

Recognized by the
Federal Communications Commission
Anechoic chamber registration no.: 90462 (FCC)
Anechoic chamber registration no.: IC 3463A-1
TCB ID: DE 0001



Accredited by the
German Accreditation Council
DAR-Registration Number
DAT-P-176/94-D1



Accredited Bluetooth® Test Facility (BQTF)

Test report no.	:	2-4723-01-10/07 A
Applicant	:	WITTE-Verlbert GmbH & Co. KG
Type	:	Keyless entry
Test Standard	:	FCC Part 15.231 RSS210 Issue 7
FCC ID	:	V2T 01060512
Certification No. IC	:	7575A-01060512



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1 General information

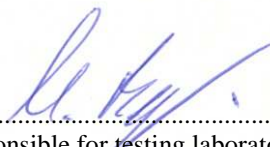
1.1 Administrative data of the test facility

1.1.1 Identification of the testing laboratory

Company name:	Cetecom ICT Services GmbH
Address:	Untertürkheimerstr. 6-10 D-66117 Saarbruecken Germany
Laboratory accreditation:	DAR-Registration No. DAT-P-176/94-D1 Bluetooth Qualification Test Facility (BQTF) Federal Communications Commission (FCC)
Responsible for testing laboratory:	Identification/Registration No : 90462 Jakob Reschke Phone: +49 681 598 0 Fax: +49 681 598 9075 email: info@ict.cetecom.de

1.2 Notes

The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations 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 the CETECOM ICT Services GmbH.



.....
Responsible for testing laboratory
(Michael Berg)



.....
Responsible for test report
(Jakob Reschke)

1.3 Details of Applicant

Name : WITTE-Velbert GmbH & Co.KG
Street : Höferstr. 3-15
Town : 42551 Velbert
Country : Germany
Telephone : -/-
Telefax : -/-
Contact : Jörg Donnerstag
Telephone : +49 (0) 20 51 498 7373
Telefax : +49 (0) 20 51 498 333
Email : joerg.donnerstag@witte-automotive.de

1.4 Application Details

Date of receipt of application : 2007-09-25
Date of receipt of test item : 2008-01-21
Date(s) of test : 2008-01-21 to 2008-01-24
Person(s) who have been present during the test : -/-

1.5 Test Item

Type of equipment : Keyless entry
 Model name : Flap Key Family Bosch
 Serial Number : 07L072-33
 Manufacturer : WITTE-Velbert GmbH & Co.KG
 Address : Höferstr. 3-15
 City : 42551 Velbert
 Country : Germany
 Tested to Radio Standards Specification(RSS) No. : 210 Issue 7
 Open Area Test Site Industry Canada Number : IC 3463A-1
 Frequency Range (or fixed frequency) : Tx: 314.9 MHz
 R F: Power in Watts : -/
 Field Strength (at what distance) : 69.11 dB μ V/m AV in 3m
 Occupied Bandwidth (99% BW) : 56.00 kHz
 Type of Modulation : ASK
 Antenna Information : integrated antenna
 Emission Designator (TRC-43) : 56k0A1D
 Transmitter Spurious (worst case) : 169 μ V/m in 10m QP
 Receiver Spurious (worst case) : Not applicable
 IC no. : V2T 01060512
 FCC ID : 7575A-01060512

Flap Key Family

GM Part Number	WITTE Part Number	Button
135 00 229	01 060 321 000	4B
135 00 226	01 060 332 000	4B
135 00 222	01 060 342 000	4B
135 00 205	01 060 370 000	4B
135 00 228	01 060 322 000	5B
135 00 227	01 060 333 000	5B
135 00 221	01 060 343 000	5B
135 00 206	01 060 493 000	5B

The green highlighted EUT was tested

ATTESTATION:

DECLARATION OF COMPLIANCE: I declare 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 :

