



TEST REPORT Nr. R20197401

Federal Communication Commission (FCC)

Report Reference No.	R20197401
Date of issue:	02.12.2020
Total number pages:	70
Applicant's name	Elca S.r.l.
Address	Via del Commercio, 7/B – 36065 Mussolente (VI) – Italy
Test specification:	
Standards	FCC Rules & Regulations, Title 47:2019 Part 15 paragraph(s): 203, 204, 205, 207, 209, 215 and 249
Non-standard test method	N/A
Test Report Form No.	15-249CMC
Test Report Form(s) Originator ..	CMC Centro Misure Compatibilità S.r.l.
Master TRF	2020-05
General disclaimer:	
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.	
Test item description	Transmitting unit AT MITO-MINI+: portable component (remote station) through which the user interfaces with the Radio Remote Control
Trademark	Elca
Manufacturer	Elca S.r.l.
Model / Type reference	AT MITO-MINI+
FCC ID	2ABS7-ATMILS915
Rating(s)	3,7 Vdc from battery
Report	
Tested by (name + signature)	C. Panozzo
Approved by (name + signature)	R. Beghetto



1 Summary

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2	Reference standard
FCC Rules and Regulation Title 47 part 15:2019	--
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	

Revision index	Date	Change history
1.0	02.12.2020	--



Testing and sampling:	
Date of receipt of test item.....	21.10.2020
Testing start date	26.10.2020
Testing end date	26.11.2020
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 P201071
General remarks:	
This report shall not be reproduced, except in full, without the written approval of CMC. The test results presented in this report relate only to the object tested. “(see appended table)”: refers to a table appended to the report. Throughout this report a comma is used as the decimal separator.	
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.	

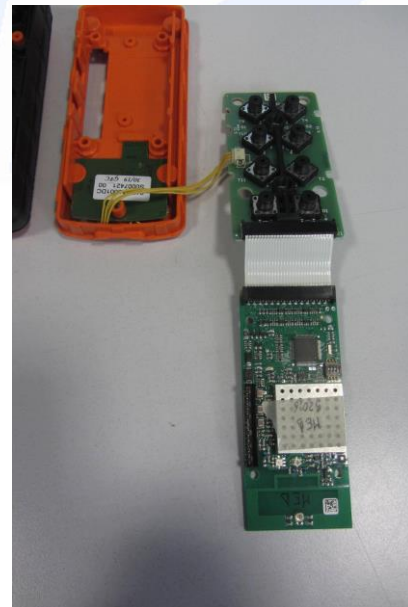


6 General description of test item(s)

Description	Transmitting unit AT MITO-MINI+: portable component (remote station) through which the user interfaces with the Radio Remote Control						
Model Number	AT MITO-MINI+						
FCC ID	2ABS7-ATMILS915						
Serial Number	--						
Brand name	Elca						
Frequency band	902 – 928 MHz						
Nominal frequency	F _L : 920,25 MHz F _M : 920,60 MHz F _H : 921,15 MHz						
Rated power supply		Voltage and Frequency	Reference poles				
			N	L1	L2	L3	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 3,7 V from battery					☐
Test configuration	☐	Table top equipment					
	☐	Floor standing equipment					
	☒	Hand-held equipment					
Type of equipment	☒	Transmitter unit					
	☒	Receiver unit					
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					



6.1 Photos of the test item





7 Verdict summary section

FCC Rules & Regulations, Title 47:2019 Part 15 paragraph(s): 203, 204, 205, 207, 209, 215 and 249			
Clause	Requirement – Test case	Basic standard	Verdict
Part 15.203	Antenna requirements	ANSI C63.10	P
Part 15.207	Conducted emissions	ANSI C63.10	N/A (+)
Part 15.209	Radiated emissions and spurious emission	ANSI C63.10	P
Part 15.209 and 15.249	Peak Output Power	ANSI C63.10	P
Part 15.215	20 dB Bandwidth	ANSI C63.10	P
Part 15.249	Band edge	ANSI C63.10	P

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



Normative references	
Reference no.	Description
FCC Rules and Regulation Title 47 part 15:2019	--
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	C. Panozzo	
Test date	26.10.2020	
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 Radiated emissions and spurious emission

Tested by	C. Panozzo	
Test date	26.10.2020	
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	☒	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(μ 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

Acceptance limits for emissions in restricted frequency bands ($f \geq 1000$ MHz)			
Frequency (MHz)	Test distance (m)	AV limits [dB(μ V/m)]	Peak limits [dB(μ 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			

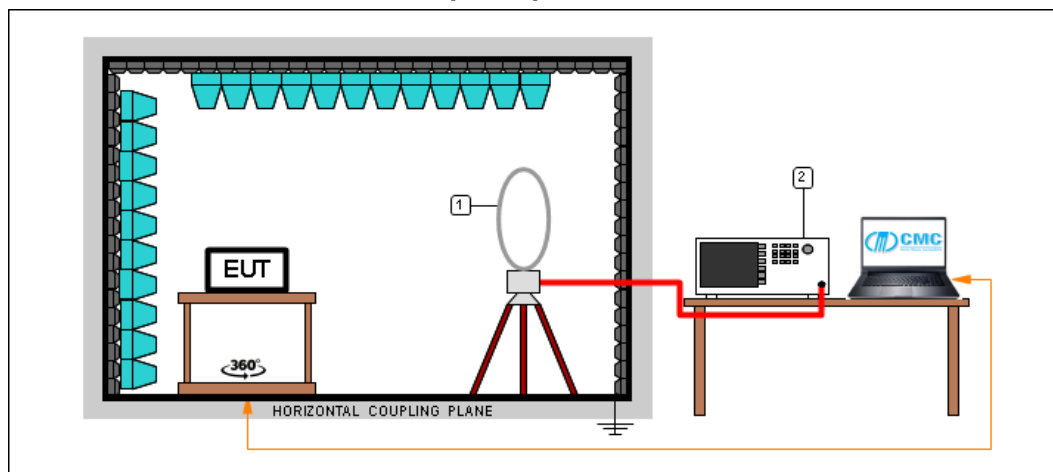
Acceptance limits for emissions in non-restricted frequency bands

Field strength of harmonics: 500 $\mu\text{V/m}$ (54 dB($\mu\text{V/m}$)).

