

FCC ID: RTD-G6RH

IC: 4943A-G6RH

# EMI - TEST REPORT

- FCC Part 15.231 -

**Test Report No. :** T38579-00-01KJ

26. January 2015

Date of issue

**Type / Model Name** : G6R-H3TV4 / G6R-H3SN / G6R-H3TV4FB / G6R-H3SNFB**Product Description** : Handset of remote electronic ignition and control  
system for gas applications**Applicant** : Plättner Elektronik GmbH

Address : Lerchenbreite 8

38889 BLANKENBURG, GERMANY

**Manufacturer** : Mertik Maxitrol GmbH & Co. KG

Address : Warnstedter Strasse 3

06502 Thale, GERMANY

**Licence holder** : Mertik Maxitrol GmbH & Co. KG

Address : Warnstedter Strasse 3

06502 Thale, GERMANY

**Test Result** according to the  
standards listed in clause 1 test  
standards:**POSITIVE**

The test report merely corresponds to the test sample.  
It is not permitted to copy extracts of these test results  
without the written permission of the test laboratory.

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# 1 TEST STANDARDS

The tests were performed according to following standards:

## **FCC Rules and Regulations Part 15, Subpart A - General (September, 2014)**

Part 15, Subpart A, Section 15.31	Measurement standards
Part 15, Subpart A, Section 15.33	Frequency range of radiated measurements
Part 15, Subpart A, Section 15.35	Measurement detector functions and bandwidths

## **FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (September, 2014)**

Part 15, Subpart C, Section 15.203	Antenna requirement
Part 15, Subpart C, Section 15.204	External radio frequency power amplifiers and antenna modifications
Part 15, Subpart C, Section 15.205	Restricted bands of operation
Part 15, Subpart C, Section 15.207	Conducted limits
Part 15, Subpart C, Section 15.209	Radiated emission limits, general requirements
Part 15, Subpart C, Section 15.231	Periodic operation in the band 40.66-40.70 MHz and above 70 MHz

## **OET Bulletin 65, 65A, 65B, 65C Edition 97-01, August 1997 – Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.**

ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
CISPR 16-4-2: 2003	Uncertainty in EMC measurement
CISPR 22: 2005 EN 55022: 2006	Information technology equipment

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## 2 Test result summary

FCC Rule Part	RSS Rule Part	Description	Result
15.207(a)	RSS Gen, 7.2.4.	Conducted limits	not applicable
15.231(b)	RSS210, A1.1.2	Field strength of the fundamental wave	passed
15.231(b)	RSS-Gen, 7.2.5	Spurious emissions (magnetic field) 9 kHz – 30 MHz	passed
15.231(b)	RSS-Gen, 7.2.5	Spurious emissions radiated (electric field)	passed
15.231(c)	RSS-Gen, 4.5	Correction for pulse operation (duty cycle)	passed
15.231(a1)	RSS210, A1.1.1	Signal deactivation	passed
-	RSS210, A1.1.3	Emission bandwidth and OBW99	passed

The mentioned RSS Rule Parts in the above table are related to:  
 RSS Gen, Issue 3, December 2010  
 RSS 210, Issue 8, December 2010

### 2.1 FINAL ASSESSMENT:

The equipment under test **fulfills** the EMC requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 24 July 2014

Testing concluded on : 21 October 2014

Checked by:



Klaus Gegenfurtner  
 I confirm the correctness  
 and integrity of this  
 documents  
 2015.01.22 13:45:29  
 +01'00'

Klaus Gegenfurtner  
 Teamleader Radio

Tested by:



Konrad Graßl  
 I am the author of this  
 document  
 2015.01.22 13:44:22  
 +01'00'

Konrad Graßl  
 Radio Team

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### 3 EQUIPMENT UNDER TEST

#### 3.1 Photo documentation of the EUT

Variant: G6R-H3TV4

Top view



Bottom view



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Label and label placement



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Right view



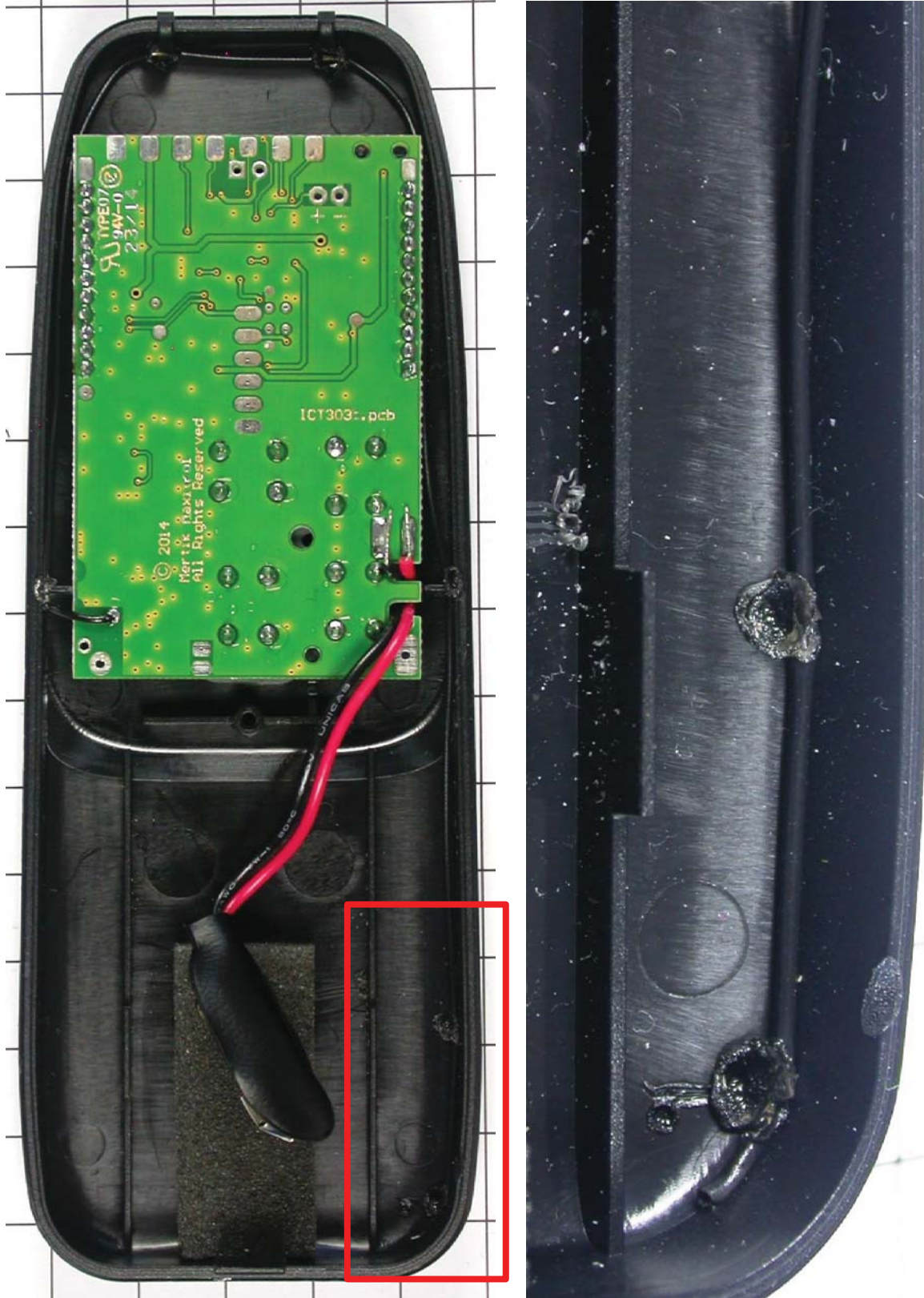
Bottom view (with open battery cover)



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Internal view of the EuT with enlarged view of the antenna wiring

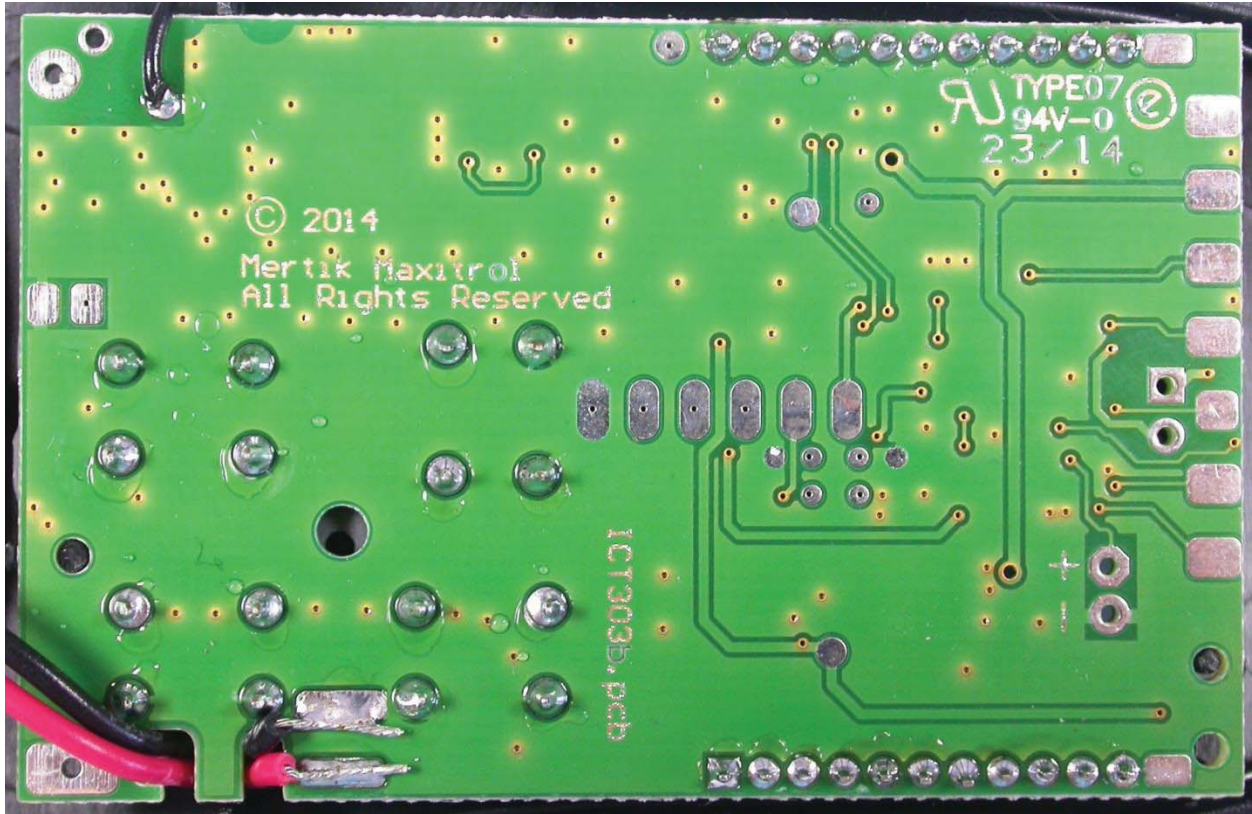




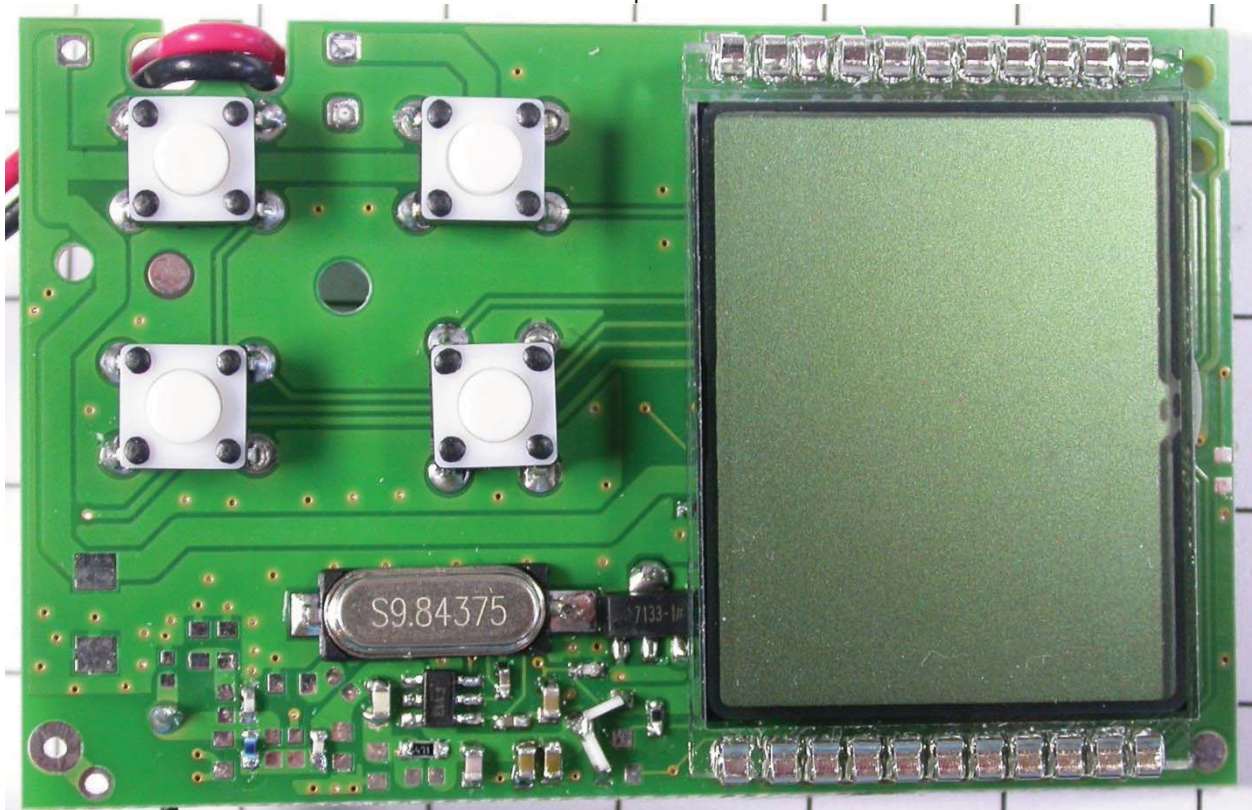
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PCB bottom view



