

Fig.93. Carrier frequency separation measurement: 8DPSK, Channel 39

## B.9. Number of Hopping Channels

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

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = the frequency band of operation
- RBW = 500kHz
- VBW = 500kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

### Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a) (1)(iii)	At least 15 non-overlapping channels

### Measurement Result:

#### For GFSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.94	79	P
40~78	Fig.95		

#### For $\pi/4$ DQPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.96	79	P
40~78	Fig.97		

#### For 8DPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.98	79	P
40~78	Fig.99		

**Conclusion: PASS**

**Test graphs as below:**

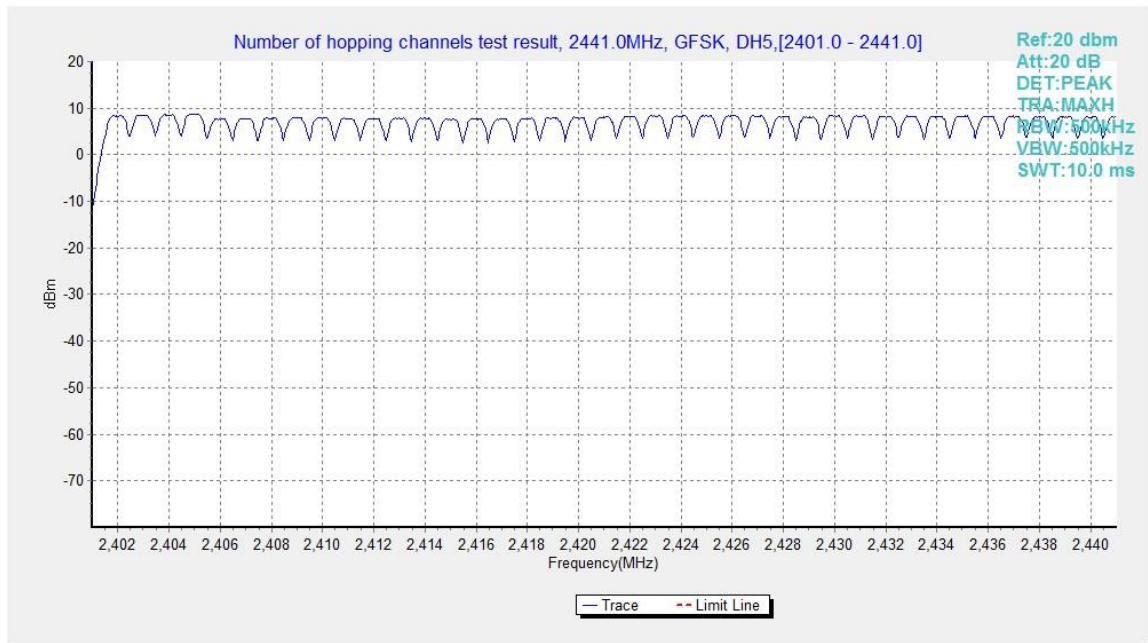


Fig.94. Number of hopping frequencies: GFSK, Channel 0 - 39

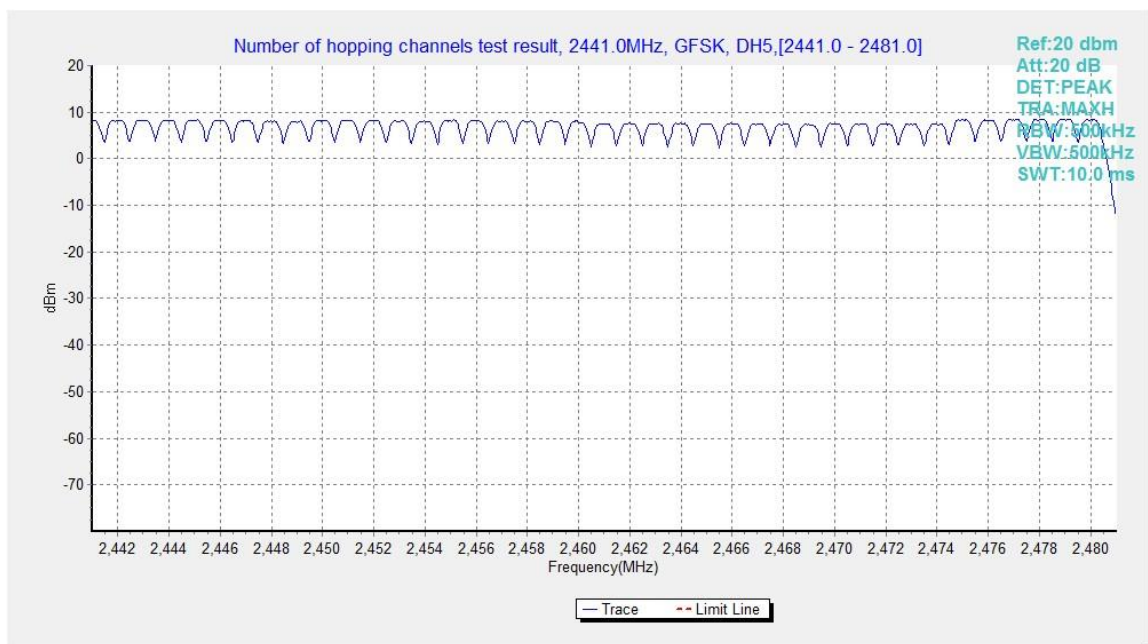
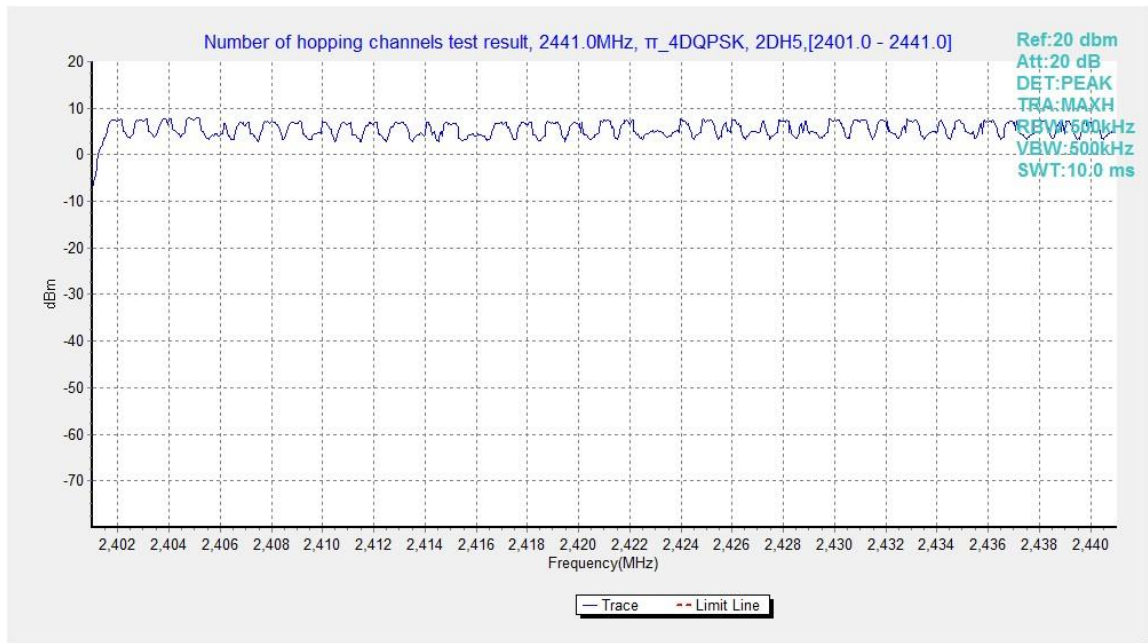
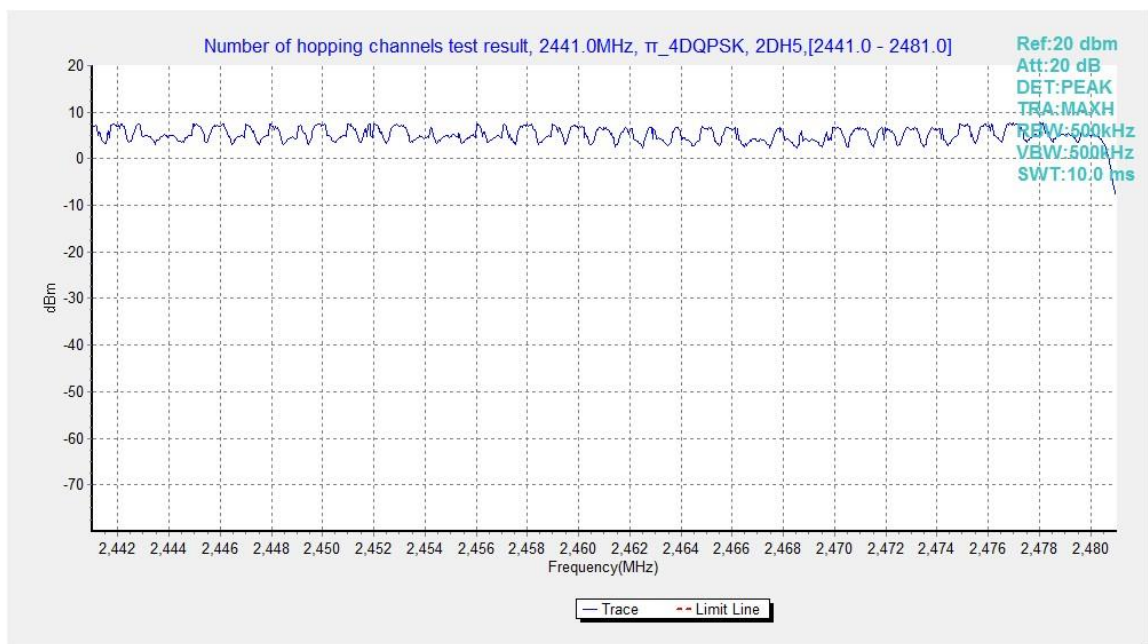


