

TEST REPORT

Nr. R24127101

Federal Communication Commission (FCC)

Report Reference No.	R24127101
Date of issue:	16.09.2025
Total number pages:	53
Customer name	CAEN RFID S.r.l.
Address	Via Vetraia, 11 - 55049 Viareggio (LU) - Italy
Test specification:	
Standard(s)	FCC Rules & Regulations, Title 47:2023 Part 15 paragraph(s): 203, 204, 205, 207, 209, 215 and 247
Non-standard test method	N/A
Test Report Form No.	15-247_Hopping_DEKRA
Test Report Form(s) Originator ...	DEKRA Testing and Certification S.r.l.
Master TRF	2024-09
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	R1307IBU – fIDo – RAIN RFID with BARCODE – FCC
(*) Trademark	CAEN RFID
(*) Manufacturer	CAEN RFID S.r.l.
(*) Model / Type reference	R1307IBU
(*) FCC ID	UVECAENRFID039
(*) Rating(s)	5 Vdc
Report	
Tested by (name + signature)	F. De Rosso
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	8
8	Test conditions	9
8.1	General	9
9	Test Verdict.....	10
9.1	Antenna requirements	10
9.2	Emissions in restricted frequency bands and in unrestricted frequency bands	11
9.3	20 dB bandwidth	32
9.4	Channel separation	36
9.5	Number of hopping channels.....	38
9.6	Time of occupancy	40
9.7	Band edge	43
9.8	Peak Output Power	47

2 Reference standard(s)	
FCC Rules and Regulation Title 47 part 15:2023 KDB 558074 D01 15.247 Meas Guidance v05r02	-- Guidance for compliance measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices operating under section 15.247 of the FCC rules
ANSI C63.4:2014	American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz
ANSI C63.10:2020 + COR1:2023 + C63.10A:2024 + Errata to C63.10A:2024	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	16.09.2025	--

Testing and sampling:	
Date of receipt of test item	02.07.2024
Testing start date	06.09.2024
Testing end date	16.09.2025
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 P240685
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	R1307IBU – fIDo – RAIN RFID with BARCODE – FCC						
Model Number	R1307IBU						
FCC ID	UVECAENRFID039						
Serial Number	0001001124110015						
Brand name	CAEN RFID						
Frequency band	902 – 928 MHz						
Nominal frequencies	FL: 902,750 MHz		FM: 914,750 MHz		FH: 927,250 MHz		
Test power supply.....		Voltage and Frequency	Reference poles				
			N	L1	L2	L3	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 5V					☐
Pseudo randomly ordered list of hopping frequencies	See document R1307IBU_Operational_Description						
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 information, 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 247			
Clause	Requirement – Test case	Basic standard	Verdict
Part 15.247 (a) (1)	Pseudo randomly ordered list of hopping frequencies	--	P
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 emissions	ANSI C63.10	P
Part 15.247	20 dB Bandwidth	ANSI C63.10	P
Part 15.247	Channel Separation	ANSI C63.10	P
Part 15.247	Number of Hopping Channel	ANSI C63.10	P
Part 15.247	Time of occupancy	ANSI C63.10	P
Part 15.247	Band edge	ANSI C63.10	P
Part 15.209 and 15.247	Peak Output Power	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.						
	<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	40370182 610	Data Logger	May 2024	May 2025
Measurement uncertainties :	Attachment 1						

9 Test Verdict

9.1 Antenna requirements

Tested by	F. De Rosso	
Test date	06.09.2024	
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	1 dBi	
External R.F. power amplifier	Not Present	

9.2 Emissions in restricted frequency bands and in unrestricted frequency bands

Tested by	F. De Rosso	
Test date	10.09.2024	
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	
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

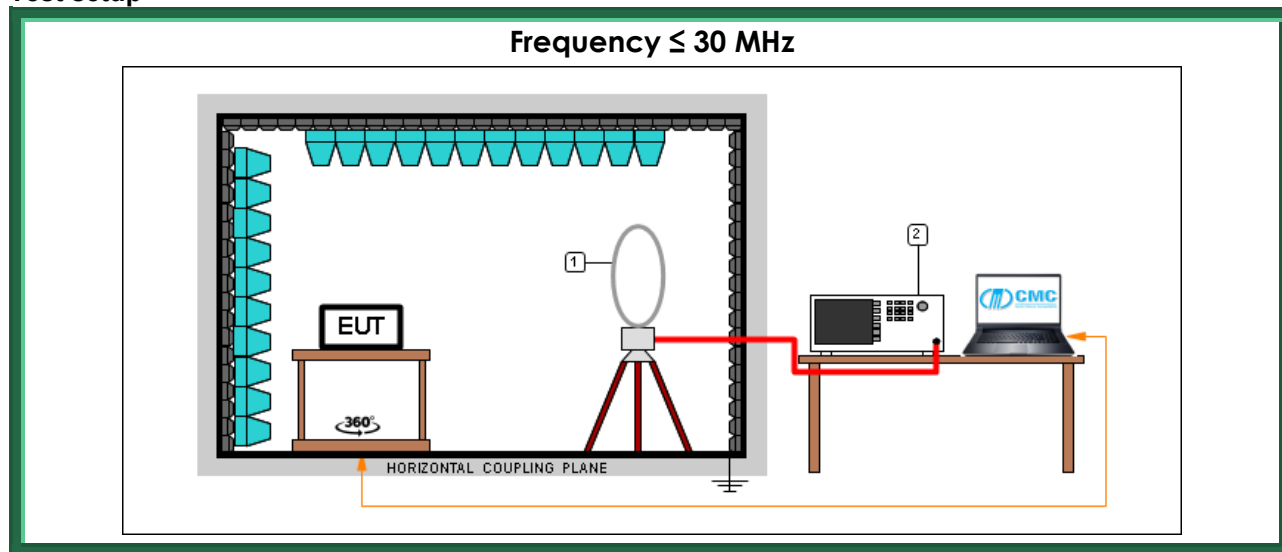
The restricted frequency bands are listed in the following table:

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

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

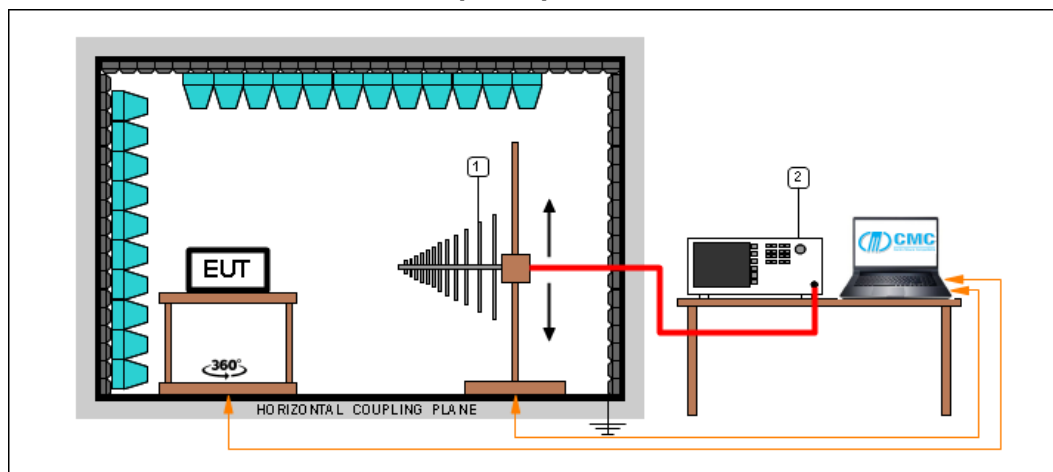
Test setup



Test setup PE004_01

Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
2	CMC S353	Rohde & Schwarz	ESW26	101492	Emi Test Receiver	December 2023	December 2024
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



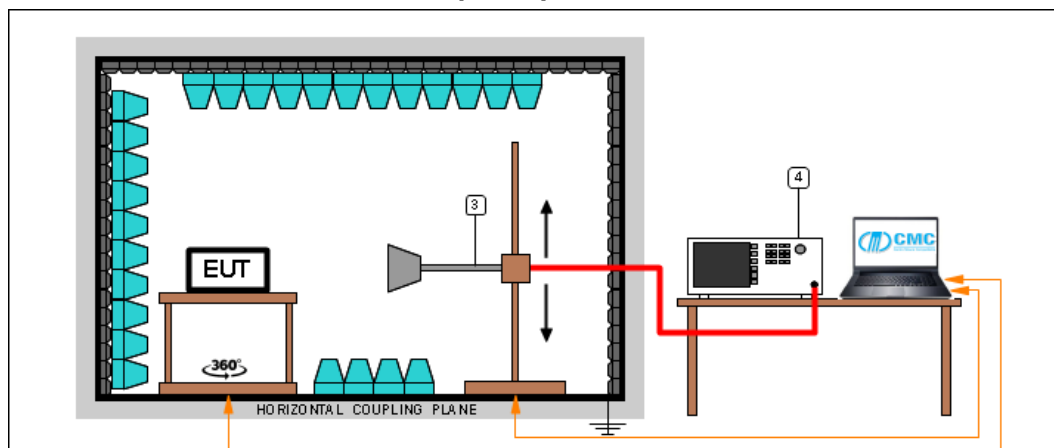
Test setup PE004_02

Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
2	CMC S353	Rohde & Schwarz	ESW26	101492	Emi Test Receiver	December 2023	December 2024
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_03

Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
2	CMC S353	Rohde & Schwarz	ESW26	101492	Emi Test Receiver	December 2023	December 2024
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_04

Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
4	CMC S353	Rohde & Schwarz	ESW26	101492	Emi Test Receiver	December 2023	December 2024
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_05

Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
4	CMC S353	Rohde & Schwarz	ESW26	101492	Emi Test Receiver	December 2023	December 2024
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)	Polarization	Frequency Range (MHz)	Graphs	Verdict
Worst case	Loop	0,009 – 30	G24127118	P
Worst case	H	30 – 300	G24127119	P
Worst case	V	30 – 300	G24127120	P
902,750	H	300 – 1000	G24127121	P
902,750	V	300 – 1000	G24127122	P
902,750	H	1000 – 10000	G24127123	P
902,750	V	1000 – 10000	G24127124	P
914,750	H	1000 – 10000	G24127125	P
914,750	V	1000 – 10000	G24127126	P
914,750	H	300 – 1000	G24127127	P
914,750	V	300 – 1000	G24127128	P
927,250	H	1000 – 10000	G24127129	P
927,250	V	1000 – 10000	G24127130	P
927,250	H	300 – 1000	G24127131	P
927,250	V	300 – 1000	G24127132	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.

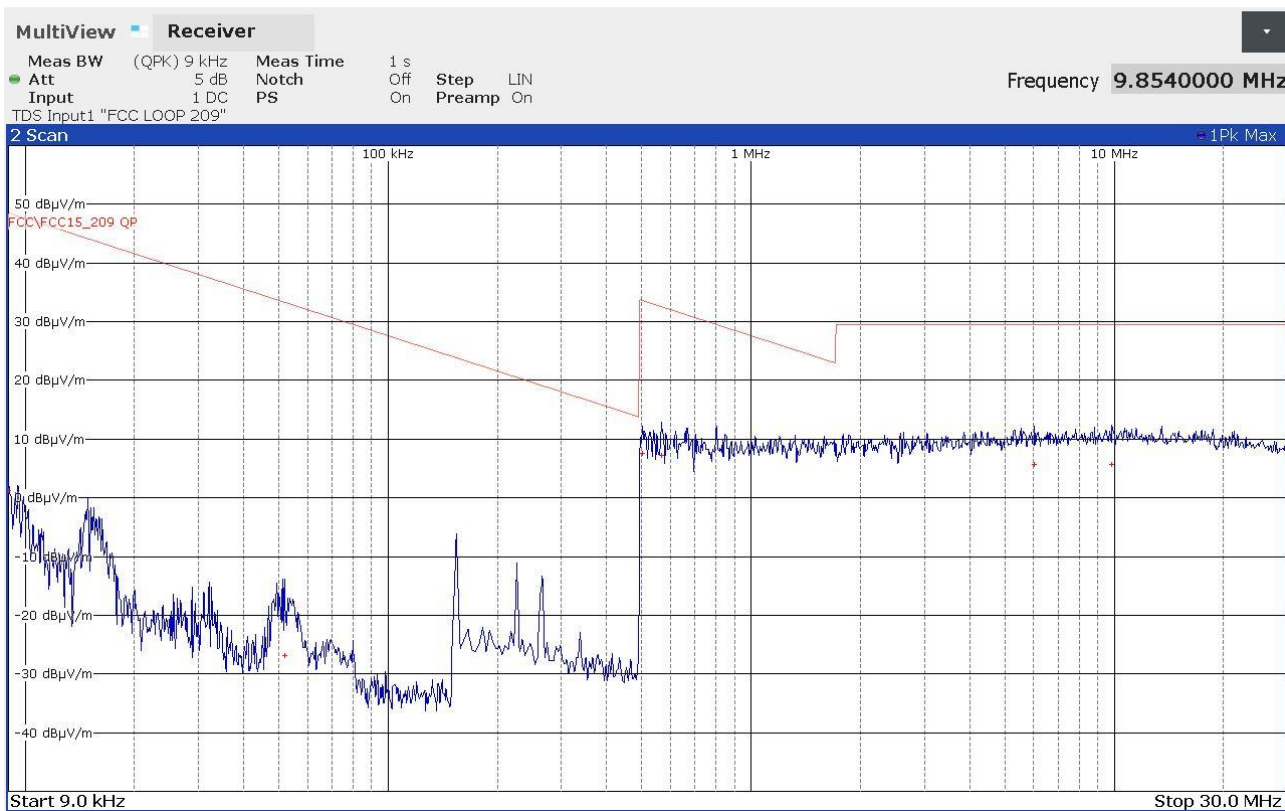
Graphs Legend

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

De Rosso-24127118-0.009-30MHz-Loop-10m-FL



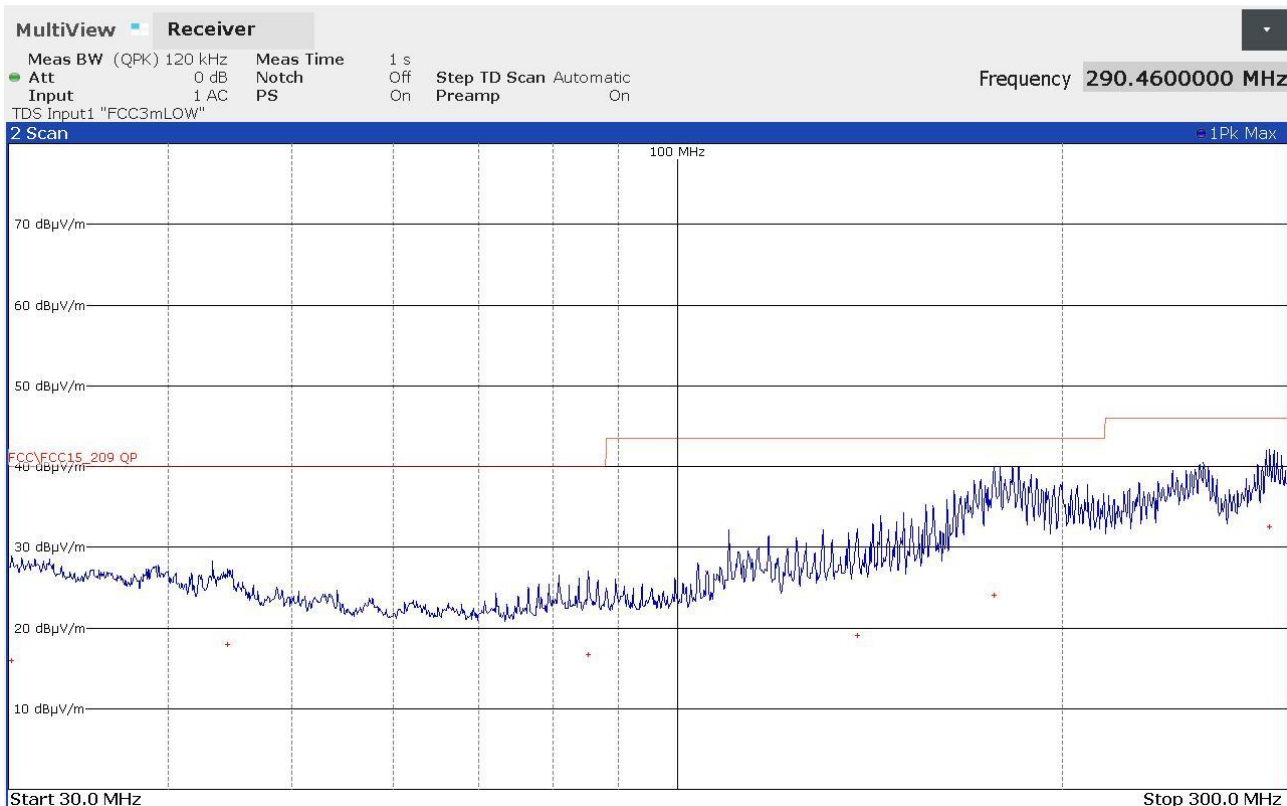
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
9000	+1.26	-47.26
51800	-26.82	-60.14
502000	+7.54	-26.05
566000	+7.24	-25.31
6030000	+5.60	-23.94
9854000	+5.75	-23.79

