

Annex 1: Measurement diagrams to TEST REPORT No.: 18-1-0002701T02

According to:
FCC Regulations
Part 15.247

for

Agilion GmbH

WIRELESS TAG EPAPER 3 PULSE | PHASE

FCC-ID: SCF6032704

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 RF LABORATORY	 Authorized Test Lab Lab Code: 20011130-00	 FEDERAL COMMUNICATIONS COMMISSION USA • 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. Radiated field strength measurements accord. §15.209&15.205

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

1.1.1. Channel 11

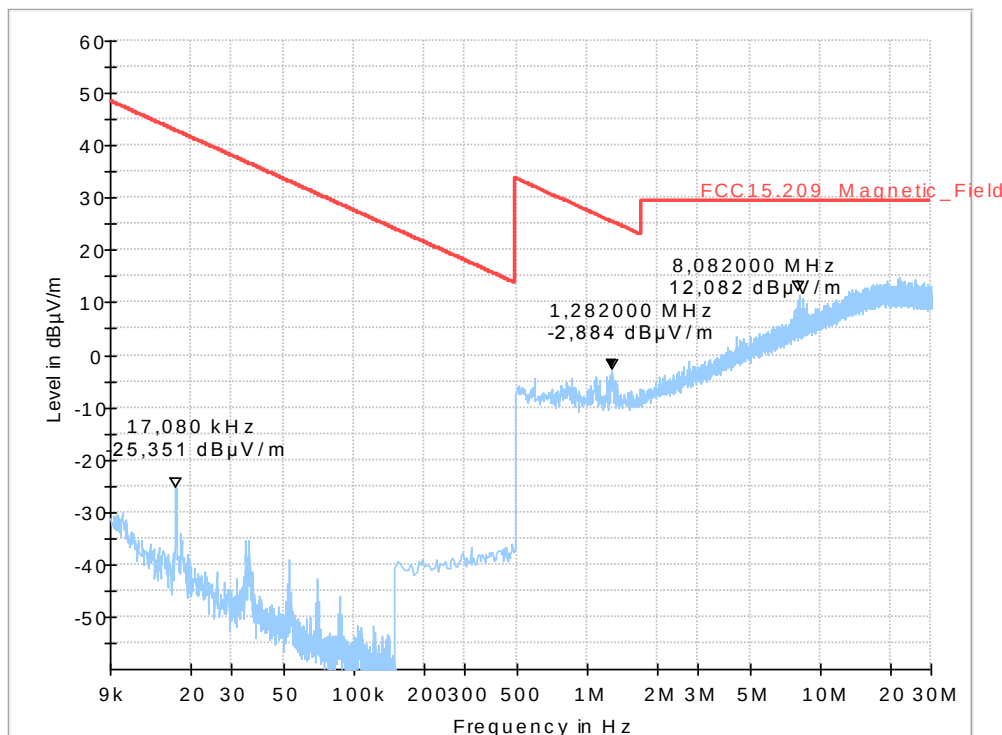


Diagram 1: Channel 11 (2.05_MgF_Ch11_PWR0_laying)

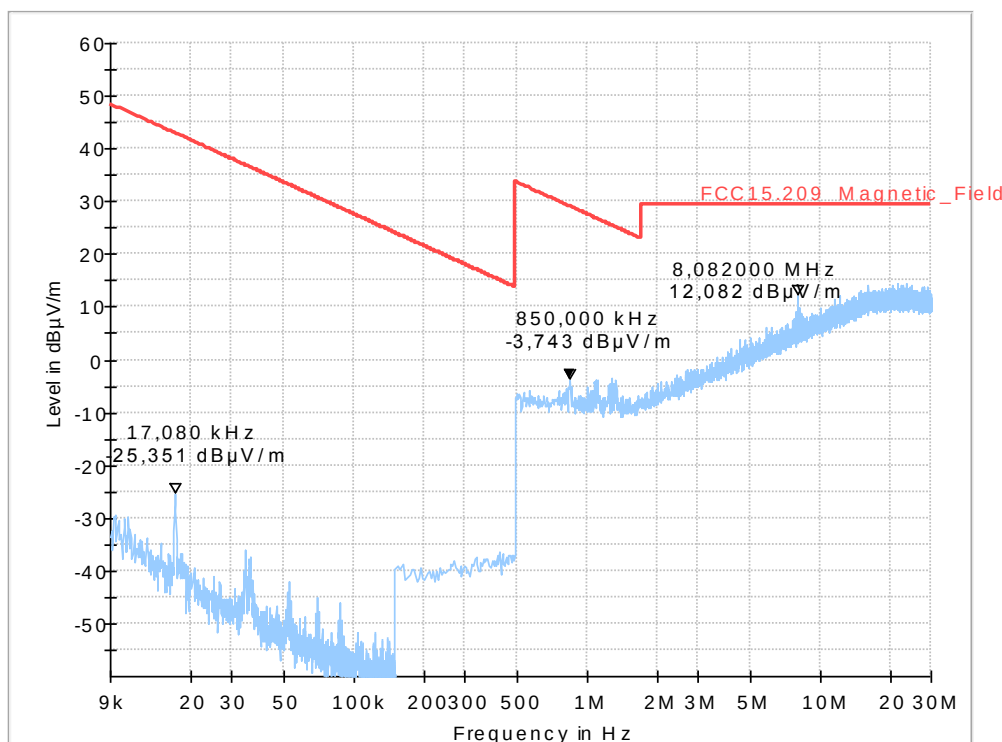


Diagram 2: Channel 11 (2.06_MgF_Ch11_PWR0_standing)

1.1.2. Channel 18

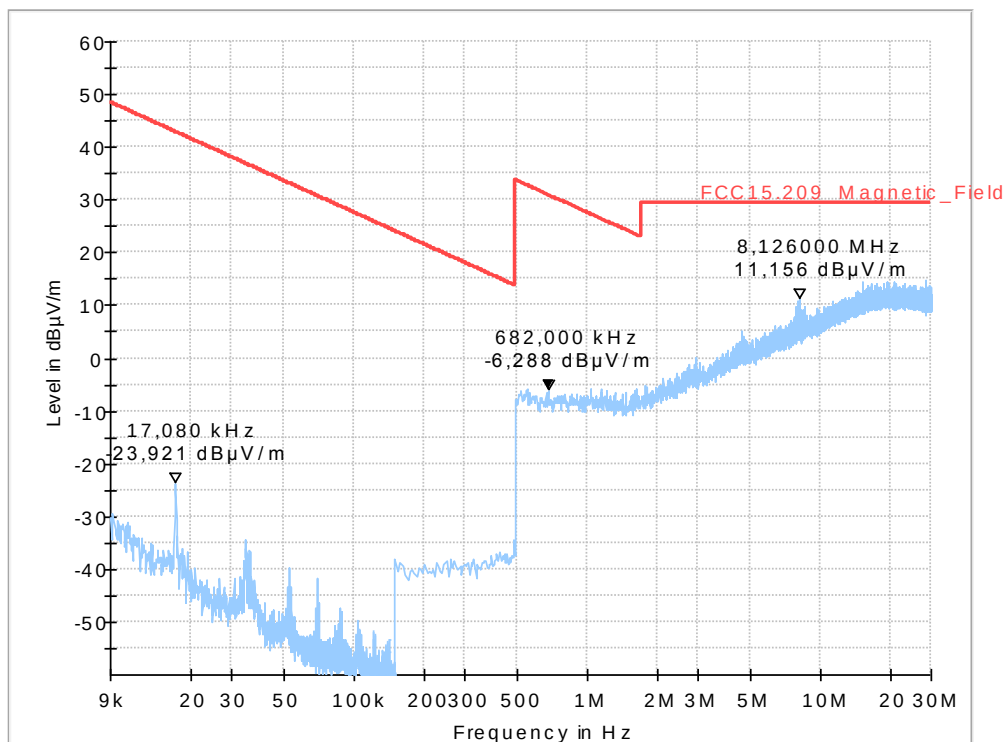


Diagram 3: Channel 18 (2.07_MgF_Ch18_PWR0_standing)

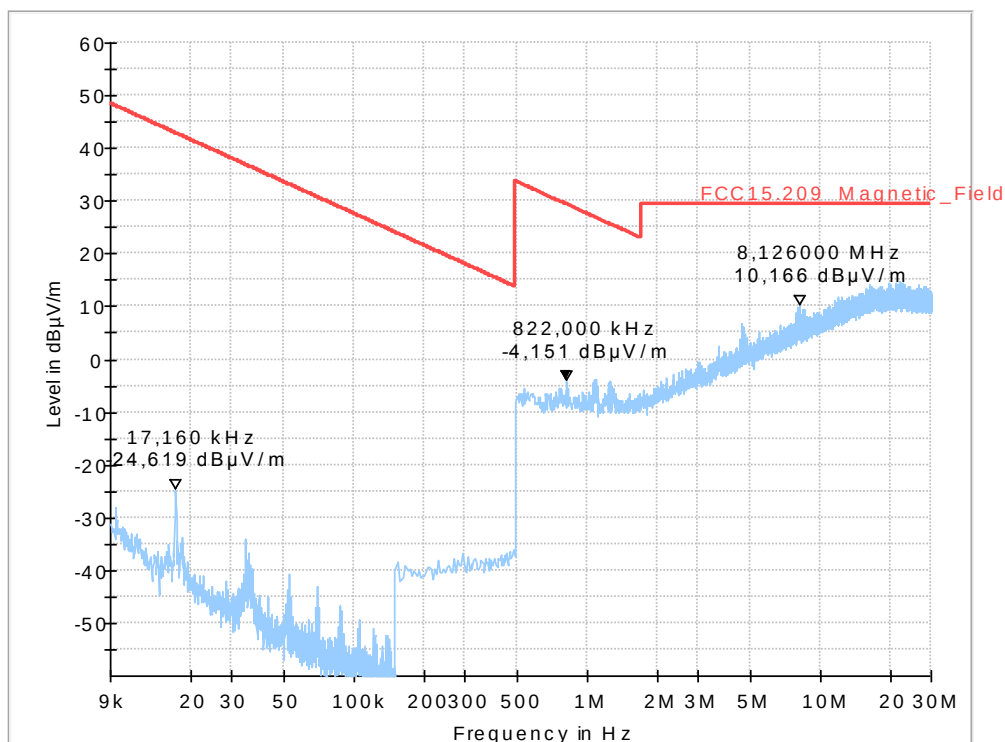


Diagram 4: Channel 18 (2.08_MgF_Ch18_PWR0_laying)

1.1.3. Channel 26

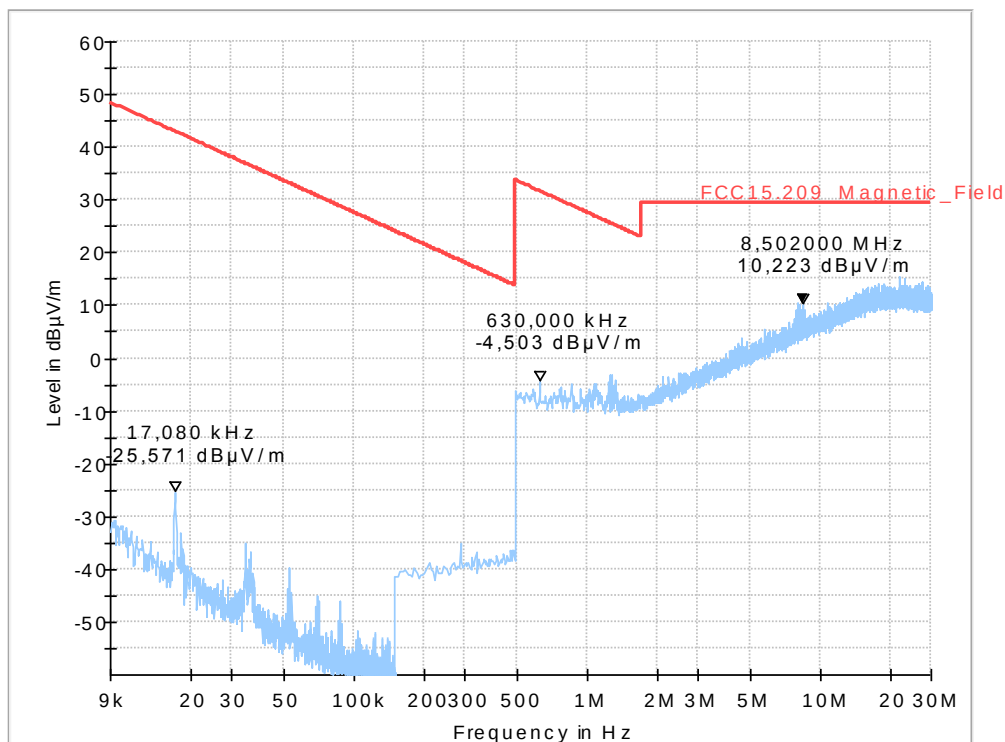


Diagram 5: Channel 26 (2.09_MgF_Ch26_laying)