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Test setup

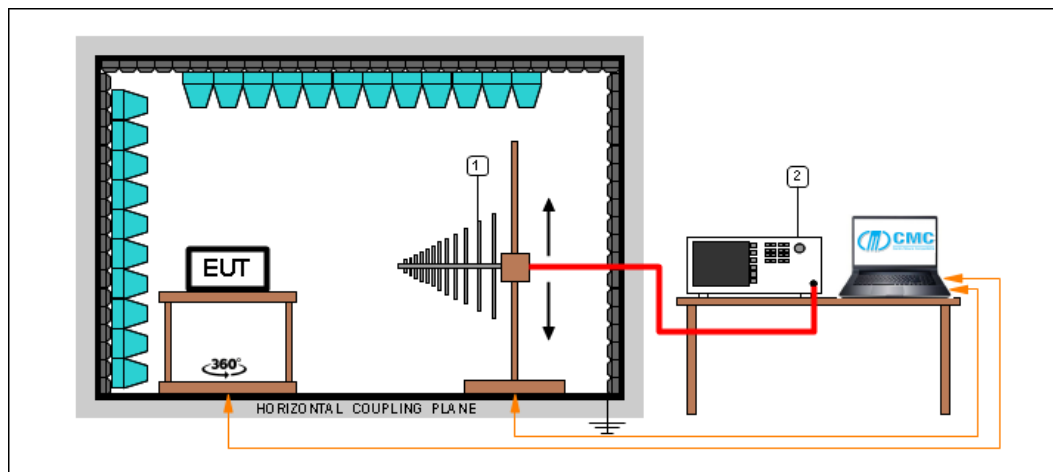
Frequency ≤ 30 MHz



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

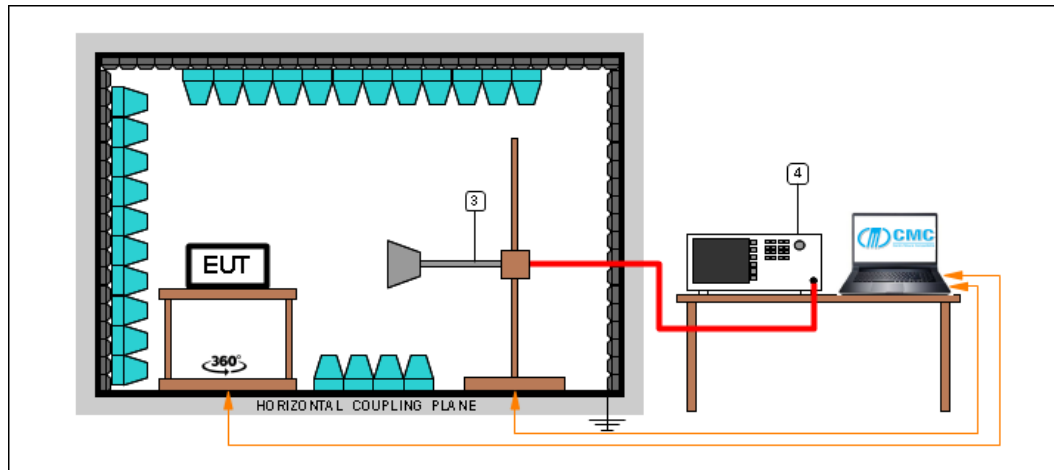
Nr.	Id. Number	Manufacturer	Model	Description
2	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
1	CMC S271	Schwarzbeck	BBA 9106 + VHBB 9124	Broadband Antenna

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

Channel (MHz)	Polarization	Frequency Range (MHz)	Graphs	Result
920,25	H	1000 – 10000	G20197403	P
920,25	V	1000 – 10000	G20197404	P
921,15	V	1000 – 10000	G20197405	P
921,15	H	1000 – 10000	G20197406	P
920,60	V	1000 – 10000	G20197409	P
920,60	H	1000 – 10000	G20197410	P
921,15	H	300 – 1000	G20197418	P
921,15	V	300 – 1000	G20197419	P
920,60	H	300 – 1000	G20197423	P
920,60	V	300 – 1000	G20197424	P
920,25	H	300 – 1000	G20197429	P
920,25	V	300 – 1000	G20197430	P
920,25	V	30 – 300	G20197431	P
920,25	H	30 – 300	G20197432	P
920,60	H	30 – 300	G20197433	P
920,60	V	30 – 300	G20197434	P
921,15	V	30 – 300	G20197435	P
921,15	H	30 – 300	G20197436	P
Worst case	Loop	0,009 – 30	G20197437	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

