



Bundesnetzagentur

Test report

ACN27_01

BNetzA-CAB-02/21-01

Product / EUT: RFID reader
Type designation: Set 210 SE
Tested type: Set 210 SE (M210SE + DS210)
EUT authorization: ☒ Certification ☐ Declaration of Conformity
☐ Verification
Production level: 06/2016
S/N: M210SE: 16300019251; DS210: 132900025224
Manufacturer: ACD Elektronik GmbH
Industriegebiet Engelberg
88480 Achstetten / Germany

Test remit: FCC Rules 47 CFR Part 15 – Subpart C – Intentional radiators
in accordance with the procedures given in
§15.207; §15.209; §15.225

The standards were: ☒ kept*
☐ not kept*

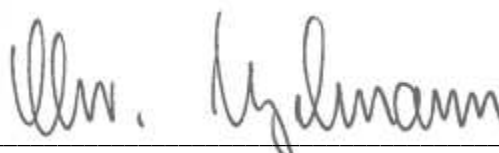
*Remark: ☒ Validation covered by the accredited scope
☐ Validation not covered by the accredited scope
according: _____
☐ Validation of the EMC-requirements partly proceeded

Applicant: ACD Elektronik GmbH
Industriegebiet Engelberg
88480 Achstetten / Germany

EUT-
Date of arrival: 2016-06-23
Test ID: PRN25_08
Date(s) of test: 2016-06-23 – 2016-07-08

Burgrieden, 2016-07-11

Released by:



Principal engineer – Christian Vogelmann

Test laboratory: ☒ EMCE GmbH
Ingenieurbüro für EMV-Prüfungen und Schaltungsentwicklung
Untere Wiesen 1 / 88483 Burgrieden / Germany

DakkS-Registration No.: D-PL-12122-01-01
CAB-Registration No.: BnetzA-CAB-02/21-01/1
FCC-Registration No.: 219415

Test procedure: ANSI C63.4-2014 Unintentional radiators
ANSI C63.10-2013 Intentional radiators
47 CFR Part 15 - 2016-07-06

Responsible inspector: Mr. Hauser
EMCE GmbH
Ingenieurbüro für EMV-Prüfungen und Schaltungsentwicklung

Contact person: Mr. Fixel / ACD Elektronik GmbH

EUT description: Mobile terminal M210SE with docking station DS210, the system contains a 13.56MHz RFID reader and optional a WLAN bg / ac module . The mobile terminal is supplied by an internal battery. A battery charger is used with the docking station.

Voltage supply: 7.2VDC – Internal battery
100-240V / 50/60Hz – Docking station (battery charger)

Fundamental frequency: 13.56MHz

Frequency list: 7.37MHz; 8MHz; 12MHz; 13.56MHz; 24MHz; 24.57MHz;
25MHz; 800MHz

Temperature range: 0°C to 45°C

Approximate size: M210SE: LxWxH / cm - 23x9x4
DS210: LxWxH / cm - 20x13x21

Supplied /
used equipment:

Designation	Type	Manufacturer	S/N
Power supply DS210	TYTK1500240DT	Taiytech	n/a
Power supply laptop	DA90PM111	Dell	CN-0MK947-48661-1 BE-09PL-A03
Access point	AIR AP1262N	Cisco	FCZ1525W0VH
Battery	Part. No. 4500081, 7.2V / 2.9Ah	ACD	n/a
Laptop	Latitude	Dell	MAC: D4BED9065268
WLAN module	b/g/n/ac	ACD Elektronik GmbH	FCC ID: O2F-MSD30AG

Configuration:



As-delivered condition*



Modified*

Cable designation	Type	Length	Remarks
AC power cord	2 core	140cm	n/a
AC power cord (Laptop)	3 core	140cm	n/a
DC power cord	2 core	120cm	n/a
USB cable	Shielded	180cm	n/a
Ethernet cable	Cat.6	300cm	n/a

Remarks:

n/a

State of revision:

Source document	New Document	Date / Reviser	Modifications

Test equipment list of EMCE GmbH:

Inv.- No.	Designation	Type	Manufacturer	S/N	Calibration: Interval /valid until
001	Test receiver	ESS 5Hz - 1000MHz	Rohde & Schwarz	833776/008 Firmware: Main: 1.21 OTP: 02.01 GRA: 02.03	1 Year(s)/ 2016-10-05
003	LISN 1	ESH3-Z5	Rohde & Schwarz	835268/007	1 Year(s)/ 2016-08-31
004	LISN 2	ESH3-Z5	Rohde & Schwarz	835268/003	1 Year(s)/ 2016-11-30
008	Loop antenna 9kHz-30MHz	HFH2-Z2	Rohde & Schwarz	835776/0002	3 Year(s)/ 2016-11-22
009	Antenna 30-300MHz	VHBA9123 / BBA9106	Schwarzbeck	435	3 Year(s)/ 2018-10-27
010	Antenna 250-1200MHz	UHALP 9108A	Schwarzbeck	108	2 Year(s)/ 2016-09-05
011	Antenna 30-300MHz	VHBA9123 / BBA9106	Schwarzbeck	0403/94	2 Year(s)/ 2016-09-05
012	Antenna 250-1200MHz	UHALP 9108A	Schwarzbeck	166	3 Year(s)/ 2018-11-10
014	OATS	3m	EMCE GmbH		3 Year(s)/ 2017-10-31
015	OATS	10m	EMCE GmbH		3 Year(s)/ 2017-10-31
042	AC-Source/ Analyser/ Norm impedance	EMV D 5000/PAS	Spitzenberger+ Spies	A2747 00/0 0501 A2747 07/00501 (ARS16/3)	2 Year(s)/ 2017-08-31
058	Receiver	ESIB 40	Rohde & Schwarz	100200/ Firmware 4.35	1 Year(s)/ 2017-04-07
062	Semi anechoic chamber #2	13.0m x 7.0m x 5.0m	EMC-Technik & Consulting GmbH		1 Year(s)/ 2016-07-31
067	LISN	ESH2-Z5	Rohde&Schwarz	872460/043	1 Year(s)/ 2016-08-31
068	LISN	ESH2-Z5	Rohde&Schwarz	872460/042	1 Year(s)/ 2016-08-31
070	Pulse limiter + 10dB Attenuator	ESH3-Z2	Rohde&Schwarz	n/a	1 Year(s)/ 2016-08-31
175	EMI Test receiver	ESR7	Rohde & Schwarz	101108 Firmware:	1 Year(s)/ 2016-07-14

Inv.- No.	Designation	Type	Manufacturer	S/N	Calibration: Interval /valid until
				FW V2.26	
997	EMC Software	EMC32 Vers. 8.54.0	Rohde& Schwarz	n/a	

Scope:

1	EMC-Test(s).....	8
1.1	Emission according 47 CFR Part 15 Subpart C - 2016-07-06	8
1.1.1	Terminal voltage according 47 CFR Part 15 Subpart C - 2016-07-06	8
1.1.1.1	Test set up	9
1.1.1.2	Test.....	11
1.1.2	Radio disturbances according 47 CFR Part 15 Subpart C - 2016-07-06	30
1.1.2.1	Test set up	31
1.1.2.2	Test – Radiated emission fundamental.....	36
1.1.2.3	Test – Spurious emissions.....	41
1.1.2.4	Restricted bands of operation	73
1.1.2.5	Antenna requirement	76
2	Summary	77

1 EMC-Test(s)

1.1 Emission according 47 CFR Part 15 Subpart C - 2016-07-06

1.1.1 Terminal voltage according 47 CFR Part 15 Subpart C - 2016-07-06

- ☒ Full compliance
☐ Precompliance
☐ Test not requested*
☐ Test not carried out*

*

Test location

☒	Inv.-No.	Designation	Type (LxWxH)	Manufacturer	Location
☒	588	Shielded room #2	8.3/5.8 x 5.5/2.9 x 3.4m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	584	Shielded room #3	3.6 x 3.6 x 2.5m	Siemens AG	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	678	Shielded room #4	4.0 x 4.0 x 3.5m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	062	Semi anechoic chamber #2	13.5 x 6.1 x 5.5m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	679	Full anechoic chamber #3	8.8 x 4.6 x 4.2m	Albatross Projects GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	014	Open area test site	10m	EMCE GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	015	Open area test site	3m	EMCE GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	042	Voltage- / current source test site	0-382VDC 0-270VAC 1x10kW / 3x5kW	Spitzenberger + Spies	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	n/a	Alternative test site	n/a	n/a	n/a

1.1.1.1 Test set up

According ANSI C63.10-2013



Used test equipment

☒	Inv.-No.	Designation	Type	Manufacturer	S/N
☒	001	Test receiver	ESS 5Hz - 1000 MHz	Rohde & Schwarz	833776/008
	002	Probe	ESH2-Z3	Rohde & Schwarz	
	003	LISN 1	ESH3-Z5	Rohde & Schwarz	835268/007
	004	LISN 2	ESH3-Z5	Rohde & Schwarz	835268/003
	005	LISN 3	NNB 4/32T	Rolf Heine HF-Technik	4/32T-96015
	006	LISN	NNBM 8125	Schwarzbeck	8125371
	007	Absorbing clamp	MDS 21	Schwarzbeck	942436
	025	Current clamp BCI	F-120-2	FCC	47
	026	Coupling device network	CDN 801-M3-25	FCC	92
	030	Coupling device network	CDN-S9	EMCE GmbH	
	031	Coupling device network	CDN-S9	EMCE GmbH	
	036	Coupling device network	CDN-M5-25	EMCE GmbH	
	037	Coupling device network	CDN-S1	EMCE GmbH	
☒	042	AC-Source / Analyser / Norm impedance	EMV D5000/PAS	Spitzenberger + Spies	A274700/ 0 0501
	058	Test receiver	ESIB 40	Rohde & Schwarz	100200
	060	HF-coupling clamp	KEMA 801	Schaffner	20808
☒	067	LISN 5	ESH2-Z5	Rohde & Schwarz	0872460/043
☒	068	LISN 4	ESH2-Z5	Rohde & Schwarz	0872460/042
	073	Absorbing clamp	MDS 21	Schwarzbeck	881757

All used test equipment are checked resp. calibrated periodically.

☒ Test equipment was checked and complied to the requirements

Test / Measurement uncertainty

The measurement uncertainty in the test met the guideline of CISPR16-4-2 or better.

Measurement uncertainty of the terminal voltage with an extended coverage factor of $k=2$:

Frequency	Measurement uncertainty
9kHz – 150kHz	4.0dB
150kHz – 30MHz	3.6dB

1.1.1.2 Test

Regulation

47 CFR Part 15 Subpart C - 2016-07-06

☐ 9kHz - 30MHz

☒ 150kHz - 30MHz

Mains supply

Limits:

☒ Section 15.207

☐ __

Operation mode

EUT arrangement:

☒ Tabletop

☐ Floor standing

Power supply:

☒ Internal battery (Mobile terminal)

☒ 120V/60Hz (Docking station)

Rated voltage variation:

☐ 85%

☐ 115%

Port #	Designation	Remarks
#1	AC power line – DS210	L1/N
#2	AC power line – Laptop	L1/N/PE
#3		

Continuous operation of the mobile terminal M210SE, the device was placed in the docking station DS210.

The mobile terminal M210SE was supplied via the internal battery whilst the battery in the mobile terminal was charged.

The following systems/tests were active during the measurement:

- RFID – without tag (worst case)
- Ethernet - ping to laptop
- Camera
- WLAN - bg ping to access point (first test run)
- WLAN - ac ping to access point (second test run)
- USB/windows mobile to laptop
- IRDA I/F - scanning

Environmental conditions

Temperature [10 - 40°C]: 26°C

Relative humidity [10 - 90%]: 41%

Environmental conditions during the test: ☒ kept
☐ not kept

Test - / Measurement procedure

Measurements are made with a receiver according CISPR 16 guidelines. A pulse limiter and a 10dB attenuator at the receiver input is used to protect the receiver. The required frequency range is scanned in an automatically operation. When the EUT is arranged the frequency range is monitored. The setup of the equipment and the cables are manipulated within the range to produce the highest emission. Frequency steps of $<0.5 \times$ receiver bandwidth and peak / average detectors are used. If the conducted emission is closer than 20dB to the limits or exceeds, the receiver will retest the emission with quasipeak or average detector. The identified frequency and amplitude of the six highest conducted emissions relative to the limit lines are listed for each current-carrying conductor. If less than six emission frequencies are within the 20dB of the limit, the noise level of the measuring instrument at representative frequencies are reported.

The reported test results are calculated with the following formula:

$$\text{Result (dB}\mu\text{V)} = \text{Reading (dB}\mu\text{V)} + \text{ATF (dB)} + \text{CF (dB)}$$

ATF = Correction factor for the pulse limiter / 10dB attenuator

CF = Correction factor for the cable loss

Test result

Limits for continuous disturbances: ☒ kept
☐ not kept

| Remarks: n/a

Protocol scope

☒ Readings - continuous emanation☒ Diagram - continuous emanation

EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

05. Jul 16 09:05

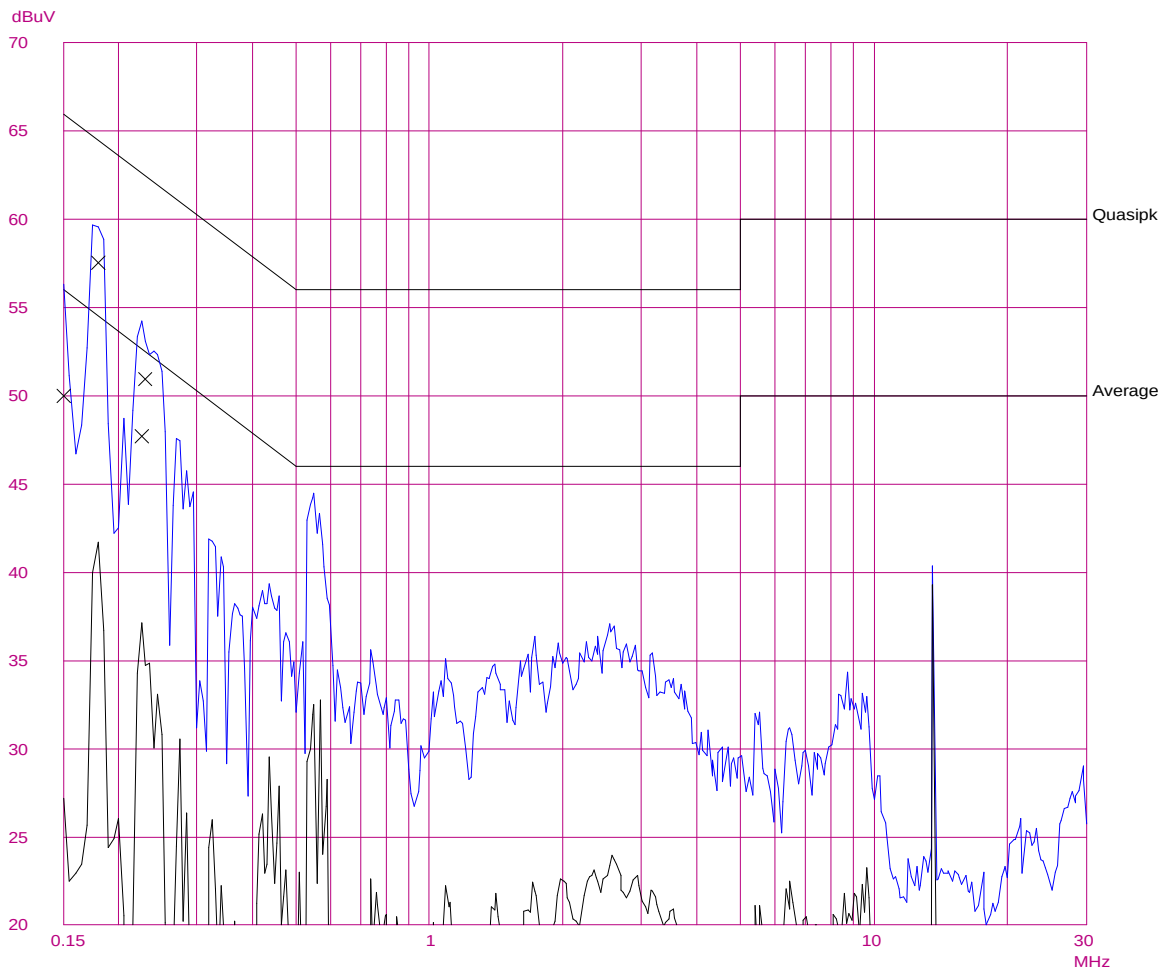
EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN bg
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_01, Phase L1 - EUT

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 50
Acc Margin: 10dB

Transducer No.	Start	Stop	Name
3	2 1Hz	1000M	Kabel_6m
20	9k	30M	Lim_#070



EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

05. Jul 16 09:05

EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN bg
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_01, Phase L1 - EUT

Scan Settings (1 Range)

Frequencies				Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO LN	OFF 60dB

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.15000	49.9	66.0
0.18000	57.5	64.5
0.22500	47.7	62.7
0.23000	50.9	62.4

Frequency MHz	AV Level dBuV	AV Limit dBuV
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no Results

* limit exceeded

EMCE GmbH Ing_buero fuer EMV_Pruefungen

Terminal voltage

05. Jul 16 09:17

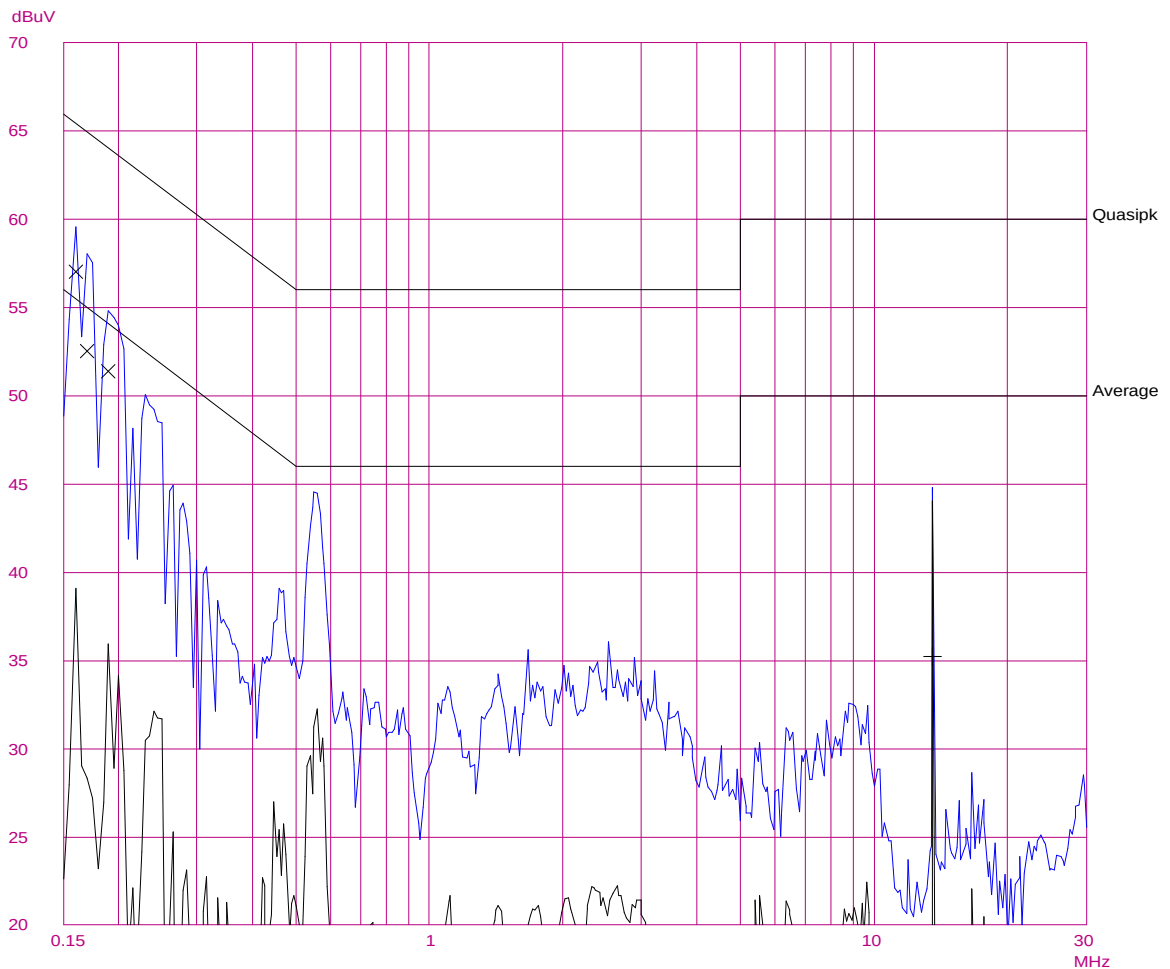
EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN bg
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_02, Phase N - EUT

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 50
Acc Margin: 10dB

Transducer No.	Start	Stop	Name
3 2	1Hz	1000M	Kabel_6m
20	9k	30M	Lim_#070



EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

05. Jul 16 09:17

EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN bg
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_02, Phase N - EUT

Scan Settings (1 Range)

Frequencies				Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO LN	OFF 60dB

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.16000	57.0	65.5
0.17000	52.5	65.0
0.19000	51.3	64.1

