

## TEST REPORT

### Nr. R21164101

### Federal Communication Commission (FCC)

<b>Report Reference No.</b> .....	R21164101
Date of issue: .....	10.09.2021
Total number pages: .....	42
<b>Applicant's name</b> .....	Teleco Automation S.r.l.
Address .....	Via Calmaggione, 10/4 – 31100 Treviso (TV) – Italy
<b>Test specification:</b>	
Standards .....	FCC Rules & Regulations, Title 47:2020 Part 15 paragraph(s): 203, 204, 205, 207, 209, 215 and 249
Non-standard test method .....	N/A
<b>Test Report Form No.</b> .....	15-249CMC
Test Report Form(s) Originator ..	CMC Centro Misure Compatibilità S.r.l.
Master TRF .....	2021-07
<b>General disclaimer:</b>	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of CMC Centro Misure Compatibilità S.r.l.	
<b>Test item description</b> .....	DAISY WI-FI
Trademark .....	Teleco Automation
Manufacturer .....	Teleco Automation S.r.l.
Model / Type reference .....	TVDAY916A01
FCC ID .....	P59TVDAY916
Rating(s) .....	5 Vdc from USB
<b>Report</b>	
Tested by (name + signature) .....	M. Segalla
Approved by (name + signature) .....	R. Beghetto

## 1 Summary

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<b>2 Reference standard</b>	
FCC Rules and Regulation Title 47 part 15:2020	--
<b>3 List of attachments</b>	
Attachment 1: Instruments list, measurement uncertainty, judgement of compliance and quality manual references	
<b>4 Deviation(s) from test specification</b>	
None	
<b>5 Testing location</b>	
CMC Centro Misure Compatibilità S.r.l. Via della Fisica, 20 – 36016 Thiene (VI) – Italy Test site facility's FCC registration number: 182474	

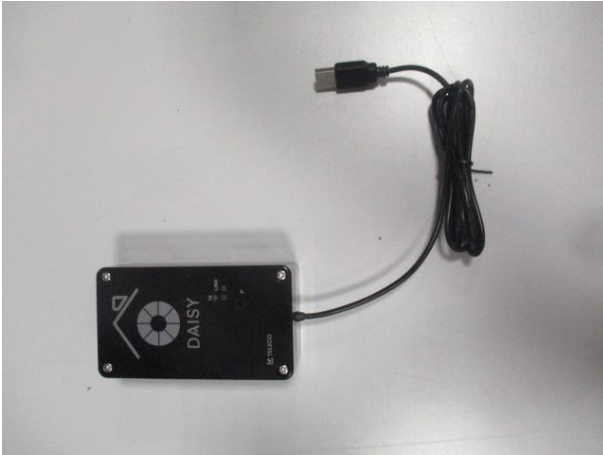
<i>Revision index</i>	<i>Date</i>	<i>Change history</i>
1.0	10.09.2021	--

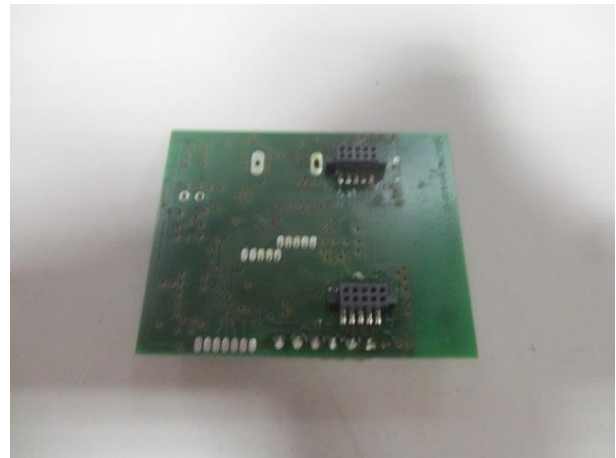
<b>Testing and sampling:</b>	
Date of receipt of test item.....	06.07.2021
Testing start date.....	06.09.2021
Testing end date.....	06.09.2021
Sampling procedure.....	Equipment used for testing was picked up by the manufacturer, at the end of the production process with random criterion.  The results relate to the sample as it has been received.
Internal identification.....	Adhesive label with the product number P210803
<b>General remarks:</b>	
<p>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.</p>	
<b>Possible test case verdicts:</b>	
Test case does not apply to the test object:	N/A (Not Applicable)
Test object does meet the requirement:	P (Pass)
Test object does not meet the requirement:	F (Fail)
Test object does not performed:	N/E (Not Executed)
<b>Definition of symbols used in this test report:</b>	
<input checked="" type="checkbox"/> Indicates that the listed condition, standard or equipment is applicable for this report. <input type="checkbox"/> Indicates that the listed condition, standard or equipment is not applicable for this report.	

**6 General description of tested item and testing condition(s)**

Description .....	DAISY WI-FI						
Model Number .....	TVDAY916						
FCC ID .....	P59TVDAY916						
Serial Number .....	--						
Brand name .....	Teleco Automation						
Frequency band .....	902 – 928 MHz						
Nominal frequency .....	Fc: 916 MHz						
Test power supply .....		Voltage and Frequency	Reference poles				
			N	L1	L2	L3	PE
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	DC: 5 V from USB					<input type="checkbox"/>
Test configuration .....	<input checked="" type="checkbox"/>	Table top equipment					
	<input type="checkbox"/>	Floor standing equipment					
	<input type="checkbox"/>	Hand-held equipment					
Type of equipment .....	<input checked="" type="checkbox"/>	Transmitter unit					
	<input type="checkbox"/>	Receiver unit					
Type of station .....	<input type="checkbox"/>	Portable station					
	<input checked="" type="checkbox"/>	Mobile station					
Operating modes .....	No.	Operating mode of test item					
	1	EUT in continuous transmission at maximum power, WiFi in normal operation (search for associated WiFi network)					

6.1 Photos of the test item







**7 Verdict summary section**

<b>FCC Rules &amp; Regulations, Title 47:2020</b>			
<b>Part 15 paragraph(s): 203, 204, 205, 207, 209, 215 and 249</b>			
<b>Clause</b>	<b>Requirement – Test case</b>	<b>Basic standard</b>	<b>Verdict</b>
Part 15.203	Antenna requirements	ANSI C63.10	<b>P</b>
Part 15.207	Conducted emissions	ANSI C63.10	<b>P</b>
Part 15.209	Radiated emissions and spurious emission	ANSI C63.10	<b>P</b>
Part 15.209 and 15.249	Peak Output Power	ANSI C63.10	<b>P</b>
Part 15.215	20 dB Bandwidth	ANSI C63.10	<b>P</b>
Part 15.249	Band edge	ANSI C63.10	<b>P</b>



<b>Normative references</b>	
<b>Reference no.</b>	<b>Description</b>
FCC Rules and Regulation Title 47 part 15:2020	--
ANSI C63.4:2014	American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz
ANSI C63.10:2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

## 8 Test conditions

### 8.1 General

Environmental reference conditions.....:	The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment.		
	The climatic conditions during the tests were within the following limits:		
	<b>Temperature</b>	<b>Humidity</b>	<b>Atmospheric pressure</b>
	15 °C – 35 °C	30 % - 60 %	800 hPa – 1060 hPa
	If explicitly required in the basic standard or applied product standard the climatic values are recorded and documented separately in this test report.		
Measurement uncertainties .....	Attachment 1		

## 9 Test results

### 9.1 Antenna requirements

Tested by .....	M. Segalla	
Test date .....	06.09.2021	
Reference standards .....	FCC Rules and Regulation; Titles 47 Part. 15.203 and 15.204	
Test specification .....	<p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded</p>	
Antenna type.....	<input type="checkbox"/>	Integral antenna
	<input checked="" type="checkbox"/>	External antenna
Antenna gain.....	2,14 dBi	
External R.F. power amplifier .....	Not Present	

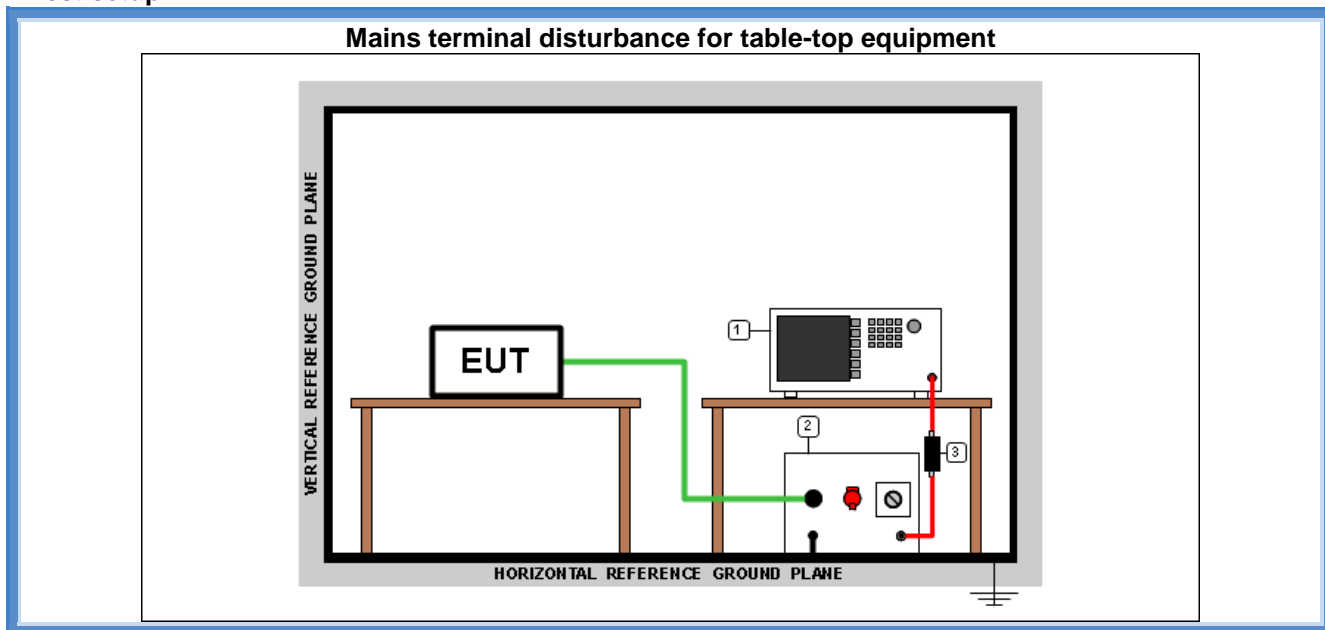
## 9.2 Conducted emission

Tested by .....	M. Segalla	
Test date .....	06.09.2021	
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 .....	<input checked="" type="checkbox"/>	Table top equipment set-up (80 cm above the reference ground plane)
	<input type="checkbox"/>	Floor standing equipment set-up (insulating material up to 12 mm thick)
	<input type="checkbox"/>	False floor installation equipment set-up (insulating material up to 34 cm above the reference ground plane)
Supplementary Test set-up description .....	--	
Test method applied .....	<input checked="" type="checkbox"/>	Artificial mains network, 50 $\mu$ H/50 $\Omega$ LISN
	<input type="checkbox"/>	Other:

### Acceptance limits

Frequency range (MHz)	$dB(\mu V)$ Quasi-peak	$dB(\mu V)$ Average
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*