24127118_2

De Rosso-24127119-Horiz-30-300MHz-10m-FL



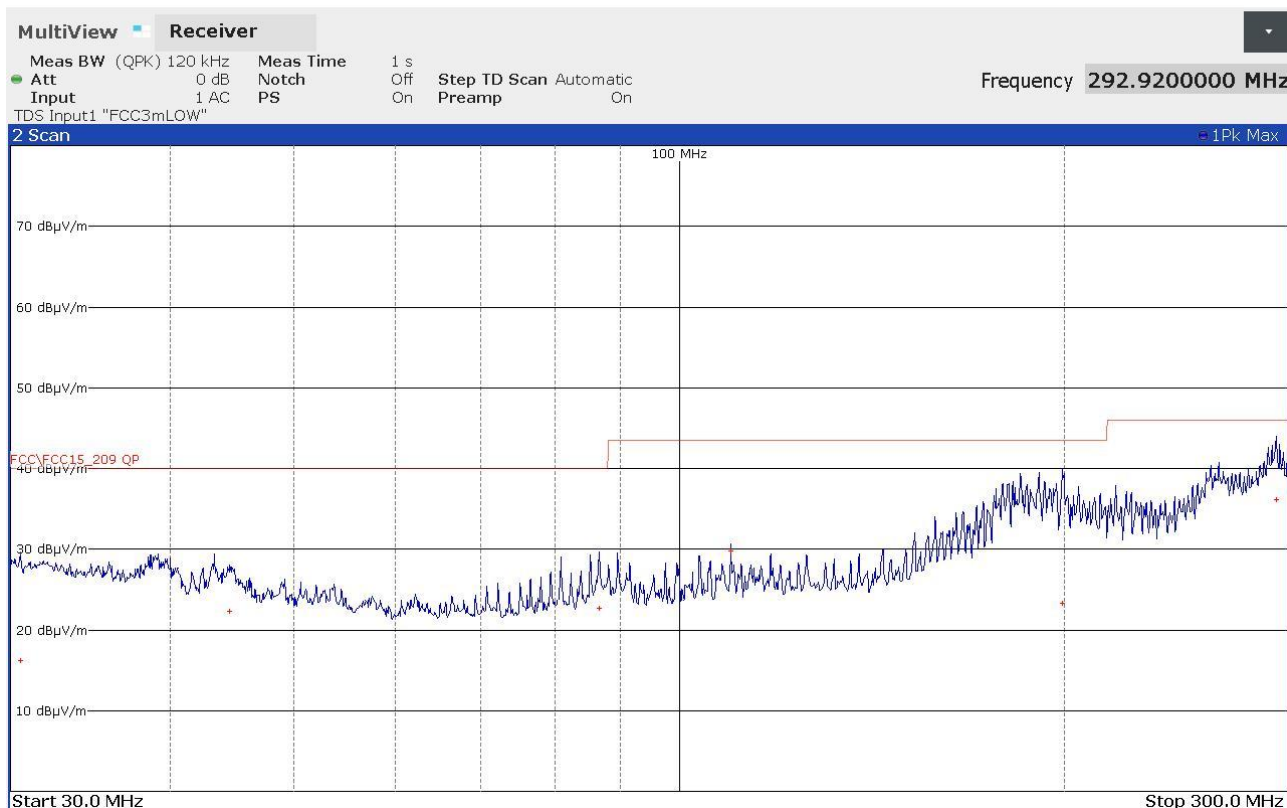
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
30180000	+16.00	-24.00
44520000	+17.92	-22.08
85170000	+16.74	-23.26
138270000	+19.04	-24.48
176850000	+24.11	-19.41
290460000	+32.47	-13.55

24127119_2

De Rosso-24127120-Vert-30-300MHz-10m-FL



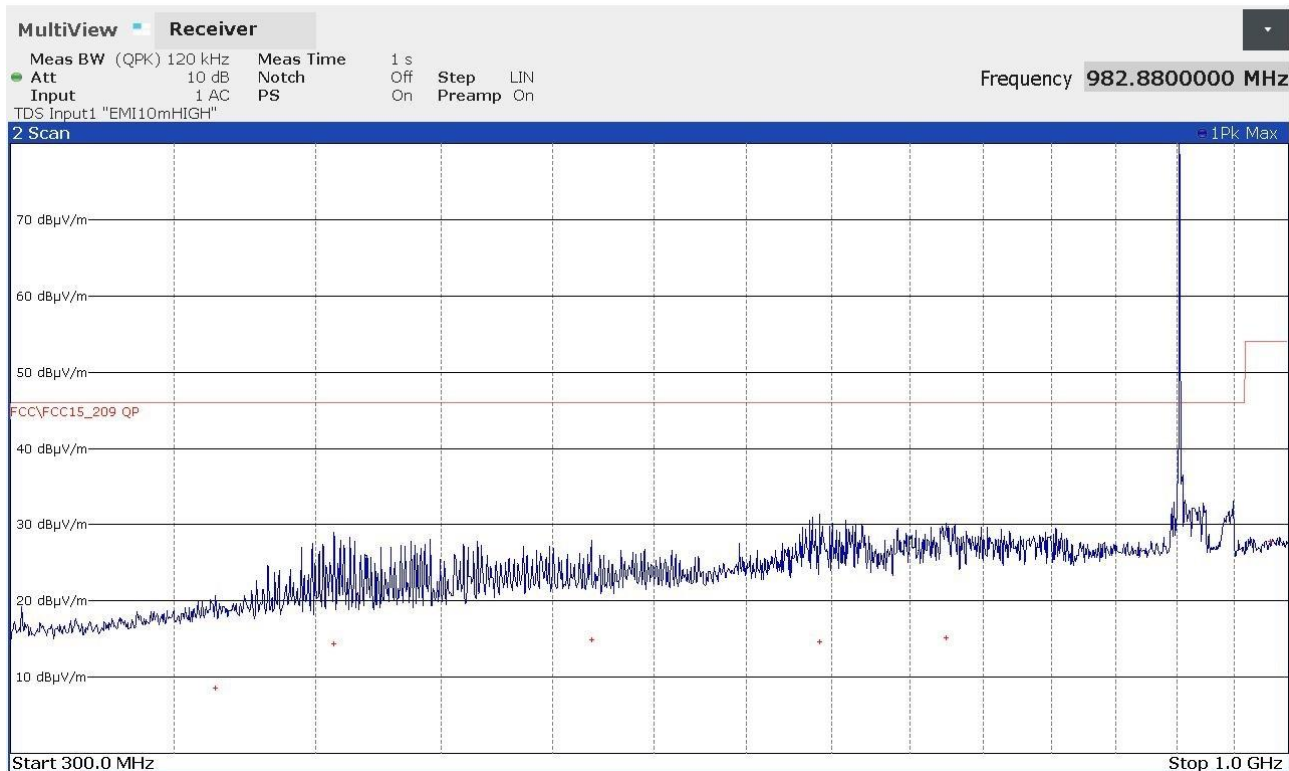
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
30540000	+16.14	-23.86
44520000	+22.33	-17.67
86580000	+22.74	-17.26
109710000	+29.76	-13.76
199350000	+23.28	-20.24
292920000	+36.08	-9.94

24127120_2

De Rosso-24127121-Horiz-300-1000MHz-10m-FL



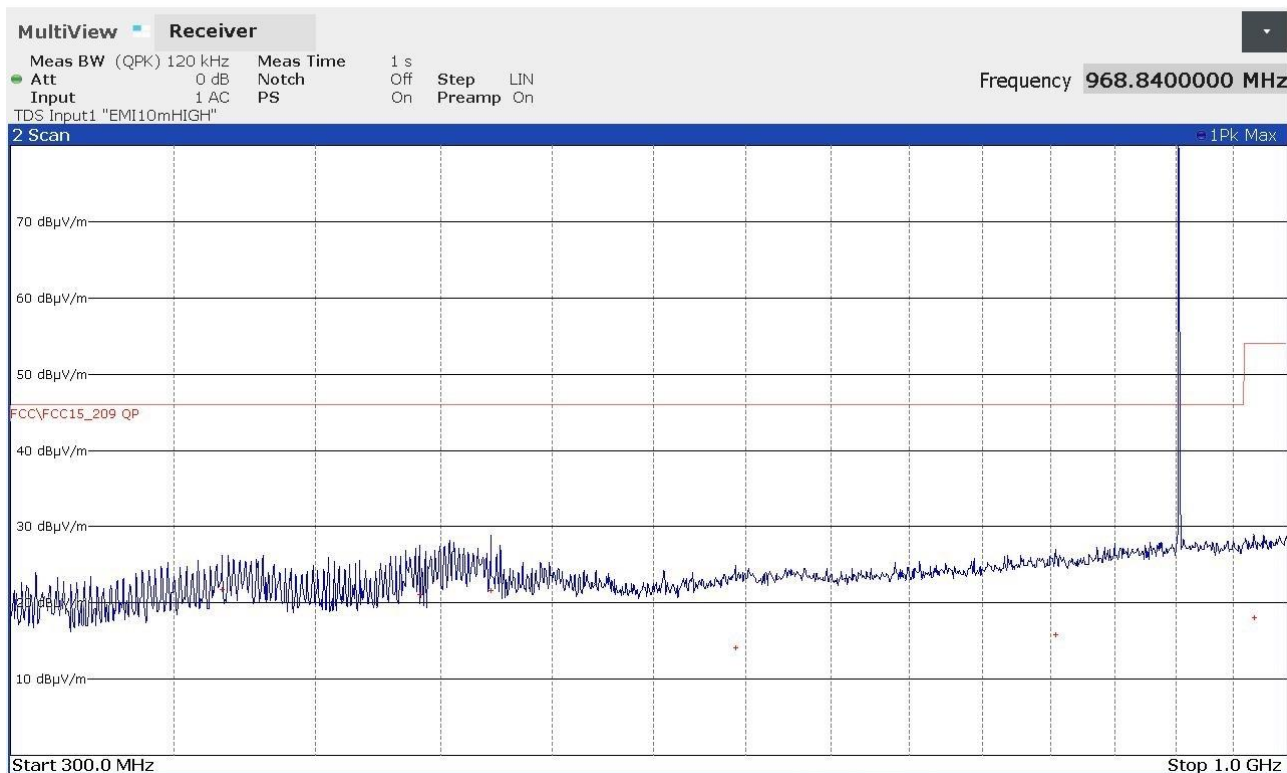
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
363880000	+8.56	-37.46
406960000	+14.38	-31.64
518680000	+14.83	-31.19
643040000	+14.62	-31.40
724360000	+15.13	-30.89
982880000	+27.87	-26.11

24127121_2

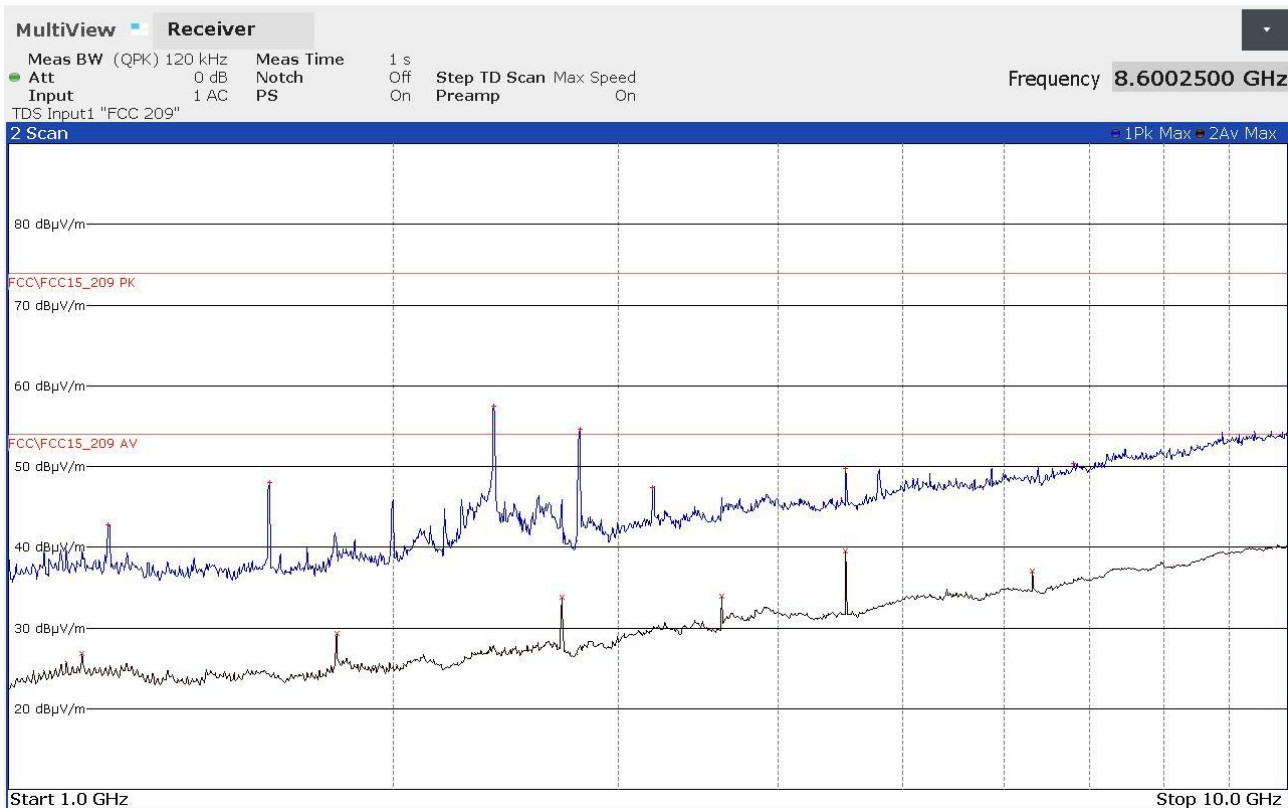
De Rosso-24127122-Vert-300-1000MHz-10m-FL


FINAL RESULT TABLE
QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
366280000	+21.75	-24.27
441280000	+21.05	-24.97
471920000	+21.62	-24.40
594400000	+14.04	-31.98
803560000	+15.86	-30.16
968840000	+18.03	-35.95