Frequency MHz	AV Level dBuV	AV Limit dBuV
13.56000	35.2	50.0

* limit exceeded

EMCE GmbH Ing_buero fuer EMV_Pruefungen

Terminal voltage

05. Jul 16 09:28

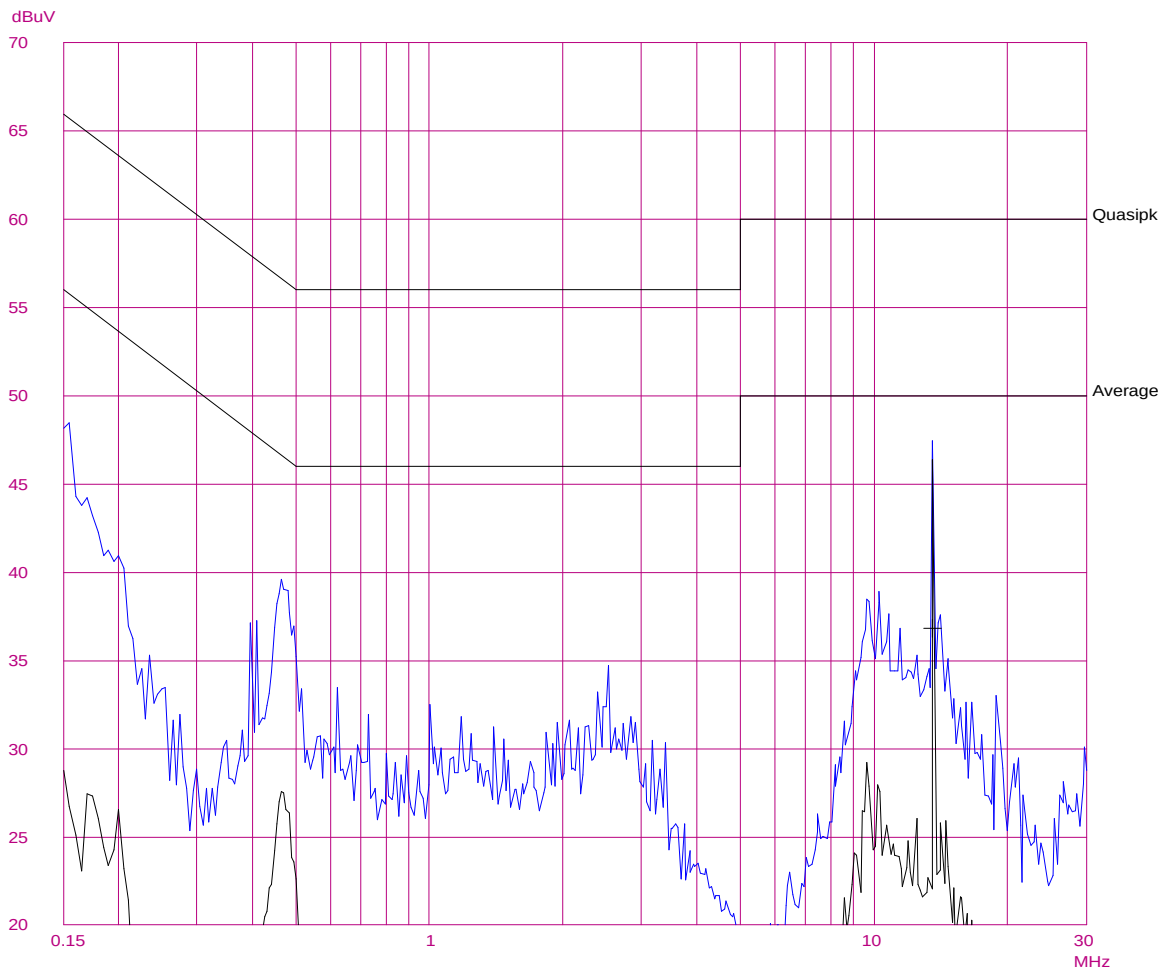
EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN bg
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_03, Phase L1 - laptop

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 50
Acc Margin: 10dB

Transducer No.	Start	Stop	Name
3	2 1Hz	1000M	Kabel_6m
20	9k	30M	Lim_#070



EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

05. Jul 16 09:28

EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN bg
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_03, Phase L1 - laptop

Scan Settings (1 Range)

Frequencies				Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO LN	OFF 60dB

Final Measurement Results:

Frequency	QP Level	QP Limit
MHz	dBuV	dBuV

no Results

Frequency	AV Level	AV Limit
MHz	dBuV	dBuV

13.56500	36.8	50.0
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* limit exceeded

EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

05. Jul 16 09:39

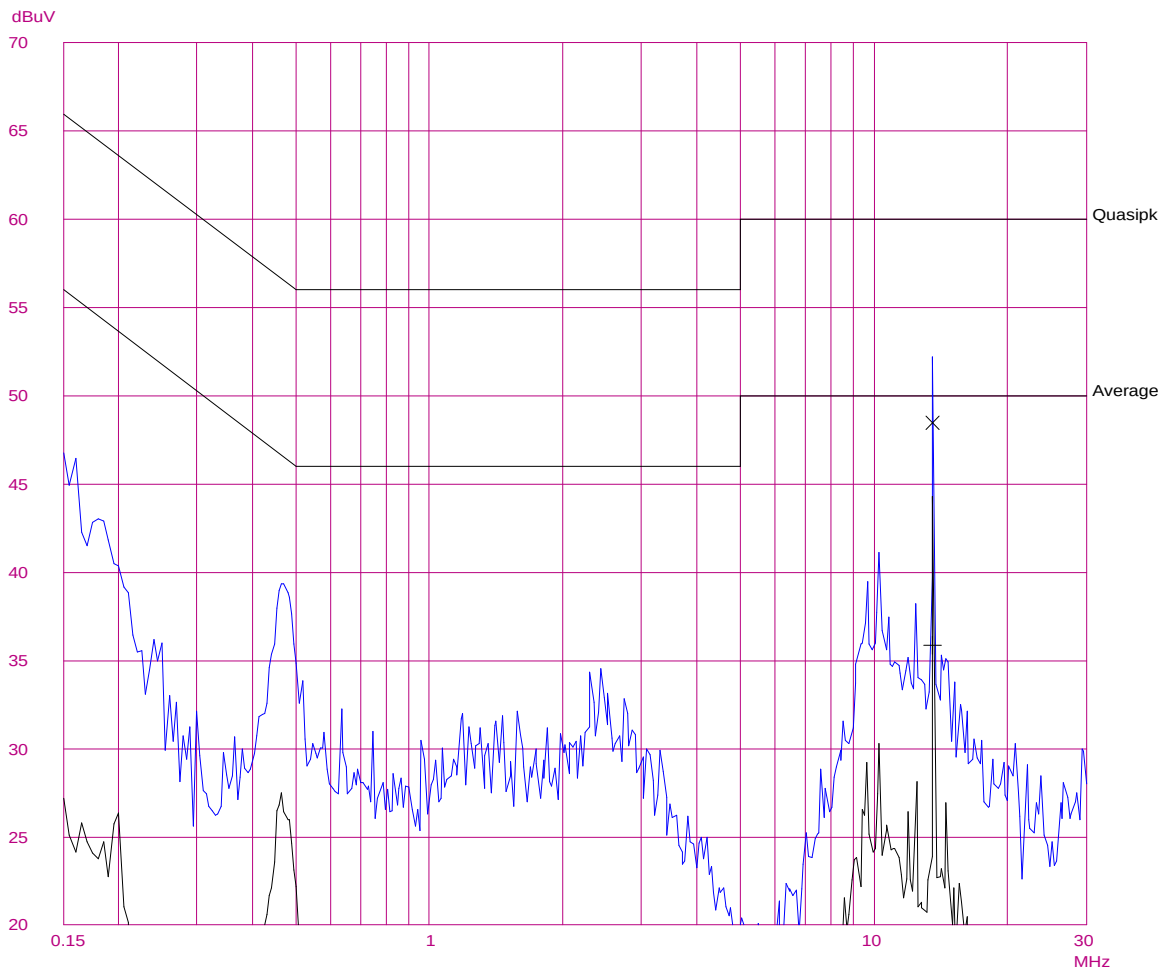
EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN bg
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_04, Phase N - laptop

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 50
Acc Margin: 10dB

Transducer No.	Start	Stop	Name
3	2 1Hz	1000M	Kabel_6m
20	9k	30M	Lim_#070



EMCE GmbH Ing_buero fuer EMV_Pruefungen

Terminal voltage

05. Jul 16 09:39

EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN bg
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_04, Phase N - laptop

Scan Settings (1 Range)

Frequencies				Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO LN	OFF 60dB

Final Measurement Results:

Frequency	QP Level	QP Limit
MHz	dBuV	dBuV

13.56000	48.4	60.0
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Frequency	AV Level	AV Limit
MHz	dBuV	dBuV

13.55500	35.8	50.0
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* limit exceeded

EMCE GmbH Ing_buero fuer EMV_Pruefungen

Terminal voltage

05. Jul 16 09:50

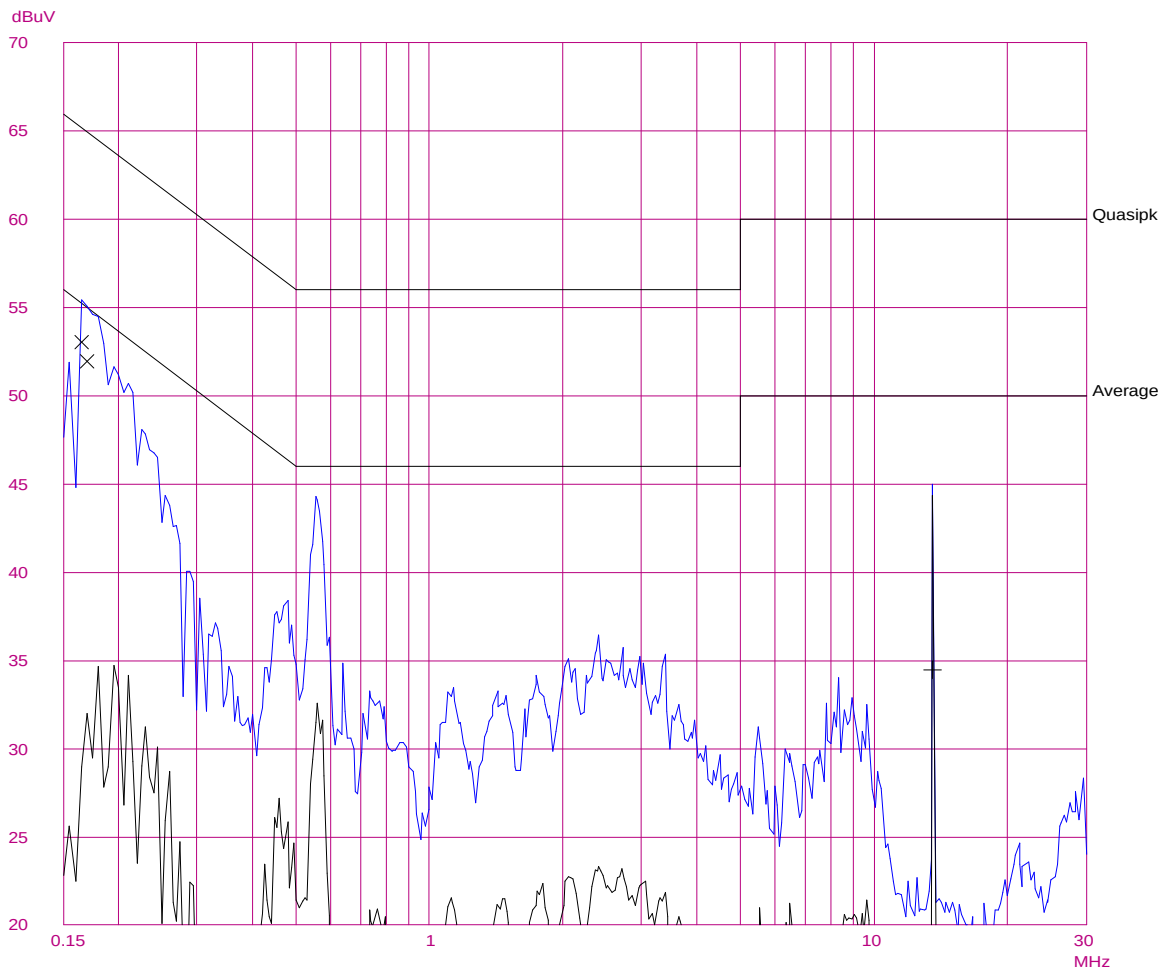
EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN ac
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_05, Phase L1 - EUT

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 50
Acc Margin: 10dB

Transducer No.	Start	Stop	Name
3	2	1Hz	1000M Kabel_6m
20	9k	30M	Lim_#070



EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

05. Jul 16 09:50

EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN ac
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_05, Phase L1 - EUT

Scan Settings (1 Range)

Frequencies				Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO LN	OFF 60dB

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.16500	53.0	65.2
0.17000	51.9	65.0

Frequency MHz	AV Level dBuV	AV Limit dBuV
13.56000	34.5	50.0

* limit exceeded

EMCE GmbH Ing_buero fuer EMV_Pruefungen

Terminal voltage

05. Jul 16 10:02

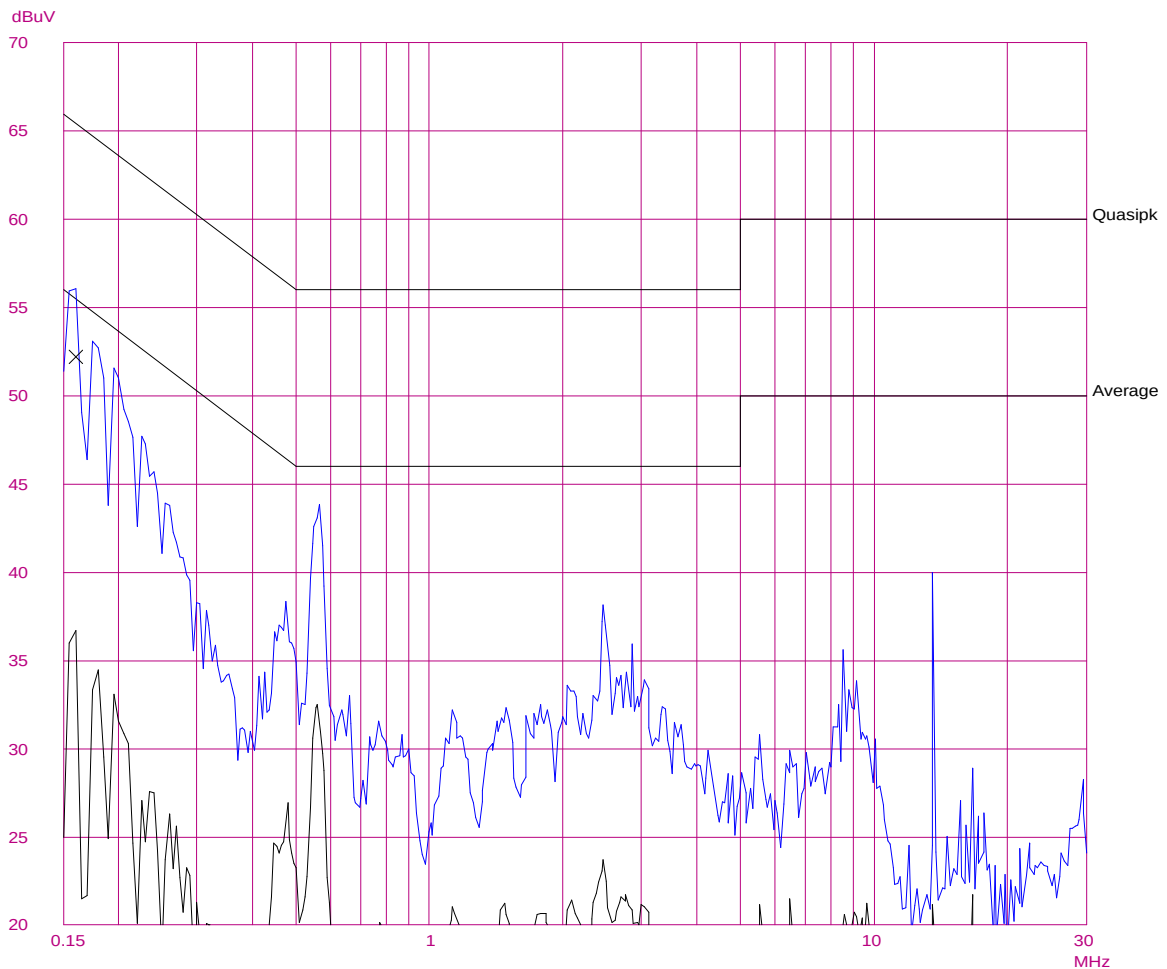
EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN ac
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_06, Phase N - EUT

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 50
Acc Margin: 10dB

Transducer No.	Start	Stop	Name
3	2	1Hz	1000M Kabel_6m
20	9k	30M	Lim_#070



EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

05. Jul 16 10:02

EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN ac
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_06, Phase N - EUT

Scan Settings (1 Range)

Frequencies				Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF

Final Measurement Results:

Frequency	QP Level	QP Limit
MHz	dBuV	dBuV
0.16000	52.2	65.5

Frequency	AV Level	AV Limit
MHz	dBuV	dBuV

no Results

* limit exceeded

EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

05. Jul 16 10:13

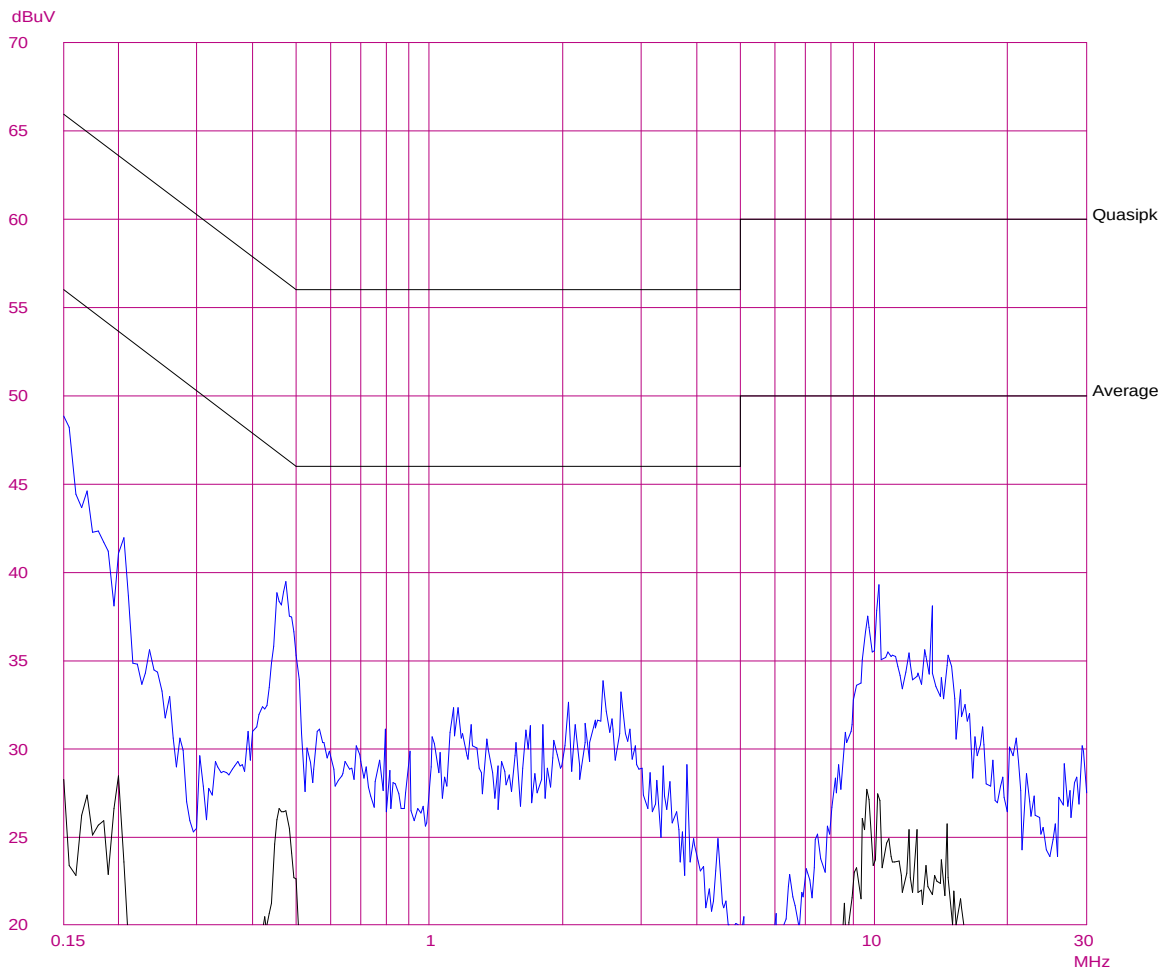
EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN ac
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_07, Phase L1 - laptop

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 50
Acc Margin: 10dB

Transducer No.	Start	Stop	Name
3	2 1Hz	1000M	Kabel_6m
20	9k	30M	Lim_#070



EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

05. Jul 16 10:13

EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN ac
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_07, Phase L1 - laptop

