



TEST REPORT Nr. R20072801

Federal Communication Commission (FCC)

Report Reference No.	R20072801
Date of issue:	28.05.2020
Total number pages:	45
Applicant's name	Tecnolab del Lago Maggiore S.r.l.
Address	Via dell'Industria, 20 – 28924 Verbania (VB) – Italy
Test specification:	
Standards	FCC Rules & Regulations, Title 47:2019 Part 15 paragraph(s): 203, 204, 205, 207, 209, 215 and 225
Non-standard test method	N/A
Test Report Form No.	15_225CMC
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	P3 RFID module 13,56 MHz
Trademark	CPI Crane
Manufacturer	Madic Italia S.p.A.
Model / Type reference	1ASA227H03
FCC ID	2AKMT-3ALIOSV
Rating(s)	9-42 Vdc
Report	
Tested by (name + signature)	A. Bertezzo
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	28.05.2020	--



Testing and sampling:	
Date of receipt of test item	14.04.2020
Testing start date	05.05.2020
Testing end date	26.05.2020
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 P200380
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	P3 RFID module 13,56 MHz						
Model Number	1ASA227H03						
FCC ID	2AKMT-3ALIOSV						
Serial Number	1060000013 P3U01UU						
Brand name	CPI Crane						
Nominal frequency	13,56 MHz						
Rated power supply	Voltage and Frequency			Reference poles			
				N	L1	L2	L3
	☐	AC:		☐	☐	☐	☐
	☐	AC:		☐	☐	☐	☐
	☒	DC: 9-42 V					☐
Software version	ch_env_R01-01						
General mounting position	☐	Table top equipment					
	☐	Wall/ceiling mounted 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	TX mode, continuous transmission at 13,56 MHz					
	2	TX dummy mode, continuous transmission at 13,56 MHz with 50 Ω termination					
Accessories (not part of the test item)	AC-DC power unit only for conducted and radiated emissions						
Declination of responsibility	Components list and software/hardware version (if reported) are provided by the manufacturer. CMC Centro Misure Compatibilità S.r.l. cannot be considered responsible for these information, for any other document sent by the manufacturer 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 47:2019 Part 15 paragraph(s): 203, 204, 205, 207, 209, 215 and 225			
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	Radiated emissions	ANSI C63.10	P
Part 15.225	Field strength with the assigned band	ANSI C63.10	P
Part 15.225 (e)	Frequency tolerance	ANSI C63.10	P
Part 15.215	20 dB bandwidth	ANSI C63.10	P



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	A. Bertezolo	
Test date	05.05.2020	
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	



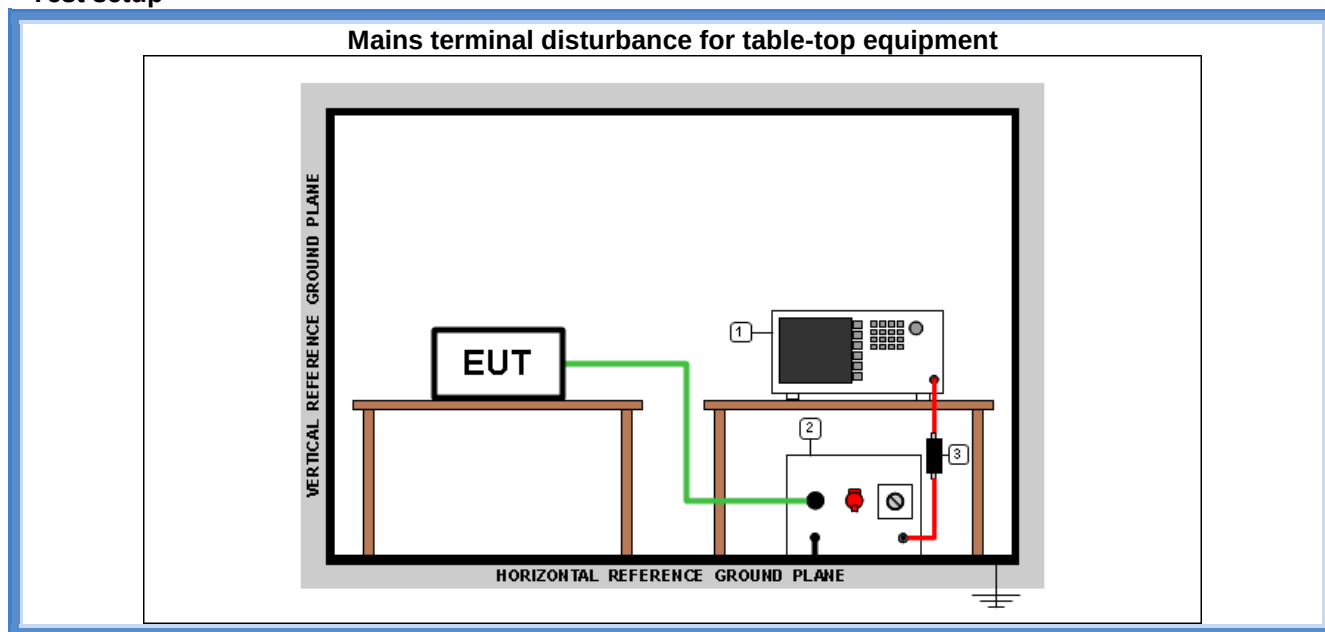
9.2 Conducted emission

Tested by	A. Bertezolo	
Test date	07.05.2020	
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 μ H/50 Ω LISN
	☐	Other:

Acceptance limits

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

Test setup



Test setup PE001_01

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	G20072810	TX mode	P
L1	0,15 – 30	G20072811	TX mode	P
L1	0,15 – 30	G20072812	TX mode with 50 Ω termination	P
N	0,15 – 30	G20072813	TX mode with 50 Ω termination	P

Remarks: tests performed on 120 Vac side of AC/DC power unit, the graphs show the highest emission detected on the full supply voltage range 9-42 Vdc. Peaks above the limits at 13,56 MHz are due to the main transmitting frequency