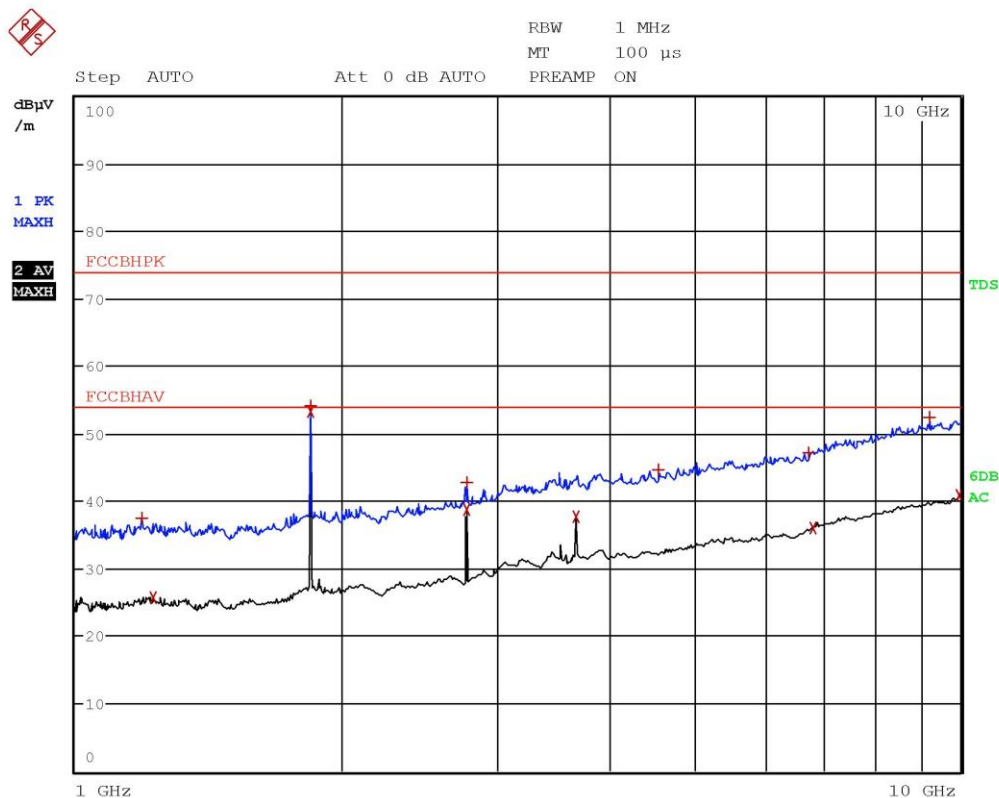
Graphs Legend

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

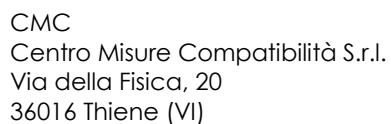


Panozzo 20197403 Horiz Tx Fmin Eut Horiz

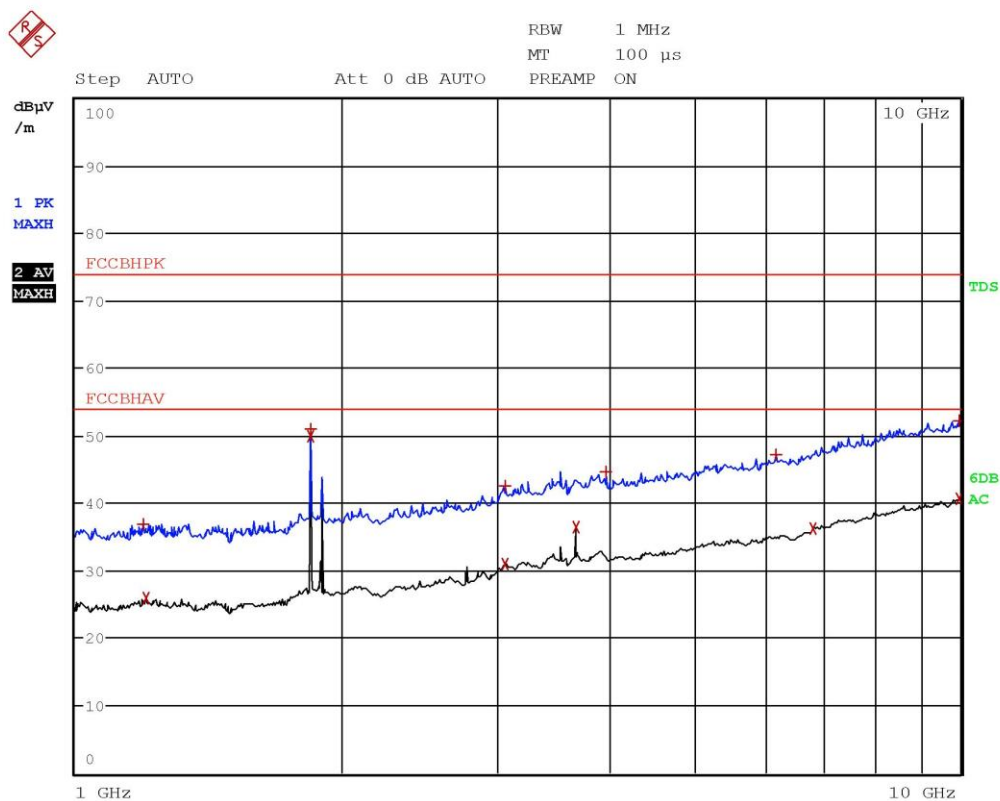


EDIT PEAK LIST (Prescan Results)			
Trace1:	FCCBHPK		
Trace2:	FCCBHAV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Max Peak	1.1908 GHz	37.54	-36.43
2 Average	1.2256 GHz	25.83	-28.15
1 Max Peak	1.8424 GHz	54.06	-19.92
2 Average	1.8424 GHz	53.17	-0.80
1 Max Peak	2.7636 GHz	42.83	-31.14
2 Average	2.7636 GHz	38.70	-15.27
2 Average	3.6832 GHz	37.75	-16.22
1 Max Peak	4.5548 GHz	44.67	-29.30
1 Max Peak	6.7264 GHz	47.14	-26.83
2 Average	6.8052 GHz	36.10	-17.87
1 Max Peak	9.2144 GHz	52.48	-21.49
2 Average	9.9668 GHz	40.78	-13.19