Fig.95. Number of hopping frequencies: GFSK, Channel 40 - 78


Fig.96. Number of hopping frequencies:  $\pi/4$  DQPSK, Channel 0 - 39

Fig.97. Number of hopping frequencies:  $\pi/4$  DQPSK, Channel 40 - 78

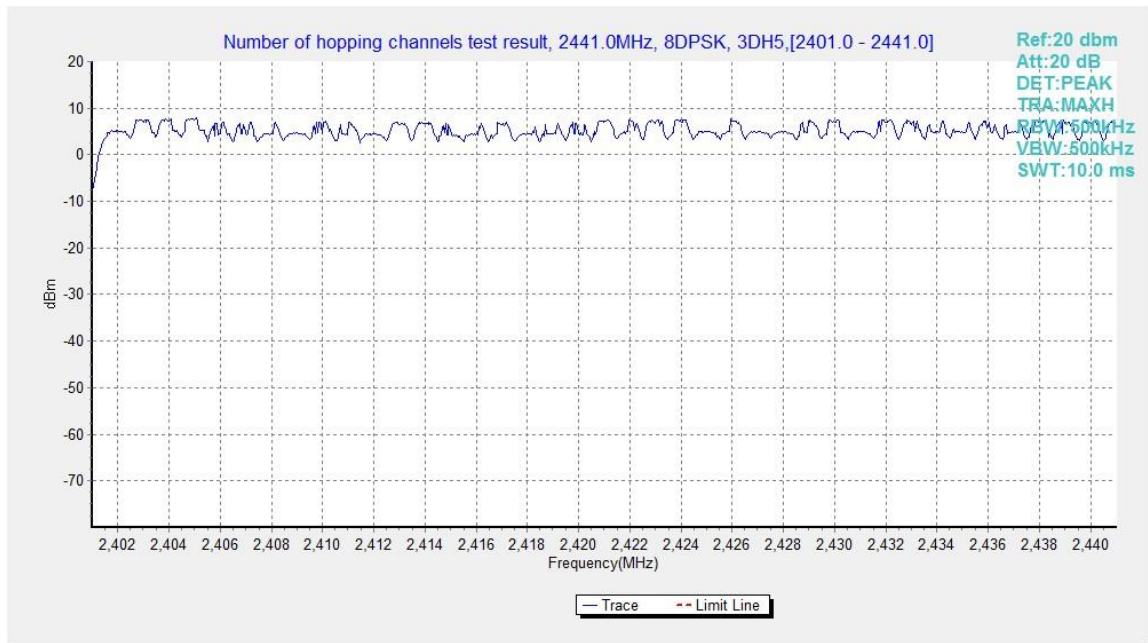


Fig.98. Number of hopping frequencies: 8DPSK, Channel 0 - 39

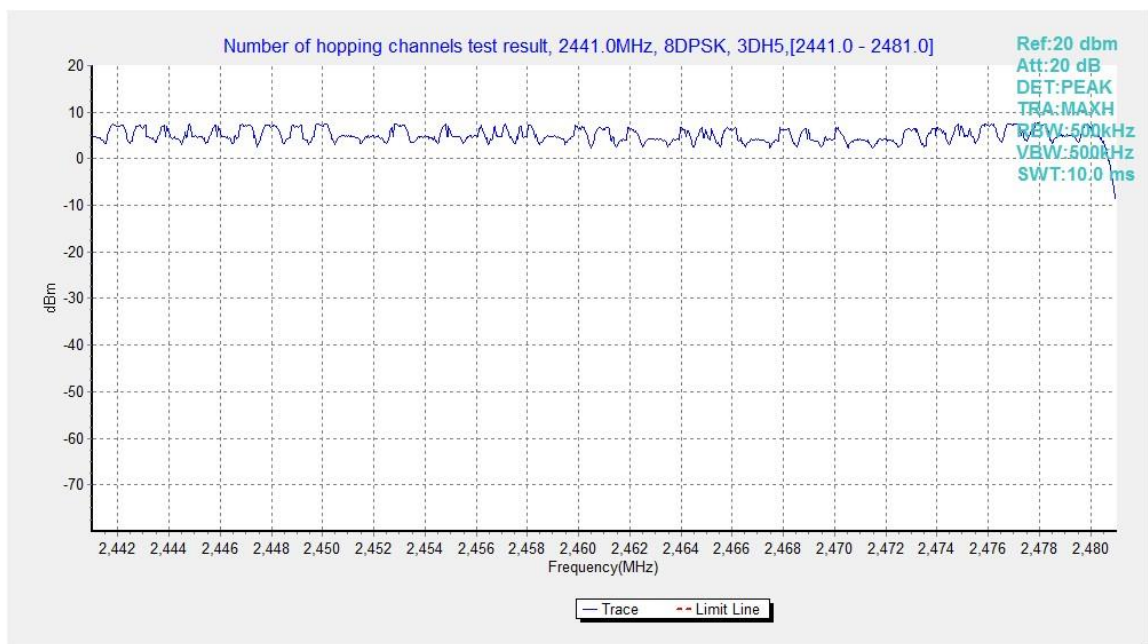


Fig.99. Number of hopping frequencies: 8DPSK, Channel 40 - 78



## B.10. AC Powerline Conducted Emission

## Summary

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section

