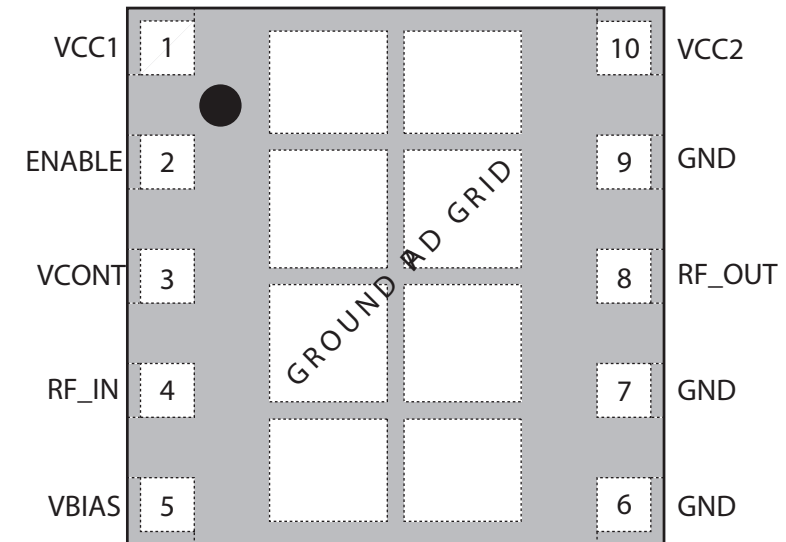
### Pinning



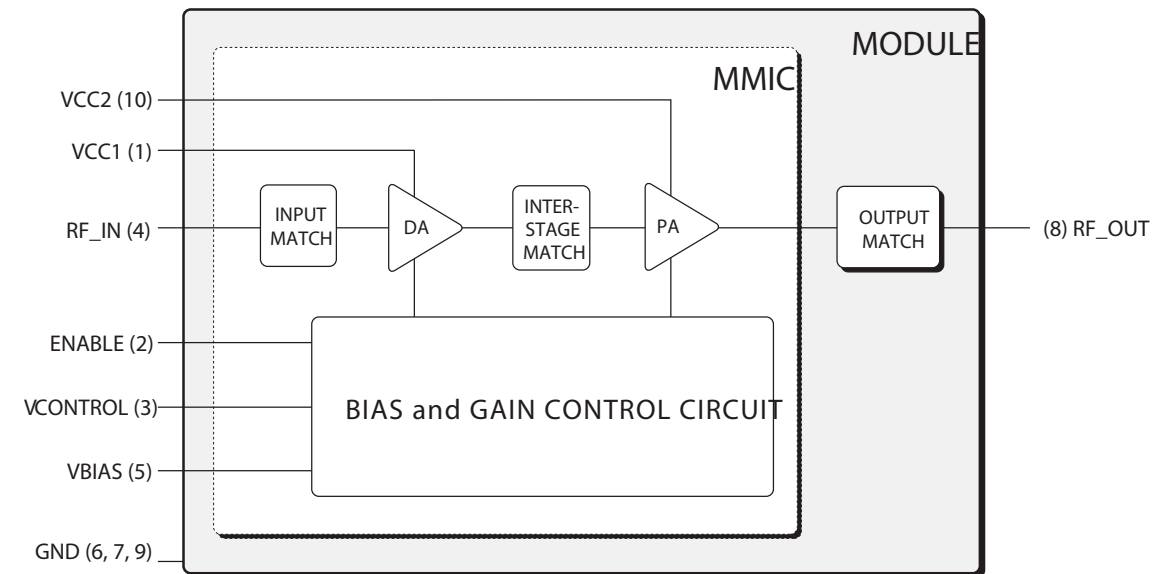
### Pin description

Symbol	Pin	Description
GNDTX	1	TX ground
NC	2	Not connected
NC	3	Not connected
TX_1	4	TX RF output 1
NC	5	Not connected
VCCLOTX	6	TX LO supply
TXIA	7	Transmit positive I channel input
TXIB	8	Transmit negative I channel input
TXQA	9	Transmit positive Q channel input
TXQB	10	Transmit negative Q channel input

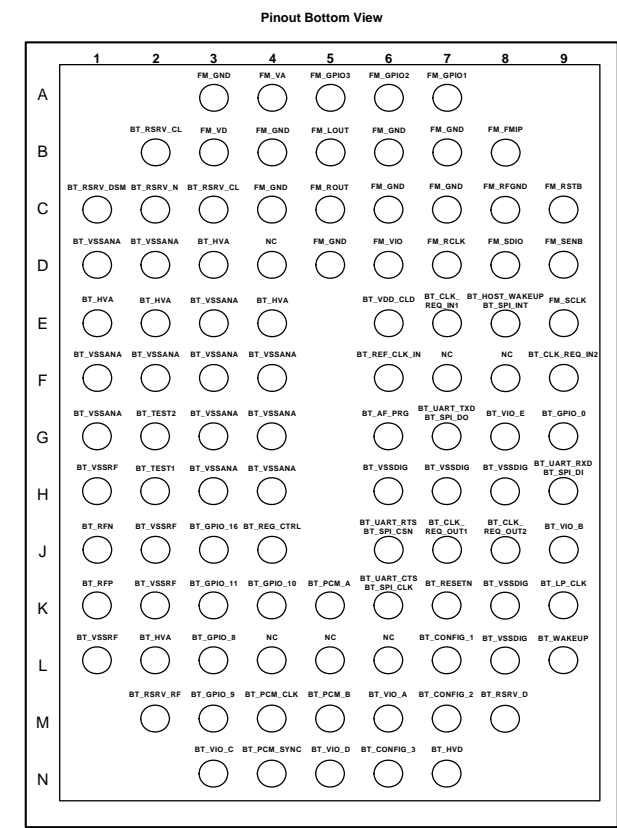
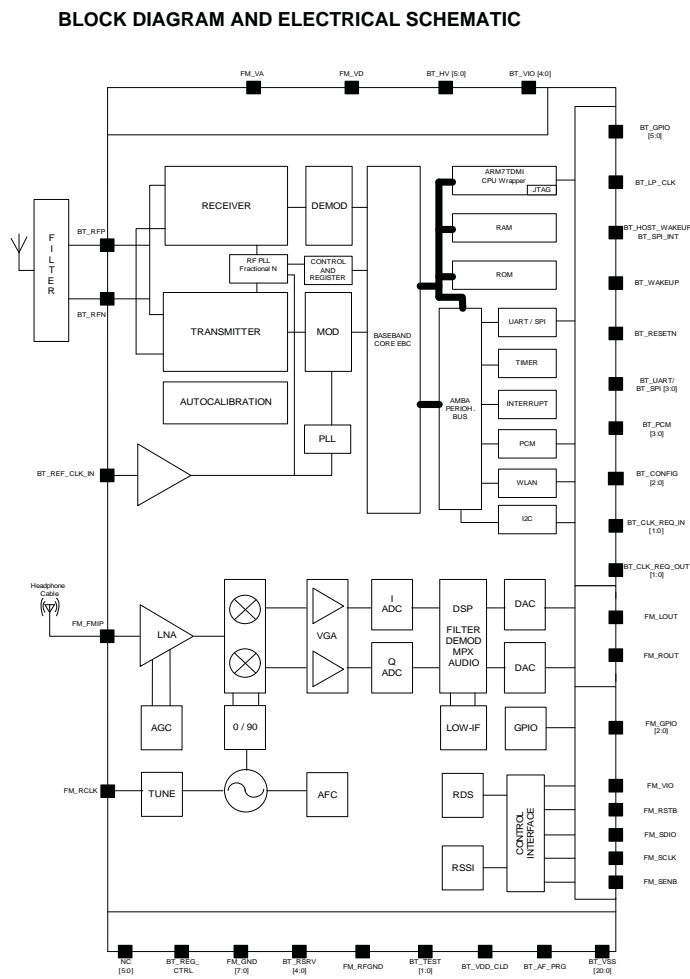
## N1380 Module PA WLAN 4040 1200-0073



Pad layout as seen from top view looking through the package.  
GROUND GRID is package underside.



N1400 Module Bluetooth + FM STLC2592 1200-6182

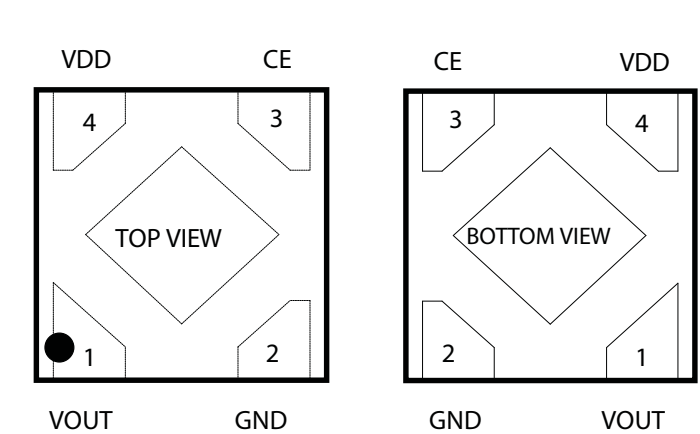


N2201 IC Vreg PLP1010-4 1201-6465

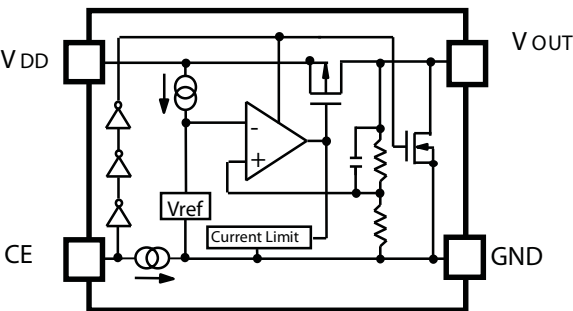
PIN DESCRIPTIONS

Pin No.	Symbol	Description
1	$V_{OUT}$	Output Pin
2	GND	Ground Pin
3	CE	Chip Enable Pin ("H" Active)
4	$V_{DD}$	Input Pin

Tab is GND level. (They are connected to the reverse side of this IC.)

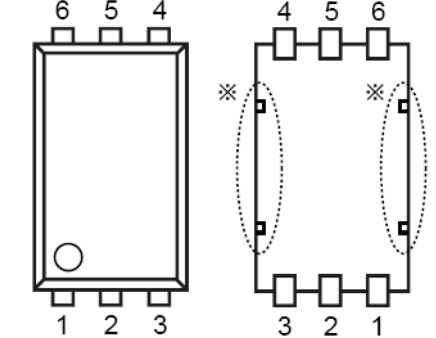


BLOCK DIAGRAM




N2202 IC Vreg SON-6 1200-0373

Top View Bottom View



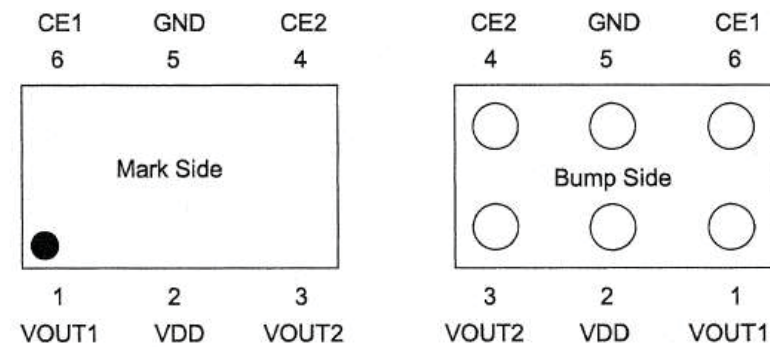
Pin No	Symbol	Pin Description
1	$V_{DD}$	Input Pin
2	NC	No Connection
3	$V_{OUT}$	Output pin
4	ECO	MODE alternative pin
5	GND	Ground Pin
6	$\overline{CE}$ or CE	Chip Enable Pin

\* Tab in the  parts have GND level.  
(They are connected to the reverse side of this IC.)  
Do not connect to other wires or land patterns.

## N2203 2 CH-LDO Vout1=2.8V, Vout2=1.8V , WL-CSP6 RYT 113 997/4

### [3] Pin Description

Pin No.	Symbol	Pin description
1	VOUT1	Output Pin of Voltage Regulator 1 (VR1)
2	VDD	Power Supply Pin
3	VOUT2	Output Pin of Voltage Regulator 2 (VR2)
4	CE2	Chip Enable Pin for Voltage Regulator 2(VR2)
5	GND	Ground Pin
6	CE1	Chip Enable Pin for Voltage Regulator 1(VR1)



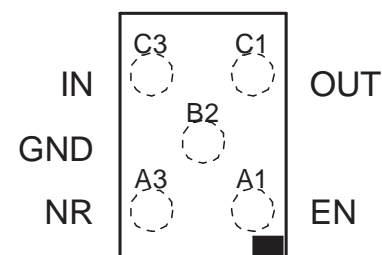
### [4] Absolute Maximum Ratings

T<sub>opt</sub>=25°C, V<sub>ss</sub>=0V

Item	Symbol	Rating	Unit
Supply Voltage	V <sub>IN</sub>	6.5	V
Input Voltage			
CE pin Voltage	V <sub>CE</sub>	-0.3 to V <sub>IN</sub> +0.3	V
Output Voltage	V <sub>OUT</sub>	-0.3 to V <sub>IN</sub> +0.3	V
Output Current (VOUT1)	I <sub>OUT1</sub>	200	mA
Output Current (VOUT2)	I <sub>OUT2</sub>	200	mA
Power Dissipation	P <sub>D</sub>	Refer to p.9 [8]	mW
Operating Temperature	T <sub>opr</sub>	-40 to 85	°C
Storage Temperature	T <sub>stg</sub>	-55 to 125	°C

## N2204 2 LDO 1.8V, 200mA low noise, CS-5 RYT113 7816/4

### (TOP VIEW)

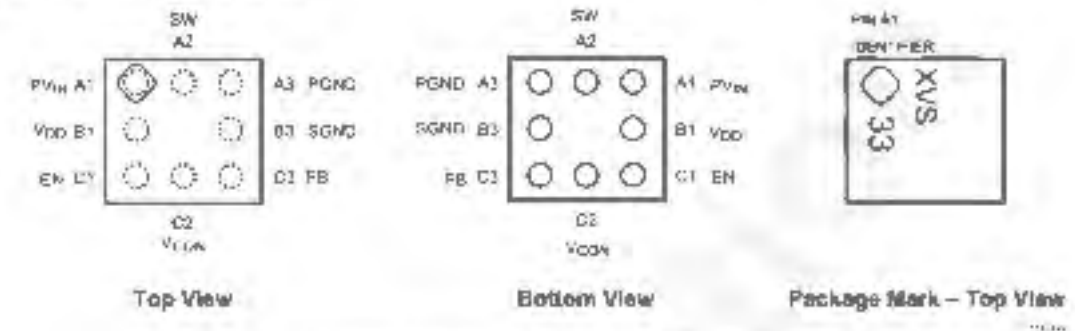


### PIN DESCRIPTIONS

TPS799xx			DESCRIPTION
NAME	YZU		
IN	C3		Input supply.
GND	B2		Ground
EN	A1		Driving the enable pin (EN) high turns on the regulator. Driving this pin low puts the regulator into shutdown mode. EN can be connected to IN if not used.
NR	A3		Fixed voltage versions only; connecting an external capacitor to this pin bypasses noise generated by the internal bandgap. This allows output noise to be reduced to very low levels.
FB	A3		Adjustable version only; this is the input to the control loop error amplifier, and is used to set the output voltage of the device.
OUT	C1		Output of the regulator. A small capacitor (total typical capacitance ≥ 2.0μF ceramic) is needed from this pin to ground to assure stability.

## N2205 DC/DC Converter RYT 113 7838/1

### Connection Diagrams



B-Bump Thin Micro SMD Package, Large Bump  
NS Package Number TL000GNA

### Order Information

Order Number	Package Marking (Note)	Supplied As
LM3208T1	XVS/33	250 units, Tape-and-Reel
LM3208TLX	XVS/33	3000 units, Tape-and-Reel

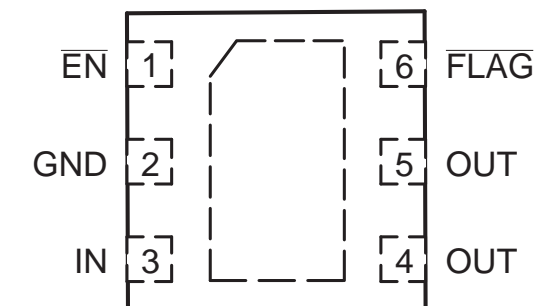
Note: The actual physical placement of the package marking will vary from pin to pin. The package marking "XVS" designates the 250-unit, 1000-unit, and 3000-unit quantities. The package marking "TLX" designates the 3000-unit quantity. The package marking "GNA" designates the 3000-unit quantity.

