



Bundesnetzagentur

Test report

AIN19c06

BNetzA-CAB-02/21-01

Product / EUT: RFID reader
Type designation: ARE H5 – FullISO/E/A/i/B/U/D/Le/PT1
Tested type: ARE H5 – FullISO/E/A/i/B/U/D/Le/PT1
EUT authorization: Certification Declaration of Conformity
 Verification
Production level: 03/2016
S/N: 2470
Manufacturer: AEG Identifikationssysteme GmbH
Hörvelsinger Weg 47
89081 Ulm / Germany

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

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: AEG Identifikationssysteme GmbH
Hörvelsinger Weg 47
89081 Ulm / Germany

**EUT-
Date of arrival:** 2016-03-21
Test ID: PRN12_07
Date(s) of test: 2016-03-23 – 2016-04-25

Burgrieden, 2016-12-06

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 C63.10-2013

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

Contact person: Mr. Köslér / AEG Identifikationssysteme GmbH

EUT-

Description: Handheld LF-RFID reader.
A = AEG ID 3D-front-label
U = USB interface
B = Bluetooth interface
i = international charger
D = additional external antenna connectable
PT_x = external passive twin antenna, sequential number x
FullISO = all ISO 11784 & 11785 transponders supported
E = packing, ESP, polysterol
Le = additional LED

Voltage supply: 7.2VDC

Fundamental frequency: 134kHz,
Frequency list: 20MHz, 22.0088MHz, 44MHz

Temperature range: 0°C to 50°C

Approximate size: LxWxH / cm - 23x14x13

**Supplied /
used equipment:**

Designation	Type	Manufacturer	S/N
Laptop	Inspiron 5150	Dell	CN-0W0941- 1296136J-2083
AC Adapter (Inspiron 5150)	PA-1131-02D	Dell	CN-9Y819-48010- 360-0954
Bluetooth – USB Stick	USB Bluetooth Nano Stick	CSL Computer	Mod.No. - BSN23996
Transponder (tag)	Tier ISO, 20mm disc	AEG ID	9990000000000000
Battery	7.2V / 1050mAh	n/a	n/a
Bluetooth module (EUT)	WT12	bluegiga	FCC ID: QOQWT12
Telescopic antenna	PT1 160cmx3.5cm LxØ	AEG ID	1019

Configuration:



As-delivered condition*
Modified*

- A ferrite core (type WE 742 711 32, 2 turns) was attached on the USB cable, see image below



Cable designation	Type	Length	Remarks
USB cable	Shielded	1.8m	Ferrite core WE 742 711 32, 2 turns, 3cm off the EUT

Remarks: n/a

State of revision:

Source document	New Document	Date / Reviser	Modifications
AIN19_06	AIN19a06	2016-06-24 Chr. Vogelmann	List of valid equipment shrink to used equipment. Test conditions supplemented. Note for the use of RFID and Bluetooth at the same time. Environmental conditions recorded.
AIN19a06	AIN19b06	2016-11-08 Chr. Vogelmann	Conducted emission documented as informative and not subject of the approval.
AIN19b06	AIN19c06	2016-11-22 P. Hauser	Harmonics of Bluetooth module recorded. Measurements with internal antenna inserted.

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. 8.53.0	Rohde& Schwarz	n/a	

Scope:

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1 EMC-Test(s)

1.1 Emission according 47 CFR Part 15 Subpart C - 04/2016

1.1.1 Terminal voltage according 47 CFR Part 15 Subpart C - 04/2016 - informative

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

*

Test location

<input checked="" type="checkbox"/>	Inv.-No.	Designation	Type (LxWxH)	Manufacturer	Location
<input checked="" type="checkbox"/>	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

<input checked="" type="checkbox"/>	Inv.-No.	Designation	Type	Manufacturer	S/N
<input checked="" type="checkbox"/>	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	
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	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 - 04/2016

9kHz - 30MHz

150kHz - 30MHz

Mains supply

Limits:

Section 15.207

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Operation mode

EUT arrangement:

Tabletop

Floor standing

Power supply:

120V/60Hz

240V/60Hz

Rated voltage variation:

85%

115%

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

Continuous operation of the RFID reader supplied by the internal battery and connected to the laptop USB-port.

RFID tag placed at approx. of the half reading distance. The Bluetooth module was configured as "Master" and active. During the test the remote station was removed from the laptop and the Bluetooth module was polling for a BT device. RFID and Bluetooth module were active at the same time.

Environmental conditions

Temperature [10 - 40°C]:

23°C

Relative humidity [10 - 90%]:

43%

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: The measurement of the terminal voltages is not necessary for battery powered devices – only informative as reference and not subject of the approval.

Protocol scope

Readings - continuous emanation

Diagram - continuous emanation

EMCE GmbH Ing_buero fuer EMV_Pruefungen
Terminal voltage

23. Mar 16 16:33

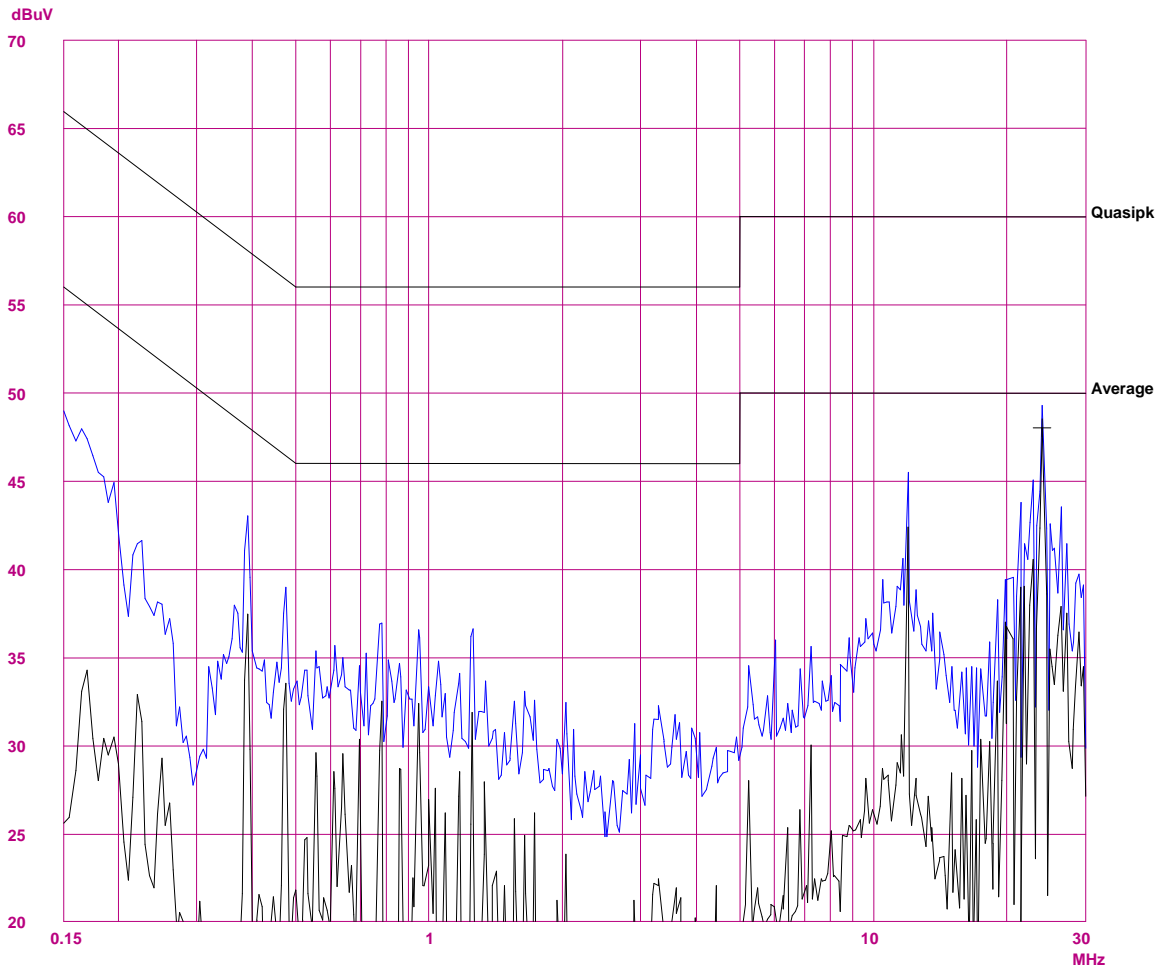
EUT: ARE H5 telescopic antenna
 Manuf: AEG ID GmbH
 Op Cond: Reading tag, half reading distance
 Operator: P. Hauser
 Test Spec: 47 CFR Part 15 Subpart C
 Comment: Test_ID PRN12_07
 AIN12_21, Phase L1 - laptop

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: 6dB

Transducer No.	Start	Stop	Name
3	2	1Hz	1000M Ca_#1006
20	9k	30M	Lim_#070



EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

23. Mar 16 16:33

EUT: ARE H5 telescopic antenna
Manuf: AEG ID GmbH
Op Cond: Reading tag, half reading distance
Operator: P. Hauser
Test Spec: 47 CFR Part 15 Subpart C
Comment: Test_ID PRN12_07
AIN12_21, 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

24.00000	48.0	50.0
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* limit exceeded

EMCE GmbH Ing_buero fuer EMV_Pruefungen

Terminal voltage

23. Mar 16 16:45

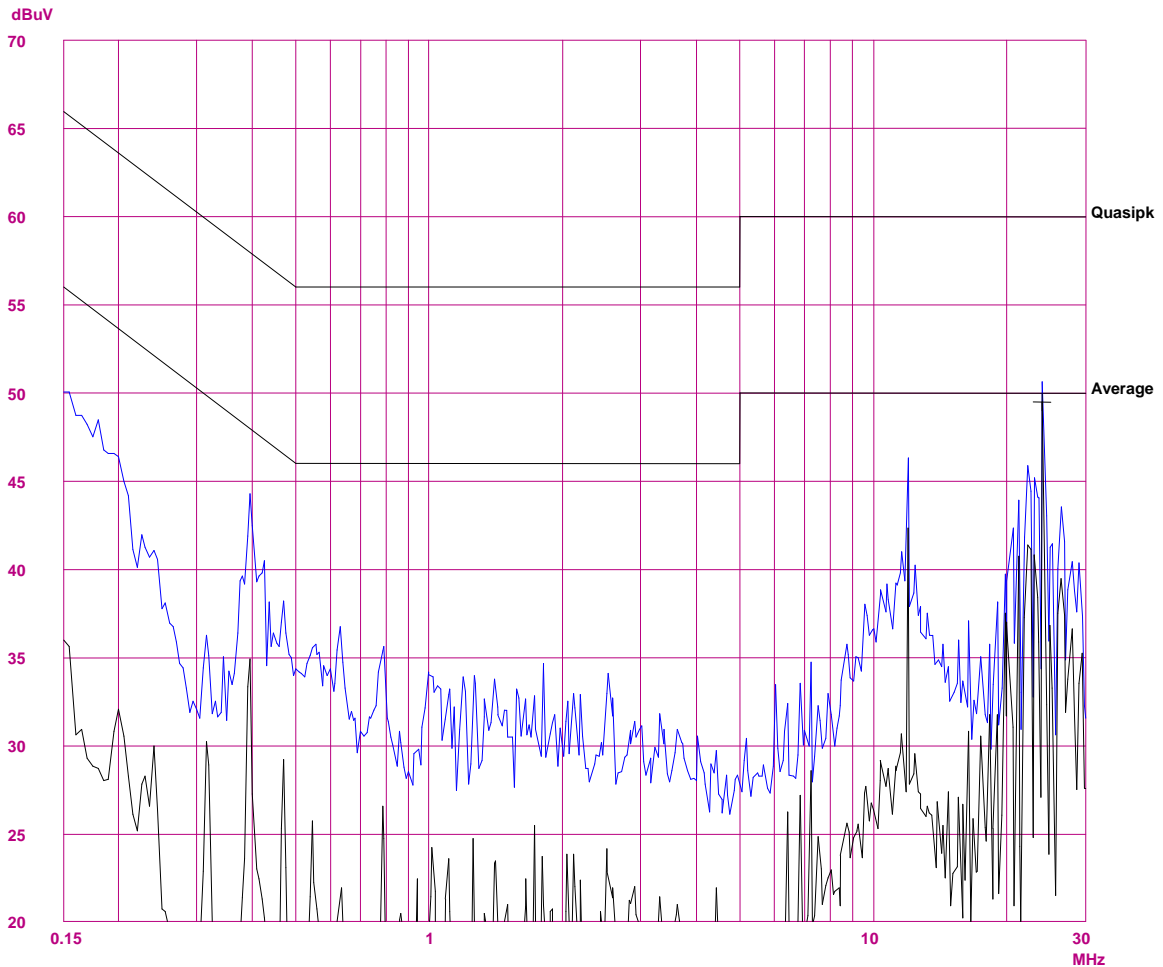
EUT: ARE H5 telescopic antenna
 Manuf: AEG ID GmbH
 Op Cond: Reading tag, half reading distance
 Operator: P. Hauser
 Test Spec: 47 CFR Part 15 Subpart C
 Comment: Test_ID PRN12_07
 AIN12_22, Phase N - laptop

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: 6dB

Transducer No.	Start	Stop	Name
3	2	1Hz	1000M Ca_#1006
20	9k	30M	Lim_#070



EMCE GmbH Ing_buero fuer EMV_Pruefungen Terminal voltage

23. Mar 16 16:45

EUT: ARE H5 telescopic antenna
Manuf: AEG ID GmbH
Op Cond: Reading tag, half reading distance
Operator: P. Hauser
Test Spec: 47 CFR Part 15 Subpart C
Comment: Test_ID PRN12_07
AIN12_22, 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

no Results

Frequency	AV Level	AV Limit
MHz	dBuV	dBuV

24.00000	49.4	50.0
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* limit exceeded