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN	OFF 60dB

Final Measurement Results:

no Results

EMCE GmbH Ing_buero fuer EMV_Pruefungen

Terminal voltage

05. Jul 16 10:24

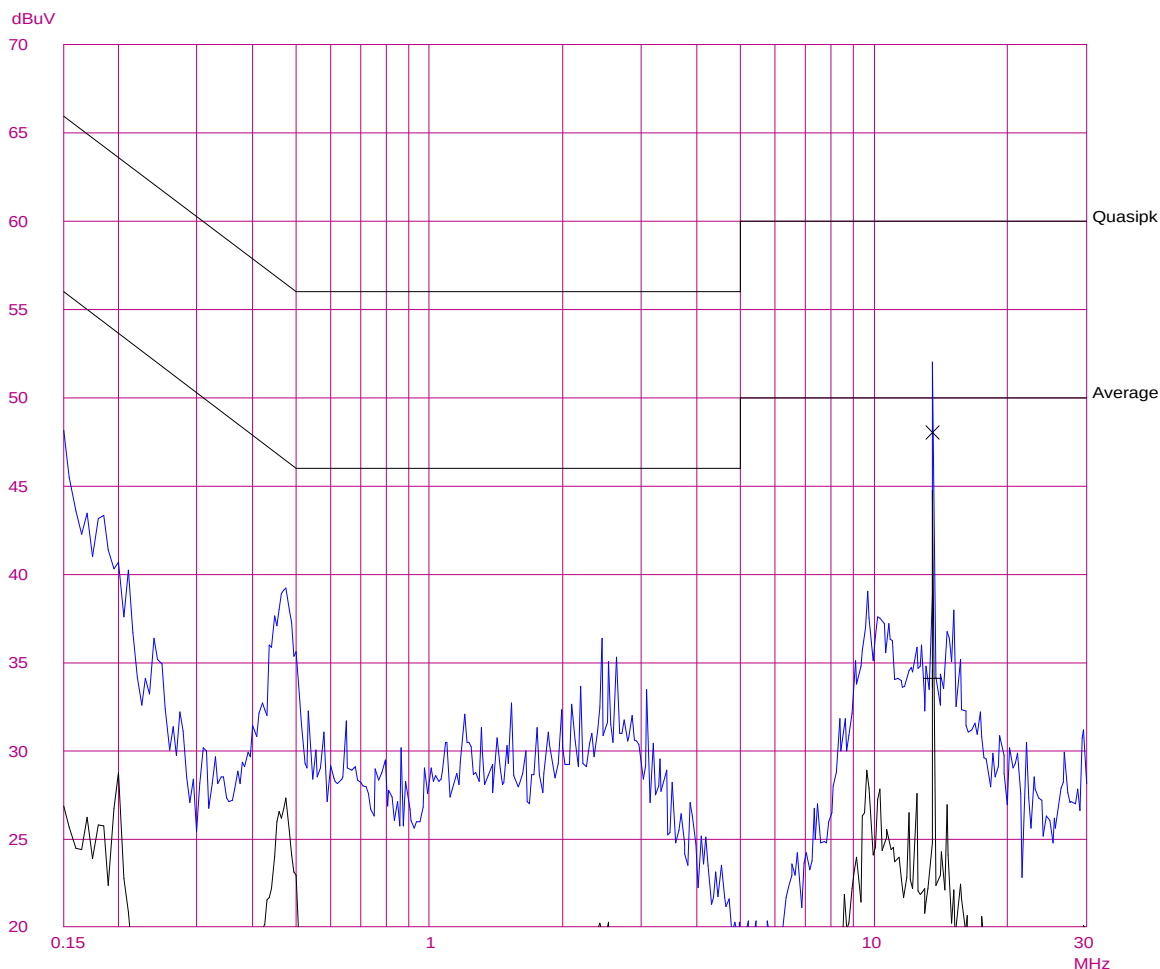
EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN ac
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_08, Phase N - laptop

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF	60dB

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 50
Acc Margin: 10dB

Transducer No.	Start	Stop	Name
3	2	1Hz	1000M Kabel_6m
	20	9k	30M Lim_#070



EMCE GmbH Ing_buero fuer EMV_Pruefungen

Terminal voltage

05. Jul 16 10:24

EUT: SET 210SE
Manuf: ACD Elektronik GmbH
Op Cond: Camera active, RFID active, ping,WLAN ac
Operator: P. Hauser
Test Spec: CFR Part 15 Subpart C
Comment: Test_ID PRN25_08
ACN27_08, Phase N - laptop

Scan Settings (1 Range)

Frequencies				Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamplifier
150k	30M	5k	10k	PK+AV	20ms	AUTO	LN OFF 60dB

Final Measurement Results:

Frequency	QP Level	QP Limit
MHz	dBuV	dBuV

13.56000	48.0	60.0
----------	------	------

Frequency	AV Level	AV Limit
MHz	dBuV	dBuV

13.55500	34.1	50.0
----------	------	------

* limit exceeded

Retested emissions

☒ Quasipeak-Detector									
Frequency	Readings	+ ATF Pulse limiter correction factor	+ CF Cable correction factor	Conducted emission	Limit	Margin	Hot / neutral line	Bandwidth	Measuring time
MHz	dB μ V	dB	dB	dB μ V	dB μ V	dB	Lx / N	kHz	ms
13.560	39.2	9.8	0.2	49.2	60.0	10.8	N / Laptop	10	5000

☒ Average-Detector									
Frequency	Readings	+ ATF Pulse limiter correction factor	+ CF Cable correction factor	Conducted emission	Limit	Margin	Hot / neutral line	Bandwidth	Measuring time
MHz	dB μ V	dB	dB	dB μ V	dB μ V	dB	Lx / N	kHz	ms
13.560	27.5	9.8	0.2	37.5	50.0	12.5	N / Laptop	10	5000

1.1.2 Radio disturbances according 47 CFR Part 15 Subpart C - 2016-07-06

- ☒ Full compliance
☐ Precompliance
☐ Test not requested*
☐ Test not carried out*

*

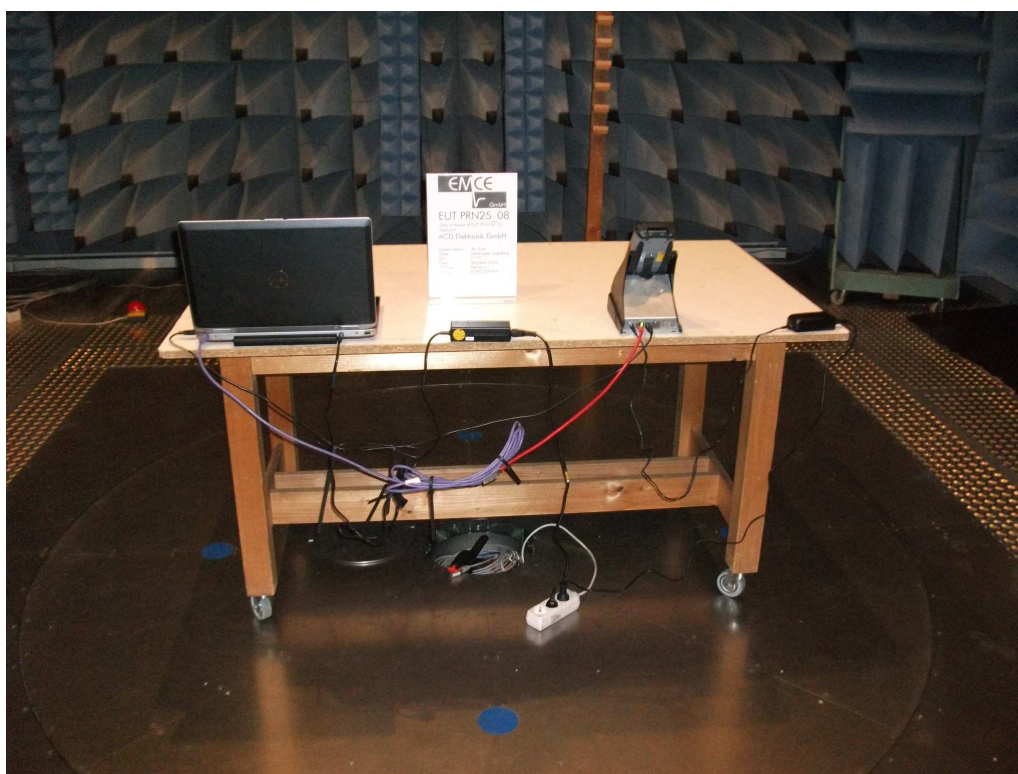
Test location

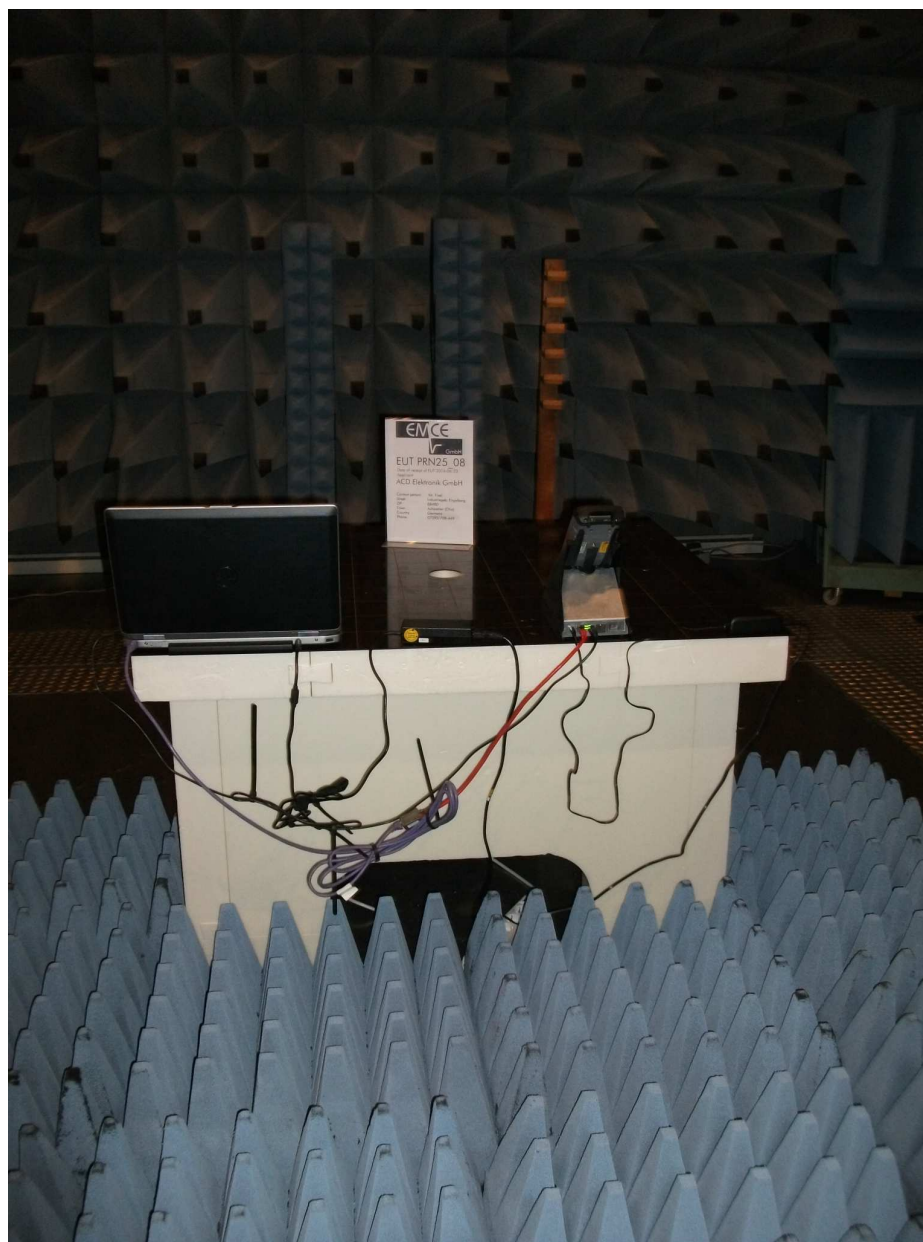
☒	Inv.-No.	Designation	Type (LxWxH)	Manufacturer	Location
	588	Shielded room #2	8.3/5.8 x 5.5/2.9 x 3.4m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	584	Shielded room #3	3.6 x 3.6 x 2.5m	Siemens AG	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	678	Shielded room #4	4.0 x 4.0 x 3.5m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
☒	062	Semi anechoic chamber #2	13.5 x 6.1 x 5.5m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	679	Full anechoic chamber #3	8.8 x 4.6 x 4.2m	Albatross Projects GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
☒	014	Open area test site	10m	EMCE GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
☒	015	Open area test site	3m	EMCE GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	042	Voltage- / current source test site	0-382VDC 0-270VAC 1x10kW / 3x5kW	Spitzenberger + Spies	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	n/a	Alternative test site	n/a	n/a	n/a

1.1.2.1 Test set up

According ANSI C63.10-2013







Used test equipment

☒	Inv.-No.	Designation	Type	Manufacturer	S/N
☒	001	Test receiver	ESS 5Hz - 1000 MHz	Rohde & Schwarz	833776/008
	003	LISN 1	ESH3-Z5	Rohde & Schwarz	835268/007
	004	LISN 2	ESH3-Z5	Rohde & Schwarz	835268/003
	005	LISN 3	NNB 4/32T	Rolf Heine HF-Technik	4/32T-96015
	006	LISN	NNBM 8125	Schwarzbeck	8125371
	007	Absorbing clamp	MDS 21	Schwarzbeck	942436
☒	008	Antenna 9kHz – 30MHz	HFH2-Z2	Rohde & Schwarz	835776/0002
☒	009	Antenna 30 – 300MHz	VHBA9123 / BBA9106	Schwarzbeck	435
☒	010	Antenna 250 -1200MHz	UHALP 9108A	Schwarzbeck	108
☒	011	Antenna 30 – 300MHz	VHBA9123 / BBA9106	Schwarzbeck	0408/94
☒	012	Antenna 250 -1200MHz	UHALP 9108A	Schwarzbeck	166
	013	Antenna 9kHz – 30 MHz	Loop antenna 1.5m Ø	EMCE GmbH	
	025	Current clamp BCI	F-120-2	FCC	47
	041	HZ-10	Shielded coil	Rohde & Schwarz	849788/020
	042	AC-Source / Analyser / Norm impedance	EMV D5000/PAS	Spitzenberger + Spies	A274700/ 0 0501
☒	058	Test receiver	ESIB 40	Rohde & Schwarz	100200
☒	059	Logper. Antenna	HL050	Rohde & Schwarz	100006
	060	HF coupling clamp	KEMA 801	Schaffner	20808
	063	Logper. Antenna	HL023 A2	Rohde & Schwarz	
	067	LISN 5	ESH2-Z5	Rohde & Schwarz	0872460/043
	068	LISN 4	ESH2-Z5	Rohde & Schwarz	0872460/042
	073	Absorbing clamp	MDS 21	Schwarzbeck	881757
	116	Vertical rod antenna	VAMP 9243	Schwarzbeck	9243-205

All used test equipment are checked resp. calibrated periodically.

☒ Test equipment was checked and complied to the requirements

Test / Measurement uncertainty

The measurement uncertainty in the test met the guideline of CISPR16-4-2 or better.

Measurement uncertainty of the radiated emission with an extended coverage factor of $k=2$:

Frequency	Measurement uncertainty
9kHz – 30MHz	on request
30MHz – 300MHz	4.4dB
300MHz – 1GHz	3.4dB
1GHz – 18GHz	on request

1.1.2.2 Test – Radiated emission fundamental

Regulation

47 CFR Part 15 Subpart C - 2016-07-06

- | | |
|--|--|
| ☒ 9kHz - 30MHz | ☐ 150kHz – 1GHz |
| ☐ 30MHz - 1000MHz | ☐ 1 – 18GHz |

Limits: ☒ Section 15.209* ☒ Section 15.225*
☒ Section 15.215(c)

* The limits for frequencies below 30MHz were corrected for a closer measuring distance by using an extrapolation factor of 40 dB/decade..

Test distance: ☐ 3m ☐ 5m
☒ 10m ☐ 30m

Operation mode

EUT arrangement: ☒ Tabletop ☐ Floor standing
Power supply: ☒ Internal battery (Mobile terminal)
☒ 120V/60Hz (Docking station)
Rated voltage variation: ☐ 85% ☐ 115%

Continuous operation of the mobile terminal M210SE, the device was placed in the docking station DS210.

The mobile terminal M210SE was supplied via the internal battery whilst the battery in the mobile terminal was charged.

The following systems/tests were active during the measurement:

- RFID – without tag (worst case)
- Ethernet - ping to laptop
- Camera – live image
- WLAN - bg ping to access point (first test run)
- WLAN - ac ping to access point (second test run)
- USB – remote desktop of the mobile terminal via USB to laptop
- IRDA I/F - scanning

Environmental conditions

Temperature [10 - 40°C]: 29°C
Relative humidity [10 - 90%]: 37%

Environmental conditions during the test: ☒ kept
☐ not kept

Test - / Measurement procedure

The test was performed at an antenna to EUT distance of 10m in the frequency range ≤ 30 MHz and at 3m distance for frequencies ≥ 30 MHz. Measurements were made with a CISPR receiver with quasi-peak. The average detector is used in the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. For pulse modulated devices with a pulse repetition frequency of 20 Hz or less, peak detector is used (15.35a Note). The frequency, the measured value, antenna information and the limit will be printed out.

The reported test results are calculated with the following formula:

$$\text{Field strength (dB}\mu\text{V/m)} = \text{Reading (dB}\mu\text{V)} + \text{AF (dB/m)} + \text{CF (dB)}$$

AF = Correction factor for the antenna
CF = Correction factor for the cable loss

$$\text{Limit}_{10\text{m}} \text{ (dB}\mu\text{V/m)} = \text{Limit (dB}\mu\text{V/m)} + \text{LCF}_{10\text{m}} \text{ (dB)}$$

Limit_{10m} Limit calculated for 10m test distance
LCF_{10m} = Limit Correction factor for 10m test distance
LCF_{10m} for 30m antenna distance = 20 dB
LCF_{10m} for 100m antenna distance = 40 dB
LCF_{10m} for 300m antenna distance = 60 dB

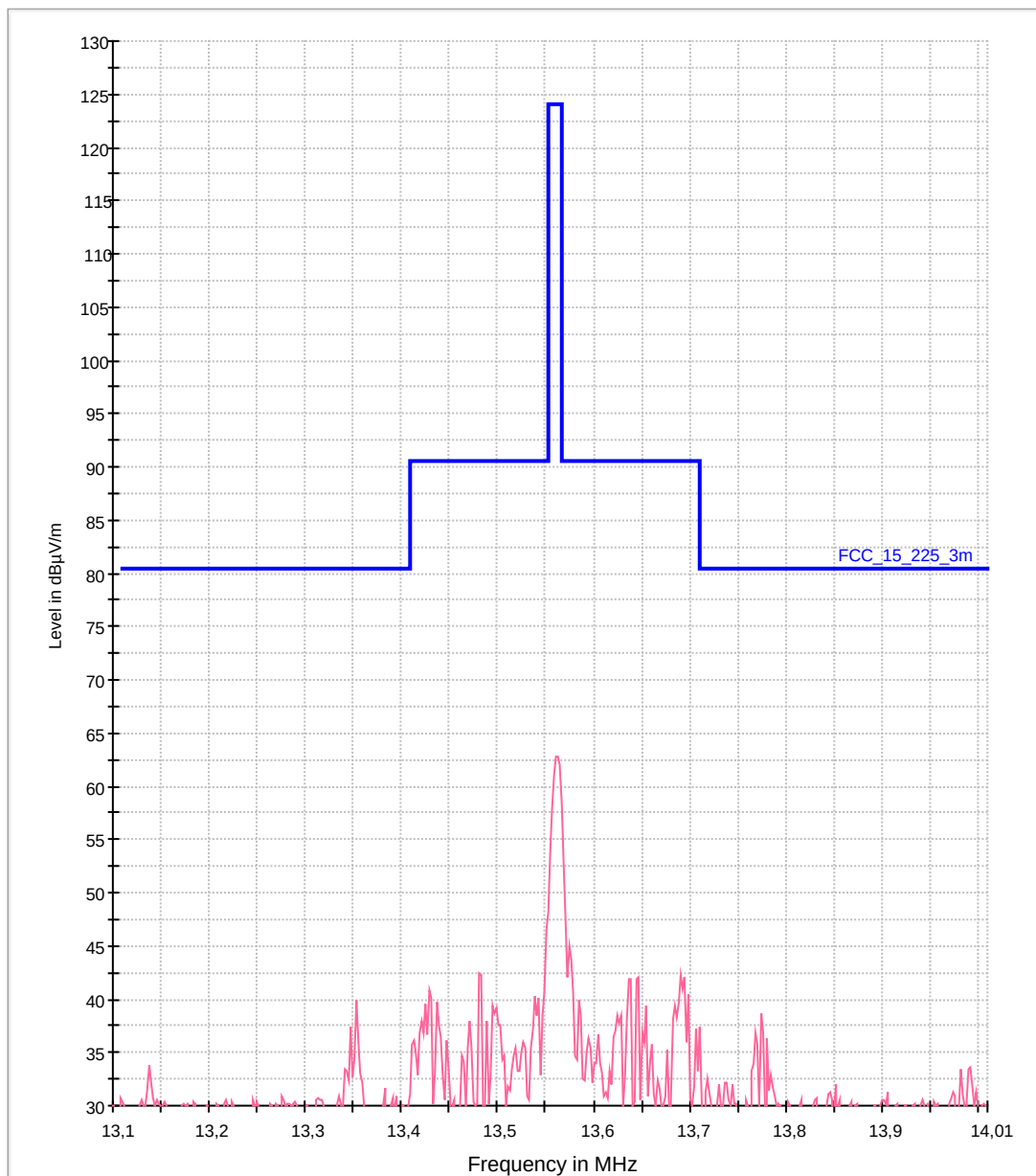
Test result

Frequency	Field strength	Limit _{10m}	Margin	Ant.-	Ant.-	Detector	Receiver	Supply voltage	Remarks
				Distance	Polar.	Peak /	6dB BW		
MHz	dB μ V/m	dB μ V/m	dB	m	H/V	QP / AV	kHz		
13.561	50.5	104	53.5	10.0	V	QP	10		Full charged battery