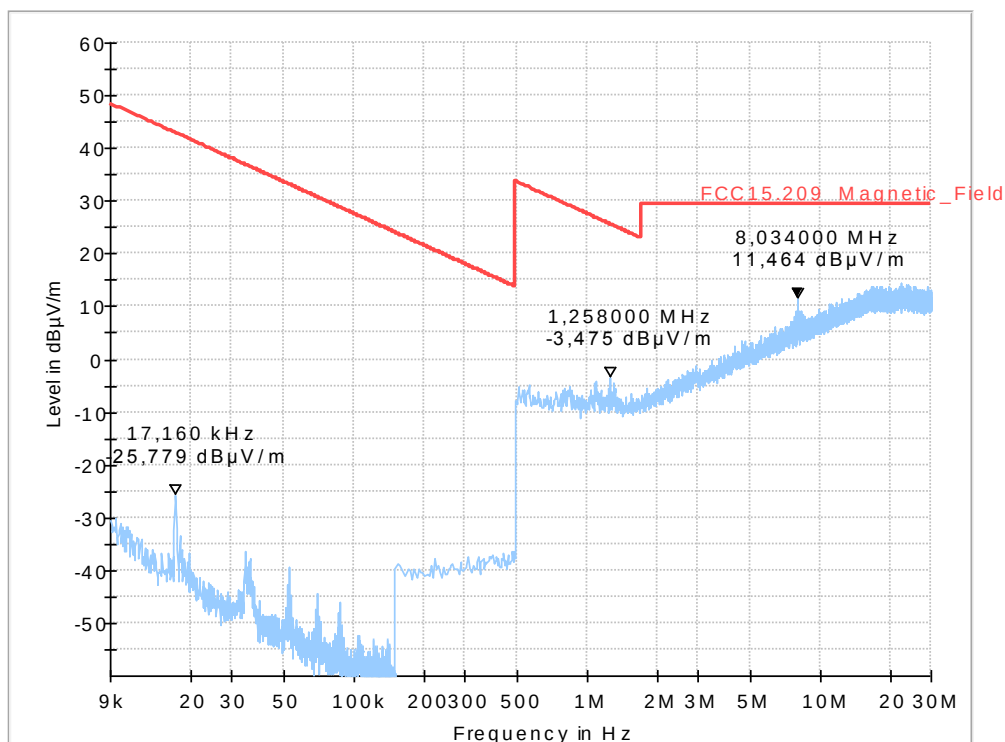


Diagram 6: Channel 26 (2.10_MgF_Ch26_standing)

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

1.2.1. Channel 11

Full Spectrum

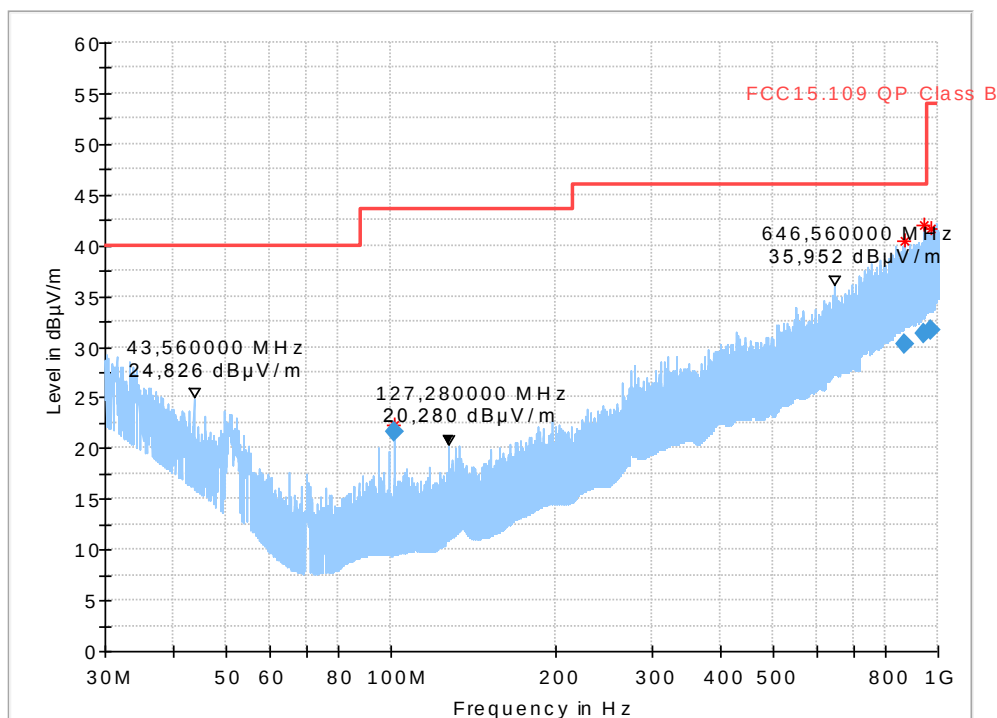


Diagram 7: Channel 11 (3.03_Ch11_PWR0_laying)

Full Spectrum

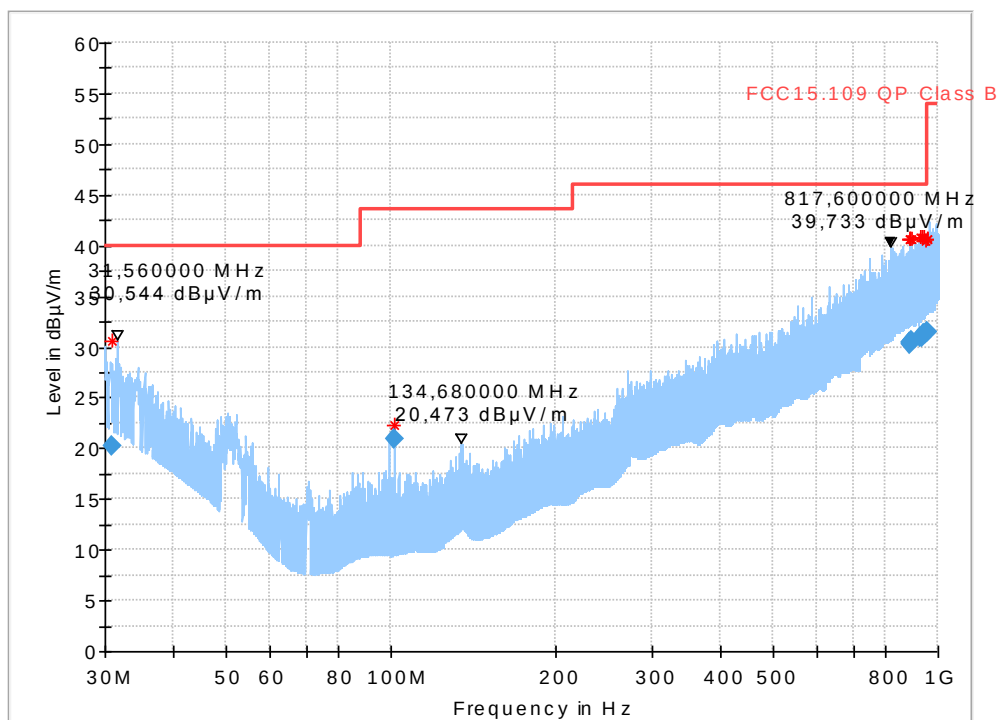


Diagram 8: Channel 11 (3.06_Ch11_PWR0_standing)

1.2.2. Channel 18

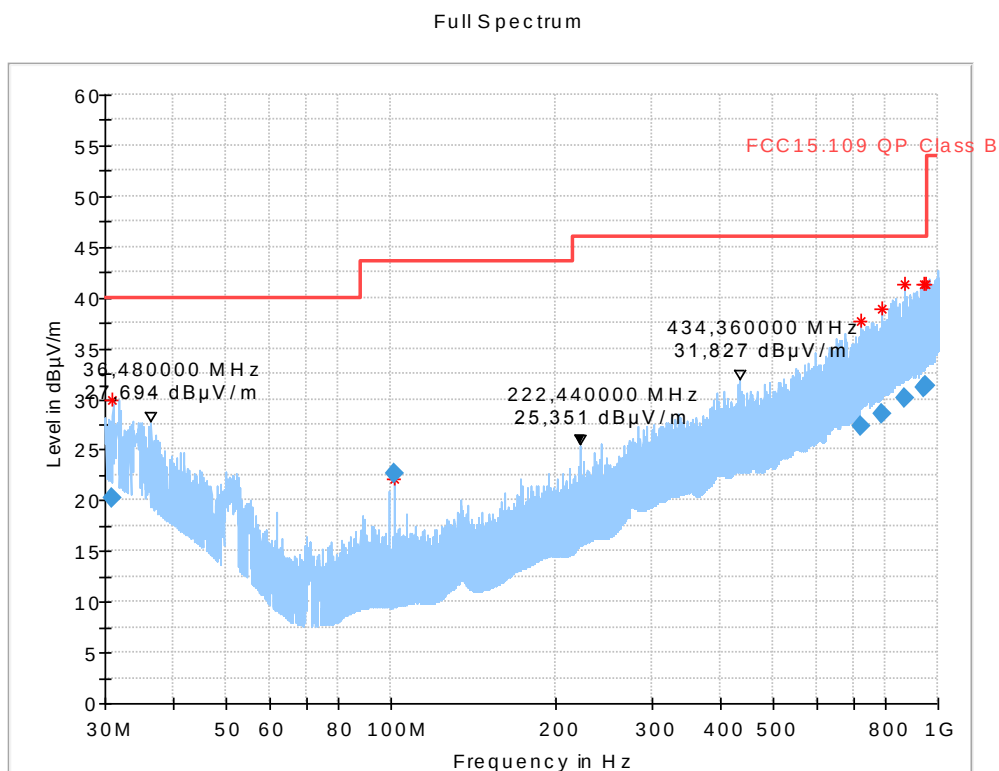


Diagram 9: Channel 18 (3.02_Ch18_PWR0_laying)

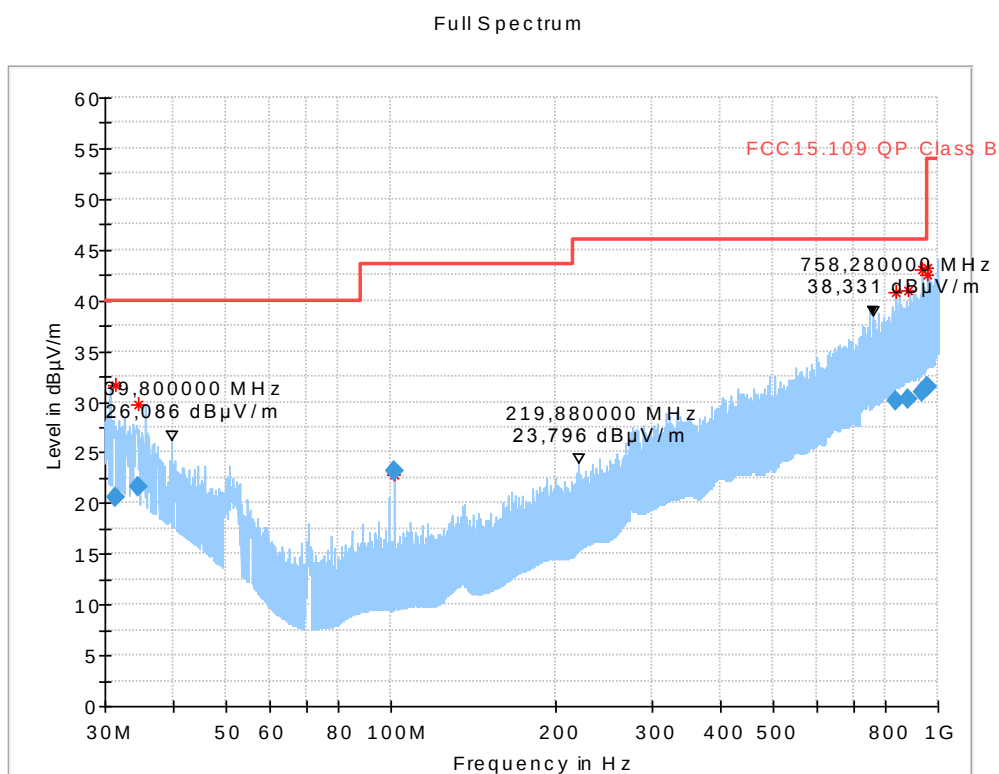


Diagram 10: Channel 18 (3.05_Ch18_PWR0_standing)