24127122_2

De Rosso-24127123-Horiz-1000-10000MHz-3m-FL

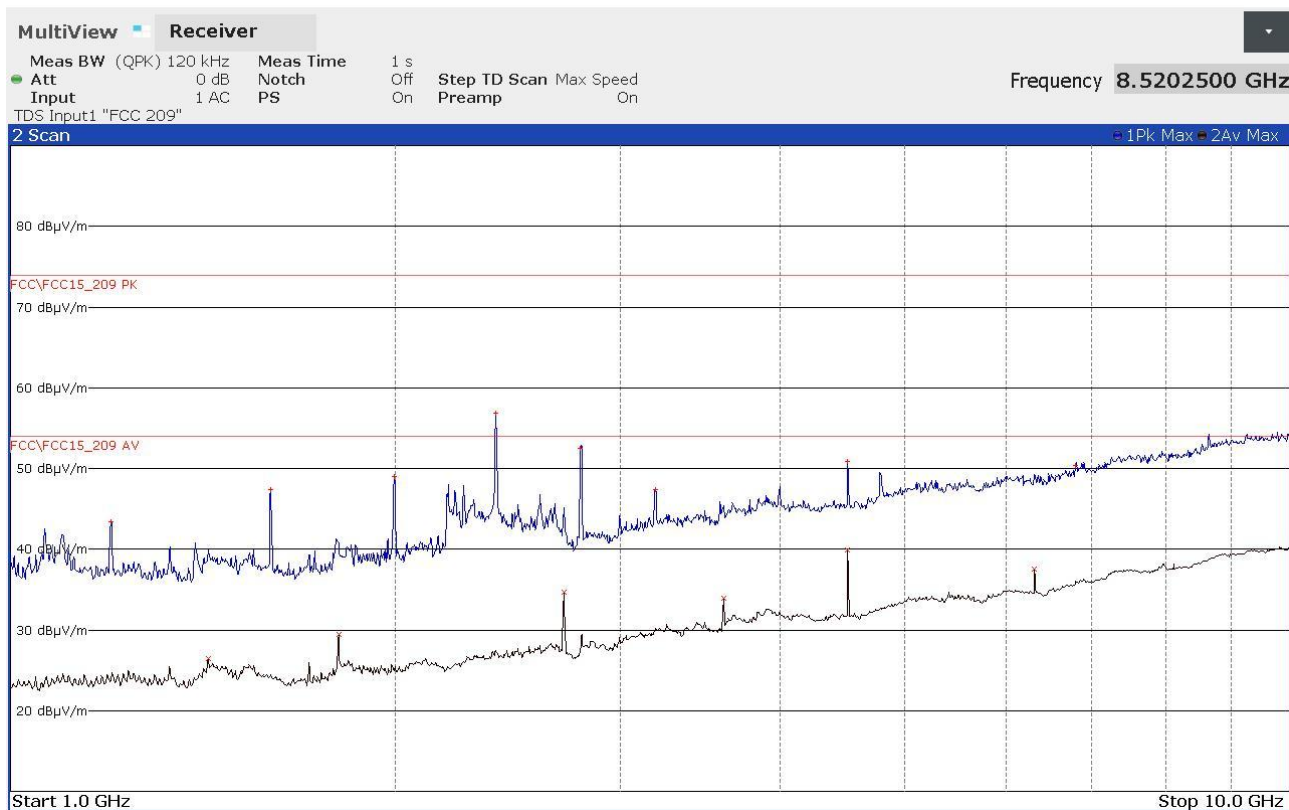


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1196500000	+42.79	-31.19	1141750000	+26.88	-27.10
1599750000	+47.95	-26.03	1805500000	+29.30	-24.68
2397250000	+57.42	-16.56	2708250000	+33.80	-20.18
2798250000	+54.58	-19.40	3611000000	+33.88	-20.10
3191000000	+47.35	-26.63	4513750000	+39.57	-14.41
4513750000	+49.80	-24.18	6319250000	+37.05	-16.93
6807750000	+50.39	-23.59			

24127123_2

De Rosso-24127124-Vert-1000-10000MHz-3m-FL

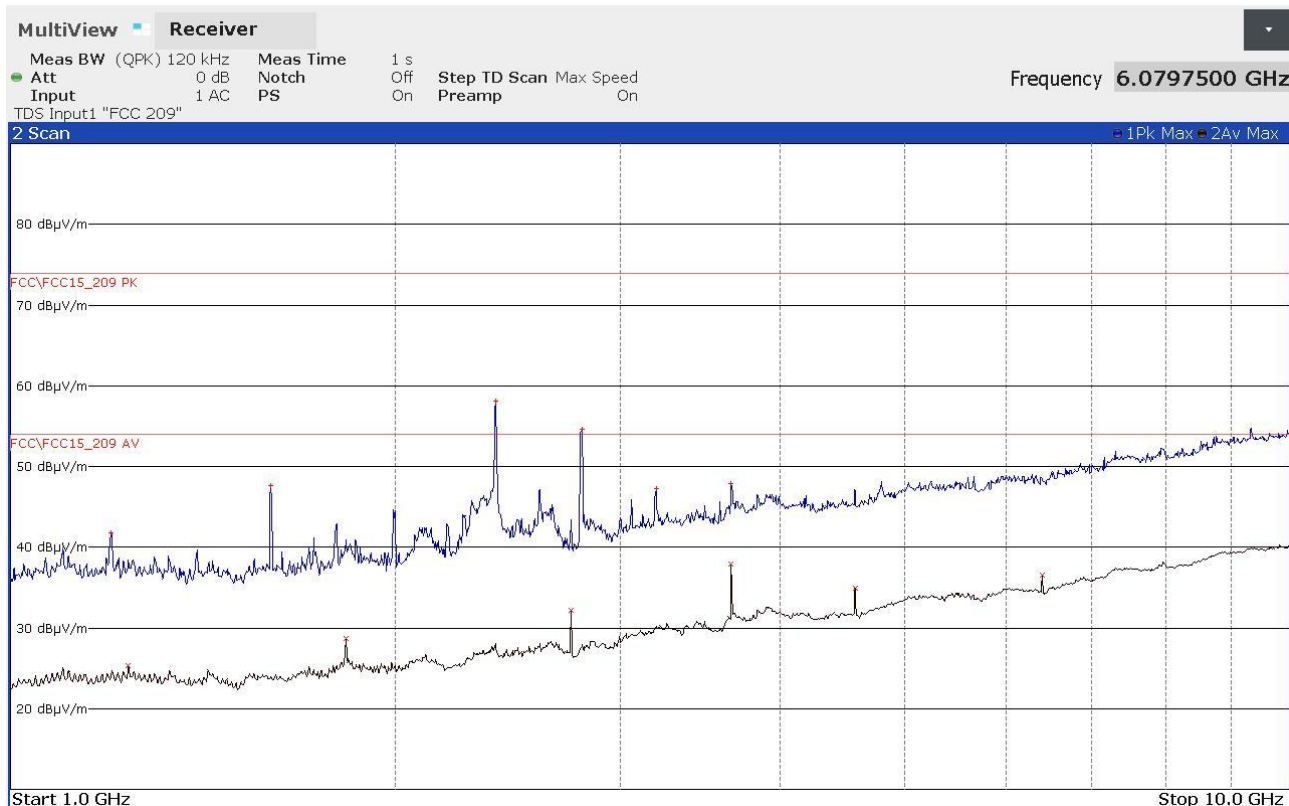


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1199000000	+43.43	-30.55	1427000000	+26.46	-27.52
1596250000	+47.43	-26.55	1805500000	+29.47	-24.51
1997250000	+49.02	-24.96	2708250000	+34.72	-19.26
2394500000	+56.83	-17.15	3611000000	+33.88	-20.10
2790000000	+52.52	-21.46	4513750000	+39.91	-14.07
3191250000	+47.42	-26.56	6319250000	+37.58	-16.40
4513750000	+50.91	-23.07			
6804750000	+50.35	-23.63			

24127124_2

De Rosso-24127125-Horiz-1000-10000MHz-3m-Fm

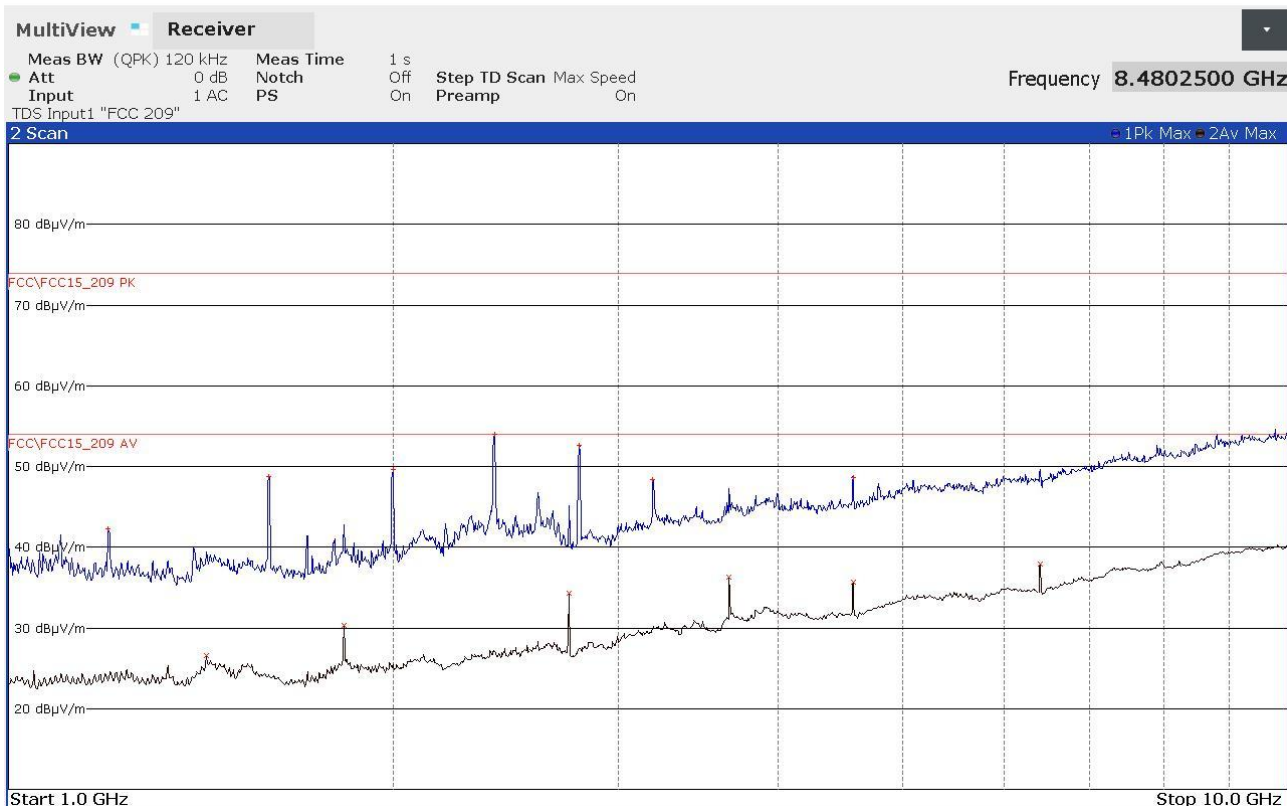


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1199250000	+41.83	-32.15	1236500000	+25.35	-28.63
1597500000	+47.67	-26.31	1829500000	+28.70	-25.28
2395000000	+58.04	-15.94	2744250000	+32.19	-21.79
2799750000	+54.55	-19.43	3659000000	+37.86	-16.12
3199750000	+47.27	-26.71	4573750000	+34.86	-19.12
3659000000	+47.87	-26.11	6403250000	+36.60	-17.38

24127125_2

De Rosso-24127126-Vert-1000-10000MHz-3m-Fm

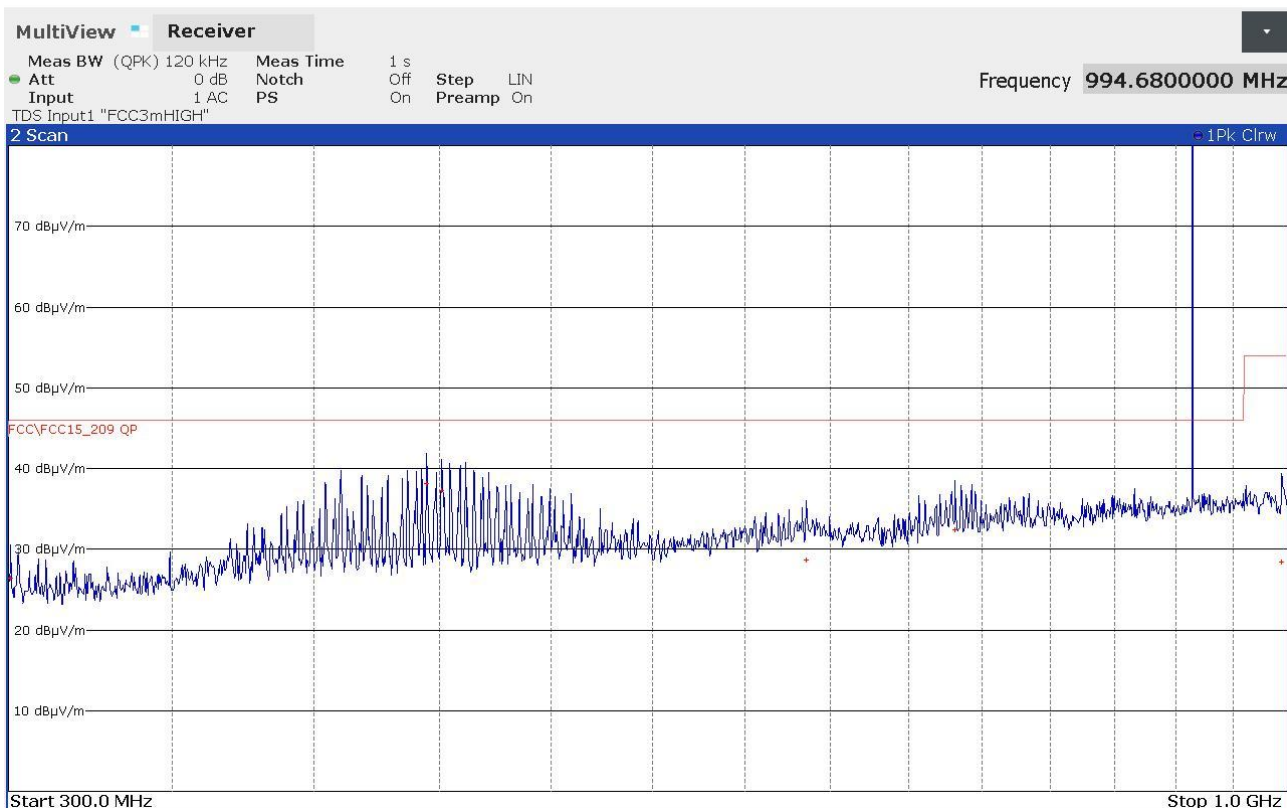


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1196250000	+42.25	-31.73	1427750000	+26.62	-27.36
1599000000	+48.75	-25.23	1829500000	+30.28	-23.70
1999750000	+49.63	-24.35	2744250000	+34.24	-19.74
2398250000	+53.96	-20.02	3659000000	+36.34	-17.64
2793750000	+52.65	-21.33	4573750000	+35.62	-18.36
3190000000	+48.39	-25.59	6403250000	+37.92	-16.06
4573750000	+48.58	-25.40			

