



Document: **User Manual**

Product: **BSRF EA**

Variant: **BSRF_EA_RW0**

Date: 2023-03-02

Role	Name	Department	Date	eSign-ID
Homologation Lead	Kelvin Fongang	A AN EN HW COE HOM RBG	2022-10-27	
Homologation Coordinator	Matthias Muench	A AN PL3 RD EMEA RBG HW	2022-10-27	
Radio Frequency Lead	Laurent Thery	A UX RD SW RBT CH1 RF-	2022-10-27	
Electrical Engineering Lead	Frederic Loiselle	A AN PL4 RD EMEA1 TLS HW	2022-10-27	
Mechanical Engineering Lead	Vincent Lubert	A AN EN HW EMEA ME TLS	2022-10-27	
Technical Project Leader	Jean-Philippe Sanchis	A AN PL3 RD EMEA TLS SR	2022-10-27	
Solutions Manager	Richard Barbier	A AN PL2 RD EMEA RBT SR	2022-10-27	

Table of Content

1.	Abstract	4
1.1	Change History	4
1.2	List of Abbreviations	5
1.3	Scope of Document	6
2.	Manufacturer Information	7
3.	Product and System Description	8
3.1	Features	8
3.2	BSRF System Overview	9
3.3	BSRF System Architecture	9
4.	Product Variants	10
4.1	Model Names	10
4.2	Similarities between variants:	10
4.3	Differences between variants:	10
4.4	Overview of variants:	10
5.	Hardware Description	11
5.1	Block Diagram	11
5.2	EE Block Diagram Level 1	12
5.3	Main Features	12
5.4	Wired Interfaces and Antenna Concept	13
5.4.1	X3 BroadR-Reach Connector (H-MTD)	14
5.4.2	X4 Backup Battery Connector	14
5.4.3	X12 Main Connector (nanoMQS 20 pin)	14
5.4.4	LTE2 Antenna Connector (FAKRA)	15
5.4.5	GNSS Antenna Connector (FAKRA)	15
5.4.6	FM2/DAB Antenna Connector (FAKRA)	16
5.4.7	AM/FM1 Antenna Connector (FAKRA)	16
5.4.8	LTE1 Antenna Connector (FAKRA)	16
5.5	Operating Temperature Range	17
5.6	Supply Voltage	17
5.7	Power Consumption	17

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 2 / 29

5.8	Maximum Humidity	17
5.9	SIM Card	17
5.10	Backup Battery (BUB)	17
6.	Wireless Services	18
6.1	NAD Module	18
6.2	Cellular Services BL28EU-RD1 NAD	19
6.2.1	2G/GSM	19
6.2.2	3G/UMTS	19
6.2.3	4G/LTE	20
6.3	GNSS Receiver	20
6.4	WLAN	21
6.4.1	WLAN RF Parameters	21
6.4.2	WLAN Supported Bands per Variants	22
6.5	Radio Broadcast Receiver	22
6.5.1	Frequency Range:	22
7.	Mechanical Design	23
7.1	Product Pictures	23
7.1.1	Top view	23
7.1.2	Side view (connectors side)	24
7.1.3	Bottom view	24
7.2	Product overall dimensions	25
7.3	Product weight	25
7.4	Mechanical Mounting concept	25
7.4.1	Mounting position	25
7.4.2	Product Assembly – exploded view	26
8.	User Manual and Packaging statements	27
8.1	Specific Absorption Rate (SAR) and RF exposure evaluation (MPE)	27
8.2	Wi-Fi 5150 – 5250 MHz Restriction	27
8.3	Safety Relevant Statements	27
9.	User Manual Statements - USA	28
10.	User Manual Statements - Taiwan	29

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 3 / 29

1. Abstract

1.1 Change History

Version	Date	Changed By	Description
0.1	2022-10-12	Matthias Muench	From BSRF V1 adapted
1.0	2022-10-26	Matthias Muench	Finished official version
1.1	2022-11-03	Kelvin Fongang	Minor formatting and general improvements
1.2	2022-12-01	Kelvin Fongang	Add Safety warning, FCC and Taiwan user manual statements
1.3	2023-01-17	J.-P. Sanchis	Section 6.2.3 : Max LTE FDD Channel Bandwidth changed from 10 MHz to 20 MHz.
1.4	2023-02-28	Matthias Muench	EU removed in broadcast Section 5.4.4: LTE2 corrected Name of document adapted
1.5	2023-03-07	Kelvin Fongang	Added FCC ID of NAD module. Updated 2.4 GHz channels for US.

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		Page 4 / 29
File:			

1.2 List of Abbreviations

Abbreviation	Description
AGC	Automatic Gain Control
AP	Access Point
BSRF	Boitier Supervision Radio Fréquence
Beidou	China's Beidou Navigation Satellite System
BUB	Backup Battery
CAN	Controller Area Network
CW	Continuous Wave
DAB	Digital Audio Broadcasting
DIM	Driver Information Module
DTC	Diagnostic Trouble Code
DUT	Device under Test
EA	External Antenna
EMC	Electromagnetic Compatibility
Galileo	European union's Navigation Satellite System
GLONASS	Russia's Navigation Satellite System
GNSS	Global Navigation Satellite System
GPS	United States' Global Positioning System
GSM	Global System for Mobile Communications
GTW	Gateway
HW	Hardware
HU	Head Unit
IVI	In-vehicle infotainment
LNA	Low Noise Amplifier
LTE	Long Term Evolution
MFF2	Embedded Form Factor (embedded SIM)
MMI	Man Machine Interface
MNO	Mobile Network Operator
NAD	Network Access Device
PCB	Printed Circuit Board
PWM	Pulse Width Modulation
RED	Radio Equipment Directive
RF	Radio Frequency
ROW	Rest of World
SIM	Subscriber Identity Module
STA	Station
SVT	Stolen Vehicle Tracking
SW	Software
TCU	Telematic Control Unit
UMTS	Universal Mobile Telecommunications System
WCDMA	Wideband Code Division Multiple Access
PWM	Pulse Width Modulation
VSM	Vehicle Security Module (Body Control Module)

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 5 / 29

1.3 *Scope of Document*

The aim of this document is to provide an operational and product description for the certification of the BSRF EA TCU.