Panozzo 20197403 Horiz Tx Fmin Eut Horiz



LAB N° 0168 L

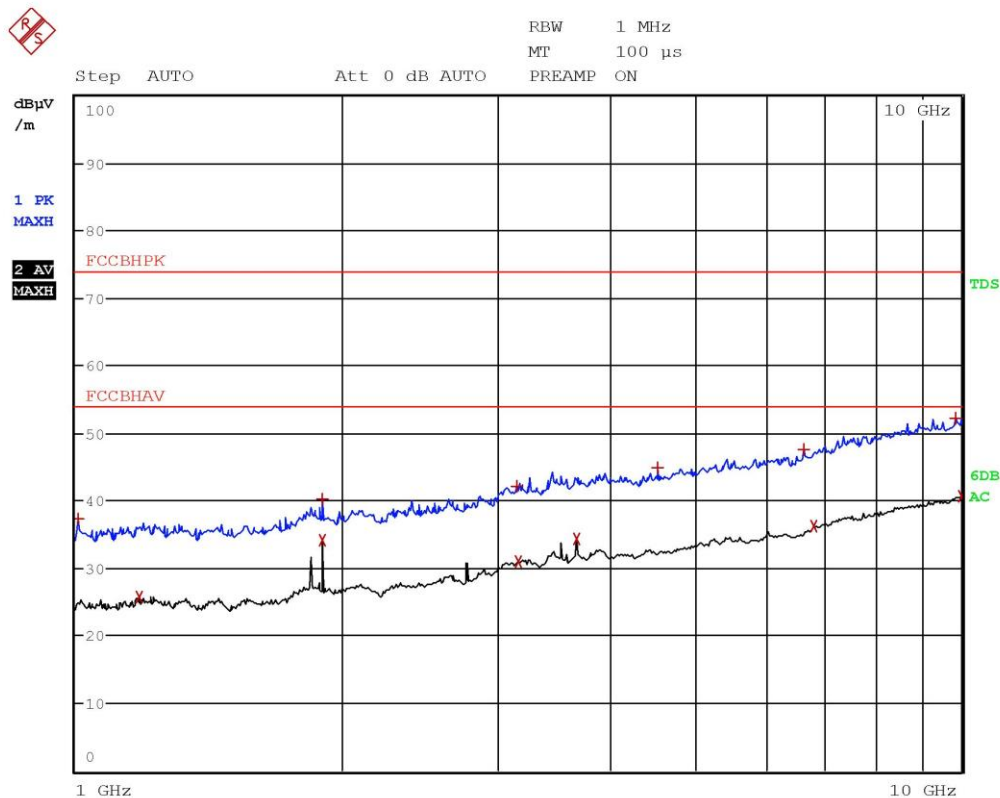


Panozzo 20197404 Vert Tx Fmin Eut Horiz



EDIT PEAK LIST (Prescan Results)			
Trace1:	FCCBHPK		
Trace2:	FCCBHAV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL, dBμV/m	DELTA LIMIT dB
1 Max Peak	1.192 GHz	36.85	-37.13
2 Average	1.2016 GHz	25.85	-28.12
1 Max Peak	1.8424 GHz	50.95	-23.02
2 Average	1.8424 GHz	49.89	-4.08
1 Max Peak	3.0552 GHz	42.53	-31.44
2 Average	3.0592 GHz	30.95	-23.02
2 Average	3.6844 GHz	36.49	-17.48
1 Max Peak	3.97 GHz	44.64	-29.33
1 Max Peak	6.1796 GHz	47.12	-26.85
2 Average	6.8108 GHz	36.30	-17.67
1 Max Peak	9.9468 GHz	52.26	-21.71
2 Average	9.9652 GHz	40.58	-13.39