Limit_{10m} Limit calculated for 10m test distance

EUT Information

EUT Name:	SET210SE
Test_ID: / SN:	PRN25_08
Customer:	ACD Elektronik GmbH
Operational condition:	RFID on, no tag inside the field
Test specification:	47 CFR Part 15 - §15.225
Antenna information:	Distance EUT-Ant.: 3.0m / Polarisation: V / Ant.Height: 1.0m
Operator:	P. Hauser
File #:	ACN27_01

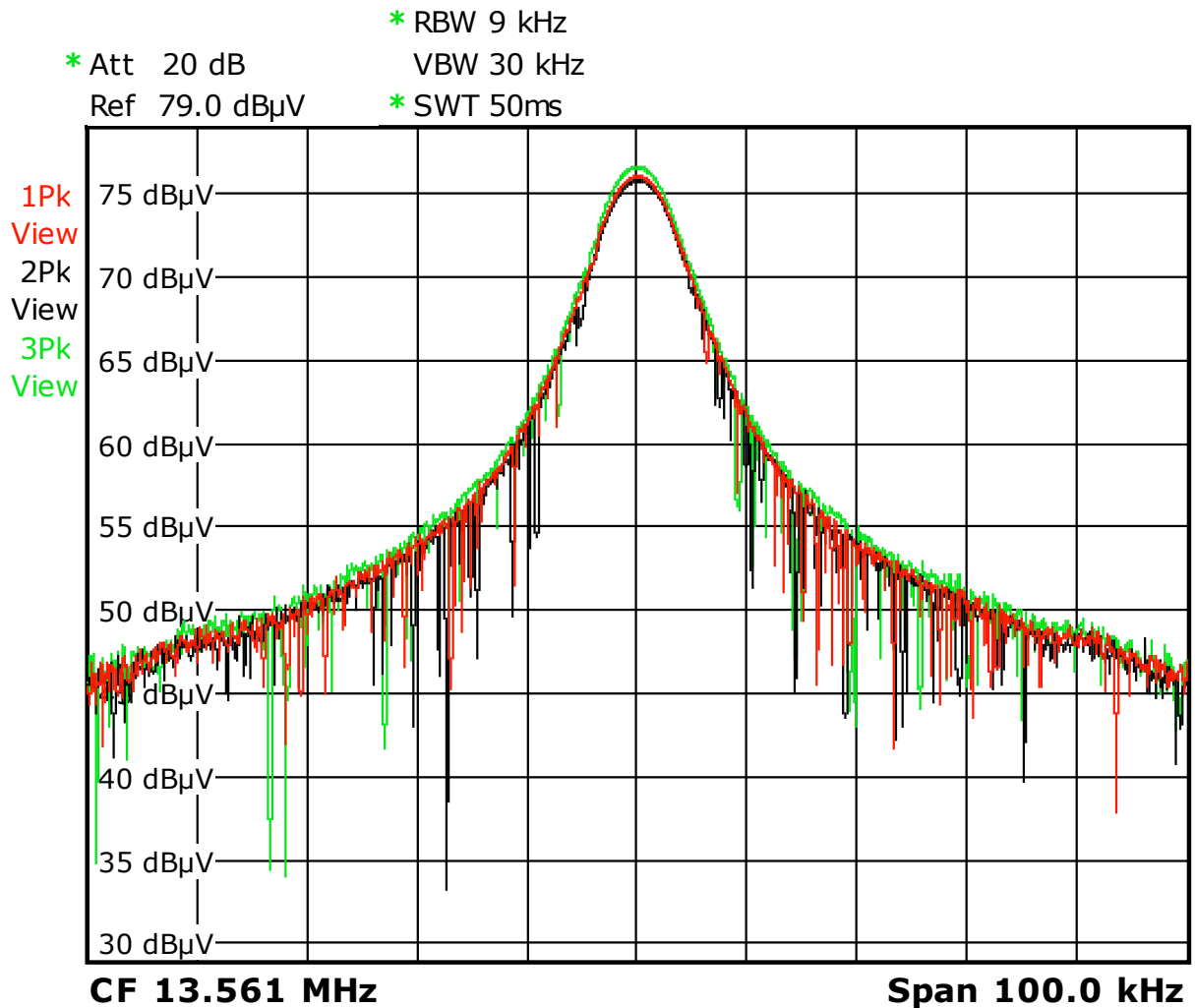


— FCC_15_225_3m [..EMI radiated] — Preview Result 1V-PK+ [Preview Result 1V.Result:2]

Fundamental frequency at 23°C, 43%rH – 13.5607MHz

Ambient temperature / °C	Frequency of fundamental / MHz at start	Frequency of fundamental / MHz after 2min	Frequency of fundamental / MHz after 5min	Frequency of fundamental / MHz after 10min
50	13.5607	13.5608	13.5606	13.5608
40	13.5609	13.5609	13.5609	13.5610
30	13.5607	13.5607	13.5605	13.5605
20	13.5606	13.5607	13.5607	13.5605
10	13.5607	13.5609	13.5606	13.5605
0	13.5607	13.5608	13.5606	13.5609
-10	13.5609	13.5608	13.5606	13.5607
-20	13.5609	13.5608	13.5606	13.5610

Diagram, frequency of fundamental vs. temperature at -20°C; 20°C; 50°C points



M210SE, tr1 20deg C, tr2 -20deg C, tr3 50deg C

Date: 5.JUL.2016 17:56:47

Limits for radiated emissions:

☒ kept
☐ not kept

Remarks: n/a

1.1.2.3 Test – Spurious emissions

Regulation

47 CFR Part 15 Subpart C - 2016-07-06

- | | |
|---|--|
| ☒ 9kHz - 30MHz | ☐ 150kHz – 1GHz |
| ☒ 30MHz - 1000MHz | ☒ 1 – 5GHz |

Limits:

- | | |
|--|-----------------------------------|
| ☒ Section 15.209 | Intentional radiator |
| | $F_{\max} \leq 135.600\text{MHz}$ |
| ☒ Section 15.109 – Class A | Unintentional radiator |
| | $135.600 < F \leq 5\text{GHz}$ |

Test distance:

- | | |
|---|------------------------------|
| ☒ 3m | ☐ 5m |
| ☒ 10m | ☐ 30m |

Operation mode

- | | | |
|--------------------------|--|---|
| EUT arrangement: | ☒ Tabletop | ☐ Floor standing |
| Power supply: | ☒ Internal battery (Mobile terminal) | |
| | ☒ 120V/60Hz (Docking station) | |
| Rated voltage variation: | ☐ 85% | ☐ 115% |

Continuous operation of the mobile terminal M210SE, the device was placed in the docking station DS210.

The mobile terminal M210SE was supplied via the internal battery whilst the battery in the mobile terminal was charged.

The following systems/tests were active during the measurement:

- RFID – without tag (worst case)
- Ethernet - ping to laptop
- Camera – life image
- WLAN - bg ping to access point (first test run)
- WLAN - ac ping to access point (second test run)
- USB – remote desktop of the mobile terminal via USB to laptop
- IRDA I/F - scanning

The device was also tested as handheld (M210SE) without the docking station

The following systems/tests were active during the measurement:

- RFID – without tag (worst case)
- Camera – life image
- WLAN - bg ping to access point (first test run)
- WLAN - ac ping to access point (second test run)
- IRDA I/F - scanning

Environmental conditions

Temperature [10 - 40°C]: 29°C

Relative humidity [10 - 90%]: 37%

Environmental conditions during the test: ☒ kept
☐ not kept

Test - / Measurement procedure

The test was performed at an antenna to EUT distance of 10m in the frequency range ≤ 30 MHz and at 3m distance for frequencies ≥ 30 MHz. Measurements were made with a CISPR receiver with quasi-peak. The average detector is used in the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. For pulse modulated devices with a pulse repetition frequency of 20 Hz or less, peak detector is used (15.35a Note). The frequency, the measured value, antenna information and the limit will be printed out.

The reported test results are calculated with the following formula:

$$\text{Field strength (dB}\mu\text{V/m)} = \text{Reading (dB}\mu\text{V)} + \text{AF (dB/m)} + \text{CF (dB)}$$

AF = Correction factor for the antenna

CF = Correction factor for the cable loss

$$\text{Limit}_{10\text{m}} (\text{dB}\mu\text{V/m}) = \text{Limit (dB}\mu\text{V/m)} + \text{LCF}_{10\text{m}} (\text{dB})$$

Limit_{10m} Limit calculated for 10m test distanceLCF_{10m} = Limit Correction factor for 10m test distanceLCF_{10m} for 30m antenna distance = 20 dBLCF_{10m} for 100m antenna distance = 40 dBLCF_{10m} for 300m antenna distance = 60 dB

Test result

Limits for intentional radiators: ☒ kept
☐ not keptLevel of the fundamental > unwanted emission: ☒ kept
☐ not kept

Remarks: The measurement values showed no impact to spurious emissions of the RFID module if using WLAN bg or ac band. The measurement in the OATS was executed only with WLAN bg active.

The frequency bands of the WLAN module were not evaluated. They are subject of the module approval – FCC ID: O2F-MSD30AG.

Protocol scope

- ☒ Readings - Antenna horizontal polarized.
- ☒ Diagram - Antenna horizontal polarized.
- ☒ Readings - Antenna vertical polarized.
- ☒ Diagram - Antenna vertical polarized.
- ☐ Bandwidth plot – Frequency response vs. supply voltage
- ☒ Pretest handheld – 3 axis.

Readings - Antenna vertical polarized, Antenna loop lowest height 1 m

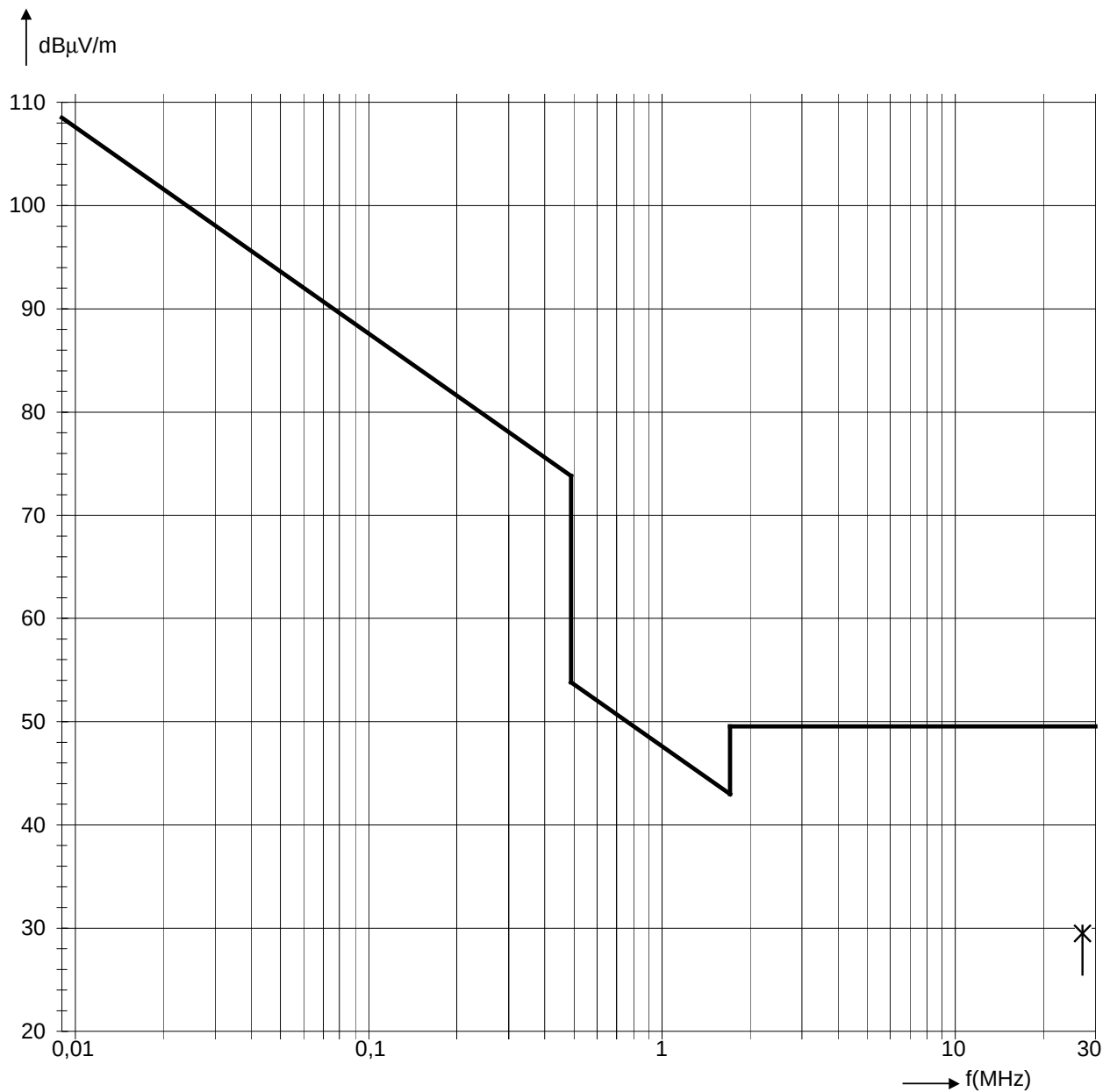
Frequency	Field strength	Limit _{10m}	Margin	Ant.-	Ant.-	Detector	Receiver	Remarks
				Distance	Polar.	Peak /	6dB BW	
MHz	dB μ V/m	dB μ V/m	dB	m	H/V	QP / AV	kHz	
27.12200	29.5	49.5	20.0	10.0	V	QP	10	

Limit_{10m} Limit calculated for 10m test distance

Diagram - Antenna vertical polarized

Limits according FCC Rules 47 CFR Part 15 – Subpart C

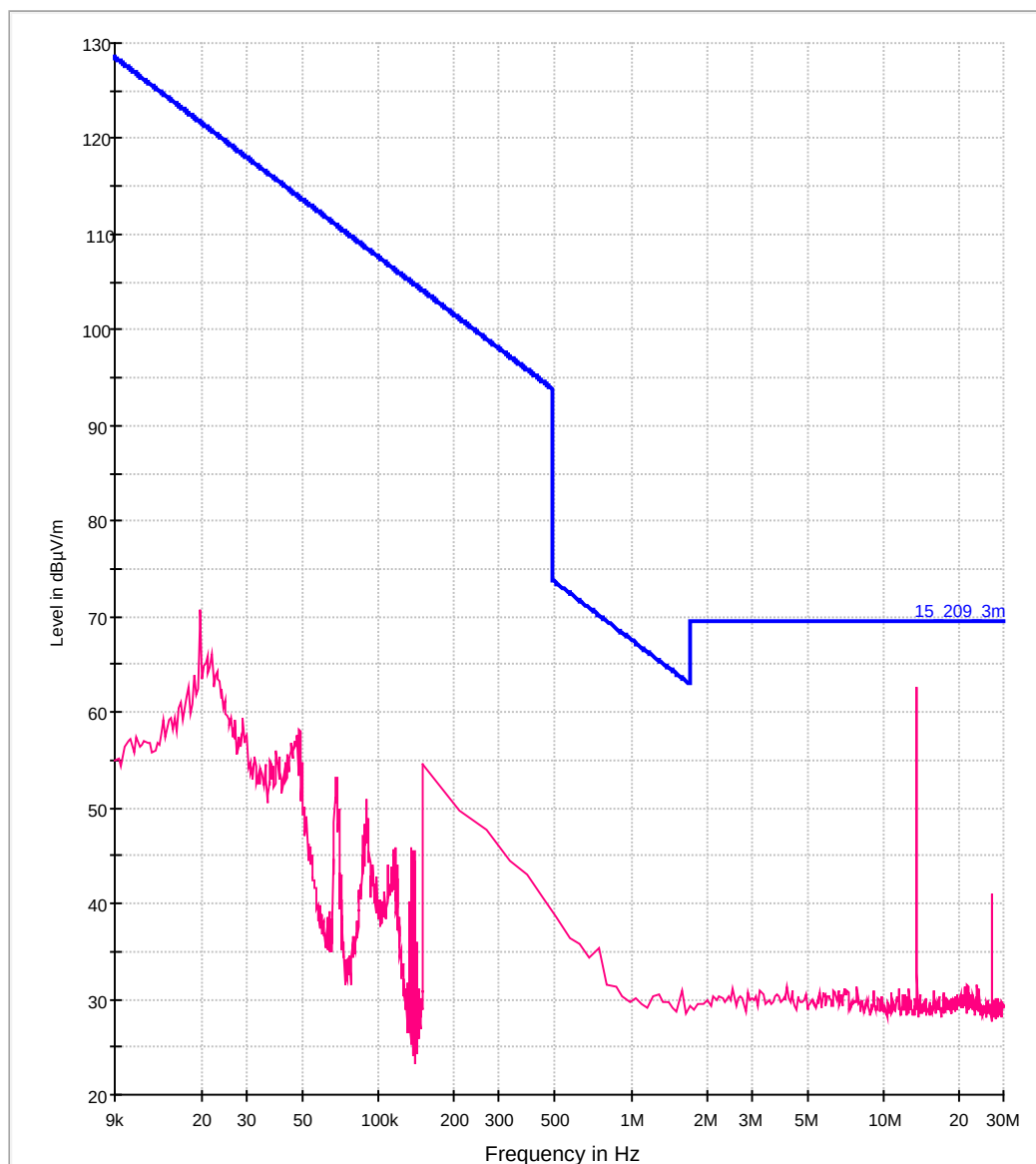
☒ Section 15.209 – Corrected to 10m distance EUT-Antenna



EUT Information

EUT Name: Set210SE
Test_ID: / SN: PRN25_08
Customer: ACD Elektronik GmbH
Operational condition: RFID on, no tag inside the field
Test specification: 47 CFR Part 15 - §15.209
Antenna information: Distance EUT-Ant.: 3.0m / Polarisation: V / Ant.Height: 1.0m
Operator: P. Hauser
File #: ACN27_02

Magnetic Field Strength dBμV with Sweep_SAC2



15_209_3m [..EMI radiated]
MaxPeak-MaxHold [Preview Result 1V.Result:2]

