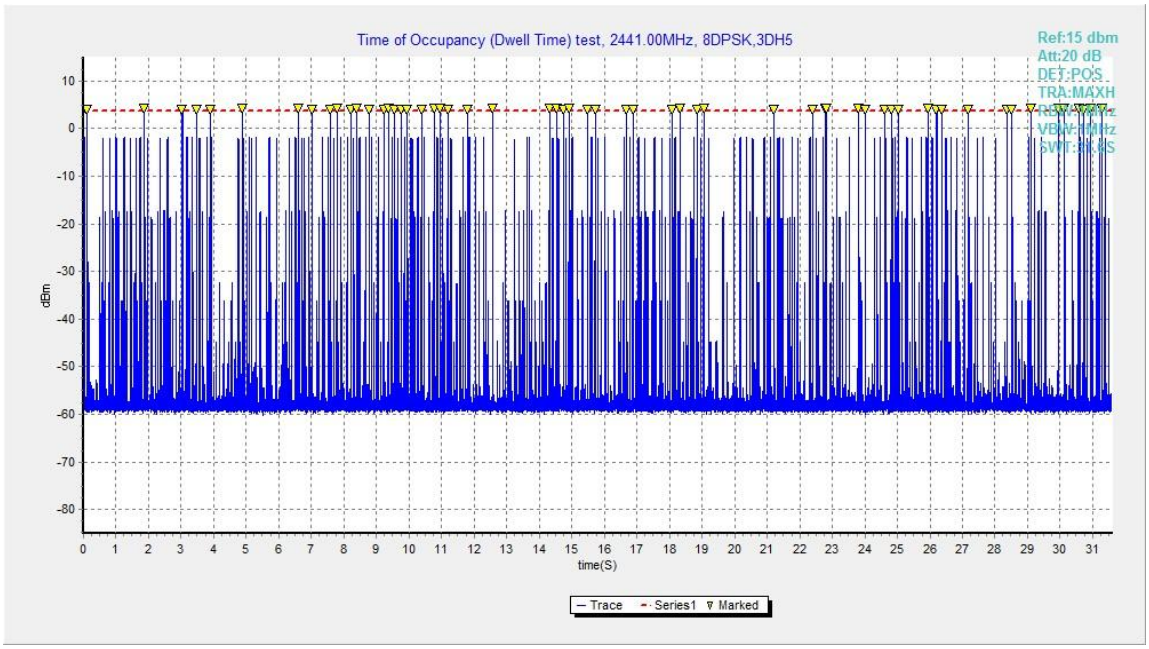


Fig.81. Number of Transmissions Measurement:Channel 39,Packet 3-DH5

A.8. 20dB Bandwidth

Method of Measurement: See ANSI C63.10-clause 6.9.2

Measurement Procedure - Unwanted Emissions

1. Set RBW = 30kHz.

2. Set VBW = 100 kHz.

3. Set span to 3MHz

4. Detector = peak.

5. Trace Mode = max hold.

6. Sweep = auto couple.

7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a)(1)	NA *

Use NdB Down function of the SA to measure the 20dB Bandwidth

* Comment: This test case is not required according to the latest FCC 47 CFR Part 15.247. But the test results are necessary for “carrier frequency separation” test case, in Annex A.8.

Measurement Results:

For GFSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.82	944.25	NA
39	Fig.83	937.50	NA
78	Fig.84	944.25	NA

Forπ/4 DQPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.85	1307.25	NA
39	Fig.86	1282.50	NA
78	Fig.87	1281.00	NA

For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.88	1274.25	NA
39	Fig.89	1296.00	NA
78	Fig.90	1293.00	NA

Conclusion: NA

Test graphs as below:

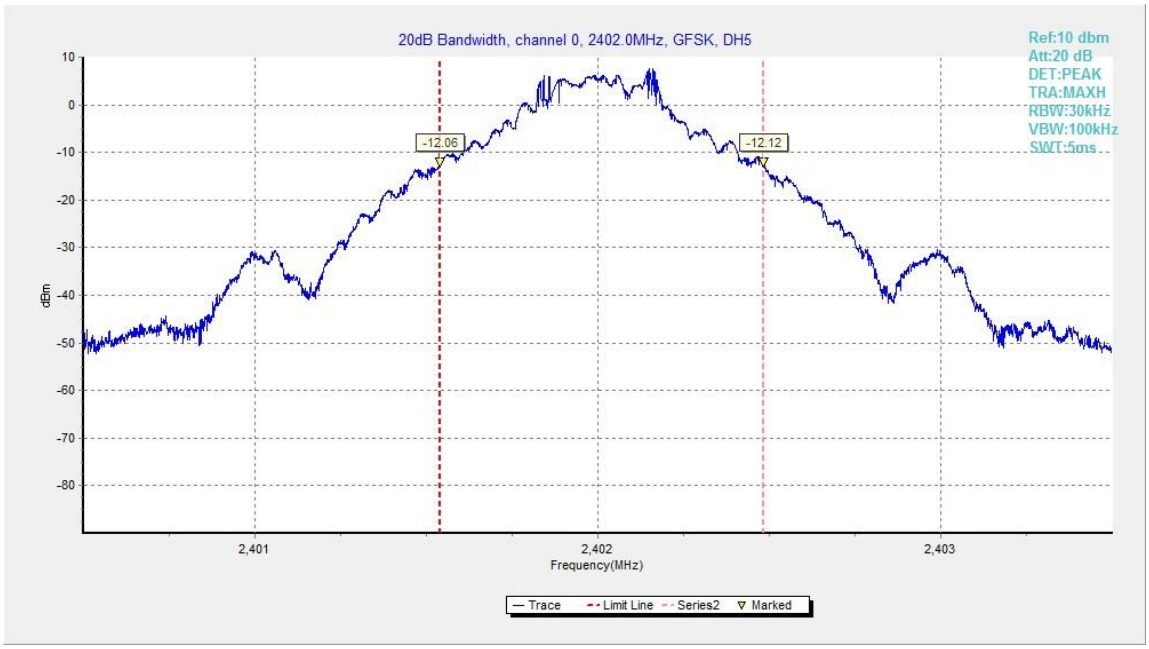


Fig.82. 20dB Bandwidth: GFSK, Channel 0

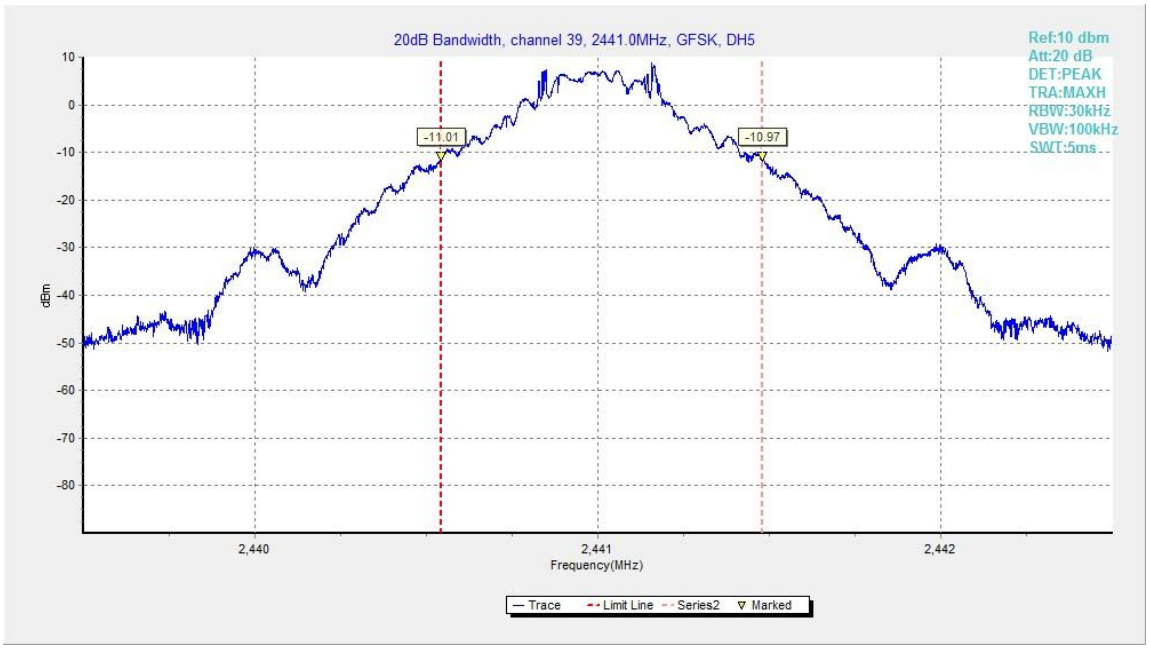


Fig.83. 20dB Bandwidth: GFSK, Channel 39

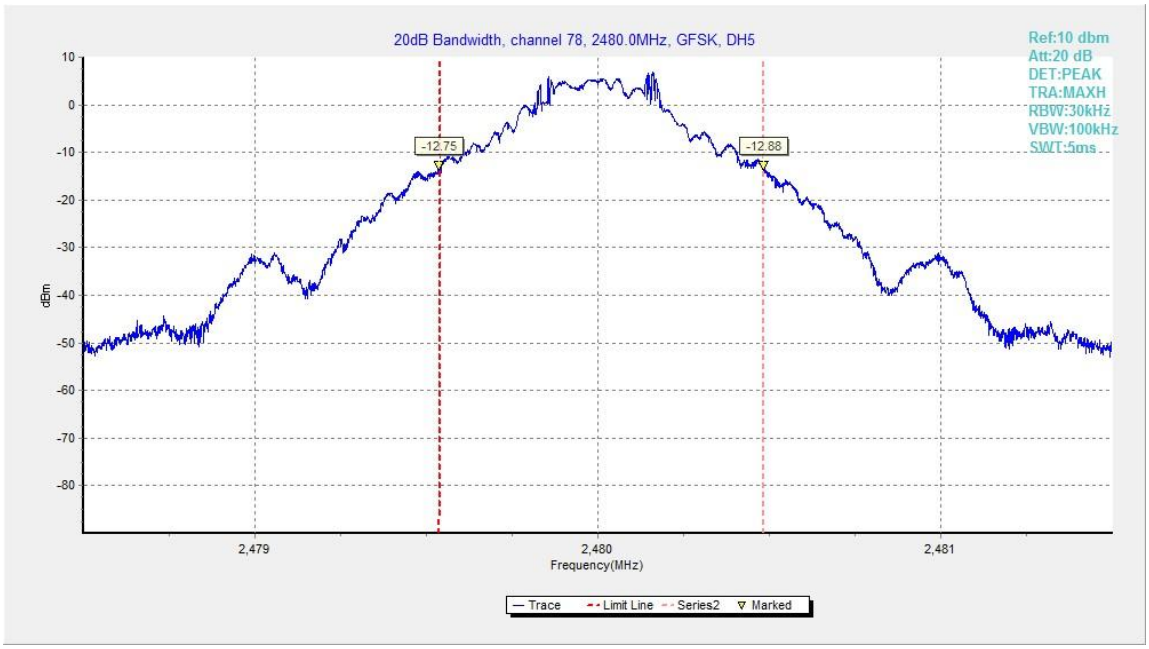


Fig.84. 20dB Bandwidth: GFSK, Channel 78

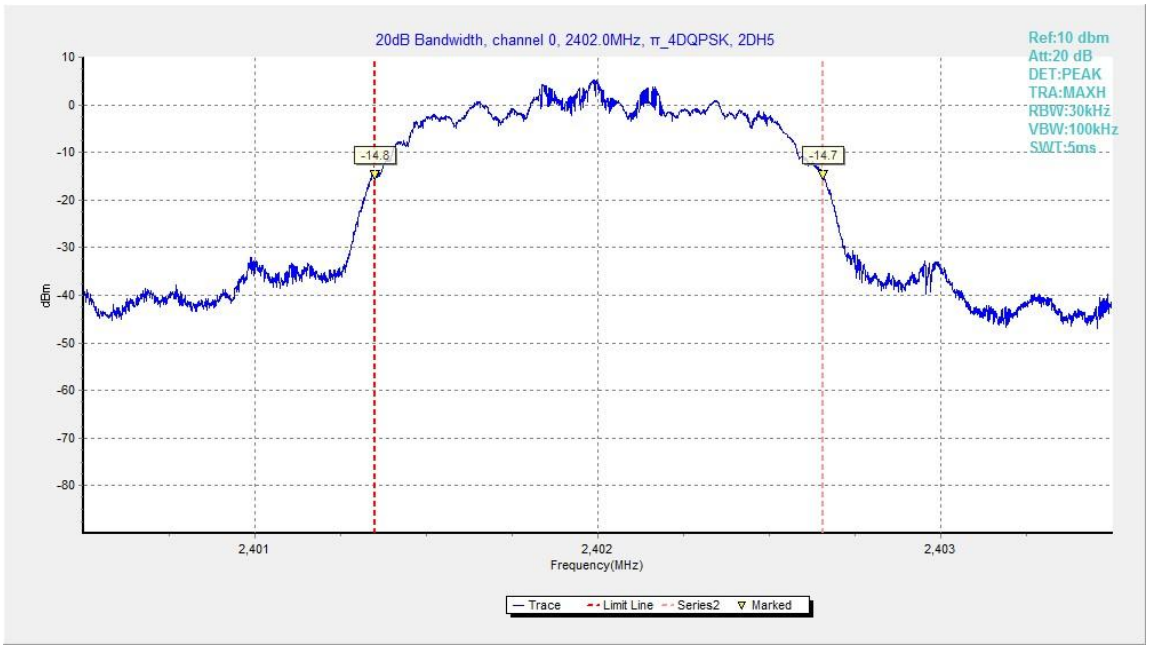


Fig.85. 20dB Bandwidth: π/4 DQPSK, Channel 0

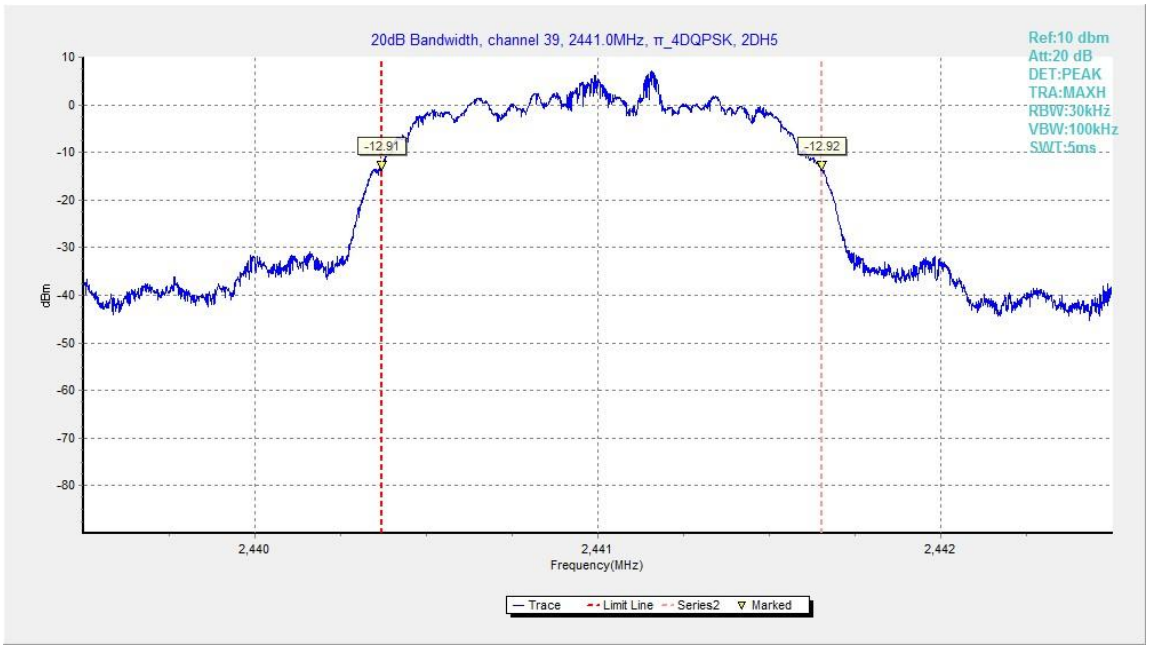


Fig.86. 20dB Bandwidth: π/4 DQPSK, Channel 39

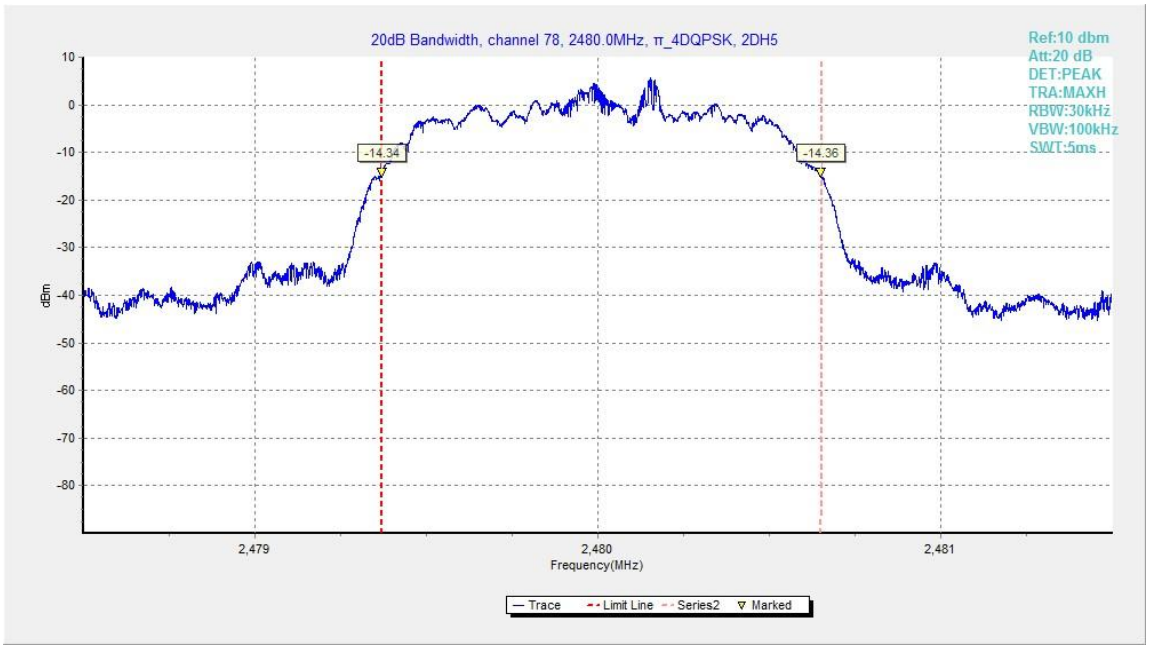


Fig.87. 20dB Bandwidth: π/4 DQPSK, Channel 78

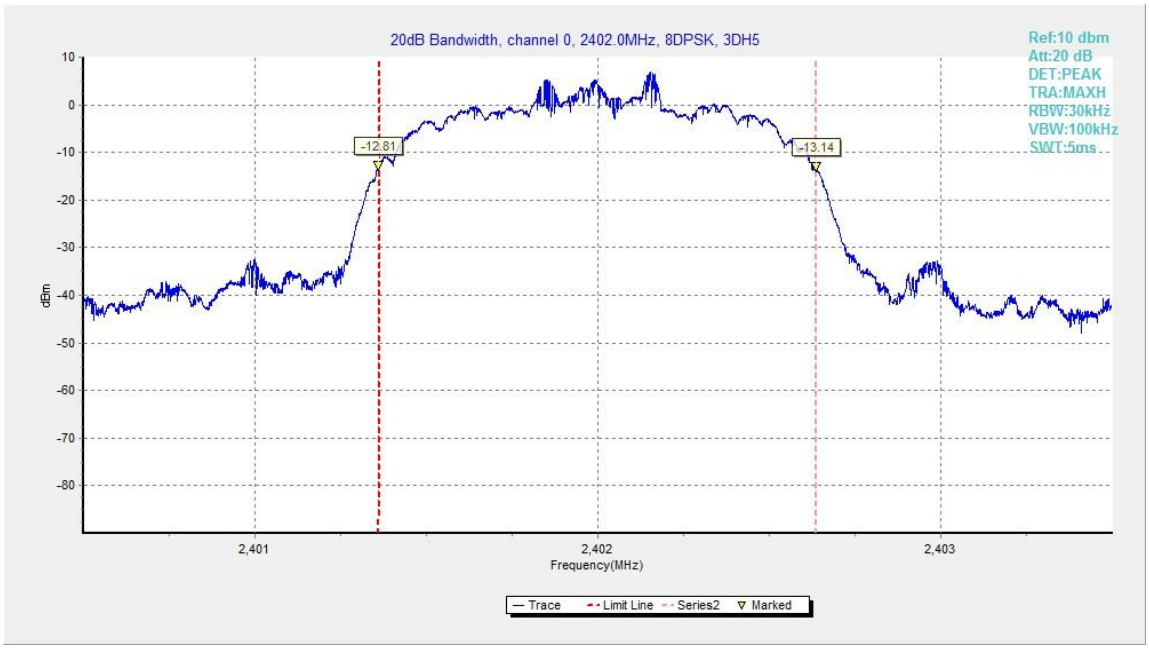


Fig.88. 20dB Bandwidth: 8DPSK, Channel 0

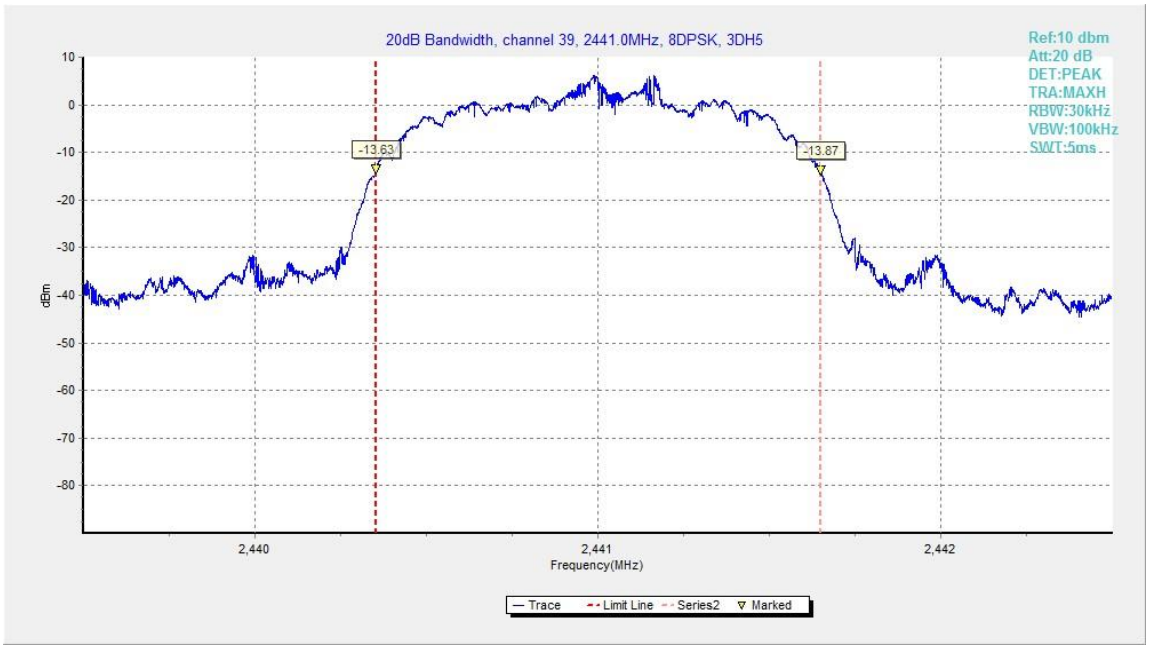


Fig.89. 20dB Bandwidth: 8DPSK, Channel 39