2008-01-25
Date

Jakob Reschke
Name



Signature

1.6 Test Setup

Hardware	:	-/-
Software	:	3.20

1.7 Test Specifications

FCC:	CFR Part 15.231
IC:	RSS 210, Issue 7

2 Statement of Compliance

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

2.1 Summary of Measurement Results

2.1.1 CFR 47 Part 15 Radio frequency devices

Section in this Report	Test Name / Section FCC Part 15	Test Name / Section RSS 210 Issue 7	Measurement applicable	Verdict
4.1	§ 15.35 (c) Timing of the transmitter (Duty cycle correction factor)	RSS-GEN Issue 2 Section 4.5	YES	PASS
4.2	§ 15.231 (a) (1) Switch off time	RSS-210 Issue 7 Section A1.1.1	YES	PASS
4.3	§ 15.231 (3) (c) Emission Bandwidth	RSS-210 Issue 7 Section A1.1.3	YES	PASS
4.4	§ 15.231 (b) Fieldstrength of Fundamental	RSS-210 Issue 7 Section A1.1.2 / 2.7 Table 4	YES	PASS
4.5	§ 15.209 Fieldstrength of harmonics and spurious	RSS-210 Issue 7 Section 2.7 Table 4	YES	PASS
4.6	§ 15.205 Band edge compliance	RSS-210 Issue 7 Section 2.7 Table 1	YES	PASS
4.7	§ 15.209 Receiver spurious emissions (radiated)	RSS-GEN Issue Section 6	YES	PASS

3 Measurements and results

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 4 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 conform 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 set-ups 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 conform with ANSI C63.2-1996 item 15.

- 9 kHz - 150 kHz: Quasi Peak measurement, 200 Hz Bandwidth, passive loop antenna.
- 150 kHz - 30 MHz: Quasi Peak measurement, 9 kHz Bandwidth, passive loop antenna.
- 30 MHz - 200 MHz: Quasi Peak measurement, 120 kHz Bandwidth, biconical antenna.
- 200MHz - 1GHz: Quasi Peak measurement, 120 kHz Bandwidth, log periodic antenna.
- >1GHz: Average, RBW 1MHz, VBW 10 Hz, waveguide horn.

