

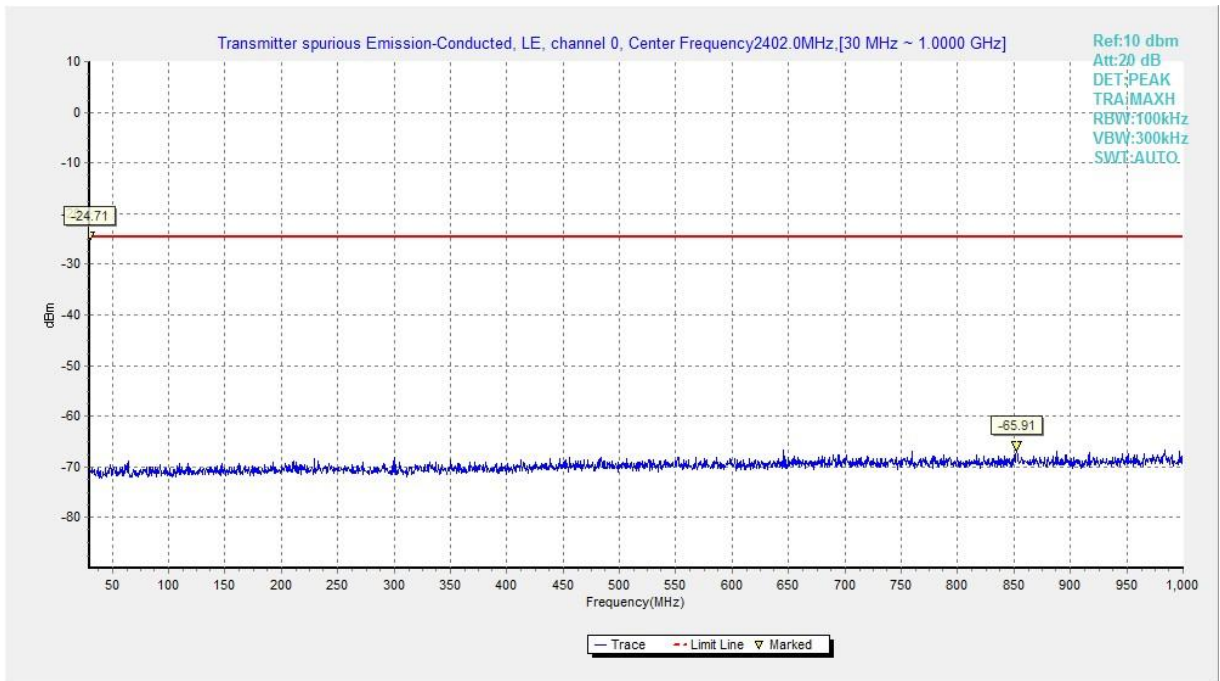


Fig.64 Conducted Spurious Emission (All channels, 30 MHz-1 GHz), LE Coded (S=8)

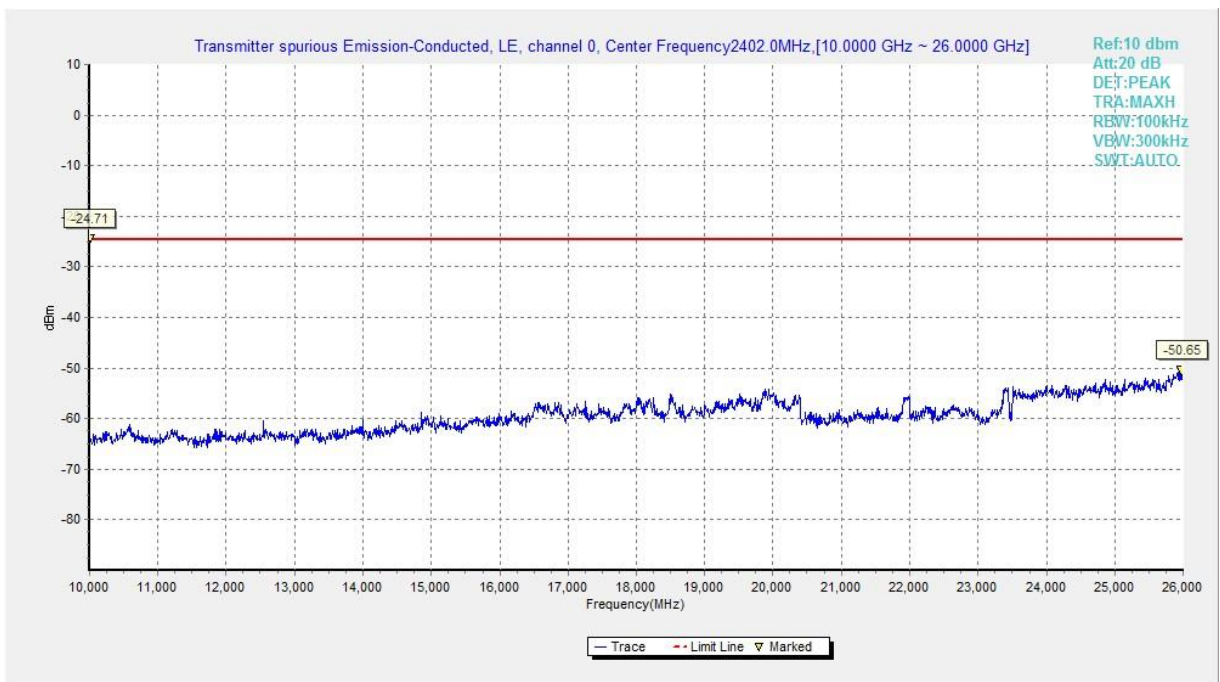


Fig.65 Conducted Spurious Emission (All channels, 10 GHz-26 GHz), LE Coded (S=8)

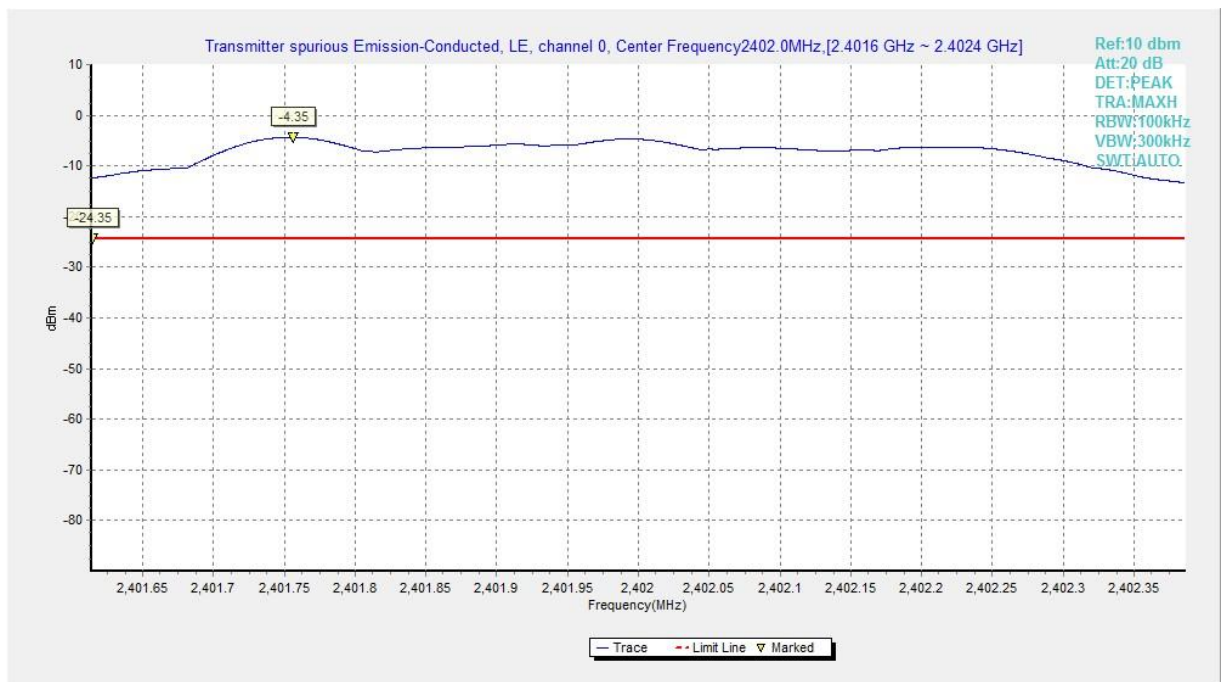


Fig.66 Conducted Spurious Emission (Ch0, Center Frequency), LE Coded (S=2)

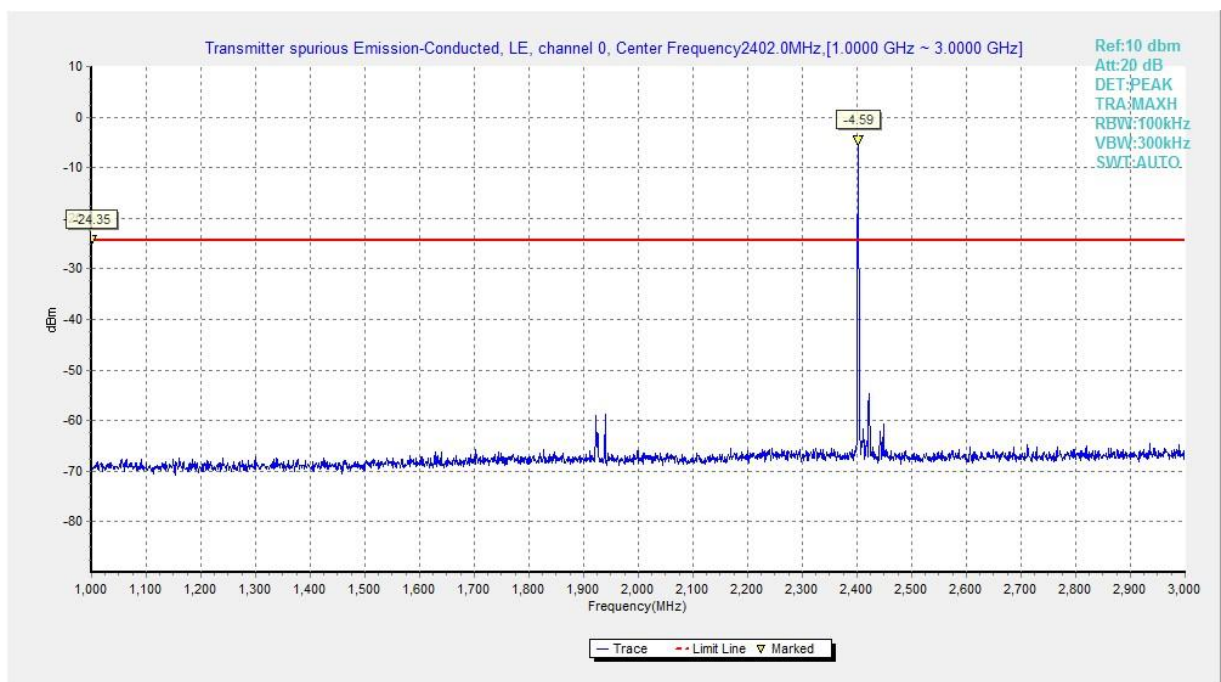


Fig.67 Conducted Spurious Emission (Ch0, 1 GHz-3 GHz), LE Coded (S=2)

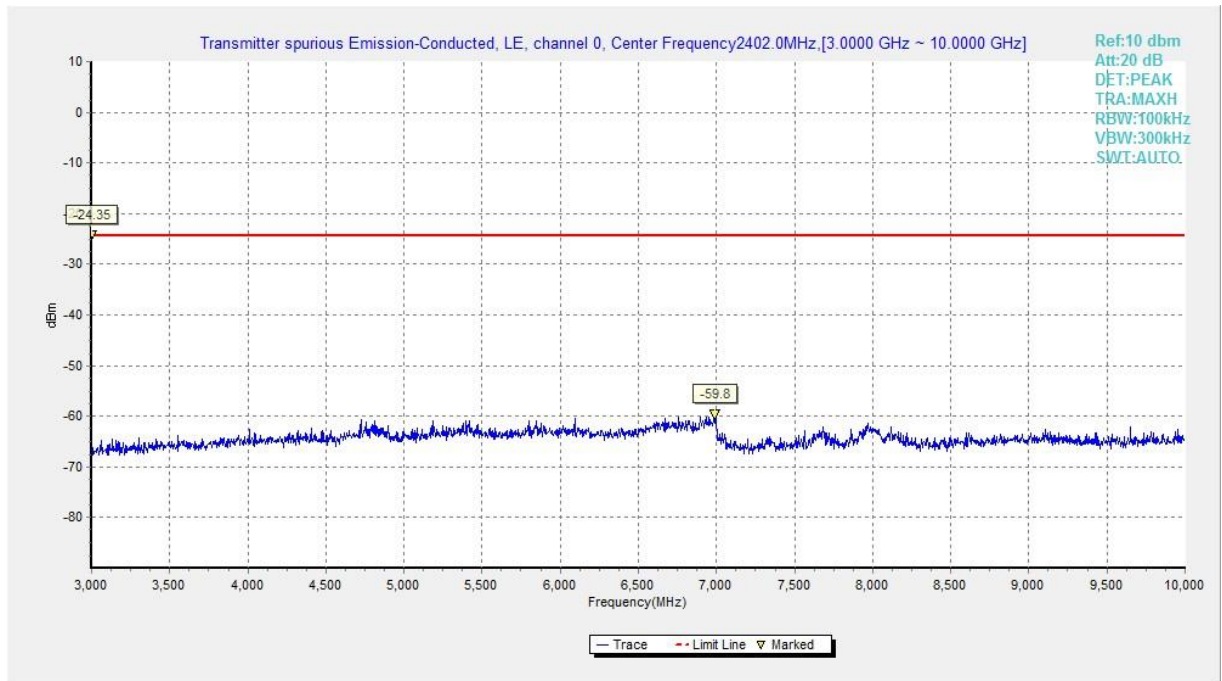


Fig.68 Conducted Spurious Emission (Ch0, 3 GHz-10 GHz), LE Coded (S=2)

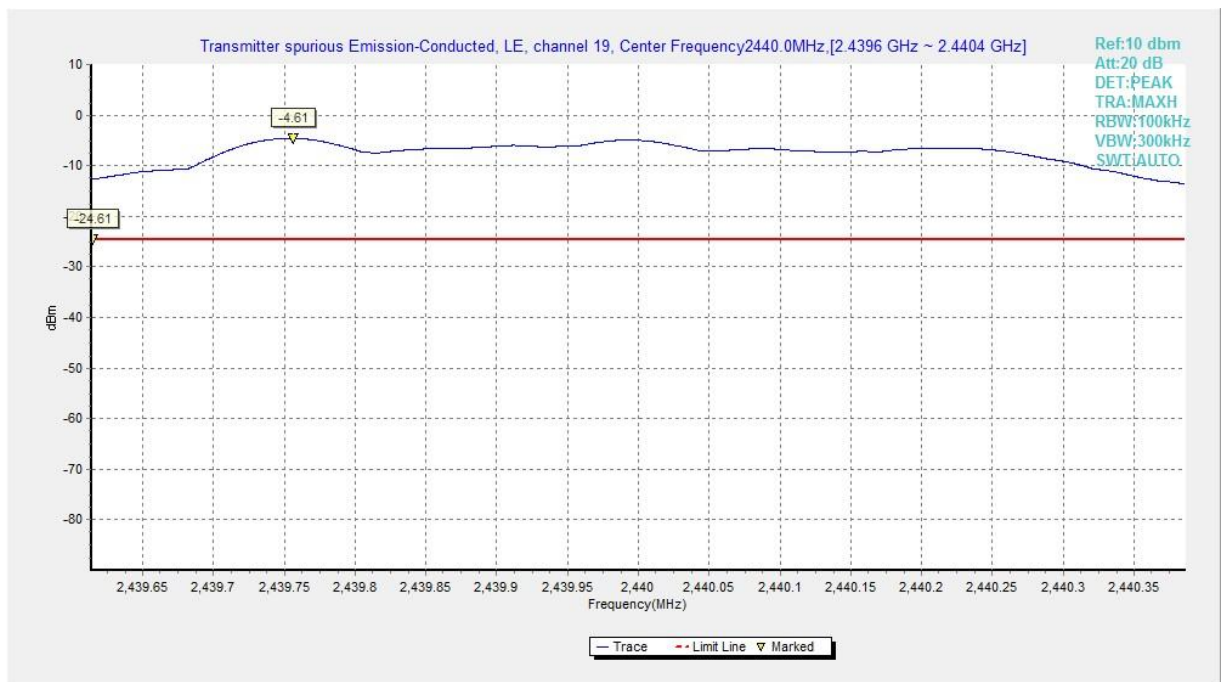


Fig.69 Conducted Spurious Emission (Ch19, Center Frequency), LE Coded (S=2)