Panozzo 20197404 Vert Tx Fmin Eut Horiz

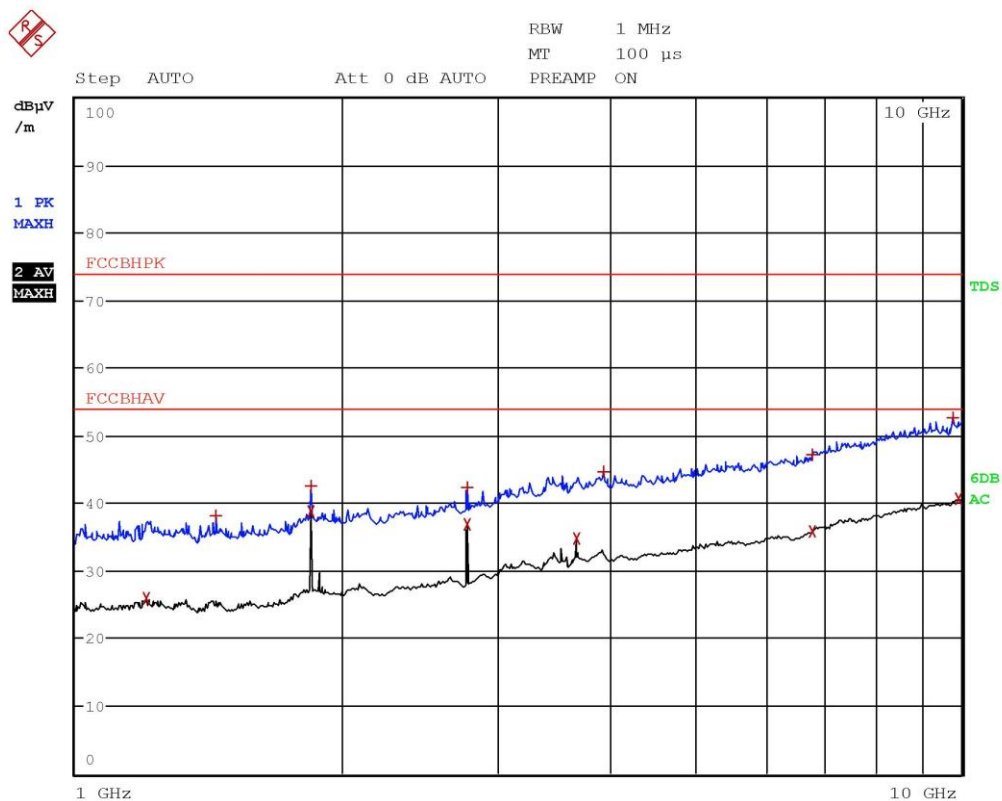


Panozzo 20197405 Vert Tx Fmax Eut Horiz



EDIT PEAK LIST (Prescan Results)			
Trace1:	FCCBHPK		
Trace2:	FCCBHAV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Max Peak	1.0064 GHz	37.30	-36.68
2 Average	1.1804 GHz	25.75	-28.23
1 Max Peak	1.8972 GHz	40.15	-33.83
2 Average	1.8972 GHz	34.03	-19.94
1 Max Peak	3.146 GHz	42.19	-31.78
2 Average	3.1608 GHz	30.89	-23.08
2 Average	3.6832 GHz	34.29	-19.68
1 Max Peak	4.5388 GHz	44.75	-29.22
1 Max Peak	6.6476 GHz	47.55	-26.42
2 Average	6.806 GHz	36.14	-17.83
1 Max Peak	9.8568 GHz	52.22	-21.75
2 Average	9.9952 GHz	40.60	-13.37

Panozzo 20197405 Vert Tx Fmax Eut Horiz

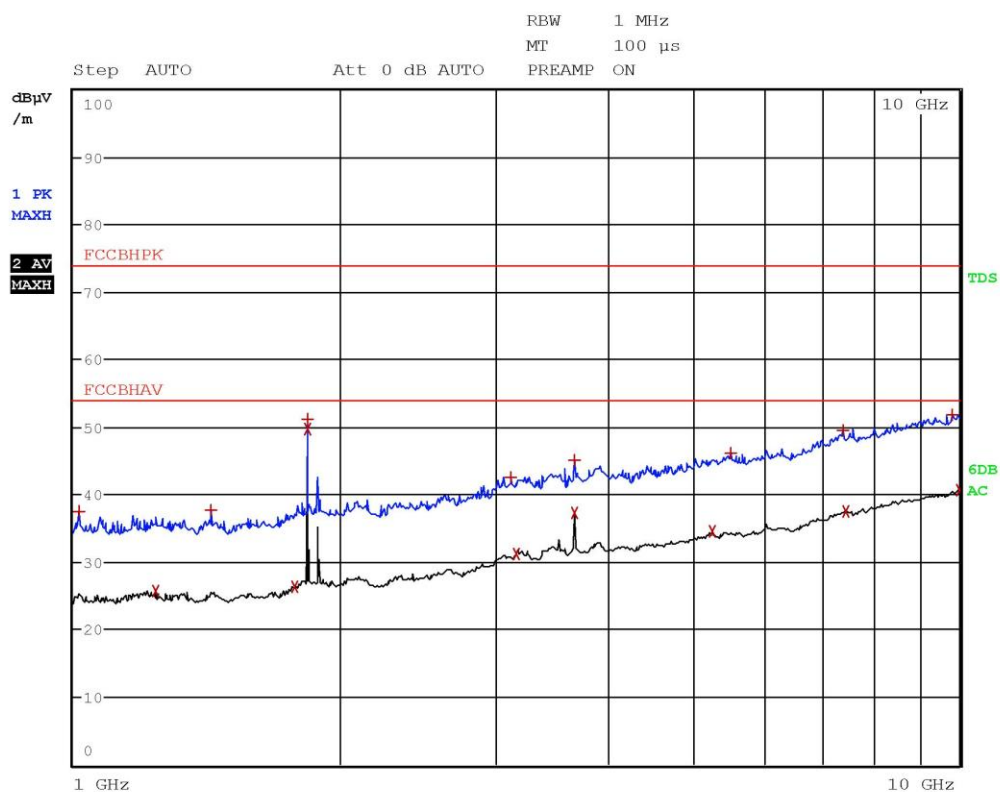


Panozzo 20197406 Horiz Tx Fmax Eut Horiz



EDIT PEAK LIST (Prescan Results)			
Trace1:	FCCBHPK		
Trace2:	FCCBHAV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
2 Average	1.2012 GHz	25.86	-28.11
1 Max Peak	1.4404 GHz	38.22	-35.75
1 Max Peak	1.8424 GHz	42.48	-31.49
2 Average	1.8424 GHz	38.86	-15.11
1 Max Peak	2.7636 GHz	42.28	-31.69
2 Average	2.7636 GHz	36.91	-17.06
2 Average	3.6832 GHz	34.66	-19.31
1 Max Peak	3.9404 GHz	44.55	-29.42
2 Average	6.778 GHz	35.89	-18.08
1 Max Peak	6.7868 GHz	47.11	-26.87
1 Max Peak	9.776 GHz	52.73	-21.24
2 Average	9.9288 GHz	40.65	-13.32