PCB top view



FCC ID: RTD-G6RH

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Variant: G6R-H3SN

Top view



Bottom view



FCC ID: RTD-G6RH

IC: 4943A-G6RH

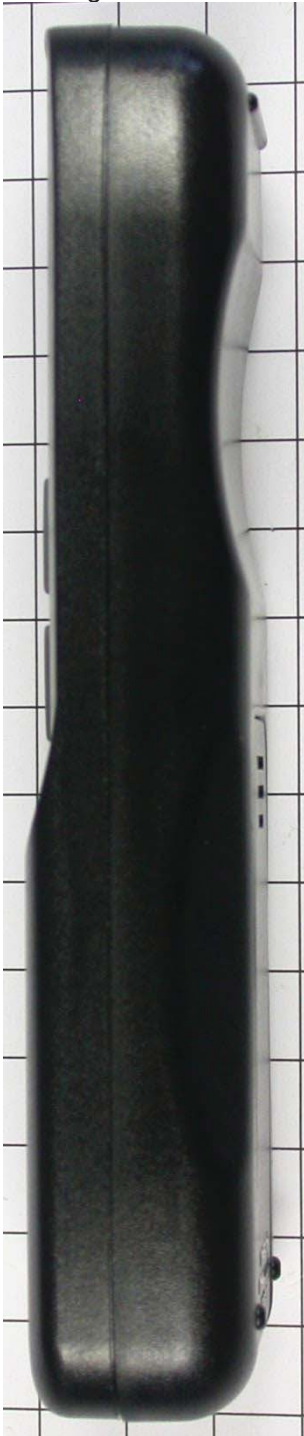
Lable and lable placement



FCC ID: RTD-G6RH

IC: 4943A-G6RH

Right view



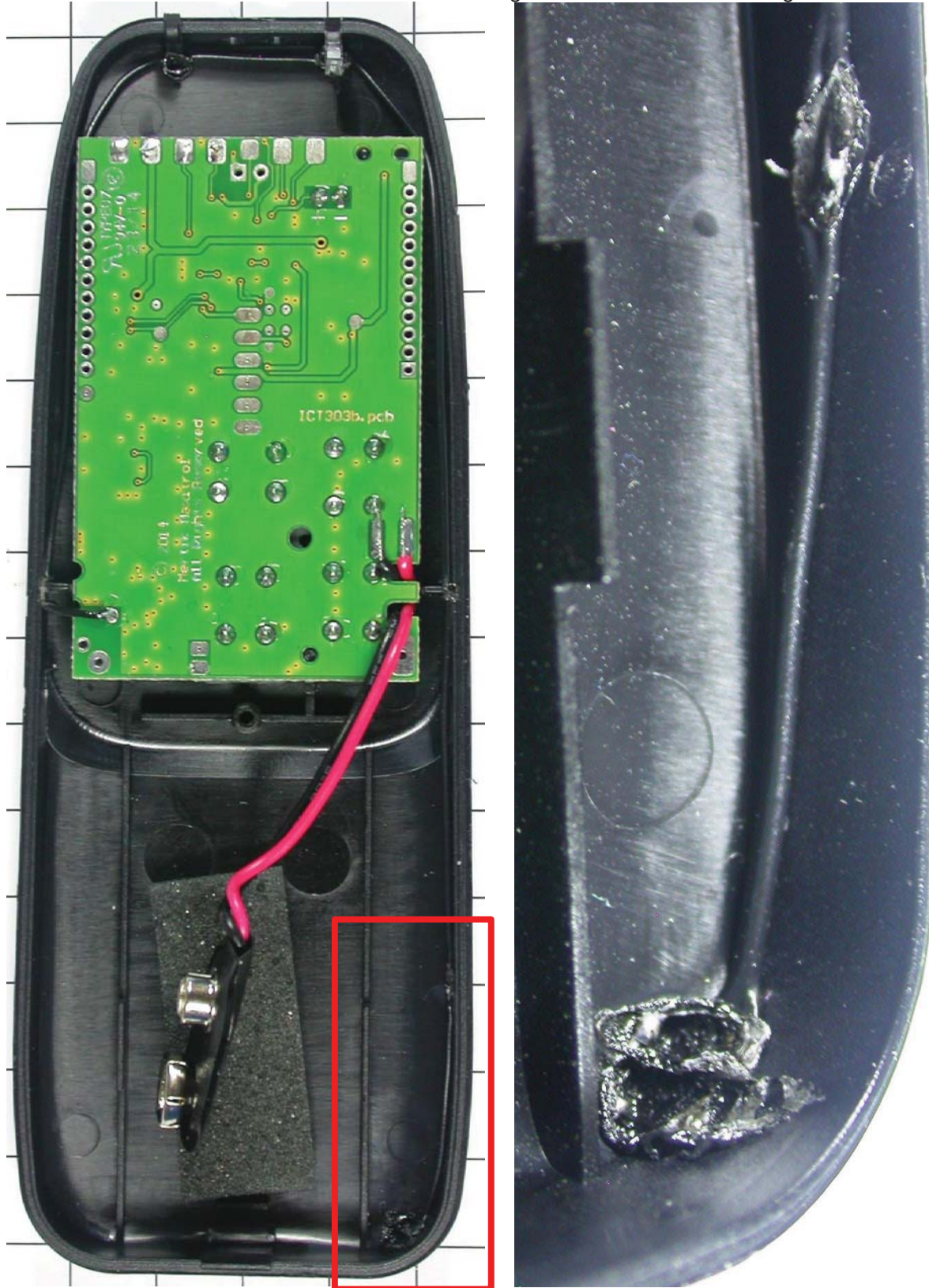
Bottom view (with open battery cover)



FCC ID: RTD-G6RH

IC: 4943A-G6RH

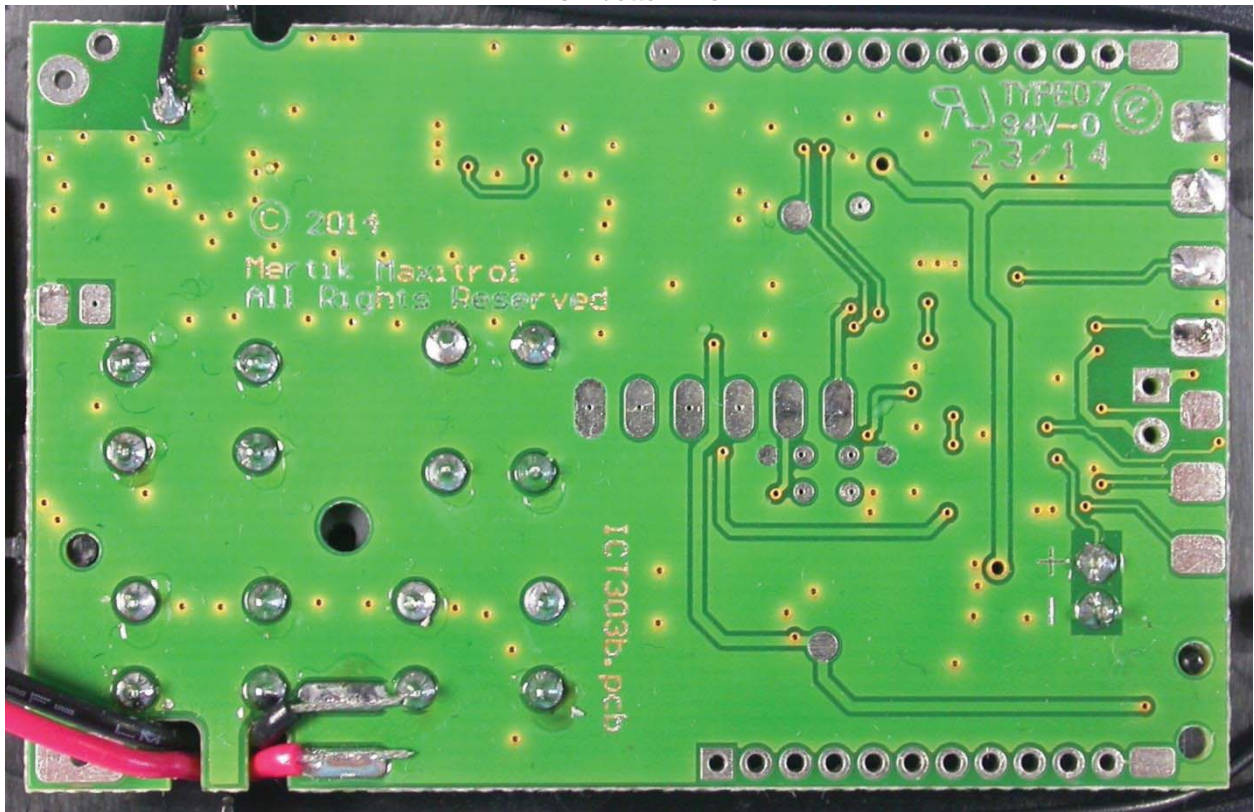
Internal view of the EuT with enlarged view of the antenna wiring



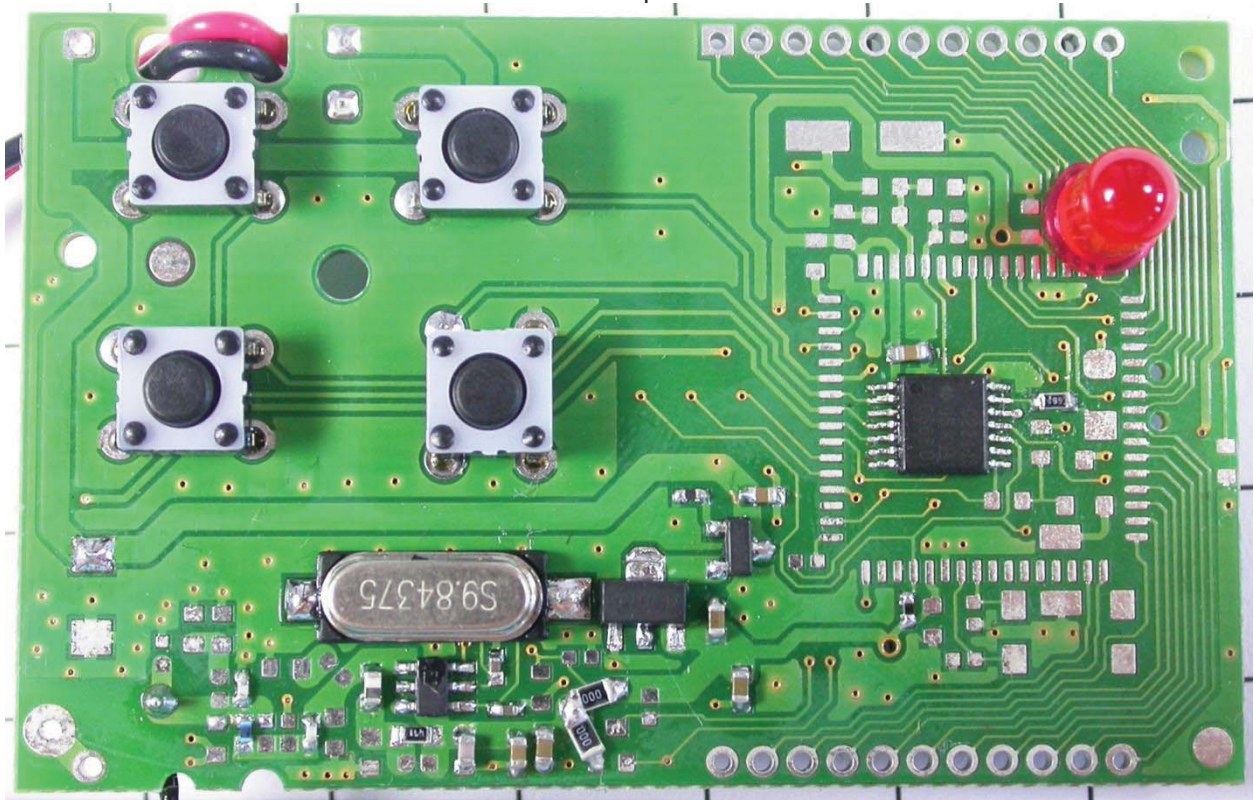
FCC ID: RTD-G6RH

IC: 4943A-G6RH

PCB bottom view



PCB top view

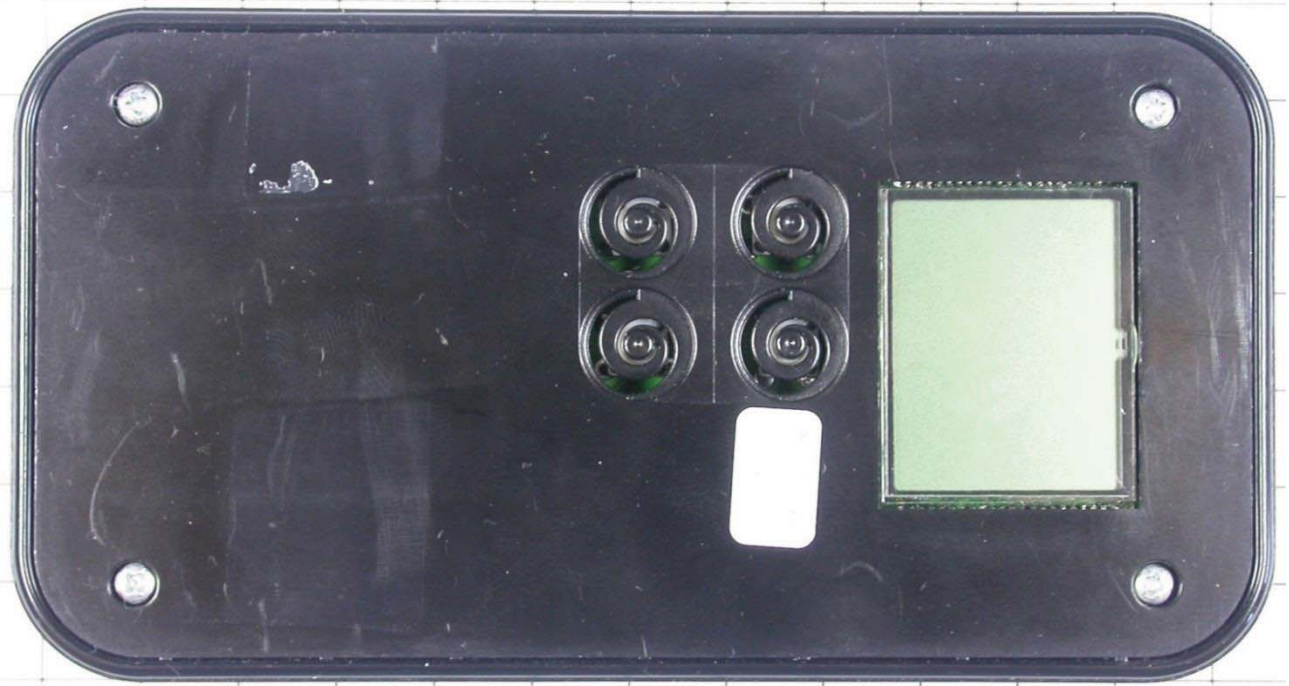


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Variant: G6R-H3TV4FB

Top view



Bottom view / Lable placement



Lable view

<b>MERTIK MAXITROL®</b>	
<b>FCC ID: RTD-G6RH</b>	<b>M#:G6R-H3TV4FB</b>
<b>IC: 4943A-G6RH</b>	315MHz amb.temp.0-60°C
<b>Made in Germany</b>	4,5V DC date 1442 EQ