All measurement settings are according to FCC 15.209 and 15.207

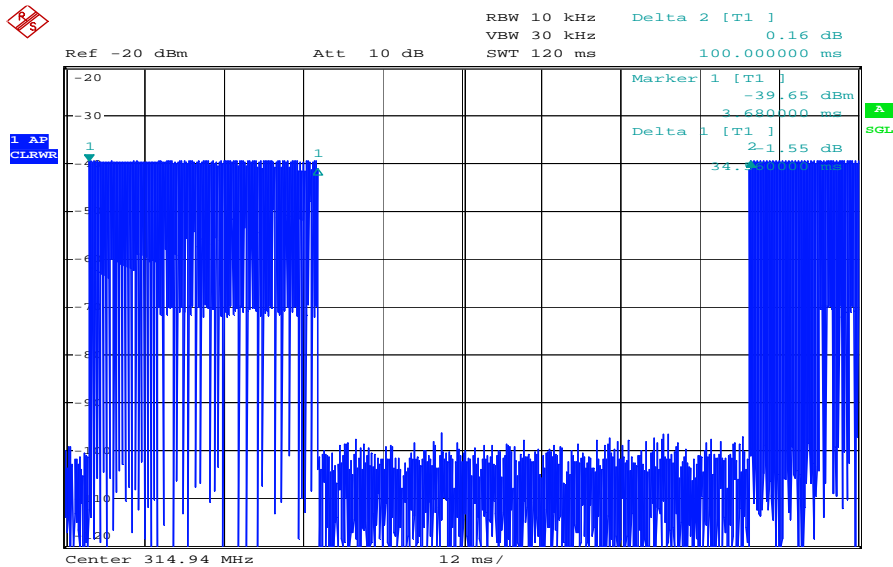
4 FCC Part 15 Subpart C

4.1 Timing of the transmitter

Reference

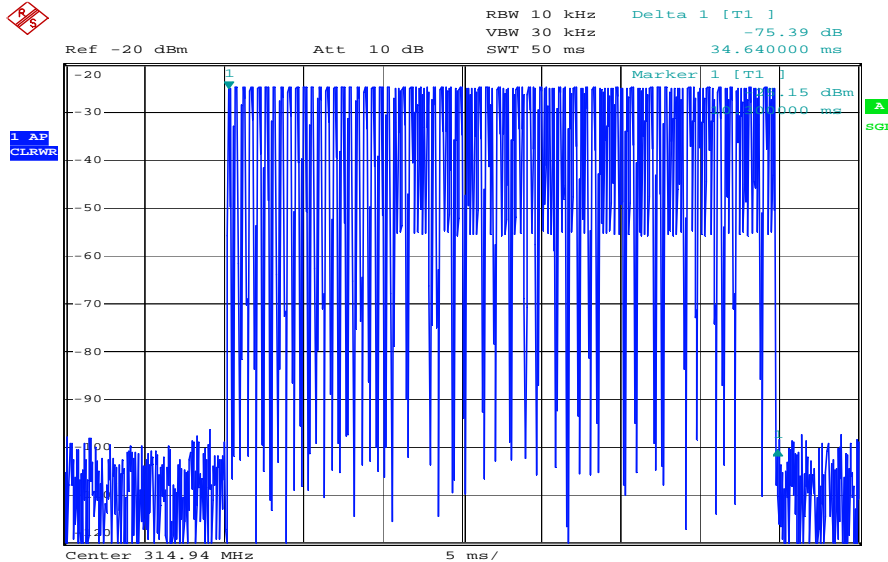
FCC:	CFR Part SUBCLAUSE § 15.35 (c)
IC:	RSS-GEN Issue 2 Section 4.5

Plot 1:



Date: 22.JAN.2008 09:44:01

Plot 2:
Zoomed Tx



Date: 22.JAN.2008 09:45:17

The Tx on is: 34.64 ms

Inside the Tx on the duty cycle is 50%

So the calculated TX on is 17.32

The correction factor from peak to average is calculated by

$20 \times \log(\text{duty cycle})$

$20 \times \log(0.17) = -15.39 \text{ dBm}$

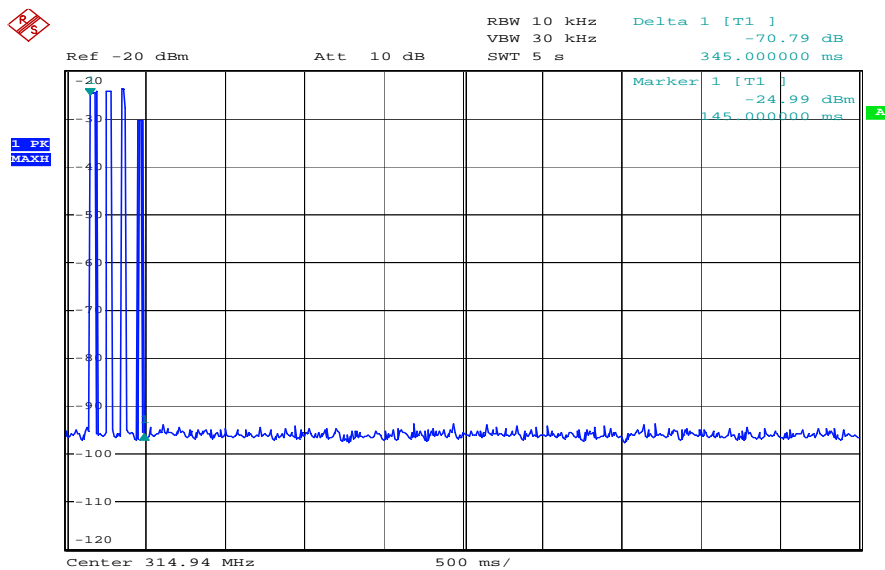
Limits: § 15.35 (c)

(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.

4.2 Switch off time

Reference

FCC:	CFR Part SUBCLAUSE § 15.231 (a) (1)
IC:	RSS-210 Issue 7 Section A1.1.1



Date: 22.JAN.2008 09:39:17

After releasing the button the EUT immediately stop to transmit.