Panozzo 20197406 Horiz Tx Fmax Eut Horiz

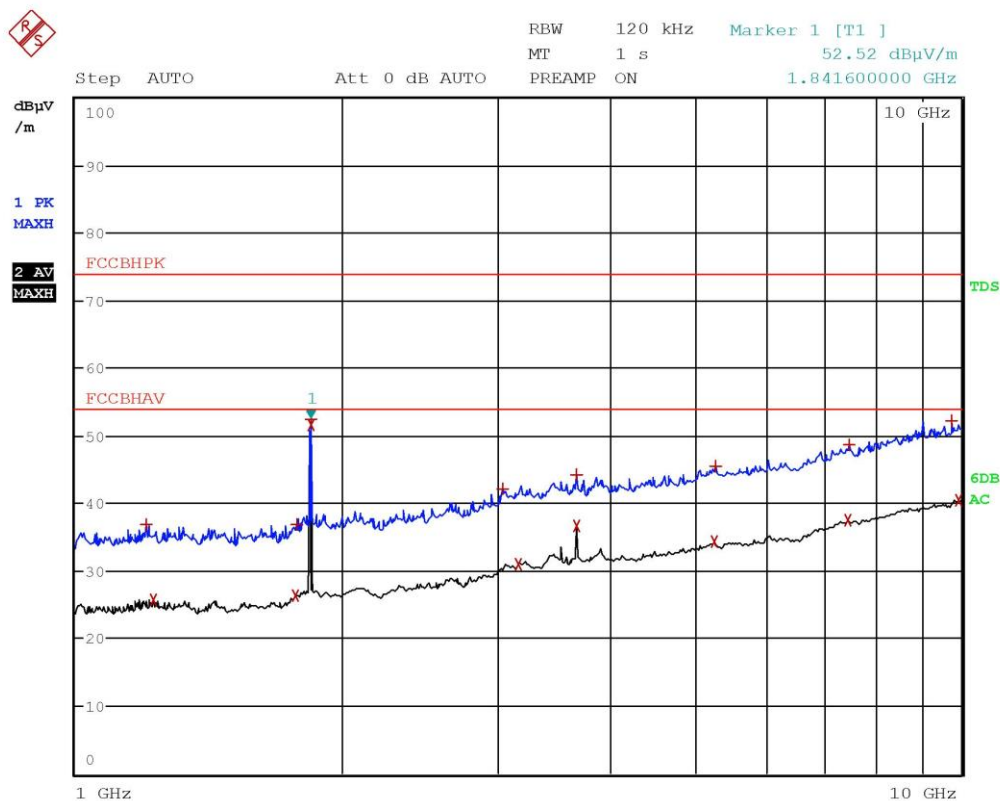


PAozzo 20197409 Vert Fmed Eut Horiz



EDIT PEAK LIST (Prescan Results)			
Trace1:	FCCBHPK		
Trace2:	FCCBHAV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Max Peak	1.0156 GHz	37.49	-36.48
2 Average	1.2372 GHz	25.77	-28.20
1 Max Peak	1.4276 GHz	37.61	-36.36
2 Average	1.7752 GHz	26.44	-27.53
1 Max Peak	1.8408 GHz	51.05	-22.92
2 Average	1.8408 GHz	49.73	-4.25
1 Max Peak	3.1176 GHz	42.64	-31.34
2 Average	3.1572 GHz	31.28	-22.69
2 Average	3.6812 GHz	37.23	-16.74
1 Max Peak	3.6816 GHz	45.00	-28.97
2 Average	5.2596 GHz	34.53	-19.44
1 Max Peak	5.5116 GHz	46.11	-27.87
1 Max Peak	7.3804 GHz	49.56	-24.41
2 Average	7.434 GHz	37.51	-16.46
1 Max Peak	9.83 GHz	51.87	-22.11
2 Average	9.99 GHz	40.67	-13.31

