

**TEST REPORT**  
**Nr. R19213601****Federal Communication Commission (FCC)**

<b>Report Reference No.</b> .....	R19213601
Date of issue: .....	30.01.2020
Total number pages: .....	82
<b>Applicant's name</b> .....	Autec S.r.l.
Address .....	Via Pomaroli, 65 – 36030 Caldogno (VI) – Italy
<b>Test specification:</b>	
Standards .....	FCC Rules & Regulations, Title 47:2018 Part 15 paragraph(s): 203, 204, 205, 207, 209, 215 and 247
Non-standard test method .....	N/A
<b>Test Report Form No.</b> .....	15-247_HoppingCMC
Test Report Form(s) Originator ..	CMC Centro Misure Compatibilità S.r.l.
Master TRF .....	2020-01
<b>General disclaimer:</b>	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of CMC Centro Misure Compatibilità S.r.l.	
<b>Test item description</b> .....	Transceiver unit
Trademark .....	Autec
Manufacturer .....	Autec S.r.l.
Model / Type reference .....	Model J6P Type NJ255
FCC ID .....	OQA-J6PNJ255
Rating(s) .....	7,4 Vdc from battery
<b>Report</b>	
Tested by (name + signature) .....	G. Gandini
Approved by (name + signature) .....	R. Beghetto



## 1 Summary

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



<b>Testing and sampling:</b>	
Date of receipt of test item .....	01.10.2019
Testing start date .....	01.10.2019
Testing end date .....	29.01.2020
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.
Internal identification .....	Adhesive label with the product number P191163
<b>General remarks:</b>	
<p>This report shall not be reproduced, except in full, without the written approval of CMC.</p> <p>The test results presented in this report relate only to the object tested.</p> <p>“(see appended table)”: refers to a table appended to the report.</p> <p>Throughout this report a comma is used as the decimal separator.</p>	
<b>Possible test case verdicts:</b>	
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)
<b>Definition of symbols used in this test report:</b>	
<input checked="" type="checkbox"/> Indicates that the listed condition, standard or equipment is applicable for this report. <input type="checkbox"/> Indicates that the listed condition, standard or equipment is not applicable for this report.	



## 6 General description of test item(s)

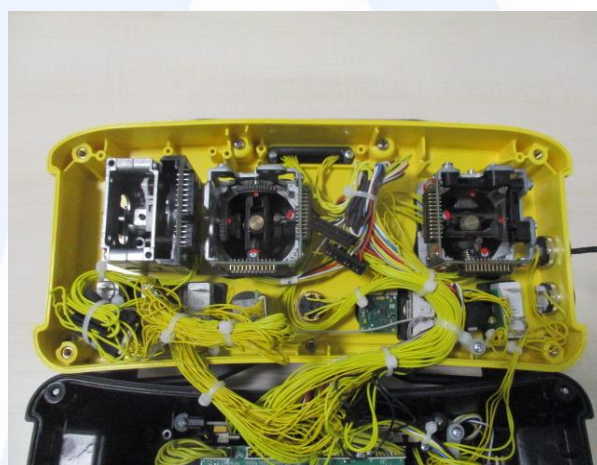
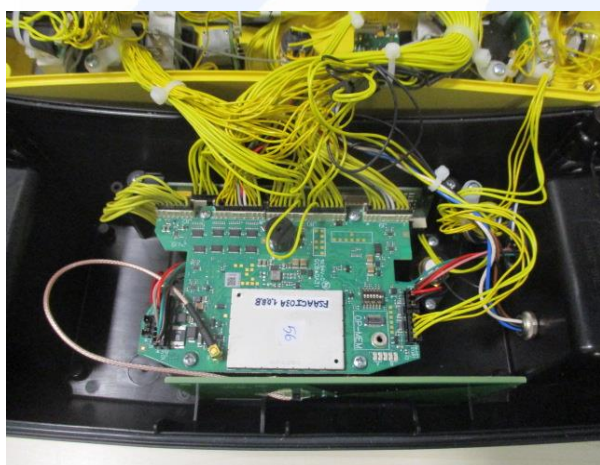
Description .....	Transceiver unit						
Model Number .....	Model J6P Type NJ255						
FCC ID .....	OQA-J6PNJ255						
Serial Number .....	--						
Brand name .....	Autec						
Frequency band .....	902 – 928 MHz						
Nominal frequencies .....	F <sub>L</sub> : 915,075 MHz		F <sub>M</sub> : 921,475 MHz		F <sub>H</sub> : 927,825 MHz		
Rated power supply .....		Voltage and Frequency	Reference poles				
			N	L1	L2	L3	PE
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	DC: 7,4 V from battery					<input type="checkbox"/>
Pseudo randomly ordered list of hopping frequencies .....	See document j6p_nj255_operational_description-rev0						
Test configuration .....	<input type="checkbox"/>	Table top equipment					
	<input type="checkbox"/>	Floor standing equipment					
	<input checked="" type="checkbox"/>	Hand-held equipment					
Type of equipment .....	<input checked="" type="checkbox"/>	Transmitter unit					
	<input checked="" type="checkbox"/>	Receiver unit					
Type of station .....	<input type="checkbox"/>	Fixed station					
	<input checked="" type="checkbox"/>	Portable station					
	<input type="checkbox"/>	Mobile station					
Operating modes .....	No.	Operating mode of test item					
	1	EUT in continuous transmission at maximum power					