1.2.3. Channel 26

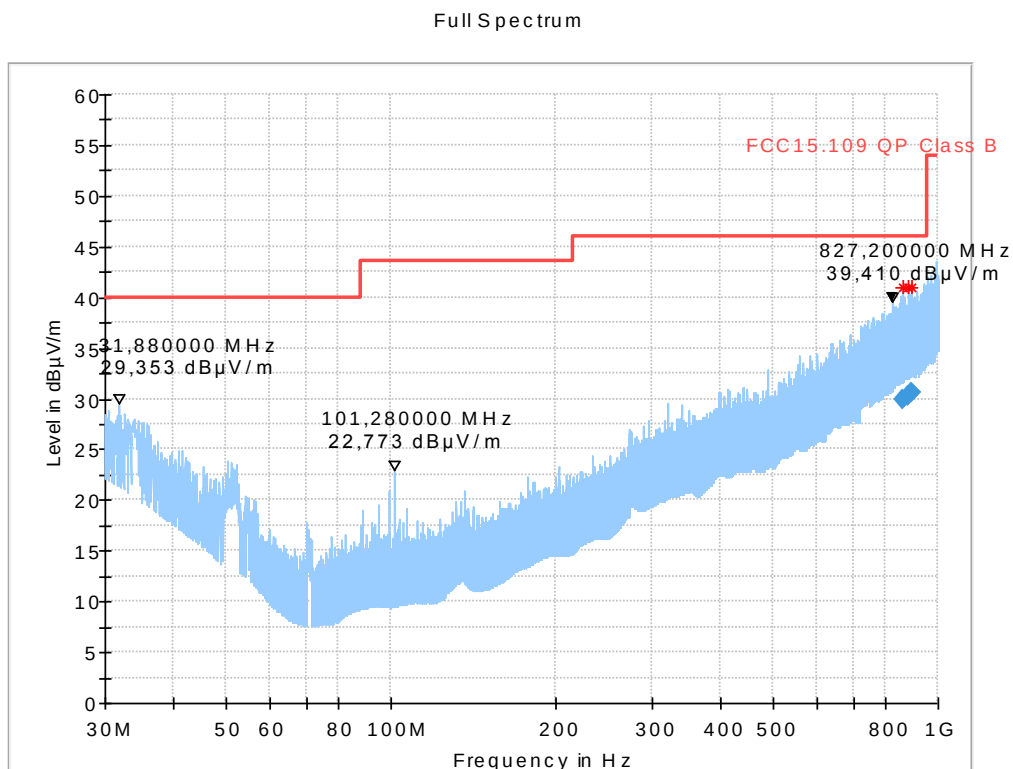


Diagram 11: Channel 26 (3.01_Ch26_laying)

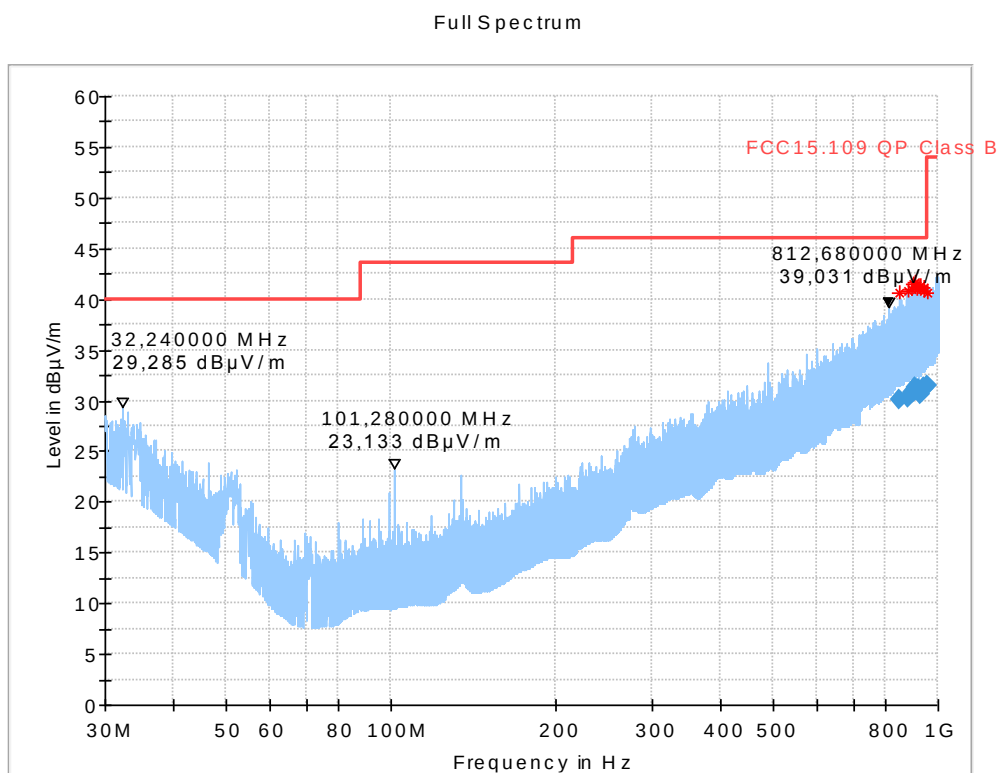
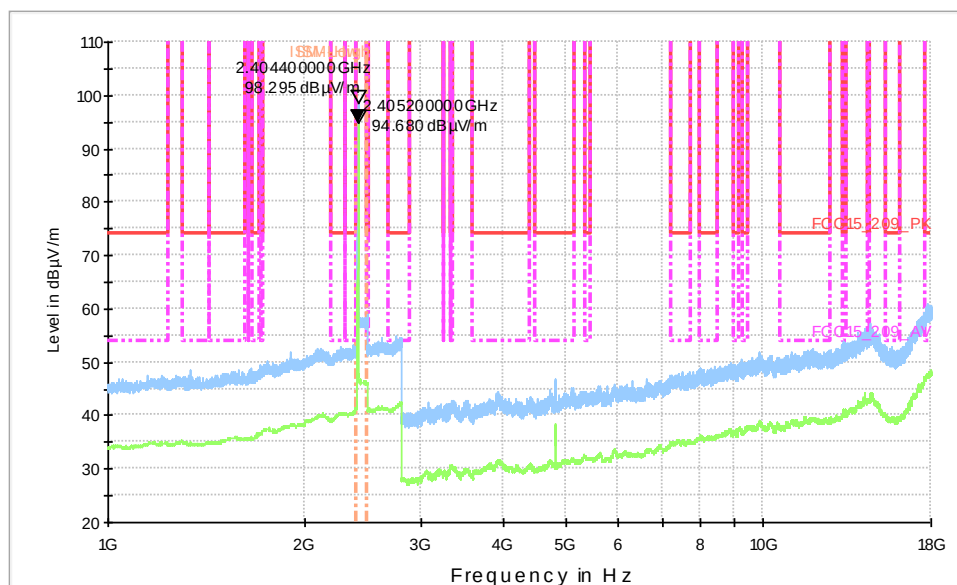


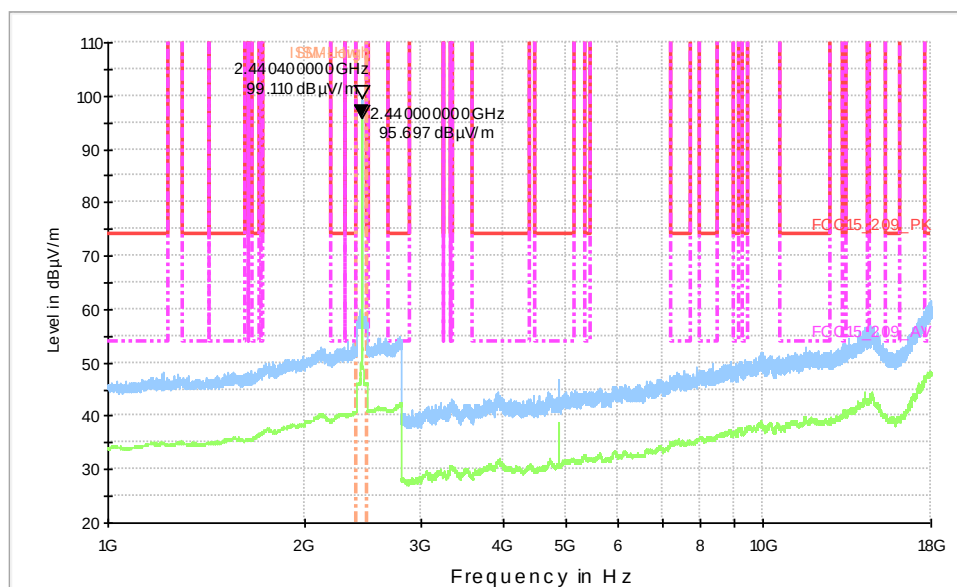
Diagram 12: Channel 26 (3.04_Ch26_standing)

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

1.3.1. Channel 11



1.3.2. Channel 18



1.3.3. Channel 26

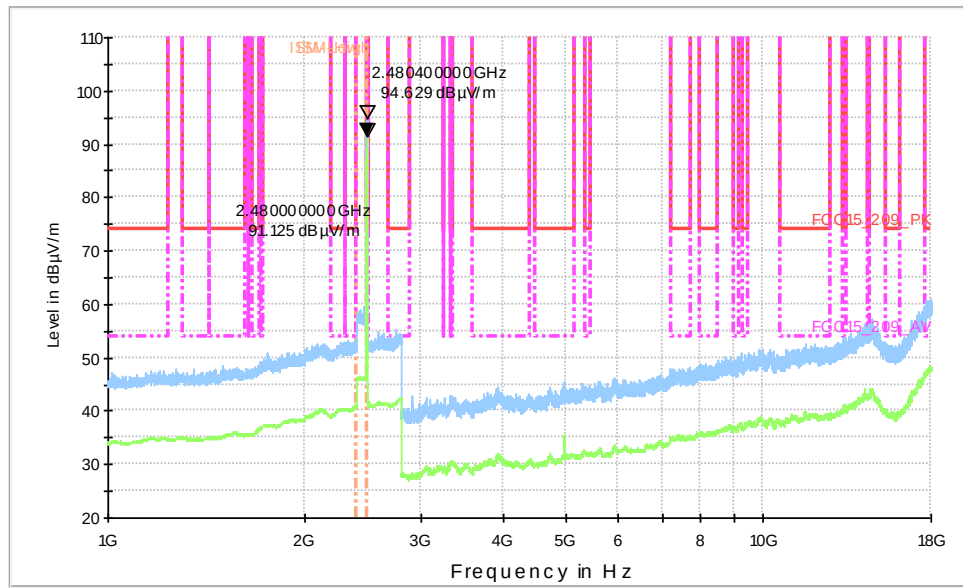
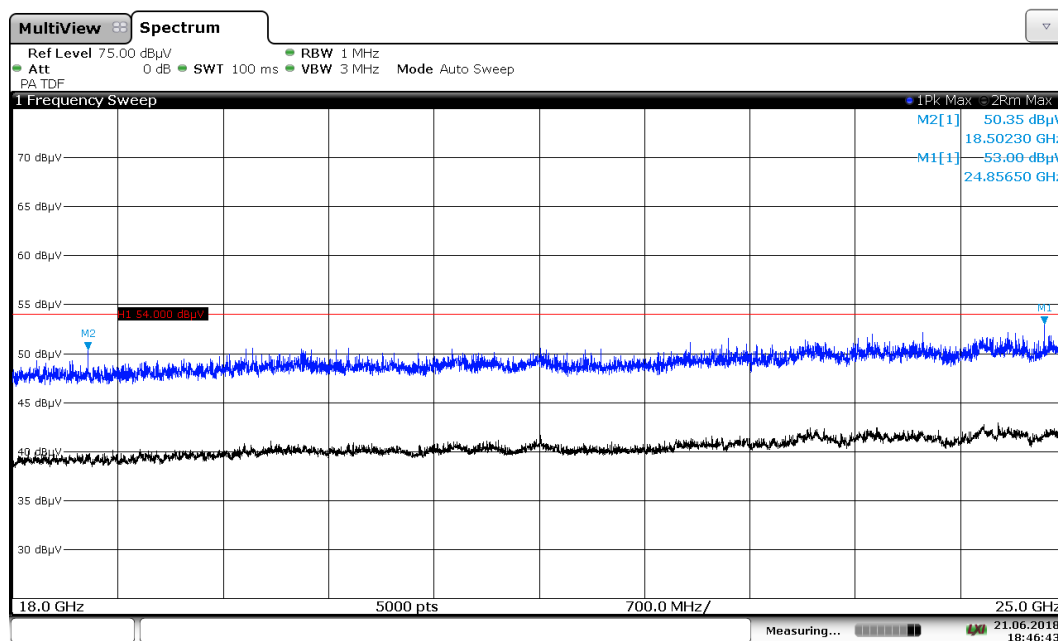


