

TEST REPORT

Test Report No.: 1-2147-01-04/10-A

Testing Laboratory

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Accredited Test Laboratory:

The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025
DAR registration number: DGA-PL-176/94-D1

Area of Testing: Radio Satellite Communications

Applicant

VALEO Security Systems - DAS
Europarc - 42, rue Le Corbusier
F-94042 CRETEIL/France
Contact: Bruno Liagre
e-mail: bruno.liagre@valeo.com
Phone: +33-156715459

Manufacturer

VALEO Security Systems - DAS
Europarc - 42, rue Le Corbusier
F-94042 CRETEIL/France

Test Standard/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I-Federal Communications Commission subchapter A - general, Part 15-Radio frequency devices
RSS - 210 Issue 7	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	Keyless entry system
Model name:	A05TAA

FCC ID:	N5F- A05TAA
IC:	3248A-A05TAA
Frequency [MHz]:	313.85 MHz
Power supply:	3V DC by Li.ion battery
Temperature range:	-20 °C to +55 °C



Test performed:

Test Report authorised:

2010-07-21 i.A. Michael Berg
Daniel Muyunga

2010-07-21 Jakob Reschke

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2 General Information

2.1 Notes

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM ICT Services GmbH.

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2010-04-22
Date of receipt of test item:	2010-04-26
Start of test:	2010-04-26
End of test:	2010-07-08
Person(s) present during the test:	

3 Test standard/s

Test Standard	Version	Test Standard Description
47 CFR Part 15	2008-07	Title 47 of the Code of Federal Regulations; Chapter I-Federal Communications Commission subchapter A - general, Part 15-Radio frequency devices
RSS - 210 Issue 7	2007-06	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

4 Test Environment

Temperature:	T _{nom}	+23 °C during room temperature tests
	T _{max}	+55 °C during high temperature test
	T _{min}	-20 °C during low temperature test
Relative humidity content:		39 %
Air pressure:		not relevant for this kind of testing
Power supply:	V _{nom}	3 V DC by Li.ion battery
	V _{max}	V
	V _{min}	V

4.1 RSP100 Test Report Cover Sheet / Performance Test Data

Test Report Number	:	1-2147-01-04/10
Equipment Model Number	:	A05TAA
Certification Number	:	3248A-A05TAA
Manufacturer (complete Address)	:	VALEO Security Systems - DAS Europarc - 42, rue Le Corbusier F-94042 CRETEIL / France
Tested to radio standards specification no.	:	RSS 210, Issue 7, Annex 8
Open Area Test Site IC No.	:	IC 3462C-1
Frequency Range or fixed frequency	:	313.85 MHz
Field Strength [dB μ V/m] (at which distance)	:	64.4 @ 3 meters
Occupied bandwidth (99%-BW)	:	176 kHz
Type of modulation	:	FSK
Emission Designator (TRC-43)	:	176KF1D
Antenna Information	:	Integral antenna
Transmitter Spurious (worst case)	:	45.5 dB μ V/m @ 3m Peak
Receiver Spurious (worst case) [μ V/m]	:	34.5 dB μ V/m @ 3m (noise floor)

ATTESTATION:

DECLARATION OF COMPLIANCE:

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

Laboratory Manager:

2010-07-22

Date

Daniel Muyunga

Name

i.A. Michael Berg

Signature

5 Test item

Kind of test item :	Keyless entry system
Type identification :	A05TAA
S/N serial number :	40638,40636,40703,
HW hardware status :	3.0
SW software status :	1.2
Frequency Range or fixed frequency :	313.85 MHz
Type of Modulation :	FSK
Number of channels :	1
Antenna :	Integral antenna
Power Supply :	3 V DC by Li.ion battery
Temperature Range :	-20°C to +55 °C

Max. field strength radiated:

64.4 dBµV/m @ 3 meters

6 Test Laboratories sub-contracted

None

7 Summary of measurement results



No deviations from the technical specifications were ascertained



There were deviations from the technical specifications ascertained

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15 RSS 210, Issue 7, Annex 8	Passed	2010-07-22	-/-

Test Specification Clause	Test Case	Temperature Conditions	Power Source Voltages	Pass	Fail	NA	NP	Results (max.)
§ 15.35 (c)/ RSS-GEN Issue 2 Section 4.5	Timing of the transmitter (Duty cycle correction factor)	Nominal	Nominal	☒	☐	☐	☐	complies
§ 15.231 (a) (1)/ RSS-210 Issue 7 Section A1.1.1	Switch off time	Nominal	Nominal	☒	☐	☐	☐	complies
§ 15.231 (3) (c)/ RSS-210 Issue 7 Section A1.1.3	Emission Bandwidth	Nominal	Nominal	☒	☐	☐	☐	
§ 15.231 (b)/ RSS-210 Issue 7 Section A1.1.2 / 2.7 Table 4	Fieldstrength of Fundamental	Nominal	Nominal	☒	☐	☐	☐	
§ 15.209/ RSS-210 Issue 7 Section 2.7 Table 4	Fieldstrength of harmonics and spurious	Nominal	Nominal	☒	☐	☐	☐	complies
§ 15.209/ RSS-GEN Issue Section 6	Receiver spurious emissions (radiated)	Nominal	Nominal	☒	☐	☐	☐	complies

