

TEST REPORT

Nr. R24218101

Federal Communication Commission (FCC)

Report Reference N.	R24218101
Date of issue:	06.02.2025
Total number pages:	55
Customer name	Atlas Copco BLM S.r.l.
Address	Via Guglielmo Pepe, 11 – 20037 Paderno Dugnano (MI) – Italy
Test specification:	
Standard(s)	FCC Rules & Regulations, Title 47:2023 Part 15 paragraph(s): 203, 204, 205, 207, 209, 215 and 249
Non-standard test method	N/A
Test Report Form N.	15-249_DEKRA
Test Report Form(s) Originator ...	DEKRA Testing and Certification S.r.l.
Master TRF	2025-01
General disclaimer:	
The test Verdict presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of DEKRA Testing and Certification S.r.l.	
(*) Test item description	Mechatronic wrench
(*) Trademark	Atlas Copco
(*) Manufacturer	Atlas Copco AB Industrial Technique SE-105 23 - Stockholm – Sweden
(*) Model / Type reference	MTRwrench 85
(*) FCC ID	2AIPFMTR
(*) Rating(s)	1,2 Vdc from battery
Report	
Tested by (name + signature)	C. Panozzo
Approved by (name + signature)	F. Marenda

(*) information provided by the customer

1 Summary

1	Summary.....	2
2	Reference standard(s)	3
3	List of attachments.....	3
4	Deviation(s) from test specification	3
5	Testing location.....	3
6	General description of tested item and testing condition(s)	5
6.1	Photos of the test item.....	6
7	Verdict summary section	7
8	Test conditions	8
8.1	General	8
9	Test results	9
9.1	Antenna requirements	9
9.2	Radiated emissions and spurious emission	10
9.3	Peak Output Power	43
9.4	20 dB bandwidth	47
9.5	Band edge	51

2 Reference standard(s)	
FCC Rules and Regulation Title 47 part 15:2023	--
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
3 List of attachments	
Attachment 1: Measurement uncertainty, judgement of compliance and quality manual references	
4 Deviation(s) from test specification	
None	
5 Testing location	
DEKRA Testing and Certification 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	06.02.2025	--

Testing and sampling:	
Date of receipt of test item	19.11.2024
Testing start date	28.11.2024
Testing end date	30.01.2025
Sampling procedure	Sample used for testing chosen by the customer; DEKRA Testing and Certification S.r.l. cannot be considered responsible for the selection of the sample
Internal identification	Adhesive label with the product number P241155
General remarks:	
This report shall not be reproduced, except in full, without the written approval of DEKRA Testing and Certification S.r.l. The test Verdict 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. Tests reported in this test report marked by wording: “Test not accredited by ACCREDIA” are not part of the ACCREDIA accreditation of this laboratory.	
Possible test case verdicts:	
Test case does not apply to the test object:	N/A (Not Applicable)
Test object meets the requirement:	P (Pass)
Test object does not meet the requirement:	F (Fail)
Test object was not evaluated for the requirement:	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 tested item and testing condition(s)

Description	Mechatronic wrench						
Model Number	MTRwrench 85						
FCC ID	2AIPFMTR						
Serial Number	--						
Brand name	Atlas Copco						
Frequency band	902 – 928 MHz						
Nominal frequencies	FL: 902,132 MHz		FM: 917,129 MHz		FH: 927,440 MHz		
Test power supply		Voltage and Frequency	Reference poles				
			N	L1	L2	L3	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 1,2 V from battery					☐
Software release	01.02.01.19RT10						
Type of equipment	☒ Transmitter unit ☐ Receiver unit						
Type of station	☒ Portable station ☐ Mobile station						
Test arrangements of EUT	<i>Intended operational arrangement(s) of EUT</i>			<i>Test arrangement (see basic standard)</i>			
	☐ Table-top only			Table-top			
	☐ Floor-standing only			Floor-standing			
	☐ Can be floor-standing or table-top			Table-top			
	☐ Rack mounted			In rack or table-top			
	☒ Other, for example wall mounted, ceiling mounted, handheld, body worn			Table-top			
Operating modes	No.	Operating mode of test item					
	1	EUT in continuous transmission at maximum power					
Declination of responsibility	Information relating to the description of the sample, components list, and software/hardware version (if reported) are provided by the customer. DEKRA Testing and Certification S.r.l. cannot be considered responsible for this certification, for any other document sent by the customer and for any difference between the software version present in the tested sample and that present in the object intended for final sale. In some cases, the software in the tested sample is in a version dedicated exclusively to the test, and therefore does not represent the software installed in the final version of the product.						

6.1 Photos of the test item



7 Verdict summary section

FCC Rules & Regulations, Title 47:2023 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)

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. Environmental conditions have been monitored with the following instrument.																			
	<table><tr><td><i>Id. Number</i></td><td><i>Manufacturer</i></td><td><i>Model</i></td><td><i>Serial number</i></td><td><i>Description</i></td><td><i>Last calibration date</i></td><td><i>Calibration expiration</i></td></tr><tr><td>CMC S302</td><td>Testo</td><td>175H1</td><td>40370182610</td><td>Data Logger</td><td>May 2024</td><td>May 2025</td></tr></table>							<i>Id. Number</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial number</i>	<i>Description</i>	<i>Last calibration date</i>	<i>Calibration expiration</i>	CMC S302	Testo	175H1	40370182610	Data Logger	May 2024
<i>Id. Number</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial number</i>	<i>Description</i>	<i>Last calibration date</i>	<i>Calibration expiration</i>														
CMC S302	Testo	175H1	40370182610	Data Logger	May 2024	May 2025														
Measurement uncertainties :	Attachment 1																			

9 Test results

9.1 Antenna requirements

Tested by	C. Panozzo	
Test date	07.01.2025	
Basic standard(s)	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	-0,4 dBi	
External R.F. power amplifier.....	Not Present	

9.2 Radiated emissions and spurious emission

Tested by	C. Panozzo	
Test date	07.01.2025	
Test location (stand)	Semi-anechoic chamber (CMC A070)	
Basic standard(s)	ANSI C63.10 cl. 6.3, 6.4, 6.5 and 6.6	
Product standard(s)	FCC Rules and Regulation; Titles 47 Part. 15.209 and 15.249 (a) and (d)	
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	OATS or SAC with measurement distance [m]: 10 m for frequencies below 1 GHz 3 m for frequencies above 1 GHz	
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	$20\log(2400/F(\text{kHz}))$
0,490 to 1,705	30	$20\log(24000/F(\text{kHz}))$
1,705 to 30	30	$20\log(30)$
30 to 88	3	$20\log(100)^{**}$
88 to 216	3	$20\log(150)^{**}$
216 to 960	3	$20\log(200)^{**}$
Above 960	3	$20\log(500)$

****:** except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54 – 72 MHz, 76 – 88 MHz, 174 – 216 MHz or 470 – 806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

Perimeter protection systems may operate in the 54 – 72 MHz and 76 – 88 MHz bands under the provisions of this section. The use of such perimeter protection systems is limited to industrial, business and commercial applications.

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 Verdict 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:

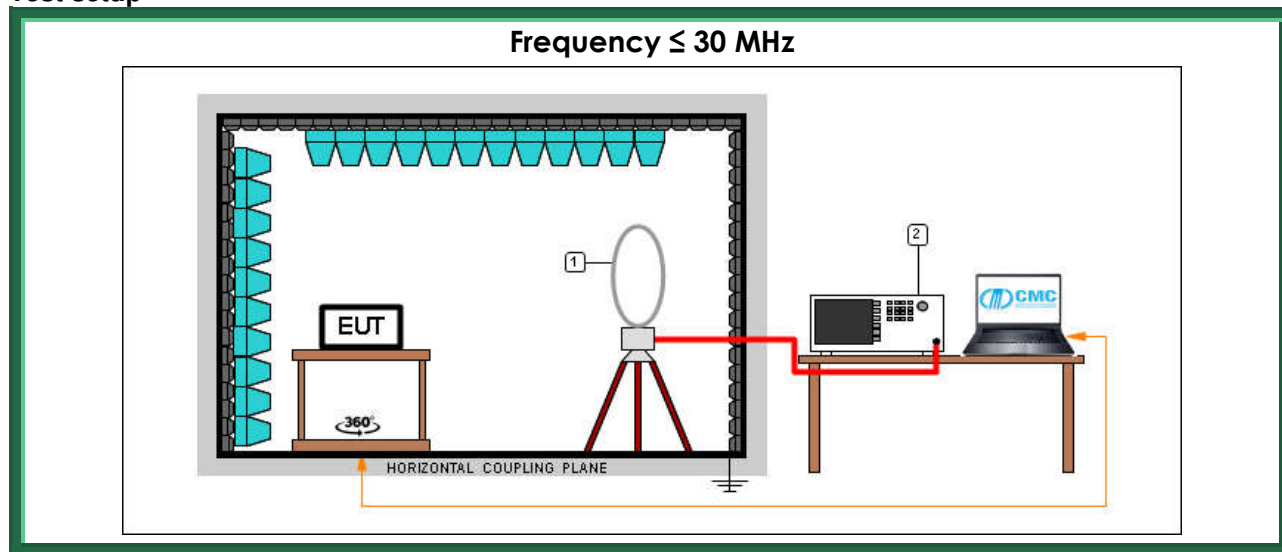
MHz	MHz	MHz	GHz
0,090 – 0,110	16,42 – 16,423	399,9 – 410	4,5 – 5,15
0,495 – 0,505	16,69475 – 16,69525	608 – 614	5,35 – 5,46
2,1735 – 2,1905	16,80425 – 16,80475	960 – 1240	7,25 – 7,75
4,125 – 4,128	25,5 – 25,67	1300 – 1427	8,025 – 8,5
4,17725 – 4,17775	37,5 – 38,25	1435 – 1626,5	9,0 – 9,2
4,20725 – 4,20775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

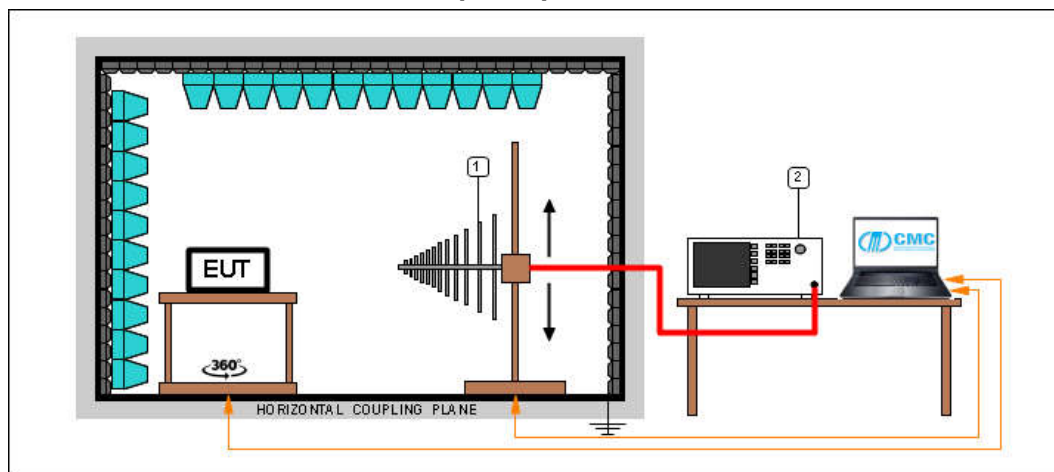
Test setup



Test setup PE004_21

Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
2	CMC S402	Rohde & Schwarz	ESW44	103433	Emi Test Receiver	December 2024	December 2025
1	CMC S127	Schaffner	HLA6120	1191	Loop Antenna 9kHz - 30MHz	May 2024	May 2025
--	CMC A105	Frankonia	FC06	FC06.1-2017-073	Turntable & Antenna mast controller (Software V02.05.013)	No calibration required	No calibration required

Frequency ≤ 1 GHz



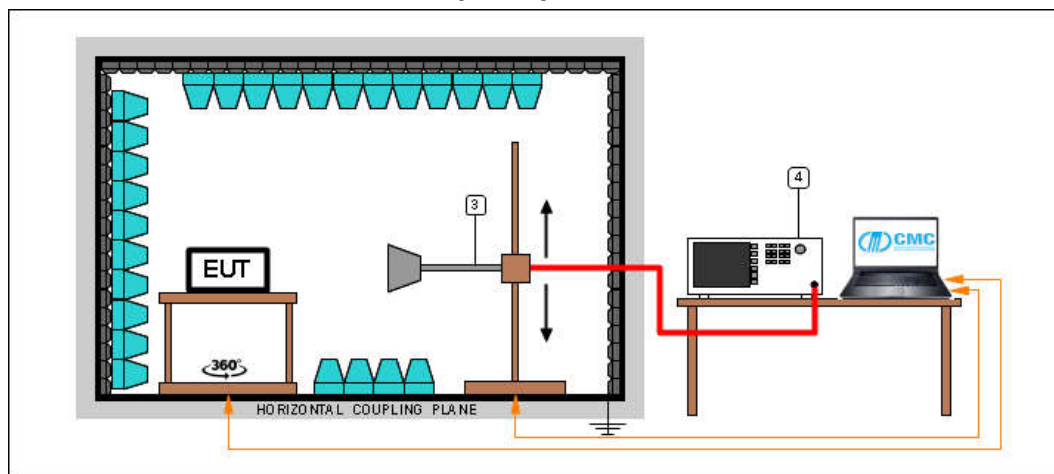
Test setup PE004_22

Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
2	CMC S402	Rohde & Schwarz	ESW44	103433	Emi Test Receiver	December 2024	December 2025
1	CMC S271	Schwarzbeck	BBA 9106 + VHBB 9124	831	Broadband Antenna	August 2022	August 2025
--	CMC A105	Frankonia	FC06	FC06.1-2017-073	Turntable & Antenna mast controller (Software V02.05.013)	No calibration required	No calibration required

Test setup PE004_23

Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
2	CMC S402	Rohde & Schwarz	ESW44	103433	Emi Test Receiver	December 2024	December 2025
1	CMC S287	Schwarzbeck	VUSLP 9111B	9111B-203	Broadband Antenna	August 2022	August 2025
--	CMC A105	Frankonia	FC06	FC06.1-2017-073	Turntable & Antenna mast controller (Software V02.05.013)	No calibration required	No calibration required

Frequency > 1 GHz



Test setup PE004_24

Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
4	CMC S402	Rohde & Schwarz	ESW44	103433	Emi Test Receiver	December 2024	December 2025
3	CMC S108	Emco	3115	9811-5622	Waveguide antenna	August 2022	August 2025
--	CMC A105	Frankonia	FC06	FC06.1-2017-073	Turntable & Antenna mast controller (Software V02.05.013)	No calibration required	No calibration required

Test setup PE004_25

Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
4	CMC S402	Rohde & Schwarz	ESW44	103433	Emi Test Receiver	December 2024	December 2025
3	CMC S290	Schwarzbeck	BBHA 9170	733	Horn Antenna	October 2021	October 2026
--	CMC A105	Frankonia	FC06	FC06.1-2017-073	Turntable & Antenna mast controller (Software V02.05.013)	No calibration required	No calibration required

Result

Transmission frequency (MHz)	Antenna polarization	EUT polarization	Frequency Range (MHz)	Graphs	Verdict
927,44	H	Worst case	300 – 1000	G24218110	P
927,44	V	Worst case	300 – 1000	G24218111	P
917,129	V	Worst case	300 – 1000	G24218112	P
917,129	H	Worst case	300 – 1000	G24218113	P
917,129	V	Worst case	30 – 300	G24218118	P
917,129	H	Worst case	30 – 300	G24218119	P
927,44	H	Worst case	30 – 300	G24218120	P
927,44	V	Worst case	30 – 300	G24218121	P
917,129	V	V	1000 – 10000	G24218126	P
917,129	H	V	1000 – 10000	G24218127	P
917,129	H	H	1000 – 10000	G24218128	P
917,129	V	H	1000 – 10000	G24218129	P
927,44	V	H	1000 – 10000	G24218130	P
927,44	H	H	1000 – 10000	G24218131	P
927,44	H	V	1000 – 10000	G24218132	P
927,44	V	V	1000 – 10000	G24218133	P
902,132	V	Worst case	30 – 300	G24218142	P
902,132	H	Worst case	30 – 300	G24218143	P
902,132	H	Worst case	300 – 1000	G24218144	P
902,132	V	Worst case	300 – 1000	G24218145	P
902,132	Loop	Worst case	0,009 – 30	G24218150	P
917,129	Loop	Worst case	0,009 – 30	G24218151	P
927,44	Loop	Worst case	0,009 – 30	G24218152	P
902,132	V	H	1000 – 10000	G24218153	P
902,132	H	H	1000 – 10000	G24218154	P
902,132	H	V	1000 – 10000	G24218155	P
902,132	V	V	1000 – 10000	G24218156	P

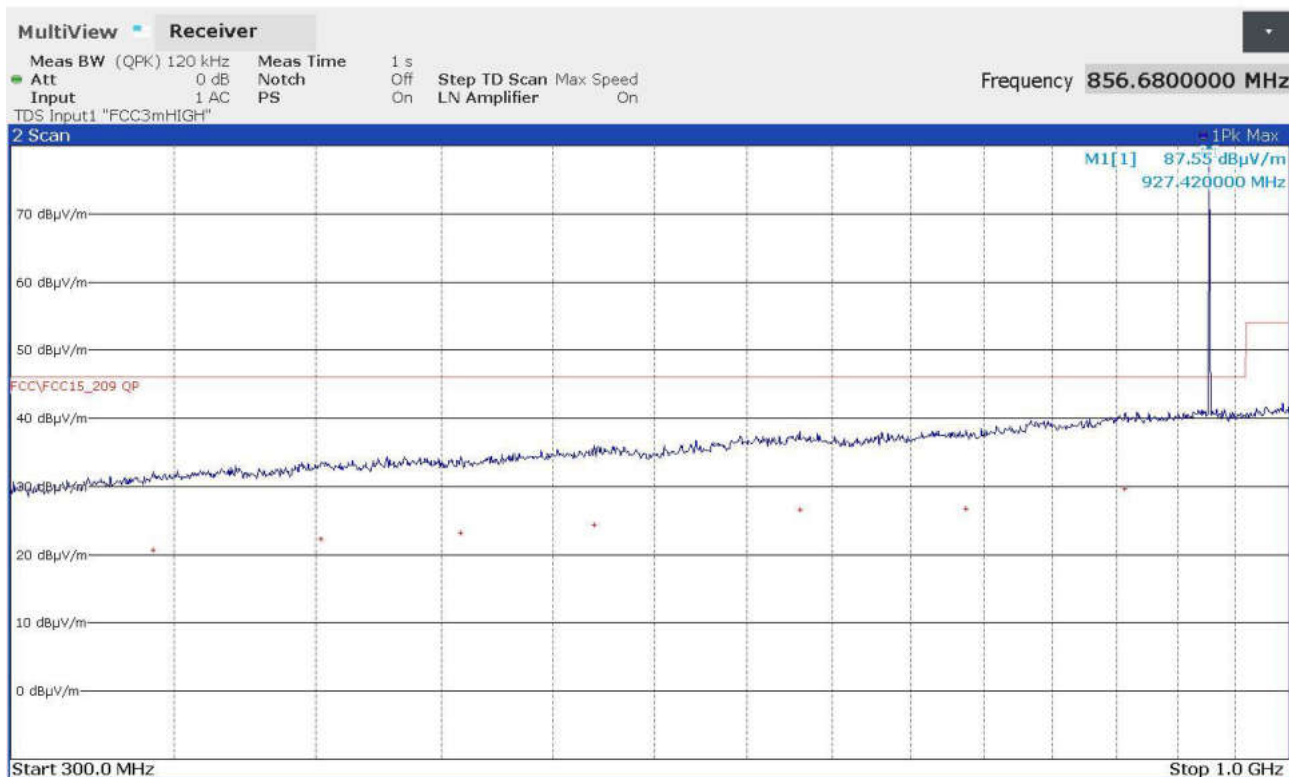
Remarks: EUT was tested in 3 orthogonal planes, graphs are related to the highest detected levels. Measurements at frequencies lower than 30 MHz have been performed with an EUT – antenna distance of 10 m. Measured values have been corrected with conversion factor $40\log(\text{test distance}/10)$ based 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 24218110



