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LAB N° 0168

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

TEST REPORT
Nr. R19065601

Federal Communication Commission (FCC)

Report Reference No. ..... :	R19065601
Date of issue: ..... :	29.11.19
Total number pages: ..... :	57
Applicant´s name ..... :	Elica S.p.A.
Address ..... :	Via Ermanno Casoli, 2 – 60044 Fabriano (AN) – ITALY
Test specification:	
Standards ..... :	FCC Rules & Regulations, Title 47:2018 Part 15 paragraph(s): 203, 204, 207, 209, 215 and 231
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	15-231CMC
Test Report Form(s) Originator .. :	CMC Centro Misure Compatibilità S.r.l.
Master TRF ..... :	2019-11

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description ..... :	Remote Controller for HOOD
Trademark ..... :	Elica
Manufacturer ..... :	Selco Industry S.p.A.
Model / Type reference ..... :	ECB0124588
FCC ID ..... :	TMQECB0124588A
Rating(s) ..... :	5 Vdc from AC/DC power unit

Report

Tested by (name + signature) ..... :	G. Gandini	.....
Approved by (name + signature) ..... :	R. Beghetto	.....

1 Summary

2 Reference standard	
FCC Rules and Regulation Title 47 part 15:2018	--
3 List of attachments	
Attachment 1: Instruments list, measurement uncertainty, judgement of compliance and quality manual references	
4 Deviation(s) from test specification	
None	
5 Testing location	
CMC Centro Misure Compatibilità S.r.l. Via della Fisica, 20 – 36016 Thiene (VI) – Italy Test site facility's FCC registration number: 182474	

Testing and sampling:	
Date of receipt of test item	15.03.19
Testing start date	20.05.19
Testing end date	27.11.19
Sampling procedure	Equipment used for testing was picked up by the manufacturer, at the end of the production process with random criterion. The results relate to the sample as it has been received.
General remarks:	
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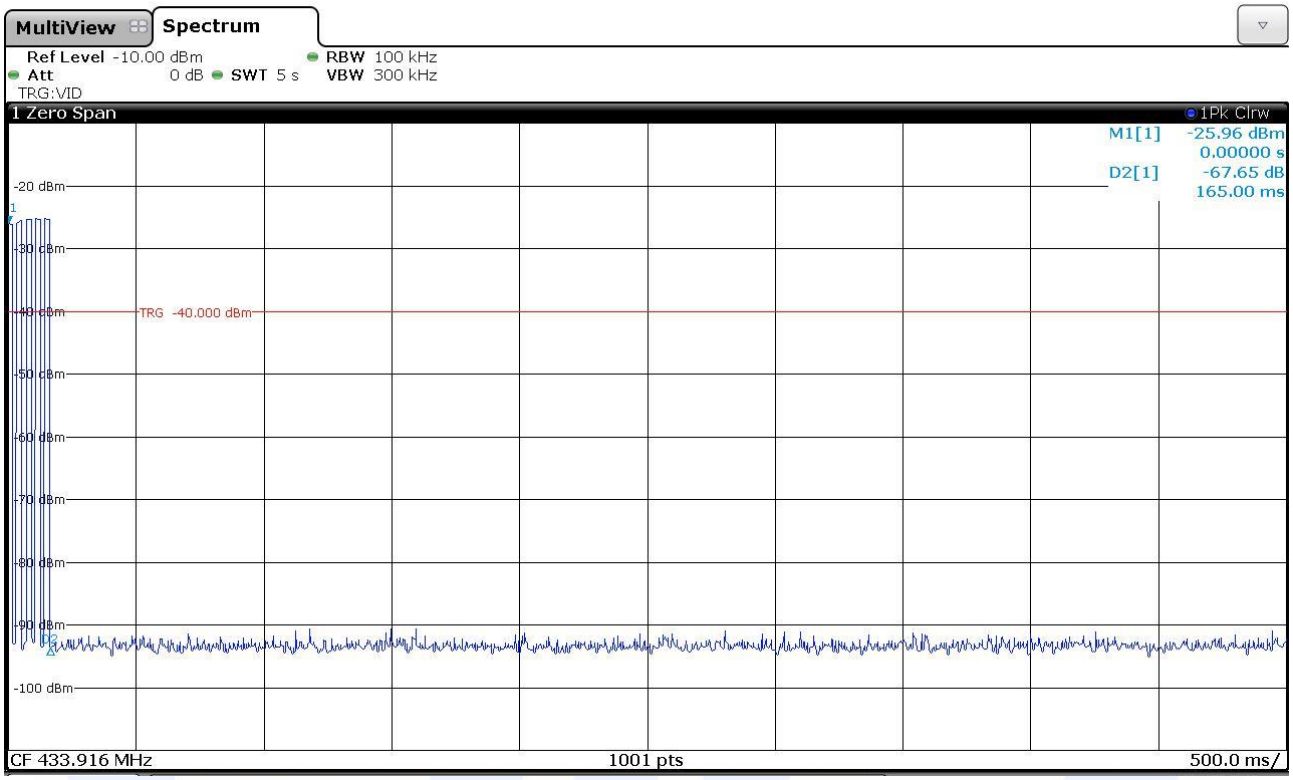
Possible test case verdicts:	
Test case does not apply to the test object:	N/A (Not Applicable)
Test object does meet the requirement:	P (Pass)
Test object does not meet the requirement:	F (Fail)
Test object does not performed:	N/E (Not Executed)
Definition of symbols used in this test report:	
☒ Indicates that the listed condition, standard or equipment is applicable for this report. ☐ Indicates that the listed condition, standard or equipment is not applicable for this report.	

