



From
CM-CI1/EHP5

Our Reference
Johann Fuhrmann

Tel
+49(5121)49-2088

Hildesheim
22 August 16

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Topic **Technical Passport Picture V6.50**
Description Picture from the Radio System

Product Type: **Radio-System PSA RCC A1**
Brand: **Robert Bosch Car Multimedia GmbH**

HW Version: 8638504617
SW Version: 15.7A110.10

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1 Overview

1.1 Business name of manufacturer

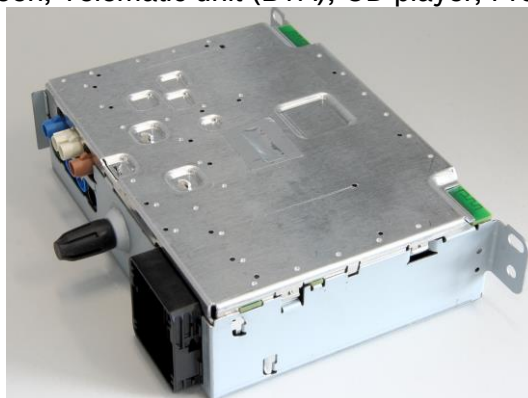
Robert Bosch Car Multimedia GmbH
Brand Name: Bosch

1.2 Address of manufacturing

Bosch Car Multimedia Portugal S.A.
Rua Max Grundig, 35 – Lomar
4705-820 BRAGA
Portugal

1.3 General Feature

- Silverbox “hidden mounted”
- Linux-based Genivi platform
- Key Features:
 - Connectivity (CAN, BT, USB), PSA portal access,
 - Smartphone integration
 - GPS localization
 - Audio: Arkamys, ESE
 - Radio: AM/FM DDA, DAB (optional)
 - Display of vehicle functions HMI
 - “No” features:
 - No onboard navigation & no onboard Voice Recognition
 - Connected ECU’s:
 - 7” touch screen, Telematic unit (BTA), CD player, Premium amplifier, Visiopark



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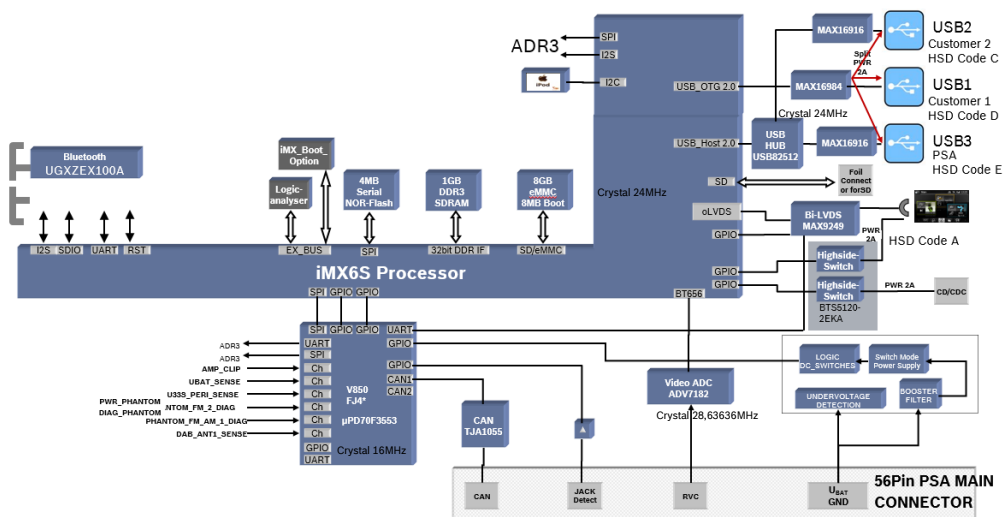
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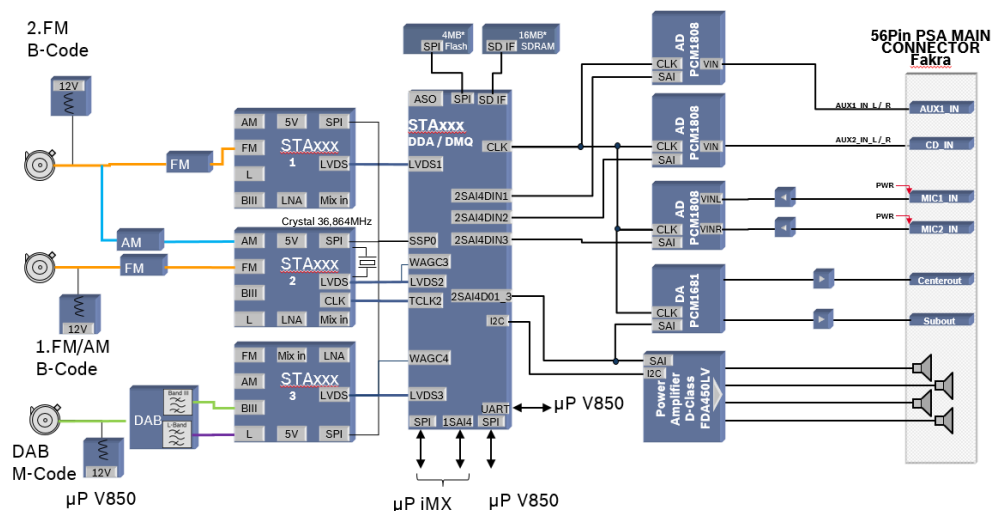
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2 Blockdiagram

HW Blockdiagram PSA RCC A1 Variant



HW Blockdiagram Audio&Tuner Application



Crystal 36,864MHz

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3 Technical attributes

3.1 *Operating condition*

- Nominal supply voltage: 13,5V DC
- Extended voltage range: 9,0V to 16,0V DC
- Current consumption: <15A (@ max. volume, CD 1 kHz sine wave 4Ohm speaker)
- Sleep current consumption: <500µA
- Loadspeaker output: 4Ohm with 13,5V → 21W (10%THD).
- Operating Temperature Range: -30°C to +70°C
- Storage Temperature: -40°C to 85°C
- Protection IP31

3.2 *AM/FM Tuner*

- AM Frequency range: 144kHz – 288kHz, 531kHz – 1629kHz (deviations for some countries possible depending on country specific settings)
- FM Frequency range: 87,5 MHz – 108,0 MHz (deviations for countries possible depending on country specific settings)