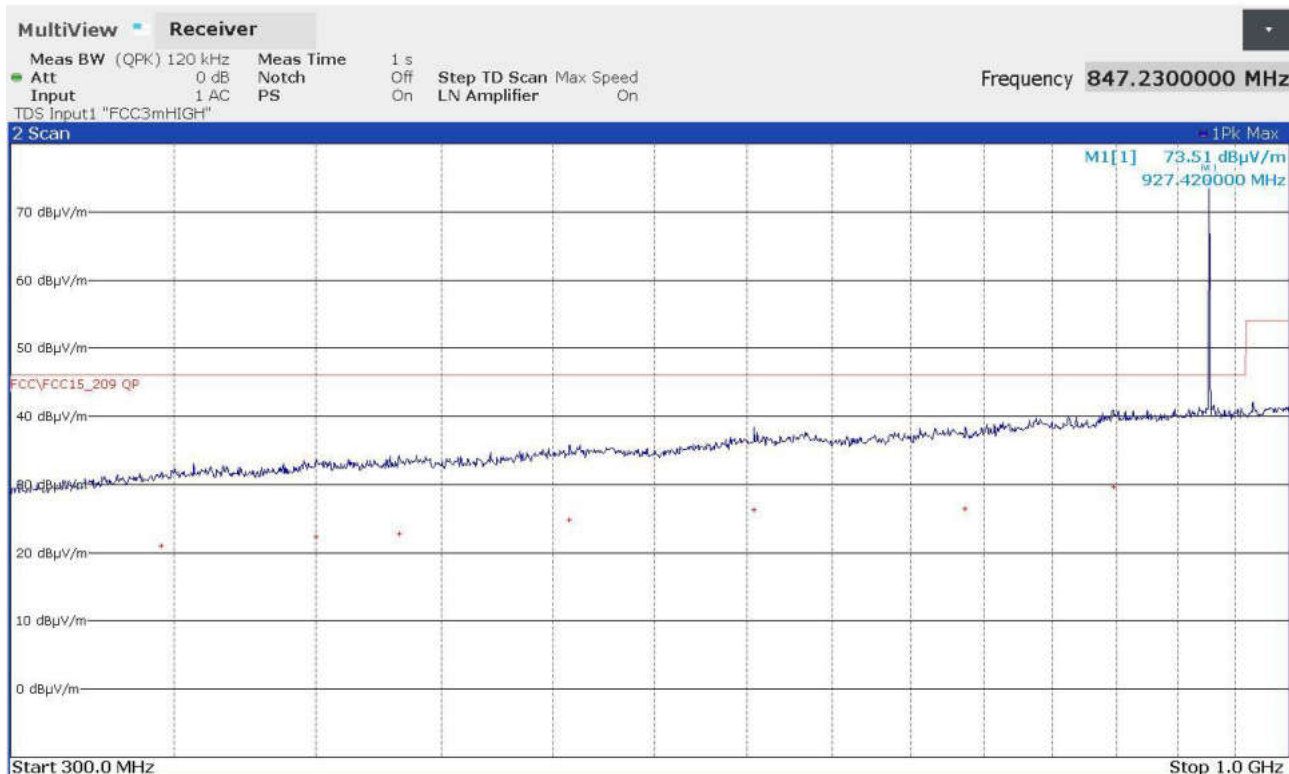
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
343080000	+20,64	-25,38
401940000	+22,30	-23,72
458280000	+23,13	-22,89
519540000	+24,35	-21,67
630720000	+26,53	-19,49
737730000	+26,72	-19,30
856680000	+29,70	-16,32

24218110_2

Panozzo 24218111



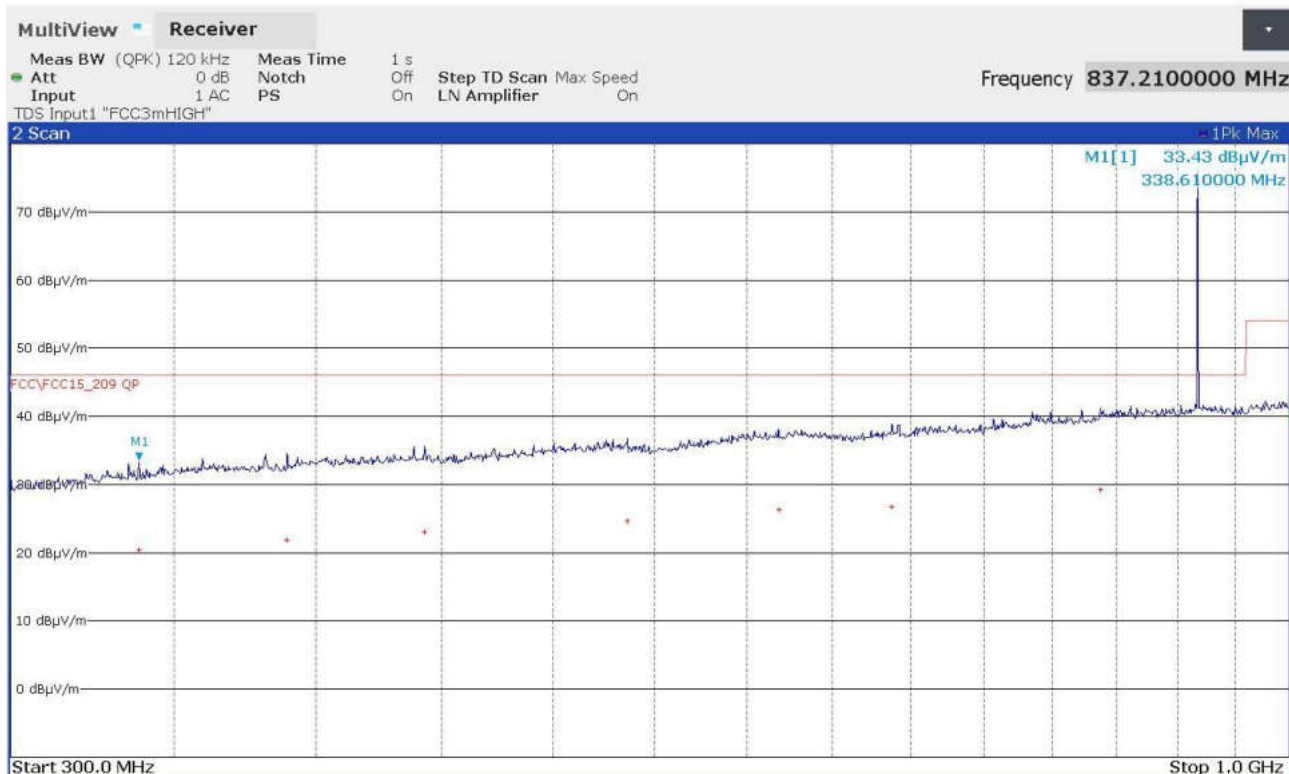
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
345870000	+21,01	-25,01
399990000	+22,38	-23,64
432450000	+22,72	-23,30
507780000	+24,81	-21,21
604050000	+26,30	-19,72
737040000	+26,49	-19,53
847230000	+29,72	-16,30

24218111_2

Panozzo 24218112



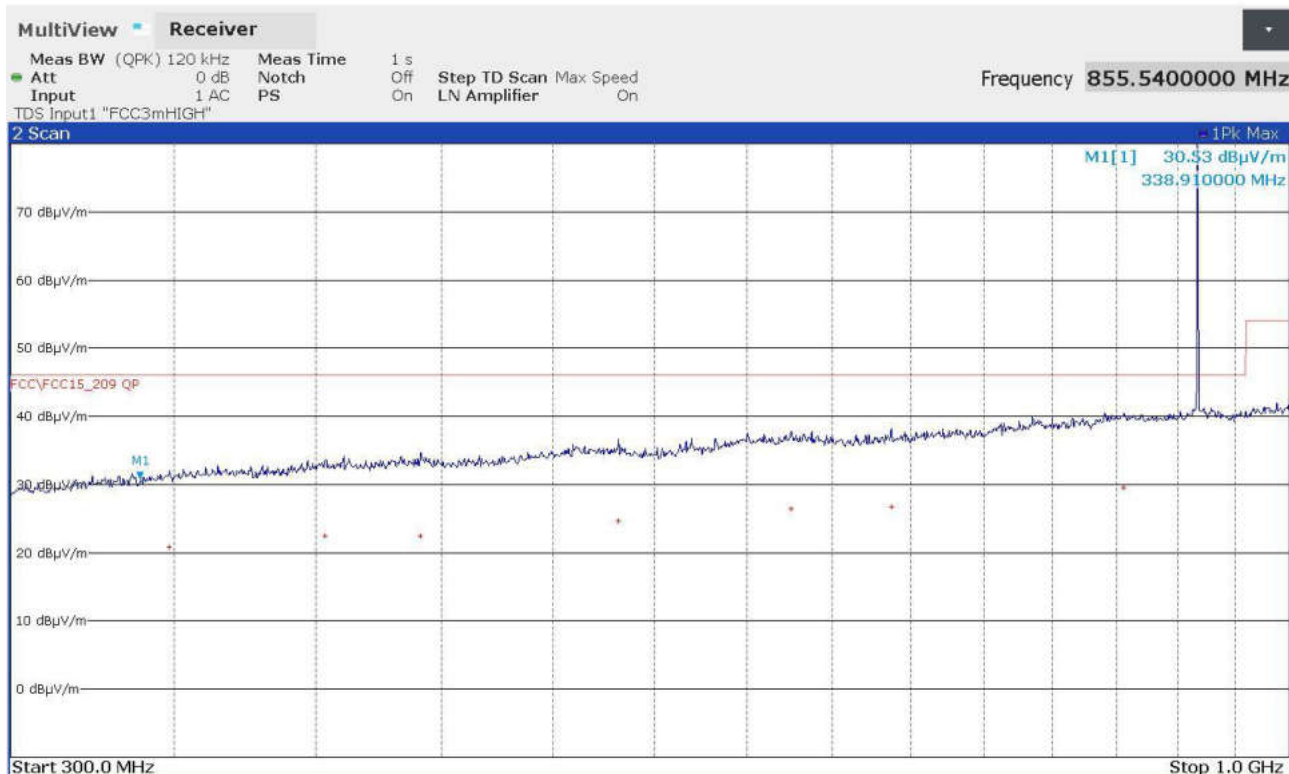
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
338610000	+20,33	-25,69
389220000	+21,93	-24,09
442950000	+23,08	-22,94
536130000	+24,71	-21,31
618210000	+26,35	-19,67
687900000	+26,71	-19,31
837210000	+29,24	-16,78

24218112_2

Panozzo 24218113



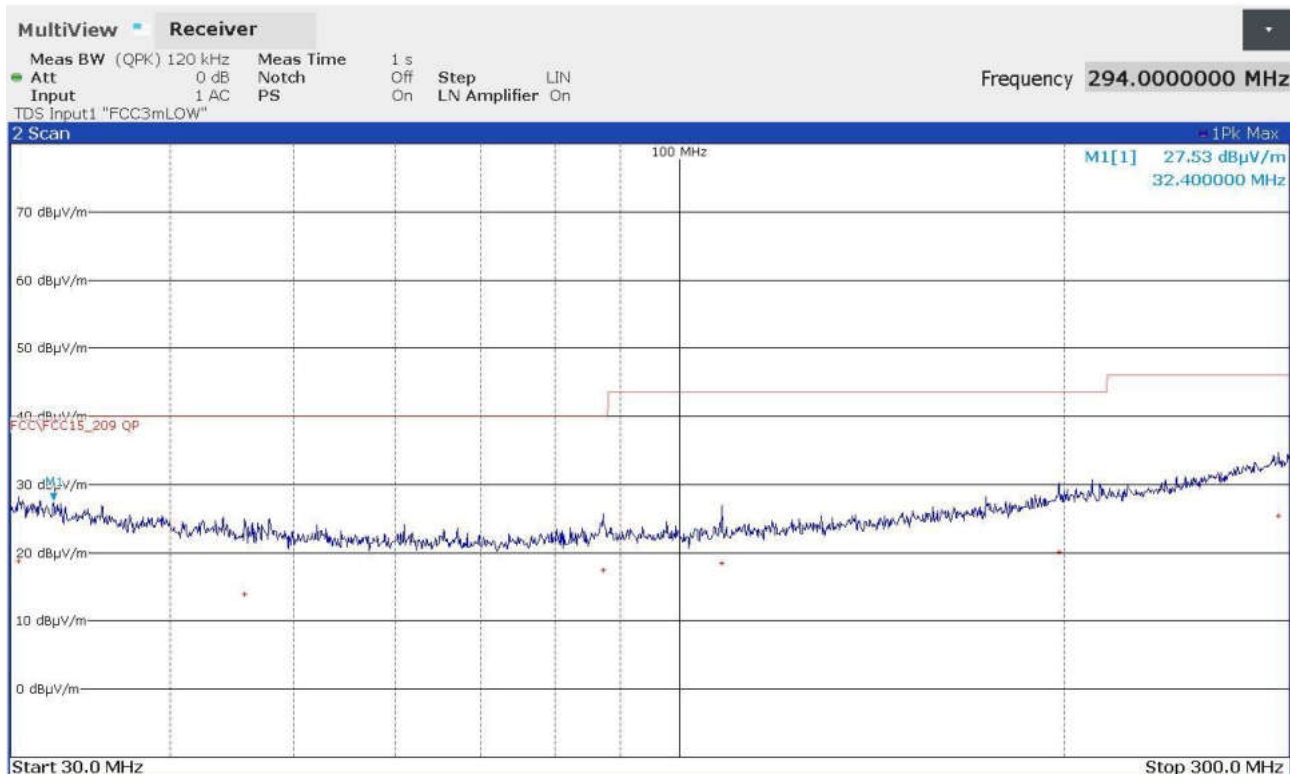
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
348450000	+20,80	-25,22
403470000	+22,50	-23,52
441360000	+22,44	-23,58
531810000	+24,74	-21,28
625800000	+26,46	-19,56
687360000	+26,78	-19,24
855540000	+29,53	-16,49

24218113_2

Panozzo 24218118



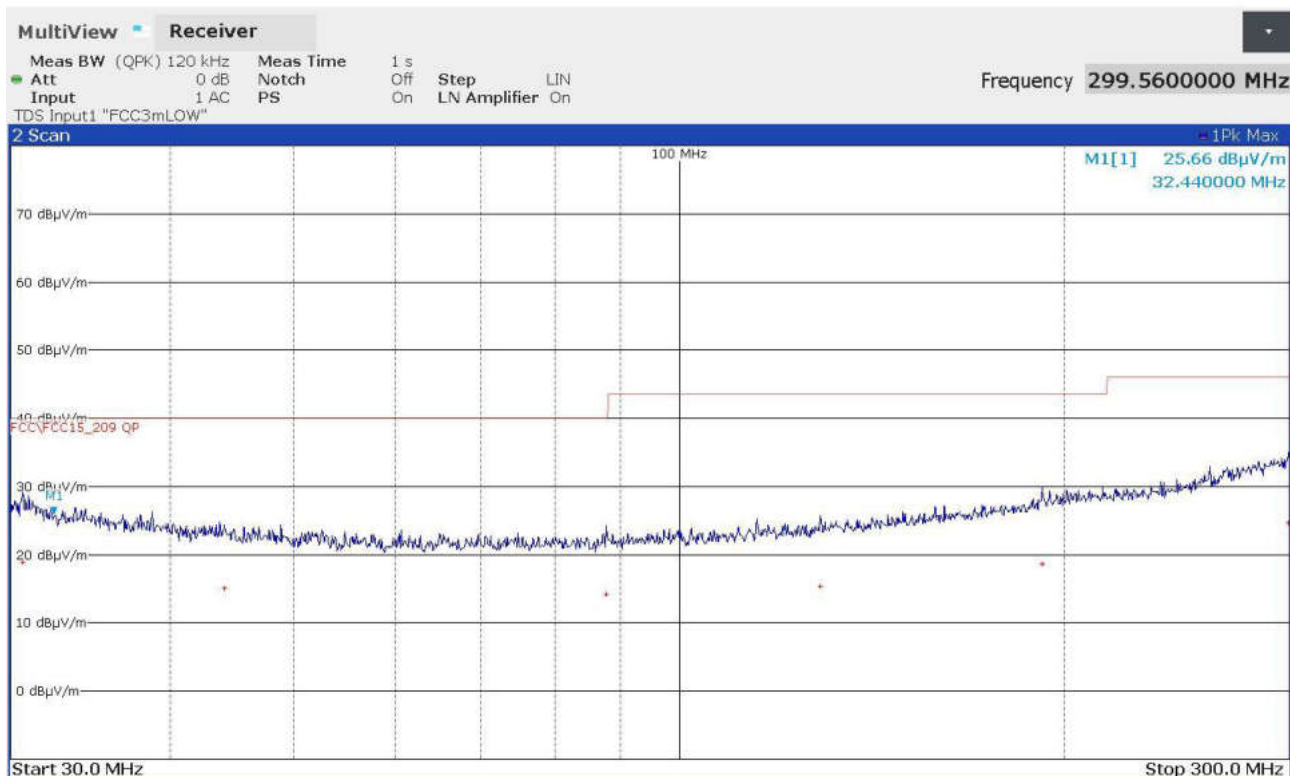
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
30440000	+18,73	-21,27
45720000	+13,96	-26,04
87240000	+17,43	-22,57
107960000	+18,49	-25,03
198120000	+20,03	-23,49
294000000	+25,36	-20,66

24218118_2

Panozzo 24218119



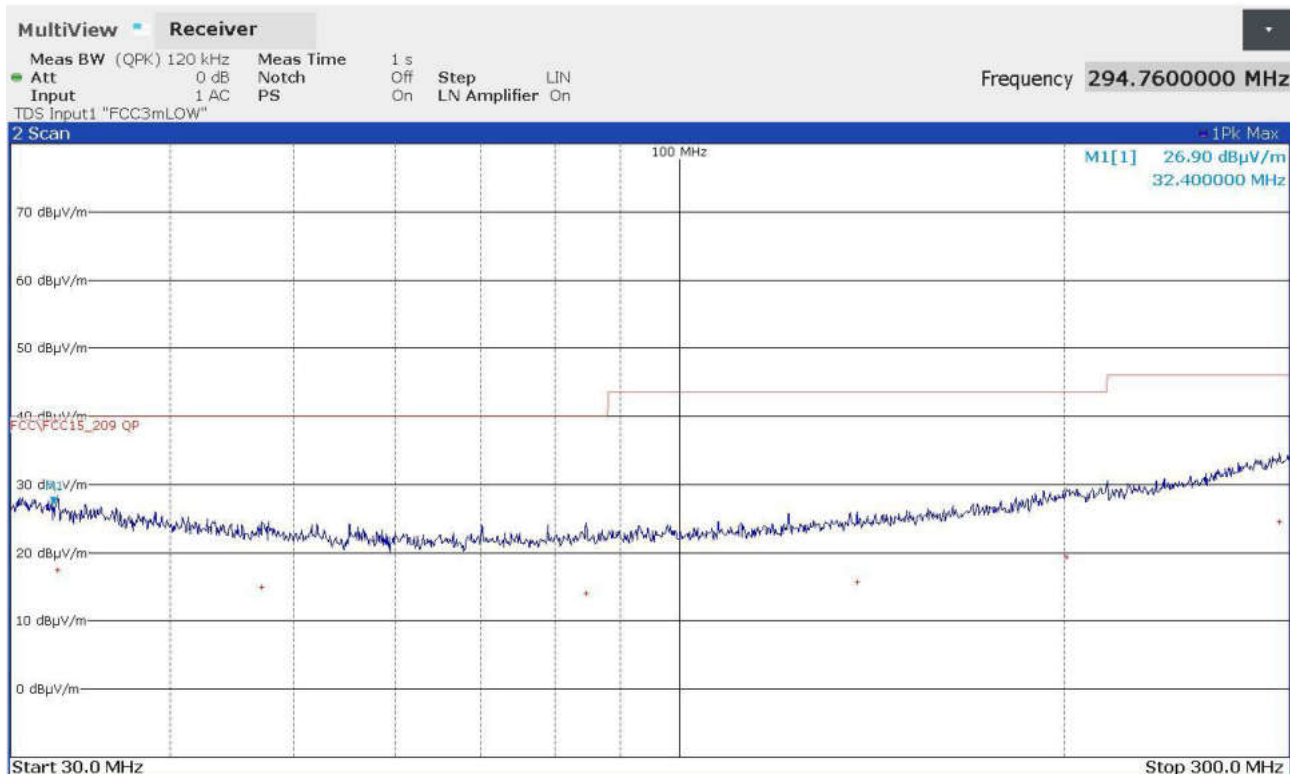
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
30680000	+18,91	-21,09
44120000	+15,06	-24,94
87720000	+14,16	-25,84
128920000	+15,31	-28,21
192200000	+18,67	-24,85
299560000	+24,70	-21,32