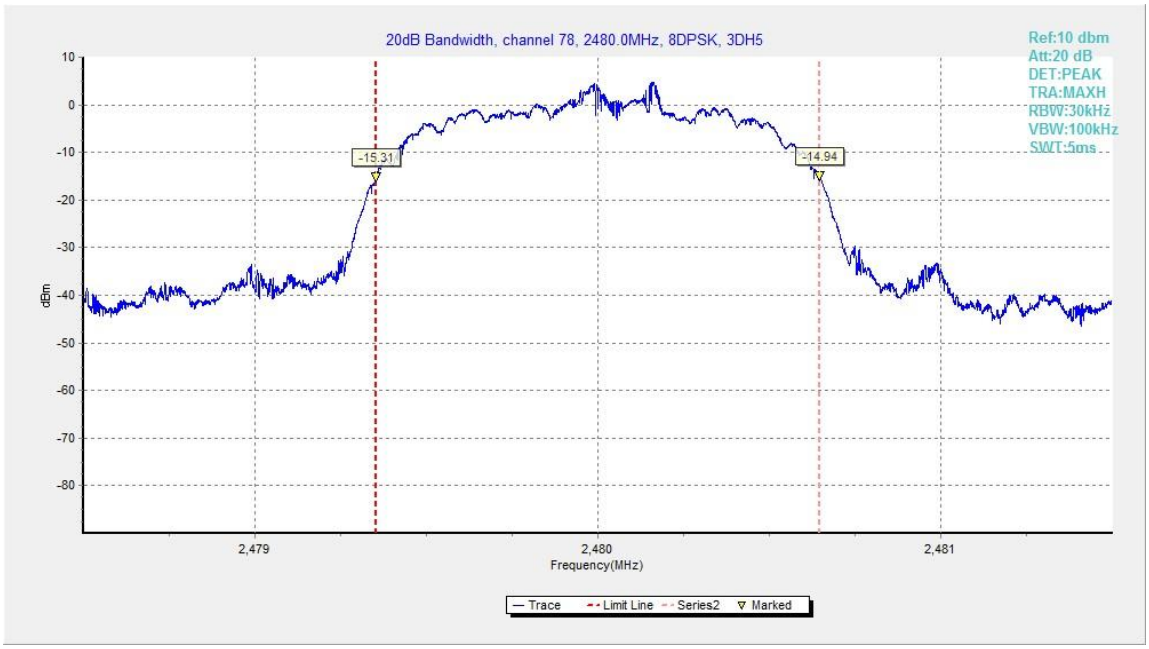


Fig.90. 20dB Bandwidth: 8DPSK, Channel 78

A.9. Carrier Frequency Separation

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

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

- Span = 3MHz
- RBW=300kHz
- VBW=300kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

Search the peak marks of the middle frequency and adjacent channel, then record the separation between them.

* Comment: This limit should be over 25 kHz or (2/3) * 20dB bandwidth, whichever is greater.

Measurement Limit:

Standard	Limit(kHz)
FCC 47 CFR Part 15.247(a)(1)	over 25 kHz or (2/3) * 20dB bandwidth

Measurement Result:

For GFSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.91	983.25	P

For π/4 DQPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.92	971.25	P

For 8DPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.93	997.50	P

Conclusion: PASS

Test graphs as below:

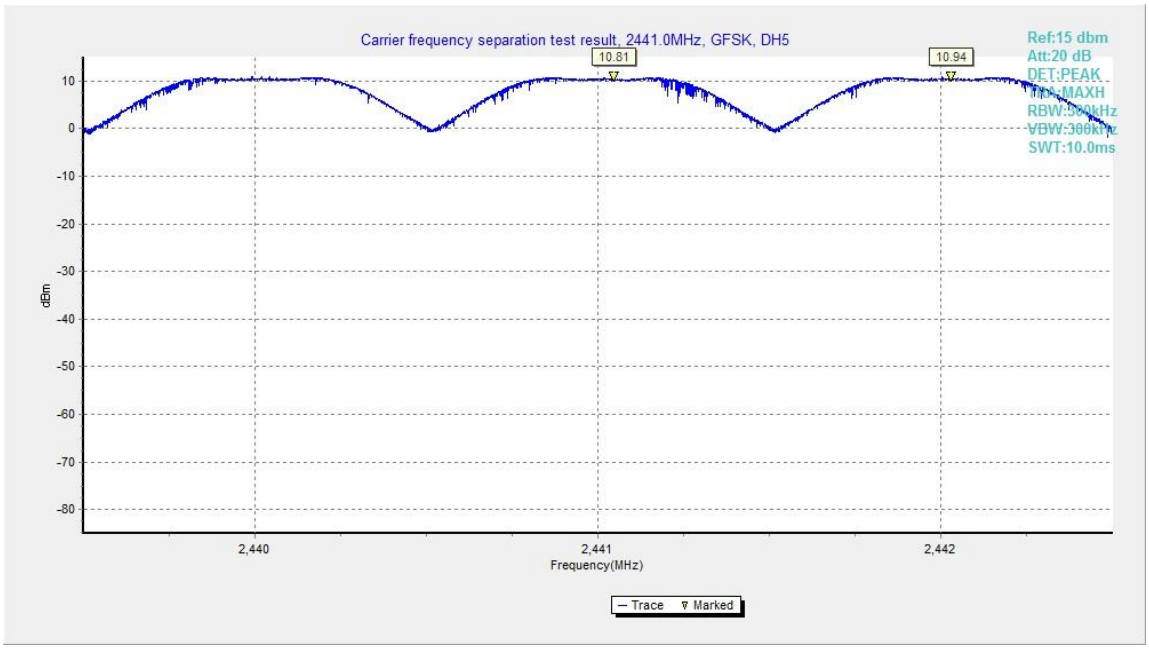


Fig.91. Carrier frequency separation measurement: GFSK, Channel 39

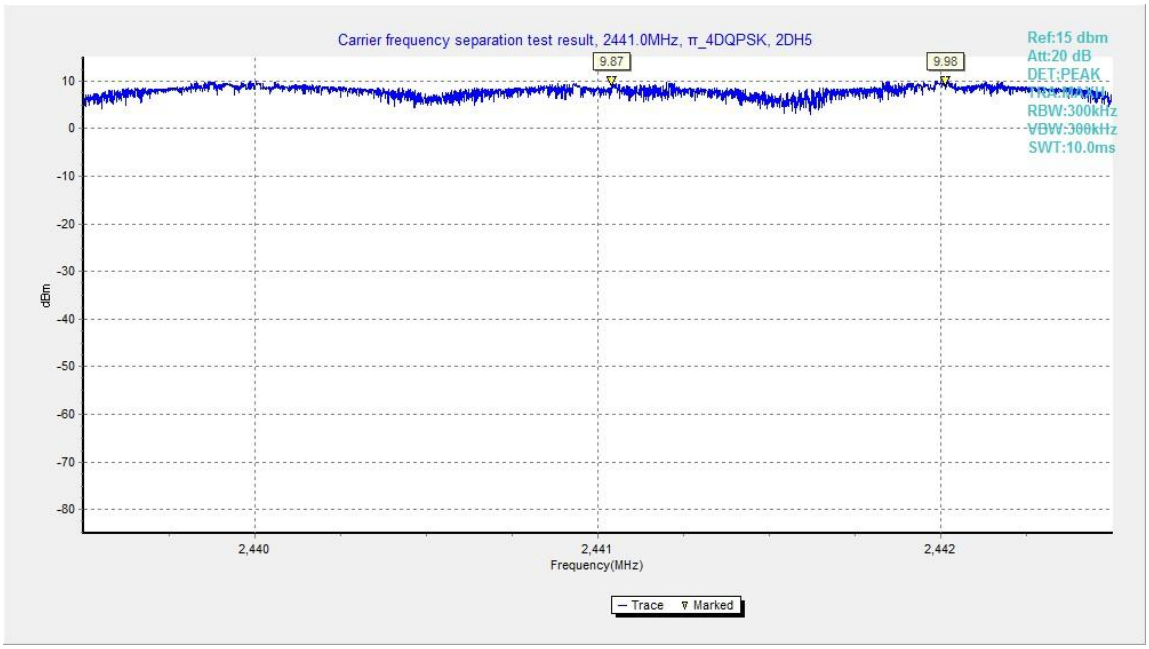


Fig.92. Carrier frequency separation measurement: π/4 DQPSK, Channel 39

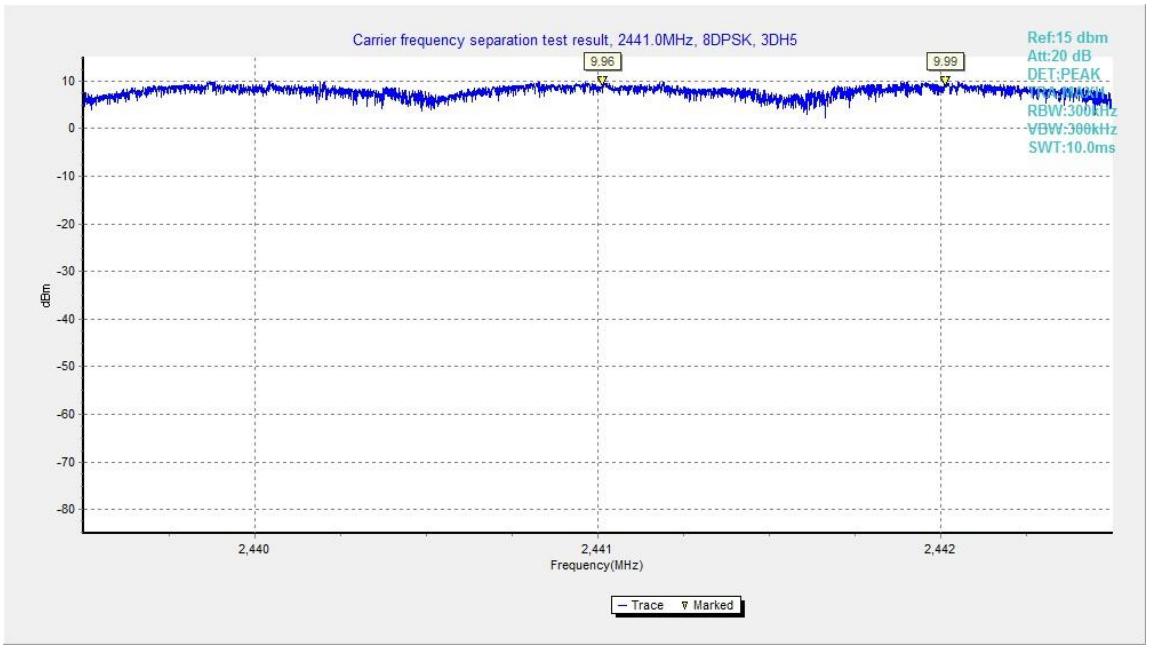


Fig.93. Carrier frequency separation measurement: 8DPSK, Channel 39

A.10. 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		

Forπ/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:

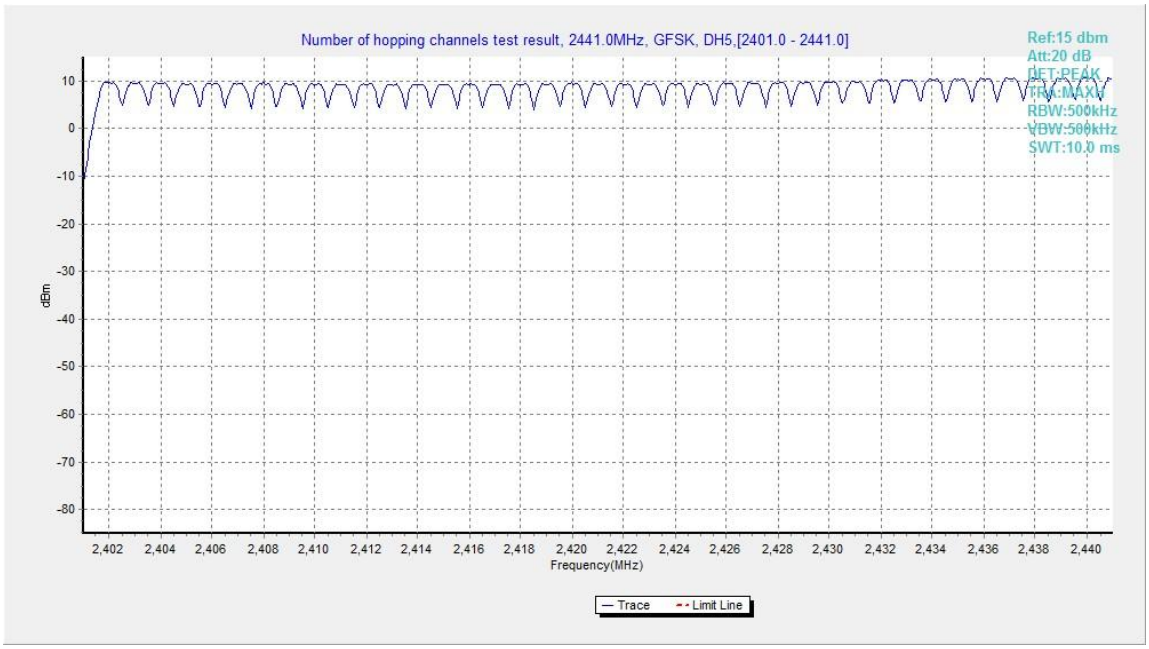


Fig.94. Number of hopping frequencies: GFSK, Channel 0 - 39

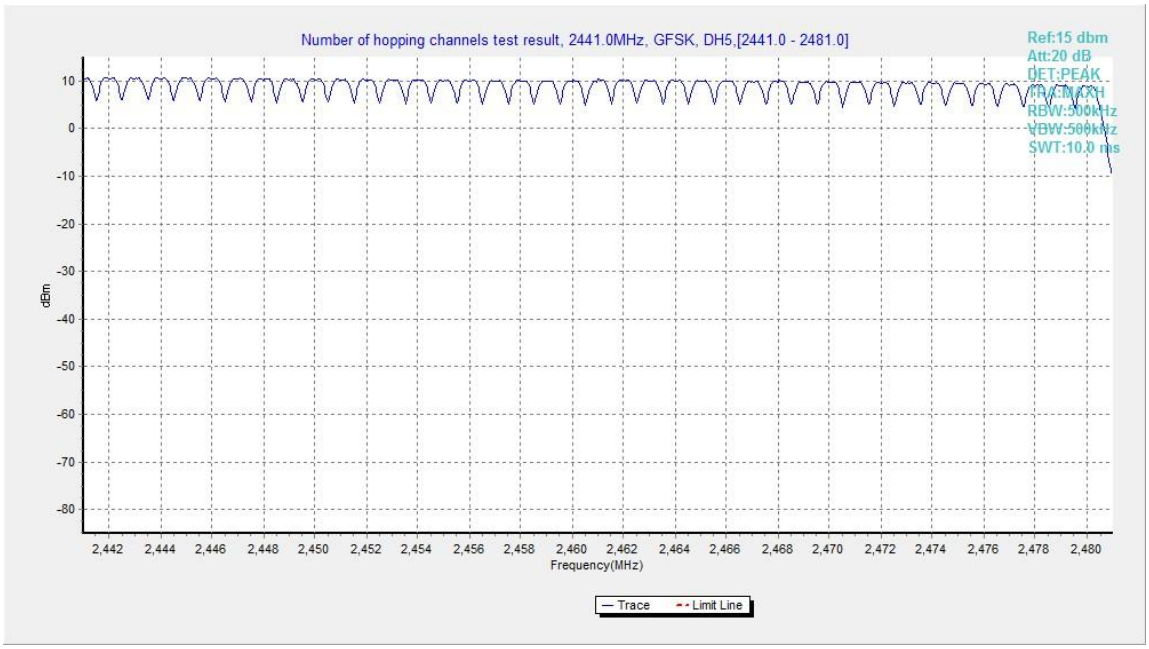


Fig.95. Number of hopping frequencies: GFSK, Channel 40 - 78

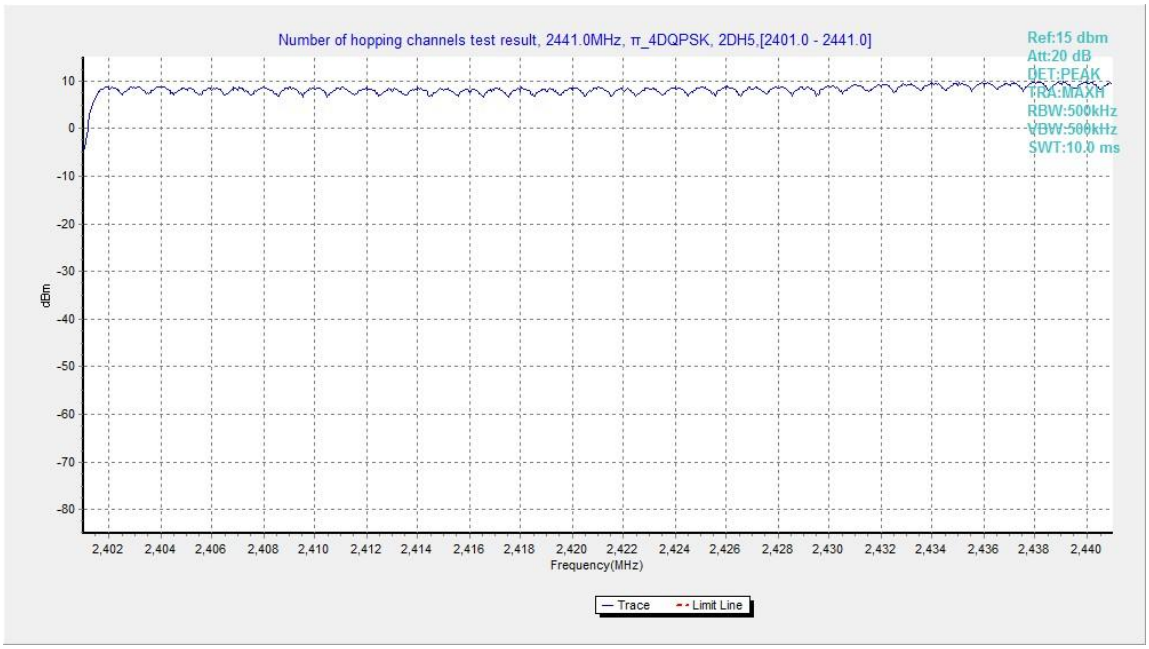


Fig.96. Number of hopping frequencies: π/4 DQPSK, Channel 0 - 39

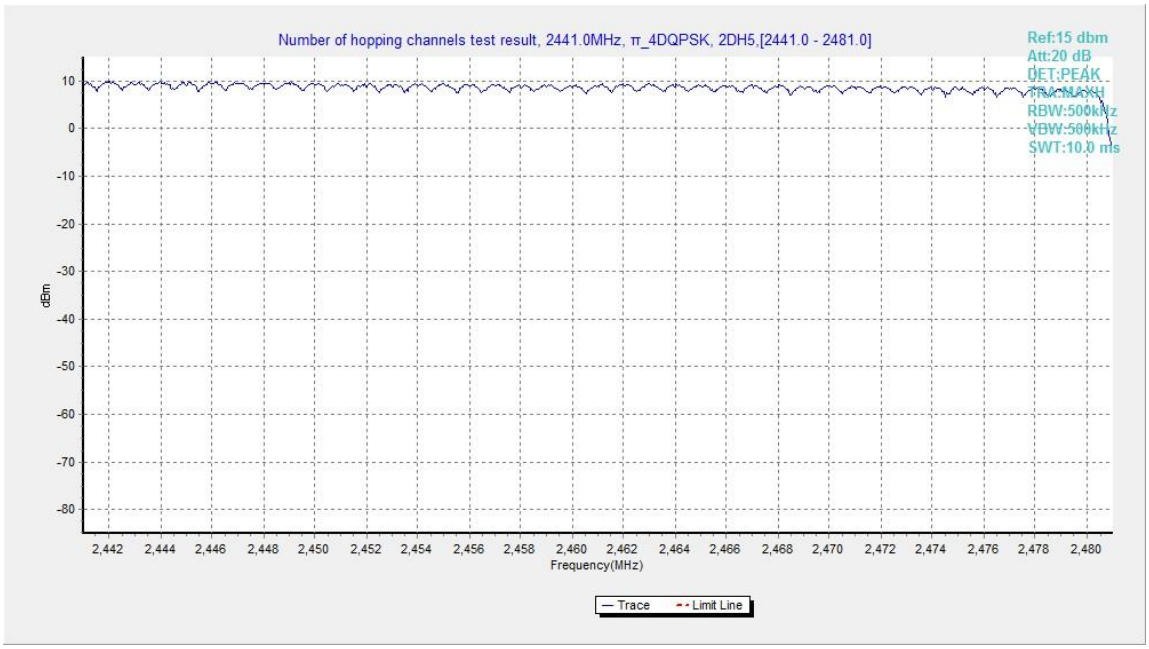


Fig.97. Number of hopping frequencies: π/4 DQPSK, Channel 40 - 78

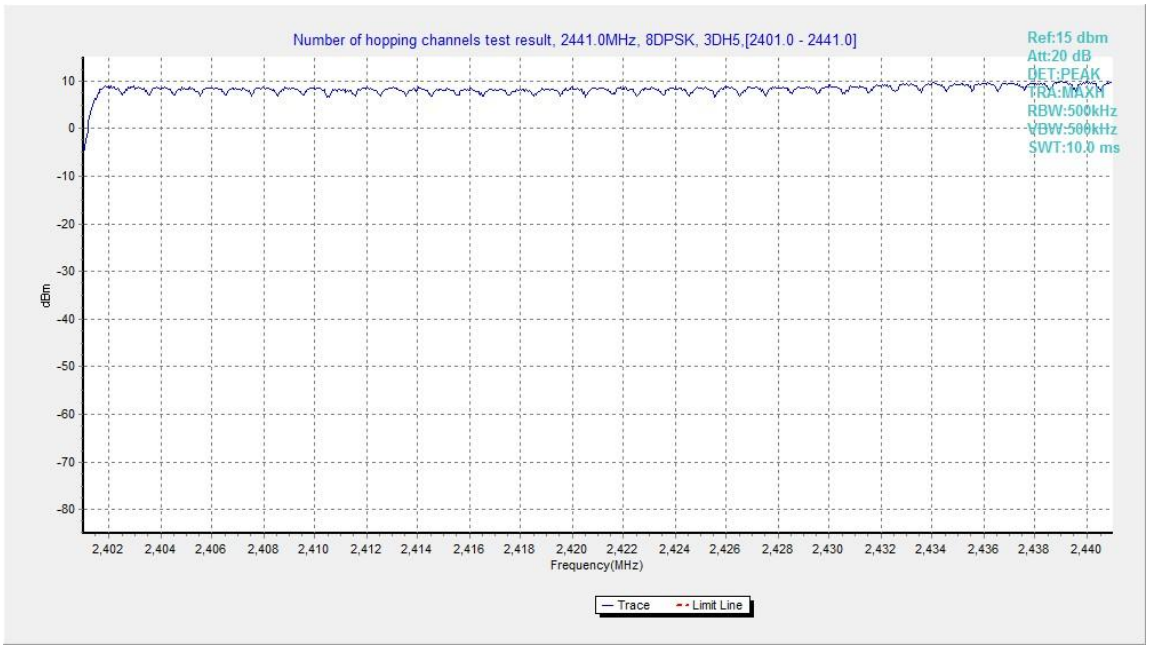


Fig.98. Number of hopping frequencies: 8DPSK, Channel 0 - 39

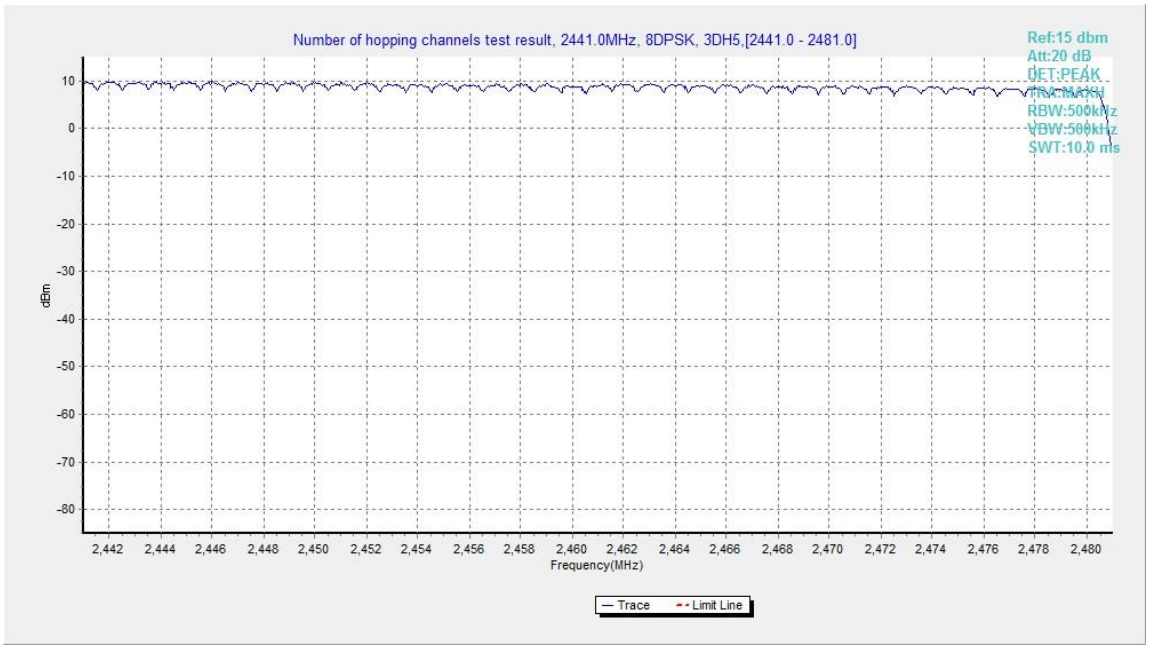


Fig.99. Number of hopping frequencies: 8DPSK, Channel 40 - 78

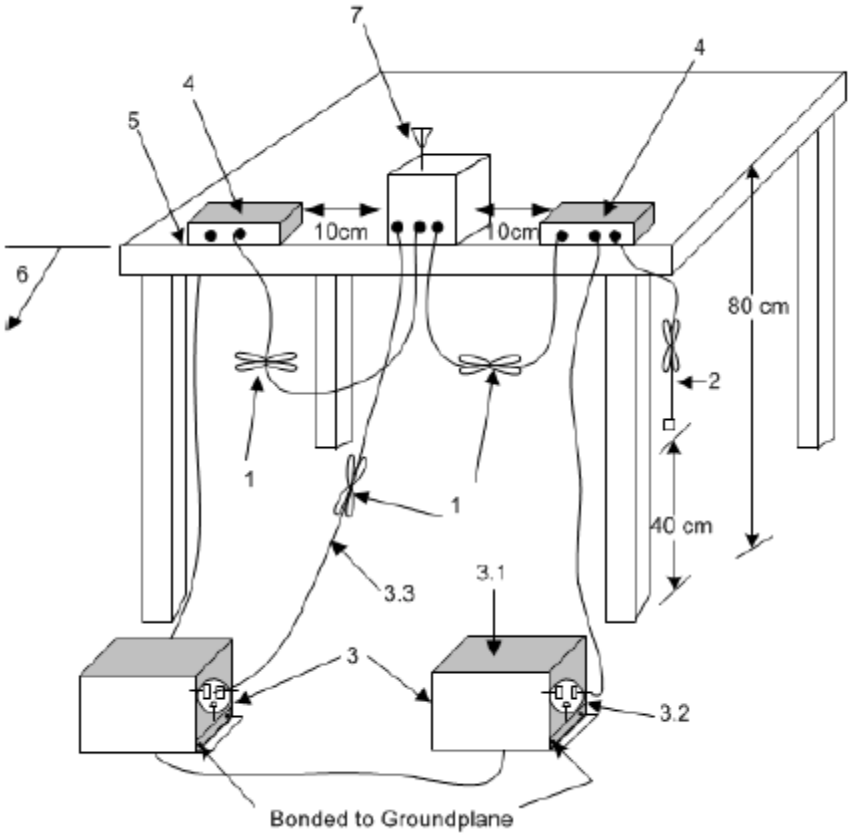
A.11. AC Powerline Conducted Emission

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

Setup:

A stand-alone EUT shall be placed in the center along the back edge of the tabletop. For multiunit tabletopsystems, the EUT shall be centered laterally (left to right facing the tabletop) on the tabletop and its rearshall be flush with the rear of the table.

Accessories that are part of an EUT system tested on a tabletop shall be placed in a test arrangement on oneor both sides of the host with a 10 cm separation between the nearest points of the cabinets.The rear of the host and accessories shall be flush with the back of the supporting tabletop unless thatwould not be typical of normal use. If more than two accessories are present, then an equipment testarrangement shall be chosen that maintains 10 cm spacing between cabinets unless the equipment isnormally located closer together.



Exploratory ac power-line conducted emission measurements