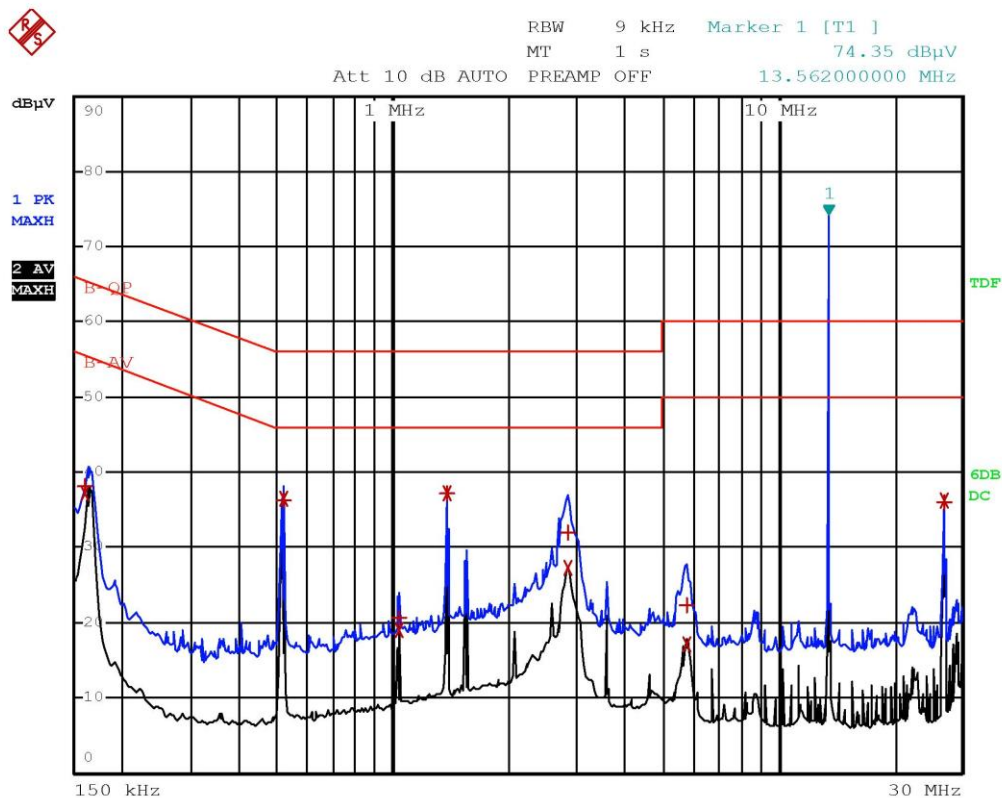
Graphs Legend

PK: Peak; QP [1s] (quasi-peak at 1 second) values are marked with a +

AV: Average; AV [1s] (average at 1 second) values are marked with a X



Graphs

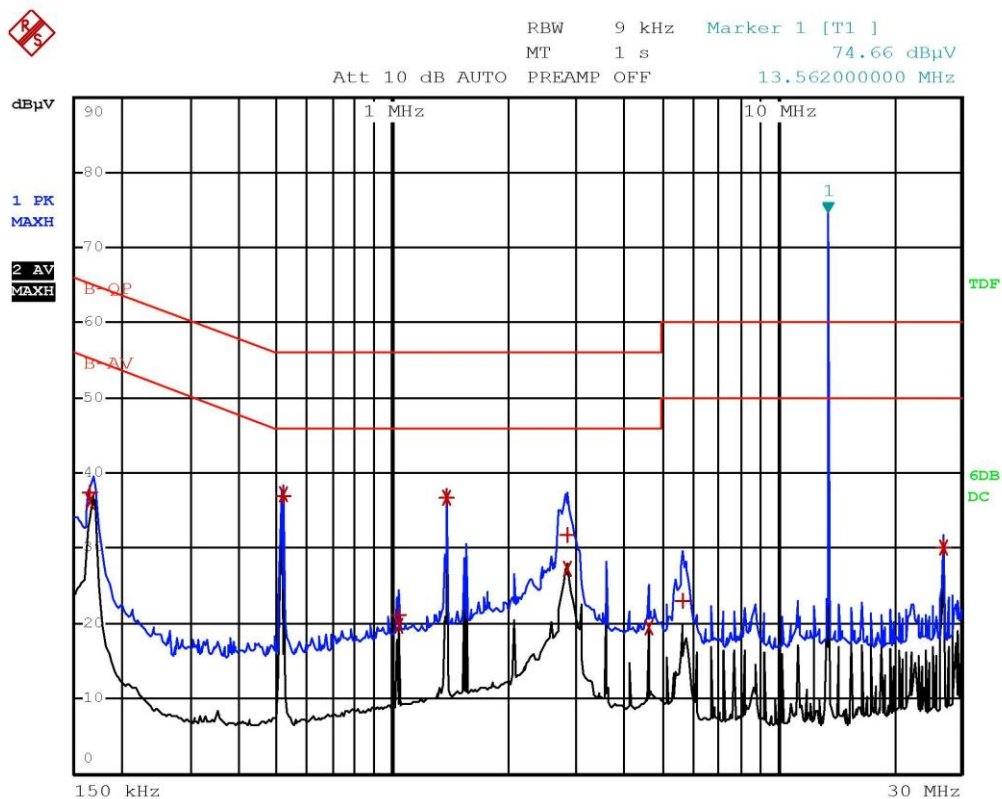


Panozzo 20072810 Line N



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	B-QP		
Trace2:	B-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBpV	DELTA LIMIT dB
1 Quasi Peak	162 kHz	38.14	-27.22
2 Average	162 kHz	37.27	-18.08
1 Quasi Peak	518 kHz	36.31	-19.68
2 Average	518 kHz	36.49	-9.50
1 Quasi Peak	1.034 MHz	20.70	-35.29
2 Average	1.034 MHz	19.06	-26.93
1 Quasi Peak	1.386 MHz	37.19	-18.80
2 Average	1.386 MHz	37.31	-8.68
2 Average	2.842 MHz	27.21	-18.78
1 Quasi Peak	2.846 MHz	31.92	-24.07
1 Quasi Peak	5.81 MHz	22.31	-37.68
2 Average	5.83 MHz	17.12	-32.87
1 Quasi Peak	27.122 MHz	36.11	-23.88
2 Average	27.122 MHz	36.30	-13.69

Panozzo 20072810 Line N

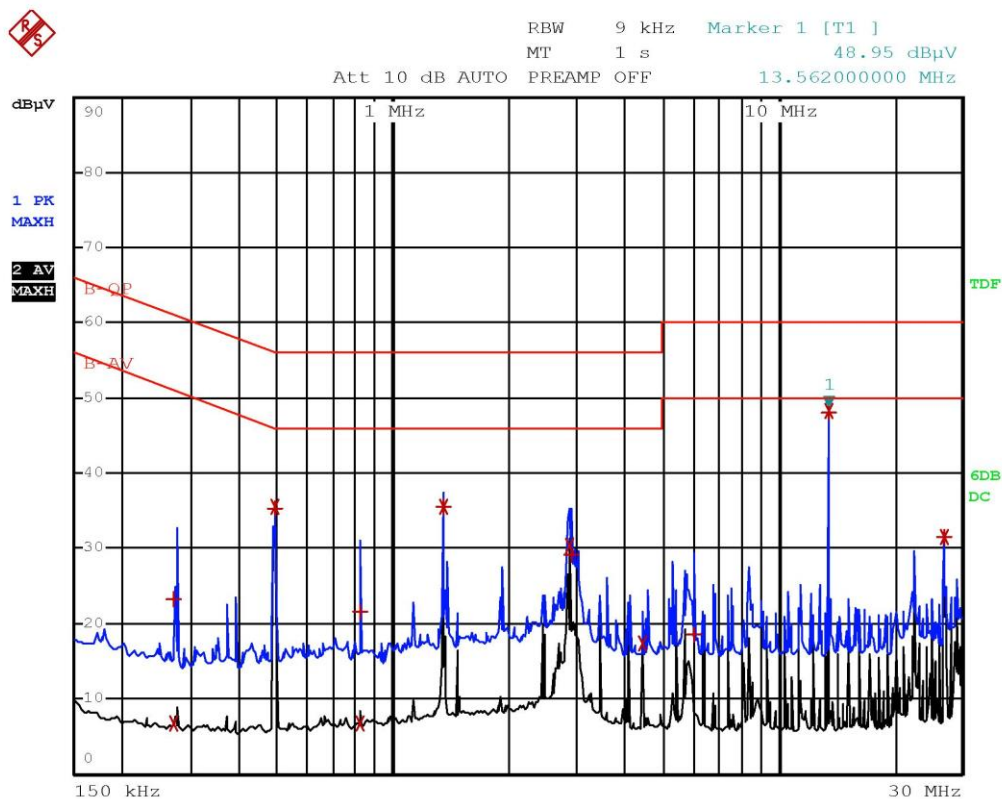


Panozzo 20072811 Line L



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	B-QP		
Trace2:	B-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Quasi Peak	166 kHz	37.36	-27.79
2 Average	166 kHz	36.33	-18.82
1 Quasi Peak	518 kHz	36.94	-19.05
2 Average	518 kHz	37.10	-8.89
1 Quasi Peak	1.034 MHz	21.10	-34.89
2 Average	1.034 MHz	19.63	-26.36
1 Quasi Peak	1.382 MHz	36.73	-19.26
2 Average	1.382 MHz	36.67	-9.32
2 Average	2.838 MHz	27.30	-18.69
1 Quasi Peak	2.846 MHz	31.77	-24.22
2 Average	4.646 MHz	19.47	-26.52
1 Quasi Peak	5.682 MHz	22.91	-37.08
1 Quasi Peak	27.122 MHz	30.00	-29.99
2 Average	27.122 MHz	30.00	-19.99

