

TEST REPORT

Nr. R22008501

Federal Communication Commission (FCC)

Report Reference No.	R22008501
Date of issue:	08.03.2023
Total number pages:	40
Customer name	Microgate S.r.l.
Address	Via Waltraud Gebert Deeg, 3e – 39100 Bolzano (BZ) – Italy
Test specification:	
Standards	FCC Rules & Regulations, Title 47:2021 Part 15 paragraph(s): 209 and 247 KDB 996369 D04 Module Integration Guide v01 Tests details at page 9
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	2023-02
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 DEKRA Testing and Certification S.r.l.	
(*) Test item description	WITTYPRO TAB – Display Board
(*) Trademark	Microgate
(*) Manufacturer	Microgate S.r.l.
(*) Model / Type reference	WIT204
(*) FCC ID of certified module	SQGBL652
(*) Rating(s)	12 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 15:2021	Radio frequency devices
KDB 996369 D04 Module Integration Guide v01	Modular transmitter integration guide – Guidance for host product manufacturers
3 List of attachments	
Attachment 1: Instruments list, measurement uncertainty, judgement of compliance and quality manual references	
Attachment 2: Components list	
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	

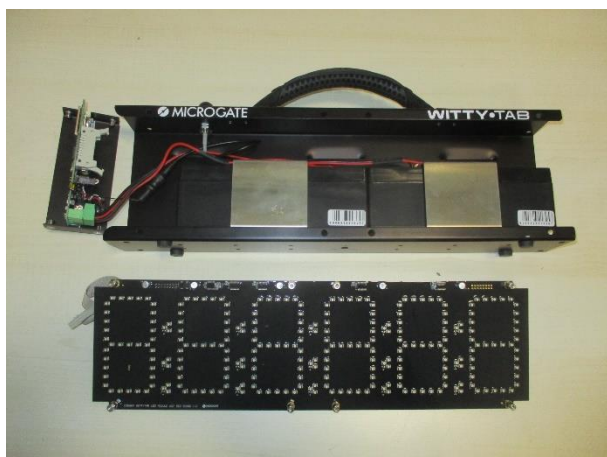
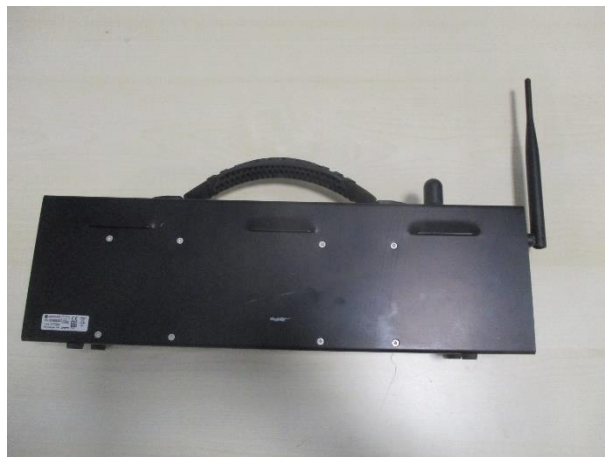
Revision index	Date	Change history
1.0	08.03.2023	--

Testing and sampling:	
Date of receipt of test item	12.01.2022
Testing start date	02.03.2023
Testing end date	02.03.2023
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 P220030
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 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. 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 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 tested item and testing condition(s)

Description	WITTYPRO TAB – Display Board						
Model Number	WIT204						
FCC ID of certified module	SQGBL652						
Serial Number	000003						
Brand name	Microgate						
Test power supply.....		Voltage and Frequency	Reference poles				
			N	L1	L2	L3	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 12 V from battery					☐
Type of equipment.....	☒ Transmitter unit ☒ Receiver unit						
Type of station	☐ Portable station ☒ Mobile station						
Software version	Bootloader version 2.0.2 Application version 2.0.22						
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		
Components list.....	Attachment 2						
Operating modes	No.	Operating mode of test item					
	1	EUT in operation, BLE in advertising mode					
Accessories (not part of the test item)	Accessory	Type	Manufacturer				
	Tablet	--	Lenovo				
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 these 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 47:2021 Part 15 paragraph(s): 209 and 247			
Clause	Requirement – Test case	Basic standard	Verdict
Part 15.209	Radiated emissions and spurious emission	ANSI C63.10	P
Part 15.209 and 15.247	Peak Output Power	ANSI C63.10	Not required (+)

(+) It should not be necessary to re-test the transmitter output power of any modular transmitter which has been certified based on conducted power

Normative references	
Reference no.	Description
FCC Rules and Regulation Title 47 part 15:2021	--
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
KDB 996369 D04 Module Integration Guide v01	Modular transmitter integration guide – Guidance for host product manufacturers
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 Emissions in restricted frequency bands and in unrestricted frequency bands

Tested by	M. Segalla
Test date	02.03.2023
Test location (stand)	Semi-anechoic chamber (CMC A070)
Reference standards.....	FCC Rules and Regulation; Titles 47 Part. 15.209 ANSI C63.10 cl. 6.3, 6.4, 6.5 and 6.6 KDB 996369 D04 Module Integration Guide v01
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 results 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

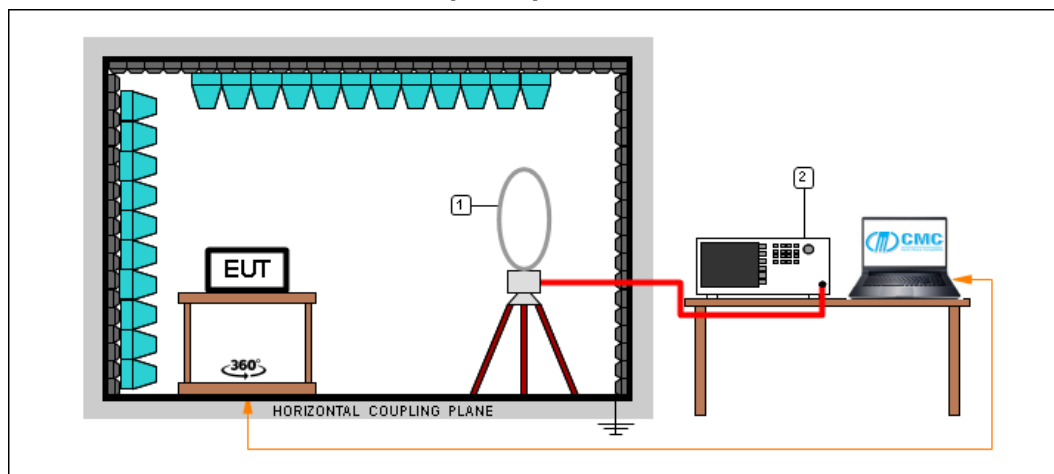
MHz	MHz	MHz	GHz
0,090 – 0,110	16,42 – 16,423	399,9 – 410	4,5 – 5,15
0,495 – 0,505	16,69475 – 16,69525	608 – 614	5,35 – 5,46
2,1735 – 2,1905	16,80425 – 16,80475	960 – 1240	7,25 – 7,75
4,125 – 4,128	25,5 – 25,67	1300 – 1427	8,025 – 8,5
4,17725 – 4,17775	37,5 – 38,25	1435 – 1626,5	9,0 – 9,2
4,20725 – 4,20775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

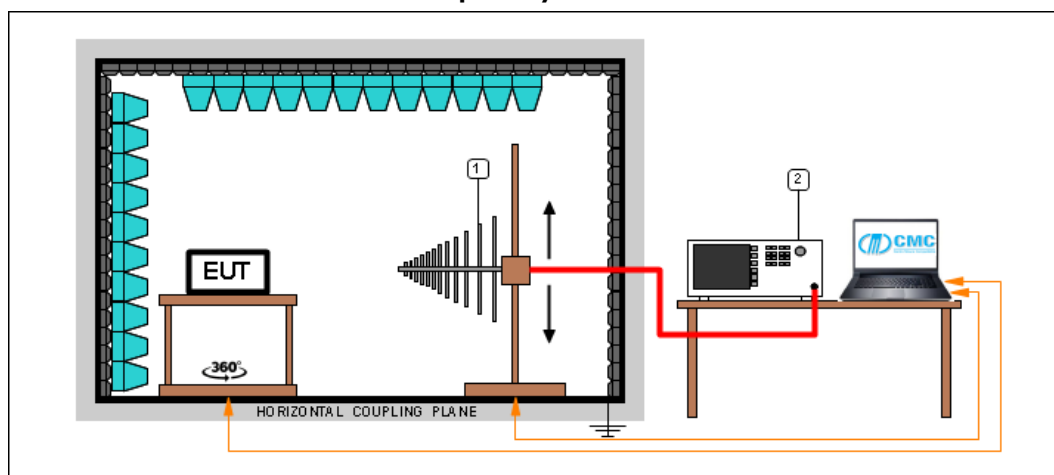
Frequency ≤ 30 MHz



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

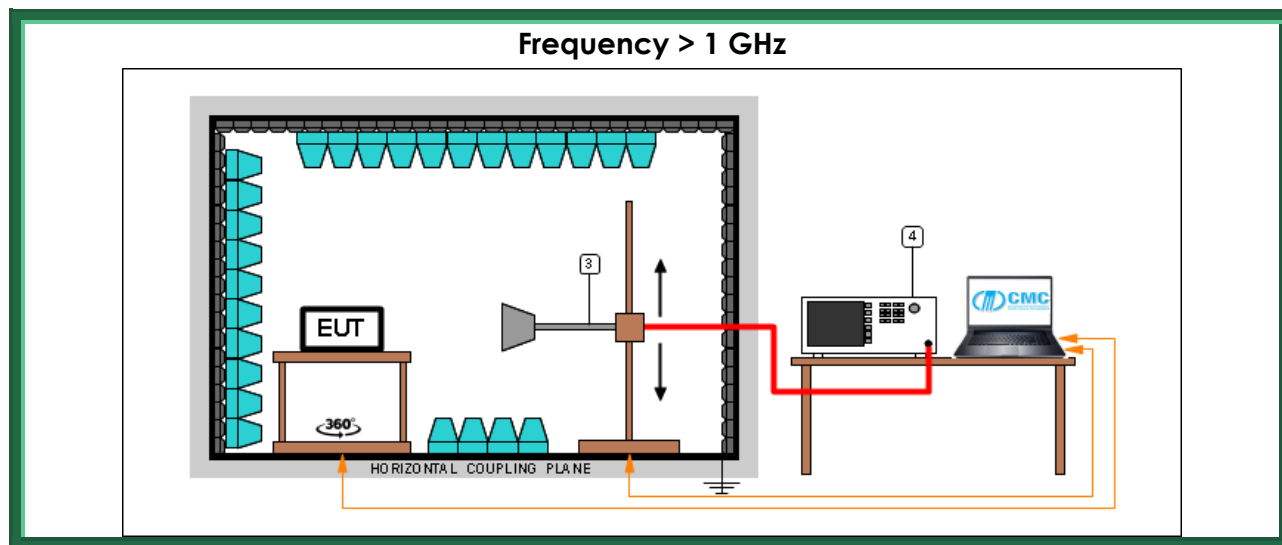


Test setup PE004_02

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



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

Polarization	Frequency Range (MHz)	Graphs	Remarks	Result
V	30 – 300	G22008501	--	P
H	30 – 300	G22008502	--	P
H	300 – 1000	G22008503	--	P
V	300 – 1000	G22008504	--	P
Loop	0,009 – 30	G22008505	--	P
H	3000 – 18000	G22008506	--	P
V	3000 – 18000	G22008507	--	P
V	1000 – 3000	G22008508	--	P
H	1000 – 3000	G22008509	--	P
H	18000 – 26000	G22008510	--	P
V	18000 – 26000	G22008511	--	P