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		Page 6 / 29
File:			

2. Manufacturer Information

Manufacturer and Applicant

Continental Automotive Technologies GmbH
Siemensstrasse 12
93055 Regensburg
Germany

Brand/Trademark

Continental

Factory/Manufacturing Location

Continental Automotive France SAS
1 Avenue Paul Ourliac
31036 Toulouse Cedex
France

Country of Origin

France

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		Page 7 / 29
File:			

3. Product and System Description

The BSRF is a Telematic Control Unit (TCU) for telematic and connectivity purposes to be factory fitted to passenger vehicles by the car manufacturer. It is designed and produced by Continental Automotive Technologies for the Stellantis Group.

The BSRF is designed for in-vehicle mounting with integrated WIFI and LTE backup antennas, external LTE main antennas, GNSS and Broadcast receiver antennas.

The BSRF does not provide a direct user interface. Instead, it provides the below mentioned radio features to be used by other control units and interfaces e.g. the Head Unit (HU) in the vehicle via the vehicle electrical bus. The only exception to this is the Emergency and Assistance Call functionalities which can operate autonomously in the vehicle or via a push button.

The BSRF uses factory mounted embedded SIM (MFF2).

The built-in LTE backup antenna provides cellular network access in case the main antennas gets damaged.

The BSRF is connected to the car power supply via a 4-pin battery connector, and to the vehicle interfaces via a 20-pin and a BroadR-Reach connector.

3.1 Features

The radio features are:

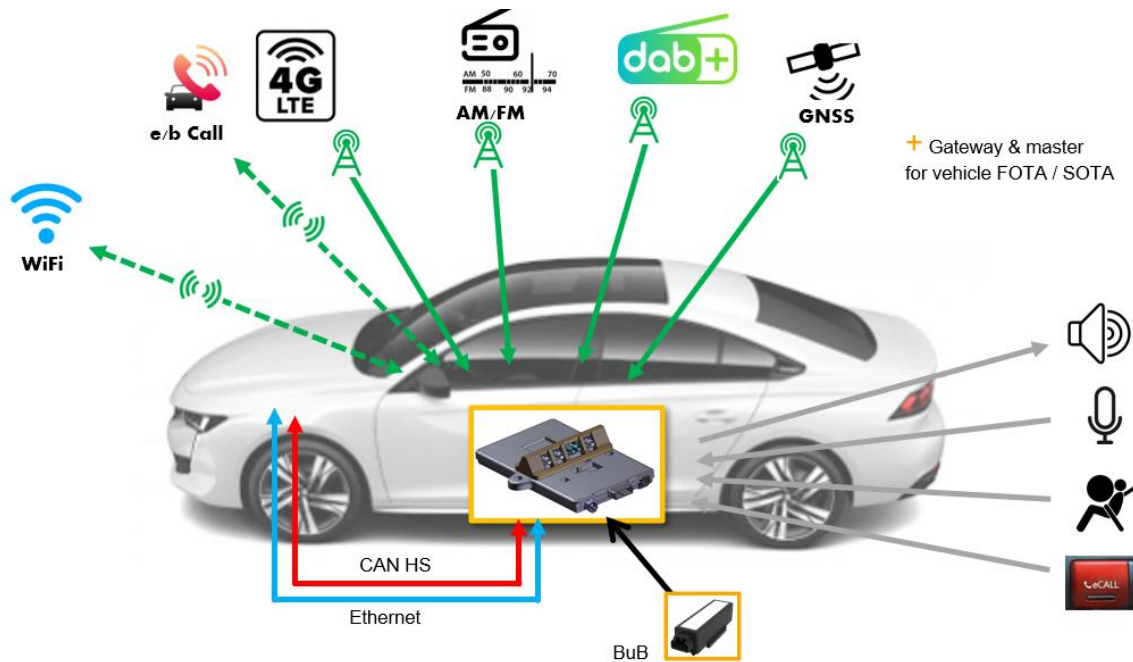
- › Radio broadcast reception services: AM, FM, DAB
- › Telematics and data connection via mobile networks (2G, 3G, 4G)
- › Wi-Fi hotspot
- › Emergency and Assistance Call Management
- › GNSS Position (GPS, GLONASS, Galileo, Beidou)

The non-radio features are:

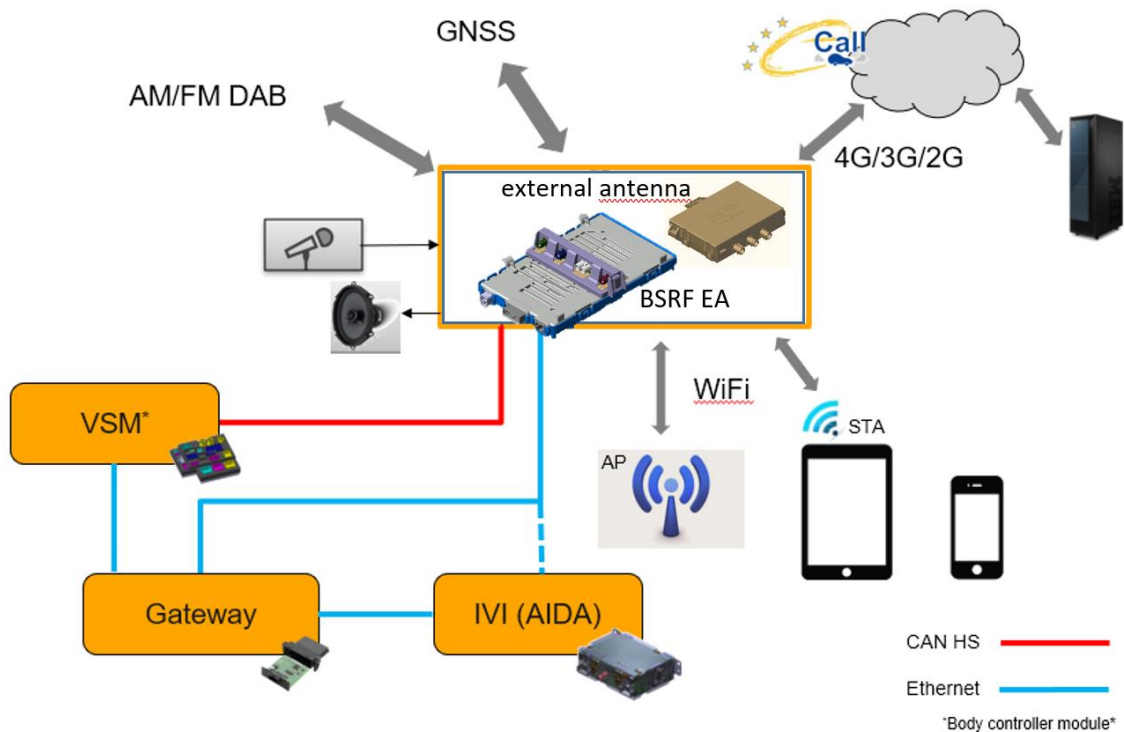
- › SW Update (via mobile networks)
- › Cyber security
- › Vehicle data storage