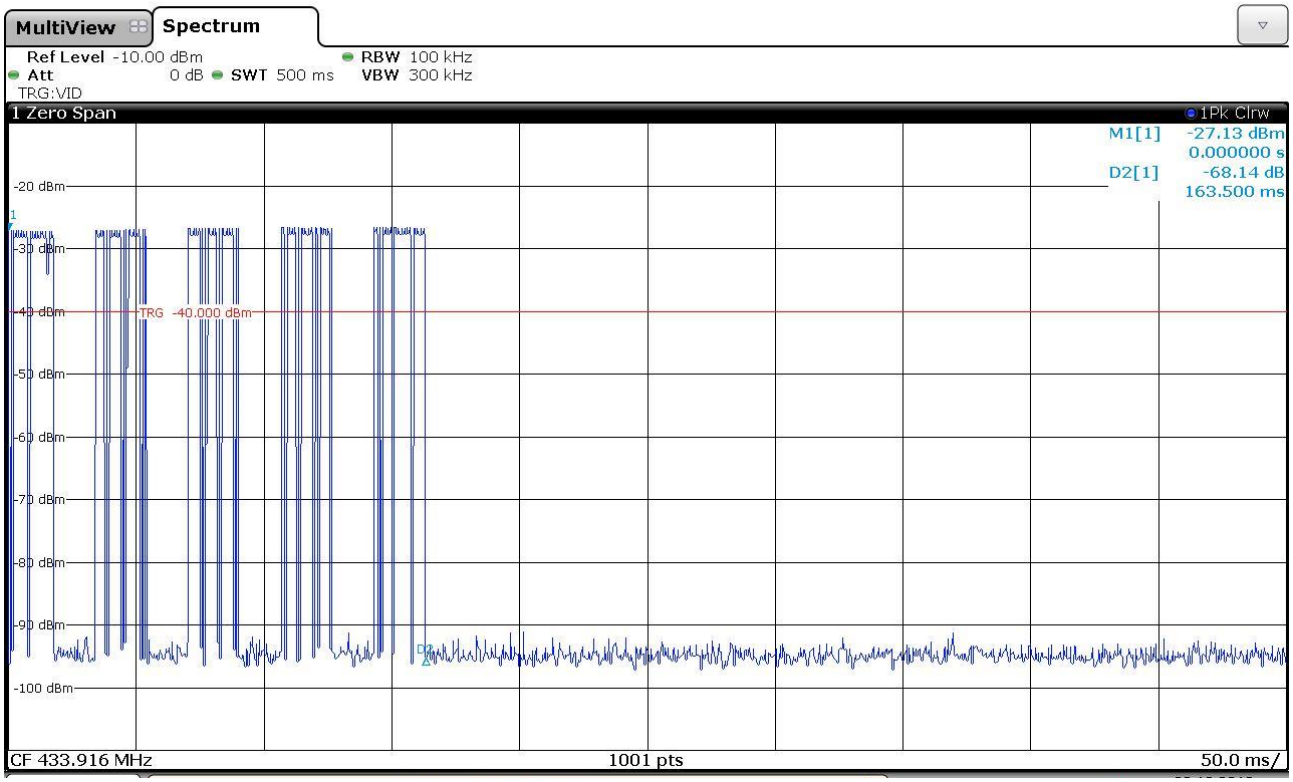
6 General description of test item(s)

Description ..... :	Remote Controller for HOOD						
Model Number ..... :	ECB0124588						
FCC ID ..... :	TMQECB0124588A						
Serial Number ..... :	--						
Brand name ..... :	Elica						
Nominal frequency ..... :	433,92 MHz						
Rated power supply ..... :		Voltage and Frequency	Reference poles				
			N	L1	L2	L3	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 5 V from AC/DC power unit					☐
Software version ..... :	R1.44						
Test configuration ..... :	☐	Table top equipment					
	☐	Floor standing equipment					
	☒	Hand-held equipment					
Type of equipment ..... :	☒	Transmitter unit					
	☐	Receiver unit					
Transmitter type ..... :	☒	Manually operated transmitter					
	☐	Transmitter activated automatically					
Type of station ..... :	☐	Fixed station					
	☒	Portable station					
	☐	Mobile station					
Operating modes ..... :	No.	Operating mode of test item					
	1	EUT in continuous transmission at maximum power					
Duty cycle evaluation ..... :	9,095 ms Evaluation has been performed in agreement with FCC Part 15.35c. The transmission is intended as a train of pulses of 19,92 ms duration with ON time of 8,26 ms. 3 pulses is transmitted during the 100 ms evaluation time, total transmission time is 163,5 ms when button is pushed for less than 2 s. See also graphs G19065616, G19065617, G19065619 and G19065620						
Delta (dB) for the performing of tests ..... :	20log (3x8,26 ms /100 ms) = -12,12 dB						

