CMC Centro Misure Compatibilità S.r.l.
Via della Fisica, 20
36016 Thiene (VI) – ITALY
Tel./Fax +39 0445 367702
www.cmclab.it - info@cmclab.it

LAB N° 0168

Independent Testing Laboratory
Accredited by ACCREDIA according to UNI CEI EN ISO/IEC 17025 cert. nr. 0168

TEST REPORT nr. R19082901

Federal Communication Commission (FCC)

Test item

Description .....: RF REMOTE CONTROL FOR TUBULAR MOTORS
Trademark .....: CHERUBINI
Model/Type .....: GIRO PLUS
FCC ID .....: 2AOG9GIRO

Test Specification

Standard.....: FCC Rules & Regulations, Title 47:2017
Part 15 paragraph(s): 203, 204, 207, 209 and 231

Client's name .....: CHERUBINI S.p.A.
Address .....: Via Adige, 55 – 25081 Bedizzole (BS) – ITALY

Manufacturer's name : Same as client
Address .....: --

Report

Tested by .....: G. Gandini .....

Approved by .....: R. Beghetto – *Laboratory Manager* .....
Date of issue .....: 07.10.19
Contents.....: 45 pages

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1. Summary

Standard:

FCC Rules & Regulations, Title 47:2017
Part 15 paragraph(s): 203, 204, 207, 209 and 231

Test specifications	*Environmental Phenomena*	*Tests sequence*	*Result*
Part 15.203	Antenna requirements	1	Complies
Part 15.207	Conducted emissions	--	N.A. (+)
Part 15.209	Radiated emissions	2	Complies
Part 15.209 and 15.231(b) (e)	Fundamental and spurious emissions (≤ 1 GHz)	3	Complies
Part 15.209 and 15.231	Spurious emissions (> 1 GHz)	4	Complies
Part 15.231(c)	Occupied channel bandwidth	5	Complies
Part 15.231(a) (e)	Periodic operation characteristics	6	Complies

(+) Devices which only employ battery power. See FCC Part 15.207 (c)

The Test Report was given to the Client representatives for necessary documentation of ratification of the tested equipment and it is valid for the FCC certification

2. Description of Equipment under test (EUT)

Power supply	:	3 Vdc from battery
Duty cycle	:	50%
		See also document duty_cycle_evaluation provided by the manufacturer
Type of equipment	:	☑ Transmitter Unit
		❑ Receiver Unit
Type of station	:	❑ Fixed station
		☑ Portable station
		❑ Mobile station

2.1 Test Site

Company	:	CMC Centro Misure Compatibilità S.r.l.
Address	:	Via della Fisica, 20
		36016 Thiene (VI) – ITALY
Test site facility's FCC registration number	:	182474

3. Testing and sampling

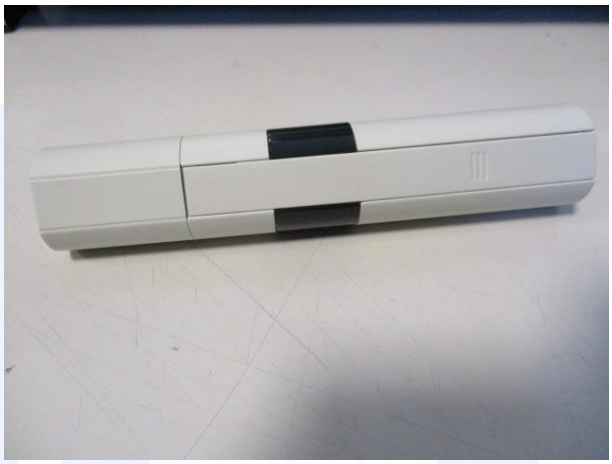
Date of receipt of test item	:	05.04.19
Testing start date	:	18.04.19
Testing end date	:	19.04.19
Samples tested nr.	:	1
Sampling procedure.	:	Equipment used for testing was picked up by the manufacturer, at the end of the production process with random criterion
Internal identification	:	adhesive label with the product number P190469

4. Operative conditions

EUT exercising	:	EUT in continuous transmission at maximum power

5. Photograph(s) of EUT

5.1 Photograph(s) of EUT



6. Equipment list

Id. number	*Manufacturer*	*Model*	*Description*	*Serial number*	*Last calibration*	*Due date calibration*
CMC S108	EMCO	3115	Horn Antenna	9811-5622	June '16	June '19
CMC S127	Schaffner	HLA6120	Loop Antenna	1191	March '17	March '20
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January '19	January '20
CMC S271	Schwarzbeck	BBA 9106 + VHBB 9124	Biconical Antenna (30-300MHz)	831	June '16	June '19
CMC S287	Schwarzbeck	VUSLP 9111B	Log-periodic Antenna (200 MHz-3Ghz)	9111B-203	June '16	June '19

7. Measurement uncertainty

Test	Test Setup	Expanded uncertainty	Note
Conducted emission CISPR 16 LISN 50uH 0,009-0,0150MHz	PE001_01	3,4 dB	1
Conducted emission CISPR 16 LISN 50uH 0,150-30,0MHz	PE001_01	3,0 dB	1
Conducted emission CISPR 16 Voltage Probe 0,15-30MHz	PE001_02	2,9 dB	1
Conducted emission CISPR 16 Current Probe 0,15-30MHz	PE001_03	2,6 dB	1
Conducted emission CISPR 16 ISN 0,15-30MHz	PE001_04	4,7 dB	1
Clic CISPR 16 LISN 50uH 0,150-30,0MHz	PE001_05	3,1 dB	1
Disturbance Power 30-300 MHz	PE002_01	3,6 dB	1
Radiated Emission LAS 0,15-30MHz	PE003_01	2,0 dB	1
Radiated Emission CISPR 16 Loop Ant. 0,15-30MHz	PE004_01	4,0 dB	1
Radiated Emission CISPR 16 Bicon. Ant. 30-300MHz	PE004_02	3,9 dB	1
Radiated Emission CISPR 16 LogP. Ant. 300-1000MHz	PE004_03	3,8 dB	1
Radiated Emission CISPR 16 Horn Ant. 1-18GHz	PE004_04	4,2 dB	1
Human Exposure to electromagnetic fields	PE005_01	23,6 %	1
Harmonic current emissions test	PE006_01	10 mA + 2,6 %	1
Voltage fluctuation and flicker test	PE007_01	4,8 %	1
Radiated Immunity 80MHz-6GHz	PE102_XX	2,1 dB 0,82 V/m a 3V/m	1
Conducted Immunity 0,15-230MHz	PE105_XX	1,2 dB 0,44 V a 3V	1
AC Magnetic field	PE106_01	1,55 % 0,15 A/m a 10A/m	1
Pulse Magnetic field	PE107_01	6,25 % 18,7 A/m a 300A/m	1
Dumped Magnetic field	PE108_01	6,25 % 1,87 A/m a 30A/m	1
Common mode conducted immunity	PE112_01	2,21 % 0,22 V a 10V	1

Test	Test Setup	Expanded uncertainty	Note
Power/Spurious 9kHz-30MHz	PR001_01	4,0 dB	1
Power/Spurious ERP 30-1000MHz d=10m	PR001_02+03	4,7 dB	1
Misura della potenza EiRP 1-18GHz d=3m	PR001_04	4,7 dB	1
Misura della potenza EiRP 18-40GHz d=3m	PR001_05	5,4 dB	1
Frequency error	PR002_01+02	< 1x10-7	1
Timing zero span (1001pts.)	PR002_01+02	0,2 % SWT	1
Modulation bandwidth	PR002_01+02	< 1x10-7	1
Conducted RF power and spurious emission	PR002_01+02	1,1 dB	1
Adjacent channel power	PR002_01+02	1,1 dB	1
Blocking	PR002_01+02	1,1 dB	1

Test	Test Setup	Expanded uncertainty	Note
Electrostatic discharge immunity test	PE101_0X		2
Electrical fast transients / burst immunity test	PE103_0X		2
Surge immunity test	PE104_0X		2
Short interruption immunity test	PE109_01		2
Rev_19_02 date 27/03/2019			