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	G21164115	--	P
L1	0,15 – 30	G21164116	--	P

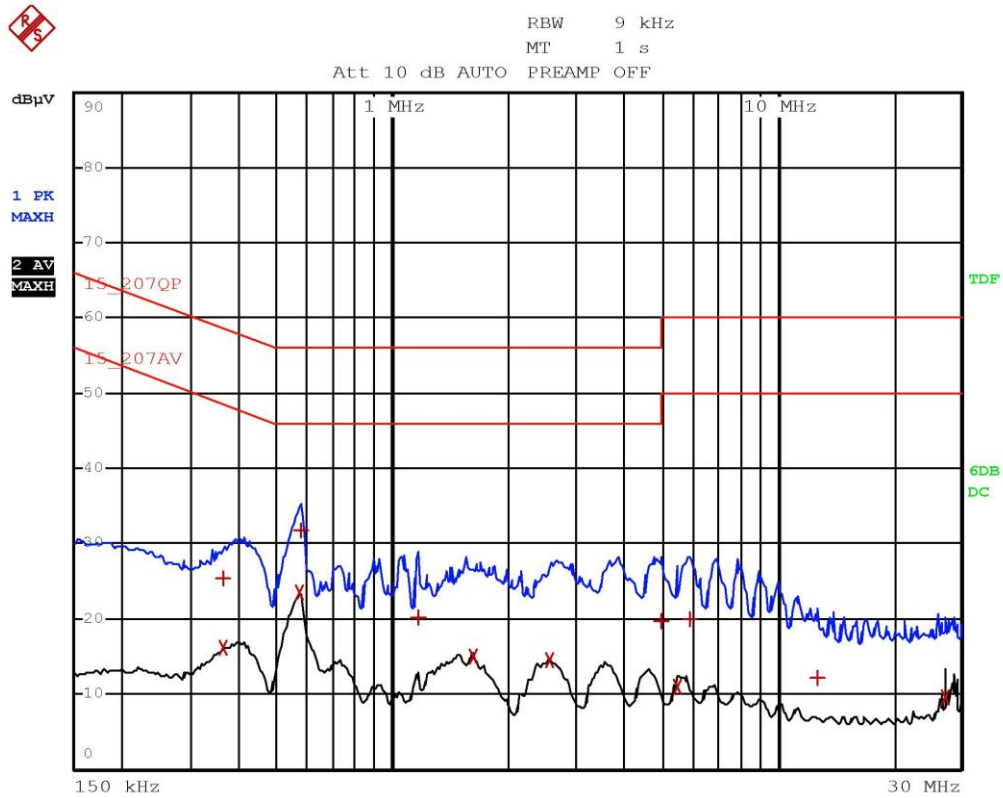
**Remarks:** tests performed on 120 V ~ 60 Hz side of USB power unit Lenovo SC-42

### 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

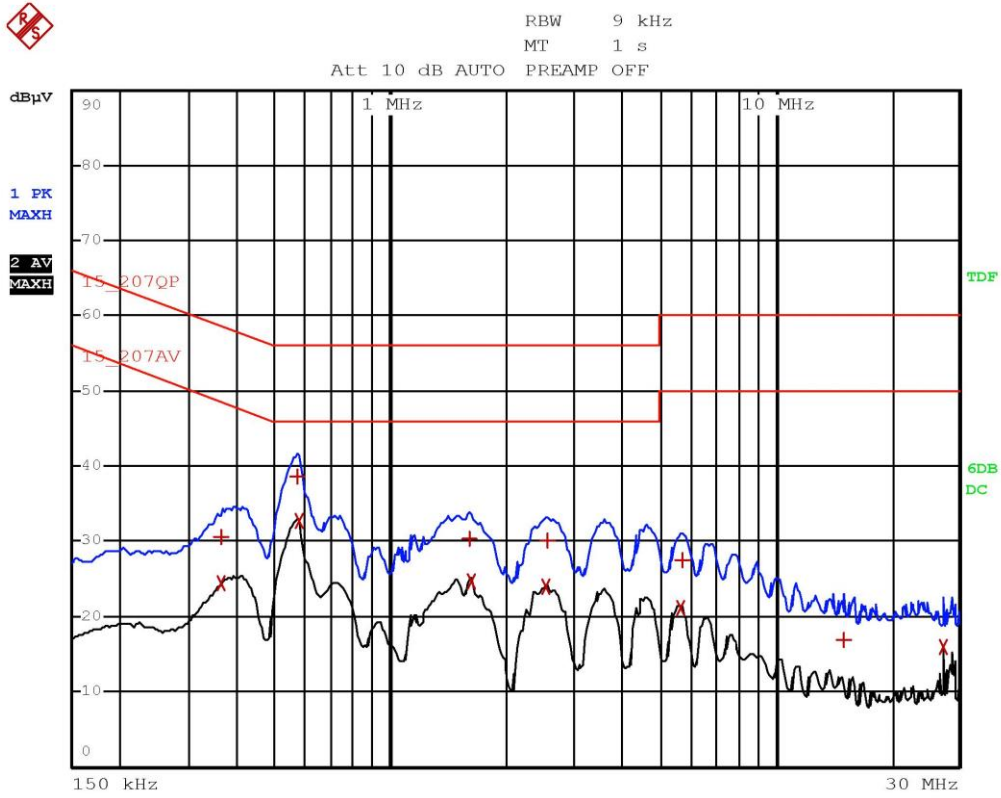


Segalla 21164115

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	15_207QP		
Trace2:	15_207AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dB $\mu$ V	DELTA LIMIT dB
1 Quasi Peak	362 kHz	25.32	-33.35
2 Average	362 kHz	16.14	-32.53
2 Average	574 kHz	23.39	-22.60
1 Quasi Peak	578 kHz	31.83	-24.16
1 Quasi Peak	1.17 MHz	20.13	-35.86
2 Average	1.618 MHz	15.02	-30.98
2 Average	2.55 MHz	14.47	-31.52
1 Quasi Peak	4.99 MHz	19.71	-36.28
2 Average	5.494 MHz	11.10	-38.89
1 Quasi Peak	5.918 MHz	20.07	-39.92
1 Quasi Peak	12.674 MHz	12.09	-47.90
2 Average	27.158 MHz	9.48	-40.51

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Segalla 21164116

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	15_207QP			
Trace2:	15_207AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dB $\mu$ V	DELTA LIMIT dB	
1 Quasi Peak	362 kHz	30.51	-28.16	
2 Average	362 kHz	24.40	-24.27	
1 Quasi Peak	570 kHz	38.69	-17.30	
2 Average	578 kHz	32.80	-13.19	
1 Quasi Peak	1.614 MHz	30.36	-25.63	
2 Average	1.618 MHz	24.77	-21.22	
2 Average	2.542 MHz	24.04	-21.95	
1 Quasi Peak	2.558 MHz	30.13	-25.86	
2 Average	5.674 MHz	21.05	-28.94	
1 Quasi Peak	5.746 MHz	27.59	-32.40	
1 Quasi Peak	14.986 MHz	16.95	-43.04	
2 Average	27.158 MHz	15.84	-34.15	

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### 9.3 Radiated emissions and spurious emission

Tested by .....	M. Segalla	
Test date .....	06.09.2021	
Test location (stand) .....	Semi-anechoic chamber (CMC A070)	
Reference standards .....	FCC Rules and Regulation; Titles 47 Part. 15.209 and 15.249 (a) and (d) ANSI C63.10 cl. 6.3, 6.4, 6.5 and 6.6	
Test set-up description .....	<input checked="" type="checkbox"/>	Table top equipment set-up (80 cm above the reference ground plane)
	<input type="checkbox"/>	Floor standing equipment set-up (insulating material up to 12 mm thick)
	<input type="checkbox"/>	False floor installation equipment set-up (insulating material up to 34 cm above the reference ground plane)
Supplementary test set-up description .....	--	
Test method applied .....	SAC with measurement distance [m]: 10	
Supplementary information.....	--	

#### Acceptance limits

<b>Acceptance limits for emissions in restricted frequency bands (<math>f &lt; 1000</math> MHz)</b>		
Frequency range (MHz)	Test distance (m)	Limits [dB( $\mu$ V/m)]
0,009 to 0,490	300	48,5 to 13,8
0,490 to 1,705	30	33,8 to 22,9
1,705 to 30	30	29,5
30 to 88	3	40
88 to 216	3	43,5
216 to 960	3	46,0
960 to 1000	3	54

**Remarks:** The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz and 110–490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector. The results have been extrapolated to the specified distance using an extrapolation factor

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

The restricted frequency bands are listed in the following table

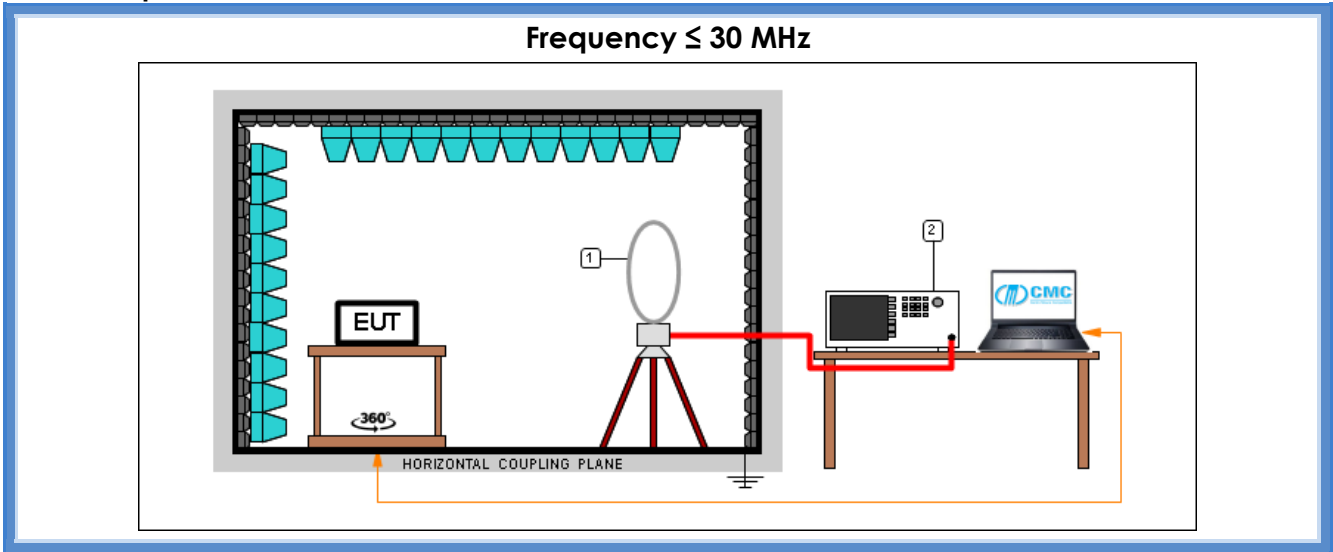
<i>MHz</i>	<i>MHz</i>	<i>MHz</i>	<i>GHz</i>
0,090 – 0,110	16,42 – 16,423	399,9 – 410	4,5 – 5,15
0,495 – 0,505	16,69475 – 16,69525	608 – 614	5,35 – 5,46
2,1735 – 2,1905	16,80425 – 16,80475	960 – 1240	7,25 – 7,75
4,125 – 4,128	25,5 – 25,67	1300 – 1427	8,025 – 8,5
4,17725 – 4,17775	37,5 – 38,25	1435 – 1626,5	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( $\mu\text{V/m}$ )).