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 8 / 29

3.2 BSRF System Overview



3.3 BSRF System Architecture



Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 9 / 29

4. Product Variants

4.1 Model Names

4 variants shall be considered for certification:

- › Europe (EU): BSRF_EA_EU0
- › Rest of World (RW): BSRF_EA_RW0
- › JAPAN (JP): BSRF_EA_JP0
- › Turkey (TR): BSRF_EA_TR0



4.2 Similarities between variants:

- › Same PCB layout
- › Same Connectors
- › Same BOM except for connectivity module and eSIM

4.3 Differences between variants:

- › TR variant uses a different eSIM profile
- › Different band configurations for the different regional variants

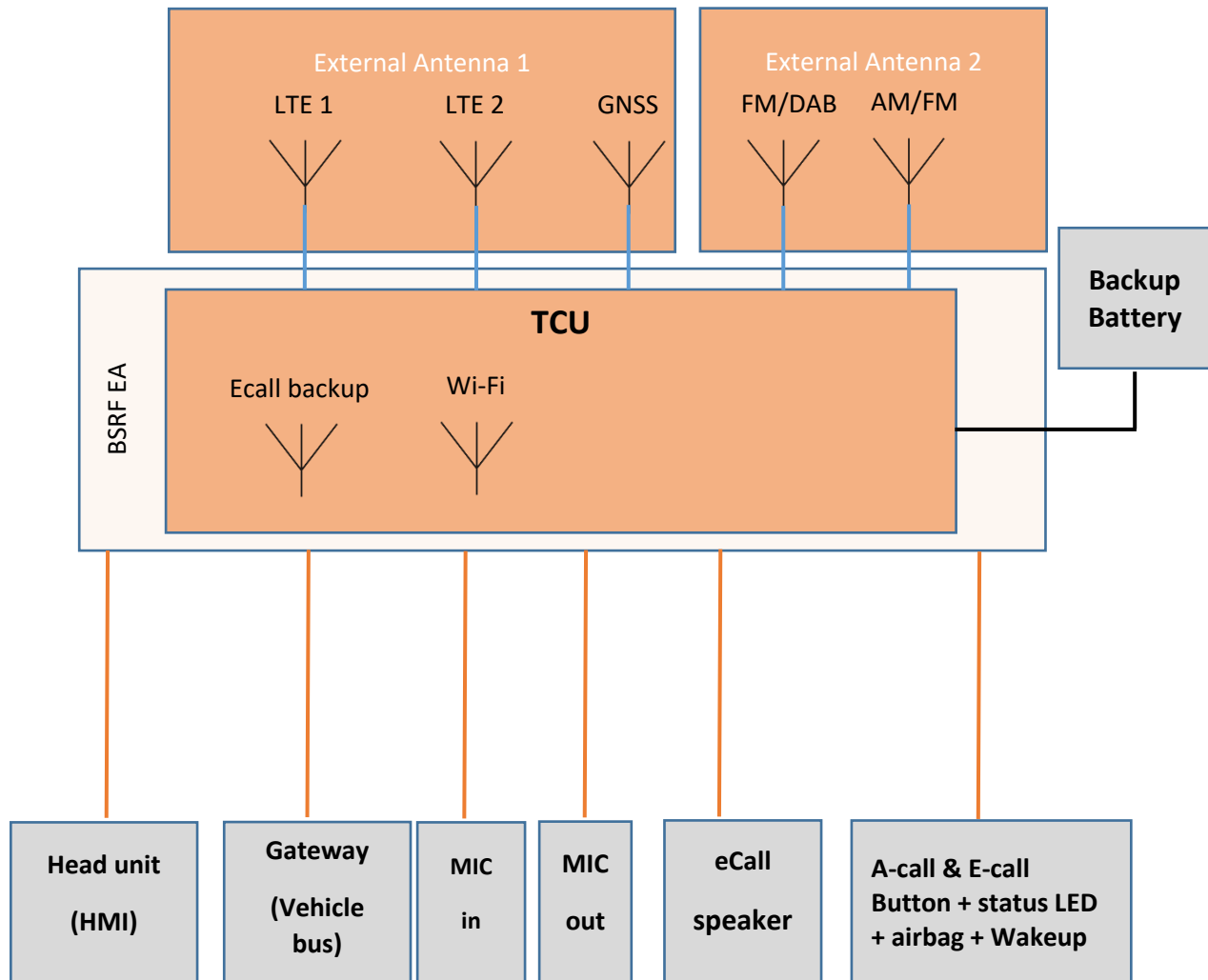
4.4 Overview of variants:

Variant	Description	HW Version	SW Build	Software Version
BSRF_EA_EU0	Europe	C5.2	V19.06	V19.03.XX_1.20.0.22.19.30
BSRF_EA_EU0	Europe	C4.2	V19.06	V19.03.XX_1.20.0.22.19.30
BSRF_EA_RW0	Rest of World	C4.2	V19.06	V19.03.XX_1.20.0.22.19.30
BSRF_EA_JP0	Japan	C4.2	V19.06	V19.03.XX_1.20.0.22.19.30
BSRF_EA_TR0	Turkey	C4.2	V19.06	V19.03.XX_1.20.0.22.19.30

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		Page 10 / 29
File:			