24218119_2

Panozzo 24218120



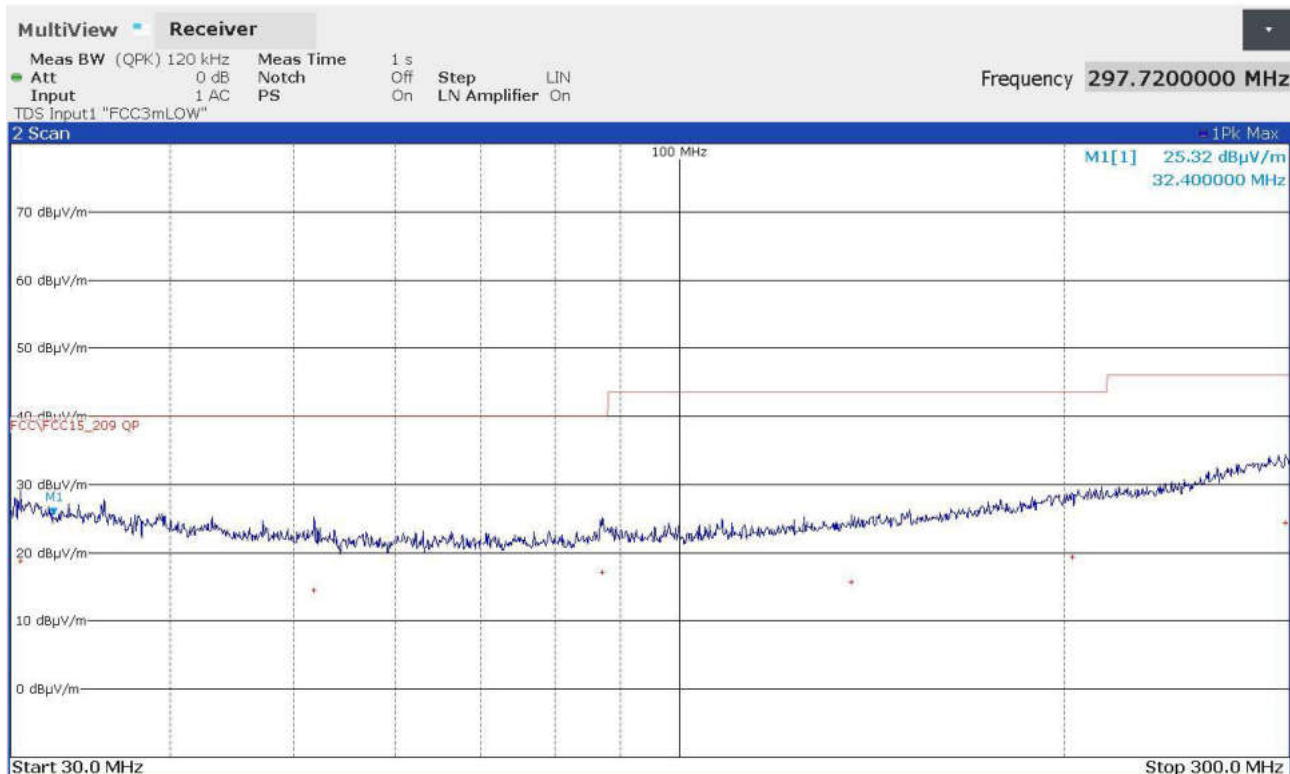
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
32680000	+17,43	-22,57
47160000	+14,98	-25,02
84520000	+14,05	-25,95
137760000	+15,74	-27,78
200680000	+19,40	-24,12
294760000	+24,53	-21,49

24218120_2

Panozzo 24218121



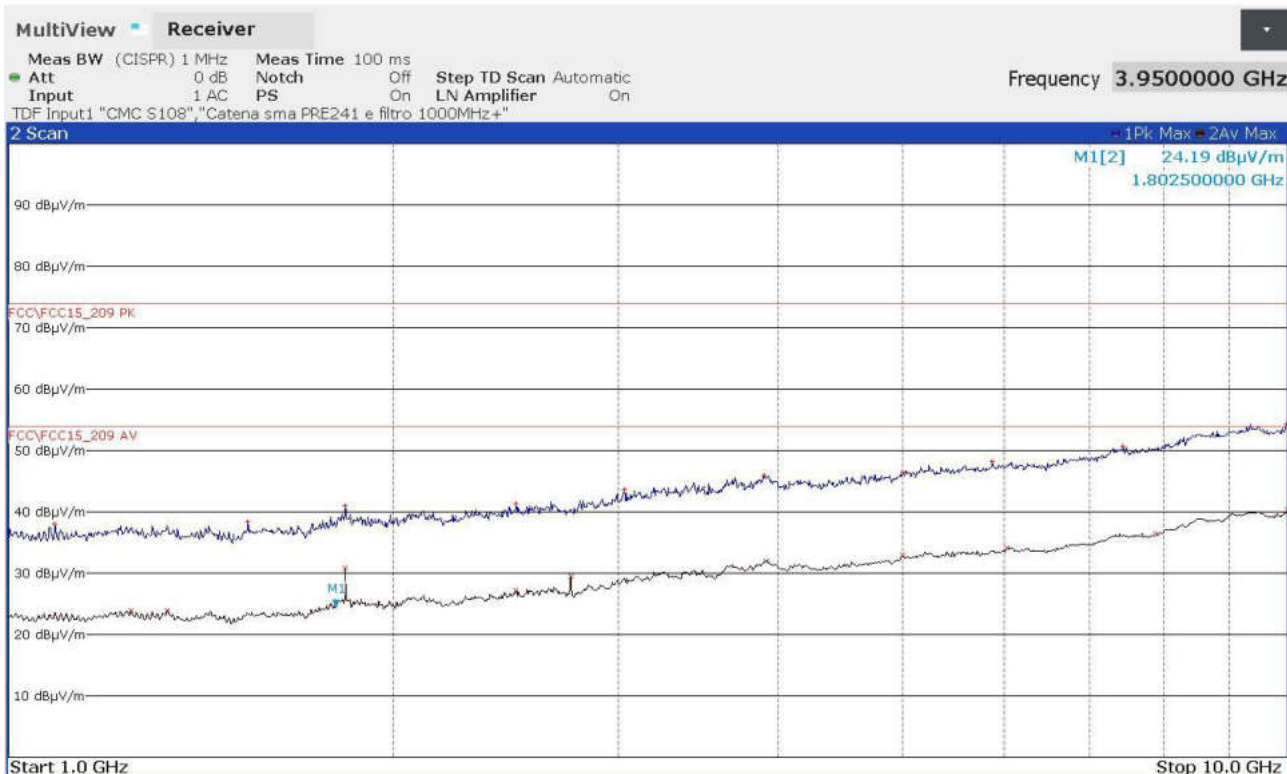
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
30560000	+18,84	-21,16
51840000	+14,53	-25,47
87120000	+17,12	-22,88
136360000	+15,71	-27,81
202800000	+19,33	-24,19
297720000	+24,36	-21,66

24218121_2

Panozzo 24218126

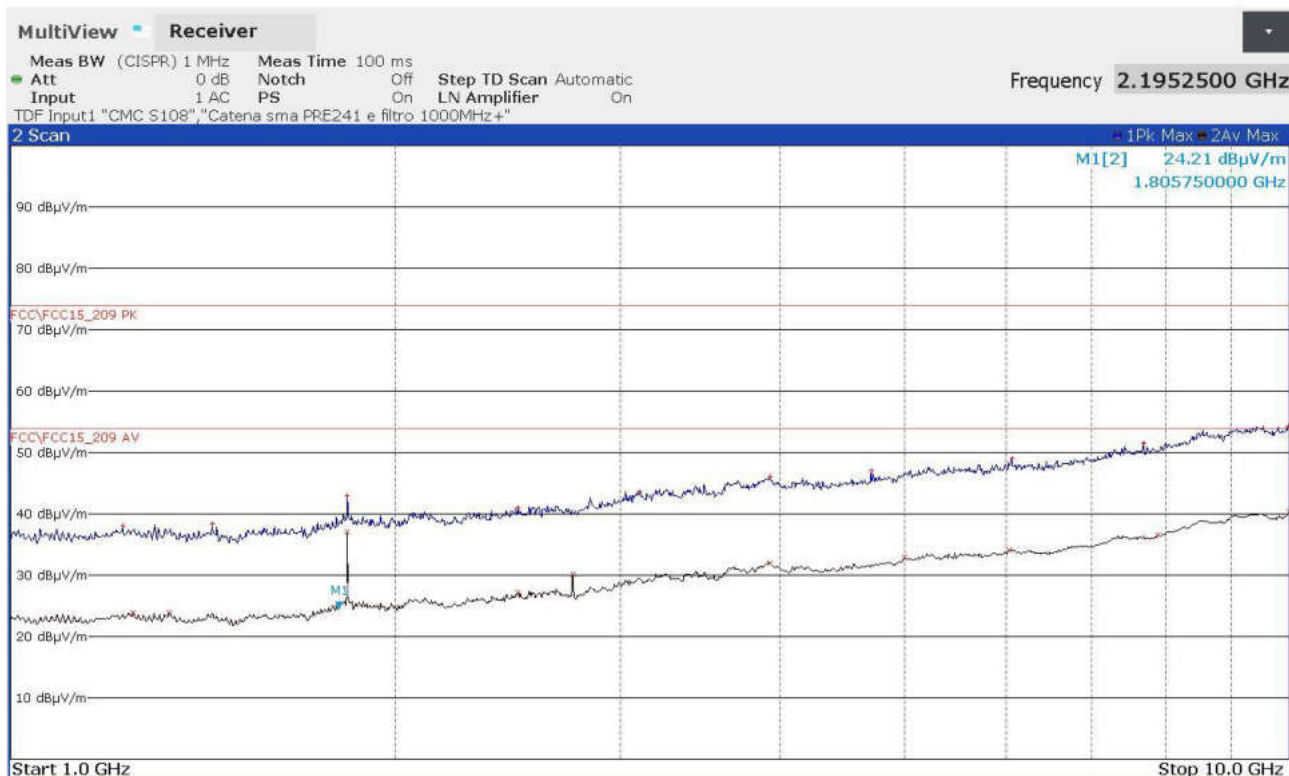


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1087250000	+38,11	-35,87	1247000000	+23,95	-30,03
1538500000	+38,37	-35,61	1331250000	+23,91	-30,07
1834250000	+41,05	-32,93	1834250000	+30,86	-23,12
2494750000	+41,37	-32,61	2492750000	+27,23	-26,75
3030750000	+43,63	-30,35	2751500000	+29,54	-24,44
3897750000	+45,95	-28,03	3912250000	+31,99	-21,99
4998000000	+46,33	-27,65	4999000000	+32,97	-21,01
5878750000	+48,12	-25,86	6033000000	+34,11	-19,87
7433750000	+50,73	-23,25	7897250000	+36,47	-17,51
9976000000	+54,25	-19,73	9998000000	+40,25	-13,73

24218126_2

Panozzo 24218127

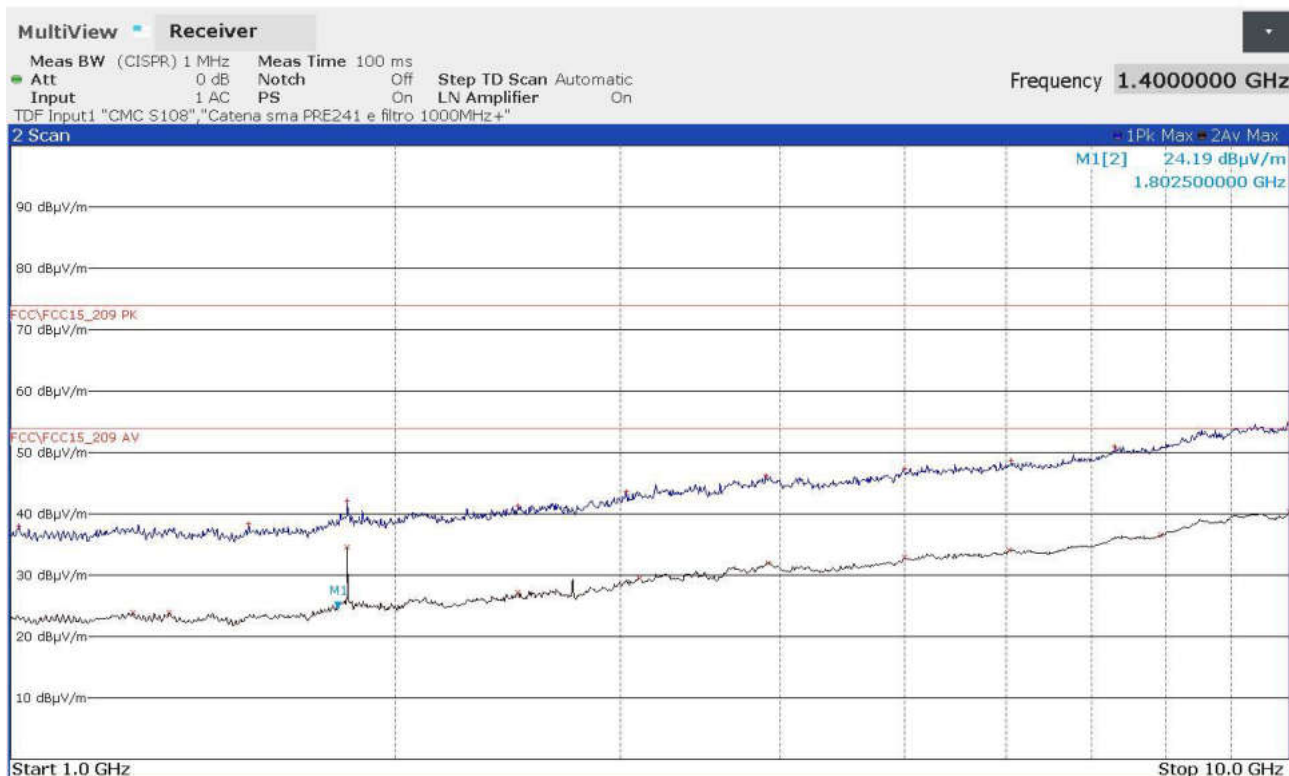


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1224500000	+38,02	-35,96	1247000000	+23,92	-30,06
1438750000	+38,38	-35,60	1331000000	+23,95	-30,03
1834500000	+42,97	-31,01	1834250000	+37,04	-16,94
2493000000	+41,06	-32,92	2492750000	+27,24	-26,74
3104000000	+43,66	-30,32	2751500000	+30,14	-23,84
3926500000	+46,03	-27,95	3923500000	+32,01	-21,97
4709500000	+47,12	-26,86	4998750000	+32,98	-21,00
6065500000	+48,98	-25,00	6033500000	+34,12	-19,86
7686500000	+51,40	-22,58	7897250000	+36,49	-17,49
9982250000	+54,31	-19,67	9998000000	+40,32	-13,66

24218127_2

Panozzo 24218128

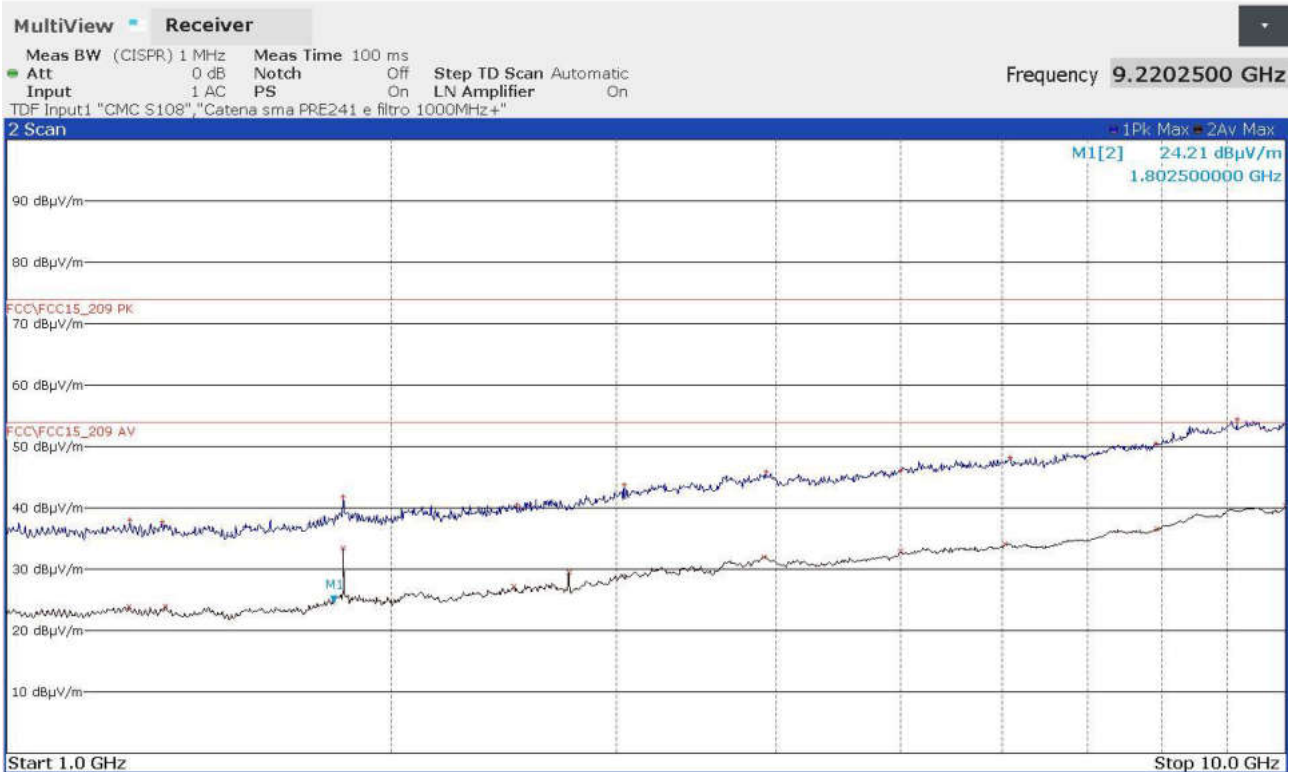


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1015250000	+37,98	-36,00	1247000000	+23,93	-30,05
1536250000	+38,32	-35,66	1331000000	+23,97	-30,01
1834250000	+42,17	-31,81	1834250000	+34,53	-19,45
2494000000	+41,34	-32,64	2493000000	+27,24	-26,74
3028500000	+43,67	-30,31	3105000000	+29,51	-24,47
3899250000	+46,15	-27,83	3911750000	+32,02	-21,96
4997750000	+47,31	-26,67	4998750000	+32,98	-21,00
6056750000	+48,63	-25,35	6031750000	+34,12	-19,86
7306000000	+51,05	-22,93	7937250000	+36,48	-17,50
9999750000	+54,99	-18,99	9999000000	+40,31	-13,67