Panozzo 20072811 Line L

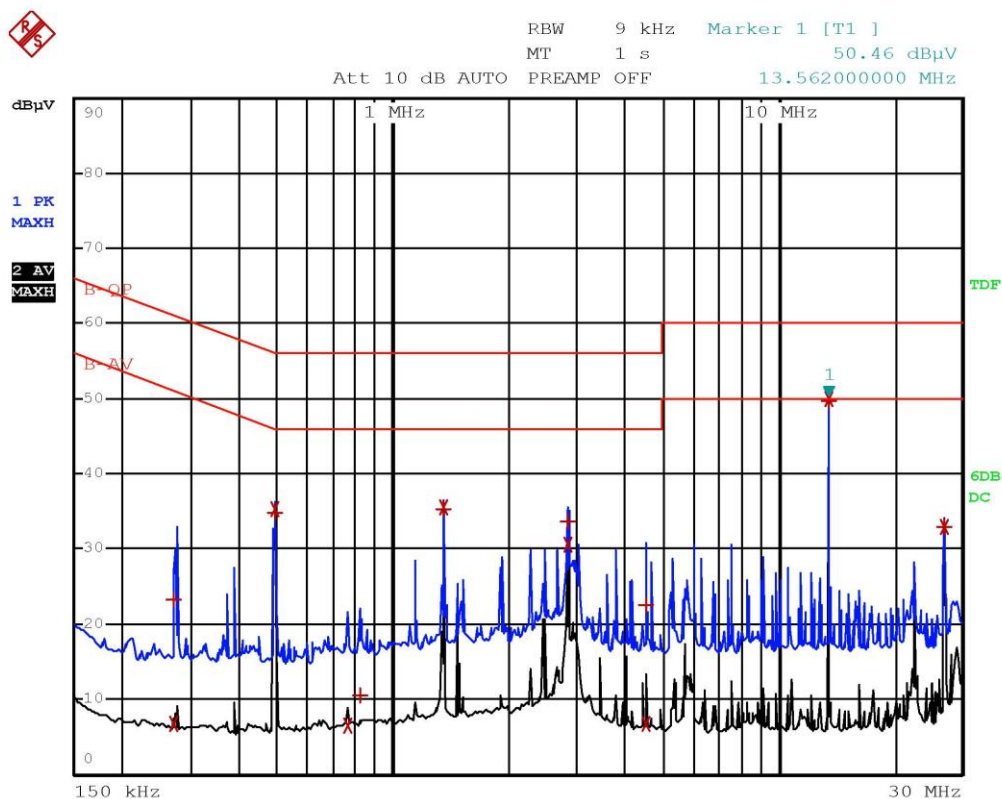


Panozzo 20072812 Line L



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	B-QP		
Trace2:	B-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Quasi Peak	274 kHz	23.16	-37.83
2 Average	274 kHz	6.66	-44.33
1 Quasi Peak	494 kHz	35.36	-20.73
2 Average	494 kHz	35.64	-10.45
1 Quasi Peak	826 kHz	21.58	-34.41
2 Average	826 kHz	6.82	-39.17
1 Quasi Peak	1.358 MHz	35.50	-20.49
2 Average	1.358 MHz	35.64	-10.35
2 Average	2.866 MHz	30.46	-15.54
1 Quasi Peak	2.902 MHz	29.18	-26.81
2 Average	4.442 MHz	17.46	-28.53
1 Quasi Peak	6.078 MHz	18.50	-41.49
1 Quasi Peak	13.562 MHz	48.11	-11.88
2 Average	13.562 MHz	48.37	-1.62
1 Quasi Peak	27.122 MHz	31.60	-28.39
2 Average	27.122 MHz	31.60	-18.39

Panozzo 20072812 Line L



Panozzo 20072813 Line N



EDIT PEAK LIST (Final Measurement Results)				
Trace1:	B-QP			
Trace2:	B-AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBpV	DELTA LIMIT dB	
1 Quasi Peak	274 kHz	23.37	-37.62	
2 Average	274 kHz	6.76	-44.23	
1 Quasi Peak	494 kHz	34.94	-21.15	
2 Average	494 kHz	35.21	-10.88	
2 Average	762 kHz	6.56	-39.43	
1 Quasi Peak	818 kHz	10.51	-45.48	
1 Quasi Peak	1.354 MHz	35.29	-20.70	
2 Average	1.354 MHz	35.51	-10.48	
1 Quasi Peak	2.862 MHz	33.72	-22.27	
2 Average	2.862 MHz	30.65	-15.34	
1 Quasi Peak	4.554 MHz	22.53	-33.46	
2 Average	4.554 MHz	6.82	-39.17	
1 Quasi Peak	13.562 MHz	49.63	-10.36	
2 Average	13.562 MHz	49.89	-0.10	
1 Quasi Peak	27.122 MHz	32.89	-27.10	
2 Average	27.122 MHz	33.00	-16.99	

Panozzo 20072813 Line N



9.3 Radiated emissions

Tested by	A. Bertezolo	
Test date	06.05.2020	
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.....	According to KDB 414788 D01 chapter 2, emissions at frequencies below 30 MHz have been evaluated on 10 m SAC test site. As demonstrated on document "Test site correlation" date 28.03.2019, results of tests on SAC10 are slightly higher than the results of tests on OATS test site. The evaluation has been performed at both 10 and 3 m distance and at both 125 kHz and 13,56 MHz frequency	

Acceptance limits

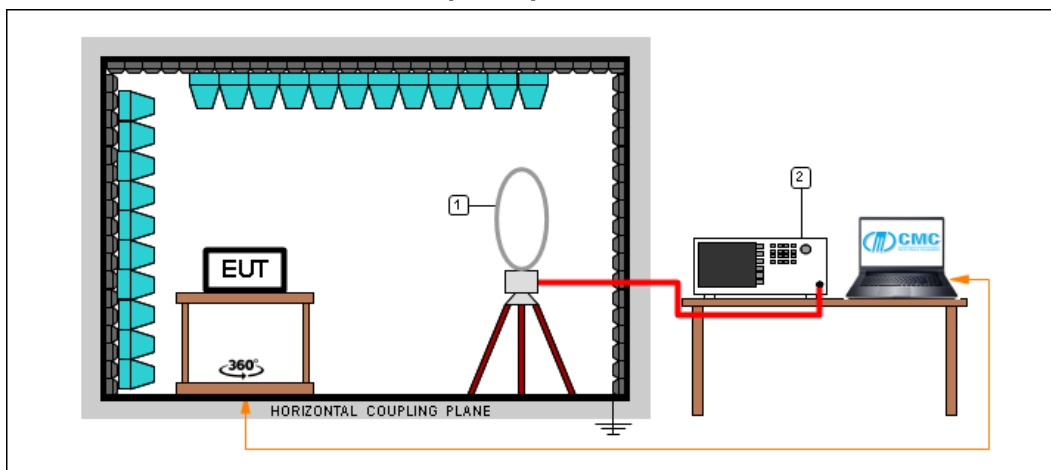
Frequency range (MHz)	Test distance (m)	Limits [dB(μV/m)]
0,009 to 0,490	300	48,5 to 13,8
0,490 to 1,705	30	33,8 to 22,9
1,705 to 30	30	29,5
30 to 88	3	40
88 to 216	3	43,5
216 to 960	3	46,0
960 to 1000	3	54

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

Frequency (MHz)	Test distance (m)	AV limits [dB(μV/m)]	Peak limits [dB(μV/m)]
> 1000	3	54	74

Test setup

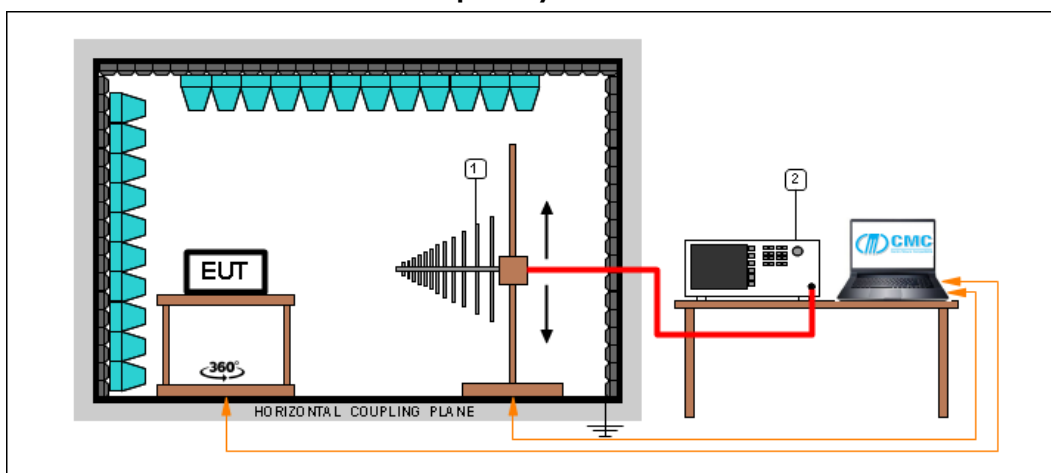
Frequency ≤ 30 MHz



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



Result

Polarization	Frequency Range (MHz)	Graphs	Remarks	Result
V	30 – 300	G20072801	--	P
H	30 – 300	G20072802	--	P
H	300 – 1000	G20072803	--	P
V	300 – 1000	G20072804	--	P
Loop	0,009 – 30	G20072805	--	P

Remarks: EUT was tested in 3 orthogonal planes, graphs are related to the highest detected levels, also on the full supply voltage range 9-42 Vdc. 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.