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3.3 BT-Modul Frequency

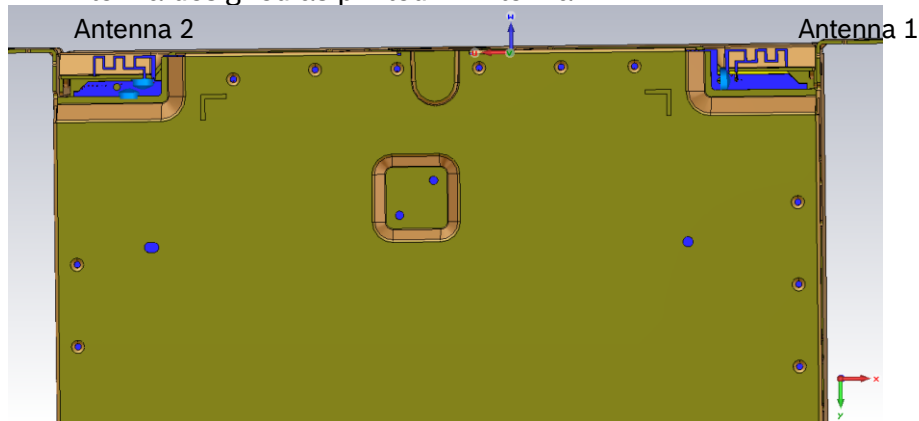
BT: BT 3.0

2402 MHz – 2480 MHz

Radiated Power [EIRP]: < 2,6 mW

3.3.1 BT Antenna

BT Antenna designed as printed F-Antenna



Antenna 1

	Value	Comment
Antenna gain	4-5 dBi	Directivity and efficiency
Bandwidth	800 MHz	Whole -3dB antenna bandwidth
center frequency	2.50 GHz	BT Bandwidth 80MHz
VSWR of BT-BW	< 1.9	
S11 reflection coeff.	< -11 dB	power loss 1dB

Antenna 2

	Value	Comment
Antenna gain	> 4-5 dBi	Directivity and efficiency
Bandwidth	> 850 MHz	Whole -3dB antenna bandwidth
center frequency	2.6 GHz	BT Bandwidth 80MHz
VSWR of BT-BW	< 2	
S11 reflection coeff.	< -10 dB	power loss 1dB

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4 Harness Connection

4.1 Picture backside



4.1.1 Main Connector

Modul	Pin	Function	Description	Type	Modul	Pin	Function	Description	Type
Modul A	1	NA			Modul C	35	NA		
	2	NA				36	Audio Right AUX		In
	3	NA				37	Audio Left AUX		In
	4	NA				38	Microphone 2+		In
	5	NA		In		39	Microphone 1+		In
	6	NA				40	Subwoofer+		Out
	7	NA				41	Centerspeaker +		Out
	8	NA				42	RL+		Out
	9	NA				43	FL+		Out
	10	CAN_LS_H		In/Out		44	FR+		Out
	11	+PERM COM	VBAT	In		45	RR+		Out
	12	NA				46	Jack detect		In
	13	NA				47	NA		
	14	NA				48	Audio GND AUX		In
	15	NA		In		49	Microphone 2-		In
	16	Video-In 1-		In		50	Microphone 1-		In
	17	Video-In 1+		In		51	Subwoofer-		Out
	18	NA				52	Centerspeaker -		Out
	19	NA				53	RL-		Out
	20	NA				54	FL-		Out
	21	CAN_LS_L		In/Out		55	FR-		Out
	22	GND		In		56	RR-		Out
Modul B	23	Debug line for the supplier	Ignition	In					
	24	Debug line for the supplier		In/Out					
	25	GND CDC		In					
	26	Right Audio CDC		In					
	27	+Per CDC	Power Supply for CD Player	Out					
	28	CAN_LS_H_CDC	Data CAN for CD player						
	29	Debug line for the supplier		In/Out					
	30	Debug line for the supplier		In/Out					
	31	GND Audio CDC		In					
	32	Left Audio CDC		In					
	33	NA							
	34	CAN_LS_L_CDC	Data CAN for CD player	In/Out					

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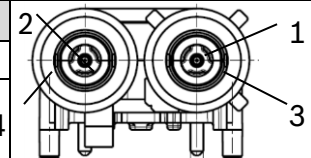
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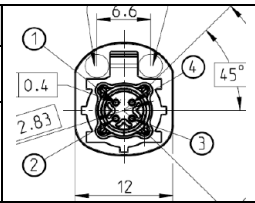
4.1.2 AM/FM Connector

Connector part number / pin assignment			
Headunit side	FAKRA : PLUG, CODE-B		
	59S2MU-40MT5-B		
No.	Connections	Explanation	
1	SIGNAL+P/S	FM1 antenna signal input + FM1 antenna power	
2	SIGNAL+P/S	FM2 antenna signal input + FM2 antenna power	
3,4	GND	GND	

4.1.3 DAB Connector

Connector part number / pin assignment			
Headunit side	FAKRA : PLUG, CODE-M		
	59S21B-40MT5-M		
No.	Connections	Explanation	
1	SIGNAL+P/S	DAB antenna signal input + DAB antenna power	
2	GND	GND	

4.1.4 LVDS Connector

Connector part number / pin assignment			
Headunit side	Rosenberger HSD Coding A		
	D4S10E-40MA5-A		
No.	Connections	Explanation	
1	Data+	LVDS data input +	
2	+12V	12V Display power supply	
3	Data-	LVDS data input -	
4	+12V	12V Display power supply	
Shield	GND	GND	

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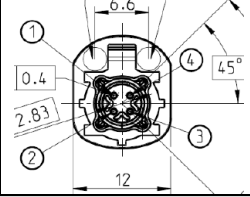
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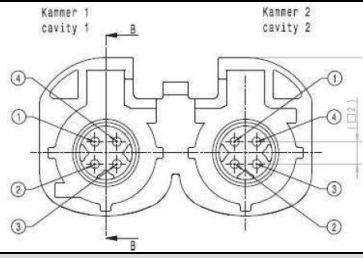
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4.1.5 USB (PSA) Connector

Connector part number / pin assignment			
Headunit side	Rosenberger HSD Coding E		
	D4S10E-40MA5-C		
No.	Connections	Explanation	
1	Data +	USB Data +	
2	+5V	+5V USB Power supply	
3	Data -	USB Data -	
4	GND	GND USB Power supply	

4.1.6 USB (Customer 1&2) Connector

Connector part number / pin assignment			
Headunit side	Rosenberger HSD Coding C		
	D4S10V-40MA5-C		
No.	Connections	Explanation	
Cavity 1 (Code			
1	Data +	USB Data +	
2	+5V	+5V USB Power supply	
3	Data-	USB Data -	
4	GND	GND USB Power supply	
Cavity 2			
1	Data +	USB Data +	
2	+5V	+5V USB Power supply	
3	Data-	USB Data -	
4	GND	GND USB Power supply	