Diagram 15: Channel 26 (4.06_Ch26)

1.4. Field strength measurements above 18GHz

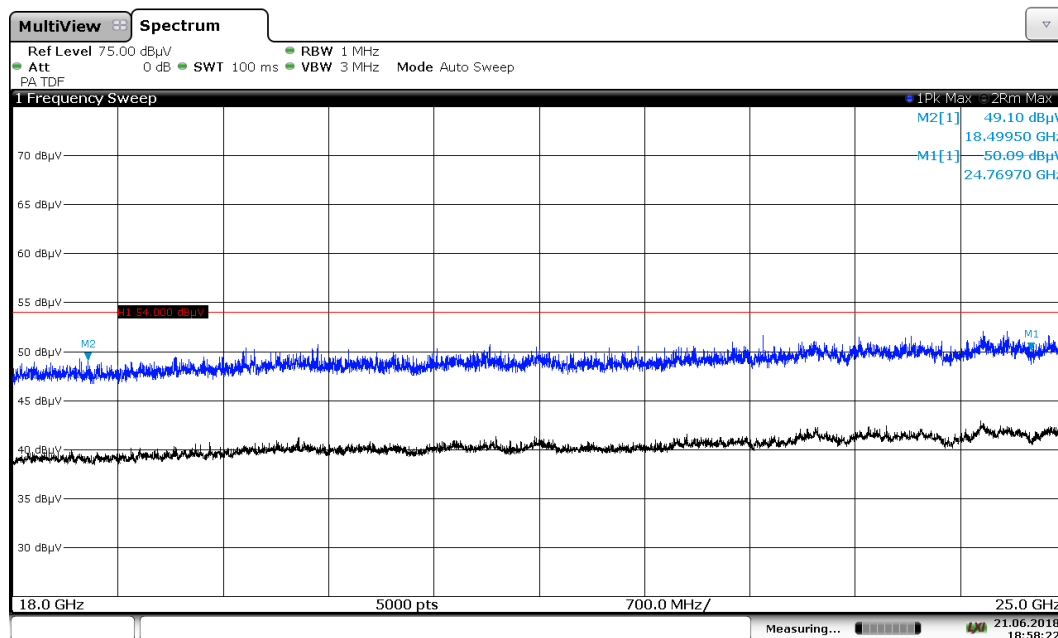
1.4.1. Channel 11



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Diagram 16: Ch11

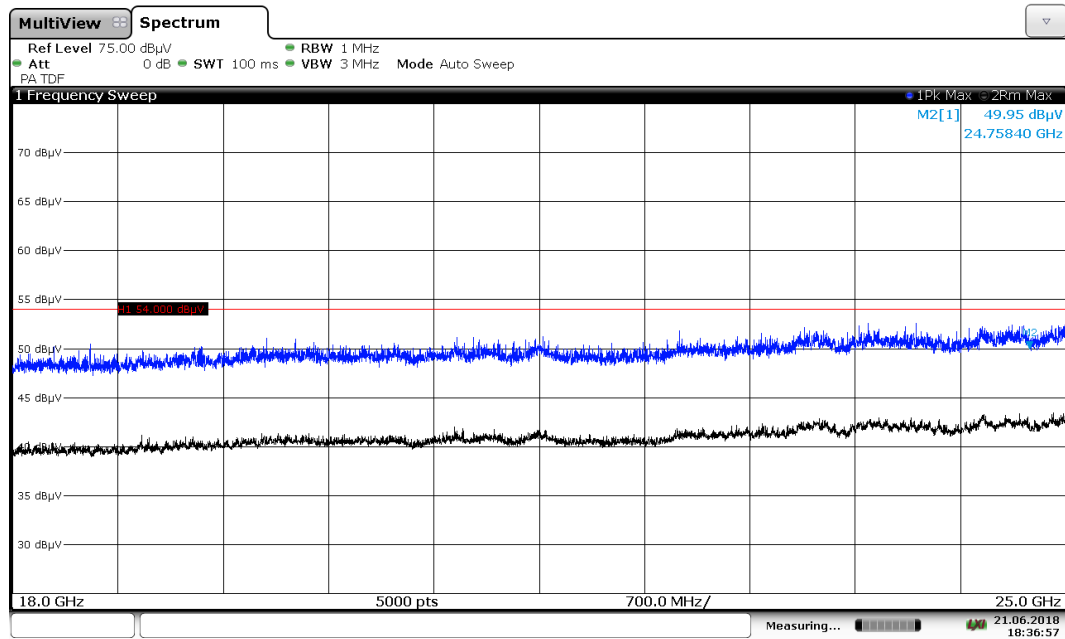
1.4.2. Channel 18



18:58:22 21.06.2018

Diagram 17: Ch18

1.4.3. Channel 26



18:36:57 21.06.2018

Diagram 18: Ch26

2. Band-edge measurements

2.1. Channel 11 (left band edge)

2.1.1. Conducted 20dBc

Result

DUT Frequency (MHz)	Result
2405.000000	PASS

Inband Peak

Frequency (MHz)	Level (dBm)
2404.715294	2.0

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.950000	-38.8	20.8	-18.0	PASS
2399.900000	-40.0	21.9	-18.0	PASS
2399.850000	-41.1	23.0	-18.0	PASS
2399.800000	-41.2	23.1	-18.0	PASS
2398.950000	-42.0	23.9	-18.0	PASS
2399.150000	-42.0	24.0	-18.0	PASS
2399.100000	-42.3	24.3	-18.0	PASS
2399.750000	-42.5	24.5	-18.0	PASS
2398.850000	-42.7	24.7	-18.0	PASS
2399.200000	-42.7	24.7	-18.0	PASS
2399.000000	-42.8	24.8	-18.0	PASS
2398.900000	-43.0	25.0	-18.0	PASS
2399.250000	-43.3	25.3	-18.0	PASS
2398.800000	-43.4	25.4	-18.0	PASS
2399.300000	-43.7	25.6	-18.0	PASS

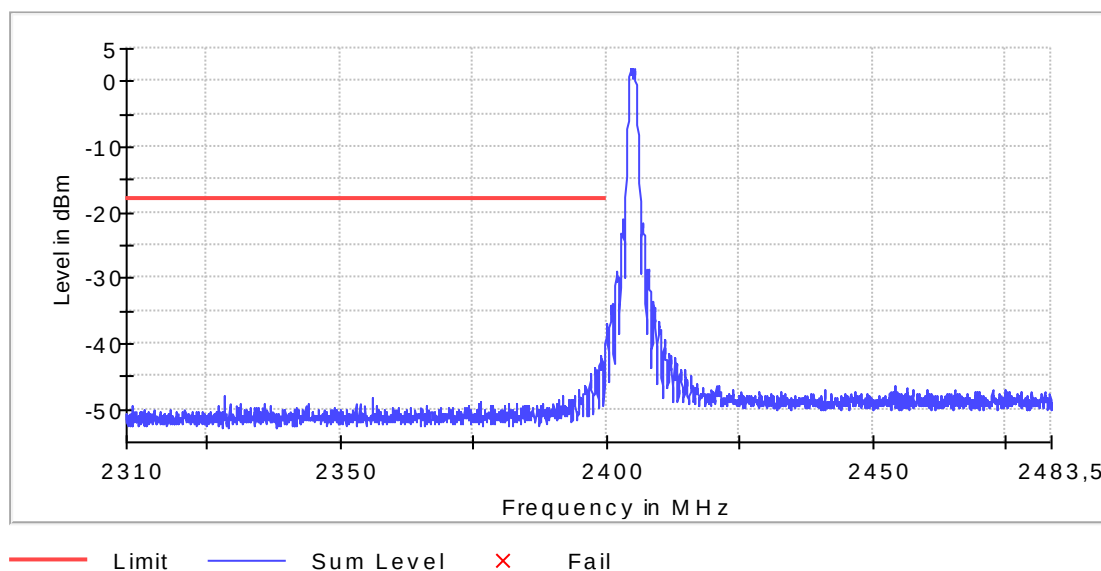


Diagram 19: Channel 11 – Band –Edge low (Ch11=2405MHz)

2.1.2. Radiated

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

2.2. Channel 26 (right band edge)

2.2.1. Conducted 20dBc

Result

DUT Frequency (MHz)	Result
2480.000000	PASS

Inband Peak

Frequency (MHz)	Level (dBm)
2479.816176	-3.4

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2371.750000	-58.8	35.4	-23.4	PASS
2377.100000	-59.2	35.7	-23.4	PASS
2384.900000	-59.2	35.8	-23.4	PASS
2395.050000	-59.3	35.8	-23.4	PASS
2362.650000	-59.3	35.9	-23.4	PASS
2395.100000	-59.4	36.0	-23.4	PASS
2346.150000	-59.5	36.1	-23.4	PASS
2377.150000	-59.6	36.1	-23.4	PASS
2362.600000	-59.6	36.2	-23.4	PASS
2343.200000	-59.7	36.2	-23.4	PASS
2343.150000	-59.8	36.3	-23.4	PASS
2359.100000	-59.9	36.4	-23.4	PASS
2382.300000	-59.9	36.4	-23.4	PASS
2323.900000	-59.9	36.4	-23.4	PASS
2331.600000	-59.9	36.5	-23.4	PASS