### Pin Descriptions

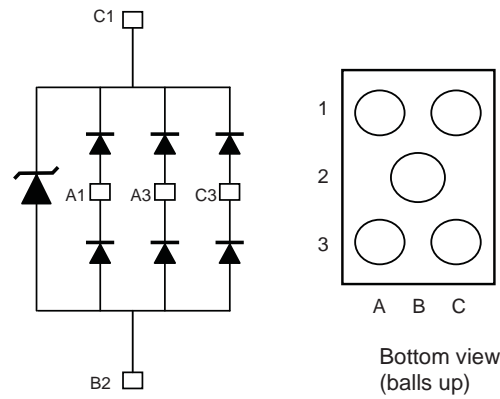
Pin #	Name	Description
A1	PV <sub>IN</sub>	Power Supply Voltage Input to the internal PFET switch.
B1	V <sub>FB</sub>	Analog Supply Input
C1	EN	Enable Input. Set this digital input high for normal operation. For shutdown, set low.
D2	V <sub>OUT</sub>	Voltage Control Analog input. V <sub>OUT</sub> controls V <sub>OUT</sub> in PWM mode.
D3	FB	Feedback Analog input. Connect to the output of the output filter capacitor.
D4	SGND	Analog and Control Ground
A3	PGND	Power Ground
A2	SW	Switch node connection to the internal PFET switch and NFET synchronous rectifier. Connect to an inductor with a saturation current rating that exceeds the maximum Switch Peak Current Limit specification of the LM3208.

## N2402 IC ESD Prot UDFN 6 2x2 mm 1200-6309

### PIN CONNECTIONS



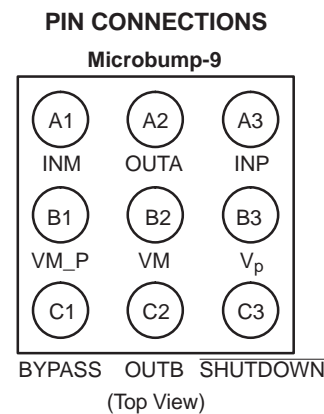
## N2424 ESD/EMI Protection for USB RKZ 923 926/1



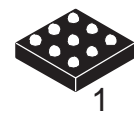
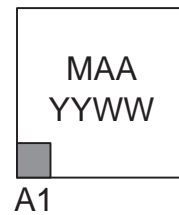
PIN	DESCRIPTION	PIN	DESCRIPTION	PIN	DESCRIPTION
A1	D-	B1	-	C1	Vbus
A2	-	B2	GND	C2	---
A3	D+	B3		C3	ID

Table 1: IP4059CX5/LF Example of pin configuration for USB2.0  
other combinations for ID, D+ and D- in relation with pins A1, A3 and C3 are possible

## N3100 OPAMP 1W Pb-Free RYT 101 947/2



### MARKING DIAGRAMS

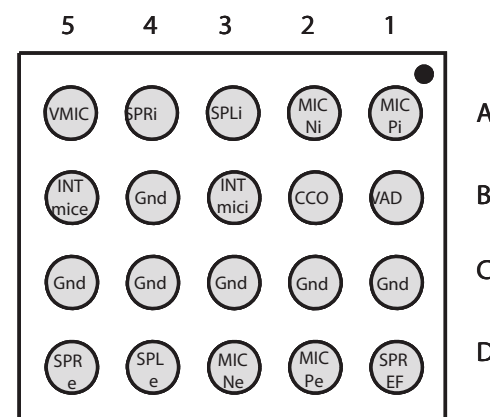


Microbump-9  
FC SUFFIX  
CASE 499E

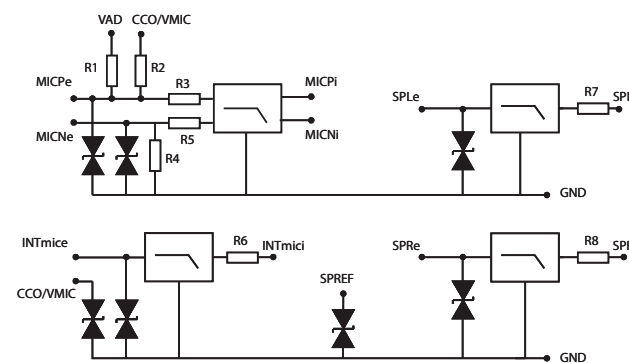
R = Assembly Location  
YY, Y = Year  
WW, W = Work Week

## N3101 ASIC Tjatte3 CSP20 ROP 101 3074/1

Pin configuration (Bump side)

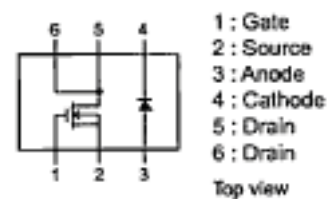


Electrical diagram

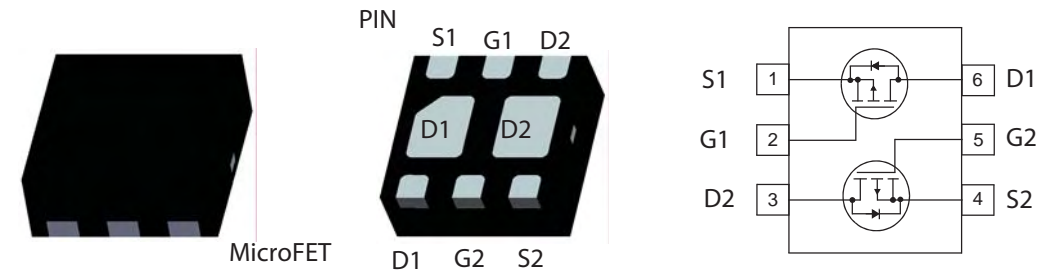


## N4201 Trans N-ch FET RYN 901 936/1

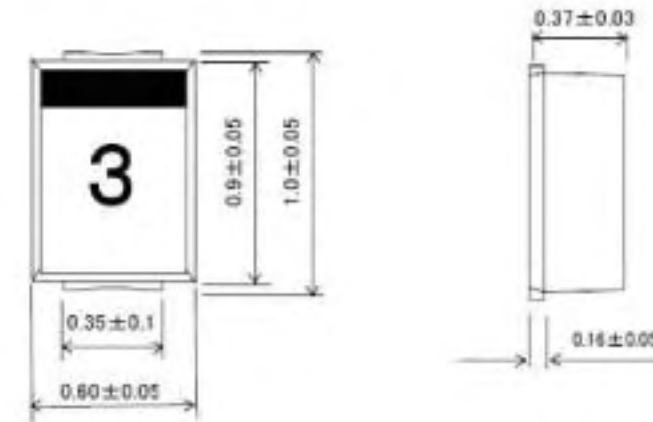
Electrical Connection



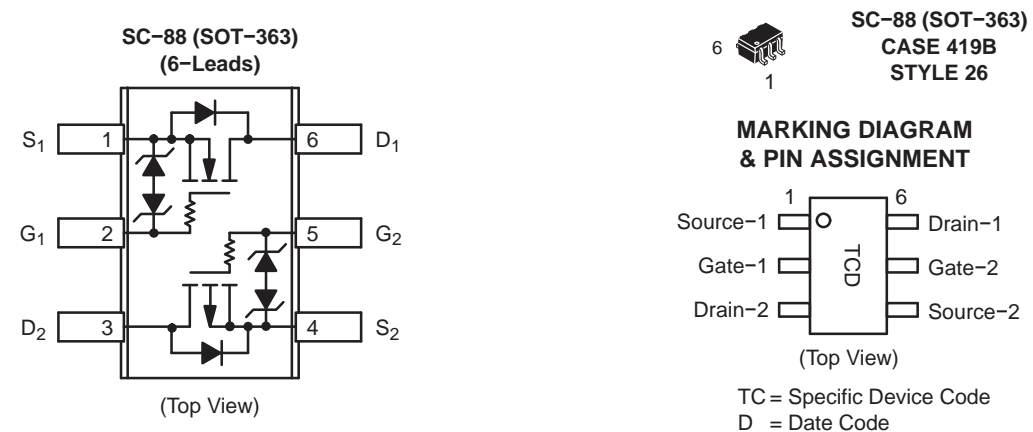
## V2202 Trans V; Dual PMOSFET; BYX1 01603\_A;REQ318 RYN 122 910/1