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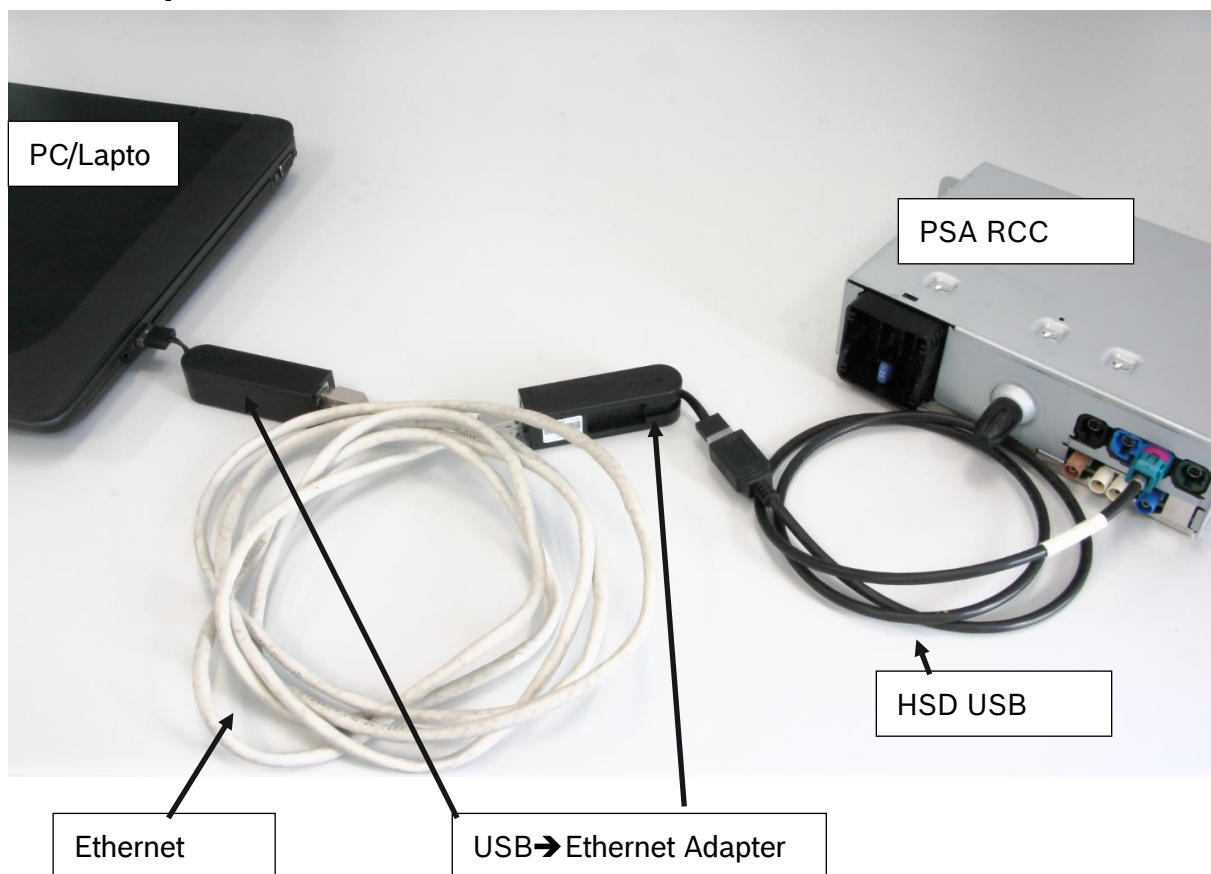
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5 Radio Type Approval Tests and iPerf

5.1 Setup



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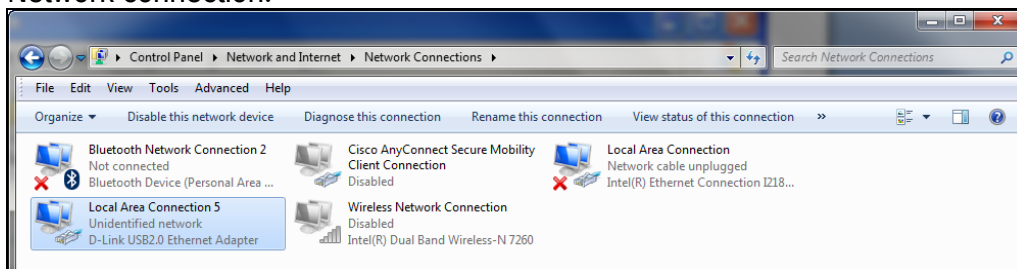
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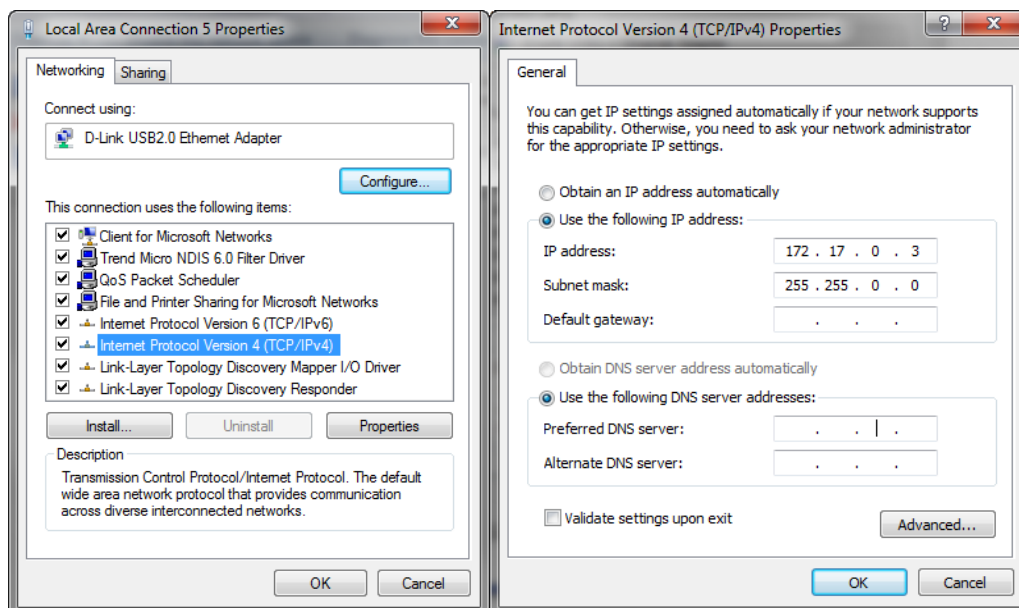
5.2 Network configuration

Add the IP-Address for 172.17.0.5 for the D-Link adapter at the Microsoft network controls as shown in the next pictures.

Network connection:



With a double click on the LAN-connection with the D-Link DUB-E100 USB 2.0 Fast Ethernet Adapter, you should be able to make the following setting under properties:



In case of problems, it might be necessary to restart the computer and check all items again.

Be also aware that your computer is capable multi network connections. This often related to your PC administration policies.