### Method of Measurement:

See Clause 6.2 of ANSI C63.10 specifically.

See Clause 4 and Clause 5 of ANSI C63.10 generally.

The conducted emissions from the AC port of the EUT are measured in a shielding room. The EUT is connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection was performed. The measurements were performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detector of the test receiver:  
Quasi-Peak / Average Detector.

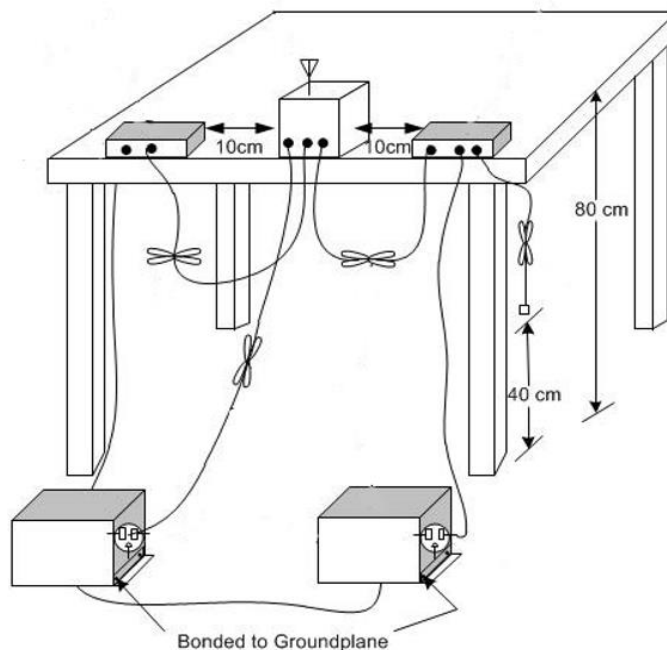
The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/IF bandwidth
0.15-30	9kHz

