

Fig.35 Conducted Spurious Emission (Ch39, 1 GHz-3 GHz), LE 2M

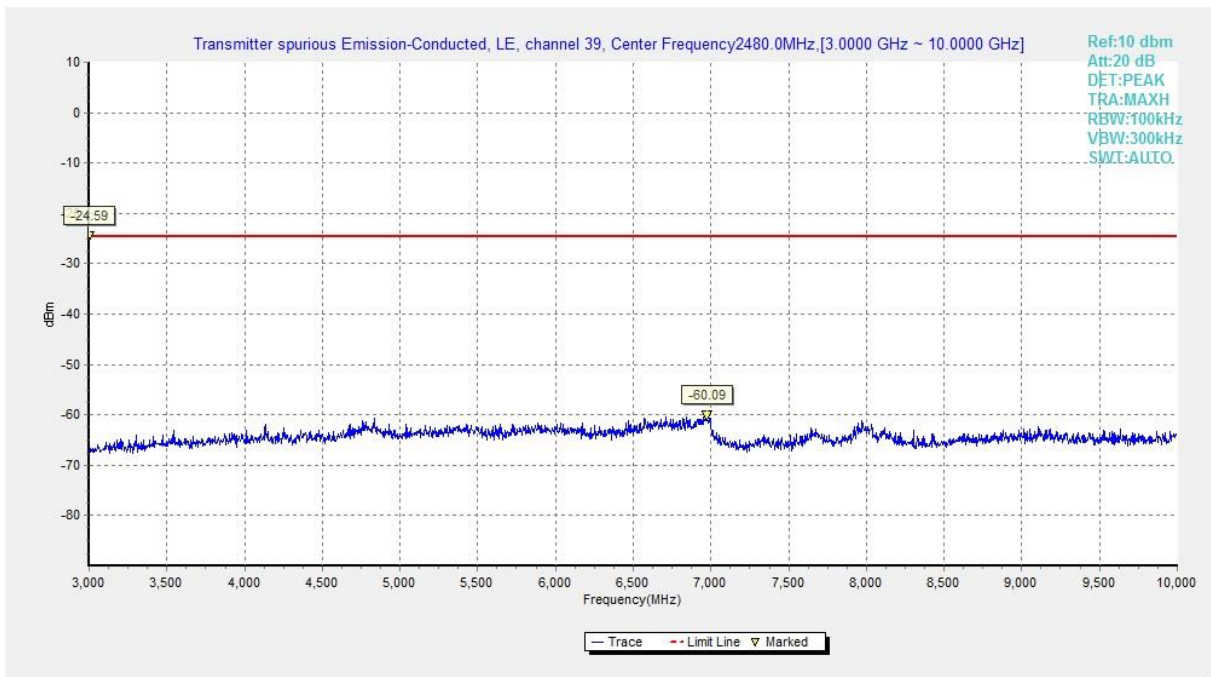


Fig.36 Conducted Spurious Emission (Ch39, 3 GHz-10 GHz), LE 2M

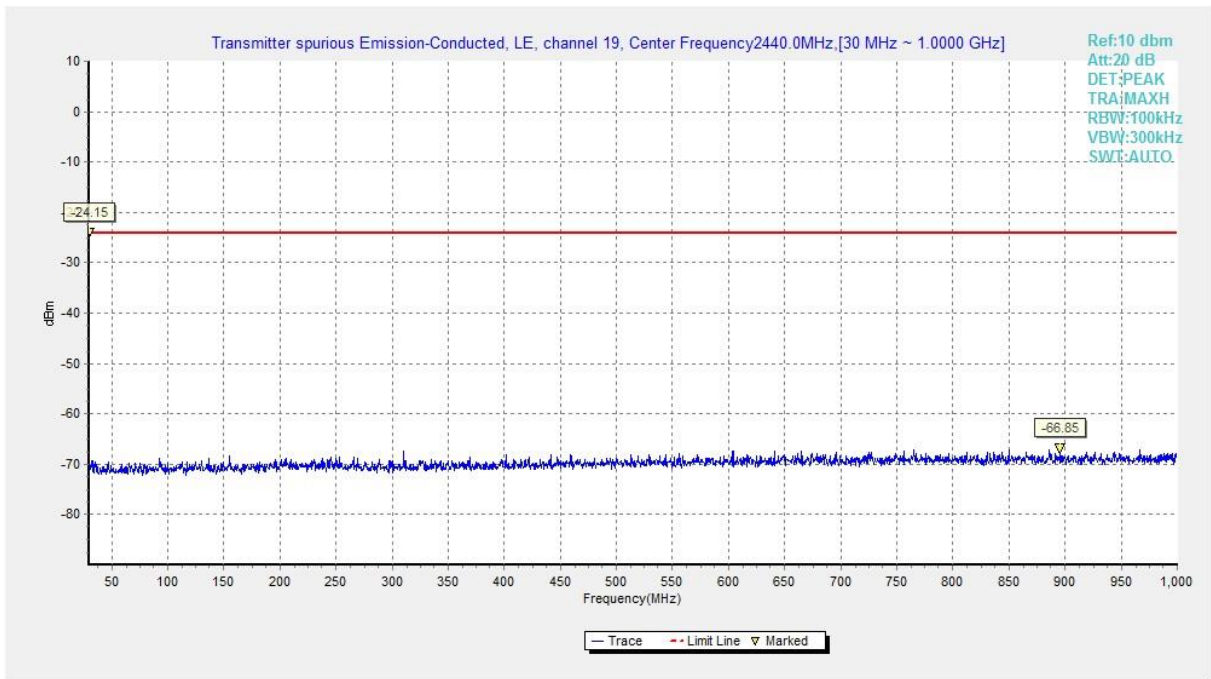


Fig.37 Conducted Spurious Emission (All channels, 30 MHz-1 GHz), LE 2M

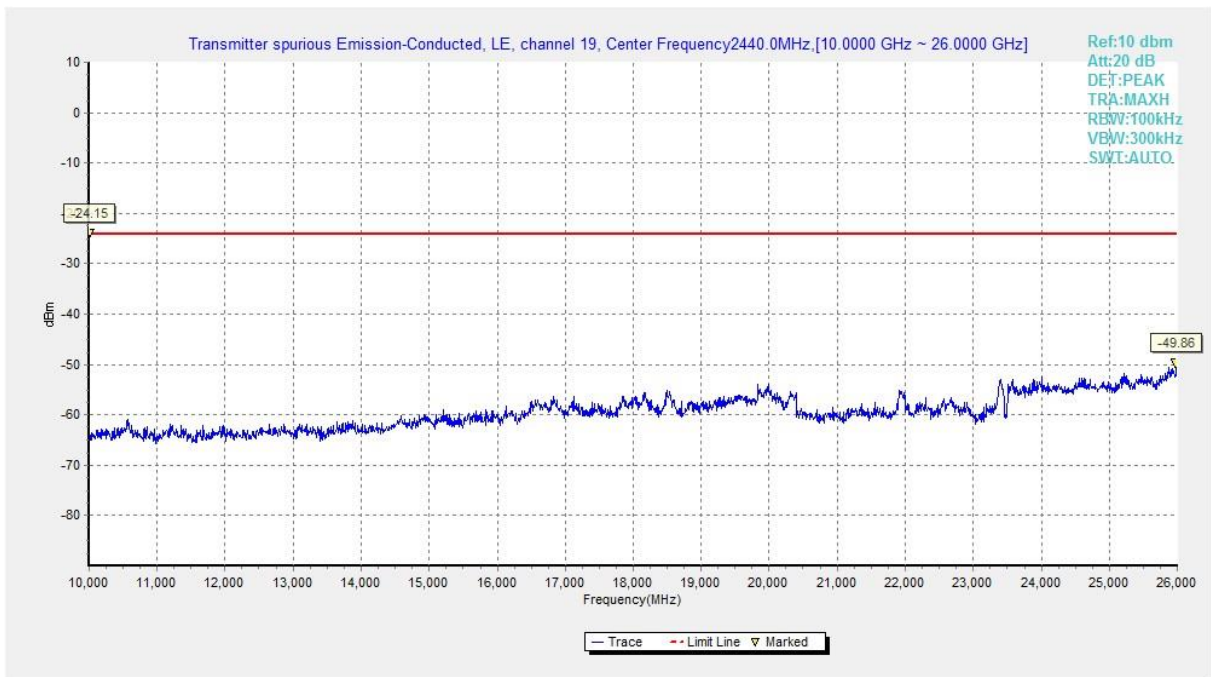


Fig.38 Conducted Spurious Emission (All channels, 10 GHz-26 GHz), LE 2M

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.39	P
	19	1 GHz ~18 GHz	Fig.40	P
	39	1 GHz ~18 GHz	Fig.41	P
	Restricted Band(CH0)	2.38 GHz ~ 2.45 GHz	Fig.42	P
	Restricted Band(CH39)	2.45 GHz ~ 2.5 GHz	Fig.43	P
	All channels	9 kHz ~30 MHz	Fig.44	P
		30 MHz ~1 GHz	Fig.45	P
18 GHz ~ 26.5 GHz		Fig.46	P	
LE 2M	0	1 GHz ~18 GHz	Fig.47	P
	19	1 GHz ~18 GHz	Fig.48	P
	39	1 GHz ~18 GHz	Fig.49	P
	Restricted Band(CH0)	2.38 GHz ~ 2.45 GHz	Fig.50	P
	Restricted Band(CH39)	2.45 GHz ~ 2.5 GHz	Fig.51	P
	All channels	9 kHz ~30 MHz	Fig.52	P
		30 MHz ~1 GHz	Fig.53	P
18 GHz ~ 26.5 GHz		Fig.54	P	

Worst Case Result

For LE 1M:

GFSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
6144.00000	52.46	---	74.00	21.54	H	17.3
13513.4375	48.64	---	74.00	25.36	H	11.9
14572.6250	48.88	---	74.00	25.12	V	12.7
15827.3750	50.74	---	74.00	23.26	H	15.3
16736.9375	51.79	---	74.00	22.21	H	16.3
17943.5625	51.50	---	74.00	22.50	V	16.9
6159.50000	---	41.11	54.00	12.89	H	17.5
13507.3125	---	37.08	54.00	16.92	V	11.9
14539.8125	---	37.72	54.00	16.28	V	12.7
15800.2500	---	39.55	54.00	14.45	H	15.1
16986.3125	---	39.97	54.00	14.03	H	16.5
17948.3750	---	40.51	54.00	13.49	H	16.9

GFSK CH19 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
6205.00000	52.64	---	74.00	21.36	H	17.7
12457.0625	48.24	---	74.00	25.76	H	11.0
13612.7500	49.29	---	74.00	24.71	H	11.7
14580.9375	49.44	---	74.00	24.56	H	12.7
15806.3750	50.88	---	74.00	23.12	H	15.1
17373.0625	52.65	---	74.00	21.35	V	16.6