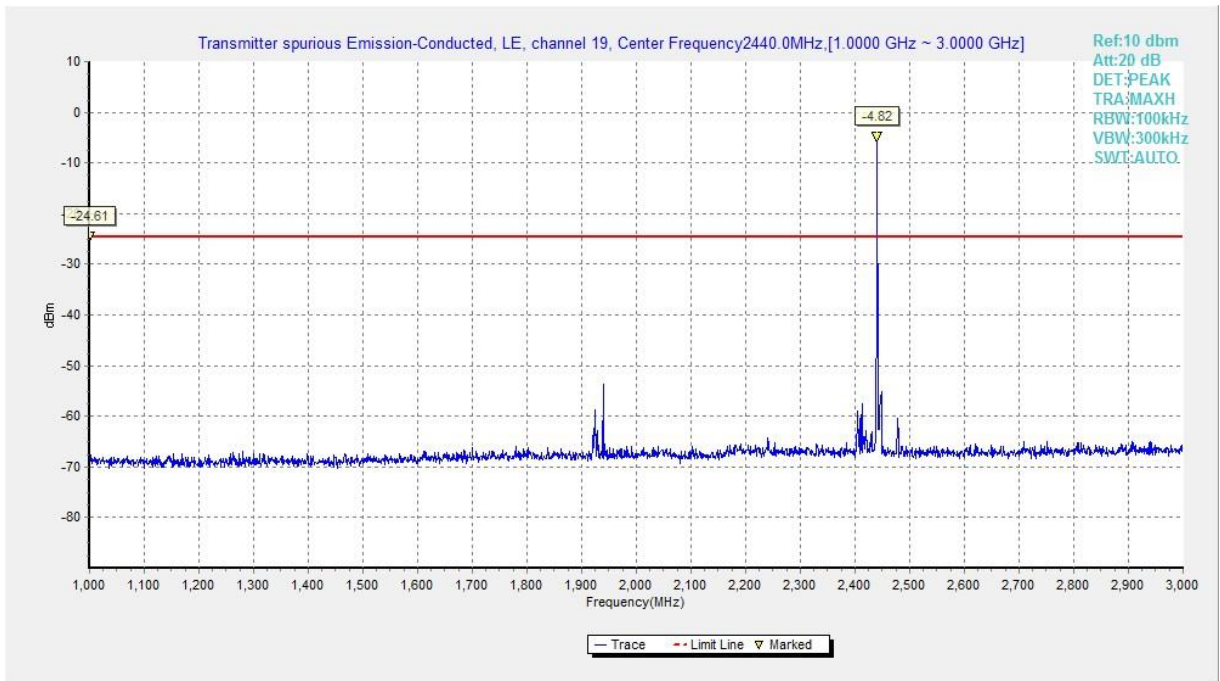


Fig.70 Conducted Spurious Emission (Ch19, 1 GHz-3 GHz), LE Coded (S=2)

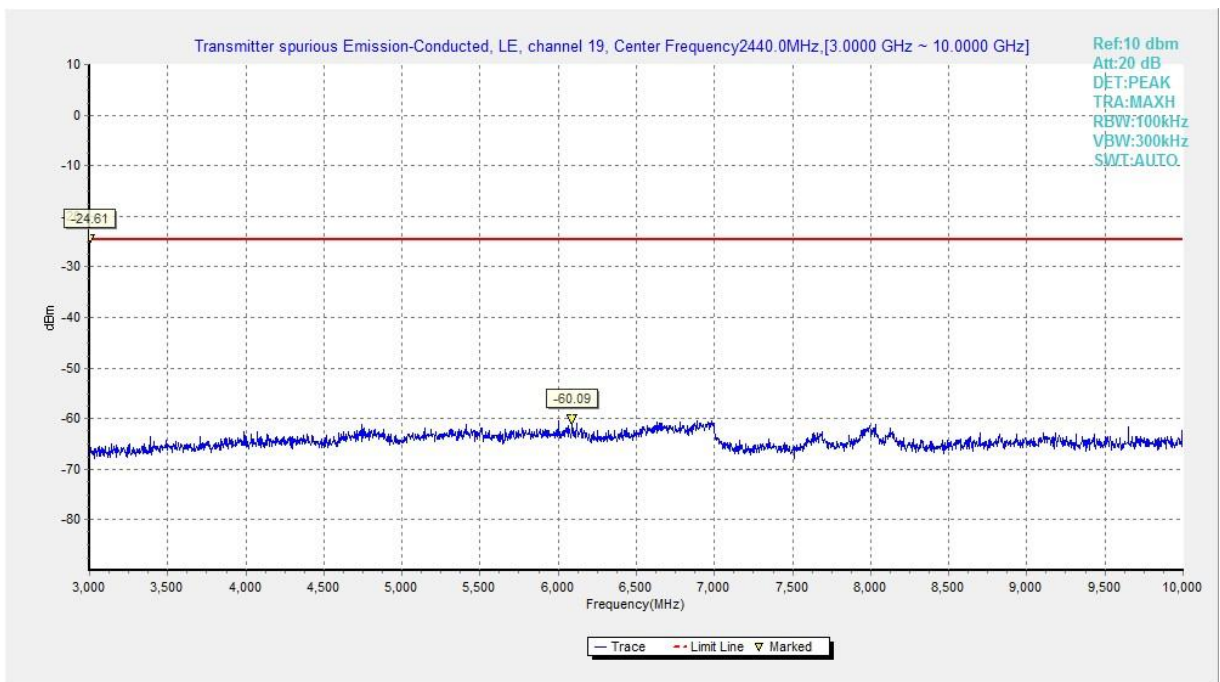


Fig.71 Conducted Spurious Emission (Ch19, 3 GHz-10 GHz), LE Coded (S=2)

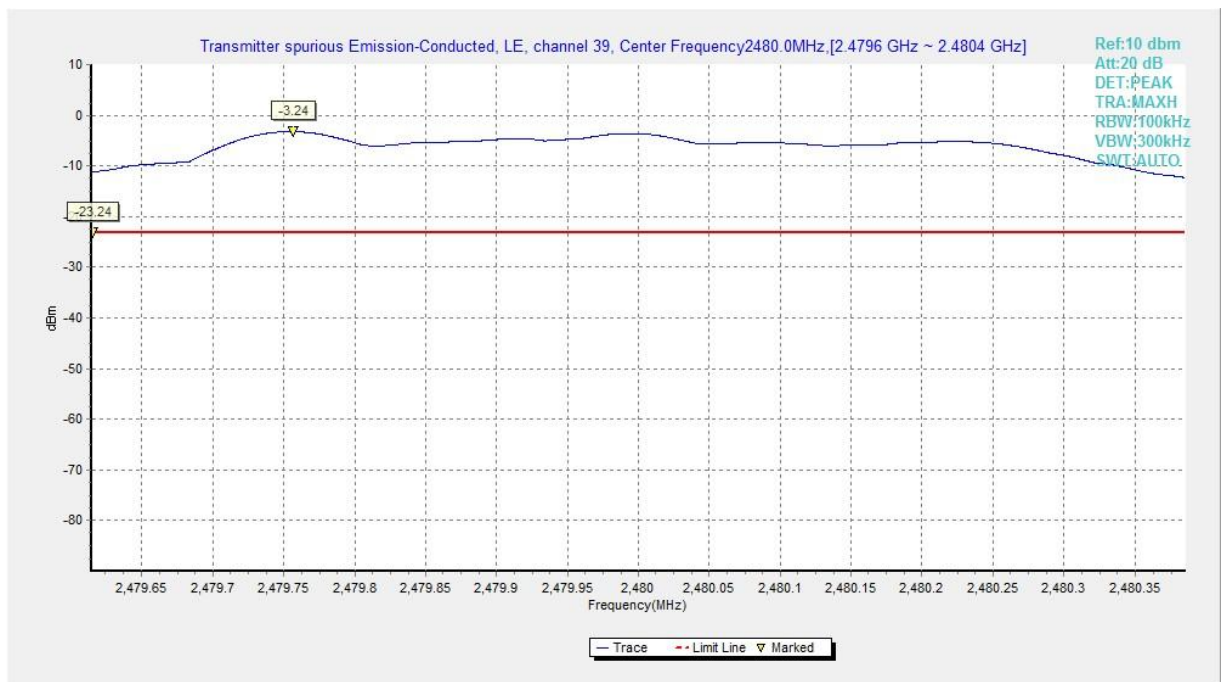


Fig.72 Conducted Spurious Emission (Ch39, Center Frequency), LE Coded (S=2)

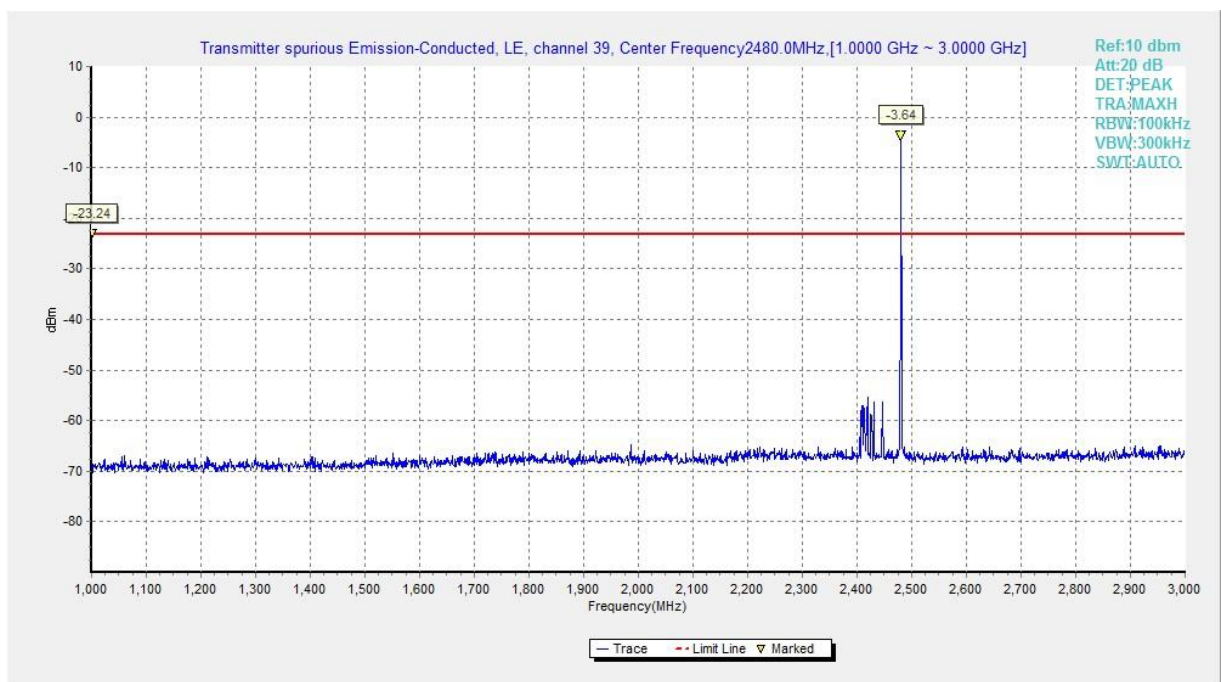


Fig.73 Conducted Spurious Emission (Ch39, 1 GHz-3 GHz), LE Coded (S=2)

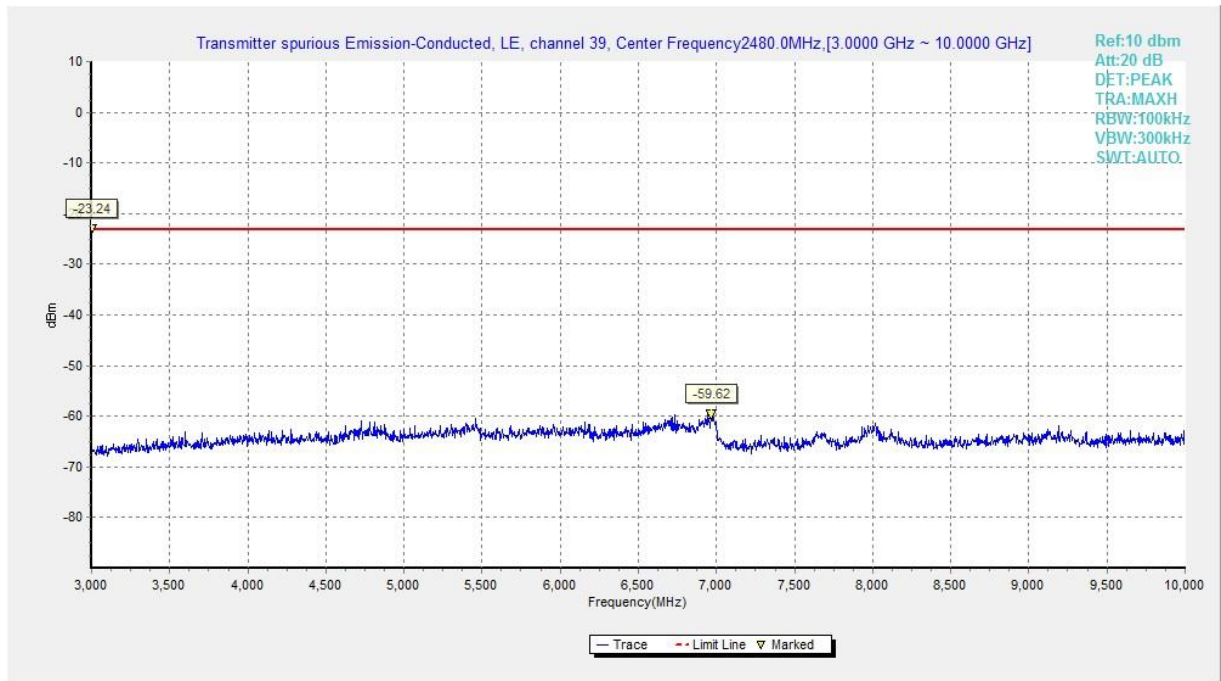


Fig.74 Conducted Spurious Emission (Ch39, 3 GHz-10 GHz), LE Coded (S=2)

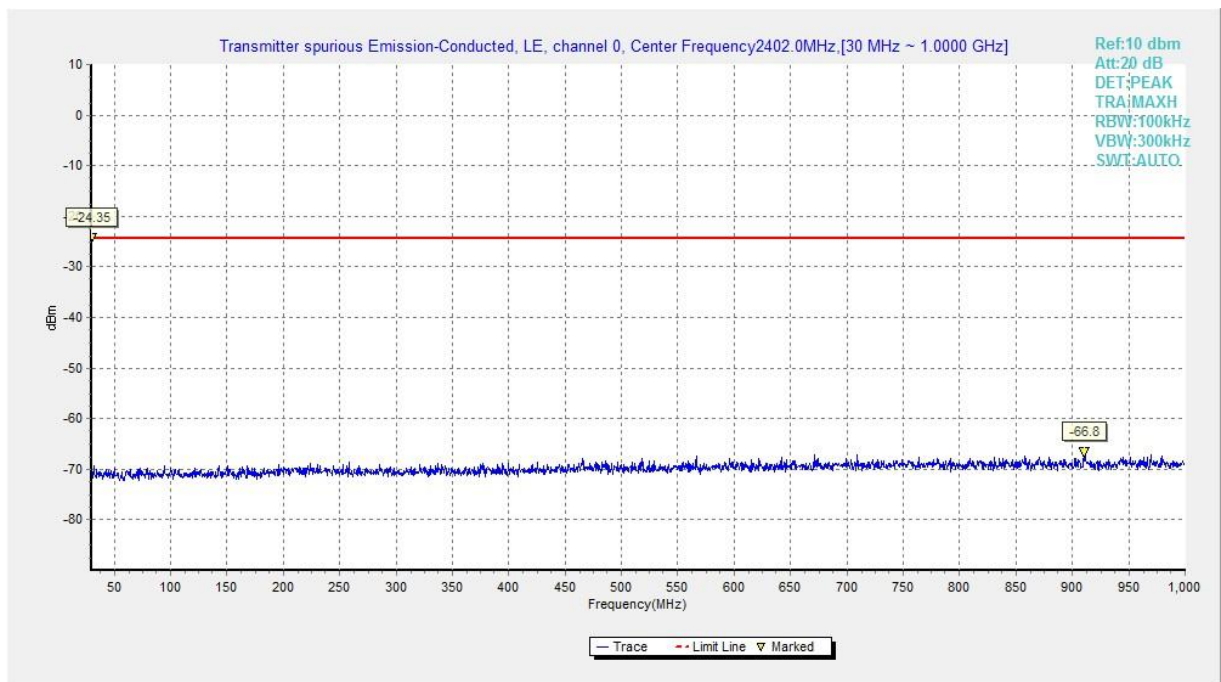


Fig.75 Conducted Spurious Emission (All channels, 30 MHz-1 GHz), LE Coded (S=2)

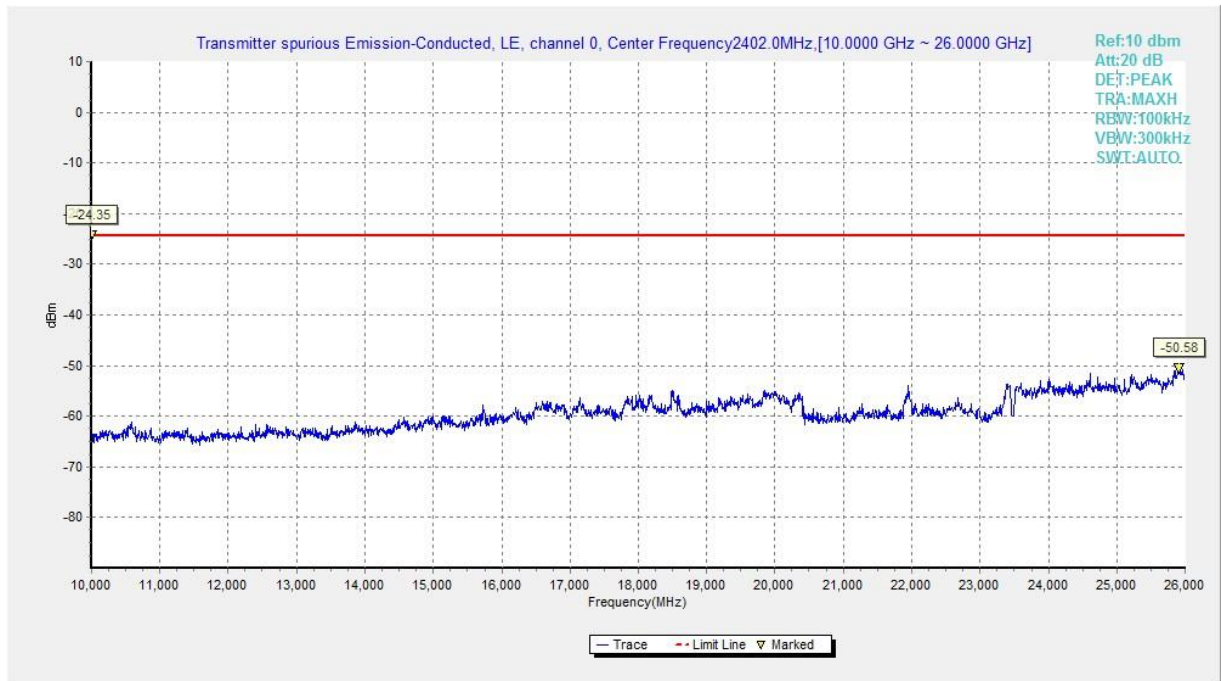


Fig.76 Conducted Spurious Emission (All channels, 10 GHz-26 GHz), LE Coded (S=2)