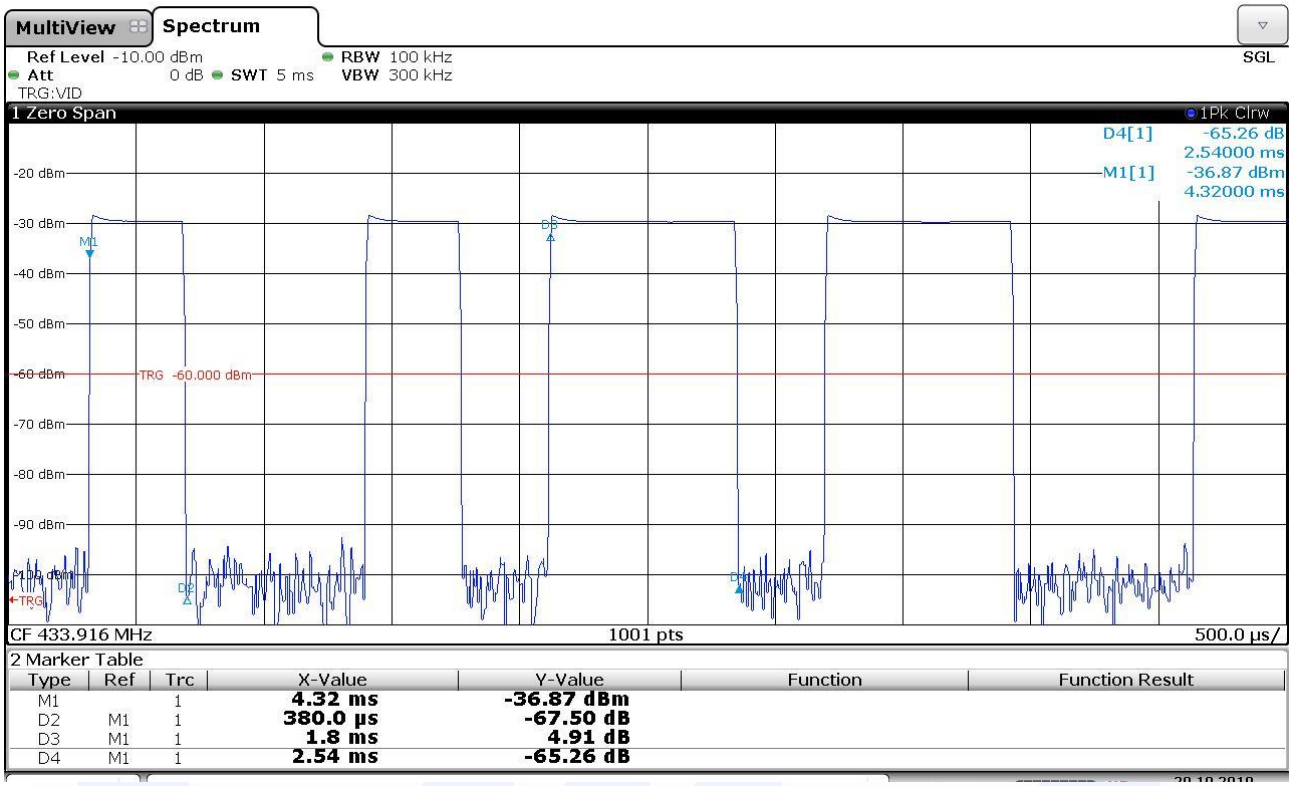
Gandini 19065616



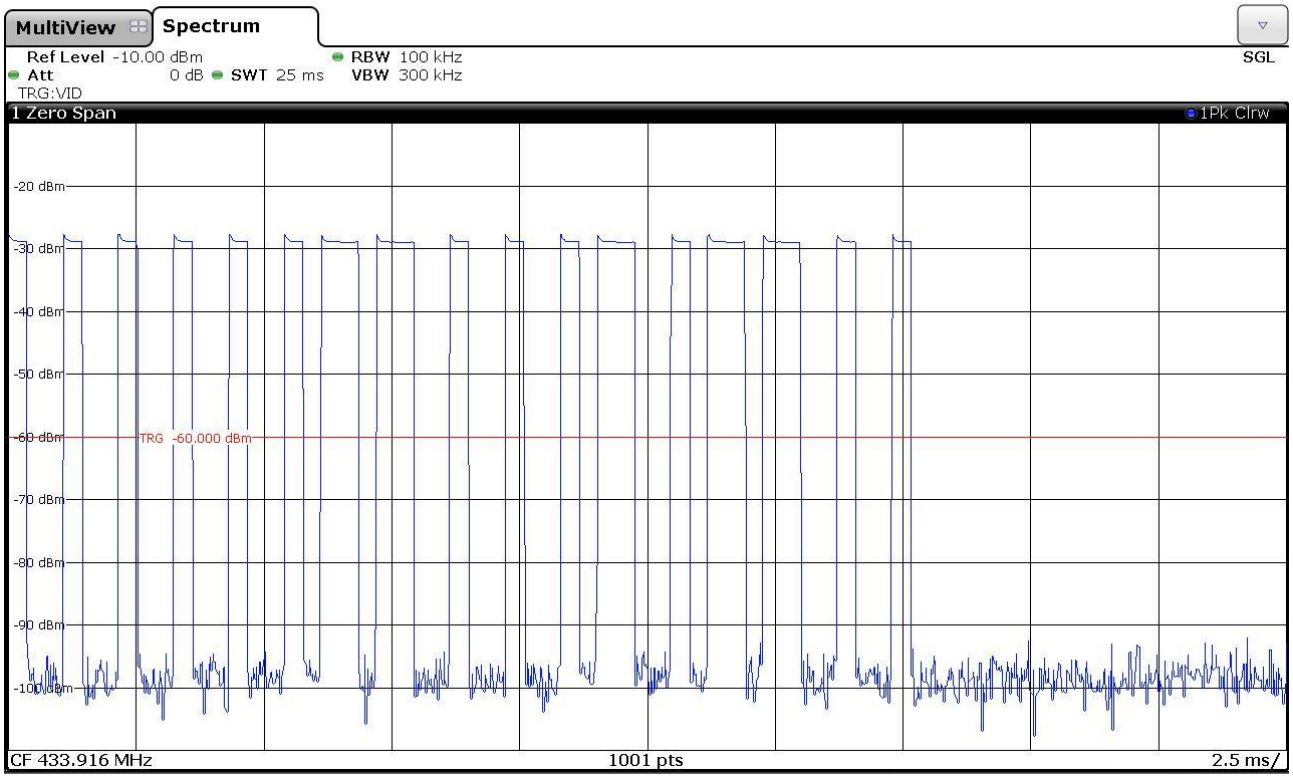
Gandini 19065617



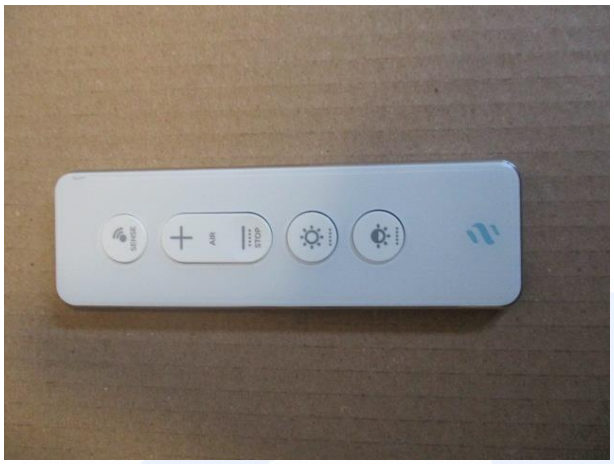
Gandini 19065619

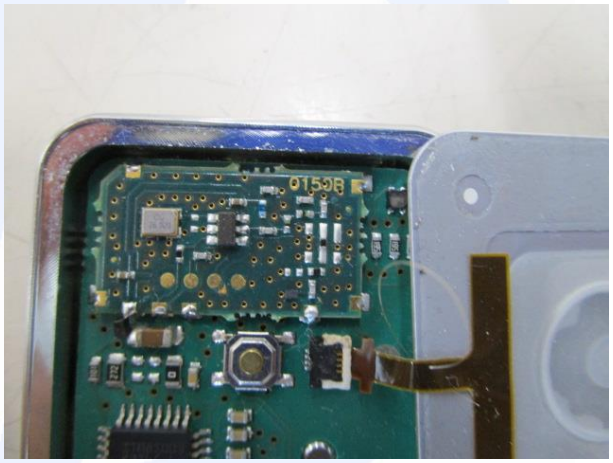


Gandini 19065620



6.1 Photos of the test item





7 Verdict summary section

FCC Rules & Regulations, Title 47:2018 Part 15 paragraph(s): 203, 204, 207, 209, 215 and 231			
Clause	**Requirement – Test case**	**Basic standard**	**Verdict**
Part 15.203	Antenna requirements	--	**P**
Part 15.207	Conducted emissions	ANSI C63.10	**P**
Part 15.209 and 15.231	Radiated emissions and spurious emissions	ANSI C63.10	**P**
Part 15.209 and 15.231(b) (e)	Fundamental and spurious emissions (≤ 1 GHz)	ANSI C63.10	**P**
Part 15.231(c)	Occupied channel bandwidth	ANSI C63.10	**P**
Part 15.231(a) (e)	Periodic operation characteristics	--	**P**

Normative references	
Reference no.	***Description***
FCC Rules and Regulation Title 47 part 15:2018	--
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

8 Test conditions

8.1 General

Environmental reference conditions.....:	The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Temperature	Humidity	Atmospheric pressure
15 °C – 35 °C	30 % - 60 %	800 hPa – 1060 hPa
If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.		

Measurement uncertainties .....:	Attachment 1

9 Test results

9.1 Antenna requirements

Tested by ..... :	G. Gandini	
Test date ..... :	20.05.19	