5. Hardware Description

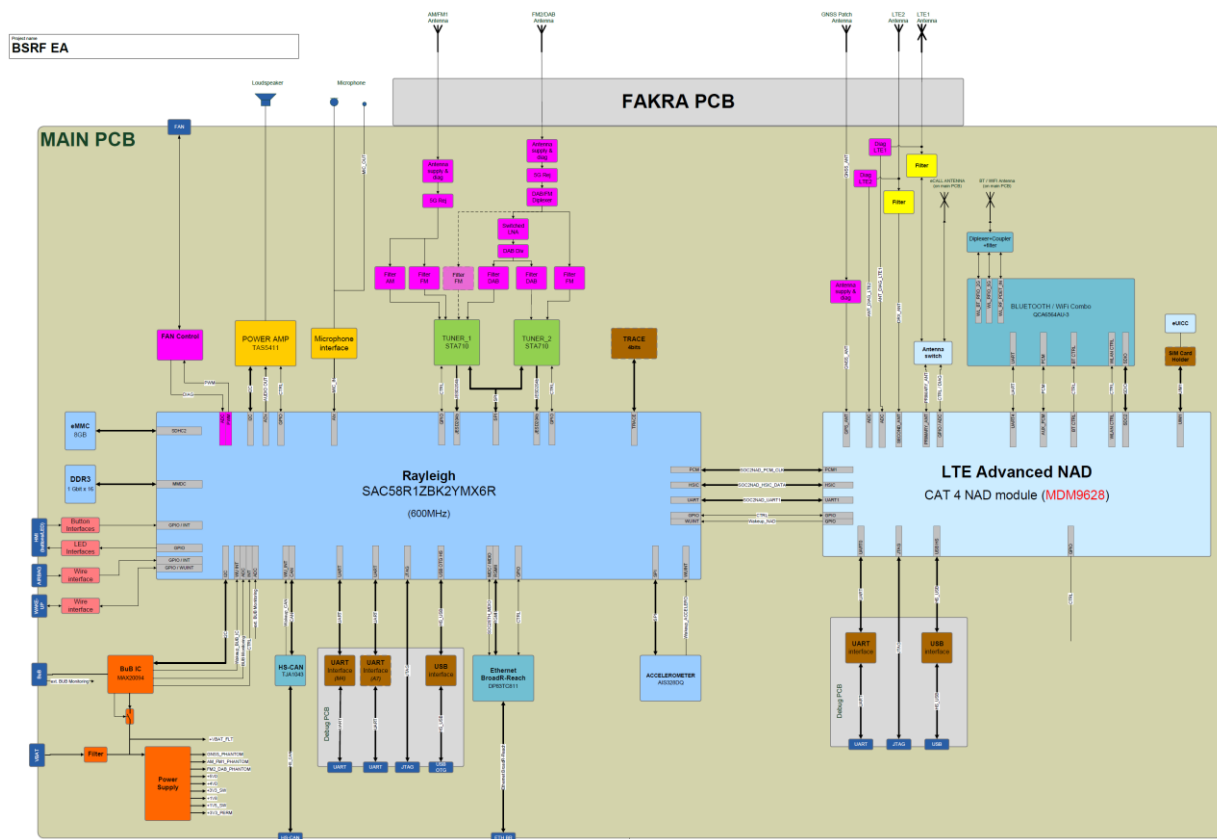
5.1 Block Diagram



- Analog / digital signal
- RF – signal

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 11 / 29

5.2 EE Block Diagram Level 1



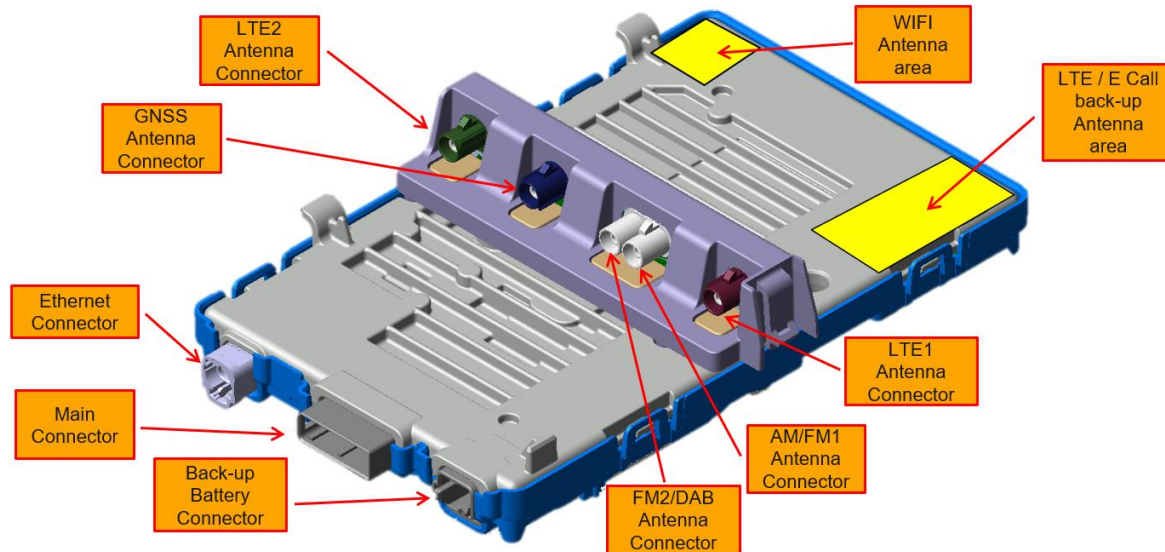
5.3 Main Features

The BSRF is a Telematics Control Unit (TCU). It:

- offers possibilities for AM/FM and DAB reception with corresponding tuner processing
- embeds a 2G/3G/4G modem which features 2 external antennas - GSM/WCDMA/LTE1 and LTE2 (Rx only)
- has a backup cellular antenna: 2G, 3G, 4G
- supports Emergency Call
- does not support VoLTE
- has a Backup Battery (BUB) in order to support eCall if the main vehicle battery is disconnected
- supports SVT (Stolen Vehicle Tracking)
- supports GNSS (GPS/GLONASS/Galileo/Beidou) via an external antenna
- supports Wi-Fi IEEE802.11 a/b/g/n/ac via an internal antenna
- features one High Speed CAN driver for interoperating with the vehicle
- communicates with Multimedia control unit via Ethernet BroadR-Reach bus
- communicates with eCall MMI via wired signals

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 12 / 29

5.4 Wired Interfaces and Antenna Concept



The wired external interfaces of the BSRF EA consists of:

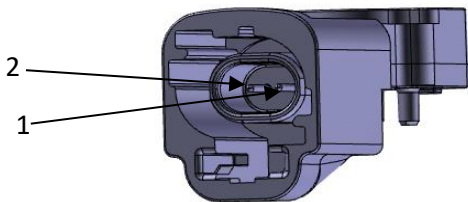
- 1) BroadR-Reach Ethernet connector (H-MTD)
- 2) Main 20 pin connector (Nano MQS 20 pin)
- 3) Backup Battery Connector
- 4) LTE2 antenna connector (FAKRA)
- 5) GNSS antenna connector (FAKRA)
- 6) FM2/DAB and AM/FM1 antenna connector (dual FAKRA)
- 7) LTE1 antenna connector (FAKRA)

The cellular backup antenna gets activated when a defect is detected on LTE1. When the cellular backup antenna is activated, only eCall and Assistance-Call operations are allowed. No other telematic operation is carried out.