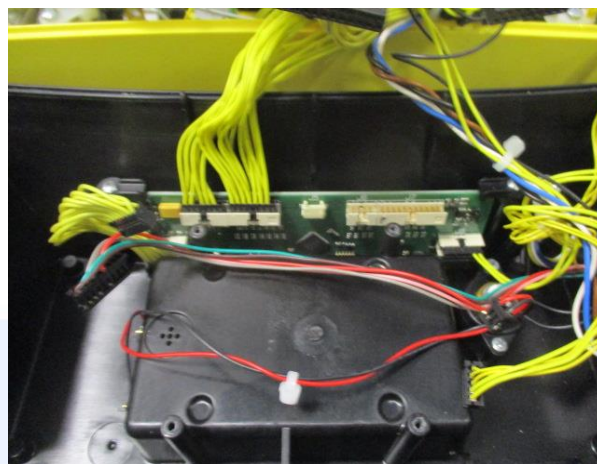
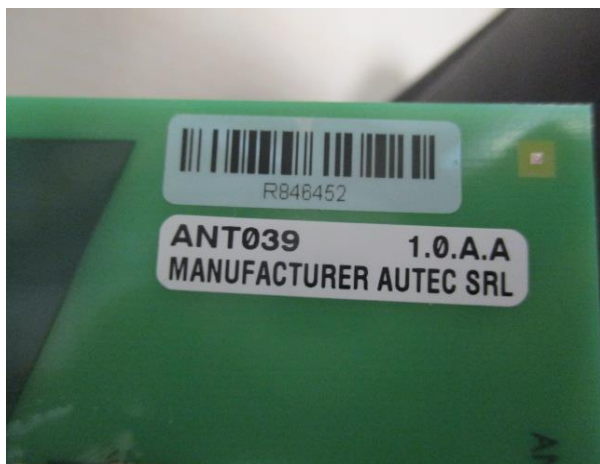