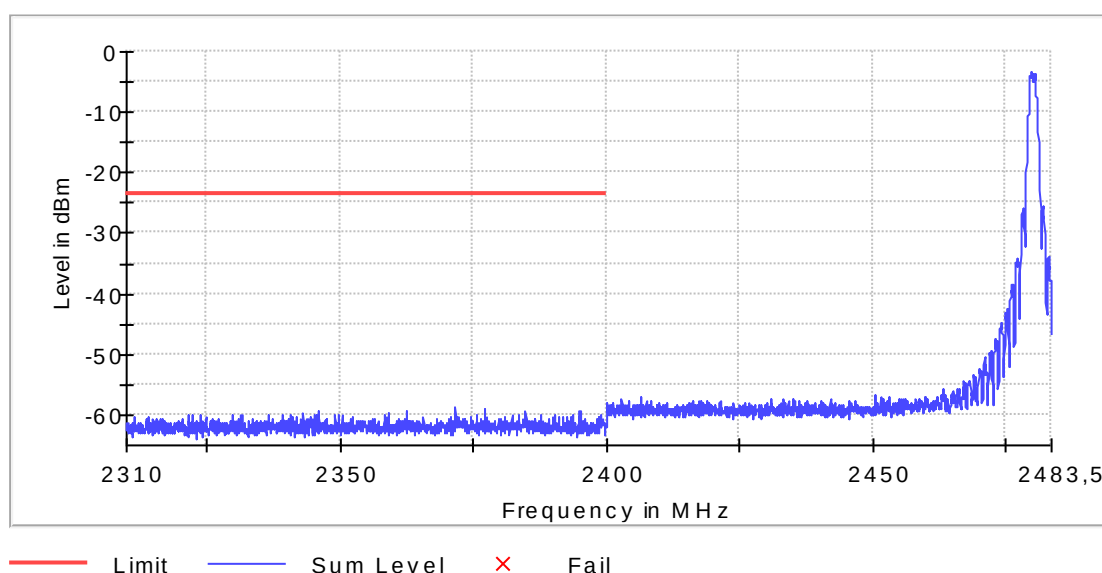


Diagram 20: Channel 26 – Band –Edge high (Ch26=2480MHz)

2.2.2. Radiated accord. §15.209 & 15.205

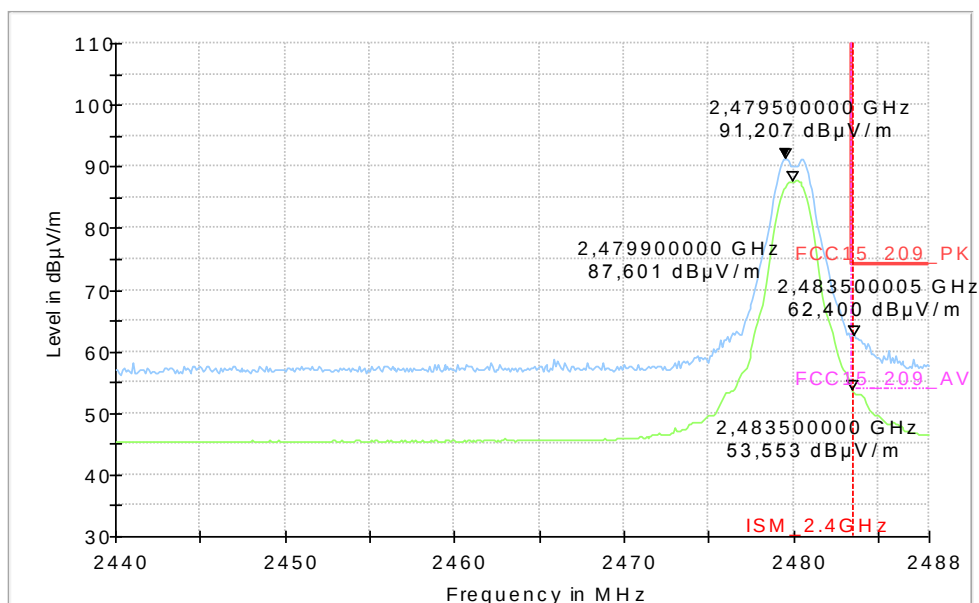
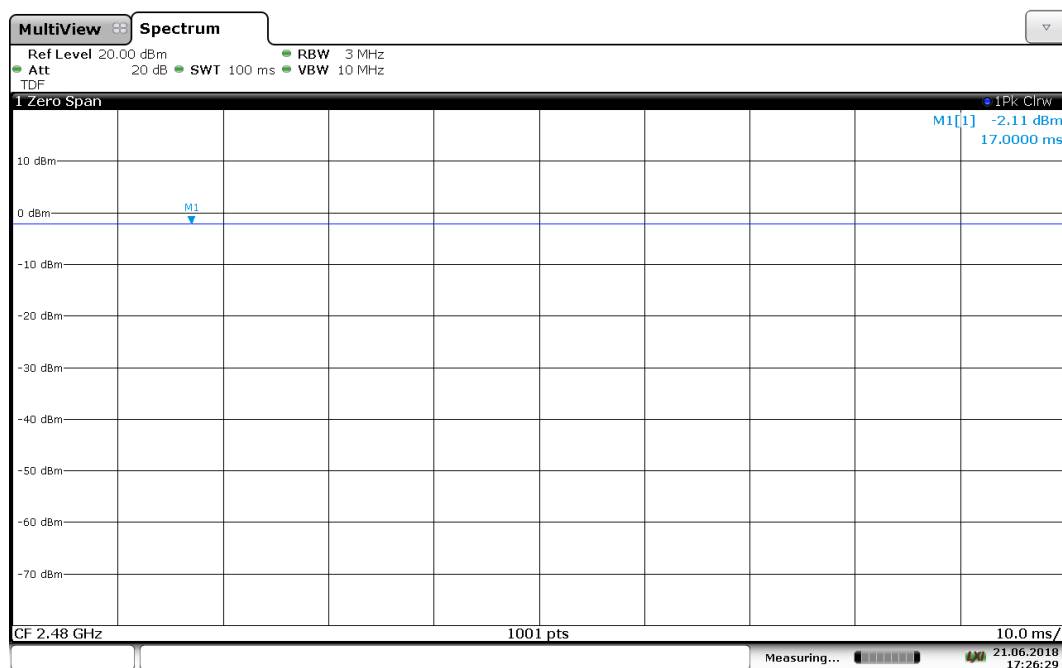


Diagram 21: Antenna 1 (test performed with PWR8)

➔ pass

3. Conducted RF-measurements on antenna port

3.1. Duty-Cycle of EUT



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Diagram 22: check of duty-cycle on channel 26 (100ms period)



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Diagram 23: check of duty-cycle on channel 26 (long 10s period)

3.2. Conducted RF-power (Peak)

3.2.1. Channel 11

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2405.000000	5.5	30.0	PASS

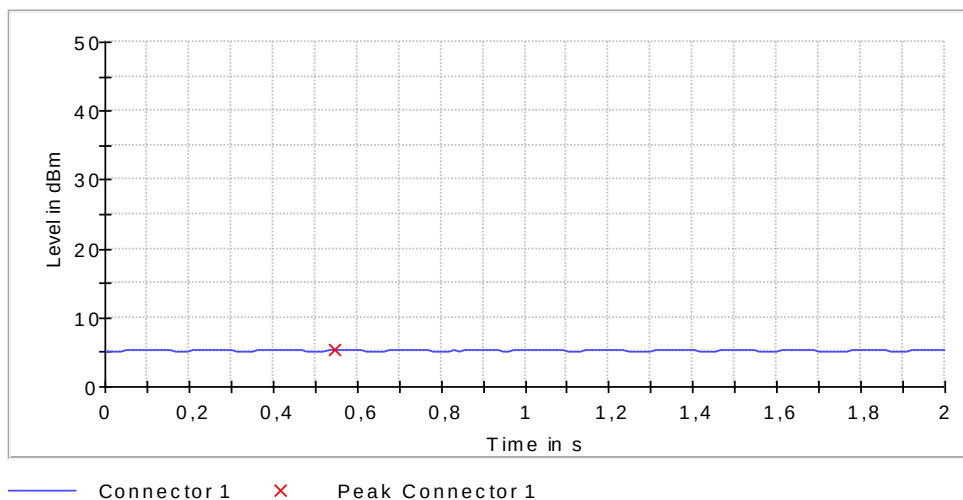


Diagram 24: Channel 11

3.2.2. Channel 12

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2410.000000	5.5	30.0	PASS

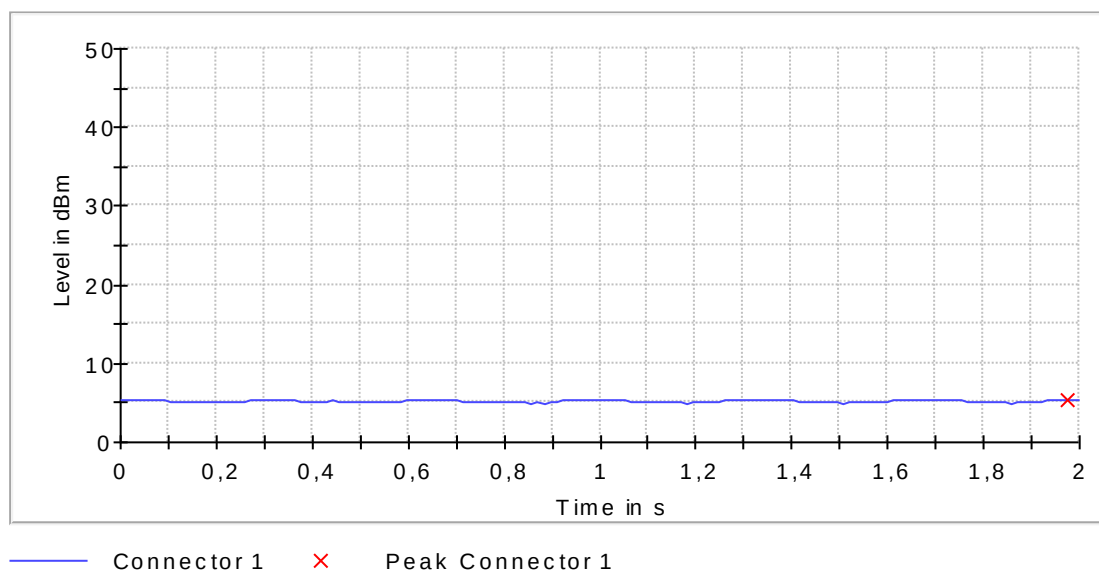


Diagram 25: Channel 12

3.2.3. Channel 18

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2440.000000	5.4	30.0	PASS

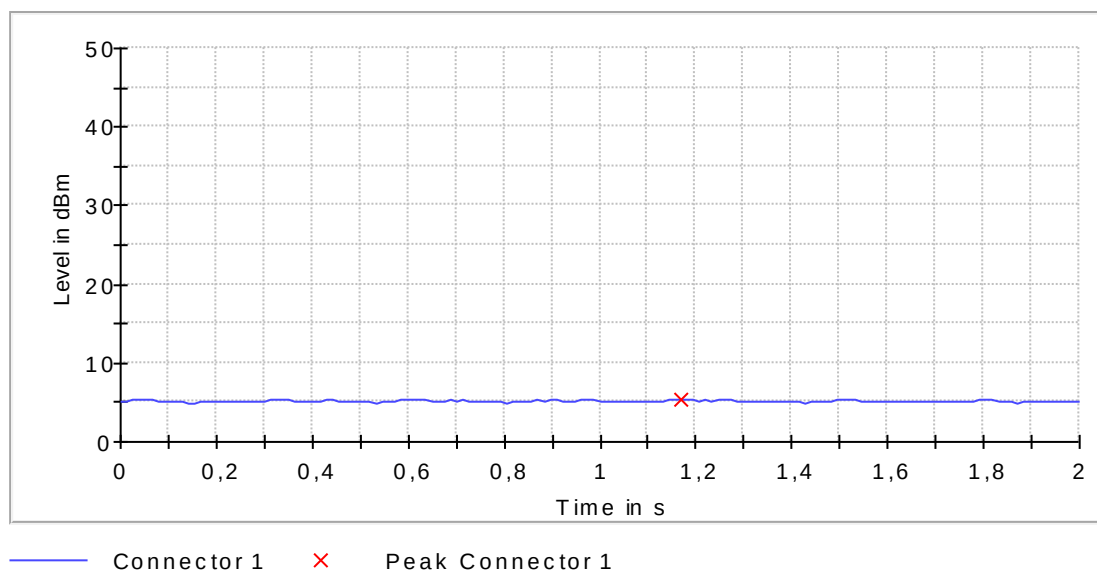


Diagram 26: Channel 18

3.2.4. Channel 26

DUT Frequency (MHz)	Peak Power (dBm)	Limit Max (dBm)	Result
2480.000000	0.1	30.0	PASS