24127126_2

De Rosso-24127127-300-1000MHz-Horiz-10m-Fm



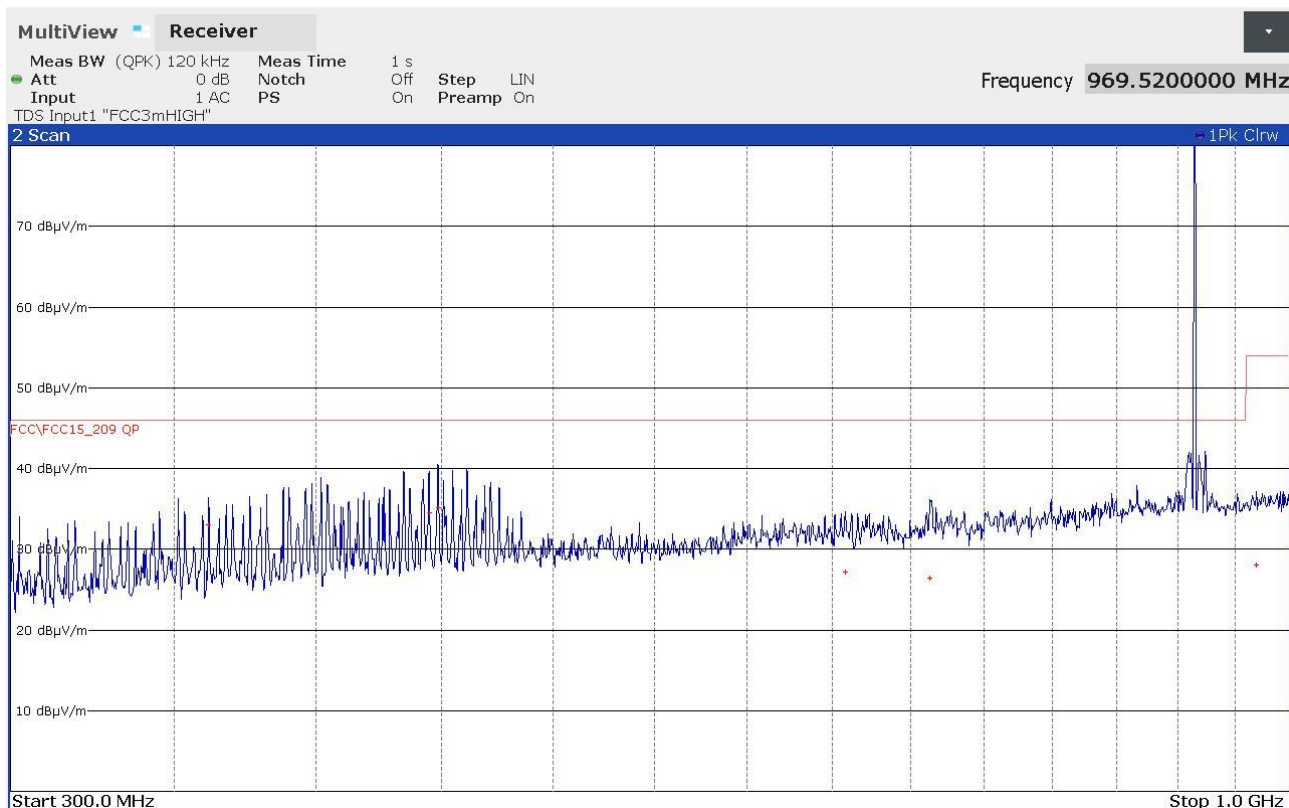
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
300520000	+26.40	-19.62
444720000	+38.14	-7.88
451000000	+37.32	-8.70
635760000	+28.61	-17.41
731120000	+32.42	-13.60
994680000	+28.43	-25.55

24127127_2

De Rosso-24127128-300-1000MHz-Vert-10m-Fm



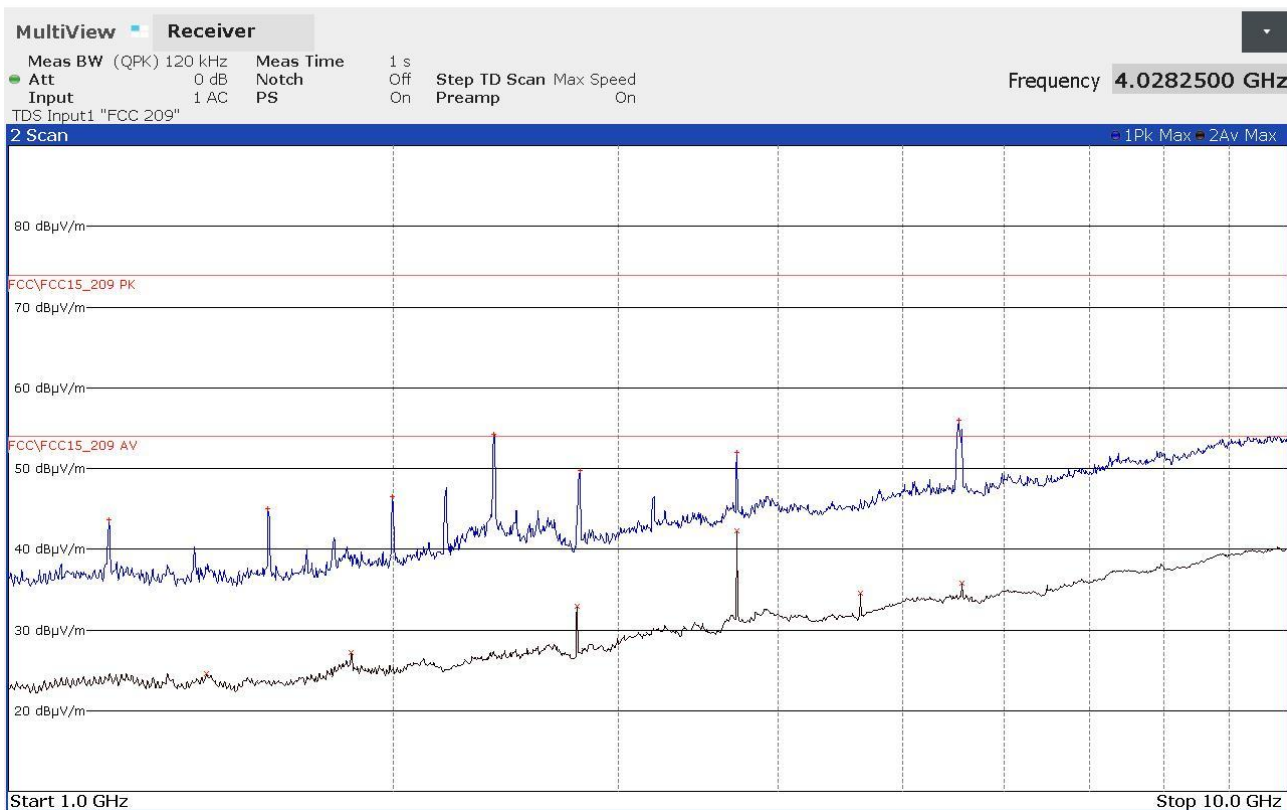
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
361560000	+33.07	-12.95
444840000	+34.51	-11.51
448640000	+35.16	-10.86
658200000	+27.18	-18.84
713040000	+26.46	-19.56
969520000	+28.00	-25.98

24127128_2

De Rosso-241271329-Horiz-1000-10000MHz-3m-FH

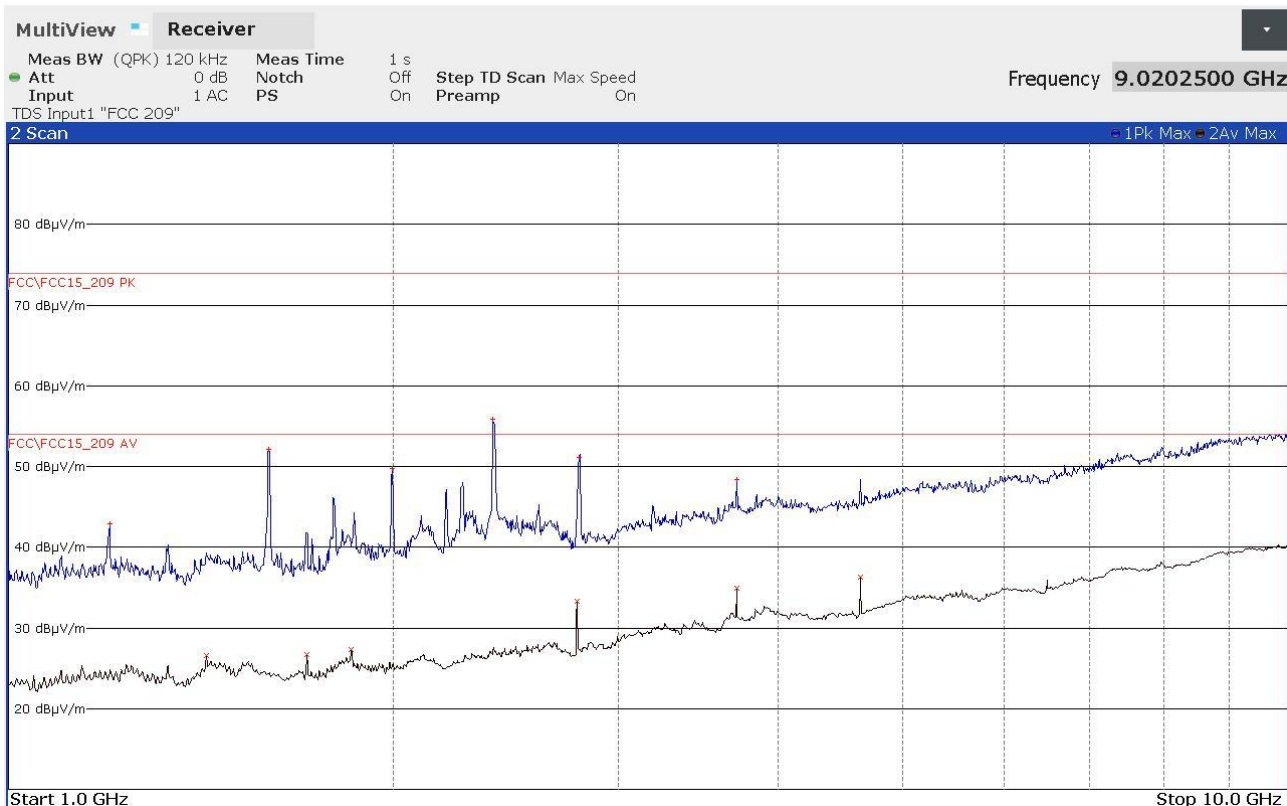


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1198500000	+43.70	-30.28	1428250000	+24.64	-29.34
1594250000	+45.03	-28.95	1854500000	+27.24	-26.74
1996750000	+46.53	-27.45	2781750000	+32.94	-21.04
2394250000	+54.25	-19.73	3709000000	+42.32	-11.66
2798500000	+49.77	-24.21	4636250000	+34.60	-19.38
3709000000	+52.01	-21.97	5563500000	+35.77	-18.21
5536500000	+55.92	-18.06			

24127129_2

De Rosso-24127130-Vert-1000-10000MHz-3m-FH

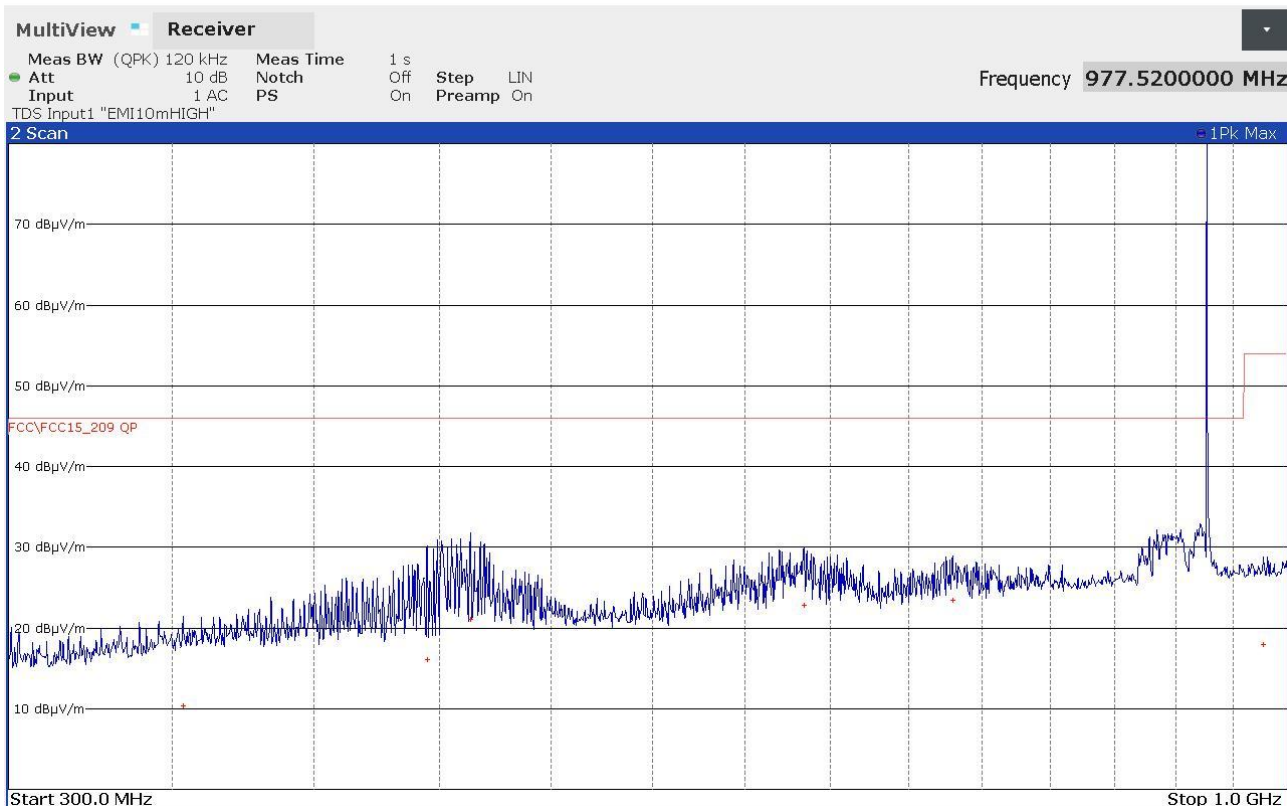


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1199500000	+42.93	-31.05	1427750000	+26.54	-27.44
1598750000	+52.10	-21.88	1712000000	+26.64	-27.34
1994500000	+49.77	-24.21	1854500000	+27.35	-26.63
2391500000	+55.86	-18.12	2781750000	+33.24	-20.74
2792750000	+51.17	-22.81	3709000000	+34.92	-19.06
3709000000	+48.35	-25.63	4636250000	+36.33	-17.65