Reference standards ..... :	FCC Rules and Regulation; Titles 47 Part. 15.203 and 15.204	
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, 15.221, or § 15.236. 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	
Antenna type ..... :	☒	Integral antenna
	☐	External antenna
Antenna gain ..... :	0 dBi	
External R.F. power amplifier ..... :	Not Present	

9.2 Conducted emission

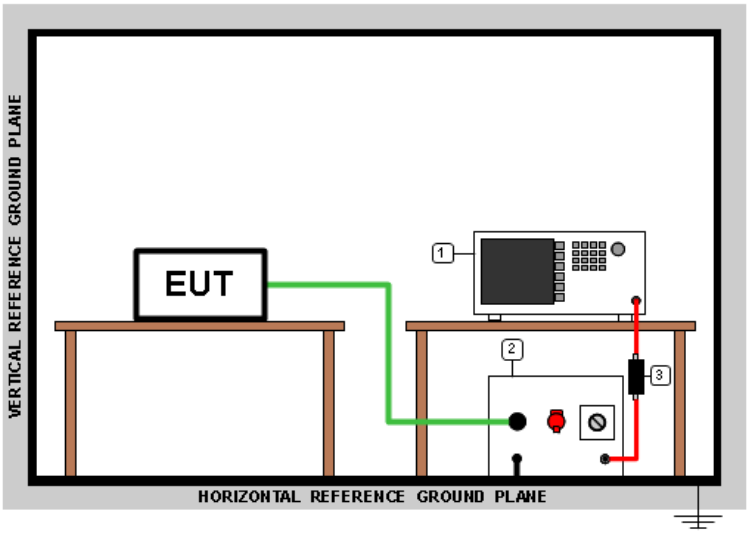
Tested by ..... :	G. Gandini	
Test date ..... :	27.11.19	
Test location (stand) ..... :	Shielded chamber (CMC A001)	
Reference standards ..... :	FCC Rules and Regulation; Titles 47 Part. 15.207 ANSI C63.10 cl. 6.2	
Test set-up description ..... :	☒	Table top equipment set-up (80 cm above the reference ground plane)
	☐	Floor standing equipment set-up (insulating material up to 12 mm thick)
	☐	False floor installation equipment set-up (insulating material up to 34 cm above the reference ground plane)
Supplementary Test set-up description ..... :	--	
Test method applied ..... :	☒	Artificial mains network, 50 µH/50 Ω LISN
	☐	Other:

Acceptance limits

Frequency range (MHz)	*dB(µV) Quasi-peak*	*dB(µV) Average*
0,15 to 0,50	66 to 56	56 to 46
0,5 to 5	56	46
5 to 30	60	50

Test setup

Mains terminal disturbance for table-top equipment



Test setup PE001_01				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
3	CMC S010	Rohde & Schwarz	ESH3-Z2	Pulse limiter
2	CMC S200	Schwarzbeck	NSLK 8128	V-LISN
1	CMC S206	Rohde & Schwarz	ESCI 7	EMC Receiver 9KHz-7GHz