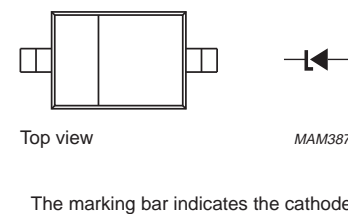
## V2402 Switching Diode RKZ 323 916/1



## V2405 MOSFET Complementary N P 20V (D S) RYN 901 918/2



## V2420 Zener Diode Voltage Regulator 15V 15% RKZ 223 905/2



PINNING

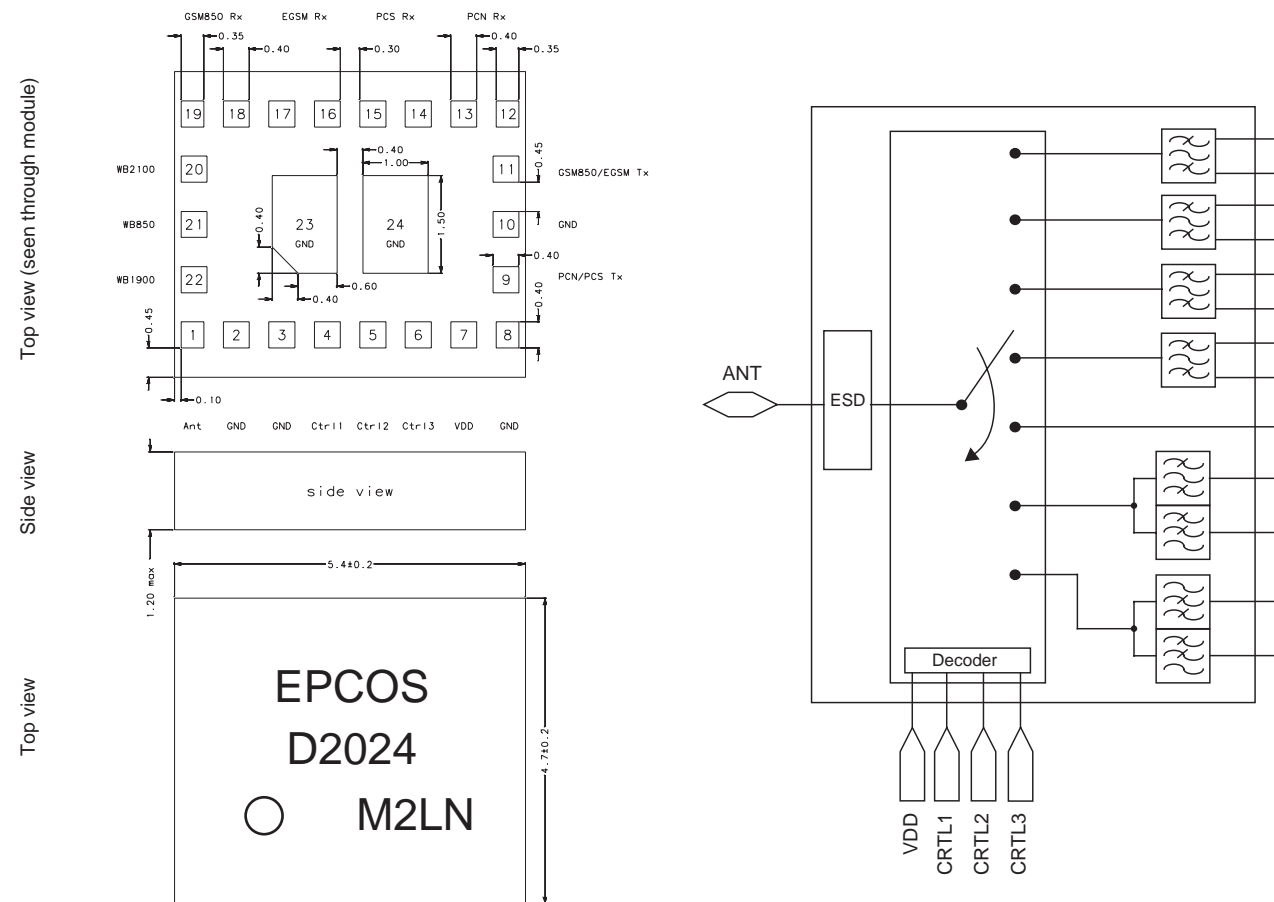
PIN	DESCRIPTION
1	cathode
2	anode



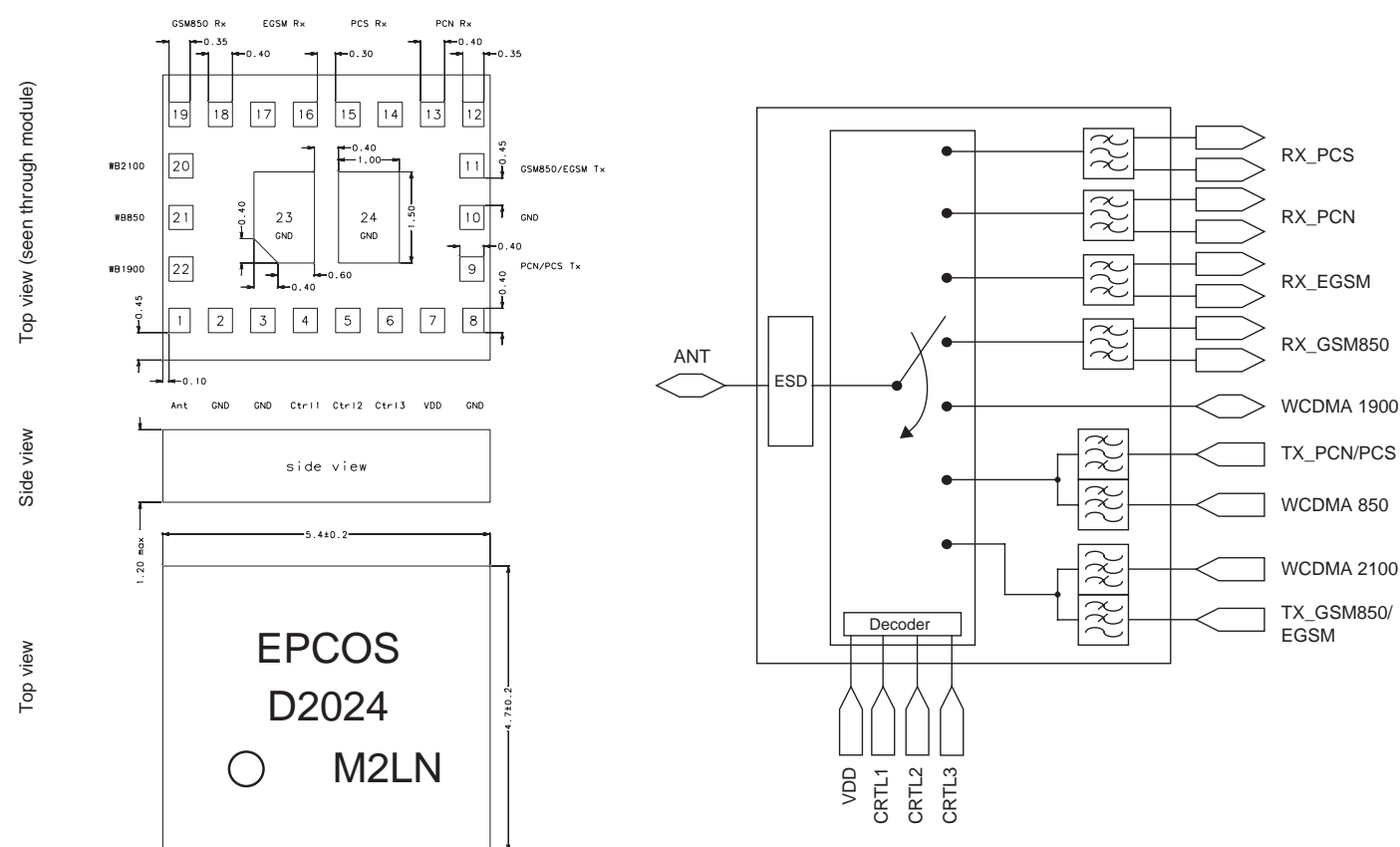




Z1230 Module GSM FEM/Switch/SAW5.4x4.7x1.2mm 1200-0169

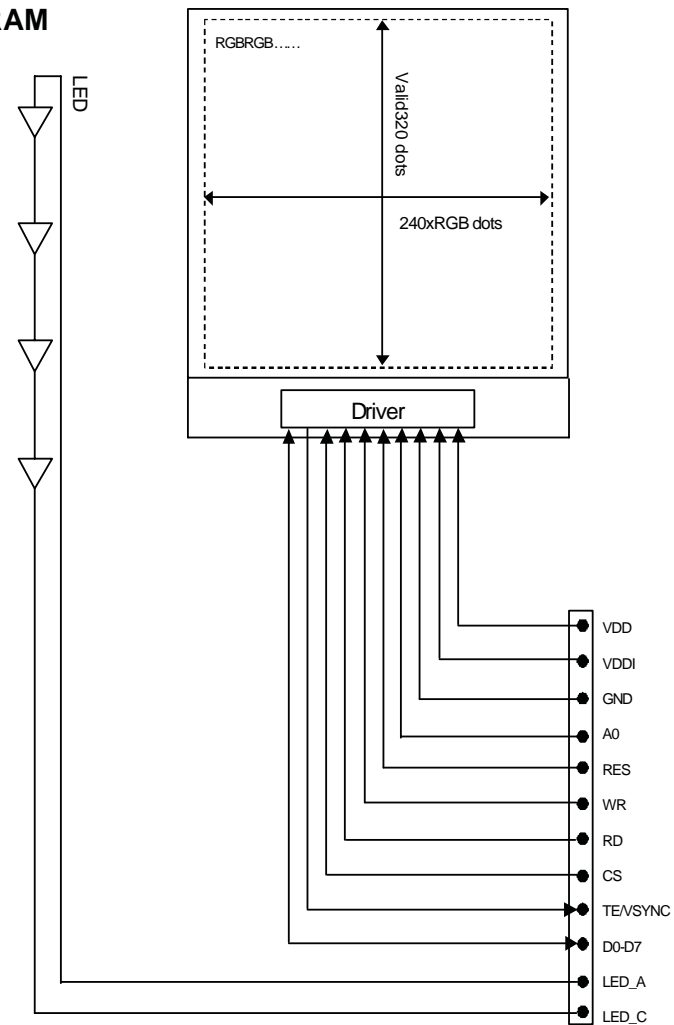


Z4200-02 Filter 400.0 MHz KNA16400 REV 501 46/1



Display 1200-8971

BLOCK DIAGRAM



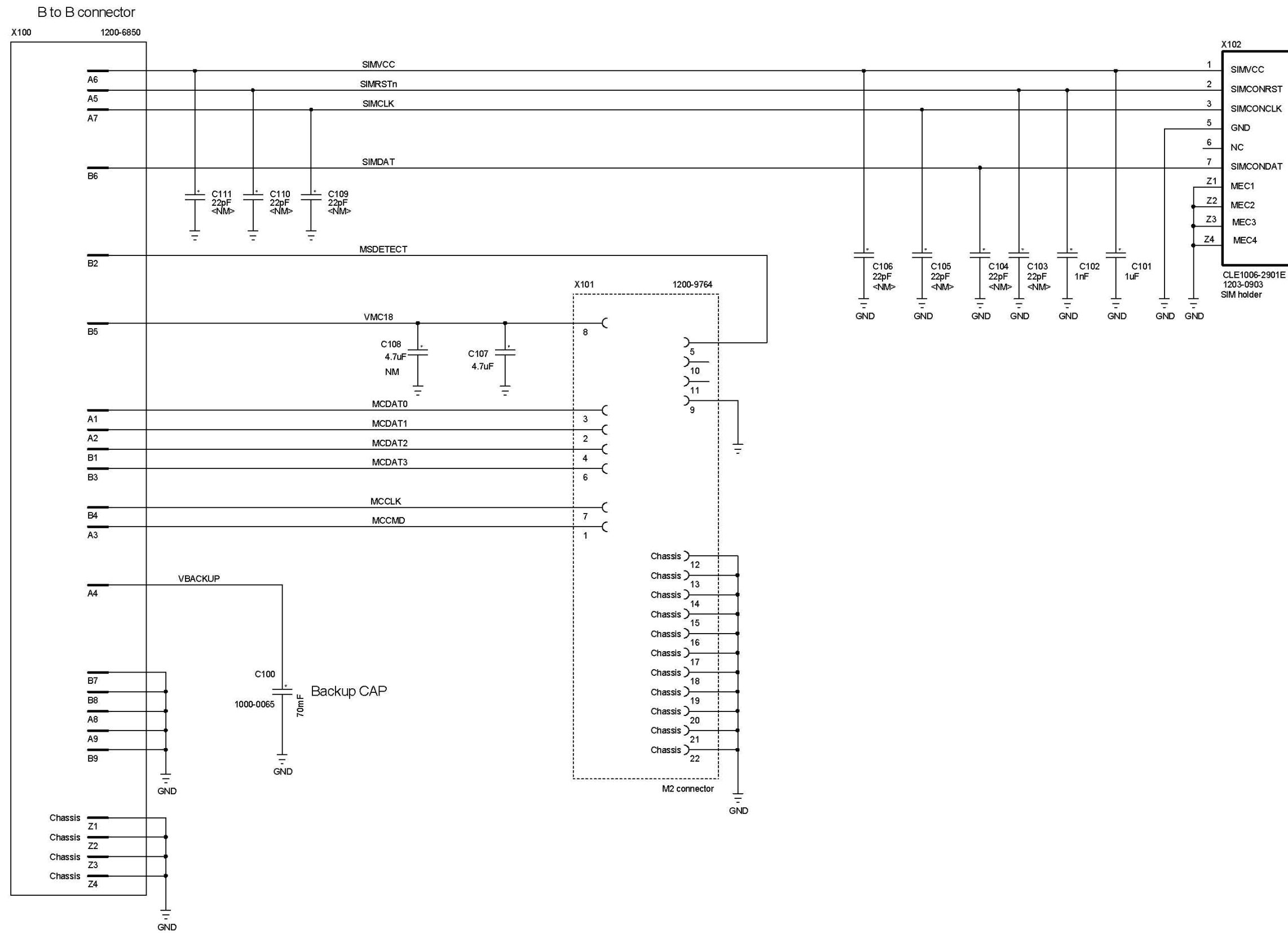
I/O TERMINALS

No.	Name	Function	I/O	Remarks
1	VDD	Supply Voltage LCD 2.6V	P	
2	GND	Ground	G	
3	GND	Ground	G	
4	GND	Ground	G	
5	RD (RDX)	Read, active at falling edge	I	
6	TEVSYNC	Picture Sync against Tearing Effect	O	
7	GND	Ground	G	
8	D0	Parallel 8bit data IF D0 (LSB)	I/O	Data for Command / Display
9	D2	Parallel 8bit data IF D2	I/O	Data for Command / Display
10	D4	Parallel 8bit data IF D4	I/O	Data for Command / Display
11	D6	Parallel 8bit data IF D6	I/O	Data for Command / Display
12	GND	Ground	G	
13	LED_A	Supply Voltage LED+	P	
14	LED_C	Supply Voltage LED-	P	
15	GND	Ground	G	
16	D7	Parallel 8bit data IF D7 (MSB)	I/O	Data for Command / Display
17	D5	Parallel 8bit data IF D5	I/O	Data for Command / Display
18	D3	Parallel 8bit data IF D3	I/O	Data for Command / Display
19	D1	Parallel 8bit data IF D1	I/O	Data for Command / Display
20	GND	Ground	G	
21	CS (CSX)	Chip Select, low active	I	
22	WR (WRX)	Write (Clock), active at rising edge	I	
23	RESET (RESX)	Reset; low active	I	
24	A0 (D_CX)	Data=High / Command=low	I	
25	GND	Ground	G	
26	VDDI	Supply Voltage I / O 1.8V	P	

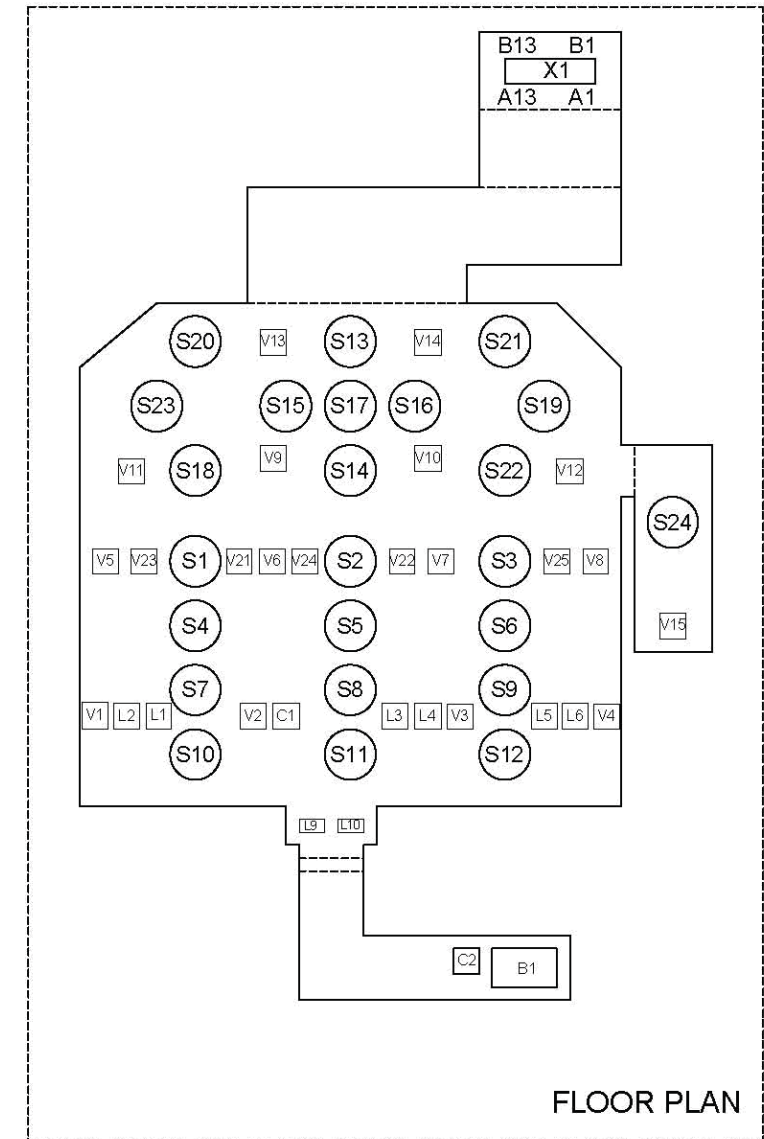
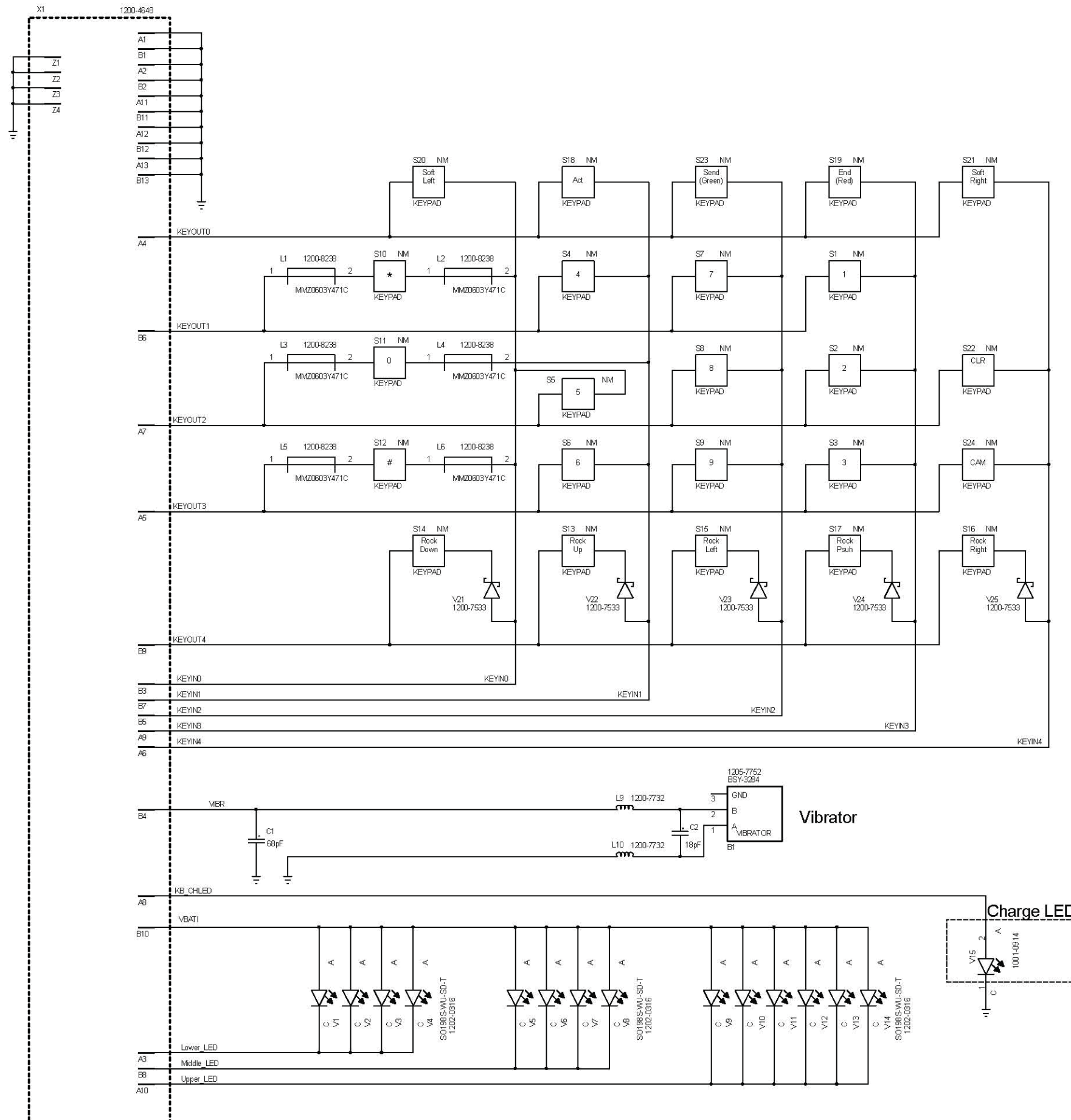
Note)

P :power supply I: Input O: Output G :Ground





26Pin Connector



FLOOR PLAN

## Troubleshooting Software Documentation

### Introduction

Using this software you can control most parts and functions of all Sony Ericsson mobile phones. It is a GUI (**G**raphical **U**ser **I**nterface) for the commands implemented in the ITP (**I**ntegrated **T**est **P**rogram). The software communicates with the phone through standard serial communication over a USB/RS232 interface (SEPI).

**Note:** *The Troubleshooting Software application is to be used with the Troubleshooting Manual and the Troubleshooting fixture kit.*

The functions in the Troubleshooting Software application are divided into three main sections: **Communication Settings**, **Radio Control** and **Base Band Controls**. These main sections are presented under six different tabs.



All settings and functions are collected under these six main tabs.

### Communication Settings

All settings for the communication between the Troubleshooting Software application and the phone are presented under the Communication Settings Tab.

### Radio Controls

**Note:** *Some parts of Radio Control functions may not be implemented since they are not supported by the ITP SW.*

**Note:** *There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available on all products.*

All Radio Control Functions implemented in the Troubleshooting Software are presented under the **Tx and Rx** tab. The main radio functions of the mobile phone presented in this tab are:

- GSM radio part
- WCDMA radio part
- Bluetooth radio part

In the GSM and the WCDMA radio control part the following radio functions can be controlled: Transmitter (TX) and Receiver (RX)

In the Bluetooth radio control part only the Transmitter (TX) function is supported.

### Base Band Controls

**Note:** *Some parts of Base Band Control functions may not be implemented since they are not supported by the ITP SW.*

**Note:** *There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available for all products.*

The functions for Base Band Control are presented under the following four different tabs:

#### Audio and FM Radio

Used for setting Audio Loop mode and test the functionality of the FM Radio.

#### Logic

Used to:

- Read out of the ADC channels
- Control or Test of SIM and Memory Stick Card
- Perform of Battery and Current Calibration
- Check Radio and Display temperature
- Etc.

#### GPIO Manager

Used to control GPIO ports at the Access and Application CPU.

**Note:** *It is very important to follow the GPIO activation sequence according to the Troubleshooting Guide instructions when the GPIO manager is used to avoid Hardware or SW function interruption.*

#### MMI

Used for:

- Main and VGA Camera Tests
- Camera Door Test
- Keyboard Scan Test
- Vibrator Test
- LED and Backlight Tests
- Xenon Flash Test
- Display Test
- Etc.

#### General

Used to:

- Read out Software and Product Data Information flashed into the phone
- Perform ASIC Revision test
- Perform available Self tests



## Equipment Setup

**Note:** During calibration the accurate voltage from VBATT must be within  $\pm 0.015$  V. If this is not fulfilled it will cause a faulty calibration. For more information about recommended power supply units, see the Repair Tool Catalogue in CSPN under the Mechanical level. The Power Supply Channel 1 VBATT must allow reverse current.

**Note:** Before starting calibration test, the phone must be flashed with ITP Software.

### Instructions for Customization of Power Supply Channel 2 DCIO/SEPI Cable

To perform Current Calibration the phone must be powered directly through the system connector. Customize the cable according to following instructions: Take the CST-75 battery charger and cut off the charger according to picture 1. **Length of the cable must be exact 1.3m.** Connect the CST-75 charger **Red** or **White** cable to the **Positive (+) Output** at Power Supply and the **Black** cable to the **Negative (GND) Output** at the Power Supply according to picture 2. Cut off isolation material from inside of the charger plug according to picture 3.

Picture 1



Picture 2



Picture 3



### Power Supply Channel 2 DCIO/SEPI Cable Connection Setup

**Note:** The Power Supply Channel 1 (VBATT) must allow reverse current.

**Note:** The maximal cable length between the Power Supply Channel 1 VBATT and the dummy battery must not exceed 1m. The cable must have a capacity for at least 16A.

