

Annex 1: Measurement diagrams to TEST REPORT No.: 17-1-0264601T03a

According to:
FCC Regulations
Part 15.247

for

Agilion GmbH

Wireless Mesh Gateway Pulse | Phase 6032502
Communication and Real Time Location System
FCC-ID: SCF6032502

Laboratory Accreditation and Listings		
 Deutsche Akkreditierungsstelle D-PL-12047-01-01 Accredited EMC-Test Laboratory	 Industry Canada Reg. No.: 3462D-1 Reg. No.: 3462D-2 Reg. No.: 3462D-3	 Voluntary Controls for Electromagnetic Emissions Reg. No.: R-20013, C-20009, T-20006, G-20013
 	 Authorized Test Lab Lab Code: 20011130-00	 MRA US-EU 0003
accredited according to DIN EN ISO/IEC 17025		
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Laboratory Accreditation and Listings		

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1. Measurement diagrams

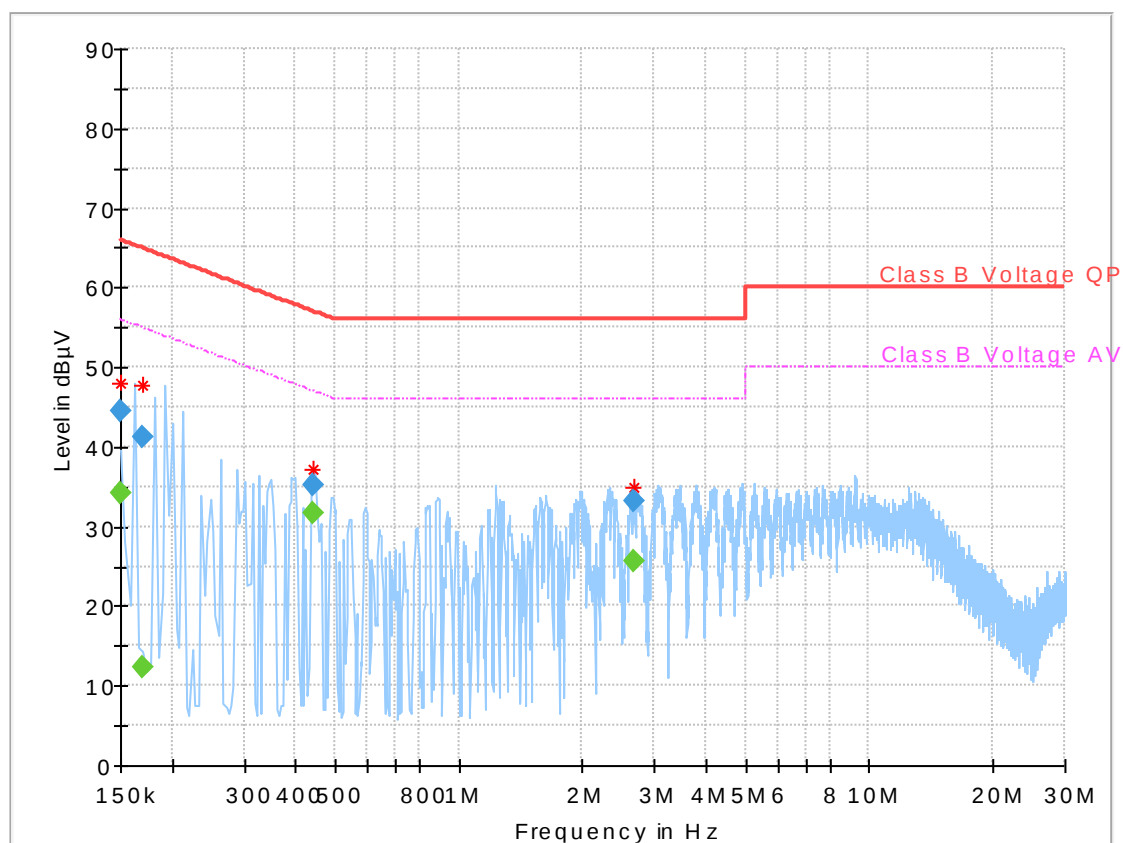
1.1. Conducted EMI measurements on AC-mains port according 15.207

Diagram 1.03_Ch18_RF215

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 15.207 /RSS-Gen.
Operating Mode:	RF215, Channel 18, Powerlevel 21
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:	MBe

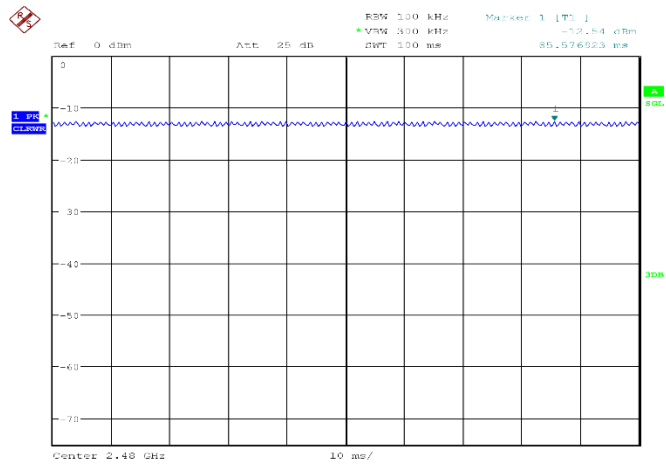
Full Spectrum



Final Result

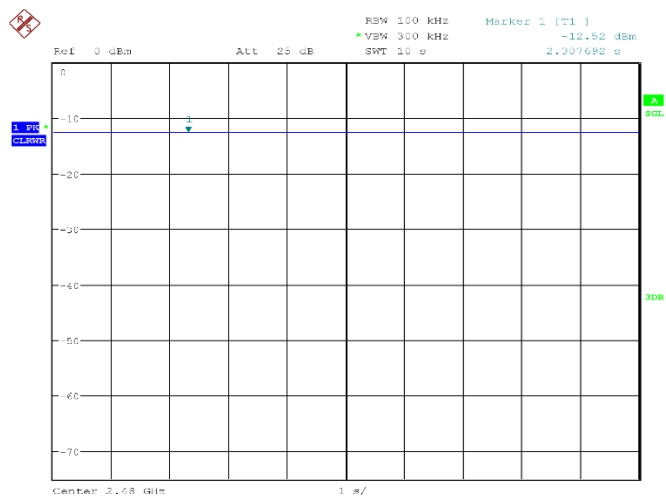
Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)
0.150000	---	34.30	56.00
0.150000	44.61	---	66.00
0.170469	---	12.43	54.94
0.170469	41.25	---	64.94
0.440469	---	31.77	47.05
0.440469	35.28	---	57.05
2.669219	---	25.58	46.00
2.669219	33.08	---	56.00

1.2. Duty-Cycle



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Diagram 1: Duty-Cycle exemplary for 100ms period



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Diagram 2: Duty-Cycle exemplary for 10s period

1.3. Radiated field strength measurements accord. §15.209&15.205

1.3.1. Magnetic field measurements $f < 30\text{MHz}$

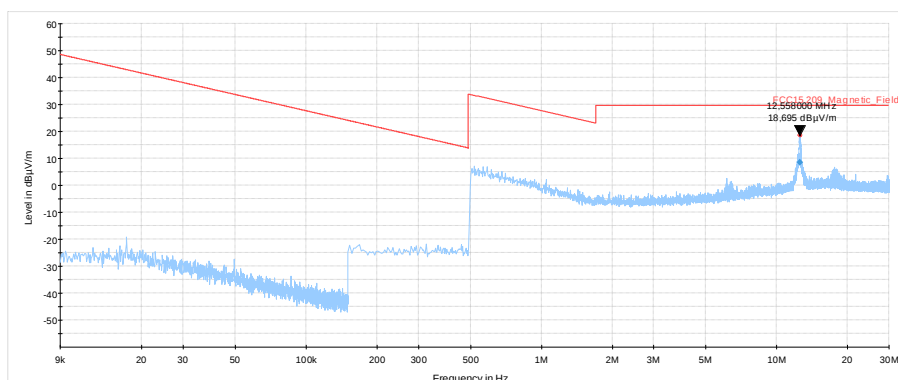


Diagram 3: Channel 11 (2.01_MgF_RF215_Ch11_PWR21_laying)

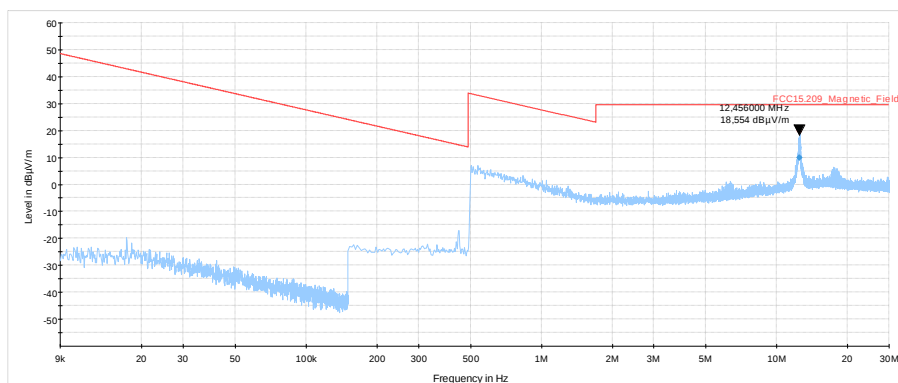


Diagram 4: Channel 11 (2.02_MgF_RF215_Ch11_PWR21_standing)