Note: NA = Not Applicable; NP = Not Performed

8 RF measurement testing

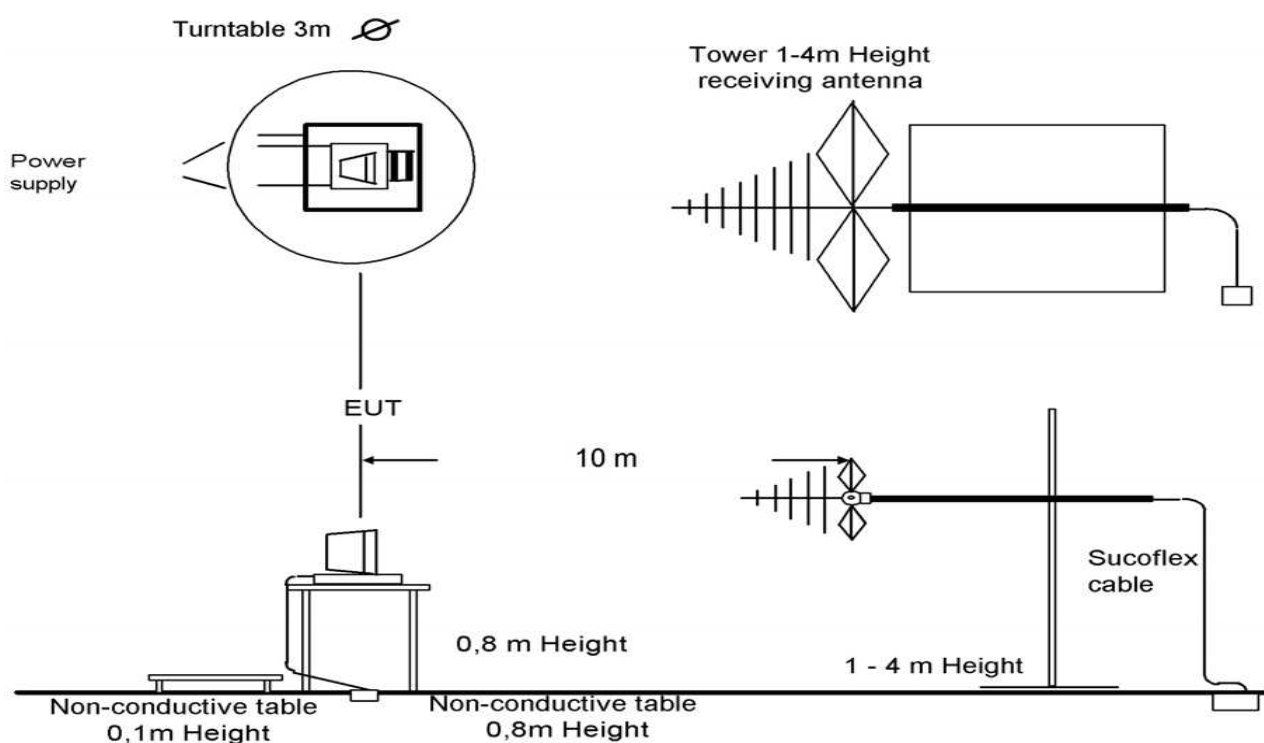
8.1 Description of test setup

8.1.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63-4-2003 clause 4.2.

Antennas are confirmed with ANSI C63.2-1996 item 15.

Semi anechoic chamber



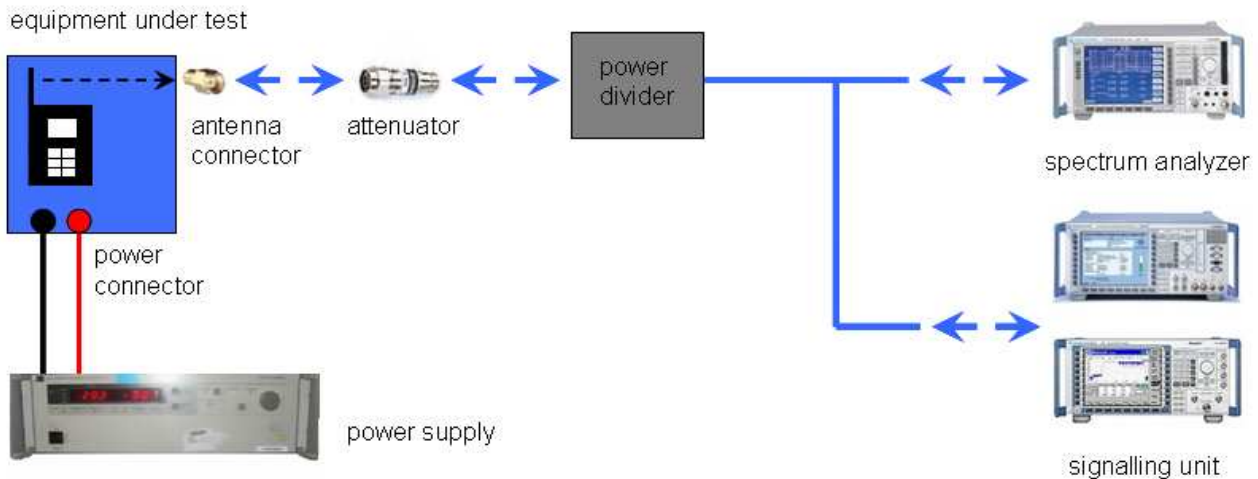
Picture 1: Diagram radiated measurements

9 kHz - 30 MHz:	active loop antenna
30 MHz – 1 GHz:	tri-log antenna
> 1 GHz:	horn antenna

The EUT is powered by an external power supply with nominal voltage. The signalling is performed from outside the chamber with a signalling unit (CMU200 or other) by air link using signalling antenna.

8.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is first 10dB attenuated before it is power divided (~6dB loss per branch). One of the signal paths is connected to the communication base Station (CMU200 or other), the other one is connected to the spectrum analyzer. The specific losses for both signal paths are first checked within a calibration. The measurement readings on the signalling unit/spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signalling unit and the spectrum analyzer are impedance matched on 50 Ohm.



Picture 2: Diagram conducted measurements

8.2 Additional comments

Reference documents: None

Special test descriptions: None

Configuration descriptions: None

9 Measurement Results

9.1 Timing of the transmitter

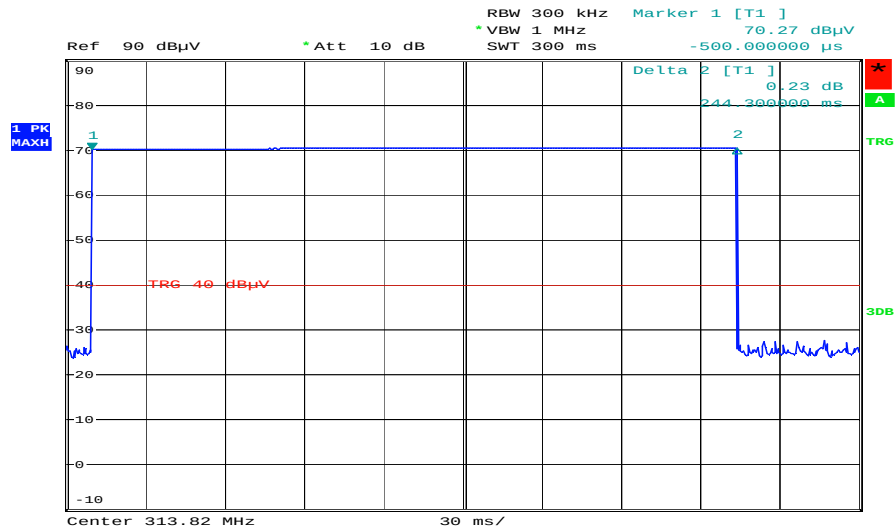
Measurement:

Measurement parameter (refer to plots)	
Detector:	Peak
Sweep time:	300ms/1.5s/300ms
Resolution bandwidth:	300 kHz
Video bandwidth:	3*RBW
Span:	Zero
Trace-Mode:	Max Hold

Limits:

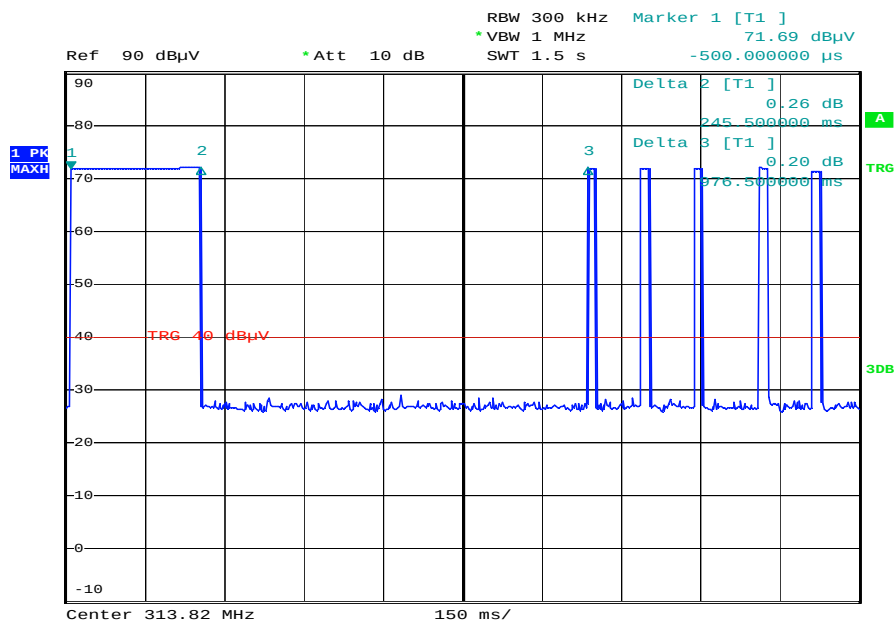
FCC	IC
CFR Part SUBCLAUSE § 15.35 (c)	RSS-GEN Issue 2 Section 4.5
Timing of the transmitter	
(c) Unless otherwise specified, e.g. Section 15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.	

Plot 1: Long burst



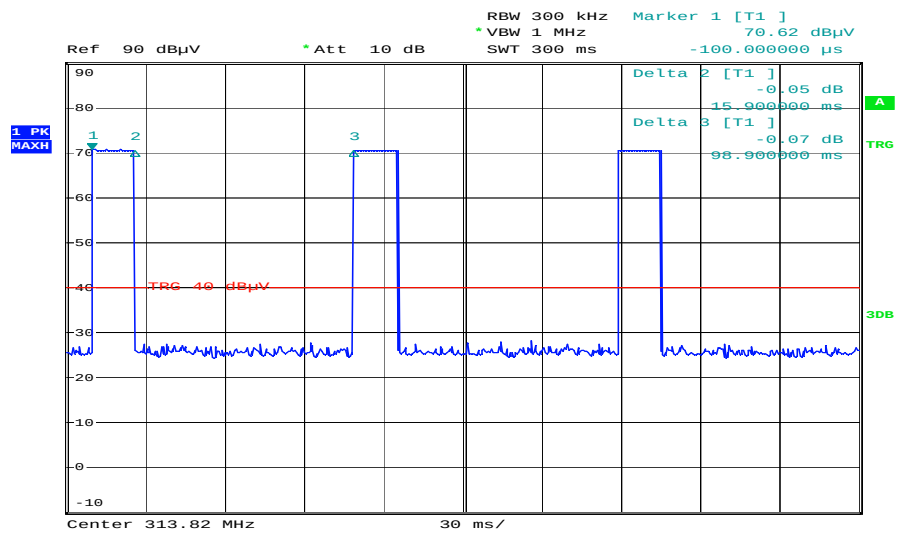
After a short press, the EUT transmits a long burst of 245 ms.

Plot 2: Timing of the Transmitter



During a long press, the EUT first transmits a long burst of 245 ms followed by a break of approximately 730 ms. After the break the transmission continues with short bursts.

Plot 3: Short burst



During a long press, short bursts of 15.9 ms are transmitted every 100 ms.

Result: The result of the measurement is passed.

9.2 Switch off time

Measurement:

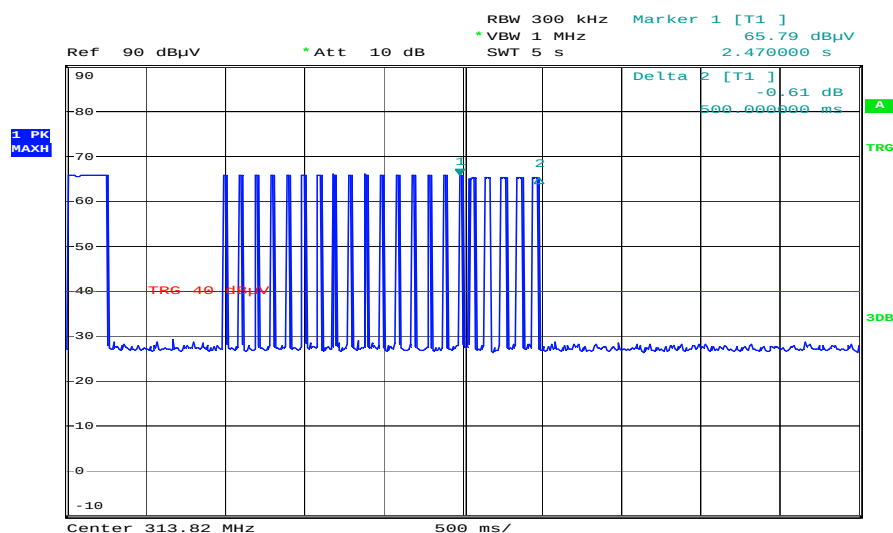
Measurement parameter (refer to plots)	
Detector:	Peak
Sweep time:	5 s
Resolution bandwidth:	300 kHz
Video bandwidth:	3*RBW
Span:	Zero
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part SUBCLAUSE § 15.231 (a) (1)	RSS-GEN Issue 2 Section 4.5
Switch off time	
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.	