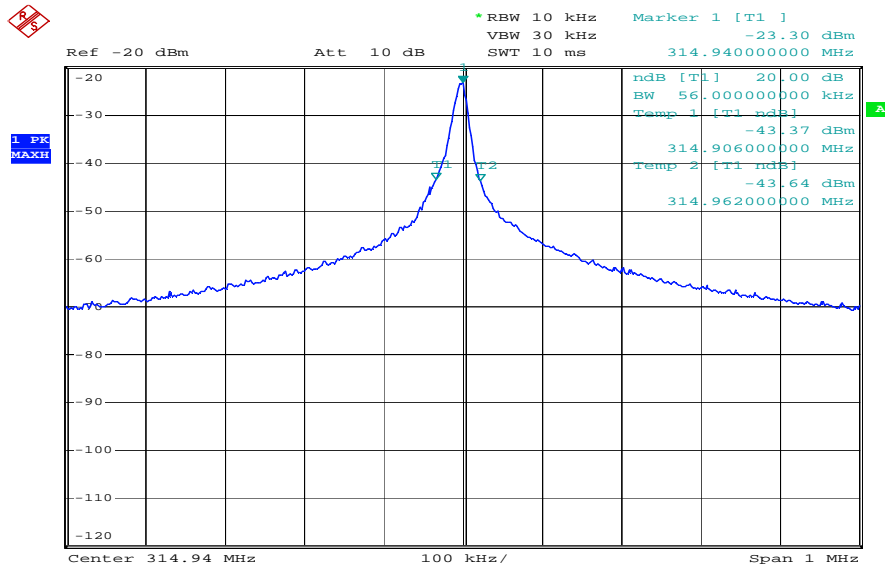
Limits: § 15.231 (a) (1)

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

4.3 Emission Bandwidth

Reference

FCC:	CFR Part SUBCLAUSE § 15.231 (c)
IC:	RSS-210 Issue 7 Section A1.1.3



Date: 22.JAN.2008 09:53:13

Emission bandwidth is: 56.00 kHz

Limit: § 15.231 (3) (c)

The OBW shall not be wider than 0.25% of the centre frequency, here maximum 78.73 kHz.

4.4 Field Strength of the Fundamental

Reference

FCC:	CFR Part SUBCLAUSE § 15.231 (b)
IC:	RSS-210 Issue 7 Section A1.1.2 / 2.7 Table 4

MAXIMUM OUTPUT POWER RADIATED (PEAK)

TEST CONDITIONS		MAXIMUM POWER (dB μ V/m) at 3 m		
		Frequency	314.94 MHz	--
T _{nom} 23 °C	V _{nom} 3.0V DC	84.50	--	--
Maximum deviation from output power under extreme test conditions (dBc)		not performed	--	--
Measurement uncertainty		±3dB		

RBW/VBW : 100 kHz

MAXIMUM OUTPUT POWER RADIATED (AVERAGE)

TEST CONDITIONS		MAXIMUM POWER (dB μ V/m) at 3 m		
		Frequency	314.94 MHz	--
T _{nom} 23 °C	V _{nom} 3.0V DC	69.11*	--	--
Maximum deviation from output power under extreme test conditions (dBc)		not performed	--	--
Measurement uncertainty		±3dB		

RBW/VBW : 100 kHz

*Value recalculated from Peak to Average with duty cycle correction factor as described in 4.1

Limits (Average Values)

SUBCLAUSE § 15.231 (b)

Fundamental Frequency (MHz)	Field strength of Fundamental (μ V/m)	Field strength of spurious(μ V/m)
40.66 – 40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750	125 to 375
174-260	3,750	375
260-470	3,750 to 12,500	375 to 1,250
Above 470	12,500	1,250

4.5 Field Strength of the Harmonics and Spurious

Reference

FCC:	CFR Part SUBCLAUSE § 15.231 (b)
IC:	RSS-210 Issue 7 Section 2.7 Table 4

EMISSION LIMITATIONS					
f (MHz)	amplitude of emission (dB μ V/m) Average/QP	limit max. allowed emmission power	actual attenuation below frequency of operation (dB)	results	
314.94	69.11 / AV	75.56 dB μ V/m AV at 3 m		Operating frequency	
629.84	44.6 / QP	45.00 dB μ V/m QP at 10 m	30.53	Complies	
914.43	21.0 / QP	45.00 dB μ V/m QP at 10 m	54.13	Complies	
944.78	39.1 / QP	45.00 dB μ V/m QP at 10 m	36.03	Complies	
1259	43.21 PK 27.82 AV	54 dB μ V/m AV at 3 m	47.31	Complies	
1574	39.54 PK 24.15 AV	54 dB μ V/m AV at 3 m	50.98	Complies	
1889	47.46 PK 32.07 AV	54 dB μ V/m AV at 3 m	43.06	Complies	
Measurement uncertainty			± 3dB		