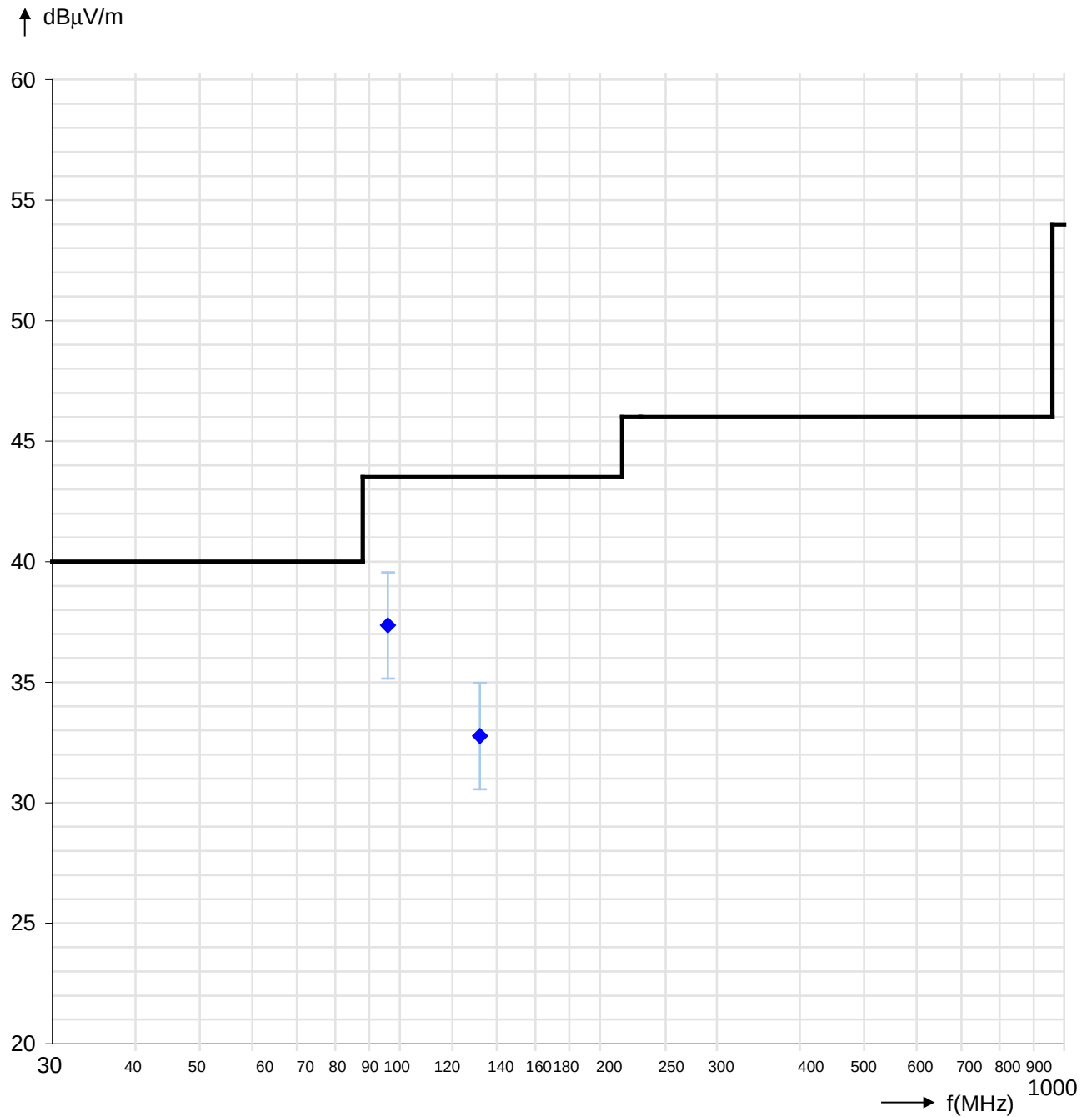
Preview Result 1V-PK+ [Preview Result 1V.Result:2]

Readings - Antenna horizontal polarized – section 15.209 – Set 210SE

Frequency	Readings	+ AF Antenna correction factor	+ KF Cable correction factor	Field strength	Limit	Margin	Antenna- Height	Antenna- Polarization	Turntable position
MHz	dB μ V	dB/m	dB	dB μ V/m	dB μ V/m	dB	m	hor./ver.	deg.
96.000	26.7	9.1	1.5	37.4	43.5	6.1	2.2	H	240
131.930	19.6	11.3	1.8	32.8	43.5	10.7	1.7	H	200

Diagram radio disturbances – Antenna horizontal polarized – Set 210SE

Limits: ☒ Section 15.209 ☐ __

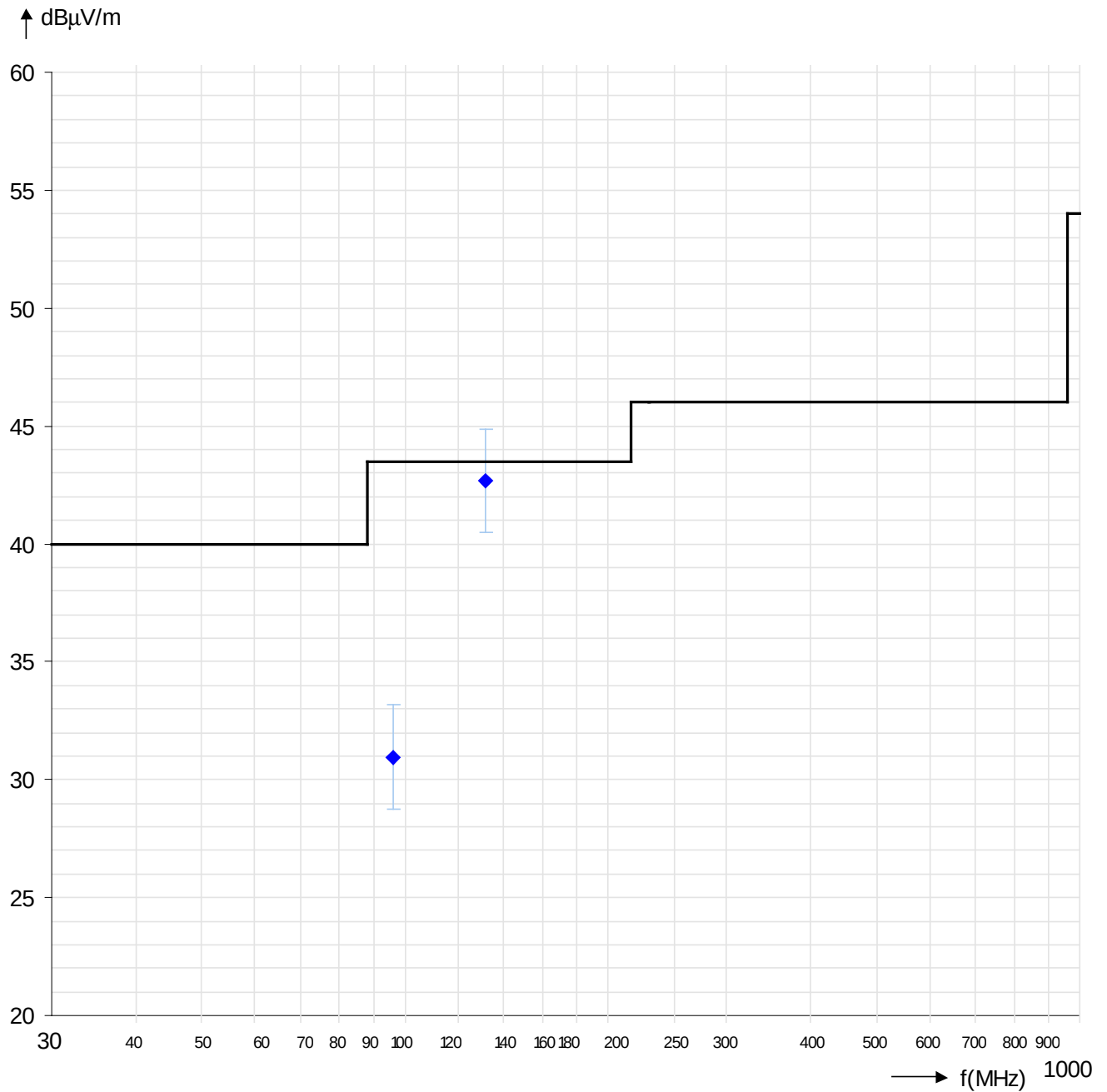


Readings - Antenna vertical polarized – section 15.209 – Set 210SE

Frequency	Readings	+ AF Antenna correction factor	+ KF Cable correction factor	Field strength	Limit	Margin	Antenna- Height	Antenna- Polarization	Turntable position
MHz	dB μ V	dB/m	dB	dB μ V/m	dB μ V/m	dB	m	hor./ver.	deg.
96.000	20.3	9.1	1.5	31.0	43.5	12.5	1.0	V	250
131.930	29.5	11.3	1.8	42.7	43.5	0.8	1.0	V	220

Diagram radio disturbances – Antenna vertical polarized – Set 210SE

Limits: ☒ Section 15.209 ☐ __



Readings - Antenna horizontal polarized – section 15.109 – Class A – Set 210SE

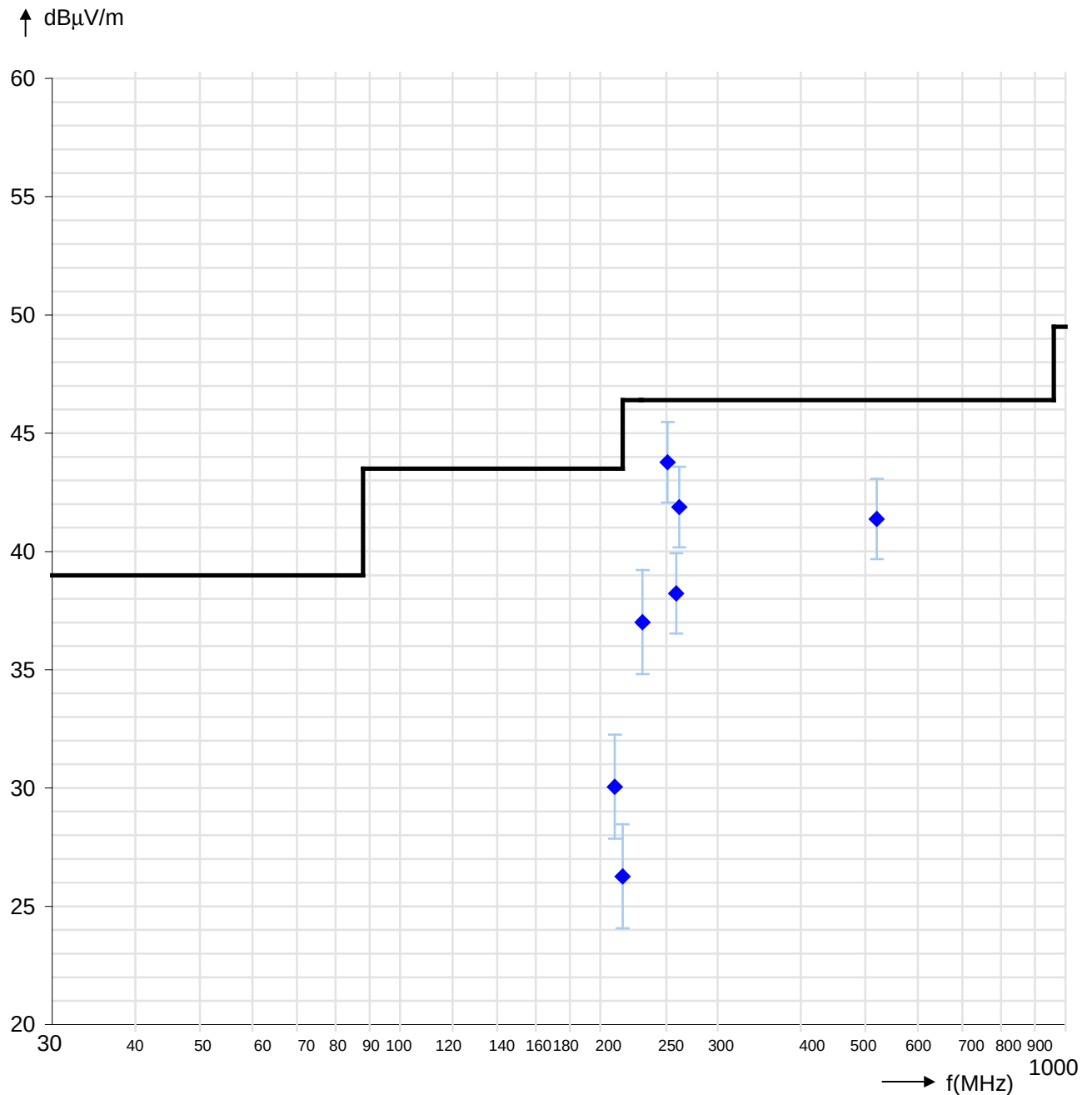
Frequency	Readings	+ AF Antenna correction factor	+ KF Cable correction factor	Field strength	Limit	Margin	Antenna- Height	Antenna- Polarization	Turntable position
MHz	dB μ V	dB/m	dB	dB μ V/m	dB μ V/m	dB	m	hor./ver.	deg.
210.200	12.1	15.6	2.3	30.1	43.5	13.4	2.0	H	170
216.030	8.2	15.7	2.4	26.3	46.4	20.1	2.6	H	300
231.220	17.8	16.8	2.4	37.0	46.4	9.4	2.5	H	300
252.240	26.1	15.1	2.6	43.8	46.4	2.6	2.5	H	320
260.040	21.0	14.6	2.6	38.2	46.4	8.2	2.3	H	340
262.750	24.7	14.6	2.6	41.9	46.4	4.5	2.3	H	200
520.080	19.9	17.7	3.7	41.4	46.4	5.0	1.3	H	180

Diagram radio disturbances – Antenna horizontal polarized – Set 210SE

Limits:

☐ Section 15.209

☒ Section 15.109 – Class A

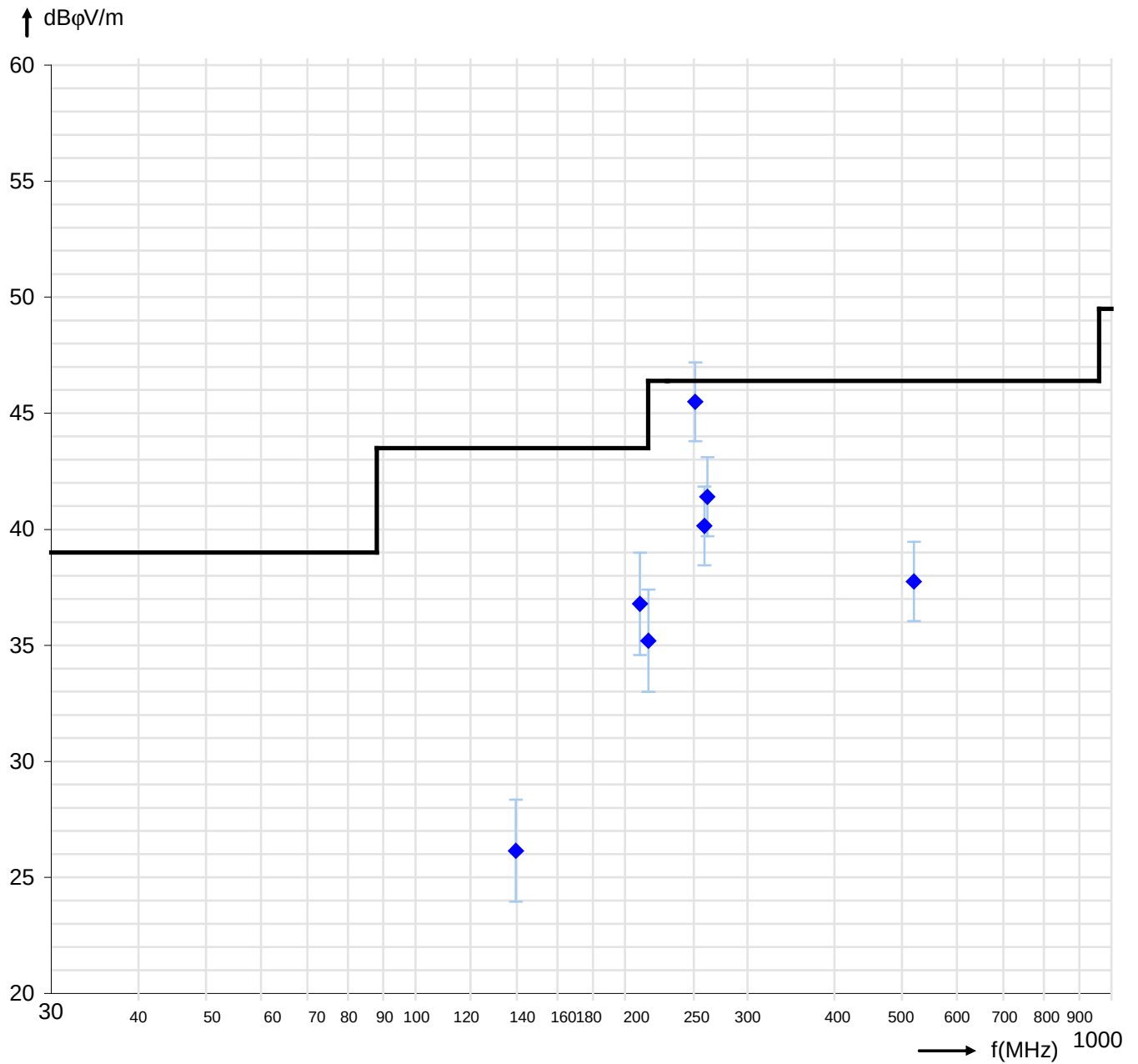


Readings - Antenna vertical polarized – section 15.109 – Set 210SE

Frequency	Readings	+ AF Antenna correction factor	+ KF Cable correction factor	Field strength	Limit	Margin	Antenna- Height	Antenna- Polarization	Turntable position
MHz	dB μ V	dB/m	dB	dB μ V/m	dB μ V/m	dB	m	hor./ver.	deg.
139.430	12.7	11.7	1.7	26.2	43.5	17.3	1.0	V	80
210.200	19.0	15.6	2.2	36.8	43.5	6.7	1.0	V	270
216.030	17.3	15.7	2.2	35.2	46.4	11.2	1.0	V	100
252.240	28.0	15.1	2.4	45.5	46.4	0.9	1.0	V	50
260.040	23.1	14.6	2.4	40.1	46.4	6.3	1.0	V	70
262.750	24.4	14.6	2.4	41.4	46.4	5.0	1.0	V	200
520.080	16.5	17.7	3.5	37.7	46.4	8.7	1.0	V	80

Diagram radio disturbances – Antenna vertical polarized – Set210SE

Limits: ☐ Section 15.209 ☒ Section 15.109 Class A



Readings - Antenna horizontal/vertical polarized – section 15.209 – M210SE

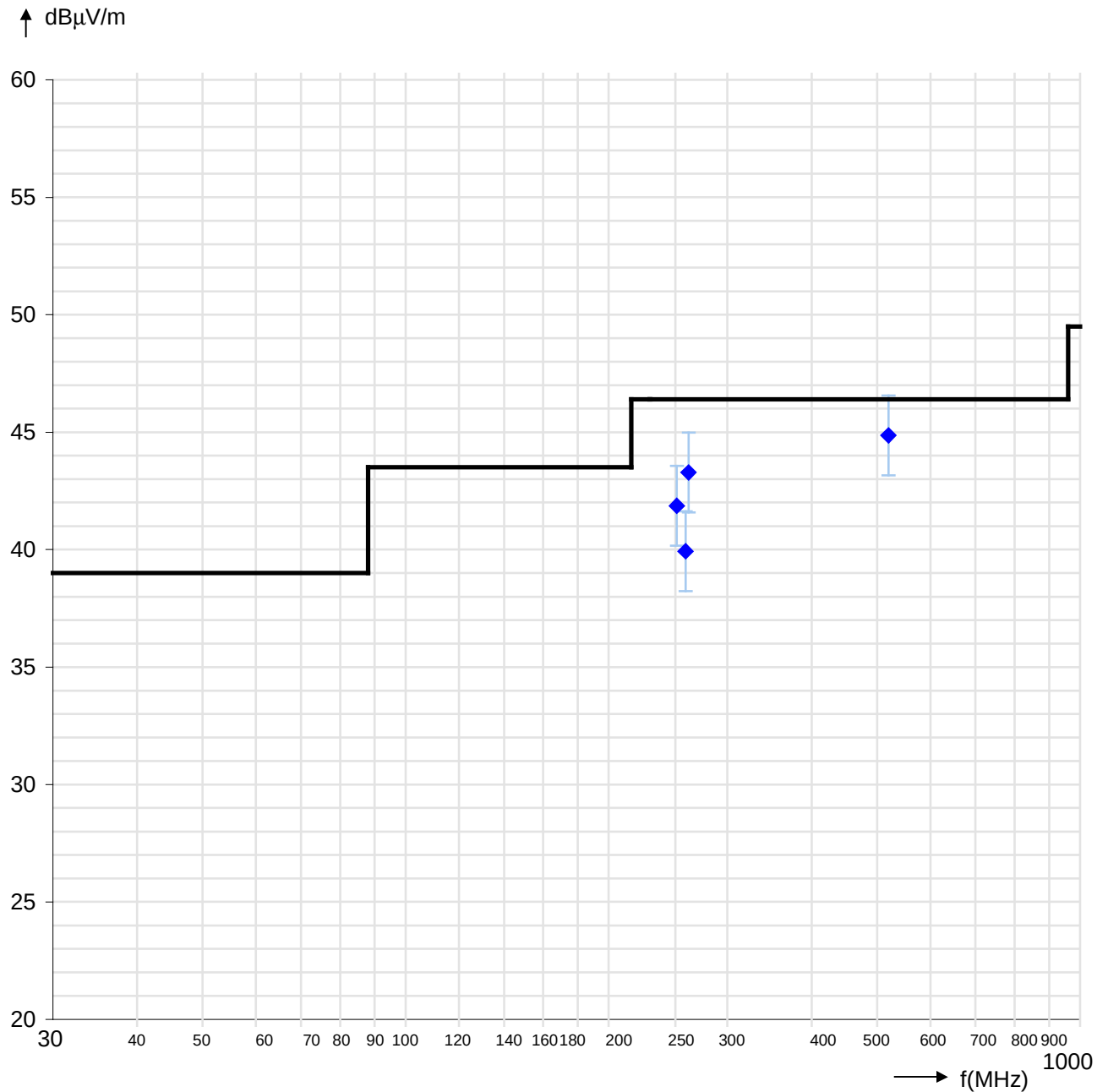
No results

Readings - Antenna horizontal polarized – section 15.109 – Class A – M210SE

Frequency	Readings	+ AF Antenna correction factor	+ KF Cable correction factor	Field strength	Limit	Margin	Antenna- Height	Antenna- Polarization	Turntable position
MHz	dB μ V	dB/m	dB	dB μ V/m	dB μ V/m	dB	m	hor./ver.	deg.
252.240	24.2	15.1	2.6	41.9	46.4	4.5	2.0	H	270
260.040	22.7	14.6	2.6	39.9	46.4	6.5	1.9	H	120
262.750	26.1	14.6	2.6	43.3	46.4	3.1	1.9	H	110
520.090	23.4	17.7	3.7	44.9	46.4	1.5	1.4	H	300