1.1.2 Radio disturbances according 47 CFR Part 15 Subpart C - 04/2016

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

* _____

Test location

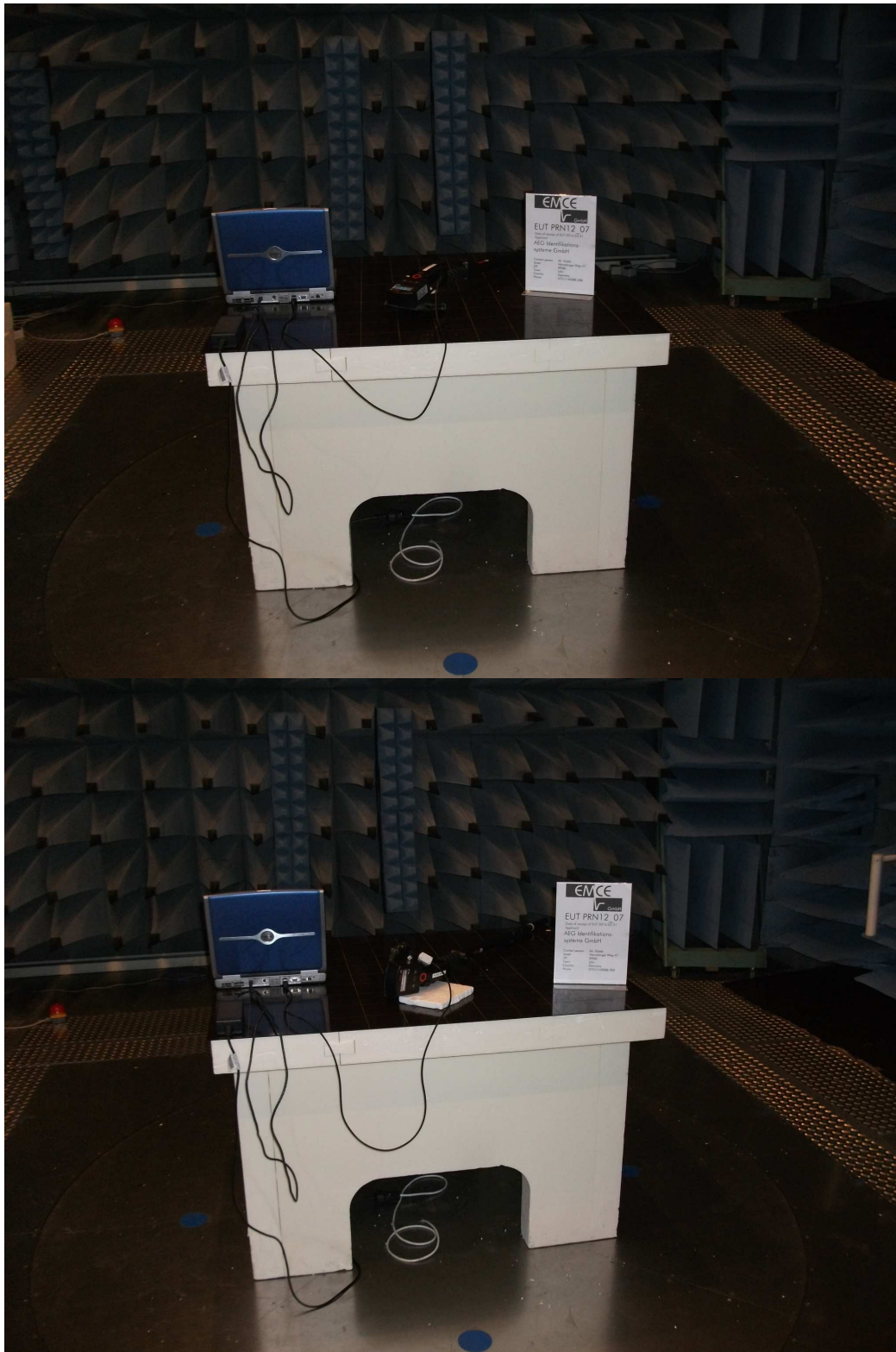
<input checked="" type="checkbox"/>	Inv.-No.	Designation	Type (LxWxH)	Manufacturer	Location
	588	Shielded room #2	8.3/5.8 x 5.5/2.9 x 3.4m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	584	Shielded room #3	3.6 x 3.6 x 2.5m	Siemens AG	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	678	Shielded room #4	4.0 x 4.0 x 3.5m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	014	Open area test site	10m	EMCE GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
<input checked="" type="checkbox"/>	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

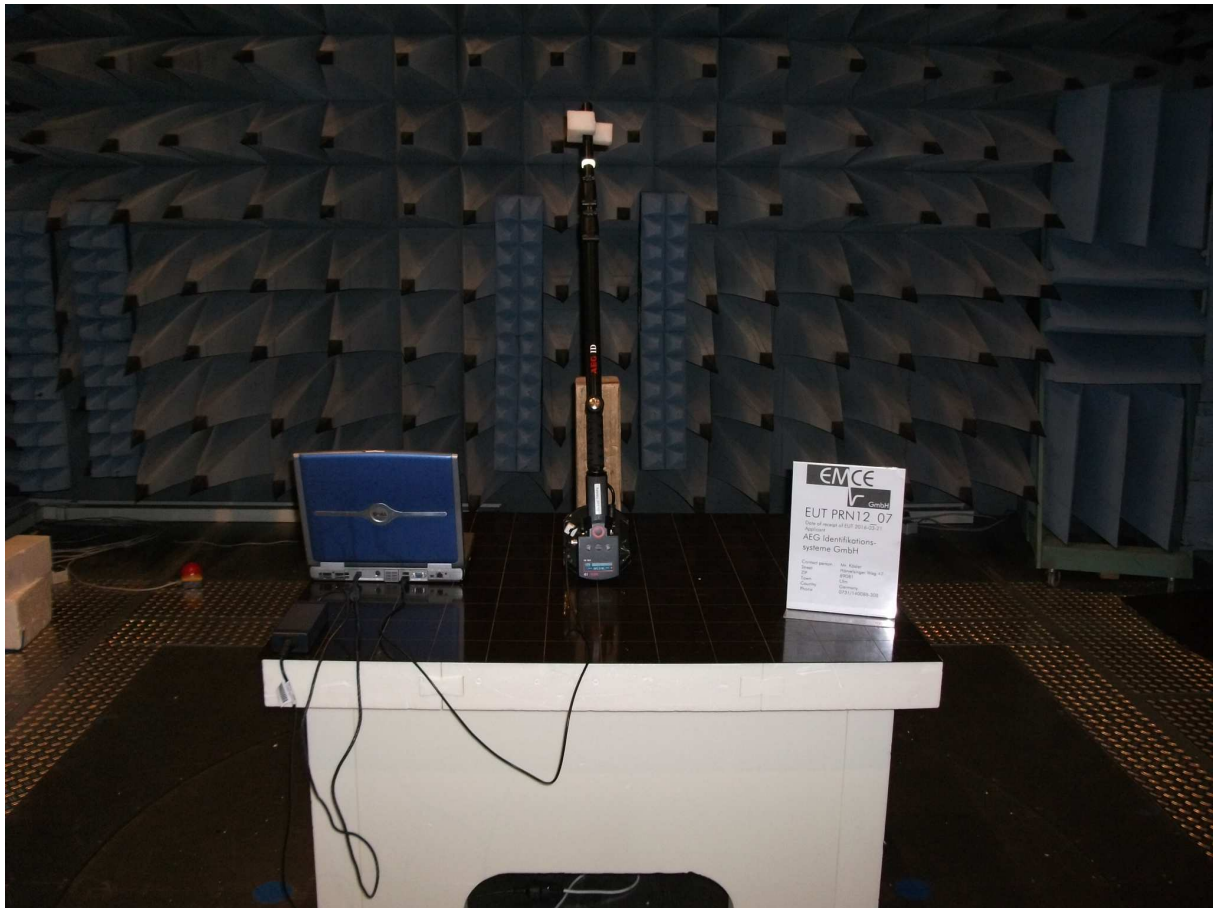
1.1.2.1 Test set up

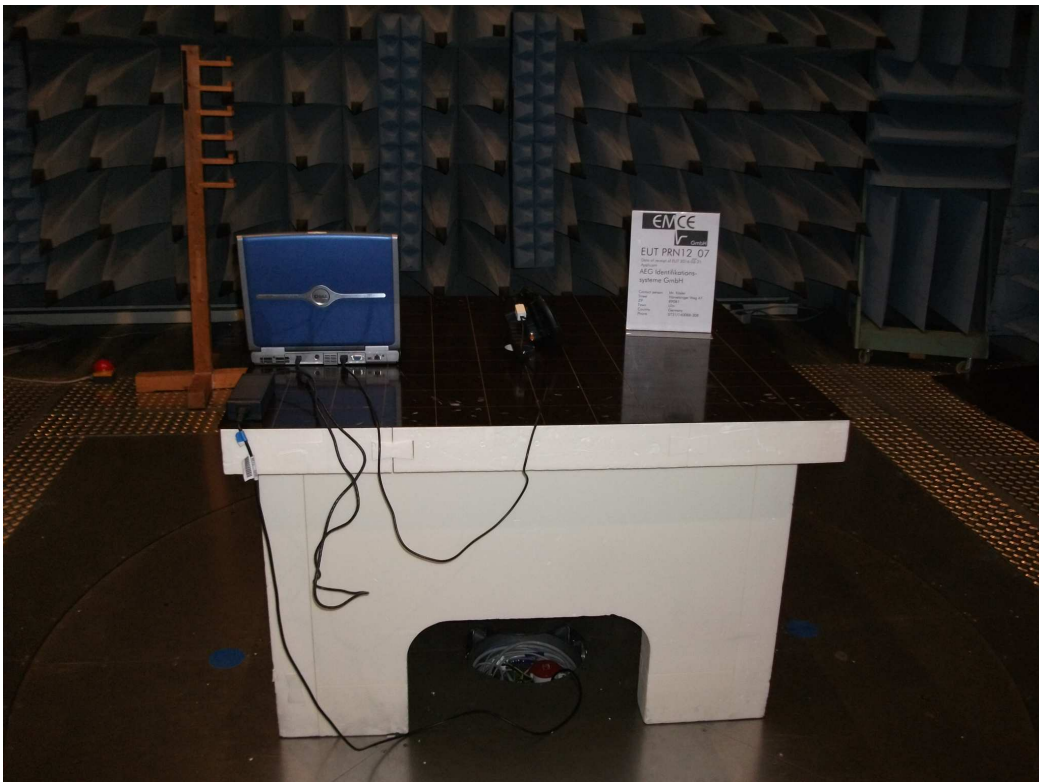
According ANSI C63.10-2013

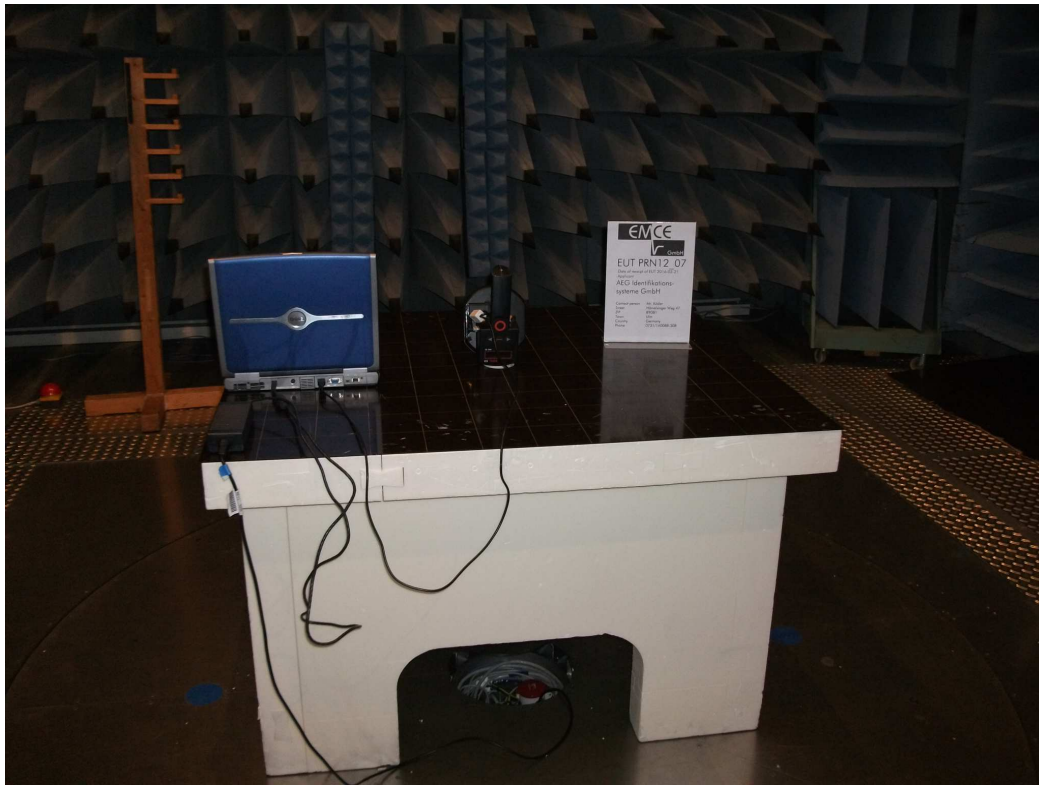












Used test equipment

<input type="checkbox"/>	Inv.-No.	Designation	Type	Manufacturer	S/N
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	008	Antenna 9kHz – 30MHz	HFH2-Z2	Rohde & Schwarz	835776/0002
<input checked="" type="checkbox"/>	009	Antenna 30 – 300MHz	VHBA9123 / BBA9106	Schwarzbeck	435
<input checked="" type="checkbox"/>	010	Antenna 250 -1200MHz	UHALP 9108A	Schwarzbeck	108
<input checked="" type="checkbox"/>	011	Antenna 30 – 300MHz	VHBA9123 / BBA9106	Schwarzbeck	0408/94
<input checked="" type="checkbox"/>	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
<input checked="" type="checkbox"/>	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 - 04/2016

- | | |
|--|--|
| <input checked="" type="checkbox"/> 9kHz - 30MHz | <input type="checkbox"/> 150kHz – 1GHz |
| <input type="checkbox"/> 30MHz - 1000MHz | <input type="checkbox"/> 1 – 18GHz |

Limits: Section 15.209* Section 15.225*

* 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:	<input checked="" type="checkbox"/> Tabletop	<input type="checkbox"/> Floor standing
Power supply:	<input checked="" type="checkbox"/> 7.2VDC	<input type="checkbox"/> 240V/60Hz
Rated voltage variation:	<input type="checkbox"/> 85%	<input type="checkbox"/> 115%

Continuous operation of the RFID reader supplied by the internal battery and connected to the laptop USB-port.