Limits (Average Values)

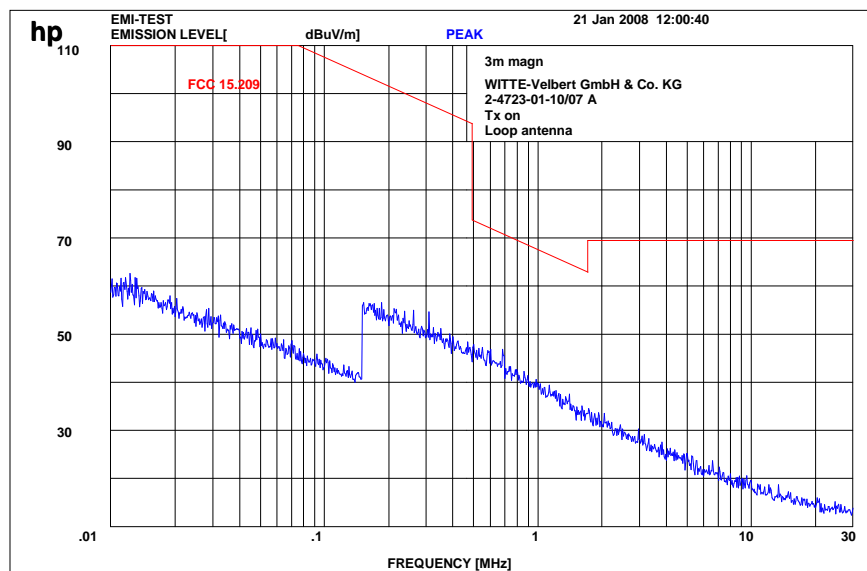
SUBCLAUSE § 15.231 (b)

Fundamental Frequency (MHz)	Field strength of Fundamental (μ V/m)	Field strength of spurious(μ V/m)
40.66 – 40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750	125 to 375
174-260	3,750	375
260-470	3,750 to 12,500	375 to 1,250
Above 470	12,500	1,250

Note: Some limits are recalculated from 3m to 10m or from 10m to 3m according to FCC § 15.31 with 20dB/decade.

Part 15.109 Magnetics

Plot 1:



(to convert the measuring distance from 3m to 30m and 30 to 300m a correction factor from 40 dB/decade was used.)

Measurement distance 3m

This measurement was done in 3 polarisation's, the plot shows the worst case

Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	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	10
88 - 216	150	10
216 - 960	200	10
above 960	500	3

Plot 2:

Tx : 30 MHz – 1 GHz

Information

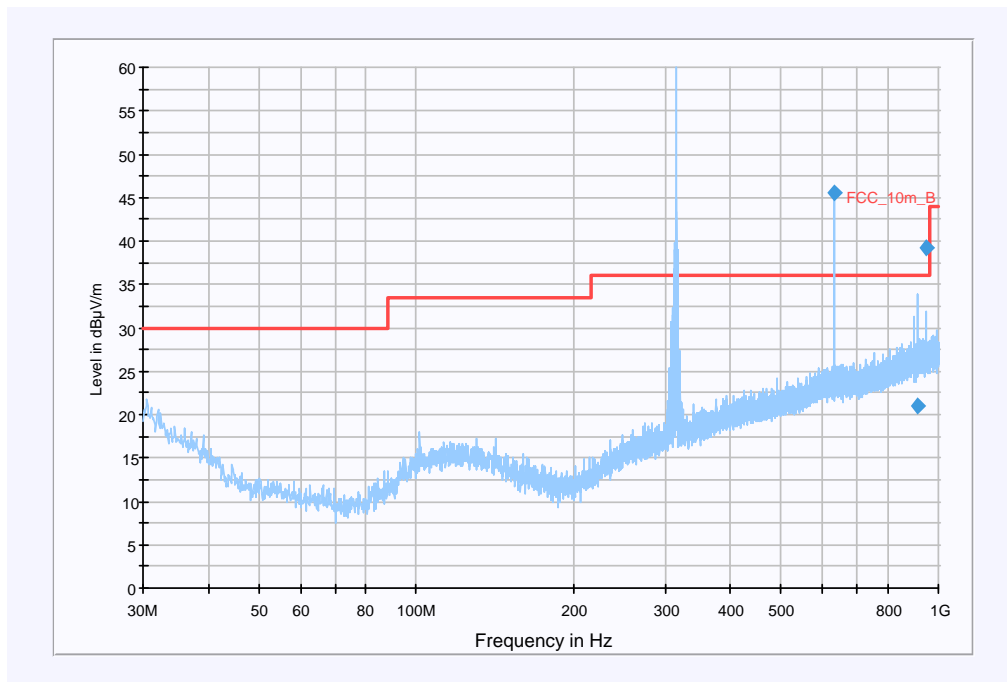
EUT: global epsilon II flap key (BOSCH pcb)
 Serial Number: 07L072-33
 Test Description: FCC part 15C
 Operating Conditions: TX
 Operator Name: Kraus

