

Fig. 37 Radiated Band Edges (8DPSK, CH78, 2.45GHz~2.50GHz)

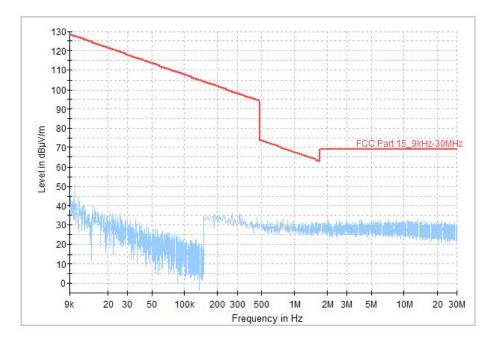


Fig. 38 Radiated Spurious Emission (All Channels, 9kHz ~30MHz)



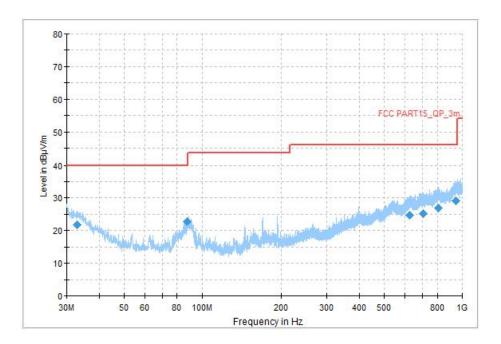


Fig. 39 Radiated Spurious Emission (All Channels, 30MHz ~1GHz)

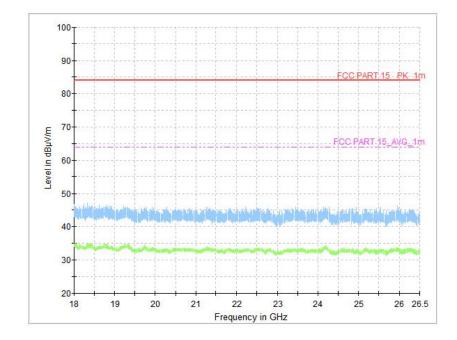


Fig. 40 Radiated Spurious Emission (All Channels, 18GHz ~26.5GHz)



## A.5 20dB Bandwidth

### Method of Measurement: See ANSI C63.10-clause 7.8.7.

#### Measurement Limit:

Standard	Limit (MHz)
FCC 47 CFR Part 15.247 (a)	/

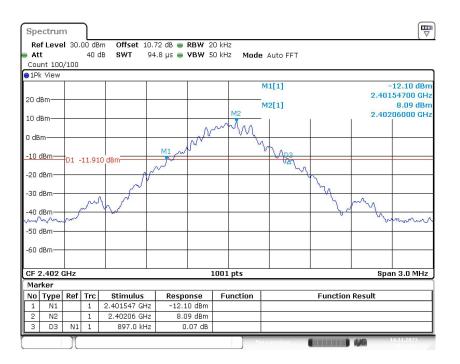
#### Measurement Result:

Mode	Frequency (MHz)		indwidth IHz)	Conclusion
	2402(CH0)	Fig.41	0.90	
GFSK	2441(CH39)	Fig.42	0.90	/
	2480(CH78)	Fig.43	0.90	
	2402(CH0)	Fig.44	1.32	
π/4 DQPSK	2441(CH39)	Fig.45	1.32	/
	2480(CH78)	Fig.46	1.32	
	2402(CH0)	Fig.47	1.29	
8DPSK	2441(CH39)	Fig.48	1.29	/
	2480(CH78)	Fig.49	1.29	

See below for test graphs.

Conclusion: PASS







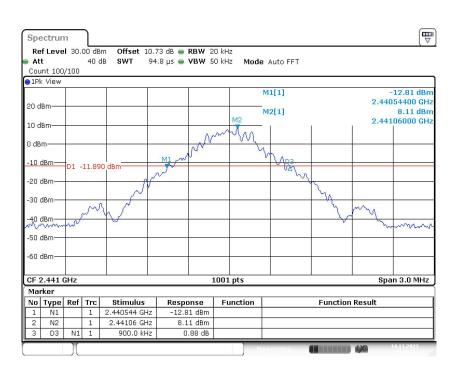
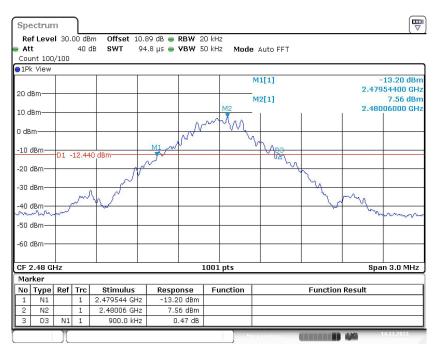
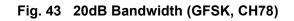
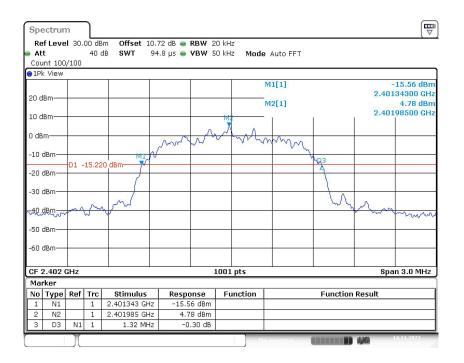