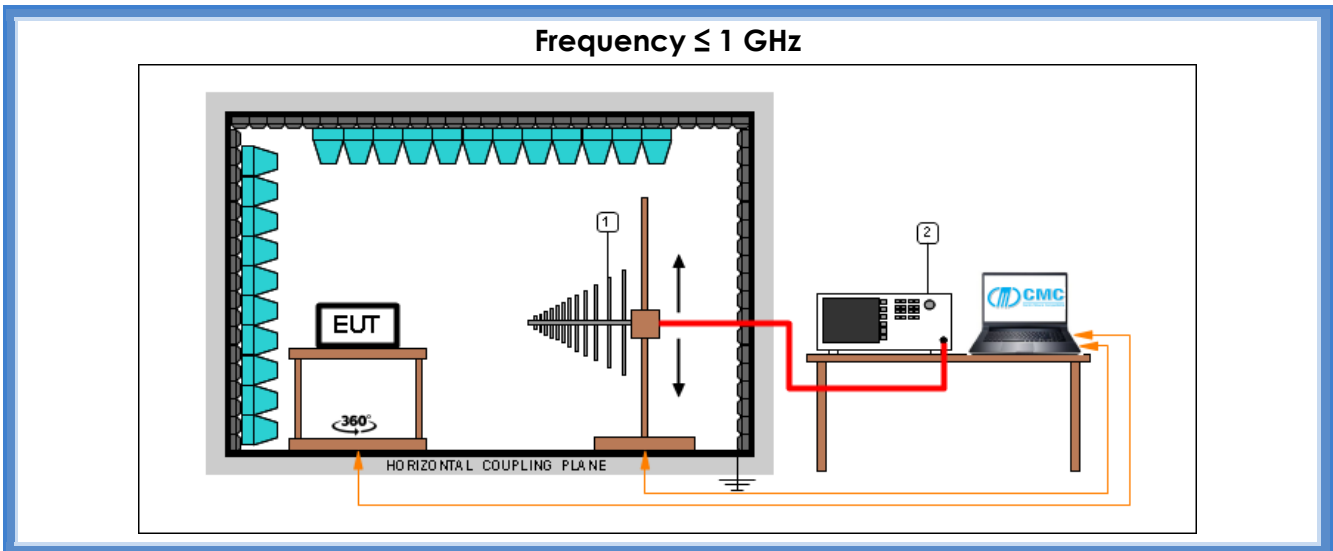
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

**Test setup**



*Test setup PE004\_01*

Nr.	Id. Number	Manufacturer	Model	Description
2	CMC S353	Rohde & Schwarz	ESW26	EMI Test Receiver 1 Hz - 26.5 GHz
1	CMC S127	Schaffner	HLA6120	Loop Antenna 9kHz - 30MHz



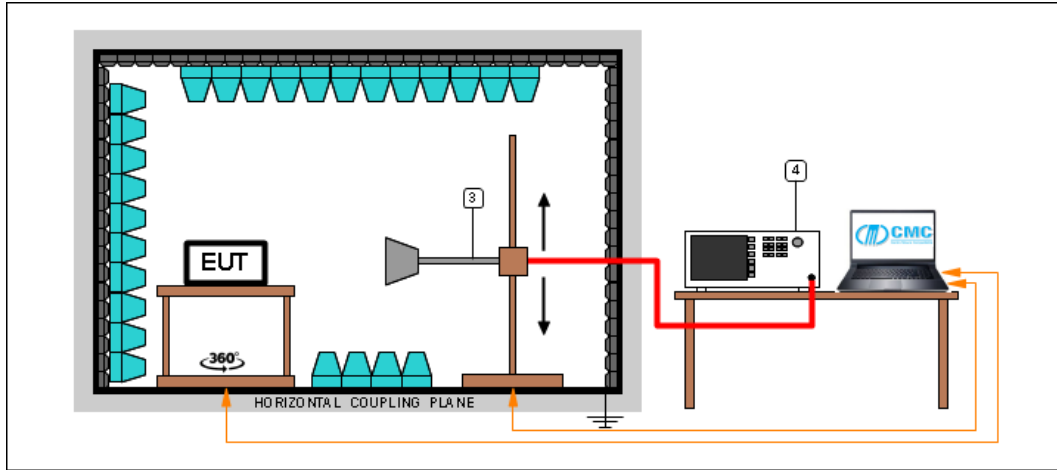
*Test setup PE004\_02*

Nr.	Id. Number	Manufacturer	Model	Description
2	CMC S353	Rohde & Schwarz	ESW26	EMI Test Receiver 1 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 S353	Rohde & Schwarz	ESW26	EMI Test Receiver 1 Hz - 26.5 GHz
1	CMC S287	Schwarzbeck	VUSLP 9111B	Broadband Antenna

Frequency > 1 GHz



Test setup PE004\_04

Nr.	Id. Number	Manufacturer	Model	Description
4	CMC S353	Rohde & Schwarz	ESW26	EMI Test Receiver 1 Hz - 26.5 GHz
3	CMC S108	Emco	3115	Waveguide antenna

Test setup PE004\_05

Nr.	Id. Number	Manufacturer	Model	Description
4	CMC S353	Rohde & Schwarz	ESW26	EMI Test Receiver 1 Hz - 26.5 GHz
3	CMC S290	Schwarzbeck	BBHA 9170	Horn Antenna (15-40 GHz)

**Result**

<i>Polarization</i>	<i>Frequency Range (MHz)</i>	<i>Graphs</i>	<i>Remarks</i>	<i>Result</i>
V	300 – 1000	G21164106	--	P
H	300 – 1000	G21164107	--	P
H	30 – 300	G21164108	--	P
V	30 – 300	G21164109	--	P
Loop	0,009 – 30	G21164110	--	P
V	3000 – 10000	G21164111	--	P
H	3000 – 10000	G21164112	--	P
H	1000 – 3000	G21164113	--	P
V	1000 – 3000	G21164114	--	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