Picture 4



Correct DCIO and SEPI A1 Cable setup when the Troubleshooting Fixture is used.

Picture 5



Correct DCIO and SEPI A1 Cable setup when a Dummy Battery is used.

Picture 6



This setup between DCIO and SEPI A1 Cable is WRONG!

**Note:** Voltage and Current settings for the Power Supply Channel 1 VBATT and 2 DCIO/SEPI can be found in the Equipment List included in the Product Specific Troubleshooting Manual.

**Note:** Instructions about the Troubleshooting fixture connections with the External RF connector, Display, SIM Card, Memory Stick Card, Keyboard etc. can be found in Troubleshooting Fixture Connection Instruction included in the Product Specific Troubleshooting Manual.

### System Requirements

**Note:** *Before start using the Troubleshooting Software, the phone must be flashed with ITP SW.*

The system requirements for running the application are:

- At least a Pentium III 500 MHz, with 128 MB of RAM
- Win2000 or Win XP
- One free USB connector
- USB Computer Cable
- At least 1024x768 display resolution. (1152x864 is recommended.)
- SEPI Drivers must be installed
- SEPI BOX
- SEPI A1 Cable
- Phone Specific Dummy Battery
- Phone Specific TRS Fixture
- CST-75 Charger cable
- One Dual or Two Single Channel Power Supplies

### TX and RX - Tab

#### Communication Functions

**Note:** *Some parts of the Communications functions may not be implemented since they are not supported by ITP Software.*

**Note:** *There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available on all products.*

### GSM

#### GSM Mode Settings

Used for selecting of the GSM radio mode. The following Radio Modes are available:

- TX and RX Switched
- TX and RX Static

**Note:** *In the TX Switched mode all parameters are available (Band, Channel and Power Level). In the TX Static mode the control of Power Level is hidden and the transmitter works with a predefined DAC value. This is done to protect the power amplifier against overheating.*

### GSM Radio Settings

Used for Channel and Power Level control of the selected GSM Band. The TX and RX frequency value for selected band and channel will be presented in the TX and RX frequency box.

1. Select the desired GSM band. Available options are **GSM 850** (Ch 128...251), **GSM 900** (Ch 1...124), **EGSM 900** (Ch 975...1023), **DCS 1800** (Ch 512...885) and **PCS 1900** (Ch 512...810).
2. Use default value or select desired channel.
3. Use default value or select desired power level.

**Note:** *Any GSM band not used by the Mobile Phone will be unavailable in the GSM Radio Settings.*

#### GSM RSSI measurements

This measurement is only possible to perform when RX Switched mode is selected. Use the Mobile Phone Tester instrument for feeding a signal to the mobile phone's receiver. For Instrument and Phone's settings go to Troubleshooting Manual – GSM Network problems.

1. Select RX Switched Mode.
2. Select desired GSM band and Channel.
3. Go to GSM RSSI Measurements and Start RSSI Test.

**Note:** *The RSSI Test can be performed differently from product to product due to the limited ITP Software support.*

### WCDMA

**Note:** *Unused WCDMA Bands will not be available in the WCDMA Radio Settings.*

**Note:** *For some products the TX and RX WCDMA Channels range can be reduced due to the limited product functionality or Test Instrument limitation. This is done to avoid wrong and incorrect measurement results.*

#### Radio Settings

Used for TX and RX Channels control of the selected WCDMA Band. The TX and RX Channels frequency for selected band will be presented in the TX and RX frequency box.

1. Select the desired WCDMA band. Available options are **Band I** (TX Ch 9612...9888, RX Ch 10562...10838), **BAND II** (TX Ch 9262...9538, RX Ch 9662...9938), **BAND IV** (TX Ch 1312...1513, RX Ch 1537...1738), **BAND V** (TX Ch 4132...4233, RX Ch 4357...4458) and **BAND VIII** (TX Ch 2712...2863, RX Ch 2937...3088)
2. Use default value or select desired TX or RX channel.

## Fast select channels

**Set High Channel:** The High Channel for selected WCDMA Band will be set by the Troubleshooting SW.

**Set Mid Channel:** The Mid Channel for selected WCDMA Band will be set by the Troubleshooting SW.

**Set Low Channel:** The Low Channel for selected WCDMA Band will be set by the Troubleshooting SW.

## Modes

**Max Pwr 23dBm** set the Phone to transmit with maximum power at the selected Band and TX Channel. The limit is 23dBm.

**Min Pwr Max -50dBm** set the Phone to transmit with minimum power at the selected Band and TX Channel. The limit is -50dBm.

**Read RSSI** set the Phone in RX mode at the selected Band and RX Channel.

**Out Pwr level x dBm** set the Phone in TX mode at the desired power level value at the selected Band and TX Channel (Power level range to choose is: from -50dBm to 23dBm).

**INP/OUT Pwr check** set the Phone to transmit with maximum power and switch the receiver On at the selected Band and TX/RX Channel

**Reset output** set the Phone in WCDMA Off mode.

## Rx on

**Read measurement** read the RSSI and report the result at Phone reported power. This function can only be used when the Receiver is On.

**Note:** *The RSSI Measurement can be performed differently from product to product due to the limited ITP Software support.*

## VCO and VCXO Functions

**Note:** *These calibrations are only possible to perform when RX static mode is selected.*

**Note:** *These calibrations may not be possible to implement for all products due to limitations in ITP Software.*

## VCO Calibration (TX)

Uses the default values in the TP to adjust the varactor diode to a pre-determined operating point, so that the loop voltage of the TXVCO (measured with an ADC) is within the valid range and the optimal value is chosen. The optimal value is defined as: The CVCO value that gives loop voltages within the limits for both high and low channel and that has the lowest maximum loop voltage.

The optimum value is stored in GDFS.

## VCXO Control

Used to fine tune the VCXO to **MCLK** frequency by calibrating the DAC that sets the VCXO control voltage. It is also used to verify the VCXO tuning range. When transmission is in Switched TX mode you are allowed to calibrate the VCXO oscillator controlling the DAC value on the AFC pin.

1. Switch the GSM tester to GSM900, Ch1.
2. Read the stored VCXO value from the GDFS by clicking the "**Read from GD**" button.
3. Start transmitting by clicking the "**TX Switched**" mode button.
4. To apply the VCXO DAC value you set, click the "**Set VCXO**" button.
5. Check your GSM tester.
6. Set the frequency error as close to 0 Hz as possible by using the up/down arrows and then click the "**Set VCXO**" button again.
7. The button "**Mean Value**" sets the value to 1024.
8. When the procedure is finished, click on "**Save VCXO**" button to store the calibrated value in GDFS.

## VCO Calibration (RX)

Uses the default values in the TP to adjust the varactor diode to a pre-determined operating point, so that the loop voltage of the RXVCO (measured with an ADC) is within the valid range, and the optimal value is chosen. The optimal value is defined as: The CVCO value that gives loop voltages within the limits for both high and low channel and that has the lowest maximum loop voltage.

The optimum value is stored in GDFS.

## Audio and FM Radio - Tab

### Audio & Radio Functions

**Note:** *Some parts of Audio and FM Radio may not be possible to implement for all products due to limitations in ITP Software.*

**Note:** *There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available on all products.*

## Audio Loop Test

1. Select desired Audio Loop Test
2. Click "**Apply Audio Loop**" to start the test.
3. To switch off the loop, select **OFF** from **Audio Output** and click "**Apply Audio Loop**".

### Audio input:

- **Mic1** is the internal microphone.
- **Aux1** is the input from the system connector.

### Loop mode:

- **Analogue**, where the loop is set before and after the AD/DA conversions.
- **Digital/DSP** loop, where the DSP signal processing also affects to the audio signal.
- **CPU/PCM** loop, where the loop is set between the PCM audio signals.
- **Dictaphone** loop.



### Audio output:

- **Earphone** is the internal Earpiece speaker of the unit.
- **AUX earphone** connected to the system connector.
- **Loudspeaker** is the internal loudspeaker of the unit.
- **OFF** is used to switch off the currently used Audio Loop.

Examples of different Audio Loop Test setups in Fault Trace SW.

Picture 9



K800 Project Setup

Picture 10



K850 Project Setup

**Note:** Audio output and input pins can be used by disconnecting the blue SEPI connector from the phone after the audio loop has been applied. Now the Portable Handsfree can be connected to the System Connector. After function test operation, disconnect the PHF or external audio device from the System Connector and connect the SEPI cable to proceed with other Audio Loop Tests.

### FM Radio

- To activate the FM radio, click at the **Set FM Radio** button.
- To turn off the FM radio, click at the **Turn OFF FM Radio** button.

### Audio output

Used for selecting Audio Output from the FM Radio. Most common Audio Outputs for all projects are AUX Stereo (Portable Handsfree, PHF) or Loudspeaker.

### Frequency in MHz

Frequency range box for the FM Radio. The frequency value can be selected in two different ways:

- The first one is with up/down spin buttons
- The second one is to type it directly into the Frequency field.

When typing directly into the Frequency field, the Frequency Span should be 100 KHz when changing from one frequency to another. The Frequency Range used in the Troubleshooting Software is from 87.50 MHz to 108.00 MHz.

Examples of different FM Radio Test setups in the Troubleshooting Software

Picture 11



K850 Project FM Radio Setup

Picture 12



K800 Project FM Radio Setup

## Logic – Tab

### Logic Functions

**Note:** Some of the Logic functions may not be possible to implement for all products due to limitations in the ITP Software.

**Note:** There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available on all products.

### Battery Calibration

**Note:** To perform this test only Power Supply channel 1 is needed. Make sure that the correct voltage values are set for each test step, otherwise the test will fail.

The Battery Calibration test is similar to the Battery Calibration test performed in the factory environment.

1. Click **1. Battery Calibration**.
2. Click **SET VBATT to 3.2 Volt**.
3. Adjust Power Supply channel 1 (the dummy battery) to 3.2 V.
4. Click **VBAT1**.
5. Click **SET VBATT to 4.1 Volt**.
6. Adjust Power Supply channel 1 to 4.1 V and click **VBAT2**.
7. Adjust Power Supply channel 1 to 3.8 V and click **SET VBATT to 3.8 Volt**.
8. The test result (**Passed** or **Failed**) will now be displayed.

When the measured values are within the limits the calibration will be passed otherwise the test will be failed. The compensation factor will be calculated and stored in the GDFS.

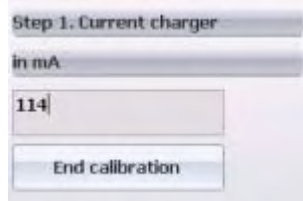
More information about the test limits can be found in the product specific Troubleshooting Manual and in the **Read Limits Table** in the **Battery and Current Calibration Test** document.

## Current Calibration

The Current Calibration test is similar to the Current Test for the charging algorithm in the factory environment.

**Note:** For a correct and accurate result, perform the **Battery Calibration Test** before current calibration. To perform this test you will need both channel 1 and 2 from the Power Supply.

1. Click **2. Current Calibration**.
2. Adjust channel 1 (the dummy battery) to 3.8 V.
3. Click button **SET VBATT to 3.8 Volt**.
4. Note the measured current for channel 2 (the customized charger with SEPI).
5. Type in the measured current (in mA) in the text box.



In this example the current is measured to 114 mA.

6. Press **Enter**.
7. The phone will switch to charging with 800mA. Note the measured current value result at Power Supply Channel 2 DCIO/SEPI.
8. Type the new value in the text box.
9. Press **Enter**.
10. The test result (**Passed** or **Failed**) will now be displayed.

When the measured values are within the limits the calibration will be passed otherwise the test will be failed. The compensation factor will be calculated and stored in the GDFS.

More information about the test limits can be found in the product specific Troubleshooting Manual and in the **Read Limits Table** in the **Battery and Current Calibration Test** document.

## ADC Values

1. Select the desired ADC Channel.
2. Click **Read ADC value**.

- The measured value will be presented in both hex and decimal info boxes.
- N/A means that the General Purpose port is not used by this phone or this port is not supported by ITP.
- If a port is missing in the Troubleshooting SW that port is not supported by the ITP SW.

## SIM Card Control

This section controls the SIM interface in the phone.

**SIM VCC:** Voltage for the SIM Card will be activated.

**SIM RESET, SIM DATA** and **SIM CLOCK:** Activate the Reset, Data and Clock signals for the SIM Card.

**SIM Com Test:** Checks the communication with the SIM Card.

The test result (**Passed** or **Failed**) will be displayed in the info box.

**Note:** A SIM card must be inserted and a card reader connected to run this test.

**Memory stick test** checks the communication with the Memory stick card.

The test result (**Passed** or **Failed**) will be displayed in the info box.

**Note:** A Memory stick card must be inserted and a Memory card reader connected to run this test.

## End Calibration

Ends the calibration and no data will be stored.

## Go Idle for 2 sec

The unit will be set to IDLE mode for 2 seconds.

## Reboot Phone

IPT command **KILL** will be send and the phone will restart.

## Radio Temperature

The value of the Radio Temperature will be displayed in the info box.

## Display Temperature

The value of the Display Temperature will be displayed in the info box.

## GPIO Manager Functions

Set GPIO port at Access and/or Application CPU to High or Low and Read Out status of the port.

## MMI – Tab

### Functions

**Note:** Some parts of MMI functions may not be possible to implement for all products due to limitations in the ITP Software.

**Note:** There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available on all products.

## Display Pattern

Activate different test patterns on the display.

## LED and Backlight

Activate/Deactivate LEDs and Backlights on the phone.

## Misc

Activate/Deactivate tests such as:

- Main Camera Test
- VGA Camera Test



- Camera Door Test
- Vibrator Test
- Keyboard Scan Test
- Etc.

**Note:** *When one test has been deactivated the phone will be restarted.*

## General – Tab

### Functions

**Note:** *Some parts of General functions may not be possible to implement for all products due to limitations in ITP Software.*

**Note:** *There are some differences in the user interface depending on the phone project file loaded. Some functions may not be available on all products.*

### Software Information

This function is used to display the following information stored into the phone:

- ITP version
- IMEI number
- OTP number
- CID number
- PAF status
- Lock Status
- Etc.

**Note:** *The OTP number must match the IMEI number otherwise the IMEI has been changed.*

**Note:** *Some of these functions may not be available for all products due to security reasons.*

### Product Data

This function displays production data stored in the phone, such as:

- First Identification (Serial Nr.)
- PBA Nr.
- PBA Rev.
- DPY Nr. (Sales Unit)
- Etc.

### ASIC Revisions

This function displays the types and revisions of the different ASICs. To find out more information about which components are included in this test go to the **ASIC Revision Test** document **included in** the product specific **Troubleshooting Manual**.

### Self Test

This function runs available self tests on the Phone.

### Fault Trace SW Error Messages

1.

**...timeout when reading**

Check the following items:

- Connection between Power Supply Channel 2 (DCIO) and SEPI A1 cable (Se picture 4, 5 and 6).
- If the SEPI BOX works properly (The Green LED at the SEPI BOX must be on).
- If the USB cable between SEPI BOX and PC is connected properly.
- If the phone has been flashed with the correct ITP version.
- If VBATT and DCIO Power Supply instruments are on.

2.

**...timeout when writing**

**...timeout when reading**

Check if the correct COM Port is selected in Troubleshooting Software - Communication Settings Tab

3.

**...Port has not been succesfully opened timeout**

- Check if COM Port is connected
- Check if the correct Phone Project File is loaded
- Restart the Troubleshooting Software application and try again

4.

**Command failed due to:**

**.... Error\_InvalidParameter, ERR**

**or**

**CERR: Error\_CommandDoesNotExist, ERR**

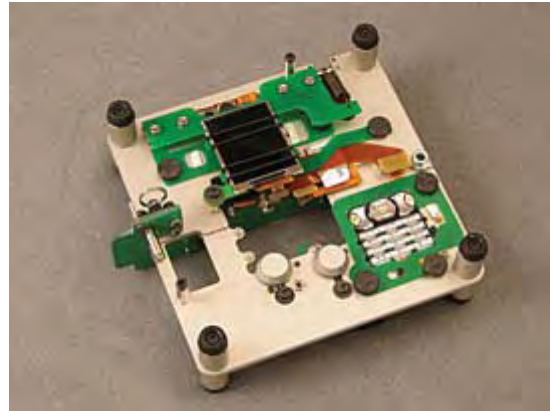
- Check if the correct Phone Project File is loaded
- Check if the phone has been flashed with the correct ITP version.



## Troubleshooting Fixture Setup Instructions

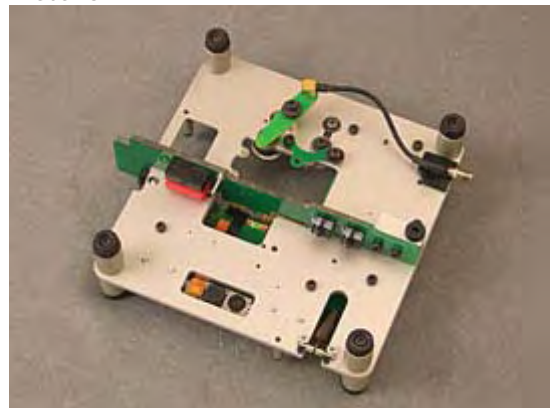
Top-view of the TRS Fixture, see picture 1.