Results:

Plot 4:



After a long press, the EUT automatically stop transmission within not more than 79.5 ms (5x short bursts of 15.9 ms) after releasing the switch. Marker 1 in plot 4 shows the moment the switch is released and Marker 2 the end of transmission.

After a short press, the EUT is immediately deactivated (hereby refer to plot 1).

Result: The result of the measurement is passed.

9.3 Emission Bandwidth

Measurement:

Measurement of the 20 dB bandwidth of the modulated signal

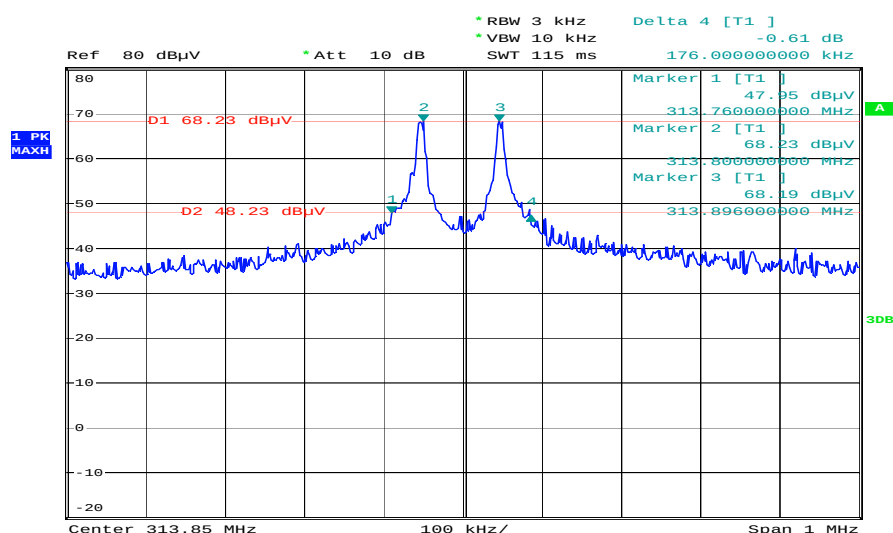
Measurement parameter (refer to plots)	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	3 kHz
Video bandwidth:	3*RBW
Span:	1 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
CFR Part SUBCLAUSE § 15.231 (c)	RSS-210 Issue 7 Section A1.1.3
Emission bandwidth	
The OBW shall not be wider than 0.25% of the centre frequency, here maximum 784.6 kHz.	

Result:

Plot 5:



The emission bandwidth at 20 dB is 176 kHz

Result: The result of the measurement is passed.

9.4 Field Strength of the Fundamental

Measurement:

Measurement parameter	
Detector:	Peak/Quasi Peak
Sweep time:	Auto
Resolution bandwidth:	300 kHz
Video bandwidth:	3*RBW
Span:	Wide enough to capture all emissions
Trace-Mode:	Max hold

Limits:

FCC		IC
CFR Part SUBCLAUSE § 15.231 (b)		RSS-210 Issue 7 Section A1.1.2 / 2.7 Table 4
Field strength of the fundamental. In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:		
Fundamental Frequency (MHz)	Field strength of Fundamental (µV/m)	Measurement distance (m)
40.66 – 40.70	2,250	3
70-130	1,250	3
130-174	1,250 to 3,750	3
174-260	3,750	3
260-470 (313.85)	3,750 to 12,500 (5993.76)	3
Above 470	12,500	3

Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows:

- for the band 130-174 MHz, µV/m at 3 meters = $56.81818(F) - 6136.3636$;
- for the band 260-470 MHz, µV/m at 3 meters = $41.6667(F) - 7083.3333$.

Result:

TEST CONDITIONS		MAXIMUM POWER (at 3 m distance)	
Frequency		313.85 MHz	313.85 MHz
Mode		Peak	Quasi Peak
T _{nom} = 23 °C	V _{nom} = 3 V	73.2 dBµV/m 4570.88 µV/m	64.4 dBµV/m 1659.58 µV/m
Measurement uncertainty		±3dB	

Result: The result of the measurement is passed.

9.5 Field Strength of the Harmonics and Spurious

Measurement:

Measurement parameter	
Detector:	Peak/Quasi Peak
Sweep time:	Auto
Resolution bandwidth:	200 Hz: Magnetic 9kHz: Magnetic 300 kHz: Fundamental 120 kHz: up to 1GHz 1MHz: above 1GHz
Video bandwidth:	≥ RBW
Span:	Wide enough to capture all emissions
Trace-Mode:	Max Hold

Limits:

FCC		IC
CFR Part SUBCLAUSE § 15.231 (b)		RSS-210 Issue 7 Section A1.1.2 / 2.7 Table 4
Field strength of the harmonics and spurious. In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:		
Fundamental Frequency (MHz)	Field strength of spurious (µV/m)	Measurement distance (m)
40.66 – 40.70	225	3
70-130	125	3
130-174	125 to 375	3
174-260	375	3
260-470	375 to 1,250	3
Above 470	1,250	3

The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level. 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 Section 15.209, whichever limit permits a higher field strength.

FCC		IC
SUBCLAUSE § 15.209		
Field strength of the harmonics and spurious.		
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.0009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
above 960	500	3

Results:

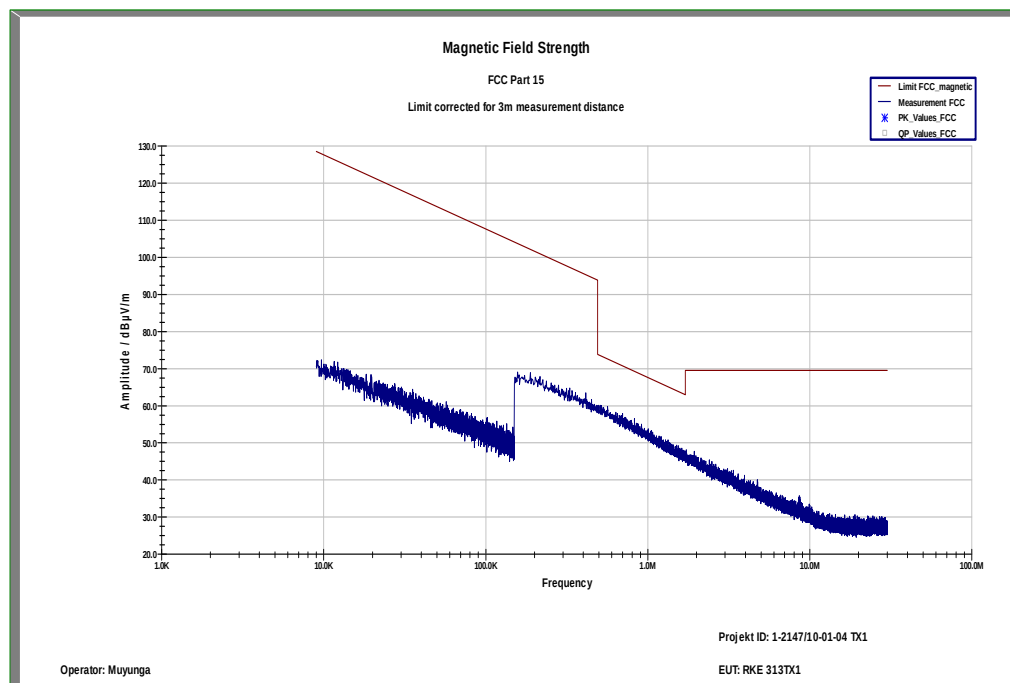
EMISSION LIMITATIONS				
F [MHz]	Detector	Amplitude of emission [dB μ V/m]	Limit [dB μ V/m]	Results
313.85	Quasi Peak	64.4	75.55	complies
627.57	Quasi Peak	29.1	55.55	complies
941.40	Quasi Peak	42.3	55.55	complies
1255.5	Peak	45.5	62.00	complies