Diagram radio disturbances – Antenna horizontal polarized – M 210SE

Limits: ☐ Section 15.209 ☒ Section 15.109 – Class A

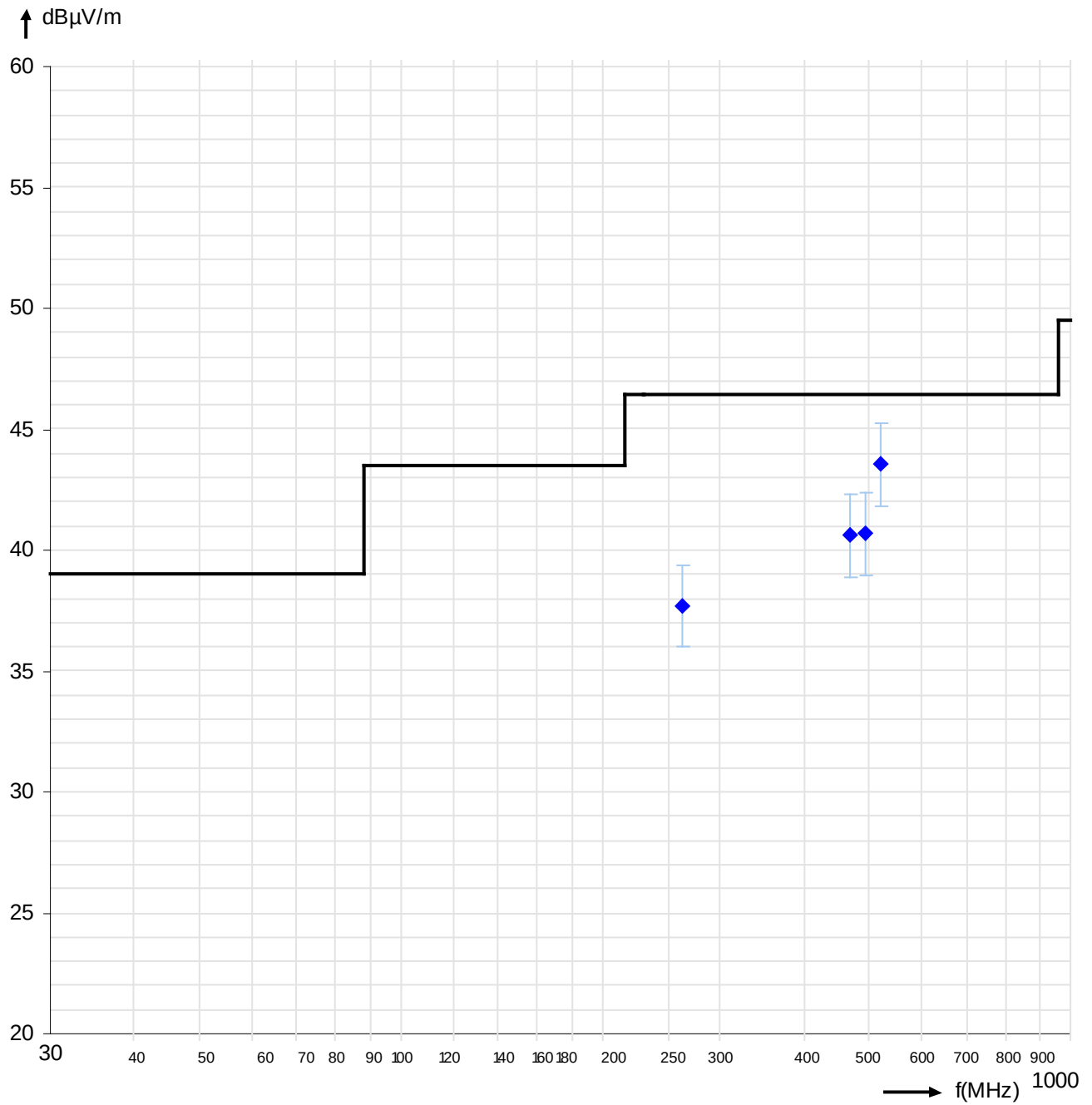


Readings - Antenna vertical polarized – section 15.109 – Class A – M210SE

Frequency	Readings	+ AF Antenna correction factor	+ KF Cable correction factor	Field strength	Limit	Margin	Antenna- Height	Antenna- Polarization	Turntable position
MHz	dB μ V	dB/m	dB	dB μ V/m	dB μ V/m	dB	m	hor./ver.	deg.
262.750	20.7	14.6	2.4	37.7	46.4	8.7	1.0	V	30
468.050	20.1	17.2	3.3	40.6	46.4	5.8	1.0	V	0
494.070	19.8	17.5	3.4	40.7	46.4	5.7	1.0	V	0
520.050	22.3	17.7	3.5	43.5	46.4	2.9	1.0	V	0

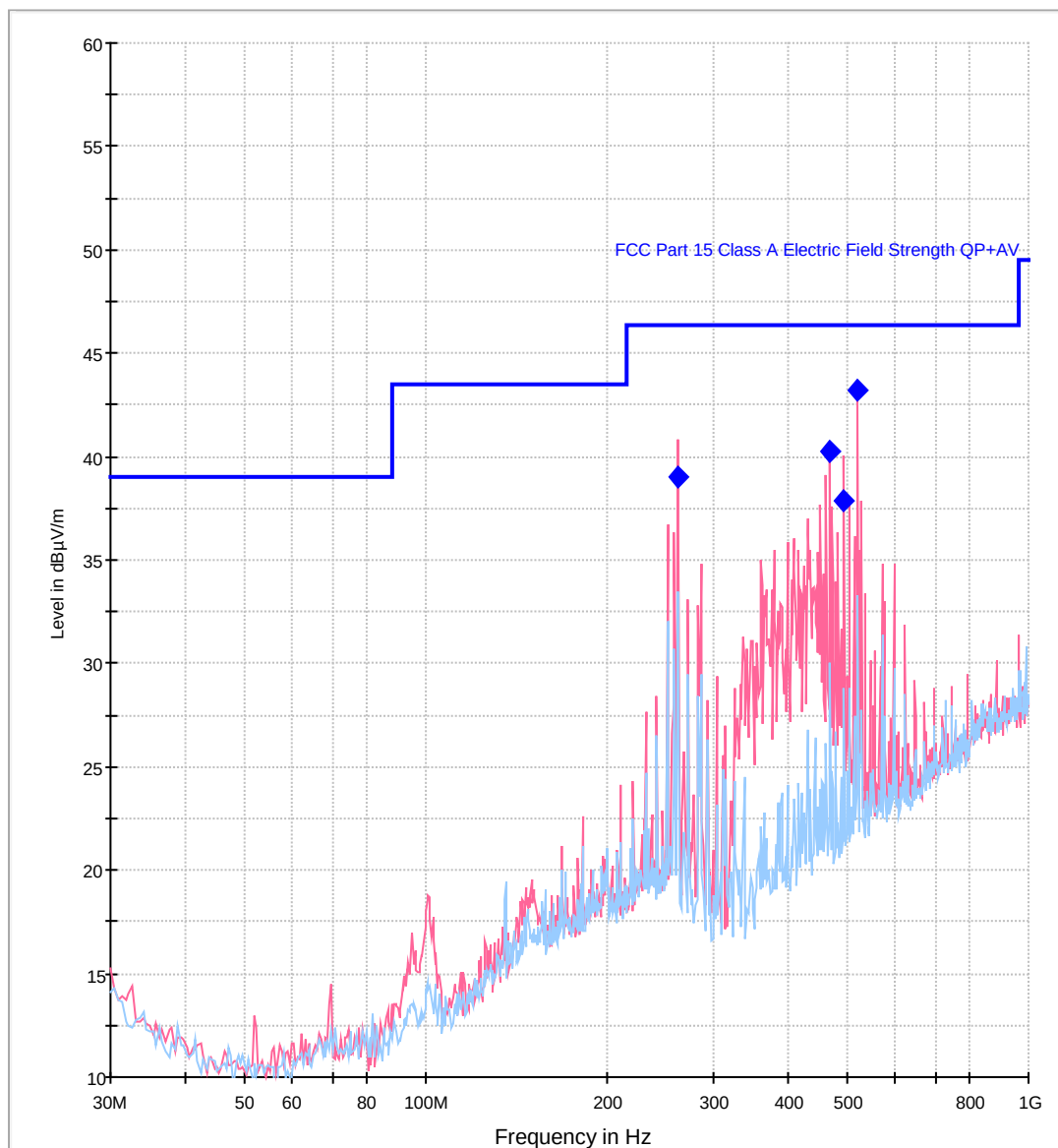
Diagram radio disturbances – Antenna vertical polarized – M 210SE

Limits: ☐ Section 15.209 ☒ Section 15.109 Class A



EUT Information

EUT Name:	M210 SE
Test_ID: / SN:	PRN25_08
Customer:	ACD Elektronik GmbH
Operational condition:	Camera active, WLAN bg active ping, RFID on
Test specification:	47 CFR Part 15 Subpart B - Class A
Antenna information:	Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
Operator:	P. Hauser
File #:	ACN25_43
Comment #1:	Test results corrected to 10m test distance
Comment #2:	x-axis



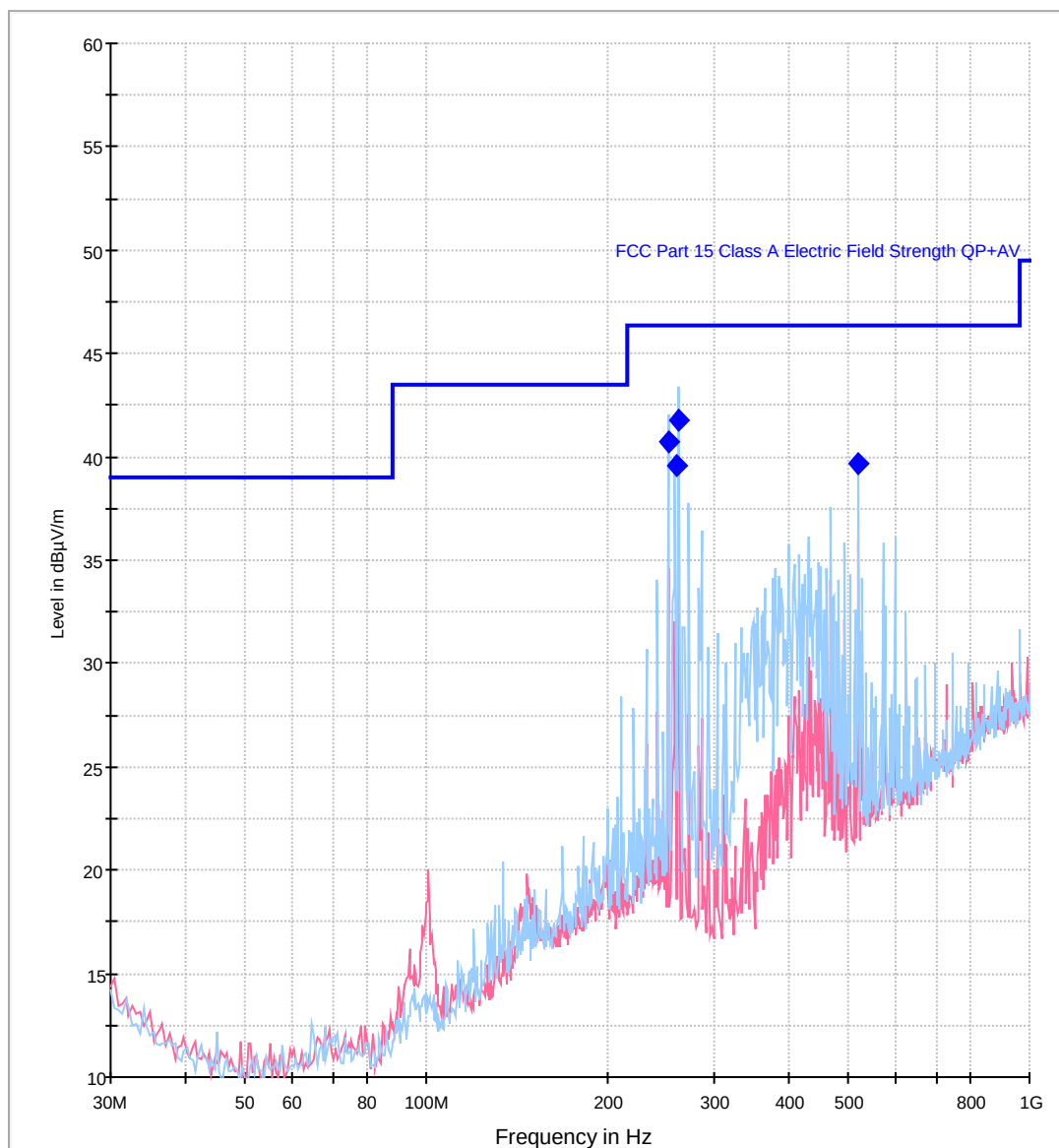
— FCC Part 15 Class A Electric Field Strength QP+AV [..EMI radiated]
— Preview Result 1V-PK+ [Preview Result 1V.Result:2]
— Preview Result 1H-PK+ [Preview Result 1H.Result:2]
◆ Final Result 1-QPK [Final Result 1.Result:1]

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Limit (dBμV/m)	Margin (dB)
262.725451	39.0	5000.0	120.000	270.2	V	173.0	5.2	46.4	7.4
468.052104	40.3	5000.0	120.000	119.7	V	124.0	8.2	46.4	6.1
494.068136	37.9	5000.0	120.000	119.7	V	148.0	8.4	46.4	8.5
520.056112	43.2	5000.0	120.000	119.7	V	135.0	8.9	46.4	3.2

EUT Information

EUT Name:	M210 SE
Test_ID / SN:	PRN25_08
Customer:	ACD Elektronik GmbH
Operational condition:	Camera active, WLAN bg active ping, RFID on
Test specification:	47 CFR Part 15 Subpart B - Class A
Antenna information:	Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
Operator:	P. Hauser
File #:	ACN25_44
Comment #1:	Test results corrected to 10m test distance
Comment #2:	y-axis



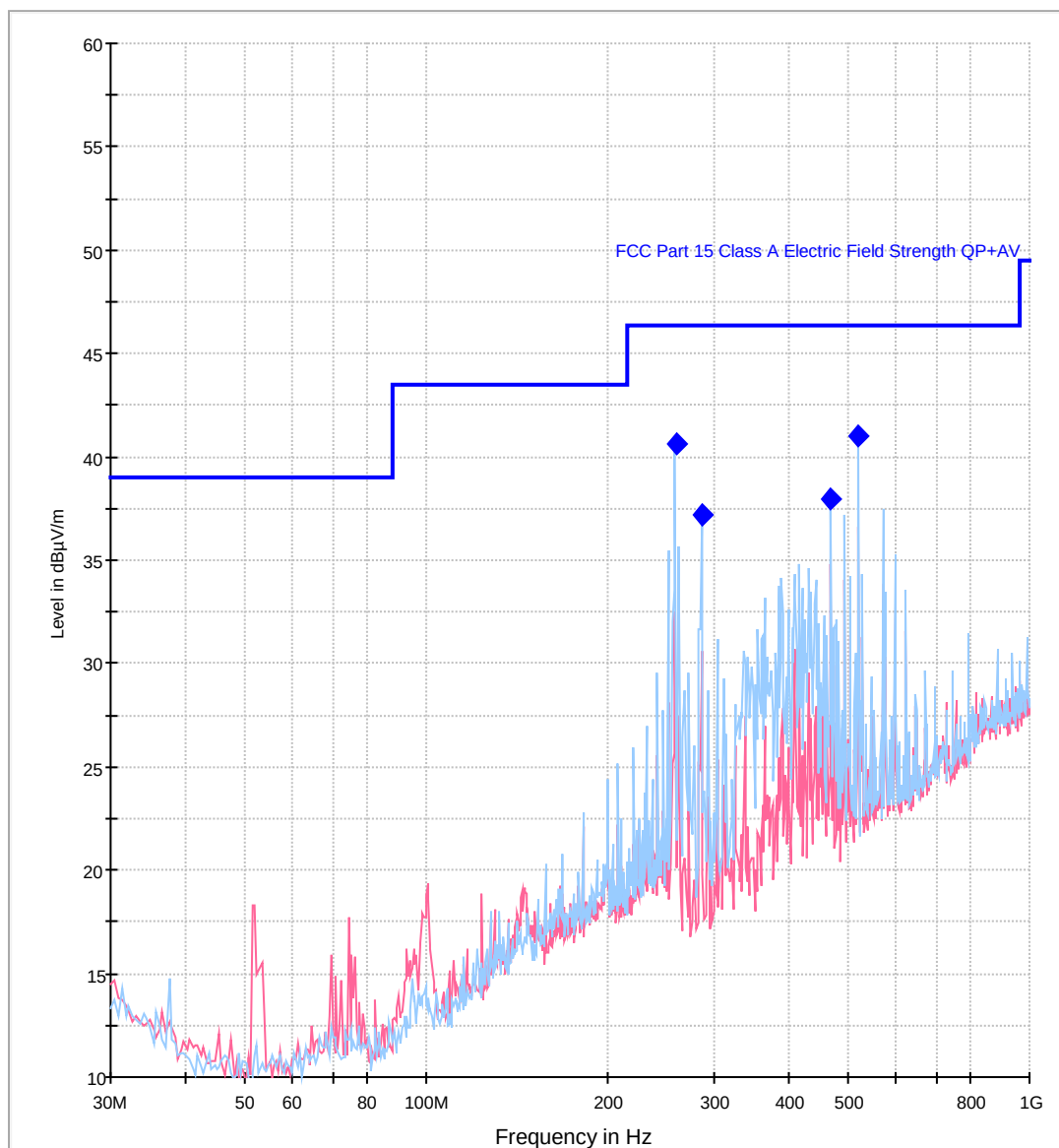
— FCC Part 15 Class A Electric Field Strength QP+AV [..EMI radiated]
— Preview Result 1V-PK+ [Preview Result 1V.Result:2]
— Preview Result 1H-PK+ [Preview Result 1H.Result:2]
◆ Final Result 1-QPK [Final Result 1.Result:1]

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Limit (dBμV/m)	Margin (dB)
252.218337	40.7	5000.0	120.000	119.9	H	39.0	6.1	46.4	5.7
260.024048	39.6	5000.0	120.000	209.8	H	209.0	5.3	46.4	6.8
262.749499	41.8	5000.0	120.000	210.0	H	170.0	5.2	46.4	4.6
520.072144	39.7	5000.0	120.000	220.3	H	50.0	8.9	46.4	6.7

EUT Information

EUT Name:	M210 SE
Test_ID: / SN:	PRN25_08
Customer:	ACD Elektronik GmbH
Operational condition:	Camera active, WLAN bg active ping, RFID on
Test specification:	47 CFR Part 15 Subpart B - Class A
Antenna information:	Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
Operator:	P. Hauser
File #:	ACN25_45
Comment #1:	Test results corrected to 10m test distance
Comment #2:	z-axis