Picture 1



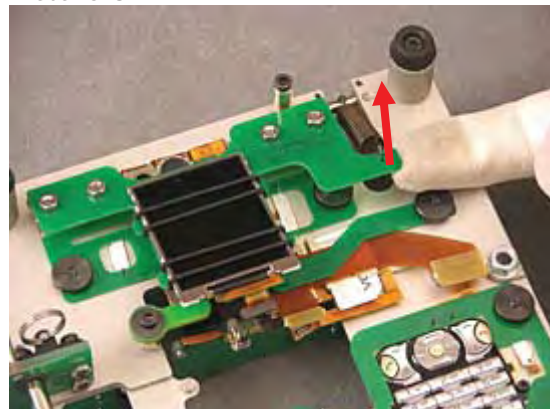
The bottom of the TRS Fixture, see picture 2.

Picture 2



Lift up the Display holder according to picture 3.

Picture 3



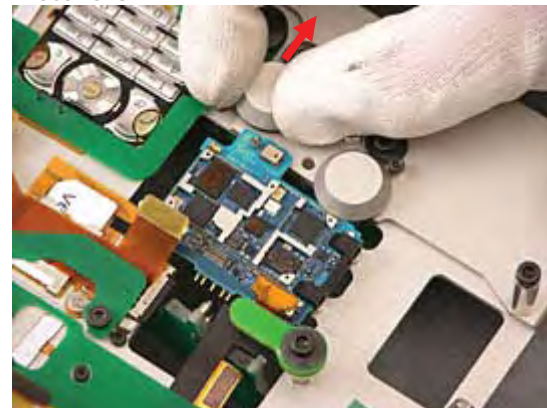
Lift up the locking device and then drag it to the left according to picture 4.

Picture 4



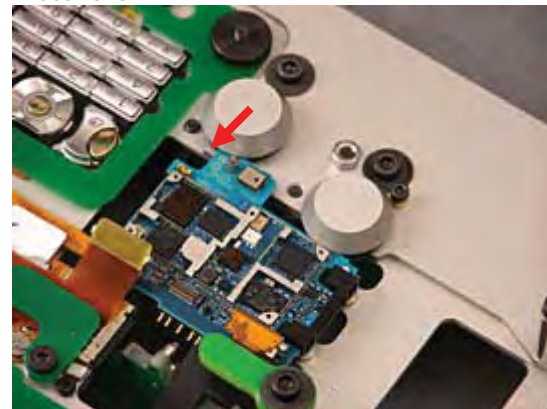
Pull back the PBA holder and place the PBA with the help of the guide pin according to picture 5.

Picture 5



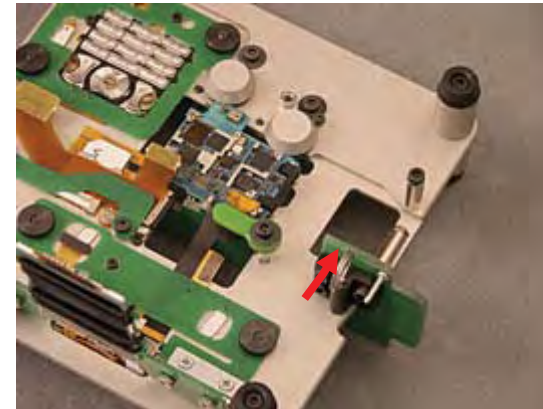
Release PBA holder according to picture 6.

Picture 6



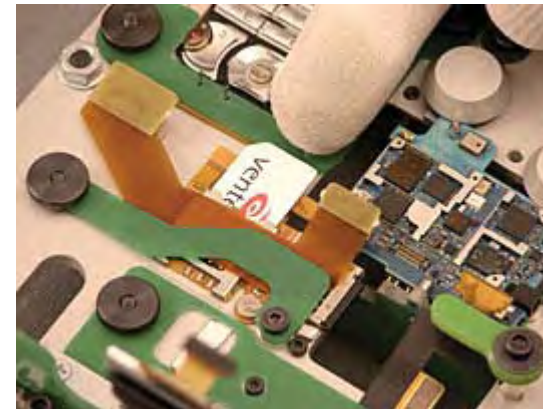
Connect VBATT connector to the PBA according to picture 7.

Picture 7



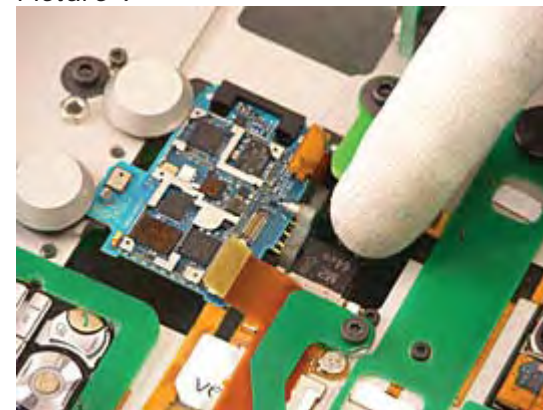
Insert SIM Card according to picture 8.

Picture 8



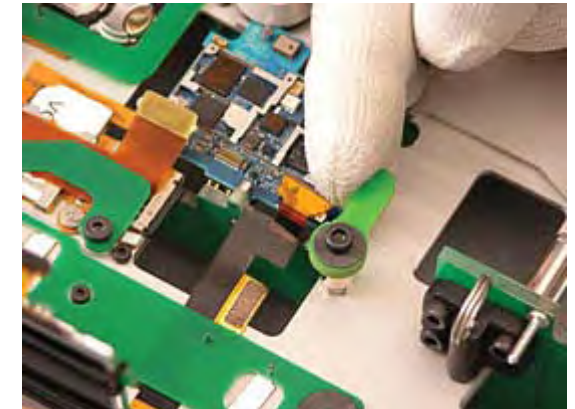
Insert Memory Card according to picture 9.

Picture 9



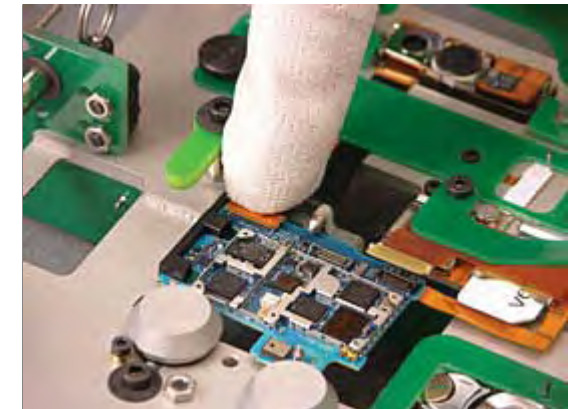
Turn the Display blocking device (LCD Stop) according to picture 10.

Picture 10



Connect Camera Flex Module according to picture 11.

Picture 11



Connect Key flex cable according to picture 12.

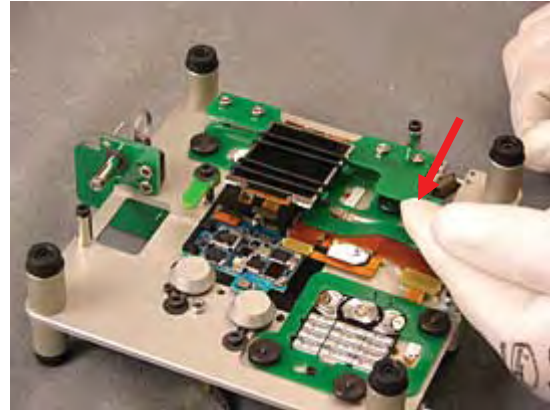
Picture 12





Take down the Display holder according to picture 13.

Picture 13



Connect Display according to picture 14.

Picture 14



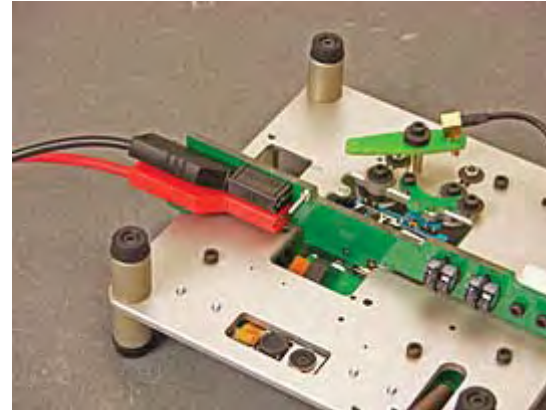
Connect SIM/M2 Flex Module according to picture 15.

Picture 15



Connect Power Supply Channel 1 VBATT (Black and Red plugs) according to picture 16.

Picture 16



Connect SMK RF Probe to the PBA by using RF Connector Frame according to picture 17.

Picture 17



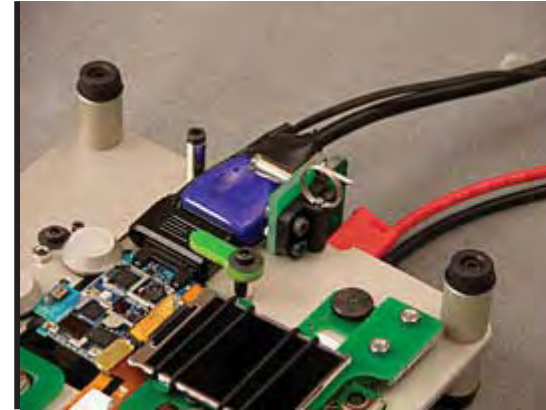
Secure the SMK RF Probe with the RF Probe locking device (RF Connector) according to picture 18.

Picture 18



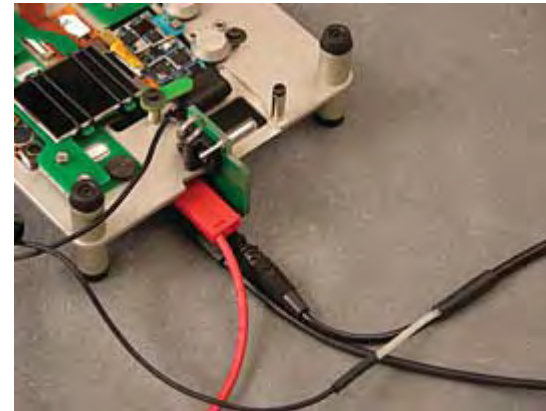
Connect Power Supply Channel 2 DCIO/SEPI Cable according to picture 19.

Picture 19



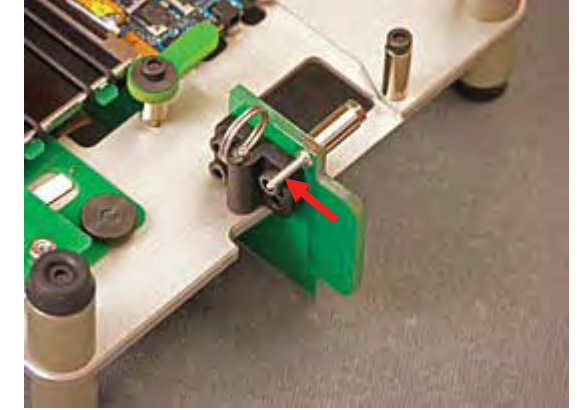
Connect Customized FM Radio Cable according to picture 20.

Picture 20



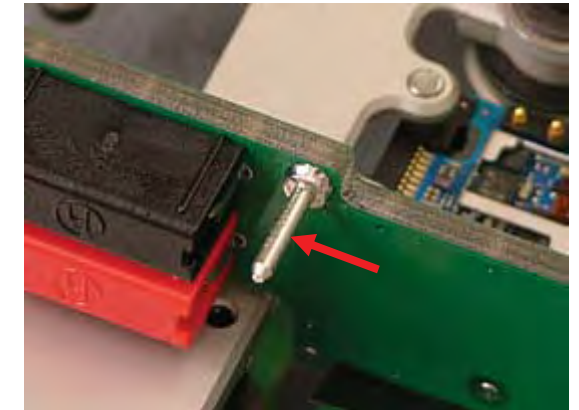
The Pin mounted on the front side of the VBATT connector marked with "RED" arrow can be used as MP TRS Fixture GND or grounding for the oscilloscope probe, see picture 21.

Picture 21



The Pin mounted on the backside of the VBATT connector marked with "RED" arrow can be used as MP TRS Fixture GND or grounding for the oscilloscope probe, see picture 22.

Picture 22





## SETUP & MAINTENANCE INSTRUCTION FOR W890 TRS FIXTURE 1207-6362

### 1. GENERAL

This fixture has been designed for the mobile phone W890.

#### 1.1 SHORT DESCRIPTION

The fixture (figure 1 and figure 2) is designed to support performing advanced troubleshooting on the PBA of the mobile phone mentioned previously.

Place the PBA when the fixture is opened. The positioning pins secure the right positioning of the board. The PBA is in a fixed position when the fixture is closed. For operating the fixture supply voltage has to be feed through the RED (V+) and BLACK (V-) banana sockets. (The supply circuitry on the fixture has a protection element; one unidirectional transient suppressor diode. It's for protecting the DUT from over voltage and reverse polarity.)

RF connection to a GSM/UMTS RF test set is optional on the fixture. Please check Equipment list for the appropriate RF connector.

Keyboard main, Display, SIM/M2 flex module and Camera Flex module as functional parts of the unit are also mountable and exchangeable.

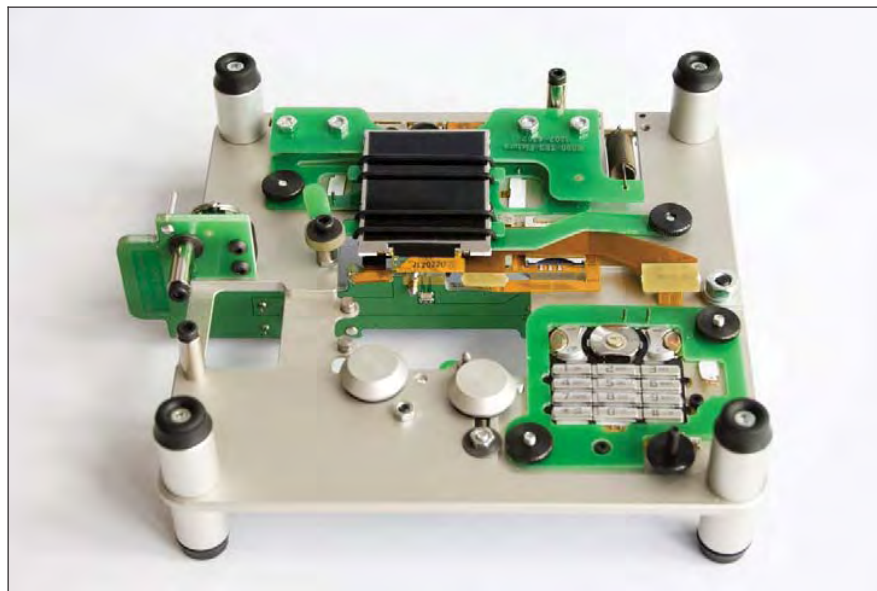


Figure 1 Top-view of the fixture.

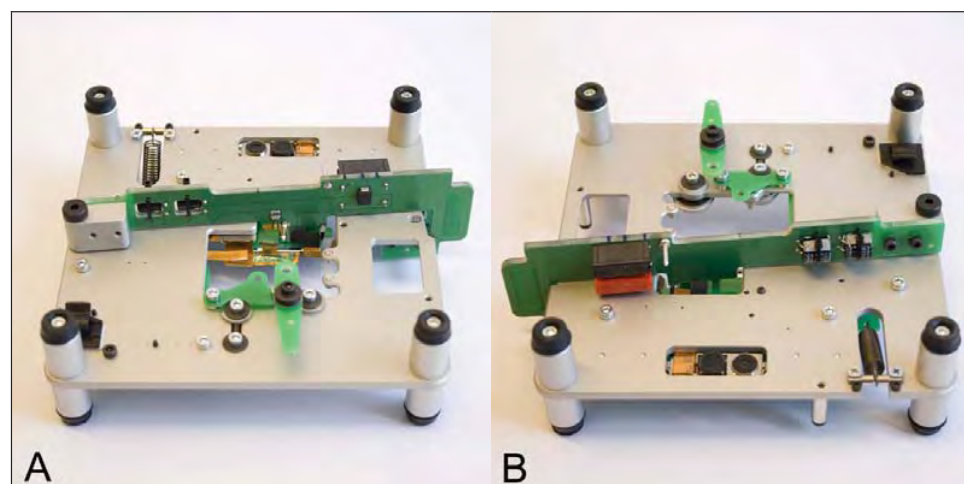


Figure 2 A) The bottom of the fixture. B) The bottom of the fixture rotated 180°

### 2. SAFETY INSTRUCTIONS

Only authorized personnel are allowed to use and do maintenance on the fixture. During maintenance disconnect all RF and power supply connections.

Please be observant when parts are in motion. Always make sure that fixture is placed steadily on a flat surface. If not, the fixture can fall and cause personal injuries. Take the same precautions when moving fixture.