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: EMI radiated\Electric Field (NOS)
 Level Unit: dB μ V/m

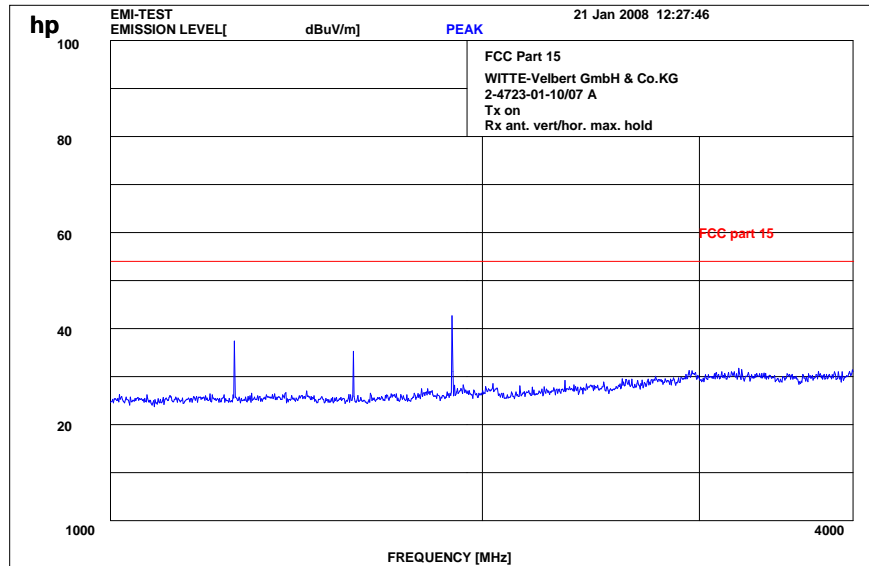
Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30MHz - 1GHz	QuasiPeak	120kHz	15s	Receiver

FCC_10m_Fast_1GHz (B)

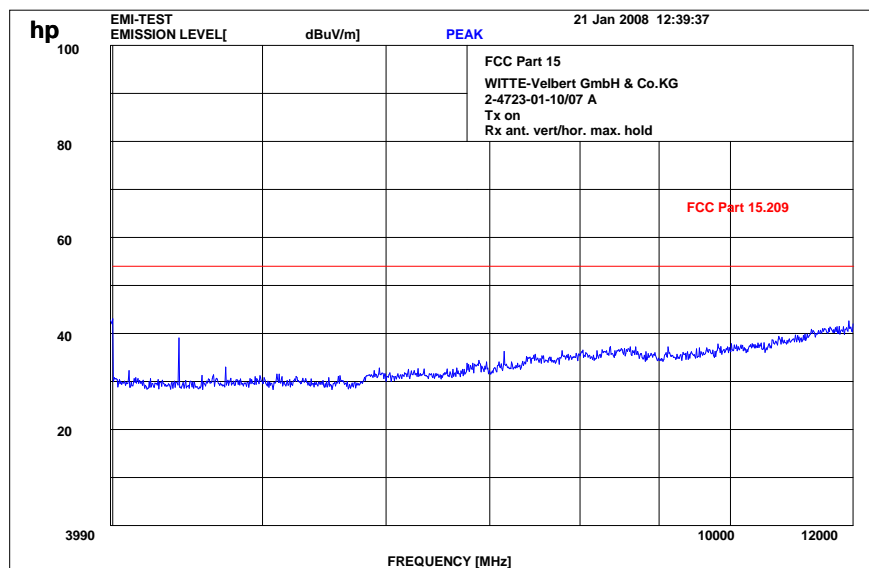


The limit of 65 dB μ V/m at 10 m is recalculated according to FCC § 15.31 from 3m to 10m.
 The limit in this plot shows the FCC § 15.209 limit.