Remarks: EUT was tested in 3 orthogonal planes, graphs are related to the highest detected levels. Peaks above the limits are due to the main transmitting frequencies

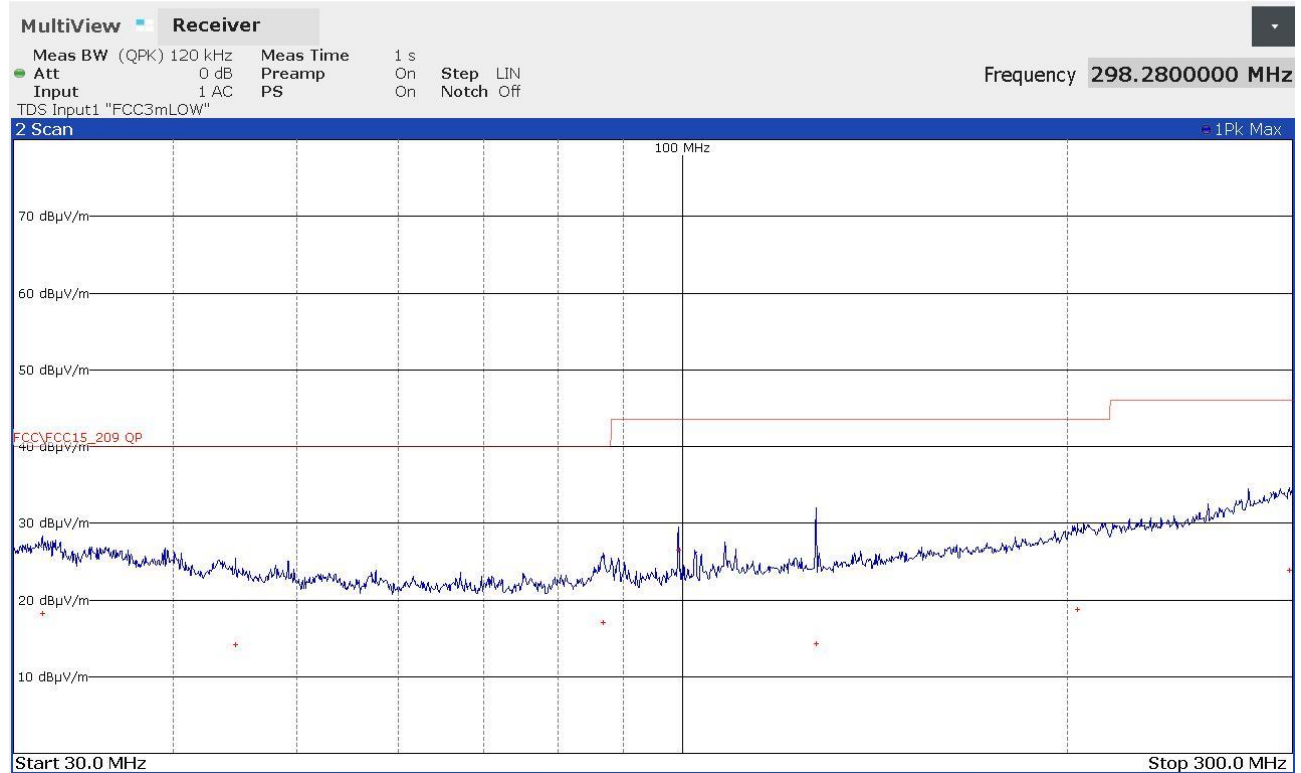
Graphs Legend

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

Segalla 22008501-Vert(30-300MHz - 10m)-BLE



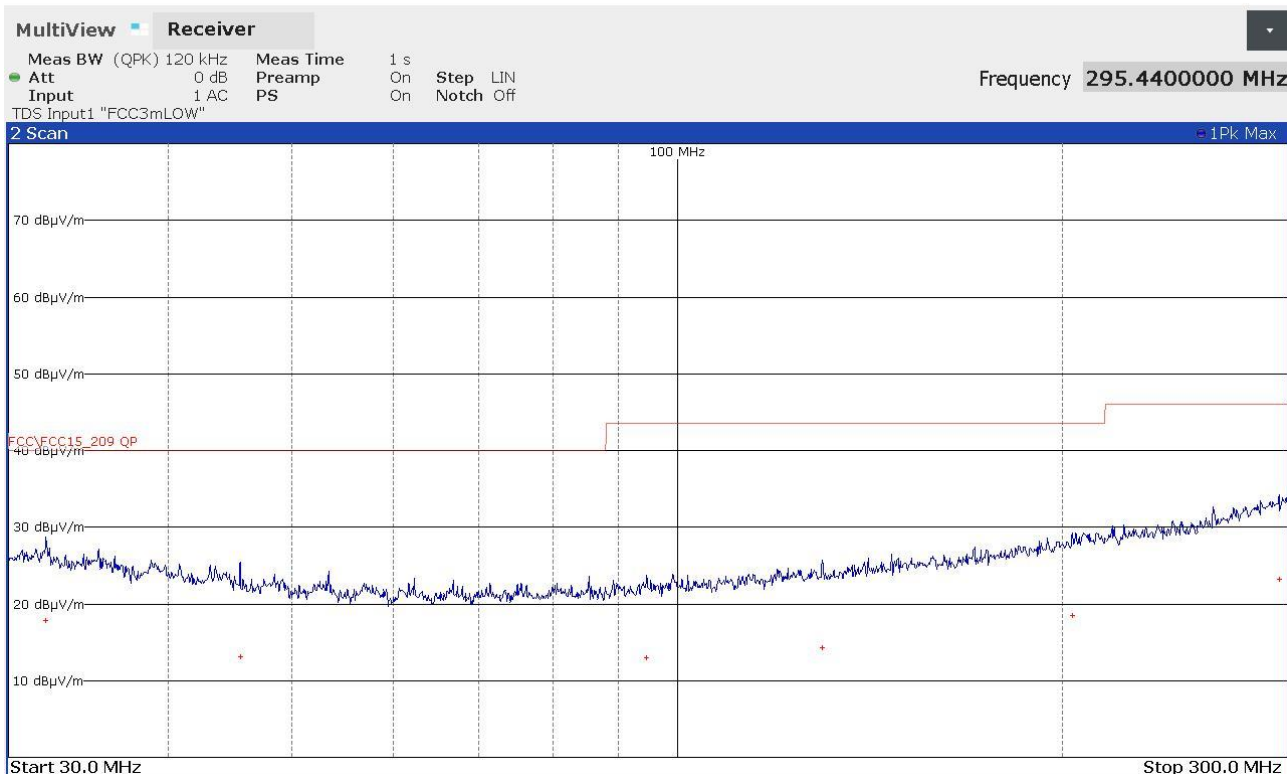
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
31600000	+18,23	-21,77
44760000	+14,16	-25,84
86800000	+17,02	-22,98
99280000	+26,54	-16,98
127240000	+14,34	-29,18
203800000	+18,71	-24,81
298280000	+23,87	-22,15

22008501_2

Segalla 22008502-Horiz(30-300MHz - 10m)-BLE



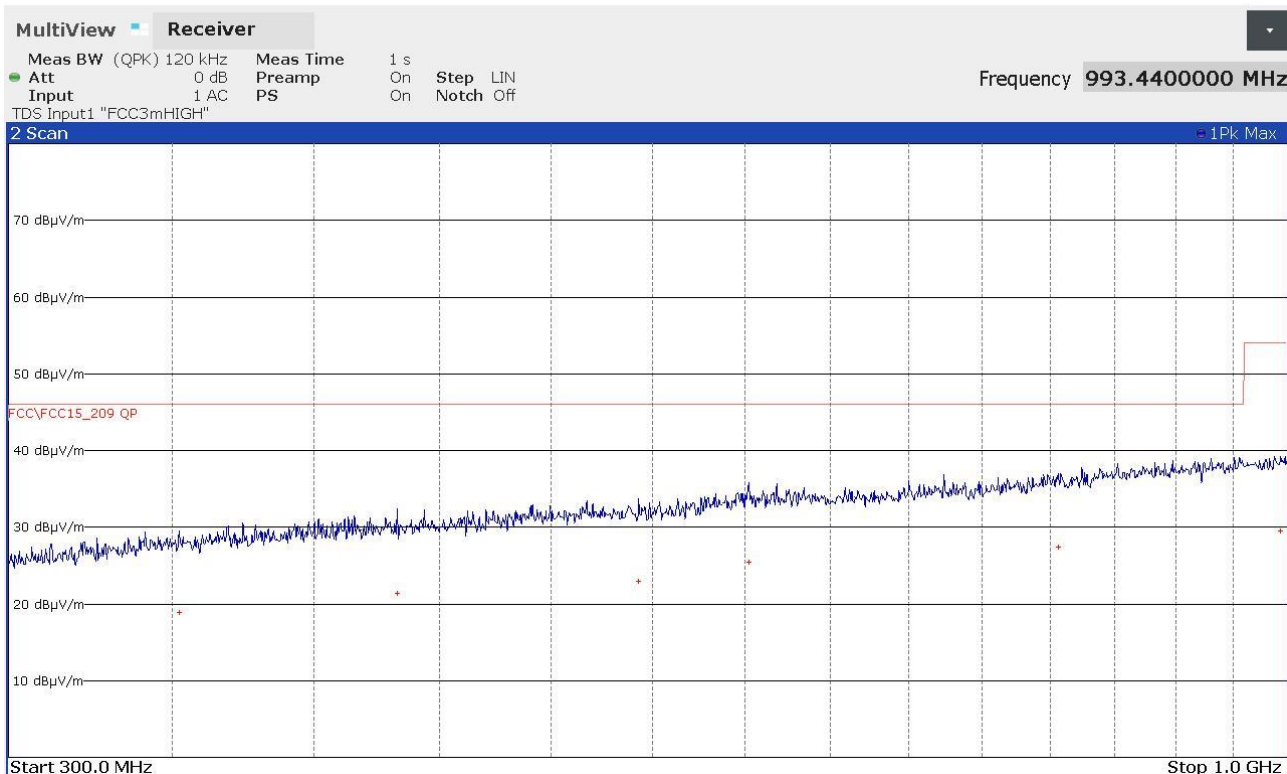
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
32080000	+17,78	-22,22
45520000	+13,07	-26,93
94680000	+12,96	-30,56
129920000	+14,26	-29,26
203560000	+18,45	-25,07
295440000	+23,20	-22,82