### 3. MOUNTING OF THE FIXTURE

#### 3.1 CAMERA FLEX MODULE

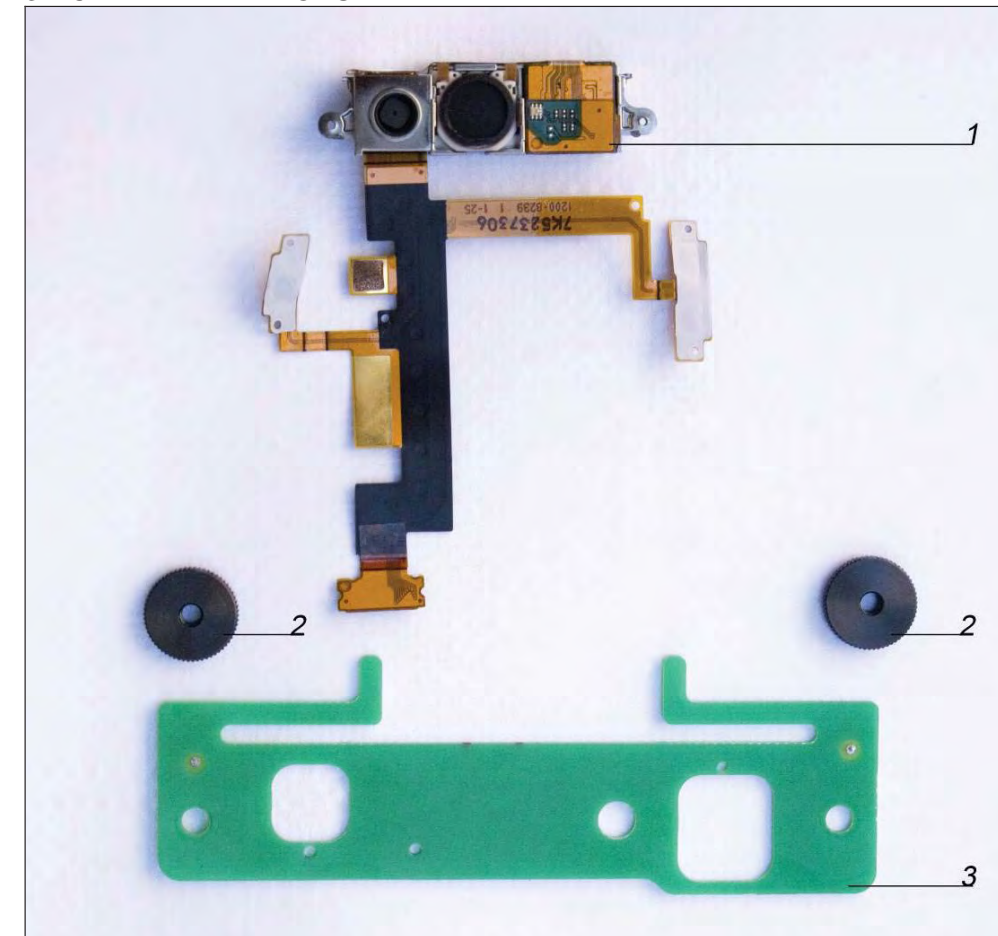


Figure 3 The components used when mounting the camera flex module is 1) camera flex module 2) two flat nuts 3) camera clamping frame.

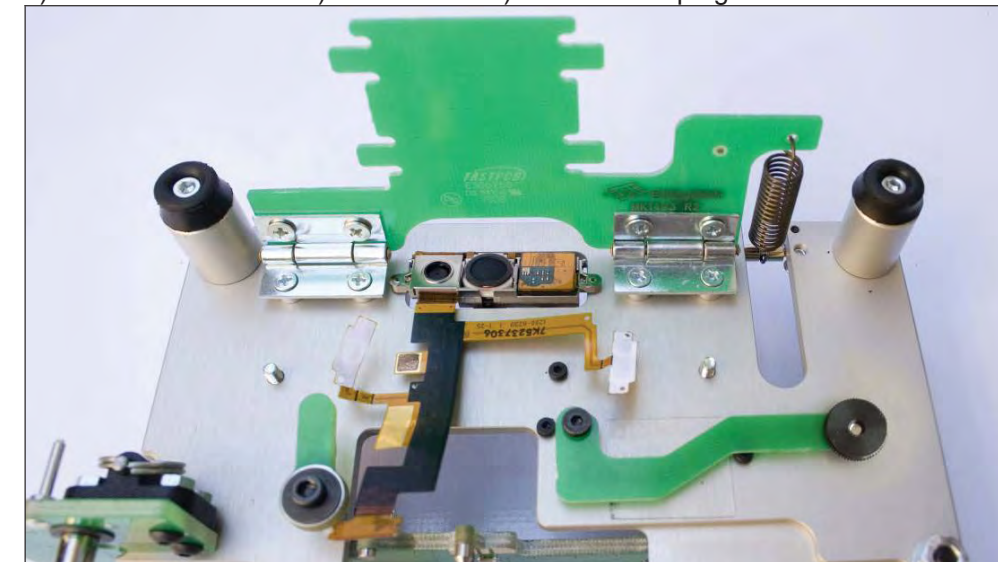
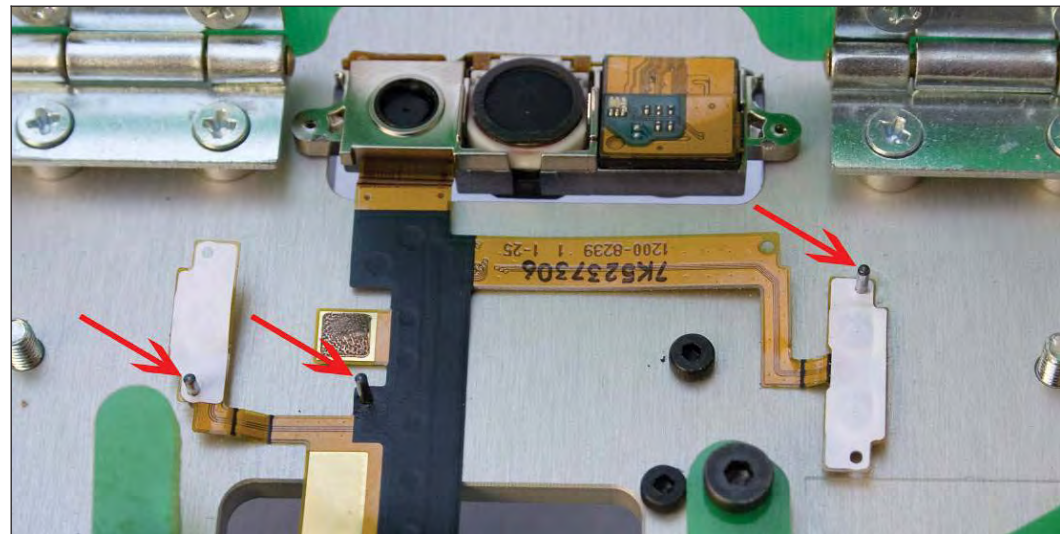
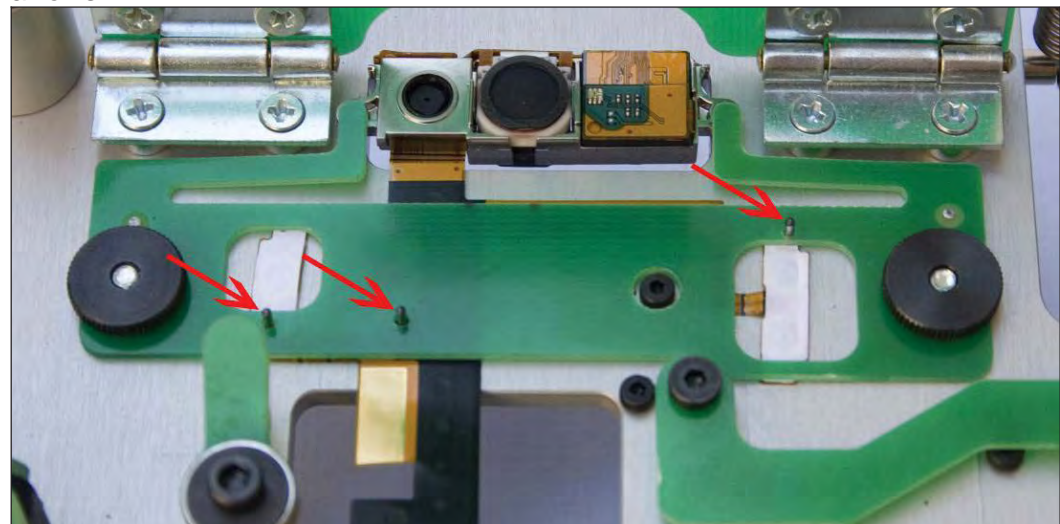


Figure 4 Place the camera flex module in slot.



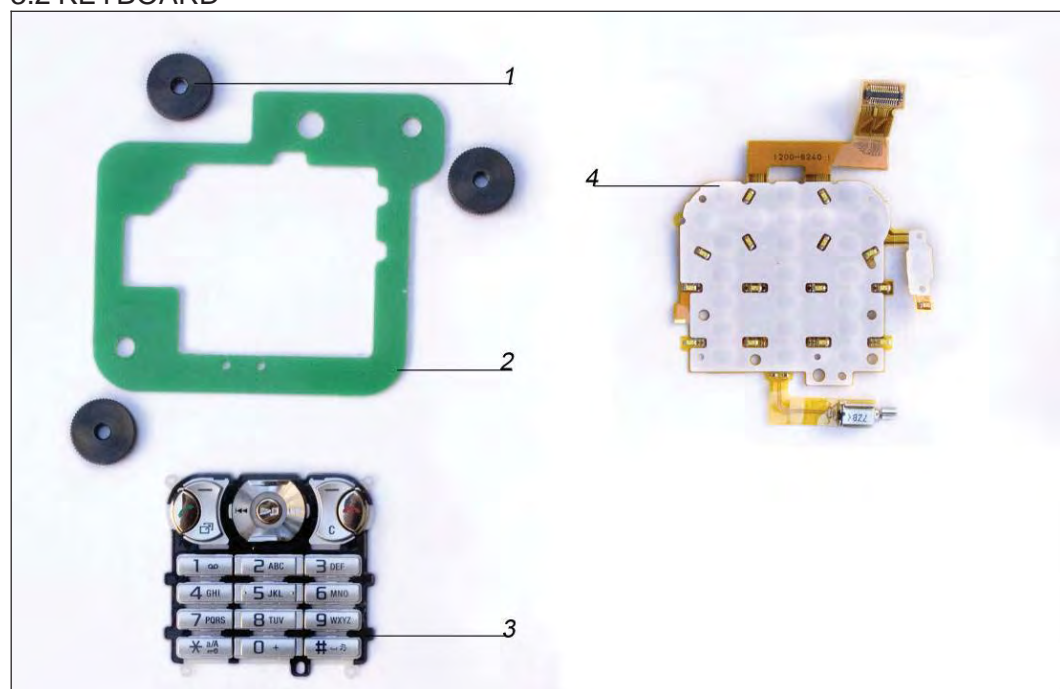


**Figure 5** Orient the camera flex cables on the three position pins marked with red arrows.

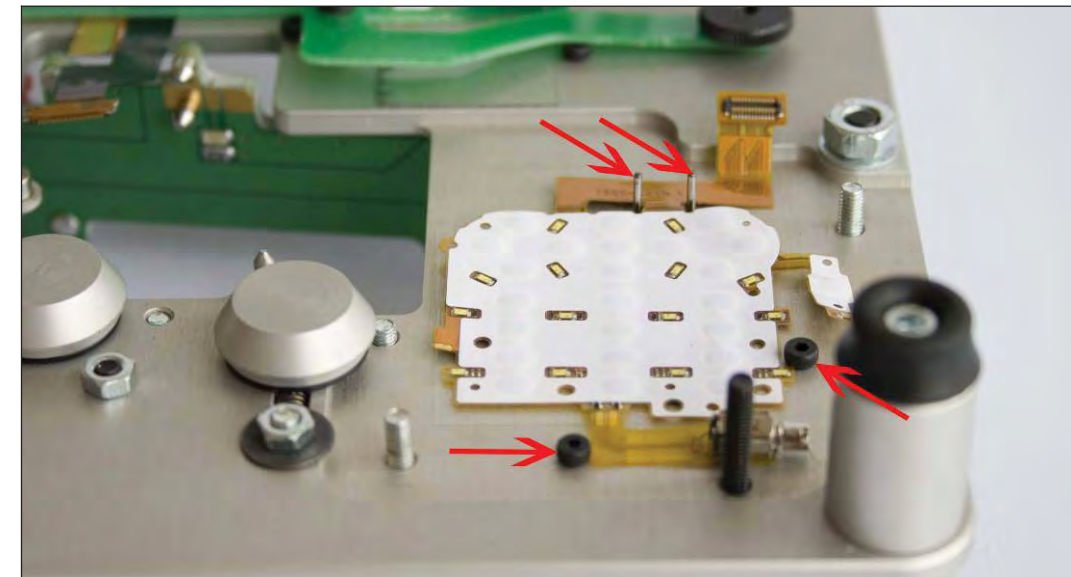


**Figure 6** Orient the camera clamping frame on the three position pins and fixate it with the two flat nuts.

### 3.2 KEYBOARD



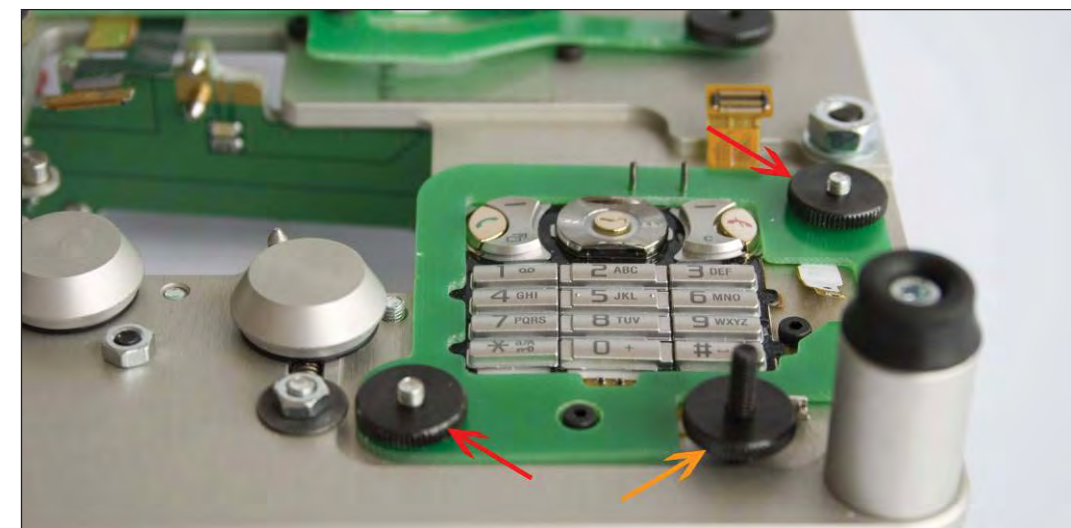
**Figure 7** The components used when mounting the key board is: 1) three flat nuts 2) keyboard clamping frame, 3) keyboard main 4) keyboard flex module.



**Figure 8** Place the keyboard flex module in position. Position the keyboard flex module with the two position pins and two screws.



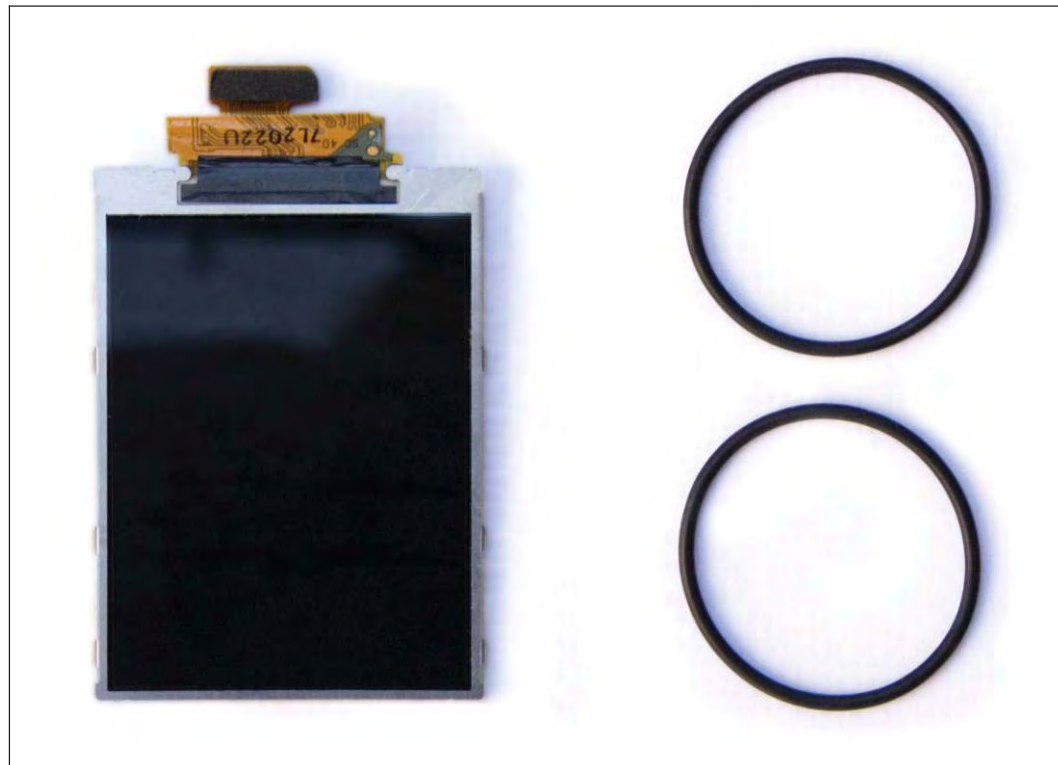
**Figure 9** Place the keyboard main on the keyboard flex module.