Note 1:
The expanded uncertainty reported according to the document EA-4-02 is based on a standard uncertainty multiplied by a coverage factor of K=2, providing a level of confidence of p = 95%

Note 2:

It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95% confidence, covering factor k = 2

8. Reference documents

Reference no.	*Description*
FCC Rules and Regulation Title 47 part 15:2017	--
ANSI C63.4:2014	American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz
ANSI C63.10:2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Internal Procedure PM001 rev. 3.0 (Quality Manual)	Measure Procedure
Internal procedure INC_M rev. 9.1 (Quality Manual)	Measurement uncertainty calculation

9. Deviation from test specification

None

10. Test case verdicts

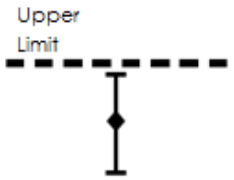
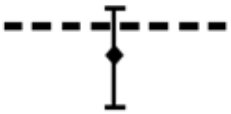
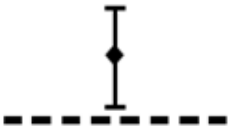
Test case does not apply to the test object	:	N.A.
Test item does meet the requirement	:	Complies
Test item does not meet the requirement	:	Does not comply
Test not performed	:	N.E.

11. Results

In this clause tests results are reported.

Measurement uncertainty is in accordance with document CMC INC_M rev. 9.1.

Judgement of compliance:

Case 1	Case 2	Case 3	Case 4
			
The sample complies with the requirement.	The sample complies with the requirement.	The sample does not comply with the requirement.	The sample does not comply with the requirement.
The measurement results is within the specification limit when the measurement uncertainty is taken into account.	It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty although the measurement result is below the limit.	It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty also the measurement result is upper the limit.	The measurement results is outside the specification limit when the measurement uncertainty is taken into account.

In agreement with ILAC-G8: 03/2009 Guidelines on the Reporting of Compliance with Specification.

11.1 Antenna requirements

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.203 and 15.204
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Laboratory

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

--
Measurement uncertainty: See clause 7 of this test report

Test specification

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.
The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded

Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
22	100	45

Result

Antenna Type	*External R.F. power amplifier*	*Remarks*	*Results*
Integrated antenna	Not Present	--	Complies

Result: The requirements are met

11.2 Radiated emissions

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part. 15.209
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Semi-anechoic chamber

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S108, CMC S127, CMC S164, CMC S271, CMC S287
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Enclosure
Frequency range: 0,009 – 4500 MHz
Antenna polarization: Horizontal (H) – Vertical (V)
EUT height about the floor:
80 cm for frequencies ≤ 1000 MHz
150 cm for frequencies > 1000 MHz
EUT – Antenna distance:
10 m for frequencies ≤ 1000 MHz
3 m for frequencies > 1000 MHz

Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
22	100	42

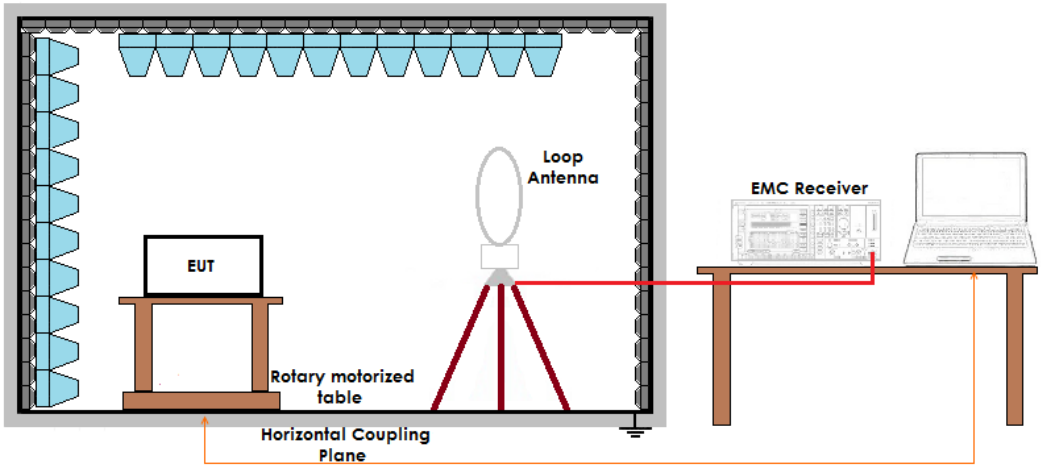
Acceptance limits

Frequency range (MHz)	*Test distance (m)*	*Limits [dB(µV/m)]*	
0,009 to 0,490	300	48,5 to 13,8	
0,490 to 1,705	30	33,8 to 22,9	
1,705 to 30	30	29,5	
30 to 88	3	40	
88 to 216	3	43,5	
216 to 960	3	46,0	
Above 960	3	53,9	
	Test distance (m)	*Linear average detector [dB(µV/m)]*	*Peak detector [dB(µV/m)]*
Above 1000	3	53,9	73,9

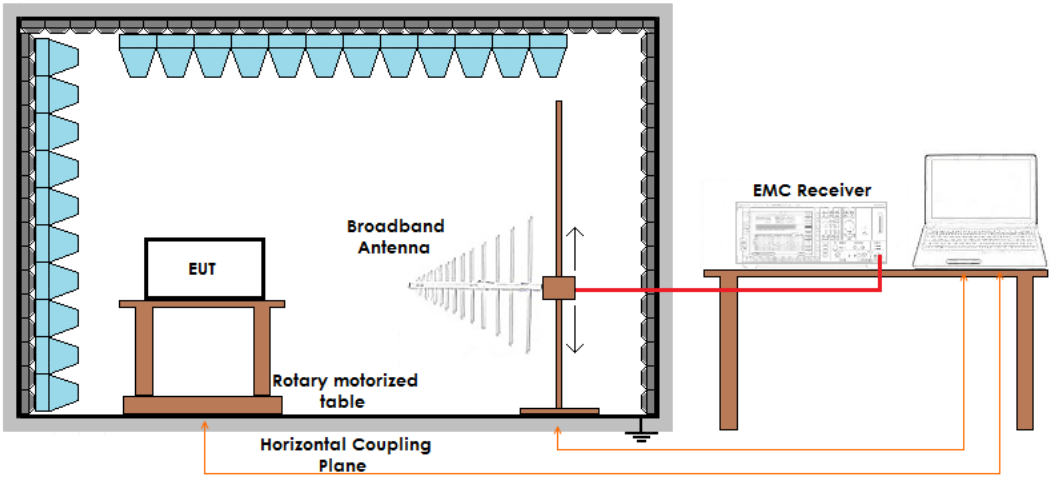
Remarks: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Setup