24218128_2

Panozzo 24218129

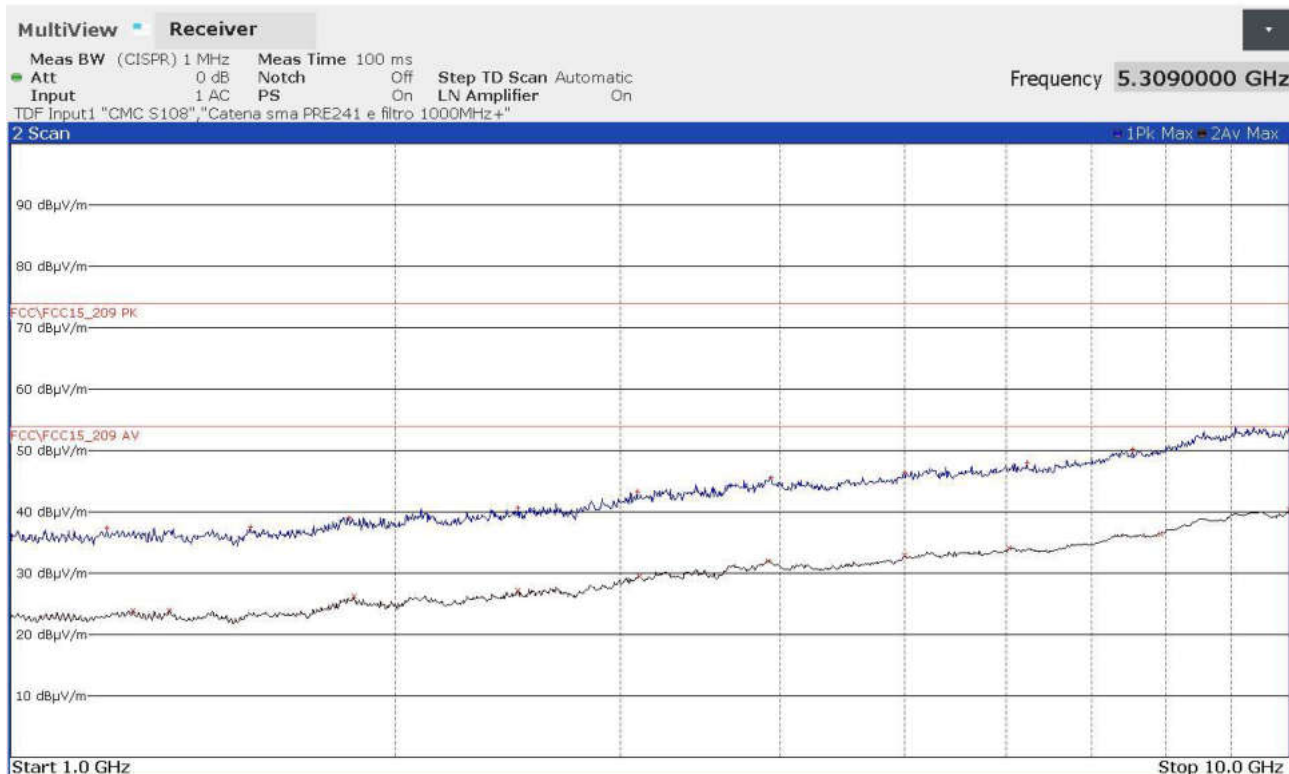


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1249000000	+38,06	-35,92	1247250000	+23,96	-30,02
1322750000	+37,76	-36,22	1331000000	+23,89	-30,09
1834500000	+41,87	-32,11	1834250000	+33,50	-20,48
2505500000	+40,49	-33,49	2493000000	+27,23	-26,75
3040000000	+43,69	-30,29	2751500000	+29,55	-24,43
3924750000	+45,93	-28,05	3912000000	+32,01	-21,97
4999000000	+46,09	-27,89	4998500000	+32,99	-20,99
6093750000	+48,15	-25,83	6033250000	+34,14	-19,84
7912500000	+50,55	-23,43	7937500000	+36,48	-17,50
9170250000	+54,44	-19,54	9999250000	+40,29	-13,69

24218129_2

Panozzo 24218130

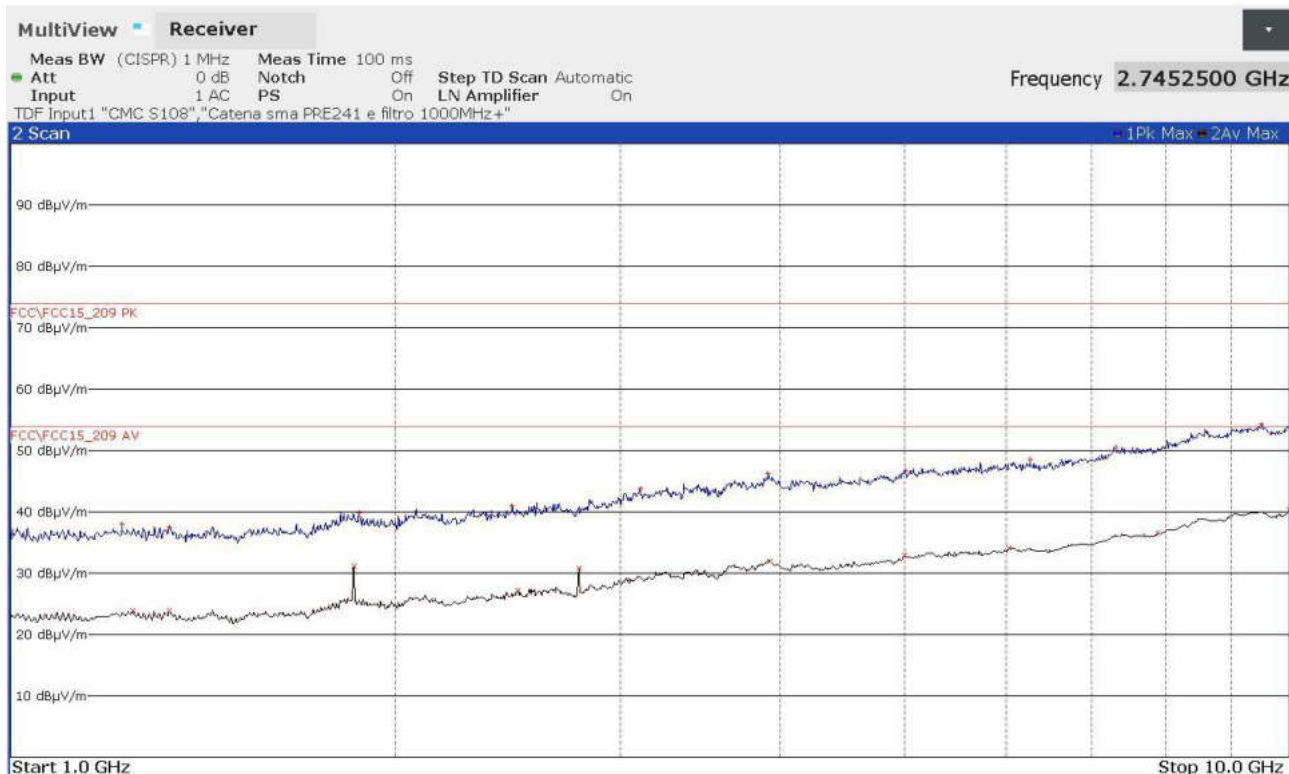


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1189750000	+37,32	-36,66	1247000000	+23,94	-30,04
1540500000	+37,62	-36,36	1331000000	+23,90	-30,08
1838750000	+39,03	-34,95	1854750000	+26,28	-27,70
2492000000	+40,66	-33,32	2493000000	+27,24	-26,74
3091500000	+43,36	-30,62	3105000000	+29,50	-24,48
3932750000	+45,58	-28,40	3912250000	+32,00	-21,98
4999000000	+46,45	-27,53	4999000000	+32,99	-20,99
6233250000	+47,98	-26,00	6033000000	+34,14	-19,84
7538750000	+50,12	-23,86	7937000000	+36,47	-17,51
9998750000	+53,86	-20,12	9998250000	+40,30	-13,68

24218130_2

Panozzo 24218131

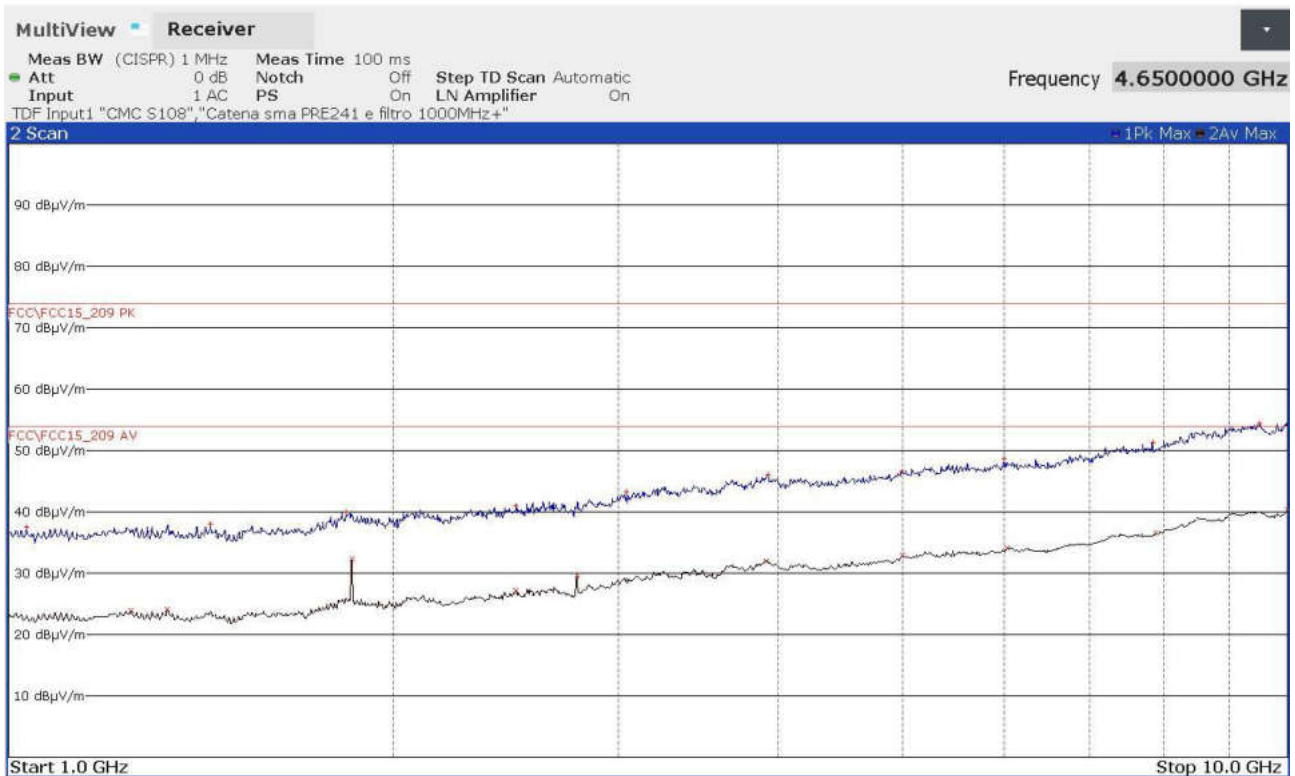


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1223250000	+37,98	-36,00	1247000000	+23,91	-30,07
1330750000	+37,62	-36,36	1331000000	+24,00	-29,98
1872000000	+39,81	-34,17	1854750000	+31,18	-22,80
2468000000	+41,03	-32,95	2492750000	+27,25	-26,73
3105750000	+43,76	-30,22	2782250000	+30,74	-23,24
3911750000	+46,24	-27,74	3923500000	+32,02	-21,96
5011750000	+46,70	-27,28	4998750000	+32,98	-21,00
6272750000	+48,48	-25,50	6033000000	+34,13	-19,85
7308500000	+50,48	-23,50	7897250000	+36,49	-17,49
9514000000	+54,29	-19,69	9999500000	+40,31	-13,67

24218131_2

Panozzo 24218132

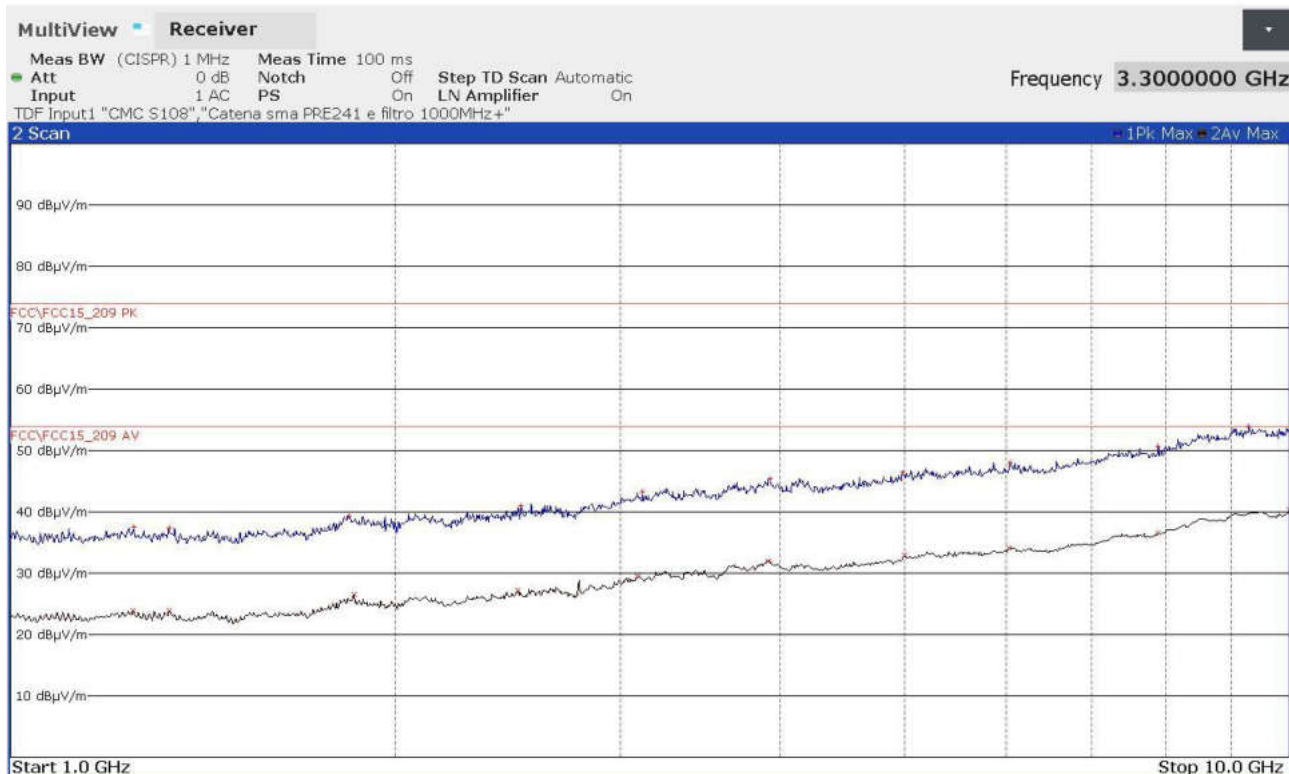


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1033250000	+37,59	-36,39	1246750000	+23,93	-30,05
1438250000	+37,97	-36,01	1331250000	+24,02	-29,96
1835500000	+40,02	-33,96	1854750000	+32,36	-21,62
2494250000	+41,02	-32,96	2492750000	+27,25	-26,73
3041250000	+43,28	-30,70	2782250000	+29,75	-24,23
3926000000	+46,02	-27,96	3912000000	+32,02	-21,96
4996750000	+46,62	-27,36	4998750000	+32,99	-20,99
6006000000	+48,62	-25,36	6032500000	+34,13	-19,85
7841250000	+51,35	-22,63	7896500000	+36,50	-17,48
9514500000	+54,43	-19,55	9998000000	+40,32	-13,66

24218132_2

Panozzo 24218133

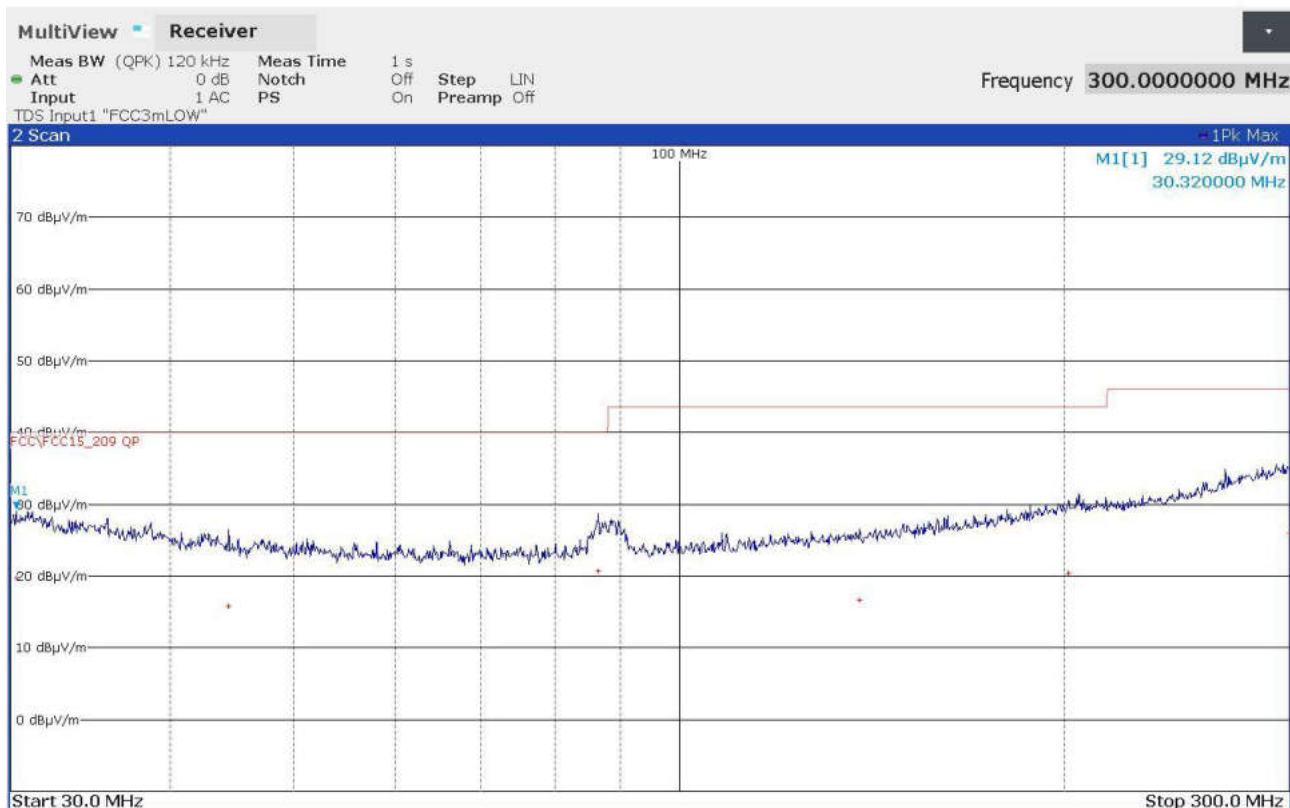


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1249500000	+37,60	-36,38	1247000000	+23,96	-30,02
1329750000	+37,39	-36,59	1331000000	+23,94	-30,04
1838750000	+39,35	-34,63	1854750000	+26,59	-27,39
2506500000	+41,04	-32,94	2493000000	+27,23	-26,75
3119000000	+43,26	-30,72	3092750000	+29,52	-24,46
3922250000	+45,42	-28,56	3912000000	+31,99	-21,99
4981500000	+46,46	-27,52	4998750000	+32,96	-21,02
6045250000	+48,08	-25,90	6033000000	+34,12	-19,86
7896250000	+50,67	-23,31	7896750000	+36,49	-17,49
9285250000	+53,92	-20,06	9999500000	+40,29	-13,69

