

Fig.41 Conducted Spurious Emission (Ch39, 1 GHz-3 GHz), LE 2M

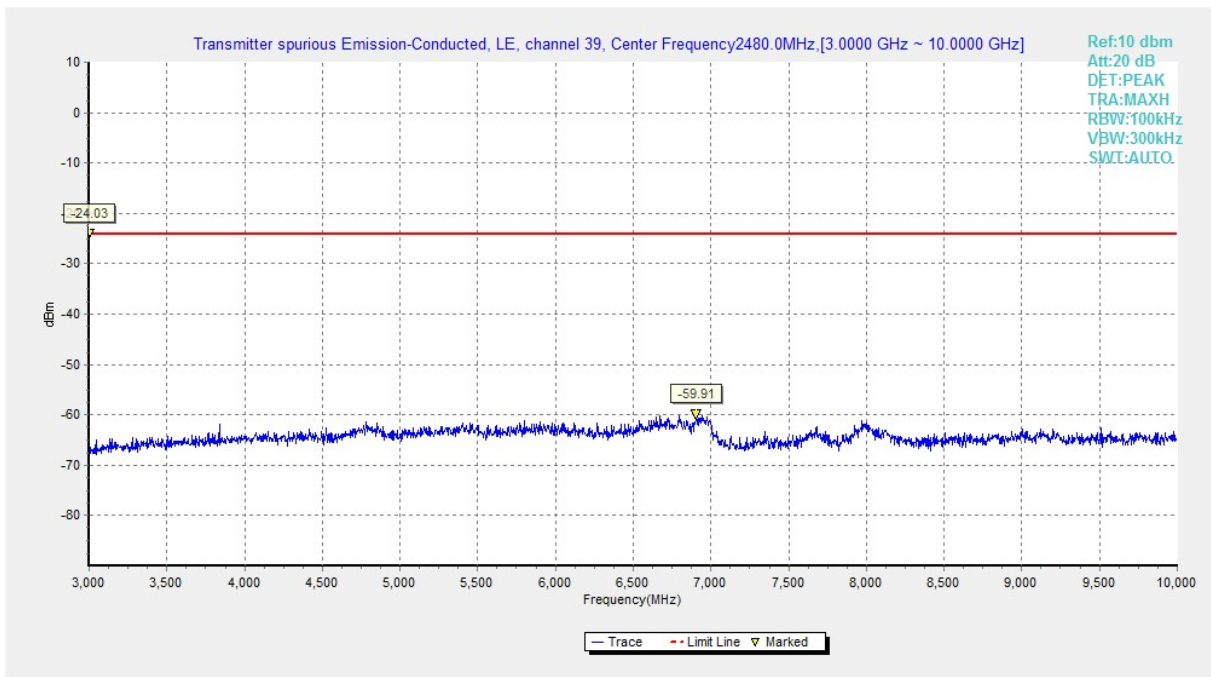


Fig.42 Conducted Spurious Emission (Ch39, 3 GHz-10 GHz), LE 2M

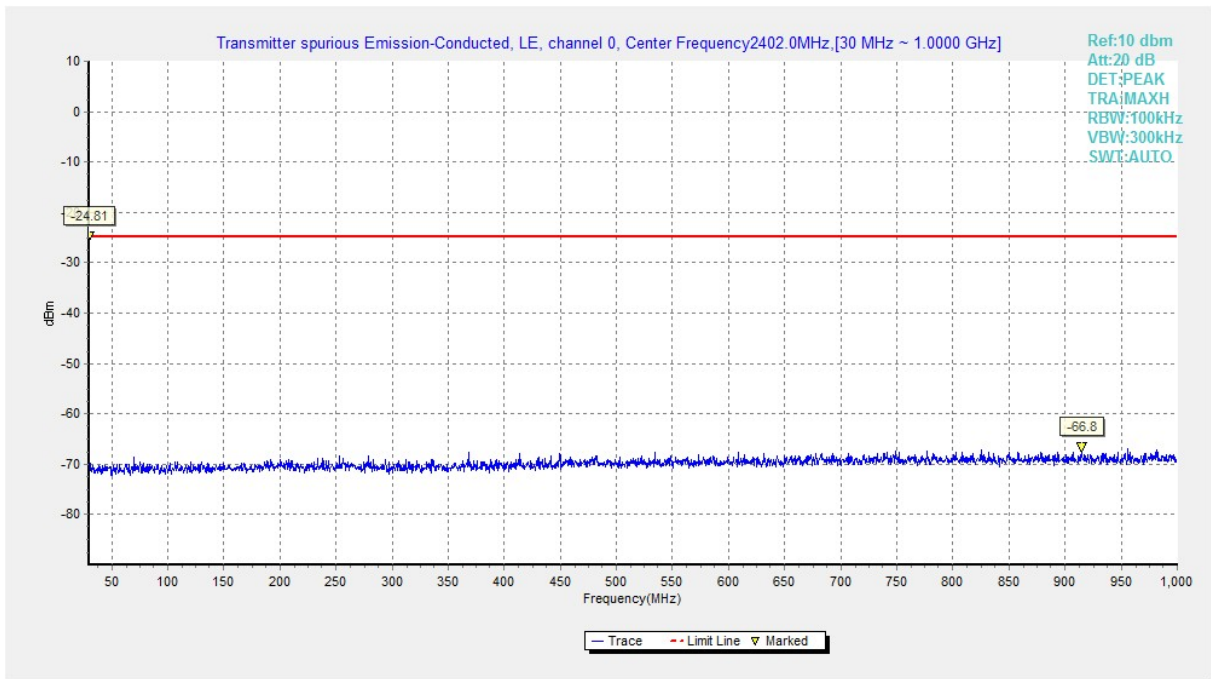


Fig.43 Conducted Spurious Emission (All channels, 30 MHz-1 GHz), LE 2M

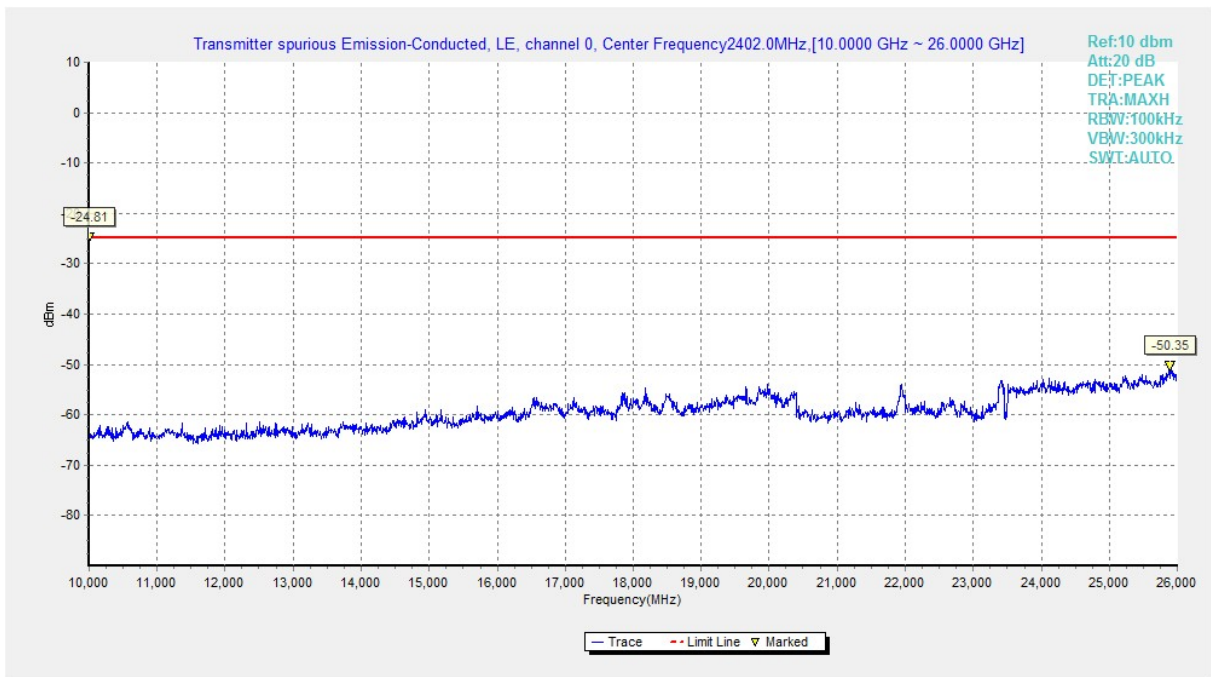


Fig.44 Conducted Spurious Emission (All channels, 10 GHz-26 GHz), LE 2M

**A.6 Transmitter Spurious Emission - Radiated****Measurement Limit:**

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band:

Frequency of emission (MHz)	Field strength(μ V/m)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Condition:

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	120kHz/300kHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Note: According to the performance evaluation, the radiated emission margin of EUT is over 20dB in the band from 9kHz to 30MHz. Therefore, the measurement starts from 30MHz to tenth harmonic. The measurement results include the horizontal polarization and vertical polarization measurements.



Measurement Results:

Mode	Channel	Frequency Range	Test Results	Conclusion
LE 1M	0	1 GHz ~18 GHz	Fig.45	P
	19	1 GHz ~18 GHz	Fig.46	P
	39	1 GHz ~18 GHz	Fig.47	P
	Restricted Band(CH0)	2.38 GHz ~ 2.45 GHz	Fig.48	P
	Restricted Band(CH39)	2.45 GHz ~ 2.5 GHz	Fig.49	P
	All channels	9 kHz ~30 MHz	Fig.50	P
		30 MHz ~1 GHz	Fig.51	P
18 GHz ~ 26.5 GHz		Fig.52	P	
LE 2M	0	1 GHz ~18 GHz	Fig.53	P
	19	1 GHz ~18 GHz	Fig.54	P
	39	1 GHz ~18 GHz	Fig.55	P
	Restricted Band(CH0)	2.38 GHz ~ 2.45 GHz	Fig.56	P
	Restricted Band(CH39)	2.45 GHz ~ 2.5 GHz	Fig.57	P
	All channels	9 kHz ~30 MHz	Fig.58	P
		30 MHz ~1 GHz	Fig.59	P
18 GHz ~ 26.5 GHz		Fig.60	P	

Worst Case Result

For LE 1M:

GFSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB/m)
4428.500000	48.20	74.00	25.80	V	12.8
5095.500000	49.17	74.00	24.83	V	14.6
6234.000000	52.56	74.00	21.44	H	18.6
12362.462500	46.79	74.00	27.21	V	11.4
14378.812500	48.52	74.00	25.48	V	13.0
16835.812500	49.75	74.00	24.25	V	16.1

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB/m)
4401.500000	37.36	54.00	16.64	H	12.8
5038.500000	38.51	54.00	15.49	H	14.2
6192.000000	41.67	54.00	12.33	H	18.9
12488.237500	35.80	54.00	18.20	V	11.4
14465.000000	37.08	54.00	16.92	H	13.0
16990.687500	39.54	54.00	14.46	V	16.5



GFSK CH19 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5168.500000	48.49	74.00	25.51	H	14.6
6201.000000	51.58	74.00	22.42	H	18.8
12545.212500	46.55	74.00	27.45	H	11.5
14454.500000	47.53	74.00	26.47	H	13.0
15832.625000	47.37	74.00	26.63	V	14.8
16746.562500	48.25	74.00	25.75	V	15.9

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5099.500000	37.88	54.00	16.12	V	14.6
6196.000000	41.19	54.00	12.81	H	18.9
12416.212500	35.47	54.00	18.53	V	11.4
14423.875000	36.78	54.00	17.22	H	13.0
15762.625000	38.22	54.00	15.78	H	14.5
16977.125000	39.21	54.00	14.79	H	16.5

GFSK CH39 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5731.000000	50.19	74.00	23.81	V	15.9
6148.000000	51.01	74.00	22.99	V	18.4
13510.375000	47.12	74.00	26.88	H	12.5
14444.875000	47.60	74.00	26.40	V	13.0
15673.375000	48.55	74.00	25.45	H	14.1
16935.125000	50.11	74.00	23.89	V	16.3

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5648.500000	38.60	54.00	15.40	H	15.6
6196.000000	41.55	54.00	12.45	H	18.9
13429.437500	36.45	54.00	17.55	H	12.6
14510.937500	37.25	54.00	16.75	V	13.0
15675.562500	38.13	54.00	15.87	H	14.1
17307.000000	39.73	54.00	14.27	H	16.9



For LE 2M:

GFSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5072.000000	50.25	74.00	23.75	H	14.5
6196.500000	54.11	74.00	19.89	V	18.9
13321.812500	47.23	74.00	26.77	V	12.6
14519.687500	47.29	74.00	26.71	V	13.0
15739.875000	48.87	74.00	25.13	V	14.4
17151.250000	52.31	74.00	21.69	V	17.1

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5110.500000	39.77	54.00	14.23	V	14.6
6204.500000	42.44	54.00	11.56	V	18.8
13393.125000	37.71	54.00	16.29	V	12.6
14456.250000	37.93	54.00	16.07	V	13.0
15717.562500	38.88	54.00	15.12	V	14.3
17144.687500	40.64	54.00	13.36	V	17.1

GFSK CH19 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5085.500000	48.48	74.00	25.52	V	14.6
6189.500000	52.42	74.00	21.58	H	18.9
13405.812500	47.42	74.00	26.58	H	12.6
14417.312500	47.88	74.00	26.12	V	13.0
15726.312500	48.30	74.00	25.70	V	14.3
17121.500000	51.16	74.00	22.84	H	17.0

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5051.000000	38.44	54.00	15.56	H	14.3
6190.000000	41.99	54.00	12.01	V	18.9
13446.500000	36.49	54.00	17.51	H	12.6
14455.812500	37.10	54.00	16.90	H	13.0
15763.500000	38.60	54.00	15.40	V	14.5
17140.750000	40.52	54.00	13.48	H	17.1

**GFSK CH39 (1-18GHz)**

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5171.000000	49.45	74.00	24.55	V	14.6
6247.000000	51.75	74.00	22.25	V	18.5
12464.050000	46.13	74.00	27.87	V	11.4
14489.937500	47.37	74.00	26.63	V	13.0
15732.437500	48.12	74.00	25.88	V	14.3
17268.937500	50.06	74.00	23.94	V	16.9

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5193.000000	38.25	54.00	15.75	H	14.7
6151.000000	40.93	54.00	13.07	V	18.4
12554.350000	36.20	54.00	17.80	H	11.5
14402.000000	37.10	54.00	16.90	V	13.0
15732.437500	38.14	54.00	15.86	V	14.3
17166.125000	40.09	54.00	13.91	V	17.0

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and Antenna Factor, the gain of the preamplifier, the cable loss. P_{Mea} is the field strength recorded from the instrument.

The measurement results are obtained as described below:

Result= P_{Mea} +Cable Loss +Antenna Factor-Gain of the preamplifier.

See below for test graphs.

Conclusion: Pass

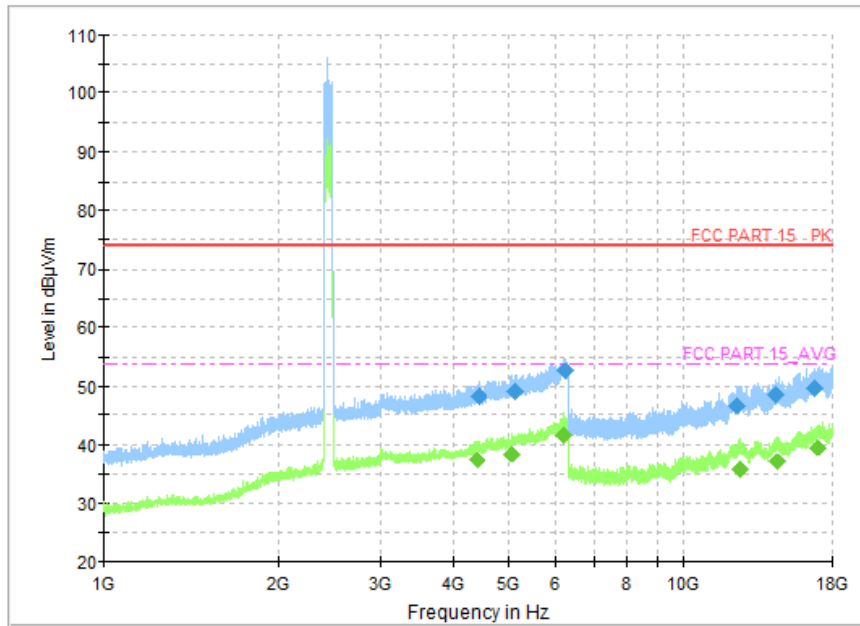


Fig.45 Radiated Spurious Emission (GFSK, Ch0, 1 GHz ~18 GHz), LE 1M

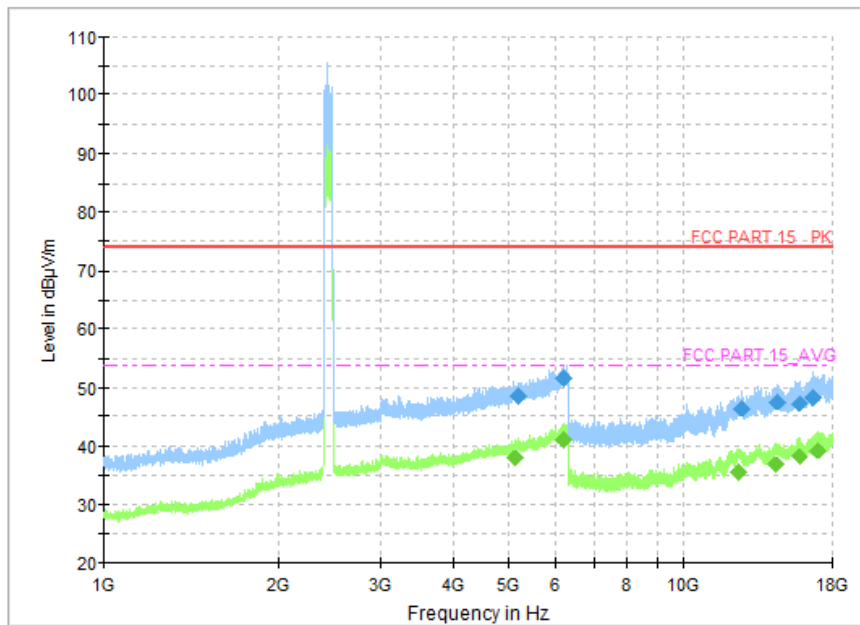


Fig.46 Radiated Spurious Emission (GFSK, Ch19, 1 GHz ~18 GHz), LE 1M

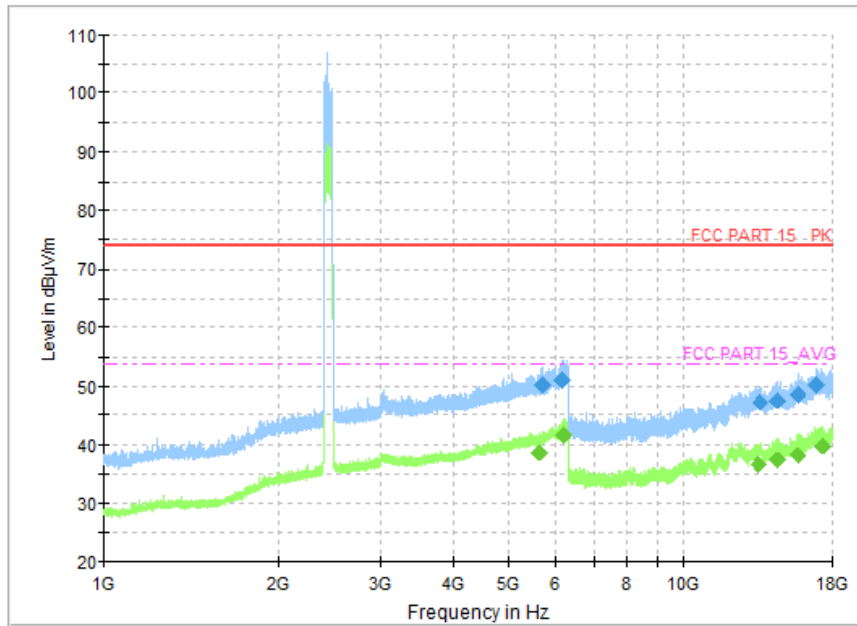


Fig.47 Radiated Spurious Emission (GFSK, Ch39, 1 GHz ~18 GHz), LE 1M

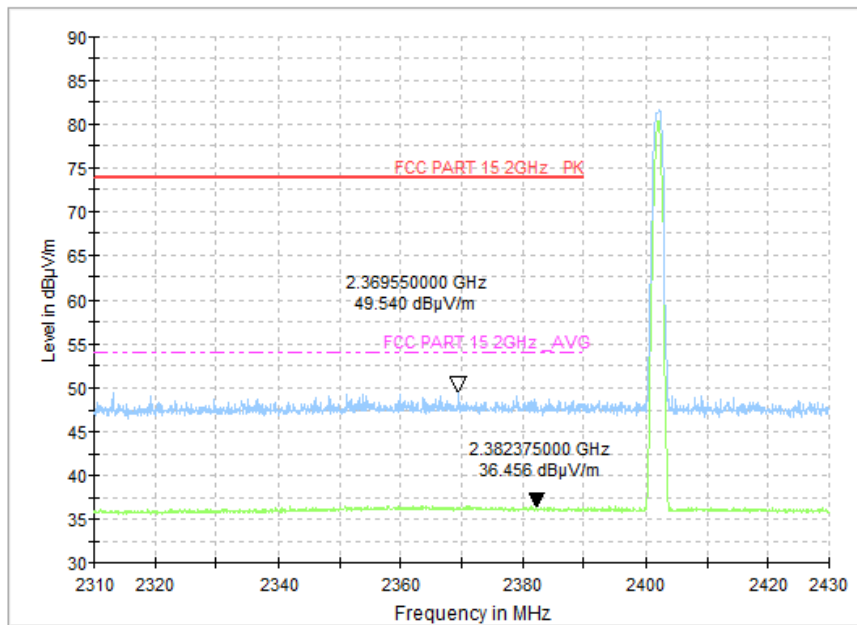


Fig.48 Radiated Band Edges (GFSK, Ch0, 2380GHz~2450GHz), LE 1M

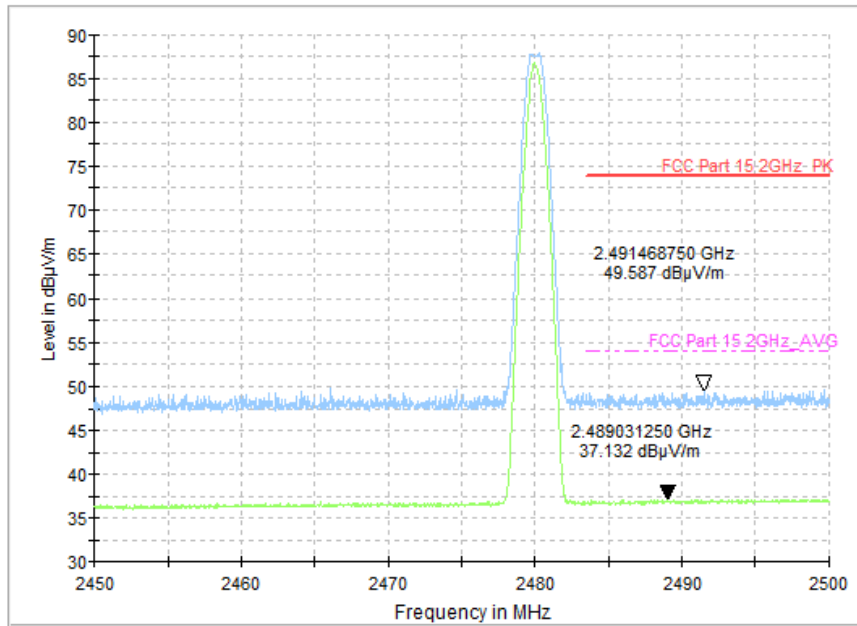


Fig.49 Radiated Band Edges (GFSK, Ch39, 2450GHz~2500GHz), LE 1M

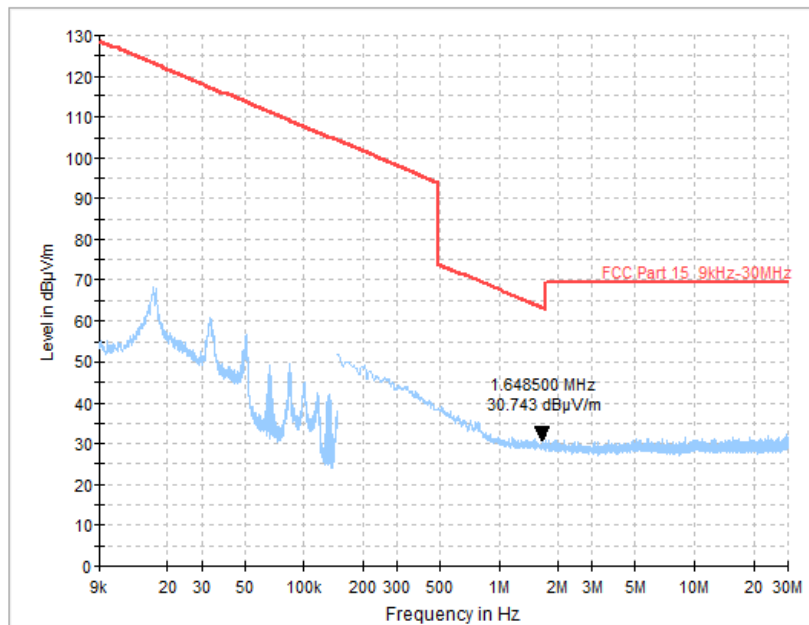


Fig.50 Radiated Spurious Emission (All Channels, 9 kHz-30 MHz), LE 1M

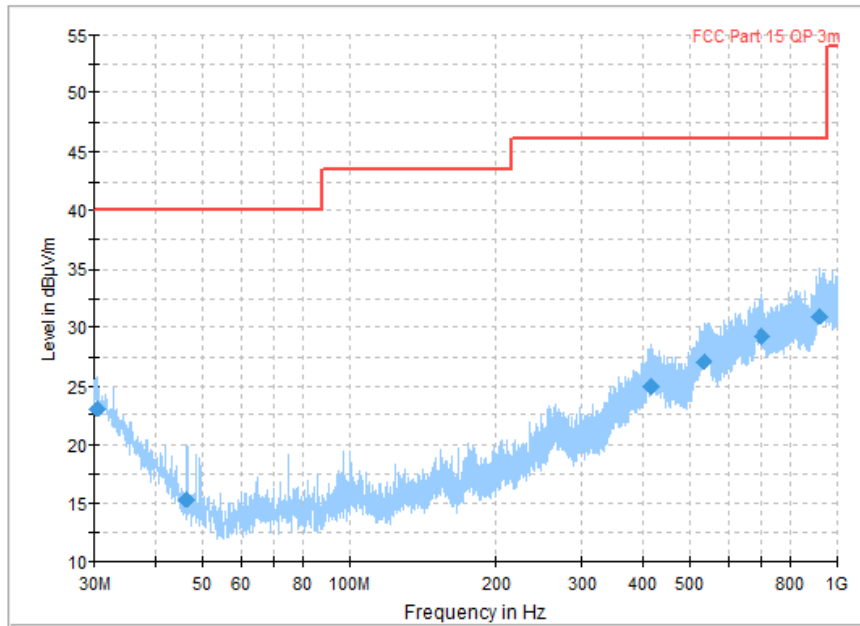


Fig.51 Radiated Spurious Emission (All Channels, 30 MHz-1 GHz), LE 1M

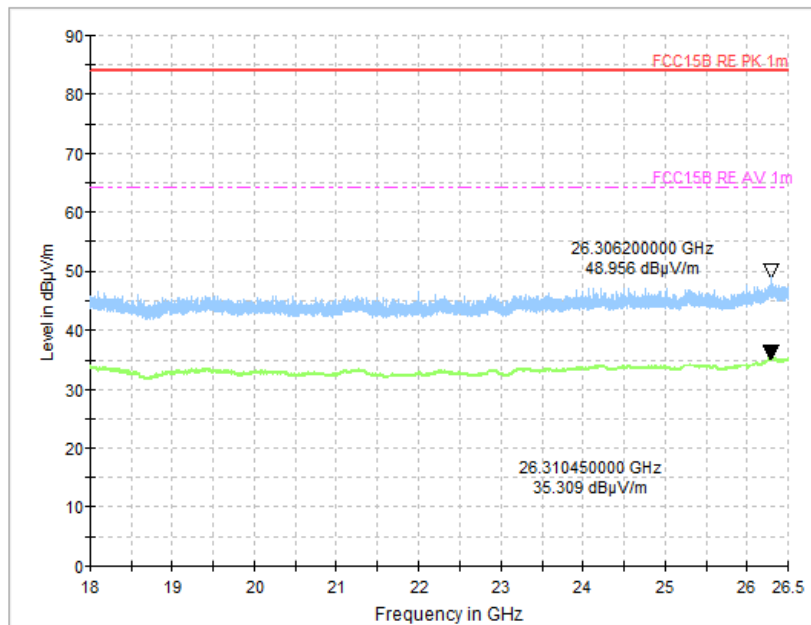


Fig.52 Radiated Spurious Emission (All Channels, 18 GHz-26.5 GHz), LE 1M

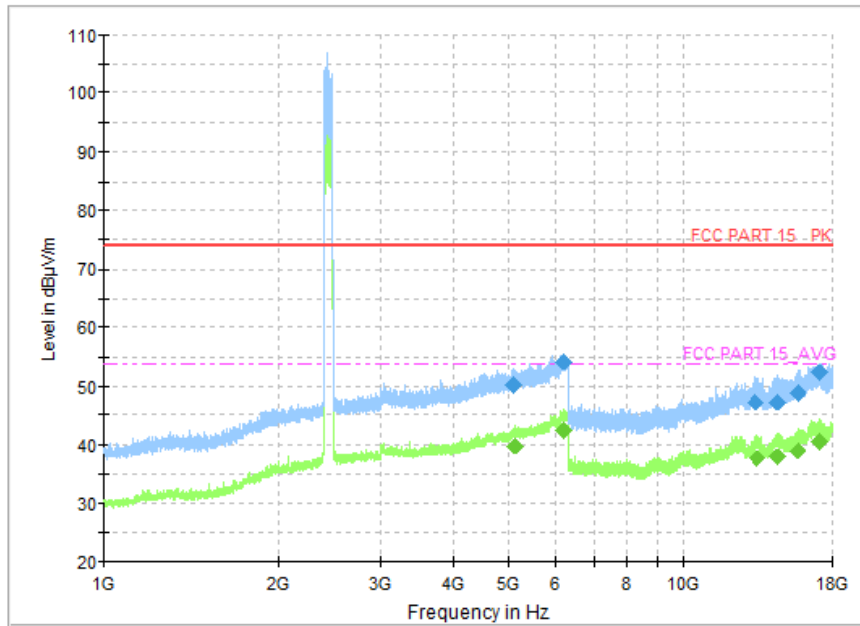


Fig.53 Radiated Spurious Emission (GFSK, Ch0, 1 GHz ~18 GHz), LE 2M

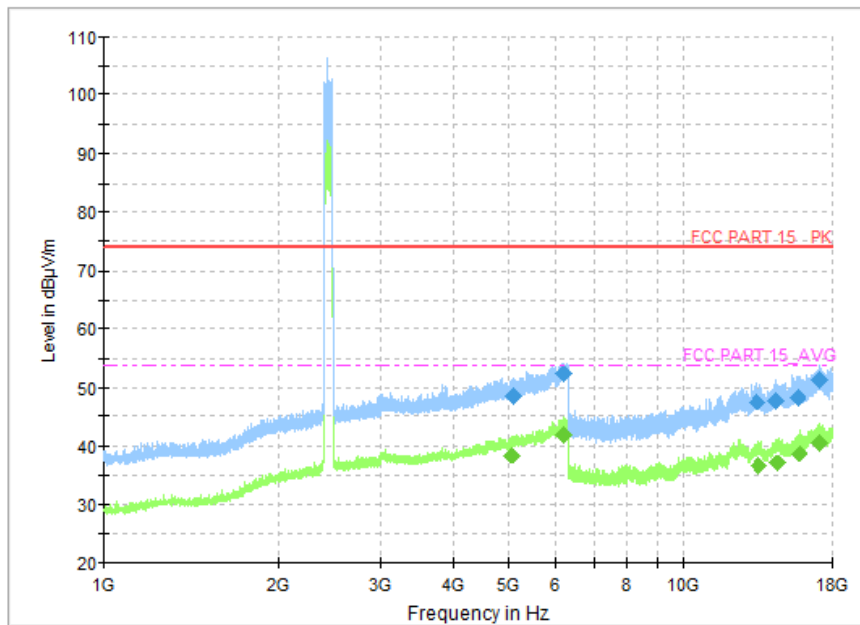


Fig.54 Radiated Spurious Emission (GFSK, Ch19, 1 GHz ~18 GHz), LE 2M

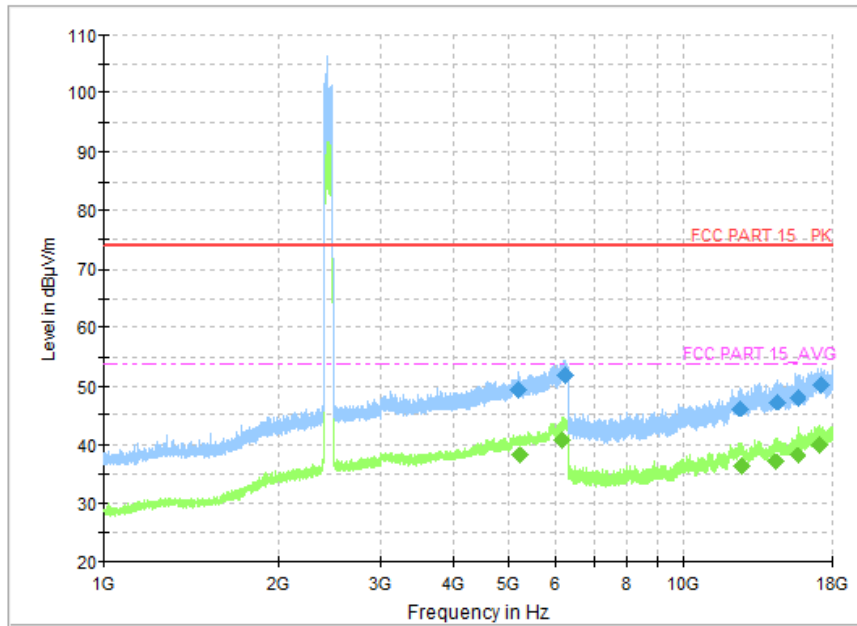


Fig.55 Radiated Spurious Emission (GFSK, Ch39, 1 GHz ~18 GHz), LE 2M

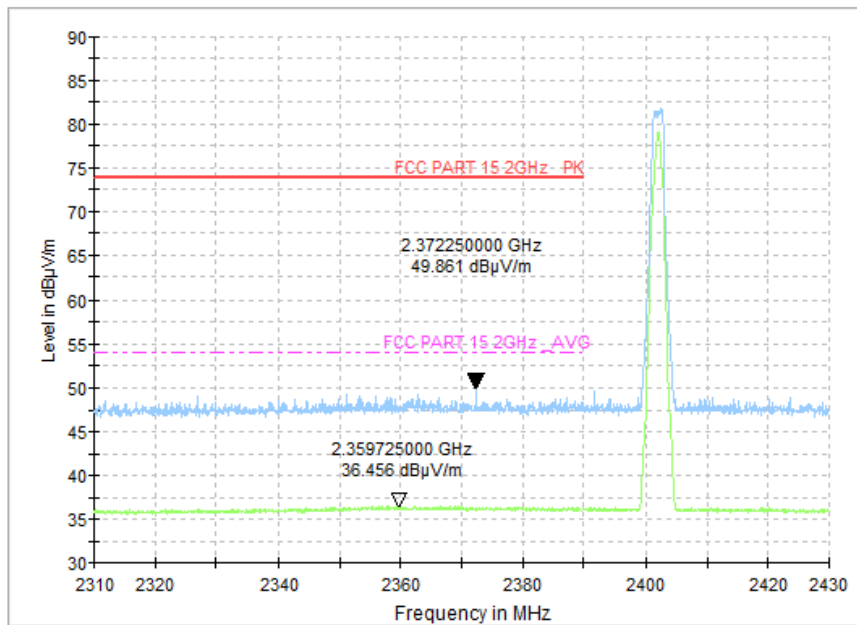


Fig.56 Radiated Band Edges (GFSK, Ch0, 2380GHz~2450GHz), LE 2M

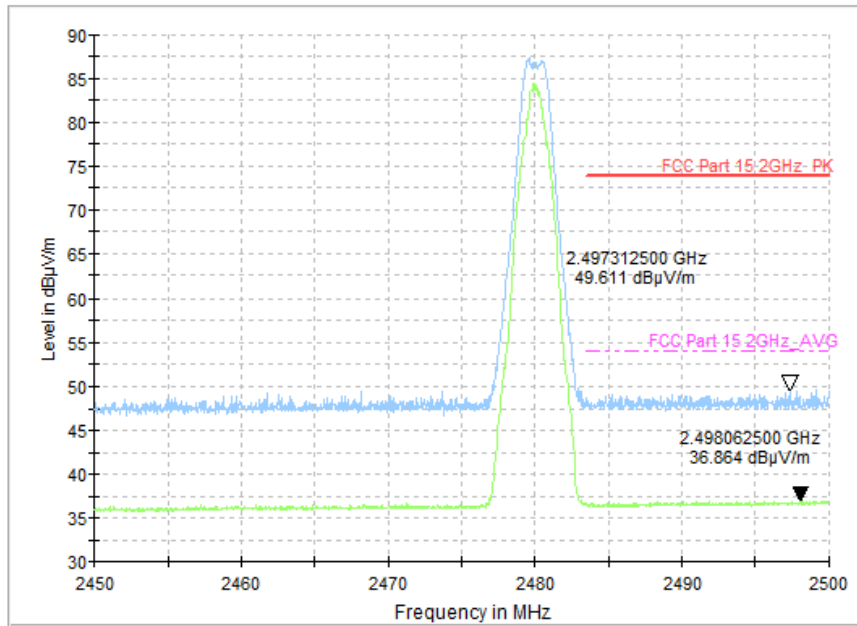


Fig.57 Radiated Band Edges (GFSK, Ch39, 2450GHz~2500GHz), LE 2M

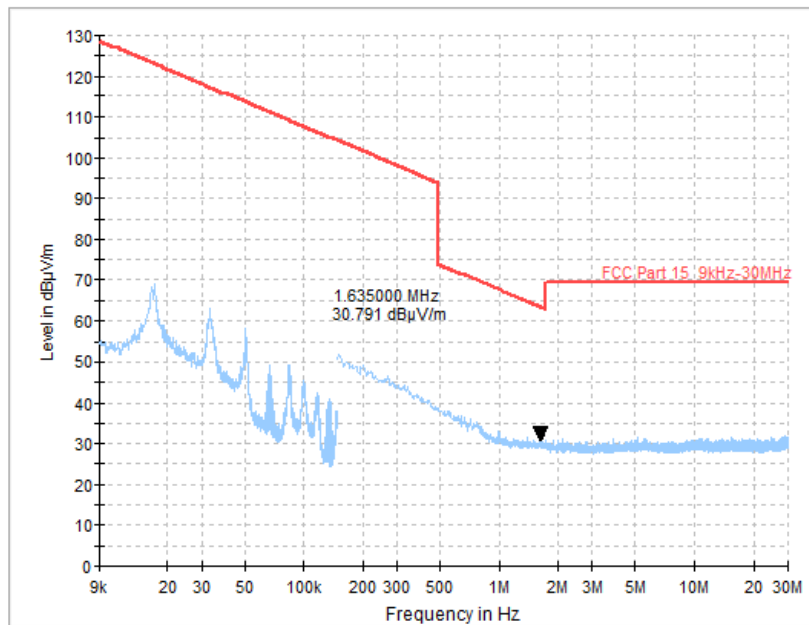


Fig.58 Radiated Spurious Emission (All Channels, 9 kHz-30 MHz), LE 2M

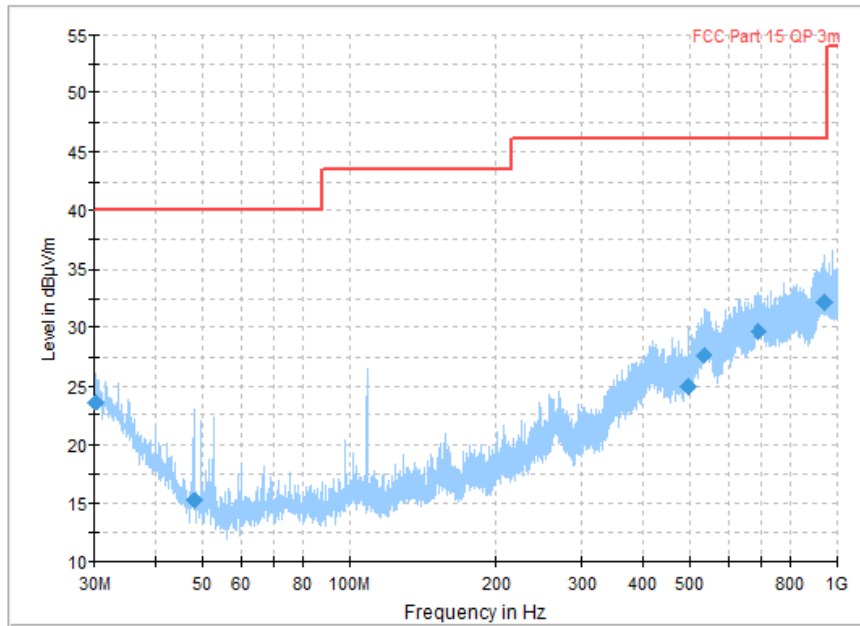


Fig.59 Radiated Spurious Emission (All Channels, 30 MHz-1 GHz), LE 2M

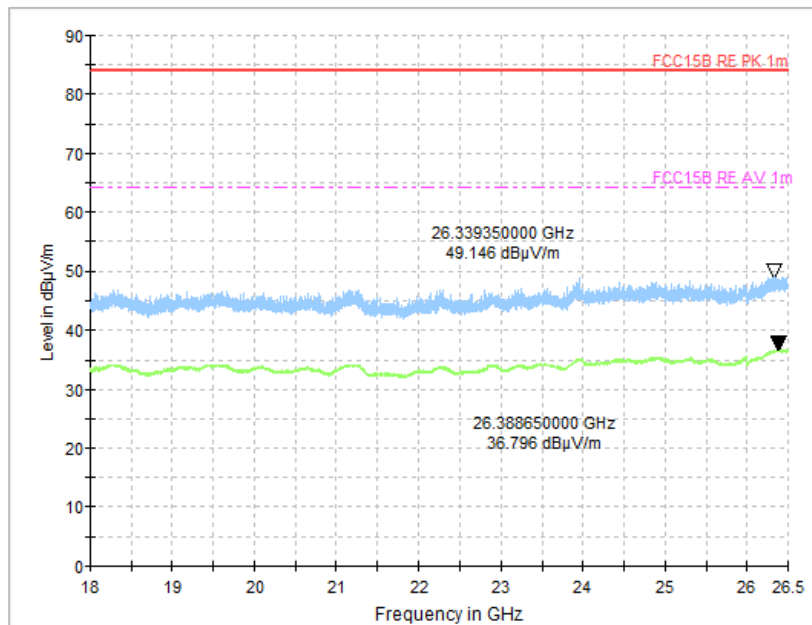


Fig.60 Radiated Spurious Emission (All Channels, 18 GHz-26.5 GHz), LE 2M



A.7 AC Power line Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

For LE 1M:

BLE (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.61	Fig.62	P
0.5 to 5	56			
5 to 30	60			

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

BLE (Average Limit)

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.61	Fig.62	P
0.5 to 5	46			
5 to 30	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.



For LE 2M:

BLE (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.16 to 0.5	66 to 56	Fig.63	Fig.64	P
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

BLE (Average Limit)

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.63	Fig.64	P
0.5 to 5	46			
5 to 30	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

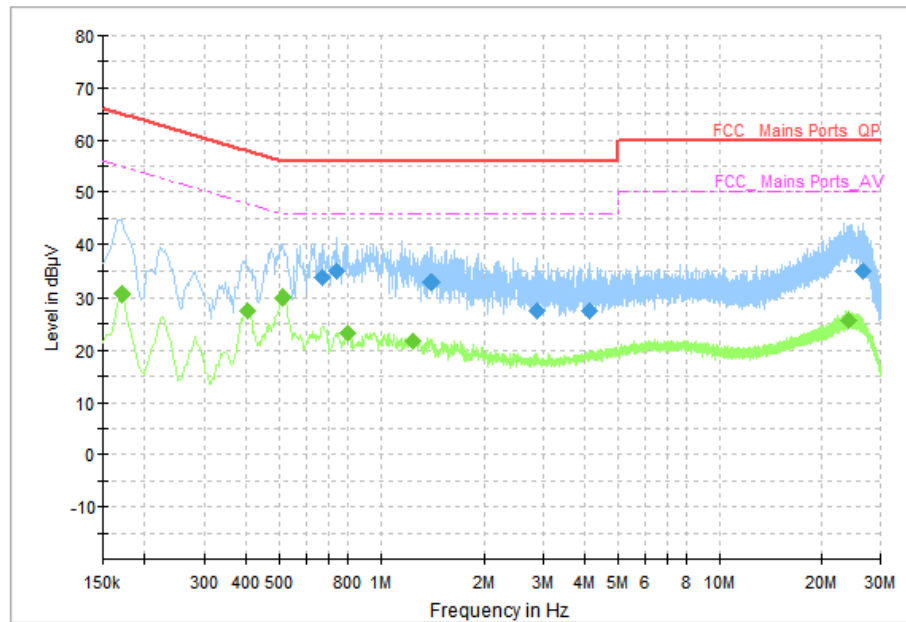


Fig.61 AC Power line Conducted Emission (Traffic, LE 1M)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.674000	33.58	56.00	22.42	N	ON	10
0.738000	34.74	56.00	21.26	N	ON	10
1.410000	32.74	56.00	23.26	N	ON	10
2.862000	27.48	56.00	28.52	N	ON	10
4.126000	27.55	56.00	28.45	N	ON	10
26.722000	34.88	60.00	25.12	N	ON	10

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.170000	30.75	54.96	24.22	L1	ON	10
0.402000	27.42	47.81	20.39	L1	ON	10
0.514000	29.94	46.00	16.06	L1	ON	10
0.798000	23.19	46.00	22.81	N	ON	10
1.250000	21.72	46.00	24.28	N	ON	10
24.050000	25.85	50.00	24.15	N	ON	10

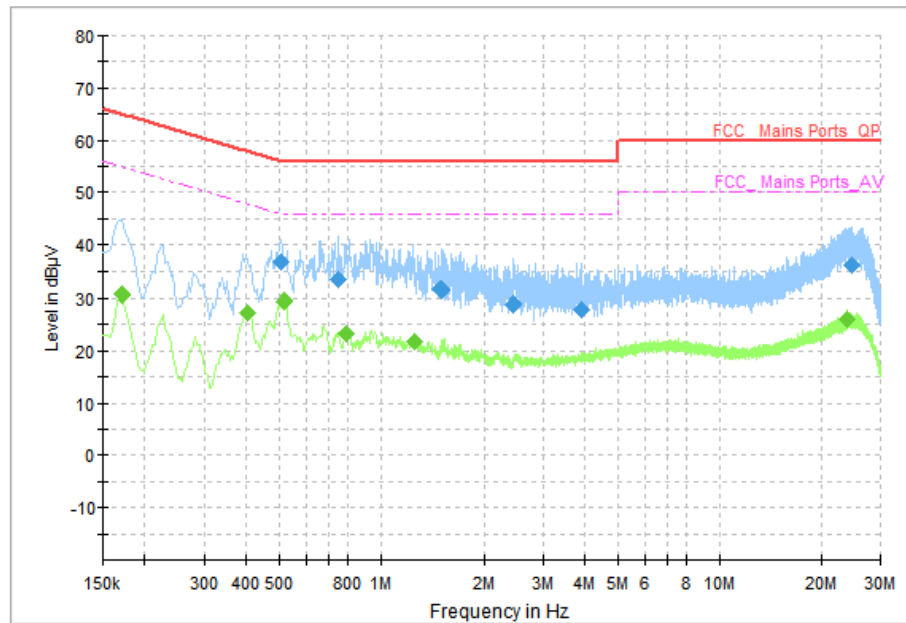


Fig.62 AC Power line Conducted Emission (Idle, LE 1M)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.506000	36.70	56.00	19.30	N	ON	10
0.750000	33.28	56.00	22.72	N	ON	10
1.506000	31.50	56.00	24.50	N	ON	10
2.442000	28.83	56.00	27.17	N	ON	10
3.886000	28.00	56.00	28.00	N	ON	10
24.590000	36.19	60.00	23.81	N	ON	10

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.170000	30.76	54.96	24.20	L1	ON	10
0.402000	27.35	47.81	20.46	L1	ON	10
0.518000	29.48	46.00	16.52	L1	ON	10
0.794000	23.31	46.00	22.69	N	ON	10
1.258000	21.80	46.00	24.20	N	ON	10
23.946000	25.90	50.00	24.10	N	ON	10

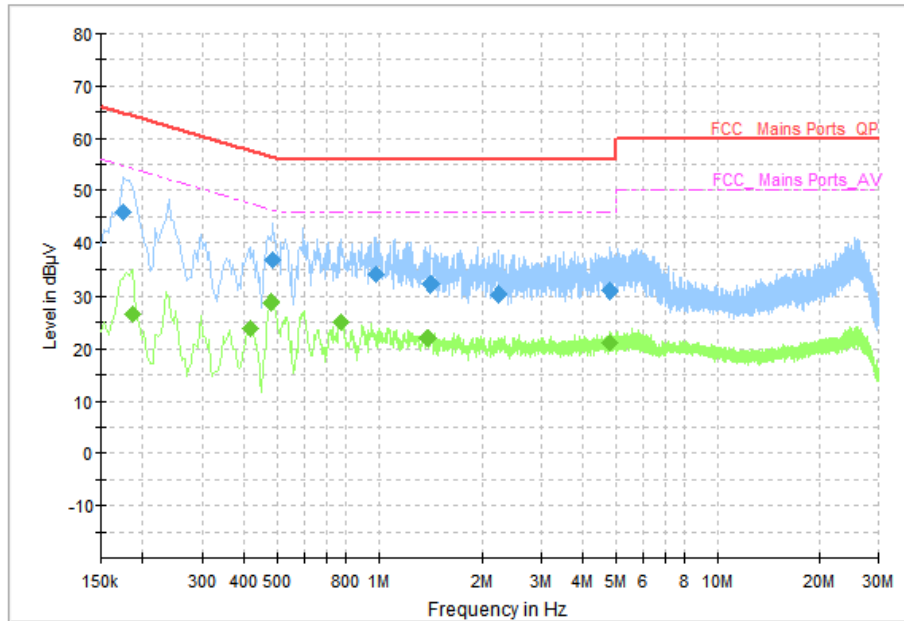


Fig.63 AC Power line Conducted Emission (Traffic, LE 2M)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.174000	45.83	64.77	18.93	N	ON	10
0.486000	36.56	56.24	19.68	L1	ON	10
0.986000	33.88	56.00	22.12	L1	ON	10
1.418000	32.20	56.00	23.80	L1	ON	10
2.242000	30.41	56.00	25.59	L1	ON	10
4.794000	30.79	56.00	25.21	L1	ON	10

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.186000	26.69	54.21	27.53	N	ON	10
0.418000	23.91	47.49	23.58	L1	ON	10
0.478000	28.78	46.37	17.60	L1	ON	10
0.770000	25.15	46.00	20.85	L1	ON	10
1.382000	21.94	46.00	24.06	L1	ON	10
4.794000	21.23	46.00	24.77	L1	ON	10

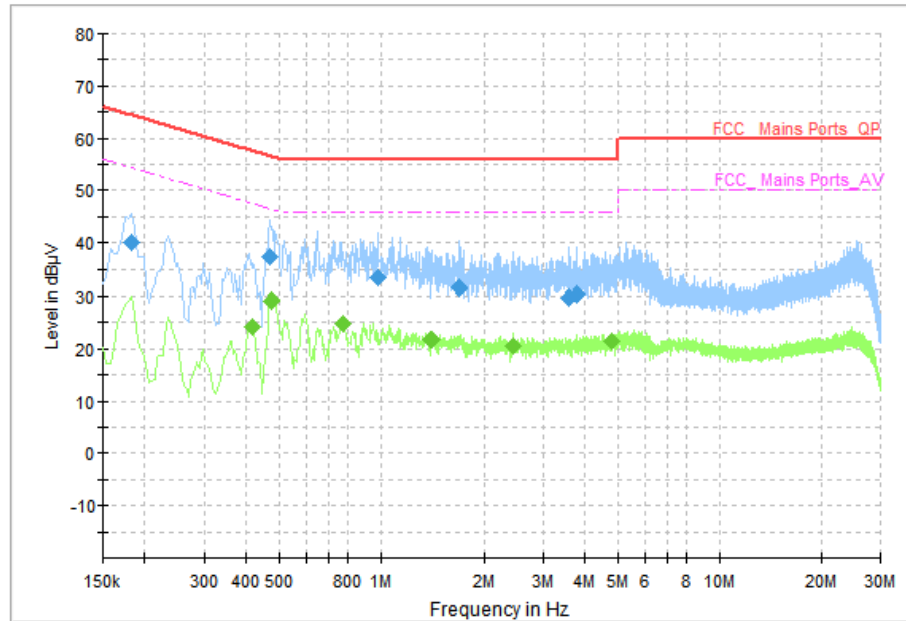


Fig.64 AC Power line Conducted Emission (Idle, LE 2M)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.182000	40.19	64.39	24.21	N	ON	10
0.470000	37.35	56.51	19.16	L1	ON	10
0.978000	33.47	56.00	22.53	L1	ON	10
1.698000	31.62	56.00	24.38	L1	ON	10
3.582000	29.58	56.00	26.42	L1	ON	10
3.774000	30.16	56.00	25.84	L1	ON	10

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.414000	24.31	47.57	23.26	L1	ON	10
0.474000	29.05	46.44	17.39	L1	ON	10
0.774000	24.90	46.00	21.10	L1	ON	10
1.402000	21.88	46.00	24.12	L1	ON	10
2.454000	20.49	46.00	25.51	L1	ON	10
4.814000	21.34	46.00	24.66	L1	ON	10

END OF REPORT