## 6.1 Photos of the test item

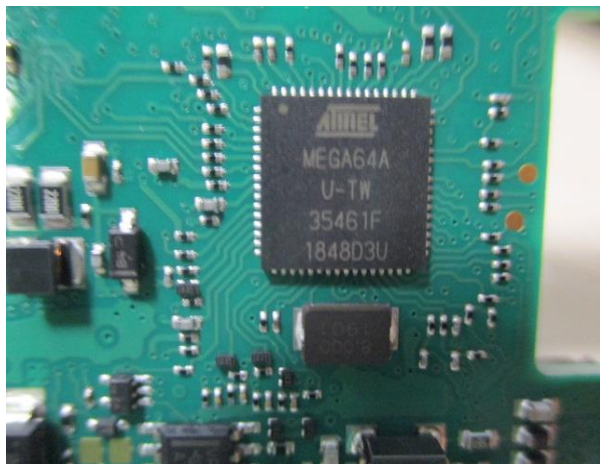














## 7 Verdict summary section

FCC Rules & Regulations, Title 47:2020 Part 15 paragraph(s): 203, 204, 205, 207, 209, 215 and 247			
Clause	Requirement – Test case	Basic standard	Verdict
Part 15.247 (a) (1)	Pseudo randomly ordered list of hopping frequencies	--	<b>P</b>
Part 15.203	Antenna requirements	ANSI C63.10	<b>P</b>
Part 15.207	Conducted emissions	ANSI C63.10	<b>N/A (+)</b>
Part 15.209	Radiated emissions and spurious emission	ANSI C63.10	<b>P</b>
Part 15.247	20 dB Bandwidth	ANSI C63.10	<b>P</b>
Part 15.247	Channel Separation	ANSI C63.10	<b>P</b>
Part 15.247	Number of Hopping Channel	ANSI C63.10	<b>P</b>
Part 15.247	Time of occupancy	ANSI C63.10	<b>P</b>
Part 15.247	Band edge	ANSI C63.10	<b>P</b>
Part 15.209 and 15.247	Peak Output Power	ANSI C63.10	<b>P</b>

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



Normative references	
Reference no.	Description
FCC Rules and Regulation Title 47 part 15:2018	--
KDB 558074 D01 15.247 Meas Guidance v05r02	Guidance for compliance measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices operating under section 15.247 of the FCC rules
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:		
	<b>Temperature</b>	<b>Humidity</b>	<b>Atmospheric pressure</b>
	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 .....	01.10.2019	
Reference standards .....	FCC Rules and Regulation; Titles 47 Part. 15.203 and 15.204	
Test specification .....	<p>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</p>	
Antenna type.....	<input type="checkbox"/>	Integral antenna
	<input type="checkbox"/>	External antenna
	<input checked="" type="checkbox"/>	Dedicated antenna
Antenna gain.....	2 dBi	
External R.F. power amplifier .....	Not Present	



## 9.2 Emissions in restricted frequency bands and in unrestricted frequency bands

Tested by .....	G. Gandini	
Test date .....	01.10.2019	
Test location (stand) .....	Semi-anechoic chamber (CMC A070)	
Reference standards .....	FCC Rules and Regulation; Titles 47 Part. 15.209 ANSI C63.10 cl. 6.3, 6.4, 6.5 and 6.6	
Test set-up description .....	<input checked="" type="checkbox"/>	Table top equipment set-up (80 cm above the reference ground plane)
	<input type="checkbox"/>	Floor standing equipment set-up (insulating material up to 12 mm thick)
	<input type="checkbox"/>	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 .....	<input checked="" type="checkbox"/>	SAC with measurement distance [m]: 10 m at frequencies $\leq 1$ GHz 3 m at frequencies $> 1$ GHz
Supplementary information .....	--	

### Acceptance limits

<b>Acceptance limits for emissions in restricted frequency bands (<math>f &lt; 1000</math> MHz)</b>		
Frequency range (MHz)	Test distance (m)	Limits [dB( $\mu$ V/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

<b>Acceptance limits for emissions in restricted frequency bands (<math>f \geq 1000</math> MHz)</b>			
Frequency (MHz)	Test distance (m)	AV limits [dB( $\mu$ V/m)]	Peak limits [dB( $\mu$ V/m)]
$> 1000$	3	54	74





The restricted frequency bands are listed in the following table

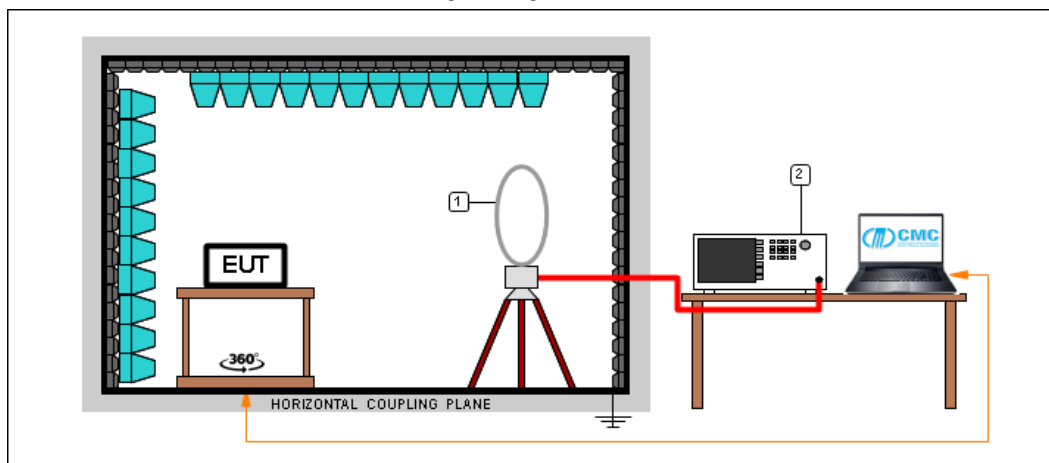
MHz	MHz	MHz	GHz
0,090 – 0,110	16,42 – 16,423	399,9 – 410	4,5 – 5,15
0,495 – 0,505	16,69475 – 16,69525	608 – 614	5,35 – 5,46
2,1735 – 2,1905	16,80425 – 16,80475	960 – 1240	7,25 – 7,75
4,125 – 4,128	25,5 – 25,67	1300 – 1427	8,025 – 8,5
4,17725 – 4,17775	37,5 – 38,25	1435 – 1626,5	9,0 – 9,2
4,20725 – 4,20775	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