PAnozzo 20197409 Vert Fmed Eut Horiz

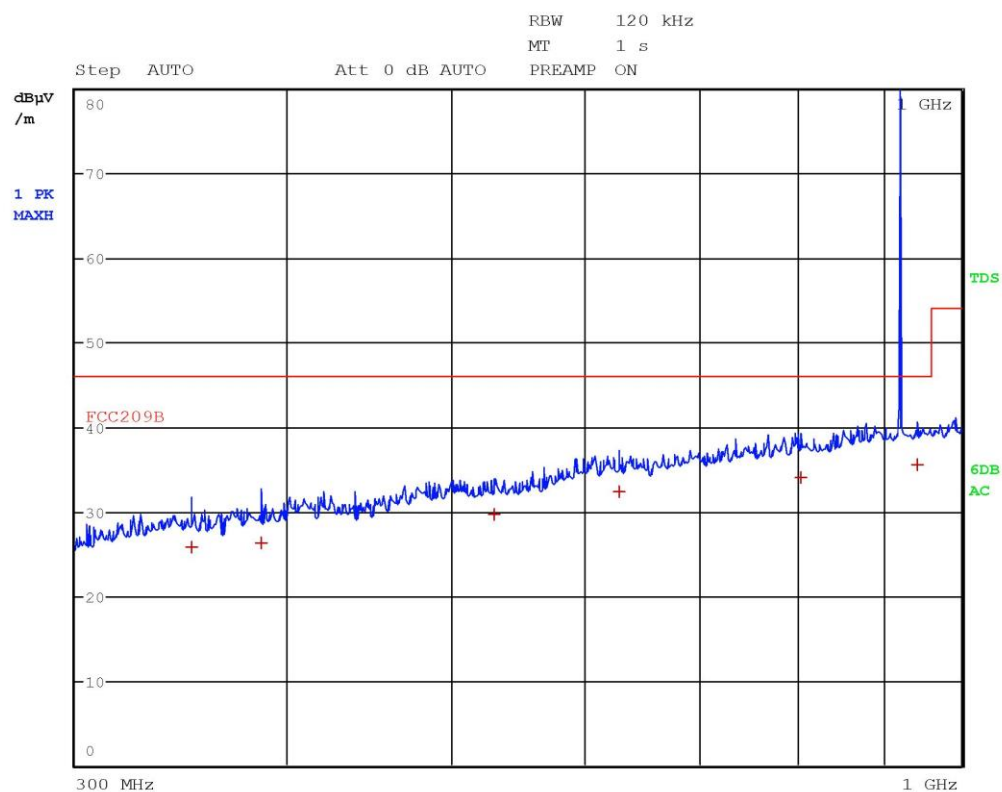


PAnozzo 20197410 Horiz Fmed Eut Horiz



EDIT PEAK LIST (Prescan Results)			
Trace1:	FCCBHPK		
Trace2:	FCCBHAV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Max Peak	1.204 GHz	36.90	-37.07
2 Average	1.2248 GHz	25.73	-28.24
2 Average	1.7736 GHz	26.44	-27.53
1 Max Peak	1.7772 GHz	36.95	-37.03
1 Max Peak	1.8416 GHz	52.51	-21.46
2 Average	1.8416 GHz	51.64	-2.33
1 Max Peak	3.0408 GHz	42.04	-31.93
2 Average	3.1584 GHz	31.09	-22.88
2 Average	3.6816 GHz	36.75	-17.22
1 Max Peak	3.682 GHz	44.13	-29.85
2 Average	5.2708 GHz	34.25	-19.72
1 Max Peak	5.2868 GHz	45.39	-28.58
2 Average	7.45 GHz	37.43	-16.54
1 Max Peak	7.46 GHz	48.67	-25.30
1 Max Peak	9.7384 GHz	52.22	-21.75
2 Average	9.9408 GHz	40.41	-13.56

PAnozzo 20197410 Horiz Fmed Eut Horiz

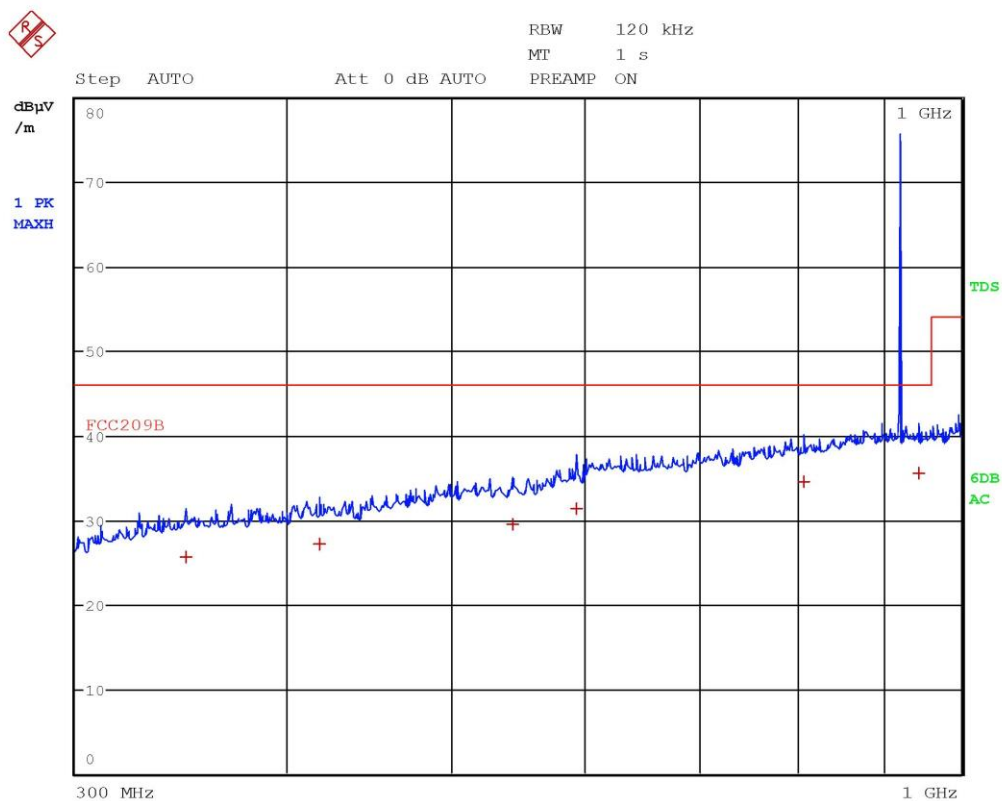


Panozzo 20197418



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC209B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Quasi Peak	351.24 MHz	25.83	-20.18
1 Quasi Peak	386.16 MHz	26.33	-19.68
1 Quasi Peak	529.6 MHz	29.61	-16.40
1 Quasi Peak	627.68 MHz	32.39	-13.62
1 Quasi Peak	804.4 MHz	34.04	-11.97
1 Quasi Peak	942.04 MHz	35.59	-10.42