FCC ID: RTD-G6RH

IC: 4943A-G6RH

Right view



Front view

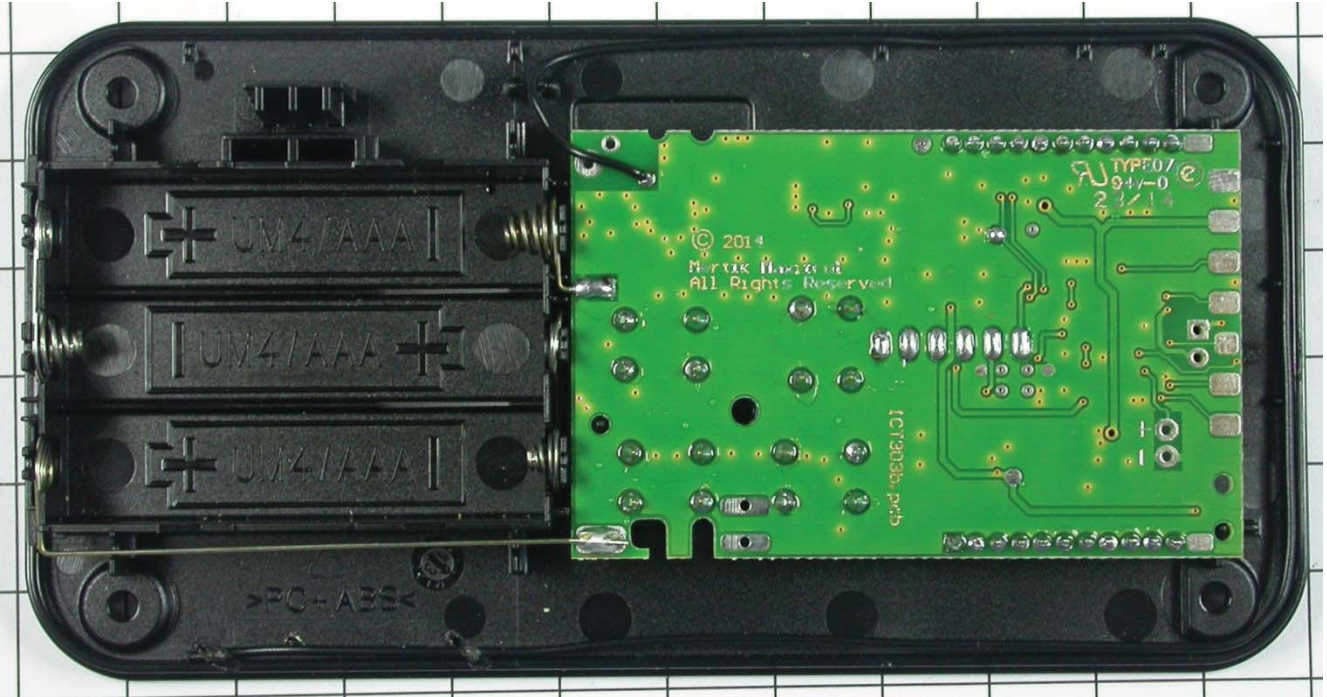




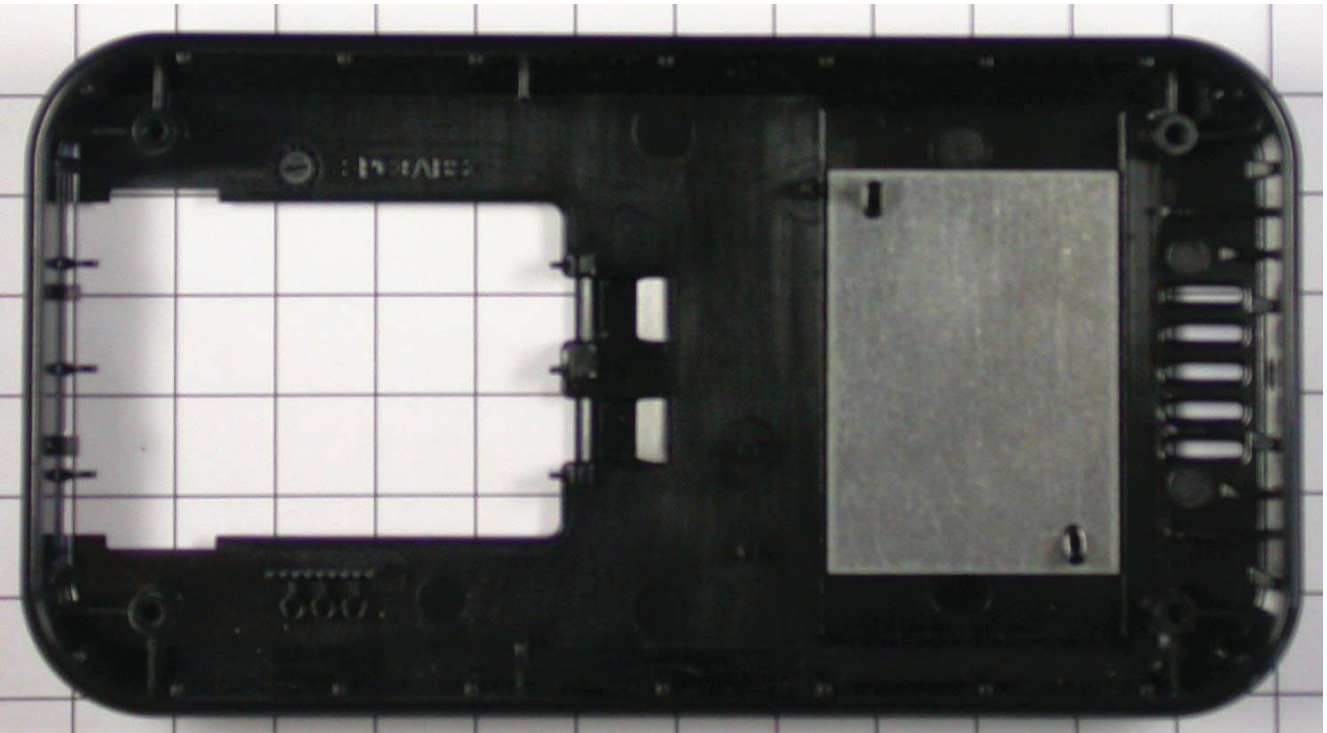
FCC ID: RTD-G6RH

IC: 4943A-G6RH

Internal view of the EuT



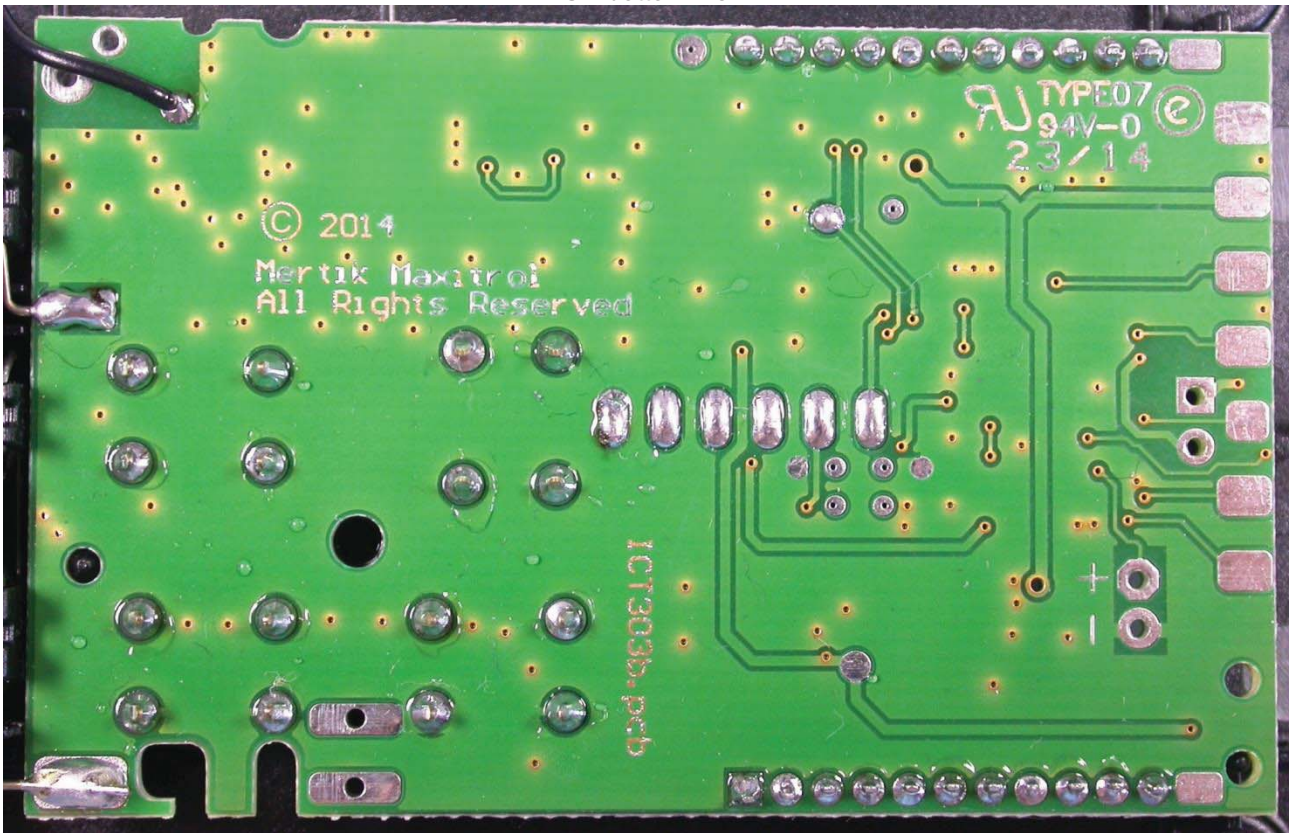
Internal view of the EuT



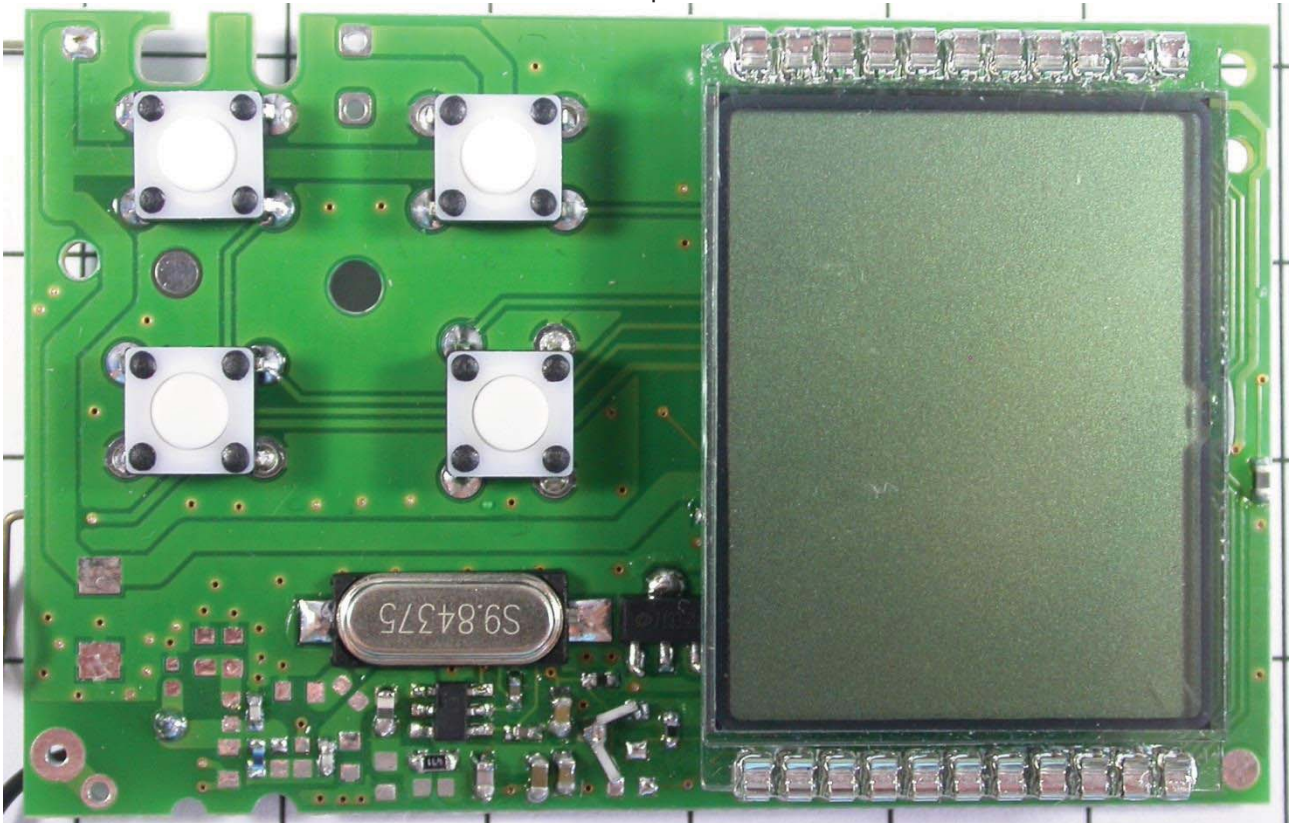
FCC ID: RTD-G6RH

IC: 4943A-G6RH

PCB bottom view



PCB top view

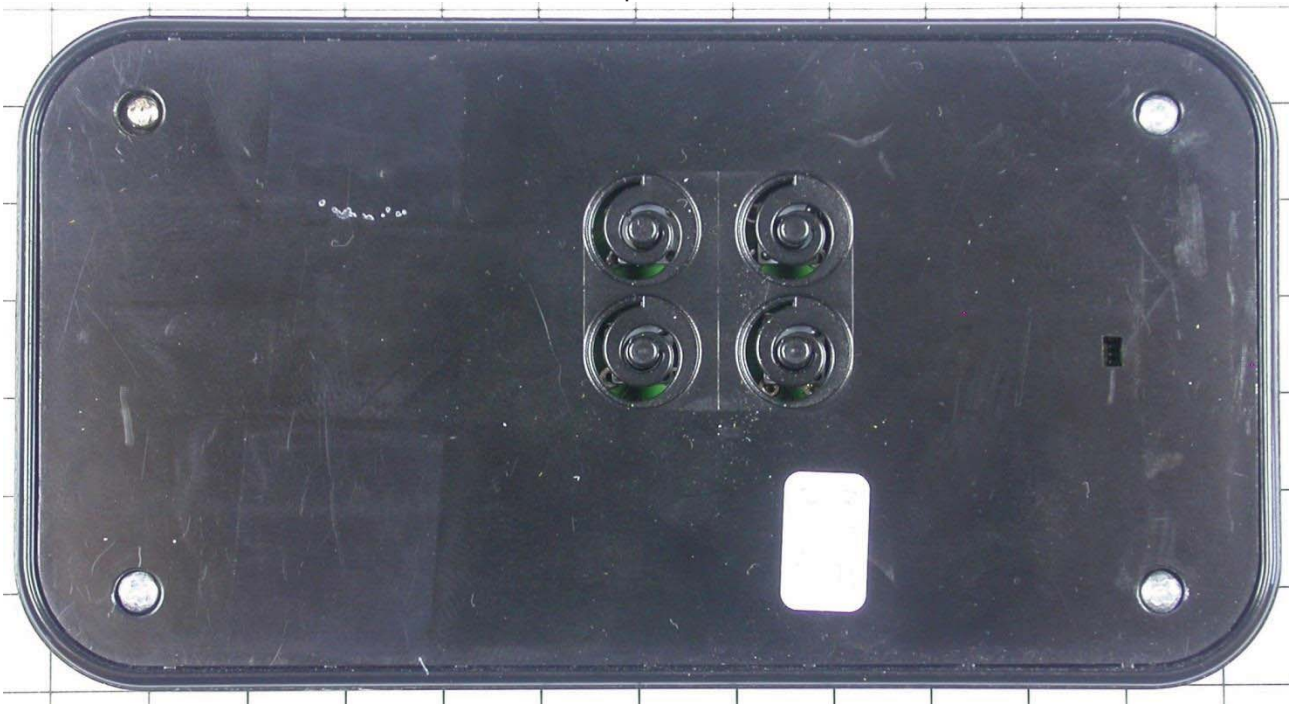


FCC ID: RTD-G6RH

IC: 4943A-G6RH

Variant: G6R-H3SNFB

Top view



Bottom view / Lable placement



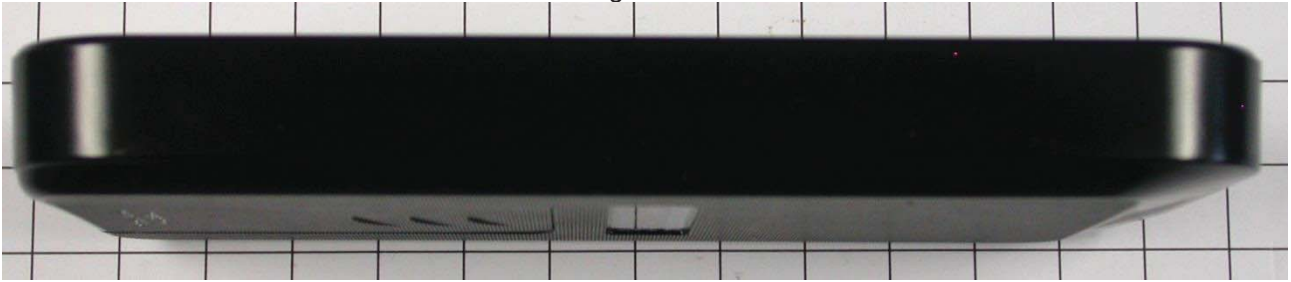
Lable view

**MERTIK MAXITROL®**  
FCC ID: RTD-G6RH M#:G6R-H3SNFB  