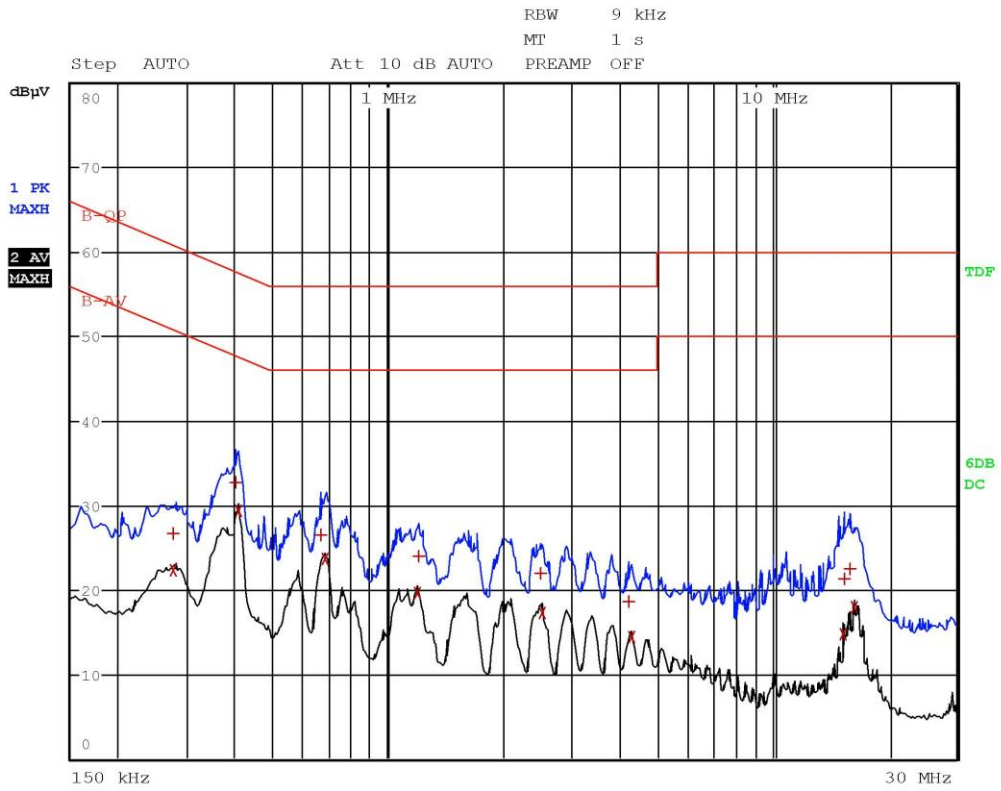
Result

Line	*Frequency Range (MHz)*	*Graphs*	*Remarks*	*Result*
N	0,15 – 30	G19065621	--	P
L1	0,15 – 30	G19065622	--	P

Remarks: tests performed on 230 Vac side of AC/DC power unit

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



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EDIT PEAK LIST (Final Measurement Results)

Trace1:	B-QP
Trace2:	B-AV
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Quasi Peak	278 kHz	26.60	-34.26
2 Average	278 kHz	22.24	-28.63
1 Quasi Peak	398 kHz	32.66	-25.22
2 Average	406 kHz	29.29	-18.43
1 Quasi Peak	662 kHz	26.54	-29.45
2 Average	682 kHz	23.68	-22.31
2 Average	1.182 MHz	19.56	-26.43
1 Quasi Peak	1.202 MHz	23.92	-32.07
1 Quasi Peak	2.494 MHz	21.88	-34.11
2 Average	2.514 MHz	17.28	-28.71
1 Quasi Peak	4.23 MHz	18.51	-37.49
2 Average	4.282 MHz	14.37	-31.62
2 Average	15.27 MHz	14.73	-35.27
1 Quasi Peak	15.37 MHz	21.28	-38.71
1 Quasi Peak	15.834 MHz	22.40	-37.59
2 Average	16.25 MHz	17.90	-32.09

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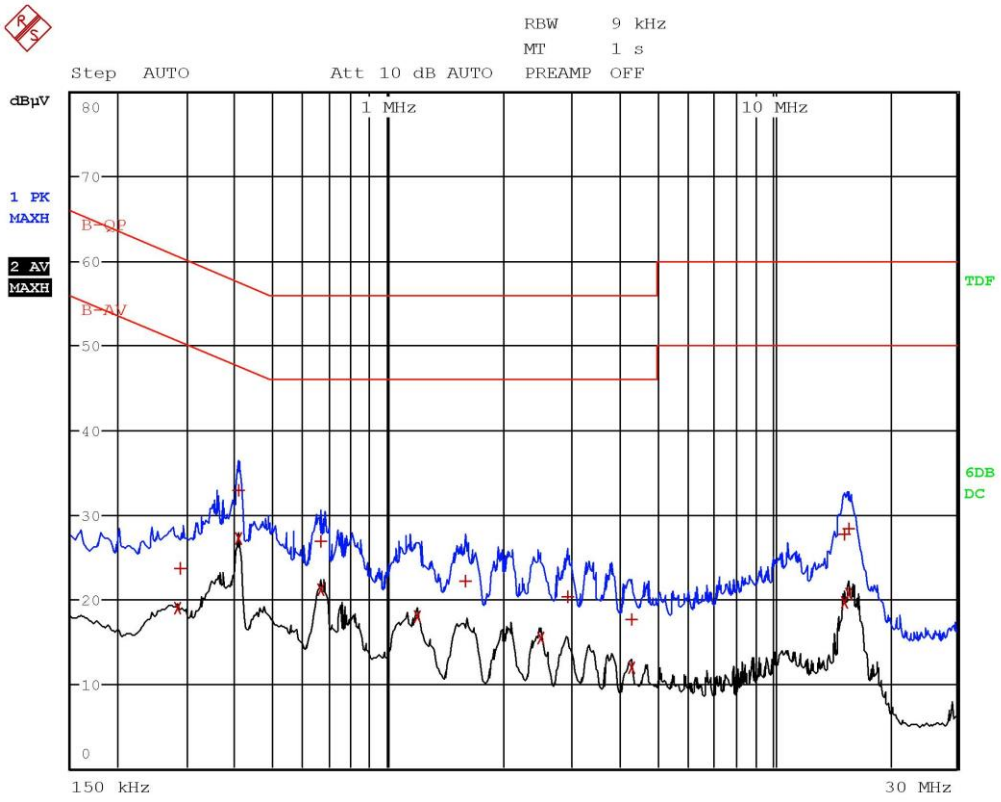

Gandini 19065622

EDIT PEAK LIST (Final Measurement Results)

