

Annex 1: Measurement diagrams to
TEST REPORT
No.: 18-1-0035701T01a

According to:

FCC Regulations
Part 15, Subpart C

for

Huf Tools GmbH Velbert

Keyreader Daimler LFSPG-MH

FCC ID: PD6LFSPGMH

Laboratory Accreditation
 Deutsche Akkreditierungsstelle D-PL-12047-01-01 D-PL-12047-01-03 D-PL-12047-01-04
accredited according to DIN EN ISO/IEC 17025
CETECOM GmbH Laboratory Radio Communications & Electromagnetic Compatibility Im Teelbruch 116 • 45219 Essen • Germany Registered in Essen, Germany, Reg. No.: HRB Essen 8984 Tel.: + 49 (0) 20 54 / 95 19-954 • Fax: + 49 (0) 20 54 / 95 19-964 E-mail: info@cetecom.com • Internet: www.cetecom.com

Table of contents

1. MEASUREMENT DIAGRAMS.....	3
1.1. Emission requirements on AC-mains	3
1.2. H-Field requirements	6
1.3. Radiated spurious emission 9 kHz – 30 MHz (FCC).....	10
1.4. Radiated spurious emission 30 MHz – 1GHz (FCC).....	11
1.5. Occupied bandwidth	12

1. Measurement diagrams

1.1. Emission requirements on AC-mains

1.01

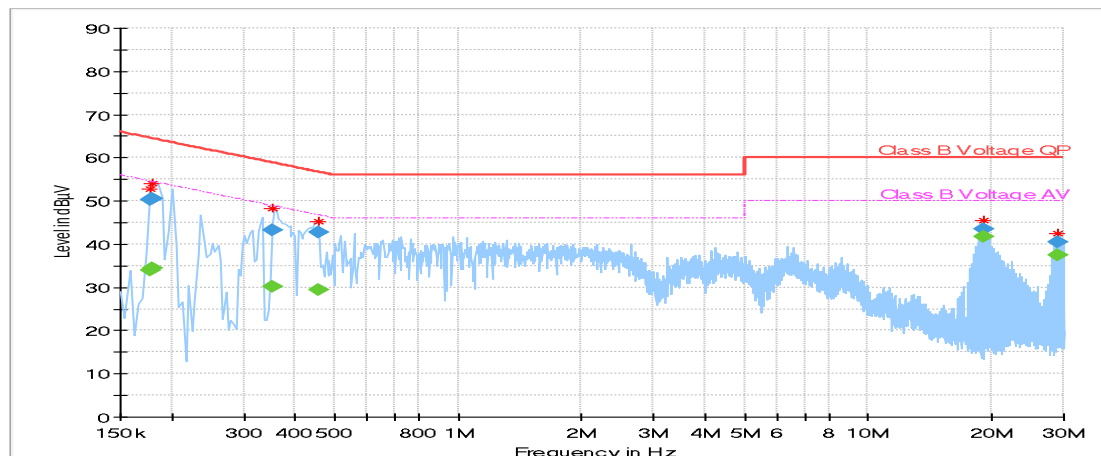
Common Information

Test Description:	Conducted Voltage Measurement Class B
Test Site & Location:	Conducted Emission, CETECOM GmbH Essen
Test Software:	R&S EMC32 v9.15
Test Specification:	FCC 15.107, FCC 15.207
Operating Mode:	120KHz + 21,8KHz + Key 21.8 (without PC)
Measured on line:	N/L1
Diagram details:	Shows the peak values as a sum of measured ports in maxhold mode
Environmental Conditions:	Humidity: 40%rH; Temperature: 22°C
Operator:	JVo
Comments:	12V over 120V AC

EUT Information

Manufacturer:	HUF Tools GmbH Velbert
Model:	LFSPG-MH
Type:	Key Reader
HW:	2.0
SW:	9
Serial Nr.:	4151800020
Power Supply:	12V DC via AC/DC Adapter

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Corr. (dB)
0.178281	---	33.87	54.57	20.70	9.000	0.1
0.178281	50.29	---	64.57	14.28	9.000	0.1
0.178750	---	34.44	54.54	20.10	9.000	0.1
0.178750	50.53	---	64.54	14.01	9.000	0.1
0.354531	43.13	---	58.86	15.73	9.000	0.1
0.354531	---	30.22	48.86	18.64	9.000	0.1
0.456094	42.63	---	56.76	14.13	9.000	0.1
0.456094	---	29.51	46.76	17.25	9.000	0.1
19.077188	---	41.73	50.00	8.27	9.000	0.8
19.077188	43.39	---	60.00	16.61	9.000	0.8
28.917031	---	37.55	50.00	12.45	9.000	0.8
28.917031	40.58	---	60.00	19.42	9.000	0.8