### Test Condition:

Voltage (V)	Frequency (Hz)
120	60

## Test setup



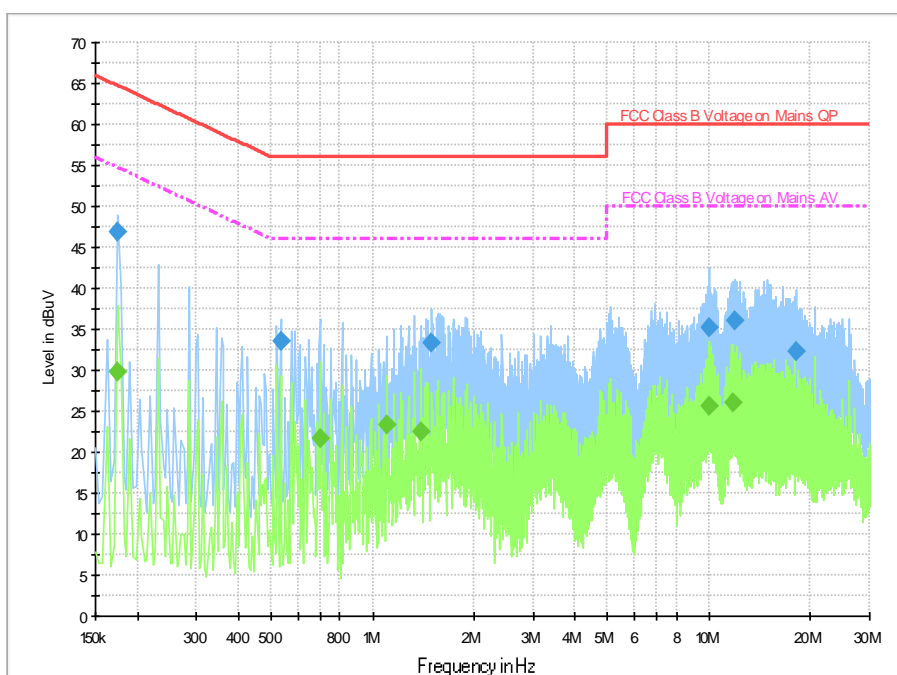
**Measurement Result and limit:**
**Bluetooth (Quasi-peak Limit)**

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		bluetooth	Idle	
0.15 to 0.5	66 to 56	Fig.B.10.1	Fig. B.10.2	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.				

**Bluetooth (Average Limit)**

Frequency range (MHz)	Average Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		bluetooth	Idle	
0.15 to 0.5	56 to 46	Fig.B.10.1	Fig. B.10.2	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.				

**Conclusion: Pass**
**Test graphs as below:**



**Fig.B.10.1 AC Powerline Conducted Emission- bluetooth**

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

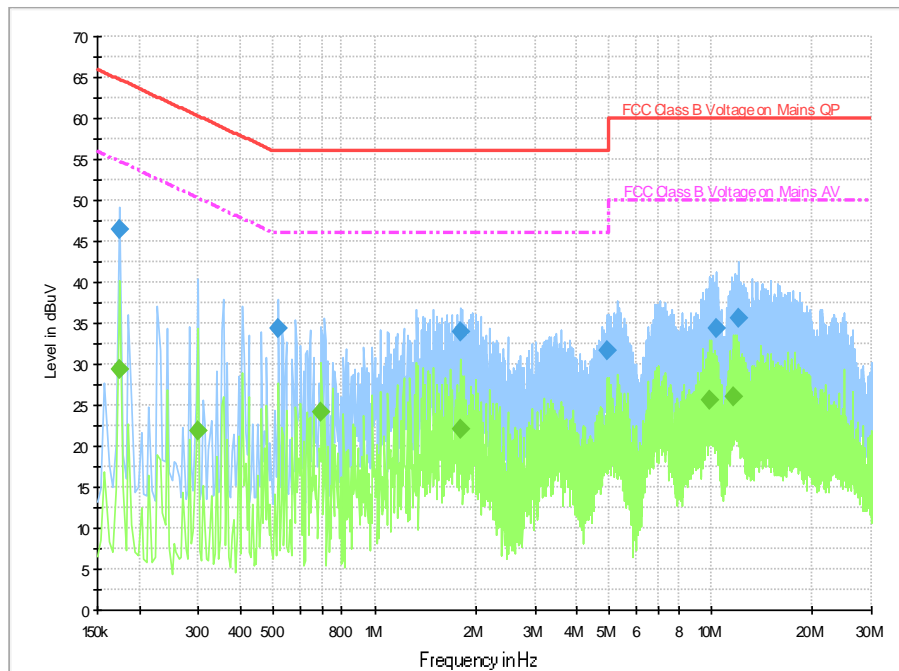
#### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	46.9	2000.0	9.000	On	N	19.8	17.9	64.8	
0.534000	33.5	2000.0	9.000	On	L1	20.0	22.5	56.0	
1.502000	33.4	2000.0	9.000	On	N	19.7	22.6	56.0	
10.034000	35.2	2000.0	9.000	On	L1	19.9	24.8	60.0	
11.954000	35.9	2000.0	9.000	On	L1	20.0	24.1	60.0	
18.086000	32.3	2000.0	9.000	On	L1	20.0	27.7	60.0	

#### Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	29.8	2000.0	9.000	On	L1	19.9	24.9	54.8	
0.698000	21.7	2000.0	9.000	On	L1	20.0	24.3	46.0	
1.098000	23.4	2000.0	9.000	On	N	19.7	22.6	46.0	
1.386000	22.5	2000.0	9.000	On	L1	19.9	23.5	46.0	
10.034000	25.7	2000.0	9.000	On	L1	19.9	24.3	50.0	
11.790000	26.0	2000.0	9.000	On	L1	20.0	24.0	50.0	





**Fig.B.10.2 AC Powerline Conducted Emission-Idle**

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

#### Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	46.5	2000.0	9.000	On	L1	19.9	18.2	64.8	
0.518000	34.3	2000.0	9.000	On	L1	20.0	21.7	56.0	
1.794000	33.9	2000.0	9.000	On	L1	19.8	22.1	56.0	
4.910000	31.7	2000.0	9.000	On	L1	19.8	24.3	56.0	
10.342000	34.3	2000.0	9.000	On	L1	19.9	25.7	60.0	
12.098000	35.6	2000.0	9.000	On	L1	20.0	24.4	60.0	

#### Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.174000	29.3	2000.0	9.000	On	L1	19.9	25.4	54.8	
0.298000	21.9	2000.0	9.000	On	L1	19.9	28.4	50.3	
0.694000	24.2	2000.0	9.000	On	L1	20.0	21.8	46.0	
1.794000	22.2	2000.0	9.000	On	L1	19.8	23.8	46.0	
9.934000	25.7	2000.0	9.000	On	L1	19.9	24.3	50.0	
11.718000	25.9	2000.0	9.000	On	L1	20.0	24.1	50.0	



## **B.11. Antenna Requirement**

The antenna of the device is permanently attached. There are no provisions for connection to an external antenna.

The unit complies with the requirement of FCC Part 15.203.

## B.12. Duty cycle

### Method of Measurement:

Use the following spectrum analyzer settings:

- Span = zero span
- RBW = 100kHz
- VBW  $\geq$  RBW
- Sweep = single sweep
- Detector function = peak

### Measurement Results:

Channel No.	Frequency (MHz)	Duty cycle	
39	2441	Fig.100	0.78

See test graphs as following:

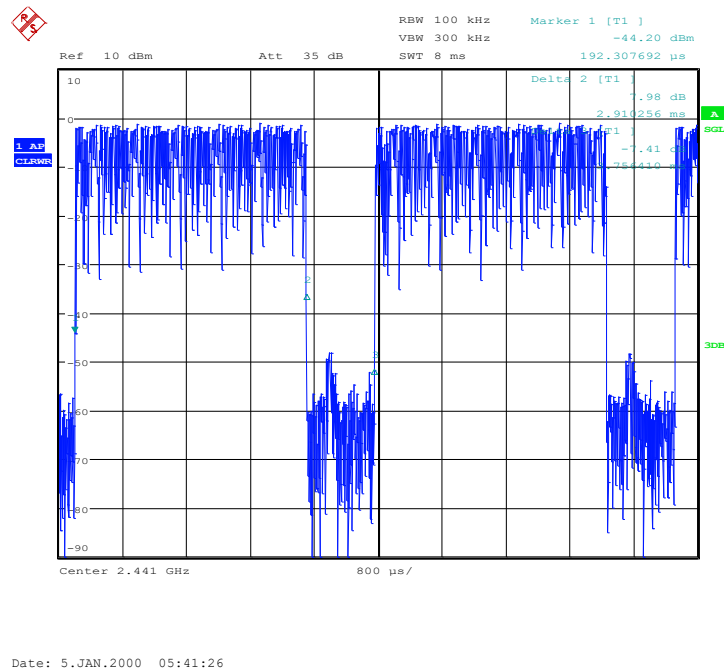


Fig.100. Duty cycle: GFSK 2441 MHz

## **ANNEX C: Accreditation Certificate**



### **Accredited Laboratory**

A2LA has accredited

#### **TELECOMMUNICATION TECHNOLOGY LABS, CAICT**

*Beijing, People's Republic of China*

for technical competence in the field of

#### **Electrical Testing**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 23<sup>rd</sup> day of July 2024.



Mr. Trace McInturff, Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 7049.01  
Valid to July 31, 2026

*For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.*

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