A.6 Transmitter Spurious Emission - Radiated

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209 & RSS-247 section 5.5/RSS-Gen section 6.13	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 (μV/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 ~ 3 GHz	Fig.77	P
		3 GHz ~ 18 GHz	Fig.78	P
	19	9 kHz ~ 30 MHz	Fig.79	P
		30 MHz ~ 1 GHz	Fig.80	P
		1 GHz ~ 3 GHz	Fig.81	P
		3 GHz ~ 18 GHz	Fig.82	P
		18 GHz ~ 26.5 GHz	Fig.83	P
	39	1 GHz ~ 3 GHz	Fig.84	P
		3 GHz ~ 18 GHz	Fig.85	P
	Restricted Band (CH0)	2.38 GHz ~ 2.45 GHz	Fig.86	P
	Restricted Band (CH39)	2.45 GHz ~ 2.5 GHz	Fig.87	P
LE-2M	0	1 GHz ~ 3 GHz	Fig.88	P
		3 GHz ~ 18 GHz	Fig.89	P
	19	9 kHz ~ 30 MHz	Fig.90	P
		30 MHz ~ 1 GHz	Fig.91	P
		1 GHz ~ 3 GHz	Fig.92	P
		3 GHz ~ 18 GHz	Fig.93	P
		18 GHz ~ 26.5 GHz	Fig.94	P
	39	1 GHz ~ 3 GHz	Fig.95	P
		3 GHz ~ 18 GHz	Fig.96	P
	Restricted Band (CH0)	2.38 GHz ~ 2.45 GHz	Fig.97	P
	Restricted Band (CH39)	2.45 GHz ~ 2.5 GHz	Fig.98	P
LE Coded	0	1 GHz ~ 3 GHz	Fig.99	P
		3 GHz ~ 18 GHz	Fig.100	P
	19	9 kHz ~ 30 MHz	Fig.101	P
		30 MHz ~ 1 GHz	Fig.102	P
		1 GHz ~ 3 GHz	Fig.103	P
		3 GHz ~ 18 GHz	Fig.104	P
		18 GHz ~ 26.5 GHz	Fig.105	P
	39	1 GHz ~ 3 GHz	Fig.106	P
		3 GHz ~ 18 GHz	Fig.107	P
	Restricted Band (CH0)	2.38 GHz ~ 2.45 GHz	Fig.108	P
	Restricted Band (CH39)	2.45 GHz ~ 2.5 GHz	Fig.109	P

See below for test graphs.

Conclusion: Pass

Worst Case Result
LE-1M
GFSK CH39 (3-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
10255.50	46.26	74.00	27.74	V	5.2
11902.00	46.63	74.00	27.37	H	7.1
13077.00	46.90	74.00	27.10	V	8.4
14509.00	48.81	74.00	25.19	H	11.5
16281.50	50.99	74.00	23.01	H	14.3
17748.50	50.98	74.00	23.02	H	16.3

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
10418.50	34.00	54.00	20.00	H	5.1
11579.00	34.43	54.00	19.57	H	6.6
12974.50	35.32	54.00	18.68	H	8.4
14626.50	36.71	54.00	17.29	H	11.3
16551.50	39.02	54.00	14.98	H	14.7
17795.50	38.84	54.00	15.16	H	16.1

LE-2M
GFSK CH39 (3-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
12125.50	46.14	74.00	27.86	V	7.3
13246.00	45.81	74.00	28.19	H	8.7
14463.50	48.58	74.00	25.42	V	11.2
15906.00	48.15	74.00	25.85	V	13.2
16619.00	50.55	74.00	23.45	H	14.9
17607.00	50.55	74.00	23.45	V	15.5

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
12556.00	37.66	54.00	16.34	H	7.9
13266.00	38.23	54.00	15.77	H	8.7
14538.50	38.66	54.00	15.34	V	11.4
16143.00	39.40	54.00	14.60	V	14.2
17435.00	39.71	54.00	14.29	H	14.6
16766.00	40.37	54.00	13.63	H	14.8

LE Coded
GFSK CH39 (3-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
10483.50	45.97	74.00	28.03	V	5.0
11993.50	46.85	74.00	27.15	H	7.0
13309.50	46.82	74.00	27.18	H	9.0
14475.00	48.70	74.00	25.30	V	11.3
16698.00	51.49	74.00	22.51	V	14.9
17914.00	51.65	74.00	22.35	H	16.3

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
10409.50	33.65	54.00	20.35	V	5.0
11521.00	34.27	54.00	19.73	V	6.2
12526.50	35.14	54.00	18.86	H	8.0
14474.00	37.18	54.00	16.82	H	11.3
16611.00	38.92	54.00	15.08	H	14.8
17914.50	40.01	54.00	13.99	H	16.3