24127130_2

De Rosso-24127131-Horiz-300-1000MHz-10m-FH



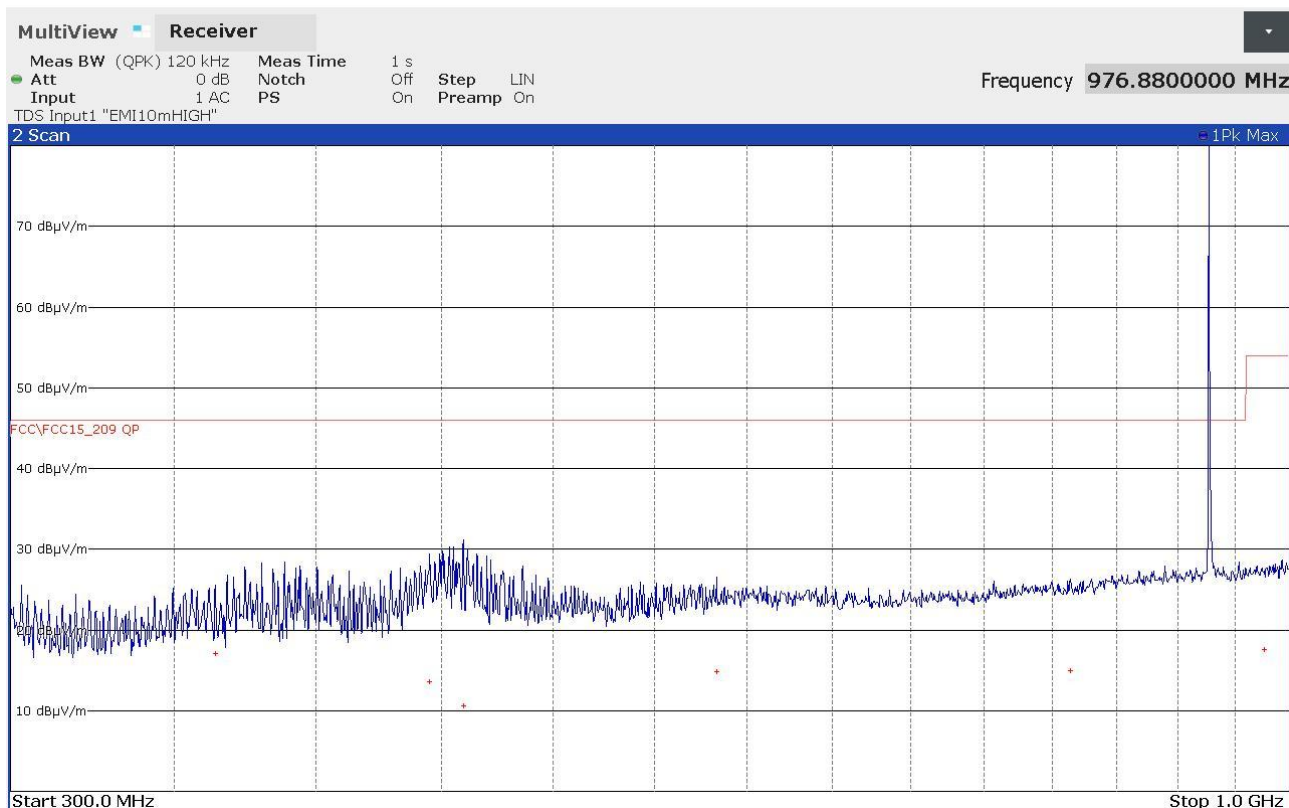
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
353600000	+10.37	-35.65
445040000	+16.09	-29.93
463400000	+21.09	-24.93
634240000	+22.82	-23.20
729560000	+23.43	-22.59
977520000	+17.91	-36.07

24127131_2

De Rosso-24127132-Vert-300-1000MHz-10m-FH



FINAL RESULT TABLE

QUASI PEAK		
Freq Hz	Lev dBuV/m	Margin dB
363840000	+17.04	-28.98
445040000	+13.60	-32.42
459400000	+10.61	-35.41
583240000	+14.86	-31.16
813360000	+15.00	-31.02
976880000	+17.60	-36.38

24127132_2

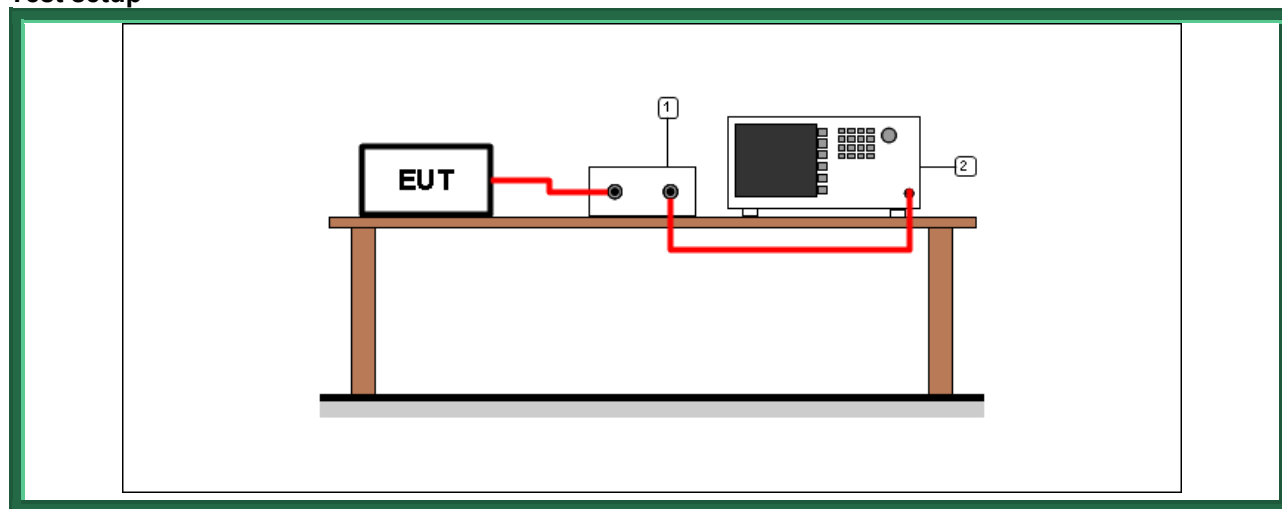
9.3 20 dB bandwidth

Tested by	F. De Rosso
Test date	06.09.2024
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)
Supplementary test set-up description	--
Supplementary information	--

Acceptance limits

For frequency hopping systems operating in the 902 – 928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0,4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0,4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Test setup



Test setup PR002_01

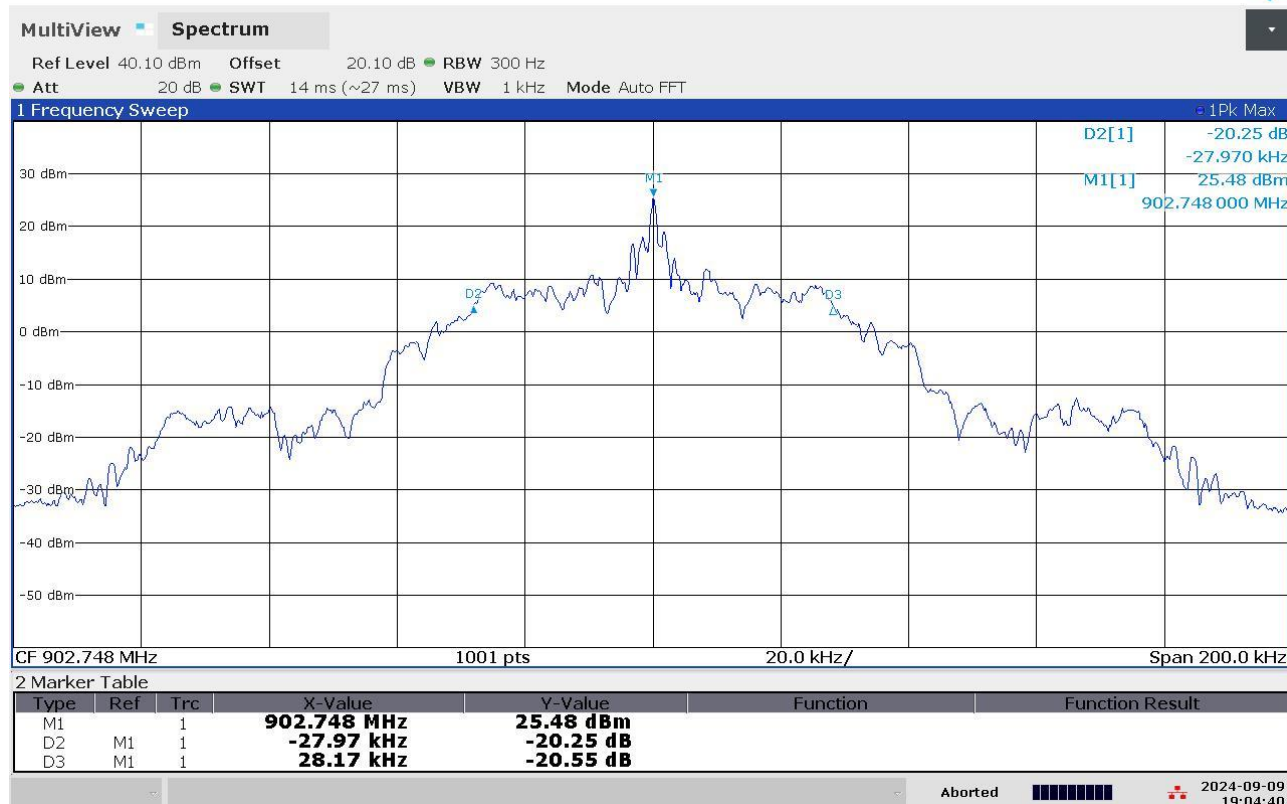
Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
2	CMC S295	Rohde & Schwarz	FSW43	104059	Spectrum Analyzer 43GHz	January 2023	January 2026
1	--	--	--	--	Cable + attenuator	Calibrated before the test	Calibrated before the test

Result

<i>Transmission frequency (MHz)</i>	<i>Graphs</i>	<i>20 dB bandwidth (kHz)</i>	<i>Limits (kHz)</i>	<i>Verdict</i>
902,750	G24127103	56,14	500	P
914,750	G24127105	56,05	500	P
927,250	G24127107	56,25	500	P

Graphs

De Rosso-24127103



De Rosso-24127105



De Rosso-24127107



MultiView Spectrum

Ref Level 40.10 dBm Offset 20.10 dB RBW 300 Hz
Att 20 dB SWT 14 ms (~27 ms) VBW 1 kHz Mode Auto FFT


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	927.248 MHz	25.40 dBm		
D2	M1	1	-28.37 kHz	-20.62 dB		
D3	M1	1	27.88 kHz	-20.21 dB		

Aborted



2024-09-09 19:08:34

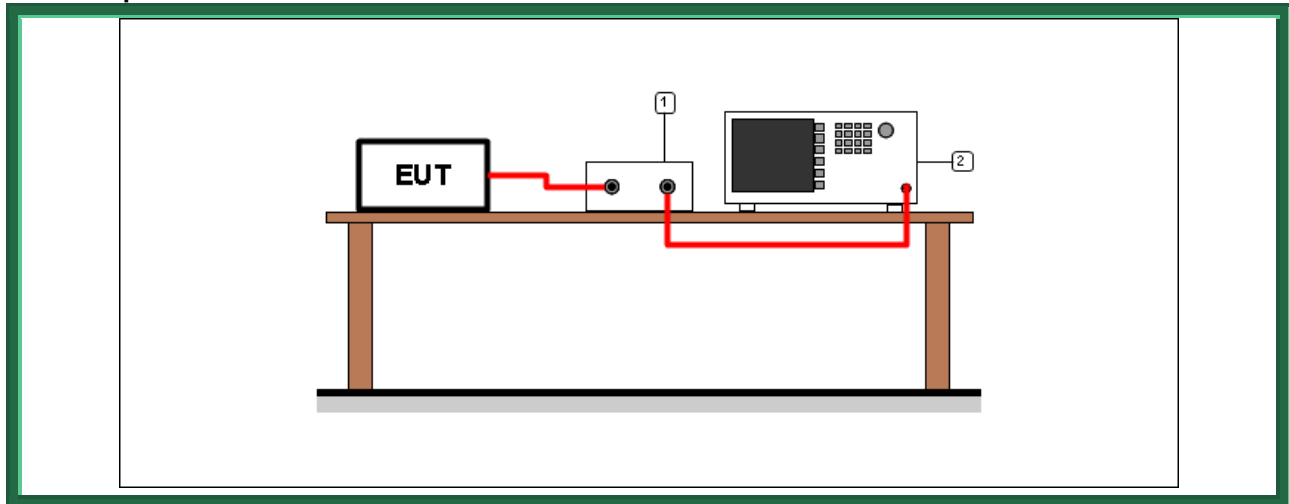
9.4 Channel separation

Tested by	F. De Rosso
Test date	06.09.2024
Test location (stand)	Laboratory
Basic standard(s)	KDB 558074 D01 15.247 Meas Guidance v05r02 cl. 9 b) ANSI C63.10 cl. 7.8.2
Product standard(s)	FCC Rules and Regulation; Titles 47 Part. 15.247
Supplementary test set-up description	--
Supplementary information	--

Acceptance limits

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Test setup



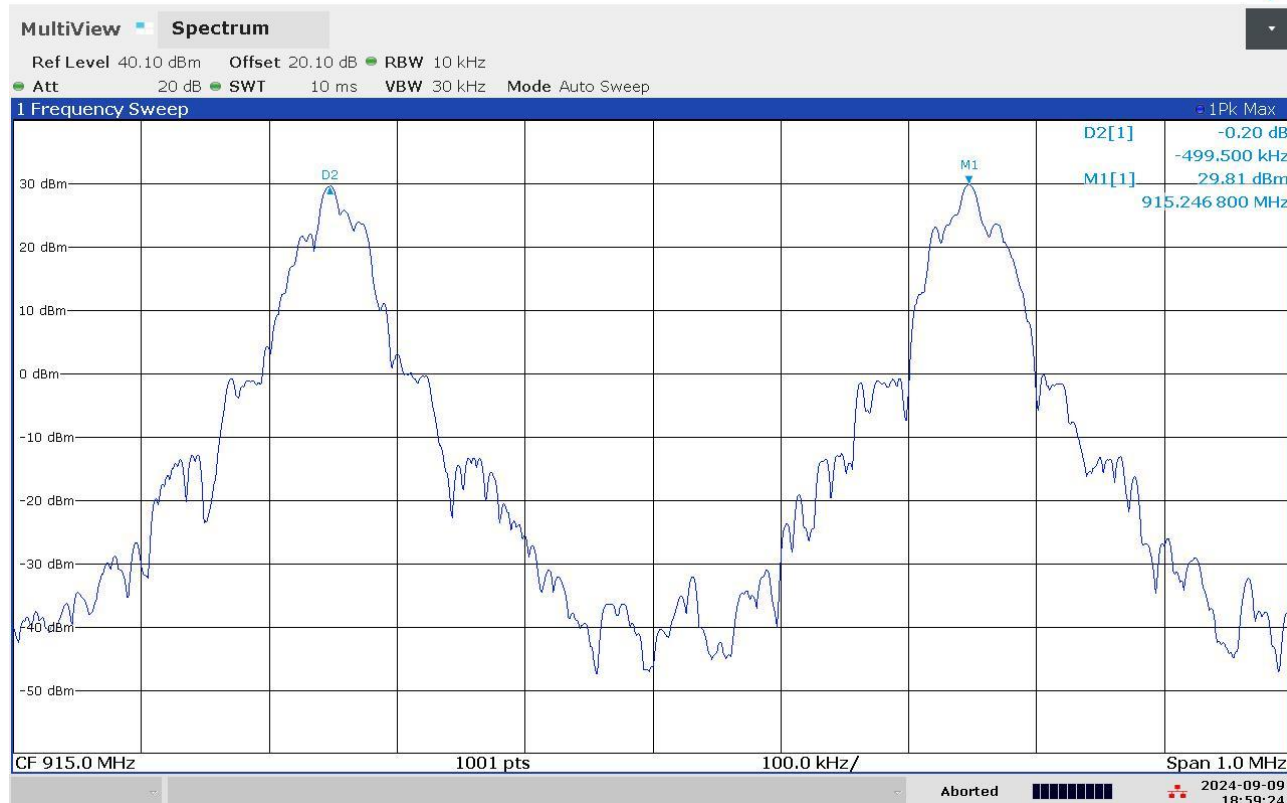
Test setup PR002_01							
Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
2	CMC S295	Rohde & Schwarz	FSW43	104059	Spectrum Analyzer 43GHz	January 2023	January 2026
1	--	--	--	--	Cable + attenuator	Calibrated before the test	Calibrated before the test

Result

Frequency band (MHz)	Graphs	Channel separation (kHz)	Minimum channel separation required (kHz)	Verdict
902 – 928	G24127102	499,50	56,25	P