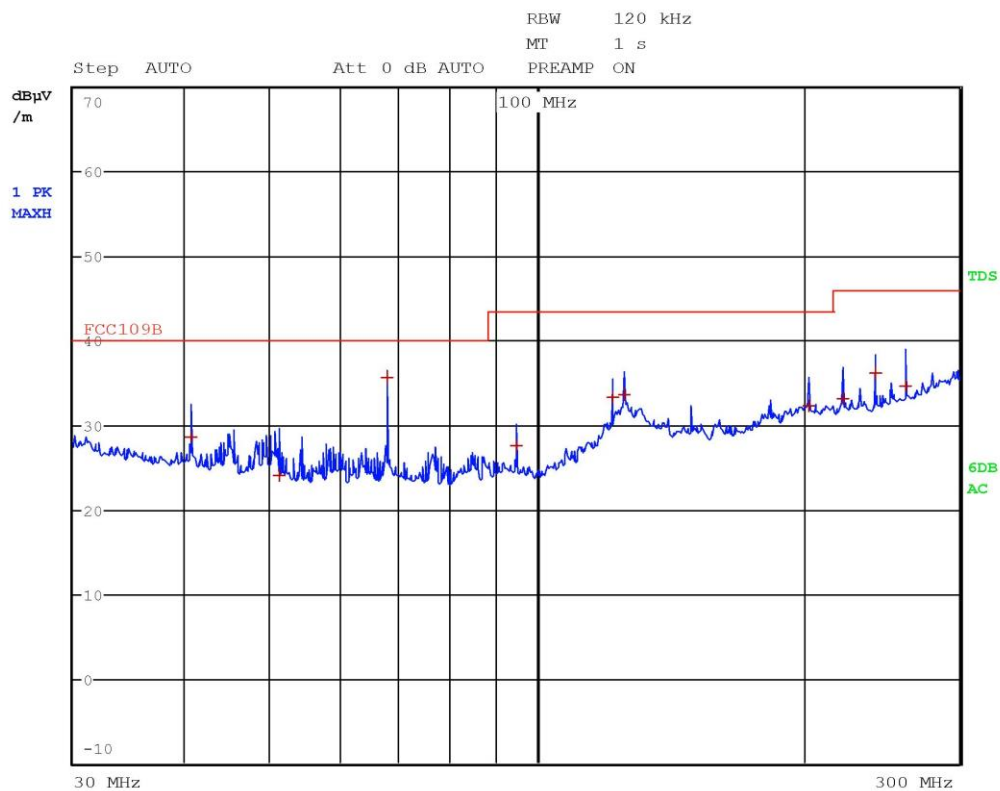
Graphs Legend

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

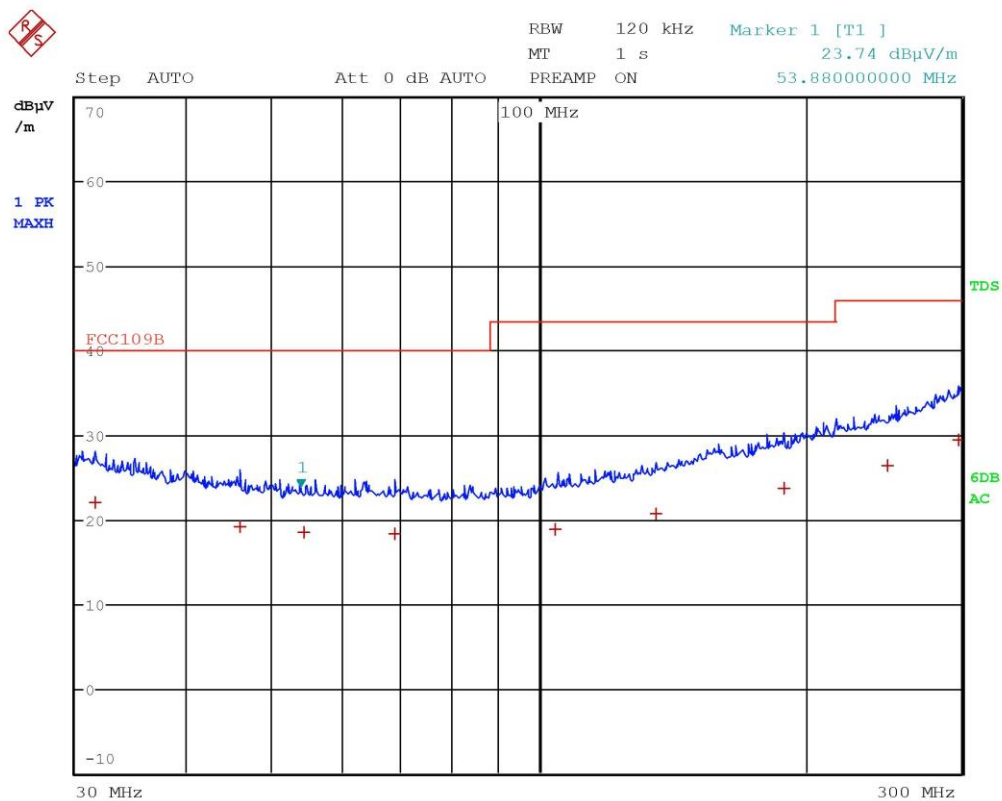


Panozzo 20072801 Vert



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC109B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Quasi Peak	40.68 MHz	28.59	-11.40
1 Quasi Peak	51.12 MHz	24.04	-15.95
1 Quasi Peak	67.8 MHz	35.58	-4.41
1 Quasi Peak	94.92 MHz	27.49	-16.02
1 Quasi Peak	122.04 MHz	33.20	-10.31
1 Quasi Peak	125.44 MHz	33.67	-9.84
1 Quasi Peak	202.6 MHz	32.31	-11.20
1 Quasi Peak	221.88 MHz	33.03	-12.98
1 Quasi Peak	241.16 MHz	36.07	-9.94
1 Quasi Peak	260.48 MHz	34.69	-11.32