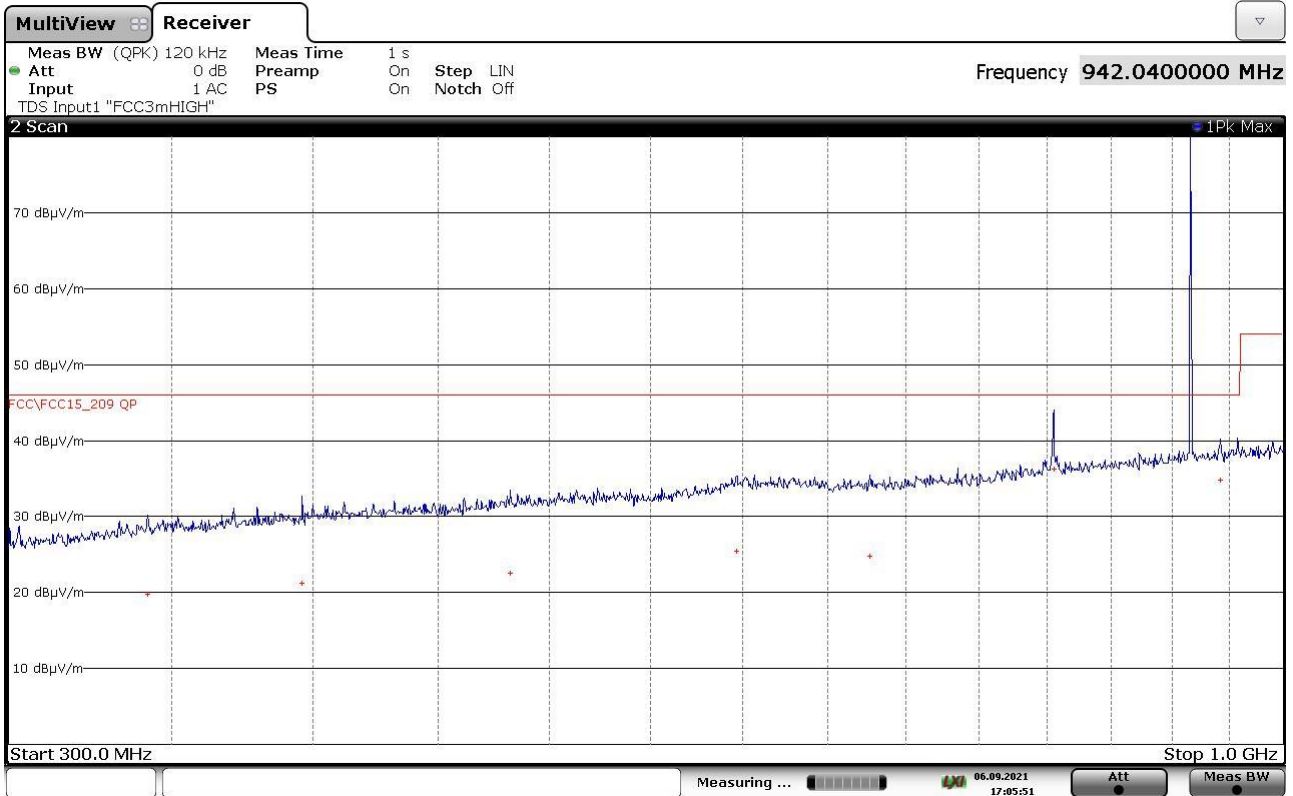
*Graphs Legend*

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

Sega11a 21164106



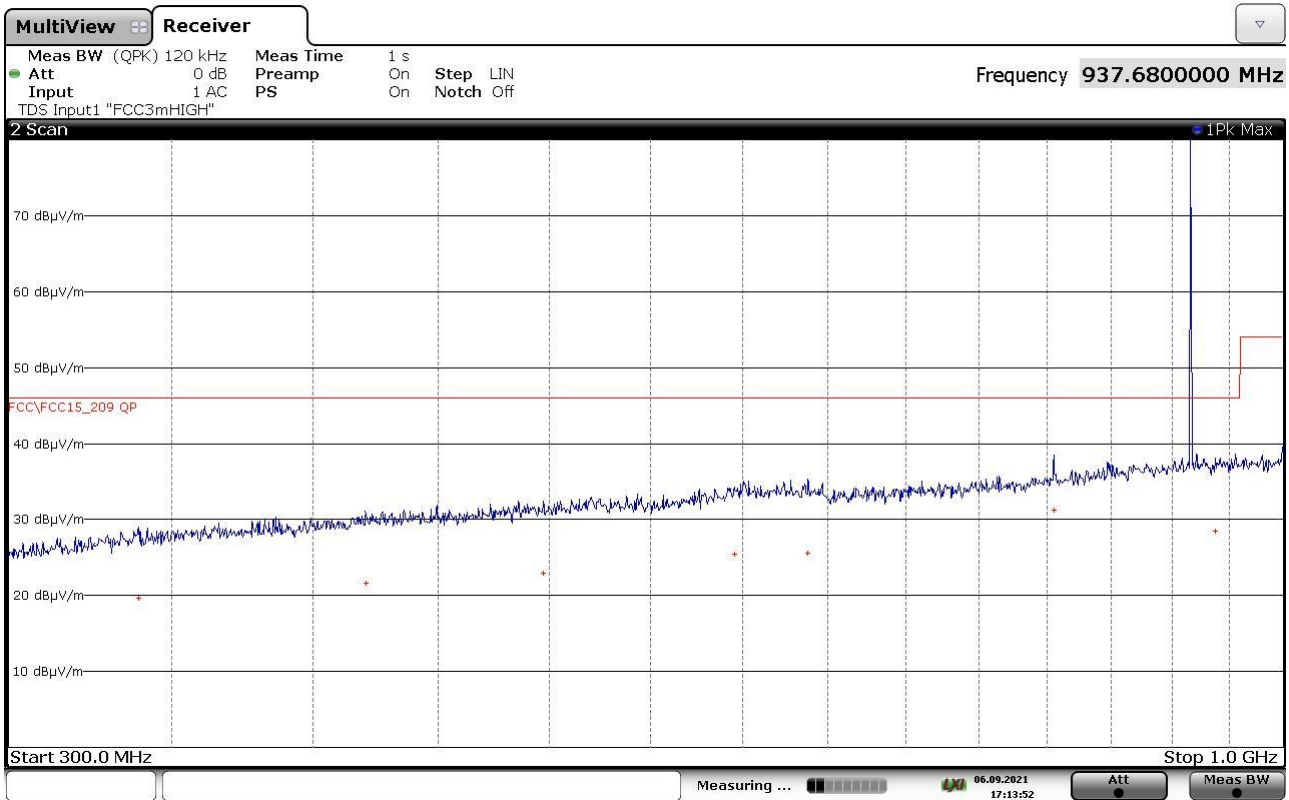
### FINAL RESULT TABLE

#### QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
342080000	+19,83	-26,19
395800000	+21,17	-24,85
481960000	+22,50	-23,52
596400000	+25,42	-20,60
676640000	+24,78	-21,24
804960000	+36,18	-9,84
942040000	+34,79	-11,23

21164106\_2

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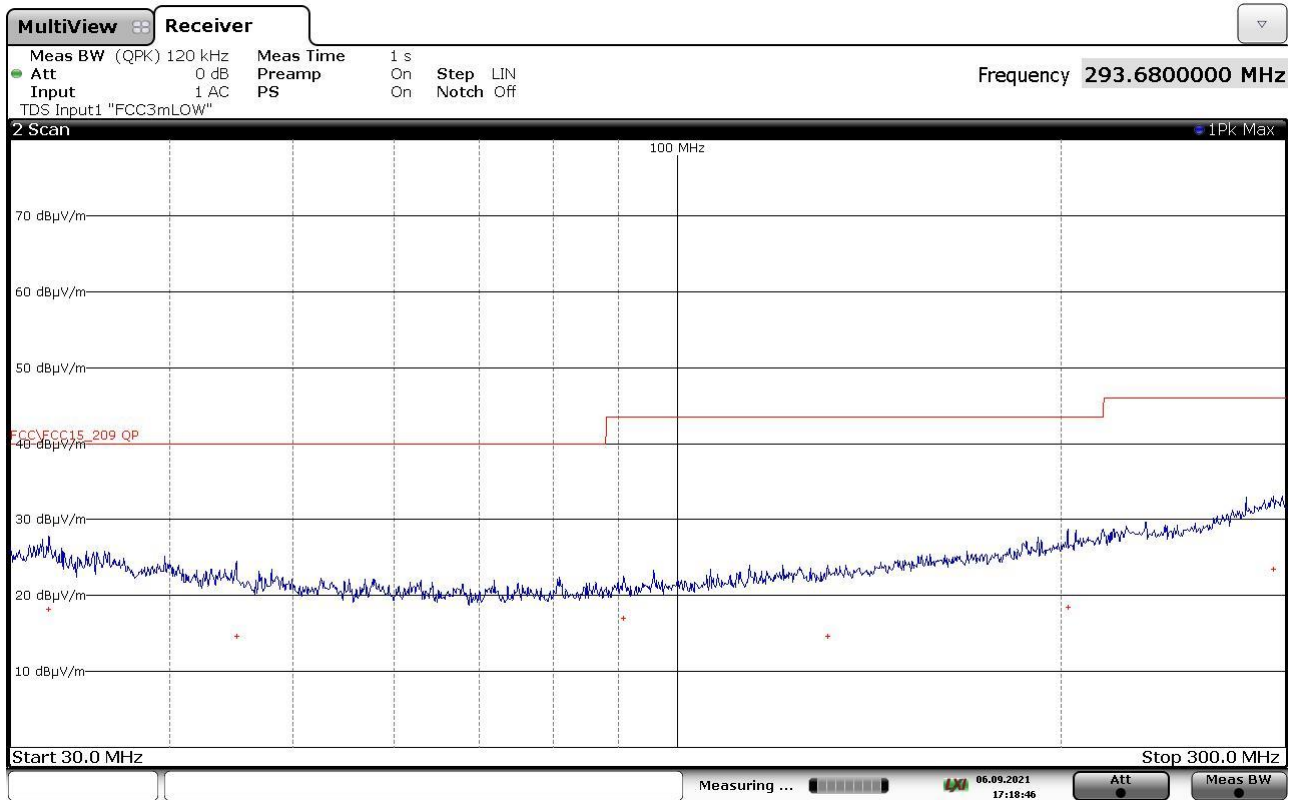


**FINAL RESULT TABLE**

QUASI PEAK		
Freq Hz	Lev dBuV/m	Margin dB
339160000	+19,62	-26,40
420320000	+21,58	-24,44
497280000	+22,92	-23,10
595320000	+25,46	-20,56
638320000	+25,63	-20,39
805000000	+31,17	-14,85
937680000	+28,50	-17,52

21164107\_2

Segalla 21164108

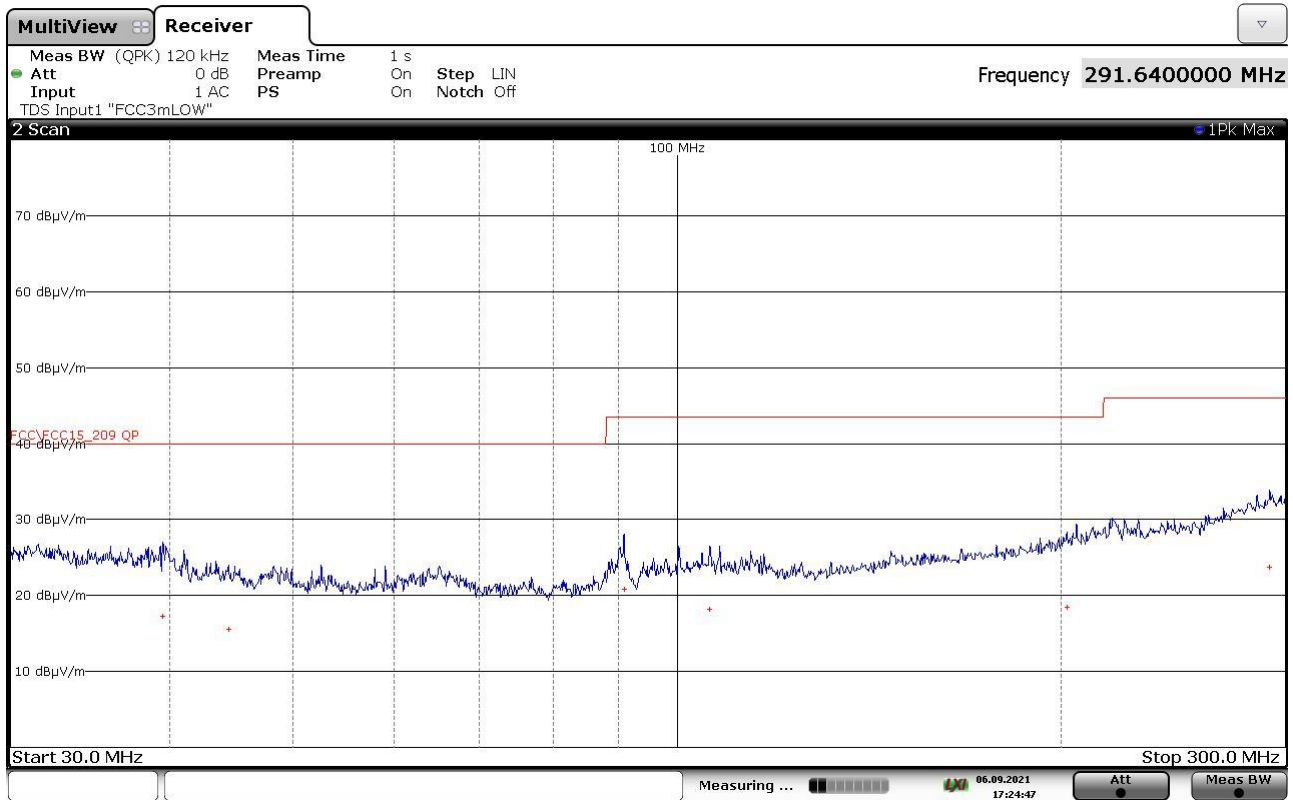


FINAL RESULT TABLE

QUASI PEAK		
Freq Hz	Lev dBuV/m	Margin dB
32160000	+18,25	-21,75
45120000	+14,58	-25,42
90800000	+16,96	-26,56
131200000	+14,61	-28,91
202480000	+18,39	-25,13
293680000	+23,51	-22,51