Graphs

De Rosso-24127102



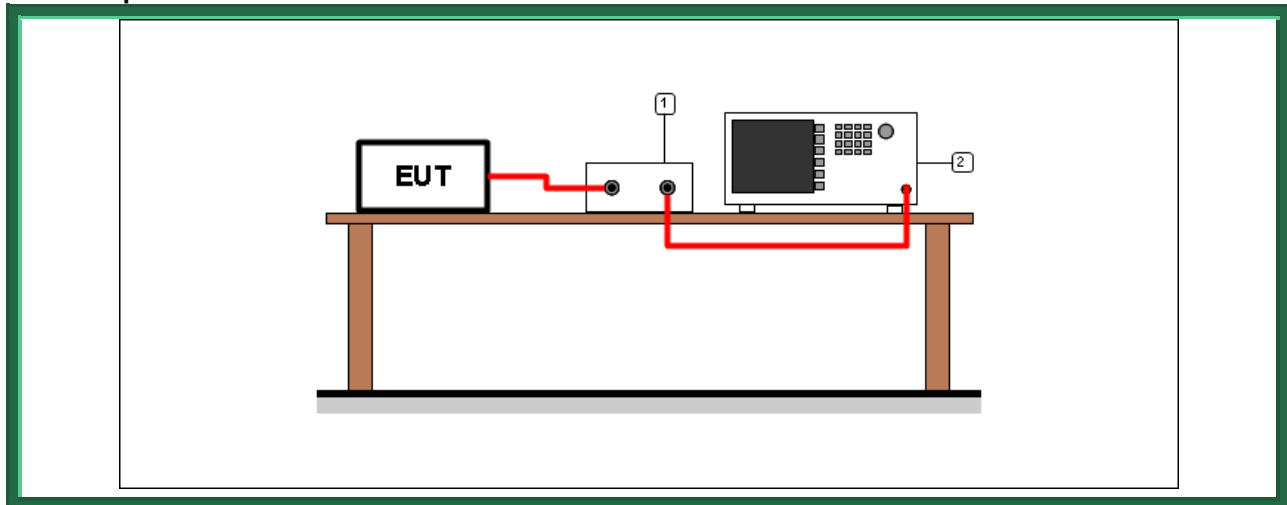
9.5 Number of hopping channels

Tested by	F. De Rosso
Test date	06.09.2024
Test location (stand)	Laboratory
Basic standard(s)	KDB 558074 D01 15.247 Meas Guidance v05r02 cl. 9 b) ANSI C63.10 cl. 7.8.3
Product standard(s)	FCC Rules and Regulation; Titles 47 Part. 15.247
Supplementary test set-up description	--
Supplementary information	--

Acceptance limits

For frequency hopping systems operating in the 902 – 928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0,4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0,4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Test setup



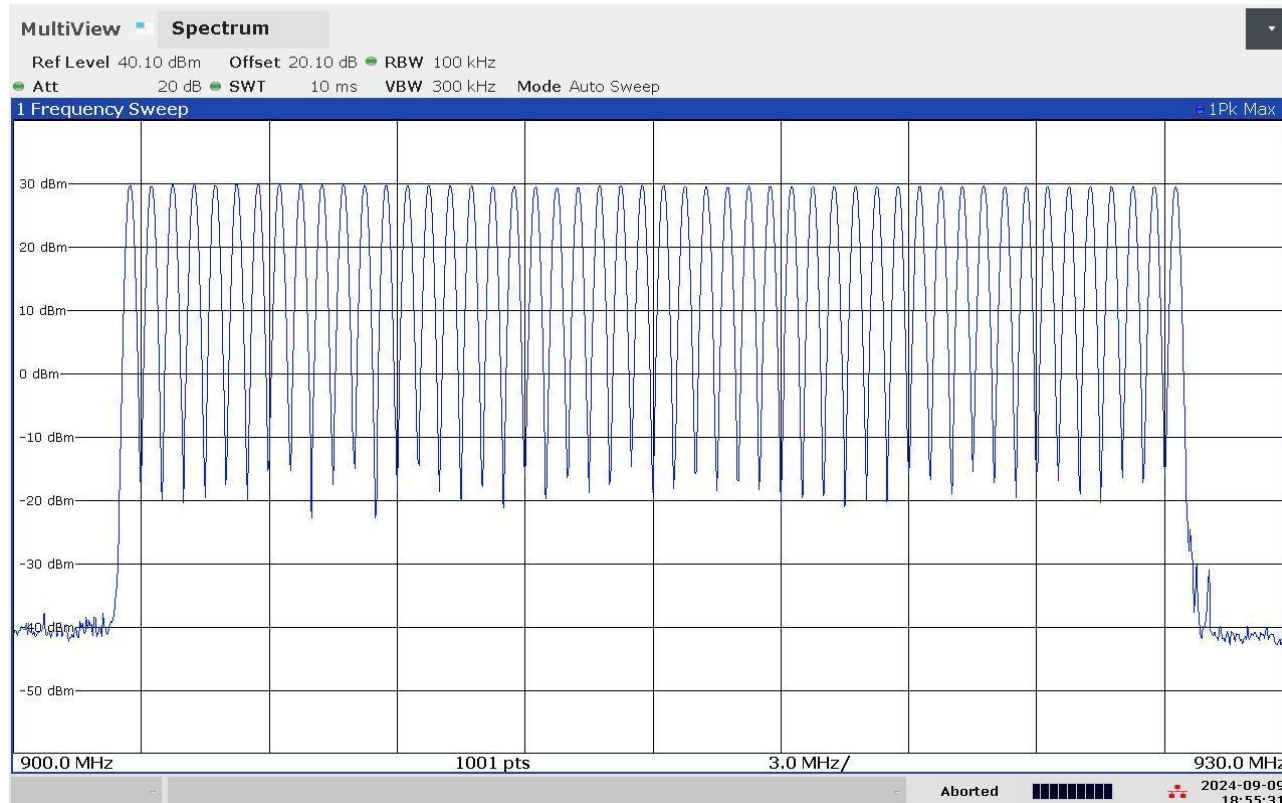
Test setup PR002_01							
Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
2	CMC S295	Rohde & Schwarz	FSW43	104059	Spectrum Analyzer 43GHz	January 2023	January 2026
1	--	--	--	--	Cable + attenuator	Calibrated before the test	Calibrated before the test

Result

Frequency band (MHz)	Graphs	Number of hopping channels	Minimum number of hopping channels required	Verdict
902 – 928	G24127101	50	50	P

Graphs

De Rosso-24127101



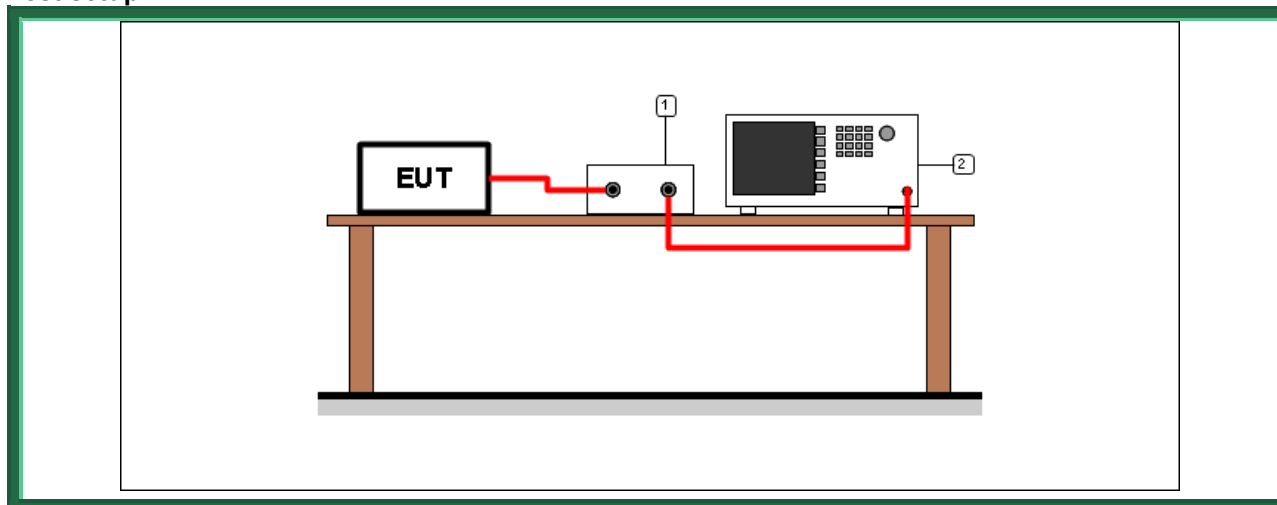
9.6 Time of occupancy

Tested by	F. De Rosso
Test date	06.09.2024
Test location (stand)	Laboratory
Basic standard(s)	KDB 558074 D01 15.247 Meas Guidance v05r02 cl. 9 b) ANSI C63.10 cl. 7.8.4
Product standard(s)	FCC Rules and Regulation; Titles 47 Part. 15.247
Supplementary test set-up description	--
Supplementary information	--

Acceptance limits

For frequency hopping systems operating in the 902 – 928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0,4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0,4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

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 2023	January 2026
1	--	--	--	--	Cable + attenuator	Calibrated before the test	Calibrated before the test

Result

<i>Transmission frequency (MHz)</i>	<i>Graphs</i>	<i>Dwell time (ms)</i>
902,7493	G24127113	24,40

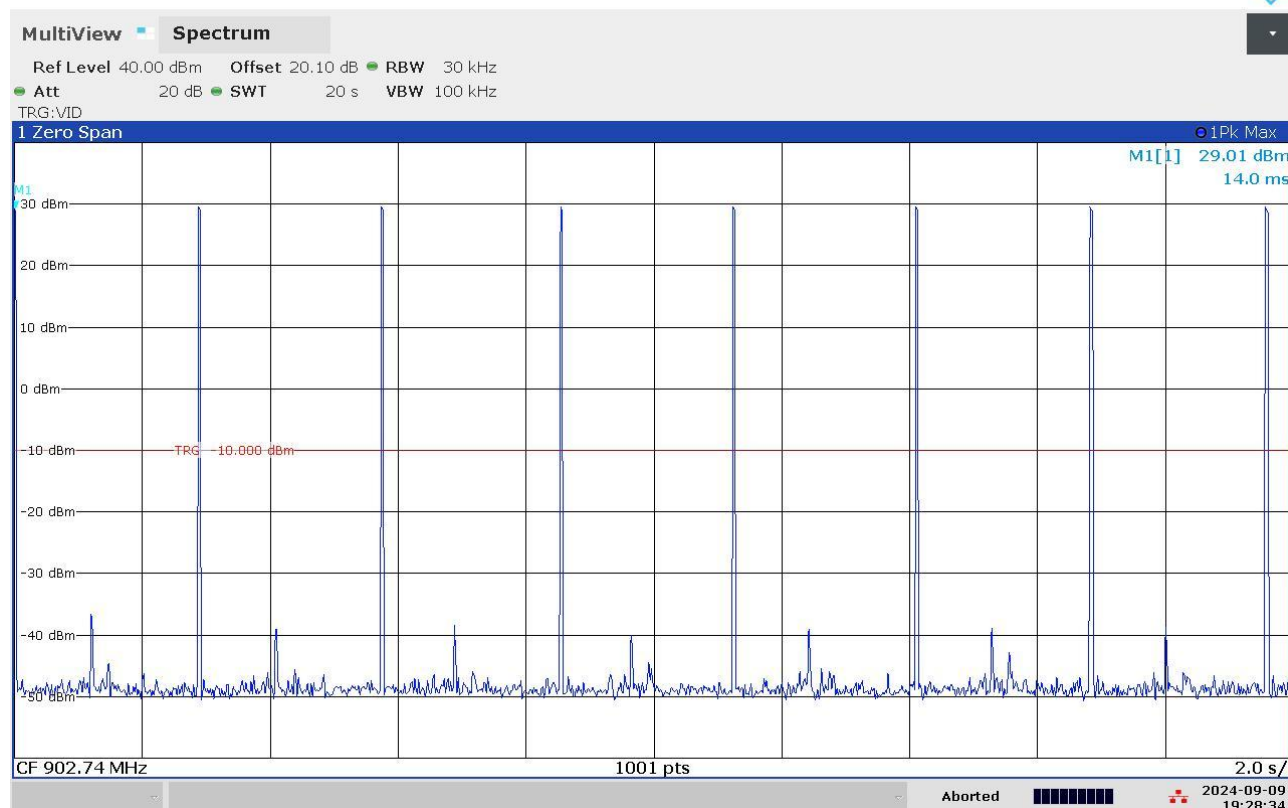
<i>Transmission frequency (MHz)</i>	<i>Graphs</i>	<i>Number of transmissions</i>	<i>Period</i>
902,74	G24127109	7	20 s

Remarks: only the highest peaks have been considered. The lowest peaks are due to the auxiliary receiver unit.

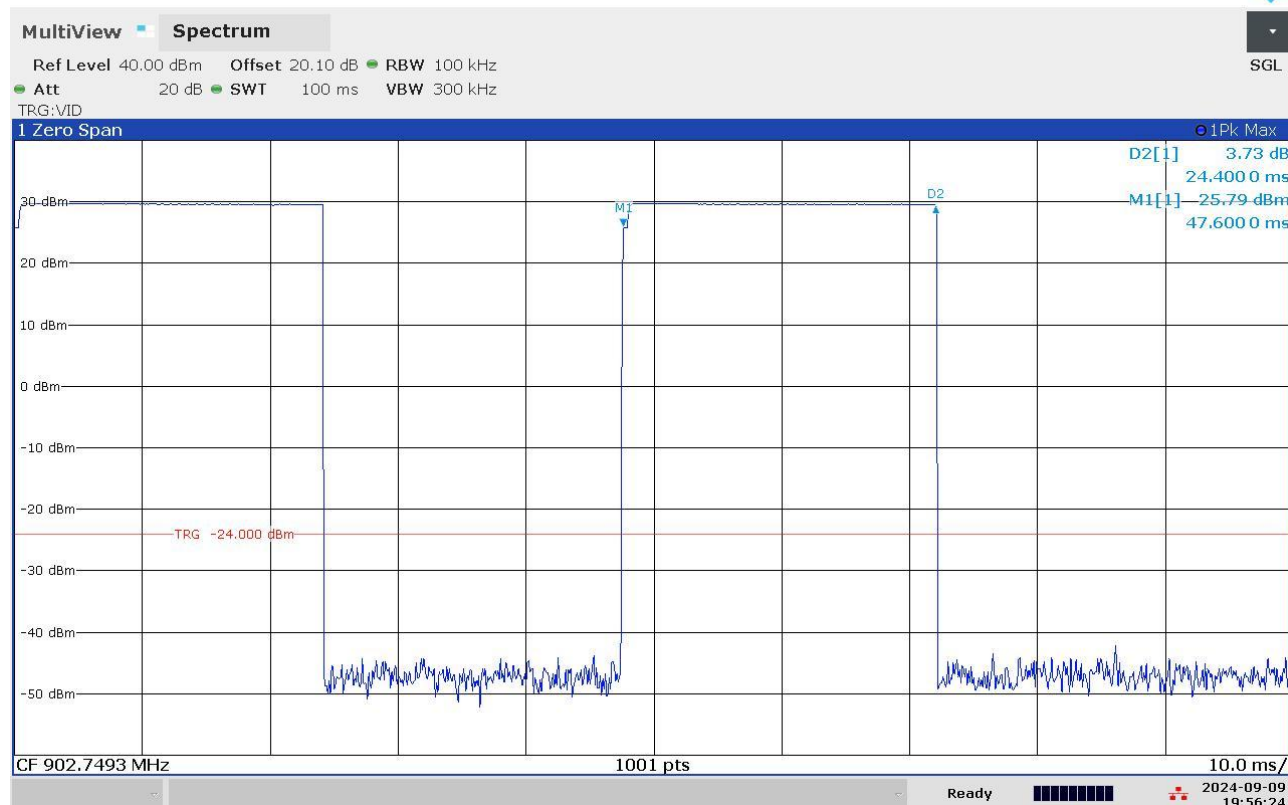
<i>Time of occupancy (Dwell time x Nr. transmissions)</i>	<i>Maximum allowed time of occupancy</i>	<i>Verdict</i>
170,8	400 ms	P