Panozzo 20072801 Vert

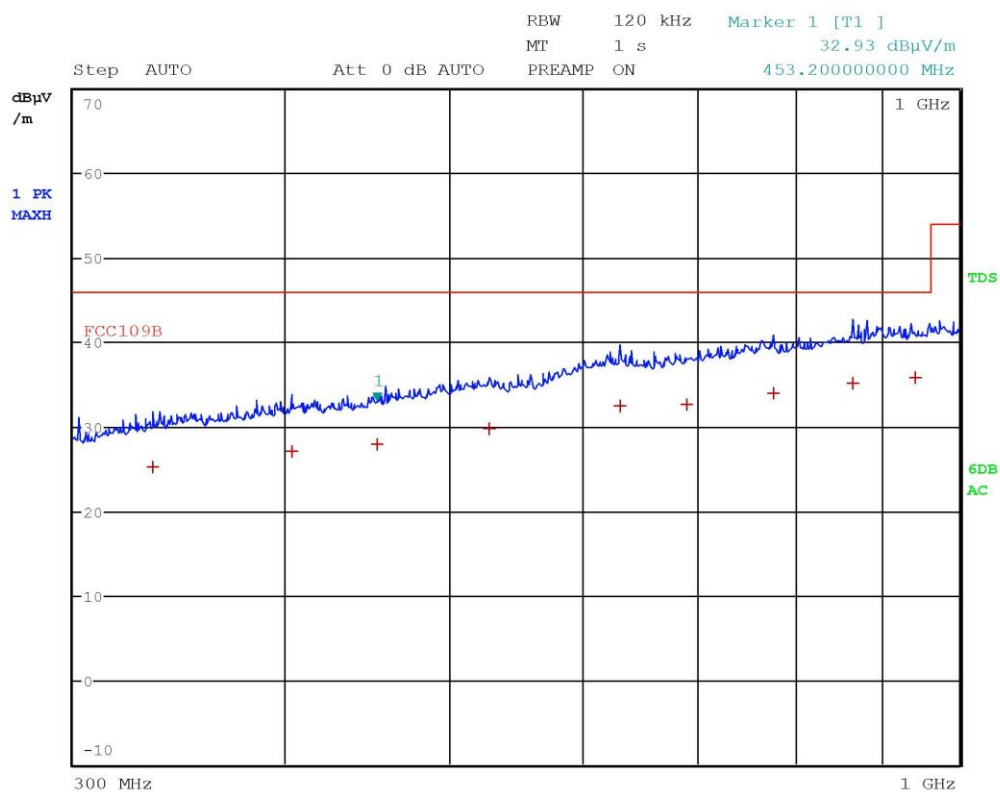


Panozzo 20072802 Horiz



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC109B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Quasi Peak	31.56 MHz	21.97	-18.02
1 Quasi Peak	45.92 MHz	19.20	-20.79
1 Quasi Peak	54.4 MHz	18.48	-21.52
1 Quasi Peak	68.8 MHz	18.32	-21.67
1 Quasi Peak	104.4 MHz	18.82	-24.70
1 Quasi Peak	135.76 MHz	20.61	-22.90
1 Quasi Peak	189.44 MHz	23.63	-19.88
1 Quasi Peak	247.56 MHz	26.37	-19.64
1 Quasi Peak	297.32 MHz	29.44	-16.57

Panozzo 20072802 Horiz

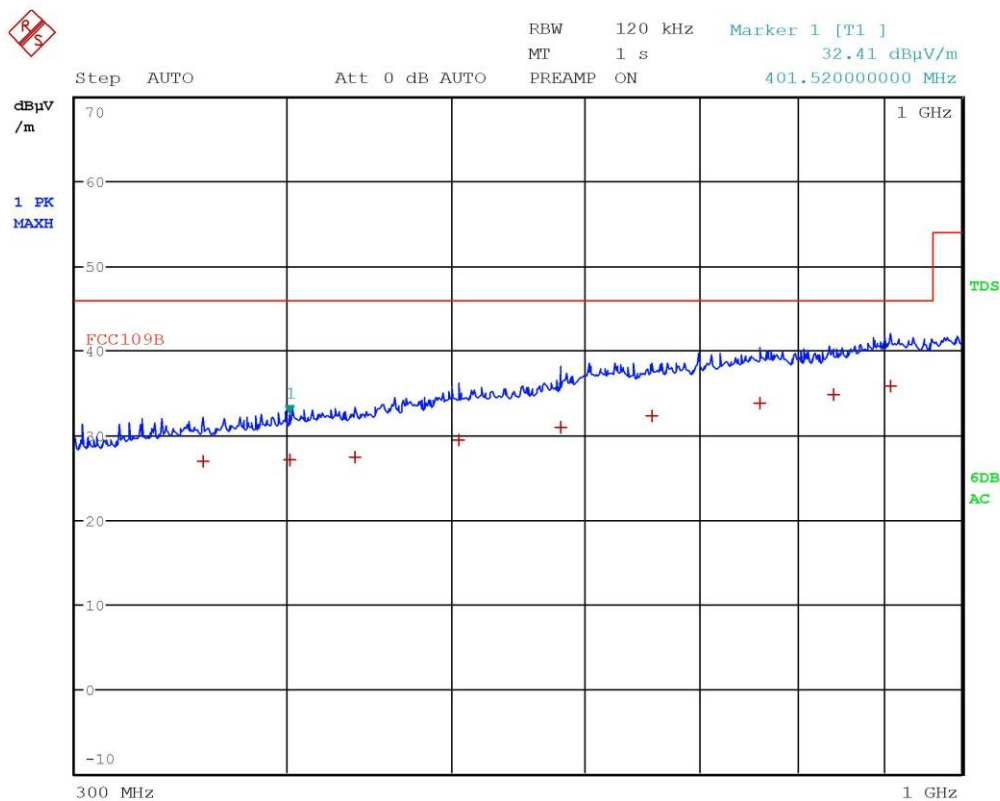


Panozzo 20072803 Horiz



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC109B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Quasi Peak	334.16 MHz	25.17	-20.84
1 Quasi Peak	403.6 MHz	27.14	-18.88
1 Quasi Peak	453.2 MHz	27.86	-18.15
1 Quasi Peak	528.08 MHz	29.77	-16.24
1 Quasi Peak	630.56 MHz	32.47	-13.54
1 Quasi Peak	690.48 MHz	32.62	-13.40
1 Quasi Peak	776.36 MHz	33.96	-12.05
1 Quasi Peak	866.04 MHz	35.20	-10.81
1 Quasi Peak	941.4 MHz	35.71	-10.30

Panozzo 20072803 Horiz

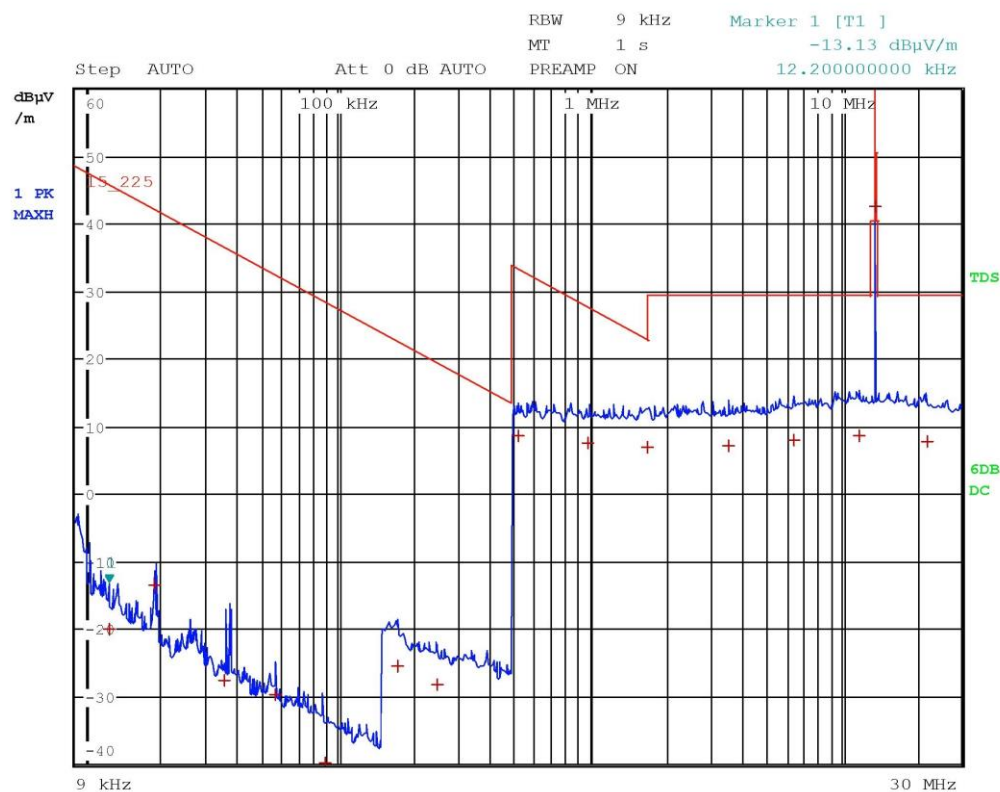


Panozzo 20072804 Vert



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC109B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Quasi Peak	356.92 MHz	26.81	-19.20
1 Quasi Peak	401.52 MHz	26.99	-19.02
1 Quasi Peak	438.76 MHz	27.39	-18.62
1 Quasi Peak	505.04 MHz	29.40	-16.61
1 Quasi Peak	579.96 MHz	30.93	-15.08
1 Quasi Peak	656.2 MHz	32.24	-13.77
1 Quasi Peak	760 MHz	33.81	-12.20
1 Quasi Peak	840.24 MHz	34.70	-11.31
1 Quasi Peak	907.24 MHz	35.82	-10.19