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

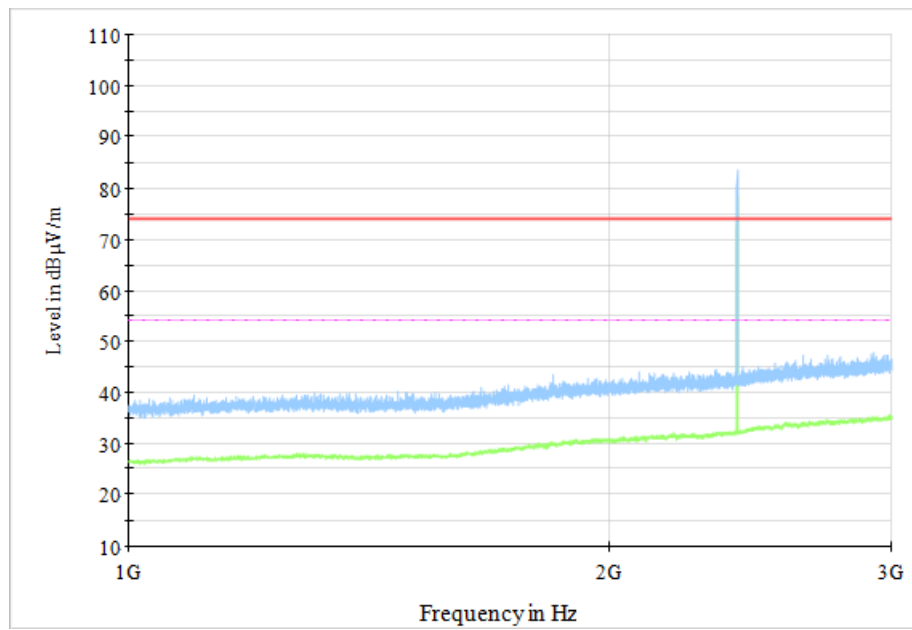


Fig.77 Radiated Spurious Emission (Ch0, 1 GHz - 3 GHz), 1M

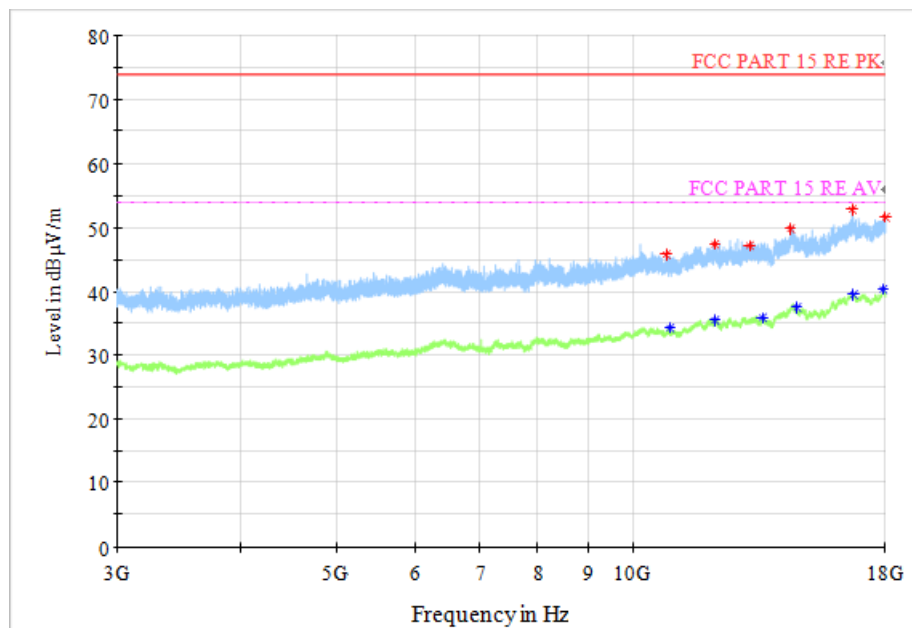


Fig.78 Radiated Spurious Emission (Ch0, 3 GHz - 18 GHz), 1M

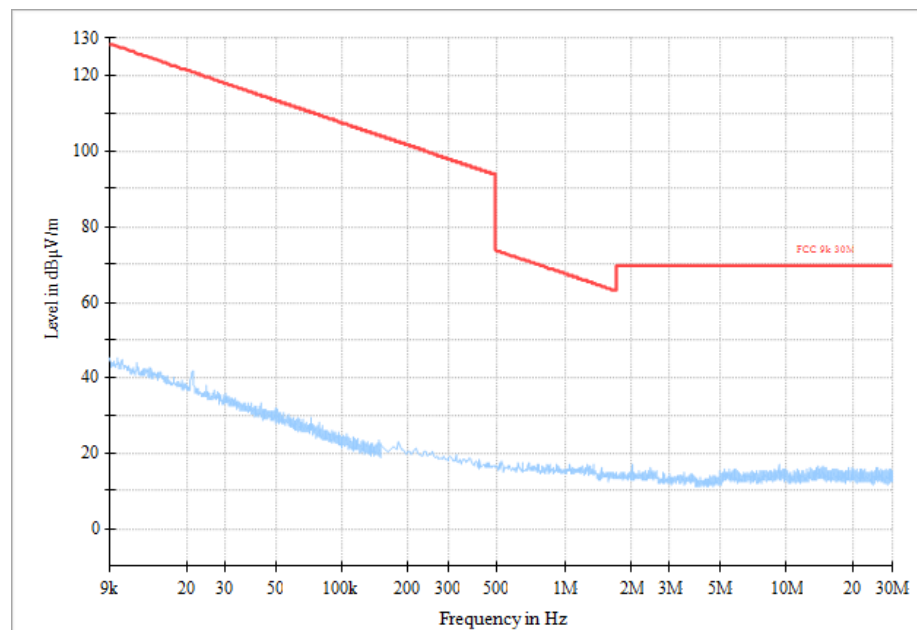


Fig.79 Radiated Spurious Emission (Ch19, 9 kHz - 30 MHz), 1M

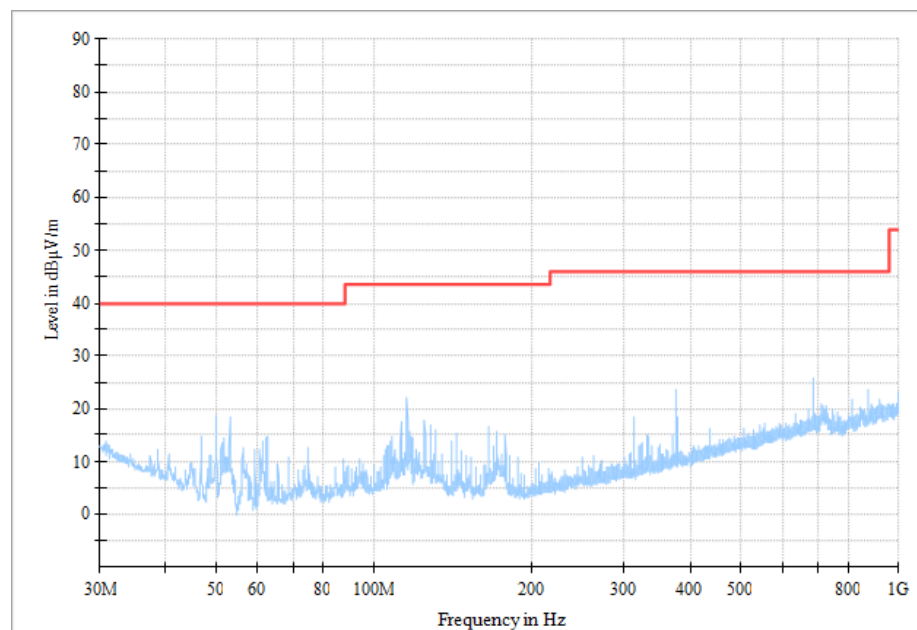


Fig.80 Radiated Spurious Emission (Ch19, 30 MHz - 1 GHz), 1M

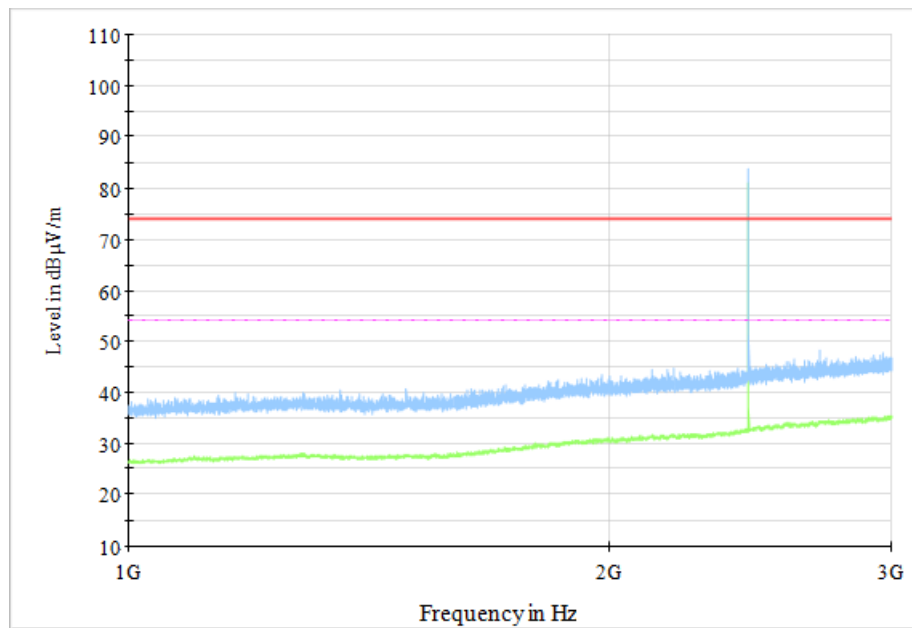


Fig.81 Radiated Spurious Emission (Ch19, 1 GHz - 3 GHz), 1M

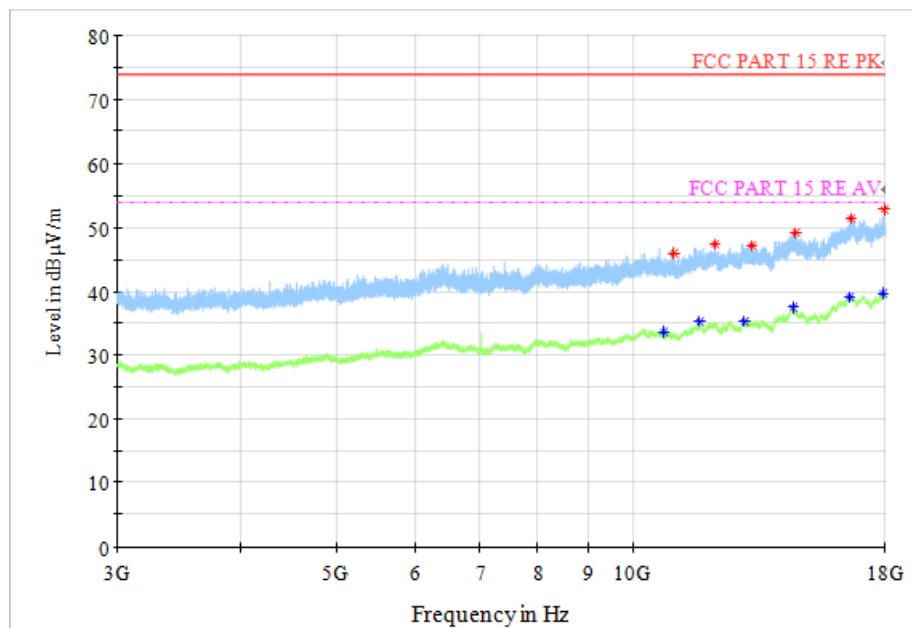


Fig.82 Radiated Spurious Emission (Ch19, 3 GHz - 18 GHz), 1M

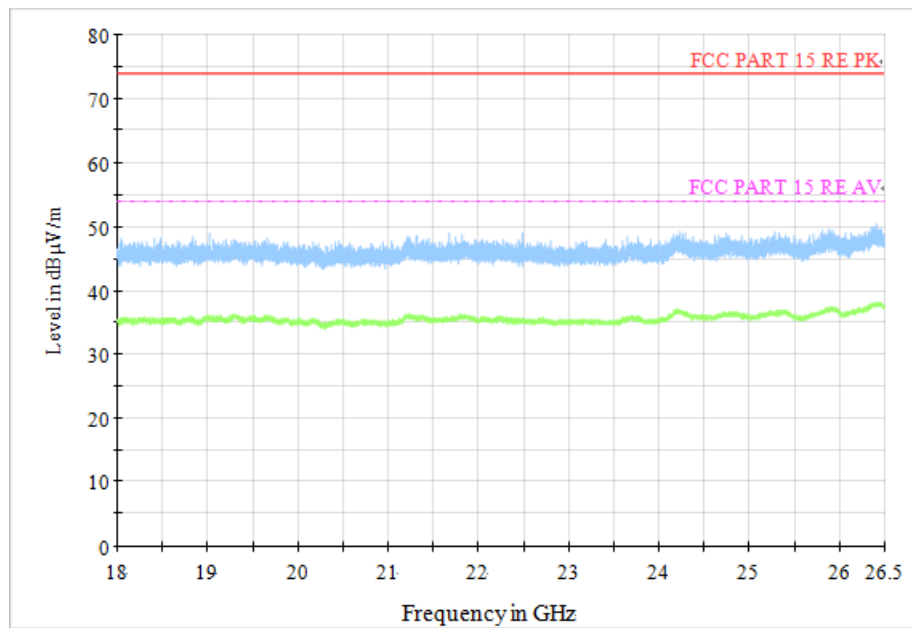


Fig.83 Radiated Spurious Emission (Ch19, 18 GHz - 26.5 GHz), 1M

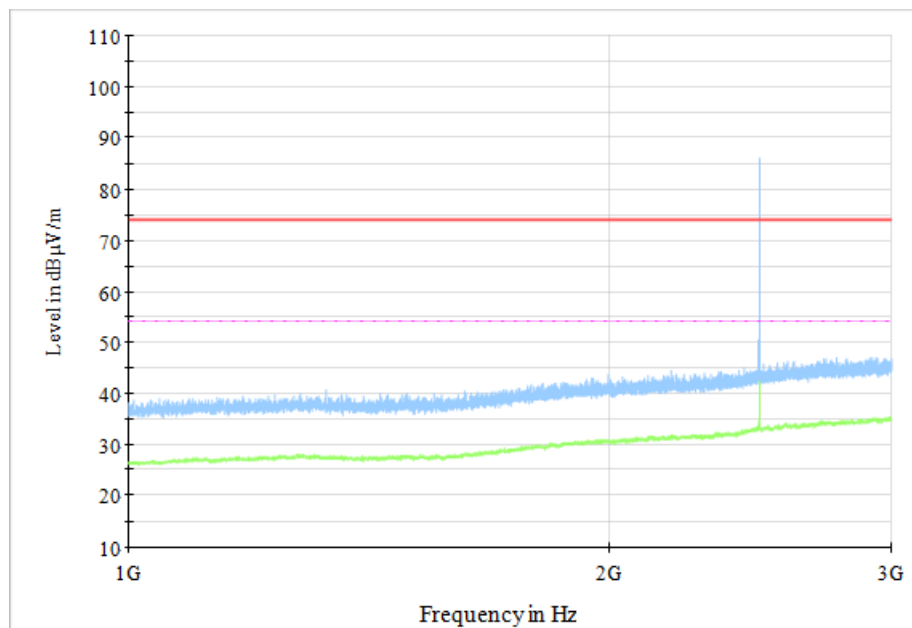


Fig.84 Radiated Spurious Emission (Ch39, 1 GHz - 3 GHz), 1M

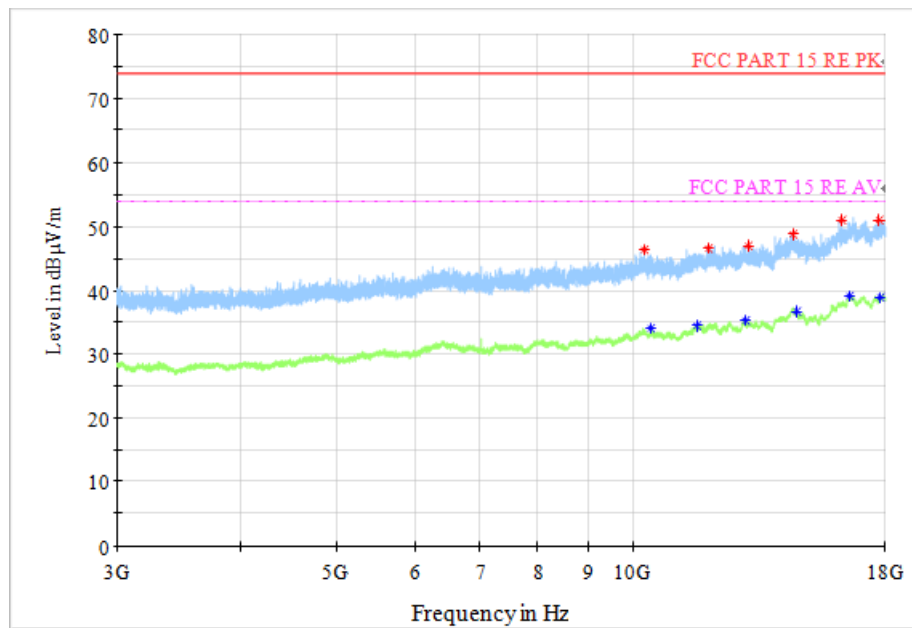


Fig.85 Radiated Spurious Emission (Ch39, 3 GHz - 18 GHz), 1M

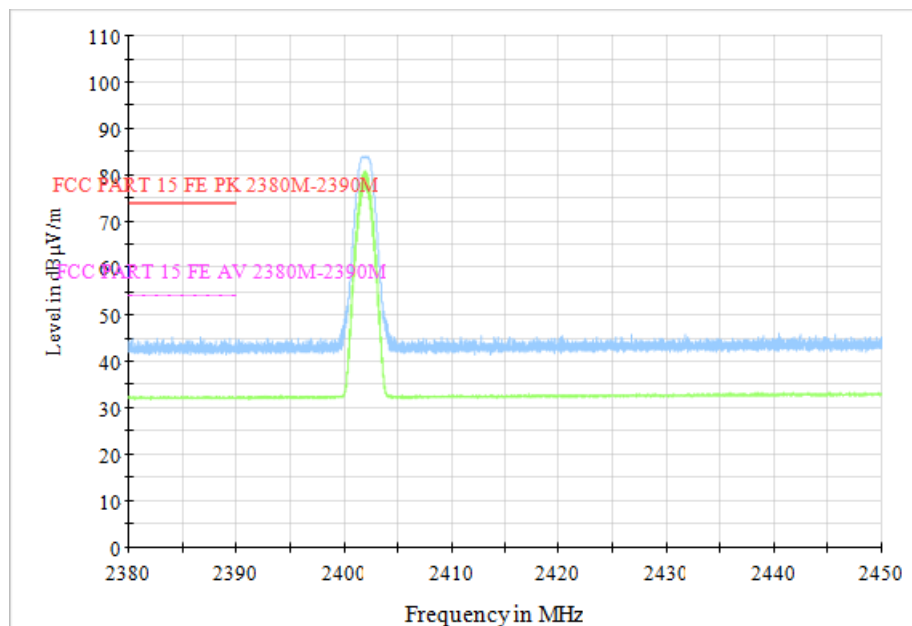


Fig.86 Radiated Band Edges (Ch0, 2380GHz - 2450GHz), 1M

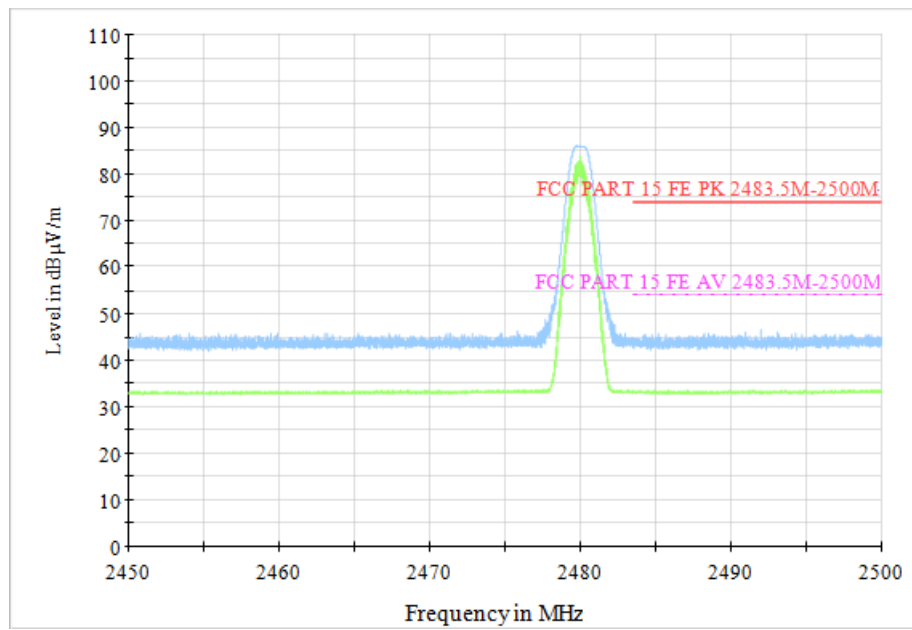


Fig.87 Radiated Band Edges (Ch39, 2450GHz - 2500GHz), 1M

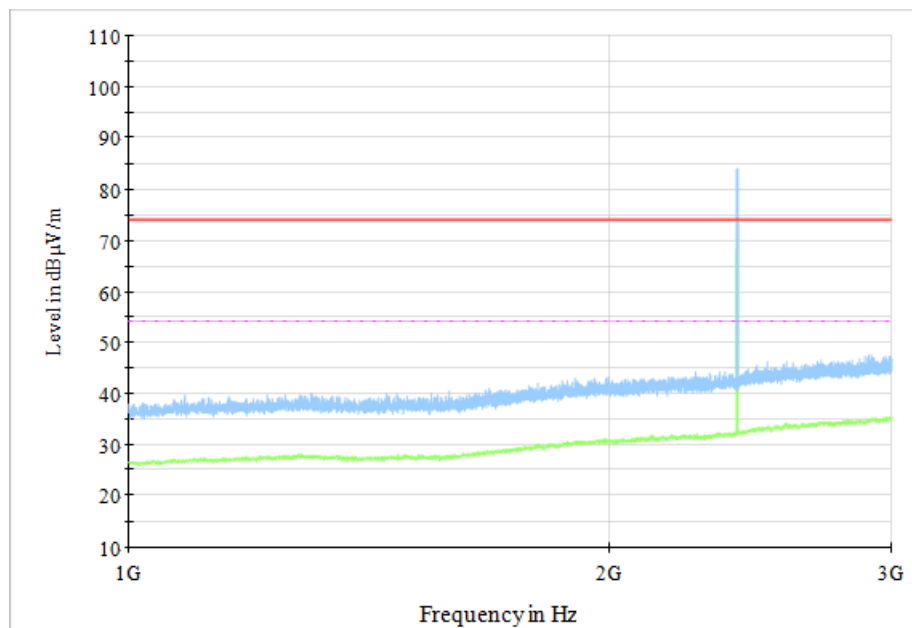


Fig.88 Radiated Spurious Emission (Ch0, 1 GHz - 3 GHz), 2M

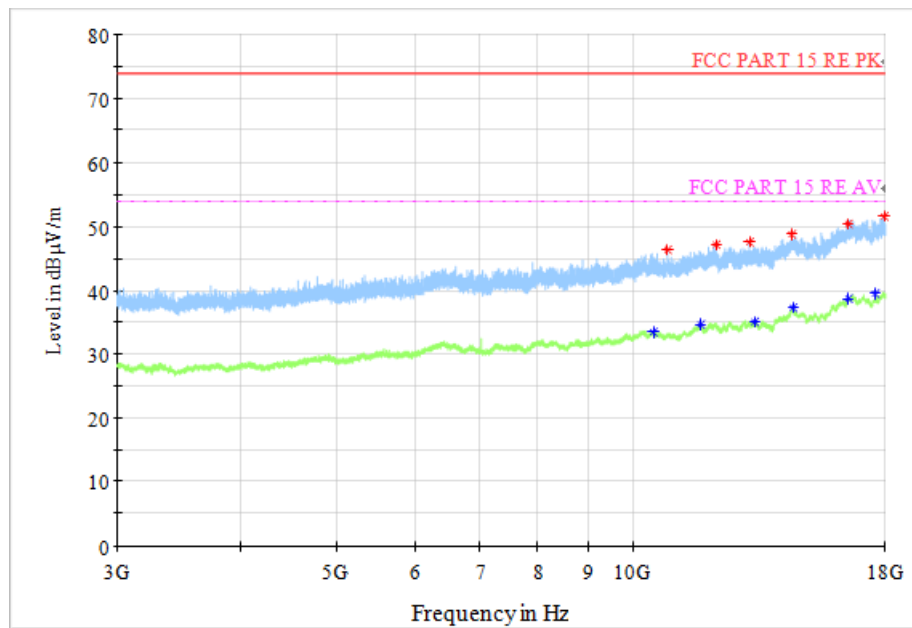


Fig.89 Radiated Spurious Emission (Ch0, 3 GHz - 18 GHz), 2M

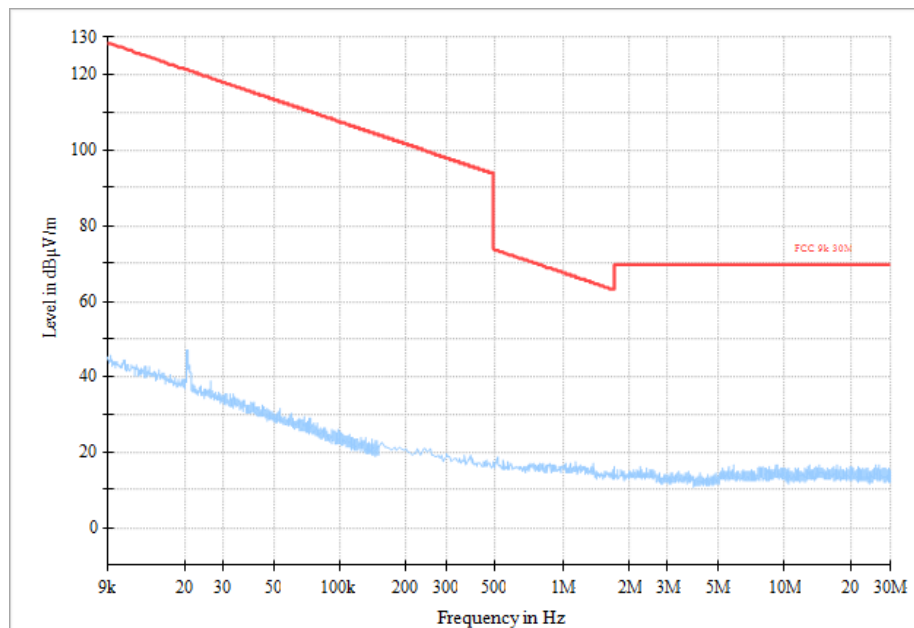