22008502_2

Segalla 22008503-Horiz(300-1000MHz - 10m)-BLE



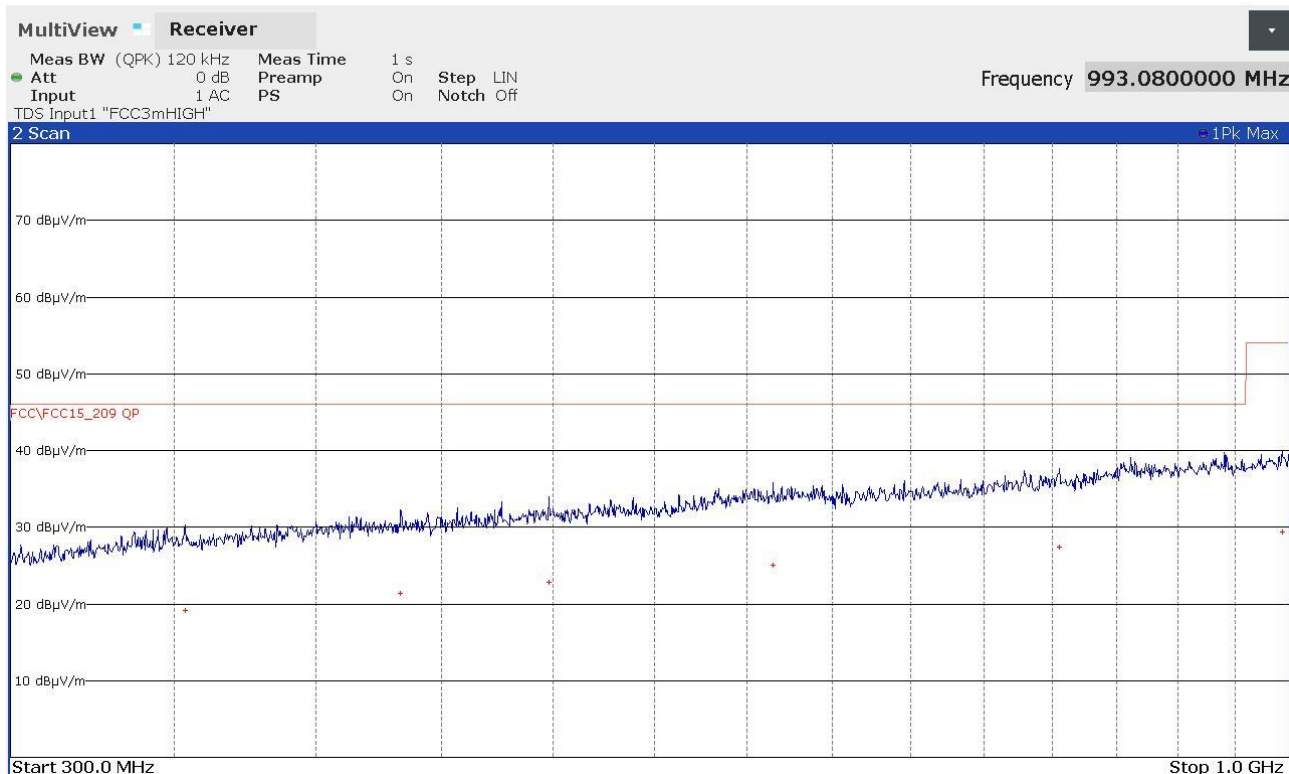
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
352240000	+18,88	-27,14
432560000	+21,37	-24,65
542800000	+22,92	-23,10
602280000	+25,44	-20,58
805800000	+27,41	-18,61
993440000	+29,50	-24,48

22008503_2

Segalla 22008504-Vert(300-1000MHz - 10m)-BLE



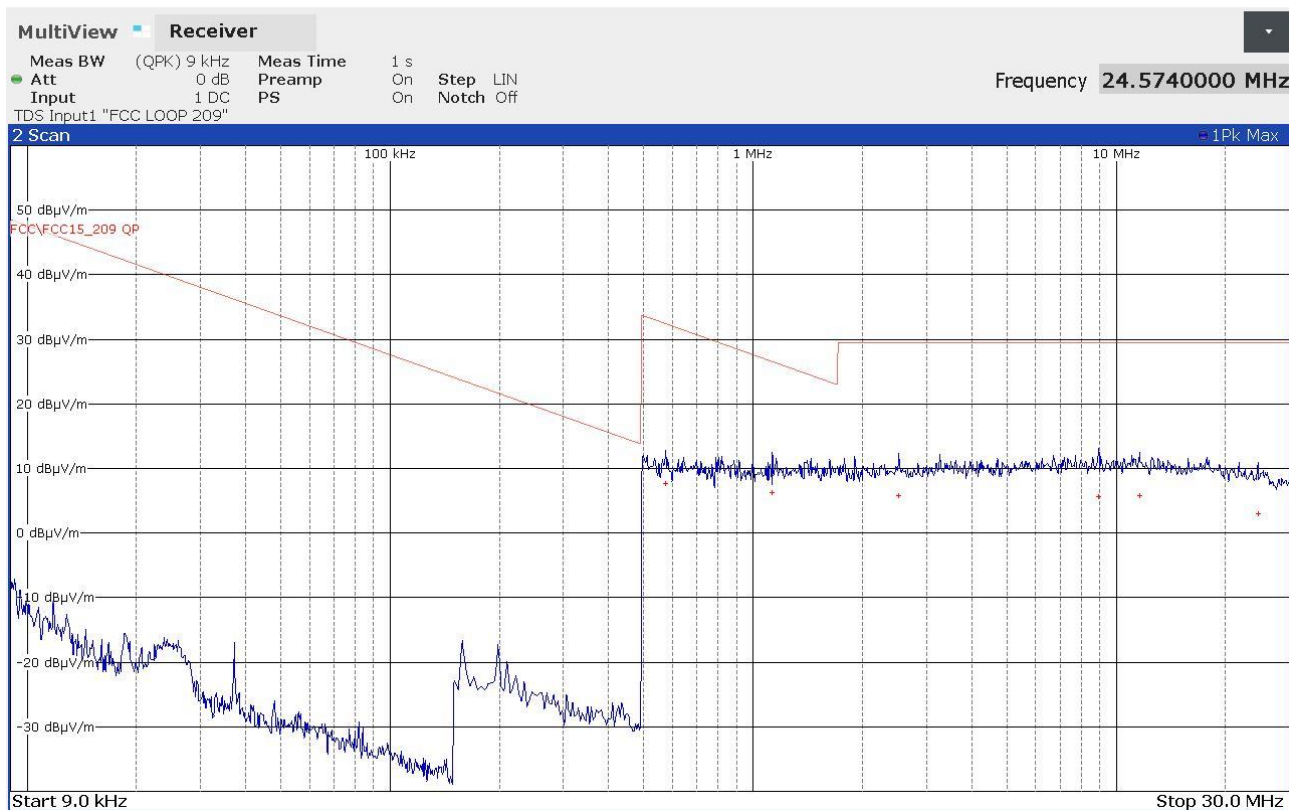
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
353560000	+19,12	-26,90
433200000	+21,32	-24,70
497880000	+22,84	-23,18
614960000	+25,05	-20,97
805280000	+27,45	-18,57
993080000	+29,34	-24,64

22008504_2

Segalla 22008505



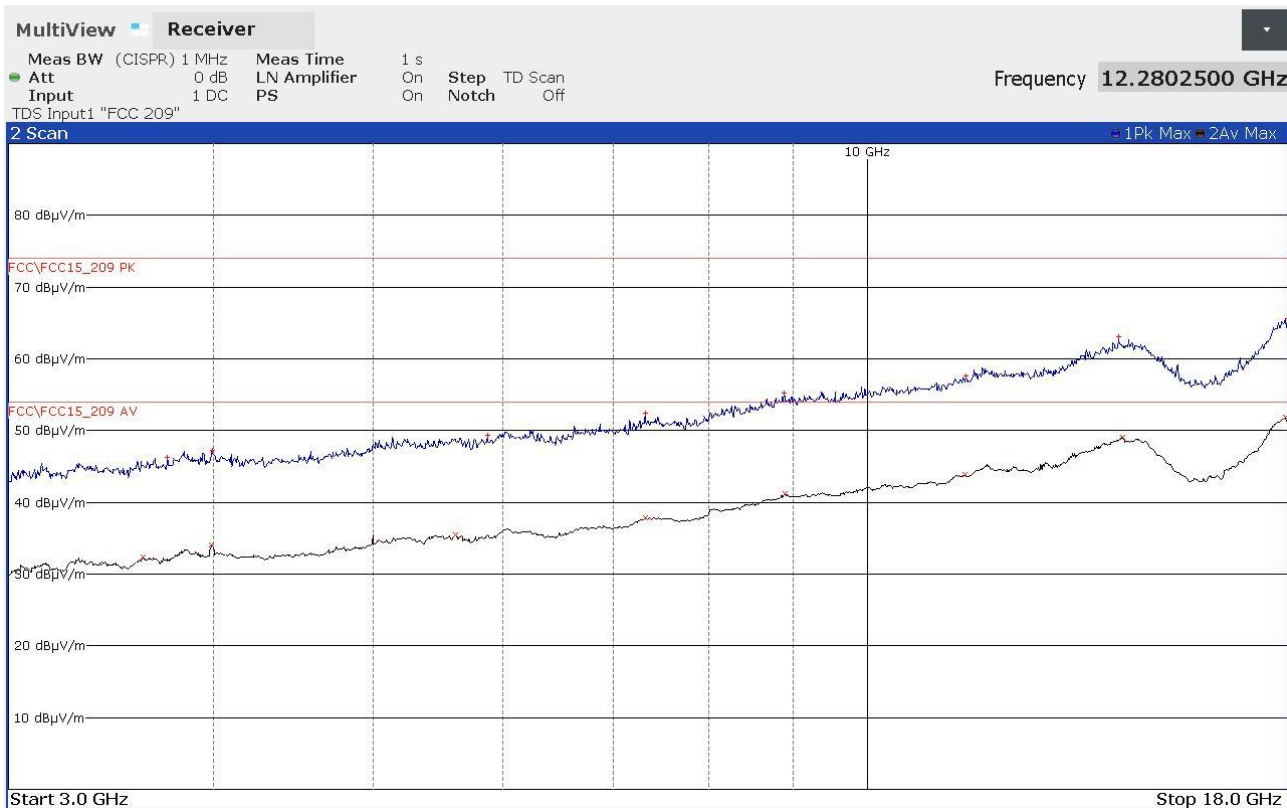
FINAL RESULT TABLE

QUASI PEAK

Freq Hz	Lev dBuV/m	Margin dB
574000	+7,67	-24,76
1130000	+6,22	-20,32
2518000	+5,81	-23,73
8962000	+5,58	-23,96
11614000	+5,80	-23,74
24574000	+3,05	-26,49