Fig. 42 20dB Bandwidth (GFSK, CH39)



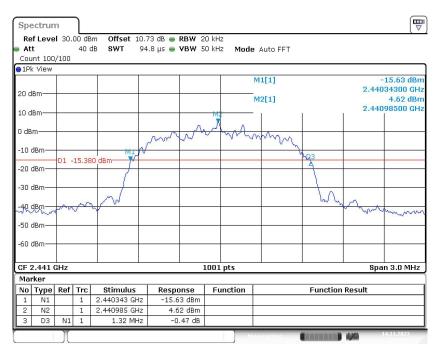




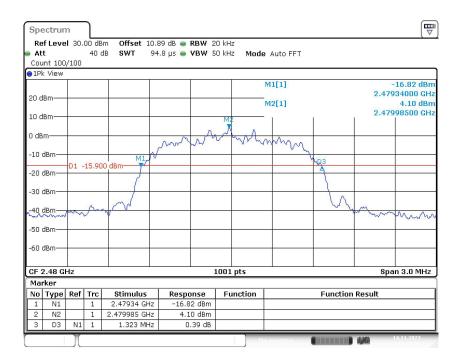








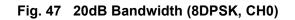


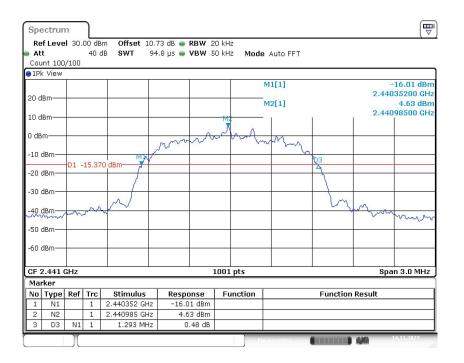


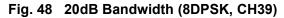


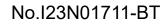


Count 100/100  1Pk View  20 dBm  20 dB	Spe	ctrur	n	٦								
20 dBm         M1[1]         -15.26 dBm           20 dBm         M2[1]         4.75 dBm           10 dBm         0         M2[1]         4.75 dBm           -10 dBm         01 -15.250 dBm         03         03           -20 dBm         03         03         03           -20 dBm         03         03         04           -20 dBm         03         04         04           -30 dBm         04         04         04           -50 dBm         04         04         04           -50 dBm         04         04         04           -50 dBm         05         05         05         05           -60 dBm         001 pts         Span 3.0 MHz           Marker         1001 pts         Span 3.0 MHz           Na Type         Ref         Trc         Stimulus         Response         Function           1         N1         1         2.401385 GHz         -15.26 dBm         1           2         N2         1         2.401385 GHz         -15.26 dBm         1           2         N2         1         2.401385 GHz         -0.50 dB         1	Att					-			Auto FFT			
20 dBm 2.40135500 GH; 4.75 dBn 2.40198500 GH; 0 dBm 01 -15.250 dBm 03 03 03 03 03 05 04 05 05 05 05 05 05 05 05 05 05 05 05 05	●1Pk	View										
10 dBin     0 dBm     0 dBm     0 dBm       -10 dBm     01 -15.250 dBm     03       -20 dBm     03       -30 dBm     03       -30 dBm     04       -50 dBm     04       -60 dBm     04       -60 dBm     04       -60 dBm     04       -10 type     Ref       Trc     Stimulus       Response     Function       Function Result       1     N1       1     2.401385 GHz       -15.26 dBm	20 di	3m									2.401	35500 GHz 4.75 dBm
0 dBm -10 dBm -20 d	10 dE	3m					M		1	7	2.401	98500 GH
-10 dBm -20 dBm -20 dBm -30 dBm -30 dBm -30 dBm -50 dBm -50 dBm -50 dBm -60 dBm -100 pts -50 dBm -60 dBm -60 dBm -60 dBm -70 dBm -7	0 dBr	n				mount	and	a.A.	m			
-20 dBm -30 dBm -30 dBm -30 dBm -50	-10 d	IBm—	-01 -	15 25		~~			5	Q3		
40.dBm	-20 d	IBm—	DI -	10,20						4		
40.dem         40.dem<	-30 d	IBm—										
-50 dBm -60 dBm -60 dBm -60 dBm -60 dBm -70 dBm -60 dBm -60 dBm -60 dBm -60 dBm -70	-40 d	iBro	word	M						C.M	sol	
CF 2.402 GHz         1001 pts         Span 3.0 MHz           Marker         Stimulus         Response         Function         Function Result           1         N1         1         2.401355 GHz         -15.26 dBm         -           2         N2         1         2.401985 GHz         4.75 dBm         -           3         D3         N1         1         1.293 MHz         -0.50 dB         -				254								