Fig.90 Radiated Spurious Emission (Ch19, 9 kHz - 30 MHz), 2M

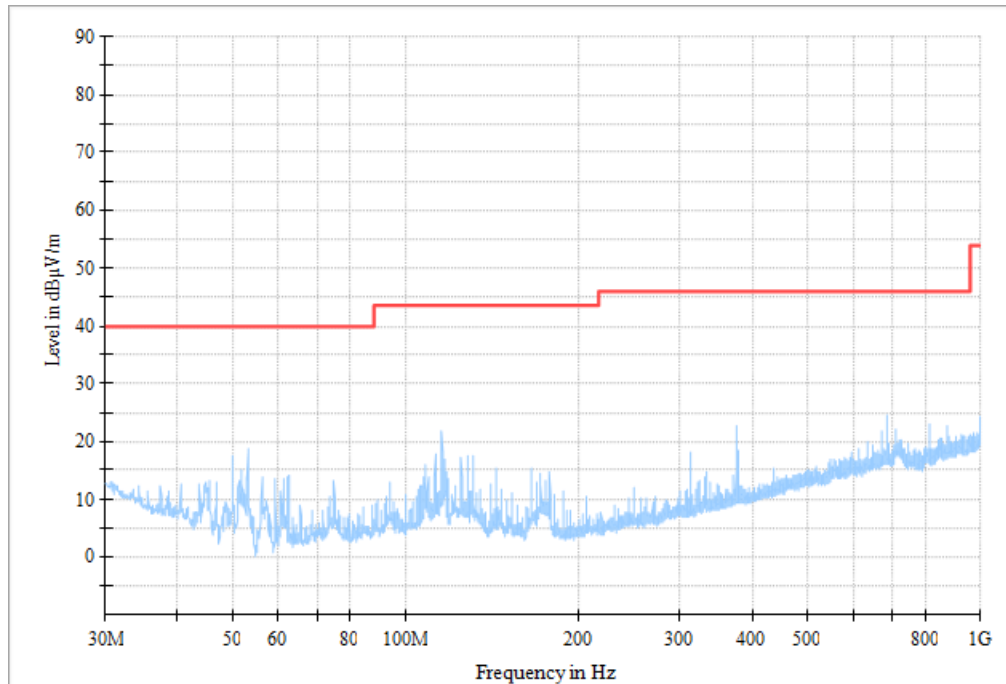


Fig.91 Radiated Spurious Emission (Ch19, 30 MHz - 1 GHz), 2M

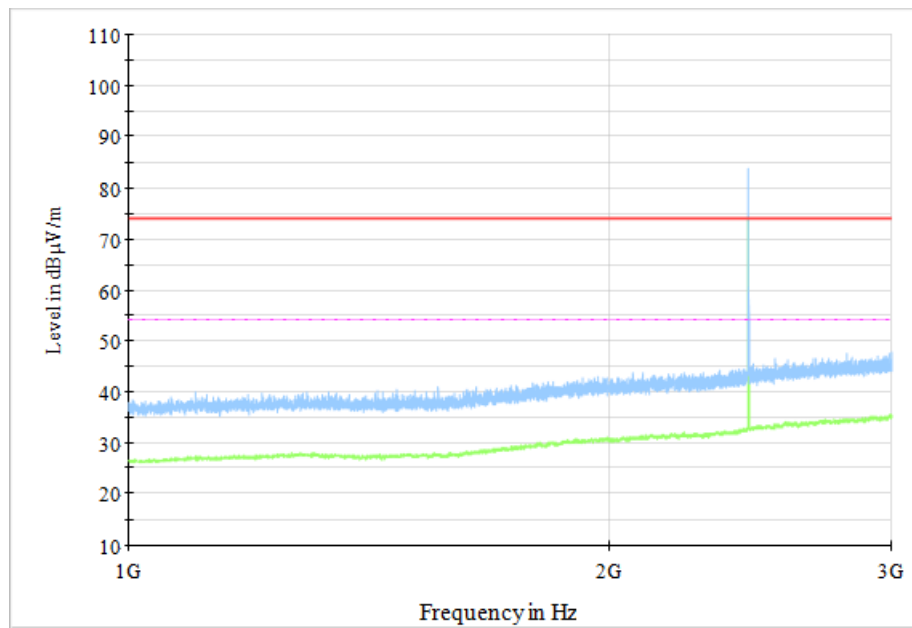


Fig.92 Radiated Spurious Emission (Ch19, 1 GHz - 3 GHz), 2M

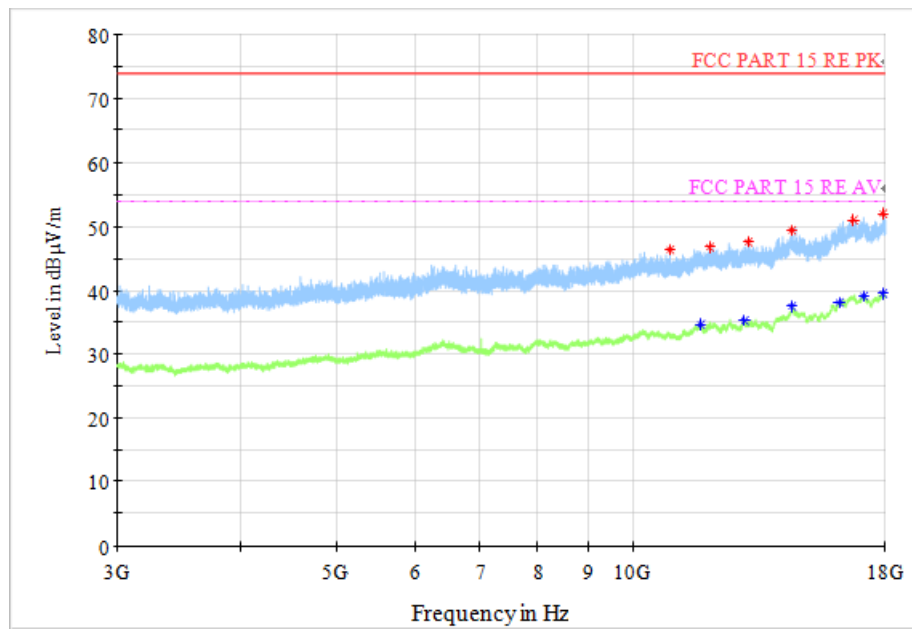


Fig.93 Radiated Spurious Emission (Ch19, 3 GHz - 18 GHz), 2M

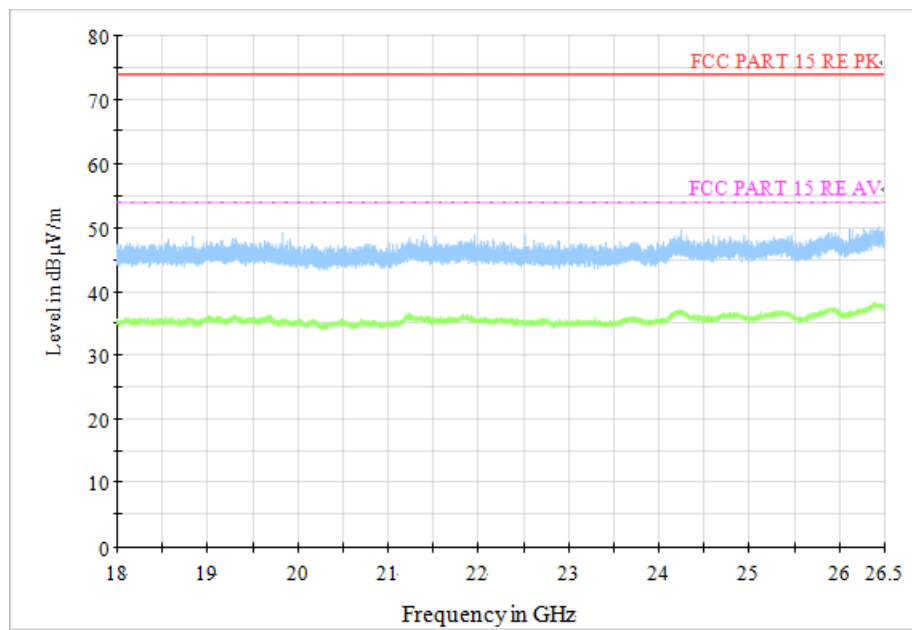


Fig.94 Radiated Spurious Emission (Ch19, 18 GHz - 26.5 GHz), 2M

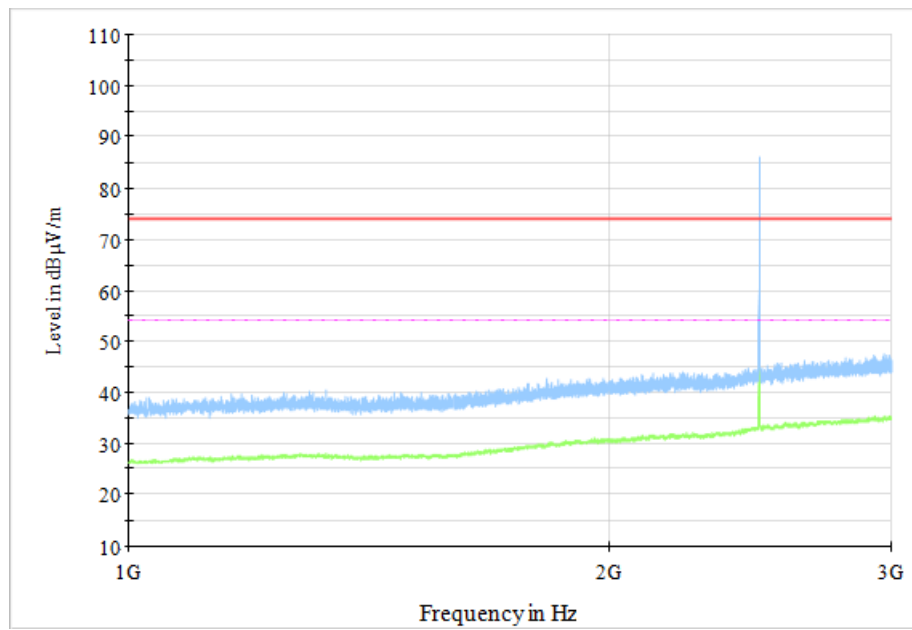


Fig.95 Radiated Spurious Emission (Ch39, 1 GHz - 3 GHz), 2M

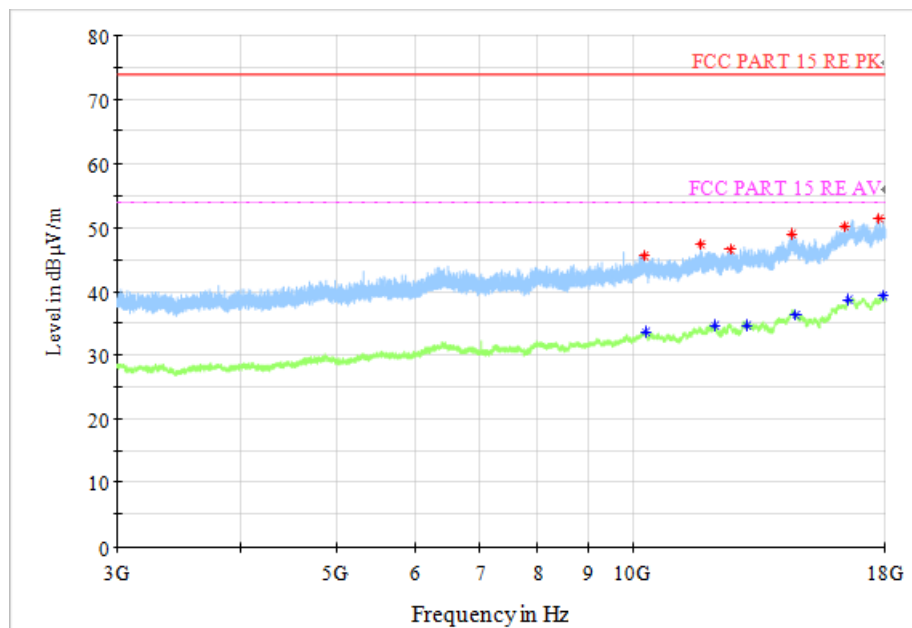


Fig.96 Radiated Spurious Emission (Ch39, 3 GHz - 18 GHz), 2M

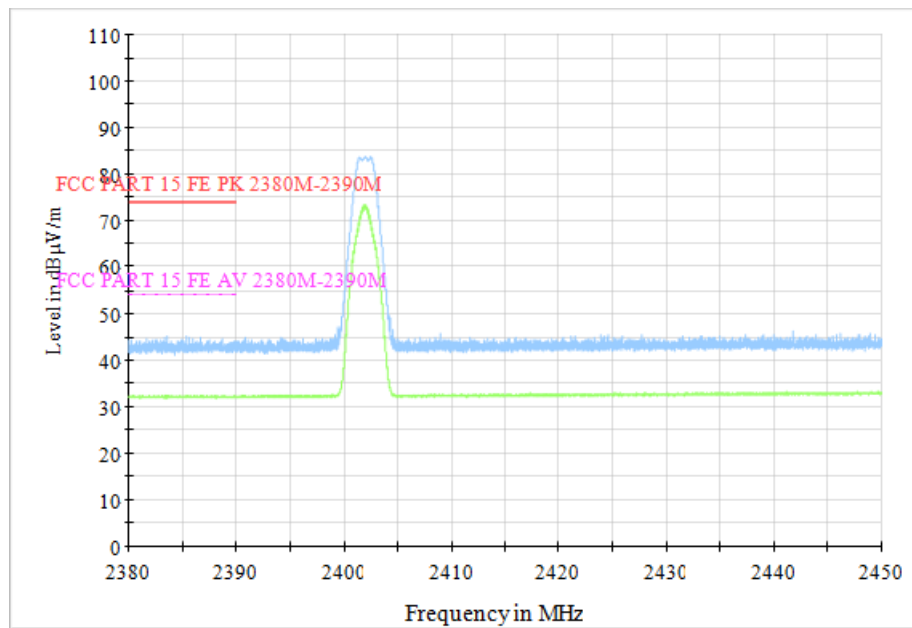


Fig.97 Radiated Band Edges (Ch0, 2380GHz - 2450GHz), 2M

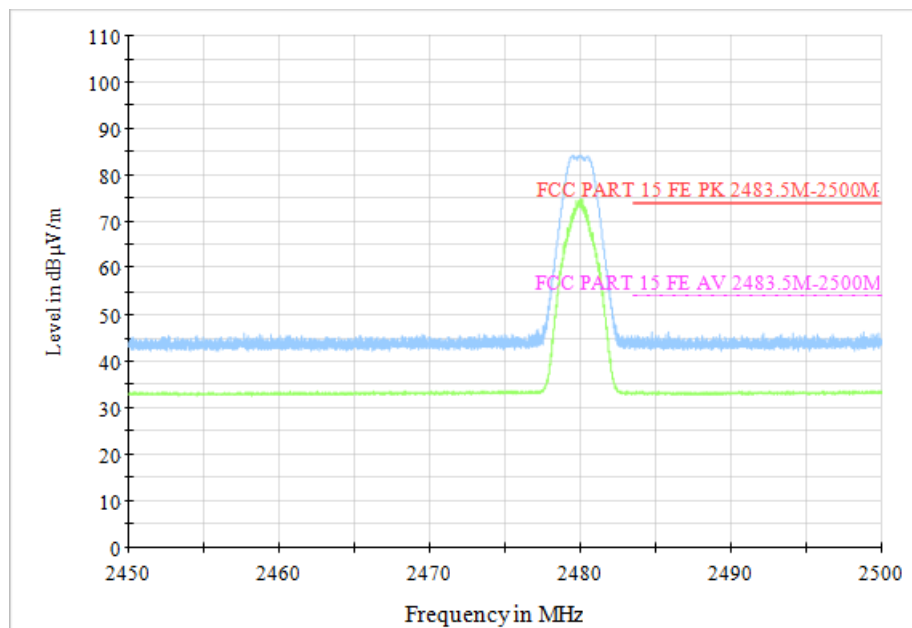


Fig.98 Radiated Band Edges (Ch39, 2450GHz - 2500GHz), 2M

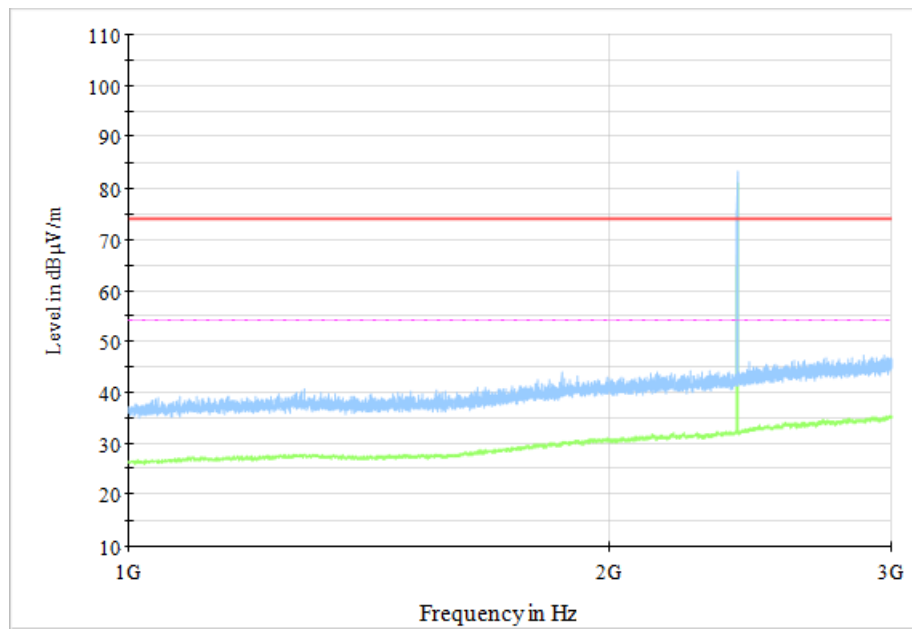


Fig.99 Radiated Spurious Emission (Ch0, 1 GHz - 3 GHz), LE Coded

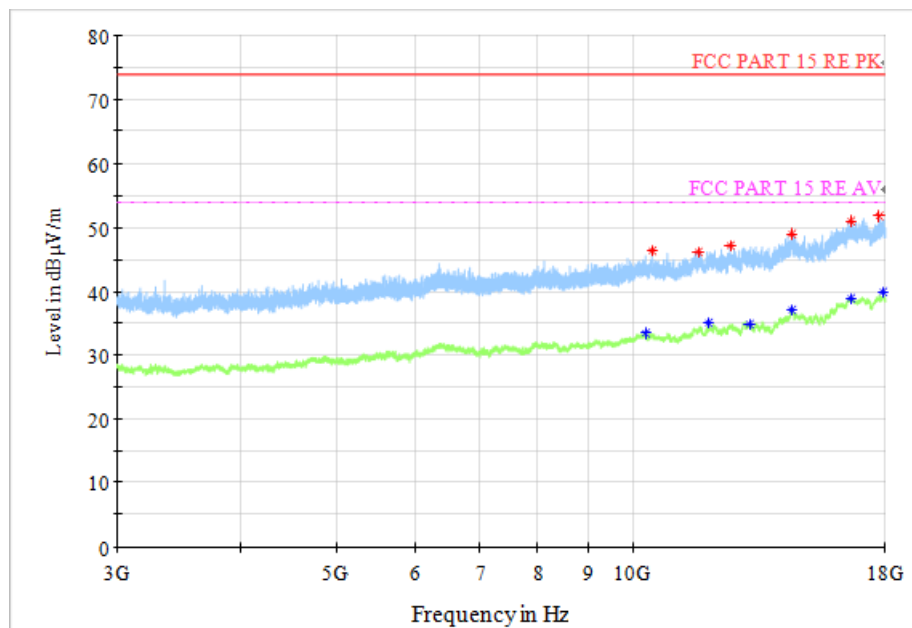


Fig.100 Radiated Spurious Emission (Ch0, 3 GHz - 18 GHz), LE Coded

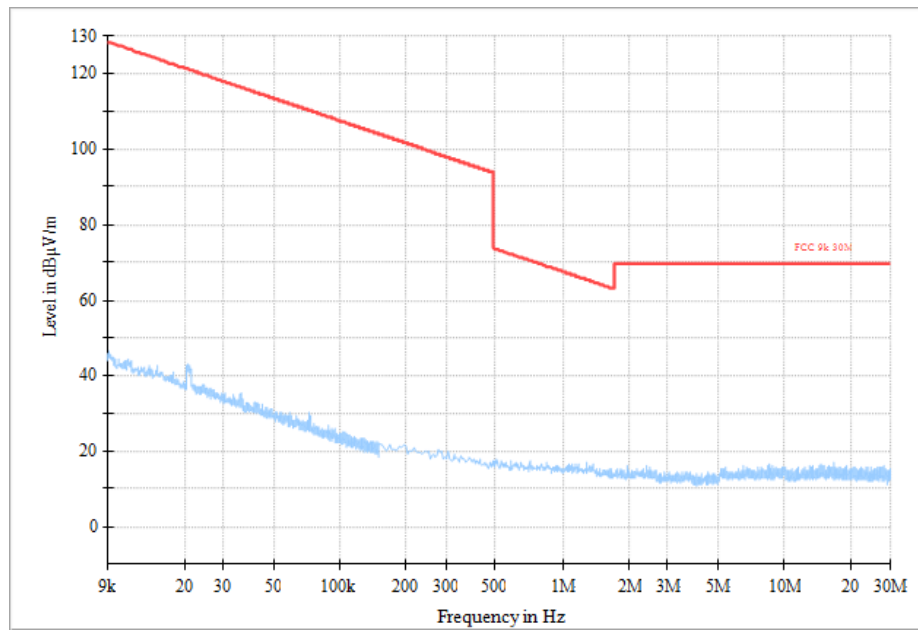


Fig.101 Radiated Spurious Emission (Ch19, 9 kHz - 30 MHz), LE Coded

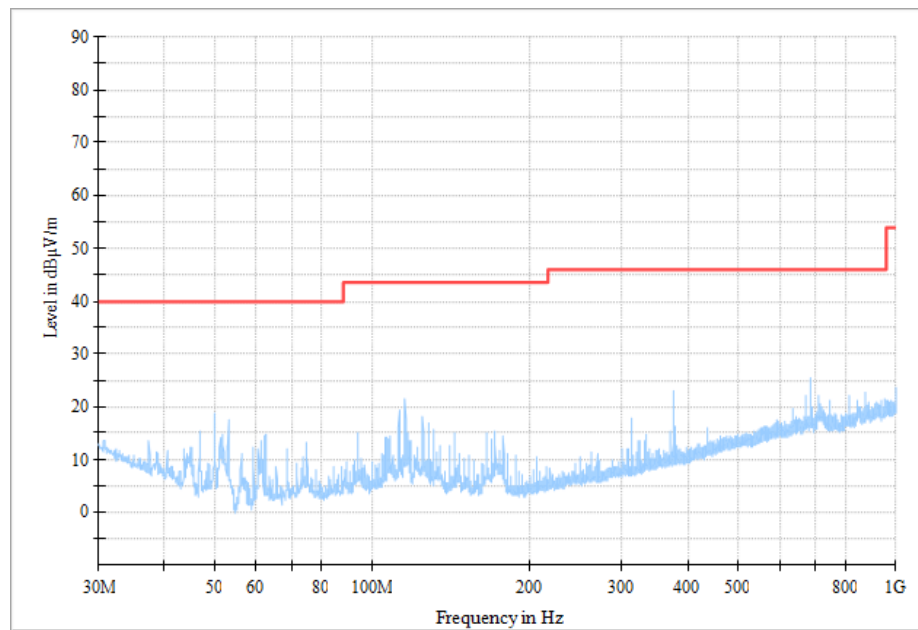


Fig.102 Radiated Spurious Emission (Ch19, 30 MHz - 1 GHz), LE Coded

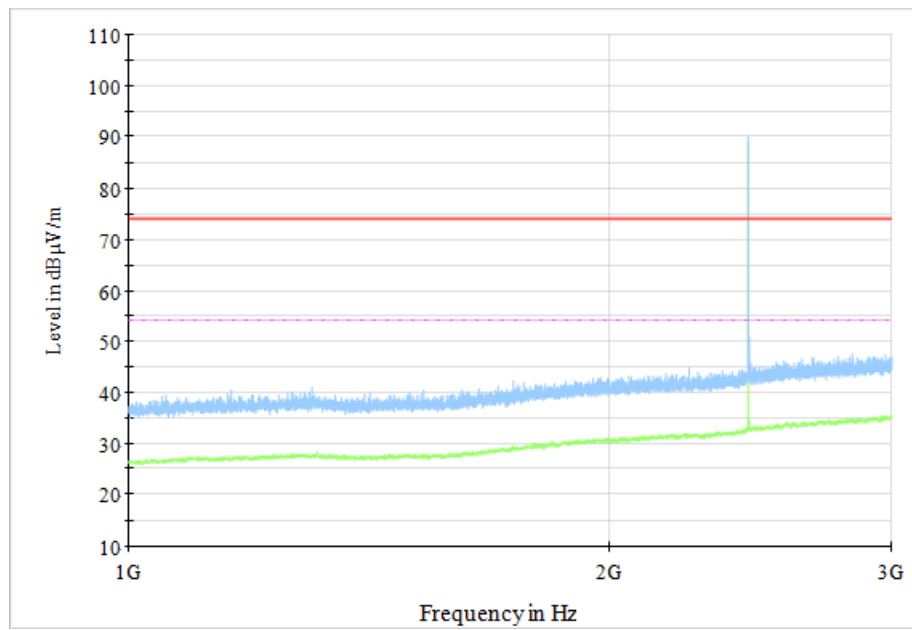