The Bluetooth module was configured as “Master” and active. During the test the remote station was removed from the laptop and the Bluetooth module was polling for a BT device. RFID and Bluetooth module were active at the same time.

The emanation was maximized while placing the RFID tag inside the field or without tag. The test was executed with external telescopic antenna as well as with internal antenna.

Environmental conditions

Temperature [10 - 40°C]:	20°C
Relative humidity [10 - 90%]:	49%

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 $\leq 30\text{MHz}$ and at 3m distance for frequencies $\geq 30\text{MHz}$. Measurements were made with a CISPR receiver with quasi-peak. The average detector is used in the frequency bands 9-90kHz, 110-490kHz and above 1000MHz. For pulse modulated devices with a pulse repetition frequency of 20Hz 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 = 20dB
LCF_{10m} for 100m antenna distance = 40dB
LCF_{10m} for 300m antenna distance = 60dB

Test result

Frequency	Field strength	Limit _{10m}	Margin	Ant.- Distance	Ant.- Polar.	Detector Peak / AV	Receiver 6dB BW	Supply voltage	Remarks
MHz	dB μ V/m	dB μ V/m	dB	m	H/V	QP / AV	kHz		
0.13422	76.5	85.0	8.5	10.0	V	AV	0.2		Full charged battery Telescopic antenna
0.13422	82.1	85.0	2.9	10.0	V	AV	0.2		Full charged battery Internal antenna

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

Limits for radiated disturbances:

kept
 not kept

Remarks: n/a

1.1.2.3 Test – Spurious emissions

Regulation

47 CFR Part 15 Subpart C - 04/2016

- | | |
|---|---|
| <input checked="" type="checkbox"/> 9kHz - 30MHz | <input type="checkbox"/> 150kHz – 1GHz |
| <input checked="" type="checkbox"/> 30MHz - 1000MHz | <input checked="" type="checkbox"/> 1 – 25GHz |

Limits: Section 15.209 __

Test distance: 3m 5m
 10m 30m

Operation mode

EUT arrangement:	<input checked="" type="checkbox"/> Tabletop	<input type="checkbox"/> Floor standing
Power supply:	<input checked="" type="checkbox"/> 7.2VDC	<input type="checkbox"/> 240V/60Hz
Rated voltage variation:	<input type="checkbox"/> 85%	<input type="checkbox"/> 115%

Continuous operation of the RFID reader supplied by the internal battery and connected to the laptop USB-port.

RFID tag placed at approx. of the half reading distance. The Bluetooth module was configured as "Master" and active. During the test the remote station was removed from the laptop and the Bluetooth module was polling for a BT device. RFID and Bluetooth module were active at the same time. The test was executed with external telescopic antenna as well as with internal antenna.

Environmental conditions

Temperature [10 - 40°C]:	20°C
Relative humidity [10 - 90%]:	49%

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 9-90kHz, 110-490kHz and above 1000MHz. For pulse modulated devices with a pulse repetition frequency of 20Hz 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 = 20dB
LCF_{10m} for 100m antenna distance = 40dB
LCF_{10m} for 300m antenna distance = 60dB

Test result

Limits for intentional radiators: kept
 not kept

Level of the fundamental > unwanted emission: kept
 not kept

Remarks: Radio disturbances below the limit line with a margin > 10dB to the limit are generally not listed.

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
- Precompliance measurement(s) – 3 axis.

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

- Telescopic antenna

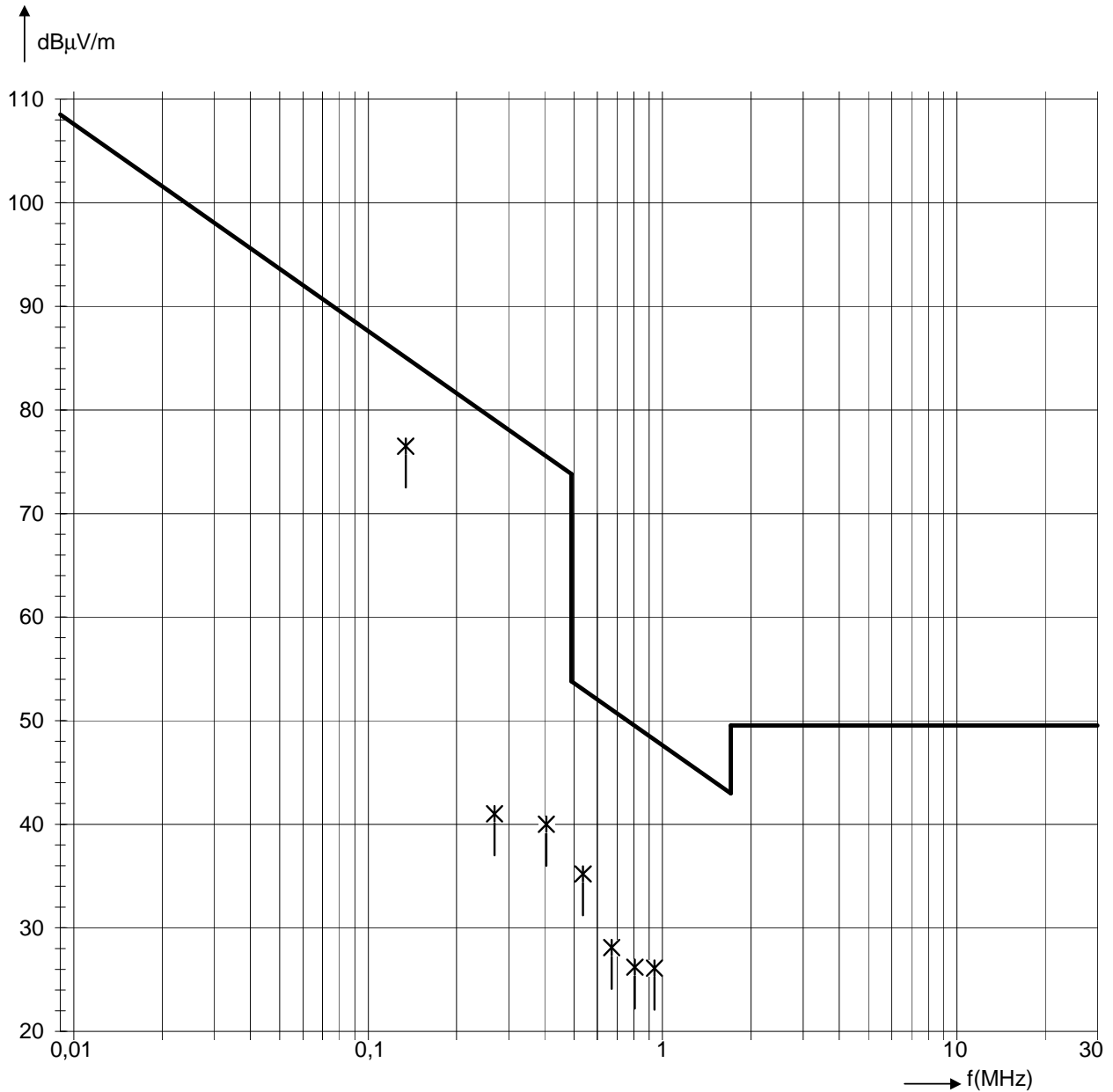
Frequency	Field strength	Limit _{10m}	Margin	Ant.-	Ant.-	Detector	Receiver	Remarks
				Distance	Polar.	Peak /	6dB BW	
MHz	dB μ V/m	dB μ V/m	dB	m	H/V	QP / AV	kHz	
0.26844	41.0	79.0	38.0	10.0	V	AV	10	Increased ambient noise
0.40266	40.0	75.5	35.5	10.0	V	AV	10	Increased ambient noise
0.53688	35.2	53.0	17.8	10.0	V	QP	10	
0.67110	28.1	51.1	23.0	10.0	V	QP	10	
0.80532	26.2	49.5	23.3	10.0	V	QP	10	
0.93954	26.1	48.1	22.0	10.0	V	QP	10	
1.07376	26.5	47.0	20.5	10.0	V	QP	10	
1.20790	26.5	46.0	19.5	10.0	V	QP	10	
1.34220	26.1	45.0	18.9	10.0	V	QP	10	

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

Diagram - Antenna vertical polarized – Telescopic antenna

Limits according FCC Rules CFR 47 Part 15 – Subpart C

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



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

- Internal antenna

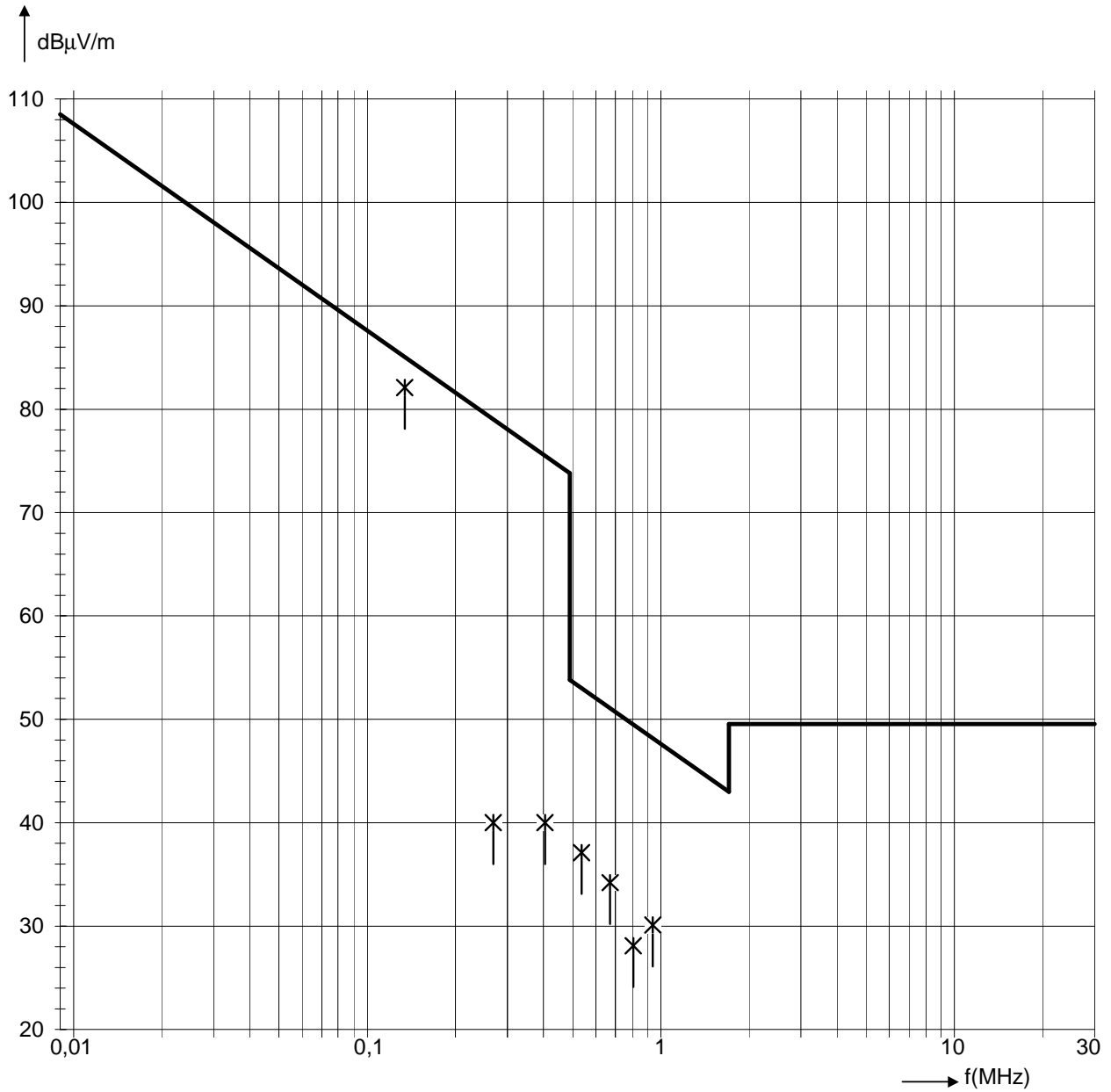
Frequency	Field strength	Limit _{10m}	Margin	Ant.-	Ant.-	Detector	Receiver	Remarks
				Distance	Polar.	Peak /	6dB BW	
MHz	dB μ V/m	dB μ V/m	dB	m	H/V	QP / AV	kHz	
0.26844	40.0	79.0	39.0	10.0	V	AV	10	Increased ambient noise
0.40266	40.0	75.5	35.5	10.0	V	AV	10	
0.53688	37.1	53.0	15.9	10.0	V	QP	10	
0.67110	34.2	51.1	16.9	10.0	V	QP	10	
0.80532	28.1	49.5	21.4	10.0	V	QP	10	
0.93954	30.1	48.1	18.0	10.0	V	QP	10	
1.07376	26.8	47.0	20.2	10.0	V	QP	10	
1.20790	25.9	46.0	20.1	10.0	V	QP	10	
1.34220	27.0	45.0	18.0	10.0	V	QP	10	