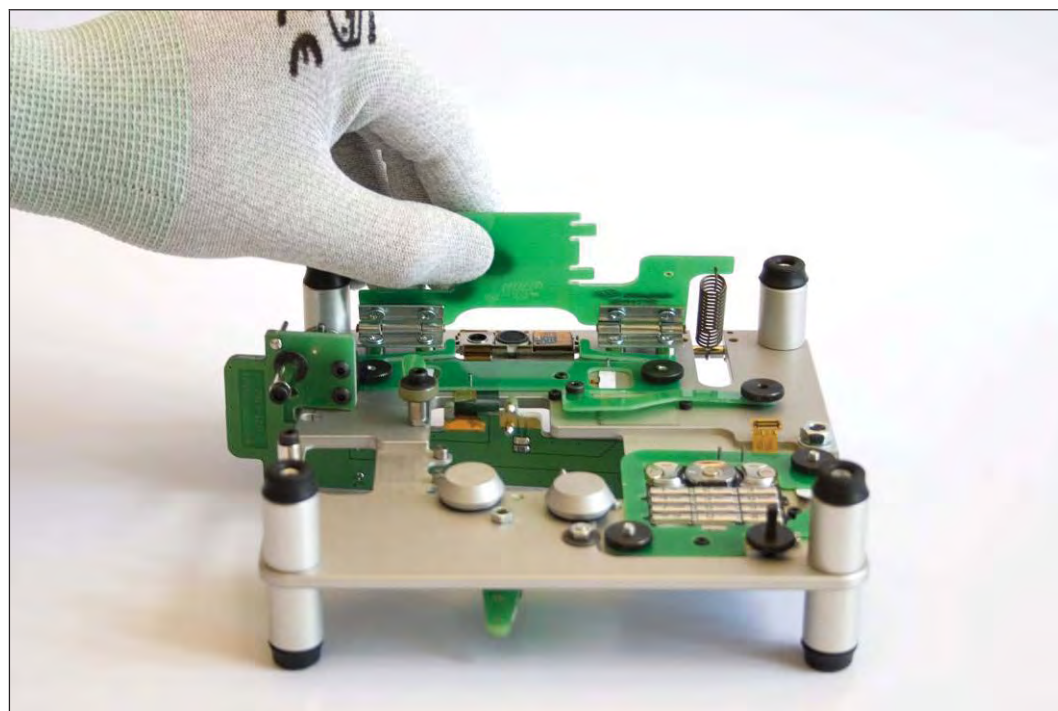
**Figure 10** Place the keyboard clamping frame and fixate it with two flat nuts (red arrows). The function of the third flat nut (orange arrow) is to hold the vibrator underneath.



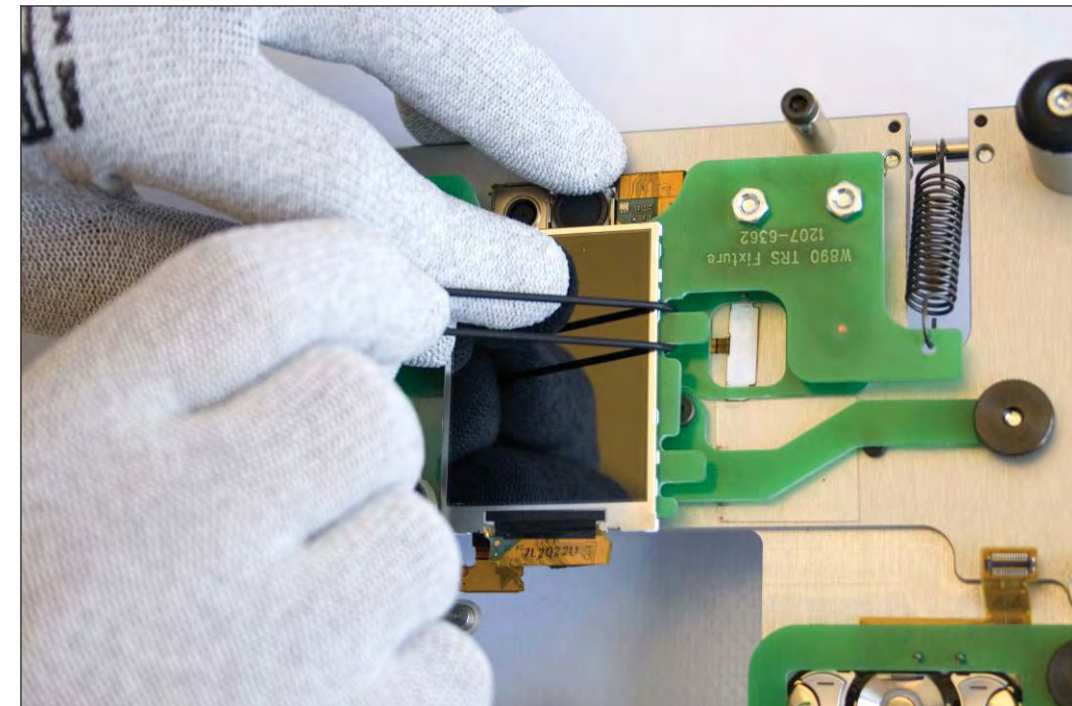
### 3.3 LCD-DISPLAY



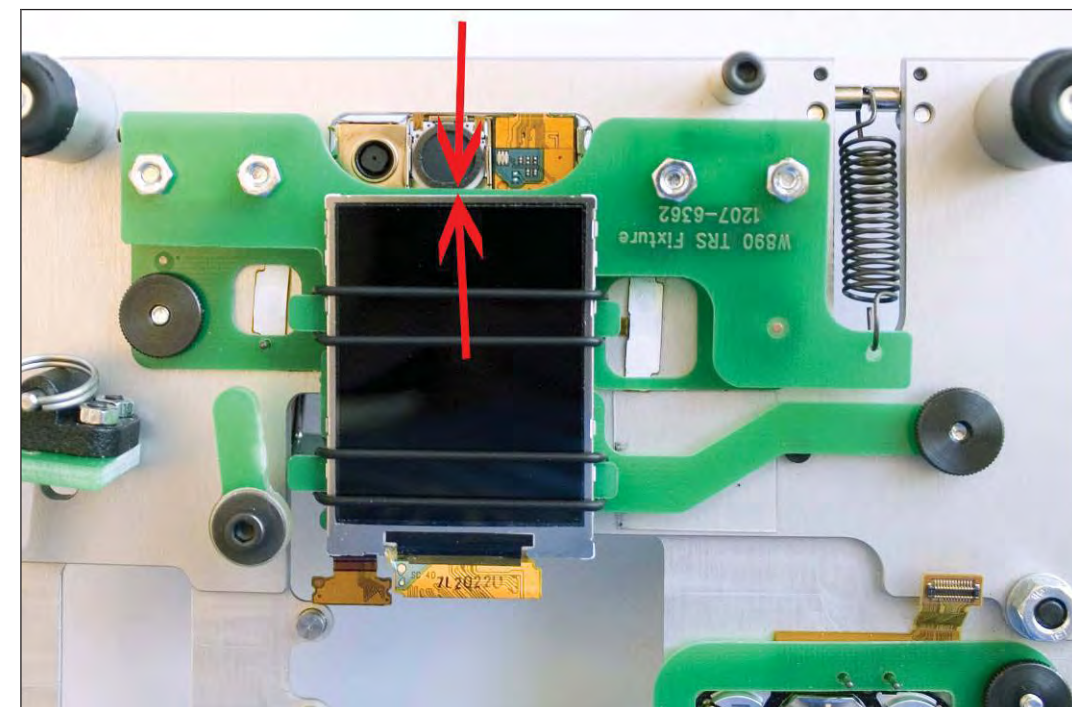
**Figure 11** Display 2,02A-SI TFT and O-rings



**Figure 12** Flip down the display holder.



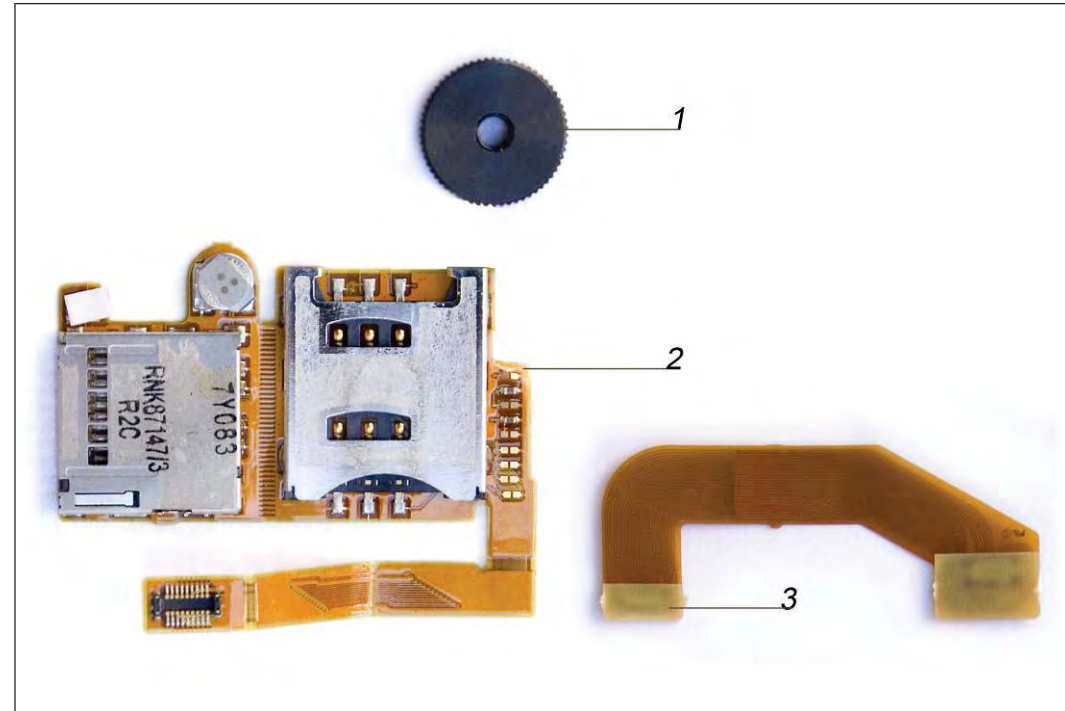
**Figure 13** Mount the display with the O-rings.



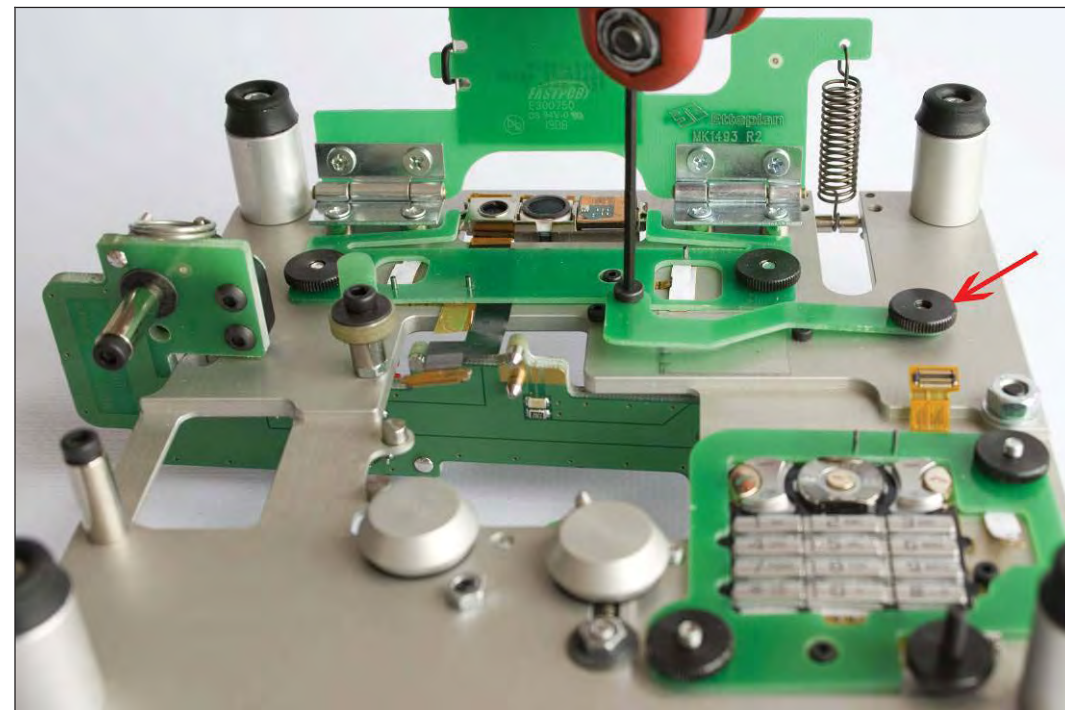
**Figure 14** The distance to the edge (between the arrows) shall be 1 mm.



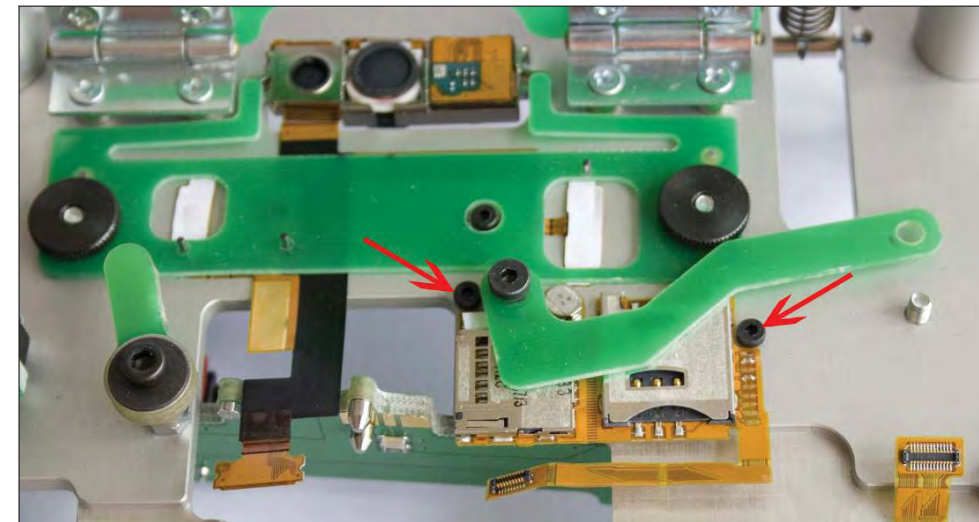
### 3.4 SIM/M2 FLEX MODULE AND KEY FLEX CABLE



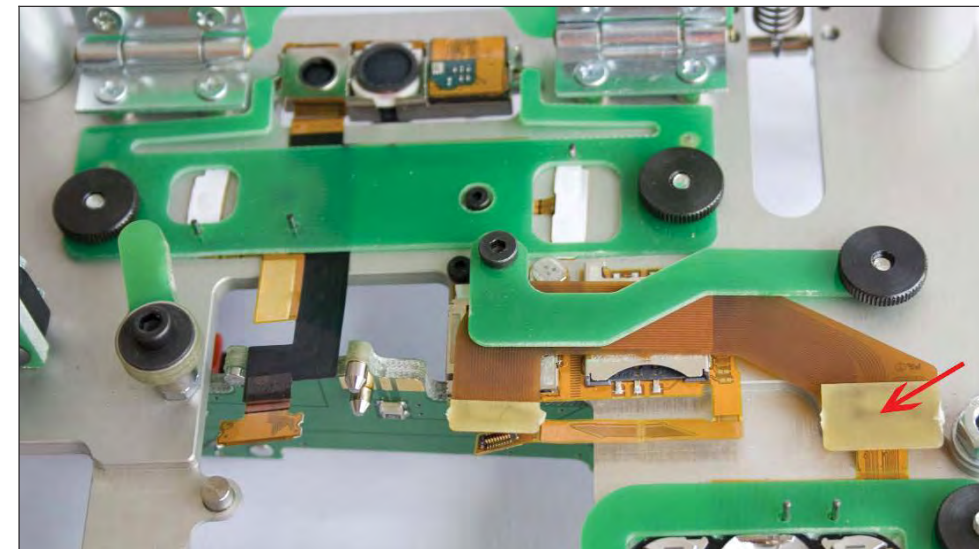
**Figure 15** 1) Flat nut, 2) SIM/M2 flex Module and 3) key flex cable.