Panozzo 20072804 Vert



Panozzo 20072805 Loop



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	15_225		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
1 Quasi Peak	12.2 kHz	-19.85	-65.72
1 Quasi Peak	18.6 kHz	-13.50	-55.71
1 Quasi Peak	35.32 kHz	-27.42	-64.06
1 Quasi Peak	55.96 kHz	-29.60	-62.24
1 Quasi Peak	88.52 kHz	-39.62	-68.28
1 Quasi Peak	121.56 kHz	-41.90	-67.81
1 Quasi Peak	174 kHz	-25.42	-48.21
1 Quasi Peak	250 kHz	-28.03	-47.68
1 Quasi Peak	518 kHz	8.68	-24.63
1 Quasi Peak	982 kHz	7.59	-20.16
1 Quasi Peak	1.694 MHz	7.02	-16.00
1 Quasi Peak	3.546 MHz	7.26	-22.28
1 Quasi Peak	6.454 MHz	7.97	-21.56
1 Quasi Peak	11.806 MHz	8.72	-20.81
1 Quasi Peak	13.558 MHz	42.04	-41.95
1 Quasi Peak	22.094 MHz	7.77	-21.76

Panozzo 20072805 Loop

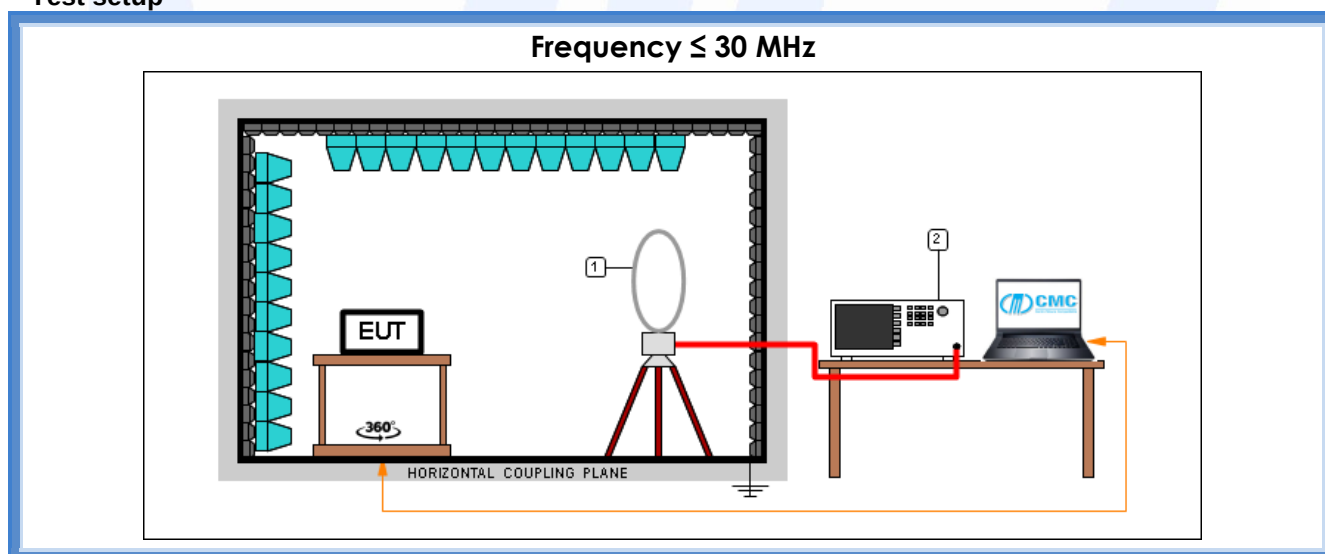
9.4 Field strength with the assigned band

Tested by	A. Bertezzolo
Test date	06.05.2020
Test location (stand)	Semi-anechoic chamber (CMC A070)
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.209 and 15.225 ANSI C63.10
Supplementary test set-up description	EUT – antenna distance: 10 m
Supplementary information.....	--

Acceptance limits

- The field strength of any emissions within the band 13,553 – 13,567 MHz shall not exceed 15,848 microvolts/meter at 30 meters
- Within the bands 13,410 – 13,553 MHz and 13,567 – 13,710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters
- Within the bands 13,110 – 13,410 MHz and 13,710 – 14,010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters
- The field strength of any emissions appearing outside of the 13,110 – 14,010 MHz band shall not exceed the general radiated emission limits in §15.209

Test setup



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



Result

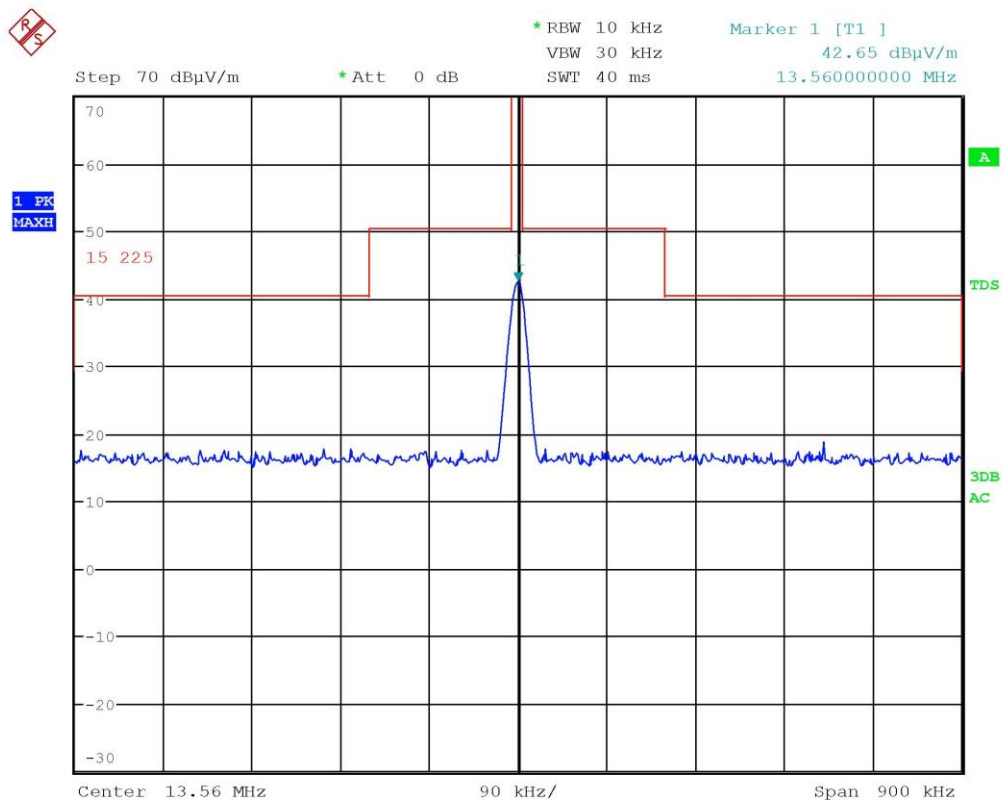
Frequency band (MHz)	Graphs	Measured level (dB μ V/m)	Limit (dB μ V/m)
13,553 – 13,567	G20072806	42,66	84,00
	G20072807		

Remarks: EUT was tested in 3 orthogonal planes, graphs are related to the highest detected levels. Measurements 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.