IP address "172.17.0.1" is the DUT

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CM-CI1/EHP5Our Reference
Johann FuhrmannTel
+49(5121)49-2088Hildesheim
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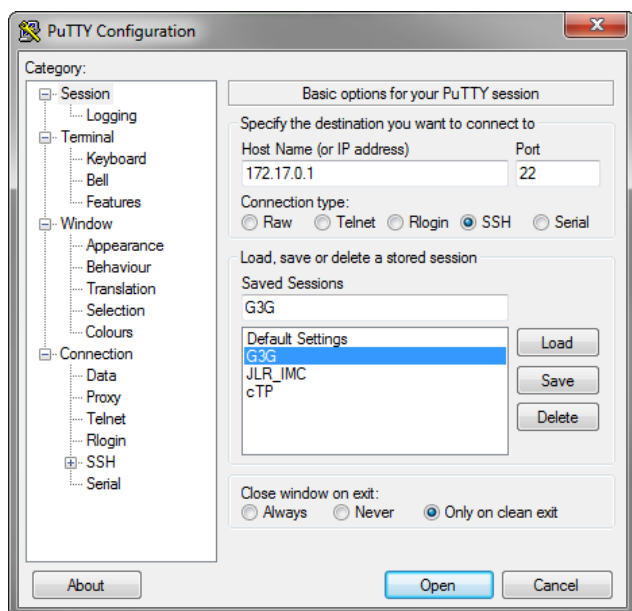
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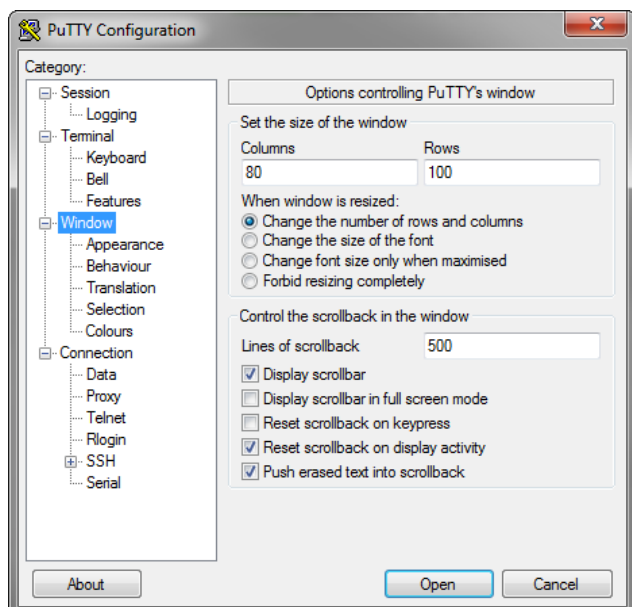
5.3 Putty Configuration and Use

Start Putty: (Simply run Putty.EXE no installation is required.)

If not configured up to now configure Putty as shown in the next 3 pictures:



You can use your personal window settings under “Window”.





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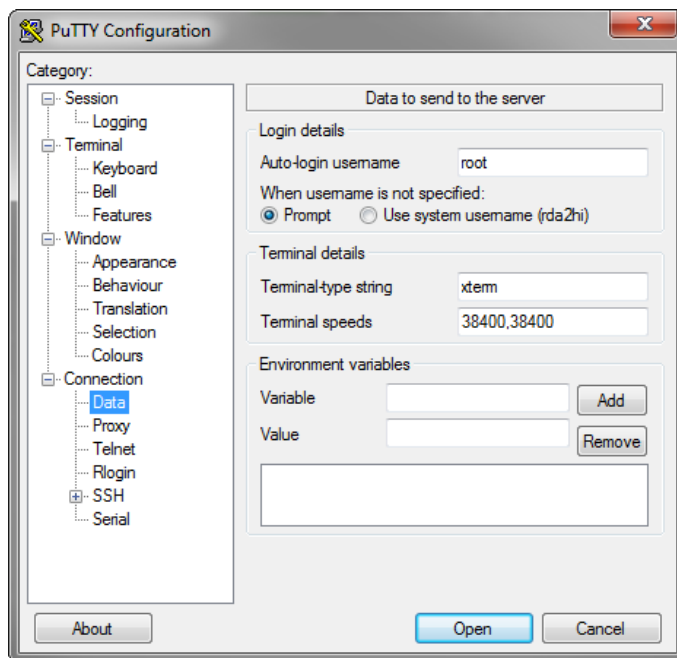
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Use “root” as username for Auto-login



Afterwards use “Save-Button” in “Session”-screen.

From now on, the session can be started by double-clicking the entry “G3G”.

At the first time of starting Putty a message is displayed. The text asks if you trust the connection. Click “yes” button.

After some seconds “root@mx6q:~#” is shown

Then type in “cd /rta” to enter the required directory



Now iPerf, Bluetooth or WLAN tests can be started as described in the following chapters.

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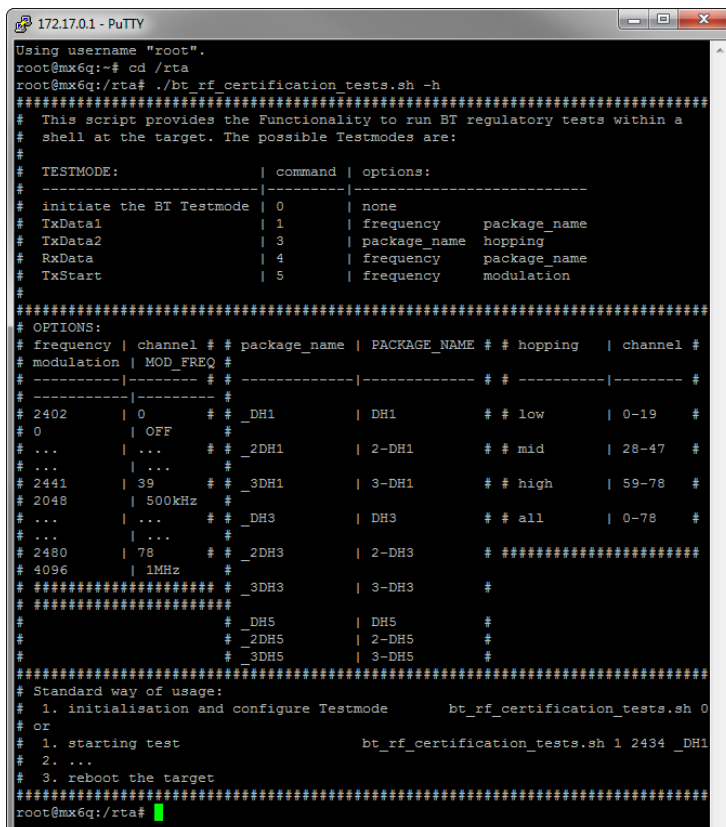
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5.4 Bluetooth Tests

Note that the RF Power on all tests are fixed settings inside module.
They cannot be changed.