24218133_2

Panozzo 24218142



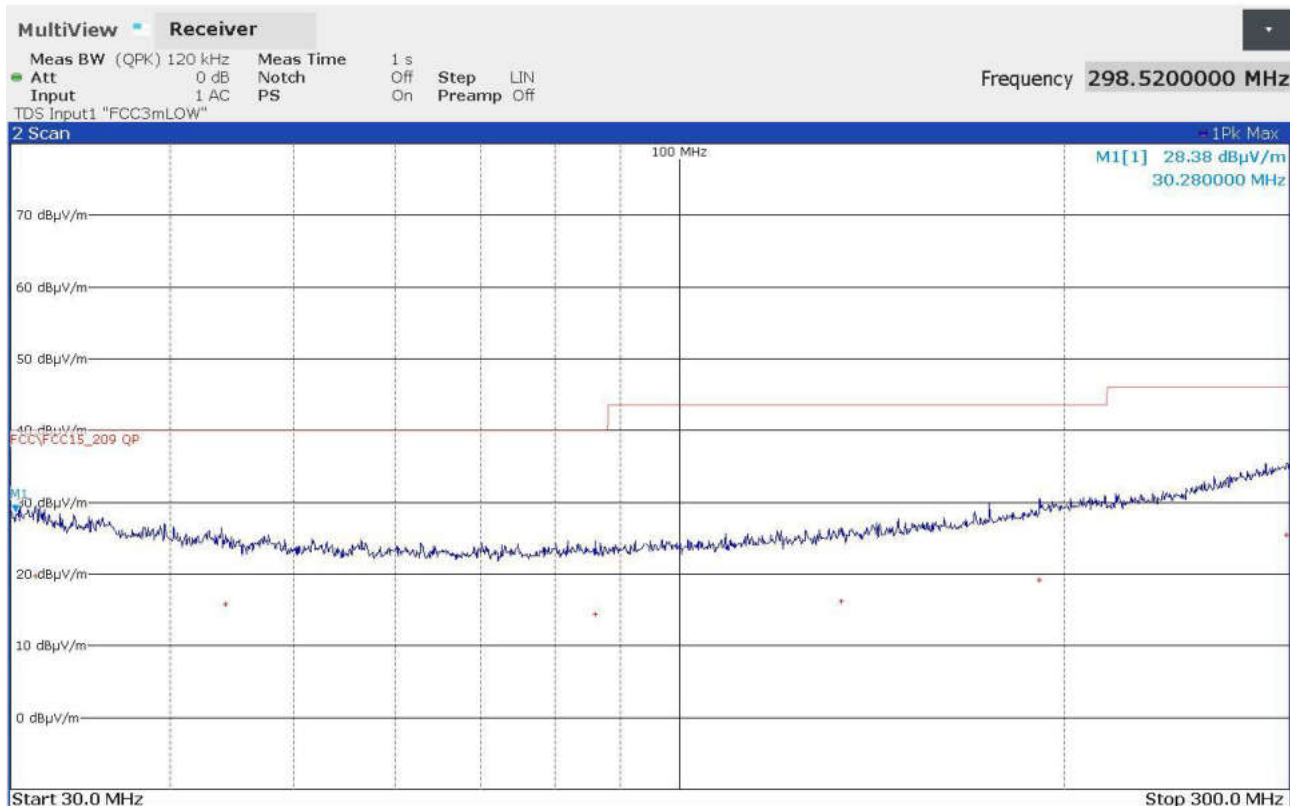
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
30320000	+19,70	-20,30
44440000	+15,78	-24,22
86440000	+20,67	-19,33
138360000	+16,60	-26,92
201680000	+20,40	-23,12
300000000	+25,87	-20,15

24218142_2

Panozzo 24218143



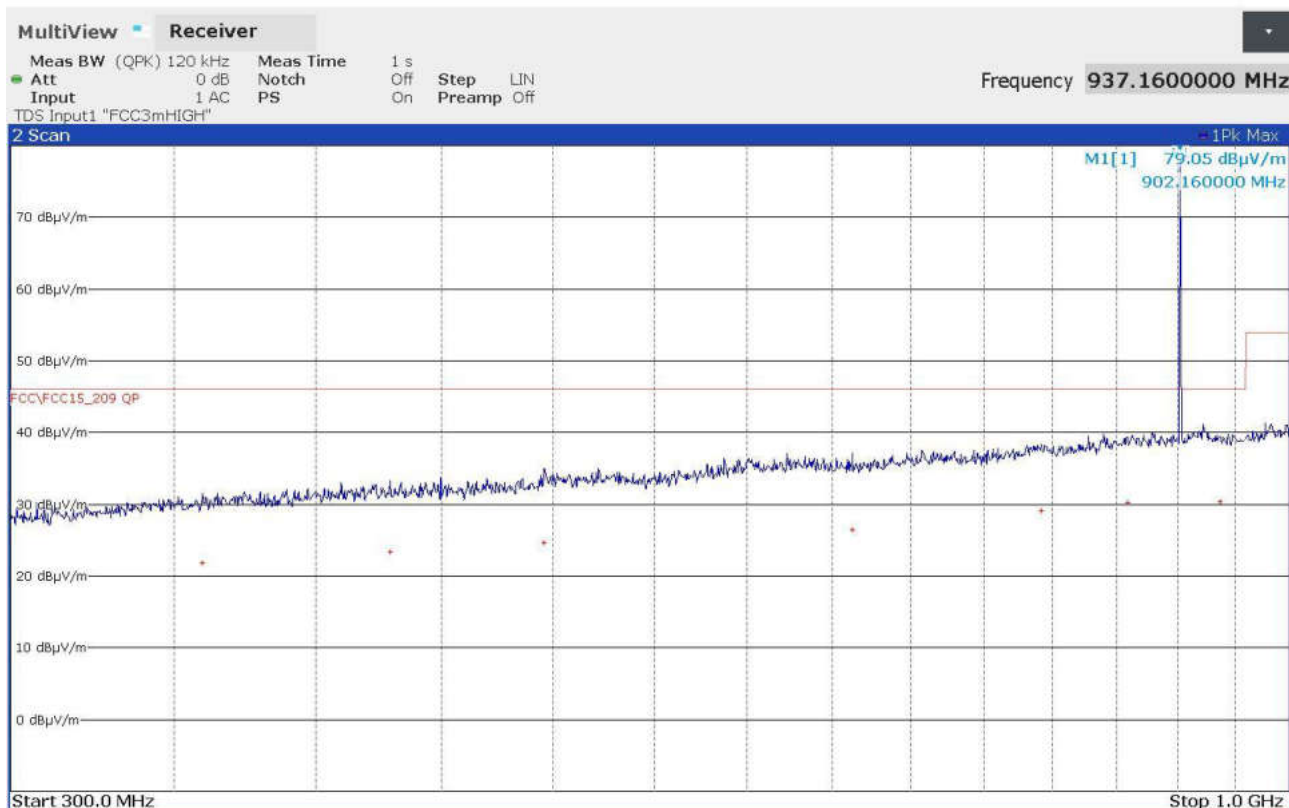
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
31400000	+19,74	-20,26
44200000	+15,73	-24,27
86000000	+14,37	-25,63
134000000	+16,20	-27,32
191360000	+19,20	-24,32
298520000	+25,46	-20,56

24218143_2

Panozzo 24218144



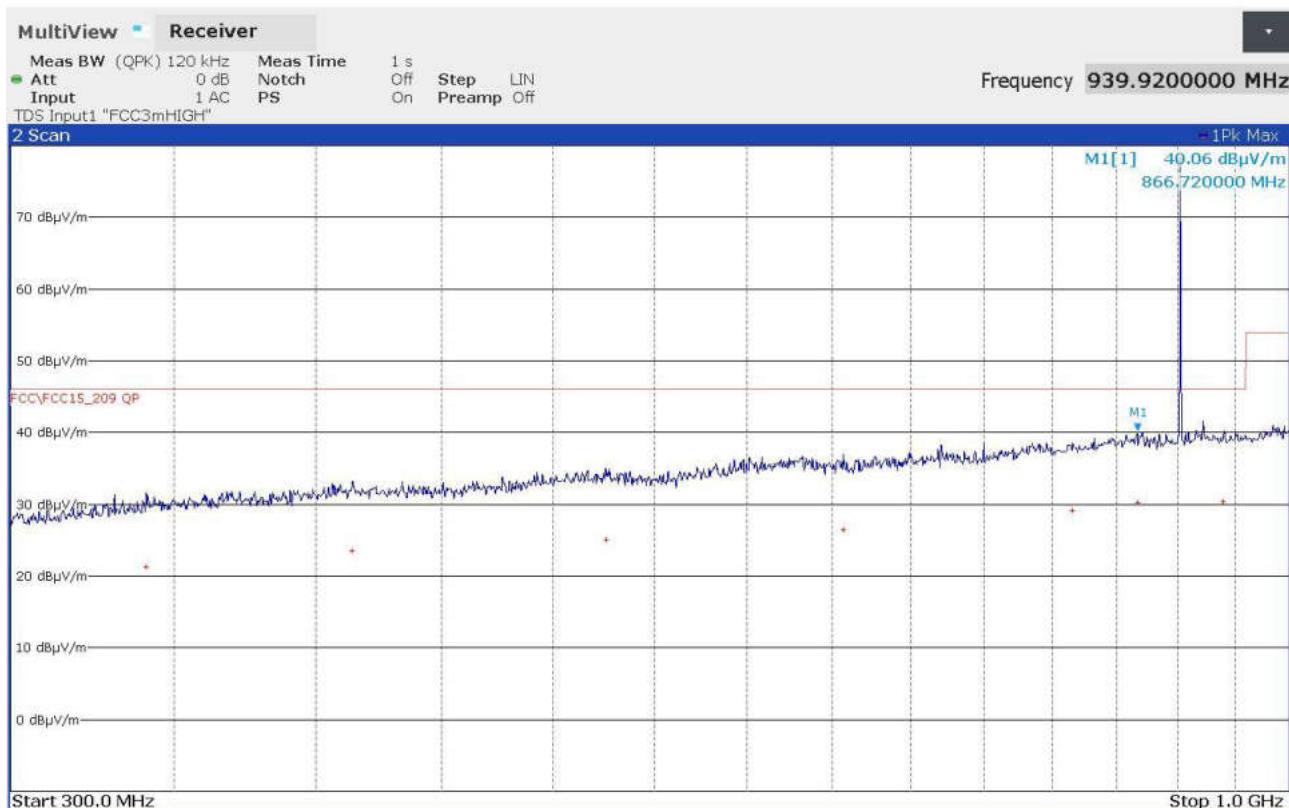
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
359520000	+21,87	-24,15
428800000	+23,40	-22,62
495920000	+24,68	-21,34
662840000	+26,39	-19,63
791800000	+29,15	-16,87
858560000	+30,21	-15,81
937160000	+30,39	-15,63

24218144_2

Panozzo 24218145



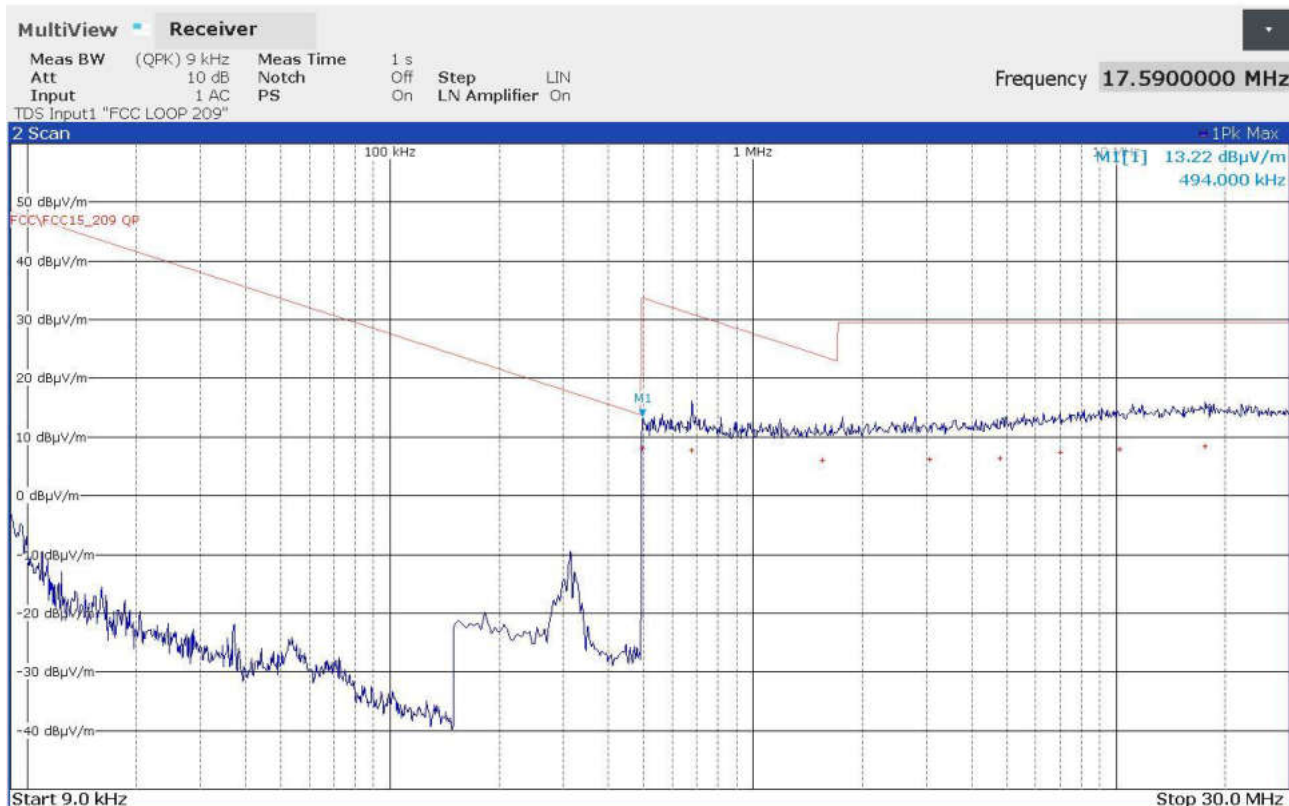
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
341000000	+21,23	-24,79
413960000	+23,47	-22,55
525400000	+25,11	-20,91
656960000	+26,40	-19,62
815400000	+29,15	-16,87
866720000	+30,21	-15,81
939920000	+30,34	-15,68

24218145_2

Panozzo24218150



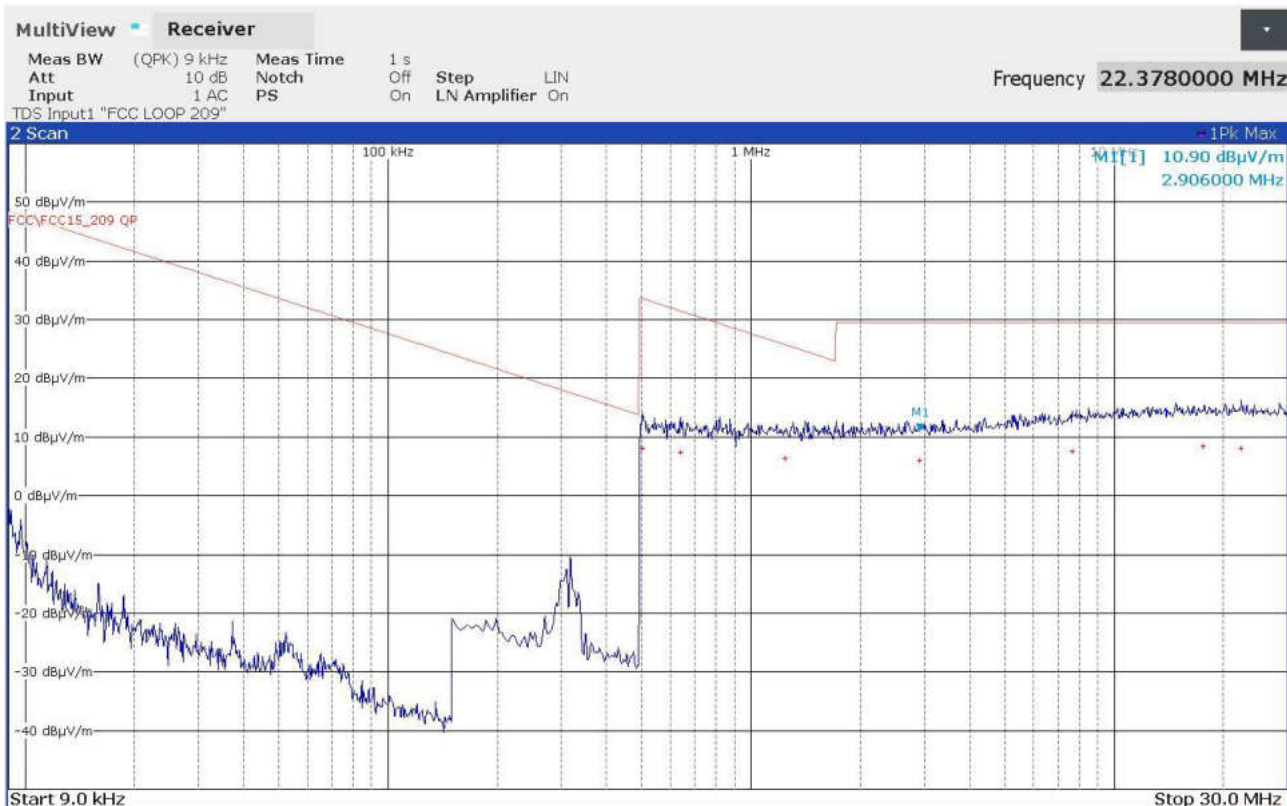
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
494000	+8,11	-25,62
678000	+7,67	-23,31
1554000	+6,10	-17,68
3066000	+6,20	-23,34
4798000	+6,43	-23,11
7010000	+7,33	-22,21
10230000	+7,90	-21,64
17590000	+8,47	-21,07