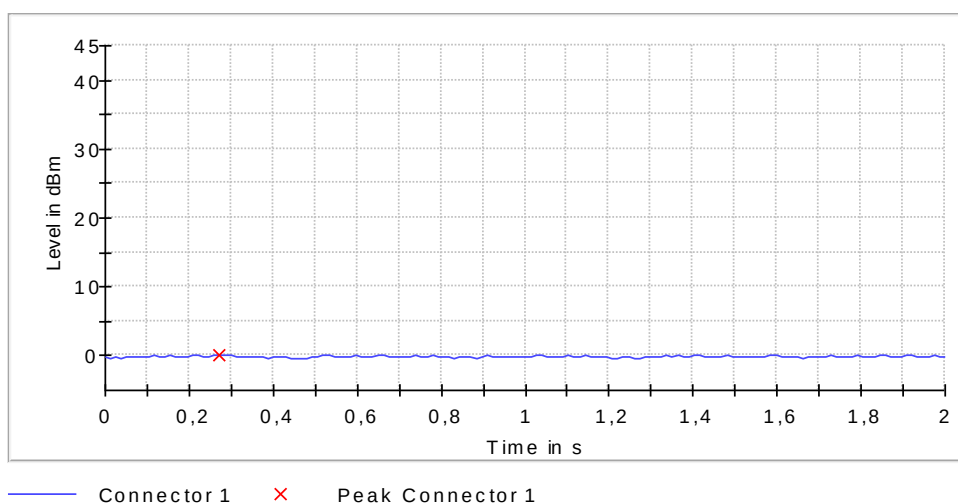


Diagram 27: Channel 26, PWR8

3.3. 6-dB Bandwidth

3.3.1. 6-dB Bandwidth Ch11

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2405.000000	1.688312	0.500000	---	2404.155844	2405.844156

DUT Frequency (MHz)	Max Level (dBm)	Result
2405.000000	2.4	PASS

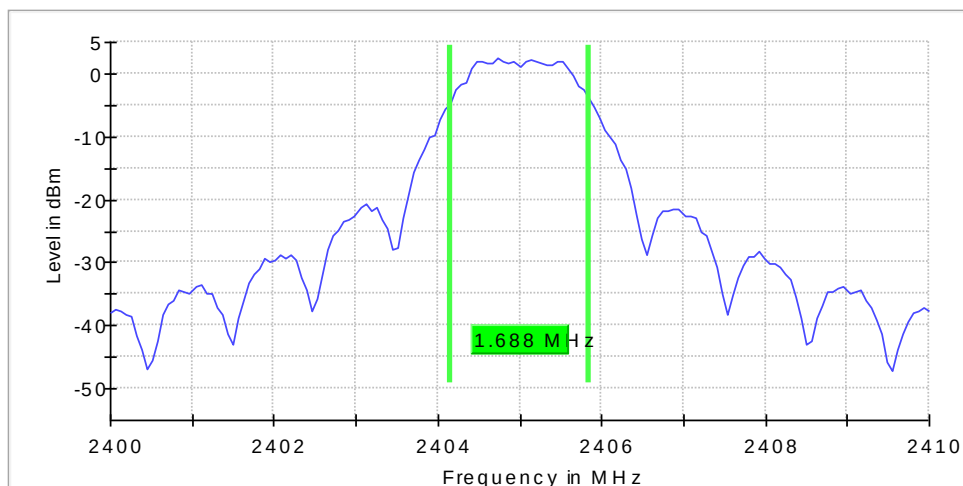


Diagram 28: Channel 11

3.3.2. 6-dB Bandwidth Ch18

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2410.000000	1.688312	0.500000	---	2409.155844	2410.844156

DUT Frequency (MHz)	Max Level (dBm)	Result
2410.000000	2.2	PASS

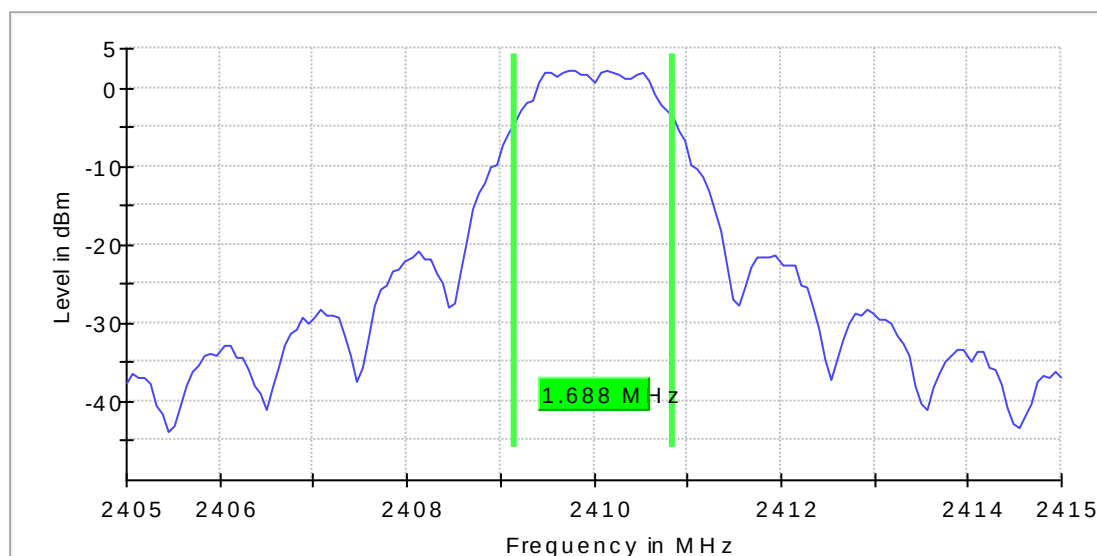


Diagram 29: Channel 18

3.3.3. 6-dB Bandwidth Ch18

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2440.000000	1.753247	0.500000	---	2439.155844	2440.909091

DUT Frequency (MHz)	Max Level (dBm)	Result
2440.000000	2.0	PASS

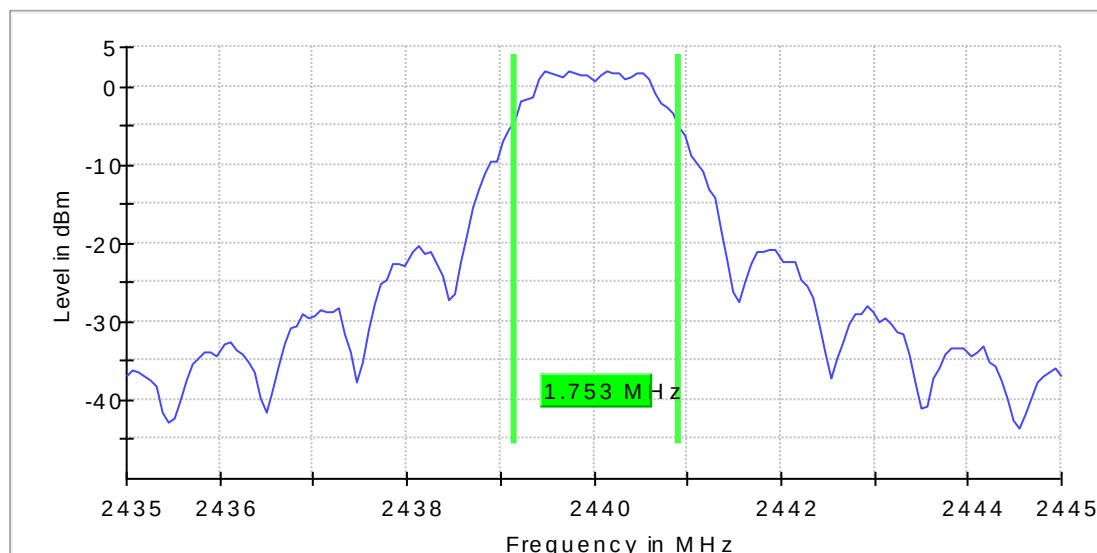


Diagram 30: Channel 18

3.3.4. 6-dB Bandwidth Ch26

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)
2480.000000	1.753247	0.500000	---	2479.155844	2480.909091