Marker         Function         Function           No         Type         Ref         Trc         Stimulus         Response         Function         Function Result           1         N1         1         2.401355 GHz         -15.26 dBm         -           2         N2         1         2.401985 GHz         4.75 dBm         -           3         D3         N1         1         1.293 MHz         -0.50 dB         -	-60 d	IBm—										
Marker         Function         Function           No         Type         Ref         Trc         Stimulus         Response         Function         Function Result           1         N1         1         2.401355 GHz         -15.26 dBm         -           2         N2         1         2.401985 GHz         4.75 dBm         -           3         D3         N1         1         1.293 MHz         -0.50 dB         -												
No         Type         Ref         Trc         Stimulus         Response         Function         Function Result           1         N1         1         2.401355 GHz         -15.26 dBm         -         -           2         N2         1         2.401985 GHz         4.75 dBm         -         -           3         D3         N1         1         1.293 MHz         -0.50 dB         -         -	CF 2	.402	GHz				1001	pts			Spa	n 3.0 MHz
1         N1         1         2.401355 GHz         -15.26 dBm           2         N2         1         2.401985 GHz         4.75 dBm           3         D3         N1         1         1.293 MHz												
2         N2         1         2.401985 GHz         4.75 dBm           3         D3         N1         1         2.401985 GHz         -0.50 dB			Ref					nction		Function	Result	
3 D3 N1 1 1.293 MHz -0.50 dB												
			N1	-								
		55	7	-	112.50 11112	0.30			_		4.342	4.11.2023











Spe	ectrur	n	٦								
🛛 At	<b>f Leve</b> t int 100		00 dB 40 d		0.89 dB 👄 94.8 µs 👄			e Auto FFT			
● 1 PI	< View										
20 d	Bm							M1[1] M2[1]		2.479	-16.46 dBn 935200 GH: 4.11 dBn
10 d	Bm—						MZ	1	Ĩ	2.479	998500 GH:
0 dB	m				m	w	man	mm			
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-20	dBm	D1 -	15.89	0 dBm					4		
-30									Im	~	
-40 m	dBm	wr	and and							- Compage	man
-50	dBm										
-60	dBm—										
CF 2	2.48 G	Hz				1	l001 pts			Spa	n 3.0 MHz
	rker										
	Туре	Ref	Trc	Stimulus	Respo		Function		Function	Result	
1	N1 N2		1	2.479352 GH 2.479985 GH		6 dBm 1 dBm					
2	D3	N1	1	1.293 MH		.36 dB					
_		)[					M	easuring		4/0	14.11.2023

Fig. 49 20dB Bandwidth (8DPSK, CH78)



# A.6 Time of Occupancy (Dwell Time)

### Method of Measurement: See ANSI C63.10-clause 7.8.4.

#### Measurement Limit:

Standard	Limit (s)
FCC 47 CFR Part 15.247(a)	< 0.4

#### Measurement Results:

Mode	Frequency (MHz)	Packet		BurstWidth (ms)		lops m)	Result (s)	Conclusion
GFSK	2441(CH39)	DH5	Fig.50	2.87	Fig.51	120	0.344	Р
π/4 DQPSK	2441(CH39)	2-DH5	Fig.52	2.87	Fig.53	100	0.287	Р
8DPSK	2441(CH39)	3-DH5	Fig.54	2.87	Fig.55	110	0.316	Р

See below for test graphs.