1.02

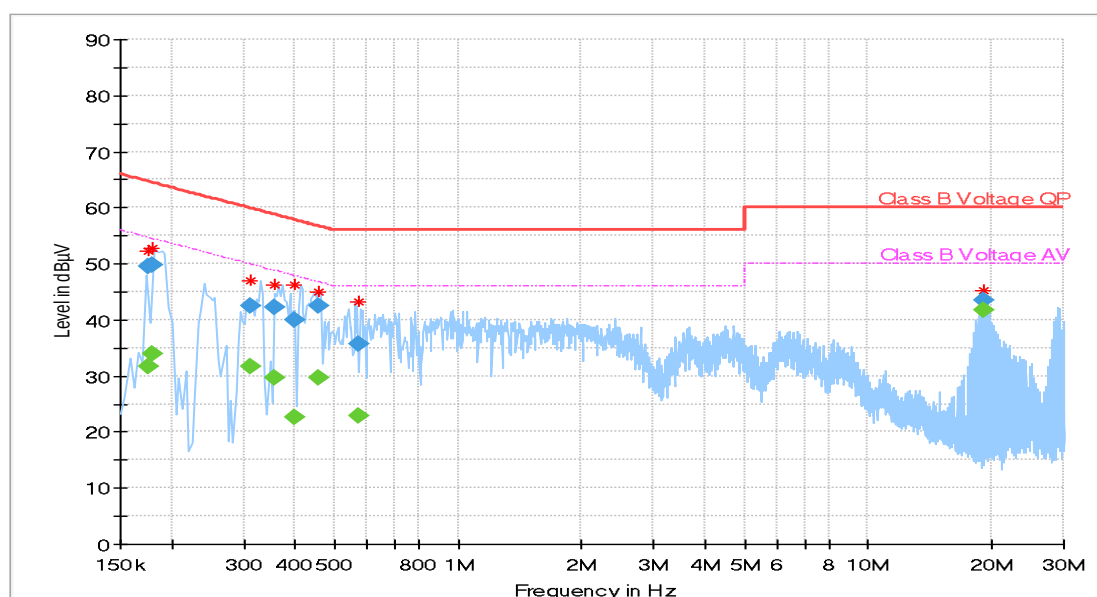
Common Information

Test Description:	Conducted Voltage Measurement Class B
Test Site & Location:	Conducted Emission, CETECOM GmbH Essen
Test Software:	R&S EMC32 v9.15
Test Specification:	FCC 15.107, FCC 15.207
Operating Mode:	120KHz + 21,8KHz + without PC, without key
Measured on line:	N/L1
Diagram details:	Shows the peak values as a sum of measured ports in maxhold mode
Environmental Conditions:	Humidity: 40%rH; Temperature: 22°C
Operator:	JVo
Comments:	12V over 120V AC

EUT Information

Manufacturer:	HUF Tools GmbH Velbert
Model:	LFSPG-MH
Type:	Key Reader
HW:	2.0
SW:	9
Serial Nr.:	4151800020
Power Supply:	12V DC via AC/DC Adapter

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Corr. (dB)
0.176563	49.53	---	64.65	15.12	9.000	0.1
0.176563	---	31.57	54.65	23.08	9.000	0.1
0.178750	49.89	---	64.54	14.65	9.000	0.1
0.178750	---	33.87	54.54	20.67	9.000	0.1
0.312188	---	31.74	49.91	18.17	9.000	0.2
0.312188	42.38	---	59.91	17.53	9.000	0.2
0.355156	---	29.76	48.84	19.08	9.000	0.1
0.355156	42.28	---	58.84	16.56	9.000	0.1
0.399219	39.90	---	57.87	17.97	9.000	0.1
0.399219	---	22.75	47.87	25.12	9.000	0.1
0.455000	---	29.66	46.78	17.12	9.000	0.1
0.455000	42.50	---	56.78	14.28	9.000	0.1
0.572656	35.67	---	56.00	20.33	9.000	0.1
0.572656	---	22.90	46.00	23.10	9.000	0.1
19.077188	---	41.71	50.00	8.29	9.000	0.8
19.077188	43.41	---	60.00	16.59	9.000	0.8

1.03

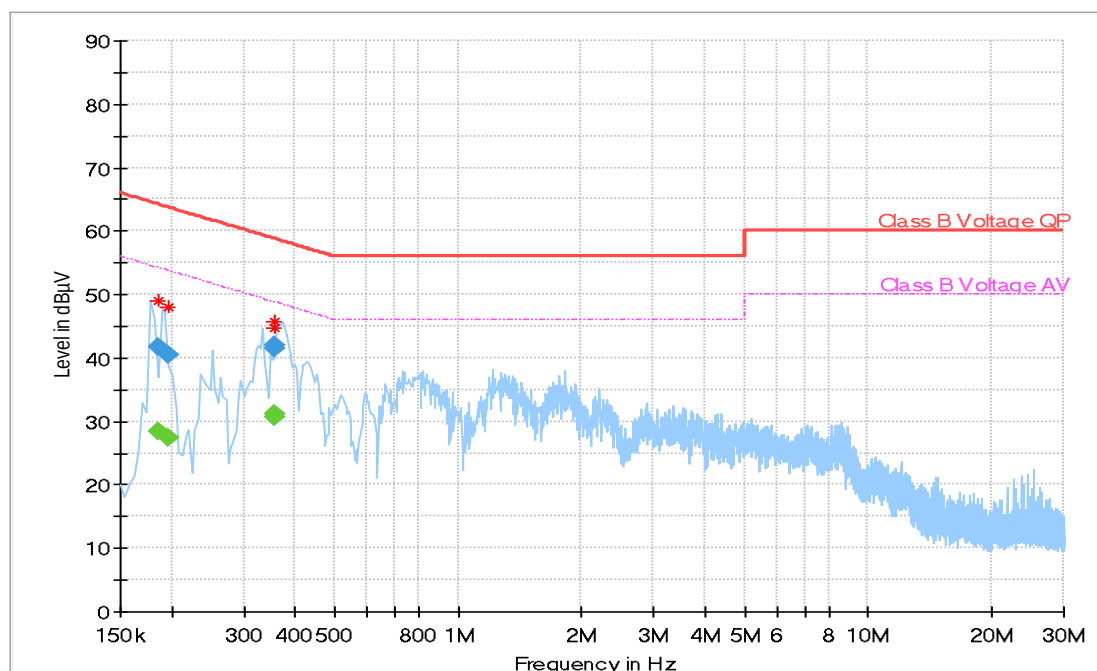
Common Information

Test Description: Conducted Voltage Measurement Class B
 Test Site & Location: Conducted Emission, CETECOM GmbH Essen
 Test Software: R&S EMC32 v9.15
 Test Specification: FCC 15.107, FCC 15.207
 Operating Mode: 120KHz + 125KHz + without PC, with key 21.8
 Measured on line: N/L1
 Diagram details: Shows the peak values as a sum of measured ports in maxhold mode
 Environmental Conditions: Humidity: 40%rH; Temperature: 22°C
 Operator: JVo
 Comments: 12V over 120V AC