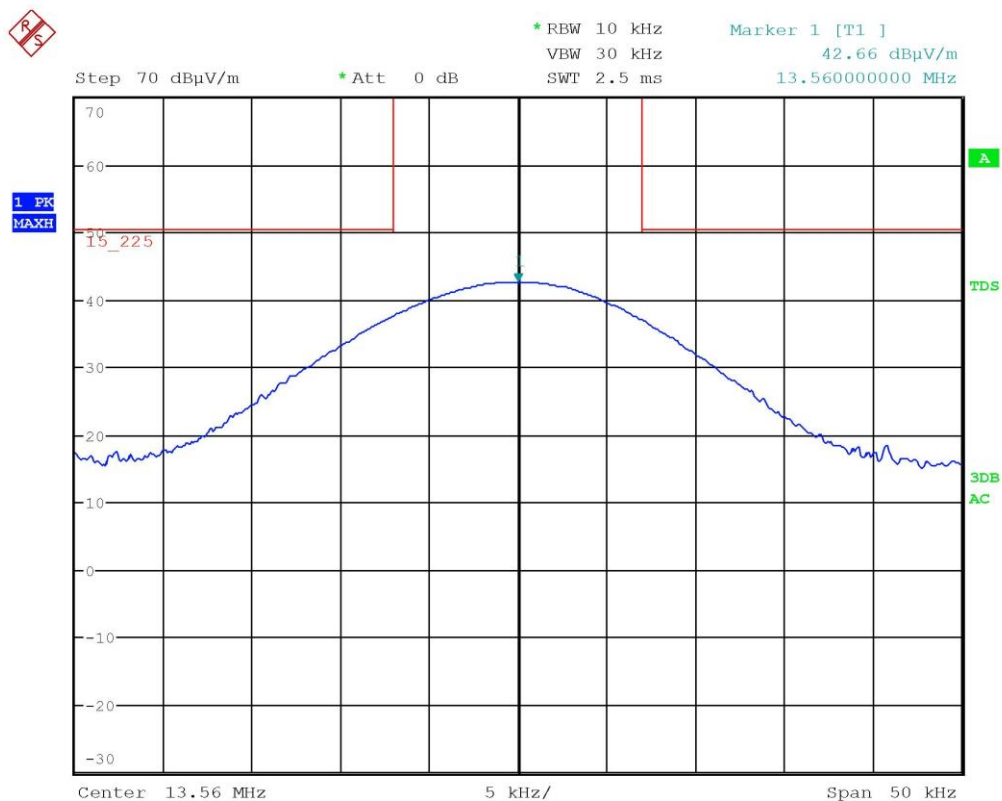




Graphs



Panozzo 20072806



Panozzo 20072807



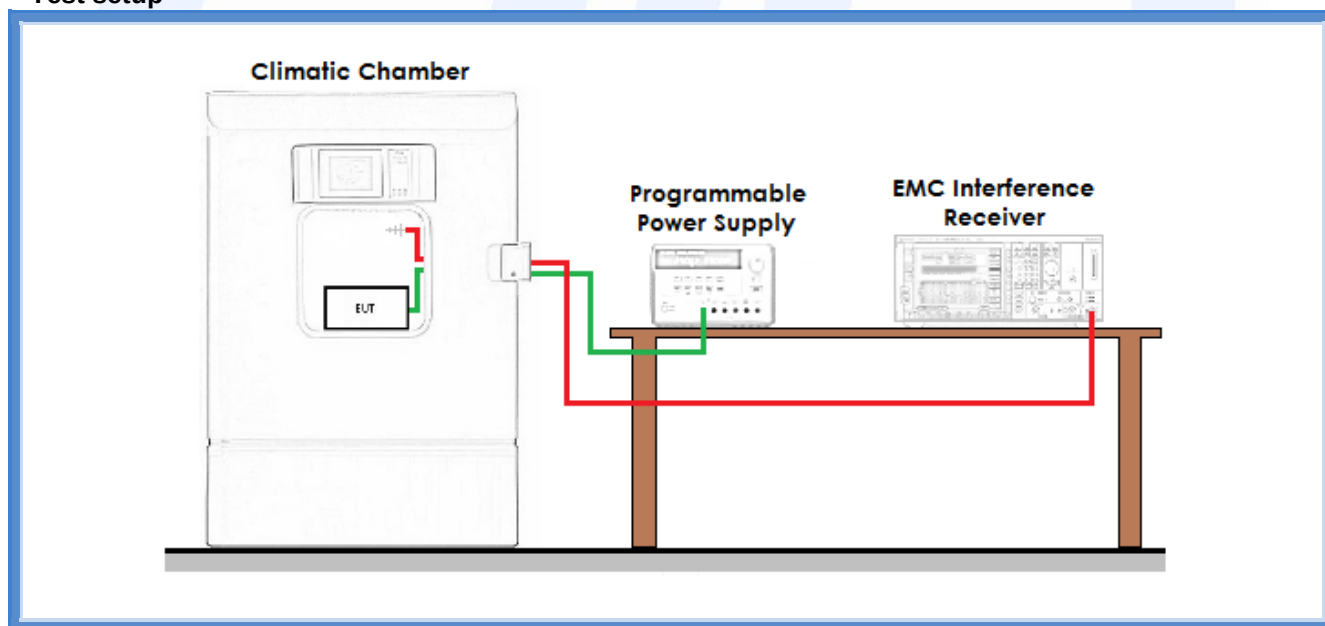
9.5 Frequency tolerance

Tested by	A. Bertezolo
Test date	26.05.2020
Test location (stand)	Climatic chamber (CMC B069)
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.225 e) ANSI C63.10
Supplementary test set-up description	--
Supplementary information.....	--

Acceptance limits

The frequency tolerance of the carrier signal shall be maintained within $\pm 0,01\%$ of the operating frequency over a temperature variation of $-20\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$ at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of $20\text{ }^{\circ}\text{C}$. For battery operated equipment, the equipment tests shall be performed using a new battery

Test setup



<i>Id. Number</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Description</i>
CMC S295	Rohde & Schwarz	FSW43	Spectrum Analyzer 43GHz
CMC B069	Angelantoni	CH 600C	Climatic chamber



Result

Test conditions		Measured frequency	Frequency limits
Temperature (°C)	Voltage level (V)	(MHz)	(MHz)
-20	Nominal supply voltage	13,560022	13,55864 – 13,56136
-10	Nominal supply voltage	13,560026	13,55864 – 13,56136
0	Nominal supply voltage	13,560022	13,55864 – 13,56136
10	Nominal supply voltage	13,560020	13,55864 – 13,56136
20	Nominal supply voltage	13,559970	13,55864 – 13,56136
30	Nominal supply voltage	13,559962	13,55864 – 13,56136
40	Nominal supply voltage	13,559962	13,55864 – 13,56136
50	Nominal supply voltage	13,559998	13,55864 – 13,56136

Test conditions			Measured frequency	Frequency limits
Temperature (°C)	Voltage level (%)	Voltage level (V)	(MHz)	(MHz)
20	85	10,20	13,559970	13,55864 – 13,56136
20	90	10,80	13,559970	13,55864 – 13,56136
20	95	11,05	13,559970	13,55864 – 13,56136
20	100	12,00	13,559970	13,55864 – 13,56136
20	105	12,60	13,559970	13,55864 – 13,56136
20	110	13,20	13,559970	13,55864 – 13,56136
20	115	13,80	13,559970	13,55864 – 13,56136



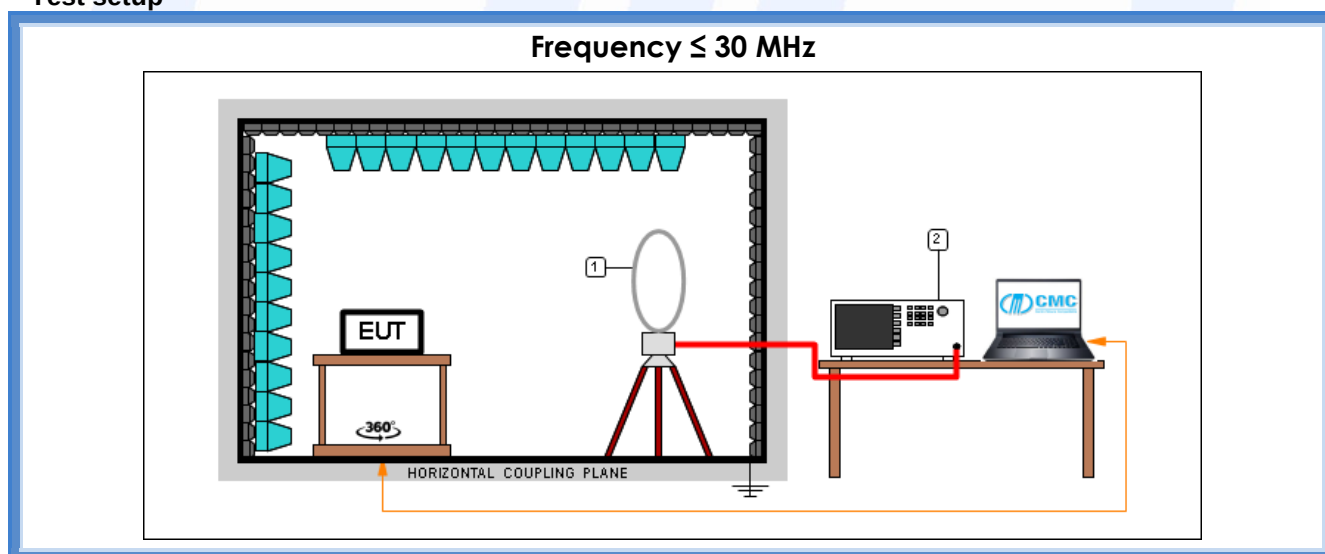
9.6 20 dB bandwidth

Tested by	A. Bertezolo
Test date	06.05.2020
Test location (stand)	Semi-anechoic chamber (CMC A070)
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.215 ANSI C63.10 cl. 7.8.7
Supplementary test set-up description	--
Supplementary information.....	--