Conclusion: Pass



Spectrum 🖌			
Ref Level 5.00 dBm Offset 10.73 dB ● RBW 1 MH			
■ Att 10 dB ● SWT 10 ms ● VBW 3 MH SGL Count 1/1 TRG: VID	z		
SGL Count 1/1 TRG: VID			
	M1[1]		-69.82 dBm
0 dBm			3.72697 ms
1KQ -2.970 OBUILENDER ALARMAN ALARMAN ALARMAN	D2[1]		2.24 dB
-10 dBm		ĩ	2.86700 ms
-20 dBm			
-30 dBm			
-40 dBm			
-50 dBm			
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-90 dBm			
CF 2.441 GHz 800	0 pts	1	1.0 ms/
T	Ready		14.11.2023



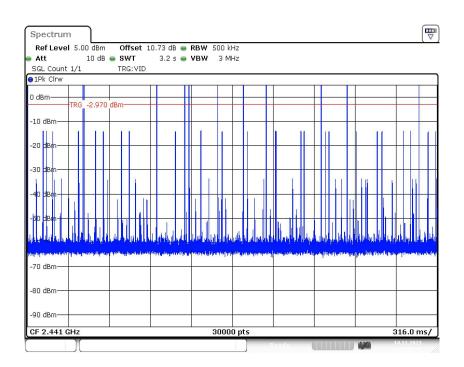
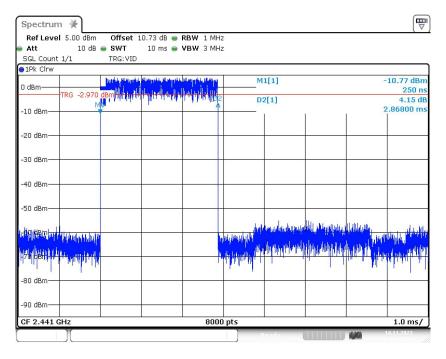


Fig. 51 Number of Burst in Observation Period (Dwell Time) (GFSK, CH39)







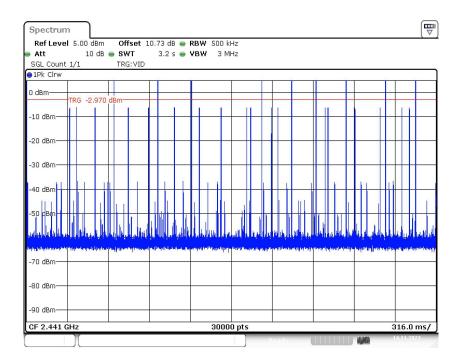


Fig. 53 Number of Burst in Observation Period (Dwell Time) ( $\pi$ /4 DQPSK, CH39)



Spectrum 🔆 Ref Level 5.00 dBm Offset 10.73	dB 👄 RBW 1 MHz			
	ms 🔵 VBW 3 MHz			
SGL Count 1/1 TRG:VID				
1Pk Clrw				
		M1[1]		-5.63 dBr
D dBm	Landah dalah katika			250 n
	atter nater series	D2[1]		1.73 d
-10 dBm			1 1	2.86900 m
-20 dBm				
-30 dBm				
10 10-1				
-40 dBm				
-50 dBm				
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-80 dBm				-
oo daliin				
-90 dBm				
CF 2.441 GHz	8000 pts		I I	1.0 ms/
T T		Dondu	1.101	14.11.2023



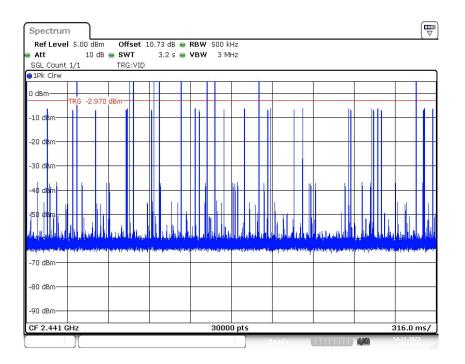


Fig. 55 Number of Burst in Observation Period (Dwell Time) (8DPSK, CH39)



## A.7 Number of Hopping Channels

### Method of Measurement: See ANSI C63.10-clause 7.8.3.

#### Measurement Limit:

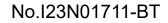
Standard	Limit (Num)
FCC 47 CFR Part 15.247(a)	At least 15 non-overlapping channels

#### **Measurement Results:**

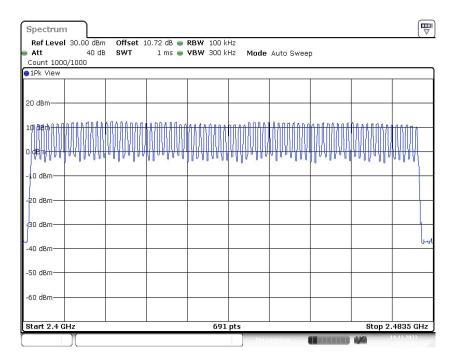
Mode	Packet	Number of Hopping Channels	Test results (Num)	Conclusion
GFSK	DH5	Fig.56	79	Р
π/4 DQPSK	2-DH5	Fig.57	79	Р
8DPSK	3-DH5	Fig.58	79	Р

See below for test graphs.