21164108\_2

Segalla 21164109

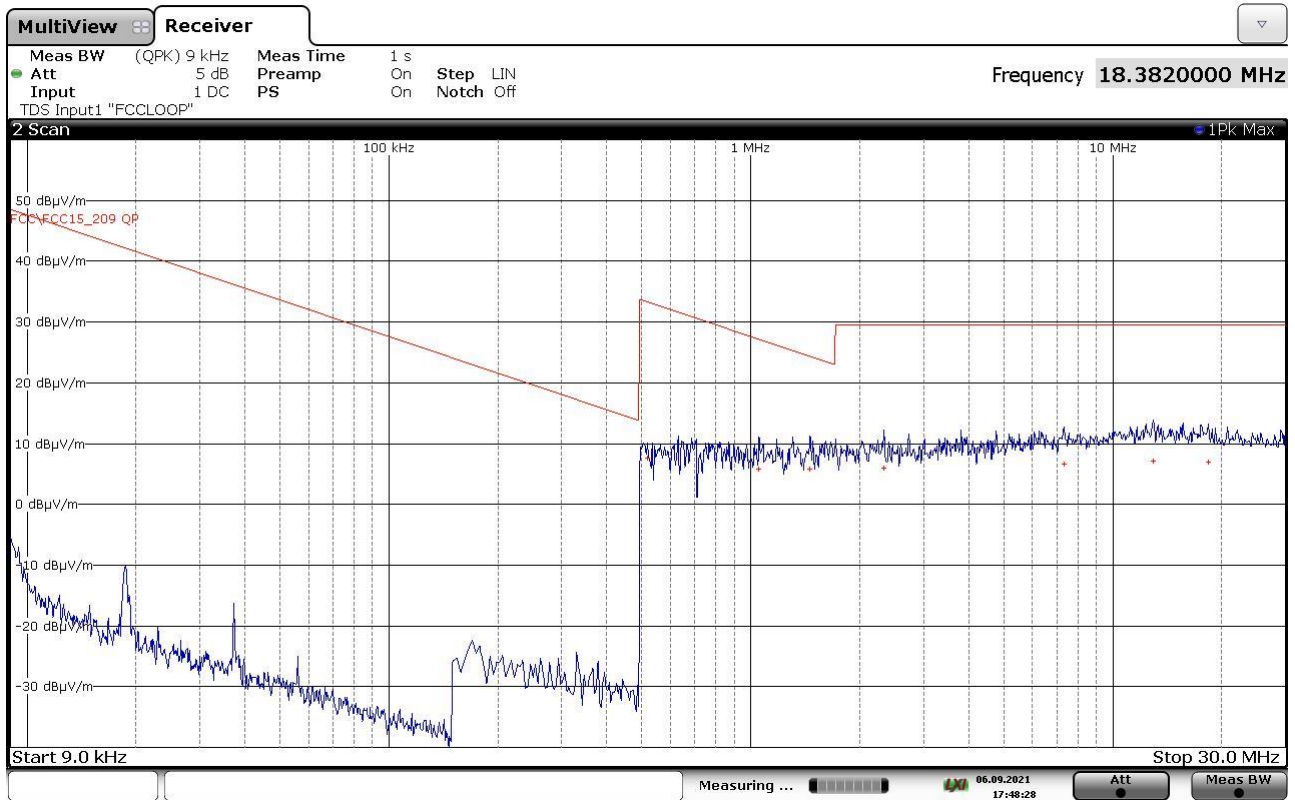


FINAL RESULT TABLE

QUASI PEAK		
Freq Hz	Lev dBuV/m	Margin dB
39520000	+17,26	-22,74
44480000	+15,56	-24,44
90840000	+20,79	-22,73
106120000	+18,21	-25,31
202120000	+18,49	-25,03
291640000	+23,66	-22,36

21164109\_2

Segalla 21164110

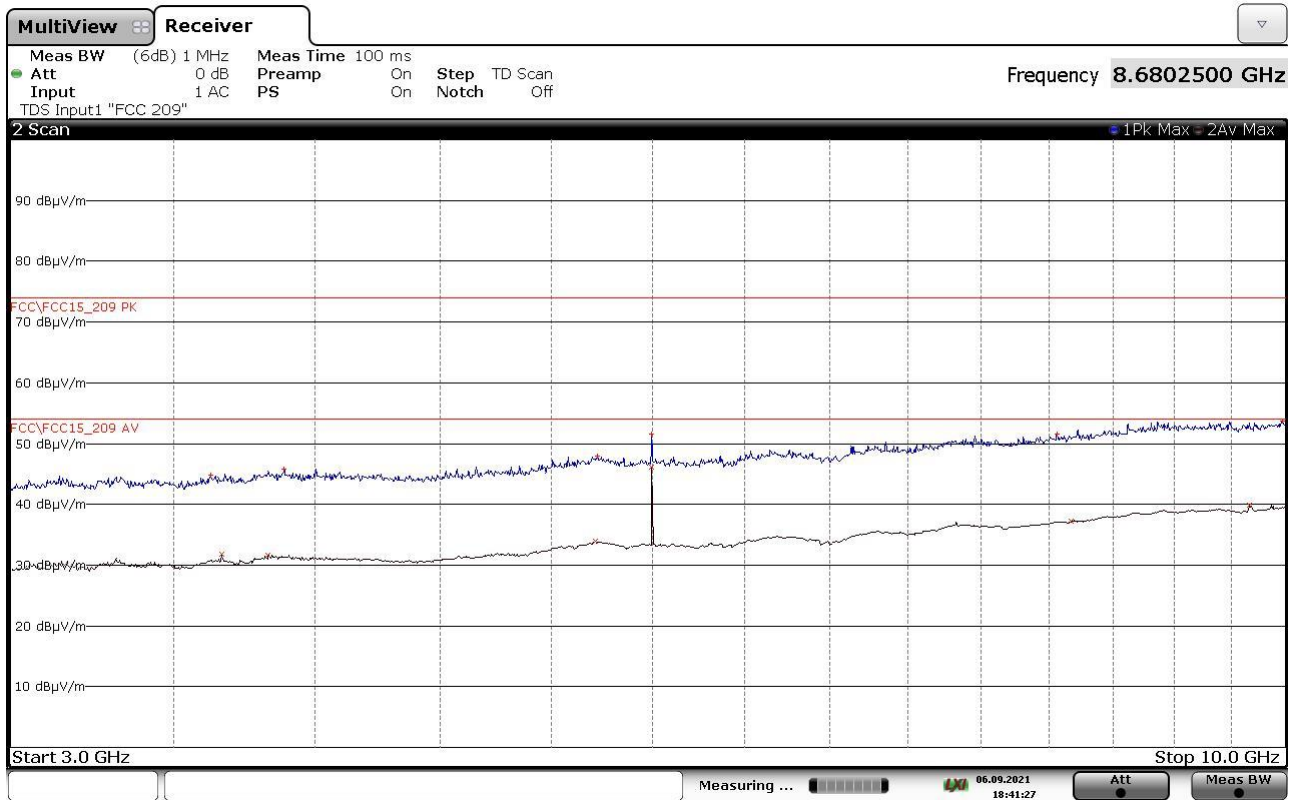


**FINAL RESULT TABLE**

QUASI PEAK		
Freq Hz	Lev dBuV/m	Margin dB
518000	+7,67	-25,65
1054000	+5,86	-21,29
1458000	+5,81	-18,52
2334000	+5,97	-23,57
7318000	+6,61	-22,93
12918000	+7,15	-22,39
18382000	+6,90	-22,64

21164110\_2

Segalla 21164111



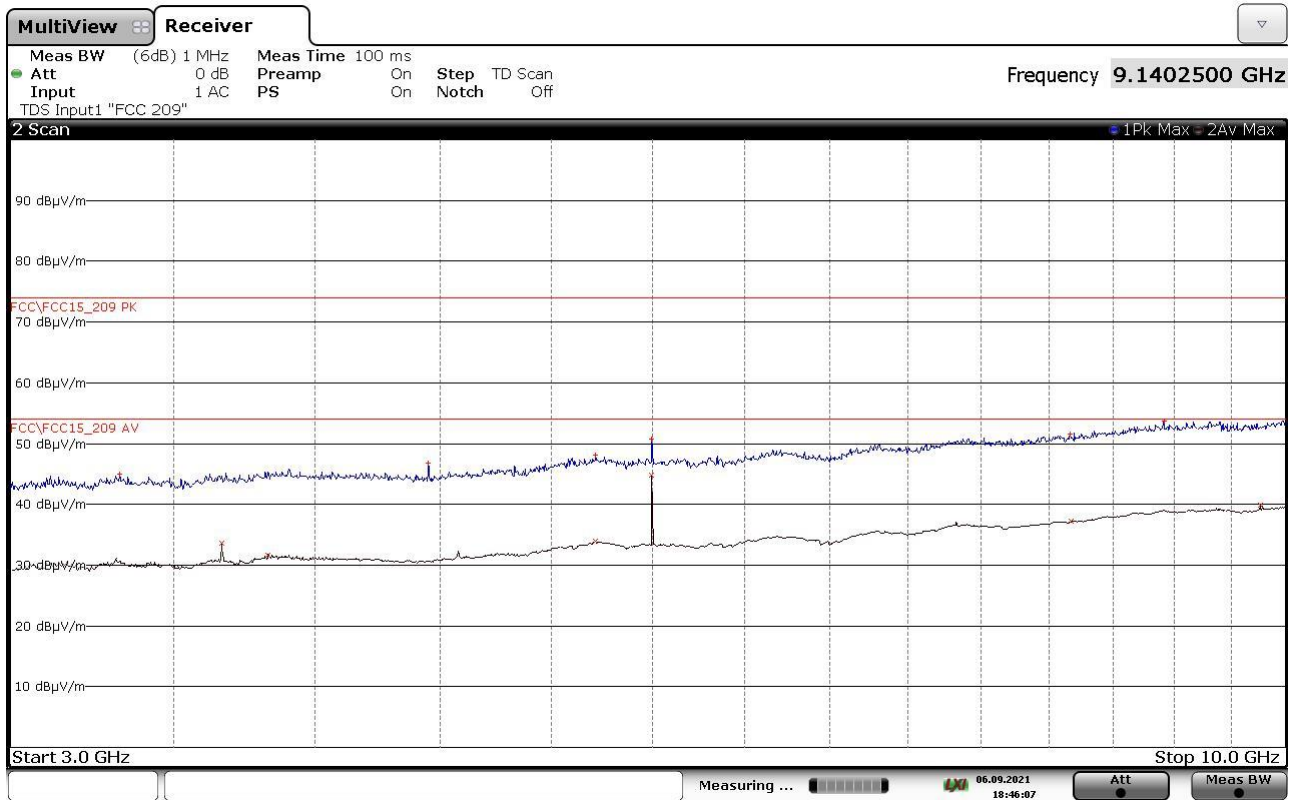
FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
3623500000	+44,73	-29,25	3663750000	+31,87	-22,11
3885250000	+45,84	-28,14	3826750000	+31,69	-22,29
5223000000	+47,89	-26,09	5213000000	+33,98	-20,00
5495750000	+51,55	-22,43	5495750000	+46,05	-7,93
8057250000	+51,61	-22,37	8170000000	+37,17	-16,81
9974250000	+53,64	-20,34	9668000000	+39,94	-14,04