Exploratory measurements shall be used to identifythe frequency of the emission that has the highest amplitude relative to the limit by operating the EUT in arange of typical modes of operation, cable positions, and with a typical system equipment configuration andarrangement. For each mode of operation and for each ac power current-carrying conductor, cablemanipulation shall be performed within the range of likely configurations. For this measurement or seriesof measurements, the frequency spectrum of interest shall be monitored looking for the emission that hasthe highest amplitude relative to the limit. Once that emission is found for each current-carrying conductorof each power cord associated with the EUT (but not the cords associated with non-EUT

equipment in theoverall system), the one configuration and arrangement and mode of operation that produces the emissionclosest to the limit over all of the measured conductors shall be recorded.

Final ac power-line conducted emission measurements

Based on the exploratory tests of the EUT, the one EUT cable configuration andarrangement and mode of operation that produced the emission with the highest amplitude relative to thelimit is selected for the final measurement, while applying the appropriate modulating signal to the EUT. If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements areperformed. The final test on all current-carrying conductors of all of the power cords to the equipment thatcomprises the EUT (but not the cords associated with other non-EUT equipment in the system) is thenperformed for the full frequency range for which the EUT is being tested for compliance without furthervariation of the EUT arrangement, cable positions, or EUT mode of operation. If the EUT is composed ofequipment units that have their own separate ac power connections (e.g., floor-standing equipment withindependent power cords for each shelf that are able to connect directly to the ac power network), then eachcurrent-carrying conductor of one unit is measured while the other units are connected to a second (ormore) LISN(s). All units shall be measured separately. If a power strip is provided by the manufacturer, tosupply all of the units making up the EUT, only the conductors in the power cord of the power strip shall bemeasured.