6198.00000	---	41.60	54.00	12.40	H	17.8
12452.7625	---	36.62	54.00	17.38	H	11.0
13431.1875	---	37.09	54.00	16.91	V	12.0
14564.7500	---	37.91	54.00	16.09	V	12.7
15784.5000	---	39.49	54.00	14.51	H	15.0
16964.8750	---	40.26	54.00	13.74	V	16.4

GFSK CH39 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
6221.50000	52.37	---	74.00	21.64	H	17.6
13497.2500	48.83	---	74.00	25.17	H	11.9
14381.8750	50.04	---	74.00	23.96	H	12.4
15767.0000	50.80	---	74.00	23.20	H	14.8
16969.6875	52.28	---	74.00	21.72	V	16.4
17974.6250	52.24	---	74.00	21.76	H	17.0
6193.50000	---	41.22	54.00	12.78	H	17.8
13520.8750	---	37.28	54.00	16.72	V	11.9
14533.2500	---	38.01	54.00	15.99	H	12.7
15809.0000	---	39.43	54.00	14.57	V	15.1
16986.7500	---	39.93	54.00	14.07	H	16.5
17909.8750	---	40.43	54.00	13.57	V	16.9

For LE 2M:

GFSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
6234.00000	52.40	---	74.00	21.60	V	17.5
13373.8750	49.46	---	74.00	24.54	V	12.0
14533.2500	49.29	---	74.00	24.71	V	12.7
15642.7500	50.71	---	74.00	23.29	V	13.9
17022.6250	51.37	---	74.00	22.63	H	16.5
17961.0625	52.19	---	74.00	21.81	H	17.0
6200.00000	---	41.19	54.00	12.81	V	17.8
13534.8750	---	37.16	54.00	16.84	V	11.8
14551.6250	---	38.02	54.00	15.98	H	12.7
15821.2500	---	39.31	54.00	14.69	V	15.3
16983.6875	---	40.00	54.00	14.00	H	16.4
17980.3125	---	40.48	54.00	13.52	V	17.0

GFSK CH19 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
6208.00000	52.18	---	74.00	21.82	V	17.7
13480.1875	48.62	---	74.00	25.38	H	11.9
14443.5625	50.17	---	74.00	23.83	H	12.6
15805.9375	51.01	---	74.00	22.99	H	15.1
16837.1250	51.71	---	74.00	22.29	H	16.3
17972.0000	51.74	---	74.00	22.26	H	17.0
6198.00000	---	41.34	54.00	12.66	H	17.8
13388.3125	---	37.20	54.00	16.80	H	12.0
14544.6250	---	37.99	54.00	16.01	H	12.7
15844.8750	---	39.43	54.00	14.57	V	15.3
16772.3750	---	40.08	54.00	13.92	H	16.3
17975.0625	---	40.31	54.00	13.69	V	17.0

GFSK CH39 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
6162.00000	52.44	---	74.00	21.56	V	17.6
13432.9375	48.92	---	74.00	25.08	H	12.0
14399.8125	49.42	---	74.00	24.58	H	12.5
15802.8750	50.81	---	74.00	23.19	H	15.1
17233.9375	52.57	---	74.00	21.43	H	16.6
17928.6875	52.25	---	74.00	21.75	H	16.9
6198.00000	---	41.42	54.00	12.58	V	17.8
13501.1875	---	37.14	54.00	16.86	V	11.9
14541.1250	---	37.72	54.00	16.28	V	12.7
15802.0000	---	39.45	54.00	14.55	V	15.1
17235.2500	---	40.09	54.00	13.91	V	16.6
17975.5000	---	40.41	54.00	13.59	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

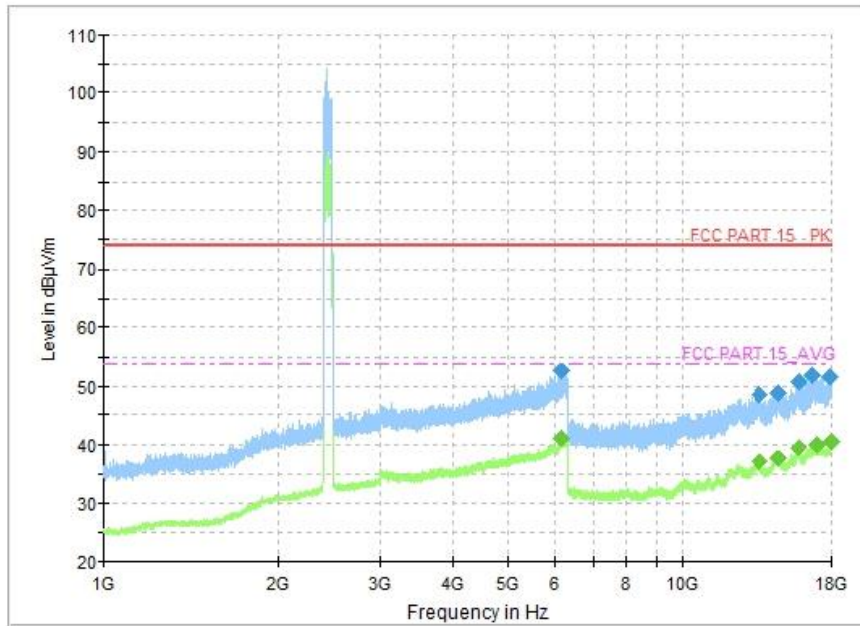


Fig.39 Radiated Spurious Emission (GFSK, Ch0, 1 GHz ~18 GHz), LE 1M

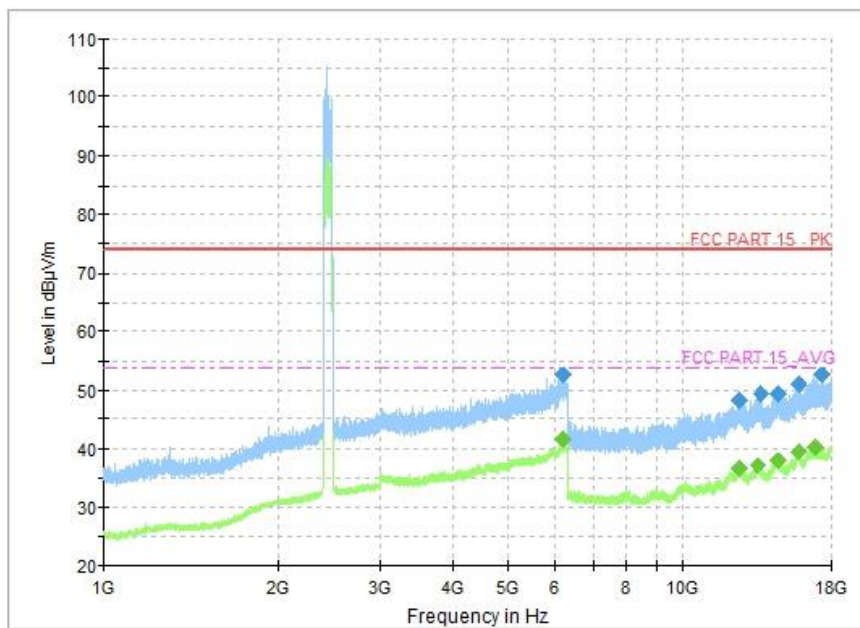


Fig.40 Radiated Spurious Emission (GFSK, Ch19, 1 GHz ~18 GHz), LE 1M

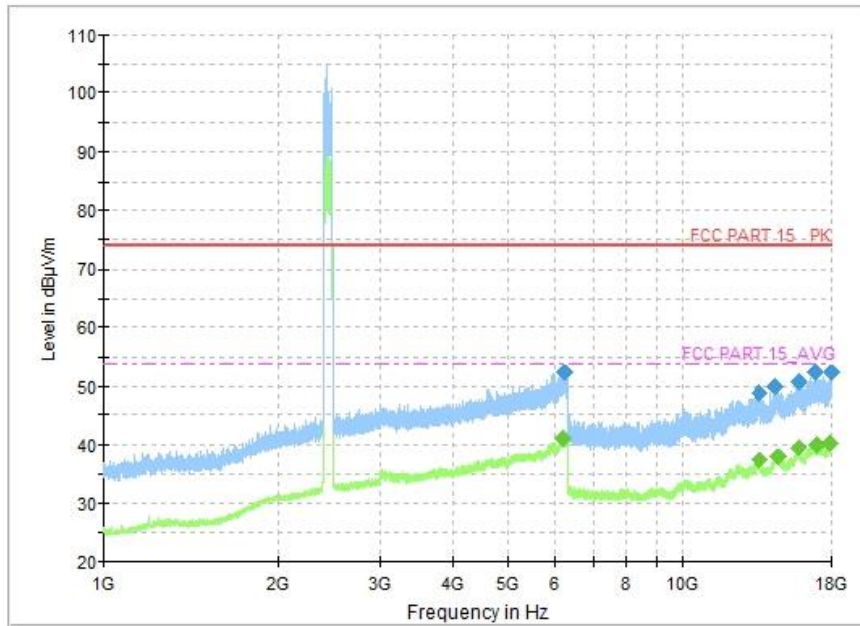


Fig.41 Radiated Spurious Emission (GFSK, Ch39, 1 GHz ~18 GHz), LE 1M

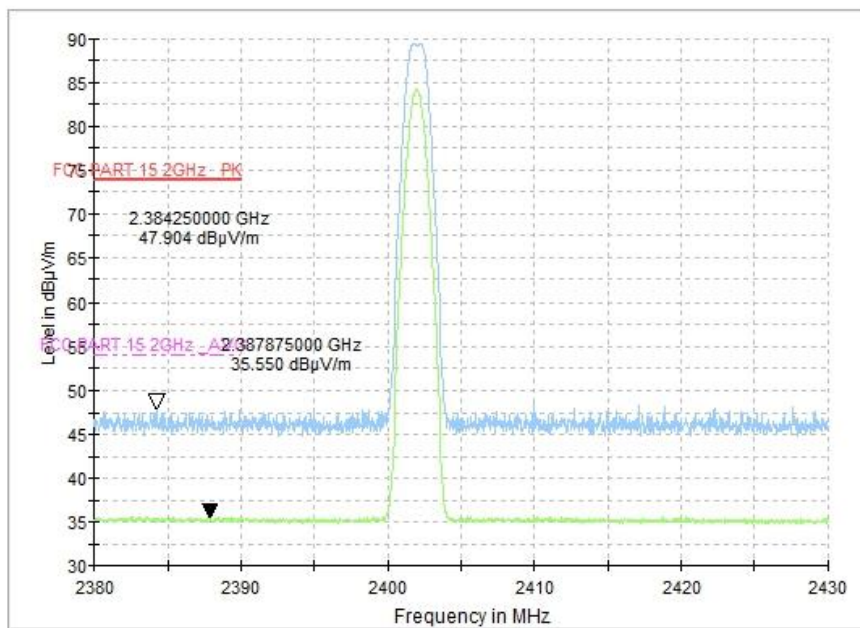


Fig.42 Radiated Band Edges (GFSK, Ch0, 2380GHz~2450GHz), LE 1M

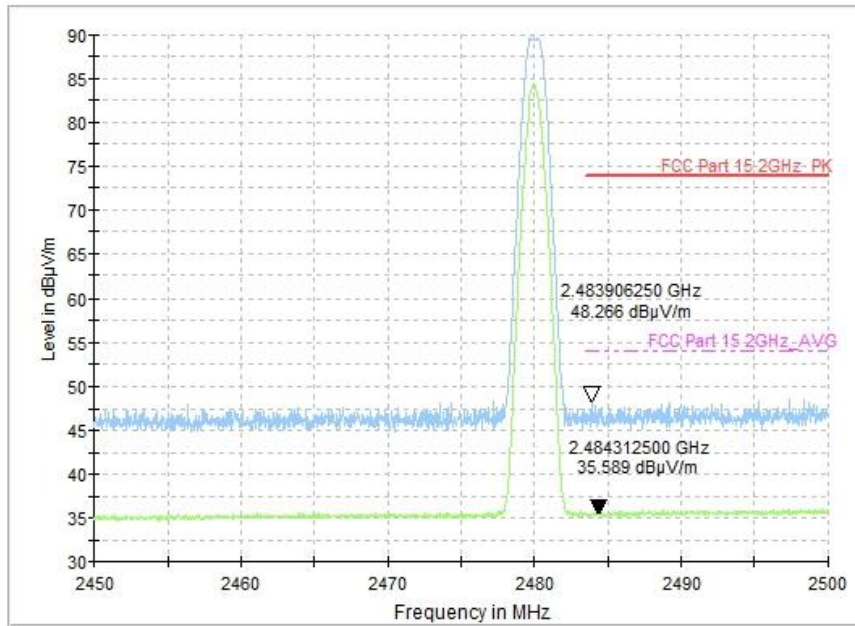


Fig.43 Radiated Band Edges (GFSK, Ch39, 2450GHz~2500GHz), LE 1M

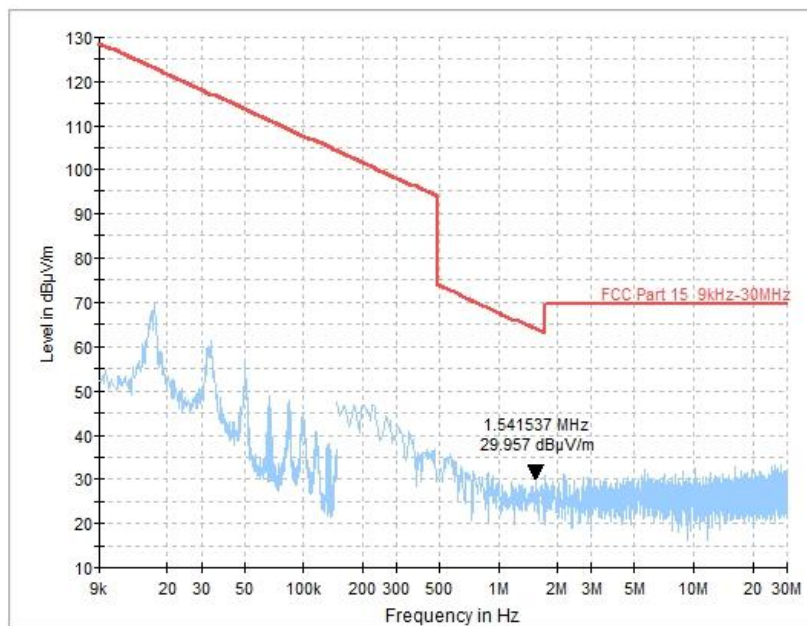


Fig.44 Radiated Spurious Emission (All Channels, 9 kHz-30 MHz), LE 1M

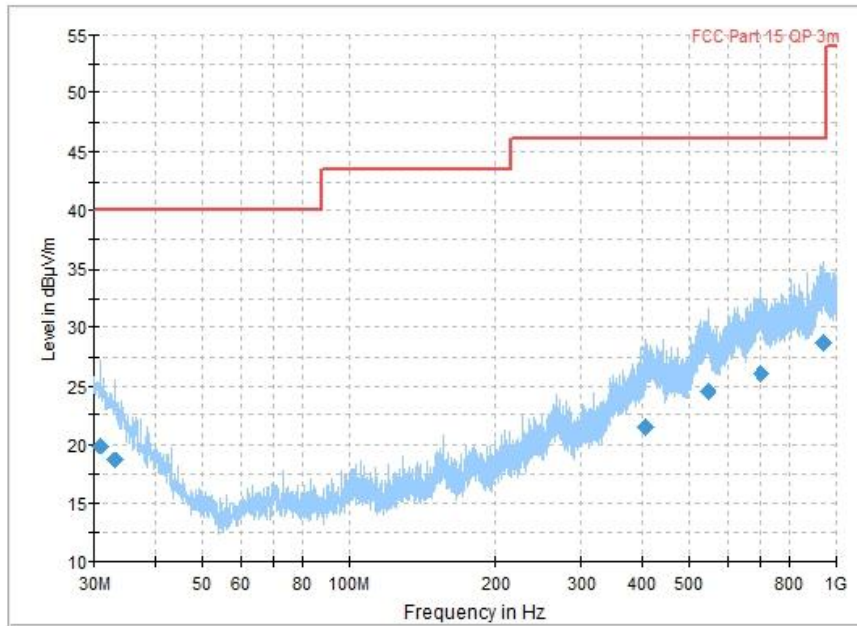


Fig.45 Radiated Spurious Emission (All Channels, 30 MHz-1 GHz), LE 1M

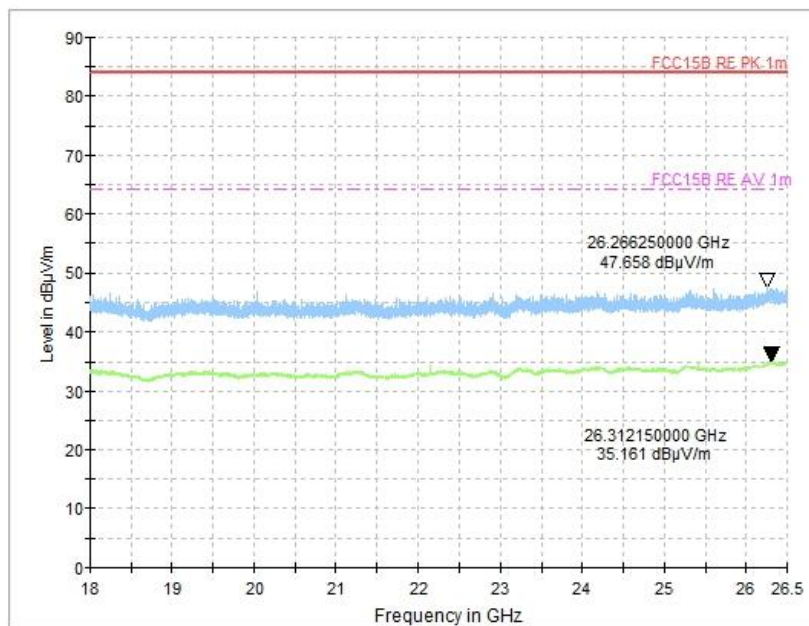


Fig.46 Radiated Spurious Emission (All Channels, 18 GHz-26.5 GHz), LE 1M

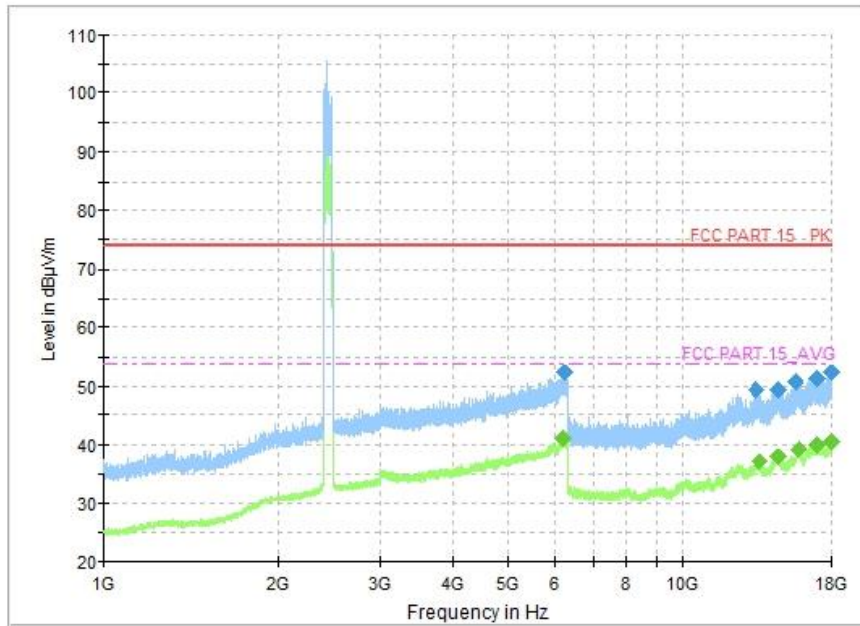


Fig.47 Radiated Spurious Emission (GFSK, Ch0, 1 GHz ~18 GHz), LE 2M

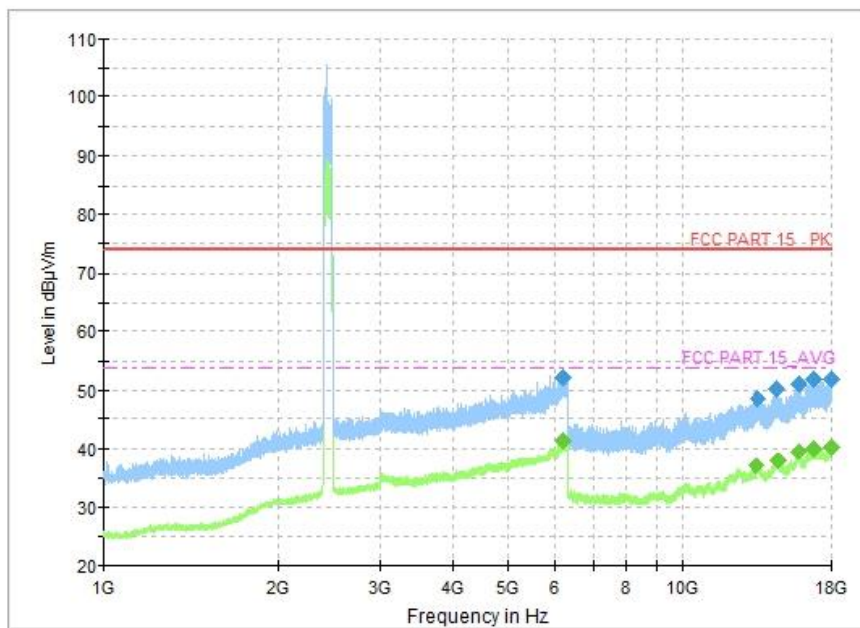


Fig.48 Radiated Spurious Emission (GFSK, Ch19, 1 GHz ~18 GHz), LE 2M

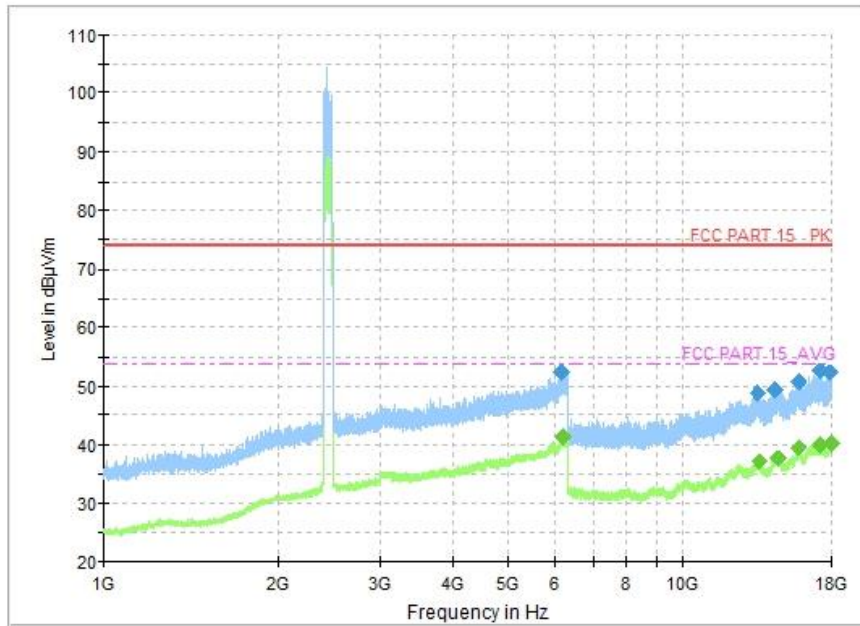


Fig.49 Radiated Spurious Emission (GFSK, Ch39, 1 GHz ~18 GHz), LE 2M

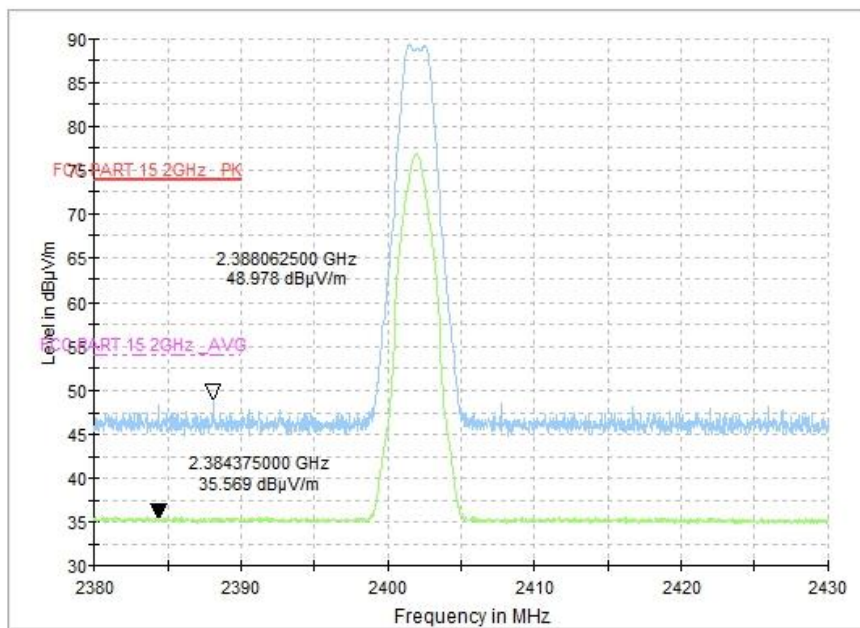


Fig.50 Radiated Band Edges (GFSK, Ch0, 2380GHz~2450GHz), LE 2M

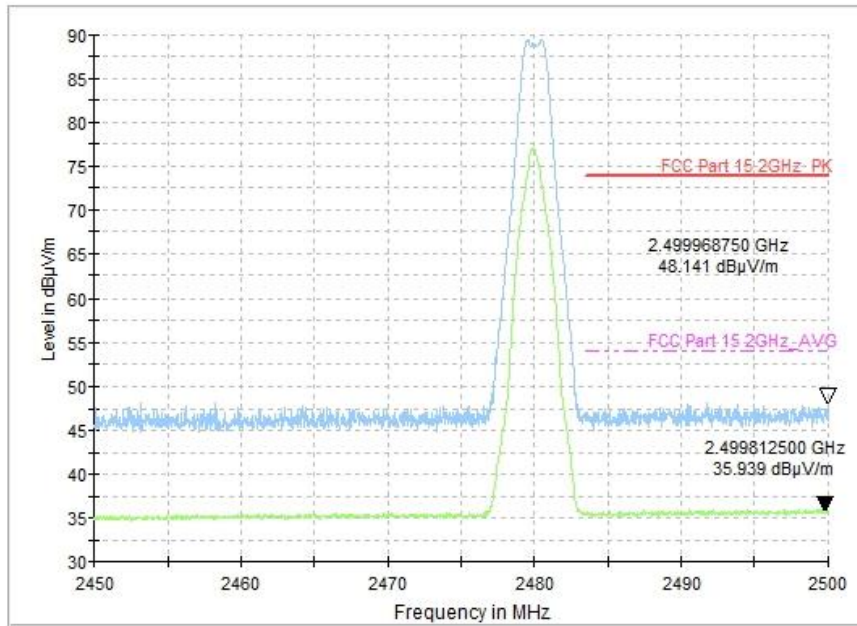


Fig.51 Radiated Band Edges (GFSK, Ch39, 2450GHz~2500GHz), LE 2M

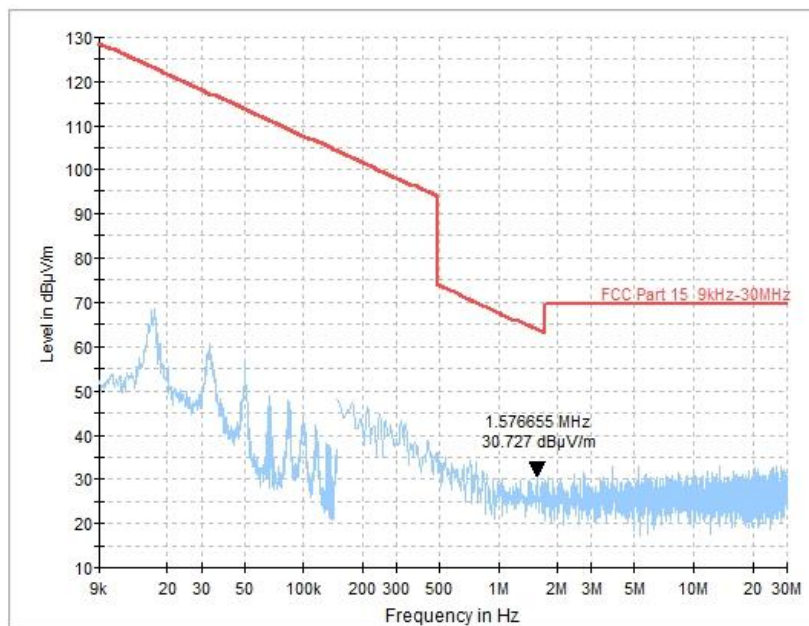


Fig.52 Radiated Spurious Emission (All Channels, 9 kHz-30 MHz), LE 2M

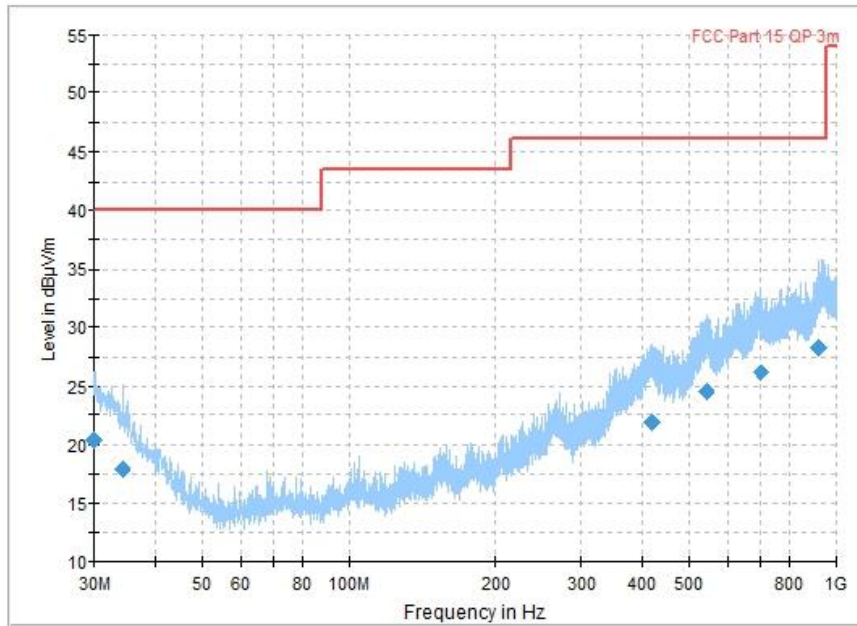


Fig.53 Radiated Spurious Emission (All Channels, 30 MHz-1 GHz), LE 2M

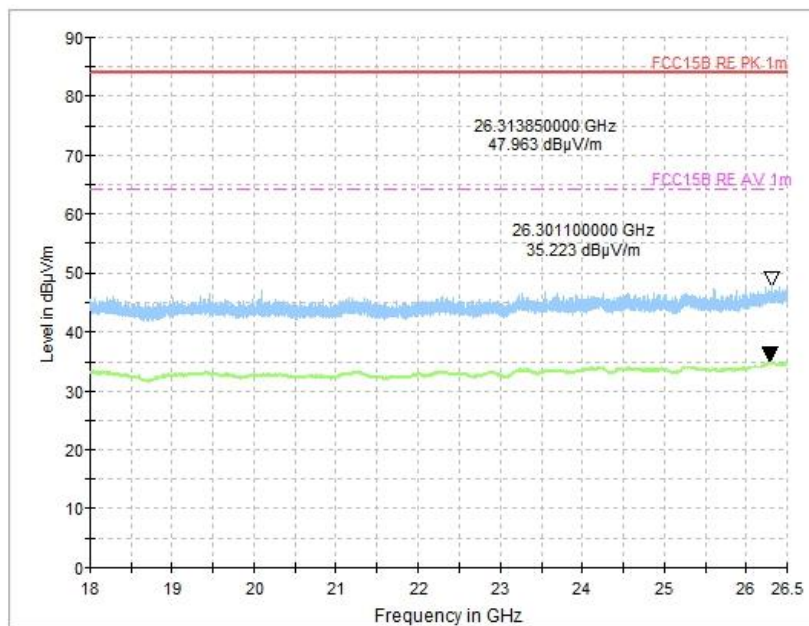


Fig.54 Radiated Spurious Emission (All Channels, 18 GHz-26.5 GHz), LE 2M

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.55	Fig.56	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.55	Fig.56	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.

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.57	Fig.58	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.57	Fig.58	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

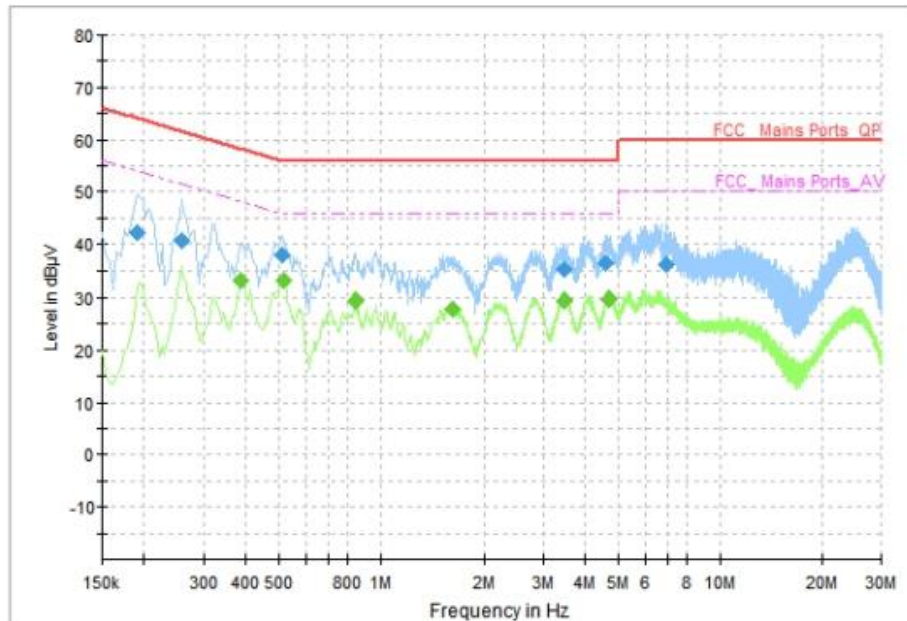


Fig.55 AC Power line Conducted Emission (Traffic),LE 1M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.190000	42.28	64.04	21.76	N	ON	9.6
0.258000	40.55	61.50	20.95	N	ON	9.6
0.510000	38.02	56.00	17.98	N	ON	9.7
3.446000	35.04	56.00	20.96	N	ON	9.7
4.598000	36.27	56.00	19.73	N	ON	9.7
6.922000	35.95	60.00	24.05	N	ON	9.8

Measurement Results : Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.386000	33.00	48.15	15.15	N	ON	9.6
0.518000	33.02	46.00	12.98	N	ON	9.7
0.842000	29.28	46.00	16.72	N	ON	9.7
1.618000	27.80	46.00	18.20	N	ON	9.7
3.450000	29.37	46.00	16.63	N	ON	9.7
4.702000	29.79	46.00	16.21	N	ON	9.7

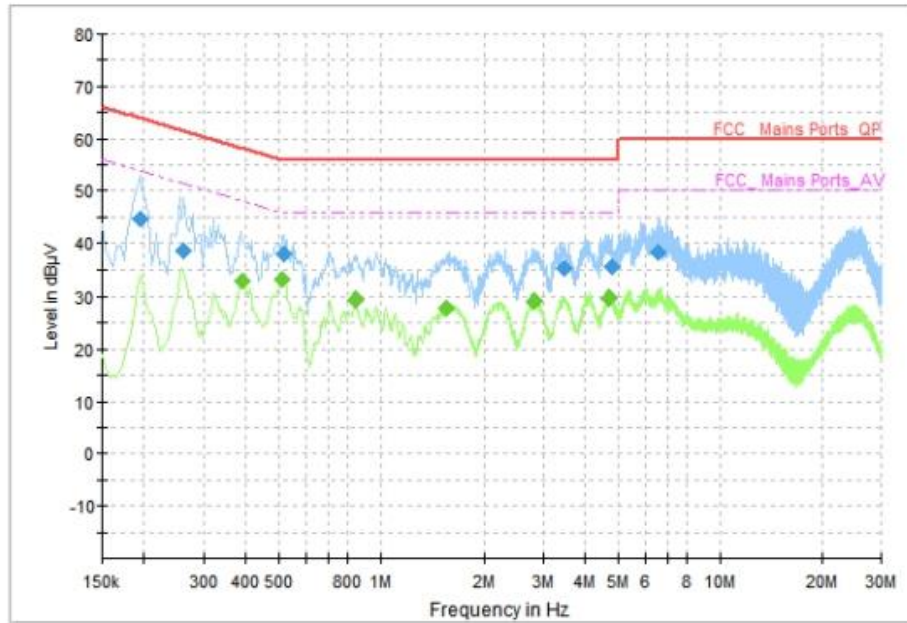


Fig.56 AC Power line Conducted Emission (Idle), LE 1M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.194000	44.62	63.86	19.25	N	ON	9.6
0.262000	38.61	61.37	22.75	L1	ON	9.7
0.518000	38.00	56.00	18.00	N	ON	9.7
3.442000	35.04	56.00	20.96	N	ON	9.7
4.774000	35.35	56.00	20.65	N	ON	9.7
6.538000	38.08	60.00	21.92	N	ON	9.8

Measurement Results : Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.390000	32.85	48.06	15.21	N	ON	9.6
0.514000	33.17	46.00	12.83	N	ON	9.7
0.842000	29.36	46.00	16.64	N	ON	9.7
1.554000	27.90	46.00	18.10	N	ON	9.7
2.810000	29.08	46.00	16.92	N	ON	9.7
4.706000	29.78	46.00	16.22	N	ON	9.7

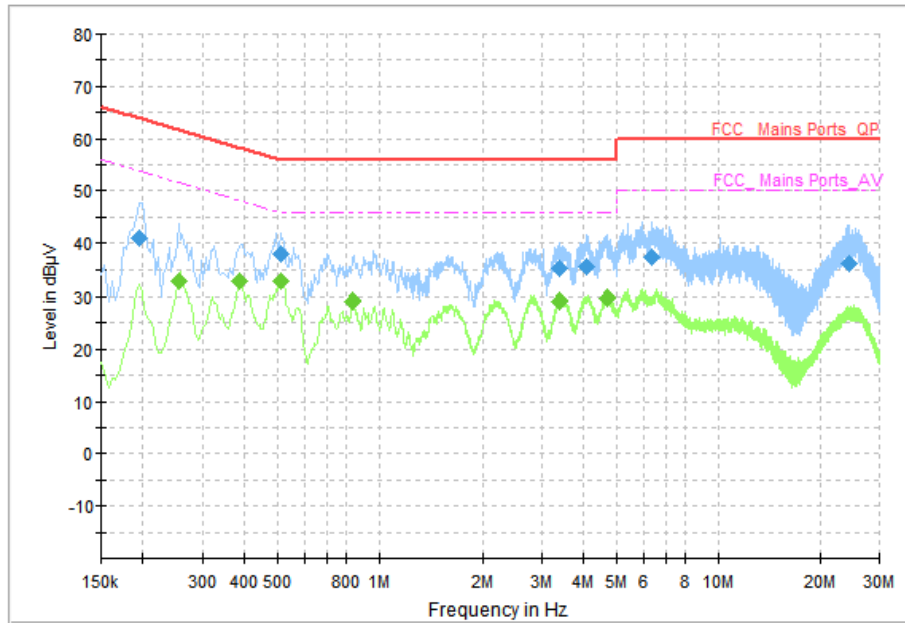


Fig.57 AC Power line Conducted Emission (Traffic), LE 2M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.194000	41.04	63.86	22.83	N	ON	9.6
0.510000	37.89	56.00	18.11	N	ON	9.7
3.378000	35.11	56.00	20.89	N	ON	9.7
4.058000	35.60	56.00	20.40	N	ON	9.7
6.370000	37.45	60.00	22.55	N	ON	9.8
24.426000	36.13	60.00	23.87	N	ON	10.2

Measurement Results : Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.254000	32.69	51.63	18.94	N	ON	9.6
0.386000	32.87	48.15	15.28	N	ON	9.6
0.514000	32.84	46.00	13.16	N	ON	9.7
0.838000	29.12	46.00	16.88	N	ON	9.7
3.378000	28.96	46.00	17.04	N	ON	9.7
4.674000	29.81	46.00	16.19	N	ON	9.7

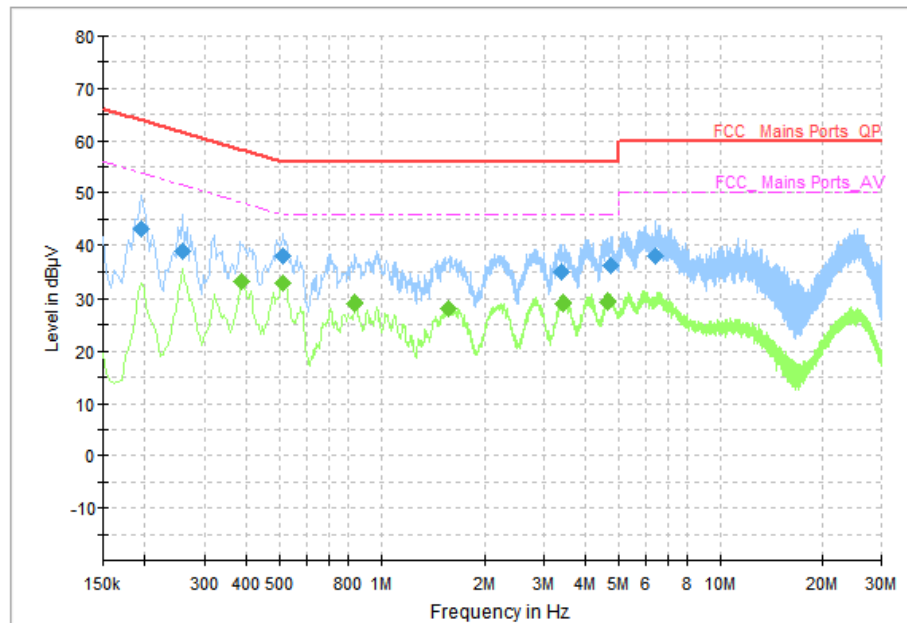


Fig.58 AC Power line Conducted Emission (Idle), LE 2M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.194000	43.14	63.86	20.73	N	ON	9.6
0.258000	38.91	61.50	22.58	N	ON	9.6
0.514000	37.89	56.00	18.11	N	ON	9.7
3.378000	34.86	56.00	21.14	N	ON	9.7
4.718000	36.07	56.00	19.93	N	ON	9.7
6.422000	37.87	60.00	22.13	N	ON	9.8

Measurement Results : Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.386000	32.91	48.15	15.24	N	ON	9.6
0.510000	32.62	46.00	13.38	N	ON	9.7
0.838000	29.15	46.00	16.85	N	ON	9.7
1.558000	28.05	46.00	17.95	N	ON	9.7
3.426000	29.18	46.00	16.82	N	ON	9.7
4.634000	29.47	46.00	16.53	N	ON	9.7

*****END OF REPORT*****