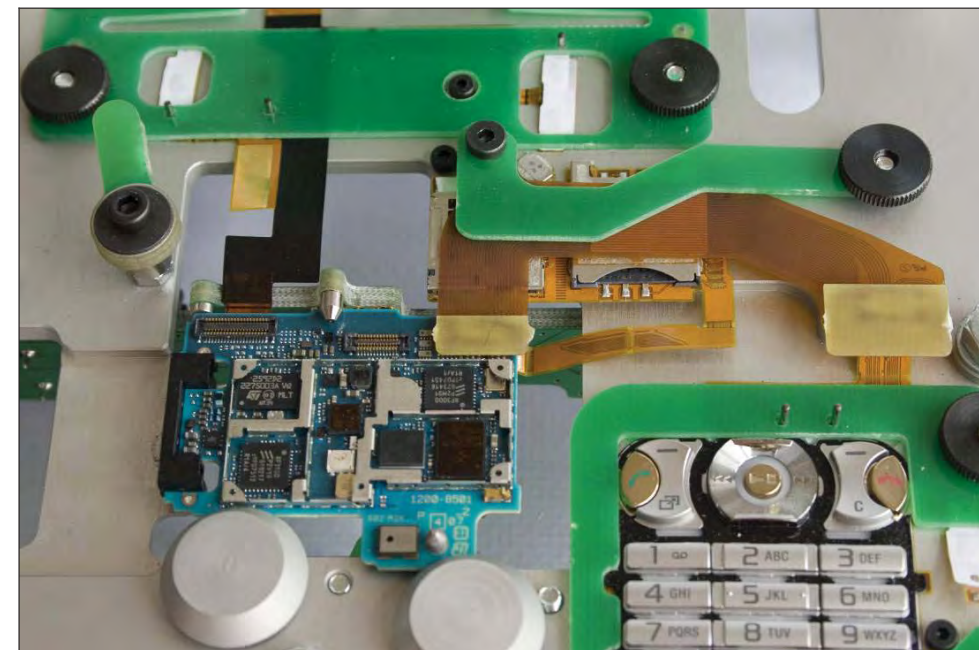
**Figure 16** Flip up the display holder and loosen the screw that holds the green card holder by screwing it 2,5 turns. Remove the flat nut (arrow).



**Figure 17** Insert the SIM/M2 flex module by sliding it into position under the green card holder. The red arrows points at the flat nuts that mark the end position for the SIM/M2 flex module.

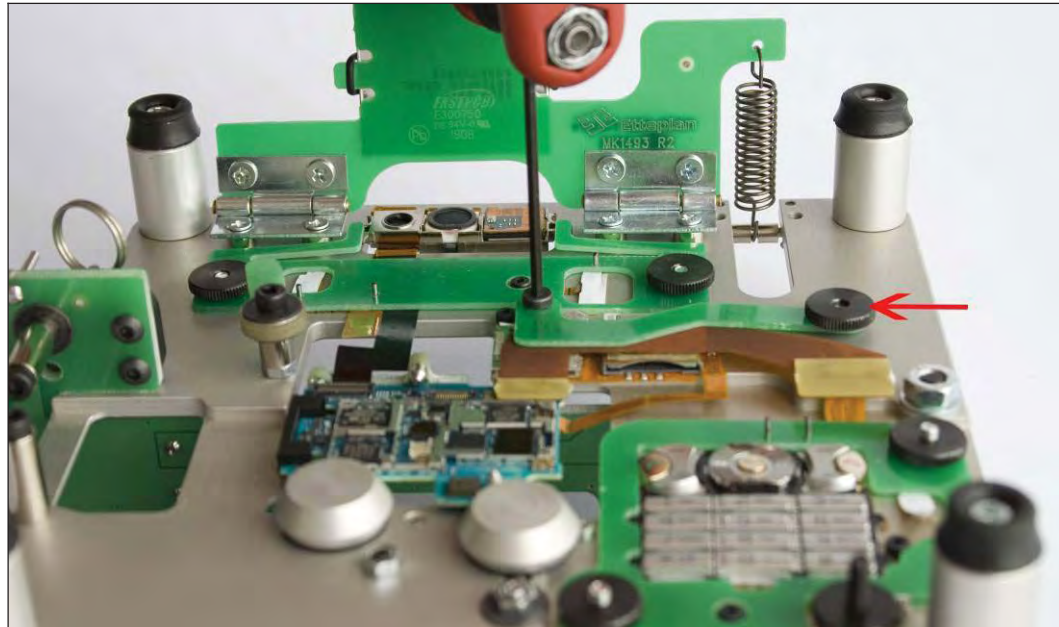


**Figure 18** Connect the key flex cable (arrow) point and slide it into position under the green card holder. Stabilise but do not fixate the flex cable and SIM/M2 flex module by adding the flat nut.

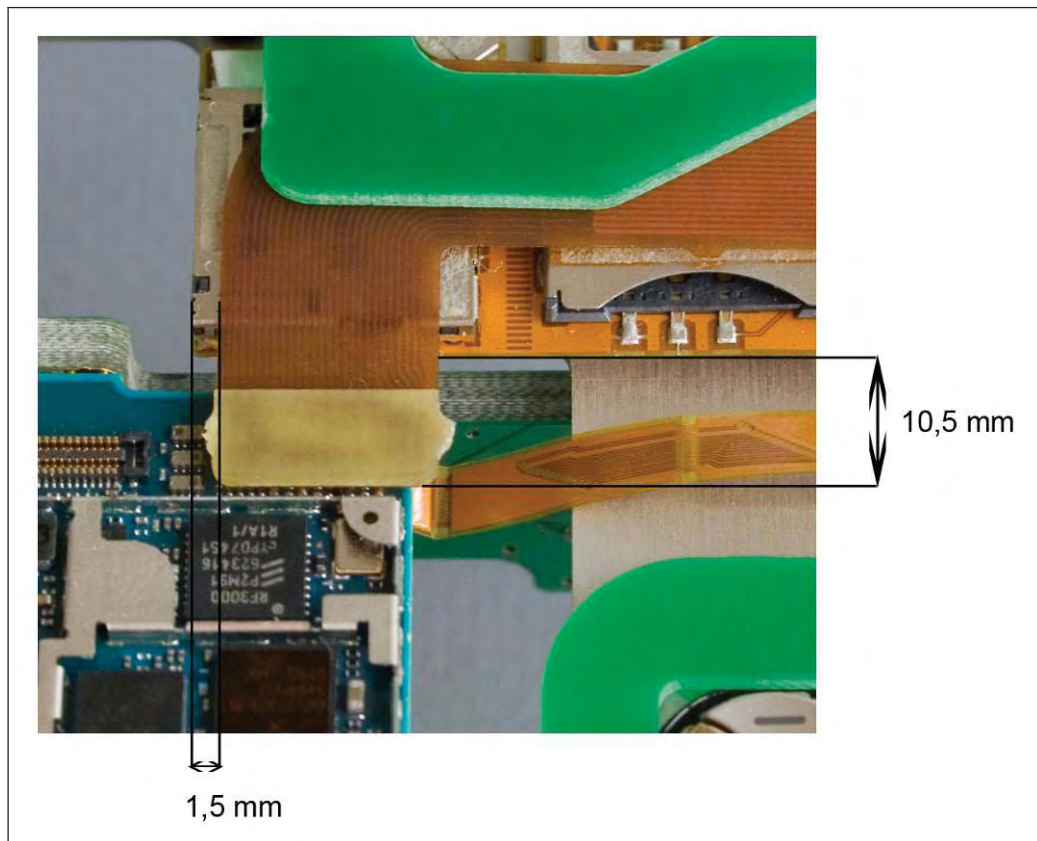


**Figure 19** Insert the PBA and connect it with the key flex cable.





**Figure 20** Fixate the key flex cable and SIM/M2 flex module card by tightening the screw and flat nut.



**Figure 21** The distances from the edge of the key flex cable to the edge of the SIM/M2 flex module shall be horizontally 1,5 mm respectively vertically 10,5 mm.

#### 4. MAINTENANCE

The maintenance of the fixture is intended to keep the fixture in the best possible condition. Preventive maintenance is important to reduce the numbers of emergency repairs and other measures that reduce reliability and usability. The daily checkpoints shall be performed at the beginning of every day shift. Only authorized personnel shall do this check.

The weekly checkpoints shall be performed once a week.

Only authorized personnel shall do this check.

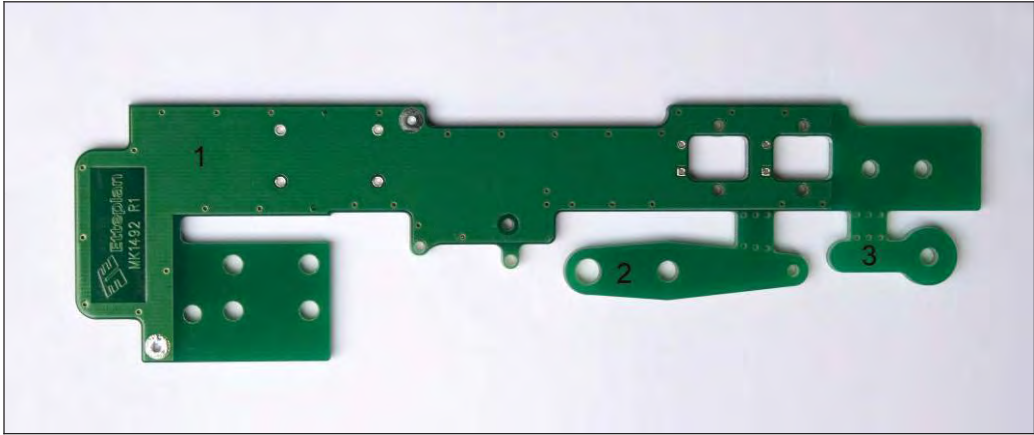
##### 4.1 MAINTENANCE SCHEDULE

Action	Daily	Weekly	After X operation	If necessary	Note
Camera Flex Module	Check			Replace	
Keyboard Main				Replace	
Display 2,02A-SI TFT				Replace	
SIM/M2 Flex Module				Replace	
RF cable	Check			Replace	
Flex cable	Check		Replace after 100 oprations	Replace	
Guide pins		Check		Replace	
Hinge		Check		Replace	
Mechanical functions	Check				
Parts not working				Check/Replace	Authorized personnel only

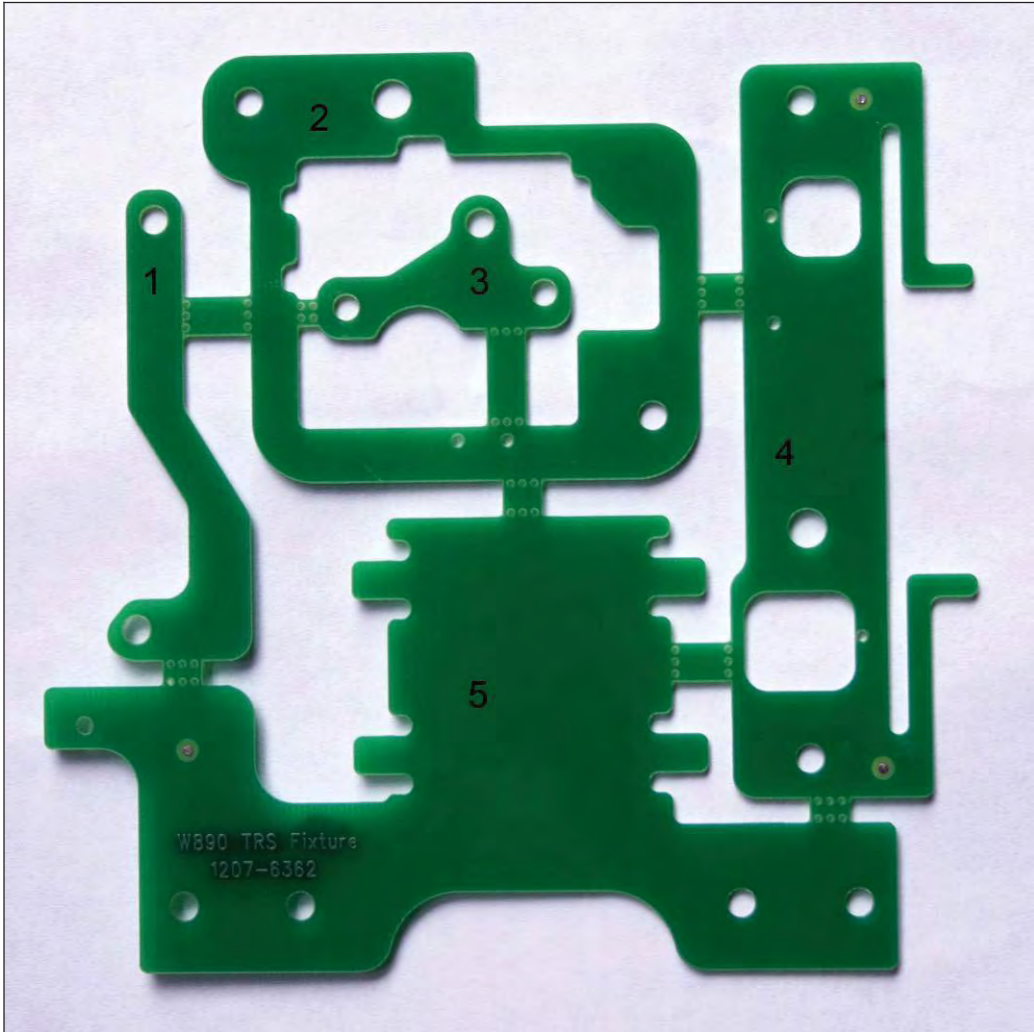
Note! "After X operation" is just recommendations and can be changed.

4.2 SPARE PARTS

Parts that are in an exposed position and can be worn are specified in table 1. Qty is per fixture.



**Figure 22** The spare parts of the mechanical parts kit KK1492. 1) Power Supply Connector, KK1492-1, 2) RF Connector, KK1492-2 and 3) LCD stop, KK1492-3.



**Figure 23** The spare parts of the thin mechanical parts kit KK1493. 1) Card holder, KK1493-3, 2) Keyboard clamping frame, KK1493-4, 3) RF Connector frame, KK1493-5, 4) Camera clamping frame, KK1493-1 and 5) Display holder, KK1493-2.



**Figure 24** Spare part, locking device, gn417a.

**Table 1** Spare parts are listed in the table.

QTY	Article Nr.	Description	Supplier
2	40-012-02	Test Pin, 2x10mm	ELFA
1	40-531-04	4mm PCB Socket Black	ELFA
1	40-531-20	4mm PCB Socket Red	ELFA
2	55-028-02	Buntband 71X1.8	ELFA
1	60-198-14	Thick Film Resistor	ELFA
1	65-776-05	Ceramic Capacitor	ELFA
1	70-229-65	Schottky Diode	ELFA
1	1200-0117	QCIF VGA Camera	Sony Ericsson
1	1200-8239	Camera Flex Module	Sony Ericsson
1	1200-8240	Key Flex Module	Sony Ericsson
1	1200-8241	Sim/M2 Flex Module	Sony Ericsson
1	1200-8971	Display 2,02A-SI TFT	Sony Ericsson
1	1201-0502	Cap Grommet CamR	Sony Ericsson
1	1201-0639	Keyboard Main	Sony Ericsson
1	1201-2058	Cap Grommet CamF	Sony Ericsson
1	1201-7111	Camera 3Mpixel CMOS	Sony Ericsson

Continuation of table 1

1	1201-7375	Frame Sub Assembly Camera	Sony Ericsson
2	812 7115	Electrolytic Capacitor 10x9mm, Pitch=5mm	Farnell
1	14577	Hinge	Etteplan
2	14578	Govren pin	Etteplan



4	14580	Lower Bushing	Etteplan
2	14581	Support Knob	Etteplan
1	14582	Guide pin	Etteplan
2	14583	Fix Knob	Etteplan
4	14584	Upper Bushing	Etteplan
2	14585	Slip Washer 6,4x16x0,8	Etteplan
1	14586	Spacer 3.2X7X2.3	Etteplan
1	gn417a	Locking Device	Wiberger
1	KK1492	Mechanical Parts	Etteplan
1	KK1492-1	Power Supply Connector	Etteplan
1	KK1492-2	RF Connector Holder	Etteplan
1	KK1492-3	LCD Stop	Etteplan
1	KK1493	Thin Mechanical Parts	Etteplan
1	KK1493-1	Camera Clamping Frame	Etteplan
1	KK1493-2	Display Holder	Etteplan
1	KK1493-3	Card Holder	Etteplan
1	KK1493-4	Keyboard Clamping Frame	Etteplan
1	KK1493-5	RF Connector Frame	Etteplan
1	KK1494	Key Flex Cable	Etteplan
1	SF-DFR-3346	Spring	Etteplan
2	O-RING_INDOMA_1-5X25	O-Ring	Etteplan