24218150_2

Panozzo24218151



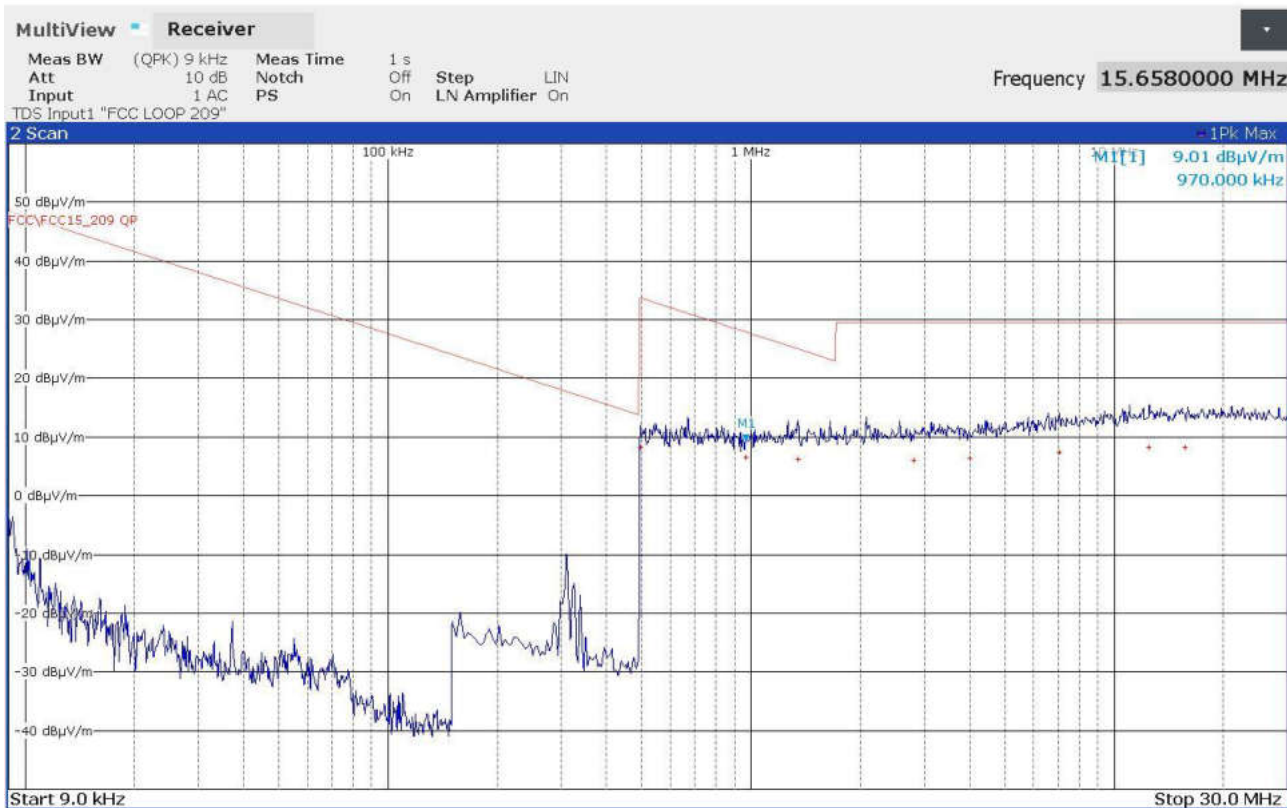
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
502000	+8,15	-25,44
638000	+7,43	-24,08
1238000	+6,34	-19,41
2906000	+6,05	-23,49
7654000	+7,50	-22,04
17590000	+8,40	-21,14
22378000	+8,00	-21,54

24218151_2

Panozzo24218152



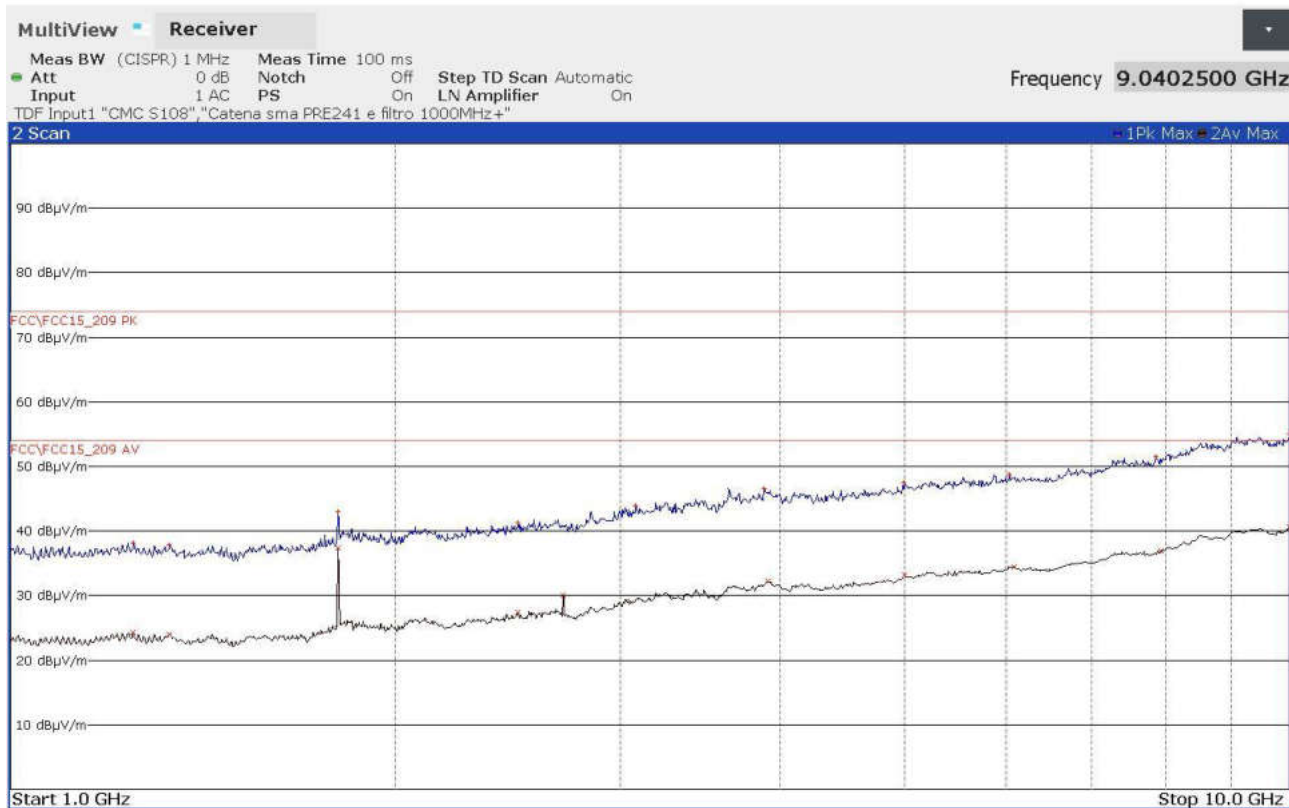
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
494000	+8,18	-25,55
970000	+6,53	-21,34
1346000	+6,28	-18,74
2806000	+5,96	-23,58
3994000	+6,32	-23,22
7046000	+7,33	-22,21
12490000	+8,32	-21,22
15658000	+8,31	-21,23

24218152_2

Panozzo24218153

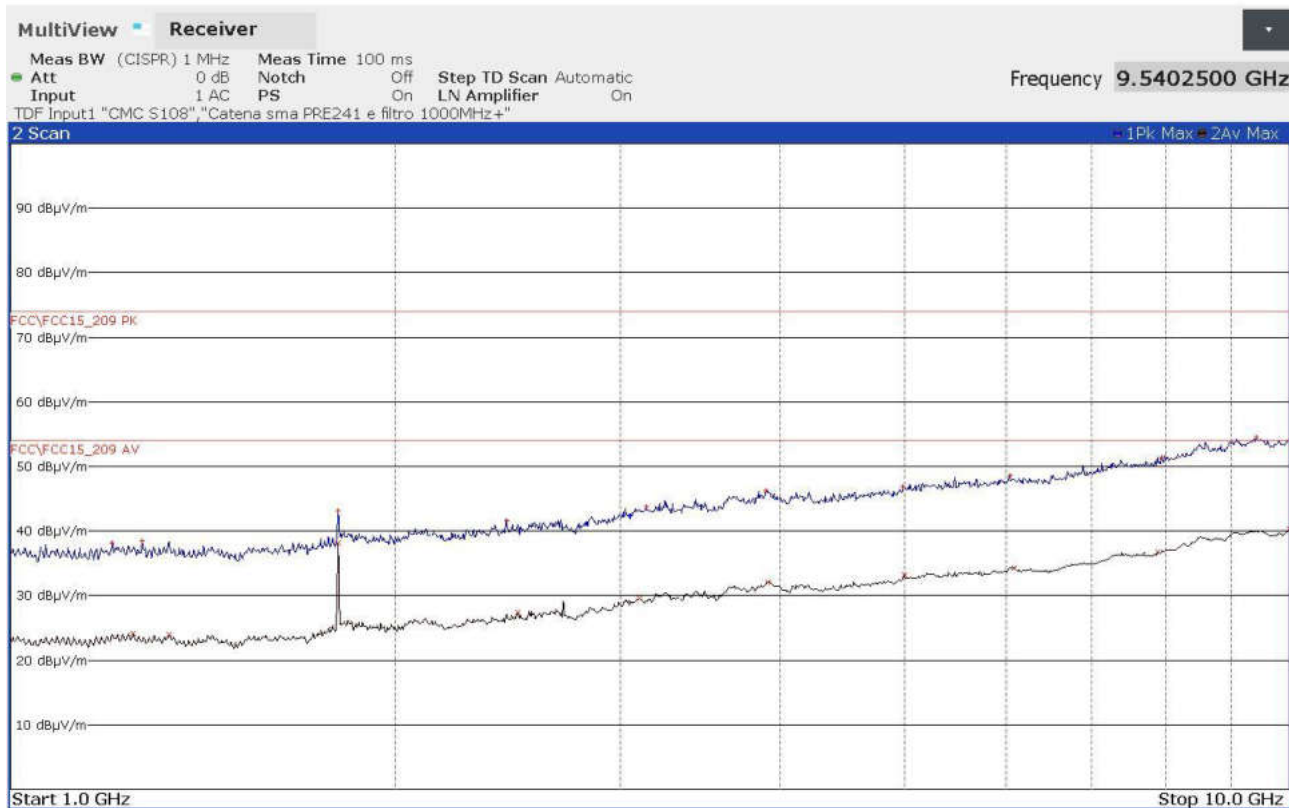


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1248000000	+38,19	-35,79	1246750000	+24,33	-29,65
1332000000	+37,92	-36,06	1330000000	+24,06	-29,92
1804250000	+43,02	-30,96	1804250000	+37,43	-16,55
2493000000	+41,28	-32,70	2492500000	+27,41	-26,57
3082000000	+43,93	-30,05	2706500000	+30,10	-23,88
3885000000	+46,64	-27,34	3912000000	+32,19	-21,79
4991500000	+47,48	-26,50	4998000000	+33,23	-20,75
6042250000	+48,81	-25,17	6095000000	+34,49	-19,49
7861750000	+51,60	-22,38	7937500000	+36,88	-17,10
9998250000	+55,00	-18,98	10000000000	+40,72	-13,26

24218153_2

Panozzo24218154

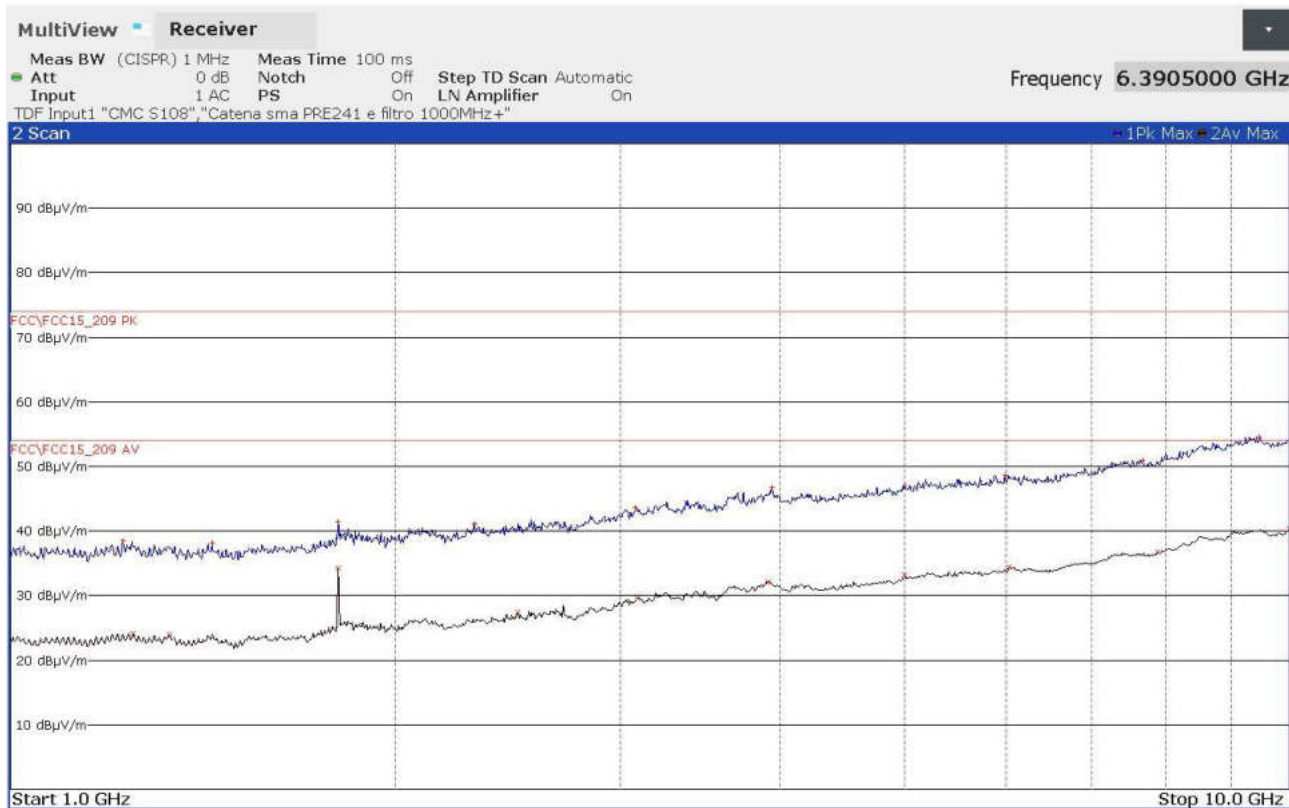


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1201500000	+38,19	-35,79	1247250000	+24,14	-29,84
1267500000	+38,54	-35,44	1330000000	+24,06	-29,92
1804250000	+43,16	-30,82	1804250000	+38,23	-15,75
2441750000	+41,58	-32,40	2492750000	+27,36	-26,62
3143250000	+43,78	-30,20	3105000000	+29,61	-24,37
3899000000	+46,22	-27,76	3912000000	+32,13	-21,85
4986000000	+46,92	-27,06	4999000000	+33,10	-20,88
6043250000	+48,53	-25,45	6095250000	+34,32	-19,66
7941500000	+51,47	-22,51	7896250000	+36,69	-17,29
9414500000	+54,44	-19,54	9997750000	+40,38	-13,60

24218154_2

Panozzo24218155

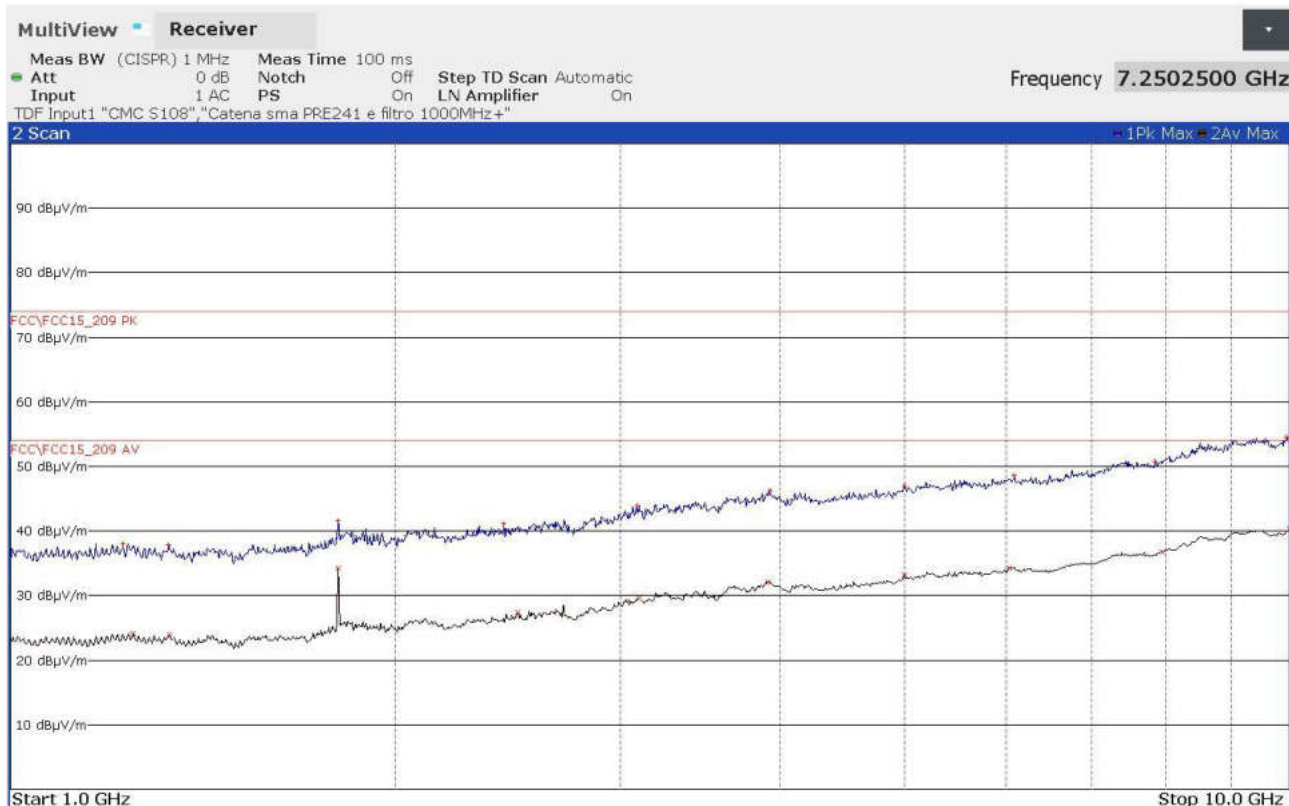


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1224000000	+38,52	-35,46	1247500000	+24,16	-29,82
1437500000	+38,10	-35,88	1330000000	+24,06	-29,92
1804250000	+41,49	-32,49	1804250000	+34,29	-19,69
2304750000	+41,19	-32,79	2492750000	+27,39	-26,59
3082750000	+43,68	-30,30	3092750000	+29,62	-24,36
3936750000	+46,70	-27,28	3911750000	+32,15	-21,83
4998750000	+47,04	-26,94	4999000000	+33,13	-20,85
5989500000	+48,63	-25,35	6032250000	+34,37	-19,61
7682500000	+50,96	-23,02	7896750000	+36,71	-17,27
9477750000	+54,58	-19,40	9998250000	+40,42	-13,56

24218155_2

Panozzo24218156



FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1224500000	+38,01	-35,97	1247250000	+24,15	-29,83
1329000000	+37,89	-36,09	1330000000	+24,06	-29,92
1804250000	+41,59	-32,39	1804250000	+34,31	-19,67
2429750000	+41,07	-32,91	2492500000	+27,40	-26,58
3089500000	+43,92	-30,06	3105250000	+29,62	-24,36
3922750000	+46,32	-27,66	3911750000	+32,15	-21,83
4998250000	+47,05	-26,93	4998750000	+33,12	-20,86
6095000000	+48,54	-25,44	6032500000	+34,34	-19,64
7848750000	+50,82	-23,16	7943250000	+36,69	-17,29
9950000000	+54,59	-19,39	9997500000	+40,42	-13,56