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.

## Test setup

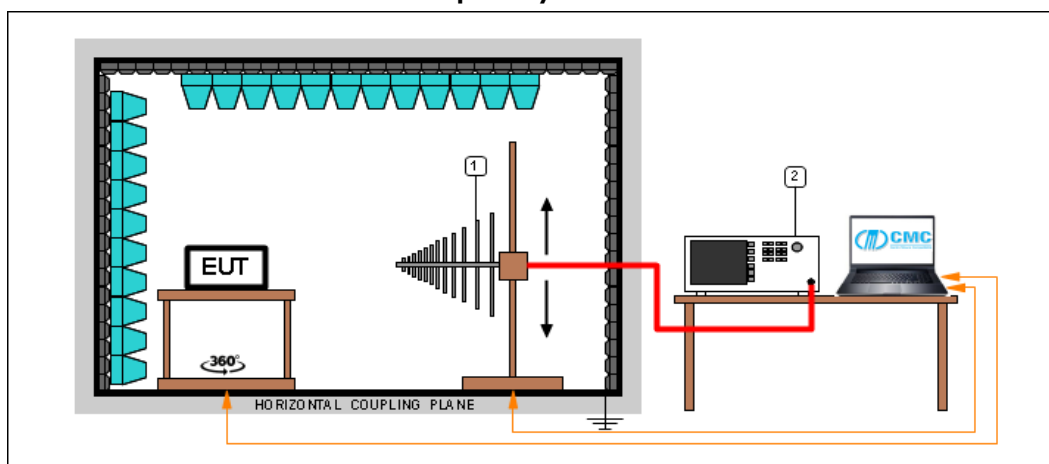
### Frequency $\leq 30$ MHz



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 $\leq 1$ GHz



Test setup PE004\_02

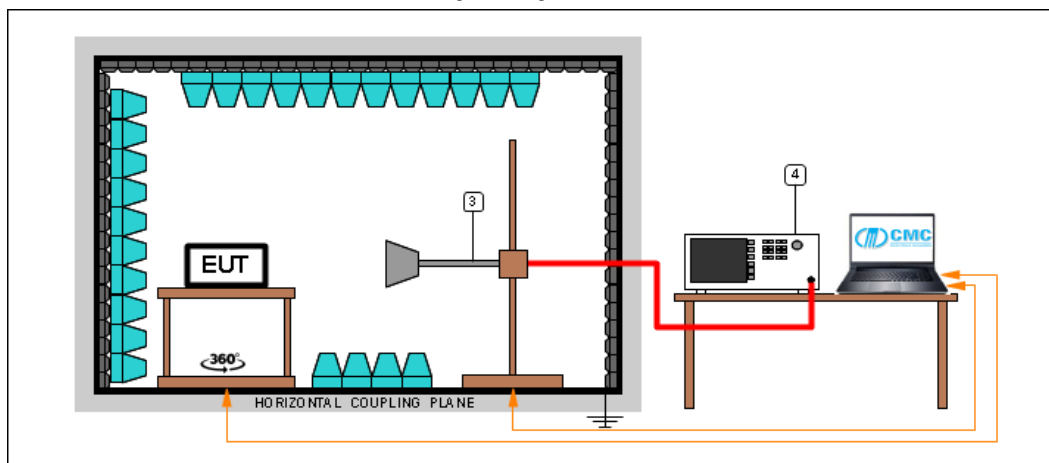
Nr.	Id. Number	Manufacturer	Model	Description
2	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
1	CMC S271	Schwarzbeck	BBA 9106 + VHBB 9124	Broadband Antenna