Result: The result of the measurement is passed.

Plots of the measurements

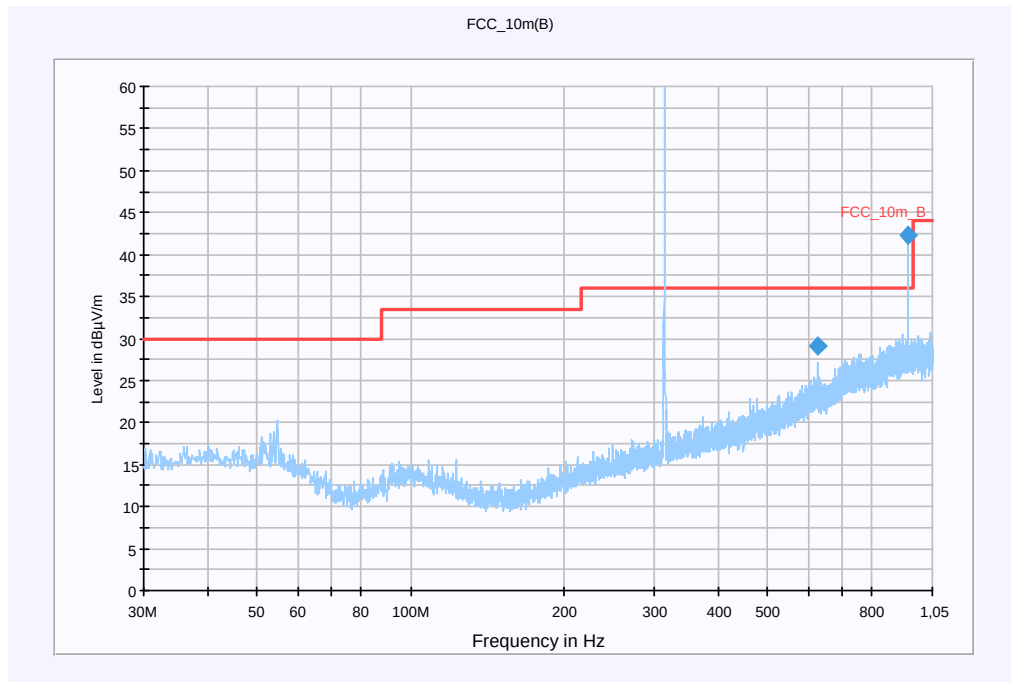
Plot 1: 9 kHz – 30 MHz;
Part 15.209 Magnetics, Measurement distance 3m

Transmit frequency 313.8 MHz

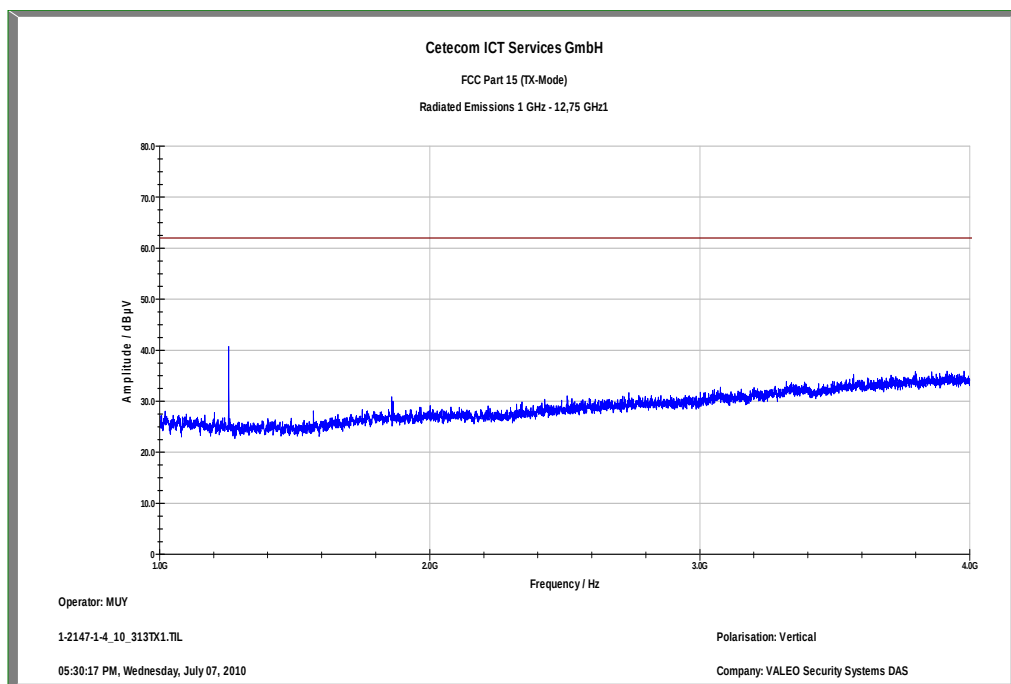


Plot 2: 30 MHz – 1000 MHz

Transmit frequency 313.8 MHz



Plot 2: 1000 MHz – 4000 MHz



9.6 Receiver Spurious Emission (radiated)

Measurement:

Measurement parameter	
Detector:	Peak/Quasi Peak
Sweep time:	Auto
Resolution bandwidth:	120 kHz/1MHz
Video bandwidth:	≥ RBW
Span:	Wide enough to capture all emissions
Trace-Mode:	Max Hold

Limits:

FCC		IC	
SUBCLAUSE § 15.109		RSS-GEN Issue Section 6	
Receiver Spurious Emission (radiated)			
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)	
30 - 88	100	3	
88 - 216	150	3	
216 - 960	200	3	
above 960	500	3	

Results:

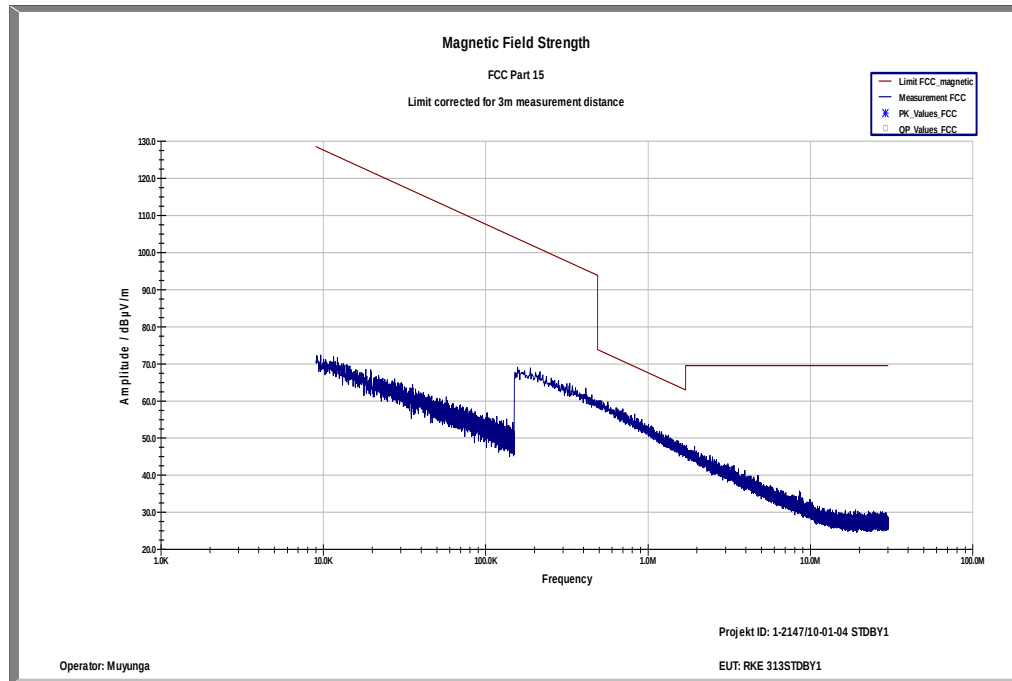
Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
36.002100	14.2	120.000	98.0	V	153.0	13.1	15.8	30.0
40.207650	10.4	120.000	152.0	V	239.0	13.4	19.6	30.0
97.810350	7.9	120.000	154.0	H	217.0	11.6	25.6	33.5
720.959400	20.3	120.000	220.0	H	107.0	22.9	15.7	36.0
933.336900	22.7	120.000	220.0	V	28.0	25.3	13.3	36.0

Result: The result of the measurement is passed.

Plot 1: 9 kHz – 30 MHz;

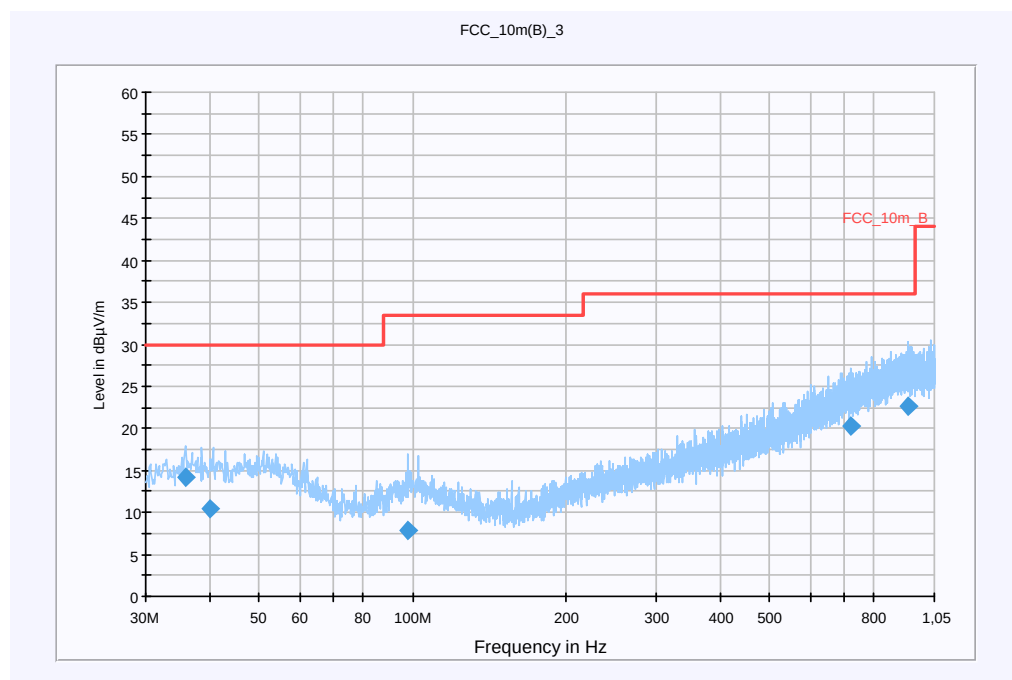
Part 15.209 Magnetics, Measurement distance 3m