EUT Information

Manufacturer: HUF Tools GmbH Velbert
 Model: LFSPG-MH
 Type: Key Reader
 HW: 2.0
 SW: 9
 Serial Nr.: 4151800020
 Power Supply: 12V DC via AC/DC Adapter

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Corr. (dB)
0.184844	---	28.52	54.27	25.75	9.000	0.1
0.184844	41.72	---	64.27	22.55	9.000	0.1
0.196563	40.51	---	63.75	23.24	9.000	0.1
0.196563	---	27.43	53.75	26.32	9.000	0.1
0.355156	---	30.64	48.84	18.20	9.000	0.1
0.355156	41.50	---	58.84	17.34	9.000	0.1
0.356094	41.88	---	58.82	16.94	9.000	0.1
0.356094	---	31.17	48.82	17.65	9.000	0.1

1.2. H-Field requirements

1.2.1. Channel 21.8 kHz - Op. Mode 1 (TX-transmitter only)

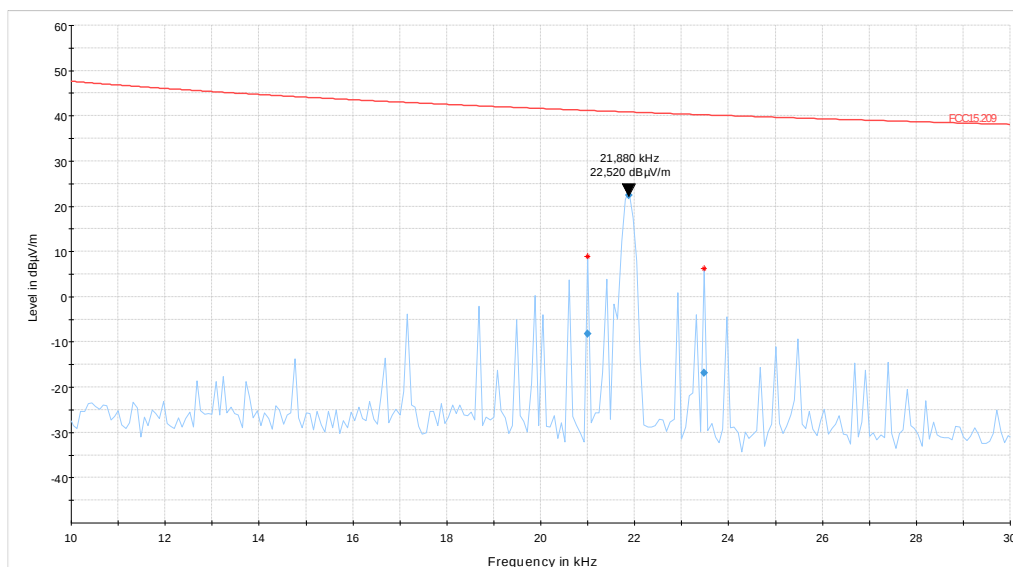


Diagram No. 2.01_standing_TXMode

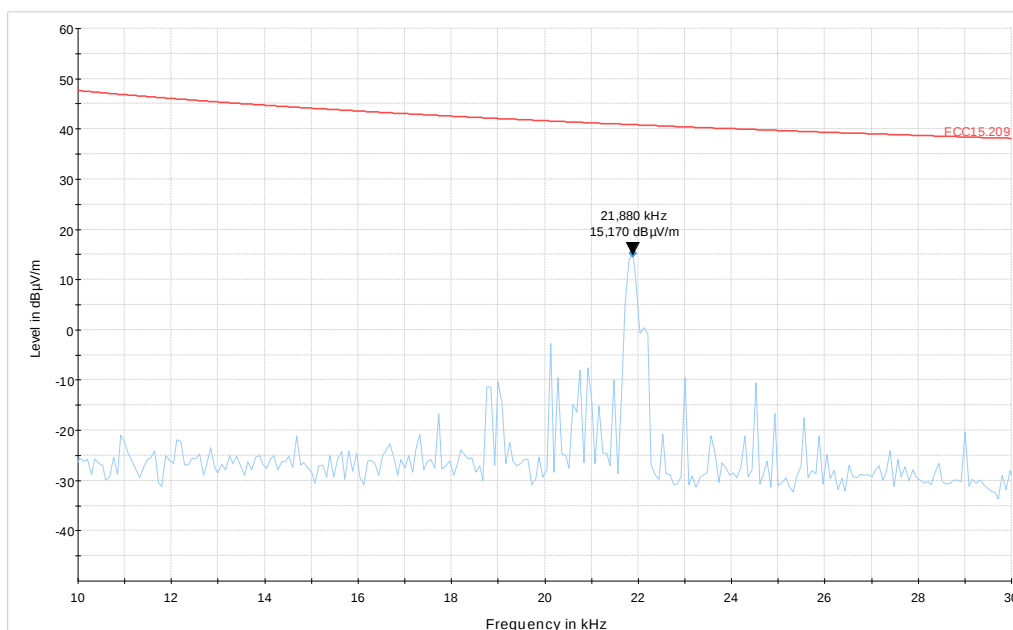


Diagram No.: 2.02_laying_TXMode

1.2.2. Channel 21.8 kHz - Op. Mode 3 (TX/RX-transmitter and receiver)

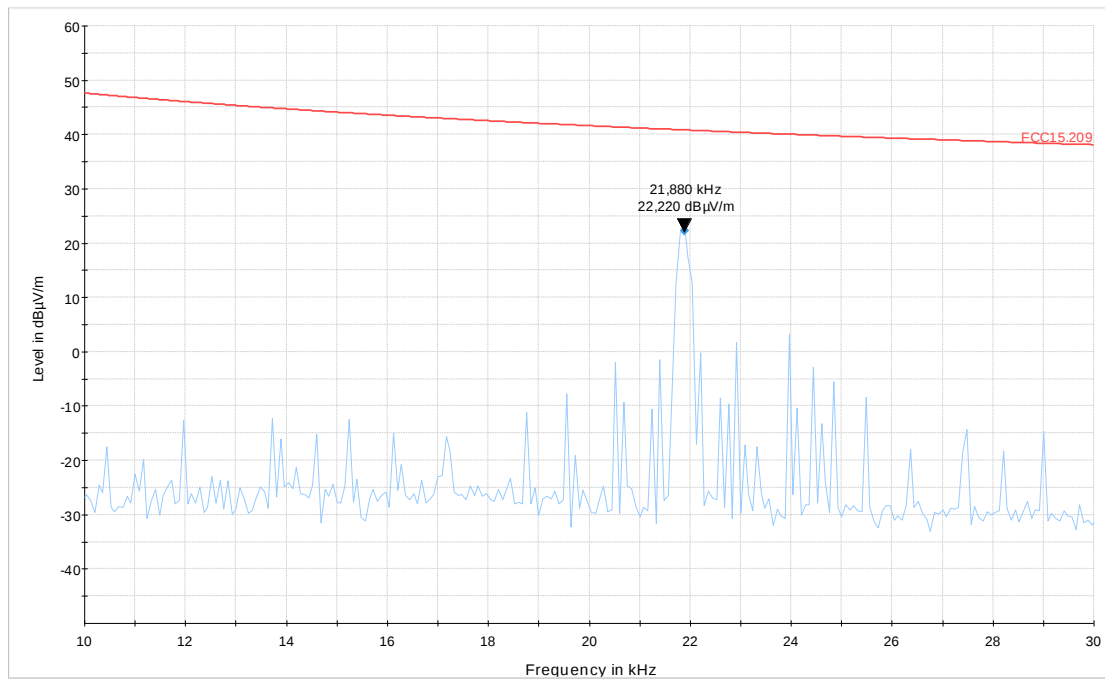


Diagram No. 2.01b_standing_TXRX_Mode

1.2.3. Channel 125 kHz - Op. Mode 2 (TX-transmitter only)

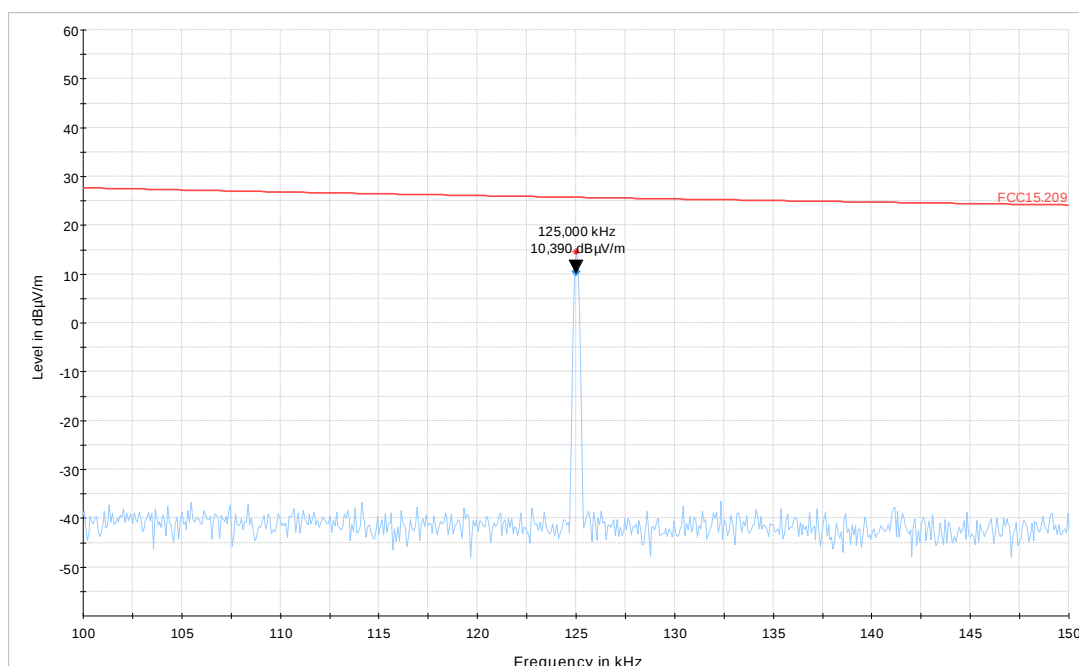


Diagram No. 2.03_standing_TXMode

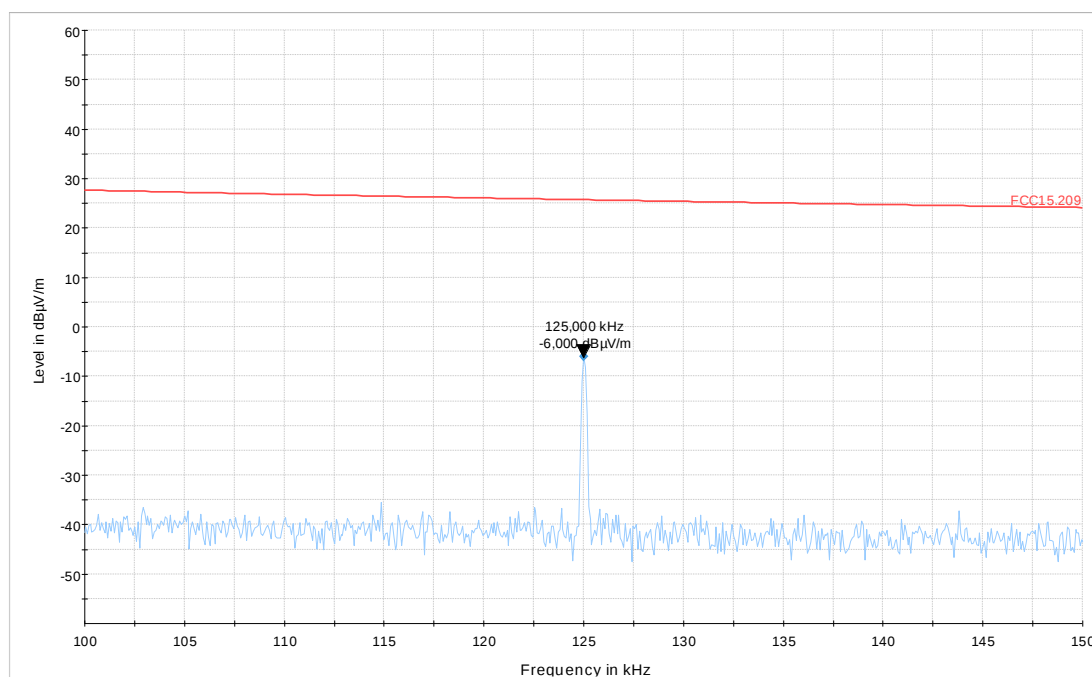


Diagram No.: 2.04_laying_TXMode

1.2.4. Channel 120 kHz - Op. Mode 2 (TX-transmitter only)

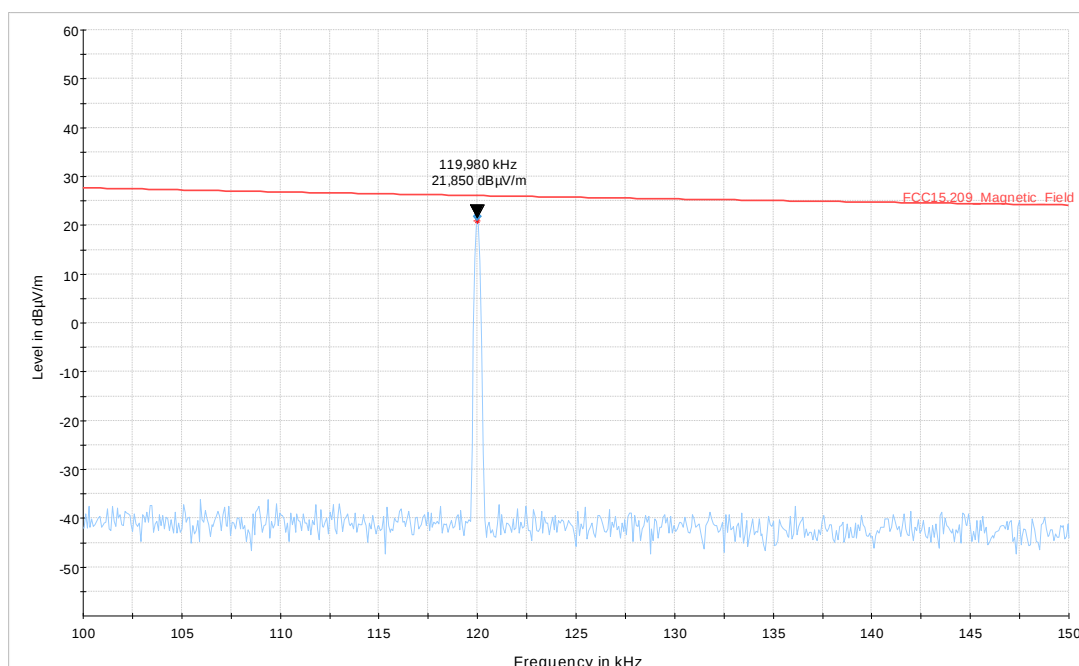


Diagram No. 2.09_standing_TXMode

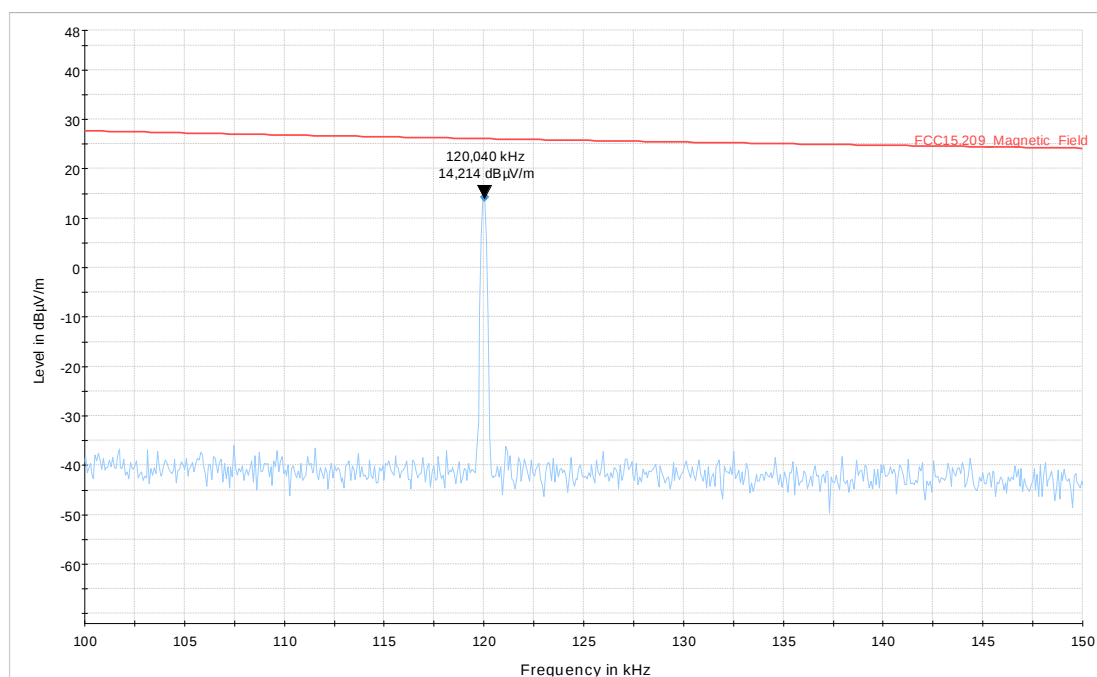


Diagram No.: 2.08_laying_TXMode

1.3. Radiated spurious emission 9 kHz – 30 MHz (FCC)

Diagram No. 2.05_TX_21.8kHz_120kHz_standing

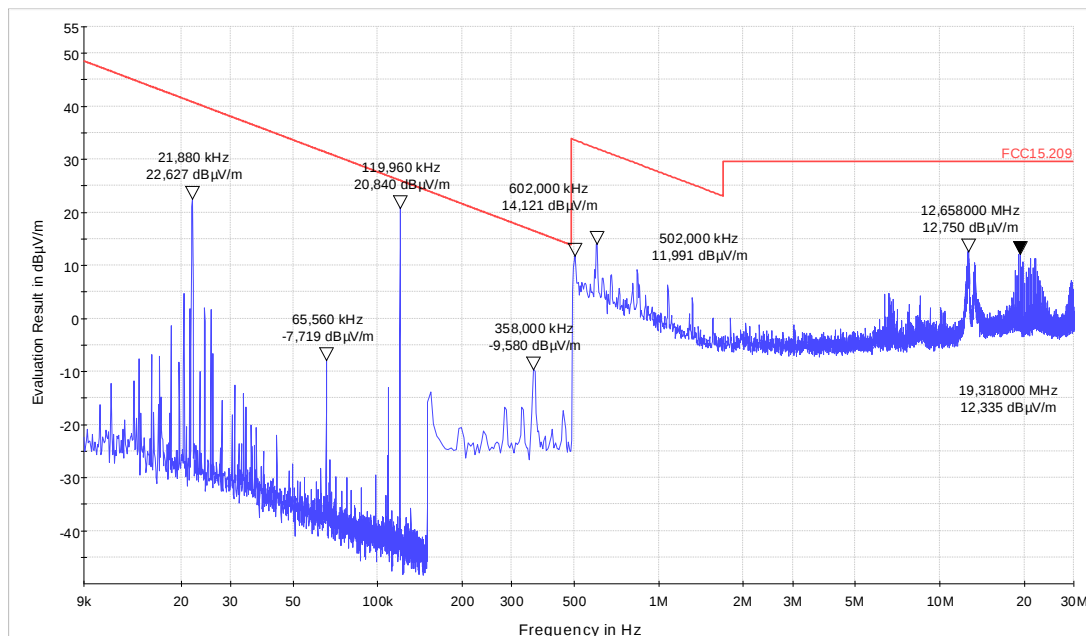
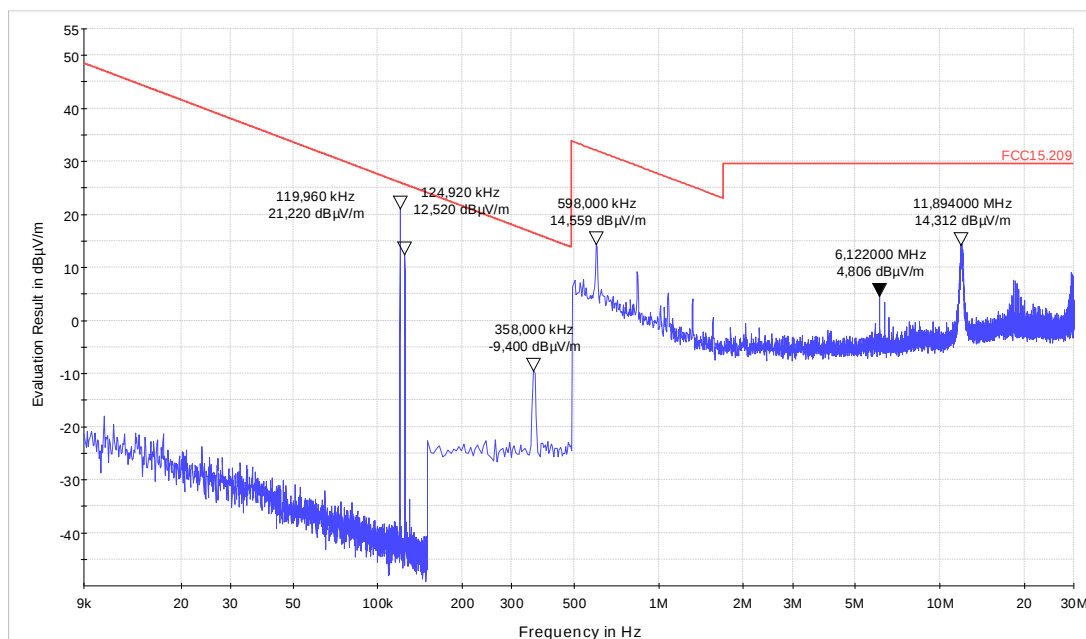


Diagram No. 2.06_TX_125kHz_120kHz_standing



1.4. Radiated spurious emission 30 MHz – 1GHz (FCC)

Diagram No. 3.01. _TX_21.8kHz_120kHz_Standing

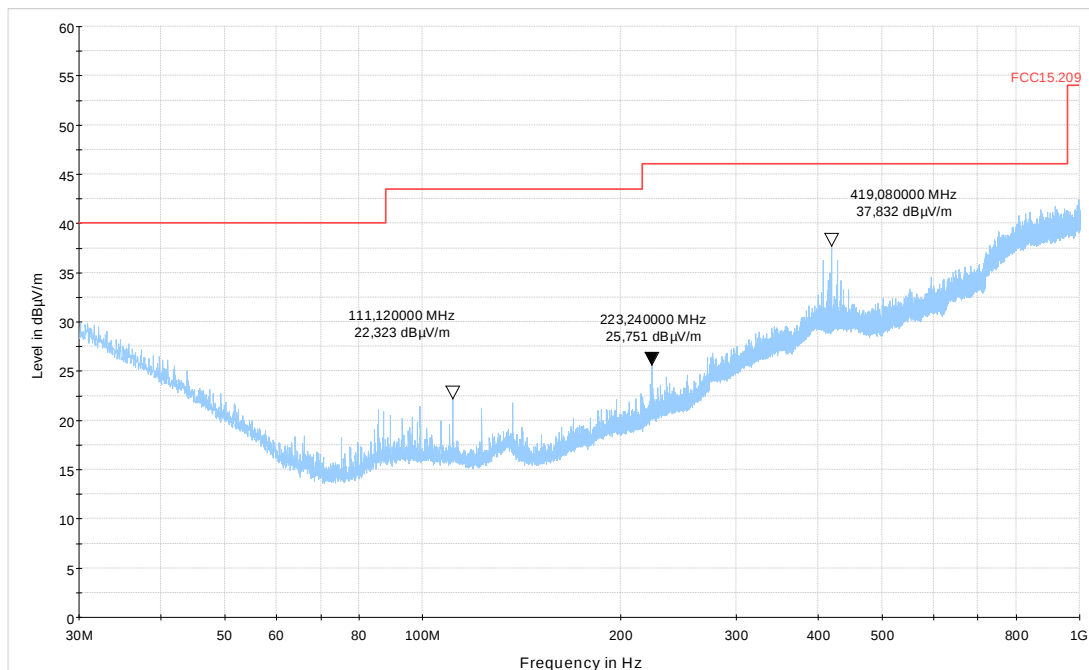
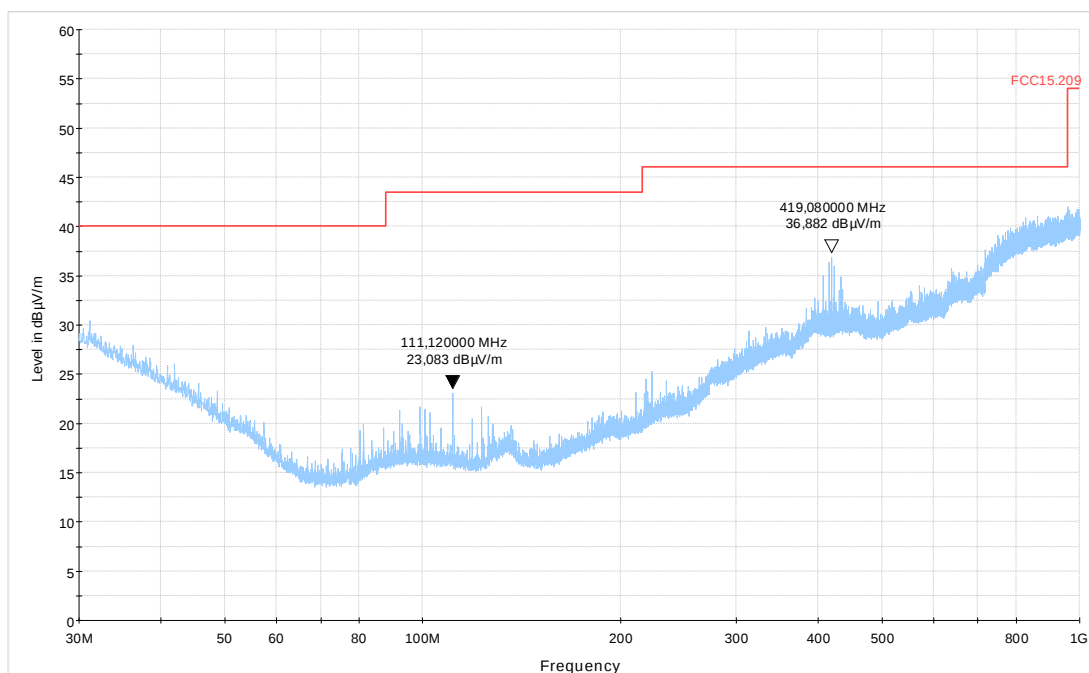
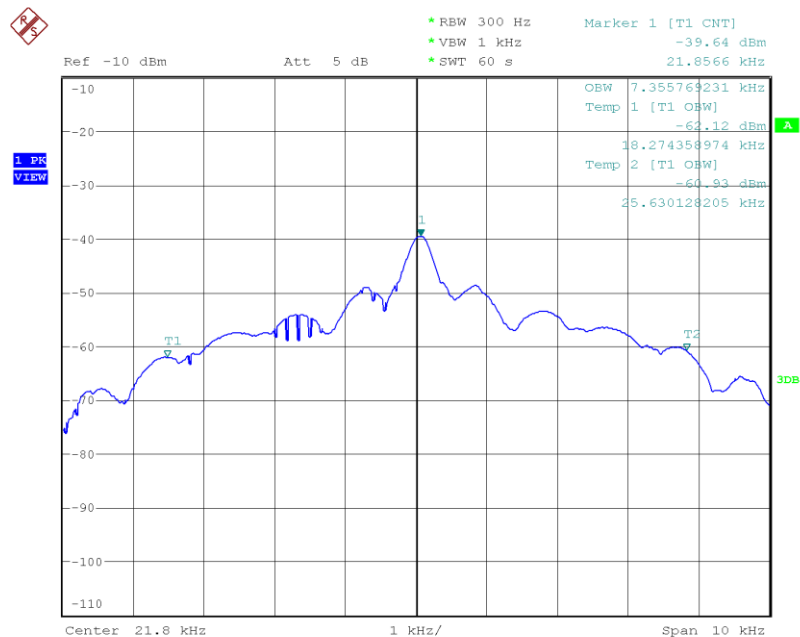


Diagram No. 3.02. _TX_125kHz_120kHz_Standing

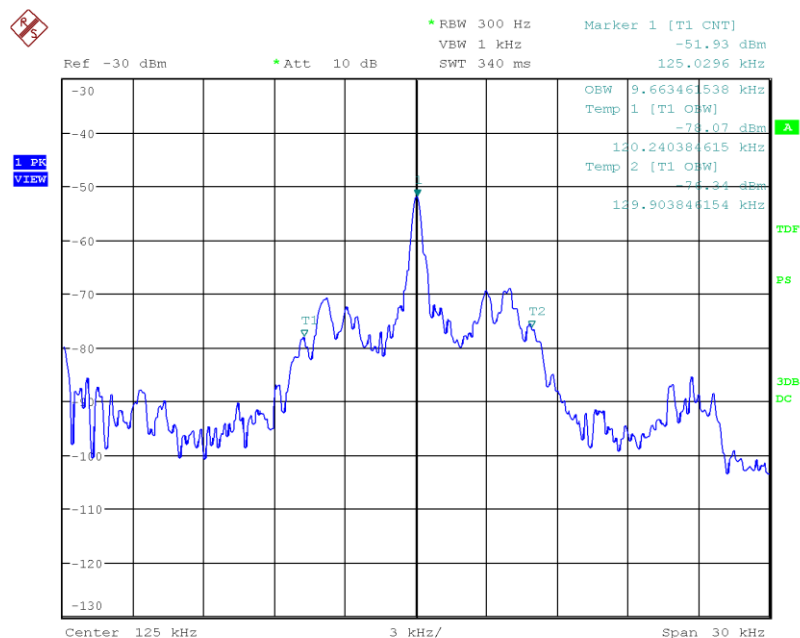


1.5. Occupied bandwidth



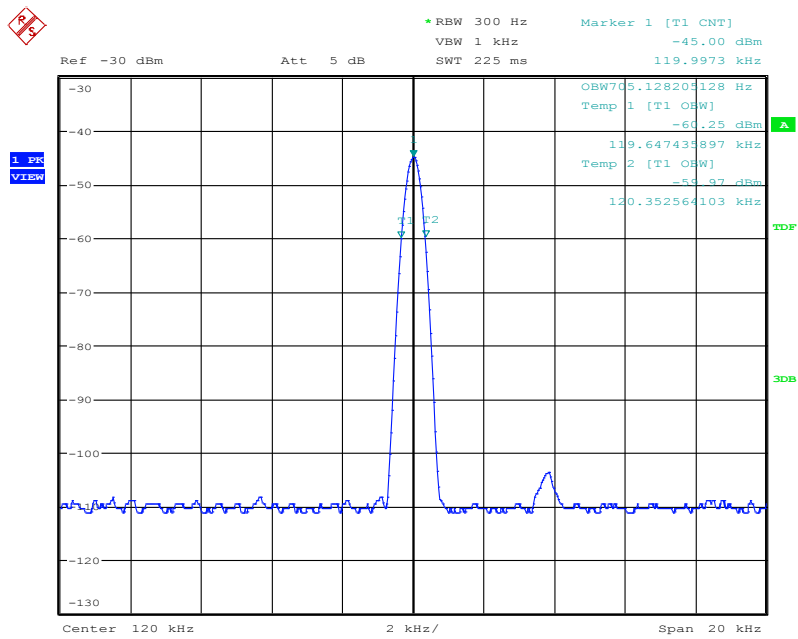
Date: 10.JUL.2018 14:15:22

Diagram 1.4.1: Channel 21.8 kHz - OBW Tnom Vnom (EUT op. 1: 21.8 kHz + 120 kHz)



Date: 24.AUG.2018 19:07:27

Diagram 1.4.2: Channel 125 kHz - OBW Tnom Vnom (EUT op. 2: 125 kHz + 120 kHz)



Date: 12.SEP.2018 13:23:16

Diagram 1.4.3: Channel 120 kHz - OBW Tnom Vnom (EUT op. 2: 125 kHz + 120 kHz)

END OF REPORT