22008505_2

Segalla 22008506

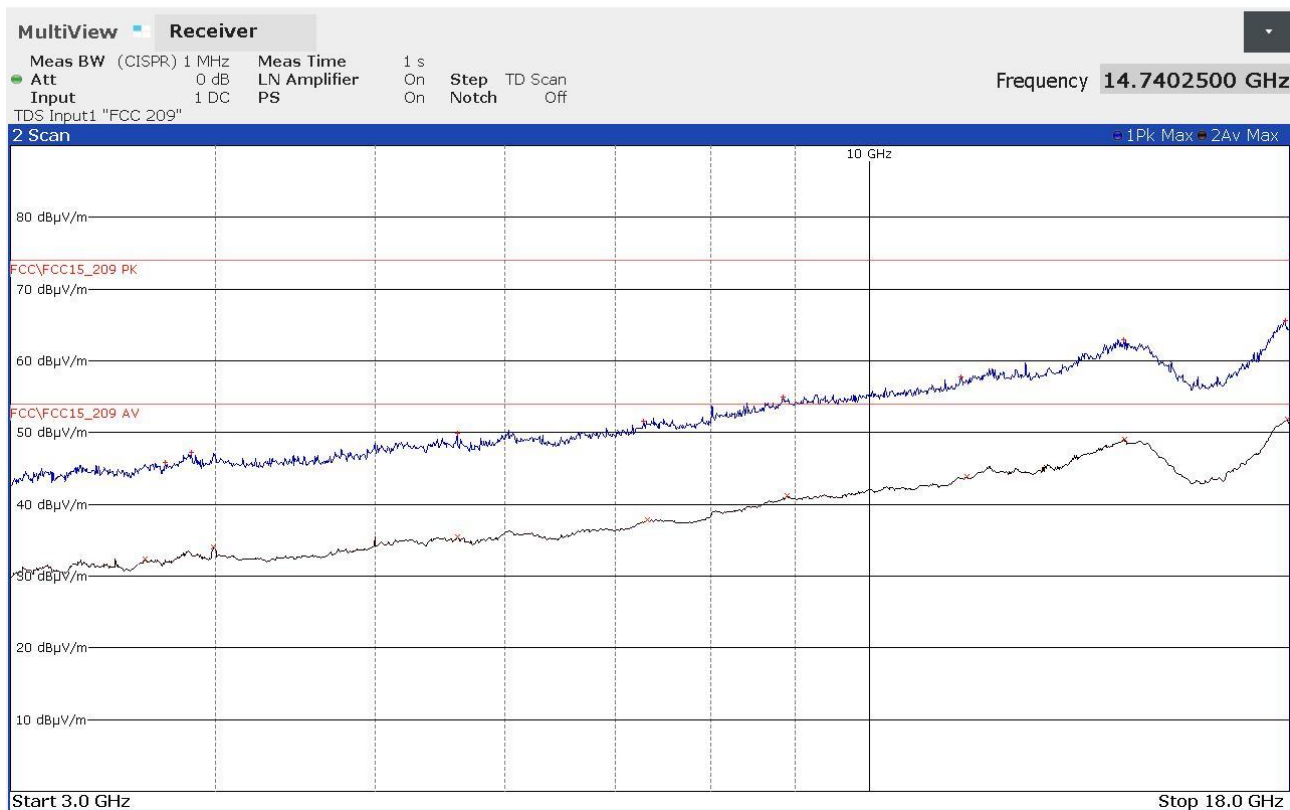


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
3749000000	+46,26	-27,72	3622250000	+32,39	-21,59
3991250000	+47,26	-26,72	3988250000	+34,01	-19,97
5870750000	+49,29	-24,69	5615500000	+35,51	-18,47
7319750000	+52,41	-21,57	7319250000	+37,79	-16,19
8892500000	+55,22	-18,76	8900000000	+41,23	-12,75
11471500000	+57,65	-16,33	11460000000	+43,81	-10,17
14218750000	+63,02	-10,96	14280000000	+49,02	-4,96
17998000000	+65,59	-8,39	17939750000	+51,89	-2,09

22008506_2

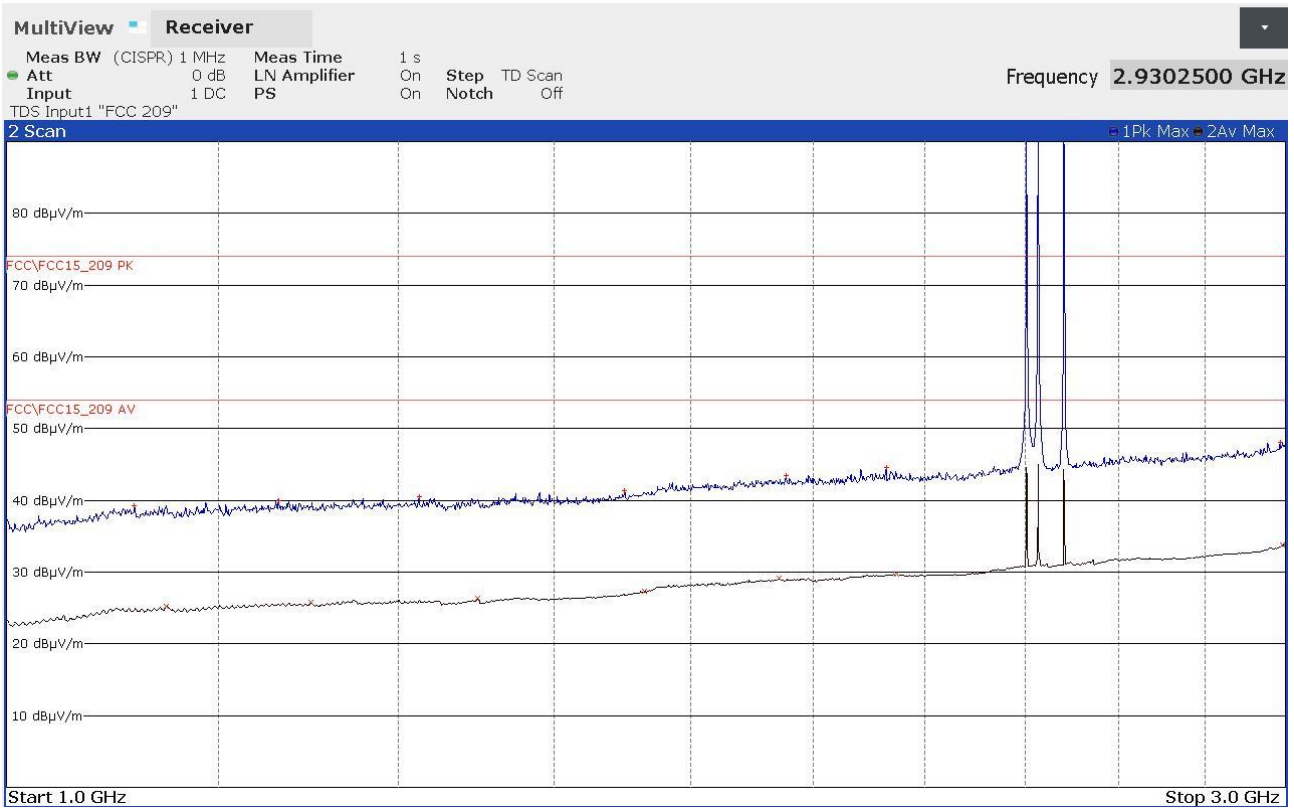
Segalla 22008507


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
3726250000	+45,87	-28,11	3622250000	+32,38	-21,60
3863250000	+47,25	-26,73	3988000000	+34,01	-19,97
5611000000	+49,90	-24,08	5615750000	+35,53	-18,45
7281500000	+51,60	-22,38	7318500000	+37,79	-16,19
8854000000	+54,97	-19,01	8900000000	+41,22	-12,76
11355250000	+57,72	-16,26	11460000000	+43,81	-10,17
14275250000	+62,91	-11,07	14280000000	+49,06	-4,92
17895750000	+65,65	-8,33	17940000000	+51,88	-2,10

22008507_2

Segalla 22008508

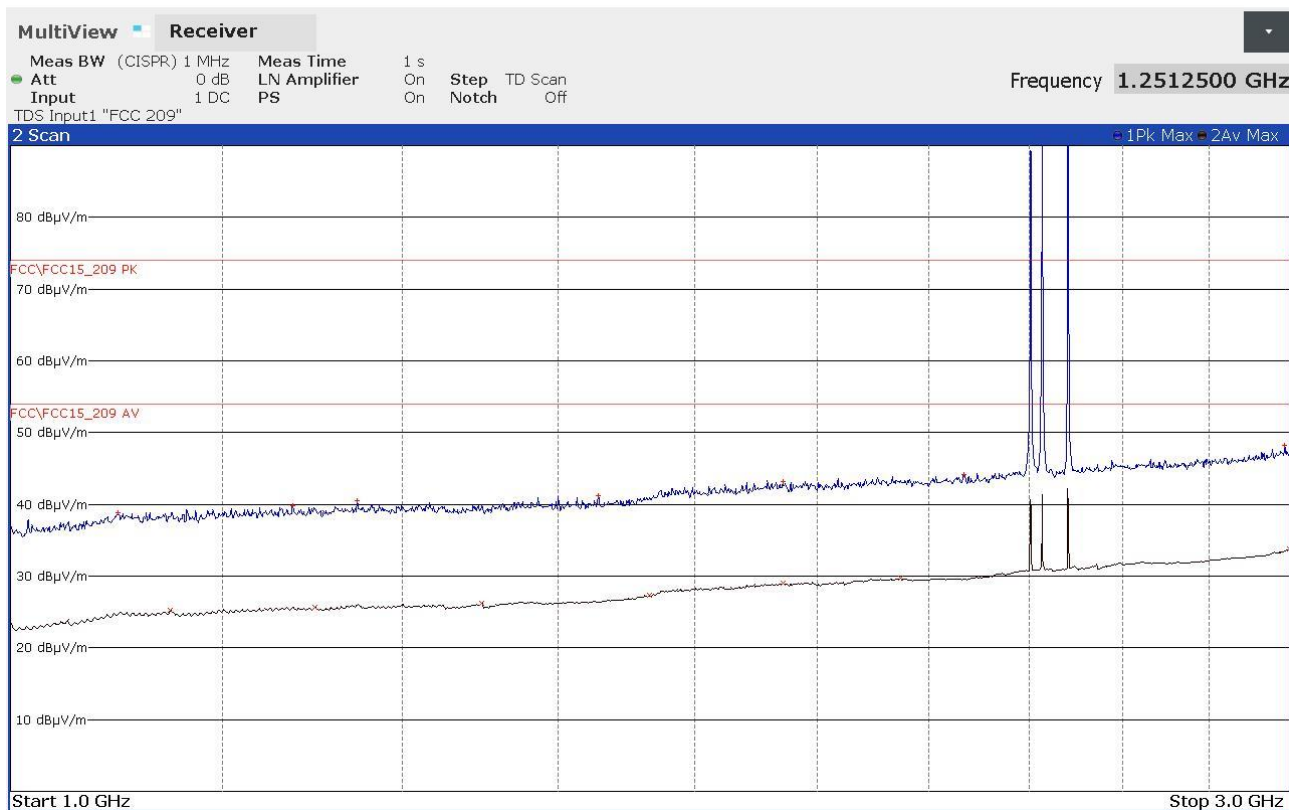


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1116000000	+39,25	-34,73	1147000000	+25,25	-28,73
1263000000	+39,90	-34,08	1298750000	+25,76	-28,22
1425750000	+40,55	-33,43	1498750000	+26,29	-27,69
1700750000	+41,32	-32,66	1730250000	+27,35	-26,63
1953500000	+43,48	-30,50	1941750000	+29,10	-24,88
2129000000	+44,52	-29,46	2148000000	+29,72	-24,26
2986500000	+48,08	-25,90	2993000000	+33,75	-20,23