Acceptance limits

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

Test setup



Test setup PE004_01

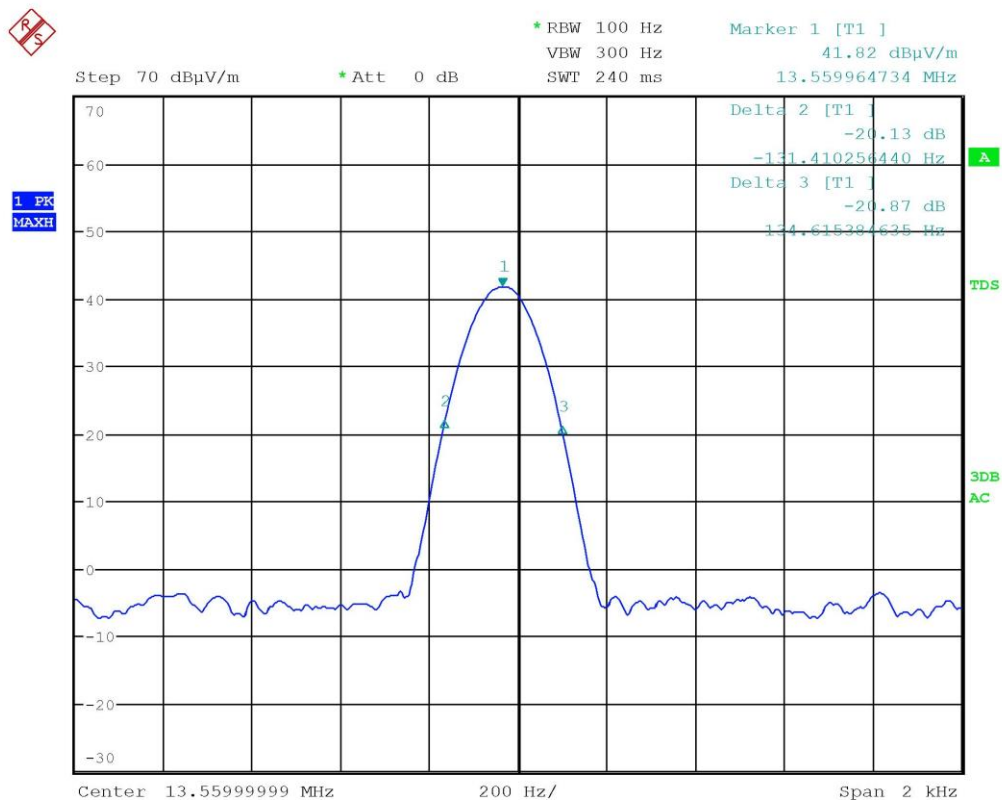
Nr.	Id. Number	Manufacturer	Model	Description
2	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
1	CMC S127	Schaffner	HLA6120	Loop Antenna 9kHz - 30MHz

Result

f (MHz)	20 dB bandwidth (MHz)		Graph	Results
	F_L	F_H		
13,56	13,428554	13,684579	G20072808	Complies



Graphs



Panozzo 20072808



Attachment 1

Instruments list

<i>Id. number</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Description</i>	<i>Serial number</i>	<i>Last calibration</i>	<i>Due date calibration</i>
CMC S010	Rohde & Schwarz	ESH3-Z2	Impulses Limiting Device	- - -	January '20	January '21
CMC S108	EMCO	3115	Horn Antenna	9811-5622	June '19	June '22
CMC S127	Schaffner	HLA6120	Loop Antenna	1191	November '18	November '23
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January '20	January '21
CMC S200	Schwarzbeck	NSLK 8128	V-LISN	8128-273	January '20	January '21
CMC S206	Rohde & Schwarz	ESCI 7	EMC Receiver 9KHz-7GHz	100781	January '20	January '21
CMC S260	CMC	Wfr_N	Shielded Cable	Wfr_ant10-1	November '19	November '20
CMC S261	CMC	Wfr_N	Shielded Cable	Wfr_ant20-1	November '19	November '20
CMC S262	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix32-1	November '19	November '20
CMC S263	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix31-1	November '19	November '20
CMC S264	CMC	Wfr_N	Shielded Cable	Wfr_ext03-1	November '19	November '20
CMC S271	Schwarzbeck	BBA 9106 + VHBB 9124	Biconical Antenna (30-300MHz)	831	June '19	June '22
CMC S287	Schwarzbeck	VUSLP 9111B	Log-periodic Antenna (200 MHz-3GHz)	9111B-203	June '19	June '22
CMC S288	CMC	W_sma_white	Joint Shielded Cable	W_001	November '19	November '20
CMC S295	Rohde & Schwarz	FSW43	Spectrum Analyzer 43GHz	104059	November '19	November '22



Attachment 1

Measurement uncertainty

Test	Test Setup	Expanded uncertainty	Note
Conducted emission CISPR 16 LISN 50uH 0,009-0,0150 MHz	PE001_01	3,4 dB	1
Conducted emission CISPR 16 LISN 50uH 0,150-30,0 MHz	PE001_01	3,0 dB	1
Conducted emission CISPR 16 Voltage Probe 0,15-30 MHz	PE001_02	2,9 dB	1
Conducted emission CISPR 16 Current Probe 0,15-30 MHz	PE001_03	2,6 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_01	3,6 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_01	4,0 dB	1
Radiated Emission CISPR 16 Bicon. Ant. 30-300 MHz	PE004_02	3,9 dB	1
Radiated Emission CISPR 16 LogP. Ant. 300-1000 MHz	PE004_03	3,8 dB	1
Radiated Emission CISPR 16 Horn Ant. 1-18 GHz	PE004_04	4,2 dB	1
Human Exposure to electromagnetic fields	PE005_01	23,6 %	1
Harmonics	PE006_01	10 mA + 2,6 %	1
Flicker	PE007_01	4,79 %	1
Radiated Immunity 80 MHz - 6 GHz	PE102_XX	1,95 dB 0,75 V/m a 3V/m	1
Conducted Immunity 0,15 - 230 MHz	PE105_XX	1,20 dB 0,44 V a 3V	1
AC Magnetic field	PE106_01	1,55 % 0,15 A/m a 10A/m	1
Pulse Magnetic field	PE107_01	6,25 % 18,7 A/m a 300A/m	1
Dumped Magnetic field	PE108_01	6,25 % 1,87 A/m a 30A/m	1
Common mode conducted immunity	PE112_01	2,21 % 0,22 V a 10V	1



Attachment 1

Test	Test Setup	Expanded uncertainty	Note
Power/Spurious 9kHz-30MHz	PR001_01	4,0 dB	1
Power/Spurious ERP 30-1000MHz d=10m	PR001_02+03	4,7 dB	1
Misura della potenza EIRP 1-18GHz d=3m	PR001_04+05	4,7 dB	1
Misura della potenza EIRP 18-40GHz d=3m	PR001_06	5,4 dB	1
Frequency error	PR002_01+02	$< 1 \times 10^{-7}$	1
Timing zero span (1001pts.)	PR002_01+02	0,2 % SWT	1
Modulation bandwidth	PR002_01+02	$< 1 \times 10^{-7}$	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. 20_02 date 24/02/2020			

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 $p = 95\%$

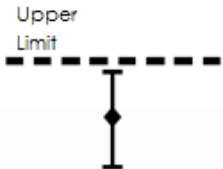
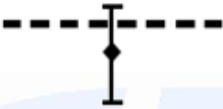
Note 2:

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: 03/2009 Guidelines on the Reporting of Compliance with Specification

Quality manual references – Internal procedure

Internal Procedure PM001 rev. 3.0 (Quality Manual)	Measure procedure
Internal Procedure INC_M rev. 9.1 (Quality Manual)	Measurement uncertainty calculation