Graphs

De Rosso-24127109



De Rosso-24127113



9.7 Band edge

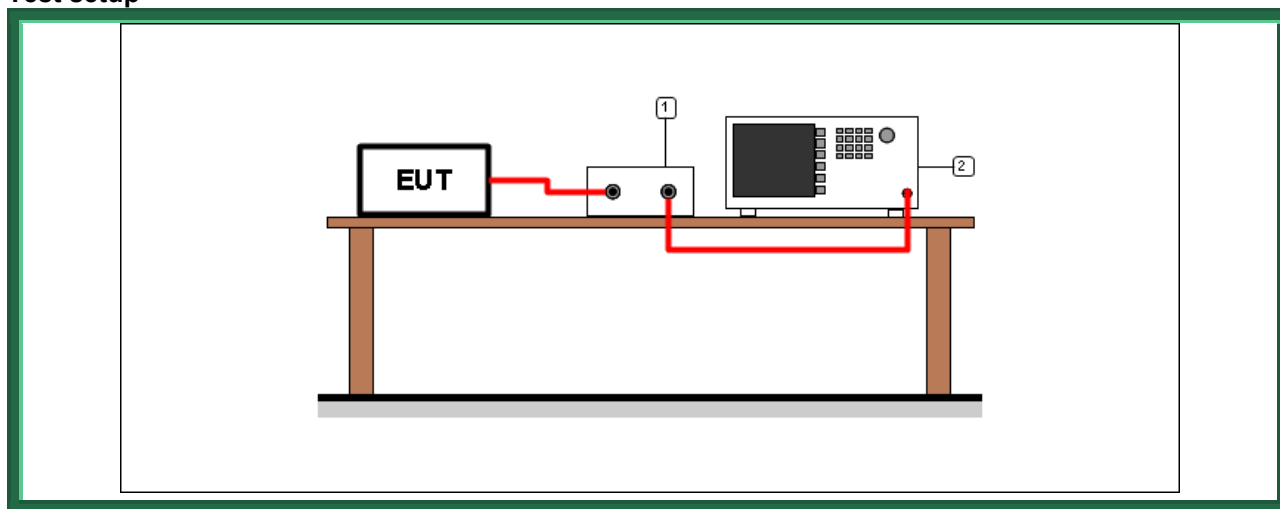
Tested by	F. De Rosso
Test date	06.09.2024
Test location (stand)	Laboratory
Basic standard(s)	ANSI C63.10 cl. 7.8.6
Product standard(s)	FCC Rules and Regulation; Titles 47 Part. 15.247
Supplementary test set-up description	--
Supplementary information	--

Acceptance limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter P with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

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 2023	January 2026
1	--	--	--	--	Cable + attenuator	Calibrated before the test	Calibrated before the test

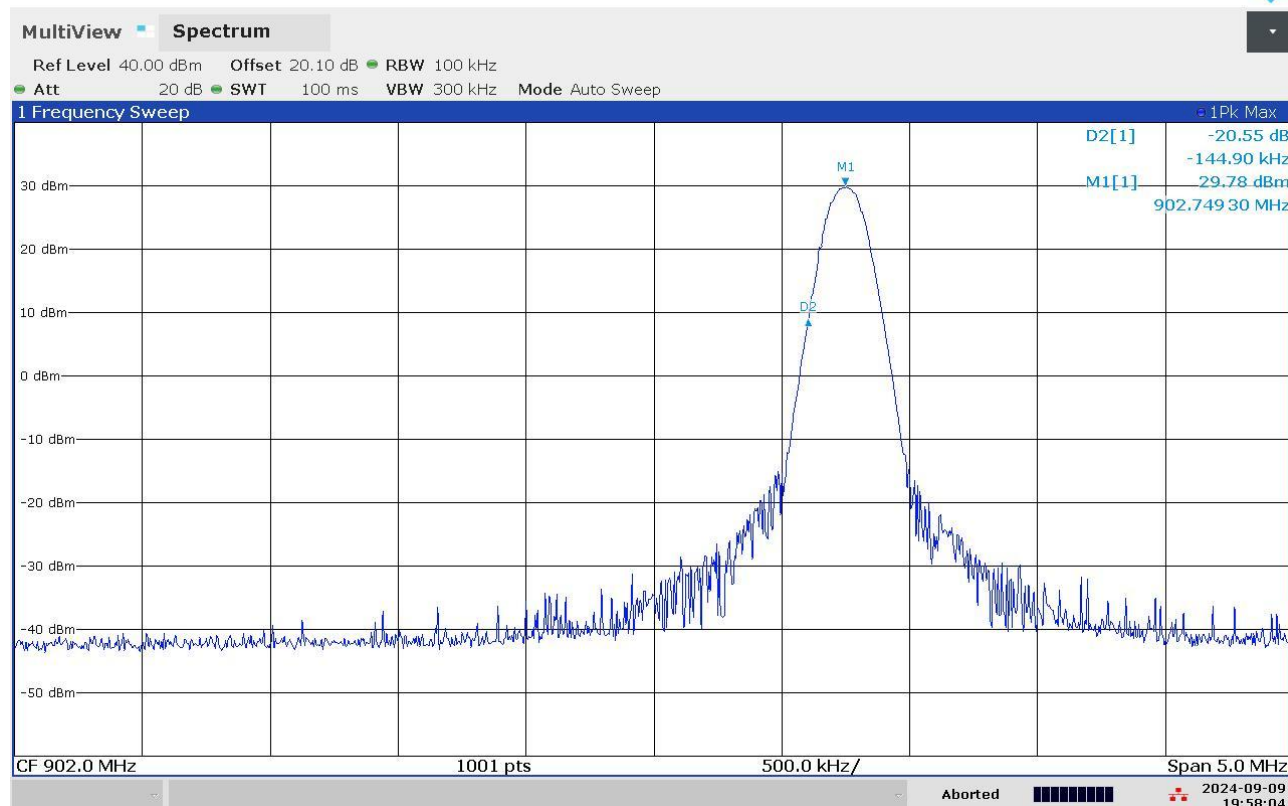
Result

<i>Transmission frequency (MHz)</i>	<i>Bandwidth</i>	<i>Graph(s) – Hopping</i>	<i>Absolute power (dBm)</i>	<i>Power limit (dBm)</i>	<i>Frequency</i>	<i>Verdict</i>
902,750	100 kHz	G24127116	8,74	9,62	F _L : 902,608 MHz	P
927,250	100 kHz	G24127117	9,08	9,47	F _H : 927,393 MHz	P

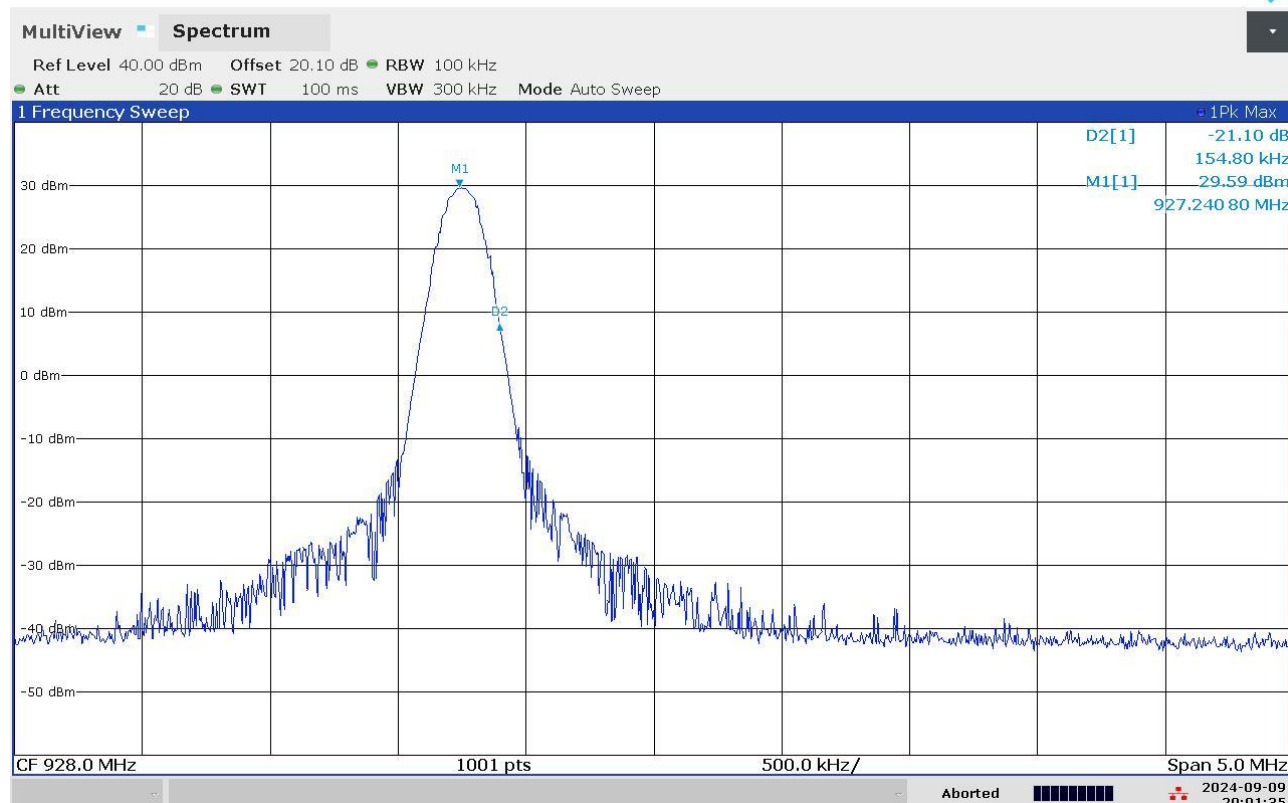
<i>Transmission frequency (MHz)</i>	<i>Bandwidth</i>	<i>Graph(s) – No hopping</i>	<i>Absolute power (dBm)</i>	<i>Power limit (dBm)</i>	<i>Frequency</i>	<i>Verdict</i>
902,750	100 kHz	G24127114	9,23	9,78	F _L : 902,604 MHz	P
927,250	100 kHz	G24127115	8,49	9,59	F _H : 927,085 MHz	P