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Measurement Result and limit:

EUT ID: EUT1

Bluetooth (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.A.11.1	Fig.A.11.2	**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		
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.A.11.1	Fig.A.11.2	**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

Bluetooth (Quasi-peak Limit)

Frequency range (MHz)	**Quasi-peak Limit (dBμV)**	**Result (dBμV)**		**Conclusion**
		with AE3		
		Traffic	**Idle**	
0.15 to 0.5	67 to 56	Fig.A.11.3	Fig.A.11.4	**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 AE3		
		Traffic	**Idle**	
0.15 to 0.5	56 to 46	Fig.A.11.3	Fig.A.11.4	**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:

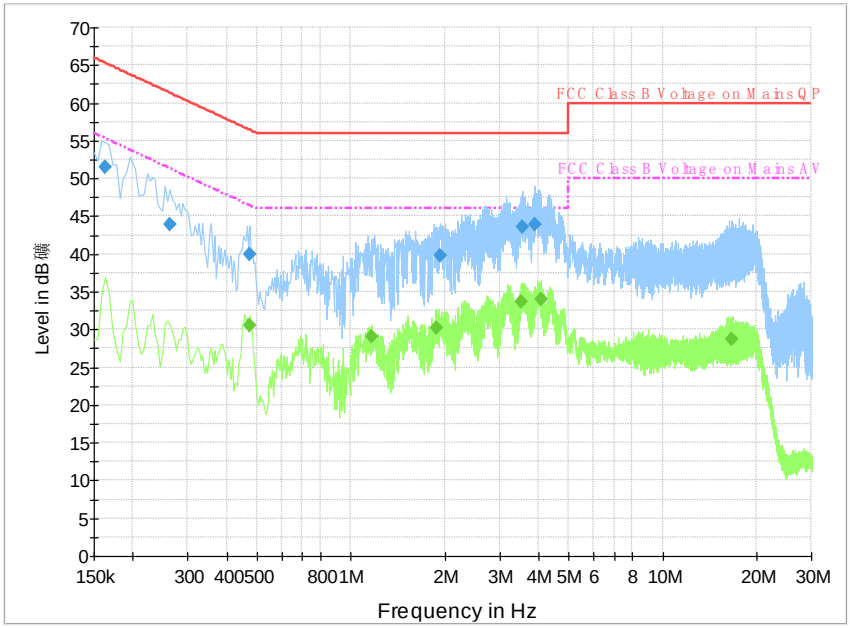


Fig.A.11.1 AC Powerline Conducted Emission- Traffic(with AE2)

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 (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.163500	51.5	1000.0	9.000	On	L1	19.8	13.8	65.3
0.262500	44.0	1000.0	9.000	On	L1	19.8	17.4	61.4
0.474000	39.9	1000.0	9.000	On	L1	19.8	16.5	56.4
1.932000	39.8	1000.0	9.000	On	L1	19.8	16.2	56.0
3.565500	43.6	1000.0	9.000	On	L1	19.8	12.4	56.0
3.889500	44.0	1000.0	9.000	On	L1	19.8	12.0	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.474000	30.6	1000.0	9.000	On	L1	19.8	15.8	46.4
1.167000	29.0	1000.0	9.000	On	L1	19.8	17.0	46.0
1.887000	30.1	1000.0	9.000	On	L1	19.8	15.9	46.0
3.516000	33.7	1000.0	9.000	On	L1	19.8	12.3	46.0
4.074000	34.0	1000.0	9.000	On	L1	19.8	12.0	46.0
16.629000	28.7	1000.0	9.000	On	L1	19.9	21.3	50.0