Plot 3:
Tx : 1 GHz – 4 GHz



Plot 4:
Tx : 4 GHz – 12 GHz



4.6 Receiver Spurious Emission (radiated)

Reference

FCC:	CFR Part SUBCLAUSE § 15.109
IC:	RSS-GEN Issue Section 6

Not applicable

Limits

SUBCLAUSE § 15.109

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
30 - 88	100	10
88 - 216	150	10
216 - 960	200	10
above 960	500	3

System Rack Room 005 :

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	FSP 30	R&S		300003575	02.04.2007	24	02.04.2009
2	CBT	R&S	100313	300003516	24.10.2006	24	24.10.2008
3	Switch Matrix	HP		300000929	n.a.		
4	Power Supply	HP	3041A00544	300002270	13.05.2007	36	13.05.2010
5	Signal Generator	R&S	836206/0092	300002680	30.05.2007	36	30.05.2010

Anechoic chamber F:

No.	Instrument/Ancillary	Manufacturer	Type	Serial-No.	Internal identification
Radiated emission in chamber F					
F-1	Control Computer	F+W		FW0502032	300003303
F-2	Bilog antenna	Chase	CBL 6112A	2110	300000573
F-3a	Amplifier	Veritech Microwave Inc.	0518C-138	- / -	- / -
F-4b	Switch	HP	3488A	- / -	300000368
F-5	EMI Test receiver	R&S	ESCI	100083	300003312
F-6	Turntable Controller	EMCO	1061 3M	1218	300000661
F-7	Tower Controller	EMCO	1051 Controller	1262	300000625
F-8	Tower	EMCO	1051 Tower	1262	300000625
F-9	Ultra Notch-Filter Rejected band Ch. 62	WRCD		9	
Radiated immunity in chamber F					
F-10	Control Computer	F+W		FW0502032	300003303
F-11	Signal Generator	R&S	SML 03	102519	300003407
F-12	RF-Amplifier	ar	50W1000	12932	300001438
F-13	Directional Coupler	ar	DC 3010	12708	300001428
F-14	Logper Antenna	R&S	HL023A1	323704/016	300001476
F-15	RF-Amplifier	ar	60S1G3	313649	300003410
F-16	Directional Coupler	ar	DC7144A	312786	300003411
F-17	Horn Antenna	ar	AT 4002	19739	300000633
F-18	Power Meter	R&S	NRV	860327/024	F033
F-19	Power sensor	R&S	URV5-Z2	839080/005	300002844.02
F-20	Power sensor	R&S	URV5-Z2	830755/057	F032
Harmonics and flicker in front of chamber F					
F-21	Flicker and Harmonics Test System	Spitzenberger & Spies	PHE4500/B I PHE4500/B II	B5983 B5984	300000210
F-22	Control Unit	Spitzenberger & Spies	STE	B5980	300000210
F-23	Power Amplifier	Spitzenberger & Spies	EP 4500/B	B5976	300000210
F-24	Conect Panel	Spitzenberger & Spies	Conect panel	B5982	300000210
F-25	Power Supply	Spitzenberger & Spies	NT-EP 4500	B3977	300000210
F-26	Additional transformer	Spitzenberger & Spies	UT-EP 4500	B5978	300000210
F-27	Analyzer Reference System	Spitzenberger & Spies	ARS 16/1	A3509 07/0 0205	300003314
F-26	Power Supply	Hewlett Packard	6032 A	2920 A 04466	300000580

6 Annex B: Photographs of Test site

Photo 1 (Radiated Emissions):