Trace1:	B-QP
Trace2:	B-AV
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
2 Average	282 kHz	18.83	-31.91
1 Quasi Peak	290 kHz	23.59	-36.92
1 Quasi Peak	406 kHz	32.90	-24.82
2 Average	406 kHz	27.11	-20.61
1 Quasi Peak	666 kHz	26.73	-29.26
2 Average	666 kHz	21.01	-24.98
2 Average	1.182 MHz	17.93	-28.06
1 Quasi Peak	1.582 MHz	22.06	-33.93
2 Average	2.486 MHz	15.38	-30.61
1 Quasi Peak	2.914 MHz	20.32	-35.67
2 Average	4.274 MHz	11.82	-34.17
1 Quasi Peak	4.286 MHz	17.52	-38.47
2 Average	15.298 MHz	19.63	-30.36
1 Quasi Peak	15.306 MHz	27.64	-32.35
1 Quasi Peak	15.686 MHz	28.23	-31.76
2 Average	15.734 MHz	20.52	-29.47

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9.3 Radiated emissions and spurious emissions

Tested by ..... :	G. Gandini	
Test date ..... :	19.05.19	
Test location (stand) ..... :	Semi-anechoic chamber (CMC A070)	
Reference standards ..... :	FCC Rules and Regulation; Titles 47 Part 15.209 and Part 15.231 ANSI C63.10 cl. 6.3, 6.4, 6.5 and 6.6	
Test set-up description ..... :	☒	Table top equipment set-up (80 cm above the reference ground plane)
	☐	Floor standing equipment set-up (insulating material up to 12 mm thick)
	☐	False floor installation equipment set-up (insulating material up to 34 cm above the reference ground plane)
Supplementary test set-up description ..... :	--	
Test method applied ..... :	☒	SAC with measurement distance [m]: 10
Supplementary information..... :	--	

Acceptance limits

Acceptance limits for emissions in restricted frequency bands (f < 1000 MHz)		
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
960 to 1000	3	54

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 and 110–490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector. The results have been extrapolated to the specified distance using an extrapolation factor

Acceptance limits for emissions in restricted frequency bands (f ≥ 1000 MHz)			
Frequency (MHz)	*Test distance (m)*	*AV limits [dB(µV/m)]*	*Peak limits [dB(µV/m)]*
> 1000	3	54	74

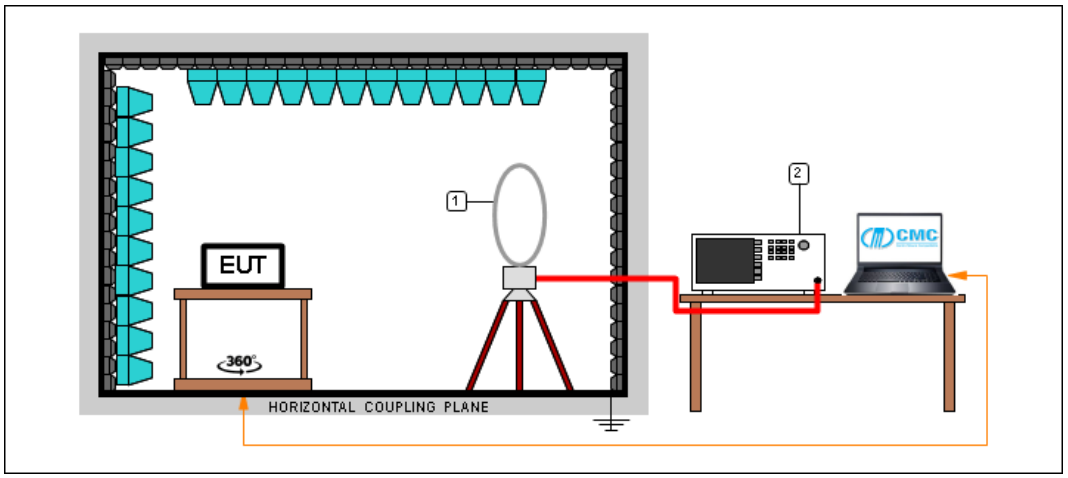
The restricted frequency bands are listed in the following table

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
The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in § 15.209, whichever limit permits a higher field strength.

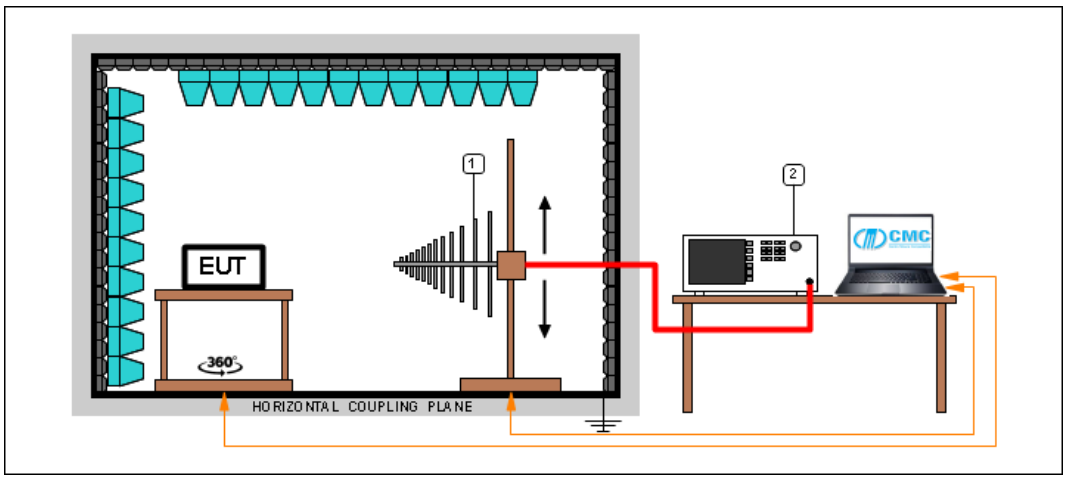
Test setup

Frequency ≤ 30 MHz



Test setup PE004_01				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
2	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
1	CMC S127	Schaffner	HLA6120	Loop Antenna 9kHz - 30MHz