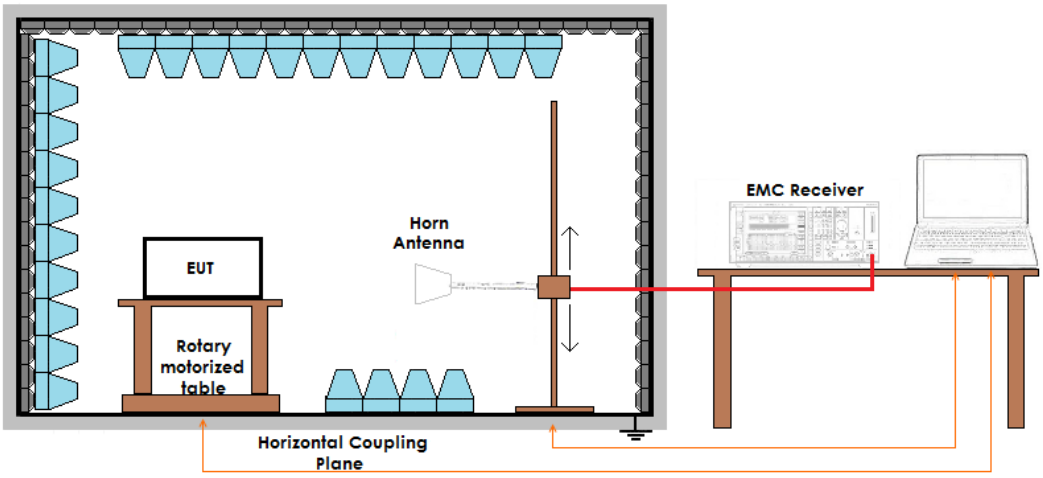
Frequency ≤ 30 MHz



Frequency ≤ 1 GHz



Frequency > 1 GHz

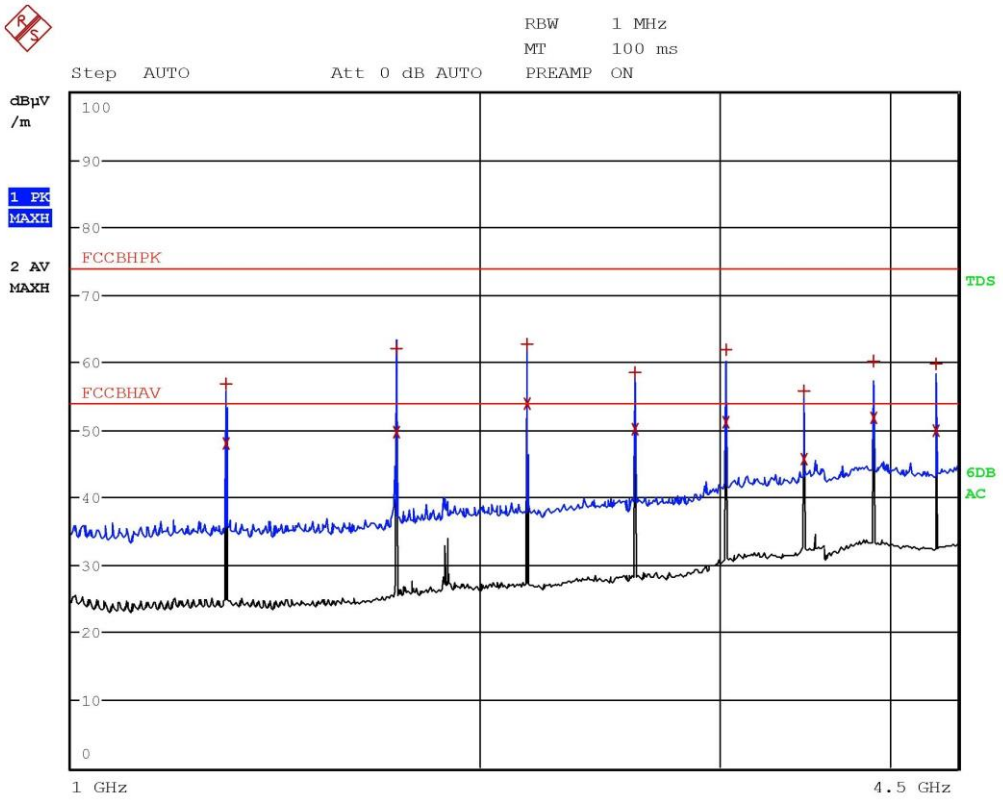


Result

Polarization	*Frequency Range (MHz)*	*Graphs*	*Remarks*	*Result*
H	1000 – 4500	G19082902	--	Complies
V	1000 – 4500	G19082903	--	Complies
H	300 – 1000	G19082904	--	Complies
V	300 – 1000	G19082905	--	Complies
V	30 – 300	G19082909	--	Complies
H	30 – 300	G19082910	--	Complies
Loop	0,009 – 30	G19082911	--	Complies
Remarks:	Peaks above the limits at 433,88 MHz are due to the main transmitting frequency			

Graphs Legend
PK: Peak; QP [1s] (quasi-peak at 1 second) values are marked with a +
AV: Average; AV [1s] (average at 1 second) values are marked with a x

Graphs



Gandini 19082902

EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCCBHPK
Trace2:	FCCBHAV
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Max Peak	1.3016 GHz	56.86	-17.11
2 Average	1.3016 GHz	47.94	-6.03
1 Max Peak	1.7356 GHz	61.97	-12.03
2 Average	1.7356 GHz	49.62	-4.35
1 Max Peak	2.1696 GHz	62.79	-11.18
2 Average	2.1696 GHz	53.91	-0.06
2 Average	2.6032 GHz	50.01	-3.96
1 Max Peak	2.6032 GHz	58.41	-15.56
1 Max Peak	3.0368 GHz	61.89	-12.08
2 Average	3.0372 GHz	51.08	-2.89
1 Max Peak	3.4708 GHz	55.83	-18.14
2 Average	3.4712 GHz	45.62	-8.35
1 Max Peak	3.9048 GHz	60.15	-13.82
2 Average	3.9048 GHz	51.71	-2.26
1 Max Peak	4.3384 GHz	59.74	-14.23
2 Average	4.3388 GHz	49.80	-4.17

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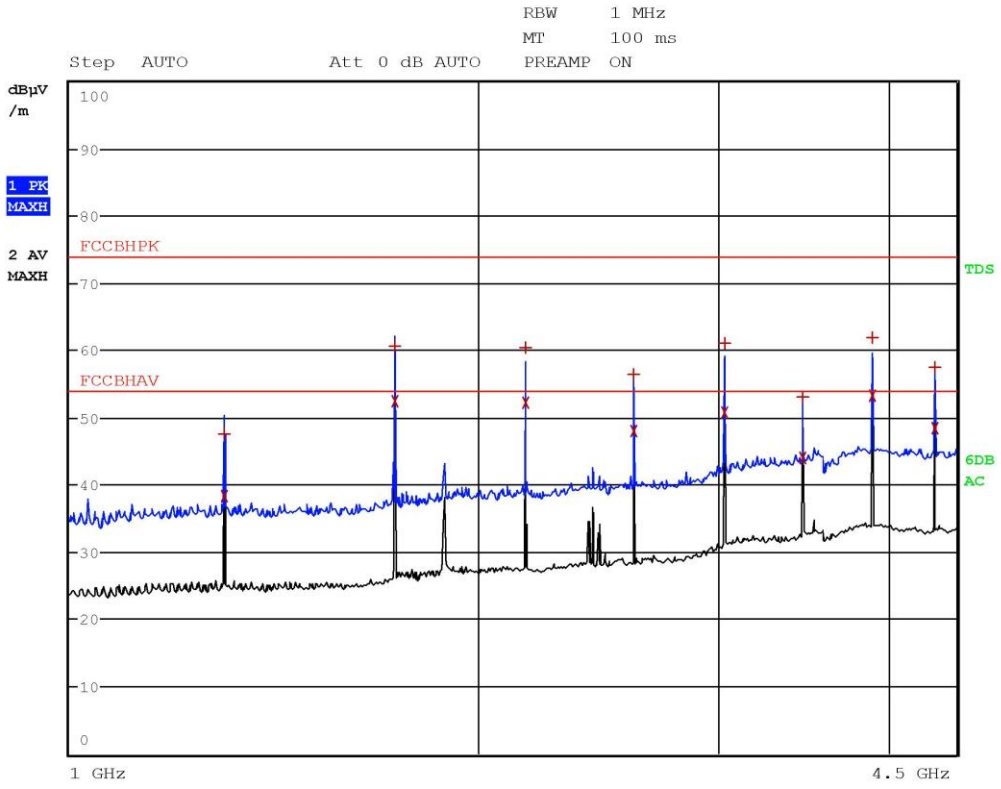