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
4	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
3	CMC S108	Emco	3115	Waveguide antenna





## Result

Polarization	Frequency Range (MHz)	Graphs	Remarks	Result
V	30 – 300	G19213601	Lowest channel	P
H	30 – 300	G19213602	Lowest channel	P
H	30 – 300	G19213603	Medium channel	P
V	30 – 300	G19213604	Medium channel	P
V	30 – 300	G19213605	Highest channel	P
H	30 – 300	G19213606	Highest channel	P
Loop	0,009 – 30	G19213607	Worst case	P
H	300 – 1000	G19213608	Highest channel	P
V	300 – 1000	G19213609	Highest channel	P
V	300 – 1000	G19213610	Medium channel	P
H	300 – 1000	G19213611	Medium channel	P
H	300 – 1000	G19213612	Lowest channel	P
V	300 – 1000	G19213613	Lowest channel	P
V	1000 – 10000	G19213614	Lowest channel	P
H	1000 – 10000	G19213615	Lowest channel	P
H	1000 – 10000	G19213616	Medium channel	P
V	1000 – 10000	G19213617	Medium channel	P
V	1000 – 10000	G19213618	Highest channel	P
H	1000 – 10000	G19213619	Highest channel	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  $40\log(\text{test distance}/10)$  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  $20\log(\text{test distance}/10)$  based on the measuring distance provided by the standard.

Peaks above the limits are caused by the nominal transmitting frequencies, the final measurements out of limits fall into non-restricted frequency bands, for these frequency bands the limit is 20 dB below the highest ERP power level at 3 m ( $114,14 - 20 = 94,14 \text{ dB}\mu\text{V/m}$ ).

The abnormal “shoulder” next above the carrier is caused by overloading the test receiver. The “Auto” function of the test receiver add attenuation to overcome the overload.