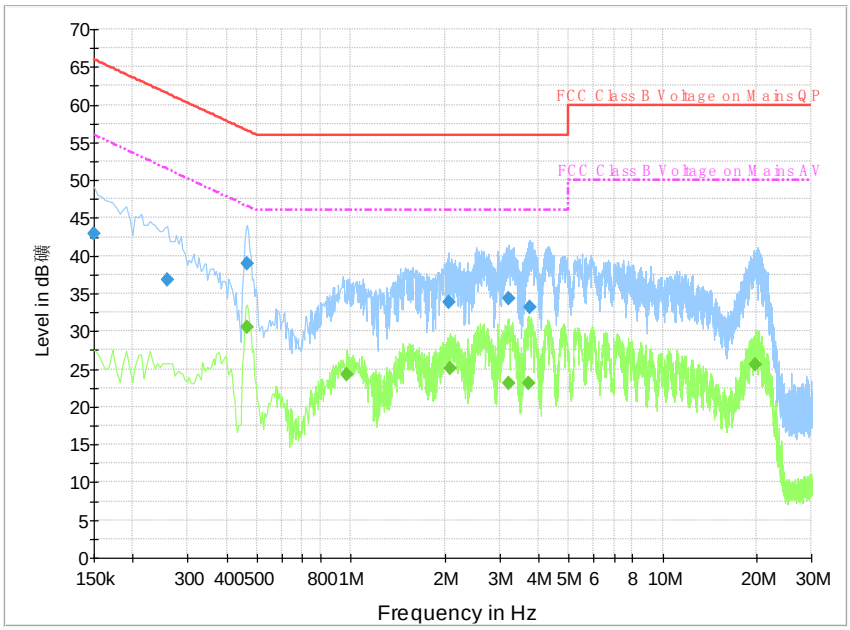


Fig.A.11.2 AC Powerline Conducted Emission-Idle(with AE2)

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 (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.159000	46.2	1000.0	9.000	On	L1	19.8	19.3	65.5
0.465000	39.7	1000.0	9.000	On	L1	19.8	17.0	56.6
1.140000	37.5	1000.0	9.000	On	L1	19.8	18.5	56.0
1.918500	39.5	1000.0	9.000	On	L1	19.8	16.5	56.0
3.498000	43.4	1000.0	9.000	On	L1	19.8	12.6	56.0
3.930000	44.2	1000.0	9.000	On	L1	19.8	11.8	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.465000	30.8	1000.0	9.000	On	L1	19.8	15.8	46.6
1.140000	29.0	1000.0	9.000	On	L1	19.8	17.0	46.0
1.999500	30.2	1000.0	9.000	On	L1	19.8	15.8	46.0
3.574500	34.7	1000.0	9.000	On	L1	19.8	11.3	46.0
4.024500	35.2	1000.0	9.000	On	L1	19.8	10.8	46.0
17.844000	28.5	1000.0	9.000	On	L1	20.0	21.5	50.0

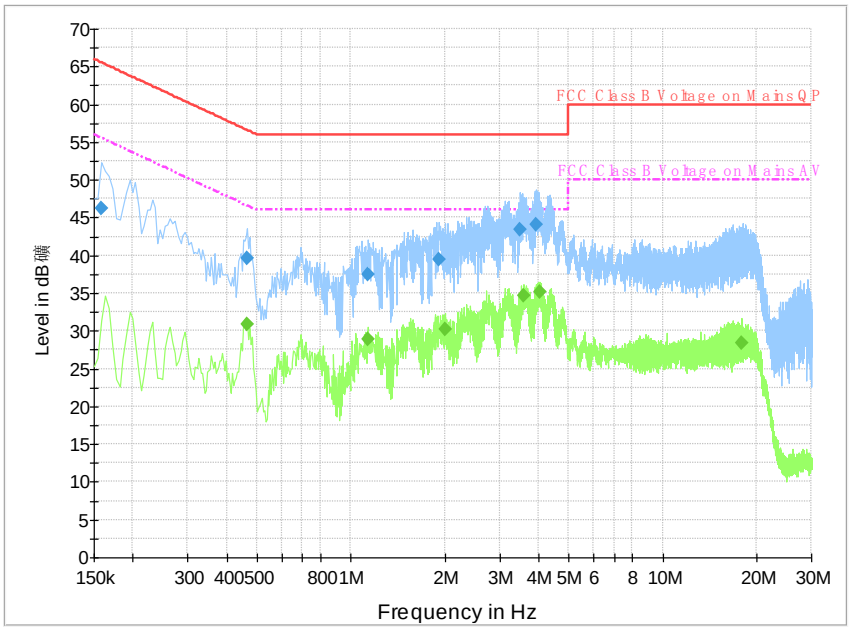


Fig.A.11.3 AC Powerline Conducted Emission- Traffic(with AE3)

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 (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	42.9	1000.0	9.000	On	L1	20.2	23.1	66.0
0.258000	36.8	1000.0	9.000	On	L1	19.8	24.7	61.5
0.465000	39.0	1000.0	9.000	On	L1	19.8	17.6	56.6
2.058000	33.8	1000.0	9.000	On	L1	19.8	22.2	56.0
3.196500	34.3	1000.0	9.000	On	L1	19.8	21.7	56.0
3.754500	33.2	1000.0	9.000	On	L1	19.8	22.8	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.465000	30.6	1000.0	9.000	On	L1	19.8	16.0	46.6
0.969000	24.3	1000.0	9.000	On	L1	19.8	21.7	46.0
2.076000	25.1	1000.0	9.000	On	L1	19.8	20.9	46.0
3.196500	23.1	1000.0	9.000	On	L1	19.8	22.9	46.0
3.727500	23.2	1000.0	9.000	On	L1	19.8	22.8	46.0
19.752000	25.6	1000.0	9.000	On	L1	20.0	24.4	50.0

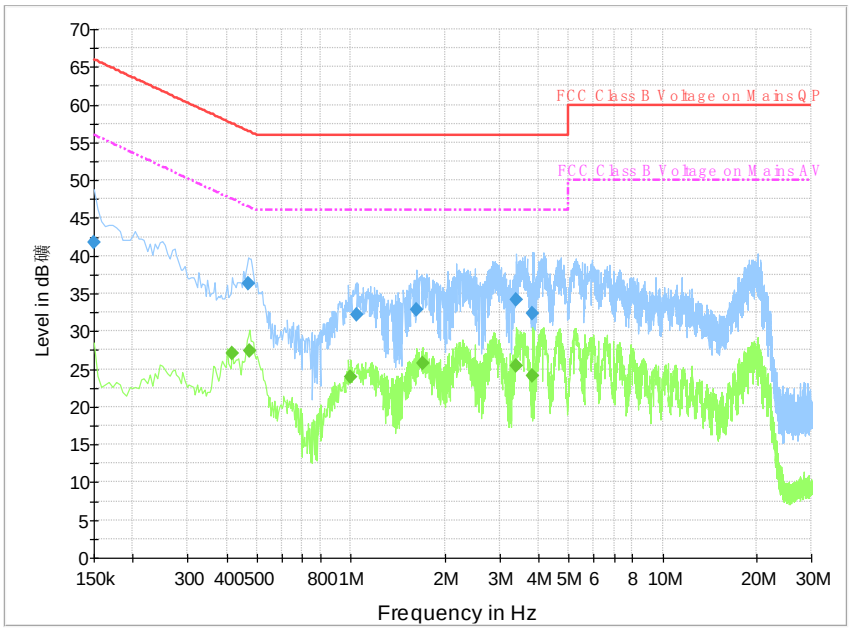


Fig.A.11.4 AC Powerline Conducted Emission-Idle(with AE3)

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 (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	41.8	1000.0	9.000	On	L1	20.2	24.2	66.0
0.469500	36.3	1000.0	9.000	On	L1	19.8	20.3	56.5
1.041000	32.2	1000.0	9.000	On	L1	19.8	23.8	56.0
1.626000	32.8	1000.0	9.000	On	L1	19.8	23.2	56.0
3.403500	34.1	1000.0	9.000	On	L1	19.8	21.9	56.0
3.826500	32.4	1000.0	9.000	On	L1	19.8	23.6	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.415500	27.1	1000.0	9.000	On	L1	19.8	20.4	47.5
0.474000	27.4	1000.0	9.000	On	L1	19.8	19.1	46.4
1.000500	23.9	1000.0	9.000	On	L1	19.8	22.1	46.0
1.693500	25.7	1000.0	9.000	On	L1	19.8	20.3	46.0
3.403500	25.4	1000.0	9.000	On	L1	19.8	20.6	46.0
3.826500	24.2	1000.0	9.000	On	L1	19.8	21.8	46.0

ANNEX B: Accreditation Certificate

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 600118-0

Telecommunication Technology Labs, CAICT
Beijing
China

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Electromagnetic Compatibility & Telecommunications

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2019-09-26 through 2020-09-30
Effective Dates

For the National Voluntary Laboratory Accreditation Program

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