22008508_2

Segalla 22008509

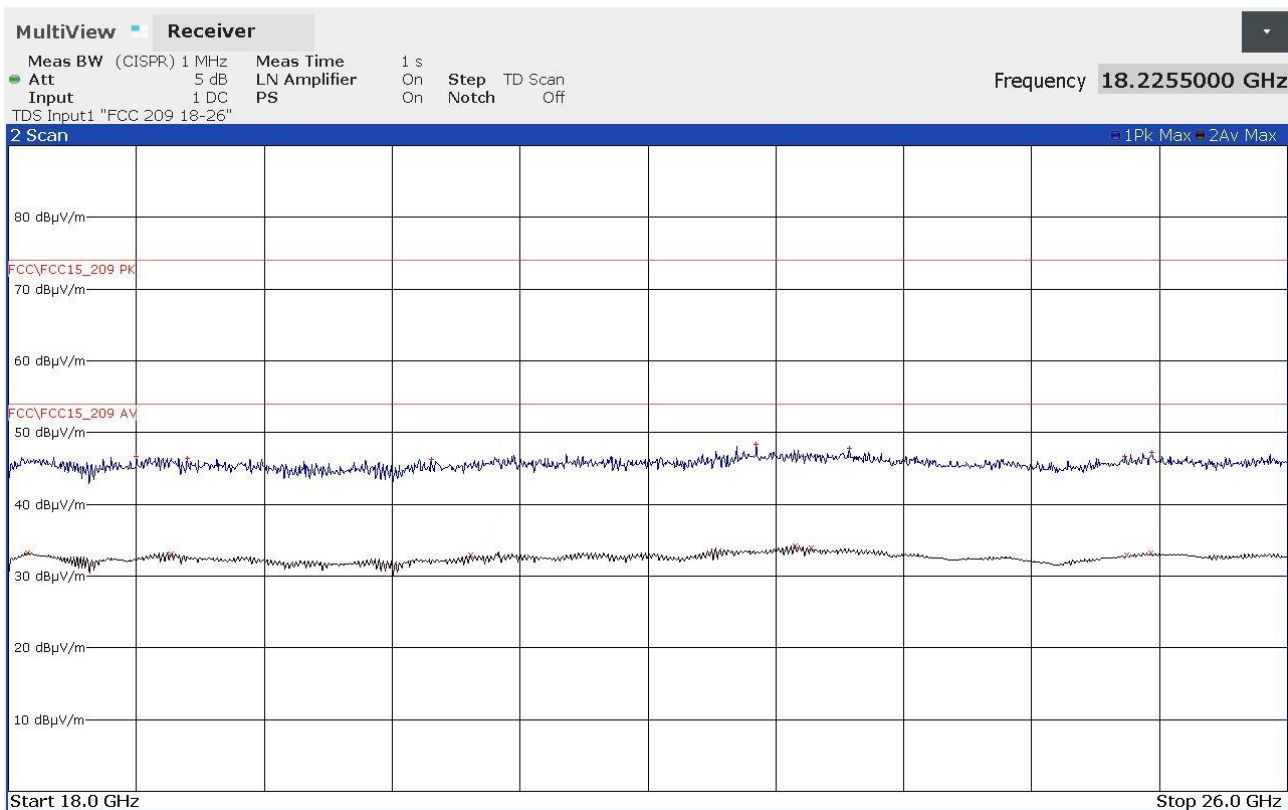


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
1096750000	+38,83	-35,15	1147000000	+25,20	-28,78
1274750000	+39,76	-34,22	1298750000	+25,71	-28,27
1347000000	+40,54	-33,44	1498750000	+26,25	-27,73
1657250000	+41,21	-32,77	1730750000	+27,34	-26,64
1942250000	+43,24	-30,74	1941750000	+29,08	-24,90
2267250000	+44,21	-29,77	2148000000	+29,70	-24,28
2987750000	+48,21	-25,77	2999750000	+33,72	-20,26

22008509_2

Segalla 22008510

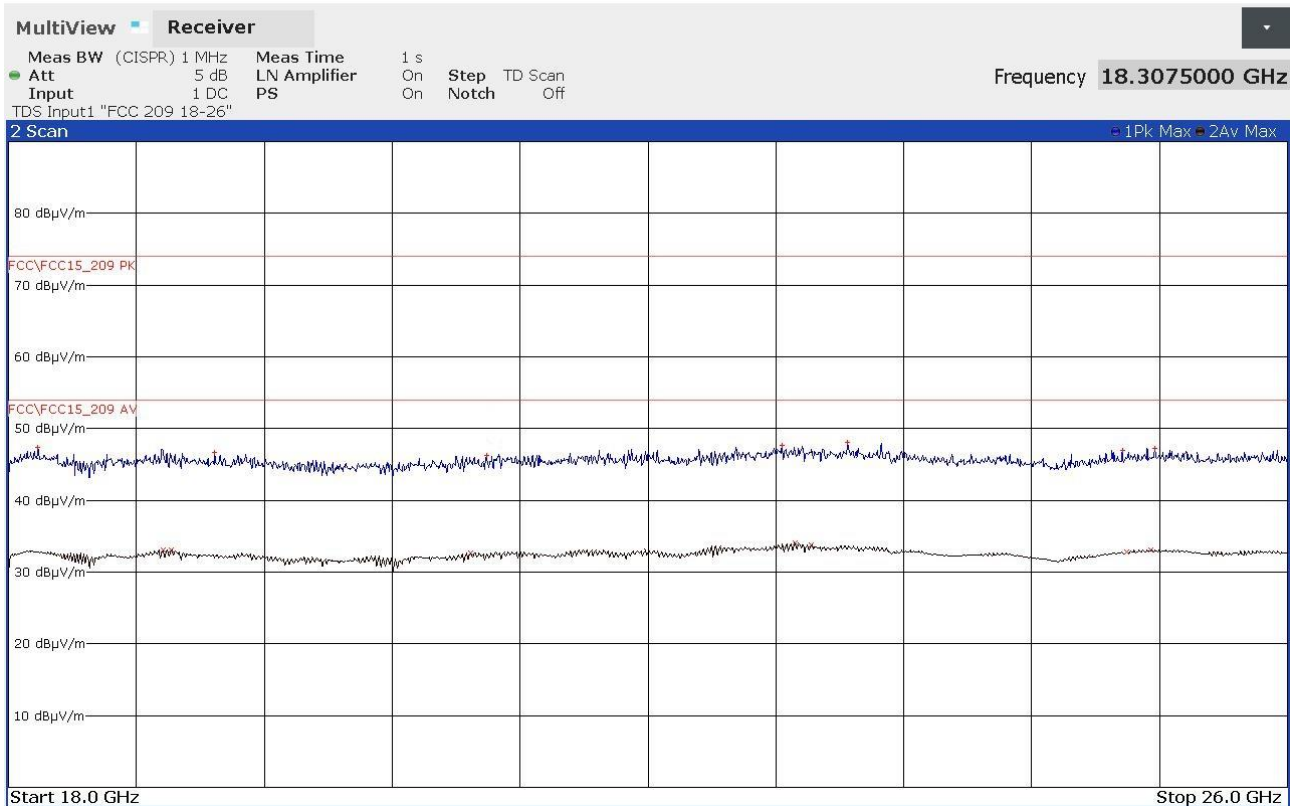


FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
18799750000	+46,64	-27,34	18122250000	+33,28	-20,70
19116750000	+46,45	-27,53	19019250000	+33,14	-20,84
20643250000	+46,24	-27,74	20890250000	+32,92	-21,06
22677750000	+48,30	-25,68	22918750000	+34,20	-19,78
23258000000	+47,74	-26,24	23021500000	+33,89	-20,09
24983500000	+46,73	-27,25	24994250000	+32,90	-21,08
25151000000	+47,30	-26,68	25146250000	+33,20	-20,78

22008510_2

Segalla 22008511



FINAL RESULT TABLE

MAX PEAK			AVERAGE		
Freq Hz	Lev dBuV/m	Margin dB	Freq Hz	Lev dBuV/m	Margin dB
18184000000	+47,40	-26,58	18966250000	+33,13	-20,85
19288250000	+46,68	-27,30	19018500000	+33,04	-20,94
20989000000	+46,21	-27,77	20890500000	+32,73	-21,25
22837000000	+47,72	-26,26	22919000000	+34,04	-19,94
23248250000	+48,13	-25,85	23022250000	+33,73	-20,25
24967000000	+47,00	-26,98	24991750000	+32,86	-21,12
25169500000	+47,27	-26,71	25147000000	+33,12	-20,86

22008511_2

Attachment 1

Instruments list

<i>Id. number</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Description</i>	<i>Serial number</i>
CMC S003	SCHAFFNER	NSG 2025-4	Burst Source with CDN	1010
CMC S006	Chauvin Arnoux	CA43	Field Meter	218541RLV
CMC S009	Rohde & Schwarz	ESH2-Z5	Artificial Network	839497/007
CMC S010	Rohde & Schwarz	ESH3-Z2	Impulses Limiting Device	- - -
CMC S013	Rohde & Schwarz	EZ-17	Current Probe	840411/009
CMC S014	Rohde & Schwarz	ESH2-Z3	Passive Probe	- - -
CMC S016	Rohde & Schwarz	HK116	Broadband Antenna	839472/001
CMC S017	Rohde & Schwarz	HL223	Broadband Antenna	825584/009
CMC S018	SCHAFFNER	CDN 126	Coupling Clamp	128
CMC S019	FCC	FCC 801-M5-25	CDN Power Line	06
CMC S022	Teseo	LAS 1	Loop Antenna	3971
CMC S027	Amplifier Research	75A250	RF Amplifier	19349
CMC S028	FCC	FCC-203I	Injection Clamp	209
CMC S029	Keytek	Cemaster	Surge/Dip/Burst Generator	9609258
CMC S031	Tektronix	TDS 210	Digital Oscilloscope	B010552
CMC S032	SCHAFFNER	NSG 2050	Surge Source with CDN	200111-253AR
CMC S034	Schwarzbeck	UHA 9105	Dipole	UHA 91052234
CMC S035	Eutron	BVR 1800 30-50	DC Power Source	3004
CMC S037	Rohde & Schwarz	NRVS	Power Meter	845127/023
CMC S039	CMC	BI 01	Induction Coil	- - -
CMC S040	Walker Scientific	ELF 50-D	Magnetic Field Meter	K71484-290
CMC S042	Fluke	Fluke 73	Multimeter	67771510
CMC S076	Altitude	25438	Barometer	- - -
CMC S078	Amplifier Research	100W1000M1	RF Amplifier	21849
CMC S079	AH System, Inc	SAS-200/542	Broadband Antenna	504
CMC S080	AH System; Inc	SAS-200/510	Broadband Antenna	807
CMC S082	AH System; Inc	SAS-200/560	Loop Antenna	635
CMC S083	AH System; Inc	BCP-200/510	Current Probe	564
CMC S084	AH System; Inc	BCP-200/511	Current Probe	579
CMC S085	AH System; Inc	SAS-200/530	Broadband Dipole	504
CMC S086	CMC	RVCP01	Resistance 470kOhm	- - -
CMC S087	CMC	RHCP01	Resistance 470kOhm	- - -
CMC S091	CMC	DIPLP	Dipole for Loop Antenna control	- - -
CMC S093	LeCroy	9370	Digital oscilloscope	937001338
CMC S094	Schwarzbeck	NNBM 8126-A	LISN 5μH	8126A161
CMC S095	FCC	FCC 801-M3-16	CDN power line	9821
CMC S106	Gigatronix	900	RF Signal Generator	323001
CMC S107	Hewlett Packard	HP8563E	Spectrum Analyser	3846A09658
CMC S108	Emco	3115	Horn Antenna	9811-5622
CMC S109	Farnell	LFM4	LF Signal Generator	531
CMC S111	LEM HEME	PR 1001	Current Probes	- - -
CMC S112	Amplifier Research	DC3010	Directional Coupler	15238
CMC S114	Schwarzbeck	VHA 9103	Dipole	VHA 91031801
CMC S116	CMC	BCIP01	Calibration BCI-JIG	--
CMC S117	MARCONI	2019A	RF Signal Generator	118453/014
CMC S118	Hewlett Packard	E3632A	Programmable Power Supply	KR75301881