Except in the case of eCall, all other RF operations can run simultaneously. When eCall is running, no other RF related operation can be executed.

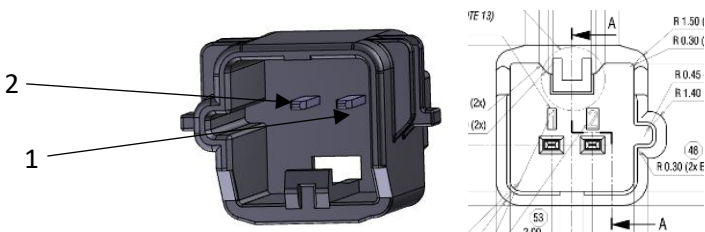
Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 13 / 29

5.4.1 X3 BroadR-Reach Connector (H-MTD)



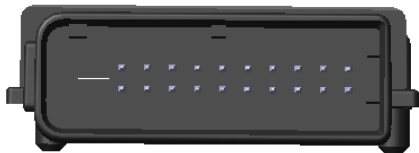
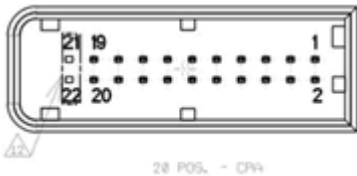
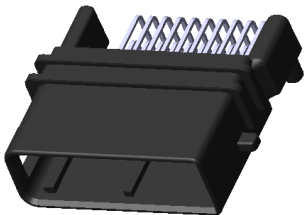
Pin	Signal Name	Test point	Type	Comments
1	BROADRR_P1	-	I/O	
2	BROADRR_M1		I/O	

5.4.2 X4 Backup Battery Connector



Pin	Signal Name	Test point	Type	Comments
1	VBUB	-	I	
2	GND	-	-	

5.4.3 X12 Main Connector (nanoMQS 20 pin)



Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		Page 14 / 29
File:			

Nano MSQ connector

Pin	Signal	I/O	Description	Current requirements	Electrical characteristics
1	CAN_H	I/O	CAN High data signal	I max. = 200 mA	High Speed CAN Bus
2	BUB_Supplier_Coding	I	Battery supplier coding		
3	Free	NC			
4	CAN_L	I/O	CAN Low data signal	I max. = 200 mA	High Speed CAN Bus
5	Microphone Out -	O	External microphone - line	I max. = 20 mA	Microphone -_recopy
6	BUB_NTC_ADC		Battery temperature sense		
7	Microphone In -	I	External microphone - line	I max. = 20 mA	
8	Microphone Out +	O	External microphone + line	I max. = 20 mA	Microphone +_recopy
9	Wakeup	I/O	Wakeup Signal	I max. = 10 mA	
10	Microphone In +	I	External microphone + line	I max. = 20 mA	
11	Power_GND	I	General supply ground	I max. = 2,5 A	
12	Airbag signal	I	Airbag Signal Input	I max. = 10 mA	
13	SPK-	O	Loud Speaker	I max. = 1,4 A (8W)	
14	SPK+	O	Loud Speaker	I max. = 1,4 A (8W)	
15	Red_Led	O	Red LED	I max. = 20 mA	
16	+VBAT	I	General power supply	I max. = 2,5 A	
17	Power_GND	I	General supply ground	I max. = 2,5 A	
18	Bcall_Button	I	Breakdown Call	I max. = 10 mA	
19	Ecall_Button	I	Emergency Call	I max. = 10 mA	
20	Green_Led	O	Green LED	I max. = 20 mA	
21	Not Available				
22	Not Available				

5.4.4 LTE2 Antenna Connector (FAKRA)

Antenna Pinning Configuration for LTE2 (green connector)

Pin	Signal Name	Test point	Type	Comments
1	LTE2			RF input
2	GND	-	-	

5.4.5 GNSS Antenna Connector (FAKRA)

Antenna Pinning Configuration for GNSS (blue connector)

Pin	Signal Name	Test point	Type	Comments
1	GNSS			5V _{DC} output (Phantom Supply); 60mA RF input
2	GND	-	-	

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		Page 15 / 29
File:			

5.4.6 FM2/DAB Antenna Connector (FAKRA)

Antenna Pinning Configuration for FM2/DAB (white connector left)

Pin	Signal Name	Test point	Type	Comments
1	FM2/DAB			12V _{DC} output (Phantom Supply); 150mA RF input
2	GND	-	-	

5.4.7 AM/FM1 Antenna Connector (FAKRA)

Antenna Pinning Configuration for AM/FM1 (white connector right)

Pin	Signal Name	Test point	Type	Comments
1	AM/FM1			12V _{DC} output (Phantom Supply); 100mA RF input
2	GND	-	-	

5.4.8 LTE1 Antenna Connector (FAKRA)

Antenna Pinning Configuration LTE1 (red connector)

Pin	Signal Name	Test point	Type	Comments
1	LTE1			RF input / output
2	GND	-	-	

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		Page 16 / 29
File:			

5.5 Operating Temperature Range

Operating temperature range: -40°C to +80°C.

NAD operating temperature range which complies with 3GPP specification: -10°C to +55°C.

5.6 Supply Voltage

Nominal Supply Voltage: 12 V DC.

Supply Voltage Range: 8 V – 16 V DC.

5.7 Power Consumption

Typical current consumption is around 700mA (Tuner, NAD, Wi-Fi, GNSS on).

Max continuous current estimated: 2A at 13V

5.8 Maximum Humidity

40 °C, 93 % to be tested for 504 hours.

5.9 SIM Card

The BSRF uses a factory fitted embedded SIM Card (MFF2 with a carrier specific profile).

5.10 Backup Battery (BUB)



The BSRF features a Lithium Ion BUB including a 3-terminals fuse, a thermal sensor with capacitor, and an active overvoltage protection. Furthermore, the cell contains a CID (Current Interrupt Device) as an additional protection. In case there is a loss of power supply from the car battery, the BSRF shall be able to run on the BUB when in Emergency or SVT power states. The BUB will be externally connected to the BSRF unit.

Nominal BUB voltage is 3.6V. This voltage is boosted to 6.2V on the +VBAT_FLT power rail.

Nominal BUB capacity is 2000mAh.

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 17 / 29

6. Wireless Services

6.1 NAD Module

The Continental NAD module is based on the MDM9628 SOC from Qualcomm that features a Cortex A7 core application processor and a modem offering the possibility to connect on 2G, 3G or 4G/LTE cellular networks.

The NAD embeds a GNSS receiver and provides control of WLAN through dedicated interfaces. LTE antennas, the GNSS and Wi-Fi antennas are connected directly to the NAD.