24218156_2

9.3 Peak Output Power

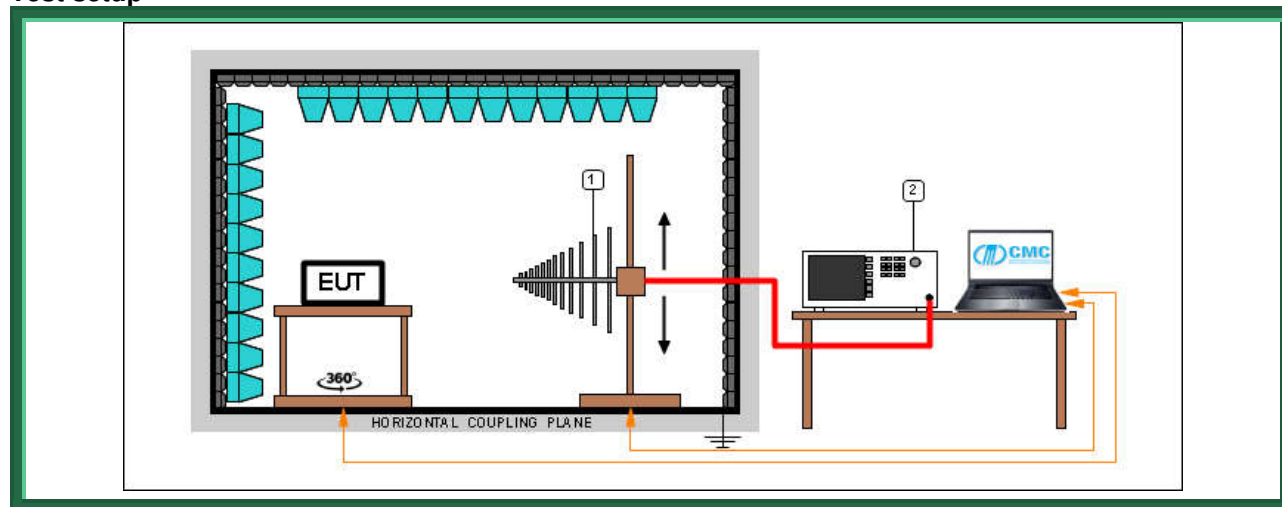
Tested by	C. Panozzo
Test date	28.11.2024
Test location (stand)	Semi-anechoic chamber (CMC A070)
Product standard(s)	FCC Rules and Regulation; Titles 47 Part. 15.209 and 249
Supplementary test set-up description	EUT – antenna distance: 10 m
Supplementary information	--

Acceptance limits

Frequency range (MHz)	RF Power Output (mV/m)	RF Power Output dB(μ V/m)
902 – 928	50	94

Frequency range (MHz)	RF Power Output (mV/m)	RF Power Output dB(μ V/m)
2400 – 2483,5	50	94

Test setup



Test setup PE004_23							
Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
2	CMC S402	Rohde & Schwarz	ESW44	103433	Emi Test Receiver	December 2024	December 2025
1	CMC S287	Schwarzbeck	VUSLP 9111B	9111B-203	Broadband Antenna	August 2022	August 2025

Result

Transmission frequency (MHz)	Polarization	Graphs	Measured level (dBμV/m)	Limit (dBμV/m)	Peak Output Power (mW)	Verdict
902,132	Worst case	G24218146	93,96	94,00	9,10	P
917,129	Worst case	G24218102	90,57	94,00	4,17	P
927,440	Worst case	G24218103	87,86	94,00	2,23	P

Remarks

$P = (E \times d)^2 / (30 \times G)$

Where:

E = the measured maximum fundamental field strength in V/m

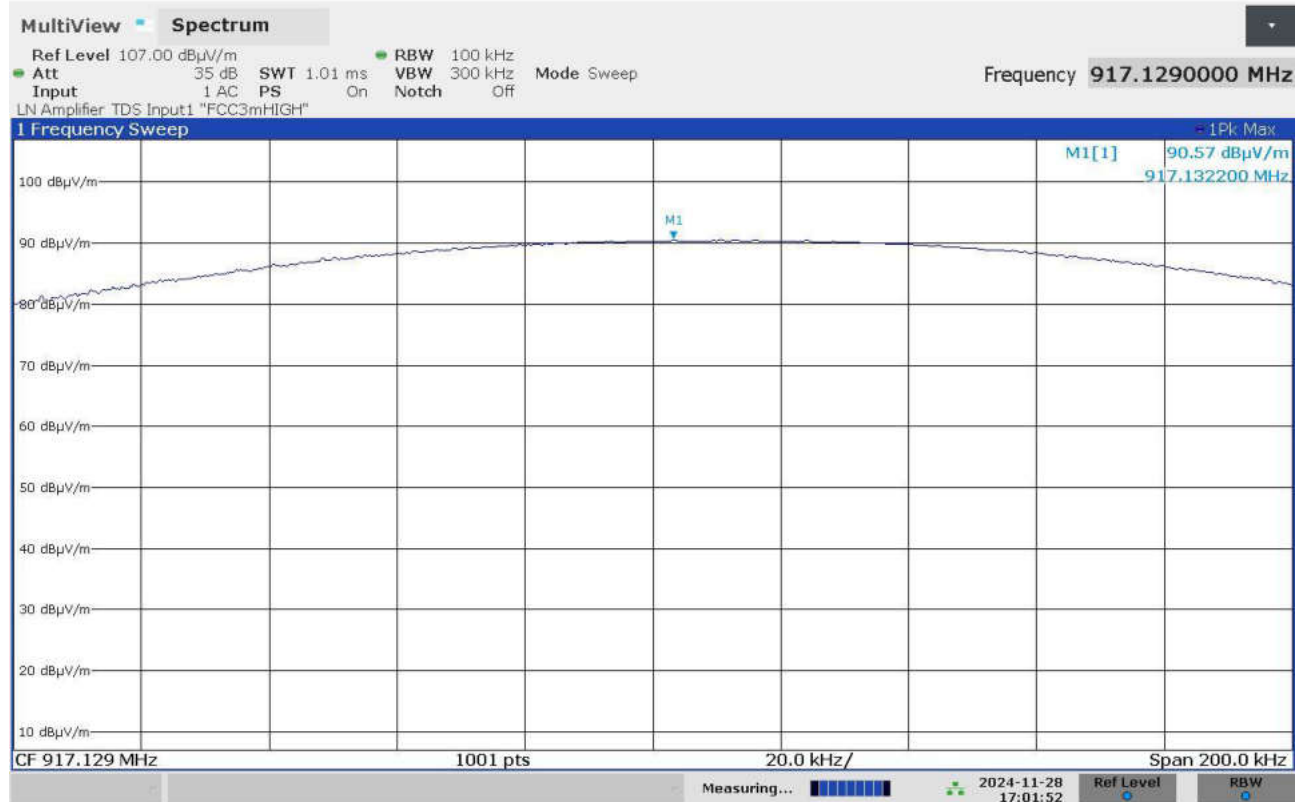
G = the numeric gain of the transmitting antenna: 0,912 (-0,4 dBi)

d = the distance in meters from which the field strength was measured (10 m)

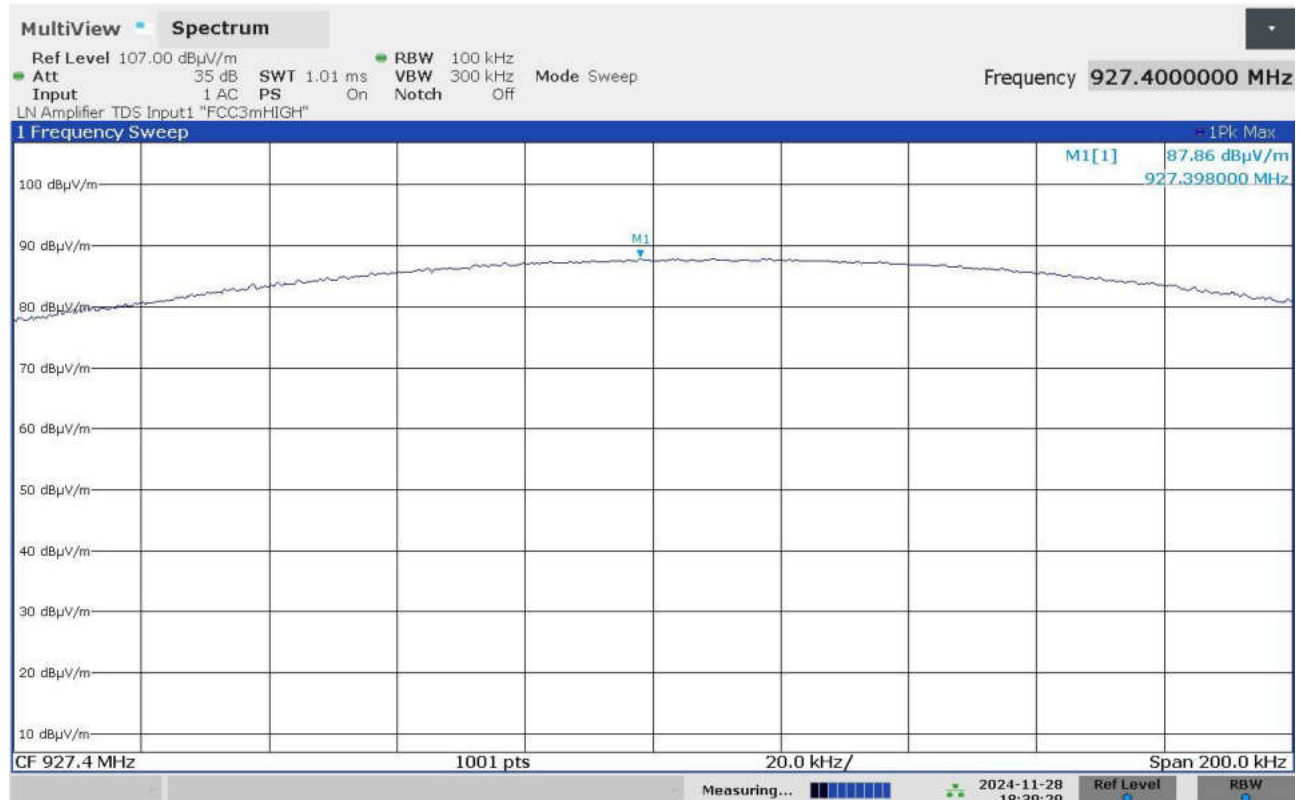
P = the power in watts

Graphs

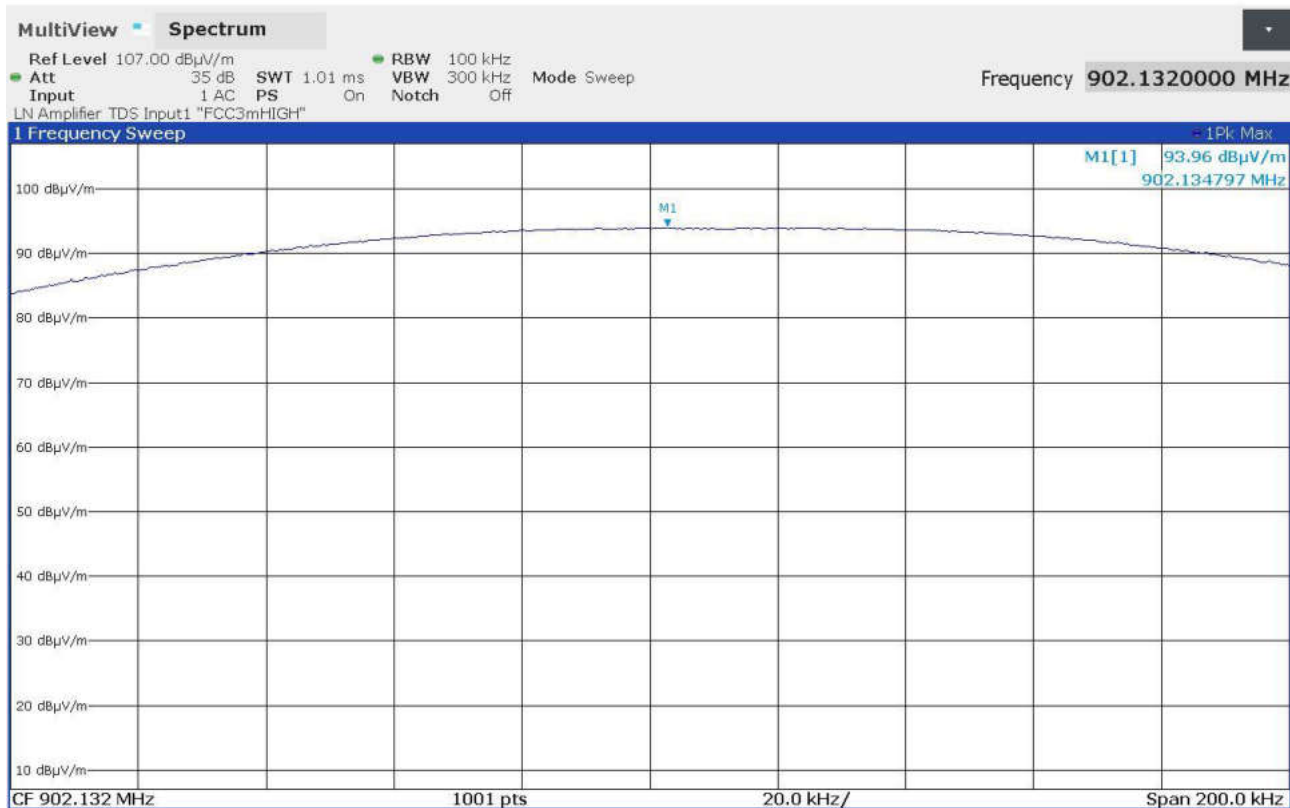
Panozzo 24218102



Panozzo 24218103



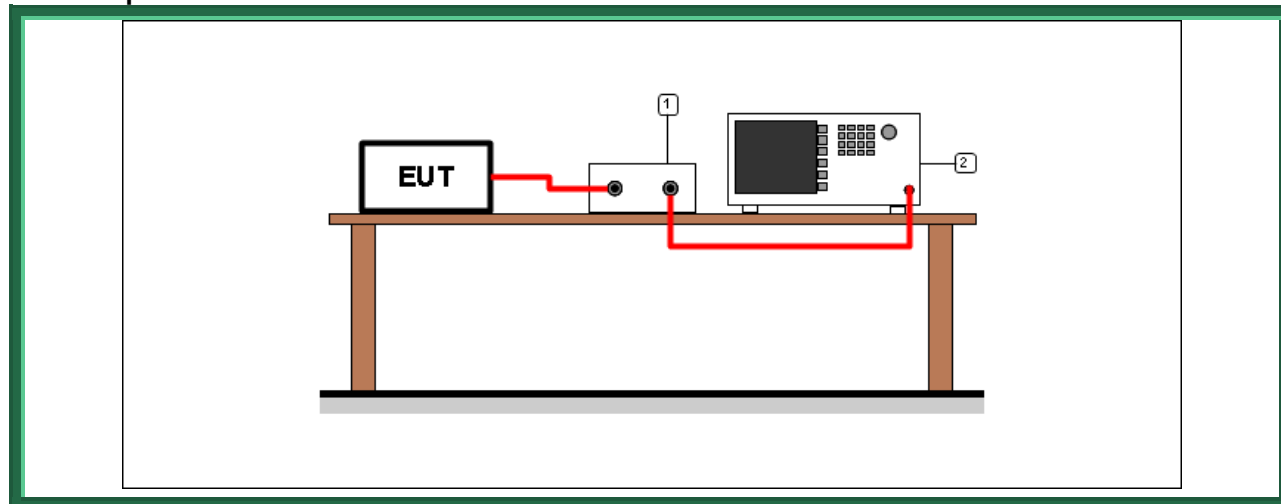
Panozzo 24218146



9.4 20 dB bandwidth

Tested by	C. Panozzo
Test date	07.01.2025
Test location (stand)	Laboratory
Basic standard(s)	ANSI C63.10 cl. 7.8.7
Product standard(s)	FCC Rules and Regulation; Titles 47 Part. 15.215 (c)
Test specification	Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation

Test setup



Test setup PR002_01

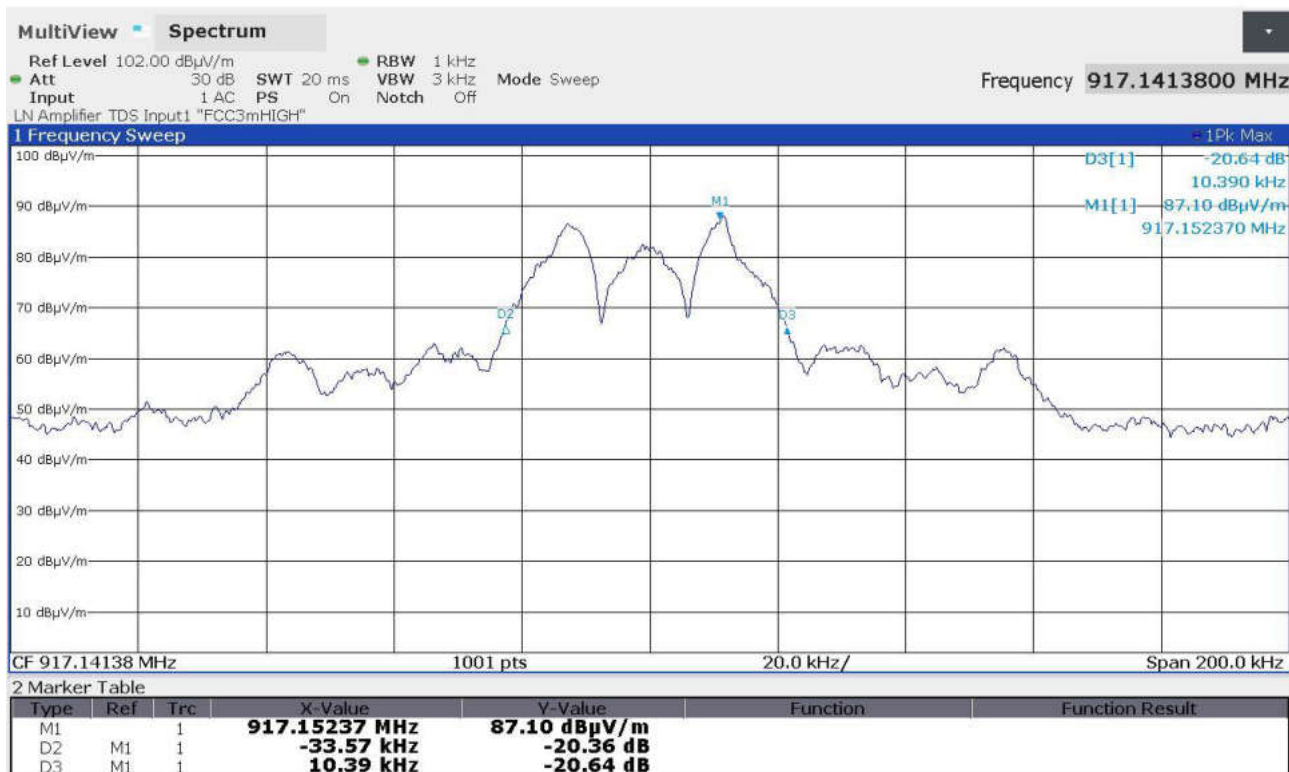
Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
2	CMC S295	Rohde & Schwarz	FSW43	104059	Spectrum Analyzer 43GHz	January 2024	January 2026
1	--	--	--	--	Cable + attenuator	Calibrated before the test	Calibrated before the test