Attachment 1

<i>Id. number</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Description</i>	<i>Serial number</i>
CMC S119	Hewlett Packard	HP8903B	Audio Analyzer	3011A09055
CMC S120	FCC	FC130-A	Current Injection Probe	118
CMC S121	Wavetek	LCR55	Bridge LCR	20104738
CMC S122	Fluke	336	Amperometric Clamp Meter	81754972
CMC S124	Spin	AMTP42-20	Horn Antenna	103
CMC S127	SCHAFFNER	HLA6120	Loop Antenna	1191
CMC S128	SCHAFFNER	CBA9428	RF Amplifier	1006
CMC S129	Rohde & Schwarz	ESPI7	Receiver	836.914/004
CMC S130	SCHAFFNER	NSG 5000	Automotive Impulse Generator	02032579-1
CMC S131	SCHAFFNER	CDN 500	Capacitive Clamp	400-151/0128
CMC S132	CMC	OPS150	Open Strip Line 150mm	- - -
CMC S135	LEM HEME	PR 30	Current Probe	P04217832830
CMC S136	Schwarzbeck	VULB 9136	Broadband Antenna	9136-205
CMC S138	Agilent	33220A	Function/Arbitrary Waveform Gener.	MY44003979
CMC S142	Narda	ELT-400+B-sensor	Exposure level tester	D-0034+D-0032
CMC S144	Rohde & Schwarz	URV5	Power Meter	881375/004
CMC S145	Hewlett Packard	778D	Directional Coupler	17237
CMC S146	Amplifier Research	10W1000B	RF Amplifier	18451
CMC S150	RKB	LOG3080	Broadband Antenna	- - -
CMC S151	CMC	CI 02	Induction Multi Coil	- - -
CMC S152	CMC	CDN100	Direct injection device	001
CMC S155	Chroma	61705	Power supply source	000000088
CMC S156	Yokogawa	DL9040	Digital Oscilloscope	91F643771
CMC S161	EM TEST	EFT 500 M4 S1	Burst source with CDN	V0739102946
CMC S162	FCC	FCC 801-M2-16	CDN power line	07047
CMC S163	NOISEKEN	ESS-2002+TC-815R	ESD simulator	ESS0787336
CMC S164	Rohde & Schwarz	ESU26	EMC receiver	100052
CMC S170	Amplifier Research	FL7006	Field meter	0327425
CMC S171	Schwarzbeck	BBHA 9120 LF(A)	Broadband Antenna	284
CMC S172	Schwarzbeck	VHBD9134+BBAL9136	Broadband Antenna	9134-037
CMC S173	Luthi	CDN L-801 AF4	CDN I/O line	2481
CMC S174	Luthi	CDN L-801 AF8	CDN I/O line	2482
CMC S175	Luthi	CDN L-801 T2	CDN I/O line	2473
CMC S176	Luthi	CDN L-801 T4	CDN I/O line	2475
CMC S177	Luthi	CDN L-801 T8	CDN I/O line	2476
CMC S178	Schwarzbeck	STLP 9128 C	Broadband Antenna	086
CMC S179	Frankonia	FLL-250A	RF Amplifier	1023
CMC S181	Milmega	AS0822-200	RF Amplifier	1031424
CMC S182	Milmega	AS0206-50	RF Amplifier	1031425
CMC S183	Minicircuits	PWR-SEN-6G+	USB Power Sensor	0809070042
CMC S184	ARRAY	3400A	Arbitrary Waveform Generation	TW00009164
CMC S185	EM TEST	OCS 500 M6 S4	Oscilatory compact simulator	V0915104789
CMC S186	Schwarzbeck	SBA 9119	Broadband Antenna	009
CMC S187	Rohde & Schwarz	SMB100A	RF signal generator	102572
CMC S189	Eutron	BVR 1800 300V5A	DC Power Source	9100
CMC S190	Spin	AMDR-10180	Horn Antenna	01-309-09
CMC S191	EM TEST	UCS 500 N5	Burst/Surge/PFQ compact simulator	V0947105547
CMC S193	Solar	6552-1A	BF Amplifier	- - -

Attachment 1

<i>Id. number</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Description</i>	<i>Serial number</i>
CMC S194	CMC	CDN 16 PL	CDN Power line	- - -
CMC S195	Schwarzbeck	VULB 9118 E sp.	Broadband Antenna	827
CMC S196	EM TEST	BS 200N	Electronic switch	V100510506
CMC S197	EM TEST	UCS 200N	Pulse generator	V0825103901
CMC S198	FCC	F - 55	RF Current Probe	100999
CMC S199	EM TEST	CNI 503	CDN for Burst and Surge	V1026106843
CMC S200	Schwarzbeck	NSLK 8128	V-LISN	8128-273
CMC S201	S.M. ELECTRONICS	SA3N150-06F	Attenuator	- - -
CMC S202	Rohde & Schwarz	CMU200	Universal radio communication tester	104099
CMC S203	CMC	VH	Van der Hoofden test-head	- - -
CMC S205	Schwarzbeck	NNBM 8124	LISN 5µH	065
CMC S206	Rohde & Schwarz	ESCI 7	EMC Receiver	100781
CMC S207	AlphaLab	ASMGM	Milligauss meter	584
CMC S209	Elettrotest	TPS40K 30K60S	AC Source	002.11
CMC S210	EM TEST	PFS 200N30	Power Fail simulator	V1130110311
CMC S211	Luthi	CDN L-801 M1	CDN M line	2811
CMC S212	Luthi	CDN L-801 M2	CDN M line	2812
CMC S213	Luthi	CDN L-801 M3	CDN M line	2813
CMC S214	EM TEST	VDS200N10	Voltage drope simulator	V1150111222
CMC S215	FCC	F-130A-1	BCI Probe	112166
CMC S216	Luthi	MDS21	Absorbing Clamp	4101
CMC S217	Schwarzbeck	TK9420	Voltage Probe	458
CMC S218	RS	50WCW	50 ohm Load	- - -
CMC S219	EM TEST	CNV 504 N1.2	Box Surge	V1210112161
CMC S221	Minicircuits	BW-N20W5+	Attenuator	0612
CMC S222	A-INFOMW	ACB06-100SN	Attenuator	J3081111111003
CMC S223	Minicircuits	BW-N20W20+	Attenuator	1217
CMC S224	Fairview microwave	SMC4037-20	Directional Coupler	J5DF568-081
CMC S225	Fairview microwave	SA3550N	Step Attenuator	201237026
CMC S226	Werlatone	C6021-10	Dual Directional Coupler	99019
CMC S227	Rohde & Schwarz	ESR7	EMI Test Receiver 7GHz	101121
CMC S228	Agilent	U3401A	Digital Multimeter	MY52270047
CMC S229	Schwarzbeck	CAT5 8158	ISN 8-Wire	CAT5-8158-0074
CMC S230	Werlatone	C1795-10	Dual Directional Coupler	100140
CMC S234	Schwarzbeck	VTSD 9561-F	Pulse Limiter/Attenuator	9561-F023
CMC S235	Schwarzbeck	VUSLP 9111B	Broadband Antenna	9111B-118
CMC S236	Schwarzbeck	BBA 9106 + VHBB 9124	Broadband Antenna	9124-672
CMC S237	EM TEST	DPA 503N	Harmonic & Flicker analyser	P1338124620
CMC S238	Minicircuits	PWR-SEN-6GHS	USB Power Sensor	11302250023
CMC S239	Schwarzbeck	UAH 9105	Dipole	9105-2599
CMC S240	CMC	ITF2	Three-phase Impedances cabinet	- - -
CMC S241	Schwarzbeck	BBV 9718	Broadband Preamplifier	9718-126
CMC S242	CMC	W-IM1	Shielded Cable	- - -
CMC S243	Minicircuits	ZX60-33LN-S+	Low Noise Amplifier	S F558500921
CMC S244	EM TEST	AutoWave	Automotive Waveforms Gen.	P1303110740
CMC S245	CMC	AEP1	Automotive ESD Plane	- - -
CMC S246	Minicircuits	ZFBT-6GW	Bias Tee	RF405100521

Attachment 1

<i>Id. number</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Description</i>	<i>Serial number</i>
CMC S247	Minicircuits	ZFBT-6GW+	Bias Tee	RF476100846
CMC S249	Schwarzbeck	NNBM 8124	LISN 5µH	685
CMC S250	Pico Technology	PicoLog1216	USB Data Logger	CO117/017
CMC S251	Schwarzbeck	BBV 9745	Broadband Preamplifier	9745-0019
CMC S252	Agilent	34972A	Data Acquisition	MY49018010
CMC S253	Minicircuits	PWR-SEN-6GHS	USB Power Sensor	11405260039
CMC S254	Prana	DR220	RF Amplifier	1610
CMC S255	S.M.ELECTRONICS	SA3N100-03F	Attenuator	- - -
CMC S256	HAMEG	HM8135	RF signal generator	014759546
CMC S257	Schwarzbeck	VAMP 9243	Active Monopole Antenna	9243-468
CMC S259	Schwarzbeck	SBA 9113 B	Broadband Antenna	247
CMC S260	CMC	Wfr_N_white	Shielded Cable	Wfr_ant10-1
CMC S261	CMC	Wfr_N	Shielded Cable	Wfr_ant20-1
CMC S262	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix32-1
CMC S263	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix31-1
CMC S264	CMC	Wfr_N	Shielded Cable	Wfr_ext03-1
CMC S265	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix22-1
CMC S266	CMC	Wfr_N	Shielded Cable	Wfr_ext02-1
CMC S267	CMC	Wfr_N	Shielded Cable	Wfr_ant20-2
CMC S268	Schwarzbeck	HLC 27	Compact Dipole Antenna	005
CMC S269	Fairview microwave	FMCP1005	Dual Directional Coupler	1520
CMC S270	Schwarzbeck	SBA 9112	Broadband Antenna	295
CMC S271	Schwarzbeck	BBA 9106 + VHBB 9124	Broadband Antenna	831
CMC S272	Minicircuits	PWR-SEN-6GHS	USB Power Sensor	11408040322
CMC S273	Minicircuits	PWR-SEN-6GHS	USB Power Sensor	11408040304
CMC S274	Minicircuits	PWR-SEN-6GHS	USB Power Sensor	11408040326
CMC S275	Schwarzbeck	NNHV 8123	LISN 5µH	8123-200#76
CMC S276	Schwarzbeck	NNHV 8123	LISN 5µH	8123-200#77
CMC S277	CMC	Wsac03_N_fix	Shielded Cable	Wsac03_fix21-1
CMC S278	CMC	Wsac03_N_fix	Shielded Cable	Wsac03_fix12-1
CMC S279	CMC	Wsac03_N_fix	Shielded Cable	Wsac03_fix12-2
CMC S280	CMC	Wsac03_N_white	Shielded Cable	Wsac03_ant10-1
CMC S281	CMC	Wsac03_N	Shielded Cable	Wsac03_ext02-1
CMC S282	CMC	Wsac03_N	Shielded Cable	Wsac03_int20-1
CMC S283	CMC	Wsac03_N_white	Shielded Cable	Wsac03_bci20-1
CMC S284	Rohde & Schwarz	SMB100A	RF signal generator	3.20.390.24
CMC S287	Schwarzbeck	VUSLP 9111B	Broadband Antenna	9111B-203
CMC S288	CMC	W_sma_white	Joint Shielded Cable	W_001
CMC S290	Schwarzbeck	BBHA 9170	Horn Antenna	733
CMC S291	Milmega	AS0860-40/25	RF Amplifier	1076710
CMC S292	BONN	BLWA 0310-300	RF Amplifier	1610818
CMC S293	Schwarzbeck	422NJ	Antenna Flat Elements	422NJ-051
CMC S294	TESEQ	NSG 437	ESD Simulator	899
CMC S295	Rohde & Schwarz	FSW43	Spectrum Analyzer	104059
CMC S296	Milmega	80RF1000-300	RF Amplifier	1078225
CMC S298	RIGOL	DSG3060	RF signal generator	DSG3A183600076
CMC S299	CMC	Wfr_sma	Shielded Cable	Wfr_ant20-2