The NAD provides the following features:

- › Audio Call: Incoming, outgoing for telematics services (eCall and Assistance Call)
- › SMS: Data only for telematics services (eCall and Assistance Call)
- › Packet Data: Data via 2G, 3G and LTE for telematics services (eCall and Assistance Call)
- › eCall

The variants are realized via different component values according to the different bands:

NAD Model name/HW	Region / Carrier	FDD / TDD LTE Band	UMTS Band	GSM Band
BL28EU-RD1/P4.1	EU / Orange	1, 3, 7, 8, 20, 28a	1, 3, 8	3, 8
BL28RW-RD1/P4.0	ROW / Orange	1, 2, 3, 4, 5, 7, 8, 28a, 28b	1, 2, 3, 4, 5, 6, 8	2, 3, 5, 8
BL28JP-RD1/P4.0	Japan / Orange	1, 3, 8, 19, 28b	1, 6, 8, 19	N/A

The NAD module variants are assigned to the BSRF according to the following table:

NAD Model name			
BL28EU-RD1	Europe		Turkey
BL28RW-RD1	Rest of World		
BL28JP-RD1	Japan		

BL28RW-RD1 is certified according to FCC.

FCC ID: LHJ-BL28RWRD1

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 18 / 29

6.2 Cellular Services BL28RW-RD1 NAD

6.2.1 2G/GSM

Wireless Service	2G/GSM
Frequency Bands / Range	Band 2 (GSM1900), 3 (GSM1800), 5 (GSM850), 8 (GSM900)
Output Power (Conducted)	Low Band (GSM850 & GSM900): +32.5 dBm High Band (GSM1900, GSM1800): +29.5 dBm
Max. Output Power (EIRP)	
Modulation	0.3 GMSK/8PSK
Channel Bandwidth	≤ 200kHz

6.2.2 3G/UMTS

Wireless Service	3G/UMTS
Frequency Bands / Range	FDD Band I (B1: 2100 UMTS), II (B2: 1900 UMTS), III (B3: 1800 UMTS), IV (B4: 1700 UMTS), V (B5: 850 UMTS), VI (B6: 850 UMTS), VIII (B8: 900 UMTS)
Output Power (Conducted)	+23.5 dBm
Max. Output Power (EIRP)	
Modulation	BPSK
Channel Bandwidth	≤ 5 MHz

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		Page 19 / 29
File:			

6.2.3 4G/LTE

Wireless Service	4G/LTE
Frequency Bands / Range	FDD Band 1 (2100 LTE), 2 (1900 LTE), 3 (1800+ LTE), 4 (1700 LTE), 5 (850 LTE), 7 (2600 LTE), 8 (900 LTE), 28a (700 LTE), 28b (700 LTE)
Output Power (Conducted)	+23.0 dBm
Max. Output Power (EIRP)	
Modulation	QPSK/16QAM
Channel Bandwidth	LTE FDD: ≤ 20MHz

6.3 GNSS Receiver

GNSS receiver is included in the NAD. It is a multi-constellation compatible receiver implementing Beidou B1I, Galileo E1, GPS L1, GLONASS G1 positioning systems.

Positioning data is used for telematics services (eCall and Assistance Call).

Positioning data is also provided to other control units and applications in the vehicle.

Wireless Service	GNSS Receiver
Frequency Range	GPS: f0 = 1575,42 MHz; BW = 2,046 MHz Galileo: f0 = 1575,42 MHz; BW = 4,092 MHz Beidou: f0 = 1561,098 MHz; BW = 4,092 MHz GLONASS: 1597-1606 MHz; (f0 = 1602 MHz; carrier spacing = 562,5 kHz; channel number k = -7 ... +6; channel BW = 1,022 MHz)
Max. Output Power (EIRP)	N/A

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 20 / 29

6.4 WLAN

The BSRF uses the Qualcomm Wi-Fi chipset QCA6564AU-3.

AU stands for automotive grade

-3 stands for SDIO 3.0 interface for WLAN part control.

6.4.1 WLAN RF Parameters

WLAN 2.4 GHz

- › IEEE 802.11 b/g/n (HT20)
- › Channels 1 - 13 (EU, RW)
- › Channels 1 – 11 (US)

WLAN 5GHz

- › IEEE 802.11 a/ac/n (HT20/HT40/HT80)
- › Channels 36 - 48 (U-NII-1)
- › Channels 149 - 165 (U-NII-3)

Wireless Service	WLAN: a, b, g, n, ac (SISO)
Frequency Range	2.4 – 2.4835 GHz 5.150 – 5.250 GHz 5.725 – 5.850 GHz
Output Power (Conducted)	
Max. Output Power (E.I.R.P.)	2.4 – 2.4835 GHz: ≤ 20 dBm 5.150 – 5.250 GHz: ≤ 16 dBm 5.725 – 5.850 GHz: ≤ 14 dBm
Modulation	DBPSK/DQPSK/CCK, BPSK/QPSK/16QAM/64QAM/256QAM
Number of Channels	
Channel Bandwidth	2.4GHz 802.11b/g/n: 20 MHz 5GHz 802.11a: 20MHz 802.11n: 20/40MHz 802.11ac: 20/40/80MHz

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 21 / 29

6.4.2 WLAN Supported Bands per Variants

WIFI 2.4 GHz (2400 – 2483,5 MHz)			
Variants	Channel	[MHz]	Supported
EU	CH1 – CH13	2400 – 2483,5	
RW	CH1 – CH13	2400 – 2483,5	
JP	CH1 – CH13	2400 – 2483,5	

WIFI 5 GHz						
	5150 – 5250 MHz (UNII-1)		5250 – 5350 MHz (UNII-2)	5470 – 5725 MHz (UNII-2) Extended	5725 – 5850 MHz (UNII-3)	
Variants	[MHz]		Not Supported		[MHz]	
EU	5150 – 5250	In the EU (restricted to indoor and vehicle usage)			5725 – 5850	Supported
RW	5150 – 5250	In the EU (restricted to indoor and vehicle usage)			5725 – 5850	Supported
JP	5150 – 5250				Not allowed	Not Supported

6.5 Radio Broadcast Receiver

Radio reception and RDS/DAB data services will be used by other control units in the vehicle e.g. the Head Unit. The Broadcast RF signals are demodulated inside the BSRF and the content (audio/data) is provided in digital format to the vehicle gateway.