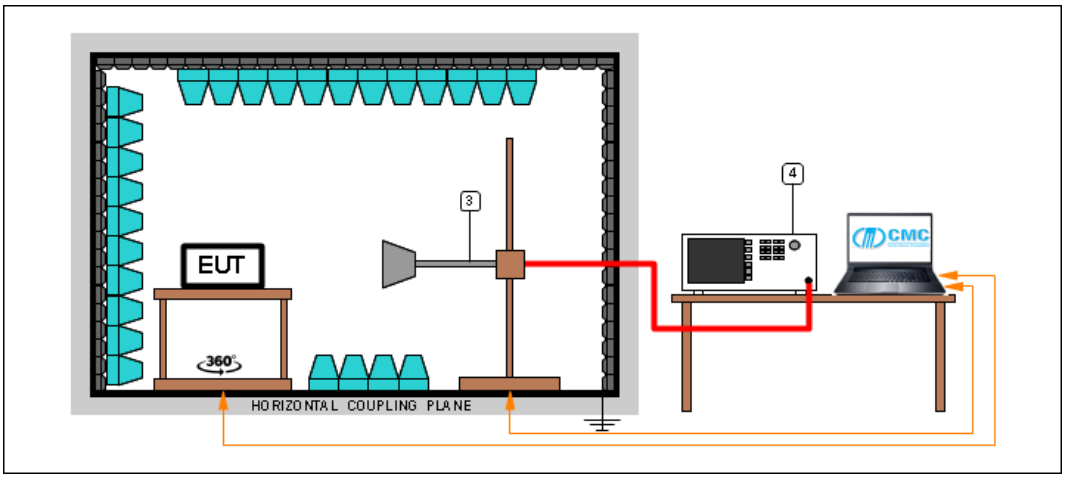
Frequency ≤ 1 GHz



Test setup PE004_02				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
2	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
1	CMC S271	Schwarzbeck	BBA 9106 + VHBB 9124	Broadband Antenna

Test setup PE004_03				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
2	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
1	CMC S287	Schwarzbeck	VUSLP 9111B	Broadband Antenna

Frequency > 1 GHz



Test setup PE004_04				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
2	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
1	CMC S108	Emco	3115	Waveguide antenna

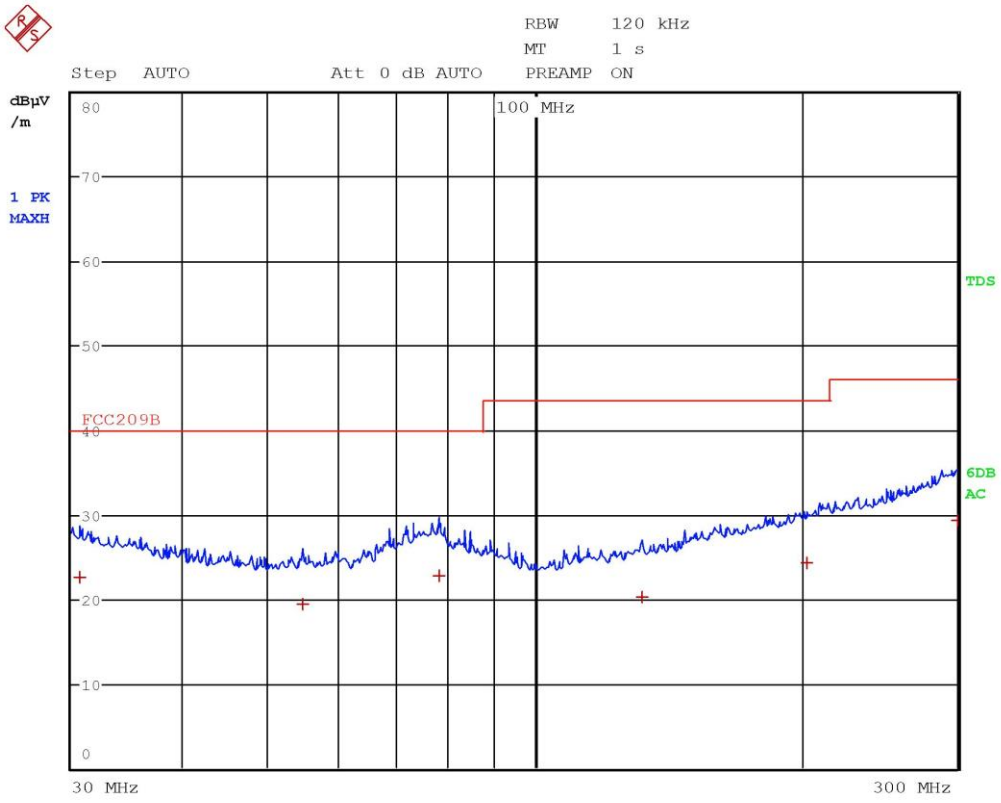
Result

Polarization	*Frequency Range (MHz)*	*Graphs*	*Remarks*	*Result*
V	30 – 300	G19065601	--	P
H	30 – 300	G19065602	--	P
H	300 – 1000	G19065603	--	P
V	300 – 1000	G19065604	--	P
V	1000 – 5000	G19065606	EUT on horizontal position	P
H	1000 – 5000	G19065607	EUT on horizontal position	P
H	1000 – 5000	G19065608	EUT on vertical position	P
V	1000 – 5000	G19065609	EUT on vertical position	P
Loop	0,009 – 30	G19065615	--	P

Remarks: EUT was tested in 3 orthogonal planes, graphs are related to the highest detected levels.
Measurements at frequencies lower than 30 MHz have been performed with an EUT – antenna distance of 10 m. Measured values have been corrected with conversion factor 40log(test distance/10) based on the measuring distance provided by the standard.
Measurements at frequencies higher than 30 MHz and lower than 1000 MHz have been performed with an EUT – antenna distance of 10 m. Measured values have been corrected with conversion factor 20log(test distance/10) based on the measuring distance provided by the standard.
Peaks above the limits are caused by the nominal transmitting frequencies

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 19065601

EDIT PEAK LIST (Final Measurement Results)