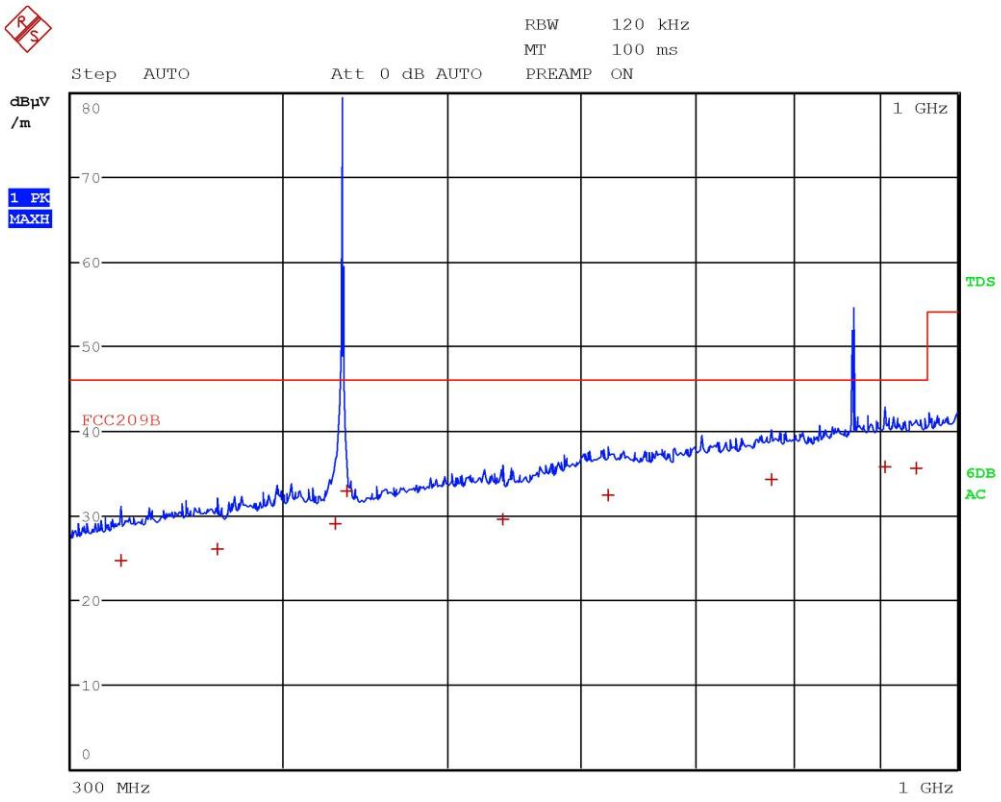
Gandini 19082903

EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCCBHPK
Trace2:	FCCBHAV
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
2 Average	1.3016 GHz	38.34	-15.63
1 Max Peak	1.3016 GHz	47.59	-26.38
1 Max Peak	1.7356 GHz	60.61	-13.36
2 Average	1.7356 GHz	52.35	-1.62
1 Max Peak	2.1692 GHz	60.44	-13.54
2 Average	2.1696 GHz	52.11	-1.86
2 Average	2.6032 GHz	47.94	-6.03
1 Max Peak	2.6032 GHz	56.43	-17.54
1 Max Peak	3.0372 GHz	61.02	-12.95
2 Average	3.0372 GHz	50.79	-3.18
1 Max Peak	3.4712 GHz	52.95	-21.02
2 Average	3.4712 GHz	44.11	-9.86
1 Max Peak	3.9048 GHz	61.93	-12.04
2 Average	3.9052 GHz	53.19	-0.78
2 Average	4.3388 GHz	48.41	-5.56
1 Max Peak	4.3388 GHz	57.35	-16.62

Gandini 19082903



Gandini 19082904

EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209B
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	320.76 MHz	24.59	-21.43
1 Quasi Peak	365.92 MHz	26.02	-19.99
1 Quasi Peak	429.2 MHz	28.93	-17.09
1 Quasi Peak	435.76 MHz	32.77	-13.24
1 Quasi Peak	539.6 MHz	29.49	-16.52
1 Quasi Peak	622.2 MHz	32.31	-13.70
1 Quasi Peak	776.32 MHz	34.27	-11.74
1 Quasi Peak	905.64 MHz	35.74	-10.27
1 Quasi Peak	944.84 MHz	35.59	-10.42

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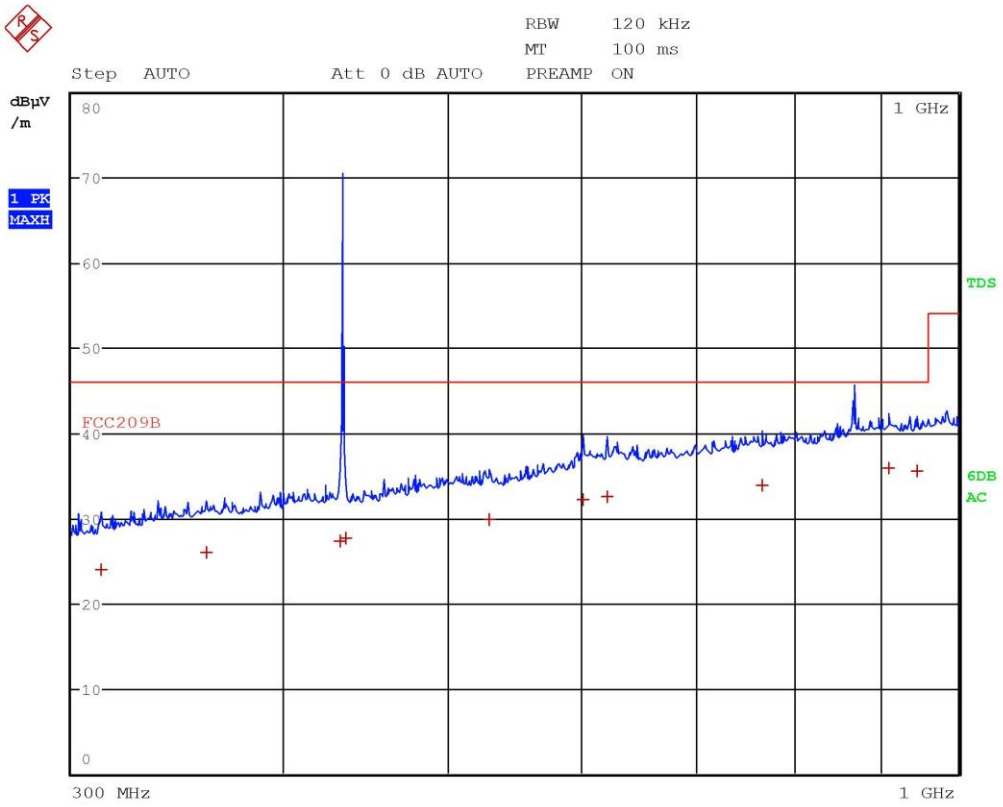

Gandini 19082905

EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209B
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	312.32 MHz	24.03	-21.98
1 Quasi Peak	360.64 MHz	25.92	-20.09
1 Quasi Peak	432.36 MHz	27.38	-18.63
1 Quasi Peak	434.92 MHz	27.70	-18.31
1 Quasi Peak	529.28 MHz	29.77	-16.24
1 Quasi Peak	600.32 MHz	32.18	-13.83
1 Quasi Peak	620.52 MHz	32.48	-13.53
1 Quasi Peak	766.8 MHz	33.86	-12.15
1 Quasi Peak	909.96 MHz	35.82	-10.19
1 Quasi Peak	944.88 MHz	35.58	-10.43