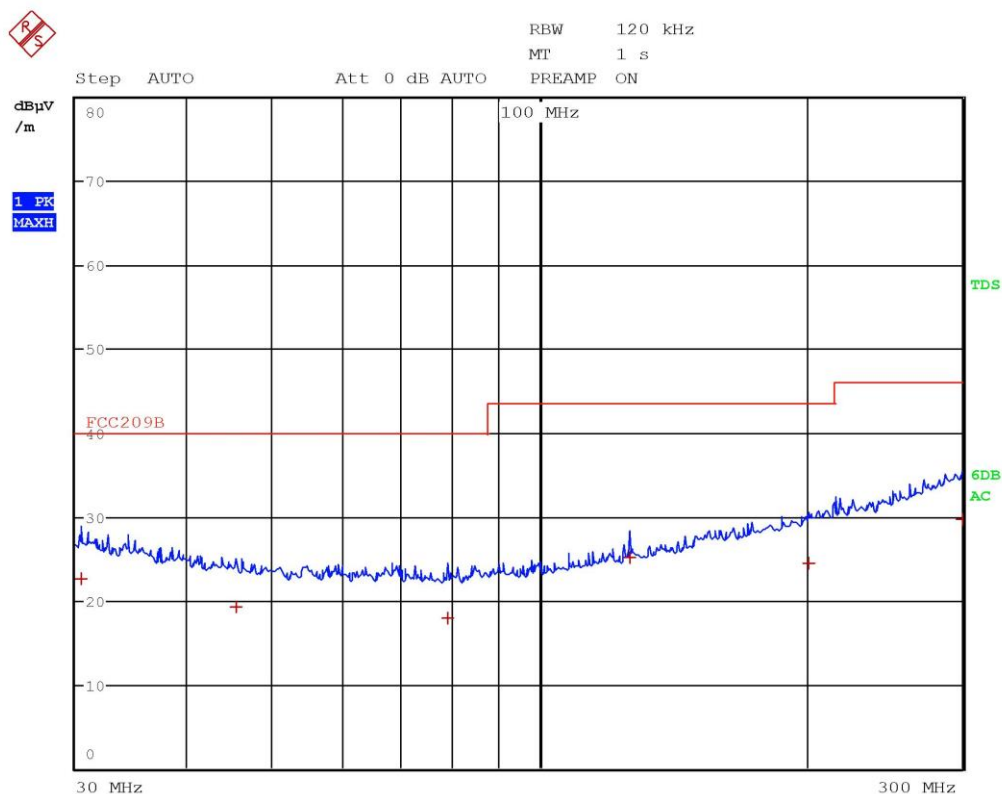
### Graphs Legend

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

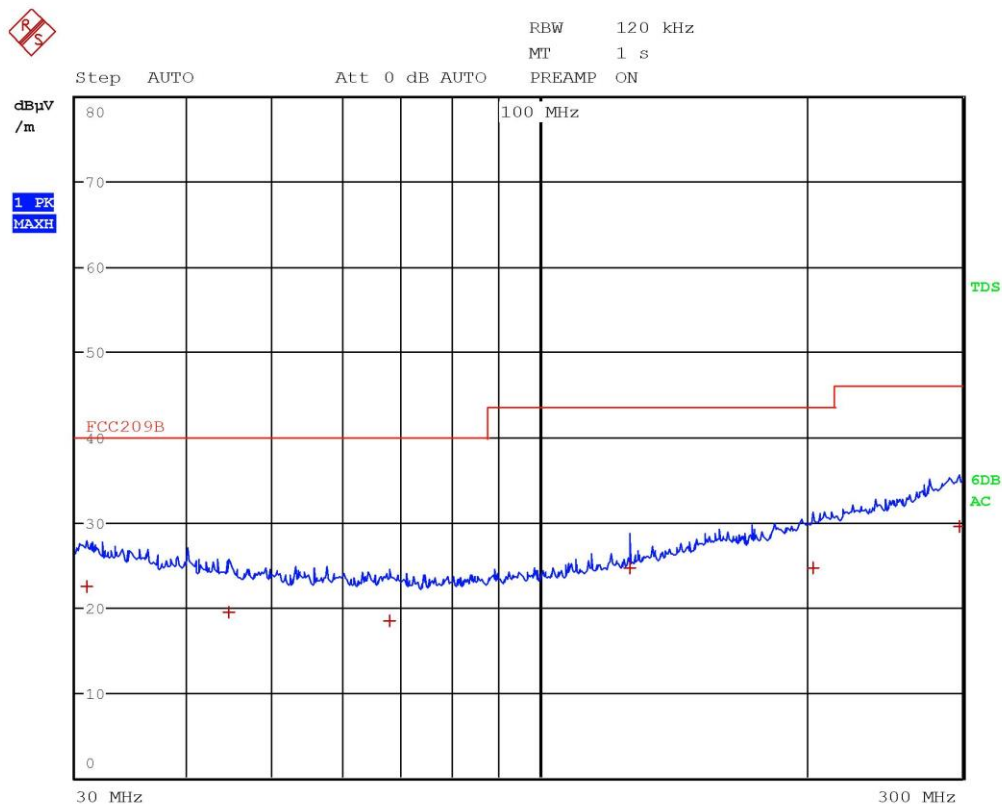


Gandini 19213601



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC209B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dB $\mu$ V/m	DELTA LIMIT dB
1 Quasi Peak	30.36 MHz	22.63	-17.36
1 Quasi Peak	45.44 MHz	19.30	-20.69
1 Quasi Peak	78.72 MHz	17.97	-22.02
1 Quasi Peak	126.56 MHz	25.16	-18.36
1 Quasi Peak	201.56 MHz	24.43	-19.09
1 Quasi Peak	299.48 MHz	29.63	-16.38