Panozzo 20197418

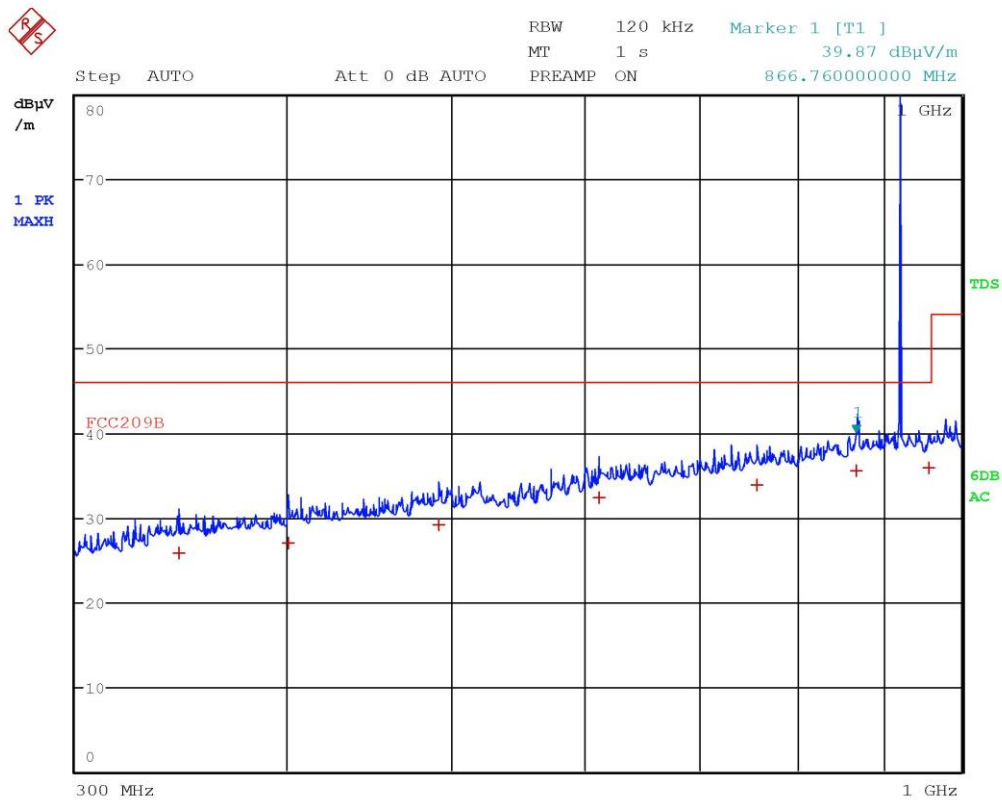


Panozzo 20197419



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC209B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Quasi Peak	348.96 MHz	25.67	-20.34
1 Quasi Peak	418.4 MHz	27.20	-18.82
1 Quasi Peak	543.08 MHz	29.52	-16.49
1 Quasi Peak	592.52 MHz	31.37	-14.64
1 Quasi Peak	807.72 MHz	34.47	-11.54
1 Quasi Peak	942.92 MHz	35.59	-10.43

Panozzo 20197419

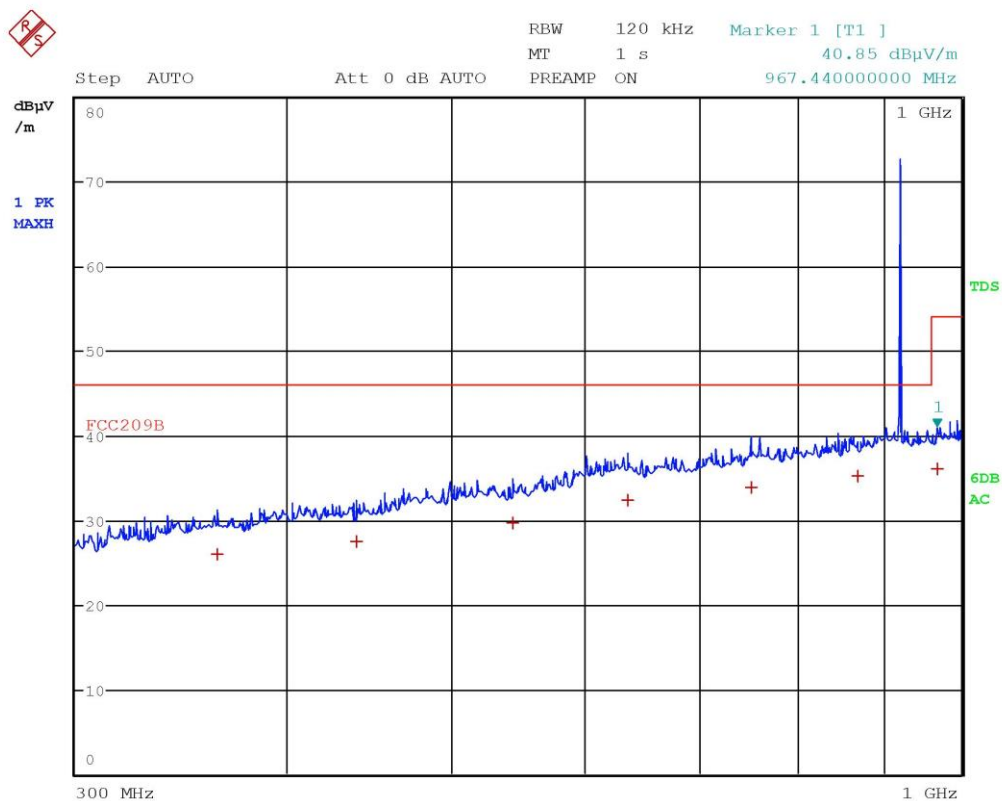


Panozzo 20197423



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC209B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Quasi Peak	345.44 MHz	25.73	-20.28
1 Quasi Peak	400.56 MHz	26.97	-19.04
1 Quasi Peak	491.64 MHz	29.08	-16.93
1 Quasi Peak	611.04 MHz	32.41	-13.60
1 Quasi Peak	756.84 MHz	33.88	-12.13
1 Quasi Peak	866.76 MHz	35.62	-10.39
1 Quasi Peak	956.8 MHz	35.83	-10.18

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EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC209B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Quasi Peak	363.88 MHz	25.96	-20.06
1 Quasi Peak	439.68 MHz	27.42	-18.60
1 Quasi Peak	543.08 MHz	29.67	-16.34
1 Quasi Peak	634.8 MHz	32.38	-13.64
1 Quasi Peak	751.76 MHz	33.81	-12.21
1 Quasi Peak	868.8 MHz	35.20	-10.81
1 Quasi Peak	967.44 MHz	36.12	-17.85

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