Result

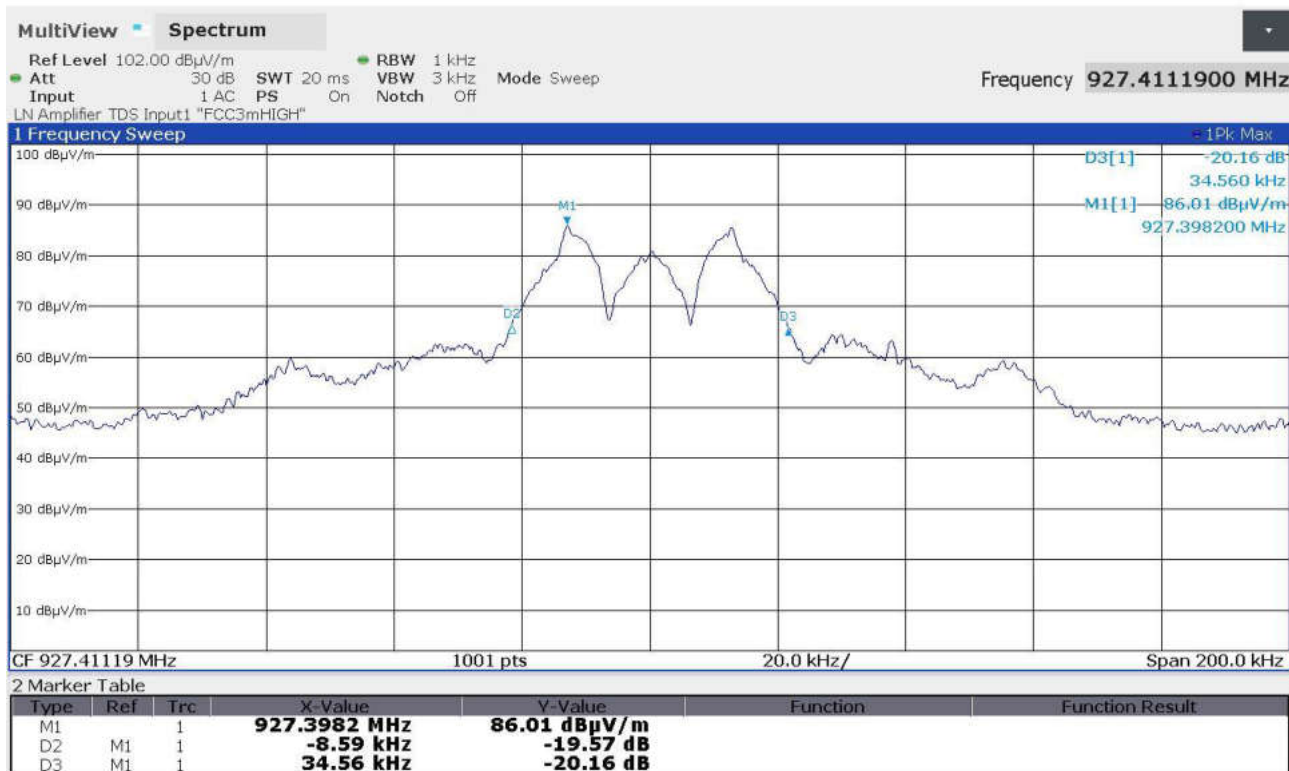
<i>Transmission frequency (MHz)</i>	<i>Graphs</i>	<i>20 dB bandwidth (MHz)</i>	<i>Limits (MHz)</i>	<i>Verdict</i>
902,132	G24218148	902,122 – 902,166	902 – 928	P
917,129	G24218107	917,119 – 917,163	902 – 928	P
927,440	G24218108	927,390 – 927,433	902 – 928	P

Graphs

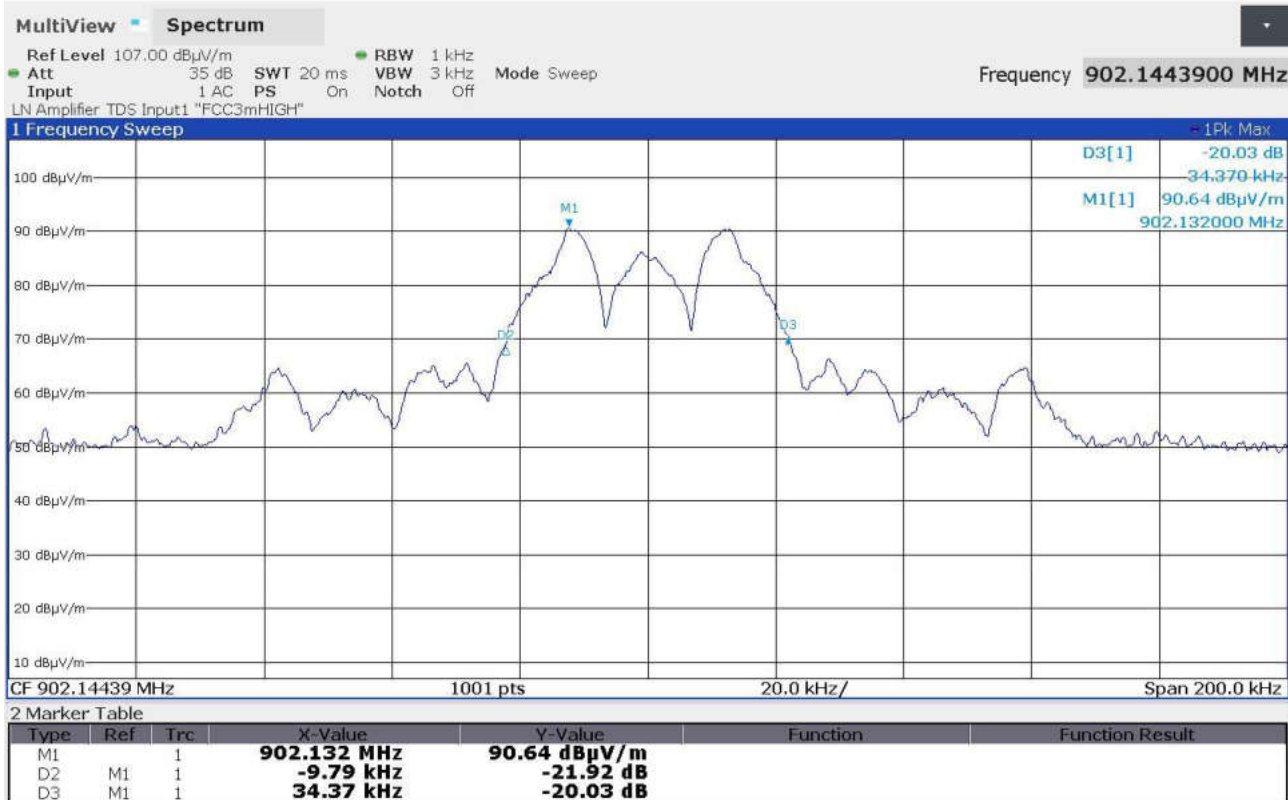
Panozzo 24218107



Panozzo 24218108



Panozzo 24218148



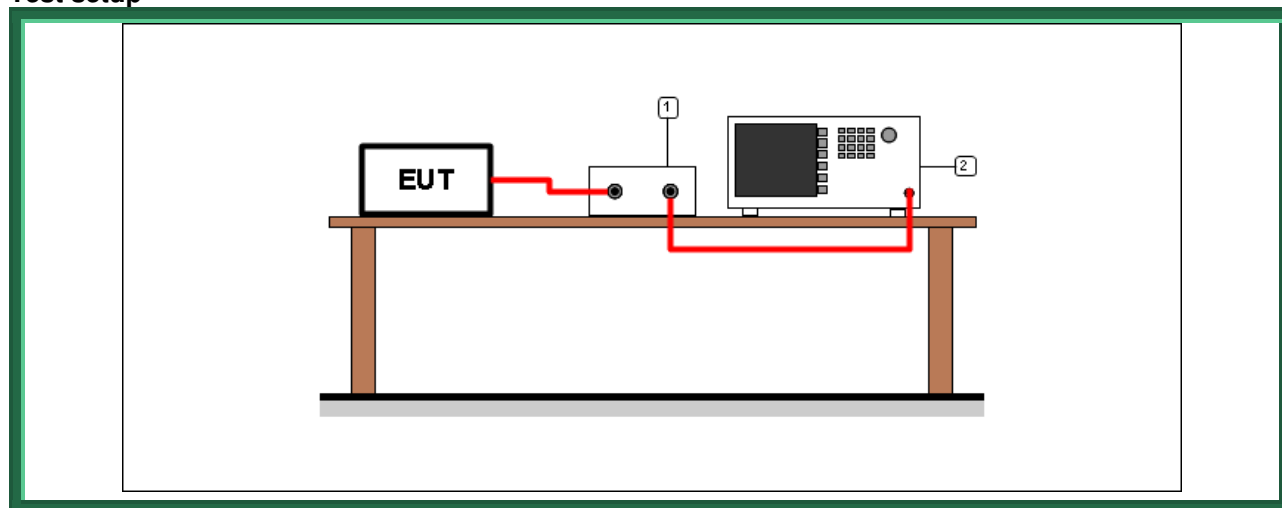
9.5 Band edge

Tested by	C. Panozzo
Test date	08.01.2025
Test location (stand)	Laboratory
Product standard(s)	FCC Rules and Regulation; Titles 47 Part. 15.249 (d)
Test specification	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

Acceptance limits

Operation within the band 902 – 928 MHz $\pm$ RBW/2

Test setup



Test setup PR002_01

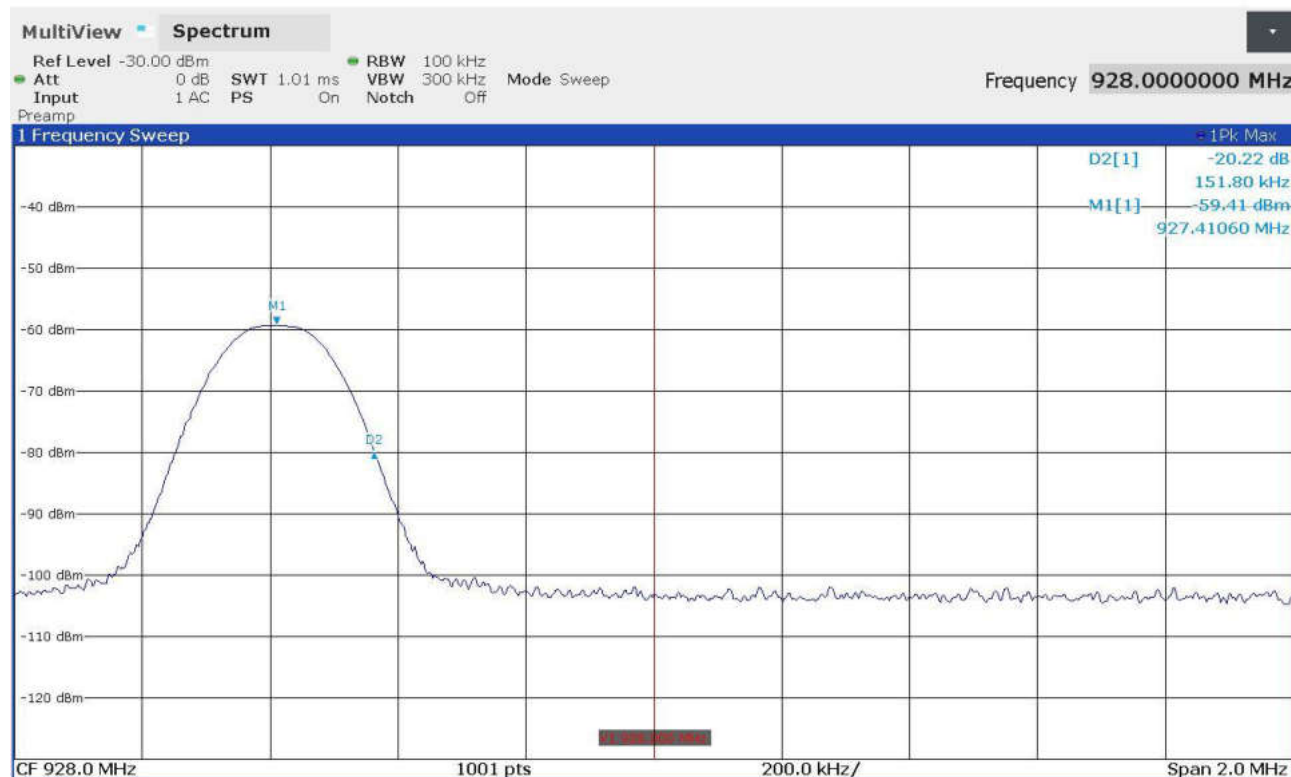
Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
2	CMC S295	Rohde & Schwarz	FSW43	104059	Spectrum Analyzer 43GHz	January 2024	January 2026
1	--	--	--	--	Cable + attenuator	Calibrated before the test	Calibrated before the test

Result

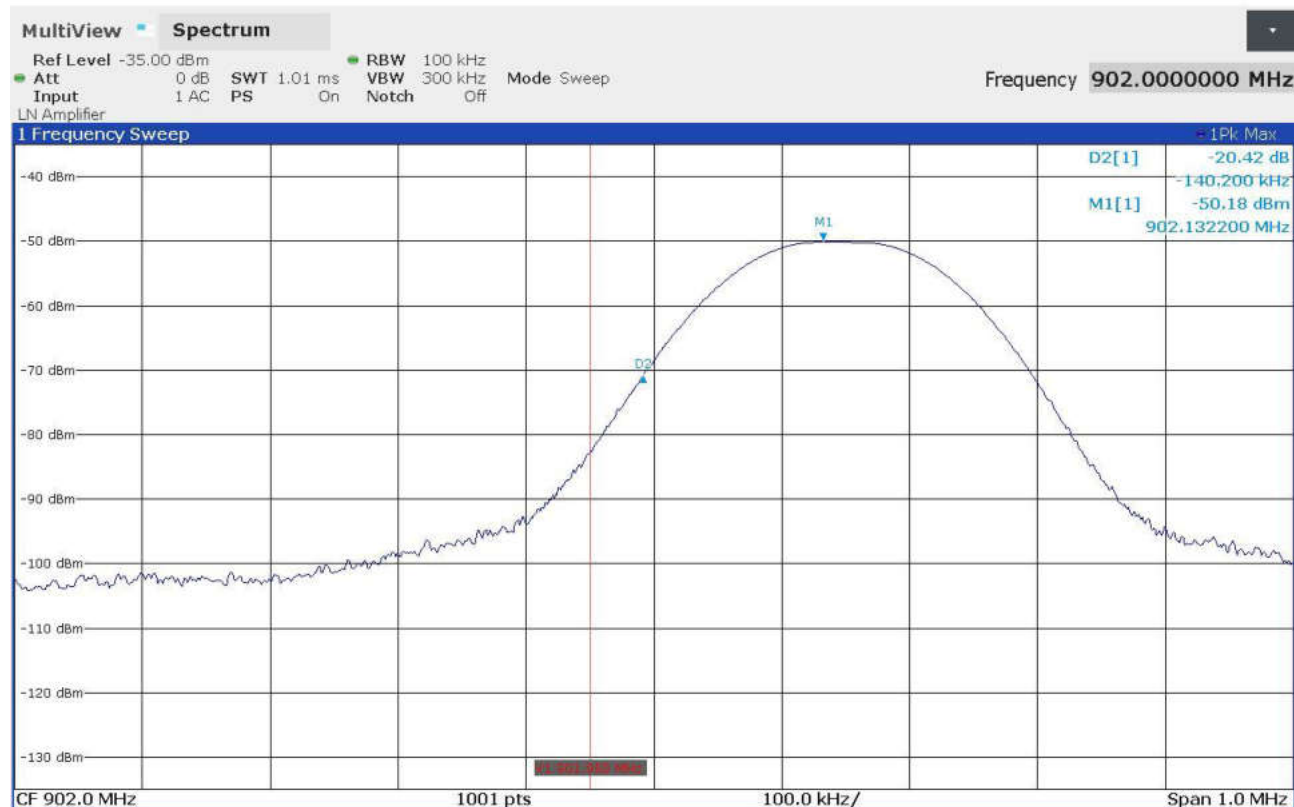
Transmission frequency (MHz)	Graph(s)	Verdict	
902,132	G24218149	F _L : 901,9920 MHz	P
927,440	G24218141	F _H : 927,5624 MHz	P

Graphs

Panozzo 24218141



Panozzo 24218149



Attachment 1

Measurement uncertainty

Test	Test Setup	Expanded uncertainty			Note
Conducted emission CISPR 16 LISN 50uH 0,009-0,0150 MHz	PE001_01			3,6 dB	1
Conducted emission CISPR 16 LISN 50uH 0,150-30,0 MHz	PE001_01			2,9 dB	1
Conducted emission CISPR 16 Voltage Probe 0,15-30 MHz	PE001_02			2,3 dB	1
Conducted emission CISPR 16 Current Probe 0,15-30 MHz	PE001_03			2,5 dB	1
Conducted emission CISPR 16 ISN 0,15-30 MHz	PE001_04			4,7 dB	1
Clic CISPR 16 LISN 50uH 0,150-30,0 MHz	PE001_05			2,9 dB	1
Radiated Emission CDNE 30-300 MHz	PE001_06			3,3 dB	1
Disturbance Power 30-300 MHz	PE002_X1			3,8 dB	1
Radiated Emission LAS 0,15-30 MHz	PE003_01			2,0 dB	1
Radiated Emission CISPR 16 Loop Ant. 0,15-30 MHz	PE004_X1			4,1 dB	1
Radiated Emission CISPR 16 Bicon. Ant. 30-300 MHz	PE004_X2			4,7 dB	1
Radiated Emission CISPR 16 LogP. Ant. 300-1000 MHz	PE004_X3			4,6 dB	1
Radiated Emission CISPR 16 Horn Ant. 1-18 GHz	PE004_X4			4,7 dB	1
Human Exposure to electromagnetic fields	PE005_01			14,2 %	1
Harmonics	PE006_01	10 mA	+	2,9 %	1
Flicker	PE007_01			3,40 %	1
Radiated Immunity 80 MHz - 6 GHz	PE102_XX	2,26 dB		0,89 V/m a 3V/m	1
Conducted Immunity 0,15 - 230 MHz	PE105_XX	1,26 dB		0,47 V a 3V	1
AC Magnetic field	PE106_01	1,55 %		0,15 A/m a 10A/m	1
Pulse Magnetic field	PE107_01	6,21 %		18,6 A/m a 300A/m	1
Dumped Magnetic field	PE108_01	6,21 %		1,86 A/m a 30A/m	1
Common mode conducted immunity	PE112_01	2,11 %		0,21 V a 10V	1

Attachment 1

Test	Test Setup	Expanded uncertainty	Note
Power/Spurious 9kHz-30MHz	PR001_X1	4,1 dB	1
Power/Spurious ERP 30-1000MHz d=10m/3m	PR001_X2+X3	4,8 dB	1
Misura della potenza EIRP 1-18GHz d=3m	PR001_X4+X5	4,7 dB	1
Misura della potenza EIRP 18-40GHz d=3m	PR001_X6	5,1 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
Ring Wave immunity test	PE110_01		2
Low frequency immunity test	PE111_01		2
Dumped Oscillatory immunity test	PE113_01		2
Rev_24_01 date 03/02/2024			

Note 1:

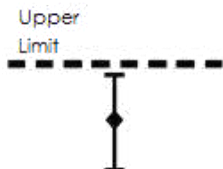
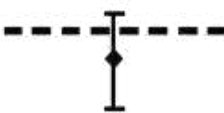
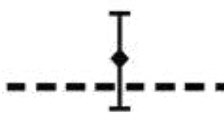
The expanded uncertainty reported according to the document EA-4-02 is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of p = 95%

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

Attachment 1

Judgement of compliance

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

In agreement with ILAC-G8:09/2019 cl.4.2.1 Guidelines on Decision Rules and Statements of Conformity

Quality manual references – Internal procedure

Internal Procedure PM001 rev. 4.1 (Quality Manual)	Measure procedure
Internal Procedure INC_M rev. 10.1 (Quality Manual)	Measurement uncertainty calculation