21164111\_2



Segalla 21164112



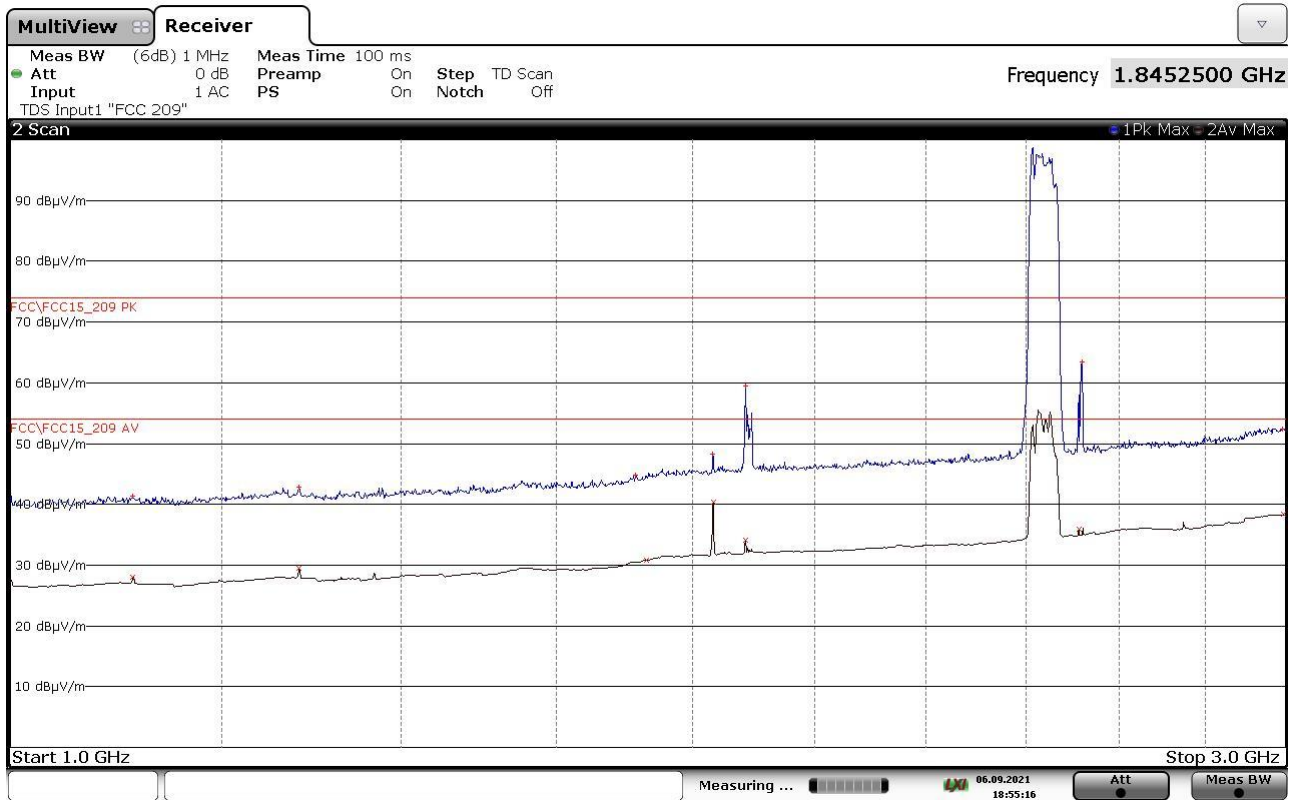
FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
3326000000	+44,94	-29,04	3663750000	+33,58	-20,40
4452000000	+46,82	-27,16	3826250000	+31,71	-22,27
5211000000	+48,07	-25,91	5212000000	+34,00	-19,98
5496000000	+50,70	-23,28	5495750000	+44,77	-9,21
8157250000	+51,53	-22,45	8169250000	+37,18	-16,80
8914750000	+53,66	-20,32	9768000000	+39,79	-14,19

21164112\_2



Segalla 21164113

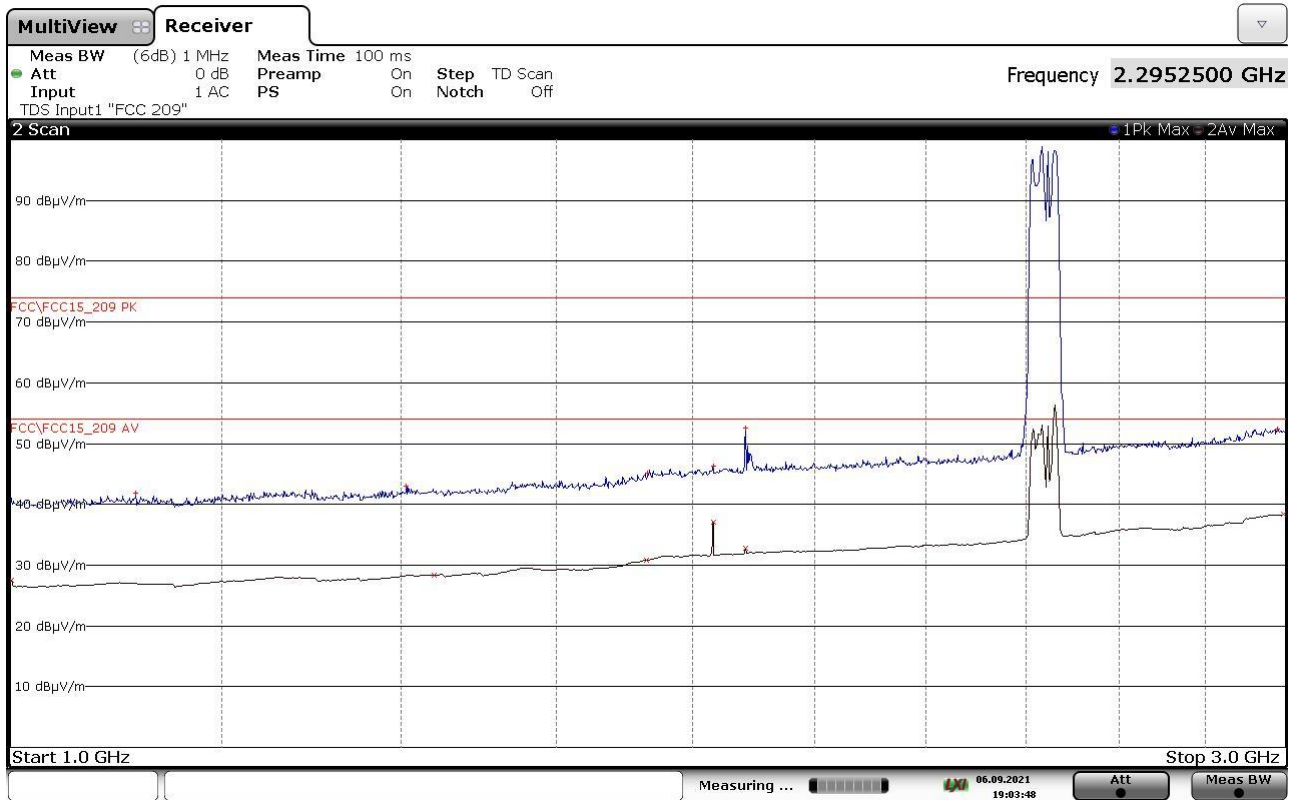


**FINAL RESULT TABLE**

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1111250000	+41,34	-32,64	1111500000	+28,05	-25,93
1282500000	+42,91	-31,07	1282500000	+29,52	-24,46
1713750000	+44,81	-29,17	1730000000	+30,83	-23,15
1831750000	+48,35	-25,63	1832000000	+40,41	-13,57
1883750000	+59,45	-14,53	1883500000	+34,17	-19,81
2517000000	+63,37	-10,61	2510750000	+35,97	-18,01
2991250000	+52,46	-21,52	2995000000	+38,32	-15,66

21164113\_2

Segalla 21164114



FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1113750000	+41,84	-32,14	1001000000	+27,55	-26,43
1406750000	+42,93	-31,05	1440500000	+28,35	-25,63
1732000000	+45,08	-28,90	1729750000	+30,82	-23,16
1832000000	+46,30	-27,68	1832000000	+36,99	-16,99
1883500000	+52,56	-21,42	1883500000	+32,84	-21,14
2979500000	+52,35	-21,63	2994750000	+38,31	-15,67

21164114\_2

#### 9.4 Peak Output Power

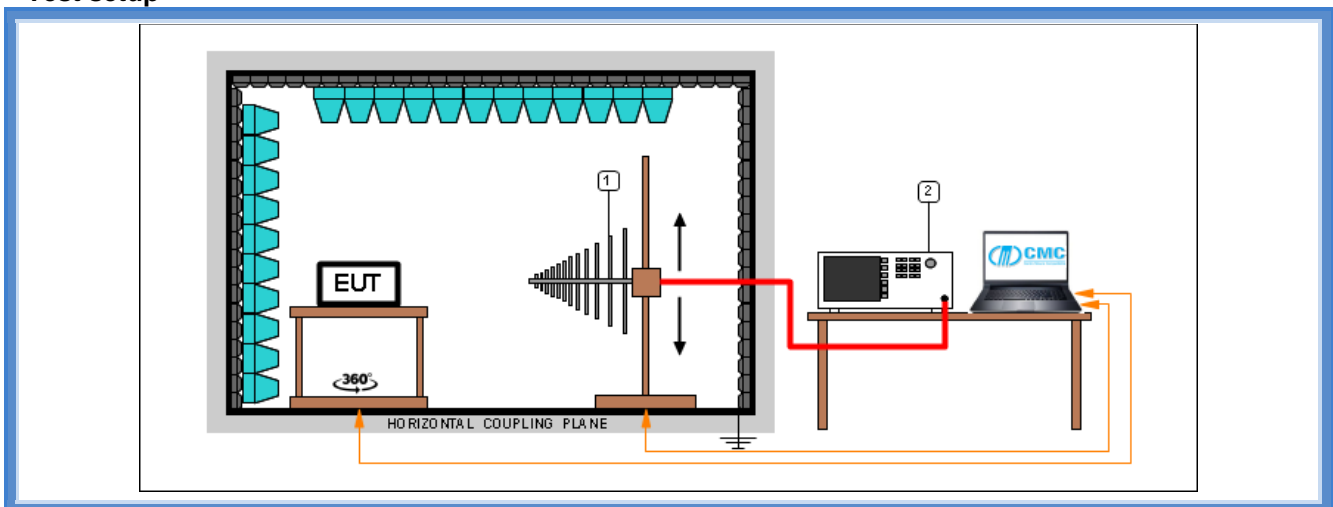
Tested by .....	M. Segalla
Test date .....	06.09.2021
Test location (stand) .....	Semi-anechoic chamber (CMC A070)
Reference standards .....	FCC Rules and Regulation; Titles 47 Part. 15.209 and 249
Supplementary test set-up description .....	EUT – antenna distance: 3 m
Supplementary information .....	--

#### Acceptance limits

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

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

#### Test setup



#### Test setup PE004\_03

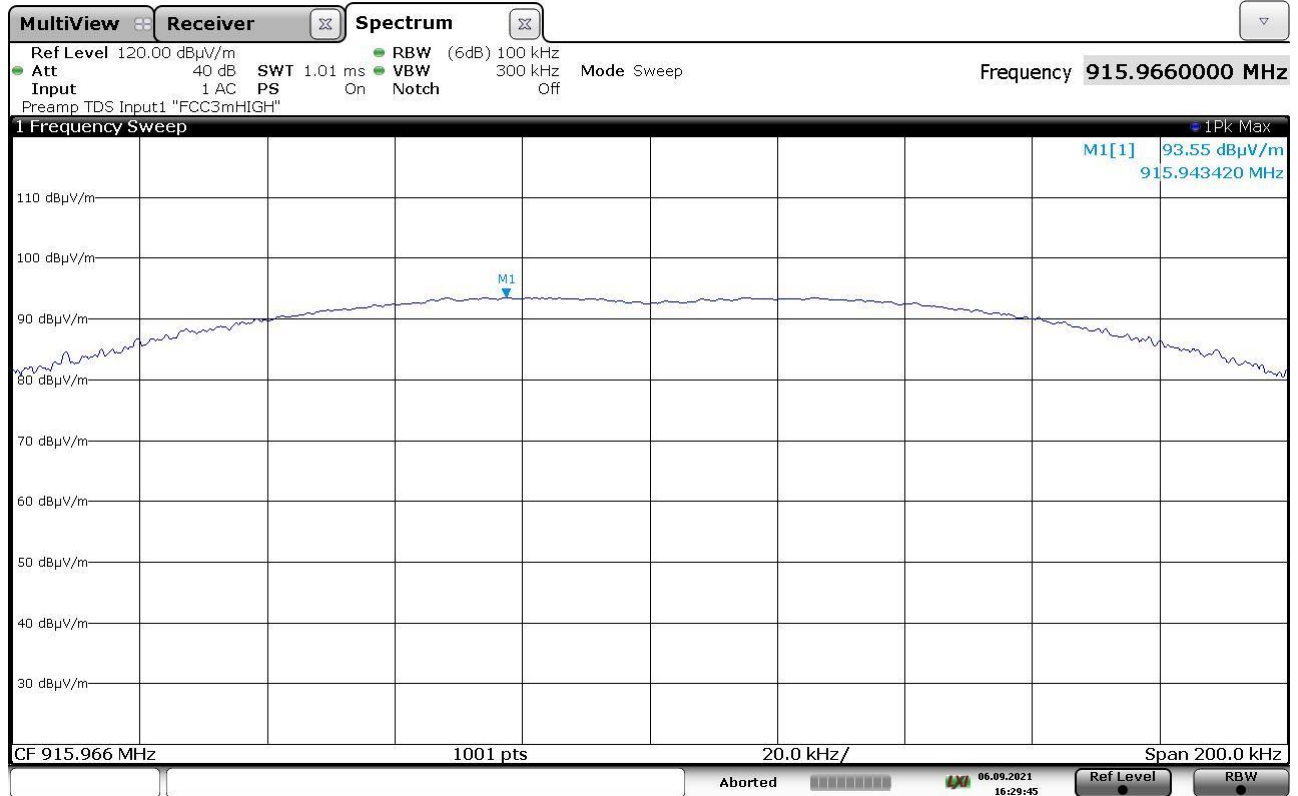
Nr.	Id. Number	Manufacturer	Model	Description
2	CMC S353	Rohde & Schwarz	ESW26	EMI Test Receiver 1 Hz - 26.5 GHz
1	CMC S287	Schwarzbeck	VUSLP 911B	Broadband Antenna