IC: 4943A-G6RH 315MHz amb.temp.0-60°C  
Made in Germany 4,5V DC date 1345 DD

FCC ID: RTD-G6RH

IC: 4943A-G6RH

Right view



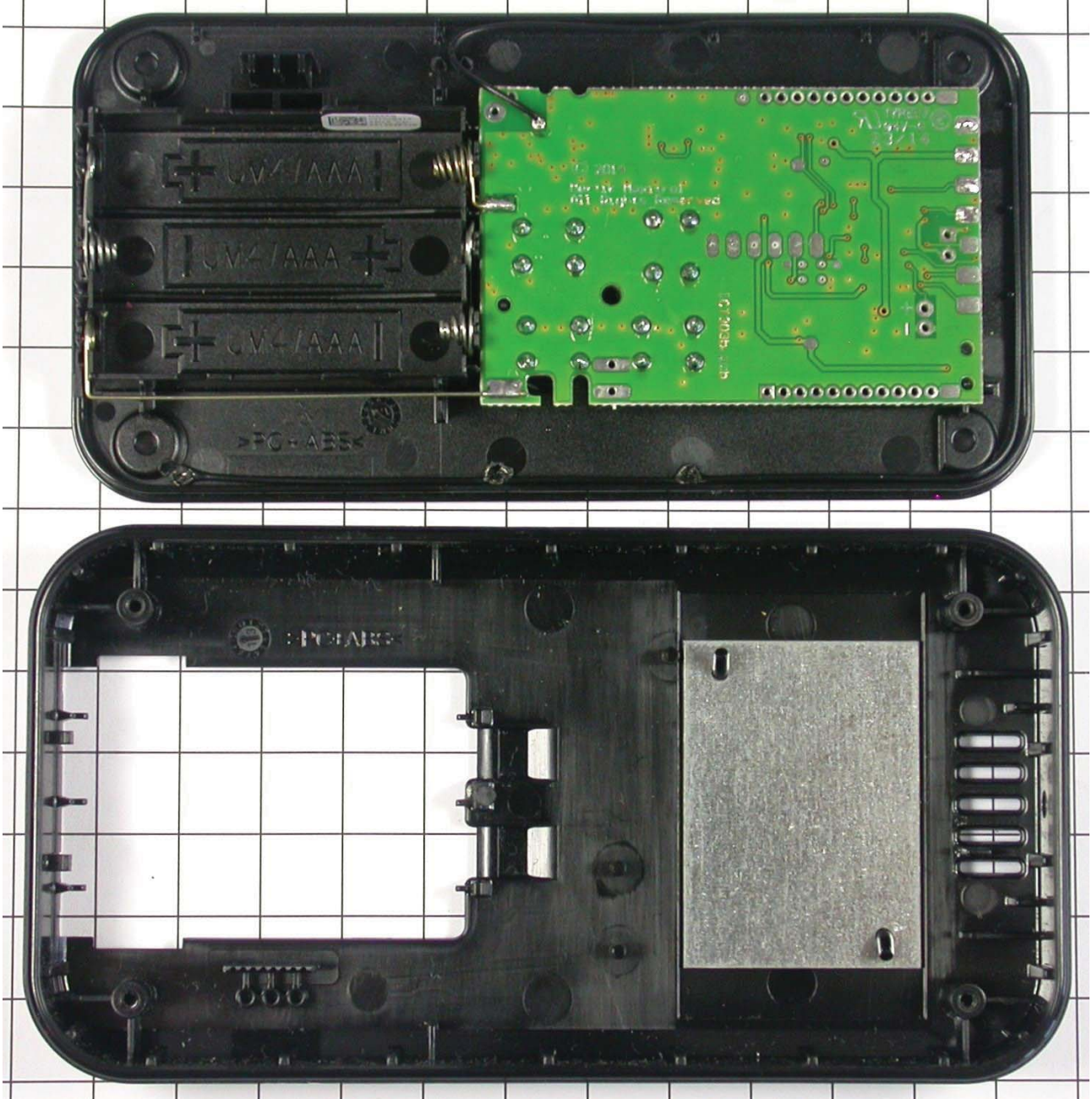
Front view



FCC ID: RTD-G6RH

IC: 4943A-G6RH

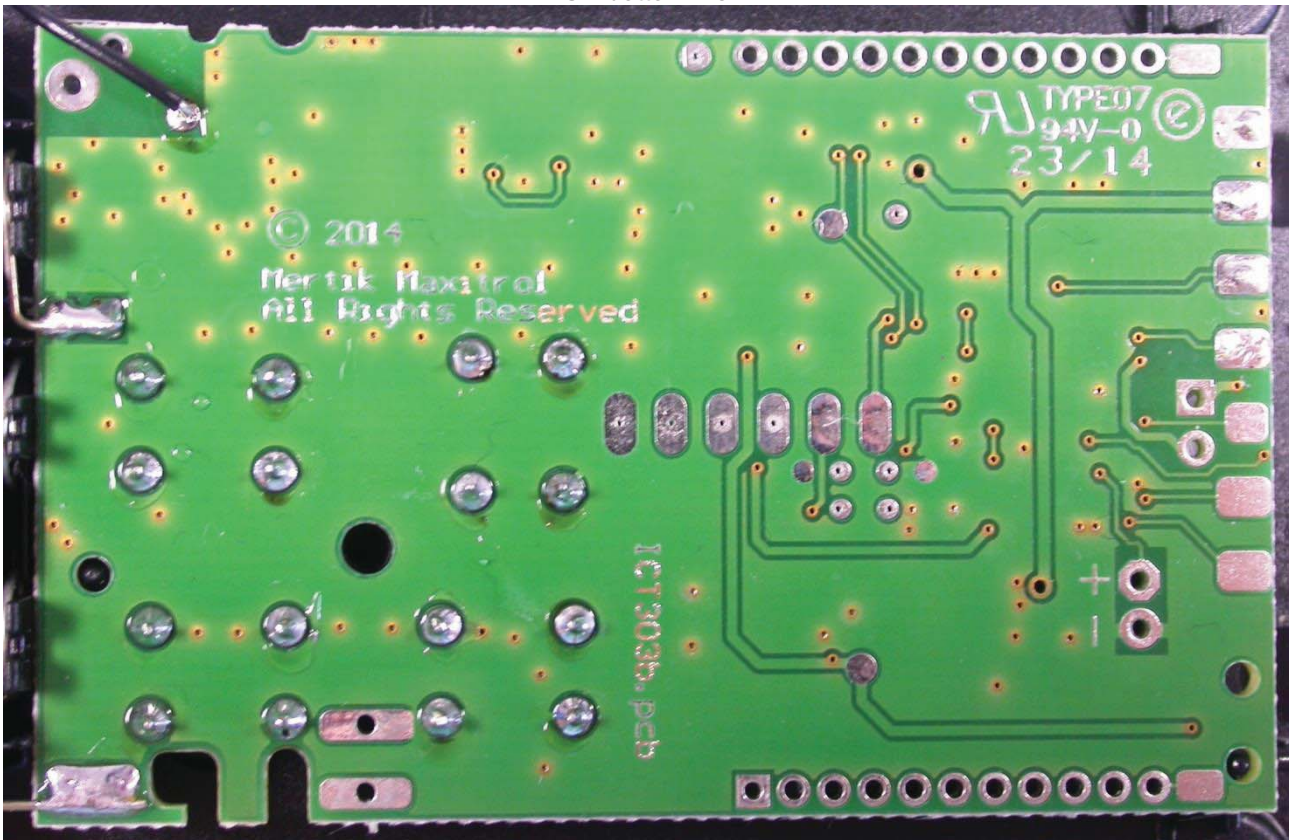
Internal view of the EuT



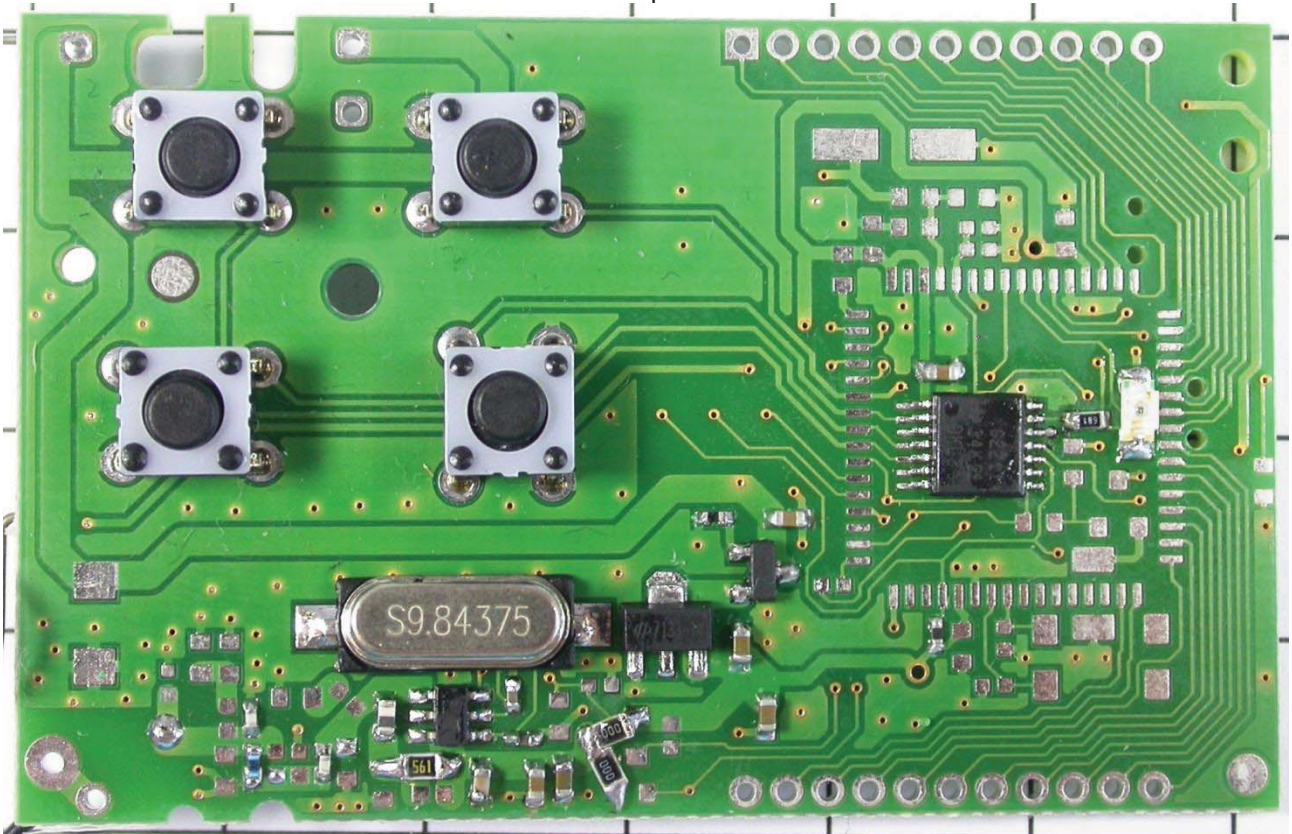
FCC ID: RTD-G6RH

IC: 4943A-G6RH

PCB bottom view



PCB top view



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### 3.2 Short description of the equipment under test (EUT)

The EUT is a battery-powered electronic remote ignition and control system for gas appliances with pilot burners and ODS systems.