Attachment 1

<i>Id. number</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Description</i>	<i>Serial number</i>
CMC S300	CMC	Wfr_sma_fix	Shielded Cable	Wfr_fix32-3
CMC S301	CMC	Wfr_sma	Shielded Cable	Wfr_ext03-2
CMC S302	Testo	175H1	Data Logger	40370182 610
CMC S303	Schwarzbeck	VHBD 9134 + BBAE 9179	Broadband Antenna	9134-037 + 00020
CMC S304	Rohde & Schwarz	CMW290	Functional radio communication tester	101637
CMC S308	CMC	CDN100	Direct injection device	002
CMC S309	EM TEST	compact NX5	Burst/Surge/PFQ compact simulator	P1640185047
CMC S310	TESEQ	CDN M432	CDN M line	48108
CMC S311	Rohde & Schwarz	BBA150	RF Amplifier	103021
CMC S312	EM TEST	coupling NX5	CDN for Burst and Surge	P1737203098
CMC S313	EM TEST	NetWave 30-400	AC Source	P1751211689
CMC S318	RIGOL	DSG815	RF signal generator	DSG8A202600203
CMC S319	TESEQ	KEMZ 801A	Injection Clamp	51292
CMC S322	Werlatone	C5960-10	Dual Directional Coupler	117666
CMC S323	Vectawave	VBA250-800	RF Amplifier	123091
CMC S324	CMC	CCC01	Coupling Clamp	001
CMC S326	RIGOL	DSG3060	RF signal generator	DSG3A204600091
CMC S327	Minicircuits	PWR-SEN-6GHS	USB Power Sensor	11901020110
CMC S328	Minicircuits	PWR-SEN-6GHS	USB Power Sensor	11901020127
CMC S329	Schwarzbeck	BBHA 9120 J	Horn Antenna	9120J-0167
CMC S331	Bruel & Kjaer	2260 + 4231	Phonometer	1847463 + 2095024
CMC S332	Schwarzbeck	STLP 9128 D	Double Log-periodic Antenna	91028 D 049
CMC S333	CMC	Wfr_sma_fix	Shielded Cable	Wfr_fix32-4
CMC S334	Wainwright Instruments	WHKX12-935-1000-15000-40SS	High Pass Filter	46
CMC S335	Wainwright Instruments	WHKX12-2487.1-2660-18000-40SS	High Pass Filter	01
CMC S336	Narda	EP601	Field Meter	711WX90802
CMC S337	Milmega	AS0860A-100/50	RF Amplifier	1087595
CMC S338	RIGOL	DSG815	RF signal generator	DSG8A212700221
CMC S339	Minicircuits	ZHSS-8G-S+	High Pass Filter	32002
CMC S340	Schwarzbeck	NNBM 8124 200A	LISN 5µH	8124-200 00629
CMC S341	Schwarzbeck	NNBM 8124 200A	LISN 5µH	8124-200 00630
CMC S342	Micsig	CP2100B	Current Probe	310000980
CMC S344	Fairview microwave	SCE18110101-800CM	Shielded Cable	- - -
CMC S345	Fairview microwave	SCE18110101-250CM	Shielded Cable	- - -
CMC S346	Fairview microwave	FMC2929085-500CM	Shielded Cable	- - -
CMC S347	Fairview microwave	FMAM3260	Broadband Preamplifier	V000669F02152016H045
CMC S348	Rohde & Schwarz	RTM3004	Digital Oscilloscope	1335.8794K04-104249-KF
CMC S349	EM TEST	AutoWave	Automotive Waveforms Generator	P2012239934
CMC S350	EM TEST	VDS 200Q50.2	Voltage Drop Simulator	P2012239962
CMC S351	EM TEST	UCS 200N	Pulse Generator	P2026241998
CMC S352	Schwarzbeck	CDN S8 RJ45	CDN I/O line	00023
CMC S353	Rohde & Schwarz	ESW26	Emi Test Receiver	101492
CMC S354	CMC	Wfr_sma_white	Shielded Cable	Wfr_ant20-1
CMC S355	CMC	Wfar03_N_white	Shielded Cable	Wfar03_blkng
CMC S356	Minicircuits	ZAPD-2-252-N+	Power Splitter	NFG23501720

Attachment 1

<i>Id. number</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Description</i>	<i>Serial number</i>
CMC S357	Minicircuits	ZAPD-30-S+	Power Splitter	SFG24201721
CMC S358	CMC	Wsac03_N	Shielded Cable	Wsac03_ant10-2
CMC S359	Wainwright Instruments GmbH	WRCJV8-2350-2400-2483.5-2533.5-40SS	Band Reject Filter	12
CMC S360	TESEQ	CIP 9136A	Bulk Current Injection Probe	61394
CMC S361	CMC	Tnet01	T Network	T001
CMC A001	Sispe	F5123	Shield chamber	---
CMC A002	SIDT	951130	Anechoic chamber	---
CMC A007	CMC	10707	Semi-anechoic chamber	---
CMC A008	CMC	BPA	Track for absorbing clamp	---
CMC A013	CMC	TR01	Rotary motorized table	---
CMC A014	CMC	PM01	Antenna positionning Mast	---
CMC A070	Frankonia	SAC10	Semi-anechoic chamber	F159003
CMC A071	Frankonia	FC06	Controller Turntable & Antennamast	FC06-2014-015
CMC A072	Frankonia	FAM2-4	Antenna mast	---
CMC A073	Frankonia	FTM 3-3	Turntable	FC062015029
CMC A075	Schwarzbeck	AM9144	Modular Antenna Mast	---
CMC A076	Frankonia	SAC03	Semi-anechoic chamber	F159002
CMC B026	Angelantoni	UY 245 IU	Climatic chamber	1059.78
CMC B069	Angelantoni	CH 600C	Climatic Chamber	41973
CMC B087	Yokogawa	WT3000	Precision Power analyzer	91JB15155

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:

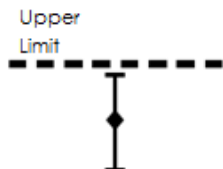
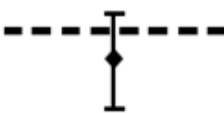
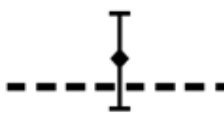
The expanded uncertainty reported according to the document EA-4-02 is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of $p = 95\%$

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

Components list by the customer

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Attachment 2

15	1	U1	SN74AHC344PW	TSSOP20	TEXAS INSTRUMENTS	SN74AHC344PW	U-DSN74AHC344P	
16	4	U2, U3, U4, U5	TLC5928IDBQR	TSSOP24	TEXAS INSTRUMENTS	TLC5928IDBQR	U-DTLC5928IDBQ	

Attachment 2

CSA683.2-CD683 WITTYTAB LED CONTROL BOARD 4.2

BILL OF MATERIAL

07/06/2021

Item	Q.ty	Reference	Part Value	Package	Manufacturer	Order Code	Microgate PN	Note
1	1	B1	BATTERY CR2032		RENATA	CR2032	BAT042	
2	13	C1, C10, C56, C58, C61, C62, C63, C67, C68, C69, C70, C71, C77	22u 25V	0805_C	MURATA	GRM218R61E226ME44L	C-8-22U-25VXSR	
3	24	C2, C3, C8, C11, C12, C29, C30, C31, C32, C40, C41, C42, C43, C44, C45, C46, C51, C52, C55, C57, C74, C75, C76, C78	100n	0402_C	TDK	C1005XR11H104M0508B	C-D100N-50VX7R	
4	2	C4, C5	10uF 6V3	0402_C	TDK CORPORATION	C1005XS01106M0508C	C-D-10U-6V3XSR	
5	3	C5, C28, C47	2u2 10V	0402_C	TDK	C1005XS11A225K0508C	C-D-2U2-10VXSR	
6	7	C13, C14, C15, C16, C17, C21, C50	150p	0402_C	MURATA	GRM1555C1H151J1A01D	C-D150P-50VCOG	
7	3	C7, C9, C20	10n	0402_C	YAGEO	CC0402KRXR98B103	C-D-10N-50VX7R	
8	3	C22, C23, C72	1u 25V	0402_C	TDK	C1005XS11E105K0508C	C-D-1U-25VXSR	
9	4	C33, C34, C35, C36	1u 25V N.M.	0402_C	TDK	C1005XS11E105K0508C	C-D-1U-25VXSR	
10	3	C37, C38, C39	100n N.M.	0402_C	TDK	C1005XR11H104M0508B	C-D100N-50VX7R	
11	2	C48, C49	15p N.M.	0402_C	MURATA	GRM1555C1H150J1A01D	C-D-15P-50VCOG	
12	2	C53, C54	15p	0402_C	MURATA	GRM1555C1H150J1A01D	C-D-15P-50VCOG	
13	1	C59	820p	0402_C	MURATA	GRM1555C1H821J1A01D	C-D820P-50VCOG	
14	1	C60	47p 25V	0402_C	VEIET	C804C470J3GAC	C-D-47P-25VCOG	
15	1	C64	22n	0402_C	TDK	C1005XR11H223K0508B	C-D-22N-50VX7R	
16	1	C65	22p	0402_C	MURATA	GRM1555C1H220FA01D	C-D-22P-50VCOG	
17	2	C66, C73	100p	0402_C	MURATA	GRM1555C1H101J1A01D	C-D100P-50VCOG	
18	1	C79	47n	0402_C	TDK	C1005XR11H473K0508B	C-D-47N-50VX7R	
19	1	DL1	LED RGB	PLCCA_LOW	CREE INC.	CLMVC-FKA-CLB0GL7LB8	DLC-RGB-PLCCA1	
20	4	D51, D55, D56, D57	BAT54VV	SOT666	NXP	BAT54VV	DSABAT54VV	
21	1	D58	15MQ040NPBF	SMA	VISHAY	15MQ040NPBF	DSA15MQ040NPBF	
22	1	D25	PESD15VL28T N.M.	SOT23_3	NXP	PESD15VL28T.215	DZAPESD15VL28T	
23	1	D26	CD50T23-SM712 N.M.	SOT23_3	BOURNS	CD50T23-SM712	DZACD50T23-SM7	
24	2	D27, D28	PESD3V351UB	SOD523	NXP	PESD3V351UB	DZAPESD3V351UB	
25	2	D29, D210	SMCJ15CA	DO214AB	VISHAY	SMCJ15CA-E3/57T	DZASMCJ15CA	
26	1	D211	SMLVT3V3	DO214AA	STMicroelectronics	SMLVT3V3	DZASMLVT3V3	
27	1	D212	SMBJ12A	DO214AA	Littlefuse	SMBJ12A	DZASMBJ12A	
28	1	D213	RCLAMP0502A.TCT	SOT666	SEMTECH	RCLAMP0502A.TCT	DZARCLAMP0502A	
29	1	E1	STD-601-434MHz	E-OSTD-601-434	CIRCUIT DESIGN	STD-601 434 MHz	E-OSTD-601-434	
30	1	EB1	Beeper_CMT-1203	BEEPER_SMD_L12	CLUI INC.	CMT-1203-SMT	E-8CMT-1203-SM	
31	3	F1, F2, F3	1500mA 24V	1812	LITTELFUSE	1812L150/24MR	F-A1500MA--24V	
32	1	F4	1500mA 24V N.M.	1812	LITTELFUSE	1812L150/24MR	F-A1500MA--24V	
33	6	FE1, FE2, FE3, FE11, FE12, FE20	600R 100M	0603_L	MURATA	BLM188D6015N1D	FEA-600R--100M	
34	4	FE7, FE8, FE9, FE10	600R 100M N.M.	0603_L	MURATA	BLM188D6015N1D	FEA-600R--100M	
35	2	FE13, FE15	33R 100M	1206	MURATA	BLM31PG3305N1L	FEA--33R--100M-C	
36	1	FE14	FEA--90R--100M	FE_TDK_2_2_0	TDK	ACM2012-900-2P-T002	FEA--90R--100M	