#### Result

Channel (MHz)	Polarization	Graphs	Measured level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)
916,00	Worst case	G21164103	93,55	94,00

## Graphs

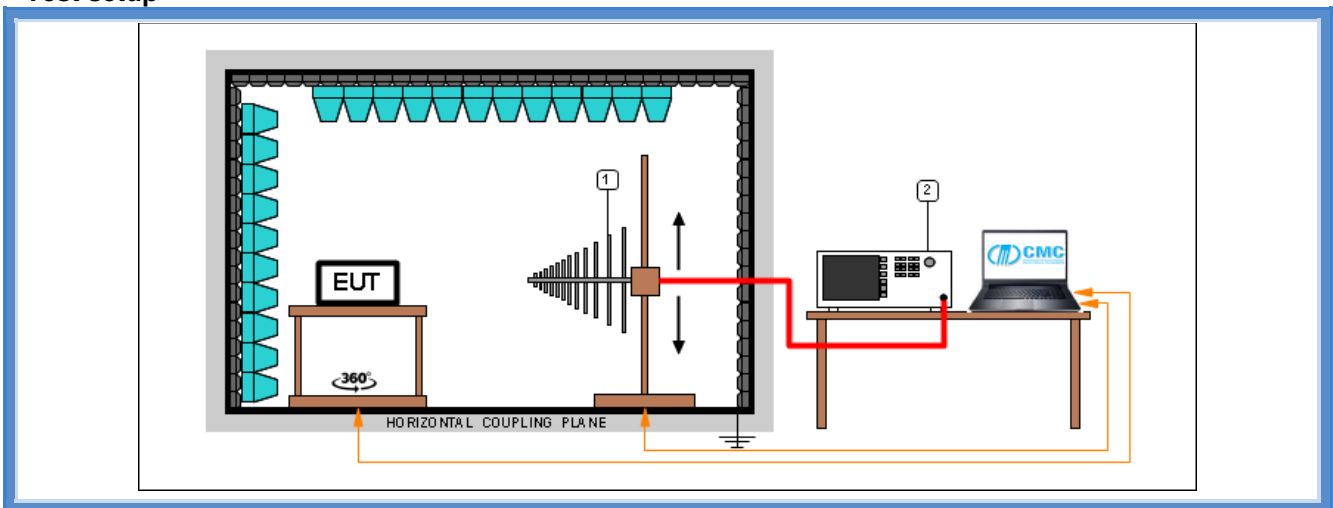
Sega11a 21164103



### 9.5 20 dB bandwidth

Tested by .....	M. Segalla
Test date .....	06.09.2021
Test location (stand) .....	Semi-anechoic chamber (CMC A070)
Reference standards .....	FCC Rules and Regulation; Titles 47 Part. 15.215 (c) ANSI C63.10 cl. 7.8.7
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 PE004\_03

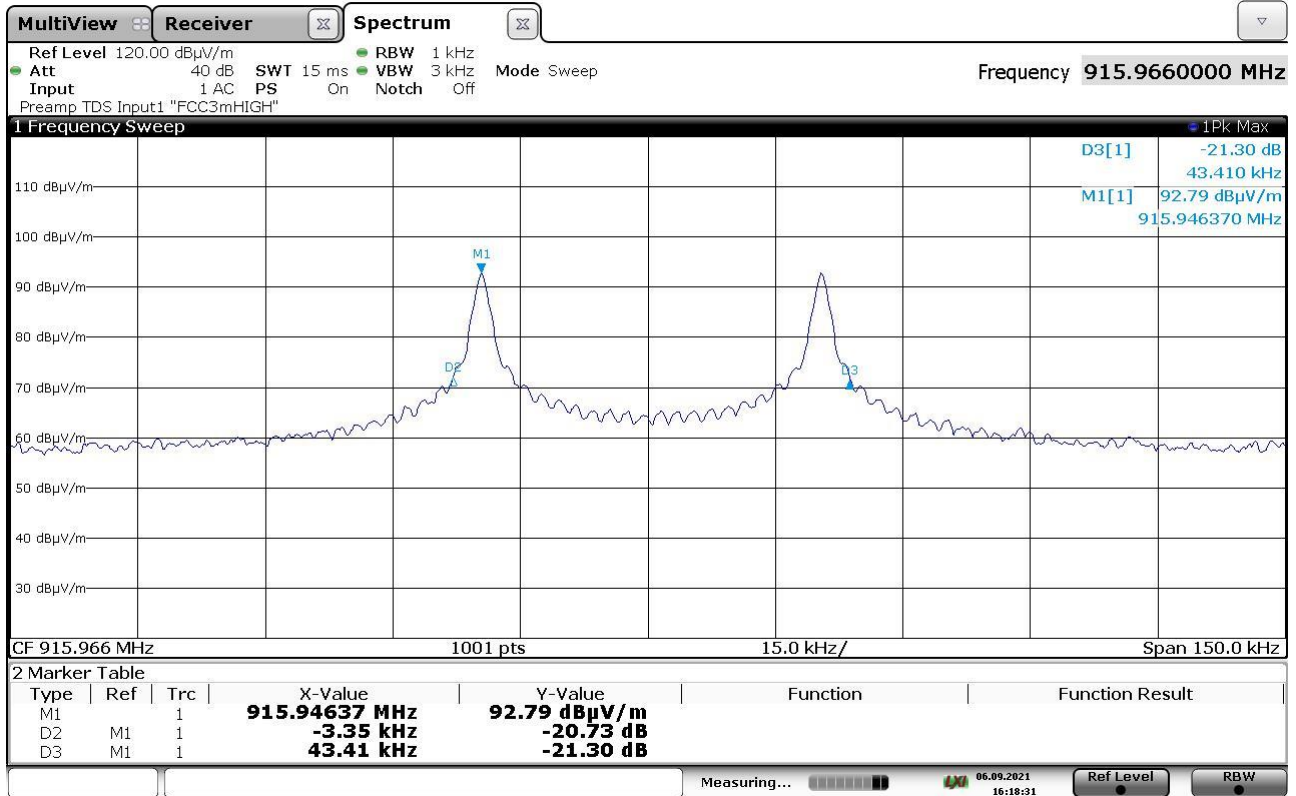
Nr.	Id. Number	Manufacturer	Model	Description
2	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
1	CMC S287	Schwarzbeck	VUSLP 9111B	Broadband Antenna

**Result**

<i>Channel (MHz)</i>	<i>Graphs</i>	<i>20 dB bandwidth (MHz)</i>	<i>Limits (MHz)</i>	<i>Results</i>
916,00	G21164101	915,943 – 915,990	902 – 928	Complies

## Graphs

Sega11a 21164101



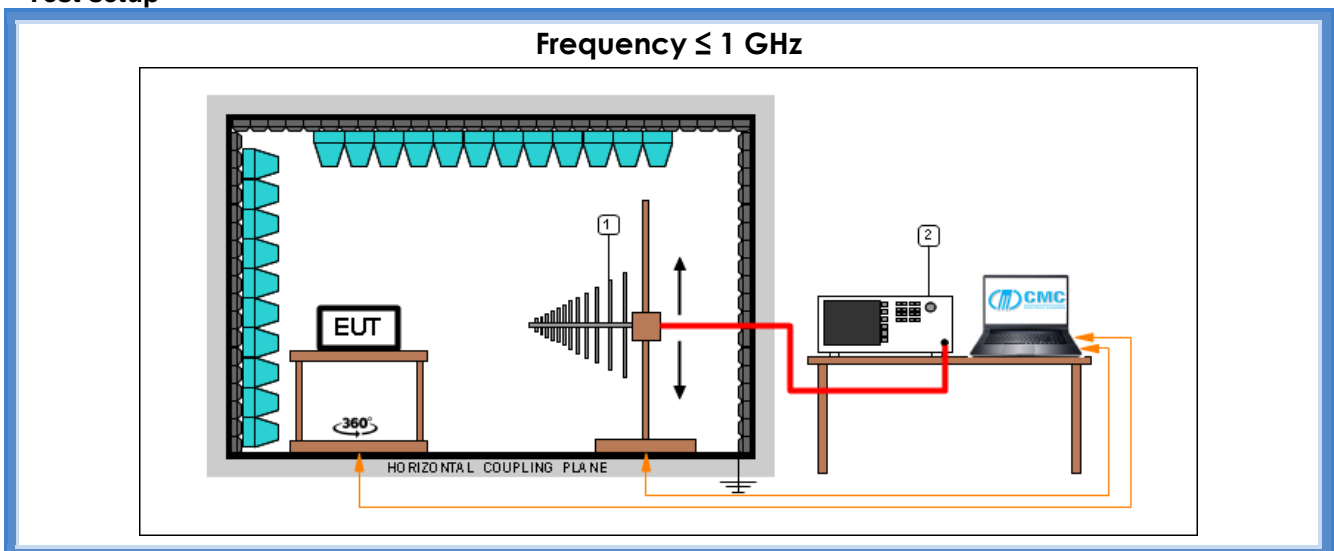
## 9.6 Band edge

Tested by .....	M. Segalla
Test date .....	06.09.2021
Test location (stand) .....	Semi-anechoic chamber (CMC A070)
Reference standards .....	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
Supplementary information.....	--

### Acceptance limits

Operation within the band 902 – 928 MHz

### Test setup



*Test setup PE004\_03*

Nr.	Id. Number	Manufacturer	Model	Description
2	CMC S353	Rohde & Schwarz	ESW26	EMI Test Receiver 1 Hz - 26.5 GHz
1	CMC S287	Schwarzbeck	VUSLP 9111B	Broadband Antenna

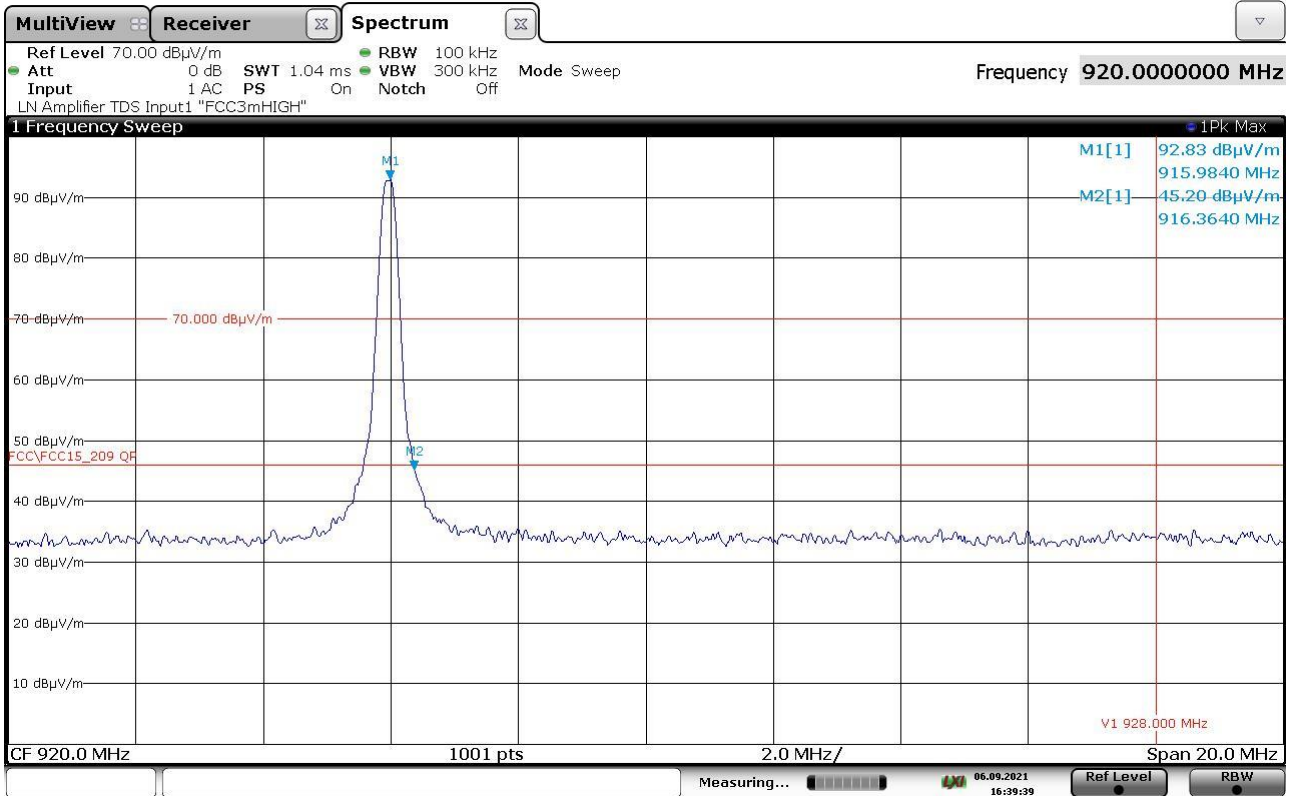
### Result

Channel (MHz)	Graph(s)	Results	
916,00	G21164105	FL: 915,544 MHz	Complies
916,00	G21164104	FH: 916,364 MHz	Complies

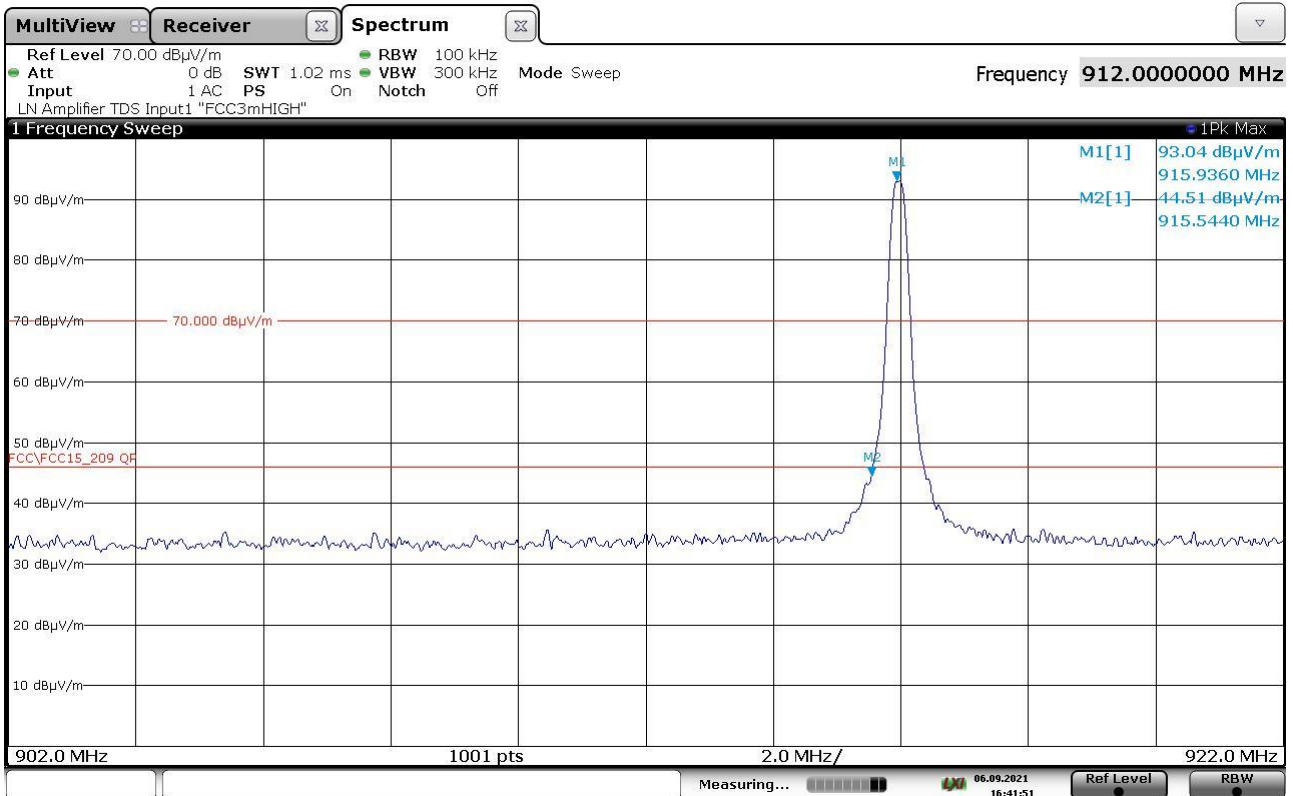


## Graphs

Segalla 21164104



Segalla 21164105



**Attachment 1**
**Instruments list**

<i><b>Id. number</b></i>	<i><b>Manufacturer</b></i>	<i><b>Model</b></i>	<i><b>Description</b></i>	<i><b>Serial number</b></i>	<i><b>Last calibration</b></i>	<i><b>Due date calibration</b></i>
CMC S010	Rohde & Schwarz	ESH3-Z2	Impulses Limiting Device	- - -	January '21	January '22
CMC S108	EMCO	3115	Horn Antenna	9811-5622	June '19	June '22
CMC S127	Schaffner	HLA6120	Loop Antenna	1191	November '18	November '23
CMC S200	Schwarzbeck	NSLK 8128	V-LISN	8128-273	January '21	January '22
CMC S206	Rohde & Schwarz	ESCI 7	EMC Receiver 9KHz-7GHz	100781	January '21	January '22
CMC S260	CMC	Wfr_N	Shielded Cable	Wfr_ant10-1	November '20	November '21
CMC S261	CMC	Wfr_N	Shielded Cable	Wfr_ant20-1	November '20	November '21
CMC S262	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix32-1	November '20	November '21
CMC S263	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix31-1	November '20	November '21
CMC S264	CMC	Wfr_N	Shielded Cable	Wfr_ext03-1	November '20	November '21
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 '20	November '23
CMC S295	Rohde & Schwarz	FSW43	Spectrum Analyzer 43GHz	104059	November '20	November '23
CMC S334	Wainwright Instruments	WHKX12-935-1000-15000-40SS	High Pass Filter 1000MHz	46	December '20	December '21
CMC S353	Rohde & Schwarz	ESW26	Emi Test Receiver 1 Hz - 26.5 GHz	101492	September '20	September '22

**Attachment 1**
**Measurement uncertainty**

<i>Test</i>	<i>Test Setup</i>	<i>Expanded uncertainty</i>	<i>Note</i>
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	2,3 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	3,8 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_01	4,2 dB	1
Radiated Emission CISPR 16 Bicon. Ant. 30-300 MHz	PE004_02	4,1 dB	1
Radiated Emission CISPR 16 LogP. Ant. 300-1000 MHz	PE004_03	3,9 dB	1
Radiated Emission CISPR 16 Horn Ant. 1-18 GHz	PE004_04	4,1 dB	1
Human Exposure to electromagnetic fields	PE005_01	16,7 %	1
Harmonics	PE006_01	10 mA + 2,9 %	1
Flicker	PE007_01	4,36 %	1
Radiated Immunity 80 MHz - 6 GHz	PE102_XX	2,20 dB 0,87 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	6,23 % 18,7 A/m a 300A/m	1
Dumped Magnetic field	PE108_01	6,23 % 1,87 A/m a 30A/m	1
Common mode conducted immunity	PE112_01	2,16 % 0,22 V a 10V	1

**Attachment 1**

<i>Test</i>	<i>Test Setup</i>	<i>Expanded uncertainty</i>	<i>Note</i>
Power/Spurious 9kHz-30MHz	PR001_01	4,2 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	< 1x10 <sup>-7</sup>	1
Timing zero span (1001pts.)	PR002_01+02	0,2 % SWT	1
Modulation bandwidth	PR002_01+02	< 1x10 <sup>-7</sup>	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

<i>Test</i>	<i>Test Setup</i>	<i>Expanded uncertainty</i>	<i>Note</i>
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
<i>Rev_21_01 date 23/02/2021</i>			

**Note 1:**

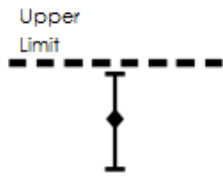
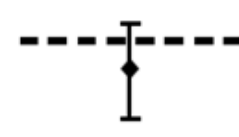
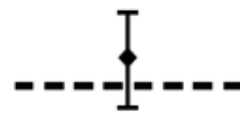
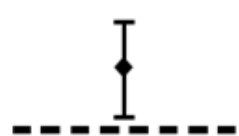
The expanded uncertainty reported according to the document EA-4-02 is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of p = 95%

**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
 <p>The sample complies with the requirements.</p> <p>The measurement results is within the specification limit when the measurement uncertainty is taken into account.</p>	 <p>The sample complies with the requirements.</p> <p>It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty although the measurement result is below the limit.</p>	 <p>The sample does not comply with the requirements.</p> <p>It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty also the measurement result is upper the limit.</p>	 <p>The sample does not comply with the requirements.</p> <p>The measurement results is outside the specification limit when the measurement uncertainty is taken into account.</p>

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. 3.1 (Quality Manual) .....	Measure procedure
Internal Procedure INC_M rev. 9.5 (Quality Manual) .....	Measurement uncertainty calculation