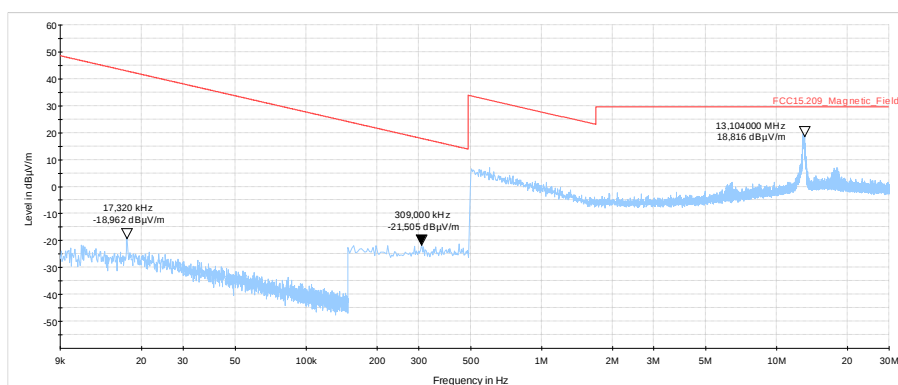


Diagram 5: Channel 18 (2.03_MgF_RF215_Ch18_PWR21_laying)

Only Worst-case orientation of EUT tested

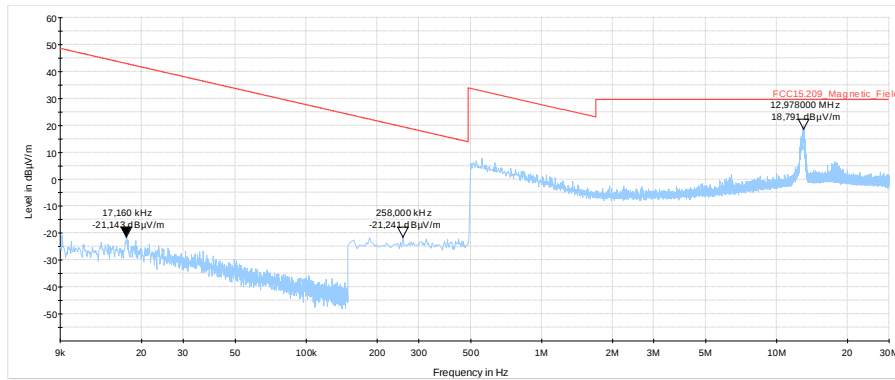


Diagram 6: Channel 26 (2.04_MgF_RF215_Ch26_PWR21_laying)