**Conclusion: Pass** 









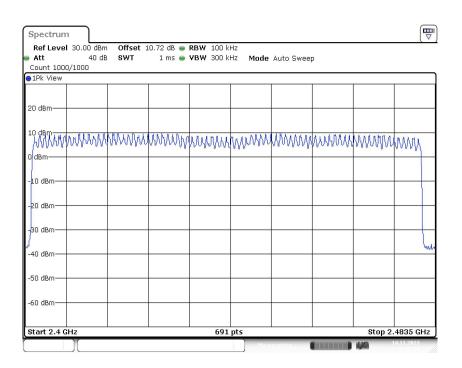


Fig. 57 Number of Hopping Channels ( $\pi/4$  DQPSK, Hopping)



Att	40 dB	SWT	1 ms 👄	<b>VBW</b> 300 k	Hz Mode	Auto Sweep	0			
Count 1000/10 1Pk View	00									_
										_
:0 dBm										
O dBm	MAN	AJUMA	MARAAAAA	ALLALAN	LIANANA	umm	ANHAAAAA	LAND ALAN	44.64.6	
dBm	1	d. 40	ne e - e - e - e (l	rwwww	AAAAAAA	an annall	ul na	Madralar	mary	
ubiii										
10 dBm										_
20 dBm										
30 dBm										
										Ĺ
40 dBm										
50 dBm										
50 dBm										

Fig. 58 Number of Hopping Channels (8DPSK, Hopping)



# A.8 Carrier Frequency Separation

## Method of Measurement: See ANSI C63.10-clause 7.8.2.

#### Measurement Limit:

Standard	Limit (kHz)
	By a minimum of 25 kHz or two-thirds of the 20 dB
FCC 47 CFR Part 15.247(a)	bandwidth of the hopping channel, whichever is
	greater

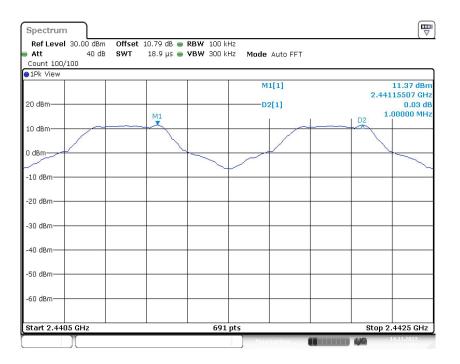
#### Measurement Results:

Mode	Frequency (MHz)	Packet	Separation of hopping channels	Test result (kHz)	Conclusion
GFSK	2441(CH39)	DH5	Fig.59	1000.00	Р
π/4 DQPSK	2441(CH39)	2-DH5	Fig.60	1003.00	Р
8DPSK	2441(CH39)	3-DH5	Fig.61	1003.00	Р

#### See below for test graphs.

**Conclusion: Pass** 







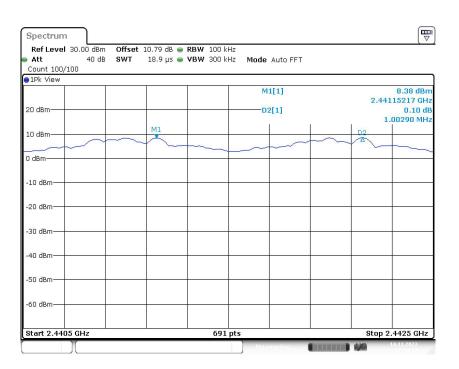


Fig. 60 Carrier Frequency Separation ( $\pi/4$  DQPSK, CH39)