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

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.64 MHz	22.59	-17.40
1 Quasi Peak	54.64 MHz	19.39	-20.60
1 Quasi Peak	78.08 MHz	22.70	-17.29
1 Quasi Peak	132.24 MHz	20.23	-23.29
1 Quasi Peak	203.08 MHz	24.26	-19.25
1 Quasi Peak	299.52 MHz	29.40	-16.61

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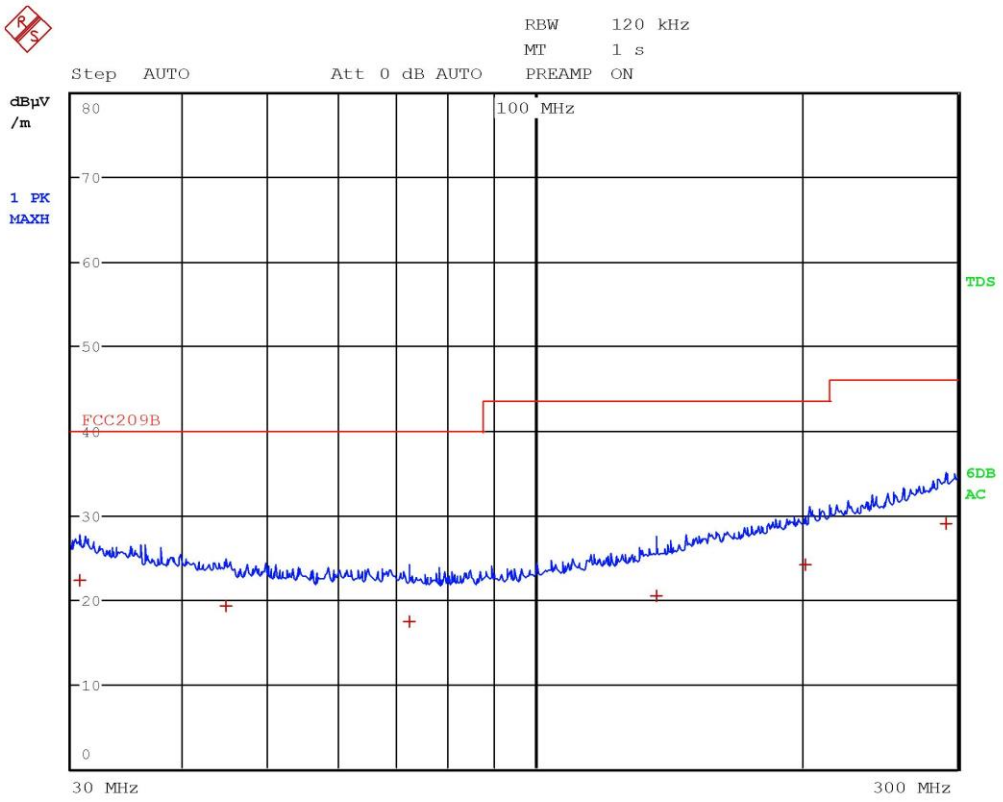

Gandini 19065602

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC209B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.64 MHz	22.29	-17.70
1 Quasi Peak	44.84 MHz	19.26	-20.73
1 Quasi Peak	72.16 MHz	17.47	-22.52
1 Quasi Peak	137.24 MHz	20.49	-23.02
1 Quasi Peak	202.16 MHz	24.13	-19.38
1 Quasi Peak	291.04 MHz	28.97	-17.04

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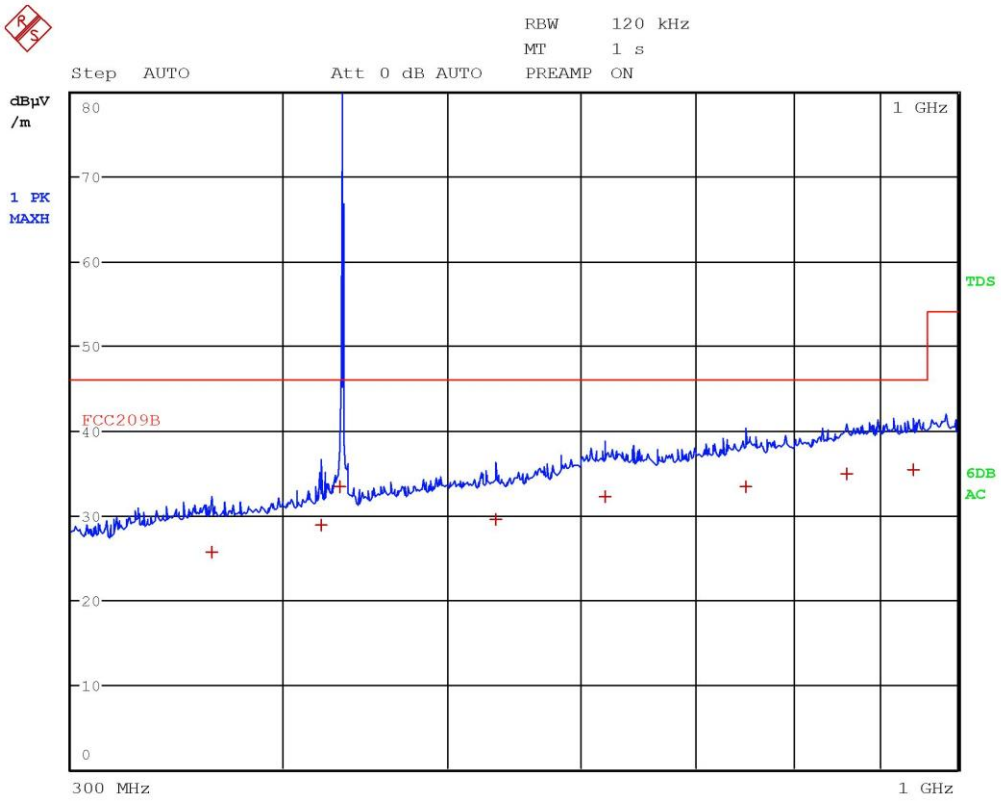

Gandini 19065603