Fig.103 Radiated Spurious Emission (Ch19, 1 GHz - 3 GHz), LE Coded

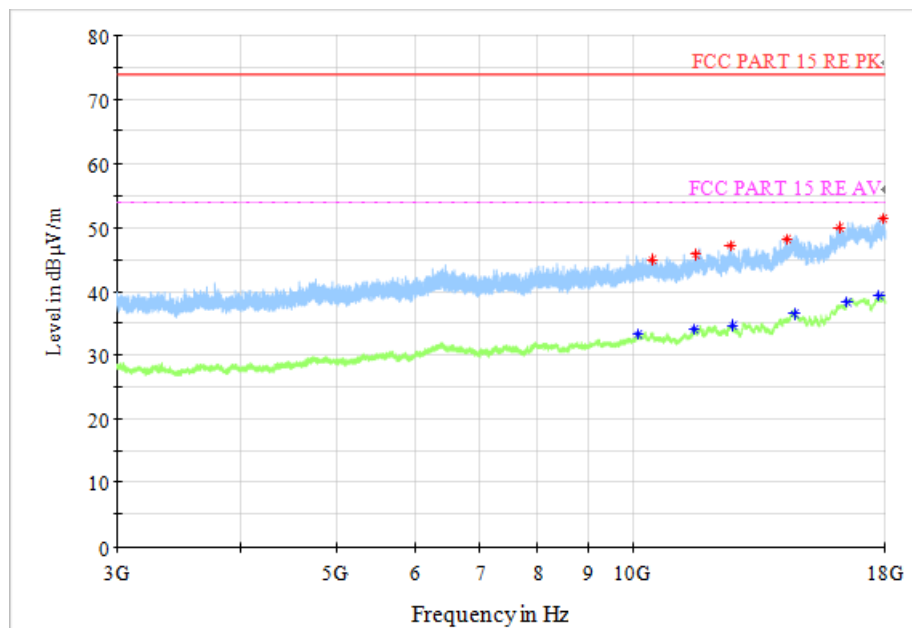


Fig.104 Radiated Spurious Emission (Ch19, 3 GHz - 18 GHz), LE Coded

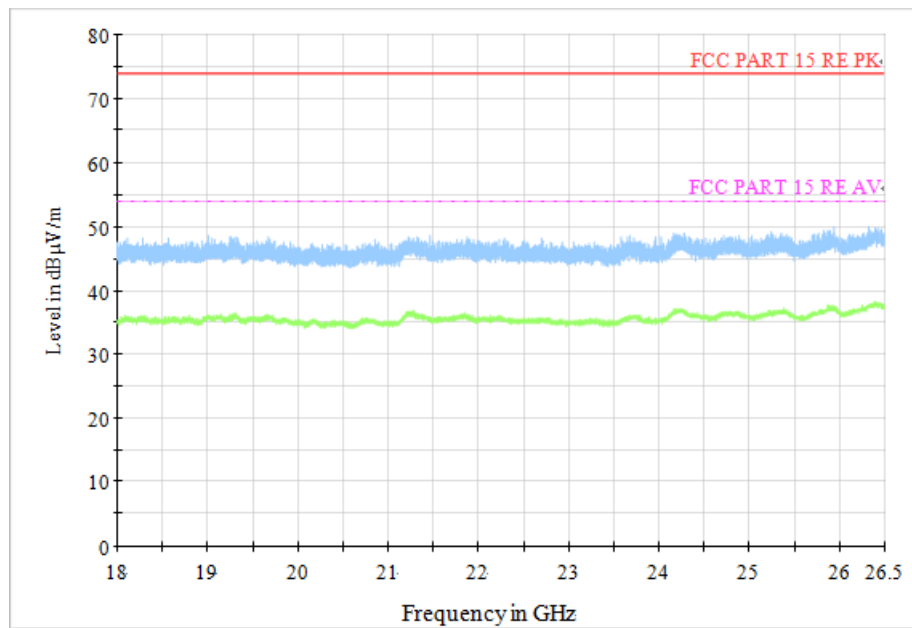


Fig.105 Radiated Spurious Emission (Ch19, 18 GHz - 26.5 GHz), LE Coded

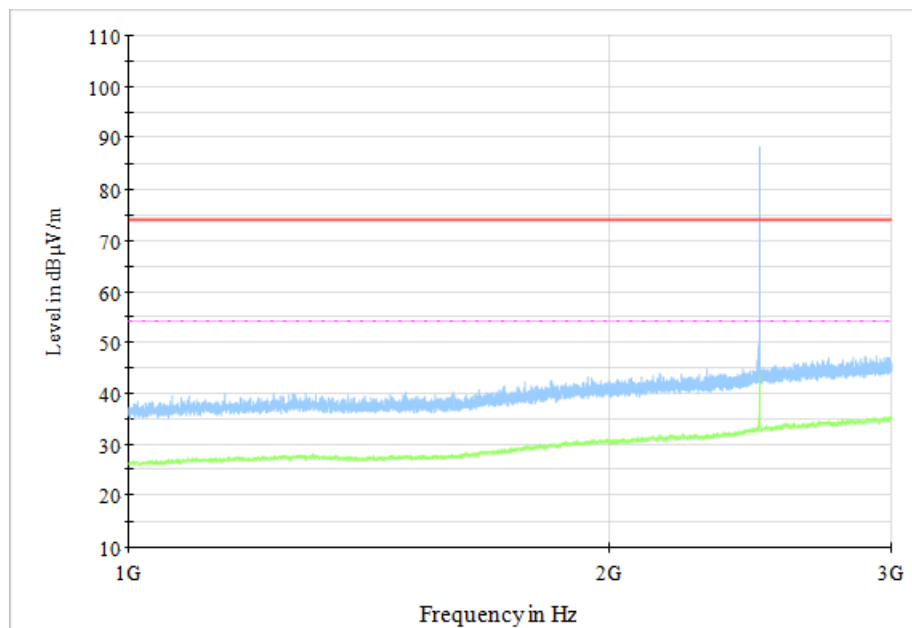


Fig.106 Radiated Spurious Emission (Ch39, 1 GHz - 3 GHz), LE Coded

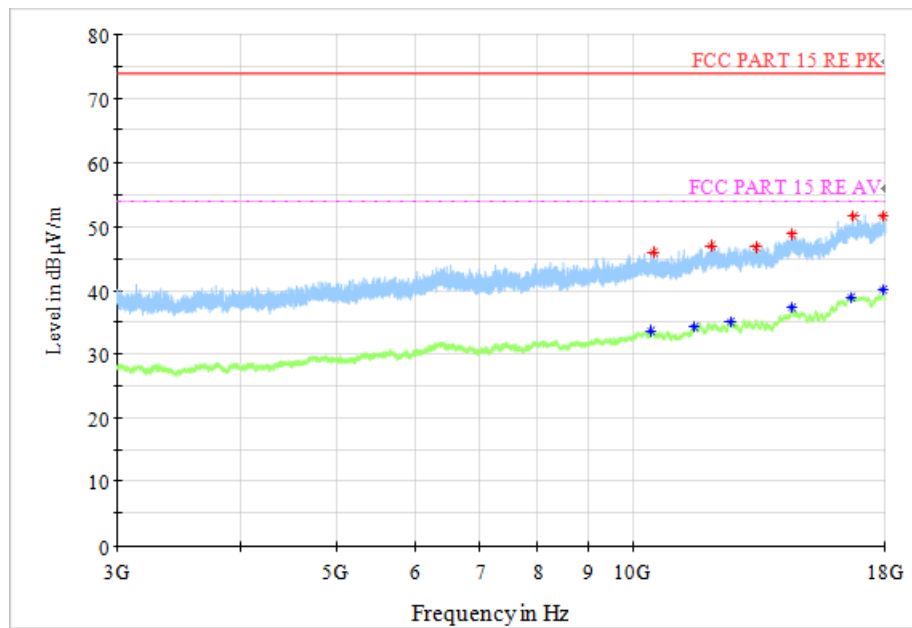


Fig.107 Radiated Spurious Emission (Ch39, 3 GHz - 18 GHz), LE Coded

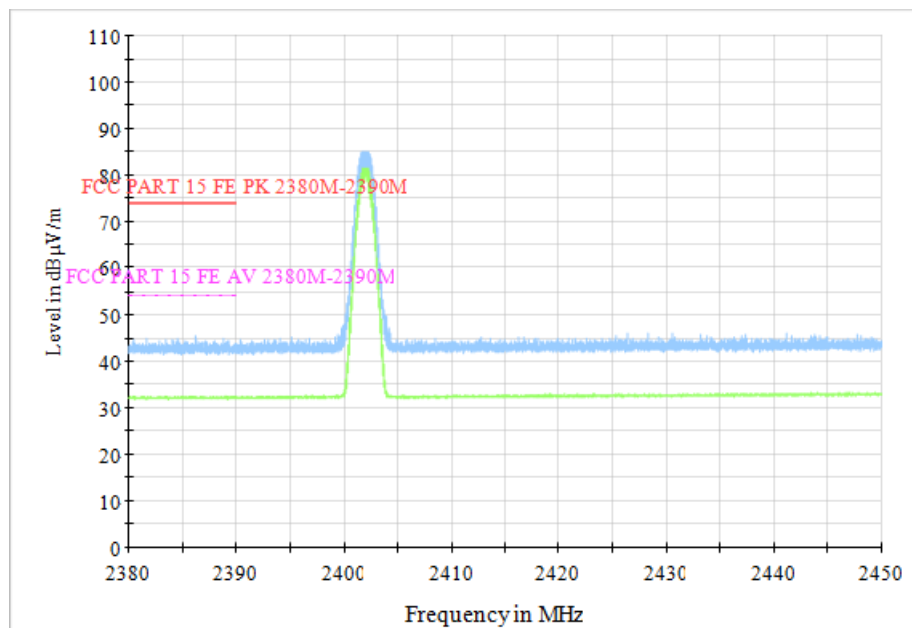


Fig.108 Radiated Band Edges (Ch0, 2380GHz - 2450GHz), LE Coded

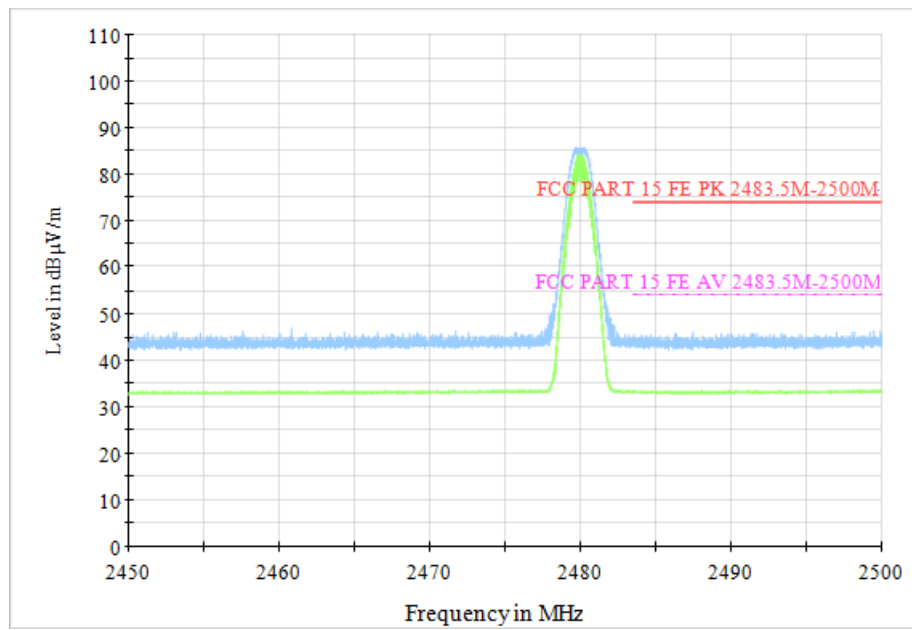


Fig.109 Radiated Band Edges (Ch39, 2450GHz - 2500GHz), LE Coded

A.7 AC Power line Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

LE-1M

BLE (Quasi-peak Limit) - AE1

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.110	Fig.111	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) - AE1

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.110	Fig.111	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

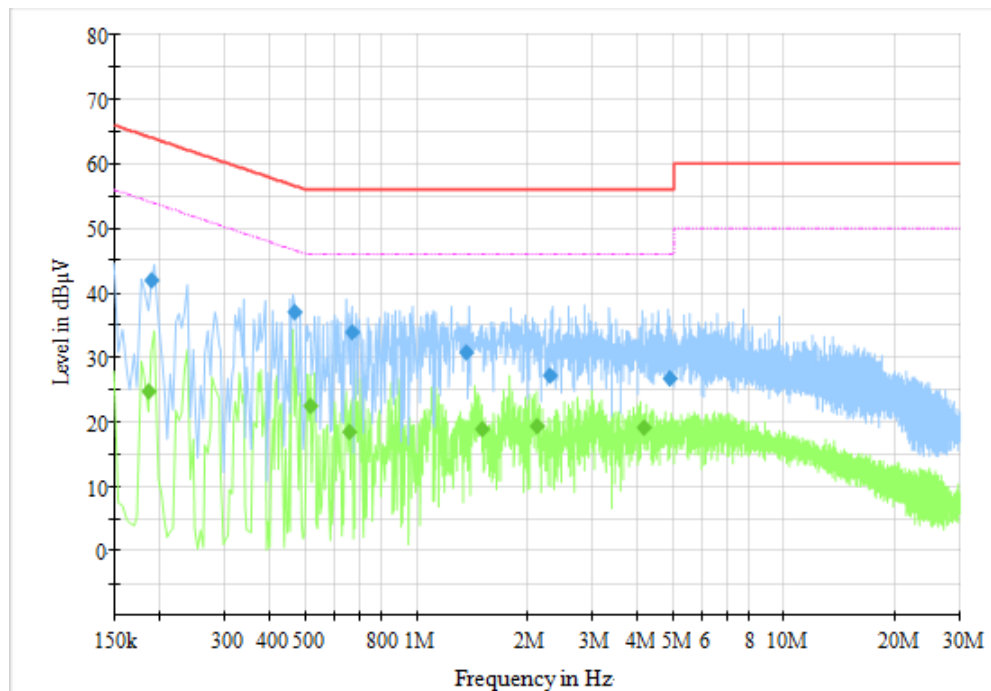


Fig.110 AC Power line Conducted Emission (Traffic, AE1, 120V), 1M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.190	41.86	64.04	22.18	L1	ON	9.6
0.464	36.91	56.62	19.71	L1	ON	9.6
0.664	33.81	56.00	22.19	L1	ON	9.6
1.364	30.72	56.00	25.28	L1	ON	9.7
2.300	27.11	56.00	28.89	L1	ON	9.7
4.880	26.64	56.00	29.36	L1	ON	9.7