6.5.1 Frequency Range:

AM (LW): 153 – 252 kHz

AM (MW): 531 – 1602 kHz

FM: 87.5 – 108 MHz

DAB Band-III: 174.928 – 239.200 MHz

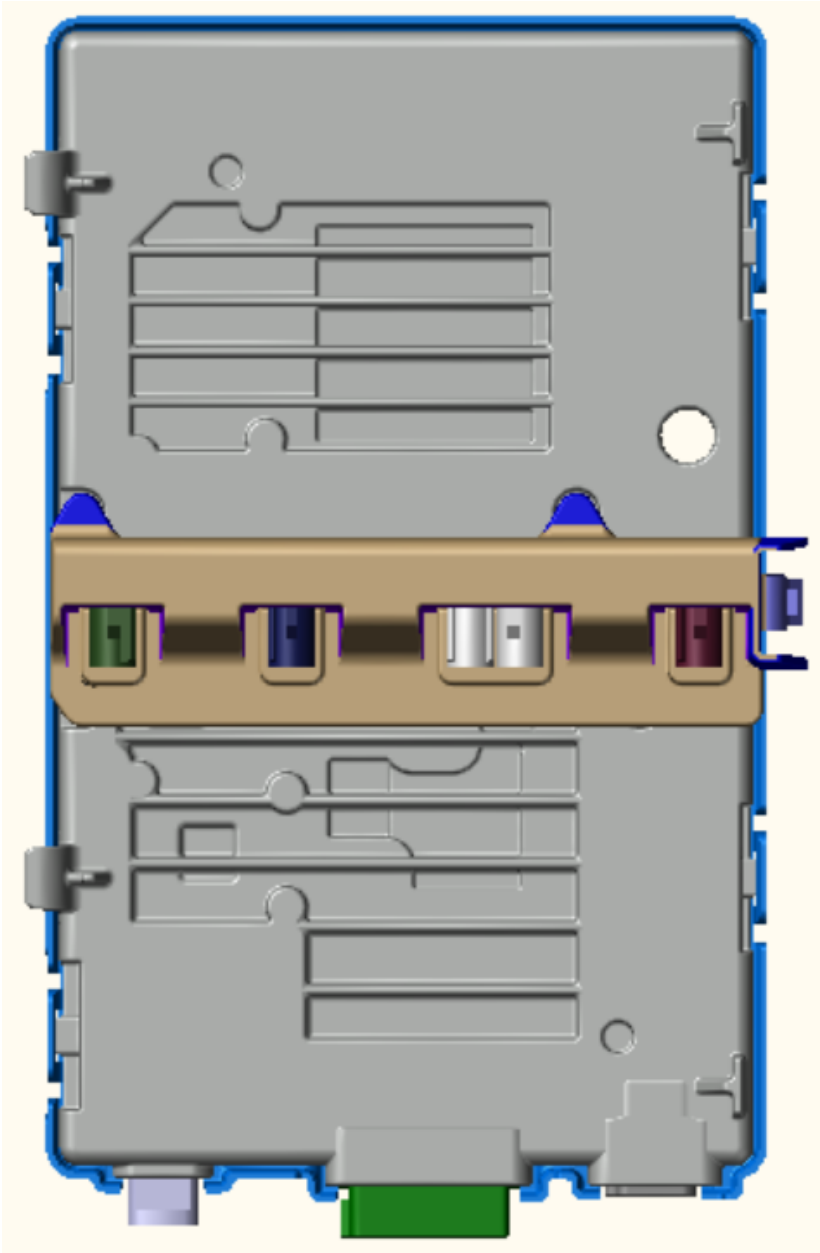
Via telecoding, the OEM will set the correct frequencies of operation in every other country.

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		Page 22 / 29
File:			

7. Mechanical Design

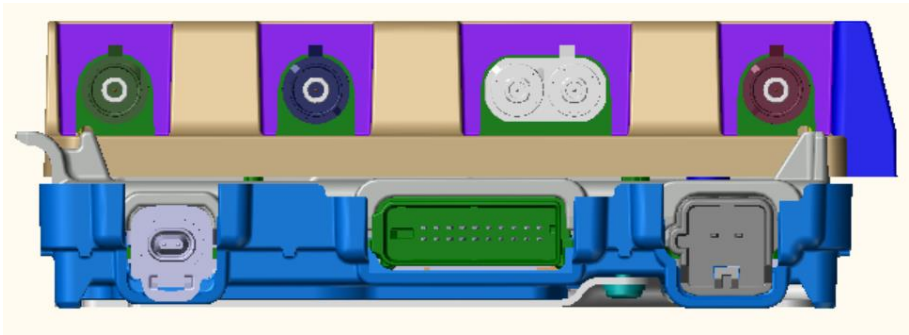
7.1 Product Pictures

7.1.1 Top view

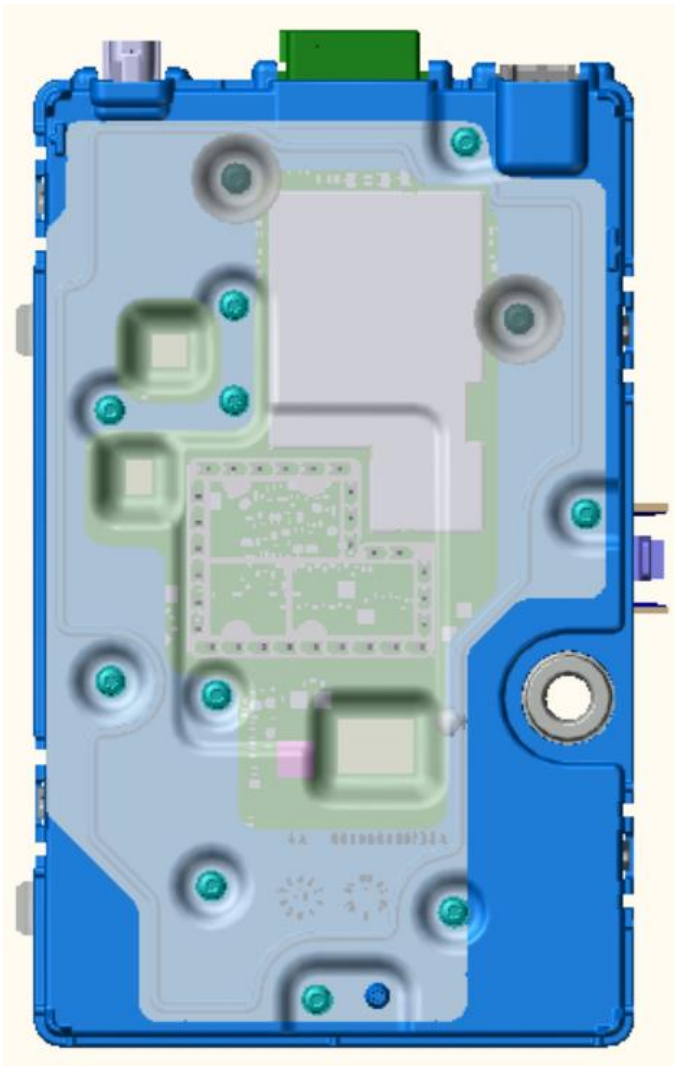


Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		Page 23 / 29
File:			