DUT Frequency (MHz)	Max Level (dBm)	Result
2480.000000	-3.2	PASS

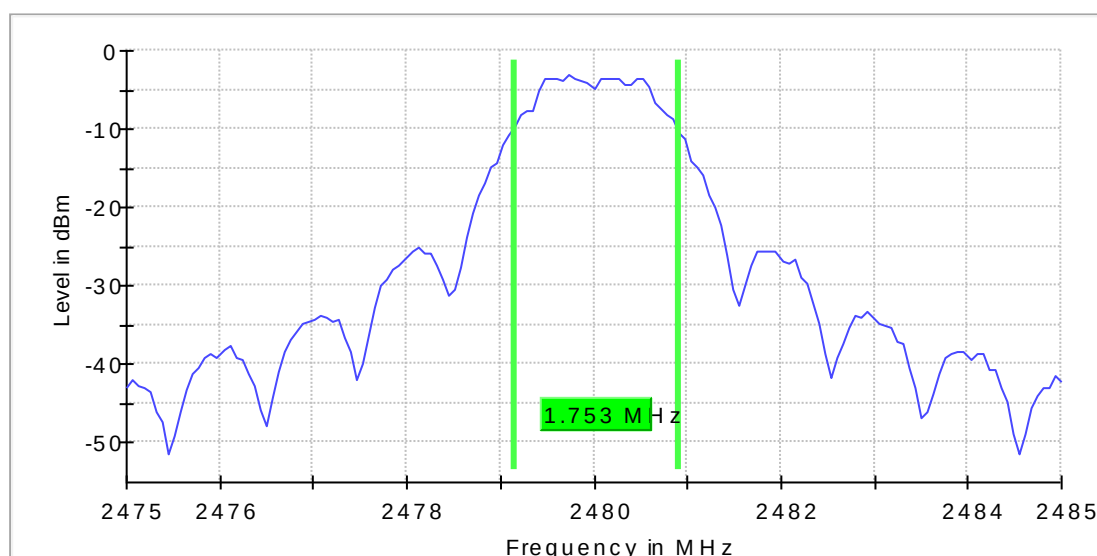


Diagram 31: Channel 26

3.4. 99% Occupied Bandwidth

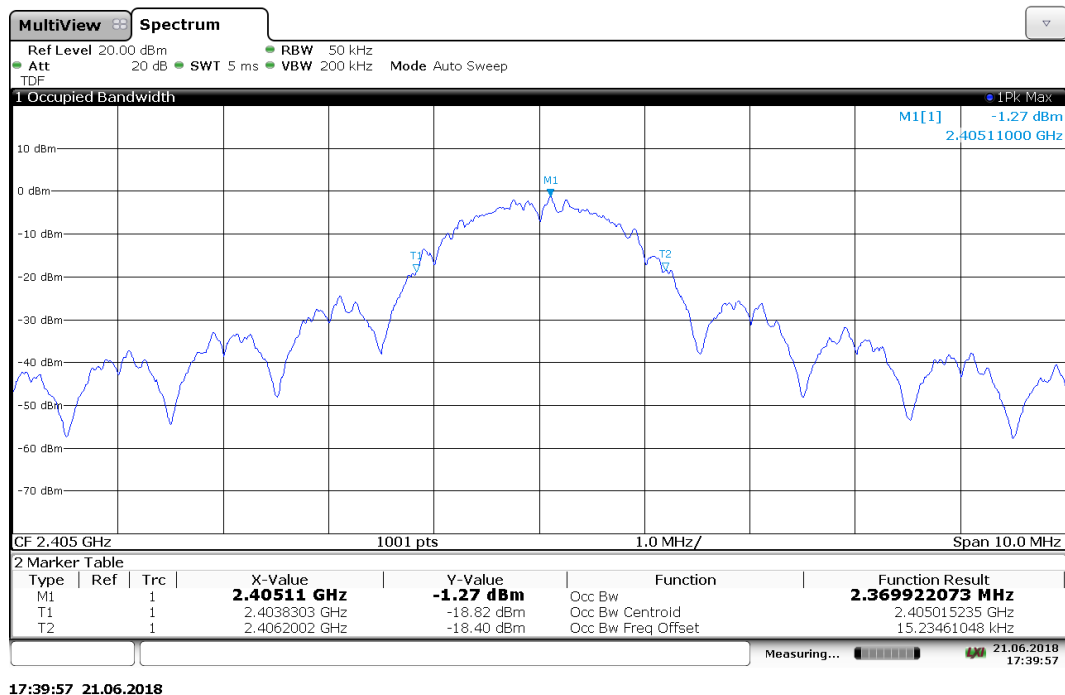


Diagram 32: OBW 99% - channel 11

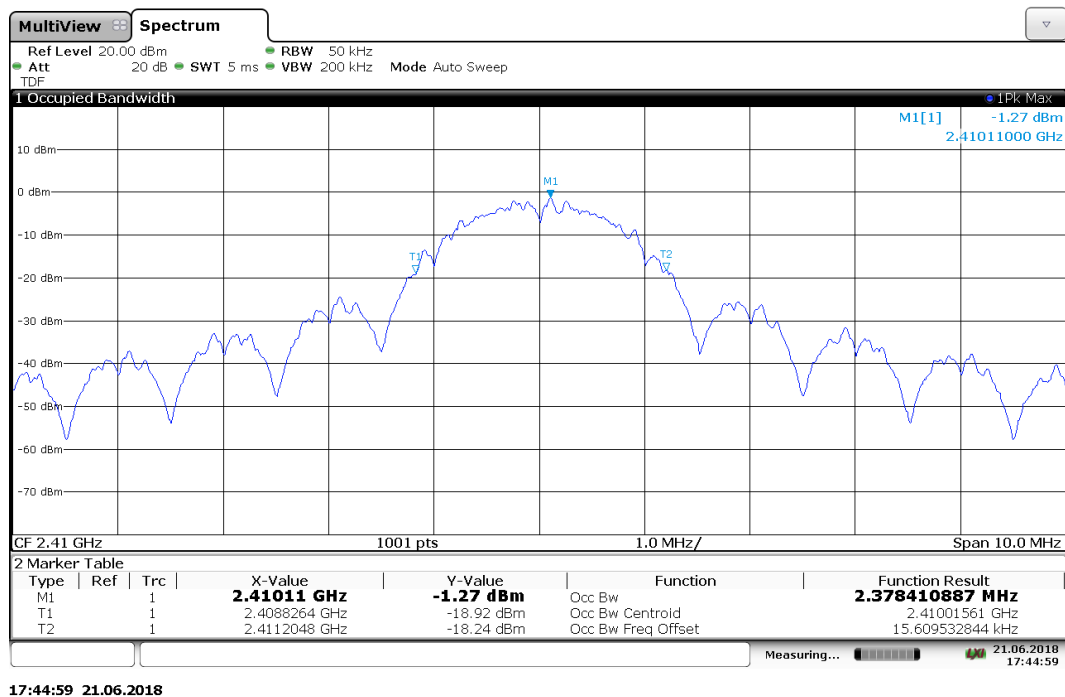
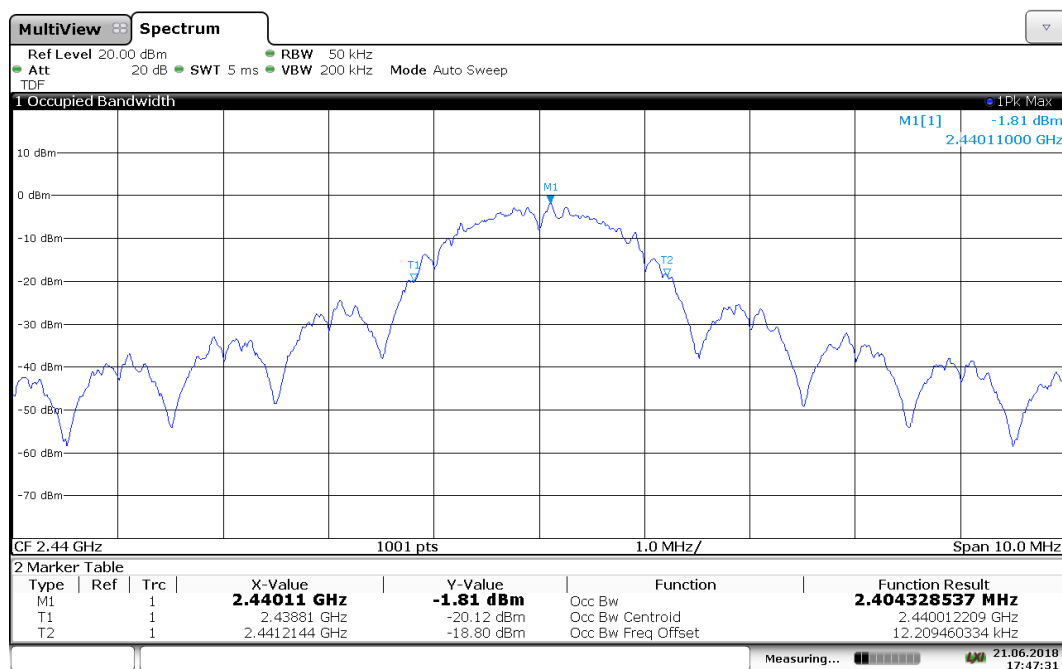
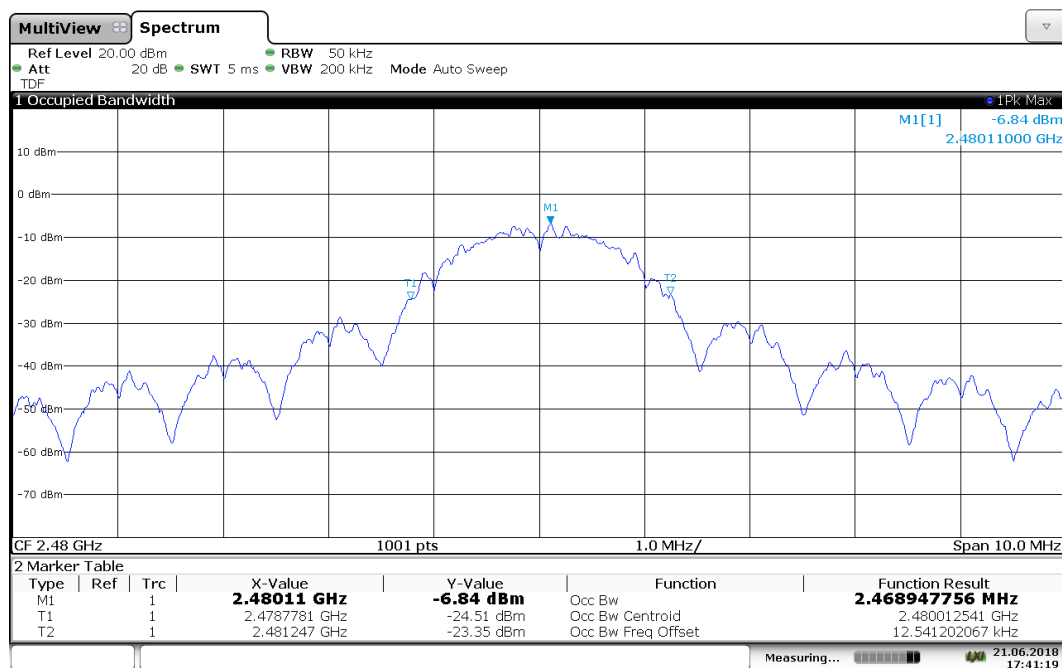


Diagram 33: OBW 99% - channel 12



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Diagram 34: OBW 99% - channel 18



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Diagram 35: OBW 99% - channel 26

3.5. Power Spectral Density

3.5.1. Channel 11

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2405.000000	2405.440000	-13.731	8.0	PASS

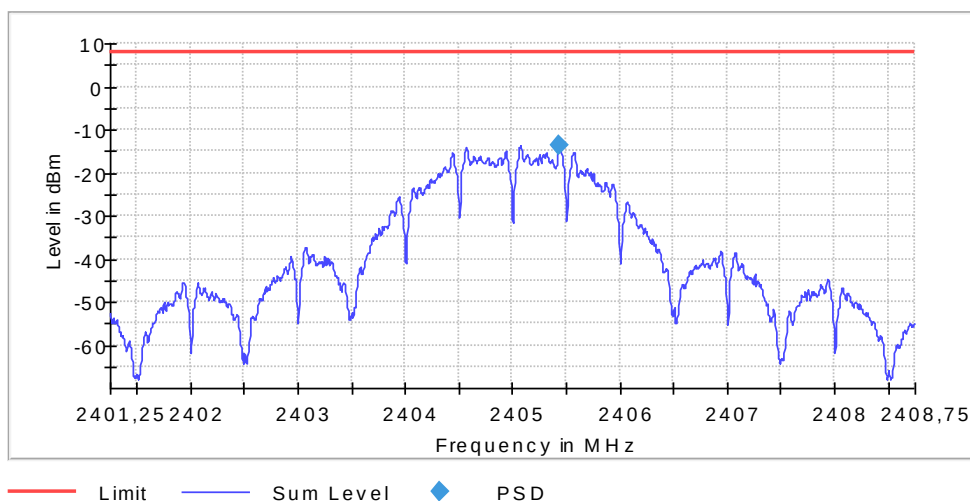


Diagram 36: Power Spectrum density (channel 11)

3.5.2. Channel 12

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2410.000000	2410.440000	-13.772	8.0	PASS

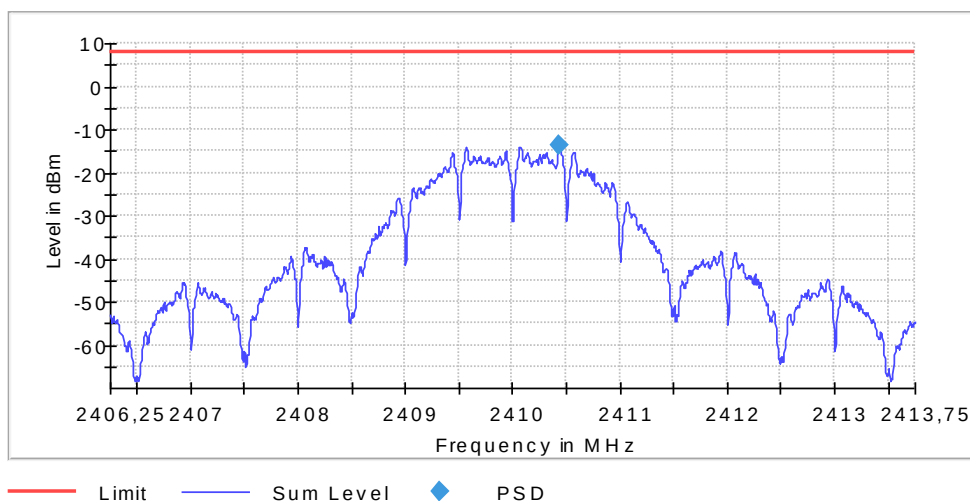


Diagram 37: Power Spectrum density (channel 12)

3.5.3. Channel 18

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2440.000000	2440.430000	-14.146	8.0	PASS

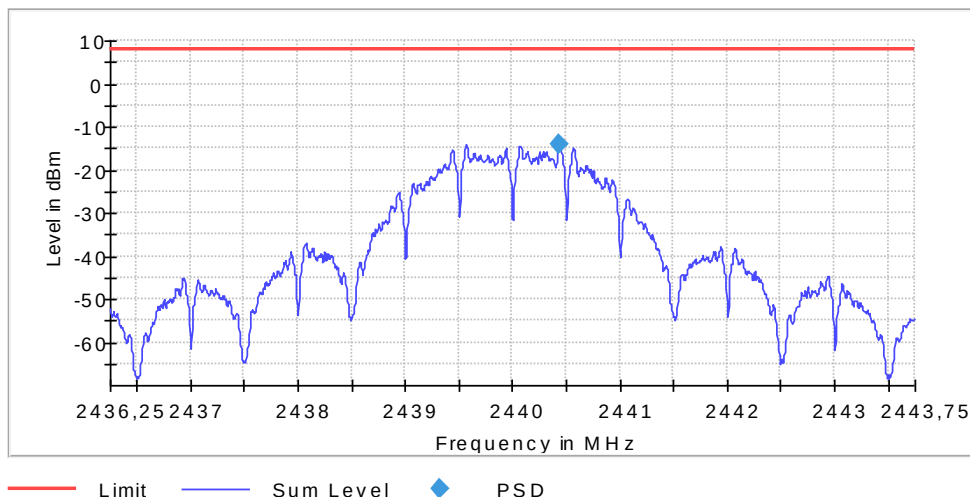


Diagram 38: Power Spectrum density (channel 18)