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

Diagram - Antenna vertical polarized – Internal antenna

Limits according FCC Rules CFR 47 Part 15 – Subpart C

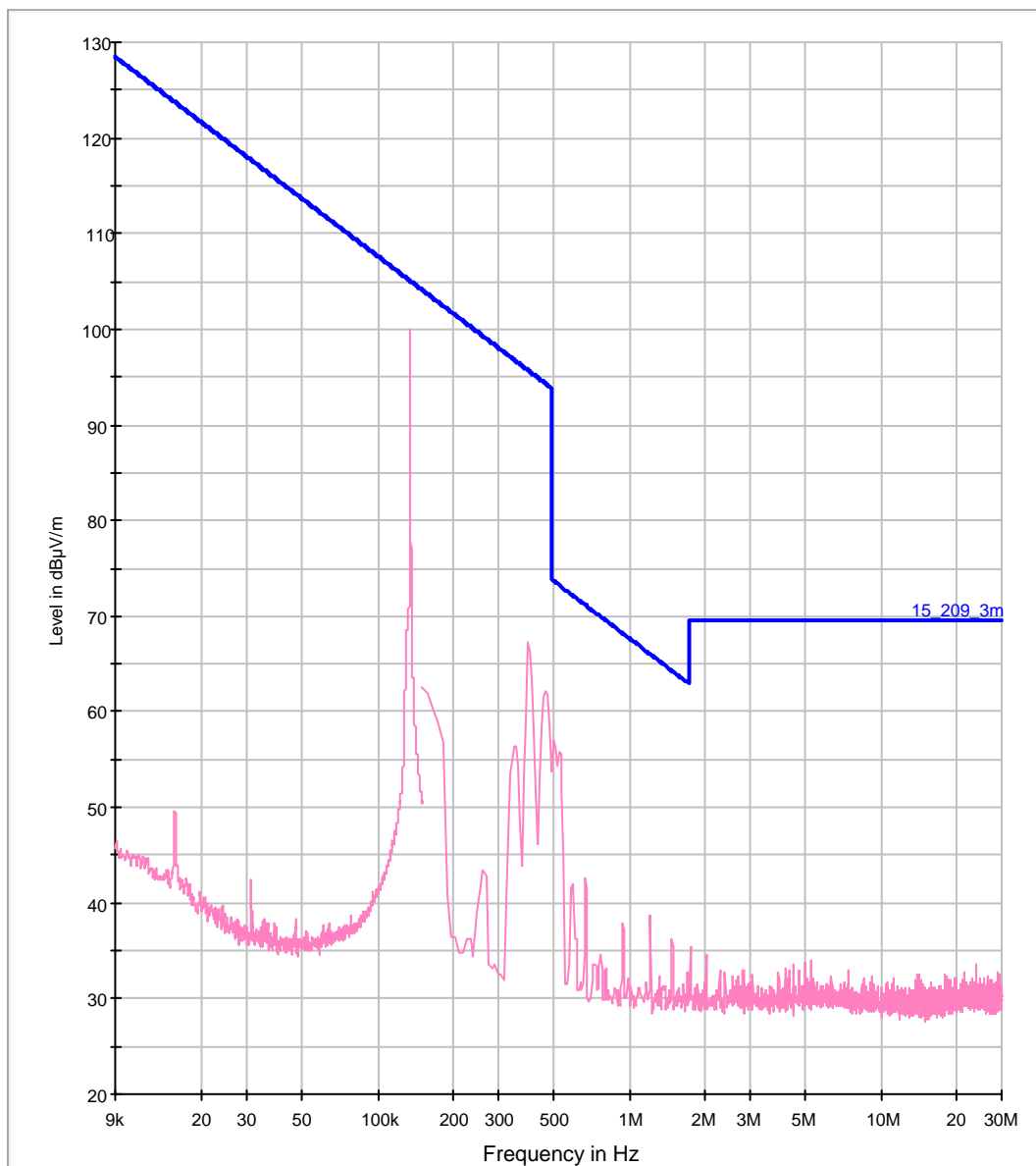
☒ Section 15.209 – Corrected to 10m distance EUT-Antenna



EUT Information

EUT Name: ARE H5 – FullISO/E/A/i/B/U/D/Le/PT1
 Test_ID: / SN: PRN12_07
 Customer: AEG ID GmbH
 Operational condition: Field on, no tag in field, telescopic antenna
 Test specification: 47 CFR §15.209
 Antenna information: Distance EUT-Ant.: 3.0m / Polarisation: V / Ant.Height: 1.0m
 Operator: P. Hauser
 File #: AIN18_04

Magnetic Field Strength dBµV with Sweep_SAC2

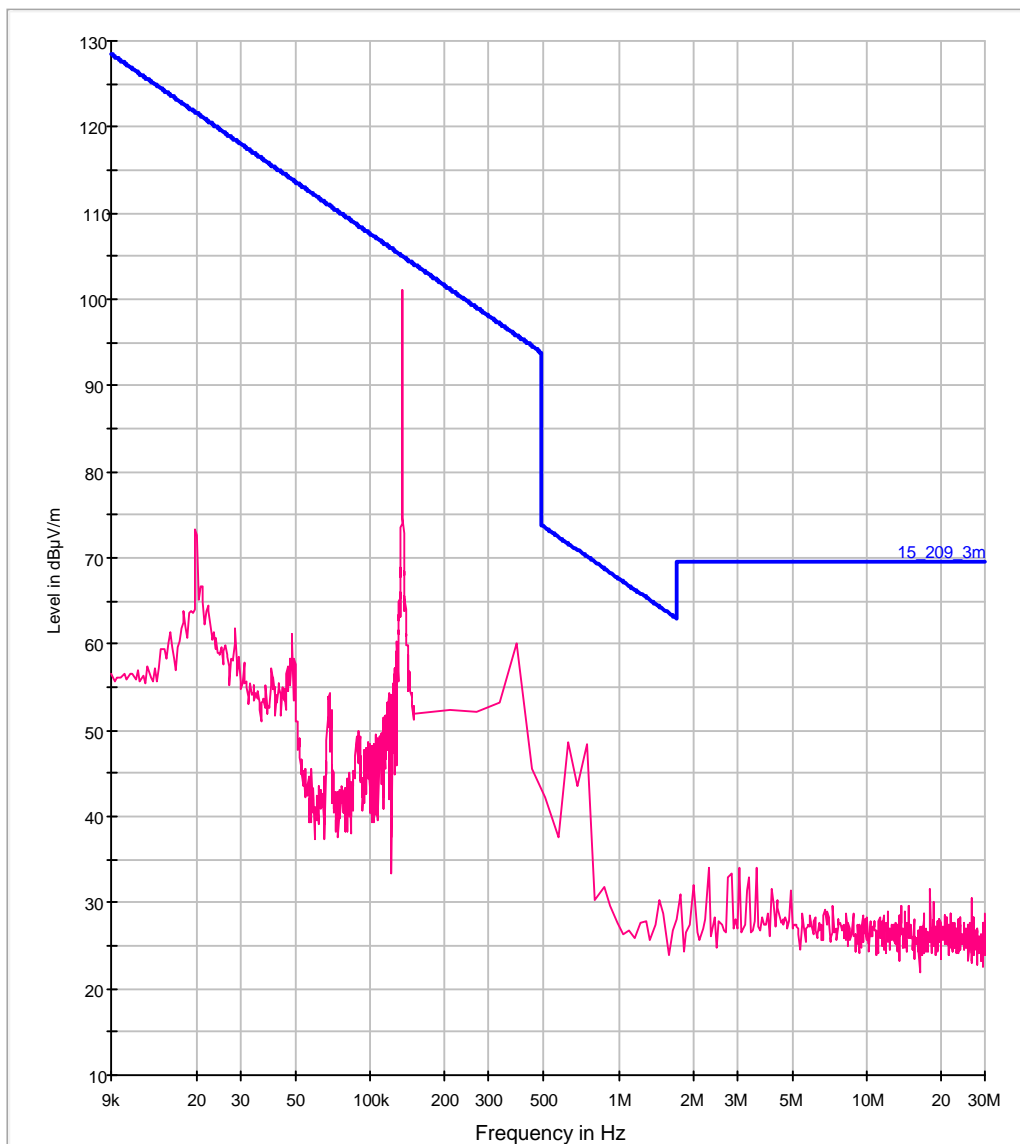


— 15_209_3m [..EMI radiated] — Preview Result 1V-PK+ [Preview Result 1V.Result:2]
 — MaxPeak-MaxHold [Preview Result 1V.Result:2]

EUT Information

EUT Name: ARE H5 - FullISO/E/A/i/B/U/D/Le/PT1
 Test_ID / SN: PRN12_07
 Customer: AEG ID GmbH
 Operational condition: Field on, no tag in field, internal antenna
 Test specification: 47 CFR §15.209
 Antenna information: Distance EUT-Ant.: 3.0m / Polarisation: V / Ant.Height: 1.0m
 Operator: P. Hauser
 File #: AIN18a04

Magnetic Field Strength dBµV with Sweep_SAC2



◆ 15_209_3m [..EMI radiated]
Final Result 1-PK+ [Final Result 1.Result:1]

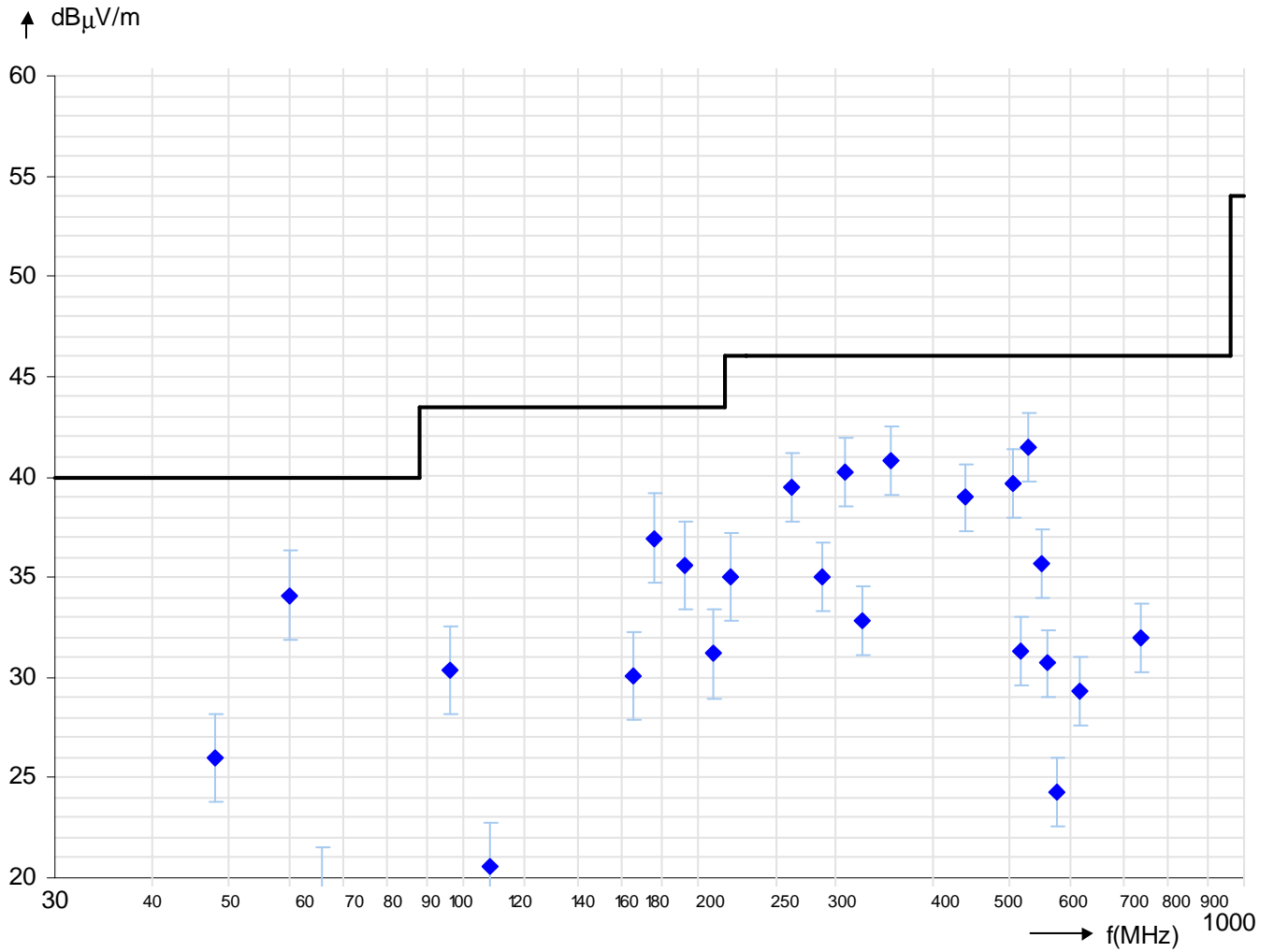
— Preview Result 1V-PK+ [Preview Result 1V.Result:2]
— MaxPeak-ClearWrite [Preview Result 1V.Result:1]

Readings - Antenna horizontal polarized – Telescopic antenna

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.
47.990	16.2	8.7	1.1	26.0	40.0	14.0	3.0	H	165
59.990	24.5	8.4	1.2	34.1	40.0	5.9	3.0	H	165
66.030	9.6	8.5	1.3	19.3	40.0	20.7	1.8	H	170
95.990	19.7	9.1	1.5	30.4	43.5	13.1	3.0	H	165
107.990	9.2	9.7	1.6	20.5	43.5	23.0	2.1	H	165
165.080	15.2	12.8	2.0	30.1	43.5	13.4	1.8	H	185
176.080	21.3	13.5	2.1	37.0	43.5	6.5	1.6	H	185
191.990	18.7	14.7	2.2	35.6	43.5	7.9	1.6	H	185
209.100	13.2	15.7	2.3	31.2	43.5	12.3	1.5	H	210
220.110	16.8	15.8	2.4	35.0	46.0	11.0	1.5	H	210
264.120	22.3	14.5	2.6	39.5	46.0	6.5	1.0	H	215
287.990	17.9	14.4	2.7	35.0	46.0	11.0	1.0	H	215
308.140	23.6	13.8	2.8	40.2	46.0	5.8	1.0	H	230
323.990	16.0	13.9	2.9	32.8	46.0	13.2	1.0	H	230
352.170	22.9	14.9	3.0	40.8	46.0	5.2	1.0	H	230
440.210	18.7	16.8	3.4	39.0	46.0	7.0	1.0	H	245
506.240	18.4	17.6	3.7	39.7	46.0	6.3	1.0	H	270
517.250	9.9	17.7	3.7	31.3	46.0	14.7	1.0	H	240
528.250	19.8	17.9	3.8	41.5	46.0	4.5	1.0	H	240
550.260	13.5	18.3	3.8	35.7	46.0	10.3	1.0	H	240
561.270	8.3	18.5	3.9	30.7	46.0	15.3	1.0	H	240
575.990	1.7	18.6	3.9	24.3	46.0	21.7	1.0	H	270
616.300	6.1	19.2	4.1	29.3	46.0	16.7	1.0	H	270
737.350	6.7	20.8	4.5	32.0	46.0	14.0	1.0	H	275