Only Worst-case orientation of EUT tested

1.4. Field strength measurements 30MHz <f <1GHz

1.4.1. Channel 11

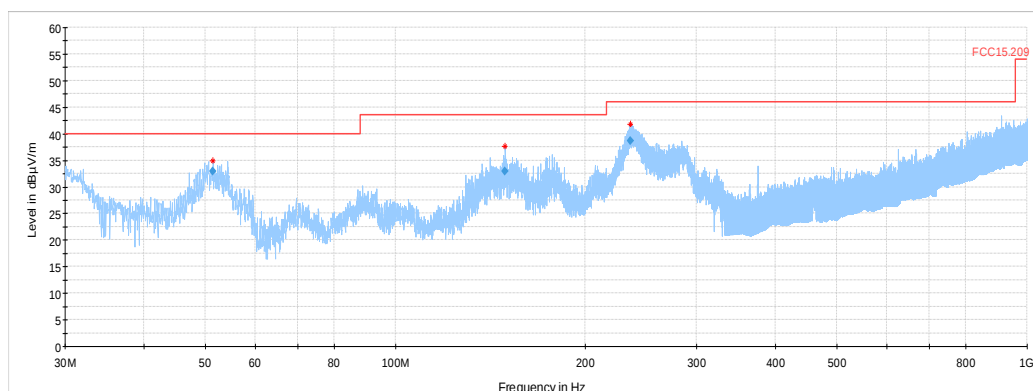


Diagram 7: 3.13_RF215_Ch11_PWR21_laying_PoE

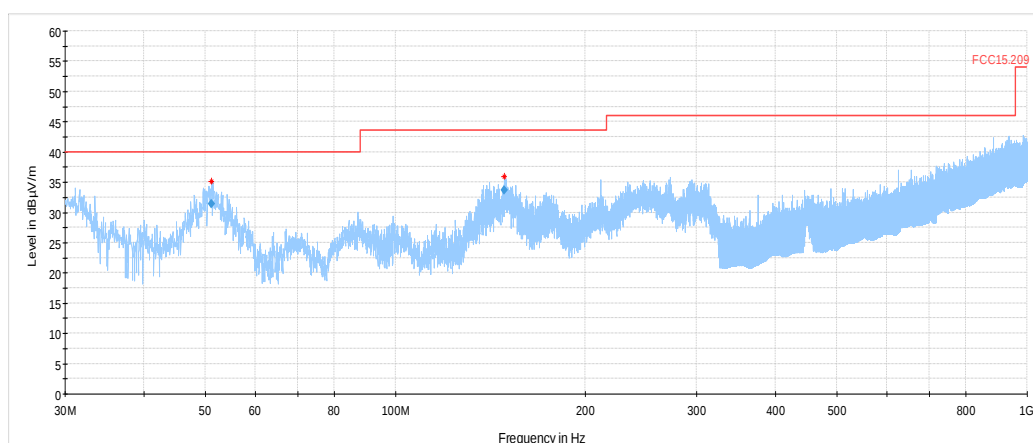


Diagram 8: 3.14_RF215_Ch11_PWR21_standing_PoE

1.4.2. Channel 18

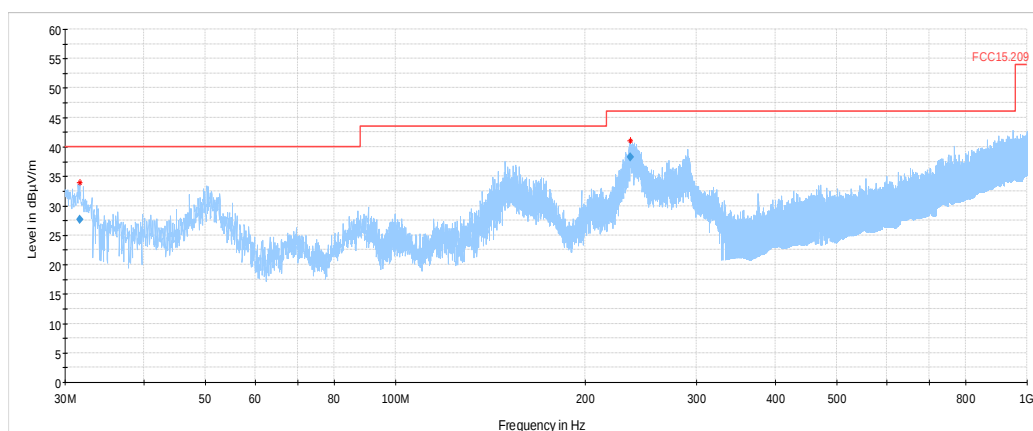


Diagram 9: 3.15_RF215_Ch18_PWR21_laying_PoE

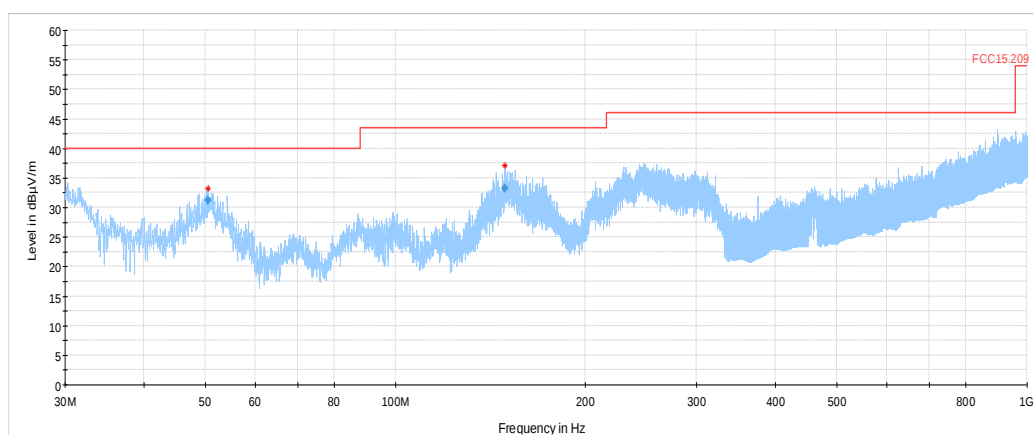


Diagram 10: 3.16_RF215_Ch18_PWR21_standing_PoE

1.4.3. Channel 26

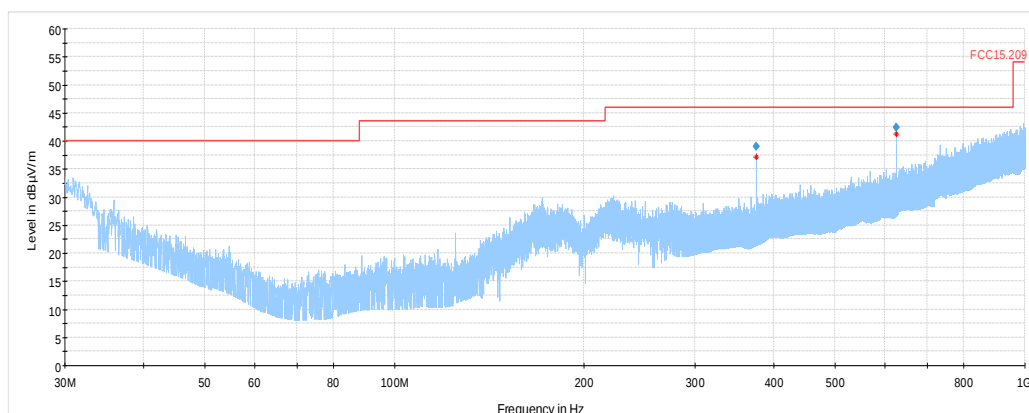


Diagram 11: 3.17_RF215_Ch26_PWR21_laying_24DC

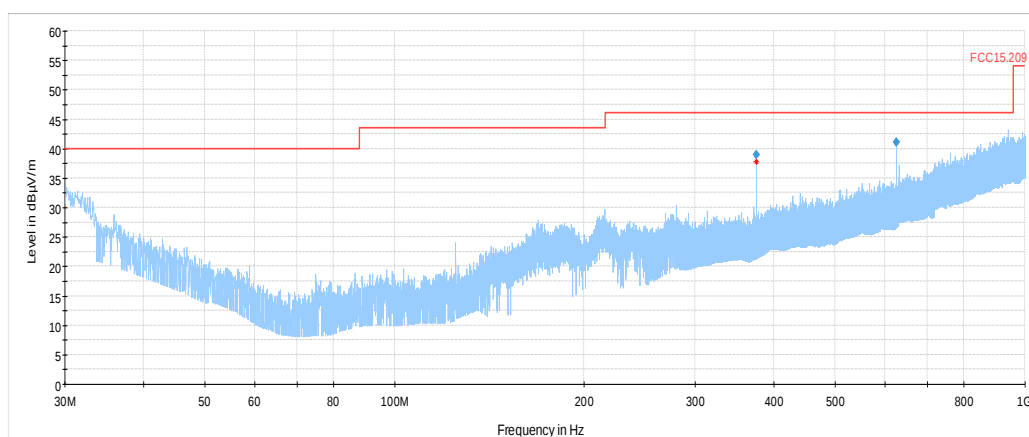


Diagram 12: 3.18_RF215_Ch26_PWR21_standing_24DC

1.5. Field strength measurements $f < 18\text{GHz}$

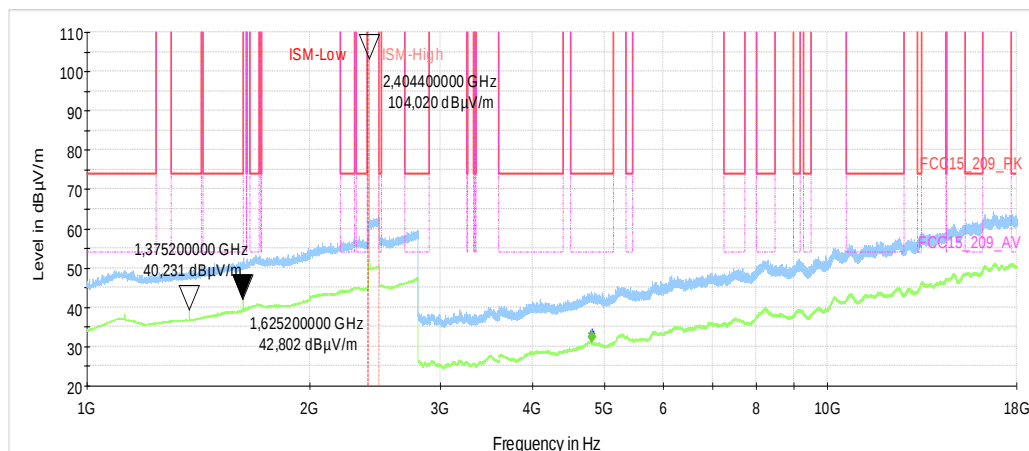


Diagram 13: Channel 11 (4.01_RF215_Ch11_PWR_21_PoE)

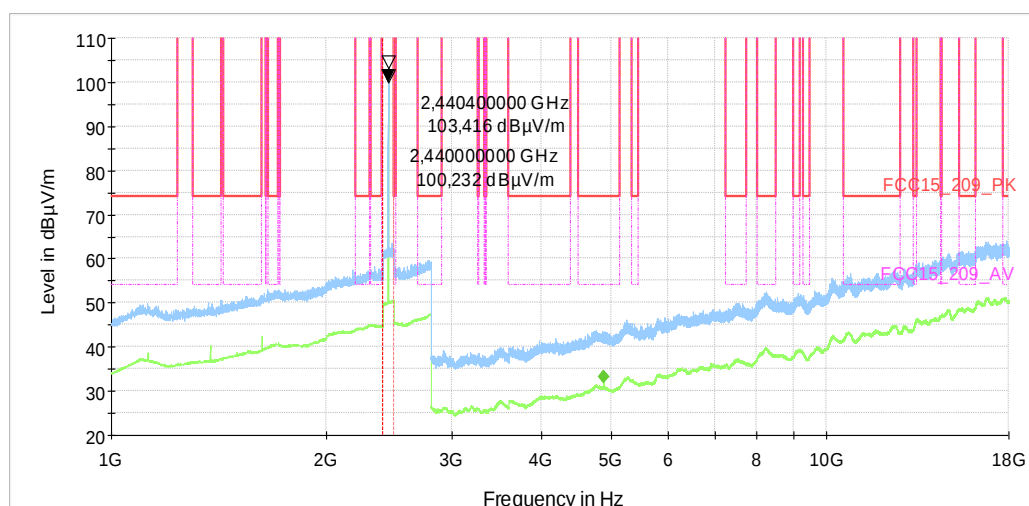


Diagram 14: Channel 18 (4.02_RF215_Ch18_PWR_21_PoE)

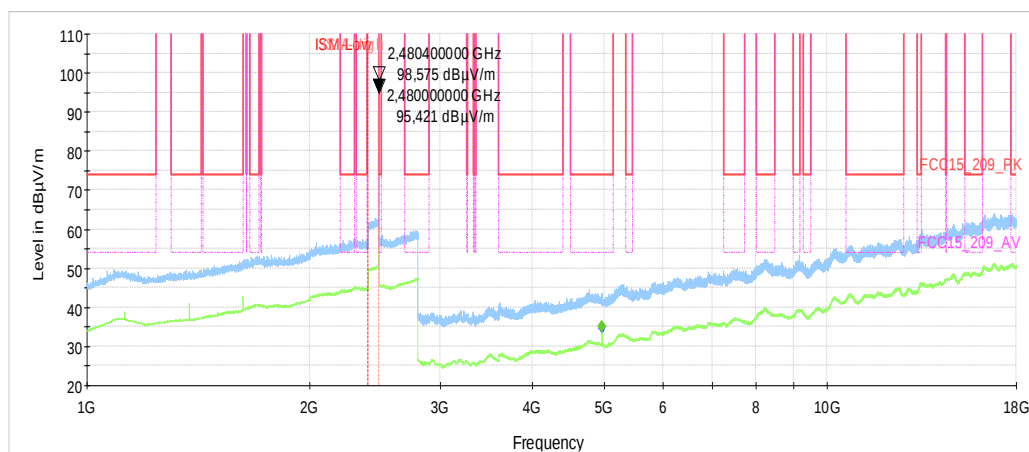
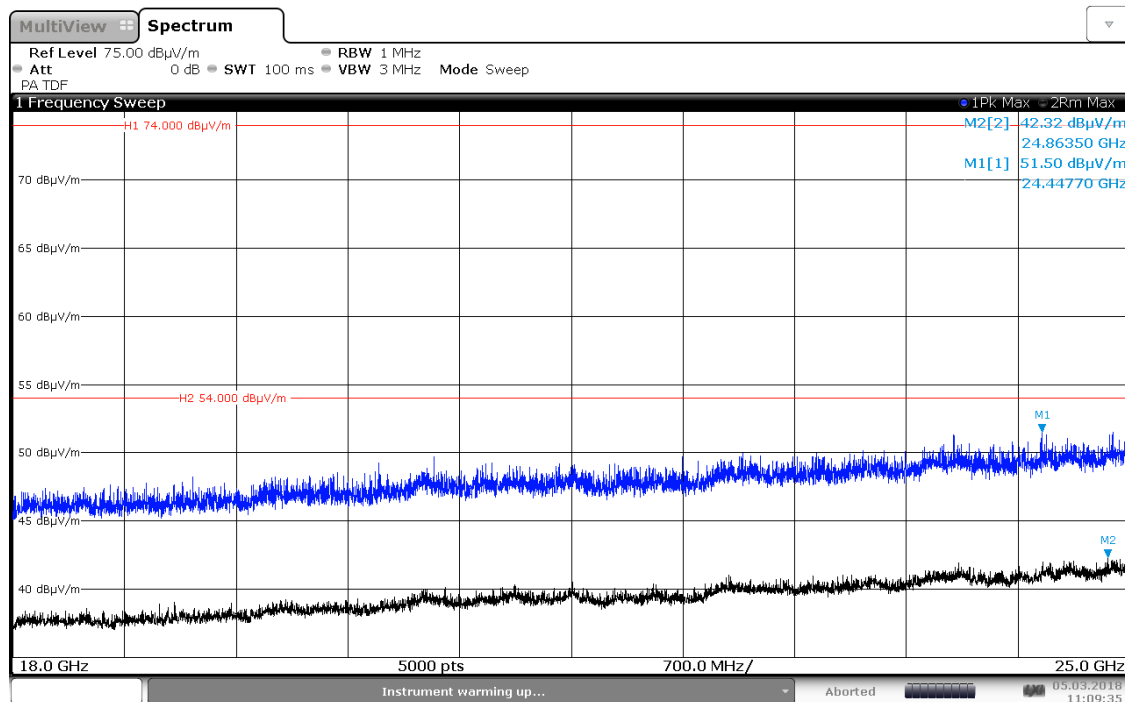


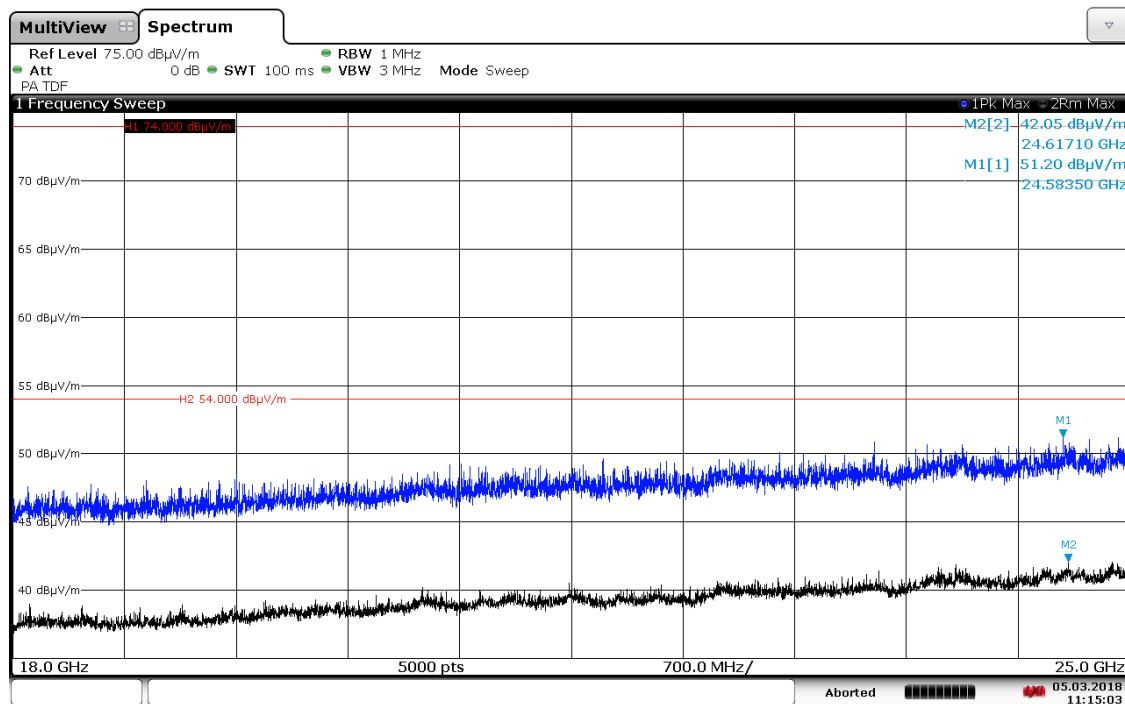
Diagram 15: Channel 26 (4.03_RF215_Ch26_PWR_21_24V_DC)

1.6. Field strength measurements 18GHz < f < 25GHz



11:09:36 05.03.2018

Diagram 16: 4.10_RF215_Ch11_PWR_21_PoE



11:15:03 05.03.2018

Diagram 17: 4.11_RF215_Ch18_PWR_21_PoE

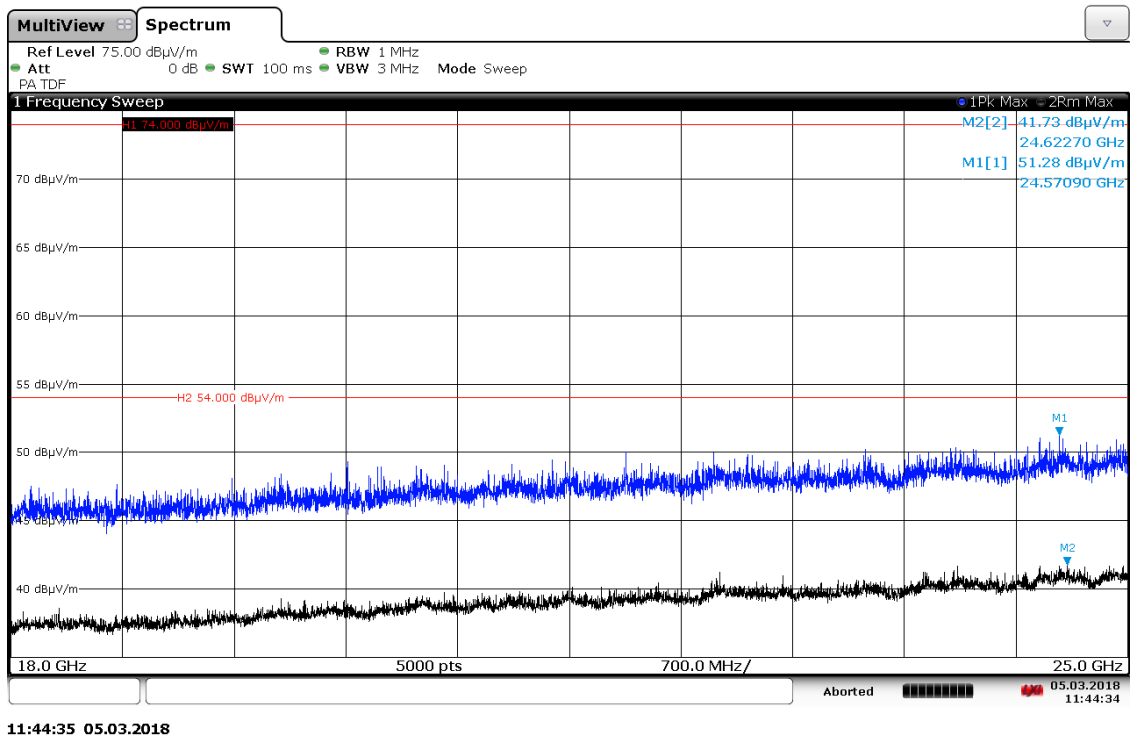


Diagram 18: 4.12_RF215_Ch26_PWR_21_24V_DC

1.7. Band-edge measurements

1.7.1. Channel 11 (left band edge)

1.7.1.1. Conducted 20dBc

Result

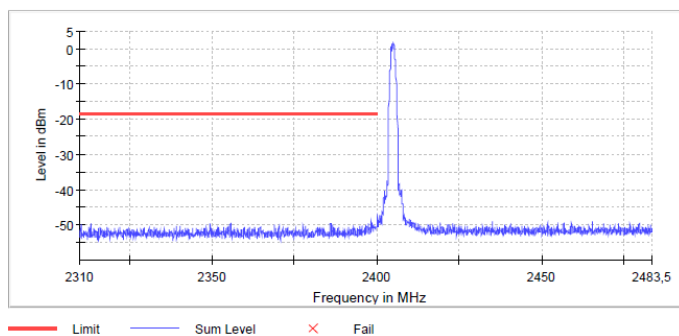
DUT Frequency (MHz)	Result
2405.000000	PASS

Inband Peak

Frequency (MHz)	Level (dBm)
2405.157353	1.5

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2398.350000	-48.9	30.5	-18.5	PASS
2398.400000	-49.1	30.6	-18.5	PASS
2398.700000	-49.3	30.8	-18.5	PASS
2355.650000	-49.6	31.2	-18.5	PASS
2313.200000	-49.7	31.2	-18.5	PASS
2386.050000	-49.7	31.3	-18.5	PASS
2397.600000	-49.8	31.3	-18.5	PASS
2386.000000	-49.8	31.3	-18.5	PASS
2349.600000	-49.8	31.4	-18.5	PASS
2397.550000	-50.0	31.5	-18.5	PASS
2310.200000	-50.0	31.6	-18.5	PASS
2310.250000	-50.1	31.6	-18.5	PASS
2398.650000	-50.1	31.6	-18.5	PASS
2386.550000	-50.1	31.6	-18.5	PASS
2398.600000	-50.1	31.7	-18.5	PASS



Band Edge Connector 1_0

Diagram 19: Band-Edge low (Ch11=2405MHz)

1.7.1.2. Radiated

20dBc criterium -> pass (limit is red-line)

Radiated field strength at 2480MHz: $-31\text{dBm} + 2\text{dBi (Antenna gain)} + 95.2\text{dB}|_{\text{meas,d}=3\text{m}} = 66.2\text{ dBuV/m @3m}$
field strength

1.8. Channel 26 (right band edge)

1.8.1. Conducted 20dBc

Result

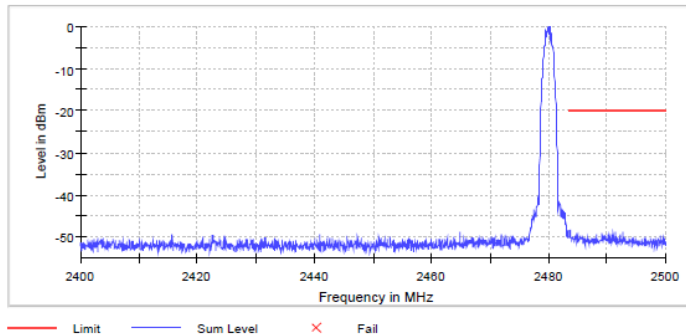
DUT Frequency (MHz)	Result
2480.000000	PASS

Inband Peak

Frequency (MHz)	Level (dBm)
2479.865294	0.0

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.711538	-48.2	28.2	-20.0	PASS
2491.432692	-48.7	28.7	-20.0	PASS
2492.754808	-48.9	28.8	-20.0	PASS
2491.062500	-49.0	29.0	-20.0	PASS
2484.822115	-49.2	29.1	-20.0	PASS
2489.158654	-49.2	29.2	-20.0	PASS
2492.225962	-49.3	29.3	-20.0	PASS
2490.427885	-49.3	29.3	-20.0	PASS
2488.259615	-49.4	29.3	-20.0	PASS
2484.769231	-49.5	29.4	-20.0	PASS
2483.658654	-49.5	29.4	-20.0	PASS
2490.745192	-49.5	29.4	-20.0	PASS
2490.216346	-49.5	29.5	-20.0	PASS
2489.528846	-49.6	29.6	-20.0	PASS
2489.740385	-49.7	29.6	-20.0	PASS



Band Edge Connector 1_0

Diagram 20: Band-Edge high (Channel 26=2480MHz)

1.8.2. Radiated accord. §15.209 & 15.205

Radiated field-strength at 2483.5MHz: approx.: $-45 \text{ dBm} + 95.2 \text{ dB}_{\text{meas,d=3m}} + 2 \text{ dBi}$ (antenna gain)= 52.2 dBuV/m Peak

Peak Value < Average value of 54dBuV/m at 2483.5MHz -> Pass

1.9. Conducted RF-measurements on antenna port

1.10. Conducted RF-power

1.10.1. Channel 11

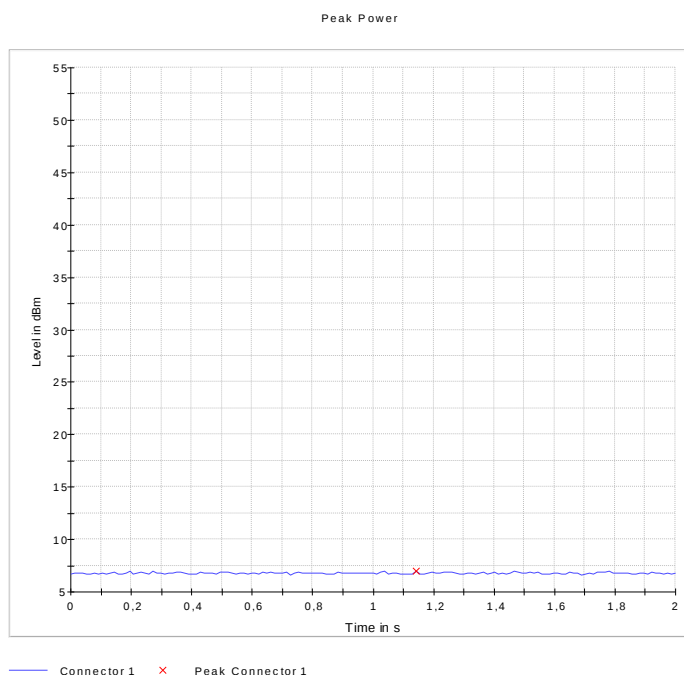


Diagram 21: Channel 11

1.10.2. Channel 12

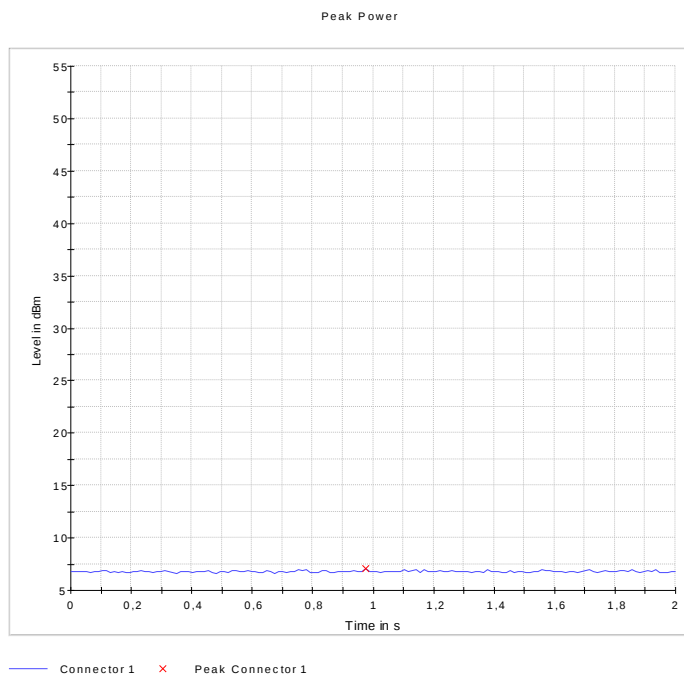


Diagram 22: Channel 12

1.10.3. Channel 18

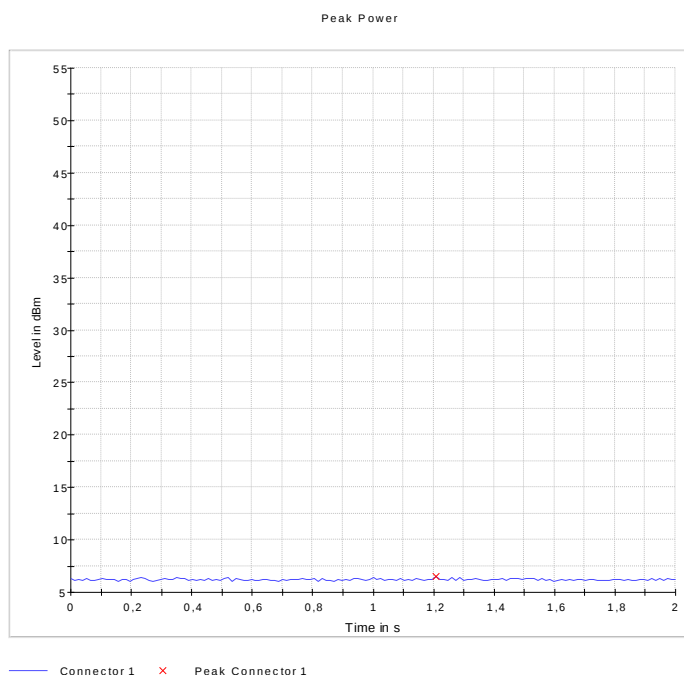


Diagram 23: Channel 18

1.10.4. Channel 26

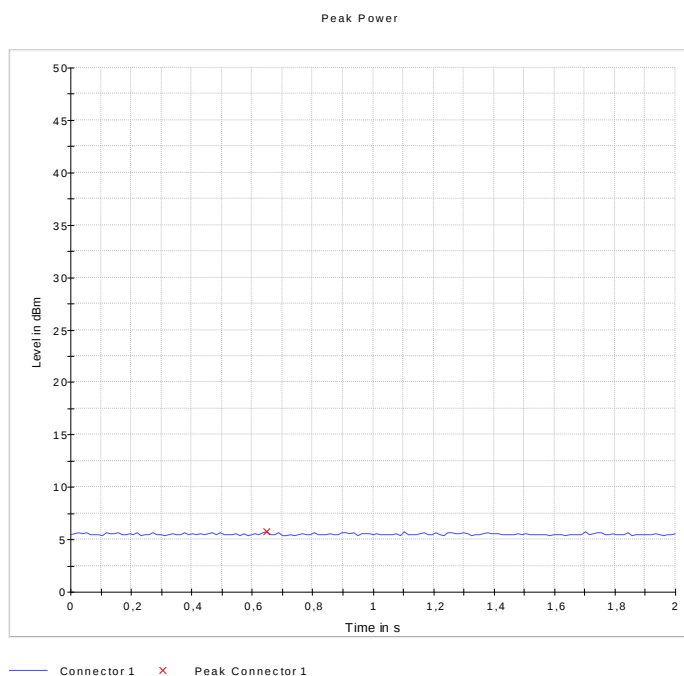


Diagram 24: Channel 26

1.11. 6-dB Bandwidth

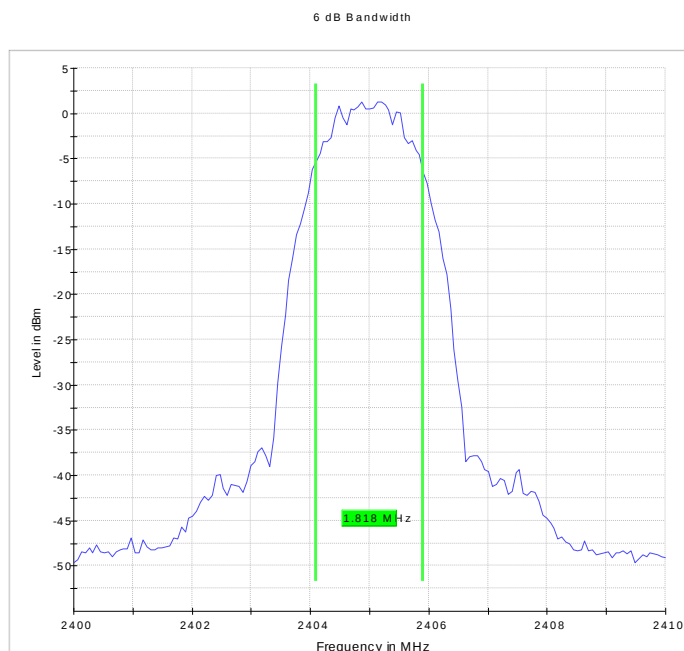


Diagram 25: Channel 11

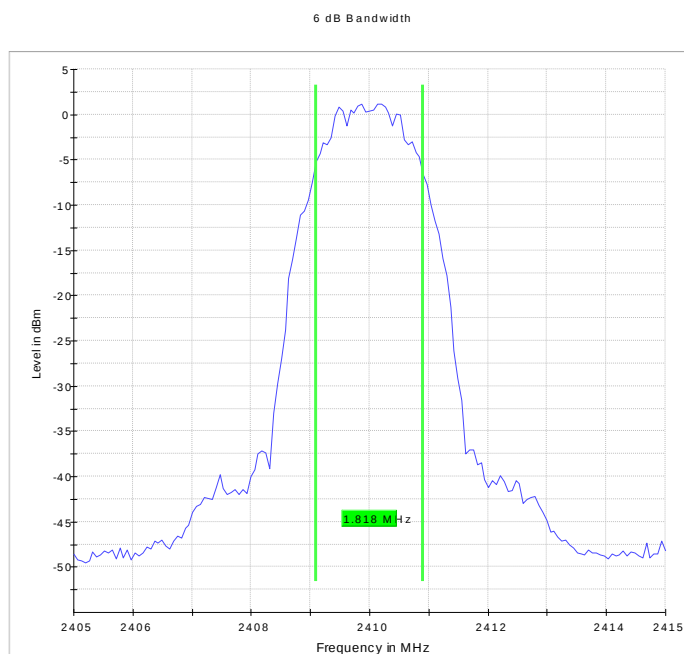


Diagram 26: Channel 12

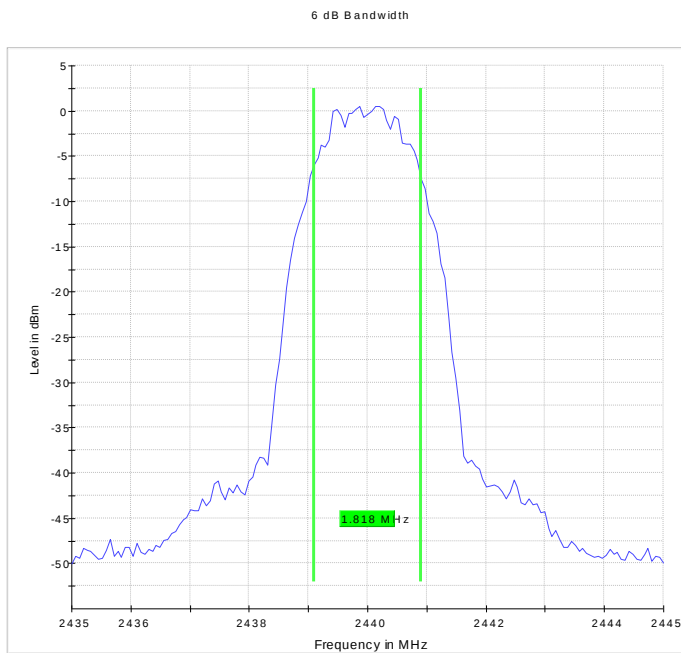


Diagram 27: Channel 18

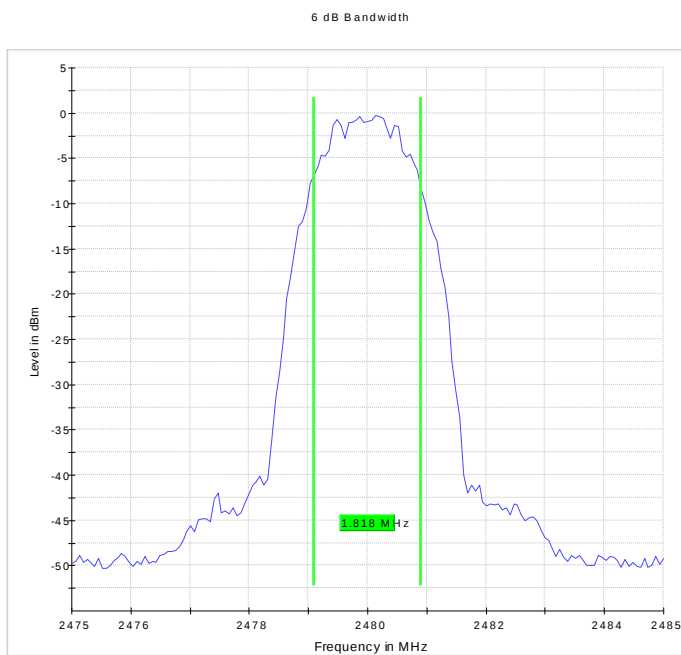
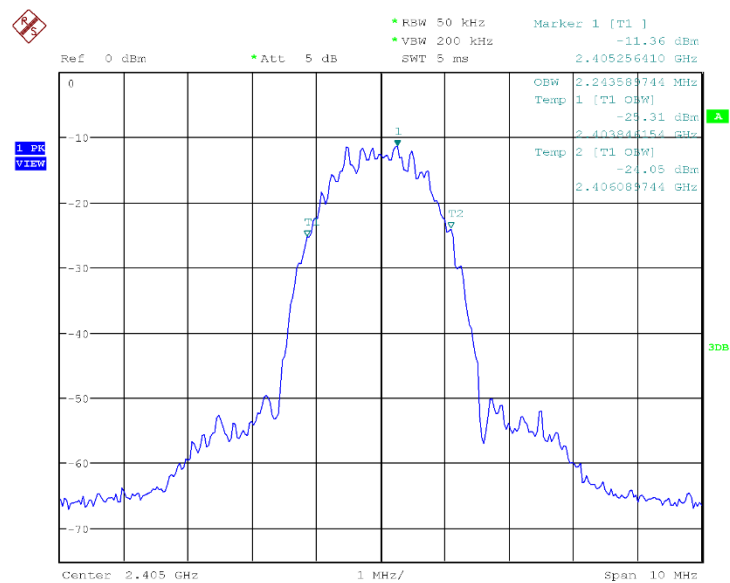


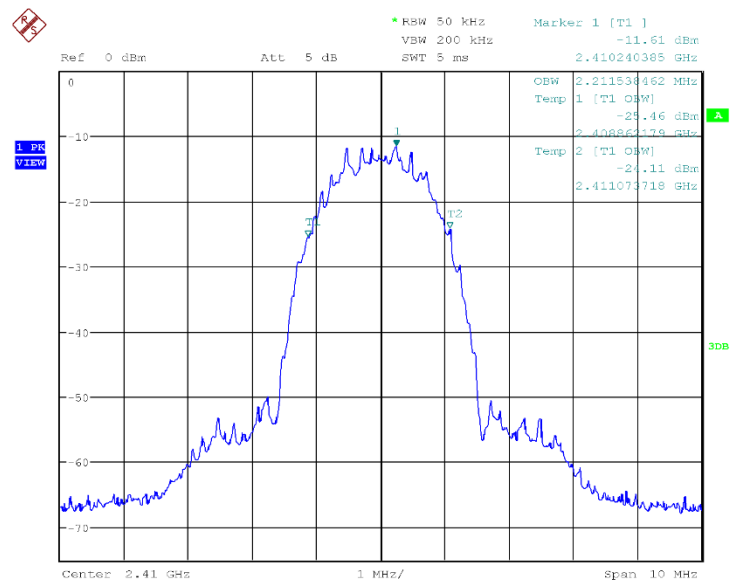
Diagram 28: Channel 26

1.12. 99% Occupied Bandwidth



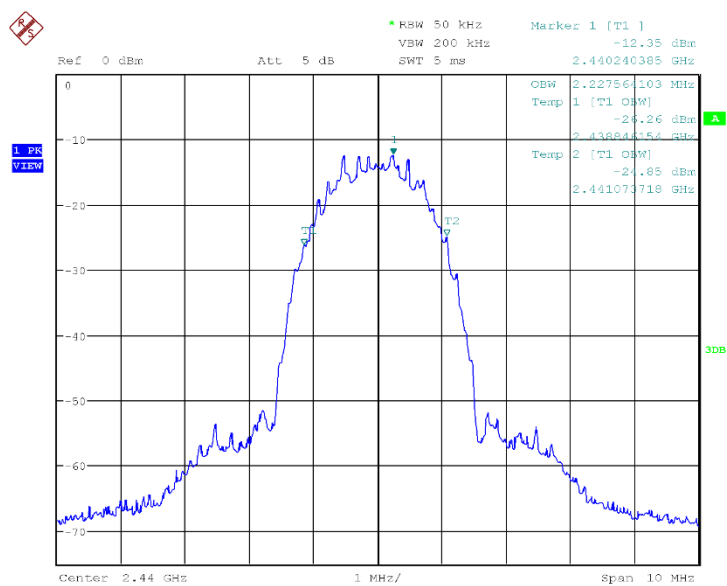
Date: 27.FEB.2018 10:52:38

Diagram 29: OBW 99% - Channel 11



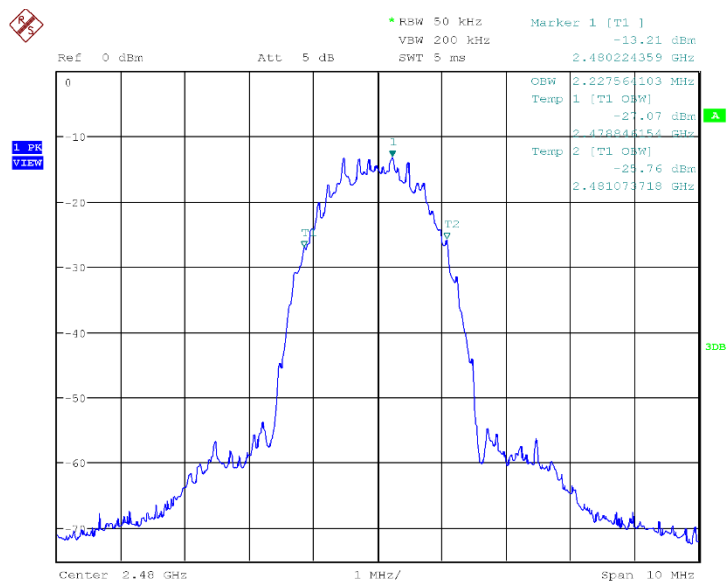
Date: 18.JAN.2018 12:35:00

Diagram 30: OBW 99% - Channel 12



Date: 18.JAN.2018 12:41:20

Diagram 31: OBW 99% - channel 18



Date: 18.JAN.2018 12:45:18

Diagram 32: OBW 99% - channel 26

1.13. Power Spectral Density

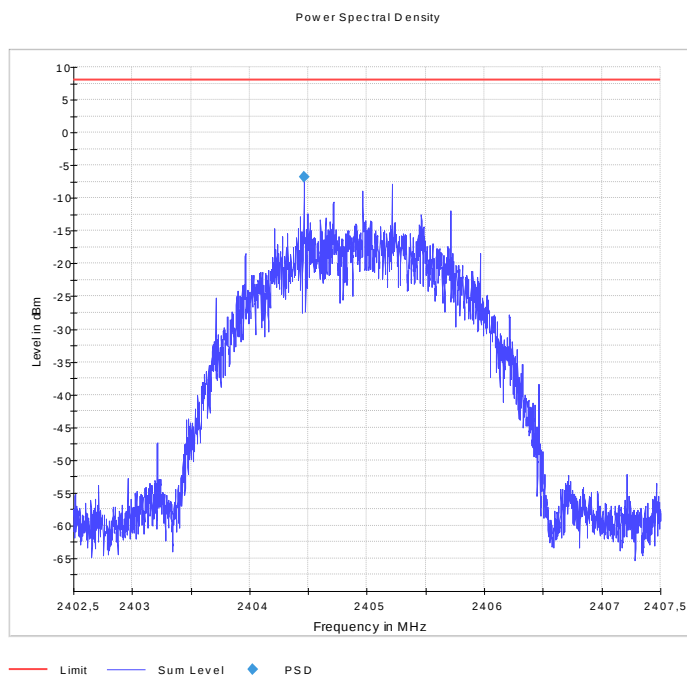


Diagram 33: Power Spectrum density (channel 11)

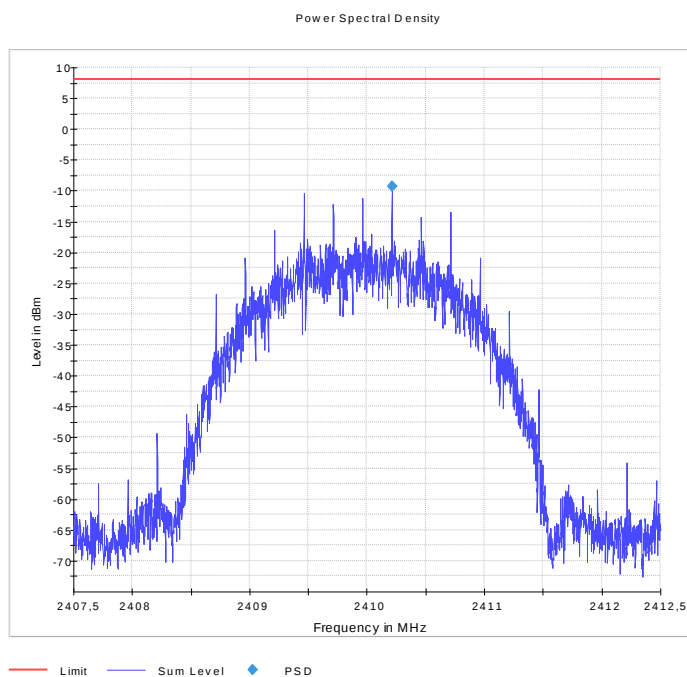


Diagram 34: Power Spectrum density (channel 12)

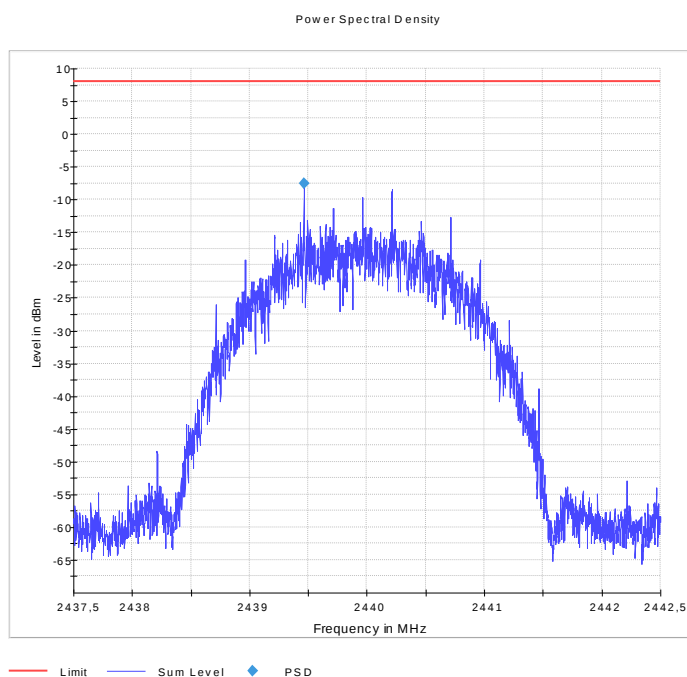


Diagram 35: Power Spectrum density (channel 18)

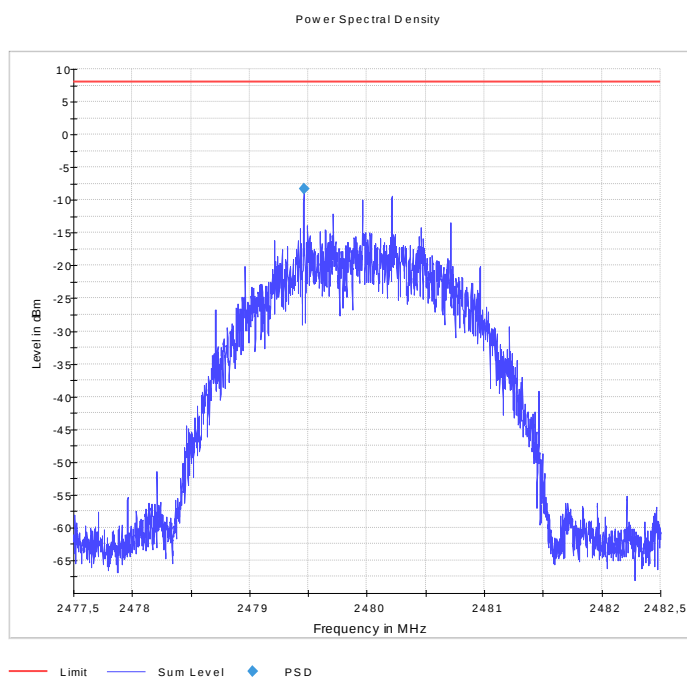


Diagram 36: Power Spectrum density (channel 26)

1.14. 20dBc Emissions

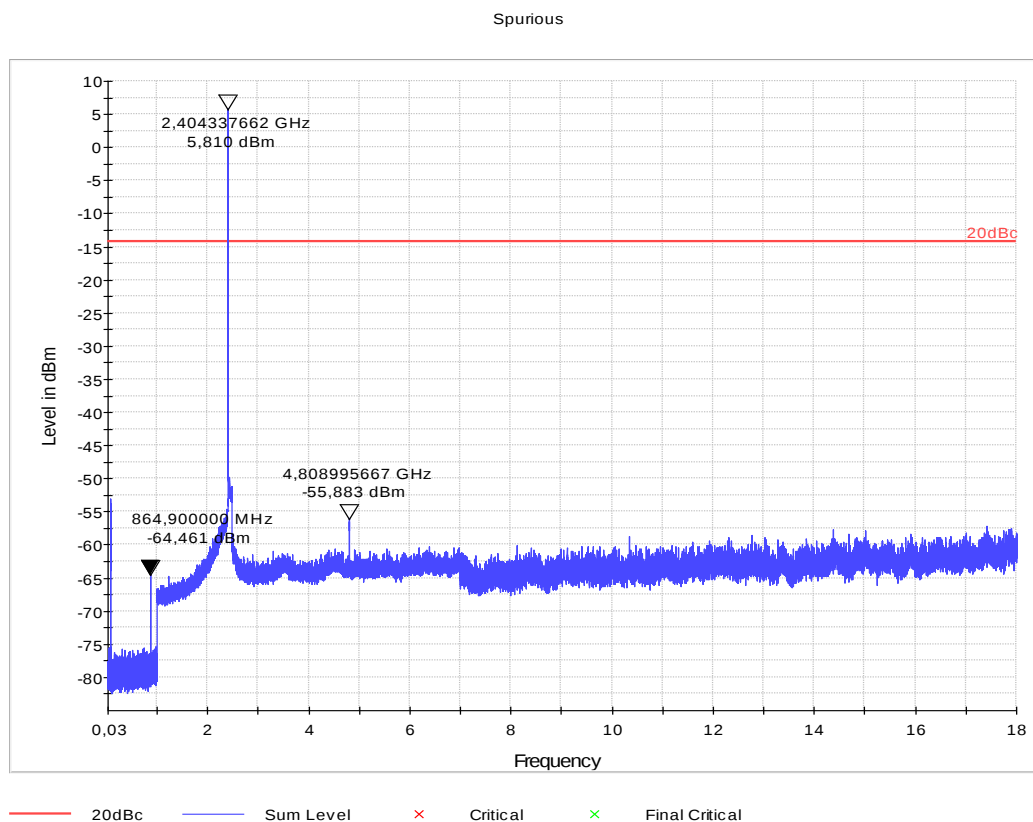


Diagram 37: Channel 11

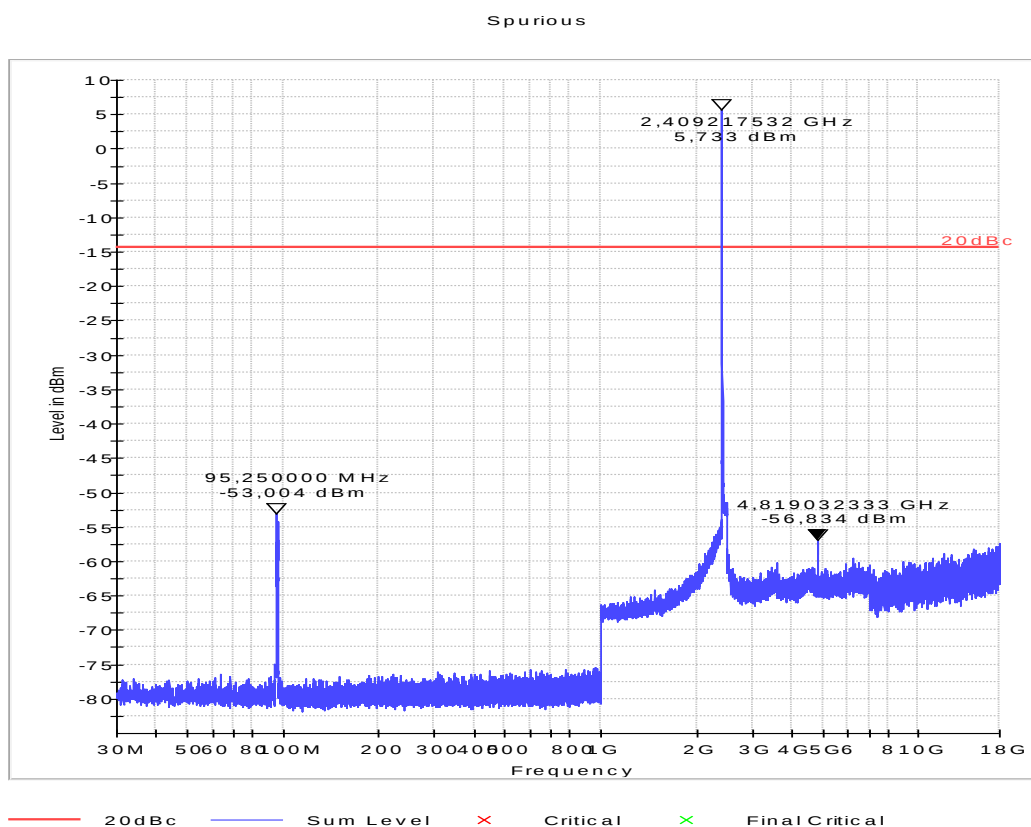


Diagram 38: Channel 12

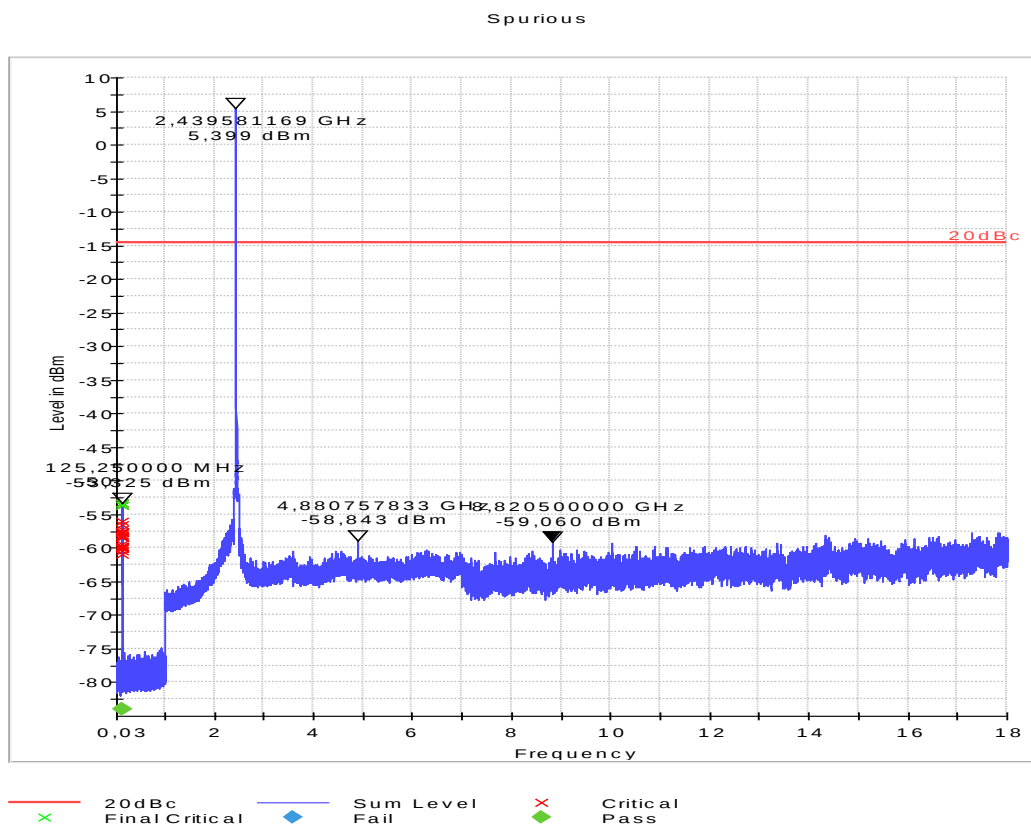


Diagram 39: Channel 18

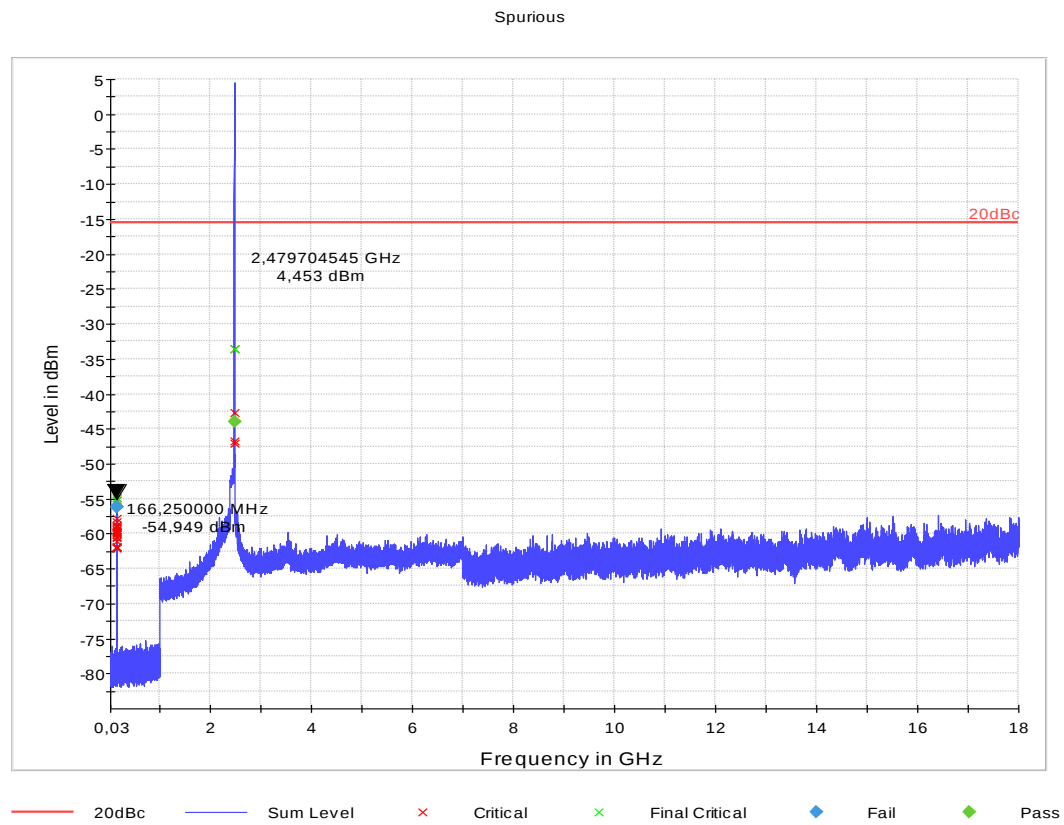


Diagram 40: Channel 26