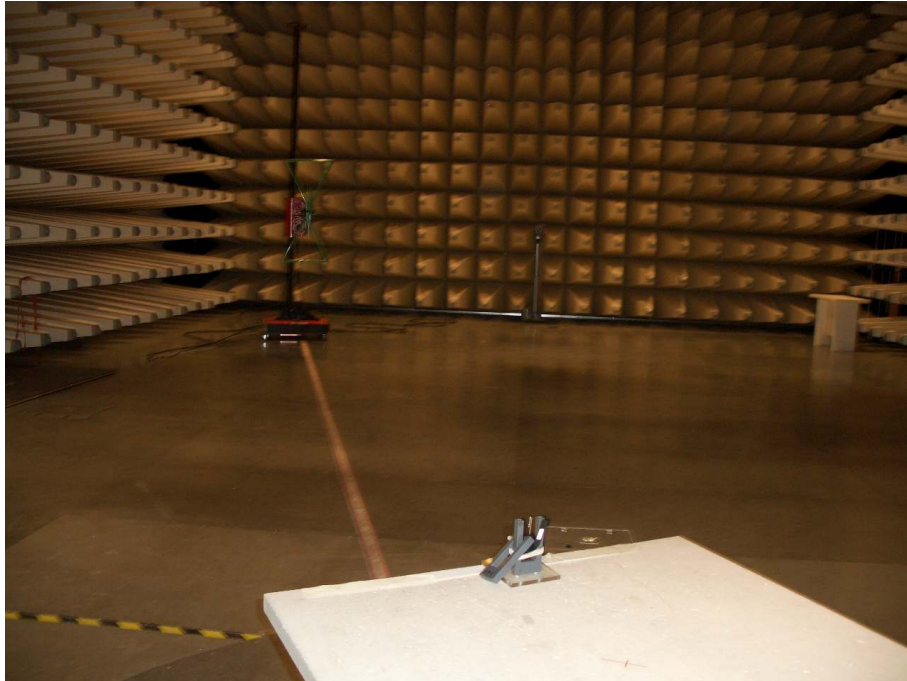
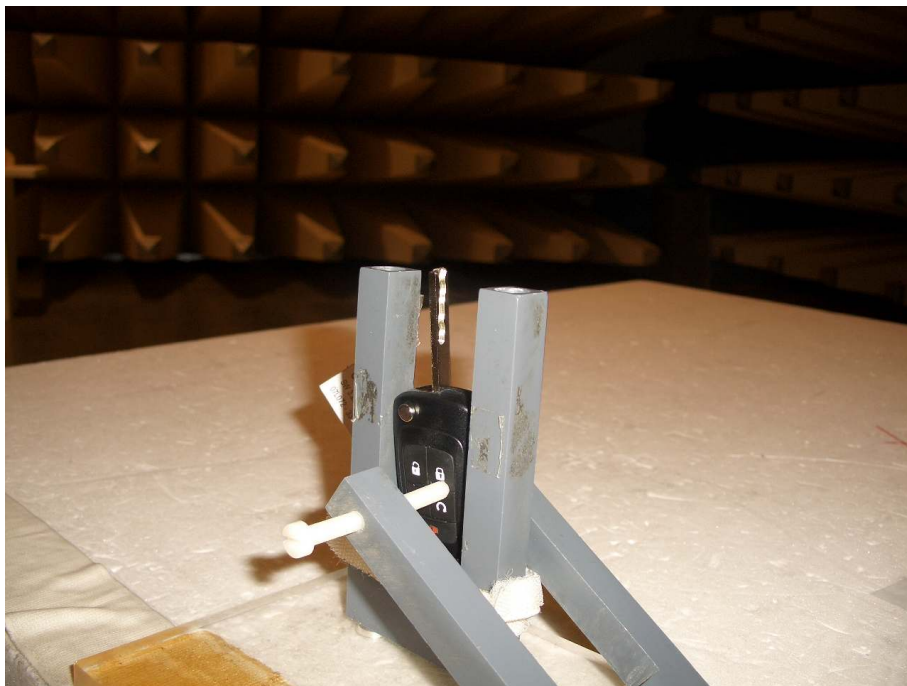


Photo 2 (Radiated Emissions):



7 Annex C: External Photographs of the Equipment

Photo 1:



Photo 2:



Photo 3:



Photo 4:



Photo 5:



Photo 6:



8 Annex D: INTERNAL PHOTOGRAPHS OF THE EQUIPMENT

Photo 1:



Photo 2:



Photo 3:

