

TEST REPORT

Nr. R22007601

Federal Communication Commission (FCC)

Report Reference No.	R22007601
Date of issue:	24.06.2022
Total number pages:	60
Customer name	Microgate S.r.l.
Address	Via Waltraud Gebert Deeg, 3e – 39100 Bolzano (BZ) – Italy
Test specification:	
Standards	FCC Rules & Regulations, Title 47:2020 Part 15 paragraph(s): 203, 204, 207, 209 and 231
Non-standard test method	N/A
Test Report Form No.	15-231
Test Report Form(s) Originator ..	CMC Centro Misure Compatibilità S.r.l.
Master TRF	2022-06
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	WITTYPRO SEM – Traffic Light
(*) Trademark	Microgate
(*) Manufacturer	Microgate S.r.l.
(*) Model / Type reference	WIT205
(*) FCC ID	2ADEOWIT205
(*) Rating(s)	3,7 Vdc from battery
Report	
Tested by (name + signature)	M. Segalla
Approved by (name + signature)	F. Marenda

(*) information provided by the customer

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2 Reference standard	
FCC Rules and Regulation Title 47 part 15:2020	--
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	

<i>Revision index</i>	<i>Date</i>	<i>Change history</i>
1.0	24.06.2022	--

Testing and sampling:	
Date of receipt of test item	12.01.2022
Testing start date	13.06.2022
Testing end date	16.06.2022
Sampling procedure.....	Equipment used for testing was picked up by the customer
Internal identification	Adhesive label with the product number P220029
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	WITTYPRO SEM – Traffic Light						
Model Number	WIT205						
FCC ID	2ADEOWIT205						
Serial Number	000004						
Brand name	Microgate						
Nominal frequency	F _L : 433,31 MHz			F _H : 434,71 MHz			
Rated power supply	Voltage and Frequency		Reference poles				
			N	L1	L2	L3	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 3,7 V from battery					☐
Type of equipment	☒ Transmitter unit ☒ Receiver unit						
Type of station	☐ Portable station ☒ Mobile station						
Software version	Bootloader Version 2.0.3 Application Version 2.1.14						
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					

6.1 Photos of the test item





7 Verdict summary section

FCC Rules & Regulations, Title 47:2019 Part 15 paragraph(s): 203, 204, 207, 209 and 231			
Clause	Requirement – Test case	Basic standard	Verdict
Part 15.203	Antenna requirements	ANSI C63.10	P
Part 15.207	Conducted emissions	ANSI C63.10	P
Part 15.209	Radiated emissions	ANSI C63.10	P
Part 15.209 and 15.231(b) (e)	Field strength of fundamental	ANSI C63.10	P
Part 15.209 and 15.231	Spurious emissions (> 1 GHz)	ANSI C63.10	P
Part 15.231(c)	Occupied channel bandwidth	ANSI C63.10	P
Part 15.231(a) (e)	Periodic operation characteristics	ANSI C63.10	P

Normative references	
Reference no.	Description
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:		
	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	M. Segalla	
Test date	13.06.2022	
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.....	-4,70 dBi	
External R.F. power amplifier	Not Present	

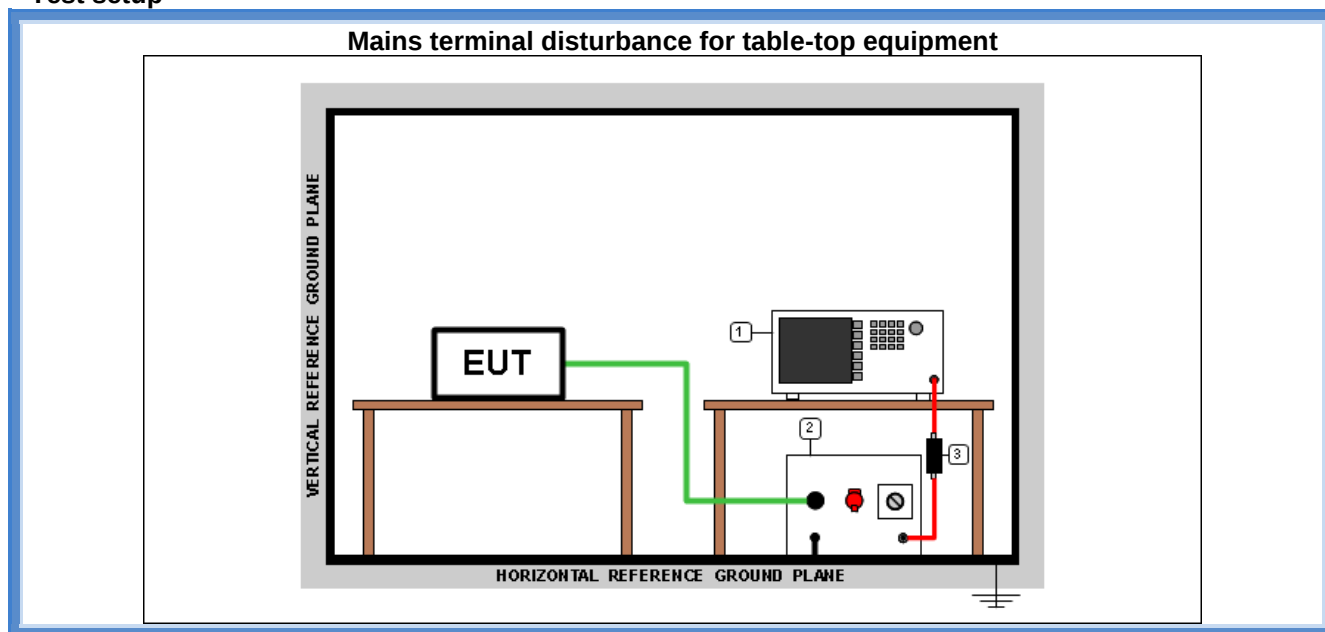
9.2 Conducted emissions

Tested by	M. Segalla	
Test date	16.06.2022	
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

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

Transmission channel (MHz)	Line	Frequency Range (MHz)	Graphs	Result
433,31	L1	0,15 – 30	G22007616	P
433,31	N	0,15 – 30	G22007617	P
434,71	N	0,15 – 30	G22007666	P
434,71	L1	0,15 – 30	G22007667	P

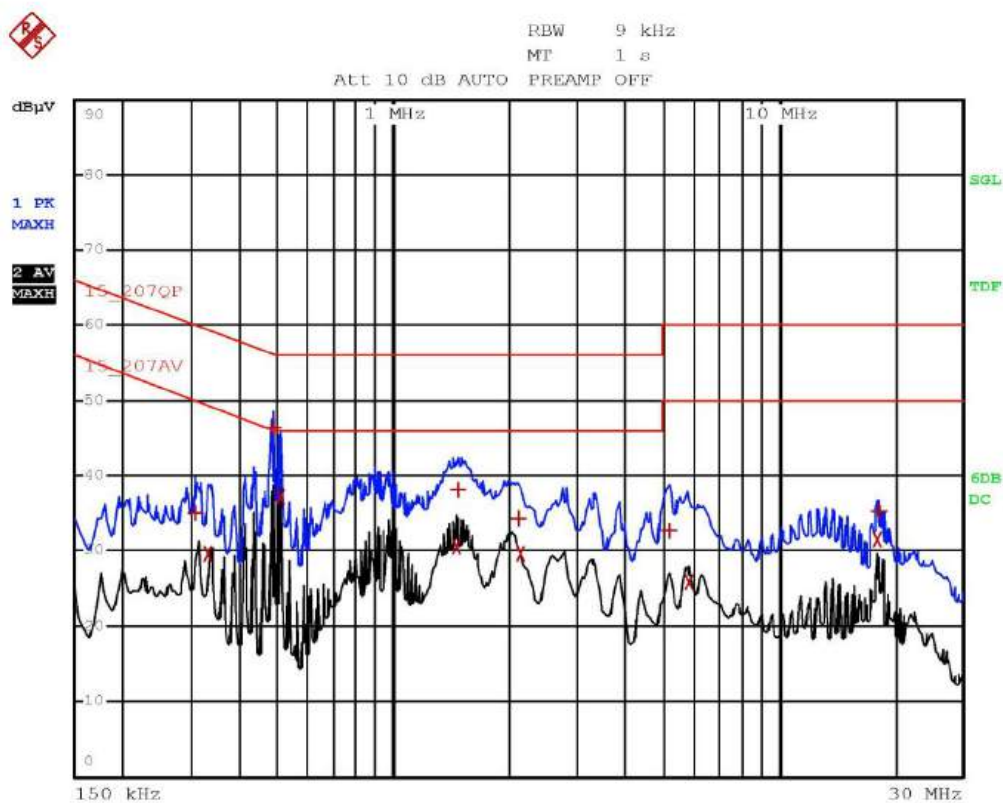
Remarks: tests performed on 110 V ~ 60 Hz side of USB FW8002MUSB/05 power unit

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

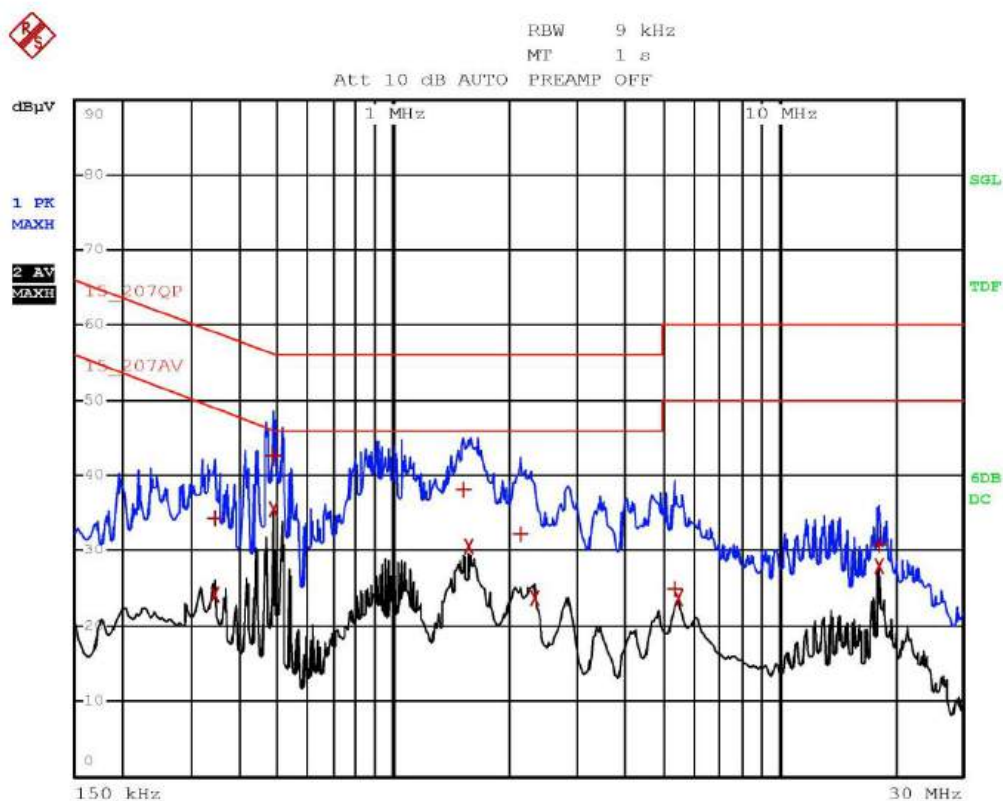
Graphs



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EDIT PEAK LIST (Final Measurement Results)			
Trace1:	15_207QP		
Trace2:	15_207AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Quasi Peak	306 kHz	35.12	-24.95
2 Average	334 kHz	29.72	-19.62
1 Quasi Peak	486 kHz	46.37	-9.85
2 Average	510 kHz	37.31	-8.68
2 Average	1.454 MHz	30.67	-15.33
1 Quasi Peak	1.482 MHz	38.13	-17.86
1 Quasi Peak	2.122 MHz	34.38	-21.61
2 Average	2.138 MHz	29.58	-16.41
1 Quasi Peak	5.234 MHz	32.75	-27.24
2 Average	5.842 MHz	25.76	-24.23
2 Average	18.13 MHz	31.52	-18.47
1 Quasi Peak	18.154 MHz	35.24	-24.75

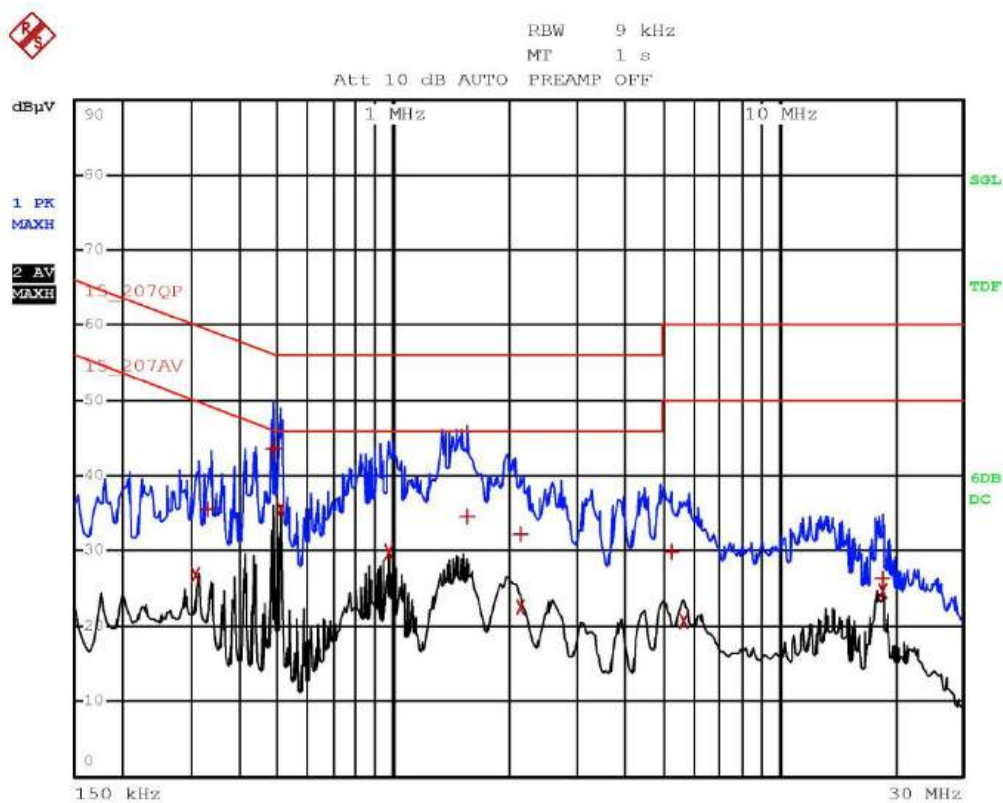
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EDIT PEAK LIST (Final Measurement Results)			
Trace1:	15_207QP		
Trace2:	15_207AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Quasi Peak	342 kHz	34.35	-24.80
2 Average	342 kHz	24.19	-24.96
1 Quasi Peak	490 kHz	42.54	-13.62
2 Average	490 kHz	35.45	-10.71
1 Quasi Peak	1.522 MHz	39.20	-17.79
2 Average	1.57 MHz	30.47	-15.52
1 Quasi Peak	2.13 MHz	32.26	-23.73
2 Average	2.318 MHz	23.68	-22.31
1 Quasi Peak	5.366 MHz	24.95	-35.04
2 Average	5.478 MHz	23.70	-26.30
2 Average	10.154 MHz	20.10	-21.90
1 Quasi Peak	10.25 MHz	30.02	-29.17

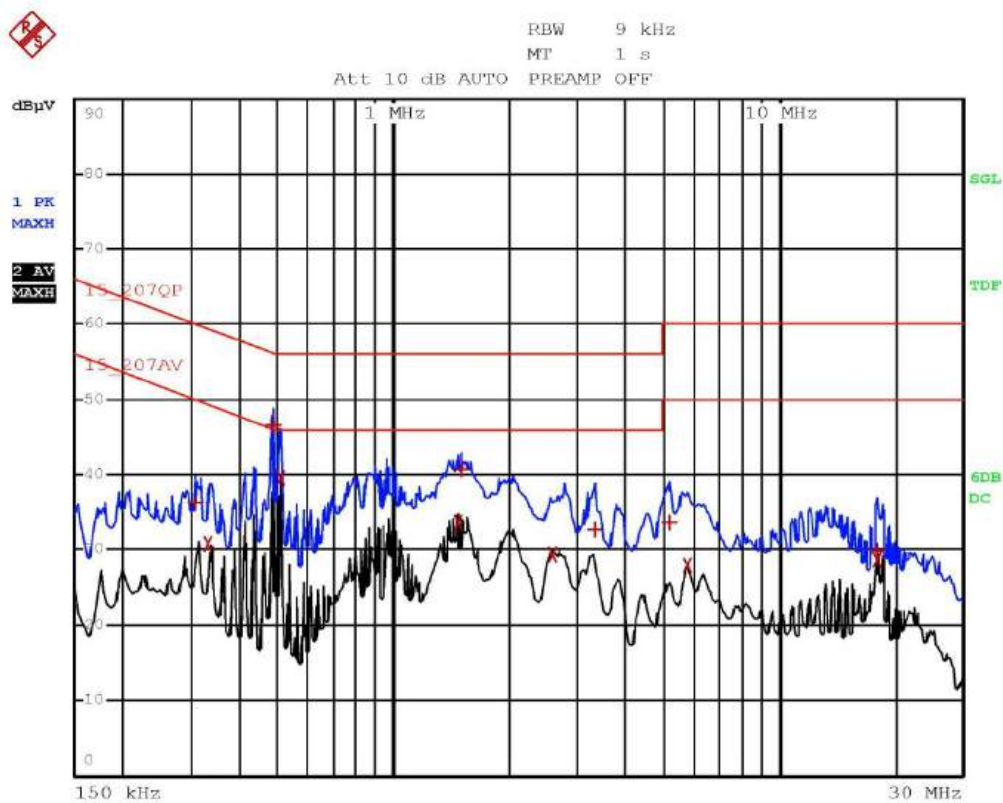
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EDIT PEAK LIST (Final Measurement Results)				
Trace1:	15_207QP			
Trace2:	15_207AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB	
2 Average	310 kHz	26.81	-23.15	
1 Quasi Peak	334 kHz	35.48	-23.86	
1 Quasi Peak	486 kHz	43.47	-12.76	
2 Average	510 kHz	35.46	-10.53	
2 Average	970 kHz	29.89	-16.10	
1 Quasi Peak	1.562 MHz	34.58	-21.41	
1 Quasi Peak	2.13 MHz	32.33	-23.66	
2 Average	2.13 MHz	22.65	-23.34	
1 Quasi Peak	5.25 MHz	29.84	-30.16	
2 Average	5.706 MHz	20.61	-29.38	
2 Average	18.618 MHz	24.68	-25.31	
1 Quasi Peak	18.646 MHz	26.28	-33.71	

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EDIT PEAK LIST (Final Measurement Results)			
Trace1:	15_207QP		
Trace2:	15_207AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Quasi Peak	306 kHz	36.37	-23.70
2 Average	334 kHz	30.93	-18.41
1 Quasi Peak	486 kHz	46.73	-9.50
2 Average	510 kHz	39.58	-6.41
2 Average	1.478 MHz	33.76	-12.24
1 Quasi Peak	1.506 MHz	40.69	-15.30
2 Average	2.602 MHz	29.33	-16.66
1 Quasi Peak	3.342 MHz	32.61	-23.39
1 Quasi Peak	5.21 MHz	33.75	-26.24
2 Average	5.794 MHz	27.88	-22.11
1 Quasi Peak	18.05 MHz	29.80	-30.19
2 Average	18.106 MHz	28.77	-21.22

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9.3 Radiated emissions and spurious emissions

Tested by	M. Segalla
Test date	13.06.2022
Test location (stand)	Semi-anechoic chamber (CMC A070)
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.209 and 15.231 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 or 3
Supplementary information.....	--

Acceptance limits

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

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

FCC Part 15.231 (b)	
Fundamental frequency (MHz)	Field strength of spurious emissions [dB(μ V/m)]
40,66 to 40,70	47,04
70 to 130	41,94
130 to 174	41,94 to 51,48
174 to 260	51,48
260 to 470	51,48 to 61,94
Above 470	61,94

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

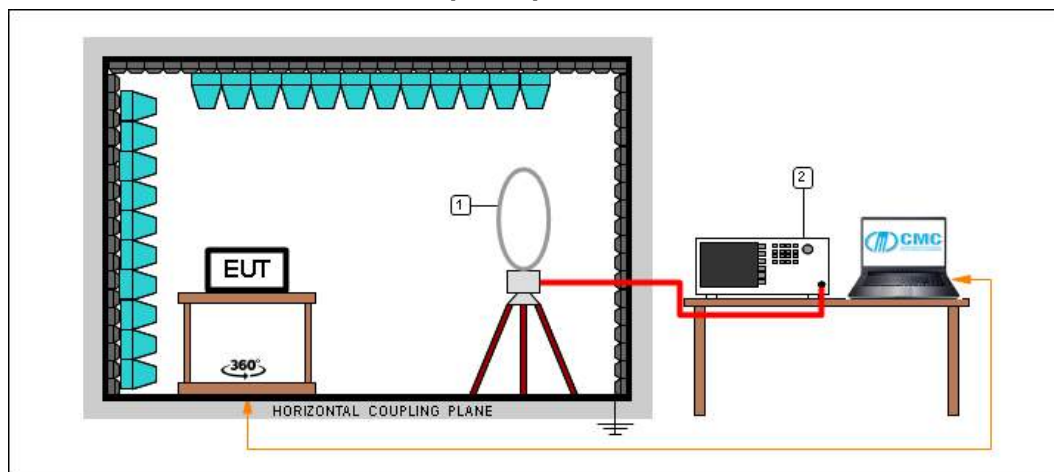
MHz	MHz	MHz	GHz
0,090 – 0,110	16,42 – 16,423	399,9 – 410	4,5 – 5,15
0,495 – 0,505	16,69475 – 16,69525	608 – 614	5,35 – 5,46
2,1735 – 2,1905	16,80425 – 16,80475	960 – 1240	7,25 – 7,75
4,125 – 4,128	25,5 – 25,67	1300 – 1427	8,025 – 8,5
4,17725 – 4,17775	37,5 – 38,25	1435 – 1626,5	9,0 – 9,2
4,20725 – 4,20775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

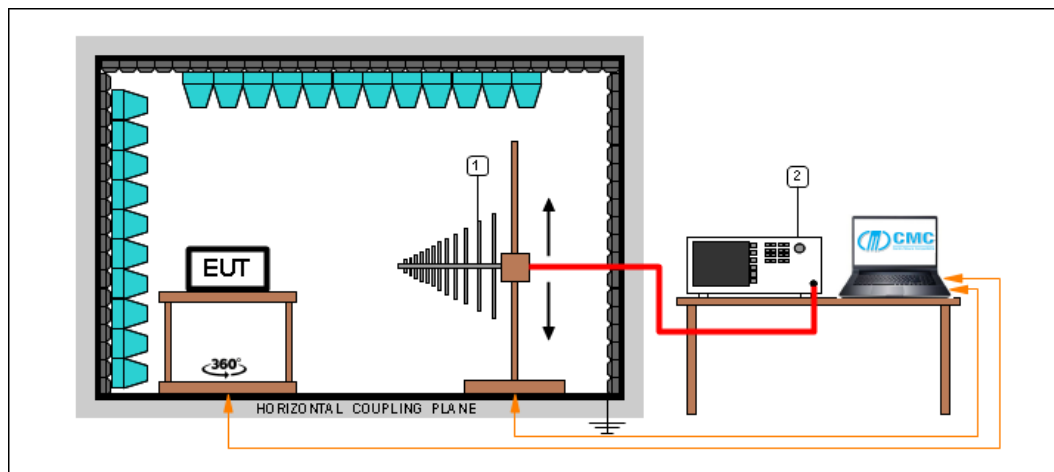
Frequency ≤ 30 MHz



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

Frequency ≤ 1 GHz



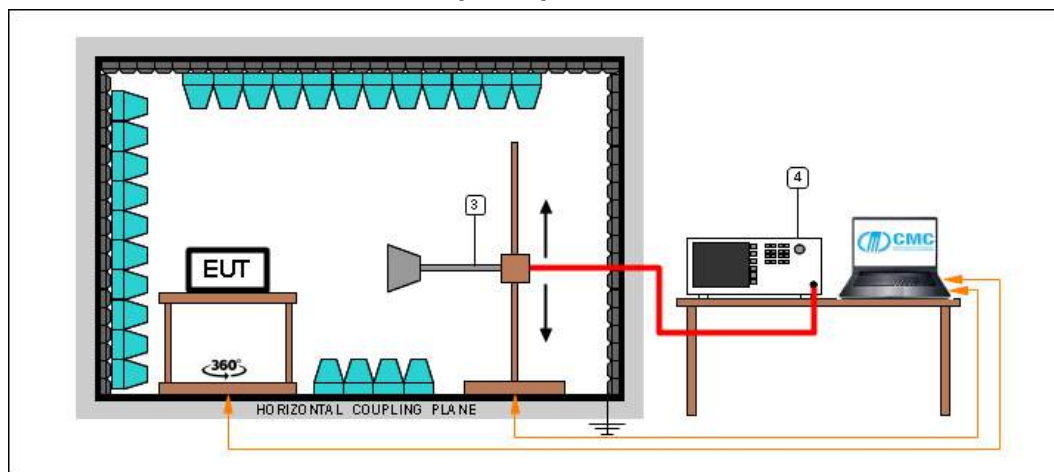
Test setup PE004_02

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

Transmission channel (MHz)	Polarization	Frequency Range (MHz)	Graphs	Result
433,31	Loop	0,009 – 30	G22007601	P
433,31	H	300 – 1000	G22007606	P
433,31	V	300 – 1000	G22007607	P
433,31	V	30 – 300	G22007608	P
433,31	H	30 – 300	G22007609	P
433,31	H	1000 – 3000	G22007610	P
433,31	V	1000 – 3000	G22007611	P
433,31	V	3000 – 18000	G22007612	P
433,31	H	3000 – 18000	G22007613	P
433,31	H	18000 – 26000	G22007614	P
433,31	V	18000 – 26000	G22007615	P
434,71	H	30 – 300	G22007650	P
434,71	V	30 – 300	G22007651	P
434,71	V	300 – 1000	G22007652	P
434,71	H	300 – 1000	G22007653	P
434,71	Loop	0,009 – 30	G22007659	P
434,71	V	1000 – 3000	G22007660	P
434,71	H	1000 – 3000	G22007661	P
434,71	H	3000 – 18000	G22007662	P
434,71	V	3000 – 18000	G22007663	P
434,71	V	18000 – 26000	G22007664	P
434,71	H	18000 – 26000	G22007665	P

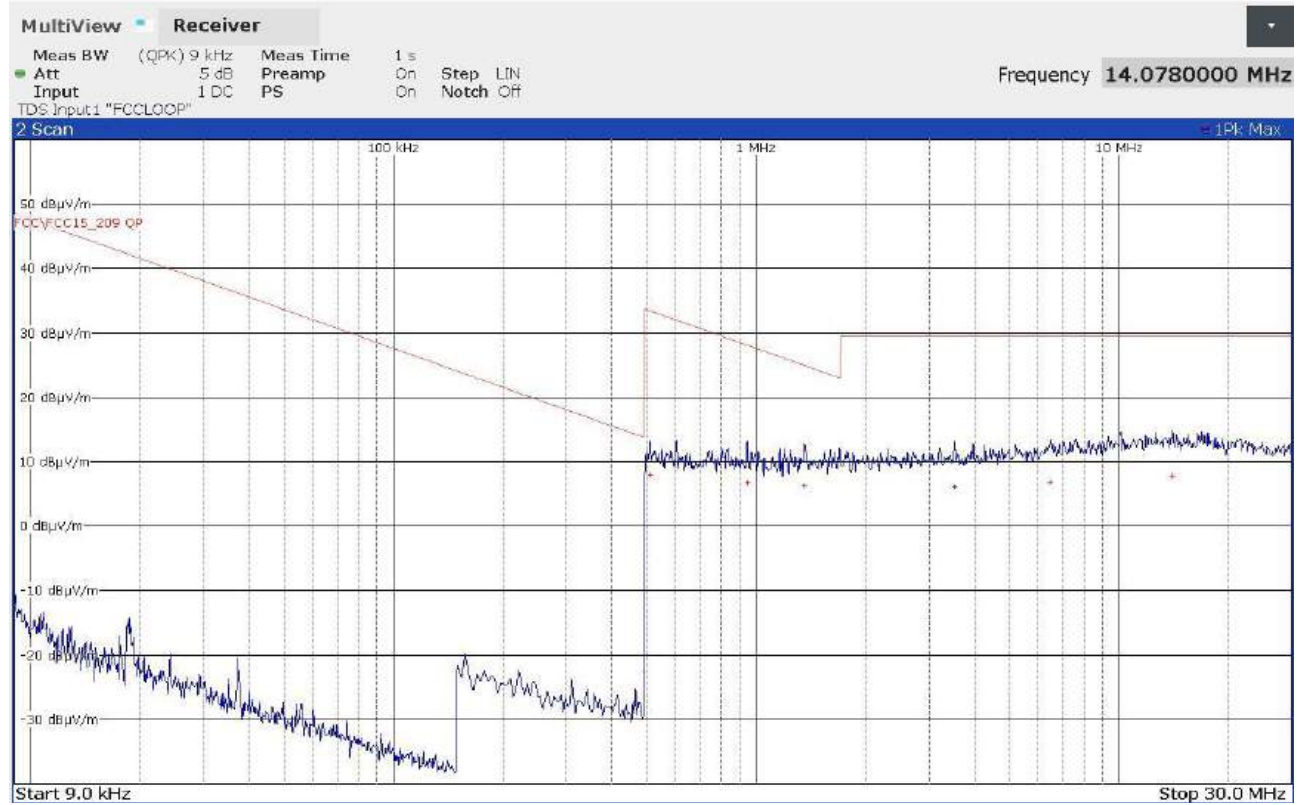
Remarks: EUT was tested in 3 orthogonal planes, graphs are related to the highest detected levels. Measurements at frequencies lower than 30 MHz have been performed with an EUT – antenna distance of 10 m. Measured values have been corrected with conversion factor $40\log(\text{test distance}/10)$ based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

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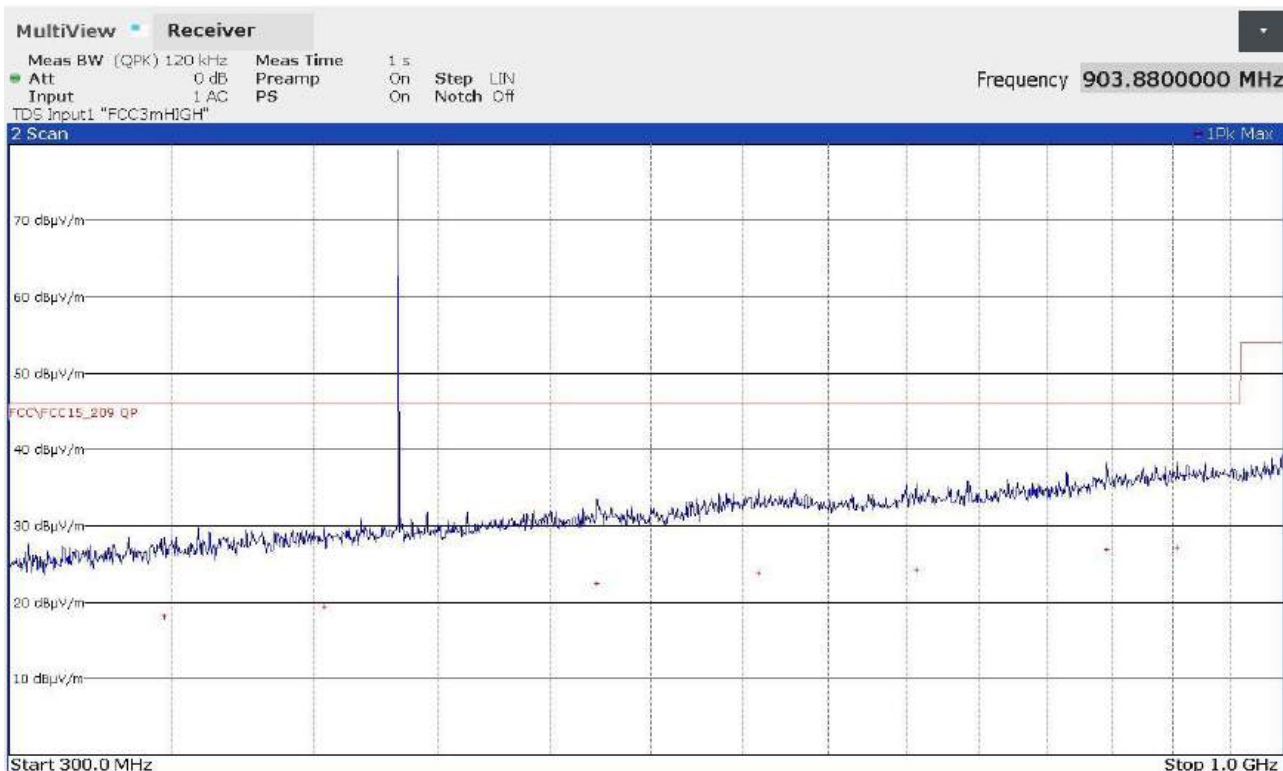
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
510000	+7,97	-25,48
946000	+6,66	-21,43
1358000	+6,30	-18,65
3530000	+6,04	-23,50
6462000	+6,91	-22,63
14078000	+7,78	-21,76

22007601_2

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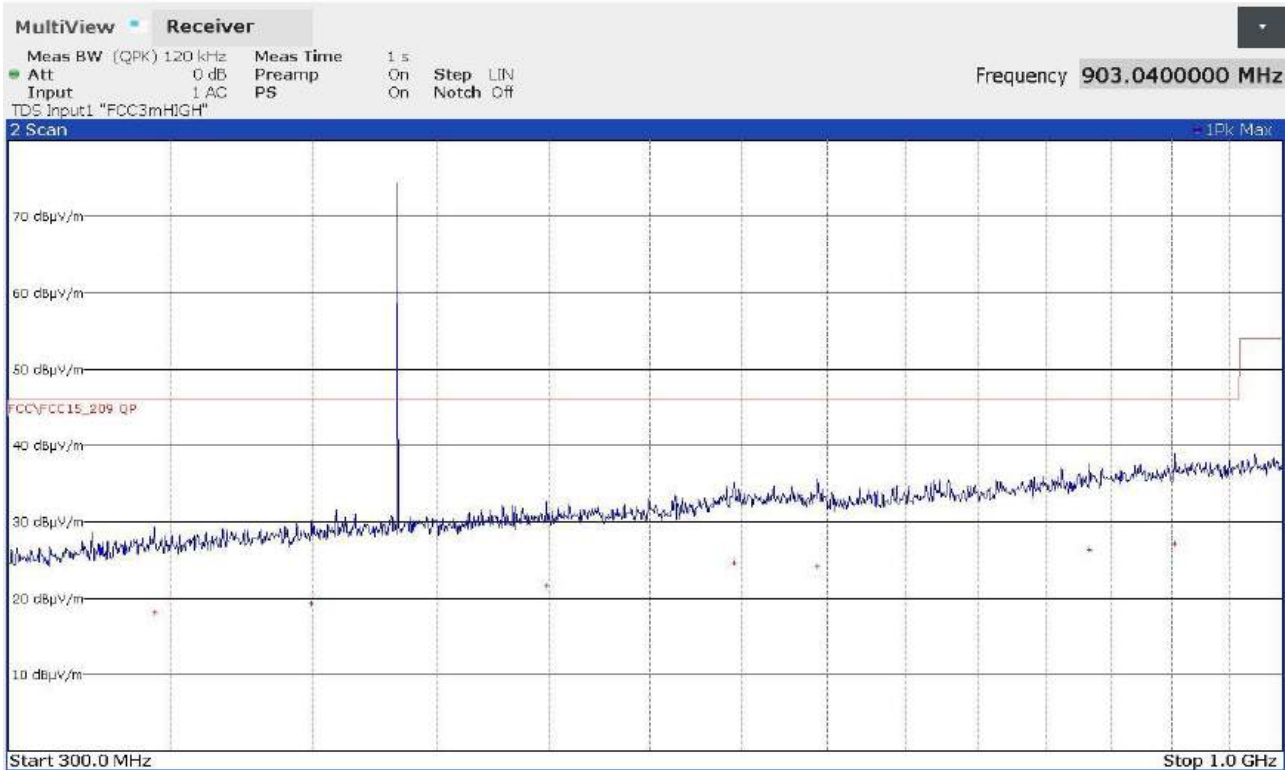
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
347400000	+18,06	-27,96
404000000	+19,36	-26,66
522880000	+22,48	-23,54
608800000	+23,89	-22,13
706720000	+24,31	-21,71
845560000	+26,92	-19,10
903880000	+27,21	-18,81

22007606_2

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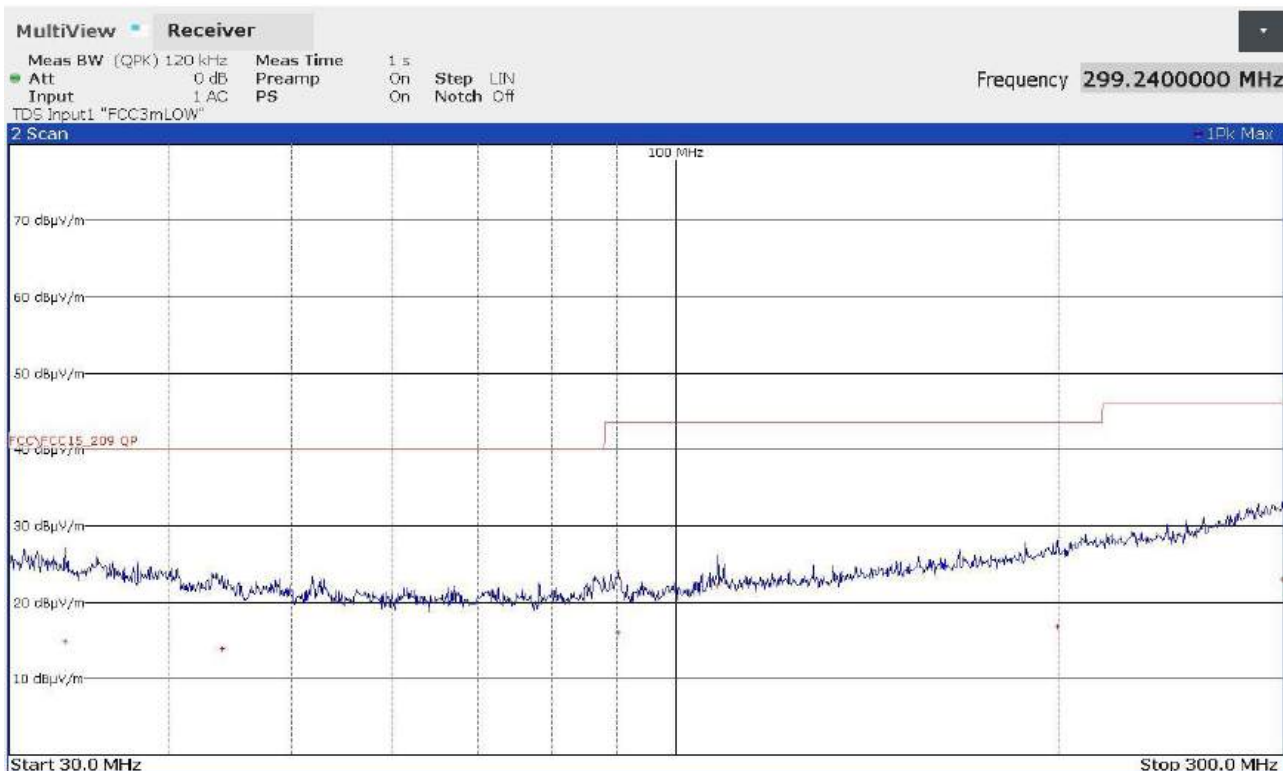
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
344600000	+18,14	-27,88
399720000	+19,26	-26,76
498800000	+21,66	-24,36
595600000	+24,61	-21,41
644160000	+24,13	-21,89
833000000	+26,36	-19,66
903040000	+27,17	-18,85

22007607_2

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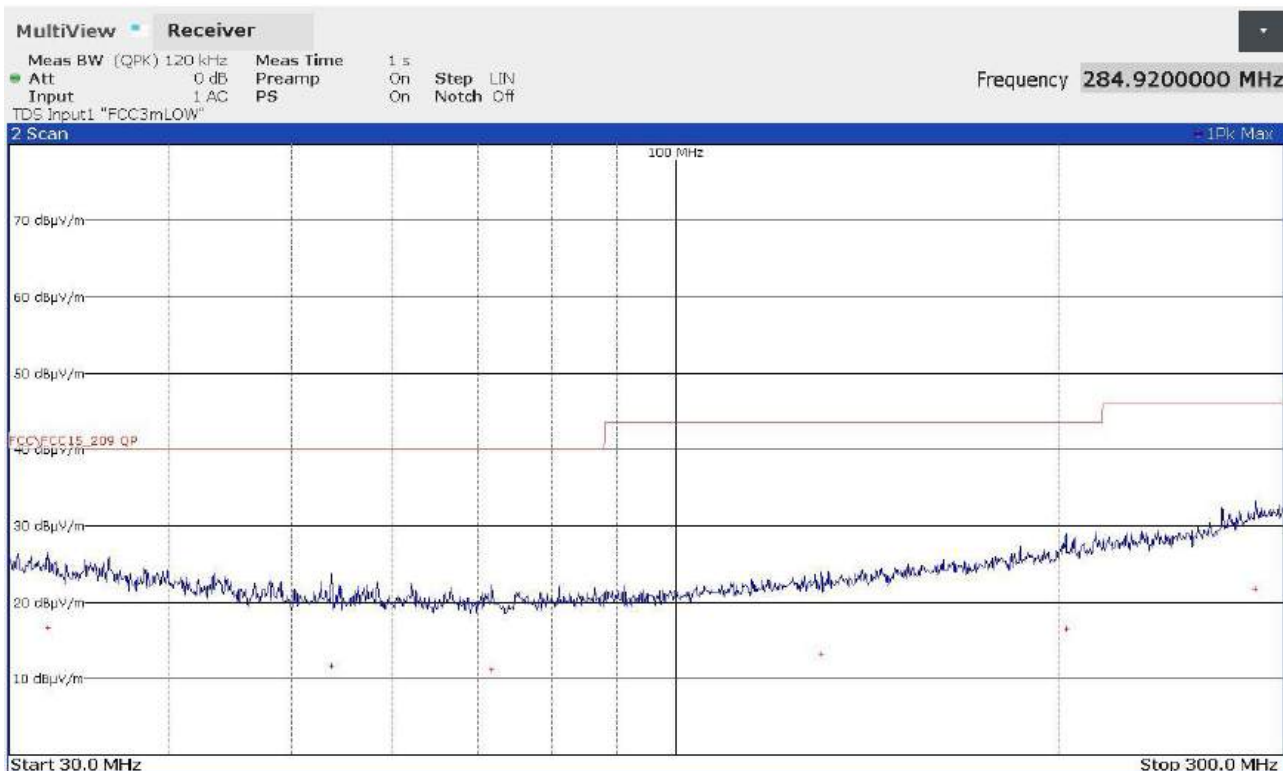


FINAL RESULT TABLE

QUASI PEAK		
Freq Hz	Lev dBuV/m	Margin dB
33200000	+14,87	-25,13
44120000	+13,96	-26,04
90120000	+15,97	-27,55
108000000	+22,21	-21,31
199200000	+16,78	-26,74
299240000	+22,97	-23,05

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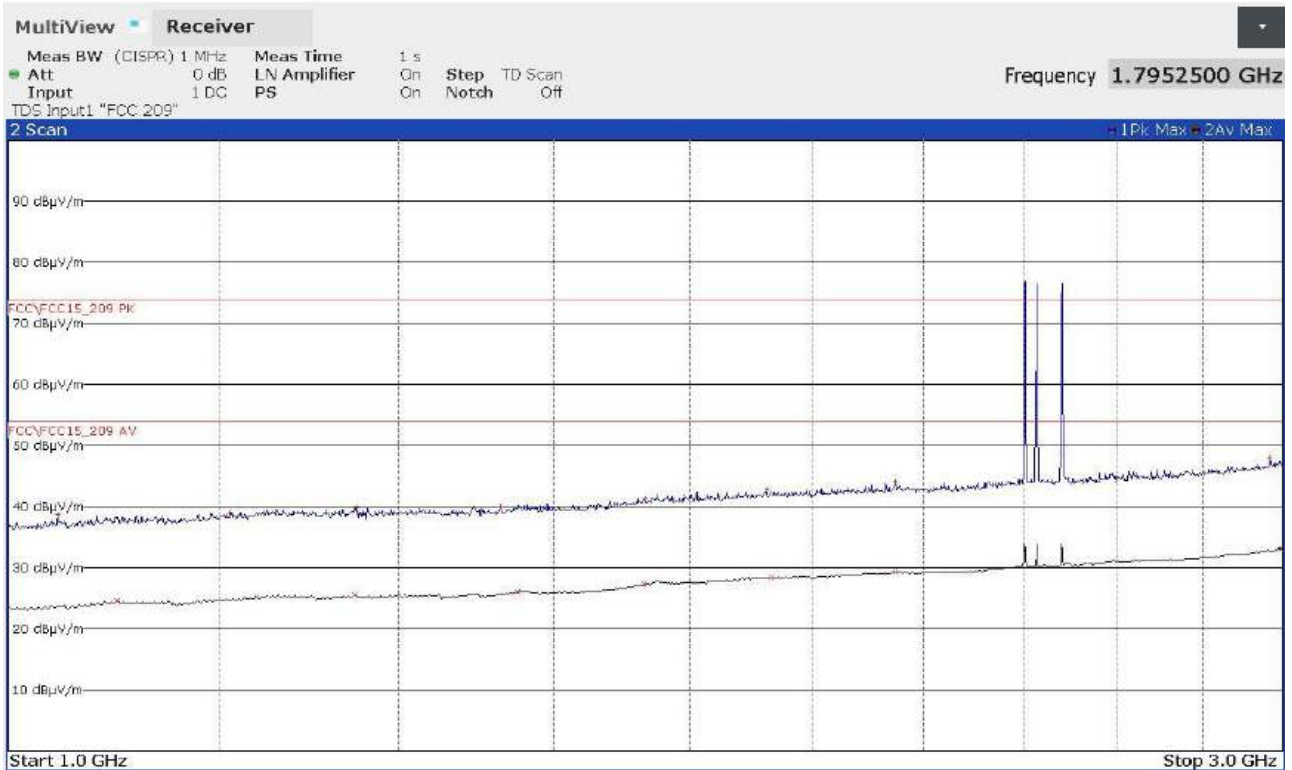


FINAL RESULT TABLE

QUASI PEAK		
Freq Hz	Lev dBuV/m	Margin dB
32200000	+16,72	-23,28
53720000	+11,67	-28,33
71720000	+11,15	-28,85
129960000	+13,31	-30,21
202440000	+16,51	-27,01
284920000	+21,80	-24,22

22007609_2

Segalla 22007610

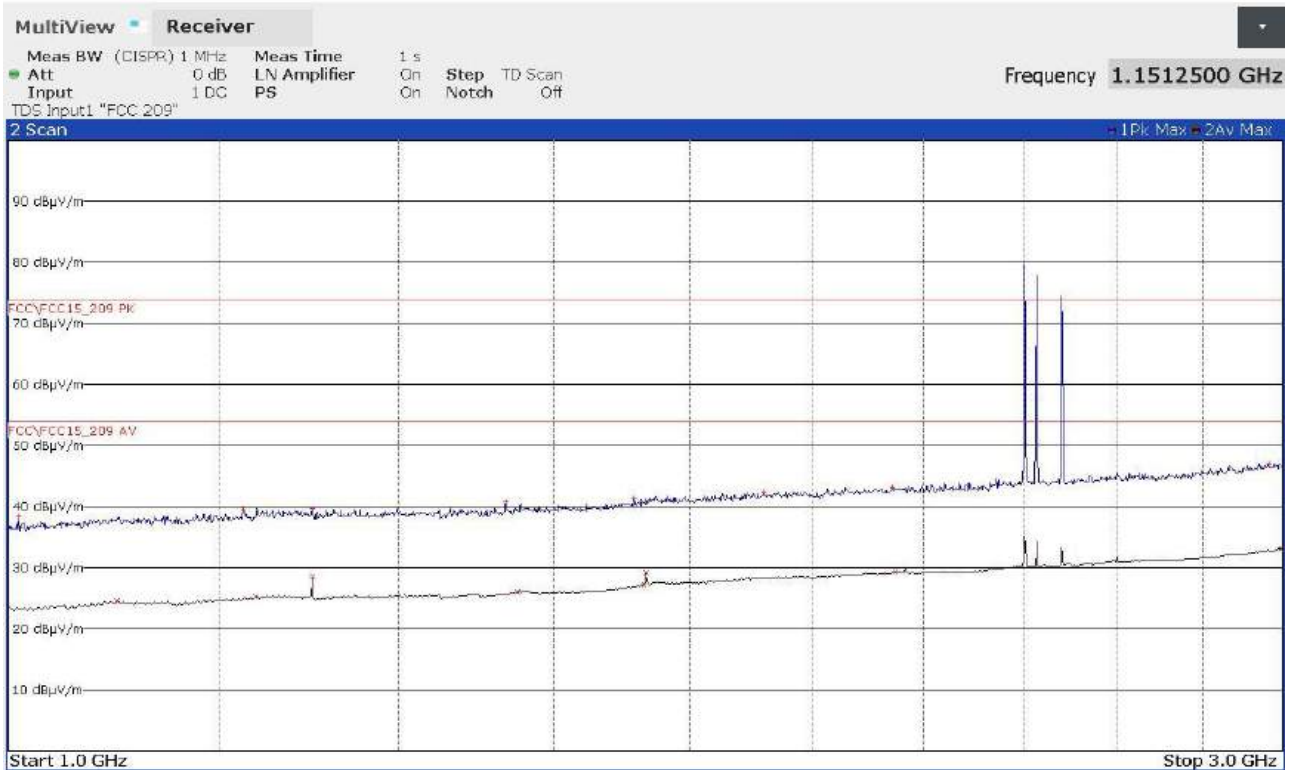


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1044000000	+38,69	-35,29	1099000000	+24,66	-29,32
1210750000	+39,08	-34,90	1238250000	+25,29	-28,69
1350000000	+39,89	-34,09	1347500000	+25,59	-28,39
1529000000	+39,99	-33,99	1551750000	+26,02	-27,96
1731250000	+41,37	-32,61	1730250000	+27,30	-26,68
1923750000	+42,80	-31,18	1930000000	+28,44	-25,54
2148500000	+44,09	-29,89	2148500000	+29,31	-24,67
2967000000	+48,00	-25,98	2994000000	+33,19	-20,79

22007610_2

Segalla 22007611

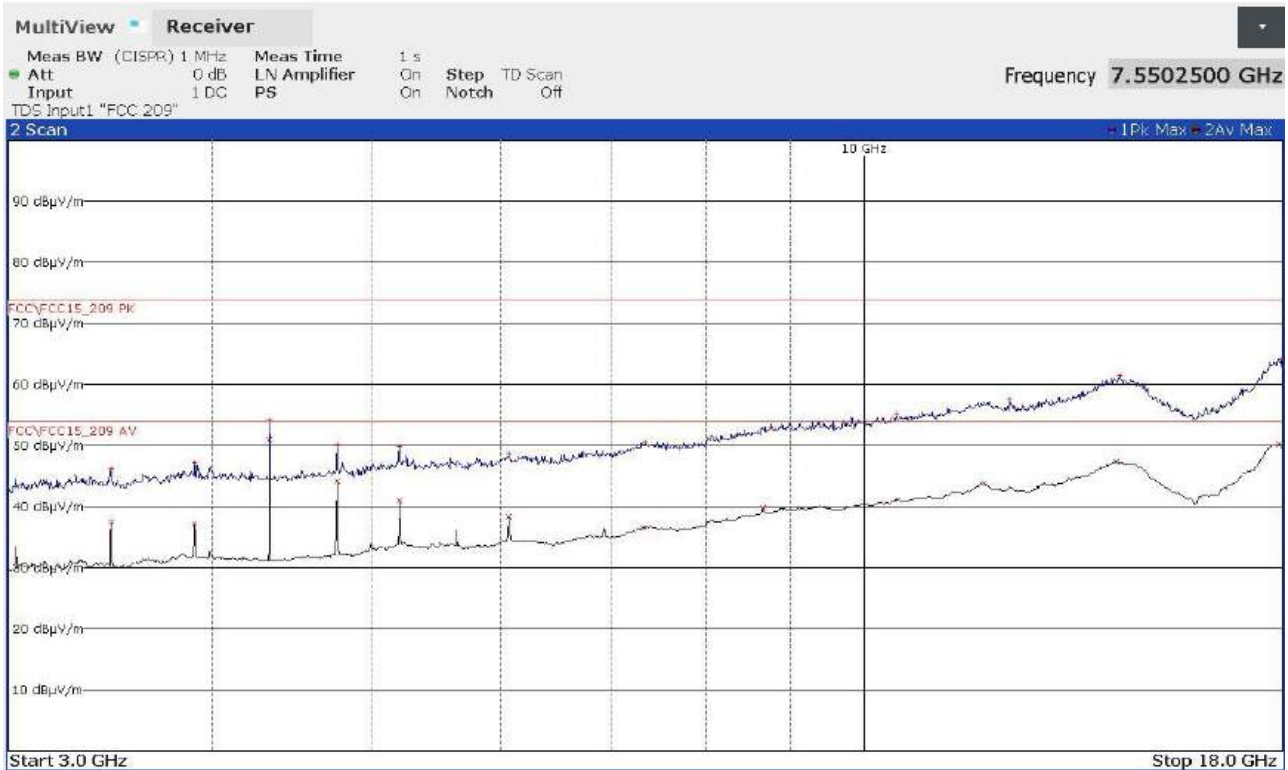


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1009500000	+38,35	-35,63	1098750000	+24,63	-29,35
1225000000	+39,54	-34,44	1238000000	+25,28	-28,70
1299750000	+39,71	-34,27	1300000000	+28,59	-25,39
1535000000	+40,79	-33,19	1551750000	+26,01	-27,97
1714500000	+41,53	-32,45	1730000000	+27,29	-26,69
1918750000	+42,52	-31,46	1733250000	+29,19	-24,79
2143000000	+43,19	-30,79	2148500000	+29,30	-24,68
2964250000	+47,09	-26,89	2994000000	+33,18	-20,80

22007611_2

Segalla 22007612

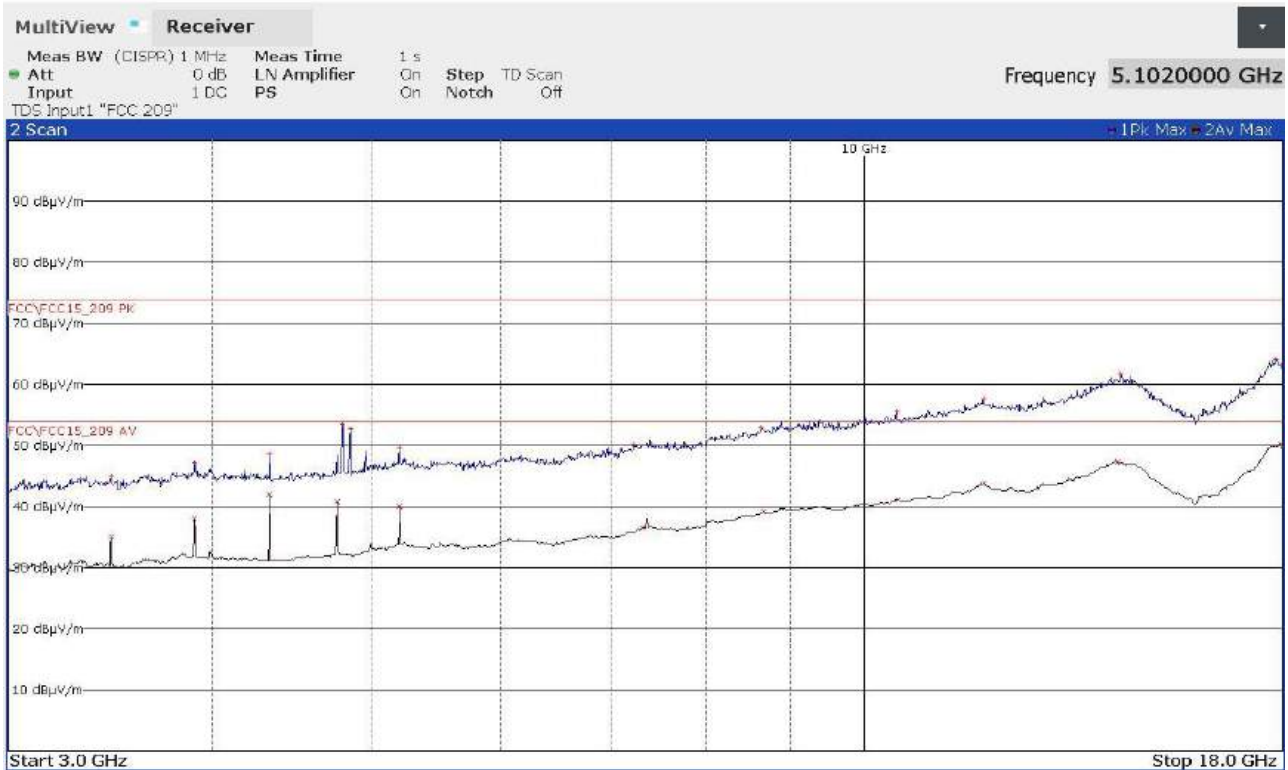


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
3466500000	+46,17	-27,81	3466500000	+37,49	-16,49
3899750000	+47,17	-26,81	3899750000	+37,16	-16,82
4333000000	+54,06	-19,92	4333250000	+51,04	-2,94
4766500000	+50,16	-23,82	4766500000	+44,17	-9,81
5199750000	+49,91	-24,07	5199750000	+41,06	-12,92
6066250000	+48,63	-25,35	6066500000	+38,38	-15,60
7345500000	+50,43	-23,55	7323000000	+36,55	-17,43
8769250000	+53,12	-20,86	8666250000	+39,81	-14,17
10456500000	+55,16	-18,82	10479750000	+41,11	-12,87
12254000000	+57,58	-16,40	11820000000	+43,83	-10,15
14318000000	+61,45	-12,53	14259500000	+47,44	-6,54
17959500000	+64,10	-9,88	17896500000	+50,21	-3,77

22007612_2

Segalla 22007613

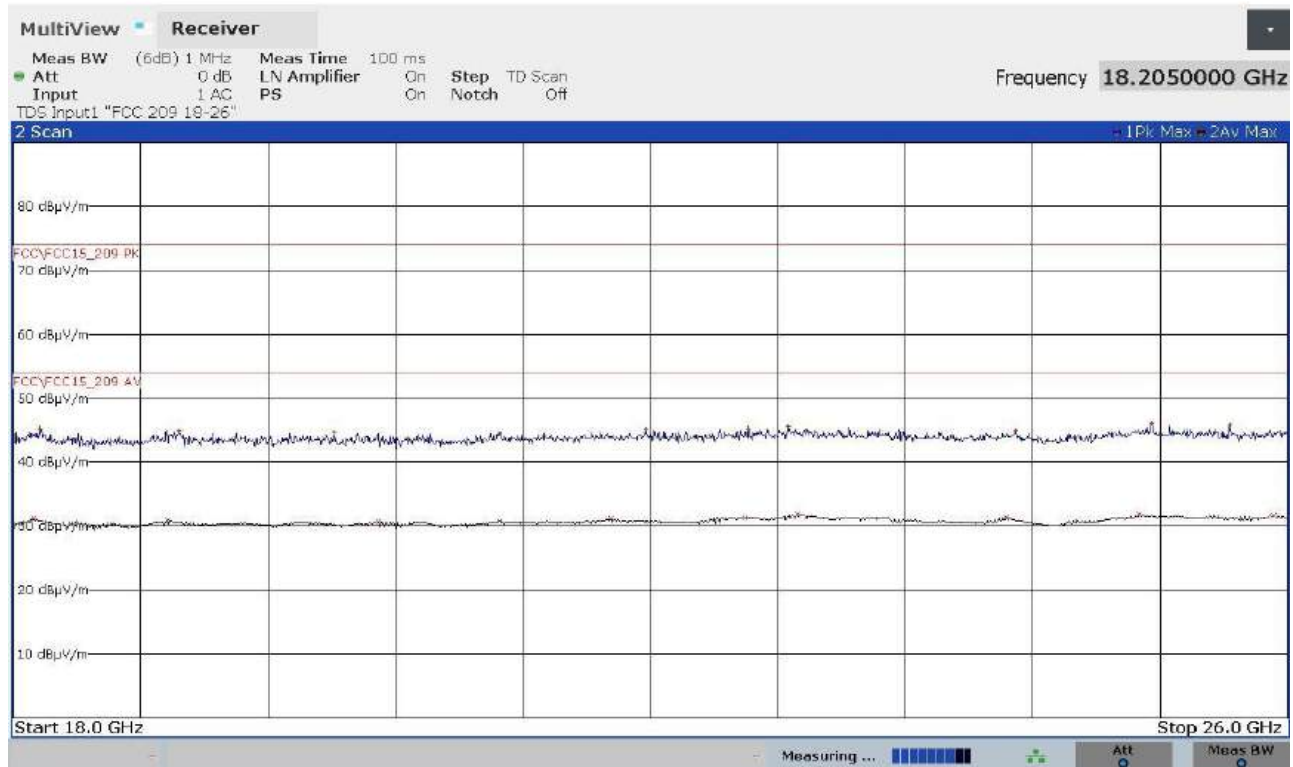


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
3466500000	+44,90	-29,08	3466500000	+35,10	-18,88
3899750000	+47,17	-26,81	3899750000	+37,97	-16,01
4333000000	+48,54	-25,44	4333250000	+41,90	-12,08
4803500000	+53,44	-20,54	4766500000	+40,89	-13,09
4852500000	+52,80	-21,18	5199750000	+40,05	-13,93
5199750000	+49,43	-24,55	7322750000	+36,54	-17,44
7226250000	+50,15	-23,83	8666250000	+39,25	-14,73
8644250000	+52,92	-21,06	10480000000	+41,11	-12,87
10467250000	+55,50	-18,48	11820000000	+43,83	-10,15
11814500000	+57,78	-16,20	14260000000	+47,44	-6,54
14334500000	+61,77	-12,21	17939750000	+50,16	-3,82
17823500000	+64,04	-9,94			

22007613_2

Segalla 22007614

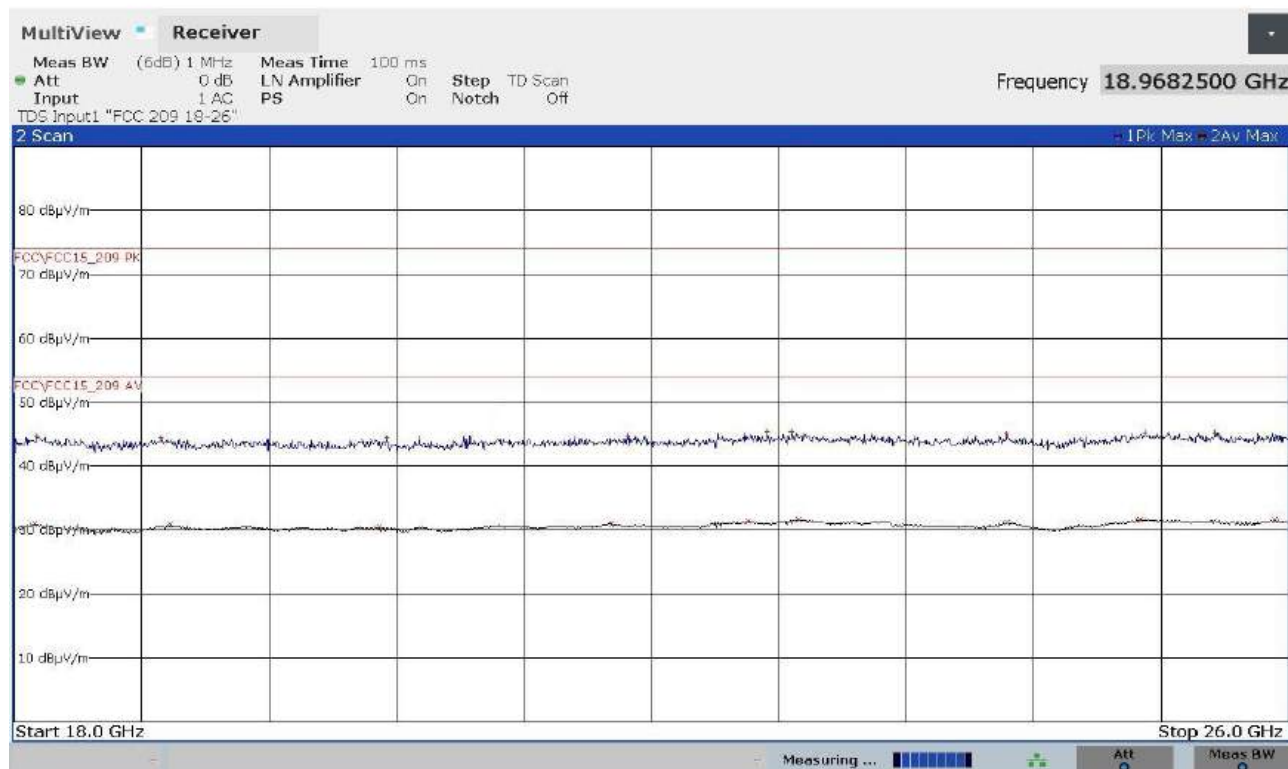


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
18169750000	+45,29	-28,69	18130000000	+31,08	-22,90
19045500000	+44,99	-28,99	18965000000	+30,89	-23,09
20017500000	+44,62	-29,36	20293750000	+30,72	-23,26
21969250000	+45,03	-28,95	21749500000	+31,10	-22,88
22615500000	+45,16	-28,82	22593750000	+31,35	-22,63
22863500000	+45,53	-28,45	22919750000	+31,73	-22,25
24289250000	+44,96	-29,02	24234000000	+31,23	-22,75
25142250000	+45,94	-28,04	25066250000	+31,75	-22,23
25632500000	+45,72	-28,26	25910750000	+31,69	-22,29

22007614_2

Segalla 22007615

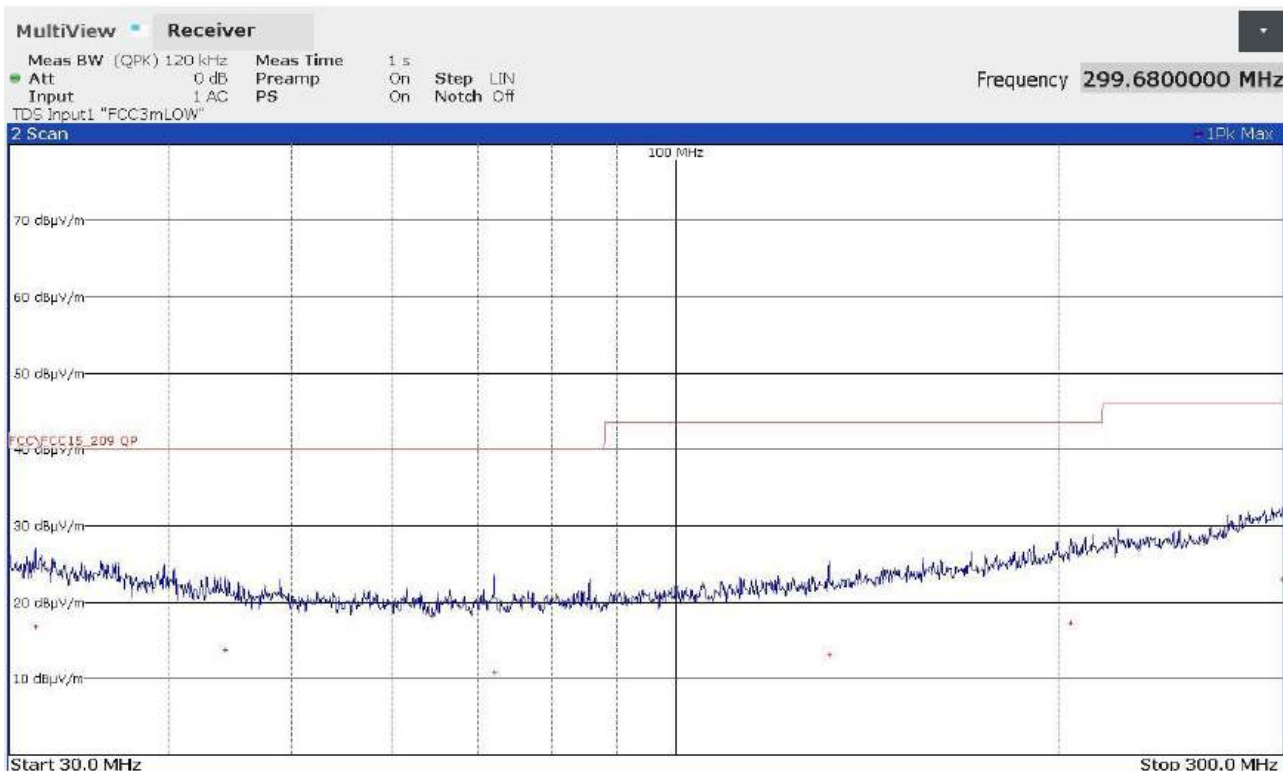


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
18143250000	+44,79	-29,19	18130000000	+31,00	-22,98
18925750000	+44,45	-29,53	18982000000	+30,83	-23,15
20337750000	+44,42	-29,56	20292500000	+30,57	-23,41
21854000000	+44,71	-29,27	21749250000	+31,00	-22,98
22725250000	+45,40	-28,58	22607750000	+31,26	-22,72
22878250000	+45,35	-28,63	22919750000	+31,60	-22,38
24229750000	+45,08	-28,90	24233500000	+31,12	-22,86
25094250000	+45,17	-28,81	25066000000	+31,67	-22,31
25536250000	+45,29	-28,69	25911250000	+31,59	-22,39

22007615_2

Segalla 22007650



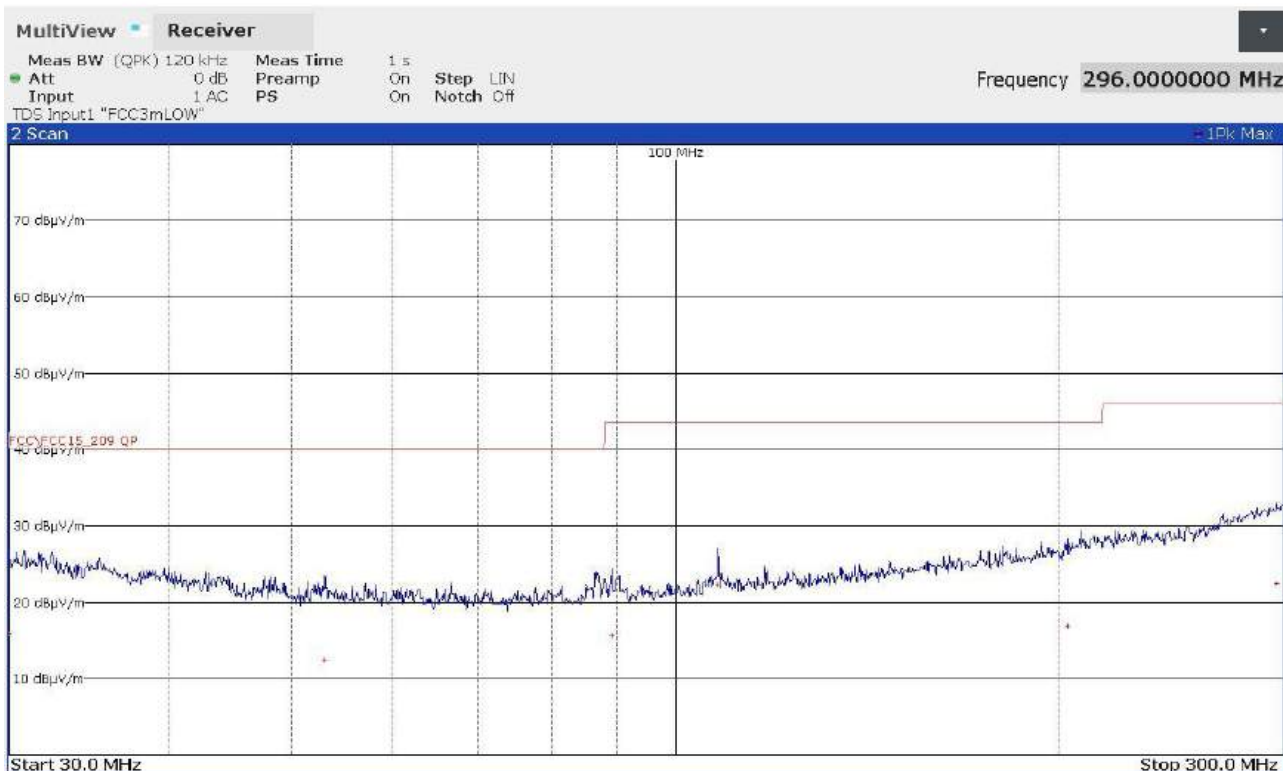
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
31480000	+16,84	-23,16
44320000	+13,78	-26,22
72080000	+10,81	-29,19
131920000	+13,09	-30,43
204160000	+17,37	-26,15
299680000	+22,95	-23,07

22007650_2

Segalla 22007651



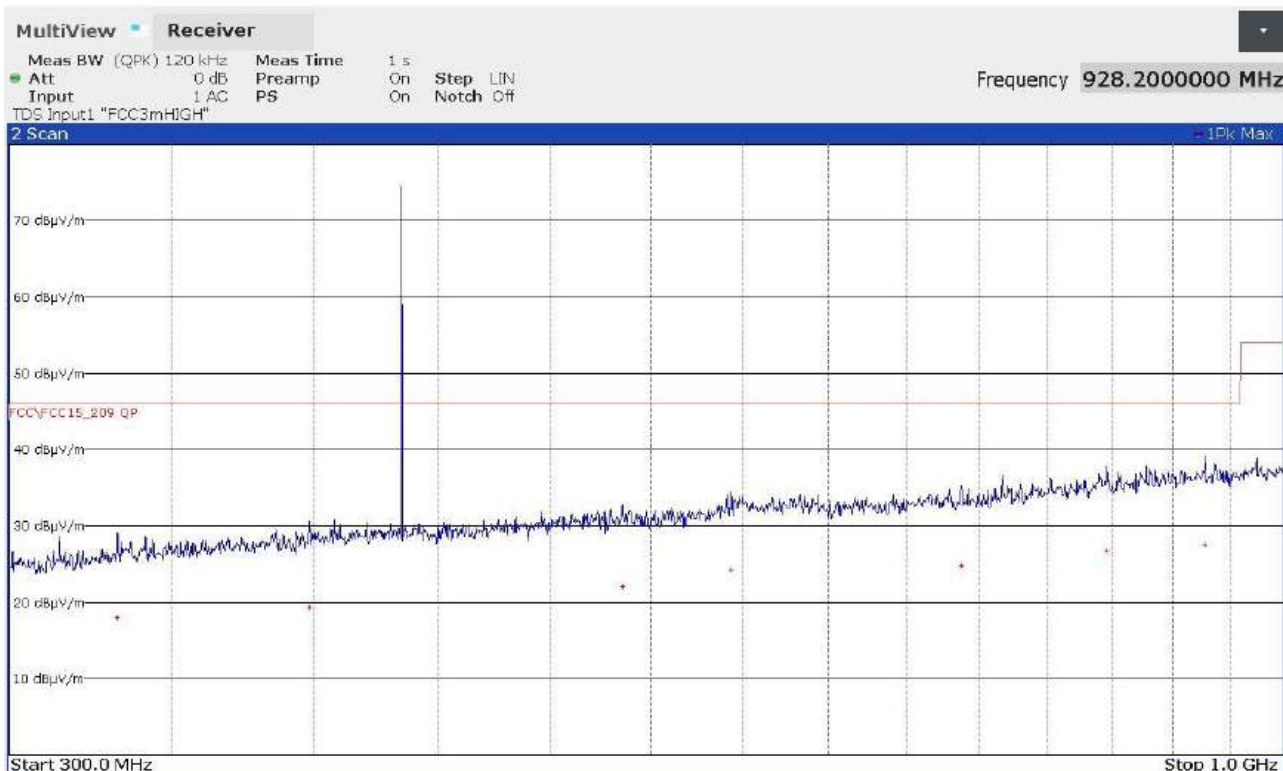
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
30000000	+15,88	-24,12
53080000	+12,45	-27,55
89120000	+15,63	-27,89
108000000	+22,23	-21,29
203000000	+16,90	-26,62
296000000	+22,37	-23,65

22007651_2

Segalla 22007652



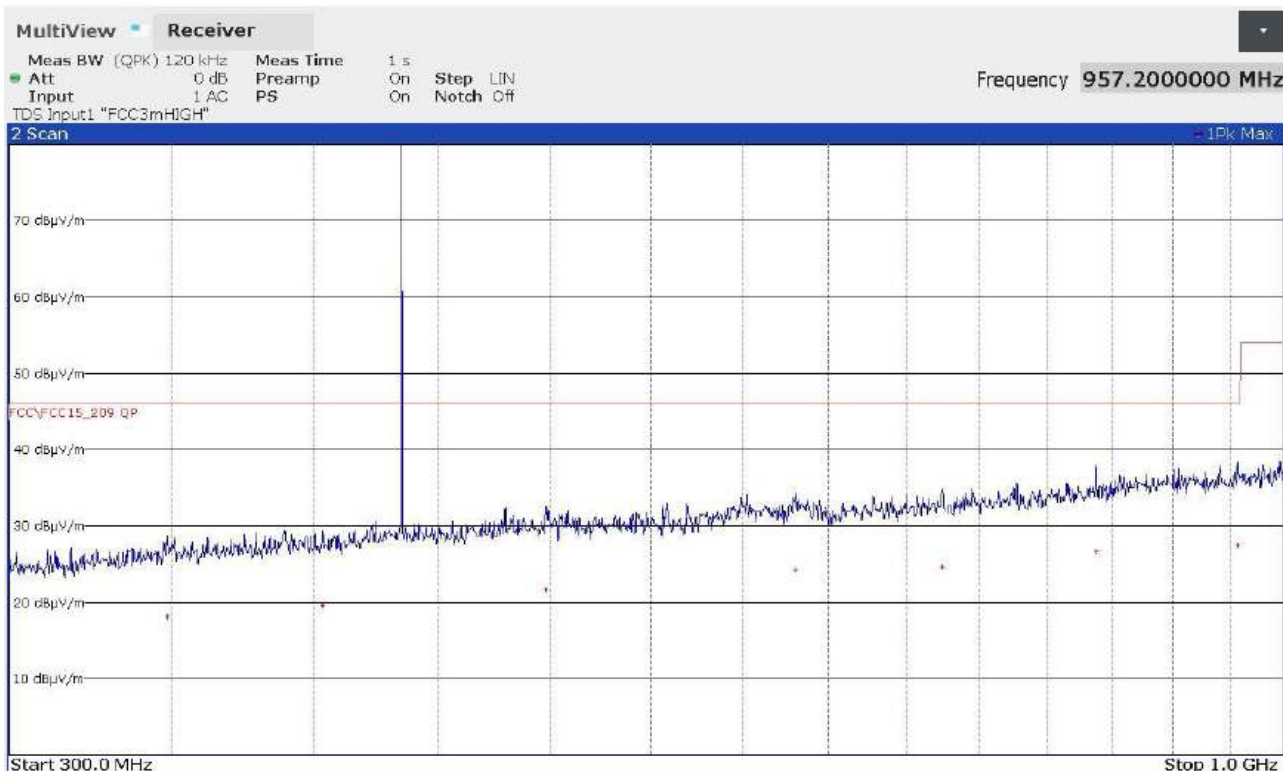
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
332400000	+17,94	-28,08
398480000	+19,23	-26,79
535560000	+22,01	-24,01
593400000	+24,25	-21,77
737480000	+24,79	-21,23
845840000	+26,80	-19,22
928200000	+27,55	-18,47

22007652_2

Segalla 22007653



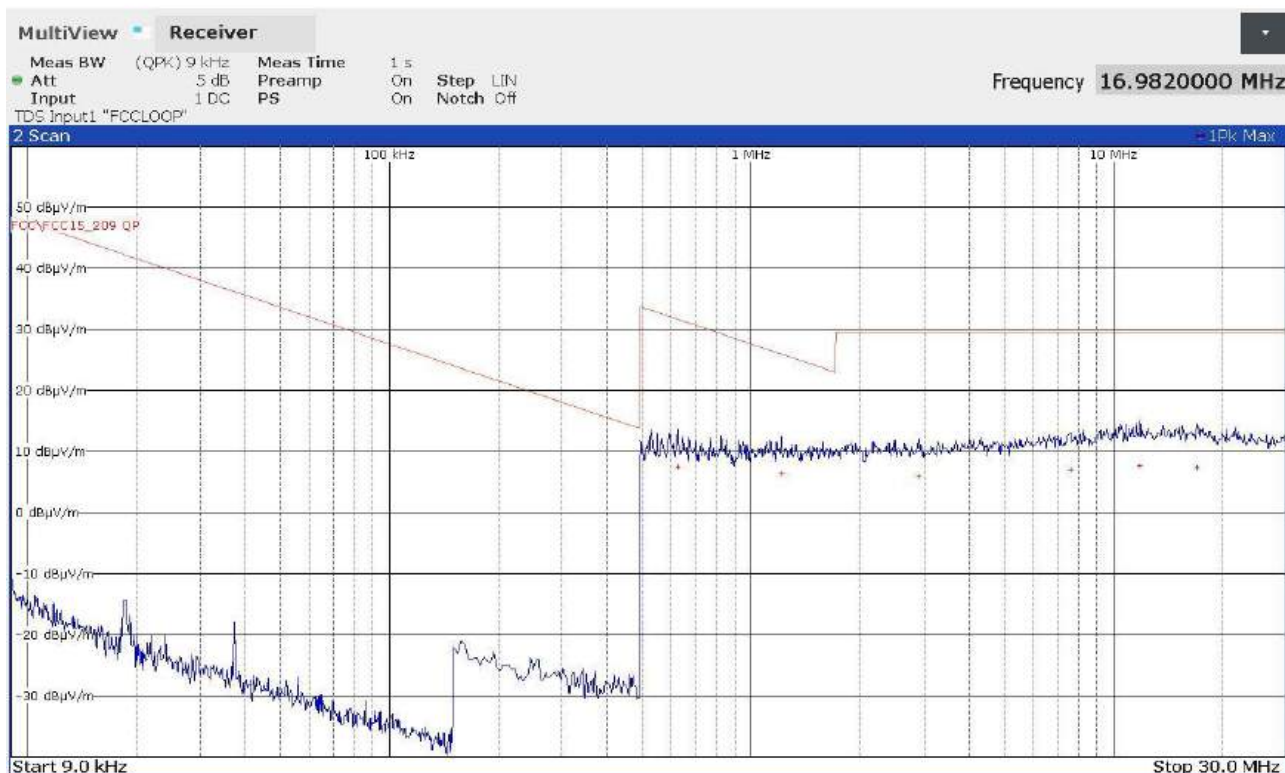
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
348280000	+18,10	-27,92
403480000	+19,58	-26,44
498280000	+21,62	-24,40
630440000	+24,29	-21,73
724280000	+24,64	-21,38
837560000	+26,61	-19,41
957200000	+27,47	-18,55

22007653_2

Segalla 22007659

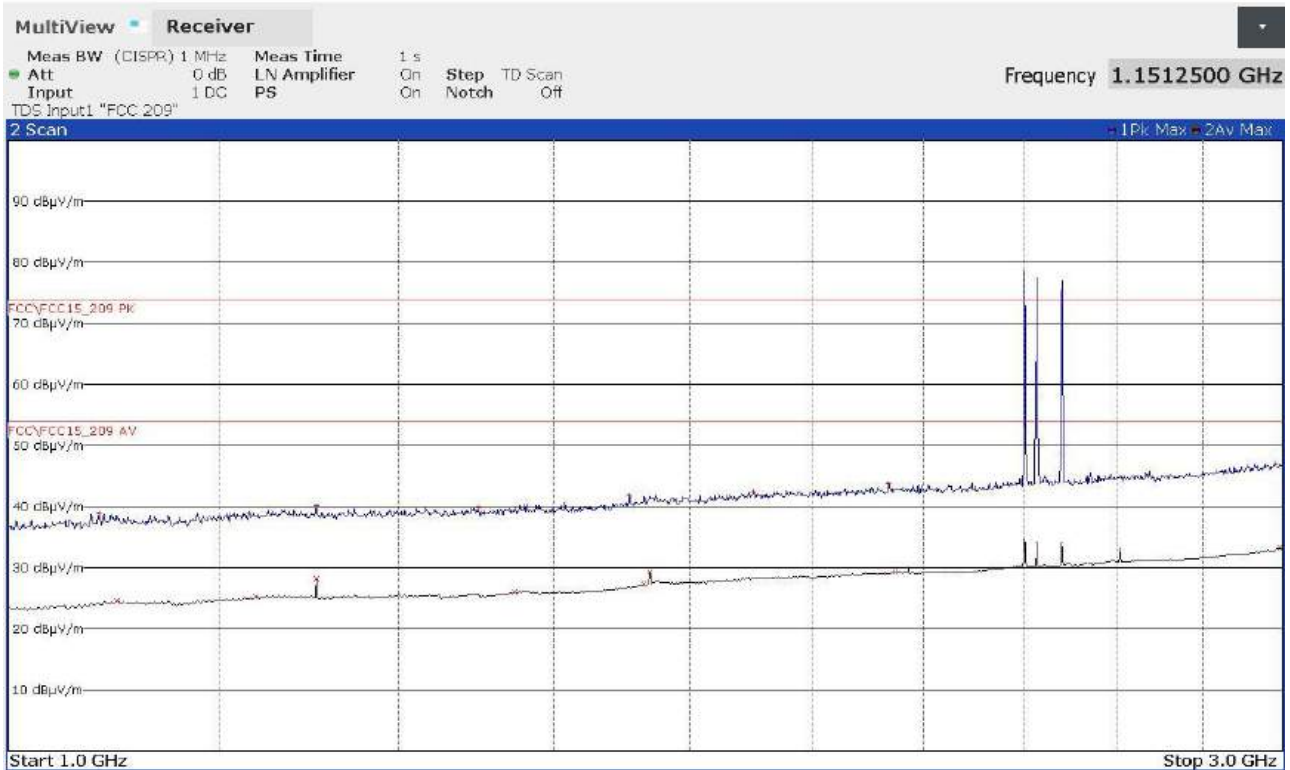


FINAL RESULT TABLE

QUASI PEAK		
Freq Hz	Lev dBuV/m	Margin dB
626000	+7,55	-24,12
1214000	+6,34	-19,58
2902000	+5,93	-23,61
7602000	+7,11	-22,43
11858000	+7,66	-21,88
16982000	+7,38	-22,16

22007659_2

Segalla 22007660

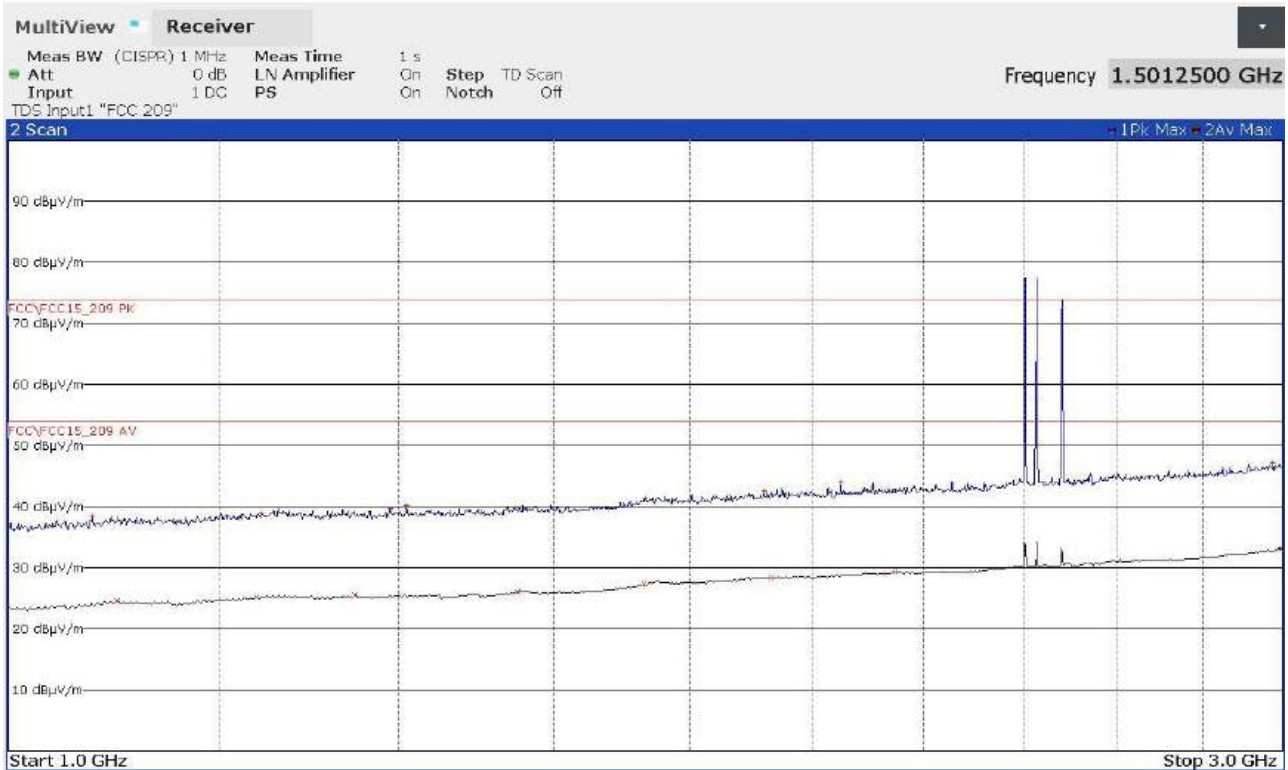


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1081250000	+38,78	-35,20	1099000000	+24,65	-29,33
1231250000	+38,89	-35,09	1238000000	+25,30	-28,68
1304250000	+40,10	-33,88	1304250000	+28,26	-25,72
1499750000	+39,87	-34,11	1547500000	+26,00	-27,98
1708250000	+41,84	-32,14	1730000000	+27,30	-26,68
1900750000	+42,45	-31,53	1738750000	+29,37	-24,61
2135750000	+43,76	-30,22	2148500000	+29,31	-24,67
2981500000	+47,07	-26,91	2993500000	+33,20	-20,78

22007660_2

Segalla 22007661

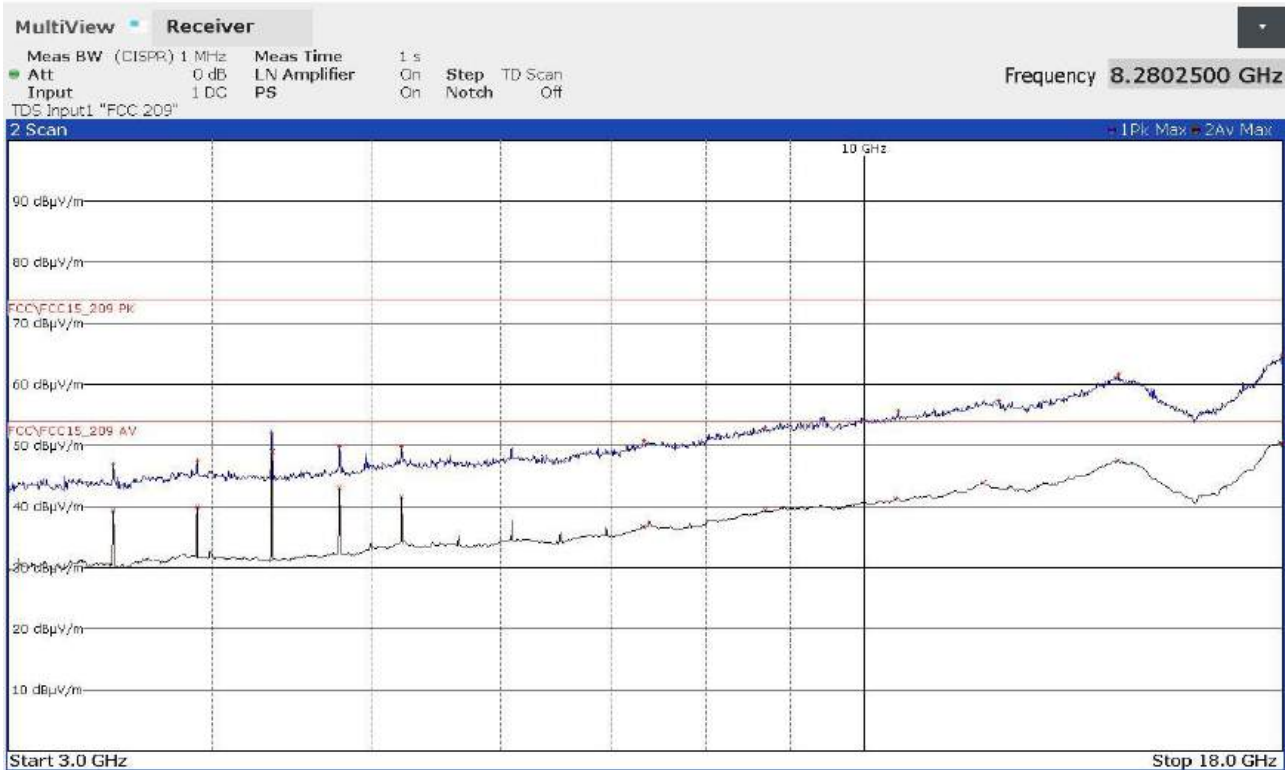


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1075500000	+38,49	-35,49	1099000000	+24,65	-29,33
1244500000	+38,93	-35,05	1238250000	+25,30	-28,68
1390000000	+39,73	-34,25	1347750000	+25,61	-28,37
1409750000	+40,19	-33,79	1551750000	+26,01	-27,97
1730750000	+41,52	-32,46	1730000000	+27,30	-26,68
1918500000	+42,61	-31,37	1929750000	+28,42	-25,56
2049750000	+43,91	-30,07	2148750000	+29,30	-24,68
2974250000	+47,23	-26,75	2994250000	+33,19	-20,79

22007661_2

Segalla 22007662

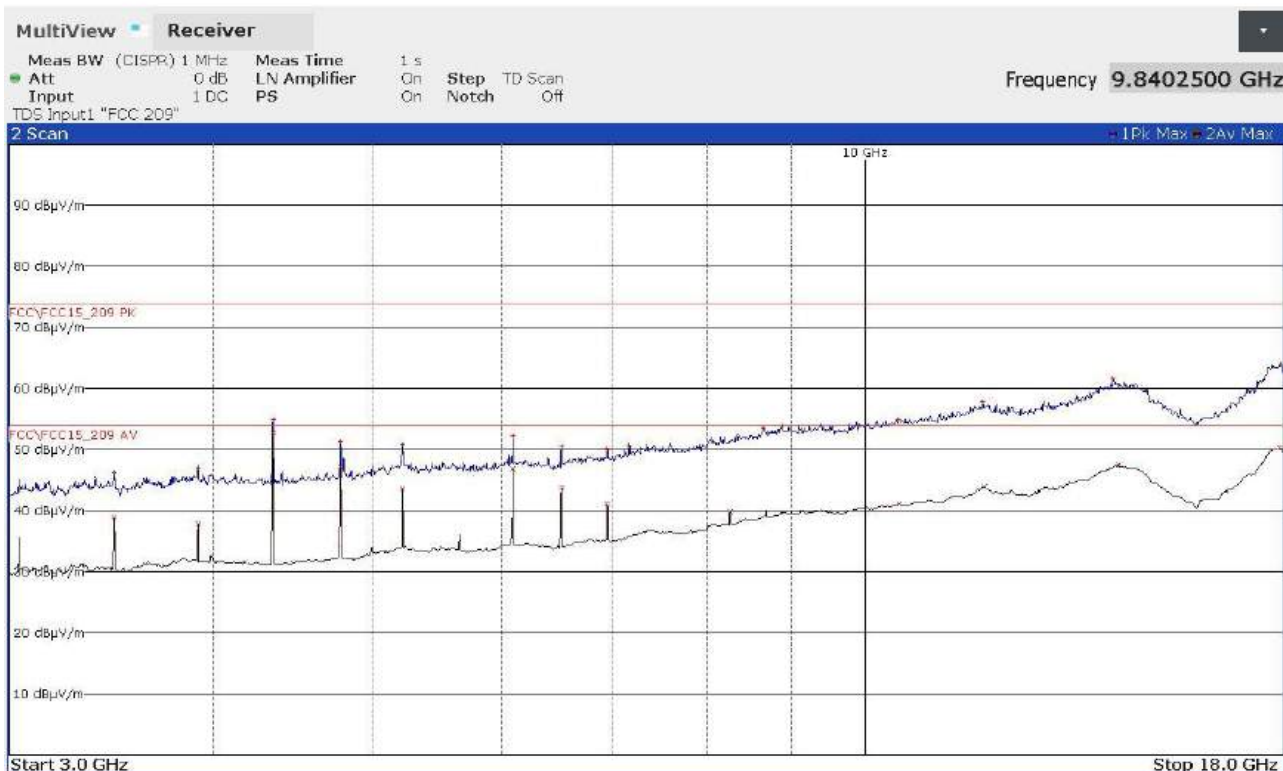


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
3477750000	+46,81	-27,17	3477750000	+39,39	-14,59
3912500000	+47,52	-26,46	3912500000	+39,93	-14,05
4347000000	+52,15	-21,83	4347250000	+49,03	-4,95
4781750000	+49,82	-24,16	4781750000	+43,14	-10,84
5216500000	+49,82	-24,16	5216500000	+41,67	-12,31
7332000000	+50,85	-23,13	7322250000	+36,70	-17,28
8695500000	+53,00	-20,98	8694250000	+39,57	-14,41
10483000000	+55,55	-18,43	10440000000	+41,30	-12,68
12072000000	+57,43	-16,55	11819000000	+43,97	-10,01
14280000000	+61,61	-12,37	14260000000	+47,59	-6,39
17971000000	+64,68	-9,30	17939250000	+50,51	-3,47

22007662_2

Segalla 22007663

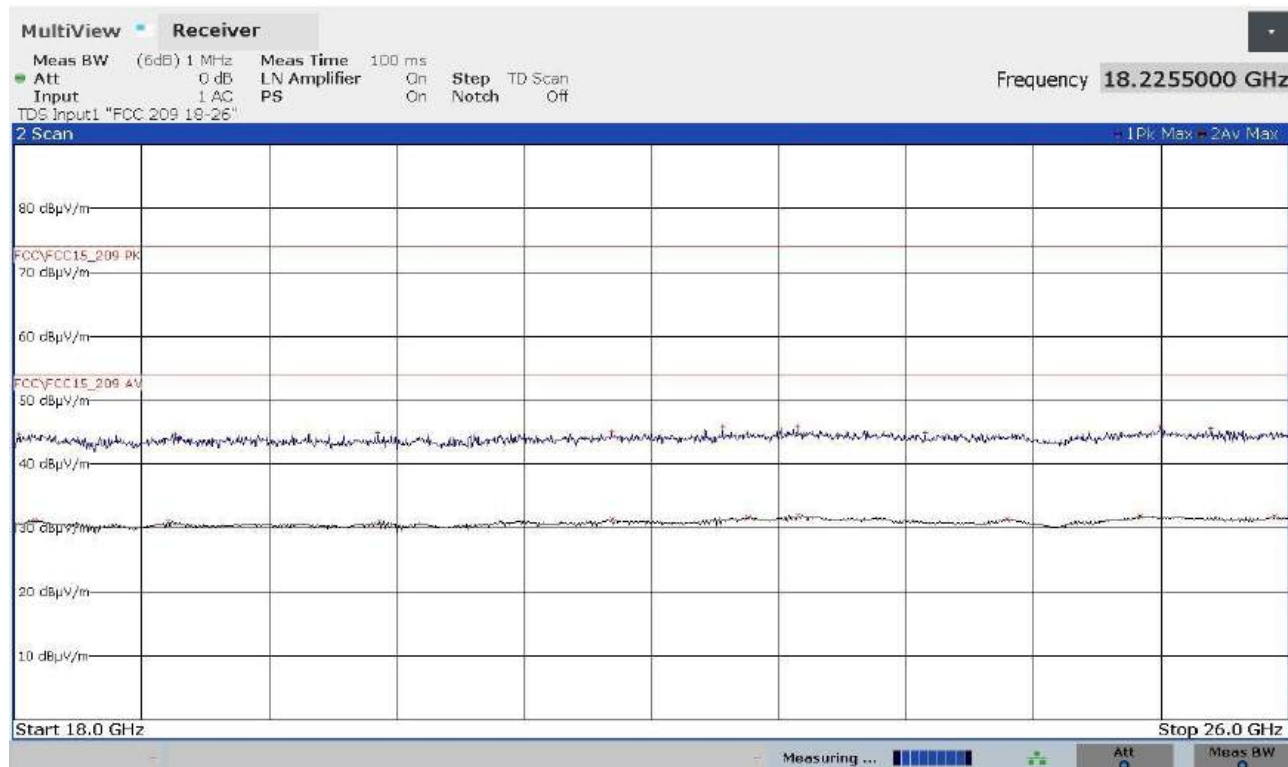


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
3477750000	+46,23	-27,75	3477750000	+38,80	-15,18
3912500000	+47,08	-26,90	3912500000	+37,85	-16,13
4347250000	+54,93	-19,05	4347250000	+52,71	-1,27
4781750000	+51,39	-22,59	4781750000	+47,27	-6,71
5216500000	+50,84	-23,14	5216500000	+43,62	-10,36
6086000000	+52,32	-21,66	6086000000	+46,88	-7,10
6520750000	+50,45	-23,53	6520750000	+43,82	-10,16
6955250000	+50,21	-23,77	6955500000	+41,21	-12,77
7174500000	+50,69	-23,29	8259500000	+39,83	-14,15
8661750000	+53,37	-20,61	10480000000	+41,18	-12,80
10474500000	+54,90	-19,08	11820000000	+43,88	-10,10
11789250000	+57,92	-16,06	14260000000	+47,51	-6,47
14157750000	+61,62	-12,36	17896500000	+50,32	-3,66
17917250000	+64,00	-9,98			

22007663_2

Segalla 22007664

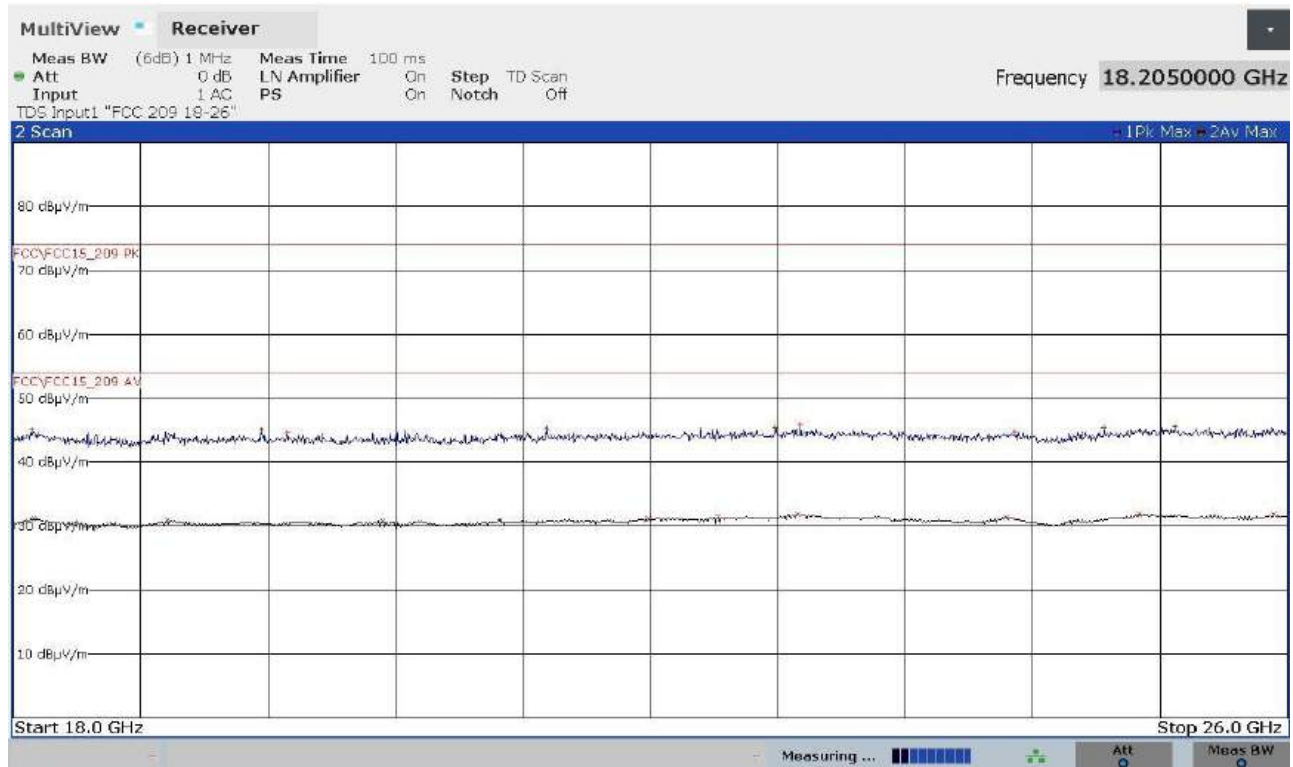


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
18033000000	+44,64	-29,34	18131500000	+31,19	-22,79
19014000000	+44,55	-29,43	18967250000	+31,02	-22,96
20282250000	+44,85	-29,13	20293750000	+31,00	-22,98
21748750000	+45,10	-28,88	21749000000	+31,30	-22,68
22448000000	+45,84	-28,14	22607750000	+31,56	-22,42
22912500000	+45,88	-28,10	22919500000	+31,97	-22,01
23717500000	+45,00	-28,98	24234750000	+31,38	-22,60
25194000000	+45,82	-28,16	25066750000	+31,85	-22,13
25510500000	+45,62	-28,36	25910750000	+31,80	-22,18

22007664_2

Segalla 22007665



FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
18120250000	+45,03	-28,95	18132000000	+31,15	-22,83
19557250000	+45,08	-28,90	18965500000	+30,89	-23,09
19721500000	+44,67	-29,31	20319000000	+30,80	-23,18
21347000000	+45,16	-28,82	21983500000	+31,09	-22,89
22784750000	+45,40	-28,58	22423750000	+31,43	-22,55
22939250000	+45,93	-28,05	22919500000	+31,80	-22,18
24283250000	+44,70	-29,28	24233250000	+31,31	-22,67
24844250000	+45,34	-28,64	25066250000	+31,82	-22,16
25288000000	+45,47	-28,51	25911250000	+31,78	-22,20

22007665_2

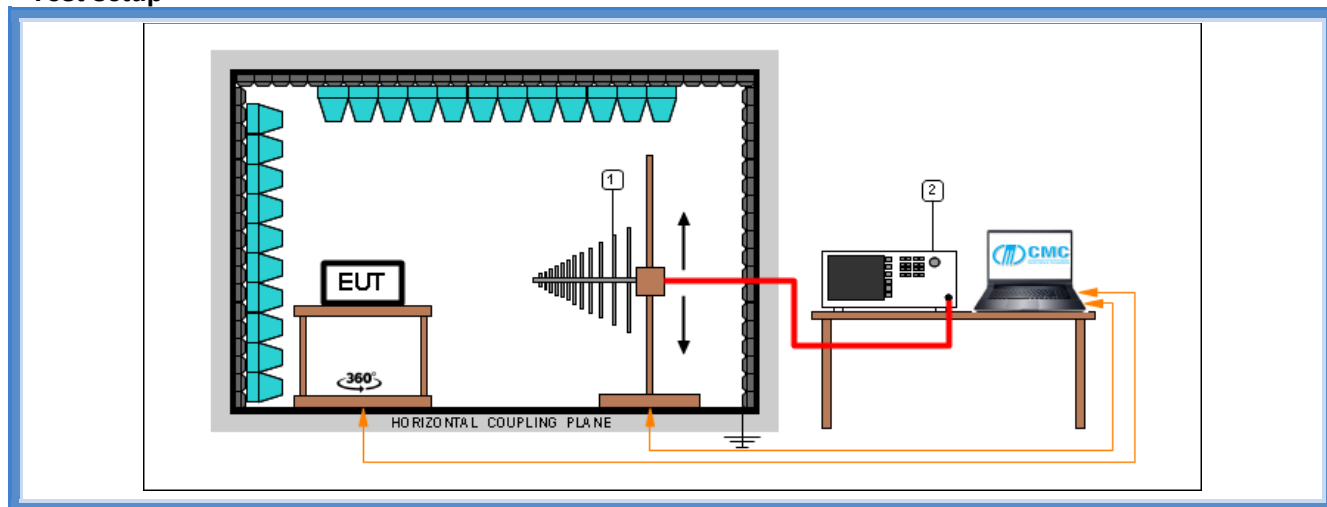
9.4 Field strength of fundamental

Tested by	M. Segalla
Test date	13.06.2022
Test location (stand)	Semi-anechoic chamber (CMC A070)
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.209 and 15.231 (b)
Supplementary test set-up description	EUT – antenna distance: 10 m
Supplementary information.....	--

Acceptance limits

FCC Part 15.231 (b)	
Fundamental frequency (MHz)	Field strength of fundamental [dB(μV/m)]
40,66 to 40,70	67,04
70 to 130	61,94
130 to 174	61,94 to 71,48
174 to 260	71,48
260 to 470	71,48 to 81,94
Above 470	81,94

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 9111B	Broadband Antenna

Result

Frequency (MHz)	Graph(s)	Peak level (dBμV/m)	Level (mW)	Limits (dBμV/m)
433,31	G22007603	79,33	0,286	80,11
434,71	G22007654	79,91	0,326	80,18

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest value.

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

Where:

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

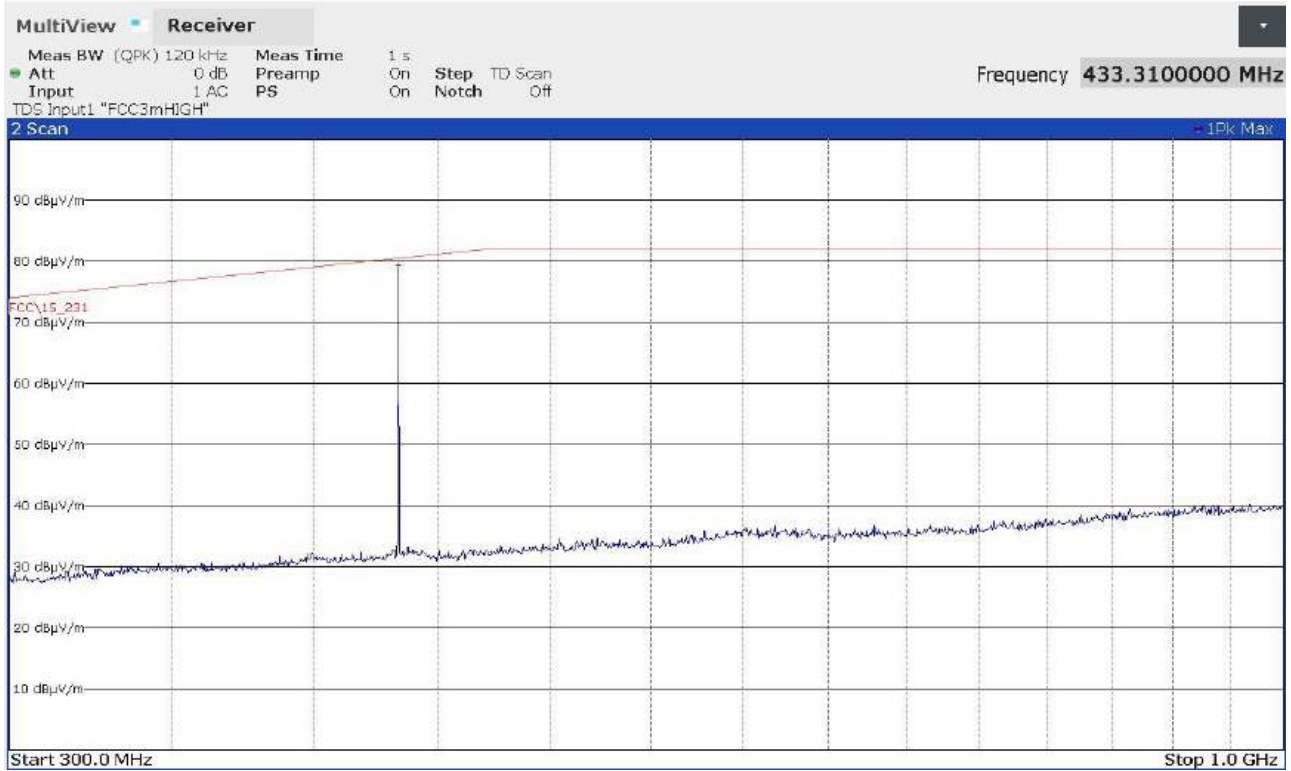
G = the numeric gain of the transmitting antenna: 1 (0 dBi)

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

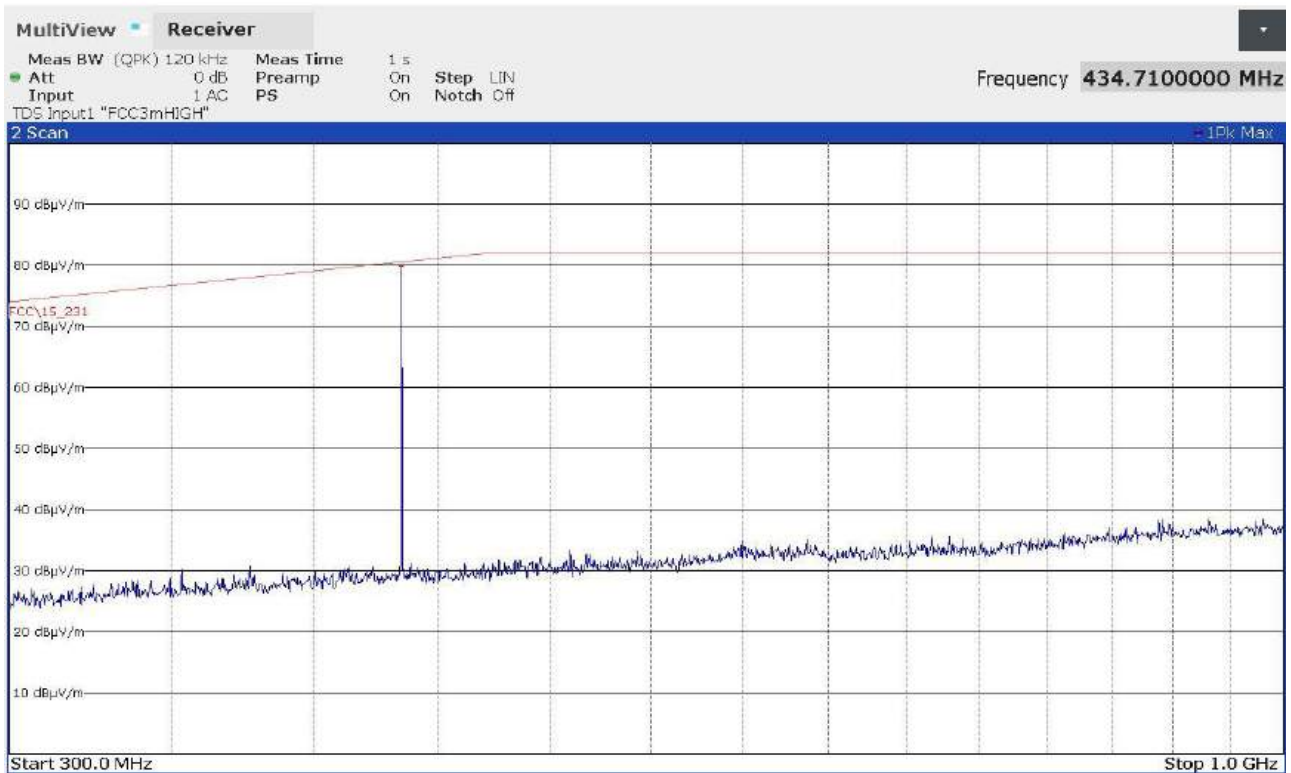
P = the power in watts

Graphs

Segalla 22007603



Segalla 22007654



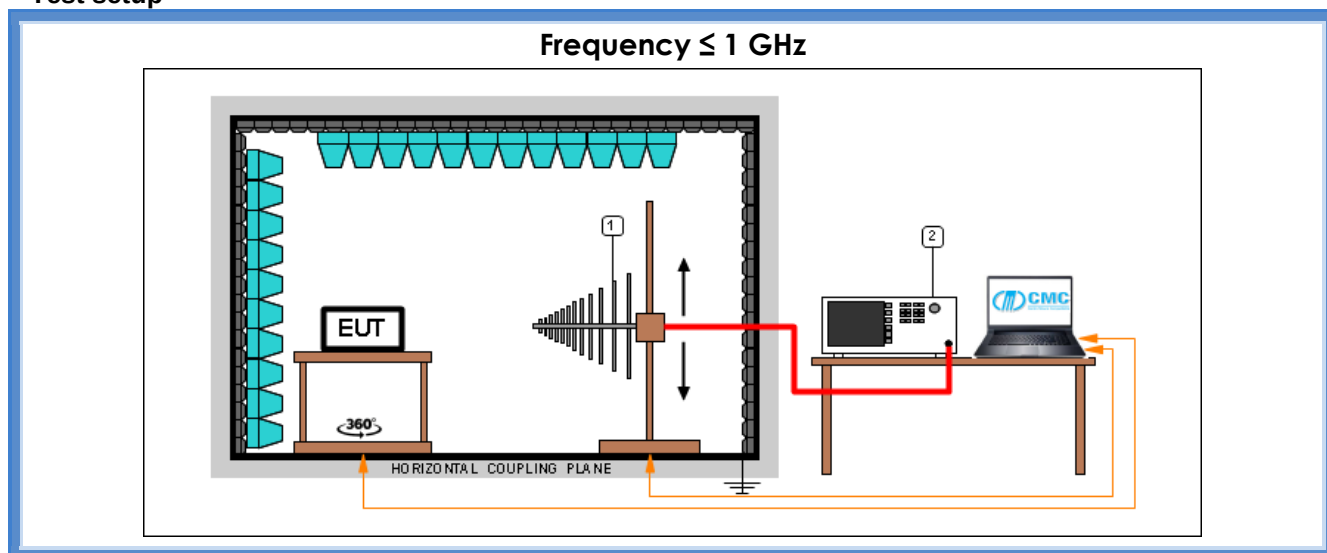
9.5 Occupied channel bandwidth

Tested by	M. Segalla
Test date	13.06.2022
Test location (stand)	Semi-anechoic chamber (CMC A070)
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.231 (c)
Supplementary test set-up description	--
Supplementary information.....	--

Acceptance limits

Limits	
Devices operating above 70 MHz and below 900 MHz	Devices operating above 900 MHz
0,25% of the center frequency	0,5% of the center frequency

Test setup



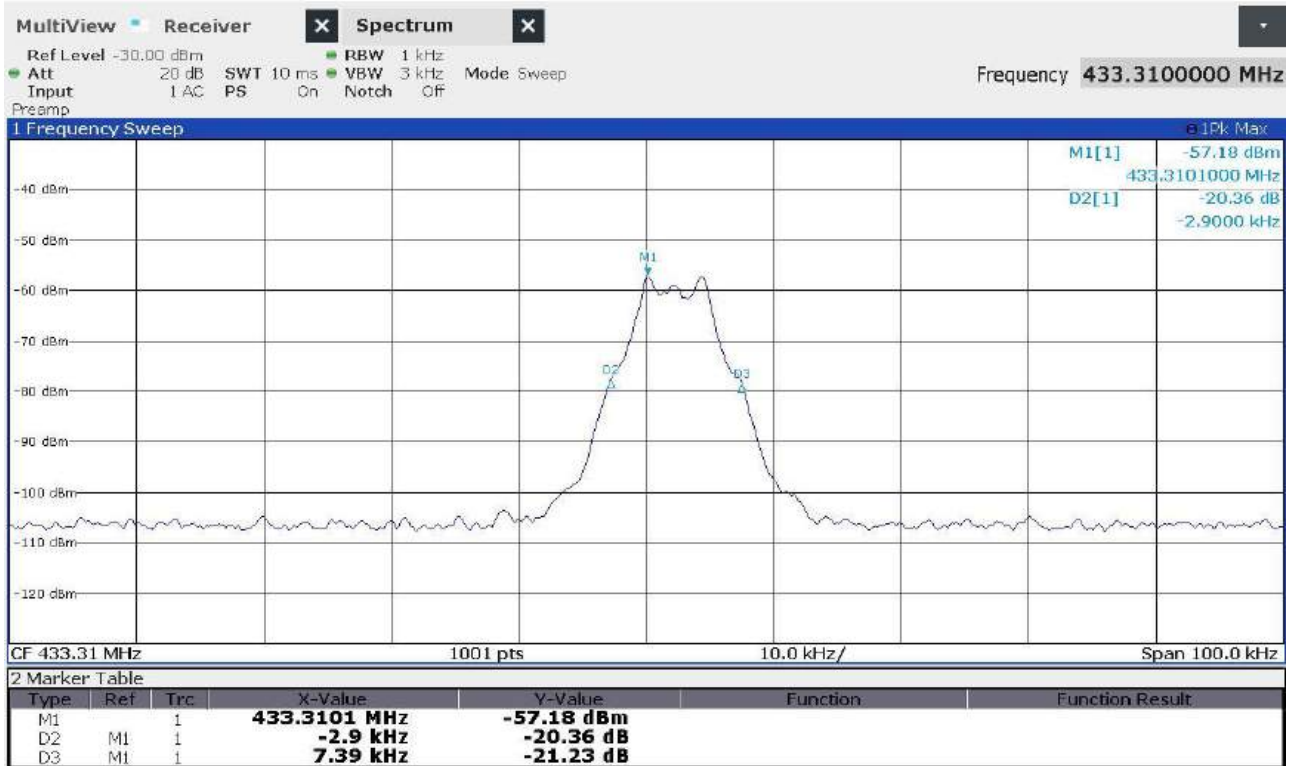
Test setup PE004_03				
Nr.	Id. Number	Manufacturer	Model	Description
2	CMC S353	Rohde & Schwarz	ESW26	EMI Test Receiver 1 Hz - 26.5 GHz
1	CMC S287	Schwarzbeck	VUSLP 9111B	Broadband Antenna

Result

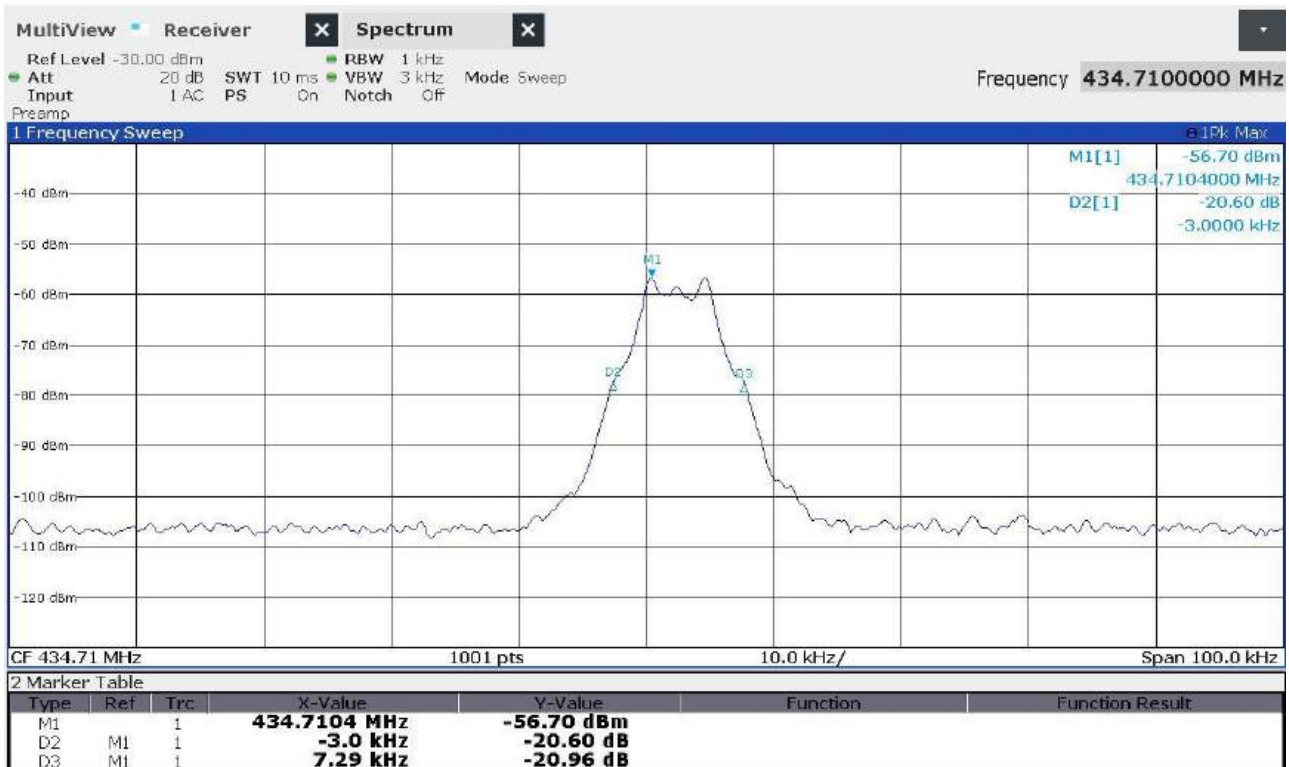
Frequency (MHz)	Graphs	20 dB bandwidth (kHz)	Limit (kHz)
433,31	G22007604	10,29	1083,27
434,71	G22007656	10,29	1086,78

Graphs

Segalla 22007604



Segalla 22007656



9.6 Periodic operation characteristics

Tested by	M. Segalla	
Test date	13.06.2022	
Test location (stand)	Laboratory	
Reference standards	FCC Rules and Regulation; Titles 47 Part. 15.231 (a) (e)	
Type of transmission.....	☒	Manually operated transmitter
	☐	Transmitter activated automatically

Acceptance limits

The provisions of this section are restricted to periodic operation within the band 40,66 – 40,70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation

15.231(a1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

<i>Transmission channel (MHz)</i>	<i>Graphs</i>	<i>Transmitter deactivation time</i>	<i>Limits</i>
433,31	G22007620	0,346 s	5 s
434,71	G22007658	0,346 s	5 s

15.231(a2) A transmitter activated automatically shall cease transmission within 5 seconds after activation

Result: N.A.

15.231(a3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour

Result: The EUT does not employ periodic transmission.

15.231(a4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

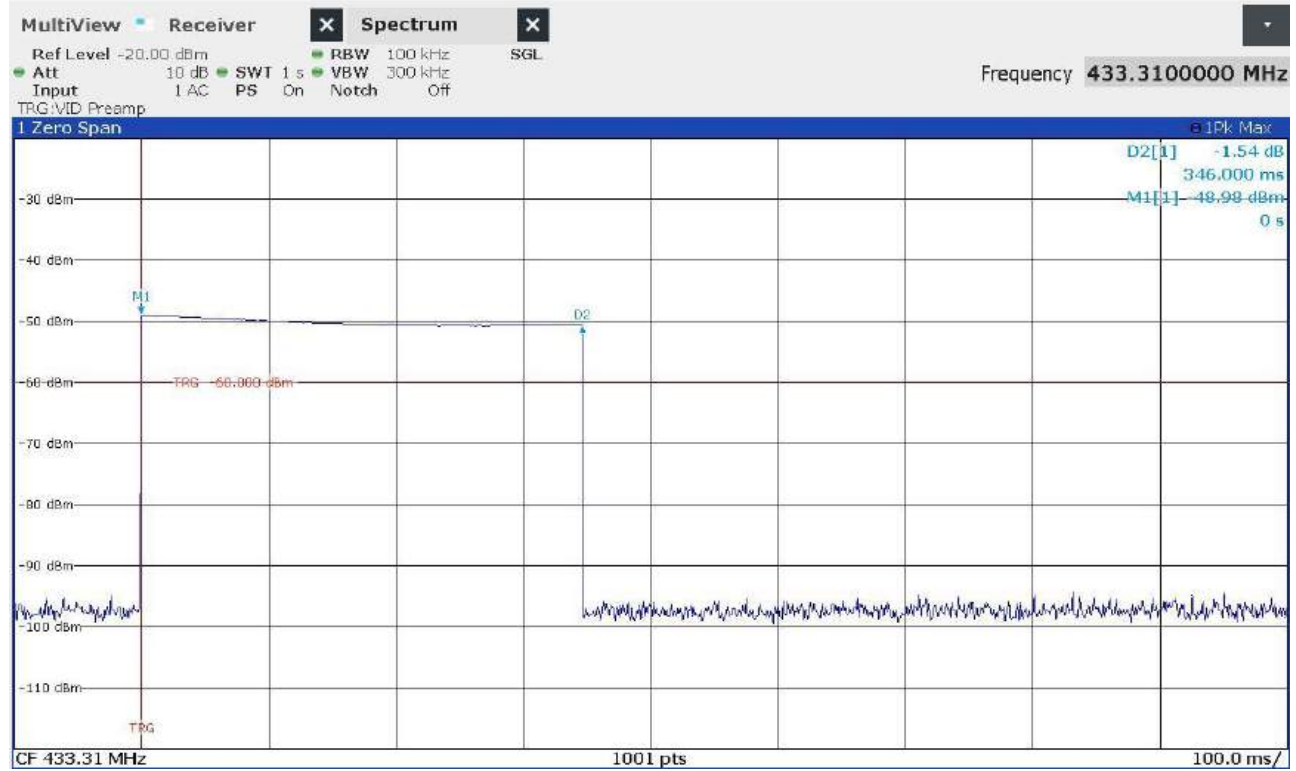
Result: N.A.

15.231(a5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data

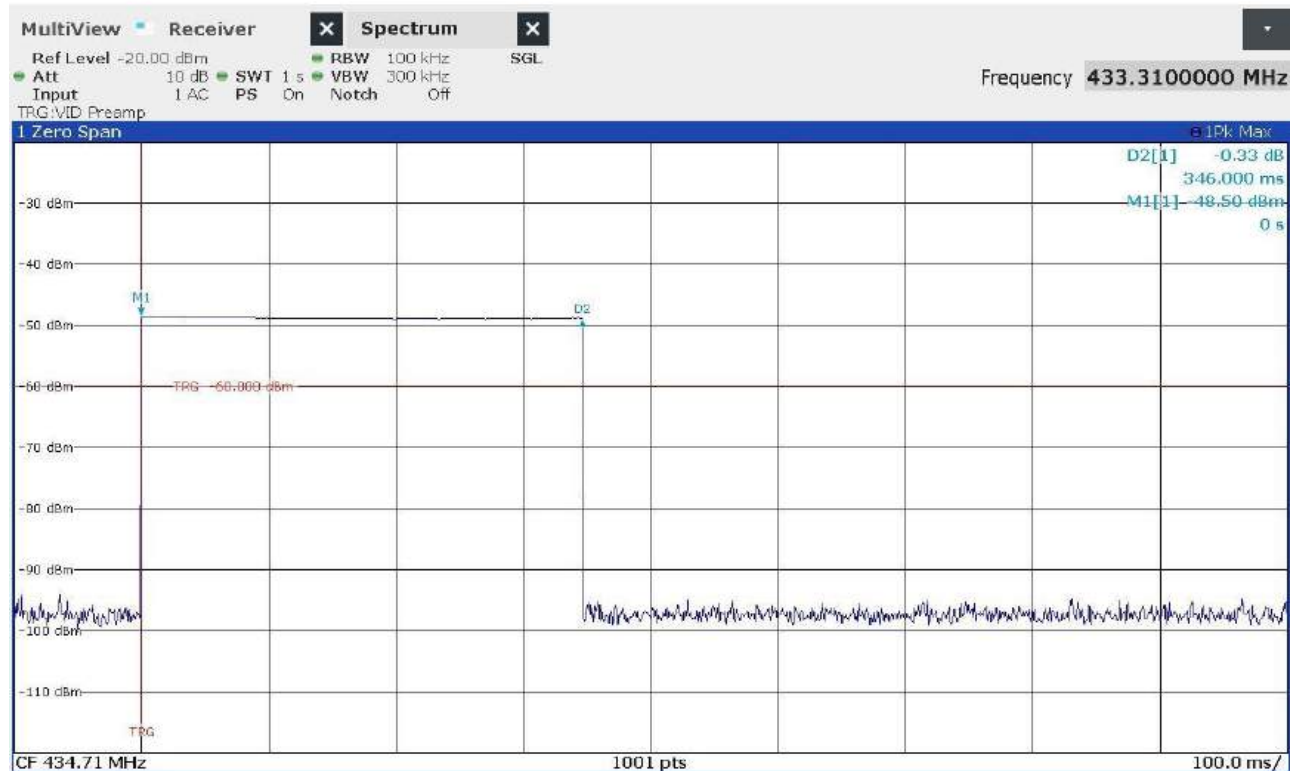
Result: N.A.

Graphs

Segalla 22007620



Segalla 22007658



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 '22	January '23
CMC S108	EMCO	3115	Horn Antenna	9811-5622	June '22	June '25
CMC S127	Schaffner	HLA6120	Loop Antenna	1191	November '18	November '23
CMC S200	Schwarzbeck	NSLK 8128	V-LISN	8128-273	January '22	January '23
CMC S206	Rohde & Schwarz	ESCI 7	EMC Receiver 9KHz-7GHz	100781	January '22	January '23
CMC S260	CMC	Wfr_N	Shielded Cable	Wfr_ant10-1	November '21	November '22
CMC S261	CMC	Wfr_N	Shielded Cable	Wfr_ant20-1	November '21	November '22
CMC S262	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix32-1	November '21	November '22
CMC S263	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix31-1	November '21	November '22
CMC S264	CMC	Wfr_N	Shielded Cable	Wfr_ext03-1	November '21	November '22
CMC S271	Schwarzbeck	BBA 9106 + VHBB 9124	Biconical Antenna (30-300MHz)	831	June '22	June '25
CMC S287	Schwarzbeck	VUSLP 9111B	Log-periodic Antenna (200 MHz-3Ghz)	9111B-203	June '22	June '25
CMC S288	CMC	W_sma_white	Joint Shielded Cable	W_001	November '21	November '22
CMC S295	Rohde & Schwarz	FSW43	Spectrum Analyzer 43GHz	104059	November '19	November '22
CMC S353	Rohde & Schwarz	ESW26	Emi Test Receiver 1 Hz - 26.5 GHz	101492	September '20	September '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	2,3 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	4,1 dB		1
Radiated Emission CISPR 16 Bicon. Ant. 30-300 MHz	PE004_02	4,7 dB		1
Radiated Emission CISPR 16 LogP. Ant. 300-1000 MHz	PE004_03	4,6 dB		1
Radiated Emission CISPR 16 Horn Ant. 1-18 GHz	PE004_04	4,7 dB		1
Human Exposure to electromagnetic fields	PE005_01	16,7 %		1
Harmonics	PE006_01	10 mA +	2,9 %	1
Flicker	PE007_01	4,15 %		1
Radiated Immunity 80 MHz - 6 GHz	PE102_XX	2,20 dB	0,86 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

Test	Test Setup	Expanded uncertainty	Note
Power/Spurious 9kHz-30MHz	PR001_01	4,1 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. 22_01 date 31/01/2022			

Note 1:

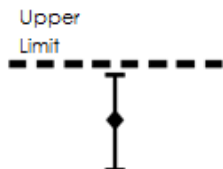
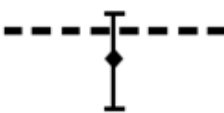
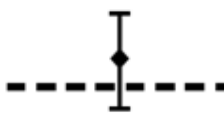
The expanded uncertainty reported according to the document EA-4-02 is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of $p = 95\%$

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. 3.1 (Quality Manual)	Measure procedure
Internal Procedure INC_M rev. 9.7 (Quality Manual)	Measurement uncertainty calculation