Gandini 19213601



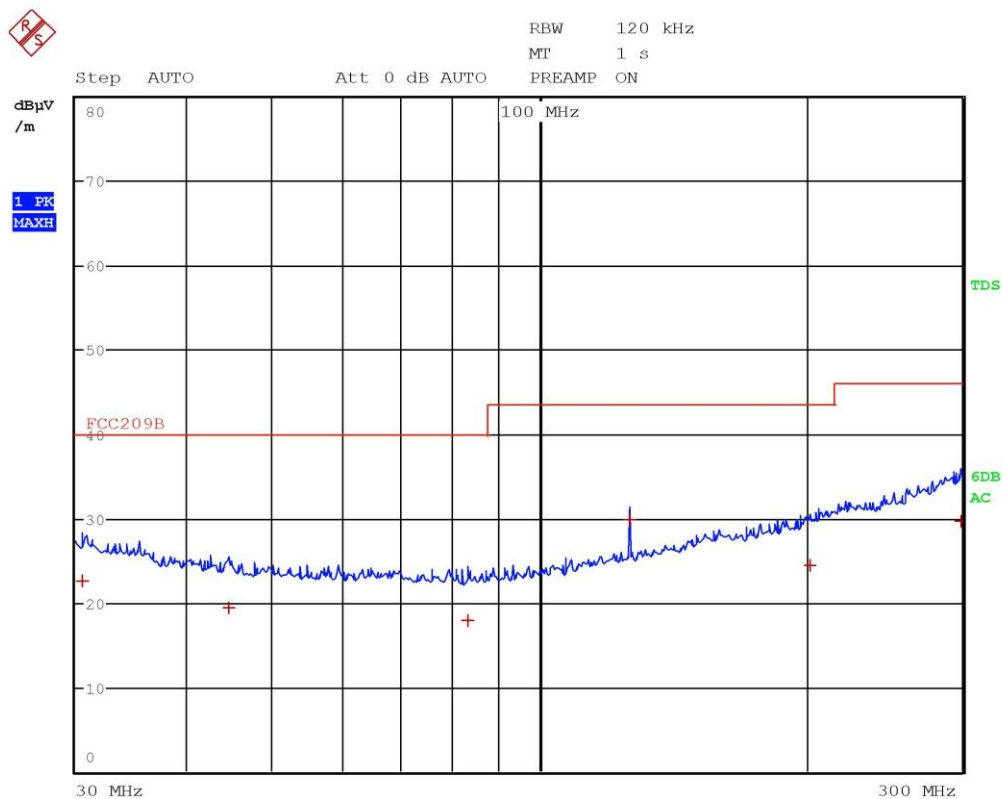
Gandini 19213602





EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC209B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL, dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.88 MHz	22.41	-17.58
1 Quasi Peak	44.72 MHz	19.47	-20.52
1 Quasi Peak	67.84 MHz	18.43	-21.56
1 Quasi Peak	126.48 MHz	24.55	-18.96
1 Quasi Peak	203.28 MHz	24.54	-18.97
1 Quasi Peak	297.32 MHz	29.52	-16.49