7.1.2 Side view (connectors side)



7.1.3 Bottom view



Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		Page 24 / 29
File:			

7.2 Product overall dimensions

194 x 124 x 41 mm

7.3 Product weight

Around 0.43 Kg

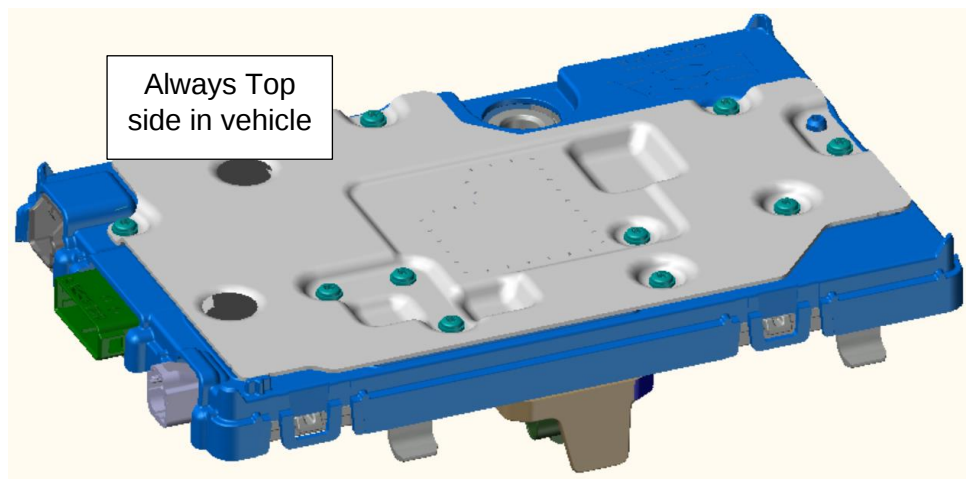
7.4 Mechanical Mounting concept

7.4.1 Mounting position

BSRF EA Mounting position depends on the carline. 3 different carlines are fitted with BSRF EA. The mounting position is different in all carlines, but one characteristic remains the same for all vehicles - BSRF EA is placed with the same side on top (as shown in picture below) under the dashboard or in the middle console between the 2 seats.

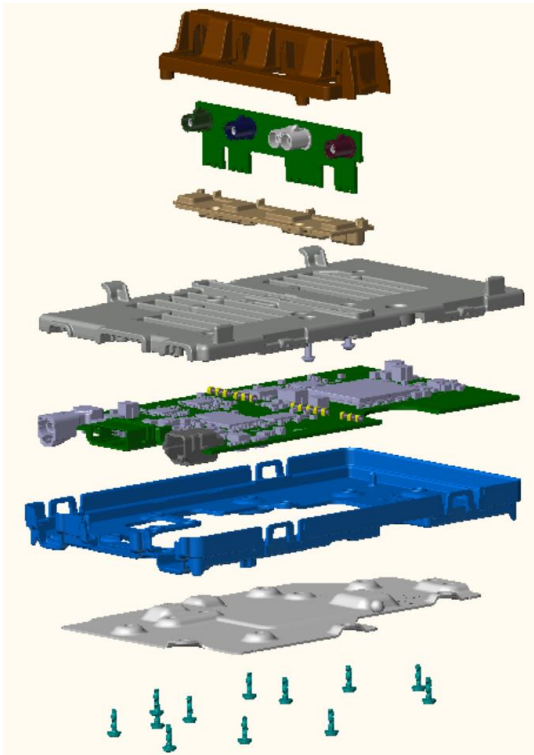
There is a minimum separation distance of 20cm between the passenger and the external antennas (LTE1, LTE2, GNSS, FM/AM/DAB) for normal seating conditions.

There is a minimum separation distance of 10mm (RED) and 15mm (FCC) between the passenger and the main PCB (Wi-Fi and backup antennas for eCall) for normal seating conditions.



Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 25 / 29

7.4.2 Product Assembly – exploded view



Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		Page 26 / 29
File:			

8. User Manual and Packaging statements

	BE	BG	CZ	DK	DE	EE	IE	EL
	ES	FR	HR	IT	CY	LV	LT	LU
	HU	MT	NL	AT	PL	PT	RO	SI
	SK	FI	SE	UK				

8.1 Specific Absorption Rate (SAR) and RF exposure evaluation (MPE)

Max. Simultaneous Transmission SAR_{10g} = XXX W/kg

The SAR_{10g} limit (2.0 W/kg for Body) general population/uncontrolled exposure is specified in Council Recommendation 1999/519/EC Annex II.

A minimum separation distance of 10mm between the passenger and the internal antennas shall be ensured during normal operation.

A minimum separation distance of 20cm between the passenger and the external antennas (which are located under the dashboard) shall be ensured during normal operation.

8.2 Wi-Fi 5150 – 5250 MHz Restriction

The band 5150 - 5250 MHz is restricted to indoor or vehicle usage in Europe.

8.3 Safety Relevant Statements



All connected wiring shall be adequate according to the equipment's ratings and flammability requirements of standard EN 62368-1.

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		
File:			Page 27 / 29

9. User Manual Statements - USA

FCC ID: KR5-BSRFEARW0

Interference statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Wireless notice

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The antenna should be installed and operated with minimum distance of 15mm between the radiator and your body.

FCC Class B digital device notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modification statement

Continental Automotive Technologies GmbH has not approved any changes or modifications to this device by the user. Any changes or modifications could void the user's authority to operate the equipment.

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5 BSRF EA RW variant		Page 28 / 29
File:			

10. User Manual Statements - Taiwan

NCC	警語
低功率射頻器材技術規範_章節3.8.2 取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。 低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。 前述合法通信，指依電信管理法規定作業之無線電通信。 低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。	

Internal	MATTHIAS MUENCH	BSRF EA User Manual RW	Internal
Version:	1.5	BSRF EA RW variant	
File:			Page 29 / 29