Graphs

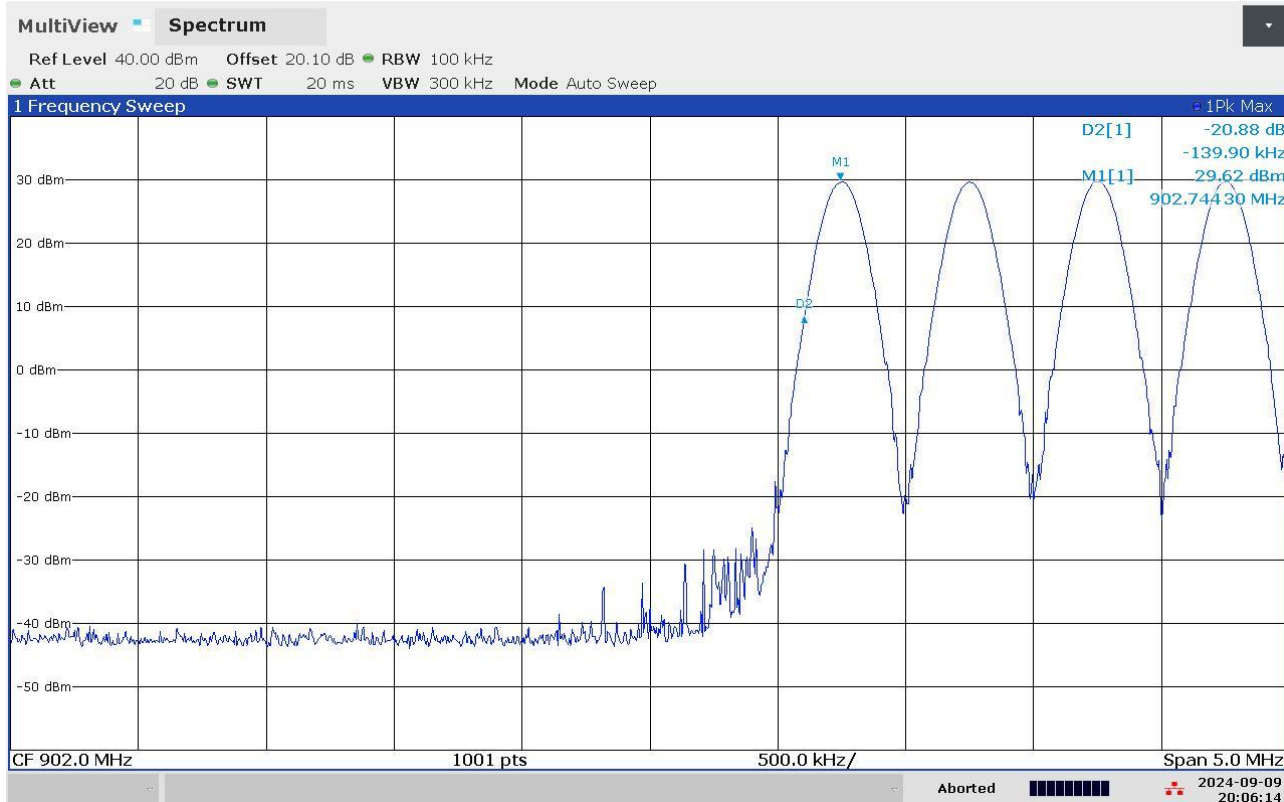
De Rosso-24127114



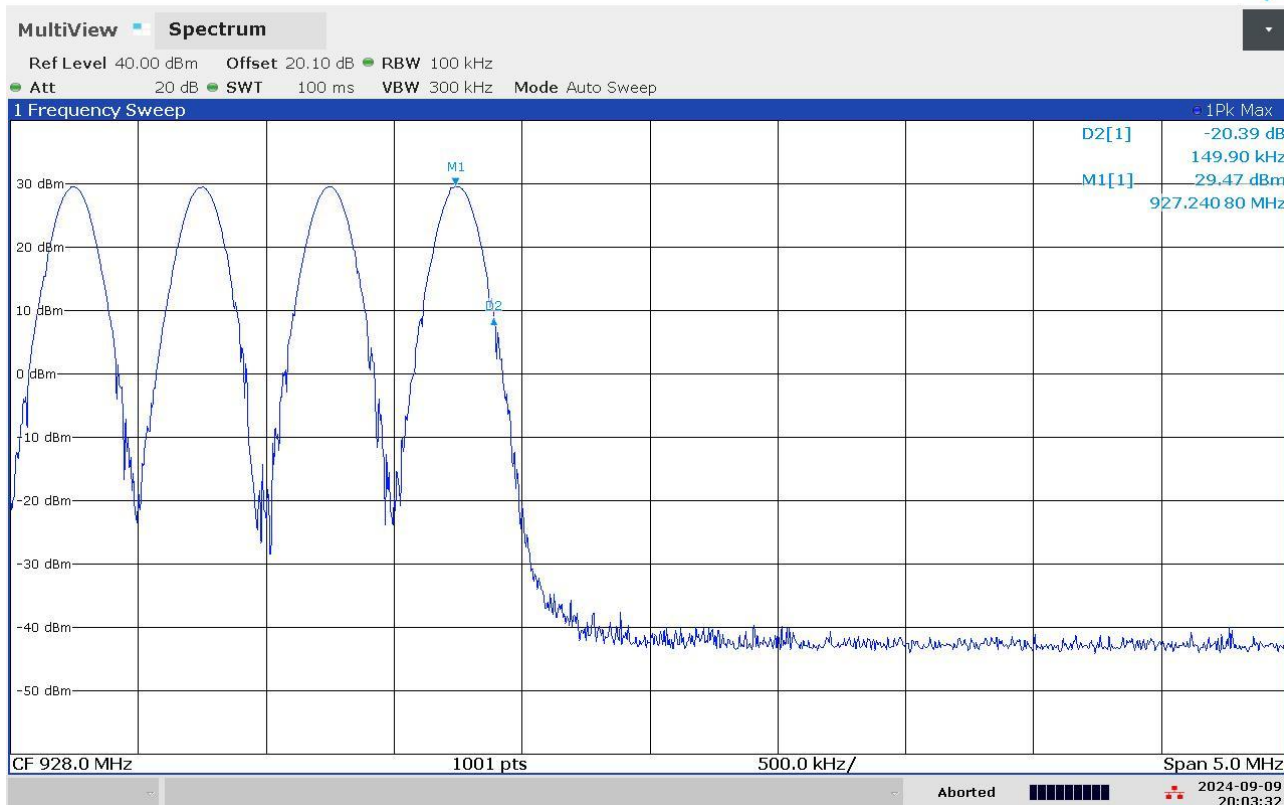
De Rosso-24127115



De Rosso-24127116



De Rosso-24127117



9.8 Peak Output Power

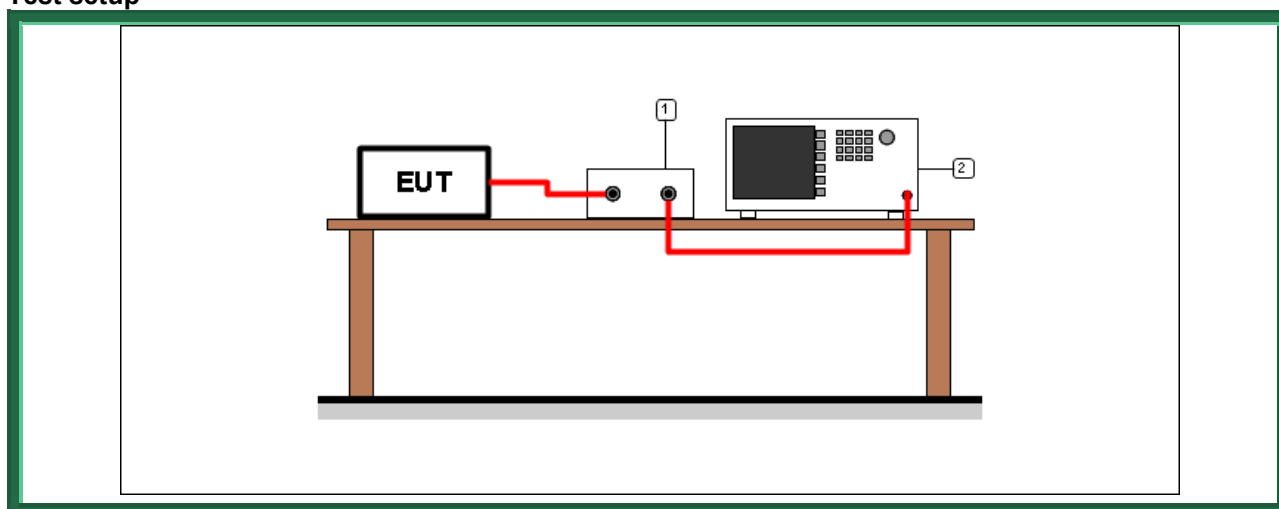
Tested by	F. De Rosso
Test date	06.09.2024
Test location (stand)	Laboratory
Basic standard(s)	KDB 558074 D01 15.247 Meas Guidance v05r02 cl. 2.2 ANSI C63.10 cl. 7.8.5
Product standard(s)	FCC Rules and Regulation; Titles 47 Part. 15.247
Supplementary test set-up description	--
Supplementary information	--

Acceptance limits

For frequency hopping systems operating in the 2400–2483,5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483,5 MHz band: 0,125 watts.

For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and 0,25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels.

Test setup



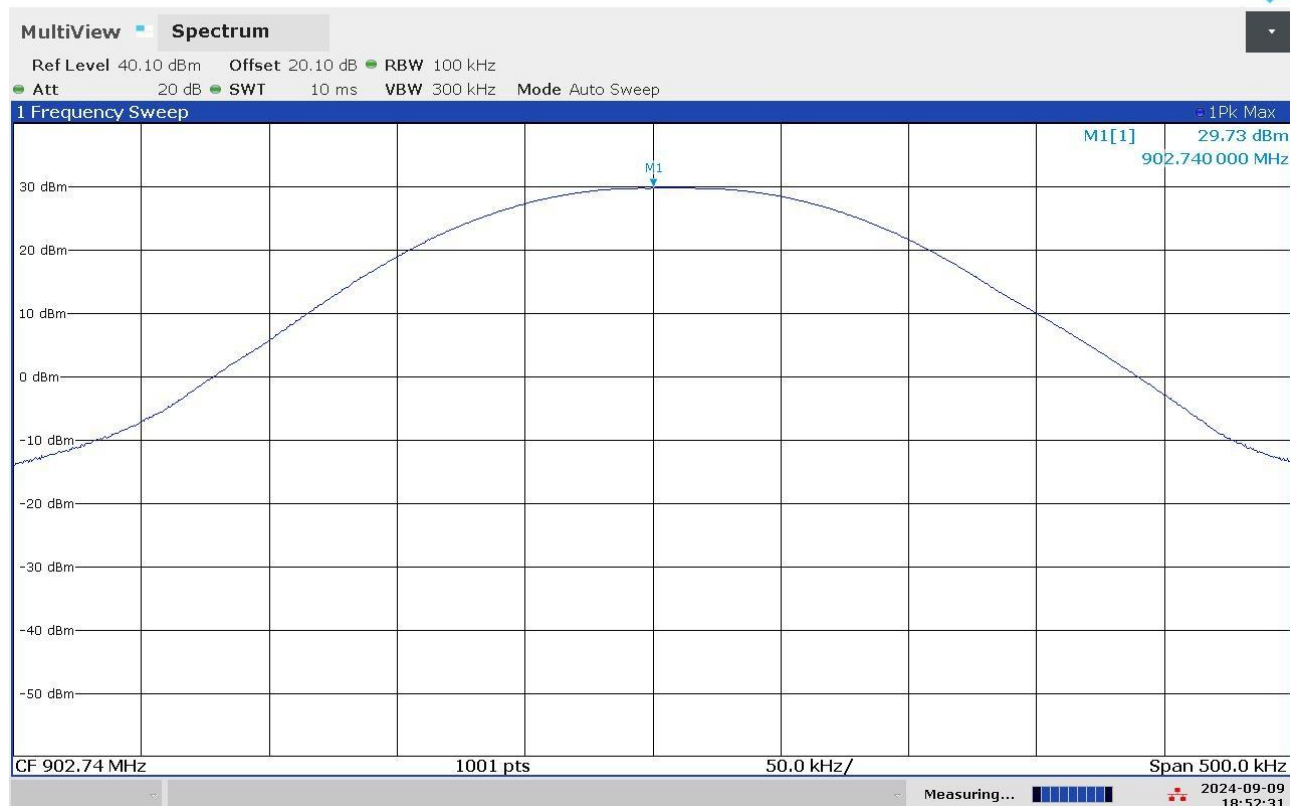
Test setup PR002_01							
Nr.	Id. Number	Manufacturer	Model	Serial number	Description	Last calibration date	Calibration expiration
2	CMC S295	Rohde & Schwarz	FSW43	104059	Spectrum Analyzer 43GHz	January 2023	January 2026
1	--	--	--	--	Cable + attenuator	Calibrated before the test	Calibrated before the test

Result

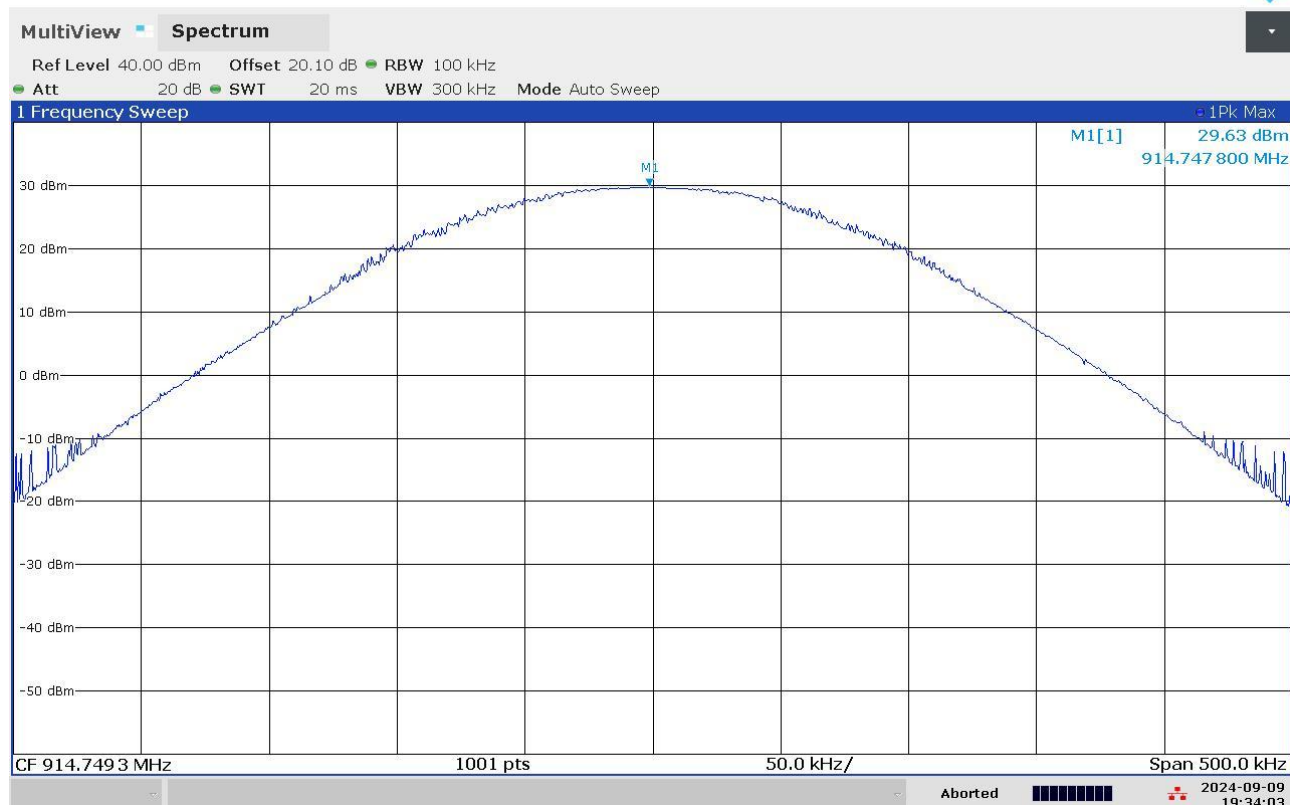
<i>Transmission frequency (MHz)</i>	<i>Graphs</i>	<i>Peak Output Power (dBm)</i>	<i>Peak Output Power (mW)</i>	<i>Limit (mW)</i>	<i>Verdict</i>
902,750	G24127110	29,73	939,72	1000	P
914,750	G24127111	29,63	918,33	1000	P
927,250	G24127112	29,58	907,82	1000	P

Graphs

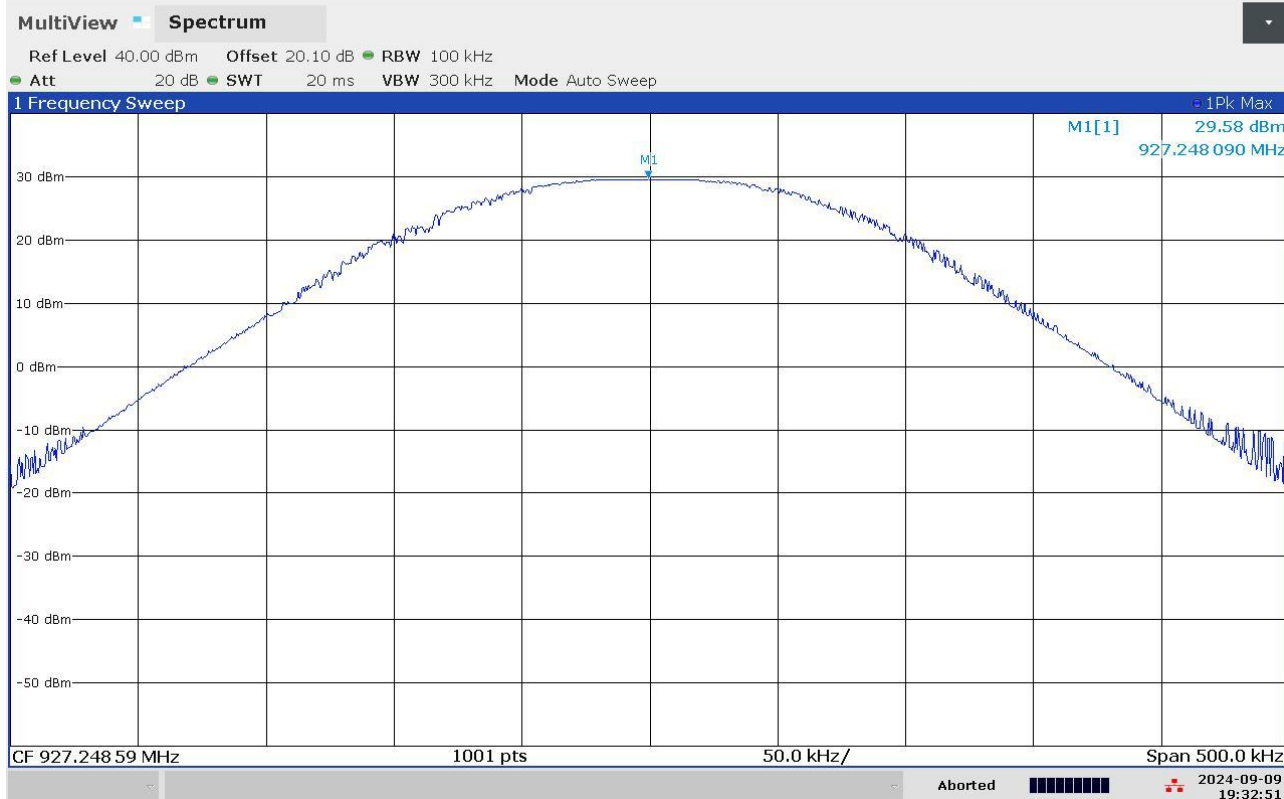
De Rosso-24127110



De Rosso-24127111



De Rosso-24127112



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	$< 1 \times 10^{-7}$	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_24_01 date 03/02/2024			

Note 1:

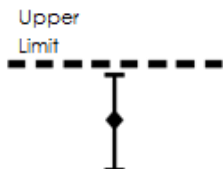
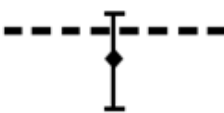
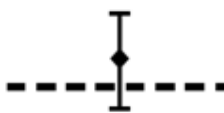
The expanded uncertainty reported according to the document EA-4-02 is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of $p = 95\%$

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. 4.0 (Quality Manual)	Measure procedure
Internal Procedure INC_M rev. 10.0 (Quality Manual)	Measurement uncertainty calculation