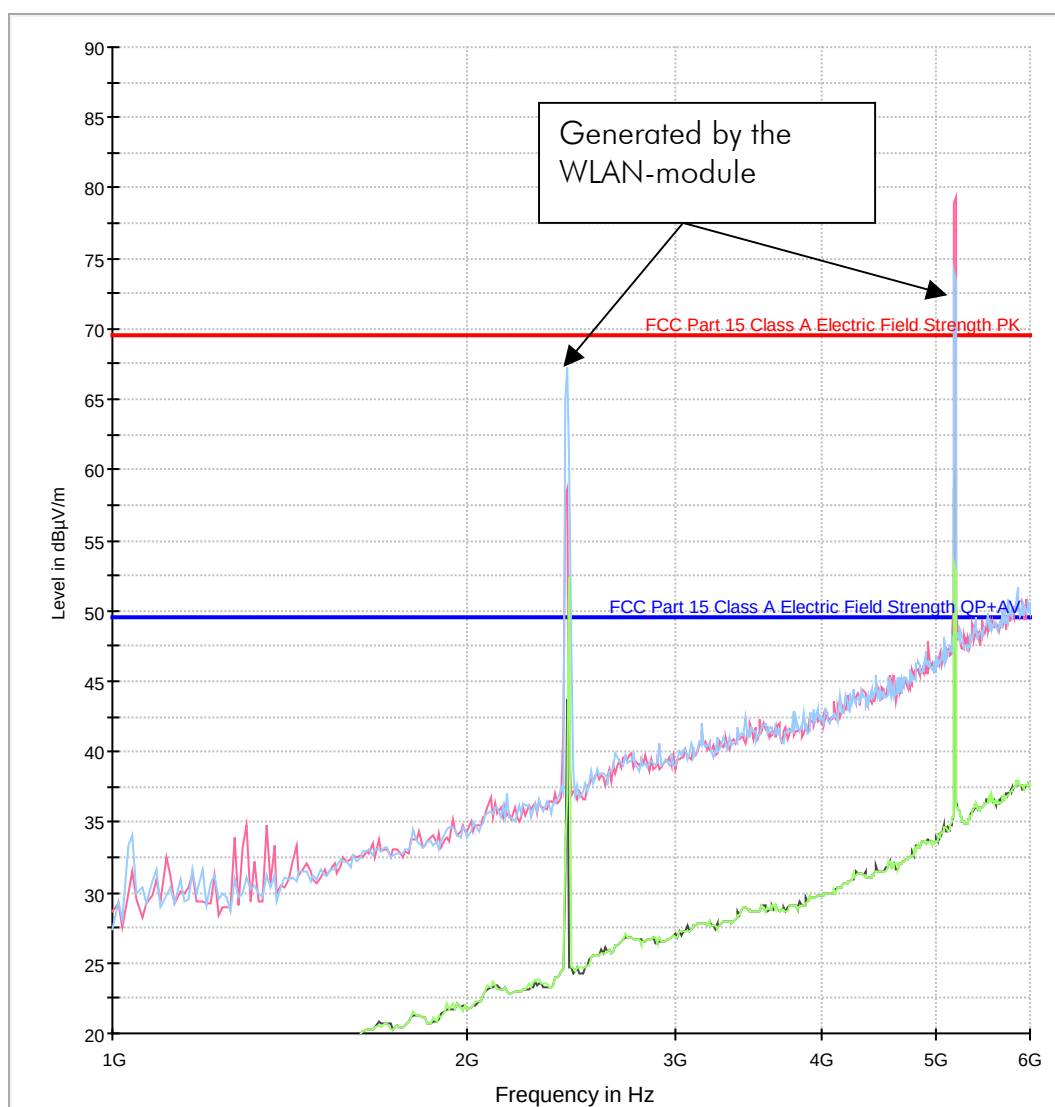
— FCC Part 15 Class A Electric Field Strength QP+AV [..EMI radiated]
 — Preview Result 1V-PK+ [Preview Result 1V.Result:2]
 — Preview Result 1H-PK+ [Preview Result 1H.Result:2]
 ◆ Final Result 1-QPK [Final Result 1.Result:1]

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Limit (dBμV/m)	Margin (dB)
260.024048	40.6	5000.0	120.000	169.9	H	190.0	5.3	46.4	5.8
286.036072	37.2	5000.0	120.000	119.8	H	196.0	4.8	46.4	9.2
468.068137	37.9	5000.0	120.000	220.0	H	10.0	8.2	46.4	8.5
520.064128	41.1	5000.0	120.000	220.0	H	41.0	8.9	46.4	5.3

EUT Information

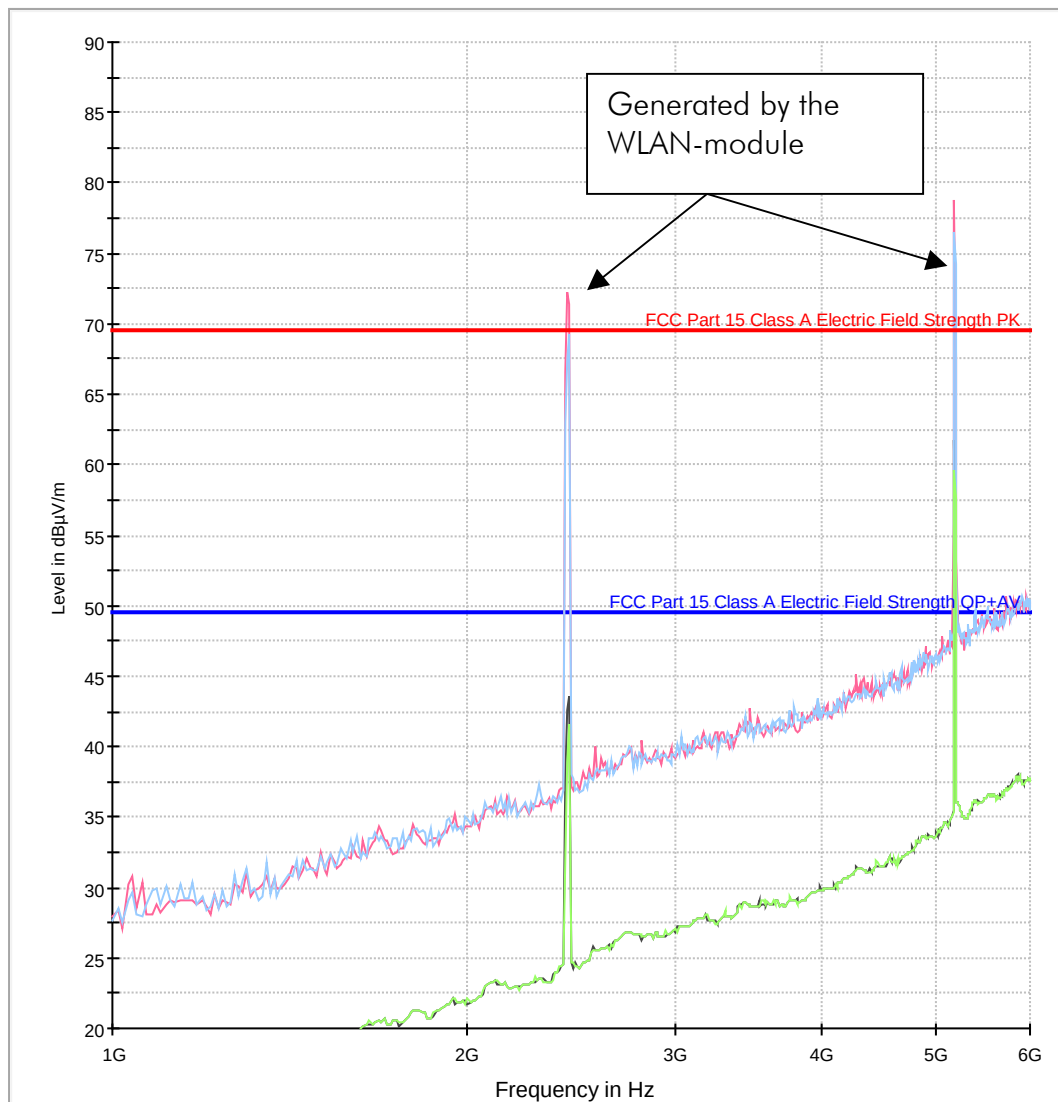
EUT Name: M210 SE
Test_ID: / SN: PRN25_08
Customer: ACD Elektronik GmbH
Operational condition: Camera active, WLAN ac active ping, RFID on
Test specification: 47 CFR Part 15 Subpart B - Class A
Antenna information: Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
Operator: P. Hauser
File #: ACN25_51
Comment #1: Test results corrected to 10m test distance
Comment #2: x-axis



— FCC Part 15 Class A Electric Field Strength QP+AV [..EMI radiated]
 — FCC Part 15 Class A Electric Field Strength PK [..EMI radiated]
 — Preview Result 1V-PK+ [Preview Result 1V.Result:2]
 — Preview Result 2V-AVG [Preview Result 2V.Result:4]
 — Preview Result 1H-PK+ [Preview Result 1H.Result:2]
 — Preview Result 2H-AVG [Preview Result 2H.Result:4]

EUT Information

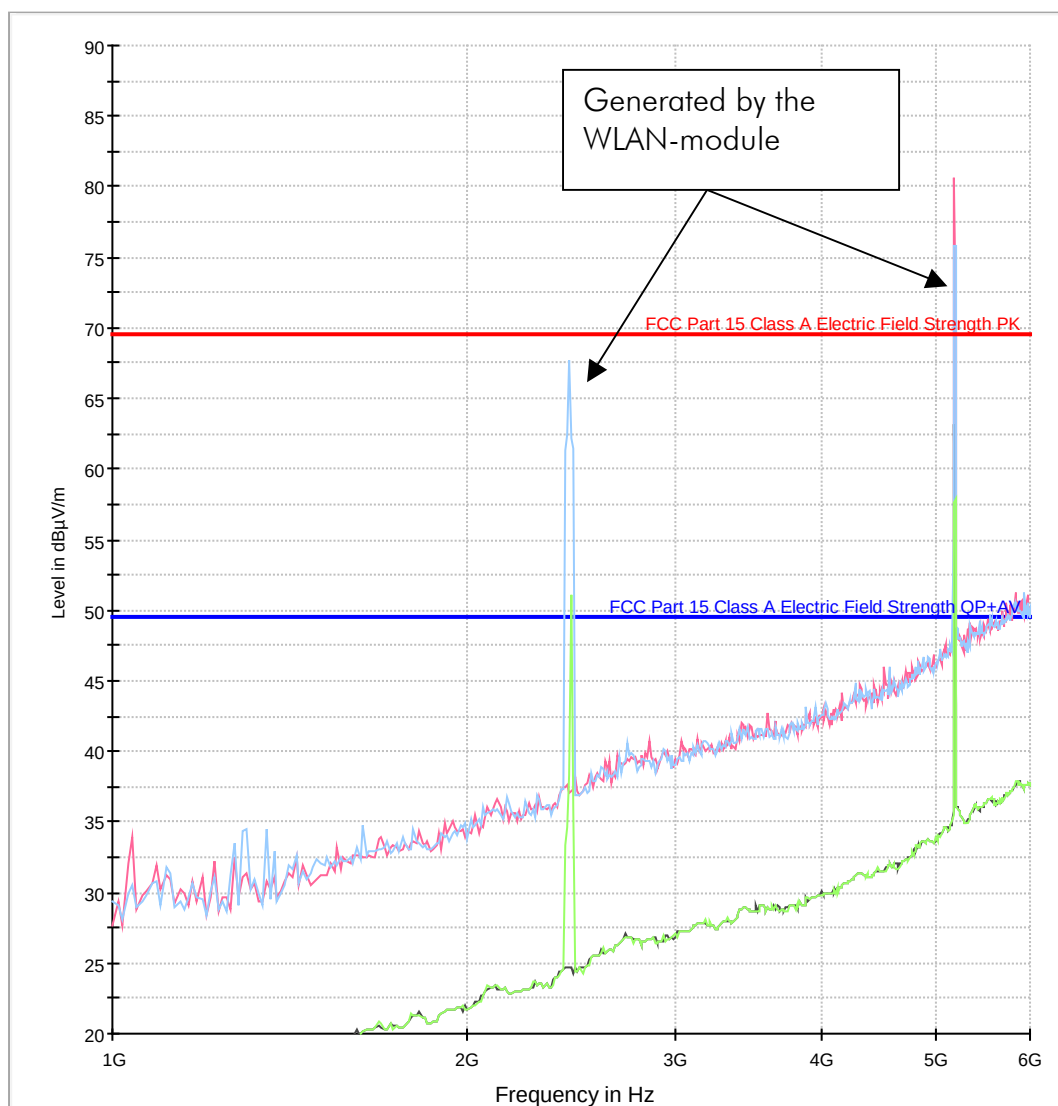
EUT Name:	M210 SE
Test_ID: / SN:	PRN25_08
Customer:	ACD Elektronik GmbH
Operational condition:	Camera active, WLAN ac active ping, RFID on
Test specification:	47 CFR Part 15 Subpart B - Class A
Antenna information:	Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
Operator:	P. Hauser
File #:	ACN25_52
Comment #1:	Test results corrected to 10m test distance
Comment #2:	y-axis



— FCC Part 15 Class A Electric Field Strength QP+AV [..EMI radiated]
 — Preview Result 1V-PK+ [Preview Result 1V.Result:2]
 — Preview Result 2V-AVG [Preview Result 2V.Result:4]
 — Preview Result 1H-PK+ [Preview Result 1H.Result:2]
 — Preview Result 2H-AVG [Preview Result 2H.Result:4]
 — FCC Part 15 Class A Electric Field Strength PK [..EMI radiated]

EUT Information

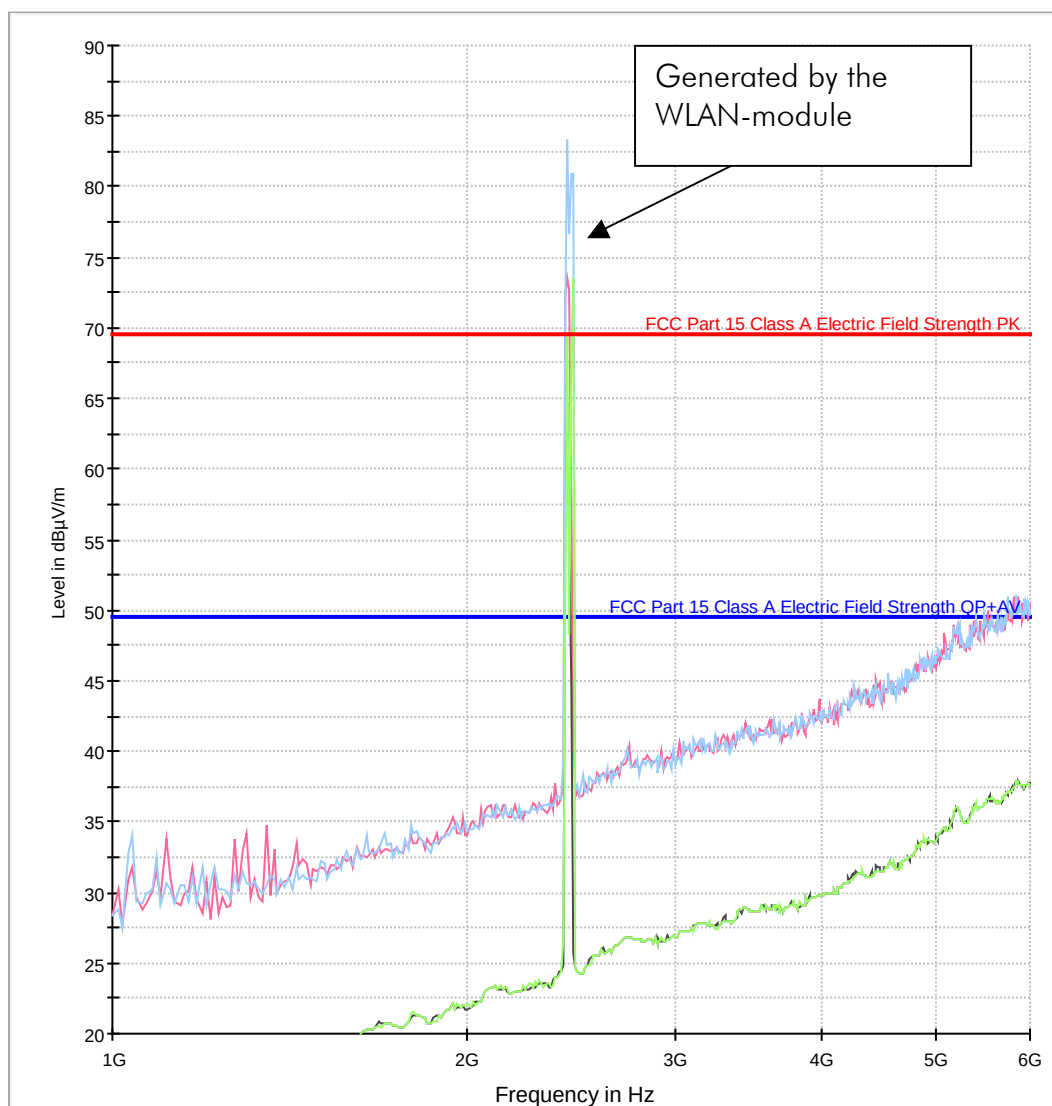
EUT Name:	M210 SE
Test_ID: / SN:	PRN25_08
Customer:	ACD Elektronik GmbH
Operational condition:	Camera active, WLAN ac active ping, RFID on
Test specification:	47 CFR Part 15 Subpart B - Class A
Antenna information:	Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
Operator:	P. Hauser
File #:	ACN25_53
Comment #1:	Test results corrected to 10m test distance
Comment #2:	z-axis



— FCC Part 15 Class A Electric Field Strength QP+AV [..EMI radiated]
 — Preview Result 1V-PK+ [Preview Result 1V.Result:2]
 — Preview Result 2V-AVG [Preview Result 2V.Result:4]
 — Preview Result 1H-PK+ [Preview Result 1H.Result:2]
 — Preview Result 2H-AVG [Preview Result 2H.Result:4]
 — FCC Part 15 Class A Electric Field Strength PK [..EMI radiated]

EUT Information

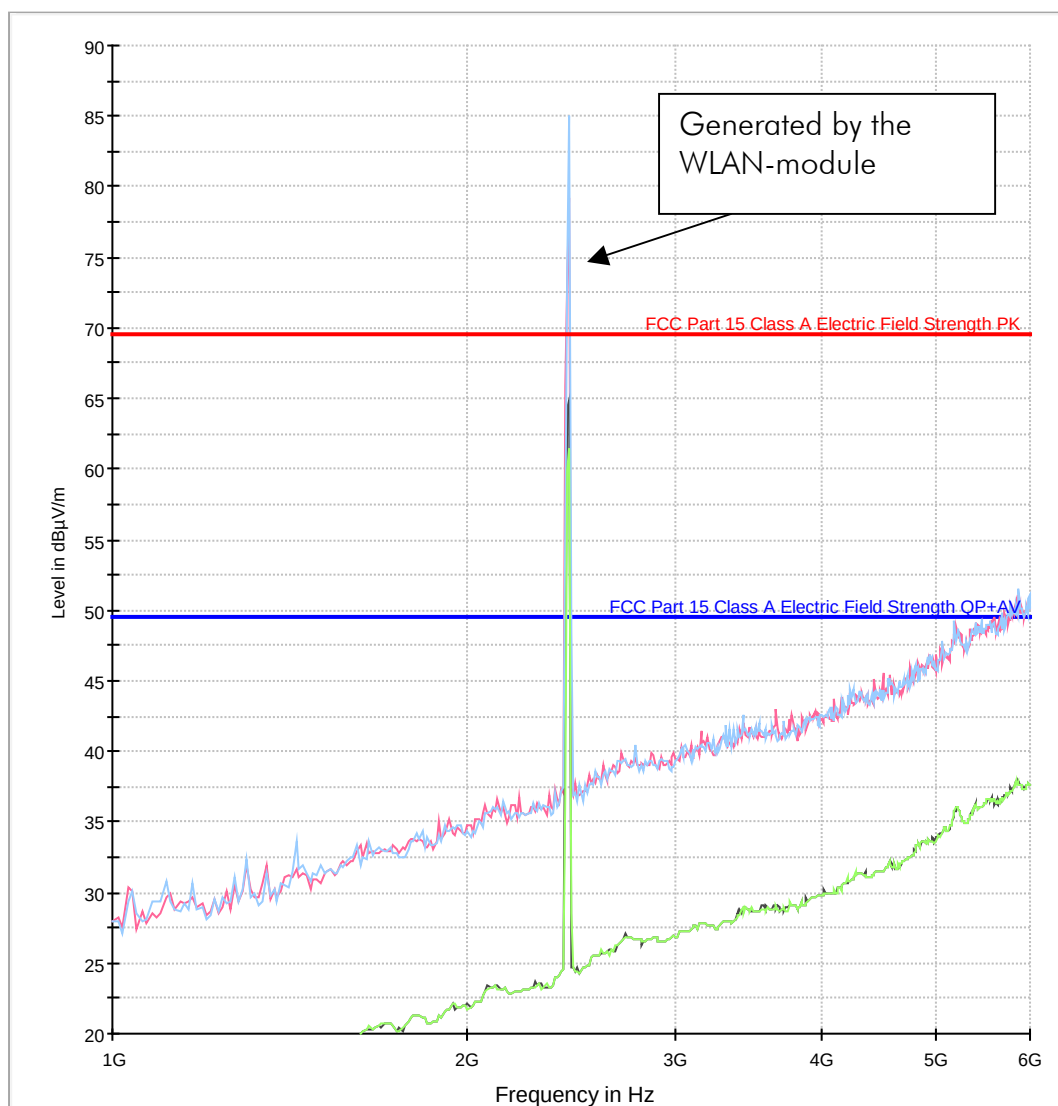
EUT Name:	M210 SE
Test_ID: / SN:	PRN25_08
Customer:	ACD Elektronik GmbH
Operational condition:	Camera active, WLAN bg active ping, RFID on
Test specification:	47 CFR Part 15 Subpart B - Class A
Antenna information:	Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
Operator:	P. Hauser
File #:	ACN25_54
Comment #1:	Test results corrected to 10m test distance
Comment #2:	x-axis



- FCC Part 15 Class A Electric Field Strength QP+AV [..EMI radiated]
- Preview Result 1V-PK+ [Preview Result 1V.Result:2]
- Preview Result 2V-AVG [Preview Result 2V.Result:4]
- Preview Result 1H-PK+ [Preview Result 1H.Result:2]
- Preview Result 2H-AVG [Preview Result 2H.Result:4]
- FCC Part 15 Class A Electric Field Strength PK [..EMI radiated]