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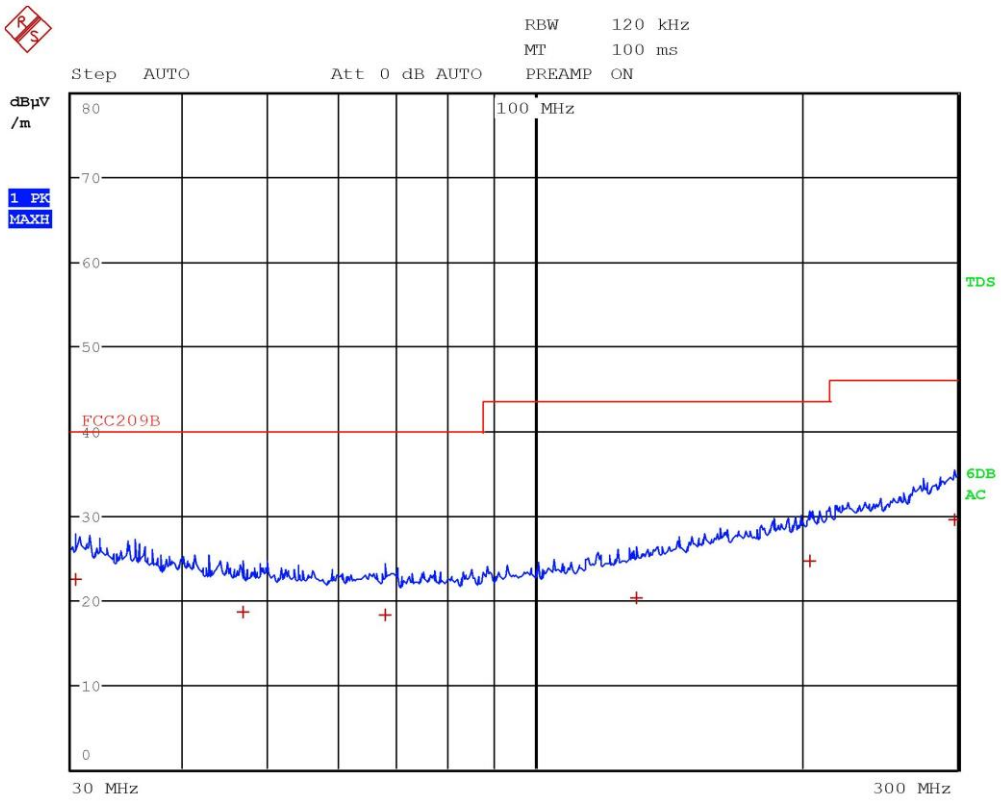

Gandini 19082909

EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209B
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.28 MHz	22.51	-17.48
1 Quasi Peak	46.92 MHz	18.63	-21.36
1 Quasi Peak	67.84 MHz	18.31	-21.68
1 Quasi Peak	130.28 MHz	20.30	-23.21
1 Quasi Peak	204.28 MHz	24.61	-18.90
1 Quasi Peak	298.24 MHz	29.55	-16.46

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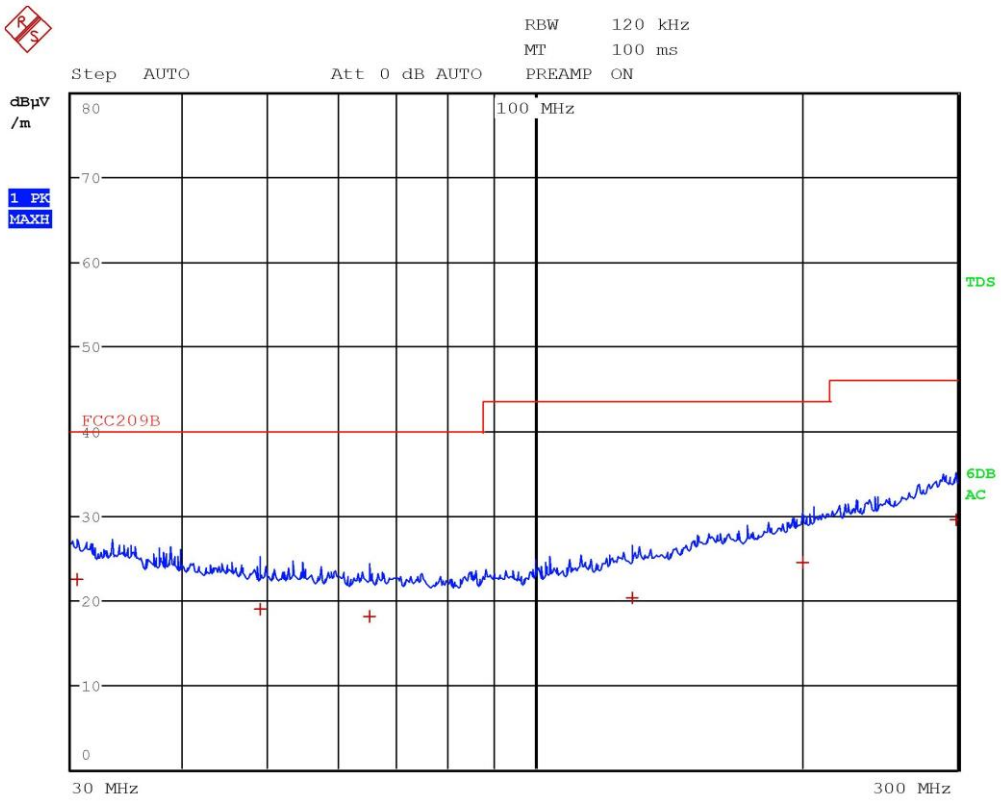

Gandini 19082910

PEAK FREQUENCY
4

EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209B
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.36 MHz	22.46	-17.53
1 Quasi Peak	48.92 MHz	18.88	-21.11
1 Quasi Peak	65.12 MHz	18.11	-21.88
1 Quasi Peak	128.84 MHz	20.20	-23.31
1 Quasi Peak	200.76 MHz	24.42	-19.09
1 Quasi Peak	298.92 MHz	29.47	-16.54

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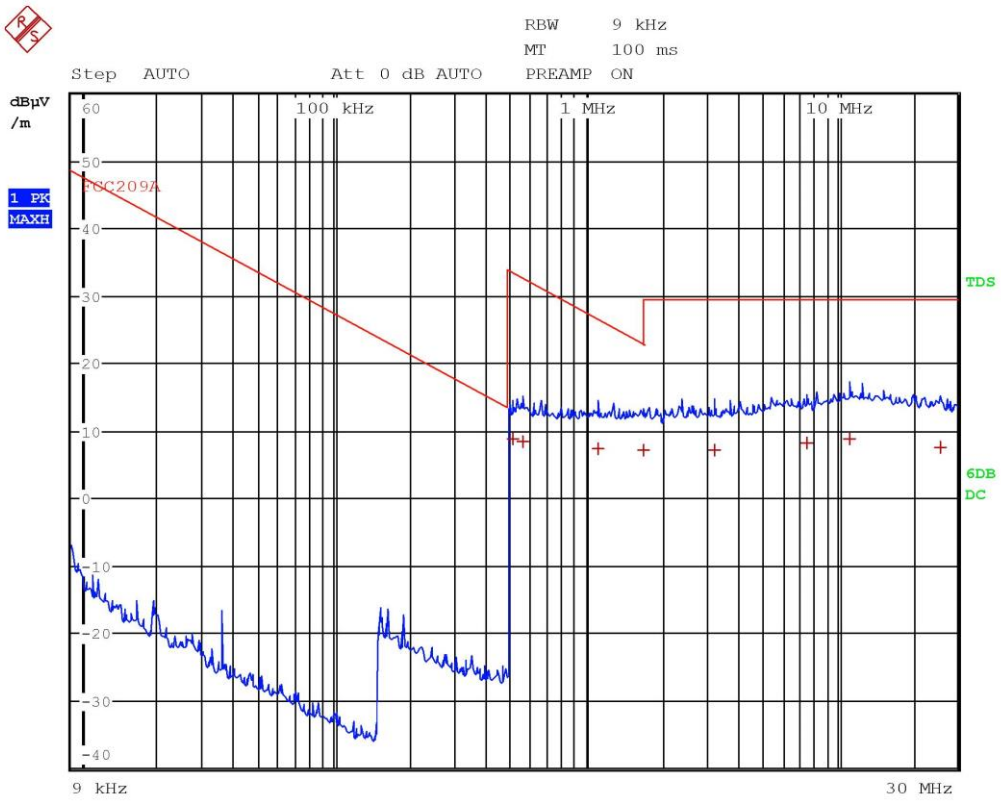


Gandini 19082911

EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209A
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	510 kHz	8.81	-24.64
1 Quasi Peak	558 kHz	8.51	-24.15
1 Quasi Peak	1.114 MHz	7.43	-19.22
1 Quasi Peak	1.694 MHz	7.18	-15.84
1 Quasi Peak	3.23 MHz	7.11	-22.42
1 Quasi Peak	7.526 MHz	8.29	-21.24
1 Quasi Peak	11.118 MHz	8.90	-20.63
1 Quasi Peak	25.766 MHz	7.67	-21.86