To start any test it is necessary to type in “**./bt_rf_certification_tests.sh**” added with the needed parameters which are described in the following picture:



```

172.17.0.1 - PuTTY
Using username "root".
root@mx6q:~# cd /rta
root@mx6q:/rta# ./bt_rf_certification_tests.sh -h
#####
# This script provides the Functionality to run BT regulatory tests within a
# shell at the target. The possible Testmodes are:
#
# TESTMODE:      | command | options:
# -----|-----|-----
# initiate the BT Testmode | 0      | none
# TxData1          | 1      | frequency package_name
# TxData2          | 3      | package_name hopping
# RxData           | 4      | frequency package_name
# TxStart          | 5      | frequency modulation
#
#####
# OPTIONS:
# frequency | channel # # package_name | PACKAGE_NAME # # hopping | channel #
# modulation | MOD_FREQ # # -----|----- # # -----|----- #
# -----|-----|-----|-----|-----|-----|-----|-----|
# 2402      | 0      | # _DH1      | DH1          | # low      | 0-19      |
# 0          | OFF    | #           |              | #           |           |
# ...       | ...    | # _2DH1     | 2-DH1        | # mid      | 28-47     |
# ...       | ...    | #           |              | #           |           |
# 2441      | 39     | # _3DH1     | 3-DH1        | # high     | 59-78     |
# 2048      | 500kHz | #           |              | #           |           |
# ...       | ...    | # _DH3      | DH3          | # all      | 0-78      |
# ...       | ...    | #           |              | #           |           |
# 2480      | 78     | # _2DH3     | 2-DH3        | #           |           |
# 4096      | 1MHz   | #           |              | #           |           |
# #####
#           | _3DH3     | 3-DH3      | #
# #####
#           | _DH5      | DH5        | #
#           | _2DH5     | 2-DH5      | #
#           | _3DH5     | 3-DH5      | #
# #####
# Standard way of usage:
# 1. initialisation and configure Testmode      bt_rf_certification_tests.sh 0
# or
# 1. starting test                             bt_rf_certification_tests.sh 1 2434 _DH1
# 2. ...
# 3. reboot the target
#####
root@mx6q:/rta#

```

For example:

Continuous Transmission at **2402MHz** with **DH5-Packets**:

```
./bt_rf_certification_tests.sh 1 2402 _DH5
```

Continuous Hopping on **all channels** with **3-DH5-Packets**:

```
./bt_rf_certification_tests.sh 3 _3DH5 all
```

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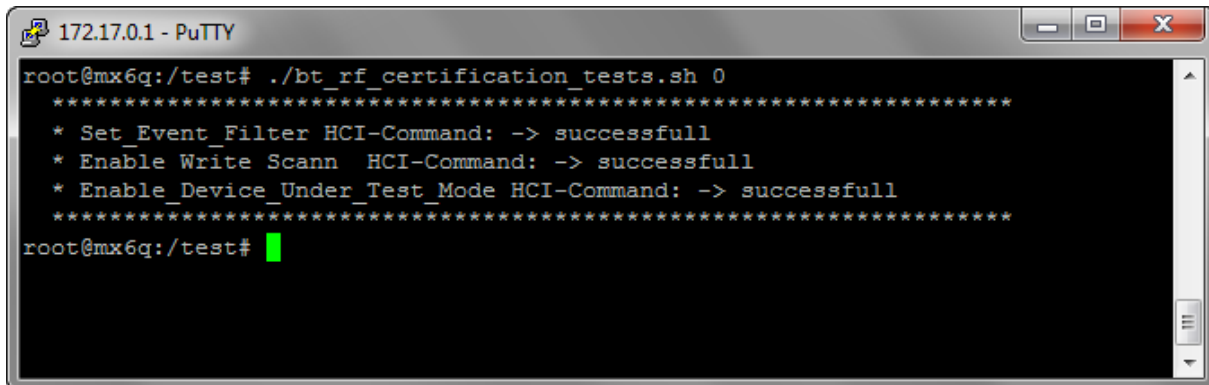
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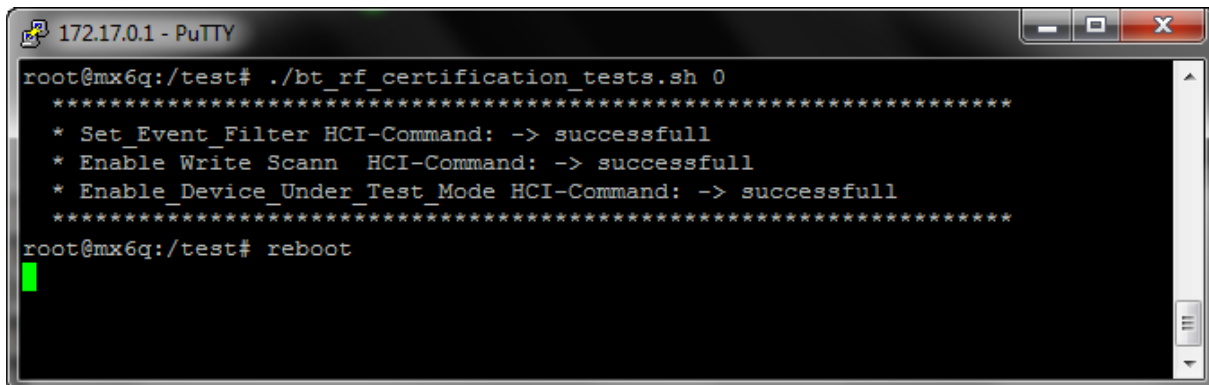
5.5 Bluetooth tests with Bluetooth tester

Activate Bluetooth test mode to test with a Bluetooth tester like Rohde & Schwarz CBT



```
172.17.0.1 - PuTTY
root@mx6q:/test# ./bt_rf_certification_tests.sh 0
*****
* Set_Event_Filter HCI-Command: -> successfull
* Enable Write Scann HCI-Command: -> successfull
* Enable_Device_Under_Test_Mode HCI-Command: -> successfull
*****
root@mx6q:/test#
```

In order to leave this mode, the DUT has to be rebooted with the command *reboot*:



```
172.17.0.1 - PuTTY
root@mx6q:/test# ./bt_rf_certification_tests.sh 0
*****
* Set_Event_Filter HCI-Command: -> successfull
* Enable Write Scann HCI-Command: -> successfull
* Enable_Device_Under_Test_Mode HCI-Command: -> successfull
*****
root@mx6q:/test# reboot
```

Alternative the device can be disconnected from the power supply. Connect it some seconds later and start the device again.

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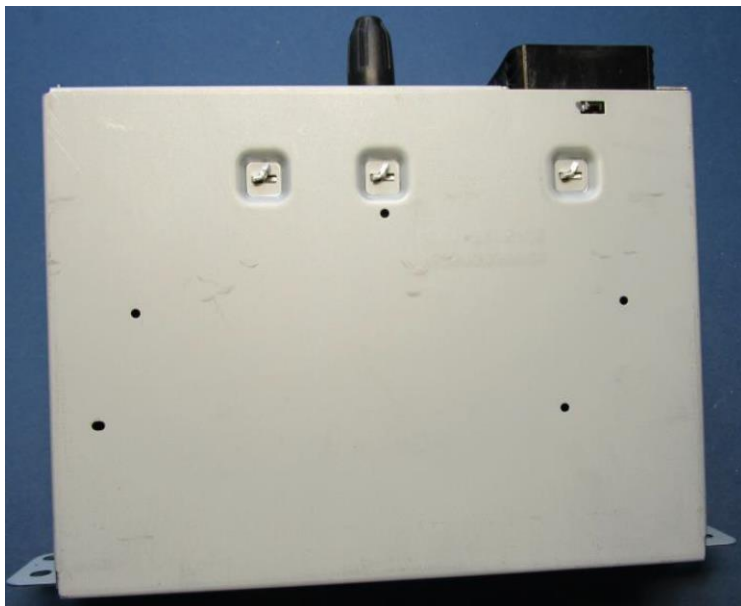
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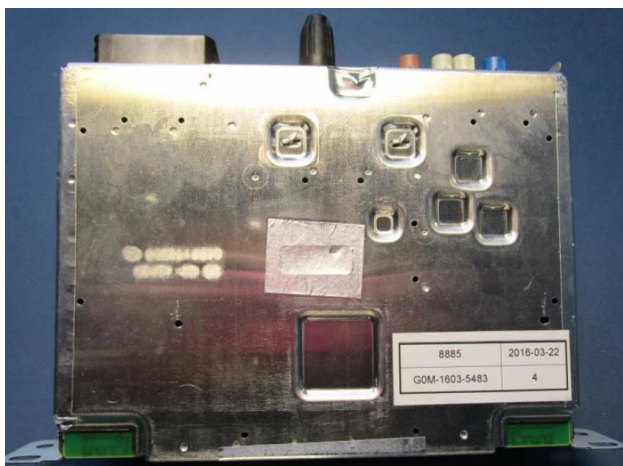
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6 Picture of the System

6.1 Housing Bottom Side



6.2 Housing Top Side



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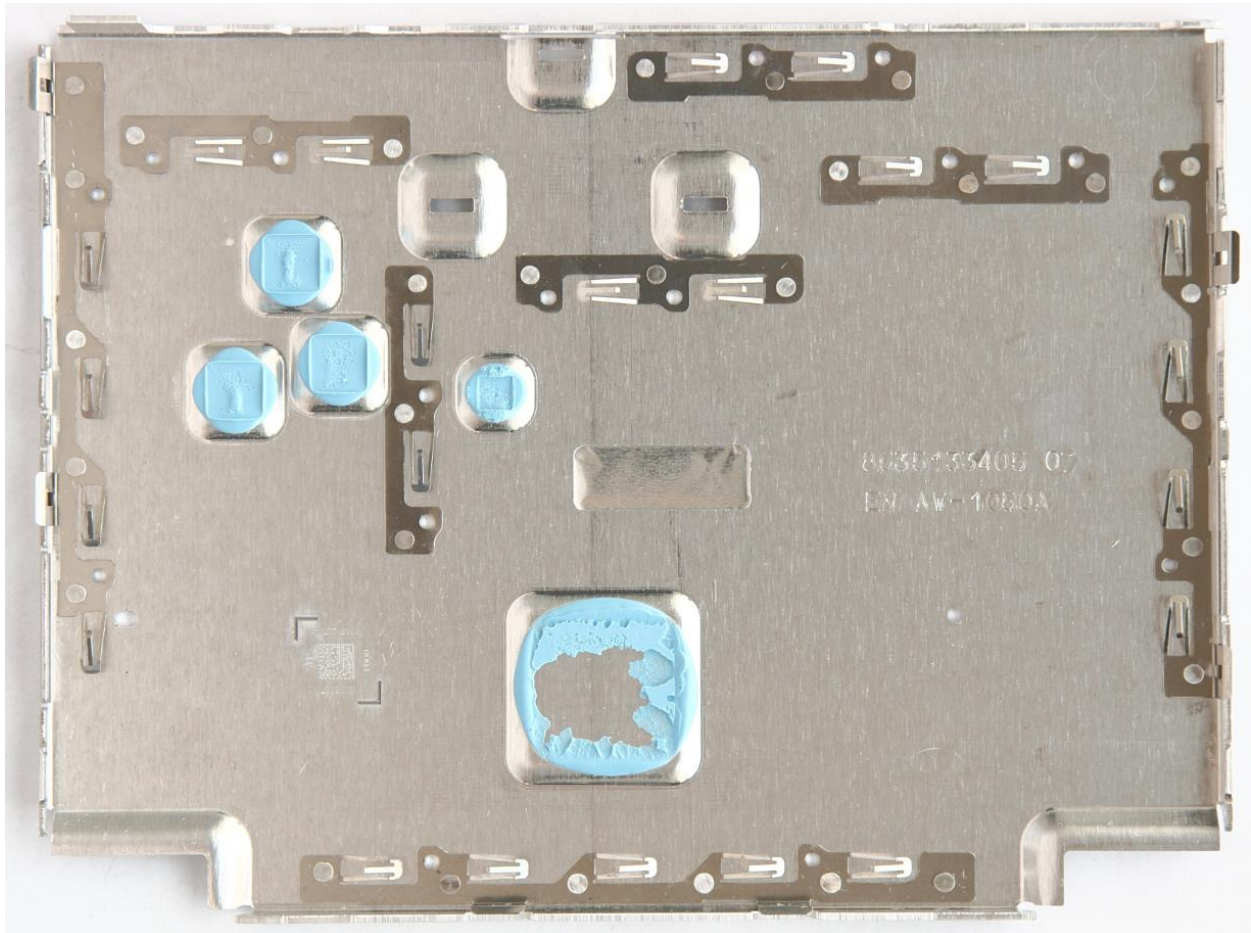
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6.3 Back Side from PSA RCC A1



Main Connector

6.4 Bottom Cover



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6.5 Top Cover



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6.6 Top Cover with Connector PCB Modul



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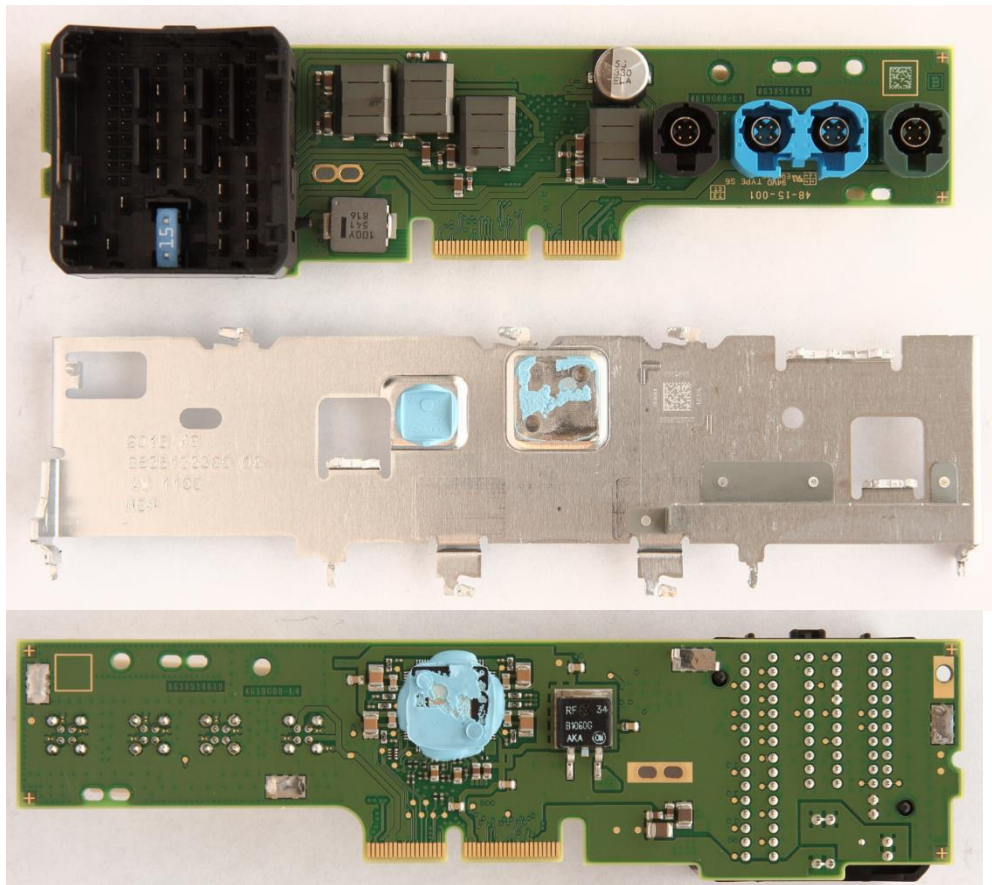
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6.7 Connector PCB



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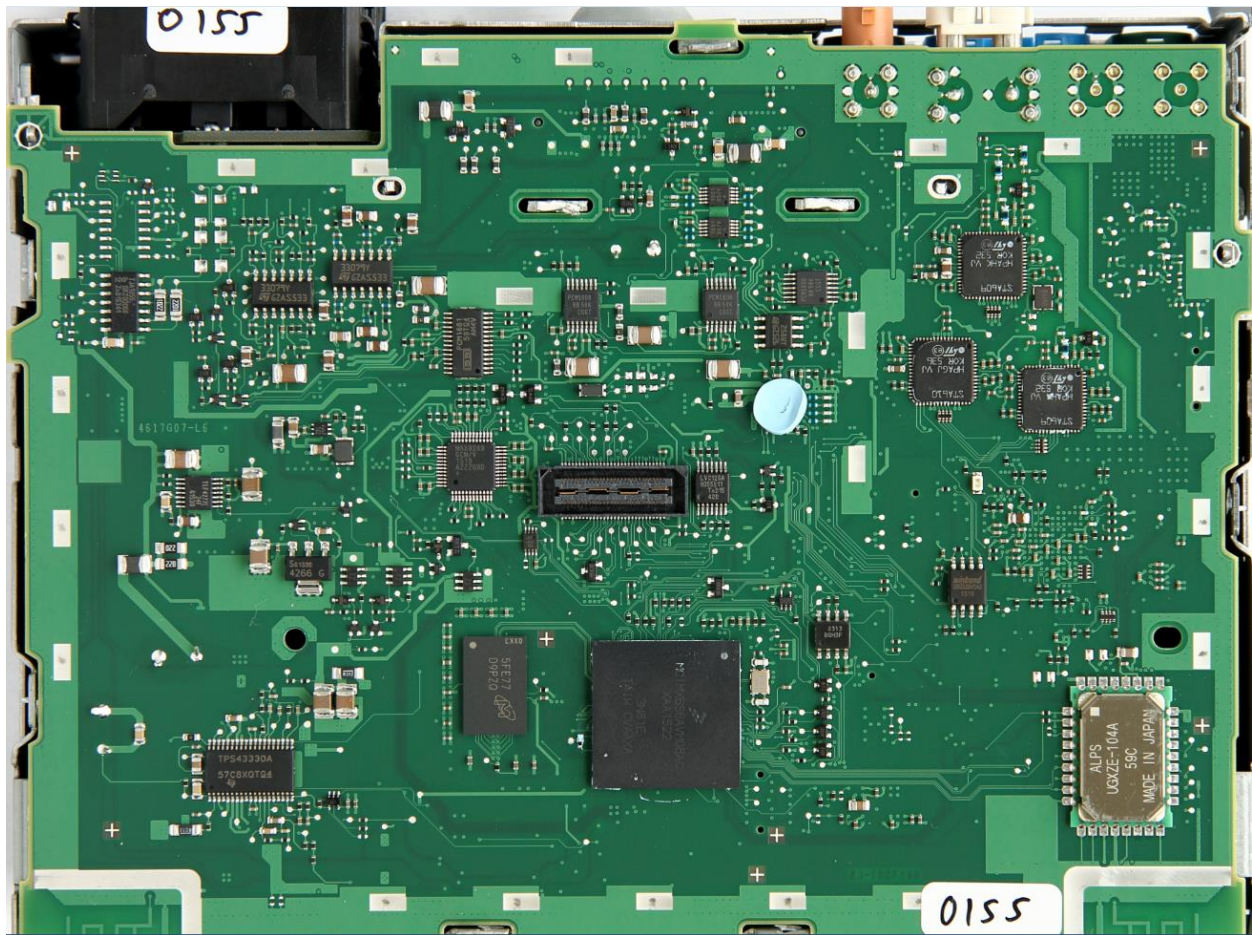
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6.8 Main PCB Bottom Side PSA RCC A1