Ref Level 30.0 Att	40 dBm Offise 40 dB SWT	t 10.79 dB 👄 RE 18.9 μs 👄 VI	3W 100 kHz 3W 300 kHz Mod	le Auto FFT	
Count 100/100					
				M1[1]	8.49 dBr
20 dBm				D2[1]	2.44115217 GH 0.16 d 1.00290 MH
10 dBm		M1			D2
0 dBm					
-10 dBm					
-20 dBm					
-30 dBm					
-40 dBm					
-50 dBm					
-60 dBm					
Start 2.4405 GF			691 pts		Stop 2.4425 GHz

Fig. 61 Carrier Frequency Separation (8DPSK, CH39)



## A.9 AC Power line Conducted Emission

### Method of Measurement: See ANSI C63.10-clause 6.2.

#### Test Condition:

Voltage (V)	Frequency (Hz)		
120	60		

#### Measurement Result and limit:

Frequency range	Quasi-peak	Average-peak	Result	Conclusion				
(MHz)	Limit (dBµV)	Limit (dBµV)	Traffic	ldle	Conclusion			
0.15 to 0.5	66 to 56	56 to 46						
0.5 to 5	56	46	Fig.62	Fig.63	Р			
5 to 30	60	50						
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15								
MHz to 0.5 MHz.								

Note: The measurement results include the L1 and N measurements.

See below for test graphs. Conclusion: Pass



80 70 FCC Part 15 Class B Voltage on Mains QI 60 FCC Part 15 Class B Voltage on Mains A 50 Level in dBµV 40 30 20 10-0-300 400 500 800 1M 2M 4M 5M 6 8 10M 20M 150k 3M 30M Frequency in Hz

CE Scan-FCC

## Fig. 62 AC Power line Conducted Emission (Traffic)

Frequency	Quasi Peak	PE	PE Line	Corr.	Limit	Margin		
(MHz)	(dBµV)			(dB)	(dBµV)	(dB)		
0.150000	39.1	GND	L1	9.8	26.9	66.0		
0.166000	34.8	GND	L1	9.8	30.4	65.2		
0.174000	35.8	GND	L1	9.8	29.0	64.8		
0.410000	30.6	GND	N	9.8	27.0	57.6		
0.598000	30.9	GND	L1	9.8	25.1	56.0		
7.954000	33.2	GND	Ν	9.7	26.8	60.0		

## Measurement Results: Quasi Peak

## Measurement Results: Average

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Limit (dBµV)	Margin (dB)
0.394000	25.5	GND	L1	9.8	22.5	48.0
0.598000	26.9	GND	L1	9.8	19.1	46.0
3.634000	22.1	GND	L1	9.8	23.9	46.0
4.078000	22.7	GND	L1	9.8	23.3	46.0
4.478000	22.8	GND	L1	9.8	23.2	46.0
7.490000	29.1	GND	L1	9.8	20.9	50.0



CE Scan-FCC

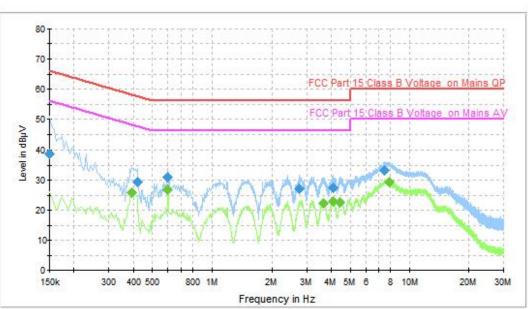


Fig. 63 AC Power line Conducted Emission (Idle)

Frequency	Quasi Peak	PE	Line	Corr.	Limit	Margin
(MHz)	(dBµV)			(dB)	(dBµV)	(dB)
0.150000	38.8	GND	Ν	9.8	27.2	66.0
0.418000	29.3	GND	Ν	9.8	28.2	57.5
0.598000	30.9	GND	L1	9.8	25.1	56.0
2.746000	27.1	GND	L1	9.8	28.9	56.0
4.086000	27.5	GND	L1	9.8	28.5	56.0
7.466000	33.2	GND	Ν	9.8	26.8	60.0

### Measurement Results: Average

Frequency	Average	PE	Line	Corr.	Limit	Margin
(MHz)	(dBµV)	FC	Line	(dB)	(dBµV)	(dB)
0.394000	25.7	GND	L1	9.8	22.3	48.0
0.598000	26.9	GND	L1	9.8	19.1	46.0
3.646000	22.4	GND	L1	9.8	23.6	46.0
4.078000	23.0	GND	L1	9.8	23.0	46.0
4.450000	22.5	GND	L1	9.8	23.5	46.0
7.846000	29.4	GND	Ν	9.7	20.6	50.0

## \*\*\*END OF REPORT\*\*\*