Diagram radio disturbances – Antenna horizontal polarized – Telescopic antenna

Limits: Section 15.209* __

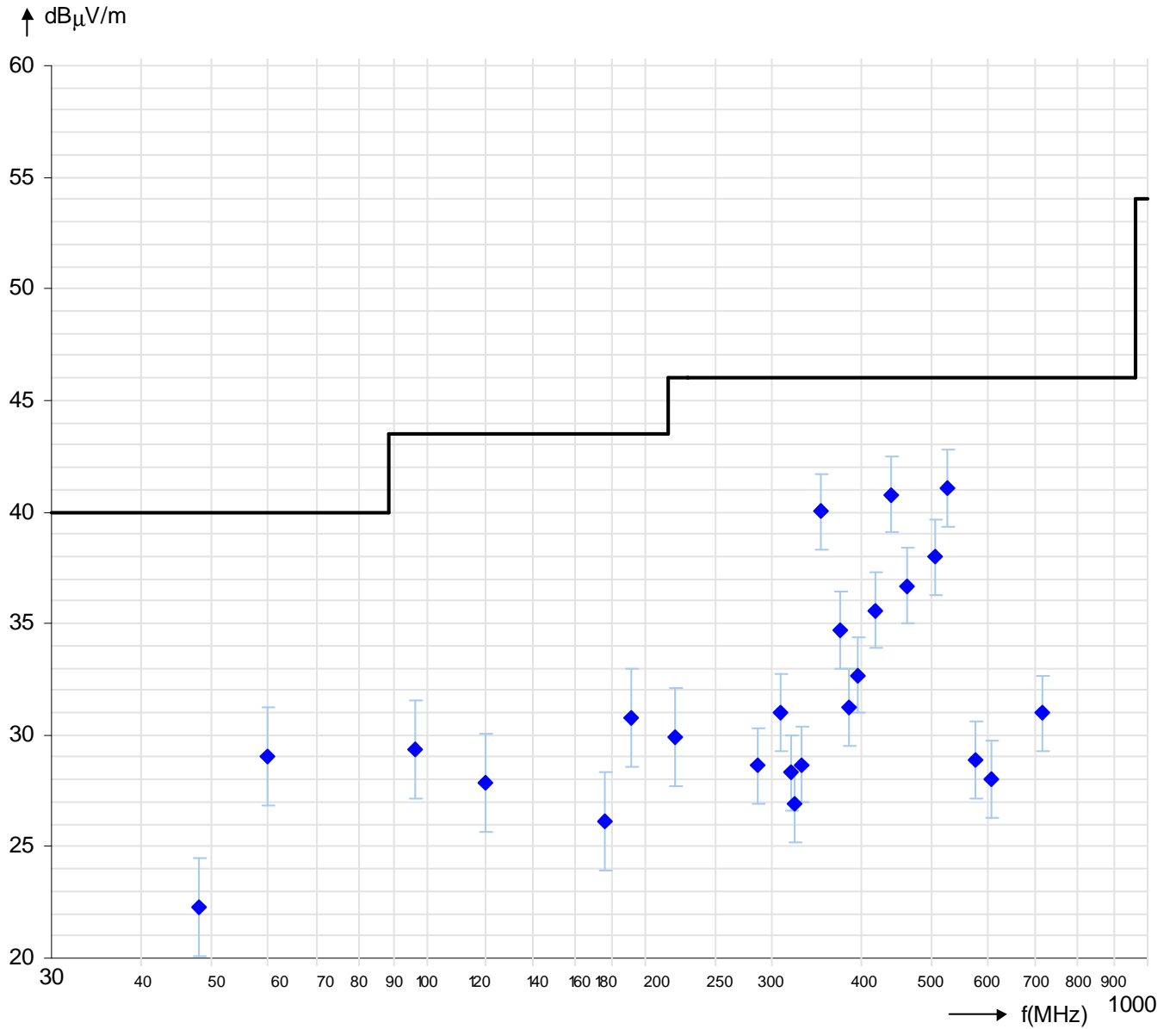


Readings - Antenna vertical polarized – Telescopic antenna

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.
47.990	12.5	8.7	1.1	22.3	40.0	17.7	1.0	V	175
59.990	19.4	8.4	1.2	29.0	40.0	11.0	1.0	V	175
95.990	18.7	9.1	1.5	29.4	43.5	14.1	1.0	V	170
119.990	15.5	10.6	1.7	27.8	43.5	15.7	1.0	V	185
176.080	10.5	13.5	2.1	26.2	43.5	17.3	1.0	V	185
191.990	13.9	14.7	2.2	30.8	43.5	12.7	1.0	V	185
220.100	11.7	15.8	2.4	29.9	46.0	16.1	1.0	V	220
287.990	11.5	14.4	2.7	28.6	46.0	17.4	1.0	V	250
308.140	14.4	13.8	2.8	31.0	46.0	15.0	1.0	V	250
319.150	11.5	13.9	2.9	28.3	46.0	17.7	1.0	V	250
323.990	10.1	13.9	2.9	26.9	46.0	19.1	1.0	V	250
330.160	11.8	13.9	2.9	28.7	46.0	17.3	1.0	V	255
352.170	22.1	14.9	3.0	40.0	46.0	6.0	1.0	V	255
374.180	16.1	15.5	3.1	34.7	46.0	11.3	1.0	V	262
383.990	12.5	15.6	3.2	31.2	46.0	14.8	1.0	V	250
396.190	13.7	15.7	3.2	32.7	46.0	13.3	1.0	V	262
418.200	16.2	16.1	3.3	35.6	46.0	10.4	1.0	V	210
440.210	20.5	16.8	3.4	40.8	46.0	5.2	1.0	V	210
462.220	16.1	17.1	3.5	36.7	46.0	9.3	1.0	V	210
506.240	16.7	17.6	3.7	38.0	46.0	8.0	1.0	V	220
528.250	19.4	17.9	3.8	41.1	46.0	4.9	1.0	V	220
575.990	6.3	18.6	3.9	28.9	46.0	17.1	1.0	V	240
605.290	4.9	19.1	4.0	28.0	46.0	18.0	1.0	V	260
715.340	6.0	20.6	4.4	31.0	46.0	15.0	1.0	V	260

Diagram radio disturbances – Antenna vertical polarized – Telescopic antenna

Limits: Section 15.209* __

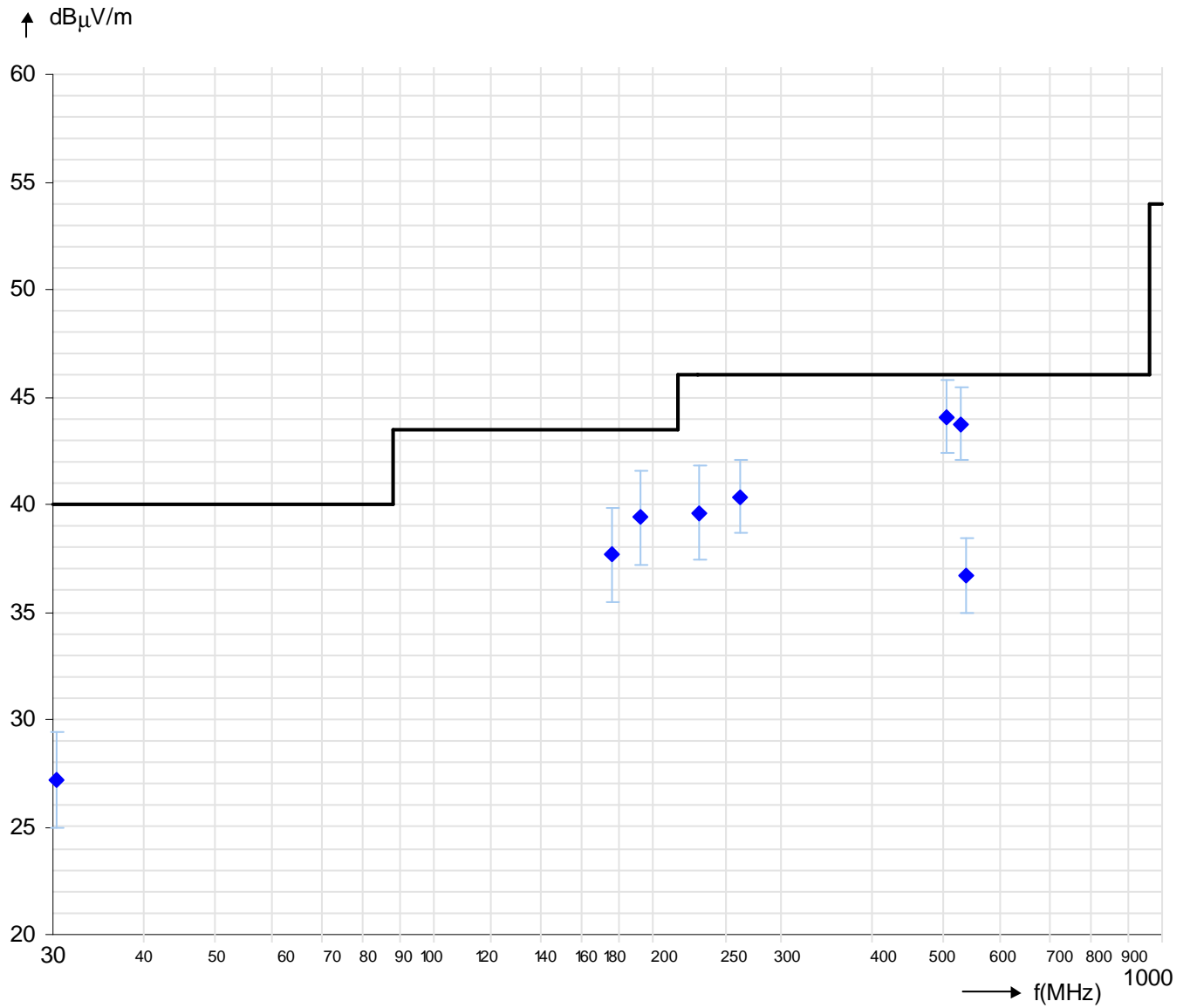


Readings - Antenna horizontal polarized – Internal antenna

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.
30.320	14.2	12.1	0.8	27.2	40.0	12.8	3.0	H	170
176.080	22.0	13.5	2.1	37.7	43.5	5.8	2.1	H	170
192.000	22.5	14.7	2.2	39.4	43.5	4.1	2.0	H	130
231.370	20.4	16.8	2.4	39.6	46.0	6.4	3.0	H	130
264.140	23.2	14.5	2.6	40.4	46.0	5.6	2.1	H	135
506.250	22.8	17.6	3.7	44.1	46.0	1.9	1.4	H	140
528.260	22.1	17.9	3.8	43.8	46.0	2.2	1.4	H	140
539.030	14.8	18.1	3.8	36.7	46.0	9.3	1.3	H	180

Diagram radio disturbances – Antenna horizontal polarized – Internal antenna

Limits: Section 15.209* _

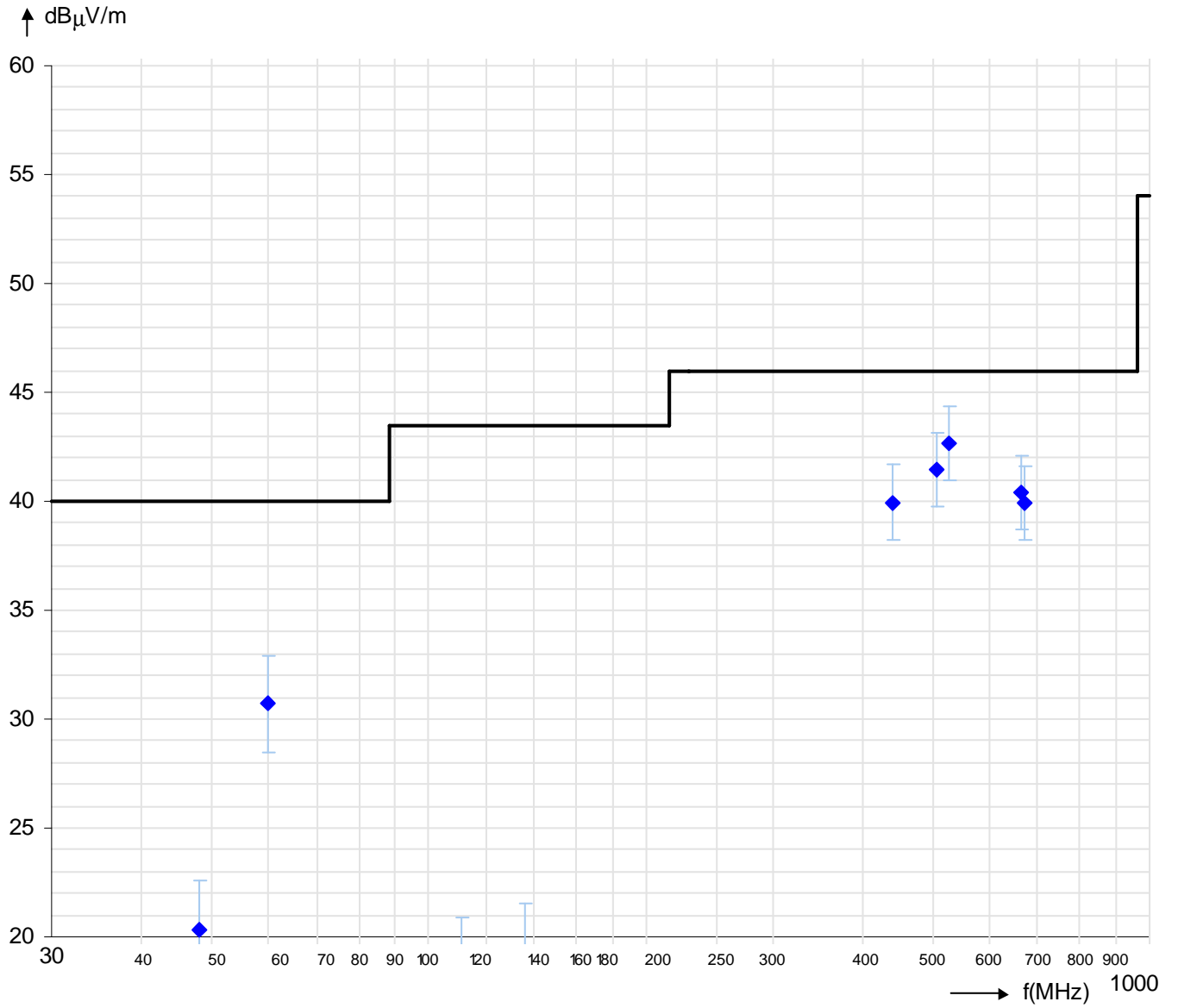


Readings - Antenna vertical polarized – Internal antenna

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.
48.040	10.6	8.7	1.1	20.4	40.0	19.6	1.0	V	180
60.000	21.1	8.4	1.2	30.7	40.0	9.3	1.0	V	180
111.160	7.1	9.9	1.7	18.7	43.5	24.8	1.0	V	130
135.870	5.9	11.6	1.8	19.3	43.5	24.2	1.0	V	130
440.200	19.7	16.8	3.4	40.0	46.0	6.0	1.0	V	145
506.230	20.2	17.6	3.7	41.5	46.0	4.5	1.0	V	145
528.260	21.0	17.9	3.8	42.7	46.0	3.3	1.0	V	210
665.150	16.4	19.7	4.3	40.4	46.0	5.6	1.0	V	170
672.100	15.7	19.9	4.3	39.9	46.0	6.1	1.0	V	170

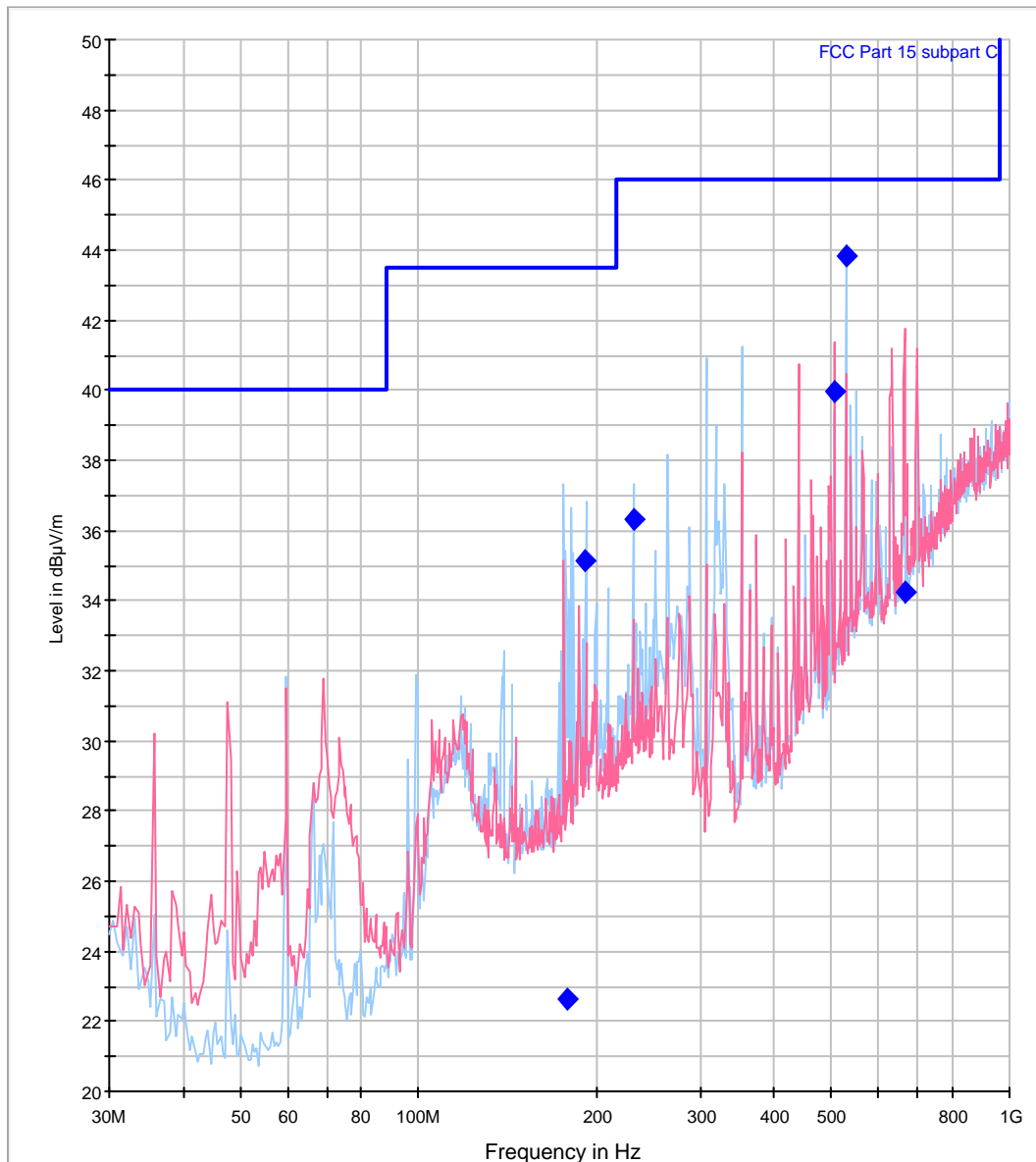
Diagram radio disturbances – Antenna vertical polarized – Internal antenna

Limits: Section 15.209* __



EUT Information

EUT Name: ARE H5 – FullISO/E/A/i/B/U/D/Le/PT1
 Test_ID: / SN: PRN12_07
 Customer: AEG ID GmbH
 Operational condition: Reading tag, half reading distance, telescopic antenna
 Test specification: FCC §15.209
 Antenna information: Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
 Operator: P. Hauser
 File #: AIN19_11
 Comment #1: X-axis



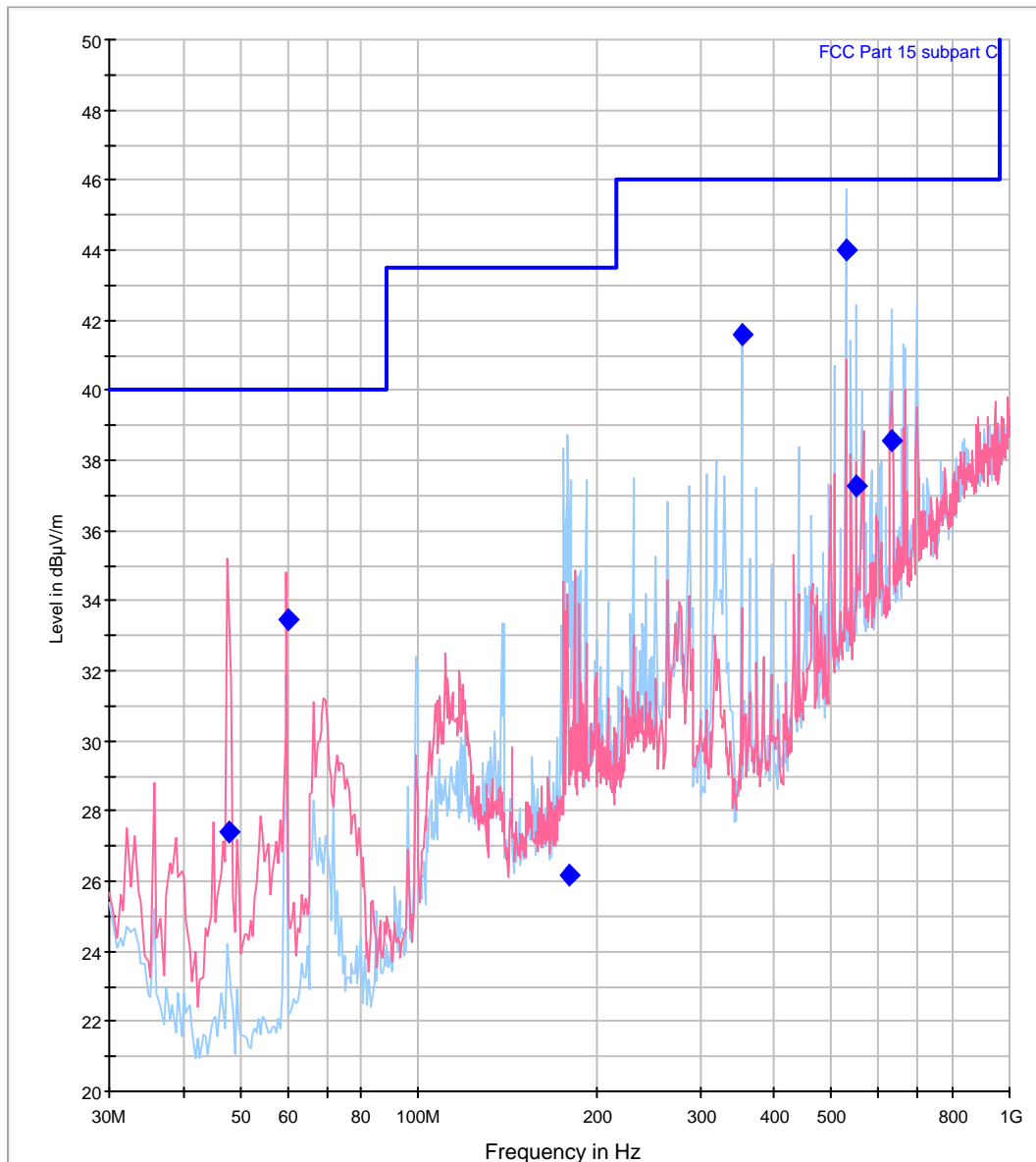
— FCC Part 15 subpart C [..EMI radiated] — Preview Result 1H-PK+ [Preview Result 1H.Result:2]
 — Preview Result 1V-PK+ [Preview Result 1V.Result:2] ◆ Final Result 1-QPK [Final Result 1.Result:1]

Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB μ V/m)
178.004008	22.6	120.000	167.0	H	108.0	14.4	20.9	43.5
192.016032	35.2	120.000	167.0	H	189.0	15.2	8.3	43.5
231.374750	36.3	120.000	208.0	H	50.0	17.6	9.7	46.0
506.252505	40.0	120.000	116.0	V	0.0	18.6	6.0	46.0
528.268537	43.8	120.000	159.0	H	74.0	19.3	2.2	46.0
665.026052	34.2	120.000	116.0	V	194.0	21.1	11.8	46.0

EUT Information

EUT Name:	ARE H5 – FullISO/E/A/i/B/U/D/Le/PT1
Test_ID: / SN:	PRN12_07
Customer:	AEG ID GmbH
Operational condition:	Reading tag, half reading distance, telescopic antenna
Test specification:	FCC §15.209
Antenna information:	Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
Operator:	P. Hauser
File #:	AIN19_12
Comment #1:	Y-axis



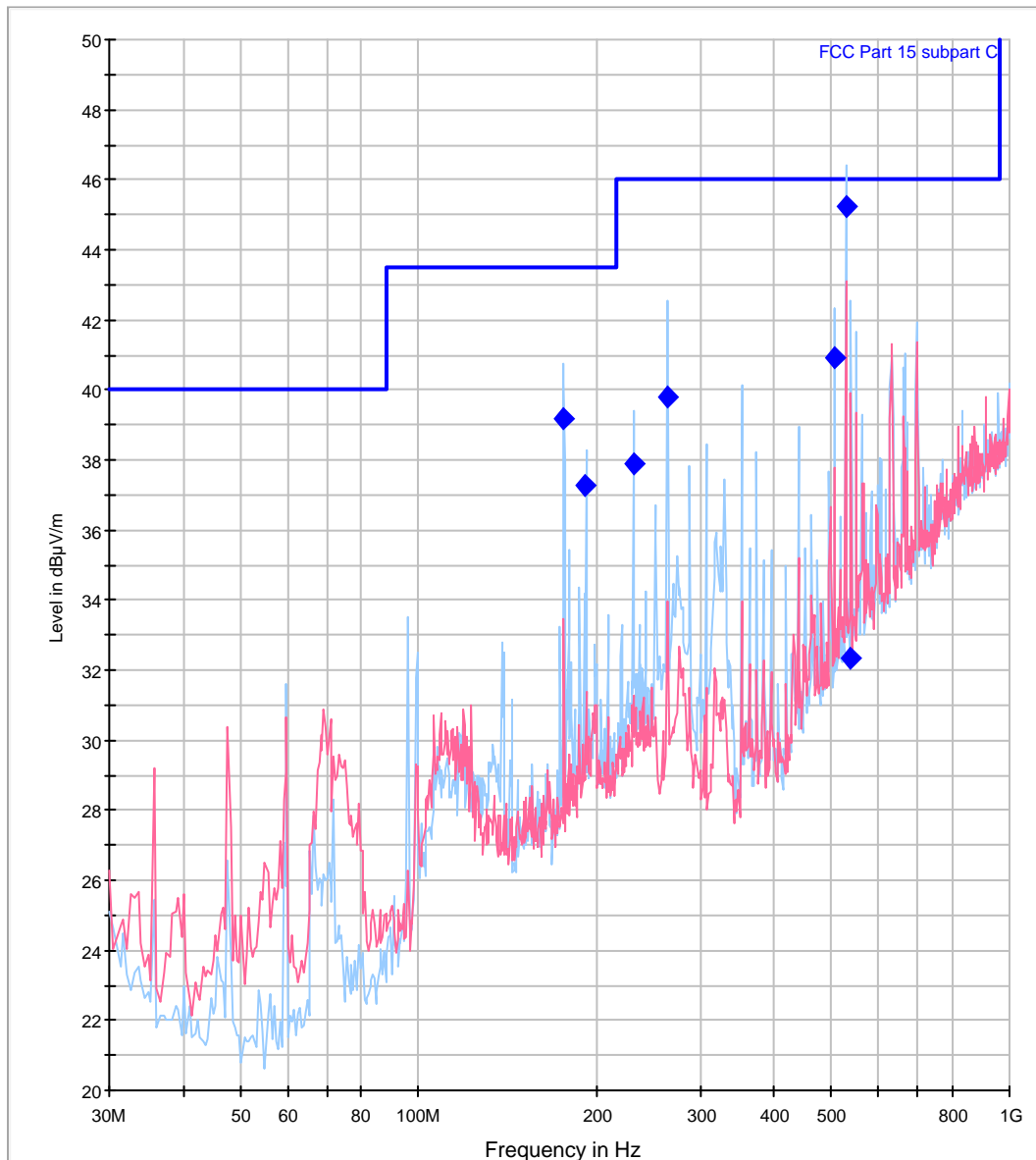
— FCC Part 15 subpart C [..EMI radiated]
— Preview Result 1V-PK+ [Preview Result 1V.Result:2]
◆ Preview Result 1H-PK+ [Preview Result 1H.Result:2]
◆ Final Result 1-QPK [Final Result 1.Result:1]

Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB μ V/m)
48.024049	27.4	120.000	167.0	V	161.0	8.9	12.6	40.0
60.008016	33.4	120.000	125.0	V	270.0	8.7	6.6	40.0
180.096192	26.2	120.000	168.0	H	45.0	14.5	17.3	43.5
352.160321	41.6	120.000	122.0	H	108.0	16.1	4.4	46.0
528.252505	44.0	120.000	220.0	H	234.0	19.3	2.0	46.0
550.260521	37.3	120.000	164.0	H	72.0	19.8	8.7	46.0
632.885771	38.5	120.000	164.0	H	291.0	20.6	7.5	46.0

EUT Information

EUT Name:	ARE H5 – FullISO/E/A/i/B/U/D/Le/PT1
Test_ID: / SN:	PRN12_07
Customer:	AEG ID GmbH
Operational condition:	Reading tag, half reading distance, telescopic antenna
Test specification:	FCC §15.209
Antenna information:	Distance EUT-Ant.: 3.0m / Polarisation: H/V / Ant.Height: 1.0-4.0m
Operator:	P. Hauser
File #:	AIN19_13
Comment #1:	Z-axis



— FCC Part 15 subpart C [..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]

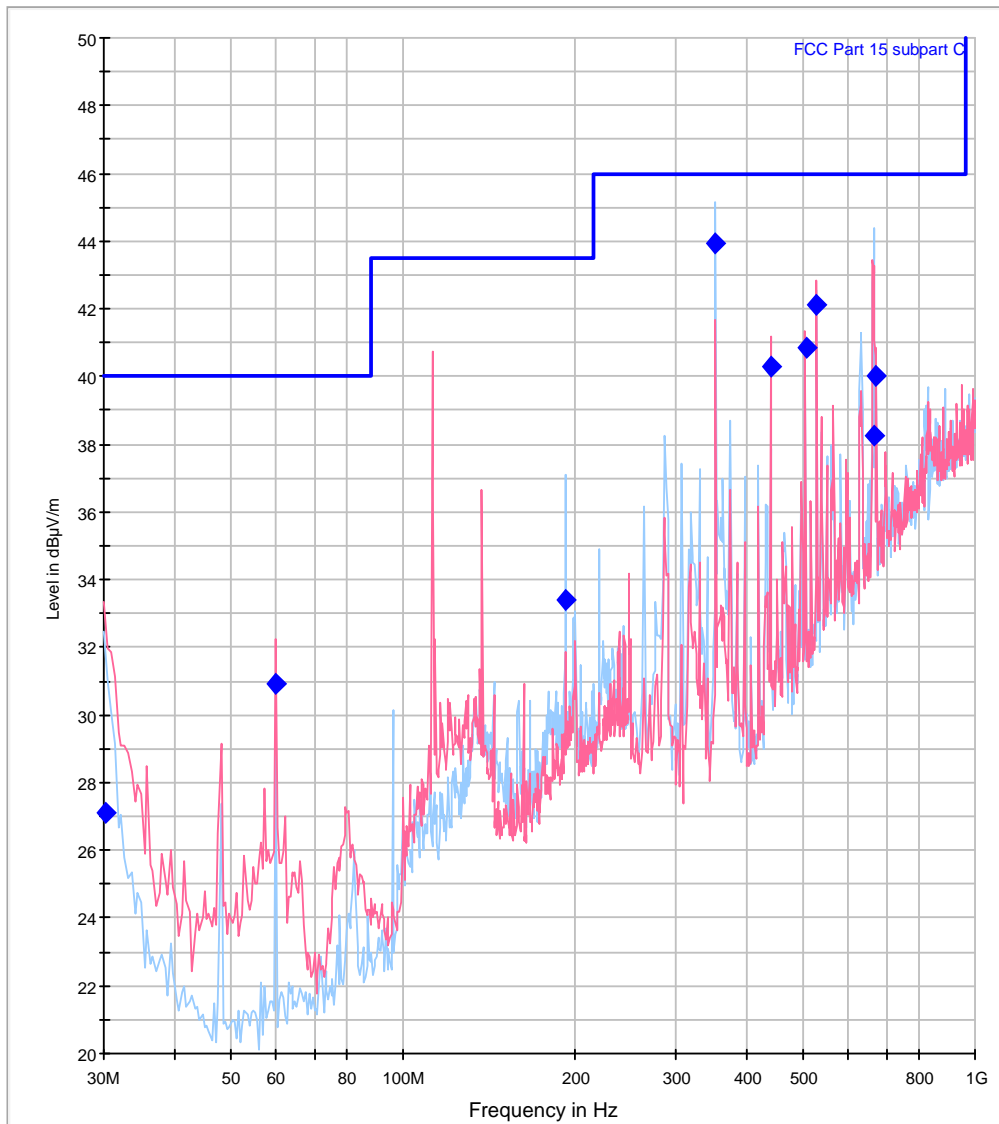
Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB μ V/m)
176.088177	39.2	120.000	172.0	H	284.0	14.2	4.3	43.5
192.000000	37.3	120.000	172.0	H	36.0	15.2	6.2	43.5
231.374749	37.9	120.000	214.0	H	350.0	17.6	8.1	46.0
264.140280	39.8	120.000	122.0	H	160.0	15.0	6.2	46.0
506.252505	40.9	120.000	220.0	H	24.0	18.6	5.1	46.0
528.260521	45.2	120.000	164.0	H	169.0	19.3	0.8	46.0
539.030060	32.3	120.000	164.0	H	178.0	19.3	13.7	46.0

EUT Information

EUT Name: ARE H5 - FullISO/E/A/i/B/U/D/Le/PT1
 Test_ID / SN: PRN12_07
 Customer: AEG ID GmbH
 Operational condition: Reading tag, half reading distance, internal antenna
 Test specification: 47 CFR §15.209
 Antenna information: Distance EUT-Ant.: 3.0 m / Polarisation: H/V / Ant.Height: 1.0-4.0 m
 Operator: P. Hauser
 File #: AIN19_11a
 Comment #1:
 Comment #2: X-axis

Electric Field Strength with Sweep_SAC2_FCC



— FCC Part 15 subpart C [..NEM 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]

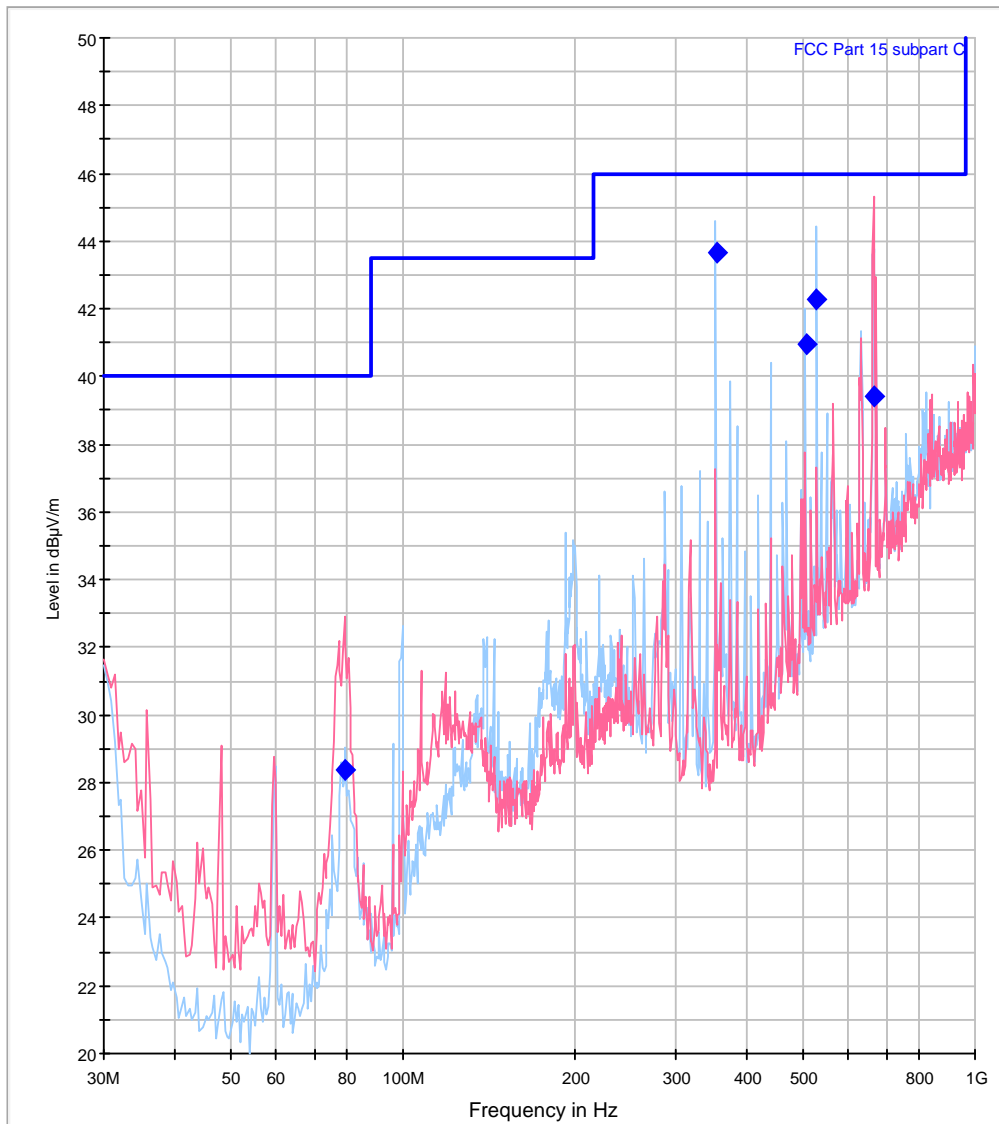
Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)
30.324649	27.1	5000.0	120.000	270.2	H	174.0	12.5	12.9
48.048096	19.9	5000.0	120.000	119.9	V	207.0	8.9	20.1
60.000000	30.9	5000.0	120.000	119.9	V	272.0	8.7	9.1
111.166333	17.1	5000.0	120.000	270.3	V	244.0	10.4	26.4
135.879759	15.8	5000.0	120.000	270.3	V	224.0	12.1	27.7
191.983968	33.4	5000.0	120.000	219.8	H	273.0	15.2	10.1
352.152305	43.9	5000.0	120.000	119.8	H	260.0	16.1	2.1
440.200401	40.3	5000.0	120.000	170.1	V	186.0	17.9	5.7
506.236473	40.8	5000.0	120.000	119.8	V	284.0	18.6	5.2
528.260521	42.1	5000.0	120.000	119.8	V	289.0	19.3	3.9
665.150300	38.3	5000.0	120.000	270.0	V	178.0	21.1	7.7
672.100200	40.0	5000.0	120.000	270.0	V	202.0	21.4	6.0

EUT Information

EUT Name: ARE H5 - FullISO/E/A/i/B/U/D/Le/PT1
 Test_ID: / SN: PRN12_07
 Customer: AEG ID GmbH
 Operational condition: Field on, no tag in field, internal antenna
 Test specification: 47 CFR §15.209
 Antenna information: Distance EUT-Ant.: 3.0m / Polarisation: V / Ant.Height: 1.0m
 Operator: P. Hauser
 File #: AIN19_11b
 Comment #1:
 Comment #2: Y-axis

Electric Field Strength with Sweep_SAC2_FCC



— FCC Part 15 subpart C [..NEM 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]

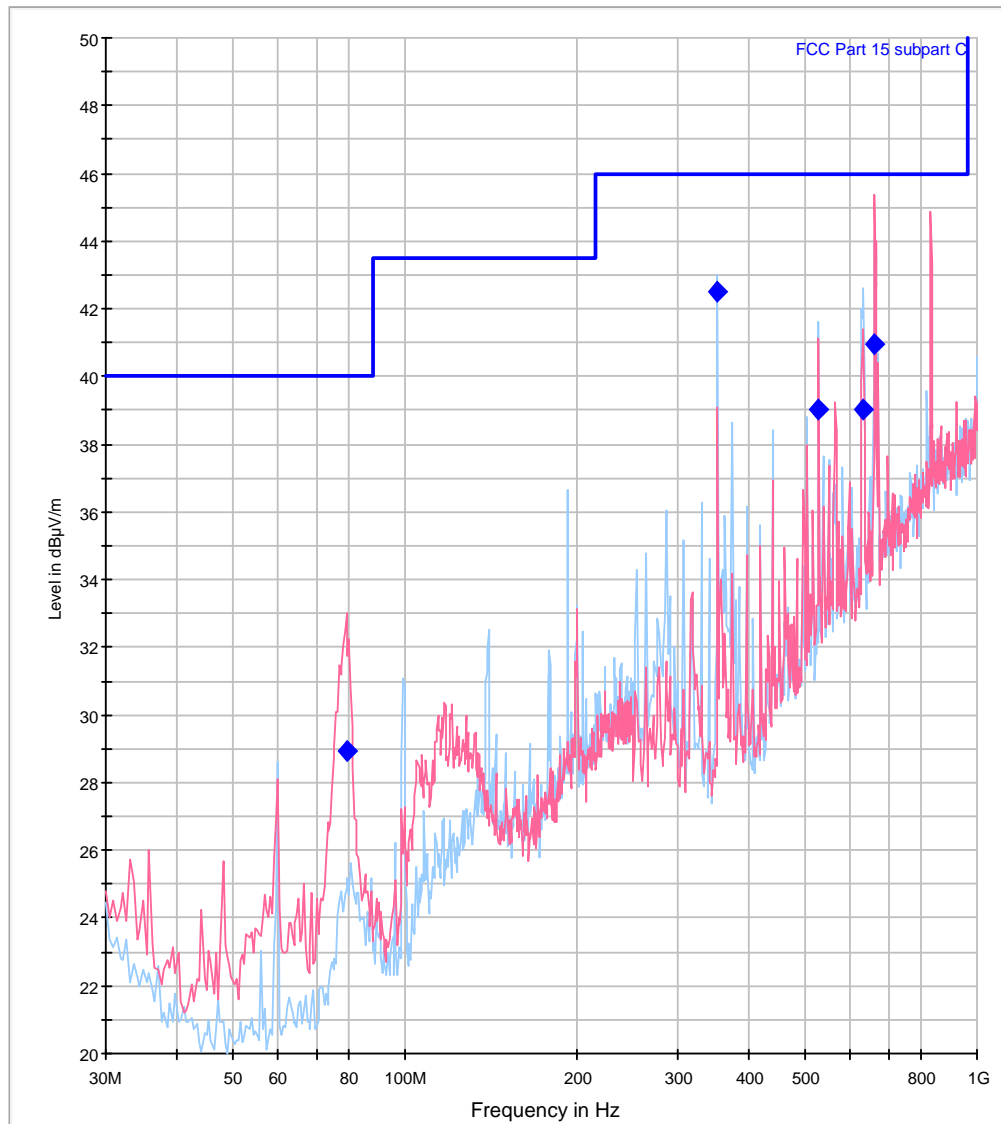
Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Limit (dB μ V/m)	Margin (dB)
78.917836	28.4	5000.0	120.000	220.3	V	223.0	9.1	40.0	11.6
353.555110	43.6	5000.0	120.000	119.8	H	162.0	16.3	46.0	2.4
506.917836	41.0	5000.0	120.000	220.3	H	123.0	18.6	46.0	5.0
528.412825	42.3	5000.0	120.000	220.3	H	115.0	19.3	46.0	3.7
664.841683	39.4	5000.0	120.000	120.0	V	209.0	21.1	46.0	6.6

EUT Information

EUT Name: ARE H5 - FullISO/E/A/i/B/U/D/Le/PT1
 Test_ID / SN: PRN12_07
 Customer: AEG ID GmbH
 Operational condition: Field on, no tag in field, internal antenna
 Test specification: 47 CFR §15.209
 Antenna information: Distance EUT-Ant.: 3.0 m / Polarisation: H/V / Ant.Height: 1.0-4.0 m
 Operator: P. Hauser
 File #: AIN19_11c
 Comment #1:
 Comment #2: Z-axis

Electric Field Strength with Sweep_SAC2_FCC



— FCC Part 15 subpart C [..NEM 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 (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Limit (dB μ V/m)	Margin (dB)
78.965932	28.9	5000.0	120.000	170.2	V	228.0	9.1	40.0	11.1
352.168337	42.5	5000.0	120.000	119.7	H	162.0	16.1	46.0	3.5
528.260521	39.0	5000.0	120.000	170.3	V	27.0	19.3	46.0	7.0
630.268537	39.0	5000.0	120.000	170.1	H	244.0	20.5	46.0	7.0
662.609218	40.9	5000.0	120.000	119.9	V	207.0	21.1	46.0	5.1

Final Result 1 – BT harmonics – telescopic antenna

Frequency (GHz)	Peak (dB μ V/m)	Average (dB μ V/m)	Bandwidth (MHz)	Height (cm)	Polarization	Limit PK (dB μ V/m)	Margin - PK (dB)
4.904	41.9		1.0	120.0	H	74.0	32.1
7.356	<54		1.0	120.0	H	74.0	≥ 20
9.808	<54		1.0	120.0	H	74.0	≥ 20
12.260	<54		1.0	120.0	H	74.0	≥ 20
14.712	<54		1.0	120.0	H	74.0	≥ 20
17.164	<60		1.0	120.0	H	74.0	≥ 14
19.616	<60		1.0	120.0	H	74.0	≥ 14
22.068	<60		1.0	120.0	H	74.0	≥ 14
24.520	<60		1.0	120.0	H	74.0	≥ 14

Final Result 1 – BT harmonics – internal antenna

Frequency (GHz)	Peak (dB μ V/m)	Average (dB μ V/m)	Bandwidth (MHz)	Height (cm)	Polarization	Limit PK (dB μ V/m)	Margin - PK (dB)
4.904	41.9		1.0	120.0	H	74.0	32.1
7.356	<54		1.0	120.0	H	74.0	≥ 20
9.808	<54		1.0	120.0	H	74.0	≥ 20
12.260	<54		1.0	120.0	H	74.0	≥ 20
14.712	<54		1.0	120.0	H	74.0	≥ 20
17.164	<60		1.0	120.0	H	74.0	≥ 14
19.616	<60		1.0	120.0	H	74.0	≥ 14
22.068	<60		1.0	120.0	H	74.0	≥ 14
24.520	<60		1.0	120.0	H	74.0	≥ 14

1.1.2.4 Restricted bands of operation

Regulation

47 CFR Part 15 Subpart C - 04/2016

- 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: 7.2VDC 240V/60Hz
Rated voltage variation: 85% 115%

Continuous operation of the RFID reader supplied by the internal battery and connected to the laptop USB-port.

RFID tag placed at approx. of the half reading distance. The Bluetooth module was configured as "Master" and active. During the test the remote station was removed from the laptop and the Bluetooth module was polling for a BT device. RFID and Bluetooth module were active at the same time. The test was executed with external telescopic antenna as well as with internal antenna.

Environmental conditions

- Temperature [10 - 40°C]: 23°C
Relative humidity [10 - 90%]: 44%
- 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 – telescopic antenna

Measured fundamental: 0.13422MHz
20dB-Emission Bandwidth: 0.598kHz

Fundamental out
of restricted bands: kept
 not kept

Limit spurious emission: kept
 not kept

Test result – internal antenna

Measured fundamental: 0.13422MHz
20dB-Emission Bandwidth: 0.659kHz

Fundamental out
of restricted bands: kept
 not kept

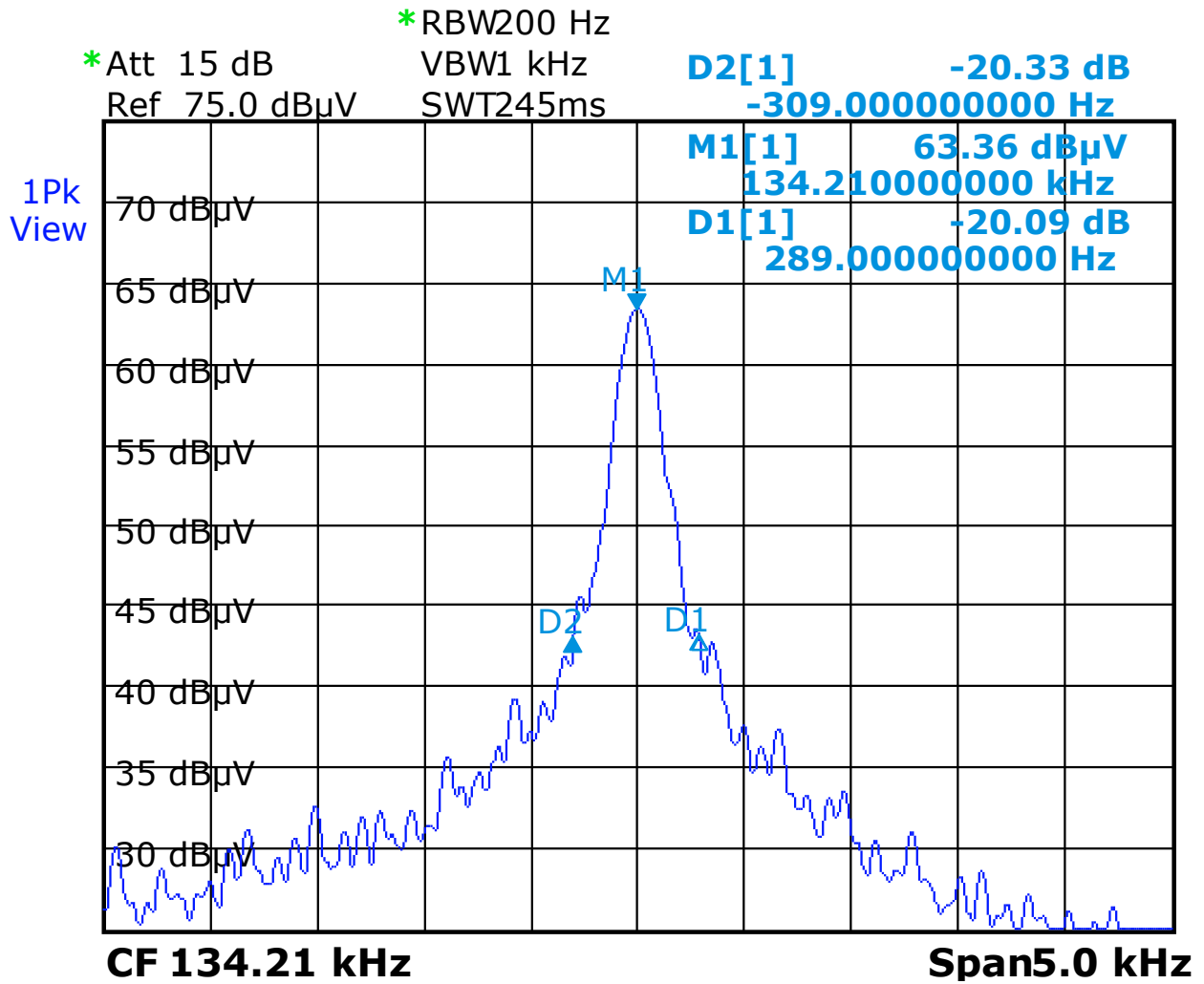
Limit spurious emission: kept
 not kept

Remarks: n/a

Protocol scope

Diagram – 20dB-Emission bandwidth.

Occupied bandwidth – Telescopic antenna

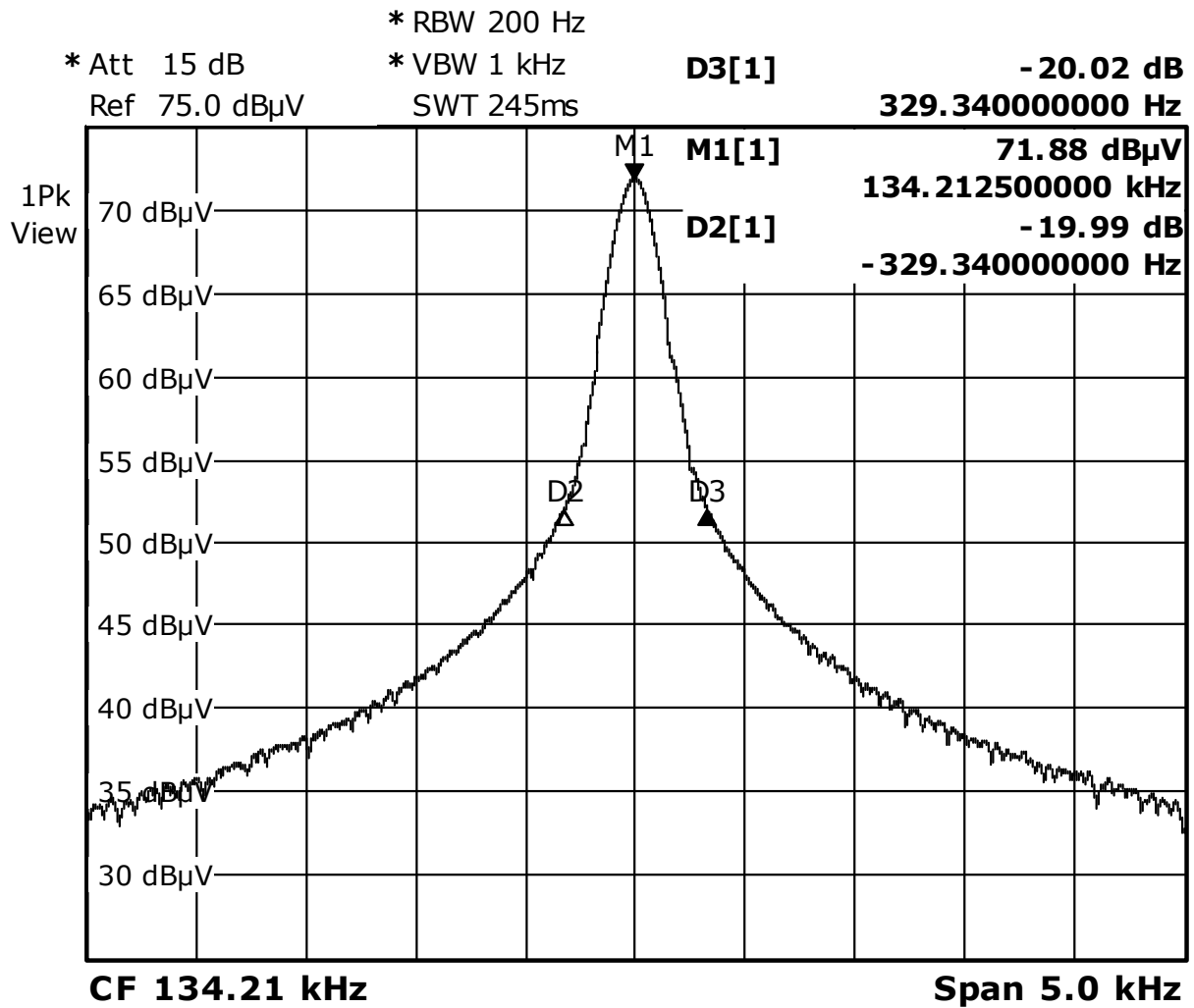


PRN12_06, ARE H5 - FullISO/E/A/i/B/U/D/Le/PT1

Date: 23.MAR.2016 09:42:36

Occupied bandwidth BW = D1 - D2 = 0.309kHz - -0.289kHz=0.598kHz

Occupied bandwidth – Internal antenna



PRN12_07, ARE H5 internal Antenna

Date: 22.NOV.2016 17:25:25

Occupied bandwidth BW = D3 - D2 = 0.32934kHz - -0.32934kHz=0.659kHz

1.1.2.5 Antenna requirement

Regulation

47 CFR Part 15 Subpart C - 04/2016

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 – Type PT1

Remarks: n/a

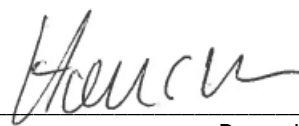
2 Summary

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	Informative
Radiated emissions 0.009-30MHz	Section 15.209	Limits kept	
Radiated emissions 30-1000MHz 1-25GHz	Section 15.209	Limits kept	
Occupied bandwidth	Section 15.215(c)	n. r.	
Restricted bands	Section 15.205(a)	Requirement kept	
Antenna requirement	Section 15.203	Requirement kept	

n. r. – not relevant

Burgrieden, 2016-12-06

Report generated by:



Acceptance inspector – Peter Hauser