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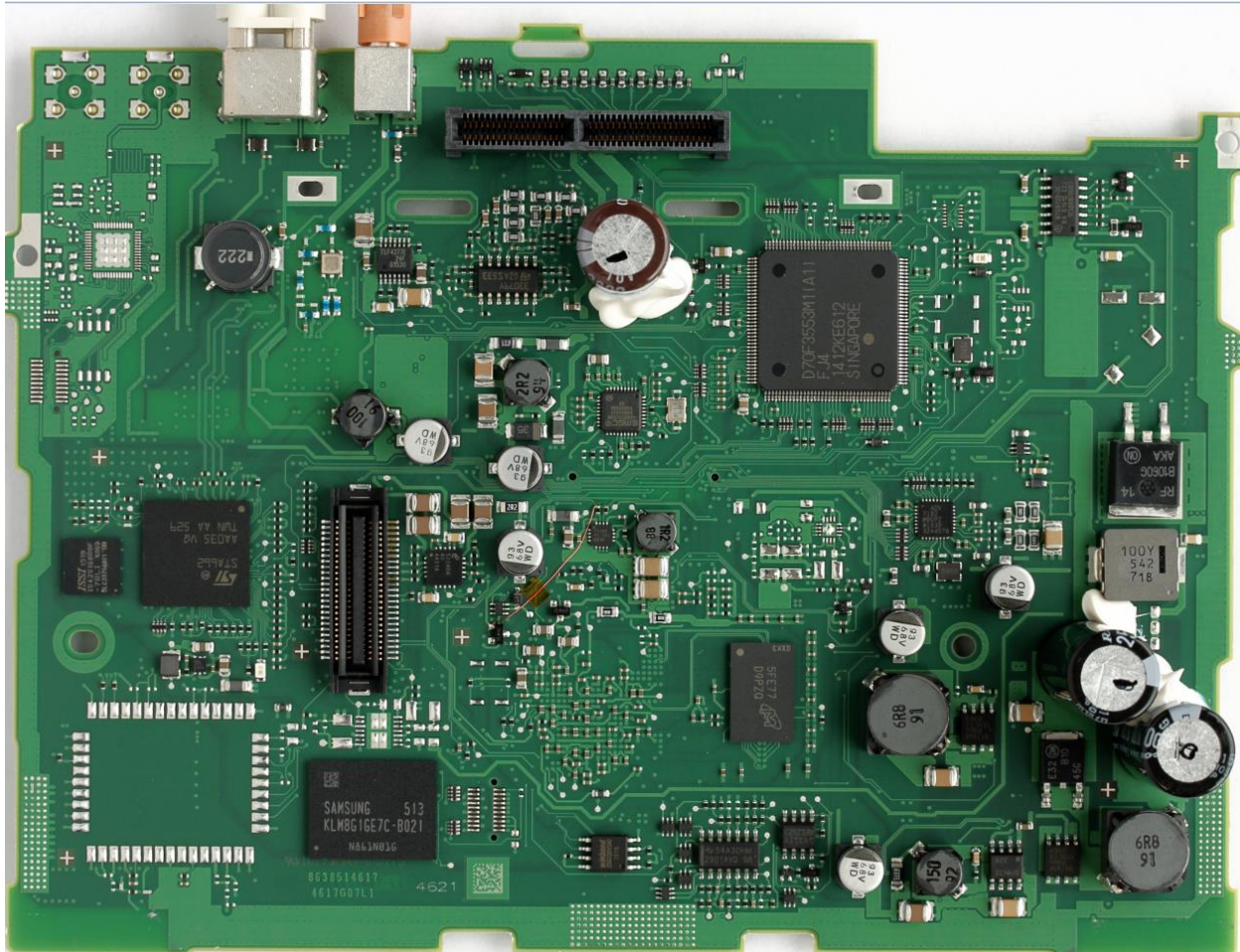
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6.9 Main PCB Top Side PSA RCC A1



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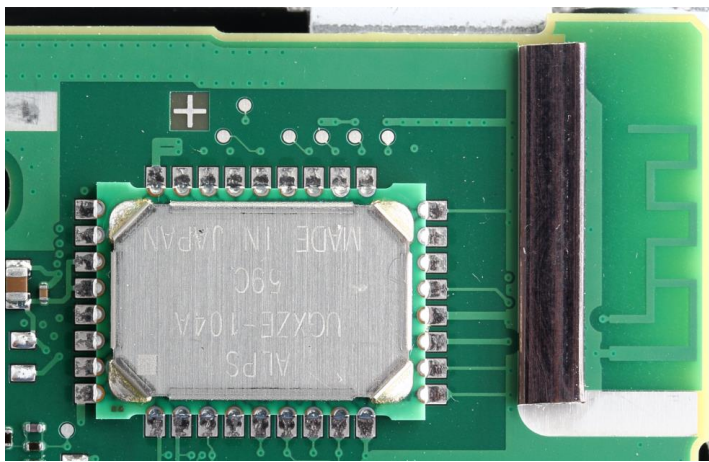
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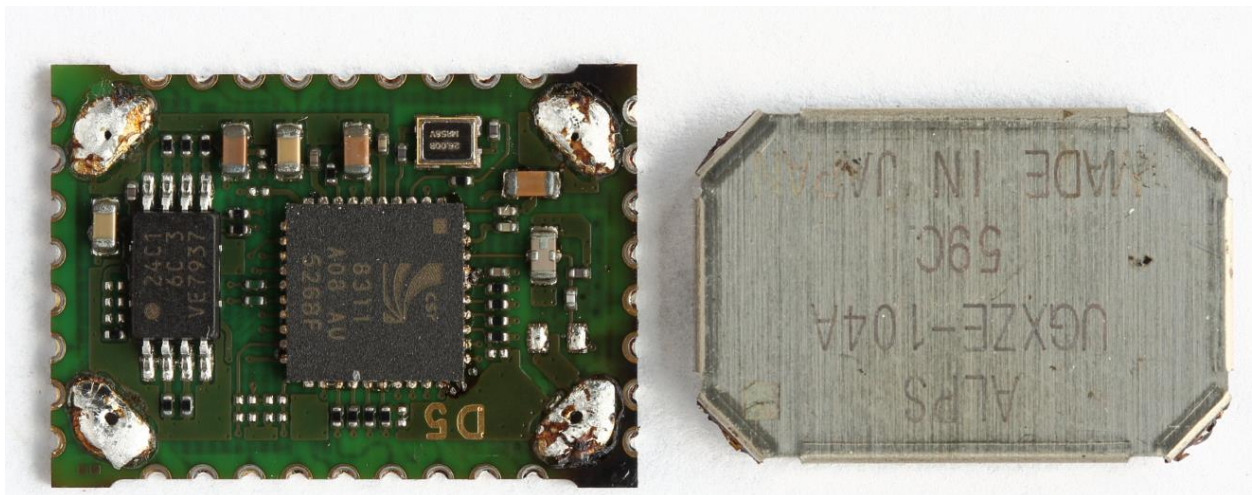
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6.10 Bluetooth Modul (PSA RCC A1 Variant used)



UGXZE100A
8928800146

6.11 Bluetooth Modul Open



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