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.186	24.71	54.21	29.51	L1	ON	9.6
0.512	22.46	46.00	23.54	N	ON	9.6
0.652	18.47	46.00	27.53	N	ON	9.6
1.508	18.90	46.00	27.10	N	ON	9.7
2.124	19.24	46.00	26.76	N	ON	9.7
4.160	19.14	46.00	26.86	N	ON	9.7

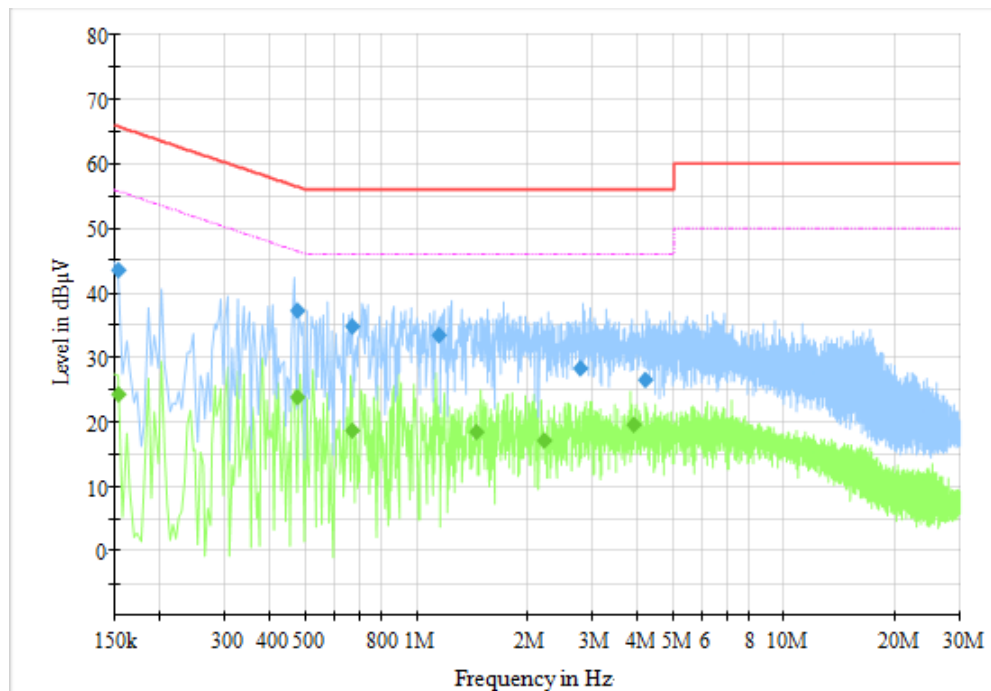


Fig.111 AC Power line Conducted Emission (Idle, AE1, 120V), 1M

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154	43.49	65.78	22.29	N	ON	9.6
0.472	37.13	56.48	19.35	L1	ON	9.6
0.668	34.68	56.00	21.32	L1	ON	9.6
1.152	33.42	56.00	22.58	L1	ON	9.7
2.792	28.19	56.00	27.81	L1	ON	9.7
4.196	26.53	56.00	29.47	L1	ON	9.7

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154	24.22	55.78	31.56	N	ON	9.6
0.472	23.70	46.48	22.78	N	ON	9.6
0.664	18.63	46.00	27.37	N	ON	9.6
1.456	18.49	46.00	27.51	N	ON	9.7
2.216	17.12	46.00	28.88	N	ON	9.7
3.904	19.54	46.00	26.46	N	ON	9.7

A.8 Occupied Bandwidth

Measurement Limit:

Standard	Limit (kHz)
RSS-Gen section 6.7	/

Measurement Result:

Mode	Frequency (MHz)	Test Results (kHz)		Conclusion
LE-1M	2402 (CH0)	Fig.110	1044.00	P
	2440 (CH19)	Fig.111	1043.00	P
	2480 (CH39)	Fig.112	1041.00	P
LE-2M	2402 (CH0)	Fig.113	2050.00	P
	2440 (CH19)	Fig.114	2042.00	P
	2480 (CH39)	Fig.115	2045.00	P
LE Coded (S=8)	2402 (CH0)	Fig.116	1041.00	P
	2440 (CH19)	Fig.117	1040.00	P
	2480 (CH39)	Fig.118	1044.00	P
LE Coded (S=2)	2402 (CH0)	Fig.119	1016.00	P
	2440 (CH19)	Fig.120	1016.00	P
	2480 (CH39)	Fig.121	1020.00	P

See below for test graphs.