Gandini 19082911

Result: The requirements are met

11.3 Fundamental and Spurious Emission (≤ 1 GHz)

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209 and Part 15.231(b)
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Semi-anechoic chamber

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S136, CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Enclosure
Antenna polarization: Horizontal (H) – Vertical (V)
EUT – Antenna distance: 3 m
Detector CISPR quasi-peak

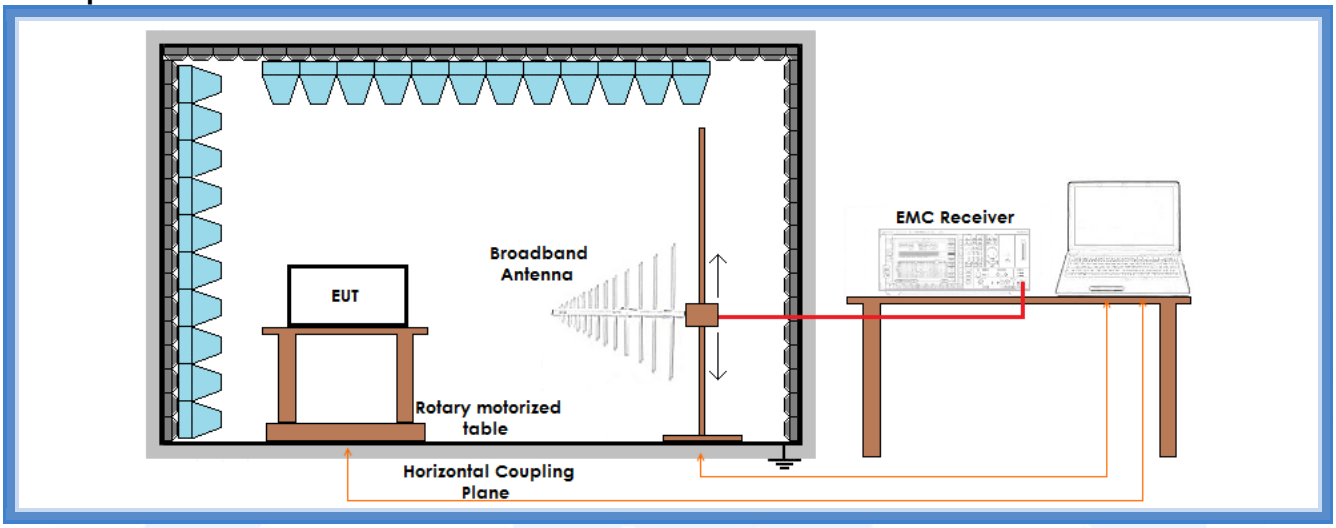
Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
23	100	45

Acceptance limits

FCC Part 15.231 (b)		
Fundamental frequency (MHz)	*Field strength of fundamental [dB(µV/m)]*	*Field strength of spurious emissions [dB(µV/m)]*
40,66 to 40,70	67,04	47,04
70 to 130	61,94	41,94
130 to 174	61,94 to 71,48	41,94 to 51,48
174 to 260	71,48	51,48
260 to 470	71,48 to 81,94	51,48 to 61,94
Above 470	81,94	61,94

Setup



Graphs:	G19082901 and G19082906

Result – Field strength of fundamental

Frequency (MHz)	*Limits (dBµV/m)*	*Peak level (dBµV/m)*	*Duty cycle correction (dB)*	*Level (dBµV/m)*	*Results*
433,88	80,82	79,74	-6,02	73,72	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest value.

Duty cycle value has been obtained using the following formula:

Duty cycle = 20log0,50 = -6,02 dB where 0,50 is the duty cycle declared by the manufacturer

Result – Field strength of spurious emissions

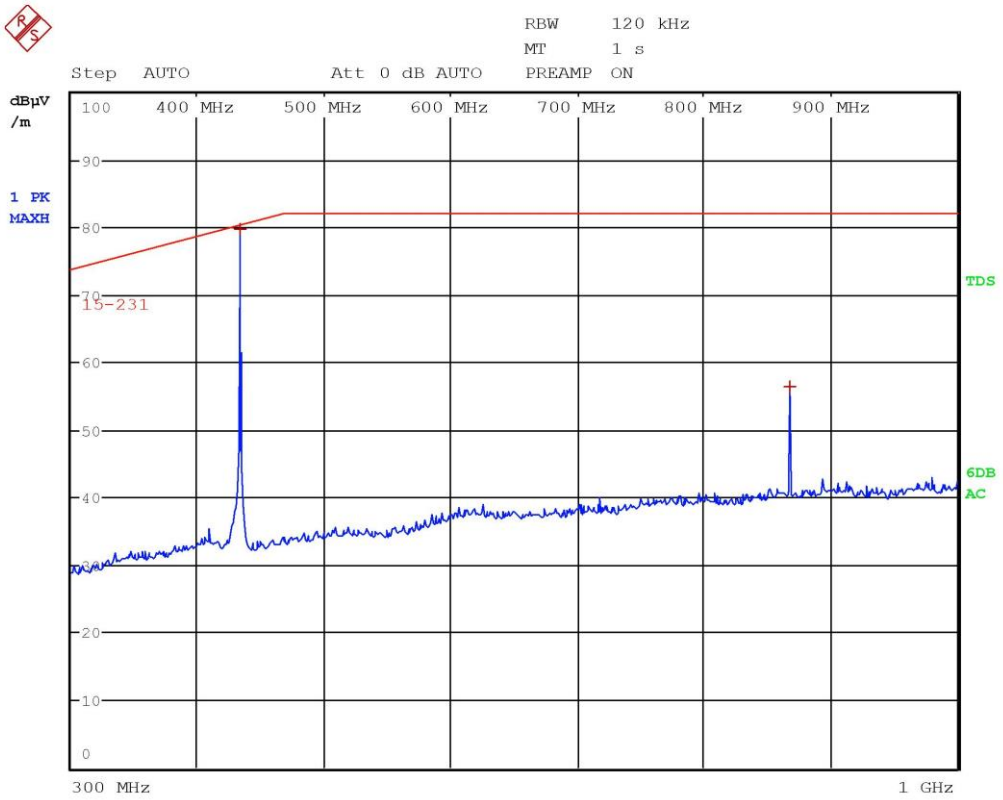
Frequency (MHz)	*Limits (dBµV/m)*	*Peak level (dBµV/m)*	*Duty cycle correction (dB)*	*Level (dBµV/m)*	*Results*
866,84	60,82	56,47	-6,02	50,45	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest value.

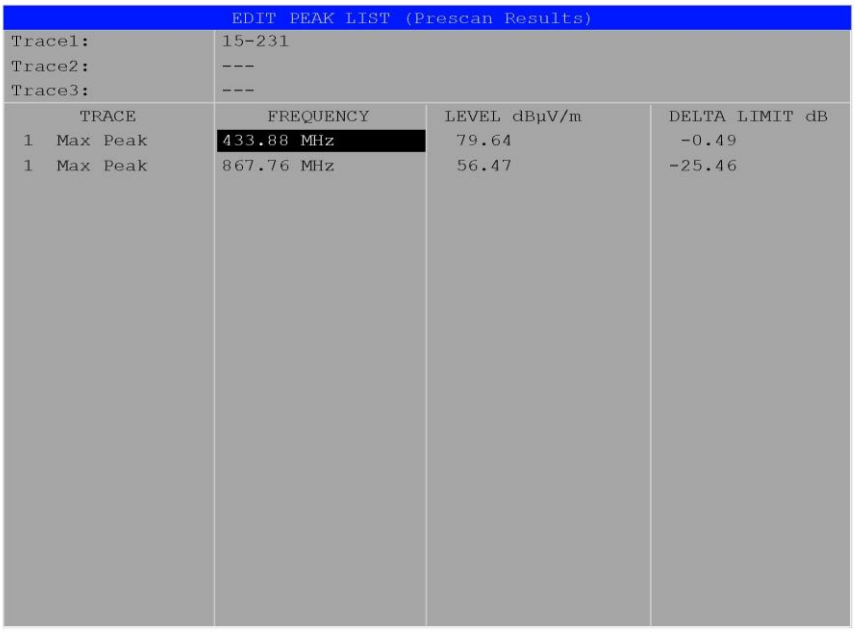
Duty cycle value has been obtained using the following formula:

Duty cycle = 20log0,50 = -6,02 dB where 0,50 is the duty cycle declared by the manufacturer

Graphs



Gandini 19082901

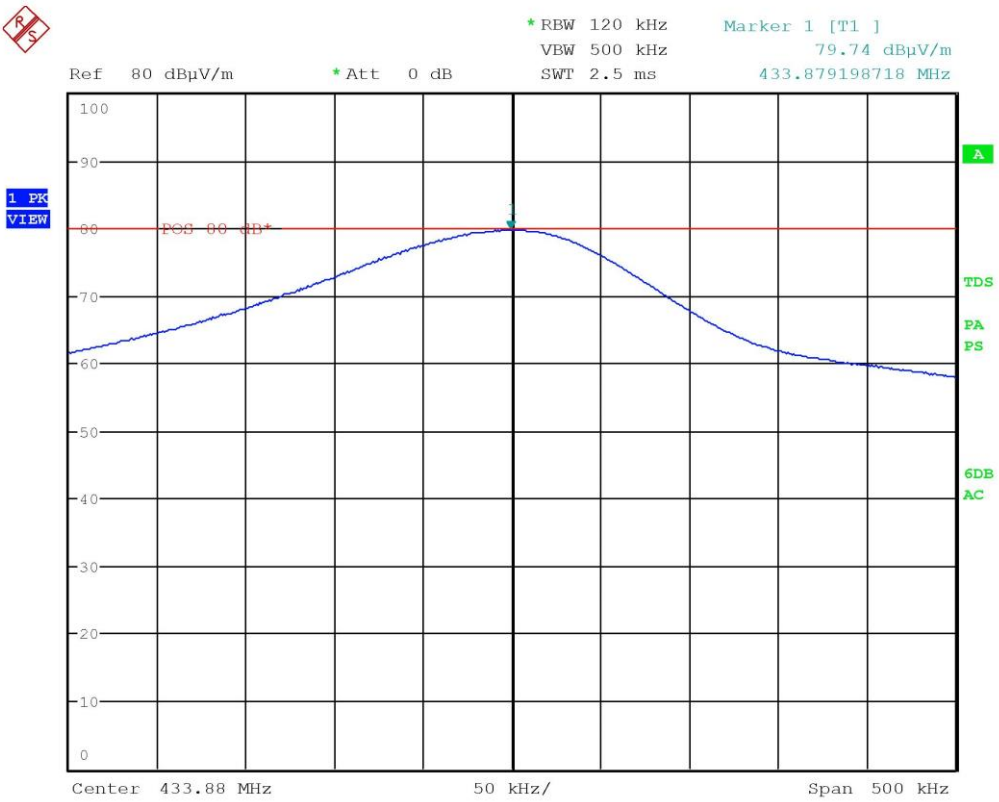


EDIT PEAK LIST (Prescan Results)

Trace1:	15-231
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Max Peak	433.88 MHz	79.64	-0.49
1 Max Peak	867.76 MHz	56.47	-25.46

Gandini 19082901



Gandini 19082906

Result: The requirements are met

11.4 Spurious Emission (> 1 GHz)

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209 and Part 15.231
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Semi-anechoic chamber

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S108, CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Enclosure
Antenna polarization: Horizontal (H) – Vertical (V)
EUT – Antenna distance: 3 m
Detector AV + Peak

Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
23	100	45

Acceptance limits

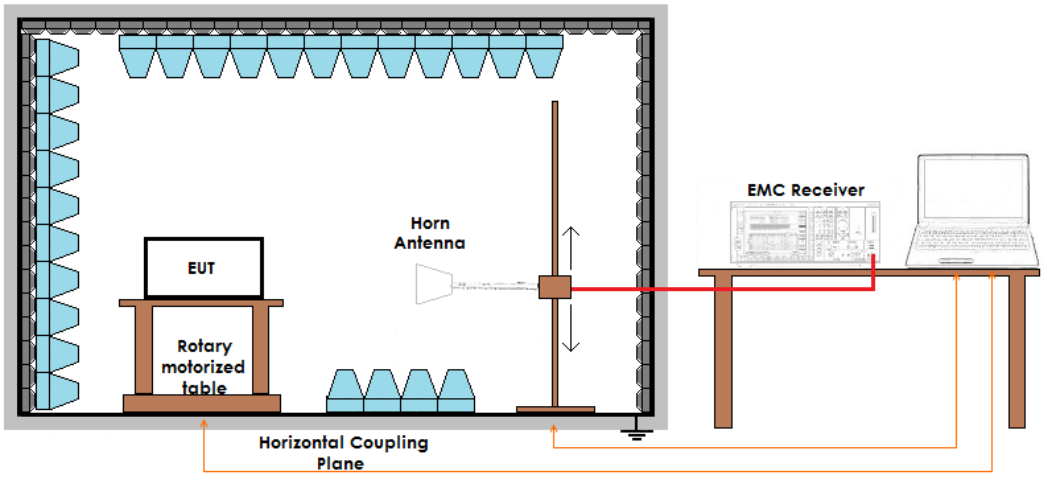
Acceptance limits for emissions in restricted frequency bands		
Frequency (MHz)	*AV limits [dB(µV/m)]*	*Peak limits [dB(µV/m)]*
> 1000	54	74

The restricted frequency bands are listed in the following table

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
13,36 – 13,41			

Acceptance limits for emissions in non-restricted frequency bands
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Setup



Result – AV detector

Harmonic	*Limits (dBµV/m)*	*Level (dBµV/m)*	*Results*
III	54,00	47,94	Complies
IV	54,00	52,35	Complies
V	54,00	53,91	Complies
VI	54,00	50,01	Complies
VII	54,00	51,08	Complies
VIII	54,00	45,62	Complies
IX	54,00	53,19	Complies
X	54,00	49,80	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. No spurious other then harmonics have been found. The results have been extrapolated to the specified distance using an extrapolation factor. For all harmonics it was considered the limit of 54 dBµV/m as a worst case

Result – PK detector

Harmonic	*Limits (dBµV/m)*	*Level (dBµV/m)*	*Results*
III	74,00	56,86	Complies
IV	74,00	61,97	Complies
V	74,00	62,79	Complies
VI	74,00	58,41	Complies
VII	74,00	61,89	Complies
VIII	74,00	55,83	Complies
IX	74,00	61,93	Complies
X	74,00	59,74	Complies
Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. No spurious other then harmonics have been found. The results have been extrapolated to the specified distance using an extrapolation factor. For all harmonics it was considered the limit of 74 dBµV/m as a worst case			

Result: The requirements are met

11.5 Occupied channel bandwidth

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.231 (c)
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Laboratory

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S136, CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

The bandwidth of the emission shall be no wider than 0,25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0,5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier

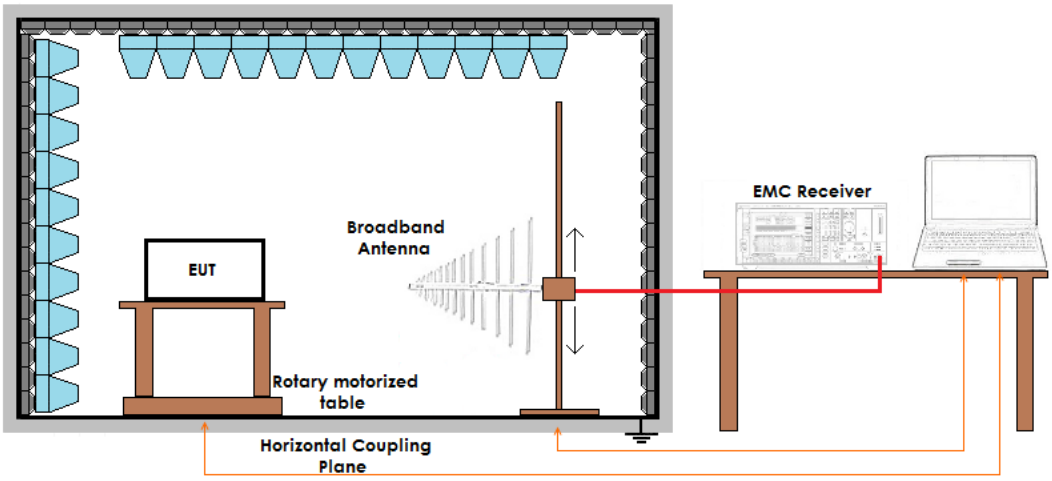
Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
23	100	45

Acceptance limits

Limits	
Devices operating above 70 MHz and below 900 MHz	***Devices operating above 900 MHz***
0,25% of the center frequency	0,5% of the center frequency

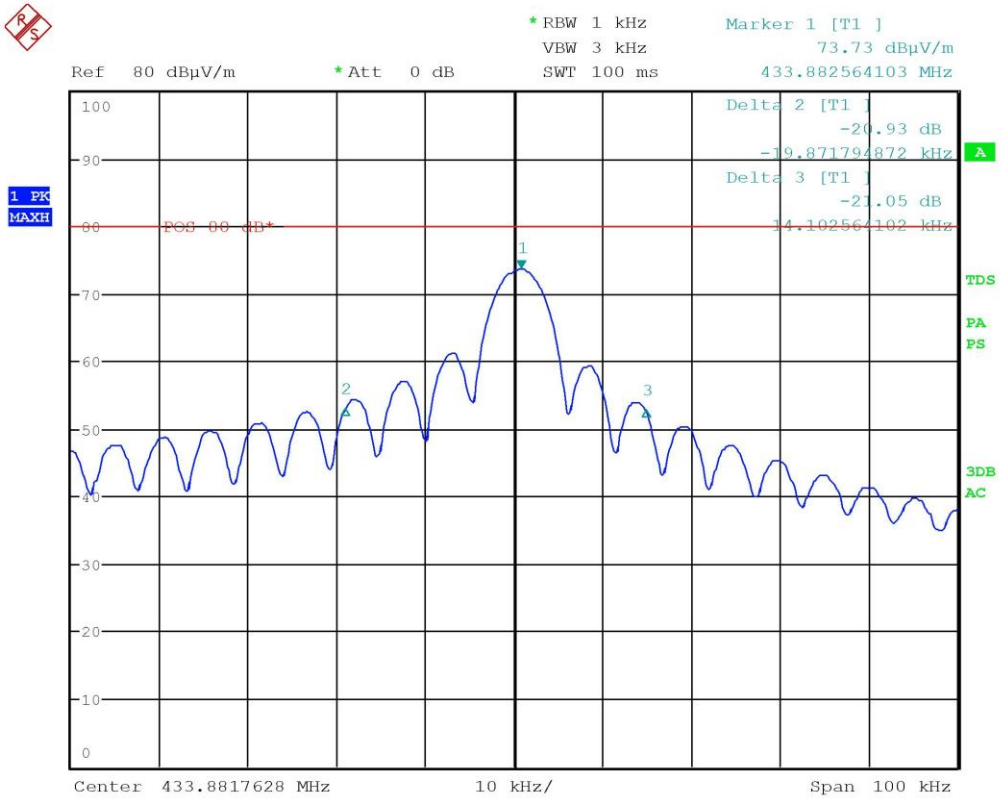
Setup



Result

Frequency (MHz)	*Limit (kHz)*	*20 dB bandwidth (kHz)*	*Graphs*	*Results*
433,88	1084,70	33,97	G19082908	Complies

Graphs



Gandini 19082908

Result: The requirements are met

11.6 Periodic Operation Characteristics

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.231 (a) (e)
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

Test site:
Laboratory

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S164
Measurement uncertainty: See clause 7 of this test report

Test specification

☑ Manually operated transmitter
❑ Transmitter activated automatically

The provisions of this section are restricted to periodic operation within the band 40,66 – 40,70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation

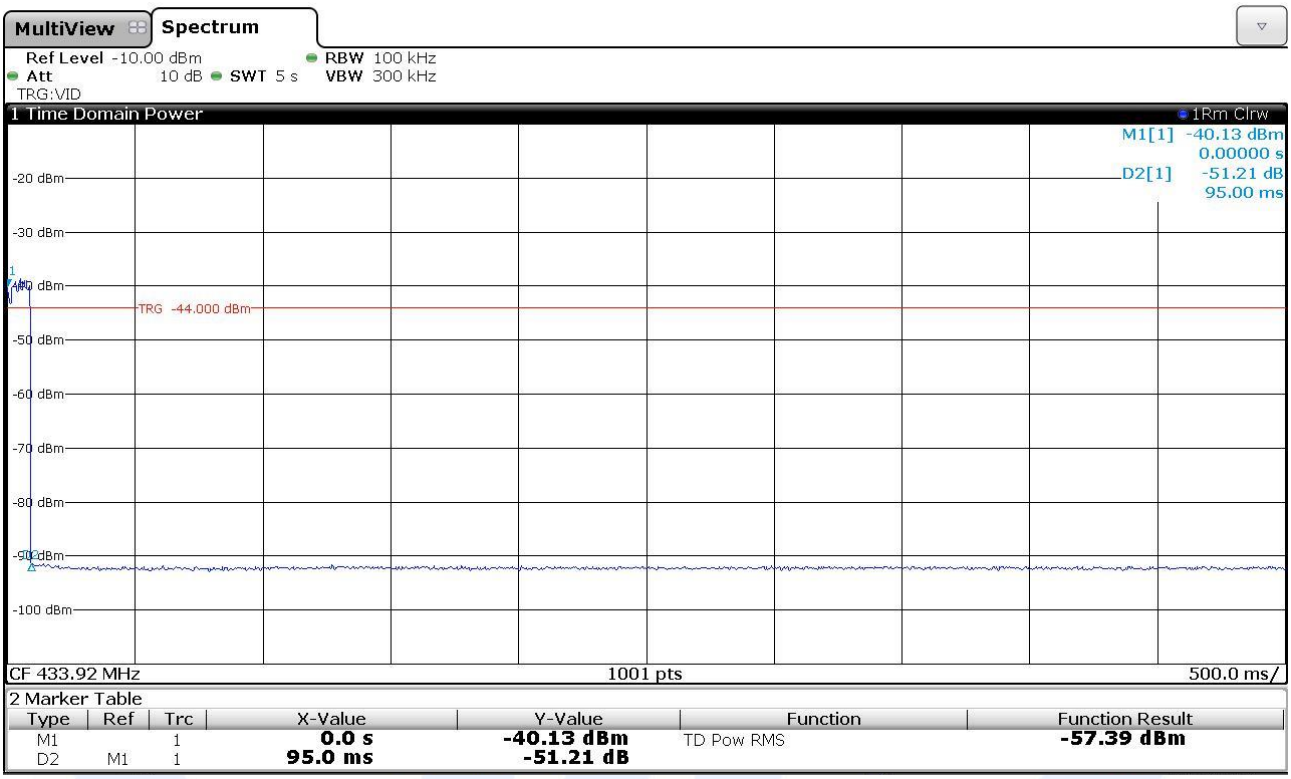
Environmental conditions

Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
23	100	45

15.231(a1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. See graph G19082912
15.231(a2) A transmitter activated automatically shall cease transmission within 5 seconds after activation **Result:** N.A.
15.231(a3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour **Result:** The EUT does not employ periodic transmission.
15.231(a4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition. **Result:** N.A.
15.231(a5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data **Result:** N.A.

Graphs

Gandini 19082912



Result: The requirements are met