### 3.3 Variants of the EUT

**G6R Transmitter Specification key**

Frequency		Handset		Design Handset		Customer Logo/Housing	
G6R-H	3 US (transmitter with antenna matching for 315 MHz)	Sx	S: Standard transmitter without display. Low cost transmitter with simple control functions  x: Software variant	Rubber switch	-z	z: customer logo	
	4 EU (transmitter with antenna matching for 433.92 MHz)					Fy	DN
		D/Tx	D/T: Transmitter with display. Transmitter with advanced features.  x: Software variant	y: Color			

**Hardware differences of the G6R-H transmitter**

	H3Sx-z	H3SxFy-z	H4Sx-z	H4SxFy-z	H3D/Tx-z	H3D/TxFy-z	H4D/Tx-z	H4D/TxFy-z	H4Tx-DN
Antenna matching	C40 [pF]	not connected		6.8	not connected		6.8		
	C8 [pF]	8.2		6.8	8.2		6.8		
	C7 [pF]	8.2		1.8	8.2		1.8		
	R2 [Ohm]	470		0	470		0		
Crystal [MHz]	9.84375		13.56		9.84375		13.56		
Antenna length [mm]	240		170		240		170		
Microcontroller with peripheries	MSP430G2211IPW14				ATMEGA169PA				
Display/Indicator	MY-5MHRD	EL11-21UYC/S53	MY-5MHRD	EL11-21UYC/S53	ADP-105 TBWP				
Housing	Standard	Flat	Standard	Flat	Standard	Flat	Standard	Flat	Custom housing
Battery holder	9V	3x AAA	9V	3x AAA	9V	3x AAA	9V	3x AAA	9V

#### G6R-H transmitter modifications

- The circuit and the layout of the standard transmitter (H3/4Sx) were implemented in the circuit and layout of the transmitter with display (H3/4D/Tx).
- Implemented new microcontrollers MSP430G2211IPW14 and ATMEGA169PA.
- Discrete modulator and transmitter were replaced by a chip solution.
- Added an optional battery holder (3xAAA).
- Existing reverse polarity protection was replaced by a FET-solution.

### 3.4 Operation frequency and channel plan

The EUT is a one channel transmitter, which is operating at 315 MHz.

### 3.5 Antennas

A lambda ¼ wire antenna is directly soldered to the PCB.

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### 3.6 Transmit operating modes

The equipment under test was operated during the measurement under the following conditions:

- cont. TX at 315 MHz

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- standby

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### 3.7 Power supply system utilised

Power supply voltage,  $V_{nom}$  : 9.0 V DC – G6R-H3TV4 & G6R-H3SN  
4.5 V DC – G6R-H3TV4FB & G6R-H3SNFB

### 3.8 Peripheral devices and interface cables

The following peripheral devices and interface cables are connected during the measurements:

- \_\_\_\_\_ Model : \_\_\_\_\_  
- \_\_\_\_\_ Model : \_\_\_\_\_  
- \_\_\_\_\_ Model : \_\_\_\_\_

### 3.9 Test Jig

No test jig is used.

### 3.10 Test software

No test software is used.



## 4 TEST ENVIRONMENT

### 4.1 Address of the test laboratory

**CSA Group Bayern GmbH  
Ohmstrasse 1-4  
94342 STRASSKIRCHEN  
GERMANY**

### 4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

### 4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor  $k = 2$ . The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 / 11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

### 4.4 Measurement Protocol for FCC

#### 4.4.1 GENERAL INFORMATION

##### 4.4.1.1 Justification

The equipment under test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

#### 4.4.1.2 General Standard information

The test methods used comply with CISPR Publication 22, EN 55022 - "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement" and with ANSI C63.4 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.4 and applying the CISPR 22 limits.

#### 4.4.2 **Conducted emission**

##### Description of measurement

The final level, expressed in dB $\mu$ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC limit or to the CISPR limit.

To convert between dB $\mu$ V and  $\mu$ V, the following conversions apply:

$$\begin{aligned} \text{dB}\mu\text{V} &= 20 \cdot \log(\mu\text{V}); \\ \mu\text{V} &= 10^{(\text{dB}\mu\text{V}/20)}; \end{aligned}$$

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a Line Impedance Stabilization Network (LISN) with 50 $\Omega$ /50  $\mu$ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum limit margin of a peak mode measurement appears to be less than 20 dB, the emissions are remeasured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

#### 4.4.3 **Radiated emission (electrical field 30 MHz - 1 GHz)**

##### Description of measurement

Spurious emissions from the EUT are measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarised antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection. Table top equipment is placed on a 1.0 X 1.5 m non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is established in accordance with ANSI C63.4. The interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so that they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screened room located outside the test area. The antenna is positioned 3, 10 or 30 metres horizontally from the EUT and is repeated vertically. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 metres and the EUT is rotated 360 degrees.

The final level in dB $\mu$ V/m is calculated by taking the reading from the EMI receiver (Level dB $\mu$ V) and adding the correction factors and cable loss factor (dB). The FCC or CISPR limit is subtracted from this result in order to provide the limit margin listed in the measurement protocol.

The resolution bandwidth setting:

30 MHz – 1000 MHz:            RBW: 120 kHz

Example:

Frequency	Level	+	Factor	=	Level	-	CISPR Limit	=
Delta								
(MHz)	(dB $\mu$ V)		(dB)		(dB $\mu$ V/m)		(dB $\mu$ V/m)	(dB)
719.0	75.0	+	32.6	=	107.6	-	110.0	= -2.4

**FCC ID: RTD-G6RH****IC: 4943A-G6RH****4.4.4 Radiated emission (electrical field 1 GHz - 40 GHz)**Description of measurement

Radiated emissions from the EUT are measured in the frequency range 1 GHz up to the maximum frequency as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and appropriate linearly polarized antennas. Table top equipment is placed on a 1.0 X 1.5 metre non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is following set out in ANSI C63.4. The interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screened room located outside the test area. Measurements are made in both the horizontal and vertical polarization planes in a fully anechoic room using a spectrum analyzer set to max peak detector function and a resolution 1 MHz and video bandwidth 3 MHz for peak and 10 Hz for average measurement. The conditions determined as worst case will then be used for the final measurements. When the EUT is larger than the beam width of the measuring antenna it will be moved over the surface for the four sides of the equipment. Where appropriate, the test distance may be reduced in order to detect emissions under better uncertainty and are calculated at the specified test distance.

## 5 TEST RESULTS

### 5.1 Conducted emissions

For test instruments and accessories used see section 6 Part A 4.

#### 5.1.1 Description of the test location

Test location: NONE

Remarks: Not applicable, because the EuT is battery powered and has no AC mains connection.

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## 5.2 Field strength of the fundamental wave

For test instruments and accessories used see section 6 Part CPR 2.

### 5.2.1 Description of the test location

Test location: OATS 1  
Test distance: 3 m

### 5.2.2 Photo documentation of the test set-up



**5.2.1 Applicable standard**

According to FCC Part 15C, Section 15.231(b):

The field strength of emissions from intentional radiators shall not exceed the effective field strength limits.

**5.2.2 Description of Measurement**

The radiated field strength of the fundamental wave from the EUT is measured using a tuned EMI-receiver. The setup of the EUT and the measurement procedure is in accordance to ANSI C63.4, Item 8.3. The EUT is measured in TX continuous mode, unmodulated, under normal conditions.

EMI test receiver settings:

30 MHz – 1000 MHz: RBW: 120 kHz

**5.2.3 Test result**
**Variant: G6R-H3TV4**

Frequency (MHz)	Level Pk (dB $\mu$ V/m)	Bandwidth (kHz)	Duty cycle factor (dB)	Level AV dB( $\mu$ V/m)	Limit 315 MHz dB( $\mu$ V/m)	Delta (dB)
315.00	83.8	120	-11.0	72.8	75.6	-2.8

**Variant: G6R-H3SN**

Frequency (MHz)	Level Pk (dB $\mu$ V/m)	Bandwidth (kHz)	Duty cycle factor (dB)	Level AV dB( $\mu$ V/m)	Limit 315 MHz dB( $\mu$ V/m)	Delta (dB)
315.00	85.9	120	-11.0	74.9	75.6	-0.7

**Variant: G6R-H3TV4FB**

Frequency (MHz)	Level Pk (dB $\mu$ V/m)	Bandwidth (kHz)	Duty cycle factor (dB)	Level AV dB( $\mu$ V/m)	Limit 315 MHz dB( $\mu$ V/m)	Delta (dB)
315.00	85.3	120	-11.0	74.3	75.6	-1.3

**Variant: G6R-H3SNFB**

Frequency (MHz)	Level Pk (dB $\mu$ V/m)	Bandwidth (kHz)	Duty cycle factor (dB)	Level AV dB( $\mu$ V/m)	Limit 315 MHz dB( $\mu$ V/m)	Delta (dB)
315.00	86.1	120	-11.0	75.1	75.6	-0.5

Limit according to FCC Section 15.231(b):

Frequency (MHz)	Field strength of fundamental @ 3m	
	( $\mu$ V/m)	dB( $\mu$ V/m)
40.66 – 40.70	2250	67
70 - 130	1250	62
130 - 174	1250 to 3750*	62 to 71.4*
174 - 260	3750	71.4
260 - 470	3750 to 12500*	71.4 to 81.9*
Above 470	12500	81.9

\*Linear interpolation

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The requirements are **FULFILLED**.

**Remarks:**

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### 5.3 Spurious emissions (magnetic field) 9 kHz – 30 MHz

For test instruments and accessories used see section 6 Part SER 1.

#### 5.3.1 Description of the test location

Test location: OATS 1  
Test distance: 3 m

#### 5.3.2 Photo documentation of the test set-up





**5.3.3 Applicable standard**

According to FCC Part 15C, Section 15.209:

The emissions from intentional radiators shall not exceed the field strength limits for spurious emissions in the table.

**5.3.4 Description of Measurement**

The magnetic field strength of spurious emission from the EUT is measured in an open area test site in the frequency range of 9 kHz to 30 MHz using a tuned receiver and a shielded loop antenna. The setup of the EUT and the measurement procedure is in accordance to ANSI C63.4, Item 8.3. The EUT is measured in TX continuous mode, unmodulated, under normal conditions.

According to Section 15.31 (f) (2): The measurement below 30 MHz is performed at a distance of 3 m. The results are extrapolated to the specified distance by using the square of an inverse linear distance extrapolation factor of 40 dB/decade.

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz:        RBW: 200 Hz  
150 kHz – 30 MHz:     RBW: 9 kHz

**5.3.5 Test result**
**All variants: G6R-H3TV4 / G6R-H3SN / G6R-H3TV4FB / G6R-H3SNFB**

Frequency (kHz)	Level QP (dB $\mu$ V/m)	Level AV (dB $\mu$ V/m)	Bandwidth (kHz)	Correction factor (dB)	Corrected level QP dB( $\mu$ V/m)	Corrected level AV dB( $\mu$ V/m)	Effective limit dB( $\mu$ V/m)	Delta (dB)
536.8 *	24.1	19.7	9.0	20	44.1	39.7	73.0	-33.3
1073.6 *	23.4	18.0	9.0	20	43.4	38.0	67.0	-29.0
1342.0 *	21.6	15.9	9.0	20	41.6	35.9	65.0	-29.1

\*Note: The level above means the noise level in the band. No emission could be detected.

Limit according to FCC Part 15C Section 15.209(a):

Frequency (MHz)	Field strength of spurious emissions		Measurement distance (metres)
	( $\mu$ V/m)	dB( $\mu$ V/m)	
0.009-0.490	2400/F(kHz)	--	300
0.490-1.705	24000/F (kHz)	--	30
1.705-30.0	30	29.5	30

The requirements are **FULFILLED**.

Remarks:

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FCC ID: RTD-G6RH

IC: 4943A-G6RH

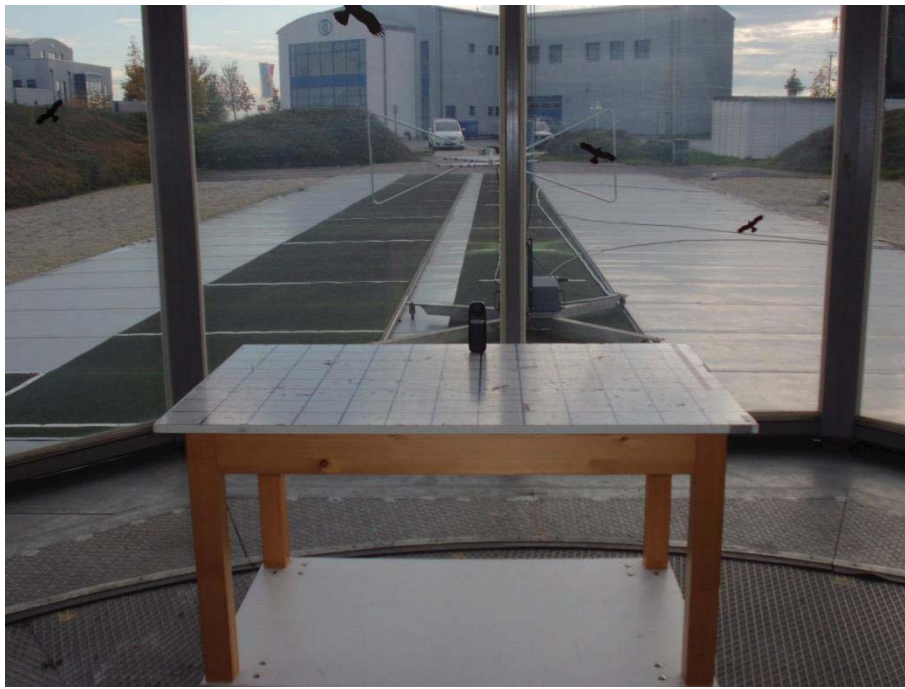
## 5.4 Spurious emissions radiated (electric field)

For test instruments and accessories used see section 6 Part SER 2, SER 3.

### 5.4.1 Description of the test location

Test location: OATS 1  
Test location: Anechoic chamber 2  
Test distance: 3 m

### 5.4.2 Photo documentation of the test set-up



FCC ID: RTD-G6RH

IC: 4943A-G6RH



**5.4.3 Applicable standard**

According to FCC Part 15C, Section 15.231(b), Section 15.209(a) and Section 15.205(a):  
The emissions from intentional radiators shall not exceed the effective field strength limits.

**5.4.4 Description of Measurement**

The radiated power of the spurious emission from the EUT is measured in a test setup following the procedures set out in ANSI C63.4, Item 8.3. If the emission level of the EUT in peak mode complies with the average limit, then testing will be stopped and peak values of the EUT will be reported, otherwise the emission will be measured in average mode again and reported.

Instrument settings:

30 MHz – 1000 MHz: RBW: 120 kHz

1000 MHz – 4500 MHz RBW: 1 MHz

Example:

Frequency (MHz)	Level (dB $\mu$ V)	+	Factor (dB)	=	Level dB( $\mu$ V/m)	-	Limit dB( $\mu$ V/m)	=	Delta (dB)
170.5	5	+	20	=	25	-	30	=	-5

**5.4.5 Test result f < 1 GHz**
**Variant: G6R-H3TV4**

Frequency (MHz)	Level QP (dB $\mu$ V)	Bandwidth (kHz)	Correct. factor (dB)	Corrected level dB( $\mu$ V/m)	Effective limit dB( $\mu$ V/m)	Delta (dB)
30.0 *	13.8	120	12.3	25.4	40.0	-14.6
150.0 *	-1.8	120	13.4	11.6	43.5	-31.9
300.0 *	-0.9	120	16.5	15.6	46.0	-30.4
450.0 *	-2.2	120	20.0	18.2	46.0	-27.8
630.0	23.7	120	24.2	47.9	55.6	-7.7
750.0 *	1.4	120	26.8	28.2	46.0	-17.8
945.0	8.9	120	29.4	38.3	55.6	-17.3
1000.0 *	-3.0	120	30.1	27.1	54.0	-26.9

\*Note: The level above means the noise level in the band. No emission could be detected.

**Variant: G6R-H3SN**

frequency (MHz)	Level QP (dB $\mu$ V)	Bandwidth (kHz)	Correct. factor (dB)	Corrected level dB( $\mu$ V/m)	Effective limit dB( $\mu$ V/m)	Delta (dB)
30.0 *	13.8	120	12.3	25.4	40.0	-14.6
150.0 *	-1.8	120	13.4	11.6	43.5	-31.9
300.0 *	-0.9	120	16.5	15.6	46.0	-30.4
450.0 *	-2.2	120	20.0	18.2	46.0	-27.8
630.0	23.0	120	24.6	47.6	55.6	-8.0
750.0 *	1.4	120	26.8	28.2	46.0	-17.8
945.0	11.5	120	29.4	40.9	55.6	-14.7
1000.0 *	-3.0	120	30.1	27.1	54.0	-26.9

\*Note: The level above means the noise level in the band. No emission could be detected.

**FCC ID: RTD-G6RH**
**IC: 4943A-G6RH**
**Variant: G6R-H3TV4FB**

frequency (MHz)	Level QP (dB $\mu$ V)	Bandwidth (kHz)	Correct. factor (dB)	Corrected level dB( $\mu$ V/m)	Effective limit dB( $\mu$ V/m)	Delta (dB)
30.0 *	13.8	120	12.3	25.4	40.0	-14.6
150.0 *	-1.8	120	13.4	11.6	43.5	-31.9
300.0 *	-0.9	120	16.5	15.6	46.0	-30.4
450.0 *	-2.2	120	20.0	18.2	46.0	-27.8
630.0	16.7	120	24.6	41.3	55.6	-14.3
750.0 *	1.4	120	26.8	28.2	46.0	-17.8
945.0	11.7	120	29.4	41.1	55.6	-14.5
1000.0 *	-3.0	120	30.1	27.1	54.0	-26.9

\*Note: The level above means the noise level in the band. No emission could be detected.

**Variant: G6R-H3SNFB**

frequency (MHz)	Level QP (dB $\mu$ V)	Bandwidth (kHz)	Correct. factor (dB)	Corrected level dB( $\mu$ V/m)	Effective limit dB( $\mu$ V/m)	Delta (dB)
30.0 *	13.8	120	12.3	25.4	40.0	-14.6
150.0 *	-1.8	120	13.4	11.6	43.5	-31.9
300.0 *	-0.9	120	16.5	15.6	46.0	-30.4
450.0 *	-2.2	120	20.0	18.2	46.0	-27.8
630.0	17.7	120	24.2	41.9	55.6	-13.7
750.0 *		120			46.0	
945.0	11.3	120	28.8	40.1	55.6	-15.5
1000.0 *	-3.0	120	30.1	27.1	54.0	-26.9

\*Note: The level above means the noise level in the band. No emission could be detected.

**5.4.6 Test result f > 1 GHz**
**Variant: G6R-H3TV4**

Frequency (MHz)	L: PK (dB $\mu$ V)	Duty Cycle (dB)	L: AV (dB $\mu$ V)	Bandwidth (kHz)	Correct. (dB)	L: PK dB( $\mu$ V/m)	L: AV dB( $\mu$ V/m)	Limit AV dB( $\mu$ V/m)	Delta (dB)
1259.9	68.5	-11.0	57.5	1000	-18.8	49.7	38.7	55.6	-16.9
1575.3	60.1	-11.0	49.1	1000	-21.2	38.9	27.9	54.0	-26.1
1889.9	63.1	-11.0	52.1	1000	-16.0	47.1	36.1	55.6	-19.5
2519.9	59.0	-11.0	48.0	1000	-13.8	45.2	34.2	55.6	-21.4
2834.9	58.2	-11.0	47.2	1000	-13.4	44.8	33.8	54.0	-20.2
3150.3	61.7	-11.0	50.7	1000	-13.3	48.4	37.4	54.0	-16.6

**Variant: G6R-H3SN**

Frequency (MHz)	L: PK (dB $\mu$ V)	Duty Cycle (dB)	L: AV (dB $\mu$ V)	Bandwidth (kHz)	Correct. (dB)	L: PK dB( $\mu$ V/m)	L: AV dB( $\mu$ V/m)	Limit AV dB( $\mu$ V/m)	Delta (dB)
1259.9	68.5	-11.0	57.5	1000	-18.8	49.7	38.7	55.6	-16.9
1575.3	63.3	-11.0	52.3	1000	-21.2	42.1	31.1	54.0	-22.9
1889.9	59.0	-11.0	48.0	1000	-16.0	43.0	32.0	55.6	-23.6
2519.9	58.6	-11.0	47.6	1000	-13.8	44.8	33.8	55.6	-21.8
2834.9	57.5	-11.0	46.5	1000	-13.4	44.1	33.1	54.0	-20.9
3150.3	60.9	-11.0	49.9	1000	-13.3	47.6	36.6	54.0	-17.4

**FCC ID: RTD-G6RH**
**IC: 4943A-G6RH**
**Variant: G6R-H3TV4FB**

Frequency (MHz)	L: PK (dB $\mu$ V)	Duty Cycle (dB)	L: AV (dB $\mu$ V)	Bandwidth (kHz)	Correct. (dB)	L: PK dB( $\mu$ V/m)	L: AV dB( $\mu$ V/m)	Limit AV dB( $\mu$ V/m)	Delta (dB)
1259.9	59.0	-11.0	48.0	1000	-18.8	40.2	29.2	55.6	-26.4
1575.3	69.4	-11.0	58.4	1000	-21.2	48.2	37.2	54.0	-16.8
1889.9	69.6	-11.0	58.6	1000	-16.0	53.6	42.6	55.6	-13.0
2519.9	61.3	-11.0	50.3	1000	-13.8	47.5	36.5	55.6	-19.1
2834.9	57.5	-11.0	46.5	1000	-13.4	44.1	33.1	54.0	-20.9
3150.3	59.4	-11.0	48.4	1000	-13.3	46.1	35.1	54.0	-18.9

**Variant: G6R-H3SNFB**

Frequency (MHz)	L: PK (dB $\mu$ V)	Duty Cycle (dB)	L: AV (dB $\mu$ V)	Bandwidth (kHz)	Correct. (dB)	L: PK dB( $\mu$ V/m)	L: AV dB( $\mu$ V/m)	Limit AV dB( $\mu$ V/m)	Delta (dB)
1259.9	61.5	-11.0	50.5	1000	-18.8	42.7	31.7	55.6	-23.9
1575.3	67.0	-11.0	56.0	1000	-21.2	45.8	34.8	54.0	-19.2
1889.9	70.1	-11.0	59.1	1000	-16.0	54.1	43.1	55.6	-12.5
2519.9	58.4	-11.0	47.4	1000	-13.8	44.6	33.6	55.6	-22.0
2834.9	57.8	-11.0	46.8	1000	-13.4	44.4	33.4	54.0	-20.6
3150.3	61.5	-11.0	50.5	1000	-13.3	48.2	37.2	54.0	-16.8

Limit according to FCC Section 15.231(b), Section 15.209(a) and Section 15.205(a):

Frequency (MHz)	Field strength of spurious		Effective limit for 315 MHz	
	( $\mu$ V/m)	dB( $\mu$ V/m)	( $\mu$ V/m)	dB( $\mu$ V/m)
40.66 – 40.70	225	47		
70 - 130	125	42		
130 - 174	125 to 375*	42 to 51.4*		
174 - 260	375	51,4		
<b>260 - 470</b>	<b>375 to 1250*</b>	<b>51.4 to 61.9*</b>	604	55.6
Above 470	1250	61.9		

\*Linear interpolation

Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in the table above or to the general limits shown in the table below according to § 15.209, whichever limit permits a higher field strength.

Frequency (MHz)	15.209 Limits ( $\mu$ V/m)	15.209 Limits dB( $\mu$ V/m)
30 - 88	100	40
88 - 216	150	43,5
<b>216 - 960</b>	<b>200</b>	<b>46</b>
Above 960	500	54

Additionally there is a limit according to §15.35(b) on the radio frequency emissions, as measured with a peak detector, corresponding to 20 dB above the maximum permitted average limits.

**FCC ID: RTD-G6RH**
**IC: 4943A-G6RH**

Restricted bands of operation according to FCC Part 15C, Section 15.205(a):

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.41425 – 8.41475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4	3600 – 4400	Above 38.6

The requirements are **FULFILLED**.

**Remarks:** The measurement was performed up to the 10<sup>th</sup> harmonic.

For detailed test results please see to following test protocols.

FCC ID: RTD-G6RH

IC: 4943A-G6RH

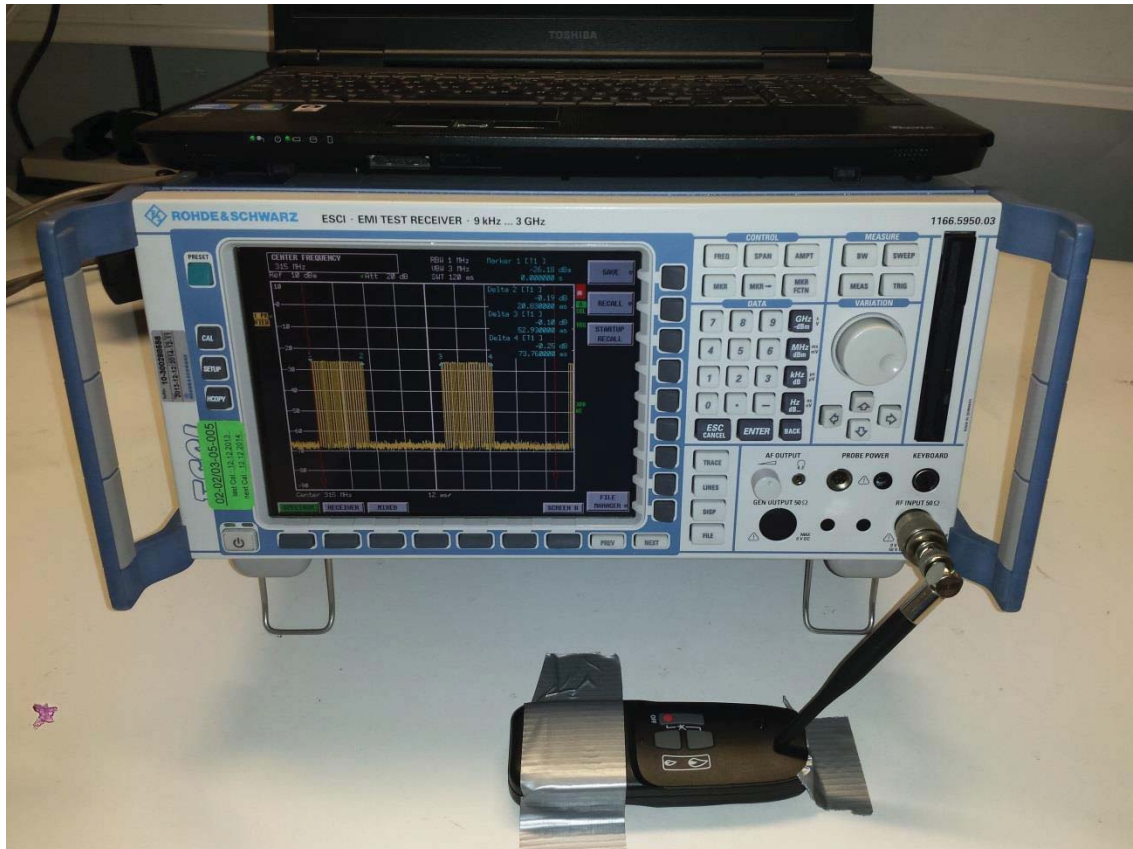
## 5.5 Correction for pulse operation (duty cycle)

For test instruments and accessories used see section 6 Part DC.

### 5.5.1 Description of the test location

Test location: Shielded Room S4

### 5.5.2 Photo documentation of the test set-up



### 5.5.3 Applicable standard

According to FCC Part 15C, Section 15.35(c):

The emissions from intentional radiators shall not exceed the effective field strength limits.

### 5.5.4 Description of Measurement

The Duty cycle factor (dB) is calculated applying the following formula:

$$KE = 20 \log ((t_{iB} * p) / T_w)$$

$KE$ :	pulse operation correction factor	(dB)
$t_{iw}$	pulse duration for one complete pulse track	(ms)
$t_{iB}$	pulse duration for one pulse	( $\mu$ s)
$T_w$	a period of the pulse track	(ms)
$p$	number of pulses in one train	



**5.5.5 Test result**

$$KE = 20 \log ((t_{iB} * p) / T_w) = 20 \log (0.6125 * 23 * 2 / 100) = -21.33 \text{ dB};$$

Duty cycle	$t_w$ (ms)	$T_w$ (ms)	$t_{iB}$ ( $\mu$ s)	$p$	$KE$ (dB)
Real Duty cycle					
Within 100 ms	-	100	612.5	23 * 2	-11.0

**Remarks:** The pulse train ( $T_w$ ) exceeds 100 ms, therefore the duty cycle have been calculated by averaging the sum of the pulse widths over the 100 ms width with the highest average value.

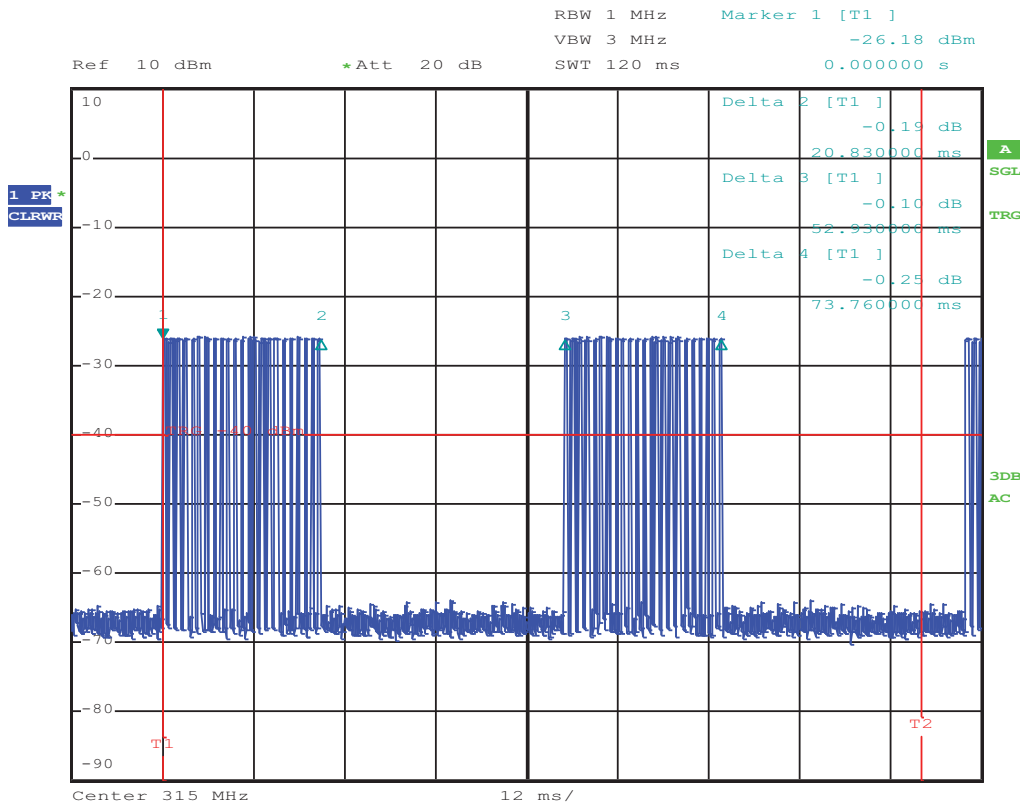
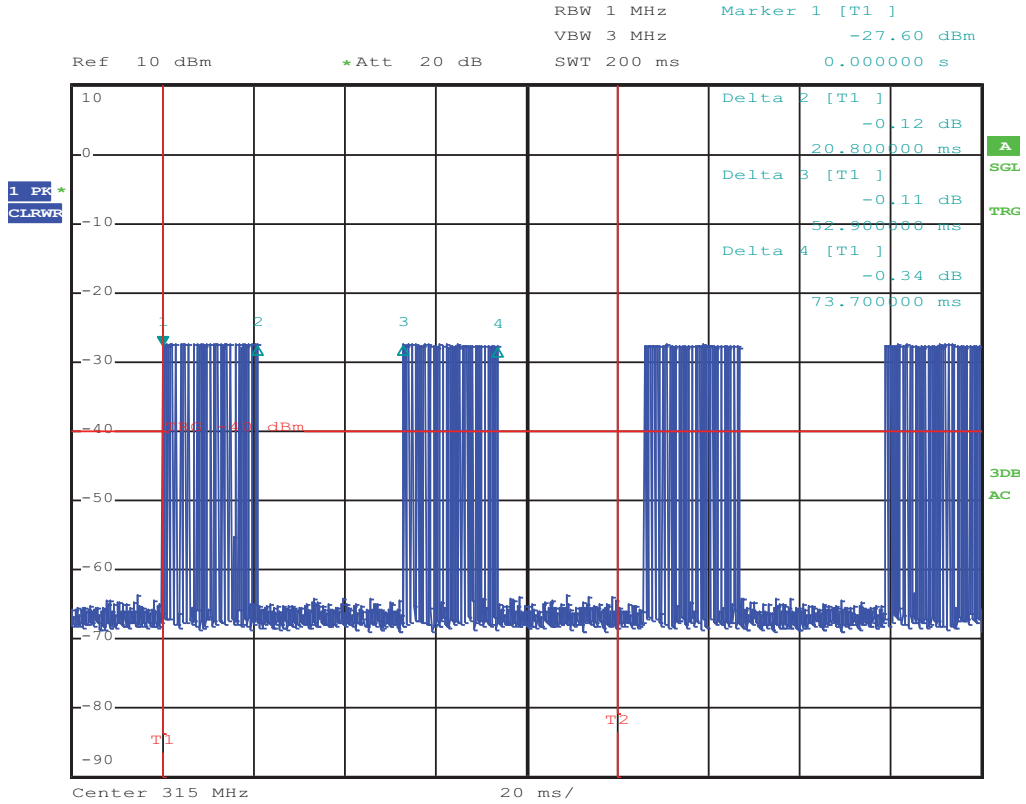
For detailed results, please see the test protocol below.

Within 100 ms there are 2 blocks with 23 on / off signals.

Each single puls was calculated with a worst case time of 612.5  $\mu$ s.

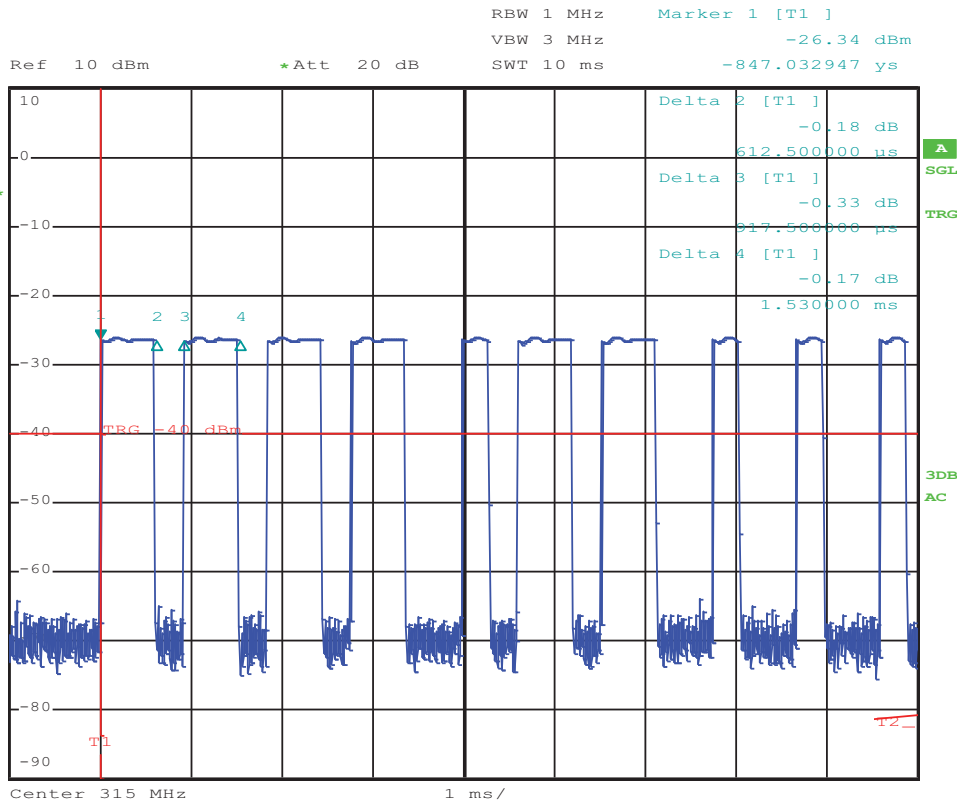
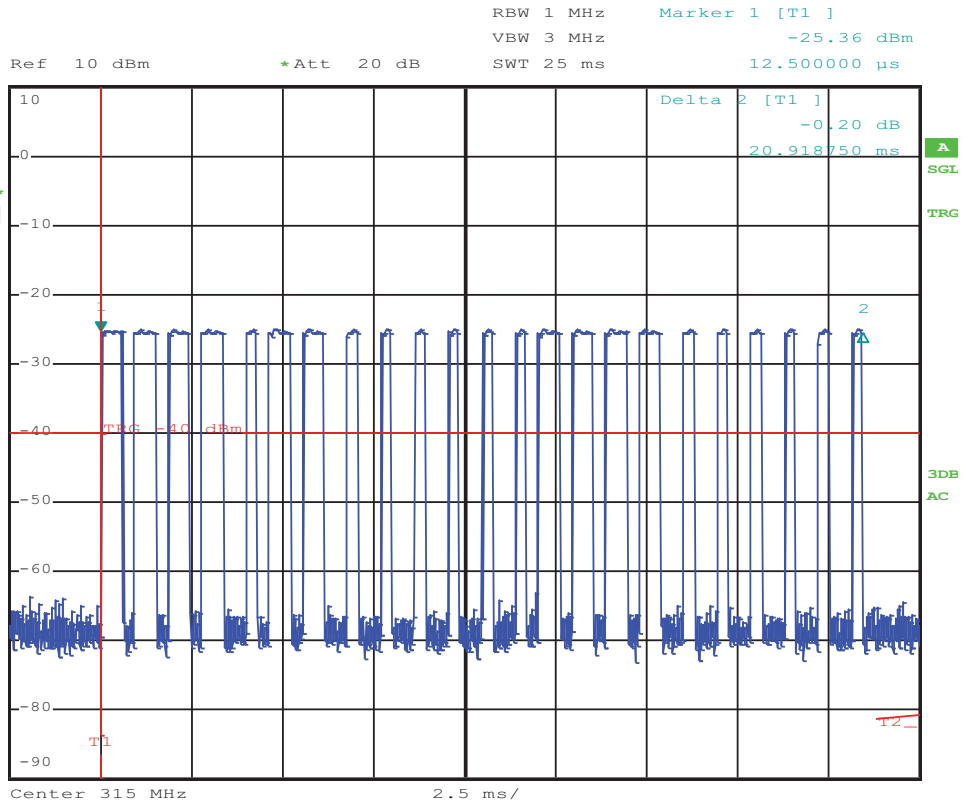
5.5.6 Test protocol

Correction for pulse operation (duty cycle)  
FCC Part 15C, Section 15.35(c)



FCC ID: RTD-G6RH

IC: 4943A-G6RH



FCC ID: RTD-G6RH

IC: 4943A-G6RH

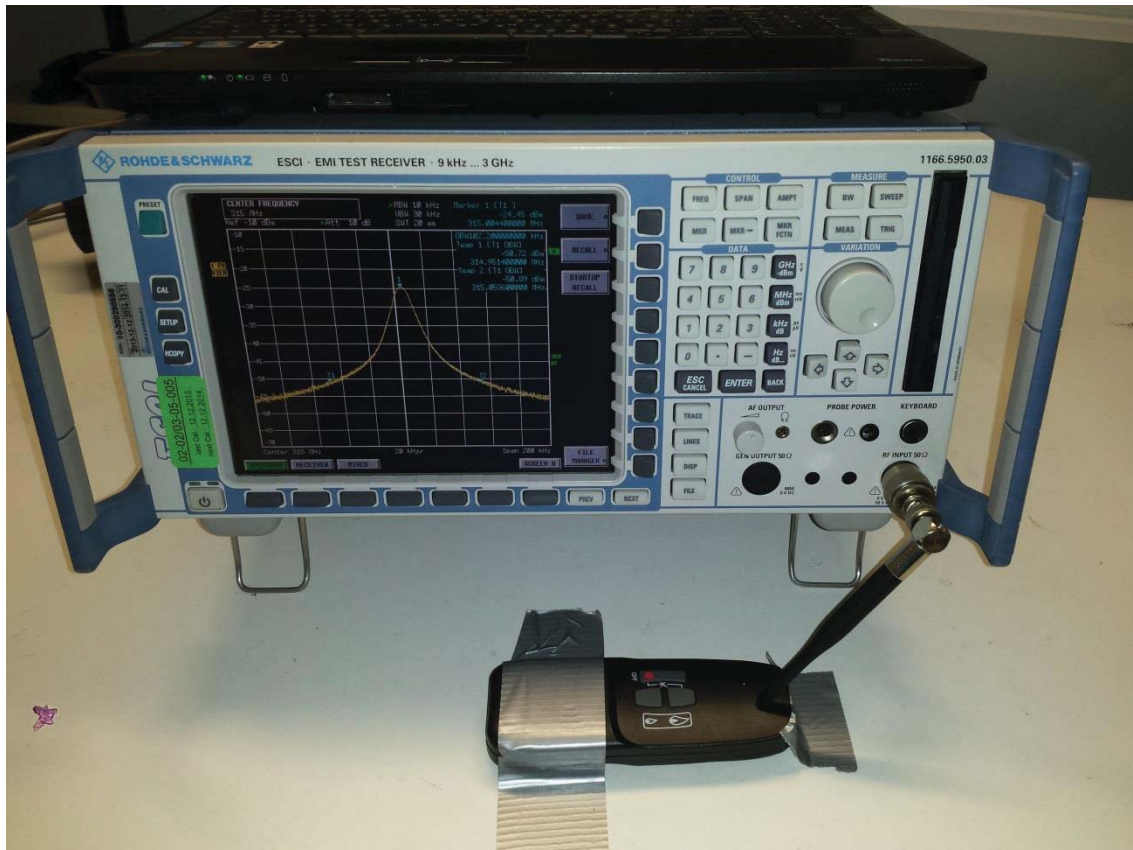
## 5.6 Emission bandwidth and OBW99

For test instruments and accessories used see section 6 Part MB.

### 5.6.1 Description of the test location

Test location: Shielded Room S4

### 5.6.2 Photo documentation of the test set-up



### 5.6.3 Applicable standard

According to FCC Part 15C, Section 15.231(c):  
The bandwidth of the emission shall not exceed the effective limits.

### 5.6.4 Description of Measurement

The measurement is performed radiated using a spectrum analyser. The analyser span is set wide enough to capture the most of the power envelope of the signal. The function "20-dB-down" (OBW 99%) is used to determine the BW.

Analyser settings:

Span: 200 kHz,                      RBW: 10 kHz                      VBW: 30 kHz                      Detector: peak;

**FCC ID: RTD-G6RH**
**IC: 4943A-G6RH**
**5.6.5 Test result**

Centre $f$ (MHz)	20dB bandwidth $f_1$	20dB bandwidth $f_2$	Measured EBW (MHz)	Limit $(f \cdot 0.0025)$ (MHz)	Limit $f \cdot 0.005$
315.00	314.9797	315.0291	0.0494	0.7875	1.5750

Centre $f$ (MHz)	99% bandwidth $f_1$	99% bandwidth $f_2$	Measured OBW (MHz)	Limit $(f \cdot 0.0025)$ (MHz)	Limit $f \cdot 0.005$
315.00	314.9514	315.0536	0.1022	0.7875	1.5750

Limit according to FCC Part 15C Section 15.231(c):

Frequency (MHz)	20 dB BW limit dependent of the carrier (%)
70 – 900	0.25
above 900	0.50

The bandwidth of the emission shall be no wider than 0.25% of the centre frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

The requirements are **FULFILLED**.

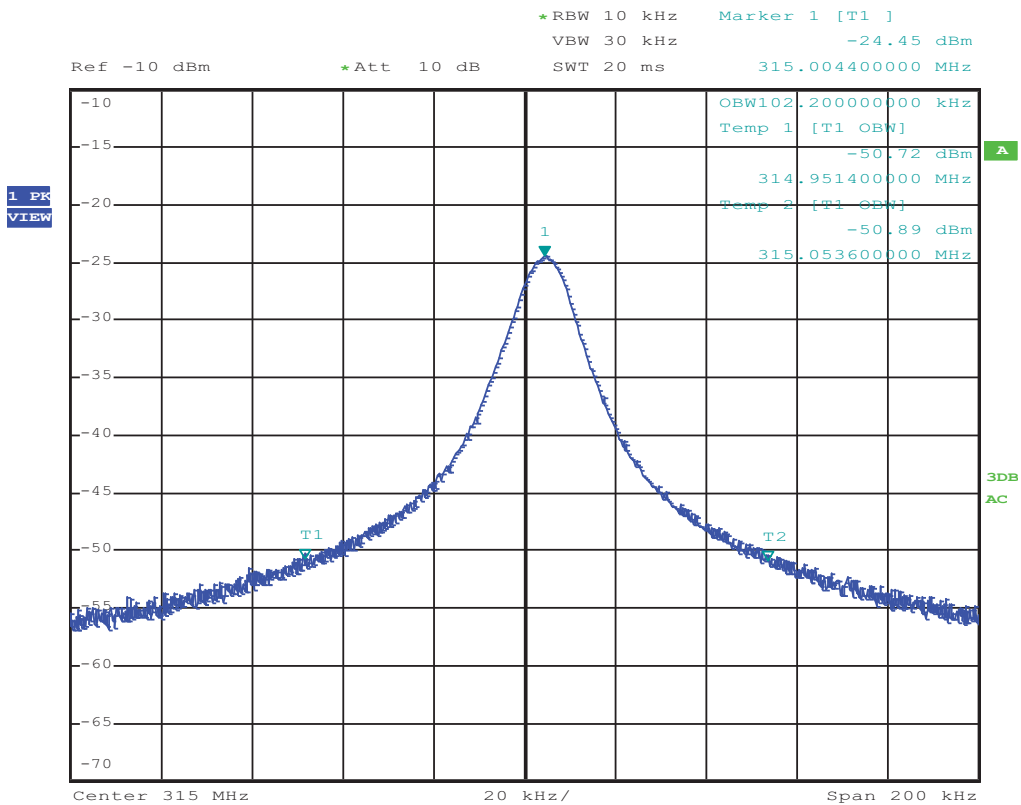
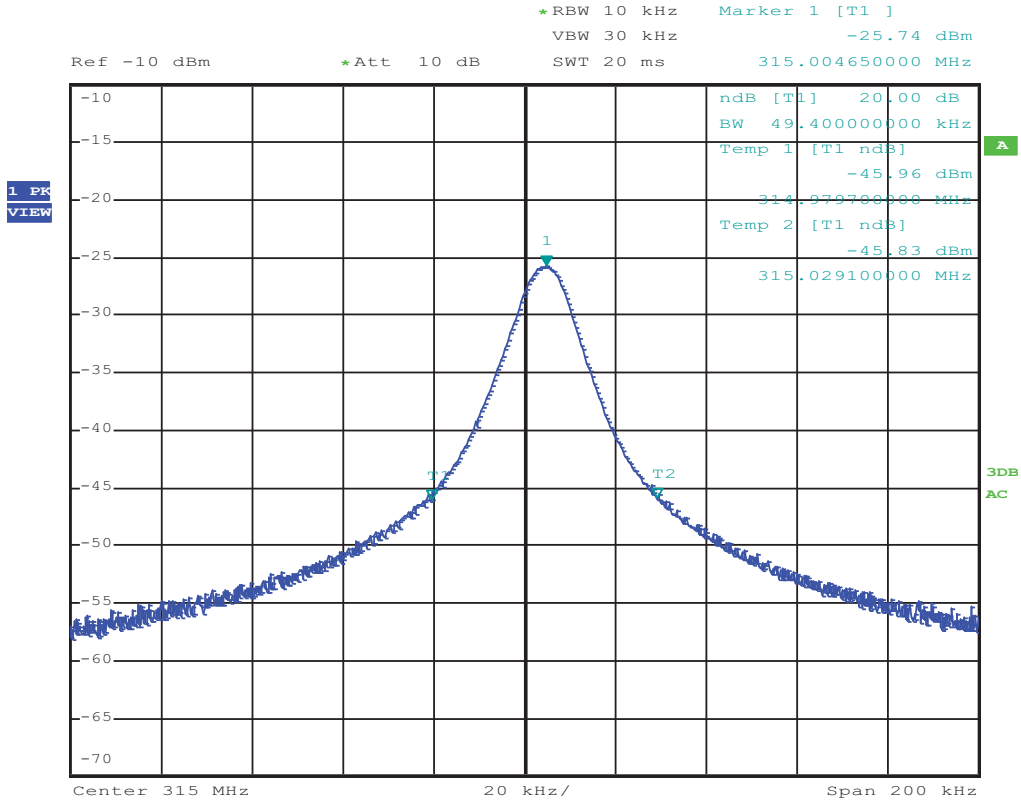
**Remarks:** For detailed results, please see the test protocol below.

FCC ID: RTD-G6RH

IC: 4943A-G6RH

5.6.6 Test protocol

Emission bandwidth  
FCC Part 15C, Section 15.231(c)



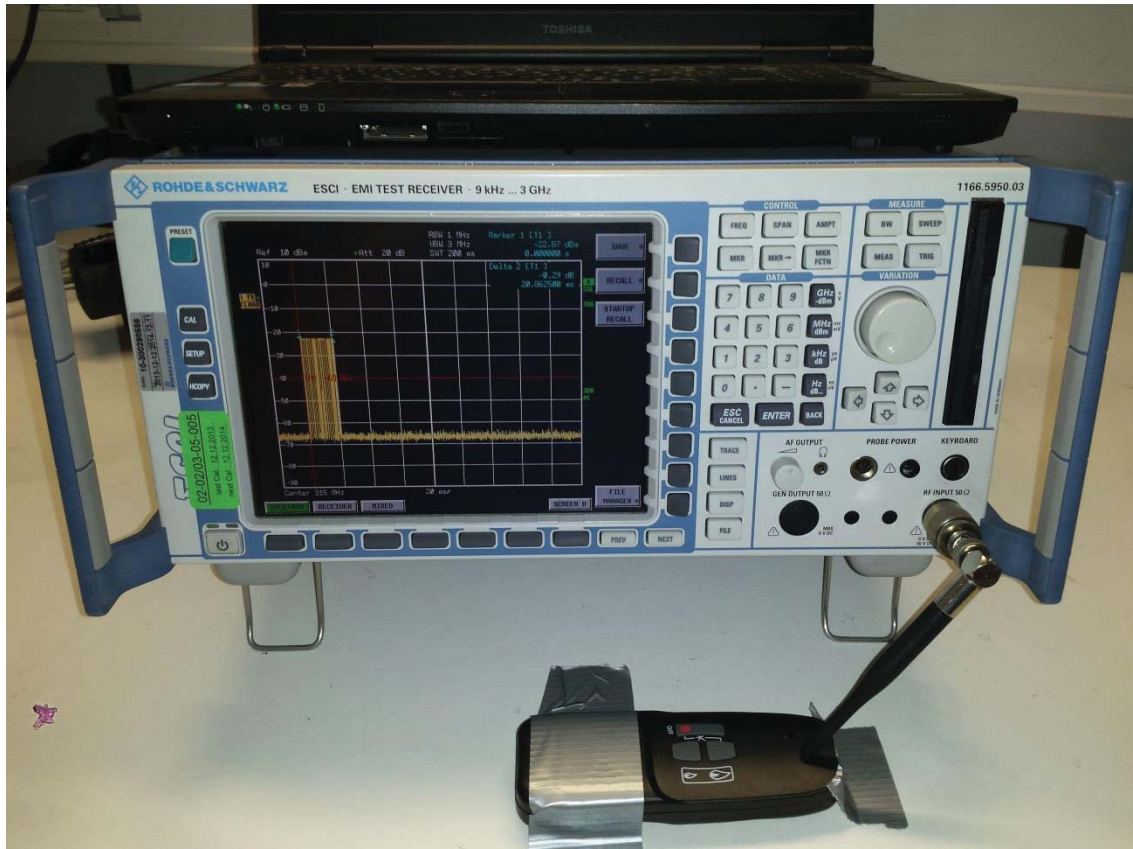
## 5.7 Signal deactivation

For test instruments and accessories used see section 6 Part MB.

### 5.7.1 Description of the test location

Test location: Shielded Room S4

### 5.7.2 Photo documentation of the test set-up



### 5.7.3 Applicable standard

According to FCC Part 15C, Section 15.231(a)(1):

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter not exceeding the defined on time limit.

### 5.7.4 Description of Measurement

The duration of transmission is measured with the spectrum analyzer. The sweep points were set to maximum for higher the time resolution. The signal is modulated; the marker of the analyzer is set to maximum amplitude at normal temperature and zero span. The analyser was set to single sweep and triggered on the button, the marker was set to the edges in order to measure the duration time and than recorded.

FCC ID: RTD-G6RH

IC: 4943A-G6RH

## 5.7.5 Test result

Duration of transmission (ms)	Duration after releasing the button (ms)
20.8	20.8

Limit according to FCC Part 15C, Section 15.231(a):

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released and a transmitter activated automatically shall cease transmission within 5 seconds after activation.

The requirements are **FULFILLED**.

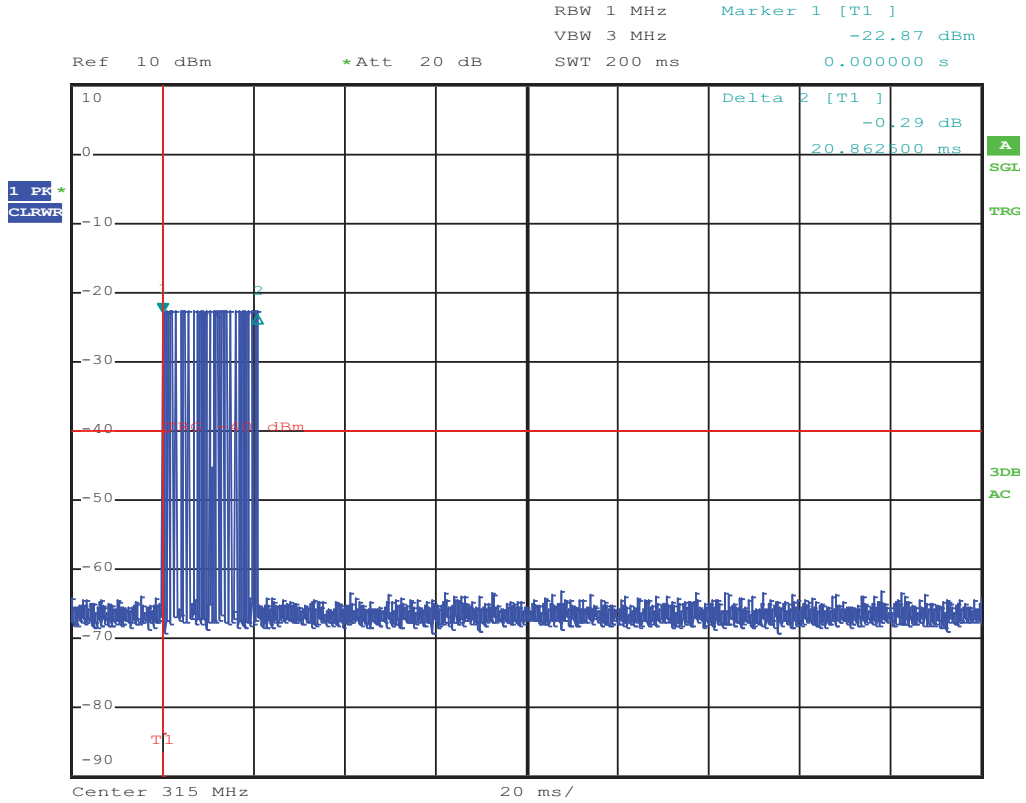
**Remarks:** For detailed test results, please see the test protocol below.

20.8 ms after key releasing the transmitter stops.



5.7.6 Test protocol

**Signal deactivation**  
FCC Part 15C, Section 15.231(a)



## **6 USED TEST EQUIPMENT AND ACCESSORIES**

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

<b>Test ID</b>	<b>Model Type</b>	<b>Equipment No.</b>	<b>Next Calib.</b>	<b>Last Calib.</b>	<b>Next Verif.</b>	<b>Last Verif.</b>
CPR 2	ESVS 30	02-02/03-05-006	03/07/2015	03/07/2014		
	VULB 9168	02-02/24-05-005	08/04/2015	08/04/2014	04/03/2015	04/09/2014
	S10162-B	02-02/50-05-031				
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
DC	ESCI	02-02/03-05-005	12/12/2014	12/12/2013		
	RF Antenna	02-02/24-05-032				
MB	ESCI	02-02/03-05-005	12/12/2014	12/12/2013		
	RF Antenna	02-02/24-05-032				
SER 1	FMZB 1516	01-02/24-01-018			13/02/2015	13/02/2014
	ESCI	02-02/03-05-005	12/12/2014	12/12/2013		
	S10162-B	02-02/50-05-031				
	KK-EF393-21N-16	02-02/50-05-033				
	NW-2000-NB	02-02/50-05-113				
SER 2	ESVS 30	02-02/03-05-006	03/07/2015	03/07/2014		
	VULB 9168	02-02/24-05-005	08/04/2015	08/04/2014	04/03/2015	04/09/2014
	S10162-B	02-02/50-05-031				
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
SER 3	FSP 40	02-02/11-11-001	02/10/2015	02/10/2014		
	AFS5-12001800-18-10P-6	02-02/17-06-002				
	AFS4-01000400-10-10P-4	02-02/17-13-002				
	AMF-4F-04001200-15-10P	02-02/17-13-003				
	3117	02-02/24-05-009	07/05/2015	07/05/2014		
	WHJS 1000-10EE	02-02/50-05-070				
	Sucoflex N-2000-SMA	02-02/50-05-075				
	SF104/11N/11N/1500MM	02-02/50-13-015				