Transmitter in standby at 313.8 MHz

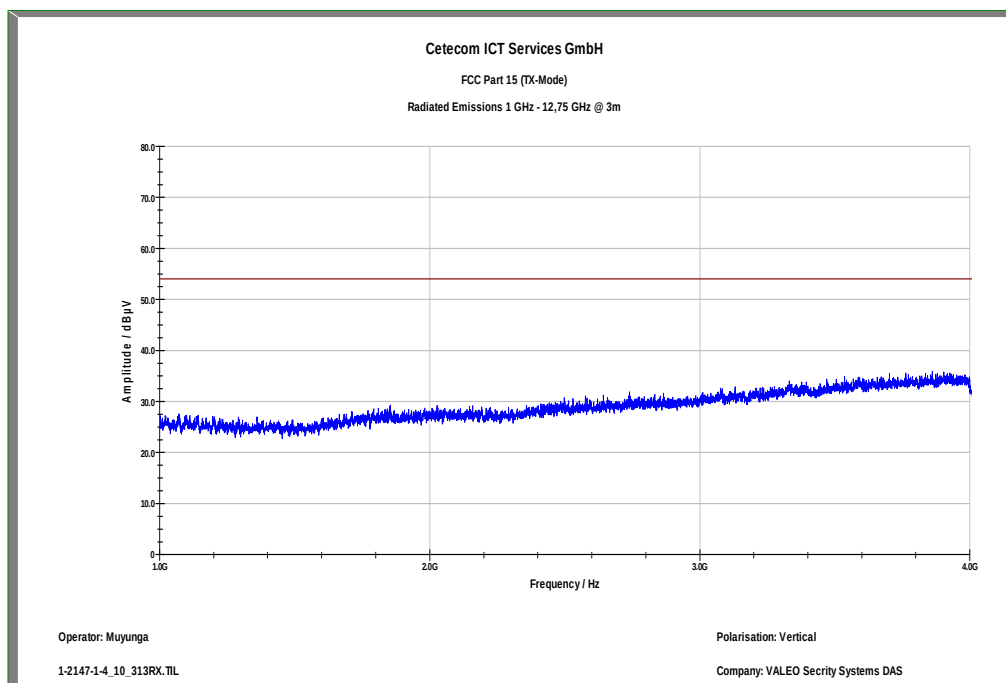


Plot 2: 30 MHz – 1000 MHz

Transmitter in standby at 313.8 MHz



Plot 2: 1000 MHz – 4000 MHz



10 Test equipment and ancillaries used for tests

In order to simplify the identification of the equipment used at each specific test, each item of test equipment and ancillaries are provided with an identifier or number in the equipment list below.

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

No.	Labor / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kal. Art	Last Calibration	Next Calibration
1	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
2	50	Netzgerät	6032A	HP Meßtechnik	2920A04466	300000580	k	06.01.2009	06.01.2011
3	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	k	03.09.2001	03.09.2003
4	n. a.	EMI-Mesempfänger	ESCI 1166.5950.03	R&S	100083	300003312	k	08.01.2010	08.01.2012
5	n. a.	Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379	ev		
6	n. a.	Antennenmast	Model 2175	ETS-LINDGREN	64762	300003745	izw		
7	n. a.	Steuergerät	Model 2090	ETS-LINDGREN	64672	300003746	izw		
8	n. a.	Interface-Box für Drehtisch	Model 105637	ETS-LINDGREN	44583	300003747	izw		
9	n. a.	Breitbandantenne	VULB9163	Schwarzbeck	295	300003787	k	01.04.2010	01.04.2012
10	n. a.	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	08.01.2010	08.01.2012
11	n. a.	System Autoranging DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	08.01.2009	08.01.2012
12	n. a.	PowerAttenuator	8325	Byrd	1530	300001595			
13	n. a.	Double-Ridged Waveguide Horn Antenna 1-26.5GHz	3115	EMCO	8812-3088	300001032	vIKI!	05.03.2009	05.03.2011
14	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
15	n. a.	Anechoic chamber		MWB	87400/02	300000996			
16	Spec.A. 2_2e	System rack for EMI measurement solution	85900	HP I.V.	*	300000222	ne		
17	9	Artificial Mains 9 kHz to 30 MHz, 4 x 25 Ampere	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2010	06.01.2012
18	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
19	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
20	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
21	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
22	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
23	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
24	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
25	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
26	n. a.	Highpass Filter	WHKX2.9/18G-	Wainwright	1	300003492	ev		

			12SS						
27	n. a.	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev		
28	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
29	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Vertr. Bad Hom	MY48250080	300003812	k	05.08.2008	05.08.2010
30	n. a.	MXG Microwave Analog Signal Generator	N5183A	Agilent Vertr. Bad Hom	MY47420220	300003813	k	06.08.2008	06.08.2010
31	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Vertr. Bad Hom	MY48260003	300003825	vIKI!	19.08.2008	19.08.2010
32	n. a.	TRILOG Super Breitband Antenne	VULB9163	Schwarzbeck	371	300003854	vIKI!	17.12.2008	17.12.2010
33	n. a.	Signal Analyzer 20Hz-26,5GHz-150 to + 30 DBM	FSIQ26	R&S	835111/0004	300002678	Ve	06.01.2009	06.01.2011

Annex A Photographs of the Test Set-up

Photo documentation

Photo 1:



Photo 2:



Annex B External Photographs of the EUT

Photo documentation of EUT for Trunk configuration

Photo 3: EUT for Trunk configuration



Photo 4: EUT for Trunk configuration



Photo 5: EUT for Trunk configuration



Photo 6: EUT for Trunk configuration



Annex C Internal Photographs of the EUT

Photo documentation of EUT for Trunk configuration

Photo 7: EUT for Trunk configuration



Photo 8: EUT for Trunk configuration



Photo 9: EUT for Trunk configuration



Photo 10: EUT for Trunk configuration



Photo 11: EUT for Trunk configuration



Photo 12: EUT for Trunk configuration



Photo 13: EUT for Trunk configuration

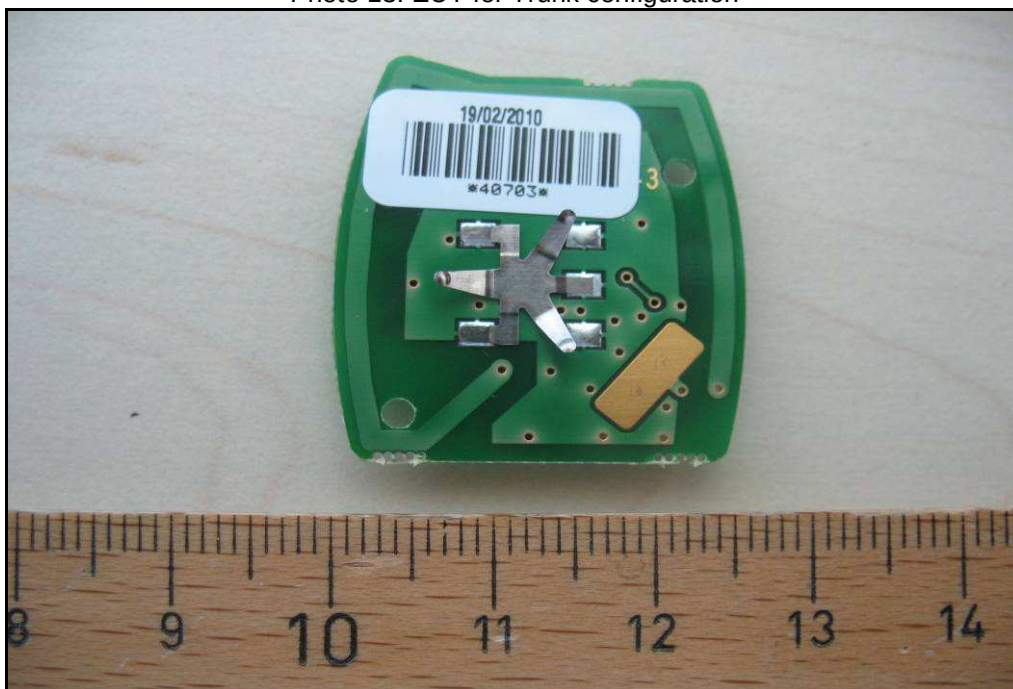
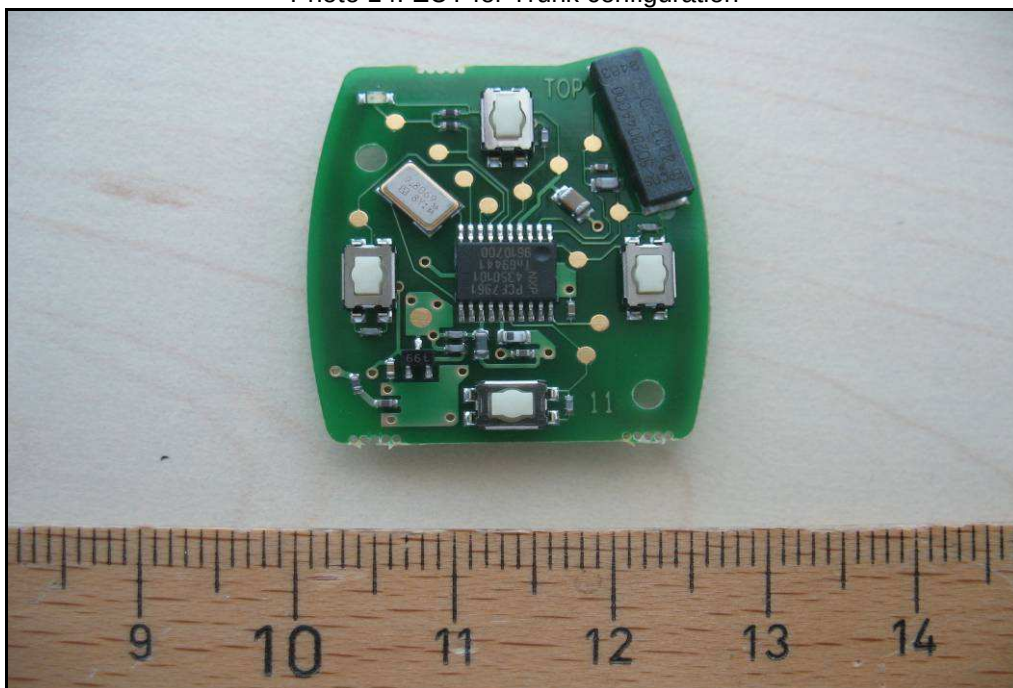


Photo 14: EUT for Trunk configuration



Annex D External Photographs of the EUT

Photo documentation of EUT without Trunk configuration

Photo 15: EUT without Trunk configuration



Photo 16: EUT without Trunk configuration



Annex E Internal Photographs of the EUT

Photo documentation of EUT without Trunk configuration

Photo 17: EUT without Trunk configuration



Photo 18: EUT without Trunk configuration



Photo 19: EUT without Trunk configuration



Photo 20: EUT without Trunk configuration



Photo 21: EUT without Trunk configuration



Photo 22: EUT without Trunk configuration



Photo 23: EUT without Trunk configuration

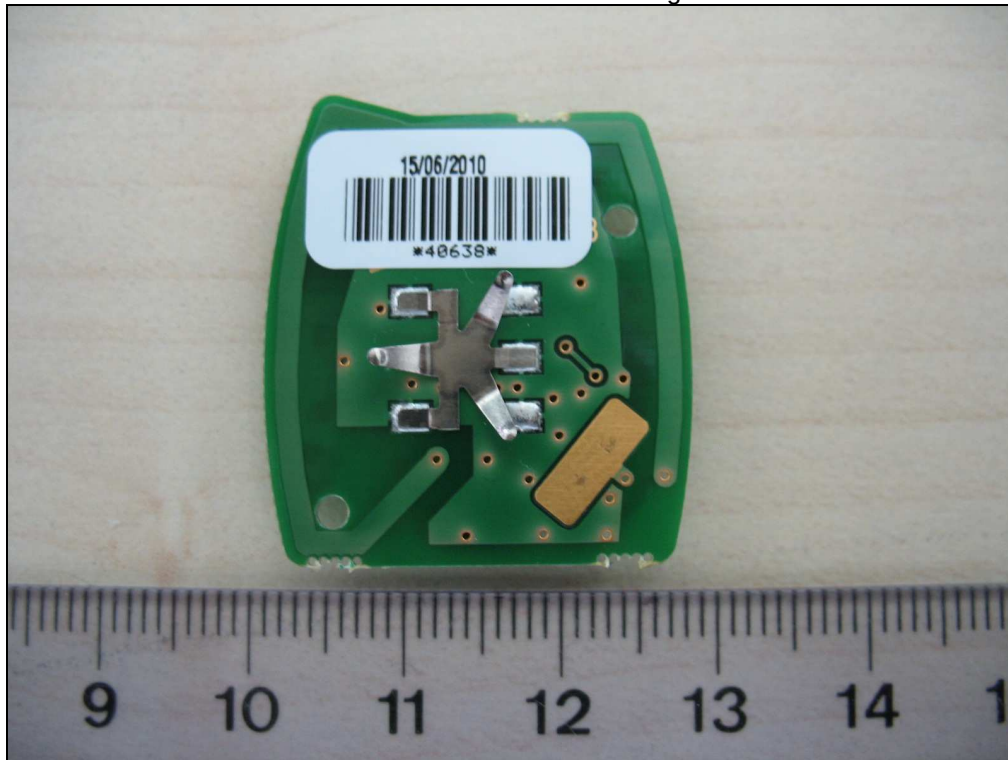


Photo 24: EUT without Trunk configuration