EUT Information

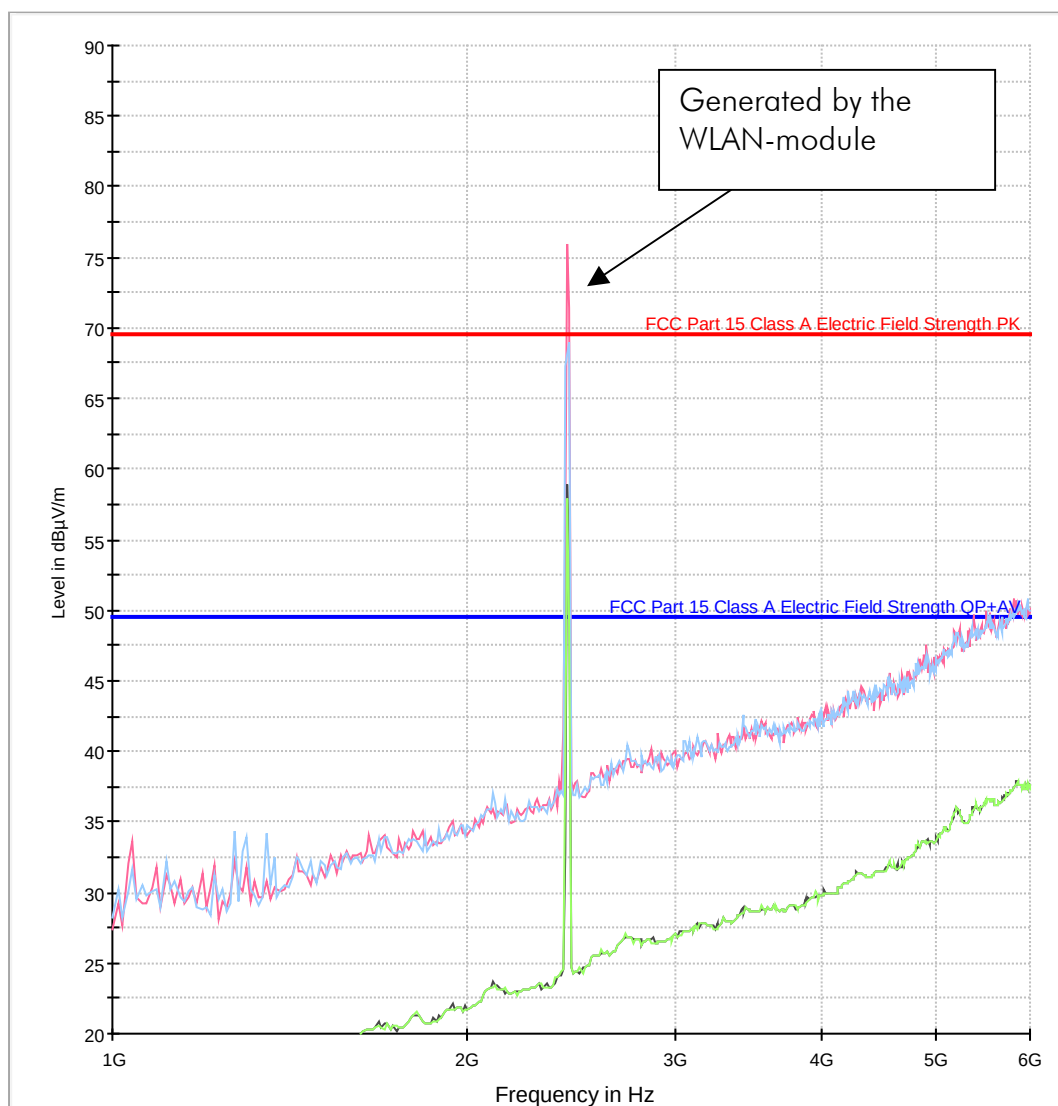
EUT Name:	M210 SE
Test_ID: / SN:	PRN25_08
Customer:	ACD Elektronik GmbH
Operational condition:	Camera active, WLAN bg active ping, RFID on
Test specification:	47 CFR Part 15 Subpart B - Class A
Antenna information:	Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
Operator:	P. Hauser
File #:	ACN25_55
Comment #1:	Test results corrected to 10m test distance
Comment #2:	y-axis



- FCC Part 15 Class A Electric Field Strength QP+AV [..EMI radiated]
- Preview Result 1V-PK+ [Preview Result 1V.Result:2]
- Preview Result 2V-AVG [Preview Result 2V.Result:4]
- Preview Result 1H-PK+ [Preview Result 1H.Result:2]
- Preview Result 2H-AVG [Preview Result 2H.Result:4]
- FCC Part 15 Class A Electric Field Strength PK [..EMI radiated]

EUT Information

EUT Name:	M210 SE
Test_ID: / SN:	PRN25_08
Customer:	ACD Elektronik GmbH
Operational condition:	Camera active, WLAN bg active ping, RFID on
Test specification:	47 CFR Part 15 Subpart B - Class A
Antenna information:	Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
Operator:	P. Hauser
File #:	ACN25_56
Comment #1:	Test results corrected to 10m test distance
Comment #2:	z-axis

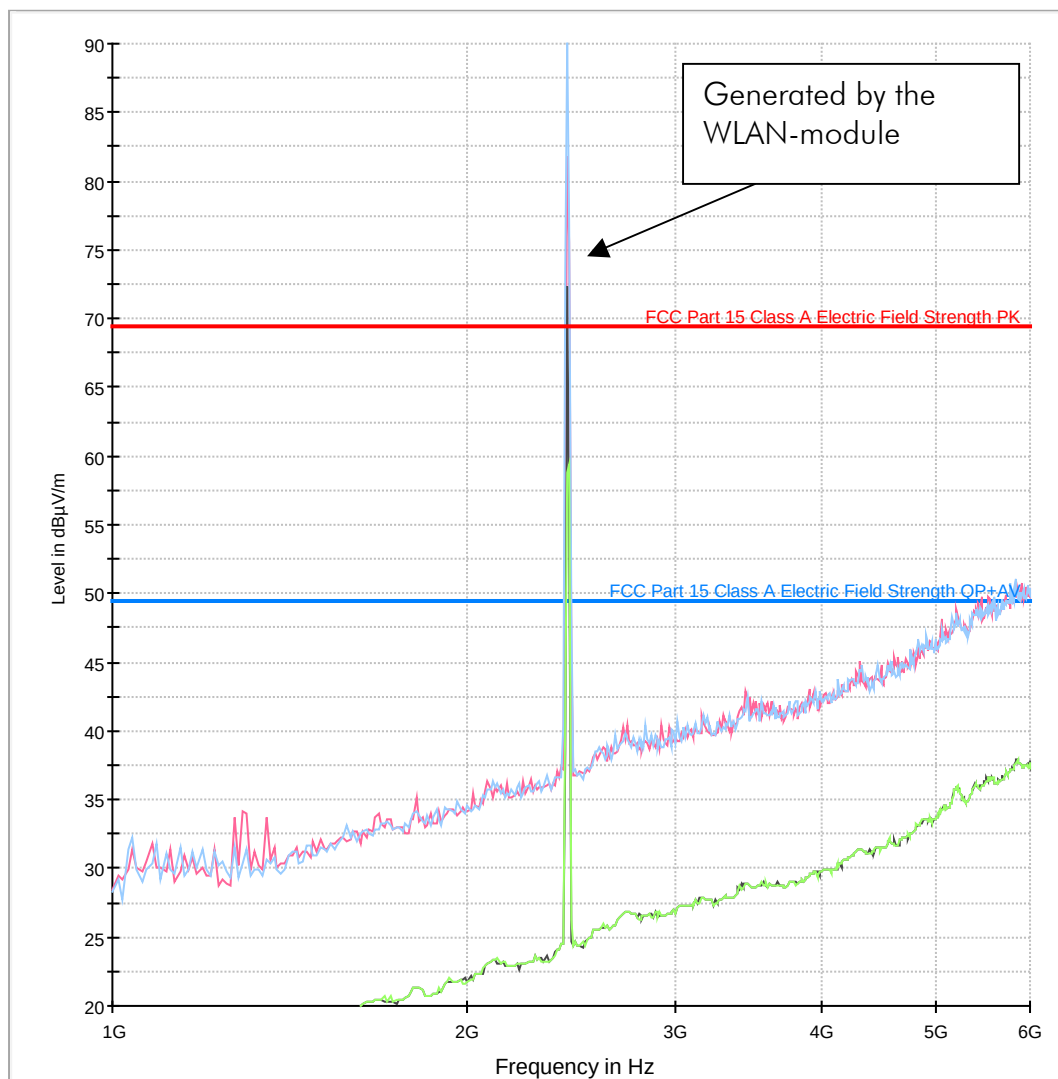


—	FCC Part 15 Class A Electric Field Strength QP+AV [..EMI radiated]
—	Preview Result 1V-PK+ [Preview Result 1V.Result:2]
—	Preview Result 2V-AVG [Preview Result 2V.Result:4]
—	Preview Result 1H-PK+ [Preview Result 1H.Result:2]
—	Preview Result 2H-AVG [Preview Result 2H.Result:4]
—	FCC Part 15 Class A Electric Field Strength PK [..EMI radiated]

EUT Information

EUT Name: Set 210 SE
 Test_ID: / SN: PRN25_08
 Customer: ACD Elektronik GmbH
 Operational condition: Ethernet ping, USB, Camera, IRDA active, WLAN bg active, RFID active

Test specification: 47 CFR Part 15 Subpart B - Class A
 Antenna information: Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
 Operator: P. Hauser
 File #: ACN25_57
 Comment #1: Test results corrected to 10m test distance
 Comment #2:

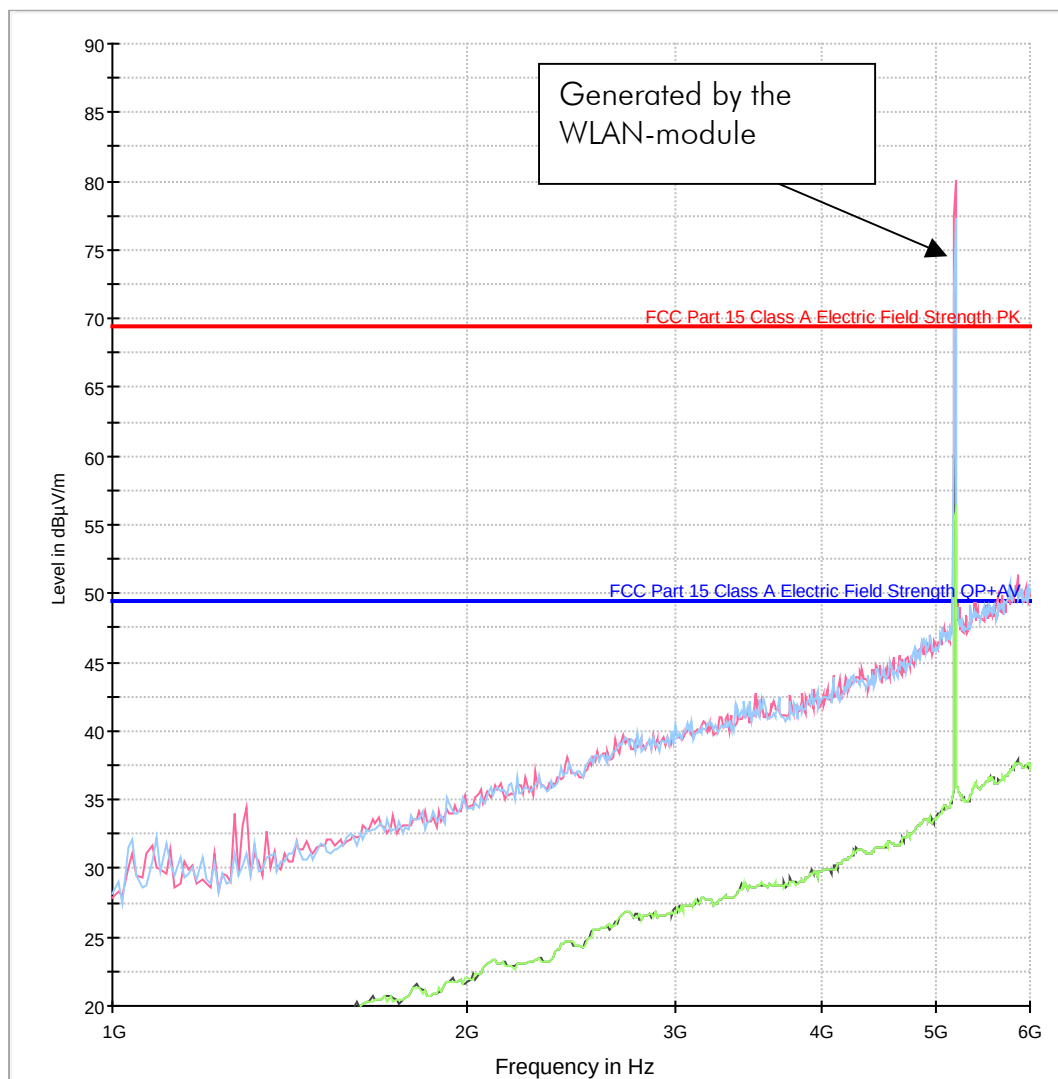


- FCC Part 15 Class A Electric Field Strength QP+AV [..EMI radiated]
- Preview Result 1V-PK+ [Preview Result 1V.Result:2]
- Preview Result 2V-AVG [Preview Result 2V.Result:4]
- Preview Result 1H-PK+ [Preview Result 1H.Result:2]
- Preview Result 2H-AVG [Preview Result 2H.Result:4]
- FCC Part 15 Class A Electric Field Strength PK [..EMI radiated]

EUT Information

EUT Name: Set 210 SE
Test_ID: / SN: PRN25_08
Customer: ACD Elektronik GmbH
Operational condition: Ethernet ping, USB, Camera, IRDA active, WLAN ac active, RFID active

Test specification: 47 CFR Part 15 Subpart B - Class A
Antenna information: Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
Operator: P. Hauser
File #: ACN25_58
Comment #1: Test results corrected to 10m test distance
Comment #2:



— FCC Part 15 Class A Electric Field Strength QP+AV [..EMI radiated]

— Preview Result 1V-PK+ [Preview Result 1V.Result:2]

— Preview Result 2V-AVG [Preview Result 2V.Result:4]

— Preview Result 1H-PK+ [Preview Result 1H.Result:2]

— Preview Result 2H-AVG [Preview Result 2H.Result:4]

— FCC Part 15 Class A Electric Field Strength PK [..EMI radiated]

1.1.2.4 Restricted bands of operation

Regulation

47 CFR Part 15 Subpart C - 2016-07-06

- Requirement: ☒ Section 15.205(a)
- Limit spurious emission: ☒ Section 15.209
☒ CISPR quasi peak detector ($f \leq 1\text{GHz}$)
☐ Average detector ($f > 1\text{GHz}$)

Operation mode

- EUT arrangement: ☒ Tabletop ☐ Floor standing
- Power supply: ☒ Internal battery (Mobile terminal)
☒ 120V/60Hz (Docking station)
- Rated voltage variation: ☐ 85% ☐ 115%

Continuous operation of the mobile terminal M210SE, the device was placed in the docking station DS210.

The mobile terminal M210SE was supplied via the internal battery whilst the battery in the mobile terminal was charged.

The following systems/tests were active during the measurement:

- RFID – without tag (worst case)
- Ethernet - ping to laptop
- Camera – live image
- WLAN - bg ping to access point (first test run)
- WLAN - ac ping to access point (second test run)
- USB – remote desktop of the mobile terminal via USB to laptop
- IRDA I/F - scanning

Environmental conditions

Temperature [10 - 40°C]: 26°C

Relative humidity [10 - 90%]: 41%

Environmental conditions during the test: ☒ kept
☐ not kept

Test - / Measurement procedure

Position the EUT in front of the measuring antenna. The analyzer is set to peak detector and the trace mode to max. hold. Set the analyzer to the identified fundamental and the sweep is continued until the trace is stabilized. The frequencies of the maximum of the envelope and the outermost points attenuated by 20dB to the maximum are noted.

Test result

Measured fundamental: 13.560MHz
20dB-Emission Bandwidth: 0.4312MHz

Fundamental out
of restricted bands: ☒ kept
☐ not kept

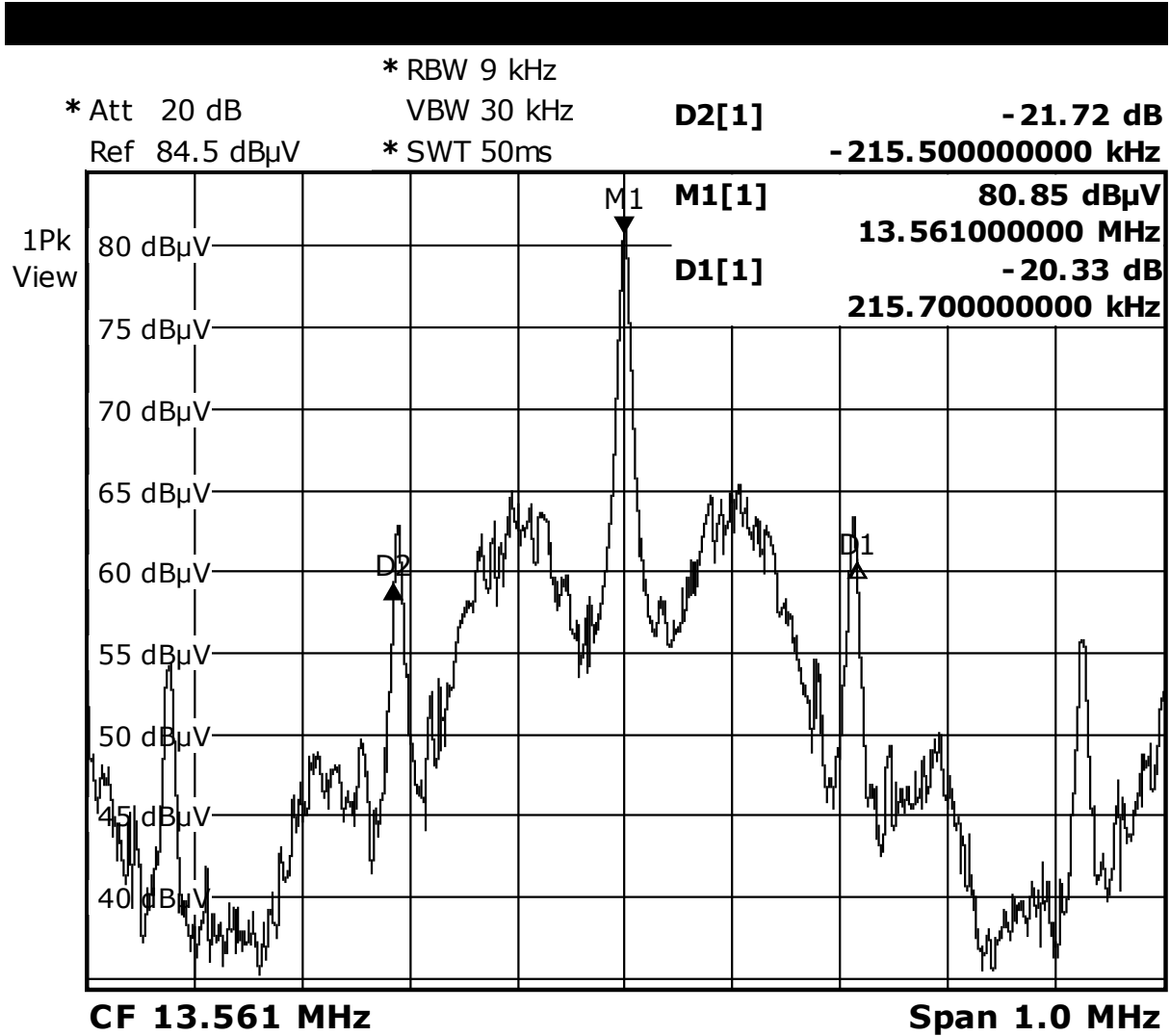
Limit spurious emission: ☒ kept
☐ not kept

Remarks: n/a

Protocol scope

- ☒ Diagram – 20dB-Emission bandwidth.
- ☒ Table – Frequency stability of fundamental vs. temperature.

Occupied bandwidth



M210SE, PRN25_08

Date: 5.JUL.2016 18:09:33

Occupied bandwidth BW = D1 - D2 = 215.5kHz - -215.7kHz=431.2kHz

1.1.2.5 Antenna requirement

Regulation

47 CFR Part 15 Subpart C - 2016-07-06

Requirement: ☒ Section 15.203
☒ Permanent attached
☐ Unique coupling to the intentional radiator

Test result

Requirement: ☒ kept
☐ not kept

Authorized antenna: ☒ Print antenna
☐ Internal antenna
☐ External antenna

Remarks: n/a

2 Summary

Regulation	Class / Test level	Result	Remark(s)
FCC Rules 47 CFR Part 15 Subpart C			
Terminal voltage 0.15-30MHz	Section 15.207	Limits kept	
Radiated emissions 0.009-30MHz	Sections 15.209; 15.225	Limits kept	
Radiated emissions 30-135.6MHz	Section 15.209	Limit kept	
Radiated emissions 135.6-5000MHz	Section 15.109 – Class A	Limit kept	
Occupied bandwidth	Section 15.215(c)	Requirement kept	
Restricted bands	Section 15.205(a)	Requirement kept	
Antenna requirement	Section 15.203	Requirement kept	

n. r. – not relevant

Burgrieden, 2016-07-11

Report generated by:



Acceptance inspector – Peter Hauser