3.5.4. Channel 26

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2480.000000	2480.445000	-19.370	8.0	PASS

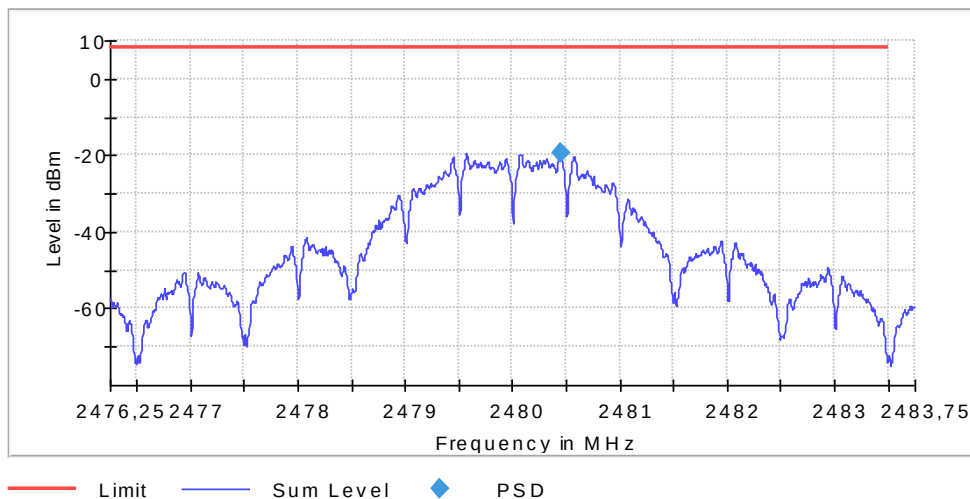


Diagram 39: Power Spectrum density (channel 26)

3.6. 20dBc Emissions (conducted)

3.6.1. Channel 11

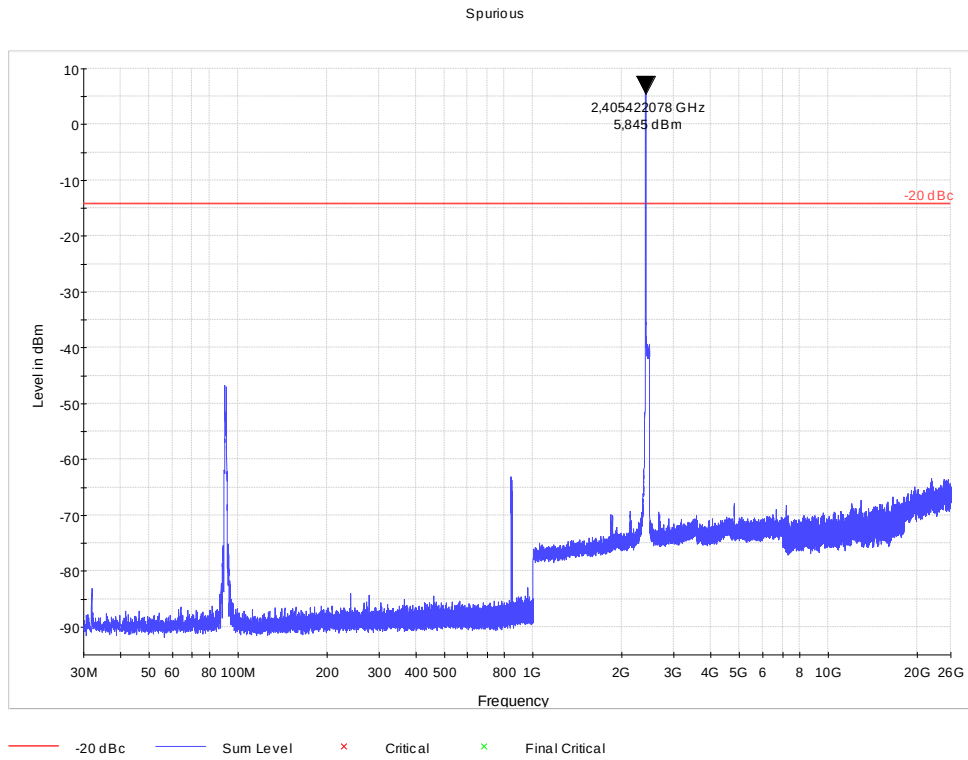


Diagram 40: 20dBc emissions on channel 11

3.6.2. Channel 12

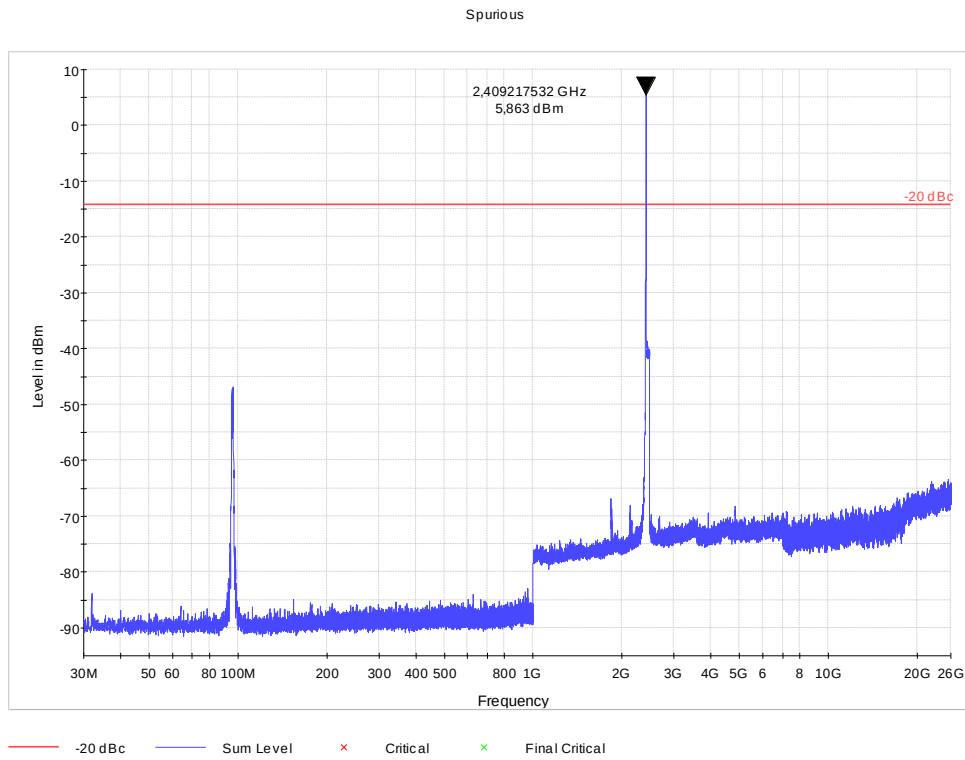


Diagram 41: 20dBc emissions on channel 12

3.6.3. Channel 18

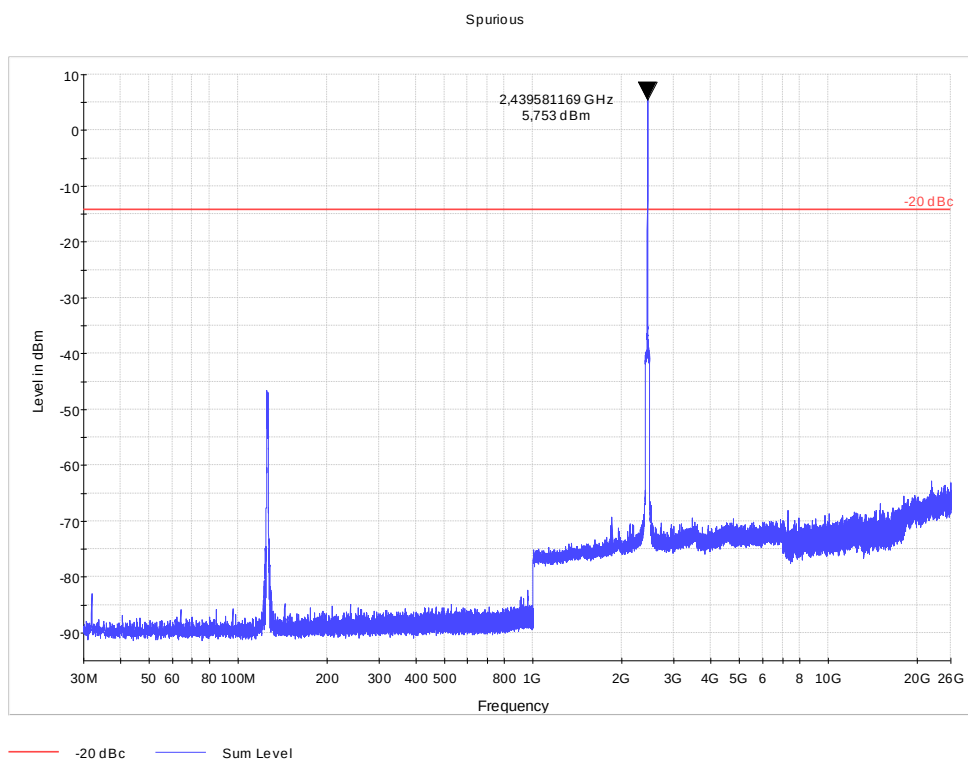


Diagram 42: 20dBc emissions on channel 18

3.6.4. Channel 26

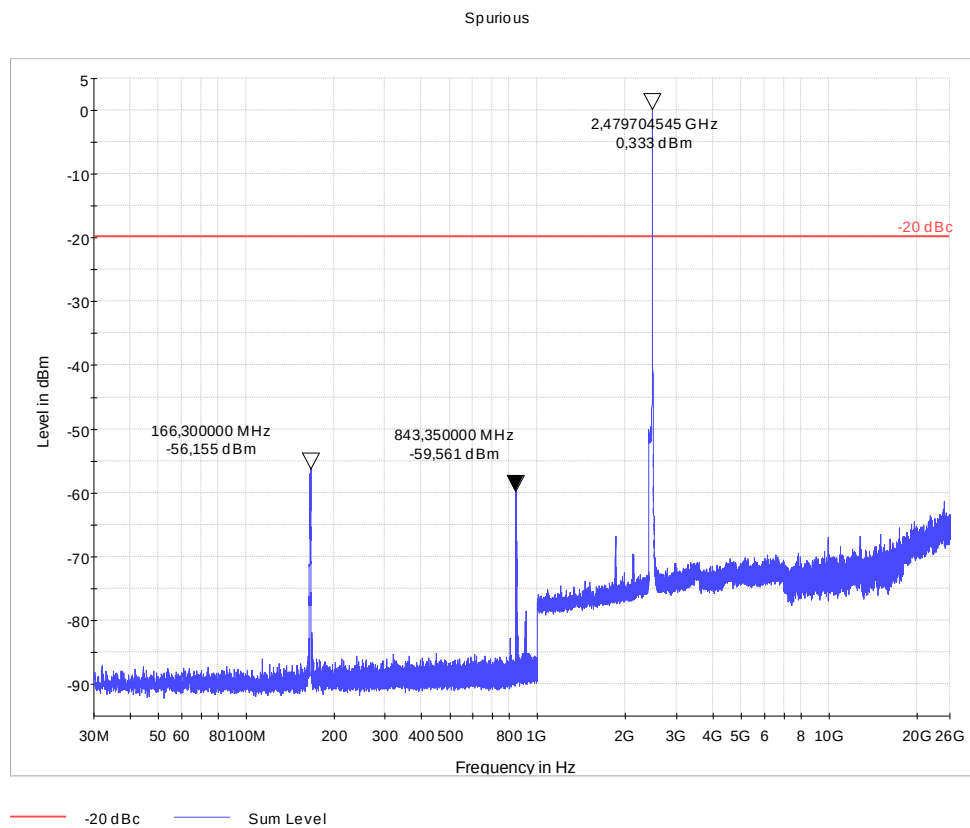


Diagram 43: 20dBc emissions on channel 26 -> Pass