Attachment 2

37	4	FE16, FE17, FE18, FE19	70R 100M	1812	WUERTH ELEKTRONIK	742 792 510	FEA--70R--100M
38	1	J2	J-C--2X1F-4MM1	J-C--2X1F-4MM1	WUERTH ELEKTRONIK	803 122 421 145 10	J-C--2X1F-4MM1
39	1	J3	J-T--8X2M2P541	J-T--8X2M2P541	HARTING	0918 516 7904	J-T--8X2M2P541
40	1	J4	J-R--6X1M2P54V N.M.	J-R--6X1M2P54V	TE CONNECTIVITY	0-0280372-2	J-R--6X1M2P54V
41	1	J7	BATTERY HOLDER CR2032	J-S-BAT-CR2032	RENATA	SMTU 2032-1-LF	J-S-BAT-CR2032
42	1	J8	3X1F3MM5H1	J-C-3X1F3MM5H1	LUMBERG	1503 03	J-C-3X1F3MM5H1
43	1	J9	J-S--5X1F0P652	J-S--5X1F0P652	MOLEX	1050170001	J-S--5X1F0P652
44	1	J10	J-T--4X1M5P08V	J-T--4X1M5P08V	WUERTH ELEKTRONIK	691 311 500 104	J-T--4X1M5P08V
45	1	J12	J-R--2X1M2P54V	J-R--2X1M2P54V	TYCO ELECTRONICS	280370-2	J-R--2X1M2P54V
46	1	J13	J-C--2X1F-6MMH	J-C--2X1F-6MMH	LUMBERG	1613 14 VP9	J-C--2X1F-6MMH
47	1	JP1	J-S--5X2F1P27V	J-S--5X2F1P27V	SAMTEC	CLP-105-02-L-D-K-TR	J-S--5X2F1P27V
48	1	JP6	J-S--5X2F1P27V	J-S--5X2F1P27V	SAMTEC	CLP-105-02-L-D-K-TR	J-S--5X2F1P27V
49	1	L1	10u 3.8A	LBQ_1_10	BOURNS	SRU1038-100Y	L-A--10U-DC3A8
50	1	L2	3u3 2.15A	LWE_1_4_8	WUERTH ELEKTRONIK	744943003	L-A--3U3DC3A15
51	1	M1	M-M-----CAP-G		MEC	1D02	M-M-----CAP-G
52	1	M3	M-M-----CAP-Y		MEC	1D04	M-M-----CAP-Y
53	1	M4	MEP465	MEP465	BIVAR	SLP3-150-100-F	MEP465
54	2	M5, M7	FRONTALINO	MEC1067	FISCHER ELEKTRONIK	F8GT384/7	MEC1067
55	1	Q1	2N7002WT1G	SOT323	ON SEMICONDUCTOR	2N7002WT1G	Q-A2N7002WT1G
56	1	Q2	5I4214DDY	SOC8	VISHAY	5I4214DDY-T1-GE3	Q-AS14214DDY
57	1	Q3	5I2333DD5	SOT23_3	VISHAY	5I2333DD5	Q-AS12333DD5
58	3	R1, R9, R58	100R	0402_R	YAGEO	RC0402FR-07100RL	R-D-100R-1%
59	1	R36	10k N.M.	0402_R	YAGEO	RC0402FR-0710KL	R-D--10K-1%
60	13	R6, R31, R35, R37, R38, R40, R42, R52, R59, R64, R65, R68, R87	100k	0402_R	YAGEO	RC0402FR-07100KL	R-D-100K-1%
61	5	R7, R8, R11, R21, R22	1k	0402_R	YAGEO	RC0402FR-071KL	R-D---1K-1%
62	1	R10	2k7	0402_R	YAGEO	RC0402FR-072KL	R-D--2K7-1%
63	1	R16	390k	0402_R	YAGEO (PHYCOMP)	RC0402FR-07390KL	R-D-390K-1%
64	1	R19	330k	0402_R	YAGEO	RC0402FR-07330KL	R-D-330K-1%
65	1	R23	180R	0603_R	YAGEO	RC0603FR-07180RL	R-A-180R-1%
66	4	R5, R28, R48, R56	270R	0402_R	YAGEO	RC0402FR-07270RL	R-D-270R-1%
67	4	R29, R33, R41, R51	2k7 0W25	0603_R	VISHAY	CRCW06032K70RKEAHP	R-A--2K7-1%0W2
68	2	R30, R34	270R 0W25	0603_R	VISHAY	CRCW0603270RKEAHP	R-A-270R-1%0W2
69	1	R32	180R N.M.	0603_R	YAGEO	RC0603FR-07180RL	R-A-180R-1%
70	9	R2, R3, R4, R39, R43, R49, R57, R63, R72	10K	0402_R	YAGEO	RC0402FR-0710KL	R-D--10K-1%
71	2	R44, R45	2k2	0402_R	YAGEO	RC0402FR-072K2L	R-D--2K2-1%
72	4	R46, R47, R54, R55	120R 0W25	0603_R	VISHAY DRALORIC	CRCW0603120RKEAHP	R-A-120R-1%0W2
73	2	R50, R53	150R	0603_R	WALSIN	WR06X1500FTL	R-A-150R-1%
74	1	R62	120R 0W25 N.M.	0603_R	VISHAY DRALORIC	CRCW0603120RKEAHP	R-A-120R-1%0W2
75	1	R67	5M6	0603_R	YAGEO	RC0603FR-075M6L	R-A--5M6-1%
76	4	R12, R69, R82, R91	33k	0402_R	YAGEO	RC0402FR-0733KL	R-D--33K-1%
77	2	R70, R71	3M9	0402_R	YAGEO	RC0402FR-073M9L	R-D--3M9-1%
78	1	R73	0R	0402_R	VISHAY/DALE	CRCW04020000Z0ED	R-D---0R-1%

Attachment 2

79	1	R74	82k	0603_R	YAGEO	RC0603FR-0782KL	R-A--82K-1%	
80	1	R75	47k	0402_R	YAGEO	RC0402FR-0747KL	R-D--47K-1%	
81	1	R76	2M7	0402_R	YAGEO	RC0402FR-072M7L	R-D--2M7-1%	
82	3	R77, R79, R83	150k	0402_R	YAGEO	RC0402FR-07150KL	R-D--150K-1%	
83	1	R78	191k	0603_R	MULTICOMP	MC0603W06031191K	R-A-191K-1%	
84	1	R80	15k	0402_R	YAGEO	RC0402FR-0715KL	R-D--15K-1%	
85	3	R84, R85, R88	10R	0402_R	VISHAY DALE	CRCW040210R0FKED	R-D--10R-1%	
86	1	R86	5k6	0402_R	YAGEO	RC0402FR-075K6L	R-D--5K6-1%	
87	2	R89, R90	47R	0402_R	VISHAY DALE	CRCW040247R0FKED	R-D--47R-1%	
88	1	R92	22R	0603_R	WALSIN	WR060322R0FTL	R-A--22R-1%	
89	2	S1, S2	RA3FTL6RAS	SWITCH_RA3FTL6RAS	MULTIMEC	RA3FTH6RAS	E-SRA3FTL6RAS	
90	1	U1	PIC24F1256G8206-I/PT	TOP964_50	MICROCHIP	PIC24F1256G8206-I/PT	U-MPIC24F1256G	
91	1	U2	TPS2553DBV	SOT23_6	TEXAS INSTRUMENTS	TPS2553DBV	U-DTPS2553DBV	
92	2	U3, U5	NC7WZ14P6X	SOT363	FAIRCHILD SEMICONDUCTOR	NC7WZ14P6X	U-DNC7WZ14P6X	
93	1	U4	ADRS043BRTZ-R2	SOT23_3	ANALOG DEVICES	ADRS043BRTZ-REEL7	U-ADRS043BRTZ	
94	1	U6	MAX3232EIPW N.M.	TSSOP16	TEXAS INSTRUMENTS	MAX3232EIPW	U-CMAX3232EIPW	
95	1	U7	NC7S204P5X N.M.	SOT353	FAIRCHILD	NC7S204P5X	U-DNC7S204P5X	
96	1	U8	ISL83072EUIZA N.M.	MSOP8	INTERSIL	ISL83072EUIZA	U-CISL83072EUIZA	
97	1	U9	STM811TW16F	SOT143_4	STMICROELECTRONICS	STM811TW16F	U-DSTM811TW16F	
98	1	U10	NC7WZ125K8X	US8	FAIRCHILD	NC7WZ125K8X	U-DNC7WZ125K8X	
99	1	U11	M41T62LC6F	LCC8_3.2x1.5		M41T62LC6F	U-DM41T62LC6F	
100	1	U12	NC7WZ17P6X	SOT363	ON SEMICONDUCTOR	NC7WZ17P6X	U-DNC7WZ17P6X	
101	1	U13	IP4254CZ8-4-TTL	HUSON8_1.7X1.35	TI	IP4254CZ8-4-TTL	U-DIP4254CZ8	
102	1	U14	BL652-SC	BL652-SC	Laird	BL652-SC	U-DL652-SC	
103	1	U15	MCP102T-450	SOT23_3	MICROCHIP	MCP102T-450E/TT	U-DMCP102T-450	
104	1	U16	LTC3112EFE#P8F	TSSOP20_PAD	LINEAR	LTC3112EFE#P8F	U-RLTC3112EFE	
105	1	U17	LTC4365CTS8#TRMP8F	SOT23_8	LINEAR TECHNOLOGY	LTC4365CTS8#TRMP8F	U-DLTC4365CTS8	
106	1	U18	APS100WG-7	SOT26_6	DIODES INC	APS100WG-7	U-RAPS100WG-7	
107	1	U19	74AUP1G157GW	SOT363	Nexperia	74AUP1G157GW.125	U-D74AUP1G157GW	
108	1	X3	BM 10ppm	QUARTZ_5X3	ABRACON CORP. ABM	3B-8.000MHz-10-1-U-T	X-A---8M--10P	
109	1	R13	4k7	0402_R	YAGEO	RC0402FR-074K7L	R-D--4K7-1%	