Conclusion: PASS

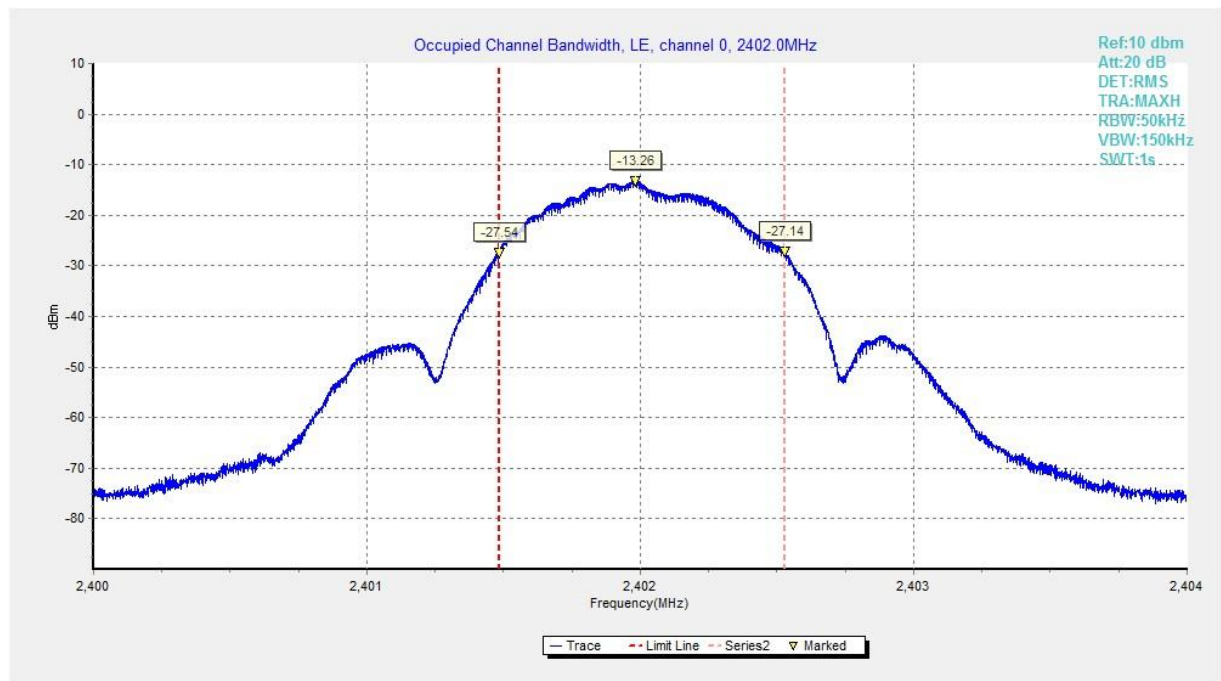


Fig.112 Occupied Bandwidth (Ch 0), 1M

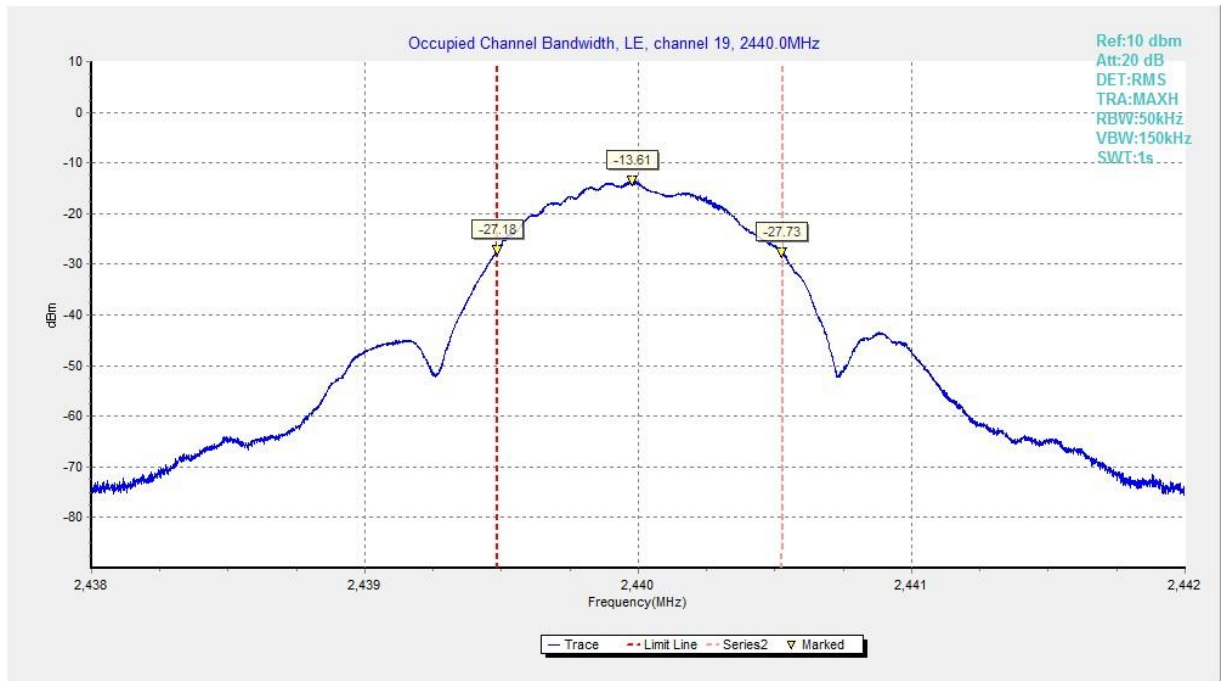


Fig.113 Occupied Bandwidth (Ch 19), 1M

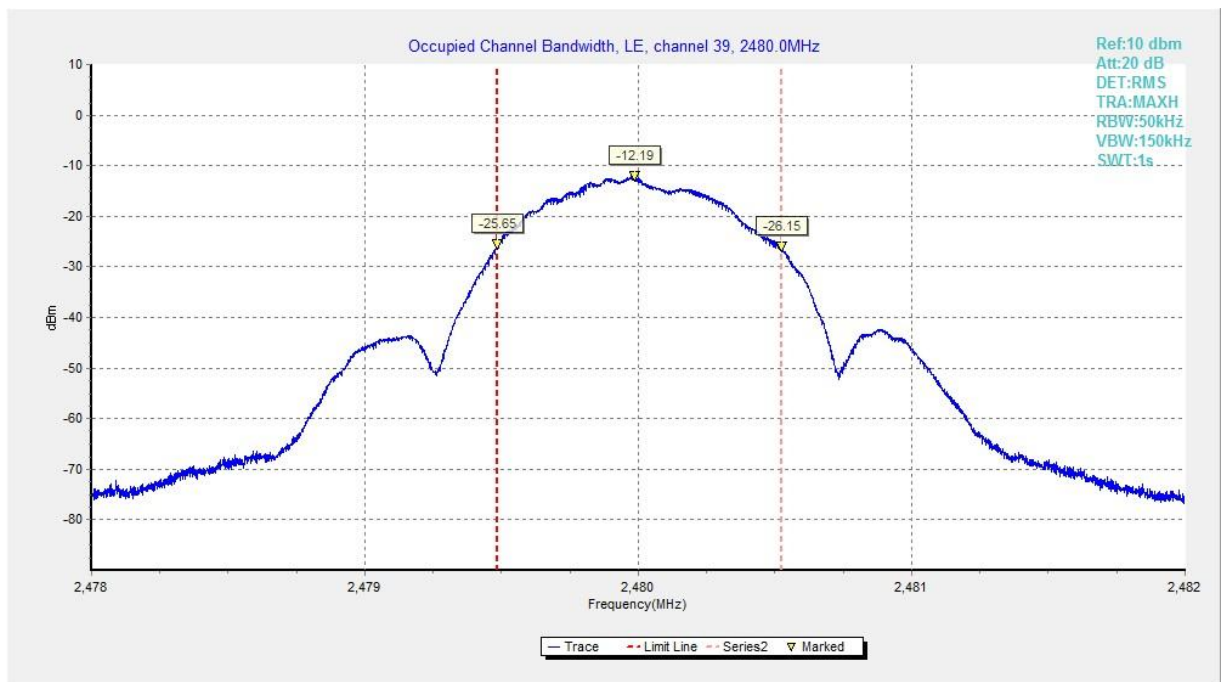


Fig.114 Occupied Bandwidth (Ch 39), 1M

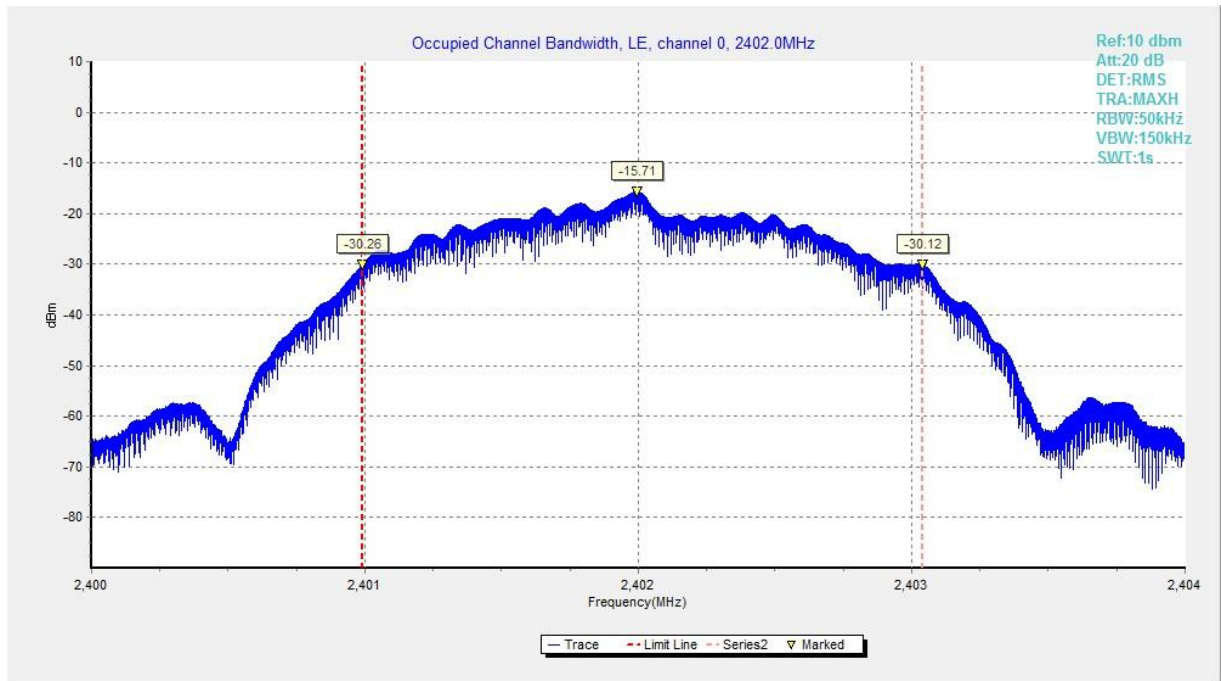


Fig.115 Occupied Bandwidth (Ch 0), 2M

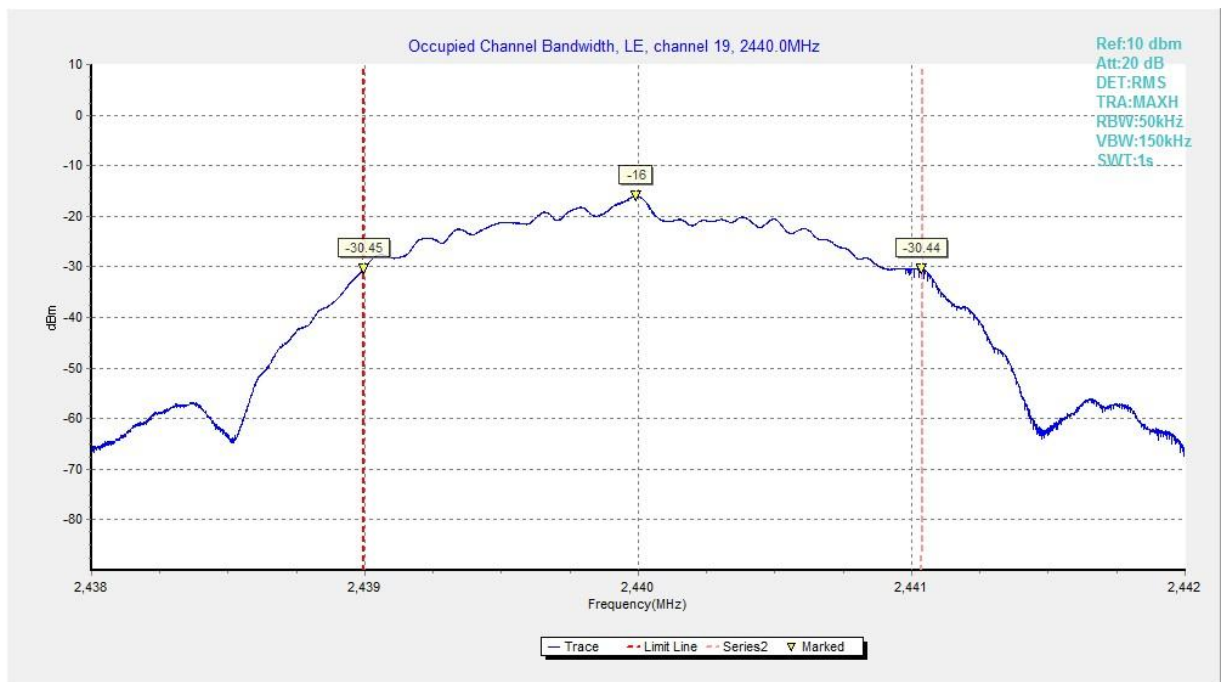


Fig.116 Occupied Bandwidth (Ch 19), 2M

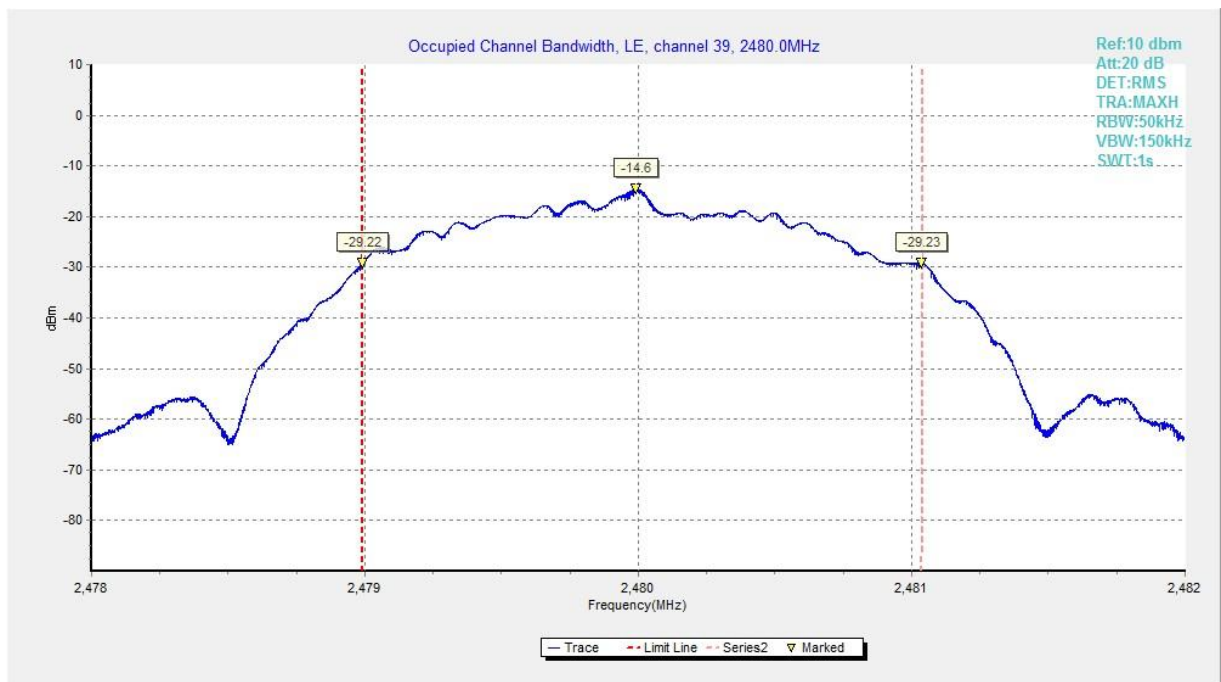


Fig.117 Occupied Bandwidth (Ch 39), 2M

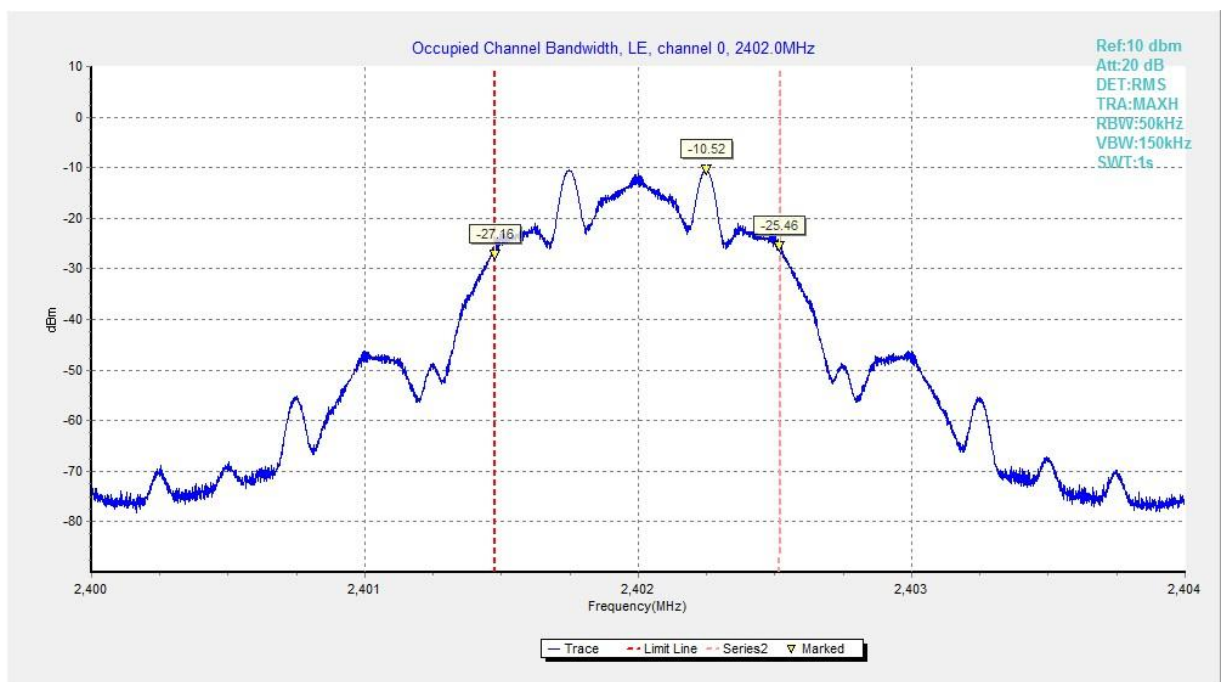


Fig.118 Occupied Bandwidth (Ch 0), LE Coded (S=8)

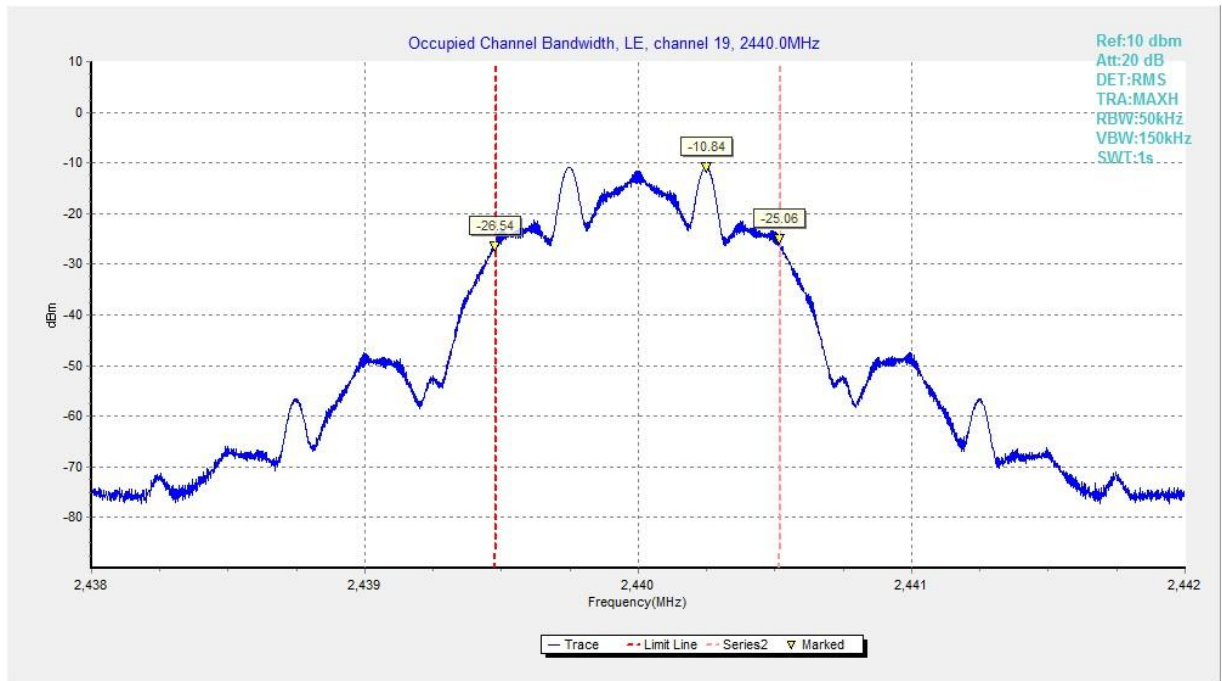


Fig.119 Occupied Bandwidth (Ch 19), LE Coded (S=8)

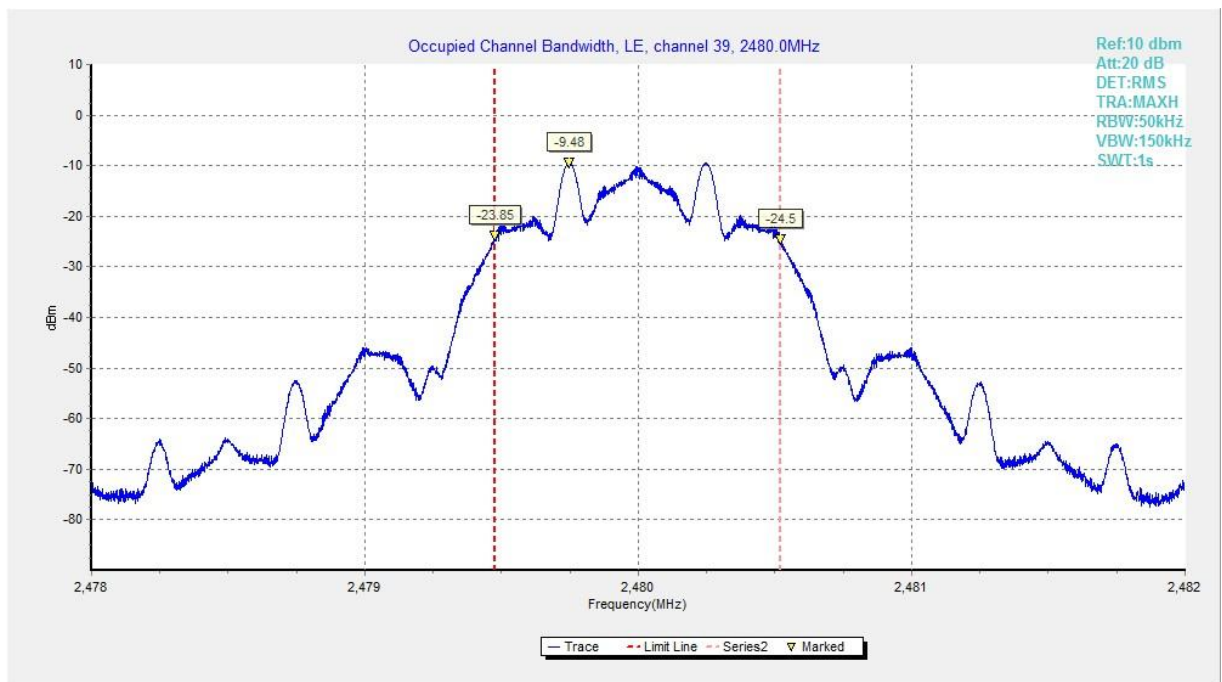


Fig.120 Occupied Bandwidth (Ch 39), LE Coded (S=8)

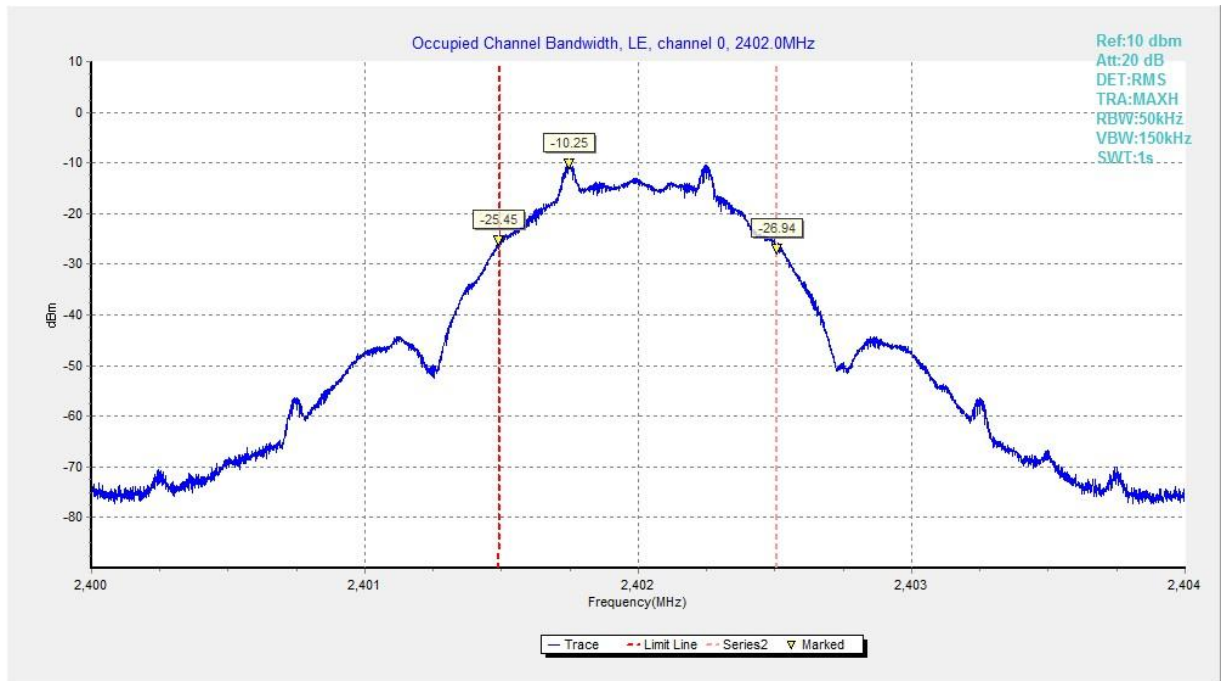


Fig.121 Occupied Bandwidth (Ch 0), LE Coded (S=2)

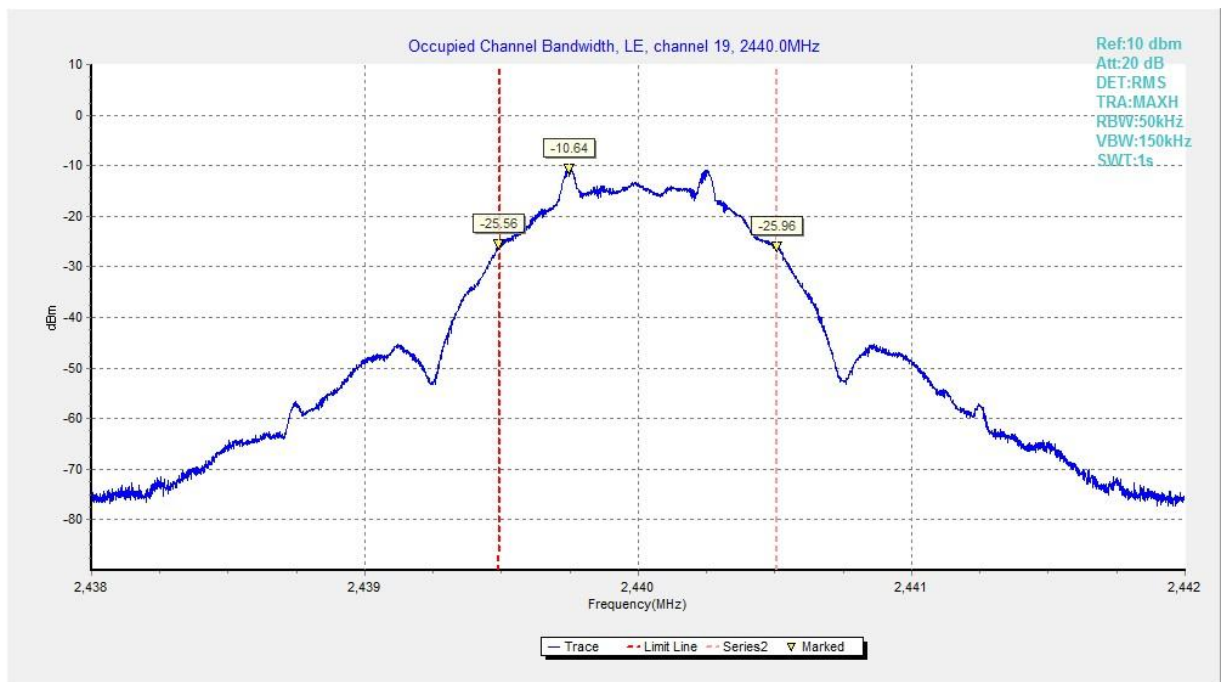


Fig.122 Occupied Bandwidth (Ch 19), LE Coded (S=2)



Fig.123 Occupied Bandwidth (Ch 39), LE Coded (S=2)

END OF REPORT