Gandini 19213602

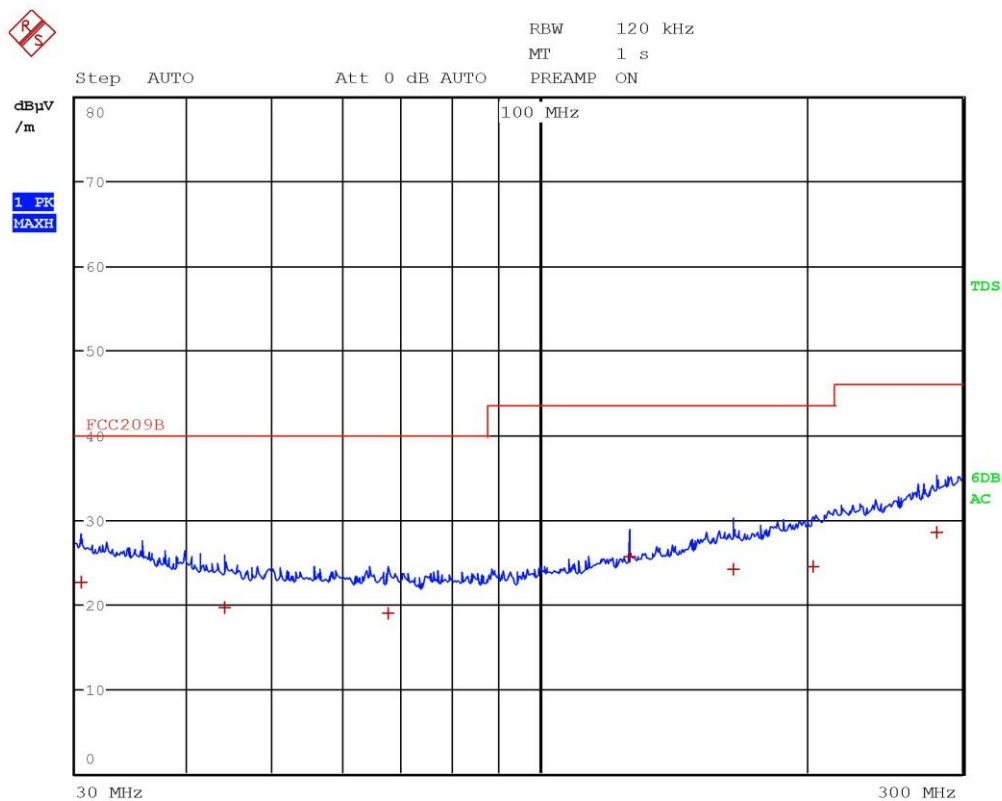


Gandini 19213603



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC209B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Quasi Peak	30.48 MHz	22.55	-17.44
1 Quasi Peak	44.68 MHz	19.47	-20.52
1 Quasi Peak	83.08 MHz	17.82	-22.17
1 Quasi Peak	126.44 MHz	29.90	-13.61
1 Quasi Peak	201.88 MHz	24.39	-19.12
1 Quasi Peak	298.48 MHz	29.60	-16.41

Gandini 19213603



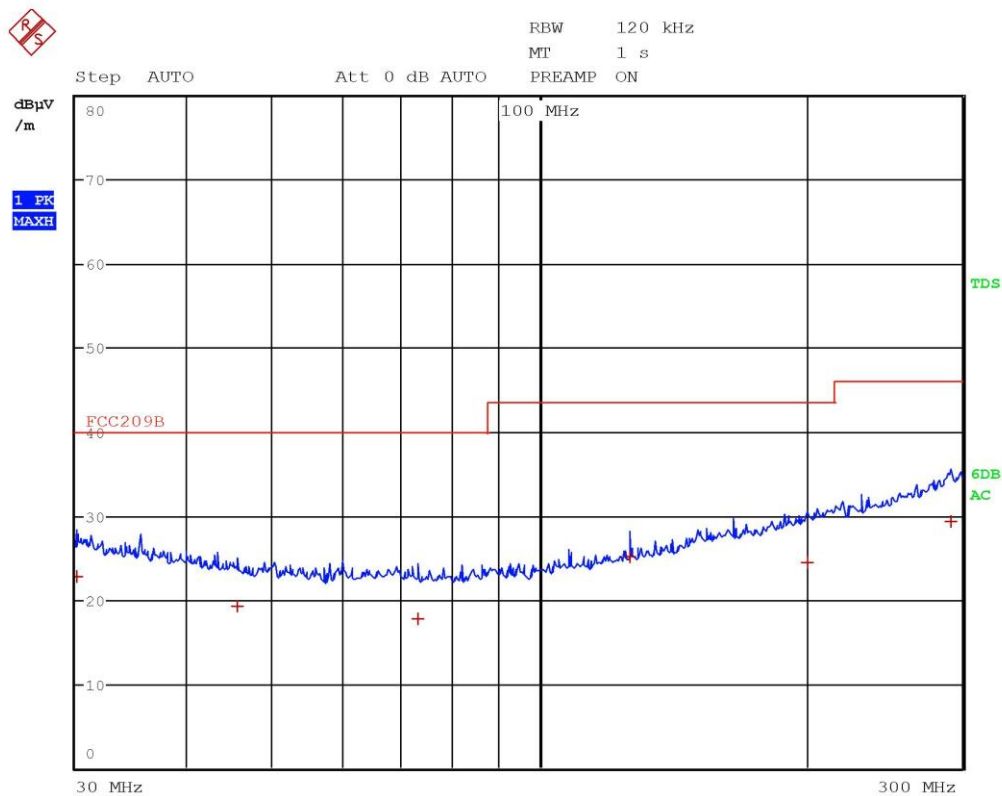
Gandini 19213604





EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC209B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Quasi Peak	30.44 MHz	22.53	-17.46
1 Quasi Peak	44.16 MHz	19.54	-20.46
1 Quasi Peak	67.6 MHz	18.93	-21.06
1 Quasi Peak	126.44 MHz	25.63	-17.89
1 Quasi Peak	165.52 MHz	24.04	-19.47
1 Quasi Peak	203.32 MHz	24.50	-19.01
1 Quasi Peak	281.16 MHz	28.53	-17.48

Gandini 19213604



Gandini 19213605